

Test Report

Client Information:

Applicant: Onward Manufacturing Company Limited
Applicant add.: 585 Kumpf Drive, Waterloo, Ontario, Canada, N2V 1K3

EUT Information:

EUT Name: wireless food thermometer
Model No.: ML0212
Brand Name: N/A

Prepared By:

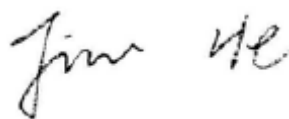
Asia Institute Technology (Dongguan) Limited
Add. : No.6 Binhe Road, Tianxin Village, Huangjiang,
Dongguan, Guangdong, China.
Date of Receipt: Oct. 8, 2009 Date of Test: Oct.8. ~ Nov.10, 2009
Date of Issue: Nov.10, 2009 Test Result: **Pass**

Test procedure used: ANSI C63.4-2003,RSS-Gen Issue 2

This device described above has been tested by Asia Institute Technology (Dongguan) Limited, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

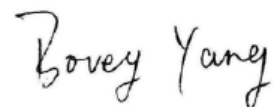
*This test report must not be used by the client to claim product endorsement by any agency of the U.S. government.

Reviewed by:



Test director

Approved by:



Technical director

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2 Test Summary

2.1 Compliance with FCC Part 15 subpart C/RSS-Gen/RSS-210

Test	RSS rule part	FCC rule part	Result
Conduction Emissions	RSS-gen 7.2.2	Section 15.207	N/A
Antenna Requirement	N/A	Section 15.203	PASS
Radiated Emissions	RSS-210 Table2/5	Section 15.231	PASS
Occupied Bandwidth	RSS-210A1.1.3	Section 15.231	PASS
Deactivation Time	RSS-210A1.1.5	Section 15.231	PASS

2.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, The following measurements uncertainty Level have estimated based on ANSI C63.4:2003, the maximum value of the uncertainty as below

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	Radiated Emission Test	$\pm 3.57\text{dB}$

3 Test Facility

The test facility is recognized, certified or accredited by the following organizations:

.FCC- Registration No: 248337

The 3m Semi-Anechoic Chamber, 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dong guan) Limited have been registered by Federal Communications Commission (FCC) on Dec.07, 2006.

.Industry Canada(IC)-Registration No: IC6819A-1 & IC6819A-2

The 3m Semi-Anechoic Chamber and 3m/10m Open Area Test Site of Asia Institute Technology (Dongguan) Limited have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing on Nov.07, 2006.

.VCCI- Registration No: R-2482 & C-2730

The 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dongguan) Limited have been registered by Voluntary Control Council for Interference on Jan.24, 2007.

.TUV Rhineland

Asia Institute Technology (Dongguan) Limited has been assessed on Jan.16, 2007 that it can carry out EMC tests by order and under supervision of TUV Rhineland.

.ITS- Registration No: TMPSHA031

Asia Institute Technology (Dongguan) Limited has been assessed and included in Intertek Shanghai TMP Program regarding Laboratory facilities and test equipment on Nov.10, 2006.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

