



**CTS (NINGBO) TESTING SERVICE TECHNOLOGY
INTERNATIONAL**

OPERATE ACCORDING TO ISO/IEC 17025

RF TEST REPORT

TEST REPORT NUMBER : CGZ3131008-00903-ER



CTS (Ningbo) Testing Service Technology Co., Ltd.
2/F., South Tower, Huoju Building, No.181, Canghai Road,
Jiangdong Science and Technology Park, Ningbo, Zhejiang, China

TEST REPORT	
ETSI EN 300 220-1 V 2.4.1, ETSI EN 300 220-2 V 2.4.1	
Electromagnetic compatibility and Radio spectrum matters(ERM); Short Range Devices(SRD); Radio equipment to be used in the 25MHz to 1000MHz frequency range with power levels ranging up to 500mW; Part 1: Technical characteristics and test methods ,Part 2: Harmonized EN covering essential requirements and article 3.2 of the R&TTE Directive	
Report Reference No.	CGZ3131008-00903-ER
Date of issue	10 October 2013
Testing Laboratory Name	CTS (Ningbo) Testing Service Technology Co., Ltd.
Address	GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China.
Testing location/ procedure	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
Applicant's name	SHERLOTRONICS SA (PTY) LTD.
Address	251 Aintree Rd, Northriding, Johannesburg, South Africa
Test specification:	
Standard	ETSI EN 300 220-1 V 2.4.1, ETSI EN 300 220-2 V 2.4.1
Test Report Form No.	CTSEMC-1.0
TRF Originator	CTS (Ningbo) Testing Service Technology Co., Ltd.
Master TRF	Dated 2009-01
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Test item description.	
WALL MOUNT REMOTE	
Trade Mark	/
Manufacturer	SHERLOTRONICS SA (PTY) LTD.
Model/Type reference	WMTX
Ratings/Frequency	Battery 3V
Result	PASSED

Compiled by:


Kate zhang / File administrators

Supervised by:


Duke yang / Technique principal

Approved by:


Vincent yao / Manager

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RF -- TEST REPORT

Test Report No. : CGZ3131008-00903-ER	<u>10 October 2013</u> Date of issue
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Type / Model.....	WMTX
EUT.....	WALL MOUNT REMOTE
Applicant	SHERLOTRONICS SA (PTY) LTD.
Address.....	251 Aintree Rd, Northriding, Johannesburg, South Africa
Telephone.....	+11-4625101
Fax.....	+11-4628177
Contact.....	Simon Knott
Manufacturer	SHERLOTRONICS SA (PTY) LTD.
Address.....	251 Aintree Rd, Northriding, Johannesburg, South Africa
Telephone.....	+11-4625101
Fax.....	+11-4628177
Contact.....	Simon Knott
Factory	SHERLOTRONICS SA (PTY) LTD.
Address.....	251 Aintree Rd, Northriding, Johannesburg, South Africa
Telephone.....	+11-4625101
Fax.....	+11-4628177
Contact.....	Simon Knott

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

ETSI EN 300 220-1 V 2.4.1, ETSI EN 300 220-2 V 2.4.1

Electromagnetic compatibility and Radio spectrum matters(ERM); Short Range Devices(SRD); Radio equipment to be used in the 25MHz to 1000MHz frequency range with power levels ranging up to 500mW;
Part 1: Technical characteristics and test methods ,
Part 2: Harmonized EN covering essential requirements and article 3.2 of the R&TTE Directive.

2 SUMMARY

2.1 GENERAL REMARKS

Date of receipt of test sample	09 October 2013
Testing commenced on	09~10 October 2013
Testing concluded on	10 October 2013

2.2 FINAL ASSESSMENT

The RF requirements pertaining to the technical standards and tested operation modes are

- fulfilled.
- **not** fulfilled.

The equipment under test

- fulfils the RF requirements cited on page 1.
- **does not** fulfil the RF requirements cited on page 1.

3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage: Battery 3V
 Other (Specified blank below)

3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: 1
Serial number: Prototype
Frequency band: 433.902 MHz
Modulation: AM OOK

3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

- TX

Operating Mode: TX

Emissions tests.....: According to **ETSI EN 300 220-1 V 2.4.1, ETSI EN 300 220-2 V 2.4.1**
searching for the highest disturbance.

