

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

PRODUCT COMPLIANCE TEAM
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNKI-DO, 467-701, KOREA
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CERTIFICATION

Manufacture; Nective Co., Ltd. Daeyoung B/D, 44-1, Youido-Dong, Youngdungpo-Gu, Seoul, Korea. Nective FRN : 0006-9069-29	Date of Issue: APRIL 12, 2002 Test Report No.: HCT-F02-0406 Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD. HCT FRN : 0005-8664-21
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FCC ID :**QBFNSB001****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-001
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).



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



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1. GENERAL INFORMATION

1.1 Product Description

The Nective Co., Ltd. Model NSB-001 (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)	22.1184MHz
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-001	QBFNSB001	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	-
POWER BOARD	Dream Electronic Co., Ltd	TCL1008PW

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

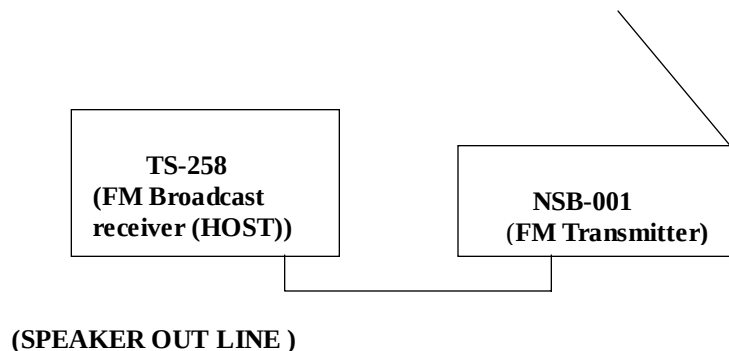
2.6 Configuration of Test system

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 : April 1, 2002
 Result : PASSED BY -10.5 dB
 EUT : FM Transmitter / NSB-001

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)
0.460	16.3	NEUTRAL	48	-31.7
1.415	7.2	HOT	48	-40.8
1.712	6.6	NEUTRAL	48	-41.4
2.420	7.3	NEUTRAL	48	-40.7
3.650	8.1	HOT	48	-39.9
6.945	10.1	HOT	48	-37.9
7.120	10.1	NEUTRAL	48	-37.9
7.405	10.2	NEUTRAL	48	-37.8
7.950	10.7	HOT	48	-37.3
22.080	37.5	HOT	48	-10.5

Young Hae Yoon

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Measured by : Kyoung-Hee YOON / Engineer

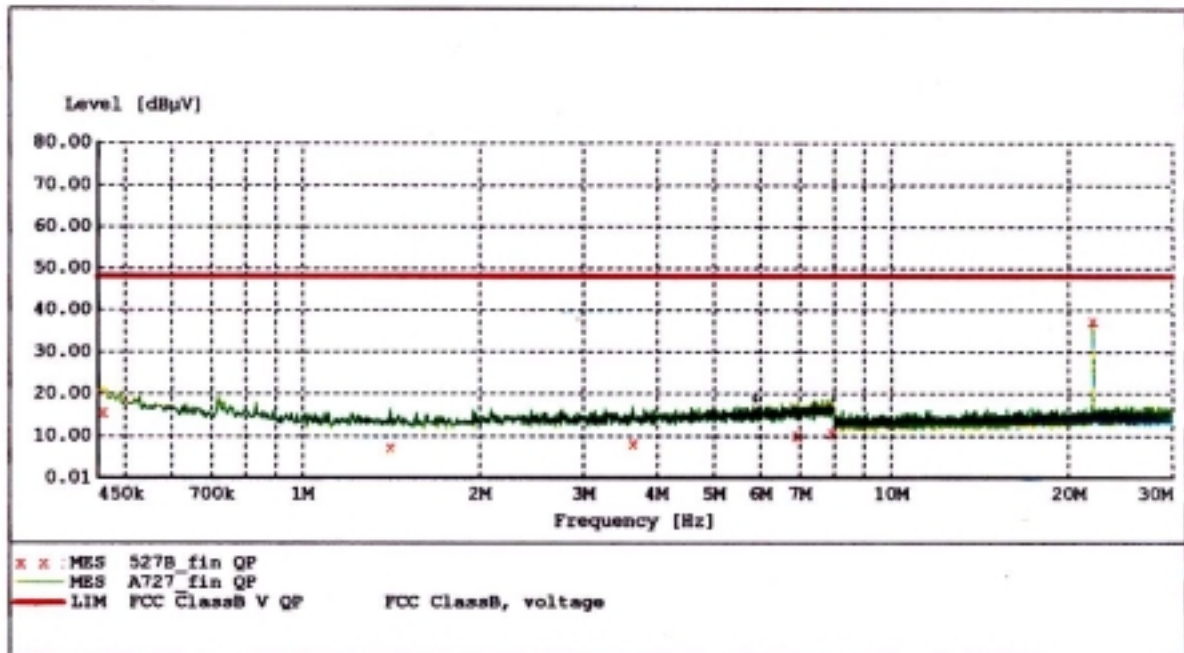
Date : April 1, 2002

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

EUT: NSB-001
 Manufacturer: Nective co., Ltd.
 Operating Condition: NORMAL CONDITIONS
 Test Site: Shield Room
 Operator: Kyoung Hee Yoon
 Test Specification: FCC Class B
 Comment: HOT

