HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

Product Compliance Division, EMC Team
SAN 136-1, AMI-RI , BUBAL-EUP, ICHEON-SI, KYOUNKI-DO, 467-701, KOREA
TEL : +82 31 639 8518 FAX : +82 31 639 8525

CERTIFICATION

Manufacture;
ACROTECH CO., LTD.

3F DAEJIN B/D, 332-4 DOCKSAN-1DONG,
KEUMCHUN-GU, SEOUL, 153-814, KOREA

ACROTECH FRN : 0008610610

Date of Issue : MARCH 17, 2003

Test Report No.: HCT-F03-

Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD.
HCT FRN : 0005-8664-21

FCC ID : **QZJCG-FM**

MODEL(S): **CG-FM016/032/064/128/256**

TYPE: **USB MEMORY**

Rule Part(s):	**Part 15 & 2; ET Docket 95-19**
Equipment Class:	**FCC Class B Peripheral Device (JBP)**
Standard(s):	**FCC Class B: 1998 (CISPR 22)**
EUT Type:	**USB Memory**
Model(s):	**CG-FM016/032/064/128/256**
Port/Connector(s)	**USB Port**

This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-1992 (Grant Notes: #19, #28).

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Ki Soo Kim

Report prepared by : Ki-Soo Kim
Manager of EMC Tech. Part

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MEASUREMENT REPORT

1.1 Scope

Measurement and determination 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.

Applicant Name:	**ACROTECH CO., LTD.**
Address:	**SAN 136-1, AMI-RI , BUBAL-EUP, ICHEON-SI, KYOUNKI-DO, 467-701,KOREA**

- **FCC ID : QZJCG-FM**
- Equipment Class: FCC Class B Peripheral Device (JBP)
- EUT Type: USB Memory
- Model(s): CG-FM016/032/064/128/256
- Rule Part(s): FCC Part 15 Subpart B
- Test Procedure(s): ANSI C63.4 (1992)
- Dates of Tests: February 10, 2003 ~ February 20, 2003

2.1 INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSIC63.4-1992) was used in determining radiated and conducted emissions emanating from **ACROTECH CO., LTD. USB Memory FCC ID: QZJCG-FM**

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, MAEKOK-RI,HOBUP-MYUN,ICHON-SI,KYOUNGKI-DO, 467-701,KOREA. The site is constructed in conformance with the requirements of ANSI C63.4and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 24,2000 (Confirmation Number: EA90661)

3.1 PRODUCT INFORMATION

3.2 Equipment Description

Equipment Under Test (EUT) is the **ACROTECH.Co.Ltd. (Model : CG-FM016/032/064/128/256) USB Memory**

OTHER		SPECIFICATION
MODEL NAME & MEMORY SIZE	CG-FM016	16 MBYTE
	CG-FM032	32 MBYTE
	CG-FM064	64 MBYTE
	CG-FM128	128 MBYTE
	CG-FM256	256 MBYTE
USB Interface		USB 1.1 (12Mbits/sec)
DATA SPEED		READ SPEED : 900 KB/sec WRITE SPEED : 600 KB/sec
POWER		P.C USB PORT
OPERATING O.S		Windows 98/ME/2000/XP MAC OS 9.0/Linux OS/Win CE
DRIVE		ONLY Windows 98
LED INDICATE		STAND BY : OFF READ/WRITE : ON
DATA PROTECT		USE SWITCH
MEMORY RETENTION		10 YEARS
TEMPERATURE		OPERATING TEMPERATURE : 0 □ ~ 70 □ STORAGE TEMPERATURE : -40 □ ~ 125 □
SIZE		68.5 X 21 X 10 mm
WEIGHT		10 g

EMI Suppression Devices:

~ No modifications were made to the device.

4.1 Description of Tests(Conducted)

4.2 Powerline Conducted RFI (150kHz- 30MHz)

The power line conducted RFI measurements were performed according to CISPR 22.
The EUT was placed on a non-conducting 1.0 by 1.5 meter table which is 0.8 meters in height and 0.40 meters away from the vertical wall of the shielded enclosure. Power to the EUT is provided through a Rohde & Schwarz 50 Ω / 50 uH Line Impedance Stabilization Network (LISN) and the support equipment through a separate Solar 50 Ω / 50 uH Line- Conducted Test Facility LISN. Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME. The spectrum was scanned from 150kHz to 30 MHz. Each maximum EME was remeasured using an EMI receiver. The detector function of the receiver was set to CISPR quasi- peak and average mode with the bandwidth set to 9 kHz. Each emission was maximized consistent with the typical applications by varying the configuration of the test sample. Interface cables were connected to the available interface ports of the test unit. The effect of varying the position of cables was investigated to find the configuration that produces maximum Diagram emission. Excess cable lengths were bundled at the centre with 30- 40cm. in length. The worst-case configuration is noted in the test report and the photographs are attached. Each EME reported was calibrated using the Rohde & Schwarz SMX signal generator and are listed on Table 1. RFI Conducted FCC Class B

RFI CONDUCTED	FCC CLASS B Limits dB(uV/m)	CISPR 22 CLASS B Limits dB(uV/m)	
Freq. Range	FCC Class B Quasi-Peak	CISPR 22 Quasi-Peak	CISPR 22 Average
150kHz - 0.5MHz	48*	66-56**	56-46**
0.5MHz - 5MHz	48	56	46
5MHz - 30MHz	48	60	50
*FCC Class B limits starts from 450kHz **Limits decreases linearly with the logarithm of frequency			

Table 1. RFI Conducted Limits

4.3 Description of Tests(Radiated)

Radiated Emissions

Preliminary measurements were made indoors at 1 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 spectrum was scanned from 30 to 300 MHz using biconical antenna, 300 to 1000 MHz using log- periodic antenna, and above 1 GHz using linearly polarized horn antennas. Final measurements were made outdoors at 10-meter test range using Dipole antennas and EMI receiver. For frequencies above 1 GHz, horn antennas were used. Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition. The EMI receiver detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120 kHz. The EUT, support equipment, and interconnecting cables were arranged to the configuration that produces the maximum EME emission found during preliminary scan. 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. Horizontal and vertical antenna polarizations were checked. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/ or support equipment, and powering the monitor the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.

