

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

PRODUCT COMPLIANCE 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 www.hctec.co.kr

CERTIFICATION

Manufacture; Nective Co., Ltd. Daeyoung B/D, 44-1, Youido-Dong, Youngdungpo-Gu, Seoul, Korea. Nective FRN : 0006-9069-29	Date of Issue: JUNE 10, 2002 Test Report No.: HCT-F02-0606 Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD. HCT FRN : 0005-8664-21
---	--

FCC ID : QBFNSB101

APPLICANT : Nective Co., Ltd.

FCC Rule Part(s): FCC Part 15.239 Subpart C
Equipment Class: Low Power Communication Device Transmitter(DXX)
Frequency Range: 1 ch , Stereo FM Transmitter 88.3MHz
Standard(s): FCC Class B: 2001
Equipment(EUT) Type: WIRELESS SOUND TRANSMITTER
Model(s): NSB-101
Port/ Connector(s) Antenna port , Audio port , Recharge port

The device bearing the trade name and model specified above, has been shown to comply 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.(See Test Report if any modifications were made for compliance)

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.

HYUNDAI C-Tech. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse of 1988,21 U.S.C.853(a).

Ki Soo Kim

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



TABLE OF CONTENTS

PAGE

1. GENERAL INFORMATION.....	3
1.1 Product Description.....	3
1.2 Related submittal(s)/Grant(s).....	3
1.3 Tested System Details.....	4
1.4 Test Methodology.....	4
1.5 Test Facility.....	4
2. SYSTEM TEST CONFIGURATION.....	5
2.1 Justification.....	5
2.2 EUT Exercise Software.....	5
2.3 Cable Description.....	6
2.4 Noise Suppression Parts on Cable.....	6
2.5 Equipment Modifications.....	7
2.6 Configuration of Tested System.....	7
3. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY.....	8
3.1 Conducted Emission Tests.....	9
3.2 Frequency bandwidth.....	10
3.3 Radiated Power Output.....	11
3.4 Radiated Emission Tests.....	12
3.5 Antenna Requirement.....	13
4. FIELD STRENGTH CALCULATION.....	14
5. LIST OF TEST EQUIPMENT	15

ATTACHMENT A	ID Label / Location Info.
ATTACHMENT B.....	External Photos.
ATTACHMENT C	Block/Circuit Diagram.
ATTACHMENT D	Test Setup Photos.
ATTACHMENT E	User's Manual.
ATTACHMENT F	Internal Photos.
ATTACHMENT G.....	Part List.
ATTACHMENT H.....	Operational Description.
ATTACHMENT I.....	Test Plot(S).

1. GENERAL INFORMATION

1.1 Product Description

The Nective Co., Ltd. Model NSB-101 (referred to as the EUT in this report) is a FM Transmitter . we can enjoy the perfect quality sound using the radio with FM 88.3MHz. Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	PLASTIC
LIST OF EACH OSC. OR XTAL. FREQ.(FREQ. 1MHz)	17.6927MHz
POWER REQUIREMENT	INPUT DC : 6V , 300mA
NUMBER OF LAYERS	MAIN BOARD 2 LAYER
ANTENNA	ROD ANTENNA (170mm)
WEIGHT	42 X 61 X 14mm
TRANSMITTING FREQUENCY	88.32MHz
OPERATING TEMPERATURE	-10 ~ +50

1.2 Related Submittal(s) / Grant(s)

ORIGINAL SUBMITTAL ONLY

1.3 Tested System Details

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

DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
FM Transmitter(EUT)	Nective Co., Ltd	NSB-101	QBFNSB101	HOST
FM Broadcast receiver (HOST)	LG	TS-258	Verification	EUT

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

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 C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 24,2000(Confirmation Number: EA90661)

2.SYSTEM TEST CONFIGURATION

2.1 Justification

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the following components and I/O cards inside the E.U.T were used.

DEVICE TYPE	MANUFACTURE	MODEL/PART NUMBER
MAIN BOARD	NECTIVE	-

2.2 EUT exercise Software

N/A

2.3 Cable Description

DEVICE TYPE	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
FM Transmitter(EUT)	N	N	1.8(P), 0.2(D)
FM Broadcast receiver (HOST)	N	N/A	1.8(P)

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

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

DEVICE TYPE	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
FM Transmitter(EUT)	N	N/A	Y	BOTH END
FM Broadcast receiver (HOST)	N	N/A	Y	BOTH END

