

FCC ID TEST REPORT

According to

FCC Part 15 Subpart C, Intentional Radiators

EUT Type **Slim Wireless Keyboard**

Transmitter (TX) **1) Model No.: RF-711**

2) FCC ID: P4PRF-711

3) Power Supply: DC 6V, battery Type AAA, 1.5Vdc x 4

Receiver (RX) **1) Model No.: RF-711**

2) FCC ID: N/A, (under DoC)

3) Power Supply: DC 5V from PS/2 Port of PC

Applicant Name: **ZIPPY TECHNOLOGY CORP.**

Address See the General Information for details.

Test Date : 2002-04-03 Issued Date : APR. 16, 2002

Test Engineer : JOHSON CHANG NVLAP Signature : Peter Kao
Peter Kao / Director

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- The report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States government.
- This report is applicable only for EUT Model which described in page 4 .
- The testing result in this report are traceable to national or international standard .

PEP TESTING LABORATORY

12-3Fl, No. 27-1, Lane 169, Kang-Ning St., Hsi-Chih.
Taipei Hsien, Taiwan, R. O. C.
Tel : 8862-26922097 Fax : 8862-26956236

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1. General Information

Measurement of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC Part 2 and 15.

a) EUT Transmitter (TX):

Model No.: RF-711

FCC ID: P4PRF-711

b) EUT Receiver (RX):

Model No.: RF-711

FCC ID: N/A, (under DoC)

c) Applicant Name/Address: ZIPPY TECHNOLOGY CORP.

**10F, NO. 50 MIN CHYUAN RD., SHIN TIEN CITY,
TAIPEI HSIEN, TAIWAN, R. O. C.**

Contact Person: LAURENCE TSAI

Phone No.: 886-2-29188512 Fax No.: 886-2-29123671

d) Manufacturer Name/Address: ZIPPY TECHNOLOGY CORP.

**10F, NO. 50 MIN CHYUAN RD., SHIN TIEN CITY,
TAIPEI HSIEN, TAIWAN, R. O. C.**

❖ Regulation: FCC Parts 2 and 15

❖ Limitation: Part 15, Section 15.227, 15.207 and 15.209

❖ Test Procedure: ANSI C63.4-1992

❖ Place of Test: PEP Testing Laboratory

12-3F1, No. 27-1, Lane 169, Kang-Ning St., Hsi-Chih.
Taipei Hsien, Taiwan, R. O. C.
TEL : 8862-26922097 FAX : 8862-26956236

Measurement Uncertainty :

The uncertainty of the testing result is given as below . The method of uncertainty Calculation is based on NIST Technical Note 1297 .

Frequency (MHz)	0.15 ~ 30	30 ~ 1000
Combined Uncertainty μ_c	1.77 (dB)	2.08 (dB)

2. Product Information

- a. **EUT Type:** Slim Wireless Keyboard
- b. **Transmitter Model:** RF-711 **Receiver Model:** RF-711
- c. **TX FCC ID:** P4PRF-711 **RX FCC ID:** N/A, (under DoC)
- d. **TX Channel No. :** Two **RX Channel No. :** Two
- e. **TX Working Freq. :** 27.145MHz, 27.195MHz **RX Working Freq. :** 27.6 / 27.65MHz
- f. **TX Modulation :** FSK **RX Modulation :** N/A
- g. **TX Crystal / Osc. :** 6 MHz, 27.145MHz, 27.195 MHz **RX Crystal / Osc. :** 27.500 MHz, 27.550 MHz, 27.600 MHz, 27.650 MHz, 455KHz
- h. **TX Port(s) :** N/A **RX Port(s) :** PS/2 for Keyboard, PS/2 for Mouse
- i. **TX Transmitting Power :** DC 6V (1.5V × 4) **RX Receiver Power :** DC 5V 30mA
- j. **TX Power Supply :** Battery(Type AAA) **RX Power Supply :** PS/2 Port of PC
- j. **TX Case :** ABS **RX Case :** ABS
- k. **EUT Condition :** Prototype Engineering Production
- l. **EUT Received Date :** APR. 03, 2002

