# **Bron International Ltd.**

# **MINI Wireless Computer Mouse**

**Main Model: MCM** Serial Model: N/A

May 29, 2012

**Report No.: 12020426-FCC-R1** (This report supersedes NONE)



**Modifications made to the product: None** 

This Test Report is Issued Under the Authority of:									
Chris Bu	Alex. Lin								
Chris Bi	Alex Liu								
Compliance Engineer	Technical Manager	直接發展發展							

This test report may be reproduced in full only. Test result presented in this test report is applicable to the representative sample only.







# **Laboratory Introduction**

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 2 of 32

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to <u>testing</u> and <u>certification</u>, SIEMIC provides initial design reviews and <u>compliance</u> <u>management</u> through out a project. Our extensive experience with <u>China</u>, <u>Asia Pacific</u>, <u>North America</u>, <u>European</u>, <u>and international</u> compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the <u>global markets</u>.

**Accreditations for Conformity Assessment** 

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI , NCC , NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA , NIST	RF/Wireless ,Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC, RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom, Safety

## **Accreditations for Product Certifications**

Country/Region	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB , NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC, (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 3 of 32

www.siemic.com.cn

This page has been left blank intentionally.



Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 4 of 32 www.siemic.com.cn

# **CONTENTS**

1	EXECUTIVE SUMMARY & EUT INFORMATION	5
2	TECHNICAL DETAILS	6
3	MODIFICATION	7
4	TEST SUMMARY	8
5	MEASUREMENTS, EXAMINATION AND DERIVED RESULTS	9
ANI	NEX A. TEST INSTRUMENT & METHOD	21
ANI	NEX B. EUT AND TEST SETUP PHOTOGRAPHS	27
ANI	NEX C. TEST SETUP AND SUPPORTING EQUIPMENT	28
ANI	NEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PART LIST	31
ANI	NEX E. DECLARATION OF SIMILARITY	32



Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 5 of 32

# **EXECUTIVE SUMMARY & EUT INFORMATION**

The purpose of this test programme was to demonstrate compliance of the Bron International Ltd., MINI Wireless Computer Mouse and model: MCM against the current Stipulated Standards. The MINI Wireless Computer Mouse has demonstrated compliance with the FCC 15.249: 2012.

## **EUT Information**

**EUT MINI Wireless Computer Mouse** 

Description

Main Model : **MCM** Serial Model : N/A

Antenna Gain : 2 dBi

: 2\*1.5 V AAA Batteries/50 mA **Input Power** 

Classification

Per Stipulated : FCC 15.249: 2012

**Test Standard** 



FCC ID

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 6 of 32

**XZJMCM** 

# **TECHNICAL DETAILS** Compliance testing of MINI Wireless Computer Mouse with Purpose stipulated standard **Bron International Ltd.** Flat J. 6/f. Block 3, Camelpaint Building 60 Hoi Yuen Road, Kwun **Applicant / Client** Tong Kowloon - Hong Kong **Bron International Ltd.** Flat J. 6/f. Block 3, Camelpaint Building 60 Hoi Yuen Road, Kwun Manufacturer Tong Kowloon - Hong Kong SIEMIC Nanjing (China) Laboratories NO.2-1, Longcang Dadao, Yuhua Economic Development Zone, Laboratory performing the Nanjing, China Tel:+86(25)86730128/86730129 tests Fax:+86(25)86730127 Email:info@siemic.com 12020426-FCC-R1 Test report reference number Date EUT received May 15, 2012 Standard applied FCC 15.249: 2012 Dates of test (from - to) May 16, 2012 to May 28, 2012 No of Units #1 **Equipment Category** DXX **Trade Name** N/A 2410-2450 MHz **RF** Operating Frequency (ies)



Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 7 of 32

# **3 MODIFICATION**

**NONE** 

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 8 of 32

# **TEST SUMMARY**

The product was tested in accordance with the following specifications. All testing has been performed according to below product classification:

# **Spread Spectrum System/Device**

**Test Results Summary** 

Test Standard	Description	Product Class	Pass / Fail
§15.203	Antenna Requirement	See Above	Pass
§15.207(a)	AC Line Conducted Emissions	See Above	N/A
§15.205, §15.209, §15.249(a), §15.249(d)	Radiated Spurious Emissions	See Above	Pass
§15.249(d)	Band Edge	See Above	Pass

# 5 <u>MEASUREMENTS, EXAMINATION AND</u> DERIVED RESULTS

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 9 of 32

# 5.1 §15.203 – Antenna Requirement

# **Standard Requirement:**

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.
- c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

#### **Antenna Connector Construction**

EUT antenna is a PCB antenna. It is in accordance to section 15.203, please refer to the internal photos.

