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FCC PART 15.239 SUPPLEMENTAL IN-CAR TESTING TEST REPORT

Applicant	Wistron NeWeb Corporation
Address	No. 10-1, Li-hsin Road I Science-based Industrial Park Hsinchu, Taiwan
FCC ID	NKRUPAST405
Model Number	ST3/ST4
Product Description	Satellite Receiver with FM Extender
Date Sample Received	October 12, 2006
Date Tested	October 12, 2006
Tested By	Richard Block, Mario de Aranzeta
Approved By	Bruno Clavier
Report Number	2851UT6TestRepot
Test Results	☒ PASS ☐ FAIL

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**



Certificate # 0955-01

TABLE OF CONTENT

STATEMENT OF COMPLIANCE.....	3
REPORT SUMMARY.....	4
TEST SYSTEM SETUP	4
DUT DESCRIPTION	5
EMC EQUIPMENT LIST	6
TEST PROCEDURES	7
RADIATION INTERFERENCE	8

STATEMENT OF COMPLIANCE



Certificate #0955-01

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment does comply with the appropriate standards.

I attest that the necessary measurements were made by me or under my supervision, at TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

Authorized by: Bruno Clavier

Signature: <on file>

Function: Engineer

Date: October 12, 2006

Tested by: Mario de Aranzeta, Richard Block

Signature: <on file>

Date: October 12, 2006

REPORT SUMMARY

Purpose of Report	To demonstrate the DUT in compliance with FCC CFR 47 Part 15.239 requirements for a FM transmitter.
Disclaimer	The test results relate only to the items tested.
Applicable Standards	FCC CFR 47, Pt 15.239, ANSI C63.4-2003
Related Report	Applicant's filing with FCC

TEST ENVIRONMENT

Test Facility	Timco Engineering Inc 849 NW State Road 45 Newberry, FL 32669 USA
Laboratory Condition	Temperature: 26°C, Humidity: 50%

TEST SYSTEM SETUP

Certified System or Supporting Equipment	The DUT was tested in three vehicles respectively. Vehicle 1: Van (Santa Fe) 2003 Vehicle 2: Volvo (S60) 2005 Vehicle 3: Honda (Civic) 2001
Modification to DUT	No modification was made to ensure the DUT in compliance with regulatory requirements
Test Exercise	The DUT was placed in continuous operation mode
Cable	N/A

DUT DESCRIPTION

Manufacturer	Wistron NeWeb Corporation		
DUT	Satellite Receiver with FM Radio Extender		
FCC ID	NKRUPAST405		
Model Number	ST3/ST4		
Serial Number	N/A		
Trade Name	N/A		
Operating Frequency	88.1 ~ 107.9 MHz		
No. of Channels Tested	3		
Max. Output Power	N/A		
Modulation	FM		
DUT Power Source	Vehicle battery operated exclusively		
Test Item	☐ Prototype	☐ Pre-Production	☒ Production
Type of Equipment	☐ Fixed	☐ Mobile	☒ Portable
Antenna Specification	Integrated		

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/27/04	3/26/07
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Antenna: Biconnical	Eaton	94455-1	1057	CAL 12/12/05	12/12/07
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 4/29/05	4/29/07
Analyzer Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/13/05	4/13/07
Analyzer Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 9/5/05	9/5/07
Analyzer Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/13/05	4/13/07
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/06	8/27/08
LISN	Electro-Metrics	EM-7820	2682	CAL 4/28/05	4/28/07
Antenna: Log-Periodic	Eaton	96005	1243	CAL 12/14/05	12/14/07

TEST PROCEDURES

Radiation Interference

The test procedure used was ANSI STANDARD C63.4-2003 using an Agilent spectrum analyzer with a preselector. In the frequency range 10 kHz to 30 MHz the RBW was 10 kHz and from 30-1000 MHz the RBW of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz.

