



**Neutron Engineering Inc.**

# FCC/IC Radio Test Report

**FCC ID: OMO-TX19**  
**IC: 5049A-TX19**

This report concerns (check one):  Original Grant  Copy Report

**Issued Date** : May. 22, 2013  
**Project No.** : 1305C071  
**Equipment** : Wireless Thermometer  
**Model Name** : TX19  
**Applicant for FCC** : La Crosse Technology Ltd.  
**Applicant for IC** : LA CROSSE TECHNOLOGY LTD.  
**Address for FCC** : 2809 Losey Blvd. South La Crosse Wisconsin  
United States 54601  
**Address for IC** : 2809 Losey Blvd. S.La Crosse Wisconsin  
54601 United States

**Tested by:**

Neutron Engineering Inc. EMC Laboratory

**Date of Receipt:** May. 14, 2013

**Date of Test:**

May. 14, 2013 ~ May. 21, 2013

**Testing Engineer** : David Mao  
(David Mao)

**Technical Manager** : Leo Hung  
(Leo Hung)

**Authorized Signatory** : Steven Lu  
(Steven Lu)

**Neutron Engineering Inc.**

**No.3, Jinshagang 1st Road, ShiXia, Dalang  
Town, Dong Guan, China.  
TEL : (0769) 8318-3000 FAX : (0769) 8319-6000**



### **Declaration**

**Neutron** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C.**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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### **Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.



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## 1. CERTIFICATION

Equipment : Wireless Thermometer  
Trade Name : LA CROSSE  
Model Name. : TX19  
Applicant for FCC : La Crosse Technology Ltd.  
Applicant for IC : LA CROSSE TECHNOLOGY LTD.  
Date of Test : May. 14, 2013 ~ May. 21, 2013  
Test Item : ENGINEERING SAMPLE  
Standards : FCC Part15, Subpart C(15.231)/ ANSI C63.4 : 2009; Canada RSS-210:2010

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FICP-1-1305C071) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).



## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.231) ; Canada RSS-210:2010				
Standard Section		Test Item	Judgment	Remark
	15.207	Conducted Emission	N/A	NOTE(1)
RSS-210 2.7 Table 5	15.209 & 15.231(e)	Radiated Spurious Emission	PASS	
RSS-210 A1.1.3	15.231(c)	20dB Occupied Bandwidth Measurement	PASS	

NOTE:

(1) "N/A" denotes test is not applicable in this test report.



**2.1 TEST FACILITY**

The test facilities used to collect the test data in this report is **DG-CB03** at the location of No.3,Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.523792  
 Neutron's test firm number for FCC 319330  
 Neutron's test firm number for IC 4428B-1

**2.2 MEASUREMENT UNCERTAINTY**

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95 %**.

**A. Conducted Measurement :**

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
DG-C02	CISPR	150 KHz ~ 30MHz	1.94	

**B. Radiated Measurement :**

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)	NOTE
DG-CB03	CISPR	30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
		1GHz~18GHz	V	3.12	
		1GHz~18GHz	H	3.68	
		18GHz~40GHz	V	4.15	
		18GHz~40GHz	H	4.14	



**3. GENERAL INFORMATION**

**3.1 GENERAL DESCRIPTION OF EUT**

Equipment	Wireless Thermometer												
Trade Name	LA CROSSE												
Model Name.	TX19												
Model Difference	N/A												
Product Description	The EUT is a Wireless Thermometer.												
	<table border="1"> <tr> <td>Product Type</td> <td>Low Power Communication Device</td> </tr> <tr> <td>Operation Frequency</td> <td>433.92 MHz</td> </tr> <tr> <td>Modulation Type</td> <td>ASK</td> </tr> <tr> <td>Number Of Channel</td> <td>1CH</td> </tr> <tr> <td>Antenna Designation</td> <td>Integral antenna</td> </tr> <tr> <td>Field Strength</td> <td>64.51 dBuV/m (AV Max.)</td> </tr> </table>	Product Type	Low Power Communication Device	Operation Frequency	433.92 MHz	Modulation Type	ASK	Number Of Channel	1CH	Antenna Designation	Integral antenna	Field Strength	64.51 dBuV/m (AV Max.)
	Product Type	Low Power Communication Device											
	Operation Frequency	433.92 MHz											
	Modulation Type	ASK											
	Number Of Channel	1CH											
	Antenna Designation	Integral antenna											
	Field Strength	64.51 dBuV/m (AV Max.)											
More details of EUT technical specification, please refer to the User's Manual.													
Channel List	Please refer to the Note 2.												
Power Source	DC voltage supplied from 2*AAA size battery.												
Power Rating	DC 3V												
Connecting I/O Port(s)	Please refer to the User's Manual												

**Note:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.

Frequency Band	Channel No.	Frequency
	1	433.92 MHz





**3.2 DESCRIPTION OF TEST MODES**

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

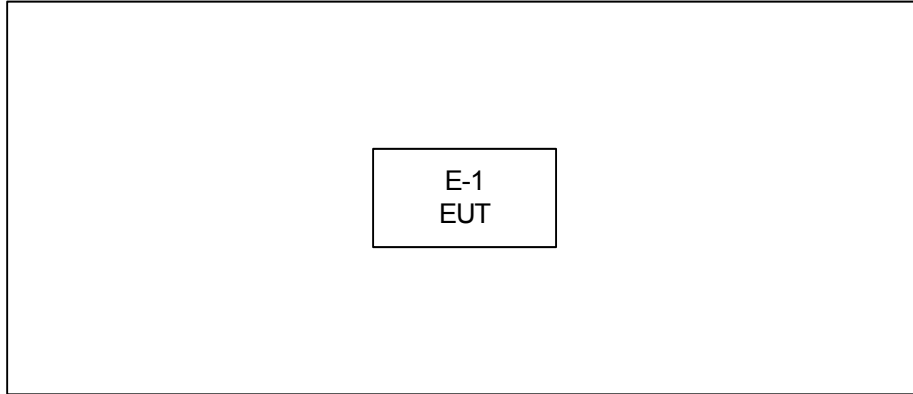
Pretest Mode	Description
Mode 1	TX 433.92MHz

<b>For Conducted Test</b>	
Final Test Mode	Description
-	"N/A" denotes test is not applicable in this test report

<b>For Radiated Test</b>	
Final Test Mode	Description
Mode 1	TX 433.92MHz



3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





**3.4 DESCRIPTION OF SUPPORT UNITS**

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID/IC	Series No.	Note
E-1	Wireless Thermometer	LA CROSSE	TX19	OMO-TX19/ 5049A-TX19	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	

**Note:**

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in m in 『Length』 column.



