



# FCC RF Test Report

**APPLICANT** : ZTE CORPORATION  
**EQUIPMENT** : WCDMA/LTE Dual-Mode Digital Mobile Phone  
**BRAND NAME** : ZTE  
**MODEL NAME** : Vodafone Smart ultra 6, VF-995N, Vodafone Smart ultra  
**FCC ID** : SRQ-995N  
**STANDARD** : 47 CFR Part 2, 27(M)  
**CLASSIFICATION** : PCS Licensed Transmitter Held to Ear (PCE)

The testing was completed on Apr. 29, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



**SPORTON INTERNATIONAL (KUNSHAN) INC.**  
**No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. C.**



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**APPENDIX A. SETUP PHOTOGRAPHS**





## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	Reporting Only	PASS	-
3.2	N/A	Peak-to-Average Ratio	Reporting Only	PASS	-
3.3	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 7)	EIRP < 2Watt	PASS	-
3.4	§2.1049 §27.53(m)(6)	Occupied Bandwidth & 26dB Bandwidth	Reporting Only	PASS	-
3.5	§2.1051 §27.53(m)(4)	Conducted Band Edge Measurement (Band 7)	< 5MHz: -10 dBm 5 MHz~6MHz or 26dB(BW): -13 dBm ≥6MHz or 26dB(BW): -25 dBm	PASS	-
3.6	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 7)	< 55+10log <sub>10</sub> (P[Watts])	PASS	
3.7	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 7)	< 55+10log <sub>10</sub> (P[Watts])	PASS	Under limit 3.34 dB at 7580.000 MHz
3.8	§2.1055 §27.54	Frequency Stability Temperature & Voltage	within authorized band	PASS	



# 1 General Description

## 1.1 Applicant

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P. R. China

## 1.2 Manufacturer

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P. R. China

## 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	WCDMA/LTE Dual-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Vodafone Smart ultra 6, VF-995N, Vodafone Smart ultra
FCC ID	SRQ-995N
EUT supports Radios application	GSM/GPRS/EGPRS/NFC/LTE WLAN 2.4GHz 802.11b/g/n HT20 Bluetooth v3.0 + EDR/ Bluetooth v4.1 LE
HW Version	wreA
SW Version	P839V55V1.0.0B01
EUT Stage	Identical Prototype

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

## 1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz
Rx Frequency	LTE Band 7 : 2622.5MHz ~ 2687.5 MHz
Bandwidth	LTE Band 7 : 5MHz/ 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 7 : 23.41 dBm
Antenna Type	PIFA Antenna
Type of Modulation	QPSK / 16QAM



### 1.5 Modification of EUT

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

### 1.6 Maximum EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	BW	Emission Designator	Frequency Tolerance	Maximum EIRP
Part 27M	LTE Band 7	QPSK	5MHz	4M52G7D	-	0.1426 W
Part 27M	LTE Band 7	16QAM	5MHz	4M51W7D	-	0.1180 W
Part 27M	LTE Band 7	QPSK	10MHz	9M11G7D	0.0052 ppm	0.1327 W
Part 27M	LTE Band 7	16QAM	10MHz	9M05W7D	-	0.1153 W
Part 27M	LTE Band 7	QPSK	15MHz	13M5G7D	-	0.1346 W
Part 27M	LTE Band 7	16QAM	15MHz	13M5W7D	-	0.1180 W
Part 27M	LTE Band 7	QPSK	20MHz	18M4G7D	-	0.1419 W
Part 27M	LTE Band 7	16QAM	20MHz	18M5W7D	-	0.1276 W



### 1.7 Testing Location

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.		
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC Registration No.</b>
	TH01-KS	03CH02-KS	418269

<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, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC Registration No.</b>
	03CH10-HY		TW1022

**Note:** The test site complies with ANSI C63.4 2009 requirement.

### 1.8 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(M)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

**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

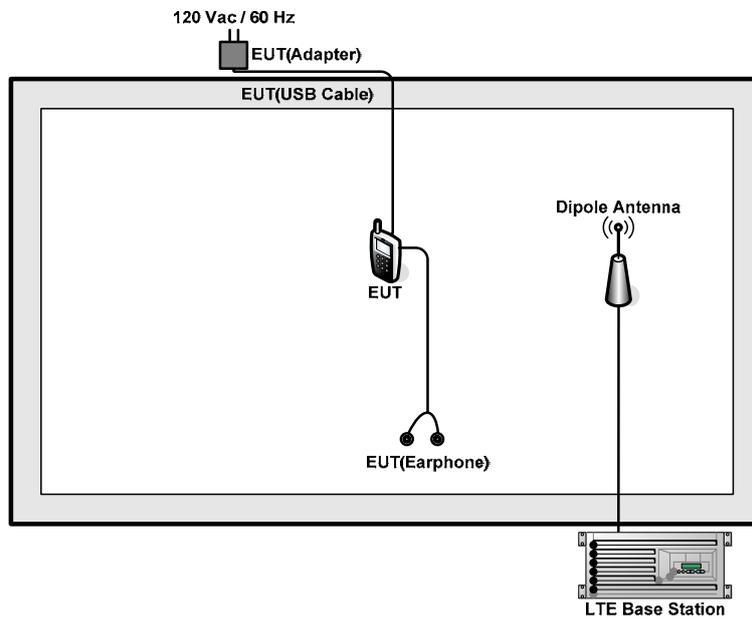
### 2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 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	7	-	-	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	7	-	-				v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	7	-	-	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	7	-	-	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	7	-	-	v	v	v	v	v	v	v			v	v	v
Frequency Stability	7	-	-		v			v				v		v	
E.I.R.P.	7	-	-	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	7	-	-	v	v	v	v	v		v				v	
Note	<ol style="list-style-type: none"> <li>The mark "v" 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.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GWINSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

## 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 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.

$Offset = RF\ cable\ loss.$

Following shows an offset computation example with cable loss 5.5 dB.

Example :

$Offset(dB) = RF\ cable\ loss(dB) = 5.5\ (dB)$

### **3 Test Result**

#### **3.1 Conducted Output Power Measurement**

##### **3.1.1 Description of the Conducted Output Power 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.

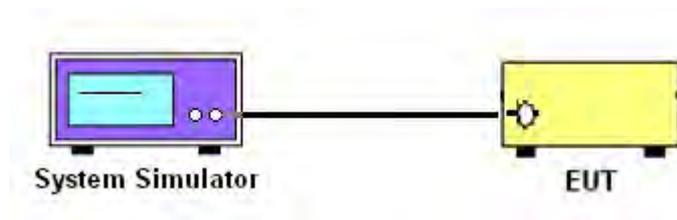
##### **3.1.2 Measuring Instruments**

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 7 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
<b>Channel</b>				<b>20850</b>	<b>21100</b>	<b>21350</b>
<b>Frequency (MHz)</b>				<b>2510</b>	<b>2535</b>	<b>2560</b>
20	QPSK	1	0	22.90	23.31	23.06
20	QPSK	1	49	22.87	23.32	23.09
20	QPSK	1	99	23.37	23.41	23.40
20	QPSK	50	0	21.68	22.09	22.10
20	QPSK	50	24	21.95	22.06	22.09
20	QPSK	50	49	21.96	22.13	22.11
20	QPSK	100	0	21.84	22.13	22.05
20	16QAM	1	0	22.39	22.36	22.48
20	16QAM	1	49	22.38	22.14	22.47
20	16QAM	1	99	22.07	22.48	22.15
20	16QAM	50	0	21.13	21.20	21.13
20	16QAM	50	24	21.00	21.04	21.15
20	16QAM	50	49	20.78	21.05	21.04
20	16QAM	100	0	21.32	21.07	21.00
<b>Channel</b>				<b>20825</b>	<b>21100</b>	<b>21375</b>
<b>Frequency (MHz)</b>				<b>2507.5</b>	<b>2535</b>	<b>2562.5</b>
15	QPSK	1	0	23.22	23.25	23.21
15	QPSK	1	37	22.80	22.83	22.98
15	QPSK	1	74	22.54	23.26	23.05
15	QPSK	36	0	21.93	22.16	22.01
15	QPSK	36	18	21.75	21.94	21.90
15	QPSK	36	37	22.04	22.15	22.07
15	QPSK	75	0	21.80	22.01	21.98
15	16QAM	1	0	22.39	22.21	22.46
15	16QAM	1	37	22.28	22.26	22.26
15	16QAM	1	74	22.33	21.86	22.36
15	16QAM	36	0	20.86	21.04	21.03
15	16QAM	36	18	20.83	20.94	20.87
15	16QAM	36	37	21.06	21.08	21.11
15	16QAM	75	0	20.79	21.08	20.92



BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
<b>Channel</b>				<b>20800</b>	<b>21100</b>	<b>21400</b>
<b>Frequency (MHz)</b>				<b>2505</b>	<b>2535</b>	<b>2565</b>
10	QPSK	1	0	22.91	23.13	23.27
10	QPSK	1	24	22.95	22.82	23.08
10	QPSK	1	49	22.81	23.18	23.37
10	QPSK	25	0	21.85	22.03	22.09
10	QPSK	25	12	21.83	21.97	21.96
10	QPSK	25	24	21.98	22.07	22.12
10	QPSK	50	0	22.18	22.03	22.05
10	16QAM	1	0	22.23	22.19	22.48
10	16QAM	1	24	22.14	22.17	22.18
10	16QAM	1	49	22.12	22.46	22.33
10	16QAM	25	0	20.96	20.90	21.17
10	16QAM	25	12	20.91	20.87	20.89
10	16QAM	25	24	20.87	21.01	21.15
10	16QAM	50	0	20.78	21.08	21.06
<b>Channel</b>				<b>20775</b>	<b>21100</b>	<b>21425</b>
<b>Frequency (MHz)</b>				<b>2502.5</b>	<b>2535</b>	<b>2567.5</b>
5	QPSK	1	0	23.13	22.90	23.10
5	QPSK	1	12	22.78	23.02	23.14
5	QPSK	1	24	22.72	23.04	23.08
5	QPSK	12	0	21.96	22.02	21.97
5	QPSK	12	6	21.93	21.96	22.02
5	QPSK	12	11	21.80	21.95	22.01
5	QPSK	25	0	21.82	22.03	22.02
5	16QAM	1	0	22.34	22.35	22.37
5	16QAM	1	12	22.07	22.40	22.30
5	16QAM	1	24	22.07	22.44	22.45
5	16QAM	12	0	20.85	20.95	21.09
5	16QAM	12	6	20.99	20.95	21.01
5	16QAM	12	11	20.81	20.87	21.08
5	16QAM	25	0	20.77	20.93	21.09

Note: maximum average power for LTE.

## 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.

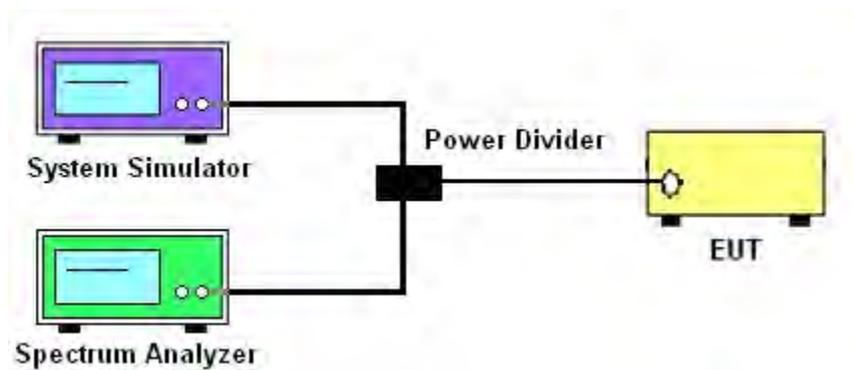
### 3.2.2 Measuring Instruments

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





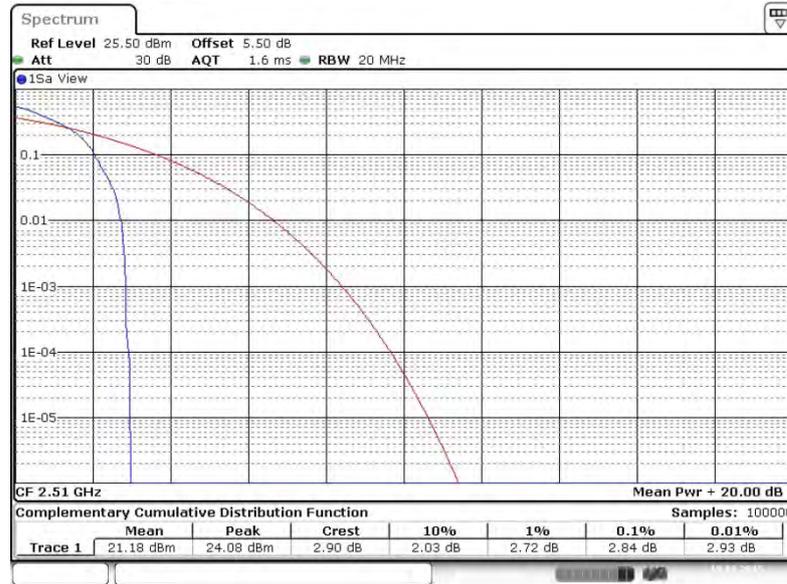
3.2.5 Test Result of Peak-to-Average Ratio

LTE Band 7						
BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				20850	21100	21350
Frequency (MHz)				2510	2535	2560
20	QPSK	1	0	2.84	3.68	3.22
20	QPSK	100	0	4.58	4.70	4.23
20	16QAM	1	0	3.22	4.72	3.74
20	16QAM	100	0	5.59	5.65	5.28



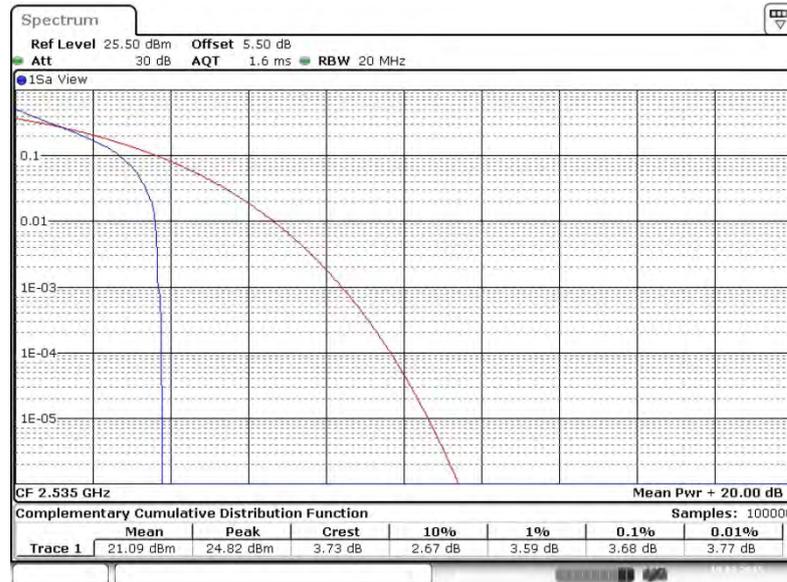
### 3.2.6 Peak to Average Power Ratio

#### Peak-to-Average Ratio on LTE Band 7 20MHz / QPSK in Ch. 20850 (1RB Size)



Date: 19.MAR.2015 00:10:38

#### Peak-to-Average Ratio on LTE Band 7 20MHz / QPSK in Ch. 21100 (1RB Size)



Date: 19.MAR.2015 00:12:24

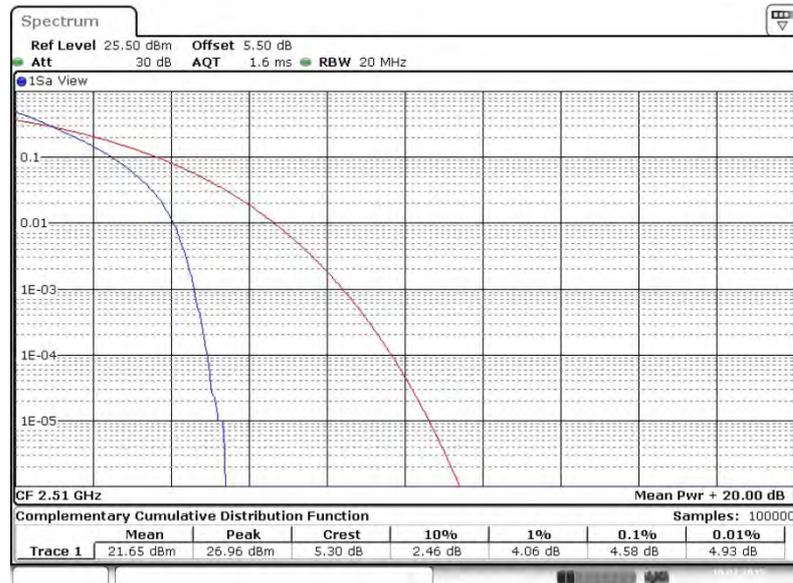


Peak-to-Average Ratio on LTE Band 7  
20MHz / QPSK in Ch. 21350 (1RB Size)



Date: 19.MAR.2015 00:13:21

Peak-to-Average Ratio on LTE Band 7  
20MHz / QPSK in Ch. 20850 (100RB Size)



Date: 19.MAR.2015 00:10:55



Peak-to-Average Ratio on LTE Band 7  
20MHz / QPSK in Ch. 21100 (100RB Size)



Date: 19.MAR.2015 00:11:53

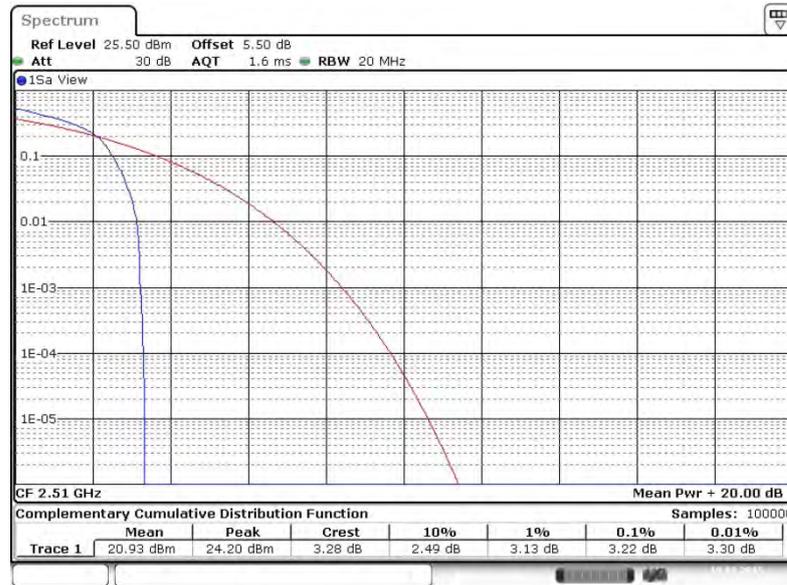
Peak-to-Average Ratio on LTE Band 7  
20MHz / QPSK in Ch. 21350 (100RB Size)



Date: 19.MAR.2015 00:14:15



Peak-to-Average Ratio on LTE Band 7  
20MHz / 16QAM in Ch. 20850 (1RB Size)



Date: 19.MAR.2015 00:10:21

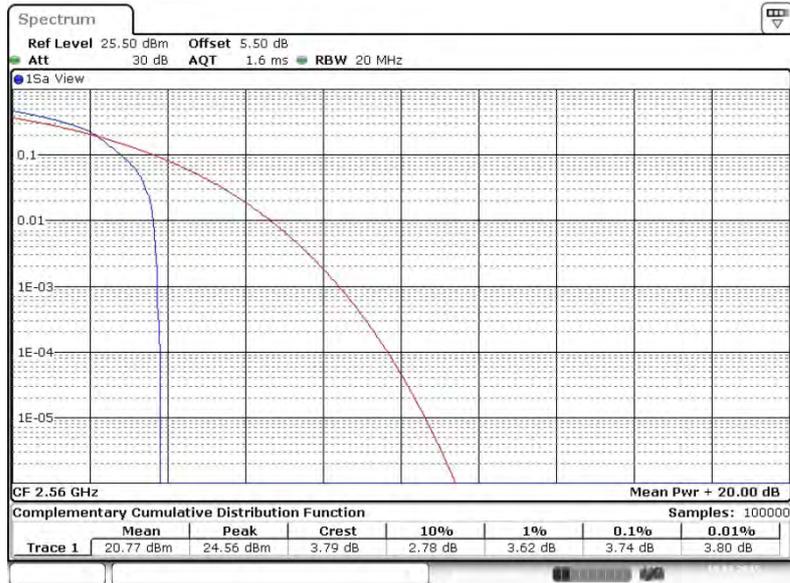
Peak-to-Average Ratio on LTE Band 7  
20MHz / 16QAM in Ch. 21100 (1RB Size)



Date: 19.MAR.2015 00:12:41

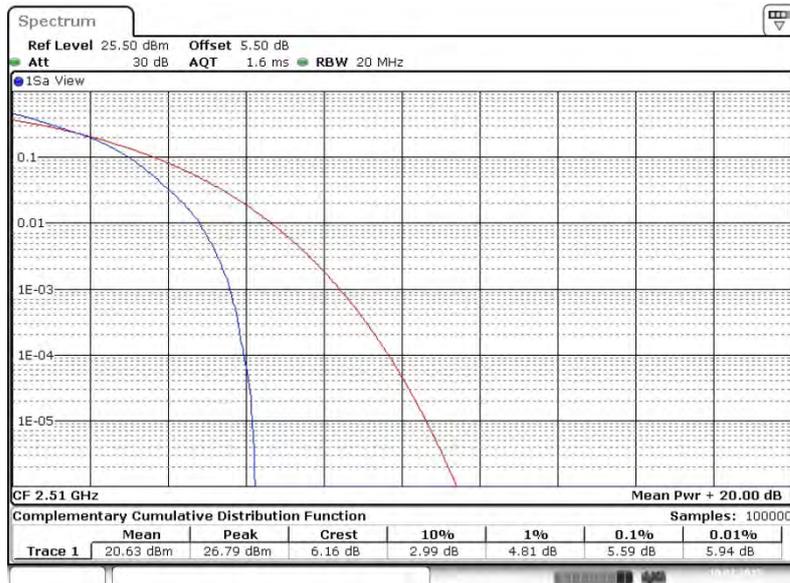


Peak-to-Average Ratio on LTE Band 7  
20MHz / 16QAM in Ch. 21350 (1RB Size)



Date: 19.MAR.2015 00:13:01

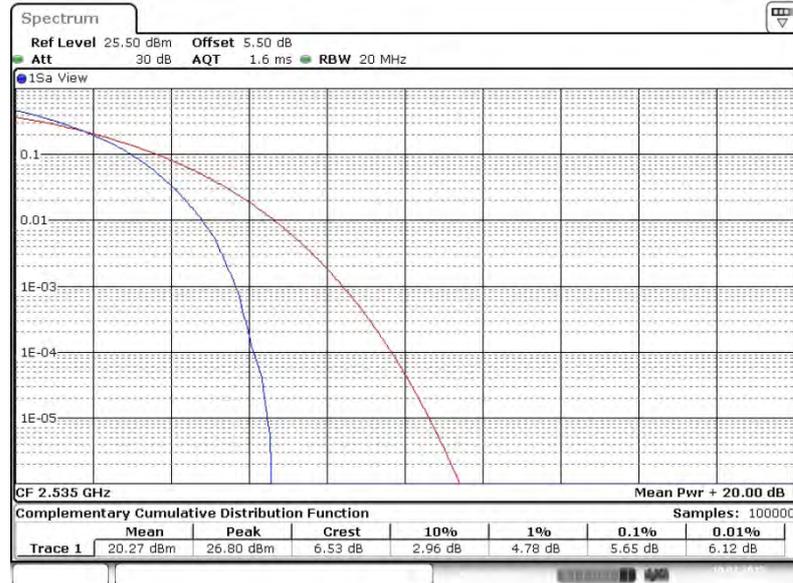
Peak-to-Average Ratio on LTE Band 7  
20MHz / 16QAM in Ch. 20850 (100RB Size)



Date: 19.MAR.2015 00:11:15

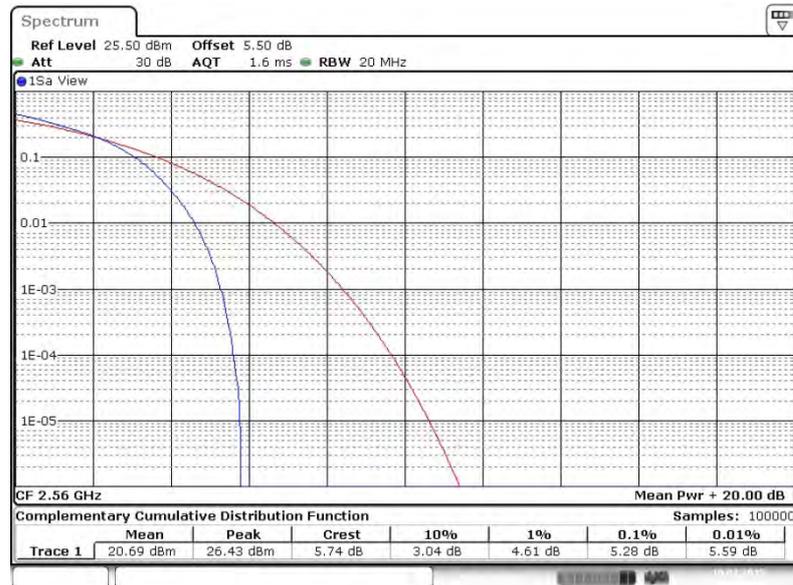


Peak-to-Average Ratio on LTE Band 7  
20MHz / 16QAM in Ch. 21100 (100RB Size)



Date: 19.MAR.2015 00:11:36

Peak-to-Average Ratio on LTE Band 7  
20MHz / 16QAM in Ch. 21350 (100RB Size)



Date: 19.MAR.2015 00:14:34



### **3.3 Equivalent Isotropic Radiated Power Measurement**

#### **3.3.1 Description of the EIRP Measurement**

Equivalent isotropic radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C-2004, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 7.

