

# FCC RF Test Report

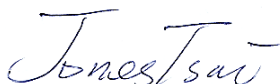
APPLICANT : Nyle Oswind Parry Limited Liability Company  
EQUIPMENT : Tablet PC  
MODEL NAME : GRT67VY  
FCC ID : 2AB06-0610  
STANDARD : 47 CFR Part 2, 27  
CLASSIFICATION : PCS Licensed Transmitter (PCB)

The testing completed on Apr. 26, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and the testing has shown the tested sample to be in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



**SPORTON INTERNATIONAL INC.**

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## REVISION HISTORY

| REPORT NO.   | VERSION | DESCRIPTION                                                 | ISSUED DATE   |
|--------------|---------|-------------------------------------------------------------|---------------|
| FG432436-10B | Rev. 01 | Initial issue of report                                     | Jul. 29, 2014 |
| FG432436-10B | Rev. 02 | Add maximum RSE results of 1559MHz-1610MHz at page 122-123. | Sep. 01, 2014 |
|              |         |                                                             |               |
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|              |         |                                                             |               |
|              |         |                                                             |               |

## SUMMARY OF TEST RESULT

| Report Section | FCC Rule                                             | Description                                              | Limit                               | Result | Remark                                     |
|----------------|------------------------------------------------------|----------------------------------------------------------|-------------------------------------|--------|--------------------------------------------|
| 3.1            | §2.1046                                              | Conducted Output Power                                   | Reporting Only                      | PASS   | -                                          |
|                | §27.50(b)(10)                                        | Effective Radiated Power<br>(Band 13)                    | ERP < 3 Watt                        | PASS   | -                                          |
|                | §27.50(d)(4)                                         | Equivalent Isotropic Radiated<br>Power<br>(Band 4)       | EIRP < 1Watt                        | PASS   | -                                          |
| 3.2            | N/A                                                  | Peak-to-Average Ratio                                    | <13 dB                              | PASS   | -                                          |
| 3.3            | §2.1049<br>§27.53(h)(3)                              | Occupied Bandwidth                                       | Reporting Only                      | PASS   | -                                          |
| 3.4            | §2.1051<br>§27.53(c)(2)<br>§27.53(c)(4)<br>§27.53(h) | Conducted Band Edge<br>Measurement<br>(Band 4) (Band 13) | < 43+10log <sub>10</sub> (P[Watt])  | PASS   | -                                          |
| 3.5            | §2.1051<br>§27.53(c)(2)<br>§27.53(h)                 | Conducted Spurious Emission<br>(Band 4) (Band 13)        | < 43+10log <sub>10</sub> (P[Watts]) | PASS   | -                                          |
| 3.6            | §2.1053<br>§27.53(c)(2)<br>§27.53(f)<br>§27.53(h)    | Radiated Spurious Emission<br>(Band 4) (Band 13)         | < 43+10log <sub>10</sub> (P[Watts]) | PASS   | Under limit<br>12.91 dB at<br>1559.000 MHz |
| 3.7            | §2.1055<br>§27.54                                    | Frequency Stability<br>Temperature & Voltage             | < 2.5 ppm                           | PASS   |                                            |

# 1 General Description

## 1.1 Applicant

Nyle Oswind Parry Limited Liability Company

7027 Old Madison Pike, Suite 108, Huntsville, Alabama 35806

## 1.2 Product Feature of Equipment Under Test

| Product Feature                 |                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment                       | Tablet PC                                                                                                                                                                        |
| Model Name                      | GRT67VY                                                                                                                                                                          |
| FCC ID                          | 2ABO6-0610                                                                                                                                                                       |
| EUT supports Radios application | GSM/EGPRS/WCDMA/HSPA/LTE<br><2.4GHz band><br>WLAN 11b/g/n HT20<br>WLAN 11ac VHT20<br>Bluetooth v4.0 EDR/LE<br><5GHz band><br>WLAN 11a/n HT20/HT40<br>WLAN 11ac VHT20/VHT40/VHT80 |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.3 Product Specification subjective to this standard

| Product Specification subjective to this standard |                                                                                         |
|---------------------------------------------------|-----------------------------------------------------------------------------------------|
| Tx Frequency                                      | LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz<br>LTE Band 13 : 779.5 MHz ~ 784.5 MHz             |
| Rx Frequency                                      | LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz<br>LTE Band 13 : 748.5 MHz ~ 753.5 MHz             |
| Bandwidth                                         | LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz<br>LTE Band 13 : 5MHz / 10MHz |
| Maximum Output Power to Antenna                   | LTE Band 4 : 23.80 dBm<br>LTE Band 13 : 22.90 dBm                                       |
| Antenna Type                                      | Fixed Internal Antenna                                                                  |
| Antenna Gain                                      | LTE Band 4 : 1.70 dBi<br>LTE Band 13 : -0.40 dBi                                        |
| Type of Modulation                                | QPSK / 16QAM                                                                            |

## 1.4 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.5 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

| FCC Rule | System      | Type of Modulation | BW      | Emission Designator | Frequency Tolerance (ppm) | Maximum ERP/EIRP |
|----------|-------------|--------------------|---------|---------------------|---------------------------|------------------|
| Part 27  | LTE Band 4  | QPSK               | 1.4 MHz | 1M10G7D             | -                         | 0.35 W           |
| Part 27  | LTE Band 4  | 16QAM              | 1.4 MHz | 1M10D7W             | -                         | 0.28 W           |
| Part 27  | LTE Band 4  | QPSK               | 3 MHz   | 2M73G7D             | -                         | 0.35 W           |
| Part 27  | LTE Band 4  | 16QAM              | 3 MHz   | 2M74D7W             | -                         | 0.28 W           |
| Part 27  | LTE Band 4  | QPSK               | 5MHz    | 4M50G7D             | -                         | 0.34 W           |
| Part 27  | LTE Band 4  | 16QAM              | 5MHz    | 4M51D7W             | -                         | 0.27 W           |
| Part 27  | LTE Band 4  | QPSK               | 10MHz   | 9M06G7D             | 0.0118 ppm                | 0.34 W           |
| Part 27  | LTE Band 4  | 16QAM              | 10MHz   | 9M04D7W             | -                         | 0.28 W           |
| Part 27  | LTE Band 4  | QPSK               | 15MHz   | 13M5G7D             | -                         | 0.34 W           |
| Part 27  | LTE Band 4  | 16QAM              | 15MHz   | 13M5D7W             | -                         | 0.27 W           |
| Part 27  | LTE Band 4  | QPSK               | 20MHz   | 18M5G7D             | -                         | 0.36 W           |
| Part 27  | LTE Band 4  | 16QAM              | 20MHz   | 18M5D7W             | -                         | 0.27 W           |
| Part 27  | LTE Band 13 | QPSK               | 5MHz    | 4M51G7D             | -                         | 0.11 W           |
| Part 27  | LTE Band 13 | 16QAM              | 5MHz    | 4M50D7W             | -                         | 0.09 W           |
| Part 27  | LTE Band 13 | QPSK               | 10MHz   | 9M08G7D             | 0.0102 ppm                | 0.11 W           |
| Part 27  | LTE Band 13 | 16QAM              | 10MHz   | 9M02D7W             | -                         | 0.09 W           |

## 1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

|                           |                                                                                                                                                                 |           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Test Site</b>          | SPORTON INTERNATIONAL INC.                                                                                                                                      |           |
| <b>Test Site Location</b> | No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park,<br>Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL: +886-3-327-3456<br>FAX: +886-3-328-4978 |           |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>                                                                                                                                         |           |
|                           | TH02-HY                                                                                                                                                         | 03CH07-HY |

## 1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2, 27
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01

### Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

## 2 Test Configuration of Equipment Under Test

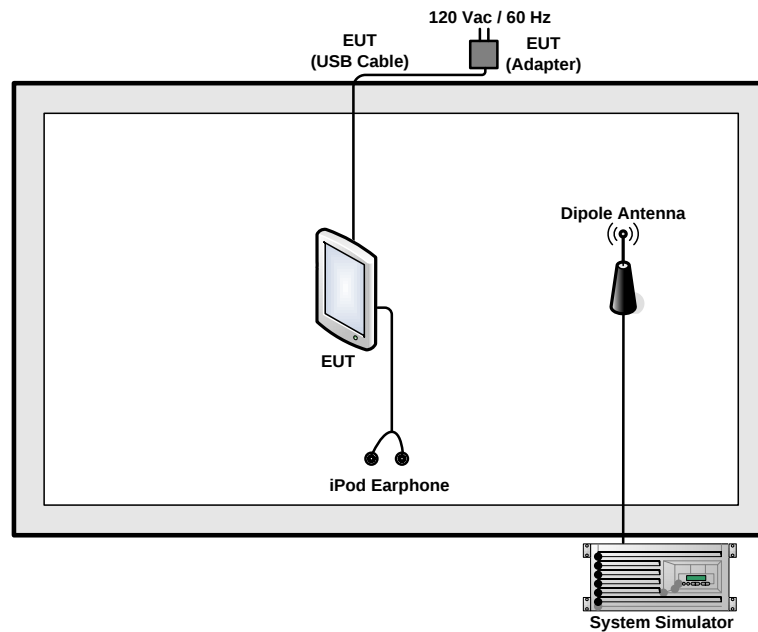
### 2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

| Test Items                  | Band                                                                                                                                                                                                                                                                                                                                                                                                                                    | Bandwidth (MHz) |   |   |    |    |    | Modulation |       | RB # |      |      | Test Channel |   |   |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---|---|----|----|----|------------|-------|------|------|------|--------------|---|---|
|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1.4             | 3 | 5 | 10 | 15 | 20 | QPSK       | 16QAM | 1    | Half | Full | L            | M | H |
| Max. Output Power           | 4                                                                                                                                                                                                                                                                                                                                                                                                                                       | ✓               | ✓ | ✓ | ✓  | ✓  | ✓  | ✓          | ✓     | ✓    | ✓    | ✓    | ✓            | ✓ | ✓ |
|                             | 13                                                                                                                                                                                                                                                                                                                                                                                                                                      | -               | - | ✓ | ✓  | -  | -  | ✓          | ✓     | ✓    | ✓    | ✓    | ✓            | ✓ | ✓ |
| Peak-to-Average Ratio       | 4                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |   |   |    |    | ✓  | ✓          | ✓     | ✓    |      | ✓    | ✓            | ✓ | ✓ |
|                             | 13                                                                                                                                                                                                                                                                                                                                                                                                                                      | -               | - |   | ✓  | -  | -  | ✓          | ✓     | ✓    |      | ✓    | ✓            | ✓ | ✓ |
| 26dB and 99% Bandwidth      | 4                                                                                                                                                                                                                                                                                                                                                                                                                                       | ✓               | ✓ | ✓ | ✓  | ✓  | ✓  | ✓          | ✓     |      |      | ✓    | ✓            | ✓ | ✓ |
|                             | 13                                                                                                                                                                                                                                                                                                                                                                                                                                      | -               | - | ✓ | ✓  | -  | -  | ✓          | ✓     |      |      | ✓    | ✓            | ✓ | ✓ |
| Conducted Band Edge         | 4                                                                                                                                                                                                                                                                                                                                                                                                                                       | ✓               | ✓ | ✓ | ✓  | ✓  | ✓  | ✓          | ✓     | ✓    |      | ✓    | ✓            |   | ✓ |
|                             | 13                                                                                                                                                                                                                                                                                                                                                                                                                                      | -               | - | ✓ | ✓  | -  | -  | ✓          | ✓     | ✓    |      | ✓    | ✓            |   | ✓ |
| Conducted Spurious Emission | 4                                                                                                                                                                                                                                                                                                                                                                                                                                       | ✓               | ✓ | ✓ | ✓  | ✓  | ✓  | ✓          | ✓     | ✓    |      |      |              | ✓ |   |
|                             | 13                                                                                                                                                                                                                                                                                                                                                                                                                                      | -               | - | ✓ | ✓  | -  | -  | ✓          | ✓     | ✓    |      |      |              | ✓ |   |
| Frequency Stability         | 4                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |   |   | ✓  |    |    | ✓          |       |      |      | ✓    |              | ✓ |   |
|                             | 13                                                                                                                                                                                                                                                                                                                                                                                                                                      | -               | - |   | ✓  | -  | -  | ✓          |       |      |      | ✓    |              | ✓ |   |
| E.R.P./ E.I.R.P.            | 4                                                                                                                                                                                                                                                                                                                                                                                                                                       | ✓               | ✓ | ✓ | ✓  | ✓  | ✓  | ✓          | ✓     | ✓    |      |      | ✓            | ✓ | ✓ |
|                             | 13                                                                                                                                                                                                                                                                                                                                                                                                                                      | -               | - | ✓ | ✓  | -  | -  | ✓          | ✓     | ✓    |      |      | ✓            | ✓ | ✓ |
| Radiated Spurious Emission  | 4                                                                                                                                                                                                                                                                                                                                                                                                                                       | ✓               | ✓ | ✓ | ✓  | ✓  | ✓  | ✓          |       | ✓    |      |      |              | ✓ |   |
|                             | 13                                                                                                                                                                                                                                                                                                                                                                                                                                      | -               | - | ✓ | ✓  | -  | -  | ✓          |       | ✓    |      |      |              | ✓ |   |
| Note                        | <ol style="list-style-type: none"> <li>The mark "✓" means that this configuration is chosen for testing</li> <li>The mark "-" means that this bandwidth is not supported.</li> <li>The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.</li> </ol> |                 |   |   |    |    |    |            |       |      |      |      |              |   |   |

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration and system

| Item | Equipment        | Trade Name | Model No. | FCC ID | Data Cable        | Power Cord        |
|------|------------------|------------|-----------|--------|-------------------|-------------------|
| 1.   | System Simulator | R&S        | CMW 500   | N/A    | N/A               | Unshielded, 1.8 m |
| 2.   | iPod Earphone    | Apple      | N/A       | N/A    | Unshielded, 1.0 m | N/A               |

## 2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

*Offset(dB) = RF cable loss(dB) + attenuator factor(dB).*

*= 4.2 + 10 = 14.2 (dB)*

### 3 Test Result

#### 3.1 Conducted Output Power Measurement and ERP/EIRP Measurement

##### 3.1.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 13. (FCC Only)

The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 4.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$ ,  $ERP = EIRP - 2.15$ , where

$P_T$  = transmitter output power in dBm

$G_T$  = gain of the transmitting antenna in dBi

$L_C$  = signal attenuation in the connecting cable between the transmitter and antenna in dB

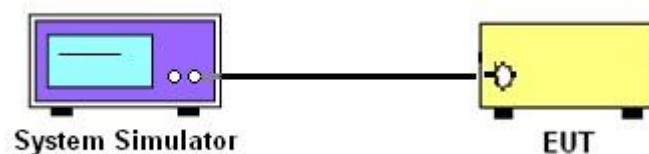
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

##### 3.1.4 Test Setup



### 3.1.5 Test Result of Conducted Output Power

#### <LTE Band 4 Conducted Power>

| BW [MHz]        | Modulation | RB Size | RB Offset | Power (dBm)<br>Low<br>Ch. / Freq. | Power (dBm)<br>Middle<br>Ch. / Freq. | Power (dBm)<br>High<br>Ch. / Freq. |
|-----------------|------------|---------|-----------|-----------------------------------|--------------------------------------|------------------------------------|
| Channel         |            |         |           | 20050                             | 20175                                | 20300                              |
| Frequency (MHz) |            |         |           | 1720                              | 1732.5                               | 1745                               |
| 20              | QPSK       | 1       | 0         | 23.80                             | 23.50                                | 23.50                              |
| 20              | QPSK       | 1       | 49        | 23.70                             | 23.40                                | 23.50                              |
| 20              | QPSK       | 1       | 99        | 23.50                             | 23.40                                | 23.50                              |
| 20              | QPSK       | 50      | 0         | 22.50                             | 22.20                                | 22.30                              |
| 20              | QPSK       | 50      | 24        | 22.40                             | 22.10                                | 22.30                              |
| 20              | QPSK       | 50      | 49        | 22.30                             | 22.00                                | 22.30                              |
| 20              | QPSK       | 100     | 0         | 22.30                             | 22.20                                | 22.20                              |
| 20              | 16QAM      | 1       | 0         | 22.60                             | 22.60                                | 22.60                              |
| 20              | 16QAM      | 1       | 49        | 22.50                             | 22.50                                | 22.60                              |
| 20              | 16QAM      | 1       | 99        | 22.40                             | 22.50                                | 22.50                              |
| 20              | 16QAM      | 50      | 0         | 21.20                             | 21.20                                | 21.20                              |
| 20              | 16QAM      | 50      | 24        | 21.20                             | 21.10                                | 21.30                              |
| 20              | 16QAM      | 50      | 49        | 21.20                             | 21.10                                | 21.30                              |
| 20              | 16QAM      | 100     | 0         | 21.30                             | 21.20                                | 21.30                              |
| Channel         |            |         |           | 20025                             | 20175                                | 20325                              |
| Frequency (MHz) |            |         |           | 1717.5                            | 1732.5                               | 1747.5                             |
| 15              | QPSK       | 1       | 0         | 23.60                             | 23.50                                | 23.60                              |
| 15              | QPSK       | 1       | 37        | 23.60                             | 23.50                                | 23.60                              |
| 15              | QPSK       | 1       | 74        | 23.40                             | 23.40                                | 23.40                              |
| 15              | QPSK       | 36      | 0         | 22.30                             | 22.30                                | 22.30                              |
| 15              | QPSK       | 36      | 18        | 22.30                             | 22.20                                | 22.40                              |
| 15              | QPSK       | 36      | 37        | 22.30                             | 22.10                                | 22.30                              |
| 15              | QPSK       | 75      | 0         | 22.20                             | 22.20                                | 22.30                              |
| 15              | 16QAM      | 1       | 0         | 22.60                             | 22.50                                | 22.50                              |
| 15              | 16QAM      | 1       | 37        | 22.60                             | 22.40                                | 22.50                              |
| 15              | 16QAM      | 1       | 74        | 22.40                             | 22.40                                | 22.50                              |
| 15              | 16QAM      | 36      | 0         | 21.30                             | 21.30                                | 21.40                              |
| 15              | 16QAM      | 36      | 18        | 21.30                             | 21.20                                | 21.30                              |
| 15              | 16QAM      | 36      | 37        | 21.30                             | 21.20                                | 21.30                              |
| 15              | 16QAM      | 75      | 0         | 21.20                             | 21.20                                | 21.30                              |

| BW<br>[MHz]     | Modulation | RB<br>Size | RB<br>Offset | Power (dBm)<br>Low<br>Ch. / Freq. | Power (dBm)<br>Middle<br>Ch. / Freq. | Power (dBm)<br>High<br>Ch. / Freq. |
|-----------------|------------|------------|--------------|-----------------------------------|--------------------------------------|------------------------------------|
| Channel         |            |            |              | 20000                             | 20175                                | 20350                              |
| Frequency (MHz) |            |            |              | 1715                              | 1732.5                               | 1750                               |
| 10              | QPSK       | 1          | 0            | 23.50                             | 23.50                                | 23.60                              |
| 10              | QPSK       | 1          | 24           | 23.50                             | 23.40                                | 23.50                              |
| 10              | QPSK       | 1          | 49           | 23.40                             | 23.30                                | 23.40                              |
| 10              | QPSK       | 25         | 0            | 22.40                             | 22.30                                | 22.40                              |
| 10              | QPSK       | 25         | 12           | 22.40                             | 22.20                                | 22.40                              |
| 10              | QPSK       | 25         | 24           | 22.40                             | 22.30                                | 22.40                              |
| 10              | QPSK       | 50         | 0            | 22.20                             | 22.20                                | 22.30                              |
| 10              | 16QAM      | 1          | 0            | 22.50                             | 22.50                                | 22.70                              |
| 10              | 16QAM      | 1          | 24           | 22.50                             | 22.40                                | 22.50                              |
| 10              | 16QAM      | 1          | 49           | 22.50                             | 22.40                                | 22.60                              |
| 10              | 16QAM      | 25         | 0            | 21.40                             | 21.30                                | 21.40                              |
| 10              | 16QAM      | 25         | 12           | 21.40                             | 21.30                                | 21.50                              |
| 10              | 16QAM      | 25         | 24           | 21.40                             | 21.30                                | 21.40                              |
| 10              | 16QAM      | 50         | 0            | 21.20                             | 21.20                                | 21.30                              |
| Channel         |            |            |              | 19975                             | 20175                                | 20375                              |
| Frequency (MHz) |            |            |              | 1712.5                            | 1732.5                               | 1752.5                             |
| 5               | QPSK       | 1          | 0            | 23.60                             | 23.40                                | 23.60                              |
| 5               | QPSK       | 1          | 12           | 23.60                             | 23.40                                | 23.50                              |
| 5               | QPSK       | 1          | 24           | 23.50                             | 23.30                                | 23.50                              |
| 5               | QPSK       | 12         | 0            | 22.60                             | 22.50                                | 22.60                              |
| 5               | QPSK       | 12         | 6            | 22.60                             | 22.40                                | 22.50                              |
| 5               | QPSK       | 12         | 11           | 22.60                             | 22.50                                | 22.60                              |
| 5               | QPSK       | 25         | 0            | 22.40                             | 22.30                                | 22.40                              |
| 5               | 16QAM      | 1          | 0            | 22.60                             | 22.50                                | 22.60                              |
| 5               | 16QAM      | 1          | 12           | 22.50                             | 22.50                                | 22.60                              |
| 5               | 16QAM      | 1          | 24           | 22.50                             | 22.40                                | 22.50                              |
| 5               | 16QAM      | 12         | 0            | 21.60                             | 21.50                                | 21.70                              |
| 5               | 16QAM      | 12         | 6            | 21.70                             | 21.50                                | 21.60                              |
| 5               | 16QAM      | 12         | 11           | 21.70                             | 21.50                                | 21.70                              |
| 5               | 16QAM      | 25         | 0            | 21.40                             | 21.30                                | 21.40                              |

| BW<br>[MHz]     | Modulation | RB<br>Size | RB<br>Offset | Power (dBm)<br>Low<br>Ch. / Freq. | Power (dBm)<br>Middle<br>Ch. / Freq. | Power (dBm)<br>High<br>Ch. / Freq. |
|-----------------|------------|------------|--------------|-----------------------------------|--------------------------------------|------------------------------------|
| Channel         |            |            |              | 19965                             | 20175                                | 20385                              |
| Frequency (MHz) |            |            |              | 1711.5                            | 1732.5                               | 1753.5                             |
| 3               | QPSK       | 1          | 0            | 23.70                             | 23.60                                | 23.70                              |
| 3               | QPSK       | 1          | 7            | 23.70                             | 23.50                                | 23.60                              |
| 3               | QPSK       | 1          | 14           | 23.70                             | 23.50                                | 23.60                              |
| 3               | QPSK       | 8          | 0            | 22.70                             | 22.70                                | 22.80                              |
| 3               | QPSK       | 8          | 4            | 22.70                             | 22.60                                | 22.70                              |
| 3               | QPSK       | 8          | 7            | 22.70                             | 22.60                                | 22.70                              |
| 3               | QPSK       | 15         | 0            | 22.70                             | 22.50                                | 22.60                              |
| 3               | 16QAM      | 1          | 0            | 22.70                             | 22.60                                | 22.70                              |
| 3               | 16QAM      | 1          | 7            | 22.70                             | 22.60                                | 22.70                              |
| 3               | 16QAM      | 1          | 14           | 22.60                             | 22.50                                | 22.70                              |
| 3               | 16QAM      | 8          | 0            | 21.70                             | 21.60                                | 21.70                              |
| 3               | 16QAM      | 8          | 4            | 21.70                             | 21.60                                | 21.70                              |
| 3               | 16QAM      | 8          | 7            | 21.70                             | 21.60                                | 21.70                              |
| 3               | 16QAM      | 15         | 0            | 21.70                             | 21.60                                | 21.70                              |
| Channel         |            |            |              | 19957                             | 20175                                | 20393                              |
| Frequency (MHz) |            |            |              | 1710.7                            | 1732.5                               | 1754.3                             |
| 1.4             | QPSK       | 1          | 0            | 23.60                             | 23.50                                | 23.70                              |
| 1.4             | QPSK       | 1          | 2            | 23.60                             | 23.50                                | 23.70                              |
| 1.4             | QPSK       | 1          | 5            | 23.50                             | 23.40                                | 23.60                              |
| 1.4             | QPSK       | 3          | 0            | 23.50                             | 23.40                                | 23.60                              |
| 1.4             | QPSK       | 3          | 1            | 23.50                             | 23.50                                | 23.70                              |
| 1.4             | QPSK       | 3          | 2            | 23.60                             | 23.40                                | 23.70                              |
| 1.4             | QPSK       | 6          | 0            | 22.60                             | 22.50                                | 22.80                              |
| 1.4             | 16QAM      | 1          | 0            | 22.60                             | 22.60                                | 22.80                              |
| 1.4             | 16QAM      | 1          | 2            | 22.50                             | 22.50                                | 22.70                              |
| 1.4             | 16QAM      | 1          | 5            | 22.50                             | 22.50                                | 22.70                              |
| 1.4             | 16QAM      | 3          | 0            | 22.60                             | 22.60                                | 22.70                              |
| 1.4             | 16QAM      | 3          | 1            | 22.60                             | 22.60                                | 22.70                              |
| 1.4             | 16QAM      | 3          | 2            | 22.60                             | 22.60                                | 22.60                              |
| 1.4             | 16QAM      | 6          | 0            | 21.70                             | 21.60                                | 21.80                              |

<LTE Band 13 Conducted Power>

| BW<br>[MHz]     | Modulation | RB<br>Size | RB<br>Offset | Power (dBm)<br>Low<br>Ch. / Freq. | Power (dBm)<br>Middle<br>Ch. / Freq. | Power (dBm)<br>High<br>Ch. / Freq. |
|-----------------|------------|------------|--------------|-----------------------------------|--------------------------------------|------------------------------------|
| Channel         |            |            |              |                                   | 23230                                |                                    |
| Frequency (MHz) |            |            |              |                                   | 782                                  |                                    |
| 10              | QPSK       | 1          | 0            |                                   | 22.90                                |                                    |
| 10              | QPSK       | 1          | 24           |                                   | 22.60                                |                                    |
| 10              | QPSK       | 1          | 49           |                                   | 22.80                                |                                    |
| 10              | QPSK       | 25         | 0            |                                   | 21.50                                |                                    |
| 10              | QPSK       | 25         | 12           |                                   | 21.50                                |                                    |
| 10              | QPSK       | 25         | 24           |                                   | 21.70                                |                                    |
| 10              | QPSK       | 50         | 0            |                                   | 21.40                                |                                    |
| 10              | 16QAM      | 1          | 0            |                                   | 21.80                                |                                    |
| 10              | 16QAM      | 1          | 24           |                                   | 21.60                                |                                    |
| 10              | 16QAM      | 1          | 49           |                                   | 21.90                                |                                    |
| 10              | 16QAM      | 25         | 0            |                                   | 20.40                                |                                    |
| 10              | 16QAM      | 25         | 12           |                                   | 20.50                                |                                    |
| 10              | 16QAM      | 25         | 24           |                                   | 20.60                                |                                    |
| 10              | 16QAM      | 50         | 0            |                                   | 20.40                                |                                    |
| Channel         |            |            |              | 23205                             | 23230                                | 23255                              |
| Frequency (MHz) |            |            |              | 779.5                             | 782                                  | 784.5                              |
| 5               | QPSK       | 1          | 0            | 22.70                             | 22.50                                | 22.88                              |
| 5               | QPSK       | 1          | 12           | 22.60                             | 22.50                                | 22.80                              |
| 5               | QPSK       | 1          | 24           | 22.50                             | 22.80                                | 22.85                              |
| 5               | QPSK       | 12         | 0            | 21.60                             | 21.70                                | 21.70                              |
| 5               | QPSK       | 12         | 6            | 21.60                             | 21.60                                | 21.70                              |
| 5               | QPSK       | 12         | 11           | 21.50                             | 21.70                                | 21.90                              |
| 5               | QPSK       | 25         | 0            | 21.50                             | 21.50                                | 21.60                              |
| 5               | 16QAM      | 1          | 0            | 21.70                             | 21.60                                | 21.60                              |
| 5               | 16QAM      | 1          | 12           | 21.60                             | 21.50                                | 21.80                              |
| 5               | 16QAM      | 1          | 24           | 21.60                             | 21.80                                | 21.90                              |
| 5               | 16QAM      | 12         | 0            | 20.70                             | 20.70                                | 20.70                              |
| 5               | 16QAM      | 12         | 6            | 20.70                             | 20.60                                | 20.80                              |
| 5               | 16QAM      | 12         | 11           | 20.60                             | 20.70                                | 20.90                              |
| 5               | 16QAM      | 25         | 0            | 20.40                             | 20.50                                | 20.60                              |

### 3.1.6 Test Result of Conducted Output Power and ERP/EIRP

| LTE Band 4 (GT - LC = 1.70 dB) |                           |             |              |                            |             |              |
|--------------------------------|---------------------------|-------------|--------------|----------------------------|-------------|--------------|
| Modes                          | LTE Band 4 (QPSK,BW=1.4M) |             |              | LTE Band 4 (16QAM,BW=1.4M) |             |              |
| Channel                        | 19957 (Low)               | 20175 (Mid) | 20393 (High) | 19957 (Low)                | 20175 (Mid) | 20393 (High) |
| Frequency (MHz)                | 1710.7                    | 1732.5      | 1754.3       | 1710.7                     | 1732.5      | 1754.3       |
| Conducted Power $P_T$ (dBm)    | 23.6                      | 23.5        | 23.7         | 22.6                       | 22.6        | 22.8         |
| Conducted Power $P_T$ (Watts)  | 0.23                      | 0.22        | 0.23         | 0.18                       | 0.18        | 0.19         |
| EIRP(dBm)                      | 25.30                     | 25.20       | 25.40        | 24.30                      | 24.30       | 24.50        |
| EIRP(Watts)                    | 0.34                      | 0.33        | 0.35         | 0.27                       | 0.27        | 0.28         |

| LTE Band 4 ( $G_T - L_C = 1.70$ dB) |                         |             |              |                          |             |              |
|-------------------------------------|-------------------------|-------------|--------------|--------------------------|-------------|--------------|
| Modes                               | LTE Band 4 (QPSK,BW=3M) |             |              | LTE Band 4 (16QAM,BW=3M) |             |              |
| Channel                             | 19965(Low)              | 20175 (Mid) | 20385 (High) | 19965(Low)               | 20175 (Mid) | 20385 (High) |
| Frequency (MHz)                     | 1711.5                  | 1732.5      | 1753.5       | 1711.5                   | 1732.5      | 1753.5       |
| Conducted Power $P_T$ (dBm)         | 23.7                    | 23.6        | 23.7         | 22.7                     | 22.6        | 22.7         |
| Conducted Power $P_T$ (Watts)       | 0.23                    | 0.23        | 0.23         | 0.19                     | 0.18        | 0.19         |
| EIRP(dBm)                           | 25.40                   | 25.30       | 25.40        | 24.40                    | 24.30       | 24.40        |
| EIRP(Watts)                         | 0.35                    | 0.34        | 0.35         | 0.28                     | 0.27        | 0.28         |

| LTE Band 4 ( $G_T - L_C = 1.70$ dB) |                         |             |              |                          |             |              |
|-------------------------------------|-------------------------|-------------|--------------|--------------------------|-------------|--------------|
| Modes                               | LTE Band 4 (QPSK,BW=5M) |             |              | LTE Band 4 (16QAM,BW=5M) |             |              |
| Channel                             | 19975(Low)              | 20175 (Mid) | 20375 (High) | 19975(Low)               | 20175 (Mid) | 20375 (High) |
| Frequency (MHz)                     | 1712.5                  | 1732.5      | 1752.5       | 1712.5                   | 1732.5      | 1752.5       |
| Conducted Power $P_T$ (dBm)         | 23.6                    | 23.4        | 23.6         | 22.6                     | 22.5        | 22.6         |
| Conducted Power $P_T$ (Watts)       | 0.23                    | 0.22        | 0.23         | 0.18                     | 0.18        | 0.18         |
| EIRP(dBm)                           | 25.30                   | 25.10       | 25.30        | 24.30                    | 24.20       | 24.30        |
| EIRP(Watts)                         | 0.34                    | 0.32        | 0.34         | 0.27                     | 0.27        | 0.27         |

| LTE Band 4 ( $G_T - L_C = 1.70$ dB) |                          |             |              |                           |             |              |
|-------------------------------------|--------------------------|-------------|--------------|---------------------------|-------------|--------------|
| Modes                               | LTE Band 4 (QPSK,BW=10M) |             |              | LTE Band 4 (16QAM,BW=10M) |             |              |
| Channel                             | 20000 (Low)              | 20175 (Mid) | 20350 (High) | 20000 (Low)               | 20175 (Mid) | 20350 (High) |
| Frequency (MHz)                     | 1715                     | 1732.5      | 1750         | 1715                      | 1732.5      | 1750         |
| Conducted Power $P_T$ (dBm)         | 23.5                     | 23.5        | 23.6         | 22.5                      | 22.5        | 22.7         |
| Conducted Power $P_T$ (Watts)       | 0.22                     | 0.22        | 0.23         | 0.18                      | 0.18        | 0.19         |
| EIRP(dBm)                           | 25.20                    | 25.20       | 25.30        | 24.20                     | 24.20       | 24.40        |
| EIRP(Watts)                         | 0.33                     | 0.33        | 0.34         | 0.26                      | 0.26        | 0.28         |

| LTE Band 4 (GT - L <sub>C</sub> = 1.70 dB) |                          |             |              |                           |             |              |
|--------------------------------------------|--------------------------|-------------|--------------|---------------------------|-------------|--------------|
| Modes                                      | LTE Band 4 (QPSK,BW=15M) |             |              | LTE Band 4 (16QAM,BW=15M) |             |              |
| Channel                                    | 20025 (Low)              | 20175 (Mid) | 20325 (High) | 20025 (Low)               | 20175 (Mid) | 20325 (High) |
| Frequency (MHz)                            | 1717.5                   | 1732.5      | 1747.5       | 1717.5                    | 1732.5      | 1747.5       |
| Conducted Power P <sub>T</sub> (dBm)       | 23.6                     | 23.5        | 23.6         | 22.6                      | 22.5        | 22.5         |
| Conducted Power P <sub>T</sub> (Watts)     | 0.23                     | 0.22        | 0.23         | 0.18                      | 0.18        | 0.18         |
| EIRP(dBm)                                  | 25.30                    | 25.20       | 25.30        | 24.30                     | 24.20       | 24.20        |
| EIRP(Watts)                                | 0.34                     | 0.33        | 0.34         | 0.27                      | 0.27        | 0.27         |

| LTE Band 4 (GT - L <sub>C</sub> = 1.70 dB) |                          |             |              |                           |             |              |
|--------------------------------------------|--------------------------|-------------|--------------|---------------------------|-------------|--------------|
| Modes                                      | LTE Band 4 (QPSK,BW=20M) |             |              | LTE Band 4 (16QAM,BW=20M) |             |              |
| Channel                                    | 20050 (Low)              | 20175 (Mid) | 20300 (High) | 20050 (Low)               | 20175 (Mid) | 20300 (High) |
| Frequency (MHz)                            | 1720                     | 1732.5      | 1745         | 1720                      | 1732.5      | 1745         |
| Conducted Power P <sub>T</sub> (dBm)       | 23.8                     | 23.5        | 23.5         | 22.6                      | 22.6        | 22.6         |
| Conducted Power P <sub>T</sub> (Watts)     | 0.24                     | 0.22        | 0.22         | 0.18                      | 0.18        | 0.18         |
| EIRP(dBm)                                  | 25.50                    | 25.20       | 25.20        | 24.30                     | 24.30       | 24.30        |
| EIRP(Watts)                                | 0.36                     | 0.33        | 0.33         | 0.27                      | 0.27        | 0.27         |

| LTE Band 13 (GT - L <sub>C</sub> = -0.40 dB) |                          |             |              |                           |             |              |
|----------------------------------------------|--------------------------|-------------|--------------|---------------------------|-------------|--------------|
| Modes                                        | LTE Band 13 (QPSK,BW=5M) |             |              | LTE Band 13 (16QAM,BW=5M) |             |              |
| Channel                                      | 23205 (Low)              | 23230 (Mid) | 23255 (High) | 23205 (Low)               | 23230 (Mid) | 23255 (High) |
| Frequency (MHz)                              | 779.5                    | 782         | 784.5        | 779.5                     | 782         | 784.5        |
| Conducted Power P <sub>T</sub> (dBm)         | 22.7                     | 22.8        | 22.9         | 21.7                      | 21.8        | 21.9         |
| Conducted Power P <sub>T</sub> (Watts)       | 0.19                     | 0.19        | 0.19         | 0.15                      | 0.15        | 0.15         |
| ERP(dBm)                                     | 20.15                    | 20.25       | 20.33        | 19.15                     | 19.25       | 19.35        |
| ERP(Watts)                                   | 0.10                     | 0.11        | 0.11         | 0.08                      | 0.08        | 0.09         |

| LTE Band 13 (GT - L <sub>C</sub> = -0.40 dB) |                           |                            |
|----------------------------------------------|---------------------------|----------------------------|
| Modes                                        | LTE Band 13 (QPSK,BW=10M) | LTE Band 13 (16QAM,BW=10M) |
| Channel                                      | 23230 (Mid)               | 23230 (Mid)                |
| Frequency (MHz)                              | 782                       | 782                        |
| Conducted Power P <sub>T</sub> (dBm)         | 22.9                      | 21.9                       |
| Conducted Power P <sub>T</sub> (Watts)       | 0.19                      | 0.15                       |
| ERP(dBm)                                     | 20.35                     | 19.35                      |
| ERP(Watts)                                   | 0.11                      | 0.09                       |