**4. EMC EMISSION TEST**

**4.1 CONDUCTED EMISSION MEASUREMENT**

**4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)**

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

**4.1.2 MEASUREMENT INSTRUMENTS LIST**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00052765	Apr. 25, 2014
2	LISN	R&S	ENV216	100087	Nov.16.2013
3	Test Cable	N/A	C_17	N/A	Mar.15.2014
4	EMI TEST RECEIVER	R&S	ESCS30	826547/022	Apr. 25, 2014
5	50Ω Terminator	SHX	TF2-3G-A	08122902	Apr. 25, 2014

Remark: "N/A" denotes no model name, serial no. or calibration specified.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

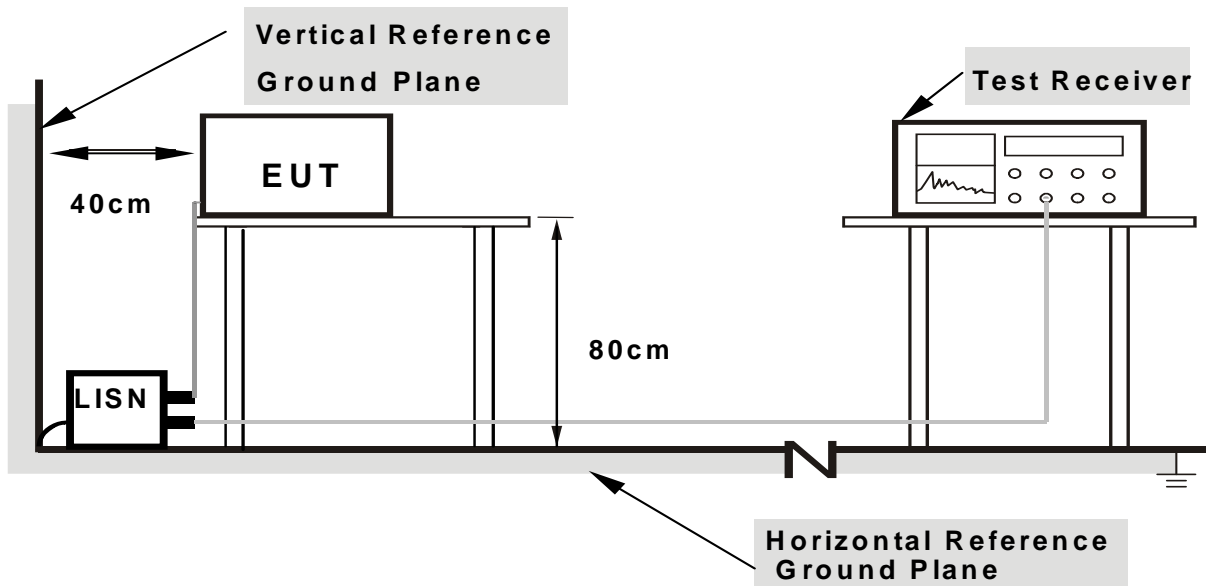
#### 4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



**Note: 1. Support units were connected to second LISN.**

**2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

#### 4.1.6 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



4.1.7 TEST RESULTS

EUT :	Wireless Thermometer	Model Name. :	TX19
Temperature :	--	Relative Humidity :	--
Pressure :	--	Test Power :	--
Test Mode :	" N/A" denotes test is not applicable in this test report.		

Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a " \* " marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.
- (3) " N/A" denotes test is not applicable in this Test Report.



**4.2 RADIATED EMISSION MEASUREMENT**

**4.2.1. FIELD STRENGTH OF FUNDAMENTAL EMISSIONS MEASUREMENT LIMIT**

Frequency Band (MHz)	Fundamental Emissions Limit (uV/m) at 3m
40.66-40.70	1000
70-130	500
130-174	500-1500(**)
174-260	1500
260-470	1500-5000(**)
Above 470	5000

\*\*1. Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

- (1) for the band 130 - 174 MHz,  $\mu\text{V/m}$  at 3 meters =  $22.72727 \times (\text{operating frequency, MHz}) - 2454.545$ ;
- (2) for the band 260 - 470 MHz,  $\mu\text{V/m}$  at 3 meters =  $16.6667 \times (\text{operating frequency, MHz}) - 2833.3333$ .

So the field strength of emission limits have been calculated in below table.

Carrier Frequency (MHz)	Fundamental Emissions Limit (dBuV/m) at 3m
433.92 MHz	72.87 (Average)
433.92 MHz	92.87 (Peak)

**4.2.2. MEASURING INSTRUMENTS AND SETTING (FIELD STRENGTH OF FUNDAMENTAL EMISSIONS)**

Receiver Parameter	Setting
Attenuation	Auto
Center Frequency	Fundamental Frequency
RBW	120 kHz
Detector	Peak / Average



**4.2.3 RADIATED EMISSIONS MEASUREMENT**

Devices complying with 47 CFR FCC part 15 subpart C, section 15.231(e). The field strength of emissions from intentional radiators at 3 meters operated under this Section shall not exceed the following:

Frequency Band (MHz)	Spurious Emissions Limit (uV/m) at 3m
40.66-40.70	100
70-130	50
130-174	50-150(**)
174-260	150
260-470	150-500(**)
Above 470	500

\*\*1. Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

(1) for the band 130 - 174 MHz,  $\mu\text{V/m}$  at 3 meters =  $22.72727 \times (\text{operating frequency, MHz}) - 2454.545$ ;

(2) for the band 260 - 470 MHz,  $\mu\text{V/m}$  at 3 meters =  $16.66667 \times (\text{operating frequency, MHz}) - 2833.3333$ .

(3) The maximum permitted unwanted emissions level is 20 dB below the maximum permitted fundamental level. In addition field strength of any emissions which appear inside of the restriction band shall not exceed the general radiated emissions limits in Section 15.209(a).

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector





Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, AV Mode with Dwell time
RB / VB (other emission)	100KHz / 100KHz for peak

$$\text{Duty Cycle} = (N_1 \cdot L_1 + N_2 \cdot L_2 + \dots + N_{n-1} \cdot L_{n-1} + N_n \cdot L_n) / T$$