#### **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 testing follows FCC KDB 971168 v02r02 Section 5.2.1. and ANSI / TIA-603-C-2004 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.

Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor,  $EIRP = LVL + \text{Correction factor}$  and  $ERP = EIRP - 2.15$ . Take the record of the output power at substitution antenna.



	LTE					
LTE BW	1.4M	3M	5M	10M	15M	20M
Span	3MHz	6MHz	10MHz	20MHz	30MHz	40MHz
RBW	30kHz	100kHz	100kHz	300kHz	300kHz	300kHz
VBW	100kHz	300kHz	300kHz	1MHz	1MHz	1MHz
Detector	RMS	RMS	RMS	RMS	RMS	RMS
Trace	Average	Average	Average	Average	Average	Average
Average Type	Power	Power	Power	Power	Power	Power
Sweep Count	100	100	100	100	100	100



3.3.4 Test Result of EIRP

LTE Band 7 / 5MHz							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	19.50	0.0891	21.54	0.1426
Middle		1	24	19.82	0.0959	20.59	0.1146
Highest		1	12	19.32	0.0855	20.58	0.1143
Lowest	16QAM	1	0	18.65	0.0733	20.72	0.1180
Middle		1	24	18.95	0.0785	20.07	0.1016
Highest		1	24	18.68	0.0738	19.79	0.0953
Limit	EIRP < 2W			Result		PASS	

LTE Band 7 / 10MHz							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	24	19.46	0.0883	21.23	0.1327
Middle		1	49	19.64	0.0920	21.08	0.1282
Highest		1	49	19.59	0.0910	20.80	0.1202
Lowest	16QAM	1	0	19.00	0.0794	20.62	0.1153
Middle		1	49	18.66	0.0735	20.13	0.1030
Highest		1	0	19.26	0.0843	19.93	0.0984
Limit	EIRP < 2W			Result		PASS	



LTE Band 7 / 15MHz							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	19.58	0.0908	21.29	0.1346
Middle		1	74	19.80	0.0955	20.88	0.1225
Highest		1	0	19.91	0.0979	20.98	0.1253
Lowest	16QAM	1	0	18.93	0.0782	20.65	0.1161
Middle		1	37	18.94	0.0783	20.72	0.1180
Highest		1	0	19.00	0.0794	19.97	0.0993
Limit	EIRP < 2W			Result		PASS	

LTE Band 7 / 20MHz							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	99	19.67	0.0927	21.52	0.1419
Middle		1	99	19.88	0.0973	21.39	0.1377
Highest		1	99	19.69	0.0931	20.87	0.1222
Lowest	16QAM	1	0	18.95	0.0785	21.06	0.1276
Middle		1	99	19.06	0.0805	20.27	0.1064
Highest		1	0	19.14	0.0820	20.40	0.1096
Limit	EIRP < 2W			Result		PASS	

### 3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 3.4.1 Description of 99% Occupied Bandwidth and 26dB 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.

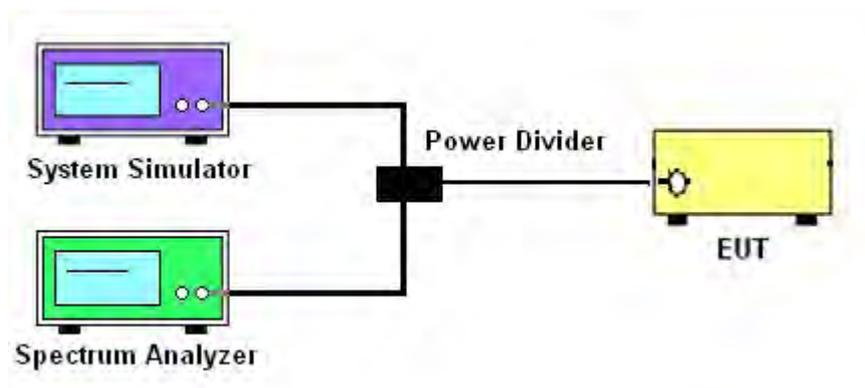
#### 3.4.2 Measuring Instruments

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 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

#### 3.4.4 Test Setup



#### 3.4.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth



Modes	LTE Band 7											
BW / Mod.	5MHz / QPSK			5MHz / 16QAM			10MHz / QPSK			10MHz / 16QAM		
	Low	Mid.	High	Low	Mid.	High	Low	Mid.	High	Low	Mid.	High
99% OBW (MHz)	4.505	4.496	4.515	4.505	4.496	4.505	9.111	9.071	9.111	9.051	9.051	9.031
26dB BW (MHz)	5.115	5.055	5.095	5.105	5.045	5.045	10.110	10.010	10.090	10.130	10.030	10.070
BW / Mod.	15MHz / QPSK			15MHz / 16QAM			20MHz / QPSK			20MHz / 16QAM		
	Low	Mid.	High	Low	Mid.	High	Low	Mid.	High	Low	Mid.	High
99% OBW (MHz)	13.546	13.487	13.516	13.546	13.487	13.457	18.382	18.422	18.422	18.462	18.501	18.422
26dB BW (MHz)	14.805	14.625	14.805	14.925	14.865	14.715	20.380	20.539	20.380	20.500	20.380	20.260

**Note:**

The maximum RB configurations of the 99% Occupied Bandwidth and 26dB Bandwidth summary as below:

BW5.0MHz RB setting : RB Size 25, RB offset 0

BW10MHz RB setting : RB Size 50, RB offset 0

BW15MHz RB setting : RB Size 75, RB offset 0

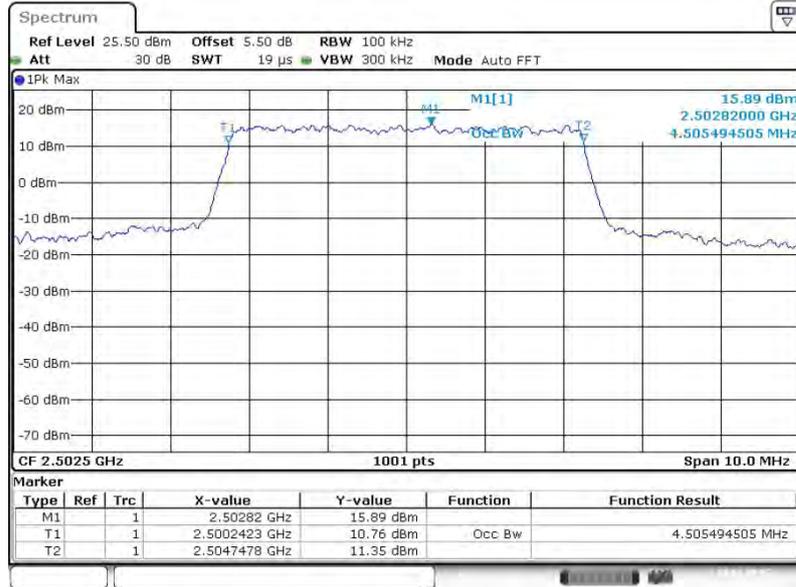
BW20MHz RB setting : RB Size 100, RB offset 0



### 3.4.6 Test Result (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth

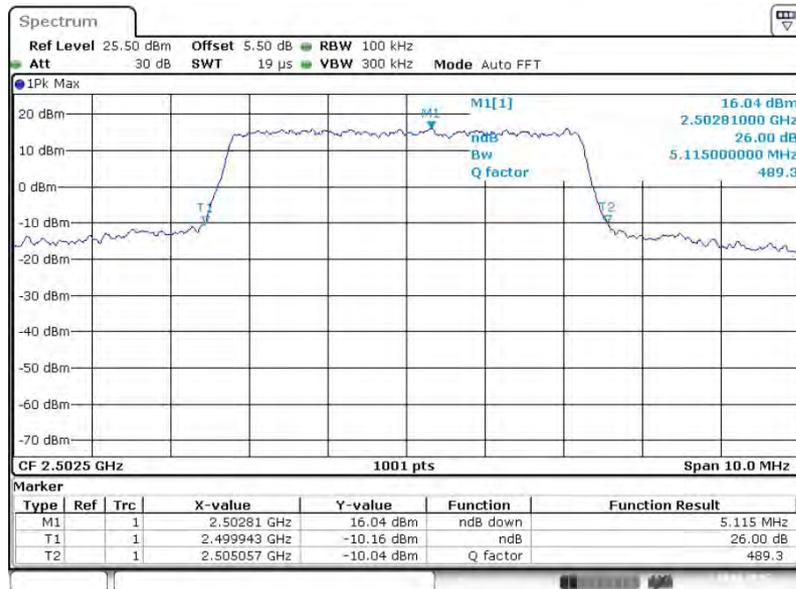
Band :	LTE Band 7	BW / Mod. :	5MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 20775



Date: 18.MAR.2015 21:40:28

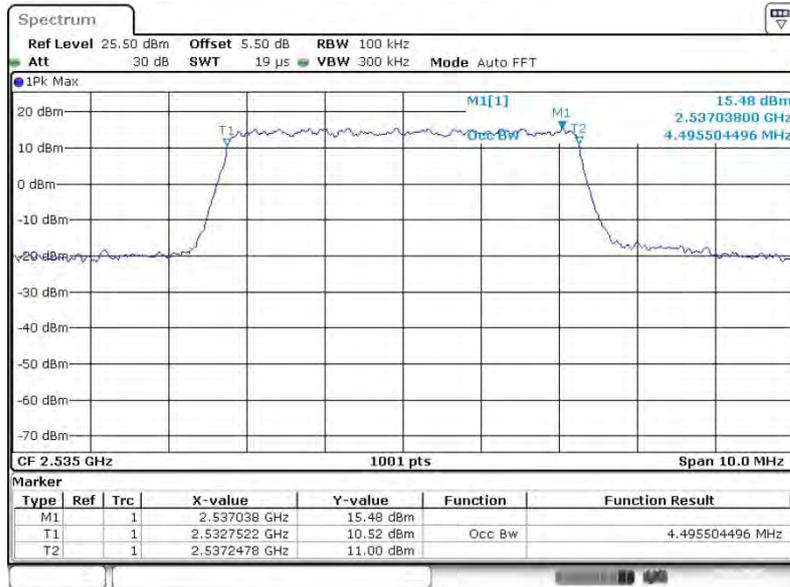
26dB Bandwidth Plot on Channel 20775



Date: 18.MAR.2015 21:40:50

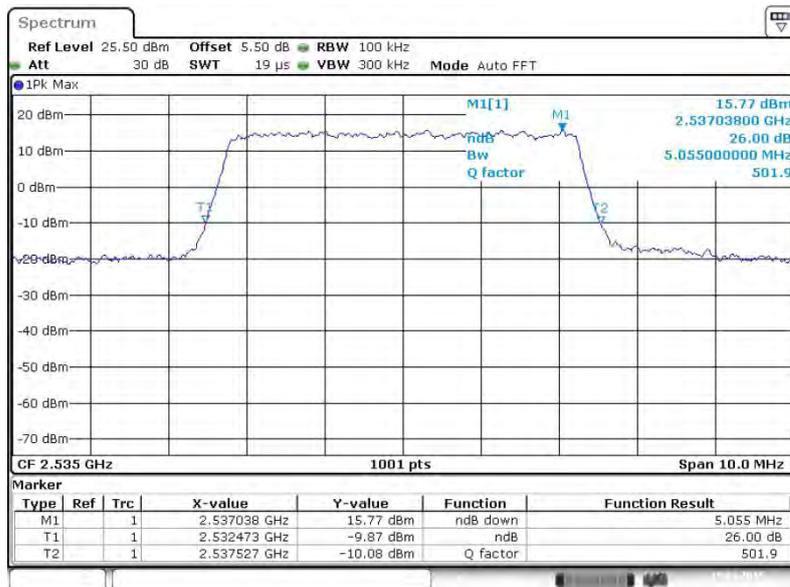


99% Occupied Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 21:43:55

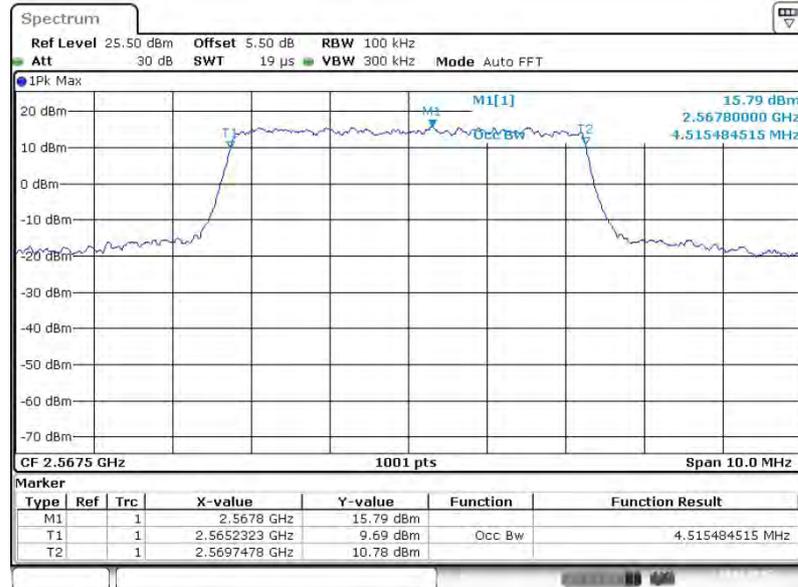
26dB Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 21:44:17

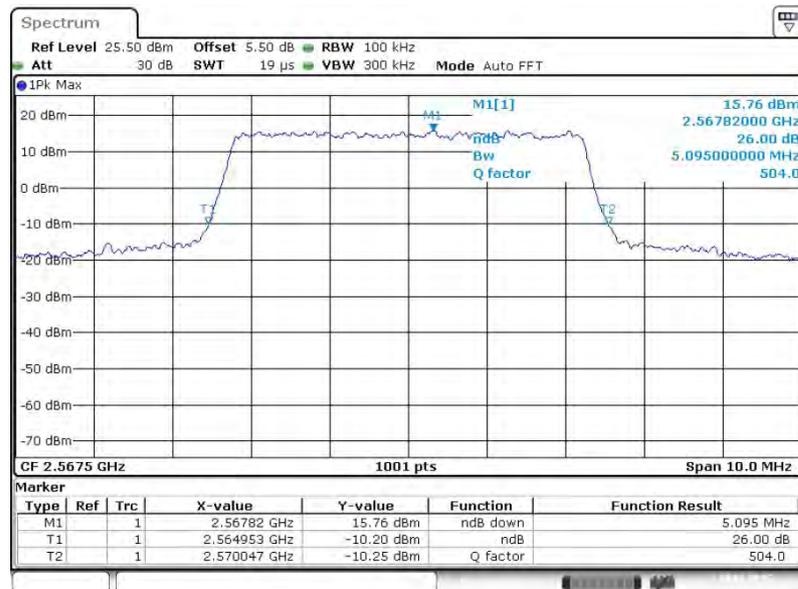


### 99% Occupied Bandwidth Plot on Channel 21425



Date: 18.MAR.2015 21:47:21

### 26dB Bandwidth Plot on Channel 21425

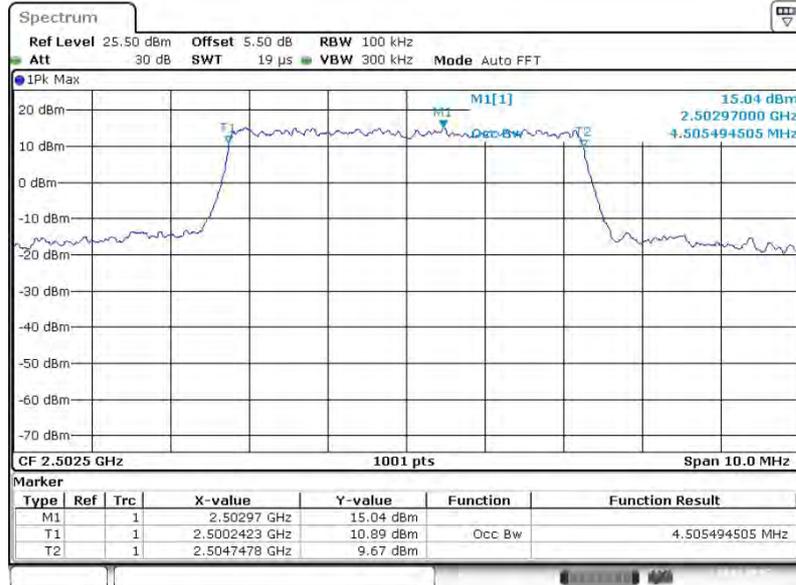


Date: 18.MAR.2015 21:47:43



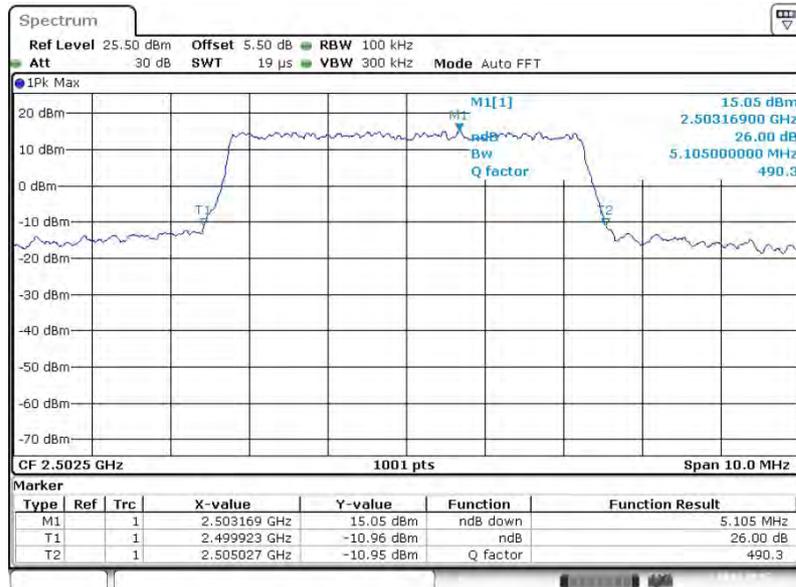
Band :	LTE Band 7	BW / Mod. :	5MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 20775



Date: 18.MAR.2015 21:40:38

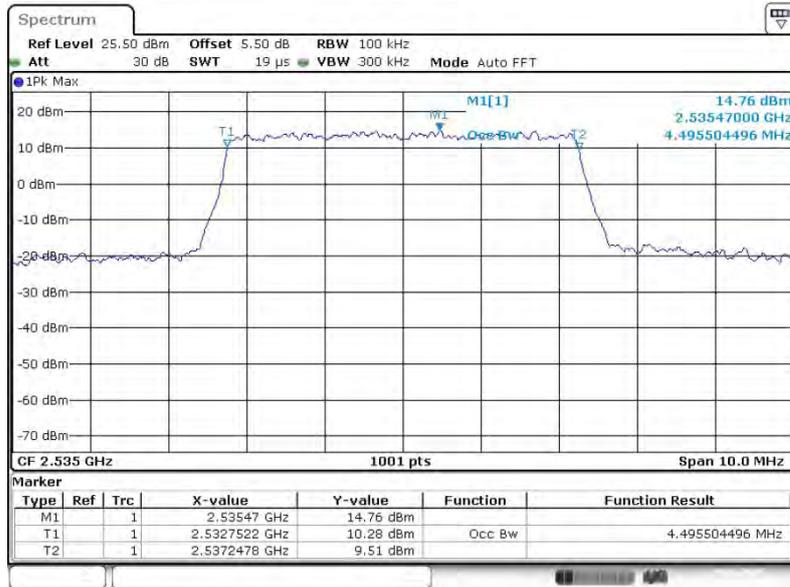
26dB Bandwidth Plot on Channel 20775



Date: 18.MAR.2015 21:41:02

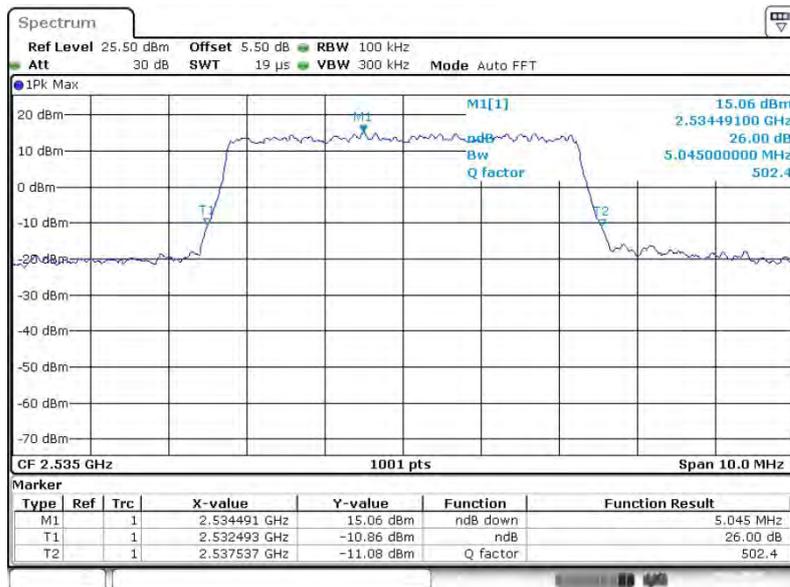


### 99% Occupied Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 21:44:05

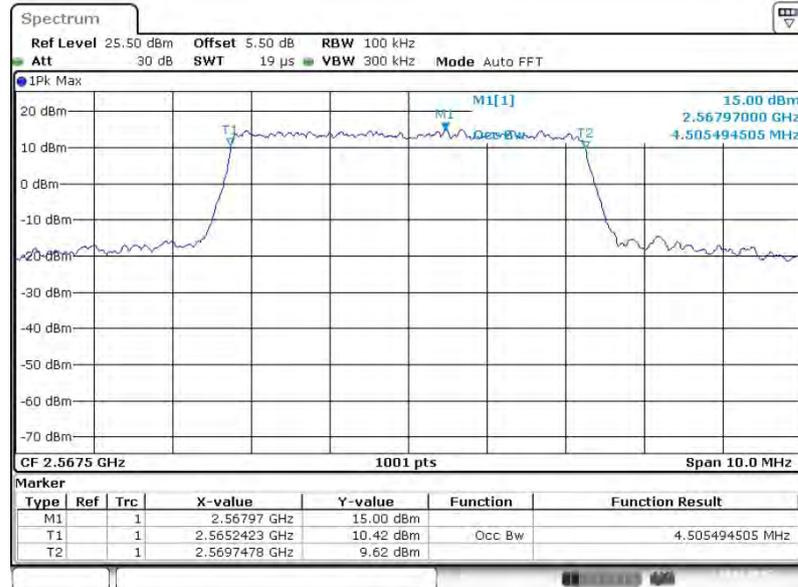
### 26dB Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 21:44:28

