FCC RF Test Report

APPLICANT	:	Hewlett-Packard Company
EQUIPMENT	:	Tablet PC
BRAND NAME	:	HP
MODEL NAME	:	TPN-C119
FCC ID	:	B94TNC119HWFR
STANDARD	:	47 CFR Part 2, 22(H), 24(E), 27
CLASSIFICATION	:	PCS Licensed Transmitter (PCB)

The product was received on Jun. 24, 2014 and testing was completed on Jul. 24, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and the testing has shown the tested sample to be in compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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APPENDIX A. SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG462459	Rev. 01	Initial issue of report	Aug. 07, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§2.1046	RSS-Gen(4.8) RSS-130(4.4) RSS-132 (5.4) RSS-133 (6.4) RSS-139 (6.4)	Conducted Output Power	Reporting Only	PASS	-
3.2	§24.232(d)	RSS-130(4.4) RSS-132 (5.4) RSS-133 (6.4) RSS-139 (6.4)	Peak-to-Average Ratio	<13 dB	PASS	-
3.2.6	§22.913(a)(2)	RSS-132(5.4) SRSP-503(5.1.3)	Effective Radiated Power (Band 5)	ERP < 7 Watt	PASS	-
	§27.50(b)(10) §27.50(c)(10)	N/A	Effective Radiated Power (Band 13) (Band 17)	ERP < 3 Watt		
	N/A	RSS-130(4.4)	Equivalent Isotropic Radiated Power (Band 13) (Band 17)	EIRP < 5 Watt		
	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power (Band 2)	EIRP < 2Watt		
	§27.50(d)(4)	RSS-139 (6.4) SRSP-513(5.1.2)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1Watt		

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.3	§2.1049 §22.917(b) §24.238(b) §27.53(h)(3)	RSS-GEN(4.6.1) RSS-132 (3.1) RSS-133 (3.1) RSS-139 (3.1)	Occupied Bandwidth	Reporting Only	PASS	-
3.4	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(c)(4) §27.53(g) §27.53(h)	RSS-GEN(4.9) RSS-132 (5.5) RSS-133 (6.5.1) RSS-130(4.6) RSS-139 (6.5)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 13) (Band 17)	< 43+10log10(P[Watt])	PASS	-
3.5	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h)	RSS-GEN(4.9) RSS-132 (5.5) RSS-133 (6.5.1) RSS-130(4.6) RSS-139 (6.5)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5) (Band 13) (Band 17)	< $43+10\log_{10}$(P[Watts])	PASS	-
3.6	§2.1053 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(f) §27.53(g) §27.53(h)	RSS-GEN(4.9) RSS-132 (5.5) RSS-133 (6.5.1) RSS-130(4.6) RSS-139 (6.5)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 13) (Band 17)	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 4.89 dB at 1560.000 MHz
3.7	§2.1055 §22.355 §24.235 §27.54	RSS-GEN(4.7) RSS-132(5.3) RSS-133(6.3) RSS-130(4.3) RSS-139 (6.3)	Frequency Stability Temperature & Voltage	< 2.5 ppm	PASS	

1 General Description

1.1 Applicant

Hewlett-Packard Company
3000 Hanover Street, Palo Alto, California 94304, USA

1.2 Manufacturer

COMPAL ELECTRONICS, INC.
No. 581, Ruiguang Rd., Neihu District, Taipei City 11492, Taiwan (R.O.C.)

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Brand Name	HP
Model Name	TPN-C119
FCC ID	B94TNC119HWFR
Integrated WWAN Module	Brand Name: HUAWEI Model Name: ME206
EUT supports Radios application	LTE
EUT Stage	Identical Prototype

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

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz
Rx Frequency	LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 7 : 2622.5MHz ~ 2687.5 MHz LTE Band 13 : 748.5 MHz ~ 753.5 MHz LTE Band 17 : 736.5 MHz ~ 743.5 MHz
Bandwidth	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 7 : 5MHz/ 10MHz / 15MHz / 20MHz LTE Band 13 : 5MHz / 10MHz LTE Band 17 : 5MHz / 10MHz
Maximum Output Power to Antenna	LTE Band 2 : 23.61 dBm LTE Band 4 : 23.95 dBm LTE Band 5 : 23.89 dBm LTE Band 13 : 23.56 dBm LTE Band 17 : 23.77 dBm
Antenna Type	PIFA Antenna
Antenna Gain	LTE Band 2 : 1.43 dBi LTE Band 4 : 0.34 dBi LTE Band 5 : -3.62 dBi LTE Band 13 : -4.60 dBi LTE Band 17 : -3.03 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	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP/EIRP
Part 22	LTE Band 5	QPSK	1.4 MHz	1M11G7D	-	0.06 W
Part 22	LTE Band 5	16QAM	1.4 MHz	1M11D7W	-	0.05 W
Part 22	LTE Band 5	QPSK	3 MHz	2M74G7D	-	0.06 W
Part 22	LTE Band 5	16QAM	3 MHz	2M73D7W	-	0.05 W
Part 22	LTE Band 5	QPSK	5 MHz	4M50G7D	-	0.06 W
Part 22	LTE Band 5	16QAM	5 MHz	4M50D7W	-	0.05 W
Part 22	LTE Band 5	QPSK	10 MHz	9M12G7D	0.008 ppm	0.06 W
Part 22	LTE Band 5	16QAM	10 MHz	9M08D7W	-	0.05 W
Part 24	LTE Band 2	QPSK	1.4 MHz	1M11G7D	-	0.30 W
Part 24	LTE Band 2	16QAM	1.4 MHz	1M11D7W	-	0.26 W
Part 24	LTE Band 2	QPSK	3 MHz	2M73G7D	-	0.30 W
Part 24	LTE Band 2	16QAM	3 MHz	2M73D7W	-	0.26 W
Part 24	LTE Band 2	QPSK	5 MHz	4M50G7D	-	0.30 W
Part 24	LTE Band 2	16QAM	5 MHz	4M50D7W	-	0.26 W
Part 24	LTE Band 2	QPSK	10 MHz	9M12G7D	0.004 ppm	0.32 W
Part 24	LTE Band 2	16QAM	10 MHz	9M10D7W	-	0.27 W
Part 24	LTE Band 2	QPSK	15 MHz	13M5G7D	-	0.32 W
Part 24	LTE Band 2	16QAM	15 MHz	13M6D7W	-	0.28 W
Part 24	LTE Band 2	QPSK	20 MHz	18M7G7D	-	0.32 W
Part 24	LTE Band 2	16QAM	20 MHz	18M7D7W	-	0.28 W

FCC Rule	System	Type of Modulation	BW	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP/EIRP
Part 27	LTE Band 4	QPSK	1.4 MHz	1M11G7D	-	0.26 W
Part 27	LTE Band 4	16QAM	1.4 MHz	1M11D7W	-	0.21 W
Part 27	LTE Band 4	QPSK	3 MHz	2M73G7D	-	0.26 W
Part 27	LTE Band 4	16QAM	3 MHz	2M74D7W	-	0.21 W
Part 27	LTE Band 4	QPSK	5MHz	4M50G7D	-	0.24 W
Part 27	LTE Band 4	16QAM	5MHz	4M50D7W	-	0.22 W
Part 27	LTE Band 4	QPSK	10MHz	9M10G7D	0.005 ppm	0.26 W
Part 27	LTE Band 4	16QAM	10MHz	9M08D7W	-	0.21 W
Part 27	LTE Band 4	QPSK	15MHz	13M5G7D	-	0.27 W
Part 27	LTE Band 4	16QAM	15MHz	13M5D7W	-	0.21 W
Part 27	LTE Band 4	QPSK	20MHz	18M7G7D	-	0.27 W
Part 27	LTE Band 4	16QAM	20MHz	18M6D7W	-	0.21 W
Part 27	LTE Band 13	QPSK	5MHz	4M50G7D	-	0.05 W
Part 27	LTE Band 13	16QAM	5MHz	4M50D7W	-	0.04 W
Part 27	LTE Band 13	QPSK	10MHz	9M12G7D	0.006 ppm	0.05 W
Part 27	LTE Band 13	16QAM	10MHz	9M08D7W	-	0.04 W
Part 27	LTE Band 17	QPSK	5MHz	4M50G7D	-	0.07 W
Part 27	LTE Band 17	16QAM	5MHz	4M51D7W	-	0.06 W
Part 27	LTE Band 17	QPSK	10MHz	9M08G7D	0.006 ppm	0.07 W
Part 27	LTE Band 17	16QAM	10MHz	9M04D7W	-	0.06 W