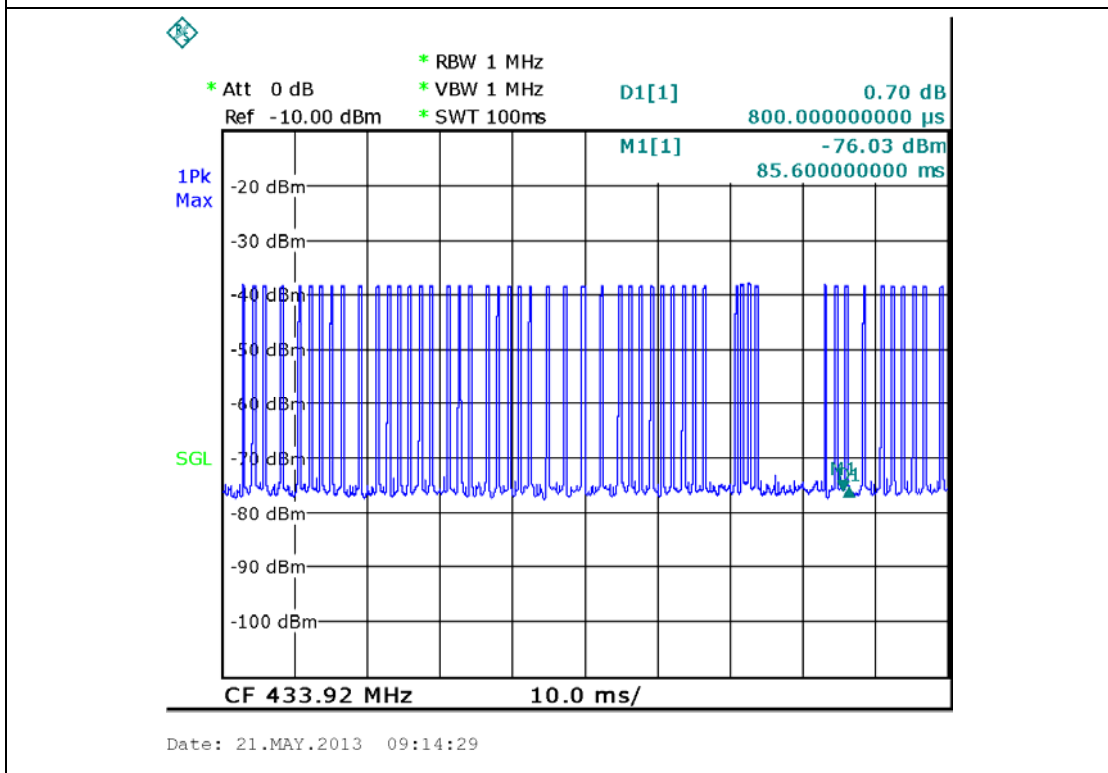
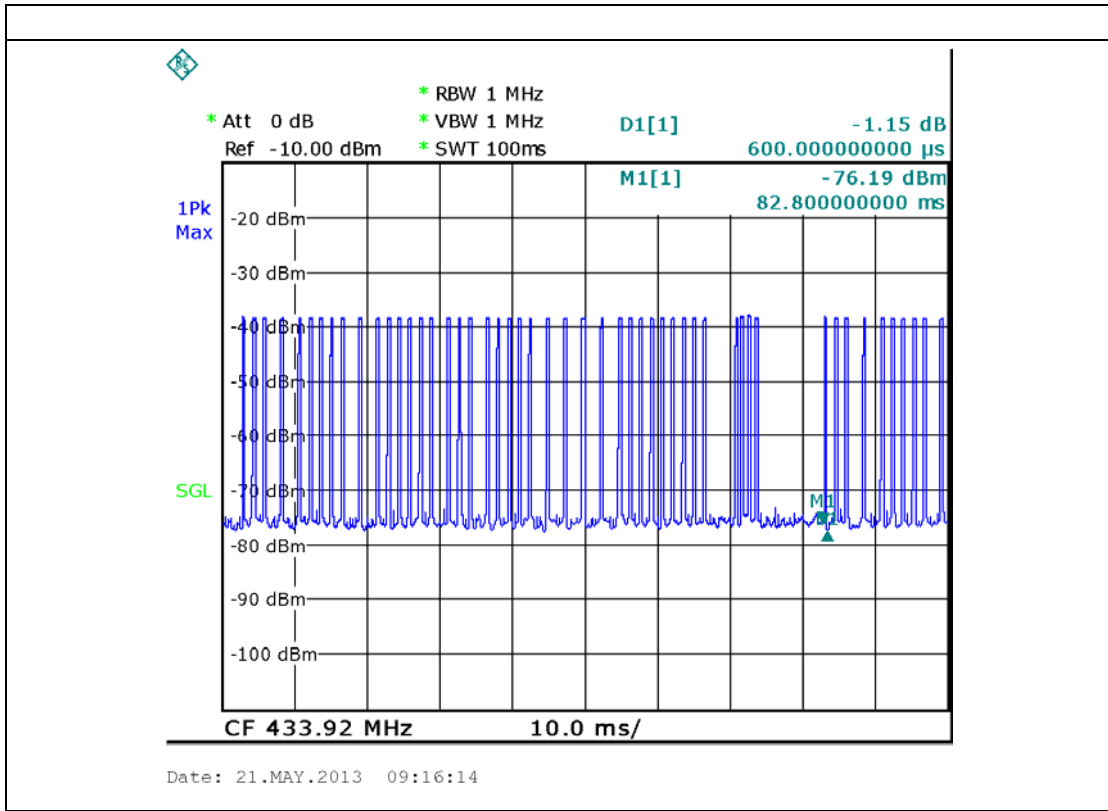
$$\text{Duty Cycle} = (0.6 \cdot 2 + 0.8 \cdot 49) / 100 \text{ msec} = 40.4\%$$

$$\text{Average Reading} = \text{Peak Reading (dBuV/m)} + 20 \log (\text{Duty cycle})$$

$$\text{Average Reading} = \text{Peak value} + 20 \log (\text{Duty cycle}) , AV = PK - 7.87$$



#### 4.2.4. DWELL TIME OF PERIODIC OPERATION MEASUREMENT





**4.2.5. MEASUREMENT INSTRUMENTS LIST**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Apr. 25, 2014
2	Amplifier	HP	8447D	2944A09673	Apr. 25, 2014
3	Test Receiver	R&S	ESCI	100382	Apr. 25, 2014
4	Test Cable	N/A	C-01_CB03	N/A	Jun.30.2013
5	Antenna	ETS	3115	00075789	Apr. 25, 2014
6	Amplifier	Agilent	8449B	3008A02274	Apr. 25, 2014
7	Spectrum	Agilent	E4408B	US39240143	Nov. 16.2013
8	Test Cable	HUBER+SUHNER	C-45	N/A	Apr. 30, 2014
9	Controller	CT	SC100	N/A	N/A
10	Horn Antenna	EMCO	3115	9605-4803	May.25.2013
11	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Apr. 25, 2014
12	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Oct.12.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

**4.2.6. TEST PROCEDURE**

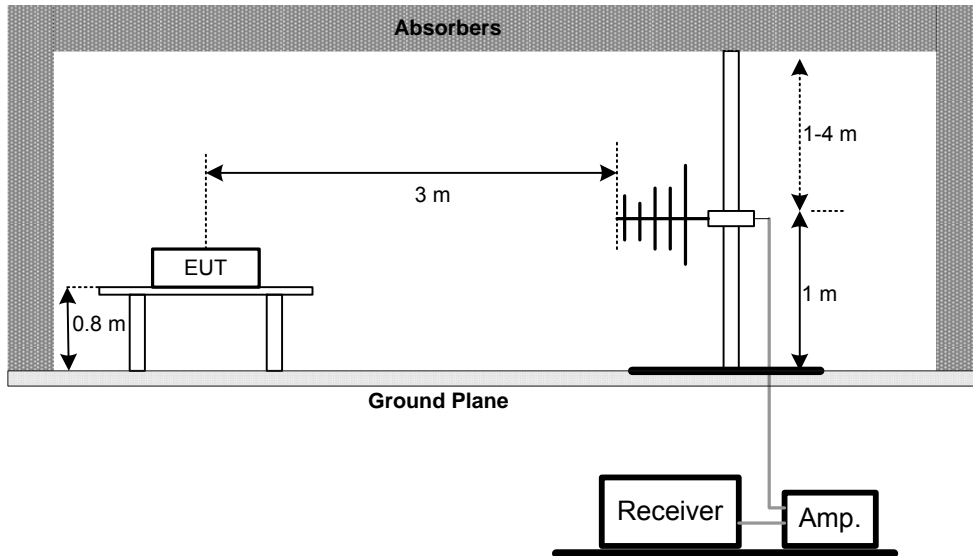
- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

