

**DIGITAL EMC CO., LTD.**

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<http://www.digitalemc.com>**CERTIFICATION OF COMPLIANCE**

SAMJIN LND Co., Ltd.

511-43, Youngcheon-ri, Dongtan-Myeon, Hwaseong-si,

Gyeonggi-do, Korea

Dates of Tests: November 9 ~12, 2005

Test Report S/N: DR50110511G

Test Site : DIGITAL EMC CO., LTD.

FCC ID

TSWLZH-100W

APPLICANT

SAMJIN LND Co., Ltd

FCC Classification	:	Low Power Communication Device Transmitter
Device name	:	Car DVD Player
Manufacturer	:	SAMJIN LND Co., Ltd
Model / Brand name	:	LZH-100W / KENWOOD
Test Device Serial number	:	Identical prototype
FCC Rule Part(s)	:	FCC Part 15 Subpart C ANSI C 63.4-2003
Frequency Range	:	88.1 ~ 89.5 MHz
Data of issue	:	November 12, 2005

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.



NVLAP LAB CODE 200559-0

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1. General Information

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".
This laboratory is accredited by NVLAP and NVLAP Lab. Code is 200559-0.

Test By : Engineer

November 12, 2005

Won -Jung LEE



Data

Name

Signature

Report Reviewed By: Manager

November 12, 2005

Harvey Sung



Data

Name

Signature

Ordering party:

Company name : SAMJIN LND Co., Ltd
Address : 511-43, Youngcheon-ri, Dongtan-Myeon, Hwaseong-si,
Zip code : 445-813
City/town : Gyeonggi-do
Country : KOREA
Date of order : November 9, 2005
Attention : Hwa-Jin Jeon(General Manager)

2. Information about test item

TSWLZH-100W

2.1 Equipment information

Equipment model name	LZH-100W
Type of equipment	CAR DVD PLAYER
Frequency band	88.1 ~ 89.5 MHz
Type of antenna	Line Antenna
Power	DC 12 V

2.2 Cabling Configuration

EUT	Shield	Length (m)	Connection
AUX-IN Video	None	1.2	Termination
AUX -IN Audio(R)	None	1.2	Termination
AUX -IN Audio(L)	None	1.2	Termination
Battery + ACC Line	None	1.0	DC power supply
Door Switch Line	None	0.5	open
ILL +	None	0.5	open
ILL -	None	0.5	open

2.3 Tested environment

Temperature	: 15 ~ 35 (°C)
Relative humidity content	: 20 ~ 75 %
Air pressure	: 86 ~ 103 kPa
Details of power supply	: DC 12.0 V (powered by power supply)

TSWLZH-100W

2.4 Tested frequency

Frequency	TX	RX
Low frequency	88.1 MHz	-
High frequency	89.5 MHz	-

Note: Measurements were performed top and bottom location in the frequency range of operation according to the section 15.31(m)

2.5 EMI Suppression Device(s)/Modifications

N/A

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.239	Field Strength of Fundamental and Emissions within permitted band.	< 250 uV @ 3m	Radiated	C
15.209	Radiated Emission	< FCC 15.209 limits	Radiated	C
15.207	AC Conducted Emissions	< FCC 15.207 limits	Line Conducted	NA
15.239	Occupied channel bandwidth	< 200kHz	Radiated	C
15.203	Antenna Requirement	-	-	C
<p>Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable</p> <p>Note 2: Conducted emission test is not applied, because the power of the EUT is supplied from a Car battery.</p> <p>Note 3: The sample was tested according to the following specification:</p> <p style="padding-left: 40px;">FCC Parts 15.239; ANSI C 63.4-2003</p>				

3.2 TEST requirements

3.2.1 Field Strength of Fundamental and Emissions within permitted band.

Procedure:

The field strength of emissions from intentional radiators operated within the bands 88 ~108MHz was measured in accordance with FCC Part §15.239. The test set-up was made according to ANSI C 63.4:2003.

The EUT was placed on a 0.8m high wooden table inside a shielded semi-anechoic chamber. An antenna was placed at 3m distance from EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed at 3m OATS.

Type of Test : Low Power Communication Device Transmitter
 FCC ID : TSWLZH-100W
 Operating Condition : Transmit the 1 kHz audio signal from the test CD.