2.5 Equipment Modifications

N/A

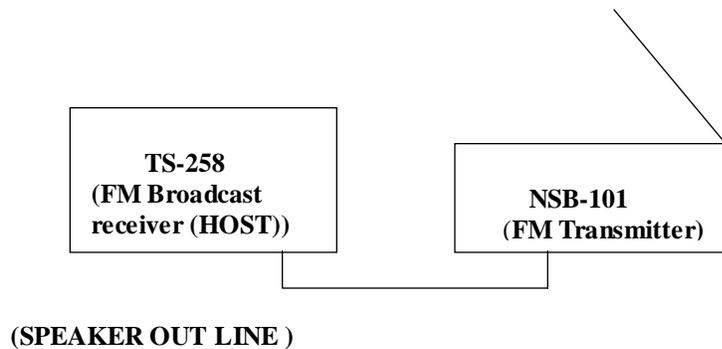
2.6 Configuration of Test system

Line Conducted Test : EUT was connected to LISN, all other supporting equipment were connected to another LISN.

Preliminary Power line Conducted Emission tests were performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test : Preliminary Radiated Emissions tests were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating condition. Final Radiated Emission tests were conducted at 3 meter open area test site.

[Configuration of Tested System]



3. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY

3.1 Conducted Emission Test

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Humidity Level : 40 % Temperature : 22
 Limit apply to : FCC CFR 47, PART 15, SUBPART B
 Type of Tests : CLASS B
 Date : JUNE 3, 2002
 Result : PASSED BY -14.9 dB
 EUT : FM Transmitter / NSB-101

Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)

Line Conducted Emission Tabulated Data

Power Line Conducted Emissions			FCC Class B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.625	22.3	NEUTRAL	48	-25.7
4.985	23.8	HOT	48	-24.2
4.990	21.3	NEUTRAL	48	-26.7
4.995	24.6	NEUTRAL	48	-23.4
5.035	21.9	HOT	48	-26.1
5.040	24.9	HOT	48	-23.1
5.045	21.9	NEUTRAL	48	-26.1
5.090	21.0	NEUTRAL	48	-27.0
13.565	28.5	HOT	48	-28.5
17.670	33.1	HOT	48	-14.9

Kyoung Hee Yoon

Measured by : Kyoung-Hee YOON / Engineer

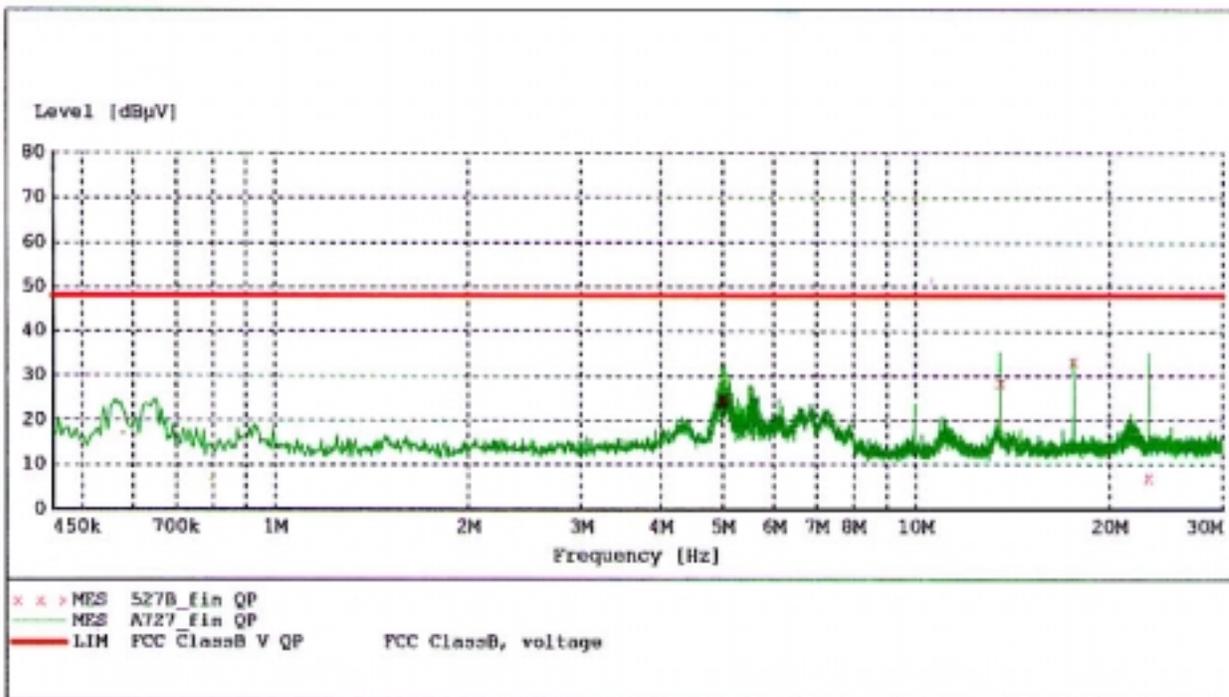
Date : JUNE 3, 2002

**HYUNDAI C-TECH. CO., LTD.
EMC TEST LAB.**

EUT: NSB-101
 Manufacturer: NECTIVE CO., LTD
 Operating Condition: NORMAL CONDITIONS
 Test Site: Shield Room
 Operator: KH, YOON
 Test Specification: FCC Part 15 Class B
 Comment: HOT