3. EUT Description and Test Methods

(A) The EUT is Slim Wireless keyboard, FCC ID: P4PRF-711, Model RF-711. The EUT consists of one wireless transmitter supplied from DC 6V (Battery size AAA 1.5V ×4). One receiver connected to PS/2 ports rated DC5V from PC was used as corresponding peripheral device for the test. The EUT transmitting frequency is operating either 27.145MHz or 27.195MHz, which is controlled by select switch at the side of transmitter unit; we tested both of two frequencies and attached the worst-case test result in this report. The effective transmitting distance of EUT system is approximate 1 meter. We located both EUT transmitter and corresponding peripheral receiver on turntable under test. For more detail information about the EUT, please refer to the user's manual.

(B) Test Method: Including EUT transmitter and corresponding peripheral receiver link with PC system were setup as a complete test system on turntable. The receiver connected to PS/2 ports of PC system, the PC operating system was setup to detect and drive every peripheral devices including EUT. Then, we pressed "H" key on the transmitter to enable RF keyboard under Control panel of WIN98 for Tx-On Mode, and ran "EMITEST" for Tx-Off Mode, and the worst-case test data as ANSI C63.4 requirement was recorded and provided in this report.

(C) Test Mode: (1) For Conducted EMI---"Tx-Off" Mode
(2) For Radiated EMI---"Tx-On" and "Tx-Off" Mode

(D) At the frequencies where the peak values of the emission exceeded the quasi-peak limit, the emissions were also measured with the quasi-peak detectors. The average detector also measured the emission either (A) quasi-peak values were under quasi-peak limit but exceeded average limit, or (B) peak values were under quasi-peak limit but exceeded average limit.

(E) Due to EUT system is Desktop type not Handheld type, only one orthogonal plane is tested for detecting the required EMI testing data.

4. Modification(s):

N/A

5. Test Software Used

(A) EMITEST program that continuously generates a complete line of repeating “H” letter was the software used during test.

6. Support Equipment Used

1. Personal Computer (PC3)

CPU : Intel P4 Socket 478 1.6GHz
FCC ID : Declaration of Conformity(DoC)
Manufacturer : LEMEL
Model Number : LMIH1A2
Power Supply : Switching
Power Cord : Non-Shielded, Detachable, 1.8m
Data Cable : N/A

2. Monitor (MON1 15")

FCC ID : Declaration of Conformity(DoC)
Manufacturer : SAMSUNG
Model Number : 550S
Power Supply : Switching
Power Cord : Non-Shielded, Detachable, 1.8m
Data Cable : 1 > Shielded , Non-detachable,1.2m
2 > Back Shell : Metal

3. Printer (PRN1)

FCC ID : B94C2642X
Manufacturer : Hewlett-Packard
Model Number : C2642E
Power Supply : Linear, 30Vdc O/P
Power Cable : Non-Shielded , Detachable,1.8m
Data Cable : 1 > Shielded , Detachable,1.2m
2 > Back Shell : Metal

4. Modem (MOD1) x 2

FCC ID : IFAXDM1414
Manufacturer : ACEEX
Model Number : 1414
Power Supply : Linear, 9Vac O/P
Power Cable : Non-Shielded , Detachable,1.7m
Data Cable : 1 > Shielded , Detachable,1m
2 > Back Shell : Metal

5. Mouse (MOUS/1 PS/2)**FCC ID :** DZL211106**Manufacturer :** LOGITECH**Model Number :** M-S43**Power Supply :** +5Vdc from PS2 of PC**Power Cord :** N/A**Data Cable :** 1 > Shielded , Non-detachable,1.8m

2 > Back Shell : Metal

6. Receiver**FCC ID :** Declaration of Conformity(DoC)**Manufacturer :** ZIPPY**Model Number :** RF-711**Power Supply :** +5Vdc from PS/2 of PC**Power Cord :** N/A**Data Cable :** 1 > Shielded , Non-detachable,1.3m

2 > Back Shell : N/A

7. Description of Conducted Emissions Test

7.1 Conducted Emissions Limits

Frequency	Maximum RF Voltage in dB(uV)				
	FCC Part 15, Subpart C		Frequency	CISPR 22	
MHz	QUASI-PEAK	AVERAGE	MHz	QUASI-PEAK	AVERAGE
0.45 – 30	48	--	0.15 – 0.5	66-56	56-46
--	--	--	0.5– 5	56	46
--	--	--	5-30	60	50

