

TEST REPORT

Report No.: HK10041148-1

Thermor Limited

Application For Certification (Original Grant) (FCC ID: VX5200TC) (IC: 6356A-200TC)

Transceiver

Prepared and Checked by:

Approved by:

Signed On File Benny Lau/sl Engineer

Chan Chi Hung, Terry Senior Lead Engineer Date: June 30, 2010

The test report only allows to be revised within the retention period unless further standard or the requirement was noticed. This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material product or service is or the agreement under an under the criftication program. material, product, or service is or has ever been under an Intertek certification program.

> Intertek Testing Services Hong Kong Ltd. 2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

GENERAL INFORMATION

Thermor Limited BRAND NAME: Bios Professional, MODEL: 200TC

FCC ID: VX5200TC IC: 6356A-200TC

Grantee:	Thermor Limited
Grantee Address:	16975 Leslie Street,
	Newmarket, ON L3Y 9A1,
	Canada.
Contact Person:	Chris Reid
Tel:	(905) 952-3737
Fax:	(905) 952-3731
e-mail:	creid@thermor-ins.com
Manufacturer:	IDT Technogolgy Ltd.
Manufacturer Address:	9/F, Kaiser Estate, 41 Man Yue Street, Hung Hom,
	Kowloon, Hong Kong
Brand Name:	Bios Professional
Model:	200TC
Type of EUT:	Transceiver
Description of EUT:	HACCP Wireless Temperature Monitor
Serial Number:	N/A
FCC ID / IC:	VX5200TC / 6356A-200TC
Date of Sample Submitted:	April 22, 2010
Date of Test:	May 15, 2010
Report No.:	HK10041148-1
Report Date:	June 30, 2010
Environmental Conidtions:	Temperature: +10 to 40°C
	Humidity: 10 to 90%

SUMMARY OF TEST RESULT

Thermor Limited BRAND NAME: Bios Professional, MODEL: 200TC

FCC ID: VX5200TC IC: 6356A-200TC

TEST SPECIFICATION	REFERENCE	RESULTS
Maximum Peak Output Power	15.247(b), (c) / RSS-210 A8.4	N/A
Hopping Channel Carrier Frequencies	15.247(e) / RSS-210 A8.1	N/A
Separation		
20dB Bandwidth of the Hopping Channel	15.247(a) / RSS-210 A8.1	N/A
Number of Hopping Frequencies	15.247(e) / RSS-210 A8.1	N/A
Average Time of Occupancy of	15.247(e) / RSS-210 A8.1	N/A
Hopping Frequency		
Antenna Conducted Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
Radiated Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
RF Exposure Compliance	15.247(i) / RSS-Gen 5.5	N/A
Transmitter Power Line Conducted	15.207 / RSS-Gen 7.2.2	Pass
Emissions		
Transmitter Field Strength	15.227 / RSS-310 3.8	N/A
Transmitter Field Strength	15.229 / RSS-210 A2.7	N/A
Transmitter Field Strength,	15.231(a) / RSS-210 A1.1.1	N/A
Bandwidth and Timing Requirement		
Transmitter Field Strength,	15.231(e) / RSS-210 A1.1.5	N/A
Bandwidth and Timing Requirement		
Transmitter Field Strength and	15.239 / RSS-210 A2.8	N/A
Bandwidth Requirement		
Transmitter Field Strength and	15.249 / RSS-210 A2.9	Pass
Bandwidth Requirement		
Receiver Radiated Emissions	RSS-210 2.6	Pass
Transmitter Field Strength and	15.235 / RSS-310 3.9	N/A
Bandwidth Requirement		
Digital Device Radiated Emissions	15.109 / ICES-003	N/A
Digital Device Conducted Emissions	15.107 / ICES-003	N/A

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions of this section.

