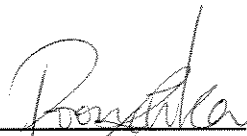
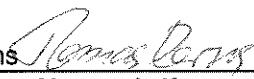


<b>Prüfbericht - Nr.:</b> Test Report No.	<b>14008252 001</b>	<b>Seite 1 von 13</b> Page 1 of 13	
<b>Auftraggeber:</b> Applicant	<b>IDT Technology Ltd.</b> <b>Block C, 9/F., Kaiser Estate, Phase 1</b> <b>41 Man Yue Street</b> <b>Hunghom, Kowloon</b> <b>Hong Kong</b>		
<b>Gegenstand der Prüfung:</b> Test item	<b>Low Power Transmitter</b>		
<b>Bezeichnung:</b> Identification	<b>THN122N</b>	<b>Serien-Nr.:</b> Serial No.	<b>Engineering sample</b>
<b>Wareneingangs-Nr.:</b> Receipt No.	<b>041214006</b>	<b>Eingangsdatum:</b> Date of receipt	<b>14.12.2004</b>
<b>Prüfört:</b> Testing location	<b>TÜV Rheinland Hong Kong Ltd.</b> Unit 8, 25 <sup>th</sup> Floor, Skyline Tower, 39 Wang Kwong Road, Kowloon Bay Kowloon, Hong Kong  <b>Hong Kong Productivity Council</b> HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong		
<b>Prüfgrundlage:</b> Test specification	<b>FCC Part 15, Subpart C</b>		
<b>Prüfergebnis:</b> Test Result	<b>Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.</b> The above mentioned product was tested and <b>passed</b> .		
<b>geprüft / tested by:</b>	<b>kontrolliert / reviewed by:</b>		
26.01.2005 Prudence Poon 	26.01.2005 Thomas Berns 		
<b>Datum</b> Date	<b>Name</b> Name	<b>Unterschrift</b> Signature	<b>Datum</b> Date
<b>Sonstiges:</b> Other Aspects	<b>FCC ID NMTTHN122N-01</b>		
<b>Abkürzungen:</b>	OK, Pass, P = entspricht Prüfgrundlage Fail, F = entspricht nicht Prüfgrundlage N/A = nicht anwendbar NT = nicht getestet	<b>Abbreviations:</b>	OK, Pass, P = passed Fail, F = failed N/A = not applicable NT = not tested
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicate in extracts. This test report does not entitle to carry any safety mark on this or similar products.			

## Test Summary

### **Radiated Emission of Carrier Frequency**

*Result: Pass*

### **Spurious Radiated Emissions**

*Result: Pass*

### **Bandwidth Measurement**

*Result: Pass*

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## General Remarks

### Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test Results

Appendix 2: Test Setup

Appendix 3: EUT External Photo

Appendix 4: EUT Internal Photo

Appendix 5: FCCID Label, Block Diagram, Schematics and User manual.

**List of Test and Measurement Instruments**

<b>Kind of Equipment</b>	<b>Manufacturer</b>	<b>Type</b>	<b>S/N</b>
Test Receiver	Rohde & Schwarz	ESVS30	842807/009
Biconical Antenna	Rohde & Schwarz	HK116	841489/015
Log.-Periodic Antenna	Rohde & Schwarz	HL223	841516/017
Double Ridge Horn Antenna	EMCO	3115	9002-3351
Double Ridge Horn Antenna	EMCO	3115	9002-3347
Signal Generator	Rohde & Schwarz	SMY 01	844146/024
Signal Generator	Rohde & Schwarz	SMY 01	844146/023
Spectrum Analyzer	Rohde & Schwarz	FSP30	1093.4495K30

## General Product Information

### Product Function and Intended Use

The equipment under test ( EUT) is a transmitter for a weather station operating at 434.06 MHz. The EUT sense the temperature and humidity level, then transmit this information to the associated weather station.

A transmitter transmits signal for every 39 seconds, and the signal on period is about 0.39ms. It activated automatically shall cease transmission within 5 seconds after activation. Hence it operates 92 times per hour.

#### FCC ID NMTTHN122N-01

Model	Product description
<b>THN122N</b>	<b>Transmitter of Thermo Sensor</b>

### Circuit Description

The temperature is measured by the thermister. The MCU will convert temperature measurement into OOK signal format and transmits through the RF channel of 433.92MHz. It is consisted of 2 parts: Control part and transmitter part. The MCU outputs the digital data, then this data will be modulated into the Colpitts oscillator, where the capacitor C33 and SAW X2 are used to adjust the operating frequency to 433.92MHz. The transistor Q10, with its fT greater than 6GHz, provide a good frequency response to the oscillator circuitry. The high frequency component of the data is suppressed by the LC filter .

### Ratings and System Details

		Transmitter
Frequency range	:	434.06 MHz
Number of channels	:	3
Type of antenna	:	Integral antenna
Power supply	:	Battery operated 3.0V
Ports	:	none
Protection Class	:	III
Equipment Class	:	B

## **Independent Operation Modes**

The basic operation modes are:

- Reset Button : Press to reset all value to default values.
- Channel selection.

For further information refer to User Manual

## **Submitted Documents**

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- User manual
- FCC ID label

## **Related Submittal(s) Grants**

This is a single application for certification of the transmitter.

## Test Set-up and Operation Mode

### Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### Test Operation and Test Software

Test operation should refer to test methodology.

- There was no special software to exercise the device.

### Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- none

### Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the Circuit Diagram or the Technical Construction File. No additional measures were employed to achieve compliance.



## Test Methodology

### Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2003.

The equipment under test (EUT ) was placed at the middle of the 80 cm height turntable, and the turntable is 3 meters far from the measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in section 7.1.1 and 7.1.2 of this test report.

