



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

FOR

Product Name:ScrollToo 800

Model : GM-080022/T

Trade Name: Genius

Issued to

KYE SYSTEMS CORP.

No.492,Sec.5, Chung Hsin Rd., San Chung, Taipei Hsien, 24160, Taiwan, R.O.C.

Issued by

Global Certification Corp.

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EMC Test Site	Sijhih office and Lab	No. 112-3. Sec.2. Siangjhang Rd. Sijhih City. Taipei County 221, Taiwan(R.O.C.)



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1. GENERAL INFORMATION

Applicant : KYE SYSTEMS CORP.

Address : No.492,Sec.5, Chung Hsin Rd., San Chung, Taipei Hsien, 24160, Taiwan, R.O.C.

Manufacturer : KYE SYSTEMS CORP.

Address : No.492,Sec.5, Chung Hsin Rd., San Chung, Taipei Hsien, 24160, Taiwan, R.O.C.

EUT : ScrollToo 800

Model Name : GM-080022/T

Model Differences : N/A

Is here with confirmed to comply with the requirements set out in the FCC Rules and Regulations Part 15 Subpart C and the measurement procedures were according to ANSI C63.4-2003. The said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

FCC part 15 subpart C

Receipt Date : 01/23/2009

Final Test Date : 13/02/2009

Taipei, Taiwan

Feb.13, 2009

(Place)

(Date)

Alex Chou / Manager

(Signature)

Designation Number: TW1030



1.1 DESCRIPTION OF THE TESTED SAMPLES

EUT Name : ScrollToo 800
Model Number : GM-080022/T
FCC ID : FSUGMZIO
Input Voltage : 3Vdc
Power From ☒Inside ☐Outside
☐Adaptor ☒BATTERY ☐Power Supply ☐DC Power Source
☐Support Unit PC
Operate Frequency : Refer to the channel list as described below
Modulation Technique : GFSK
Number of Channels : 16
Channel spacing : ☒N/A ☐_____MHz
Operating Mode : ☐Simplex ☒Duplex
Antenna Type : ☒integral antenna ☐a dedicated antenna
Antenna gain : -3dBi

Channel	Frequency (MHz)
0	2402
1	2425
2	2448
3	2471
4	2405
5	2428
6	2451
7	2474
8	2408
9	2431
10	2454
11	2477
12	2411
13	2434
14	2457
15	2480



2. TEST METHODOLOGY

All testing as described bellowed were performed in accordance with ANSI C63.4 and FCC CFR 47 Part 15 Subpart C.

2.1 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on a wood table, which is at 0.8 m above ground plane acceding to clause 15.207 and requirements of ANSI C63.4. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz are using CISPR Quasi-Peak / Average detectors.

Radiated Emissions

The EUT is a placed on a turn table, which is 0.8 m above ground plane. The turntable was rotated through 360 degrees to determine the position of maximum emission level. The EUT is placed at 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

2.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
10.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	()
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a



CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

2.3 DESCRIPTION OF TEST MODES

The EUT was tested under following modes:

Modes:

1. **Continuous transmitting**

Channels:

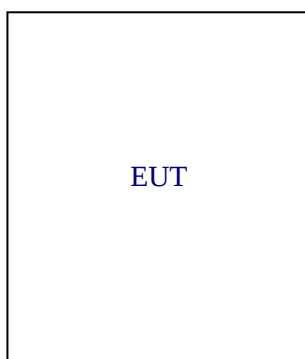
1. **2.402GHz (Lowest Channel)**
2. **2.448GHz (Middle Channel)**
3. **2.480GHz (Highest Channel)**



2.4 DESCRIPTION OF THE SUPPORT EQUIPMENTS

Setup Diagram

See test photographs attached in appendix 1 for the actual connections between EUT and support equipment.





Support Equipment

Peripherals Devices:

OUTSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
	N/A						
INSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
	N/A						

Note: All the above equipment /cable were placed in worse case position to maximize emission signals during emission test

Grounding: Grounding was in accordance with the manufacturer's requirement and conditions for the intended use.



