



RADIO TEST REPORT

Test Report No. : 30IE0281-HO-01-R1

Applicant : MITSUBISHI CABLE INDUSTRIES, LTD.
Type of Equipment : Remote Transmitter
Model No. : PZ113-04021
Test regulation : FCC Part 15 Subpart C : 2010
FCC ID : WKE-PZ113-04021
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 30IE0281-HO-01. 30IE0281-HO-01 is replaced with this report.

Date of test:

June 10, 2010

Tested by

K. Kawamura

Keisuke Kawamura
Engineer of EMC Service

Approved by:

T. Hatakeeda

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Leader of EMC Service



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
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<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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| CONTENTS | PAGE |
|--|-------------|
| SECTION 1: Customer information | 3 |
| SECTION 2: Equipment under test (E.U.T.) | 3 |
| SECTION 3: Test specification, procedures & results | 4 |
| SECTION 4: Operation of E.U.T. during testing | 7 |
| SECTION 5: Radiated emission (Electric Field Strength of Fundamental and Spurious Emission) | 8 |
| SECTION 6: Automatically deactivate | 9 |
| SECTION 7: -20dB Bandwidth | 9 |
| APPENDIX 1: Photographs of test setup | 10 |
| Radiated emission | 10 |
| Worst case position | 11 |
| APPENDIX 2: Data of EMI test | 12 |
| Automatically deactivate | 12 |
| Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission) | 13 |
| -20dB Bandwidth | 14 |
| Duty Cycle | 15 |
| APPENDIX 3: Test Instruments | 16 |

SECTION 1: Customer information

| | | |
|------------------|---|--|
| Company Name | : | MITSUBISHI CABLE INDUSTRIES, LTD. |
| Address | : | 1-23-9, Imai-cho, Anjo-City, Aichi-pref. 446-0071, Japan |
| Telephone Number | : | +81-556-97-3222 |
| Facsimile Number | : | +81-556-97-3251 |
| Contact Person | : | Hiroshi Kurumagawa |

<Remarks>

MITSUBISHI CABLE INDUSTRIES, LTD. designates NEC Access Technica, Ltd. as manufacturer of the product (Remote Transmitter).

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

| | | |
|----------------------------|---|---|
| Type of Equipment | : | Remote Transmitter |
| Model No. | : | PZ113-04021 |
| Serial No. | : | Refer to Clause 4.2 |
| Rating | : | DC6.0V (CR 2032 x 2) |
| Receipt Date of Sample | : | June 10, 2010 |
| Country of Mass-production | : | Japan |
| Condition of EUT | : | Production prototype (Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification of EUT | : | No Modification by the test lab |

2.2 Product Description

Model: PZ113-04021 (referred to as the EUT in this report) is a Remote Transmitter (Remote Engine Starter) which commands remotely from the outside of vehicles.

This device is a Specified low-power radio equipment for telecontrol, which has a function of transmitting the command (Start and Stop of Engine, etc.) from the transmitter body.

General Specification

| | | |
|------------------------------------|---|----------------------------------|
| Clock frequency(ies) in the system | : | CPU: 4.915MHz, RF-IC: 14.7456MHz |
|------------------------------------|---|----------------------------------|

Radio Specification

| | | |
|------------------------|---|--------------|
| Radio Type | : | Transmitter |
| Frequency of Operation | : | 426.050MHz |
| Intermediate Frequency | : | 307.2 kHz |
| Modulation | : | GFSK |
| Antenna type | : | Chip Antenna |

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart C: 2010, final revised on January 22, 2010 and effective March 1, 2010

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.231 Periodic operation in the band 40.66 - 40.70MHz
and above 70MHz