SCAN TABLE: "FCC ClassB Voltage"

Short Description:		FCC ClassB Voltage				
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
450.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	CABLE LOSS (NEW)



MEASUREMENT RESULT: "527B_fin QP"

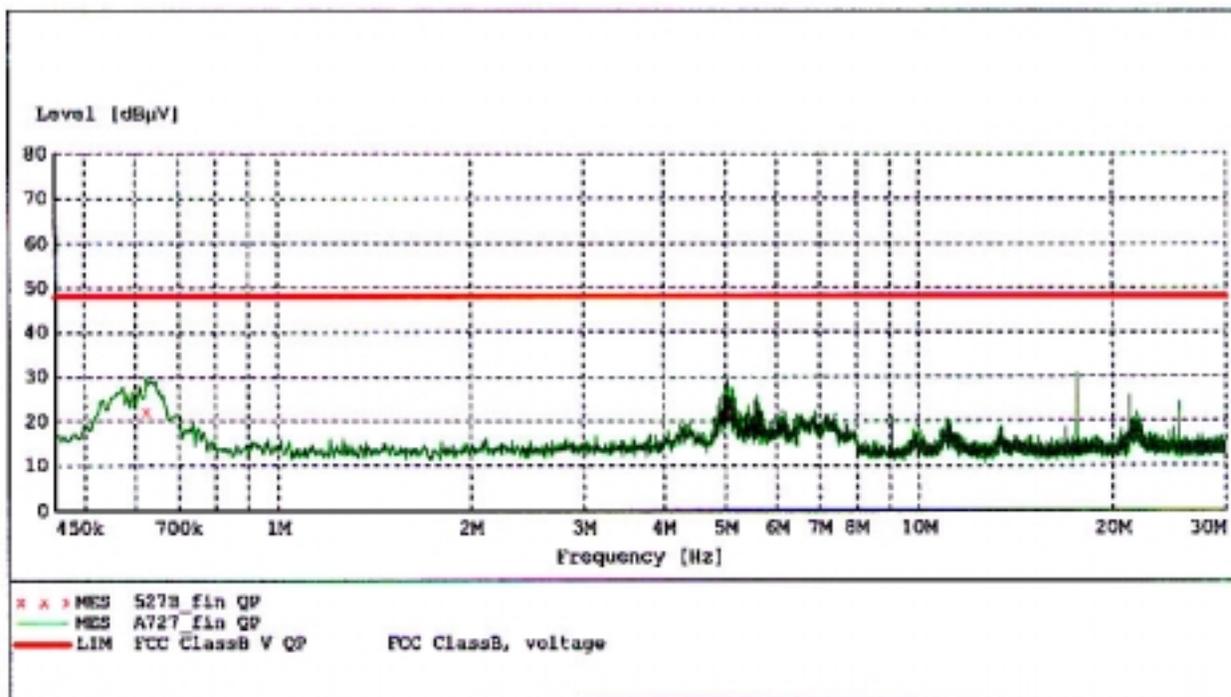
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
4.985000	23.80	0.9	48	24.2	1	---
4.995000	24.60	0.9	48	23.4	1	---
5.040000	24.90	0.9	48	23.1	1	---
13.565000	28.50	1.4	48	19.5	1	---
17.670000	33.10	1.7	48	14.9	1	---
23.080000	7.20	2.0	48	40.8	1	---

HYUNDAI C-TECH. CO., LTD.
EMC TEST LAB.