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

8. Description of Radiated Emissions Test

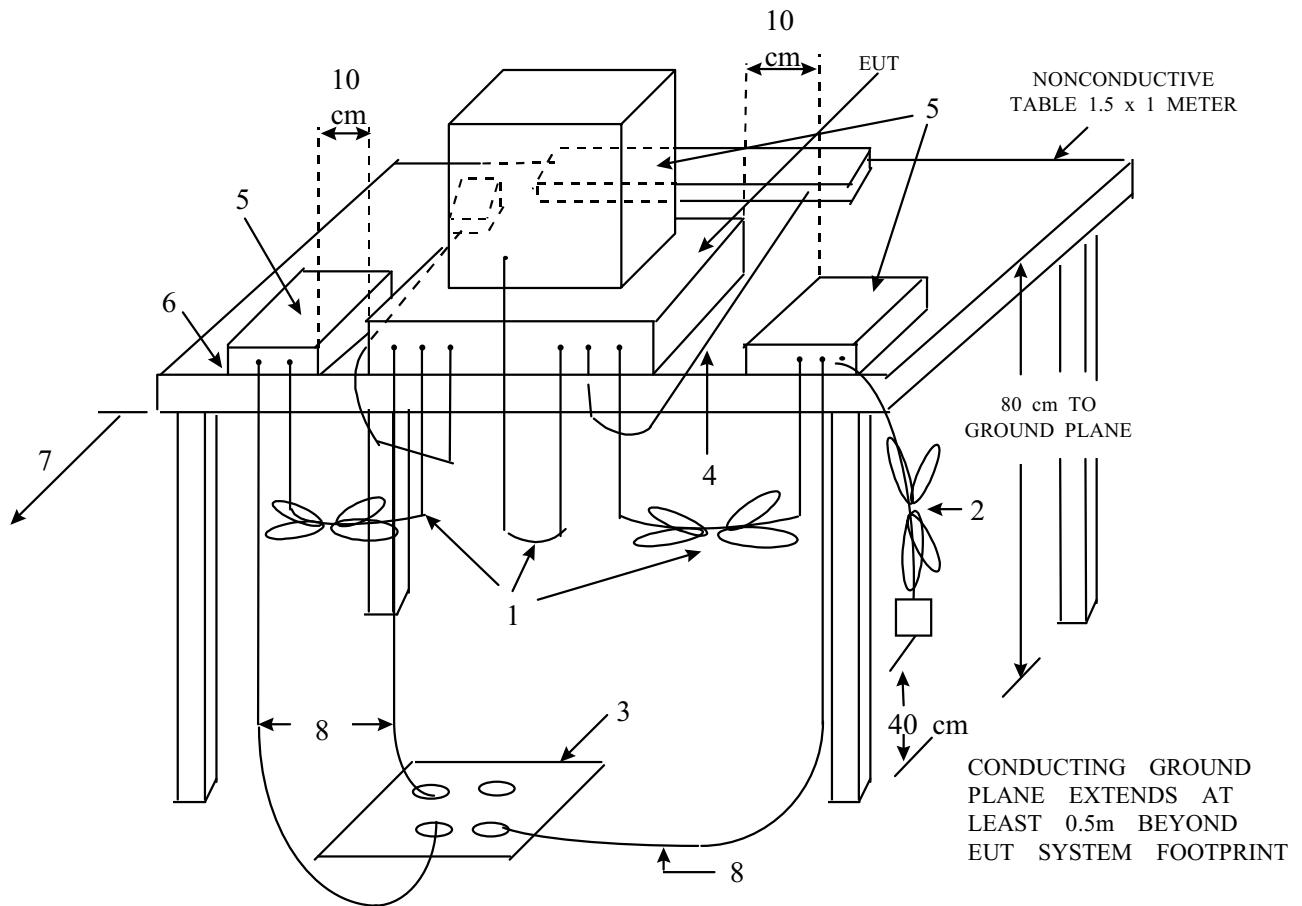
8.1 Radiated Emissions

Preliminary measurements were made indoors chamber at 3 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000 MHz using logbicon antenna. Above 1GHz, linearly polarized double ridge horn antenna was used.

