

**InterLab®**  
**Final Report on**  
**SARA-U260**  
**FCC ID: XPYSARAU260**  
**IC:8595A-SARAU260**

According to:

FCC Part 22, Subpart H and FCC Part 24, Subpart E

**Report Reference:** MDE\_UBLOX\_1404\_FCCa

**Date:** May 20, 2014

**Test Laboratory:**

7Layers AG  
Borsigstr. 11  
40880 Ratingen  
Germany



**Note:**

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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Chairman of the Supervisory Board:  
Peter Mertel  
Vorstand • Board:  
Dr. H.-J. Meckelburg  
Dr. H. Ansorge

Registergericht • registered in:  
Düsseldorf, HRB 44096  
USt-IdNr • VAT No.:  
DE 203159652  
TAX No. 147/5869/0385

## 1 Administrative Data

### 1.1 Project Data

*Project Responsible:* Patrick Lomax  
*Date Of Test Report:* 2014/05/20  
*Date of first test:* 2014/04/23  
*Date of last test:* 2014/05/08

### 1.2 Applicant Data

*Company Name:* u-blox Italia S.p.A.  
*Street:* Via Stazione di Prosecco, 15  
 34010 Sgonico (Trieste)  
*Country:* Italy  
*Contact Person:* Giulio Comar  
*Function:* Wireless Products Certification  
*Department:* Wireless R&D center  
*Phone:* +39 040 2529 400  
*Fax:* +39 040 2529 394  
*E-Mail:* giulio.comar@u-blox.com

### 1.3 Test Laboratory Data

The following list shows all places and laboratories involved for test result generation:

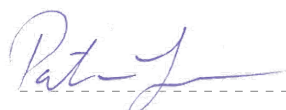
#### 7 layers DE

*Company Name :* 7 layers AG  
*Street :* Borsigstrasse 11  
*City :* 40880 Ratingen  
*Country :* Germany  
*Contact Person :* Mr. Michael Albert  
*Phone :* +49 2102 749 201  
*Fax :* +49 2102 749 444  
*E Mail :* michael.albert@7Layers.de

#### Laboratory Details

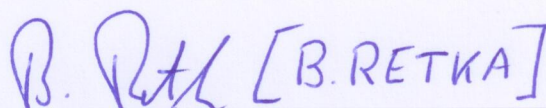
| Lab ID | Identification     | Responsible                             | Accreditation Info                      |
|--------|--------------------|-----------------------------------------|-----------------------------------------|
| Lab 1  | Radiated Emissions | Mr. Robert Machulec<br>Mr. Andreas Petz | DAkKS-Registration no. D-PL-12140-01-01 |
| Lab 2  | Radio Lab          | Mr. Robert Machulec<br>Mr. Andreas Petz | DAkKS-Registration no. D-PL-12140-01-01 |

### 1.4 Signature of the Testing Responsible



Patrick Lomax  
responsible for tests performed in: Lab 1, Lab 2

## 1.5 Signature of the Accreditation Responsible

 [B. RETKA]

Accreditation scope responsible person  
responsible for Lab 1, Lab 2

## 2 Test Object Data

### 2.1 General OUT Description

The following section lists all OUTs (Object's Under Test) involved during testing.

#### OUT: SARA-U260

|                                       |                                                       |
|---------------------------------------|-------------------------------------------------------|
| Type / Model / Family:                | SARA-U260<br>FCC ID: XPYSARAU260<br>IC:8595A-SARAU260 |
| Product Category:                     | Module                                                |
| <b>Manufacturer:</b><br>Company Name: | Please see applicant data                             |
| Contact Person:                       | -                                                     |

#### Parameter List:

| Parameter name                     | Value                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Parameter for Scope FCC_v2:</b> |                                                                                                                  |
| AC Power Supply                    | 120V/60Hz                                                                                                        |
| highest channel                    | 251 (848.8MHz) for GSM850, 810 (1909.8MHz) for GSM1900, 4233 (846.6MHz) for FDD5, 9538 (1907.6MHz) for FDD2      |
| lowest channel                     | 128 (824.2MHz) for GSM850, 512 (1850.2MHz) for GSM1900, 4132 (826.4MHz) for FDD5, 9262 (1852.4MHz)for FDD2 (MHz) |
| mid channel                        | 190 (836.6MHz) for GSM850, 661 (1880.0MHz) for GSM1900, 4183 (836.6MHz) for FDD5, 9400 (1880MHz) for FDD2        |

## 2.2 Detailed Description of OUT Samples

### Sample : AH02

|                           |                 |                     |        |
|---------------------------|-----------------|---------------------|--------|
| <i>OUT Identifier</i>     | SARA-U260       |                     |        |
| <i>Sample Description</i> | Protocol Sample |                     |        |
| <i>Serial No.</i>         | 352253060002929 |                     |        |
| <i>HW Status</i>          | 188BA1          |                     |        |
| <i>SW Status</i>          | 23.05           |                     |        |
| <i>Date of Receipt</i>    | 2014/04/16      |                     |        |
| <i>Low Voltage</i>        | 3.3 V           | <i>Low Temp.</i>    | -20 °C |
| <i>High Voltage</i>       | 4.4 V           | <i>High Temp.</i>   | 55 °C  |
| <i>Nominal Voltage</i>    | 3.8 V           | <i>Normal Temp.</i> | 25 °C  |

## 2.3 OUT Features

### Features for OUT: SARA-U260

| <i>Designation</i>                | <i>Description</i>                                                                                                | <i>Allowed Values</i> | <i>Supported Value(s)</i> |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------|
| <b>Features for scope: FCC_v2</b> |                                                                                                                   |                       |                           |
| AC                                | The OUT is powered by or connected to AC Mains                                                                    |                       |                           |
| Dant                              | removable antenna supplied and type tested with the radio equipment, designed as an example part of the equipment |                       |                           |
| EDGE850                           | EUT supports EDGE in the band 824 MHz - 849 MHz                                                                   |                       |                           |
| EDGE1900                          | EUT supports EDGE in the band 1850 MHz - 1910 MHz                                                                 |                       |                           |
| FDD2                              | EUT supports UMTS FDD2 in the band 1850 MHz - 1910 MHz                                                            |                       |                           |
| FDD5                              | EUT supports UMTS FDD5 in the band 824 MHz - 849 MHz                                                              |                       |                           |
| GSM850                            | EUT supports GSM850 band 824MHz - 849MHz                                                                          |                       |                           |
| HSDPA-FDD2                        | EUT supports UMTS FDD2 HSDPA in the band 1850 MHz - 1910 MHz                                                      |                       |                           |
| HSDPA-FDD5                        | EUT supports UMTS FDD5 HSDPA in the band 824 MHz - 849 MHz                                                        |                       |                           |
| HSUPA-FDD2                        | EUT supports UMTS FDD2 HSUPA in the band 1850 MHz - 1910 MHz                                                      |                       |                           |
| HSUPA-FDD5                        | EUT supports UMTS FDD5 HSUPA in the band 824 MHz - 849 MHz                                                        |                       |                           |
| PantC                             | permanent fixed antenna connector, which may be built-in, designed as an indispensable part of the equipment      |                       |                           |
| PCS1900                           | EUT supports PCS1900 band 1850MHz - 1910MHz                                                                       |                       |                           |

## 2.4 Auxiliary Equipment

| AE No.    | Type Designation | Serial No.  | HW Status    | SW Status | Description       |
|-----------|------------------|-------------|--------------|-----------|-------------------|
| AE USBca1 |                  |             |              |           | USB cable         |
| AE HaFr1  |                  |             | tbd.         |           | Handsfree headset |
| AE ACDC1  | UUX324-1215      | E01-0103700 | 120V/60HZ AC |           | AC/DC adapter     |

## 2.5 Setups used for Testing

For each setup a relation is given to determine if and which samples and auxiliary equipment is used. The left side list all OUT samples and the right side lists all auxiliary equipment for the given setup.

| Setup No.  | List of OUT samples | List of auxiliary equipment |
|------------|---------------------|-----------------------------|
| Sample No. | Sample Description  | AE No. AE Description       |

### S\_AH02

Sample: AH02 Protocol Sample

### S\_AH02\_RSE (RSE setup with ah02 and AC/DC adapter, headset and USB-cable)

Sample: AH02 Protocol Sample

|           |                   |
|-----------|-------------------|
| AE HaFr1  | Handsfree headset |
| AE USBca1 | USB cable         |
| AE ACDC1  | AC/DC adapter     |

## 3 Results

### 3.1 General

#### Documentation of tested devices:

Available at the test laboratory.

#### Interpretation of the test results:

The results of the inspection are described on the following pages, where 'Conformity' or 'Passed' means that the certification criteria were verified and that the tested device is conform to the applied standard.

In cases where 'Declaration' is printed, the required documents are available in the manufacturers product documentation.

In cases where 'not applicable' is printed, the test case requirements are not relevant to the specific equipment implementation.

#### Note:

1. This report contains the abbreviated information content pertaining to services rendered. Supporting documentation not included herein is maintained and available at the laboratory.
2. All tests are performed under environmental conditions within the requirements of the specifications. Environmental conditions are available at the laboratory.

### 3.2 List of the Applicable Body

(Bodies for Scope: FCC\_v2)

| <i>Designation</i>                                | <i>Description</i>                                   |
|---------------------------------------------------|------------------------------------------------------|
| FCC47CFRChIPART22PUBLIC MOBILE SERVICES           | Part 22, Subpart H - Cellular Radiotelephone Service |
| FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES | Part 24, Subpart E - Broadband PCS                   |

### 3.3 List of Test Specification

|                            |                                                                                      |
|----------------------------|--------------------------------------------------------------------------------------|
| <i>Test Specification:</i> | <b>FCC part 2 and 22</b>                                                             |
| <i>Version</i>             | 10-1-12 Edition                                                                      |
| <i>Title:</i>              | PART 2 - GENERAL RULES AND REGULATIONS<br>PART 22 - PUBLIC MOBILE SERVICES           |
| <i>Test Specification:</i> | <b>FCC part 2 and 24</b>                                                             |
| <i>Version</i>             | 10-1-12 Edition                                                                      |
| <i>Title:</i>              | PART 2 - GENERAL RULES AND REGULATIONS<br>PART 24 - PERSONAL COMMUNICATIONS SERVICES |



### 3.4 Summary

Test Case Identifier / Name

| Test (condition)                                                                 | Result | Date of Test | Lab Ref. | Setup      |
|----------------------------------------------------------------------------------|--------|--------------|----------|------------|
| <b>Test Specification: FCC part 2 and 22</b>                                     |        |              |          |            |
| <b>22.1 RF Power Output §2.1046, §22.913</b>                                     |        |              |          |            |
| 22.1; Frequency Band = 850 / FDD5                                                | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| <b>22.2 Frequency stability §2.1055</b>                                          |        |              |          |            |
| 22.2; Frequency Band = 850 / FDD5                                                | Passed | 2014/04/30   | Lab 2    | S_AH02     |
| <b>22.3 Spurious emissions at antenna terminals §2.1051, §22.917</b>             |        |              |          |            |
| 22.3; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz,     | Passed | 2014/05/06   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz      | Passed | 2014/05/06   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz      | Passed | 2014/05/06   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = FDD5, Mode = HSDPA, Channel = 4132, Frequency = 826.4MHz  | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = FDD5, Mode = HSDPA, Channel = 4183, Frequency = 836.6MHz  | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = FDD5, Mode = HSDPA, Channel = 4233, Frequency = 846.6MHz  | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = FDD5, Mode = HSUPA, Channel = 4132, Frequency = 826.4MHz  | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = FDD5, Mode = HSUPA, Channel = 4183, Frequency = 836.6MHz  | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = FDD5, Mode = HSUPA, Channel = 4233, Frequency = 846.6MHz  | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4132, Frequency = 826.4MHz | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4183, Frequency = 836.6MHz | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| 22.3; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4233, Frequency = 846.6MHz | Passed | 2014/05/07   | Lab 2    | S_AH02     |
| <b>22.4 Field strength of spurious radiation §2.1053, §22.917</b>                |        |              |          |            |
| 22.4; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz      | Passed | 2014/04/23   | Lab 1    | S_AH02_RSE |
| 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4183, Frequency = 836.6MHz  | Passed | 2014/05/02   | Lab 1    | S_AH02_RSE |
| 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4183, Frequency = 836.6MHz  | Passed | 2014/05/08   | Lab 1    | S_AH02_RSE |
| 22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4183, Frequency = 836.6MHz | Passed | 2014/04/26   | Lab 1    | S_AH02_RSE |
| <b>22.5 Emission and Occupied Bandwidth §2.1049, §22.917</b>                     |        |              |          |            |
| 22.5; Frequency Band = 850 / FDD5                                                | Passed | 2014/05/06   | Lab 2    | S_AH02     |
| <b>22.6 Band edge compliance §2.1053, §22.917</b>                                |        |              |          |            |
| 22.6; Frequency Band = 850 / FDD5                                                | Passed | 2014/05/06   | Lab 2    | S_AH02     |

### Test Specification: FCC part 2 and 24

| Test Case Identifier / Name<br>Test (condition)                                   | Result | Date of Test | Lab<br>Ref. | Setup      |
|-----------------------------------------------------------------------------------|--------|--------------|-------------|------------|
| <b>24.1 RF Power Output §2.1046, §24.232</b>                                      |        |              |             |            |
| 24.1; Frequency Band = 1900 / FDD 2                                               | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| <b>24.2 Frequency stability §2.1055, §24.235</b>                                  |        |              |             |            |
| 24.2; Frequency Band = 1900 / FDD2                                                | Passed | 2014/04/30   | Lab 2       | S_AH02     |
| <b>24.3 Spurious emissions at antenna terminals §2.1051, §24.238</b>              |        |              |             |            |
| 24.3; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz     | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz     | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz     | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = FDD2, Mode = HSDPA, Channel = 9262, Frequency = 1852.4MHz  | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = FDD2, Mode = HSDPA, Channel = 9400, Frequency = 1880MHz    | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = FDD2, Mode = HSDPA, Channel = 9538, Frequency = 1907.6MHz  | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = FDD2, Mode = HSUPA, Channel = 9262, Frequency = 1852.4MHz  | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = FDD2, Mode = HSUPA, Channel = 9400, Frequency = 1880MHz    | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = FDD2, Mode = HSUPA, Channel = 9538, Frequency = 1907.6MHz  | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9262, Frequency = 1852.4MHz | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9400, Frequency = 1880MHz   | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| 24.3; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9538, Frequency = 1907.6MHz | Passed | 2014/05/07   | Lab 2       | S_AH02     |
| <b>24.4 Field strength of spurious radiation §2.1053, §24.238</b>                 |        |              |             |            |
| 24.4; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz     | Passed | 2014/04/26   | Lab 1       | S_AH02_RSE |
| 24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9400, Frequency = 1880MHz    | Passed | 2014/05/02   | Lab 1       | S_AH02_RSE |
| 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9400, Frequency = 1880MHz    | Passed | 2014/05/08   | Lab 1       | S_AH02_RSE |
| 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9400, Frequency = 1880MHz   | Passed | 2014/04/25   | Lab 1       | S_AH02_RSE |
| <b>24.5 Emission and Occupied Bandwidth §2.1049, §24.238</b>                      |        |              |             |            |
| 24.5; Frequency Band = 1900 / FDD2                                                | Passed | 2014/05/06   | Lab 2       | S_AH02     |
| <b>24.6 Band edge compliance §2.1053, §24.238</b>                                 |        |              |             |            |
| 24.6; Frequency Band = 1900 / FDD2                                                | Passed | 2014/05/06   | Lab 2       | S_AH02     |



### 3.5 Detailed Results

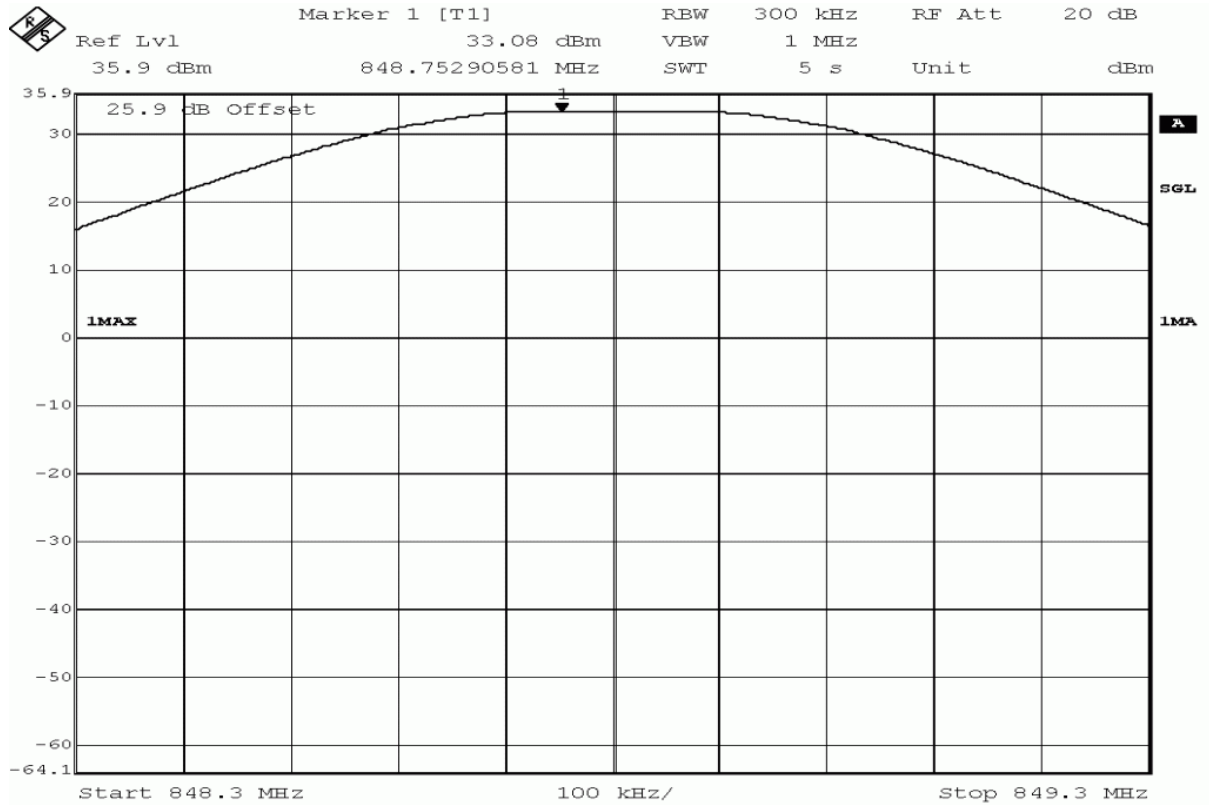
#### 3.5.1 22.1 RF Power Output §2.1046, §22.913

**Test: 22.1; Frequency Band = 850 / FDD5**

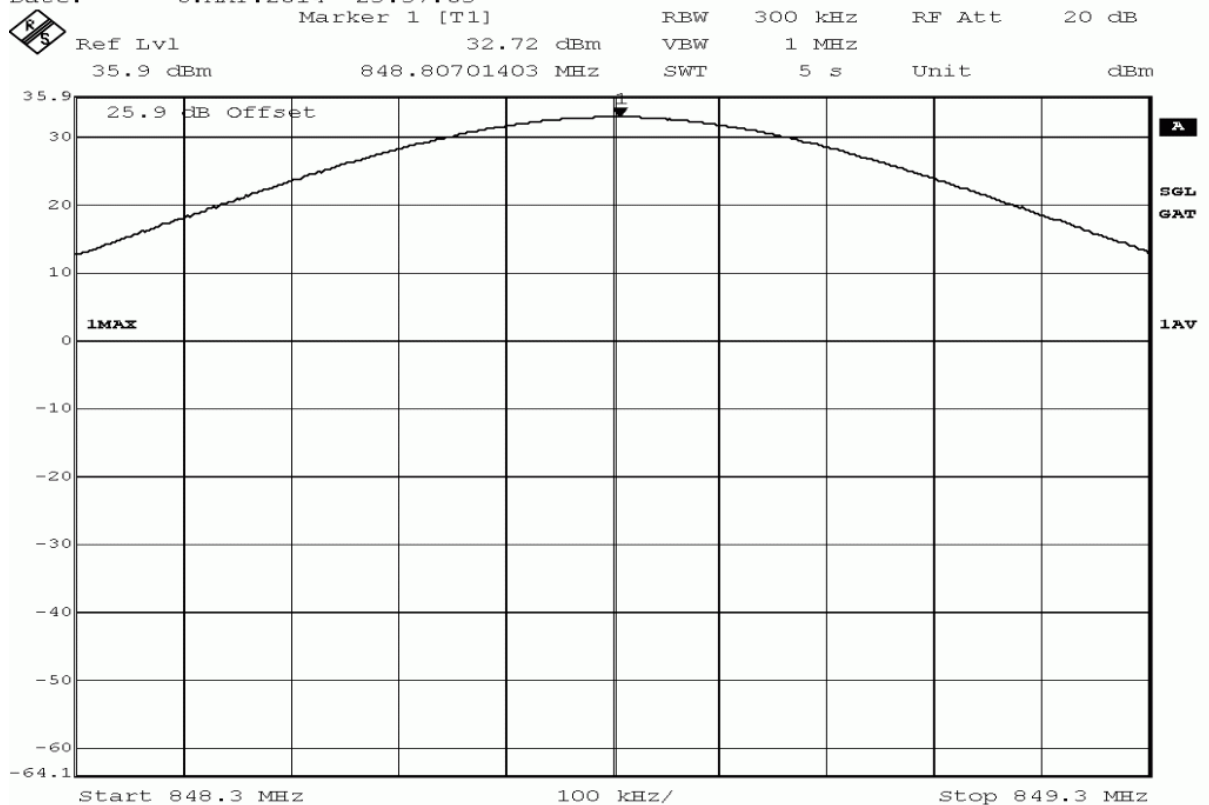
|                            |                                         |
|----------------------------|-----------------------------------------|
| <i>Result:</i>             | Passed                                  |
| <i>Setup No.:</i>          | S_AH02                                  |
| <i>Date of Test:</i>       | 2014/05/07 8:38                         |
| <i>Body:</i>               | FCC47CFRChIPART22PUBLIC MOBILE SERVICES |
| <i>Test Specification:</i> | FCC part 2 and 22                       |

**Detailed Results:**

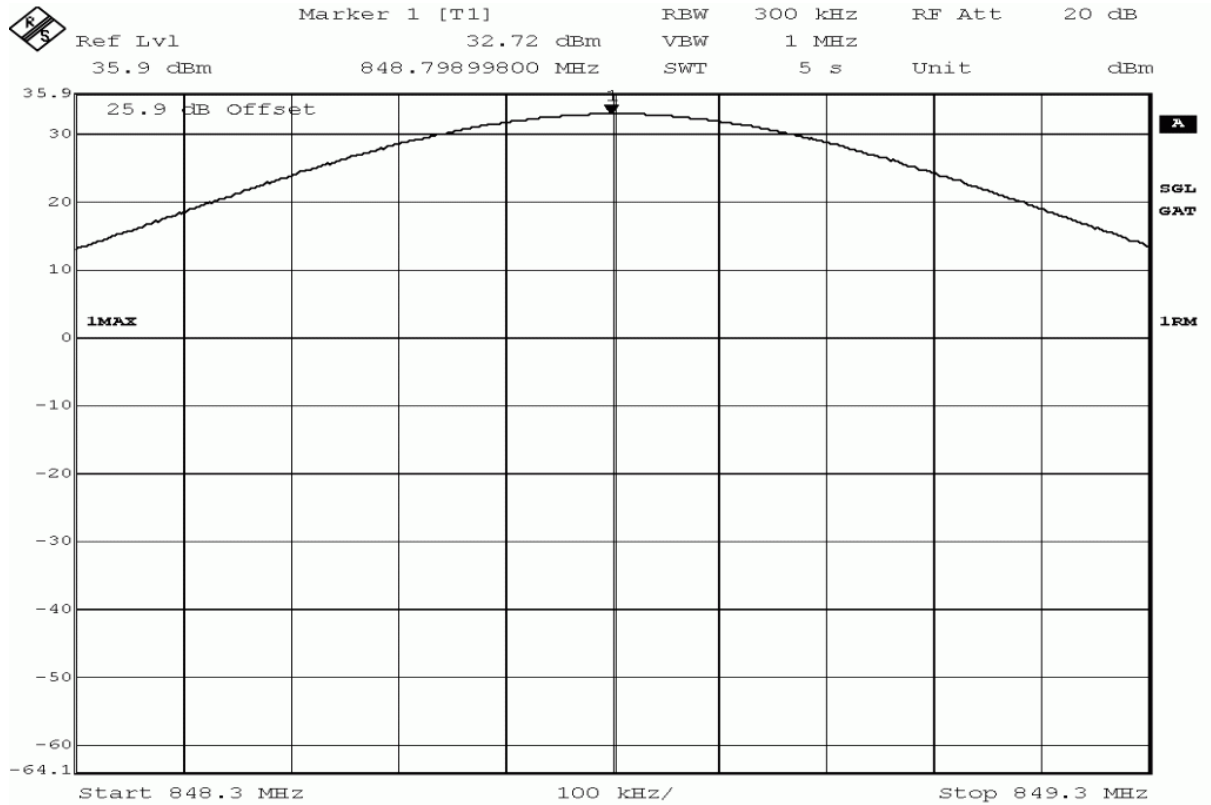
| Band  | Mode       | Modulation | Channel | Frequency (MHz) | Average Conducted power | RMS Conducted power | Peak Conducted power | FCC EIRP limit (W) | IC EIRP limit per SRSP-503 (W) | Maximum antenna gain (dBi) | Verdict |
|-------|------------|------------|---------|-----------------|-------------------------|---------------------|----------------------|--------------------|--------------------------------|----------------------------|---------|
| 850   | GSM / GPRS | GFSK       | Low     | 824,2           | 32.5                    | 32.51               | 32.89                | 11.48              | 11.5                           | 8.09                       | Pass    |
|       |            |            | Mid     | 836,6           | 32.57                   | 32.59               | 32.93                |                    |                                | 8.01                       | Pass    |
|       |            |            | High    | 848,8           | 32.72                   | 32.72               | 33.08                |                    |                                | 7.88                       | Pass    |
|       |            |            |         |                 |                         |                     |                      |                    |                                |                            |         |
|       |            |            |         |                 |                         |                     |                      |                    |                                |                            |         |
| Band  | Mode       | Modulation | Channel | Frequency (MHz) | Average Conducted power | RMS Conducted power | Peak Conducted power | FCC EIRP limit (W) | IC EIRP limit per SRSP-503 (W) | Maximum antenna gain (dBi) | Verdict |
| FDD 5 | W-CDMA     | QPSK       | Low     | 826.4           | 21.47                   | 21.7                | 27.19                | 11.48              | 11.5                           | 18.9                       | Pass    |
|       |            |            | Mid     | 836.6           | 21.68                   | 21.9                | 27.44                |                    |                                | 18.7                       | Pass    |
|       |            |            | High    | 846.6           | 21.88                   | 22.12               | 27.86                |                    |                                | 18.48                      | Pass    |
| FDD 5 | HSDPA      | QPSK       | Low     | 826.4           | 21.41                   | 21.64               | 27.04                | 11.48              | 11.5                           | 18.96                      | Pass    |
|       |            |            | Mid     | 836.6           | 21.56                   | 21.84               | 27.19                |                    |                                | 18.76                      | Pass    |
|       |            |            | High    | 846.6           | 21.71                   | 21.98               | 27.57                |                    |                                | 18.62                      | Pass    |
| FDD 5 | HSDPA      | QPSK       | Low     | 826.4           | 19.45                   | 20.22               | 28.12                | 11.48              | 11.5                           | 20.38                      | Pass    |
|       |            |            | Mid     | 836.6           | 19.85                   | 20.38               | 27.7                 |                    |                                | 20.22                      | Pass    |
|       |            |            | High    | 846.6           | 19.78                   | 20.49               | 28.37                |                    |                                | 20.11                      | Pass    |
| FDD 5 | HSDPA      | QPSK       | Low     | 826.4           | 18.73                   | 19.5                | 28.12                | 11.48              | 11.5                           | 21.1                       | Pass    |
|       |            |            | Mid     | 836.6           | 18.85                   | 19.9                | 27.7                 |                    |                                | 20.7                       | Pass    |
|       |            |            | High    | 846.6           | 18.82                   | 20.03               | 27.79                |                    |                                | 20.57                      | Pass    |
| FDD 5 | HSDPA      | QPSK       | Low     | 826.4           | 18.09                   | 19.25               | 27.32                | 11.48              | 11.5                           | 21.35                      | Pass    |
|       |            |            | Mid     | 836.6           | 18.54                   | 19.43               | 27.32                |                    |                                | 21.17                      | Pass    |
|       |            |            | High    | 846.6           | 18.61                   | 19.55               | 27.99                |                    |                                | 21.05                      | Pass    |
| FDD 5 | HSUPA      | QPSK       | Low     | 826.4           | 20.39                   | 20.81               | 27.57                | 11.48              | 11.5                           | 19.79                      | Pass    |
|       |            |            | Mid     | 836.6           | 20.44                   | 20.85               | 27.86                |                    |                                | 19.75                      | Pass    |
|       |            |            | High    | 846.6           | 20.72                   | 21.15               | 28.9                 |                    |                                | 19.45                      | Pass    |
| FDD 5 | HSUPA      | QPSK       | Low     | 826.4           | 18.25                   | 19.18               | 27.32                | 11.48              | 11.5                           | 21.42                      | Pass    |
|       |            |            | Mid     | 836.6           | 18.47                   | 19.32               | 27.19                |                    |                                | 21.28                      | Pass    |
|       |            |            | High    | 846.6           | 18.6                    | 19.52               | 27.99                |                    |                                | 21.08                      | Pass    |
| FDD 5 | HSUPA      | QPSK       | Low     | 826.4           | 19.4                    | 20.11               | 28.24                | 11.48              | 11.5                           | 20.49                      | Pass    |
|       |            |            | Mid     | 836.6           | 19.59                   | 20.33               | 28.24                |                    |                                | 20.27                      | Pass    |
|       |            |            | High    | 846.6           | 19.75                   | 20.52               | 29.28                |                    |                                | 20.08                      | Pass    |
| FDD 5 | HSUPA      | QPSK       | Low     | 826.4           | 18.69                   | 19.6                | 27.32                | 11.48              | 11.5                           | 21                         | Pass    |
|       |            |            | Mid     | 836.6           | 18.87                   | 19.8                | 27.44                |                    |                                | 20.8                       | Pass    |
|       |            |            | High    | 846.6           | 19.01                   | 19.95               | 27.99                |                    |                                | 20.65                      | Pass    |
| FDD 5 | HSUPA      | QPSK       | Low     | 826.4           | 19.86                   | 20.23               | 27.04                | 11.48              | 11.5                           | 20.37                      | Pass    |
|       |            |            | Mid     | 836.6           | 19.99                   | 20.35               | 27.04                |                    |                                | 20.25                      | Pass    |
|       |            |            | High    | 846.6           | 20.18                   | 20.58               | 27.57                |                    |                                | 20.02                      | Pass    |



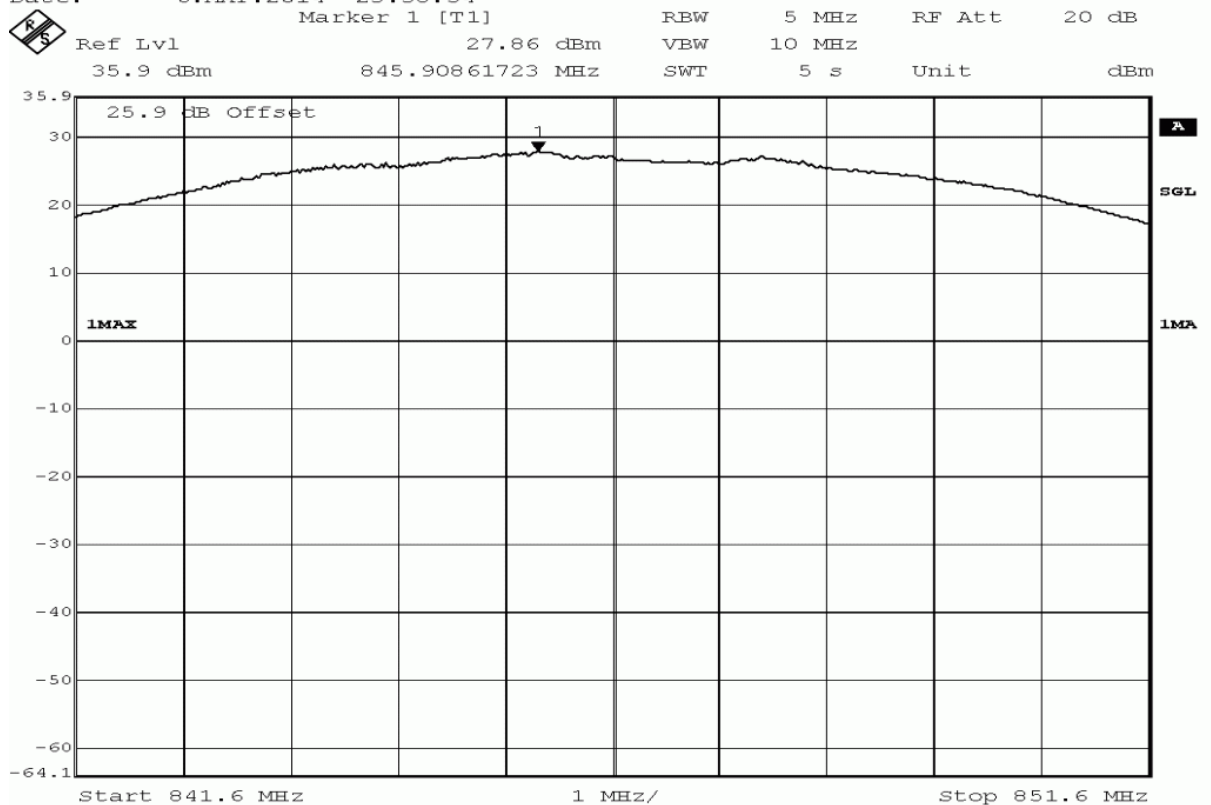
Title: output power measurement  
Comment A: DE1015001, GSM850, output power, channel 251,  
(848.8MHz)  
Date: 6.MAY.2014 23:37:03



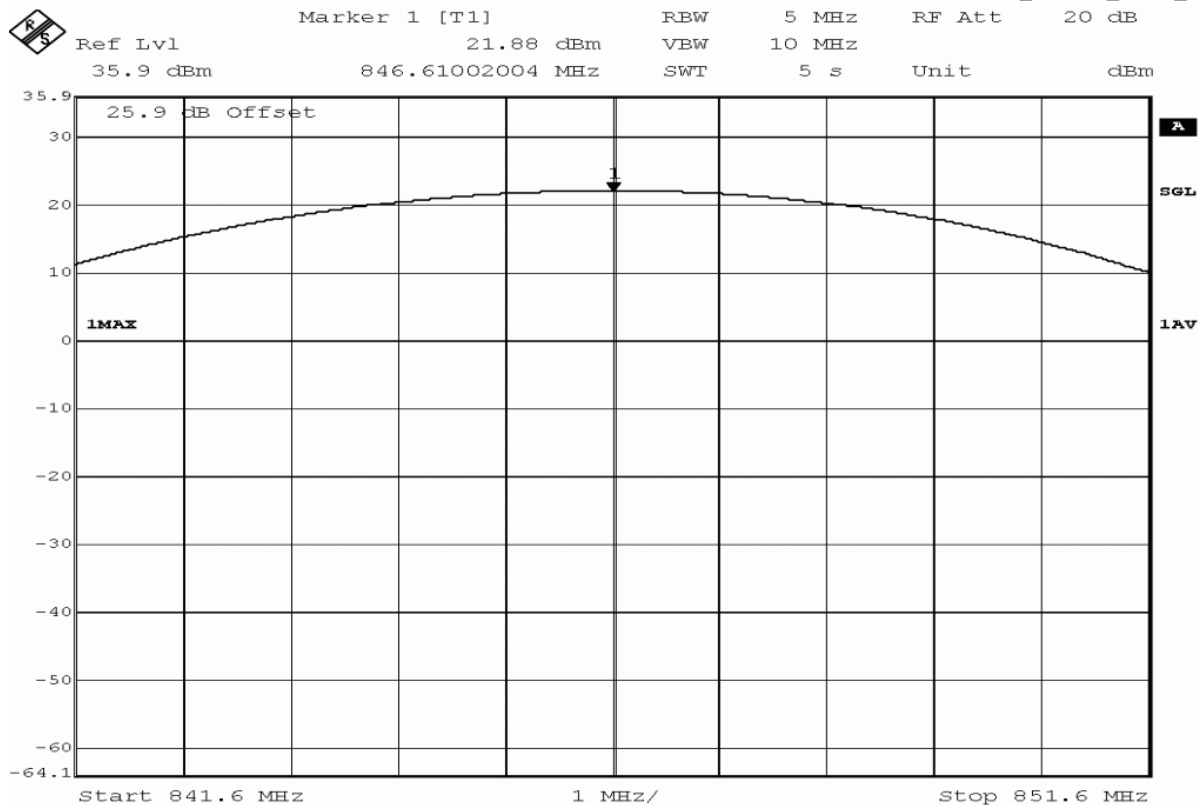
Title: output power measurement  
Comment A: DE1015001, GSM850, output power, channel 251,  
(848.8MHz)  
Date: 6.MAY.2014 23:37:59



Title: output power measurement  
Comment A: DE1015001, GSM850, output power, channel 251,  
(848.8MHz)  
Date: 6.MAY.2014 23:38:54



Title: output power measurement  
Comment A: DE1015001, FDD V, output power,  
channel 4233 (846.6MHz)  
Date: 6.MAY.2014 22:41:20



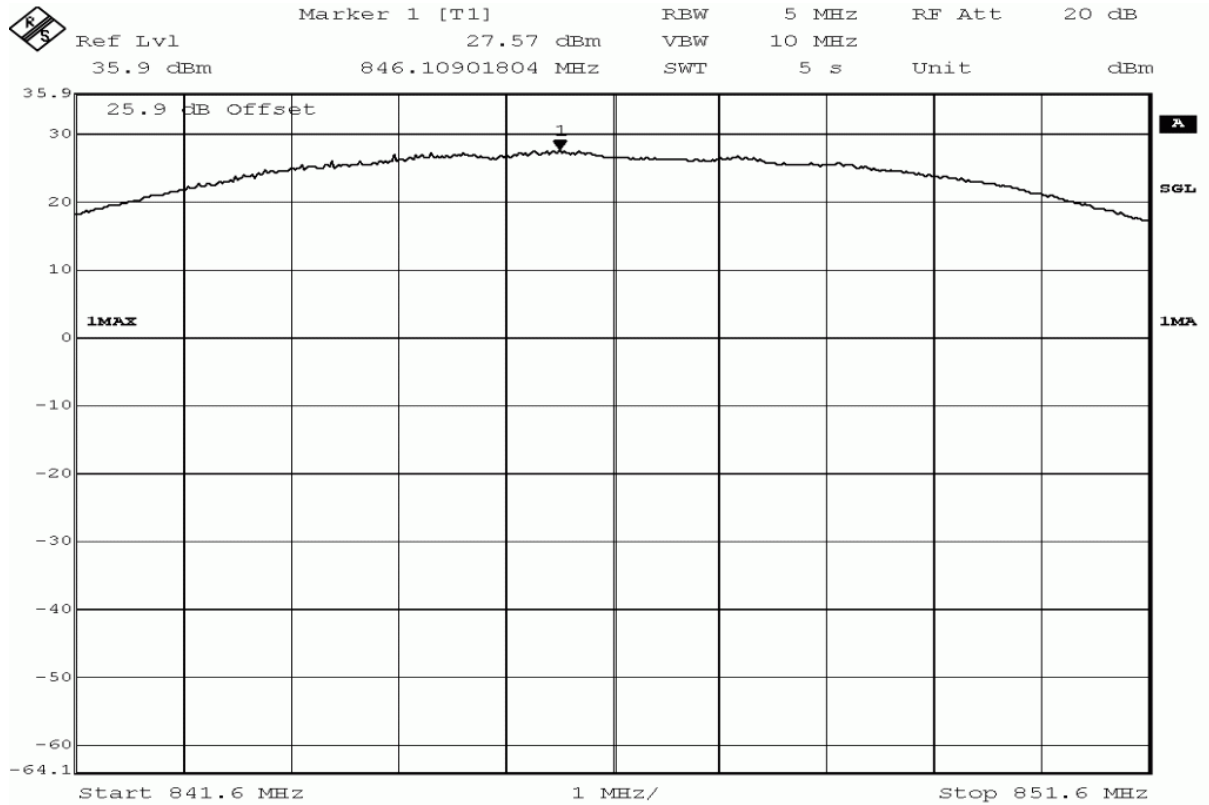
Title: output power measurement  
 Comment A: DE1015001, FDD V, output power,  
 channel 4233 (846.6MHz)

Date: 6.MAY.2014 22:41:37

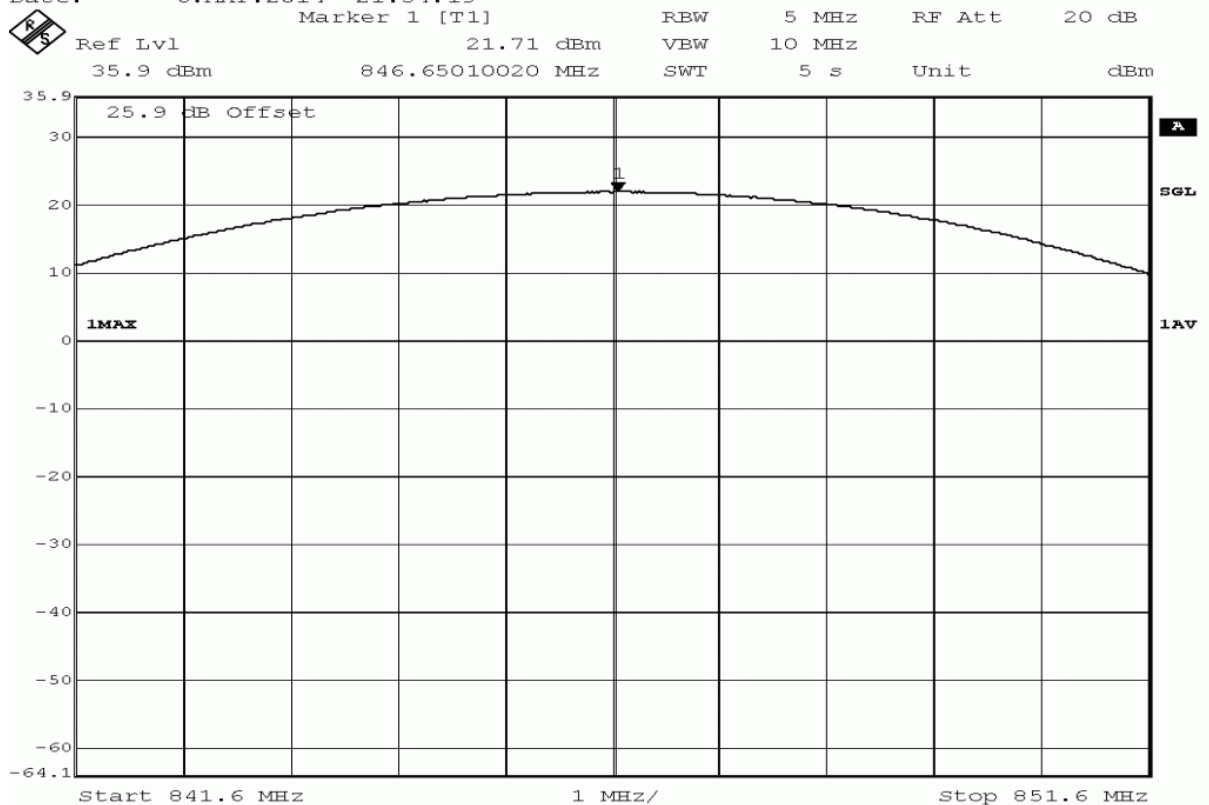


Title: output power measurement  
 Comment A: DE1015001, FDD V, output power,  
 channel 4233 (846.6MHz)

Date: 6.MAY.2014 22:41:54

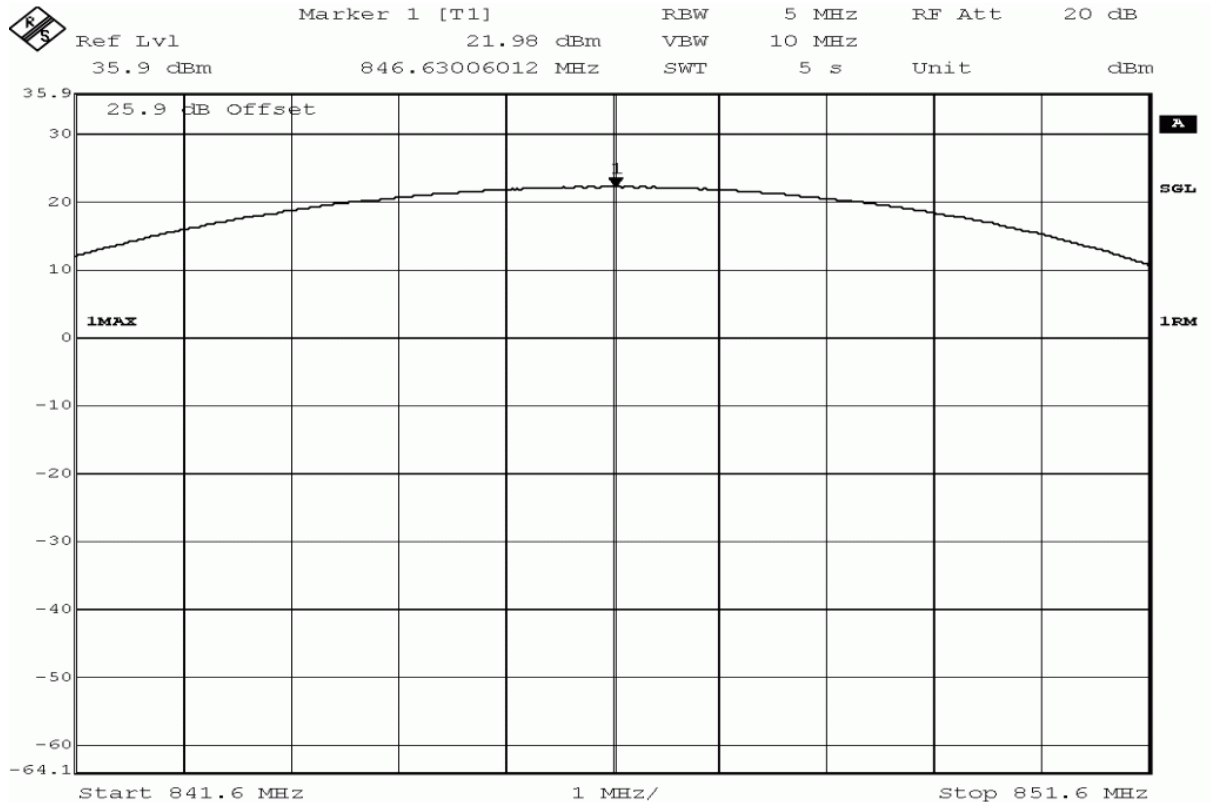


Title: output power measurement  
Comment A: DE1015001, subtest 1 HSDPA FDD V, output power,  
channel 4233 (846.6MHz)  
Date: 6.MAY.2014 21:54:19

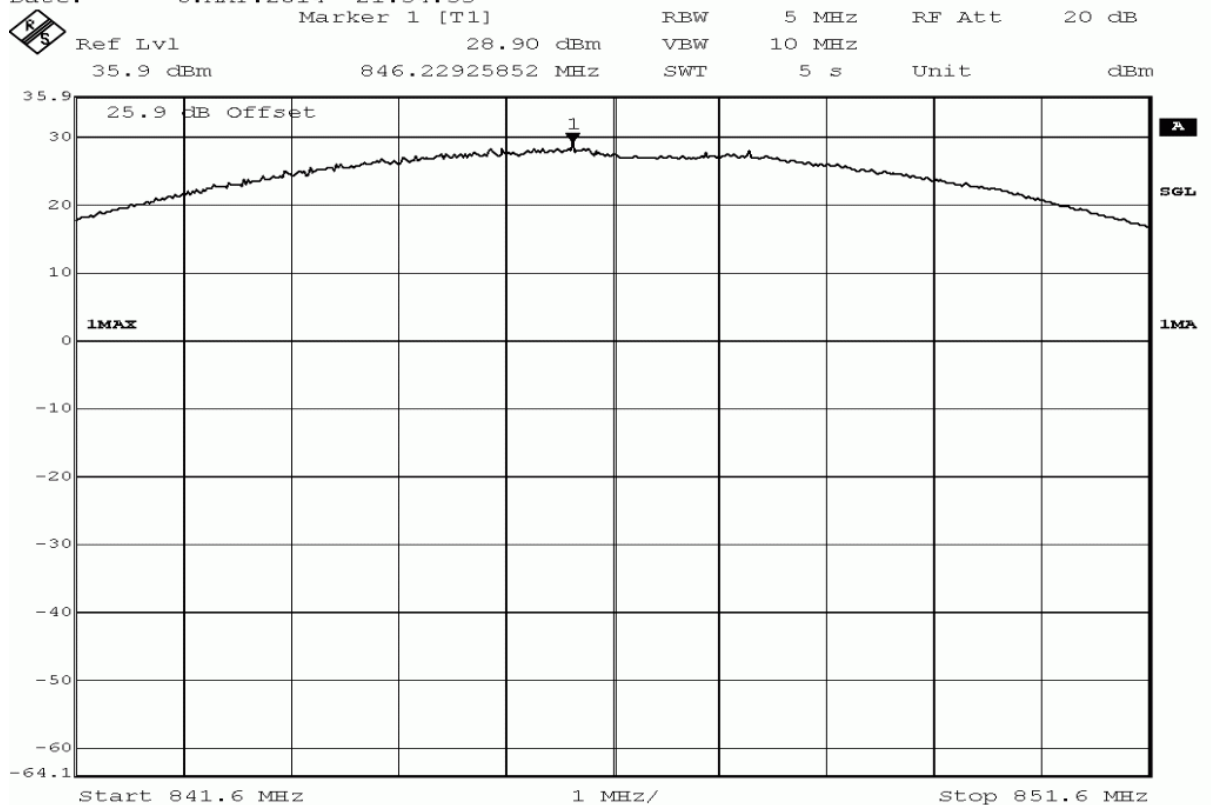


Title: output power measurement  
Comment A: DE1015001, subtest 1 HSDPA FDD V, output power,  
channel 4233 (846.6MHz)  
Date: 6.MAY.2014 21:54:36

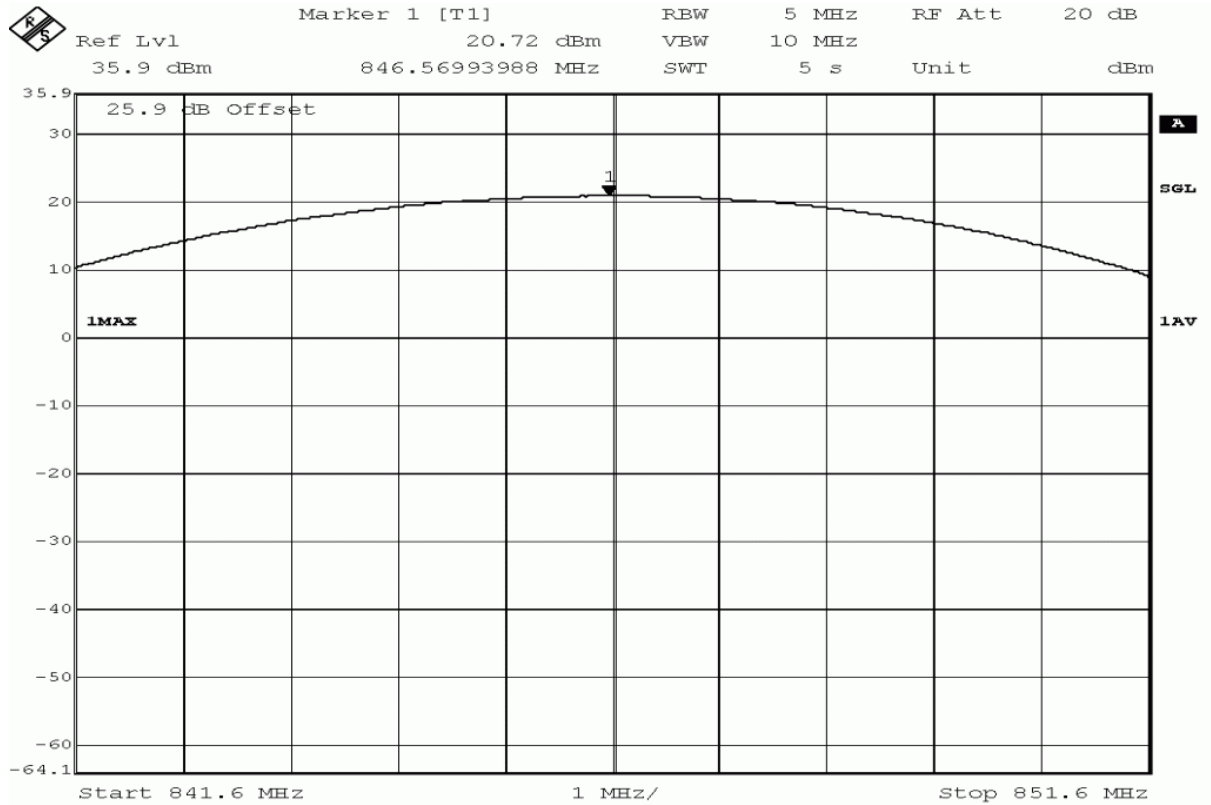




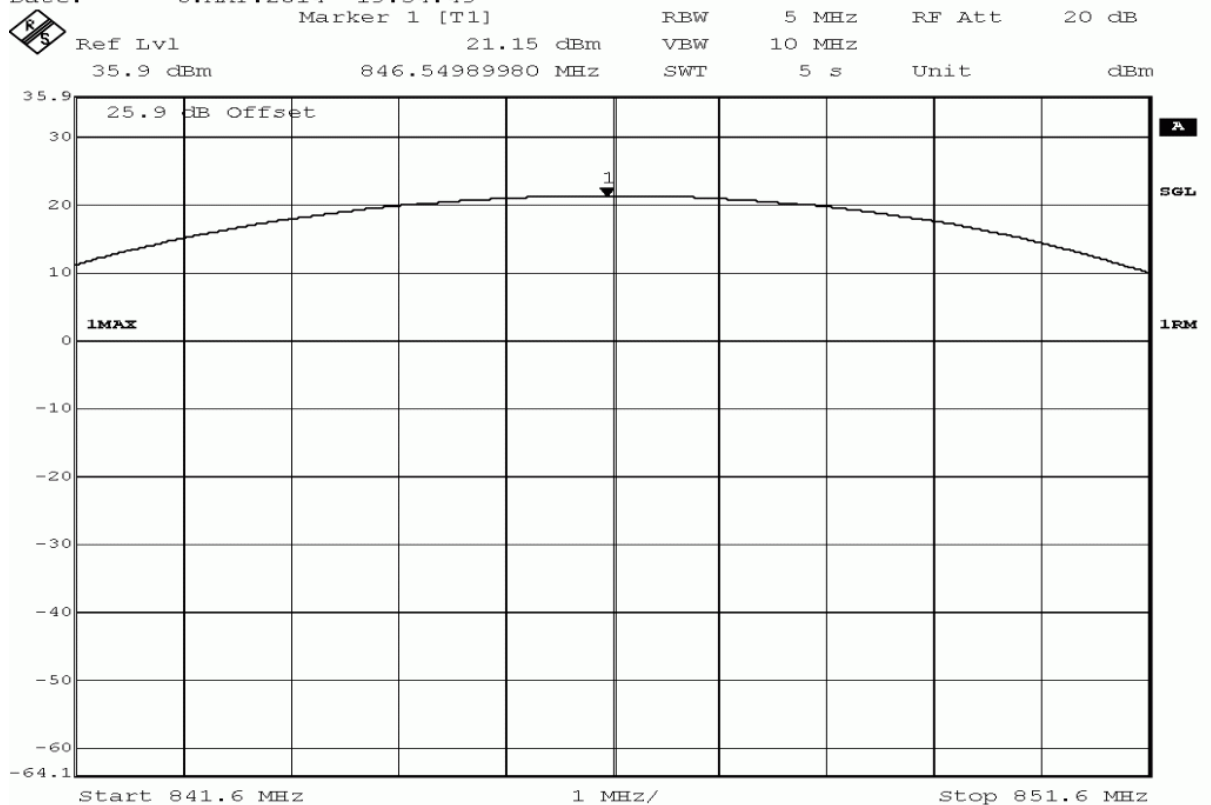
Title: output power measurement  
Comment A: DE1015001, subtest 1 HSDPA FDD V, output power,  
channel 4233 (846.6MHz)  
Date: 6.MAY.2014 21:54:53



Title: output power measurement  
Comment A: DE1015001, subtest 1 HSUPA FDD V, output power,  
channel 4233 (846.6MHz)  
Date: 6.MAY.2014 19:54:32



Title: output power measurement  
Comment A: DE1015001, subtest 1 HSUPA FDD V, output power,  
channel 4233 (846.6MHz)  
Date: 6.MAY.2014 19:54:49



Title: output power measurement  
Comment A: DE1015001, subtest 1 HSUPA FDD V, output power,  
channel 4233 (846.6MHz)  
Date: 6.MAY.2014 19:55:06

### 3.5.2 22.2 Frequency stability §2.1055

#### Test: 22.2; Frequency Band = 850 / FDD5

|                            |                                         |
|----------------------------|-----------------------------------------|
| <i>Result:</i>             | Passed                                  |
| <i>Setup No.:</i>          | S_AH02                                  |
| <i>Date of Test:</i>       | 2014/04/30 9:13                         |
| <i>Body:</i>               | FCC47CFRChIPART22PUBLIC MOBILE SERVICES |
| <i>Test Specification:</i> | FCC part 2 and 22                       |

### Detailed Results:

#### GSM 850 Freq Stability

| Temp.<br>°C | Duration<br>min | Voltage                           | Limit<br>Hz | Freq. error<br>Average (Hz) | Freq. error<br>Max. (Hz) | Verdict |
|-------------|-----------------|-----------------------------------|-------------|-----------------------------|--------------------------|---------|
| -30         | 0               | normal                            | 2095.5      | 6                           | 14                       | passed  |
| -30         | 5               |                                   |             | 3                           | 15                       | passed  |
| -30         | 10              |                                   |             | 5                           | 14                       | passed  |
| -20         | 0               | normal                            | 2095.5      | 3                           | 9                        | passed  |
| -20         | 5               |                                   |             | 2                           | 19                       | passed  |
| -20         | 10              |                                   |             | 3                           | 12                       | passed  |
| -10         | 0               | normal                            | 2095.5      | 6                           | 11                       | passed  |
| -10         | 5               |                                   |             | 4                           | 12                       | passed  |
| -10         | 10              |                                   |             | 1                           | 12                       | passed  |
| 0           | 0               | normal                            | 2095.5      | 3                           | 8                        | passed  |
| 0           | 5               |                                   |             | 4                           | 11                       | passed  |
| 0           | 10              |                                   |             | 1                           | 9                        | passed  |
| 10          | 0               | normal                            | 2095.5      | 3                           | 10                       | passed  |
| 10          | 5               |                                   |             | 6                           | 12                       | passed  |
| 10          | 10              |                                   |             | 4                           | 14                       | passed  |
| 20          | 0               | low                               | 2095.5      | -1                          | -11                      | passed  |
| 20          | 5               |                                   |             | -1                          | -10                      | passed  |
| 20          | 10              |                                   |             | -3                          | -8                       | passed  |
| 20          | 0               | normal<br>=<br>high <sup>1)</sup> | 2095.5      | 2                           | 12                       | passed  |
| 20          | 5               |                                   |             | 4                           | 12                       | passed  |
| 20          | 10              |                                   |             | 1                           | 5                        | passed  |
| 20          | 0               | high                              | 2095.5      | -2                          | -12                      | passed  |
| 20          | 5               |                                   |             | 1                           | 9                        | passed  |
| 20          | 10              |                                   |             | 6                           | 10                       | passed  |
| 30          | 0               | normal                            | 2095.5      | 1                           | 9                        | passed  |
| 30          | 5               |                                   |             | 4                           | 27                       | passed  |
| 30          | 10              |                                   |             | 7                           | 11                       | passed  |
| 40          | 0               | normal                            | 2095.5      | 2                           | 5                        | passed  |
| 40          | 5               |                                   |             | 4                           | 13                       | passed  |
| 40          | 10              |                                   |             | 2                           | 11                       | passed  |
| 50          | 0               | normal                            | 2095.5      | 5                           | 11                       | passed  |
| 50          | 5               |                                   |             | 6                           | 14                       | passed  |
| 50          | 10              |                                   |             | 6                           | 13                       | passed  |

| Battery operating end point voltage <sup>2)</sup> |                 |              |             |                             |                          |         |
|---------------------------------------------------|-----------------|--------------|-------------|-----------------------------|--------------------------|---------|
| Temp.<br>°C                                       | Duration<br>min | Voltage<br>V | Limit<br>Hz | Freq. error<br>Average (Hz) | Freq. error<br>Max. (Hz) | Verdict |
| 20                                                | 0               | 3.2          | 2095.5      | -12                         | -24                      | passed  |
| 20                                                | 5               |              |             | -5                          | -11                      | passed  |
| 20                                                | 10              |              |             | -4                          | -11                      | passed  |

1) The manufacturer declared that normal voltage is equivalent with high voltage.

2) The call is established at high voltage and the voltage is then reduced to the battery operating end.

WCDMA FDD5 Freq Stability

| Temp.<br>°C | Duration<br>min | Voltage                           | Limit<br>Hz | Freq. error<br>Average (Hz) | Freq. error<br>Max. (Hz) | Verdict |
|-------------|-----------------|-----------------------------------|-------------|-----------------------------|--------------------------|---------|
| -30         | 0               | normal                            | 2095.5      | 19                          | 53                       | passed  |
| -30         | 5               |                                   |             | 9                           | 54                       | passed  |
| -30         | 10              |                                   |             | 8                           | 84                       | passed  |
| -20         | 0               | normal                            | 2095.5      | -13                         | -36                      | passed  |
| -20         | 5               |                                   |             | -1                          | -26                      | passed  |
| -20         | 10              |                                   |             | 3                           | -26                      | passed  |
| -10         | 0               | normal                            | 2095.5      | -16                         | -28                      | passed  |
| -10         | 5               |                                   |             | -3                          | -35                      | passed  |
| -10         | 10              |                                   |             | -14                         | -35                      | passed  |
| 0           | 0               | normal                            | 2095.5      | -28                         | -55                      | passed  |
| 0           | 5               |                                   |             | -17                         | -55                      | passed  |
| 0           | 10              |                                   |             | -13                         | -55                      | passed  |
| 10          | 0               | normal                            | 2095.5      | -18                         | -50                      | passed  |
| 10          | 5               |                                   |             | -10                         | -50                      | passed  |
| 10          | 10              |                                   |             | -6                          | -50                      | passed  |
| 20          | 0               | low                               | 2095.5      | -16                         | -26                      | passed  |
| 20          | 5               |                                   |             | -15                         | -24                      | passed  |
| 20          | 10              |                                   |             | 23                          | 26                       | passed  |
| 20          | 0               | normal<br>=<br>high <sup>1)</sup> | 2095.5      | -20                         | -24                      | passed  |
| 20          | 5               |                                   |             | -18                         | -21                      | passed  |
| 20          | 10              |                                   |             | -11                         | -16                      | passed  |
| 20          | 0               | high                              | 2095.5      | -12                         | -23                      | passed  |
| 20          | 5               |                                   |             | -13                         | -16                      | passed  |
| 20          | 10              |                                   |             | -2                          | -5                       | passed  |
| 30          | 0               | normal                            | 2095.5      | -19                         | -28                      | passed  |
| 30          | 5               |                                   |             | -9                          | -24                      | passed  |
| 30          | 10              |                                   |             | -18                         | -22                      | passed  |
| 40          | 0               | normal                            | 2095.5      | -17                         | -35                      | passed  |
| 40          | 5               |                                   |             | -12                         | -48                      | passed  |
| 40          | 10              |                                   |             | -18                         | -48                      | passed  |
| 50          | 0               | normal                            | 2095.5      | 10                          | -29                      | passed  |
| 50          | 5               |                                   |             | 19                          | 30                       | passed  |
| 50          | 10              |                                   |             | 16                          | 30                       | passed  |

| Battery operating end point voltage <sup>2)</sup> |                 |              |             |                             |                          |         |
|---------------------------------------------------|-----------------|--------------|-------------|-----------------------------|--------------------------|---------|
| Temp.<br>°C                                       | Duration<br>min | Voltage<br>V | Limit<br>Hz | Freq. error<br>Average (Hz) | Freq. error<br>Max. (Hz) | Verdict |
| 20                                                | 0               | 3.2          | 2095.5      | -18                         | -27                      | passed  |
| 20                                                | 5               |              |             | 16                          | 18                       | passed  |
| 20                                                | 10              |              |             | -23                         | -27                      | passed  |

1) The manufacturer declared that normal voltage is equivalent with high voltage.

2) The call is established at high voltage and the voltage is then reduced to the battery operating end.

### 3.5.3 22.3 Spurious emissions at antenna terminals §2.1051, §22.917

**Test: 22.3; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz,**

Result: Passed  
Setup No.: S\_AH02  
Date of Test: 2014/05/06 23:00  
Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES  
Test Specification: FCC part 2 and 22

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 3                         | 823.8938       | -31.5           | 18.5                | -13.0      | passed  |
| peak     | maxhold | 3                         | 823.9178       | -28.6           | 15.6                | -13.0      | passed  |
| peak     | maxhold | 3                         | 823.9359       | -22.3           | 9.3                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 823.9519       | -21.3           | 8.3                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 823.9619       | -18.4           | 5.4                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 823.9840       | -16.6           | 3.6                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 823.9980       | -13.1           | 0.1                 | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

\* Emission shown in list is the carrier and not a spurious emission

**Test: 22.3; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz**

Result: Passed  
Setup No.: S\_AH02  
Date of Test: 2014/05/06 23:17  
Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES  
Test Specification: FCC part 2 and 22

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 100                       | 1673.347       | -33.39          | 20.39               | -13        | passed  |

no further values have been found with a margin of less than 20 dB

\* Emission shown in list is the carrier and not a spurious emission

**Test: 22.3; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz**

Result: Passed  
Setup No.: S\_AH02  
Date of Test: 2014/05/06 23:31  
Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES  
Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 3                         | 849.0020       | -15.8           | 2.8                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 849.0080       | -15.6           | 2.6                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 849.0281       | -15.1           | 2.1                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 849.0501       | -18.3           | 5.3                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 849.0641       | -23.5           | 10.5                | -13.0      | passed  |
| peak     | maxhold | 3                         | 849.0762       | -24.9           | 11.9                | -13.0      | passed  |
| peak     | maxhold | 3                         | 849.0882       | -28.1           | 15.1                | -13.0      | passed  |
| peak     | maxhold | 3                         | 849.1022       | -32.7           | 19.7                | -13.0      | passed  |
| peak     | maxhold | 100                       | 1697.39        | -32.9           | 19.9                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.3; Frequency Band = FDD5, Mode = HSDPA, Channel = 4132, Frequency = 826.4MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 16:20

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| rms      | maxhold | 50                        | 824.00         | -30.1           | 17.1                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.3; Frequency Band = FDD5, Mode = HSDPA, Channel = 4183, Frequency = 836.6MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 16:28

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 100                       | 6983.968       | -34.38          | 21.38               | -13        | passed  |

no further values have been found with a margin of less than 20 dB



**Test: 22.3; Frequency Band = FDD5, Mode = HSDPA, Channel = 4233, Frequency = 846.6MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 16:32

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | margin to<br>limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------------------|------------|---------|
| rms      | maxhold | 50                              | 849.14            | -30.8              | 17.8                   | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.3; Frequency Band = FDD5, Mode = HSUPA, Channel = 4132, Frequency = 826.4MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 15:57

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | margin to<br>limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------------------|------------|---------|
| rms      | maxhold | 50                              | 824.00            | -31.1              | 18.1                   | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.3; Frequency Band = FDD5, Mode = HSUPA, Channel = 4183, Frequency = 836.6MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 16:03

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | margin to<br>limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------------------|------------|---------|
| peak     | maxhold | 100                             | 6993.988          | -34.23             | 21.23                  | -13        | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.3; Frequency Band = FDD5, Mode = HSUPA, Channel = 4233, Frequency = 846.6MHz**

Result: Passed  
Setup No.: S\_AH02  
Date of Test: 2014/05/07 16:12  
Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES  
Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | margin to<br>limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------------------|------------|---------|
| rms      | maxhold | 50                              | 849.11            | -31.7              | 18.7                   | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.3; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4132, Frequency = 826.4MHz**

Result: Passed  
Setup No.: S\_AH02  
Date of Test: 2014/05/07 17:10  
Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES  
Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | margin to<br>limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------------------|------------|---------|
| rms      | maxhold | 50                              | 824.00            | -30.5              | 17.5                   | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.3; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4183, Frequency = 836.6MHz**

Result: Passed  
Setup No.: S\_AH02  
Date of Test: 2014/05/07 17:13  
Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES  
Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | margin to<br>limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------------------|------------|---------|
| peak     | maxhold | 100                             | 6993.988          | -34.32             | 21.32                  | -13        | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.3; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4233, Frequency = 846.6MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 17:15

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | margin to<br>limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------------------|------------|---------|
| rms      | maxhold | 50                              | 849.11            | -30.8              | 17.8                   | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

### 3.5.4 22.4 Field strength of spurious radiation §2.1053, §22.917

**Test: 22.4; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz**

Result: Passed

Setup No.: S\_AH02\_RSE

Date of Test: 2014/04/23 23:26

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | limit /dBm | margin to limit /dB | azimuth /° | antenna polarization | EUT orientation | verdict |
|----------|---------|---------------------------|----------------|-----------------|------------|---------------------|------------|----------------------|-----------------|---------|
| peak     | maxhold | 1000                      | 9519.0         | -42.00          | -13.00     | 29.00               | 0.0        | horizontal           | vertical        | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.4; Frequency Band = FDD5, Mode = HSDPA, Channel = 4183, Frequency = 836.6MHz**

Result: Passed

Setup No.: S\_AH02\_RSE

Date of Test: 2014/05/02 16:19

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | limit /dBm | margin to limit /dB | azimuth /° | antenna polarization | EUT orientation | verdict |
|----------|---------|---------------------------|----------------|-----------------|------------|---------------------|------------|----------------------|-----------------|---------|
| peak     | maxhold | 1000                      | 881.6          | -27.07          | -13.00     | 14.07               | 90.0       | horizontal           | vertical        | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.4; Frequency Band = FDD5, Mode = HSUPA, Channel = 4183, Frequency = 836.6MHz**

Result: Passed

Setup No.: S\_AH02\_RSE

Date of Test: 2014/05/08 22:32

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | limit /dBm | margin to limit /dB | azimuth /° | antenna polarization | EUT orientation | verdict |
|----------|---------|---------------------------|----------------|-----------------|------------|---------------------|------------|----------------------|-----------------|---------|
| peak     | maxhold | 1000                      | 823.0          | -38.49          | -13.00     | 25.49               | 0.0        | horizontal           | vertical        | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 22.4; Frequency Band = FDD5, Mode = W-CDMA, Channel = 4183, Frequency = 836.6MHz**

Result: Passed

Setup No.: S\_AH02\_RSE

Date of Test: 2014/04/26 0:04

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

Test Specification: FCC part 2 and 22

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | limit /dBm | margin to<br>limit /dB | azimuth /° | antenna<br>polarization | EUT<br>orientation | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------|------------------------|------------|-------------------------|--------------------|---------|
| peak     | maxhold | 1000                            | 42.7              | -42.25             | -13.00     | 29.25                  | -90.0      | vertical                | vertical           | passed  |

no further values have been found with a margin of less than 20 dB

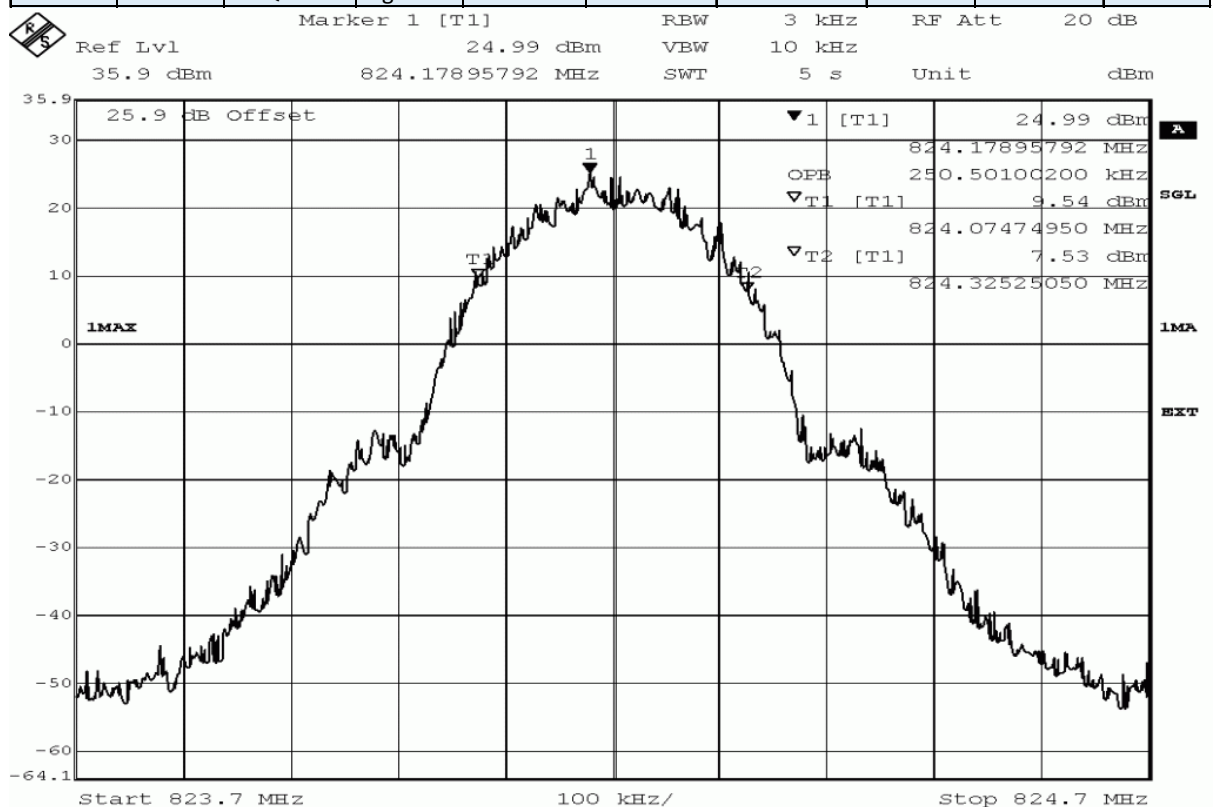
### **3.5.5      22.5    Emission and Occupied Bandwidth §2.1049, §22.917**

#### **Test: 22.5; Frequency Band = 850 / FDD5**

|                            |                                         |
|----------------------------|-----------------------------------------|
| <i>Result:</i>             | Passed                                  |
| <i>Setup No.:</i>          | S_AH02                                  |
| <i>Date of Test:</i>       | 2014/05/06   9:57                       |
| <i>Body:</i>               | FCC47CFRChIPART22PUBLIC MOBILE SERVICES |
| <i>Test Specification:</i> | FCC part 2 and 22                       |

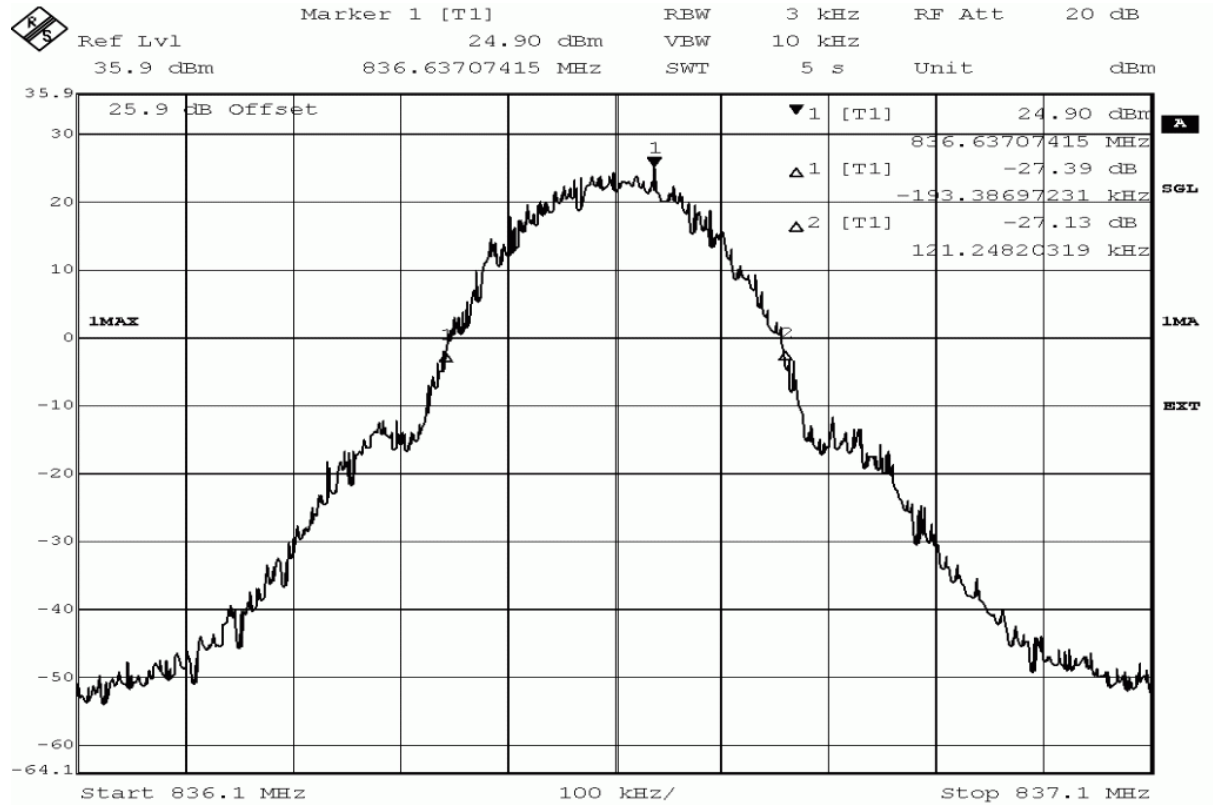
### Detailed Results:

| Band  | Mode       | Modulation | Channel | Frequency (MHz) | 26 dB Bandwidth (KHz) | 99% Bandwidth (KHz) | Detector | RBW (KHz) | Verdict |
|-------|------------|------------|---------|-----------------|-----------------------|---------------------|----------|-----------|---------|
| 850   | GSM / GPRS | GFSK       | Low     | 824,2           | 308.6                 | 250.5               | Peak     | 3         | Pass    |
|       |            |            | Mid     | 836,6           | 314.6                 | 246.5               |          |           | Pass    |
|       |            |            | High    | 848,8           | 306.6                 | 240.5               |          |           | Pass    |
| FDD 5 | W-CDMA     | QPSK       | Low     | 826.4           | 4669.3                | 4088.2              | Peak     | 100       | Pass    |
|       |            |            | Mid     | 836.6           | 4649.3                | 4088.2              |          |           | Pass    |
|       |            |            | High    | 846.6           | 4649.3                | 4068.1              |          |           | Pass    |
| FDD 5 | HSDPA      | QPSK       | Low     | 826.4           | 4649.3                | 4068.1              | Peak     | 100       | Pass    |
|       |            |            | Mid     | 836.6           | 4669.3                | 4068.1              |          |           | Pass    |
|       |            |            | High    | 846.6           | 4649.3                | 4068.1              |          |           | Pass    |
| FDD 5 | HSUPA      | QPSK       | Low     | 826.4           | 4669.3                | 4108.2              | Peak     | 100       | Pass    |
|       |            |            | Mid     | 836.6           | 4649.3                | 4088.2              |          |           | Pass    |
|       |            |            | High    | 846.6           | 4649.3                | 4088.2              |          |           | Pass    |



Title: bandwidth measurement  
 Comment A: DE1015001, GSM850, occupied bandwidth (99%),  
 channel 128 (824.2MHz)  
 Date: 6.MAY.2014 23:19:08

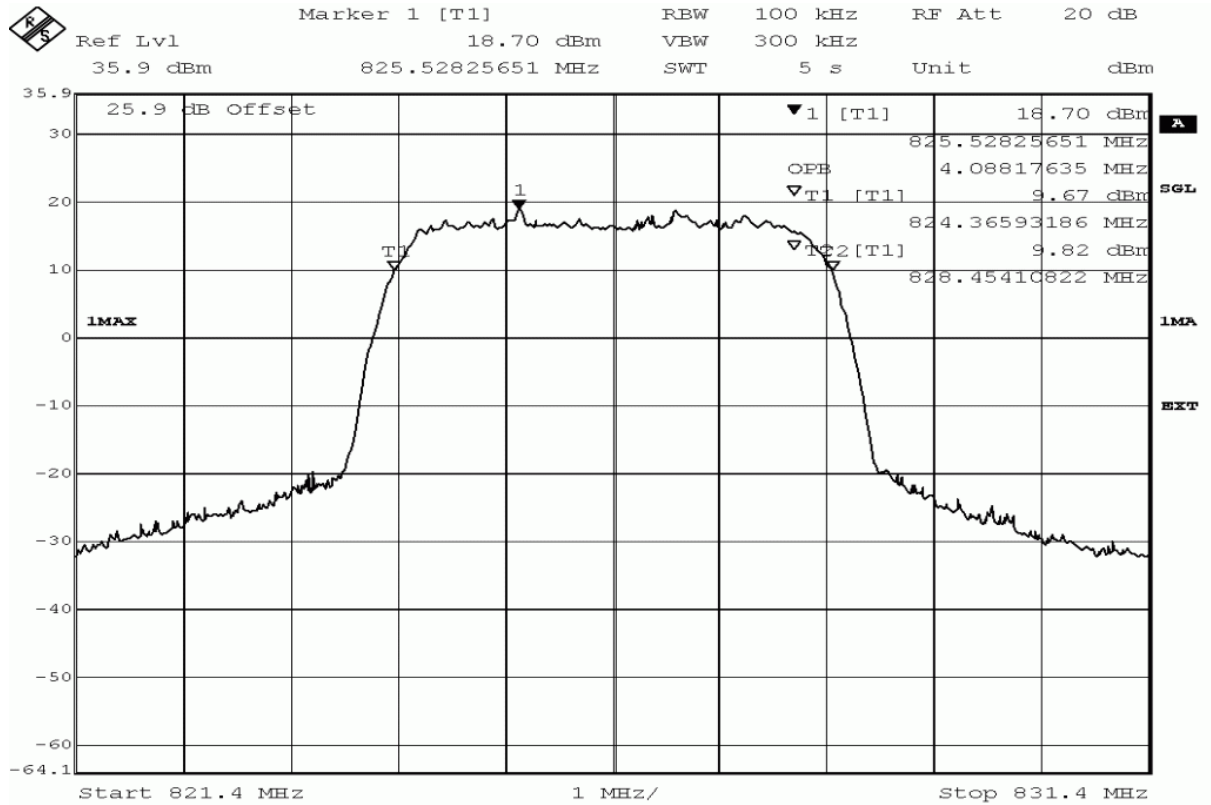
99% Bandwidth GSM Low channel



Title: bandwidth measurement  
 Comment A: DE1015001, GSM850, 26dB bandwidth, channel 190  
 (836.6MHz)  
 Date: 6.MAY.2014 23:35:56

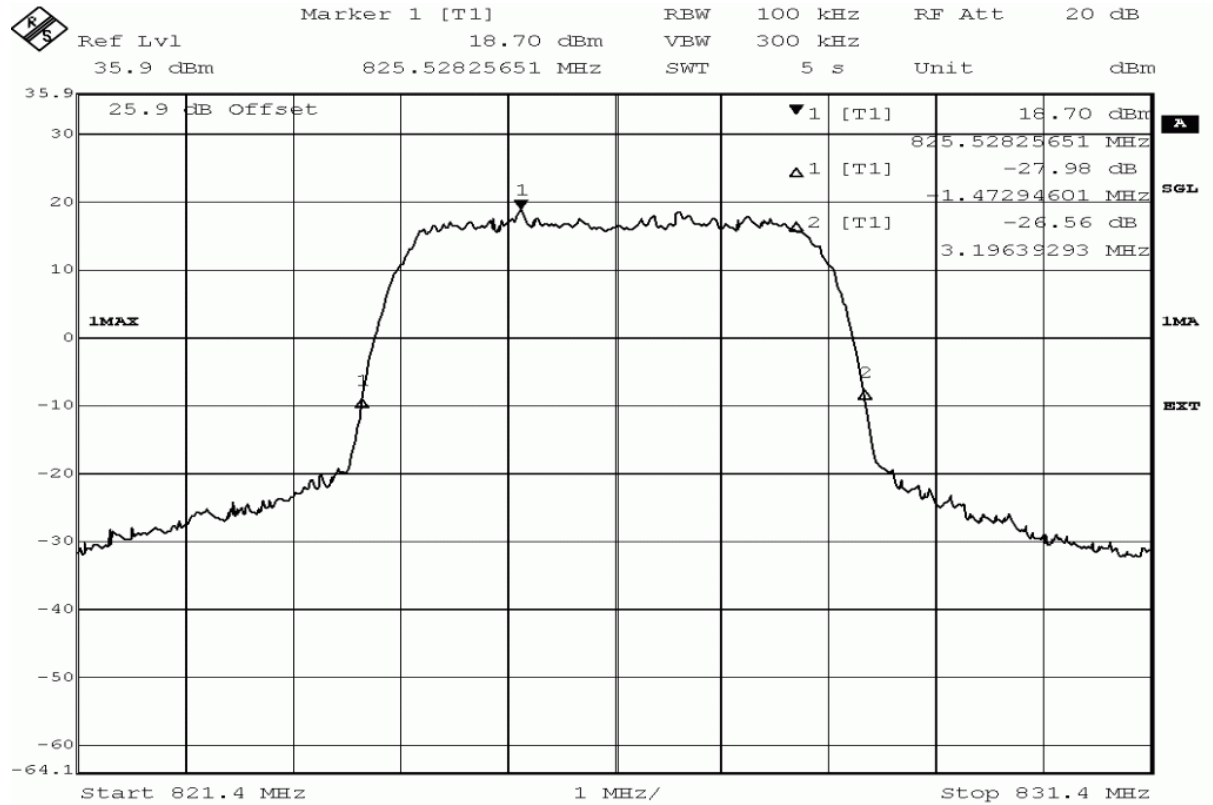
26dB Bandwidth Mid channel





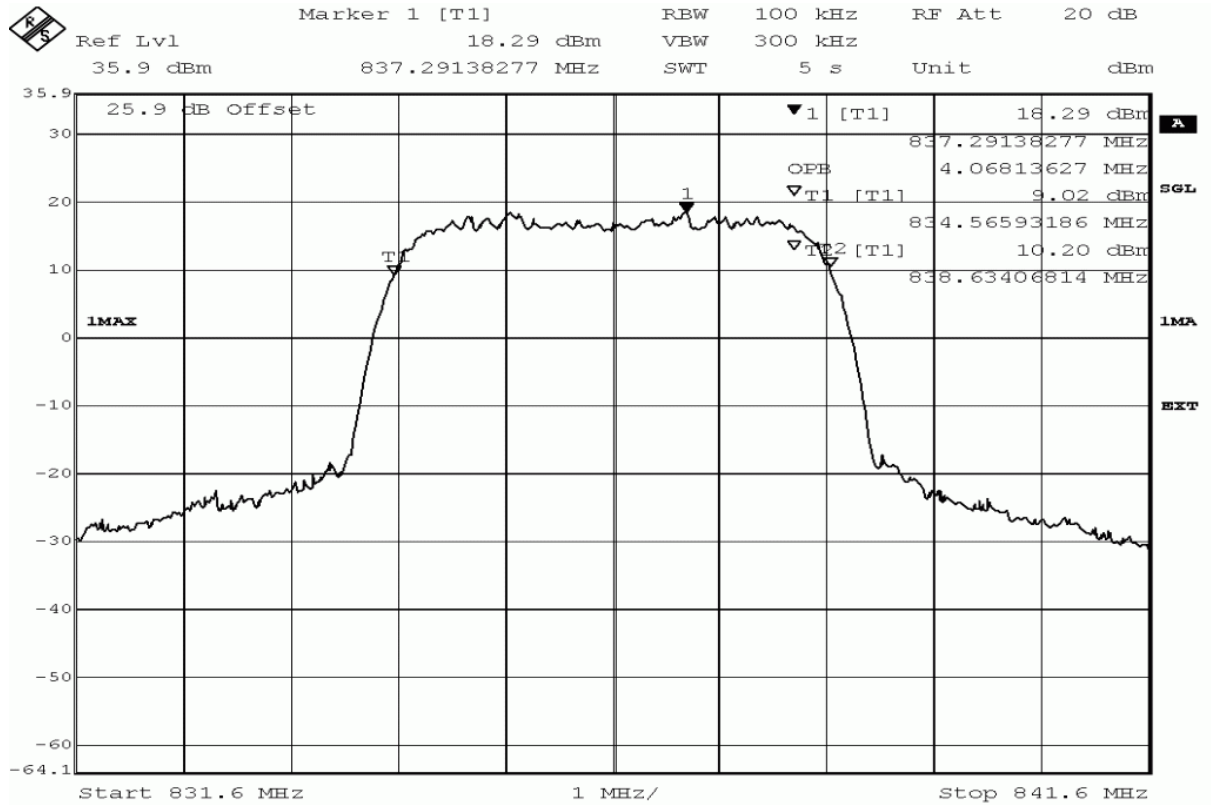
Title: bandwidth measurement  
Comment A: DE1015001, FDD V, occupied bandwidth (99%),  
channel 4132 (826.4MHz)  
Date: 6.MAY.2014 22:33:54

WCDMA 99% Bandwidth Low channel



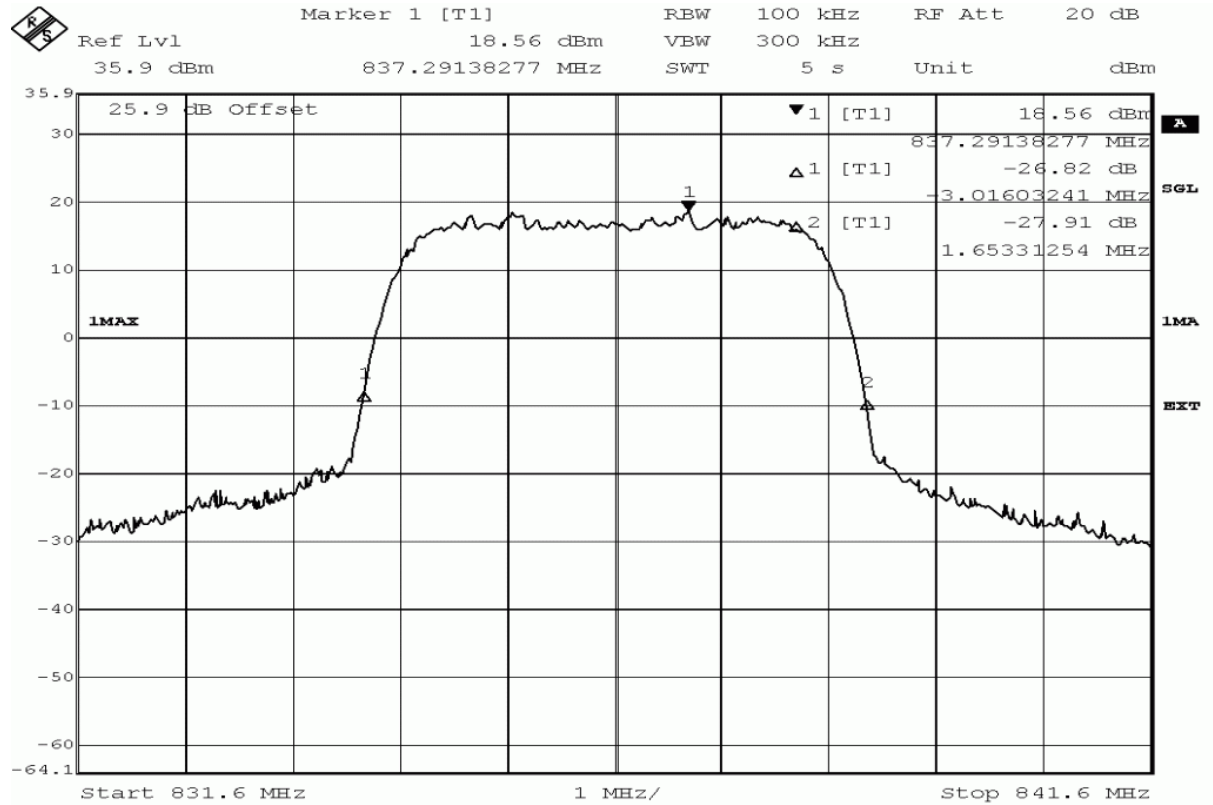
Title: bandwidth measurement  
Comment A: DE1015001, FDD V, 26dB bandwidth,  
channel 4132 (826.4MHz)  
Date: 6.MAY.2014 22:33:31

WCDMA 26dB Bandwidth Low channel



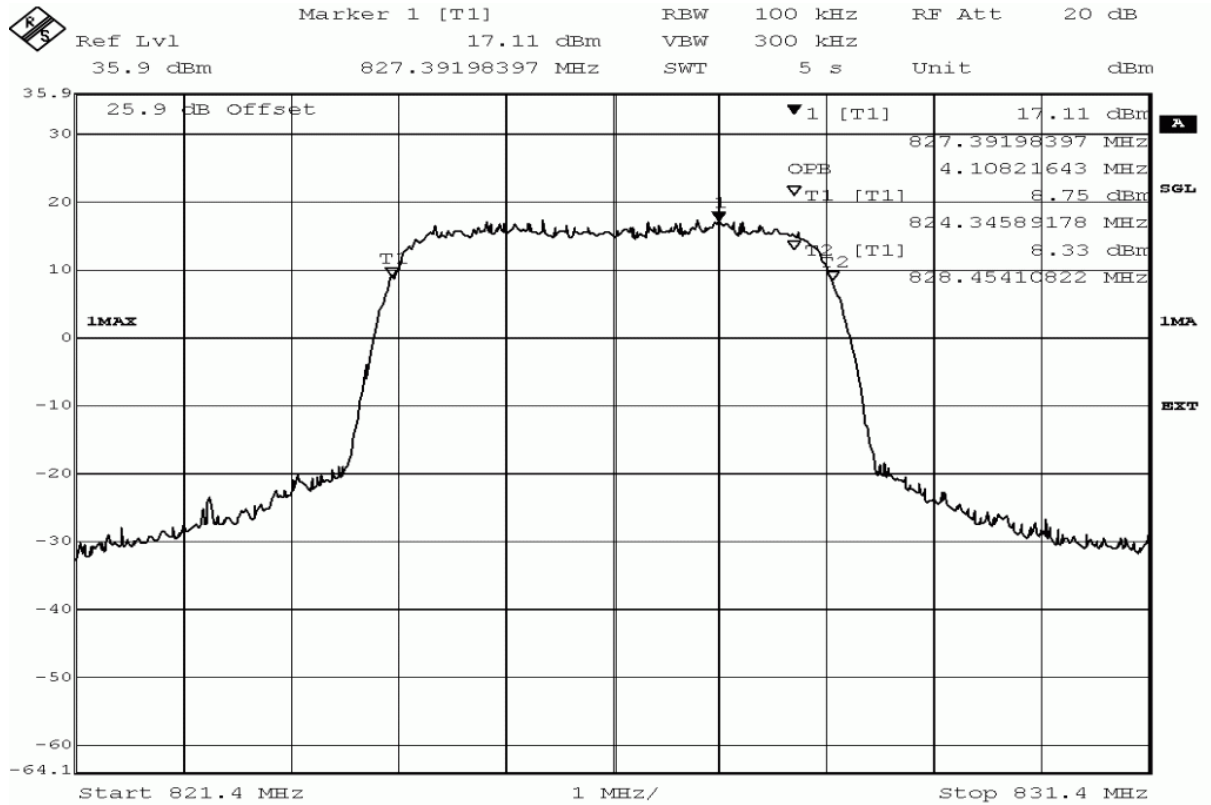
Title: bandwidth measurement  
Comment A: DE1015001, FDD V, occupied bandwidth (99%),  
channel 4183 (836.6MHz)  
Date: 6.MAY.2014 21:53:27

HSDPA 99% Bandwidth Mid channel



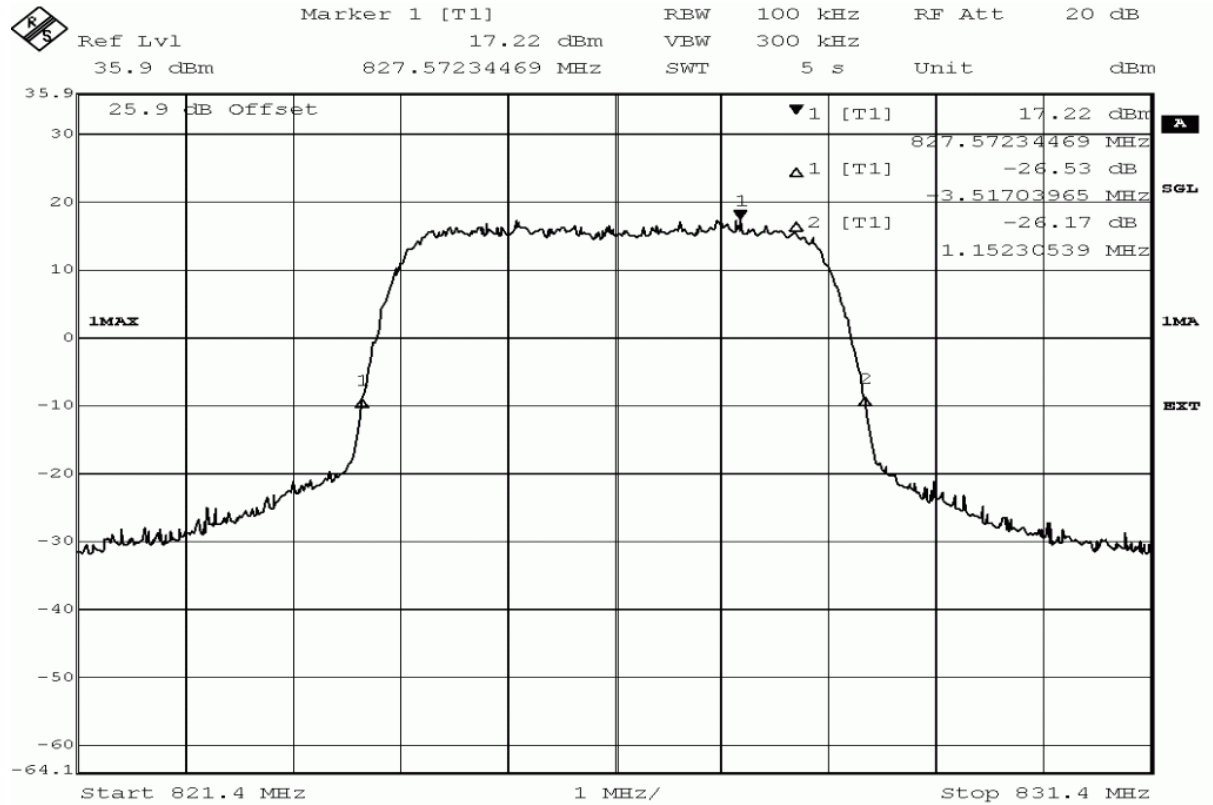
Title: bandwidth measurement  
 Comment A: DE1015001, FDD V, 26dB bandwidth,  
 channel 4183 (836.6MHz)  
 Date: 6.MAY.2014 21:53:04

HSDPA 26dB Bandwidth Mid channel



Title: bandwidth measurement  
Comment A: DE1015001, FDD V, occupied bandwidth (99%),  
channel 4132 (826.4MHz)  
Date: 6.MAY.2014 20:43:49

HSUPA 99% Bandwidth Low channel



Title: bandwidth measurement  
Comment A: DE1015001, FDD V, 26dB bandwidth,  
channel 4132 (826.4MHz)  
Date: 6.MAY.2014 20:43:26

HSUPA 26dB Bandwidth Low channel

### **3.5.6      22.6    Band edge compliance §2.1053, §22.917**

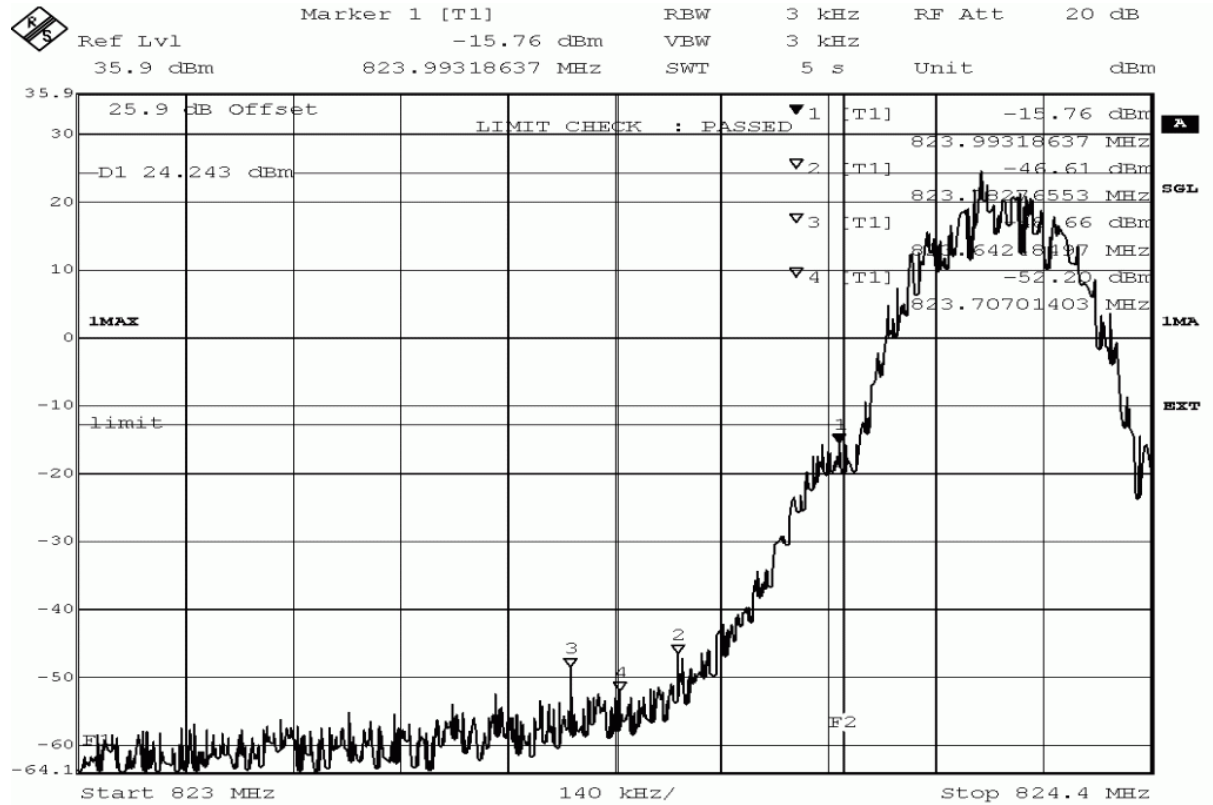
#### **Test: 22.6; Frequency Band = 850 / FDD5**

|                            |                                         |
|----------------------------|-----------------------------------------|
| <i>Result:</i>             | Passed                                  |
| <i>Setup No.:</i>          | S_AH02                                  |
| <i>Date of Test:</i>       | 2014/05/06   9:43                       |
| <i>Body:</i>               | FCC47CFRChIPART22PUBLIC MOBILE SERVICES |
| <i>Test Specification:</i> | FCC part 2 and 22                       |

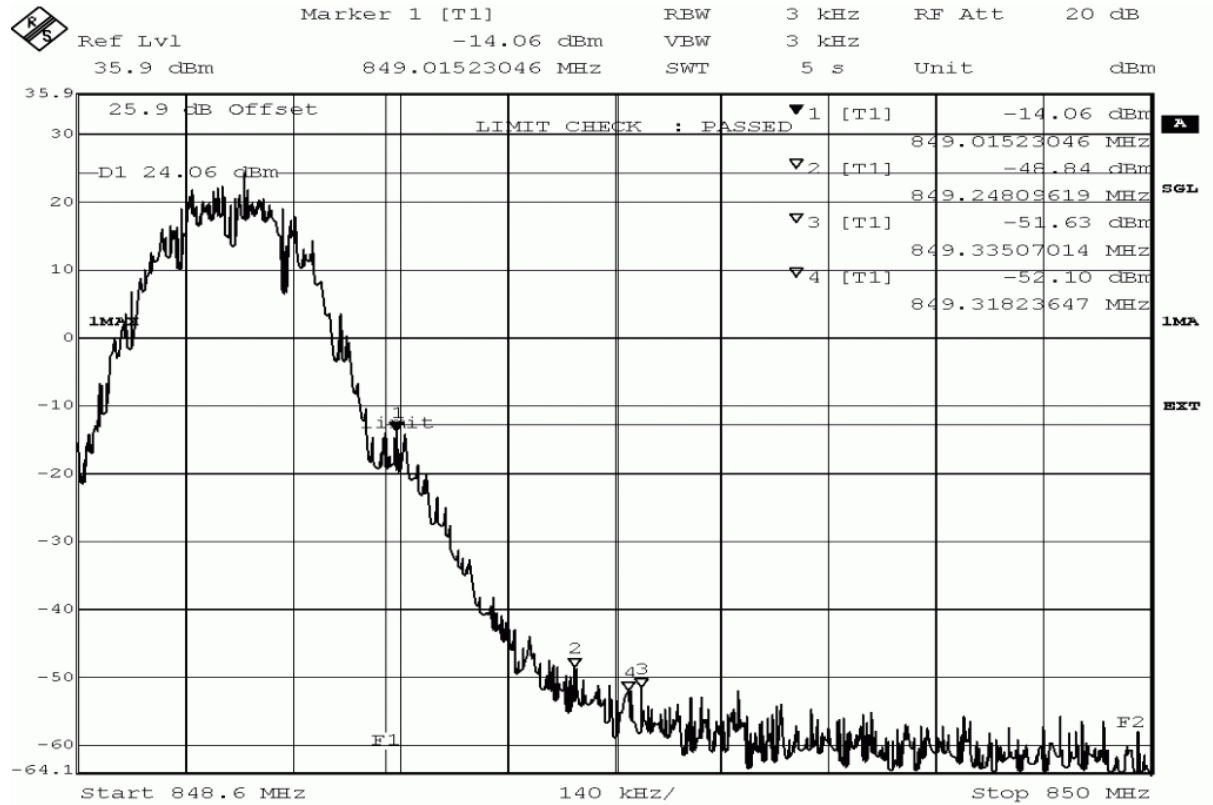
**Detailed Results:**

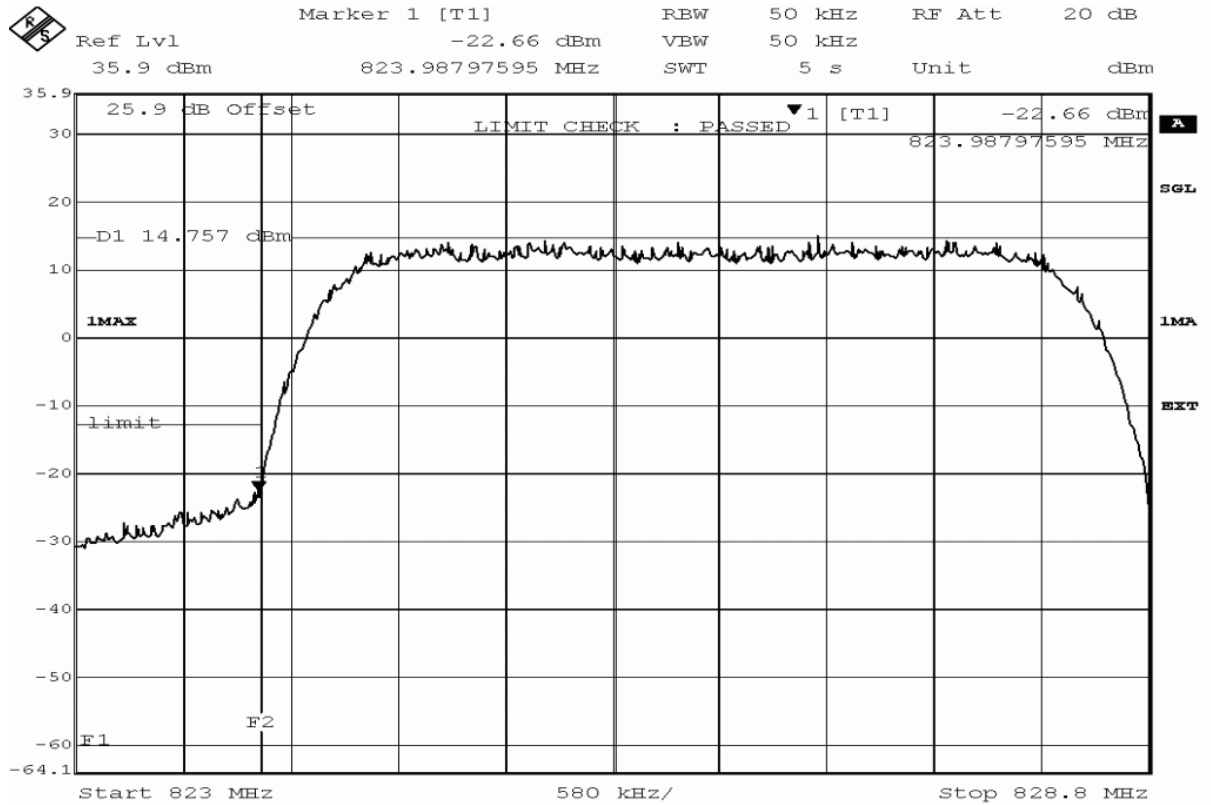
| Band  | Mode       | Modulation | Detector | Frequency (MHZ) | peak value /dBm | margin to limit /dB | limit /dBm | Verdict |
|-------|------------|------------|----------|-----------------|-----------------|---------------------|------------|---------|
| 850   | GSM / GPRS | GFSK       | peak     | 823.993         | -15.76          | 2.76                | -13.0      | passed  |
|       |            |            | average  | 823.979         | -34.09          | 21.09               | -13.0      | passed  |
|       |            |            | rms      | 823.979         | -26.41          | 13.41               | -13.0      | passed  |
|       |            |            | peak     | 849.015         | -14.06          | 1.06                | -13.0      | passed  |
|       |            |            | average  | 849.007         | -34.56          | 21.56               | -13.0      | passed  |
|       |            |            | rms      | 849.018         | -27.00          | 14.00               | -13.0      | passed  |
|       |            |            |          |                 |                 |                     |            |         |
|       |            |            |          |                 |                 |                     |            |         |
| Band  | Mode       | Modulation | Detector | Frequency (MHZ) | peak value /dBm | margin to limit /dB | limit /dBm | Verdict |
| FDD 5 | W-CDMA     | QPSK       | peak     | 823.988         | -22.66          | 9.66                | -13.0      | Pass    |
|       |            |            | average  | 824.000         | -30.12          | 17.12               | -13.0      | Pass    |
|       |            |            | rms      | 824.000         | -29.56          | 16.56               | -13.0      | Pass    |
|       |            |            | peak     | 849.140         | -21.33          | 8.33                | -13.0      | Pass    |
|       |            |            | average  | 849.105         | -31.04          | 18.04               | -13.0      | Pass    |
|       |            |            | rms      | 849.105         | -30.12          | 17.12               | -13.0      | Pass    |
|       | HSDPA      |            | peak     | 824.000         | -21.74          | 8.74                | -13.0      | Pass    |
|       |            |            | average  | 824.000         | -30.12          | 17.12               | -13.0      | Pass    |
|       |            |            | rms      | 824.000         | -29.30          | 16.30               | -13.0      | Pass    |
|       |            |            | peak     | 849.093         | -21.33          | 8.33                | -13.0      | Pass    |
|       |            |            | average  | 849.082         | -31.37          | 18.37               | -13.0      | Pass    |
|       |            |            | rms      | 849.093         | -30.42          | 17.42               | -13.0      | Pass    |
|       | HSUPA      |            | peak     | 824.000         | -21.97          | 8.97                | -13.0      | Pass    |
|       |            |            | average  | 824.000         | -30.72          | 17.72               | -13.0      | Pass    |
|       |            |            | rms      | 824.000         | -29.84          | 16.84               | -13.0      | Pass    |
|       |            |            | peak     | 849.163         | -20.81          | 7.81                | -13.0      | Pass    |
|       |            |            | average  | 849.082         | -31.71          | 18.71               | -13.0      | Pass    |
|       |            |            | rms      | 849.093         | -30.72          | 17.72               | -13.0      | Pass    |





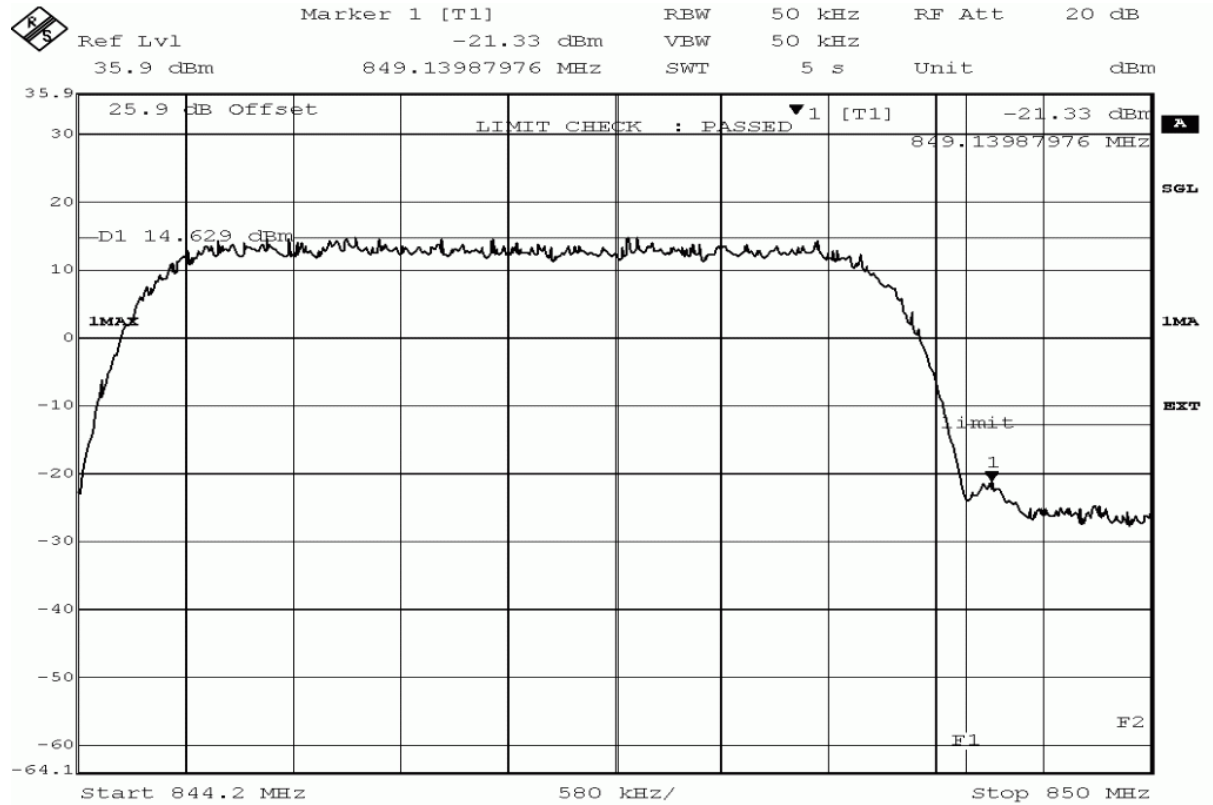
GSM Low channel





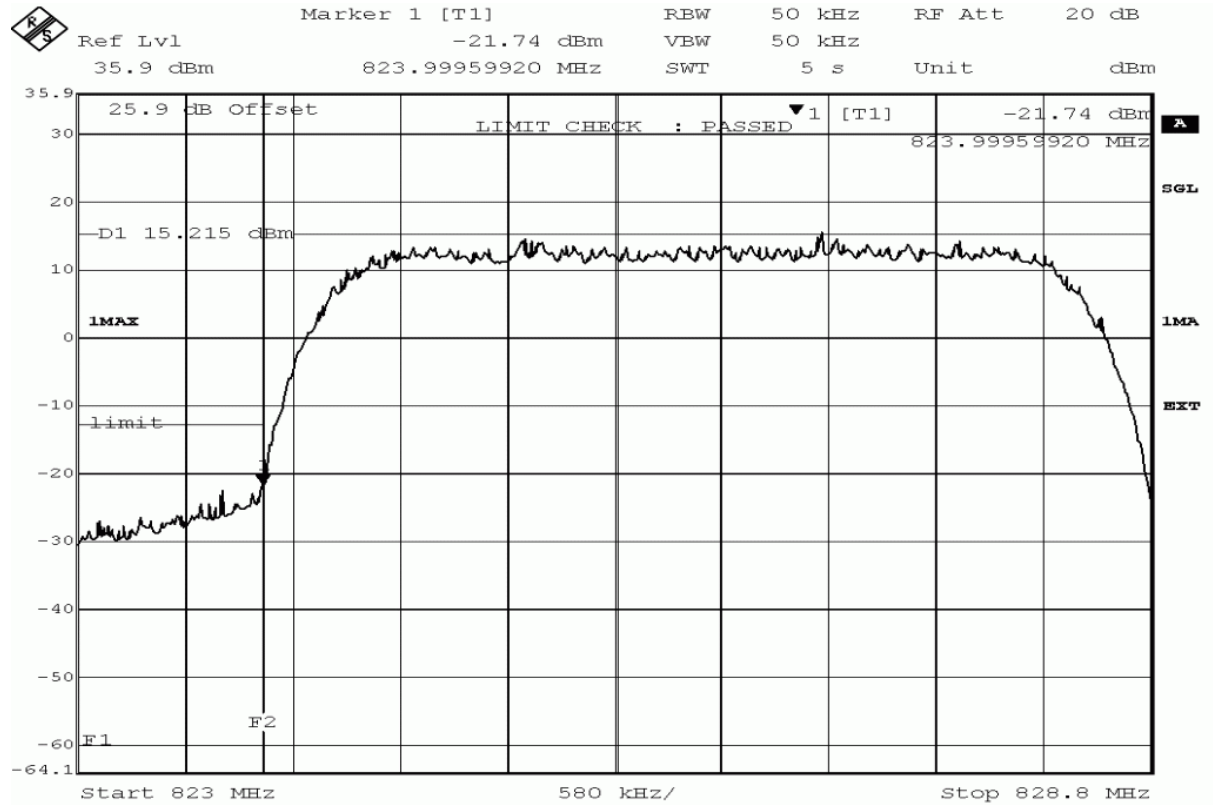
Title: band edge compliance measurement  
 Comment A: DE1015001, FDD V, band edge compliance,  
 channel 4132 (826.4MHz)  
 Date: 6.MAY.2014 22:34:17

WCDMA Low channel



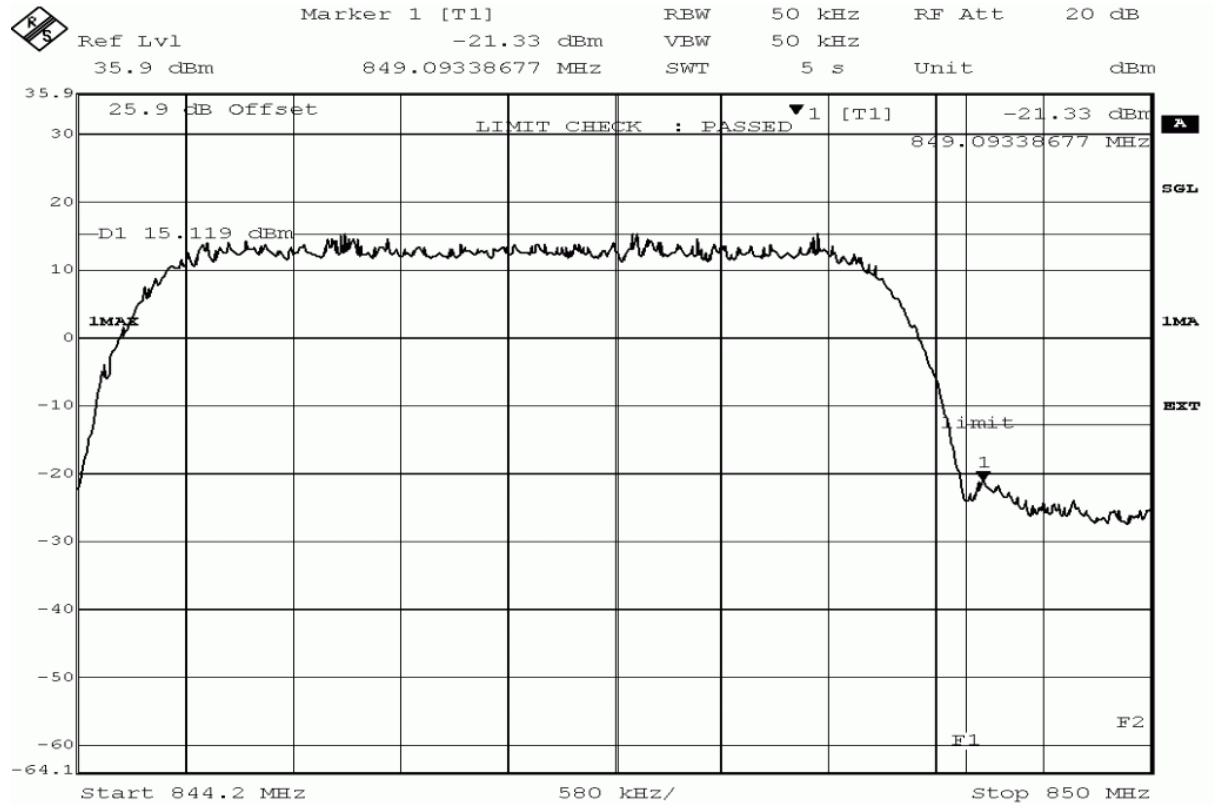
Title: band edge compliance measurement  
 Comment A: DE1015001, FDD V, band edge compliance,  
 channel 4233 (846.6MHz)  
 Date: 6.MAY.2014 22:46:25

WCDMA High channel



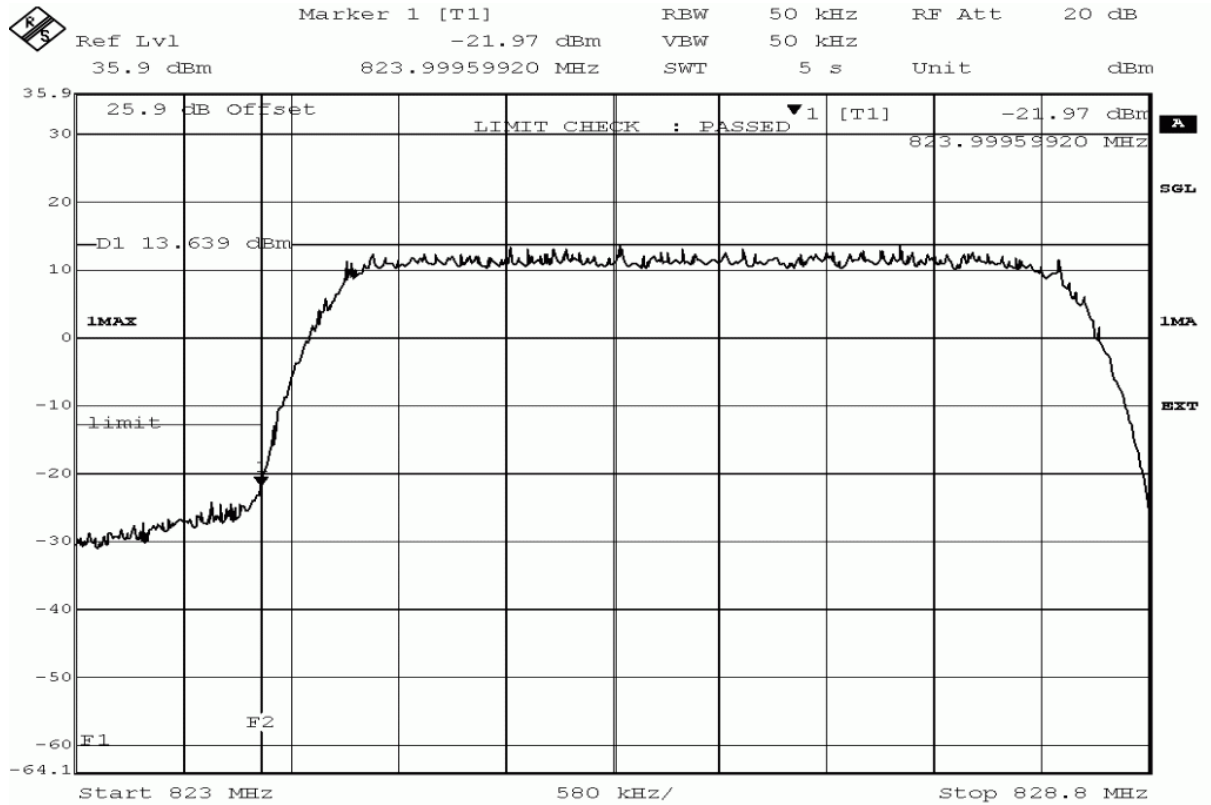
Title: band edge compliance measurement  
 Comment A: DE1015001, FDD V, band edge compliance,  
 channel 4132 (826.4MHz)  
 Date: 6.MAY.2014 21:47:04

HSDPA Low Channel



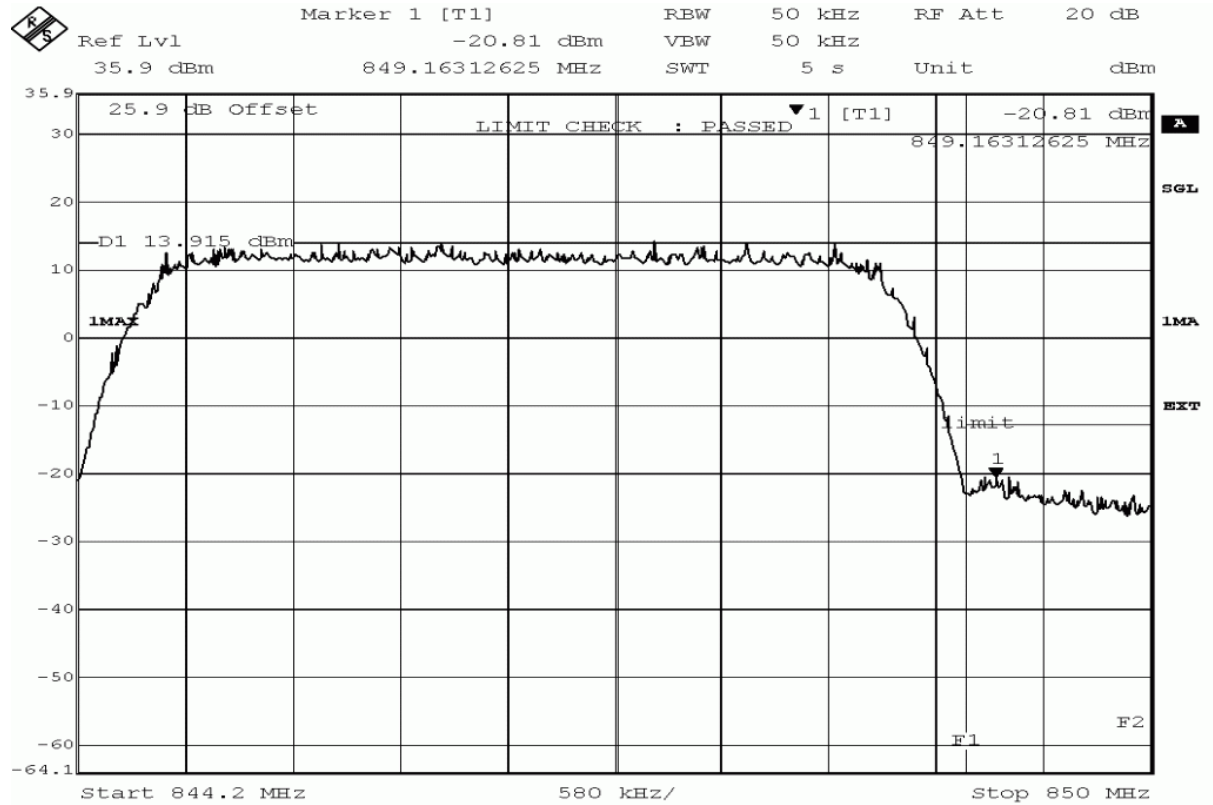
Title: band edge compliance measurement  
 Comment A: DE1015001, FDD V, band edge compliance,  
 channel 4233 (846.6MHz)  
 Date: 6.MAY.2014 21:59:18

HSDPA High Channel



Title: band edge compliance measurement  
 Comment A: DE1015001, FDD V, band edge compliance,  
 channel 4132 (826.4MHz)  
 Date: 6.MAY.2014 20:44:12

HSUPA Low Channel



Title: band edge compliance measurement  
 Comment A: DE1015001, FDD V, band edge compliance,  
 channel 4233 (846.6MHz)  
 Date: 6.MAY.2014 21:04:20

HSUPA High Channel



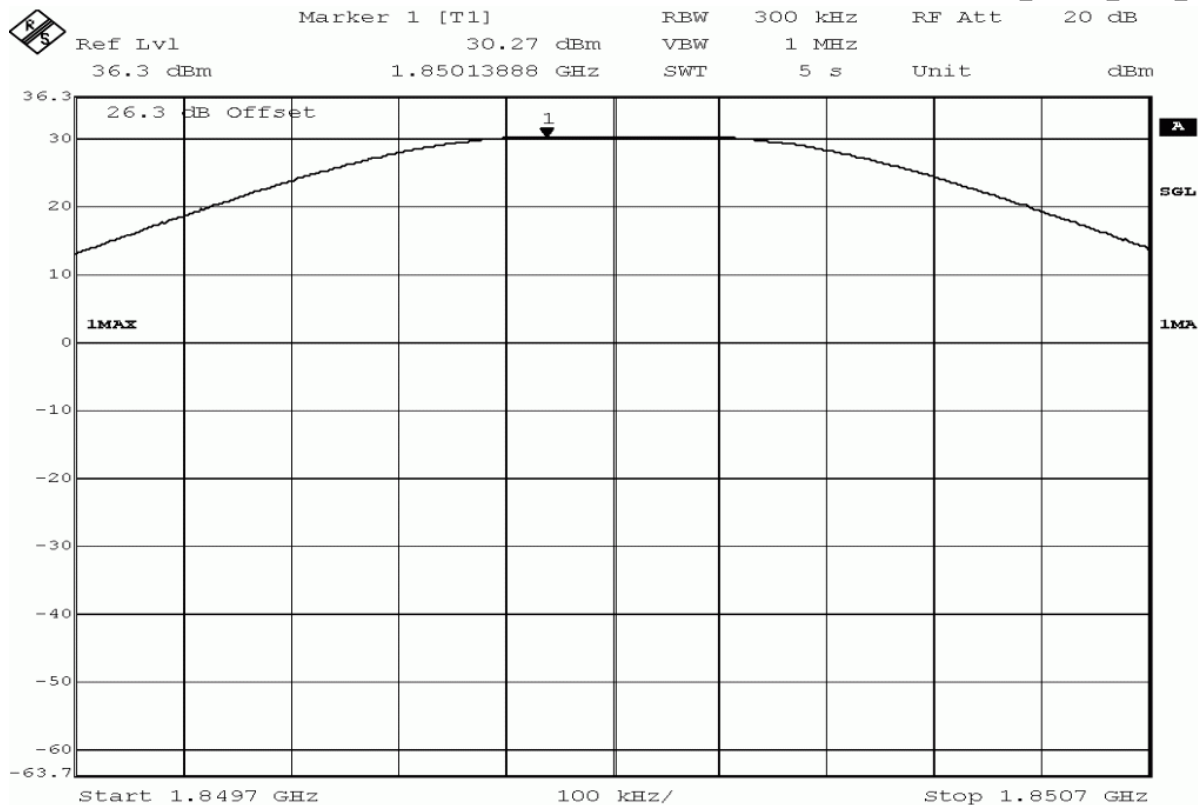
### **3.5.7      24.1   RF Power Output §2.1046, §24.232**

#### **Test: 24.1; Frequency Band = 1900 / FDD 2**

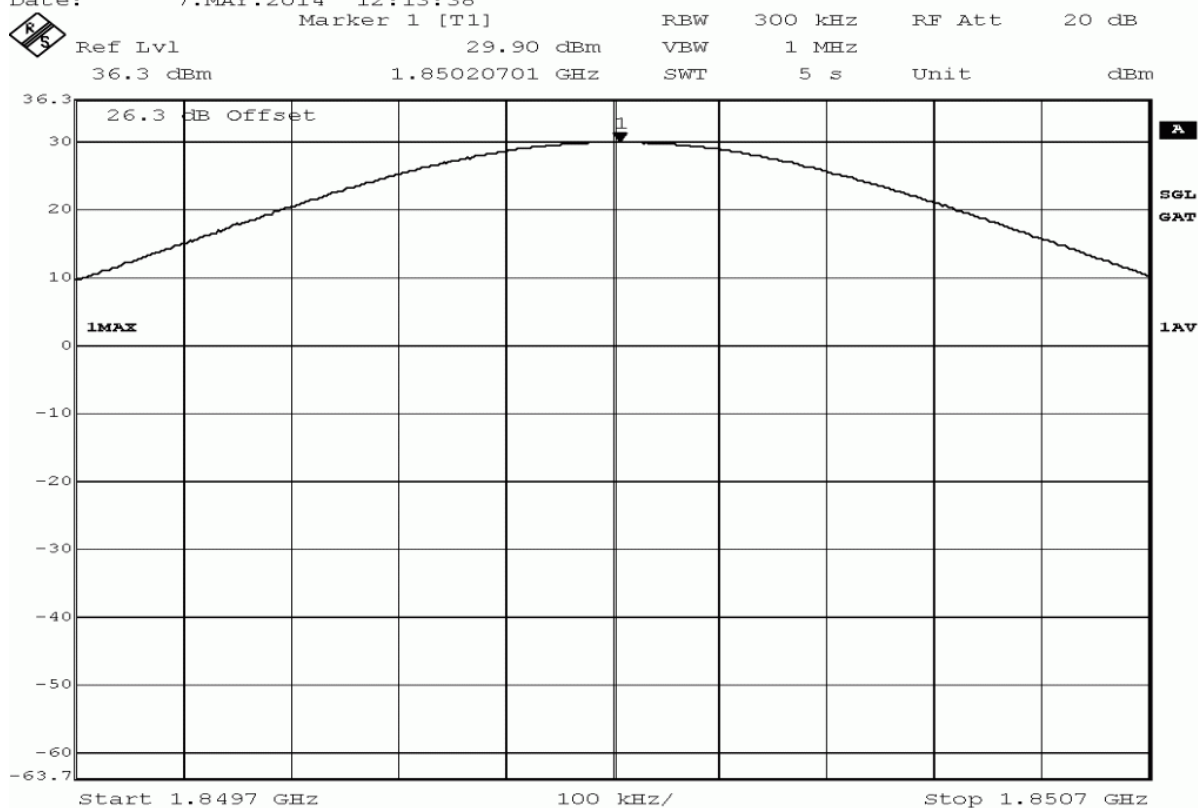
|                            |                                                   |
|----------------------------|---------------------------------------------------|
| <i>Result:</i>             | Passed                                            |
| <i>Setup No.:</i>          | S_AH02                                            |
| <i>Date of Test:</i>       | 2014/05/07   8:49                                 |
| <i>Body:</i>               | FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES |
| <i>Test Specification:</i> | FCC part 2 and 24                                 |

**Detailed Results:**

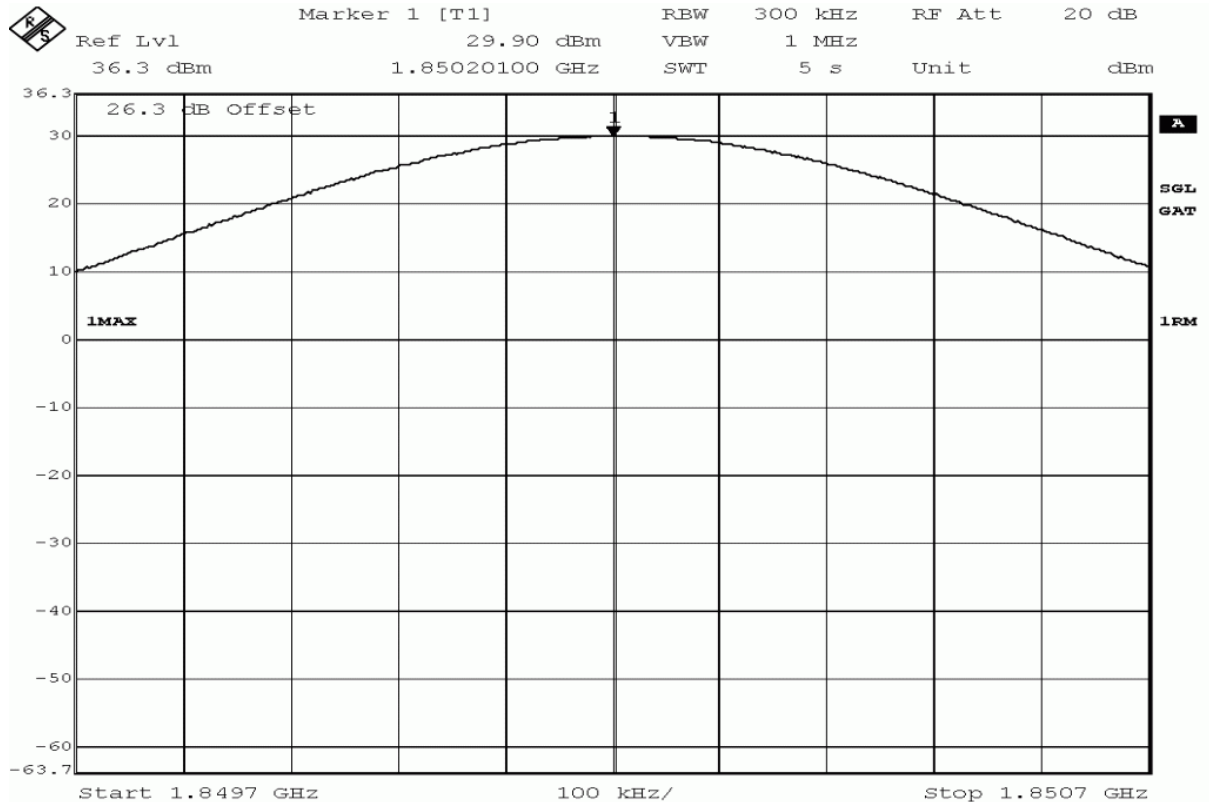
| Band  | Mode            | Modulation | Channel | Frequency (MHz) | Average Conducted power | RMS Conducted power | Peak Conducted power | FCC EIRP limit (W) | IC EIRP limit per SRSP-503 (W) | Maximum antenna gain (dBi) | Verdict |
|-------|-----------------|------------|---------|-----------------|-------------------------|---------------------|----------------------|--------------------|--------------------------------|----------------------------|---------|
| 1900  | GSM / GPRS      | GFSK       | Low     | 1850.2          | 29.9                    | 29.9                | 30.27                | 2                  | 2                              | 3.1                        | Pass    |
|       |                 |            | Mid     | 1880            | 29.55                   | 29.57               | 29.93                |                    |                                | 3.43                       | Pass    |
|       |                 |            | High    | 1909.8          | 29.34                   | 29.36               | 29.73                |                    |                                | 3.64                       | Pass    |
|       |                 |            |         |                 |                         |                     |                      |                    |                                |                            |         |
| Band  | Mode            | Modulation | Channel | Frequency (MHz) | Average Conducted power | RMS Conducted power | Peak Conducted power | FCC EIRP limit (W) | IC EIRP limit per SRSP-503 (W) | Maximum antenna gain (dBi) | Verdict |
| FDD 2 | W-CDMA          | QPSK       | Low     | 1852.4          | 22                      | 22.28               | 27.59                | 2                  | 2                              | 10.72                      | Pass    |
|       |                 |            | Mid     | 1880            | 21.94                   | 22.18               | 27.84                |                    |                                | 10.82                      | Pass    |
|       |                 |            | High    | 1907.6          | 21.37                   | 21.63               | 27.22                |                    |                                | 11.37                      | Pass    |
| FDD 2 | HSDPA Subtest 1 | QPSK       | Low     | 1852.4          | 21.84                   | 22.09               | 27.59                | 2                  | 2                              | 10.91                      | Pass    |
|       |                 |            | Mid     | 1880            | 21.77                   | 22.03               | 27.59                |                    |                                | 10.97                      | Pass    |
|       |                 |            | High    | 1907.6          | 21.17                   | 21.42               | 26.95                |                    |                                | 11.58                      | Pass    |
| FDD 2 | HSDPA Subtest 2 | QPSK       | Low     | 1852.4          | 19.96                   | 20.75               | 28.89                | 2                  | 2                              | 12.25                      | Pass    |
|       |                 |            | Mid     | 1880            | 19.76                   | 20.56               | 28.52                |                    |                                | 12.44                      | Pass    |
|       |                 |            | High    | 1907.6          | 19.44                   | 20.17               | 27.84                |                    |                                | 12.83                      | Pass    |
| FDD 2 | HSDPA Subtest 3 | QPSK       | Low     | 1852.4          | 19.23                   | 20.23               | 28.52                | 2                  | 2                              | 12.77                      | Pass    |
|       |                 |            | Mid     | 1880            | 19.11                   | 20.04               | 28.39                |                    |                                | 12.96                      | Pass    |
|       |                 |            | High    | 1907.6          | 18.68                   | 19.53               | 27.72                |                    |                                | 13.47                      | Pass    |
| FDD 2 | HSDPA Subtest 4 | QPSK       | Low     | 1852.4          | 18.75                   | 19.75               | 27.72                | 2                  | 2                              | 13.25                      | Pass    |
|       |                 |            | Mid     | 1880            | 18.56                   | 19.68               | 28.26                |                    |                                | 13.32                      | Pass    |
|       |                 |            | High    | 1907.6          | 18.17                   | 19.31               | 27.84                |                    |                                | 13.69                      | Pass    |
| FDD 2 | HSUPA Subtest 1 | QPSK       | Low     | 1852.4          | 20.77                   | 21.18               | 28.64                | 2                  | 2                              | 11.82                      | Pass    |
|       |                 |            | Mid     | 1880            | 20.52                   | 20.92               | 28.26                |                    |                                | 12.08                      | Pass    |
|       |                 |            | High    | 1907.6          | 20.01                   | 20.45               | 27.72                |                    |                                | 12.55                      | Pass    |
| FDD 2 | HSUPA Subtest 2 | QPSK       | Low     | 1852.4          | 18.74                   | 19.65               | 28.1                 | 2                  | 2                              | 13.35                      | Pass    |
|       |                 |            | Mid     | 1880            | 18.53                   | 19.46               | 28.1                 |                    |                                | 13.54                      | Pass    |
|       |                 |            | High    | 1907.6          | 18.18                   | 19.1                | 27.44                |                    |                                | 13.9                       | Pass    |
| FDD 2 | HSUPA Subtest 3 | QPSK       | Low     | 1852.4          | 19.99                   | 20.77               | 29.02                | 2                  | 2                              | 12.23                      | Pass    |
|       |                 |            | Mid     | 1880            | 19.89                   | 20.69               | 29.17                |                    |                                | 12.31                      | Pass    |
|       |                 |            | High    | 1907.6          | 19.39                   | 20.17               | 28.39                |                    |                                | 12.83                      | Pass    |
| FDD 2 | HSUPA Subtest 4 | QPSK       | Low     | 1852.4          | 19.25                   | 20.19               | 28.1                 | 2                  | 2                              | 12.82                      | Pass    |
|       |                 |            | Mid     | 1880            | 19.08                   | 20.02               | 27.97                |                    |                                | 12.98                      | Pass    |
|       |                 |            | High    | 1907.6          | 18.57                   | 19.52               | 27.31                |                    |                                | 13.48                      | Pass    |
| FDD 2 | HSUPA Subtest 4 | QPSK       | Low     | 1852.4          | 20.36                   | 20.74               | 27.97                | 2                  | 2                              | 12.26                      | Pass    |
|       |                 |            | Mid     | 1880            | 20.56                   | 20.96               | 28.1                 |                    |                                | 12.04                      | Pass    |
|       |                 |            | High    | 1907.6          | 20.13                   | 20.58               | 27.72                |                    |                                | 12.42                      | Pass    |



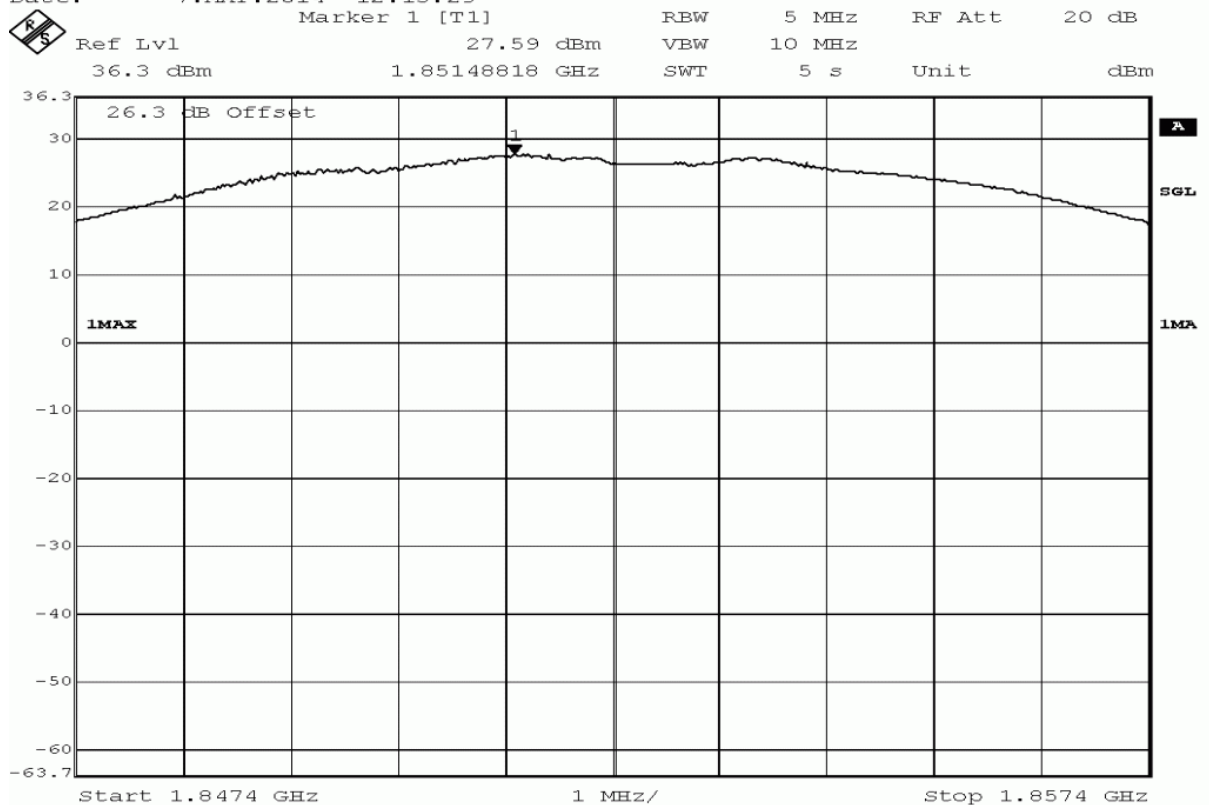
Title: output power measurement  
Comment A: DE1015001, GSM1900, output power,  
channel 512 (1850.2MHz)  
Date: 7.MAY.2014 12:13:38



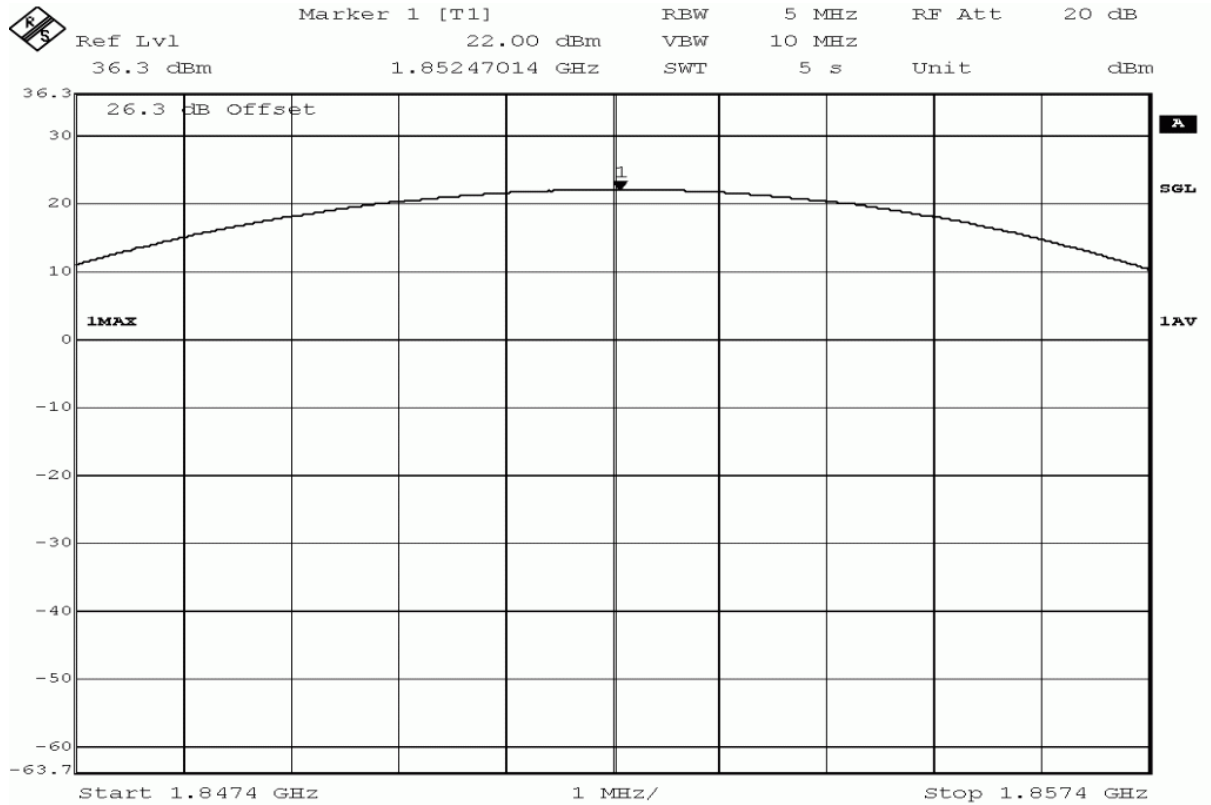
Title: output power measurement  
Comment A: DE1015001, GSM1900, output power,  
channel 512 (1850.2MHz)  
Date: 7.MAY.2014 12:14:33



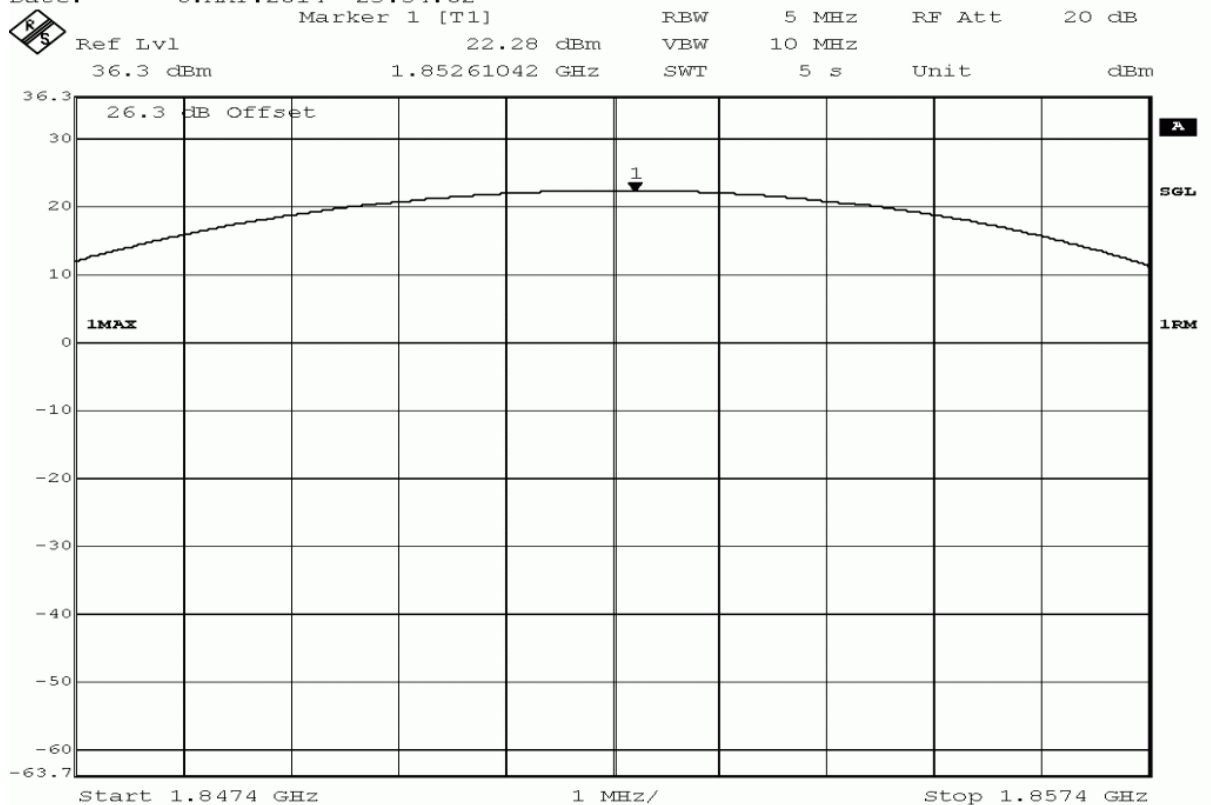
Title: output power measurement  
Comment A: DE1015001, GSM1900, output power,  
channel 512 (1850.2MHz)  
Date: 7.MAY.2014 12:15:29



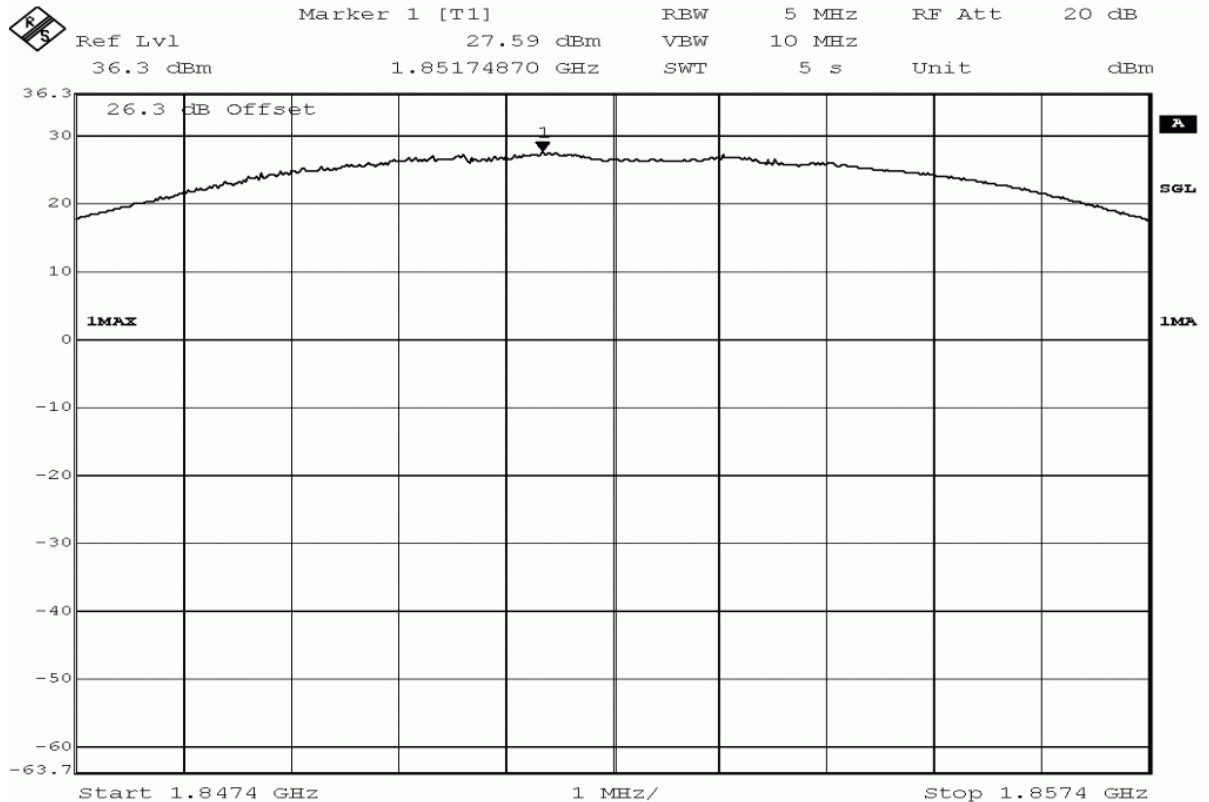
Title: output power measurement  
Comment A: DE1015001, FDD II, output power,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 23:53:45



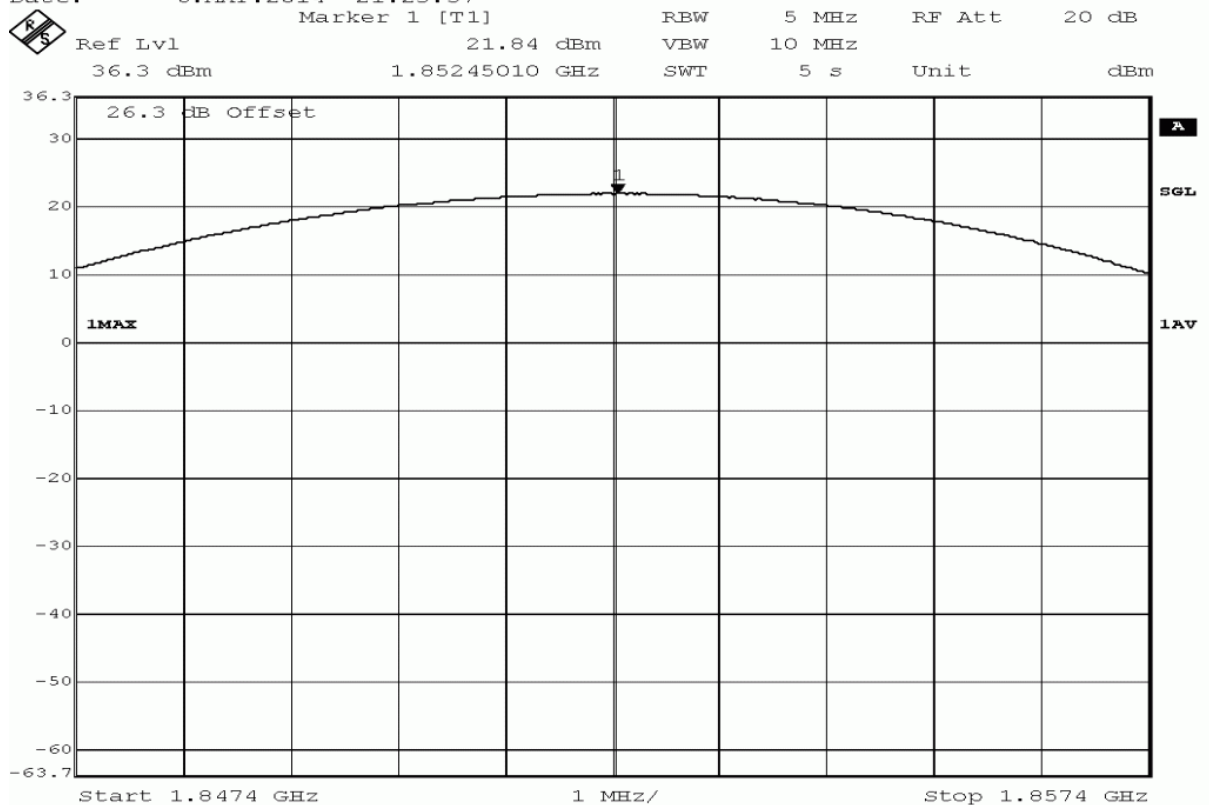
Title: output power measurement  
Comment A: DE1015001, FDD II, output power,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 23:54:02



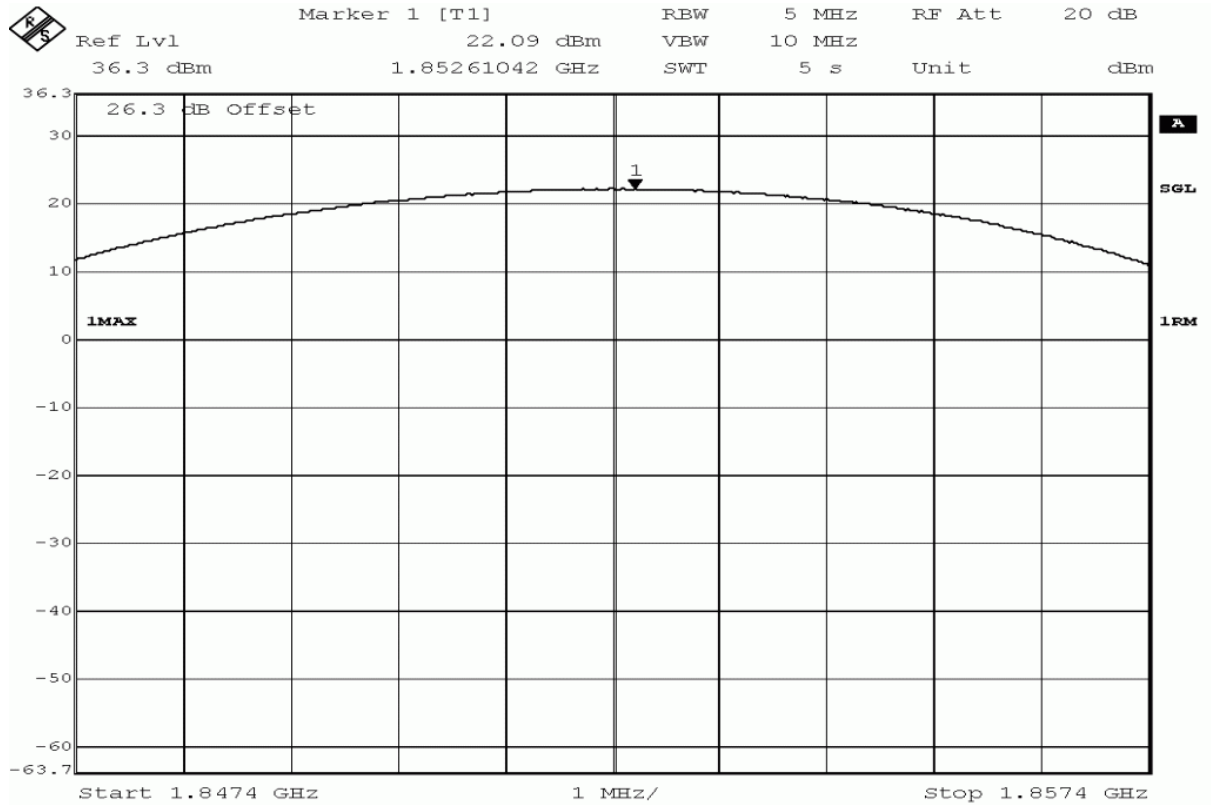
Title: output power measurement  
Comment A: DE1015001, FDD II, output power,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 23:54:19



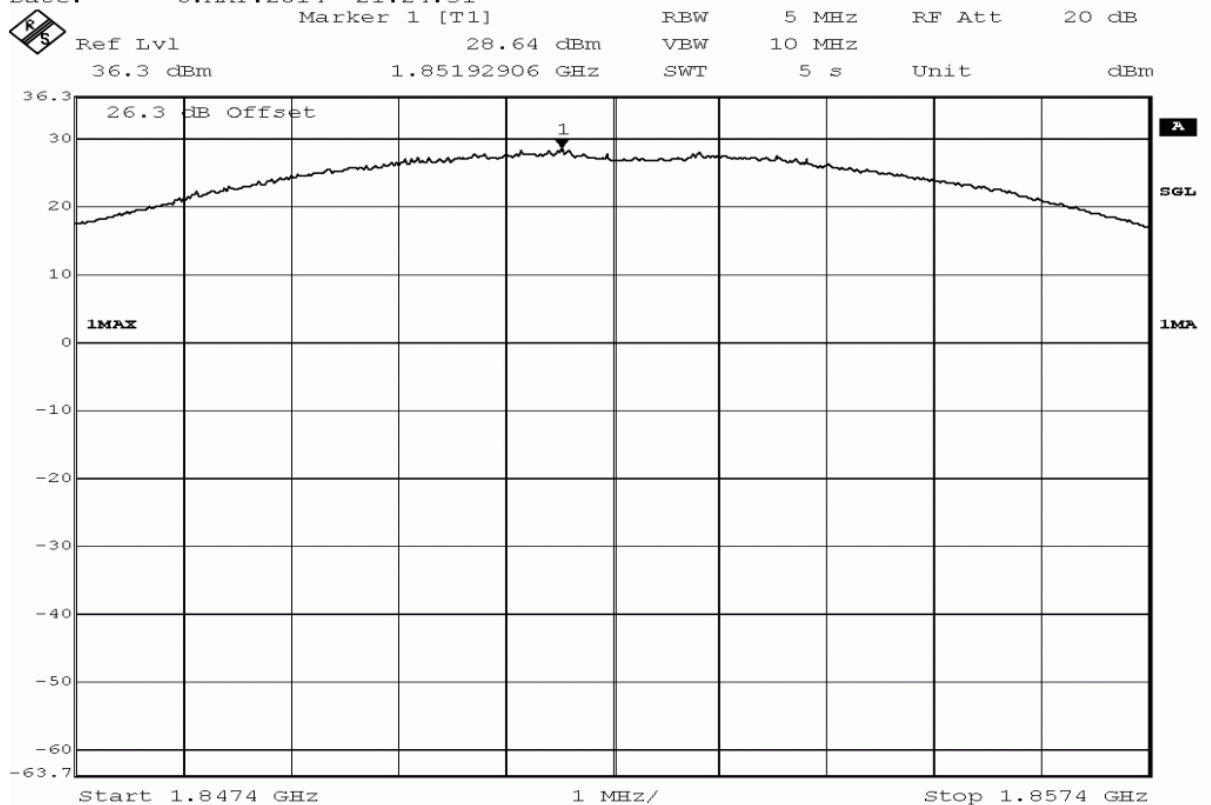
Title: output power measurement  
Comment A: DE1015001, subtest 1 HSDPA FDD II, output power,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 21:23:57



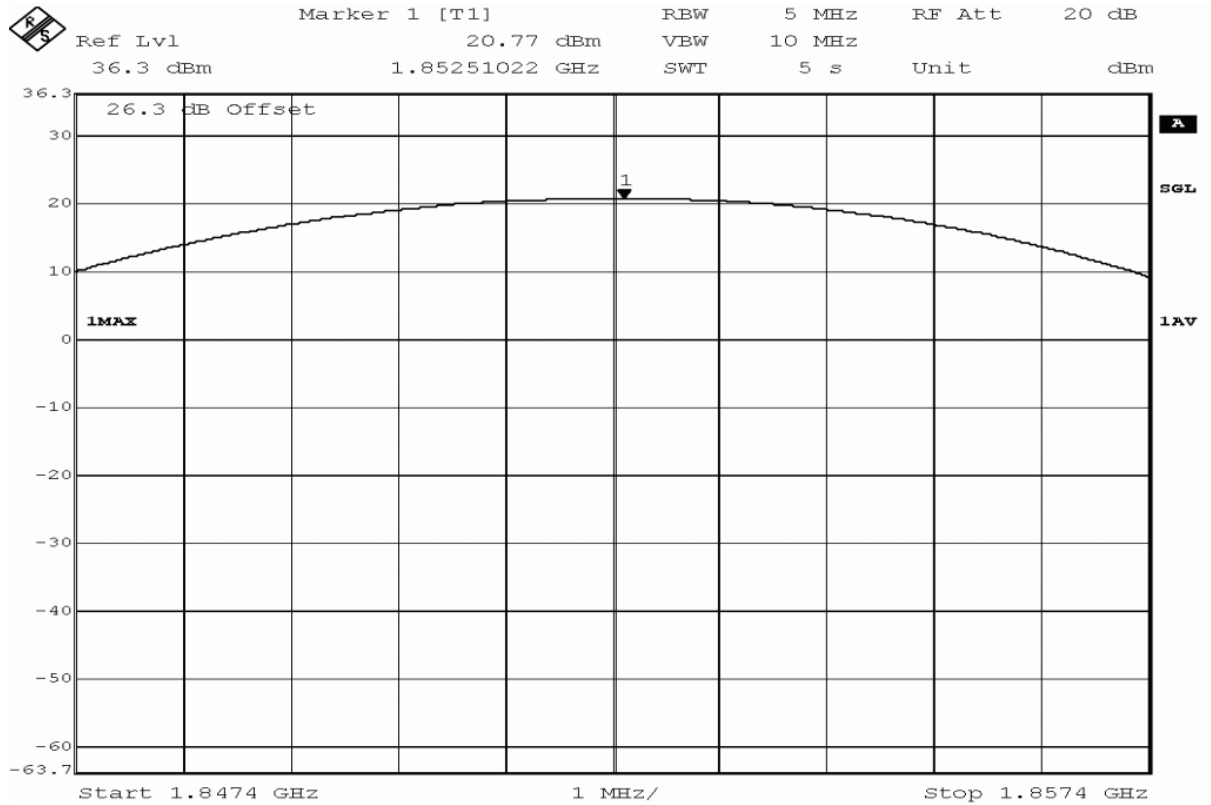
Title: output power measurement  
Comment A: DE1015001, subtest 1 HSDPA FDD II, output power,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 21:24:14



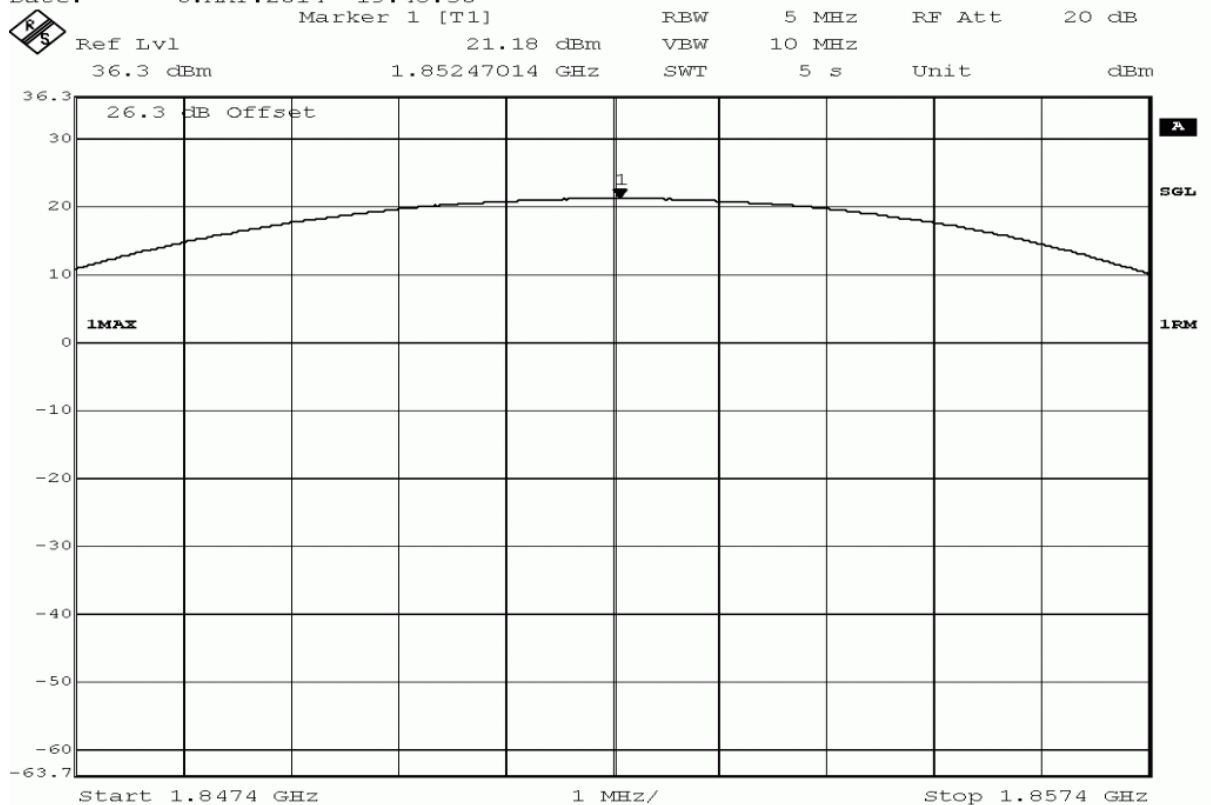
Title: output power measurement  
Comment A: DE1015001, subtest 1 HSDPA FDD II, output power,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 21:24:31



Title: output power measurement  
Comment A: DE1015001, subtest 1 HSUPA FDD II, output power,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 19:48:13



Title: output power measurement  
Comment A: DE1015001, subtest 1 HSUPA FDD II, output power,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 19:48:30



Title: output power measurement  
Comment A: DE1015001, subtest 1 HSUPA FDD II, output power,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 19:48:47



### **3.5.8      24.2    Frequency stability §2.1055, §24.235**

#### **Test: 24.2; Frequency Band = 1900 / FDD2**

|                            |                                                   |
|----------------------------|---------------------------------------------------|
| <i>Result:</i>             | Passed                                            |
| <i>Setup No.:</i>          | S_AH02                                            |
| <i>Date of Test:</i>       | 2014/04/30 9:15                                   |
| <i>Body:</i>               | FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES |
| <i>Test Specification:</i> | FCC part 2 and 24                                 |

### Detailed Results:

#### GSM 1900 Freq Stability

| Temp. °C | Duration min | Voltage                     | Limit Hz | Freq. error Average (Hz) | Freq. error Max. (Hz) | Verdict |
|----------|--------------|-----------------------------|----------|--------------------------|-----------------------|---------|
| -30      | 0            | normal                      | 4700     | 20                       | 38                    | passed  |
| -30      | 5            |                             |          | 9                        | 22                    | passed  |
| -30      | 10           |                             |          | 8                        | 29                    | passed  |
| -20      | 0            | normal                      | 4700     | 13                       | 30                    | passed  |
| -20      | 5            |                             |          | 4                        | 25                    | passed  |
| -20      | 10           |                             |          | 6                        | 27                    | passed  |
| -10      | 0            | normal                      | 4700     | 13                       | 23                    | passed  |
| -10      | 5            |                             |          | 7                        | 16                    | passed  |
| -10      | 10           |                             |          | 6                        | 26                    | passed  |
| 0        | 0            | normal                      | 4700     | 5                        | 21                    | passed  |
| 0        | 5            |                             |          | 5                        | 23                    | passed  |
| 0        | 10           |                             |          | 6                        | 28                    | passed  |
| 10       | 0            | normal                      | 4700     | 4                        | 20                    | passed  |
| 10       | 5            |                             |          | 4                        | 22                    | passed  |
| 10       | 10           |                             |          | 11                       | 27                    | passed  |
| 20       | 0            | low                         | 4700     | 8                        | 23                    | passed  |
| 20       | 5            |                             |          | 10                       | 15                    | passed  |
| 20       | 10           |                             |          | 11                       | 23                    | passed  |
| 20       | 0            | normal = high <sup>1)</sup> | 4700     | 11                       | 28                    | passed  |
| 20       | 5            |                             |          | 13                       | 23                    | passed  |
| 20       | 10           |                             |          | 5                        | 13                    | passed  |
| 20       | 0            | high                        | 4700     | 1                        | 20                    | passed  |
| 20       | 5            |                             |          | 9                        | 16                    | passed  |
| 20       | 10           |                             |          | 17                       | 83                    | passed  |
| 30       | 0            | normal                      | 4700     | 3                        | -23                   | passed  |
| 30       | 5            |                             |          | 12                       | 19                    | passed  |
| 30       | 10           |                             |          | 11                       | 23                    | passed  |
| 40       | 0            | normal                      | 4700     | 5                        | 24                    | passed  |
| 40       | 5            |                             |          | 5                        | 25                    | passed  |
| 40       | 10           |                             |          | 9                        | 24                    | passed  |
| 50       | 0            | normal                      | 4700     | 6                        | 28                    | passed  |
| 50       | 5            |                             |          | 14                       | 23                    | passed  |
| 50       | 10           |                             |          | -1                       | 29                    | passed  |

| Battery operating end point voltage <sup>2)</sup> |              |           |          |                          |                       |         |
|---------------------------------------------------|--------------|-----------|----------|--------------------------|-----------------------|---------|
| Temp. °C                                          | Duration min | Voltage V | Limit Hz | Freq. error Average (Hz) | Freq. error Max. (Hz) | Verdict |
| 20                                                | 0            | 3.2       | 4700     | -2                       | 26                    | passed  |
| 20                                                | 5            |           |          | 11                       | 28                    | passed  |
| 20                                                | 10           |           |          | 11                       | 21                    | passed  |

1) The manufacturer declared that normal voltage is equivalent with high voltage.

2) The call is established at high voltage and the voltage is then reduced to the battery operating end.

WCDMA FDD2 Freq Stability

| Temp. °C | Duration min | Voltage                     | Limit Hz | Freq. error Average (Hz) | Freq. error Max. (Hz) | Verdict |
|----------|--------------|-----------------------------|----------|--------------------------|-----------------------|---------|
| -30      | 0            | normal                      | 4700     | 36                       | 78                    | passed  |
| -30      | 5            |                             |          | 2                        | 56                    | passed  |
| -30      | 10           |                             |          | 4                        | 56                    | passed  |
| -20      | 0            | normal                      | 4700     | 31                       | 72                    | passed  |
| -20      | 5            |                             |          | -35                      | -54                   | passed  |
| -20      | 10           |                             |          | -18                      | -54                   | passed  |
| -10      | 0            | normal                      | 4700     | -16                      | -64                   | passed  |
| -10      | 5            |                             |          | -23                      | -67                   | passed  |
| -10      | 10           |                             |          | 16                       | -67                   | passed  |
| 0        | 0            | normal                      | 4700     | -44                      | -109                  | passed  |
| 0        | 5            |                             |          | -51                      | -109                  | passed  |
| 0        | 10           |                             |          | -13                      | -109                  | passed  |
| 10       | 0            | normal                      | 4700     | -40                      | -107                  | passed  |
| 10       | 5            |                             |          | -27                      | -107                  | passed  |
| 10       | 10           |                             |          | 21                       | -107                  | passed  |
| 20       | 0            | low                         | 4700     | -23                      | -53                   | passed  |
| 20       | 5            |                             |          | -38                      | -42                   | passed  |
| 20       | 10           |                             |          | -25                      | -35                   | passed  |
| 20       | 0            | normal = high <sup>1)</sup> | 4700     | -27                      | -54                   | passed  |
| 20       | 5            |                             |          | -32                      | -51                   | passed  |
| 20       | 10           |                             |          | -29                      | -33                   | passed  |
| 20       | 0            | high                        | 4700     | -33                      | -60                   | passed  |
| 20       | 5            |                             |          | -29                      | -52                   | passed  |
| 20       | 10           |                             |          | 1                        | 5                     | passed  |
| 30       | 0            | normal                      | 4700     | -34                      | -44                   | passed  |
| 30       | 5            |                             |          | -29                      | -32                   | passed  |
| 30       | 10           |                             |          | -32                      | -48                   | passed  |
| 40       | 0            | normal                      | 4700     | -24                      | -84                   | passed  |
| 40       | 5            |                             |          | 21                       | 52                    | passed  |
| 40       | 10           |                             |          | 11                       | -79                   | passed  |
| 50       | 0            | normal                      | 4700     | -32                      | -64                   | passed  |
| 50       | 5            |                             |          | 9                        | -64                   | passed  |
| 50       | 10           |                             |          | 2                        | -64                   | passed  |

| Battery operating end point voltage <sup>2)</sup> |              |           |          |                          |                       |         |
|---------------------------------------------------|--------------|-----------|----------|--------------------------|-----------------------|---------|
| Temp. °C                                          | Duration min | Voltage V | Limit Hz | Freq. error Average (Hz) | Freq. error Max. (Hz) | Verdict |
| 20                                                | 0            | 3.2       | 4700     | -15                      | -55                   | passed  |
| 20                                                | 5            |           |          | -15                      | -21                   | passed  |
| 20                                                | 10           |           |          | -32                      | -36                   | passed  |

1) The manufacturer declared that normal voltage is equivalent with high voltage.

2) The call is established at high voltage and the voltage is then reduced to the battery operating end.

### 3.5.9 24.3 Spurious emissions at antenna terminals §2.1051, §24.238

**Test: 24.3; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz**

Result: Passed  
 Setup No.: S\_AH02  
 Date of Test: 2014/05/07 12:01  
 Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES  
 Test Specification: FCC part 2 and 24

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1000                      | 1769.3         | -30.9           | 17.9                | -13.0      | passed  |
| peak     | maxhold | 100                       | 1846.19        | -28.8           | 15.8                | -13.0      | passed  |
| peak     | maxhold | 3                         | 1849.9198      | -29.6           | 16.6                | -13.0      | passed  |
| peak     | maxhold | 3                         | 1849.9359      | -24.8           | 11.8                | -13.0      | passed  |
| peak     | maxhold | 3                         | 1849.9699      | -19.5           | 6.5                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 1849.9820      | -19.6           | 6.6                 | -13.0      | passed  |
| peak     | maxhold | 3                         | 1849.9980      | -16.2           | 3.2                 | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1912.1         | -32.3           | 19.3                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 4248.5         | -29.8           | 16.8                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6973.9         | -25.7           | 12.7                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 14569.1        | -26.7           | 13.7                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 18917.8        | -23.7           | 10.7                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz**

Result: Passed  
 Setup No.: S\_AH02  
 Date of Test: 2014/05/07 12:15  
 Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES  
 Test Specification: FCC part 2 and 24

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1                         | 0.0095         | -32.8           | 19.8                | -13.0      | passed  |
| peak     | maxhold | 1                         | 0.0113         | -32.4           | 19.4                | -13.0      | passed  |
| peak     | maxhold | 1                         | 0.0142         | -32.8           | 19.8                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1643.1         | -31.0           | 18.0                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1913.0         | -32.5           | 19.5                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 3184.4         | -30.1           | 17.1                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6984.0         | -25.5           | 12.5                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 14779.6        | -26.6           | 13.6                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 18937.9        | -23.4           | 10.4                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 12:23

Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | margin to<br>limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------------------|------------|---------|
| peak     | maxhold | 1000                            | 1636.3            | -31.6              | 18.6                   | -13.0      | passed  |
| peak     | maxhold | 3                               | 1910.0000         | -20.6              | 7.6                    | -13.0      | passed  |
| peak     | maxhold | 3                               | 1910.0060         | -20.3              | 7.3                    | -13.0      | passed  |
| peak     | maxhold | 3                               | 1910.0160         | -16.4              | 3.4                    | -13.0      | passed  |
| peak     | maxhold | 3                               | 1910.0361         | -18.5              | 5.5                    | -13.0      | passed  |
| peak     | maxhold | 3                               | 1910.0721         | -24.7              | 11.7                   | -13.0      | passed  |
| peak     | maxhold | 100                             | 1911.02           | -27.8              | 14.8                   | -13.0      | passed  |
| peak     | maxhold | 1000                            | 1942.4            | -32.2              | 19.2                   | -13.0      | passed  |
| peak     | maxhold | 1000                            | 4230.5            | -30.5              | 17.5                   | -13.0      | passed  |
| peak     | maxhold | 1000                            | 6994.0            | -25.0              | 12.0                   | -13.0      | passed  |
| peak     | maxhold | 1000                            | 10631.3           | -27.0              | 14.0                   | -13.0      | passed  |
| peak     | maxhold | 1000                            | 18927.9           | -24.0              | 11.0                   | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = FDD2, Mode = HSDPA, Channel = 9262, Frequency = 1852.4MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 16:35

Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution<br>bandwidth<br>/kHz | frequency<br>/MHz | peak value<br>/dBm | margin to<br>limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------------|-------------------|--------------------|------------------------|------------|---------|
| peak     | maxhold | 1000                            | 1804.6            | -31.7              | 18.7                   | -13.0      | passed  |
| rms      | maxhold | 100                             | 1848.59           | -20.9              | 7.9                    | -13.0      | passed  |
| rms      | maxhold | 50                              | 1849.84           | -30.6              | 17.6                   | -13.0      | passed  |
| peak     | maxhold | 1000                            | 1934.0            | -19.4              | 6.4                    | -13.0      | passed  |
| peak     | maxhold | 1000                            | 4128.3            | -30.0              | 17.0                   | -13.0      | passed  |
| peak     | maxhold | 1000                            | 6994.0            | -26.0              | 13.0                   | -13.0      | passed  |
| peak     | maxhold | 1000                            | 14799.6           | -28.0              | 15.0                   | -13.0      | passed  |
| peak     | maxhold | 1000                            | 18907.8           | -24.7              | 11.7                   | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = FDD2, Mode = HSDPA, Channel = 9400, Frequency = 1880MHz**

Result: Passed  
Setup No.: S\_AH02  
Date of Test: 2014/05/07 16:38  
Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES  
Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1                         | 0.0099         | -31.3           | 18.3                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1757.1         | -31.7           | 18.7                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1960.0         | -18.2           | 5.2                 | -13.0      | passed  |
| peak     | maxhold | 1000                      | 4122.2         | -29.7           | 16.7                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6984.0         | -25.7           | 12.7                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 14769.5        | -27.6           | 14.6                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 18927.9        | -24.6           | 11.6                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = FDD2, Mode = HSDPA, Channel = 9538, Frequency = 1907.6MHz**

Result: Passed  
Setup No.: S\_AH02  
Date of Test: 2014/05/07 16:40  
Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES  
Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1                         | 0.0097         | -32.8           | 19.8                | -13.0      | passed  |
| peak     | maxhold | 1                         | 0.0247         | -32.9           | 19.9                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1668.7         | -31.6           | 18.6                | -13.0      | passed  |
| rms      | maxhold | 50                        | 1910.10        | -29.8           | 16.8                | -13.0      | passed  |
| rms      | maxhold | 100                       | 1911.34        | -22.0           | 9.0                 | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1988.3         | -18.4           | 5.4                 | -13.0      | passed  |
| peak     | maxhold | 1000                      | 4464.9         | -30.9           | 17.9                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6573.1         | -26.0           | 13.0                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 14198.4        | -27.1           | 14.1                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 18887.8        | -23.6           | 10.6                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = FDD2, Mode = HSUPA, Channel = 9262, Frequency = 1852.4MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 16:46

Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1                         | 0.0098         | -31.5           | 18.5                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1641.4         | -32.1           | 19.1                | -13.0      | passed  |
| rms      | maxhold | 100                       | 1848.62        | -22.3           | 9.3                 | -13.0      | passed  |
| rms      | maxhold | 50                        | 1849.83        | -32.0           | 19.0                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1929.7         | -31.9           | 18.9                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 2420.8         | -30.8           | 17.8                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6994.0         | -26.2           | 13.2                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 14529.1        | -27.1           | 14.1                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 18917.8        | -23.6           | 10.6                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = FDD2, Mode = HSUPA, Channel = 9400, Frequency = 1880MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 16:49

Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1                         | 0.0106         | -32.3           | 19.3                | -13.0      | passed  |
| peak     | maxhold | 3                         | 0.0333         | -32.6           | 19.6                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1626.1         | -31.5           | 18.5                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1962.0         | -32.6           | 19.6                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 4969.9         | -30.8           | 17.8                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6984.0         | -26.6           | 13.6                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 14499.0        | -27.5           | 14.5                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 19048.1        | -24.3           | 11.3                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = FDD2, Mode = HSUPA, Channel = 9538, Frequency = 1907.6MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 16:55

Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1                         | 0.0095         | -32.7           | 19.7                | -13.0      | passed  |
| peak     | maxhold | 1                         | 0.0106         | -30.5           | 17.5                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1757.1         | -31.7           | 18.7                | -13.0      | passed  |
| rms      | maxhold | 50                        | 1910.09        | -30.6           | 17.6                | -13.0      | passed  |
| rms      | maxhold | 100                       | 1911.14        | -21.6           | 8.6                 | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1972.7         | -32.4           | 19.4                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 3887.8         | -30.8           | 17.8                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6984.0         | -25.8           | 12.8                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 14959.9        | -27.2           | 14.2                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 18917.8        | -25.4           | 12.4                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9262, Frequency = 1852.4MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 17:02

Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1000                      | 1513.4         | -31.4           | 18.4                | -13.0      | passed  |
| rms      | maxhold | 100                       | 1848.64        | -22.7           | 9.7                 | -13.0      | passed  |
| rms      | maxhold | 50                        | 1849.85        | -31.6           | 18.6                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1988.1         | -32.0           | 19.0                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 4501.0         | -30.6           | 17.6                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6984.0         | -26.0           | 13.0                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 14909.8        | -27.5           | 14.5                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 19008.0        | -24.8           | 11.8                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB



**Test: 24.3; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9400, Frequency = 1880MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 17:04

Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1                         | 0.0103         | -31.3           | 18.3                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1757.1         | -32.2           | 19.2                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1937.9         | -32.9           | 19.9                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 4272.5         | -31.2           | 18.2                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6963.9         | -25.8           | 12.8                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 11082.2        | -26.8           | 13.8                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 18927.9        | -25.0           | 12.0                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.3; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9538, Frequency = 1907.6MHz**

Result: Passed

Setup No.: S\_AH02

Date of Test: 2014/05/07 17:06

Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

**Detailed Results:**

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | margin to limit /dB | limit /dBm | verdict |
|----------|---------|---------------------------|----------------|-----------------|---------------------|------------|---------|
| peak     | maxhold | 1                         | 0.0119         | -32.6           | 19.6                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1707.8         | -31.7           | 18.7                | -13.0      | passed  |
| rms      | maxhold | 50                        | 1910.12        | -29.8           | 16.8                | -13.0      | passed  |
| rms      | maxhold | 100                       | 1911.40        | -21.3           | 8.3                 | -13.0      | passed  |
| peak     | maxhold | 1000                      | 1938.4         | -32.4           | 19.4                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 4032.1         | -30.0           | 17.0                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 6984.0         | -26.4           | 13.4                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 14819.6        | -27.8           | 14.8                | -13.0      | passed  |
| peak     | maxhold | 1000                      | 18907.8        | -24.0           | 11.0                | -13.0      | passed  |

no further values have been found with a margin of less than 20 dB

### 3.5.10 24.4 Field strength of spurious radiation §2.1053, §24.238

**Test: 24.4; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz**

**Result:** Passed  
**Setup No.:** S\_AH02\_RSE  
**Date of Test:** 2014/04/26 2:08  
**Body:** FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES  
**Test Specification:** FCC part 2 and 24

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | limit /dBm | margin to limit /dB | azimuth /° | antenna polarization | EUT orientation | verdict |
|----------|---------|---------------------------|----------------|-----------------|------------|---------------------|------------|----------------------|-----------------|---------|
| peak     | maxhold | 1000                      | 7925.9         | -30.73          | -13.00     | 17.73               | -90.0      | horizontal           | vertical        | passed  |
| peak     | maxhold | 1000                      | 7937.9         | -31.16          | -13.00     | 18.16               | -180.0     | horizontal           | horizontal      | passed  |
| peak     | maxhold | 1000                      | 7949.9         | -31.35          | -13.00     | 18.35               | 120.0      | vertical             | horizontal      | passed  |
| peak     | maxhold | 1000                      | 9344.7         | -32.28          | -13.00     | 19.28               | 0.0        | horizontal           | vertical        | passed  |
| peak     | maxhold | 1000                      | 19228.5        | -17.79          | -13.00     | 4.79                | 120.0      | horizontal           | horizontal      | passed  |
| peak     | maxhold | 1000                      | 19312.6        | -17.78          | -13.00     | 4.78                | -135.0     | vertical             | vertical        | passed  |
| peak     | maxhold | 1000                      | 19354.7        | -18.53          | -13.00     | 5.53                | 0.0        | vertical             | vertical        | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.4; Frequency Band = FDD2, Mode = HSDPA, Channel = 9400, Frequency = 1880MHz**

**Result:** Passed  
**Setup No.:** S\_AH02\_RSE  
**Date of Test:** 2014/05/02 17:13  
**Body:** FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES  
**Test Specification:** FCC part 2 and 24

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | limit /dBm | margin to limit /dB | azimuth /° | antenna polarization | EUT orientation | verdict |
|----------|---------|---------------------------|----------------|-----------------|------------|---------------------|------------|----------------------|-----------------|---------|
| peak     | maxhold | 1000                      | 1958.4         | -28.32          | -13.00     | 15.32               | 0.0        | vertical             | vertical        | passed  |
| peak     | maxhold | 1000                      | 1960.0         | -31.95          | -13.00     | 18.95               | 120.0      | vertical             | horizontal      | passed  |
| peak     | maxhold | 1000                      | 7925.9         | -31.83          | -13.00     | 18.83               | -135.0     | horizontal           | vertical        | passed  |
| peak     | maxhold | 1000                      | 7937.9         | -31.08          | -13.00     | 18.08               | 120.0      | vertical             | horizontal      | passed  |
| peak     | maxhold | 1000                      | 7949.9         | -32.77          | -13.00     | 19.77               | -120.0     | horizontal           | horizontal      | passed  |
| peak     | maxhold | 1000                      | 19214.4        | -19.73          | -13.00     | 6.73                | -120.0     | horizontal           | horizontal      | passed  |
| peak     | maxhold | 1000                      | 19228.5        | -19.03          | -13.00     | 6.03                | -90.0      | vertical             | vertical        | passed  |
| peak     | maxhold | 1000                      | 19242.5        | -19.26          | -13.00     | 6.26                | 45.0       | horizontal           | vertical        | passed  |
| peak     | maxhold | 1000                      | 19312.6        | -18.69          | -13.00     | 5.69                | -45.0      | horizontal           | vertical        | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.4; Frequency Band = FDD2, Mode = HSUPA, Channel = 9400, Frequency = 1880MHz**

**Result:** Passed  
**Setup No.:** S\_AH02\_RSE  
**Date of Test:** 2014/05/08 20:47  
**Body:** FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES  
**Test Specification:** FCC part 2 and 24

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | limit /dBm | margin to limit /dB | azimuth /° | antenna polarization | EUT orientation | verdict |
|----------|---------|---------------------------|----------------|-----------------|------------|---------------------|------------|----------------------|-----------------|---------|
| peak     | maxhold | 1000                      | 7925.9         | -31.66          | -13.00     | 18.66               | 60.0       | vertical             | horizontal      | passed  |
| peak     | maxhold | 1000                      | 7937.9         | -31.00          | -13.00     | 18.00               | -180.0     | vertical             | horizontal      | passed  |
| peak     | maxhold | 1000                      | 7949.9         | -32.74          | -13.00     | 19.74               | 60.0       | horizontal           | horizontal      | passed  |
| peak     | maxhold | 1000                      | 7961.9         | -31.64          | -13.00     | 18.64               | 45.0       | horizontal           | vertical        | passed  |
| peak     | maxhold | 1000                      | 19228.5        | -18.35          | -13.00     | 5.35                | -60.0      | vertical             | horizontal      | passed  |
| peak     | maxhold | 1000                      | 19256.5        | -19.95          | -13.00     | 6.95                | -90.0      | vertical             | vertical        | passed  |
| peak     | maxhold | 1000                      | 19312.6        | -17.75          | -13.00     | 4.75                | -180.0     | vertical             | horizontal      | passed  |

no further values have been found with a margin of less than 20 dB

**Test: 24.4; Frequency Band = FDD2, Mode = W-CDMA, Channel = 9400, Frequency = 1880MHz**

Result: Passed

Setup No.: S\_AH02\_RSE

Date of Test: 2014/04/25 22:39

Body: FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES

Test Specification: FCC part 2 and 24

#### Detailed Results:

| detector | trace   | resolution bandwidth /kHz | frequency /MHz | peak value /dBm | limit /dBm | margin to limit /dB | azimuth /° | antenna polarization | EUT orientation | verdict |
|----------|---------|---------------------------|----------------|-----------------|------------|---------------------|------------|----------------------|-----------------|---------|
| peak     | maxhold | 1000                      | 7901.8         | -32.74          | -13.00     | 19.74               | 90.0       | horizontal           | vertical        | passed  |
| peak     | maxhold | 1000                      | 7913.8         | -32.69          | -13.00     | 19.69               | 135.0      | horizontal           | vertical        | passed  |
| peak     | maxhold | 1000                      | 7925.9         | -32.05          | -13.00     | 19.05               | -135.0     | vertical             | vertical        | passed  |
| peak     | maxhold | 1000                      | 7937.9         | -32.20          | -13.00     | 19.20               | 0.0        | horizontal           | horizontal      | passed  |
| peak     | maxhold | 1000                      | 7949.9         | -32.69          | -13.00     | 19.69               | 120.0      | vertical             | horizontal      | passed  |
| peak     | maxhold | 1000                      | 9344.7         | -17.03          | -13.00     | 4.03                | -60.0      | vertical             | horizontal      | passed  |
| peak     | maxhold | 1000                      | 19228.5        | -17.84          | -13.00     | 4.84                | 0.0        | horizontal           | vertical        | passed  |
| peak     | maxhold | 1000                      | 19312.6        | -18.40          | -13.00     | 5.40                | -120.0     | horizontal           | horizontal      | passed  |

no further values have been found with a margin of less than 20 dB

### **3.5.11 24.5 Emission and Occupied Bandwidth §2.1049, §24.238**

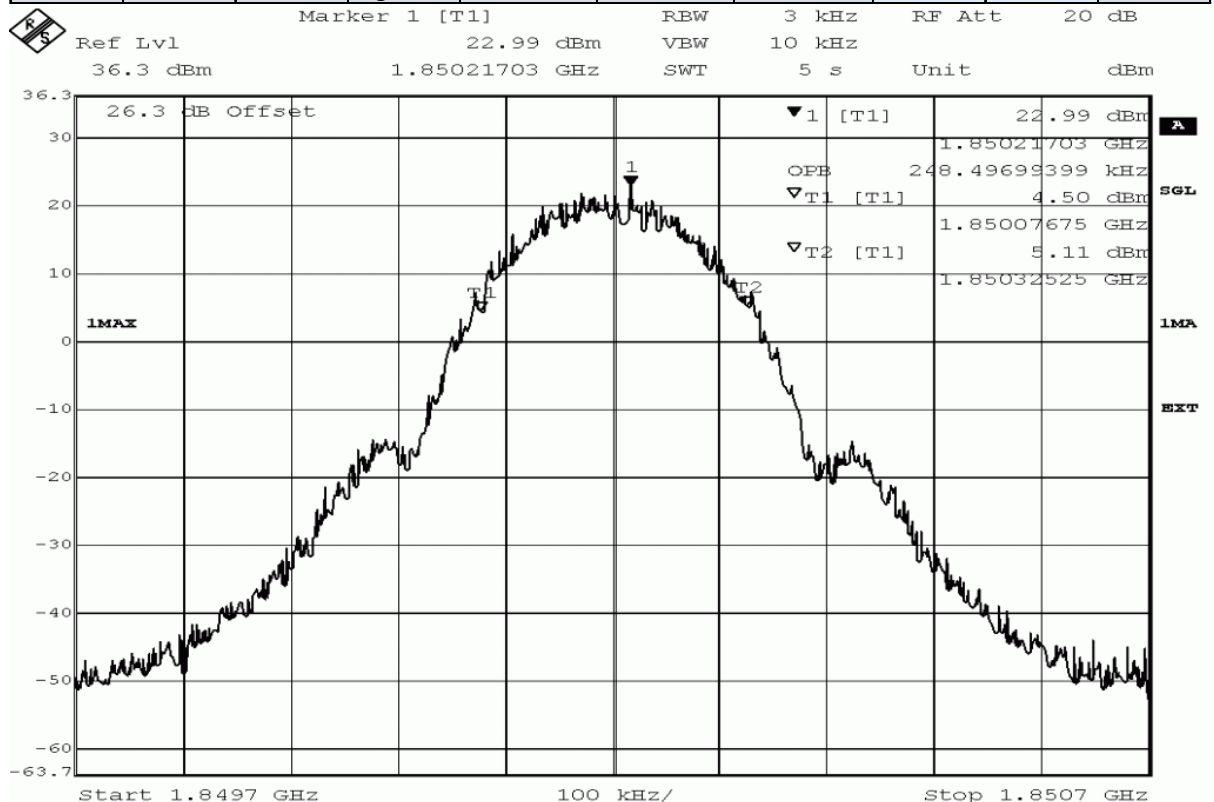
#### **Test: 24.5; Frequency Band = 1900 / FDD2**

|                            |                                                   |
|----------------------------|---------------------------------------------------|
| <i>Result:</i>             | Passed                                            |
| <i>Setup No.:</i>          | S_AH02                                            |
| <i>Date of Test:</i>       | 2014/05/06 10:04                                  |
| <i>Body:</i>               | FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES |
| <i>Test Specification:</i> | FCC part 2 and 24                                 |

### Detailed Results:

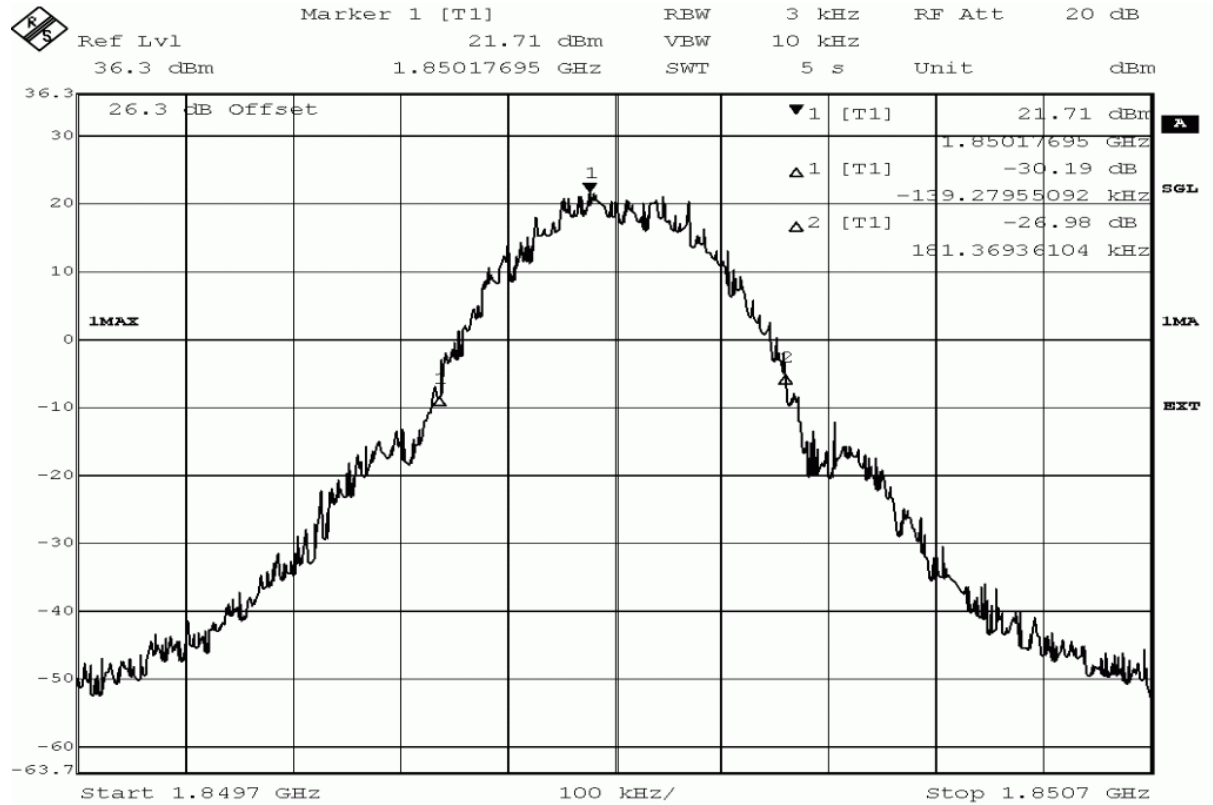
| Band | Mode       | Modulation | Channel | Frequency (MHz) | 26 dB Bandwidth (KHz) | 99% Bandwidth (KHz) | Detector | RBW (KHz) | Verdict |
|------|------------|------------|---------|-----------------|-----------------------|---------------------|----------|-----------|---------|
| 1900 | GSM / GPRS | GFSK       | Low     | 1850.2          | 320.6                 | 248.5               | Peak     | 3         | Pass    |
|      |            |            | Mid     | 1880            | 314.6                 | 244.5               |          |           | Pass    |
|      |            |            | High    | 1909.8          | 320.6                 | 242.5               |          |           | Pass    |

| Band  | Mode   | Modulation | Channel | Frequency (MHz) | 26 dB Bandwidth (KHz) | 99% Bandwidth (KHz) | Detector | RBW (KHz) | Verdict |
|-------|--------|------------|---------|-----------------|-----------------------|---------------------|----------|-----------|---------|
| FDD 2 | W-CDMA | QPSK       | Low     | 1852.4          | 4649.3                | 4088.2              | Peak     | 100       | Pass    |
|       |        |            | Mid     | 1880            | 4649.3                | 4068.1              |          |           | Pass    |
|       |        |            | High    | 1907.6          | 4649.3                | 4068.1              |          |           | Pass    |
| FDD 2 | HSDPA  | QPSK       | Low     | 1852.4          | 4649.3                | 4088.2              | Peak     | 100       | Pass    |
|       |        |            | Mid     | 1880            | 4649.3                | 4068.1              |          |           | Pass    |
|       |        |            | High    | 1907.6          | 4649.3                | 4068.1              |          |           | Pass    |
| FDD 2 | HSUPA  | QPSK       | Low     | 1852.4          | 4669.3                | 4088.2              | Peak     | 100       | Pass    |
|       |        |            | Mid     | 1880            | 4689.4                | 4108.2              |          |           | Pass    |
|       |        |            | High    | 1907.6          | 4649.3                | 4088.2              |          |           | Pass    |



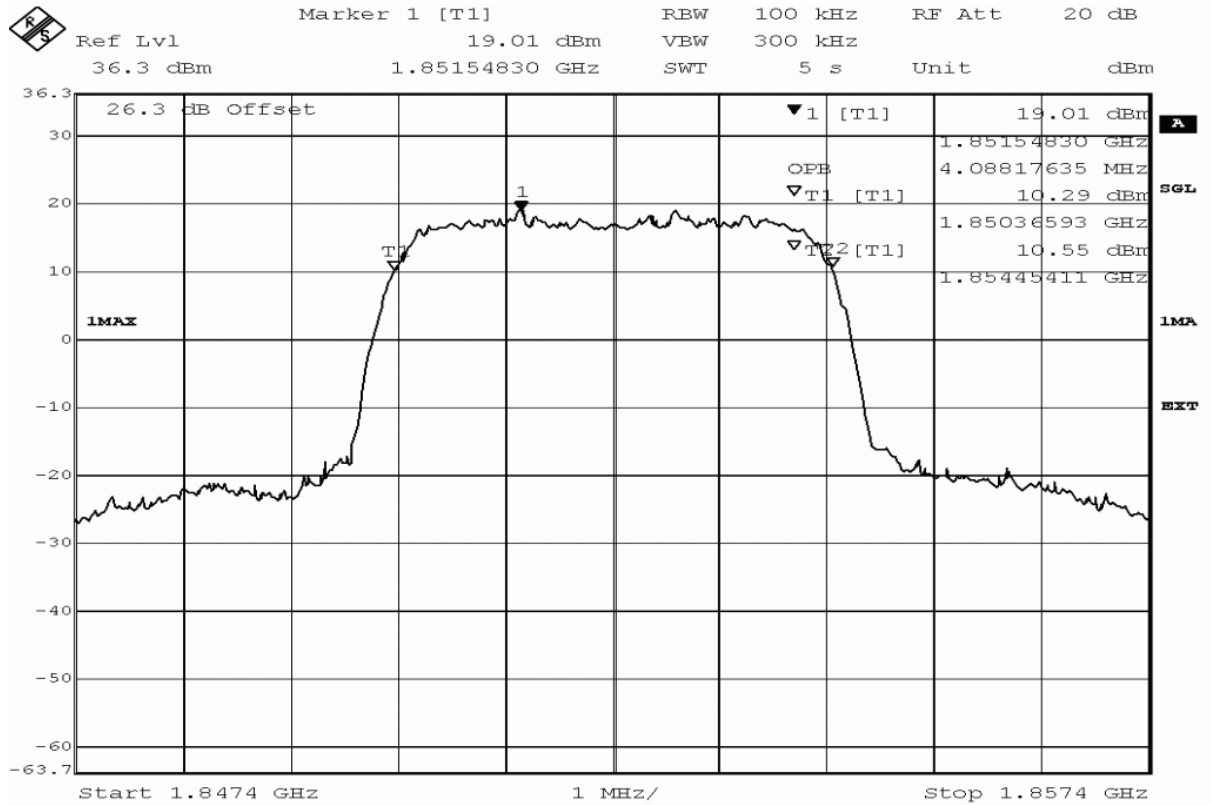
Title: bandwidth measurement  
Comment A: DE1015001, GSM1900, occupied bandwidth (99%),  
channel 512 (1850.2MHz)  
Date: 7.MAY.2014 12:20:48

GSM 99% Bandwidth Low Channel



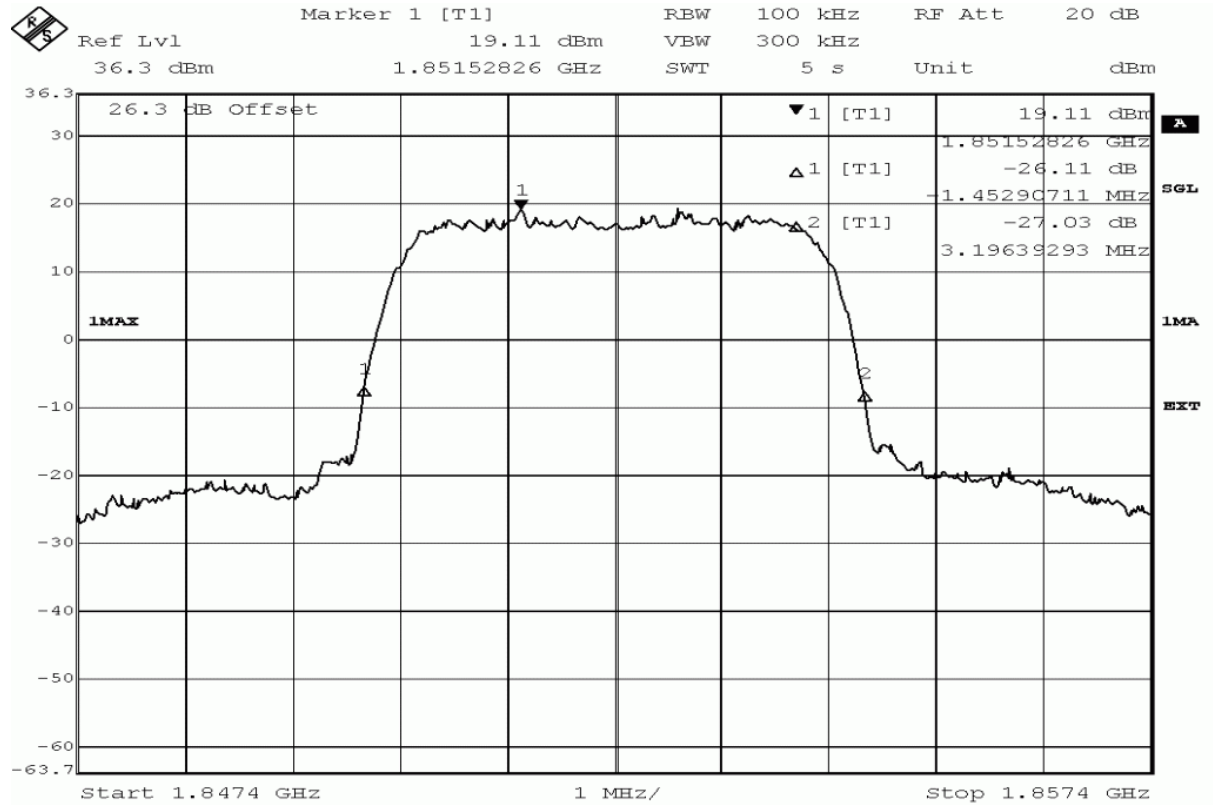
Title: bandwidth measurement  
Comment A: DE1015001, GSM1900, 26dB bandwidth,  
channel 512 (1850.2MHz)  
Date: 7.MAY.2014 12:20:25

GSM 26dB Bandwidth Low Channel



Title: bandwidth measurement  
Comment A: DE1015001, FDD II, occupied bandwidth (99%),  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 23:57:42

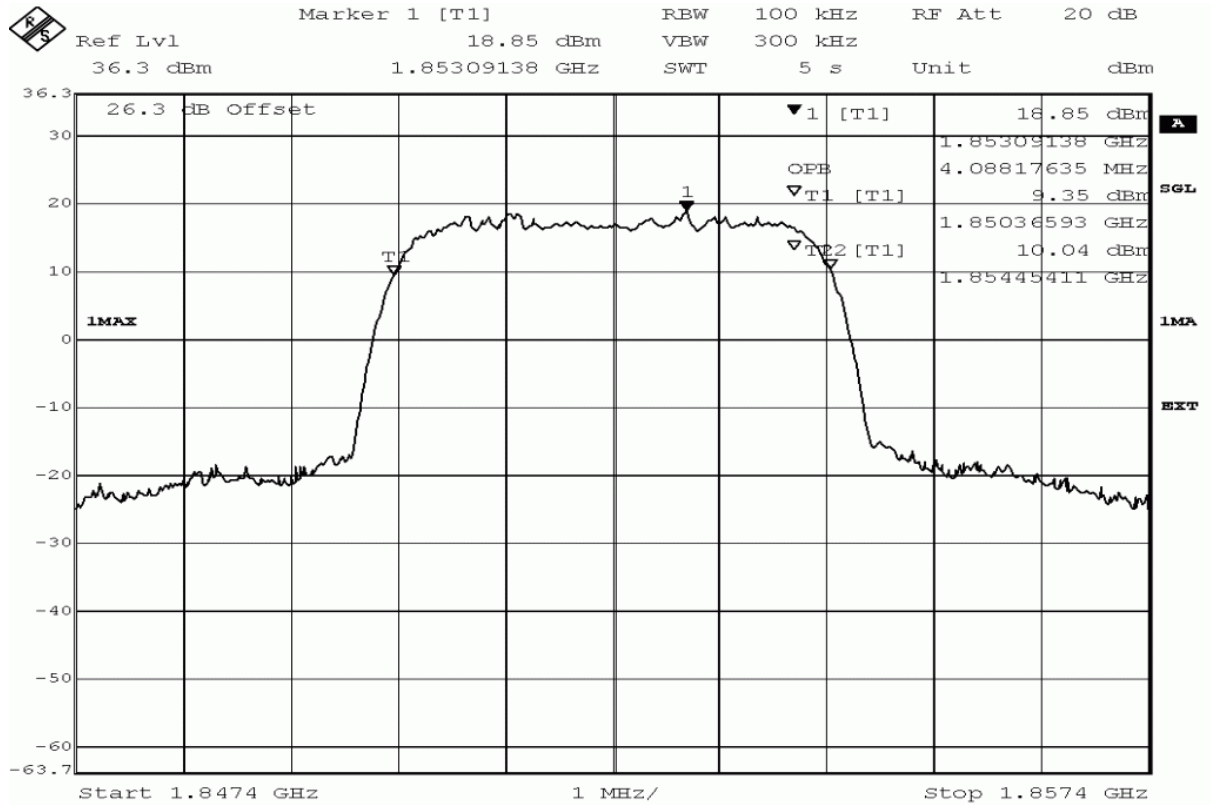
WCDMA 99% Bandwidth Low Channel



Title: bandwidth measurement  
Comment A: DE1015001, FDD II, 26dB bandwidth,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 23:57:19

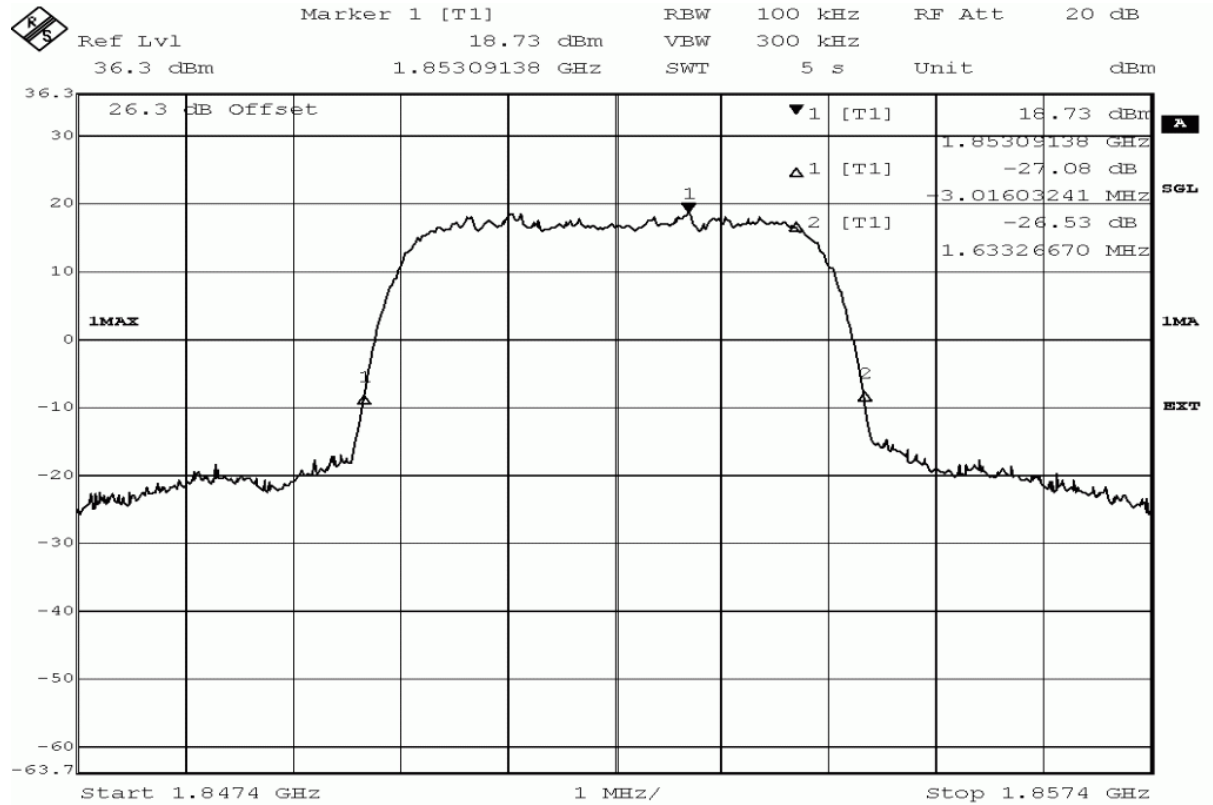
WCDMA 26dB Bandwidth Low Channel





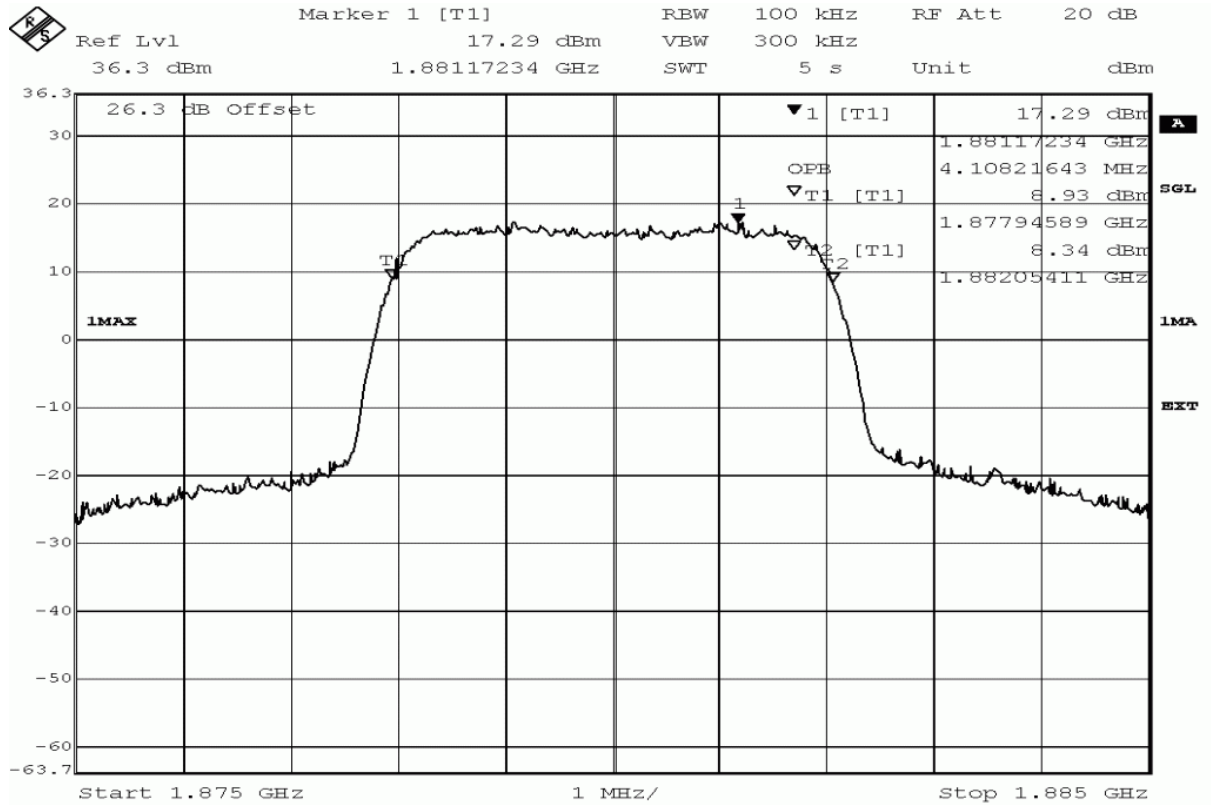
Title: bandwidth measurement  
Comment A: DE1015001, FDD II, occupied bandwidth (99%),  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 21:27:54

HSDPA 99% Bandwidth Low Channel



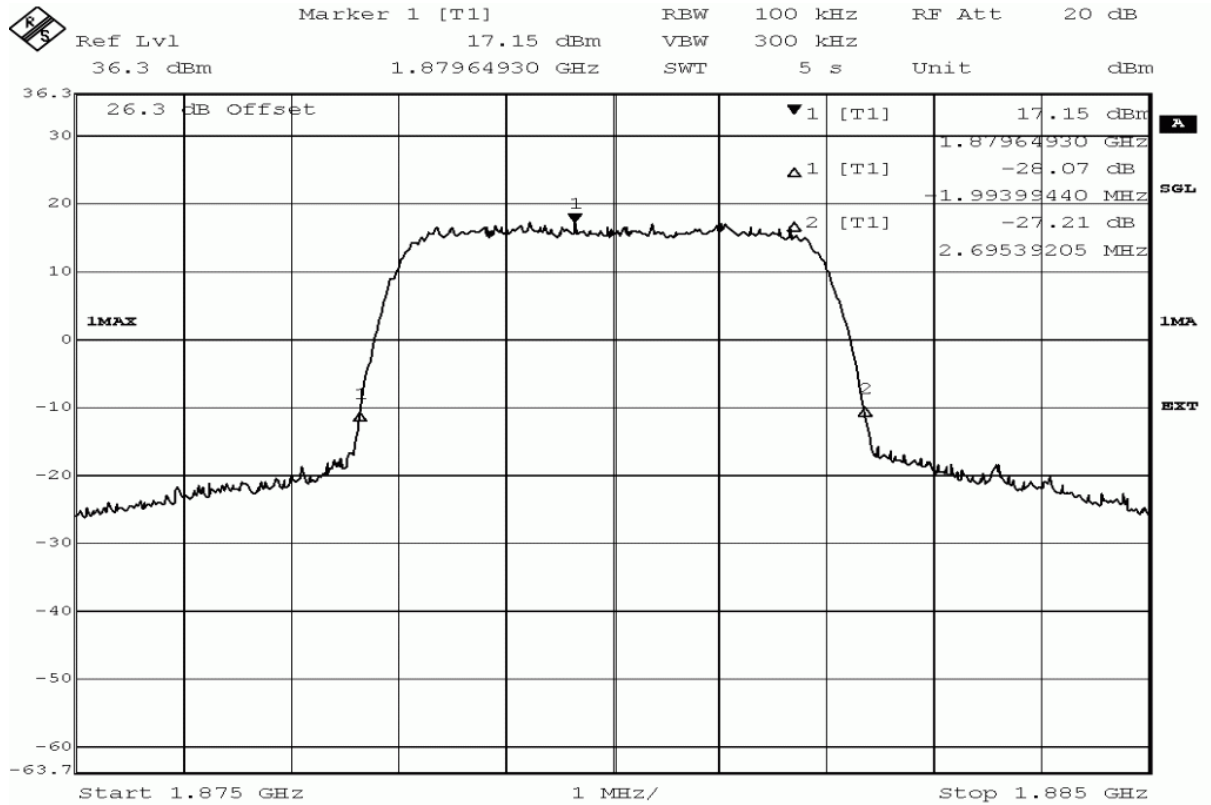
Title: bandwidth measurement  
Comment A: DE1015001, FDD II, 26dB bandwidth,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 21:27:32

HSDPA 26dB Bandwidth Low Channel



Title: bandwidth measurement  
Comment A: DE1015001, FDD II, occupied bandwidth (99%),  
channel 9400 (1880.0MHz)  
Date: 6.MAY.2014 21:14:38

HSUPA 99% Bandwidth Mid Channel



Title: bandwidth measurement  
Comment A: DE1015001, FDD II, 26dB bandwidth,  
channel 9400 (1880.0MHz)  
Date: 6.MAY.2014 21:14:15

HSUPA 26dB Bandwidth Mid Channel

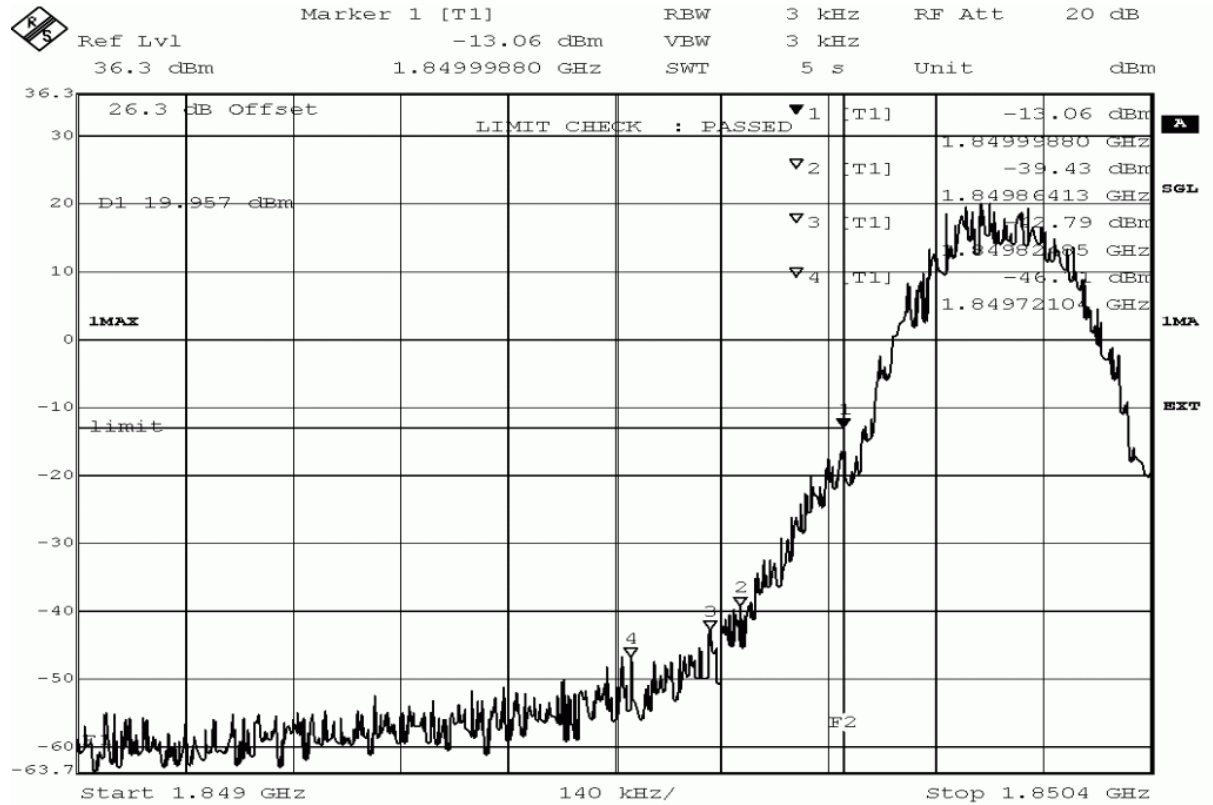
### **3.5.12 24.6 Band edge compliance §2.1053, §24.238**

#### **Test: 24.6; Frequency Band = 1900 / FDD2**

|                            |                                                   |
|----------------------------|---------------------------------------------------|
| <i>Result:</i>             | Passed                                            |
| <i>Setup No.:</i>          | S_AH02                                            |
| <i>Date of Test:</i>       | 2014/05/06 9:36                                   |
| <i>Body:</i>               | FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES |
| <i>Test Specification:</i> | FCC part 2 and 24                                 |

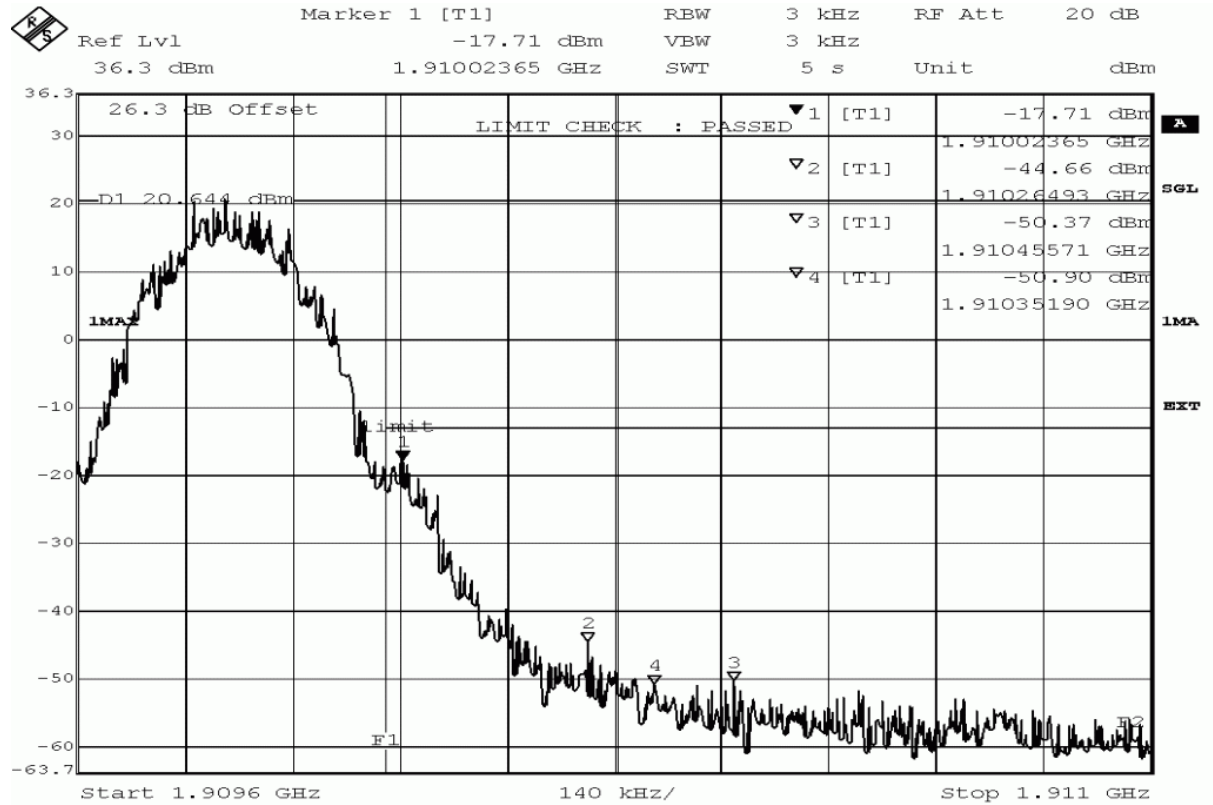
**Detailed Results:**

| Band  | Mode       | Modulation | Detector | Frequency (MHZ) | peak value /dBm | margin to limit /dB | limit /dBm | Verdict |
|-------|------------|------------|----------|-----------------|-----------------|---------------------|------------|---------|
| 1900  | GSM / GPRS | GFSK       | peak     | 1849.999        | -13.06          | 0.06                | -13.0      | passed  |
|       |            |            | average  | 1849.996        | -35.18          | 22.18               | -13.0      | passed  |
|       |            |            | rms      | 1849.999        | -27.44          | 14.44               | -13.0      | passed  |
| 1900  |            |            | peak     | 1910.024        | -17.71          | 4.71                | -13.0      | passed  |
|       |            |            | average  | 1910.021        | -36.34          | 23.34               | -13.0      | passed  |
|       |            |            | rms      | 1910.021        | -28.64          | 15.64               | -13.0      | passed  |
|       |            |            |          |                 |                 |                     |            |         |
|       |            |            |          |                 |                 |                     |            |         |
| Band  | Mode       | Modulation | Detector | Frequency (MHZ) | peak value /dBm | margin to limit /dB | limit /dBm | Verdict |
| FDD 2 | W-CDMA     | QPSK       | peak     | 1849.930        | -22.56          | 9.56                | -13.0      | Pass    |
|       |            |            | average  | 1850.000        | -32.03          | 19.03               | -13.0      | Pass    |
|       |            |            | rms      | 1850.000        | -31.31          | 18.31               | -13.0      | Pass    |
| FDD 2 |            |            | peak     | 1910.140        | -21.29          | 8.28                | -13.0      | Pass    |
|       |            |            | average  | 1910.093        | -30.64          | 17.64               | -13.0      | Pass    |
|       |            |            | rms      | 1910.117        | -29.72          | 16.72               | -13.0      | Pass    |
| FDD 2 | HSDPA      |            | peak     | 1849.790        | -21.05          | 8.05                | -13.0      | Pass    |
|       |            |            | average  | 1849.895        | -31.31          | 18.31               | -13.0      | Pass    |
|       |            |            | rms      | 1849.848        | -30.64          | 17.64               | -13.0      | Pass    |
| FDD 2 |            |            | peak     | 1910.152        | -20.75          | 7.75                | -13.0      | Pass    |
|       |            |            | average  | 1910.105        | -30.64          | 17.64               | -13.0      | Pass    |
|       |            |            | rms      | 1910.128        | -29.44          | 16.44               | -13.0      | Pass    |
| FDD 2 | HSUPA      |            | peak     | 1849.941        | -22.64          | 9.64                | -13.0      | Pass    |
|       |            |            | average  | 1850.000        | -32.03          | 19.03               | -13.0      | Pass    |
|       |            |            | rms      | 1850.000        | -31.31          | 18.31               | -13.0      | Pass    |
| FDD 2 |            |            | peak     | 1910.000        | -20.82          | 7.82                | -13.0      | Pass    |
|       |            |            | average  | 1910.000        | -31.31          | 18.31               | -13.0      | Pass    |
|       |            |            | rms      | 1910.000        | -30.32          | 17.32               | -13.0      | Pass    |



Title: band edge compliance measurement  
Comment A: DE1015001, GSM1900, band edge compliance,  
channel 512 (1850.2MHz)  
Date: 7.MAY.2014 12:21:14

GSM Low Channel



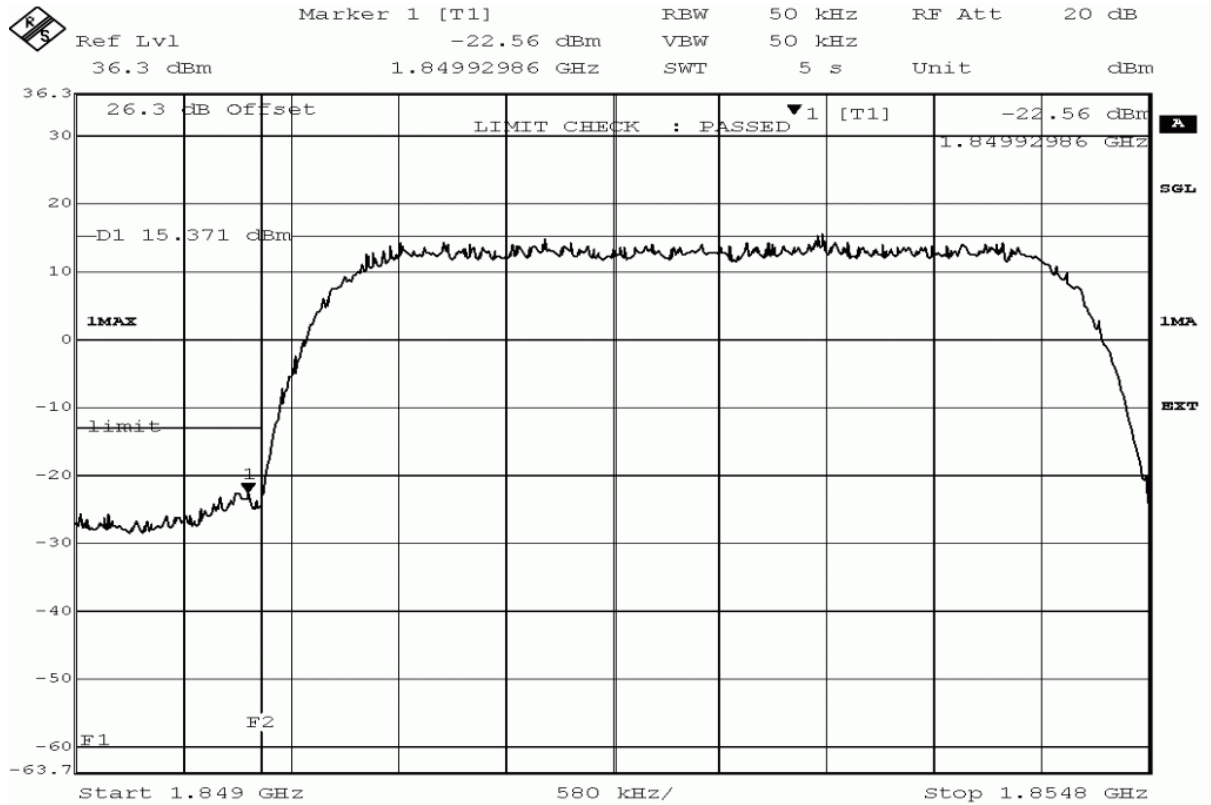
Title: band edge compliance measurement

Comment A: DE1015001, GSM1900, band edge compliance,  
channel 810 (1909.8MHz)

Date: 7.MAY.2014 12:42:37

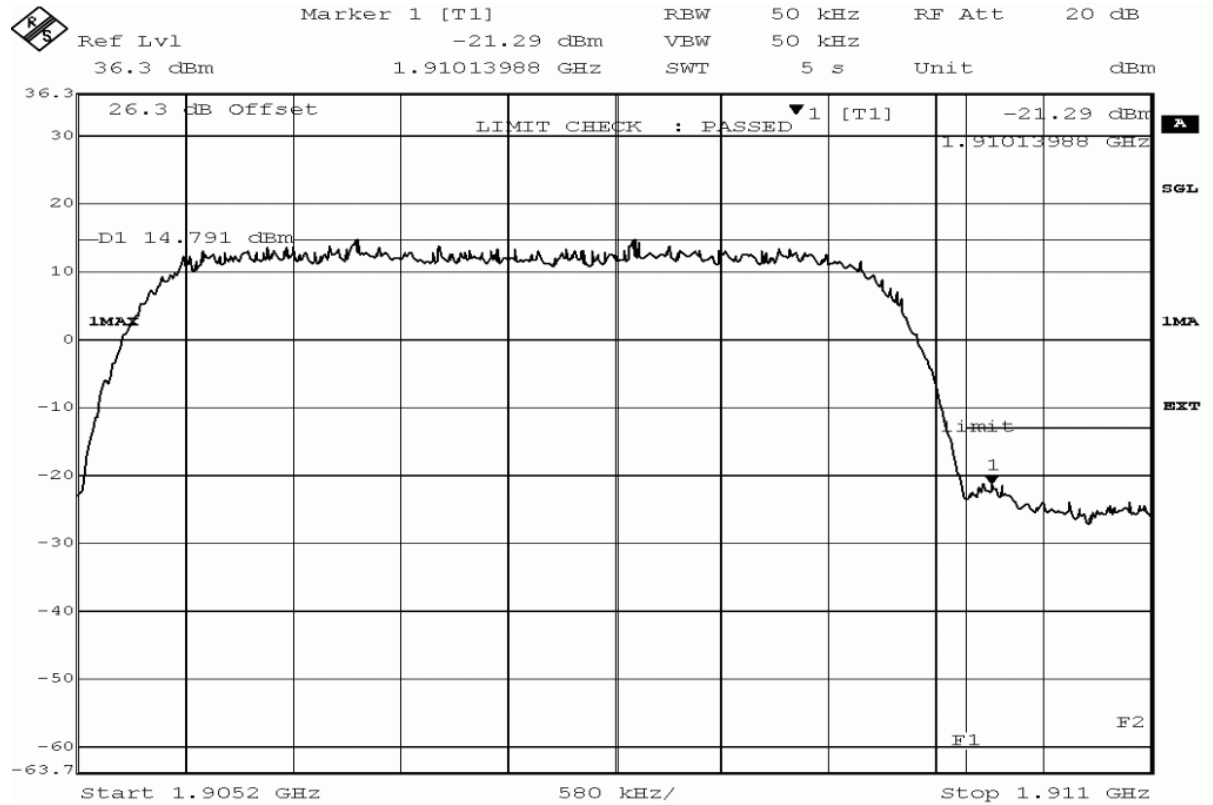
GSM High Channel





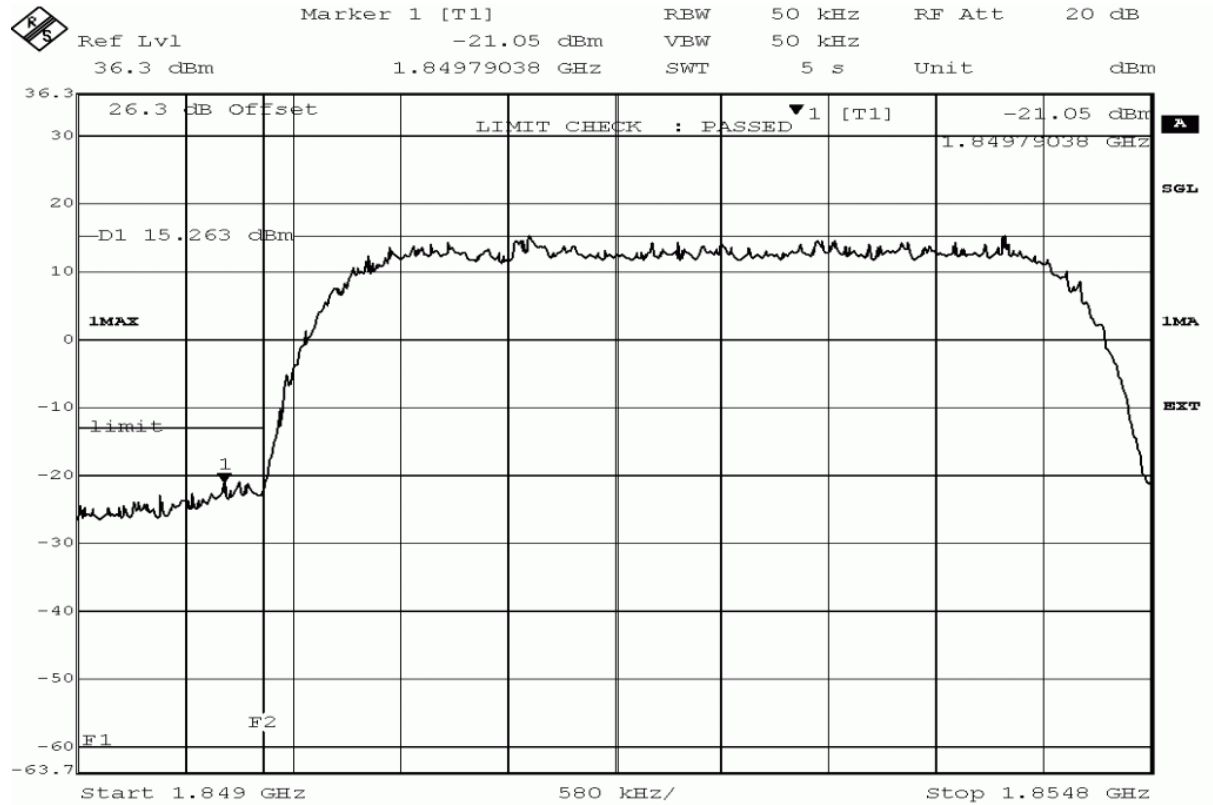
Title: band edge compliance measurement  
Comment A: DE1015001, FDD II, band edge compliance,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 23:58:05

WCDMA Low channel



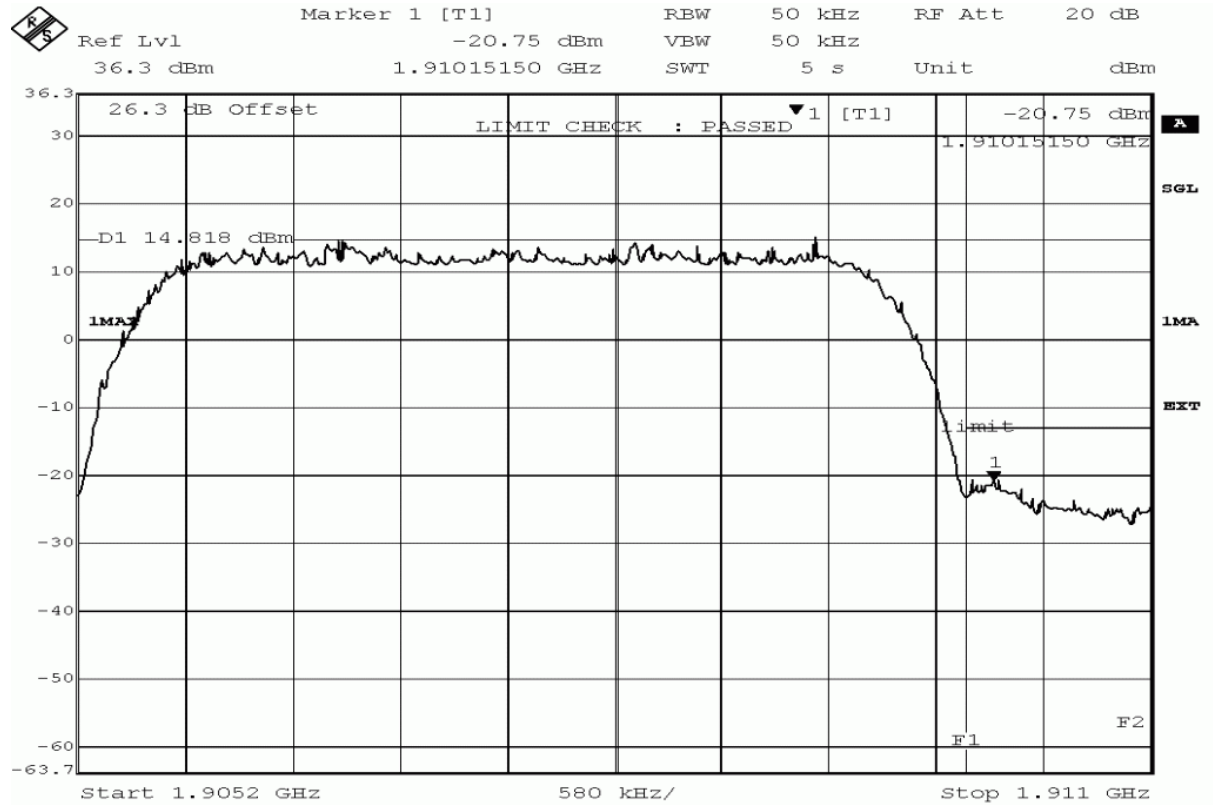
Title: band edge compliance measurement  
 Comment A: DE1015001, FDD II, band edge compliance,  
 channel 9538 (1907.6MHz)  
 Date: 7.MAY.2014 00:08:53

WCDMA high channel



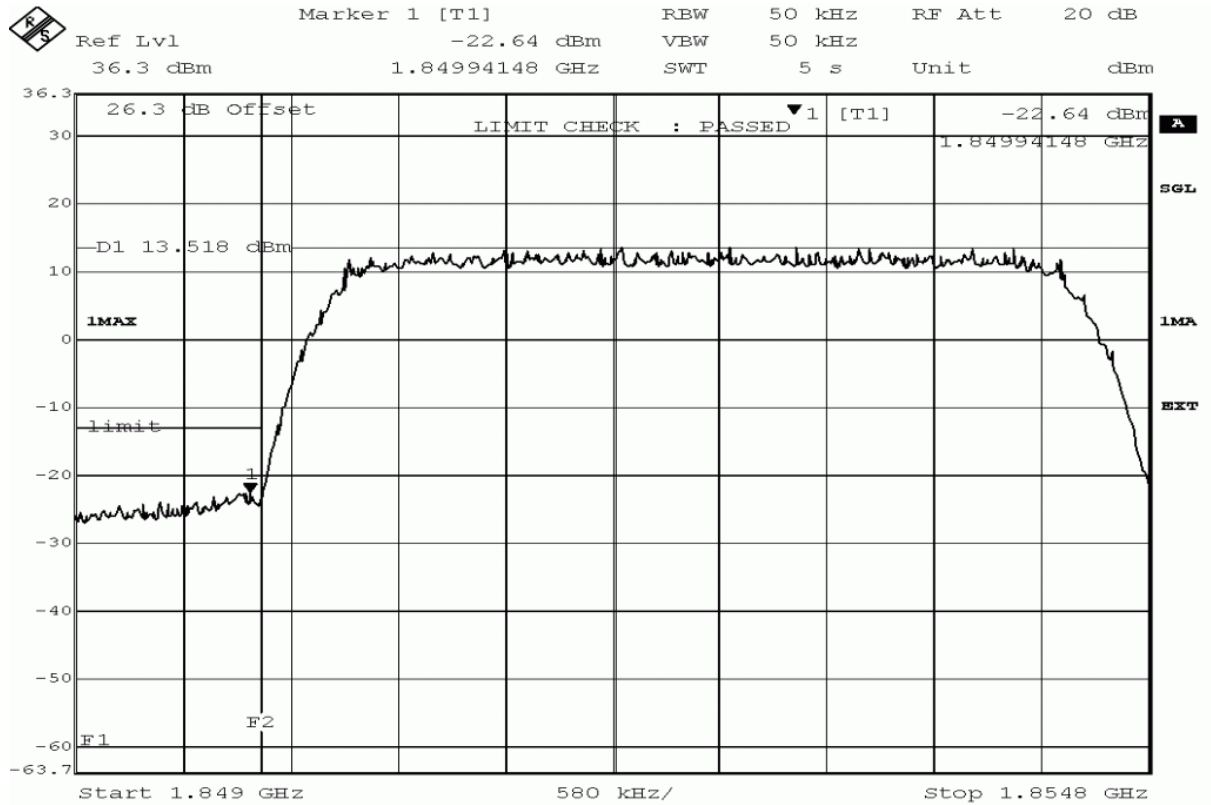
Title: band edge compliance measurement  
Comment A: DE1015001, FDD II HSUPA, band edge compliance,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 21:28:18

HSDPA low channel



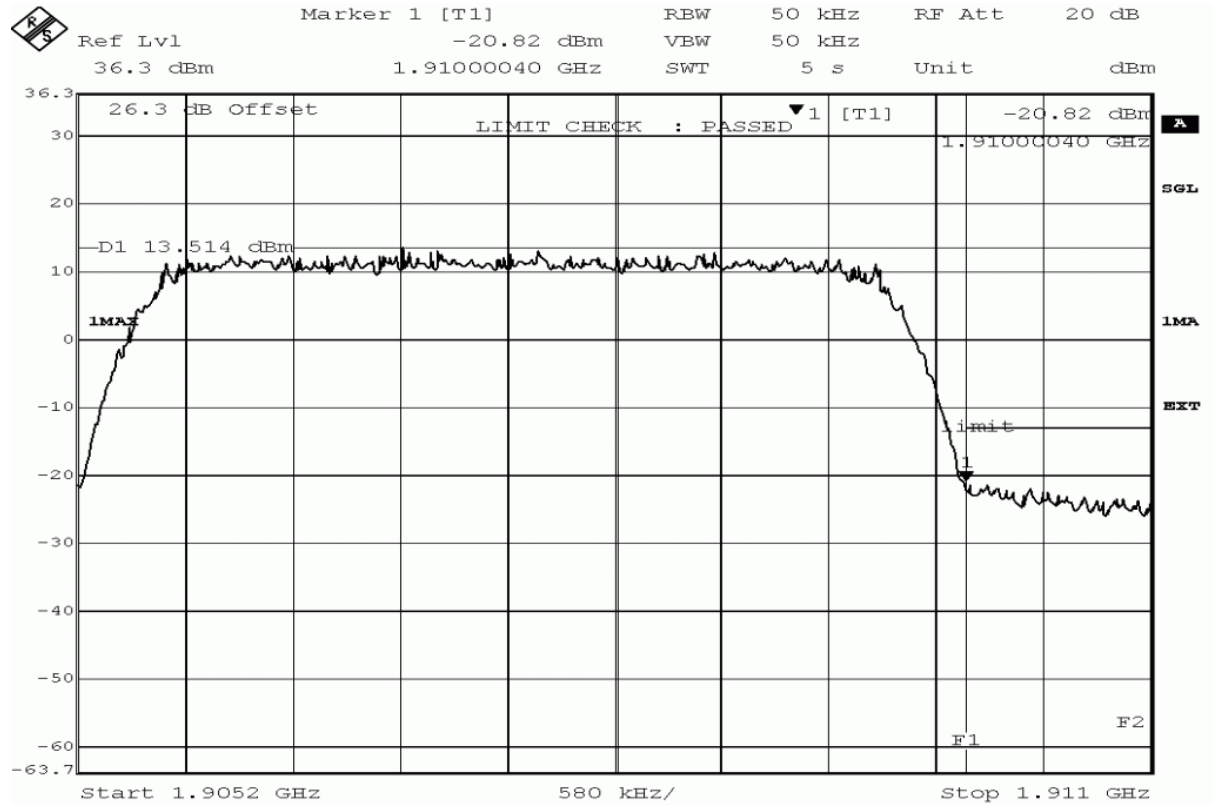
Title: band edge compliance measurement  
 Comment A: DE1015001, FDD II HSUPA, band edge compliance,  
 channel 9262 (1852.4MHz)  
 Date: 6.MAY.2014 21:39:52

HSDPA high channel



Title: band edge compliance measurement  
Comment A: DE1015001, FDD II HSUPA, band edge compliance,  
channel 9262 (1852.4MHz)  
Date: 6.MAY.2014 21:09:56

HSUPA Low channel



Title: band edge compliance measurement  
 Comment A: DE1015001, FDD II HSUPA, band edge compliance,  
 channel 9262 (1852.4MHz)  
 Date: 6.MAY.2014 21:18:46

HSUPA high channel

## 4 Test Equipment Details

### 4.1 List of Used Test Equipment

The calibration, hardware and software states are shown for the testing period.

#### Test Equipment Anechoic Chamber

|                      |                                       |                       |                   |
|----------------------|---------------------------------------|-----------------------|-------------------|
| <b>Lab ID:</b>       | <b>Lab 1</b>                          |                       |                   |
| <b>Manufacturer:</b> | Frankonia                             |                       |                   |
| <b>Description:</b>  | Anechoic Chamber for radiated testing |                       |                   |
| <b>Type:</b>         | 10.58x6.38x6.00 m <sup>3</sup>        |                       |                   |
|                      | <i>Calibration Details</i>            | <i>Last Execution</i> | <i>Next Exec.</i> |
|                      | NSA (FCC)                             | 2014/01/09            | 2017/01/09        |

#### Single Devices for Anechoic Chamber

| Single Device Name  | Type                               | Serial Number | Manufacturer                            |
|---------------------|------------------------------------|---------------|-----------------------------------------|
| Air compressor      | none                               | -             | Atlas Copco                             |
| Anechoic Chamber    | 10.58 x 6.38 x 6.00 m <sup>3</sup> | none          | Frankonia                               |
|                     | <i>Calibration Details</i>         |               | <i>Last Execution</i> <i>Next Exec.</i> |
|                     | FCC listing 96716 3m Part15/18     |               | 2014/01/09 2017/01/08                   |
| Controller Maturo   | MCU                                | 961208        | Maturo GmbH                             |
| EMC camera          | CE-CAM/1                           | -             | CE-SYS                                  |
| EMC camera Nr.2     | CCD-400E                           | 0005033       | Mitsubishi                              |
| Filter ISDN         | B84312-C110-E1                     |               | Siemens&Matsushita                      |
| Filter Universal 1A | BB4312-C30-H3                      | -             | Siemens&Matsushita                      |

#### Test Equipment Auxiliary Equipment for Radiated emissions

|                       |                                     |
|-----------------------|-------------------------------------|
| <b>Lab ID:</b>        | <b>Lab 1</b>                        |
| <b>Description:</b>   | Equipment for emission measurements |
| <b>Serial Number:</b> | see single devices                  |

#### Single Devices for Auxiliary Equipment for Radiated emissions

| Single Device Name              | Type                       | Serial Number       | Manufacturer                            |
|---------------------------------|----------------------------|---------------------|-----------------------------------------|
| Antenna mast                    | AM 4.0                     | AM4.0/180/11920 513 | Maturo GmbH                             |
| Biconical Broadband Antenna     | SBA 9119                   | 9119-005            | Schwarzbeck                             |
|                                 | <i>Calibration Details</i> |                     | <i>Last Execution</i> <i>Next Exec.</i> |
|                                 | Standard Calibration       |                     | 2009/06/04 2014/06/03                   |
| Biconical dipole                | VUBA 9117                  | 9117-108            | Schwarzbeck                             |
|                                 | <i>Calibration Details</i> |                     | <i>Last Execution</i> <i>Next Exec.</i> |
|                                 | Standard Calibration       |                     | 2012/01/18 2015/01/17                   |
| Broadband Amplifier 18MHz-26GHz | JS4-18002600-32-5P         | 849785              | Miteq                                   |
| Broadband Amplifier 1GHz-4GHz   | AFS4-01000400-1Q-10P-4     | -                   | Miteq                                   |
| Broadband Amplifier 30MHz-18GHz | JS4-00101800-35-5P         | 896037              | Miteq                                   |
| Cable "ESI to EMI Antenna"      | EcoFlex10                  | W18.01-2+W38.01-2   | Kabel Kusch                             |
| Cable "ESI to Horn Antenna"     | UFB311A+UFB293C            | W18.02-2+W38.02-2   | Rosenberger Micro-Coax                  |

**Single Devices for Auxiliary Equipment for Radiated emissions (continued)**

| <i>Single Device Name</i>                          | <i>Type</i>                | <i>Serial Number</i>           | <i>Manufacturer</i>                     |
|----------------------------------------------------|----------------------------|--------------------------------|-----------------------------------------|
| Double-ridged horn                                 | HF 906                     | 357357/001                     | Rohde & Schwarz GmbH & Co. KG           |
|                                                    | <i>Calibration Details</i> |                                | <i>Last Execution</i> <i>Next Exec.</i> |
|                                                    | Standard Calibration       |                                | 2012/05/18 2015/05/17                   |
| Double-ridged horn                                 | HF 906                     | 357357/002                     | Rohde & Schwarz GmbH & Co. KG           |
|                                                    | <i>Calibration Details</i> |                                | <i>Last Execution</i> <i>Next Exec.</i> |
|                                                    | Standard Calibration       |                                | 2012/06/26 2015/06/25                   |
| High Pass Filter                                   | 4HC1600/12750-1.5-KK       | 9942011                        | Trilithic                               |
| High Pass Filter                                   | 5HC2700/12750-1.5-KK       | 9942012                        | Trilithic                               |
| High Pass Filter                                   | 5HC3500/12750-1.2-KK       | 200035008                      | Trilithic                               |
| High Pass Filter                                   | WHKX 7.0/18G-8SS           | 09                             | Wainwright                              |
| Horn Antenna<br>Schwarzbeck 15-26<br>GHz BBHA 9170 | BBHA 9170                  |                                |                                         |
| Log.-per. Antenna                                  | HL 562 Ultralog            | 100609                         | Rohde & Schwarz GmbH & Co. KG           |
|                                                    | <i>Calibration Details</i> |                                | <i>Last Execution</i> <i>Next Exec.</i> |
|                                                    | Standard Calibration       |                                | 2012/12/18 2015/12/17                   |
| Log.-per. Antenna                                  | HL 562 Ultralog            | 830547/003                     | Rohde & Schwarz GmbH & Co. KG           |
| Loop Antenna                                       | HFH2-Z2                    | 829324/006                     | Rohde & Schwarz GmbH & Co. KG           |
|                                                    | <i>Calibration Details</i> |                                | <i>Last Execution</i> <i>Next Exec.</i> |
|                                                    | Standard calibration       |                                | 2011/10/27 2014/10/26                   |
| Pyramidal Horn<br>Antenna 26,5 GHz                 | 3160-09                    | 00083069                       | EMCO Elektronik GmbH                    |
| Pyramidal Horn<br>Antenna 40 GHz                   | 3160-10                    | 00086675                       | EMCO Elektronik GmbH                    |
| Tilt device Maturo<br>(Rohacell)                   | Antrieb TD1.5-10kg         | TD1.5-<br>10kg/024/379070<br>9 | Maturo GmbH                             |



### Test Equipment Auxiliary Test Equipment

|                       |                                           |
|-----------------------|-------------------------------------------|
| <b>Lab ID:</b>        | <b>Lab 1, Lab 2</b>                       |
| <b>Manufacturer:</b>  | see single devices                        |
| <b>Description:</b>   | Single Devices for various Test Equipment |
| <b>Type:</b>          | various                                   |
| <b>Serial Number:</b> | none                                      |

### Single Devices for Auxiliary Test Equipment

| Single Device Name                 | Type             | Serial Number | Manufacturer                          |
|------------------------------------|------------------|---------------|---------------------------------------|
| Broadband Power Divider N (Aux)    | 1506A / 93459    | LM390         | Weinschel Associates                  |
| Broadband Power Divider SMA        | WA1515           | A855          | Weinschel Associates                  |
| Digital Multimeter 03 (Multimeter) | Fluke 177        | 86670383      | Fluke Europe B.V.                     |
| <i>Calibration Details</i>         |                  |               | <i>Last Execution   Next Exec.</i>    |
| Customized calibration             |                  |               | 2013/12/04   2015/12/03               |
| Fibre optic link Satellite (Aux)   | FO RS232 Link    | 181-018       | Pontis                                |
| Fibre optic link Transceiver (Aux) | FO RS232 Link    | 182-018       | Pontis                                |
| Isolating Transformer              | LTS 604          | 1888          | Thalheimer<br>Transformatorwerke GmbH |
| Notch Filter Ultra Stable (Aux)    | WRCA800/960-6EEK | 24            | Wainwright                            |
| Signal Analyzer                    | FSV30            | 103005        | Rohde & Schwarz GmbH & Co. KG         |
| <i>Calibration Details</i>         |                  |               | <i>Last Execution   Next Exec.</i>    |
| Standard                           |                  |               | 2014/02/10   2016/02/09               |
| Spectrum Analyser                  | FSP3             | 836722/011    | Rohde & Schwarz GmbH & Co. KG         |
| <i>Calibration Details</i>         |                  |               | <i>Last Execution   Next Exec.</i>    |
| Standard                           |                  |               | 2012/06/13   2015/06/12               |
| Spectrum Analyser                  | FSU26            | 200418        | Rohde & Schwarz GmbH & Co.KG          |
| <i>Calibration Details</i>         |                  |               | <i>Last Execution   Next Exec.</i>    |
| Standard calibration               |                  |               | 2013/07/29   2014/07/28               |
| Vector Signal Generator            | SMIQ 03B         | 832492/061    | Rohde & Schwarz GmbH & Co.KG          |

## Test Equipment Digital Signalling Devices

**Lab ID:** Lab 1, Lab 2

**Description:** Signalling equipment for various wireless technologies.

### Single Devices for Digital Signalling Devices

| Single Device Name                   | Type                                                                                                                                                                                                                                                                                                                                                         | Serial Number | Manufacturer                                     |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------|
| Bluetooth Signalling Unit CBT        | CBT                                                                                                                                                                                                                                                                                                                                                          | 100589        | Rohde & Schwarz GmbH & Co. KG                    |
|                                      | <i>Calibration Details</i>                                                                                                                                                                                                                                                                                                                                   |               | <i>Last Execution</i> <i>Next Exec.</i>          |
|                                      | Standard calibration                                                                                                                                                                                                                                                                                                                                         |               | 2011/11/24 2014/11/23                            |
| CMW500                               | CMW500                                                                                                                                                                                                                                                                                                                                                       | 107500        | Rohde & Schwarz GmbH & Co. KG                    |
| Digital Radio Communication Tester   | CMD 55                                                                                                                                                                                                                                                                                                                                                       | 831050/020    | Rohde & Schwarz GmbH & Co. KG                    |
|                                      | <i>Calibration Details</i>                                                                                                                                                                                                                                                                                                                                   |               | <i>Last Execution</i> <i>Next Exec.</i>          |
|                                      | Standard calibration                                                                                                                                                                                                                                                                                                                                         |               | 2011/11/28 2014/11/27                            |
| Universal Radio Communication Tester | CMU 200                                                                                                                                                                                                                                                                                                                                                      | 102366        | Rohde & Schwarz GmbH & Co. KG                    |
|                                      | <i>HW/SW Status</i>                                                                                                                                                                                                                                                                                                                                          |               | <i>Date of Start</i> <i>Date of End</i>          |
|                                      | Hardware:<br>B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B56V14, B68 3v04, PCMCIA, U65V04<br>Software:<br>K21 4v21, K22 4v21, K23 4v21, K24 4v21, K42 4v21, K43 4v21, K53 4v21, K56 4v22, K57 4v22, K58 4v22, K59 4v22, K61 4v22, K62 4v22, K63 4v22, K64 4v22, K65 4v22, K66 4v22, K67 4v22, K68 4v22, K69 4v22<br>Firmware:<br>µP1 8v50 02.05.06<br>--- |               | 2007/07/16                                       |
| Universal Radio Communication Tester | CMU 200                                                                                                                                                                                                                                                                                                                                                      | 837983/052    | Rohde & Schwarz GmbH & Co. KG                    |
|                                      | <i>Calibration Details</i>                                                                                                                                                                                                                                                                                                                                   |               | <i>Last Execution</i> <i>Next Exec.</i>          |
|                                      | Standard calibration                                                                                                                                                                                                                                                                                                                                         |               | 2011/12/07 2014/12/06                            |
|                                      | <i>HW/SW Status</i>                                                                                                                                                                                                                                                                                                                                          |               | <i>Date of Start</i> <i>Date of End</i>          |
|                                      | HW options:<br>B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B54V14, B56V14, B68 3v04, B95, PCMCIA, U65V02<br>SW options:<br>K21 4v11, K22 4v11, K23 4v11, K24 4v11, K27 4v10, K28 4v10, K42 4v11, K43 4v11, K53 4v10, K65 4v10, K66 4v10, K68 4v10,<br>Firmware:<br>µP1 8v40 01.12.05<br>---<br>SW:<br>K62, K69                                            |               | 2007/01/02<br><br><br><br><br><br><br>2008/11/03 |
| Vector Signal Generator              | SMU200A                                                                                                                                                                                                                                                                                                                                                      | 100912        | Rohde & Schwarz GmbH & Co. KG                    |

## Test Equipment Emission measurement devices

**Lab ID:** Lab 1  
**Description:** Equipment for emission measurements  
**Serial Number:** see single devices

### Single Devices for Emission measurement devices

| Single Device Name                                  | Type    | Serial Number | Manufacturer                       |
|-----------------------------------------------------|---------|---------------|------------------------------------|
| Personal Computer                                   | Dell    | 30304832059   | Dell                               |
| Power Meter                                         | NRVD    | 828110/016    | Rohde & Schwarz GmbH & Co.KG       |
| <i>Calibration Details</i>                          |         |               | <i>Last Execution   Next Exec.</i> |
| Standard calibration                                |         |               | 2013/05/03   2014/05/02            |
| Sensor Head A                                       | NRV-Z1  | 827753/005    | Rohde & Schwarz GmbH & Co.KG       |
| <i>Calibration Details</i>                          |         |               | <i>Last Execution   Next Exec.</i> |
| Standard calibration                                |         |               | 2013/04/30   2014/04/29            |
| Signal Generator                                    | SMR 20  | 846834/008    | Rohde & Schwarz GmbH & Co. KG      |
| <i>Calibration Details</i>                          |         |               | <i>Last Execution   Next Exec.</i> |
| standard calibration                                |         |               | 2011/05/12   2014/05/11            |
| Spectrum Analyzer                                   | ESIB 26 | 830482/004    | Rohde & Schwarz GmbH & Co. KG      |
| <i>Calibration Details</i>                          |         |               | <i>Last Execution   Next Exec.</i> |
| Standard Calibration                                |         |               | 2014/01/07   2016/01/31            |
| <i>HW/SW Status</i>                                 |         |               | <i>Date of Start   Date of End</i> |
| Firmware-Update 4.34.4 from 3.45 during calibration |         |               | 2009/12/03                         |

## Test Equipment Radio Lab Test Equipment

**Lab ID:** Lab 2  
**Description:** Radio Lab Test Equipment

### Single Devices for Radio Lab Test Equipment

| Single Device Name                                              | Type              | Serial Number  | Manufacturer                     |
|-----------------------------------------------------------------|-------------------|----------------|----------------------------------|
| Broadband Power Divider SMA                                     | WA1515            | A856           | Weinschel Associates             |
| Coax Attenuator 10dB SMA 2W                                     | 4T-10             | F9401          | Weinschel Associates             |
| Coax Attenuator 10dB SMA 2W                                     | 56-10             | W3702          | Weinschel Associates             |
| Coax Attenuator 10dB SMA 2W                                     | 56-10             | W3711          | Weinschel Associates             |
| Coax Cable Huber&Suhner                                         | Sucotest 2,0m     |                | Huber&Suhner                     |
| Coax Cable Rosenberger Micro Coax FA210A0010003030 SMA/SMA 1,0m | FA210A0010003030  | 54491-2        | Rosenberger Micro-Coax           |
| Power Meter                                                     | NRVD              | 828110/016     | Rohde & Schwarz GmbH & Co.KG     |
| <i>Calibration Details</i>                                      |                   |                | <i>Last Execution Next Exec.</i> |
| Standard calibration                                            |                   |                | 2013/05/03 2014/05/02            |
| RF Step Attenuator RSP                                          | RSP               | 833695/001     | Rohde & Schwarz GmbH & Co.KG     |
| Rubidium Frequency Standard                                     | Datum, Model: MFS | 5489/001       | Datum-Beverly                    |
| <i>Calibration Details</i>                                      |                   |                | <i>Last Execution Next Exec.</i> |
| Standard calibration                                            |                   |                | 2013/06/24 2014/06/23            |
| Sensor Head A                                                   | NRV-Z1            | 827753/005     | Rohde & Schwarz GmbH & Co.KG     |
| <i>Calibration Details</i>                                      |                   |                | <i>Last Execution Next Exec.</i> |
| Standard calibration                                            |                   |                | 2013/04/30 2014/04/29            |
| Signal Generator SME                                            | SME03             | 827460/016     | Rohde & Schwarz GmbH & Co.KG     |
| <i>Calibration Details</i>                                      |                   |                | <i>Last Execution Next Exec.</i> |
| Standard calibration                                            |                   |                | 2011/11/25 2014/11/24            |
| Signal Generator SMP                                            | SMP02             | 836402/008     | Rohde & Schwarz GmbH & Co. KG    |
| <i>Calibration Details</i>                                      |                   |                | <i>Last Execution Next Exec.</i> |
| Standard calibration                                            |                   |                | 2013/05/06 2016/05/05            |
| Spectrum Analyser                                               | FSIQ26            | 840061/005     | Rohde & Schwarz GmbH & Co. KG    |
| <i>Calibration Details</i>                                      |                   |                | <i>Last Execution Next Exec.</i> |
| Standard Calibration                                            |                   |                | 2013/02/12 2015/02/11            |
| Temperature Chamber Vötsch 03                                   | VT 4002           | 58566002150010 | Vötsch                           |
| <i>Calibration Details</i>                                      |                   |                | <i>Last Execution Next Exec.</i> |
| Customized calibration                                          |                   |                | 2014/03/11 2016/03/10            |

## **5 Annex**

### **5.1 Additional Information for Report**

#### Summary of Test Results

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The EUT complied with all performed tests as listed in the summary section of this report.

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#### Technical Report Summary

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#### Type of Authorization :

Certification for a GSM/WCDMA/CDMA2000 cellular radiotelephone device

#### Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 0 to 69. The following subparts are applicable to the results in this test report.

#### Part 2, Subpart J - Equipment Authorization Procedures, Certification

- § 2.1046 Measurement required: RF power output
- § 2.1049 Measurement required: Occupied bandwidth
- § 2.1051 Measurement required: Spurious emissions at antenna terminals
- § 2.1053 Measurement required: Field strength of spurious radiation
- § 2.1055 Measurement required: Frequency stability
- § 2.1057 Frequency spectrum to be investigated

#### Part 22, Subpart C – Operational and Technical Requirements

- § 22.355 Frequency tolerance

#### Part 22, Subpart H – Cellular Radiotelephone Service

- § 22.913 Effective radiated power limits
- § 22.917 Emission limitations for cellular equipment

#### Part 24, Subpart E - Broadband PCS

- § 24.232 Power and antenna height limits
- § 24.235 Frequency stability
- § 24.236 Field strength limits
- § 24.238 Emission limitations for Broadband PCS equipment

additional documents

ANSI TIA-603-C-2004

#### Description of Methods of Measurements

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#### RF Power Output

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Standard     FCC Part 22, Subpart H  
                  FCC Part 24, Subpart E

The test was performed according to: FCC §2.1046

#### Test Description (conducted measurement procedure)

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
  - 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
  - 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
- Important Settings:
- Channel (Frequency): please refer to the detailed results
- 4) The transmitted power of the EUT was recorded by using a spectrum analyser.

#### Test Description (radiated measurement procedure)

- 1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a Digital Communication Tester which was located outside the chamber via a small signalling antenna.
  - 2) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
- Important Settings:
- Output Power: Maximum
  - Channel: please refer to the detailed results
- 3) A substitution procedure is used so that the readings from the spectrum analyser are corrected and represent directly the equivalent radiated power (related to a  $\lambda/2$  dipole).
  - 4) The output power was measured in both vertical and horizontal antenna polarisation during the call is established on the lowest channel, mid channel and on the highest channel. To find the worst case power all orientations (X, Y, Z) of the EUT have been measured.
  - 5) The test procedure according to TIA-603-C-2004 has been considered.

#### Test Requirements / Limits

##### §2.1046 Measurements Required: RF Power Output

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the output terminals when this test is made shall be stated.

##### §22.913 Effective radiated power limits

(a)(2) Maximum ERP. ... The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

##### §24.232 Power and antenna height limits

(c) Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

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#### Emission and Occupied Bandwidth

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Standard     FCC Part 22, Subpart H  
                  FCC Part 24, Subpart E

The test was performed according to: FCC §2.1049

#### Test Description

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
  - 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
  - 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
- Important Settings:
- Output Power: Maximum
  - Channel: please refer to the detailed results

4) Important Analyser Settings:

- Resolution Bandwidth: >1% of the manufacturer's stated occupied bandwidth

5) The maximum spectral level of the modulated signal was recorded as the reference.

6) The emission bandwidth is measured as follows:

the two furthest frequencies above and below the frequency of the maximum reference level where the spectrum is -26 dB down have to be found.

7) The occupied bandwidth (99% Bandwidth) is measured as follows:

the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 percent of the total mean power.

Test Requirements / Limits

§ 2.1049 Measurements required: Occupied bandwidth

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions (as applicable):

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

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Spurious emissions at antenna terminals

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Standard     FCC Part 22, Subpart H  
                  FCC Part 24, Subpart E

The test was performed according to FCC §2.1051

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".

2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.

3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum

- Channel: please refer to the detailed results

4) Important Analyser Settings

- [Resolution Bandwidth]:

a) [ $\geq 1\%$  of wanted signal bandwidth] in the Span of 1 MHz directly below and above the PCS-Band,

b) otherwise [100 kHz] (or [1 MHz] for accelerated sweep times)

c) [reduced resolution bandwidth] in case the curve of the analyser IF-Filter or the wanted EUT signal leads to an exceeding of the limit, in this case a correction factor was used

- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth

5) The spurious emissions peaks were measured in the frequency range from 9 kHz to 10 GHz (up to the 10th harmonic) during the call was established

Test Requirements / Limits

§ 2.1051 Spurious emissions at antenna terminals

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 2.1057 Frequency spectrum to be investigated.



(a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

#### § 22.917 Emission limitations for cellular equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

Remark of the test laboratory: This is calculated to be -13 dBm.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].

(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

#### § 24.238 Emission limitations for Broadband PCS equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

Remark of the test laboratory: This is calculated to be -13 dBm.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].

(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

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Field strength of spurious radiation

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Standard     FCC Part 22, Subpart H  
                  FCC Part 24, Subpart E

The test was performed according to: FCC §2.1053

Test Description

- 1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a Digital Communication Tester which was located outside the chamber via a small signalling antenna.
- 2) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum
  - Channel: please refer to the detailed results
- 3) A pre-calibration procedure is used so that the readings from the spectrum analyser are corrected and represent directly the equivalent radiated power (related to a  $\lambda/2$  dipole).
  - 4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antennas for the frequency range of 30 MHz to 10 GHz (up to the 10th harmonic of the transmit frequency). The frequency range from 9 kHz to 30 MHz has been examined during the conducted spurious emission measurements.
  - 5) Important Analyser Settings
    - [Resolution Bandwidth / Video Bandwidth]:
      - a) [3 kHz / 10 kHz] in the Span of 1 MHz directly below and above the Band,
      - b) [10 kHz / 30 kHz] in case the curve of the analyser IF-Filter leads to an exceeding of the limit, in this case a worst case correction factor of 20 dB (1 MHz  $\rightarrow$  10 kHz) was used
      - c) [1 MHz / 3 MHz] otherwise
    - Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth
  - 6) The spurious emissions peaks were measured in both vertical and horizontal antenna polarization during the call is established on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y, Z) of the EUT have been measured.

#### Test Requirements / Limits

§ 2.1053 Measurements required: Field strength of spurious radiation.

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of Sec. 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

- (b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:
- (2) All equipment operating on frequencies higher than 25 MHz.

§ 2.1057 Frequency spectrum to be investigated.

- (a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
  - (1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
  - (b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.
  - (c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.
  - (d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 22.917 Emission limitations for cellular equipment

- (a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.  
This is calculated to be -13 dBm (effective radiated power) which corresponds to 84.6 dB $\mu$ V/m (field strength) in a distance of 3 m.
- (b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve

measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].

(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

#### § 24.238 Emission limitations for Broadband PCS equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

This is calculated to be -13 dBm (effective radiated power) which corresponds to 84.6 dBµV/m (field strength) in a distance of 3 m.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].

(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

#### Frequency stability

Standard FCC Part 22, Subpart H  
FCC Part 24, Subpart E

The test was performed according to FCC §2.1055

#### Test Description

- 1) The EUT was placed inside a temperature chamber.
  - 2) The EUT was coupled to a Digital Communication Tester. Refer to chapter "Setup Drawings".
  - 3) The climatic chamber was cycled down/up to a certain temperature, starting with the EUT minimum temperature.
  - 4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
- Important Settings:
- Output Power: Maximum
  - Mid Channel
- 5) The frequency error of the EUT was recorded by using an internal measurement function of the Digital Communication Tester immediately after the call was established, five minutes after the call was established and ten minutes after the call was established.
  - 6) This measurement procedure was performed for temperature variation from -30°C to +50°C in increments of 10°C, if not otherwise stated in the detailed results.
- When the EUT did not operate at certain temperature levels, these measurements were left out.

#### Test Requirements / Limits

§2.1055 Measurements required: Frequency stability

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

- (1) From -30° to +50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
- (b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.
- (d) The frequency stability shall be measured with variation of primary supply voltage as follows:
- (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
- (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
- (3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

#### §22.355 Frequency tolerance

...the carrier frequency of each transmitter in the Public Mobile Service must be maintained within the tolerances given in table C-1 of this section.

Table C-1.- Frequency Tolerance for Transmitters in the Public Mobile Services

| Frequency range (MHz)                                               | Base, fixed (ppm) | Mobile up to 3 watts (ppm) | Mobile above 3 watts (ppm) |
|---------------------------------------------------------------------|-------------------|----------------------------|----------------------------|
| 25 to 50                                                            | 20.0              | 20.0                       | 50.0                       |
| 50 to 450                                                           | 5.0               | 5.0                        | 50.0                       |
| 450 to 512                                                          | 2.5               | 5.0                        | 5.0                        |
| 821 to 896                                                          | 1.5               | 2.5                        | 2.5                        |
| 928 to 929                                                          | 5.0               | n/a                        | n/a                        |
| 929 to 960                                                          | 1.5               | n/a                        | n/a                        |
| 2110 to 2220                                                        | 10.0              | n/a                        | n/a                        |
| channel (836.6 MHz) the frequency tolerance is 2.5 ppm (2091.5 Hz). |                   |                            |                            |

#### §24.235 Frequency stability

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

7Layers interpretation of limit:

To ensure that the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block following limit was used:

$$\pm 2.5 \text{ ppm} = 4700 \text{ Hz for a frequency of } 1880.0 \text{ MHz}$$

in accordance with FCC Part 22, Subpart H, §22.355, table C-1: Frequency tolerance for the carrier frequency of mobile transmitters in the Public Mobile Service in the frequency range 821 to 896 MHz.

#### Band edge compliance

Standard FCC Part 22, Subpart H

The test was performed according to: FCC §22.913

#### Test Description

- 1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
  - 2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
  - 3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
- Important Settings:

- Output Power: Maximum
- Channel: please refer to the detailed results
- 4) Important Analyser Settings:
  - Resolution Bandwidth = Video Bandwidth: >1% of the manufacturer's stated occupied bandwidth

#### Test Requirements / Limits

§ 22.917 Emission limitations for cellular equipment

Refer to chapter "Field strength of spurious radiation".

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#### Band edge compliance

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Standard: FCC Part 24, Subpart E

The test was performed according to: FCC §24.238

#### Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".

2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.

3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

Important Settings:

- Output Power: Maximum
- Channel: please refer to the detailed results
- 4) Important Analyser Settings:
  - Resolution Bandwidth = Video Bandwidth: >1% of the manufacturer's stated occupied bandwidth

#### Test Requirements / Limits

§ 24.238 Effective radiated power limits

Refer to chapter "Field strength of spurious radiation".

### Subtests HSDPA

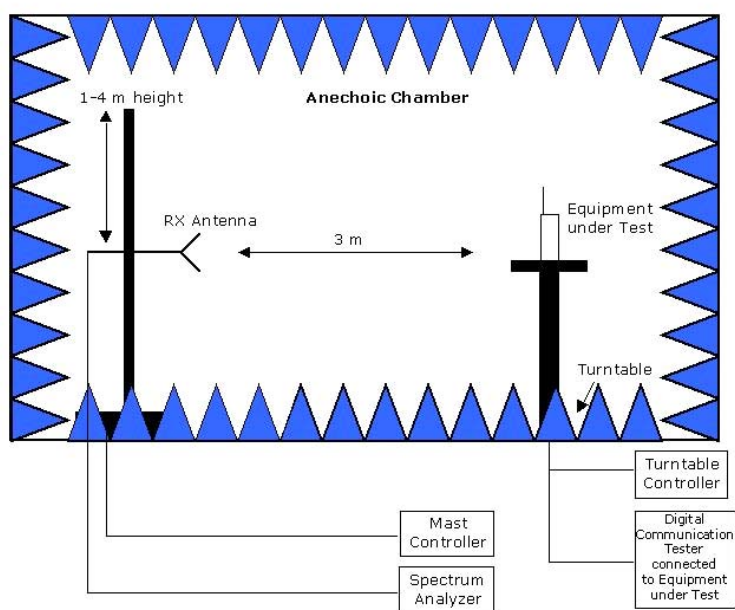
| Sub-test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $\beta_c$      | $\beta_d$      | $\beta_d$ (SF) | $\beta_c/\beta_d$ | $\beta_{HS}$ (Note1, Note 2) | CM (dB) (Note 3) | MPR (dB) (Note 3) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|-------------------|------------------------------|------------------|-------------------|
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2/15           | 15/15          | 64             | 2/15              | 4/15                         | 0.0              | 0.0               |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 12/15 (Note 4) | 15/15 (Note 4) | 64             | 12/15 (Note 4)    | 24/15                        | 1.0              | 0.0               |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 15/15          | 8/15           | 64             | 15/8              | 30/15                        | 1.5              | 0.5               |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 15/15          | 4/15           | 64             | 15/4              | 30/15                        | 1.5              | 0.5               |
| <p>Note 1: <math>\gamma_{ACK}</math>, <math>\gamma_{NACK}</math> and <math>\gamma_{CQI} = 30/15</math> with <math>\beta_{hs} = 30/15 * \beta_c</math>.</p> <p>Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, <math>\gamma_{ACK}</math> and <math>\gamma_{NACK} = 30/15</math> with <math>\beta_{hs} = 30/15 * \beta_c</math>, and <math>\gamma_{CQI} = 24/15</math> with <math>\beta_{hs} = 24/15 * \beta_c</math>.</p> <p>Note 3: CM = 1 for <math>\beta_c/\beta_d = 12/15</math>, <math>\beta_{hs}/\beta_c = 24/15</math>. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.</p> <p>Note 4: For subtest 2 the <math>\beta_c/\beta_d</math> ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF0) to <math>\beta_c = 11/15</math> and <math>\beta_d = 15/15</math>.</p> |                |                |                |                   |                              |                  |                   |

### Subtests HSUPA

| Subtest | Mode       | Loopback Mode | Rel99 RMC    | HSDPA FRC | HSUPA Test     | Number of E-DPDCH Channels |
|---------|------------|---------------|--------------|-----------|----------------|----------------------------|
| 1       | Rel6 HSUPA | Test Mode 1   | 12.2kbps RMC | H-Set1    | HSUPA Loopback | 1                          |
| 2       | Rel6 HSUPA | Test Mode 1   | 12.2kbps RMC | H-Set1    | HSUPA Loopback | 1                          |
| 3       | Rel6 HSUPA | Test Mode 1   | 12.2kbps RMC | H-Set1    | HSUPA Loopback | 2                          |
| 4       | Rel6 HSUPA | Test Mode 1   | 12.2kbps RMC | H-Set1    | HSUPA Loopback | 1                          |
| 5       | Rel6 HSUPA | Test Mode 1   | 12.2kbps RMC | H-Set1    | HSUPA Loopback | 1                          |

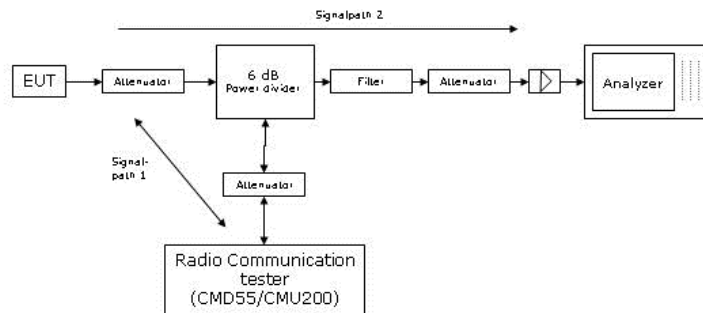
| Subtest | Max UL Data Rate (kb/s) | $\beta_c/\beta_d$ | $\beta_{hs}$ | $\beta_{ed}$ | CM |
|---------|-------------------------|-------------------|--------------|--------------|----|
| 1       | 242.1                   | 11/15             | 22/15        | 1309/225     | 1  |
| 2       | 161.3                   | 6/15              | 12/15        | 94/75        | 3  |
| 3       | 524.7                   | 15/9              | 30/15        | 47/15        | 2  |
| 4       | 197.6                   | 2/15              | 4/15         | 56/75        | 3  |
| 5       | 299.6                   | 15/15             | 30/15        | 134/15       | 1  |

## Setup Drawings



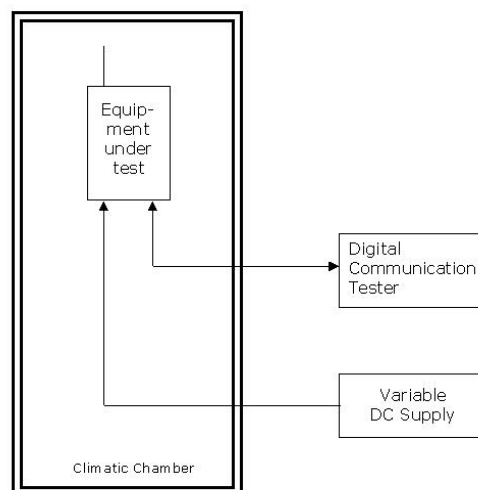
Remark: Depending on the frequency range suitable antenna types, attenuators or preamplifiers are used.

Principle set-up for radiated measurements



**Remark:** Depending on the frequency range suitable attenuators and/or filters and/or amplifiers are used.

Principle set-up for conducted measurements under nominal conditions



Principle set-up for tests under extreme test conditions



### Correlation of measurement requirements for Cellular Equipment from FCC and IC

| Test name – FCC                         | FCC reference CFR47 |          |          |         | Test name – IC                           | IC reference |                     |                     |                     |
|-----------------------------------------|---------------------|----------|----------|---------|------------------------------------------|--------------|---------------------|---------------------|---------------------|
|                                         | Part 2              | Part 22  | Part 24  | Part 27 |                                          | RSS-Gen      | RSS-132<br>SRSP-503 | RSS-133<br>SRSP-510 | RSS-139<br>SRSP-513 |
|                                         |                     |          |          |         | <b>Issue:</b>                            | 3, 2010      | 3, 2013             | 6, 2013             | 2, 2009             |
| RF power output                         | § 2.1046            | § 22.913 | § 24.232 | § 27.50 | Transmitter output power                 | 4.8          | 5.4                 | 6.4                 | 6.4                 |
| Frequency stability                     | § 2.1055            | § 22.355 | § 24.235 | § 27.54 | Frequency stability                      | 4.7          | 5.3                 | 6.3                 | 6.3                 |
| Spurious emissions at antenna terminals | § 2.1051            | § 22.917 | § 24.238 | § 27.53 | Transmitter unwanted emissions conducted | 4.9          | 5.5                 | 6.5                 | 6.5                 |
| –                                       | –                   | –        | –        | –       | Receiver unwanted emissions conducted    | 4.10;<br>6.2 | 5.6 *)              | 6.6 *)              | 6.6 *)              |
| Field strength of spurious radiation    | § 2.1053            | § 22.917 | § 24.238 | § 27.53 | Transmitter unwanted emissions radiated  | 4.9          | 5.5                 | 6.5                 | 6.5                 |
| –                                       | –                   | –        | –        | –       | Receiver unwanted emissions radiated     | 4.10;<br>6.2 | 5.6 *)              | 6.6 *)              | 6.6 *)              |
| Emission and Occupied Bandwidth         | § 2.1049            | –        | –        | –       | Emission and Occupied Bandwidth          | 4.6          | 5.5                 | 2.3;<br>6.5         | 2.3;<br>6.5         |
| Band edge compliance                    | § 2.1053            | § 22.917 | § 24.238 | § 27.53 | Band edge compliance                     | 4.9          | 5.5                 | 6.5                 | 6.5                 |

\*) Receivers which are part of Transceivers are exempted with respect to Notice 2012-DRS0126.

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