

FCC RF Test Report

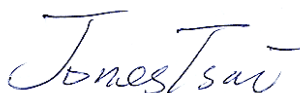
APPLICANT : Novatel Wireless
EQUIPMENT : Fixed Wireless Gateway
BRAND NAME : Novatel Wireless Inc.
MODEL NAME : SA 2100-V
FCC ID : PKRNVWSA2100V
STANDARD : 47 CFR Part 2, 27(L), 27(F)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

The product was received on Nov. 13, 2013 and testing was completed on Nov. 24, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (SHENZHEN) INC.

No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.



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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(c)(10)	Effective Radiated Power (Band 13)	ERP < 3 Watts		
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1Watt		
3.2	§24.232(d) 27.53(d)(5)	Peak-to-Average Ratio	<13 dB	PASS	-
3.3	§2.1049 §27.53(h)(3)	Occupied Bandwidth	Reporting Only	PASS	-
3.4	§2.1049 §27.53(c) (h)	Conducted Band Edge Measurement (Band 4) (Band 13)	< 43+10log ₁₀ (P[Watts])	PASS	-
3.5	§2.1051 §27.53(c)(h)	Conducted Spurious Emission (Band 4) (Band 13)	< 43+10log ₁₀ (P[Watts])	PASS	-
3.6	§2.1053 §27.53(c) (h)	Radiated Spurious Emission (Band 4) (Band 13)	< 43+10log ₁₀ (P[Watts])	PASS	Under limit 30.42 dB at 3464.000 MHz
3.7	§2.1055 §27.54	Frequency Stability Temperature & Voltage	< 2.5 ppm	PASS	-



1 General Description

1.1 Applicant

Novatel Wireless

9645 Scranton Road, Suite #205, San Diego, California USA 92121

1.2 Manufacturer

Novatel Wireless

9645 Scranton Road, Suite #205, San Diego, California USA 92121

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Fixed Wireless Gateway
Brand Name	Novatel Wireless Inc.
Model Name	SA 2100-V
FCC ID	PKRNVWSA2100V
EUT supports Radios application	CDMA/EV-DO/LTE/WLAN 2.4GHz 802.11b/g/n HT20
EUT Stage	Production Unit

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 of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz
Rx Frequency	LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 13 : 748.5 MHz ~ 753.5 MHz
Bandwidth	1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz (LTE Band 4) 5MHz / 10MHz (LTE Band 13)
Maximum Output Power to Antenna	LTE Band 4 : 23.95 dBm LTE Band 13 : 23.63 dBm
Antenna Type	PIFA Antenna
Antenna Gain	LTE Band 4 : 1.64 dBi LTE Band 13 : 0.04 dBi
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

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

1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	BW	Maximum ERP/EIRP	Frequency Tolerance (% , Hz, ppm)	Emission Designator
Part 27L	LTE Band 4	QPSK	1.4 MHz	0.36 W	0.007 ppm	1M10G7D
Part 27L	LTE Band 4	16QAM	1.4 MHz	0.29 W	0.006 ppm	1M10D7W
Part 27L	LTE Band 4	QPSK	3 MHz	0.35 W	0.007 ppm	2M72G7D
Part 27L	LTE Band 4	16QAM	3 MHz	0.29 W	0.007 ppm	2M74D7W
Part 27L	LTE Band 4	QPSK	5MHz	0.36 W	0.007 ppm	4M50G7D
Part 27L	LTE Band 4	16QAM	5MHz	0.29 W	0.007 ppm	4M50D7W
Part 27L	LTE Band 4	QPSK	10MHz	0.36 W	0.008 ppm	9M12G7D
Part 27L	LTE Band 4	16QAM	10MHz	0.29 W	0.007 ppm	9M08D7W
Part 27L	LTE Band 4	QPSK	15MHz	0.36 W	0.008 ppm	13M6G7D
Part 27L	LTE Band 4	16QAM	15MHz	0.29 W	0.006 ppm	13M6D7W
Part 27L	LTE Band 4	QPSK	20MHz	0.36 W	0.006 ppm	18M7G7D
Part 27L	LTE Band 4	16QAM	20MHz	0.29 W	0.005 ppm	18M8D7W
Part 27F	LTE Band 13	QPSK	5MHz	0.14 W	0.008 ppm	4M52G7D
Part 27F	LTE Band 13	16QAM	5MHz	0.11 W	0.007 ppm	4M52D7W
Part 27F	LTE Band 13	QPSK	10MHz	0.14 W	0.008 ppm	9M20G7D
Part 27F	LTE Band 13	16QAM	10MHz	0.11 W	0.009 ppm	9M16D7W

1.7 Testing Site

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755-3320-2398		
Test Site No.	Sporton Site No.		FCC Registration No.
	TH01-SZ	03CH01-SZ	831040

1.8 Applied Standards

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

- ♦ 47 CFR Part 2, 27(L), 27(F)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 412172 D01 Determining ERP and ERIP 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

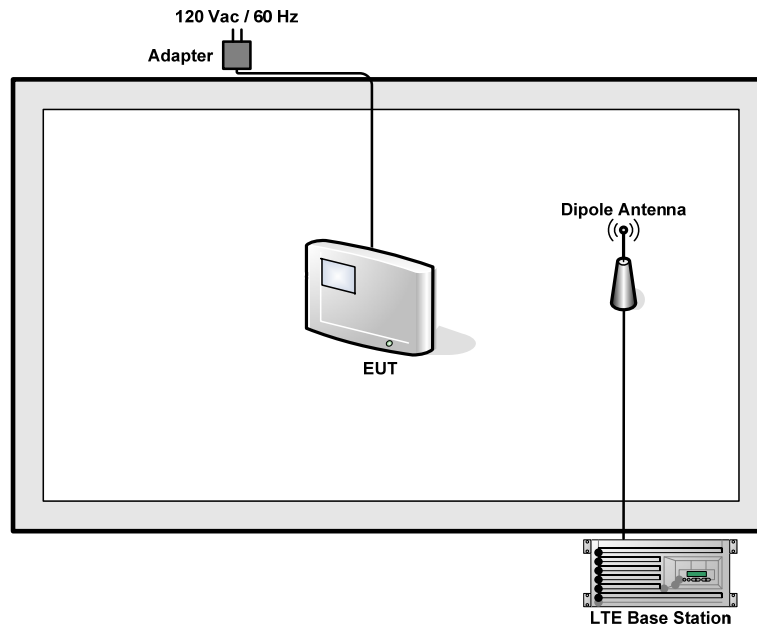
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT was rotated on three test planes to find out the worst emission. (Y Plane)

Frequency range investigated for radiated emission: 30MHz to 10th harmonic.

Test Modes			
Band		Radiated TCs	Conducted TCs
LTE Band 4	BW 1.4MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 3, RB Offset 0) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 3) Link ■ LTE (RB Size 6) Link
	BW 3MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 1, RB Offset 14) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 8) Link ■ LTE (RB Size 15) Link
	BW 5MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 1, RB Offset 0) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 12) Link ■ LTE (RB Size 25) Link
	BW 10MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 1, RB Offset 0) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 25) Link ■ LTE (RB Size 50) Link
	BW 15MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 1, RB Offset 74) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 36) Link ■ LTE (RB Size 75) Link
	BW 20MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 1, RB Offset 0) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 50) Link ■ LTE (RB Size 100) Link
LTE Band 13	BW 5MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 12, RB Offset 0) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 12) Link ■ LTE (RB Size 25) Link
	BW 10MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 25, RB Offset 12) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 25) Link ■ LTE (RB Size 50) Link

Remark: The spurious emission was performed by conducted and radiated methods. From conducted spurious emission measurement (QPSK and 16QAM), the modulation related spurious emission out of the band was not identified and the radiated spurious emissions results on 16QAM were not worse than QSPK mode during exploratory test.

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

2.4 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.

Example :

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 7.5 dB and 10dB attenuator.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 7.5 + 10 = 17.5 \text{ (dB)} \end{aligned}$$

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 base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. 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 Band 13.

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

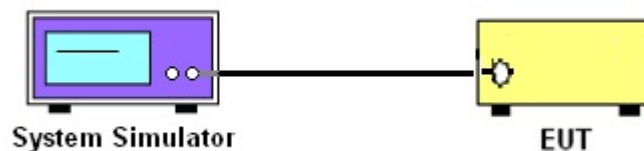
3.1.2 Measuring Instruments

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 base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

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) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				20050	20175	20300
Frequency (MHz)				1720	1732.5	1745
20	QPSK	1	0	23.68	23.87	23.88
20	QPSK	1	49	23.66	23.86	23.79
20	QPSK	1	99	23.71	23.65	23.52
20	QPSK	50	0	22.55	22.78	22.55
20	QPSK	50	24	22.40	22.55	22.53
20	QPSK	50	49	22.46	22.47	22.49
20	QPSK	100	0	22.49	22.66	22.60
20	16QAM	1	0	22.78	22.85	23.04
20	16QAM	1	49	22.91	22.82	22.78
20	16QAM	1	99	22.98	22.70	22.58
20	16QAM	50	0	21.58	21.60	21.70
20	16QAM	50	24	21.47	21.72	21.49
20	16QAM	50	49	21.48	21.48	21.52
20	16QAM	100	0	21.53	21.73	21.67
Channel				20025	20175	20325
Frequency (MHz)				1717.5	1732.5	1747.5
15	QPSK	1	0	23.56	23.83	23.81
15	QPSK	1	37	23.72	23.89	23.77
15	QPSK	1	74	23.78	23.93	23.81
15	QPSK	36	0	22.66	22.86	22.62
15	QPSK	36	18	22.70	22.76	22.72
15	QPSK	36	37	22.64	22.61	22.59
15	QPSK	75	0	22.69	22.69	22.60
15	16QAM	1	0	22.86	22.89	23.03
15	16QAM	1	37	22.95	22.99	22.72
15	16QAM	1	74	22.79	22.83	22.57
15	16QAM	36	0	21.54	21.69	21.62
15	16QAM	36	18	21.71	21.81	21.71
15	16QAM	36	37	21.71	21.70	21.54
15	16QAM	75	0	21.62	21.60	21.52



BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				20000	20175	20350
Frequency (MHz)				1715	1732.5	1750
10	QPSK	1	0	23.65	23.95	23.74
10	QPSK	1	24	23.67	23.94	23.71
10	QPSK	1	49	23.65	23.75	23.83
10	QPSK	25	0	22.60	22.94	22.82
10	QPSK	25	12	22.62	22.89	22.74
10	QPSK	25	24	22.74	22.83	22.56
10	QPSK	50	0	22.60	22.66	22.46
10	16QAM	1	0	22.73	23.04	22.66
10	16QAM	1	24	22.87	22.94	22.66
10	16QAM	1	49	22.70	22.90	22.63
10	16QAM	25	0	21.54	21.67	21.77
10	16QAM	25	12	21.73	21.69	21.58
10	16QAM	25	24	21.72	21.61	21.58
10	16QAM	50	0	21.49	21.52	21.52
Channel				19975	20175	20375
Frequency (MHz)				1712.5	1732.5	1752.5
5	QPSK	1	0	23.58	23.89	23.71
5	QPSK	1	12	23.55	23.88	23.87
5	QPSK	1	24	23.60	23.76	23.66
5	QPSK	12	0	22.65	22.99	22.88
5	QPSK	12	6	22.65	22.81	22.93
5	QPSK	12	11	22.58	22.93	22.78
5	QPSK	25	0	22.58	22.75	22.78
5	16QAM	1	0	22.68	22.99	22.86
5	16QAM	1	12	22.90	23.05	22.85
5	16QAM	1	24	22.76	22.96	22.66
5	16QAM	12	0	21.70	21.97	21.87
5	16QAM	12	6	21.75	22.03	21.95
5	16QAM	12	11	21.95	21.97	21.80
5	16QAM	25	0	21.76	21.71	21.66



BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				19965	20175	20385
Frequency (MHz)				1711.5	1732.5	1753.5
3	QPSK	1	0	23.54	23.77	23.73
3	QPSK	1	7	23.64	23.80	23.68
3	QPSK	1	14	23.60	23.85	23.78
3	QPSK	8	0	22.58	22.94	22.81
3	QPSK	8	4	22.56	22.84	22.83
3	QPSK	8	7	22.70	22.82	22.75
3	QPSK	15	0	22.54	22.78	22.78
3	16QAM	1	0	22.58	22.85	22.82
3	16QAM	1	7	22.79	22.91	22.72
3	16QAM	1	14	22.63	22.74	22.70
3	16QAM	8	0	21.52	21.69	21.87
3	16QAM	8	4	21.56	21.72	21.68
3	16QAM	8	7	21.54	21.92	21.59
3	16QAM	15	0	21.57	21.85	21.77
Channel				19957	20175	20393
Frequency (MHz)				1710.7	1732.5	1754.3
1.4	QPSK	1	0	23.62	23.83	23.73
1.4	QPSK	1	2	23.58	23.82	23.65
1.4	QPSK	1	5	23.59	23.75	23.79
1.4	QPSK	3	0	23.56	23.90	23.63
1.4	QPSK	3	1	23.56	23.76	23.64
1.4	QPSK	3	2	23.54	23.88	23.75
1.4	QPSK	6	0	22.65	23.04	22.86
1.4	16QAM	1	0	22.58	22.87	22.67
1.4	16QAM	1	2	22.70	23.02	22.72
1.4	16QAM	1	5	22.61	22.89	22.68
1.4	16QAM	3	0	22.75	22.98	22.75
1.4	16QAM	3	1	22.63	23.04	22.75
1.4	16QAM	3	2	22.60	22.88	22.85
1.4	16QAM	6	0	21.77	21.90	21.76



<LTE Band 13 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel					23230	
Frequency (MHz)					782	
10	QPSK	1	0		23.47	
10	QPSK	1	24		23.45	
10	QPSK	1	49		23.48	
10	QPSK	25	0		22.99	
10	QPSK	25	12		23.63	
10	QPSK	25	24		22.32	
10	QPSK	50	0		22.22	
10	16QAM	1	0		22.57	
10	16QAM	1	24		22.62	
10	16QAM	1	49		22.50	
10	16QAM	25	0		21.39	
10	16QAM	25	12		21.48	
10	16QAM	25	24		21.36	
10	16QAM	50	0		21.27	
Channel				23205	23230	23255
Frequency (MHz)				779.5	782	784.5
5	QPSK	1	0	23.55	23.42	23.50
5	QPSK	1	12	23.49	23.32	23.30
5	QPSK	1	24	23.47	23.33	23.21
5	QPSK	12	0	23.57	22.41	22.65
5	QPSK	12	6	22.57	22.50	22.44
5	QPSK	12	11	22.54	22.55	22.30
5	QPSK	25	0	22.47	22.46	22.24
5	16QAM	1	0	22.42	22.54	22.46
5	16QAM	1	12	22.56	22.60	22.46
5	16QAM	1	24	22.53	22.40	22.38
5	16QAM	12	0	21.65	21.61	21.56
5	16QAM	12	6	21.64	21.52	21.42
5	16QAM	12	11	21.60	21.63	21.48
5	16QAM	25	0	21.39	21.38	21.50

Note: Maximum average power for LTE.

3.1.6 Test Result of Conducted Output Power and ERP/EIRP

PCS Band ($G_T - L_C = 1.64$ 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
RB Size, RB Offset	(1RB-0)	(3RB-0)	(1RB-5)	(3RB-0)	(3RB-1)	(3RB-2)
Conducted Power P_T (dBm)	23.62	23.90	23.79	22.75	23.04	22.85
Conducted Power P_T (Watts)	0.23	0.25	0.24	0.19	0.20	0.19
EIRP(dBm)	25.26	25.54	25.43	24.39	24.68	24.49
EIRP(Watts)	0.34	0.36	0.35	0.27	0.29	0.28

PCS Band ($G_T - L_C = 1.64$ 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
RB Size, RB Offset	(1RB-7)	(1RB-14)	(1RB-14)	(1RB-7)	(1RB-7)	(1RB-0)
Conducted Power P_T (dBm)	23.64	23.85	23.78	22.79	22.91	22.82
Conducted Power P_T (Watts)	0.23	0.24	0.24	0.19	0.20	0.19
EIRP(dBm)	25.28	25.49	25.42	24.43	24.55	24.46
EIRP(Watts)	0.34	0.35	0.35	0.28	0.29	0.28



PCS Band ($G_T - L_C = 1.64$ 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
RB Size, RB Offset	(1RB-24)	(1RB-0)	(1RB-12)	(1RB-12)	(1RB-12)	(1RB-0)
Conducted Power P_T (dBm)	23.60	23.89	23.87	22.90	23.05	22.86
Conducted Power P_T (Watts)	0.23	0.24	0.24	0.19	0.20	0.19
EIRP(dBm)	25.24	25.53	25.51	24.54	24.69	24.50
EIRP(Watts)	0.33	0.36	0.36	0.28	0.29	0.28

PCS Band ($G_T - L_C = 1.64$ 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
RB Size, RB Offset	(1RB-24)	(1RB-0)	(1RB-49)	(1RB-24)	(1RB-0)	(1RB-0)
Conducted Power P_T (dBm)	23.67	23.95	23.83	22.87	23.04	22.66
Conducted Power P_T (Watts)	0.23	0.25	0.24	0.19	0.20	0.18
EIRP(dBm)	25.31	25.59	25.47	24.51	24.68	24.30
EIRP(Watts)	0.34	0.36	0.35	0.28	0.29	0.27



PCS Band ($G_T - L_C = 1.64$ 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
RB Size, RB Offset	(1RB-74)	(1RB-74)	(1RB-0)	(1RB-37)	(1RB-37)	(1RB-0)
Conducted Power P_T (dBm)	23.78	23.93	23.81	22.95	22.99	23.03
Conducted Power P_T (Watts)	0.24	0.25	0.24	0.20	0.20	0.20
EIRP(dBm)	25.42	25.57	25.45	24.59	24.63	24.67
EIRP(Watts)	0.35	0.36	0.35	0.29	0.29	0.29

PCS Band ($G_T - L_C = 1.64$ 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
RB Size, RB Offset	(1RB-99)	(1RB-0)	(1RB-0)	(1RB-99)	(1RB-0)	(1RB-0)
Conducted Power P_T (dBm)	23.71	23.87	23.88	22.98	22.85	23.04
Conducted Power P_T (Watts)	0.23	0.24	0.24	0.20	0.19	0.20
EIRP(dBm)	25.35	25.51	25.52	24.62	24.49	24.68
EIRP(Watts)	0.34	0.36	0.36	0.29	0.28	0.29



Cellular Band ($G_T - L_C = 0.04$ 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
RB Size, RB Offset	(12RB-0)	(1RB-0)	(1RB-0)	(1RB-12)	(1RB-12)	(1RB-0)
Conducted Power P_T (dBm)	23.57	23.42	23.50	22.56	22.60	22.46
Conducted Power P_T (Watts)	0.23	0.22	0.22	0.18	0.18	0.18
ERP(dBm)	21.46	21.31	21.39	20.45	20.49	20.35
ERP(Watts)	0.14	0.14	0.14	0.11	0.11	0.11

Cellular Band ($G_T - L_C = 0.04$ dB)		
Modes	LTE Band 13 (QPSK, BW=10M)	LTE Band 13 (16QAM, BW=10M)
Channel	23230 (Mid)	23230 (Mid)
Frequency (MHz)	782	782
RB Size, RB Offset	(25RB-12)	(1RB-24)
Conducted Power P_T (dBm)	23.63	22.62
Conducted Power P_T (Watts)	0.23	0.18
ERP(dBm)	21.52	20.51
ERP(Watts)	0.14	0.11

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.

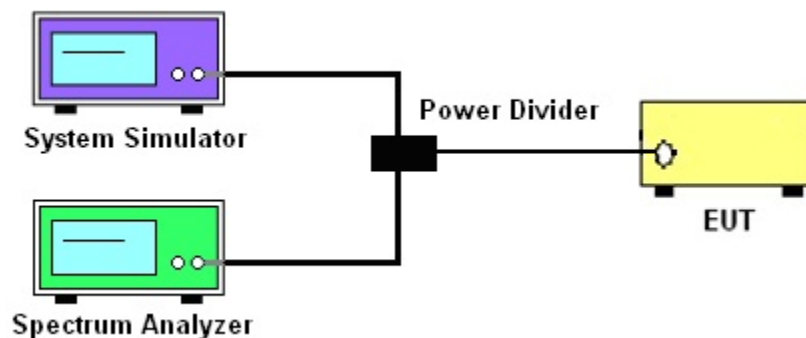
3.2.2 Measuring Instruments

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 Analyzer and Base Station via power divider.
2. For LTE operating modes:
 - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
 - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
3. Record the deviation as Peak to Average Ratio.

3.2.4 Test Setup



3.2.5 Test Result of Peak-to-Average Ratio

Modes	LTE Band 4			
BW / Mod.	1.4MHz / QPSK	1.4MHz / 16QAM	3MHz / QPSK	3MHz / 16QAM
Peak-to-Average Ratio (dB)	6.32	7.04	6.20	7.04
BW / Mod.	5MHz / QPSK	5MHz / 16QAM	10MHz / QPSK	10MHz / 16QAM
Peak-to-Average Ratio (dB)	6.12	6.84	5.68	6.52
BW / Mod.	15MHz / QPSK	15MHz / 16QAM	20MHz / QPSK	20MHz / 16QAM
Peak-to-Average Ratio (dB)	5.76	6.88	6.40	7.16

Modes	LTE Band 13			
BW / Mod.	5MHz / QPSK	5MHz / 16QAM	10MHz / QPSK	10MHz / 16QAM
Peak-to-Average Ratio (dB)	5.96	6.64	5.88	6.52

Note:

The maximum RB configurations of the PAPR summary as below:

BW1.4MHz RB setting : RB Size 6, RB offset 0

BW3.0MHz RB setting : RB Size 15, RB offset 0

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

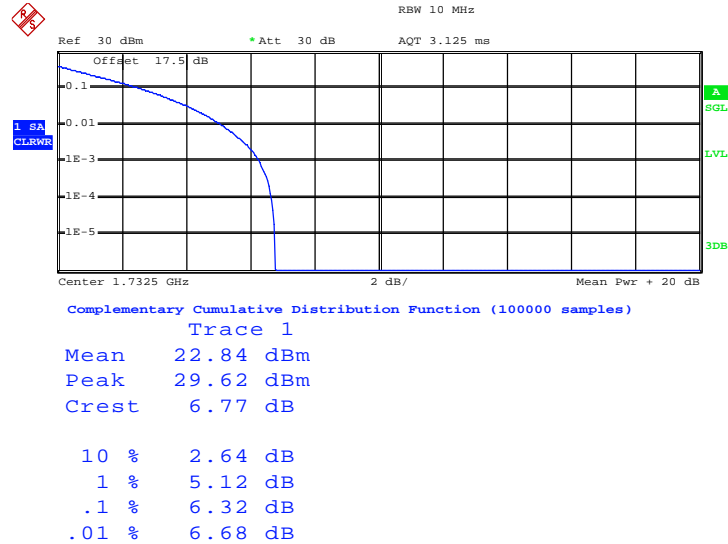
BW10MHz RB setting : RB Size 50, RB offset 0

BW15MHz RB setting : RB Size 75, RB offset 0

BW20MHz RB setting : RB Size 100, RB offset 0

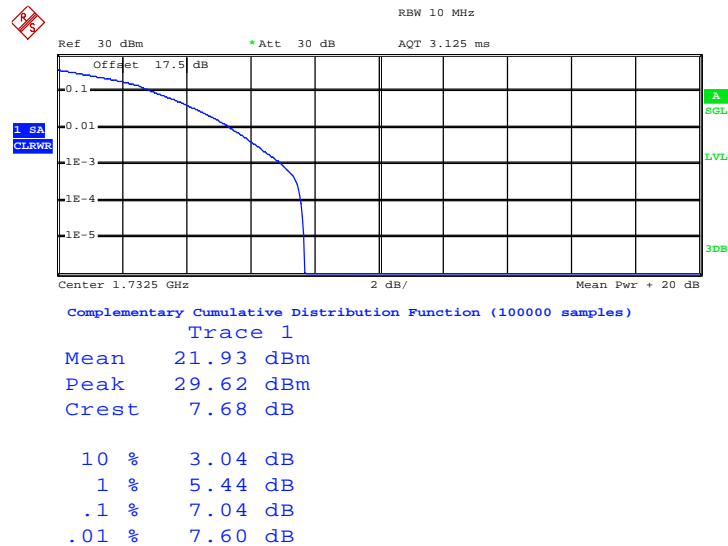
3.2.6 Peak to Average Power Ratio

Peak-to-Average Ratio on LTE Band 4 1.4MHz / QPSK



Date: 23.NOV.2013 11:53:49

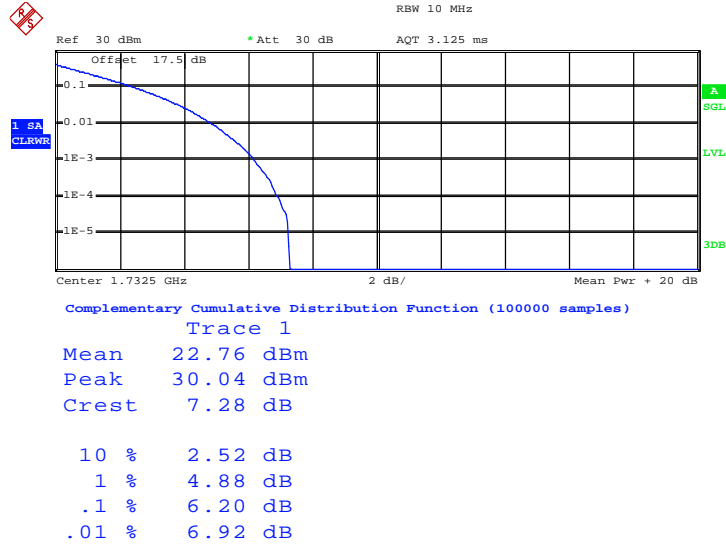
Peak-to-Average Ratio on LTE Band 4 1.4MHz / 16QAM



Date: 23.NOV.2013 11:53:34

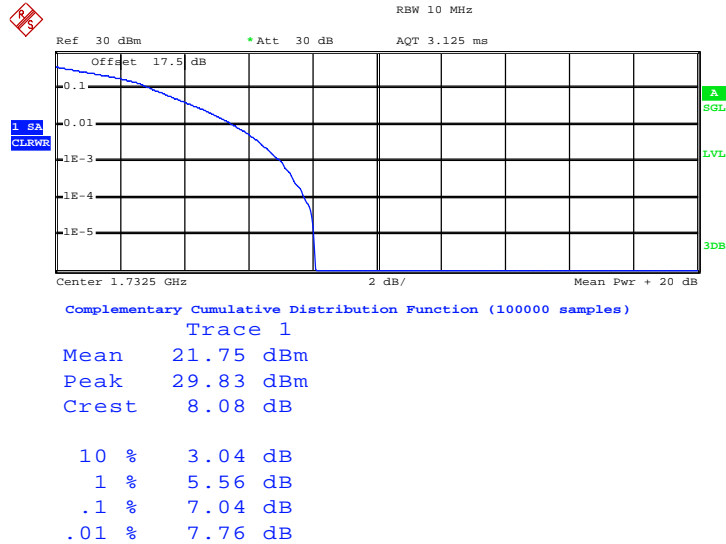


Peak-to-Average Ratio on LTE Band 4 3MHz / QPSK



Date: 23.NOV.2013 11:52:38

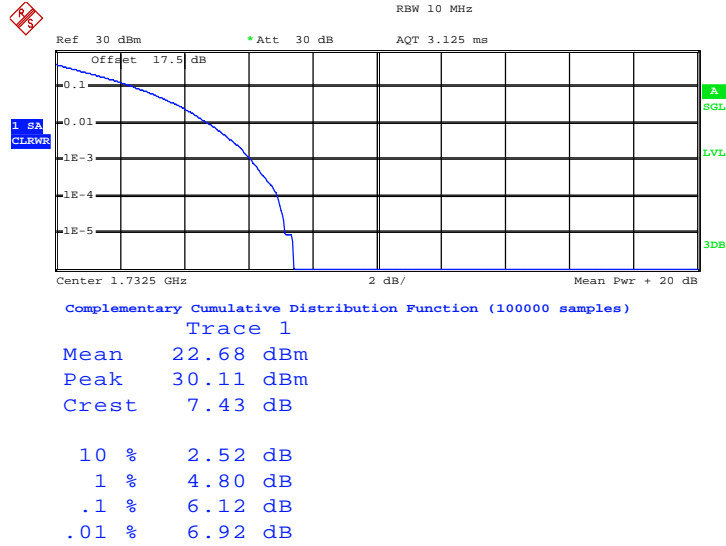
Peak-to-Average Ratio on LTE Band 4 3MHz / 16QAM



Date: 23.NOV.2013 11:52:58

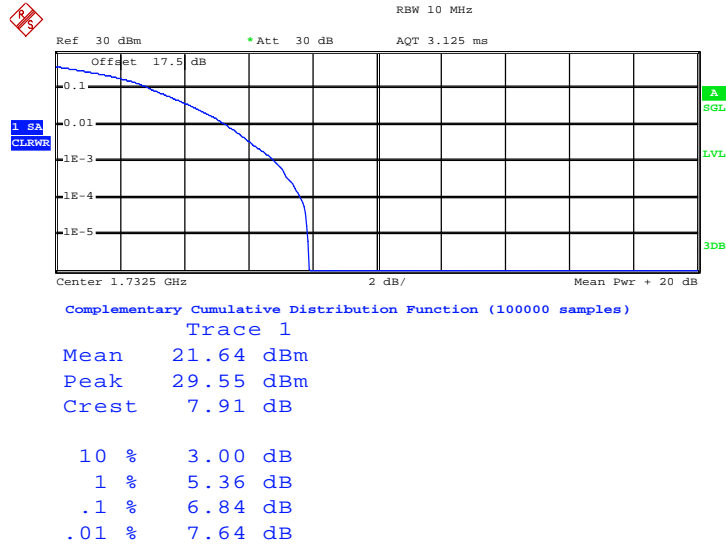


Peak-to-Average Ratio on LTE Band 4 5MHz / QPSK



Date: 23.NOV.2013 11:52:07

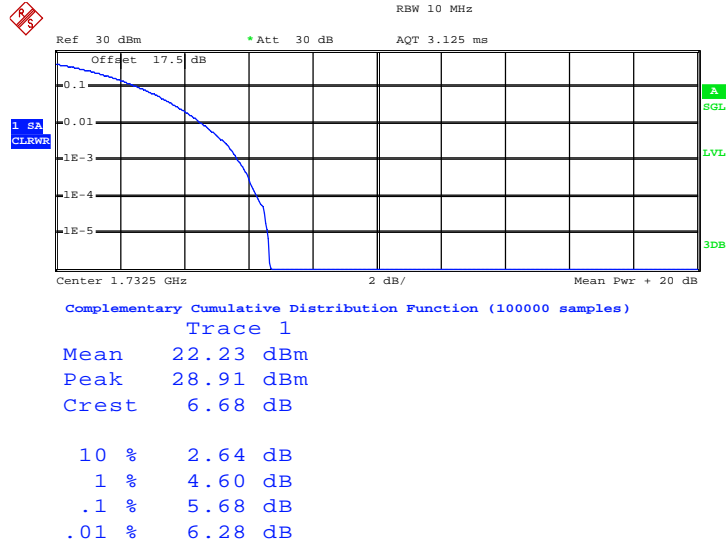
Peak-to-Average Ratio on LTE Band 4 5MHz / 16QAM



Date: 23.NOV.2013 11:51:42

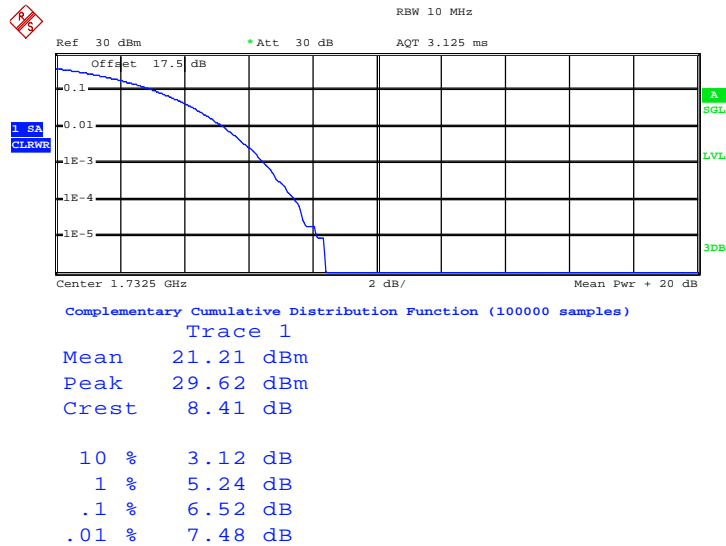


Peak-to-Average Ratio on LTE Band 4 10MHz / QPSK



Date: 23.NOV.2013 11:50:42

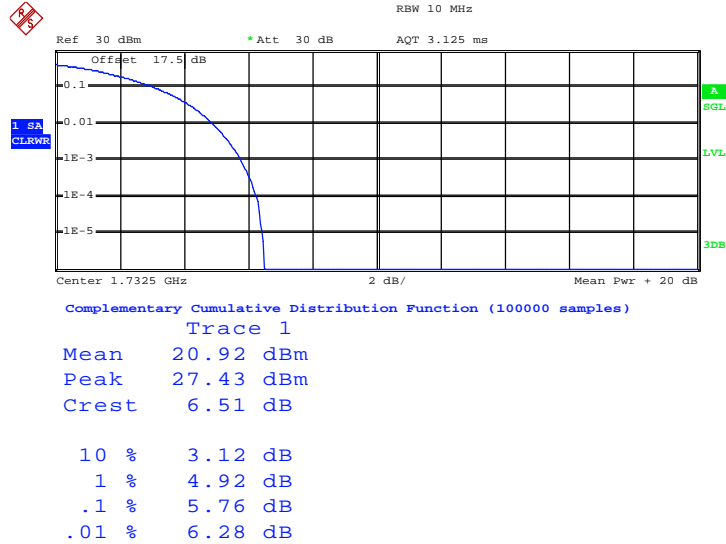
Peak-to-Average Ratio on LTE Band 4 10MHz / 16QAM



