



Intertek Testing Services

ETL SEMKO

FCC ID. : QLQST313

Report No.: EME-020823
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EMC TEST REPORT

Report No. : EME-020823
Model No. : ST313-T
Issued Date : Aug. 27, 2002

Applicant : Mesure Technology Co., Ltd.
7F. No. 86, Sec. 1, Kwangfu Road, San Chung City,
Taipei Hsien, Taiwan, R.O.C.

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Ko-Tze-Nan Chia-Tung Li, Shiang-Shan District,
Hsinchu, Taiwan, R.O.C.

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Project Engineer

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Summary of Tests

Wireless Temperature Monitor -Model: ST313-T FCC ID: QLQST313

Test	Reference	Results
Conducted Emission of AC Power	15.207	Complies
Radiated Emission test	15.231(b), 15.209	Complies
Measured bandwidth	15.231(c)	Complies



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1. General information

1.1 Identification of the EUT

Manufacturer	: Mesure Technology Co., Ltd.
Product	: Wireless Temperature Monitor
Model No.	: ST313-T
FCC ID.	: QLQST313
Frequency Range	: 433.92MHz
Channel Number	: 1
Frequency of each channel	: 433.92MHz
Type of Modulation	: ASK
Power Supply	: 3Vdc mercury battery ×1
Power Cord	: N/A
Sample Received	: July 22, 2002
Test Date(s)	: July 22, 2002

A DoC report has been generated for the client.

1.2 Additional information about the EUT

The product is designed for the children who cannot get to sleep or patients with bad sleep habit. Patient's body temperature can be monitored any time by using this product.

The EUT has a trade name: MSR, and the difference is the same model number for different brand serves as marketing strategy.

For more detail features, please refer to User's manual as file name "Installation guide.pdf"



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1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : -30dBi

Antenna Type : Loop antenna

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section 15.231.

2.2 Operation mode

EUT was used a new 3Vdc mercury battery. Press any key of the EUT.

Once the button releasing, the transmission will be stopped within 1 second.

The EUT transmitted continuously and the duty cycle of transmitting was set to worst case condition (100% duty cycle), which provided by manufacturer during all the tests.

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Series No.	Cal.Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	825788/014	May 24, 2002
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	825428/005	June 10, 2002
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2002
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5822	Sep. 10, 2001
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	159	June 20, 2002
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	3111	June 20, 2002
Turn Table	HDGmbH	N/A	DS 420S	420/669/01	N/A
Antenna Tower	HDGmbH	N/A	MA 240	240/573	N/A
Microwave Amplifier	Agilent	2GHz~26.5GHz	8348A	3111A00567	Dec. 20, 2001

Note:

1. The calibration interval of the above instruments is 12 months.

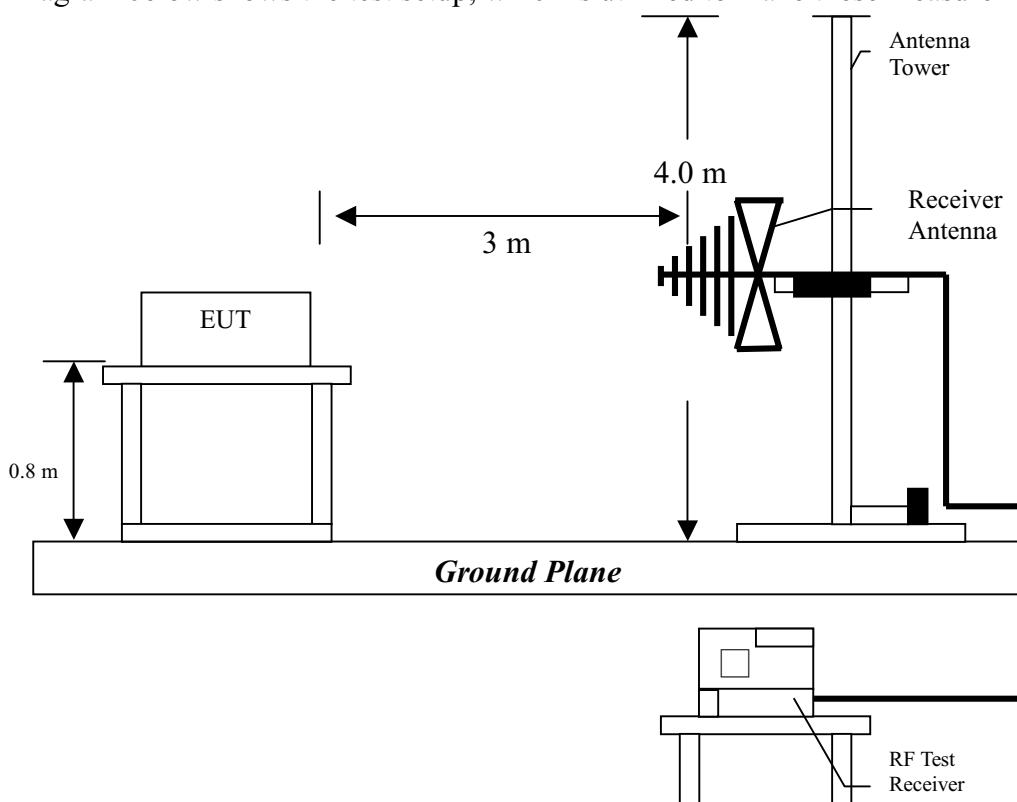
3. Radiated emission test FCC 15.231 (b)

3.1 Operating environment

Temperature: 22 °C
Relative Humidity: 59 %

3.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



The signal is maximized through rotation and placement in the three orthogonal axes. Radiated emission measurements were performed from 30MHz to 25GHz. Spectrum Analyzer Resolution Bandwidth is 100kHz or greater for frequencies 30MHz to 1GHz, 1MHz – for frequencies above 1GHz.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.



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3.3 Radiated emission limit

3.3.1 Fundamental and harmonics emission limits

Frequency (MHz)	Field Strength of Fundamental		Field Strength of Harmonics	
	(uV/m@3m)	(dBuV/m@3m)	(uV/m@3m)	(dBuV/m@3m)
433.92	10958	80.8	1096.5	60.8

3.3.2 General radiated emission limit

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Frequency MHz	15.209 Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81. Expanded uncertainty ($k=2$) of radiated emission measurement is ± 3.078 dB.



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3.5 Radiated emission test data FCC 15.231

3.5.1 Fundamental & Harmonics Radiated Emission Data

EUT : ST313-T
Worst Case Condition : Transmitter Mode

Freq. (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading Level (dBuV)	Corrected Reading (dBuV/m)	Limit At 3m (dBuV/m)	Margin (dB)
433.921	PK	V	17.7	55.3	73	80.83	-7.83
433.922	PK	H	17.7	47.1	64.8	80.83	-16.03
866.41	PK	V	24.3	16.4	40.7	60.83	-20.13
*1301.22	PK	V	29.3	15.8	45.1	54	-8.9
1735.05	PK	V	33.2	20.7	53.9	60.83	-6.93
866.75	PK	H	24.3	15.2	39.5	60.83	-21.33
*1301.77	PK	H	29.3	13.9	43.2	54	-10.8
1735.25	PK	H	33.2	18.6	51.8	60.83	-9.03

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor.
4. “*” means the emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000MHz.



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3.6 Measured bandwidth FCC 15.231(C)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.

$$B.W(20\text{dBc}) \text{ Limit} = 0.25\% \times f(\text{MHz}) = 0.25\% \times 433.92\text{MHz} = 1.0848\text{MHz}$$

From the plot, the bandwidth is observed to be 644kHz, at 20dBc where the bandwidth limit is 1.0848MHz. and the plot is saved with file name: 20dB bandwidth plot.pdf