2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

Table of Contents

1.0 1.1 1.2 1.3 1.4	General Description Product Description Related Submittal(s) Grants. Test Methodology. Test Facility	1 1 1
2.0 2.1 2.2 2.3 2.4 2.5 2.6	System Test Configuration Justification EUT Exercising Software Special Accessories Equipment Modification Measurement Uncertainty Support Equipment List and Description	2 2 2 2 2
3.0 3.1 3.2 3.3 3.4 3.5	Emission Results Field Strength Calculation Radiated Emission Configuration Photograph Radiated Emission Data Conducted Emission Configuration Photograph Conducted Emission Data	3 4 4 4
4.0	Equipment Photographs	9
5.0	Product Labelling	9
6.0	Technical Specifications	9
7.0	Instruction Manual	9
8.0 8.1 8.2 8.3 8.4	Miscellaneous Information Measured Bandwidth. Discussion of Pulse Desensitization. Calculation of Average Factor. 1 Emissions Test Procedures	9 0 0
9.0	Equipment List	2

1.0 General Description

1.1 Product Description

200TC is a wireless digital temperature device which is capable of reading, displaying and monitoring current temperatures from up to 30 temperature sensors. It has 10 frequency channels and it is operating from 903.2MHz to 926.6MHz. Different frequency channel is used to communicate with different sensors. And it is assigned to the sensor in the register process. Aside from current temperatures, the monitor's LCD screen displays a real time clock and calendar, as well as maximum and minimum pre-set temperature settings. Every 15 minutes, PC uploadable temperature data for each sensor is logged. Logged data is retrieved through the USB port and PC download software, as provided.

Antenna Type : Internal, Integral

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

The Verification procedure and Declaration of the Conformity procedure of the receiver portion and PC connection portion for this transceiver are being processed as the same time of this application respectively.

The Certification procedure of the transceiver for this transceiver (with FCC ID: VX5201TC) is in the process of being tested.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). All radiated measurements were performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been placed on file with the FCC and IC.

2.0 System Test Configuration

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2003).

The device was powered by 6VDC (4 x 1.5V "AA" batteries) and/or AC/DC adaptor (Model: KU2B-060-0300D, Input: 120VAC 60Hz, Output: 6VDC 300mA).

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, and transmits the RF signal continuously.

2.3 **Special Accessories**

There are no special accessories necessary for compliance of this product.

2.4 Equipment Modification

Any modifications installed previous to testing by Thermor Limited will be incorporated in each production model sold/leased in the United States and Canada.

No modifications were installed by Intertek Testing Services Hong Kong Ltd.

2.5 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

2.6 Support Equipment List and Description

- Lenovo Notebook (Model: T61; S/N: L3-CF468)
 Lenovo Notebook (Model: SL500; S/N: ML-DXMM3)
 Smart-Drive External 1394 HDD (Model: HD3-SU2FW; S/N: 0800261)
- 4. 1 x 1394 cable with length of 0.8 meter long
 5. 1 x USB cable with length of 0.7 meter long (Provided by Intertek)
 6. 1 x USB cable with length of 1 meter long (Provided by Applicant)

Report No.: HK10041148-1 FCC ID: VX5200TC IC: 6356A-200TC

3.0 Emission Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows: FS = RA + AF + CF - AG - AV

where $FS = Field Strength in dB\mu V/m$ RA = Receiver Amplitude (including preamplifier) in dB μ V CF = Cable Attenuation Factor in dB AF = Antenna Factor in dB AG = Amplifier Gain in dB AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows: FS = RR + LF

where $FS = Field Strength in dB\mu V/m$ RR = RA - AG - AV in dB μ V LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V/m AF = 7.4 dB CF = 1.6 dB AG = 29.0 dB AV = 5.0 dB FS = RR + LF FS = 18 + 9 = 27 dB μ V/m RR = 18.0 dB μ V LF = 9.0 dB

Level in μ V/m = Common Antilogarithm [(27 dB μ V/m)/20] = 22.4 μ V/m

3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 6322.400 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 0.2 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 0.1545 MHz

For electronic filing, the worst case line-conducted configuration photographs are saved with filename: conducted photos.pdf.

