

## RF EXPOSURE EVALUATION

### EUT Specification

<b>EUT</b>	RV Propane Gas Detector
<b>Model Number</b>	ICGD-2023
<b>FCC ID</b>	2A3BE- ICGD-2023
<b>Antenna gain (Max)</b>	1.37dBi
<b>Operation Frequency</b>	BT:2.402-2.480GHz WLAN: 2.412GHz ~ 2.462GHz
<b>Input Rating</b>	DC 12V
<b>Max. output power</b>	BT: -0.08 dBm WLAN: IEEE 802.11b: 15.91dBm IEEE 802.11g: 6.25 dBm IEEE 802.11n-HT20: 6.04 dBm IEEE 802.11n-HT40: 4.96 dBm

### Test Requirement:

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

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
<b>(A) Limits for Occupational/Control Exposures</b>				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
<b>(B) Limits for General Population/Uncontrol Exposures</b>				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

### 11.1 Friis transmission 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= Numeric gain of the antenna relative to isotropic antenna

Pi=3.1416

R= distance between observation point and center of the radiator in cm=20cm

Pd the limit of MPE, 1mW/cm<sup>2</sup>. If we know the maximum gain of the antenna total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

### 11.2 Measurement Result

Antenna gain: 1.37 dBi

BT:

Mode	Channel Freq. (MHz)	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain (Numeric)	Evaluation result (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
GFSK	2402	-0.08	0±1	1	1.371	0.390497	1
GFSK	2440	-0.17	0±1	1	1.371	0.393574	1
GFSK	2480	-1.77	0±1	1	1.371	0.396787	1

WIFI:

Operating Mode	Test Channel	Tune up tolerance (dBm)	Max tune up conducted power (dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
802.11b	1	16±1	17	50.119	1.37	1.371	0.013670	1
	6	15±1	16	39.811	1.37	1.371	0.010858	1
	11	15±1	16	39.811	1.37	1.371	0.010858	1
802.11g	1	6±1	7	5.012	1.37	1.371	0.001367	1
	6	6±1	7	5.012	1.37	1.371	0.001367	1
	11	5±1	6	3.981	1.37	1.371	0.001086	1
802.11n (HT20)	1	6±1	7	5.012	1.37	1.371	0.001367	1
	6	6±1	7	5.012	1.37	1.371	0.001367	1
	11	5±1	6	3.981	1.37	1.371	0.001086	1
802.11n (HT40)	3	5±1	6	3.981	1.37	1.371	0.001086	1
	6	4±1	5	3.162	1.37	1.371	0.000863	1
	9	4±1	5	3.162	1.37	1.371	0.000863	1

Signature:

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