



Date: 2007-10-05
No.: 60.870.7.008.01F

TEST REPORT

Applicant: Electronics Tomorrow Ltd.
Unit 903-7, 9/F, Tower 1, Harbour Center,
1 Hok Cheung Street, Hung Hom, Kowloon, HK.

Description of Samples: Model name: Wireless Memory Thermometer
Brand name: Nil
Model no.: 259NU, 259NC, 259BC, 259BU
FCCID: PEQ943390807

Date Samples Received: 2007-09-24

Date Tested: 2007-09-24 to 2007-10-03

Investigation Requested: FCC Part 15 Subpart B

Conclusions: The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks: ----

Checked by:

Approved by:-

Prudence Poon
Project Manager
Telecom department

Victor Kwan
Manager
Telecom department

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Photos of Test Setup

Appendix B

External EUT Photos

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Internal EUT Photos

1.0 **General Details**

1.1 **Test Laboratory**

Hong Kong Productivity Council
HKPC Building, 78 Tat Chee Avenue, Kowloon Tong,
Hong Kong

Registration Number: 90656

1.2 **Applicant Details** **Applicant**

Electronics Tomorrow Ltd.
Unit 903-7, 9/F, Tower 1, Harbour Center,
1 Hok Cheung Street, Hung Hom, Kowloon, HK.

Manufacturer

Electronics Tomorrow Ltd.
Unit 903-7, 9/F, Tower 1, Harbour Center,
1 Hok Cheung Street, Hung Hom, Kowloon, HK.

1.3 Equipment Under Test [EUT] Description of Sample

Model Name: Wireless Memory Thermometer
Manufacturer: Electronics Tomorrow Ltd.
Brand Name: Nil
Model Number: 259NU
Rating: 3.0Vd.c. (3 x " AA" size batteries)
No. of Channel: 1
Accessories and Auxiliary: None
Equipment:
EUT Exercising Software: None

Description of EUT

The Equipment Under Test (EUT) is the wireless weather station operated at 433.920MHz to receive the temperature signal from the associated transmitter.

As per Client Declaration, circuit design, PCB Layout, shielding and interface of 259NU, 259NC, 259BC, 259BU are identical, only the cosmetic design is different. So, 259NU is selected to be a representative model to perform all testing.

1.4 Related Submittal(s) Grants

This is a single application for certification of the receiver.

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2007 and ANSI C63.4: 2003 for FCC Verification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Radiated Emissions, 30MHz to 2GHz	FCC 47CFR 15.109	ANSI C63.4:2003	Class B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.107	ANSI C63.4:2003	Class B	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Note: N/A - Not Applicable

3.0 Test Methodology

3.1 Radiated Emission

The sample was placed 0.8m above the ground plane on a standard emission test site *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

*On a standard emission test site with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 90656.

3.2 Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$\begin{aligned} \text{FS} &= \text{R} + \text{System Factor} \\ \text{System Factor} &= \text{AF} + \text{CF} + \text{FA} - \text{PA} \end{aligned}$$

Where FS = Net Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer / Test Receiver in dBuV.

AF = Antenna Factor in dB.

CF = Cable Attenuation Factor in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

3.3 Conducted Emissions

The EUT was placed on a non-metallic table 0.8m above the horizontal metal reference place and 0.4m from a vertical ground plane which is connected to the horizontal metal ground plane. Meanwhile, the AC main of EUT was connected to the distance of 0.8m line impedance stabilization network (LISN) during measurement.

