

FCC CFR47 PART 15 DIGITAL DEVICE

TEST REPORT

FOR

15" TFT COLOR MONITOR W/ MAX. RESOLUTION OF 1024X768 NON-INTERLACE (60KHz)

MODEL: CD-1560B

FCC ID: KG6CD-1560B

REPORT NUMBER: 02C1157-1

ISSUE DATE: MARCH 4, 2002

Prepared for

SHENZHEN GODWING ELECTRONICS CO., LTD. 2/F, 706 BLDG. PENGJI INDUSTRIAL AREA LIANTANG, SHENZHEN, GUANGDONG 518004 PRC

Prepared by

COMPLIANCE CERTIFICATION SERVICES 561F MONTEREY ROAD MORGAN HILL, CA 95037 USA

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1. VERIFICATION OF COMPLIANCE

COMPANY NAME: SHENZHEN GODWING ELECTRONICS CO., LTD.

2/F, 706 BLDG. PENGJI INDUSTRIAL AREA LIANTANG, SHENZHEN, GUANGDONG

518004 PRC

CONTACT PERSON: YONG ZHAO

TELEPHONE NO: 755-573-2767

MODEL NO/NAME: CD-1560B

DATE TESTED: MARCH 4, 2002 SERIAL NO: N/A

DITTE TESTED: Number 1, 200	2 5214121(0.1771
TYPE OF EQUIPMENT:	INFORMATION TECHNOLOGY EQUIPMENT (ITE)
MEASUREMENT DISTANCE:	() 3 METER (X) 10 METER
TECHNICAL LIMIT:	CLASS B
FCC RULES:	PART 15, SUBPART B, SECTIONS 15.107 & 15.109
MEASUREMENT PROCEDURE	ANSI C63.4:92
EQUIPMENT AUTHORIZATION PROCEDURE	CERTIFICATION
MODIFICATIONS MADE ON EUT	⊠ YES □ NO
DEVIATIONS FROM MEASUREMENT	YES (refer to section 20 for comments)
PROCEDURE	⊠NO
RADIATED EMISSION TEST RESULT	-0.32dB@63.02MHz/VERTICAL
CONDUCTED EMISSION TEST RESULT	-5.41dB@2.47MHz/L2

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 15. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. **Warning**: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification will constitute fraud and shall nullify the document. Tested By:

CHIN PANG / EMC TECHNICIAN

COMPLIANCE CERTIFICATION SERVICES

Approved & Released For CCS By:

THU CHAN / SENIOR EMC ENGINEER

COMPLIANCE CERTIFICATION SERVICES

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COMPLIANCE CERTIFICATION SERVICES 561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA DOCUMENT NO:CCSUP4002C

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2. PRODUCT DESCRIPTION

CHASSIS TYPE	PLASTIC
	METAL ON THE BOTTOM ONLY
POWER SUPPLY/NAME/MODEL/S.N.	BUILT-IN
LIST OF EACH OSC. OR CRY. FREQ. (FREQ.>=1 MHz)	14.318 MHz
POWER REQUIREMENTS	115/230 V AC. 50/60 Hz
NO. OF EXTERNAL I/O CONNECTORS	7
MAX. RESOLUTION	1024X768 NI
MAX. HOR/VERT FREQUENCY	60 KHz , 75 Hz

3. TESTED SYSTEM DETAILS

The Model names for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are as follows:

External Peripheral Devices

	TEST PERIPHERALS			
Device Type	Manufacturer	Model Number	Serial Number	FCC ID
MOUSE	HP	M-S34	LZB75062022	DZL211029
PRINTER	HP	2225C	2930S52614	DSI6XU2225
MODEM	ACEEX	1414	9013537	IFAXDM1414
PC	IBM	2137-E26	14LK6	DoC
KEYBOARD	IBM	KB-8923	3464682	EHKB-5923
SPEAKER	JBL	N/A	N/A	N/A

4. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code:200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are currently registered with the Federal Communications Commission (Reference no: 31040/SIT (1300B3) and 31040/SIT(1300F2))

6. MEASUREMENT INSTRUMENTATION

Radiated emissions were measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, ridged waveguide, liner horn. EMI receivers were used for line conducted readings, spectrum analyzers with preselectors and quasi-peak detectors were used to perform radiated measurements. Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specification for "Radio Interference Measuring Apparatus and Measurement

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

7. MEASURING INSTRUMENT CALIBRATION

The measuring equipment which was utilized in performing the tests documented herein has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment which is traceable to recognized national standards.