Date: 23.NOV.2013 11:51:01

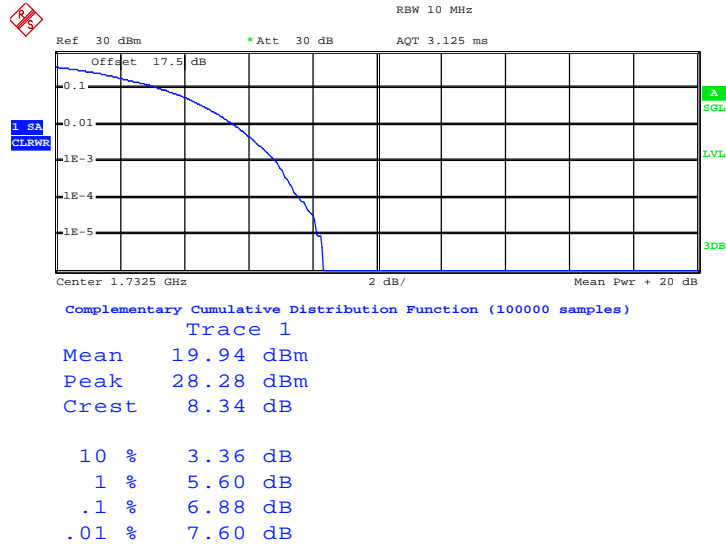


Peak-to-Average Ratio on LTE Band 4 15MHz / QPSK



Date: 23.NOV.2013 11:49:07

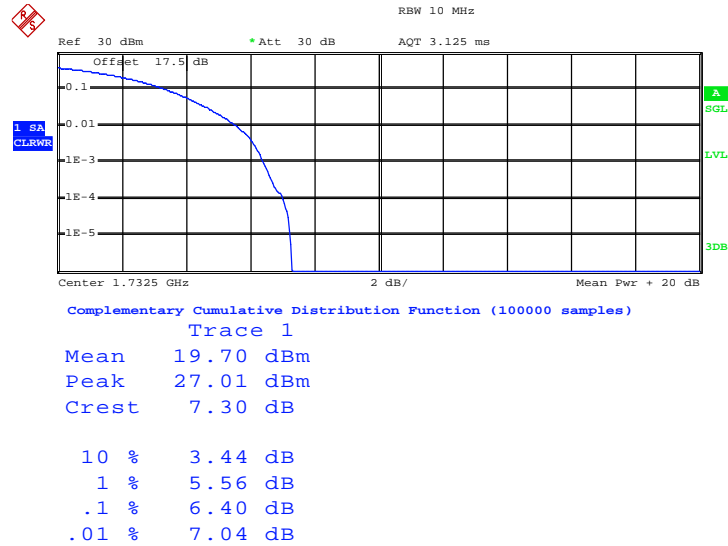
Peak-to-Average Ratio on LTE Band 4 15MHz / 16QAM



Date: 23.NOV.2013 11:48:43

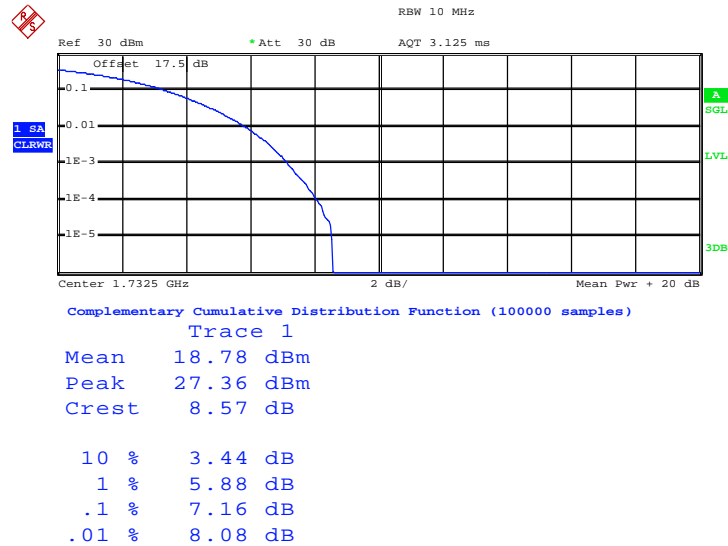


Peak-to-Average Ratio on LTE Band 4 20MHz / QPSK



Date: 23.NOV.2013 11:47:54

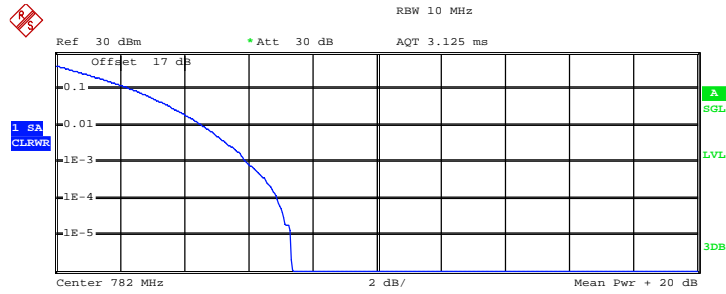
Peak-to-Average Ratio on LTE Band 4 20MHz / 16QAM



Date: 23.NOV.2013 11:48:10



Peak-to-Average Ratio on LTE Band 13 5MHz / QPSK



Complementary Cumulative Distribution Function (100000 samples)

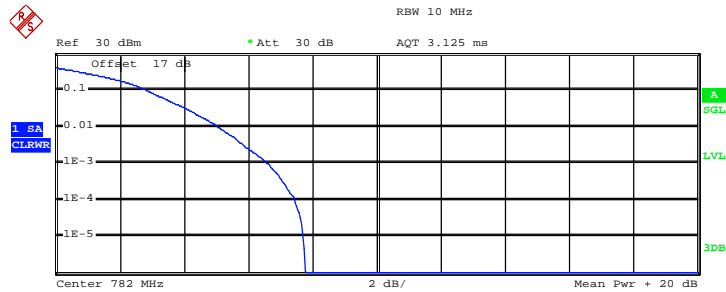
Trace 1

Mean 21.98 dBm
 Peak 29.33 dBm
 Crest 7.35 dB

10 % 2.44 dB
 1 % 4.60 dB
 .1 % 5.96 dB
 .01 % 6.92 dB

Date: 23.NOV.2013 14:59:17

Peak-to-Average Ratio on LTE Band 13 5MHz / 16QAM



Complementary Cumulative Distribution Function (100000 samples)

Trace 1

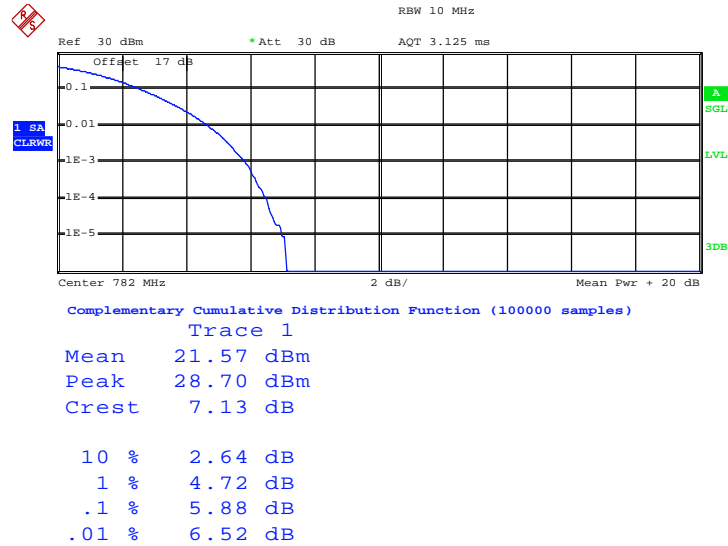
Mean 20.78 dBm
 Peak 28.56 dBm
 Crest 7.78 dB

10 % 2.88 dB
 1 % 5.08 dB
 .1 % 6.64 dB
 .01 % 7.48 dB

Date: 23.NOV.2013 14:59:49

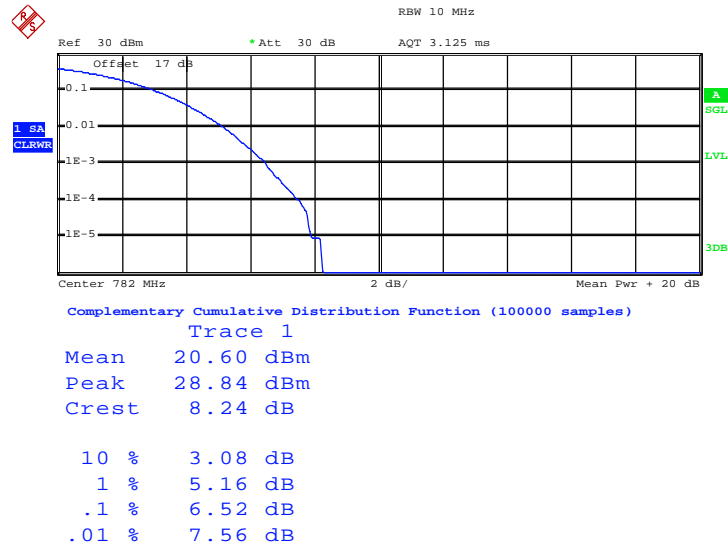


Peak-to-Average Ratio on LTE Band 13 10MHz / QPSK



Date: 23.NOV.2013 14:58:15

Peak-to-Average Ratio on LTE Band 13 10MHz / 16QAM



Date: 23.NOV.2013 14:57:48

3.3 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.3.1 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 26dB 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 26 dB.

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.

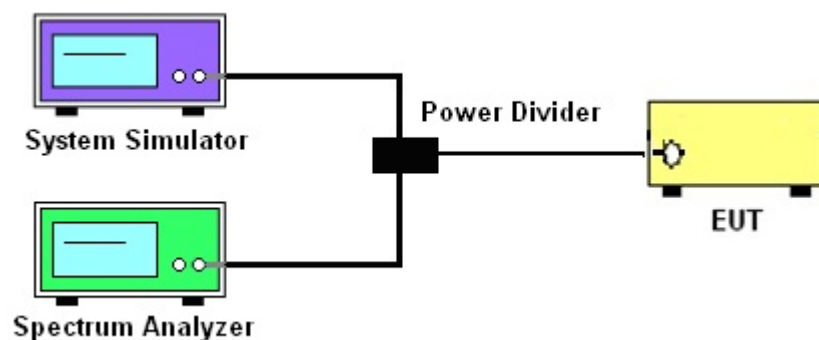
3.3.2 Measuring Instruments

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 Base Station via power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF powers with full RB sizes were measured.

3.3.4 Test Setup



3.3.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth

Modes	LTE Band 4			
BW / Mod.	1.4MHz / QPSK	1.4MHz / 16QAM	3MHz / QPSK	3MHz / 16QAM
99% OBW (MHz)	1.1032	1.1032	2.7240	2.7360
26dB BW (MHz)	1.3048	1.3048	3.0960	3.1200
BW / Mod.	5MHz / QPSK	5MHz / 16QAM	10MHz / QPSK	10MHz / 16QAM
99% OBW (MHz)	4.5000	4.5000	9.1200	9.0800
26dB BW (MHz)	5.0600	5.1000	10.0800	10.0400
BW / Mod.	15MHz / QPSK	15MHz / 16QAM	20MHz / QPSK	20MHz / 16QAM
99% OBW (MHz)	13.5600	13.5600	18.7200	18.8000
26dB BW (MHz)	14.7600	14.9400	21.2800	21.3600

Modes	LTE Band 13			
BW / Mod.	5MHz / QPSK	5MHz / 16QAM	10MHz / QPSK	10MHz / 16QAM
99% OBW (MHz)	4.5200	4.5200	9.2000	9.1600
26dB BW (MHz)	5.1000	5.1400	10.1600	10.1200

Note:

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

BW1.4MHz RB setting : RB Size 6, RB offset 0

BW3.0MHz RB setting : RB Size 15, RB offset 0

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

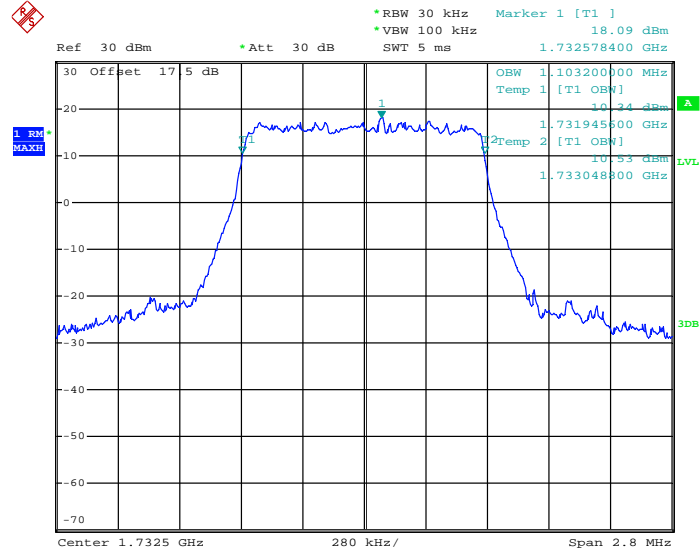
BW20MHz RB setting : RB Size 100, RB offset 0



3.3.6 Test Result (Plots) of Occupied Bandwidth

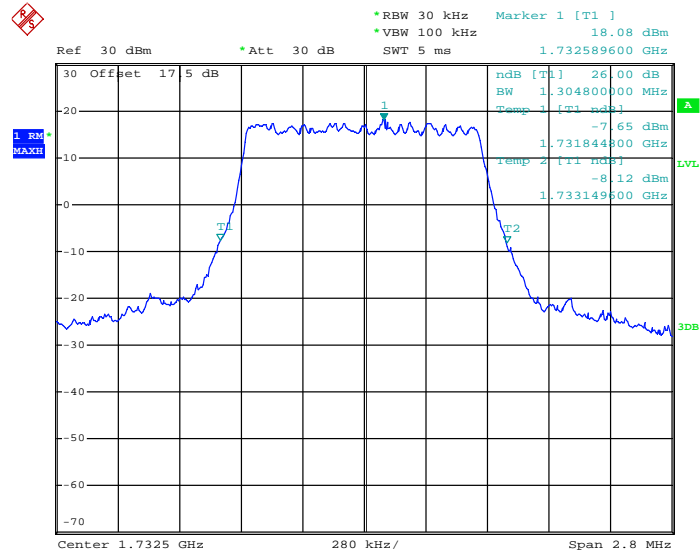
Band :	LTE Band 4	BW / Mod. :	1.4MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:00:02

26dB Bandwidth Plot on Channel 20175

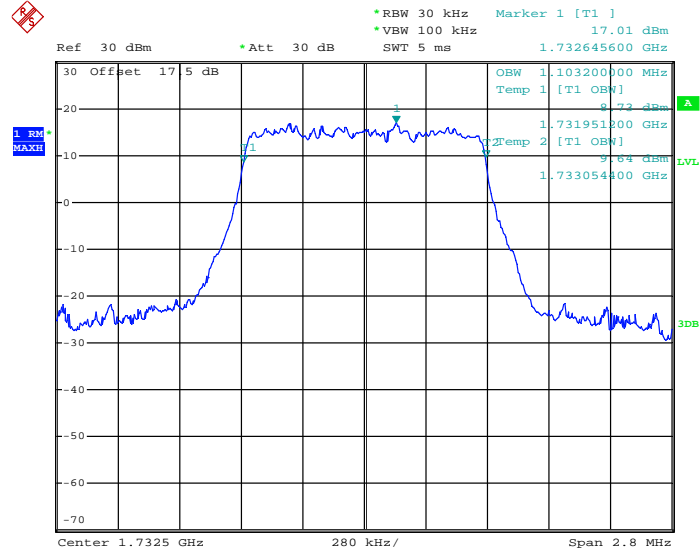


Date: 23.NOV.2013 10:12:43



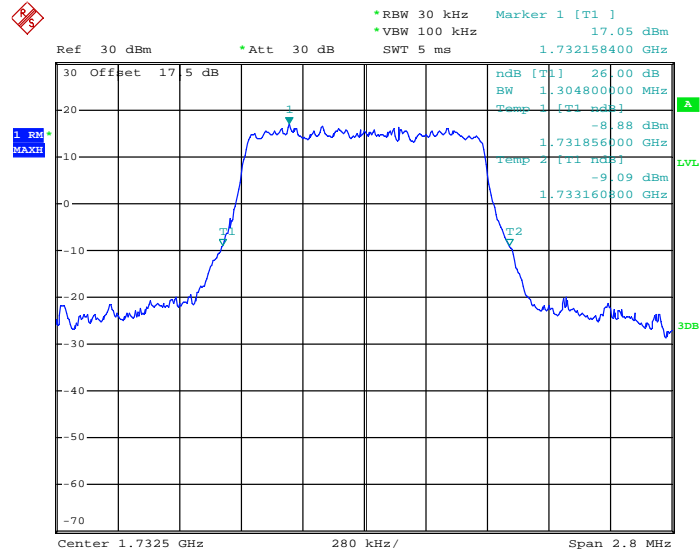
Band :	LTE Band 4	BW / Mod. :	1.4MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:00:48

26dB Bandwidth Plot on Channel 20175

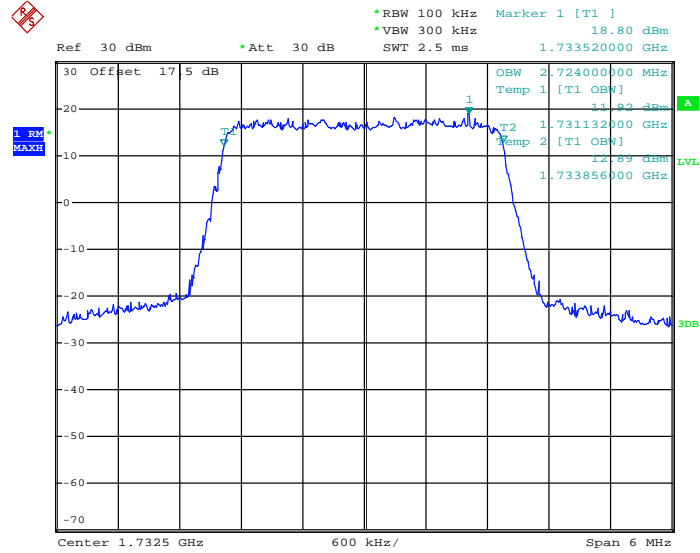


Date: 23.NOV.2013 10:13:36



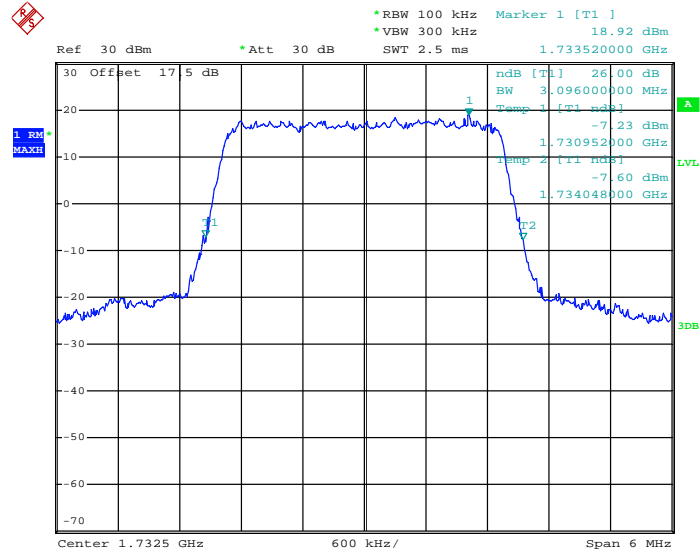
Band :	LTE Band 4	BW / Mod. :	3MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:08:55

26dB Bandwidth Plot on Channel 20175

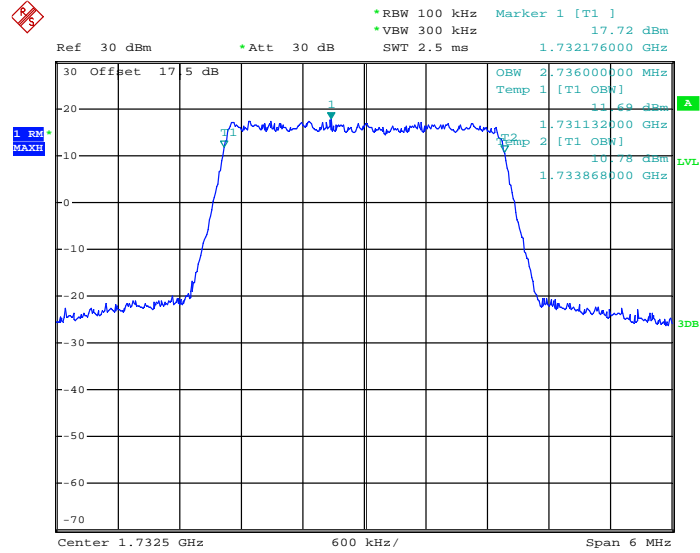


Date: 23.NOV.2013 10:15:57



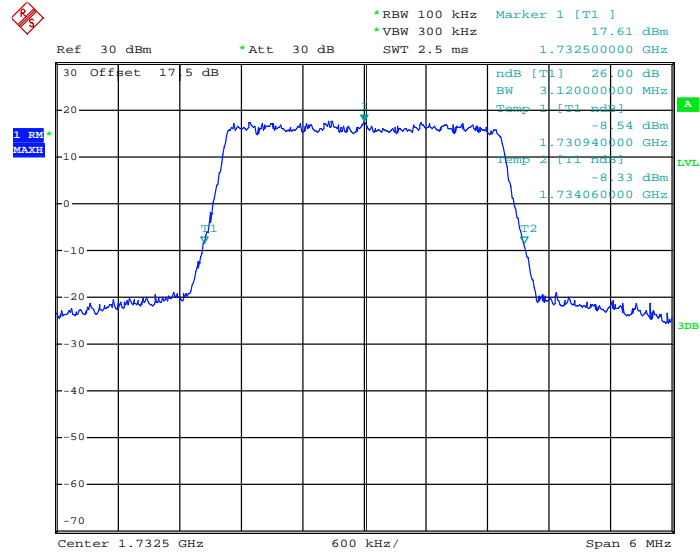
Band :	LTE Band 4	BW / Mod. :	3MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:09:36

26dB Bandwidth Plot on Channel 20175

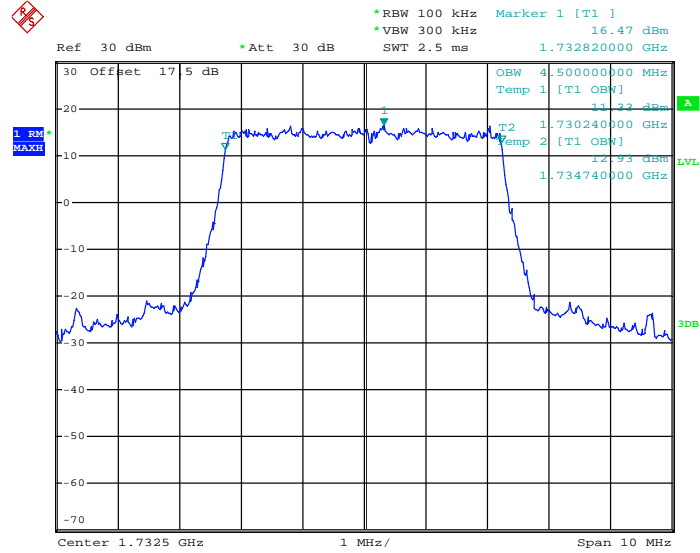


Date: 23.NOV.2013 10:15:11



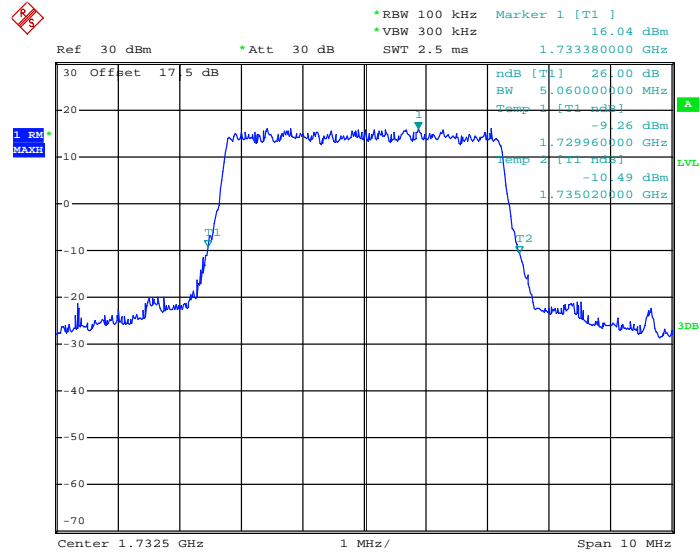
Band :	LTE Band 4	BW / Mod. :	5MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:19:03

26dB Bandwidth Plot on Channel 20175

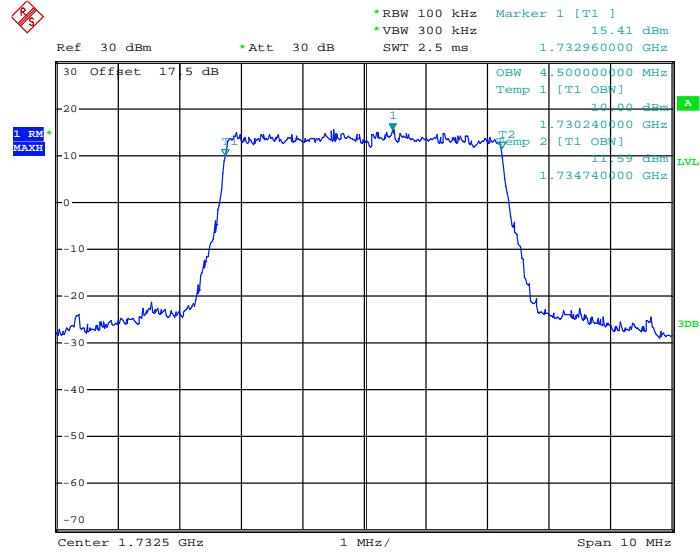


Date: 23.NOV.2013 10:16:42



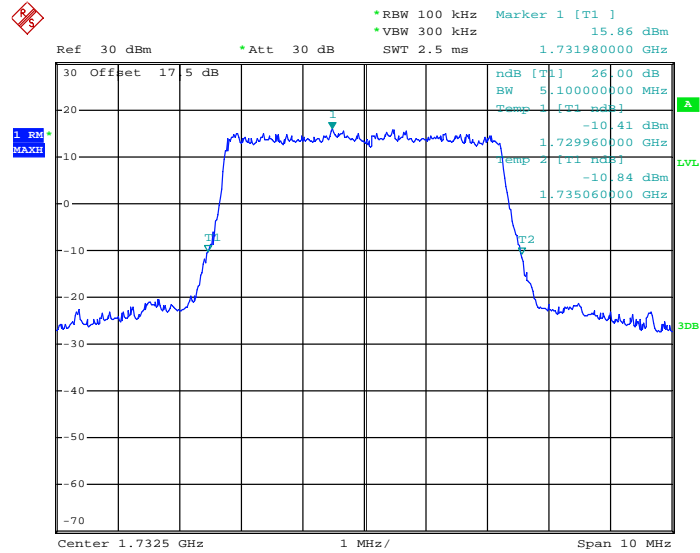
Band :	LTE Band 4	BW / Mod. :	5MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:20:04

26dB Bandwidth Plot on Channel 20175

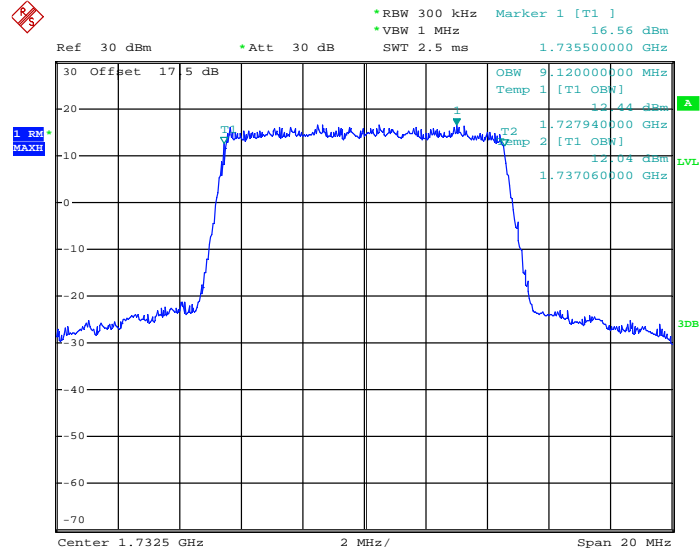


Date: 23.NOV.2013 10:18:36



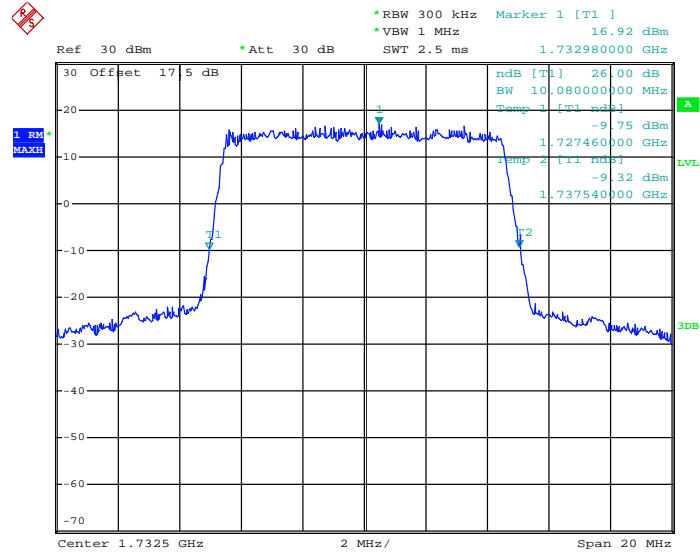
Band :	LTE Band 4	BW / Mod. :	10MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:28:31

26dB Bandwidth Plot on Channel 20175

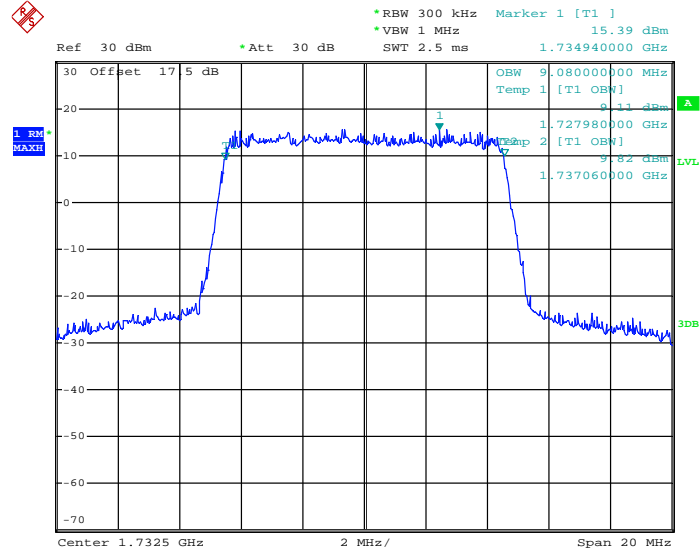


Date: 23.NOV.2013 10:38:39



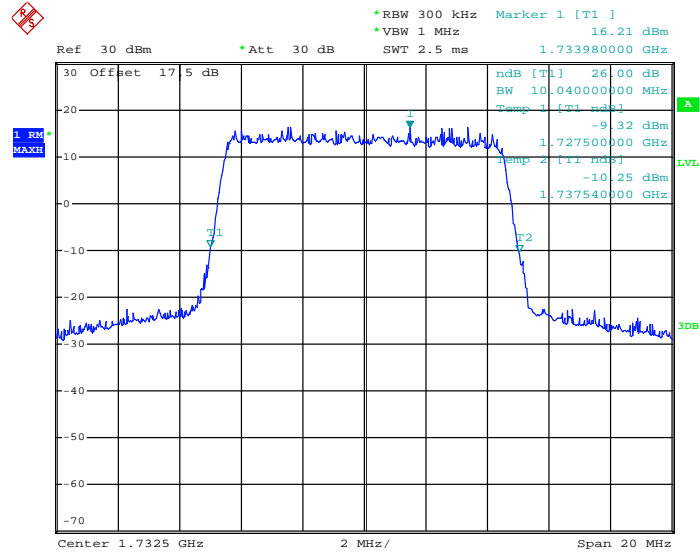
Band :	LTE Band 4	BW / Mod. :	10MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:28:54

26dB Bandwidth Plot on Channel 20175

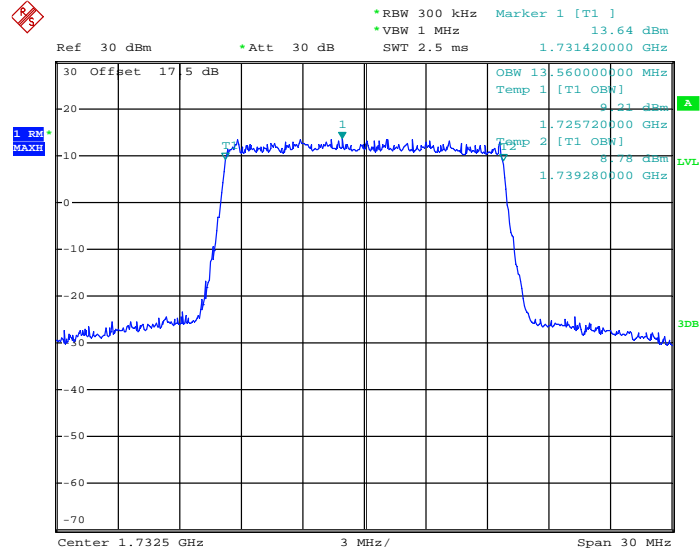


Date: 23.NOV.2013 10:38:01



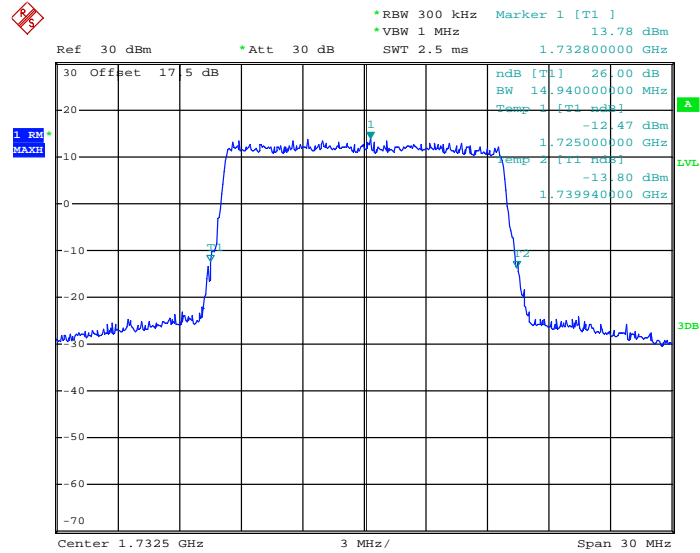
Band :	LTE Band 4	BW / Mod. :	15MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:34:50

26dB Bandwidth Plot on Channel 20175

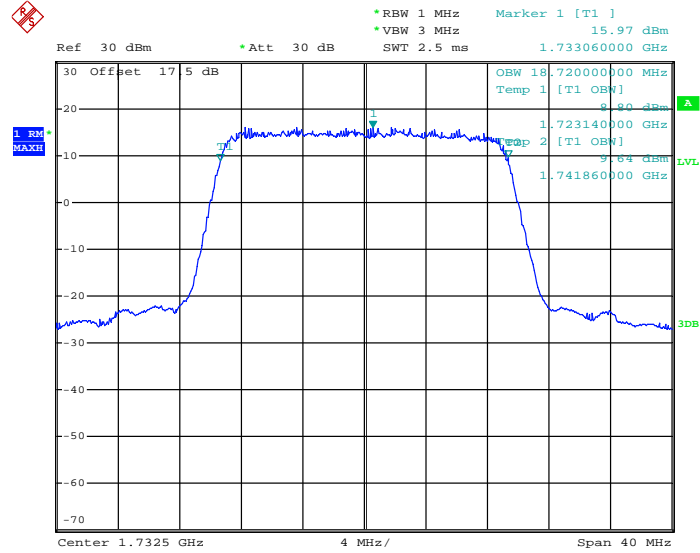


Date: 23.NOV.2013 10:40:00



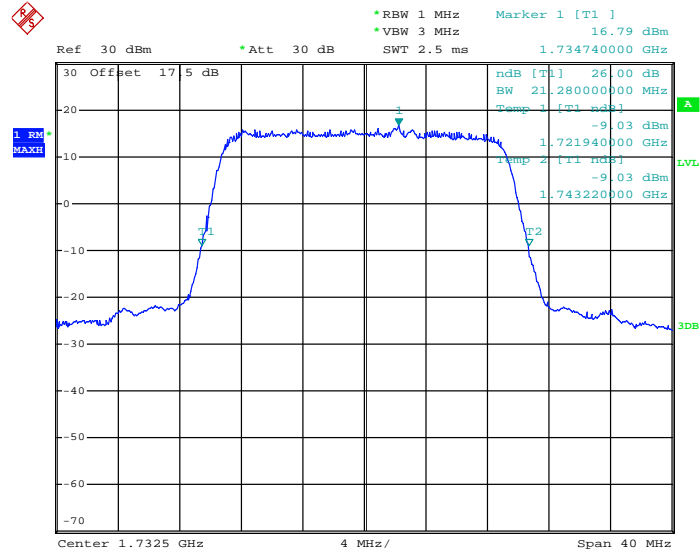
Band :	LTE Band 4	BW / Mod. :	20MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:42:36

