**Test report no. : 241590-1**

**Item tested : SC14SPNODE SF / SC14CVMDECT SF01**

**Type of equipment : UPCS Base Station**

**FCC ID : Y82-SC14D**

**Client : Dialog Semiconductor B.V.**

**FCC Part 15, subpart D**
Isochronous UPCS Device
1920 - 1930 MHz

**Industry Canada RSS-213, Issue 2**
2 GHz Licence-exempt Personal
Communications Service Devices
(LE-PCS)

**28 August 2013**

**Authorized by : .....**
G. Suhanthakumar
Technical Verificator

## CONTENTS

# 1 GENERAL INFORMATION

## 1.1 Testhouse Info

| | |
|---|---|
| Name : | Nemko AS |
| Address : | Nemko Kjeller<br>Instituttveien 6<br>N-2007 Kjeller, NORWAY |
| Telephone : | +47 64 84 57 00 |
| Fax : | +47 64 84 57 05 |
| E-mail: | comlab@nemko.com |
| FCC test firm registration # : | 994405 |
| IC OATS registration # : | 2040D-1 |
| Total Number of Pages: | 16 |

## 1.2 Client Information

| | |
|---|---|
| Name : | Dialog Semiconductor BV. |
| Address : | Het Zuiderkruis 53, 5215MV, ‘s-Hertogenbosch, The Netherlands |

***Contact:***

| | |
|---|---|
| Name : | Frank van den Dungen |
| Telephone : | +31 73 64 08 249 |
| E-mail : | frank.van.den.dungen@diasemi.com |

## 1.3 Manufacturer (if other than client)

Same as client.

# 2 Test Information

## 2.1 Tested Item

| | |
|---|---|
| Name : | Dialog Semiconductor |
| Model name : | SC14SPNODE SF<br>SC14CVMDECT SF01 |
| FCC ID : | Y82-SC14D |
| Industry Canada ID : | 9576A-SC14D |
| Serial number : | / |
| Hardware identity and/or version: | SF01 + REV1 |
| Software identity and/or version : | 8814 |
| Tested to IC Radio Standard (RSS) : | RSS-213 Issue 2, RSS-GEN Issue 3 |
| Test Site IC Reg. Number : | IC 2040D-1 |
| Frequency Range : | 1921.536 – 1928.448 MHz |
| Number of Channels : | 5 RF Channels, 5x12 = 60 TDMA Duplex Channels |
| Type of Modulation : | Digital (Gaussian Frequency Shift Keying) |
| Conducted Output Power : | 100 mW (Peak) |
| Antenna Connector : | None |
| Number of Antennas : | 2 (Internal PCB Antennas) |
| Antenna Diversity Supported : | Yes |

## 2.2 Description of Tested Device

The EUT is a DECT ULE module and is designed to operate as a base station, it is then a responding device as defined in ANSI C63.17 and is designed to operate together with a DECT Portable Part (e.g. a handset or headset), which is then the initiating device. The EUT may also be used as a DECT Portable Part.

## 2.3 Exposure Evaluation

The EUT is defined as a mobile or fixed device and should be used at least 20 cm from any persons.

## 2.4 Test Environment

| | |
|---|---|
| Temperature: | 24 – 26 °C |
| Relative humidity: | 36 – 42 % |
| Normal test voltage: | 5.0 V DC (USB)<br>120 V, 60 Hz (AC Adaptor) |

All tests were performed with the EUT powered from USB.

Power Line Conducted Emissions were tested with an AC Adaptor.

The values are the limit registered during the test period.

## 2.5 Test Period

Item received date: 2013-07-19

Test period : from 2013-07-22 to 2013-07-23

## 2.6 Test Engineer(s)

Frode Sveinsen / Jan G. Eriksen

## 2.7 Test Equipment

See list of test equipment in clause 6.

## 2.8 Other Comments

This test report covers only Power Line Conducted Emissions and Antenna Gain on the new Antenna. All other tests are covered by Nemko test report no. 220131-4 (FCC ID: Y82-SC14S).

The EUT covered by this test report is identical to “FCC ID: Y82-SC14S” except that the version covered by this report has an add-on PCB with an extra antenna.