8. UNITS OF MEASUREMENT

use of appropriate conversion factors. Measurements of conducted interference are reported in terms of $dB(i\ V)$.

The field strength was calculated by adding the Antenna Factor and Cable Factors, then by subtracting the Amplifier Gain from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

AG = Amplifier Gain

7.4dB/m and a Cable Factor of 1.1dB is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBì V/m. The 32 dBì V/m value was mathematically converted to its corresponding level in ì V/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 dBi V/m$$

Level in i V/m = Common Antilogarithm [(32 dBi V/m)/20] = 39.8 i V/m

9. ANTENNAS

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 10 meters from the leading edge of the turntable.

10. CLASSIFICATION OF DIGITAL DEVICE

Class A includes digital devices that are marketed for use in commercial, industrial or business environments, excluding devices which are marketed for use by the general public or are intended to be used in the home.

Class B includes digital devices that are marketed for use in residential environments, notwithstanding use in commercial, business and industrial environments.

Note: The responsible party may also qualify a device intended to be marketed in a commercial, business or industrial environment as Class B device, and in fact is encouraged to do so provided the device complies with the technical specifications for a Class B digital device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B digital device, regardless of its intended use.

11. RADIATED EMISSION LIMITS

FCC PART 15 CLASS A

MEASURING DISTANCE OF 10 METER		
FREQUENCY RANGE	FIELD STRENGTH	FIELD STRENGTH
(MHz)	(Microvolts/m)	(dBi V/m)
30-88	90	39.1
88-216	150	43.5
216-960	210	46.4
Above 960	300	49.5

FCC PART 15 CLASS B

100111111111111111111111111111111111111		
MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE	FIELD STRENGTH	FIELD STRENGTH
(MHz)	(Microvolts/m)	(dBì V/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

FCC RADIATED EMISSION ALTERNATIVE METHOD (CISPR 22/EN55022)

Limits for radiated disturbance of Class A ITE at measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(î V/m)
30 to 230	40
230 to 1000	47
NOTES	

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

Limits for radiated disturbance of Class B ITE at measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(î V/m)
30 to 230	30
230 to 1000	37

NOTES

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

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12. CONDUCTED EMISSION LIMITS

FCC CLASS A

FREQUENCY RANGE	FIELD STRENGTH	FIELD STRENGTH
	(Microvolts)	(dBì V)/QP
450kHz-1.705MHz	1000	60
1.705MHz - 30MHz	3000	69.54

FCC CLASS B

FREQUENCY RANGE	FIELD STRENGTH	FIELD STRENGTH
	(Microvolts)	(dBì V)/QP
450kHz-30MHz	250	48

FCC CONDUCTED EMISSION ALTERNATIVE METHOD (CISPR 22/EN55022)

Limits for conducted disturbance at the mains ports of

Class A ITE

Frequency range	Limits dB(î V)		
MHz	Quasi-peak Average		
0.15 to 0.50	79	66	
0.5 to 30	73 60		
Note- The lower limit shall apply at the transition frequency.			

Limits of Conducted disturbance at the mains ports of Class B ITE

Frequency range	Limits dB(î V)	
MHz	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

Note

1. The lower limit shall apply at the transition frequencies

2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

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13. CONDUCTED EMISSION TEST PROCEDURE

The EUT was setup and located so that the distance between the boundary of the EUT and the closest surface to the LISN was 0.8m or more.