**Test Result: Pass** 



Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 10 of 32 www.siemic.com.ci

# 5.2 §15.207 (a) – AC Line Conducted Emissions

# **Standard Requirement:**

	Conducted lin	mit (dBμV)
Frequency of emission (MHz)	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

<sup>\*</sup>Decreases with the logarithm of the frequency.

#### **Procedures:**

- 1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
- 2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- 3. Conducted Emissions Measurement Uncertainty
  All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 9kHz 30MHz (Average & Quasi-peak) is ±3.5dB.
- 4. Environmental Conditions Temperature 22°C

Relative Humidity 50% Atmospheric Pressure 1019mbar

5. Test date: --Tested By: --

Test Result: N/A

Battery supply.

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 11 of 32

# 5.3 §15.209, §15.205, §15.249(a) & §15.249(d) - Radiated Spurious Emissions

- 1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- 2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- 3. Radiated Emissions Measurement Uncertainty

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz (3m & 10m) & 1GHz above (3m) is +5.6/-4.5dB.

4. Environmental Conditions Temperature 22°C Relative Humidity 50%

Atmospheric Pressure 1019mbar

5. Test date: May 28, 2012 Tested By: Chris Bi

### **Standard Requirement:**

The emissions from the Low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges.

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of	Field strength of harmonics
	fundamental	(microvolts/meter)
	(millivolts/meter)	
902–928 MHz	50	500
2400-2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

### Sample Calculation:

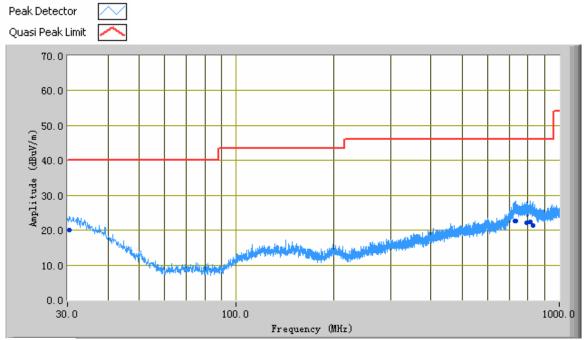
EUT Field Strength = Raw Amplitude  $(dB\mu V/m)$  – Amplitude Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used).

**Test Result: Pass** 

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 12 of 32 www.siemic.com.cr

# Test Mode: Transmitting

# Below 1GHz



### Test Data

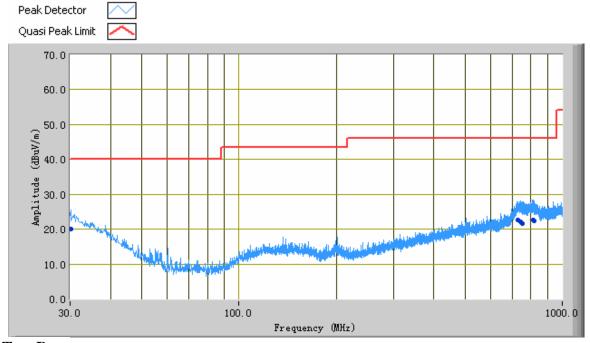
## Horizontal Polarity Plot @3m

Frequency (MHz)	Peak Azimith		Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dBµV/m)	Margin (dB)			
30.31	19.93	231.00	Н	327.00	-20.71	40.00	-20.07			
811.58	22.46	198.00	Н	271.00	-18.83	46.00	-23.54			
735.23	22.66	31.00	Н	249.00	-19.85	46.00	-23.34			
831.59	21.27	115.00	Н	294.00	-18.05	46.00	-24.73			
790.21	22.00	349.00	Н	372.00	-19.07	46.00	-24.00			
726.83	22.54	318.00	Н	156.00	-20.27	46.00	-23.46			

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 13 of 32 www.siemic.com.cr

Test Mode: Transmitting

# Below 1GHz



## Test Data

### Vertical Polarity Plot @3m

vertical rolatity riot woom										
Frequency (MHz)	Quasi Peak (dBμV/m)	Azimuth	Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dBµV/m)	Margin (dB)			
30.01	20.13	340.00	V	294.00	-20.50	40.00	-19.87			
811.97	22.59	18.00	V	107.00	-18.79	46.00	-23.41			
816.32	22.34	39.00	V	183.00	-18.49	46.00	-23.66			
744.87	22.13	30.00	V	352.00	-19.10	46.00	-23.87			
754.89	21.72	326.00	V	178.00	-18.01	46.00	-24.28			
730.53	22.70	271.00	V	168.00	-20.09	46.00	-23.30			