**4.2.7. DEVIATION FROM TEST STANDARD**

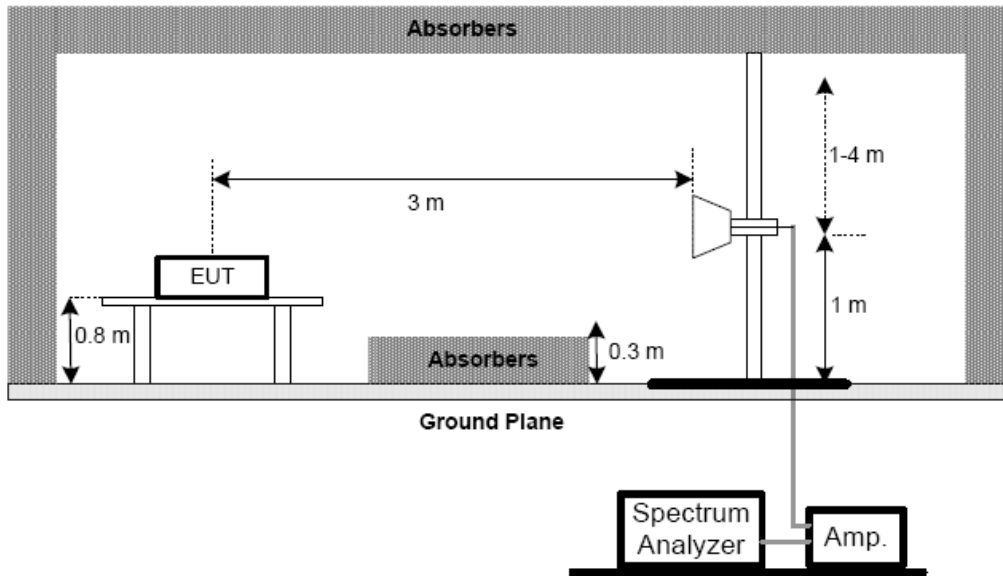
No deviation

4.2.8. TEST SETUP

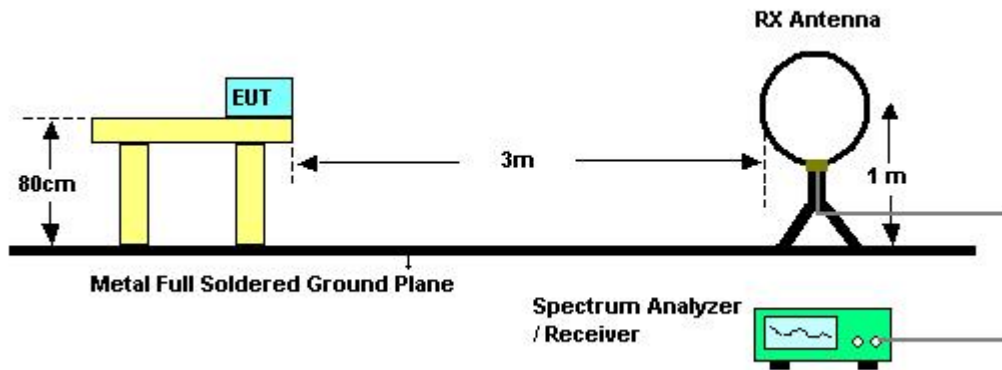
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



(C) For radiated emissions below 30MHz



#### 4.2.9. EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.



4.3.0 TEST RESULTS (9K~ 30MHz)

EUT:	Wireless Thermometer	Model Name. :	TX19
Temperature:	25 °C	Relative Humidity:	58 %
Test Voltage:	DC 3V		
Test Mode:	TX Mode		

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0095	0°	20.45	24.30	44.75	128.01	-83.26	AVG
0.0095	0°	21.78	24.30	46.08	148.01	-101.93	PK
0.0236	0°	19.54	24.07	43.61	120.13	-76.52	AVG
0.0236	0°	21.45	24.07	45.52	140.13	-94.61	PK
0.0375	0°	19.44	23.19	42.63	116.14	-73.50	AVG
0.0375	0°	22.34	23.19	45.53	136.14	-90.60	PK
0.0627	0°	18.36	22.15	40.51	111.66	-71.15	AVG
0.0627	0°	24.37	22.15	46.52	131.66	-85.14	PK
0.2543	0°	24.33	20.39	44.72	99.50	-54.78	AVG
0.2543	0°	24.78	20.39	45.17	119.50	-74.33	PK
1.2524	0°	25.12	19.57	44.69	65.65	-20.95	QP

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0094	90°	17.65	24.30	41.95	128.12	-86.17	AVG
0.0094	90°	21.37	24.30	45.67	148.12	-102.45	PK
0.0258	90°	16.27	23.94	40.21	119.39	-79.18	AVG
0.0258	90°	20.42	23.94	44.36	139.39	-95.03	PK
0.0344	90°	19.33	23.39	42.72	116.88	-74.16	AVG
0.0344	90°	21.78	23.39	45.17	136.88	-91.71	PK
0.0644	90°	21.07	22.11	43.18	111.42	-68.24	AVG
0.0644	90°	23.55	22.11	45.66	131.42	-85.76	PK
0.2372	90°	21.65	20.43	42.08	100.10	-58.03	AVG
0.2372	90°	23.75	20.43	44.18	120.10	-75.93	PK
1.2538	90°	24.67	19.57	44.24	65.64	-21.40	QP

Remark :

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor = 40 log (specific distance / test distance) (dB);.
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor..



4.3.1 TEST RESULTS (BETWEEN 30 – 1000 MHz)

EUT :	Wireless Thermometer	Model Name. :	TX19
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010hPa	Test Power :	DC 3V
Test Mode :	TX Mode		
<b>About the duty cycle correction factor calculated, please refer to the page 17~19</b>			

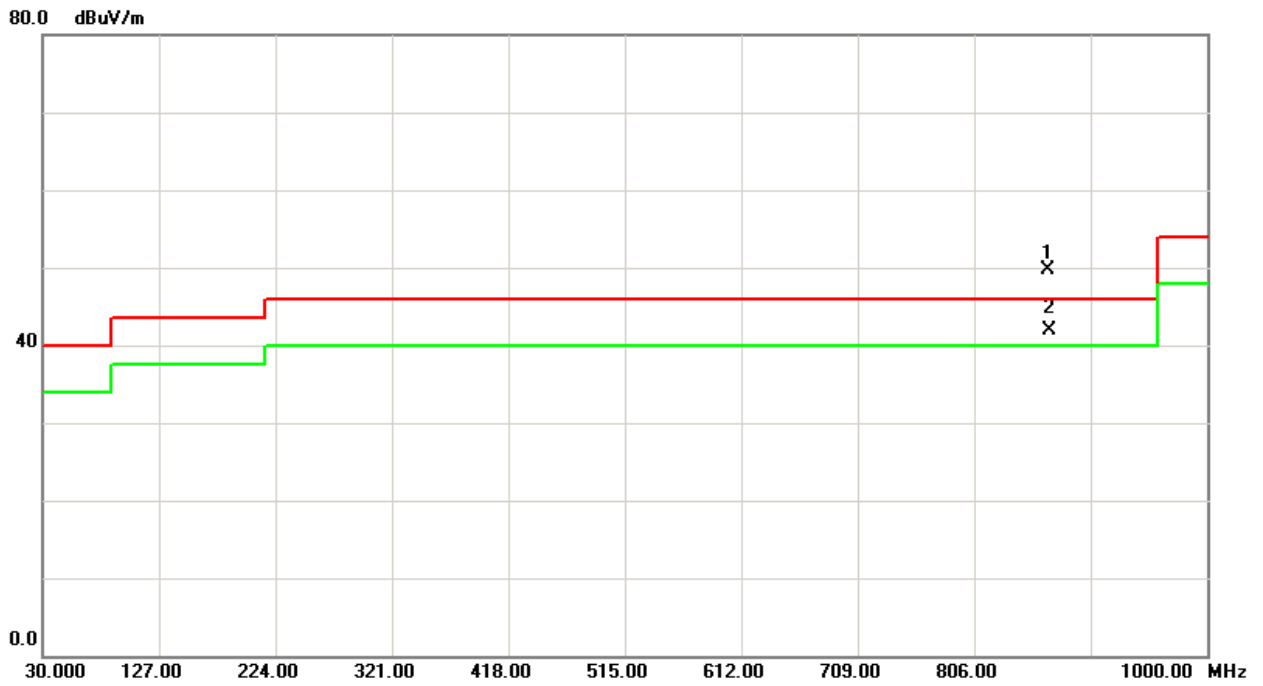
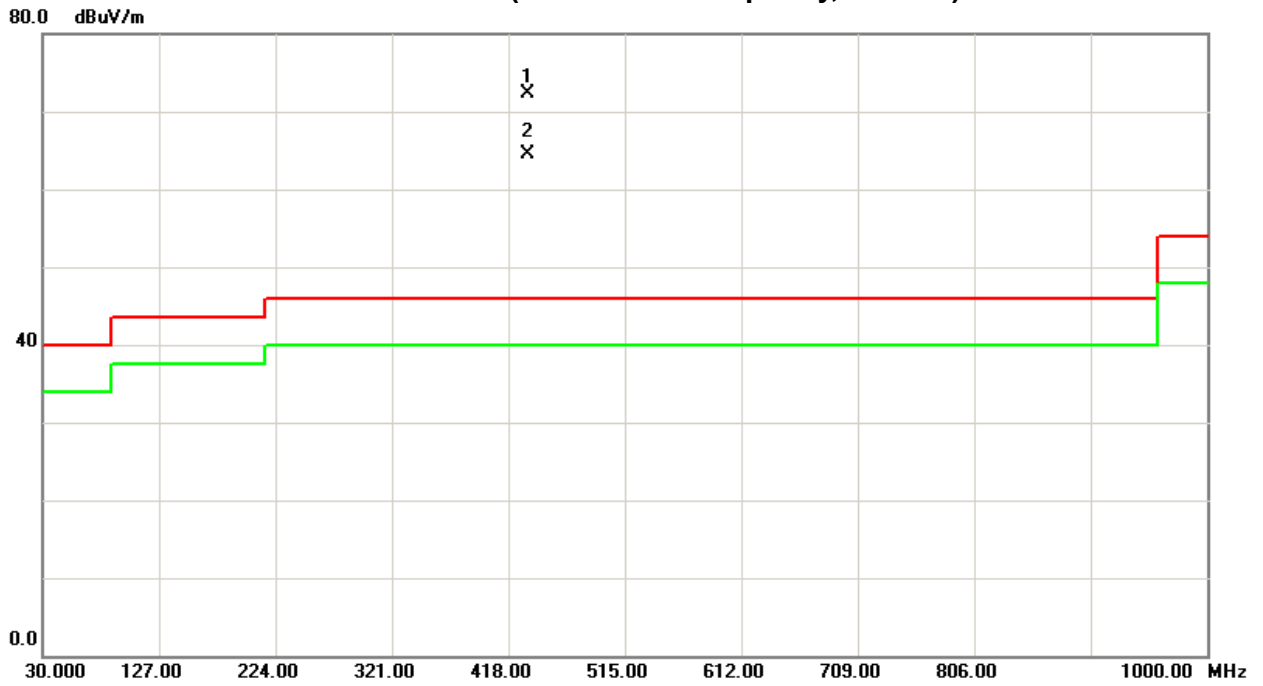
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Result
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
<b>433.88</b>	<b>V</b>	<b>81.65</b>	<b>73.78</b>	<b>-9.27</b>	<b>72.38</b>	<b>64.51</b>	<b>92.87</b>	<b>72.87</b>	<b>X/F</b>
867.76	V	52.15	44.28	-2.42	49.73	41.86	72.87	52.87	X/H

Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency ◦ “F” denotes fundamental frequency; “ H” denotes spurious frequency. “E” denotes band edge frequency.
- (3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission ◦
- (4) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) , Final AV=PK-7.87
- (6) EUT Orthogonal Axis :  
“X” - denotes Laid on Table ; “Y” - denotes Vertical Stand ; “Z” - denotes Side Stand



Orthogonal Axis : X  
TX 433.92 MHz (Fundamental frequency, Vertical)







EUT :	Wireless Thermometer	Model Name. :	TX19
Temperature :	25 °C	Relative Humidity :	63 %
Pressure :	1010hPa	Test Power :	DC 3V
Test Mode :	TX Mode		

**About the duty cycle correction factor calculated, please refer to the page 17~19**

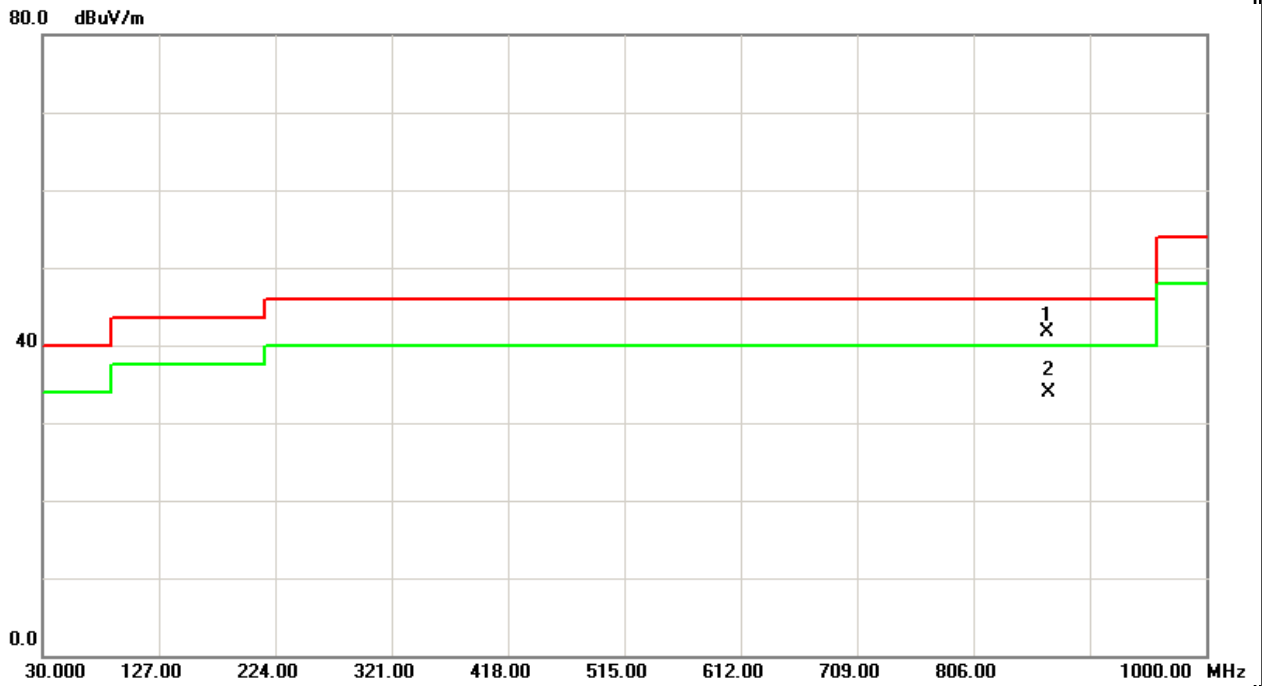
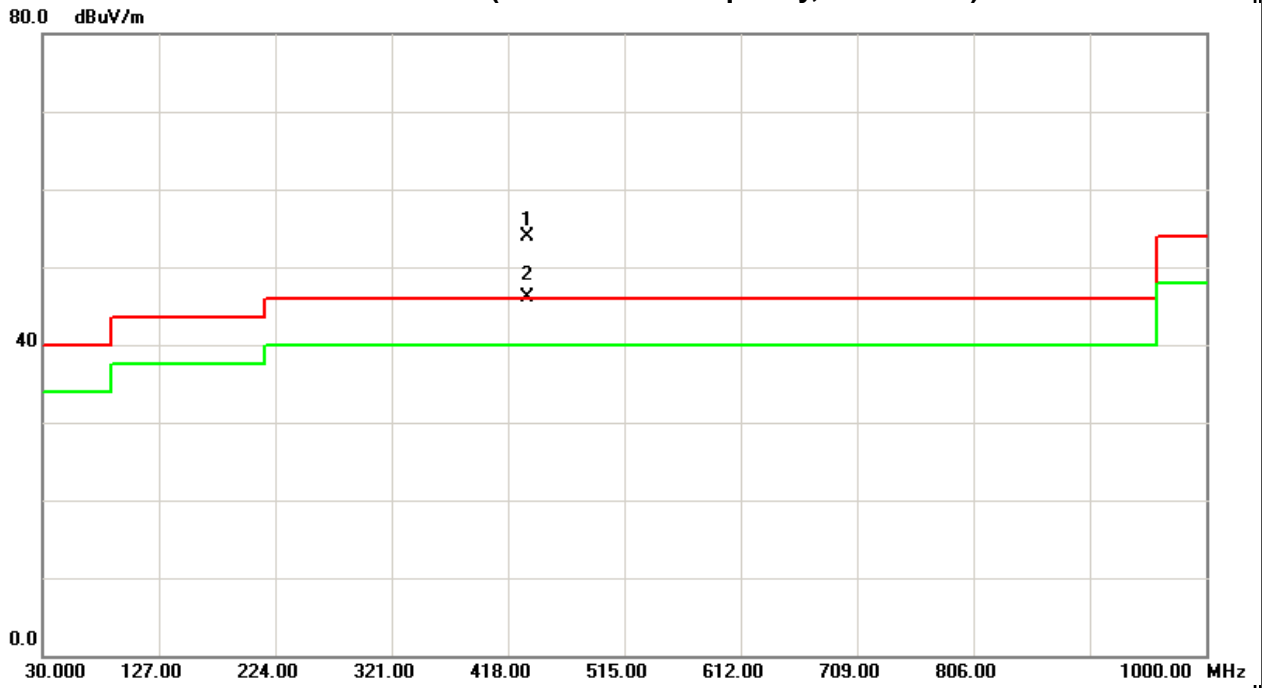
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Result
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
433.88	H	63.15	55.28	-9.27	53.88	46.01	92.87	72.87	X/F
867.75	H	44.20	36.33	-2.42	41.78	33.91	72.87	52.87	X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency ◦ “F” denotes fundamental frequency; “ H” denotes spurious frequency. “E” denotes band edge frequency.
- (3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission ◦
- (4) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) , Final AV=PK-7.87
- (6) EUT Orthogonal Axis :  
“X” - denotes Laid on Table ; “Y” - denotes Vertical Stand ; “Z” - denotes Side Stand