Final measurements were made outdoors at 3-meter test range using logbicon antenna and horn antenna. The test equipment was placed on a wooden bench situated on a 1.5x1 meter area adjacent to the measurement area. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz.

The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet , if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in radiated emission test photo.

8.2 Test Configuration



LEGEND

1. Interconnecting cables which hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables which are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.
3. If LISN are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground if required receptacle flush with the ground plane.
4. Cables of hand-operated devices, such as keyboards, KEYPADs, etc., have to be placed as close as possible to the controller.
5. Non-EUT components of EUT system being tested.
6. The rear of all components of the system under test shall be located flush with the rear of the table.
7. No vertical conducting wall used.
8. Power cords drape to the floor and are routed over to receptacle.

8.3 Radiated Emission Limits

Limits for radiated disturbance of
Class B ITE or Intentional Radiator
At a measuring distance of 3 m

Frequency MHz	Field Strength dB(μ V/m) or uV/m	
30 to 88	40	100
88 to 216	43.5	150
216 to 960	46	200
Above 960	56	500

NOTES

- 1 The lower limit shall apply at the transition frequency.
- 2 Additional provisions may be required for cases where interference occurs.

9. Conducted Emissions Test Setup Photo.

< Front View >



< Rear View >



10. Conducted Emissions Test Data

Model No. : RF-711
Frequency range : 150KHz to 30MHz
Detector : Quasi-peak Value
Temperature : 27 °C
Humidity : 43 %
Memo : CH1 (27.152MHz)

Test Data : # 2445 < LINE >
2446 < NEUTRAL >

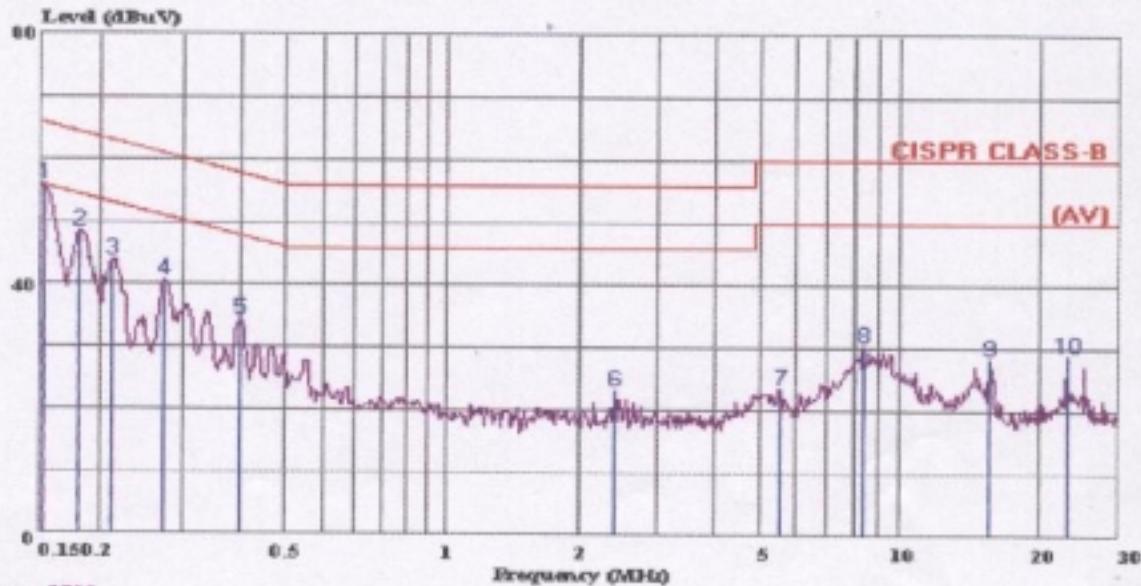
※ Note 1. Level = Read Level + Cable Loss + Probe (LISN)
2. Over Limit = Level – Limit = Margin