3. TEST AND MEASUREMENT EQUIPMENT

3.1 CALIBRATION

The measuring equipment utilized to perform the tests documented in the report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

3.2 EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

TABLE 1 LIST OF TEST AND MEASUREMENT EQUIPMENT

Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
Test Receiver	AFJ	ER55R	55300508277	May.20.2009	
Bilog Antenna	SUNOL	JB1	A052104	SEP.30.2009	
Turn table	EMCO	2080	9508-1805	N/A	
Controller	EMCO	2090	9804-1328	N/A	
Amplifier	G.W	GAP-801	EF150001	Jul.18.2009	
Amplifier	Schwarzbeck	BBV 9718	9718-008	Aug. 10.2009	
EMC Analyzer	AGILENT	E7401A	MY42000145	May.23.2009	
Spectrum Analyzer	NEX1	Ns-265	5044006	Aug.8.2009	
RF Cable	BELDEN	RG-8/U	E037	Jun.07.2009	
RF Cable	Huber Suhner	SUCOFLEX 104	293864/4	Nov. 13.2009	
Thermo-Hygro meter	WISEWIND	4-IN-1	0412	Apr.10.2009	
Loop Antenna	Teseq GmbH	HLA 6120	26439	Sep. 11.2009	



Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-491	Aug. 05.2009	
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✂ Calibration interval of instruments listed above is one year



4. SECTION 15.249 REQUIREMENTS (FUNDAMENTAL/ HARMONICS)

4.1 TEST SETUP

Refer to paragraph 6.1.

4.2 LIMIT

Frequency (MHz)	Field Strength of Fundamental (dB μ V/m at 3-meter)	Field Strength of Harmonics (dB μ V/m at 3-meter)
2400 - 2483	94	54

4.3 RESULT: PASSED

4.4 TEST DATA:

Fundamental

Frequency (MHz)	Ant. Polarization	Reading (dB μ V)	Correction factor(dB)	Emission (dB μ V/m)	Peak Limit (dB μ V/m)	AV Limit (dB μ V/m)	Detector
2402.40	H	98.83	7.8	91.03	110	94	Peak
2402.40	V	99.56	7.8	91.76	110	94	Peak
2448.40	H	100.37	7.43	92.94	110	94	Peak
2448.40	V	98.87	7.43	91.44	110	94	Peak
2480.40	H	99.08	7.16	91.92	110	94	Peak
2480.40	V	96.86	7.16	89.70	110	94	Peak

Note:

1. Emission level = Reading level – Correction factor
2. Correction factor : Antenna factor, Cable loss, PreAmp, etc.
3. All emissions as described above were determining by rotating the EUT through three orthogonal axes to maximizing the emissions if the EUT belongs to hand-held or body-worn devices.
4. Measurements above 1000 MHz, Peak detector setting: use a 1 MHz RBW, a 1 MHz VBW.
5. Measurements above 1000 MHz, Average detector setting: 1 MHz RBW with 10 Hz VBW
6. Peak detector measurement data will represent the worst case results.

**Harmonics -Lowest Channel**

Frequency (MHz)	Ant. Polarization	Reading (dB μ V)	Correction factor(dB)	Emission (dB μ V/m)	Peak Limit (dB μ V/m)	AV Limit (dB μ V/m)	Detector
4808.00	H	51.81	1.34	50.47	74	54	Peak
7205.00	H	40.12	-4.29	44.41	74	54	Peak
9602.00	H	41.11	-6.86	47.97	74	54	Peak
4808.00	V	48.78	1.34	47.44	74	54	Peak
7205.00	V	40.87	-4.29	45.16	74	54	Peak
9602.00	V	41.28	-6.86	48.14	74	54	Peak

Harmonics –Middle Channel

Frequency (MHz)	Ant. Polarization	Reading (dB μ V)	Correction factor(dB)	Emission (dB μ V/m)	Peak Limit (dB μ V/m)	AV Limit (dB μ V/m)	Detector
4876.00	H	55.87	1.33	54.54	74	54	Peak
4876.00	H	52.30	1.33	50.97	74	54	AV
7188.00	H	43.77	-4.19	47.96	74	54	Peak
9568.00	H	44.05	-6.81	50.86	74	54	Peak
4876.00	V	48.53	1.33	47.20	74	54	Peak
7358.00	V	44.44	-5.34	49.78	74	54	Peak
9670.00	V	42.53	-6.97	49.50	74	54	Peak