1.7 Testing Location

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

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

1.8 Applicable Standards

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

- 47 CFR Part 2, 22(H), 24(E), 27
- ANSI / TIA / EIA-603-C-2004
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

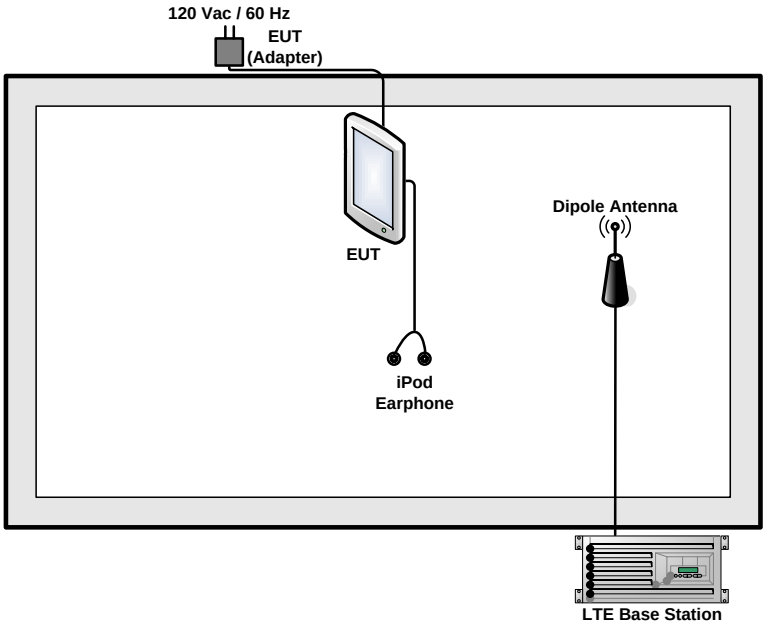
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r01 with maximum output power.

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

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v	-	-	v	v	v	v	v	v	v	v
	13	-	-	v	v	-	-	v	v	v	v	v	v	v	v
	17	-	-	v	v	-	-	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	2						v		v	v		v	v	v	v
	4						v		v	v		v	v	v	v
	5				v	-	-		v	v		v	v	v	v
	13	-	-		v	-	-		v	v		v	v	v	v
	17	-	-		v	-	-		v	v		v	v	v	v
26dB and 99% Bandwidth	2	v	v	v	v	v	v	v	v			v	v	v	v
	4	v	v	v	v	v	v	v	v			v	v	v	v
	5	v	v	v	v	-	-	v	v			v	v	v	v
	13	-	-	v	v	-	-	v	v			v	v	v	v
	17	-	-	v	v	-	-	v	v			v	v	v	v
Conducted Band Edge	2	v	v	v	v	v	v	v	v	v		v	v		v
	4	v	v	v	v	v	v	v	v	v		v	v		v
	5	v	v	v	v	-	-	v	v	v		v	v		v
	13	-	-	v	v	-	-	v	v	v		v	v		v
	17	-	-	v	v	-	-	v	v	v		v	v		v

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Conducted Spurious Emission	2	v	v	v	v	v	v	v	v	v			v	v	v
	4	v	v	v	v	v	v	v	v	v			v	v	v
	5	v	v	v	v	-	-	v	v	v			v	v	v
	13	-	-	v	v	-	-	v	v	v			v	v	v
	17	-	-	v	v	-	-	v	v	v			v	v	v
Frequency Stability	2				v			v				v		v	
	4				v			v				v		v	
	5				v	-	-	v				v		v	
	13	-	-		v	-	-	v				v		v	
	17	-	-		v	-	-	v				v		v	
E.R.P./ E.I.R.P.	2	v	v	v	v	v	v	v	v	v			v	v	v
	4	v	v	v	v	v	v	v	v	v			v	v	v
	5	v	v	v	v	-	-	v	v	v			v	v	v
	13	-	-	v	v	-	-	v	v	v			v	v	v
	17	-	-	v	v	-	-	v	v	v			v	v	v
Radiated Spurious Emission	2	v	v	v	v	v	v	v		v			v	v	v
	4	v	v	v	v	v	v	v		v			v	v	v
	5	v	v	v	v	-	-	v		v			v	v	v
	13	-	-	v	v	-	-	v		v			v	v	v
	17	-	-	v	v	-	-	v		v			v	v	v
Note	1. The mark "v " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.														

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

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

2.4 Measurement Results Explanation Example

For all conducted test items:

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

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

Offset = RF cable loss + attenuator factor.

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

Example :

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

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 Conducted Output Power Measurement and ERP/EIRP Measurement

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

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

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 5.

The ERP of mobile transmitters must not exceed 3 Watts for Band 13 and Band 17.

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 2.

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

According to KDB 412172 D01 Power Approach,

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

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

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

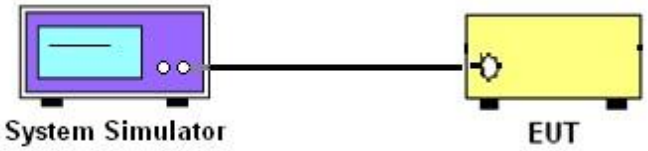
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

<LTE Band 5 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				**20450**	**20525**	**20600**
Frequency (MHz)				**829**	**836.5**	**844**
10	QPSK	1	0	**23.89**	23.64	23.71
10	QPSK	1	24	23.75	23.61	23.68
10	QPSK	1	49	23.60	23.56	23.49
10	QPSK	25	0	22.99	22.86	22.94
10	QPSK	25	12	22.90	22.84	22.93
10	QPSK	25	24	22.85	22.84	22.94
10	QPSK	50	0	22.96	22.90	22.95
10	16QAM	1	0	22.98	22.82	22.97
10	16QAM	1	24	22.83	22.81	22.94
10	16QAM	1	49	22.73	22.71	22.82
10	16QAM	25	0	21.94	21.80	21.87
10	16QAM	25	12	21.88	21.79	21.86
10	16QAM	25	24	21.84	21.80	21.87
10	16QAM	50	0	21.92	21.84	21.87
Channel				**20425**	**20525**	**20625**
Frequency (MHz)				**826.5**	**836.5**	**846.5**
5	QPSK	1	0	**23.70**	23.54	23.62
5	QPSK	1	12	23.66	23.55	23.63
5	QPSK	1	24	23.56	23.53	23.51
5	QPSK	12	0	22.94	22.89	22.98
5	QPSK	12	6	22.98	22.87	22.97
5	QPSK	12	11	22.95	22.86	22.97
5	QPSK	25	0	22.97	22.86	22.93
5	16QAM	1	0	22.90	22.93	22.97
5	16QAM	1	12	22.84	22.97	22.91
5	16QAM	1	24	22.71	22.89	22.84
5	16QAM	12	0	21.97	21.87	21.91
5	16QAM	12	6	21.92	21.82	21.92
5	16QAM	12	11	21.90	21.80	21.90
5	16QAM	25	0	21.92	21.80	21.90