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PEP Testing Laboratory

Data#: 2449 File#: EN55022-B (QP).EMI Date: 2002-04-15 Time: 11:44:36



Trace: 1705

Site : Conduction NO.1(Nick)
Condition: CISPR CLASS-B LISN.L(16A) LINE
eut : E910069
power : AC 120V 60Hz
memo : Peak Value
model : FINAL TEST
: CH1

Page: 1

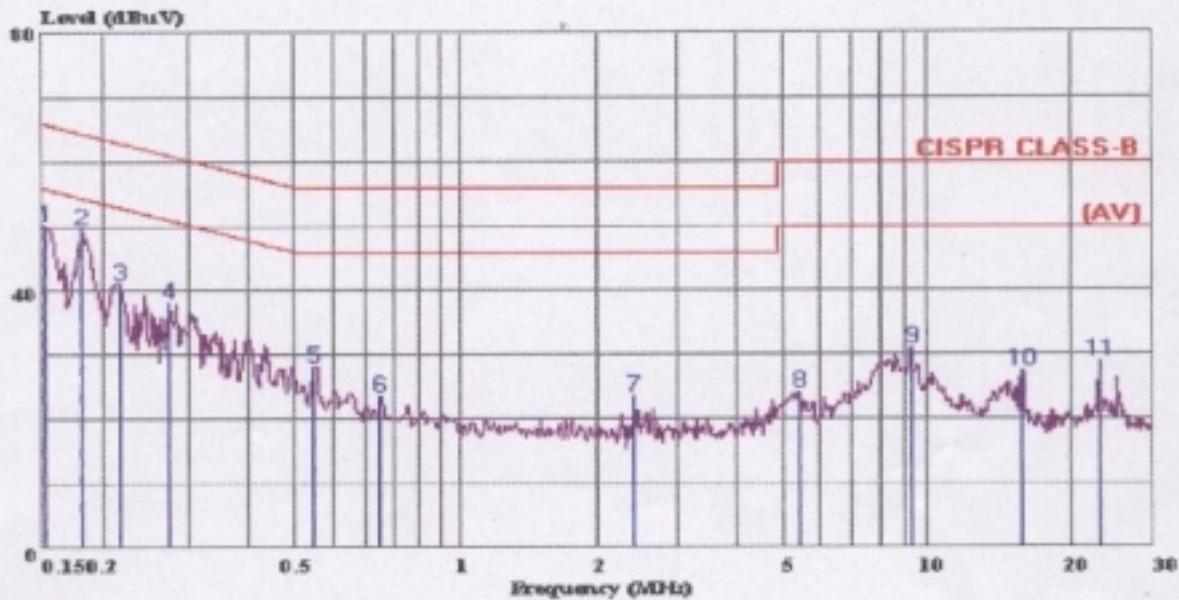
Freq	Level	Over	Limit	Read	Probe	Cable	Remark
		Limit	Line	Level	Factor	Loss	
MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	55.79	-10.12	65.91	55.39	0.10	0.30
2	0.182	48.46	-15.96	64.42	48.19	0.10	0.17
3	0.214	44.00	-19.05	63.05	43.80	0.10	0.10
4	0.276	40.80	-20.14	60.94	40.60	0.10	0.10
5	0.398	34.40	-23.50	57.90	34.20	0.10	0.10
6	2.513	23.28	-32.72	56.00	23.01	0.13	0.14
7	5.683	23.58	-36.42	60.00	23.20	0.28	0.10
8	8.501	30.46	-29.54	60.00	29.99	0.37	0.10
9	15.801	28.50	-31.50	60.00	27.61	0.62	0.27
10	23.140	28.93	-31.07	60.00	27.79	0.84	0.30



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PEP Testing Laboratory

Data#: 2450 File#: EN55022-B(QP).EMI Date: 2002-04-15 Time: 11:46:10



Trace: 1710

Site : Conduction NO.1(Nick)
Condition: CISPR CLASS-B LISN.N(16A) NEUTRAL
eut : E910089
power : AC 120V 60Hz
memo : Peak Value
model : FINAL TEST
: CH1