3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement:

Not Applicable

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China

Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

4.2 Test facility

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

CNAS-Lab Code: L3394

CTS (Ningbo) Testing Service Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

IC-Registration No.: 8374A

The 3m Alternate Test Site of CTS (Ningbo) Testing Service Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374 on June 06, 2011 .

FCC-Registration No.: 971995

CTS (Ningbo) Testing Service Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.971995, July 13, 2012.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 ° C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Parameter	Uncertainty
Total RF Power	$\pm 1.914\text{dB}$
RF Power density, Conducted	$\pm 1.5\text{dB}$
Frequency Range	$\pm 0.227\text{KHz}$
All emissions, Radiated	$\pm 4.04\text{dB}$
Temperature	$\pm 0.3^{\circ}\text{C}$
Humidity	$\pm 2.0\% \text{ RH}$
Voltage(DC)	± 0.223
Voltage(AC, <10KHz)	± 0.262

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4.6 Test Description and Results

Test case	Subclause	Results
<i>TRANSMITTER PARAMETERS</i>		
Frequency error	7.1	PASS
Carrier power (conducted)	7.2	N/A
Effective radiated power	7.3	PASS
Spread spectrum modulation	7.4	N/A
Transient power	7.5	N/A
Adjacent channel power	7.6	PASS
Modulation bandwidth for wideband equipment	7.7	N/A
Spurious emissions	7.8	PASS
Frequency stability under low voltage conditions	7.9	PASS
Duty cycle	7.10	PASS
<i>RECEIVER PARAMETERS</i>		
Maximum usable sensitivity	8.1	N/A
Receiver LBT threshold and transmitter max on-time	8.2	N/A
Adjacent band selectivity	8.3	N/A
Blocking or desensitization	8.4	N/A
Receiver spurious radiations	8.6	PASS
Note: N/A= Not applicable		

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5 TEST CONDITIONS AND RESULTS

5.1 Frequency error

For test instruments and accessories used see section 6 part 6.1.

5.1.1 Limit for normal and extreme test conditions

Frequency error for systems with channel spacings of less than or equal to 25KHz

Channelization	Frequency error limit(KHz)				
	<47MHz	47MHz to 137MHz	>137MHz to 300MHz	>300MHz to 500MHz	>500MHz to 1000MHz
Channelized Systems	± 10, 0	± 10, 0	± 10, 0	± 10, 0	± 10, 0
NOTE 1: Adjacent channel power as defined in clause 7.6.1 shall not exceed the limit in clause 7.6.3. NOTE 2: For equipment having a channel spacing of 12,5 kHz or less, the frequency error limit shall not exceed 50 % of the channel spacing.					

Frequency error for all others systems

Operating frequency	Frequency error limit (ppm),see note
≤ 1000MHz	± 100
NOTE: The frequency error measured shall not exceed the designated frequency band.	

5.1.2 Test Procedure reference clause 7.1.2.1 of ETSI EN 300 220-1 V 2.4.1

5.1.3 Test Results for normal and extreme test conditions

This measurement is only applicable if the equipment is capable of producing an unmodulated carrier.

Note: This equipments can not produce an unmodulated carrier.



Test Temp.	Test Voltage (V dc)	Frequency (MHz)	Error (KHz)	Limit (ppm)
-20°C	3.45	433.905	+3	± 100
	3.00	433.901	-1	
	2.55	433.903	+2	
25°C	3.45	433.902	0	
	3.00	433.902	0	
	2.55	433.903	+1	
55°C	3.45	433.902	0	
	3.00	433.902	0	
	2.55	433.901	-1	
Measurement uncertainty		± 0.227(KHz)		
Test Result:PASS				

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5.2 Effective radiated power

For test instruments and accessories used see section 6 part 6.2.

5.2.1 Limit for normal test conditions

Class	Power level
5a	0,025 mW/-16.0 dBm
7a	5 mW/7.0 dBm
8	10 mW/10.0 dBm
9	25 mW/14.0 dBm
11	100 mW/20.0 dBm
12	500 mW/27.0 dBm

The class designation is based on CEPT/ERC Recommendation 70-03.

5.2.2 Test Procedure reference clause 7.3.2 of ETSI EN 300 220-1 V 2.4.1

5.2.3 Test Results for normal test conditions

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

The power was measured with an modulated carrier.