EUT test configuration was according to Section 7 of ANSI C63.4/1992.

Conducted disturbance was measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.450 - 30 MHz (or 0.150 - 30 MHz in case of CISPR 22/EN55022 method) was investigated.

The EMI receiver was set to PEAK detector setting, and swept continuously over the frequency range to be investigated. The resolution bandwidth was set to 9kHz minimum. The EMI receiver input cable was connected to LINE 1 RF measurement connection on the LISN. A 50ohm terminator was connected to the unused RF port on the LISN. For each mode of EUT operation, emissions readings were maximized by manipulating cable and wire positions. The configuration for each EUT power cord which produced emissions closest to the limit was recorded. The same procedure was repeated for LINE 2 of each EUT power cord.

14. RADIATED EMISSION TEST PROCEDURE

The EUT and all other support equipment were placed on a wooden table 80 cm above the ground screen. The antenna to EUT distance was either 3 meters (FCC Class B method or 10 meters CISPR22/EN55022 method or FCC Class A method). During the test, the table was rotated 360 degrees to maximize emissions and the antenna was positioned from 1 to 4 meters above the ground screen to further maximize emissions. Measurements were made with the antenna polarized in both the vertical and the horizontal positions.

The EUT test configuration was according to Section 8 of ANSI C63.4/1992.

The following procedure was used to make the measurements: The frequency range of interest was monitored at a fixed antenna height and EUT azimuth. The Frequency span was set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT was rotated through 360 degrees to maximize emissions received. During the rotation if emission increased by more than 1 dB, or if another emission appeard that was greater by 1 dB, the EUT was returned to the azimuth where the maximum occurred, and additional cable manipulation was performed to further maximize received emissions.

The antenna was moved up and down to further maximize the suspected highest amplitude signal. If the emission increased by 1 dB or more, or if another emission appeared that was greater by 1dB or more, the antenna was returned to the height where maximum signal was observed, and, cables were manipulated to produce highest emissions, noting frequency and amplitude.

15. AMBIENT CONDITIONS

The ambient conditions at the time of final tests were as follows:

	Temperature	Humidity
Radiated Emission	21 ° C	69 %
Conducted Emission	21 ° C	68 %

16. SYSTEM TEST CONFIGURATION

The equipment under test was configured and operated in a manner which tended to maximize its emission characteristics in a typical application. Power and signal distribution, ground, interconnecting cabling and physical placement of equipment simulated the typical application and usage insofar as practicable.

Software Used During The Tests								
File Name	EMCTEST Terminal	Pinging Music	Read & Write Joy-Stick					
	Other:							
Program Sequence	EMCTEST Music							

17. EQUIPMENT MODIFICATIONS

To achieve compliance to CLASS B levels, the following change(s) were made during compliance testing:

Mod.#1	Added Ferrite core (Fair-Rite, M/N: 0443164151) to AC Power Cord with 3
	turns. See photo 2.
Mod.#2	Added Ferrite Core (Steward, M/N: 25A0640-0A-2) to the Internal Cable of
	Video port. See photo 1.
Mod.#3	Added Ferrite Cored (TDK, M/N: ZCAT2132-1130) to the Internal Cable of
	monitor port. See photo 1.
Mod.#4	Added Copper tape to cover the hole of Internal Shielding Metal box. See
	photo 1.





Photo 1 Photo 2

18. EUT SETUP PHOTOS





Radiated Emission Setup Photos (Worst Emission Position)

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Conducted Emission Setup Photos (Worst Emission Position)