Orthogonal Axis : X  
TX 433.92 MHz (Fundamental frequency,Horizontal)





4.3.2 TEST RESULTS (ABOVE 1000 MHz)

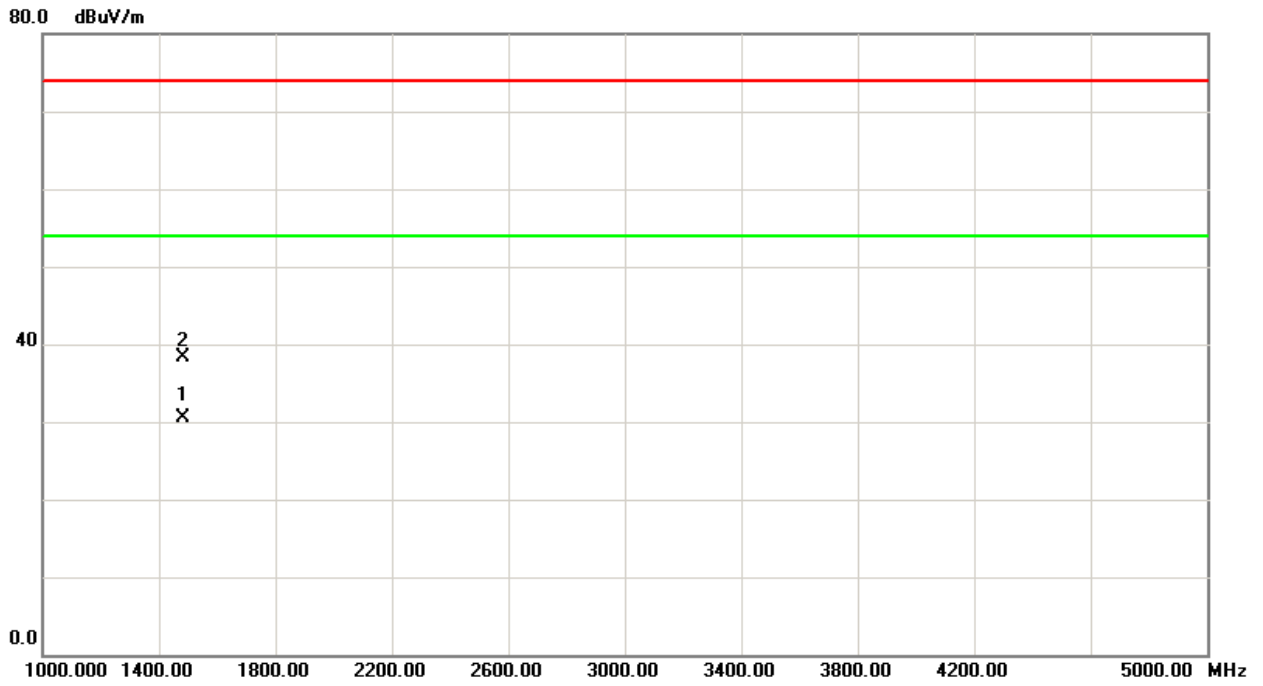
EUT :	Wireless Thermometer	Model Name. :	TX19
Temperature :	25 °C	Relative Humidity :	63 %
Pressure :	1010hPa	Test Power :	DC 3V
Test Mode :	TX CH 433.92 MHz		

**About the duty cycle correction factor calculated, please refer to the page 17~19**

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
1484.00	V	44.61	36.74	-6.29	38.32	30.45	74.00	54.00	X/H

Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency ◦ “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ◦
- (4) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) ◦ Final AV=PK-7.87
- (5) Data of measurement within this frequency range shown “ \* ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (7) EUT Orthogonal Axis :  
“X” - denotes Laid on Table ; ”Y” - denotes Vertical Stand ; ”Z” - denotes Side Stand
- (8) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna





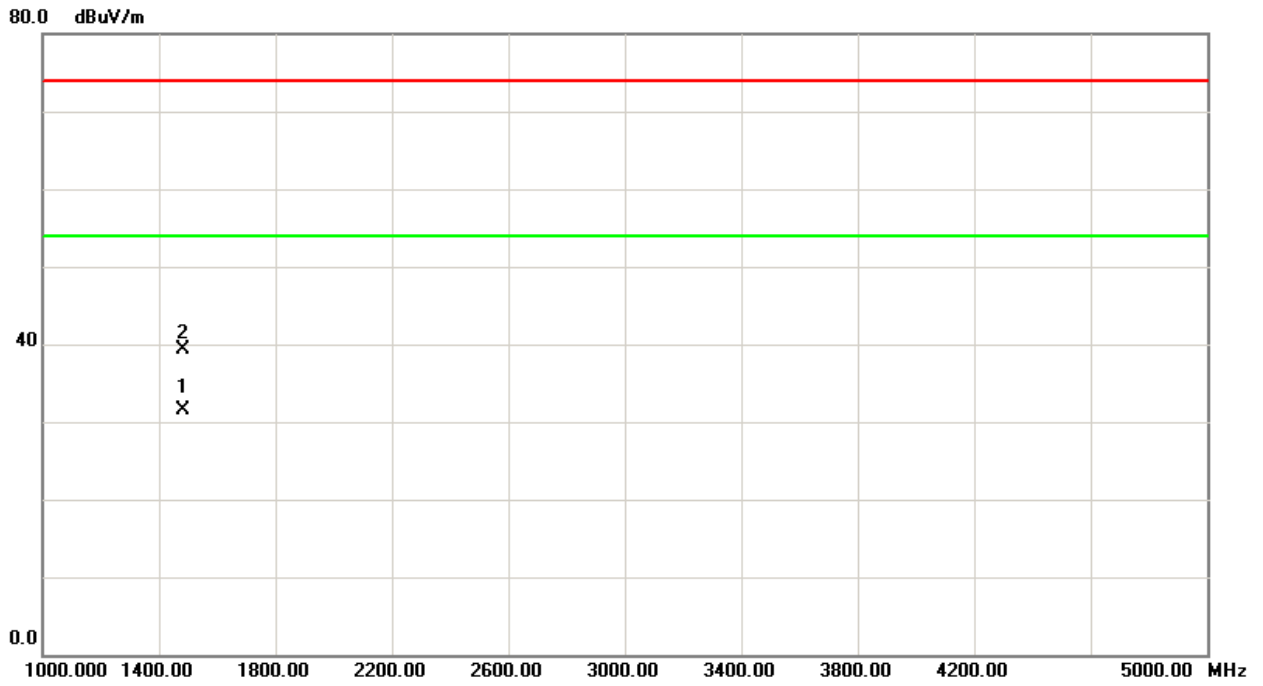
EUT :	Wireless Thermometer	Model Name. :	TX19
Temperature :	25 °C	Relative Humidity :	63 %
Pressure :	1010hPa	Test Power :	DC 3V
Test Mode :	TX CH 433.92 MHz		