ITE Radiated Limits			
Frequency (MHz)	**FCC Limit @ 3m. Quasi-Peak dB[μV/m]**	**FCC Limit @ 10m.* Quasi – Peak dB [μV/m]**	**CISPR Limit @ 10m. Quasi-Peak dB [μV/m]**
30-88	**40.0**	**29.5**	**30.0**
88-216	**43.5**	**33.0**	**30.0**
216-230	**46.0**	**35.6**	**30.0**
230-960	**46.0**	**35.6**	**37.0**
960-1000	**54.0**	**43.5**	**37.0**
> 1000	**54.0**	**43.5**	**No Specified Limit**
*** Limit extrapolated 20 dB/decade**			

Table 2. Radiated Class B limits @ 10-meters

5.1 PRELIMINARY TESTS

5.2 AC Power line Conducted Emission Tests

MODEL : CG-FM016

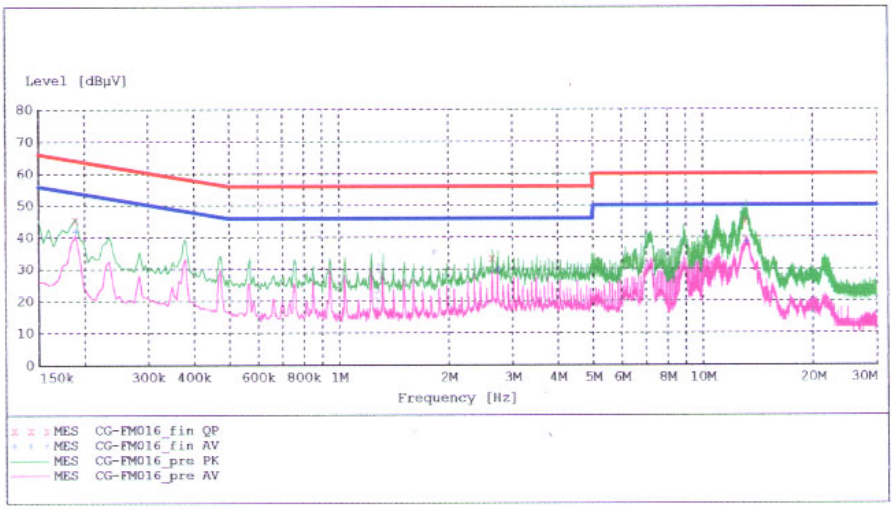
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM016
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	H
Start of Test:	2/10/03 / 10:21:02AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM016_fin QP"
2/10/03 10:23AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	45.40	10.1	64	18.7	1	---
2.650000	33.30	10.3	56	22.7	1	---
13.185000	45.00	10.5	60	15.0	1	---

MEASUREMENT RESULT: "CG-FM016_fin AV"
2/10/03 10:23AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	42.00	10.1	54	12.1	1	---
2.745000	30.00	10.2	46	16.0	1	---
13.255000	38.60	10.5	50	11.4	1	---

Page 1/1 2/10/03 10:23AM CG-FM016

MODEL : CG-FM016

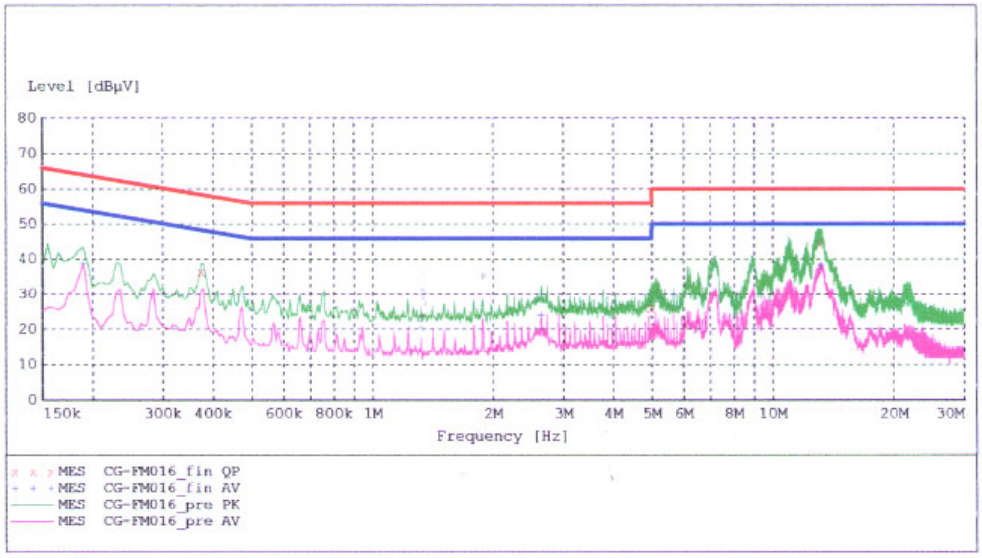
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM016
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	N
Start of Test:	2/10/03 / 10:24:10AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM016_fin QP"
2/10/03 10:26AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.375000	36.30	10.1	58	22.1	1	---
4.990000	26.10	10.3	56	29.9	1	---
13.165000	44.30	10.5	60	15.7	1	---

MEASUREMENT RESULT: "CG-FM016_fin AV"
2/10/03 10:26AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	38.90	10.1	54	15.1	1	---
2.650000	24.20	10.3	46	21.8	1	---
13.215000	38.00	10.5	50	12.0	1	---

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MODEL : CG-FM032

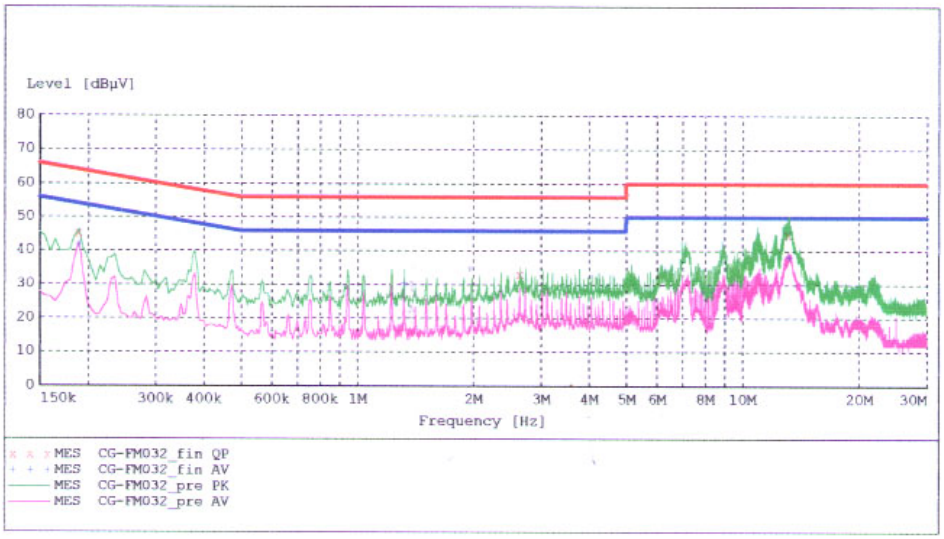
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM032
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	H
Start of Test:	2/10/03 / 10:31:27AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM032_fin QP"
2/10/03 10:33AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	45.10	10.1	64	18.9	1	---
2.650000	33.10	10.3	56	22.9	1	---
13.180000	44.90	10.5	60	15.1	1	---