Measurement Data:

Frequency (MHz)	Pol	Read Level (dBuV/m)	Probe Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
88.1	V	62.50	8.14	1.50	28.33	43.81	48	4.19
89.5	V	63.00	8.14	1.50	28.33	44.31	48	3.69

Note 1: Field Strength Calculation

Level = Read Level + Probe Factor + Cable Loss - Preamp Factor

Margin = Limit - Level

Minimum Standard:

The maximum Field Strength authorized within 200kHz is 250 uV/m@3m

3.2.2 Radiated Emission

Procedure:

The field strength of emissions from intentional radiators operated within the bands 88 ~108MHz was measured in accordance with FCC Part §15.239. The test set-up was made according to ANSI C 63.4:2003.

The EUT was placed on a 0.8m high wooden table inside a shielded semi-anechoic chamber. An antenna was placed at 3m distance from the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed at 3m OATS.

The spectrum analyzer is set to:

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 120 kHz (30MHz ~ 1 GHz)

VBW RBW

= 1 MHz (1 GHz ~ 10th harmonic)

Trace = max hold

Detector function = Peak

Sweep = auto

Receiver Detector = Quasi-Peak

Operating Condition: Transmit the 1 kHz audio signal from the test CD.

Measurement Data: Complies

- Refer to the next page.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data 1 : Harmonics of the 88.0 MHz

Frequency (MHz)	Pol	Read Level (dBuV/m)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
176.20	V	43.50	16.08	3.40	27.94	35.04	43.50	8.46
264.30	V	40.50	18.25	4.15	27.69	35.21	46.00	10.79
352.40	V	41.00	17.59	4.5	27.99	35.10	46.00	10.90
-	-	-	-	-	-	-	-	-

Measurement Data 2: Harmonics of the 89.5 MHz

Frequency (MHz)	Pol	Read Level (dBuV/m)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
179.00	V	43.50	16.15	3.10	27.93	34.82	43.50	8.68
268.50	V	40.00	18.45	4.20	27.68	34.97	46.00	11.03
358.00	V	41.00	17.37	4.50	28.03	34.84	46.00	11.16
-	-	-	-	-	-	-	-	-

Note 1: Field Strength Calculation

Level = Read Level + Probe Factor + Cable Loss - Preamp Factor

Margin = Limit - Level

Note 2.: Up to the 10th harmonics were investigated according to 15.239 and the worst-case emissions are reported.

Measurement Data 3 : other emissions

Frequency (MHz)	Pol	Read Level (dBuV/m)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
124.58	H	47.50	13.24	2.92	28.16	35.50	43.50	8.00
308.88	H	42.50	19.33	4.50	27.68	38.65	46.00	7.35
340.04	H	48.00	18.05	4.50	27.91	42.64	46.00	3.36
350.10	H	45.00	17.66	4.50	27.99	39.17	46.00	6.83
369.50	H	45.00	16.95	4.50	28.11	38.34	46.00	7.66
-	-	-	-	-	-	-	-	-

Note 1: Field Strength Calculation

Level = Read Level + Probe Factor + Cable Loss - Preamp Factor

Margin = Limit - Level

Note 2.: Up to the 10th harmonics were investigated according to 15.239 and the worst-case emissions are reported.

3.2.3 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its normal operating function. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Not Applicable

Conducted emission test is not applied because the power of the EUT is supplied from a Car battery.