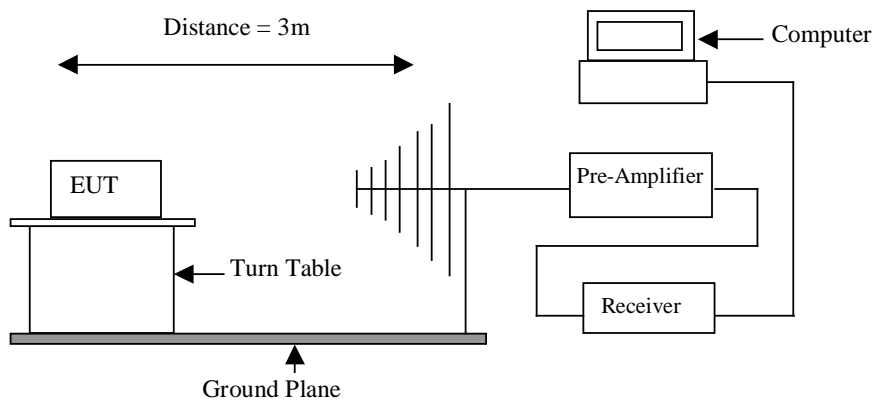
Initial measurements were performed in quasi-peak and average detection modes by the test receiver, any emissions recorded within 30dB of the relevant limit lines were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

4.0 Test Results

4.1 Radiated Emissions (30MHz to 2GHz)

Test Requirement:	FCC part 15 section 15.109 Class B
Test Method:	ANSI C63.4:2003
Test Date:	2007-09-24
Mode of Operation:	Receiving signal from the transmitter.

Test Setup:



Results: PASS

Radiated Emissions Quasi-Peak						
Emissions Frequency MHz	E-Field Polarity	Reading dBuV/m	System Factor dB	Field Strength at 3m dBuV/m	Limit dBuV/m	Delta to Limit dBuV/m
195.67	V	3.35	14.95	18.30	43.50	-25.20
376.55	V	6.06	16.64	22.70	46.00	-23.30
1300.00	V	41.21	-8.41	32.80	54.00	-21.20
198.88	H	4.36	15.04	19.40	43.50	-24.10
471.90	H	12.70	19.00	31.70	46.00	-14.30
1300.00	H	40.21	-8.41	31.80	54.00	-22.20

Note: No further spurious emissions found between 30 MHz and lowest internal used/generated frequency.

Remark:

- Calculated measurement uncertainty: $\pm 5.0\text{dB}$
- Result data graph is attached at the next pages for reference.

Limits for Radiated Emissions [Section 15.109 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V/m}$]
30-88	100
88-216	150
216-960	200
Above 960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Vertical