MEASUREMENT RESULT: "CG-FM032_fin AV"
2/10/03 10:33AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	41.80	10.1	54	12.2	1	---
1.325000	30.60	10.2	46	15.4	1	---
13.205000	38.50	10.5	50	11.5	1	---

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MODEL : CG-FM032

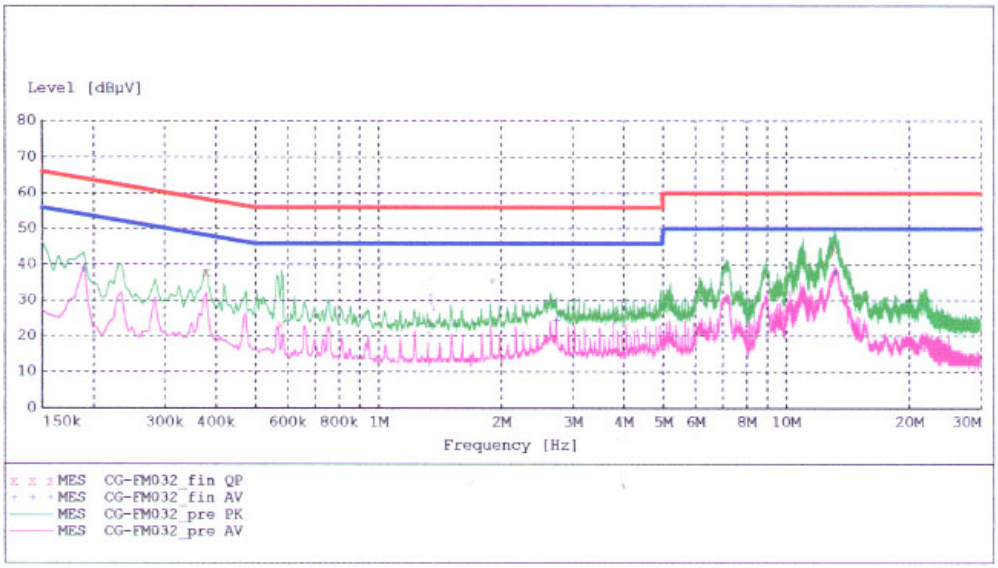
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM032
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	N
Start of Test:	2/10/03 / 10:28:21AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM032_fin QP"
2/10/03 10:30AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.380000	37.90	10.1	58	20.4	1	---
0.580000	23.20	10.2	56	32.8	1	---
13.170000	44.30	10.5	60	15.7	1	---

MEASUREMENT RESULT: "CG-FM032_fin AV"
2/10/03 10:30AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	39.10	10.1	54	14.9	1	---
2.745000	24.40	10.2	46	21.6	1	---
13.220000	38.10	10.5	50	11.9	1	---

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MODEL : CG-FM064

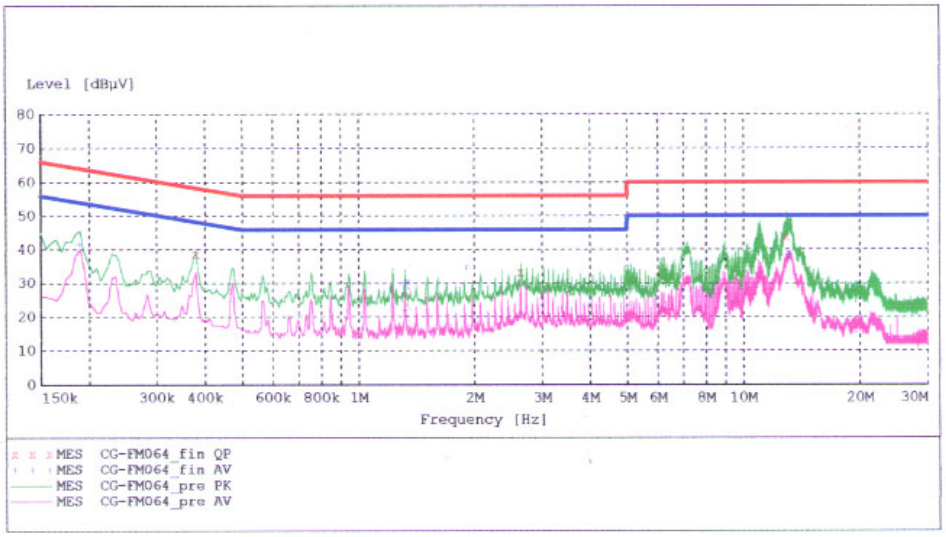
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM064
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	H
Start of Test:	2/10/03 / 10:39:07AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM064_fin QP"
2/10/03 10:41AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.380000	38.70	10.1	58	19.6	1	---
2.650000	33.40	10.3	56	22.6	1	---
12.960000	43.80	10.5	60	16.2	1	---

MEASUREMENT RESULT: "CG-FM064_fin AV"
2/10/03 10:41AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	41.70	10.1	54	12.3	1	---
1.325000	30.50	10.2	46	15.5	1	---
13.155000	38.40	10.5	50	11.6	1	---

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MODEL : CG-FM064

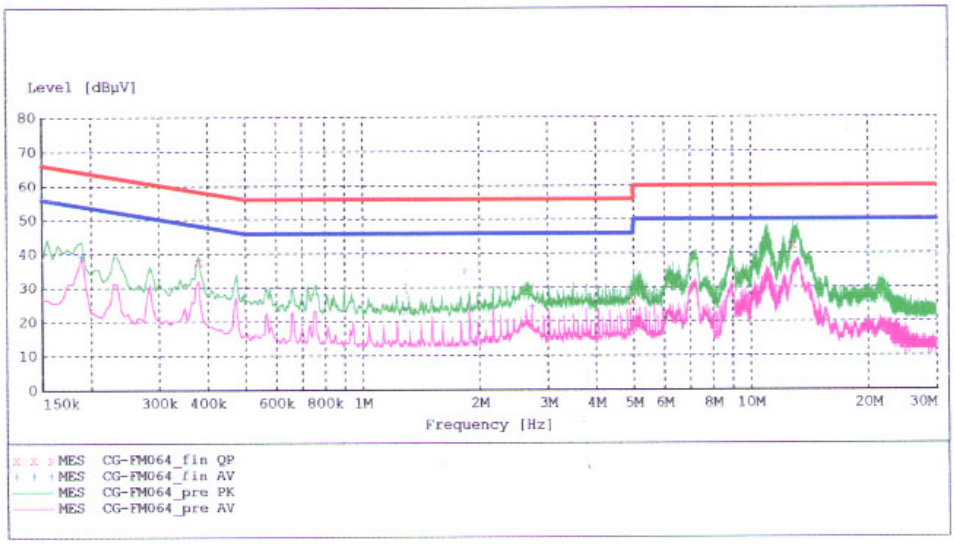
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM064
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	N
Start of Test:	2/10/03 / 10:44:35AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM064_fin QP"

