ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION

Product Name	:	Wireless Mouse
Model Number	:	82-801
Trade Name	:	Earth Trek
FCC ID	:	WSN82-801-2
Report Number	:	SZEE100927430908
Date	:	Oct. 20, 2010

Standards	Results
☒ 47 CFR FCC Part 15 Subpart C 15.249	PASS

Prepared for

Earth Trek (Hong Kong) Limited
Unit 503, 5/F, Silvercord Tower 2, 30 Canton Road,
Tsimshatsui, Kln., Hong Kong
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Prepared by

CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION
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(Note: N/A means not applicable)

1. GENERAL INFORMATION

Applicant:	Earth Trek (Hong Kong) Limited Unit 503, 5/F, Silvercord Tower 2, 30 Canton Road, Tsimshatsui, Kln., Hong Kong
Manufacturer:	Earth Trek (Hong Kong) Limited Unit 503, 5/F, Silvercord Tower 2, 30 Canton Road, Tsimshatsui, Kln., Hong Kong
Sample Description:	Wireless Mouse
Technical Date:	DC 2.4V
Model Name:	82-801
Trade Name:	Earth Trek
FCC ID:	WSN82-801-2
Report Number:	SZEE100927430908
Date of Test:	Sep. 27, 2010 to Oct. 20, 2010

The above equipment was tested by CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION for compliance with the requirements set forth in FCC Rules and the measurement procedure according to ANSI C63.4-2009.
The test results of this report relate only to the tested sample identified in this report.

Prepared by : Christy Chen

Reviewed by : Louisa Lu

Approved by : Lily Yan
Supervisor

Date : Oct. 20, 2010

2. TEST SUMMARY

The complete list of measurements is given below:

Clause	Test Item	Rule	Result
7	Conducted Emission	FCC 15.207	**PASS**
8	20dB Bandwidth	FCC 15.215(c)	**PASS**
9	Radiated Emission	FCC 15.209 FCC 15.249(a) (d)	**PASS**
10	Out of Band Emission	FCC 15.249 (d)	**PASS**

3. MEASUREMENT UNCERTAINTY

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement items	Uncertainty
Radiated Emissions / Band edge Emission	4.6 dB
Conducted disturbance	2.6 dB

4. TEST EQUIPMENT LIST

Equipment	Manufacturer	Model Number	Serial Number	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	01/19/2011
Spectrum Analyzer	Agilent	E4443A	MY46185649	01/19/2011
Biconilog Antenna	ETS-LINGREN	3142C	920250	01/19/2011
Multi device Controller	ETS-LINGREN	2090	00057230	01/19/2011
Horn Antenna	ETS-LINDGREN	3117	00057407	07/31/2011
Loop Antenna	ETS-LINDGREN	6502	00071730	08/24/2011
Receiver	R&S	ESCI	100009	07/10/2011
LISN	R&S	ENV216	100098	07/10/2011

5. SUPPORT EQUIPMENT LIST

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1.	PC	Lenovo	M4600C	SS05730805	N/A	Un-shielded1.2M
2.	Monitor	Lenovo	SY2	SS161118X6	Un-shielded1M	Un-shielded1 M
3.	Keyboard	IBM	89P8300	02284699	Un-shielded1.2M	N/A

6. PRODUCT INFORMATION

Items	Description
Rating	DC 2.4V by recharge battery
Intentional Transceiver	Intentional Transceiver
Modulation	GFSK
Frequency Range	2408 ～ 2474 MHz
Channel Number	64
Type	PCB Antenna
Connector	fixed on board
Gain	1.7dBi

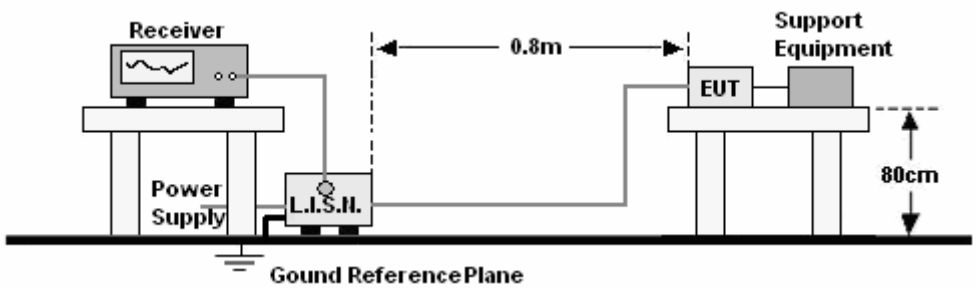
Channels	Frequency
1～64	CH01: (2408)MHz; CH02: (2410)MHz; CH03: (2411)MHz; CH04: (2412)MHz; CH05: (2413)MHz; CH06: (2414)MHz; CH07: (2415)MHz; CH08: (2416)MHz; CH09: (2417)MHz; CH10: (2418)MHz; CH11: (2419)MHz; CH12: (2420)MHz; CH13: (2421)MHz; CH14: (2422)MHz; CH15: (2423)MHz; CH16: (2424)MHz; CH17: (2425)MHz; CH18: (2426)MHz; CH19: (2427)MHz; CH20: (2428)MHz; CH21: (2429)MHz; CH22: (2430)MHz; CH23: (2431)MHz; CH24: (2432)MHz; CH25: (2433)MHz; CH26: (2434)MHz; CH27: (2435)MHz; CH28: (2436)MHz; CH29: (2437)MHz; CH30: (2438)MHz; CH31: (2440)MHz; CH32: (2441)MHz; CH33: (2442)MHz; CH34: (2443)MHz; CH35: (2444)MHz; CH36: (2445)MHz; CH37: (2446)MHz; CH38: (2447)MHz; CH39: (2448)MHz; CH40: (2449)MHz; CH41: (2450)MHz; CH42: (2451)MHz; CH43: (2452)MHz; CH44: (2453)MHz; CH45: (2454)MHz; CH46: (2455)MHz; CH47: (2456)MHz; CH48: (2457)MHz; CH49: (2458)MHz; CH50: (2459)MHz; CH51: (2460)MHz; CH52: (2461)MHz; CH53: (2462)MHz; CH54: (2463)MHz; CH55: (2464)MHz; CH56: (2465)MHz; CH57: (2466)MHz; CH58: (2467)MHz; CH59: (2468)MHz; CH60: (2469)MHz; CH61: (2470)MHz; CH62: (2471)MHz; CH63: (2472)MHz; CH64: (2474)MHz;

7. CONDUCTED EMISSION (CE)

7.1 LIMITS

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

7.2 BLOCK DIAGRAM OF TEST SETUP



7.3 TEST PROCEDURE

a. The EUT was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from EUT in all power lines in the full band.