Formula Of Conversion Factors:

The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Pre-selector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz)	Meter Reading	+ ACF	+CL	= FS
33	20 dBuV	+ 10.36 dB/m	+0.40 dB	=30.76 dBuV/m @ 3m

ANSI C63.4-2003 Section 8.2.1 Measurement Procedures:

Measurements were made at a distance of 3 meters from the auto on a minimum of 8 equally spaced radials around the vehicle. The antenna height varied and also placed in a horizontal position.

Vehicle Antenna Mounting:

The external remote antenna was attached as a function of the FM auto antenna arrangement. If a window glass antenna is used the remote antenna is placed adjacent to it and along its length and attached with the adhesive fixtures provided. If a fender mount antenna is used, the remote antenna is placed vertically along the roof support column nearest the car antenna.

Product Tuning:

All controls, manual and software were adjusted to determine the maximum tuning range capabilities. The range was found to be as specified is 88.1 to 107.9 MHz. The modulator input level was set to maximum.

RADIATION INTERFERENCE

Rules Part No.: Pt 15.239

Requirements: Carrier frequency will not exceeds 48.0 dBuV/m at 3m. Out-of-band emissions shall not exceed:

Operating Frequency MHz	Limits dBuV/M measured at 3 meters
30 ~ 88	40.0
88 - 216	43.5
216 - 960	46.0
ABOVE 960	54.0

Test Data: Sample Calculation: $FSdBuV/m = MR(dBuV) + ACFdB$

Vehicle 1 – Hyundai Santa Fe

Vehicle Angle Degrees	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
0	89.7	10.3	V	1.27	11.01	22.58	25.42
0	89.7	12.2	H	1.27	10.35	23.82	24.18
0	97.9	21.8	V	1.33	11.53	34.66	13.34
0	97.9	19.8	H	1.33	10.86	31.99	16.01
0	107.5	25.5	V	1.43	10.9	37.83	10.17
0	107.5	9.3	H	1.43	10.65	21.38	26.62
45	89.7	10.2	V	1.27	11.01	22.48	25.52
45	89.7	11.5	H	1.27	10.35	23.12	24.88
45	97.9	19.8	V	1.33	11.53	32.66	15.34
45	97.9	15.9	H	1.33	10.86	28.09	19.91
45	107.5	16.4	V	1.43	10.9	28.73	19.27
45	107.5	10.5	H	1.43	10.65	22.58	25.42
90	89.7	12.4	V	1.27	11.01	24.68	23.32
90	89.7	10.7	H	1.27	10.35	22.32	25.68
90	97.9	15.8	V	1.33	11.53	28.66	19.34
90	97.9	22.7	H	1.33	10.86	34.89	13.11
90	107.5	18.5	V	1.43	10.9	30.83	17.17
90	107.5	11.4	H	1.43	10.65	23.48	24.52

[Continued]
Vehicle 1 – Hyundai Santa Fe

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
135	89.7	13.2	V	1.27	11.01	25.48	22.52
135	89.7	12.5	H	1.27	10.35	24.12	23.88
135	97.9	20.1	V	1.33	11.53	32.96	15.04
135	97.9	22	H	1.33	10.86	34.19	13.81
135	107.5	14.8	V	1.43	10.9	27.13	20.87
135	107.5	11	H	1.43	10.65	23.08	24.92
180	89.7	13.7	V	1.27	11.01	25.98	22.02
180	89.7	14.6	H	1.27	10.35	26.22	21.78
180	97.9	22.6	V	1.33	11.53	35.46	12.54
180	97.9	19.8	H	1.33	10.86	31.99	16.01
180	107.9	14.1	V	1.43	10.87	26.4	21.6
180	107.9	7	H	1.43	10.63	19.06	28.94
225	89.7	17.1	V	1.27	11.01	29.38	18.62
225	89.7	11.2	H	1.27	10.35	22.82	25.18
225	97.9	20.8	V	1.33	11.53	33.66	14.34
225	97.9	18.6	H	1.33	10.86	30.79	17.21
225	107.5	13.9	V	1.43	10.9	26.23	21.77
225	107.5	11.7	H	1.43	10.65	23.78	24.22
270	89.7	16.9	V	1.27	11.01	29.18	18.82
270	89.7	18.4	H	1.27	10.35	30.02	17.98
270	97.9	21.1	V	1.33	11.53	33.96	14.04
270	97.9	19.8	H	1.33	10.86	31.99	16.01
270	107.5	15.3	V	1.43	10.9	27.63	20.37
270	107.5	13.2	H	1.43	10.65	25.28	22.72
315	89.7	13.6	V	1.27	11.01	25.88	22.12
315	89.7	12.6	H	1.27	10.35	24.22	23.78
315	97.9	18	V	1.33	11.53	30.86	17.14
315	97.9	17.9	H	1.33	10.86	30.09	17.91
315	107.5	20	V	1.43	10.9	32.33	15.67
315	107.5	18.4	H	1.43	10.65	30.48	17.52