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				**20415**	**20525**	**20635**
Frequency (MHz)				**825.5**	**836.5**	**847.5**
3	QPSK	1	0	**23.78**	23.60	23.65
3	QPSK	1	7	23.74	23.58	23.60
3	QPSK	1	14	23.67	23.55	23.55
3	QPSK	8	0	22.98	22.87	22.97
3	QPSK	8	4	22.93	22.83	22.93
3	QPSK	8	7	22.93	22.84	22.95
3	QPSK	15	0	22.94	22.84	22.96
3	16QAM	1	0	22.94	22.90	22.91
3	16QAM	1	7	22.92	22.93	22.92
3	16QAM	1	14	22.81	22.90	22.82
3	16QAM	8	0	21.84	21.83	21.95
3	16QAM	8	4	21.81	21.83	21.92
3	16QAM	8	7	21.80	21.84	21.91
3	16QAM	15	0	21.81	21.80	21.90
Channel				**20407**	**20525**	**20643**
Frequency (MHz)				**824.7**	**836.5**	**848.3**
1.4	QPSK	1	0	23.87	23.64	23.74
1.4	QPSK	1	2	23.85	23.62	23.72
1.4	QPSK	1	5	23.83	23.64	23.66
1.4	QPSK	3	0	23.87	23.66	23.74
1.4	QPSK	3	1	**23.88**	23.67	23.73
1.4	QPSK	3	2	23.87	23.68	23.73
1.4	QPSK	6	0	22.96	22.87	22.93
1.4	16QAM	1	0	22.96	22.86	22.93
1.4	16QAM	1	2	22.92	22.85	22.86
1.4	16QAM	1	5	22.94	22.86	22.85
1.4	16QAM	3	0	22.81	22.67	22.76
1.4	16QAM	3	1	22.80	22.67	22.76
1.4	16QAM	3	2	22.77	22.65	22.73
1.4	16QAM	6	0	21.89	21.77	21.85

<LTE Band 2 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				**18700**	**18900**	**19100**
Frequency (MHz)				**1860**	**1880**	**1900**
20	QPSK	1	0	23.56	**23.61**	23.55
20	QPSK	1	49	23.14	23.20	23.10
20	QPSK	1	99	23.07	22.97	22.98
20	QPSK	50	0	22.71	22.82	22.67
20	QPSK	50	24	22.50	22.54	22.45
20	QPSK	50	49	22.52	22.42	22.43
20	QPSK	100	0	22.64	22.66	22.58
20	16QAM	1	0	22.88	22.98	22.91
20	16QAM	1	49	22.57	22.56	22.51
20	16QAM	1	99	22.45	22.33	22.32
20	16QAM	50	0	21.62	21.73	21.61
20	16QAM	50	24	21.41	21.45	21.34
20	16QAM	50	49	21.47	21.36	21.32
20	16QAM	100	0	21.57	21.56	21.44
Channel				**18675**	**18900**	**19125**
Frequency (MHz)				**1857.5**	**1880**	**1902.5**
15	QPSK	1	0	**23.60**	23.56	23.48
15	QPSK	1	37	23.33	23.36	23.25
15	QPSK	1	74	23.31	23.29	23.26
15	QPSK	36	0	22.67	22.85	22.71
15	QPSK	36	18	22.56	22.64	22.52
15	QPSK	36	37	22.58	22.58	22.51
15	QPSK	75	0	22.64	22.73	22.61
15	16QAM	1	0	22.98	22.74	22.76
15	16QAM	1	37	22.69	22.70	22.66
15	16QAM	1	74	22.72	22.66	22.61
15	16QAM	36	0	21.62	21.77	21.62
15	16QAM	36	18	21.49	21.54	21.40
15	16QAM	36	37	21.50	21.48	21.39
15	16QAM	75	0	21.56	21.64	21.50

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				18650	18900	19150
Frequency (MHz)				1855	1880	1905
10	QPSK	1	0	23.37	23.57	23.42
10	QPSK	1	24	23.24	23.33	23.23
10	QPSK	1	49	23.22	23.23	23.21
10	QPSK	25	0	22.56	22.67	22.55
10	QPSK	25	12	22.49	22.51	22.44
10	QPSK	25	24	22.47	22.48	22.43
10	QPSK	50	0	22.55	22.60	22.51
10	16QAM	1	0	22.81	22.96	22.87
10	16QAM	1	24	22.69	22.72	22.62
10	16QAM	1	49	22.68	22.65	22.62
10	16QAM	25	0	21.46	21.66	21.49
10	16QAM	25	12	21.37	21.51	21.37
10	16QAM	25	24	21.36	21.48	21.36
10	16QAM	50	0	21.42	21.57	21.42
Channel				18625	18900	19175
Frequency (MHz)				1852.5	1880	1907.5
5	QPSK	1	0	23.17	23.37	23.21
5	QPSK	1	12	23.16	23.28	23.14
5	QPSK	1	24	23.13	23.20	23.16
5	QPSK	12	0	22.43	22.59	22.48
5	QPSK	12	6	22.41	22.55	22.44
5	QPSK	12	11	22.42	22.52	22.40
5	QPSK	25	0	22.44	22.56	22.43
5	16QAM	1	0	22.59	22.79	22.60
5	16QAM	1	12	22.57	22.70	22.54
5	16QAM	1	24	22.53	22.61	22.52
5	16QAM	12	0	21.40	21.57	21.42
5	16QAM	12	6	21.36	21.50	21.36
5	16QAM	12	11	21.37	21.47	21.34
5	16QAM	25	0	21.38	21.49	21.35

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				18615	18900	19185
Frequency (MHz)				1851.5	1880	1908.5
3	QPSK	1	0	23.16	23.35	23.21
3	QPSK	1	7	23.11	23.26	23.13
3	QPSK	1	14	23.12	23.25	23.18
3	QPSK	8	0	22.39	22.58	22.45
3	QPSK	8	4	22.36	22.54	22.43
3	QPSK	8	7	22.37	22.52	22.42
3	QPSK	15	0	22.40	22.55	22.43
3	16QAM	1	0	22.56	22.70	22.59
3	16QAM	1	7	22.55	22.67	22.55
3	16QAM	1	14	22.53	22.63	22.55
3	16QAM	8	0	21.41	21.55	21.42
3	16QAM	8	4	21.37	21.50	21.38
3	16QAM	8	7	21.40	21.51	21.40
3	16QAM	15	0	21.36	21.49	21.39
Channel				18607	18900	19193
Frequency (MHz)				1850.7	1880	1909.3
1.4	QPSK	1	0	23.18	23.31	23.27
1.4	QPSK	1	2	23.18	23.29	23.26
1.4	QPSK	1	5	23.20	23.29	23.23
1.4	QPSK	3	0	23.22	23.38	23.29
1.4	QPSK	3	1	23.20	23.36	23.26
1.4	QPSK	3	2	23.24	23.38	23.29
1.4	QPSK	6	0	22.34	22.48	22.38
1.4	16QAM	1	0	22.56	22.70	22.61
1.4	16QAM	1	2	22.54	22.70	22.62
1.4	16QAM	1	5	22.56	22.67	22.59
1.4	16QAM	3	0	22.37	22.52	22.42
1.4	16QAM	3	1	22.33	22.51	22.42
1.4	16QAM	3	2	22.31	22.48	22.42
1.4	16QAM	6	0	21.38	21.55	21.49

<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	23.89	23.70	**23.95**
20	QPSK	1	49	23.30	23.33	23.53
20	QPSK	1	99	23.21	23.25	23.54
20	QPSK	50	0	22.92	22.93	22.97
20	QPSK	50	24	22.64	22.71	22.90
20	QPSK	50	49	22.63	22.71	22.94
20	QPSK	100	0	22.74	22.82	22.87
20	16QAM	1	0	22.79	22.95	22.93
20	16QAM	1	49	22.72	22.81	22.91
20	16QAM	1	99	22.65	22.72	22.89
20	16QAM	50	0	21.90	21.85	21.93
20	16QAM	50	24	21.58	21.63	21.82
20	16QAM	50	49	21.57	21.66	21.85
20	16QAM	100	0	21.71	21.76	21.95
Channel				**20025**	**20175**	**20325**
Frequency (MHz)				**1717.5**	**1732.5**	**1747.5**
15	QPSK	1	0	**23.94**	23.92	23.84
15	QPSK	1	37	23.44	23.51	23.66
15	QPSK	1	74	23.41	23.61	23.73
15	QPSK	36	0	22.90	22.91	22.94
15	QPSK	36	18	22.64	22.83	22.97
15	QPSK	36	37	22.65	22.85	22.99
15	QPSK	75	0	22.75	22.91	22.88
15	16QAM	1	0	22.83	22.93	22.89
15	16QAM	1	37	22.82	22.90	22.81
15	16QAM	1	74	22.85	22.91	22.84
15	16QAM	36	0	21.93	21.95	21.93
15	16QAM	36	18	21.68	21.73	21.87
15	16QAM	36	37	21.66	21.74	21.89
15	16QAM	75	0	21.78	21.82	21.81

