



**FCC Part 1 Subpart I
FCC Part 2 Subpart J
INDUSTRY CANADA RSS 102 ISSUE 4**

RF EXPOSURE REPORT

FOR

OEM CAR HEAD UNIT

MODEL NUMBER: GA-130-COLR-NS

**FCC ID: ACJ-GA-130-COLR
IC: 216B-GA130COLRNS**

REPORT NUMBER: 12U14378-3

**ISSUE DATE: 2012-04-20
REVISION DATE: 2012-05-09**

Prepared for
**PANASONIC AUTOMOTIVE SYSTEMS COMPANY OF AMERICA
776 HWY. 74
PEACHTREE CITY
GA, 30269, USA**

Prepared by
**UNDERWRITERS LABORATORIES
1285 WALT WHITMAN ROAD
MELVILLE, NY 11747, U.S.A.
TEL: (631) 271-6200
FAX: (631) 271-8259**



NVLAP LAB CODE 100255-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	4/20/12	Initial Issue	M. Antola
1	5/9/12	Updated MPE from distance to density at 20cm	B. DeLisi

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. METHODOLOGY	5
3. REFERENCES	5
4. FACILITIES AND ACCREDITATION	5
5. EUT DESCRIPTION	5
6. REQUIREMENTS - LIMITATION OF EXPOSURE	6
6.1. LIMITS.....	6
6.1.1. FCC RULES	6
6.1.2. IC RULES.....	7
6.1.3. LIMITS APPLICABLE TO THE EUT	7
6.2. EQUATIONS.....	8
6.3. RESULTS.....	9

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PANASONIC AUTOMOTIVE SYSTEMS CO. OF AMERICA
776 HWY. 74
PEACHTREE CITY, GA, 30269, USA

EUT DESCRIPTION: OEM CAR HEAD UNIT

MODEL: GA-130-COLR-NS

SERIAL NUMBER: 100184 & 100223

DATE TESTED: 2012-04-06 to 2012-04-18

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 1 SUBPART I & PART 2 SUBPART J (2011)	Pass
INDUSTRY CANADA RSS 102 ISSUE 4 (2010)	Pass

Underwriters Laboratories Inc. calculated the RF Exposure of the above equipment in accordance with the requirements set forth in the above standards, using test results reported in the test report documents referenced below and/or documentation furnished by the applicant. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Inc. based on interpretations of these calculations. The results show that the equipment is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation, as described by the referenced documents. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL By:

Tested By:



Bob DeLisi
Senior Staff Engineer
UL

Mike Antola
Senior Project Engineer
UL

2. METHODOLOGY

All calculations were made in accordance with FCC OET Bulletin 65 Edition 97-01 and IC Safety Code 6.

3. REFERENCES

All Bluetooth measurements were made as documented in test report UL Document 12U14378-1 – FCC IC BLUETOOTH Report for operation in the 2.4 GHz band.

All WLAN (802.11b/g) measurements were made as documented in the test report UL Document 12U14378-2 - FCC IC DTS WLAN Report for operation in the 2.4 GHz band

Output power, Duty cycle and Antenna gain data is excerpted from the applicable test reports.

Antenna gain data is excerpted from product documentation provided by the applicant.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 1285 Walt Whitman Rd. Melville, NY 11747, USA.

UL Melville is accredited by NVLAP, Laboratory Code 100255-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/1002550.htm>.

5. EUT DESCRIPTION

The EUT is a Bluetooth and 802.11b/g transceiver Model number CQ-XG01E0GD.

The radio module is manufactured by Panasonic Corporation of North America.

Other details regarding the EUT are documented in the applicable test reports and product documentation.

6. REQUIREMENTS - LIMITATION OF EXPOSURE

6.1. LIMITS

6.1.1. FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) 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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
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

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

6.1.2. IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

**Table 5
 Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)**

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m ²)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	280/ <i>f</i>	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 / <i>f</i> ^{1.2}
150 000–300 000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616 000 / <i>f</i> ^{1.2}

* Power density limit is applicable at frequencies greater than 100 MHz.

- Notes:**
1. Frequency, *f*, is in MHz.
 2. A power density of 10 W/m² is equivalent to 1 mW/cm².
 3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

6.1.3. LIMITS APPLICABLE TO THE EUT

For operation in the PCS band, the 2.4 GHz band and the 5 GHz bands, from FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm² and from IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m².

6.2. EQUATIONS

Power density is given by:

$$S = \text{EIRP} / (4 * \text{Pi} * \text{D}^2)$$

where

S = Power density in W/m²

EIRP = Equivalent Isotropic Radiated Power in W

D = Separation distance in m

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \text{Pi} * S))$$

where

D = Separation distance in m

EIRP = Equivalent Isotropic Radiated Power in W

S = Power density in W/m²

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

6.3. RESULTS

MPE distance = 20 cm

Band	Mode	FCC Limit (mW/cm ²)	IC Limit (W/m ²)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	Source Based EIRP (mW)	Power Density mW/cm ²	Power Density W/cm ²
2.4 GHz	Bluetooth	1.0	10.0	1.97	4.00	100	4.0	0.000008	0.007870

The device operates above 1.5 GHz with a maximum EIRP less than or equal to 5 Watts as a mobile device with a minimum separation distance of 20 cm, therefore it is exempt from routine RF Exposure Evaluation.

MPE distance = 20 cm

Band	Mode	FCC Limit (mW/cm ²)	IC Limit (W/m ²)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	Source Based EIRP (mW)	Power Density mW/cm ²	Power Density W/cm ²
2.4 GHz	WLAN	1.0	10.0	24.15	4.00	100	653.1	0.0013	1.30

The device operates above 1.5 GHz with a maximum EIRP less than or equal to 5 Watts as a mobile device with a minimum separation distance of 20 cm, therefore it is exempt from routine RF Exposure Evaluation.

CO-LOCATED RESULTS

MPE distance = 20 cm, limit is the same for all bands

Band	Mode	IC Limit (W/m ²)	FCC Limit (mW/cm ²)	Output Power (dBm)	Antenna Gain (dBi)	EIRP (W)	Duty Cycle (%)	Corrd EIRP (W)	Power Density mW/cm ²	Power Density W/cm ²
2.4 GHz	Bluetooth			1.97	4.00	0.0040	100	0.0040		
2.4 GHz	WLAN			24.15	4.00	0.65	100	0.6531		
Combined		10.00	1.000					0.66	0.001308	1.307891

END OF REPORT