**About the duty cycle correction factor calculated, please refer to the page 17~19**

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
1484.00	H	45.65	37.78	-6.29	39.36	31.49	74.00	54.00	X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency ◦ “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ◦
- (4) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) ◦ Final AV=PK-7.87
- (5) Data of measurement within this frequency range shown “ \* ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (7) EUT Orthogonal Axis :  
“X” - denotes Laid on Table ; “Y” - denotes Vertical Stand ; “Z” - denotes Side Stand
- (8) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna



## 5. 20dB SPECTRUM BANDWIDTH MEASUREMENT

Limit

The bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. So the emission bandwidth limits have been calculated in below table.

Fundamental Frequency	20dB Bandwidth Limits (MHz)
433.92 MHz	1.0848

### 5.1. MEASURING INSTRUMENTS AND SETTING

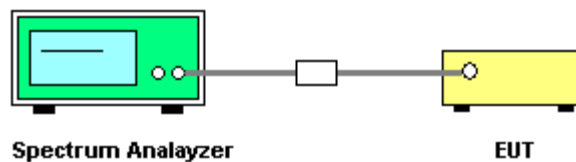
Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 20dB Bandwidth
RB	10 kHz
VB	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### 5.2. TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 10 kHz and the video bandwidth of 10 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

### 5.3. TEST SETUP LAYOUT



### 5.4. TEST DEVIATION

There is no deviation with the original standard.

### 5.5. EUT OPERATION DURING TEST

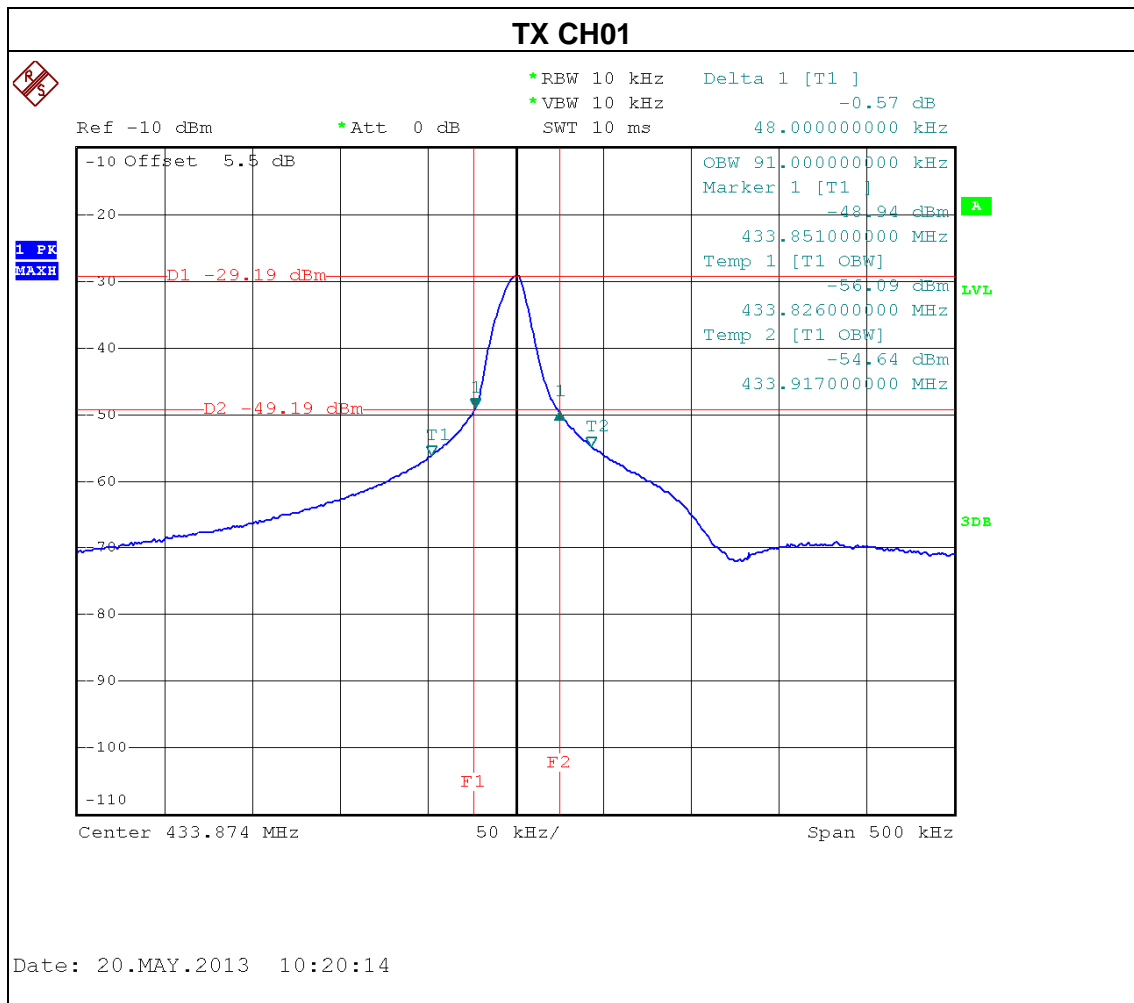
The EUT was programmed to be in continuously transmitting mode.



**5.6. TEST RESULT**

EUT :	Wireless Thermometer	Model Name. :	TX19
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Power :	DC 3V
Test Mode :	TX CH 01		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (KHz)	99% OBW (KHz)	Result
CH01	433.92	48.00	91.00	PASS





## 6. TIMING TESTING

### Limit

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 transmission but in no case less than 10 seconds.

### 6.1. MEASURING INSTRUMENTS AND SETTING

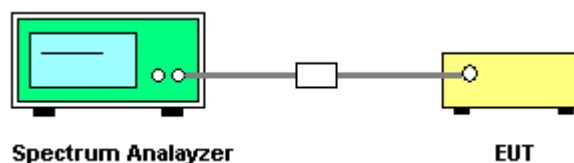
Please refer to section 6 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	Zero Span
RB	1MHz
VB	1MHz
Detector	Peak
Trace	Max Hold
Sweep Time	300 seconds

### 6.2. TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 1MHz and the video bandwidth of 1MHz were used.

### 6.3. TEST SETUP LAYOUT



### 6.4. TEST DEVIATION

There is no deviation with the original standard.

### 6.5. EUT OPERATION DURING TEST

The EUT was programmed to be in normal mode.