26dB Bandwidth Plot on Channel 20175

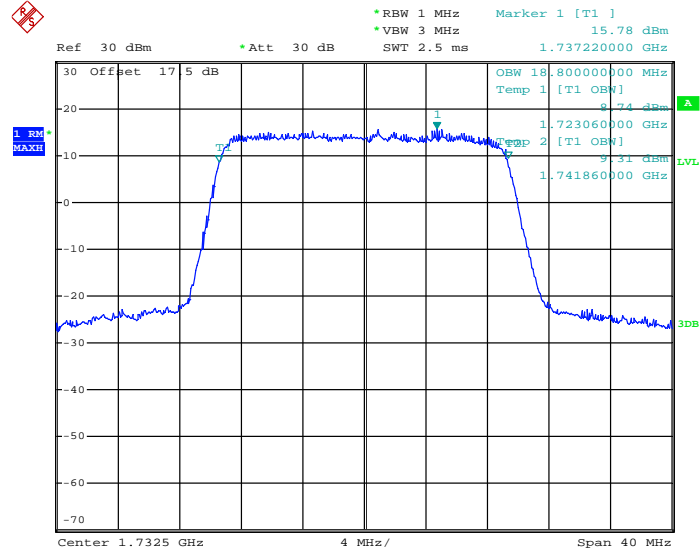


Date: 23.NOV.2013 10:44:36



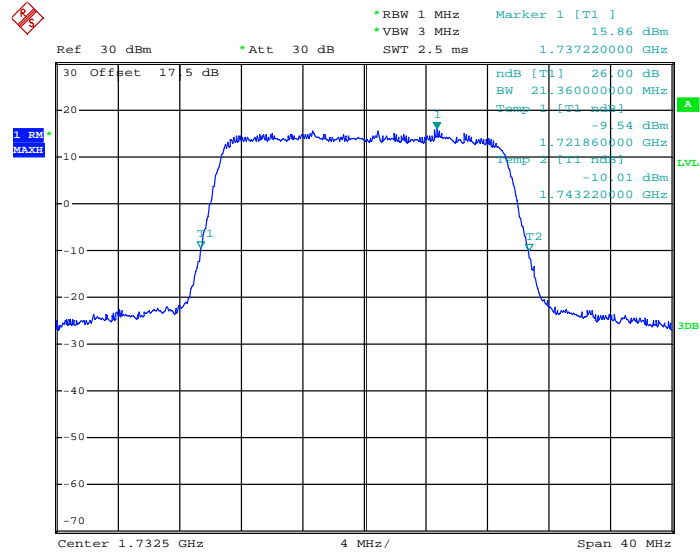
Band :	LTE Band 4	BW / Mod. :	20MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 20175



Date: 23.NOV.2013 12:44:14

26dB Bandwidth Plot on Channel 20175

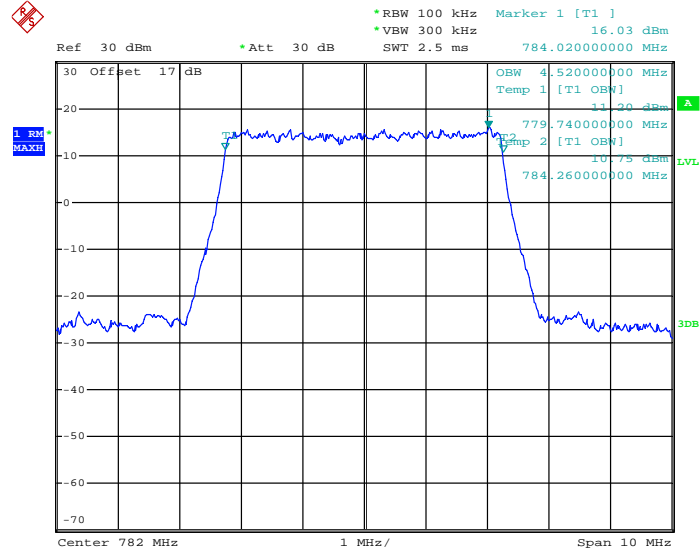


Date: 23.NOV.2013 10:42:40



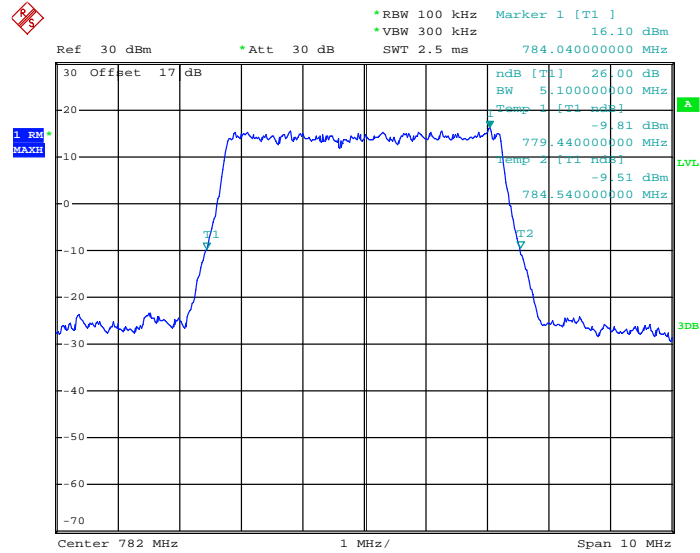
Band :	LTE Band 13	BW / Mod. :	5MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 23230



Date: 23.NOV.2013 15:08:22

26dB Bandwidth Plot on Channel 23230

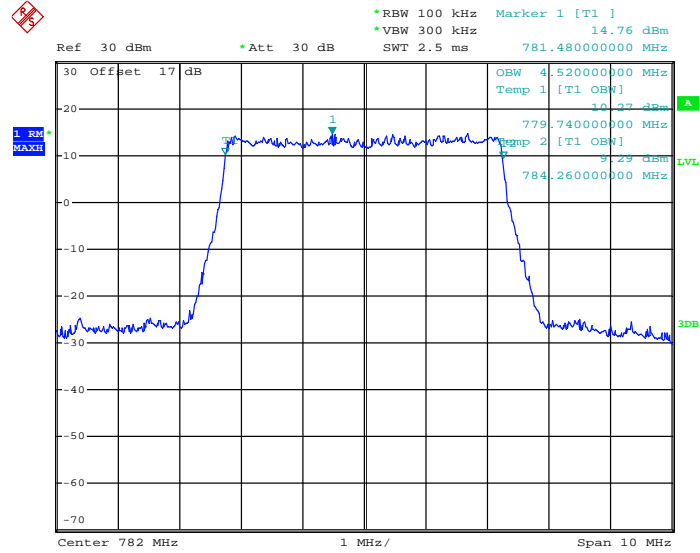


Date: 23.NOV.2013 14:49:41



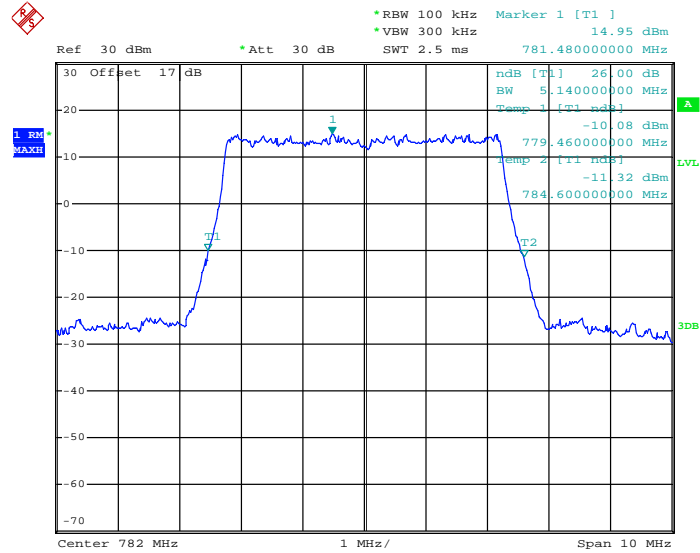
Band :	LTE Band 13	BW / Mod. :	5MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 23230



Date: 23.NOV.2013 15:04:32

26dB Bandwidth Plot on Channel 23230

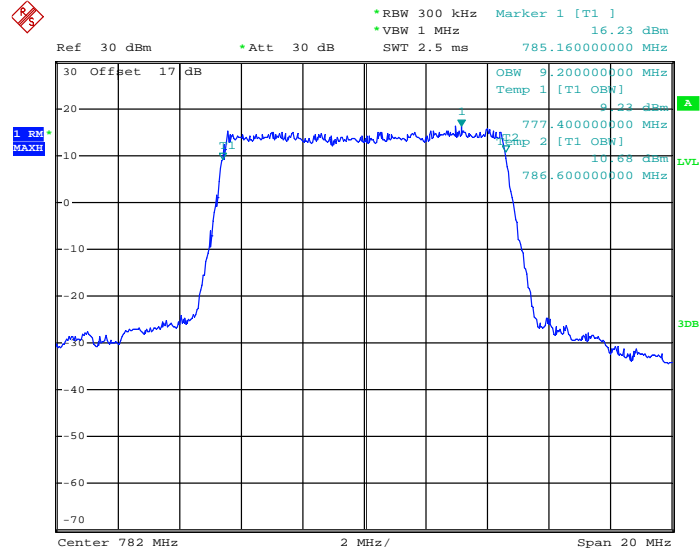


Date: 23.NOV.2013 14:47:25



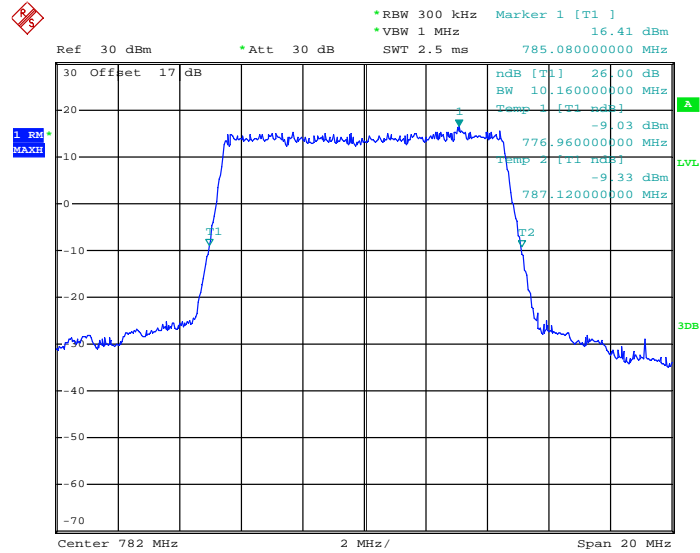
Band :	LTE Band 13	BW / Mod. :	10MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 23230



Date: 23.NOV.2013 15:26:53

26dB Bandwidth Plot on Channel 23230

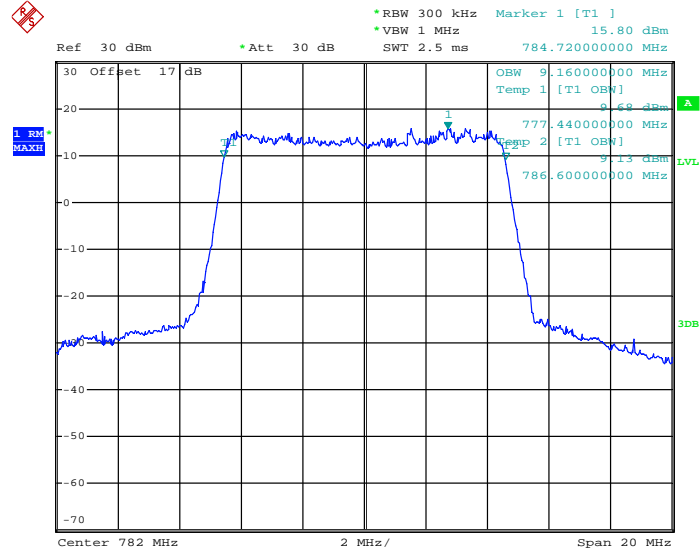


Date: 23.NOV.2013 14:53:45



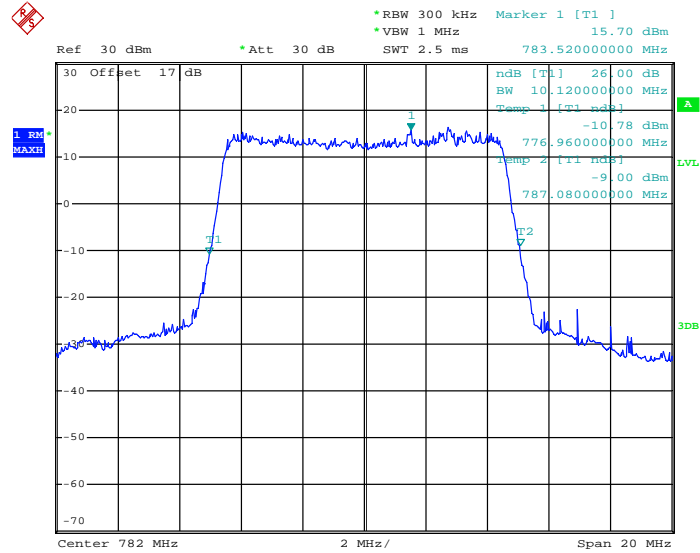
Band :	LTE Band 13	BW / Mod. :	10MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 23230



Date: 23.NOV.2013 15:25:49

26dB Bandwidth Plot on Channel 23230



Date: 23.NOV.2013 14:55:12

3.4 Conducted Band Edge Measurement

3.4.1 Description of Conducted Band Edge Measurement

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.

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.

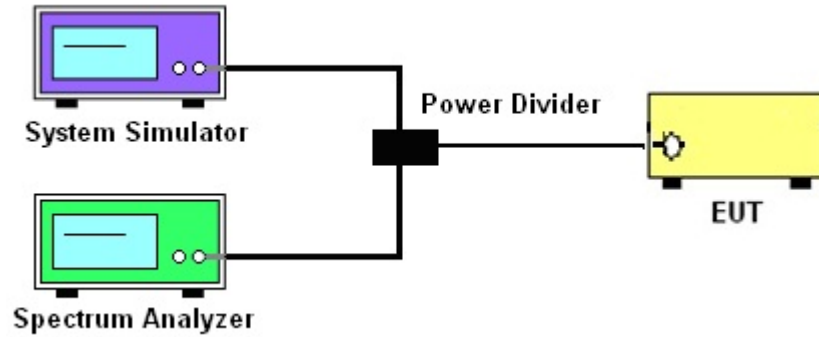
3.4.2 Measuring Instruments

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 Base Station via power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Setting $RBW \geq 1\%$ EBW, and measuring bandwidth = 1MHz.
3. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
4. 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

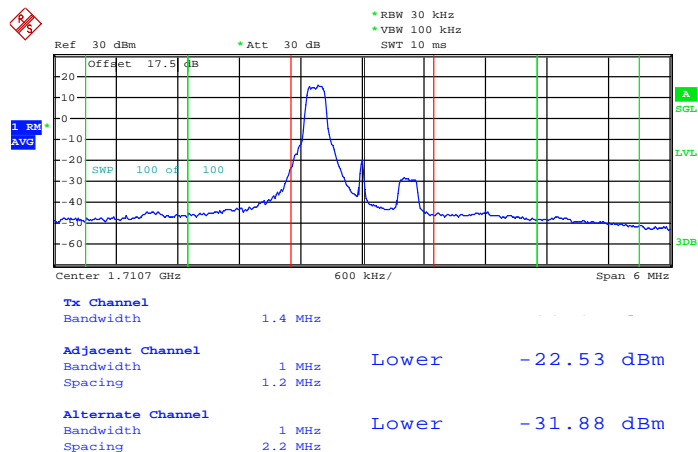




3.4.5 Test Result (Plots) of Conducted Band Edge

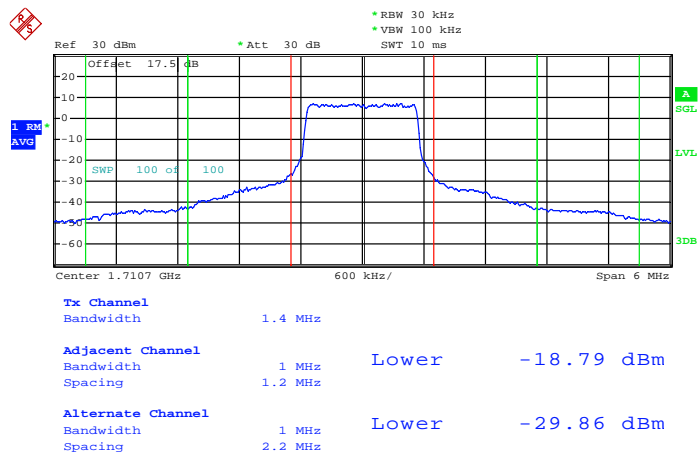
Band :	LTE Band 4	Band Width :	1.4MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:56:48

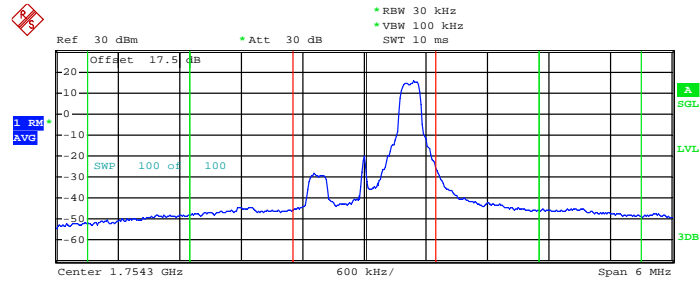
Lower Band Edge Plot for QPSK-RB Size 6, RB Offset 0



Date: 23.NOV.2013 13:56:25



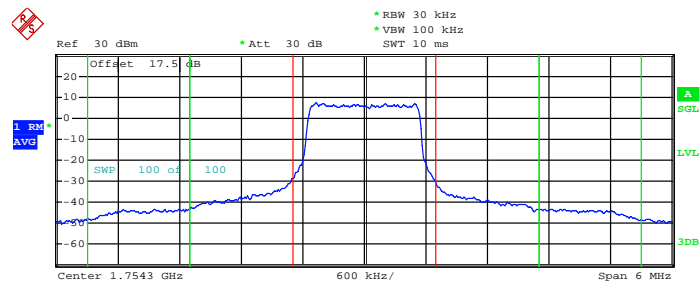
Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 5



Tx Channel			
Bandwidth	1.4 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	1.2 MHz	Upper	-22.86 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	2.2 MHz	Upper	-31.68 dBm

Date: 23.NOV.2013 13:54:13

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



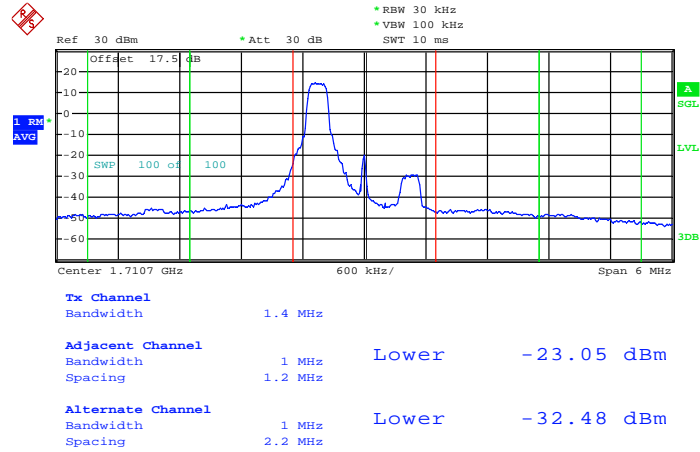
Tx Channel			
Bandwidth	1.4 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	1.2 MHz	Upper	-23.38 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	2.2 MHz	Upper	-29.64 dBm

Date: 23.NOV.2013 13:53:49



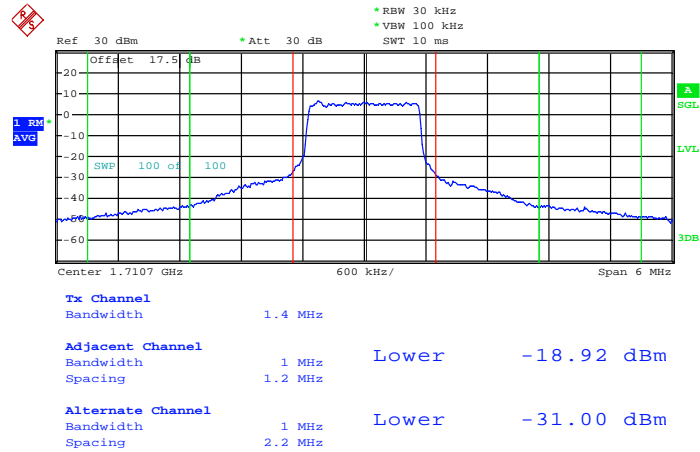
Band :	LTE Band 4	Band Width :	1.4MHz / 16QAM
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Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:57:09

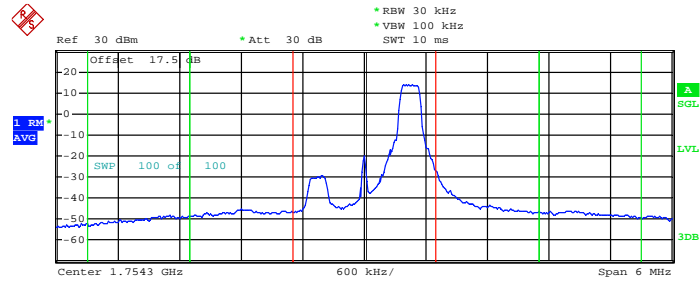
Lower Band Edge Plot for 16QAM -RB Size 6, RB Offset 0



Date: 23.NOV.2013 13:55:52



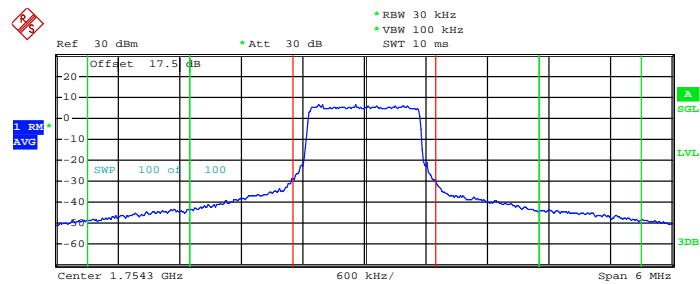
Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 5



Tx Channel			
Bandwidth	1.4 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	1.2 MHz	Upper	-24.07 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	2.2 MHz	Upper	-32.63 dBm

Date: 23.NOV.2013 13:54:31

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



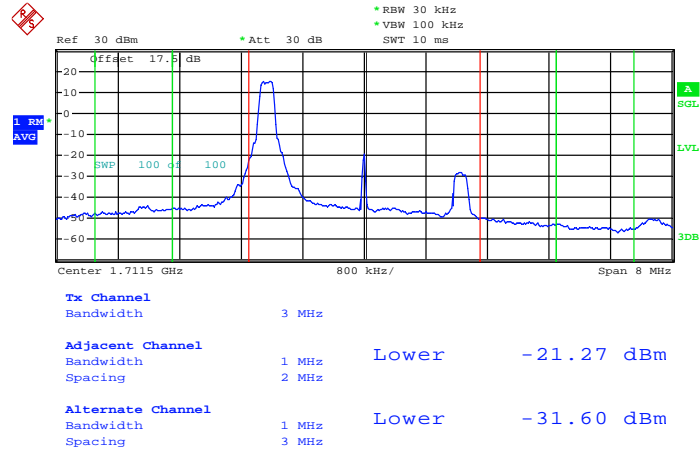
Tx Channel			
Bandwidth	1.4 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	1.2 MHz	Upper	-23.27 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	2.2 MHz	Upper	-30.71 dBm

Date: 23.NOV.2013 13:53:33



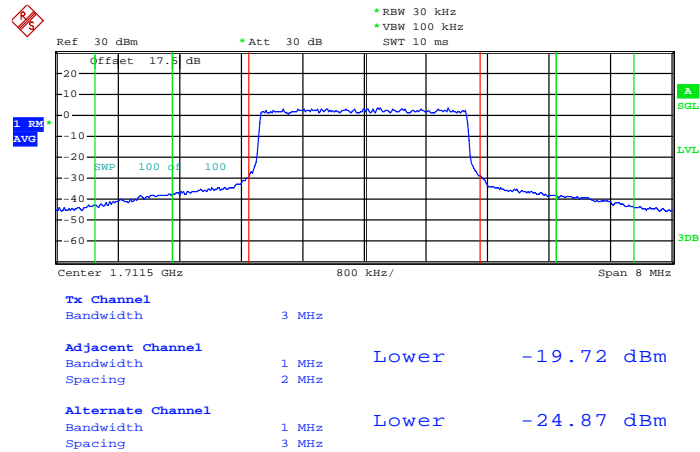
Band :	LTE Band 4	Band Width :	3MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:47:32

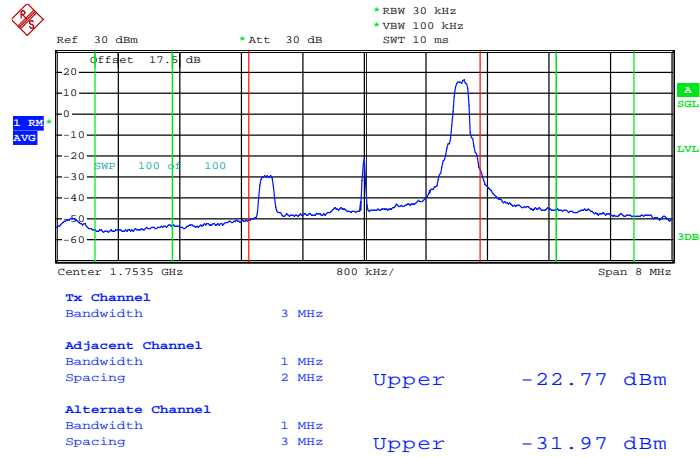
Lower Band Edge Plot for QPSK-RB Size 15, RB Offset 0



Date: 23.NOV.2013 13:47:11

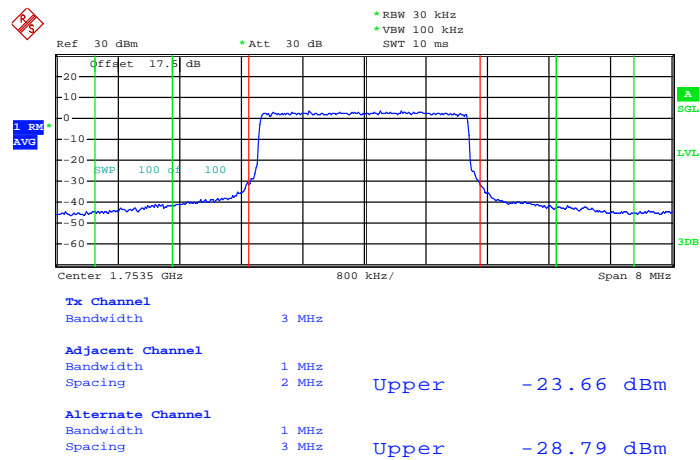


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 14



Date: 23.NOV.2013 13:49:29

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

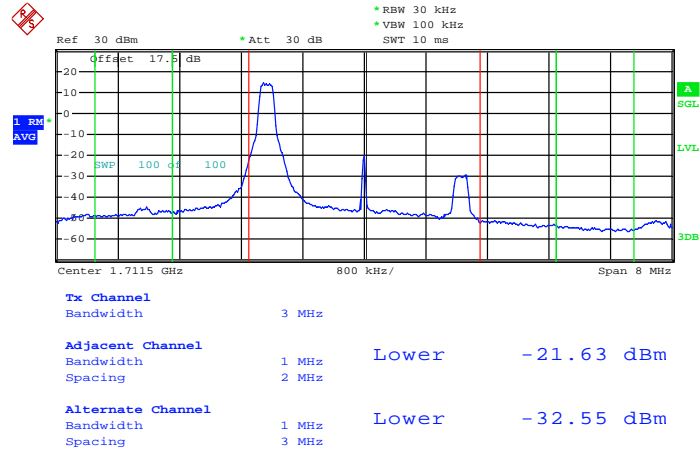


Date: 23.NOV.2013 13:49:50



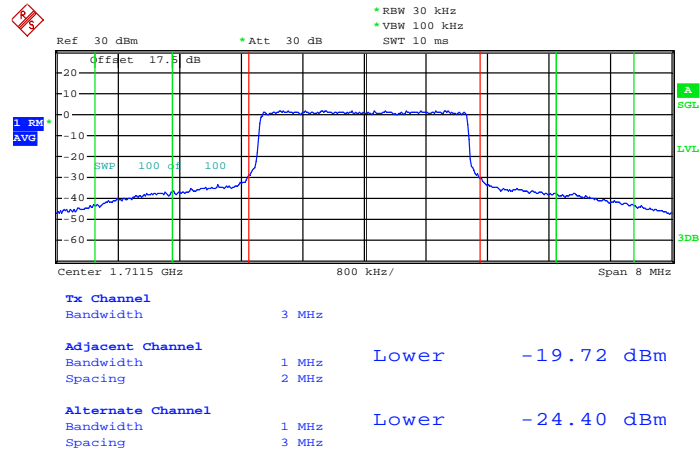
Band :	LTE Band 4	Band Width :	3MHz / 16QAM
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Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:47:51

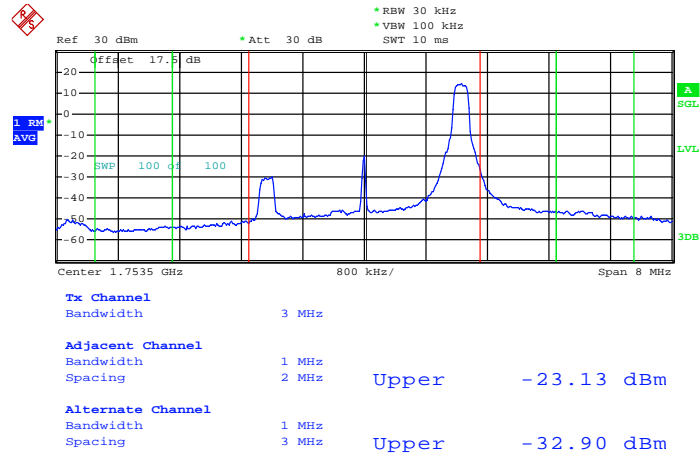
Lower Band Edge Plot for 16QAM -RB Size 15, RB Offset 0



Date: 23.NOV.2013 13:46:46

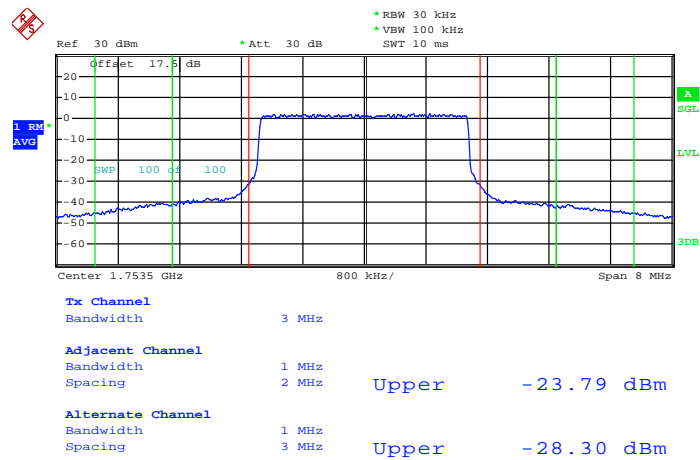


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 14



Date: 23.NOV.2013 13:49:10

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

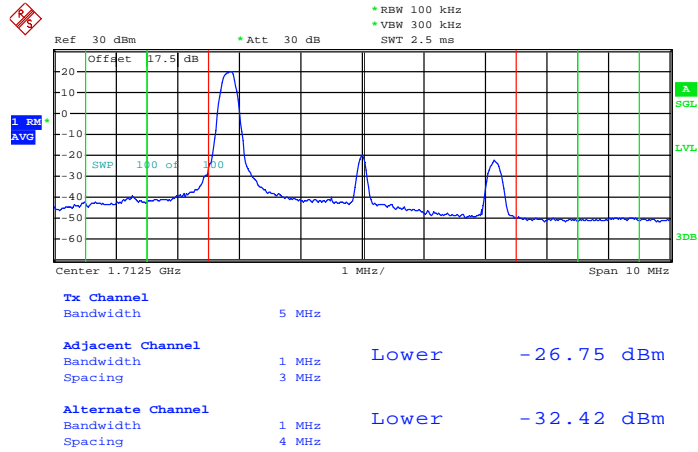


Date: 23.NOV.2013 13:50:08



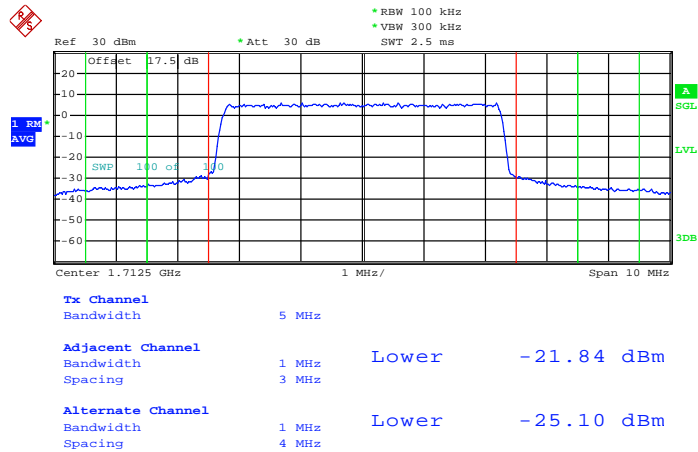
Band :	LTE Band 4	Band Width :	5MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:25:03

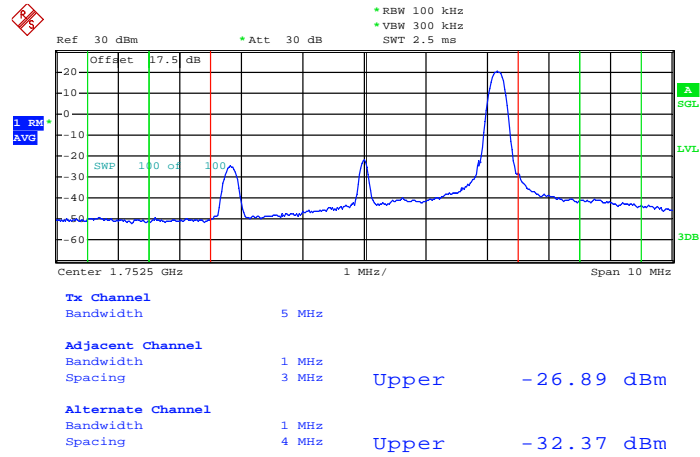
Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0