EUT: NSB-101
 Manufacturer: NECTIVE CO., LTD
 Operating Condition: NORMAL CONDITIONS
 Test Site: Shield Room
 Operator: KH, YOON
 Test Specification: FCC Part 15 Class B
 Comment: NEUTRAL

SCAN TABLE: "FCC ClassB Voltage"

Short Description:		FCC ClassB Voltage				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
450.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	CABLE LOSS (NEW)



MEASUREMENT RESULT: "527B_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.625000	22.30	0.5	48	25.7	1	---
4.990000	21.30	0.9	48	26.7	1	---
5.035000	21.90	0.9	48	26.1	1	---
5.045000	21.90	0.9	48	26.1	1	---
5.090000	21.00	0.9	48	27.0	1	---
17.670000	32.60	1.7	48	15.4	1	---

3.2 Frequency Bandwidth

Refer to the ATTACHMENT I

3.3 Radiated Power Output

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Humidity Level : 41 % Temperature : 24
 Limit apply to : FCC CFR 47, PART 15.239, SUBPART C
 Date : JUNE 4, 2002
 Result : PASSED BY-3.2dB

=====

EUT : FM Transmitter / NSB-101
 Detector : Average Mode (6 dB Bandwidth : 120 KHz)

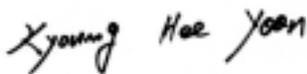
Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
88.3	35.24	7.66	1.90	V	44.8	48.0	-3.2

EUT : FM Transmitter / NSB-101
 Detector : Peak Mode (6 dB Bandwidth : 120 KHz)

Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
88.3	37.94	7.66	1.90	V	47.5	68.0	-20.5

NOTES:

The frequency range investigated during radiated emission test was from 30MHz to 1GHz.



Measured by Kyoung-Hee YOON / Engineer

Date : JUNE 4, 2002

3.4 Radiated Emissions

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Humidity Level : 39 % Temperature : 18
 Limit apply to : FCC CFR 47, PART 15, SUBPART /B
 Type of Tests : CLASS B
 Date : JUNE 4, 2002
 Result : PASSED BY4.2dB

EUT : FM Transmitter / NSB-101
 Detector : CISPR Quasi-Peak Mode (6 dB Bandwidth : 120 KHz)

Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
30.0	11.82	19.78	0.90	V	32.5	40.0	-7.5
35.4	17.03	17.77	1.00	V	35.8	40.0	-4.2
53.1	23.32	9.78	1.50	V	34.6	40.0	-5.4
70.7	26.38	5.62	1.80	V	33.8	40.0	-6.2
106.2	19.02	11.38	2.20	V	32.6	43.5	-10.9
123.8	18.28	13.62	2.40	H	34.3	43.5	-9.2
141.5	16.71	14.59	2.50	V	33.8	43.5	-9.7
159.2	18.03	14.77	2.60	H	35.4	43.5	-8.1
176.9	17.83	15.07	2.70	H	35.6	43.5	-7.9
194.6	17.89	15.51	3.00	V	36.4	43.5	-7.1

NOTES:

The frequency range investigated during radiated emission test was from 30MHz to 1GHz.

Kyoung Hee Yoon

Measured by Kyoung-Hee YOON / Engineer

Date : JUNE 4, 2002

3.5 Antenna Requirement

Since the antenna in the box set is specially manufactured, no other products can be substituted. And the warning statement for using the supplied antenna will be inserted in the User's manual.

CONCLUSION

The Nective CO., LTD. wireless transmitter complies with the antenna requirement having an Rod antenna uniquely designed for the transmitter unit.

4. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor.

The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The 30 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm} [(30 \text{ dBuV/m})/20] = 31.6 \text{ uV/m}$$

5. LIST OF TEST EQUIPMENT

<u>TYPE</u>	<u>MANUFACTURE</u>	<u>MODEL</u>	<u>CAL.DUE DATE</u>	
EMI Test Receiver	Rohde & Schwarz	ESI40	2002.11.5	
EMI Test Receiver	Rohde & Schwarz	ESVS30	2003.3.6	Spectrum
Monitor	Rohde & Schwarz	EZM	N.A	
Graphic Plotter	Rohde & Schwarz	DOP2	N.A	
Printer	Rohde & Schwarz	PDN	N.A	
Spectrum Analyzer	H.P	8591EM	2002.7.11	
LISN	EMCO	3825/2	2003.2.7	
LISN	Rohde & Schwarz	ESH2-Z5	2002.8.12	
Amplifier	Hewlett-Packard	8447E	2003.3.2	
Dipole Antennas	Rohde & Schwarz	VHAP	2002.6.28	
Dipole Antennas	Rohde & Schwarz	UHAP	2002.6.28	
Biconical Antenna	Rohde & Schwarz	BBA-9106	2002.6.28	
Log-Periodic Antenna	Rohde & Schwarz	UHALP-9107	2002.6.26	
Broadband Horn Antenna	Rohde & Schwarz	BBHA 9120 D(1099)	2002.10.26	
Antenna Position Tower	EMCO	1051-12	N.A	
Turn Table	EMCO	1060-06	N.A	
Line Filter	KEENE	ULW 2X30-60	N.A	