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	23.79	23.67	23.89
10	QPSK	1	24	23.38	23.43	23.66
10	QPSK	1	49	23.37	23.46	23.68
10	QPSK	25	0	22.83	22.85	22.88
10	QPSK	25	12	22.68	22.75	22.96
10	QPSK	25	24	22.66	22.78	22.96
10	QPSK	50	0	22.75	22.85	22.92
10	16QAM	1	0	22.88	22.87	22.96
10	16QAM	1	24	22.82	22.84	22.89
10	16QAM	1	49	22.81	22.89	22.92
10	16QAM	25	0	21.81	21.83	21.82
10	16QAM	25	12	21.65	21.70	21.69
10	16QAM	25	24	21.61	21.72	21.69
10	16QAM	50	0	21.71	21.77	21.75
Channel				19975	20175	20375
Frequency (MHz)				1712.5	1732.5	1752.5
5	QPSK	1	0	23.55	23.51	23.52
5	QPSK	1	12	23.40	23.46	23.46
5	QPSK	1	24	23.34	23.44	23.42
5	QPSK	12	0	22.76	22.81	22.82
5	QPSK	12	6	22.71	22.76	22.77
5	QPSK	12	11	22.68	22.75	22.77
5	QPSK	25	0	22.72	22.76	22.79
5	16QAM	1	0	22.95	22.99	22.87
5	16QAM	1	12	22.82	22.91	22.82
5	16QAM	1	24	22.79	22.89	22.75
5	16QAM	12	0	21.78	21.77	21.99
5	16QAM	12	6	21.69	21.71	21.92
5	16QAM	12	11	21.67	21.70	21.90
5	16QAM	25	0	21.70	21.68	21.92

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	23.47	23.48	23.75
3	QPSK	1	7	23.37	23.41	23.67
3	QPSK	1	14	23.36	23.43	23.64
3	QPSK	8	0	22.75	22.77	22.78
3	QPSK	8	4	22.70	22.73	22.73
3	QPSK	8	7	22.71	22.73	22.74
3	QPSK	15	0	22.73	22.74	22.75
3	16QAM	1	0	22.88	22.92	22.91
3	16QAM	1	7	22.82	22.91	22.88
3	16QAM	1	14	22.77	22.87	22.87
3	16QAM	8	0	21.77	21.75	21.77
3	16QAM	8	4	21.71	21.74	21.71
3	16QAM	8	7	21.71	21.77	21.72
3	16QAM	15	0	21.71	21.76	21.71
Channel				19957	20175	20393
Frequency (MHz)				1710.7	1732.5	1754.3
1.4	QPSK	1	0	23.53	23.51	23.75
1.4	QPSK	1	2	23.51	23.50	23.72
1.4	QPSK	1	5	23.48	23.48	23.73
1.4	QPSK	3	0	23.52	23.45	23.56
1.4	QPSK	3	1	23.50	23.42	23.56
1.4	QPSK	3	2	23.52	23.44	23.56
1.4	QPSK	6	0	22.69	22.72	22.76
1.4	16QAM	1	0	22.86	22.94	22.96
1.4	16QAM	1	2	22.84	22.93	22.93
1.4	16QAM	1	5	22.83	22.93	22.93
1.4	16QAM	3	0	22.72	22.73	22.77
1.4	16QAM	3	1	22.69	22.74	22.76
1.4	16QAM	3	2	22.68	22.70	22.75
1.4	16QAM	6	0	21.77	21.75	21.79

<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		**23.56**	
10	QPSK	1	24		23.55	
10	QPSK	1	49		23.08	
10	QPSK	25	0		22.85	
10	QPSK	25	12		22.73	
10	QPSK	25	24		22.72	
10	QPSK	50	0		22.80	
10	16QAM	1	0		22.88	
10	16QAM	1	24		22.70	
10	16QAM	1	49		22.22	
10	16QAM	25	0		21.83	
10	16QAM	25	12		21.68	
10	16QAM	25	24		21.68	
10	16QAM	50	0		21.77	
Channel				**23205**	**23230**	**23255**
Frequency (MHz)				**779.5**	**782**	**784.5**
5	QPSK	1	0	23.49	**23.50**	23.44
5	QPSK	1	12	**23.50**	23.47	23.41
5	QPSK	1	24	23.42	23.37	23.32
5	QPSK	12	0	22.82	22.77	22.72
5	QPSK	12	6	22.79	22.73	22.67
5	QPSK	12	11	22.77	22.71	22.67
5	QPSK	25	0	22.75	22.71	22.66
5	16QAM	1	0	22.70	22.69	22.76
5	16QAM	1	12	22.72	22.67	22.72
5	16QAM	1	24	22.63	22.55	22.59
5	16QAM	12	0	21.79	21.74	21.71
5	16QAM	12	6	21.74	21.70	21.65
5	16QAM	12	11	21.72	21.65	21.61
5	16QAM	25	0	21.73	21.68	21.62

<LTE Band 17 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				**23780**	**23790**	**23800**
Frequency (MHz)				**709**	**710**	**711**
10	QPSK	1	0	**23.77**	23.71	23.71
10	QPSK	1	24	23.75	23.74	23.68
10	QPSK	1	49	23.65	23.62	23.61
10	QPSK	25	0	22.99	22.97	22.97
10	QPSK	25	12	22.94	22.92	22.93
10	QPSK	25	24	22.96	22.93	22.95
10	QPSK	50	0	22.99	22.96	22.97
10	16QAM	1	0	23.00	22.97	22.96
10	16QAM	1	24	22.96	22.93	22.97
10	16QAM	1	49	22.92	22.93	22.92
10	16QAM	25	0	21.78	21.76	21.76
10	16QAM	25	12	21.72	21.71	21.75
10	16QAM	25	24	21.75	21.74	21.76
10	16QAM	50	0	21.75	21.76	21.79
Channel				**23755**	**23790**	**23825**
Frequency (MHz)				**706.5**	**710**	**713.5**
5	QPSK	1	0	**23.74**	23.66	23.66
5	QPSK	1	12	23.73	23.69	23.66
5	QPSK	1	24	23.71	23.62	23.64
5	QPSK	12	0	22.98	22.98	22.97
5	QPSK	12	6	22.94	22.95	22.95
5	QPSK	12	11	22.94	22.98	22.96
5	QPSK	25	0	22.93	22.98	22.98
5	16QAM	1	0	22.96	22.92	22.94
5	16QAM	1	12	22.93	22.94	22.93
5	16QAM	1	24	22.89	22.89	22.87
5	16QAM	12	0	21.83	21.80	21.76
5	16QAM	12	6	21.78	21.75	21.74
5	16QAM	12	11	21.76	21.74	21.75
5	16QAM	25	0	21.77	21.76	21.76

Note: maximum average power for LTE.

3.1.6 Test Result of Conducted Output Power and ERP/EIRP

Cellular Band (G_T - L_C = -3.62 dB)						
Modes	LTE Band 5 (QPSK,BW=1.4M)			LTE Band 5 (16QAM,BW=1.4M)		
Channel	20407 (Low)	20525 (Mid)	20643 (High)	20407 (Low)	20525 (Mid)	20643 (High)
Frequency (MHz)	824.7	836.5	848.3	824.7	836.5	848.3
Conducted Power P_T (dBm)	23.88	23.68	23.74	22.96	22.86	22.93
Conducted Power P_T (Watts)	0.24	0.23	0.24	0.20	0.19	0.20
ERP(dBm)	18.11	17.91	17.97	17.19	17.09	17.16
ERP(Watts)	0.06	0.06	0.06	0.05	0.05	0.05

Cellular Band (G_T - L_C = -3.62 dB)						
Modes	LTE Band 5 (QPSK,BW=3M)			LTE Band 5 (16QAM,BW=3M)		
Channel	20415 (Low)	20525 (Mid)	20635 (High)	20415 (Low)	20525 (Mid)	20635 (High)
Frequency (MHz)	825.5	836.5	847.5	825.5	836.5	847.5
Conducted Power P_T (dBm)	23.78	23.6	23.65	22.94	22.93	22.92
Conducted Power P_T (Watts)	0.24	0.23	0.23	0.20	0.20	0.20
ERP(dBm)	18.01	17.83	17.88	17.17	17.16	17.15
ERP(Watts)	0.06	0.06	0.06	0.05	0.05	0.05