Date: 23.NOV.2013 13:25:37

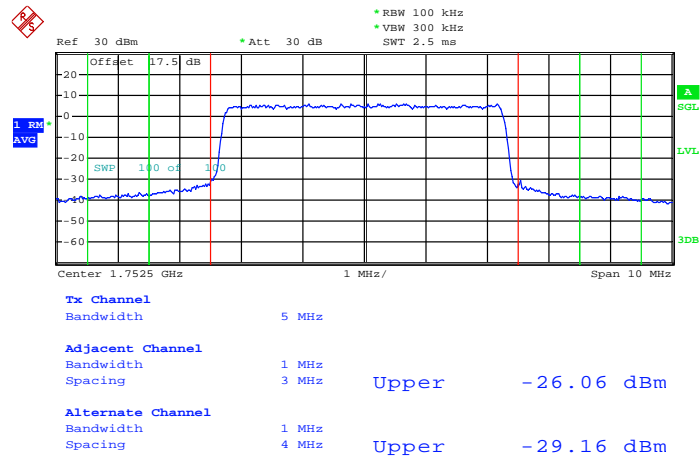


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24



Date: 23.NOV.2013 13:22:32

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

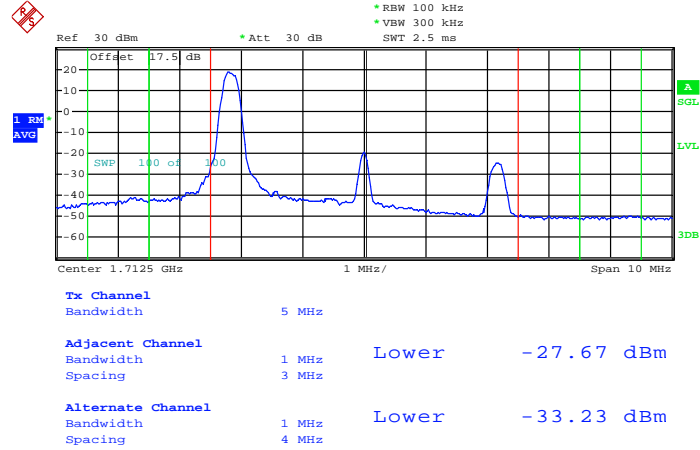


Date: 23.NOV.2013 13:22:05



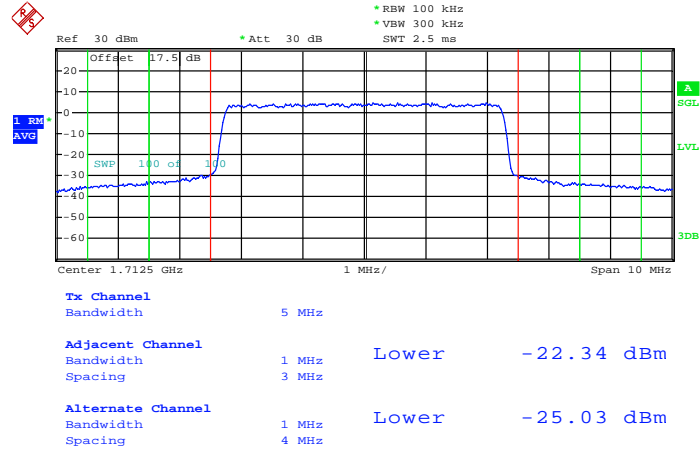
Band :	LTE Band 4	Band Width :	5MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:24:43

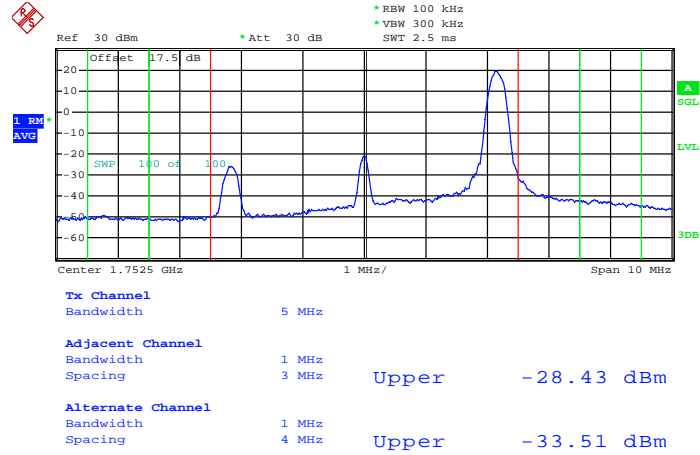
Lower Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



Date: 23.NOV.2013 13:25:56

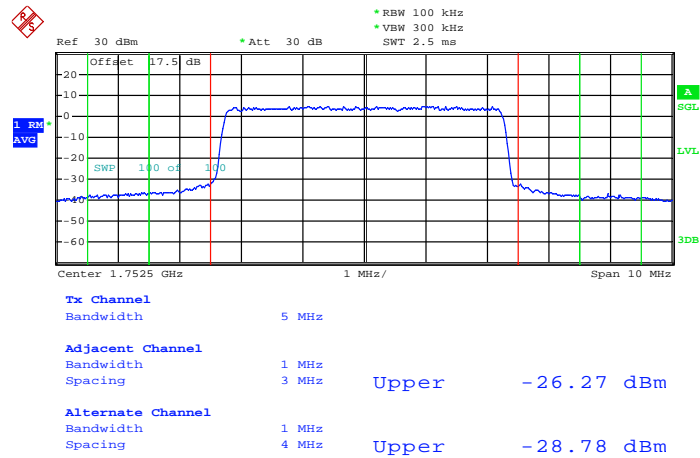


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 24



Date: 23.NOV.2013 13:22:59

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

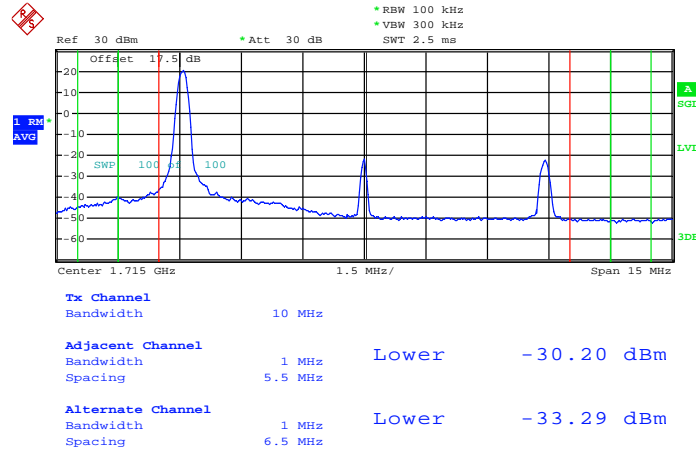


Date: 23.NOV.2013 13:21:46



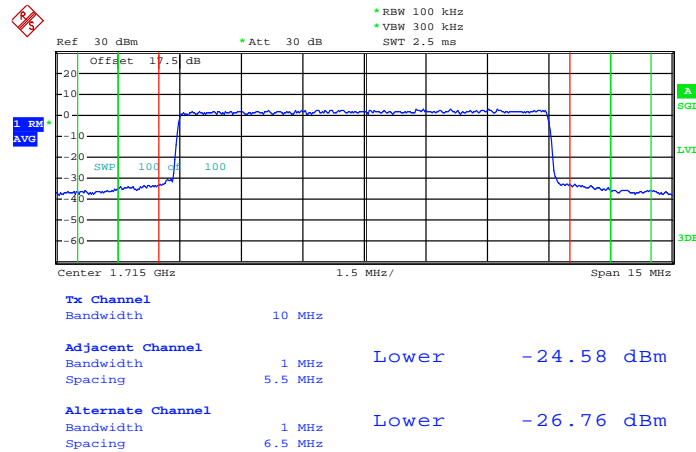
Band :	LTE Band 4	Band Width :	10MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:17:43

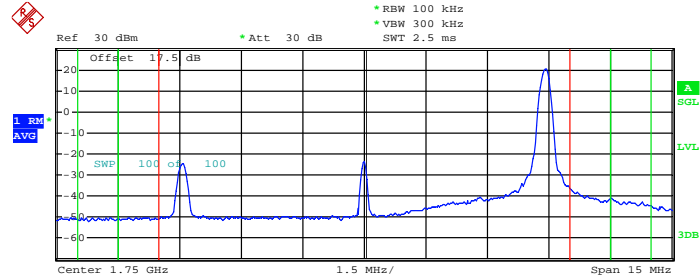
Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0



Date: 23.NOV.2013 13:17:25



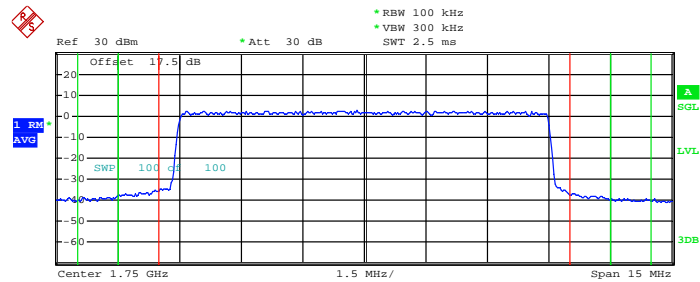
Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49



Tx Channel			
Bandwidth	10 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	5.5 MHz	Upper	-30.45 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	6.5 MHz	Upper	-33.55 dBm

Date: 23.NOV.2013 13:19:10

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



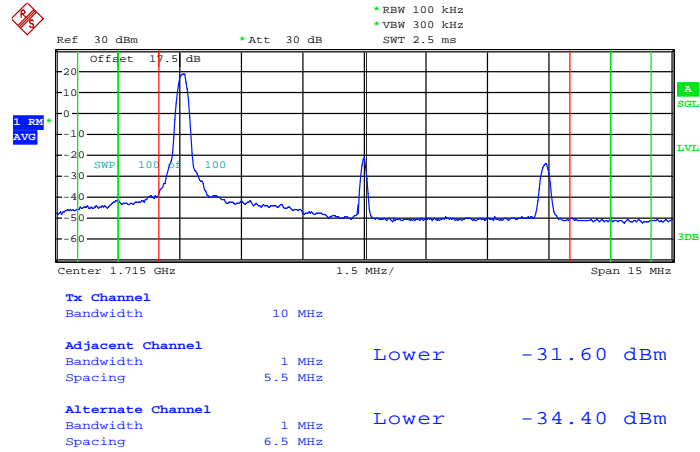
Tx Channel			
Bandwidth	10 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	5.5 MHz	Upper	-28.52 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	6.5 MHz	Upper	-30.15 dBm

Date: 23.NOV.2013 13:19:39



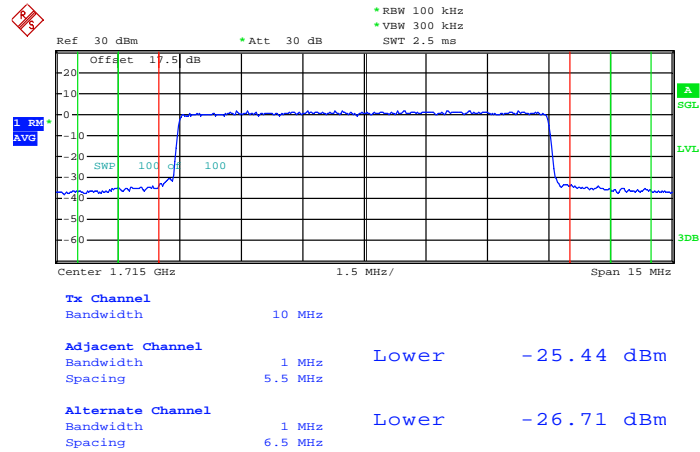
Band :	LTE Band 4	Band Width :	10MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:17:56

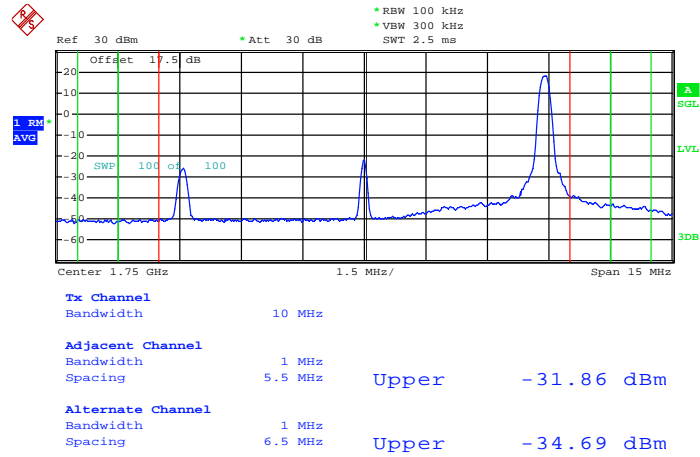
Lower Band Edge Plot for 16QAM-RB Size 50, RB Offset 0



Date: 23.NOV.2013 13:17:09

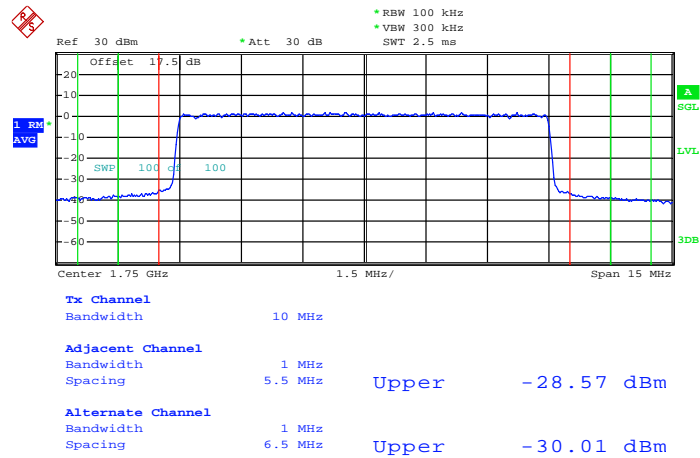


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 49



Date: 23.NOV.2013 13:18:51

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

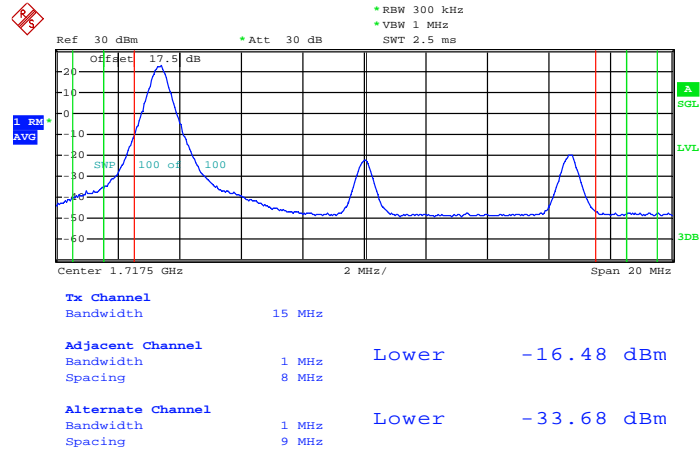


Date: 23.NOV.2013 13:19:58



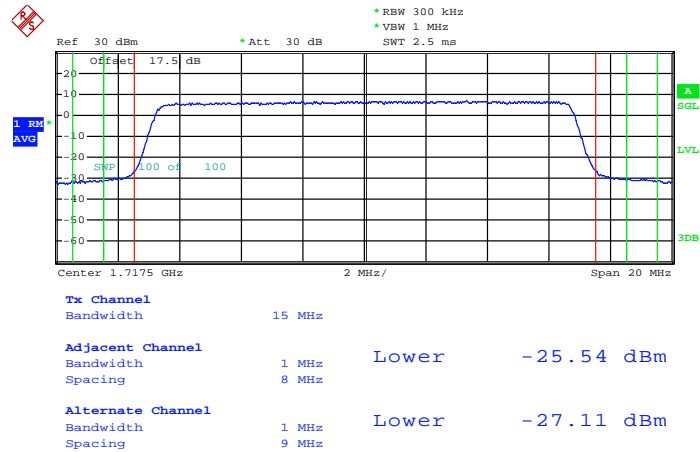
Band :	LTE Band 4	Band Width :	15MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:12:35

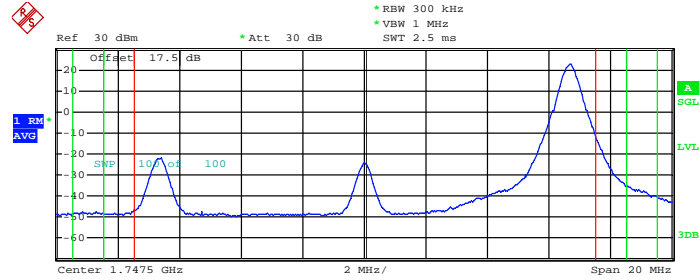
Lower Band Edge Plot for QPSK-RB Size 75, RB Offset 0



Date: 23.NOV.2013 13:12:59



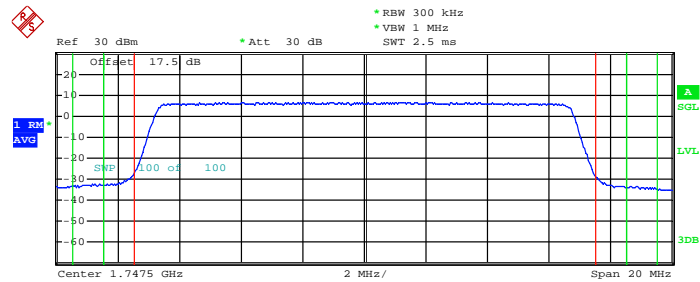
Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 74



Tx Channel			
Bandwidth	15 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	8 MHz	Upper	-15.25 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	9 MHz	Upper	-33.14 dBm

Date: 23.NOV.2013 13:10:38

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



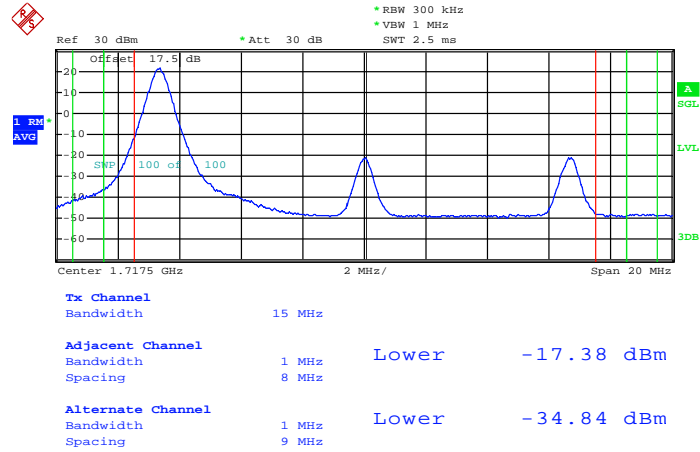
Tx Channel			
Bandwidth	15 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	8 MHz	Upper	-27.74 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	9 MHz	Upper	-29.60 dBm

Date: 23.NOV.2013 13:09:50



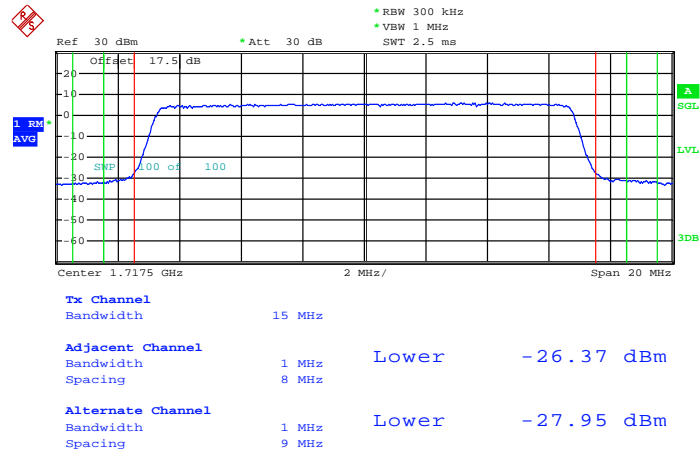
Band :	LTE Band 4	Band Width :	15MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:12:16

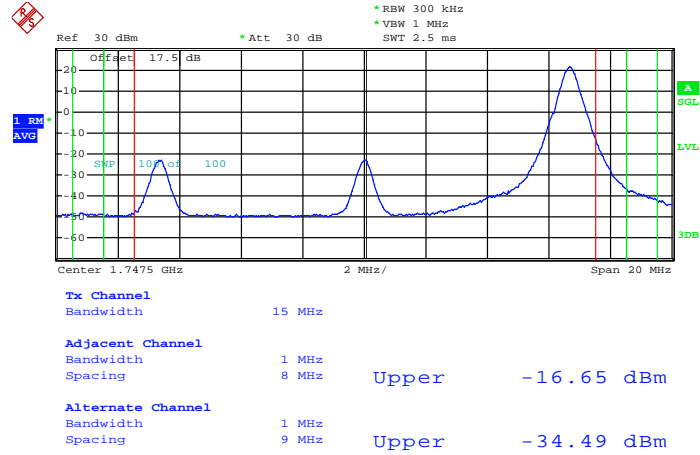
Lower Band Edge Plot for 16QAM-RB Size 75, RB Offset 0



Date: 23.NOV.2013 13:13:21

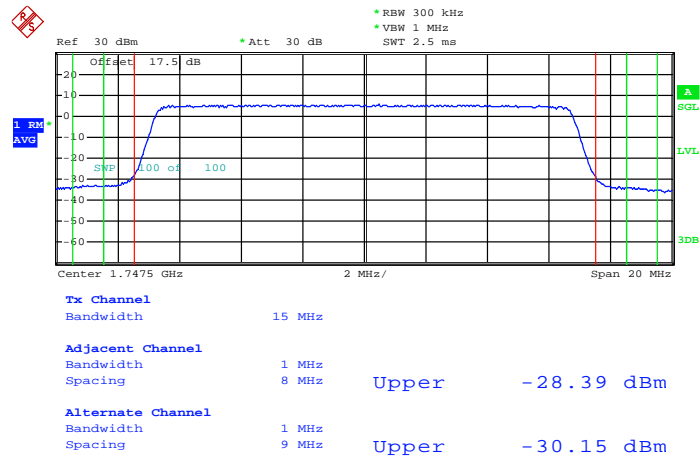


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 74



Date: 23.NOV.2013 13:11:12

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

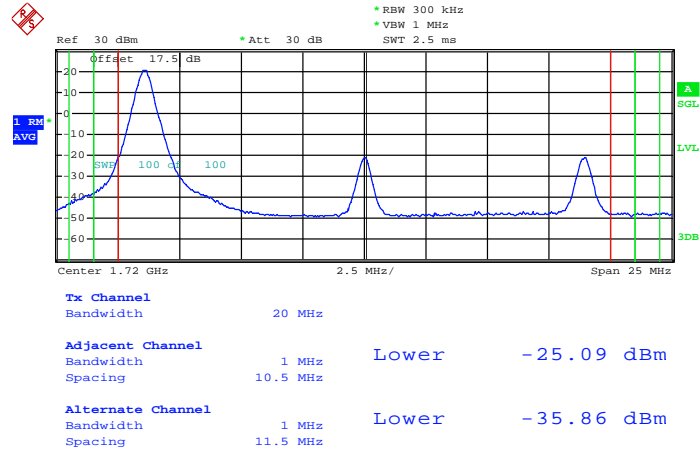


Date: 23.NOV.2013 13:09:35



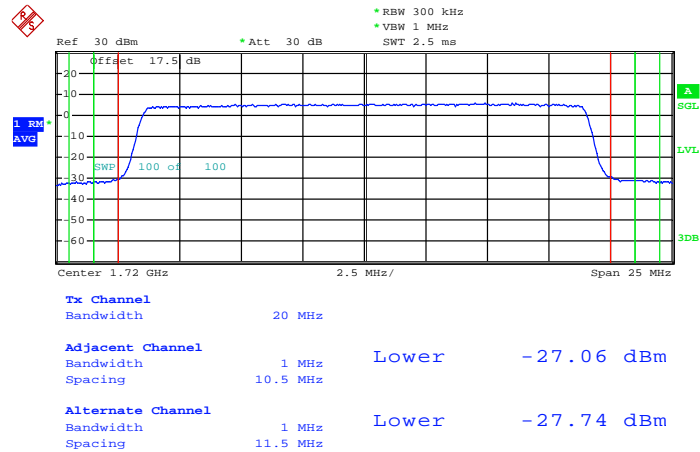
Band :	LTE Band 4	Band Width :	20MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:04:13

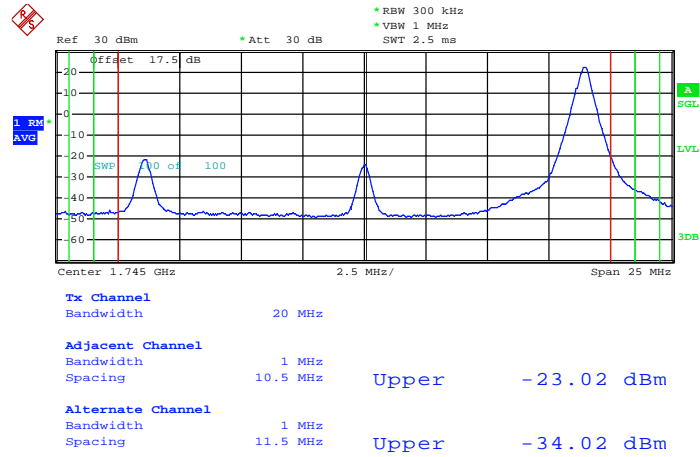
Lower Band Edge Plot for QPSK-RB Size 100, RB Offset 0



Date: 23.NOV.2013 13:04:54

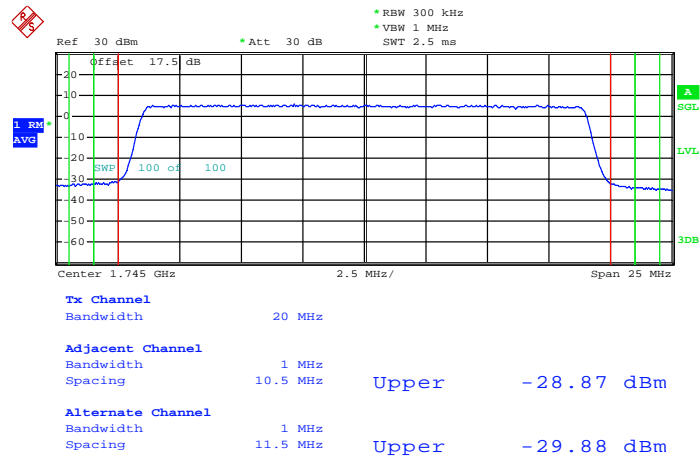


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 99



Date: 23.NOV.2013 13:06:37

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

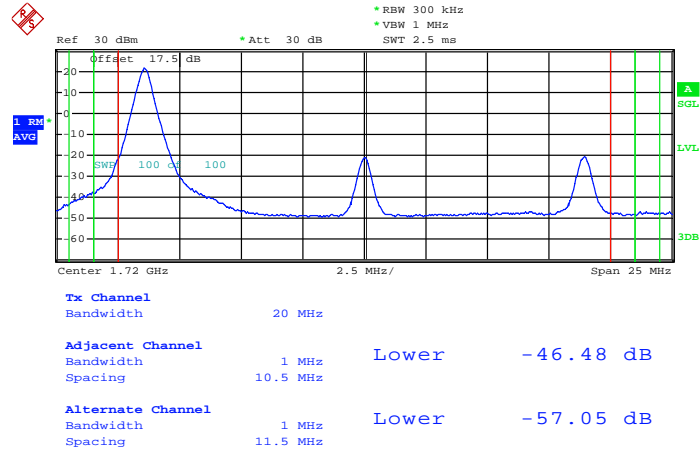


Date: 23.NOV.2013 13:06:16



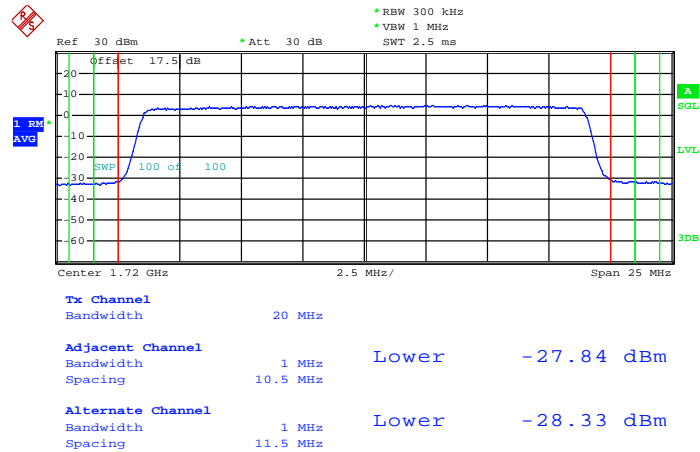
Band :	LTE Band 4	Band Width :	20MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 23.NOV.2013 13:03:14

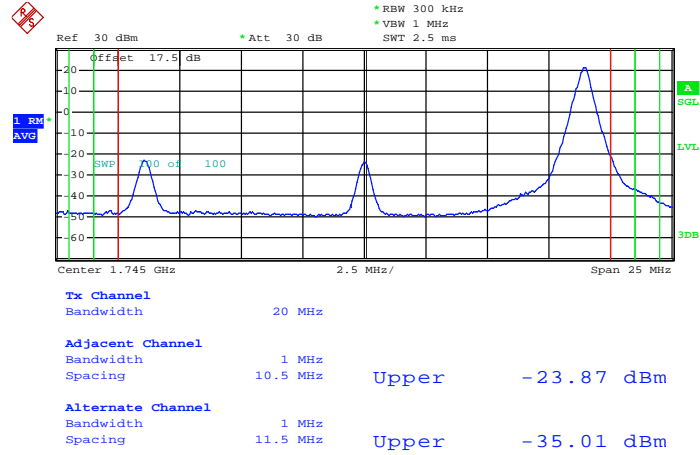
Lower Band Edge Plot for 16QAM-RB Size 100, RB Offset 0



Date: 23.NOV.2013 13:05:12

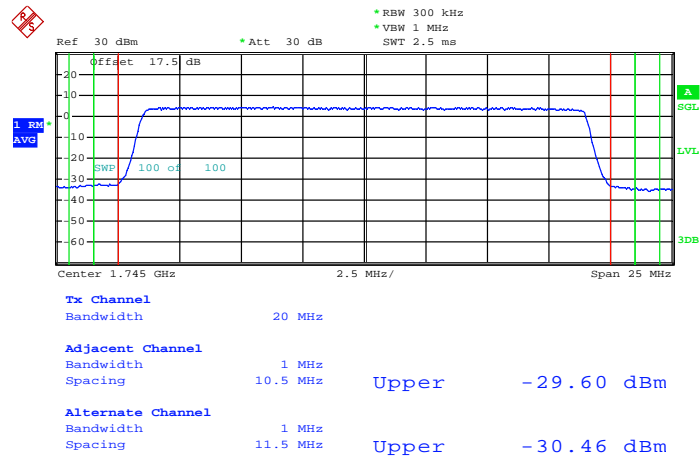


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 99



Date: 23.NOV.2013 13:06:53

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

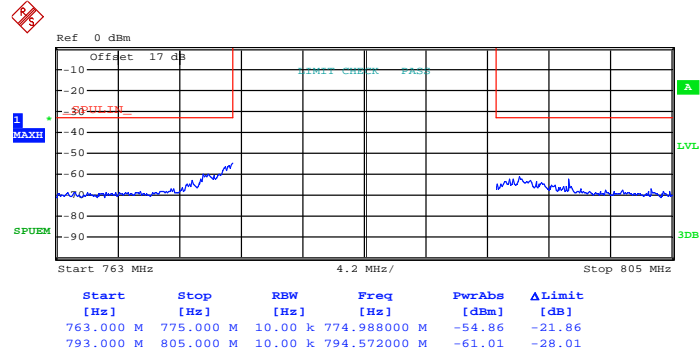


Date: 23.NOV.2013 13:06:01



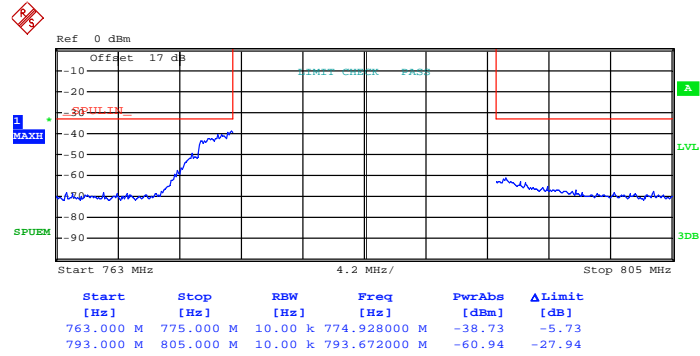
Band :	LTE Band 13	Band Width :	5MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 23.NOV.2013 16:14:06

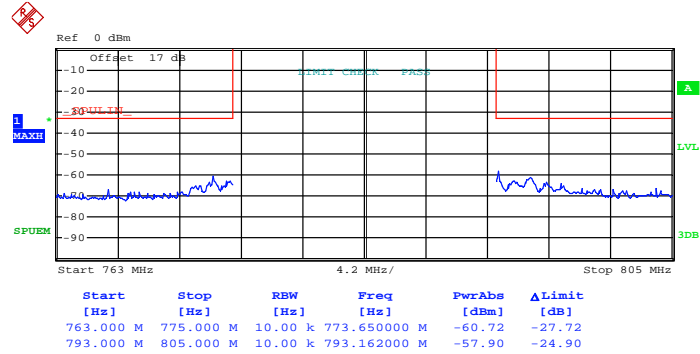
Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0



Date: 23.NOV.2013 16:13:28

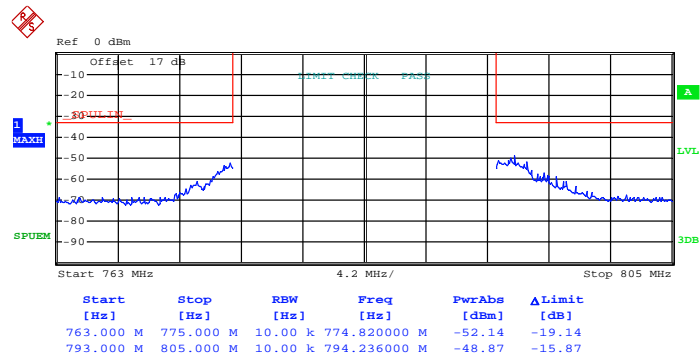


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24



Date: 23.NOV.2013 16:16:47

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

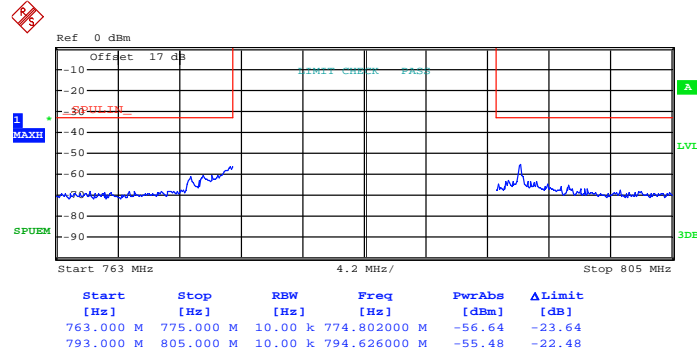


Date: 23.NOV.2013 16:16:17



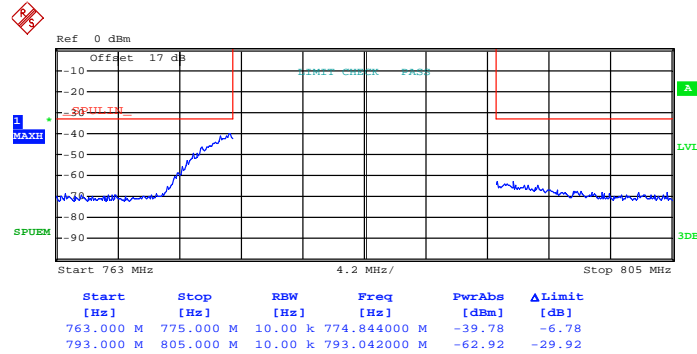
Band :	LTE Band 13	Band Width :	5MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 23.NOV.2013 16:14:29

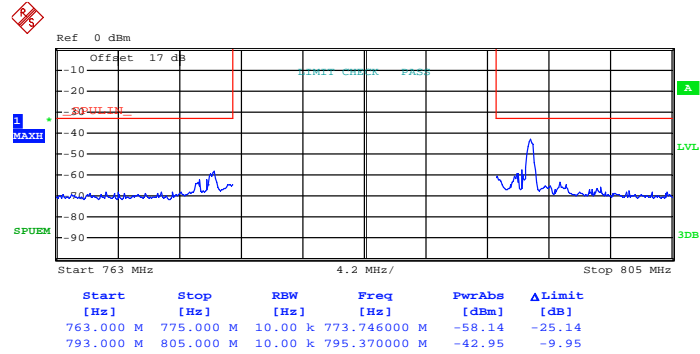
Lower Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



Date: 23.NOV.2013 16:13:04

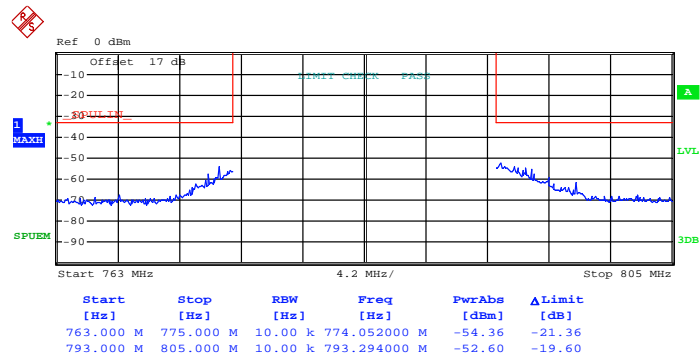


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 24



Date: 23.NOV.2013 16:17:38

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



Date: 23.NOV.2013 16:15:52

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 9 kHz up to a frequency including its 10th harmonic.

