

EMI TEST REPORT

Test report No.: EMC- FCC- 0303
Type of equipment: Digital Multi Player
Model Name: MR-200
Variant Model: MR-200X, MR-200F, MR-200K
FCC ID : RL4MR200
Applicant: Muro Co.,Ltd
Factory#1: YOUNG CHAMP ELECTRONICS LTD.
Factory#2: S.CAM CO.,LTD
Test standards: FCC part 15 subpart B (Class B)

Test Procedure and Items :

AC Power Line Conducted Emissions Measurement: ANSI C63.4:2001
Radiated Emissions Measurement : ANSI C63.4:2001

Test result : Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.

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.

Date of test: 2005. 07. 04~05 **Issued date: 2005. 07. 08**

Tested by :  **Approved by:** 

You, Sang-Hun

Chung, Min-Seok

EMC Compliance Ltd.

82-1 JEIL-RI, YANGJI-MYUN, YONGIN-CITY, KYUNGGI-DO 449-825, KOREA
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1. Client information

Applicant	: Muro Co.,Ltd
Address	: 8F Hana B/D, 118-5 NonHyon-Dong, KangNam-Ku Seoul, Korea 135-821
Telephone Number	: +82-2-544-8112
Facsimile Number	: +82-2-544-8056
Contact person	: KWON JOON MO
Manufacturer#1	: YOUNG CHAMP ELECTRONICS LTD.
Address	: Tailink Industrial Park Jinqiao Industrial Zone, Qing Xing, Dongguan Gauangdong, China
Telephone Number	: (0769)7736431
Facsimile Number	: (0769)7739420
Manufacturer#2	: S.CAM CO., LTD
Address	: 35, Buk-ri, Namsa-myon, Yongin city, Gyeonggi-do, Korea
Telephone Number	: +82-31-329-8700
Facsimile Number	: +82-31-329-8729

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2. Laboratory information

Address

EMC compliance Ltd.

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Telephone Number : 82 31 336 9919

Facsimile Number : 82 31 336 4767

FCC Filing No. : 793334

VCCI Registration No. : C-1713, R-1606

SITE MAP



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3. Test system configuration

3.1 Operation Environment

		Temperature	Humidity	Pressure
OATS	:	30 °C	47 %	995 hPa
Shielded room	:	24 °C	45 %	992 hPa

Test site

These testing were performed following locations;

Shielded Room : Conducted Emission
OATS (10m) : Radiated Emission

3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMI. The factors contributing to uncertainties are test receiver, Cable Loss, antenna factor calibration, Antenna directivity, antenna factor Variation with height, antenna phase center variation, antenna Frequency interpolation, measurement distance variation, Site imperfection, mismatching, and system repeatability.

Based on NIS 80, 81, the measurement uncertainty level with a 95% confidence level was applied.

3.3 Sample calculation

Radiated emission

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follows :

$$FS = MR + AF + CL + AT - AG$$

MR = Meter Reading / AF = Antenna Factor / CL = Cable Loss

AP = Antenna Pad / AG=Amplifier Gain /

If MR is 30dB, AF 12dB, CL 5dB, AP 10dB, AG 35dB

The result (MR) is

$$30 + 12 + 5 + 10 - 35 = 22\text{dBuV/m}$$

Conducted emission

The field strength is calculated by adding the LISN factor, cable loss to the measured reading.

The sample calculation is as follows :

$$FS = MR + LF + CL$$

MR = Meter Reading

LF = LISN Factor

CL = Cable Loss

If MR is 30dB, LISN Factor 1dB, CL 1dB

The result (FS) is

$$30 + 1 + 1 = 32\text{dBuV}$$

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4. Description of E.U.T.

4.1 Product description

Applicant:	Muro Co.,Ltd
Address of Applicant:	8F Hana B/D, 118-5 NonHyon-Dong, KangNam-Ku Seoul, Korea 135-821
Manufacturer#1:	YOUNG CHAMP ELECTRONICS LTD.
Address of Manufacturer:	Tailink Industrial Park Jinqiao Industrial Zone, Qing Xing, Dongguan Gauangdong, China
Manufacturer#2:	S.CAM CO., LTD
Address of Manufacturer:	35, Buk-ri, Namsa-myon, Yongin city, Gyeonggi-do, Korea
Type of equipment:	Digital Multi Player
Basic Model:	MR-200
Variant Model:	MR-200X(256MB), MR-200F(512MB), MR-200K(1GB)
The difference between basic model and variant model:	Memory
Rating:	Built In Polymer Battery