Cellular Band (G_T - L_C = -3.62 dB)						
Modes	LTE Band 5 (QPSK,BW=5M)			LTE Band 5 (16QAM,BW=5M)		
Channel	20425 (Low)	20525 (Mid)	20625 (High)	20425 (Low)	20525 (Mid)	20625 (High)
Frequency (MHz)	826.5	836.5	846.5	826.5	836.5	846.5
Conducted Power P_T (dBm)	23.7	23.55	23.63	22.9	22.97	22.97
Conducted Power P_T (Watts)	0.23	0.23	0.23	0.19	0.20	0.20
ERP(dBm)	17.93	17.78	17.86	17.13	17.20	17.20
ERP(Watts)	0.06	0.06	0.06	0.05	0.05	0.05

Cellular Band (G_T - L_C = -3.62 dB)						
Modes	LTE Band 5 (QPSK,BW=10M)			LTE Band 5 (16QAM,BW=10M)		
Channel	20450 (Low)	20525 (Mid)	20600 (High)	20450 (Low)	20525 (Mid)	20600 (High)
Frequency (MHz)	829	836.5	844	829	836.5	844
Conducted Power P_T (dBm)	23.89	23.64	23.71	22.98	22.82	22.97
Conducted Power P_T (Watts)	0.24	0.23	0.23	0.20	0.19	0.20
ERP(dBm)	18.12	17.87	17.94	17.21	17.05	17.20
ERP(Watts)	0.06	0.06	0.06	0.05	0.05	0.05

PCS Band (G_T - L_C = 1.43 dB)						
Modes	LTE Band 2 (QPSK,BW=1.4M)			LTE Band 2 (16QAM,BW=1.4M)		
Channel	18607(Low)	18900 (Mid)	19193 (High)	18607(Low)	18900 (Mid)	19193 (High)
Frequency (MHz)	1850.7	1880	1909.3	1850.7	1880	1909.3
Conducted Power P_T (dBm)	23.24	23.38	23.29	22.56	22.7	22.62
Conducted Power P_T (Watts)	0.21	0.22	0.21	0.18	0.19	0.18
EIRP(dBm)	24.67	24.81	24.72	23.99	24.13	24.05
EIRP(Watts)	0.29	0.30	0.30	0.25	0.26	0.25

PCS Band (G_T - L_C = 1.43 dB)						
Modes	LTE Band 2 (QPSK,BW=3M)			LTE Band 2 (16QAM,BW=3M)		
Channel	18615(Low)	18900 (Mid)	19185 (High)	18615(Low)	18900 (Mid)	19185 (High)
Frequency (MHz)	1851.5	1880	1908.5	1851.5	1880	1908.5
Conducted Power P_T (dBm)	23.16	23.35	23.21	22.56	22.7	22.59
Conducted Power P_T (Watts)	0.21	0.22	0.21	0.18	0.19	0.18
EIRP(dBm)	24.59	24.78	24.64	23.99	24.13	24.02
EIRP(Watts)	0.29	0.30	0.29	0.25	0.26	0.25

PCS Band (G_T - L_C = 1.43 dB)						
Modes	LTE Band 2 (QPSK,BW=5M)			LTE Band 2 (16QAM,BW=5M)		
Channel	18625(Low)	18900 (Mid)	19175 (High)	18625(Low)	18900 (Mid)	19175 (High)
Frequency (MHz)	1852.5	1880	1907.5	1852.5	1880	1907.5
Conducted Power P_T (dBm)	23.17	23.37	23.21	22.59	22.79	22.6
Conducted Power P_T (Watts)	0.21	0.22	0.21	0.18	0.19	0.18
EIRP(dBm)	24.60	24.80	24.64	24.02	24.22	24.03
EIRP(Watts)	0.29	0.30	0.29	0.25	0.26	0.25

PCS Band (G_T - L_C = 1.43 dB)						
Modes	LTE Band 2 (QPSK,BW=10M)			LTE Band 2 (16QAM,BW=10M)		
Channel	18650(Low)	18900 (Mid)	19150 (High)	18650(Low)	18900 (Mid)	19150 (High)
Frequency (MHz)	1855	1880	1905	1855	1880	1905
Conducted Power P_T (dBm)	23.37	23.57	23.42	22.81	22.96	22.87
Conducted Power P_T (Watts)	0.22	0.23	0.22	0.19	0.20	0.19
EIRP(dBm)	24.80	25.00	24.85	24.24	24.39	24.30
EIRP(Watts)	0.30	0.32	0.31	0.27	0.27	0.27

PCS Band (G_T - L_C = 1.43 dB)						
Modes	LTE Band 2 (QPSK,BW=15M)			LTE Band 2 (16QAM,BW=15M)		
Channel	18675(Low)	18900 (Mid)	19125 (High)	18675(Low)	18900 (Mid)	19125 (High)
Frequency (MHz)	1857.5	1880	1902.5	1857.5	1880	1902.5
Conducted Power P_T (dBm)	23.6	23.56	23.48	22.98	22.74	22.76
Conducted Power P_T (Watts)	0.23	0.23	0.22	0.20	0.19	0.19
EIRP(dBm)	25.03	24.99	24.91	24.41	24.17	24.19
EIRP(Watts)	0.32	0.32	0.31	0.28	0.26	0.26

PCS Band (G_T - L_C = 1.43 dB)						
Modes	LTE Band 2 (QPSK,BW=20M)			LTE Band 2 (16QAM,BW=20M)		
Channel	18700(Low)	18900 (Mid)	19100 (High)	18700(Low)	18900 (Mid)	19100 (High)
Frequency (MHz)	1860	1880	1900	1860	1880	1900
Conducted Power P_T (dBm)	23.56	23.61	23.55	22.88	22.98	22.91
Conducted Power P_T (Watts)	0.23	0.23	0.23	0.19	0.20	0.20
EIRP(dBm)	24.99	25.04	24.98	24.31	24.41	24.34
EIRP(Watts)	0.32	0.32	0.31	0.27	0.28	0.27

PCS Band (G_T - L_C = 0.34 dB)						
Modes	LTE Band 4 (QPSK,BW=1.4M)			LTE Band 4 (16QAM,BW=1.4M)		
Channel	19957 (Low)	20175 (Mid)	20393 (High)	19957 (Low)	20175 (Mid)	20393 (High)
Frequency (MHz)	1710.7	1732.5	1754.3	1710.7	1732.5	1754.3
Conducted Power P_T (dBm)	23.53	23.51	23.75	22.86	22.94	22.96
Conducted Power P_T (Watts)	0.23	0.22	0.24	0.19	0.20	0.20
EIRP(dBm)	23.87	23.85	24.09	23.20	23.28	23.30
EIRP(Watts)	0.24	0.24	0.26	0.21	0.21	0.21

PCS Band (G_T - L_C = 0.34 dB)						
Modes	LTE Band 4 (QPSK,BW=3M)			LTE Band 4 (16QAM,BW=3M)		
Channel	19965(Low)	20175 (Mid)	20385 (High)	19965(Low)	20175 (Mid)	20385 (High)
Frequency (MHz)	1711.5	1732.5	1753.5	1711.5	1732.5	1753.5
Conducted Power P_T (dBm)	23.47	23.48	23.75	22.88	22.92	22.91
Conducted Power P_T (Watts)	0.22	0.22	0.24	0.19	0.20	0.20
EIRP(dBm)	23.81	23.82	24.09	23.22	23.26	23.25
EIRP(Watts)	0.24	0.24	0.26	0.21	0.21	0.21