Harmonics –Highest Channel

Frequency (MHz)	Ant. Polarization	Reading (dB μ V)	Correction factor(dB)	Emission (dB μ V/m)	Peak Limit (dB μ V/m)	AV Limit (dB μ V/m)	Detector
4944.00	H	53.42	1.31	52.11	74	54	Peak
4944.00	H	47.12	1.31	45.81	74	54	AV
7256.00	H	44.50	-4.64	49.14	74	54	Peak
9704.00	H	44.28	-7.02	51.30	74	54	Peak
4944.00	V	49.33	1.31	48.02	74	54	Peak
7732.00	V	44.87	-7.08	51.95	74	54	Peak
9806.00	V	44.03	-7.19	51.22	74	54	Peak

Note:

1. Emission level = Reading level – Correction factor
2. Correction factor : Antenna factor, Cable loss, PreAmp, etc.
3. All emissions as described above were determining by rotating the EUT through three orthogonal axes to maximizing the emissions if the EUT belongs to hand-held or body-worn devices.
4. Measurements above 1000 MHz, Peak detector setting: use a 1 MHz RBW, a 1 MHz VBW.
5. Measurements above 1000 MHz, Average detector setting: 1 MHz RBW with 10 Hz VBW



6. Peak detector measurement data will represent the worst case results.

5. SECTION 15.205 REQUIREMENTS (BAND EDGE)

5.1 TEST SETUP

Refer to paragraph 6.1.

5.2 LIMIT

Restricted Bands:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

Frequency (Hz)	Field Strength (μ V/m at 3-meter)	Field Strength (dB μ V/m at 3-meter)
1.705-30	30 (at 30-meter)	29.5#
30-88	100	40
88-216	150	43
216-960	200	46
Above 960	500	54

: The Measurement Distance is at 30 meters.