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19. TEST EQUIPMENT LIST

TEST EQUIPMENTS LIST									
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date					
Pre-Amplifier,25 dB	HP0.1 - 1300MHz	8447D (P8)	2944A06589	8/10/02					
Antenna, Bilog	Schaffner-Chase30M-2GHz	CBL6112B	2586	8/2/02					
Spectrum Analyzer	HP100Hz - 22GHz	8566B	3014A06685	6/28/02					
Spectrum Display	HP	85662A	3026A19146	6/28/02					
Quasi-Peak Detector	HP9K - 1GHz	85650A	3145A01654	6/28/02					
LISN	Fischer 9k - 100MHz	FCC-LISN-50/250-25-2	114	8/8/02					
Line Filter	Lindgren 10k - 10GHz	LMF-3489	497	N.C.R.					
EMI Test Receiver	Rohde & Schwarz	ESHS 20	827129/006	4/2/02					
LISN	Solar Elec. Co.	8012-50-R-24-BNC	837990	8/8/02					

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20. TEST RESULT SUMMARY

Preliminary Radiated Emission Tests were performed at the 3 meter open area test site. CCS test procedure no: CCSUE2001B and the procedure listed in ANSI C63.4(1992) section 8.3.1.1 were used. The following preliminary tests were conducted to determine the worst mode of operation and configuration.

Preliminary Radiated Emission Test								
Frequency Range Investigated		30 MHz TO 1000 MHz						
Mode of operation	Date	Data Report No.	Worst Mode					
1024x768 NI	2/20/02	020220B1						
800x600 NI	2/20/02	020220B1						
640x480 NI	2/20/02	020220B1						

Final Radiated Emission Test was conducted by operating the worst mode as indicated above.

				Pre-							
Freq.	Reading	AF	Closs	amp	Level	Limit	Margin	Pol	Az	Height	Mark
(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	EN_B	(dB)	(H/V)	(Deg)	(Meter)	(P/Q/A)
63.02	51.35	5.84	2.12	29.64	29.68	30.00	-0.32	10mV	0.00	1.00	QP
50.13	49.50	7.08	1.99	29.68	28.89	30.00	-1.11	10mV	0.00	1.00	Р
49.13	48.44	7.53	1.97	29.68	28.27	30.00	-1.73	10mV	0.00	1.00	QP
30.00	39.50	16.73	1.58	29.74	28.07	30.00	-1.93	10mV	180.00	1.00	Р
119.27	42.50	12.15	2.57	29.51	27.72	30.00	-2.28	10mH	0.00	2.20	Р
119.27	43.00	11.64	2.57	29.51	27.70	30.00	-2.30	10mV	0.00	1.00	QP
6 Worst Data											

C.F.(Correction Factor) = Antenna Factor + Cable Loss - Amplifier Gain

Corrected Reading = Metering Reading + C.F.

Margin = Corrected Reading - Limits

 $P = Peak \ Reading \ H = Horizontal \ Polarization/Antenna \ Q = Quasi-peak \ V = Vertical \ Polarization/Antenna$

A = Average Reading

Comments: N/A

Preliminary Conducted Emission Tests were performed according to CCS test procedure no: CCSUE2002B and ANSI C63.4/1992 section 7.2.3. The following preliminary tests were conducted to determine the worst mode of operation.

Preliminary Conducted Emission Test								
Frequency Range Investigated		150 kHz TO 30 MHz						
Mode of operation	Date	Data Report/Plot No.	Worst Mode					
1024x768 NI	2/20/02	02C1157						
800x600 NI	2/20/02	02C1157						
640x480 NI	2/20/02	02C1157						

Final Conducted Emission Test was conducted by operating the worst mode as indicated above.

	CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq.		Reading		Closs	Limit	EN_B	Mar	Remark			
(MHz)	PK (dBuV) QP (dBuV) AV (dBuV)			(dB)	QP	AV	QP (dB)	L1/L2			
0.16	52.30		43.14	0.00	65.80	55.80	-13.50	-12.66	L1		
0.21	50.81		42.79	0.00	64.20	54.20	-13.39	-11.41	L1		
2.47	46.84		36.13	0.00	56.00	46.00	-9.16	-9.87	L1		
0.16	54.09		43.13	0.00	65.80	55.80	-11.71	-12.67	L2		
0.21	51.48		45.77	0.00	64.23	54.23	-12.75	-8.46	L2		
2.47	46.12		40.59	0.00	56.00	46.00	-9.88	-5.41	L2		
6 Worst I	l Data 										

C.F.(Correction Factor) = Insertion Loss + Cable Loss

Corrected Reading = Metering Reading + C.F.