4.2 Peripherals

Description	Model / Part #	Serial number	Manufacture
PC	DIMESION4700	6FZRD1S	DELL
MONITOR	52S-S	N379HVEY216486E	SAMSUNG
PRINTER	EPSON STYLUS C60	DR5K015097	EPSON
KEYBOARD	7801	N36004569	SAMSUNG
MOUSE	M-S34	F13490N5BI4160S	COMPAQ
MOUSE	SWW-23	N/A	A4Tech
HEADSET	RP-HM211	N/A	PANASONIC

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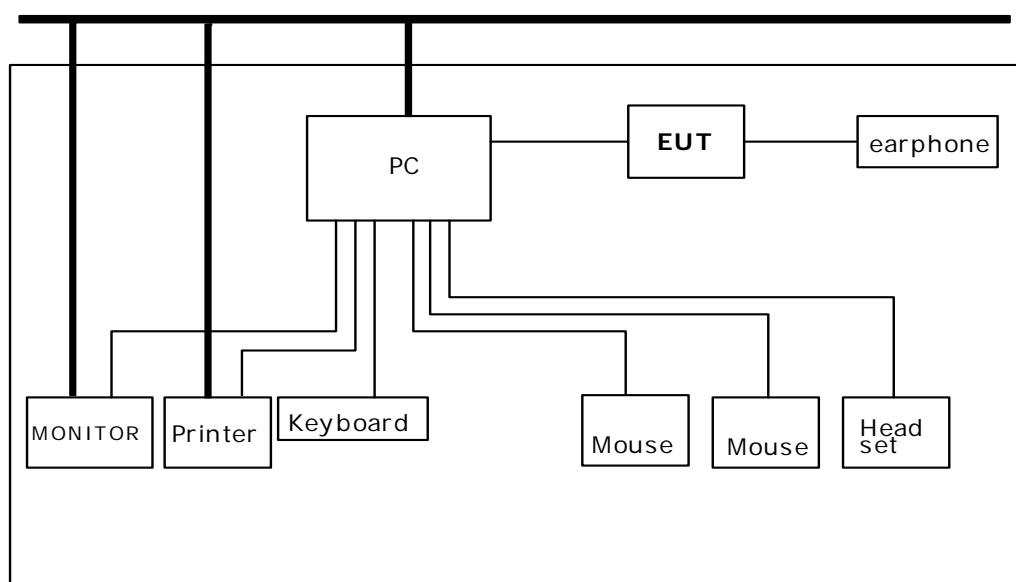
4.3 Operating conditions

- MP3 play mode.
- Recording mode.
- Up & down load through the USB cable.
- FM Tuner mode.

4.4 Used cables

Start		END		Cable Spec.	
Name	I/O Port	Name	I/O Port	Length	Shield
PC	VGA	MONITOR	D-SUB	1.5	Shield
	PARALLEL	PRINTER	PARALLEL	1.8	Shield
	PS/2	KEYBOARD	PS/2	2.0	Shield
	PS/2	PS/2 MOUSE	PS/2	1.8	Shield
	SPEAKER,MIC	HEADSET	P-JACK	2.0	Unshield
EUT	USB	PC	USB	1.5	SHIELD
	Earphone	OPEN	-	1.2	UNSHIELD

4.5 EUT test configuration



5. Summary of test results

5.1 Modification to the E.U.T.

- None

5.2 Standards & results

FCC Part 15 Subpart B (Class B)

ANSI C63.4 – 2001

Test items	Test methods	Result
Conducted emission	ANSI C63.4-2001	Pass
Radiated emission	ANSI C63.4-2001	Pass

6. Test results

6.1 Conducted Emission

6.1.1 Measurement procedure

Mains

The measurements were performed in a shielded room.

EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane.

The rear of table was located 0.4 m to the vertical conducted plane.

Each EUT power lead, except ground (safety) lead, was individually connected through a LISN to input power source.

Both lines of power cord, hot and neutral, were measured.