5.3 RESULT: PASSED

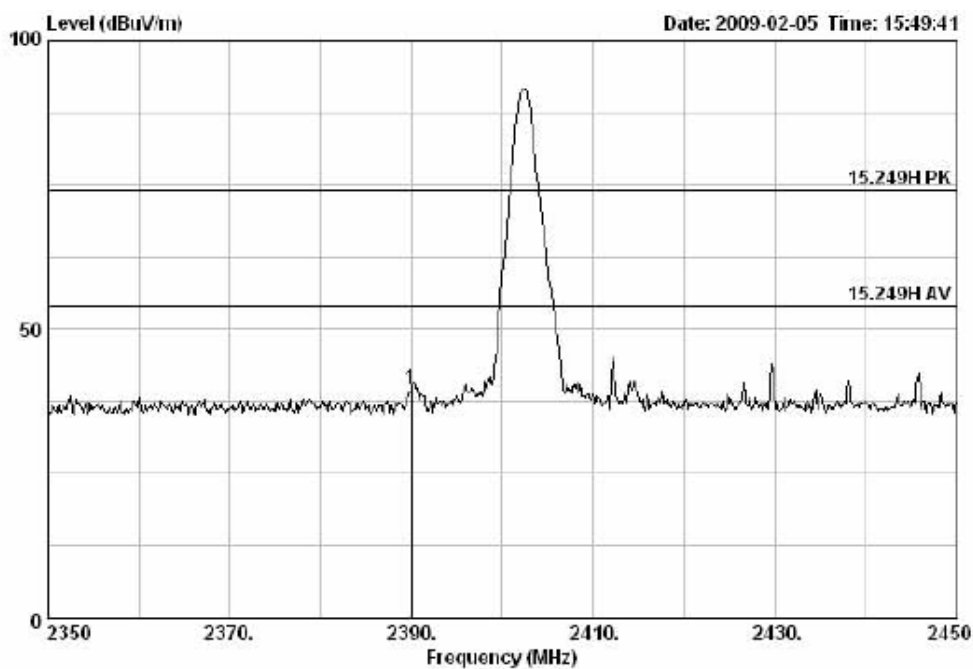


5.4 TEST DATA:

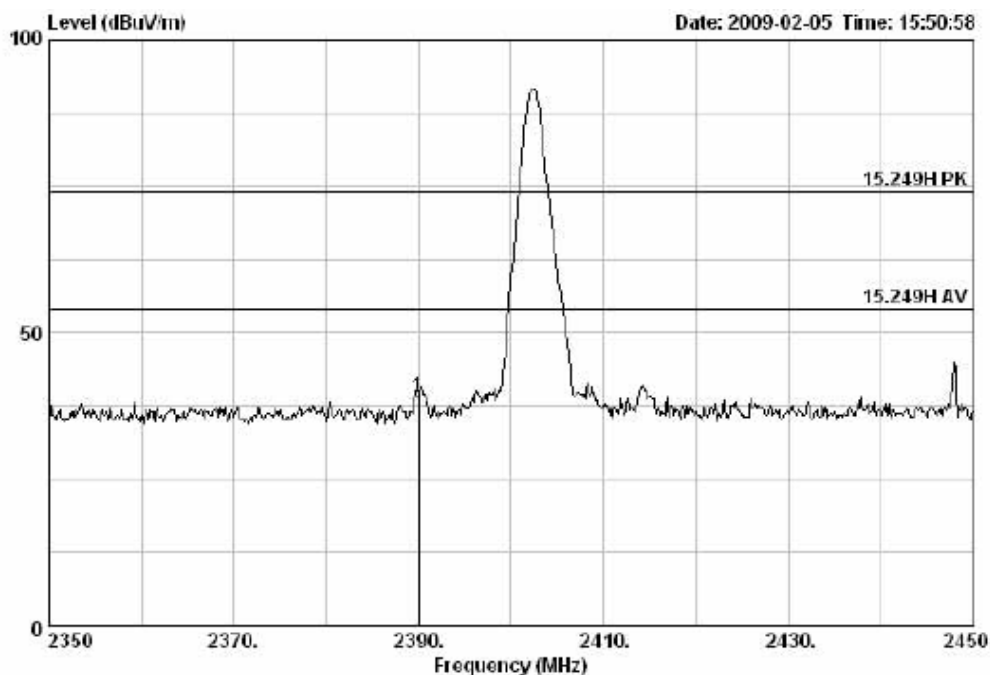
Lowest Channel

Frequency (MHz)	Ant. Polarization	Reading (dB μ V)	Correction factor(dB)	Emission (dB μ V/m)	Peak Limit (dB μ V/m)	AV Limit (dB μ V/m)	Detector
2390.00	H	47.39	7.9	39.49	74	54	Peak
2390.00	V	47.03	7.9	39.13	74	54	Peak