2/10/03 10:46AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.380000	37.80	10.1	58	20.5	1	---
4.985000	26.10	10.3	56	29.9	1	---
12.880000	42.40	10.5	60	17.6	1	---

MEASUREMENT RESULT: "CG-FM064_fin AV"

2/10/03 10:46AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	39.20	10.1	54	14.8	1	---
2.745000	24.40	10.2	46	21.6	1	---
13.235000	37.60	10.5	50	12.4	1	---

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MODEL : CG-FM128

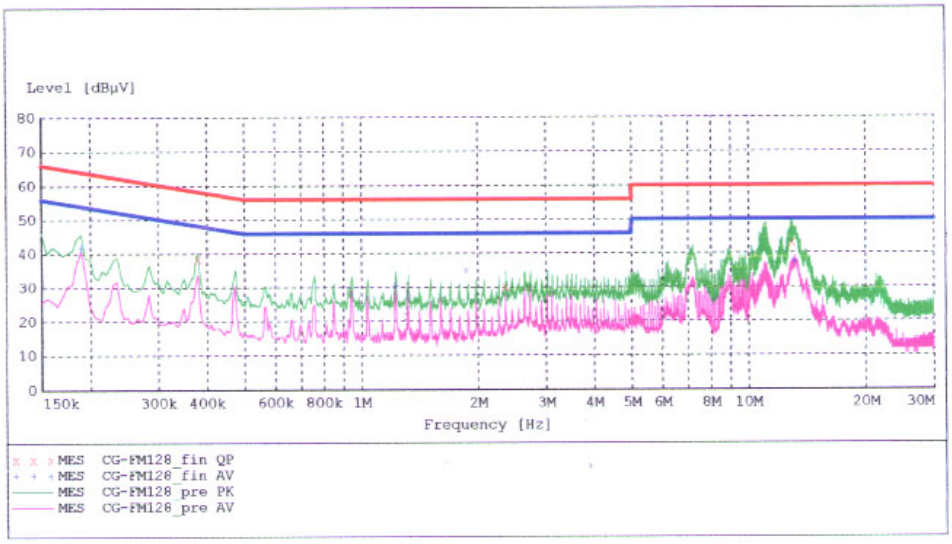
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM128
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	H
Start of Test:	2/10/03 / 10:51:56AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM128_fin QP"
2/10/03 10:54AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.380000	38.60	10.1	58	19.7	1	---
2.370000	30.00	10.3	56	26.0	1	---
12.995000	43.20	10.5	60	16.8	1	---

MEASUREMENT RESULT: "CG-FM128_fin AV"
2/10/03 10:54AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	41.80	10.1	54	12.2	1	---
1.230000	30.60	10.2	46	15.4	1	---
13.195000	37.50	10.5	50	12.5	1	---

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MODEL : CG-FM128

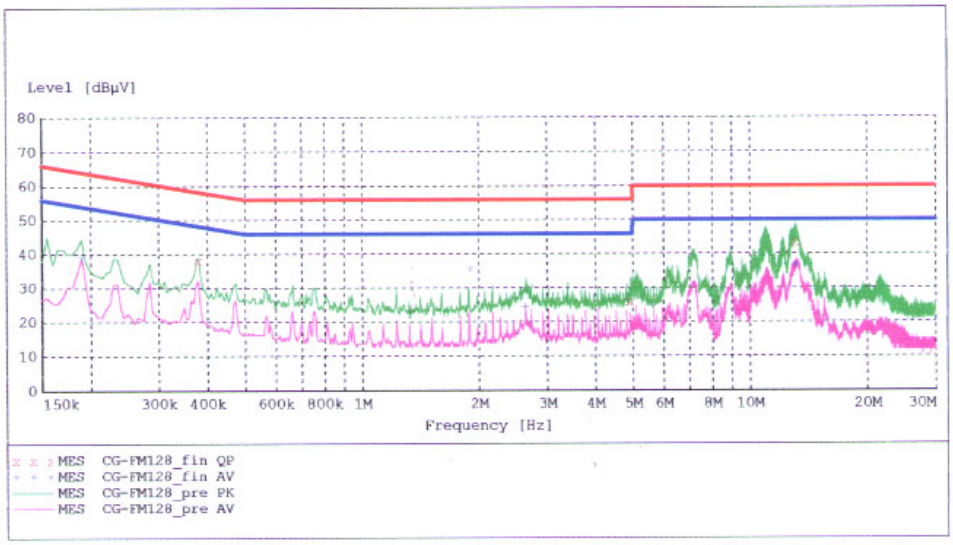
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM128
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	N
Start of Test:	2/10/03 / 10:48:52AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM128_fin QP"
2/10/03 10:51AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.380000	37.90	10.1	58	20.4	1	---
4.925000	25.80	10.3	56	30.2	1	---
13.160000	43.50	10.5	60	16.5	1	---

MEASUREMENT RESULT: "CG-FM128_fin AV"
2/10/03 10:51AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	39.10	10.1	54	14.9	1	---
2.650000	24.40	10.3	46	21.6	1	---
13.145000	36.80	10.5	50	13.2	1	---

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MODEL : CG-FM256

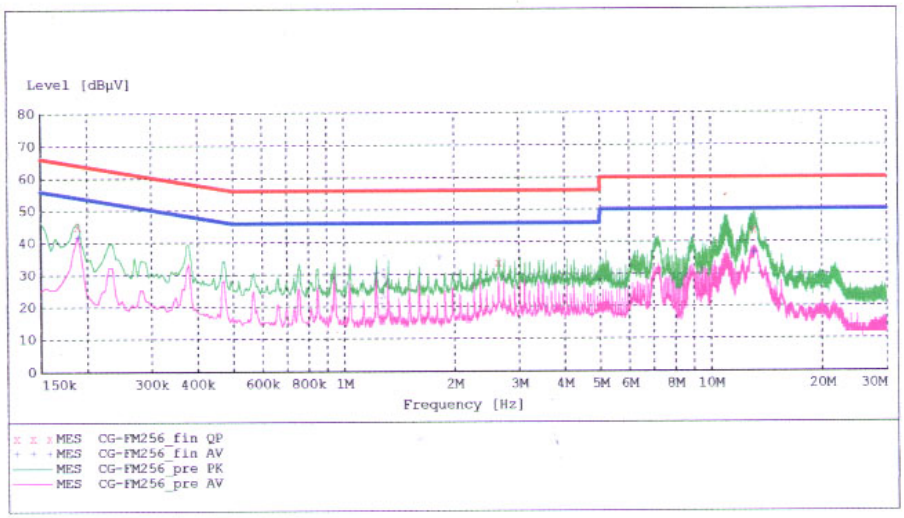
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM256
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	H
Start of Test:	2/10/03 / 10:54:47AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM256_fin QP"
2/10/03 10:57AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	45.20	10.1	64	18.9	1	---
2.650000	33.60	10.3	56	22.4	1	---
13.140000	43.60	10.5	60	16.4	1	---