## 3.2 Peak-to-Average Ratio

### 3.2.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

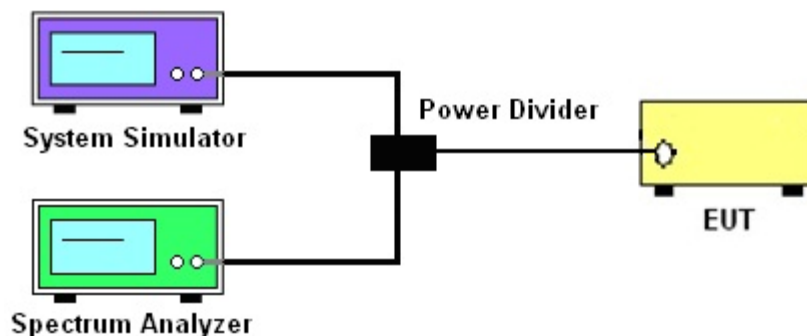
### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.2.3 Test Procedures

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

### 3.2.4 Test Setup



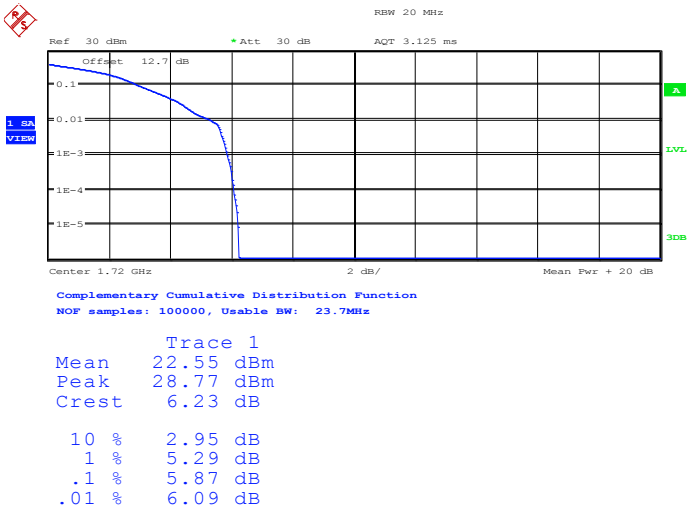
### 3.2.5 Test Result of Peak-to-Average Ratio

| LTE Band 4      |            |         |           |                                   |                                      |                                    |
|-----------------|------------|---------|-----------|-----------------------------------|--------------------------------------|------------------------------------|
| BW [MHz]        | Modulation | RB Size | RB Offset | Power (dBm)<br>Low<br>Ch. / Freq. | Power (dBm)<br>Middle<br>Ch. / Freq. | Power (dBm)<br>High<br>Ch. / Freq. |
| Channel         |            |         |           | 20050                             | 20175                                | 20300                              |
| Frequency (MHz) |            |         |           | 1720                              | 1732.5                               | 1745                               |
| 20              | 16QAM      | 1       | 0         | 5.87                              | 6.15                                 | 6.12                               |
| 20              | 16QAM      | 100     | 0         | 6.41                              | 6.44                                 | 6.41                               |

| LTE Band 13     |            |         |           |                                   |                                      |                                    |
|-----------------|------------|---------|-----------|-----------------------------------|--------------------------------------|------------------------------------|
| BW [MHz]        | Modulation | RB Size | RB Offset | Power (dBm)<br>Low<br>Ch. / Freq. | Power (dBm)<br>Middle<br>Ch. / Freq. | Power (dBm)<br>High<br>Ch. / Freq. |
| Channel         |            |         |           |                                   | 23230                                |                                    |
| Frequency (MHz) |            |         |           |                                   | 782                                  |                                    |
| 10              | 16QAM      | 1       | 0         |                                   | 6.25                                 |                                    |
| 10              | 16QAM      | 50      | 0         |                                   | 6.31                                 |                                    |

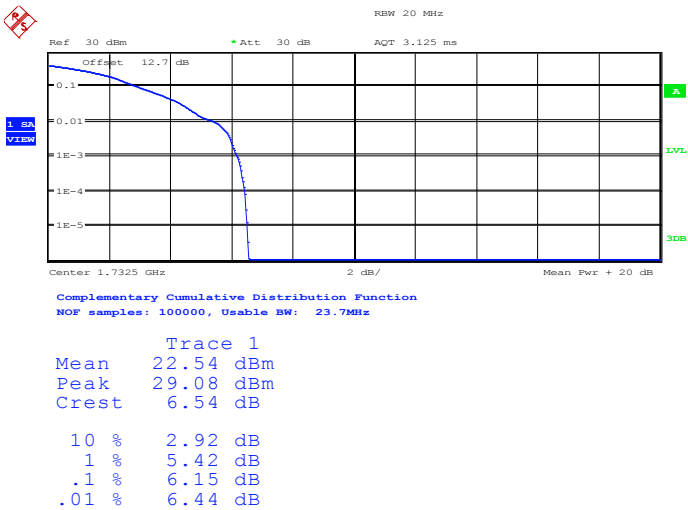
### 3.2.6 Peak to Average Power Ratio

#### Peak-to-Average Ratio on LTE Band 4 20MHz / 16QAM in Ch. 20050 (1RB Size)



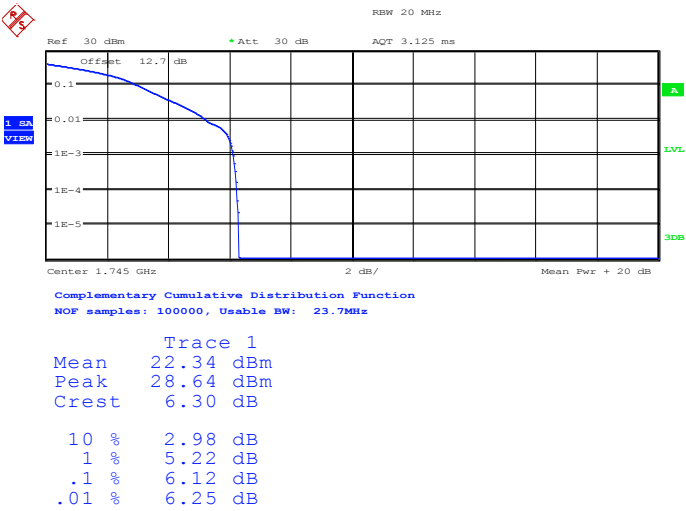
Date: 24.APR.2014 22:38:54

#### Peak-to-Average Ratio on LTE Band 4 20MHz / 16QAM in Ch. 20175 (1RB Size)



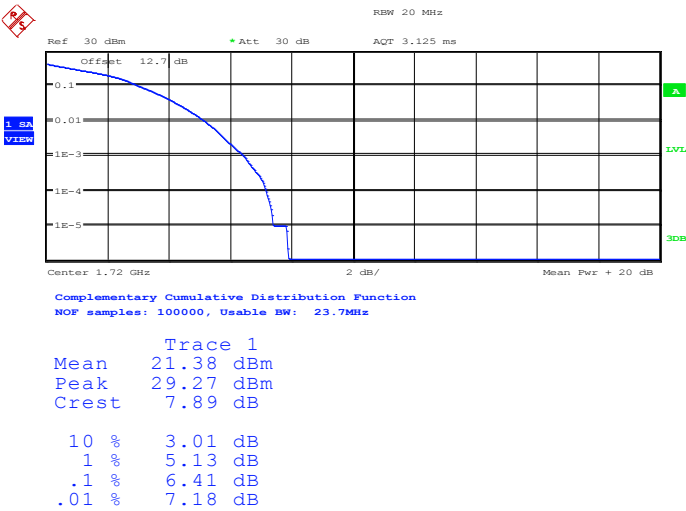
Date: 24.APR.2014 22:36:21

Peak-to-Average Ratio on LTE Band 4  
20MHz / 16QAM in Ch. 20300 (1RB Size)



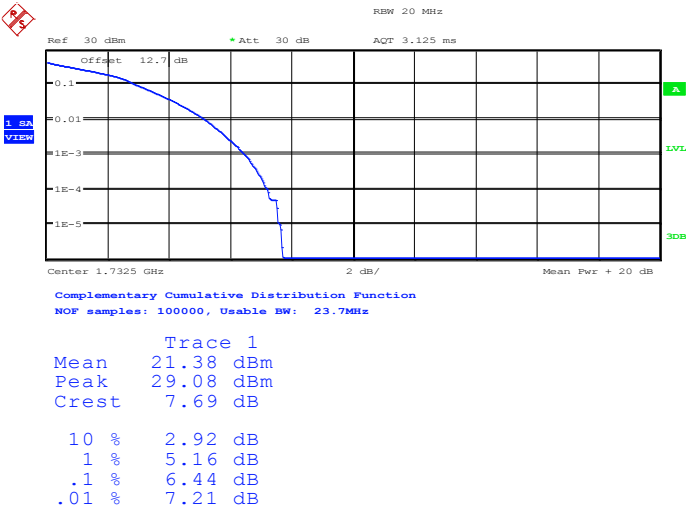
Date: 24.APR.2014 22:37:15

Peak-to-Average Ratio on LTE Band 4  
20MHz / 16QAM in Ch. 20050 (100RB Size)



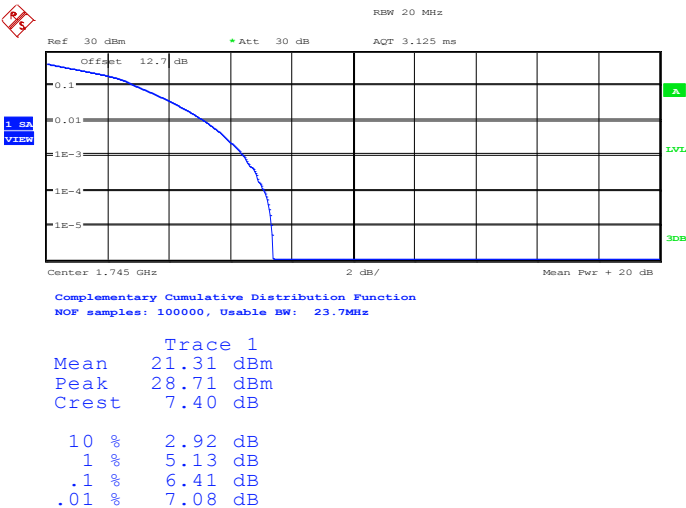
Date: 24.APR.2014 22:35:41

Peak-to-Average Ratio on LTE Band 4  
20MHz / 16QAM in Ch. 20175 (100RB Size)



Date: 24.APR.2014 22:36:47

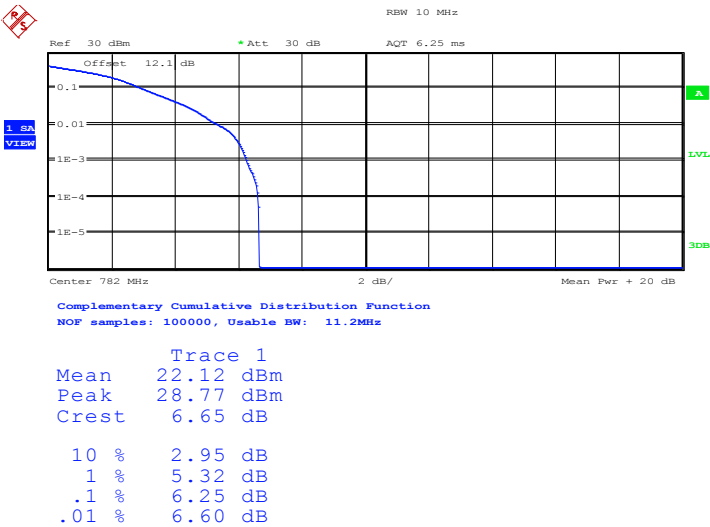
Peak-to-Average Ratio on LTE Band 4  
20MHz / 16QAM in Ch. 20300 (100RB Size)



Date: 24.APR.2014 22:37:51

Peak-to-Average Ratio on LTE Band 13

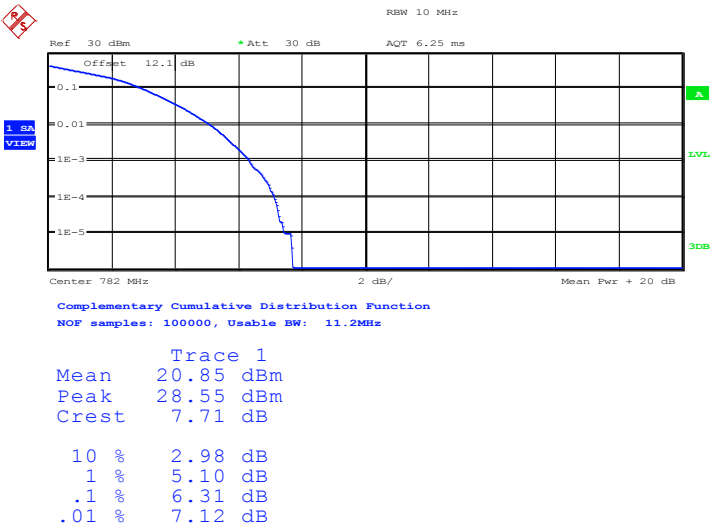
10MHz / 16QAM in Ch. 23230 (1RB Size)



Date: 25.APR.2014 00:21:24

Peak-to-Average Ratio on LTE Band 13

10MHz / 16QAM in Ch. 23230 (50RB Size)



Date: 25.APR.2014 00:43:12

### 3.3 Occupied Bandwidth

#### 3.3.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

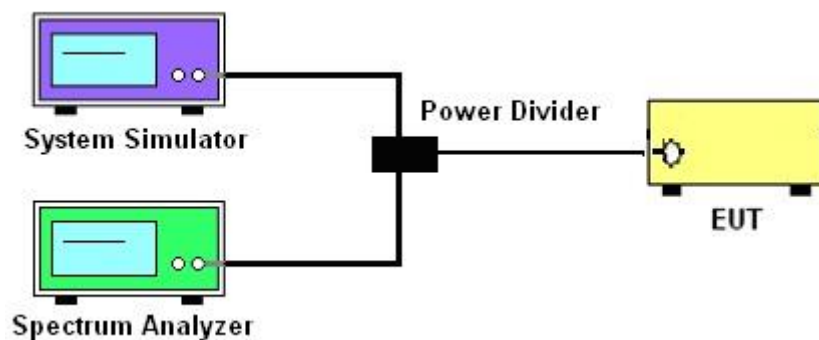
#### 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.3.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

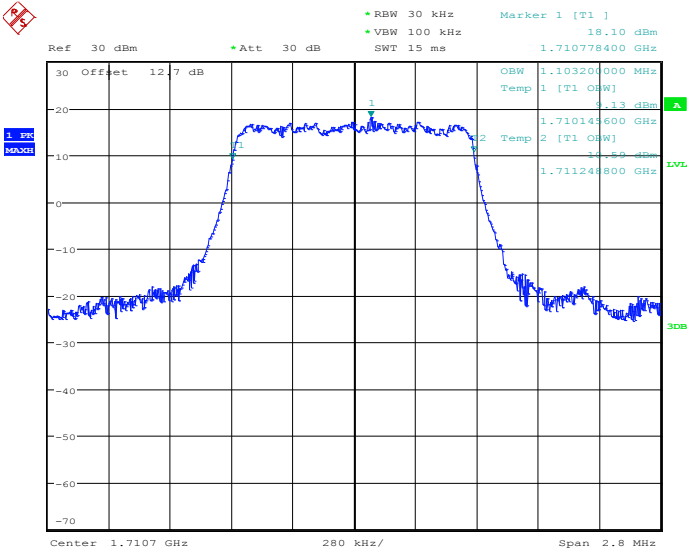
#### 3.3.4 Test Setup



3.3.5 Test Result (Plots) of Occupied Bandwidth

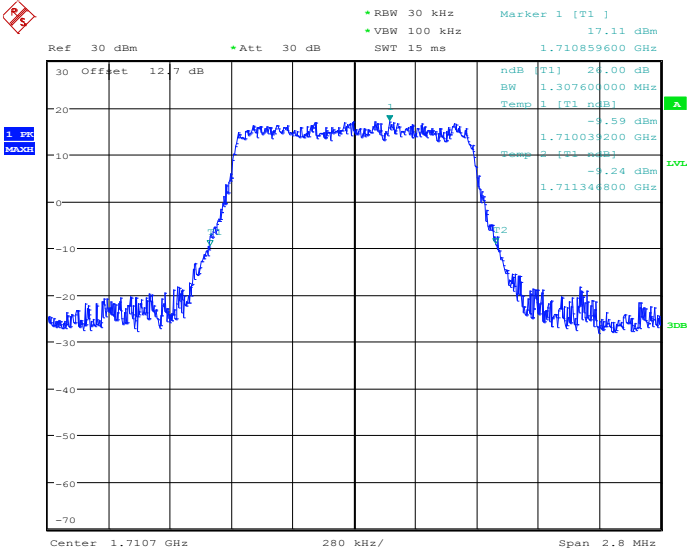
|        |            |             |               |
|--------|------------|-------------|---------------|
| Band : | LTE Band 4 | BW / Mod. : | 1.4MHz / QPSK |
|--------|------------|-------------|---------------|

99% Occupied Bandwidth Plot on Channel 19957



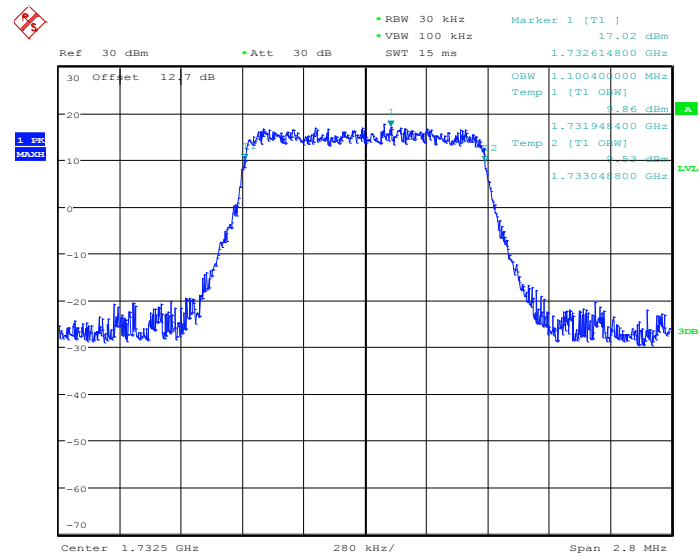
Date: 24.APR.2014 22:40:50

26dB Bandwidth Plot on Channel 19957



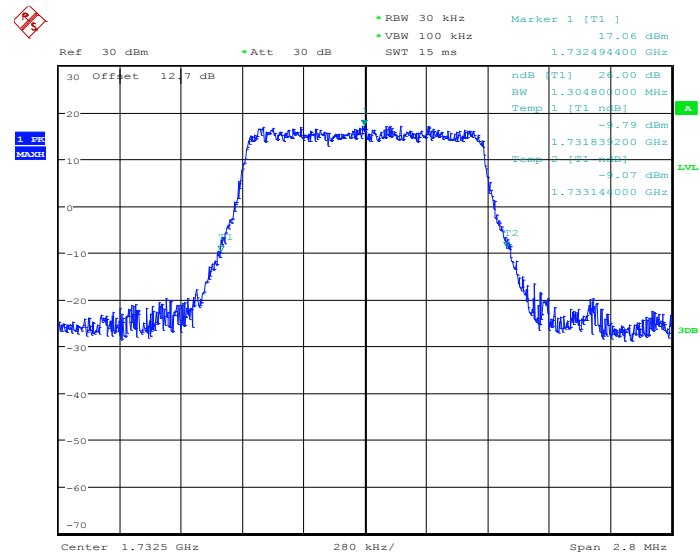
Date: 24.APR.2014 20:15:53

## 99% Occupied Bandwidth Plot on Channel 20175



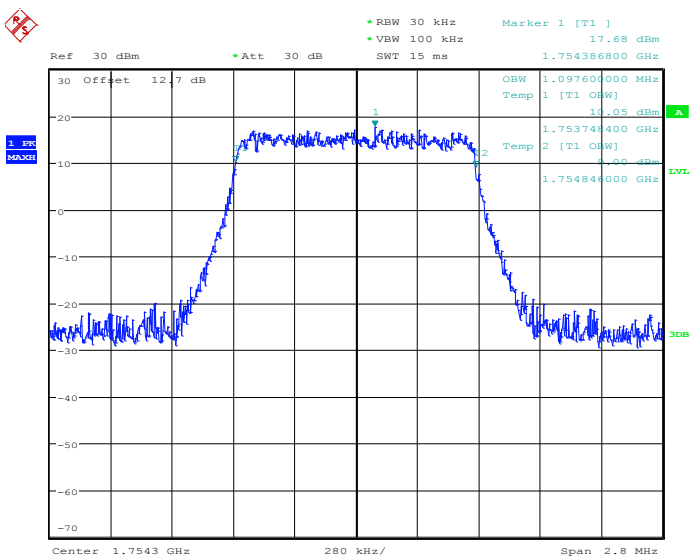
Date: 24.APR.2014 20:21:31

## 26dB Bandwidth Plot on Channel 20175



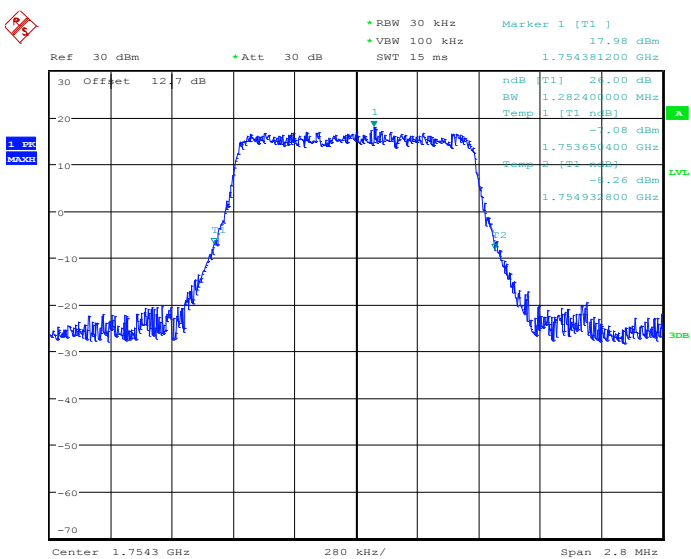
Date: 24.APR.2014 20:22:05

99% Occupied Bandwidth Plot on Channel 20393



Date: 24.APR.2014 20:24:37

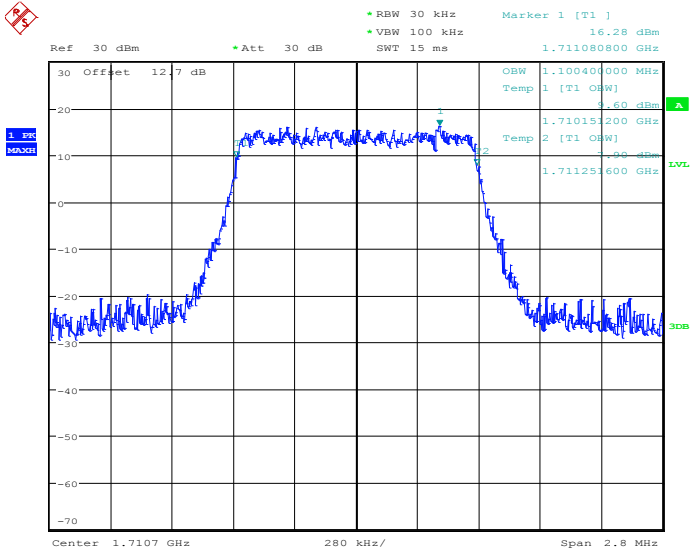
26dB Bandwidth Plot on Channel 20393



Date: 24.APR.2014 20:25:11

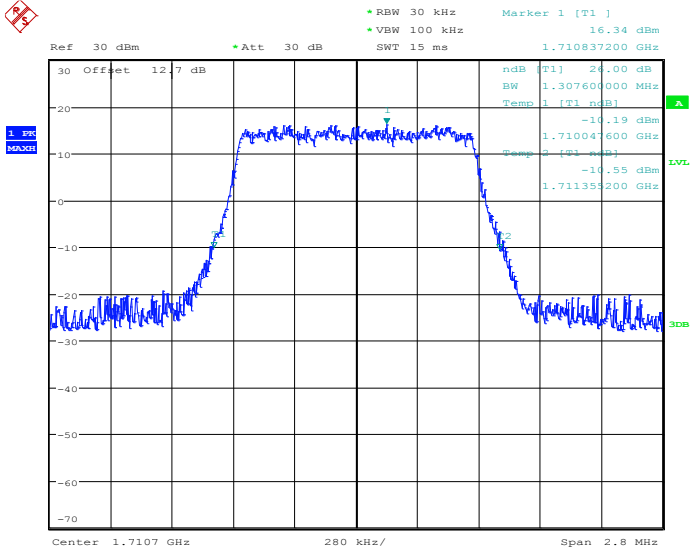
|        |            |             |                |
|--------|------------|-------------|----------------|
| Band : | LTE Band 4 | BW / Mod. : | 1.4MHz / 16QAM |
|--------|------------|-------------|----------------|

99% Occupied Bandwidth Plot on Channel 19957



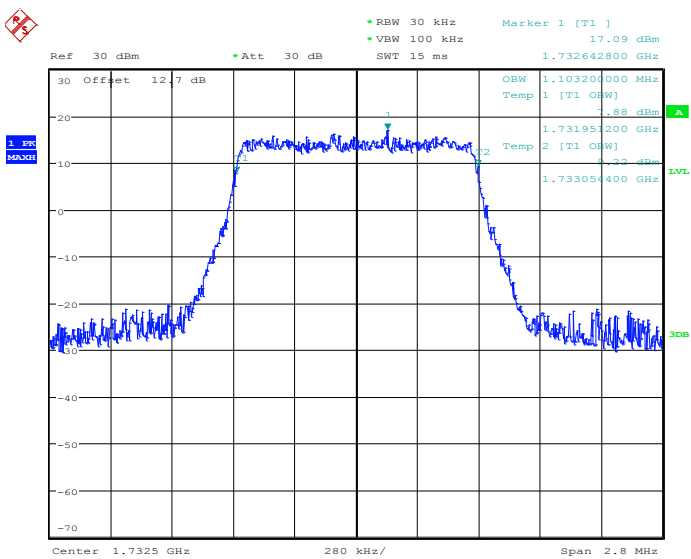
Date: 24.APR.2014 20:15:35

26dB Bandwidth Plot on Channel 19957



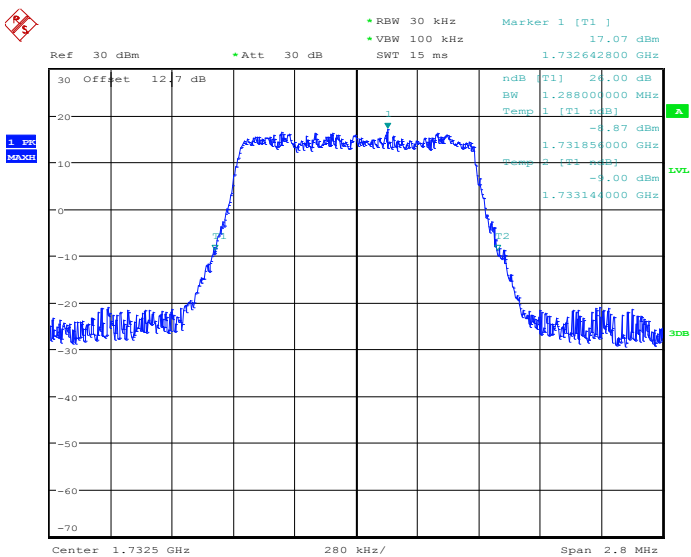
Date: 24.APR.2014 20:16:10

99% Occupied Bandwidth Plot on Channel 20175



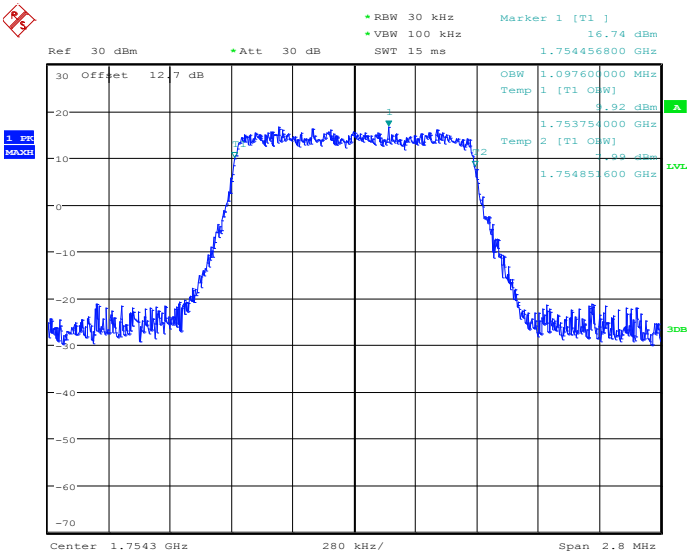
Date: 24.APR.2014 20:21:47

26dB Bandwidth Plot on Channel 20175



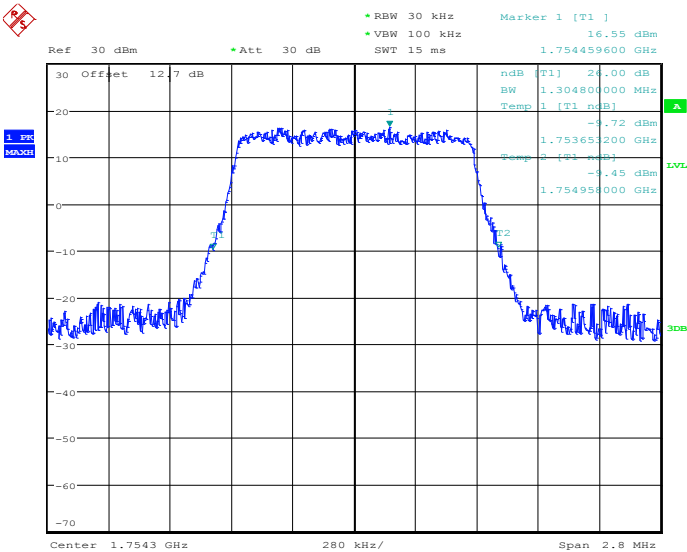
Date: 24.APR.2014 20:22:22

99% Occupied Bandwidth Plot on Channel 20393



Date: 24.APR.2014 20:24:53

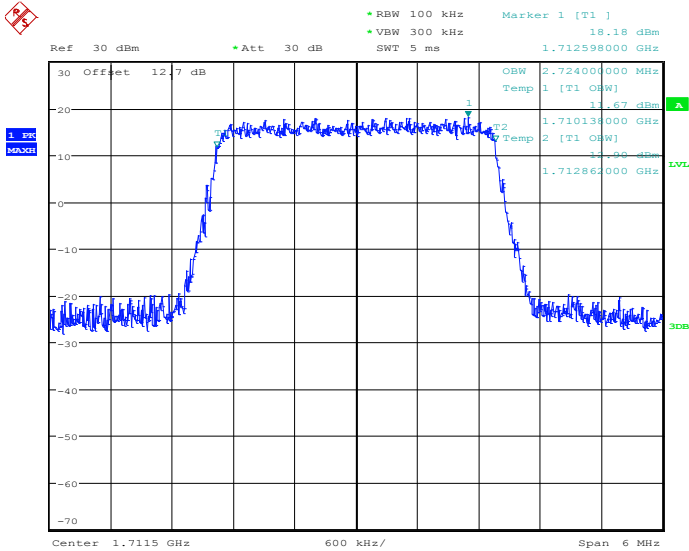
26dB Bandwidth Plot on Channel 20393



Date: 24.APR.2014 20:25:28

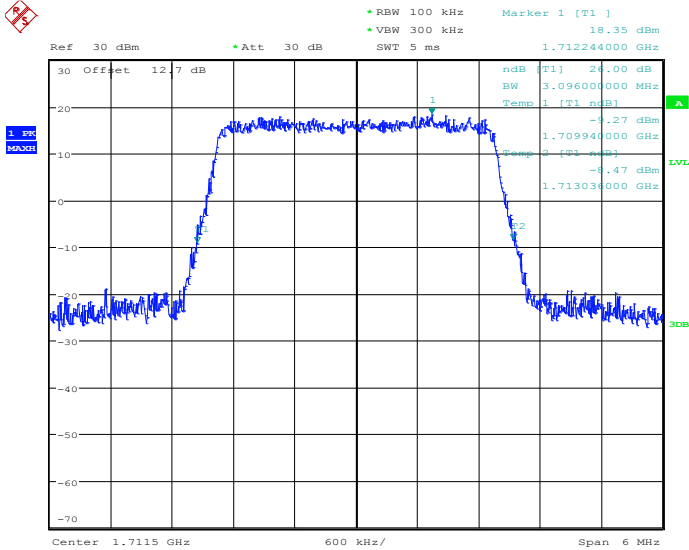
|        |            |             |             |
|--------|------------|-------------|-------------|
| Band : | LTE Band 4 | BW / Mod. : | 3MHz / QPSK |
|--------|------------|-------------|-------------|

99% Occupied Bandwidth Plot on Channel 19965



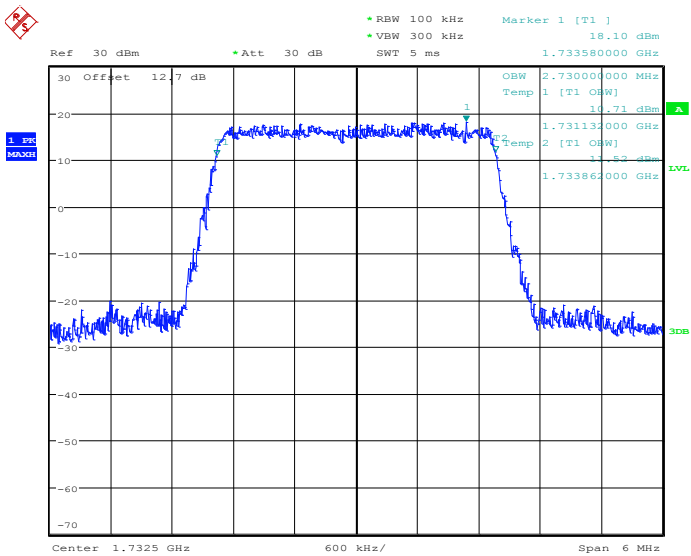
Date: 24.APR.2014 20:30:50

26dB Bandwidth Plot on Channel 19965



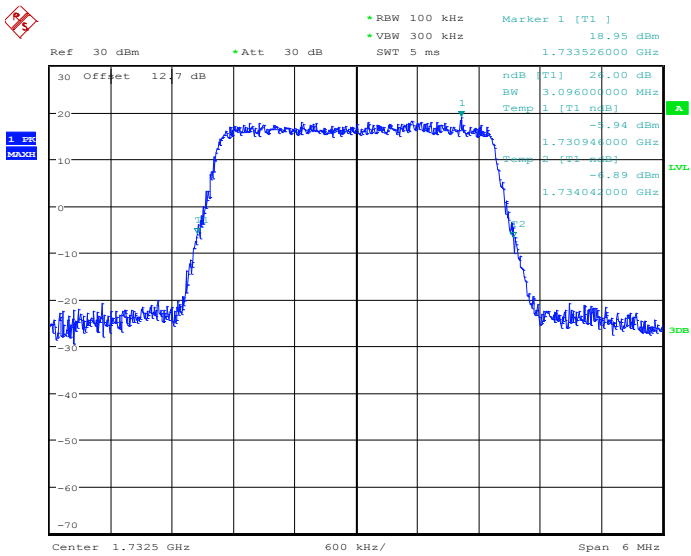
Date: 24.APR.2014 20:31:23

99% Occupied Bandwidth Plot on Channel 20175



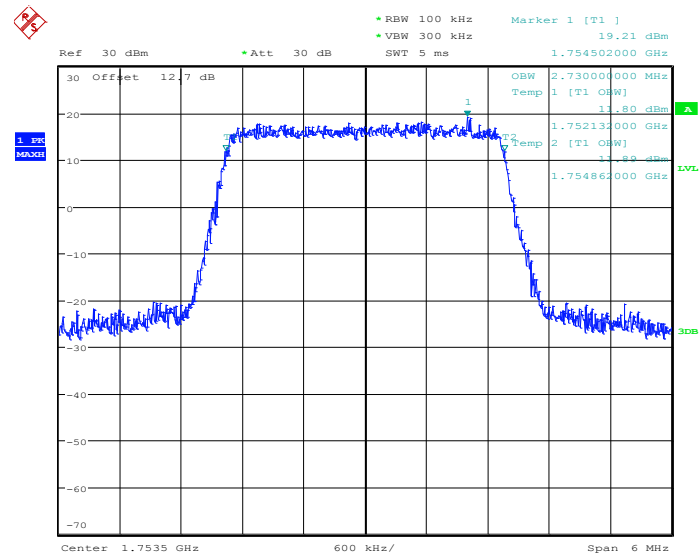
Date: 24.APR.2014 20:37:03

26dB Bandwidth Plot on Channel 20175



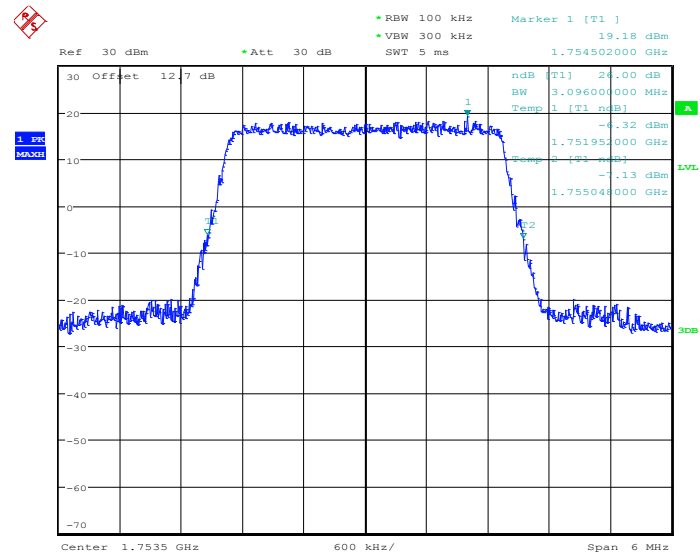
Date: 24.APR.2014 20:37:36

## 99% Occupied Bandwidth Plot on Channel 20385



Date: 24.APR.2014 20:40:09

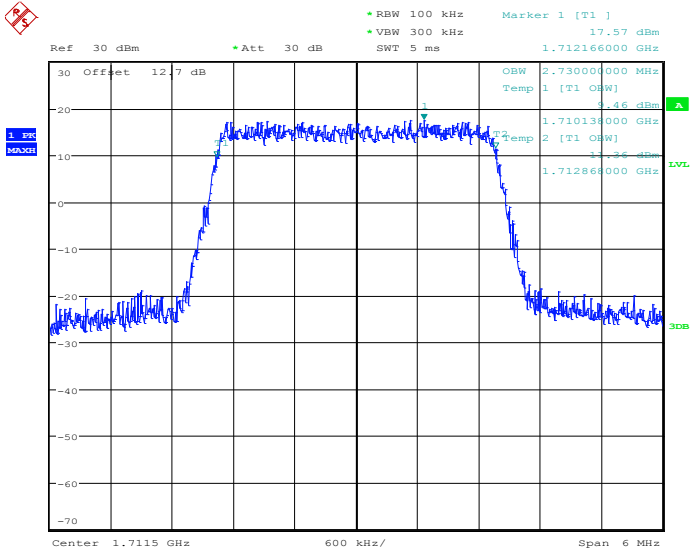
## 26dB Bandwidth Plot on Channel 20385



Date: 24.APR.2014 20:40:42

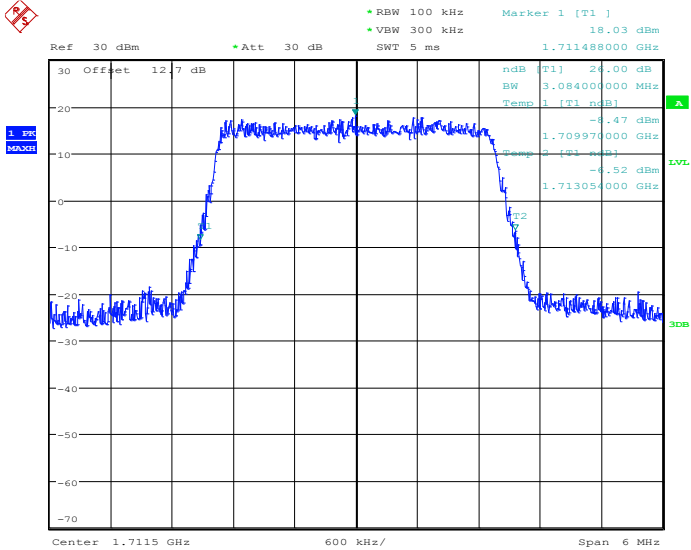
|        |            |             |              |
|--------|------------|-------------|--------------|
| Band : | LTE Band 4 | BW / Mod. : | 3MHz / 16QAM |
|--------|------------|-------------|--------------|

99% Occupied Bandwidth Plot on Channel 19965



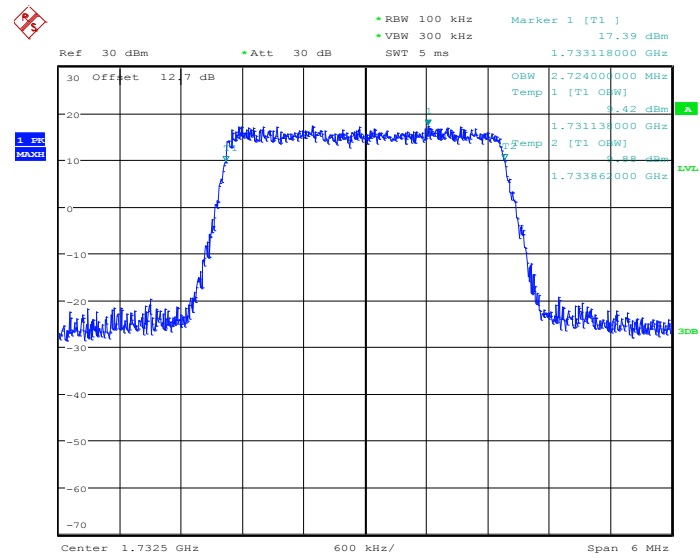
Date: 24.APR.2014 20:31:06

26dB Bandwidth Plot on Channel 19965



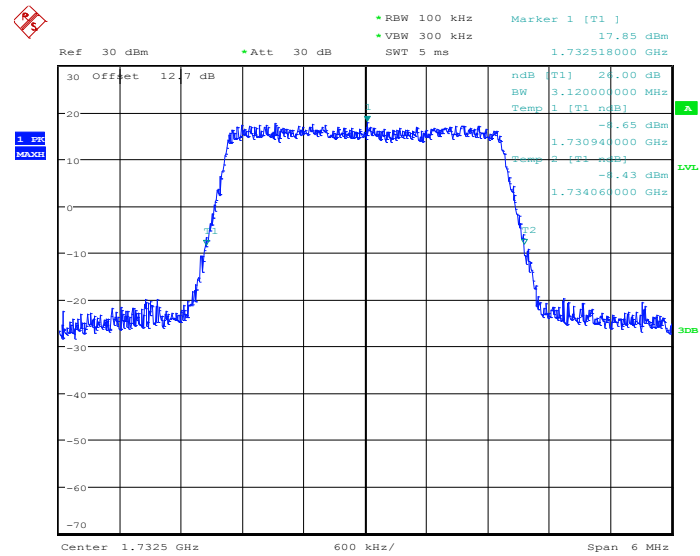
Date: 24.APR.2014 20:31:41

## 99% Occupied Bandwidth Plot on Channel 20175



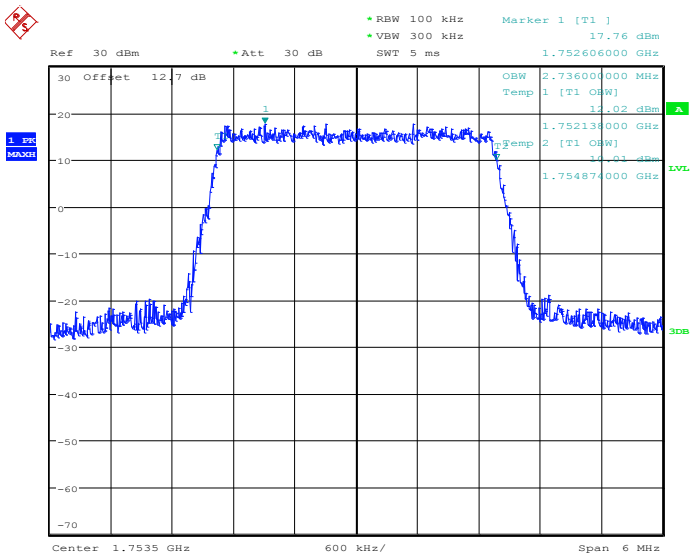
Date: 24.APR.2014 20:37:18

## 26dB Bandwidth Plot on Channel 20175



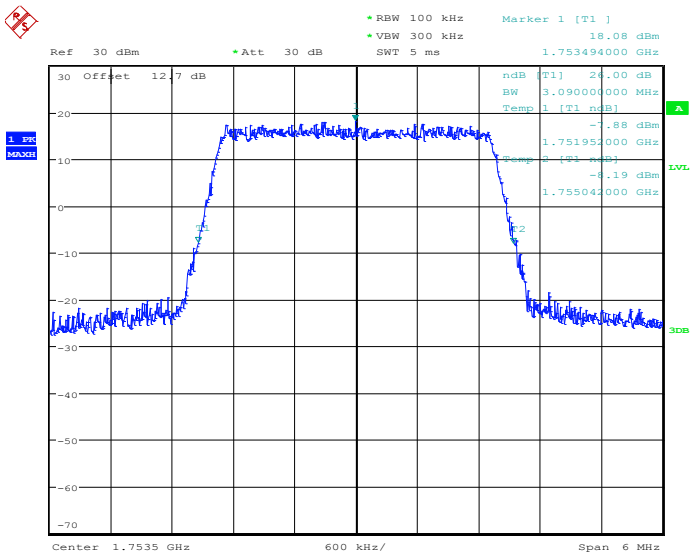
Date: 24.APR.2014 20:37:54

99% Occupied Bandwidth Plot on Channel 20385



Date: 24.APR.2014 20:40:24

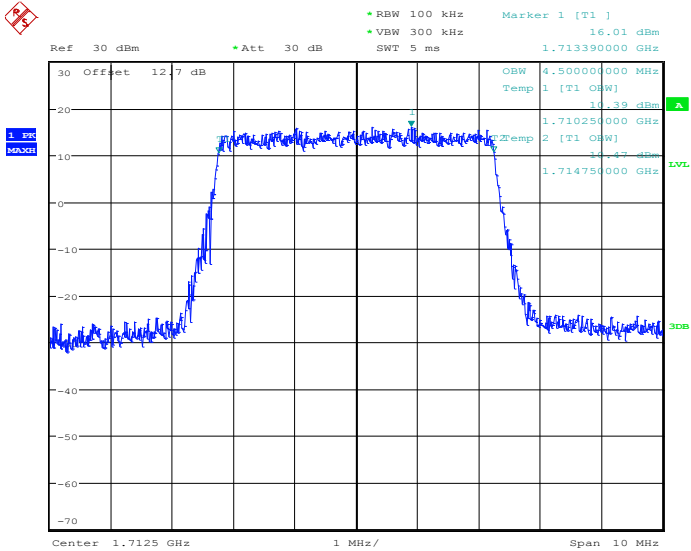
26dB Bandwidth Plot on Channel 20385



Date: 24.APR.2014 20:40:59

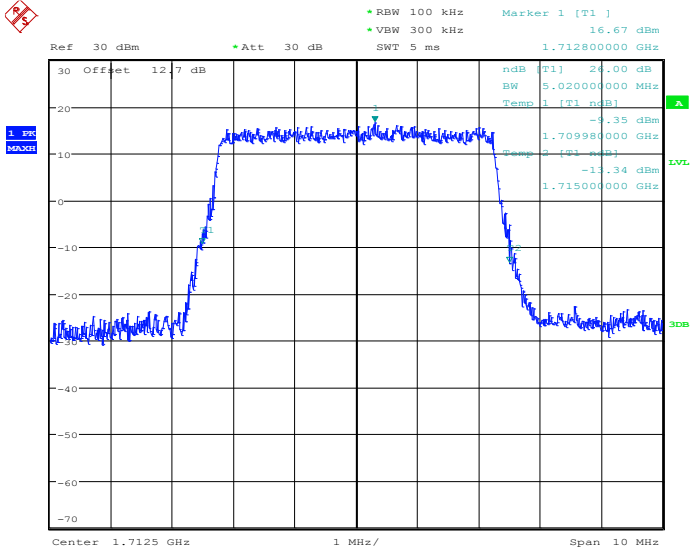
|        |            |             |             |
|--------|------------|-------------|-------------|
| Band : | LTE Band 4 | BW / Mod. : | 5MHz / QPSK |
|--------|------------|-------------|-------------|

99% Occupied Bandwidth Plot on Channel 19975



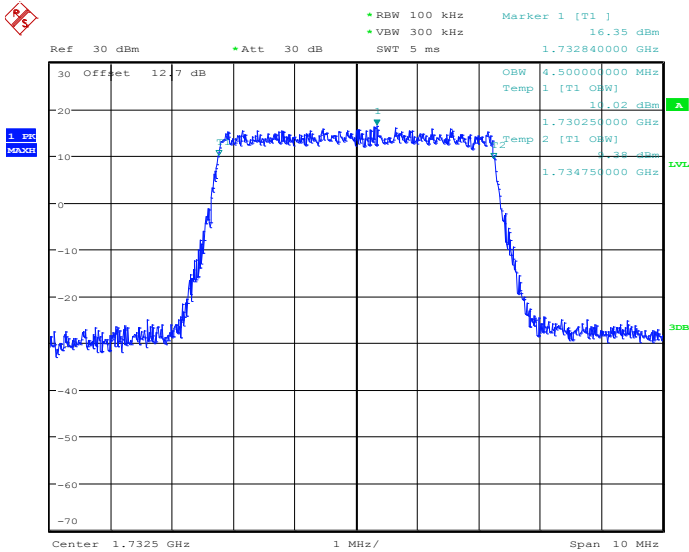
Date: 24.APR.2014 20:46:20

26dB Bandwidth Plot on Channel 19975



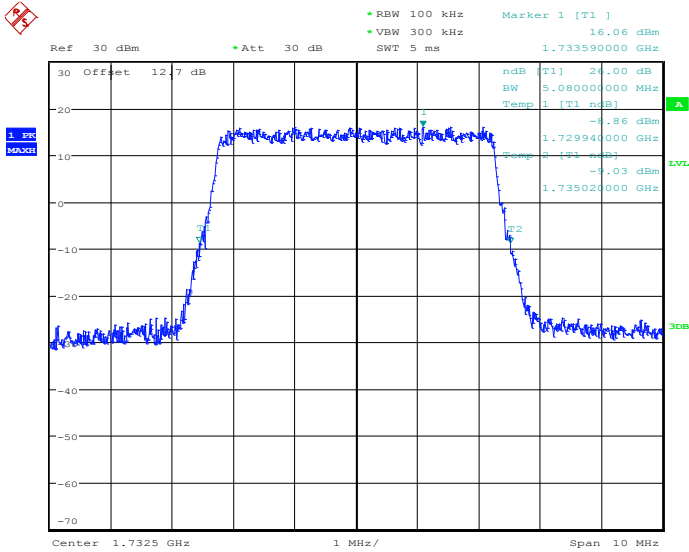
Date: 24.APR.2014 20:46:53

99% Occupied Bandwidth Plot on Channel 20175



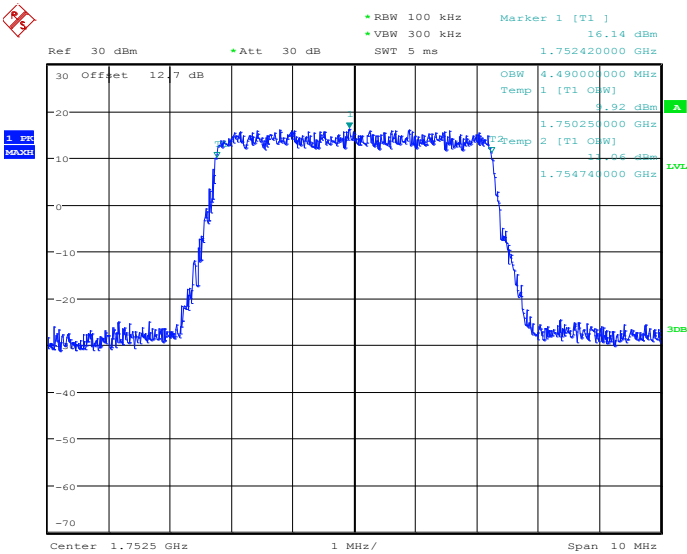
Date: 24.APR.2014 20:52:34

26dB Bandwidth Plot on Channel 20175



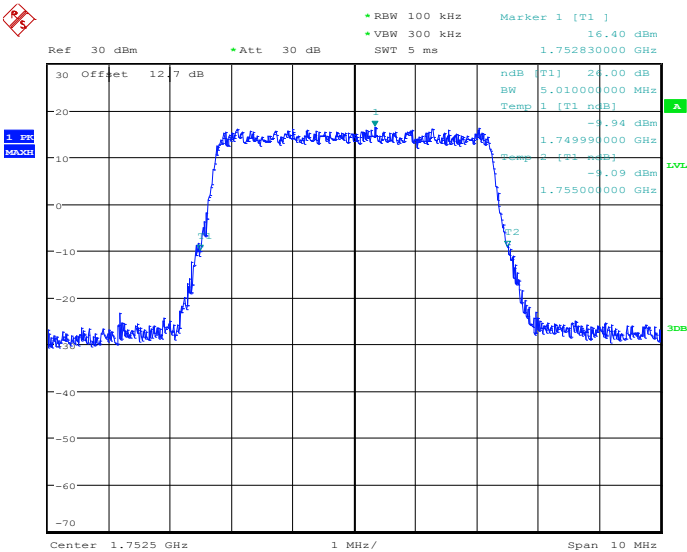
Date: 24.APR.2014 20:53:07

99% Occupied Bandwidth Plot on Channel 20375



Date: 24.APR.2014 20:55:40

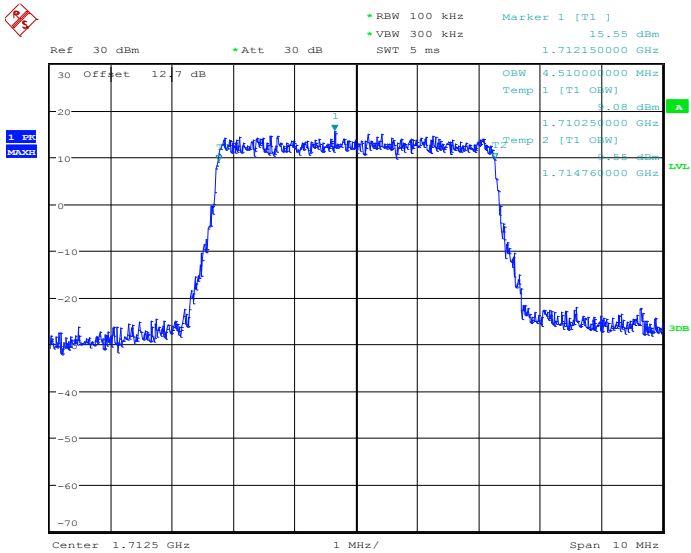
26dB Bandwidth Plot on Channel 20375



Date: 24.APR.2014 20:56:13

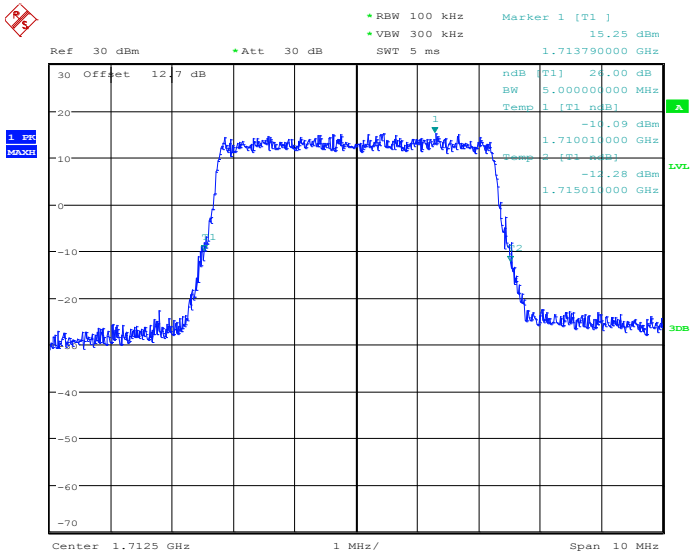
|        |            |             |              |
|--------|------------|-------------|--------------|
| Band : | LTE Band 4 | BW / Mod. : | 5MHz / 16QAM |
|--------|------------|-------------|--------------|

99% Occupied Bandwidth Plot on Channel 19975



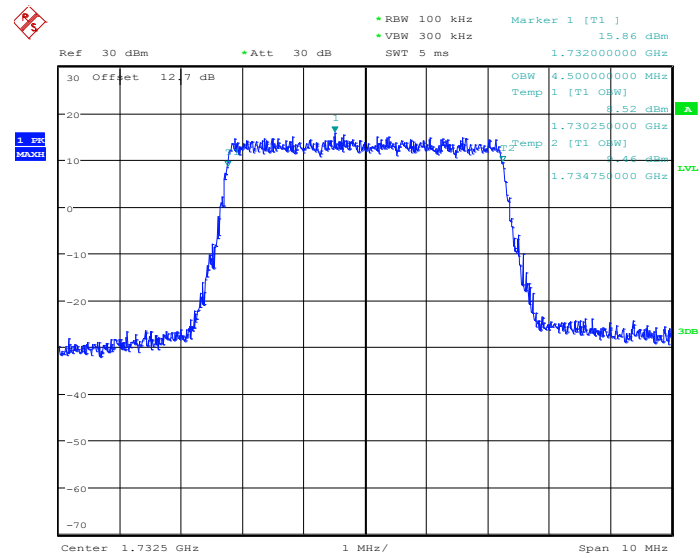
Date: 24.APR.2014 20:46:35

26dB Bandwidth Plot on Channel 19975



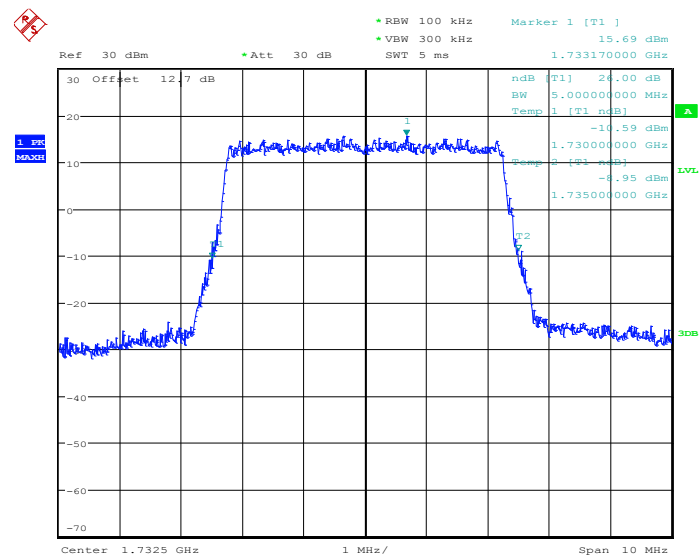
Date: 24.APR.2014 20:47:11

## 99% Occupied Bandwidth Plot on Channel 20175



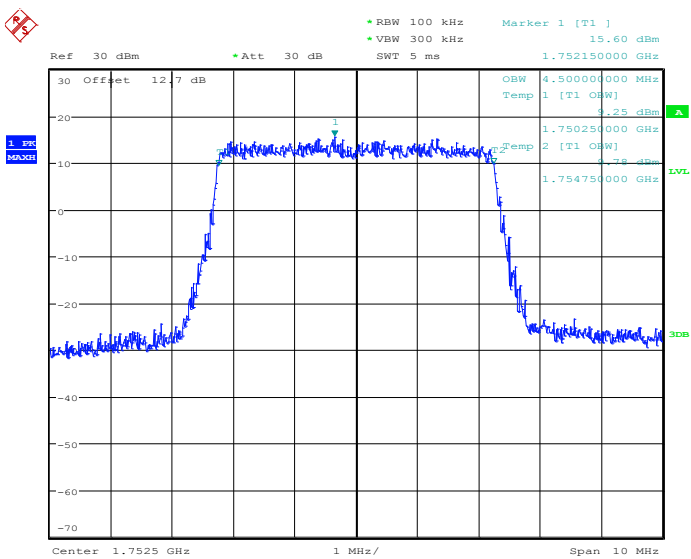
Date: 24.APR.2014 20:52:50

## 26dB Bandwidth Plot on Channel 20175



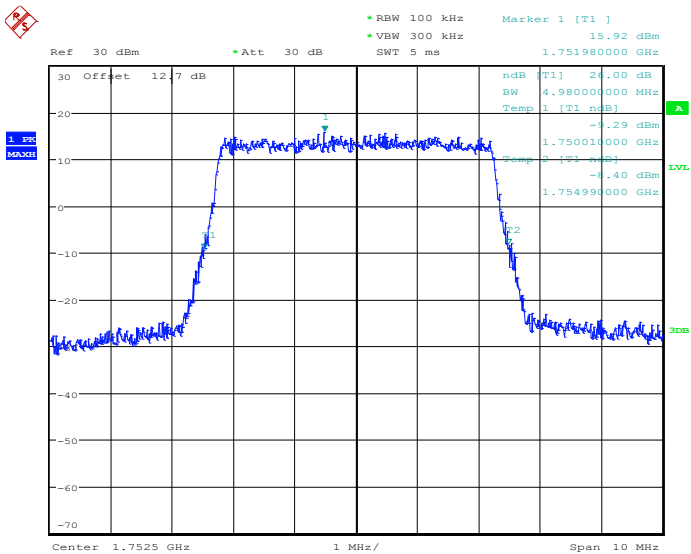
Date: 24.APR.2014 20:53:25

99% Occupied Bandwidth Plot on Channel 20375



Date: 24.APR.2014 20:55:55

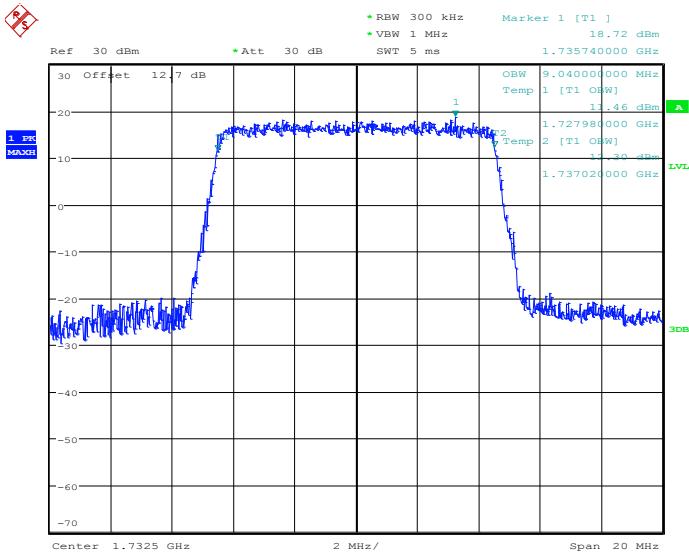
26dB Bandwidth Plot on Channel 20375



Date: 24.APR.2014 20:56:31

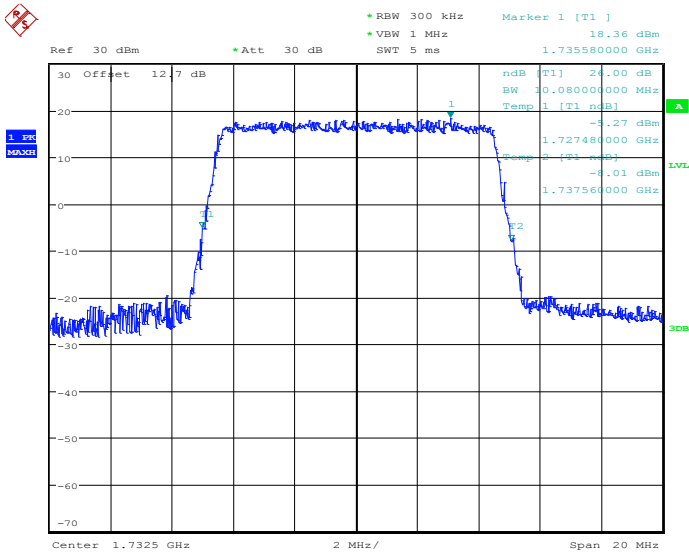


99% Occupied Bandwidth Plot on Channel 20175



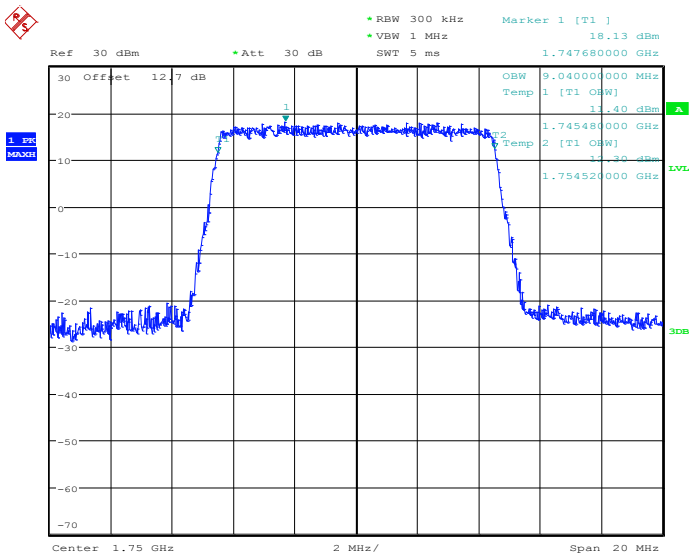
Date: 24.APR.2014 21:08:03

26dB Bandwidth Plot on Channel 20175



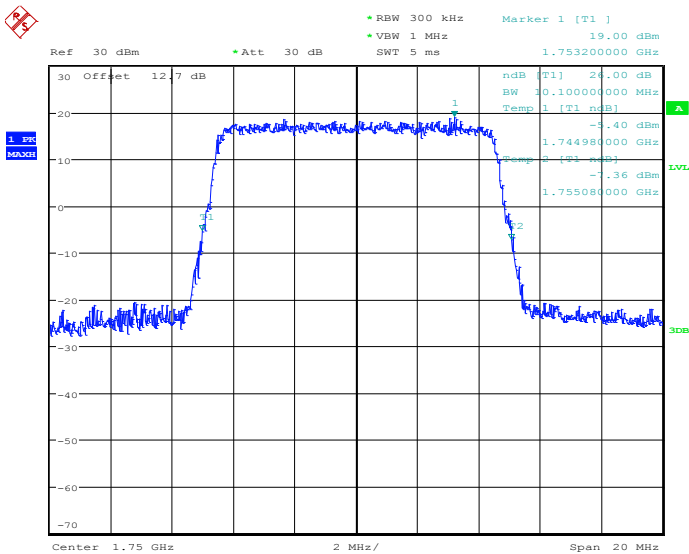
Date: 24.APR.2014 21:08:36

99% Occupied Bandwidth Plot on Channel 20350



Date: 24.APR.2014 21:11:08

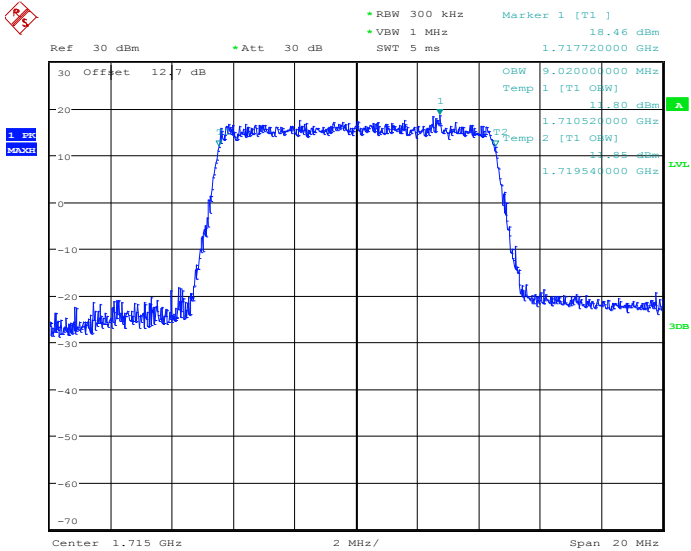
26dB Bandwidth Plot on Channel 20350



Date: 24.APR.2014 21:11:41

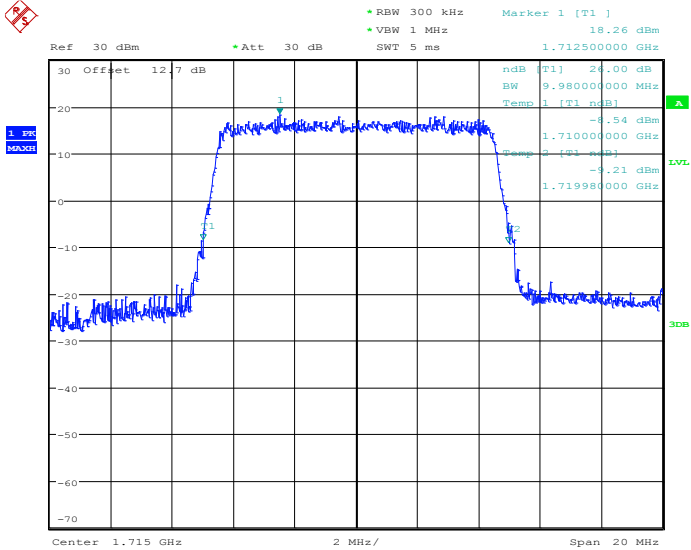
|        |            |             |               |
|--------|------------|-------------|---------------|
| Band : | LTE Band 4 | BW / Mod. : | 10MHz / 16QAM |
|--------|------------|-------------|---------------|

99% Occupied Bandwidth Plot on Channel 20000



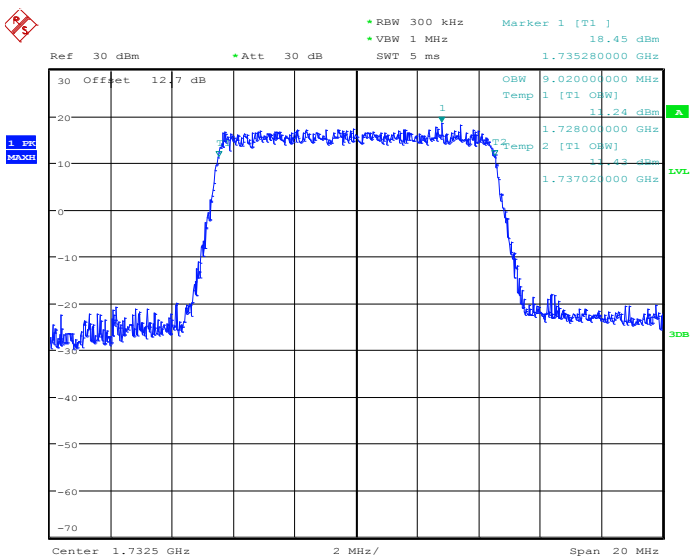
Date: 24.APR.2014 21:02:08

26dB Bandwidth Plot on Channel 20000



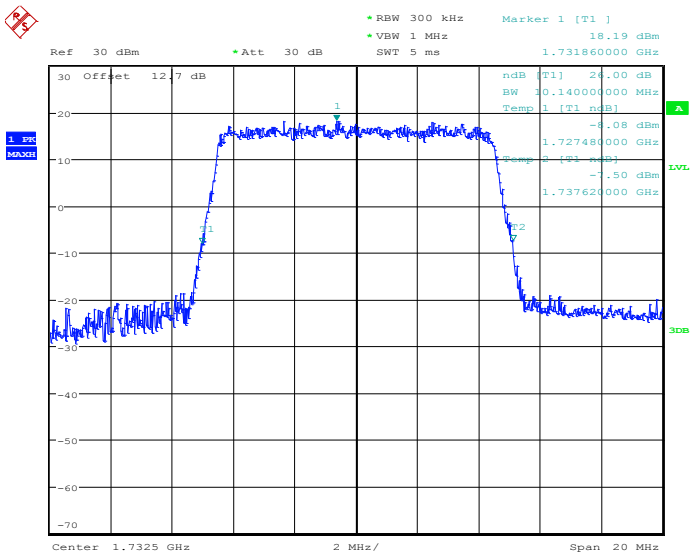
Date: 24.APR.2014 21:02:43

99% Occupied Bandwidth Plot on Channel 20175



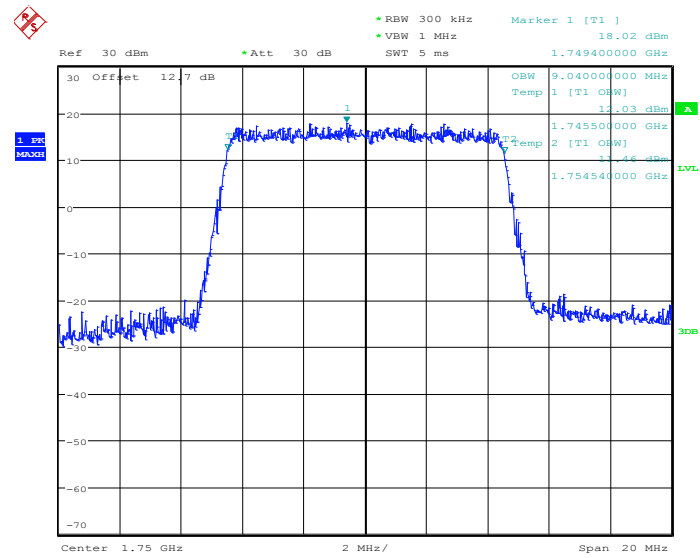
Date: 24.APR.2014 21:08:18

26dB Bandwidth Plot on Channel 20175



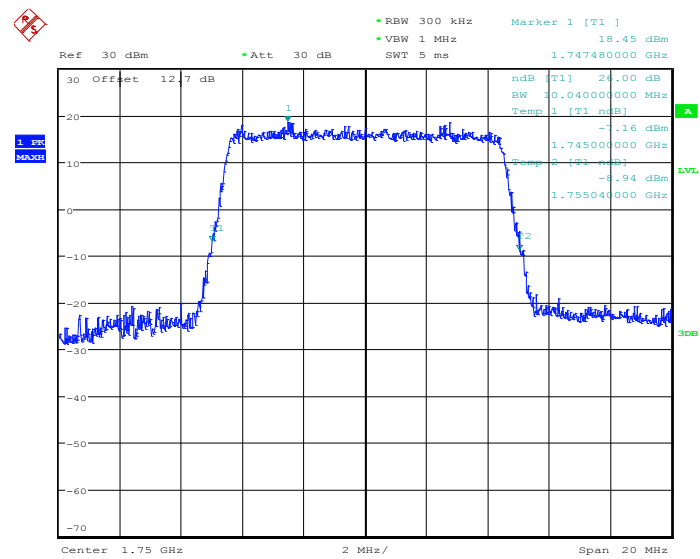
Date: 24.APR.2014 21:08:54

## 99% Occupied Bandwidth Plot on Channel 20350



Date: 24.APR.2014 21:11:24

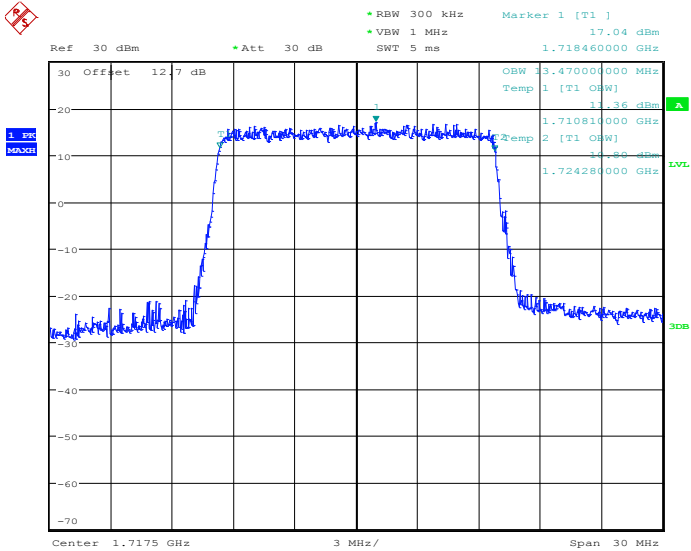
## 26dB Bandwidth Plot on Channel 20350



Date: 24.APR.2014 21:11:59

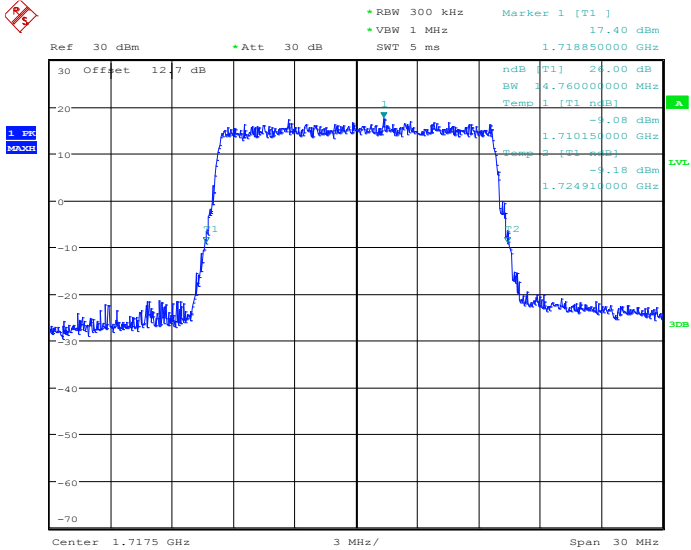
|        |            |             |              |
|--------|------------|-------------|--------------|
| Band : | LTE Band 4 | BW / Mod. : | 15MHz / QPSK |
|--------|------------|-------------|--------------|

99% Occupied Bandwidth Plot on Channel 20025



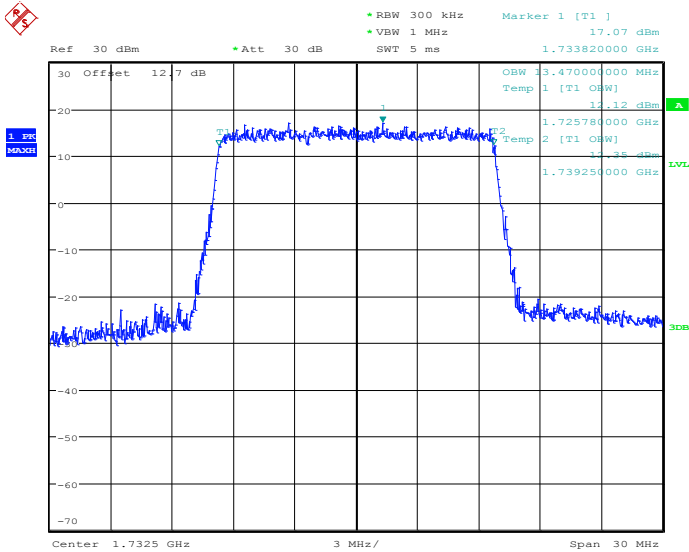
Date: 24.APR.2014 21:17:20

26dB Bandwidth Plot on Channel 20025



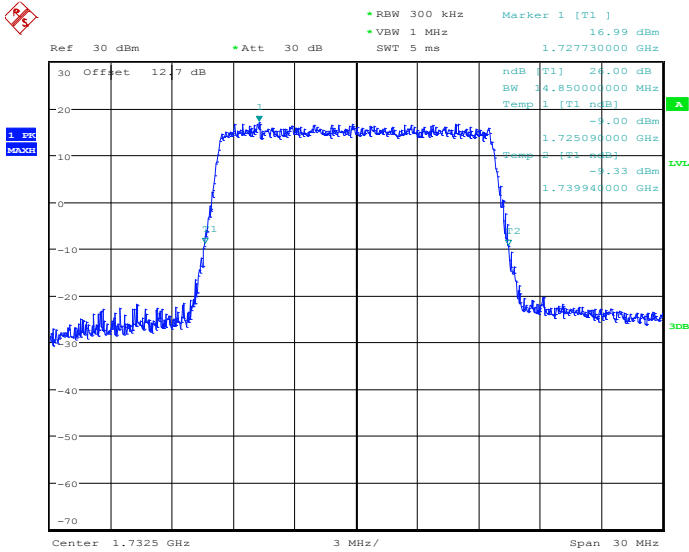
Date: 24.APR.2014 21:17:53

99% Occupied Bandwidth Plot on Channel 20175



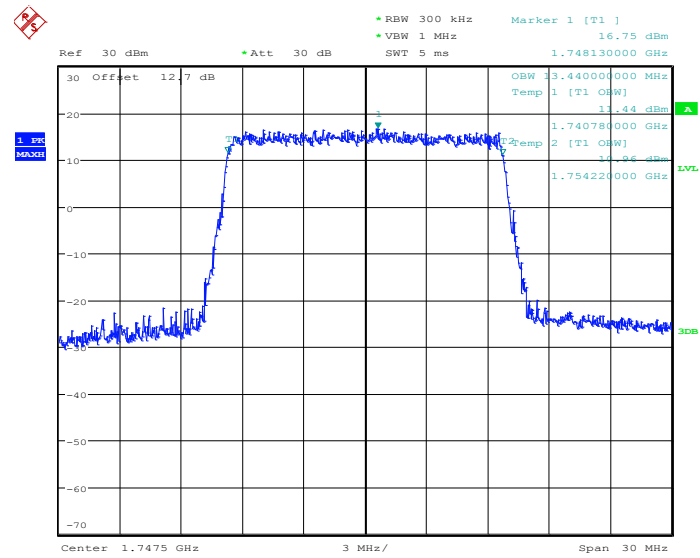
Date: 24.APR.2014 21:23:31

26dB Bandwidth Plot on Channel 20175



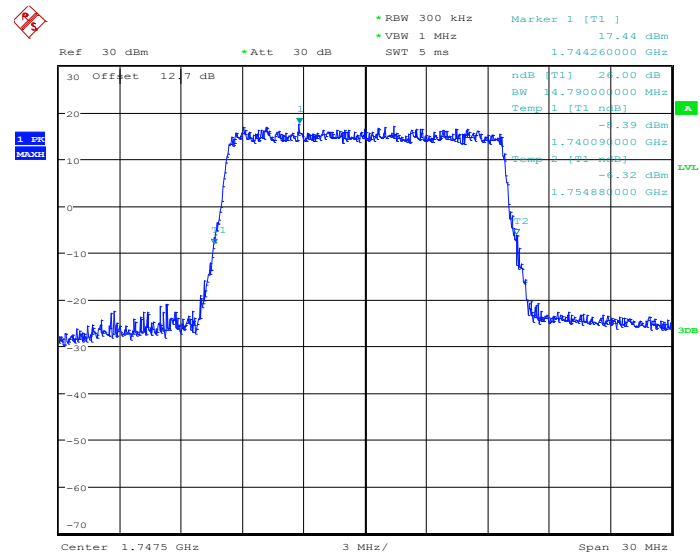
Date: 24.APR.2014 21:24:05

## 99% Occupied Bandwidth Plot on Channel 20325



Date: 24.APR.2014 21:26:37

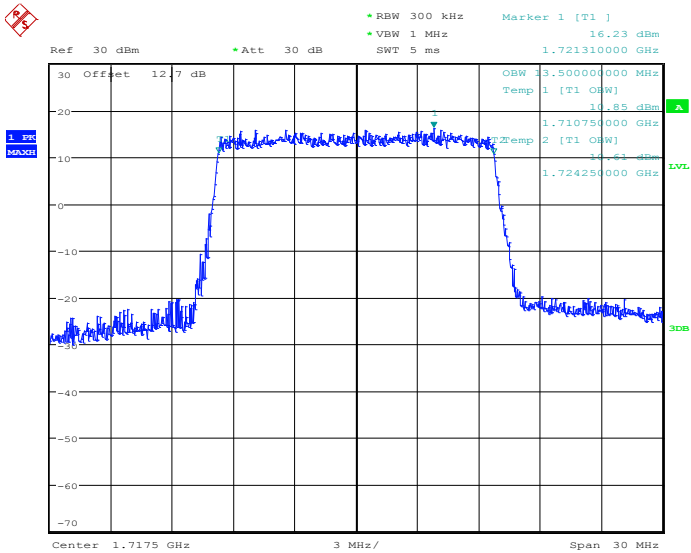
## 26dB Bandwidth Plot on Channel 20325



Date: 24.APR.2014 21:27:11

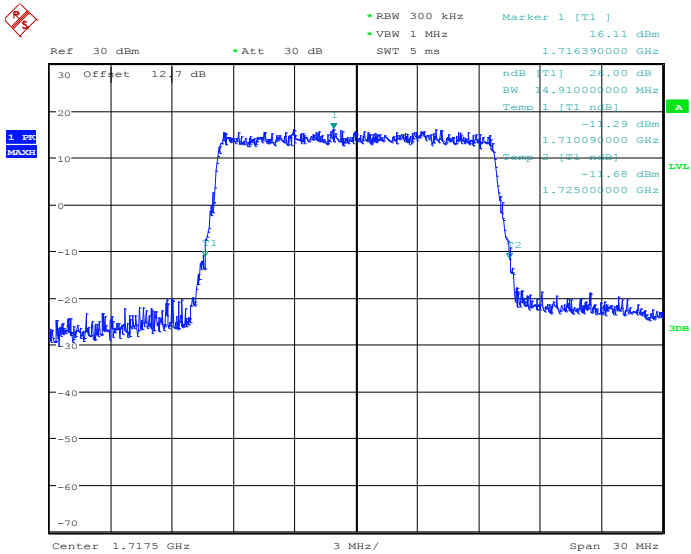
|        |            |             |               |
|--------|------------|-------------|---------------|
| Band : | LTE Band 4 | BW / Mod. : | 15MHz / 16QAM |
|--------|------------|-------------|---------------|

99% Occupied Bandwidth Plot on Channel 20025



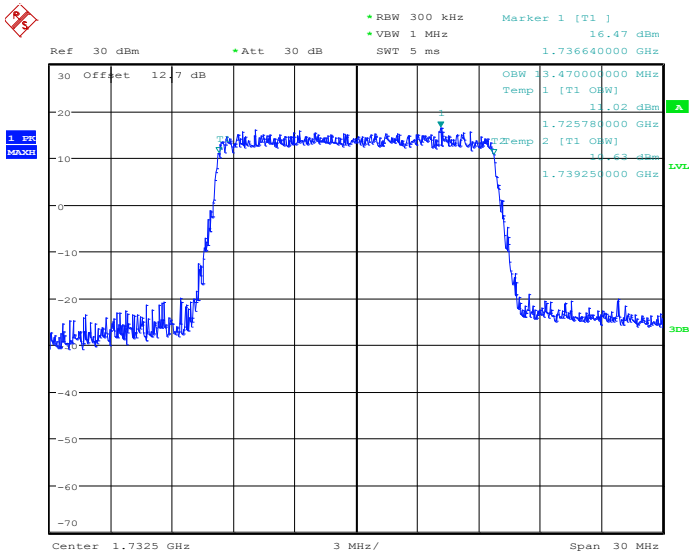
Date: 24.APR.2014 21:17:36

26dB Bandwidth Plot on Channel 20025



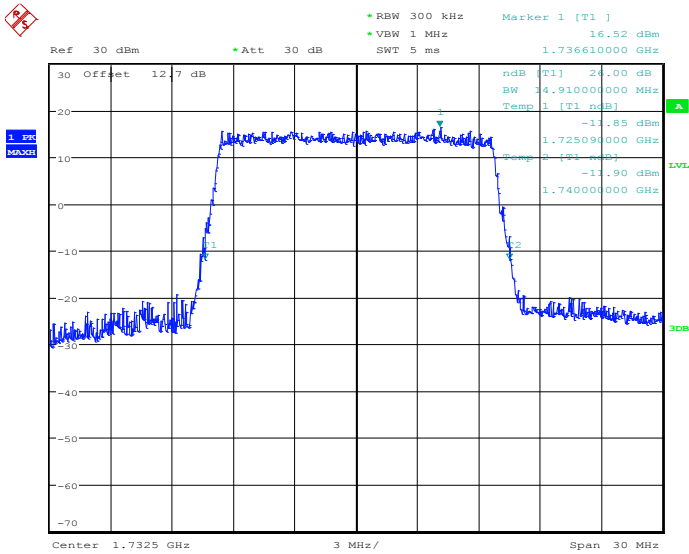
Date: 24.APR.2014 21:18:11

99% Occupied Bandwidth Plot on Channel 20175



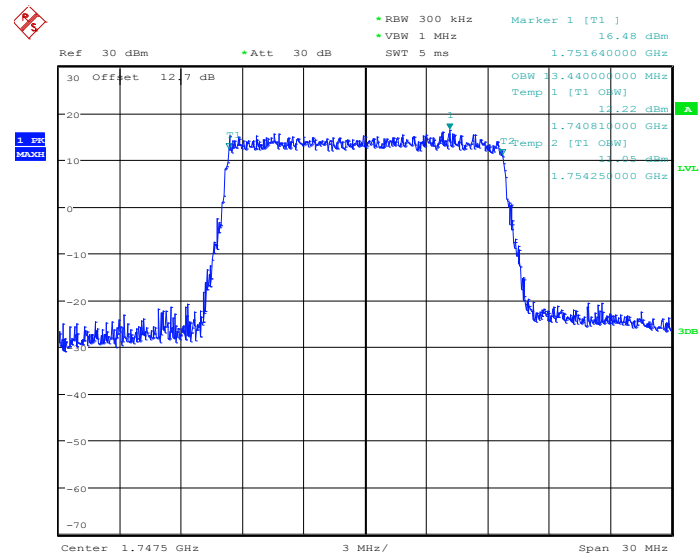
Date: 24.APR.2014 21:23:47

26dB Bandwidth Plot on Channel 20175



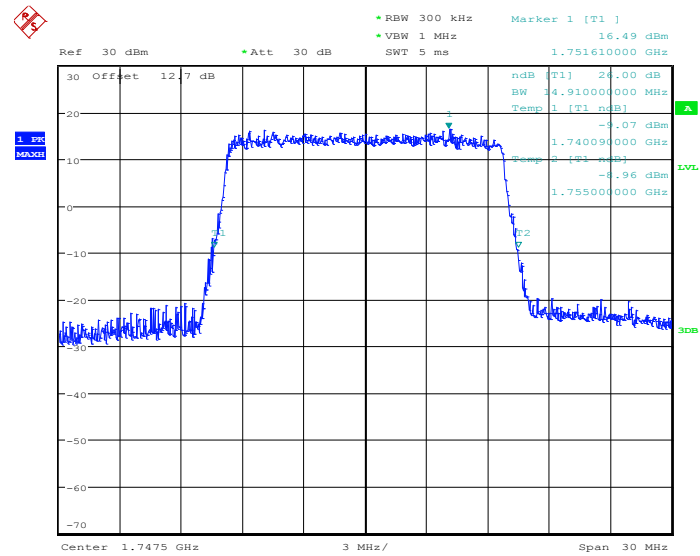
Date: 24.APR.2014 21:24:22

## 99% Occupied Bandwidth Plot on Channel 20325



Date: 24.APR.2014 21:26:53

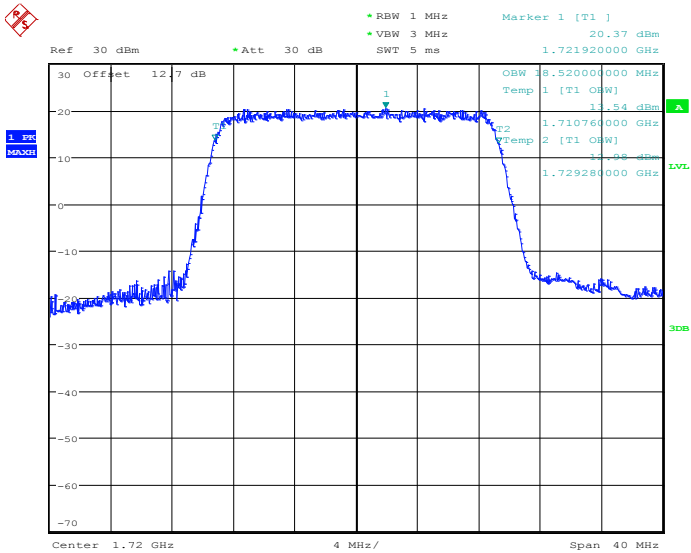
## 26dB Bandwidth Plot on Channel 20325



Date: 24.APR.2014 21:27:28

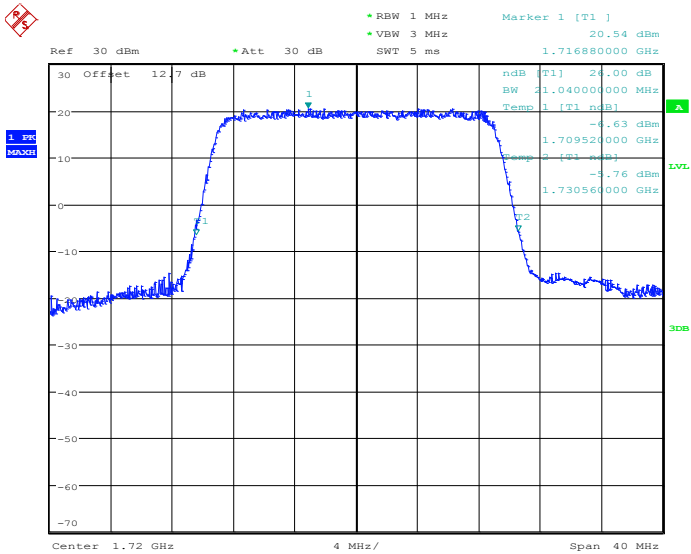
|        |            |             |              |
|--------|------------|-------------|--------------|
| Band : | LTE Band 4 | BW / Mod. : | 20MHz / QPSK |
|--------|------------|-------------|--------------|

99% Occupied Bandwidth Plot on Channel 20050



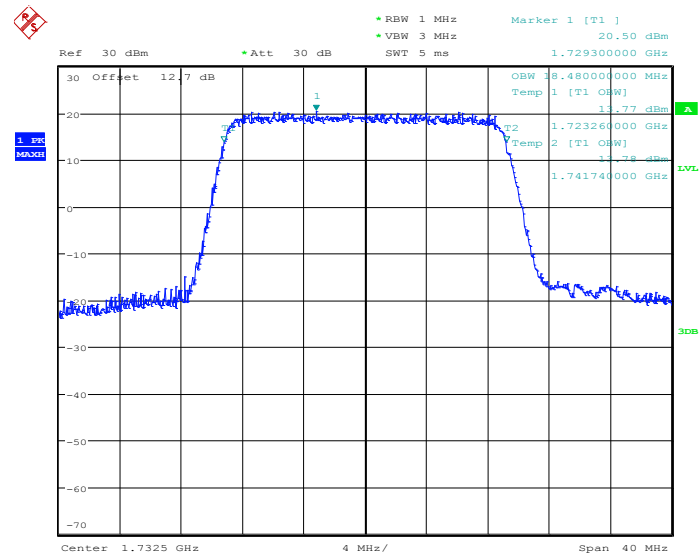
Date: 24.APR.2014 21:32:50

26dB Bandwidth Plot on Channel 20050



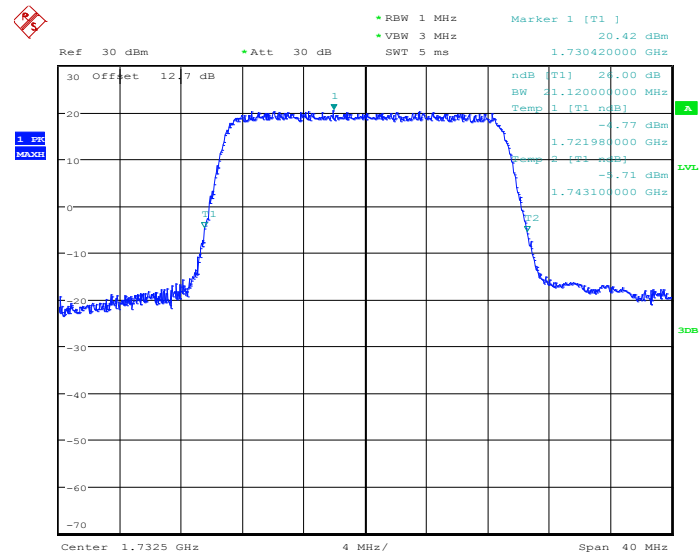
Date: 24.APR.2014 21:33:23

## 99% Occupied Bandwidth Plot on Channel 20175



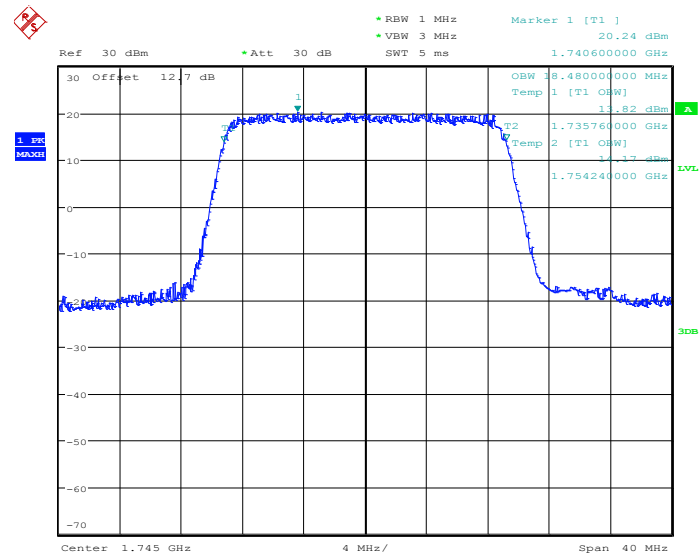
Date: 24.APR.2014 21:39:01

## 26dB Bandwidth Plot on Channel 20175



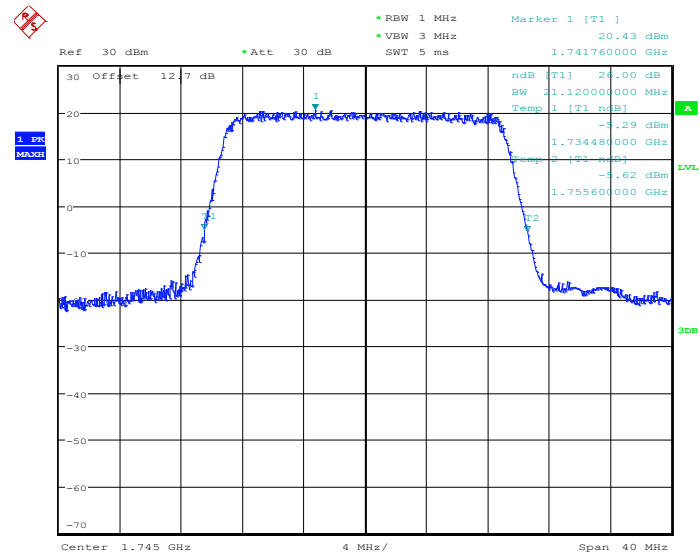
Date: 24.APR.2014 21:39:34

## 99% Occupied Bandwidth Plot on Channel 20300



Date: 24.APR.2014 21:42:07

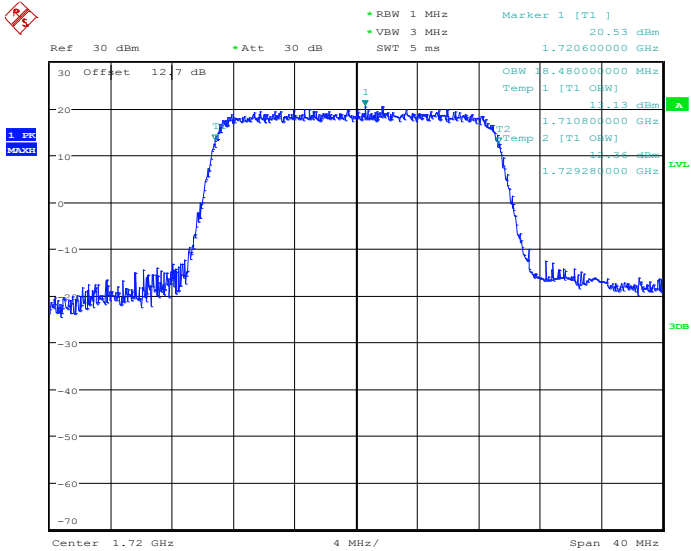
## 26dB Bandwidth Plot on Channel 20300



Date: 24.APR.2014 21:42:40

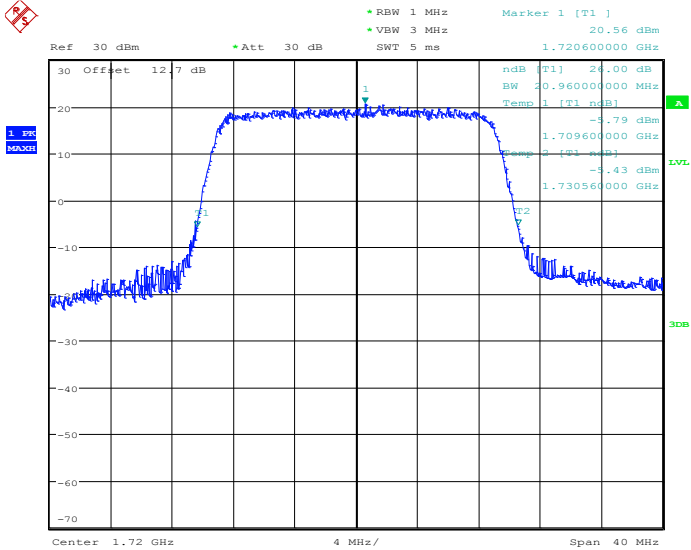
|        |            |             |               |
|--------|------------|-------------|---------------|
| Band : | LTE Band 4 | BW / Mod. : | 20MHz / 16QAM |
|--------|------------|-------------|---------------|

### 99% Occupied Bandwidth Plot on Channel 20050



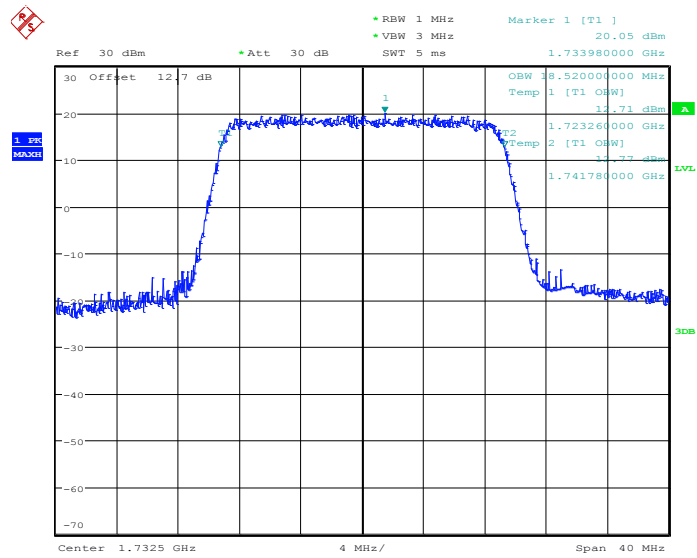
Date: 24.APR.2014 21:33:06

### 26dB Bandwidth Plot on Channel 20050



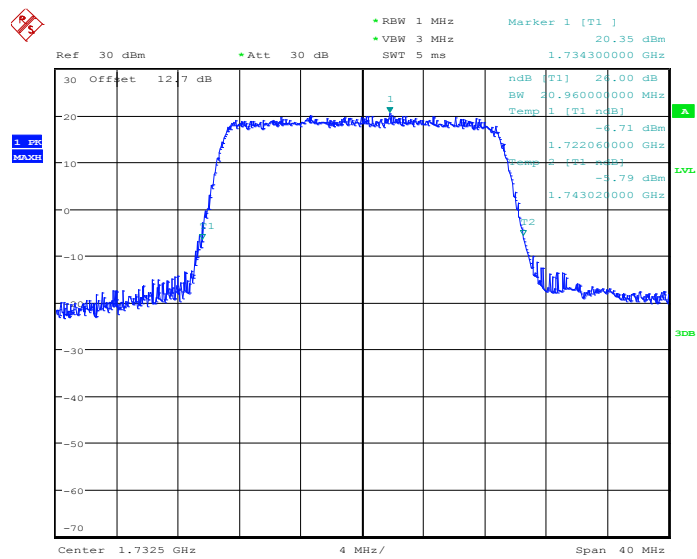
Date: 24.APR.2014 21:33:41

## 99% Occupied Bandwidth Plot on Channel 20175



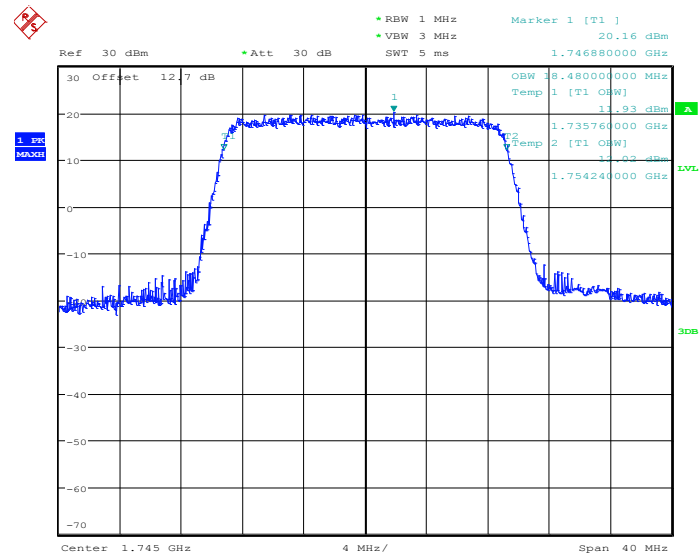
Date: 24.APR.2014 21:39:16

## 26dB Bandwidth Plot on Channel 20175



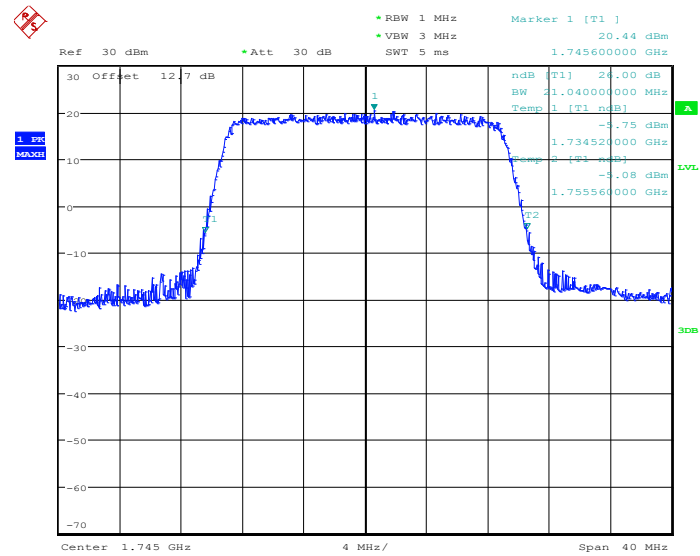
Date: 24.APR.2014 21:39:52

## 99% Occupied Bandwidth Plot on Channel 20300



Date: 24.APR.2014 21:42:23

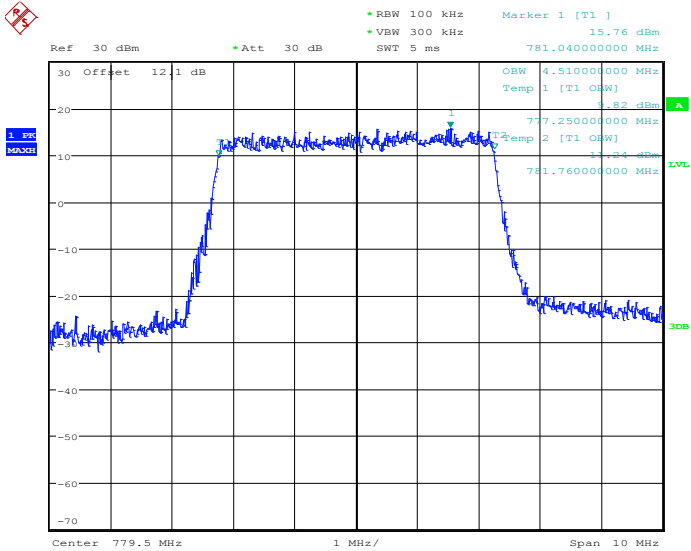
## 26dB Bandwidth Plot on Channel 20300



Date: 24.APR.2014 21:42:58

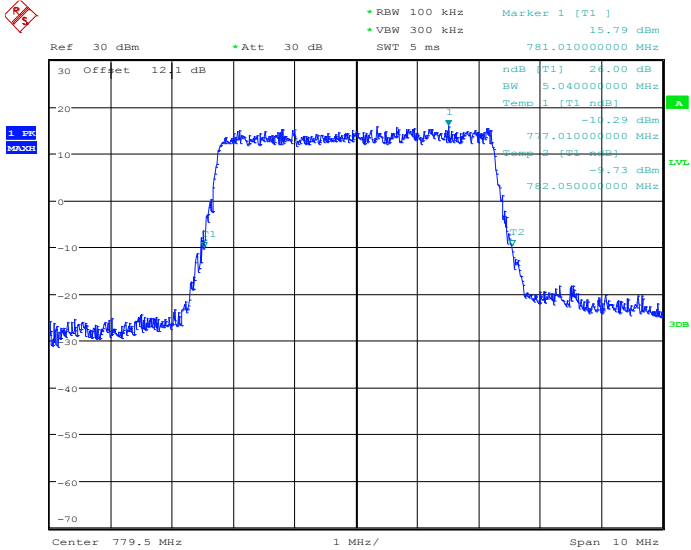
|        |             |             |             |
|--------|-------------|-------------|-------------|
| Band : | LTE Band 13 | BW / Mod. : | 5MHz / QPSK |
|--------|-------------|-------------|-------------|

### 99% Occupied Bandwidth Plot on Channel 23205



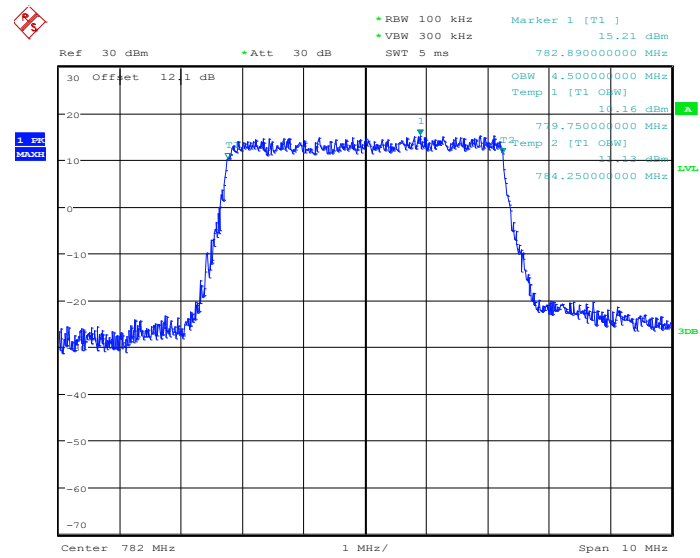
Date: 24.APR.2014 22:54:49

### 26dB Bandwidth Plot on Channel 23205



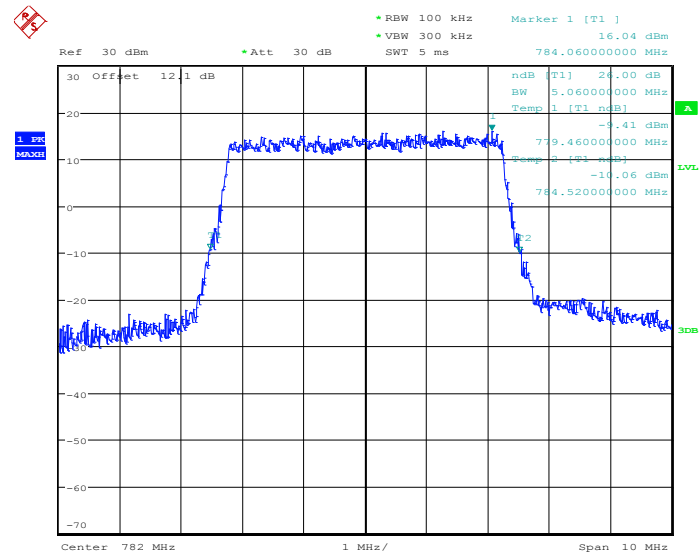
Date: 24.APR.2014 22:55:08

## 99% Occupied Bandwidth Plot on Channel 23230



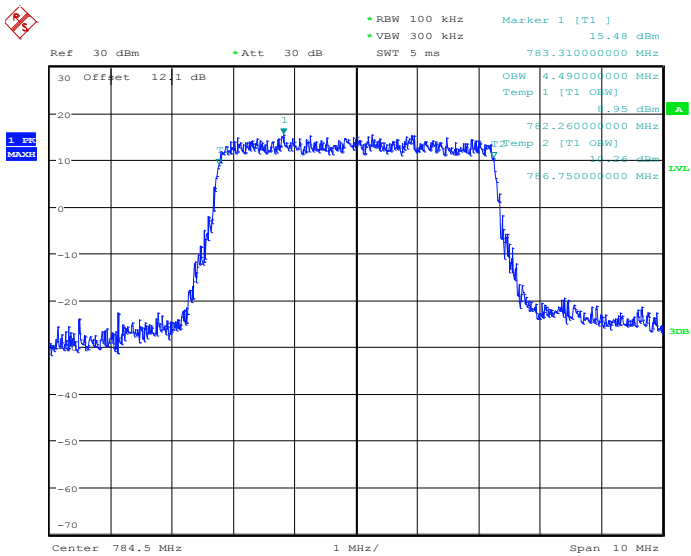
Date: 24.APR.2014 22:55:57

## 26dB Bandwidth Plot on Channel 23230



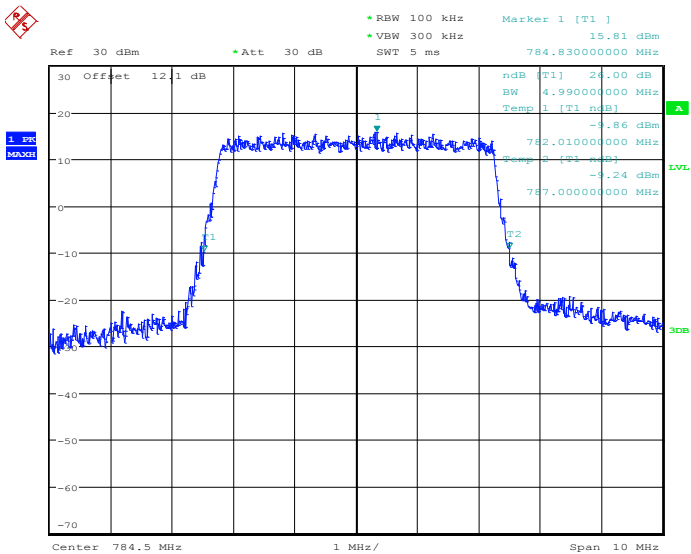
Date: 24.APR.2014 22:56:14

99% Occupied Bandwidth Plot on Channel 23255



Date: 24.APR.2014 22:57:03

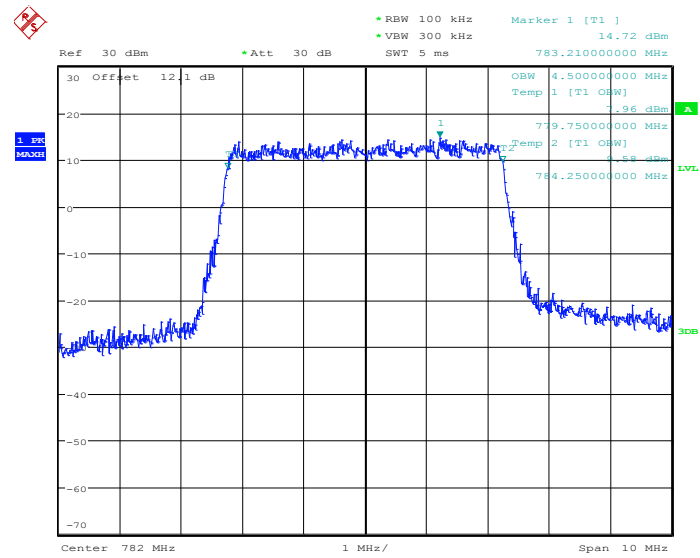
26dB Bandwidth Plot on Channel 23255



Date: 24.APR.2014 22:57:21

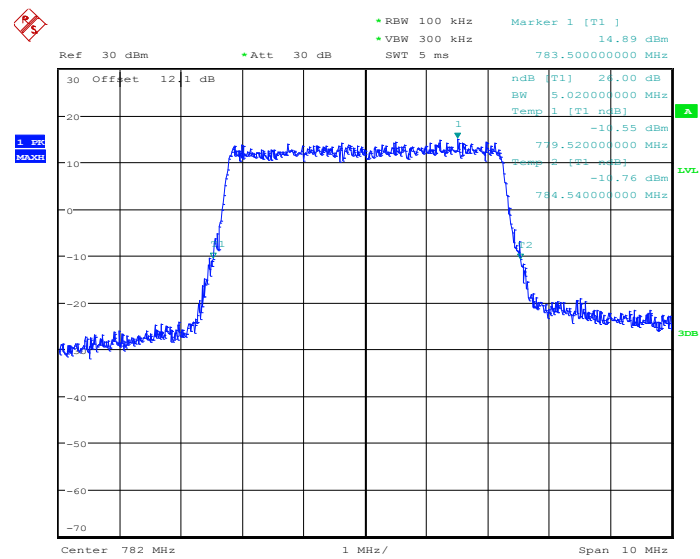


## 99% Occupied Bandwidth Plot on Channel 23230



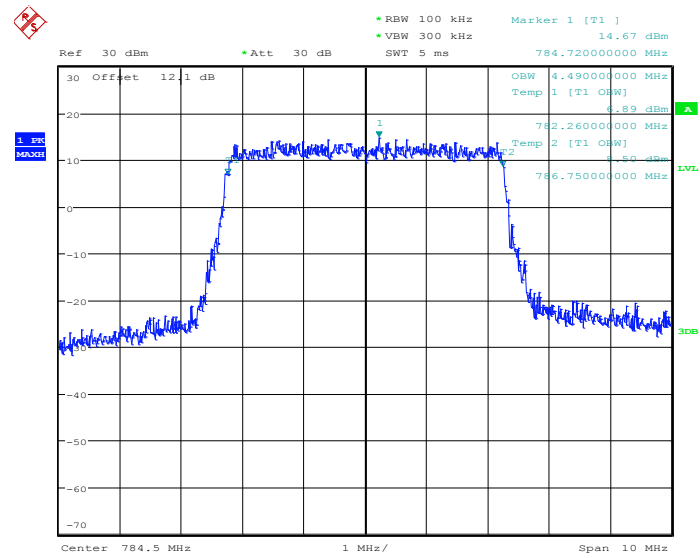
Date: 24.APR.2014 22:56:30

## 26dB Bandwidth Plot on Channel 23230



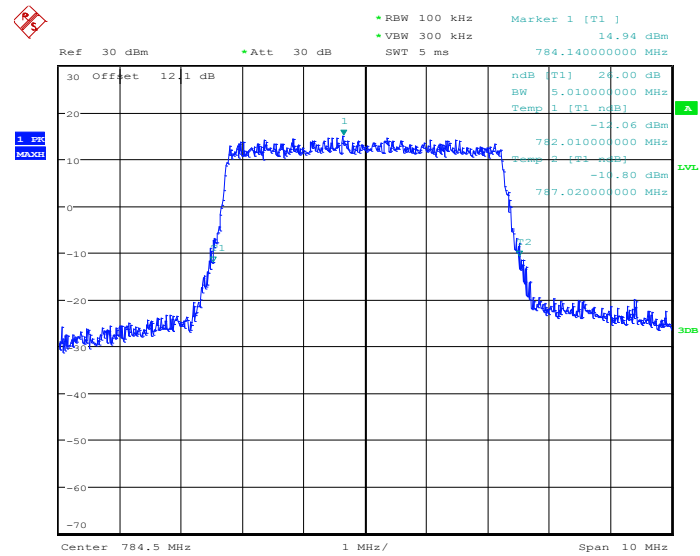
Date: 24.APR.2014 22:56:48

## 99% Occupied Bandwidth Plot on Channel 23255



Date: 24.APR.2014 22:57:37

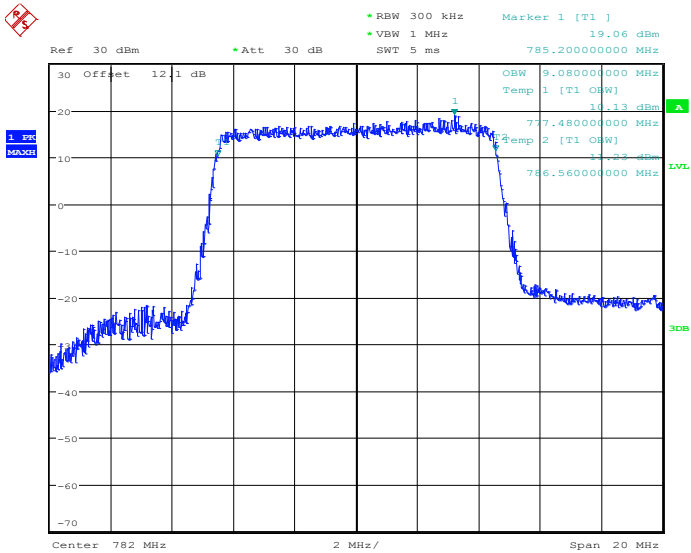
## 26dB Bandwidth Plot on Channel 23255



Date: 24.APR.2014 22:57:54

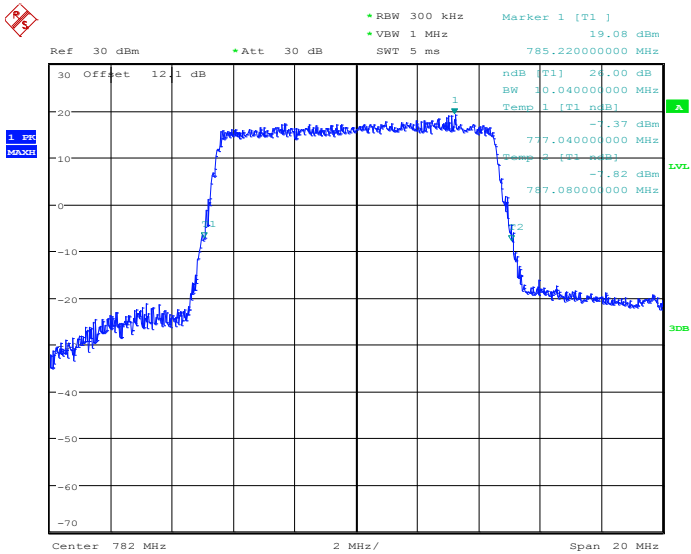
|        |             |             |              |
|--------|-------------|-------------|--------------|
| Band : | LTE Band 13 | BW / Mod. : | 10MHz / QPSK |
|--------|-------------|-------------|--------------|

### 99% Occupied Bandwidth Plot on Channel 23230



Date: 24.APR.2014 22:58:10

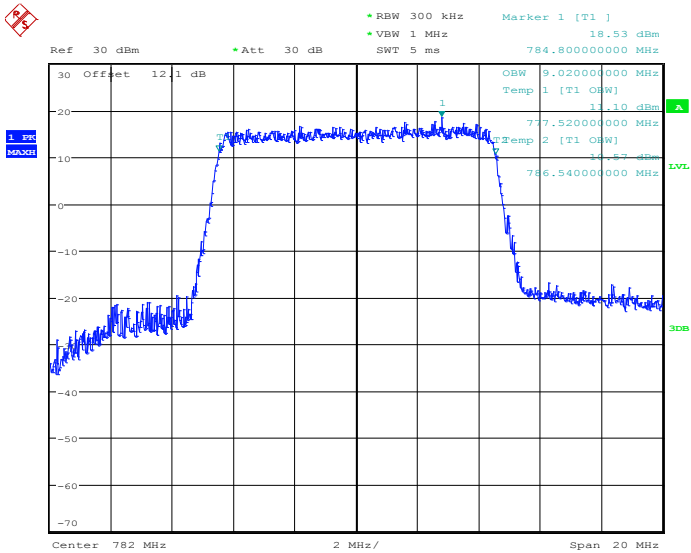
### 26dB Bandwidth Plot on Channel 23230



Date: 24.APR.2014 22:58:28

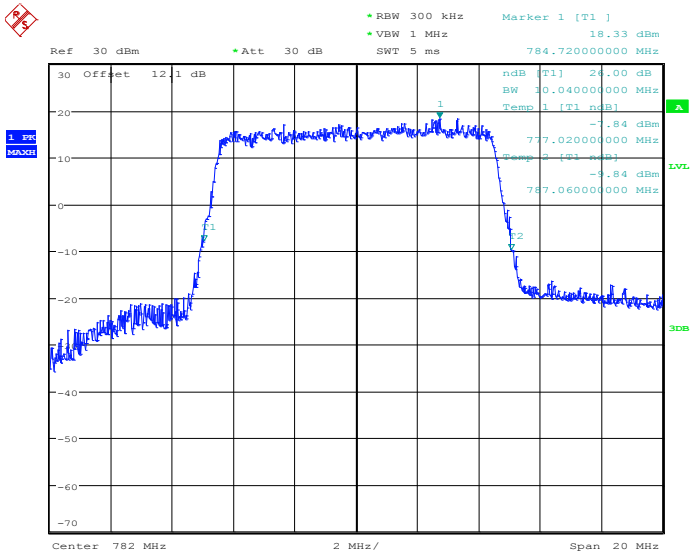
|        |             |             |               |
|--------|-------------|-------------|---------------|
| Band : | LTE Band 13 | BW / Mod. : | 10MHz / 16QAM |
|--------|-------------|-------------|---------------|

99% Occupied Bandwidth Plot on Channel 23230



Date: 24.APR.2014 22:58:43

26dB Bandwidth Plot on Channel 23230



Date: 24.APR.2014 22:59:01

## 3.4 Conducted Band Edge Measurement

### 3.4.1 Description of Conducted Band Edge Measurement

27.53 (c) for Band 13

For operations in the 776-788 MHz band, the FCC limit is  $43 + 10\log_{10}(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 100 kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. In addition, the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power,  $P$  (dBW), by at least  $65 + 10 \log_{10} p(\text{watts})$ , dB, for mobile and portable equipment.

27.53 (h) for Band 4

For operations in the 1710 – 1755 MHz band, the FCC limit is  $43 + 10\log_{10}(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

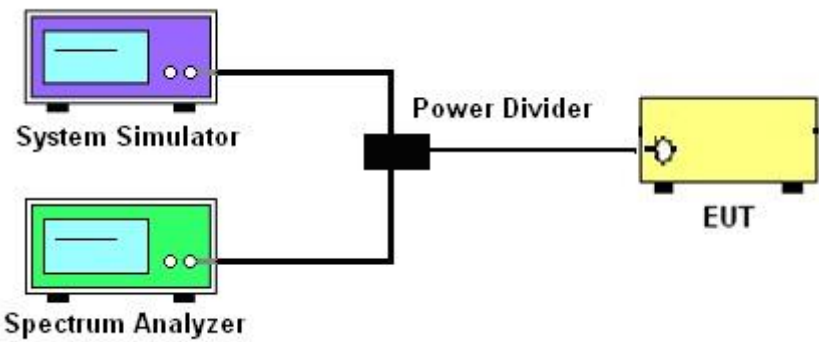
### 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.4.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW  $\geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
5. The limit line is derived from  $43 + 10\log(P)\text{dB}$  below the transmitter power  $P(\text{Watts})$   
$$= P(\text{W}) - [43 + 10\log(P)] (\text{dB})$$
$$= [30 + 10\log(P)] (\text{dBm}) - [43 + 10\log(P)] (\text{dB})$$
$$= -13\text{dBm}.$$

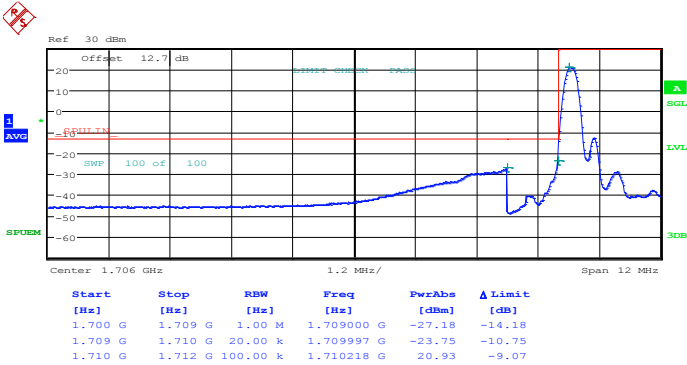
3.4.4 Test Setup



3.4.5 Test Result (Plots) of Conducted Band Edge

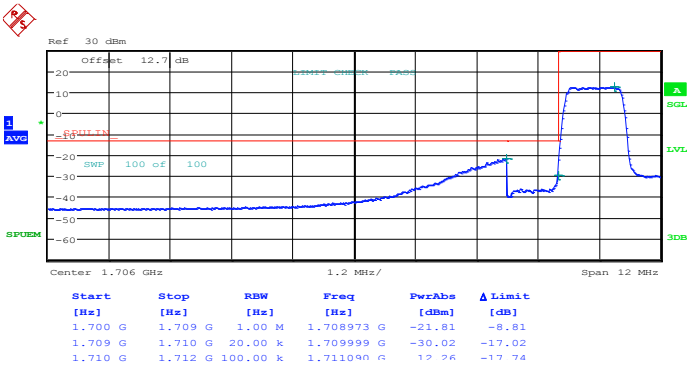
|        |            |              |               |
|--------|------------|--------------|---------------|
| Band : | LTE Band 4 | Band Width : | 1.4MHz / QPSK |
|--------|------------|--------------|---------------|

Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



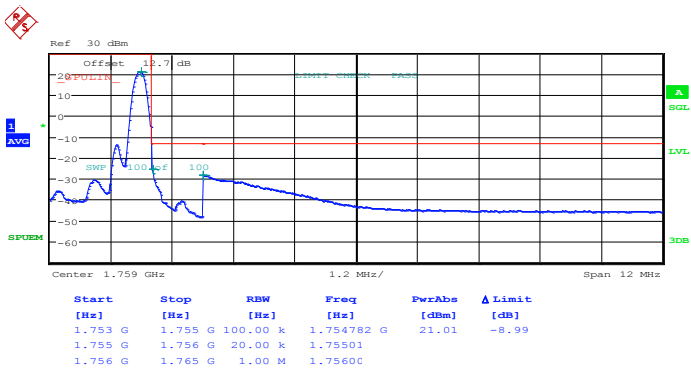
Date: 24.APR.2014 20:16:56

Lower Band Edge Plot for QPSK-RB Size 6, RB Offset 0



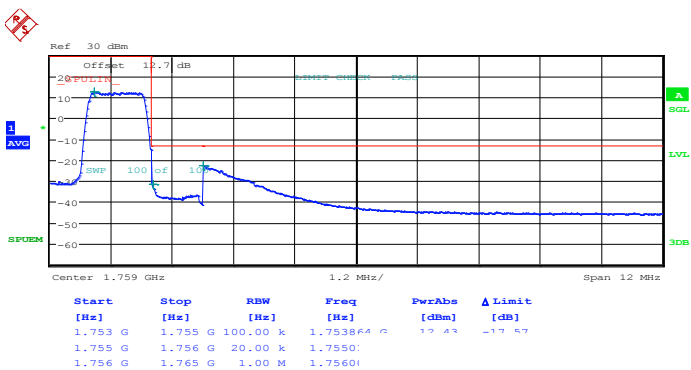
Date: 24.APR.2014 20:18:30

Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 5



Date: 24.APR.2014 20:26:15

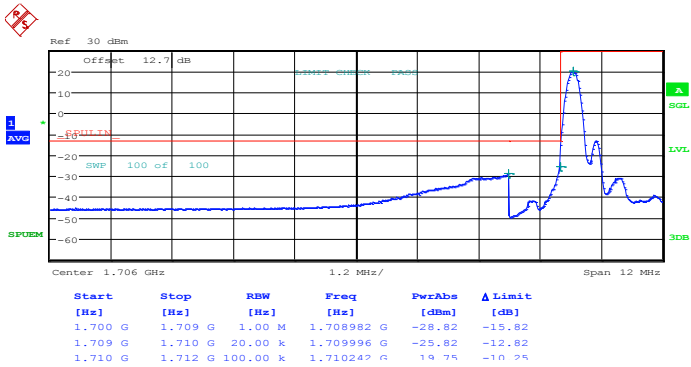
Higher Band Edge Plot for QPSK-RB Size 6, RB Offset 0



Date: 24.APR.2014 20:27:48

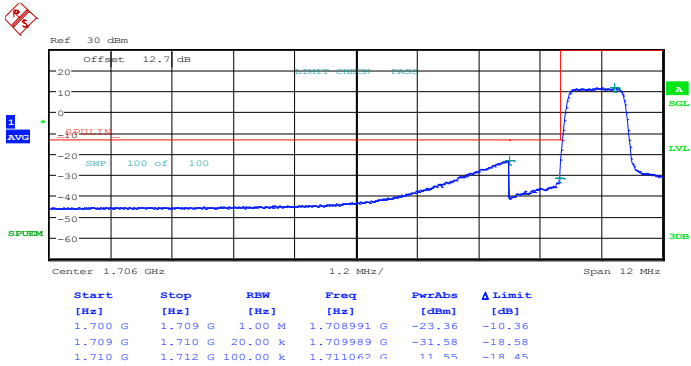
|        |            |              |                |
|--------|------------|--------------|----------------|
| Band : | LTE Band 4 | Band Width : | 1.4MHz / 16QAM |
|--------|------------|--------------|----------------|

Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



Date: 24.APR.2014 20:17:43

Lower Band Edge Plot for 16QAM-RB Size 6, RB Offset 0



Date: 24.APR.2014 20:19:16



Ref 30 dBm

Offset 10.7 dB

20.00 dBm

LIMIT SWP PWR ABS

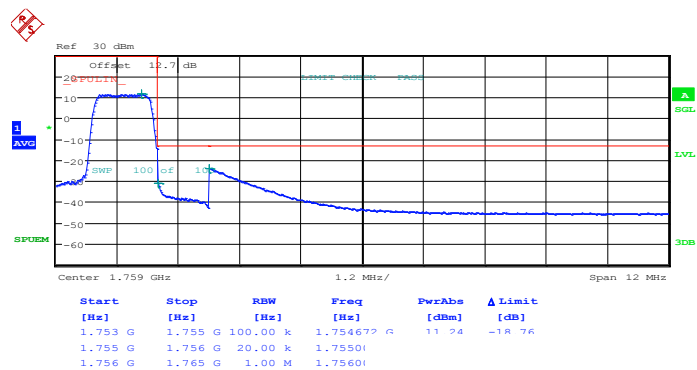
SWP 100.00 f

Center 1.759 GHz

Span 12 MHz

| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz]  | PwrAbs [dBm] | Δ Limit [dB] |
|------------|-----------|----------|------------|--------------|--------------|
| 1.753 G    | 1.755 G   | 100.00 k | 1.754748 G | 19.50        | -10.50       |
| 1.755 G    | 1.756 G   | 20.00 k  | 1.75501    |              |              |
| 1.756 G    | 1.765 G   | 1.00 M   | 1.75600    |              |              |

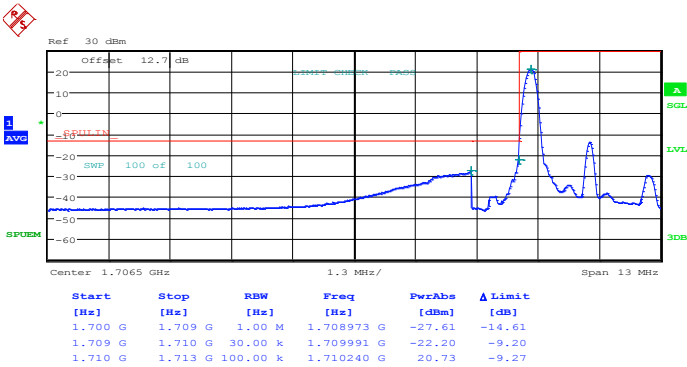
### Higher Band Edge Plot for 16QAM-RB Size 6, RB Offset 0



Date: 24.APR.2014 20:28:34

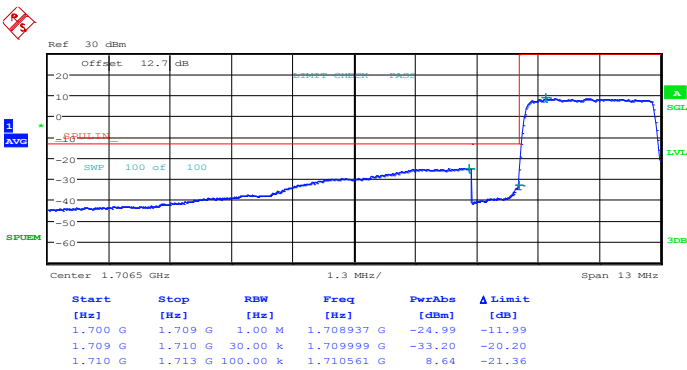
|        |            |              |             |
|--------|------------|--------------|-------------|
| Band : | LTE Band 4 | Band Width : | 3MHz / QPSK |
|--------|------------|--------------|-------------|

Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 24.APR.2014 20:32:27

Lower Band Edge Plot for QPSK-RB Size 15, RB Offset 0



Date: 24.APR.2014 20:34:01

Ref 30 dBm

Offset 12.7 dB

20 PWR

10

0

-10

-20

-30

-40

-50

-60

SWP 100.00

1.755 GHz

1.756 GHz

1.757 GHz

1.758 GHz

1.759 GHz

1.760 GHz

1.761 GHz

1.762 GHz

1.763 GHz

1.764 GHz

1.765 GHz

1.766 GHz

1.767 GHz

1.768 GHz

1.769 GHz

1.770 GHz

1.771 GHz

1.772 GHz

1.773 GHz

1.774 GHz

1.775 GHz

1.776 GHz

1.777 GHz

1.778 GHz

1.779 GHz

1.780 GHz

1.781 GHz

1.782 GHz

1.783 GHz

1.784 GHz

1.785 GHz

1.786 GHz

1.787 GHz

1.788 GHz

1.789 GHz

1.790 GHz

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1.793 GHz

1.794 GHz

1.795 GHz

1.796 GHz

1.797 GHz

1.798 GHz

1.799 GHz

1.800 GHz

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1.996 GHz

1.997 GHz

1.998 GHz

1.999 GHz

2.000 GHz

2.001 GHz

2.002 GHz

2.003 GHz

2.004 GHz

2.005 GHz

2.006 GHz

2.007 GHz

2.008 GHz

2.009 GHz

2.010 GHz

2.011 GHz

2.012 GHz

2.013 GHz

2.014 GHz

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2.026 GHz

2.027 GHz

2.028 GHz

2.029 GHz

2.030 GHz

2.031 GHz

2.032 GHz

2.033 GHz

2.034 GHz

2.035 GHz

2.036 GHz

2.037 GHz

2.038 GHz

2.039 GHz

2.040 GHz

2.041 GHz

2.042 GHz

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2.067 GHz

2.068 GHz

2.069 GHz

2.070 GHz

2.071 GHz

2.072 GHz

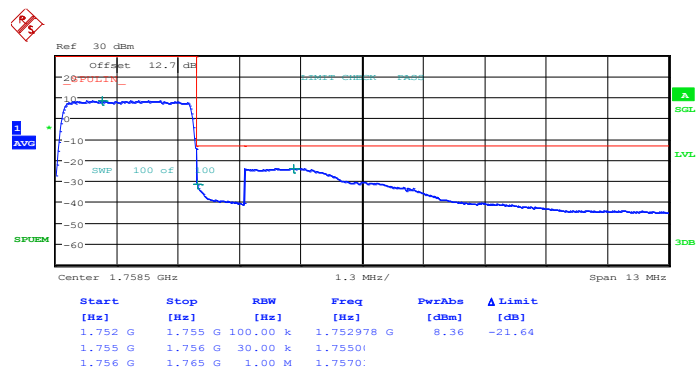
2.073 GHz

2.074 GHz

2.075 GHz

2.076 GHz

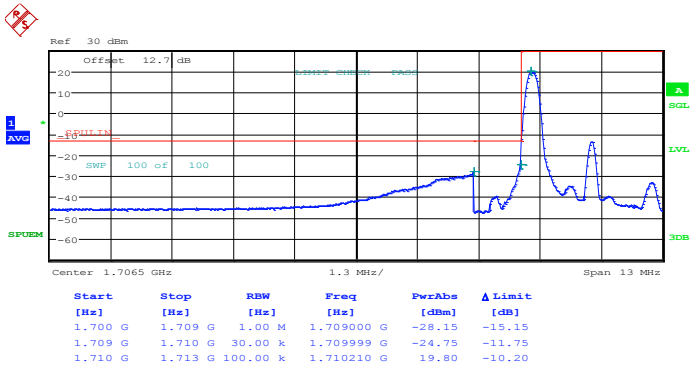
### Higher Band Edge Plot for QPSK-RB Size 15, RB Offset 0



Date: 24.APR.2014 20:43:19

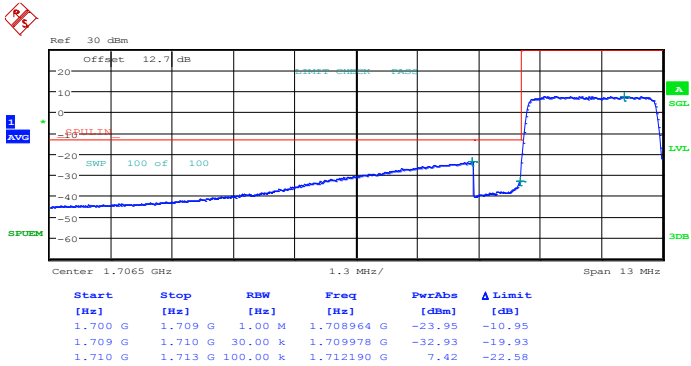
|        |            |              |              |
|--------|------------|--------------|--------------|
| Band : | LTE Band 4 | Band Width : | 3MHz / 16QAM |
|--------|------------|--------------|--------------|

Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



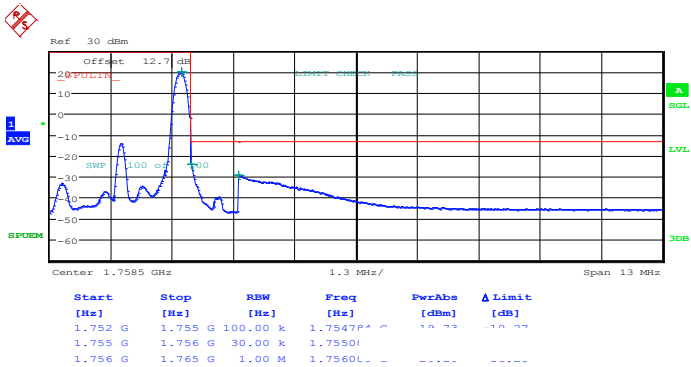
Date: 24.APR.2014 20:33:14

Lower Band Edge Plot for 16QAM-RB Size 15, RB Offset 0



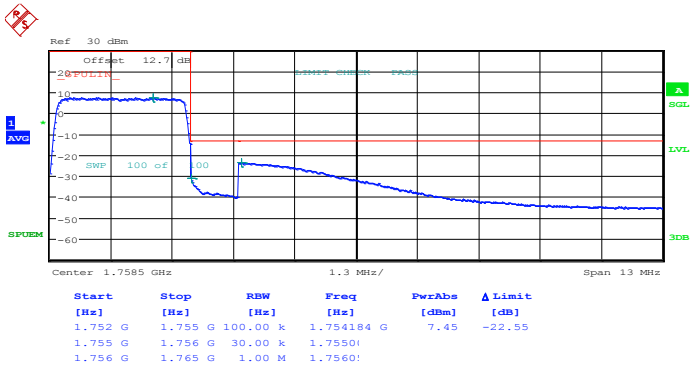
Date: 24.APR.2014 20:34:47

Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 14



Date: 24.APR.2014 20:42:32

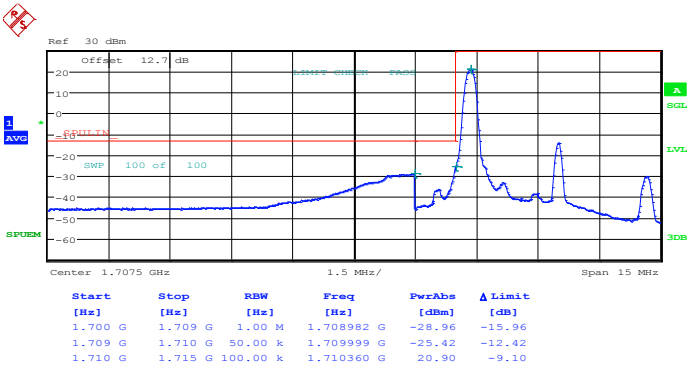
Higher Band Edge Plot for 16QAM-RB Size 15, RB Offset 0



Date: 24.APR.2014 20:44:05

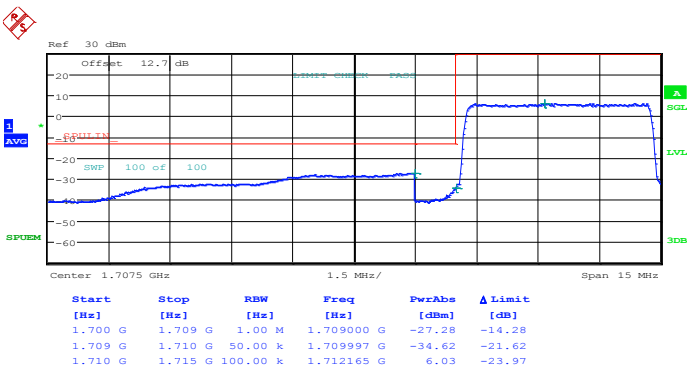
|        |            |              |             |
|--------|------------|--------------|-------------|
| Band : | LTE Band 4 | Band Width : | 5MHz / QPSK |
|--------|------------|--------------|-------------|

Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



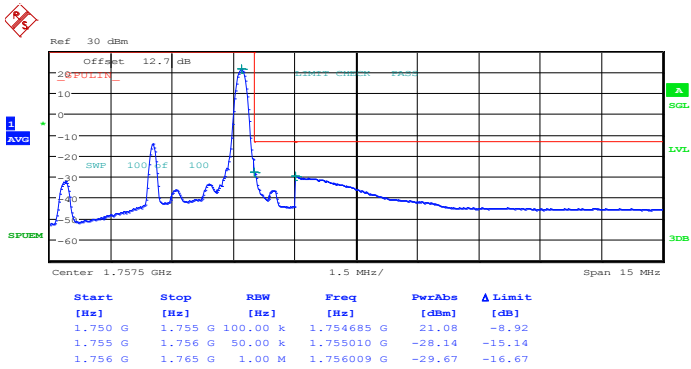
Date: 24.APR.2014 20:47:58

Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0



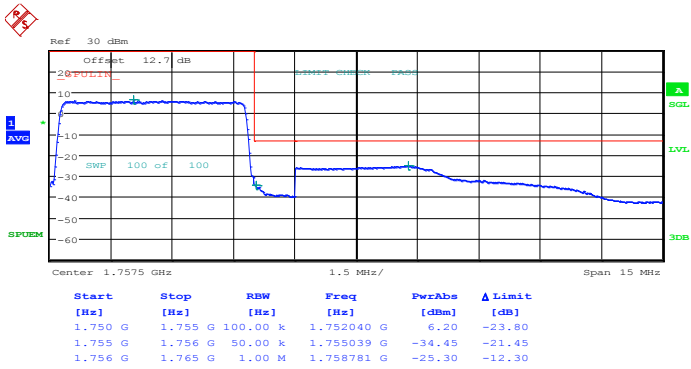
Date: 24.APR.2014 20:49:31

Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24



Date: 24.APR.2014 20:57:17

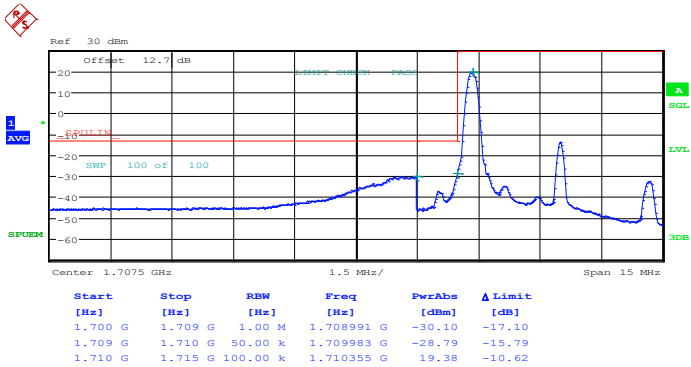
Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0



Date: 24.APR.2014 20:58:50

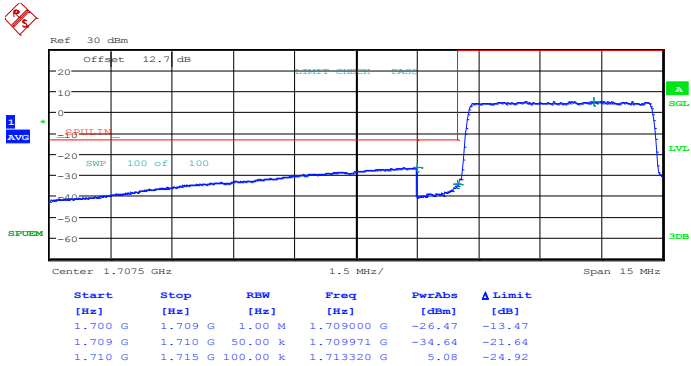
|        |            |              |              |
|--------|------------|--------------|--------------|
| Band : | LTE Band 4 | Band Width : | 5MHz / 16QAM |
|--------|------------|--------------|--------------|

Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



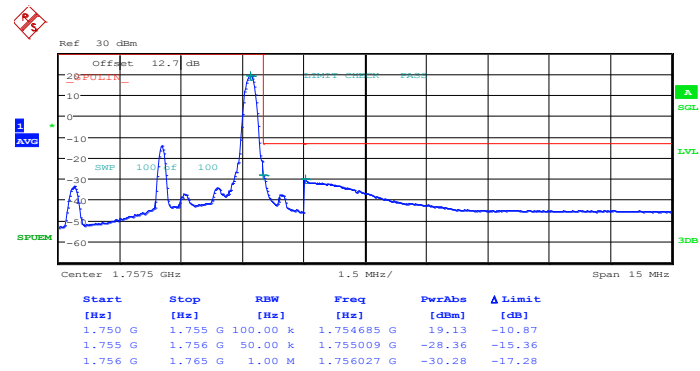
Date: 24.APR.2014 20:48:45

Lower Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



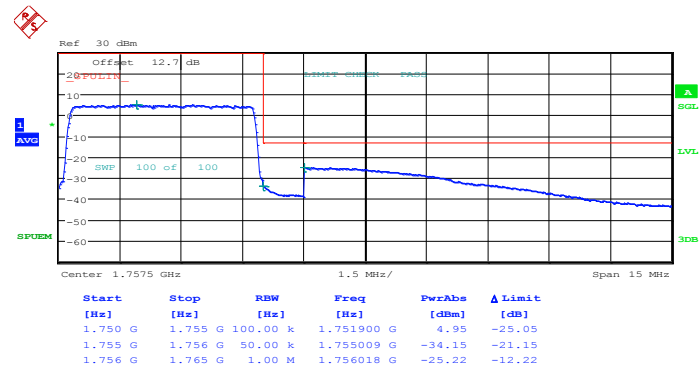
Date: 24.APR.2014 20:50:18

## Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 24



Date: 24.APR.2014 20:58:04

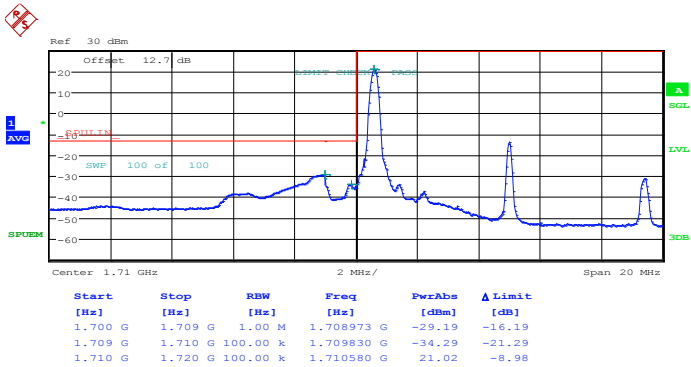
## Higher Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



Date: 24.APR.2014 20:59:37

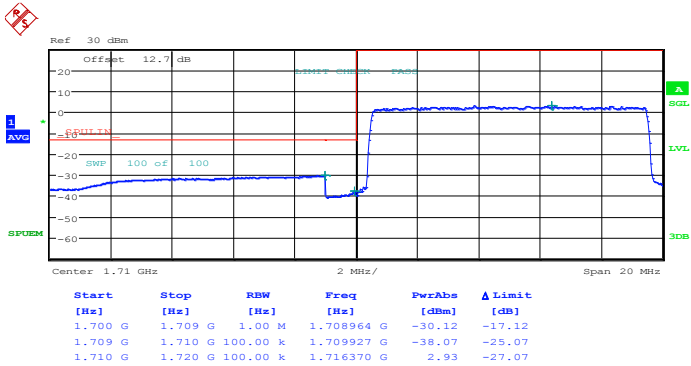
|        |            |              |              |
|--------|------------|--------------|--------------|
| Band : | LTE Band 4 | Band Width : | 10MHz / QPSK |
|--------|------------|--------------|--------------|

Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



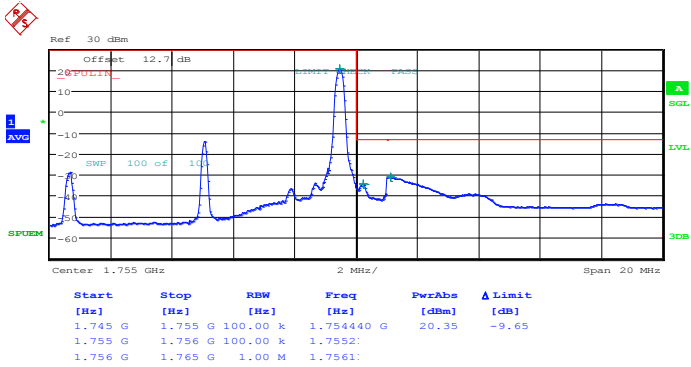
Date: 24.APR.2014 21:03:29

Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0



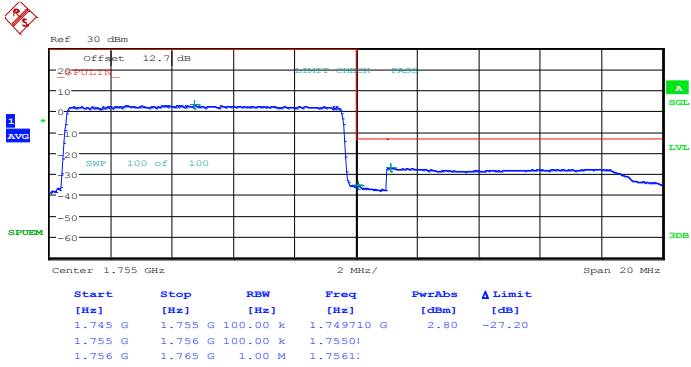
Date: 24.APR.2014 21:05:02

Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49



Date: 24.APR.2014 21:12:45

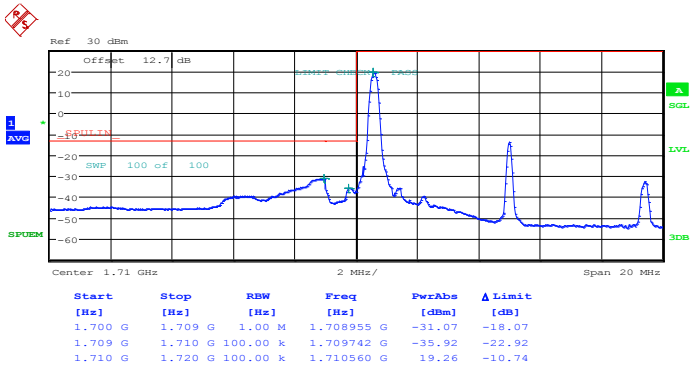
Higher Band Edge Plot for QPSK-RB Size 50, RB Offset 0



Date: 24.APR.2014 21:14:18

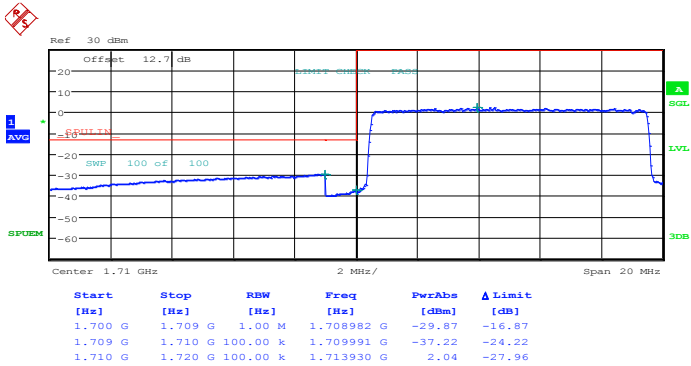
|        |            |              |               |
|--------|------------|--------------|---------------|
| Band : | LTE Band 4 | Band Width : | 10MHz / 16QAM |
|--------|------------|--------------|---------------|

Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



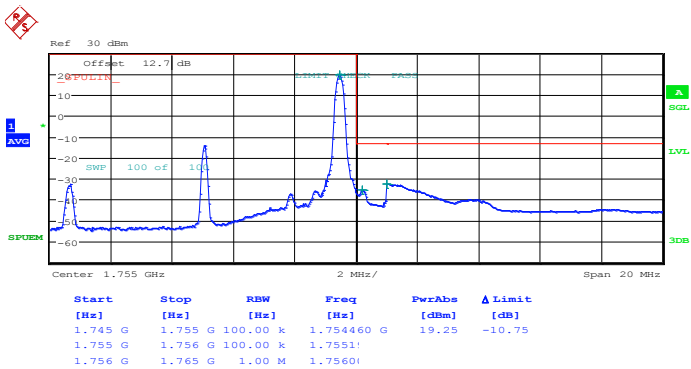
Date: 24.APR.2014 21:04:15

Lower Band Edge Plot for 16QAM-RB Size 50, RB Offset 0



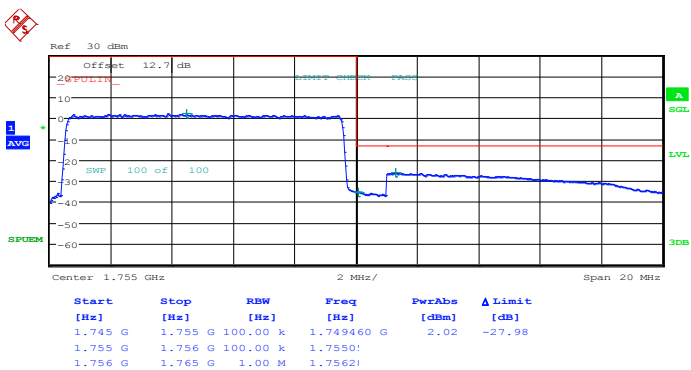
Date: 24.APR.2014 21:05:48

Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 49



Date: 24.APR.2014 21:13:32

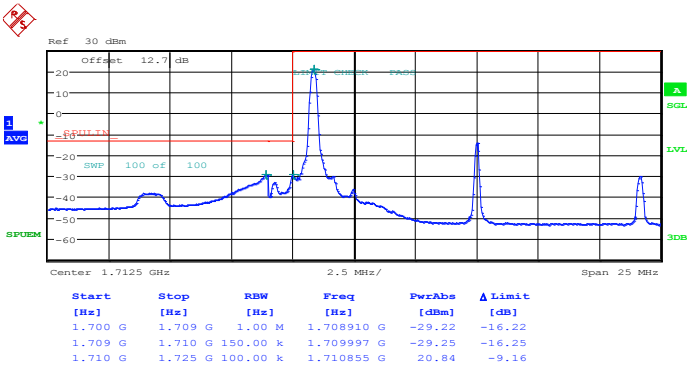
Higher Band Edge Plot for 16QAM-RB Size 50, RB Offset 0



Date: 24.APR.2014 21:15:05

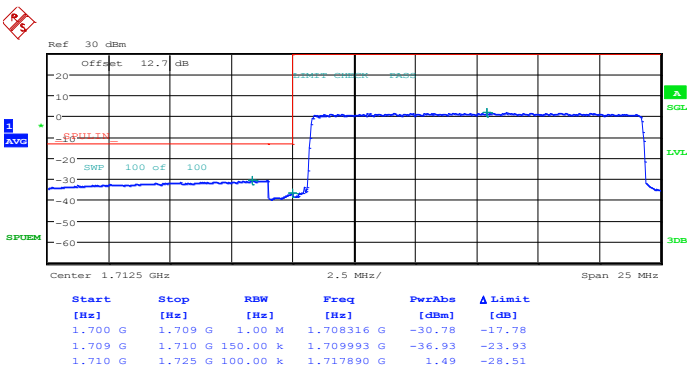
|        |            |              |              |
|--------|------------|--------------|--------------|
| Band : | LTE Band 4 | Band Width : | 15MHz / QPSK |
|--------|------------|--------------|--------------|

Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



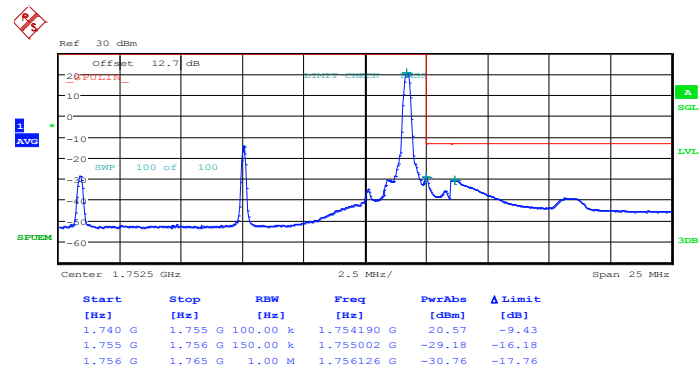
Date: 24.APR.2014 21:18:57

Lower Band Edge Plot for QPSK-RB Size 75, RB Offset 0



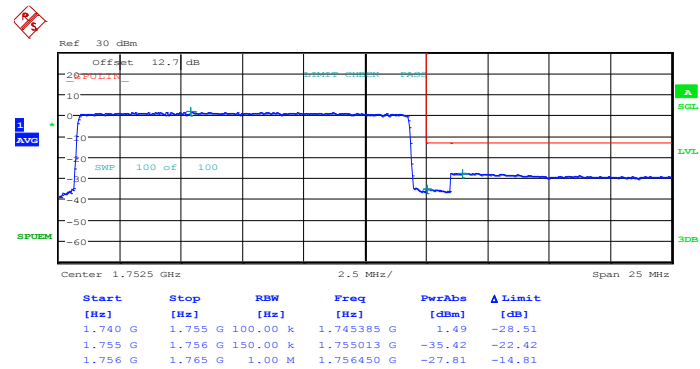
Date: 24.APR.2014 21:20:30

## Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 74



Date: 24.APR.2014 21:28:15

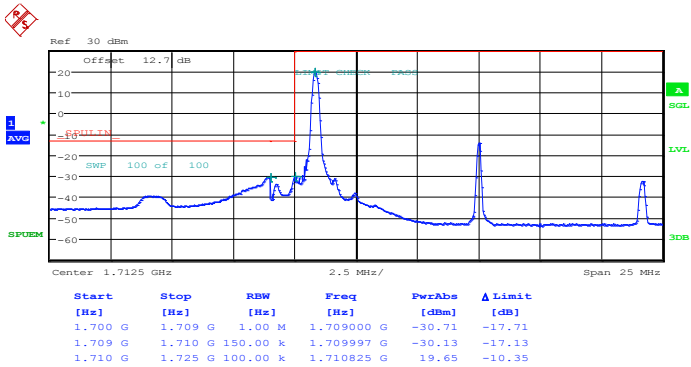
## Higher Band Edge Plot for QPSK-RB Size 75, RB Offset 0



Date: 24.APR.2014 21:29:48

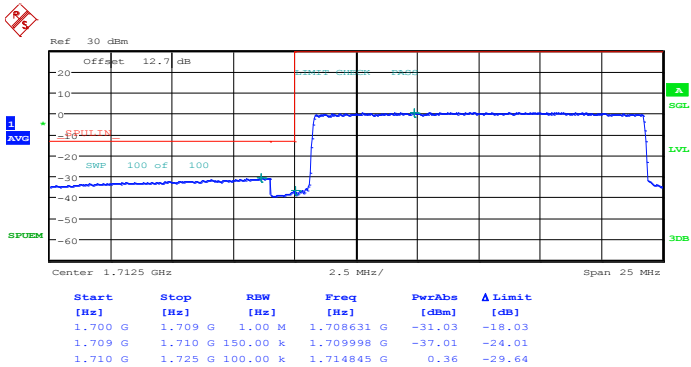
|        |            |              |               |
|--------|------------|--------------|---------------|
| Band : | LTE Band 4 | Band Width : | 15MHz / 16QAM |
|--------|------------|--------------|---------------|

Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



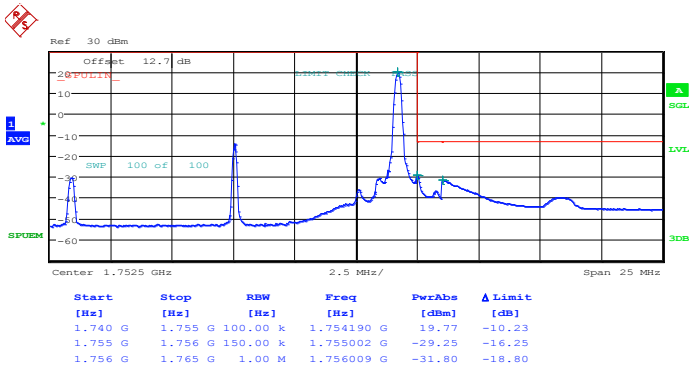
Date: 24.APR.2014 21:19:43

Lower Band Edge Plot for 16QAM-RB Size 75, RB Offset 0



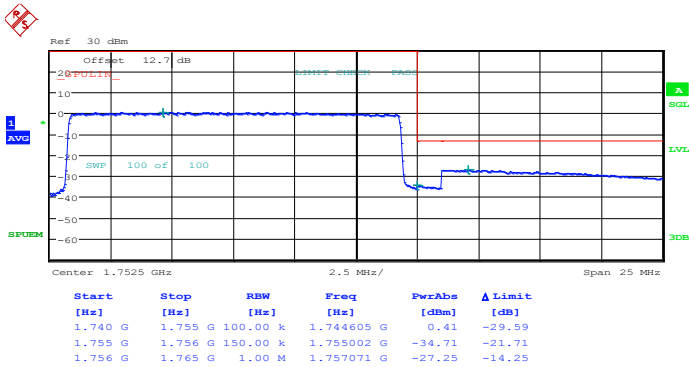
Date: 24.APR.2014 21:21:16

Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 74



Date: 24.APR.2014 21:29:01

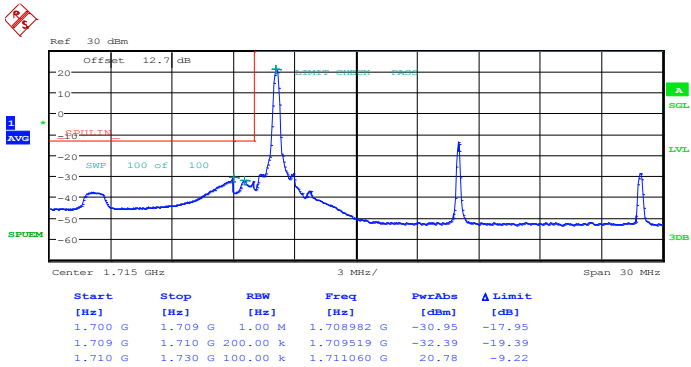
Higher Band Edge Plot for 16QAM-RB Size 75, RB Offset 0



Date: 24.APR.2014 21:30:34

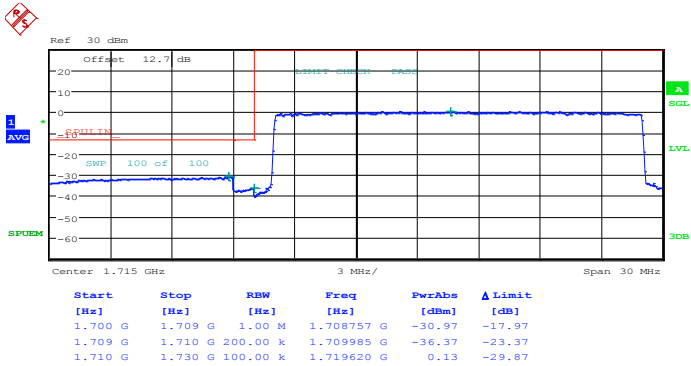
|        |            |              |              |
|--------|------------|--------------|--------------|
| Band : | LTE Band 4 | Band Width : | 20MHz / QPSK |
|--------|------------|--------------|--------------|

Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 24.APR.2014 21:34:27

Lower Band Edge Plot for QPSK-RB Size 100, RB Offset 0



Date: 24.APR.2014 21:36:00

Ref 30 dBm

Offset 12.7 dB

20 PULS

LIMIT CHN PASS

SWP 100 of 100

Center 1.75 GHz

Span 30 MHz

| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz]  | PwrAbs [dBm] | Δ Limit [dB] |
|------------|-----------|----------|------------|--------------|--------------|
| 1.735 G    | 1.755 G   | 100.00 k | 1.753960 G | 20.93        | -9.07        |
| 1.755 G    | 1.756 G   | 200.00 k | 1.7550;    |              |              |
| 1.756 G    | 1.765 G   | 1.00 M   | 1.7560;    |              |              |

Date: 24.APR.2014 21:43:44

Ref 30 dBm

Offset 12.7 dB

LIMIT -0.14 dBm

LIMIT -29.86 dBm

SWP 100 of 100

Center 1.75 GHz

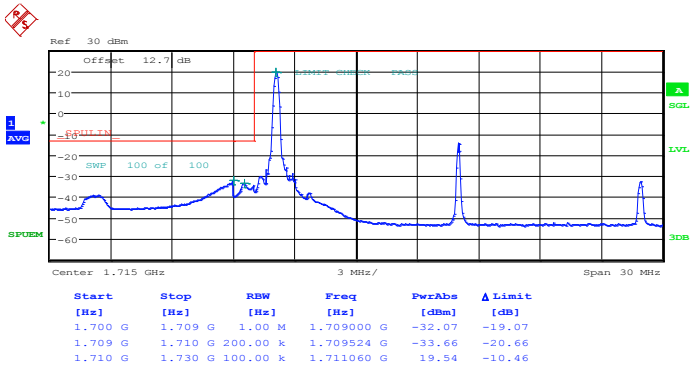
Span 30 MHz

| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz]  | PwrAbs [dBm] | Δ Limit [dB] |
|------------|-----------|----------|------------|--------------|--------------|
| 1.735 G    | 1.755 G   | 100.00 k | 1.746460 G | 0.14         | -29.86       |
| 1.755 G    | 1.756 G   | 200.00 k | 1.75500    |              |              |
| 1.756 G    | 1.765 G   | 1.00 M   | 1.75600    |              |              |

Date: 24.APR.2014 21:45:17

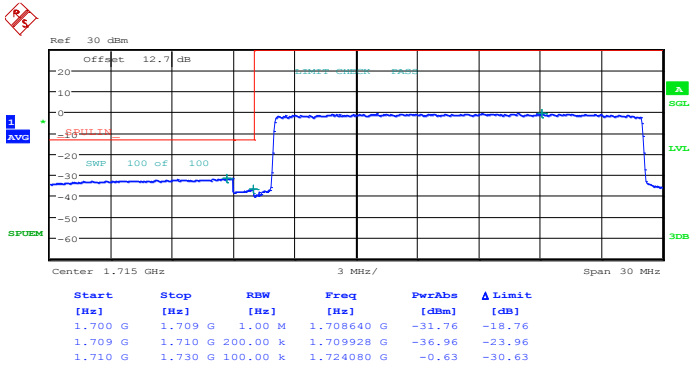
|        |            |              |               |
|--------|------------|--------------|---------------|
| Band : | LTE Band 4 | Band Width : | 20MHz / 16QAM |
|--------|------------|--------------|---------------|

Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



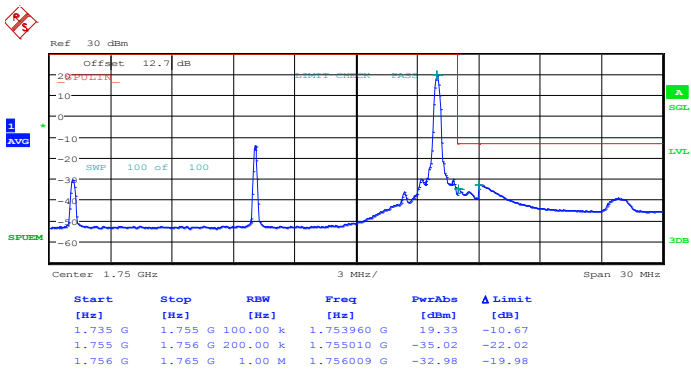
Date: 24.APR.2014 21:35:13

Lower Band Edge Plot for 16QAM-RB Size 100, RB Offset 0



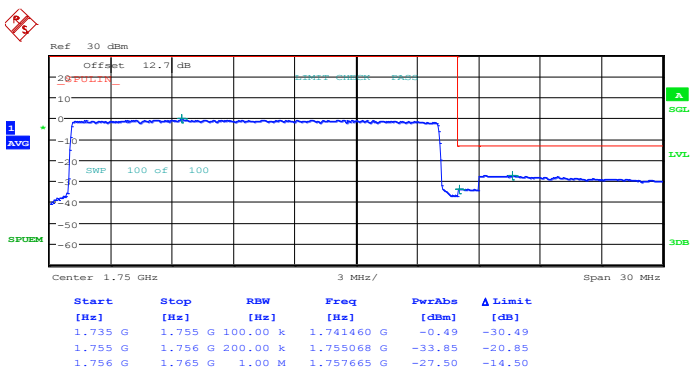
Date: 24.APR.2014 21:36:46

Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 99



Date: 24.APR.2014 21:44:31

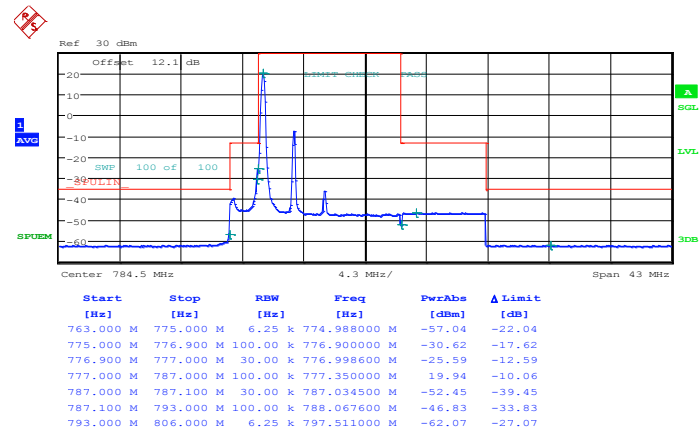
Higher Band Edge Plot for 16QAM-RB Size 100, RB Offset 0



Date: 24.APR.2014 21:46:04

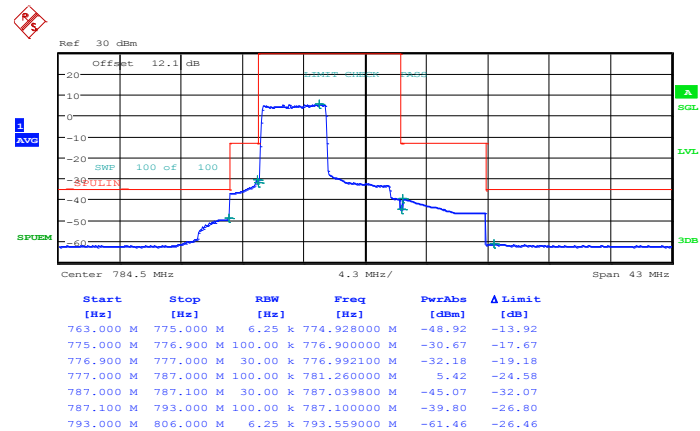
|        |             |              |             |
|--------|-------------|--------------|-------------|
| Band : | LTE Band 13 | Band Width : | 5MHz / QPSK |
|--------|-------------|--------------|-------------|

### Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



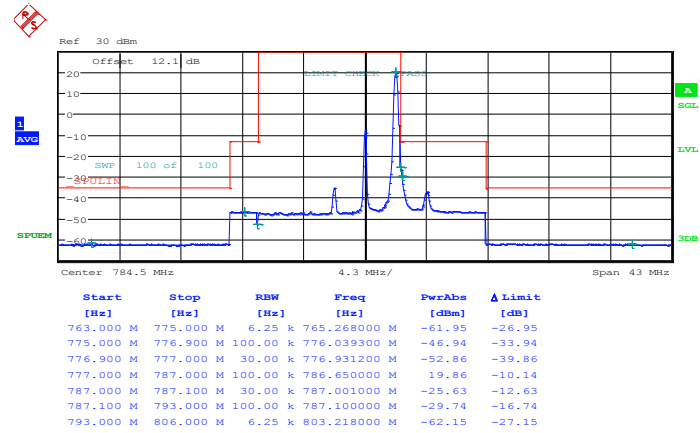
Date: 26.APR.2014 18:09:06

### Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0



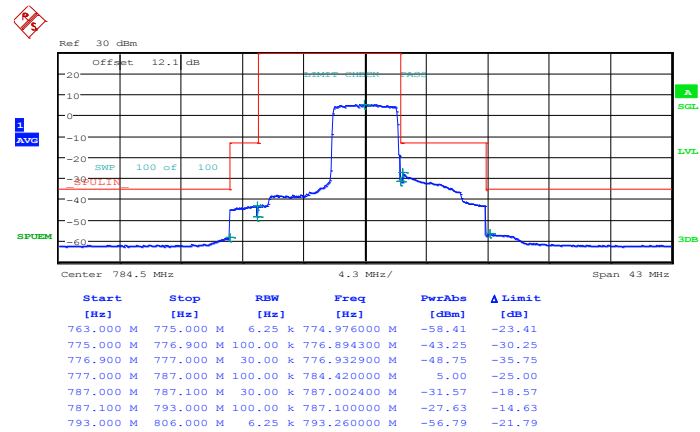
Date: 26.APR.2014 18:11:27

## Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24



Date: 26.APR.2014 18:24:04

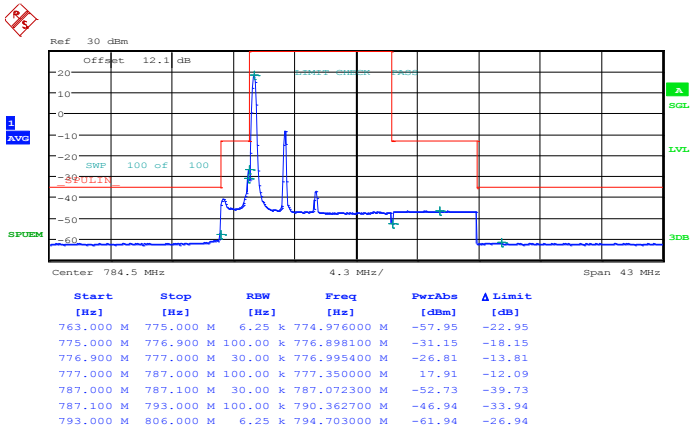
## Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0



Date: 26.APR.2014 18:19:57

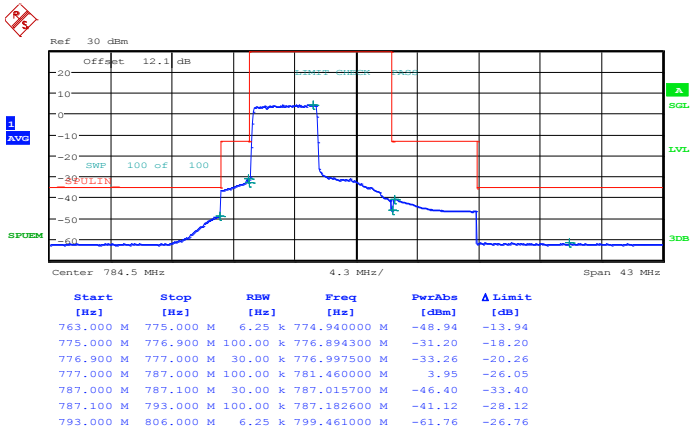
|        |             |              |              |
|--------|-------------|--------------|--------------|
| Band : | LTE Band 13 | Band Width : | 5MHz / 16QAM |
|--------|-------------|--------------|--------------|

Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



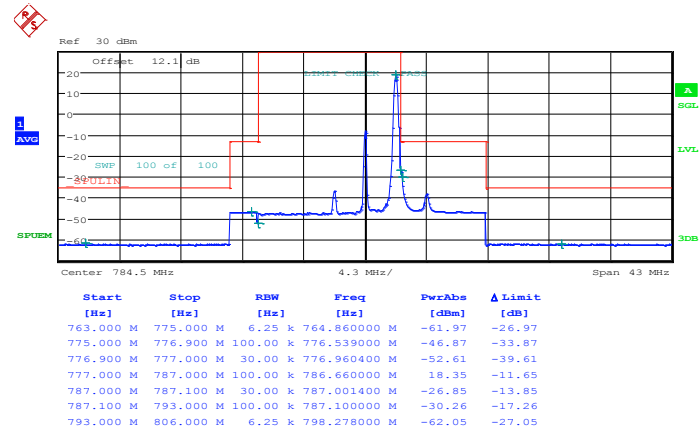
Date: 26.APR.2014 18:07:04

Lower Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



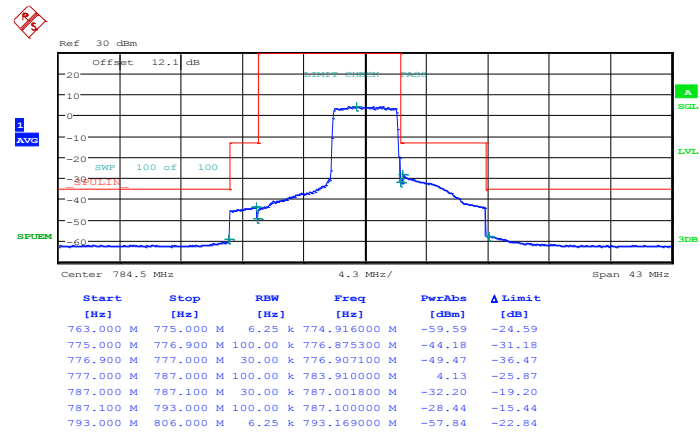
Date: 26.APR.2014 18:13:46

## Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 24



Date: 26.APR.2014 18:26:34

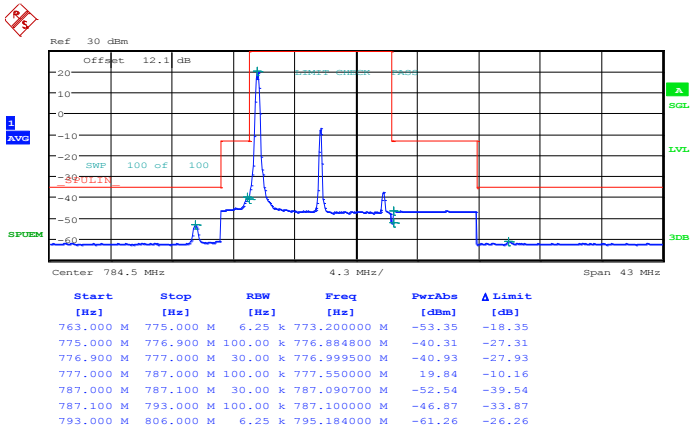
## Higher Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



Date: 26.APR.2014 18:16:10

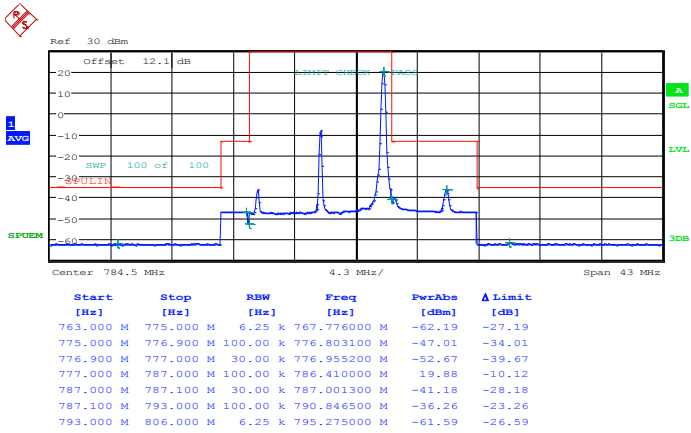
|        |             |              |              |
|--------|-------------|--------------|--------------|
| Band : | LTE Band 13 | Band Width : | 10MHz / QPSK |
|--------|-------------|--------------|--------------|

Middle Band Edge Plot for QPSK-RB Size 1, RB Offset 0



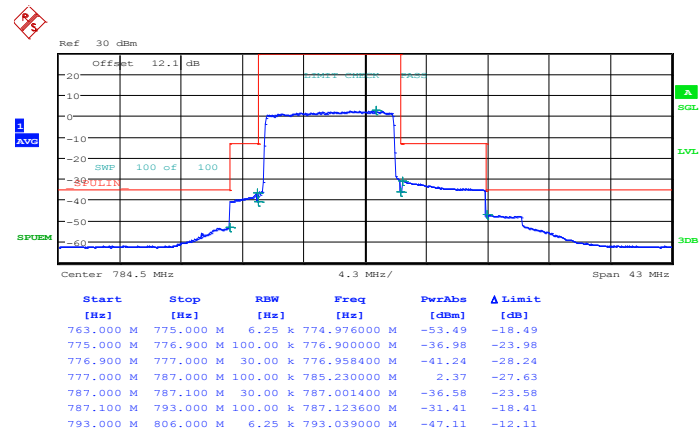
Date: 26.APR.2014 17:51:56

Middle Band Edge Plot for QPSK-RB Size 50, RB Offset 0



Date: 26.APR.2014 18:00:59

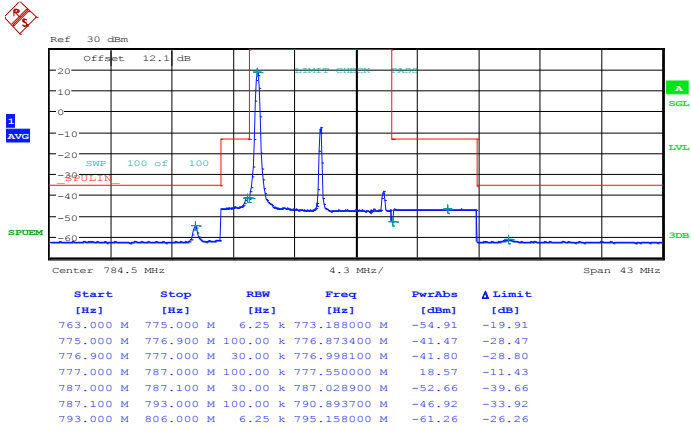
## Middle Band Edge Plot for QPSK-RB Size 1, RB Offset 49



Date: 26.APR.2014 17:54:03

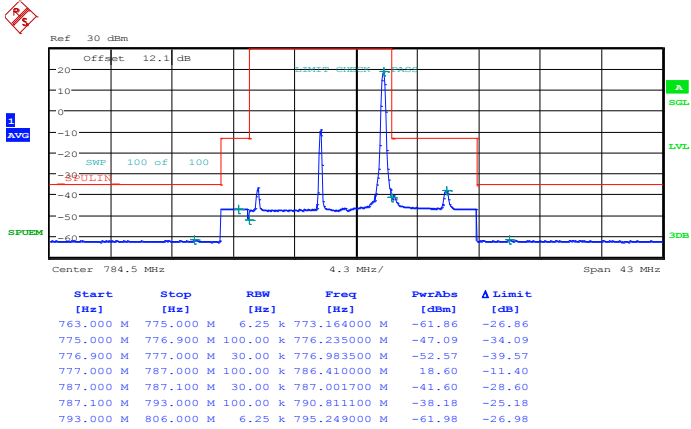
|        |             |              |               |
|--------|-------------|--------------|---------------|
| Band : | LTE Band 13 | Band Width : | 10MHz / 16QAM |
|--------|-------------|--------------|---------------|

Middle Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



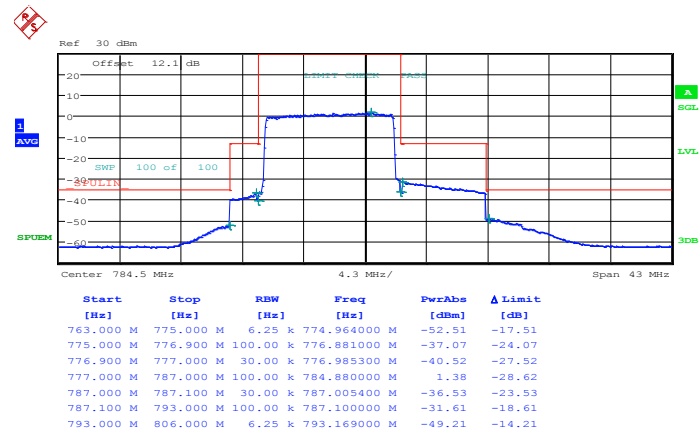
Date: 26.APR.2014 17:49:30

Middle Band Edge Plot for 16QAM-RB Size 50, RB Offset 0



Date: 26.APR.2014 17:58:59

## Middle Band Edge Plot for 16QAM-RB Size 1, RB Offset 49



Date: 26.APR.2014 17:56:26

## 3.5 Conducted Spurious Emission Measurement

### 3.5.1 Description of Conducted Spurious Emission Measurement

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

It is measured by means of a calibrated spectrum analyzer and scanned from 30MHz up to a frequency including its 10<sup>th</sup> harmonic.

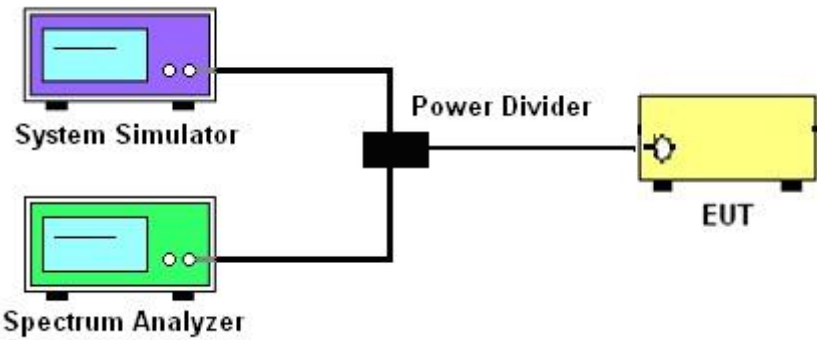
### 3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.5.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from  $43 + 10\log(P)$ dB below the transmitter power P(Watts)  
=  $P(W) - [43 + 10\log(P)]$  (dB)  
=  $[30 + 10\log(P)]$  (dBm) -  $[43 + 10\log(P)]$  (dB)  
= -13dBm.

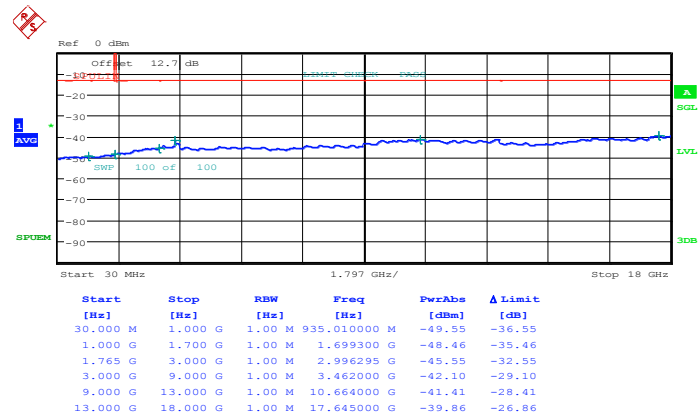
3.5.4 Test Setup



3.5.5 Test Result (Plots) of Conducted Spurious Emission

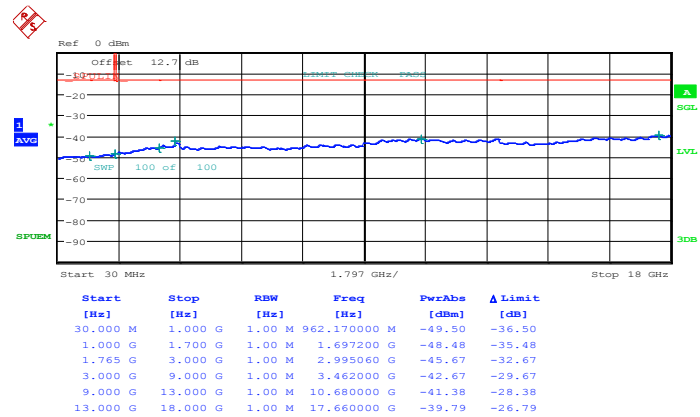
|              |            |           |                  |
|--------------|------------|-----------|------------------|
| Band :       | LTE Band 4 | Channel : | CH20175 (Middle) |
| Band Width : | 1.4MHz     |           |                  |

QPSK (RB Size 1, RB Offset 0)



Date: 24.APR.2014 20:23:22

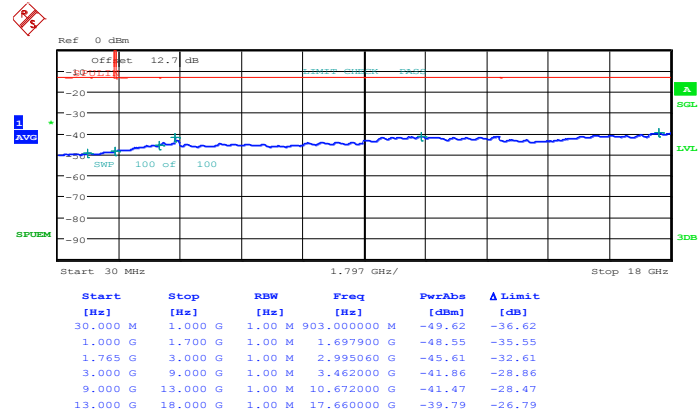
16QAM (RB Size 1, RB Offset 0)



Date: 24.APR.2014 20:24:21

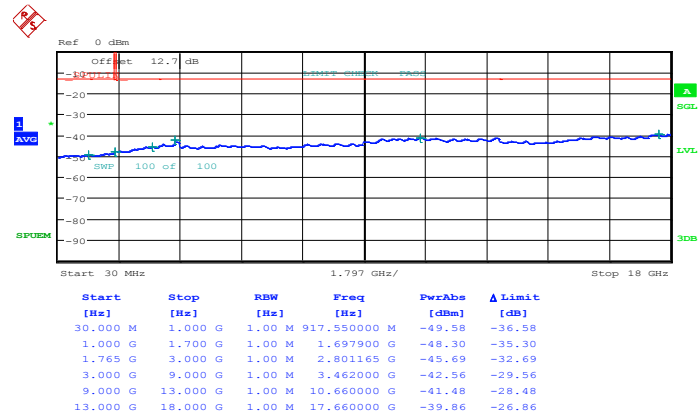
|              |            |           |                  |
|--------------|------------|-----------|------------------|
| Band :       | LTE Band 4 | Channel : | CH20175 (Middle) |
| Band Width : | 3MHz       |           |                  |

QPSK (RB Size 1, RB Offset 0)



Date: 24.APR.2014 20:38:53

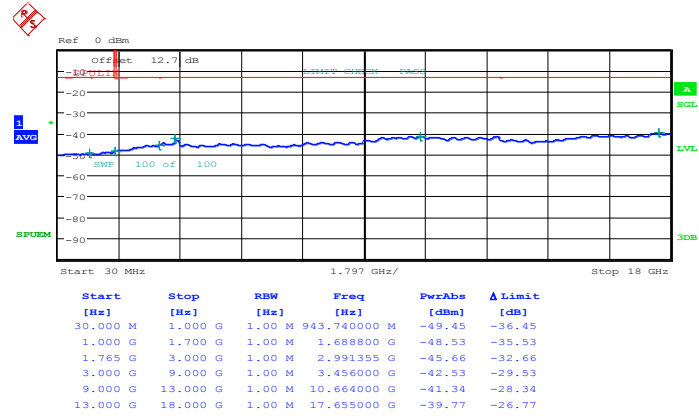
16QAM (RB Size 1, RB Offset 0)



Date: 24.APR.2014 20:39:53

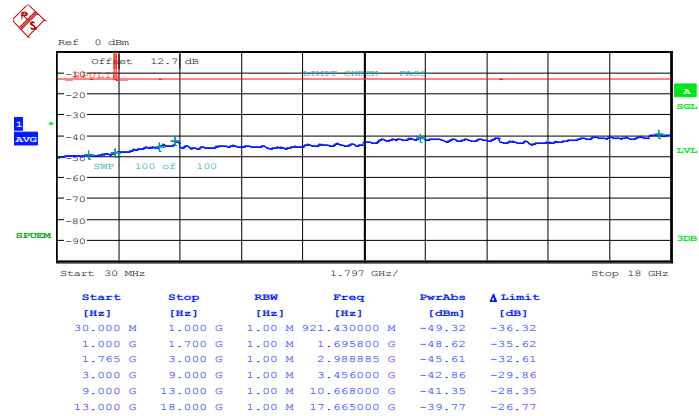
|              |            |           |                  |
|--------------|------------|-----------|------------------|
| Band :       | LTE Band 4 | Channel : | CH20175 (Middle) |
| Band Width : | 5MHz       |           |                  |

QPSK (RB Size 1, RB Offset 0)



Date: 24.APR.2014 20:54:24

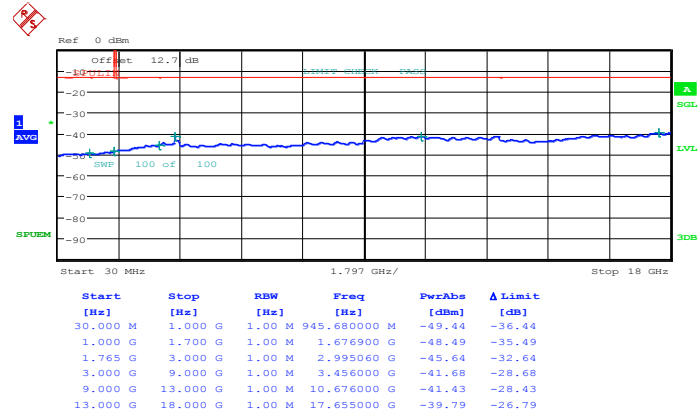
16QAM (RB Size 1, RB Offset 0)



Date: 24.APR.2014 20:55:24

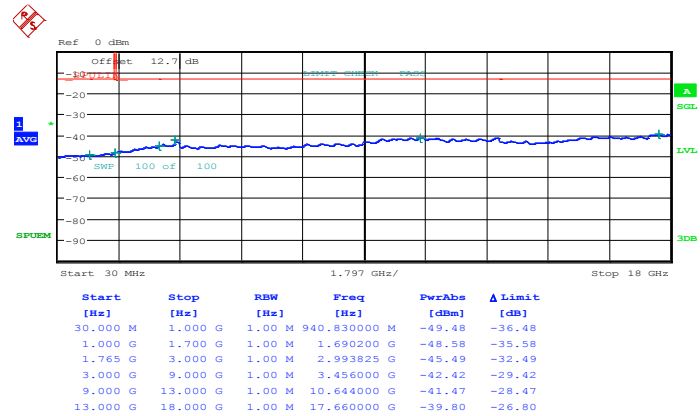
|              |            |           |                  |
|--------------|------------|-----------|------------------|
| Band :       | LTE Band 4 | Channel : | CH20175 (Middle) |
| Band Width : | 10MHz      |           |                  |

QPSK (RB Size 1, RB Offset 0)



Date: 24.APR.2014 21:09:53

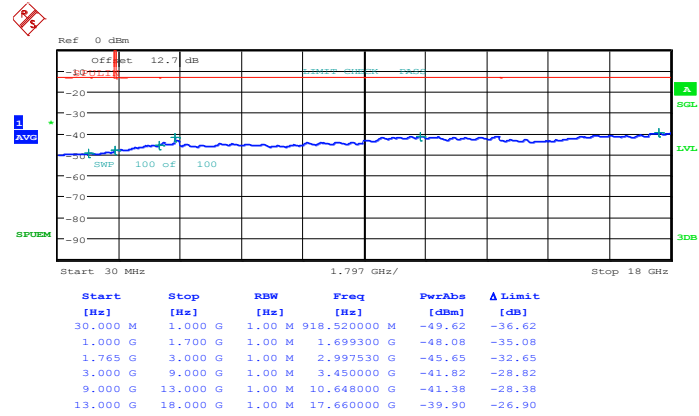
16QAM (RB Size 1, RB Offset 0)



Date: 24.APR.2014 21:10:53

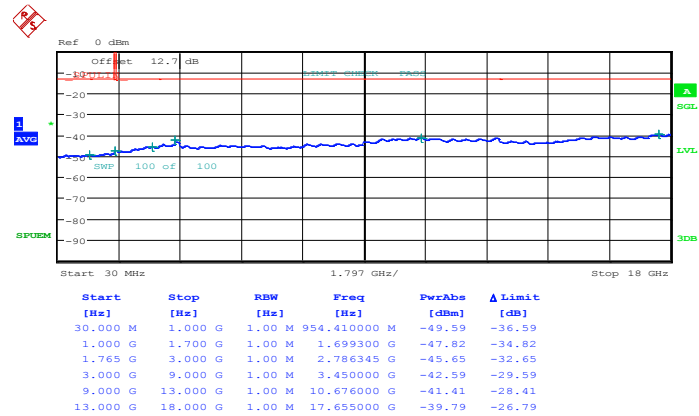
|              |            |           |                  |
|--------------|------------|-----------|------------------|
| Band :       | LTE Band 4 | Channel : | CH20175 (Middle) |
| Band Width : | 15MHz      |           |                  |

QPSK (RB Size 1, RB Offset 0)



Date: 24.APR.2014 21:25:22

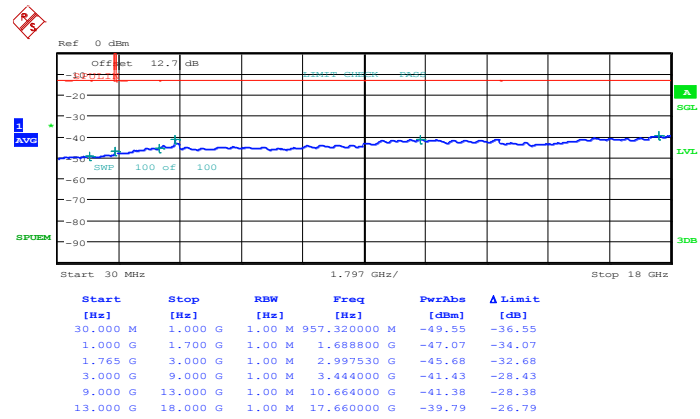
16QAM (RB Size 1, RB Offset 0)



Date: 24.APR.2014 21:26:22

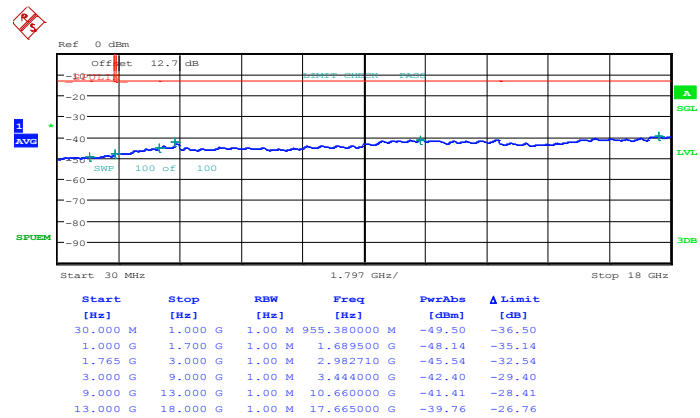
|              |            |           |                  |
|--------------|------------|-----------|------------------|
| Band :       | LTE Band 4 | Channel : | CH20175 (Middle) |
| Band Width : | 20MHz      |           |                  |

QPSK (RB Size 1, RB Offset 0)



Date: 24.APR.2014 21:40:51

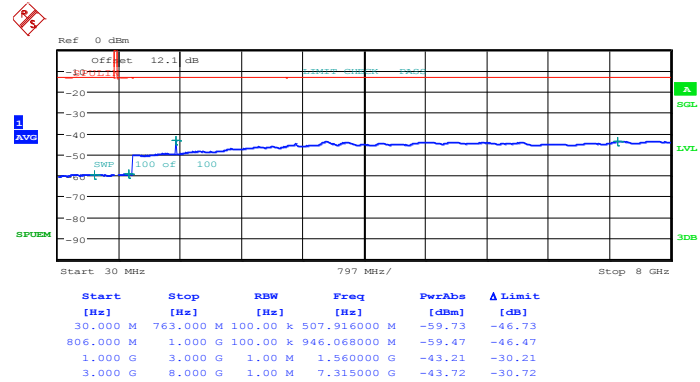
16QAM (RB Size 1, RB Offset 0)



Date: 24.APR.2014 21:41:51

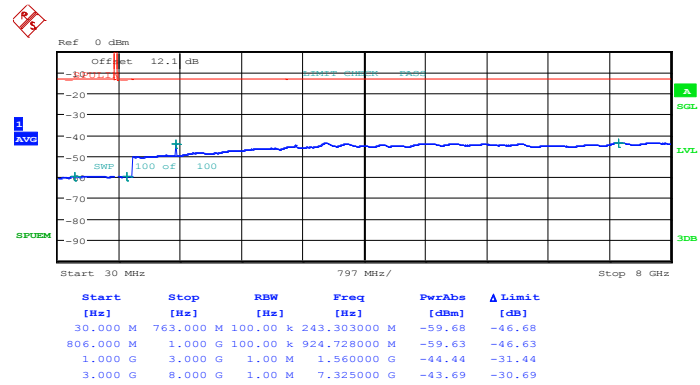
|              |             |           |                  |
|--------------|-------------|-----------|------------------|
| Band :       | LTE Band 13 | Channel : | CH23230 (Middle) |
| Band Width : | 5MHz        |           |                  |

QPSK (RB Size 1, RB Offset 0)



Date: 24.APR.2014 23:40:32

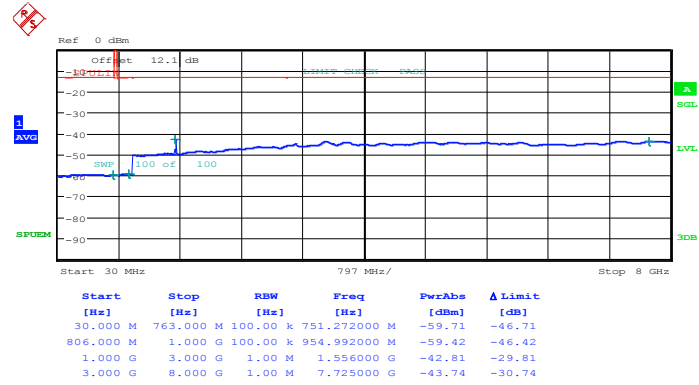
16QAM (RB Size 1, RB Offset 0)



Date: 24.APR.2014 23:41:22

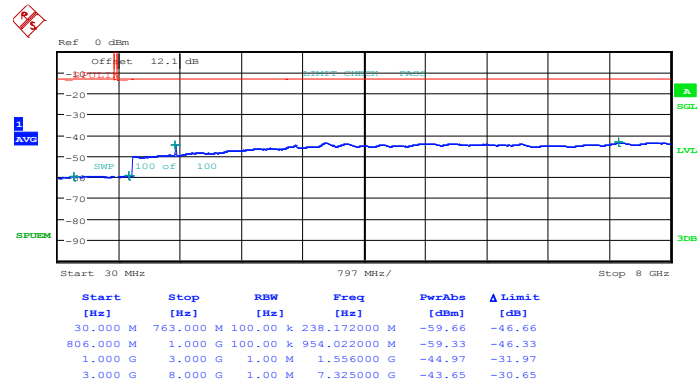
|              |             |           |                  |
|--------------|-------------|-----------|------------------|
| Band :       | LTE Band 13 | Channel : | CH23230 (Middle) |
| Band Width : | 10MHz       |           |                  |

QPSK (RB Size 1, RB Offset 0)



Date: 24.APR.2014 23:46:10

16QAM (RB Size 1, RB Offset 0)



Date: 24.APR.2014 23:47:10

## 3.6 Radiated Spurious Emission Measurement

### 3.6.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

For LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

### 3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.6.3 Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

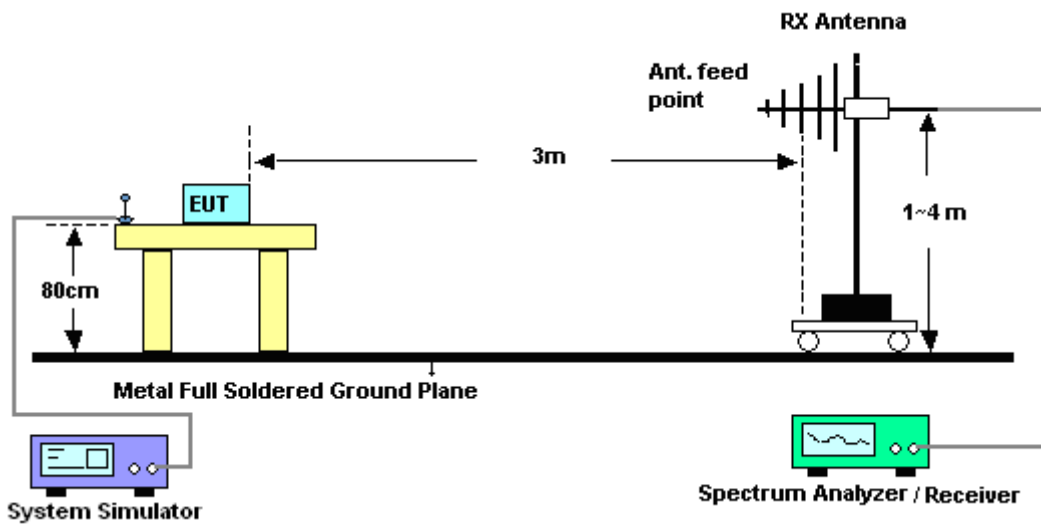
$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm}.$$

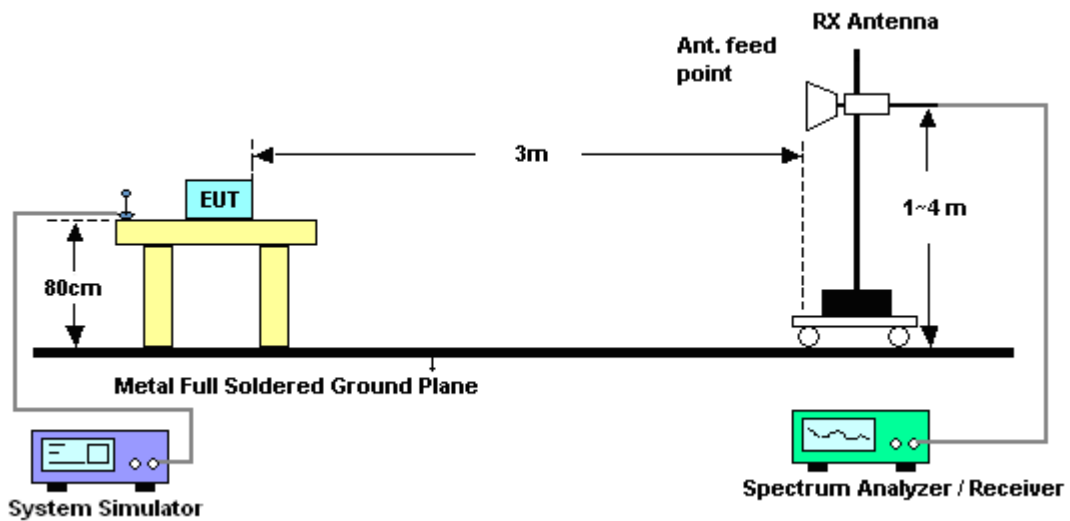
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (dBm) = EIRP - 2.15

### 3.6.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.6.5 Test Result of Field Strength of Spurious Radiated

|                 |                                                                                        |                     |            |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------------------|------------|---------|---------|----------|------------|--------------|--------|
| Band :          | LTE Band 4                                                                             | Temperature :       | 21~24°C    |         |         |          |            |              |        |
| Test Mode :     | 1.4MHz QPSK RB Size 1 Offset 0                                                         | Relative Humidity : | 44~48%     |         |         |          |            |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  | Polarization :      | Horizontal |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |                     |            |         |         |          |            |              |        |
| Frequency       | EIRP                                                                                   | Limit               | Over       | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
|                 |                                                                                        |                     | Limit      | Reading | Power   | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                                | ( dBm )             | ( dB )     | (dBm)   | ( dBm ) | ( dB )   | (dBi)      | (H/V)        |        |
| 3463            | -45.57                                                                                 | -13                 | -32.57     | -60.34  | -49.4   | 4.48     | 8.31       | H            | Pass   |
| 5195            | -47.86                                                                                 | -13                 | -34.86     | -67.18  | -52.5   | 5.332    | 9.98       | H            | Pass   |
| 6927            | -41.96                                                                                 | -13                 | -28.96     | -68.28  | -47.2   | 6.1      | 11.34      | H            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 4                                                                             |         |                 |                  | Temperature :       | 21~24°C        |               |              |        |
| Test Mode :     | 1.4MHz QPSK RB Size 1 Offset 0                                                         |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Vertical       |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | EIRP                                                                                   | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 3463            | -44.27                                                                                 | -13     | -31.27          | -60.17           | -48.1               | 4.48           | 8.31          | V            | Pass   |
| 5195            | -48.56                                                                                 | -13     | -35.56          | -68.05           | -53.2               | 5.332          | 9.98          | V            | Pass   |
| 6927            | -42.96                                                                                 | -13     | -29.96          | -68.63           | -48.2               | 6.1            | 11.34         | V            | Pass   |

|                 |                                                                                        |         |        |         |                     |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|--------|---------|---------------------|----------|------------|--------------|--------|
| Band :          | LTE Band 4                                                                             |         |        |         | Temperature :       |          | 21~24°C    |              |        |
| Test Mode :     | 3MHz QPSK RB Size 1 Offset 0                                                           |         |        |         | Relative Humidity : |          | 44~48%     |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |        |         | Polarization :      |          | Horizontal |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |        |         |                     |          |            |              |        |
| Frequency       | EIRP                                                                                   | Limit   | Over   | SPA     | S.G.                | TX Cable | TX Antenna | Polarization | Result |
|                 |                                                                                        |         | Limit  | Reading | Power               | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | ( dB ) | (dBm)   | ( dBm )             | ( dB )   | (dBi)      | (H/V)        |        |
| 3462            | -44.47                                                                                 | -13     | -31.47 | -59.29  | -48.3               | 4.48     | 8.31       | H            | Pass   |
| 5193            | -49.46                                                                                 | -13     | -36.46 | -68.55  | -54.1               | 5.332    | 9.98       | H            | Pass   |
| 6924            | -41.86                                                                                 | -13     | -28.86 | -68.25  | -47.1               | 6.1      | 11.34      | H            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 4                                                                             |         |                 |                  | Temperature :       | 21~24°C        |               |              |        |
| Test Mode :     | 3MHz QPSK RB Size 1 Offset 0                                                           |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Vertical       |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | EIRP                                                                                   | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 3462            | -47.27                                                                                 | -13     | -34.27          | -63.13           | -51.1               | 4.48           | 8.31          | V            | Pass   |
| 5193            | -51.06                                                                                 | -13     | -38.06          | -69.48           | -55.7               | 5.332          | 9.98          | V            | Pass   |
| 6924            | -43.96                                                                                 | -13     | -30.96          | -69.14           | -49.2               | 6.1            | 11.34         | V            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 4                                                                             |         |                 |                  | Temperature :       | 21~24°C        |               |              |        |
| Test Mode :     | 5MHz QPSK RB Size 1 Offset 0                                                           |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Horizontal     |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | EIRP                                                                                   | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 3460            | -45.47                                                                                 | -13     | -32.47          | -60.35           | -49.3               | 4.48           | 8.31          | H            | Pass   |
| 5190            | -49.86                                                                                 | -13     | -36.86          | -68.58           | -54.5               | 5.332          | 9.98          | H            | Pass   |
| 6920            | -43.66                                                                                 | -13     | -30.66          | -69.08           | -48.9               | 6.1            | 11.34         | H            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 4                                                                             |         |                 |                  | Temperature :       | 21~24℃         |               |              |        |
| Test Mode :     | 5MHz QPSK RB Size 1 Offset 0                                                           |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Vertical       |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | EIRP                                                                                   | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 3460            | -48.67                                                                                 | -13     | -35.67          | -64.12           | -52.5               | 4.48           | 8.31          | V            | Pass   |
| 5190            | -48.86                                                                                 | -13     | -35.86          | -68.28           | -53.5               | 5.332          | 9.98          | V            | Pass   |
| 6920            | -43.26                                                                                 | -13     | -30.26          | -67.9            | -48.5               | 6.1            | 11.34         | V            | Pass   |

|                 |                                                                                        |         |        |         |                     |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|--------|---------|---------------------|----------|------------|--------------|--------|
| Band :          | LTE Band 4                                                                             |         |        |         | Temperature :       |          | 21~24°C    |              |        |
| Test Mode :     | 10MHz QPSK RB Size 1 Offset 0                                                          |         |        |         | Relative Humidity : |          | 44~48%     |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |        |         | Polarization :      |          | Horizontal |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |        |         |                     |          |            |              |        |
| Frequency       | EIRP                                                                                   | Limit   | Over   | SPA     | S.G.                | TX Cable | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit  | Reading | Power               | loss     | Gain       | (H/V)        |        |
| ( dB )          |                                                                                        |         | ( dB ) | (dBm)   | ( dBm )             | ( dB )   | (dBi)      |              |        |
| 3455            | -48.07                                                                                 | -13     | -35.07 | -62.38  | -51.9               | 4.48     | 8.31       | H            | Pass   |
| 5183            | -49.96                                                                                 | -13     | -36.96 | -68.71  | -54.6               | 5.332    | 9.98       | H            | Pass   |
| 6910            | -42.86                                                                                 | -13     | -29.86 | -68.32  | -48.1               | 6.1      | 11.34      | H            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 4                                                                             |         |                 |                  | Temperature :       | 21~24°C        |               |              |        |
| Test Mode :     | 10MHz QPSK RB Size 1 Offset 0                                                          |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Vertical       |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | EIRP                                                                                   | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 3455            | -48.37                                                                                 | -13     | -35.37          | -64.2            | -52.2               | 4.48           | 8.31          | V            | Pass   |
| 5183            | -50.46                                                                                 | -13     | -37.46          | -69.14           | -55.1               | 5.332          | 9.98          | V            | Pass   |
| 6910            | -43.86                                                                                 | -13     | -30.86          | -68.76           | -49.1               | 6.1            | 11.34         | V            | Pass   |

|                 |                                                                                        |                     |            |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------------------|------------|---------|---------|----------|------------|--------------|--------|
| Band :          | LTE Band 4                                                                             | Temperature :       | 21~24°C    |         |         |          |            |              |        |
| Test Mode :     | 15MHz QPSK RB Size 1 Offset 0                                                          | Relative Humidity : | 44~48%     |         |         |          |            |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  | Polarization :      | Horizontal |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |                     |            |         |         |          |            |              |        |
| Frequency       | EIRP                                                                                   | Limit               | Over       | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
|                 |                                                                                        |                     | Limit      | Reading | Power   | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                                | ( dBm )             | ( dB )     | (dBm)   | ( dBm ) | ( dB )   | (dBi)      | (H/V)        |        |
| 3450            | -47.37                                                                                 | -13                 | -34.37     | -62.17  | -51.2   | 4.48     | 8.31       | H            | Pass   |
| 5175            | -50.16                                                                                 | -13                 | -37.16     | -68.9   | -54.8   | 5.332    | 9.98       | H            | Pass   |
| 6900            | -42.96                                                                                 | -13                 | -29.96     | -68.72  | -48.2   | 6.1      | 11.34      | H            | Pass   |

|                 |                                                                                        |                     |          |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------------------|----------|---------|---------|----------|------------|--------------|--------|
| Band :          | LTE Band 4                                                                             | Temperature :       | 21~24°C  |         |         |          |            |              |        |
| Test Mode :     | 15MHz QPSK RB Size 1 Offset 0                                                          | Relative Humidity : | 44~48%   |         |         |          |            |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  | Polarization :      | Vertical |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |                     |          |         |         |          |            |              |        |
| Frequency       | EIRP                                                                                   | Limit               | Over     | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm )             | Limit    | Reading | Power   | loss     | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                                | ( dBm )             | ( dB )   | (dBm)   | ( dBm ) | ( dB )   | (dBi)      | (H/V)        |        |
| 3450            | -46.27                                                                                 | -13                 | -33.27   | -65.84  | -50.1   | 4.48     | 8.31       | V            | Pass   |
| 5175            | -49.46                                                                                 | -13                 | -36.46   | -68.17  | -54.1   | 5.332    | 9.98       | V            | Pass   |
| 6900            | -44.36                                                                                 | -13                 | -31.36   | -69.16  | -49.6   | 6.1      | 11.34      | V            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 4                                                                             |         |                 |                  | Temperature :       | 21~24°C        |               |              |        |
| Test Mode :     | 20MHz QPSK RB Size 1 Offset 0                                                          |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Horizontal     |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | EIRP                                                                                   | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 3445            | -46.47                                                                                 | -13     | -33.47          | -61.23           | -50.3               | 4.48           | 8.31          | H            | Pass   |
| 5168            | -49.56                                                                                 | -13     | -36.56          | -68.55           | -54.2               | 5.332          | 9.98          | H            | Pass   |
| 6890            | -42.56                                                                                 | -13     | -29.56          | -68.2            | -47.8               | 6.1            | 11.34         | H            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 4                                                                             |         |                 |                  | Temperature :       | 21~24℃         |               |              |        |
| Test Mode :     | 20MHz QPSK RB Size 1 Offset 0                                                          |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Vertical       |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | EIRP                                                                                   | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 3445            | -49.37                                                                                 | -13     | -36.37          | -65.35           | -53.2               | 4.48           | 8.31          | V            | Pass   |
| 5168            | -50.16                                                                                 | -13     | -37.16          | -68.91           | -54.8               | 5.332          | 9.98          | V            | Pass   |
| 6890            | -43.26                                                                                 | -13     | -30.26          | -68.8            | -48.5               | 6.1            | 11.34         | V            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 13                                                                            |         |                 |                  | Temperature :       | 21~24°C        |               |              |        |
| Test Mode :     | 5MHz QPSK RB Size 1 Offset 0                                                           |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Horizontal     |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | ERP                                                                                    | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 1558            | -52.02                                                                                 | -13     | -39.02          | -58.29           | -53.85              | 1.51           | 5.49          | H            | Pass   |
| 1559            | -55.06                                                                                 | -42.15  | -12.91          | -60.29           | -56.9               | 1.51           | 5.50          | H            | Pass   |
| 2341            | -55.77                                                                                 | -13     | -42.77          | -66.06           | -57.69              | 1.98           | 6.05          | H            | Pass   |
| 3119            | -55.61                                                                                 | -13     | -42.61          | -67.12           | -58.63              | 2.39           | 7.56          | H            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 13                                                                            |         |                 |                  | Temperature :       | 21~24°C        |               |              |        |
| Test Mode :     | 5MHz QPSK RB Size 1 Offset 0                                                           |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Vertical       |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | ERP                                                                                    | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 1558            | -53.72                                                                                 | -13     | -40.72          | -62.11           | -55.55              | 1.51           | 5.49          | V            | Pass   |
| 1559            | -55.68                                                                                 | -42.15  | -13.53          | -63.11           | -57.52              | 1.51           | 5.50          | V            | Pass   |
| 2341            | -54.57                                                                                 | -13     | -41.57          | -65.88           | -56.49              | 1.98           | 6.05          | V            | Pass   |
| 3118            | -53.84                                                                                 | -13     | -40.84          | -67.28           | -56.86              | 2.39           | 7.56          | V            | Pass   |

|                 |                                                                                        |         |                 |                  |                  |                     |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|------------------|---------------------|---------------|--------------|--------|
| Band :          | LTE Band 13                                                                            |         |                 |                  |                  | Temperature :       | 21~24°C       |              |        |
| Test Mode :     | 10MHz QPSK RB Size 1 Offset 0                                                          |         |                 |                  |                  | Relative Humidity : | 44~48%        |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  |                  | Polarization :      | Horizontal    |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                  |                     |               |              |        |
| Frequency       | ERP                                                                                    | Limit   | Over            | SPA              | S.G.             | TX Cable            | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm ) | loss<br>( dB )      | Gain<br>(dBi) | (H/V)        |        |
| 1555            | -51.03                                                                                 | -13     | -38.03          | -59.96           | -52.86           | 1.51                | 5.49          | H            | Pass   |
| 1594            | -58.25                                                                                 | -42.15  | -16.10          | -65.81           | -60.05           | 1.63                | 5.58          | H            | Pass   |
| 2332            | -53.75                                                                                 | -13     | -40.75          | -67.04           | -55.67           | 1.98                | 6.05          | H            | Pass   |
| 3110.72         | -53.32                                                                                 | -13     | -40.32          | -67.81           | -56.34           | 2.39                | 7.56          | H            | Pass   |

|                 |                                                                                        |         |                 |                  |                     |                |               |              |        |
|-----------------|----------------------------------------------------------------------------------------|---------|-----------------|------------------|---------------------|----------------|---------------|--------------|--------|
| Band :          | LTE Band 13                                                                            |         |                 |                  | Temperature :       | 21~24°C        |               |              |        |
| Test Mode :     | 10MHz QPSK RB Size 1 Offset 0                                                          |         |                 |                  | Relative Humidity : | 44~48%         |               |              |        |
| Test Engineer : | Stan Hsieh and Ken Wu                                                                  |         |                 |                  | Polarization :      | Vertical       |               |              |        |
| Remark :        | Spurious emissions within 30-10th harmonic were found more than 20dB below limit line. |         |                 |                  |                     |                |               |              |        |
| Frequency       | ERP                                                                                    | Limit   | Over            | SPA              | S.G.                | TX Cable       | TX Antenna    | Polarization | Result |
| ( MHz )         | ( dBm )                                                                                | ( dBm ) | Limit<br>( dB ) | Reading<br>(dBm) | Power<br>( dBm )    | loss<br>( dB ) | Gain<br>(dBi) | (H/V)        |        |
| 1555            | -52.49                                                                                 | -13     | -39.49          | -63.73           | -54.32              | 1.51           | 5.49          | V            | Pass   |
| 1579            | -55.68                                                                                 | -42.15  | -13.53          | -65.39           | -57.46              | 1.6            | 5.53          | V            | Pass   |
| 2333.04         | -52.07                                                                                 | -13     | -39.07          | -67.08           | -53.99              | 1.98           | 6.05          | V            | Pass   |
| 3110.72         | -49.42                                                                                 | -13     | -36.42          | -67.23           | -52.44              | 2.39           | 7.56          | V            | Pass   |

## 3.7 Frequency Stability Measurement

### 3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency.

### 3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

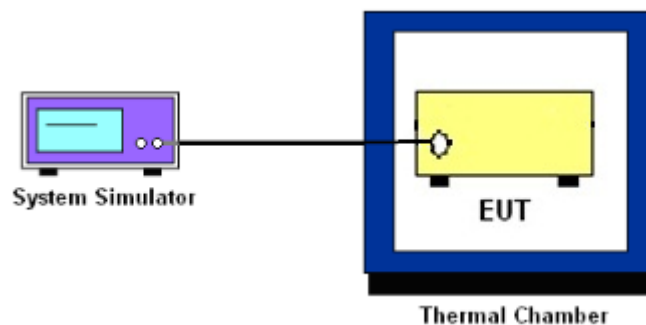
### 3.7.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to  $-30^{\circ}\text{C}$  and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  step up to  $50^{\circ}\text{C}$ . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

### 3.7.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at  $25\pm 5^{\circ}\text{C}$  and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

### 3.7.5 Test Setup



### 3.7.6 Test Result of Temperature Variation (FCC)

| Band :           | LTE Band 4 (QPSK) | Limit (ppm) : | 2.5 |
|------------------|-------------------|---------------|-----|
| Temperature (°C) | BW 10MHz          | Result        |     |
|                  | Deviation (ppm)   |               |     |
| 50               | 0.0086            | PASS          |     |
| 40               | 0.0099            |               |     |
| 30               | 0.0110            |               |     |
| 20(Ref.)         | 0.0000            |               |     |
| 10               | 0.0041            |               |     |
| 0                | 0.0012            |               |     |
| -10              | N/A – note        |               |     |
| -20              | N/A – note        |               |     |
| -30              | N/A – note        |               |     |

|                  |                    |               |     |
|------------------|--------------------|---------------|-----|
| Band :           | LTE Band 13 (QPSK) | Limit (ppm) : | 2.5 |
| Temperature (°C) | BW 10MHz           | Result        |     |
|                  | Deviation (ppm)    |               |     |
| 50               | 0.0013             | PASS          |     |
| 40               | 0.0044             |               |     |
| 30               | 0.0102             |               |     |
| 20(Ref.)         | 0.0000             |               |     |
| 10               | 0.0032             |               |     |
| 0                | 0.0084             |               |     |
| -10              | N/A – note         |               |     |
| -20              | N/A – note         |               |     |
| -30              | N/A – note         |               |     |

**Note:** Device does not turn on, no transmission of signal.

### 3.7.7 Test Result of Voltage Variation (FCC)

| Band        | Bandwidth | Voltage (Volt) | Deviation (ppm) | Limit (ppm) | Result |
|-------------|-----------|----------------|-----------------|-------------|--------|
| LTE Band 4  | 10M       | 4.2            | 0.0012          | 2.5         | PASS   |
|             |           | Normal         | 0.0085          |             |        |
|             |           | 3.4            | 0.0118          |             |        |
| LTE Band 13 | 10M       | 4.2            | 0.0044          | 2.5         | PASS   |
|             |           | Normal         | 0.0047          |             |        |
|             |           | 3.4            | 0.0027          |             |        |

**Remark:**

1. Normal Voltage = 3.7V.
2. The manufacturer declared that the EUT could work properly between voltage 3.4V ~ 4.2V.

## 4 List of Measuring Equipment

| Instrument                | Manufacturer    | Model No.     | Serial No.   | Characteristics  | Calibration Date | Test Date                     | Due Date      | Remark                |
|---------------------------|-----------------|---------------|--------------|------------------|------------------|-------------------------------|---------------|-----------------------|
| LTE Base Station          | Anritsu         | MT8820C       | 6201026480   | 30MHz~2.7GHz     | Jan. 07, 2014    | Apr. 24, 2014 ~ Apr. 26, 2014 | Jan. 06, 2015 | Conducted (TH02-HY)   |
| Spectrum Analyzer         | Rohde & Schwarz | FSP40         | 100055       | 9kHz~40GHz       | Jun. 07, 2013    | Apr. 24, 2014 ~ Apr. 26, 2014 | Jun. 06, 2014 | Conducted (TH02-HY)   |
| Thermal Chamber           | Ten Billion     | TTH-D3SP      | TBN-930701   | N/A              | Jul. 19, 2013    | Apr. 24, 2014 ~ Apr. 26, 2014 | Jul. 18, 2014 | Conducted (TH02-HY)   |
| Spectrum Analyzer         | Rohde & Schwarz | FSV30         | 101749       | 10Hz ~ 30GHz     | Feb. 10, 2014    | Apr. 14, 2014 ~ Apr. 17, 2014 | Feb. 09, 2015 | Radiation (03CH07-HY) |
| Bilog Antenna             | Schaffner       | CBL6111C      | 2726         | 30MHz ~ 1GHz     | Oct. 10, 2013    | Apr. 14, 2014 ~ Apr. 17, 2014 | Oct. 09, 2014 | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna | ESCO            | 3117          | 75962        | 1GHz~18GHz       | Aug. 22, 2013    | Apr. 14, 2014 ~ Apr. 17, 2014 | Aug. 21, 2014 | Radiation (03CH07-HY) |
| Preamplifier              | COM-POWER       | PA-103A       | 161241       | 10 MHz ~ 1000MHz | Mar. 17, 2014    | Apr. 14, 2014 ~ Apr. 17, 2014 | Mar. 16, 2015 | Radiation (03CH07-HY) |
| Preamplifier              | Agilent         | 8449B         | 3008A02362   | 1 GHz~26.5 GHz   | Nov. 29, 2013    | Apr. 14, 2014 ~ Apr. 17, 2014 | Nov. 28, 2014 | Radiation (03CH07-HY) |
| Turn Table                | ChainTek        | ChainTek 3000 | N/A          | 0 ~ 360 degree   | N/A              | Apr. 14, 2014 ~ Apr. 17, 2014 | N/A           | Radiation (03CH07-HY) |
| Antenna Mast              | ChainTek        | M-400-0       | 114/8000604  | N/A              | N/A              | Apr. 14, 2014 ~ Apr. 17, 2014 | N/A           | Radiation (03CH07-HY) |
| SHF-EHF Horn Antenna      | SCHWARZBEC K    | BBHA 9170     | BBHA91702 51 | 15GHz- 40GHz     | Oct. 03, 2013    | Apr. 14, 2014 ~ Apr. 17, 2014 | Oct. 02, 2014 | Radiation (03CH07-HY) |

## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

|                                                                          |      |
|--------------------------------------------------------------------------|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 4.50 |
|--------------------------------------------------------------------------|------|