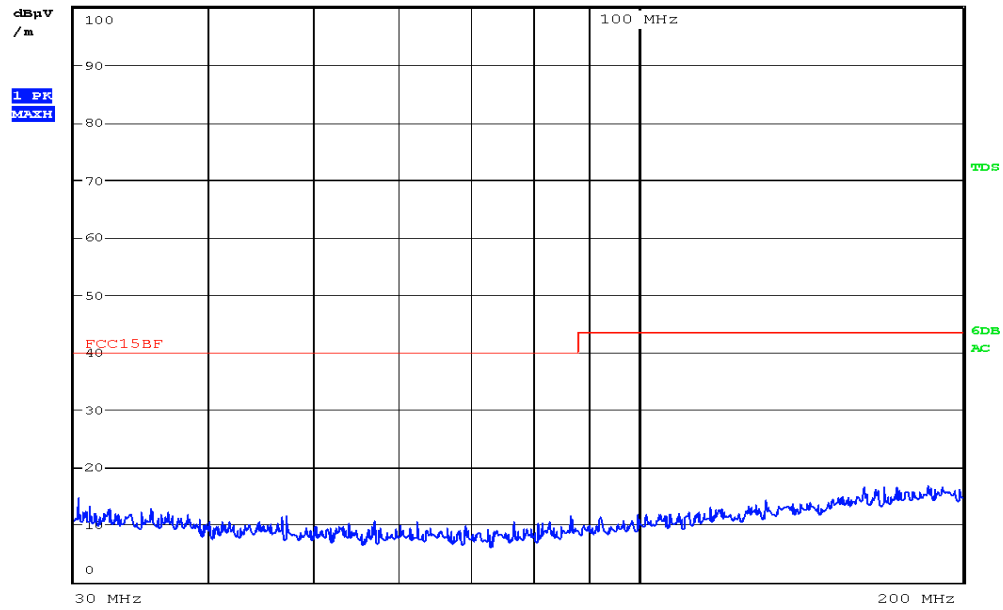
24.Sep 07 16:55

Att 0 dB AUTO

RBW 120 kHz

MT 100 μ s

PREAMP ON



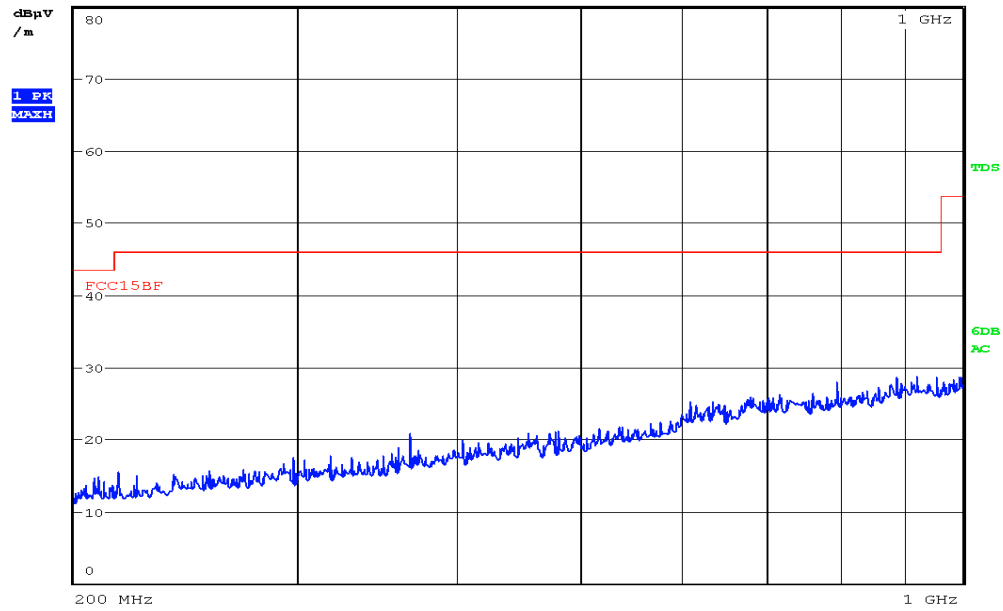
24.Sep 07 15:37

Att 0 dB AUTO

RBW 120 kHz

MT 100 μ s

PREAMP ON



Vertical

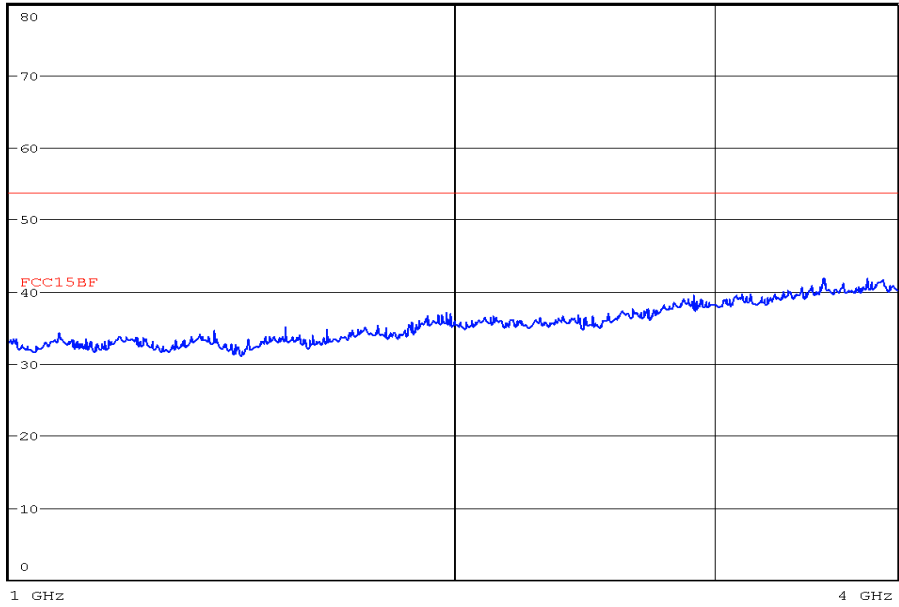


02.Oct 07 12:36

RBW 1 MHz
MT 100 μ s
TD SCAN PREAMP OFF

dB μ V
/m

1 PK
MAXH



Horizontal



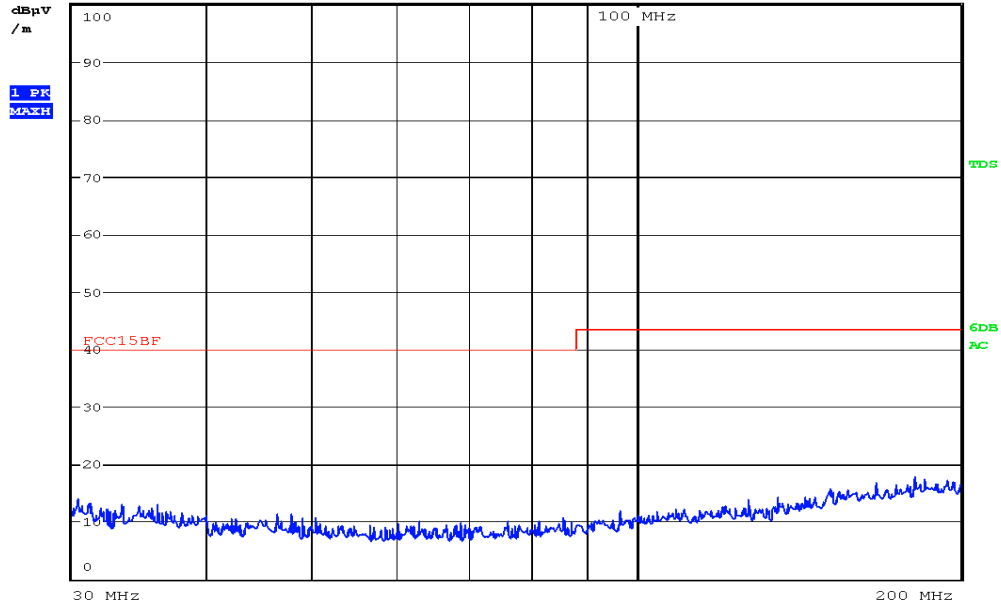
24.Sep 07 16:57

Att 0 dB AUTO

RBW 120 kHz

MT 100 μ s

PREAMP ON



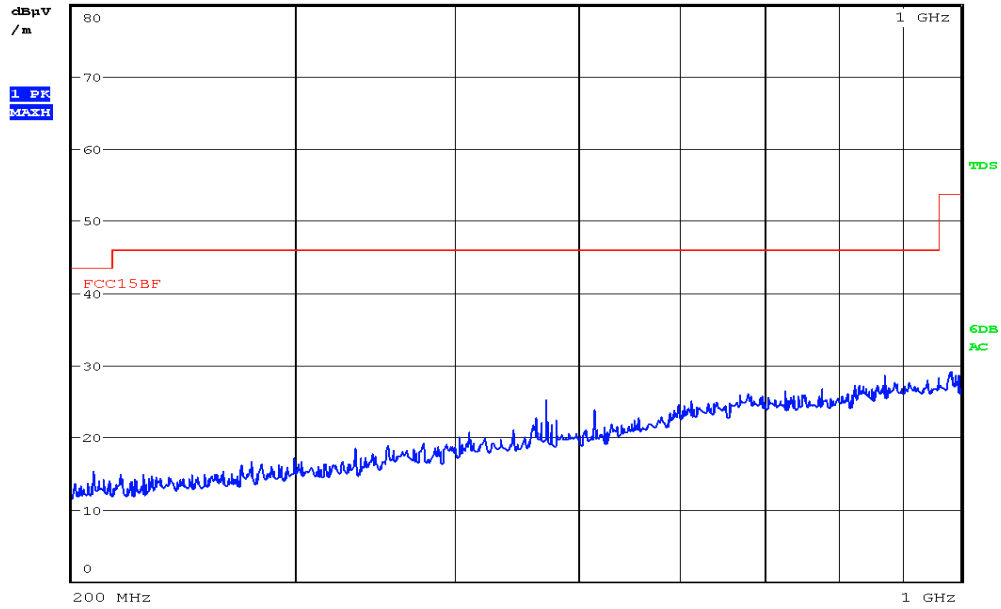
24.Sep 07 15:40

Att 0 dB AUTO

RBW 120 kHz

MT 100 μ s

PREAMP ON

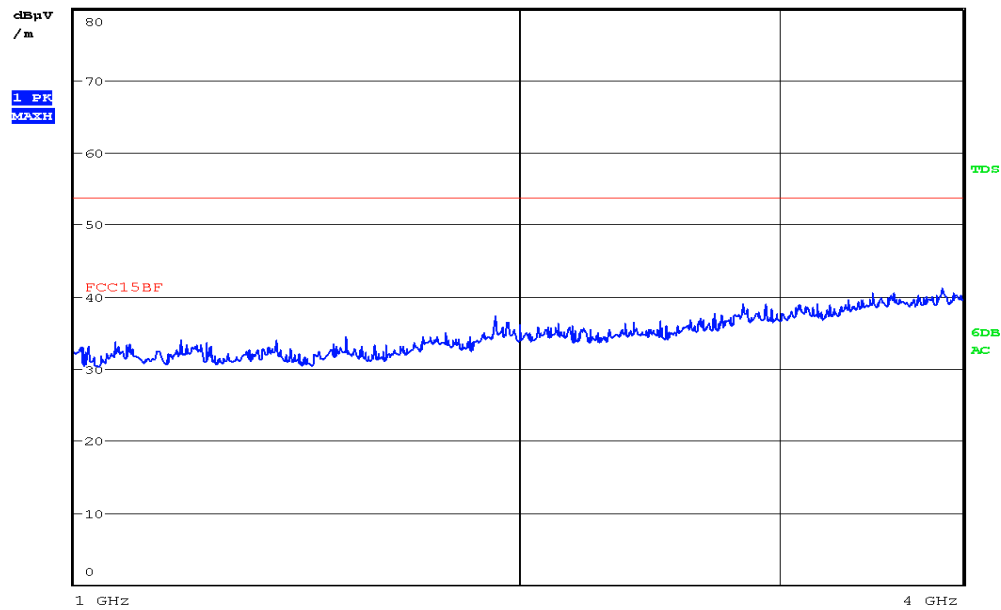