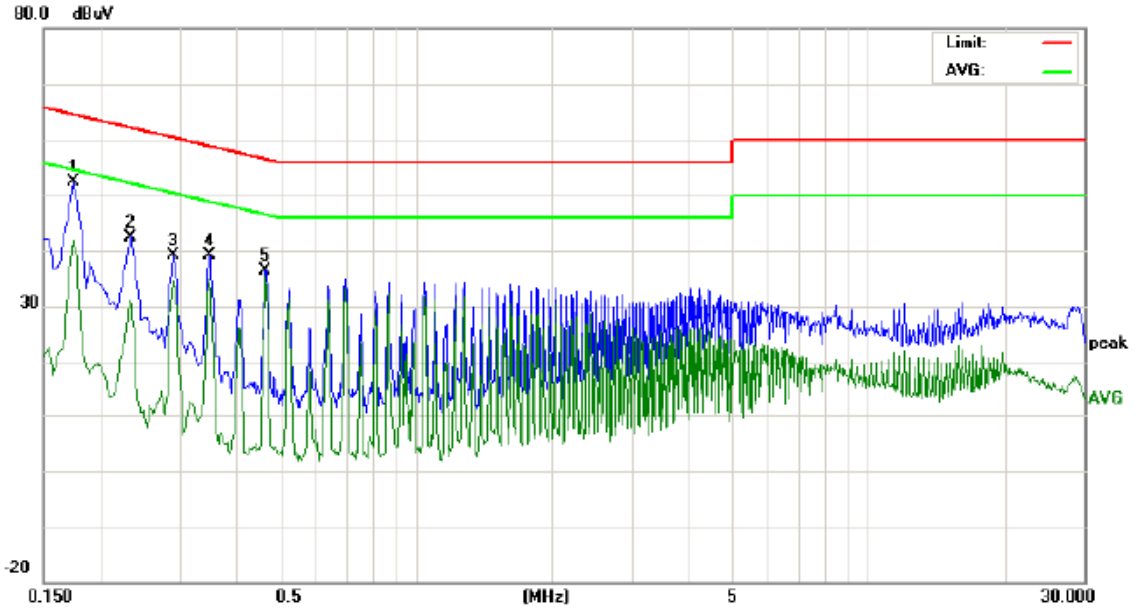
c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

7.4 TEST RESULT

Pass.

7.5 GRAPHS AND DATA

L:



Site site #1 Phase: L1 Temperature: 24

Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz for PC Humidity: 53 %

EUT: Wireless Mouse

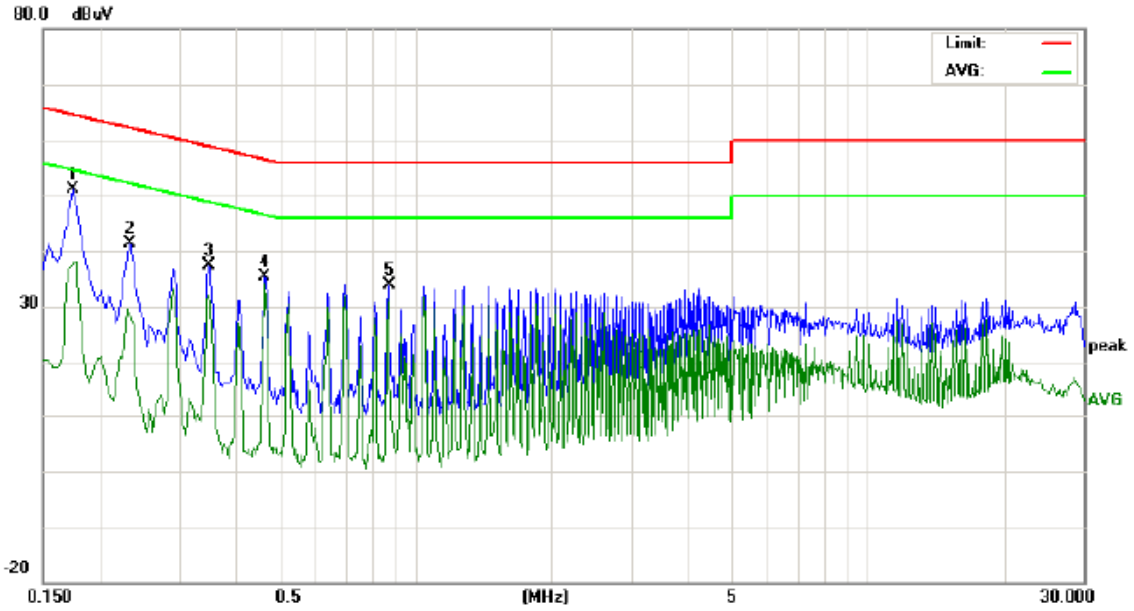
M/N: 82-801

Mode: TX+Charging

Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1740	42.27	40.88	29.59	10.15	52.42	51.03	39.74	64.76	54.76	-13.73	-15.02	P	
2	0.2340	32.54	30.74	19.64	9.96	42.50	40.70	29.60	62.30	52.30	-21.60	-22.70	P	
3	0.2900	29.05	27.67	24.78	9.97	39.02	37.64	34.75	60.52	50.52	-22.88	-15.77	P	
4	0.3500	29.10	27.33	23.17	9.98	39.08	37.31	33.15	58.96	48.96	-21.65	-15.81	P	
5	0.4660	26.39	25.20	24.76	10.00	36.39	35.20	34.76	56.58	46.58	-21.38	-11.82	P	

N:



Site site #1 Phase: N Temperature: 24

Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz for PC Humidity: 53 %

EUT: Wireless Mouse

M/N: 82-801

Mode: TX+Charging

Note:

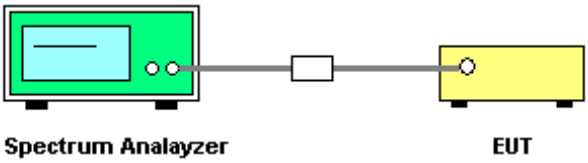
No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1740	40.99	39.83	28.37	10.15	51.14	49.98	38.52	64.77	54.77	-14.79	-16.25	P	
2	0.2340	31.29	30.02	18.61	9.96	41.25	39.98	28.57	62.31	52.31	-22.33	-23.74	P	
3	0.3500	27.42	26.28	22.12	9.98	37.40	36.26	32.10	58.96	48.96	-22.70	-16.86	P	
4	0.4660	25.28	24.13	23.51	10.00	35.28	34.13	33.51	56.58	46.58	-22.45	-13.07	P	
5	0.8740	23.95	21.37	19.55	9.89	33.84	31.26	29.44	56.00	46.00	-24.74	-16.56	P	

8. 20DB BANDWIDTH MEASUREMENT

8.1 LIMITS

None

8.2 BLOCK DIAGRAM OF TEST SETUP



8.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.

2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.

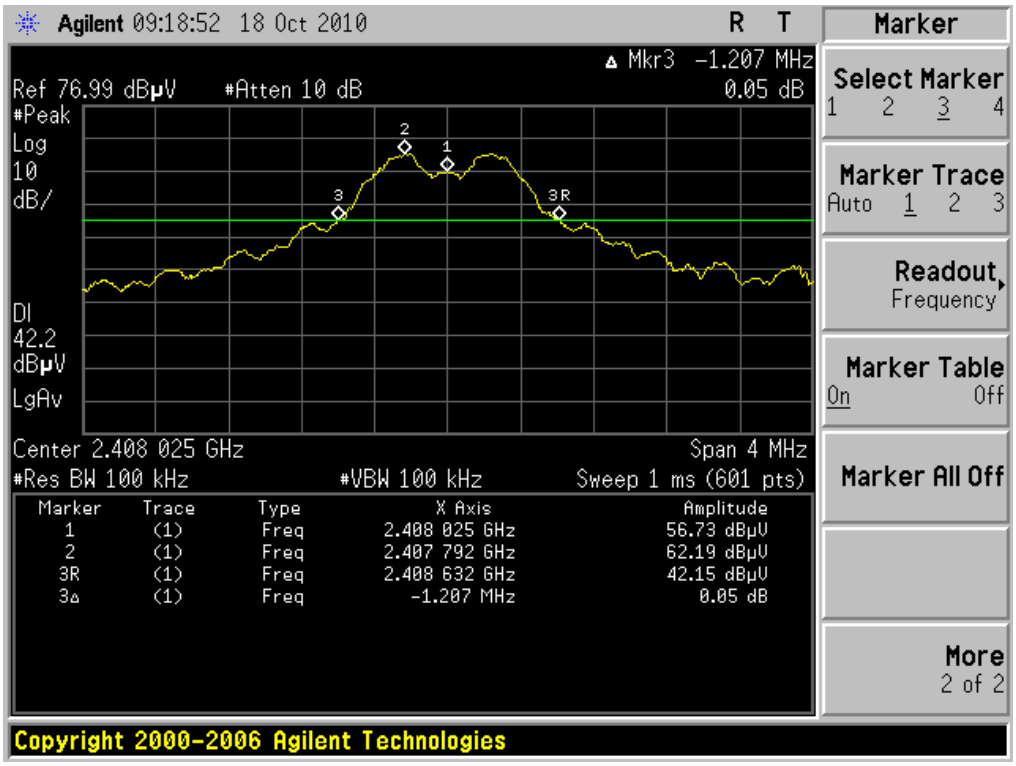
3. A PEAK output reading was taken, a DISPLAY line was drawn 20 dB lower than PEAK level.