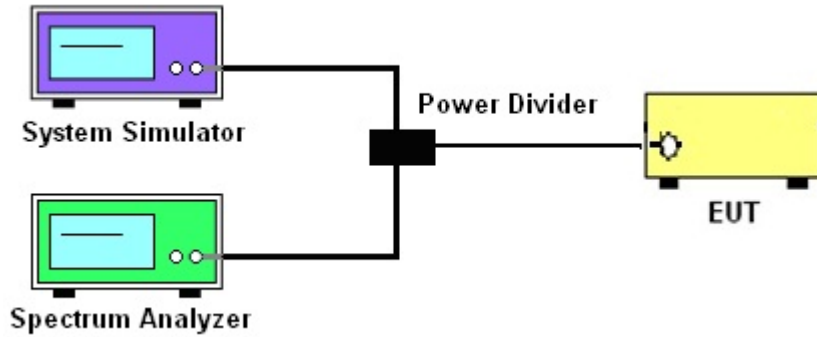
3.5.2 Measuring Instruments

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 base station via 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 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm.

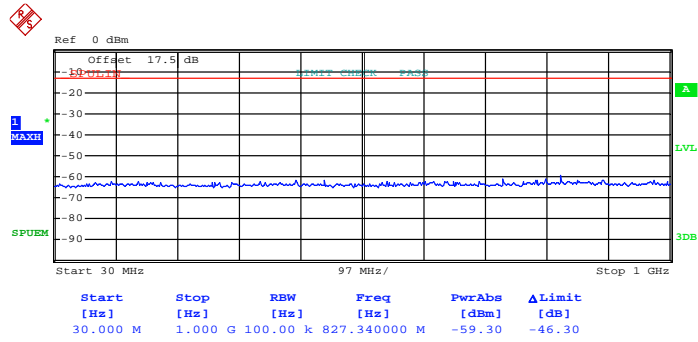
3.5.4 Test Setup



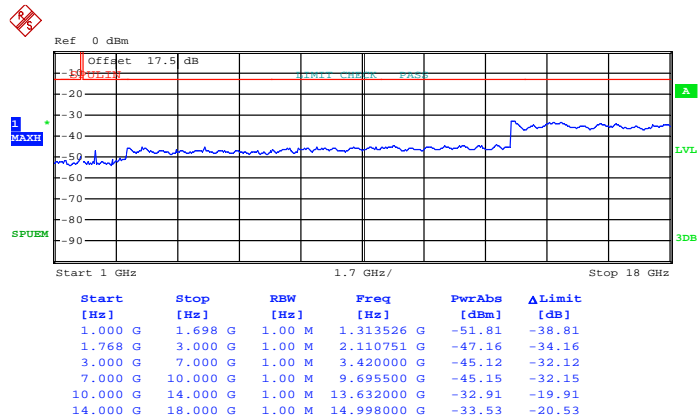
3.5.5 Test Result (Plots) of Conducted Spurious Emission

Band :	LTE Band 4	Channel :	CH19957 (Low)
Band Width :	1.4MHz		

QPSK (RB Size 1, RB Offset 0)



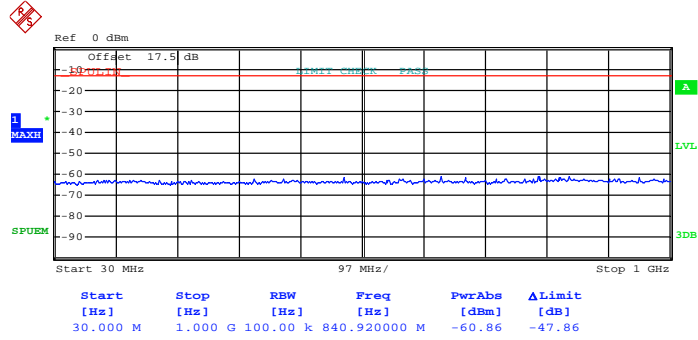
Date: 24.NOV.2013 13:28:55



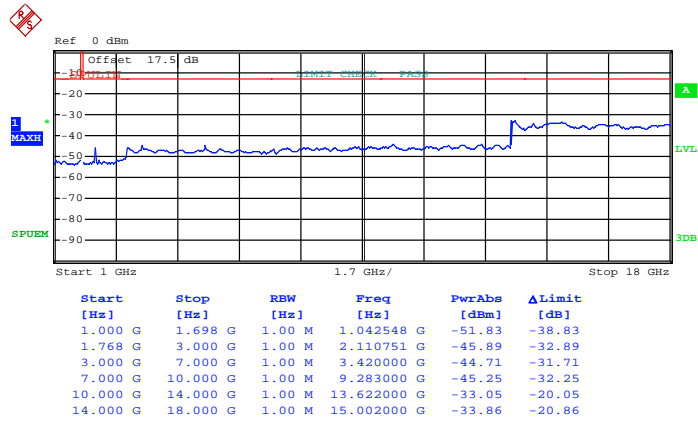
Date: 24.NOV.2013 13:30:03



16QAM (RB Size 3, RB Offset 0)



Date: 24.NOV.2013 13:27:56

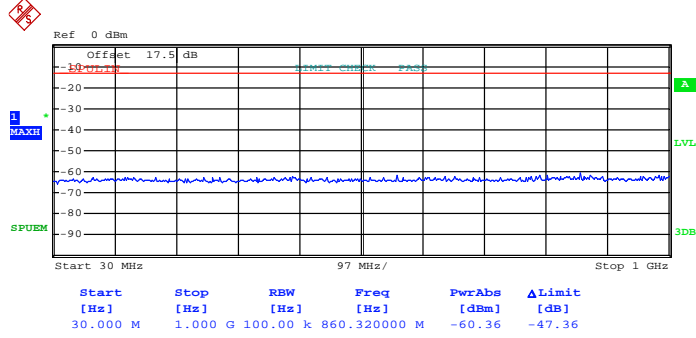


Date: 24.NOV.2013 13:27:07

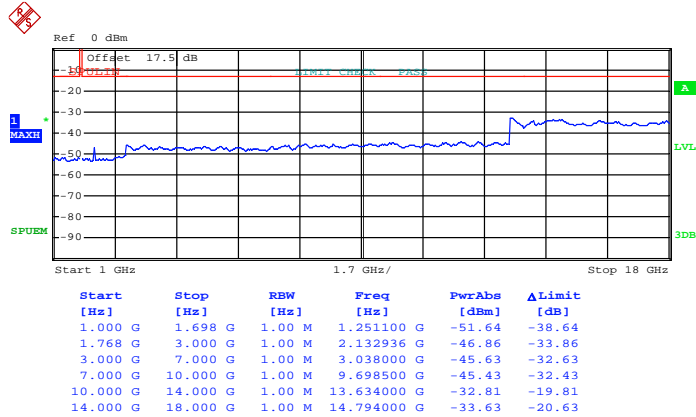


Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	1.4MHz		

QPSK (RB Size 3, RB Offset 0)



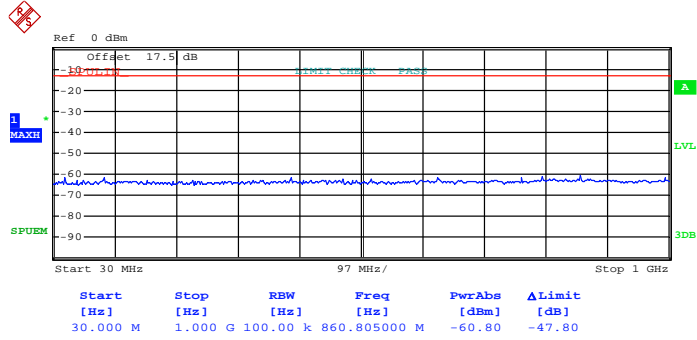
Date: 24.NOV.2013 13:22:57



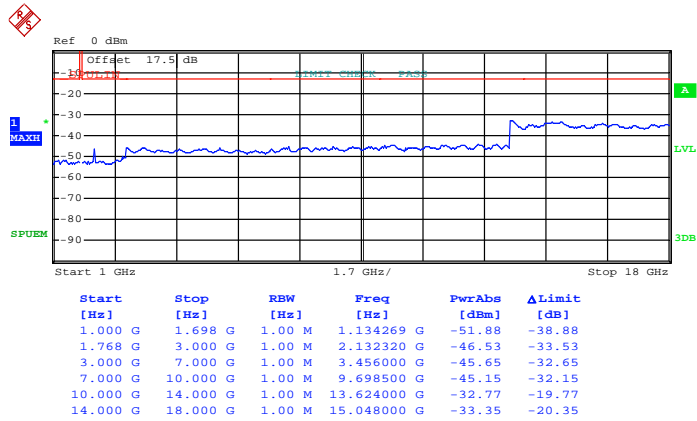
Date: 24.NOV.2013 13:22:13



16QAM (RB Size 3, RB Offset 1)



Date: 24.NOV.2013 13:24:02

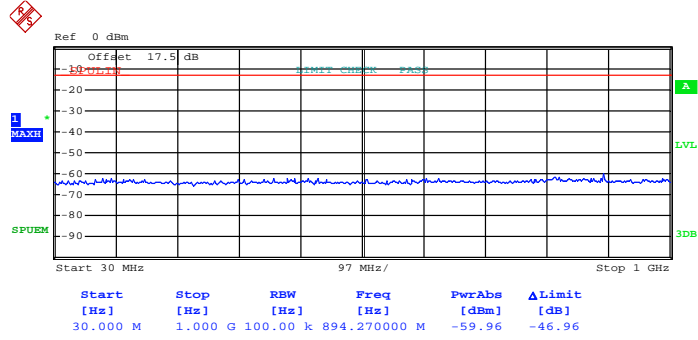


Date: 24.NOV.2013 13:24:51

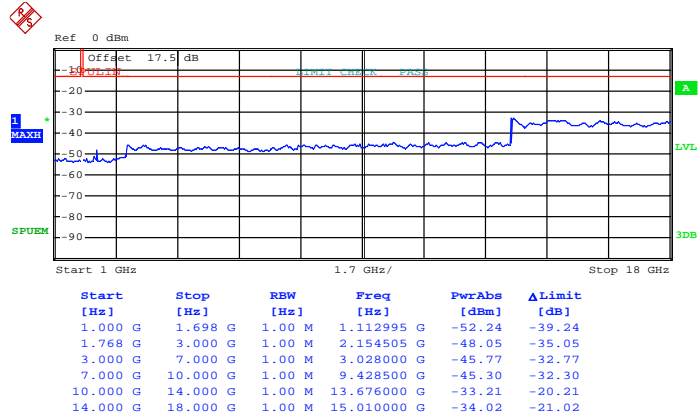


Band :	LTE Band 4	Channel :	CH20393 (High)
Band Width :	1.4MHz		

QPSK (RB Size 1, RB Offset 5)



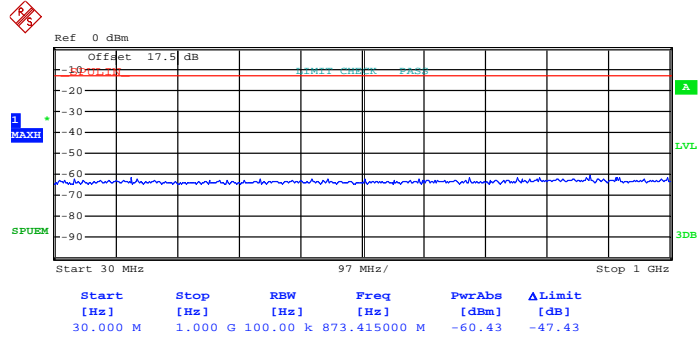
Date: 24.NOV.2013 13:31:46



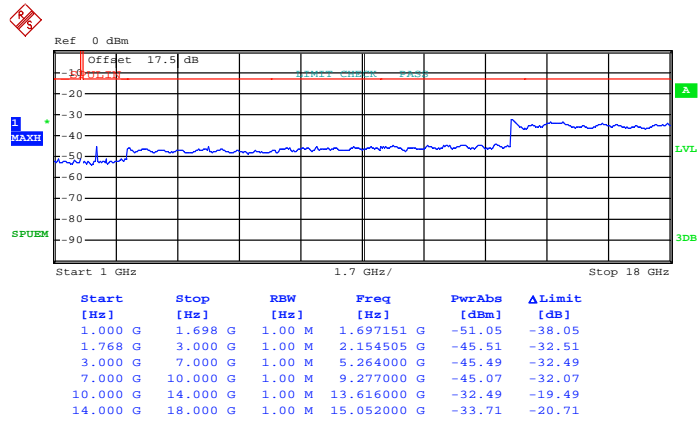
Date: 24.NOV.2013 13:31:02



16QAM (RB Size 3, RB Offset 2)



Date: 24.NOV.2013 13:32:49

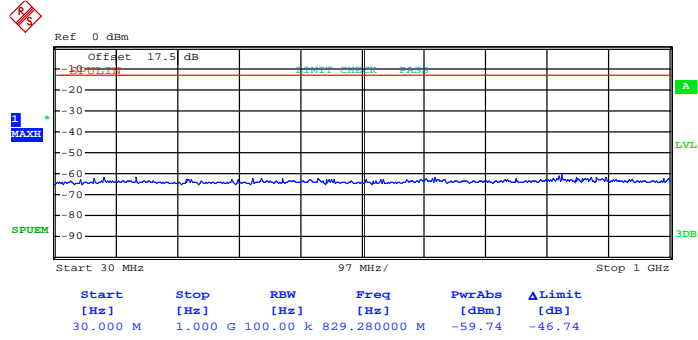


Date: 24.NOV.2013 13:33:44

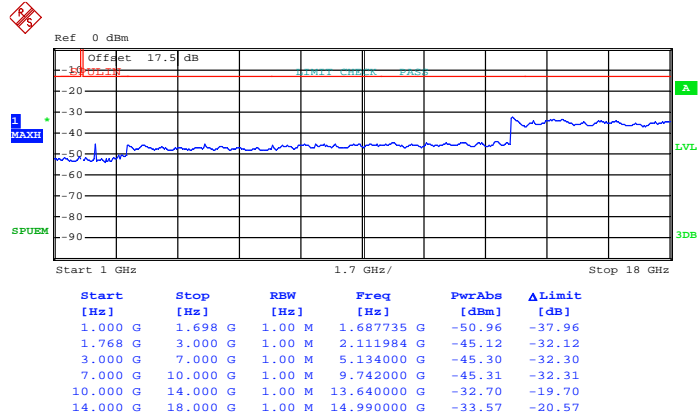


Band :	LTE Band 4	Channel :	CH19965 (Low)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 7)



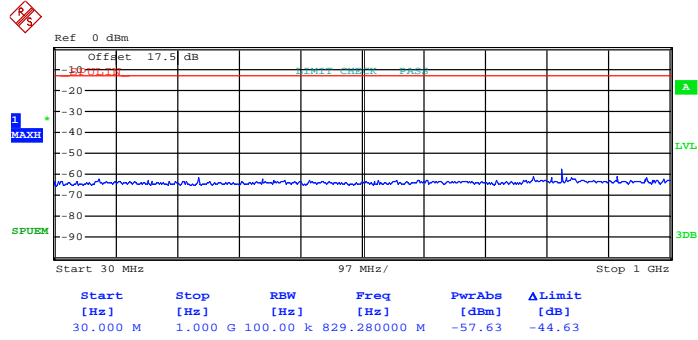
Date: 24.NOV.2013 13:11:20



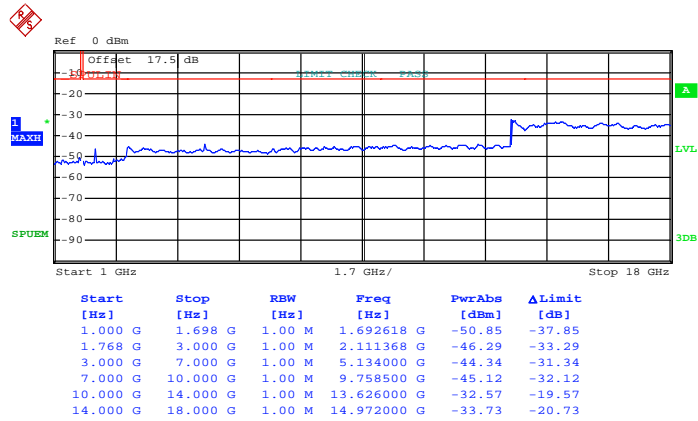
Date: 24.NOV.2013 13:12:04



16QAM (RB Size 1, RB Offset 7)



Date: 24.NOV.2013 13:10:49

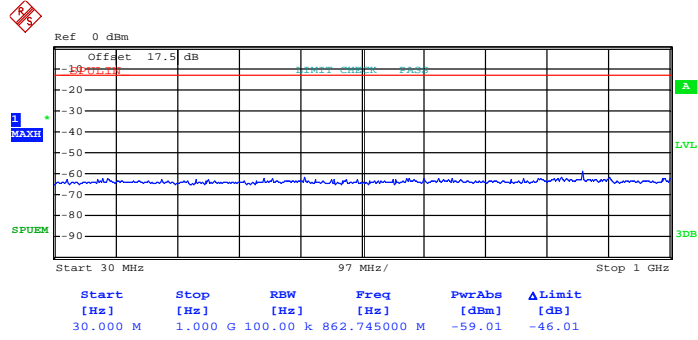


Date: 24.NOV.2013 13:12:46

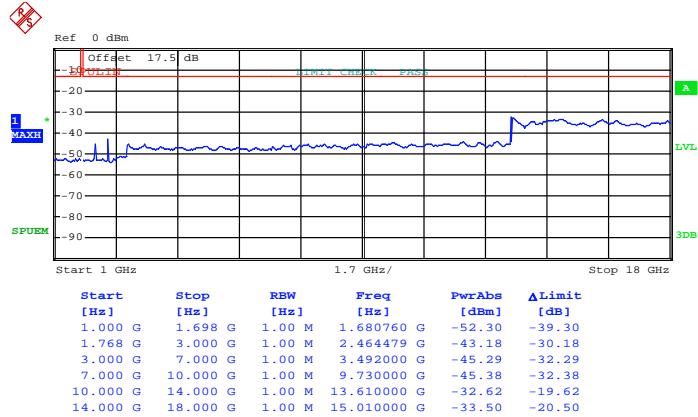


Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 14)



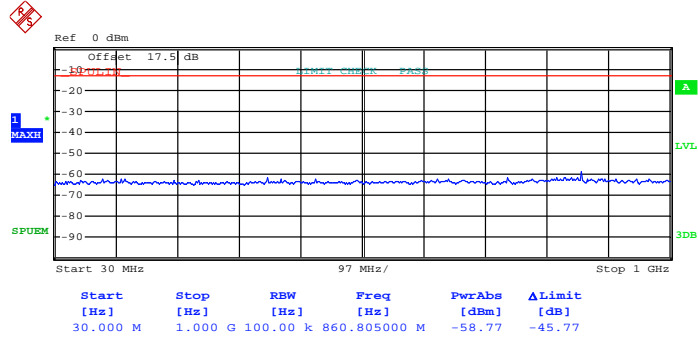
Date: 24.NOV.2013 13:06:57



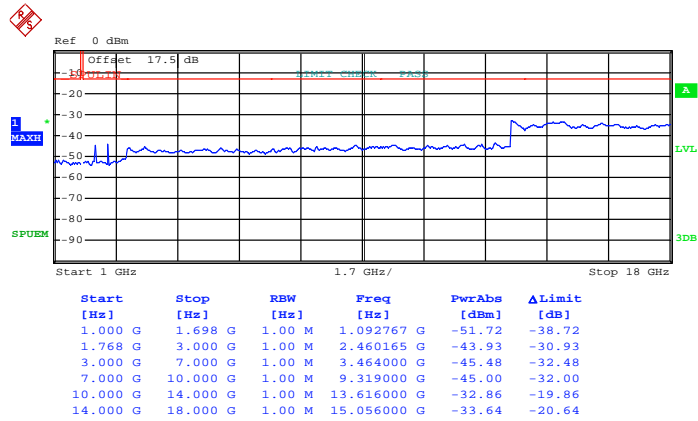
Date: 24.NOV.2013 13:07:40



16QAM (RB Size 1, RB Offset 7)



Date: 24.NOV.2013 13:09:06

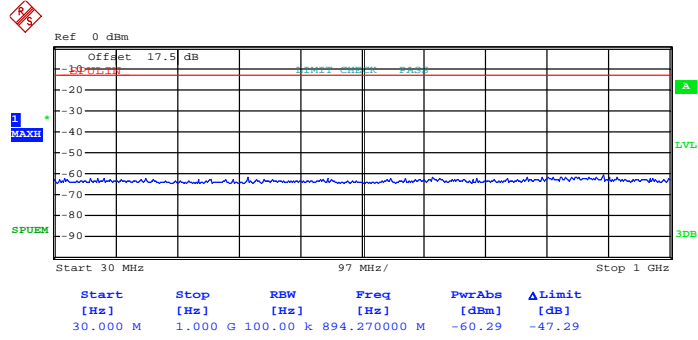


Date: 24.NOV.2013 13:08:25

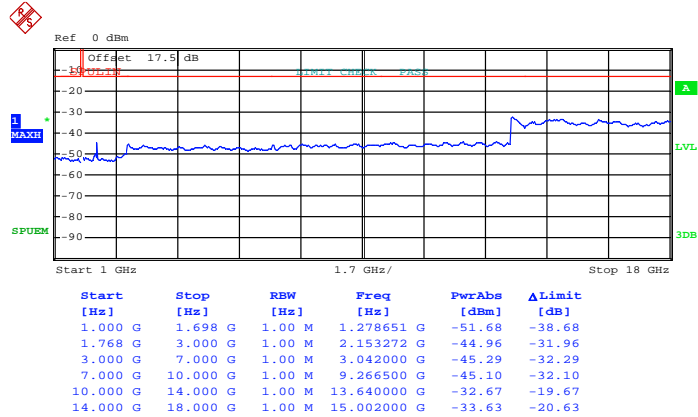


Band :	LTE Band 4	Channel :	CH20385 (High)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 14)



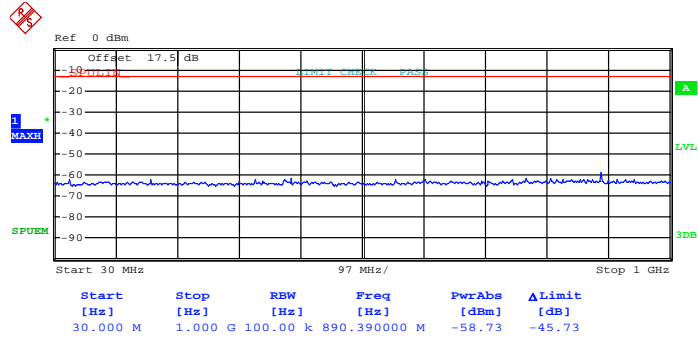
Date: 24.NOV.2013 13:19:01



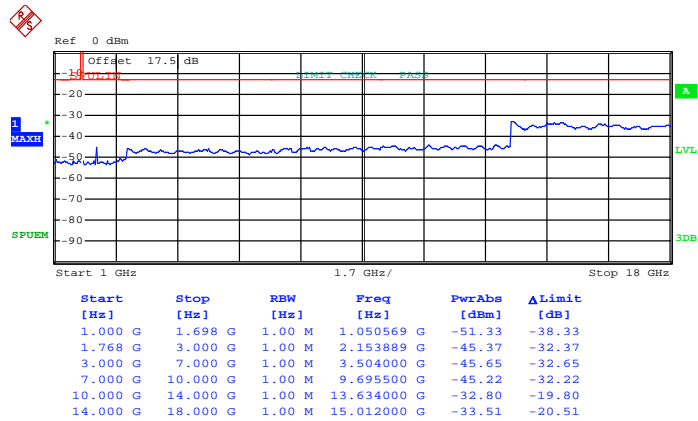
Date: 24.NOV.2013 13:20:12



16QAM (RB Size 1, RB Offset 0)



Date: 24.NOV.2013 13:17:35

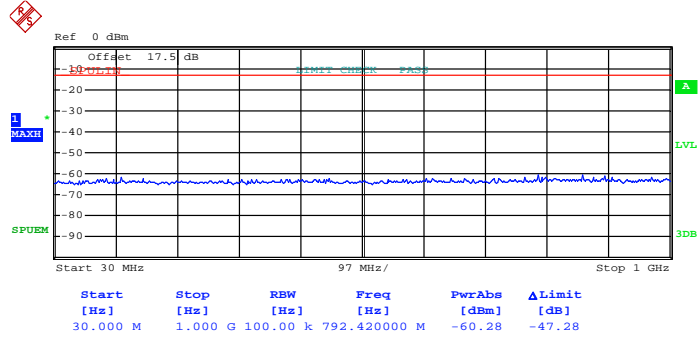


Date: 24.NOV.2013 13:16:56

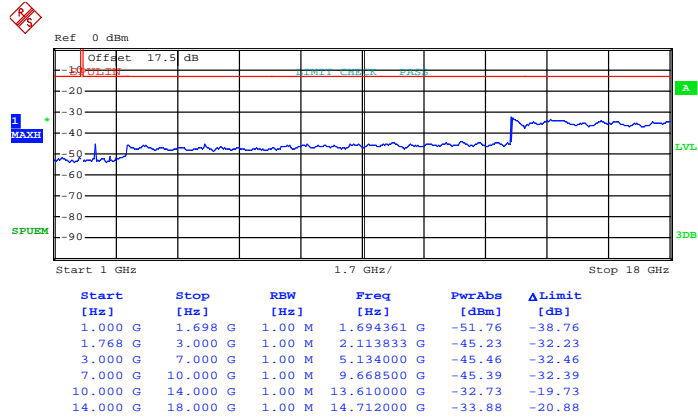


Band :	LTE Band 4	Channel :	CH19975 (Low)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 24)



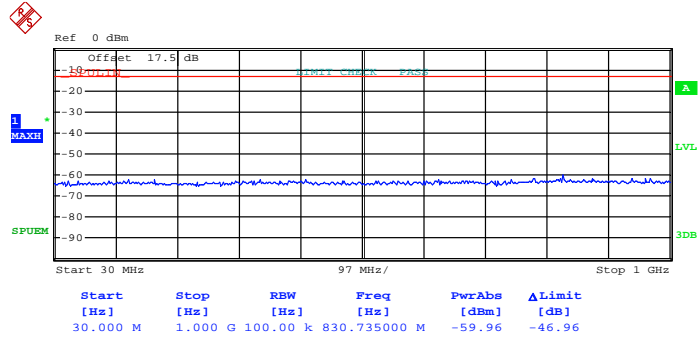
Date: 24.NOV.2013 12:39:43



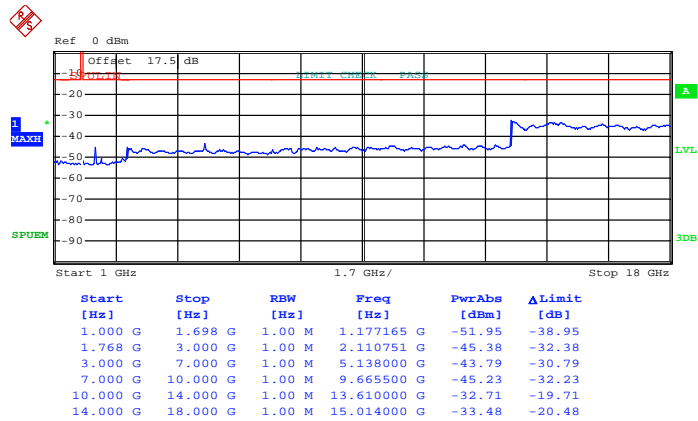
Date: 24.NOV.2013 12:38:38



16QAM (RB Size 1, RB Offset 12)



Date: 24.NOV.2013 12:37:14

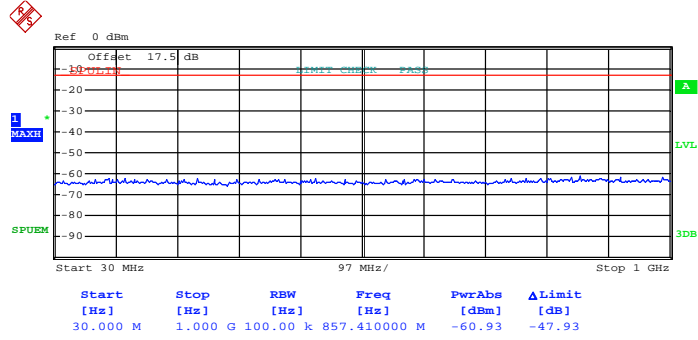


Date: 24.NOV.2013 12:37:51

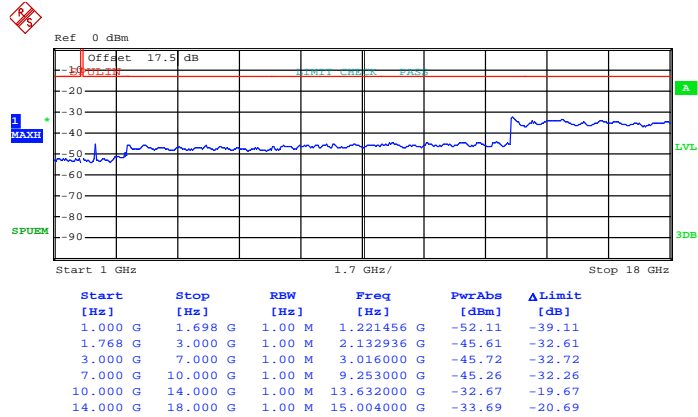


Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



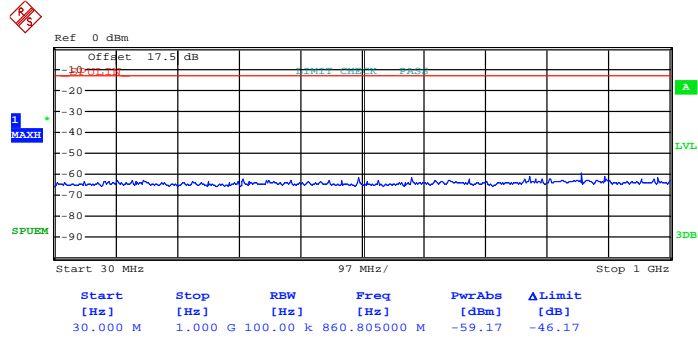
Date: 24.NOV.2013 12:36:03



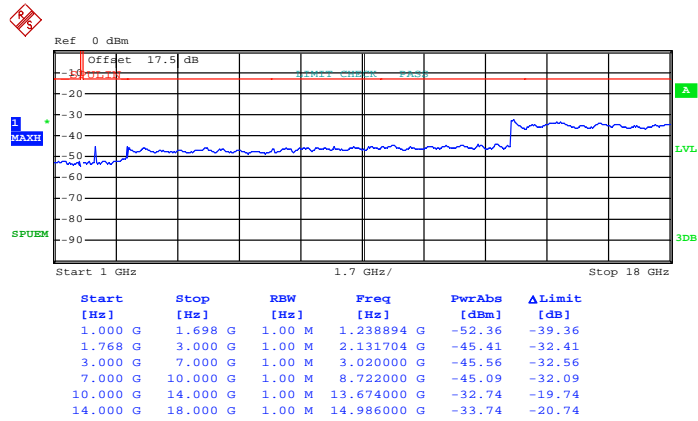
Date: 24.NOV.2013 12:35:37



16QAM (RB Size 1, RB Offset 12)



Date: 24.NOV.2013 12:34:30

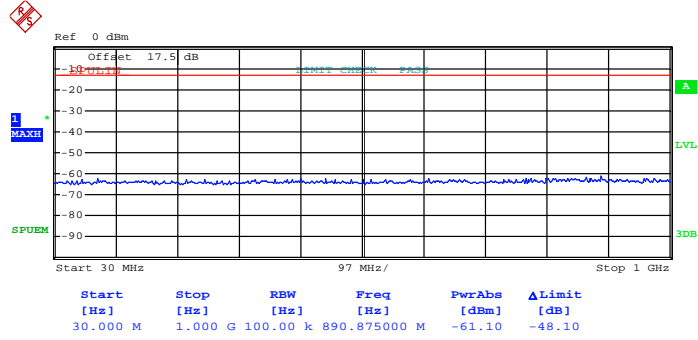


Date: 24.NOV.2013 12:35:03

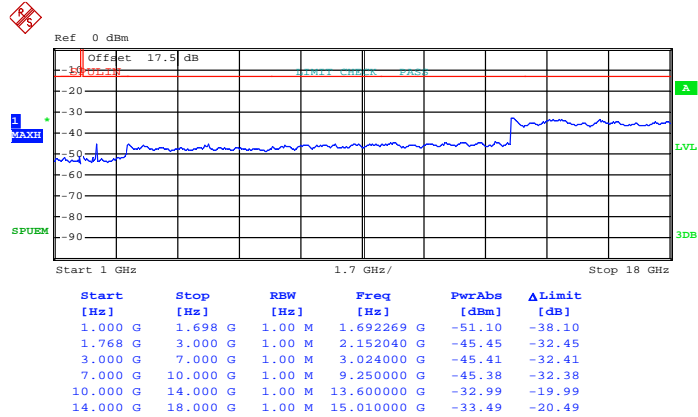


Band :	LTE Band 4	Channel :	CH20375 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 12)