Horizontal



Vertical

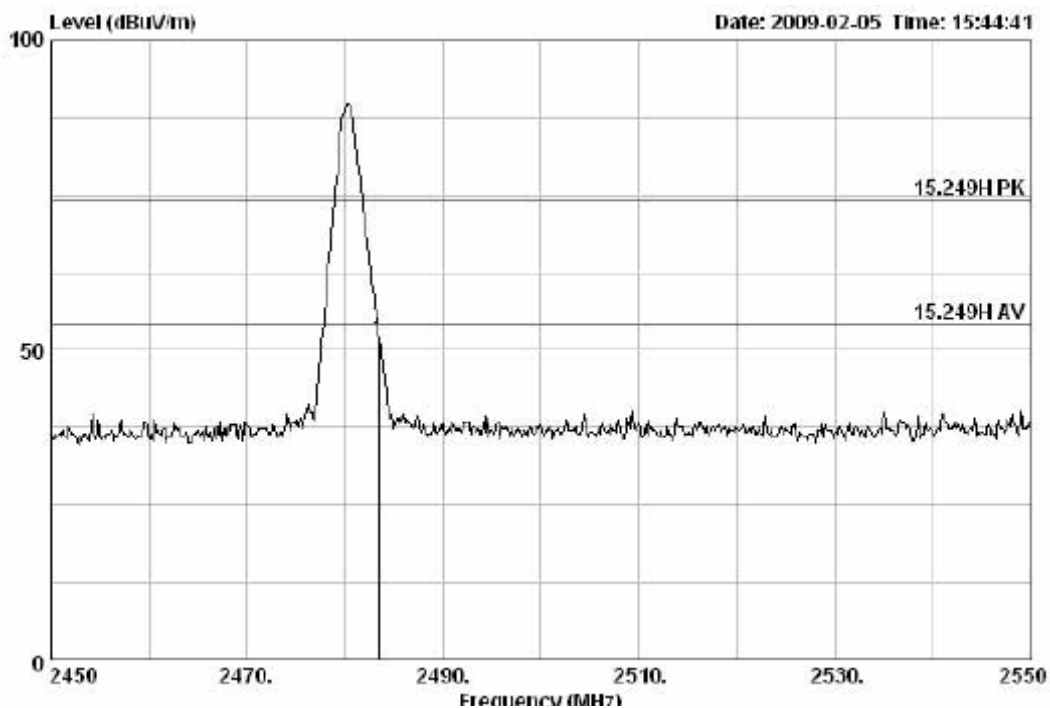




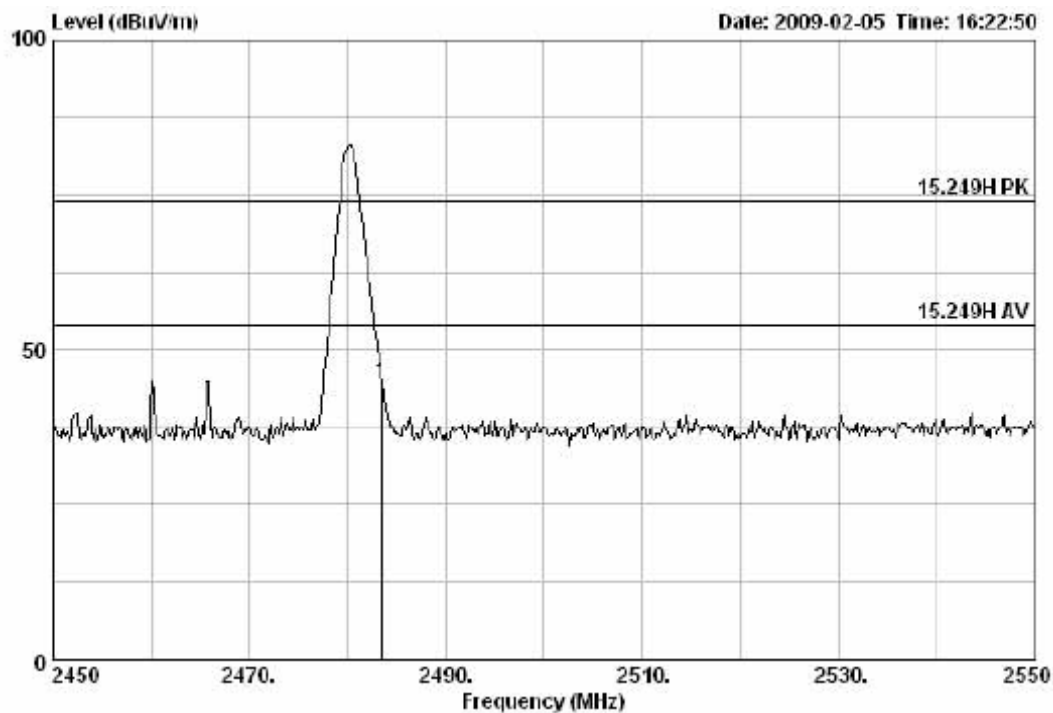
Highest Channel

Frequency (MHz)	Ant. Polarization	Reading (dBμV)	Correction factor(dB)	Emission (dBμV/m)	Peak Limit (dBμV/m)	AV Limit (dBμV/m)	Detector
2483.50	H	59.73	7.13	52.60	74	54	Peak
2483.50	V	58.83	7.13	51.70	74	54	Peak