4. The 20dB bandwidth was determined from where the channel output spectrum intersected the display line.

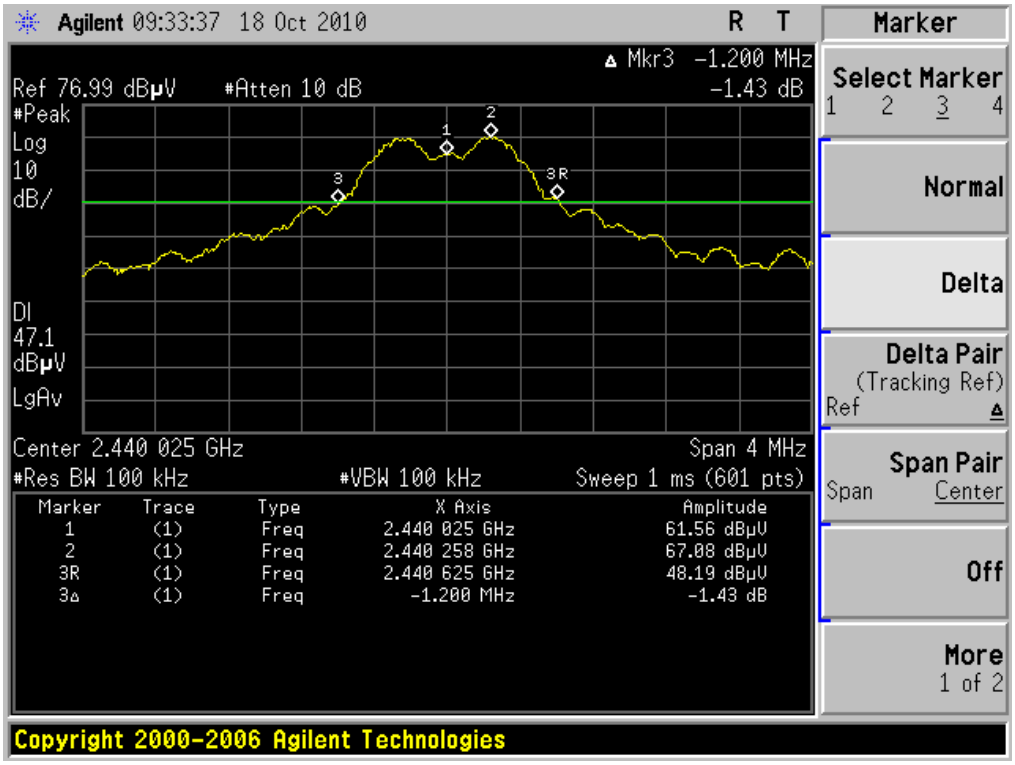
8.4 TEST RESULT

Worst case-- Modulation Type: GFSK

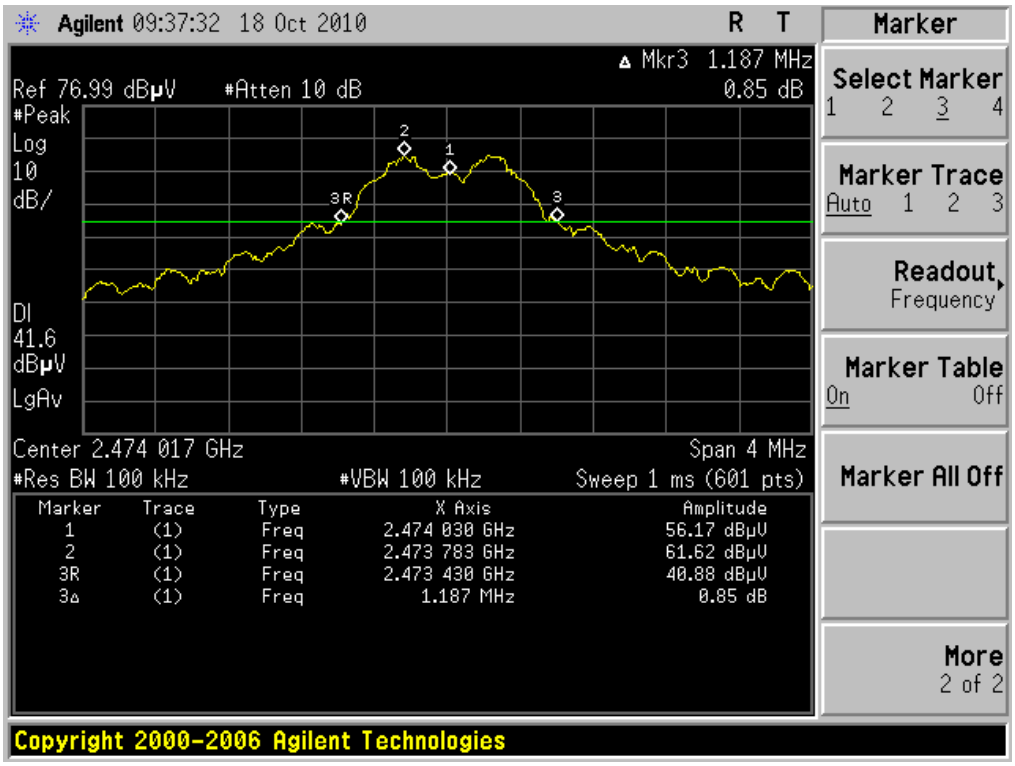
Channel	Frequency (MHz)	20 dB BW (MHz)	Result
CH1	2408	1.207	1.207MHz
CH31	2440	1.200	
CH64	2474	1.107	



Channel 1



Channel 31


Agilent 09:37:32 18 Oct 2010
R T
Marker
Mkr3 1.187 MHz
0.85 dB
Ref 76.99 dBµV
#Atten 10 dB
#Peak
Log
10
dB/
DI
41.6
dBµV
LgAv
Center 2.474 017 GHz
Span 4 MHz
#Res BW 100 kHz
#VBW 100 kHz
Sweep 1 ms (601 pts)
Marker Trace X Axis Amplitude
1 (1) Freq 2.474 030 GHz 56.17 dBµV
2 (1) Freq 2.473 783 GHz 61.62 dBµV
3R (1) Freq 2.473 430 GHz 40.88 dBµV
3Δ (1) Freq 1.187 MHz 0.85 dB
Select Marker
1 2 3 4
Marker Trace
Auto 1 2 3
Readout
Frequency
Marker Table
On Off
Marker All Off
More
2 of 2
Copyright 2000-2006 Agilent Technologies

Channel 64

9. RADIATED EMISSIONS MEASUREMENT

9.1 LIMITS

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

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

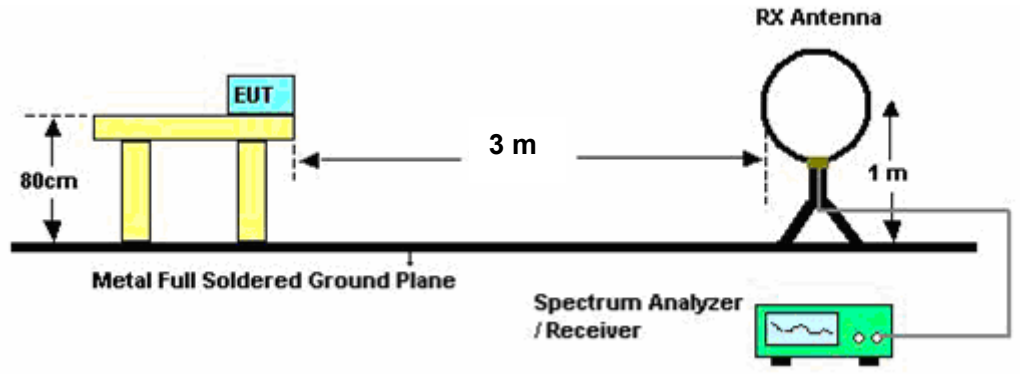
(2) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209 as the following , whichever is the lesser attenuation.