PCS Band (G_T - L_C = 0.34 dB)						
Modes	LTE Band 4 (QPSK,BW=5M)			LTE Band 4 (16QAM,BW=5M)		
Channel	19975(Low)	20175 (Mid)	20375 (High)	19975(Low)	20175 (Mid)	20375 (High)
Frequency (MHz)	1712.5	1732.5	1752.5	1712.5	1732.5	1752.5
Conducted Power P_T (dBm)	23.55	23.51	23.52	22.95	22.99	22.87
Conducted Power P_T (Watts)	0.23	0.22	0.22	0.20	0.20	0.19
EIRP(dBm)	23.89	23.85	23.86	23.29	23.33	23.21
EIRP(Watts)	0.24	0.24	0.24	0.21	0.22	0.21

PCS Band (G_T - L_C = 0.34 dB)						
Modes	LTE Band 4 (QPSK,BW=10M)			LTE Band 4 (16QAM,BW=10M)		
Channel	20000 (Low)	20175 (Mid)	20350 (High)	20000 (Low)	20175 (Mid)	20350 (High)
Frequency (MHz)	1715	1732.5	1750	1715	1732.5	1750
Conducted Power P_T (dBm)	23.79	23.67	23.89	22.88	22.89	22.96
Conducted Power P_T (Watts)	0.24	0.23	0.24	0.19	0.19	0.20
EIRP(dBm)	24.13	24.01	24.23	23.22	23.23	23.30
EIRP(Watts)	0.26	0.25	0.26	0.21	0.21	0.21

PCS Band (G_T - L_C = 0.34 dB)						
Modes	LTE Band 4 (QPSK,BW=15M)			LTE Band 4 (16QAM,BW=15M)		
Channel	20025 (Low)	20175 (Mid)	20325 (High)	20025 (Low)	20175 (Mid)	20325 (High)
Frequency (MHz)	1717.5	1732.5	1747.5	1717.5	1732.5	1747.5
Conducted Power P_T (dBm)	23.94	23.92	23.84	22.85	22.93	22.89
Conducted Power P_T (Watts)	0.25	0.25	0.24	0.19	0.20	0.19
EIRP(dBm)	24.28	24.26	24.18	23.19	23.27	23.23
EIRP(Watts)	0.27	0.27	0.26	0.21	0.21	0.21

PCS Band (G_T - L_C = 0.34 dB)						
Modes	LTE Band 4 (QPSK,BW=20M)			LTE Band 4 (16QAM,BW=20M)		
Channel	20050 (Low)	20175 (Mid)	20300 (High)	20050 (Low)	20175 (Mid)	20300 (High)
Frequency (MHz)	1720	1732.5	1745	1720	1732.5	1745
Conducted Power P_T (dBm)	23.89	23.7	23.95	22.79	22.95	22.93
Conducted Power P_T (Watts)	0.24	0.23	0.25	0.19	0.20	0.20
EIRP(dBm)	24.23	24.04	24.29	23.13	23.29	23.27
EIRP(Watts)	0.26	0.25	0.27	0.21	0.21	0.21

Cellular Band (G_T - L_C = -4.60 dB)						
Modes	**LTE Band 13 (QPSK,BW=5M)**			**LTE Band 13 (16QAM,BW=5M)**		
Channel	**23205 (Low)**	**23230 (Mid)**	**23255 (High)**	**23205 (Low)**	**23230 (Mid)**	**23255 (High)**
Frequency (MHz)	**779.5**	**782**	**784.5**	**779.5**	**782**	**784.5**
Conducted Power P_T (dBm)	23.56	23.5	23.44	22.88	22.69	22.76
Conducted Power P_T (Watts)	0.23	0.22	0.22	0.19	0.19	0.19
ERP(dBm)	16.81	16.75	16.69	16.13	15.94	16.01
ERP(Watts)	0.05	0.05	0.05	0.04	0.04	0.04

Cellular Band (G_T - L_C = -4.60 dB)		
Modes	**LTE Band 13 (QPSK,BW=10M)**	**LTE Band 13 (16QAM,BW=10M)**
Channel	**23230 (Mid)**	**23230 (Mid)**
Frequency (MHz)	**782**	**782**
Conducted Power P_T (dBm)	23.5	22.72
Conducted Power P_T (Watts)	0.22	0.19
ERP(dBm)	16.75	15.97
ERP(Watts)	0.05	0.04

Cellular Band (G_T - L_C = -3.03 dB)						
Modes	LTE Band 17 (QPSK,BW=5M)			LTE Band 17 (16QAM,BW=5M)		
Channel	23755(Low)	23790 (Mid)	23825 (High)	23755(Low)	23790 (Mid)	23825 (High)
Frequency (MHz)	706.5	710	713.5	706.5	710	713.5
Conducted Power P_T (dBm)	23.74	23.69	23.66	22.96	22.94	22.94
Conducted Power P_T (Watts)	0.24	0.23	0.23	0.20	0.20	0.20
ERP(dBm)	18.56	18.51	18.48	17.78	17.76	17.76
ERP(Watts)	0.07	0.07	0.07	0.06	0.06	0.06

Cellular Band (G_T - L_C = -3.03 dB)						
Modes	LTE Band 17 (QPSK,BW=10M)			LTE Band 17 (16QAM,BW=10M)		
Channel	23780(Low)	23790 (Mid)	23800 (High)	23780(Low)	23790 (Mid)	23800 (High)
Frequency (MHz)	709	710	711	709	710	711
Conducted Power P_T (dBm)	23.77	23.74	23.71	23	22.97	22.97
Conducted Power P_T (Watts)	0.24	0.24	0.23	0.20	0.20	0.20
ERP(dBm)	18.59	18.56	18.53	17.82	17.79	17.79
ERP(Watts)	0.07	0.07	0.07	0.06	0.06	0.06

3.2 Peak-to-Average Ratio

3.2.1 Description of the PAR Measurement

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

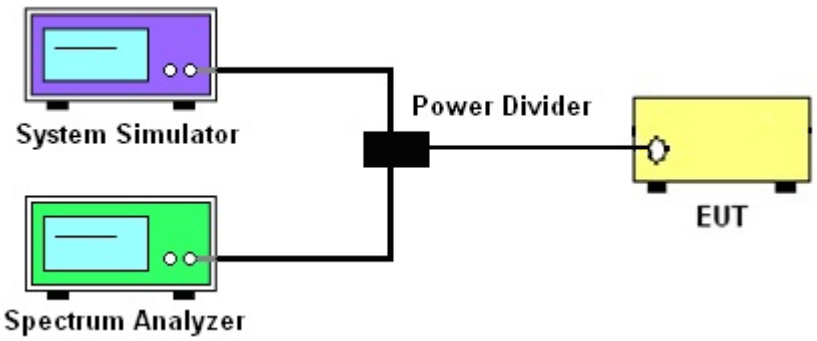
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

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

3.2.4 Test Setup



3.2.5 Test Result of Peak-to-Average Ratio

LTE Band 5						
BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				20450	20525	20600
Frequency (MHz)				829	836.5	844
10	16QAM	1	0	4.94	5.38	4.97
10	16QAM	50	0	5.90	5.96	5.74

LTE Band 2						
BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				18700	18900	19100
Frequency (MHz)				1860	1880	1900
20	16QAM	1	0	4.62	4.39	4.71
20	16QAM	100	0	6.06	5.80	5.99

LTE Band 4						
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	16QAM	1	0	5.38	5.48	5.29
20	16QAM	100	0	6.25	6.31	6.25

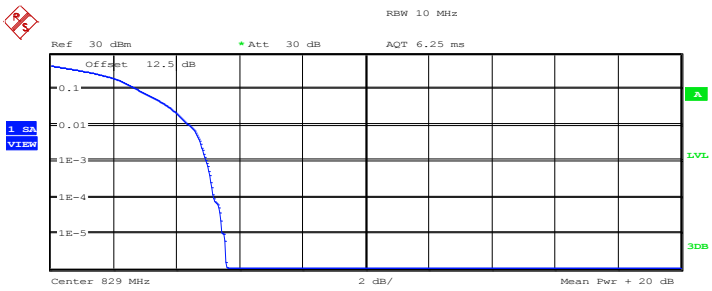
LTE Band 13						
BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel					23230	
Frequency (MHz)					782	
10	16QAM	1	0		4.97	
10	16QAM	50	0		5.83	