Test conditions		Test Frequency	TRANSMITTER POWER	
			[dBm]	[mw]
$T_{nom} = 25\text{ }^{\circ}\text{C}$	$V_{nom} = 3.0\text{ V}$	433.902	-17.42	0.018
Measurement uncertainty:		$\pm 4.04\text{ dB}$		
Test Results:		PASS		

Test by	Eric
Test date	2013-10-09

5.3 Adjacent channel power

For test instruments and accessories used see section 6 part 6.3.

5.3.1 Limit for normal and extreme test conditions

Channel separation of the EUT	normal test conditions	extreme test conditions
< 20 kHz	10 μ W (-20dBm)	32 μ W (-15,059dBm)
\geq 20 kHz	200 nW(-36,989dBm)	640 nW(-31,940dBm)

5.3.2 Test Procedure reference clause 7.6.2 of ETSI EN 300 220-1 V 2.4.1

5.3.3 Test result

5.3.3 This measurement are not applicable for wide band equipment.

Test conditions		Test results(dBm)	Limits	Results
$T_{nom}=25\text{ }^{\circ}\text{C}$	$V_{nom} = 3.00\text{ V}$	-40.66	10 μ W (-20dBm)	Pass
				Pass
$T_{min}=-10\text{ }^{\circ}\text{C}$	$V_{nom} =3.00\text{V}$	-43.50	32 μ W (-15,059dBm)	Pass
				Pass
$T_{max} = 55\text{ }^{\circ}\text{C}$	$V_{min} = 3.00\text{ V}$	-42.44	32 μ W (-15,059dBm)	Pass
Measurement uncertainty		$\pm 3\text{ dB}$		

Comment:Channle Separation of the EUT< 20 kHz

Test by	Eric
Test date	2013-10-09

5.4 Transmitter Spurious emissions

For test instruments and accessories used see section 6 part 6.4.

5.4.1 Limits reference clause 7.8.5 of ETSI EN 300 220-1 V 2.4.1, Detail see below.

Frequency \ State	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies below 1 000 MHz	Frequencies above 1 000 MHz
Operating	4 nW	250 nW	1 μ W
Standby	2 nW	2 nW	20 nW

5.4.2 Test Procedure reference clause 7.8 of ETSI EN 300 220-1 V 2.4.1

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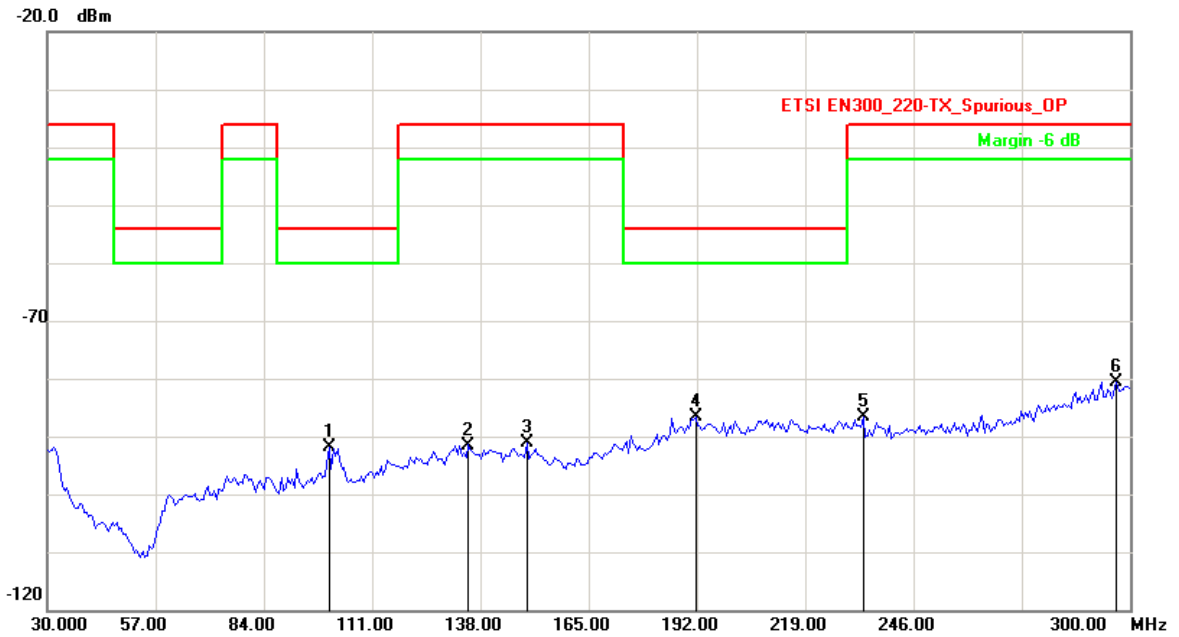
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5.5.3 Test Results