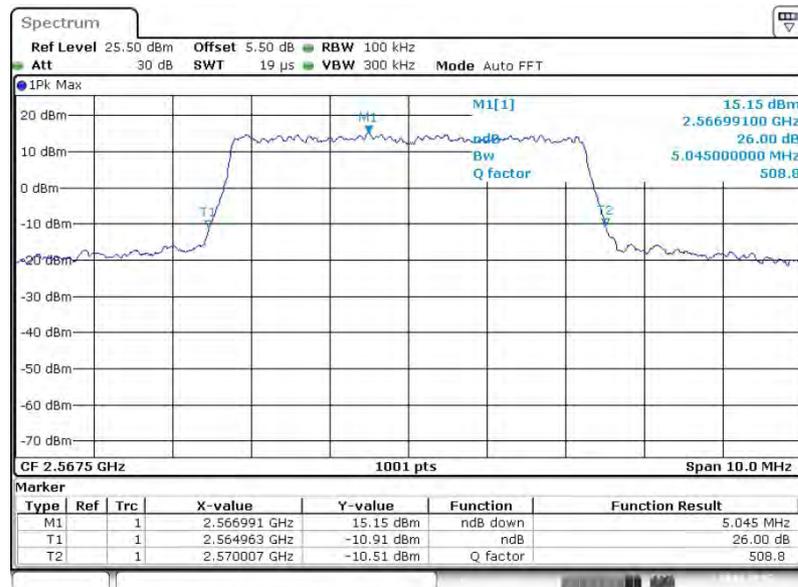


99% Occupied Bandwidth Plot on Channel 21425



Date: 18.MAR.2015 21:47:31

26dB Bandwidth Plot on Channel 21425

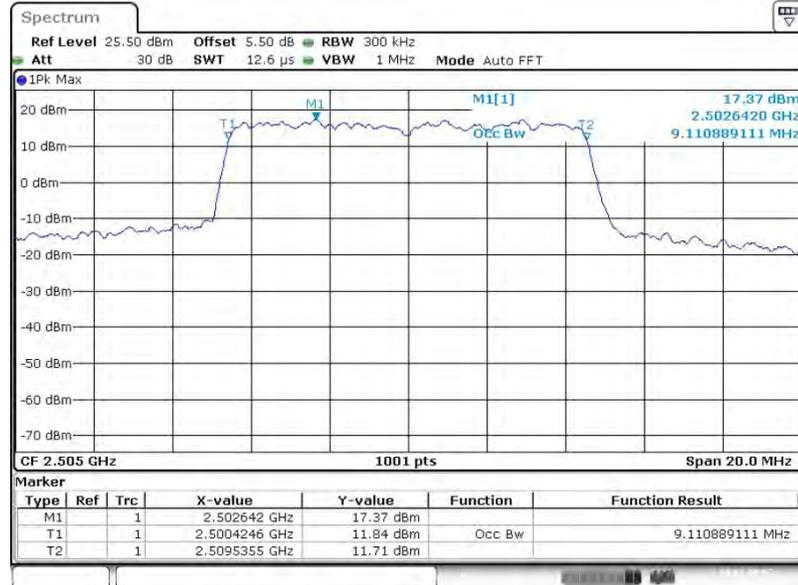


Date: 18.MAR.2015 21:47:55

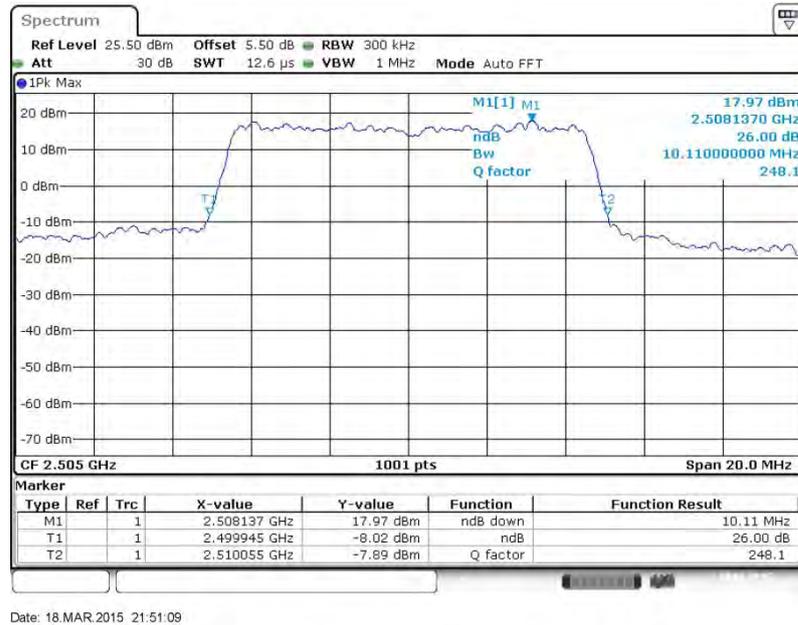


Band :	LTE Band 7	BW / Mod. :	10MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 20800

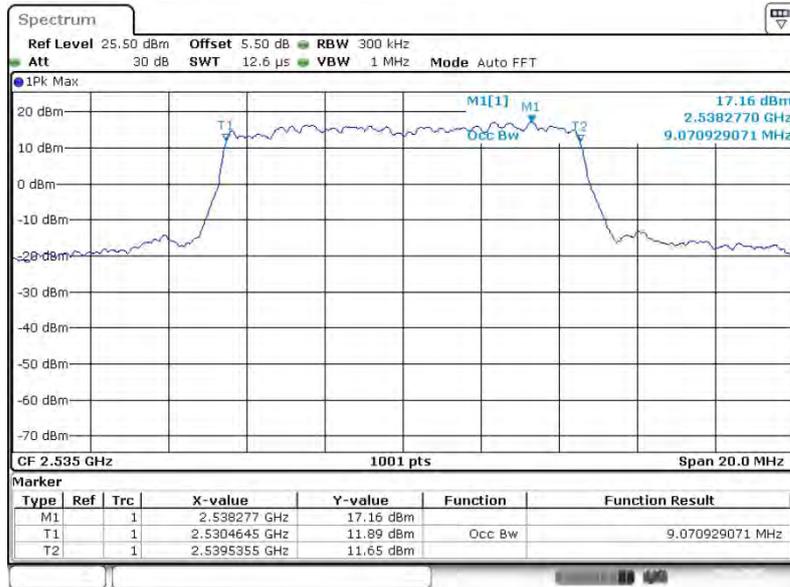


26dB Bandwidth Plot on Channel 20800



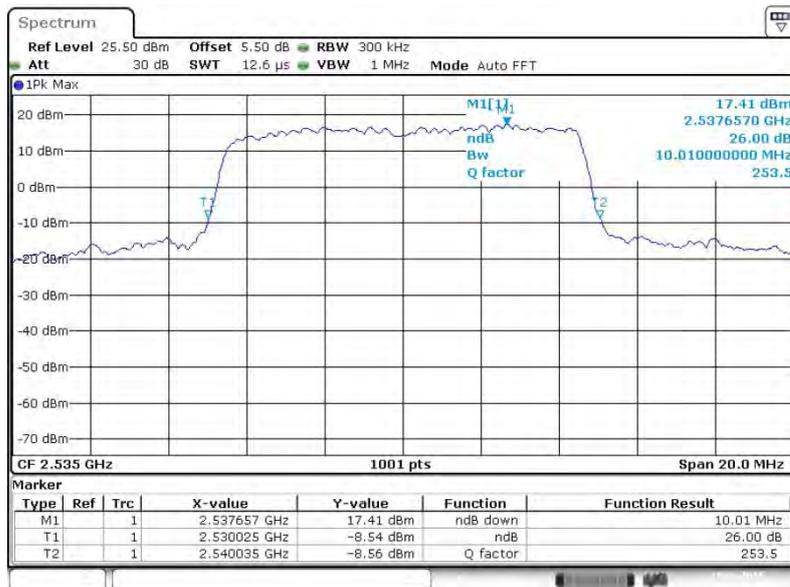


### 99% Occupied Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 21:54:12

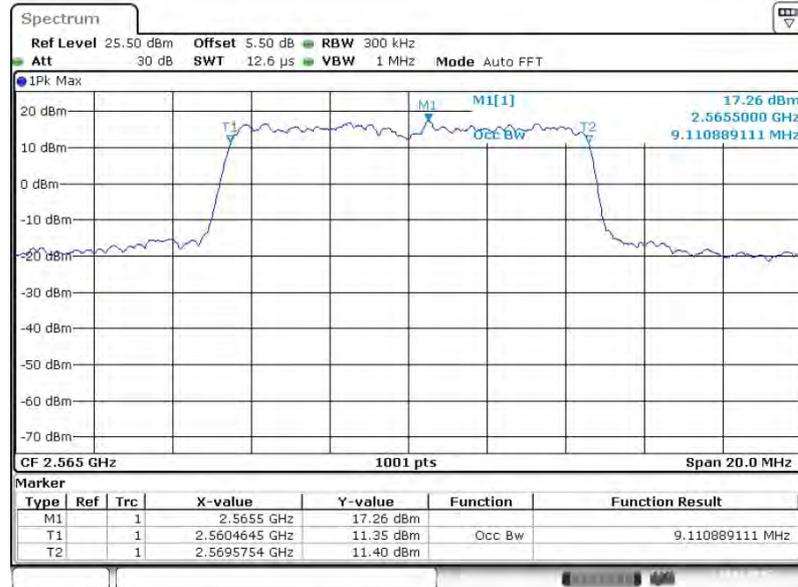
### 26dB Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 21:54:34

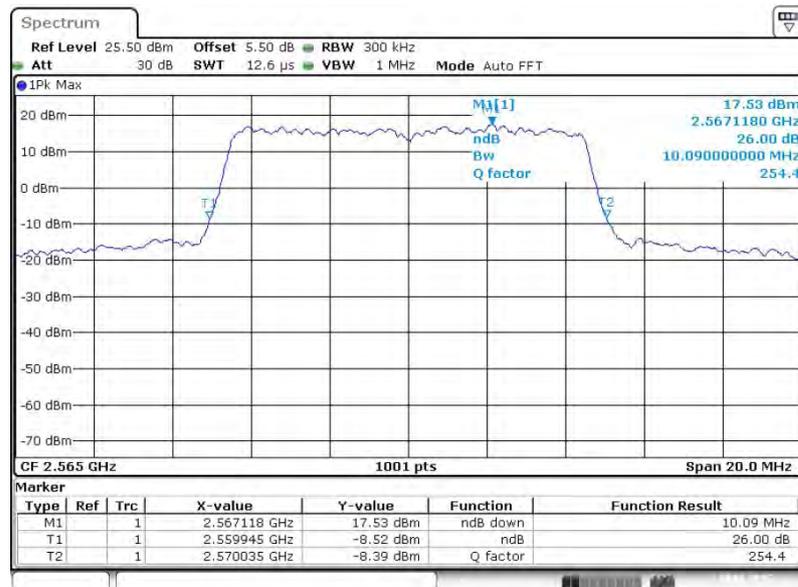


99% Occupied Bandwidth Plot on Channel 21400



Date: 18.MAR.2015 21:57.40

26dB Bandwidth Plot on Channel 21400

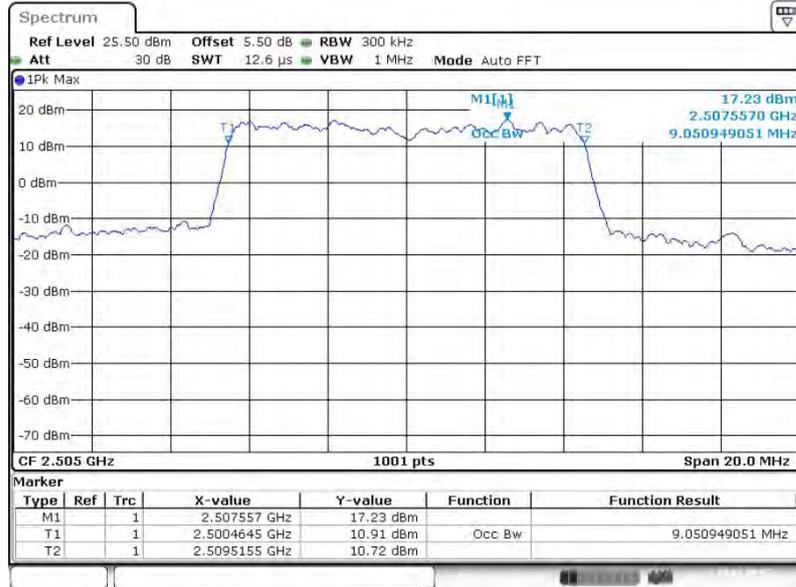


Date: 18.MAR.2015 21:58.02



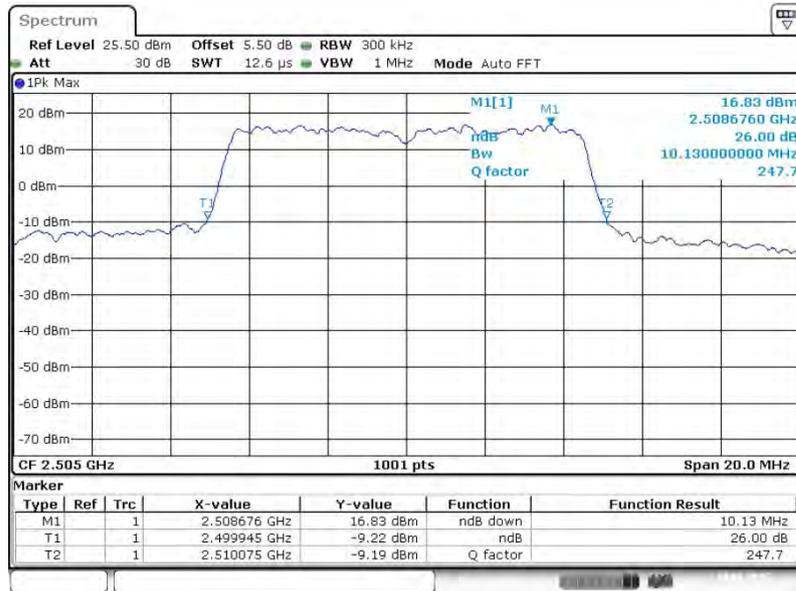
<b>Band :</b>	LTE Band 7	<b>BW / Mod. :</b>	10MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 20800



Date: 18.MAR.2015 21:50:58

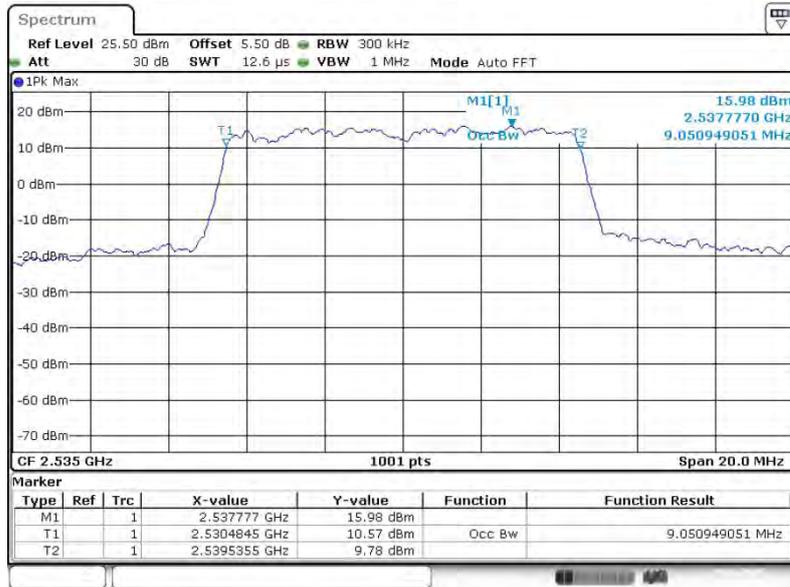
26dB Bandwidth Plot on Channel 20800



Date: 18.MAR.2015 21:51:21

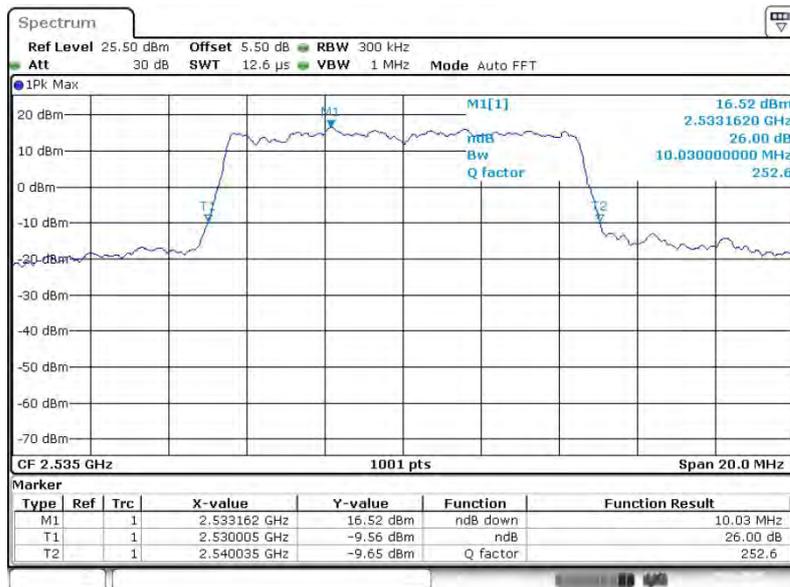


### 99% Occupied Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 21:54:22

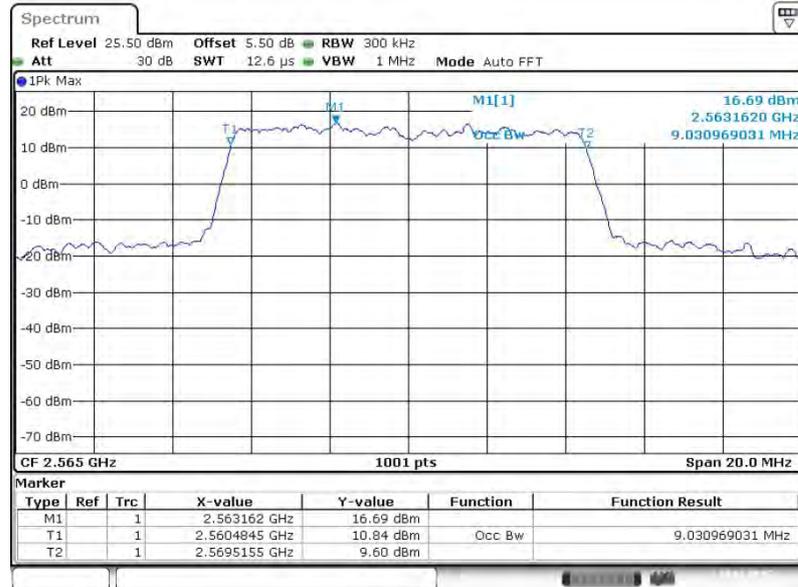
### 26dB Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 21:54:46

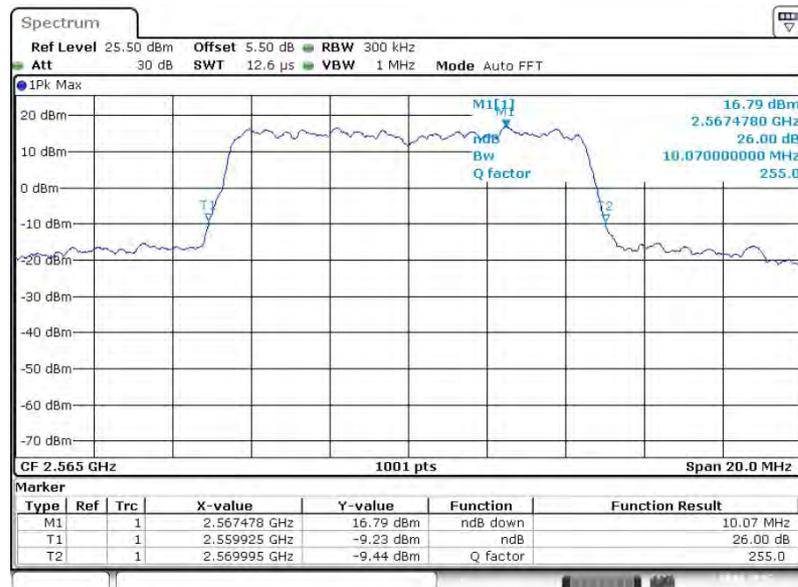


99% Occupied Bandwidth Plot on Channel 21400



Date: 18.MAR.2015 21:57:50

26dB Bandwidth Plot on Channel 21400

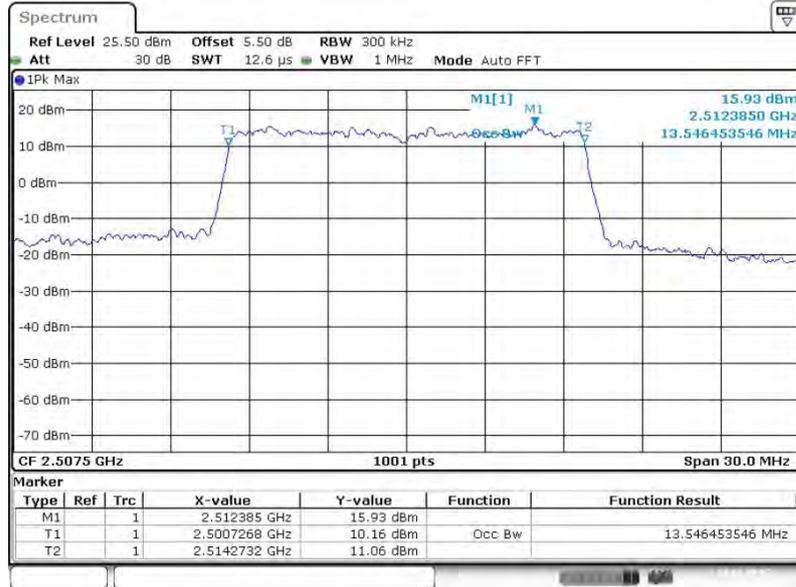


Date: 18.MAR.2015 21:58:14



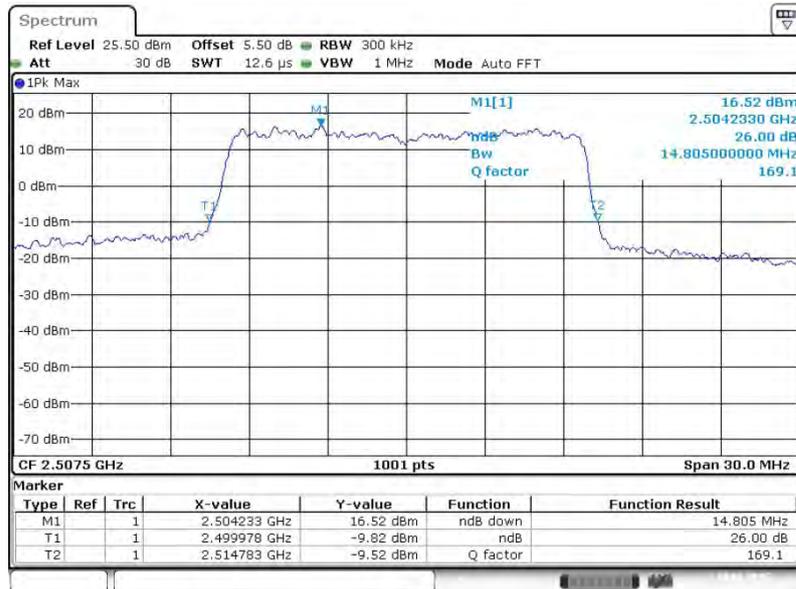
Band :	LTE Band 7	BW / Mod. :	15MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 20825