Frequency (MHz)	Field strength (mV/m)	Distance (m)
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

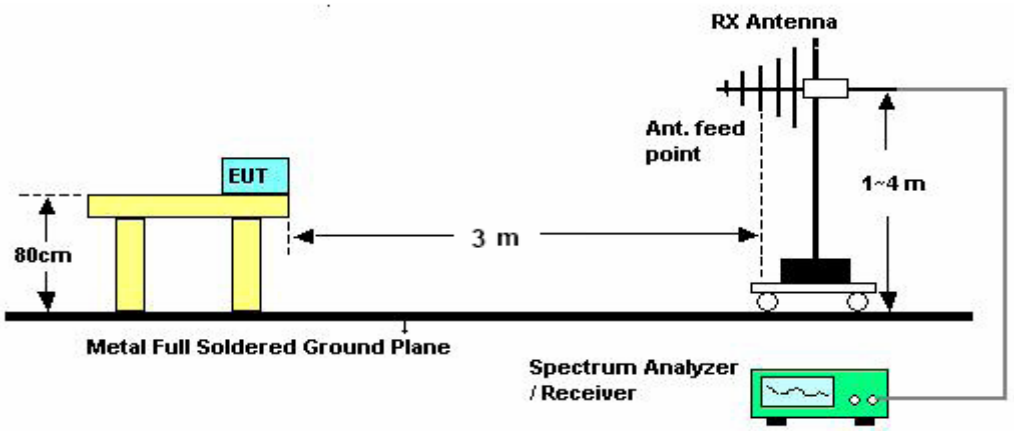
Note: the tighter limit applies at the band edges.

9.2 BLOCK DIAGRAM OF TEST SETUP

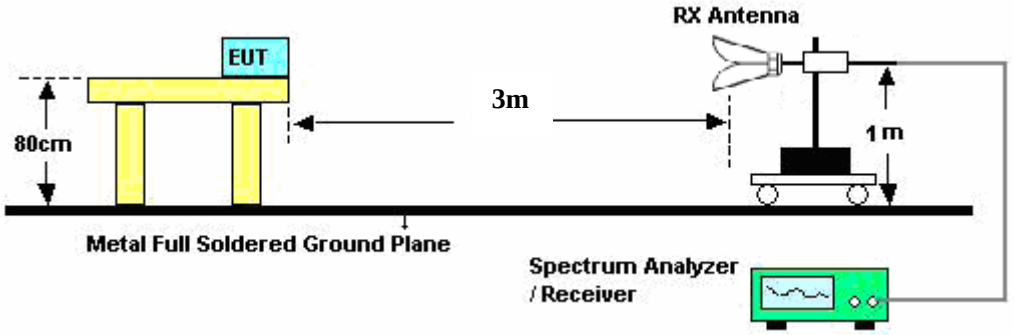
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30 - 1000MHz



For radiated emissions from 1GHz to 25GHz



9.3 TEST PROCEDURE

A. Above 30MHz

a. The EUT was placed on the top of a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna (wideband antenna), which was mounted on the top of a variable-height antenna tower. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.

b. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

c. The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

B. Below 30MHz

a. The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 1 meter away from the antenna (loop antenna). The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.

b. For each suspected emission, the EUT was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

c. The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

9.4 TEST RESULT

Note: Limit dBμV/m @3m = Limit dBμV/m @300m+ 80
Limit dBμV/m @3m = Limit dBμV/m @30m + 40

Test Results-(Measurement Distance: 3m)_Channel 1								
Frequency (MHz)	Measurement value			Limit			Antenna	Result
	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	(H/V)	(P/F)
30.0000	25.76	---	---	---	40	---	H	P
97.9000	18.99	---	---	---	43.5	---	H	P
395.3666	28.63	---	---	---	46	---	H	P
***2408.000**	77.20	---	---	114	---	94	H	P
**4816.000	39.70	---	---	74	---	54	H	P
**7224.000	44.85	---	---	74	---	54	H	P
7311.667	45.90	---	---	74	---	54	H	P
**9632.000	48.23	---	---	74	---	54	H	P
30.0000	24.87	---	---	---	40	---	V	P
104.3667	19.13	---	---	---	43.5	---	V	P
356.5667	26.51	---	---	---	46	---	V	P
***2408.000**	76.04	---	---	114	---	94	V	P
4605.000	40.65	---	---	74	---	54	V	P
**7224.000	43.65	---	---	74	---	54	V	P
**9632.000	47.96	---	---	74	---	54	V	P

*: fundamental frequency

**: harmonics frequency

Note:

1. The test data below 30MHz are very low, so they are not recorded.
2. The harmonics inside restricted bands meet the limits of FCC part 15.209.

Test Results-(Measurement Distance: 3m)_Channel 31								
Frequency (MHz)	Measurement value			Limit			Antenna	Result
	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	(H/V)	(P/F)
30.0000	24.96	---	---	---	40	---	H	P
395.3666	29.66	---	---	---	46	---	H	P
469.7332	29.30	---	---	---	46	---	H	P
***2440.000**	68.61	---	---	114	---	94	H	P
4208.333	40.99	---	---	74	---	54	H	P
**4880.000	41.02	---	---	74	---	54	H	P
6471.667	41.73	---	---	74	---	54	H	P
**7320.000	46.20	---	---	74	---	54	H	P
30.0000	25.32	---	---	---	40	---	V	P
183.5833	20.94	---	---	---	43.5	---	V	P
356.5667	27.12	---	---	---	46	---	V	P
***2440.000**	70.21	---	---	114	---	94	V	P
4511.667	40.39	---	---	74	---	54	V	P
**4880.000	41.20	---	---	74	---	54	V	P
6273.333	41.66	---	---	74	---	54	V	P
**7320.000	46.83	---	---	74	---	54	V	P

*: fundamental frequency

**: harmonics frequency

Note:

1. The test data below 30MHz are very low, so they are not recorded.
2. The harmonics inside restricted bands meet the limits of FCC part 15.209.