Test point: Operation mode Remarks:	Horizontal Normal TX Operating	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
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EUT	WALL MOUNT REMOTE
Operating Condition	Battery 3V
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Eric
MODEL NO.	WMTX



No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	100.3407	-23.06	-68.77	-91.83	-54.00	-37.83	peak
2	134.9699	-16.72	-74.78	-91.50	-36.00	-55.50	peak
3	149.5792	-17.30	-73.80	-91.10	-36.00	-55.10	peak
4	191.7836	-12.13	-74.54	-86.67	-54.00	-32.67	peak
5	233.4469	-12.61	-73.89	-86.50	-36.00	-50.50	peak
6	296.7535	-6.05	-74.59	-80.64	-36.00	-44.64	peak

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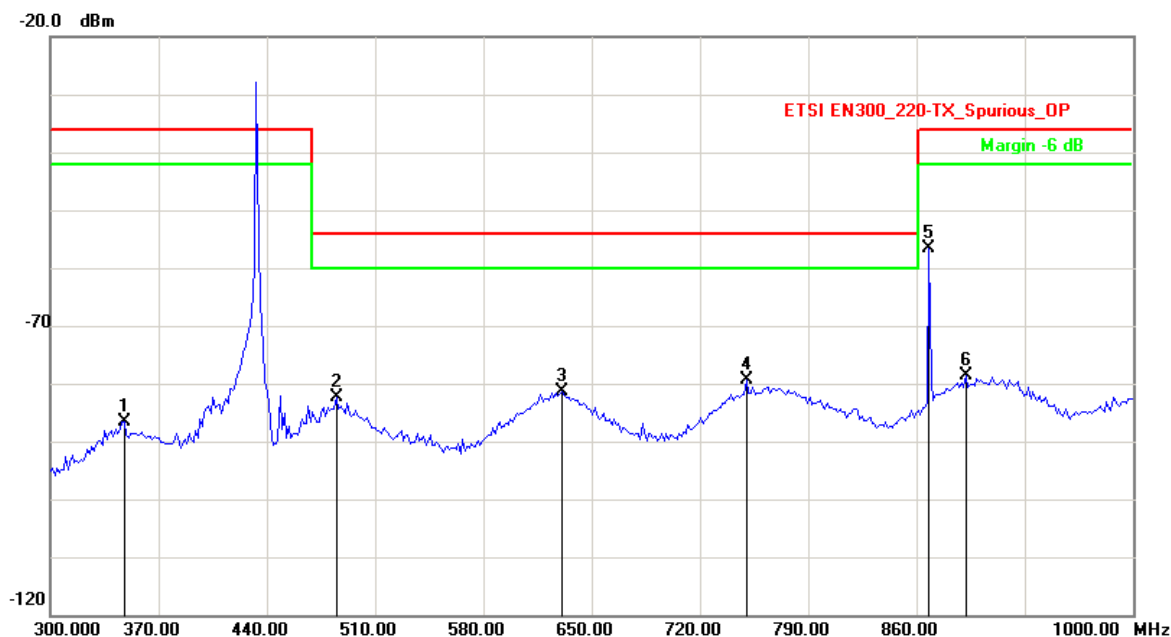
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No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	347.6953	-13.41	-73.12	-86.53	-36.00	-50.53	peak
2	485.1703	-9.81	-72.51	-82.32	-54.00	-28.32	peak
3	631.0621	-7.37	-74.07	-81.44	-54.00	-27.44	peak
4	750.3006	-6.30	-73.13	-79.43	-54.00	-25.43	peak
5	868.1362	-7.54	-49.05	-56.59	-36.00	-20.59	peak
6	891.9839	-4.33	-74.34	-78.67	-36.00	-42.67	peak

Above 1GHZ

No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	1282.565	-3.28	-47.07	-50.35	-30.00	-20.35	peak
2	1729.960	-1.27	-56.06	-57.33	-30.00	-27.33	peak
3	2153.808	0.36	-33.60	-33.24	-30.00	-3.24	peak
4	3025.050	6.68	-51.17	-44.49	-30.00	-14.49	peak
5	3896.293	9.48	-55.68	-46.20	-30.00	-16.20	peak
6	6980.962	17.75	-63.92	-46.17	-30.00	-16.17	peak

Note:Level=Reading+Factor. Margin=Limit-Level.