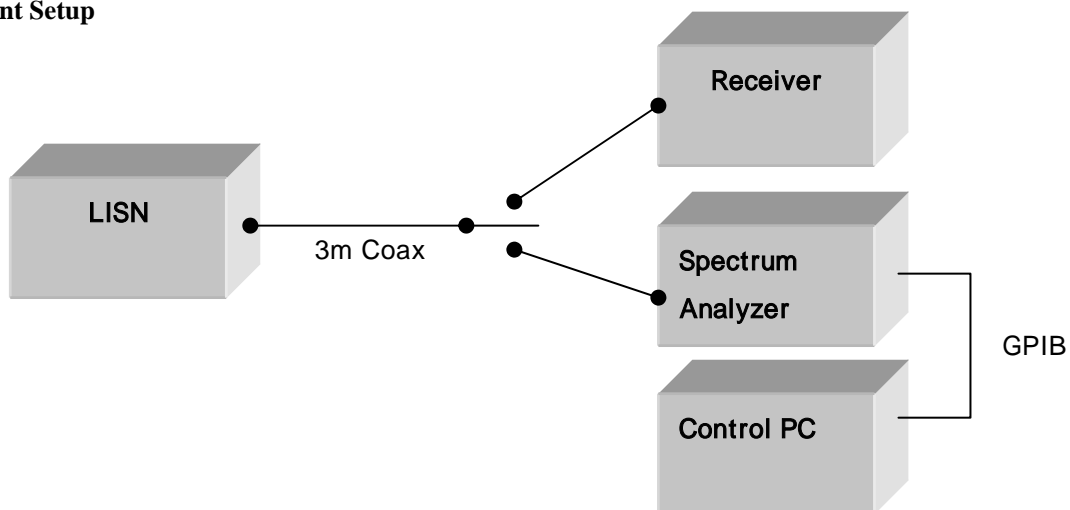
So it is not need to test this requirement,

Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

Measurement Setup



Measurement setup for AC Conducted Emission

3.2.4 Occupied Channel Bandwidth

Procedure:

The occupied channel Bandwidth is defined as the minimum declared bandwidth within which the transmitter's necessary bandwidth can be contained. The transmitter was adjusted to work at the selected channels. The occupied channel BW was measured at an amplitude level reduced from the reference level by the 26dB.

The plot is taken at 30kHz/division frequency span, 10kHz resolution bandwidth and 5dB/division amplitude logarithmic display from a spectrum analyzer.

The spectrum analyzer is set to:

Frequency Range =

RBW = 10 kHz

Trace = max hold

Sweep = auto

VBW RBW

Detector function = Peak

Span = 300 kHz

Operating Condition: Transmit 1kHz audio signal from the test CD

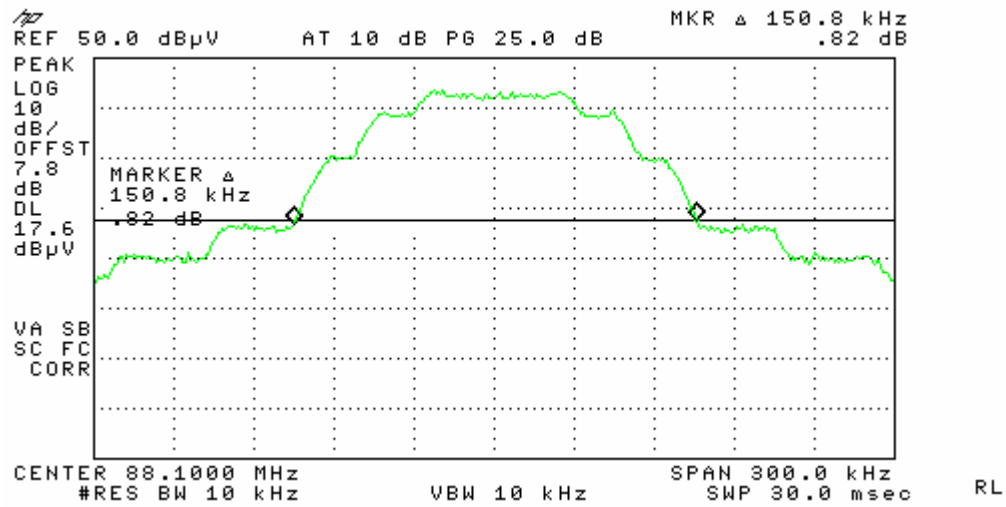
Measurement Data: **Complies**

Refer to the next page.