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 14 of 32 www.siemic.com.cn

Test Mode: FSK Transmitting

# **Fundamental**

## Low Channel (2410 MHz)

Enaguanay	Reading(dBμV/m)		Factors	Polarity	Result(d	BμV/m)		mit ıV/m)	Margi	n (dB)
Frequency (MHz)	AV	PEAK	(dB)	(H/V)	AV	PEAK	AV	PEAK	AV	PEAK
2410	110.91	111.54	-19.48	V	91.43	92.06	94	114	-22.57	-21.94
2410	111.73	112.30	-19.48	Н	92.25	92.82	94	114	-21.75	-21.18

# Middle Channel (2430 MHz)

Enaguanay	Reading(dBµV/m)		Reading(dBμV/m)		Factors	Polarity	Result(d	lBμV/m)		mit uV/m)	Margi	n (dB)
Frequency (MHz)	AV	PEAK	(dB)	(H/V)	AV	PEAK	AV	PEAK	AV	PEAK		
2430	110.58	112.04	-19.38	V	91.20	92.66	94	114	-22.80	-21.34		
2430	111.04	112.13	-19.38	Н	91.66	92.75	94	114	-22.34	-21.25		

## High Channel (2450 MHz)

Frequency Reading(dBµV/m)		Factors	Factors Polarity		Result(dBμV/m)		Limit (dBµV/m)		Margin (dB)	
(MHz)	AV	PEAK	(dB)	(H/V)	AV	PEAK	AV	PEAK	AV	PEAK
2450	111.15	112.06	-19.28	V	91.87	92.78	94	114	-22.13	-21.22
2450	110.7	112.08	-19.28	Н	91.42	92.8	94	114	-22.58	-21.2

# Spurious Emissions above 1GHz Low Channel (2410 MHz)

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 15 of 32

Evaguanay	Reading	(dBµV/m)	Factors	Polarity	Result(d	BμV/m)		mit ιV/m)	Margi	n (dB)
Frequency (MHz)	AV	PEAK	(dB)	(H/V)	AV	PEAK	AV	PEAK	AV	PEAK
4820	78.65	79.33	-13.24	V	65.41	66.09	54	74	-8.59	-7.91
4820	70.89	72.67	-13.24	Н	57.65	59.43	54	74	-16.35	-14.57

# Middle Channel (2430 MHz)

Enaguanay	Reading	(dBµV/m)	Factors	Polarity	Result(d	BμV/m)		mit ιV/m)	Margi	n (dB)
Frequency (MHz)	AV	PEAK	(dB)	(H/V)	AV	PEAK	AV	PEAK	AV	PEAK
4860	80.50	81.33	-13.14	V	67.36	68.19	54	74	-6.64	-5.81
4860	73.20	74.00	-13.04	Н	60.16	60.96	54	74	-13.84	-13.04

High Channel (2450 MHz)

Frequency	Reading	(dBµV/m)	Factors	Polarity	Result(d	BμV/m)		mit ıV/m)	Margi	n (dB)
(MHz)	AV	PEAK	(dB)	(H/V)	AV	PEAK	AV	PEAK	AV	PEAK
4900	77.35	79.50	-13.04	V	64.31	66.46	54	74	-9.69	-7.54
4900	72.33	73.50	-13.04	Н	59.29	60.46	54	74	-14.71	-13.54

# **5.4** §15.249(d) - Band Edge

1. Radiated Emissions Measurement Uncertainty

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz (3m & 10m) & 1GHz above (3m) is +5.6/-4.5dB.

2. Environmental Conditions Temperature 22°C Relative Humidity 50%

Atmospheric Pressure 1019mbar

3. Test date: May 23, 2012 Tested By: Chris Bi

### **Standard Requirement:**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

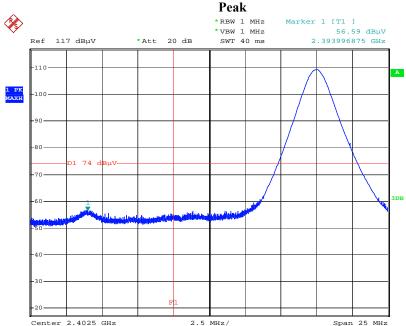
#### **Procedures:**

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
- 3. Set both RBW and VBW of spectrum analyzer to 1MHz.
- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 5. Repeat above procedures until all measured frequencies were complete.

