



**TEST REPORT CONCERNING THE COMPLIANCE
OF AN IDENTIFICATION AND TIMING SYSTEM,
BRAND AMB-IT, MODEL CHIPX DECODER**

WITH THE FOLLOWING REQUIRMENTS:

47 CFR PART 15 (JULY 10, 2008).

FCC listed : 90828
Industry Canada : 2932G-1
VCCI Registered : R-1518, C-1598
R&TTE, LVD, EMC Notified Body : 1856

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MEASUREMENT/TECHNICAL REPORT

AMB-IT holding B.V.

Model : CHIPX decoder

FCC ID: NXYCHIPX

August 28, 2009

| | | | |
|--|------------------|---------------------------------------|------|
| This report concerns: Original grant/certification Class 2 change Verification | | | |
| Equipment type: | | DCD, Identification and Timing system | |
| Deferred grant requested per 47 CFR 0.457(d)(1)(ii) ? | | | |
| | Yes | No | n.a. |
| Report prepared by: | Name | : Richard van der Meer | |
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The data taken for this test and report herein was done in accordance with 47 CFR Part 15 (July 10, 2008) and the measurement procedures of ANSI C63.4-2003. TÜV Rheinland EPS B.V. at Niekerk, The Netherlands, certifies that the data is accurate and contains a true representation of the emission profile of the Equipment Under Test (EUT) on the date of the test as noted in the test report. I have reviewed the test report and find it to be an accurate description of the test(s) performed and the EUT so tested.

Date: August 28, 2009

Signature:



O. Hoekstra
Senior Engineer telecom, TÜV Rheinland EPS B.V.

Description of test item

Test item : Identification and timing system
Manufacturer : AMB-IT holding B.V.
Brand : AMB-IT
Model(s) : CHIPX decoder
Serial number(s) : 00+04-B7-04-07-D4
Revision : n.a.
Receipt date : August 20, 2009

Applicant information

Applicant's representative : Mr. P. Storm
Company : Champion Chip B.V. / AMB-it B.V.
Address : Havenweg 15
Postal code : 6541 AD
City : Nijmegen
Country : The Netherlands
Telephone number : + 31 24 379 12 44
Telefax number : + 31 24 379 12 45

Test(s) performed

Location : Niekerk
Test(s) started : August 24, 2009
Test(s) completed : August 24, 2009
Purpose of test(s) : Equipment Authorization, Permissive Change 2

Test specification(s) : 47 CFR Part 15 (July 10, 2008)

Test engineers : R. van der Meer 

Report written by : R. van der Meer 

Report date : August 28, 2009

This report is in conformity with NEN-EN-ISO/IEC 17025: 2005

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The test results relate only to the item(s) tested.

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1 General information.

1.1 Product description.

1.1.1 Introduction.

The EUT is an identification and timing system. It consists of a decoder, which transmits a 125 kHz signal via a loop antenna, which is typically buried under a finish line of a racetrack. The transmitted signal triggers a transponder, which sends an identification to the decoder. The Decode time stamps the reception of the transponder. The application is in sport events, such as auto racing.

1.2 Related submittal(s) and/or Grant(s).

None.

1.3 Tested system details.

Details and an overview of the system and all of its components, as it has been tested, may be found below.

| | |
|----------------------|------------------------------------|
| Test item (EUT) | : Identification and timing system |
| Manufacturer | : AMB-IT holding B.V. |
| Brand | : AMB-IT |
| Model | : CHIPX |
| Serial number | : 00-04-B7-04-07-D4 |
| Voltage input rating | : 12 VDC |
| Current input rating | : 500 mA |
| Antenna | : External |
| Frequency | : Tx 125 kHz, Rx = 6.78 MHz |
| Remarks | : - |

| | |
|-----------------------------|------------------------|
| Auxiliary equipment 1 (AE1) | : AC DC adapter |
| Manufacturer | :DVE |
| Brand | :DVE |
| Model | :DSA-0421S-12 1 |
| Serial number | :- |
| Voltage input rating | :100-240VAC 50/60Hz |
| Current input rating | :1.2A |
| Voltage output rating | :+12VDC |
| Current output rating | :2.7A |
| Remarks | :Used to power the EUT |

| | |
|-----------------------------|------------------------------|
| Auxiliary equipment 2 (AE2) | : Loop antenna |
| Manufacturer | : AMB-IT holding B.V. |
| Brand | : AMB-IT |
| Model | : -- |
| Serial number | : -- |
| Remarks | : 12m (length), 0.6m (width) |

Auxiliary equipment 3 (AE3) : Headphone
Brand : Bandridge
Impedance : 32 Ohms
Serial number : --
Remarks : Delivered with the product.