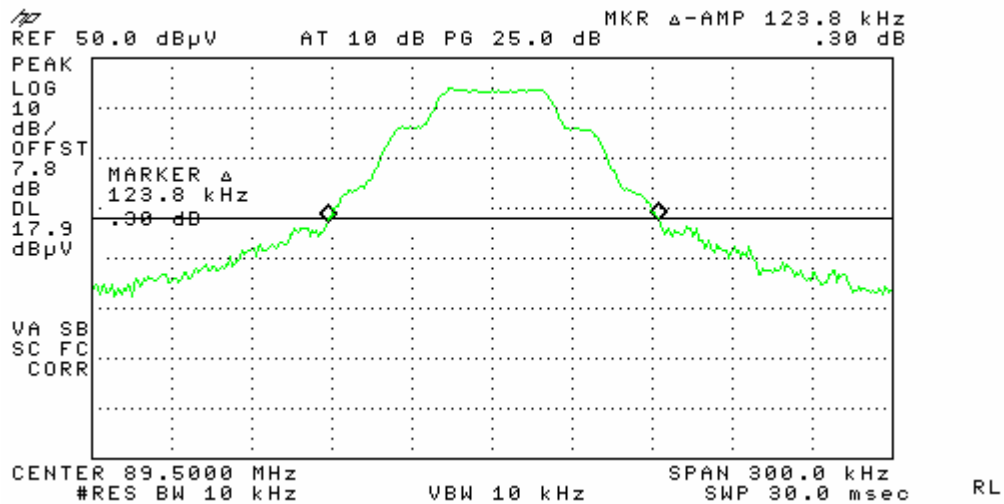
Minimum Standard:

Occupied Channel Bandwidth < 200kHz.

Occupied Channel Bandwidth plot (88.1 MHz)



Occupied Channel Bandwidth plot (89.5 MHz)



3.2.5 Antenna Requirement

Define:

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the applicant can be used with the device. The use of permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with this requirement.

--- **The antenna Type** : Line Antenna with soldering to the PCB.

APPENDIX I

MEASUREMETN UNCERTAINTY

Measurement Uncertainty(CE/RE)

Input Quantity	Probability Distribution	Probability Distribution (dB)	Standard
		9kHz~30MHz	
Cable loss(RG214)	Standard Deviation(SD)	± 0.08	10 th measurement
Receiver corrections; -Voltage accuracy -Attenuation accuracy -Absolute pulse response	Rectangular (3) Rectangular (3) Rectangular (3)	± 0.27 ± 0.1 ± 1.5	Cal. Report Cal. Report Cal. Report (CISPR16-3)
LISN corrections (KNW-242) ; -Voltage division factor	Normal (k=2)	± 0.8	Cal. Report
Mismatch; - Receiver VRC* : $i = 0.2$ -LISN VRC : $g = 0.2(150\text{kHz})$ $= 0.04(30\text{MHz})$ - Uncertainty : $20\log(1 \pm i \quad g)$	U-type (2)	+0.34 -0.35	Cal. Report Cal. Report
System Repeatability	Standard Deviation(SD)	± 0.46	10 th measurement
Combined measurement uncertainty Uc(y)	Normal	+ 1.1 - 1.1	
Expended measurement uncertainty (95%,Confidence level,k=2)dB	Normal(k=2)	+ 2.20 - 2.21	

Input Quantity	Probability Distribution	Measurement Uncertainty(dB)		Standard
		3m	10m	
		Bi-Log	Bi-Log	
Antenna Factor(CBL6112B)	Normal(K=2)	30M~1G: ± 1.5 1G~2G: ± 1.2	30M~1G: ± 1.5 1G~2G: ± 1.2	ANT Cal. uncertainty
Cable loss(RG214/U,HFC12D)	Standard Deviation(SD)	± 0.14	± 0.14	5 th measurement
Receiver corrections; -Voltage accuracy -Attenuation accuracy -Absolute pulse response	3	± 0.19 ± 0.15 ± 0.19	± 0.19 ± 0.15 ± 0.19	Cal. Report
Antenna Directivity	Rectangular (3)	+1.0/-0	+1.0/-0	CISPR16-4
AF height deviations	Rectangular (3)	± 0	± 0	CISPR16-4
Phase center location	Rectangular (3)	± 0	± 0	CISPR16-4
Separation distance	Rectangular (3)	± 0.3	± 0.1	CISPR16-4
Uncertainty of Site	Rectangular (3)	+2.3/-3.17	+2.0/-3.1	NSA
Mismatch -Receiver VRC*: $i=0.2$ -ANT.VRC : $g=0.33$ - Uncertainty $20\log(1 \pm i \quad g=0.33)$	U-type 2	+0.56 -0.59	+0.56 -0.59	Manual
Pre-amp.	K=2	± 0.18	± 0.18	Cal. Report
System Repeatability	Standard Deviation(SD)	± 0.11	± 0.71	5 th repeated measurement
Combined measurement uncertainty Uc(y)	Normal(k=1)	+ 1.7342 - 2.0682	+ 1.7328 - 2.1346	
Expended measurement uncertainty (95%,Confidence level,k=2)dB	K=2	30M~1GHz +3.47 -4.14	30M~1GHz +3.47 -4.27	