Both versions may be used as either Fixed Part or Portable Part, but the version covered here (FCC ID: Y82-SC14D) may not be used in applications where it is defined as a Portable Device since the SAR report does not cover the extra antenna.

# 3 TEST REPORT SUMMARY

## 3.1 General

All measurements are traceable to national standards.

The tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC CFR47 Part 15D for Isochronous UPCS Devices and Industry Canada RSS-213 Issue 2 / RSS-GEN Issue 3.

All tests were conducted is accordance with ANSI C63.4-2009 and ANSI C63.17-2006. Antenna Gain tests were made in a 3m fully-anechoic chamber.

A description of the test facility is on file with the FCC and Industry Canada.

| | |
|---|---|
| ☒ New Submission | ☒ Production Unit |
| ☐ Class II Permissive Change | ☐ Pre-production Unit |
| **PUB** Equipment Code | ☐ Family Listing |

**THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.**

**Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".**

**TEST REPORT NO: 241590-1**

**TESTED BY :** _____ **DATE: 25 July 2013**

Frode Sveinsen, Chief Enginerer

## 3.2 Test Summary

| **Name of test** | **FCC CFR 47 Paragraph #** | **IC RSS-213 Paragraph #** | **Verdict** |
|---|---|---|---|
| Coordination with fixed microwave | 15.307(b) | N/A | Complies |
| Digital Modulation Techniques | 15.319(b) | 6.1 | Complies |
| Channel Frequencies | 15.303 | 1 | Complies |
| Power Line Conducted Emissions | 15.107(a)<br>15.207(a) | 6.3<br>RSS-GEN 7.2.2 | Complies |
| Output Power and Antenna Gain | 15.319(c)(e),<br>15.31(e) | 6.5 and 4.1(e) | Complies |
| Automatic discontinuation of transmission | 15.319(f) | 4.3.4(a) | Complies |

[1] The client declares that the tested equipment does not implement this provision

[2] Not required if the Conducted Out-of-Band Emissions test is Passed

# 4 TEST RESULTS

## 4.1 Power Line Conducted Emissions

**Para. No.: 15.207 (a)**

| **Test Performed By: Jan G. Eriksen** | **Date of Test: 23 Jul 2013** |
|---|---|