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.pdf.

Judgment: Passed by 18.17 dB

Applicant: Thermor Limited Model: 200TC Worst-Case Operating Mode: TX mode Date of Test: May 15, 2010

Table 1

Radiated Emissions Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 00

			Pre-Amp	Antenna	Net at	Average Limit	
Polari-	Frequency	Reading	Gain	Factor	3m - Average	at 3m	Margin
zation	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
V	903.200	68.6	16	32.0	84.6	94.0	-9.4
V	1806.400	56.2	33	27.2	50.4	54.0	-3.6
V	2709.600	53.7	33	30.4	51.1	54.0	-2.9
V	3612.800	52.1	33	33.3	52.4	54.0	-1.6
V	4516.000	51.5	33	34.9	53.4	54.0	-0.6
V	5419.200	50.3	33	35.7	53.0	54.0	-1.0
V	6322.400	49.9	33	36.9	53.8	54.0	-0.2

NOTES: 1. Peak Detector Data unless otherwise stated.

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative sign in the column shows value below limit.
- 4. Horn antenna is used for the emission over 1000MHz.

Applicant: Thermor Limited Model: 200TC Worst-Case Operating Mode: TX mode Date of Test: May 15, 2010

Table 2

Radiated Emissions Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 04

			Pre-Amp	Antenna	Net at	Average Limit	
Polari-	Frequency	Reading	Gain	Factor	3m - Average	at 3m	Margin
zation	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
V	913.630	67.7	16	33.0	84.7	94.0	-9.3
V	1827.260	56.6	33	27.2	50.8	54.0	-3.2
V	2740.890	53.6	33	30.4	51.0	54.0	-3.0
V	3654.520	51.6	33	33.3	51.9	54.0	-2.1
V	4568.150	50.5	33	34.9	52.4	54.0	-1.6
V	5481.780	51.0	33	35.7	53.7	54.0	-0.3
V	6395.410	49.9	33	36.9	53.8	54.0	-0.2

NOTES: 1. Peak Detector Data unless otherwise stated.

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative sign in the column shows value below limit.
- 4. Horn antenna is used for the emission over 1000MHz.

Applicant: Thermor Limited Model: 200TC Worst-Case Operating Mode: TX mode Date of Test: May 15, 2010

Table 3

Radiated Emissions Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 09

			Pre-Amp	Antenna	Net at	Average Limit	
Polari-	Frequency	Reading	Gain	Factor	3m - Average	at 3m	Margin
zation	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
V	926.612	66.4	16	33.0	83.4	94.0	-10.6
V	1853.224	55.8	33	27.2	50.0	54.0	-4.0
V	2779.836	53.4	33	30.4	50.8	54.0	-3.2
V	3706.448	51.1	33	33.3	51.4	54.0	-2.6
V	4633.060	50.6	33	34.9	52.5	54.0	-1.5
V	5559.672	49.9	33	36.6	53.5	54.0	-0.5
V	6486.284	49.8	33	36.9	53.7	54.0	-0.3

NOTES: 1. Peak Detector Data unless otherwise stated.

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative sign in the column shows value below limit.
- 4. Horn antenna is used for the emission over 1000MHz.

Applicant: Thermor Limited Model: 200TC Worst-Case Operating Mode: RX mode Date of Test: May 15, 2010

Table 4

Radiated Emissions Pursuant to RSS-210 2.6: Emissions Requirement

			Pre-	Antenna	Net	Limit	
	Frequency	Reading	amp	Factor	at 3m	at 3m	Margin
Polarization	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
V	903.200	18.5	16	32.0	34.5	46.0	-11.5
V	1806.400	45.4	33	27.2	39.6	54.0	-14.4
V	2709.600	42.7	33	30.4	40.1	54.0	-13.9
V	3612.800	41.4	33	33.3	41.7	54.0	-12.3
V	4516.000	40.6	33	34.9	42.5	54.0	-11.5
V	5419.200	41.0	33	35.7	43.7	54.0	-10.3