Test Results-(Measurement Distance: 3m)_Channel 64								
Frequency (MHz)	Measurement value			Limit			Antenna	Result
	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	(H/V)	(P/F)
30.0000	25.45	---	---	---	40	---	H	P
395.3666	27.89	---	---	---	46	---	H	P
531.7332	30.78	---	---	---	46	---	H	P
***2474.000**	68.02	---	---	114	---	94	H	P
4546.667	40.86	---	---	74	---	54	H	P
**4948.000	41.03	---	---	74	---	54	H	P
6005.000	41.99	---	---	74	---	54	H	P
**7422.000	45.96	---	---	74	---	54	H	P
7825.000	47.59	---	---	74	---	54	H	P
30.0000	25.87	---	---	---	40	---	V	P
183.5833	21.32	---	---	---	43.5	---	V	P
460.0333	28.43	---	---	---	46	---	V	P
***2474.000**	70.51	---	---	114	---	94	V	P
4570.000	40.34	---	---	74	---	54	V	P
**4948.000	41.02	---	---	74	---	54	V	P
6308.333	41.91	---	---	74	---	54	V	P
**7422.000	46.02	---	---	74	---	54	V	P
7696.667	47.21	---	---	74	---	54	V	P

*: fundamental frequency

**: harmonics frequency

Note:

1. The test data below 30MHz are very low, so they are not recorded.
2. The harmonics inside restricted bands meet the limits of FCC part 15.209.

10. BAND EDGE EMISSION MEASUREMENT

10.1 LIMITS

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.

10.2 BLOCK DIAGRAM OF TEST SETUP

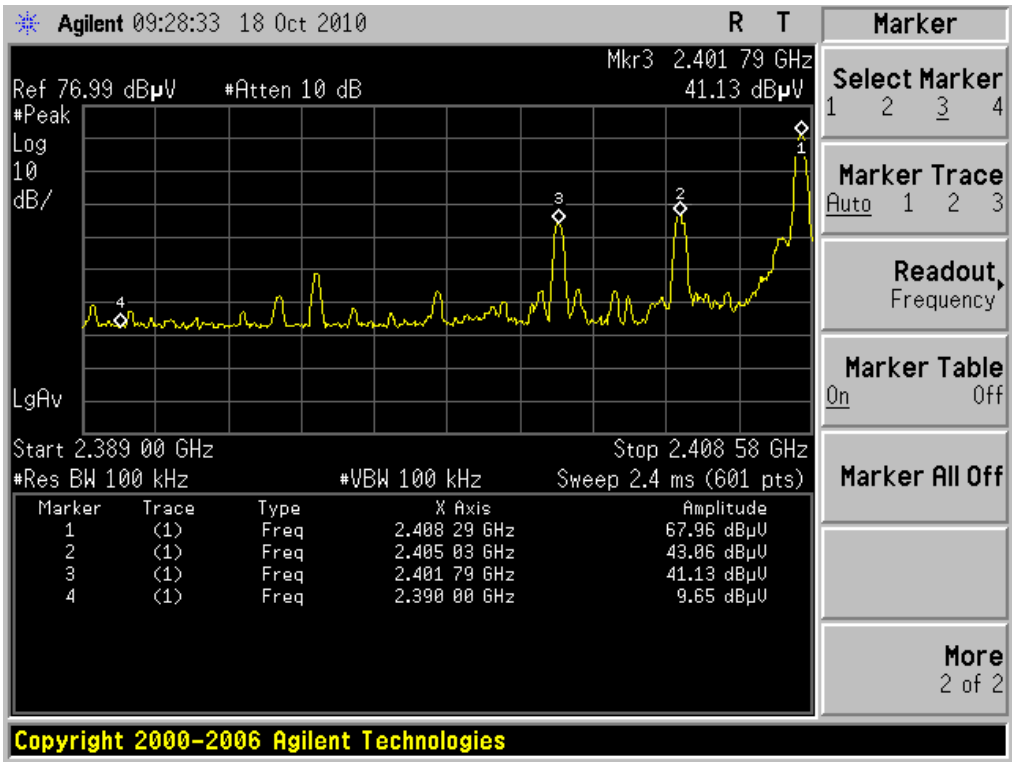
10.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. Record the emission drops at the band-edge relative to the highest fundamental emission level.
4. Use the marker-delta method to determine band-edge compliance as required.