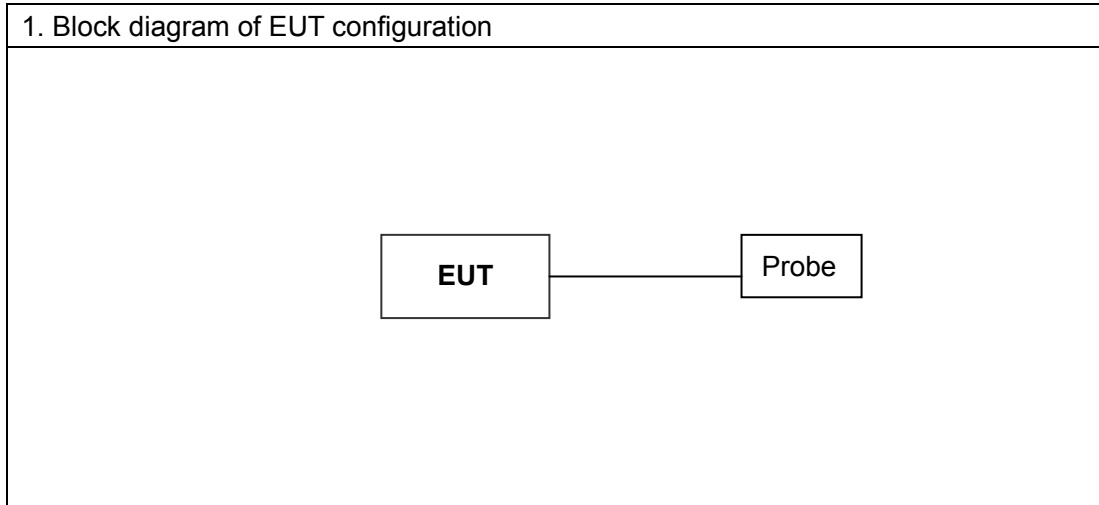
4 General Information

4.1 General Description of EUT

Manufacturer:	Onward Manufacturing Company Limited
Manufacturer Address:	585 Kumpf Drive, Waterloo, Ontario, Canada, N2V 1K3
EUT Name:	wireless food thermometer
Model No:	ML0212
Operation frequency:	433.92MHz
Channel Number:	1
AntennaType:	Printed on PCB
Brand Name:	N/A
Serial No:	N/A
Power Supply Range:	DC 3V
Power Supply:	DC 3V
Power Cord:	N/A
Signal Cable:	Probe line:0.8m/unshielded/detachable/without ferrite core
Description of Channel:	
Channel No.	Frequency(MHz)
1	433.92

4.2 Description of Test conditions

- (1) EUT was tested in normal configuration (Please See following Block diagram)



- (2) E.U.T. test conditions:

15.31(e) :For intentional radiators, measurements of the variation of the input power or the adiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

- (3) Test frequencies:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

- (4) Frequency range of radiated measurements:

According to the 15.33, The test range will be up to the tenth harmonic of the highest fundamental frequency

4.3 Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	signal cable
1	N/A	N/A	N/A	N/A	N/A	N/A

5 Equipments List for All Test Items

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	ADVANTEST	R3182	150900201	2009.04.17	2010.04.16
2	EMI Measuring Receiver	Schaffner	SCR3501	235	2009.04.08	2010.04.07
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2009.09.08	2010.03.07
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2009.04.08	2010.04.07
5	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2009.07.15	2010.07.14
6	Broadband Horn Antenna	SCHWARZBECK	BBHA9120A	451	2009.07.15	2010.07.14
7	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2009.09.08	2010.03.07
8	EMI Test Receiver	R&S	ESCI	100124	2008.12.29	2009.12.28
9	LISN	Kyoritsu	KNW-242	8-837-4	2009.04.08	2010.04.07
10	LISN	Kyoritsu	KNW-407	8-1789-3	2009.04.08	2010.04.07
11	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2009.09.08	2010.03.07

6 Test Result

6.1 Antenna Requirement

6.1.1 Standard requirement

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

6.1.2 EUT Antenna

The antenna is integrated on the main PCB and no consideration of replacement.

6.2 Conduction Emissions Measurement

6.2.1 limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: Decreases with the logarithm of the frequency.

6.2.2 Test procedure

EUT was placed upon a wooden test table 0.8m above the horizontal metal reference plane and 0.4m from the vertical ground plane, and it was connected to an AMN. The closest distance between the boundary of the EUT and the surface of the AMN is 0.8m. All peripherals were connected to another AMN, and placed at a distance of 10cm from each other. A spectrum and receiver was connected to the RF output port of the AMN. Both average and quasi-peak value were detected.