Vehicle 2 – Volvo S60 (2005)

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
0	89.7	25.9	V	1.27	11.01	38.18	9.82
0	89.7	22.6	H	1.27	10.35	34.22	13.78
0	97.7	25.7	V	1.33	11.54	38.57	9.43
0	97.7	18.6	H	1.33	10.85	30.78	17.22
0	107.5	33.0	V	1.43	10.90	45.33	2.67
0	107.5	23.5	H	1.43	10.65	35.58	12.42
45	88.7	29.0	V	1.27	10.71	40.98	7.02
45	88.7	33.0	H	1.27	10.19	44.46	3.54
45	97.7	20.9	V	1.33	11.54	33.77	14.23
45	97.7	15.6	H	1.33	10.85	27.78	20.22
45	107.5	30.3	V	1.43	10.90	42.63	5.37
45	107.5	25.1	H	1.43	10.65	37.18	10.82
90	88.7	24.8	V	1.27	10.71	36.78	11.22
90	88.7	24.9	H	1.27	10.19	36.36	11.64
90	97.7	21.5	V	1.33	11.54	34.37	13.63
90	97.7	25.3	H	1.33	10.85	37.48	10.52
90	107.5	27.7	V	1.43	10.90	40.03	7.97
90	107.5	28.8	H	1.43	10.65	40.88	7.12
135	88.7	27.5	V	1.27	10.71	39.48	8.52
135	88.7	26.7	H	1.27	10.19	38.16	9.84
135	97.7	23.9	V	1.33	11.54	36.77	11.23
135	97.7	26.2	H	1.33	10.85	38.38	9.62
135	107.5	32.7	V	1.43	10.90	45.03	2.97
135	107.5	31.8	H	1.43	10.65	43.88	4.12
180	88.7	24.1	V	1.27	11.01	36.38	11.62
180	88.7	28.4	H	1.27	10.35	40.02	7.98
180	97.7	26.5	V	1.33	11.53	39.36	8.64
180	97.7	18.3	H	1.33	10.86	30.49	17.51
180	107.5	33.4	V	1.43	10.90	45.73	2.27
180	107.5	20.2	H	1.43	10.65	32.28	15.72

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Vehicle 2 – Volvo S60 (2005)

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
225	89.7	25.4	V	1.27	11.01	37.68	10.32
225	89.7	26.5	H	1.27	10.35	38.12	9.88
225	97.7	28.6	V	1.33	11.54	41.47	6.53
225	97.7	24.1	H	1.33	10.85	36.28	11.72
225	107.5	31.9	V	1.43	10.90	44.23	3.77
225	107.5	28.8	H	1.43	10.65	40.88	7.12
270	89.7	16.9	V	1.27	11.01	29.18	18.82
270	89.7	18.4	H	1.27	10.35	30.02	17.98
270	97.7	23.0	V	1.33	11.54	35.87	12.13
270	97.7	25.5	H	1.33	10.85	37.68	10.32
270	107.5	24.0	V	1.43	10.90	36.33	11.67
270	107.5	27.6	H	1.43	10.65	39.68	8.32
315	89.7	19.3	V	1.27	11.01	31.58	16.42
315	89.7	21.4	H	1.27	10.35	33.02	14.98
315	97.7	19.7	V	1.33	11.54	32.57	15.43
315	97.7	18.0	H	1.33	10.85	30.18	17.82
315	107.5	28.7	V	1.43	10.90	41.03	6.97
315	107.5	28.9	H	1.43	10.65	40.98	7.02