Auxiliary equipment 4 (AE4) :Laptop
Manufacturer :Dell
Brand :Dell
Model :Latitude D505
Serial number :CN-OH2049-48643-44K-1413
Voltage input rating :19.5 Vdc
Current input rating :4.62 A.
Remarks :used on control port.

Auxiliary equipment 5 (AE5) :AC Adapter
Manufacturer :Dell
Brand :Dell
Model :PA-1650-05D
Serial number :CN-05U092-71615-43I-0580
Voltage input rating :100-240 VAC, 50-60 Hz
Current input rating :1.5 A
Remarks :used on AE4

Auxiliary equipment 6 (AE6) : Dummy connection box
Manufacturer : AMB-IT holding B.V.
Brand : AMB-IT
Model :-
Serial number :-
Remarks : With cable 1.50, intended to provide a RS-485 connection to the AUX input of the EUT.

1.3.1 Description of input and output ports.

| Number | Ports | From | To | Length (metres) | Shielding | Remarks |
|--------|--------------|------|-----|-----------------|-----------|---------|
| 1 | DC input | AE1 | EUT | 1.5 | no | - |
| 2 | Ethernet | AE4 | EUT | 1.5 | no | - |
| 3 | RS-485 | AE4 | EUT | 1.5 | yes | - |
| 4 | USB | AE6 | EUT | 1.5 | yes | - |
| 5 | Antenne port | EUT | AE2 | > 3m | yes | - |
| 6 | Headphone | EUT | AE3 | 1.5 | no | - |
| 7 | DC input | AE5 | AE4 | 1.5 | no | - |
| 8 | RS-485 | AE6 | EUT | 1.5 | yes | - |

1.4 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (July 10, 2008), sections 15.205 and 15.209.

The test methods, which have been used, are based on ANSI C63.4: 2003.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters.
Radiated emission tests below 30 MHz were performed at a measurement distance of 3 meters. To calculate the field strength level from these results to the appropriate distance at which the limit is specified, the distance extrapolation factor of 40dB/decade is used.

The receivers are switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

1.5 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland EPS B.V., located in Niekerk, 9822 TL Smidshornerweg 18, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948, per October 23, 2000.

The description of the test facilities has been filed at the Office of the Federal Communications Commission under registration number 90828. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

1.6 Test conditions.

Normal test conditions:

Temperature (*) : +15°C to +35°C
Relative humidity(*) : 20 % to 75 %
Supply voltage : 115VAC/60Hz to the AC/DC Power Supply
Air pressure : 950 – 1050 hPa

When it was impracticable to carry out the tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests are stated separately

2 System test configuration.

2.1 Justification.

The system was configured for testing in a typical fashion (as a customer would normally use it).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4: 2003.

2.2 EUT mode of operation.

The EUT transmits a 125 kHz signal. Upon reception the transponder triggers and sends out a message containing the transponder number. The intentional radiator tests (47 CFR Part 15 sections 15.209) have been performed with a complete functioning EUT and interconnections.

2.3 Special accessories.

No special accessories are used and/or needed to achieve compliance.

2.4 Equipment modifications.

No modifications have been made to the equipment in order to achieve compliance.

2.5 Test software

The test software was used to define various different operational modes of the EUT for the purpose of compliance testing. The version of the test software, as supplied by the applicant and used during all tests is:

| | |
|---------------|-------------------------|
| Test software | Orbits 4 |
| Version | Build 9404 SP2 |
| Brand | AMB i.t. B.V. |
| Platform | Windows XP Professional |

3 Radiated emission data.

3.1 Radiated field strength measurements (30 MHz – 1 GHz, E-field)

| Frequency (MHz) | Measurement results dB(μV)/m @ 3m Quasi-peak | | Limits dB(μV)/m @ 3m Quasi-peak | Result |
|-----------------|--|------------|---------------------------------|-----------|
| | Vertical | Horizontal | | PASS/FAIL |
| 30.0-88.0 | <20 | <15 | 40.0 | PASS |
| 88.0-216.0 | <20 | <15 | 43.5 | PASS |
| 216.0-950.0 | <20 | <15 | 46.0 | PASS |
| > 950.0 | <20 | <15 | 54.0 | PASS |

Table 2 Radiated emissions of the EUT

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.209, are depicted in table 2.