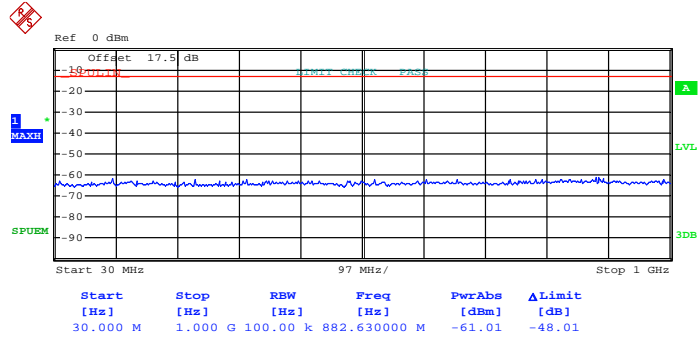
Date: 24.NOV.2013 12:33:29



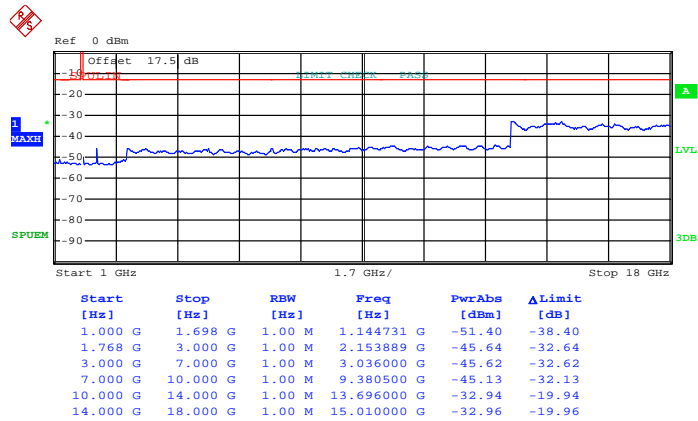
Date: 24.NOV.2013 12:32:53



16QAM (RB Size 1, RB Offset 0)



Date: 24.NOV.2013 12:31:29

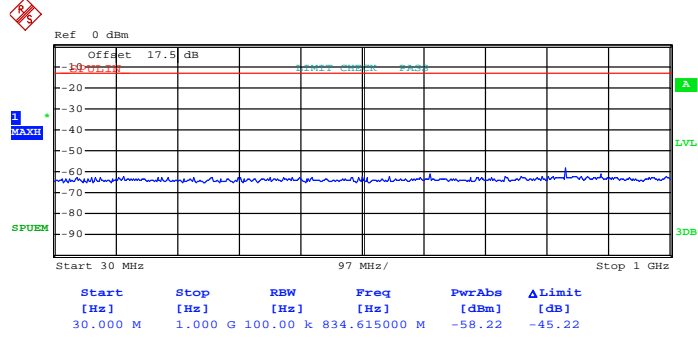


Date: 24.NOV.2013 12:32:13

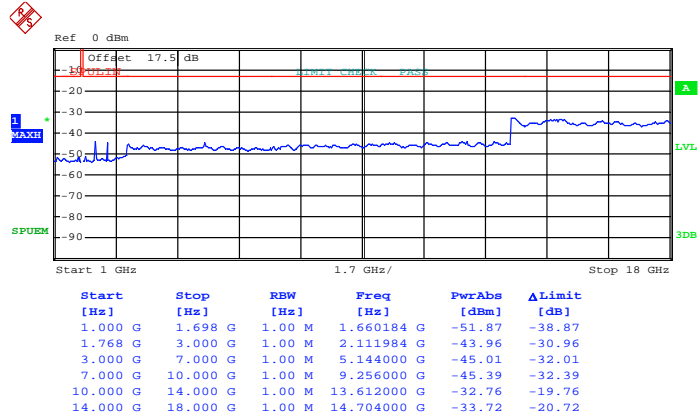


Band :	LTE Band 4	Channel :	CH20000 (Low)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 24)



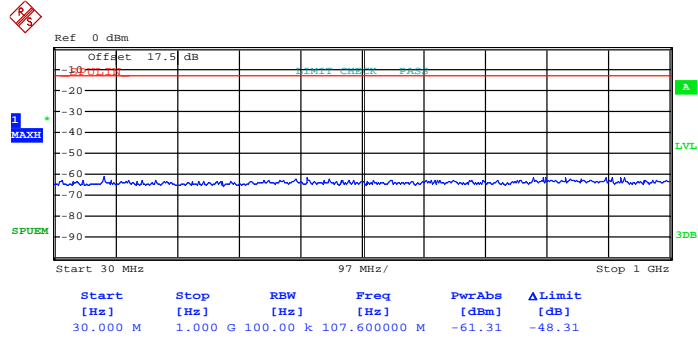
Date: 24.NOV.2013 12:27:15



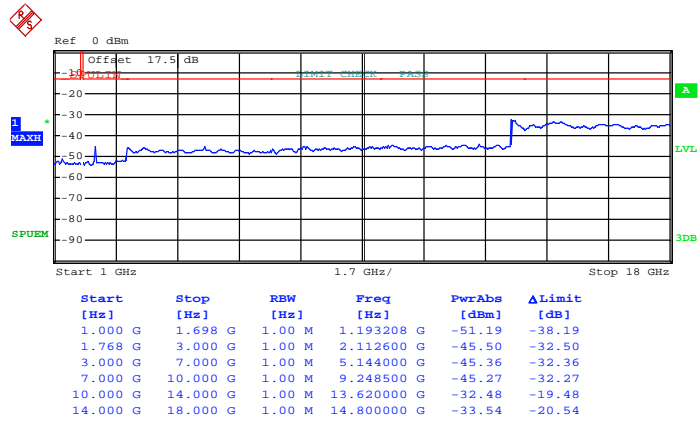
Date: 24.NOV.2013 12:25:49



16QAM (RB Size 1, RB Offset 24)



Date: 24.NOV.2013 12:26:47

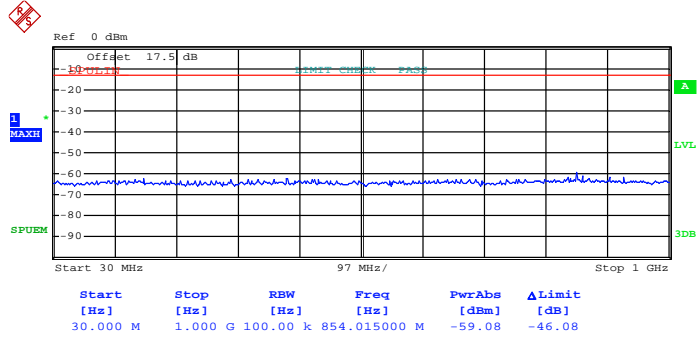


Date: 24.NOV.2013 12:26:13

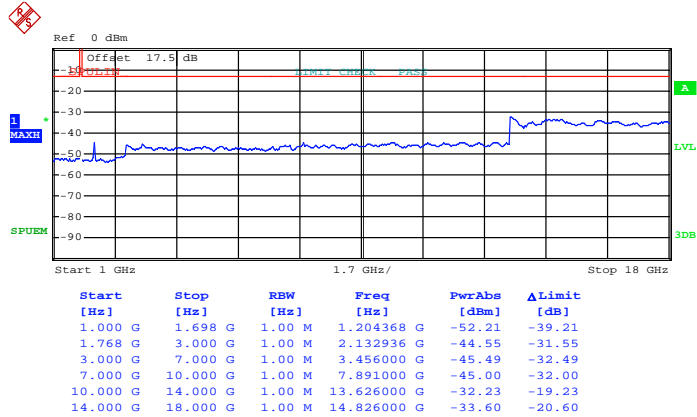


Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



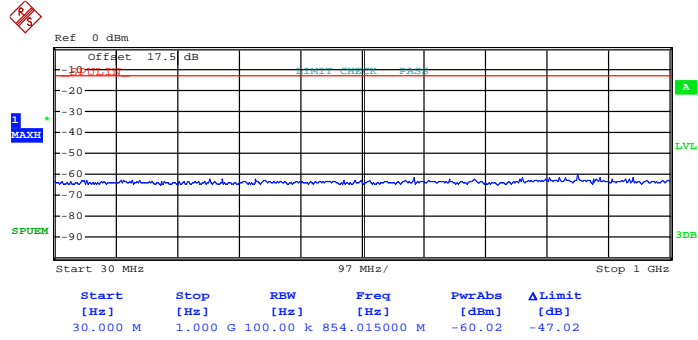
Date: 24.NOV.2013 12:22:13



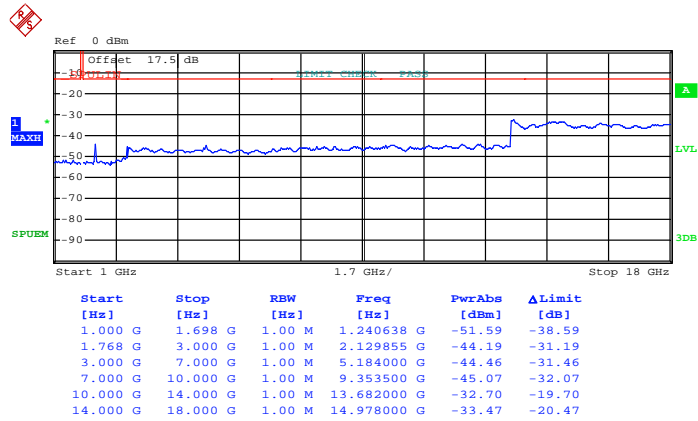
Date: 24.NOV.2013 12:24:11



16QAM (RB Size 1, RB Offset 0)



Date: 24.NOV.2013 12:22:45

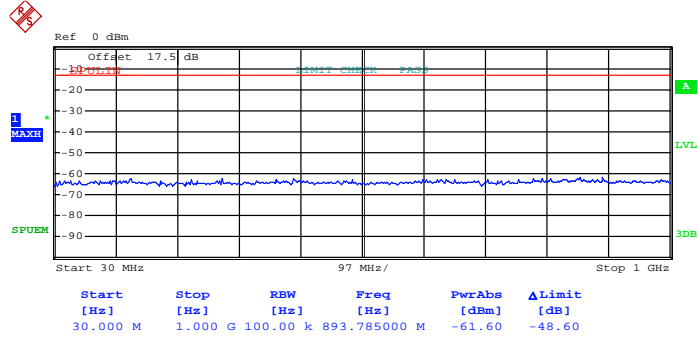


Date: 24.NOV.2013 12:23:47

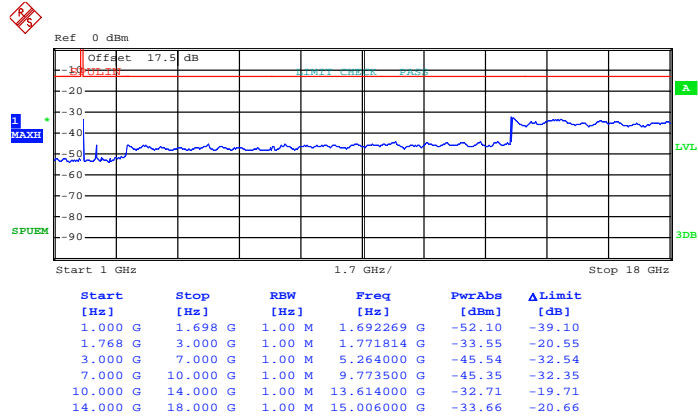


Band :	LTE Band 4	Channel :	CH20350 (High)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 49)



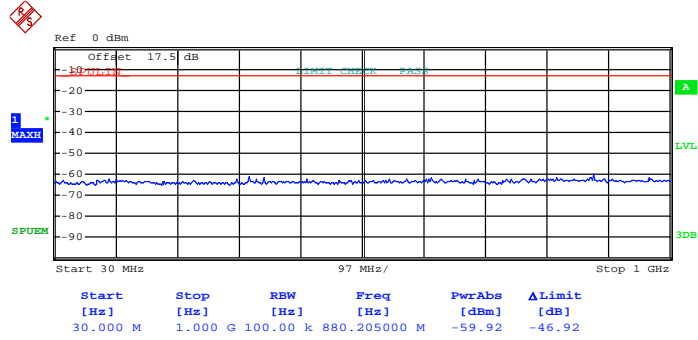
Date: 24.NOV.2013 12:28:10



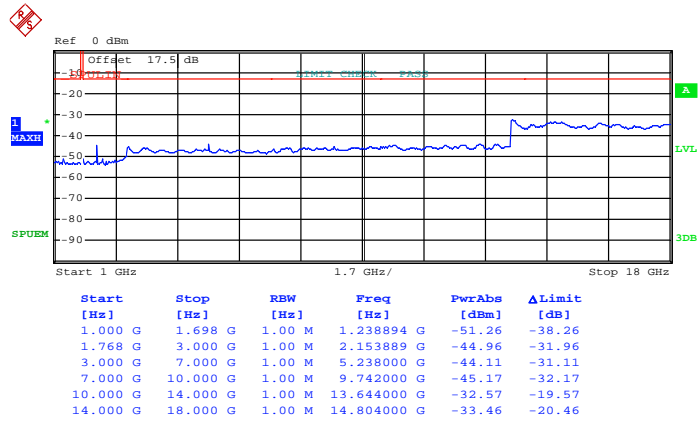
Date: 24.NOV.2013 12:28:43



16QAM (RB Size 1, RB Offset 0)



Date: 24.NOV.2013 12:30:29

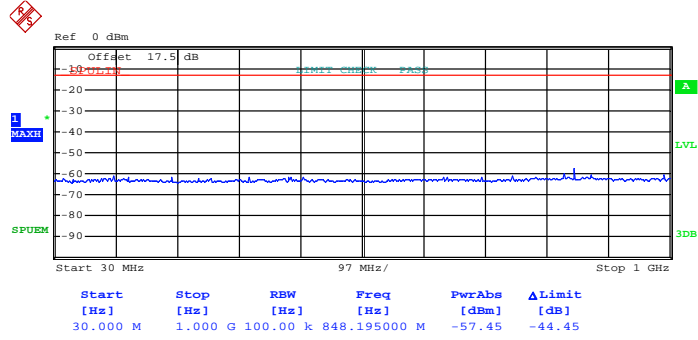


Date: 24.NOV.2013 12:29:16

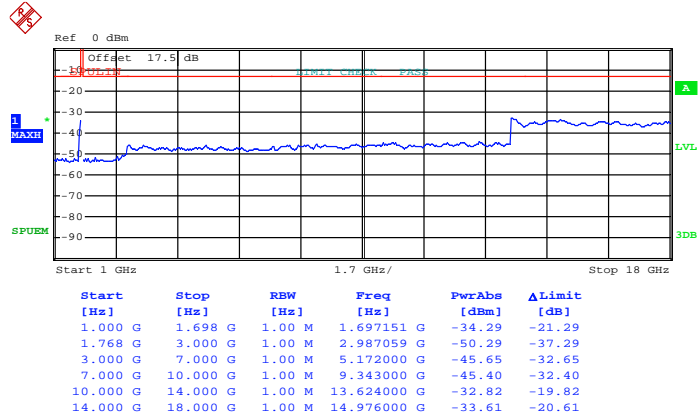


Band :	LTE Band 4	Channel :	CH20025 (Low)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 74)



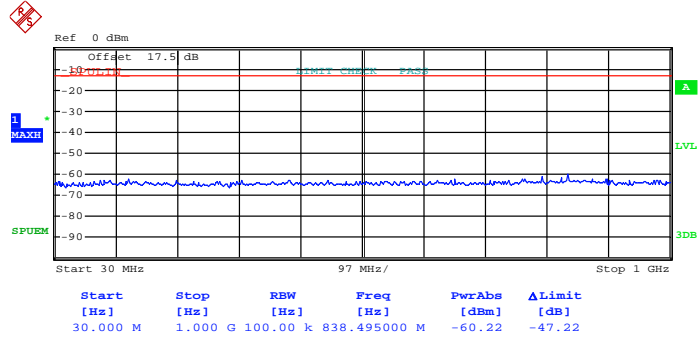
Date: 24.NOV.2013 12:08:30



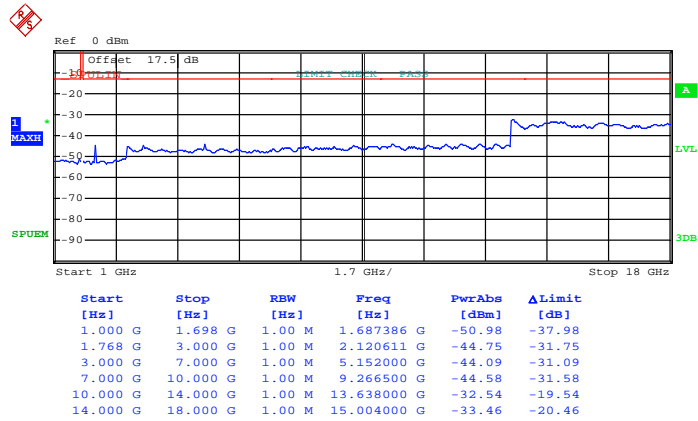
Date: 24.NOV.2013 12:06:57



16QAM (RB Size 1, RB Offset 37)



Date: 24.NOV.2013 12:09:04

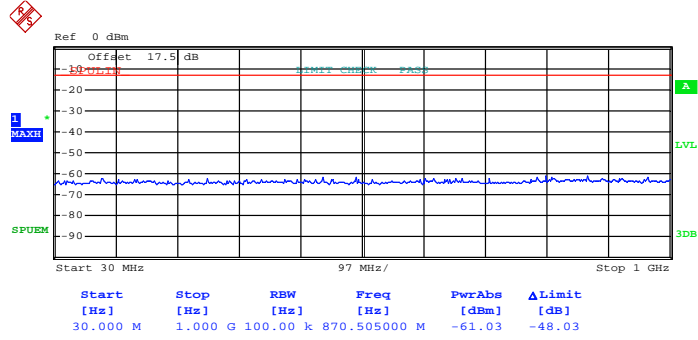


Date: 24.NOV.2013 12:10:49

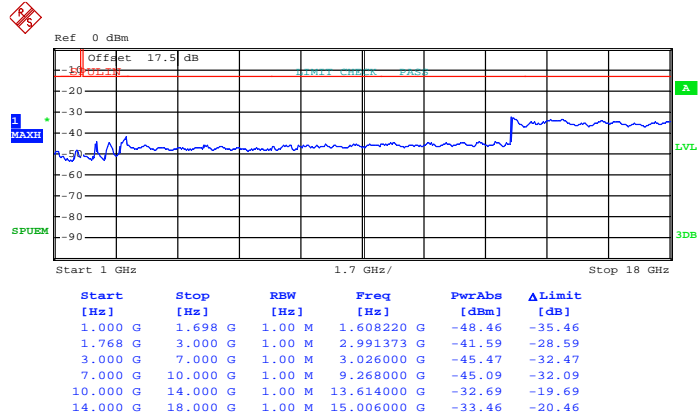


Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 74)



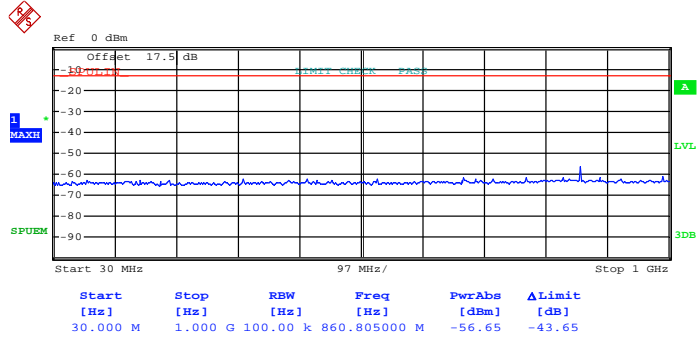
Date: 24.NOV.2013 12:16:45



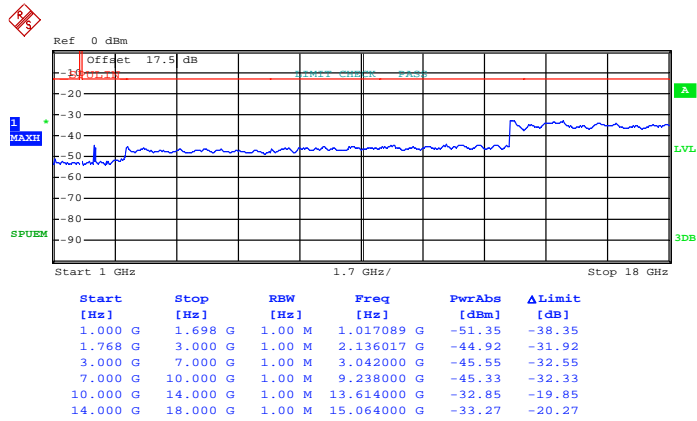
Date: 24.NOV.2013 12:16:10



16QAM (RB Size 1, RB Offset 37)



Date: 24.NOV.2013 12:14:48

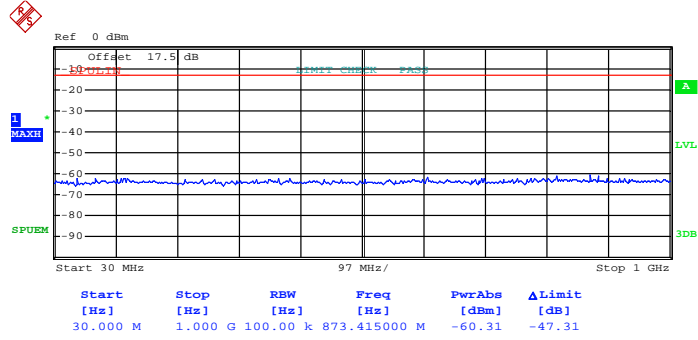


Date: 24.NOV.2013 12:15:19

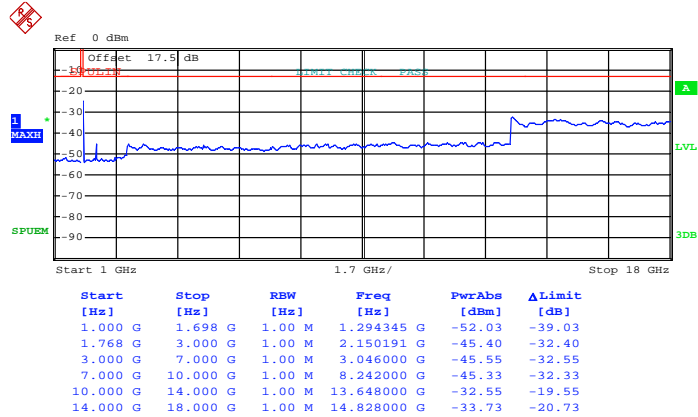


Band :	LTE Band 4	Channel :	CH20325 (High)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)



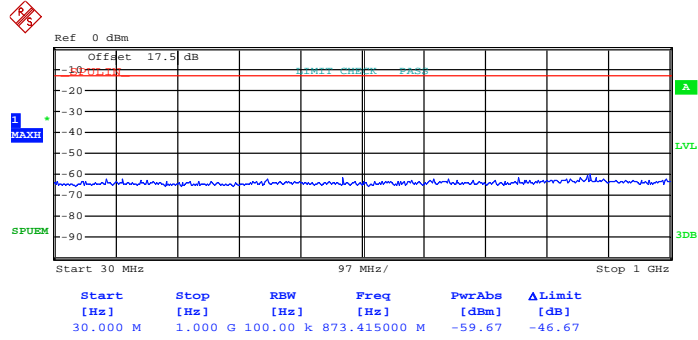
Date: 24.NOV.2013 12:12:43



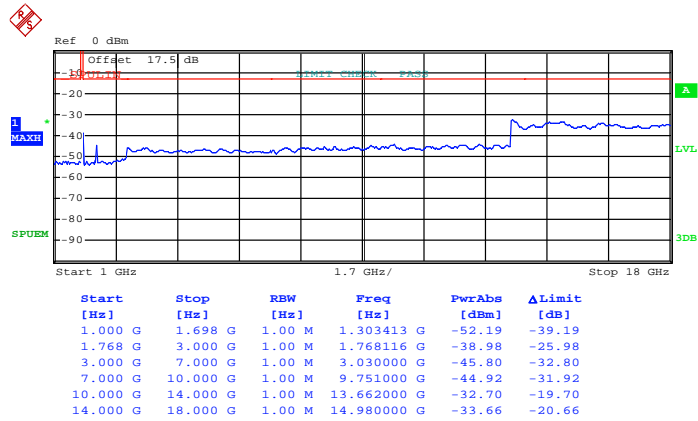
Date: 24.NOV.2013 12:12:13



16QAM (RB Size 1, RB Offset 0)



Date: 24.NOV.2013 12:13:10

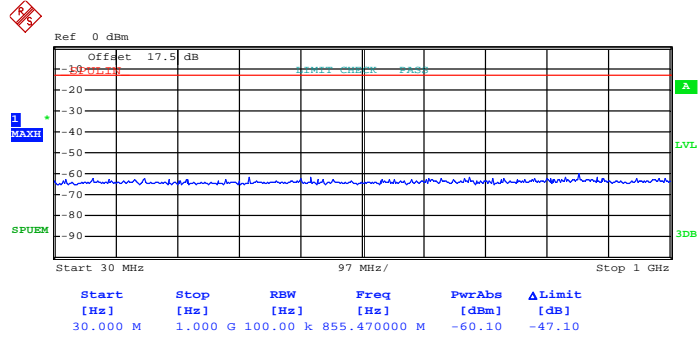


Date: 24.NOV.2013 12:11:47

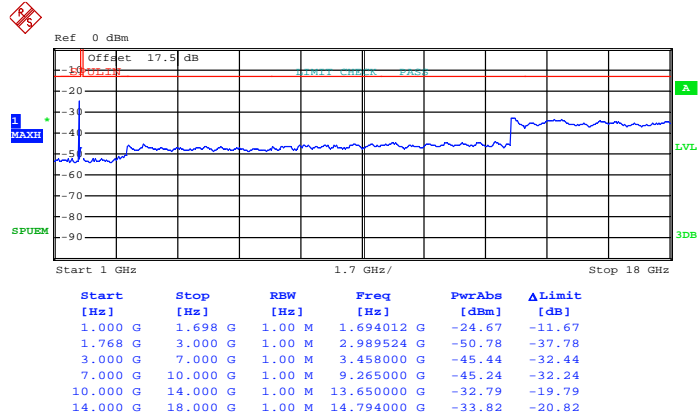


Band :	LTE Band 4	Channel :	CH20050 (Low)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 99)



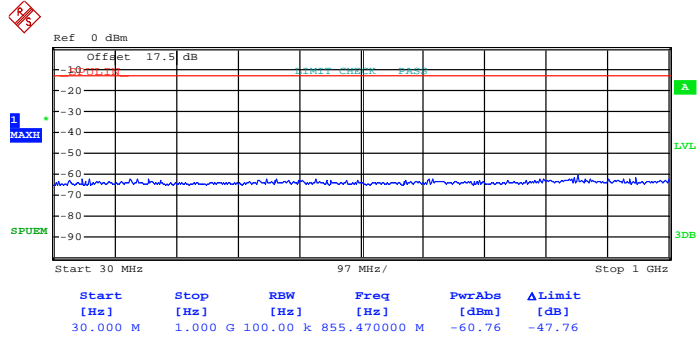
Date: 24.NOV.2013 12:02:35



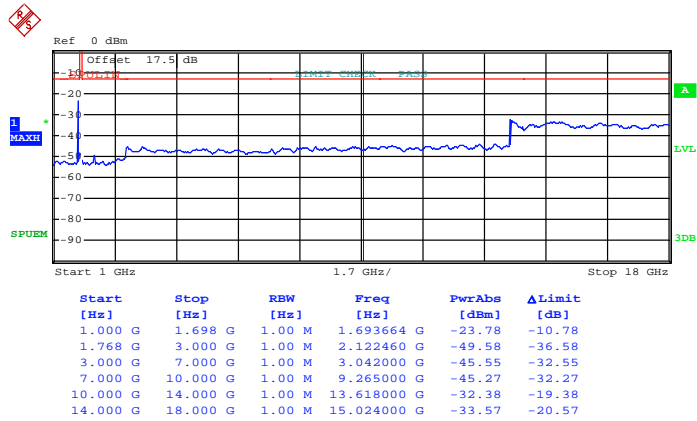
Date: 24.NOV.2013 12:05:36



16QAM (RB Size 1, RB Offset 99)



Date: 24.NOV.2013 12:03:10

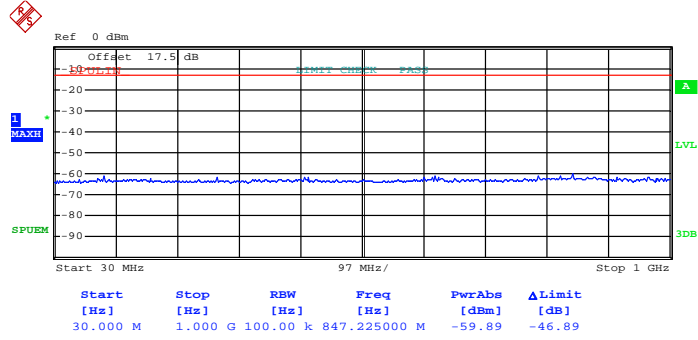


Date: 24.NOV.2013 12:04:17

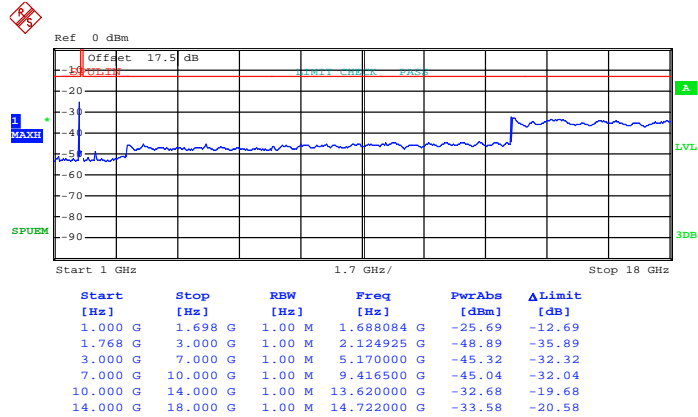


Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



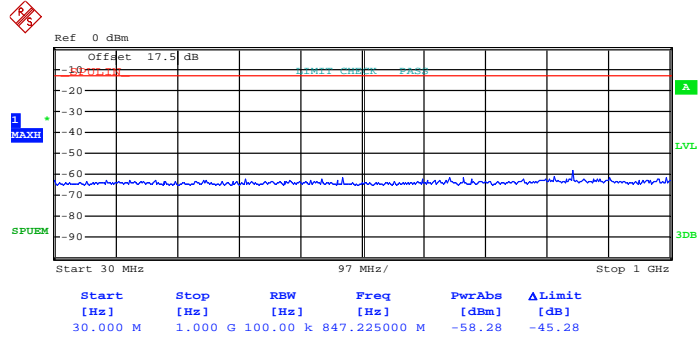
Date: 24.NOV.2013 11:51:07



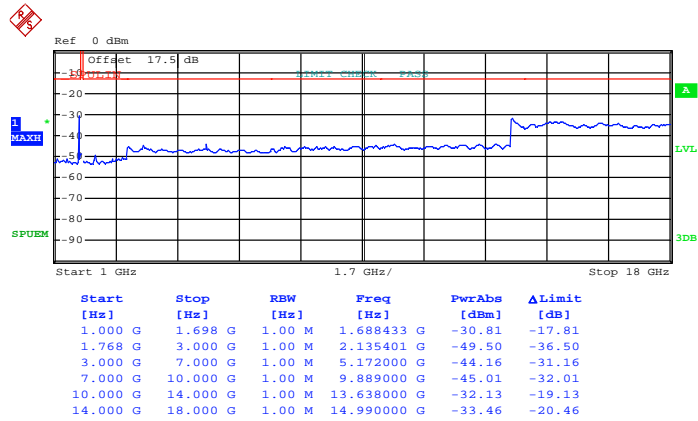
Date: 24.NOV.2013 11:55:23



16QAM (RB Size 1, RB Offset 0)



Date: 24.NOV.2013 11:51:42

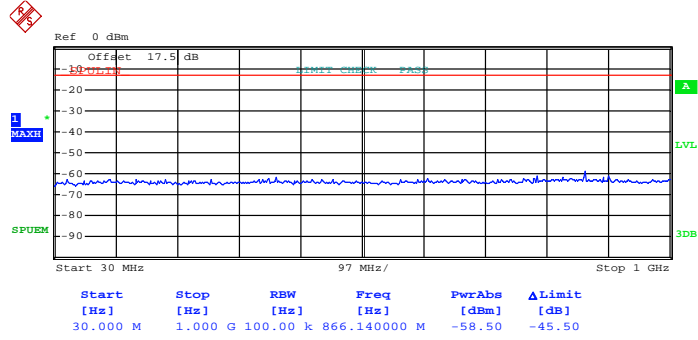


Date: 24.NOV.2013 11:54:49

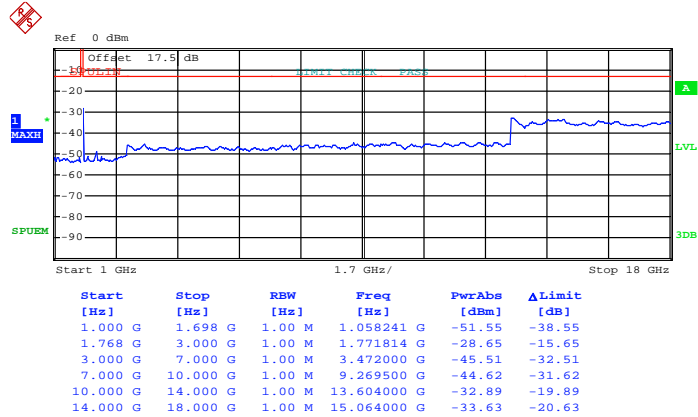


Band :	LTE Band 4	Channel :	CH20300 (High)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



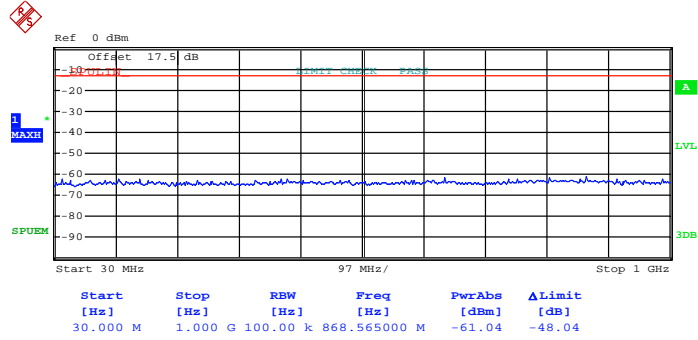
Date: 24.NOV.2013 12:00:31



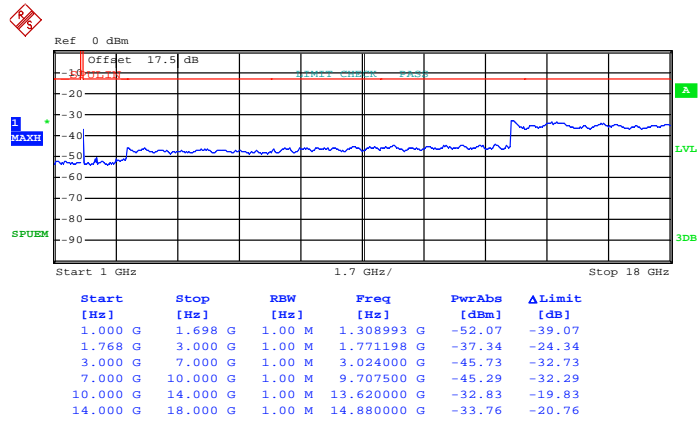
Date: 24.NOV.2013 11:58:03



16QAM (RB Size 1, RB Offset 0)