Page: 1

Freq	Level	Over	Limit	Read	Probe	Cable	Remark
		Limit	Line	Level	Factor	Loss	
MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	50.19	-15.72	65.91	49.79	0.10	0.30
2	0.181	49.67	-14.79	64.46	49.40	0.10	0.17
3	0.217	41.00	-21.92	62.92	40.80	0.10	0.10
4	0.276	38.20	-22.74	60.94	38.00	0.10	0.10
5	0.549	28.00	-28.00	56.00	27.80	0.10	0.10
6	0.751	23.40	-32.60	56.00	23.20	0.10	0.10
7	2.513	23.64	-32.36	56.00	23.40	0.10	0.14
8	5.535	24.07	-35.93	60.00	23.80	0.17	0.10
9	9.451	31.03	-28.97	60.00	30.60	0.29	0.14
10	16.055	27.52	-32.48	60.00	26.79	0.43	0.30
11	23.140	28.87	-31.13	60.00	28.00	0.57	0.30

Model No. : RF-711
Frequency range : 150KHz to 30MHz
Detector : Quasi-peak Value
Temperature : 27 °C
Humidity : 43 %
Memo : CH2 (27.192MHz)

Test Data : # 2447 < LINE >
2448 < NEUTRAL >

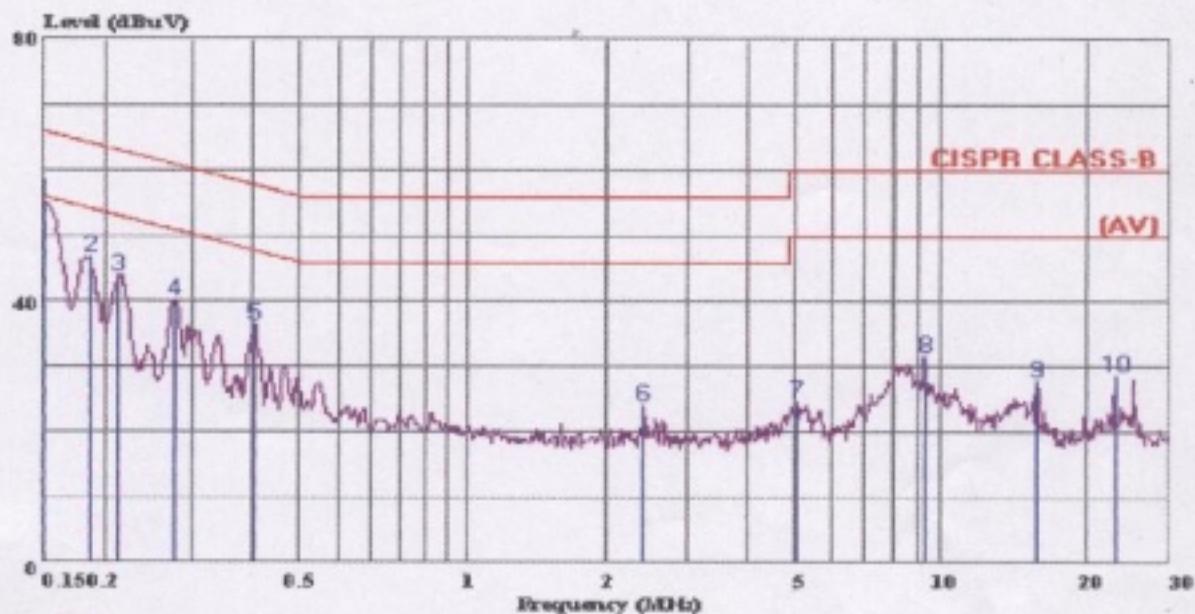
※ Note 1. Level = Read Level + Cable Loss + Probe (LISN)
2. Over Limit = Level – Limit = Margin



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PEP Testing Laboratory

Data# 2451 File#: EN55022-B (QP).EMI Date: 2002-04-15 Time: 11:47:31



Site : Conduction NO.1(Nick)
 Condition: CISPR CLASS-B LISN.L(16A) LINE
 eut : E910089
 power : AC 120V 60Hz
 memo : Peak Value
 model : FINAL TEST
 : CH2