SCAN TABLE: "FCC ClassB Voltage"

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


MEASUREMENT RESULT: "527B_fin QP"

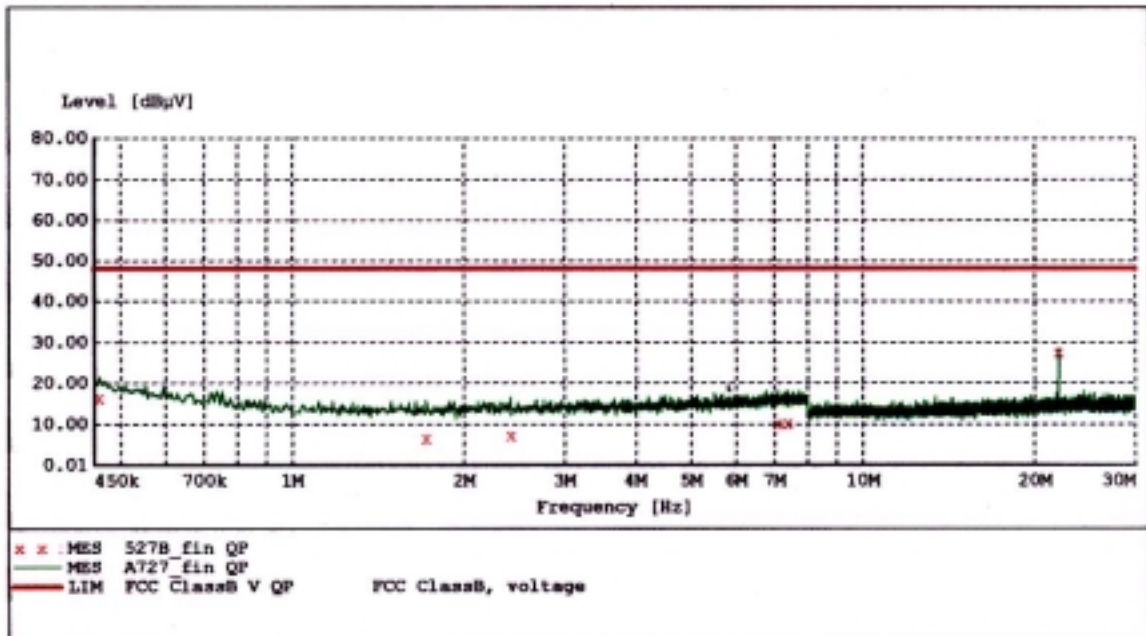
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.460000	15.60	0.5	48	32.4	1	---
1.415000	7.20	0.5	48	40.8	1	---
3.650000	8.10	0.7	48	39.9	1	---
6.945000	10.10	1.1	48	37.9	1	---
7.950000	10.70	1.2	48	37.3	1	---
22.080000	37.50	1.9	48	10.5	1	---

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

EUT: NSB-001
 Manufacturer: Nective co., Ltd.
 Operating Condition: NORMAL CONDITIONS
 Test Site: Shield Room
 Operator: Kyoung Hee Yoon
 Test Specification: FCC 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	MaxPeak			
450.0 kHz	30.0 MHz	5.0 kHz		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
0.460000	16.30	0.5	48	31.7	1	---
1.720000	6.60	0.5	48	41.4	1	---
2.420000	7.30	0.6	48	40.7	1	---
7.120000	10.10	1.1	48	37.9	1	---
7.405000	10.20	1.1	48	37.8	1	---
22.080000	27.60	1.9	48	20.4	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 : 39 % Temperature : 18
 Limit apply to : FCC CFR 47, PART 15.239, SUBPART C
 Date : April 1, 2002
 Result : PASSED BY-3.0dB

=====

EUT : FM Transmitter / NSB-001
 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	35.44	7.66	1.90	V	45.0	48.0	-3.0

EUT : FM Transmitter / NSB-001
 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	38.44	7.66	1.90	V	48.0	68.0	-20.0

NOTES:

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

Kyoung Hee Yoon

Measured by Kyoung-Hee YOON / Engineer

Date : April 1, 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 : April 1, 2002
 Result : PASSED BY-5.4dB

EUT : FM Transmitter / NSB-001
 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
44.2	19.69	13.61	1.30	V	34.6	40.0	-5.4
66.3	25.41	6.39	1.70	V	33.5	40.0	-6.5
102.3	21.47	10.93	2.10	V	34.5	43.5	-9.0
122.5	17.14	13.56	2.40	V	33.1	43.5	-10.4
144.4	15.36	14.64	2.50	V	32.5	43.5	-11.0
166.3	13.02	14.88	2.70	H	30.6	43.5	-12.9
188.3	13.53	15.27	2.80	H	31.6	43.5	-11.9
201.6	14.57	15.83	3.00	H	33.4	43.5	-10.1
408.5	10.34	16.66	4.20	V	31.2	46.0	-14.8
532.3	4.27	19.03	5.20	V	28.5	46.0	-17.5

NOTES:

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

Kyoung Hee Yoon

Measured by Kyoung-Hee YOON / Engineer

Date : April 1, 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
Monitor	Rohde & Schwarz	EZM	N.A	Spectrum
Graphic Plotter	Rohde & Schwarz		DOP2	
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