LTE Band 17						
BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				23780	23790	23800
Frequency (MHz)				709	710	711
10	16QAM	1	0	4.65	4.78	4.62
10	16QAM	50	0	5.80	5.90	5.83

3.2.6 Peak to Average Power Ratio

Peak-to-Average Ratio on LTE Band 5

10MHz / 16QAM in Ch. 20450 (1RB Size)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	23.91 dBm
Peak	29.49 dBm
Crest	5.58 dB
10 %	2.76 dB
1 %	4.39 dB
.1 %	4.94 dB
.01 %	5.19 dB

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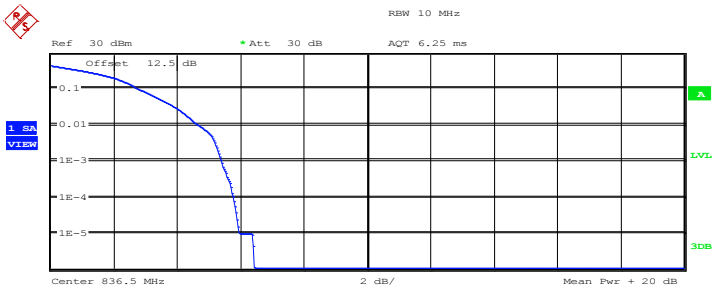
Peak-to-Average Ratio on LTE Band 5

10MHz / 16QAM in Ch. 20525 (1RB Size)



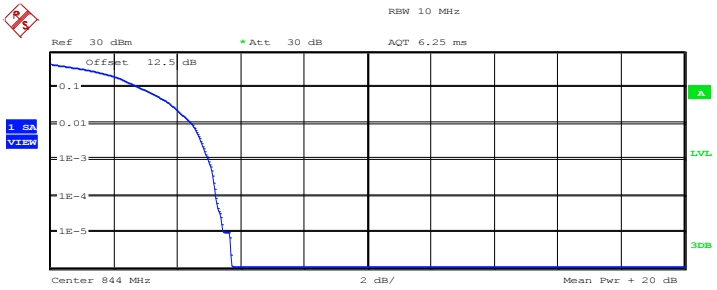
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	23.93 dBm
Peak	30.36 dBm
Crest	6.43 dB
10 %	2.79 dB
1 %	4.65 dB
.1 %	5.38 dB
.01 %	5.77 dB

Date: 10.JUL.2014 01:18:42

Peak-to-Average Ratio on LTE Band 5

10MHz / 16QAM in Ch. 20600 (1RB Size)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	24.12 dBm
Peak	29.83 dBm
Crest	5.71 dB
10 %	2.82 dB
1 %	4.42 dB
.1 %	4.97 dB
.01 %	5.22 dB

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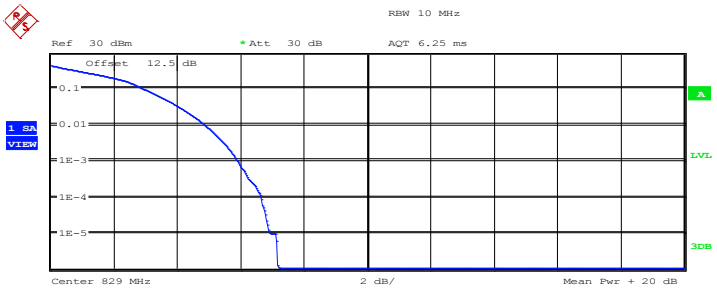
Peak-to-Average Ratio on LTE Band 5

10MHz / 16QAM in Ch. 20450 (50RB Size)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	22.88 dBm
Peak	30.05 dBm
Crest	7.18 dB
10 %	2.95 dB
1 %	4.84 dB
.1 %	5.90 dB
.01 %	6.63 dB

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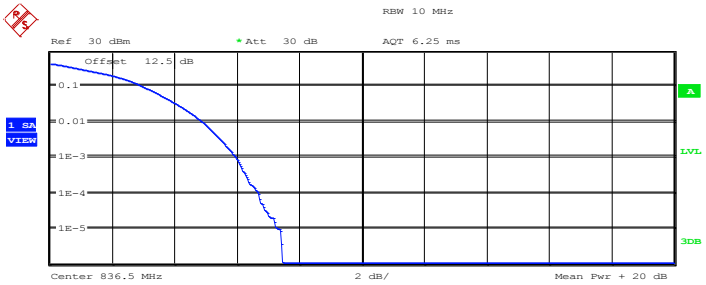
Peak-to-Average Ratio on LTE Band 5

10MHz / 16QAM in Ch. 20525 (50RB Size)



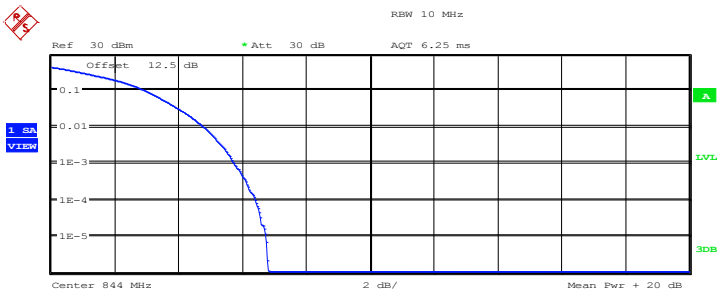
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	22.84 dBm
Peak	30.29 dBm
Crest	7.45 dB
10 %	2.98 dB
1 %	4.87 dB
.1 %	5.96 dB
.01 %	6.67 dB

Date: 10.JUL.2014 01:19:01

Peak-to-Average Ratio on LTE Band 5

10MHz / 16QAM in Ch. 20600 (50RB Size)



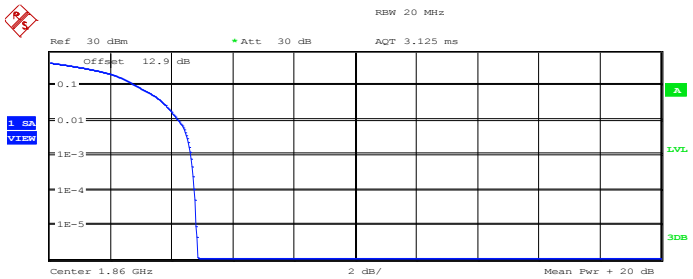
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	22.82 dBm
Peak	29.62 dBm
Crest	6.80 dB
10 %	2.95 dB
1 %	4.78 dB
.1 %	5.74 dB
.01 %	6.41 dB

Date: 10.JUL.2014 01:19:46

Peak-to-Average Ratio on LTE Band 2

20MHz / 16QAM in Ch. 18700 (1RB Size)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	23.69 dBm
Peak	28.56 dBm
Crest	4.86 dB
10 %	2.82 dB
1 %	4.23 dB
.1 %	4.62 dB
.01 %	4.74 dB

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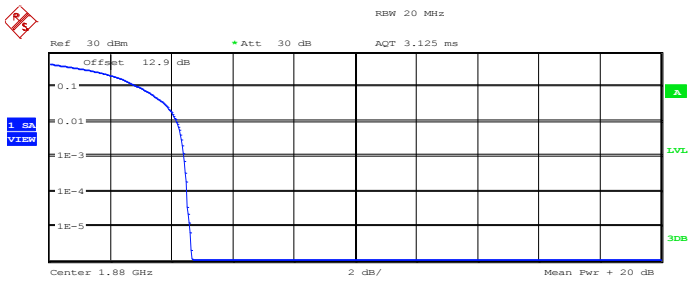
Peak-to-Average Ratio on LTE Band 2

20MHz / 16QAM in Ch. 18900 (1RB Size)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	23.57 dBm
Peak	28.23 dBm
Crest	4.65 dB
10 %	2.92 dB
1 %	4.17 dB
.1 %	4.39 dB
.01 %	4.52 dB

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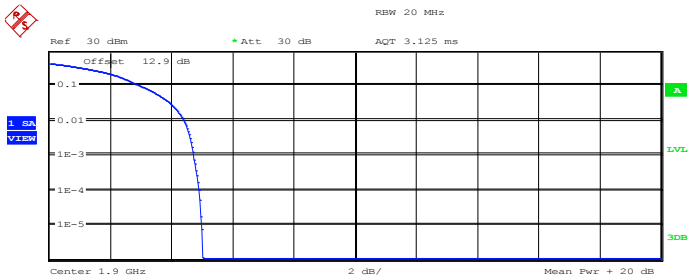
Peak-to-Average Ratio on LTE Band 2