APPENDIX II

TEST EQUIPMENT USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4404B	18/04/06	US41061134
02	Spectrum Analyzer	Agilent	E4440A	05/10/07	MY45304199
03	Spectrum Analyzer	H.P	8563E	06/10/07	3551A04634
04	Power Meter	H.P	EPM-442A	04/07/06	GB37170413
05	Power Sensor	H.P	8481A	05/07/06	3318A96332
06	Frequency Counter	H.P	5342A	21/10/06	2119A04450
07	Multifunction Synthesizer	H.P	8904A	21/10/06	3633A08404
08	Signal Generator	Rohde Schwarz	SMR20	17/05/06	101251
09	Signal Generator	H.P	E4421A	05/07/06	US37230529
10	Audio Analyzer	H.P	8903B	07/07/06	3011A0944B
11	Modulation Analyzer	H.P	8901B	05/07/06	3028A03029
12	Oscilloscope	Tektronix	TDS3052	01/10/06	B016821
13	CDMA Mobile Station Test Set	H.P	8924C	21/10/06	US35360688
14	Power Splitter	WEINSCHEL	1593	21/10/06	332
15	BAND Reject Filter	Microwave Circuits	N0308372	21/10/06	3125-01DC0312
16	BAND Reject Filter	Wainwright	WRCG1750	21/10/06	SN2
17	AC Power supply	DAEKWANG	5KVA	18/04/06	N/A
18	DC Power Supply	H.P	6622A	18/04/06	465487
19	Attenuator (30dB)	H.P	8498A	21/10/06	50101
20	Attenuator (10dB)	WEINSCHEL	23-10-34	21/10/06	BP4387
21	HORN ANT	EMCO	3115	06/03/07	6419
22	HORN ANT	EMCO	3115	04/25/07	21097
23	HORN ANT	A.H.Systems	SAS-574	09/11/06	154
24	HORN ANT	A.H.Systems	SAS-574	09/11/06	155

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
25	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	07/07/06	SN-161-4
26	Frequency Converter	Kyorits	KCV-604C	07/07/06	4-230-3
27	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	13/09/06	021031
28	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	29/09/06	1098
29	Biconical Antenna	Schwarzbeck	VHA9103	18/04/06	2233
30	Digital Multimeter	H.P	34401A	18/04/06	3146A13475
31	Attenuator (10dB)	WEINSCHTEL	23-10-34	21/10/06	BP4386
32	High-Pass Filter	ANRITSU	MP526	12/05/06	M27756
33	Attenuator (3dB)	Agilent	8491B	21/10/06	58177
34	Amplifier (25dB)	Agilent	8447D	18/04/06	2944A10144
35	Amplifier (30dB)	Agilent	8449B	21/10/06	3008A01590
36	Position Controller	TOKIN	5901T	N/A	14173
37	Driver	TOKIN	5902T2	N/A	14174
38	Spectrum Analyzer	H.P	8591E	18/04/06	3649A05889
39	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	04/07/06	4N-170-3
40	LISN	Kyorits	KNW-407	11/08/06	8-317-8
41	LISN	Kyorits	KNW-242	11/08/06	8-654-15
42	CVCF	NF Electronic	4400	N/A	344536 4420064
43	Software	ToYo EMI	EP5/RE	N/A	Ver 2.0.800
44	Software	ToYo EMI	EP5/CE	N/A	Ver 2.0.801
45	Software	AUDIX	e3	N/A	Ver 3.0
46	Software	Agilent	Benchlink	N/A	A.01.09 021211
47	Base Station	Agilent	8960	25/03/06	GB43133120