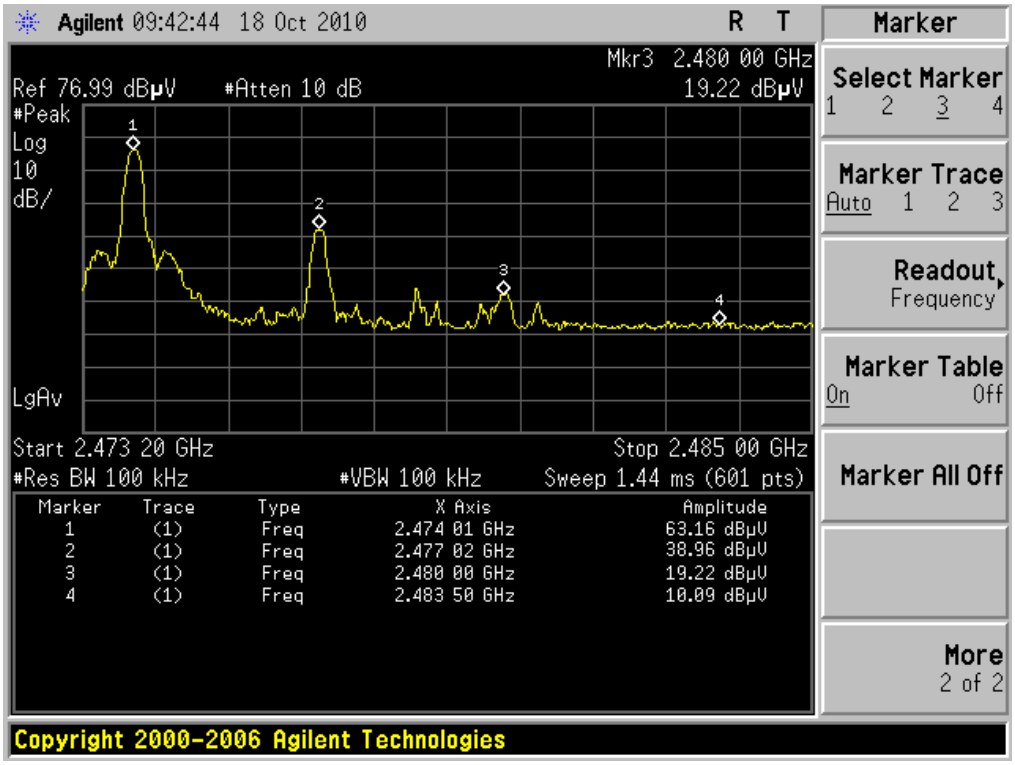
10.4 TEST RESULT

Worst case-- Modulation Type: GFSK

Channel Frequency (MHz)	Fundamental Emission (dBμV/m)	Delta (dB)	Final Emission (dBμV/m)	Limit (dBμV/m)		Result (Pass / Fail)
	PK		PK	PK	AV	
CH1_2408	77.20	---	---	---	---	---
2405.0	---	24.90	52.30	74	54	Pass
2401.8	---	26.83	50.37	74	54	Pass
2390.0	---	58.31	18.89	74	54	Pass
CH64_2474	70.51	---	---	---	---	---
2477.0	---	24.20	46.31	74	54	Pass
2480.0	---	43.94	26.57	74	54	Pass
2483.5	---	53.07	17.44	74	54	Pass



CH1 _ 2408MHz



CH64_ 2474MHz

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

TEST SETUP OF CONDUCTED EMISSION

TEST SETUP OF RADIATED EMISSION (Below 30MHz)

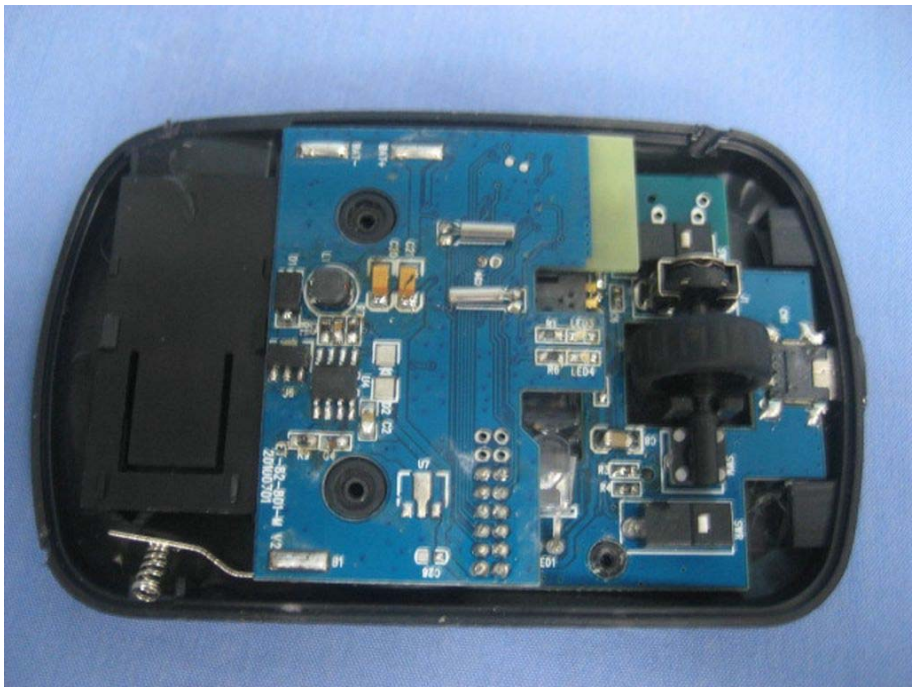
TEST SETUP OF RADIATED EMISSION (30MHz～1GHz)

TEST SETUP OF RADIATED EMISSION (Above1GHz)