3.2 Procedures and results

| Item | Test Procedure | Specification | Worst margin | Results | Remarks |
|--|--|---|---|----------|----------|
| Conducted emission | ANSI C63.4:2003 7. AC powerline conducted emission measurements | Section 15.207 | N/A | N/A*1) | - |
| Automatically Deactivate | ANSI C63.4:2003 13. Measurement of intentional radiators | Section 15.231(a)(1) | N/A | Complied | Radiated |
| Electric Field Strength of Fundamental Emission | ANSI C63.4:2003 13. Measurement of intentional radiators | Section 15.231(b) | 5.7dB 426.050MHz Horizontal, QP | Complied | Radiated |
| Electric Field Strength of Spurious Emission | ANSI C63.4:2003 13. Measurement of intentional radiators | Section 15.205 Section 15.209 Section 15.231(b) | 10.3dB 1704.200MHz Vertical, PK with Duty factor | Complied | Radiated |
| -20dB Bandwidth | ANSI C63.4:2003 13. Measurement of intentional radiators | Section 15.231(c) | N/A | Complied | Radiated |
| Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15. *1) The test is not applicable since the EUT does not have AC Mains. | | | | | |

FCC 15.31 (e)

This test was performed with the New Battery (DC 6.0V: DC3.0 x 2) and the constant voltage was supplied to the EUT during the tests. Therefore, the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

| Test room (semi-anechoic chamber) | Radiated emission (10m*)(±dB) | | |
|--------------------------------------|----------------------------------|------------------|-----------------|
| | 9kHz -30MHz | 30MHz -300MHz | 300MHz -1GHz |
| No.1 | 2.7dB | 4.8dB | 5.0dB |
| No.2 | - | - | - |
| No.3 | - | - | - |
| No.4 | - | - | - |

*10m = Measurement distance

| Test room (semi-anechoic chamber) | Radiated emission | | | | | | |
|--------------------------------------|-------------------|------------------|-----------------|----------------|-----------------|-------------------|-------------------|
| | (3m*)(±dB) | | | | (1m*)(±dB) | | (0.5m*)(±dB) |
| | 9kHz -30MHz | 30MHz -300MHz | 300MHz -1GHz | 1GHz -10GHz | 10GHz -18GHz | 18GHz -26.5GHz | 26.5GHz -40GHz |
| No.1 | 2.9dB | 4.8dB | 5.0dB | 3.9dB | 4.3dB | 4.5dB | 4.3dB |
| No.2 | 3.5dB | 4.8dB | 5.1dB | 4.0dB | 4.2dB | 4.4dB | 4.2dB |
| No.3 | 3.8dB | 4.6dB | 4.7dB | 4.0dB | 4.2dB | 4.5dB | 4.2dB |
| No.4 | 3.5dB | 4.4dB | 4.9dB | 4.0dB | 4.2dB | 4.6dB | 4.2dB |

*3m/1m/0.5m = Measurement distance

Radiated emission test (3m)

The data listed in this test report has enough margin, more than the site margin.

3.5 Test Location

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| | FCC Registration Number | IC Registration Number | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Other rooms |
|----------------------------|-------------------------|------------------------|----------------------------|--|------------------------|
| No.1 semi-anechoic chamber | 313583 | 2973C-1 | 19.2 x 11.2 x 7.7m | 7.0 x 6.0m | No.1 Power source room |
| No.2 semi-anechoic chamber | 655103 | 2973C-2 | 7.5 x 5.8 x 5.2m | 4.0 x 4.0m | - |
| No.3 semi-anechoic chamber | 148738 | 2973C-3 | 12.0 x 8.5 x 5.9m | 6.8 x 5.75m | No.3 Preparation room |
| No.3 shielded room | - | - | 4.0 x 6.0 x 2.7m | N/A | - |
| No.4 semi-anechoic chamber | 134570 | 2973C-4 | 12.0 x 8.5 x 5.9m | 6.8 x 5.75m | No.4 Preparation room |
| No.4 shielded room | - | - | 4.0 x 6.0 x 2.7m | N/A | - |
| No.5 semi-anechoic chamber | - | - | 6.0 x 6.0 x 3.9m | 6.0 x 6.0m | - |
| No.6 shielded room | - | - | 4.0 x 4.5 x 2.7m | 4.75 x 5.4 m | - |
| No.6 measurement room | - | - | 4.75 x 5.4 x 3.0m | 4.75 x 4.15 m | - |
| No.7 shielded room | - | - | 4.7 x 7.5 x 2.7m | 4.7 x 7.5m | - |
| No.8 measurement room | - | - | 3.1 x 5.0 x 2.7m | N/A | - |
| No.9 measurement room | - | - | 8.0 x 4.5 x 2.8m | 2.0 x 2.0m | - |
| No.10 measurement room | - | - | 2.6 x 2.8 x 2.5m | 2.4 x 2.4m | - |
| No.11 measurement room | - | - | 3.1 x 3.4 x 3.0m | 2.4 x 3.4m | - |