6.2.3 Test result

Cause the EUT only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

Measurements to demonstrate compliance with the conducted limits are not required for devices

6.3 Radiated Emissions Measurement

6.3.1 Limit

Fcc part15.231 (e) the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of fundamental (microvolts/meter)	Field Strength of Unwanted Emissions (microvolts/meter)
40.66 - 40.70	1,000	100
70 - 130	500	50
130 - 174	500 to 1,500 **	50 to 1,50 **
174 - 260	1,500	1,50
260 - 470	1,500 to 5,000 **	1,50 to 5,00 **
Above 470	5,000	5,00

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3 meters = $22.72727(F) - 2454.545$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $16.6667(F) - 2833.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in 93 Section 15.209, whichever limit permits a higher field strength.

Frequency of Emission (MHz)	Field Strength		Measurement Distance (meters)
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

6.3.2 Test procedure

EUT was placed upon a wooden test table which was placed on the turn table 0.8m above the horizontal metal ground plane, and operating in the mode as mentioned above. A receiving antenna was placed 3m away from the EUT. During testing, turn around the turn table and move the antenna from 1m to 4m to find the maximum field-strength reading. All peripherals were placed at a distance of 10cm between each other. Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

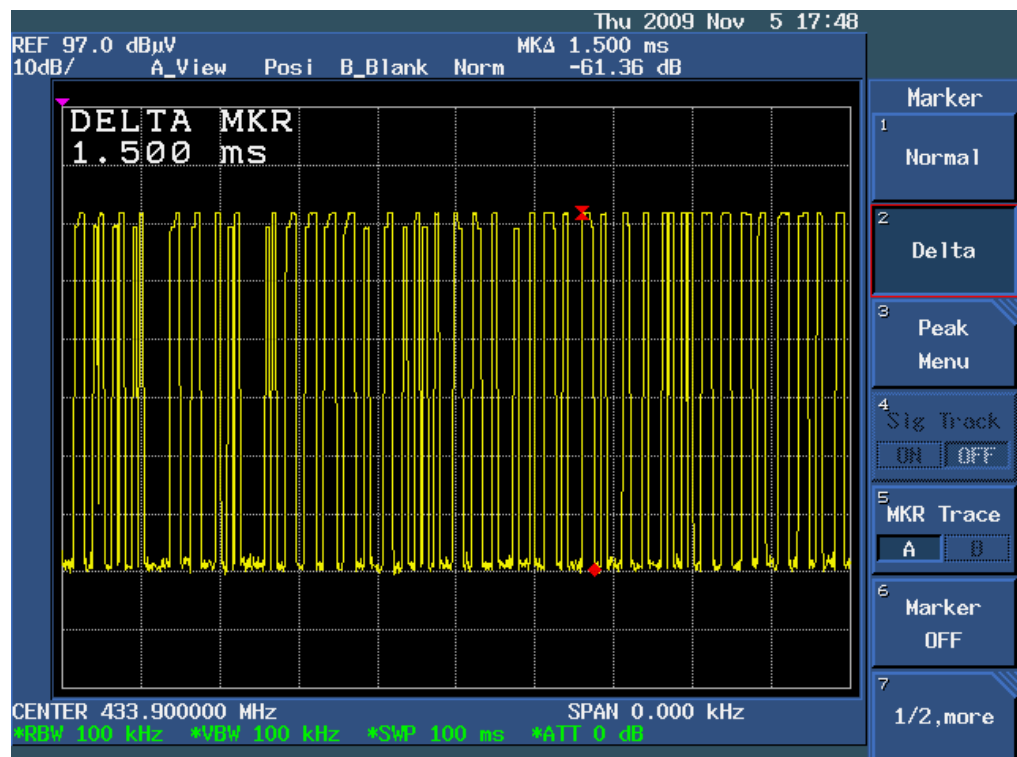
And according 15.35(a) On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified. The specifications for the measuring instrument using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Interference (CISPR) of the International Electrotechnical Commission. As an alternative to CISPR quasi-peak measurements, the responsible party, at its option, may demonstrate compliance with the emission limits using measuring equipment employing a peak detector function, properly adjusted for such factors as pulse desensitization, as long as the same bandwidths as indicated for CISPR quasi-peak measurements are employed.