Notes:

1. Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
2. “<<” means that measurement values are much lower than the value determined for the other polarization.
3. The reported field strength values are the worst case values at the indicated frequency. The EUT was varied in three positions, the antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. Resolution bandwidth for QP: 120 kHz
5. Measurement uncertainty is ±5.0dB

Test engineer

Signature :



Name : Richard van der Meer

Date : August 24, 2009

3.2 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field)

| Frequency (MHz) | Measurement results dB μ V | Antenna factor | Cable loss | Measurement results for 30 m (calculated) | Limits Part 15.209 |
|--------------------------|--------------------------------|----------------|------------|---|---------------------|
| | 3 meters | dB | dB | dB(μ V)/m | dB(μ V)/m |
| 0.009 - 0.490 Except: | n.i. | 20.1 | 1 | n.i. | 48.5 – 13.8 (300 m) |
| 0.125 | 70 | 20.1 | 1 | 11.1 | 25.7 (300m) |
| 0.250 | 39 | 20.1 | 1 | -19.9 | 19.6 (300m) |
| 0.375 | 21 | 20.0 | 1 | -38.0 | 16.1 (300m) |
| 0.490 - 1.705 Except: | <15 | 19.7 | 1 | -4.3 | 33.8 - 22.9 (30 m) |
| 0.500 | 16 | 20.0 | 1 | -3.0 | |
| 1.705 – 30.0 | <20 | 20.1 | 1 | 1.1 | 29.5 (30 m) |

Table 4 Radiated emissions of the EUT.

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 sections 15.205 and 15.209, with the EUT operating in continuous transmit mode on 125 kHz, are depicted in table 4.

Notes:

1. Calculated measurement results are obtained by using the distance extrapolation factor of 40dB/decade, antenna factor and cable loss. For example: in the range 1.705 -30 MHz all signals were equal or lower than $20 + 20.1 + 1 - 40 = 1.1$ dB(μ V)/m
2. Frequency range:
 - a. 9- 90 kHz Average detector used during measurements
 - b. 110-490 kHz Average detector used during measurements
 - c. For all other frequency range a quasi-peak detector was used
3. n.i. Indicates that no field strength values could be measured on the listed frequencies or in the listed frequency range.
4. A resolution bandwidth of 9 kHz was used.
5. Field strength values of radiated emissions at frequencies not listed in table 4 are more than 20 dB below the applicable limit
6. The EUT was varied in three positions, the loop antenna was varied in horizontal and vertical orientations and also around it's axis. The reported value is the worst case found at the reported frequency.
7. Measurement uncertainty is ± 5.0 dB

Test engineer

Signature : 

Name : R. van der Meer

Date : August 24, 2009

4 List of utilized test equipment.

| Inventory number | Description | Brand | Model | Last cal. | Next cal. |
|------------------|---------------------------|-----------------|-----------|-----------|-----------|
| 12476 | Antenna mast | EMCO | TR3 | NA | NA |
| 12477 | Antenna mast 1-4 mtr | Poelstra | NA | NA | NA |
| 99580 | Open Area testsite (FCC) | Comtest | NA | 05/2008 | 05/2011 |
| 15453 | Active loopant. 60 cm | Chase | HLA6120 | 05/2009 | 05/2010 |
| 15633 | Biconilog Testantenna | Chase | CBL 6111B | 02/2009 | 02/2010 |
| 99069 | Coax 5m RG213 OATS | NMi Certin B.V. | RG213 | 10/2008 | 10/2009 |
| 99070 | Coax 15m RG213 OATS | NMi Certin B.V. | RG213 | 03/2009 | 03/2010 |
| 99071 | Coax OATS ground | NMi Certin B.V. | NA | 10/2008 | 10/2009 |
| 99161 | Variac | RFT | LTS001 | NA | NA |
| 99547 | Temperature-Humiditymeter | Europe supplies | WS-7082 | 09/2008 | 09/2009 |
| 99699 | Measuring Receiver | R&S | ESCI | 11/2008 | 11/2009 |

NA= Not Applicable