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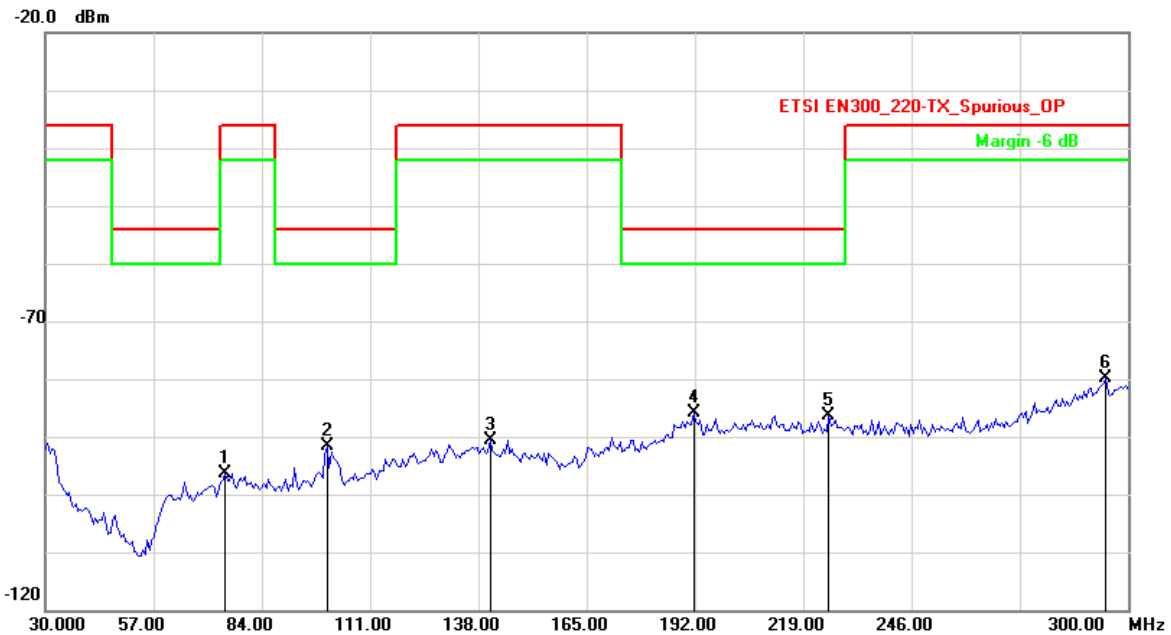
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Test point:	Vertical	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:	TX Operating		

EUT	WALL MOUNT REMOTE
Operating Condition	Battery 3V
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Eric
MODEL NO.	WMTX



No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	74.9098	-21.48	-74.88	-96.36	-36.00	-60.36	peak
2	100.3407	-23.06	-68.64	-91.70	-54.00	-37.70	peak
3	140.9218	-16.47	-74.16	-90.63	-36.00	-54.63	peak
4	191.7836	-12.13	-73.73	-85.86	-54.00	-31.86	peak
5	225.3307	-12.38	-74.04	-86.42	-54.00	-32.42	peak
6	294.5892	-6.38	-73.57	-79.95	-36.00	-43.95	peak