Margin = Corrected Reading - Limits

P = Peak Reading L1 = HotQ = Quasi-peak L2 = Neutral

A = Average Reading

Comments: N/A

APPENDICES

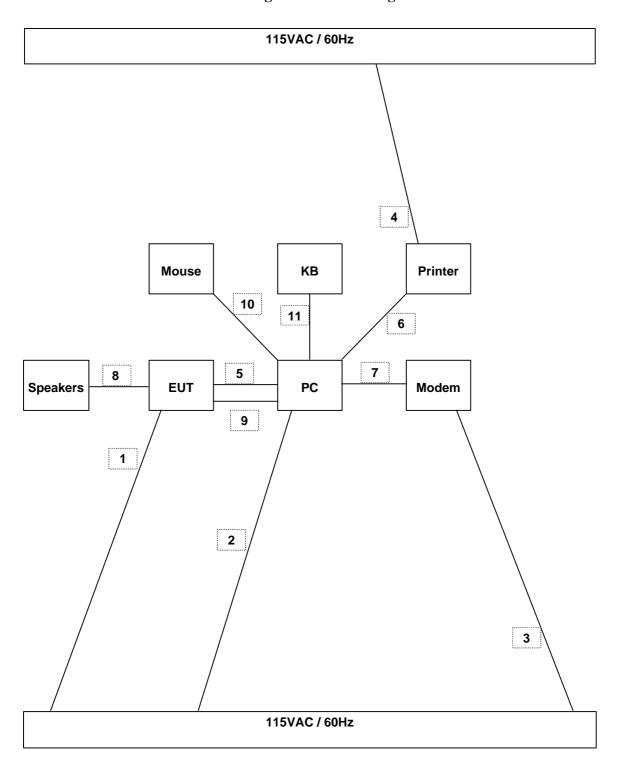
EXTERNAL I/O CABLE CONSTRUCTION DESCRIPTION CONFIGURATION BLOCK DIAGRAM RADIATED EMISSION DATA

External I/O Cable Construction Description

	TEST I / O CABLES										
Cable	I/O	# of I/O	Connector	Type of	Cable	Data					
No	Port	Port	Type	Cable	Length	Traffic	Bundled	Remark			
1	AC	1	US 115V	Un-shielded	2m	No	No	Ferite on EUT side with 3 turns			
2	AC	1	US 115V	Un-shielded	2m	No	No	N/A			
3	AC	1	US 115V	Un-shielded	2m	No	No	N/A			
4	AC	1	US 115V	Un-shielded	2m	No	No	N/A			
5	Video	1	DB15	Shielded	2m	Yes	Yes	One Torroid on Each End			
6	Parallel	1	DB25	Shielded	2m	Yes	Yes	N/A			
7	Serial	1	DB9	Shielded	1m	Yes	Yes	N/A			
8	Line Out	1	Din	Un-shielded	1.5m	Yes	Yes	To Speakers			
9	Line In	1	Din	Un-shielded	1.5m	Yes	Yes	N/A			
10	Mouse	1	PS/2	Un-shielded	2m	Yes	No	N/A			
11	KB	1	PS/2	Shielded	2m	Yes	No	N/A			

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Configuration Block Diagram



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Radiated Emission Data



FCC, VCCI, CISPR, CE, AUSTEL, NZ UL, CSA, TUV, BSMI, DHHS, NVLAP

Report #: Date& Time: Test Engr:

Project #:

02C1157-1 020220B1 02/20/02 10:03 AM

Chin & Thu

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001 PHONE: (408) 463-0885 FAX: (408) 463-0888

Company: Shenzhen Godwing Electronics Co., Ltd.