**Measurement procedure:** **ANSI C63.4-2009 using 50 µH/50 ohms LISN.**

**Test Results:** **Complies**

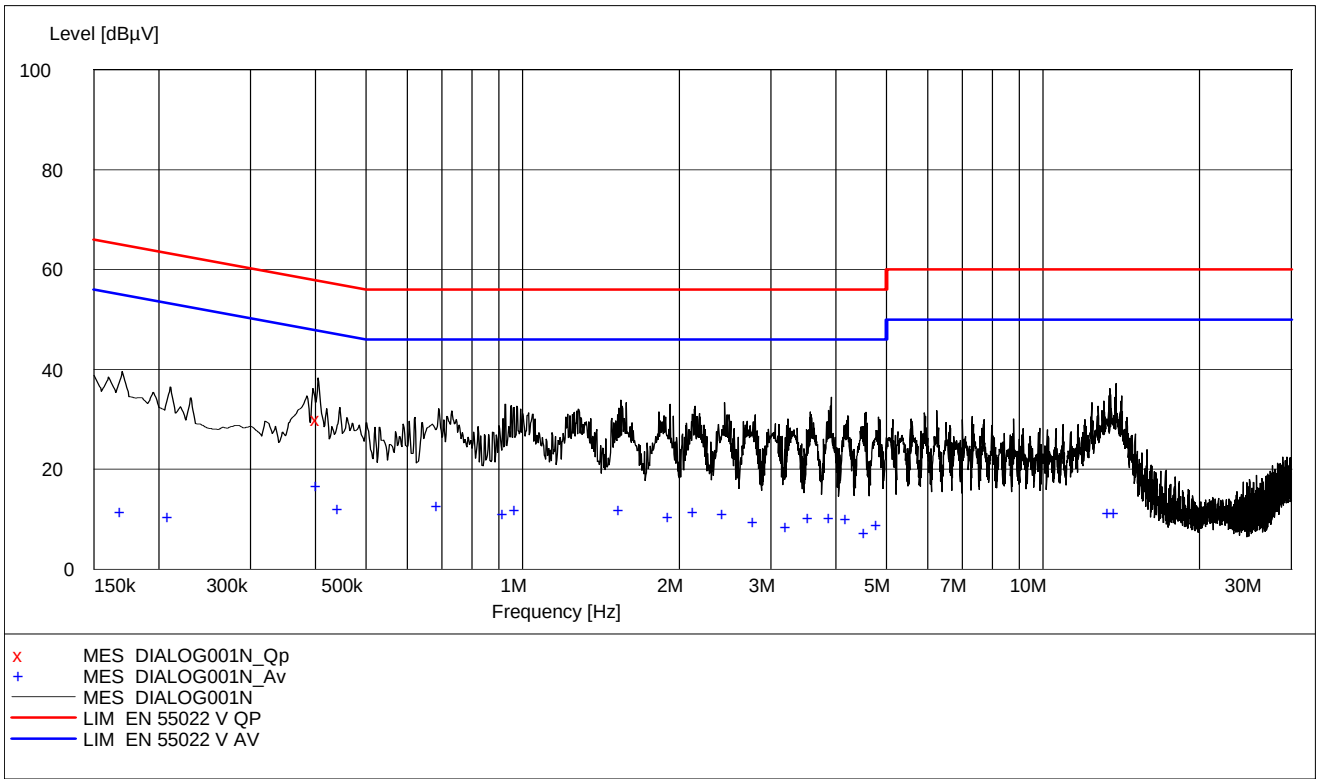
**Measurement Data:** **See attached graph, (Peak detector).**

**Highest measured value (L1 and N):**

**Transmitting:**

| Frequency [MHz] | Level [dBuV] | Af [dB] | Limit [dBuV] | Margin [dB] | Det | Position | Verdict [Pass/Fail] |
|---|---|---|---|---|---|---|---|
| 0.405000 | 30.00 | 10.20 | 57.80 | 27.80 | QP | N | Pass |
| 0.170000 | 11.40 | 10.10 | 55.00 | 43.60 | AV | L1 | Pass |
| 0.210000 | 10.60 | 10.10 | 53.20 | 42.60 | AV | L1 | Pass |
| 0.405000 | 16.60 | 10.20 | 47.80 | 31.20 | AV | N | Pass |
| 0.445000 | 12.10 | 10.20 | 47.00 | 34.90 | AV | N | Pass |
| 0.690000 | 12.70 | 10.20 | 46.00 | 33.30 | AV | N | Pass |
| 0.925000 | 11.00 | 10.20 | 46.00 | 35.00 | AV | N | Pass |
| 0.975000 | 11.80 | 10.20 | 46.00 | 34.20 | AV | N | Pass |
| 1.545000 | 11.80 | 10.20 | 46.00 | 34.20 | AV | N | Pass |
| 1.920000 | 10.50 | 10.20 | 46.00 | 35.50 | AV | N | Pass |
| 2.145000 | 11.40 | 10.30 | 46.00 | 34.60 | AV | N | Pass |
| 2.445000 | 11.10 | 10.30 | 46.00 | 34.90 | AV | N | Pass |
| 2.795000 | 9.40 | 10.30 | 46.00 | 36.60 | AV | N | Pass |
| 3.235000 | 8.50 | 10.30 | 46.00 | 37.50 | AV | N | Pass |
| 3.570000 | 10.40 | 10.30 | 46.00 | 35.60 | AV | N | Pass |
| 3.915000 | 10.30 | 10.40 | 46.00 | 35.70 | AV | N | Pass |
| 4.215000 | 10.10 | 10.40 | 46.00 | 35.90 | AV | N | Pass |
| 4.565000 | 7.40 | 10.40 | 46.00 | 38.60 | AV | N | Pass |
| 4.825000 | 8.90 | 10.40 | 46.00 | 37.10 | AV | N | Pass |
| 13.450000 | 11.30 | 10.70 | 50.00 | 38.70 | AV | N | Pass |
| 13.815000 | 11.30 | 10.80 | 50.00 | 38.70 | AV | N | Pass |

Tested with AC Adaptor Model: SW4310, 120 V AC, 60 Hz.




**EUT Transmitting**

## 4.2 Coordination with fixed microwave

The affidavit from UTAM, Inc. is included in the documentation supplied by the applicant:

☒ Yes ☐ No

**Requirement, FCC 15.307 (b):**

Each application for certification of equipment operating under the provisions of this Subpart must be accompanied by an affidavit from UTAM, Inc. certifying that the applicant is a participating member of UTAM, Inc. In the event a grantee fails to fulfill the obligations attendant to participation in UTAM, Inc., the Commission may invoke administrative sanctions as necessary to preclude continued marketing and installation of devices covered by the grant of certification, including but not limited to revoking certification.

## 4.3 Digital Modulation Techniques

The EUT uses Multi Carrier / Time Division Multiple Access / Time Division Duplex and Digital GFSK modulation. For further details see the operational description provided by the applicant.

**Requirement, FCC 15.319(b):**

All transmissions must use only digital modulation techniques.

## 4.4 Channel Frequencies

| UPCS CHANNEL | FREQUENCY (MHz) |
|---|---|
| **Upper Band Edge** | 1930.000 |
| **0 (Highest)** | 1928.448 |
| **1** | 1926.720 |
| **2** | 1924.992 |
| **3** | 1923.264 |
| **4 (Lowest)** | 1921.536 |
| **Lower Band Edge** | 1920.000 |

**Requirement: FCC 15.303**

Within 1920 -1930 MHz band for isochronous devices.

## 4.5 Automatic Discontinuation of Transmission

| | | |
|---|---|---|
| **Does the EUT transmit Control and Signaling Information[1]?** | | ☒ **YES** ☐ **NO** |
| **TYPE OF EUT[1] :** | ☐ **INITIATING DEVICE** | ☒ **RESPONDING DEVICE** |

The following tests simulate the reaction of the EUT in case of either absence of information to transmit or operational failure after a connection with the companion device is established.

| Number | Test | EUT Reaction | Verdict |
|---|---|---|---|
| | | Operating Mode | |
| 1 | Power removed from the EUT | A | **Pass** |
| 2 | EUT Switch Off | N/A | **Pass** |
| 3 | Hook-On by EUT | N/A | **Pass** |
| 4 | Hook-On by companion device | B | **Pass** |
| 5 | Power Removed from Companion Device | B | **Pass** |
| 6 | Companion Device Switch Off | B | **Pass** |

A - Connection breakdown, Cease of all transmissions
B - Connection breakdown, EUT transmits control and signaling information
C - Connection breakdown, Companion Device transmits control and signaling information
N/A - Not Applicable (the EUT does not have an on/off switch and cannot perform Hook-On)

**Requirements, FCC 15.319(f)**

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

## 4.6 Peak Power Output

**Test Method:**

ANSI C63.17, clause 6.1.2.

**Test Results: Complies**

**Measurement Data:**

**Maximum Conducted Output Power**

| Channel No. | Frequency (MHz) | Maximum Conducted Output Power (dBm) | Maximum Radiated Output Power (dBm) | Maximum Antenna Gain (dBi) |
|---|---|---|---|---|
| **4** | 1921.536 | 20.0 | 19.9 | -0.1 |
| **2** | 1924.992 | 20.0 | 20.0 | 0.0 |
| **0** | 1928.448 | 20.0 | 20.0 | 0.0 |

**Substitution:**

| Frequency MHz | Measured value dBm | Subst. Gen. (incl. corr.) dBm | Attenuator and Cable dB | Gain Subst. Antenna dB | Result dBm |
|---|---|---|---|---|---|
| 1921.536 | 19.0 | 25.6 | -14.0 | 8.3 | 19.9 |
| 1924.992 | 18.9 | 25.7 | -14.0 | 8.3 | 20.0 |
| 1928.448 | 18.9 | 25.7 | -14.0 | 8.3 | 20.0 |

**Result = Subst.Gen. + Attenuator + Cable + Antenna Gain**

The values for Conducted Output Power are from Nemko test report no. 220131-4.

**Limit:**

Conducted: 100 µW x SQRT(*B*) where *B* is the measured Emission Bandwidth in Hz

FCC 15.319(c)(e): 20.8 dBm (120 mW)

RSS-213, Issue 2: 20.4 dBm (110 mW)

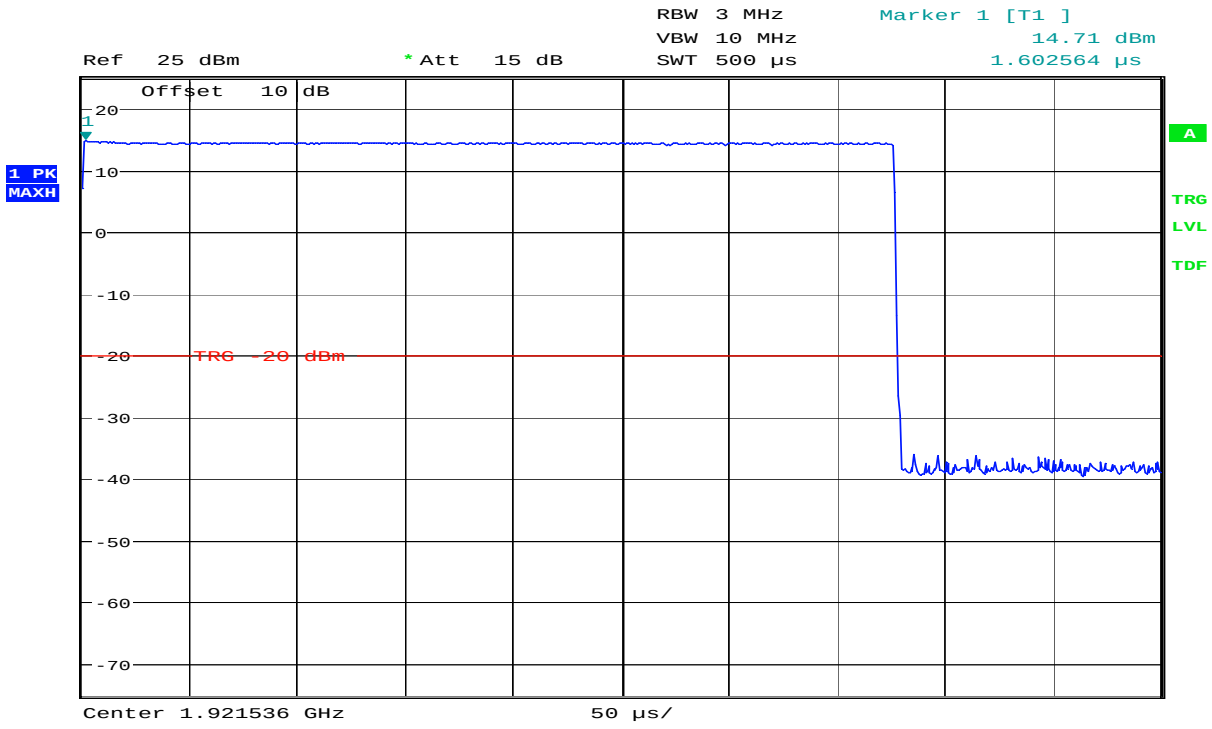
The antenna gain is below 3 dBi, no reduction in transmit power is necessary.

**Requirements, FCC 15.319(c)(e), RSS-213, Issue 2**

Peak transmit power shall not exceed 100 microwatts multiplied by the square root of the emission bandwidth in Hertz.

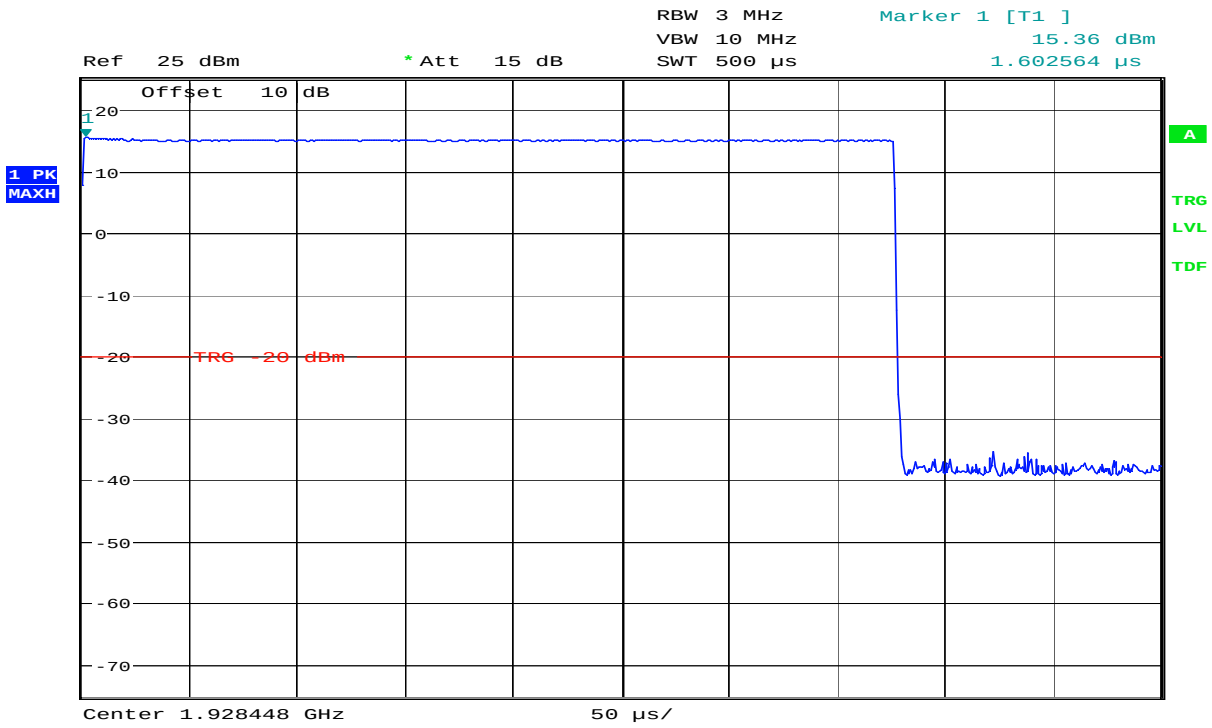
The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

## Radiated Peak Output Power



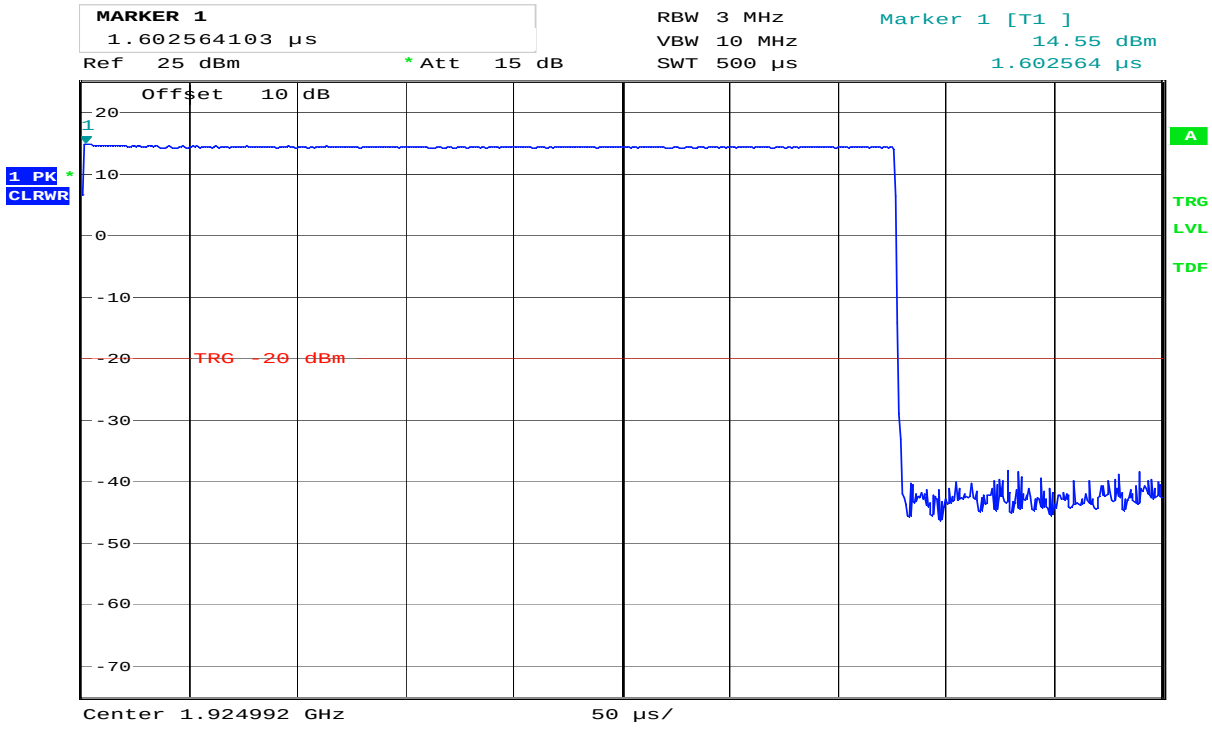

Date: 30.NOV.2012 14:55:27

**Lower Channel (Max: EUT H, HP)**




Date: 30.NOV.2012 14:41:30

**Upper Channel (Max: EUT H, HP)**

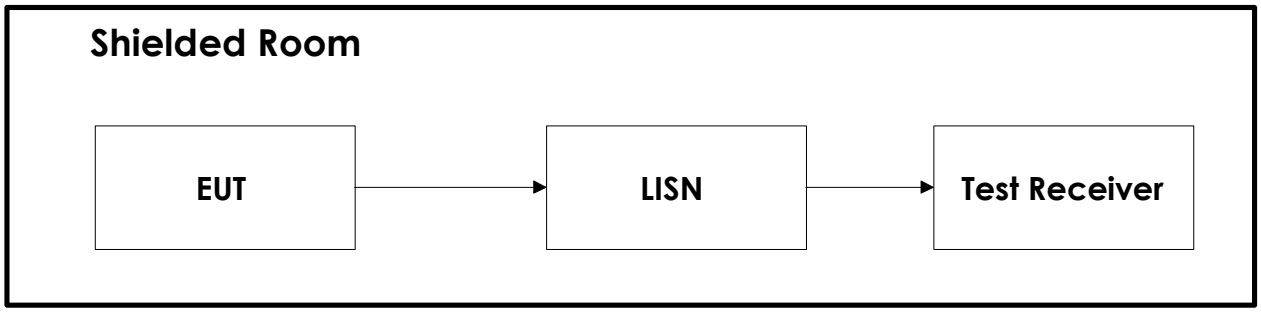



Date: 30.NOV.2012 15:01:11

**Middle Channel (Max: EUT H, HP)**

# 5 Test Setups

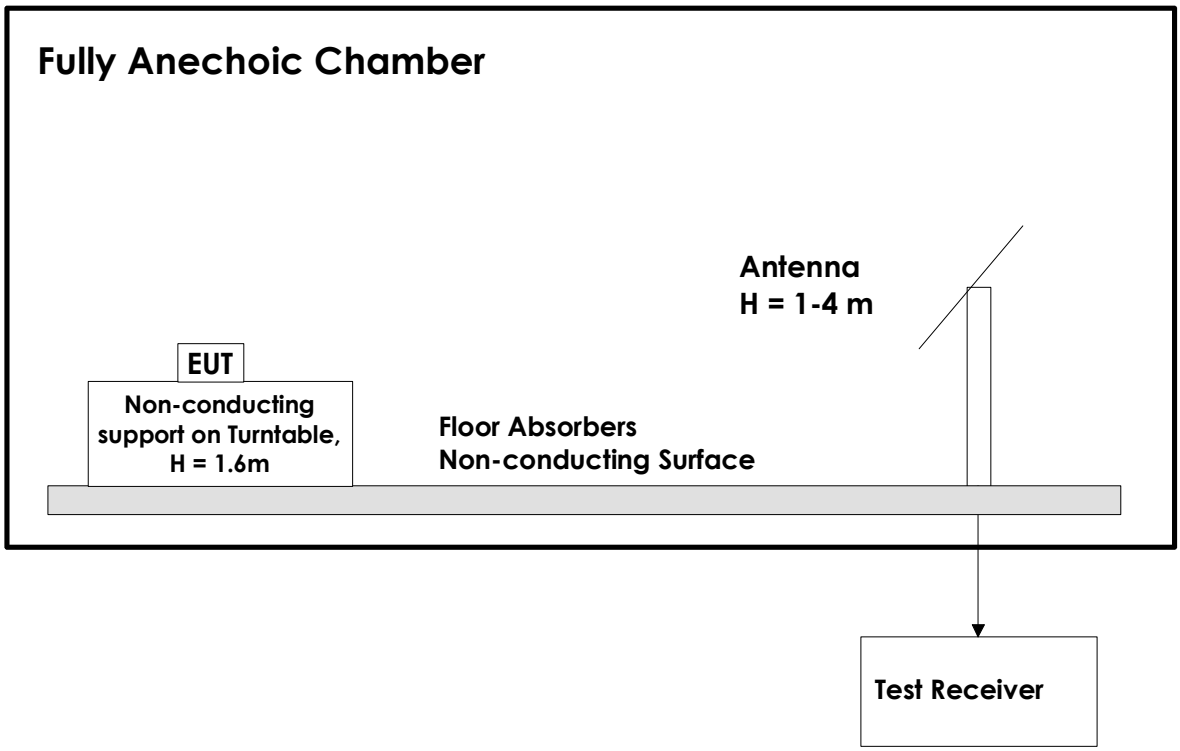
## 5.1 Power Line Conducted Emissions Test




*Test equipment: 8, 17, 19, 22, 27*

**Test Set-Up 5**

## 5.2 Radiated Emissions Test, Fully Anechoic Chamber




*Test equipment: 1, 16, 19, 21, 26, 29, 30*

**Test Set-Up 7**

This test setup is used for measuring radiated output power. The measurements are performed in a 3m Fully Anechoic Chamber with a Spectrum Analyzer and Horn Antenna, a preamplifier may be used after the antenna. The measuring distance is 3m.

# 6 Test Equipment Used

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Testhouse.

| No. | Model number | Description | Manufacturer | Ref. no. | Cal. date | Cal. Due |
|---|---|---|---|---|---|---|
| 1 | FSU26 | Spectrum Analyzer | Rohde & Schwarz | LR 1504 | 2011.11.03 | 2013.11.03 |
| 8 | ESHS10 | Measuring Receiver | Rohde & Schwarz | N- 3528 | 2012-07 | 2013-07 |
| 16 | 3115 | Double Ridged Horn Antenna | EMCO | LR 1226 | N/A | |
| 17 | ESH3-Z5 | Two Line V-Network | Rohde & Schwarz | LR 1076 | 2011.11.03 | 2013.11.03 |
| 19 | 6812B | AC Power Source | Agilent | LR 1515 | N/A | |
| 21 | JS4 | Pre-Amplifier | Miteq | LR 1552 | 2012.09 | 2013.09 |
| 22 | Model 87 V | Multimeter | Fluke | N-4669 | 2012.09.05 | 2013.09.05 |
| 26 | NRP-Z81 | Wideband Power Sensor | Rohde & Schwarz | LR 1644 | 2013.04.05 | 2014.04.05 |
| 27 | ESH3-Z2 | Pulse Limiter | Rohde & Schwarz | LR 285 | 2012.04.24 | 2014.04.24 |
| 29 | Model 7200 | Signal generator | Gigatronics | LR 1188 | 2012.10.31 | 2014.10.31 |
| 30 | 3115 | Double Ridged Horn Antenna | EMCO | LR 1330 | 2010.08.05 | 2015.08.05 |