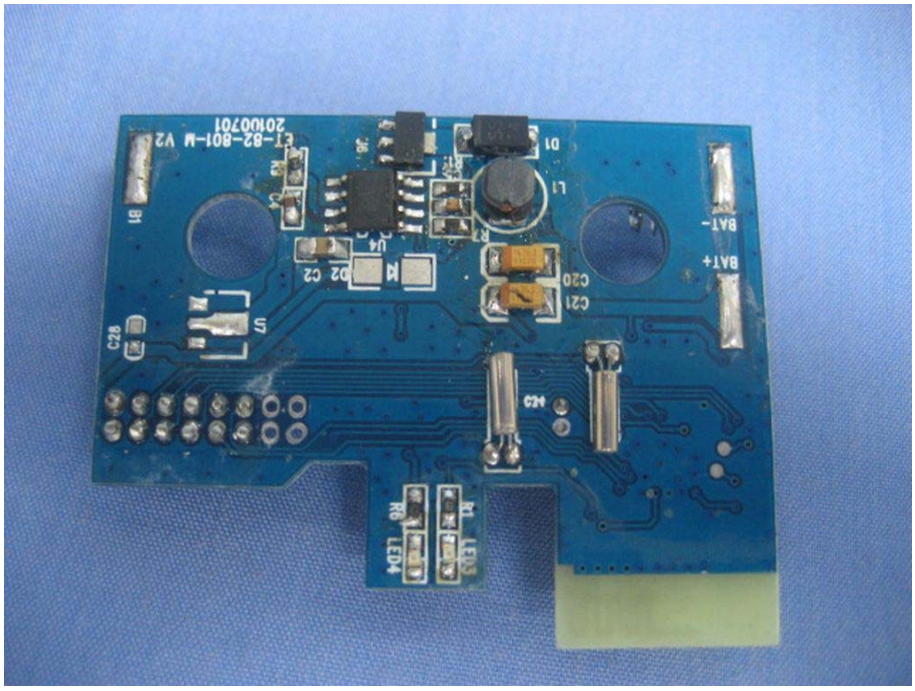
APPENDIX 2 PHOTOGRAPHS OF EUT

View of external EUT-1

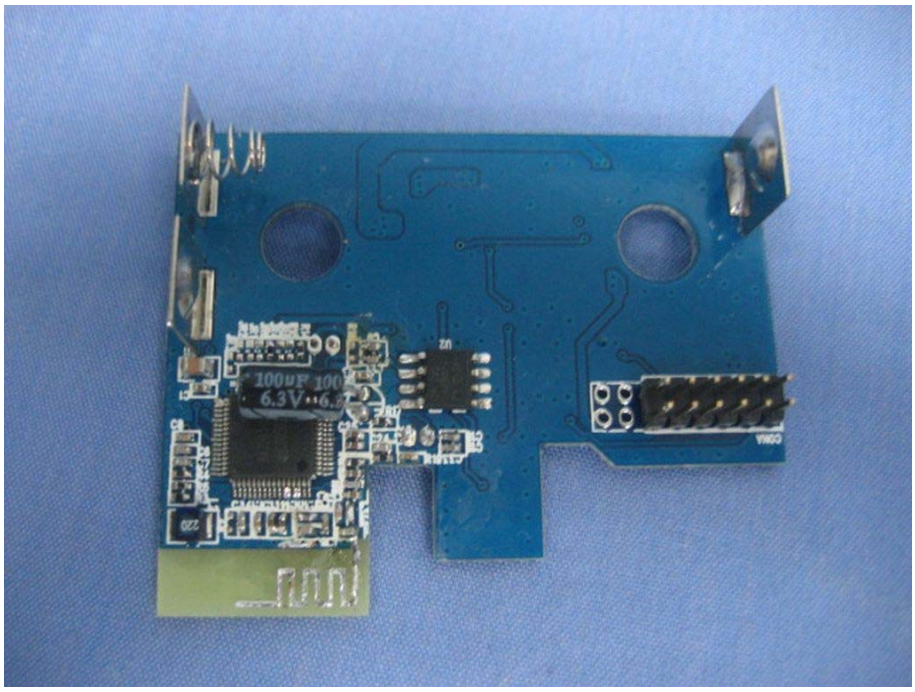
View of external EUT-2



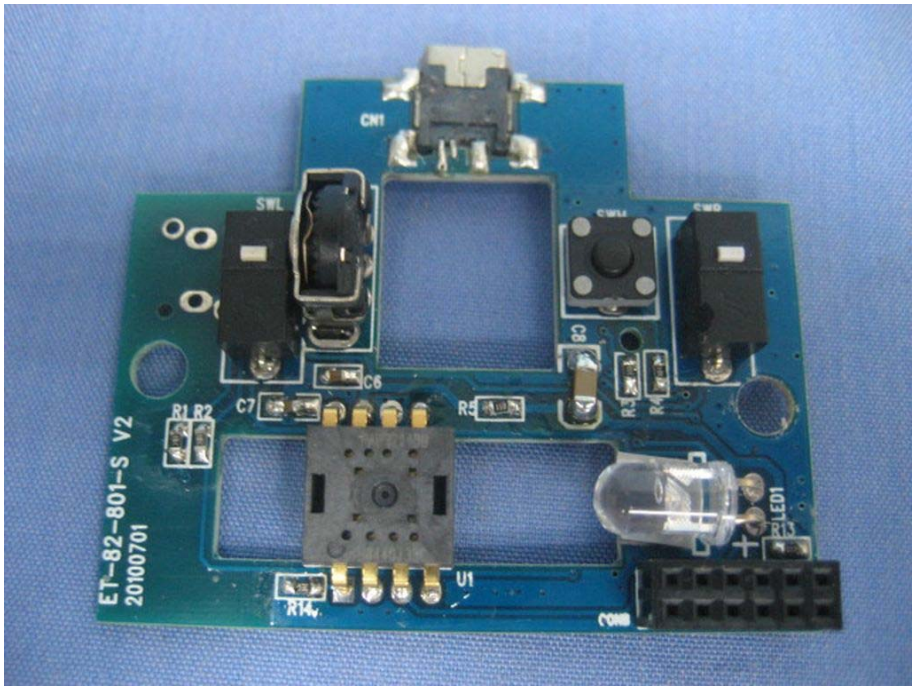
View of internal EUT-1



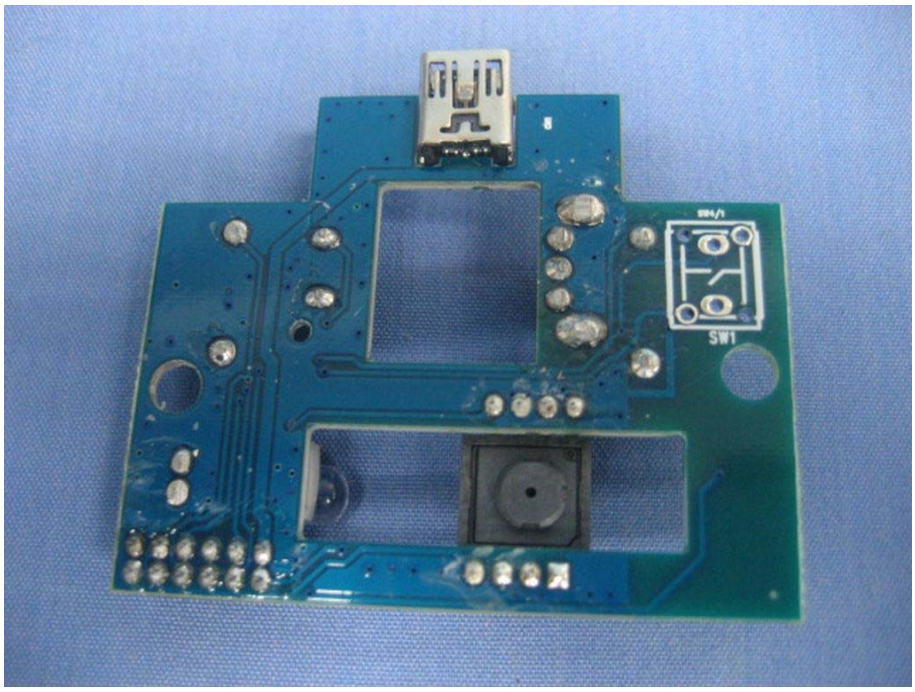
View of internal EUT-2



View of internal EUT-3



View of internal EUT-4



View of internal EUT-5

------- End of report -------