**Test Result: Pass** 

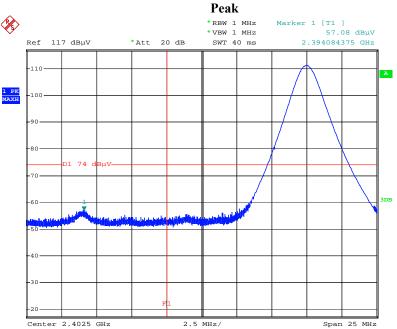
Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 17 of 32

# **Band Edge: Left Side** Vertical



Date: 23.MAY.2012 23:36:19

# **Band Edge: Left Side** Horizontal

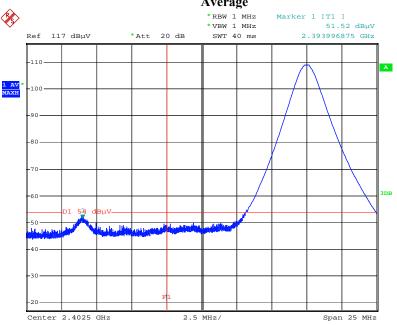


Date: 23.MAY.2012 23:39:35

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 18 of 32

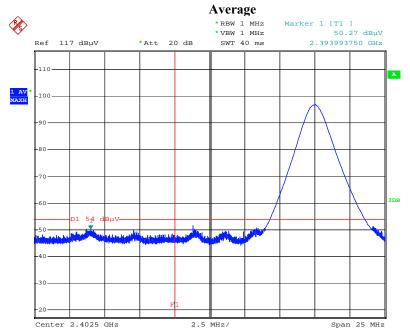
www.siemic.com.cn

#### Band Edge: Left Side Vertical Average



Date: 23.MAY.2012 23:37:30

## Band Edge: Left Side Horizontal

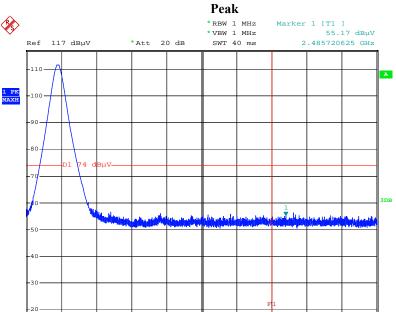


Date: 23.MAY.2012 23:38:09

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 19 of 32

Stop 2.5 GHz

# Band Edge: Right Side Vertical

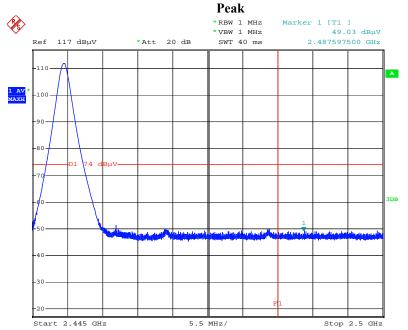


5.5 MHz/

Date: 23.MAY.2012 23:45:21

Start 2.445 GHz

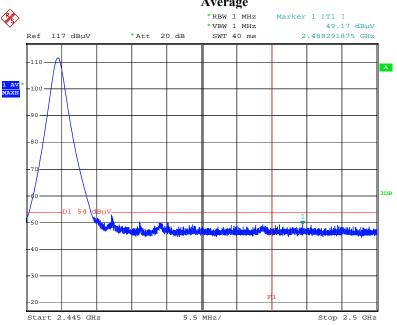
## Band Edge: Right Side Horizontal



Date: 23.MAY.2012 23:43:42

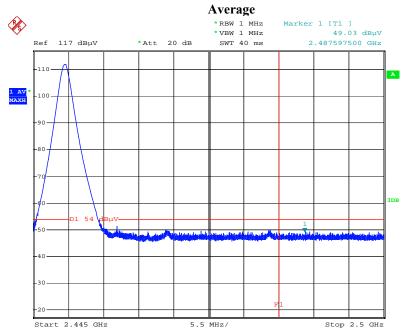
Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 20 of 32