Date: 18.MAR.2015 22:01:08

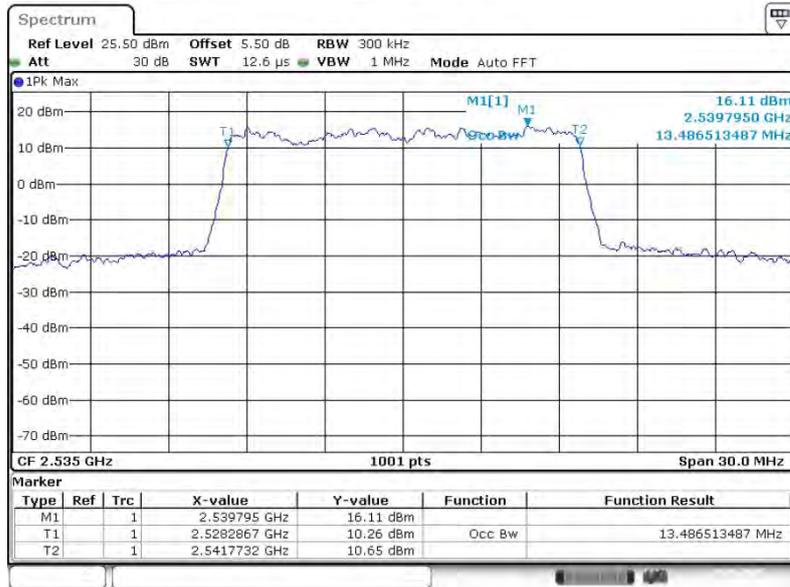
26dB Bandwidth Plot on Channel 20825



Date: 18.MAR.2015 22:01:30

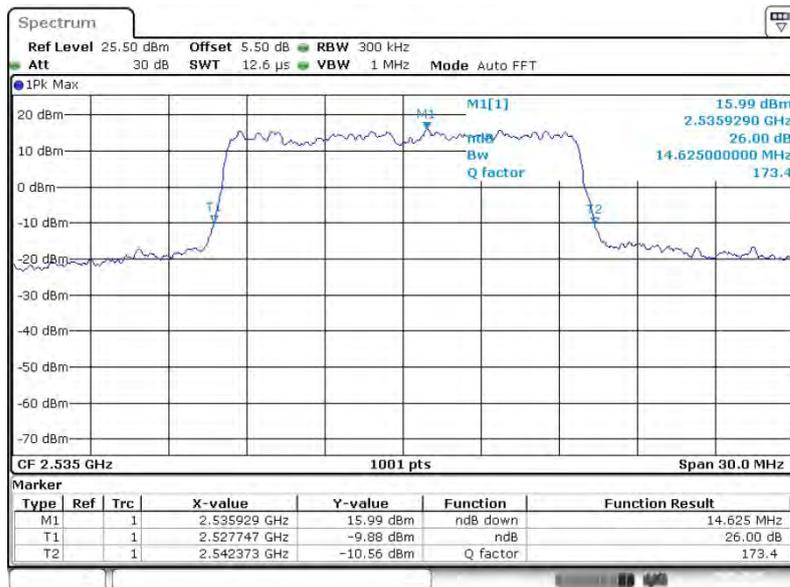


### 99% Occupied Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 22:04:35

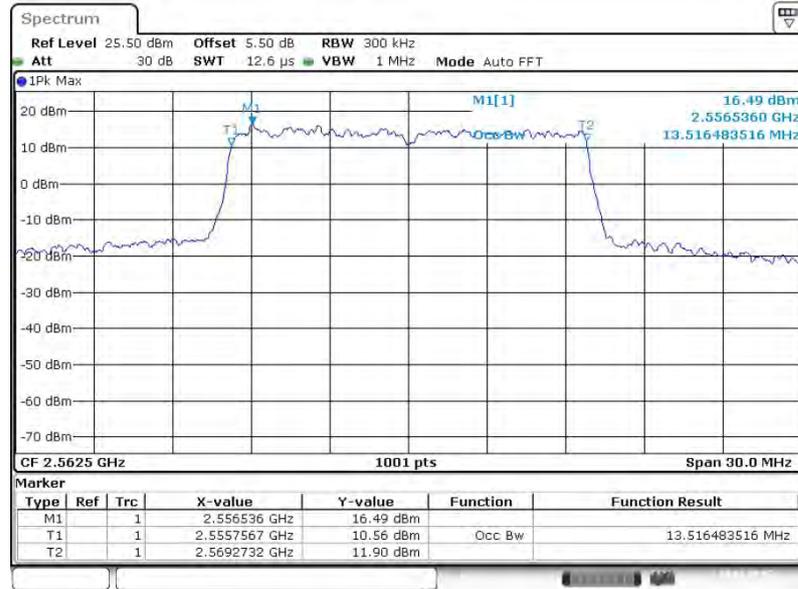
### 26dB Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 22:04:56

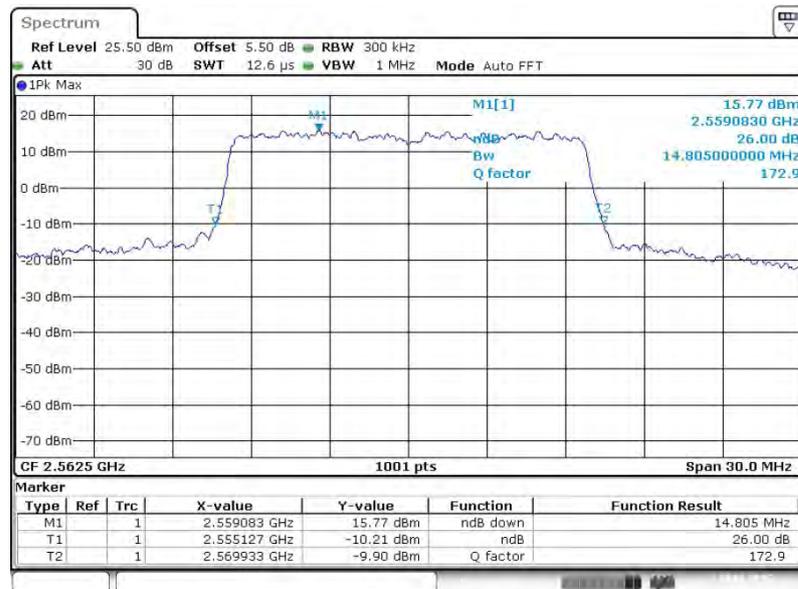


99% Occupied Bandwidth Plot on Channel 21375



Date: 18.MAR.2015 22:08:01

26dB Bandwidth Plot on Channel 21375

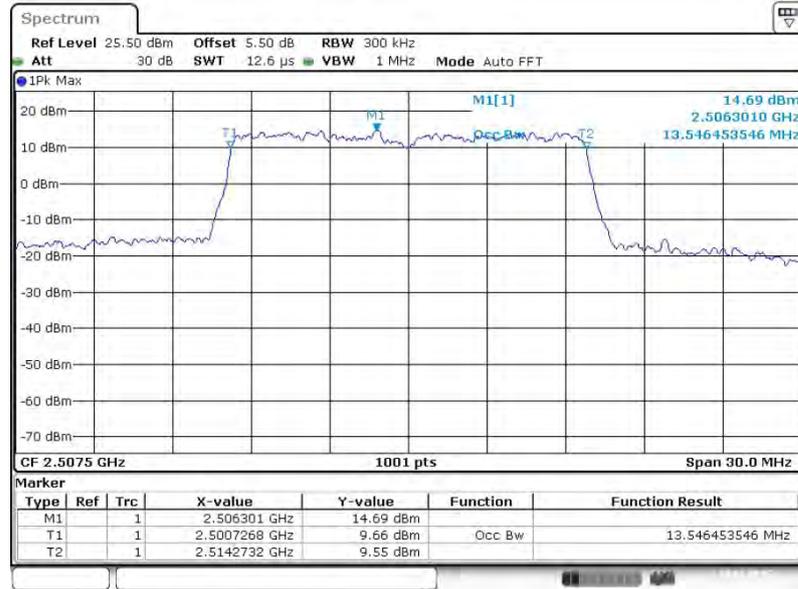


Date: 18.MAR.2015 22:08:23



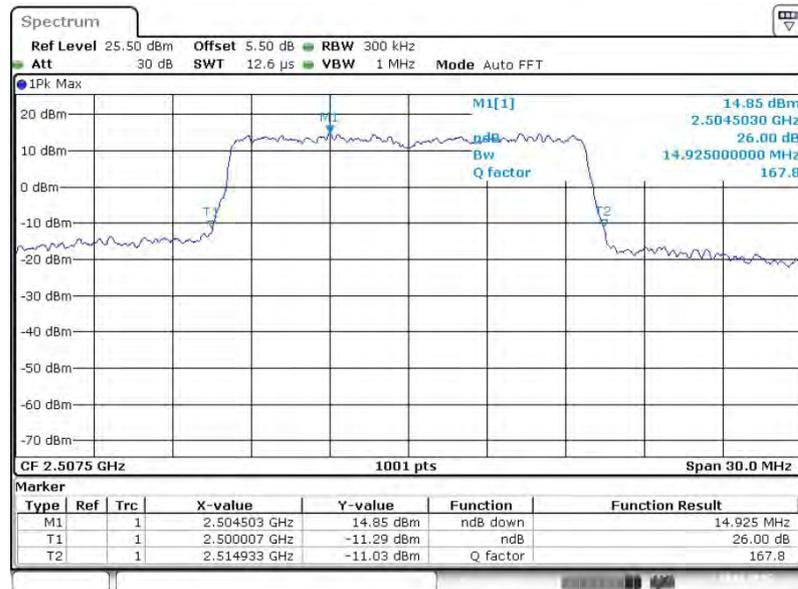
Band :	LTE Band 7	BW / Mod. :	15MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 20825



Date: 18.MAR.2015 22:01:18

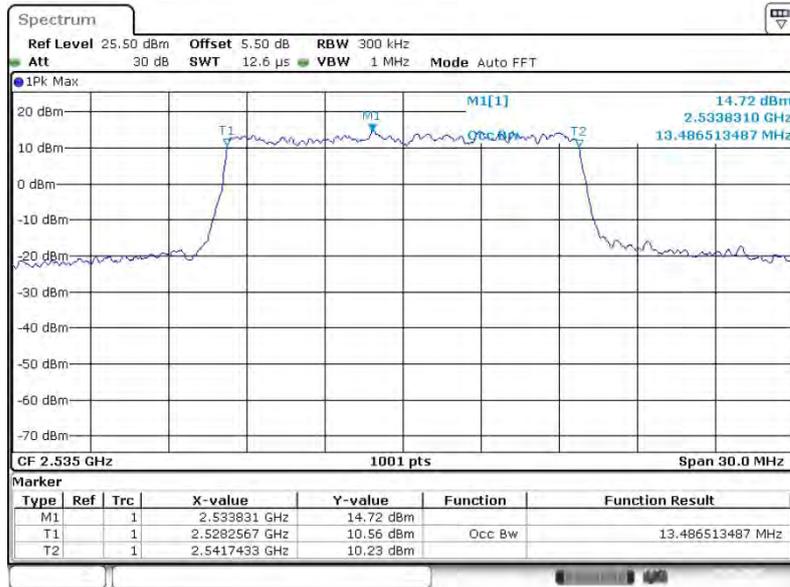
26dB Bandwidth Plot on Channel 20825



Date: 18.MAR.2015 22:01:42

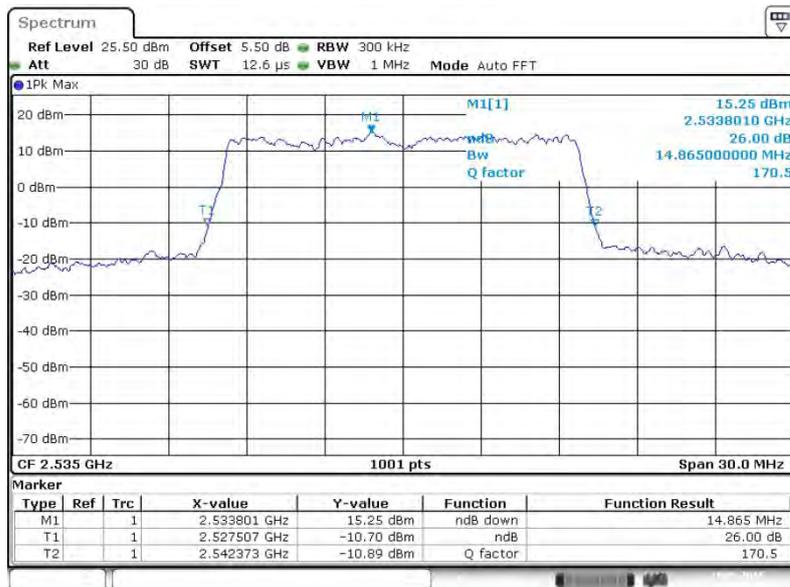


### 99% Occupied Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 22:04:45

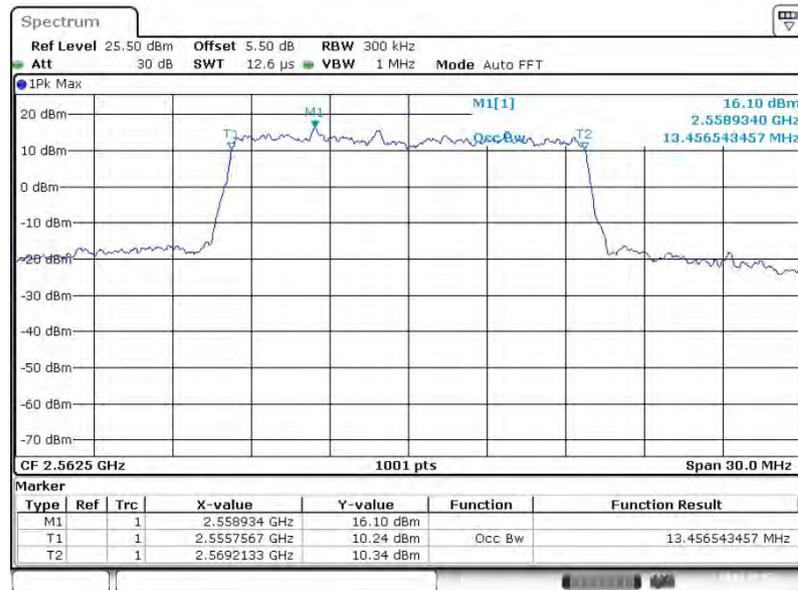
### 26dB Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 22:05:08

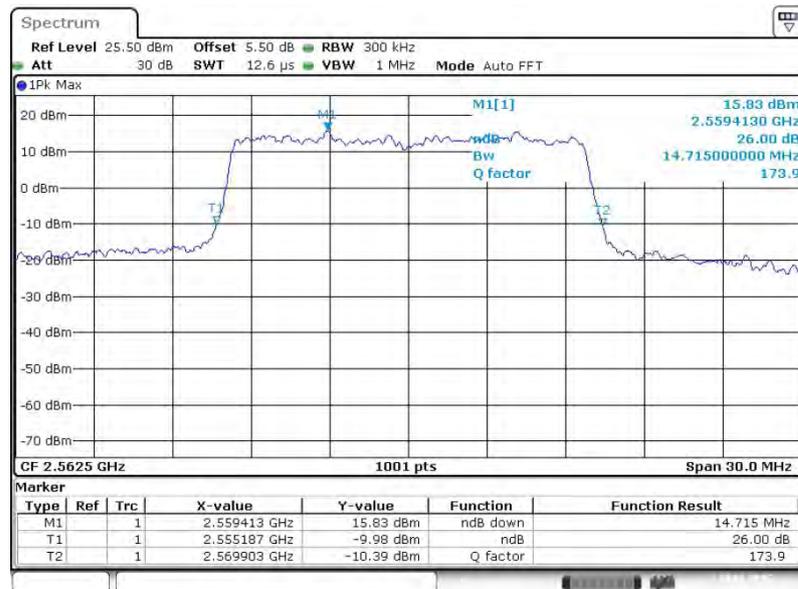


### 99% Occupied Bandwidth Plot on Channel 21375



Date: 18.MAR.2015 22:08:11

### 26dB Bandwidth Plot on Channel 21375

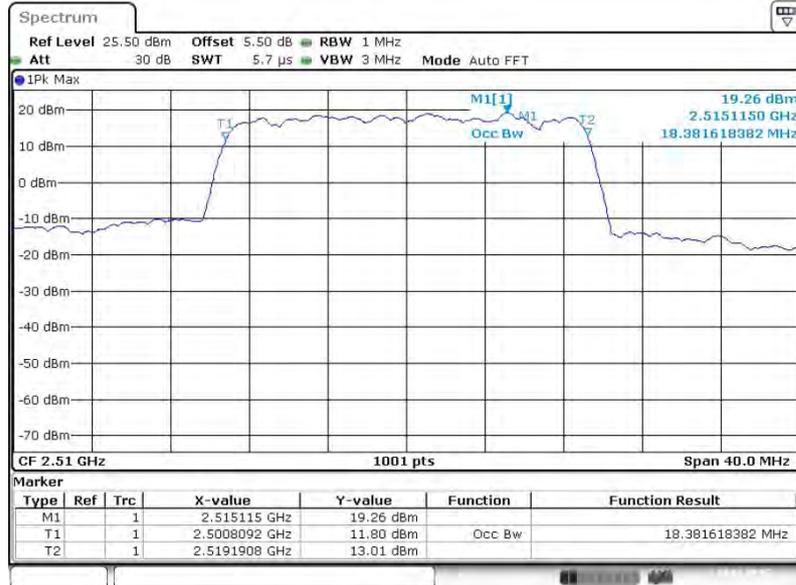


Date: 18.MAR.2015 22:08:34



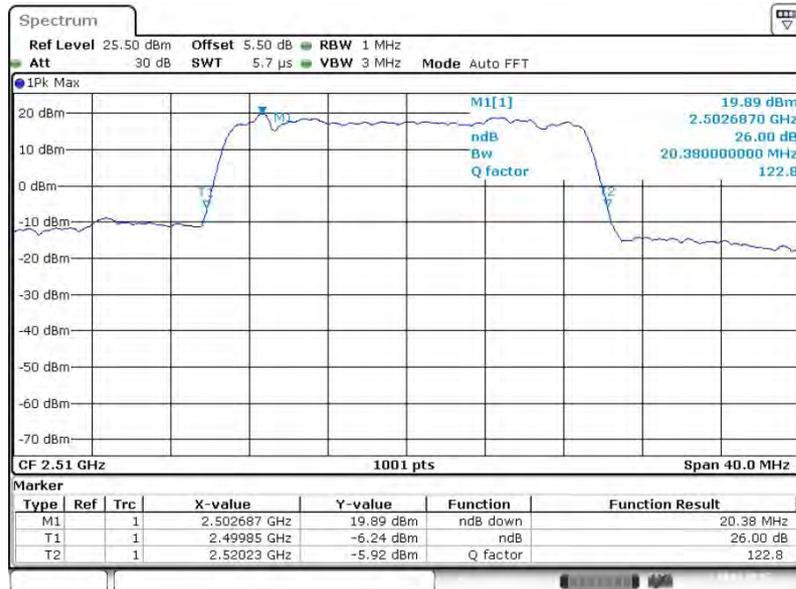
<b>Band :</b>	LTE Band 7	<b>BW / Mod. :</b>	20MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 20850



Date: 18.MAR.2015 22:11:27

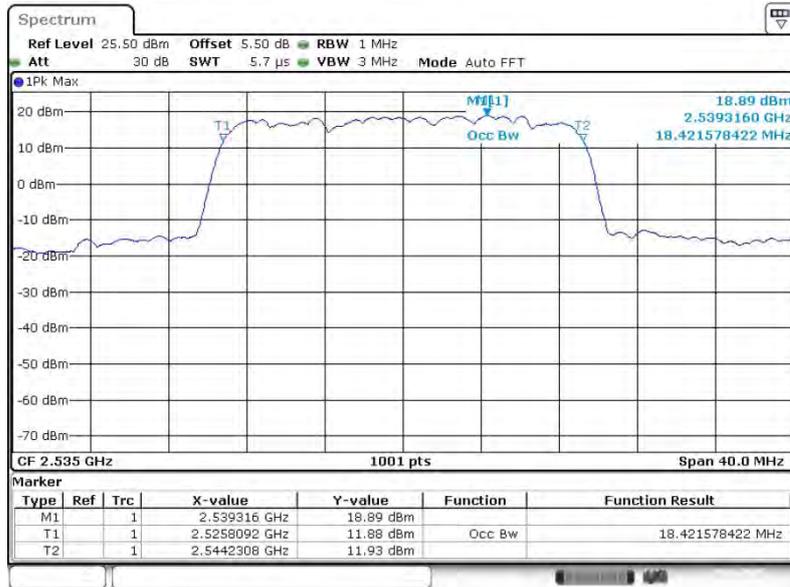
26dB Bandwidth Plot on Channel 20850



Date: 18.MAR.2015 22:11:48

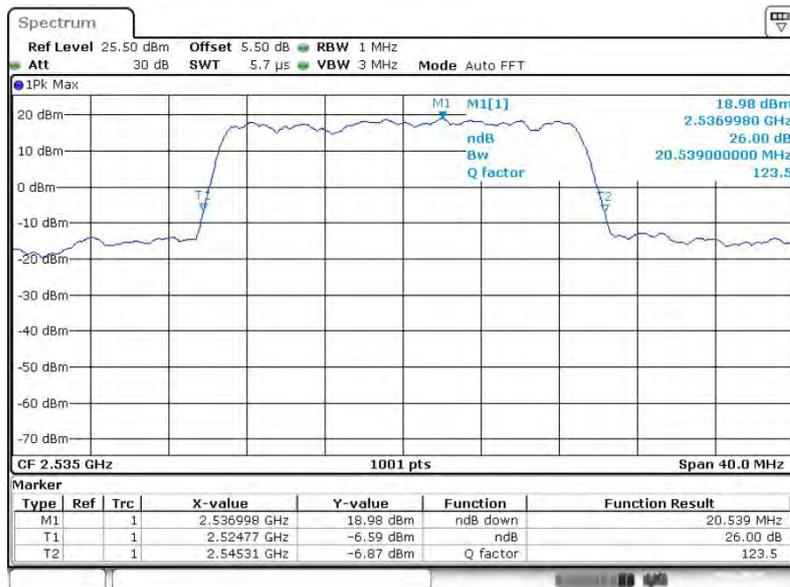


99% Occupied Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 22:14:51

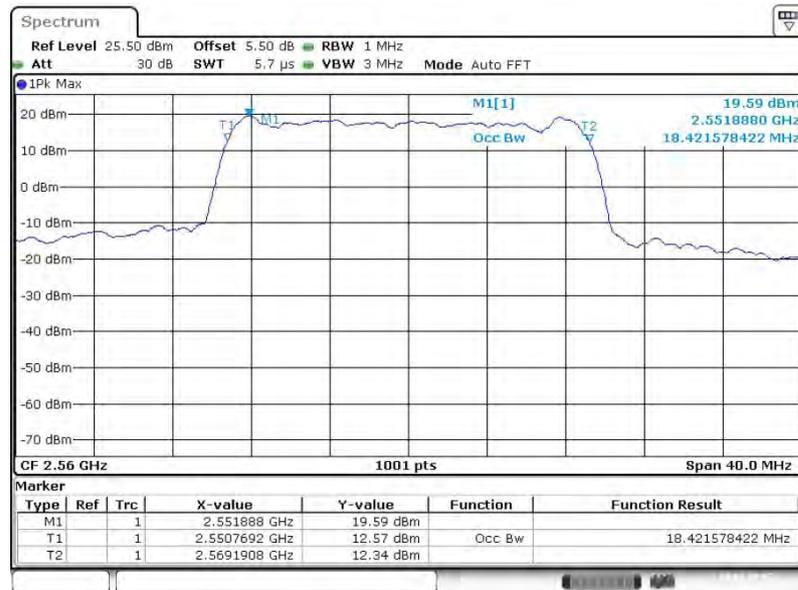
26dB Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 22:15:13