Page: 1

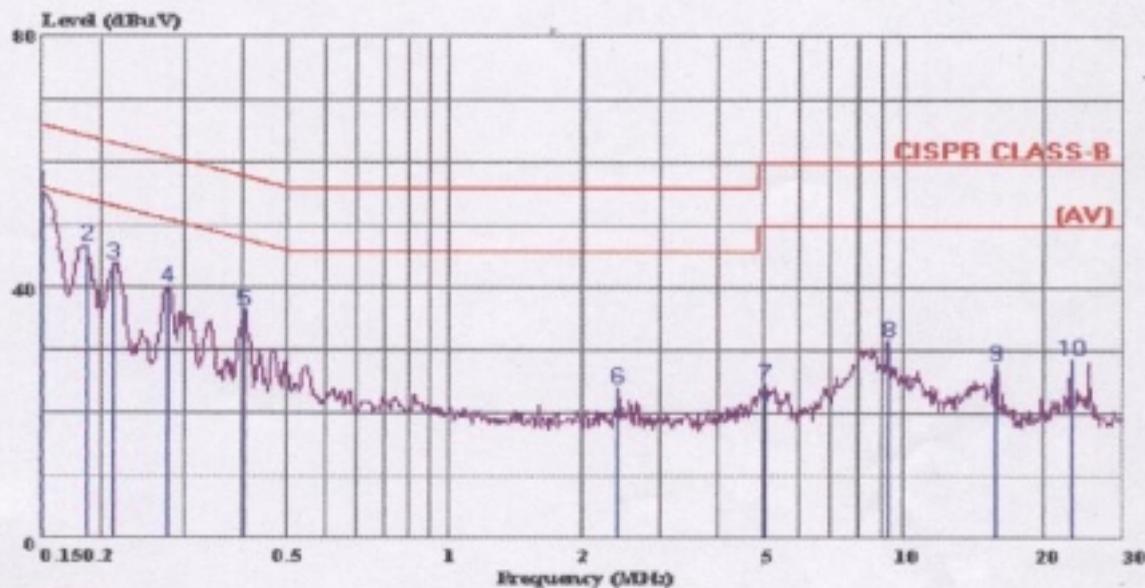
Freq	Level	Over	Limit	Read	Probe	Cable	Remark
		Limit	Line	Level	Factor	Loss	
MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.151	55.20	-10.76	65.96	54.80	0.10	0.30
2	0.186	46.85	-17.35	64.20	46.60	0.10	0.15
3	0.213	44.00	-19.10	63.10	43.80	0.10	0.10
4	0.277	40.00	-20.90	60.90	39.80	0.10	0.10
5	0.404	36.40	-21.37	57.77	36.20	0.10	0.10
6	2.513	24.08	-31.92	56.00	23.81	0.13	0.14
7	5.194	24.56	-35.44	60.00	24.20	0.26	0.10
8	9.451	31.53	-28.47	60.00	31.00	0.39	0.14
9	16.055	27.92	-32.08	60.00	27.00	0.62	0.30
10	23.140	28.74	-31.26	60.00	27.60	0.84	0.30



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PEP Testing Laboratory

Data#: 2451 File#: EN55022-B(QP).EMI Date: 2002-04-15 Time: 11:47:31



Trace: 1720

Site : Conduction NO.1(Nick)
Condition: CISPR CLASS-B LISN,L(16A) LINE
eut : E910089
power : AC 120V 60Hz
memo : Peak Value
model : FINAL TEST
: CH2

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.151	55.20	-10.76	65.96	54.80	0.10	0.30	
2	0.186	46.85	-17.35	64.20	46.60	0.10	0.15	
3	0.213	44.00	-19.10	63.10	43.80	0.10	0.10	
4	0.277	40.00	-20.90	60.90	39.80	0.10	0.10	
5	0.404	36.40	-21.37	57.77	36.20	0.10	0.10	
6	2.513	24.08	-31.92	56.00	23.81	0.13	0.14	
7	5.194	24.56	-35.44	60.00	24.20	0.26	0.10	
8	9.451	31.53	-28.47	60.00	31.00	0.39	0.14	
9	16.055	27.92	-32.08	60.00	27.00	0.62	0.30	
10	23.140	28.74	-31.26	60.00	27.60	0.84	0.30	