6.1.2 Used equipments

Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test receiver	ESHS10	1004.0401.10	R&S	06.05.13	<input checked="" type="checkbox"/>
L.I.S.N.	ESH3-Z5	100267	R&S	06.06.14	<input checked="" type="checkbox"/>
	L2-16A	0000J10705	PMM	05.11.20	<input checked="" type="checkbox"/>
Test site	Shield room	-	-	-	<input checked="" type="checkbox"/>

6.1.3 Measurement uncertainty

Conducted emission measurement : (k=2, 95%)

9kHz-150 kHz : ± 3.48

150kHz-300 MHz : ± 3.05

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6.1.4 Test data

- Note. QP = Quasi-Peak, AV= Average / LINE(N) : NEUTRAL, LINE(H) : HOT
- Loss = LISN Loss + Cable Loss
- Measurement time : 1 s

[UP/DOWN MODE]

Frequency [MHz]	Correction Factor		Line	Quasi-peak			Average		
	LISN	Cable		Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Limit [dBuV]	Reading [dBuV]	Result [dBuV]
0.150	0.03	0.2	H	66.00	40.26	40.49	56.00	15.76	15.99
0.156	0.03	0.2	N	65.67	38.17	38.40	55.67	15.99	16.22
0.174	0.03	0.2	N	64.77	33.61	33.84	54.77	15.38	15.61
0.180	0.03	0.2	H	64.49	32.32	32.55	54.49	9.48	9.71
0.234	0.03	0.2	N	62.31	42.19	42.42	52.31	34.34	34.57
0.351	0.08	0.2	H	58.94	26.60	26.88	48.94	21.79	22.07
0.819	0.09	0.3	H	56.00	26.10	26.49	46.00	21.55	21.94
0.822	0.11	0.3	N		25.21	25.62		20.88	21.29
0.936	0.11	0.3	N		22.06	22.47		19.49	19.90
1.173	0.11	0.4	H		24.21	24.72		19.56	20.07
1.761	0.14	0.4	N		26.05	26.59		21.81	22.35
4.010	0.15	0.5	H		30.55	31.20		28.74	29.39
8.160	0.23	0.5	N	60.00	30.84	31.57	50.00	29.75	30.48
9.790	0.40	0.3	N		32.19	32.89		30.53	31.23
12.040	0.46	0.5	N		31.76	32.72		29.19	30.15
16.050	0.73	0.5	N		34.02	35.25		30.82	32.05
20.060	0.86	0.5	N		39.05	40.41		35.16	36.52
20.070	0.93	0.5	H		39.00	40.43		32.88	34.31

[REC MODE]

Frequency [MHz]	Correction Factor		Line	Quasi-peak			Average		
	LISN	Cable		Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Limit [dBuV]	Reading [dBuV]	Result [dBuV]
	0.150	0.03	0.2	H	66.00	42.16	42.39	56.00	17.23
0.234	0.03	0.2	N	62.31	42.94	43.17	52.31	34.39	34.62
0.237	0.03	0.2	H	62.20	41.92	42.15	52.20	34.52	34.75
0.354	0.08	0.2	H	58.87	26.46	26.74	48.87	20.97	21.25
0.819	0.09	0.3	H	56.00	30.17	30.56	46.00	27.40	27.79
0.822	0.11	0.3	N		28.67	29.08		21.98	22.39
0.942	0.11	0.3	N		27.87	28.28		23.14	23.55
4.590	0.17	0.4	H		25.51	26.08		18.41	18.98
4.820	0.18	0.4	N		28.47	29.05		21.49	22.07
5.290	0.18	0.4	N	60.00	29.91	30.49	50.00	22.64	23.22
6.120	0.19	0.5	H		24.90	25.59		17.35	18.04
8.700	0.32	0.6	N		28.35	29.27		21.29	22.21
17.140	0.77	0.5	N		36.13	37.40		33.19	34.46
17.990	0.81	0.5	N		38.96	40.27		29.34	30.65

6.1.5 Result

Complied

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6.2 Radiated Emission

6.2.1 Measurement procedure

A pretest was performed at 3 m distance in a mini chamber for searching correct frequency.

The final test was done at a 10 m open area test site with a quasi-peak detector.

EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane.

They were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane.

Cables connected to EUT were fixed to cause maximum emission.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.

The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

6.2.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next cal. date	Used
Test receiver	ESVS10	827864/006	R&S	06.05.14	<input checked="" type="checkbox"/>
TRILOG Broadband Antenna	VULB 9160	3138	SCHWARZBECK	06.05.17	<input checked="" type="checkbox"/>
Antenna Mast	A109	N/A	DEAIL	-	<input checked="" type="checkbox"/>
Turn Table	TS14	N/A	DEAIL	-	<input checked="" type="checkbox"/>
10m OATS	-	-	EMC Compliance	-	<input checked="" type="checkbox"/>

6.2.3 Measurement uncertainty

Radiated Emission measurement : (k=2, 95%)

30-300 MHz ; 3 m: ± 3.56 , 10 m: ± 3.50

300-1000 MHz ; 3 m: ± 4.47 , 10 m: ± 2.64

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6.2.4 Test data

* Receiving Antenna Mode : *Horizontal, Vertical*

* 10 m OATS

* Note : *Reading = Test Receiver meter,*

P= Polarization → POL H = Horizontal, POL V = Vertical

* Result = *Field Strength (Antenna factor + Cable factor + Reading)*

-Up/Down mode-

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	angle	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
					Antenna	Cable			
35.24	12.6	H	1.5	310	11.57	0.90	30.0	25.07	4.93
39.15	14.6	H	1.0	219	11.90	0.90	30.0	27.40	2.60
162.80	6.9	H	1.5	89	13.04	2.21	30.0	22.15	7.85
177.33	9.7	V	1.0	78	11.98	2.28	30.0	24.00	6.00
178.65	10.8	V	1.6	137	11.89	2.29	30.0	24.96	5.04
194.78	9.6	H	3.5	332	10.19	2.37	30.0	22.16	7.84
278.48	15.7	H	1.8	198	12.55	2.99	37.0	31.23	5.77
456.07	2.6	V	1.0	73	16.67	4.08	37.0	23.35	13.65
482.99	6.7	H	2.1	54	17.17	4.32	37.0	28.19	8.81
538.49	3.2	H	2.0	102	17.98	4.79	37.0	25.97	11.03
663.31	1.9	V	1.0	94	20.16	5.73	37.0	27.79	9.21
782.60	5.8	H	3.8	147	22.03	6.61	37.0	34.44	2.56

-Play mode-

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	angle	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
					Antenna	Cable			
180.42	14.2	H	2.9	150	11.71	2.30	30.0	28.21	1.79
420.40	15.6	V	1.0	339	15.87	3.90	37.0	35.37	1.63

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-REC mode-

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	angle	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
					Antenna	Cable			
180.46	14.0	H	1.7	129	11.71	2.30	30.0	27.96	2.04

※TEST MODE: FM TUNER

Tuned Frequency [MHz]	Local Oscillator	Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	angle	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	
							Antenna	Cable			
87.5	Harmonics	294.60	10.8	H	4.0	250	13.14	3.40	46.0	27.34	
		491.00	8.5	H	3.5	315	17.05	4.70	46.0	30.25	
98	Harmonics	652.20	6.8	H	1.9	240	20.31	5.40	46.0	32.51	
		869.60	5.4	H	1.0	194	23.58	6.00	46.0	34.98	
108	Harmonics	474.80	9.3	H	2.3	264	17.07	4.50	46.0	30.87	
		712.20	3.2	H	1.8	229	21.74	5.70	46.0	30.64	
OTHER		192.26	11.3	H	4.0	183	10.26	2.40	43.5	23.96	
		466.10	8.2	H	2.5	271	17.07	4.50	46.0	29.77	

* Receiving Antenna Mode : *Horizontal, Vertical*

* 3 m OATS

* Note : *Reading = Test Receiver meter,*

P= Polarization → POL H = Horizontal, POL V = Vertical

* *Result = Field Strength (Antenna factor + Cable factor + Reading)*

6.2.5 Result

Complied

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7. Test graphs

Conducted Emission test graphs

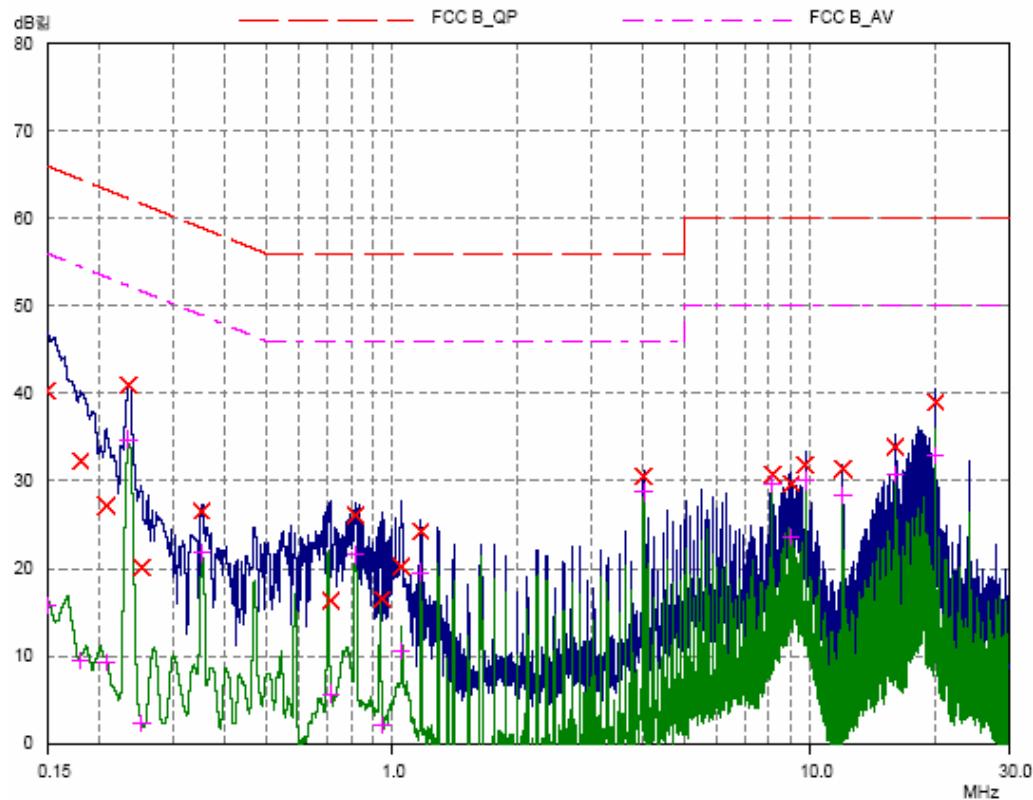
EUT: MR-200
 Manuf: MURO
 Op Cond: H
 Operator:
 Test Spec: FCC Class B Conducted Emission
 Comment:

Result File: mura1gh.dat : MR 200 1G H

Scan Settings (2 Ranges)

Frequencies		Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	10msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
 Meas Time: 1sec
 Peaks: 8
 Acc Margin: 25 dB



EUT: MR-200
Manuf: MURO
Op Cond: N
Operator:
Test Spec: FCC Class B Conducted Emission
Comment:

Result File: mura1gn.dat : MR 200 1G N

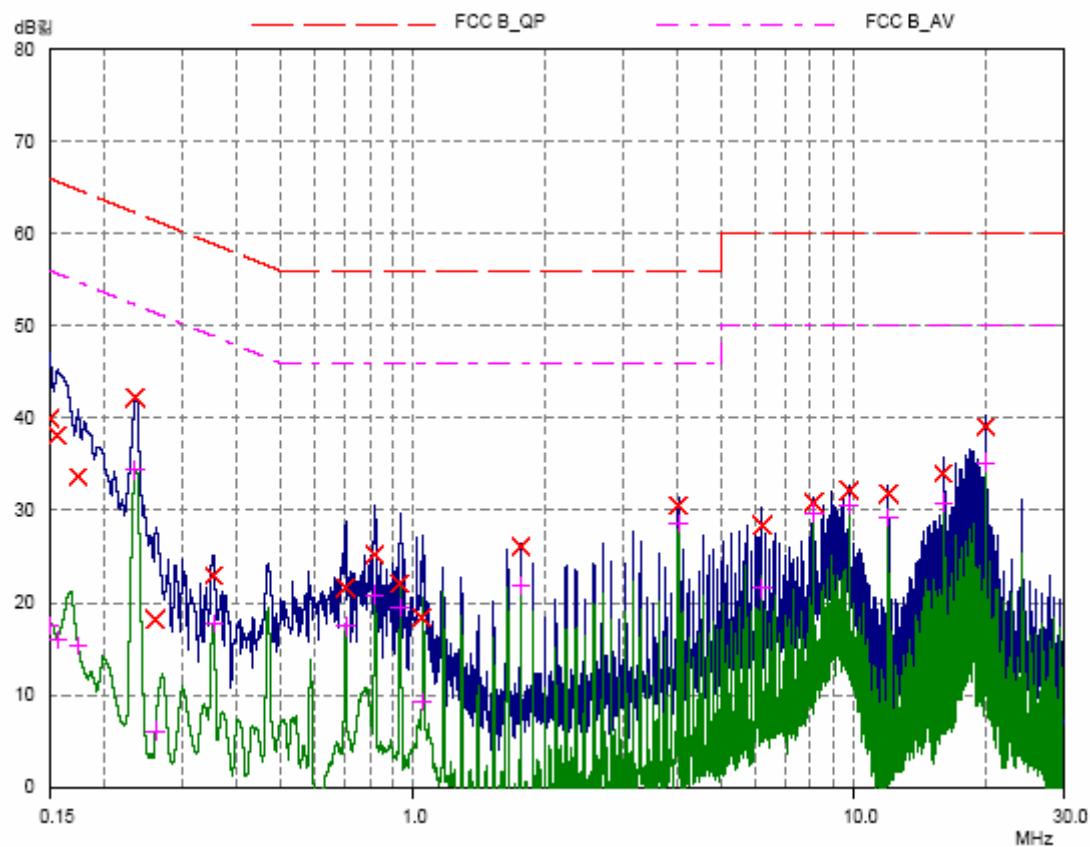
Scan Settings

(2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	10msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB

Final Measurement:

Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



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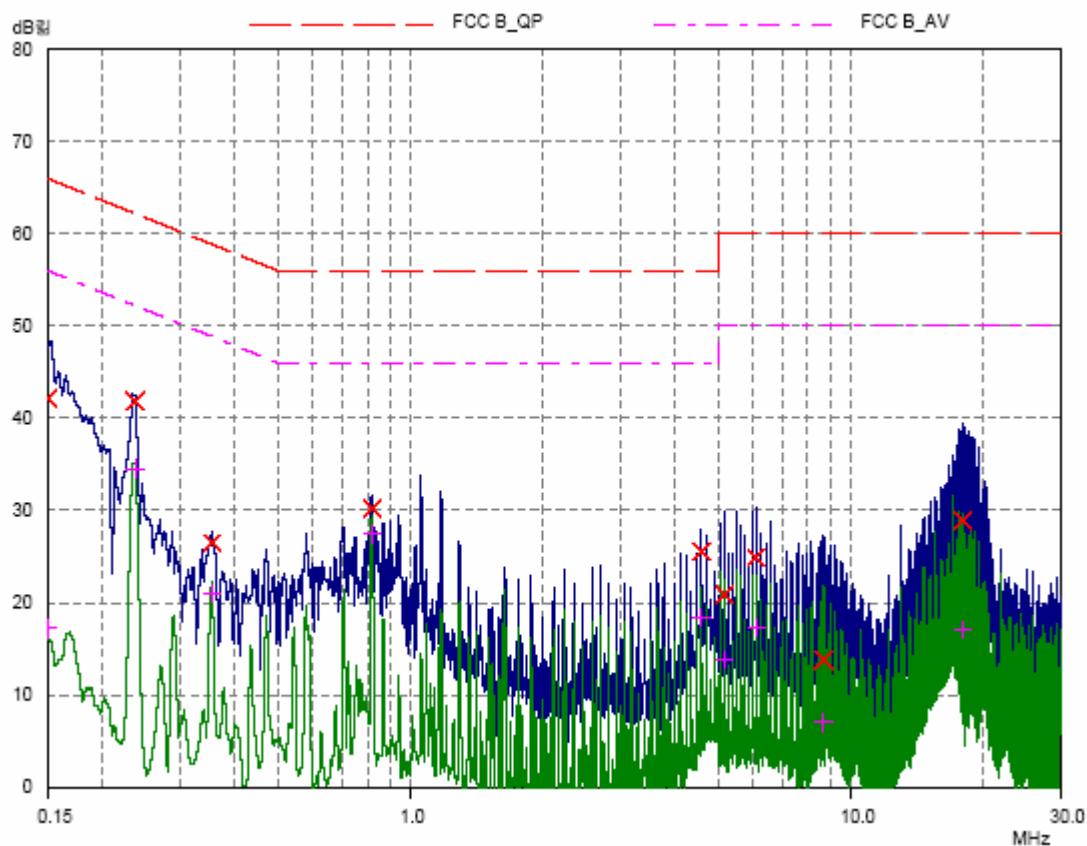
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EUT: MR-200
Manuf: MURO
Op Cond: H
Operator:
Test Spec: FCC Class B Conducted Emission
Comment: LINE IN

Result File: muro_lh.dat : MURO_MP3_LINI RECORDING

Scan Settings (2 Ranges)		Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	10msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



EUT: MR-200
 Manuf: MURO
 Op Cond: N
 Operator:
 Test Spec: FCC Class B Conducted Emission
 Comment: LINE IN

Result File: muro_ln.dat : MURO_MP3_LINI RECORDING

Scan Settings (2 Ranges)

Frequencies		Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	10msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
 Meas Time: 1sec
 Peaks: 8
 Acc Margin: 25 dB