EUT Description: 15" TFT LCD Color Monitor w/ Max Resolution 1024x768

Test Configuration: EUT/PC/KB/Mouse/Modem/Printer
Type of Test: EN55022 Class B

Mode of Operation: 1024x768, VF_75Hz, HF_60KHz/EMCTEST/Media

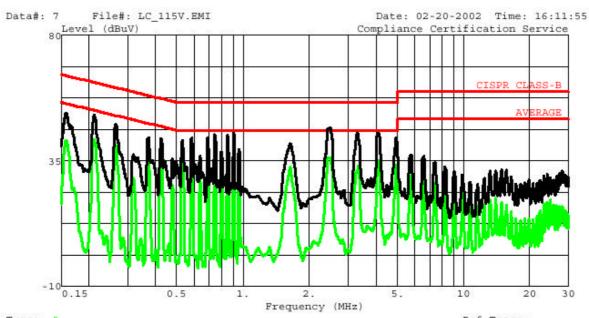
<< Main Sheet

Freq.	Reading	AF	Closs	Pre-amp	Level	Limit	Margin	Pol	Az	Height	Mark
(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	EN_B	(dB)	(H/V)	(Deg)	(Meter)	(P/Q/A)
63.02	51.35	5.84	2.12	29.64	29.68	30.00	-0.32	10mV	0.00	1.00	QP
50.13	49.50	7.08	1.99	29.68	28.89	30.00	-1.11	10mV	0.00	1.00	Р
49.13	48.44	7.53	1.97	29.68	28.27	30.00	-1.73	10mV	0.00	1.00	QP
30.00	39.50	16.73	1.58	29.74	28.07	30.00	-1.93	10mV	180.00	1.00	Р
119.27	42.50	12.15	2.57	29.51	27.72	30.00	-2.28	10mH	0.00	2.20	Р
119.27	43.00	11.64	2.57	29.51	27.70	30.00	-2.30	10mV	0.00	1.00	QP
6 Worst	Data										

Conducted Emission Plot



561F Monterey Road, San Jose, CA 95037 USA Tel: (408) 463-0885 Fax: (408) 463-0888



Trace: 5 Ref Trace:

Project # : 02C1157-1 Test Engr : Chin & Thu

Company : Shenzhen Godwing Electronics Co., Ltd. EUT : 15" TFT LCD Color Monitor w/ Max Res

: 1024x768

Test Config : EUT/PC/KB/Mouse/Printer/Modem

Type of Test: EN55022 Class B

Mode of Op. : EMCTEST/1024x768, VF_75Hz, HF_60KHz

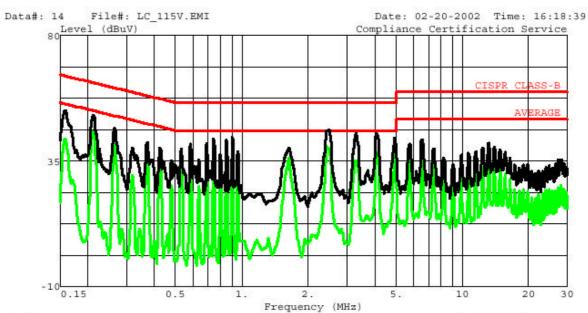
: L1: Peak(Black), Average(Green)

: 115Vac, 60Hz

Conducted Emission Plot



561F Monterey Road, San Jose, CA 95037 USA Tel: (408) 463-0885 Fax: (408) 463-0888



Trace: 12 Ref Trace:

Project # : 02C1157-1 Test Engr : Chin & Thu

Company : Shenzhen Godwing Electronics Co., Ltd. EUT : 15" TFT LCD Color Monitor w/ Max Res

: 1024x768

Test Config : EUT/PC/KB/Mouse/Printer/Modem

Type of Test: EN55022 Class B

Mode of Op. : EMCTEST/1024x768, VF_75Hz, HF_60KHz : L2: Peak(Black), Average(Green)

: 115Vac, 60Hz