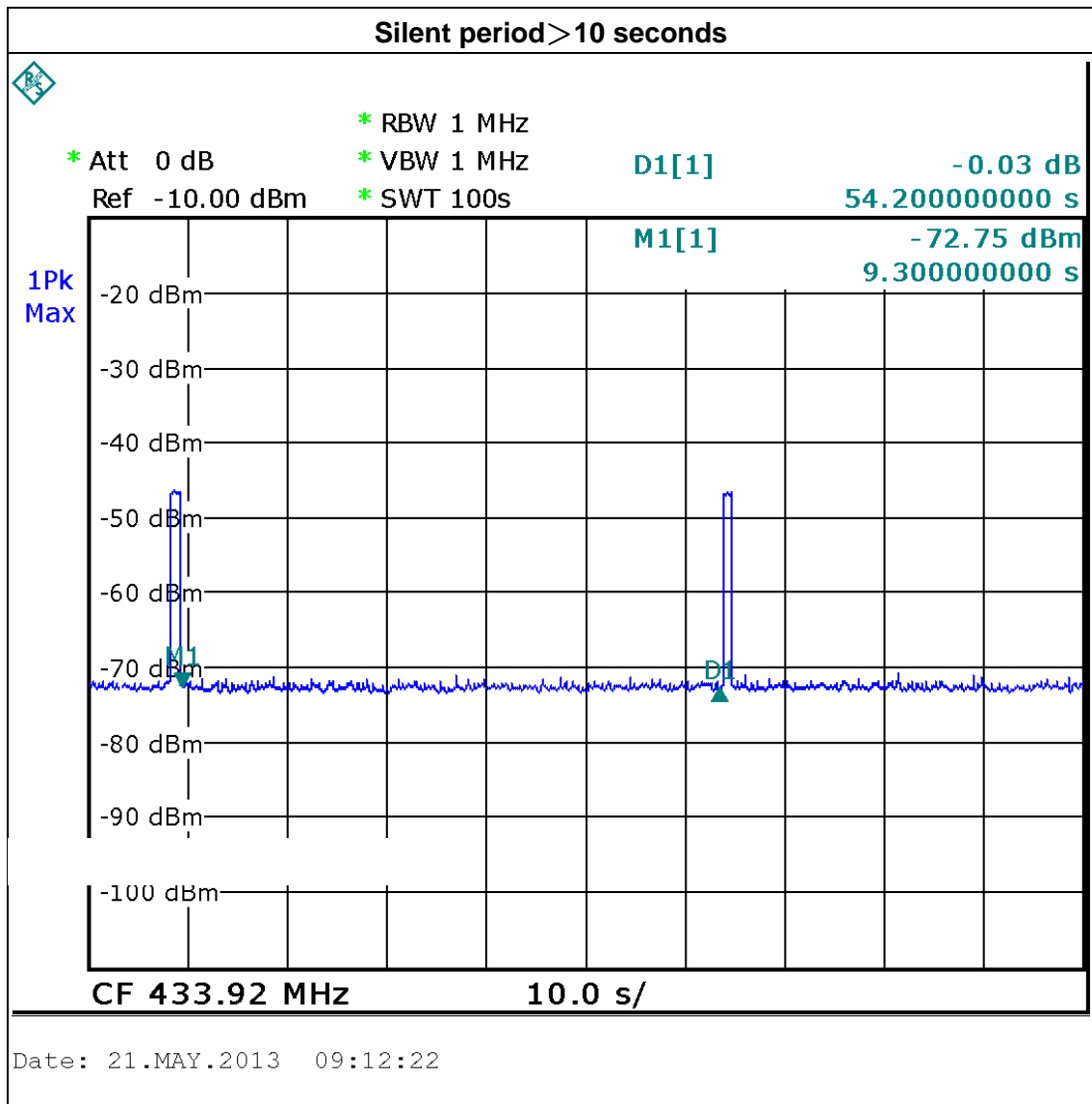


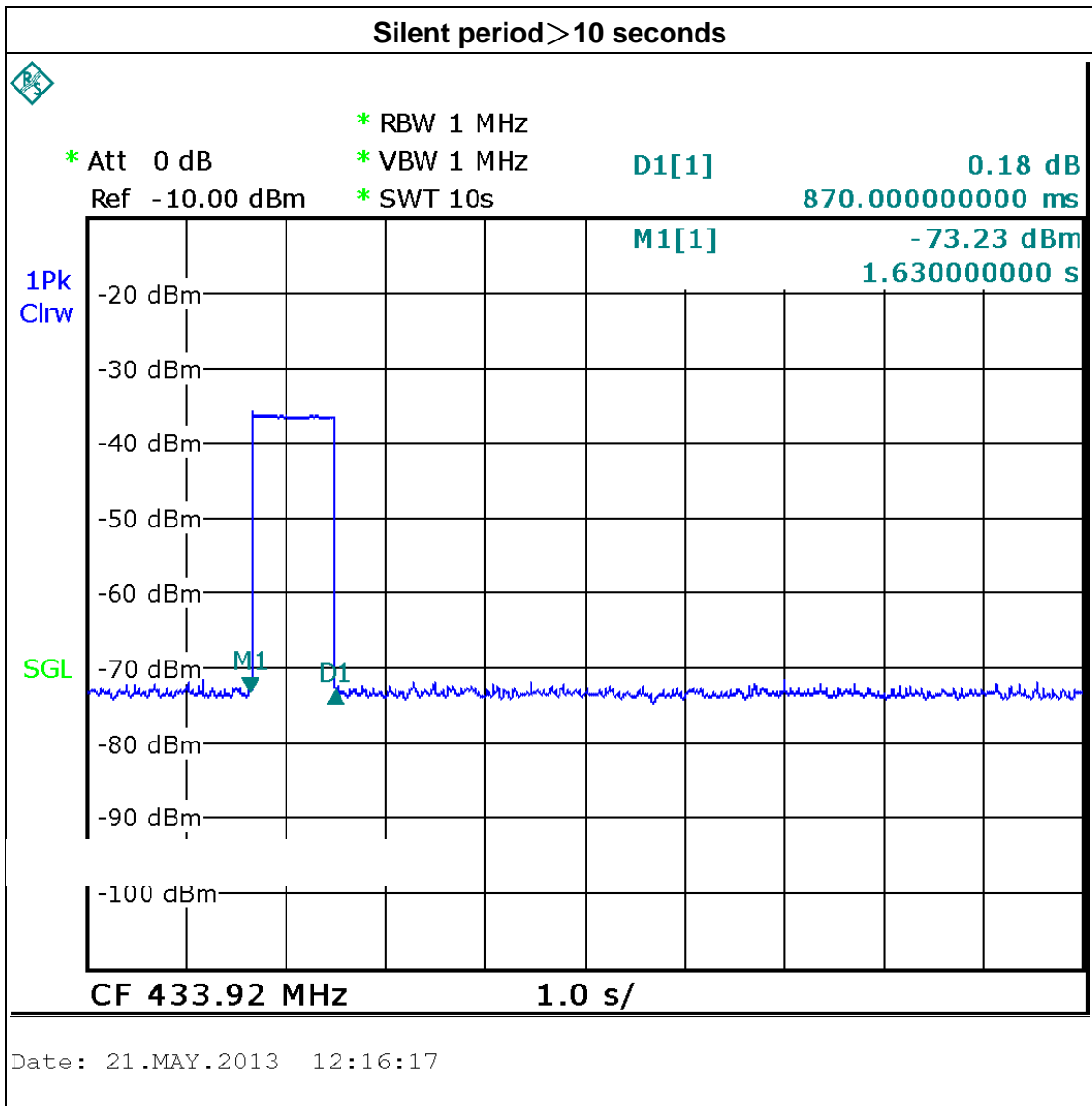
6.6. TEST RESULT

EUT :	Wireless Thermometer	Model Name. :	TX19
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Power :	DC 3V
Test Mode :	TX CH 01		

Test Channel	Frequency (MHz)	Silent period (seconds)	Silent period limit (seconds)	Result
CH01	433.92	54.2	> 10	PASS

Silent period = 54.2 s > 30\* 0.87 s = 26.1 s







**7. EUT TEST PHOTO**

**Radiated Measurement Photos  
9K~30MHz**



**Radiated Measurement Photos  
30~1000MHz**



**Radiated Measurement Photos  
Above 1000MHz**