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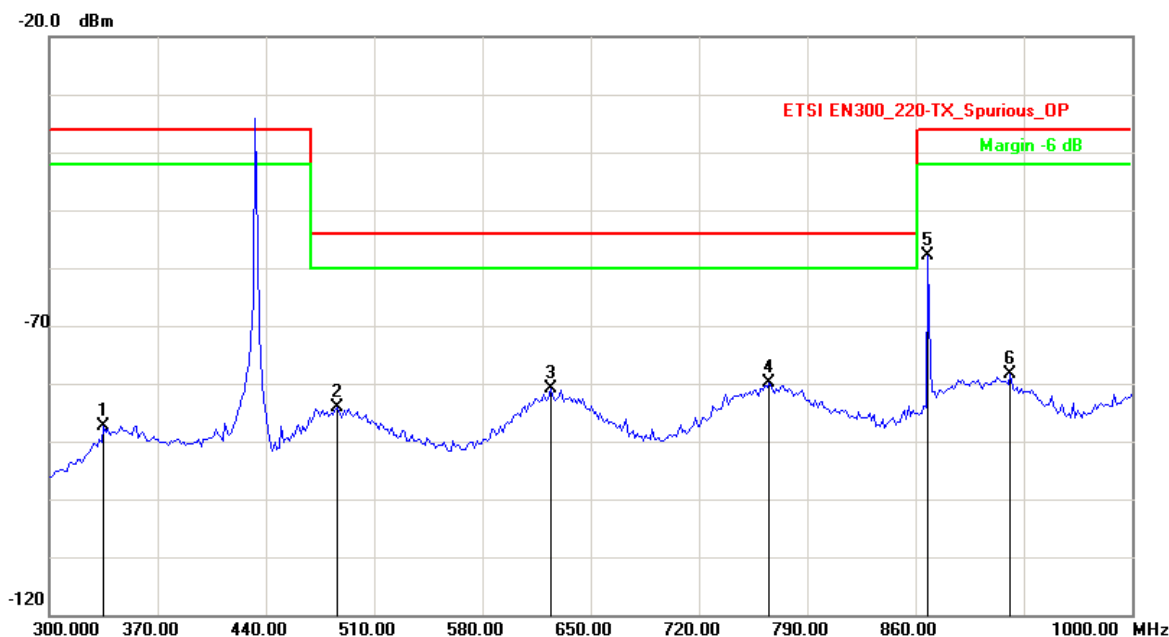
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No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	335.0701	-14.31	-73.08	-87.39	-36.00	-51.39	peak
2	486.5731	-9.85	-74.35	-84.20	-54.00	-30.20	peak
3	624.0480	-7.18	-73.72	-80.90	-54.00	-26.90	peak
4	765.7315	-5.62	-74.28	-79.90	-54.00	-25.90	peak
5	868.1363	-7.54	-50.45	-57.99	-36.00	-21.99	peak
6	921.4429	-4.70	-73.77	-78.47	-36.00	-42.47	peak

Above 1GHZ

No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	1282.565	-3.28	-43.54	-46.82	-30.00	-16.82	peak
2	2153.808	0.36	-44.40	-44.04	-30.00	-14.04	peak
3	3025.050	6.68	-55.46	-48.78	-30.00	-18.78	peak
4	3896.293	9.48	-54.28	-44.80	-30.00	-14.80	peak
5	4767.535	11.61	-63.02	-51.41	-30.00	-21.41	peak
6	6957.415	17.70	-63.54	-45.84	-30.00	-15.84	peak

Above 1G test results Margin all >10dBm

Note: Level=Reading+Factor. Margin=Limit-Level.

Test by	Eric
Test date	2013-10-09

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5.5 Frequency Stability under low voltage conditions

For test instruments and accessories used see section 6 part 6.5.

5.5.1 Limits reference clause 7.9.3 of ETSI EN 300 220-1 V 2.4.1

5.5.2 Test Procedure reference clause 7.9.2 of ETSI EN 300 220-1 V 2.4.1

5.5.3 Test Results

This test is required for battery operated equipment only.

Test result: The equipment under test remains within the assigned operating frequency band whilst the radiated or conducted power is greater than the spurious emission limits.

Test conditions		Test results(MHz)	Error(kHz)	Results
$T_{nom}=25\text{ }^{\circ}\text{C}$	$V_{nom} = 3.0\text{V}$	433.902	0	Pass
$T_{nom}=25\text{ }^{\circ}\text{C}$	$V_{ext} = 2.5\text{ V}$	433.901	-1	Pass
$T_{nom}=25\text{ }^{\circ}\text{C}$	$V_{ext} = 2.0\text{ V}$	433.899	-3	Pass
End point	$V_{ext} = 1.5\text{ V}$	433.897	-5	Pass

Test by	Eric
Test date	2013-10-09

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5.6 Duty cycle

For test instruments and accessories used see section 6 part 6.6.