MEASUREMENT RESULT: "CG-FM256_fin AV"
2/10/03 10:57AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	41.80	10.1	54	12.3	1	---
1.230000	30.70	10.2	46	15.3	1	---
13.125000	36.70	10.5	50	13.3	1	---

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MODEL : CG-FM256

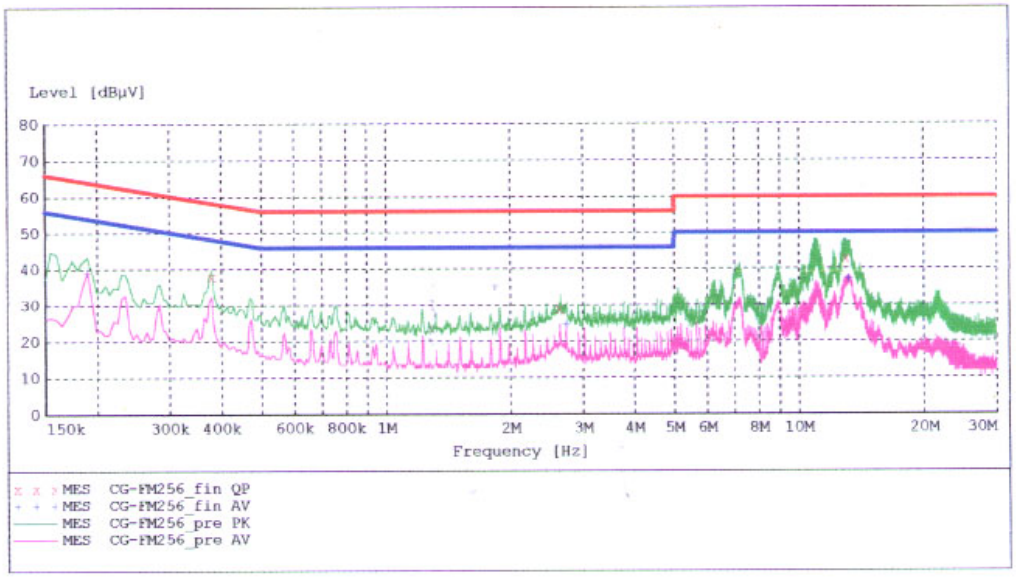
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM256
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	N
Start of Test:	2/10/03 / 11:01:17AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM256_fin QP"
2/10/03 11:03AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.380000	37.90	10.1	58	20.3	1	---
2.650000	28.80	10.3	56	27.2	1	---
13.045000	42.80	10.5	60	17.2	1	---

MEASUREMENT RESULT: "CG-FM256_fin AV"
2/10/03 11:03AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	39.20	10.1	54	14.8	1	---
2.745000	24.90	10.2	46	21.1	1	---
13.230000	37.20	10.5	50	12.8	1	---

Page 1/1 2/10/03 11:03AM CG-FM256

5.3 Radiated Emission Tests

MODEL : CG-FM016

Frequency MHz	Reading [dBuV]	ANT POL (H/V)	Ant. Factor [dB/m]	Cable Loss [dB]	Total dBuV/m	Limit [dBuV/m]	Margin dB
48.0	10.04	V	12.26	1.5	23.8	30	6.2
120.1	9.29	V	12.78	2.4	24.5	30	5.5
168.0	6.30	V	15.62	3.0	24.9	30	5.1
192.0	5.73	H	16.11	3.1	25.0	30	5
199.8	6.27	H	16.24	3.2	25.7	30	4.3
214.8	5.45	H	16.67	3.3	25.4	30	4.6
233.2	10.88	H	17.12	3.5	31.5	37	5.5
240.0	6.92	H	17.24	3.5	27.7	37	9.3
264.0	7.46	H	17.80	3.7	29.0	37	8
333.1	11.43	V	16.38	4.2	32.0	37	5
366.5	10.30	V	16.60	4.4	31.3	37	5.7
432.0	7.69	H	17.89	4.8	30.3	37	6.7

MODEL : CG-FM034

Frequency MHz	Reading [dBuV]	ANT POL (H/V)	Ant. Factor [dB/m]	Cable Loss [dB]	Total dBuV/m	Limit [dBuV/m]	Margin dB
48.0	10.32	V	11.88	1.5	23.7	30	6.3
120.0	9.79	V	12.78	2.4	25.0	30	5
144.0	5.83	V	14.67	2.6	23.1	30	6.9
168.0	6.70	V	15.62	3.0	25.3	30	4.7
192.0	5.33	H	16.11	3.1	24.6	30	5.4
200.0	4.24	H	16.26	3.2	23.7	30	6.3
233.2	11.18	H	17.12	3.5	31.8	37	5.2
240.0	6.85	H	17.22	3.5	27.6	37	9.4
264.0	6.76	H	17.80	3.7	28.3	37	8.7
312.0	9.40	H	16.30	4.1	29.8	37	7.2
333.1	10.83	V	16.38	4.2	31.4	37	5.6
432.0	8.29	H	17.89	4.8	30.9	37	6.1

MODEL : CG-FM064

Frequency MHz	Reading [dBuV]	ANT POL (H/V)	Ant. Factor [dB/m]	Cable Loss [dB]	Total dBuV/m	Limit [dBuV/m]	Margin dB
48.0	9.84	V	12.26	1.5	23.6	30	6.4
120.0	8.99	V	12.68	2.4	24.1	30	5.9
168.0	6.33	V	15.60	2.9	24.9	30	5.1
192.0	4.46	H	16.09	3.1	23.7	30	6.3
200.0	4.87	H	16.24	3.2	24.3	30	5.7
214.9	3.95	H	16.67	3.3	23.9	30	6.1
233.2	11.68	H	17.12	3.5	32.3	37	4.7
240.0	7.12	H	17.24	3.5	27.9	37	9.1
264.0	6.49	H	17.77	3.7	28.0	37	9
432.0	8.29	H	17.89	4.8	30.9	37	6.1
456.0	6.75	V	18.49	4.9	30.1	37	6.9
480.0	6.07	H	18.83	5.0	29.9	37	7.1