Horizontal



02.Oct 07 12:33

RBW 1 MHz
MT 100 μ s
TD SCAN PREAMP OFF



4.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC part 15 Section 15.107 Class B
Test Method: ANSI C63.4:2003
Test Date: ---
Mode of Operation: ---

Results: N/A

Note : This testing is not applicable for the battery operated EUT.

Limits for Conducted Emissions (Section 15.107):

Frequency Range [MHz]	Quasi-Peak Limits [dBμV]	Average [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Remarks:

Calculated measurement uncertainty: $\pm 2.8\text{dB}$

5.0 List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	CAL DUE
EMC209	Semi-anechoic Chamber	Frankonia	N/A	N/A	28-Mar-07	28-Mar-08
EMC017	Test Receiver	R & S	ESVS30	842807/009	06-Aug-07	06-Aug-08
EMC040	Bi-conical Antenna	R & S	HK116	841489/016	08-Feb-06	08-Feb-08
EMC045	Log Periodic Antenna	R & S	HL223	841516/020	03-Feb-06	03-Feb-08
EMC184	Horn Antenna	EMCO	3115	9002-3347	02-Feb-06	02-Feb-08
EMC138	Loop Antenna	Chase	LLA6142	1019	07-Jun-07	07-Jun-08
EMC406	Coaxial Cable 50ohm	Rosenberger	RTK081-05S-10m	LA2-001-10M/002	15-May-07	15-May-08
EMC556	Spectrum Analyser	R & S	FSP 30	100416	08-Jun-07	08-Jun-08

Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined