

Measurement Report for FCC Part 15

Report number: STD-FCC-05006

Type of EUT: Functional Natural Sounds Device

Model number: R-1265
Brand name: molle

Applicant: SAM JIN R&D CO., LTD.

Applied standards: FCC 15 Subpart B (Class B)

The above mentioned EUT had been tested by EMC Laboratory of Standard Engineering Company in order to confirm the compliance with the requirements of FCC rules and this test was executed in accordance with the measurement method specified in ANSI C63.4-2001.

I hereby certify that the accuracy of test-data is true and correct with my best knowledge and belief. Also I prove this measurement was performed by qualified person,

Date of tested: April. 02, 2005

Date of Issued April. 04,2005

Tested by:



K.W. Jung/ Test Engineer

Approved by:



J.Y. Ahn/ Manager

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1. General Information

1.1 Product information

Description of EUT : Functional Natural Sounds Device

Model number : R-1265

Brand name: molle

Specification : DC 9V 300mA

Memory size: 128MB Audio format: Stereo

Applied Standard : FCC Part 15 subpart B (Class B)

Test method : ANSI C63.4 - 2001

1.2 Client information

Applicant : SAM JIN R&D CO., LTD.

Address : 279-19, Seongsu 2 ga – 3 dong, Seongdong-gu,
Seoul, Korea

Phone No. : +82-2-464-4674

Fax. No. : +82-2-464-4676

Contact person : Jae Hyuk Lee (Manager)

Manufacturer : SAM JIN R&D CO., LTD.

Address : 279-19, Seongsu 2 ga – 3 dong, Seongdong-gu,
Seoul, Korea

Phone No.: +82-2-464-4674

Fax. No.: +82-2-464-4676

2. Information of EMC Laboratory

Name of test laboratory

Standard Engineering Co. Ltd.

Location

377-11 Sinjang-Ri, Eumam-Myeon, Seosan-Si Choongnam, Korea

Phone No. : +82-41-663-9436~7

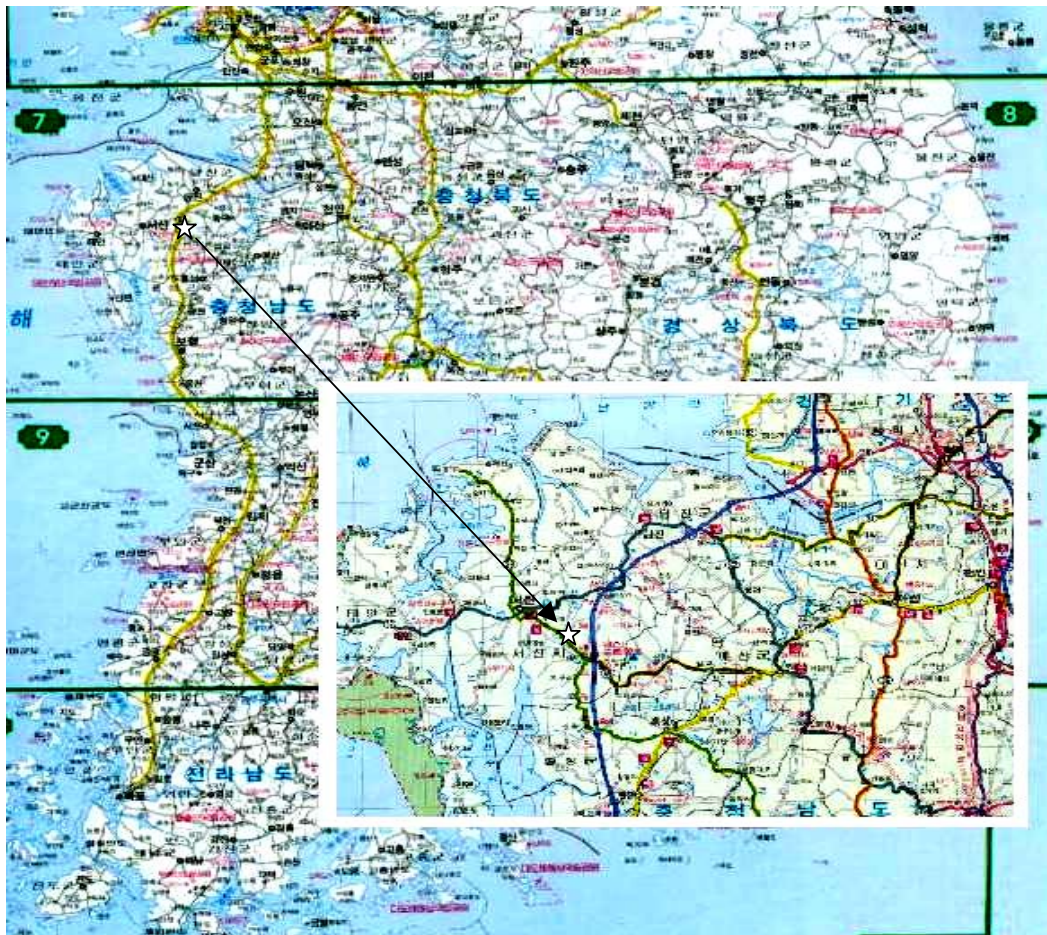
Fax. No. : +82-41-663-9434

FCC Filing Number : 284057

Environment of Laboratory

This location can keep accuracy in measuring more than anywhere because surrounding noise ambient is low and silent excellently to be suitable in EMI's measuring.

Map



3. Procedure of measurement

3.1 Conducted emissions

3.1.1 Configuration of measurement

This measurement executed in shield-room and EUT was tested on 0.8m height wooden table located on the floor with 0.1m distance from the reference ground plane.

EUT's rear part had a distance from VCP(Vertical Conducted Plane) with 0.4m length and LISN placed on the grounded plane with 0.8m distance from EUT's side part .

Excess power cord and cables fixed in bundle style of 30~40m length with non-inductive material, and power line was connected to power source through LISN to detect maximum EMI without external RFI from aux. instruments.

For the measurement, maker supplied AC/DC adaptor was connected to the EUT in order to supply DC power into the EUT even it is a DC use only device and connected to the PC for making download link between EUT and PC through the USB port.

Measuring equipments and EUT confirmed that warming-up was performed during enough time and calibration of antenna as well as calibration of measuring equipment also completed beforehand.

This measurement was performed on condition of worst-case emission.

3.1.2 Detector function selection and bandwidth

During conducted emission measurement, a radio noise meter that has a CISPR quasi-peak detector with 9 kHz IF bandwidth of 6 dB was utilized.

3.1.3 Frequency range to be scanned

For conducted emissions measurement, frequency range of 150 kHz to 30 MHz included, was investigated.

3.1.4 Line impedance stabilization network (LISN)

A LISN with characteristics that conform to the requirements of ANSI C63.4-2001 was used for the measurement of conducted power-line radio noise; (50 micro-henries/ 50 ohms). Chassis and earth-points for grounding of the LISN were earth-grounded.

3.2 Radiated Emissions

3.2.1 Configuration of measurement

Preliminary measurement was performed in 3 meter semi-anechoic chamber to detect correct EMI frequency. For detecting the EMI frequency in semi-anechoic chamber, TRILOG antenna used on 30-1000MHz band.

Final measurement was executed at 3 meters OATS(Open Area Test Site) using Quasi-peak detector and TRILOG antenna.

EUT was placed on 0.8m height wooden table located on the reference ground plane.

Excess power cord and other excess cables fixed in bundle style of 30~40m length with non-inductive material to detect maximum EMI emission from EUT.

For the measurement, maker supplied AC/DC adaptor was connected to the EUT in order to supply DC power into the EUT and connected to the PC for making download link between EUT and PC through the USB port..

Measuring equipments and EUT confirmed that warming-up was performed during enough time and calibration of antenna as well as calibration of measuring equipment also completed beforehand.

Measurement antenna height was varied 1 to 4 meters and set position in both horizontal and vertical plane to search maximum EMI emission frequency.

3.2.2 Detector function, bandwidth and frequency range to be scanned

In radiated emissions measurement, a field strength meter that has a CISPR quasi-peak detector was used. The 6 dB bandwidth of the detector of instrument is 120 kHz over frequency range of 30 to 1000 MHz.

3.3 Method of Calculations

3.3.1 Unit of Conducted emission measurement

Conducted Emission Test results for conducted emissions are reported in micro-volts.

3.3.2 Unit of Radiated emission measurement

Test results of radiated emissions measurement are reported in micro-volts per meter at the specific distance. Using the unit of dBuV on the test instrument, the indication unit was converted to field strength unit of uV/m as following method;

$$F (uV/m) = 10^{(R+CL+AF)/20} (uV/m)$$

F: Field Strength in uV/m, R: Meter Reading Level in dB(uV),

CL: Cable Loss from antenna to meter in dB,

AF: Antenna Factor of receiving antenna in dB(/m)

Sample calculation (Radiated emission)

Emission level is calculated as follows;

Emission Level(dBuV/m)

= Reading Level + Ant. Factor + Cable Loss – Amp Gain

Margin Level is calculated as follows;

Margin(dBuV) = Limit Level – Emission Level

Example) Standard limit = 40 dBuV/m,

Reading Level = 10 dBuV,

Ant. Factor = 15 dB,

Cable Loss= 1 dB

External Amp Gain= 0 dB

Emission Level(dBuV/m) = 10 + 15 + 1 - 0 = 26 (dBuV/m)

Margin(dBuV) = 40 – 26 = 14 (dBuV)

4. Environments of measurement

4.1 Conditions of environment

		Apr.01,2005	Apr.02,2005
Shield room	Temperature	21 °C	22 °C
	Humidity	31 %	33 %
	Pressure	1021 hPa	1018 hPa
OATS	Temperature	22 °C	20 °C
	Humidity	55 %	65 %
	Pressure	1021 hPa	1018 hPa

4.2 Measurement uncertainty

All measurements, especially EUT's measurement includes uncertain level that can happen for the reason as following;

Variation of antenna factor by changes of height,center,polarization,directivity.

Uncertainty factor by change of measurement distance, site's imperfection.

Radiated emissions measurements: ± 5 dB

Power line conducted emission measurements: ± 3 dB

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT in the above mentioned way.

The measurement uncertainty was calculated in accordance with NAMAS NIS 81 : The treatment of uncertainty in EMC measurement.

The measurement uncertainty was given with a confidence of 95%.

4.3 List of Test equipments

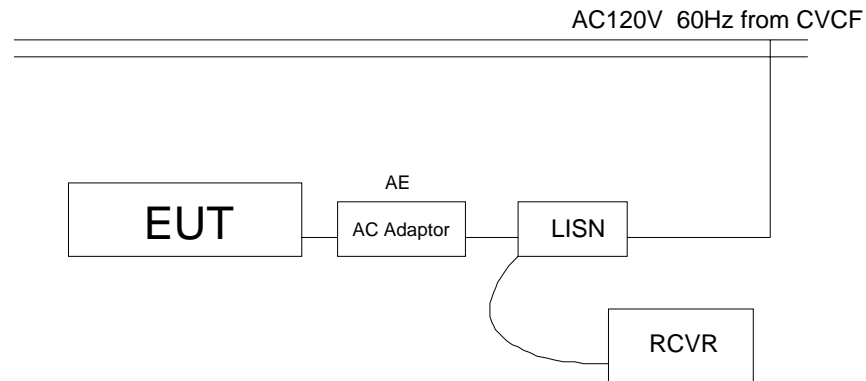
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<input checked="" type="checkbox"/>	EMI Test Receiver	Rhode & Schwarz	ESIB7	100119	05/17/2005
<input checked="" type="checkbox"/>	Spectrum Analyzer	ADVANTEST	R3132	130300485	09/20/2005
<input type="checkbox"/>	Artificial Mains	Rhode & Schwarz	ESH2-Z5	100064	09/22/2005
<input checked="" type="checkbox"/>	Artificial Mains	Rhode & Schwarz	ESH3-Z5	100204	09/22/2005
<input type="checkbox"/>	Absorbing Clamp	Rhode & Schwarz	MDS-21	100076	09/21/2005
<input checked="" type="checkbox"/>	TRILOG Antenna	Schwarzbeck	VULB9163	164	06/02/2005
<input type="checkbox"/>	2 Wire ISN	Rhode & Schwarz	ENY22	10086	N/A
<input type="checkbox"/>	4 Wire ISN	Rhode & Schwarz	ENY41	100095	N/A
<input checked="" type="checkbox"/>	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100137	N/A
<input type="checkbox"/>	Attenuator	Rhode & Schwarz	MDS-2	100274	N/A
<input type="checkbox"/>	Ferrite Clamp	Rhode & Schwarz	EZ-24	100002	N/A

4.4 List of Peripherals & Cables

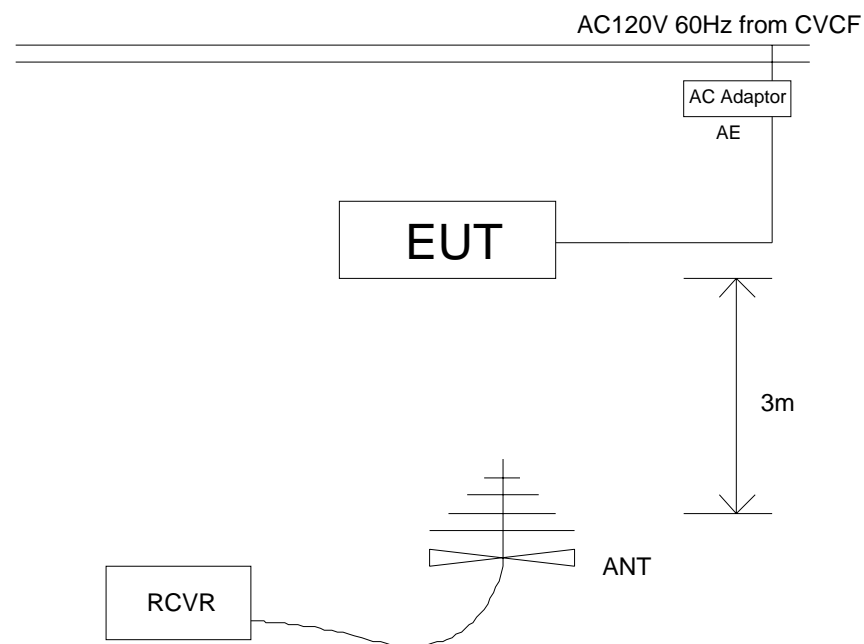
	Descriptions	Maker	Type	Ser. No.	Approval
<input type="checkbox"/>	Reference PC set	DELL	Dimension 4600	D39Z81S	<i>Class B CE/FCC MIC/VCCI</i>
<input checked="" type="checkbox"/>	Reference Printer	EPSON	P730A	60H0187628	
<input checked="" type="checkbox"/>	Notebook Computer	TG	H2	50052-788-00057	
<input type="checkbox"/>	DC Power Supply	HP	6574A	US36340515	CE
<input checked="" type="checkbox"/>	M/W Cable/2GHz 5m	H+Suhner	SF104/2x11BNC	14354	
<input type="checkbox"/>	M/W Cable/2GHz10m	“	“	14353	
<input type="checkbox"/>	M/W Cable/18GHz18m	“	SF104/2x11N	6025	
<input checked="" type="checkbox"/>	M/W Cable/18GHz18m	“	“	6026	
<input checked="" type="checkbox"/>	M/W Cable/18GHz10m	“	“	6027	
<input checked="" type="checkbox"/>	M/W Cable/2GHz43m	Thermax	MS-P400		
<input type="checkbox"/>	Color monitor/composit	Samsung	SCM-14		
<input checked="" type="checkbox"/>	AC/DC Adaptor	SAMJIN	120V AC/ 9V DC		FCC

4.5 Connection of EUT

Conducted Emission



Radiated emission



EUT	Funtional Natural Sounds Device (R-1265)
AE	AC/DC adaptor (Linear type - supplied by manufacturer)
LISN	Line Impedance Stabilization Network (ESH3-Z5)
ANT	TRILOG Antenna (VULB9163)

5. Result of Measurement

5.1 Conducted Emission

5.1.1 Test data

Frequency [MHz]	Line	Limit [dB μ V]		Reading [dB μ V]		Factor [dB]	Margin [dB μ V]	
		QP	AV	QP	AV		QP	AV
<i>All of measured data were detected with enough margins (20dB or more) from the limit line.</i>								

* Factor = LISN Factor + Cable loss + Pulse limiter(10dB).

5.1.2 Result

Complied

5.2 Radiated Emission

5.2.1 Test data

Frequency	Reading	POL.	Antenna Height	Factor	Limit	Margin
MHz	dB μ V/m		m	dB	dB μ V/m	dB μ V/m
142.700	17.77	V	1.1	9.64	43.50	16.09
144.000	25.77	V	1.0	9.66	43.50	8.07
147.450	27.13	V	1.3	9.73	43.50	6.64
528.000	18.68	H	1.4	21.52	46.00	5.80
528.050	17.75	H	1.5	21.52	46.00	6.73
528.100	13.70	H	1.7	21.52	46.00	10.78
720.050	11.13	H	2.5	24.14	46.00	10.73

* Detector function was set into Quasi-peak mode.

* Factor = Antenna Factor + Cable loss

5.2.1 Result

Complied

6. Attachments

6.1 Sample Label

PRODUCT	Functional Natural Sounds Device	
MODEL	R-1265	
FCC ID	XXXXR-1265	
MANUFACTURER	SAM JIN R&D CO., LTD.	
SERIAL		Made in Korea
POWER RATING	DC 9V 300mA	

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions; (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation...

Labeling Requirements per section 2.925 & 15.19
 The label shown shall be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.



6.2 Photographs of Set-up

Conducted Emission (Front & Rear)



Radiated Emission (Front & Rear)



6.3 Photographs of EUT

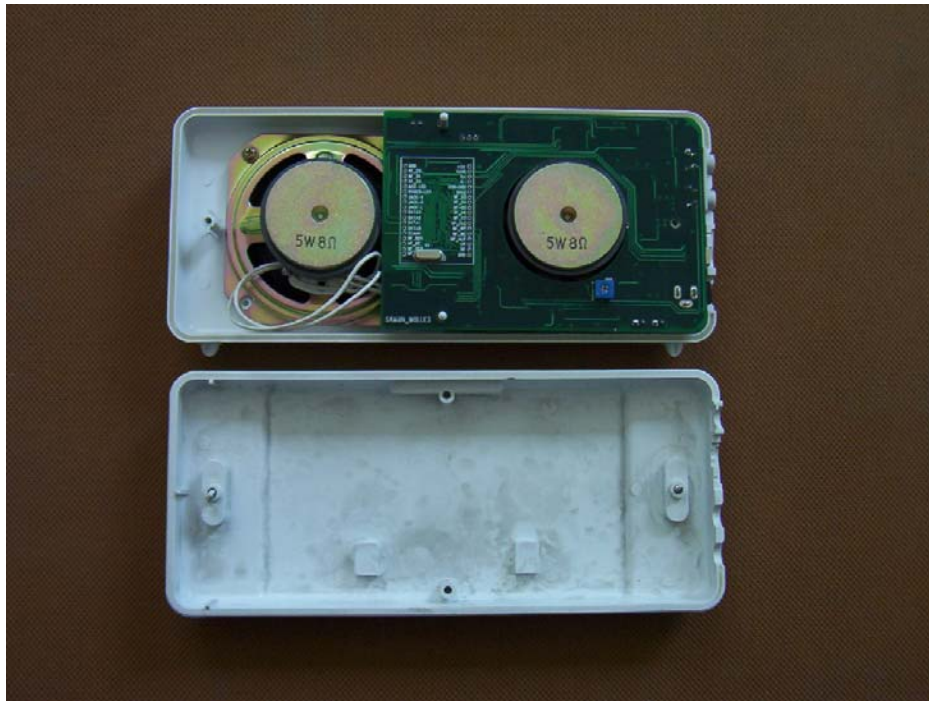
Front / Rear View



Side View (Left & Right)



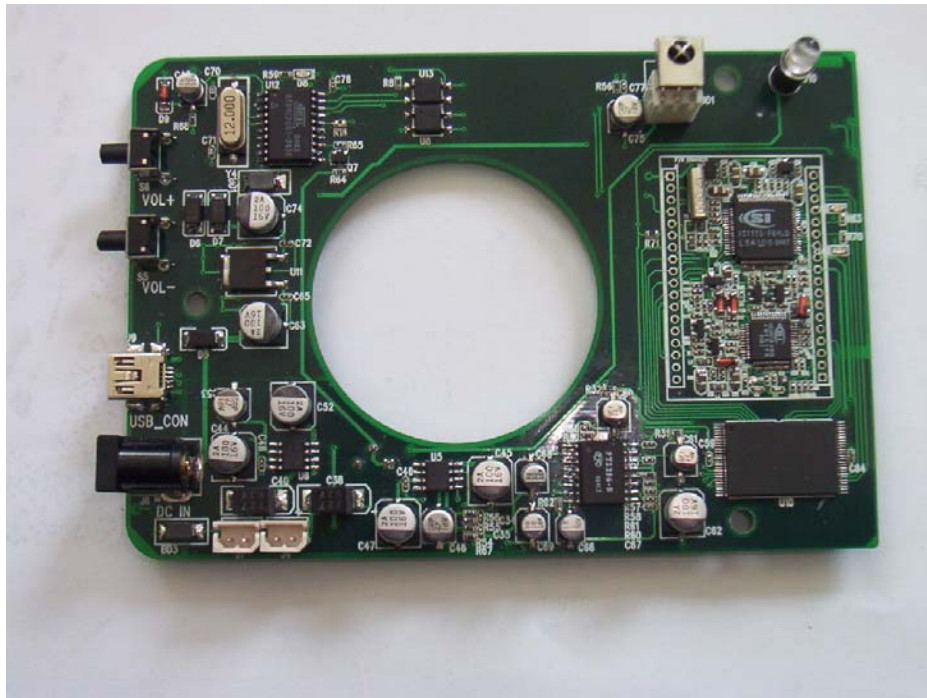
Inside View



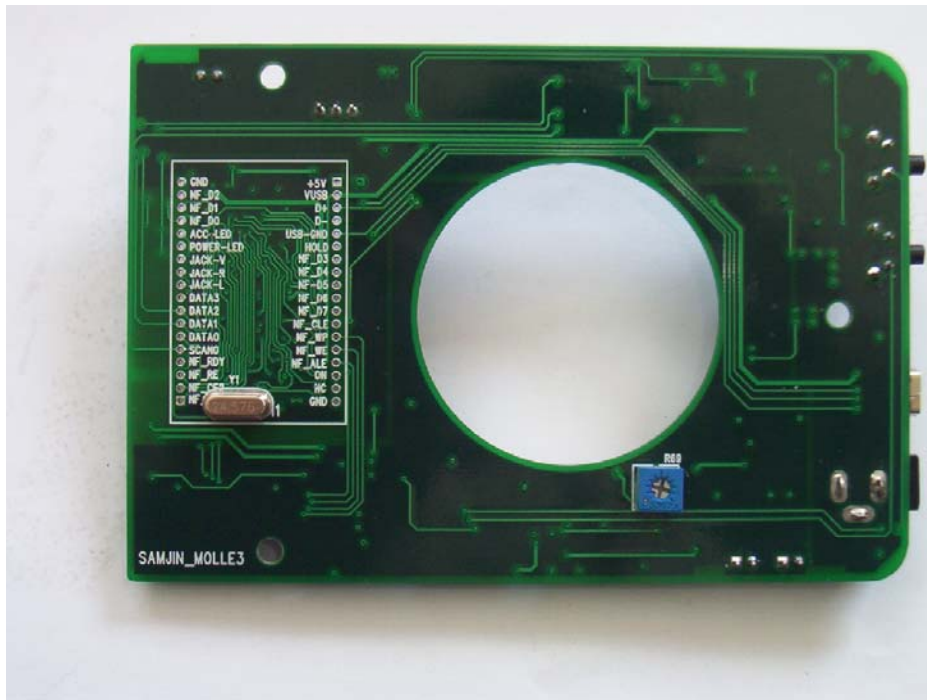
Internal connection



Mainboard (Components side)



Mainboard (Copper side)

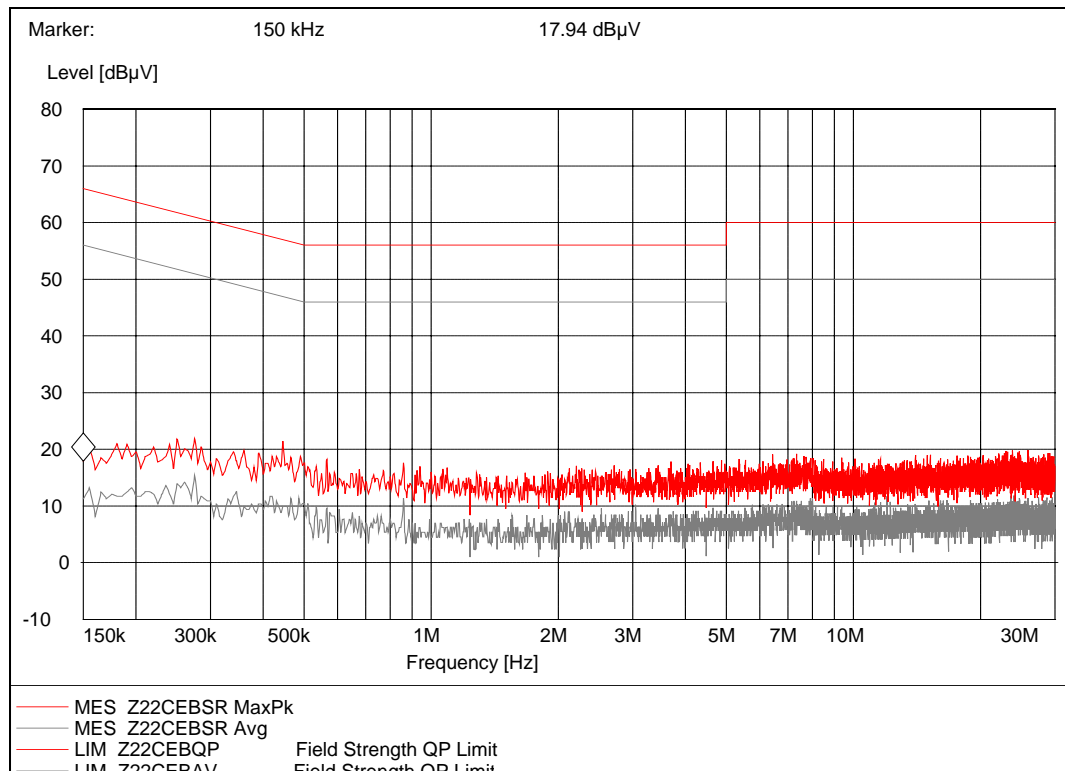


6.4 Data sheet of Conducted Emission

Continuous disturbance measurement Phase L

EUT type/Model	R-1265
Manufacturer	SAM JIN R&D CO., LTD.
Operating condition	Normal
Test site	Shield room
Operator	/kwj
Test Specification	CISPR 22 Class B
Start/Stop frequency	150 KHz ~ 30MHz
Detector/ Measuring time/ IF Band width	5 KHz/ 1 mS / 9 KHz
Transducer / Protector	LISN(ESH3-Z5) / Pulse limiter (ESH3-Z2)

Unit: dB μ V

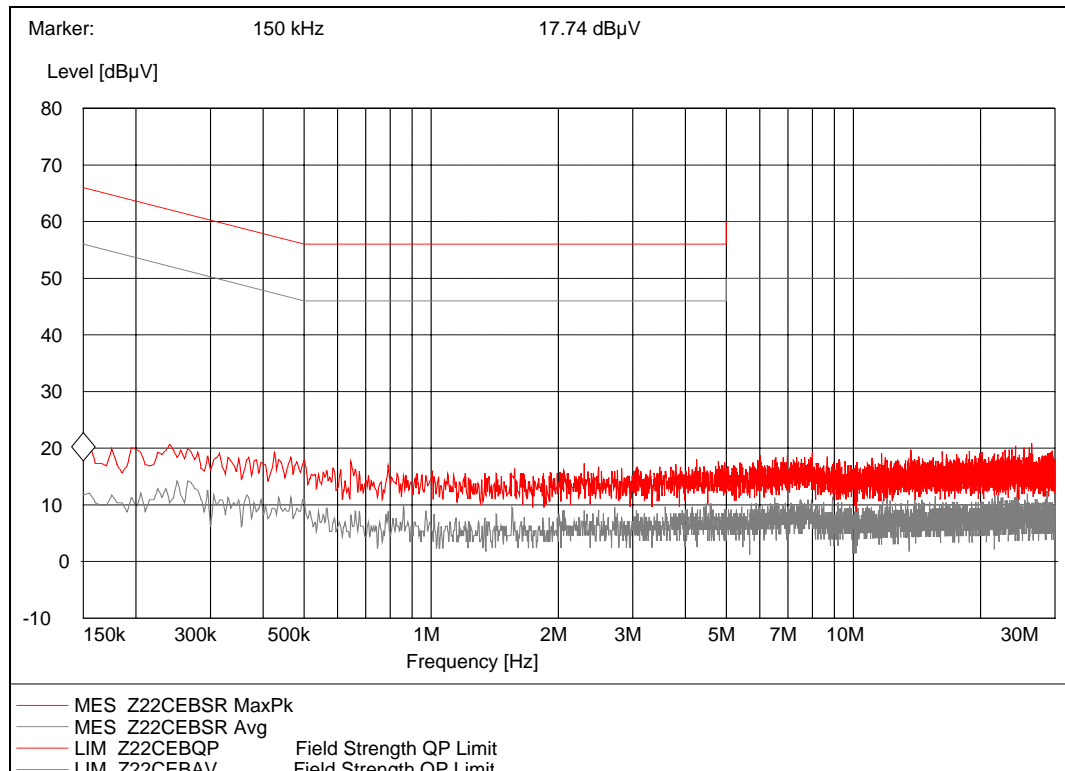


- * Measurement curve shows Max-peak & Average value
- * Limit line shows Quasi-peak & Average value
- * All data were compensated with factors(LISN+Pulse limiter)

Continuous disturbance measurement Phase N

EUT type/Model	R-1265
Manufacturer	SAM JIN R&D CO., LTD.
Operating condition	Normal
Test site	Shield room
Operator	/kwj
Test Specification	CISPR 22 Class B
Start/Stop frequency	150 KHz ~ 30MHz
Detector/ Measuring time/ IF Band width	5 KHz/ 1 mS / 9 KHz
Transducer / Protector	LISN(ESH3-Z5) / Pulse limiter (ESH3-Z2)

Unit: dBuV



- * Measurement curve shows Max-peak & Average value
- * Limit line shows Quasi-peak & Average value
- * All data were compensated with factors(LISN+Pulse limiter)

6.5 Block Diagram

Attached

6.6 User's Manual

Attached