Horizontal



Vertical



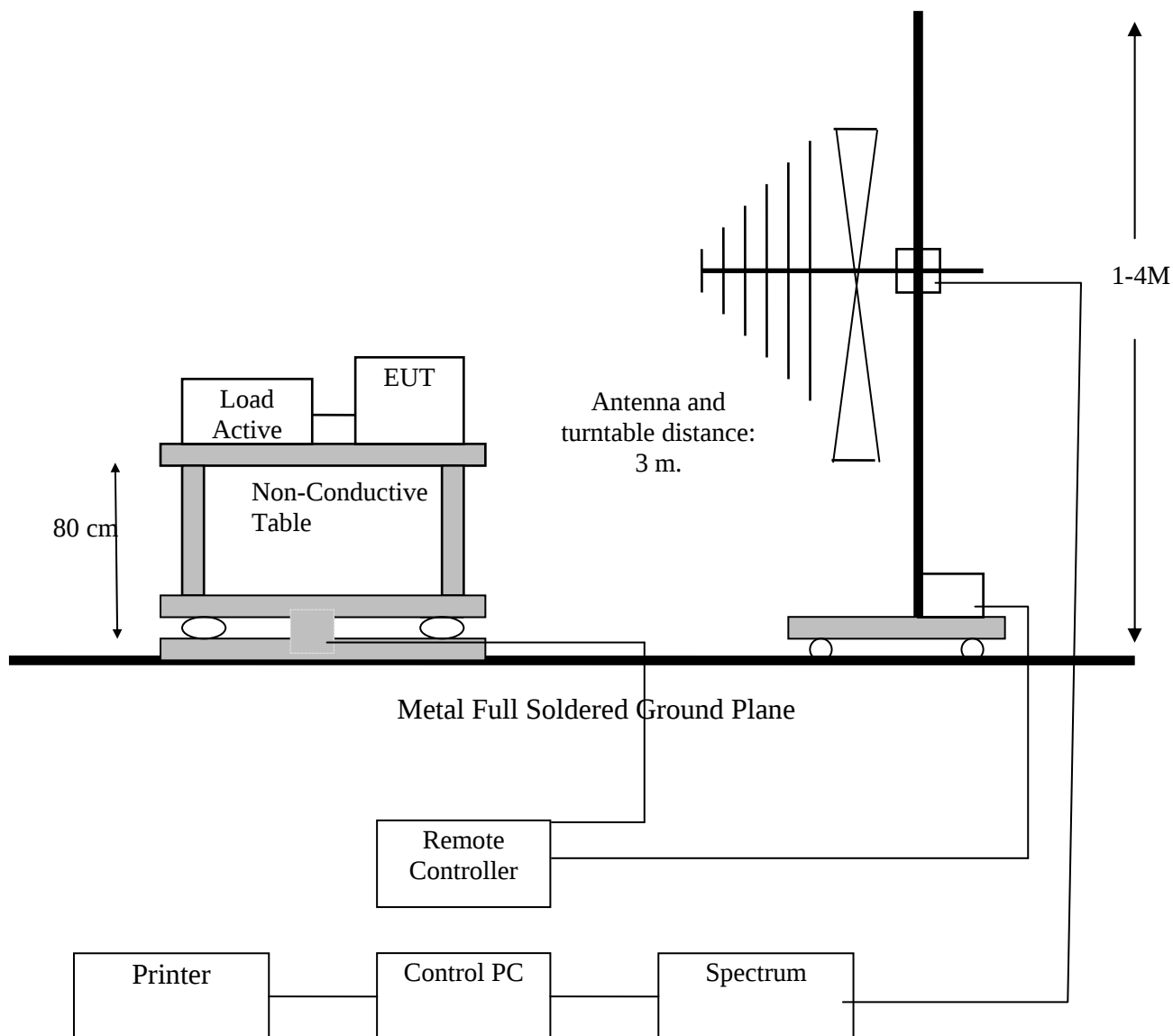


Note:

1. Emission level = Reading level – Correction factor
2. Correction factor : Antenna factor, Cable loss, PreAmp, etc.
3. All emissions as described above were determining by rotating the EUT through three orthogonal axes to maximizing the emissions if the EUT belongs to hand-held or body-worn devices.
4. Measurements above 1000 MHz, Peak detector setting: use a 1 MHz RBW, a 1 MHz VBW.
5. Measurements above 1000 MHz, Average detector setting: 1 MHz RBW with 10 Hz VBW
6. Peak detector measurement data will represent the worst case results.

6. SECTION 15.209 REQUIREMENTS (GENERAL RADIATED EMISSION)

6.1 TEST SETUP





6.2 LIMIT

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209 as below.

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
1.705-30	30	30
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500*	3

**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.*

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

Frequency (Hz)	Field Strength (μ V/m at 3-meter)	Field Strength (dB μ V/m at 3-meter)
1.705-30	30 (at 30-meter)	29.5#
30-88	100	40
88-216	150	43
216-960	200	46
Above 960	500	54

: The Measurement Distance is at 30 meters.



6.3 TEST PROCEDURE

1. The EUT was placed on a turntable, which was 0.8m above ground plane.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT was set at 3m away from the receiving antenna, which was varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was maximized by changing the polarization of receiving antenna, both horizontal and vertical.
6. Repeated above procedures until the measurements for all frequencies are completed.

6.4 RESULT: PASSED

6.5 TEST DATA:

All frequencies except for Fundamentals and Harmonics within the range of the general radiated emission limits are not detectable significantly.



7. SECTION 15.207 REQUIREMENTS (POWERLINE CONDUCTED EMISSIONS)

The EUT is powered by the battery; therefore this test item is not applicable.