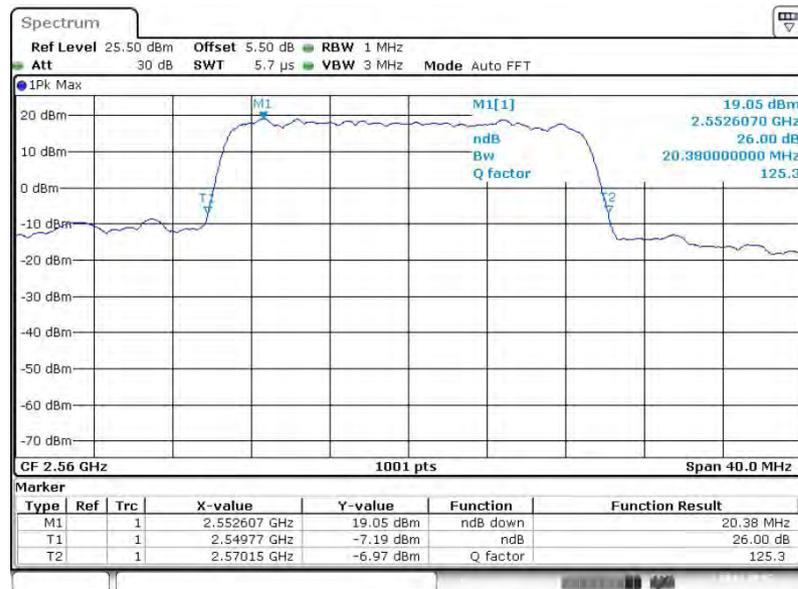


99% Occupied Bandwidth Plot on Channel 21350



Date: 18.MAR.2015 22:18:16

26dB Bandwidth Plot on Channel 21350

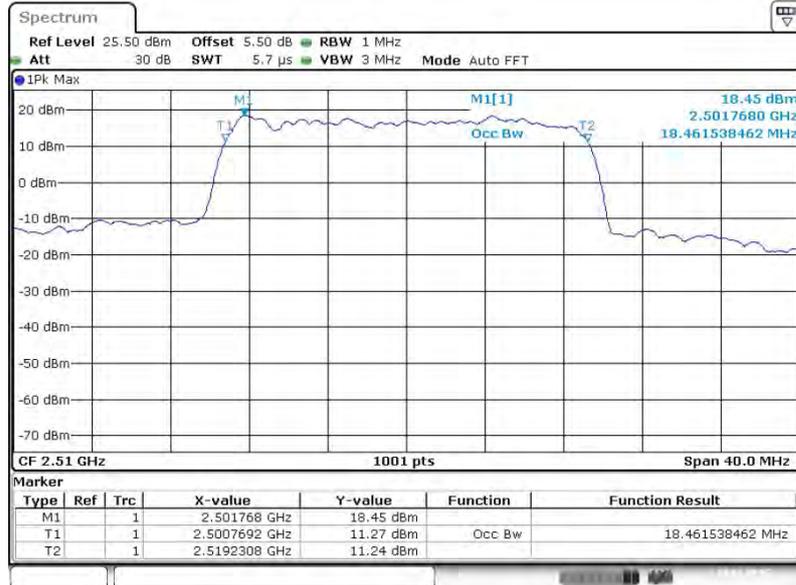


Date: 18.MAR.2015 22:18:38



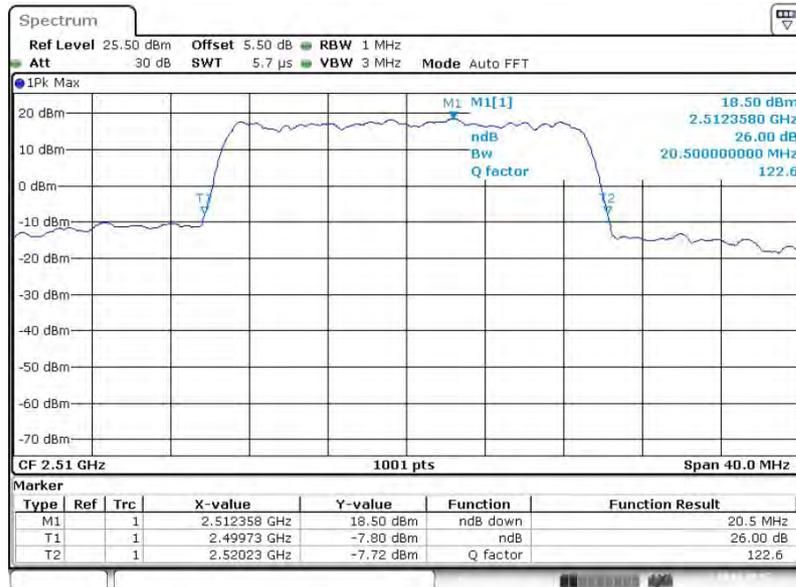
<b>Band :</b>	LTE Band 7	<b>BW / Mod. :</b>	20MHz / 16QAM
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**99% Occupied Bandwidth Plot on Channel 20850**



Date: 18.MAR.2015 22:11:37

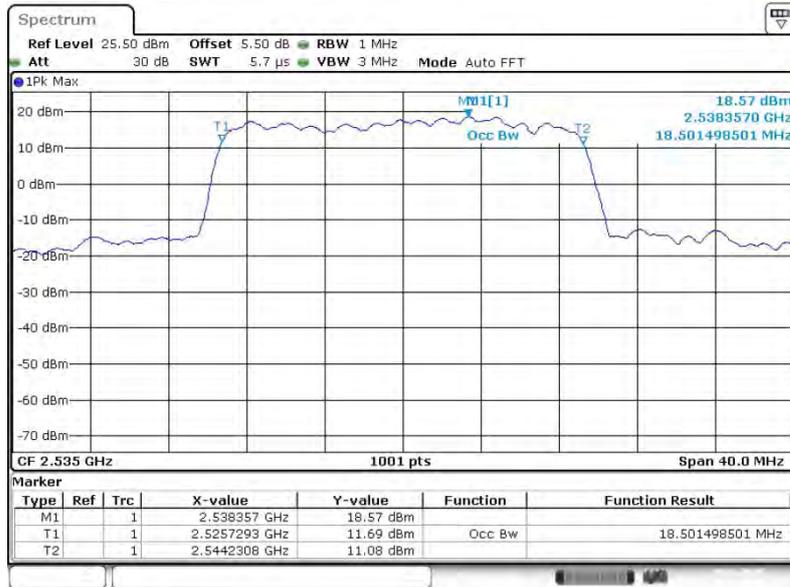
**26dB Bandwidth Plot on Channel 20850**



Date: 18.MAR.2015 22:12:00

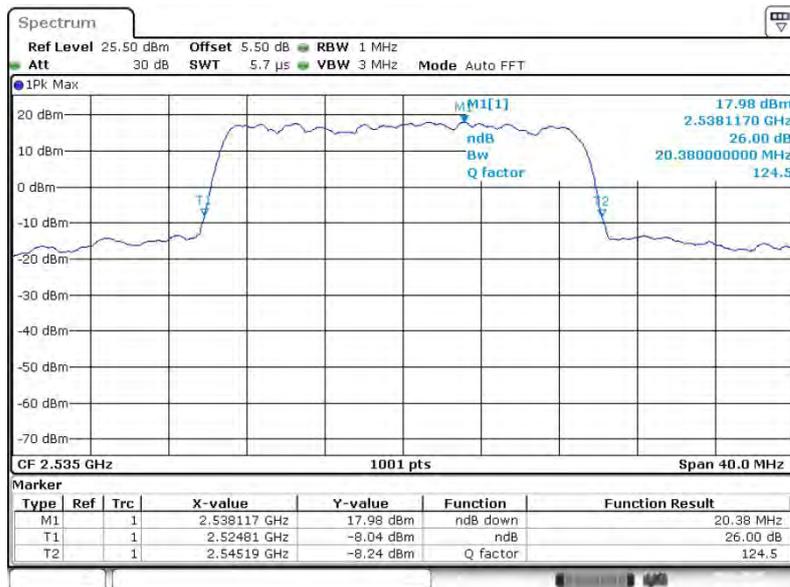


99% Occupied Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 22:15:01

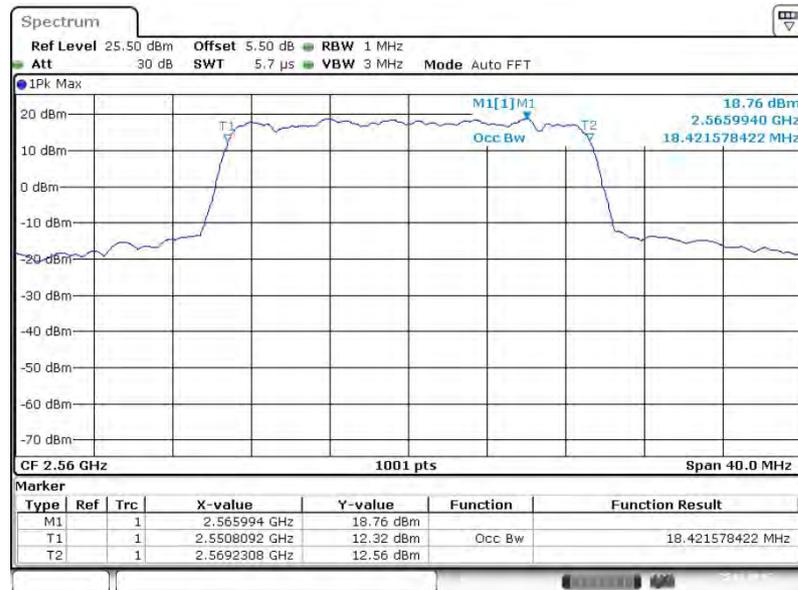
26dB Bandwidth Plot on Channel 21100



Date: 18.MAR.2015 22:15:25

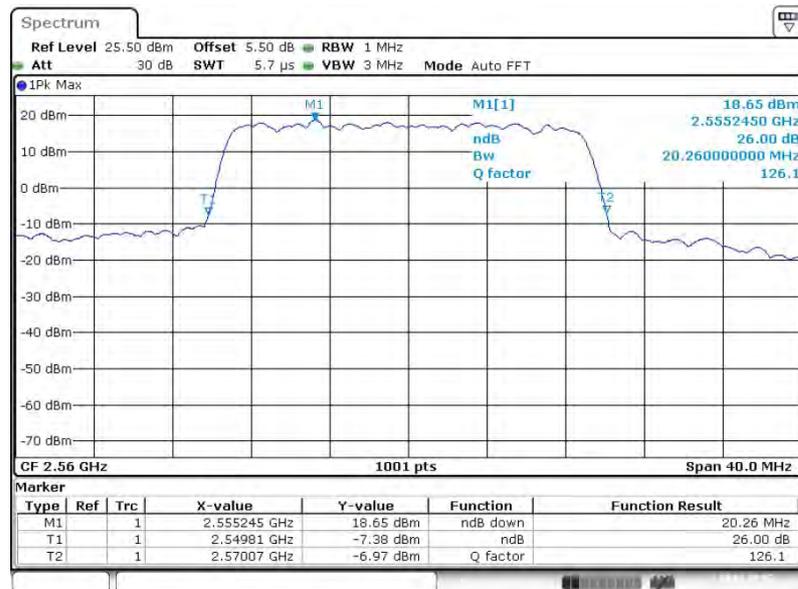


### 99% Occupied Bandwidth Plot on Channel 21350



Date: 25.MAR.2015 22:39:29

### 26dB Bandwidth Plot on Channel 21350



Date: 18.MAR.2015 22:18:50



## 3.5 Conducted Band Edge Measurement

### 3.5.1 Description of Conducted Band Edge Measurement

27.53 (m)(4)

For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

### 3.5.2 Measuring Instruments

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

### 3.5.3 Test Procedures

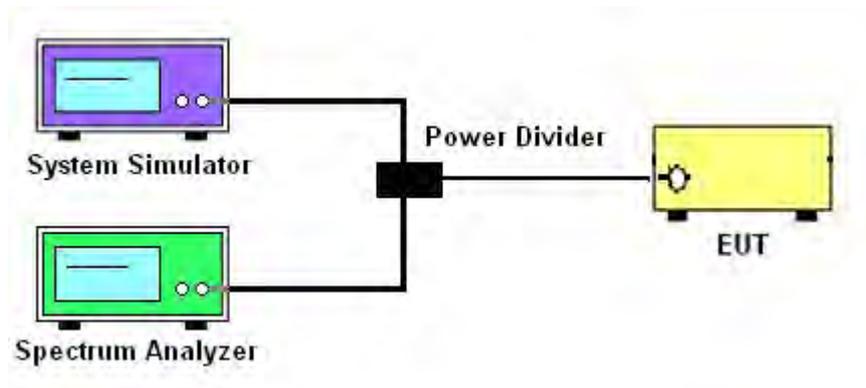
1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW  $\geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

5. The limit line is derived from  $43 + 10\log(P)$ 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.

<For Band 7>

The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)  
=  $P(W) - [55 + 10\log(P)]$  (dB)  
=  $[30 + 10\log(P)]$  (dBm) -  $[55 + 10\log(P)]$  (dB)  
= -25dBm.

### 3.5.4 Test Setup

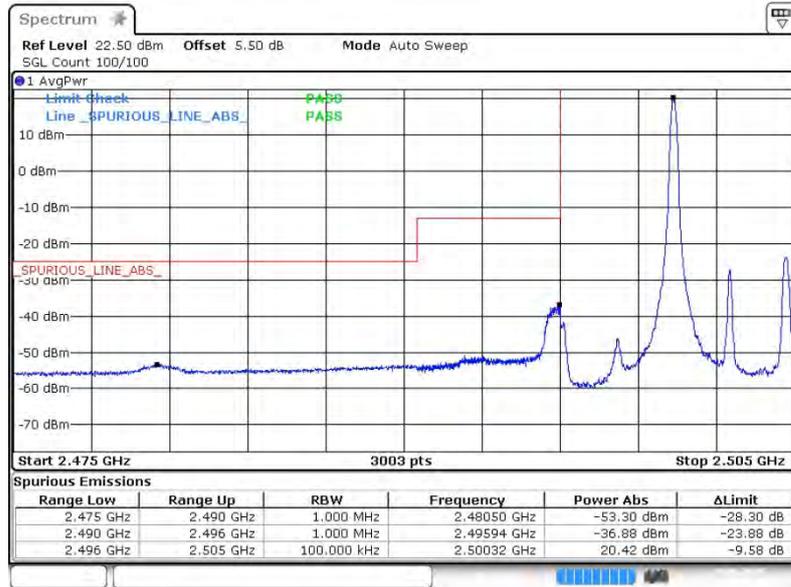




### 3.5.5 Test Result (Plots) of Conducted Band Edge

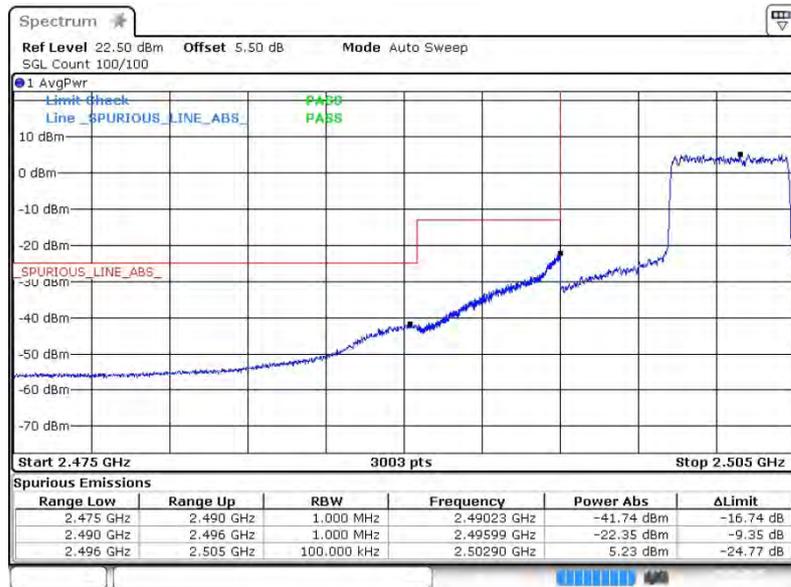
Band :	LTE Band 7	Band Width :	5MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 18.MAR.2015 23:49:37

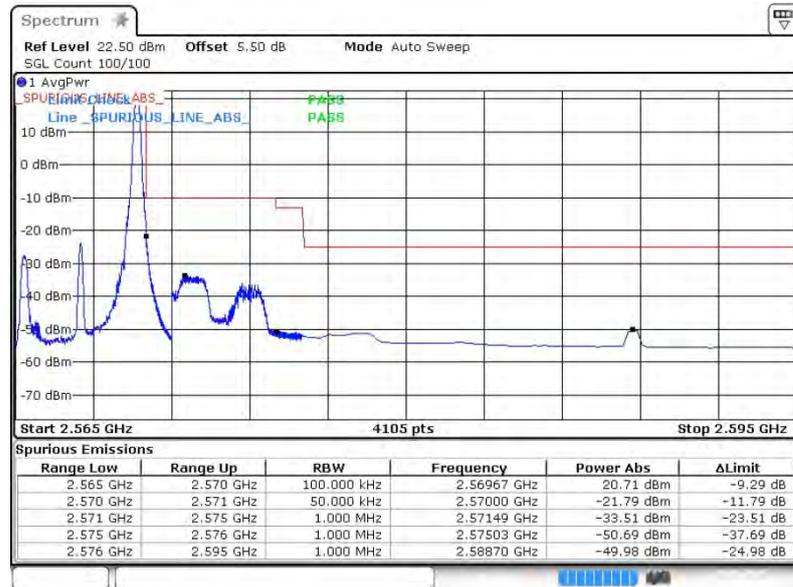
Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0



Date: 18.MAR.2015 23:50:10



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



Date: 18.MAR.2015 23:52:18

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

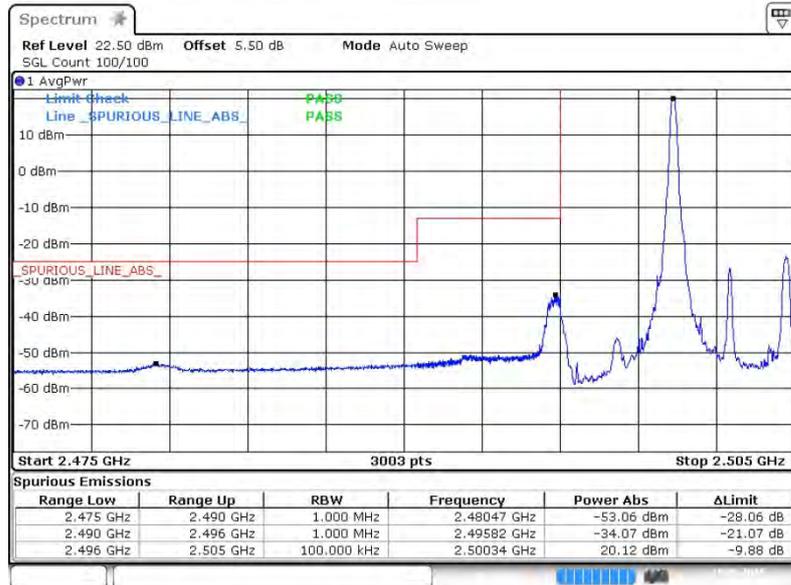


Date: 18.MAR.2015 23:51:45



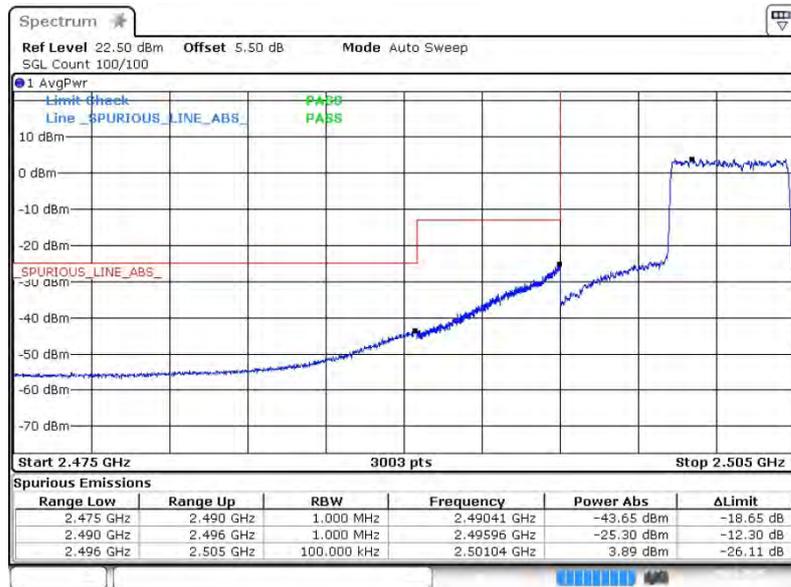
<b>Band :</b>	LTE Band 7	<b>Band Width :</b>	5MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 18.MAR.2015 23:49:15

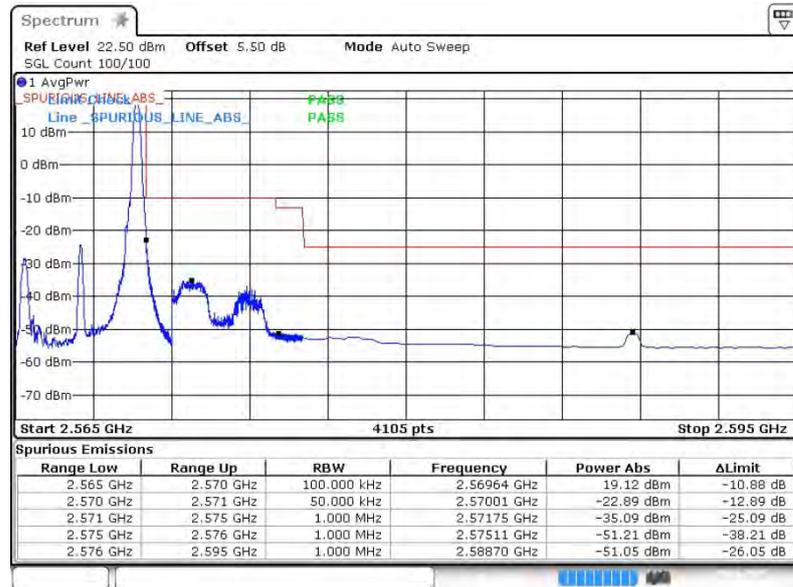
Lower Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



Date: 18.MAR.2015 23:50:30



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



Date: 18.MAR.2015 23:52:44

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

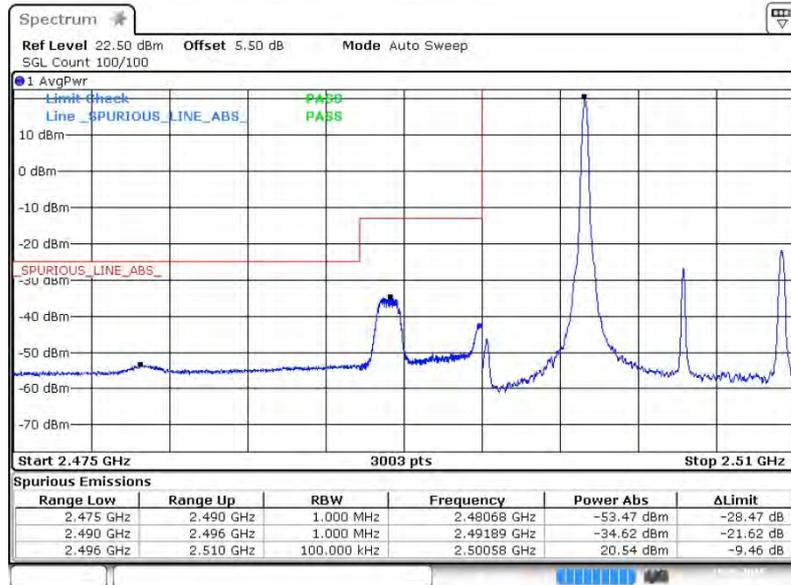


Date: 18.MAR.2015 23:51:12



Band :	LTE Band 7	Band Width :	10MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 18.MAR.2015 23:53:43

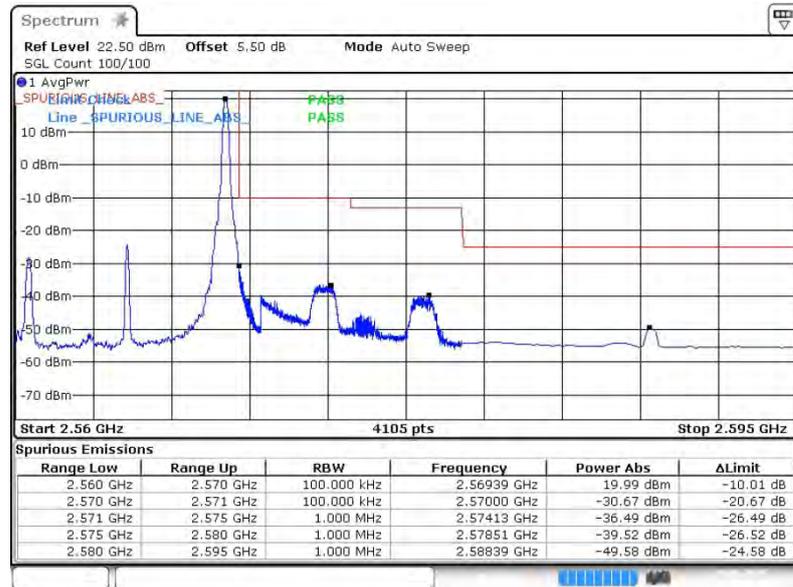
Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0



Date: 18.MAR.2015 23:54:04



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



Date: 18.MAR.2015 23:55:33

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

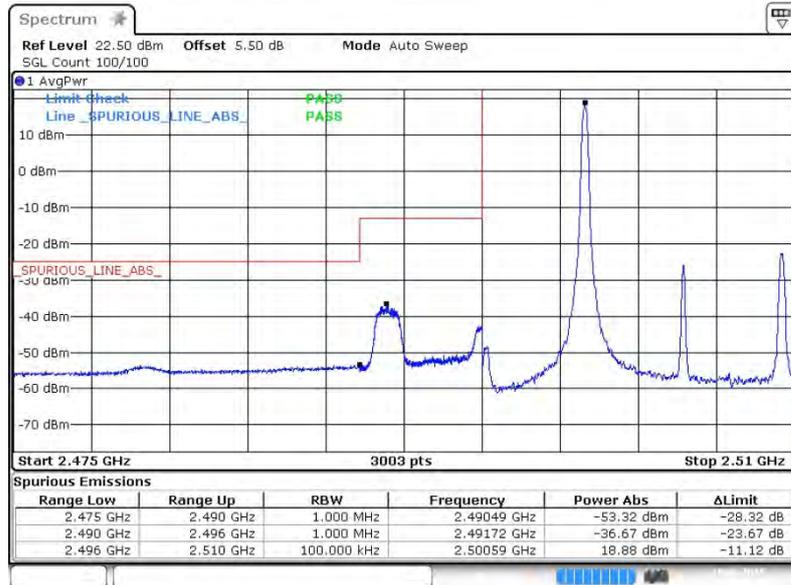


Date: 18.MAR.2015 23:55:11



Band :	LTE Band 7	Band Width :	10MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 18.MAR.2015 23:53:21

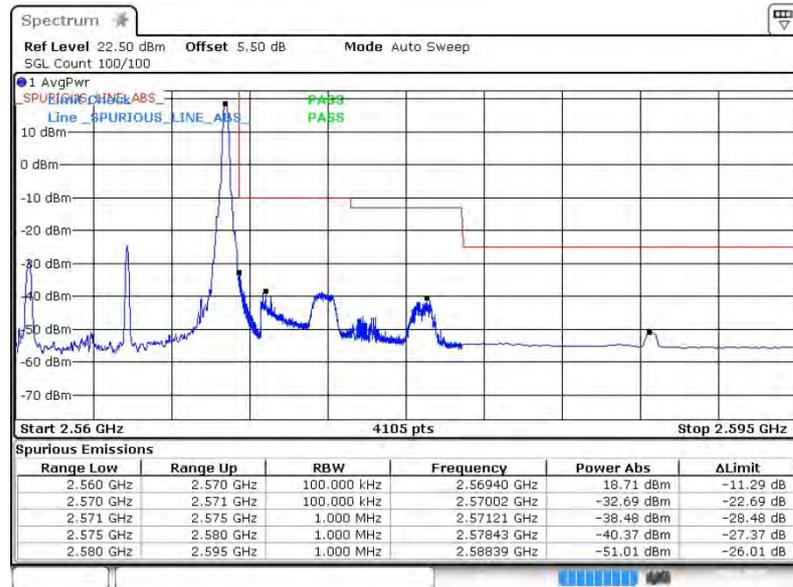
Lower Band Edge Plot for 16QAM-RB Size 50, RB Offset 0



Date: 18.MAR.2015 23:54:26



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



Date: 18.MAR.2015 23:55:53

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

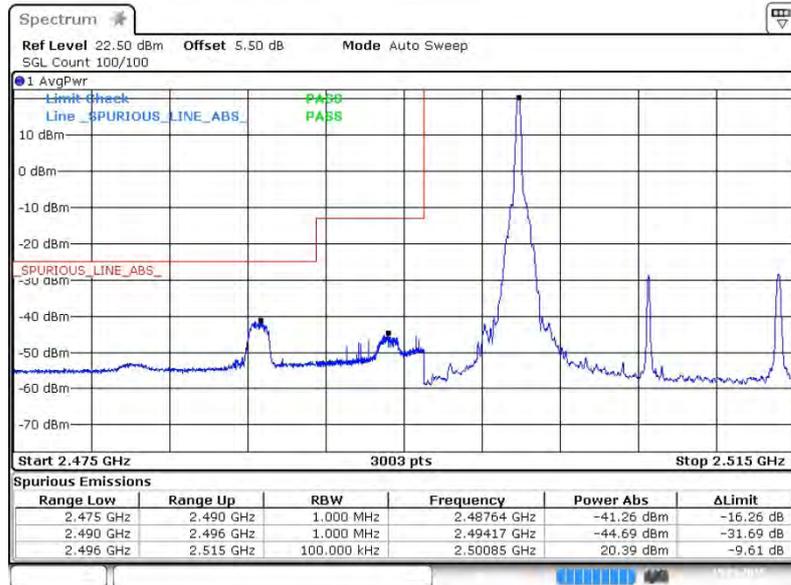


Date: 18.MAR.2015 23:54:47



Band :	LTE Band 7	Band Width :	15MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 19.MAR.2015 10:09:50

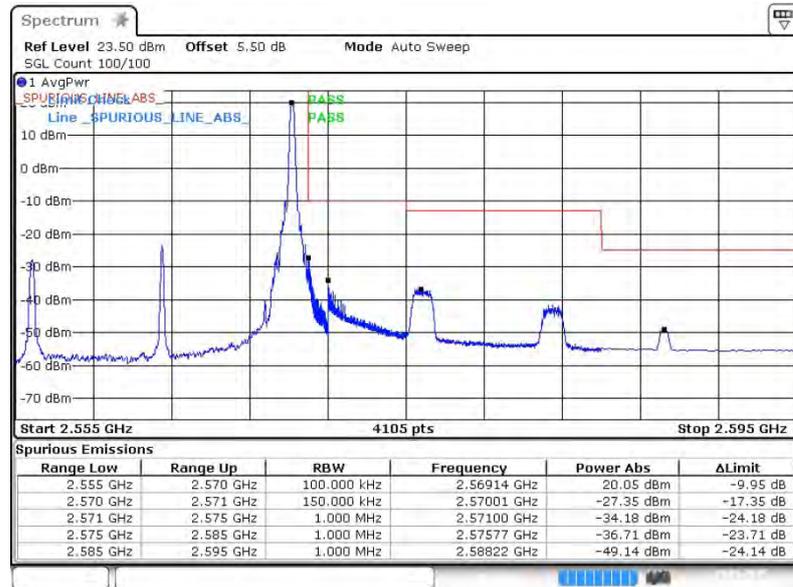
Lower Band Edge Plot for QPSK-RB Size 75, RB Offset 0



Date: 19.MAR.2015 10:07:44



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



Date: 19.MAR.2015 00:04:34

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

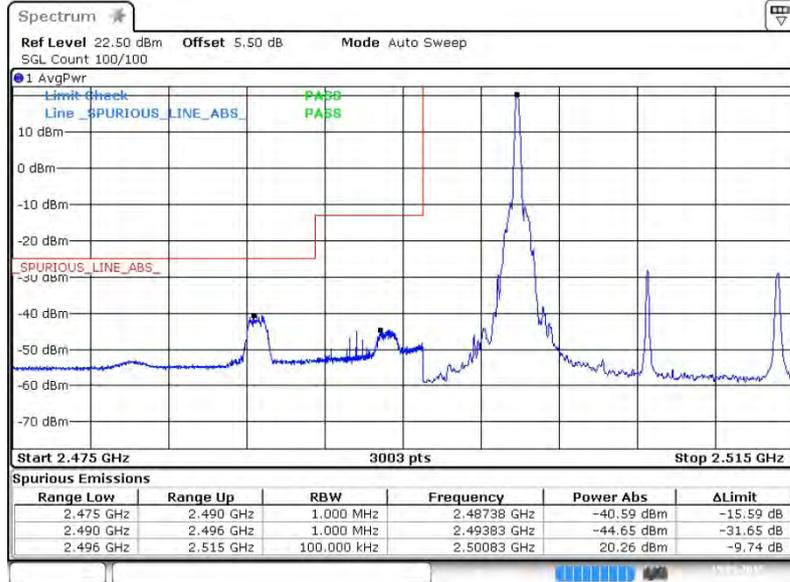


Date: 19.MAR.2015 00:04:16



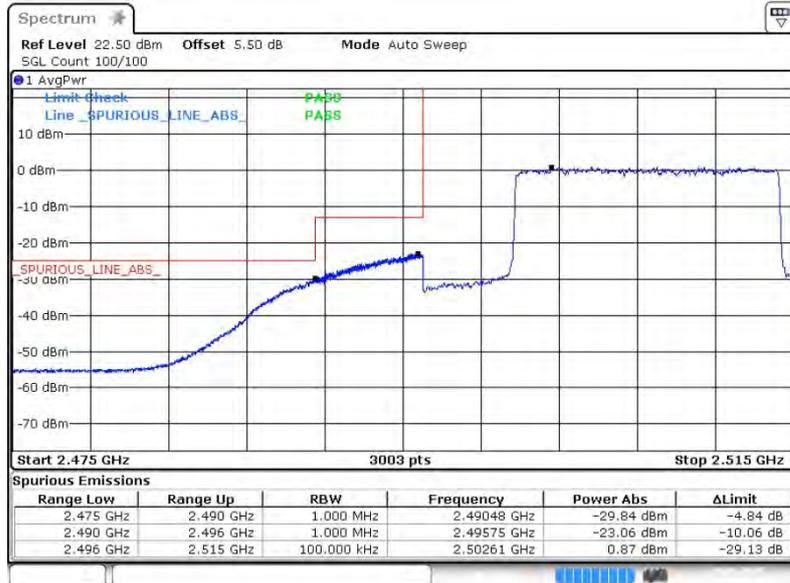
<b>Band :</b>	LTE Band 7	<b>Band Width :</b>	15MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 19.MAR.2015 10:09:19

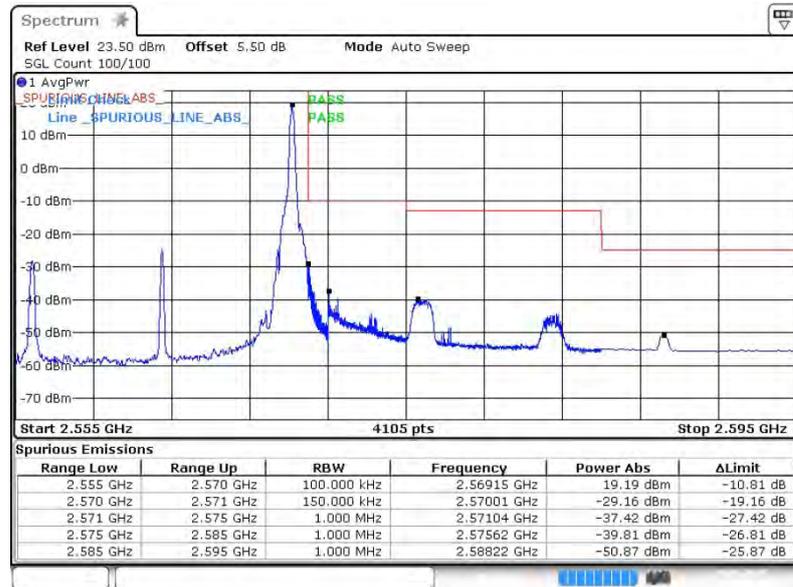
Lower Band Edge Plot for 16QAM-RB Size 75, RB Offset 0



Date: 19.MAR.2015 10:08:46



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



Date: 19.MAR.2015 00:04:55

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

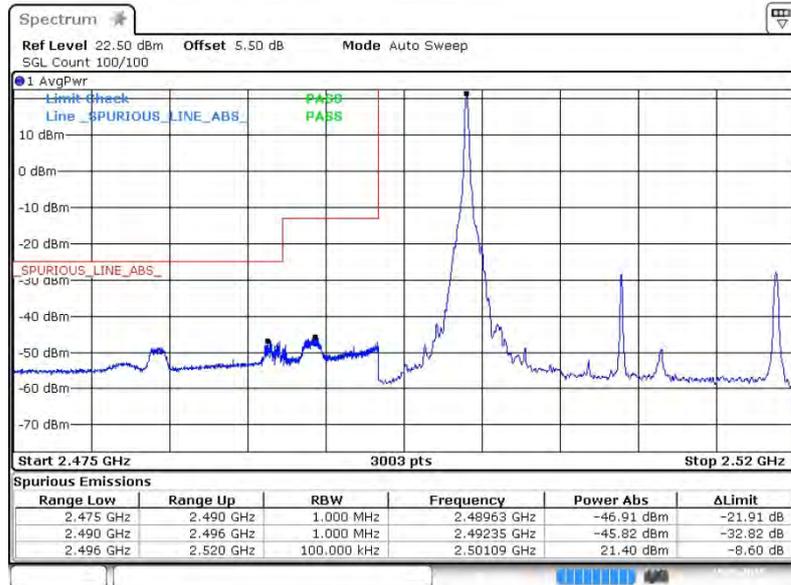


Date: 19.MAR.2015 00:03:58



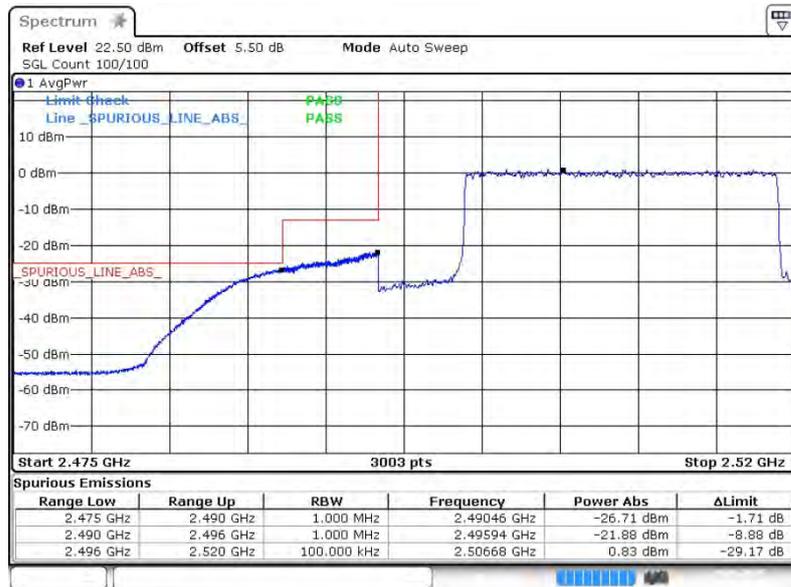
Band :	LTE Band 7	Band Width :	20MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 19.MAR.2015 10:11:47

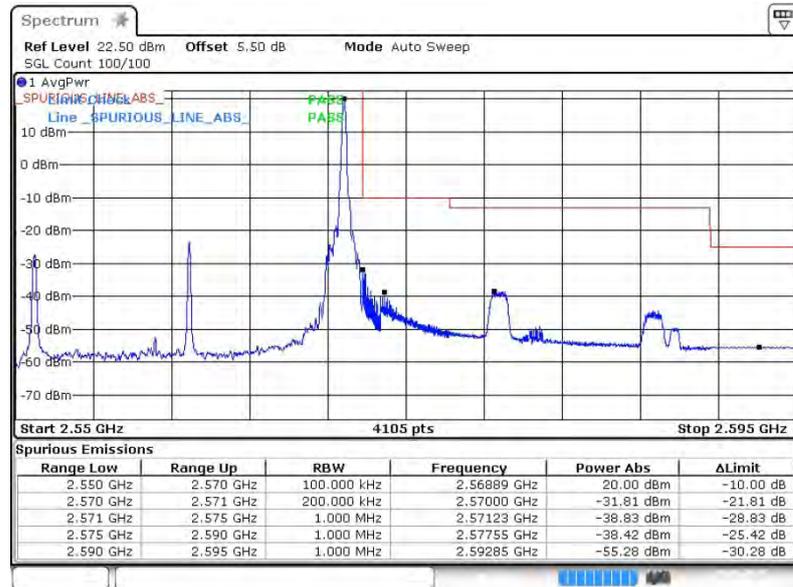
Lower Band Edge Plot for QPSK-RB Size 100, RB Offset 0



Date: 19.MAR.2015 10:13:17

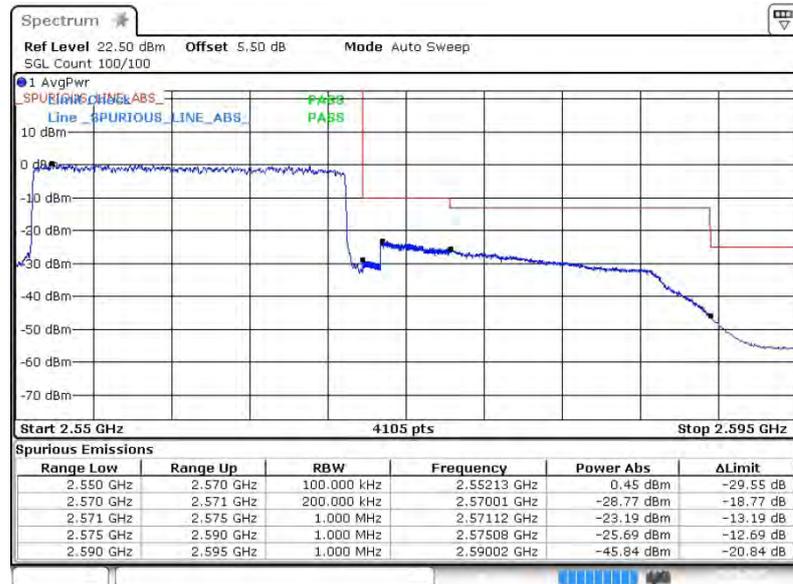


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 99



Date: 19.MAR.2015 00:08:48

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

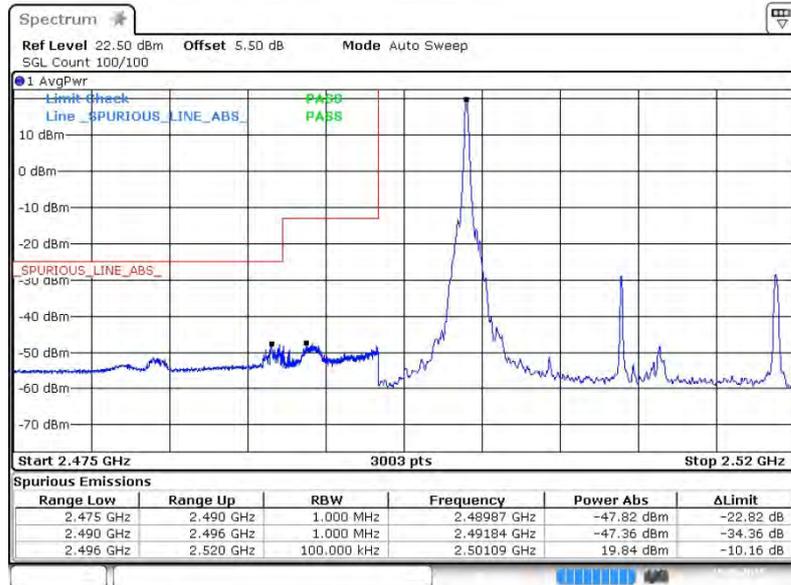


Date: 19.MAR.2015 00:07:40



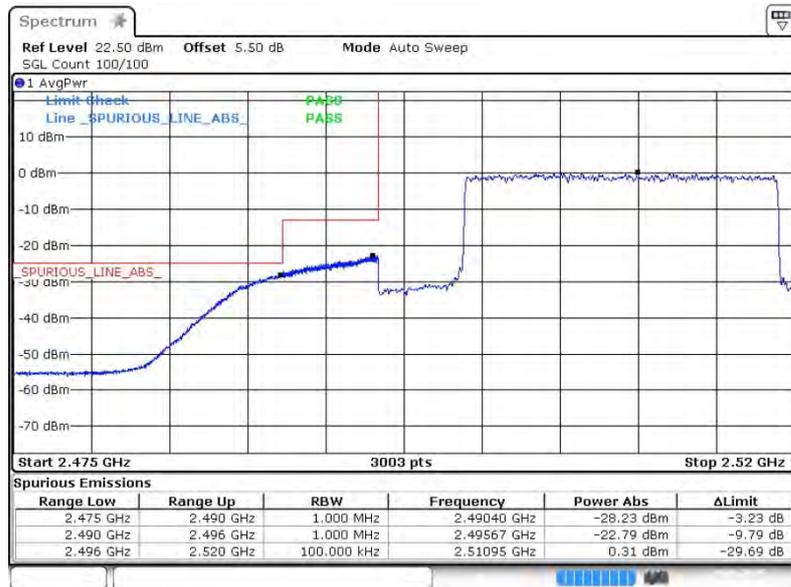
<b>Band :</b>	LTE Band 7	<b>Band Width :</b>	20MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 19.MAR.2015 10:12:13

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



Date: 19.MAR.2015 10:12:52

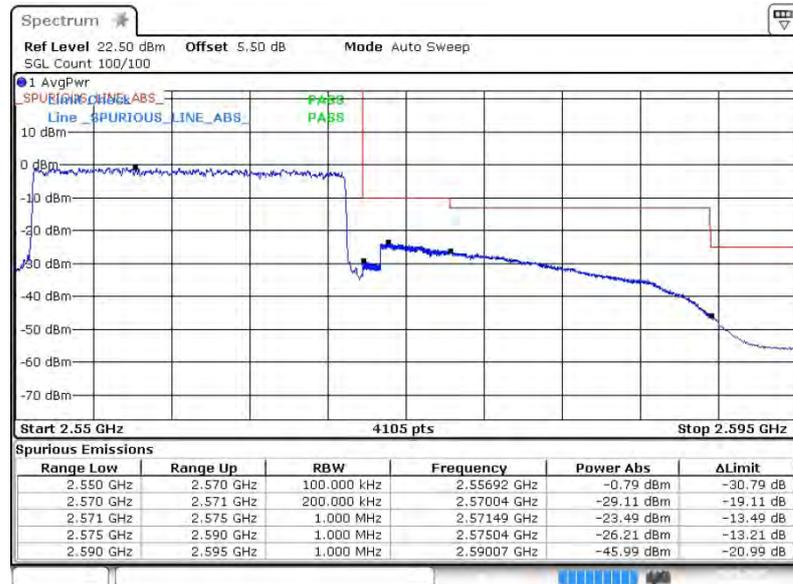


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 99



Date: 19.MAR.2015 00:09:19

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



Date: 19.MAR.2015 00:07:18



## 3.6 Conducted Spurious Emission Measurement

### 3.6.1 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.

For Band 7

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  $55 + 10 \log (P)$  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.

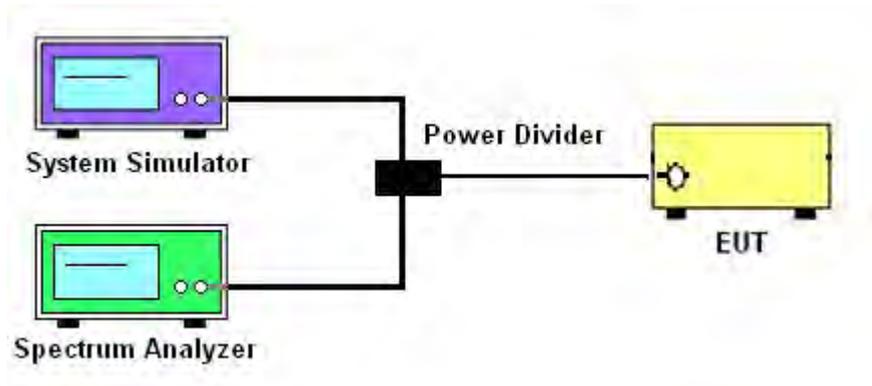
### 3.6.2 Measuring Instruments

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

### 3.6.3 Test Procedures

1. The EUT was 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)  
 $= -13$ dBm.
8. For Band 7  
The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)  
 $= P(W) - [55 + 10\log(P)]$  (dB)  
 $= [30 + 10\log(P)]$  (dBm) -  $[55 + 10\log(P)]$  (dB)  
 $= -25$ dBm.

### 3.6.4 Test Setup

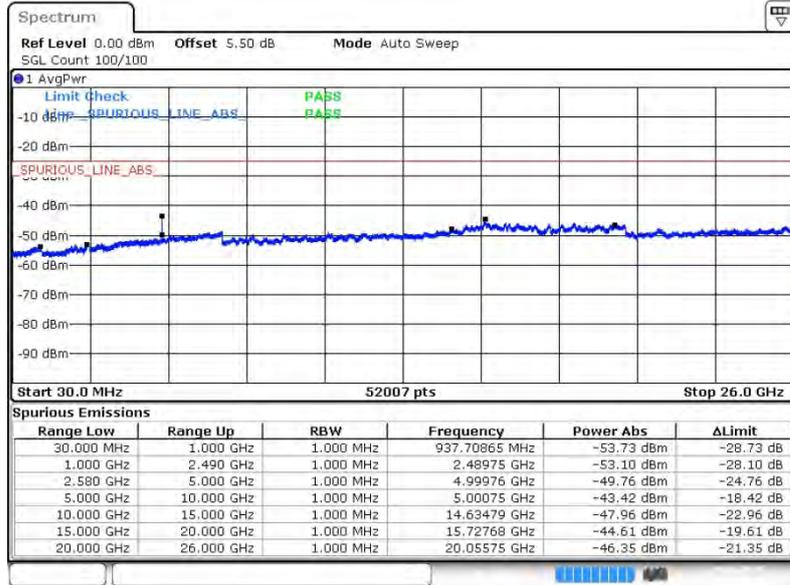




### 3.6.5 Test Result (Plots) of Conducted Spurious Emission

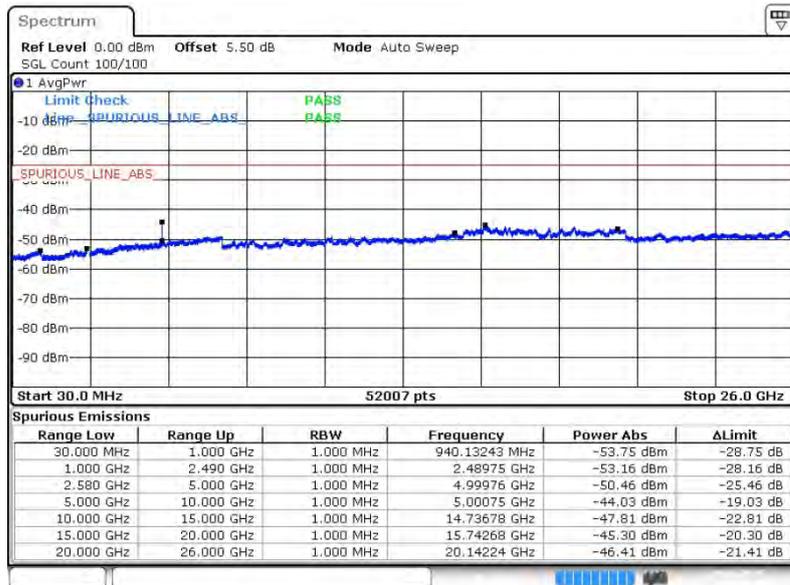
Band :	LTE Band 7	Channel :	CH20775 (Low)
Band Width :	5MHz		

#### QPSK (RB Size 1, RB Offset 0)



Date: 18.MAR.2015 21:42:12

#### 16QAM (RB Size 1, RB Offset 0)

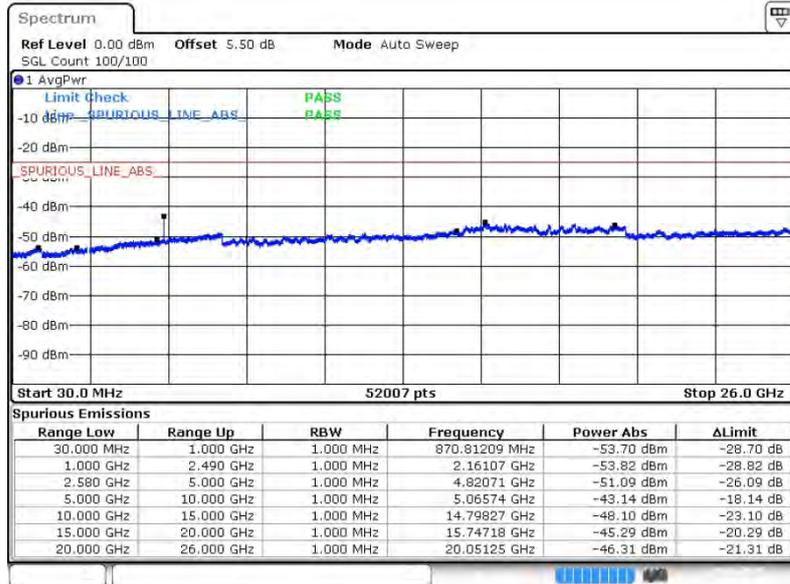


Date: 18.MAR.2015 21:43:34



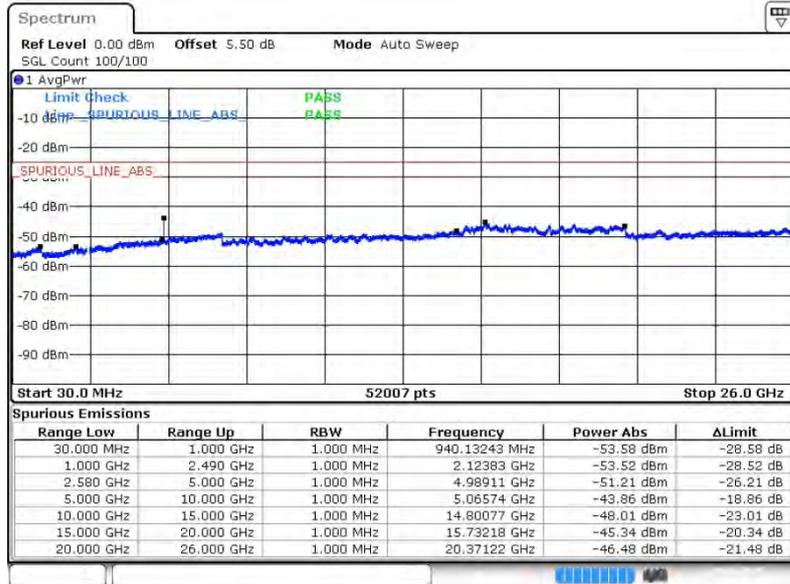
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH21100 (Middle)
<b>Band Width :</b>	5MHz		

QPSK (RB Size 1, RB Offset 0)



Date: 18.MAR.2015 21:45:39

16QAM (RB Size 1, RB Offset 0)

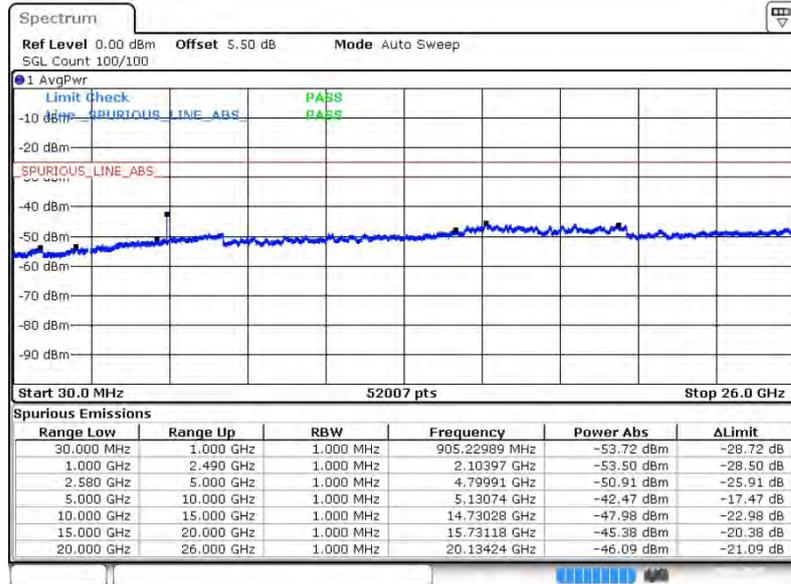


Date: 18.MAR.2015 21:47:00



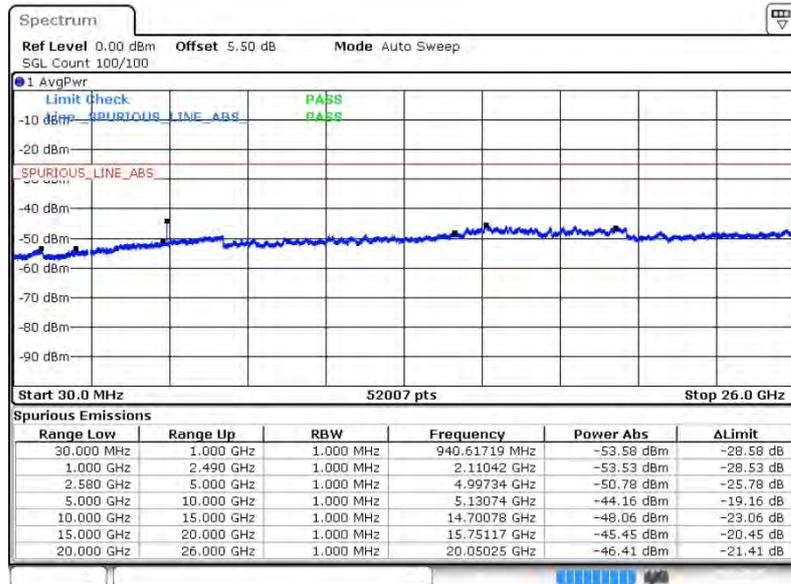
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH21425 (High)
<b>Band Width :</b>	5MHz		

**QPSK (RB Size 1, RB Offset 0)**



Date: 18.MAR.2015 21:49:06

**16QAM (RB Size 1, RB Offset 0)**

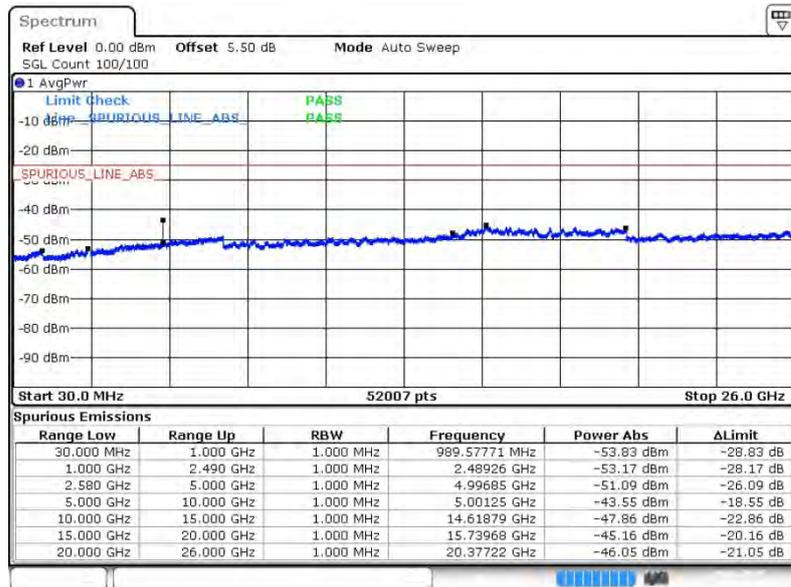


Date: 18.MAR.2015 21:50:27



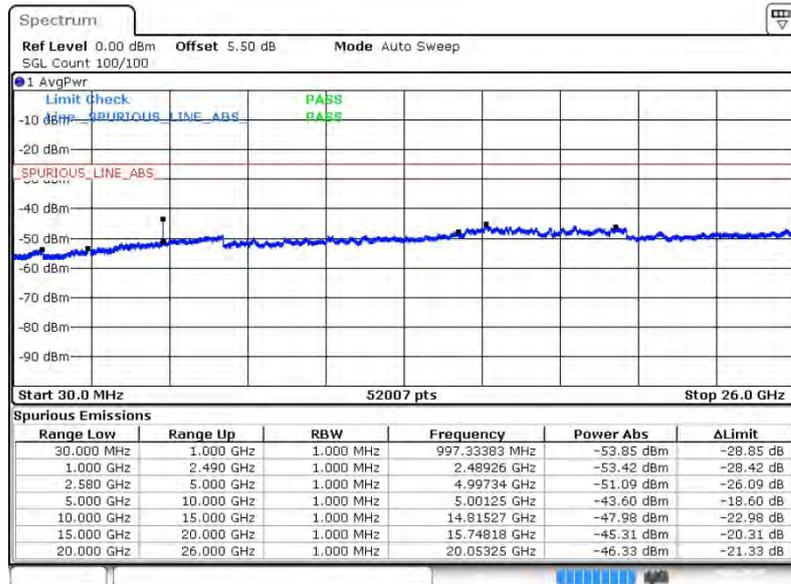
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH20800 (Low)
<b>Band Width :</b>	10MHz		

**QPSK (RB Size 1, RB Offset 0)**



Date: 18.MAR.2015 21:52:31

**16QAM (RB Size 1, RB Offset 0)**

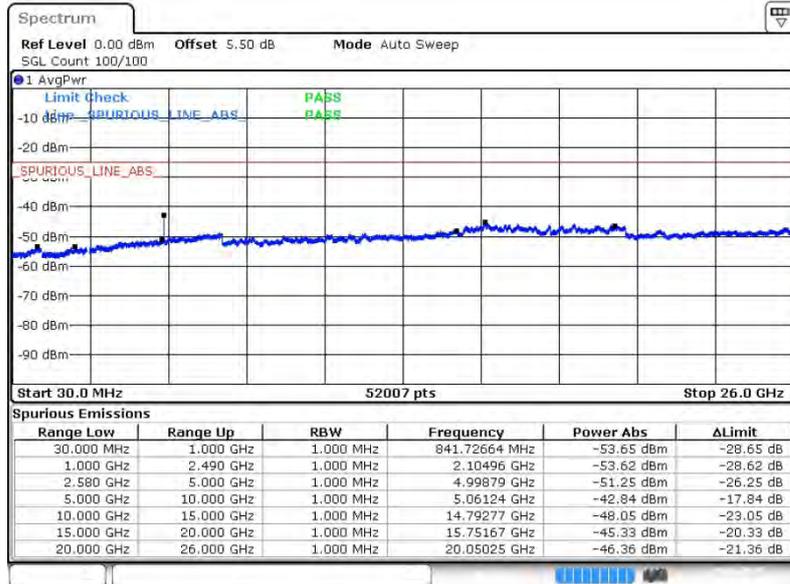


Date: 18.MAR.2015 21:53:52



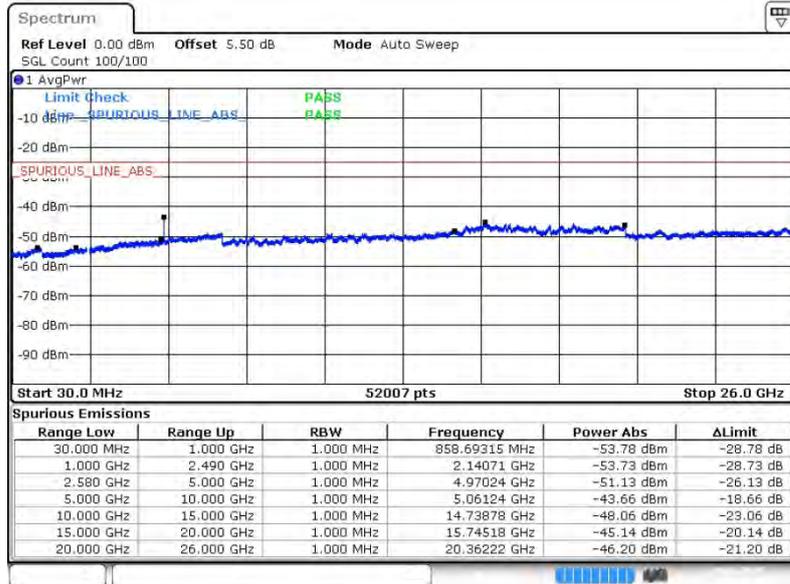
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH21100 (Middle)
<b>Band Width :</b>	10MHz		

**QPSK (RB Size 1, RB Offset 0)**



Date: 18.MAR.2015 21:55:57

**16QAM (RB Size 1, RB Offset 0)**

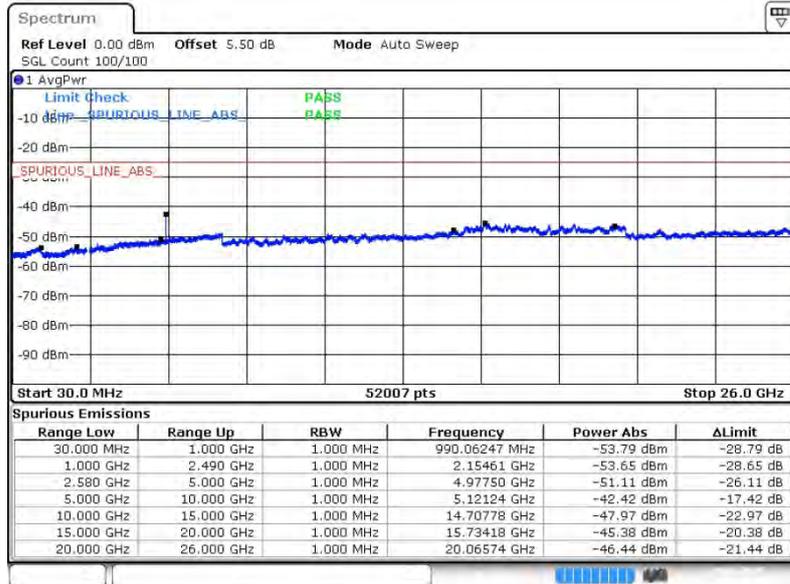


Date: 18.MAR.2015 21:57:20



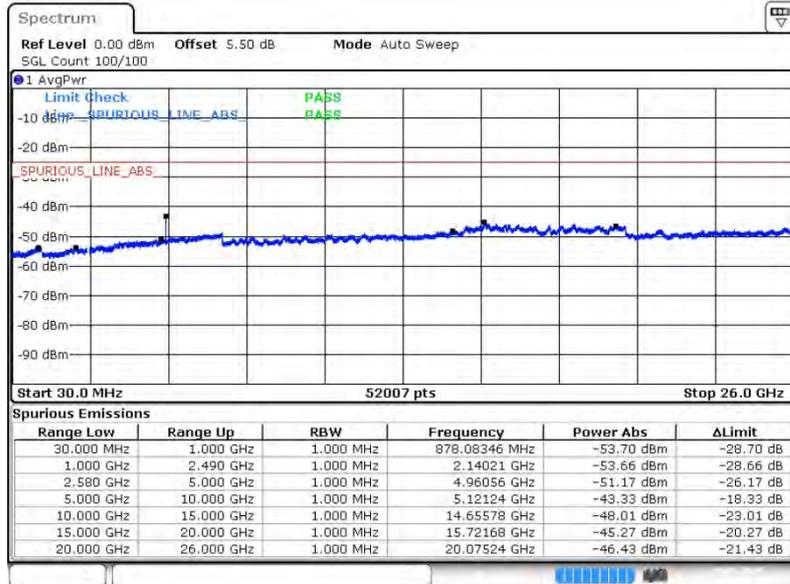
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH21400 (High)
<b>Band Width :</b>	10MHz		

QPSK (RB Size 1, RB Offset 0)



Date: 18.MAR.2015 21:59:25

16QAM (RB Size 1, RB Offset 0)

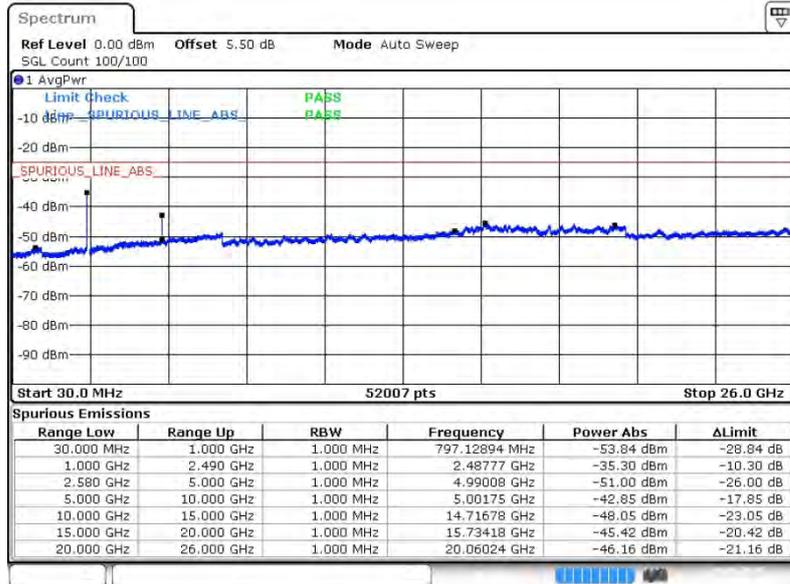


Date: 18.MAR.2015 22:00:48



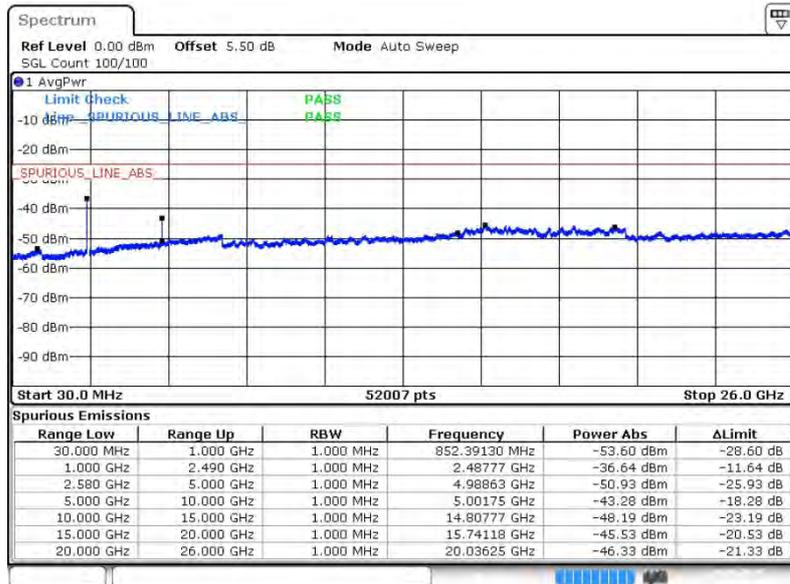
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH20825 (Low)
<b>Band Width :</b>	15MHz		

QPSK (RB Size 1, RB Offset 0)



Date: 18.MAR.2015 22:02:53

16QAM (RB Size 1, RB Offset 0)

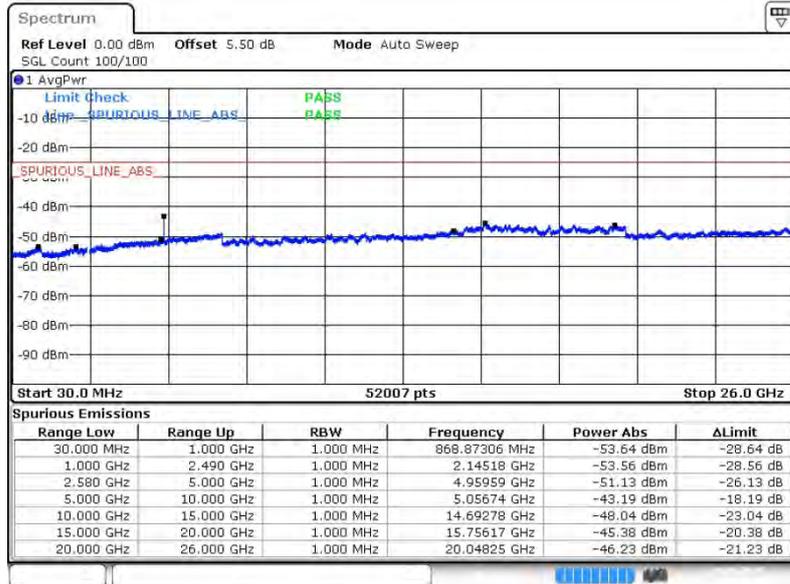


Date: 18.MAR.2015 22:04:14



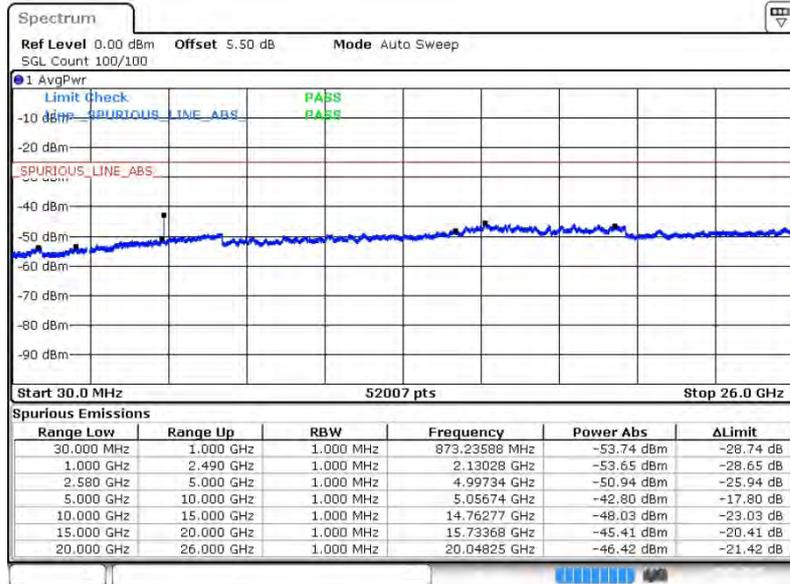
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH21100 (Middle)
<b>Band Width :</b>	15MHz		

QPSK (RB Size 1, RB Offset 0)



Date: 18.MAR.2015 22:06:19

16QAM (RB Size 1, RB Offset 0)



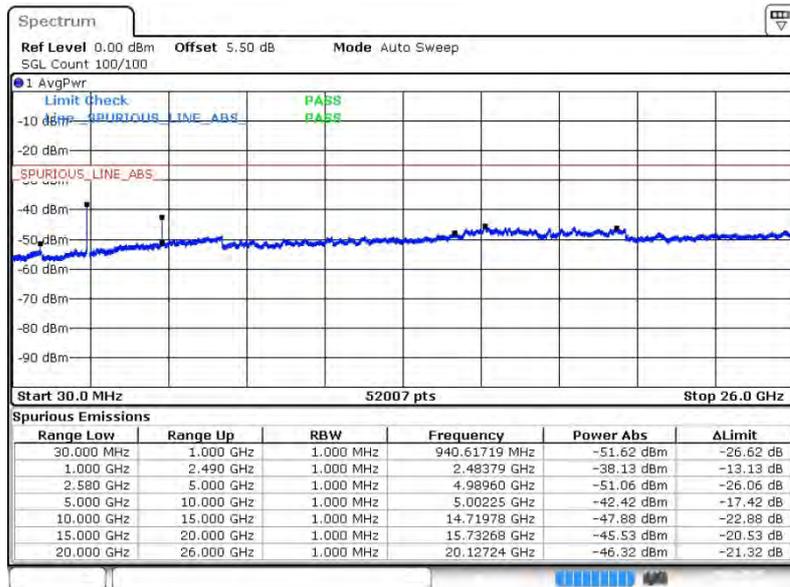
Date: 18.MAR.2015 22:07:40





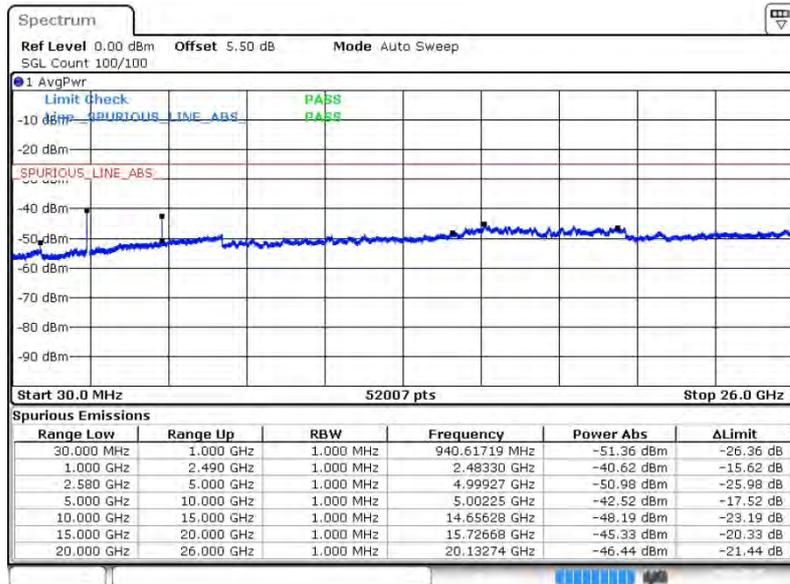
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH20850 (Low)
<b>Band Width :</b>	20MHz		

**QPSK (RB Size 1, RB Offset 0)**



Date: 18.MAR.2015 22:13:11

**16QAM (RB Size 1, RB Offset 0)**

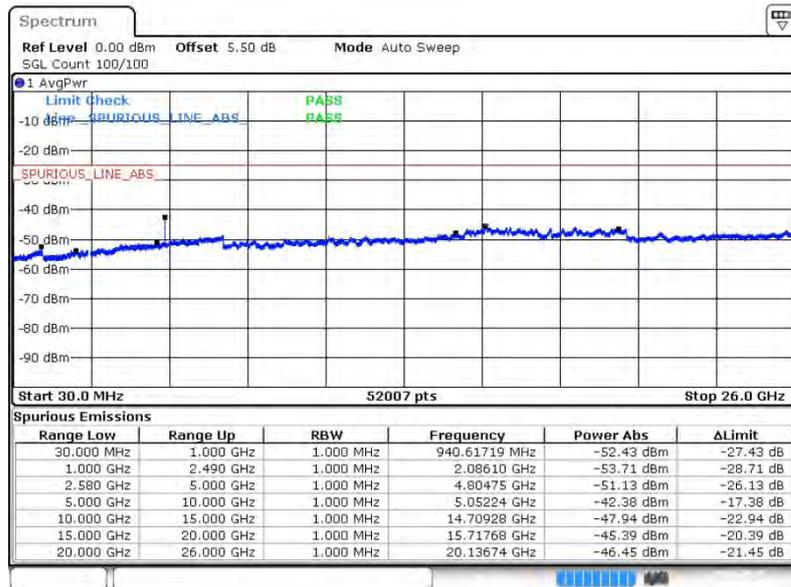


Date: 18.MAR.2015 22:14:31



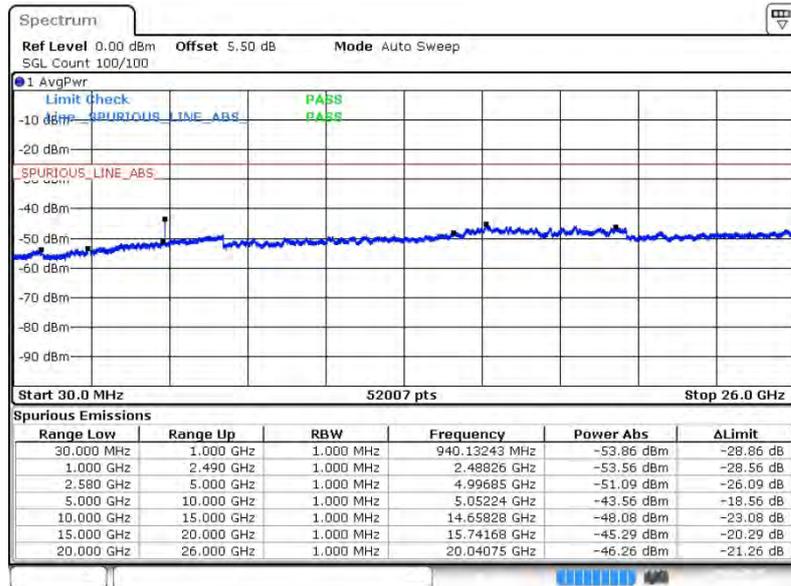
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH21100 (Middle)
<b>Band Width :</b>	20MHz		

**QPSK (RB Size 1, RB Offset 0)**



Date: 18.MAR.2015 22:16:35

**16QAM (RB Size 1, RB Offset 0)**

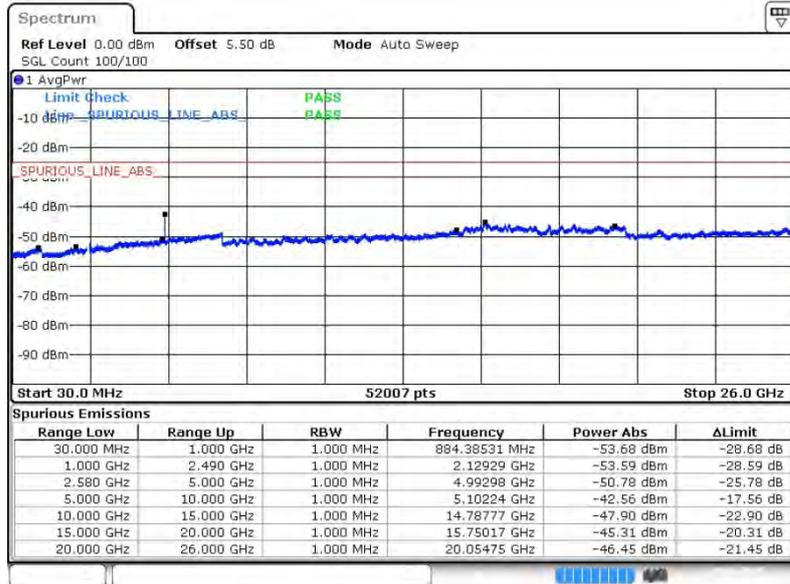


Date: 18.MAR.2015 22:17:56



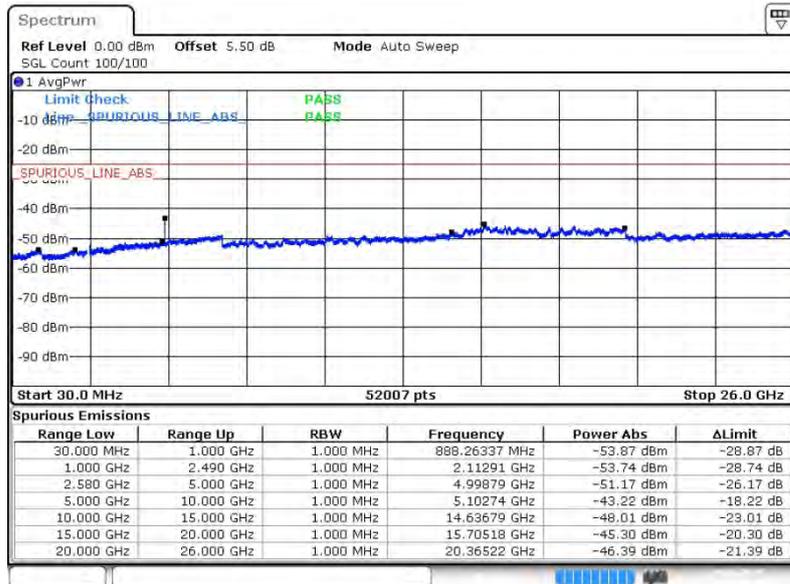
<b>Band :</b>	LTE Band 7	<b>Channel :</b>	CH21350 (High)
<b>Band Width :</b>	20MHz		

QPSK (RB Size 1, RB Offset 0)



Date: 18.MAR.2015 22:20:00

16QAM (RB Size 1, RB Offset 0)



Date: 18.MAR.2015 22:21:21



## 3.7 Radiated Spurious Emission Measurement

### 3.7.1 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.

For Band 7

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  $55 + 10 \log (P)$  dB.

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

### 3.7.2 Measuring Instruments

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

### 3.7.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. 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.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. 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)

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

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

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

For Band 7

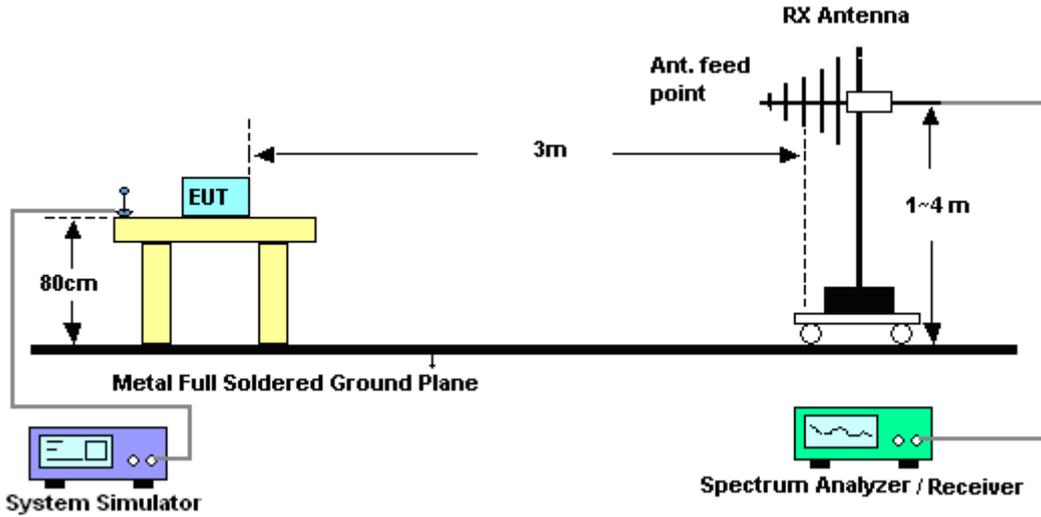
The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$12. \text{ EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$$

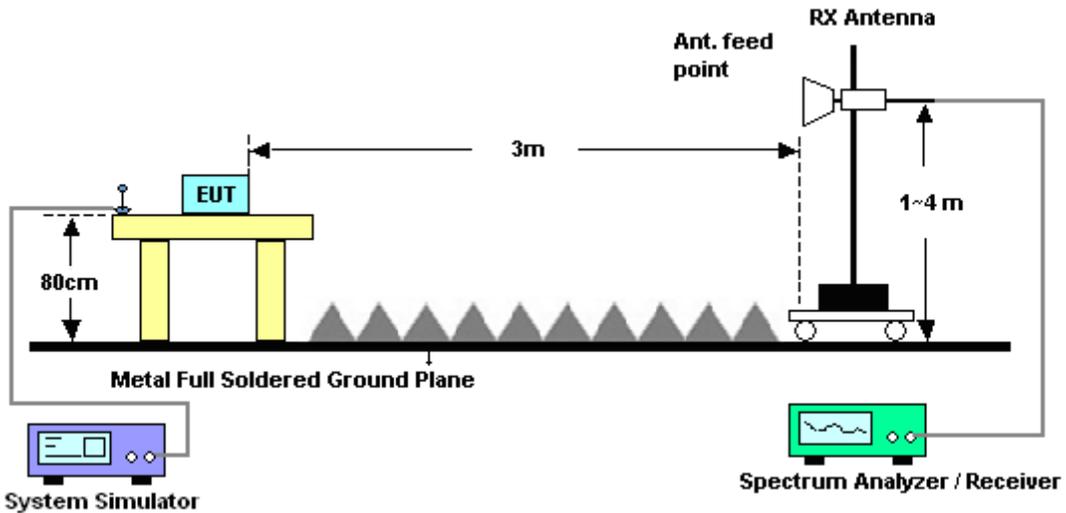
$$13. \text{ ERP (dBm)} = \text{EIRP} - 2.15$$

### 3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.7.5 Test Result of Field Strength of Spurious Radiated

<b>Band :</b>	LTE Band 7		<b>Temperature :</b>	18~19°C					
<b>Test Mode :</b>	5MHz QPSK RB Size 1 Offset 0		<b>Relative Humidity :</b>	41~42%					
<b>Test Engineer :</b>	Ken Huang		<b>Polarization :</b>	Horizontal					
<b>Remark :</b>	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
5064	-44.15	-25	-19.15	-66.91	-51.48	2.37	9.70	H	Pass
7600	-30.62	-25	-5.62	-58.98	-40.08	2.40	11.86	H	Pass
10132	-41.68	-25	-16.68	-72.99	-51.24	2.70	12.25	H	Pass

<b>Band :</b>	LTE Band 7		<b>Temperature :</b>	18~19°C					
<b>Test Mode :</b>	5MHz QPSK RB Size 1 Offset 0		<b>Relative Humidity :</b>	41~42%					
<b>Test Engineer :</b>	Ken Huang		<b>Polarization :</b>	Vertical					
<b>Remark :</b>	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
5064	-40.84	-25	-15.84	-62.04	-48.17	2.37	9.70	V	Pass
7600	-28.99	-25	-3.99	-56.63	-38.45	2.40	11.86	V	Pass
10132	-41.70	-25	-16.70	-72.12	-51.26	2.70	12.25	V	Pass



<b>Band :</b>	LTE Band 7	<b>Temperature :</b>	18~19°C						
<b>Test Mode :</b>	10MHz QPSK RB Size 1 Offset 0	<b>Relative Humidity :</b>	41~42%						
<b>Test Engineer :</b>	Ken Huang	<b>Polarization :</b>	Horizontal						
<b>Remark :</b>	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
5060	-42.85	-25	-17.85	-64.89	-50.18	2.37	9.70	H	5060
7592	-29.54	-25	-4.54	-58.38	-39	2.40	11.86	H	7592
10124	-40.48	-25	-15.48	72.27	-50.03	2.70	12.25	H	10124

<b>Band :</b>	LTE Band 7	<b>Temperature :</b>	18~19°C						
<b>Test Mode :</b>	10MHz QPSK RB Size 1 Offset 0	<b>Relative Humidity :</b>	41~42%						
<b>Test Engineer :</b>	Ken Huang	<b>Polarization :</b>	Vertical						
<b>Remark :</b>	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
5060	-39.25	-25	-14.25	-61.51	-46.58	2.37	9.70	V	5060
7592	-28.43	-25	-3.43	-55.79	-37.89	2.40	11.86	V	7592
10124	-41.23	-25	-16.23	-71.27	-50.78	2.70	12.25	V	10124



<b>Band :</b>	LTE Band 7		<b>Temperature :</b>	18~19°C					
<b>Test Mode :</b>	15MHz QPSK RB Size 1 Offset 0		<b>Relative Humidity :</b>	41~42%					
<b>Test Engineer :</b>	Ken Huang		<b>Polarization :</b>	Horizontal					
<b>Remark :</b>	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
5054	-44.99	-25	-19.99	-58.97	-50.77	3.49	9.27	H	Pass
7586	-40.86	-25	-15.86	-58.31	-48.65	4.28	12.07	H	Pass
10112	-42.84	-25	-17.84	-64.23	-50.14	5.1	12.40	H	Pass

<b>Band :</b>	LTE Band 7		<b>Temperature :</b>	18~19°C					
<b>Test Mode :</b>	15MHz QPSK RB Size 1 Offset 0		<b>Relative Humidity :</b>	41~42%					
<b>Test Engineer :</b>	Ken Huang		<b>Polarization :</b>	Vertical					
<b>Remark :</b>	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
5054	-39.96	-25	-14.96	-56.24	-45.74	3.49	9.27	V	Pass
7583	-44.22	-25	-19.22	-61.24	-52.01	4.28	12.07	V	Pass
10112	-42.73	-25	-17.73	-63.83	-50.03	5.1	12.40	V	Pass



<b>Band :</b>	LTE Band 7	<b>Temperature :</b>	18~19°C						
<b>Test Mode :</b>	20MHz QPSK RB Size 1 Offset 0	<b>Relative Humidity :</b>	41~42%						
<b>Test Engineer :</b>	Ken Huang	<b>Polarization :</b>	Horizontal						
<b>Remark :</b>	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
5052	-40.81	-25	-15.81	-63.53	-48.14	2.37	9.70	H	Pass
7580	-31.68	-25	-6.68	-59.87	-41.12	2.40	11.85	H	Pass
10104	-41.78	-25	-16.78	-73.43	-51.33	2.70	12.24	H	Pass

<b>Band :</b>	LTE Band 7	<b>Temperature :</b>	18~19°C						
<b>Test Mode :</b>	20MHz QPSK RB Size 1 Offset 0	<b>Relative Humidity :</b>	41~42%						
<b>Test Engineer :</b>	Ken Huang	<b>Polarization :</b>	Vertical						
<b>Remark :</b>	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
5052	-37.85	-25	-12.85	-59.2	-45.18	2.37	9.70	V	Pass
7580	-28.34	-25	-3.34	-55.83	-37.78	2.40	11.85	V	Pass
10104	-40.56	-25	-15.56	-70.97	-50.11	2.70	12.24	V	Pass

## 3.8 Frequency Stability Measurement

### 3.8.1 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.

### 3.8.2 Measuring Instruments

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

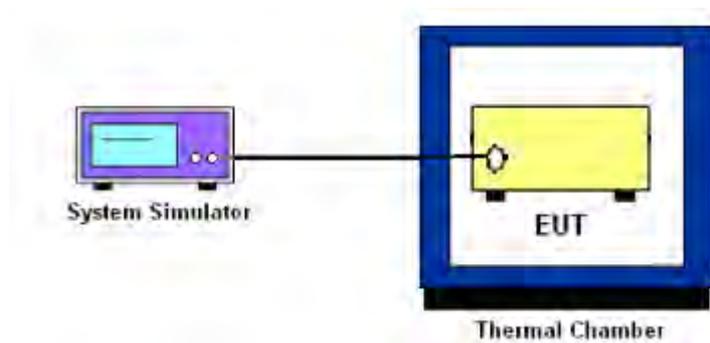
### 3.8.3 Test Procedures for Temperature Variation

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.

### 3.8.4 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.

### 3.8.5 Test Setup





3.8.6 Test Result of Temperature Variation (FCC)

Band :	LTE Band 7 (QPSK)	Limit (ppm) :	within authorized band
Temperature (°C)	BW 10MHz		Result
	Deviation (ppm)		
50	0.0036		PASS
40	0.0002		
30	0.0002		
20(Ref.)	0.0000		
10	0.0052		
0	0.0013		
-10	0.0017		
-20	0.0011		
-30	0.0003		

3.8.7 Test Result of Voltage Variation (FCC)

Band	Bandwidth	Voltage (Volt)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 7	10M	4.2	0.0032	(Note 3.)	PASS
		Normal	0.0012		
		3.5	0.0013		

Remark:

1. Normal Voltage = 3.8V.
2. The manufacturer declared that the EUT could work properly between voltage 3.5V ~ 4.2V.
3. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV30	101338	9kHz~30GHz	May 04, 2014	Mar. 18, 2015~ Mar. 25, 2015	May 03, 2015	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 25, 2014	Mar. 18, 2015~ Mar. 25, 2015	Oct. 24, 2015	Conducted (TH01-KS)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9 kHz~7 GHz	Aug. 30, 2014	Apr. 07, 2015	Aug. 29, 2015	Radiation (03CH10-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	101749	10Hz ~ 30GHz	Feb. 09, 2015	Apr. 07, 2015	Feb. 08, 2016	Radiation (03CH10-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Sep. 27, 2014	Apr. 07, 2015	Sep. 26, 2015	Radiation (03CH10-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 19, 2014	Apr. 07, 2015	Aug. 18, 2015	Radiation (03CH10-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Oct. 02, 2014	Apr. 07, 2015	Oct. 01, 2015	Radiation (03CH10-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz	Mar. 16, 2015	Apr. 07, 2015	Mar. 15, 2016	Radiation (03CH10-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Oct. 21, 2014	Apr. 07, 2015	Oct. 20, 2015	Radiation (03CH10-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Apr. 07, 2015	N/A	Radiation (03CH10-HY)
Antenna Mast	ChainTek	M-400-0	114/8000604/L	N/A	N/A	Apr. 07, 2015	N/A	Radiation (03CH10-HY)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Sep. 29, 2014	Apr. 29, 2015	Sep. 28, 2015	Radiation (03CH02-KS)
Spectrum Analyzer	R&S	FSV40	101040	10kHz~40GHz;Max 30dBm	Sep. 25, 2014	Apr. 29, 2015	Sep. 24, 2015	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz-2GHz	Sep. 13, 2014	Apr. 29, 2015	Sep. 12, 2015	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	Apr. 29, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Apr. 29, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18Ghz-40GHz	Sep. 04, 2014	Apr. 29, 2015	Sep. 03, 2015	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz ~1000MHz / 32 dB	May 04, 2014	Apr. 29, 2015	May 03, 2015	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1-26.5GHz Gain 30dB	Oct. 28, 2014	Apr. 29, 2015	Oct. 27, 2015	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Apr. 29, 2015	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Apr. 29, 2015	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Apr. 29, 2015	NCR	Radiation (03CH02-KS)



## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz) for 03CH10-HY

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.5 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz) for 03CH02-KS

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.1 dB
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