5.6.1 Limits reference clause 7.10.3 of ETSI EN 300 220-1 V 2.4.1

Class	Duty cycle ratio
1	<0,1%
2	<1,0%
3	<10%
4	Up to 100%

5.6.2 Test Procedure reference clause 7.10.2 of ETSI EN 300 220-1 V 2.4.1

5.6.3 Test Results

The typical usage pattern as declared by the manufacturer is: Up to 100%

Test by	Eric
Test date	2013-10-09

6 USED TEST EQUIPMENT

6.1

Effective isotropic radiated power					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2013/03/28
2	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2013/03/29
3	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2013/03/29
4	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2013/03/29
5	Pre-Amplifier	EMC	EMC330	980113	2013/03/28
6	Pre-Amplifier	EMC	EMC012645	980114	2013/03/28
7	Temperature Chamber	GW	GDS-150	1016	2013/03/29
8	Oscilloscope	Agilent	DSO6104A	MY40009313	2013/03/29
9	Power meter	ROHDE & SCHWARZ	NRVS	842856/049	2012/11/06

6.2

Frequency Range					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2013/03/28
2	Temperature Chamber	GW	GDS-150	1016	2013/03/29

6.3

Spurious Emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2013/03/28
2	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2013/03/29
3	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2013/03/29
4	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2013/03/29
5	Pre-Amplifier	EMC	EMC330	980113	2013/03/28
6	Pre-Amplifier	EMC	EMC012645	980114	2013/03/28
7	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.4

Dwell Time					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2013/03/28

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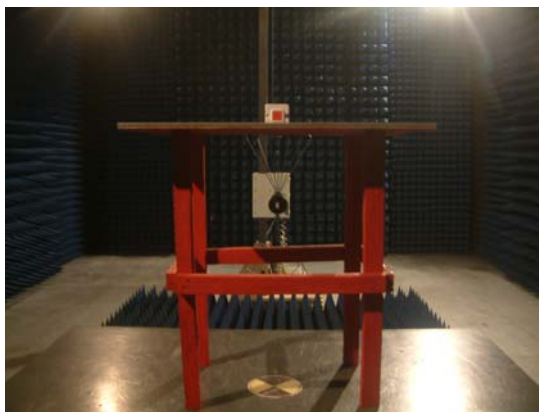
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7 TEST PHOTOGRAPHS

7.1. Photo of radiated emission measurement (R.E. Electric field)



RE Below 1GHz



RE Above 1GHz

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8 External Photos of the EUT



External view 1



External view 2



External view 3

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External view 4



External view 5



External view 6

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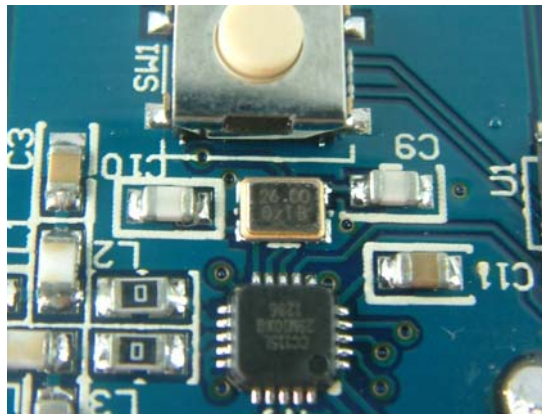
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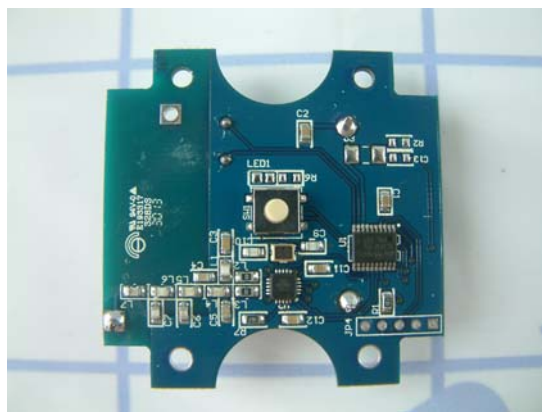
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Oscillator



Internal view 1



PCB side 1

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PCB side 2

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9 Manufacturer/ Approval holder Declaration

The following identical model(s):

N/A

Belong to the tested device:

Product description: **WALL MOUNT REMOTE**
Model name: **WMTX**