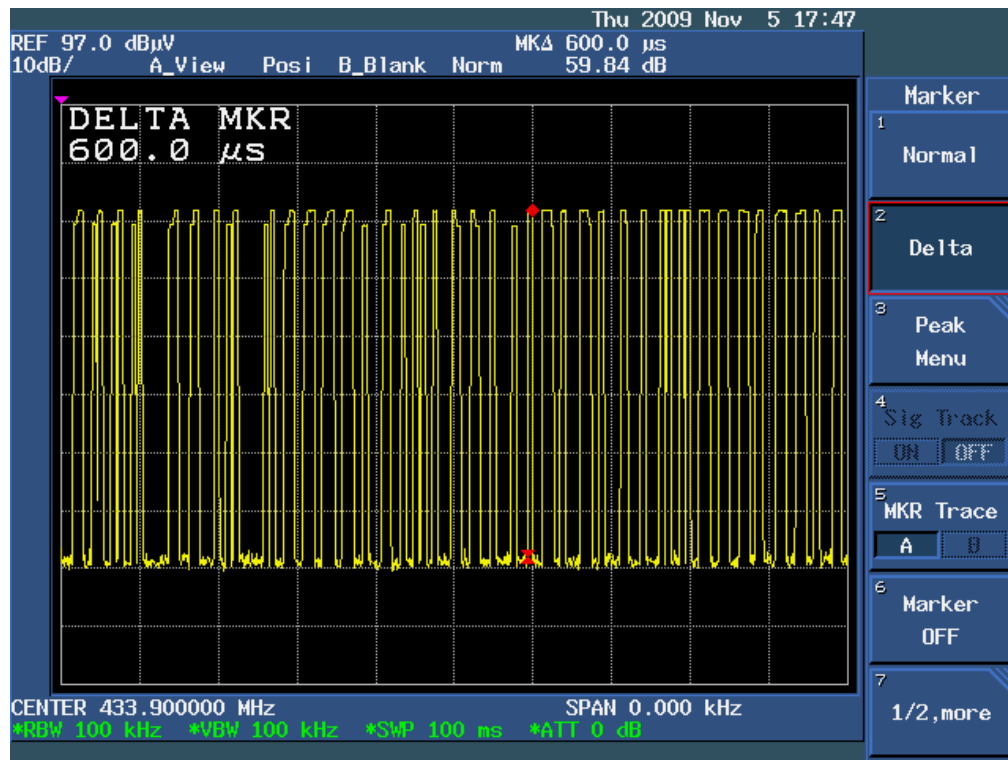
Note: For pulse modulated devices with a pulse-repetition frequency of 20 Hz or less and for which CISPR quasi-peak measurements are specified, compliance with the regulations shall be demonstrated using measuring equipment employing a peak detector function, properly adjusted for such factors as pulse desensitization, using the same measurement bandwidths that are indicated for CISPR quasi-peak measurements.

The Value of fundamental frequency is: Average= Peak value + 20log(Duty cycle), where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log(26 \times 1.5\text{ms} + 12 \times 600\text{us} / 100\text{ms}) = -6.7\text{dB}$$

Please refer to below for more detail:





6.3.3 Test Result

Test Data: 2009-10-12

Frequency Range: 30MHz to 1GHz

RBW/VBW: 100KHz/300KHz for spectrum, RBW=120KHz for receiver

Measurement Distance: 3 m

Operating Environment: 25.3°C, 58% RH, 102 Kpa

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
75.590	11.600	12.904	24.504	-15.496	40.000	QUASIPeAK
101.780	12.500	20.381	32.881	-10.619	43.500	QUASIPeAK
157.070	16.610	5.492	22.102	-21.398	43.500	QUASIPeAK
207.510	13.700	13.723	27.423	-16.077	43.500	QUASIPeAK
317.120	17.610	8.199	25.809	-20.191	46.000	QUASIPeAK
433.920	20.800	50.549	71.349	-21.551	92.900	PEAK
433.920	-6.7	71.349	64.649	-8.251	72.900	AVERAGE
867.110	29.110	26.805	55.915	-16.985	72.900	PEAK
867.110	-6.7	55.915	49.215	-3.685	52.900	AVERAGE