#### Band Edge: Right Side Vertical Average



Date: 23.MAY.2012 23:44:39

### Band Edge: Right Side Horizontal



Date: 23.MAY.2012 23:44:01

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 21 of 32 www.siemic.com.cr

# **Annex A. TEST INSTRUMENT & METHOD**

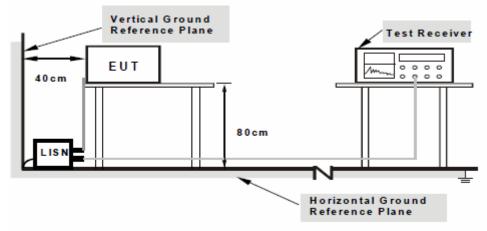
# Annex A.i. TEST INSTRUMENTATION & GENERAL PROCEDURES

Instrument	Model	Calibration Date	Calibration Due Date
Radiated Emissions			
Hp Spectrum Analyzer	8563E	01/10/2012	01/09/2013
R&S EMI Receiver	ESPI3	08/26/2011	08/25/2012
Antenna (30MHz~2GHz)	JB1	10/04/2011	10/03/2012
ETS-Lindgren Antenna(1 ~18GHz)	3115	10/04/2011	10/03/2012
A-INFOMW Antenna(1 ~18GHz)	JXTXLB-10180	06/25/2011	06/24/2012
Horn Antenna (18~40GHz)	AH-840	07/23/2011	07/22/2012
Microwave Pre-Amp (18~40GHz)	PA-840	Every 20	000 Hours
Hp Agilent Pre-Amplifier	8447F	05/25/2012	05/24/2013
MITEQ Pre-Amplifier(1 ~ 18GHz)	AMF-7D-00101800-30- 10P	05/26/2012	05/25/2013
Chamber	3m	04/13/2012	04/12/2013

### Annex A.ii. CONDUCTED EMISSIONS TEST DESCRIPTION

#### **Test Set-up**

- 1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B.
- 2. The power supply for the EUT was fed through a  $50\Omega/50\mu$ H EUT LISN, connected to filtered mains.
- 3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
- 4. All other supporting equipments were powered separately from another main supply.



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

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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration1.

#### **Test Method**

- 1. The EUT was switched on and allowed to warm up to its normal operating condition.
- 2. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
- 3. High peaks, relative to the limit line, were then selected.
- 4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made.
- 5. Steps 2 to 4 were then repeated for the LIVE line (for AC mains) or DC line (for DC power).

#### **Description of Conducted Emission Program**

This EMC Measurement software run LabView automation software and offers a common user interface for electromagnetic interference (EMI) measurements. This software is a modern and powerful tool for controlling and monitoring EMI test receivers and EMC test systems. It guarantees reliable collection, evaluation, and documentation of measurement results. Basically, this program will run a pre-scan measurement before it proceeds with the final measurement. The pre-scan routine will run the common scan range from 150 kHz to 30 MHz; the program will first start a peak and average scan on selectable measurement time and step size. After the program complete the pre-scan, this program will perform the Quasi Peak and Average measurement, based on the pre-scan peak data reduction result.

# **Sample Calculation Example**

At 20 MHz  $limit = 250 \ \mu V = 47.96 \ dB\mu V$ 

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 23 of 32

Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.20 dB

Q-P reading obtained directly from EMI Receiver =  $40.00~\text{dB}\mu\text{V}$  (Calibrated for system losses)

Therefore, Q-P margin = 47.96 - 40.00 = 7.96 i.e. **7.96 dB below limit** 

#### Annex A. iii. RADIATED EMISSIONS TEST DESCRIPTION

#### Limit

1. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)		
30-88	100*	3		
88-216	150*	3		
216-960	200*	3		
Above 960	500	3		

**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength (μV/m at 3-meter)	Field Strength (dBµV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

#### **EUT Characterisation**

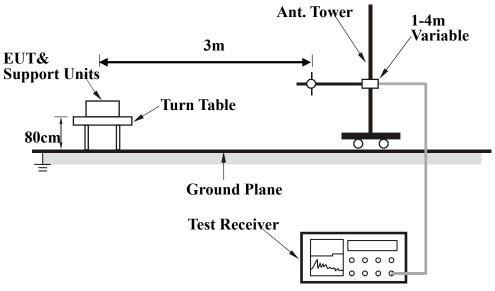
EUT characterisation, over the frequency range from 30MHz to 10<sup>th</sup> Harmonic, was done in order to minimise radiated emissions testing time while still maintaining high confidence in the test results.