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test set up, Data of EMI, Test instruments

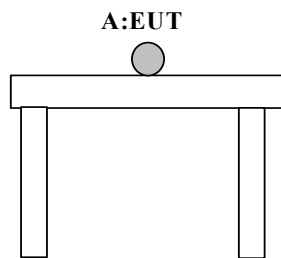
Refer to APPENDIX.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

| Test Item* | Mode |
|---|---|
| Automatically Deactivate Duty Cycle -20dB Bandwidth | Normal use mode |
| Electric Field Strength of Fundamental Emission Electric Field Strength of Spurious Emission | Transmitting mode (Tx) (PN9 continuous transmitting) |
| * The system was configured in typical fashion (as a customer would normally use it) for testing. | |

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT

| No | Item | Model number | Serial number | Manufacturer | Remarks |
|----|--------------------|--------------|------------------|---------------------------|---------|
| A | Remote Transmitter | PZ113-04021 | 23 *1) 14 *2) | NEC Access Technica, Ltd. | EUT |

*1) Used for Transmitting mode (Tx)

*2) Used for Normal use mode

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SECTION 5: Radiated emission (Electric Field Strength of Fundamental and Spurious Emission)

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane. The EUT was set on the center of the tabletop.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

Photographs of the set up are shown in Appendix 1.

The Radiated Electric Field Strength has been measured on Semi anechoic chamber with a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detector function of the test receiver/spectrum analyzer.

Test Antennas are used as below;

| Frequency | Below 30MHz | 30MHz to 300MHz | 300MHz to 1GHz | Above 1GHz |
|--------------|-------------|-----------------|----------------|------------|
| Antenna Type | Loop | Biconical | Logperiodic | Horn |

| | Below or equal to 1GHz *1) | Above 1GHz |
|---------------|----------------------------|--------------------------------|
| Detector Type | QP | Peak and Peak with Duty factor |
| IF Bandwidth | 120kHz | PK: S/A:RBW 1MHz, VBW:3MHz |

*1) The test below 1GHz was performed with QP detect because the transmitting duty was 100% on all tests.

Frequency shift width is 3.7kHz, which is much lower than 120kHz. Therefore, the measurement was performed with duty 100%.

- The carrier level (or, noise levels) was (or were) measured at each position of all three axes X, Y and Z, and the position that has the maximum noise was determined.

With the position, the noise levels of all the frequencies was measured.

*The result is rounded off to the second decimal place, so some differences might be observed.

Measurement range : 30MHz-4.3GHz

Test data : APPENDIX

Test result : Pass

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SECTION 6: Automatically deactivate

Test Procedure

The measurement was performed with Electric field strength using a spectrum analyzer.

Test data : APPENDIX
Test result : Pass

SECTION 7: -20dB Bandwidth

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

| Test | Span | RBW | VBW | Sweep | Detector | Trace | Instrument used |
|----------------|------|-------|-------|-------|----------|----------|-------------------|
| 20dB Bandwidth | 1MHz | 10kHz | 30kHz | Auto | Peak | Max Hold | Spectrum Analyzer |

Test data : APPENDIX
Test result : Pass