MODEL : CG-FM128

Frequency MHz	Reading [dBuV]	ANT POL (H/V)	Ant. Factor [dB/m]	Cable Loss [dB]	Total dBuV/m	Limit [dBuV/m]	Margin dB
48.0	9.42	V	11.88	1.5	22.8	30	7.2
143.2	7.24	V	14.62	2.6	24.5	30	5.5
168.0	5.10	V	15.62	3.0	23.7	30	6.3
192.0	3.63	H	16.11	3.1	22.9	30	7.1
200.0	3.87	H	16.24	3.2	23.3	30	6.7
214.8	4.85	H	16.67	3.3	24.8	30	5.2
233.2	11.28	H	17.12	3.5	31.9	37	5.1
240.0	6.85	H	17.22	3.5	27.6	37	9.4
243.4	7.56	H	17.29	3.5	28.4	37	8.6
313.0	10.71	H	16.30	4.1	31.1	37	5.9
432.0	7.65	V	17.86	4.8	30.3	37	6.7
480.0	6.24	V	18.82	5.0	30.1	37	6.9

MODEL : CG-FM256

Frequency MHz	Reading [dBuV]	ANT POL (H/V)	Ant. Factor [dB/m]	Cable Loss [dB]	Total dBuV/m	Limit [dBuV/m]	Margin dB
57.2	11.02	V	8.71	1.7	21.4	30	8.6
120.0	7.29	V	12.78	2.4	22.5	30	7.5
143.2	6.04	V	14.62	2.6	23.3	30	6.7
168.0	4.83	V	15.60	2.9	23.4	30	6.6
192.0	3.46	H	16.09	3.1	22.7	30	7.3
214.8	3.95	H	16.67	3.3	23.9	30	6.1
240.0	10.62	H	17.24	3.5	31.4	37	5.6
264.0	8.96	H	17.80	3.7	30.5	37	6.5
288.0	9.60	H	18.95	3.9	32.5	37	4.5
312.0	10.40	H	16.30	4.1	30.8	37	6.2
384.0	9.57	V	16.78	4.5	30.8	37	6.2
480.0	7.44	V	18.82	5.0	31.3	37	5.7

Tested by Jin Pyo Hong Date : FEB, 04, 2003

6.1 Support Equipment Used

DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
USB Memory (EUT)	ACROTECH CO., LTD.	CG-FM016/032/064/128/256	QZJCG-FM	P.C
P.C	H/P	HP Pavilion700	DoC	N/A
MONITOR	CORNEA TECHNOLOGY	CT1502-	DoC	P.C
MONITOR ADAPTOR	Lishin International Enterprise Corp.	LSE9901B1260	DoC	N/A
KEY BOARD	H/P	5181	DoC	P.C
MOUSE	Microsoft	Intellimouse optical USB and PS/2 compatible HP Pavilion700	DoC	P.C
PRINTER	H/P	C4569A	DoC	P.C
SERIAL MOUSE	LOGITECH	M-M28	DoC	P.C
SPEAKER	CAMAC	CM680	DoC	P.C

6.2 Cable Description

	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
USB Memory (EUT)	N/A	Y	N/A
PC(HOST)	N	N/A	1.8(P)
MONITOR	N	Y	1.8(P),1.5(D)
KEY BOARD	N/A	Y	1.8(D)
MOUSE	N/A	Y	1.8(D)
PRINTER	N	Y	1.8(P),1.8(D)
SERIAL MOUSE	N/A	Y	1.8(D)
SPEAKER	N/A	N	1.6(D)

The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

6.3 Noise Suppression Parts on Cable. (I/O CABLE)

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
USB Memory (EUT)	Y	BOTH END	Y	BOTH END
MONITOR	Y	BOTH END	Y	BOTH END
KEY BOARD	N	N/A	Y	P.C END
MOUSE	N	N/A	Y	P.C END
PRINTER	Y	BOTH END	Y	BOTH END
SERIAL MOUSE	N	N/A	Y	P.C END
SPEAKER	Y	N/A	Y	P.C END

7.1 LINE-CONDUCTED TEST DATA

MODEL : CG-FM128

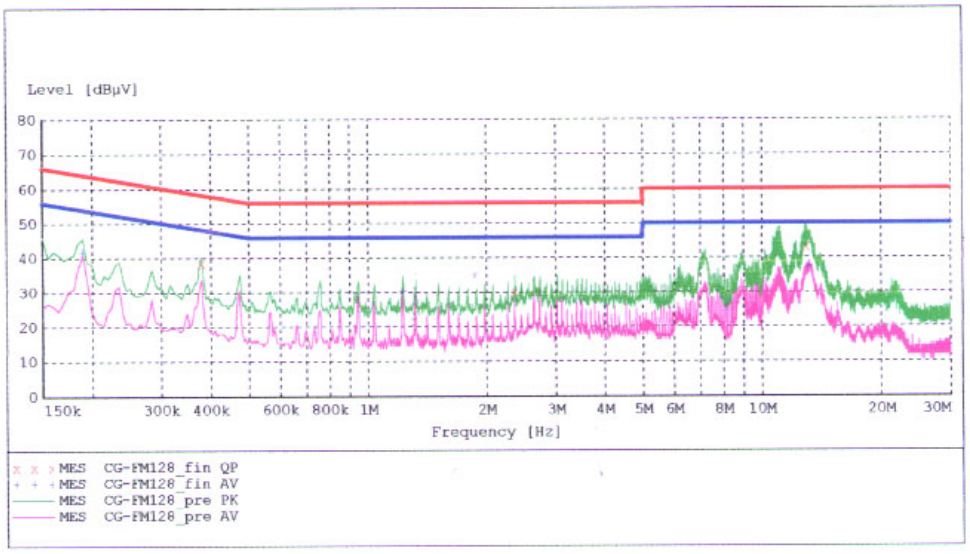
HYUNDAI C-TECH.
EMC Testing Laboratory

```
EUT:                    CG-FM128
Manufacturer:           ACROTECH CO.,LTD.
Operating Condition:    NORMAL
Test Site:              SHIELD ROOM
Operator:               JP-HONG
Test Specification:     CISPR 22 CLASS B
Comment:                H
Start of Test:          2/10/03 / 10:51:56AM
```

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM128_fin QP"
2/10/03 10:54AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.380000	38.60	10.1	58	19.7	1	---
2.370000	30.00	10.3	56	26.0	1	---
12.995000	43.20	10.5	60	16.8	1	---

MEASUREMENT RESULT: "CG-FM128_fin AV"
2/10/03 10:54AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	41.80	10.1	54	12.2	1	---
1.230000	30.60	10.2	46	15.4	1	---
13.195000	37.50	10.5	50	12.5	1	---

Page 1/1 2/10/03 10:54AM CG-FM128

MODEL : CG-FM128

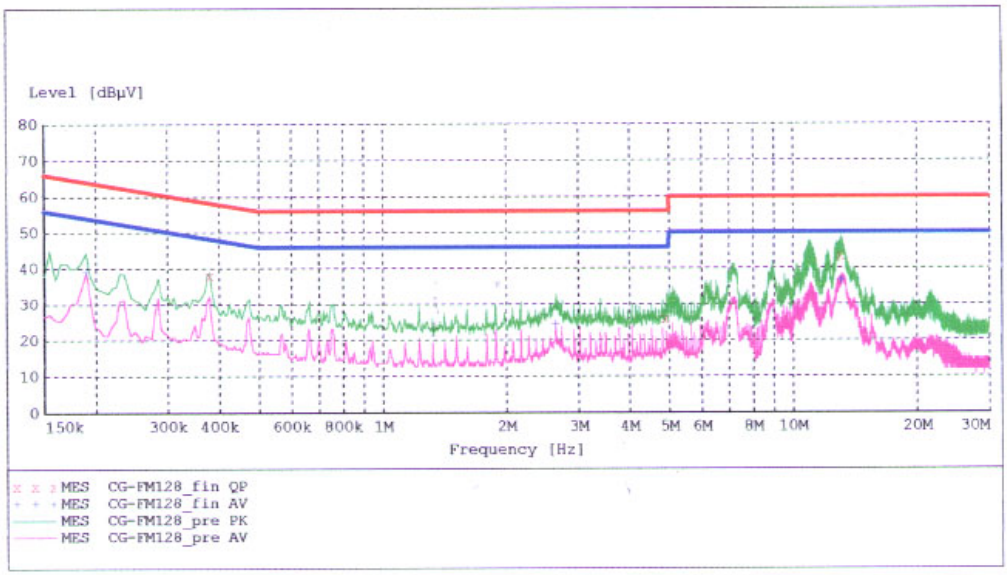
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM128
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	N
Start of Test:	2/10/03 / 10:48:52AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM128_fin QP"
2/10/03 10:51AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.380000	37.90	10.1	58	20.4	1	---
4.925000	25.80	10.3	56	30.2	1	---
13.160000	43.50	10.5	60	16.5	1	---

MEASUREMENT RESULT: "CG-FM128_fin AV"
2/10/03 10:51AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	39.10	10.1	54	14.9	1	---
2.650000	24.40	10.3	46	21.6	1	---
13.145000	36.80	10.5	50	13.2	1	---

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MODEL : CG-FM256

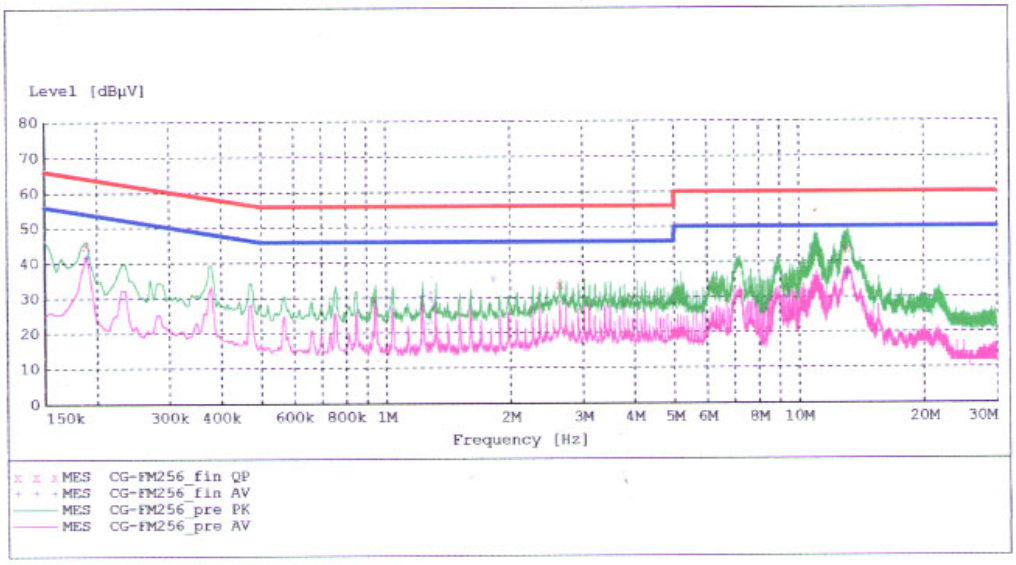
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM256
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	H
Start of Test:	2/10/03 / 10:54:47AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM256_fin QP"
2/10/03 10:57AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	45.20	10.1	64	18.9	1	---
2.650000	33.60	10.3	56	22.4	1	---
13.140000	43.60	10.5	60	16.4	1	---

MEASUREMENT RESULT: "CG-FM256_fin AV"
2/10/03 10:57AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	41.80	10.1	54	12.3	1	---
1.230000	30.70	10.2	46	15.3	1	---
13.125000	36.70	10.5	50	13.3	1	---

Page 1/1 2/10/03 10:57AM CG-FM256

MODEL : CG-FM256

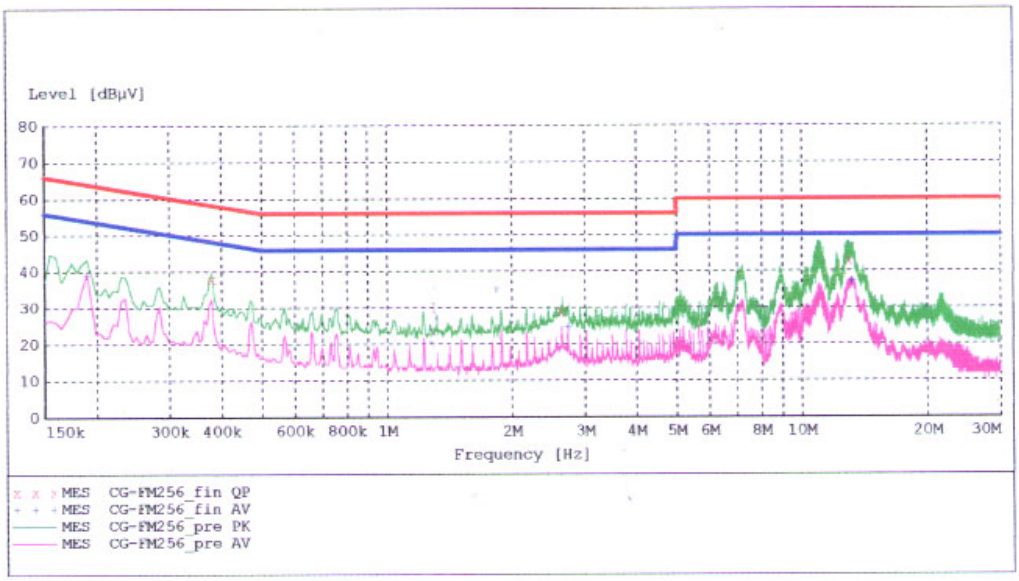
HYUNDAI C-TECH.
EMC Testing Laboratory

EUT:	CG-FM256
Manufacturer:	ACROTECH CO.,LTD.
Operating Condition:	NORMAL
Test Site:	SHIELD ROOM
Operator:	JP-HONG
Test Specification:	CISPR 22 CLASS B
Comment:	N
Start of Test:	2/10/03 / 11:01:17AM

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "CG-FM256_fin QP"
2/10/03 11:03AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.380000	37.90	10.1	58	20.3	1	---
2.650000	28.80	10.3	56	27.2	1	---
13.045000	42.80	10.5	60	17.2	1	---

MEASUREMENT RESULT: "CG-FM256_fin AV"
2/10/03 11:03AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	39.20	10.1	54	14.8	1	---
2.745000	24.90	10.2	46	21.1	1	---
13.230000	37.20	10.5	50	12.8	1	---

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NOTES:

1. **All modes of operation were investigated and the worst-case emissions are reported.**
2. **The CISPR RFI conducted limits are listed on Table 1 (Page 6).**
3. **Line A = Phase Line B = Neutral**

** Measurements using CISPR quasi-peak mode.

8.1 RADIATED TEST DATA

MODEL : CG-FM128

Frequency MHz	Reading [dBuV]	ANT POL (H/V)	Ant. Factor [dB/m]	Cable Loss [dB]	Total dBuV/m	Limit [dBuV/m]	Margin dB
48.0	9.42	V	11.88	1.5	22.8	30	7.2
143.2	7.24	V	14.62	2.6	24.5	30	5.5
168.0	5.10	V	15.62	3.0	23.7	30	6.3
192.0	3.63	H	16.11	3.1	22.9	30	7.1
200.0	3.87	H	16.24	3.2	23.3	30	6.7
214.8	4.85	H	16.67	3.3	24.8	30	5.2
233.2	11.28	H	17.12	3.5	31.9	37	5.1
240.0	6.85	H	17.22	3.5	27.6	37	9.4
243.4	7.56	H	17.29	3.5	28.4	37	8.6
313.0	10.71	H	16.30	4.1	31.1	37	5.9
432.0	7.65	V	17.86	4.8	30.3	37	6.7
480.0	6.24	V	18.82	5.0	30.1	37	6.9

MODEL : CG-FM256

Frequency MHz	Reading [dBuV]	ANT POL (H/V)	Ant. Factor [dB/m]	Cable Loss [dB]	Total dBuV/m	Limit [dBuV/m]	Margin dB
57.2	11.02	V	8.71	1.7	21.4	30	8.6
120.0	7.29	V	12.78	2.4	22.5	30	7.5
143.2	6.04	V	14.62	2.6	23.3	30	6.7
168.0	4.83	V	15.60	2.9	23.4	30	6.6
192.0	3.46	H	16.09	3.1	22.7	30	7.3
214.8	3.95	H	16.67	3.3	23.9	30	6.1
240.0	10.62	H	17.24	3.5	31.4	37	5.6
264.0	8.96	H	17.80	3.7	30.5	37	6.5
288.0	9.60	H	18.95	3.9	32.5	37	4.5
312.0	10.40	H	16.30	4.1	30.8	37	6.2
384.0	9.57	V	16.78	4.5	30.8	37	6.2
480.0	7.44	V	18.82	5.0	31.3	37	5.7

Radiated Measurements at 10-meters.

NOTES:

1. All modes of operation were investigated, and the worst-case emissions are reported.
2. The radiated limits are listed on Table 2 (Page 7).

** AFCL = Antenna Factor (Roberts dipole) and Cable Loss .

*** Measurements using CISPR quasi-peak mode. Above 1GHz, peak detector function mode is used using a resolution bandwidth of 1MHz and a video bandwidth of 1MHz. The peak level complies with the average limit. Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

9.1 Sample Calculations

$dB\mu = 20 \log_{10} (mV/m)$

$dB\mu = dBm + 107$

9.2 Example 1:

@ 20.3 MHz

Class B limit = 250 μV = 47.96 dBμV
Reading = - 67.8 dBm (calibrated level)
Convert to dbμV = - 67.8 + 107 = 39.2 dBμV
$10^{(39.2/20)}$ = 91.2 μV

Margin = 39.2 - 47.96 = - 8.76
= 8.8 dB below limit

9.3 Example 2:

@ 66.7 MHz

Class B limit = 100 μV/m = 47.96 dBμV/m
Reading = - 76.0 dBm (calibrated level)
Convert to dbμV/m = - 76.0 + 107 = 31.0 dBμV/m
Antenna Factor + Cable Loss = 5.8 dB
Total = 36.8 dBμV/m

Margin = 36.8 - 40.0 = - 3.2
= 3.2 dB below limit

10.1 Test Equipment

Type	Manufacture	Model Number	CAL Date
EMI Test Receiver	Rohde & Schwarz	ESH3	2002.07.16
EMI Test Receiver	Rohde & Schwarz	ESVP	2002.10.01
EMI Test Receiver	Rohde & Schwarz	ESI40	2002.11.16
EMI Test Receiver	Rohde & Schwarz	ESVS30	2002.07.16
LISN	EMCO	3816/2	2002.11.29
LISN	EMCO	3816/2	2002.08.22
Amplifier	Hewlett-Packard	8447E	2002.08.23
Absorbing Clamp	Rohde & Schwarz	MDS-21	2002.04.24
Dipole Antennas	Rohde & Schwarz	VHAP	2002.07.16
Dipole Antennas	Rohde & Schwarz	UHAP	2002.07.16
Biconical Antenna	Rohde & Schwarz	VHA9103	2002.07.12
Log-Periodic Antenna	Rohde & Schwarz	UHALP9107	2002.07.12
Antenna Position Tower	EMCO	1051-12	N/A
Turn Table	EMCO	1060-06	N/A
Power Analyzer	Voltech	PM 3300	2003.2.15
Reference Network	ImpedanceVoltech	IEC 555	N/A
AC Power Source	PACIFIC	Magnetic Module	N/A
AC Power Source	PACIFIC	360AMX	2002.11.25
Controller	HD GmbH	HD 100	N/A
EMI in Motion	HD GmbH	KMS 560	N/A

11.1 Test Software Used

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disc, was inserted into drive A and is auto starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is :(1) Display test, (2) RS 232 test (3) Key board test,(4) Printer test,(5) FDD test,(6) HDD test. The complete cycle takes about 20 seconds and is repeated continuously. As the keyboard and mouse are strictly input devices, no data is transmitted to them during test. They are however, continuously scanned for data input activity. The video resolution modes setup and change program was used during the radiated and conducted emission testing.

NOTE: This is a sample of the basic program used during the test. However, during testing, a different software program may be used; whichever determines the worst-case condition. In addition, the program used also depends on the number and type of devices being tested.

12.1 Conclusion

The data collected shows that the ACROTECH CO., LTD. USB Memory **FCC ID:QZJCG-FM**

complies with §15.107 and §15.109 of the FCC Rules.