The EUT was placed in the chamber, at a height of about 0.8m on a turntable. Its radiated emissions frequency profile was observed, using a spectrum analyzer /receiver with the appropriate broadband antenna placed 3m away from the EUT. Radiated emissions from the EUT were maximised by rotating the turntable manually, changing the antenna polarisation and manipulating the EUT cables while observing the frequency profile on the spectrum analyzer / receiver. Frequency points at which maximum emissions occurred, clock frequencies and operating frequencies were then noted for the formal radiated emissions test at the Open Area Test Site (OATS) or 3m EMC chamber.



#### **Test Set-up**

- 1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
- 2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
- 3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.



#### **Test Method**

The following procedure was performed to determine the maximum emission axis of EUT:

- 1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
- 2. With the receiving antenna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
- 3. Compare the results derived from above two steps. So, the axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.

#### Final Radiated Emission Measurement

- 1. Setup the configuration according to figure 1. Turn on EUT and make sure that it is in normal function.
- 2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
- 3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
- 4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from  $0 \circ to 360 \circ with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading.$
- 5. Repeat step 4 until all frequencies need to be measured were complete.
- 6. Repeat step 5 with search antenna in vertical polarized orientations.

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Peak	100 kHz	100 kHz
Above 1000	Peak	1 MHz	1 MHz
Above 1000	Average	1 MHz	10 Hz

#### **Description of Radiated Emission Program**

This EMC Measurement software run LabView automation software and offers a common user interface for electromagnetic interference (EMI) measurements. This software is a modern and powerful tool for controlling and monitoring EMI test receivers and EMC test systems. It guarantees reliable collection, evaluation, and documentation of measurement results. Basically, this program will run a pre-scan measurement before it proceeds with the final measurement. The pre-scan routine will run the scan on four different antenna heights, 2 antenna polarity, and 360 degrees table rotation. For example, the program was set to run 30 MHz to 1 GHz scan; the program will first start from a meter antenna height and divide the 30 MHz to 1 GHz into 10 separate parts of maximum hold sweeps. Each parts of maximum hold sweep, the program will collect the data from 0 degree to 360 degrees table rotation. After the program complete the 1m scan, the antenna continues to rise to 2m and continue the scan. The step will repeated for all specified antenna height and polarity. This program will perform the Quasi Peak measurement after the signal maximization process and pre-scan routine. The final measurement will be base on the pre-scan data reduction result.

#### **Sample Calculation Example**

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

Peak = Reading + Corrected Factor

where

Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any) And the average value is

Average = Peak Value + Duty Factor or Set RBW = 1MHz, VBW = 10Hz.

Note:

If the measured frequencies are fall in the restricted frequency band, the limit employed must be quasi peak value when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function.



Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 27 of 32 www.siemic.com.cn

# **Annex B. EUT AND TEST SETUP PHOTOGRAPHS**

Please see attachment

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 28 of 32

# **Annex C. TEST SETUP AND SUPPORTING EQUIPMENT**

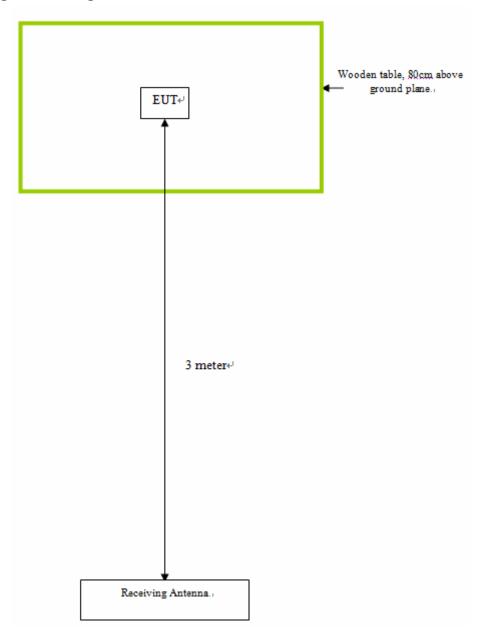
# **EUT TEST CONDITIONS**

#### Annex C. i. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description (Including Brand Name)	Model	Calibration Date	Calibration Due Date
N/A	N/A	N/A	N/A	N/A

# **Block Configuration Diagram for Radiated Emissions**



# Annex C.ii. EUT OPERATING CONDITIONS

The following is the description of how the EUT is exercised during testing.

Test	Description Of Operation		
<b>Emissions Testing</b>	The EUT was continuously transmitting to stimulate the worst case.		

Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 31 of 32

# Annex D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PART LIST

Please see attachment



Report No: 12020426-FCC-R1 Issue Date: May 29, 2012 Page: 32 of 32 www.siemic.com.cn

# **Annex E. DECLARATION OF SIMILARITY**

N/A