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
101.780	12.500	13.523	26.023	-17.477	43.500	QUASIPeAK
159.010	16.620	6.449	23.069	-20.431	43.500	QUASIPeAK
213.330	13.860	19.358	33.218	-10.282	43.500	QUASIPeAK
304.510	17.230	8.397	25.627	-20.373	46.000	QUASIPeAK
433.920	20.800	54.760	75.560	-17.340	92.900	PEAK
433.920	-6.7	75.560	68.860	-4.040	72.900	AVERAGE
867.110	29.110	20.773	49.883	-23.017	72.900	PEAK
867.110	-6.7	49.883	43.183	-9.717	52.900	AVERAGE
947.620	29.980	1.363	31.343	-14.657	46.000	QUASIPeAK

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Test Data: 2009-10-12
Frequency Range: 1GHz to 5GHz
RBW/VBW: 1MHz/1MHz for Peak
Measurement Distance: 3 m
Operating Environment: 25.3°C, 58% RH, 102 Kpa

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1302.000	29.603	28.639	58.242	-14.658	72.900	PEAK
1302.000	-6.7	58.242	51.542	-1.358	52.900	AVERAGE
1734.000	30.706	27.272	57.978	-14.922	72.900	PEAK
1734.000	-6.7	57.978	51.278	-1.622	52.900	AVERAGE
2602.000	34.403	7.834	42.237	-30.663	72.900	PEAK
2602.000	-6.7	42.237	35.537	-17.363	52.900	AVERAGE

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1302.000	29.603	26.778	56.381	-16.519	72.900	PEAK
1302.000	-6.7	56.381	49.681	-3.219	52.900	AVERAGE
1734.000	30.706	25.634	56.340	-16.56	72.900	PEAK
1734.000	-6.7	56.340	49.64	-3.26	52.900	AVERAGE
2168.000	32.659	11.036	43.695	-29.205	72.900	PEAK
2168.000	-6.7	43.695	36.995	-15.905	52.900	AVERAGE
2602.000	34.403	15.303	49.706	-23.194	72.900	PEAK
2602.000	-6.7	49.706	43.006	-9.894	52.900	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

6.4 Occupied Bandwidth

6.4.1 Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

6.4.2 Test procedure:

- (1) Connected the antenna port to the Spectrum Analyzer , set the Spectrum Analyzer as RBW=30kHz,VBW \geq RBW,Sweep time=Auto, Detector Function=Peak
- (2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission.
- (3) The above procedure shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range with modulated mode. also shall be performed at different modes of operation

6.4.3 Test Result

channel	Channel frequency (MHz)	20dB bandwidth (KHz)	Limit (MHz)	Result
1	433.92	47.5	1.08	Pass

Channel:433.92MHz



Low Frenquy is 433.8855 MHz High Frenquy is 433.9330 MHz
The 20dB bandwidth is 47.5kHz

6.5 Deactivation Time

6.5.1 Limits

In addition, devices operated under the provisions of this paragraph shall be provided with a means For automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the but in no case less than 10 seconds.

6.5.2 Test procedure:

- (1) Put the EUT on the support in its standard position with associated equipment and switched on.
- (2) Set center frequency of spectrum analyzer = operating frequency.
- (3) Set the spectrum analyzer as RBW=100kHz, VBW=100kHz, Span=0Hz, Adjust Sweep=120s.
- (4) record the duration time

6.5.3 Result

Frequency(MHz)	Each transmission time(s)	silent period between transmissions(s)
433.92	0.888	38.04
Limit	<1s	>10s and > 30*(duration of transmission
Result	PASS	