11. Radiated Emissions Test Setup Photo.

< FRONT VIEW >



< REAR VIEW >



12. Radiated Emissions Test Data

Model No. : RF-711

Frequency range : 30MHz to 1GHz Detector : Quasi-Peak Value

Frequency range : above 1GHz Detector : Quasi-Peak/Average Value

Temperature : 23° C Humidity : 45 %

Memo : TX ON (CH1 27.152MHz)

Antenna polarization : HORIZONTAL ; Test distance : 3m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (° angle)	Antenna High(m)
27.148	68.08	-11.92	80.00	46.42	21.66	1.39	19.97	233.0	4.0
120.298	31.35	-12.15	43.50	37.86	12.07	1.39	19.97	220.0	4.0
198.000	32.72	-10.78	43.50	41.56	9.05	2.07	19.96	221.0	4.0
210.720	35.55	- 7.95	43.50	44.14	9.20	2.19	19.98	229.0	4.0
229.346	30.25	-15.75	46.00	37.82	9.81	2.40	19.78	228.0	4.0
243.949	34.06	-11.94	46.00	39.34	11.86	2.76	19.90	226.0	4.0
360.291	31.36	-14.64	46.00	33.38	14.23	3.65	19.90	225.0	3.9

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : RF-711
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 23° C **Humidity** : 45 %
Memo : TX ON (CH1 27.152MHz)

Antenna polarization : VERTICAL ; **Test distance** : 3m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (° angle)	Antenna High(m)
27.140	56.60	-23.40	80.00	34.93	21.67	1.39	19.97	225.0	1.0
120.195	29.51	-13.99	43.50	36.02	12.07	1.39	19.97	223.0	1.0
126.198	26.53	-16.97	43.50	33.51	11.41	1.32	19.71	229.0	1.0
132.196	25.39	-18.11	43.50	32.99	11.00	1.40	20.00	227.0	1.0
168.703	24.04	-19.46	43.50	32.68	9.18	1.96	19.78	221.0	1.0
243.948	26.02	-19.98	46.00	31.30	11.86	2.76	19.90	226.0	1.0
624.062	37.30	- 8.70	46.00	31.87	19.04	6.10	19.71	225.0	1.1

Note :

1. Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. Over Limit = Level - Limit Line

Model No. : RF-711
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 23° C **Humidity** : 45 %
Memo : TX ON (CH2 27.192MHz)

Antenna polarization : HORIZONTAL ; Test distance : 3m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (° angle)	Antenna High(m)
27.198	69.28	-10.72	80.00	47.64	21.64	1.40	19.98	235.0	4.0
120.016	31.04	-12.46	43.50	37.52	12.10	1.40	19.98	232.0	4.0
149.932	25.21	-18.29	43.50	33.81	9.70	1.60	19.90	231.0	4.0
168.025	23.49	-20.01	43.50	32.12	9.23	1.96	19.82	239.0	4.0
203.904	31.27	-12.23	43.50	39.78	9.20	2.13	19.84	230.0	4.0
245.932	30.48	-15.52	46.00	35.40	12.17	2.81	19.90	235.0	4.0
624.059	33.99	-12.01	46.00	28.56	19.04	6.10	19.71	239.0	3.8

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : RF-711
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 23° C **Humidity** : 45 %
Memo : TX ON (CH2 27.192MHz)

Antenna polarization : VERTICAL ; **Test distance** : 3m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (° angle)	Antenna High(m)
27.206	57.15	-22.85	80.00	35.52	21.63	0.73	20.00	233.0	1.0
66.477	24.98	-15.02	40.00	39.18	5.07	0.73	20.00	236.0	1.0
120.029	31.02	-12.48	43.50	37.50	12.10	1.40	19.98	234.0	1.0
132.405	22.30	-21.20	43.50	29.89	11.00	1.41	20.00	231.0	1.0
168.024	24.37	-19.13	43.50	33.00	9.23	1.96	19.82	239.0	1.0
245.961	25.08	-20.92	46.00	30.00	12.17	2.81	19.90	234.0	1.0
624.059	34.44	-11.56	46.00	29.01	19.04	6.10	19.71	237.0	1.1

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line