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Appendix 1

PHOTOS OF TEST CONFIGURATION





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PHOTO OF EUT

PHOTOS OF EUT



PHOTO OF EUT



Front View of EUT 1



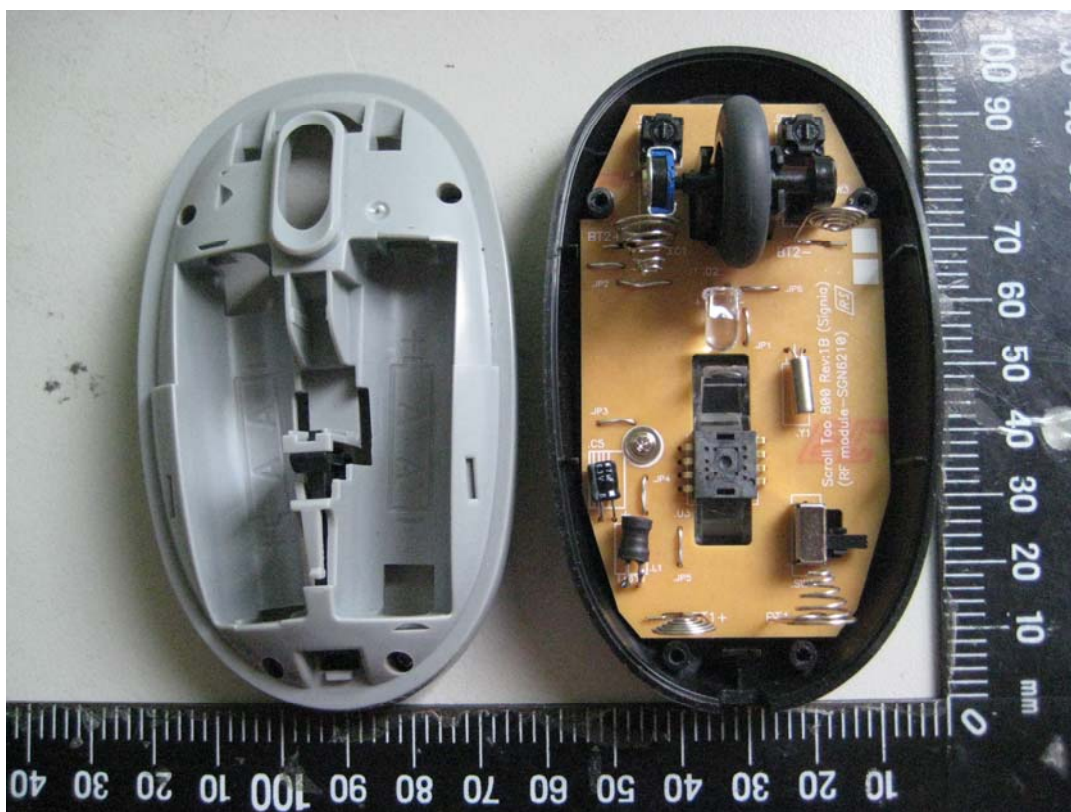