Vehicle 3 – Honda Civic

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
0	88.7	31.3	V	1.27	10.71	43.28	4.72
0	88.7	14.1	H	1.27	10.19	25.56	22.44
0	97.7	28.7	V	1.33	11.54	41.57	6.43
0	97.7	10	H	1.33	10.85	22.18	25.82
0	107.5	24.7	V	1.43	10.90	37.03	10.97
0	107.5	24.7	H	1.43	10.65	36.78	11.22
45	88.7	27.6	V	1.27	10.71	39.58	8.42
45	88.7	27.4	H	1.27	10.19	38.86	9.14
45	97.7	16.7	V	1.33	11.54	29.57	18.43
45	97.7	9.8	H	1.33	10.85	21.98	26.02
45	107.5	20.6	V	1.43	10.90	32.93	15.07
45	107.5	12	H	1.43	10.65	24.08	23.92
90	88.7	22.8	V	1.27	10.71	34.78	13.22
90	88.7	31	H	1.27	10.19	42.46	5.54
90	97.7	16.6	V	1.33	11.54	29.47	18.53
90	97.7	26.9	H	1.33	10.85	39.08	8.92
90	107.5	22.6	V	1.43	10.90	34.93	13.07
90	107.5	25.1	H	1.43	10.65	37.18	10.82
135	88.7	30.6	V	1.27	10.71	42.58	5.42
135	88.7	25.8	H	1.27	10.19	37.26	10.74
135	97.7	28.3	V	1.33	11.54	41.17	6.83
135	97.7	23.5	H	1.33	10.85	35.68	12.32
135	107.5	29.6	V	1.43	10.90	41.93	6.07
135	107.5	20.9	H	1.43	10.65	32.98	15.02
180	88.7	27.4	V	1.27	11.01	39.68	8.32
180	88.7	17.9	H	1.27	10.35	29.52	18.48
180	97.7	30	V	1.33	11.53	42.86	5.14
180	97.7	14.7	H	1.33	10.86	26.89	21.11
180	107.5	30	V	1.43	10.90	42.33	5.67
180	107.5	20.7	H	1.43	10.65	32.78	15.22

[Continued]
Vehicle 3 – Honda Civic

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
225	88.7	27.1	V	1.27	10.71	39.08	8.92
225	88.7	19.1	H	1.27	10.19	30.56	17.44
225	97.7	29.7	V	1.33	11.54	42.57	5.43
225	97.7	25.7	H	1.33	10.85	37.88	10.12
225	107.5	22.5	V	1.43	10.90	34.83	13.17
225	107.5	18.8	H	1.43	10.65	30.88	17.12
270	88.7	25.5	V	1.27	10.71	37.48	10.52
270	88.7	29.5	H	1.27	10.19	40.96	7.04
270	97.7	9.9	V	1.33	11.54	22.77	25.23
270	97.7	23.3	H	1.33	10.85	35.48	12.52
270	107.5	20.3	V	1.43	10.90	32.63	15.37
270	107.5	22.9	H	1.43	10.65	34.98	13.02
315	88.7	31.4	V	1.27	10.71	43.38	4.62
315	88.7	28.2	H	1.27	10.19	39.66	8.34
315	97.7	13.8	V	1.33	11.54	26.67	21.33
315	97.7	11.4	H	1.33	10.85	23.58	24.42
315	107.5	18.7	V	1.43	10.90	31.03	16.97
315	107.5	22.1	H	1.43	10.65	34.18	13.82