			Pre-	Antenna	Net	Limit	
	Frequency	Reading	amp	Factor	at 3m	at 3m	Margin
Polarization	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
V	913.630	17.8	16	33.0	34.8	46.0	-11.2
V	1827.360	45.7	33	27.2	39.9	54.0	-14.1
V	2740.890	43.2	33	30.4	40.6	54.0	-13.4
V	3654.520	41.5	33	33.3	41.8	54.0	-12.2
V	4568.150	40.9	33	34.9	42.8	54.0	-11.2
V	5481.780	40.6	33	35.7	43.3	54.0	-10.7

			Pre-	Antenna	Net	Limit	
	Frequency	Reading	amp	Factor	at 3m	at 3m	Margin
Polarization	(MHz)	(dBµV)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
V	926.612	17.6	16	33.0	34.6	46.0	-11.4
V	1853.224	45.8	33	27.2	40.0	54.0	-14.0
V	2779.836	43.4	33	30.4	40.8	54.0	-13.2
V	3706.448	41.3	33	33.3	41.6	54.0	-12.4
V	4633.060	40.7	33	34.9	42.6	54.0	-11.4
V	5559.672	40.2	33	36.6	43.8	54.0	-10.2

Note: Negative signs (-) in the margin column signify levels below the limit.

4.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 **Product Labelling**

For electronics filing, the FCC ID and IC label artwork and the label location are saved with filename: label.pdf.

6.0 **Technical Specifications**

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States and Canada.

8.0 Miscellaneous Information

The miscellaneous information includes details of the test procedure and measured bandwidth.

8.1 Measured Bandwidth

From the following plots, they show that the fundamental emissions are confined in the specified band (902MHz and 928MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.4 (2003) for frequency being measured.

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50dB below the level of the fundamental or to the general radiated emissions limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).

8.2 Discussion Pulse Desensitivity

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

8.3 Calculation of Average Factor

The average factor is not applicable for this device as the transmitted signal is a continuously signal.

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003. A typical or an unmodulated CW signal at the operating frequency of the EUT has been supplied to the EUT for all measurements. Such a signal is supplied by a signal generator and an antenna in close proximity to the EUT. The signal level is sufficient to stabilize the local oscillator of the EUT.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.4 - 2003.

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

9.0 Equipment List

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna
Registration No.	EW-0014	EW-2512	EW-0446
Manufacturer	R&S	EMCO	EMCO
Model No.	ESVS30	3104C	3146
Calibration Date	Jun 01, 2009	May 12, 2010	Apr 26, 2010
Calibration Due Date	Jun 01, 2010	Nov 12, 2011	Oct 26, 2011

Equipment	Spectrum Analyzer	Double Ridged Guide Antenna
Registration No.	EW-2188	EW-0194
Manufacturer	AGILENTTECH	EMCO
Model No.	o. E4407B 3115	
Calibration Date	Dec 25, 2009	Dec 24, 2008
Calibration Due Date	Dec 31, 2010	Jun 24, 2010

2) Conducted Emissions Test

-,							
Equipment	EMI Test Receiver	LISN	Pulse Limiter				
Registration No.	EW-2251	EW-0192	EW-0699				
Manufacturer	R&S	R&S	R&S				
Model No.	ESCI	ESH3-Z5	ESH3-Z2				
Calibration Date	Oct 22, 2009	Nov 23, 2009	Dec 24, 2009				
Calibration Due Date	Oct 22, 2010	Nov 23, 2010	Jun 24, 2011				

3) Bandedge Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2329
Manufacturer	R&S
Model No.	FSP3
Calibration Date	Jun 26, 2009
Calibration Due Date	Jun 26, 2010