Rear View of EUT 1



PHOTO OF EUT



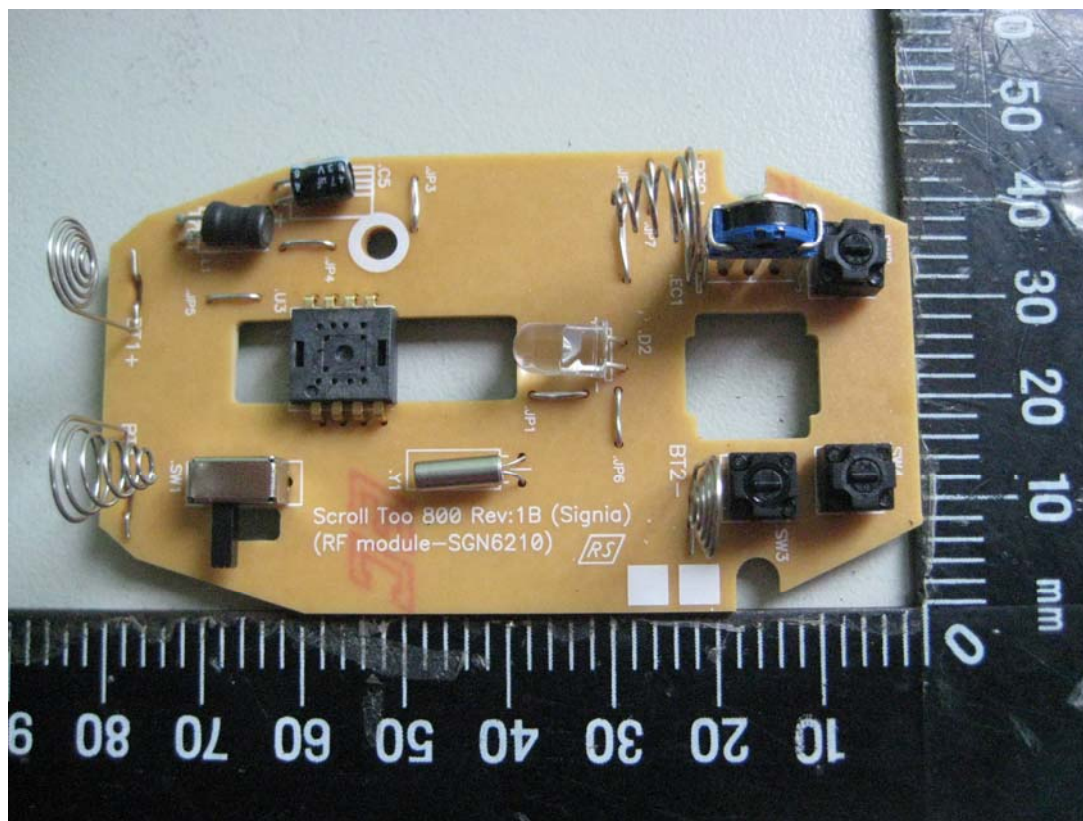
Inside View of EUT 1



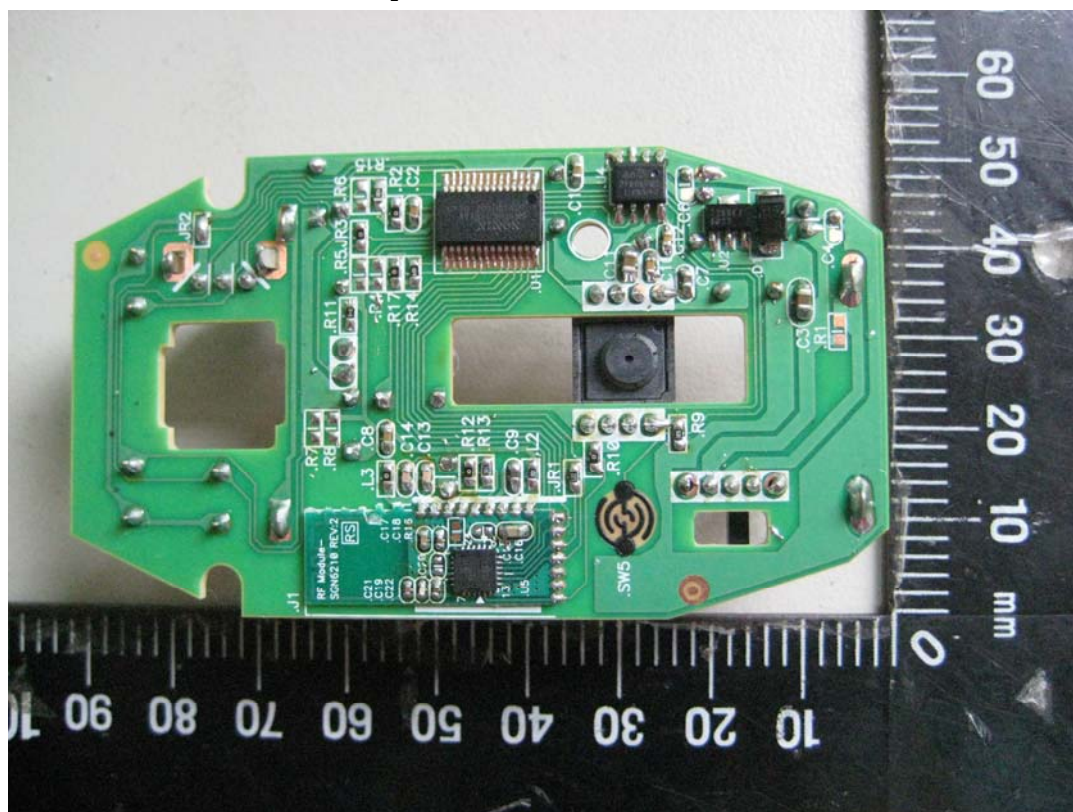
Inside View of EUT 1-1



PHOTO OF EUT



Component Side of Main Board 1



Solder Side of Main Board 1