Date: 24.NOV.2013 11:59:57

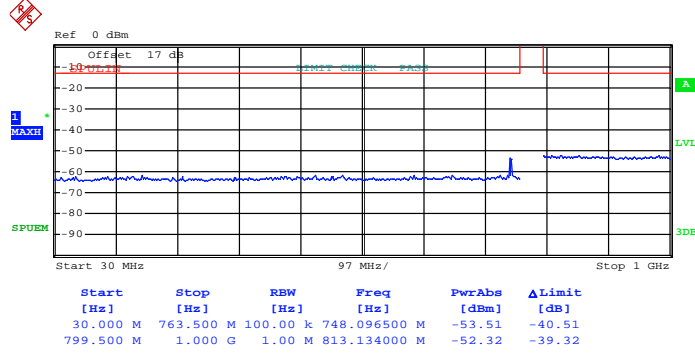


Date: 24.NOV.2013 11:58:53

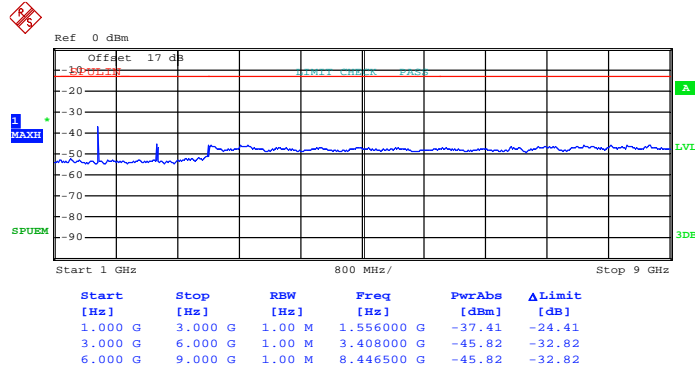


Band :	LTE Band 13	Channel :	CH23205 (Low)
Band Width :	5MHz		

QPSK (RB Size 12, RB Offset 0)



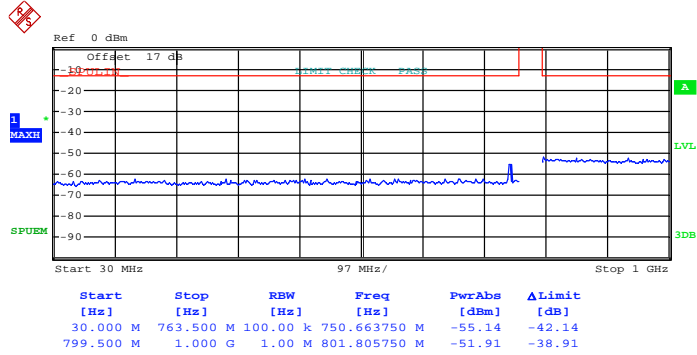
Date: 24.NOV.2013 14:21:22



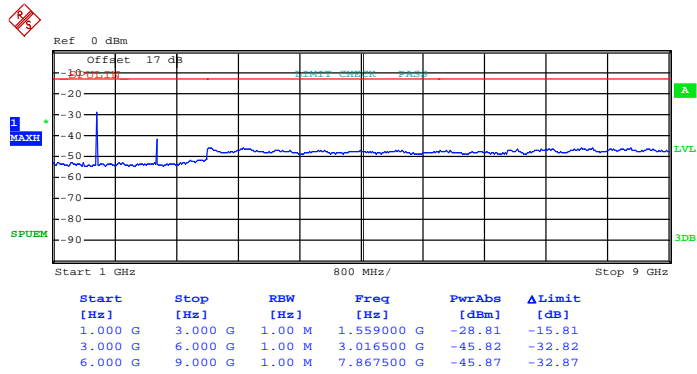
Date: 24.NOV.2013 14:19:55



16QAM (RB Size 1, RB Offset 12)



Date: 24.NOV.2013 14:24:23

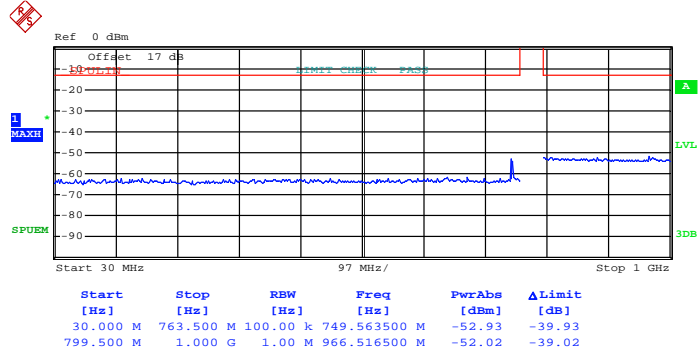


Date: 24.NOV.2013 14:25:08

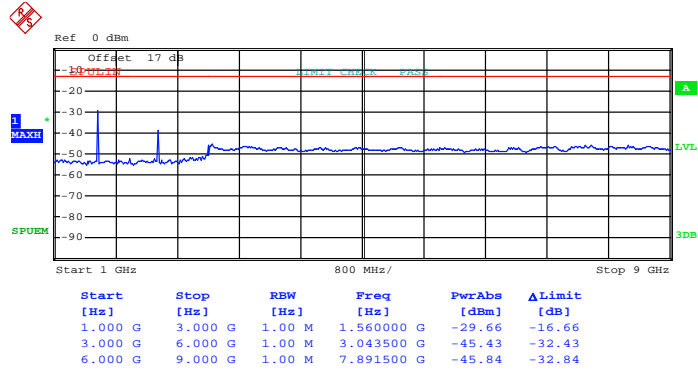


Band :	LTE Band 13	Channel :	CH23230 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



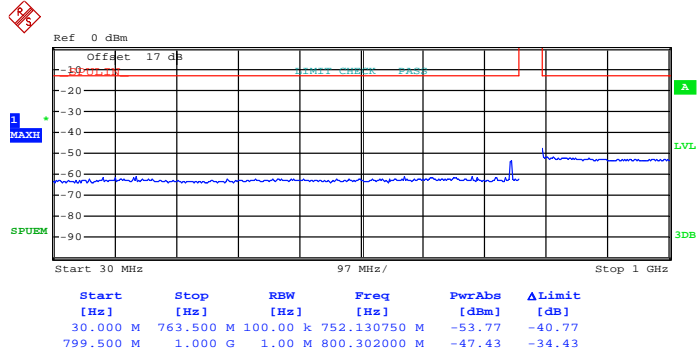
Date: 24.NOV.2013 14:14:25



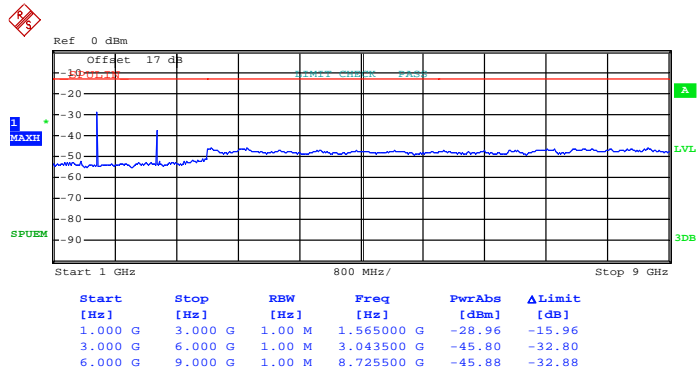
Date: 24.NOV.2013 14:15:02



16QAM (RB Size 1, RB Offset 12)



Date: 24.NOV.2013 14:12:19

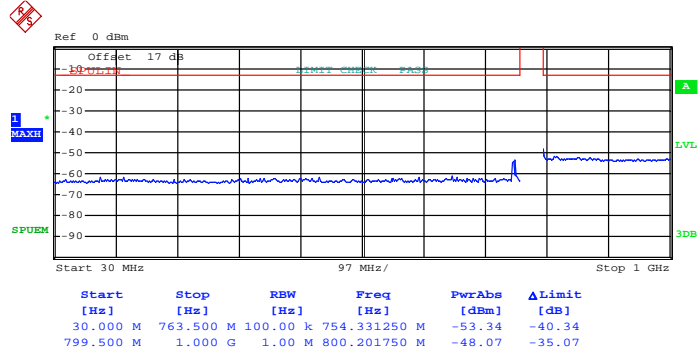


Date: 24.NOV.2013 14:09:29

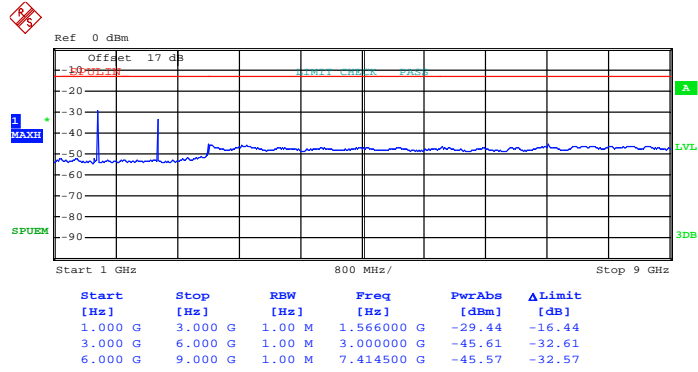


Band :	LTE Band 13	Channel :	CH23255 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



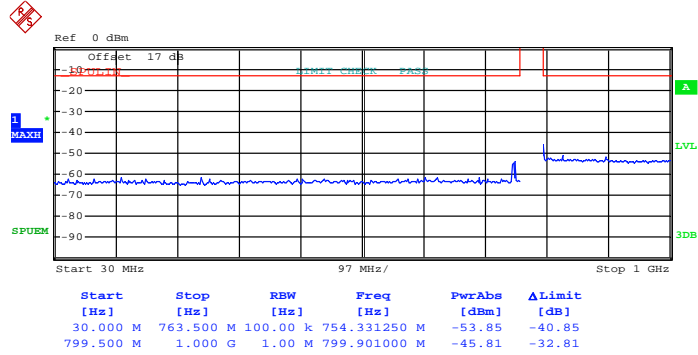
Date: 24.NOV.2013 14:27:58



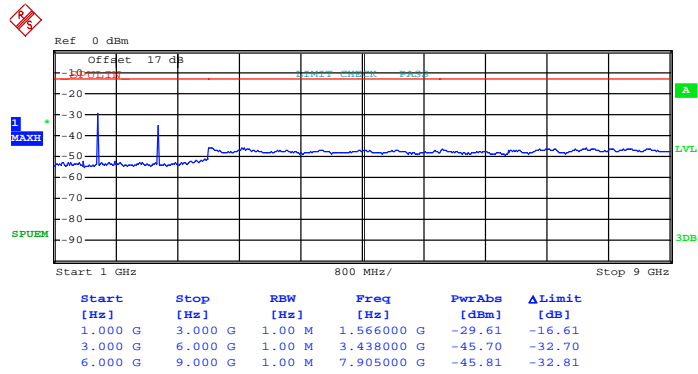
Date: 24.NOV.2013 14:26:51



16QAM (RB Size 1, RB Offset 0)



Date: 24.NOV.2013 14:28:43

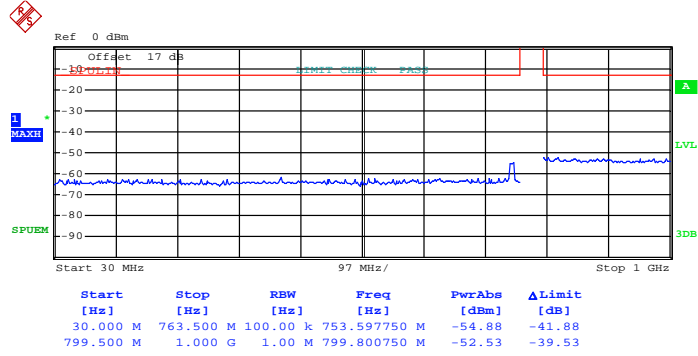


Date: 24.NOV.2013 14:26:08

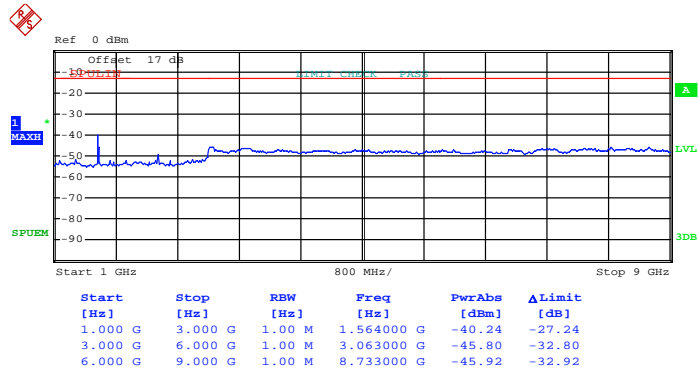


Band :	LTE Band 13	Channel :	CH23230 (Middle)
Band Width :	10MHz		

QPSK (RB Size 25, RB Offset 12)



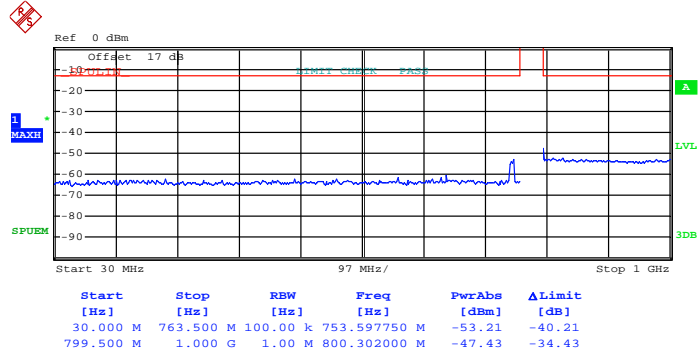
Date: 24.NOV.2013 14:06:44



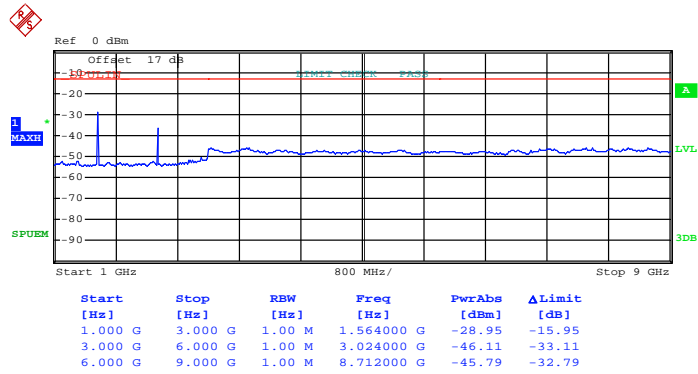
Date: 24.NOV.2013 14:03:58



16QAM (RB Size 1, RB Offset 24)



Date: 24.NOV.2013 14:07:33



Date: 24.NOV.2013 14:08:18

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.

3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

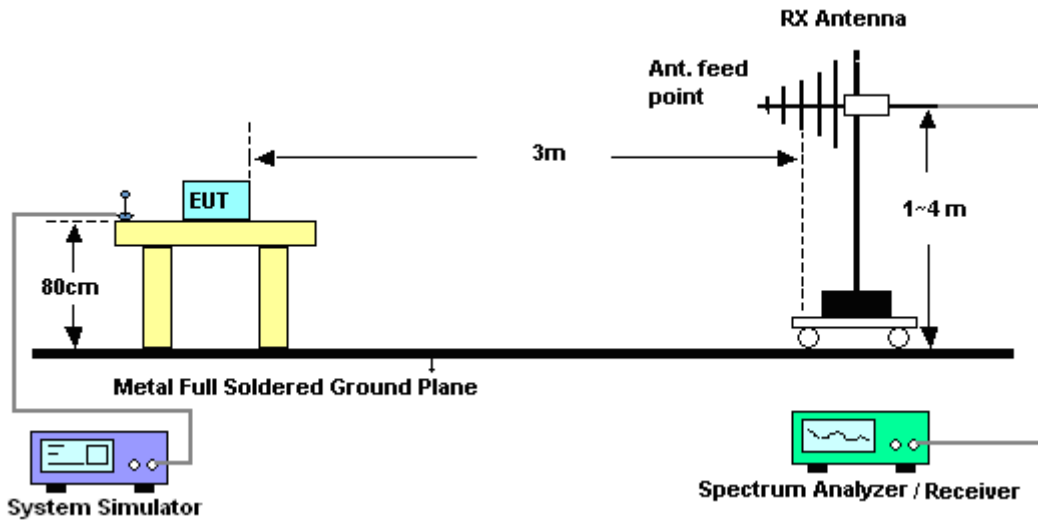
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving 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 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm.

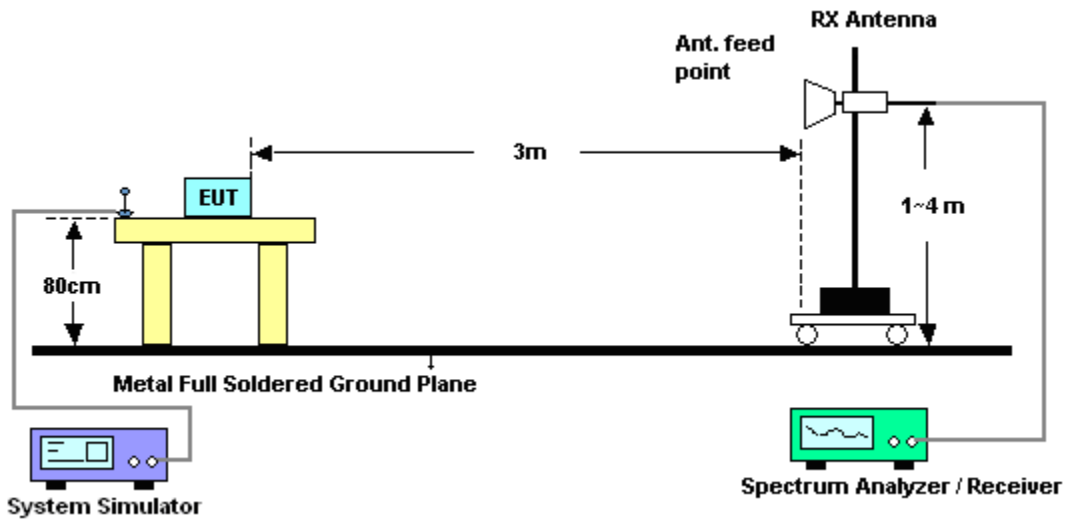
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (dBm) = EIRP - 2.15

3.6.4 Test Setup

For radiated emissions from 30MHz to 1GHz



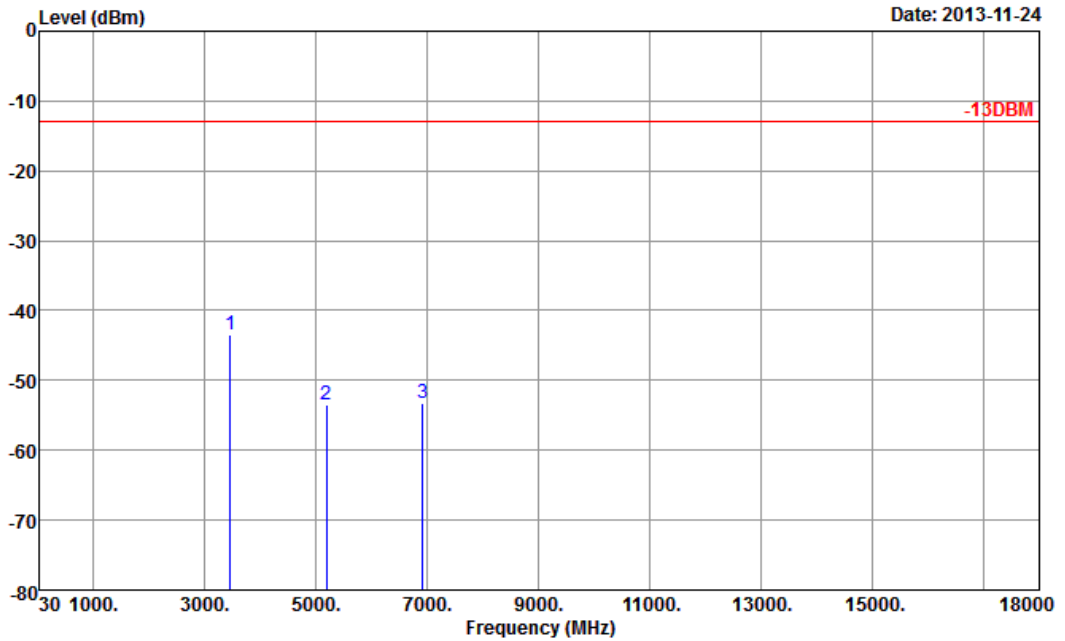
For radiated emissions above 1GHz





3.6.5 Test Result of Field Strength of Spurious Radiated

Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	1.4MHz QPSK RB Size 3 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



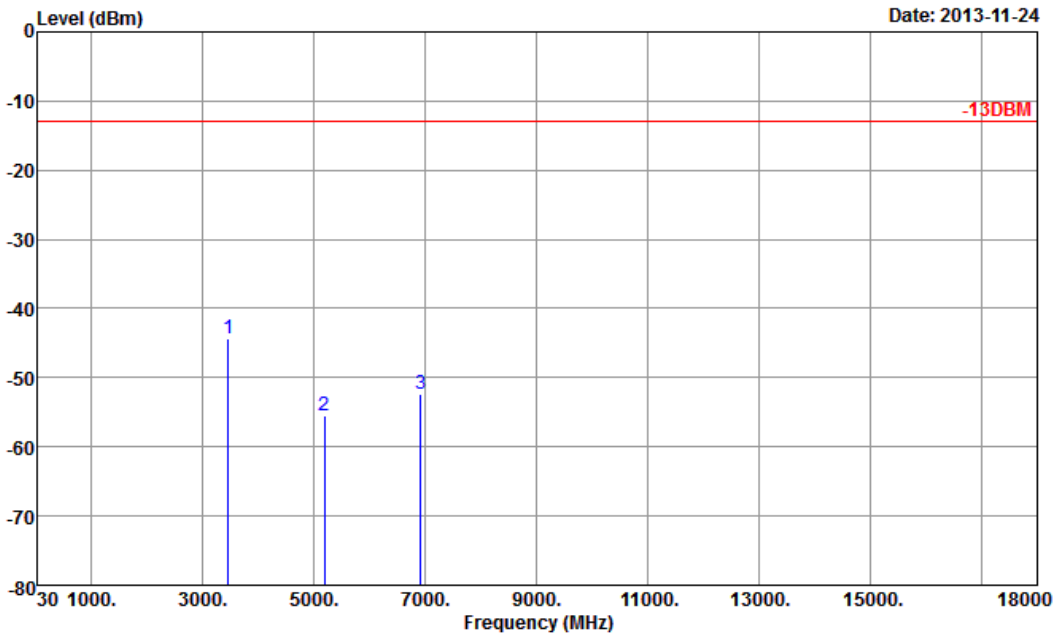
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_H_130101 HORIZONTAL

Plane : Y

Frequency (MHz)	EIRP (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
3464	-43.42	-13	-30.42	-59.55	-50.42	1.3	8.30	H	Pass
5196	-53.44	-13	-40.44	-71.17	-61.96	1.6	10.12	H	Pass
6928	-53.31	-13	-40.31	-75.05	-63.71	1.7	12.10	H	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	1.4MHz QPSK RB Size 3 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



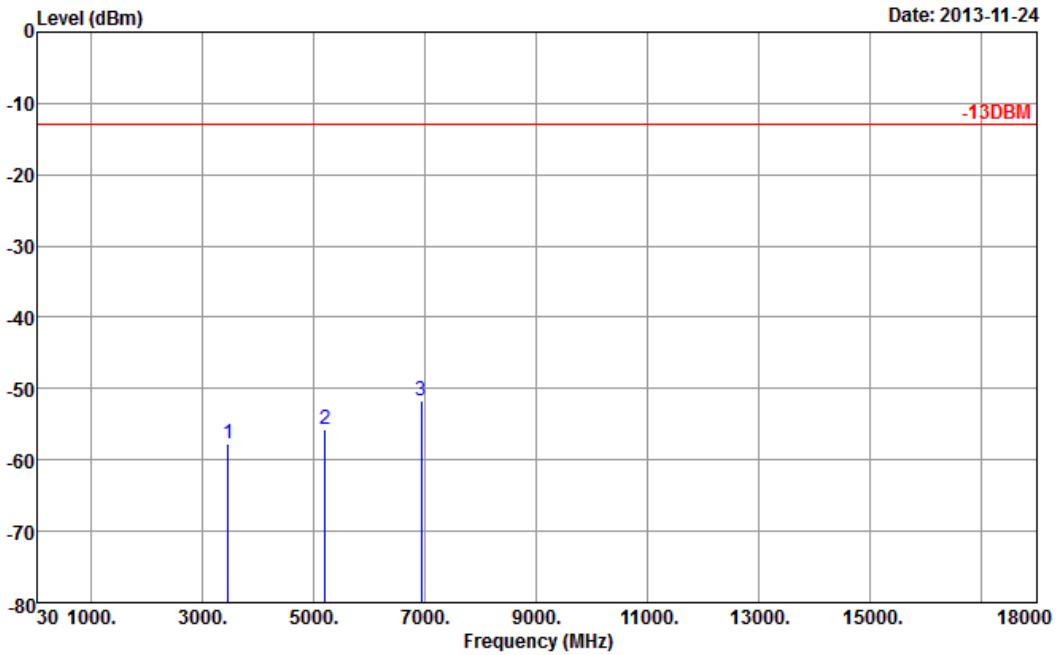
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_V_130101 VERTICAL

Plane : Y

Frequency (MHz)	EIRP (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
3464	-44.39	-13	-31.39	-60.98	-51.39	1.3	8.3	V	Pass
5196	-55.46	-13	-42.46	-72.28	-63.98	1.6	10.12	V	Pass
6928	-52.31	-13	-39.31	-74.36	-62.71	1.7	12.1	V	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	3MHz QPSK RB Size 1 Offset 14	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



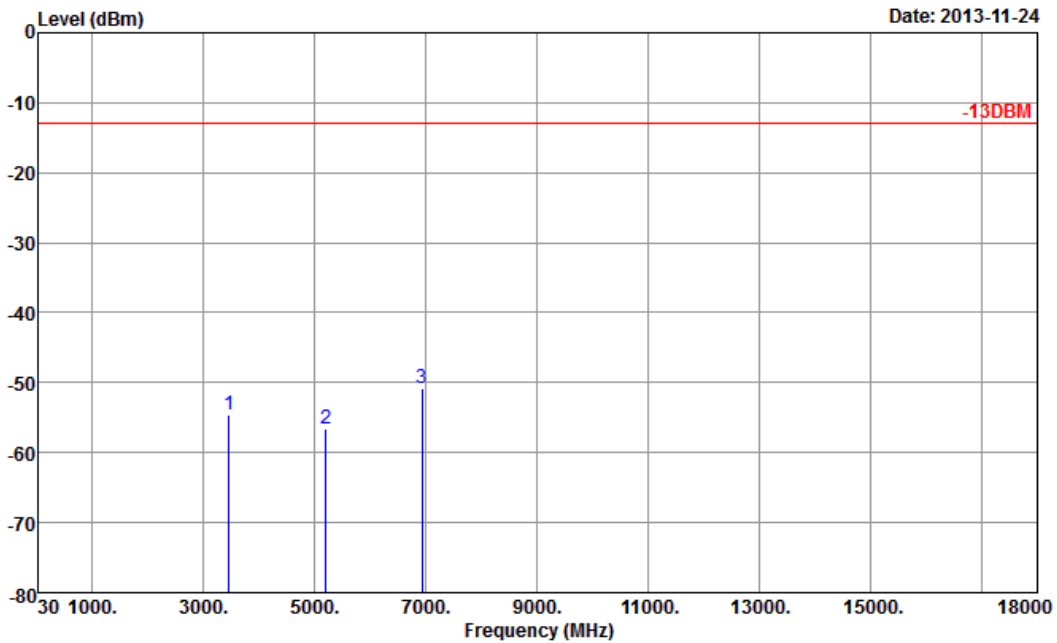
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_H_130101 HORIZONTAL

Plane : Y

Frequency (MHz)	EIRP (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
3468	-57.82	-13	-44.82	-70.49	-64.82	1.3	8.30	H	Pass
5202	-55.62	-13	-42.62	-73.35	-64.14	1.6	10.12	H	Pass
6936	-51.69	-13	-38.69	-73.43	-62.09	1.7	12.10	H	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	3MHz QPSK RB Size 1 Offset 14	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



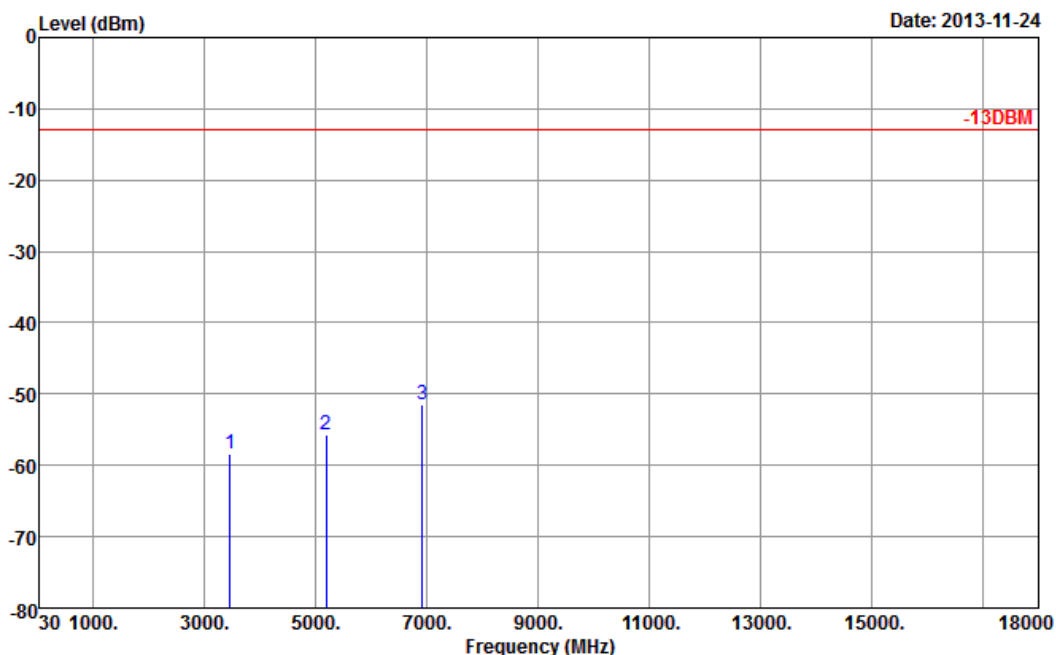
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_V_130101 VERTICAL

Plane : Y

Frequency (MHz)	EIRP (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
3468	-54.52	-13	-41.52	-70.07	-61.52	1.3	8.3	V	Pass
5202	-56.64	-13	-43.64	-73.46	-65.16	1.6	10.12	V	Pass
6936	-50.86	-13	-37.86	-72.91	-61.26	1.7	12.1	V	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



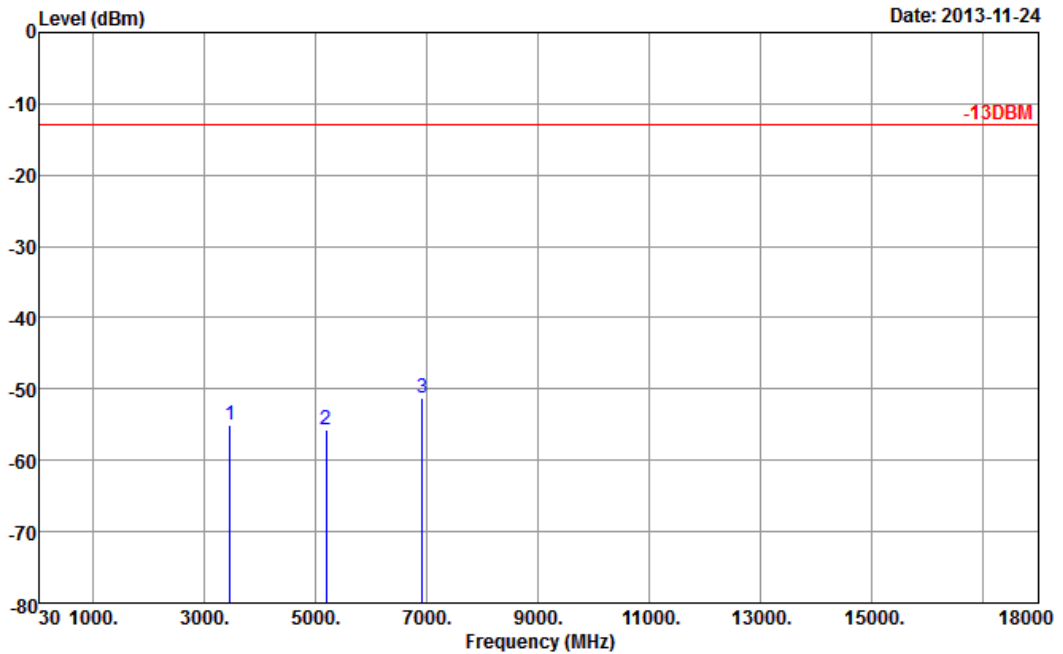
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_H_130101 HORIZONTAL

Plane : Y

Frequency (MHz)	EIRP (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
3460	-58.42	-13	-45.42	-71.09	-65.42	1.3	8.30	H	Pass
5190	-55.76	-13	-42.76	-73.49	-64.28	1.6	10.12	H	Pass
6920	-51.55	-13	-38.55	-73.29	-61.95	1.7	12.10	H	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



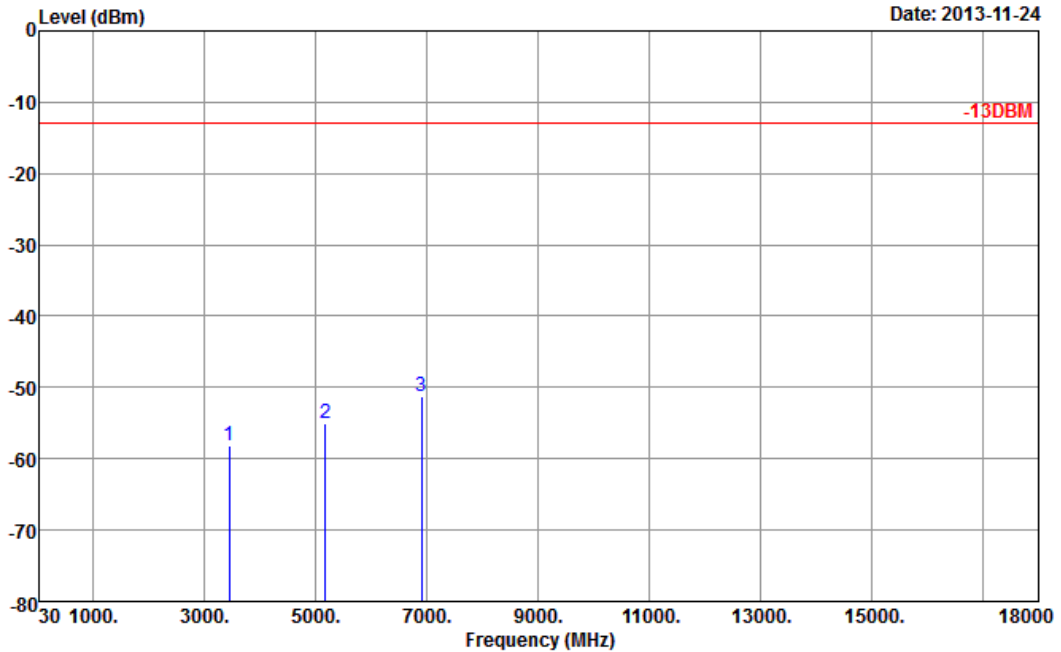
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_V_130101 VERTICAL