### 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:

$$FS = R + AF + CF + FA - PA$$

Where FS = Field Strength in dBuV/m at 3 meters.  
R = Reading of Spectrum Analyzer in dBuV.  
AF = Antenna Factor in dB.  
CF = Cable Attenuation Factor in dB.  
FA = Filter Attenuation Factor in dB.  
PA = Preamplifier Factor in dB.

System Factor = CF + FA – PA.

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

## Test Results

### Radiated Emission of Carrier Frequency

### Section 15.231(b)

**RESULT:**
**Pass**

Test Specification : FCC Part 15 Section 15.231(b1 and b2)  
 Test Method : ANSI 63.4-2003  
 Measurement Location : Semi Anechoic Chamber  
 Measurement Distance : 3m  
 Detector Function : Peak and Average  
 Measurement BW : 100 kHz  
 Supply Voltage : DC 3.0V  
 Channel under test : Channel 1 with highest emission level.

**Polarization: Vertical**

Detector function	Frequency (MHz)	Reading (dBuV)	Antenna Factor (dBuV/m)	Attenuation of cable (dB)	Measured Field strength at 3m (dBuV/m)	Delta to Limit (dB)
Peak	434.06	56.6	16.3	1.8	74.7	-26.1
Average	434.06	37.9	16.3	1.8	56.0	-24.8

**Polarization: Horizontal**

Detector function	Frequency (MHz)	Reading (dBuV)	Antenna Factor (dBuV/m)	Attenuation of cable (dB)	Measured Field strength at 3m (dBuV/m)	Delta to Limit (dB)
Peak	434.06	40.1	16.3	1.8	58.2	-42.6
Average	434.06	21.4	16.3	1.8	39.5	-41.3

**Limit**
**Section 15.231(b2)**

Frequency within the band (MHz)	Peak Emission		Average Emission	
	(microvolt/meter)	dB $\mu$ V/m	(microvolt/meter)	dB $\mu$ V/m
434.06	110,025	100.8	11,0025	80.8

According to section 15.35(b), When average radiated emission measurements are specified, including emission measurement below 1000MHz, there also is limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated.

**Spurious Radiated Emissions****Section 15.231(b)****RESULT:****Pass**

Test Specification : FCC Part 15 Section 15.231(b1 and b3)  
 Test Method : ANSI 63.4-2003  
 Measurement Location : Semi Anechoic Chamber  
 Measurement Distance : 3m  
 Detector Function : Quasi Peak  
 Measurement BW : 100 kHz  
 Supply Voltage : DC 3.0V  
 Measuring Frequency Range : 30-4500MHz

Polarization: Vertical

Frequency (MHz)	Reading (dBuV/m)	Antenna Factor (dBuV/m)	System Factor (dB)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
868.128	12.83	22.20	2.67	37.70	60.80	-23.10
*1302.25	38.75	24.90	-33.70	29.95	54.00	-24.05
1736.32	36.09	26.50	-33.30	29.29	60.80	-31.51
2170.52	36.67	27.80	-32.56	31.91	60.80	-28.89
2604.58	33.72	28.88	-31.18	31.42	60.80	-29.38
3038.48	36.17	30.00	-29.73	36.44	60.80	-24.36
3472.57	35.12	31.20	-31.09	35.23	60.80	-25.57
*3906.56	34.85	32.50	-30.35	37.00	54.00	-17.00
4340.54	33.87	32.45	-29.91	36.41	60.80	-24.39

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV/m)	Antenna Factor (dBuV/m)	System Factor (dB)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
868.128	13.13	22.20	2.67	38.00	60.80	-22.80
*1302.19	38.11	24.90	-33.70	29.31	54.00	-24.69
1736.28	36.29	26.50	-33.30	29.49	60.80	-31.31
2170.30	36.81	27.80	-32.56	32.05	60.80	-28.75
2604.30	34.27	28.88	-31.18	31.97	60.80	-28.83
3038.51	35.92	30.00	-29.73	36.19	60.80	-24.61
3472.59	35.08	31.20	-31.09	35.19	60.80	-25.61
*3906.86	35.94	32.50	-30.35	38.09	54.00	-15.91
4340.66	34.06	32.45	-29.91	36.60	60.80	-24.20

Remark: ' \* ' indicates the frequency of the emissions fall into the restricted band.

**Limit****Section 15.231(b3)**

Frequency (MHz)	Field strength (microvolt/meter)	Field strength (dB $\mu$ V/m)	Measurement distance (meters)
434.06	1,100	$20 \cdot \log(1100) = 60.8$	3

**Section 15.209**

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209.

Limit for Radiated Emission under Section 15.209:

Frequency (MHz)	Field strength (microvolt/meter)	Field strength (dB $\mu$ V/m)	Measurement distance (meters)
30-88	100	$20 \cdot \log(100) = 40.0$	3
88-216	150	$20 \cdot \log(150) = 43.5$	3
216-960	200	$20 \cdot \log(200) = 46.0$	3
960-2500	500	$20 \cdot \log(500) = 54.0$	3

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

## Bandwidth Measurement

## Section 15.231(c)

### RESULT:

Pass

Test Specification : FCC Part 15 section 15.231(c)  
Port of Testing : Antenna port  
Detector Function : Peak  
Supply Voltage : DC 3.0V

Refer to the data graph, the 20dB points at lower edge and at higher edge are 5.8KHz and 9.4KHz respectively apart from the centre modulated carrier, the bandwidth of the emission is 0.0035 % of the centre frequency. Therefore, the EUT meets the requirement of section 15.231(c).

For test results refer to Appendix 1, page 1.

### Limit

### Section 15.231(c)

The bandwidth of the emission shall be no wider than 0.25% if the center frequency for devices operating above 70MHz and below 900MHz.