Plane : Y

Frequency (MHz)	EIRP (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
3460	-55.09	-13	-42.09	-70.64	-62.09	1.3	8.3	V	Pass
5190	-55.64	-13	-42.64	-72.46	-64.16	1.6	10.12	V	Pass
6920	-51.23	-13	-38.23	-73.28	-61.63	1.7	12.1	V	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



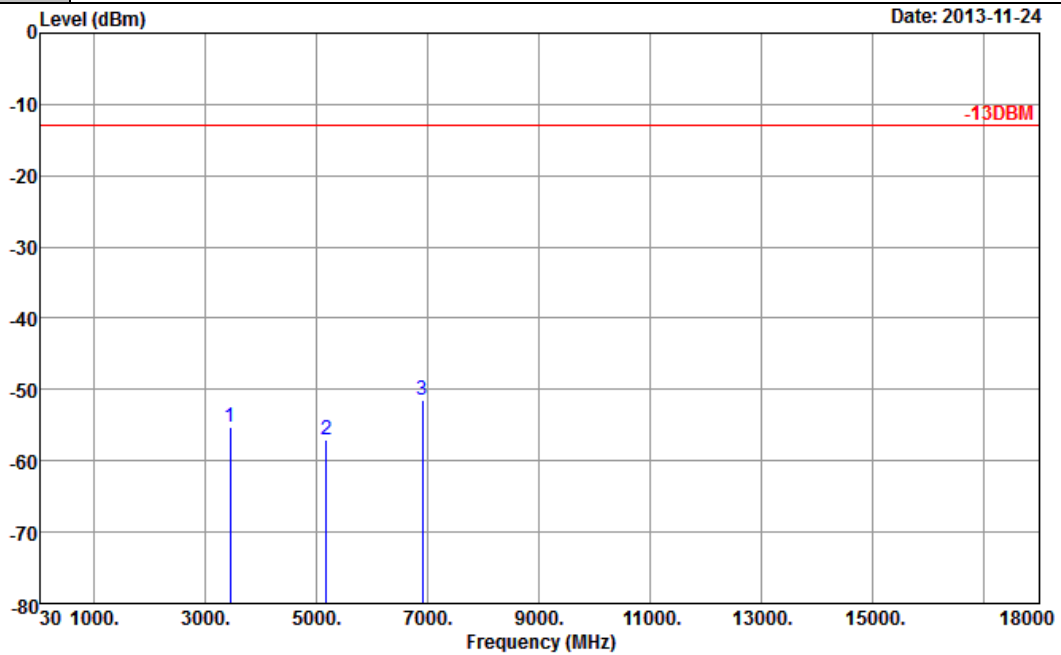
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_H_130101 HORIZONTAL

Plane : Y

Frequency (MHz)	EIRP (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
3456	-58.16	-13	-45.16	-70.83	-65.16	1.3	8.30	H	Pass
5184	-55.00	-13	-42.00	-72.73	-63.52	1.6	10.12	H	Pass
6912	-51.35	-13	-38.35	-73.09	-61.75	1.7	12.10	H	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



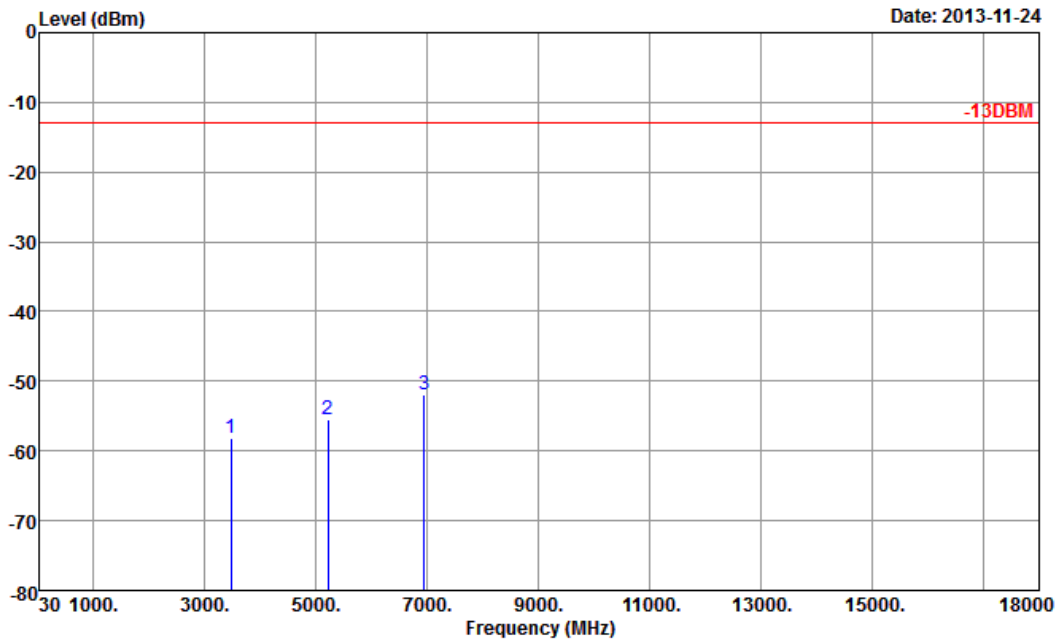
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_V_130101 VERTICAL

Plane : Y

Frequency (MHz)	EIRP (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
3456	-55.34	-13	-42.34	-70.89	-62.34	1.3	8.3	V	Pass
5184	-57.14	-13	-44.14	-73.96	-65.66	1.6	10.12	V	Pass
6912	-51.47	-13	-38.47	-73.52	-61.87	1.7	12.1	V	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 74	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



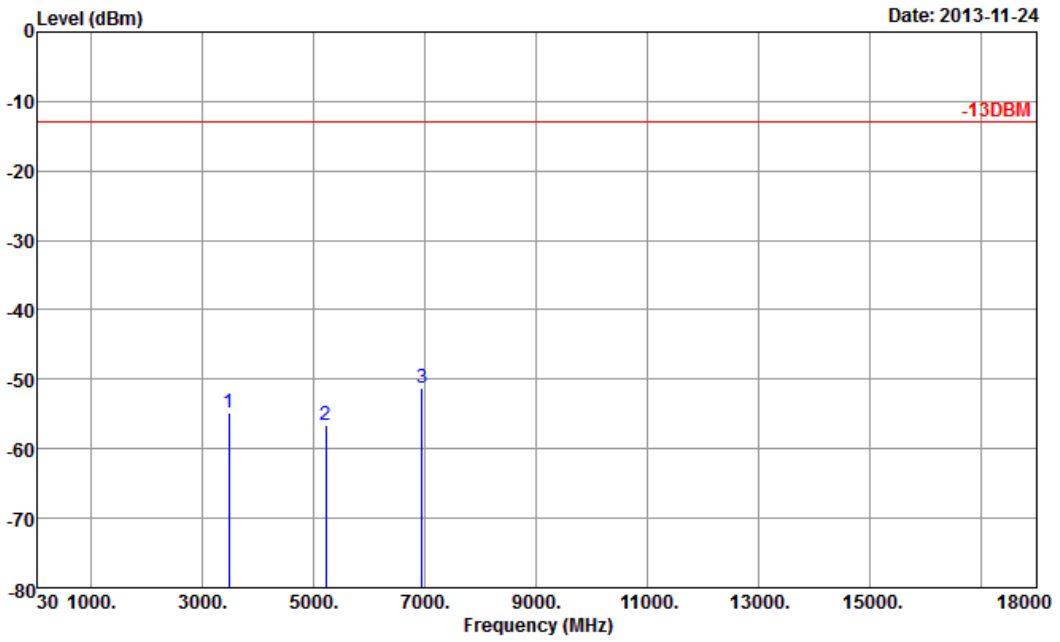
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_H_130101 HORIZONTAL

Plane : Y

Frequency (MHz)	EIRP (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
3478	-58.19	-13	-45.19	-70.86	-65.19	1.3	8.30	H	Pass
5217	-55.52	-13	-42.52	-73.25	-64.04	1.6	10.12	H	Pass
6956	-51.88	-13	-38.88	-73.62	-62.28	1.7	12.10	H	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 74	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



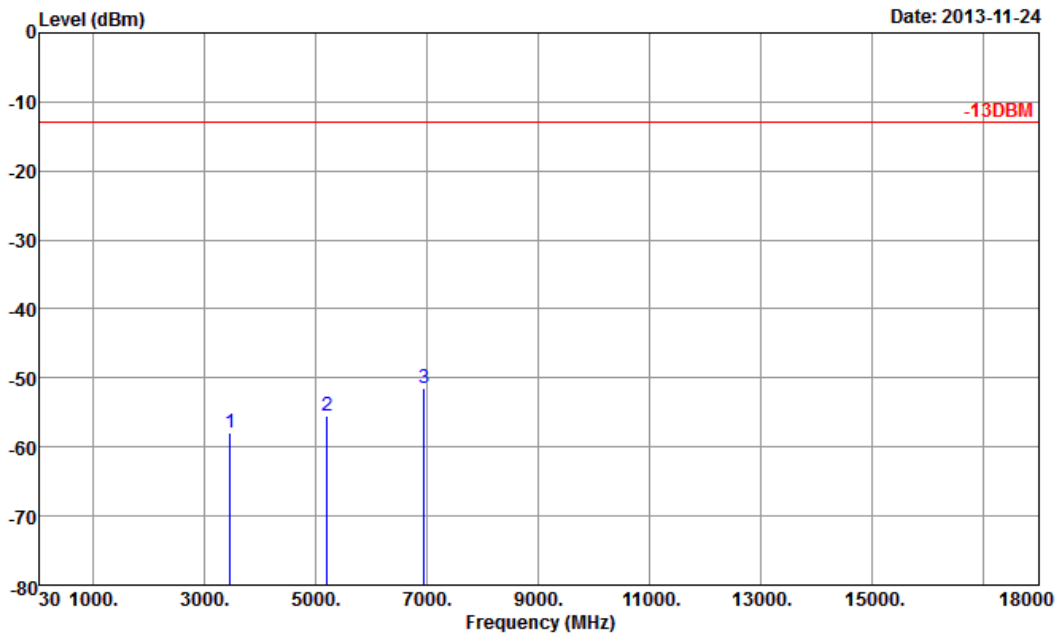
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_V_130101 VERTICAL

Plane : Y

Frequency (MHz)	EIRP (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
3478	-54.93	-13	-41.93	-70.48	-61.93	1.3	8.3	V	Pass
5217	-56.58	-13	-43.58	-73.4	-65.10	1.6	10.12	V	Pass
6956	-51.33	-13	-38.33	-73.38	-61.73	1.7	12.1	V	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



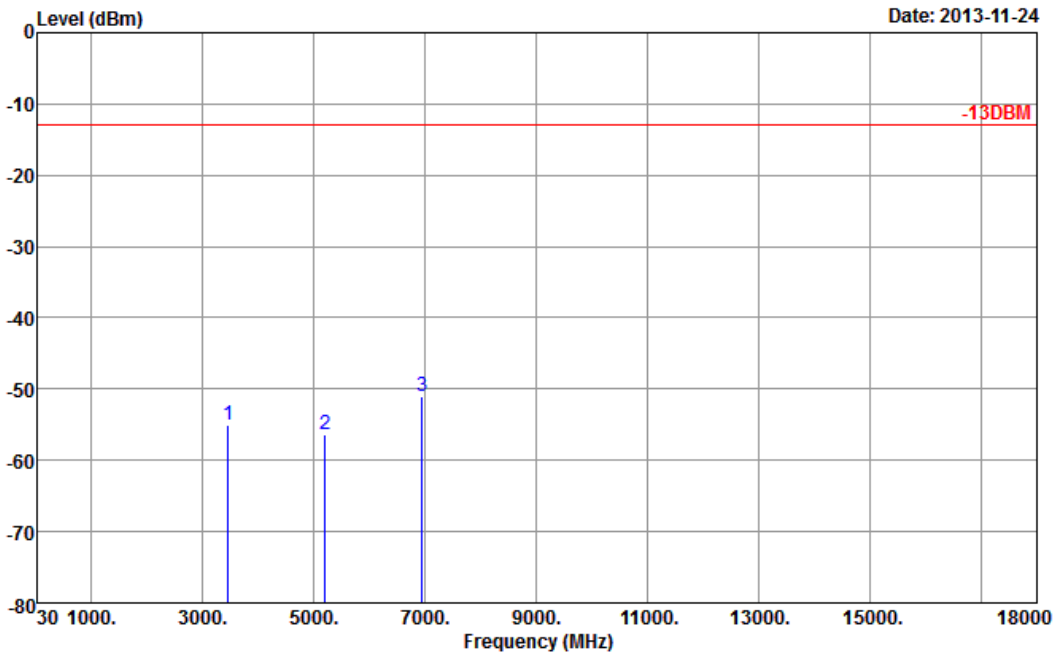
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_H_130101 HORIZONTAL

Plane : Y

Frequency (MHz)	EIRP (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
3472	-57.84	-13	-44.84	-70.51	-64.84	1.3	8.30	H	Pass
5208	-55.53	-13	-42.53	-73.26	-64.05	1.6	10.12	H	Pass
6944	-51.47	-13	-38.47	-73.21	-61.87	1.7	12.10	H	Pass



Band :	LTE Band 4	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



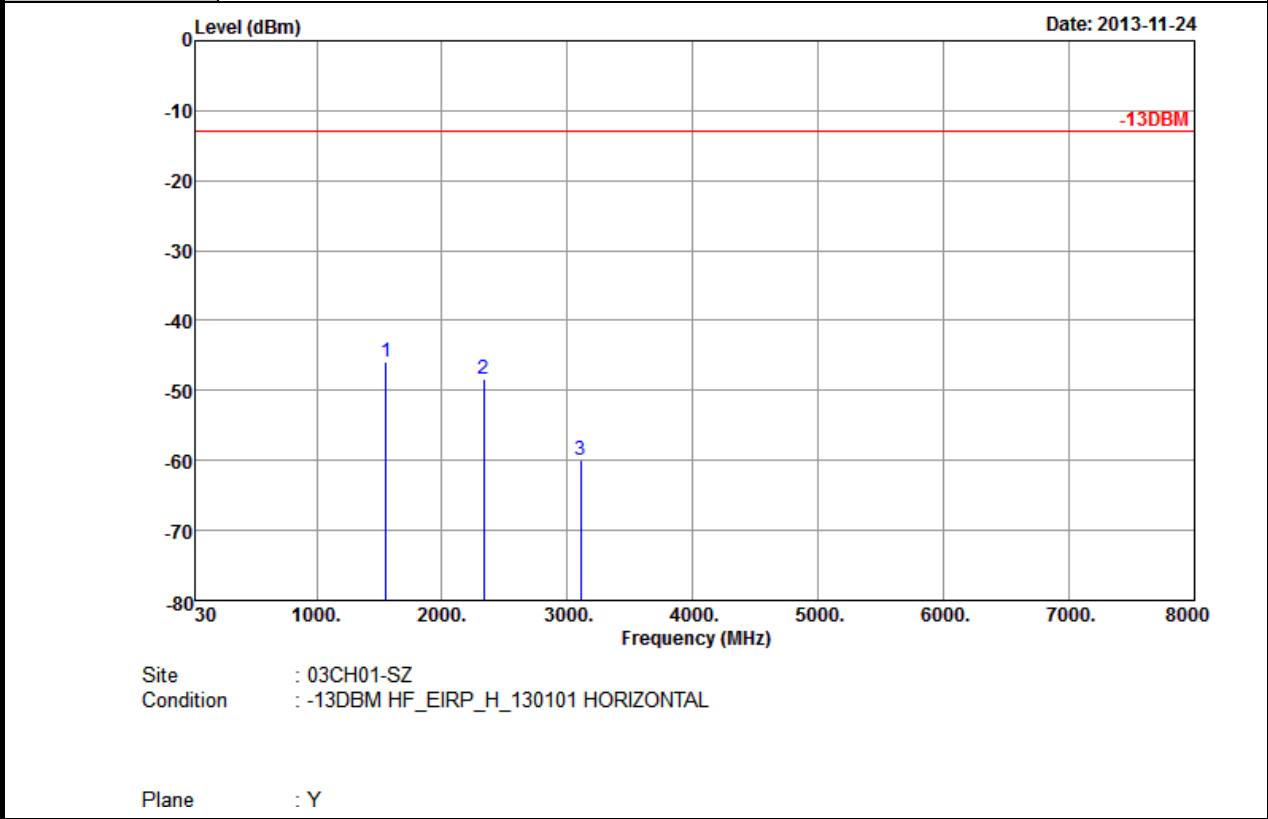
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_V_130101 VERTICAL

Plane : Y

Frequency (MHz)	EIRP (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
3472	-55.12	-13	-42.12	-70.67	-62.12	1.3	8.3	V	Pass
5208	-56.33	-13	-43.33	-73.15	-64.85	1.6	10.12	V	Pass
6944	-51.03	-13	-38.03	-73.08	-61.43	1.7	12.1	V	Pass



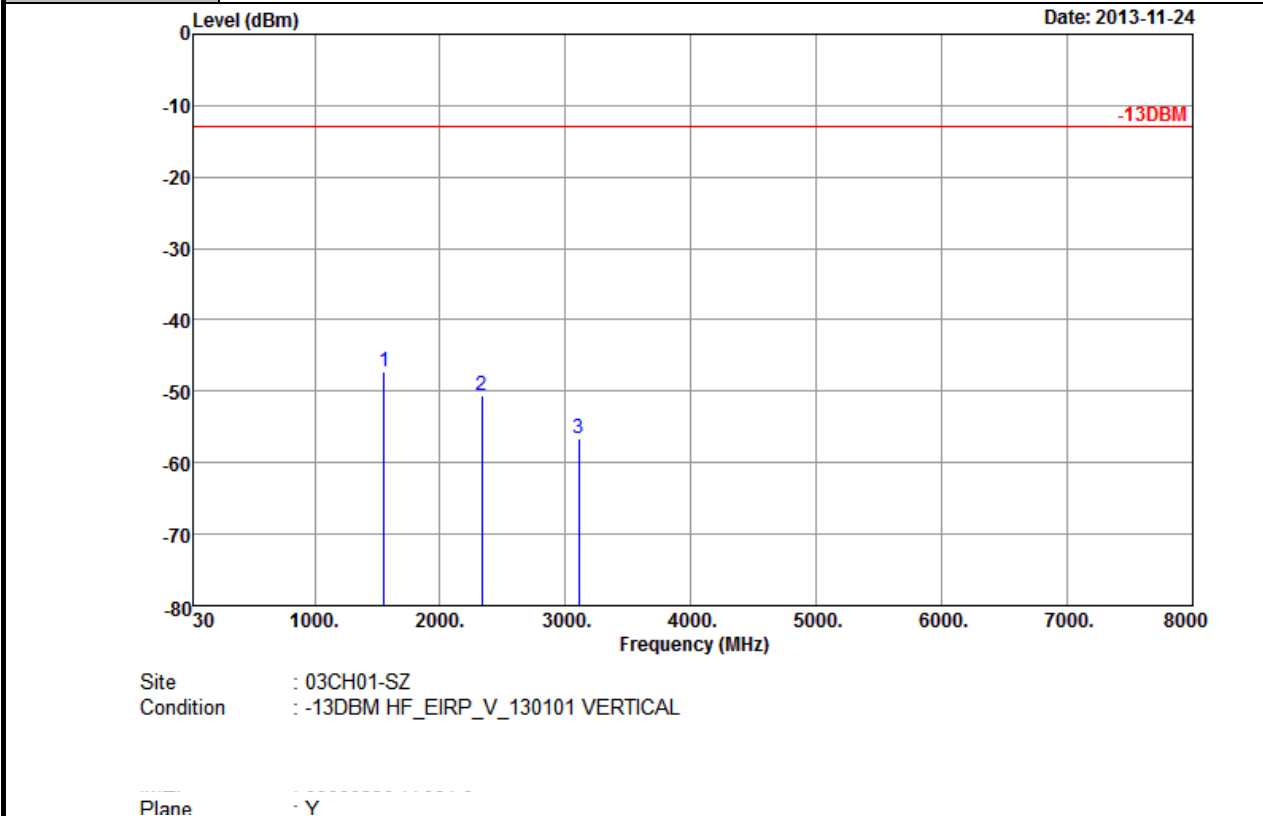
Band :	LTE Band 13	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 12 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



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
1554	-45.82	-13	-32.82	-61.07	-49.07	0.92	6.32	H	Pass
2331	-48.40	-13	-35.40	-70.23	-50.95	1.2	5.90	H	Pass
3108	-59.91	-13	-46.91	-71.11	-64.36	1.2	7.80	H	Pass



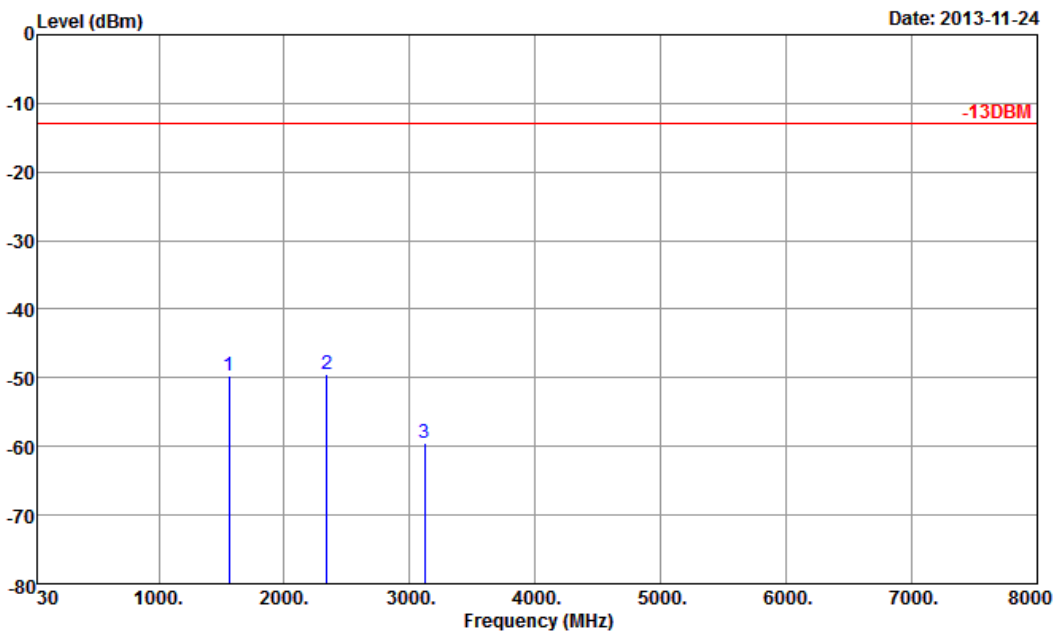
Band :	LTE Band 13	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 12 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



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
1554	-47.33	-13	-34.33	-59.69	-50.58	0.92	6.32	V	Pass
2331	-50.65	-13	-37.65	-70.26	-53.20	1.20	5.90	V	Pass
3108	-56.66	-13	-43.66	-69.09	-61.11	1.20	7.80	V	Pass



Band :	LTE Band 13	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 25 Offset 12	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



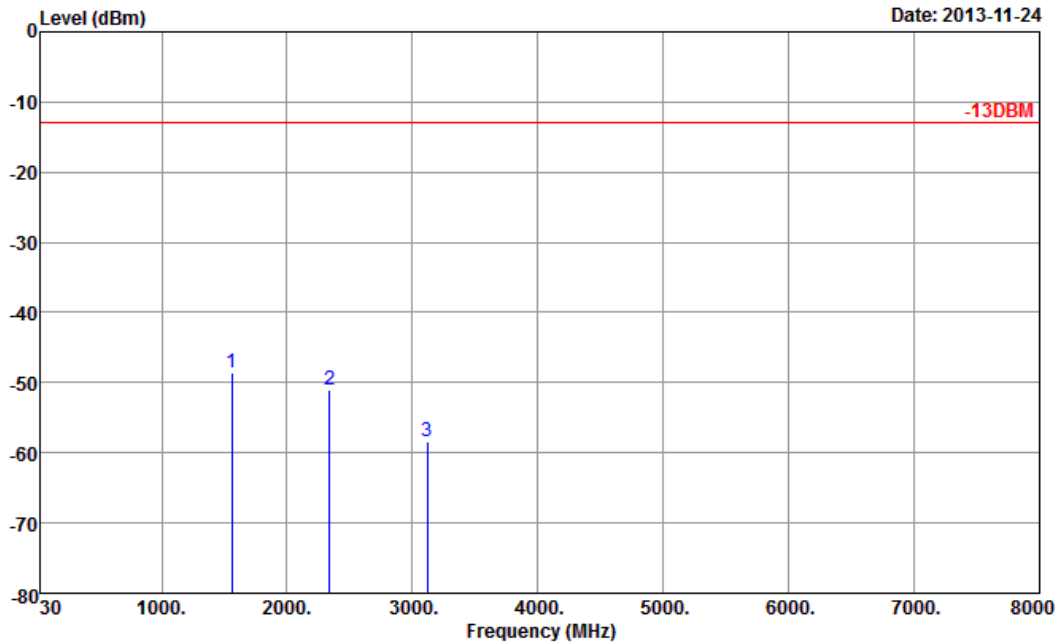
Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_H_130101 HORIZONTAL

Plane : Y

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
1560	-49.61	-13	-36.61	-63.84	-52.86	0.92	6.32	H	Pass
2340	-49.36	-13	-36.36	-70.83	-51.91	1.2	5.90	H	Pass
3120	-59.54	-13	-46.54	-70.74	-63.99	1.2	7.80	H	Pass



Band :	LTE Band 13	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 25 Offset 12	Relative Humidity :	48~52%
Test Engineer :	Gavin Zhang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



Site : 03CH01-SZ
 Condition : -13DBM HF_EIRP_V_130101 VERTICAL

Plane : Y

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
1560	-48.62	-13	-35.62	-61.00	-51.87	0.92	6.32	V	Pass
2340	-51.11	-13	-38.11	-70.49	-53.66	1.20	5.90	V	Pass
3120	-58.47	-13	-45.47	-70.90	-62.92	1.20	7.80	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.

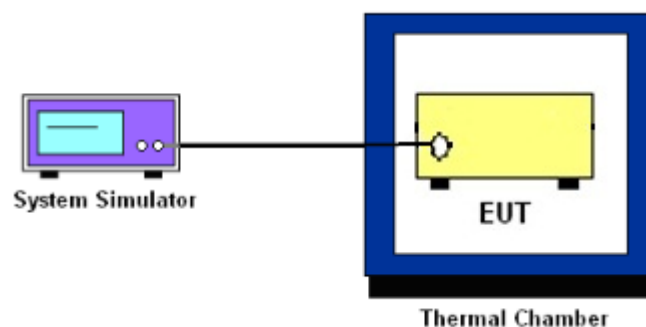
3.7.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°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°C step up to 50°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 base station.
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

Band :	LTE Band 4 (QPSK)		Limit (ppm) :	2.5	
Temperature (°C)	BW 1.4MHz		BW 3MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	11.6	+0.007	10.5	+0.006	PASS
-20	10.3	+0.006	9.5	+0.005	
-10	11.5	+0.007	10.5	+0.006	
0	10.2	+0.006	9.8	+0.006	
10	10.7	+0.006	10.2	+0.006	
20	10.9	+0.006	10.6	+0.006	
30	9.8	+0.006	9.7	+0.006	
40	10.6	+0.006	11.6	+0.007	
50	11.2	+0.006	12.6	+0.007	

Band :	LTE Band 4 (QPSK)		Limit (ppm) :	2.5	
Temperature (°C)	BW 5MHz		BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	9.7	+0.006	14.1	+0.008	PASS
-20	9.5	+0.005	12.8	+0.007	
-10	10.3	+0.006	13.7	+0.008	
0	9.7	+0.006	11.8	+0.007	
10	9.8	+0.006	12.5	+0.007	
20	9.6	+0.006	13.2	+0.008	
30	9.2	+0.005	12.4	+0.007	
40	9.7	+0.006	13.7	+0.008	
50	10.3	+0.006	13.9	+0.008	



Band :	LTE Band 4 (QPSK)		Limit (ppm) :	2.5	
Temperature (°C)	BW 15MHz		BW 20MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	13.1	+0.008	9.7	+0.006	PASS
-20	12.5	+0.007	9.1	+0.005	
-10	12.2	+0.007	8.6	+0.005	
0	11.9	+0.007	9.2	+0.005	
10	11.2	+0.006	8.6	+0.005	
20	12.0	+0.007	8.3	+0.005	
30	12.3	+0.007	9.0	+0.005	
40	11.6	+0.007	10.1	+0.006	
50	12.5	+0.007	10.7	+0.006	

Band :	LTE Band 4 (16QAM)		Limit (ppm) :	2.5	
Temperature (°C)	BW 1.4MHz		BW 3MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	9.9	+0.006	10.1	+0.006	PASS
-20	9.8	+0.006	9.7	+0.006	
-10	8.7	+0.005	9.5	+0.005	
0	9.7	+0.006	8.6	+0.005	
10	9.6	+0.006	8.8	+0.005	
20	8.8	+0.005	9.1	+0.005	
30	8.4	+0.005	9.3	+0.005	
40	9.2	+0.005	10.1	+0.006	
50	9.6	+0.006	9.8	+0.006	



Band :	LTE Band 4 (16QAM)		Limit (ppm) :	2.5	
Temperature (°C)	BW 5MHz		BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	10.2	+0.006	8.6	+0.005	PASS
-20	9.5	+0.005	8.8	+0.005	
-10	8.7	+0.005	9.2	+0.005	
0	9.6	+0.006	7.7	+0.004	
10	8.8	+0.005	8.5	+0.005	
20	8.9	+0.005	7.6	+0.004	
30	10.2	+0.006	9.3	+0.005	
40	9.9	+0.006	9.5	+0.005	
50	11.1	+0.006	9.9	+0.006	

Band :	LTE Band 4 (16QAM)		Limit (ppm) :	2.5	
Temperature (°C)	BW 15MHz		BW 20MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	8.8	+0.005	7.9	+0.005	PASS
-20	7.9	+0.005	7.5	+0.004	
-10	8.5	+0.005	7.1	+0.004	
0	7.8	+0.005	6.9	+0.004	
10	8.2	+0.005	8.1	+0.005	
20	7.1	+0.004	7.2	+0.004	
30	7.6	+0.004	8.1	+0.005	
40	7.9	+0.005	7.4	+0.004	
50	8.5	+0.005	8.2	+0.005	



Band :	LTE Band 13 (QPSK)		Limit (ppm) :	2.5	
Temperature (°C)	BW 5MHz		BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	6.5	+0.008	-5.7	-0.007	PASS
-20	5.1	+0.007	-5.6	-0.007	
-10	5.9	+0.008	-5.1	-0.007	
0	6.1	+0.008	-5.2	-0.007	
10	5.6	+0.007	-5.4	-0.007	
20	5.7	+0.007	-5.7	-0.007	
30	5.9	+0.008	-5.7	-0.007	
40	5.1	+0.007	-5.9	-0.008	
50	5.8	+0.007	-6.1	-0.008	

Band :	LTE Band 13 (16QAM)		Limit (ppm) :	2.5	
Temperature (°C)	BW 5MHz		BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	4.3	+0.005	6.8	+0.009	PASS
-20	3.9	+0.005	6.6	+0.008	
-10	4.1	+0.005	6.3	+0.008	
0	3.7	+0.005	5.9	+0.008	
10	3.6	+0.005	6.1	+0.008	
20	3.4	+0.004	5.5	+0.007	
30	4.2	+0.005	6.3	+0.008	
40	3.2	+0.004	5.4	+0.007	
50	3.7	+0.005	5.8	+0.007	

3.7.7 Test Result of Voltage Variation

Band	Bandwidth	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 4 (QPSK)	1.4M	32	8.7	+0.005	2.5	PASS
		Normal	10.6	+0.006		
		9	9.2	+0.005		
	3M	32	7.2	+0.004		
		Normal	10.9	+0.006		
		9	9.5	+0.005		
	5M	32	9.7	+0.006		
		Normal	12.3	+0.007		
		9	11.7	+0.007		
	10M	32	11.9	+0.007		
		Normal	9.5	+0.005		
		9	10.1	+0.006		
	15M	32	9.4	+0.005		
		Normal	10.2	+0.006		
		9	8.9	+0.005		
20M	32	8.4	+0.005			
	Normal	10.3	+0.006			
	9	7.7	+0.004			
LTE Band 13 (QPSK)	5M	32	-4.9	-0.006	2.5	PASS
		Normal	-4.2	-0.005		
		9	-5.2	-0.007		
	10M	32	-5.6	-0.007		
		Normal	-5.1	-0.007		
		9	-4.1	-0.005		



Band	Bandwidth	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 4 (16QAM)	1.4M	32	9.3	+0.005	2.5	PASS
		Normal	11.2	+0.006		
		9	9.6	+0.006		
	3M	32	8.5	+0.005		
		Normal	11.3	+0.007		
		9	10.2	+0.006		
	5M	32	10.5	+0.006		
		Normal	12.5	+0.007		
		9	11.1	+0.006		
	10M	32	11.6	+0.007		
		Normal	10.3	+0.006		
		9	10.8	+0.006		
	15M	32	10.1	+0.006		
		Normal	10.5	+0.006		
		9	9.3	+0.005		
20M	32	8.8	+0.005			
	Normal	9.4	+0.005			
	9	8.2	+0.005			
LTE Band 13 (16QAM)	5M	32	-5.6	-0.007	2.5	PASS
		Normal	-5.1	-0.007		
		9	-4.9	-0.006		
	10M	32	-5.8	-0.007		
		Normal	-5.3	-0.007		
		9	-4.6	-0.006		

Remark:

1. Normal Voltage = 12V.
2. The manufacturer declared that the EUT could work properly between voltage 9V ~ 32V.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Mar. 28, 2013	Nov. 23, 2013~ Nov. 24, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	N/A	Mar. 28, 2013	Nov. 23, 2013~ Nov. 24, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA2411B	1207253	N/A	Mar. 28, 2013	Nov. 23, 2013~ Nov. 24, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Thermal Chamber	Hongzhan	LP-150U	HD20120425	N/A	Mar. 28, 2013	Nov. 23, 2013~ Nov. 24, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	Apr. 04, 2013	Nov. 24, 2013	Apr. 03, 2014	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 26, 2013	Nov. 24, 2013	Oct. 25, 2014	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz~2GHz	Dec. 26, 2012	Nov. 24, 2013	Dec. 25, 2013	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3GHz Gain 30dB	Mar. 28, 2013	Nov. 24, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	Mar. 28, 2013	Nov. 24, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
SHF-EHF-Horn	Schwarzbeck	BBHA9170	BBHA9170249	14GHz~40GHz	Nov. 22, 2013	Nov. 24, 2013	Nov. 21, 2014	Radiation (03CH01-SZ)
Turn Table	EM Electronics	EM 1000	N/A	0 ~ 360 degree	N/A	Nov. 24, 2013	N/A	Radiation (03CH01-SZ)
Antenna Mast	EM Electronics	EM 1000	N/A	1 m ~ 4 m	N/A	Nov. 24, 2013	N/A	Radiation (03CH01-SZ)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.90
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