20MHz / 16QAM in Ch. 19100 (1RB Size)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	23.54 dBm
Peak	28.56 dBm
Crest	5.02 dB
10 %	2.98 dB
1 %	4.39 dB
.1 %	4.71 dB
.01 %	4.90 dB

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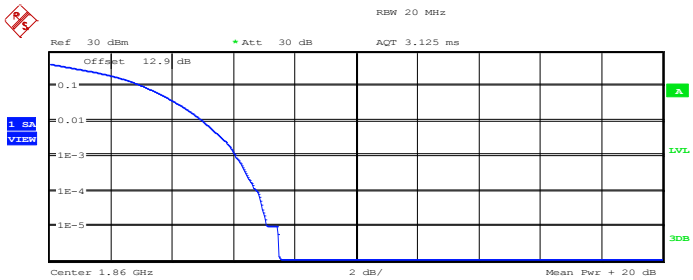
Peak-to-Average Ratio on LTE Band 2

20MHz / 16QAM in Ch. 18700 (100RB Size)



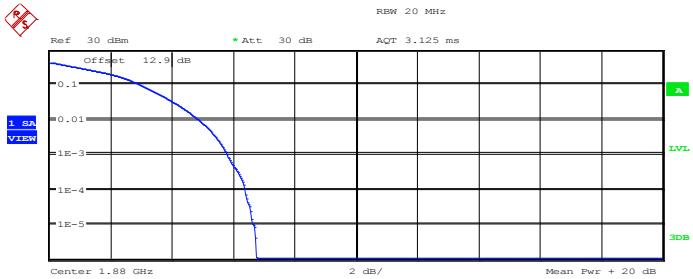
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	22.26 dBm
Peak	29.75 dBm
Crest	7.50 dB
10 %	3.04 dB
1 %	4.97 dB
.1 %	6.06 dB
.01 %	6.73 dB

Date: 8.JUL.2014 01:32:27

Peak-to-Average Ratio on LTE Band 2

20MHz / 16QAM in Ch. 18900 (100RB Size)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	22.39 dBm
Peak	29.14 dBm
Crest	6.75 dB
10 %	2.95 dB
1 %	4.84 dB
.1 %	5.80 dB
.01 %	6.38 dB

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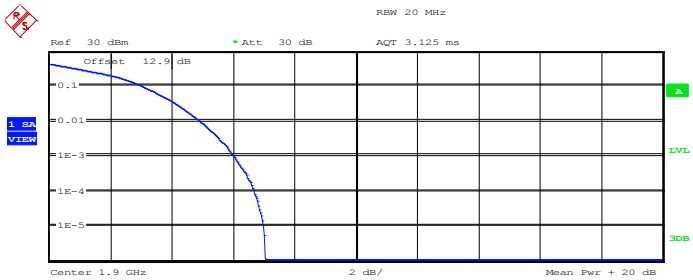
Peak-to-Average Ratio on LTE Band 2

20MHz / 16QAM in Ch. 19100 (100RB Size)



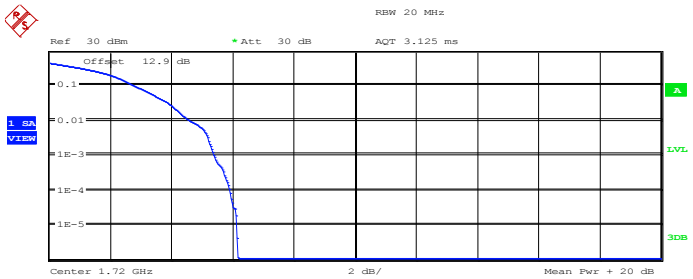
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	22.29 dBm
Peak	29.34 dBm
Crest	7.04 dB
10 %	3.04 dB
1 %	4.90 dB
.1 %	5.99 dB
.01 %	6.67 dB

Date: 8.JUL.2014 01:36:07

Peak-to-Average Ratio on LTE Band 4

20MHz / 16QAM in Ch. 20050 (1RB Size)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	23.73 dBm
Peak	29.89 dBm
Crest	6.15 dB
10 %	2.76 dB
1 %	4.58 dB
.1 %	5.38 dB
.01 %	5.90 dB

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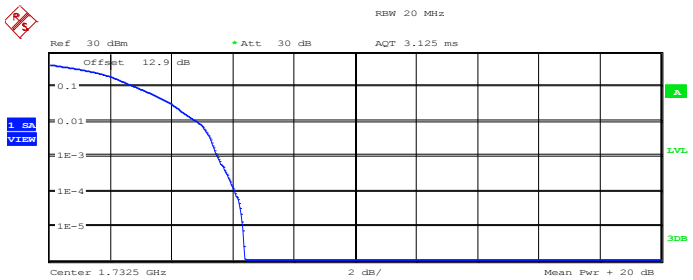
Peak-to-Average Ratio on LTE Band 4

20MHz / 16QAM in Ch. 20175 (1RB Size)



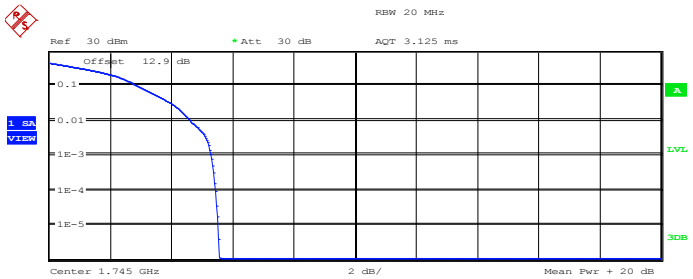
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	23.87 dBm
Peak	30.26 dBm
Crest	6.39 dB
10 %	2.82 dB
1 %	4.84 dB
.1 %	5.48 dB
.01 %	6.06 dB

Date: 9.JUL.2014 22:38:47

Peak-to-Average Ratio on LTE Band 4

20MHz / 16QAM in Ch. 20300 (1RB Size)



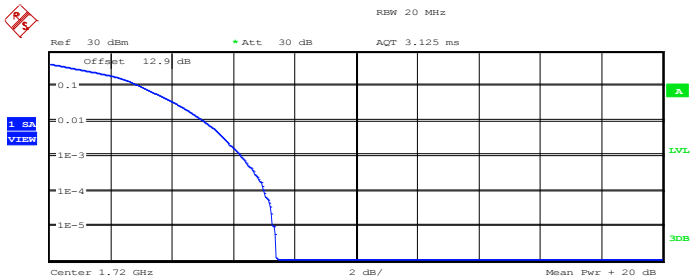
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	23.99 dBm
Peak	29.53 dBm
Crest	5.54 dB
10 %	2.88 dB
1 %	4.58 dB
.1 %	5.29 dB
.01 %	5.45 dB

Date: 9.JUL.2014 22:39:22

Peak-to-Average Ratio on LTE Band 4

20MHz / 16QAM in Ch. 20500 (100RB Size)



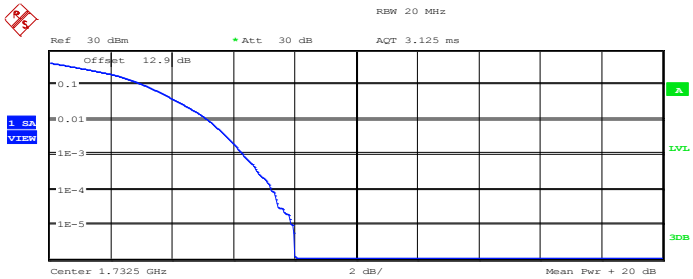
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	22.27 dBm
Peak	29.67 dBm
Crest	7.40 dB
10 %	2.95 dB
1 %	5.03 dB
.1 %	6.25 dB
.01 %	6.99 dB

Date: 9.JUL.2014 22:38:31

Peak-to-Average Ratio on LTE Band 4

20MHz / 16QAM in Ch. 201750 (100RB Size)



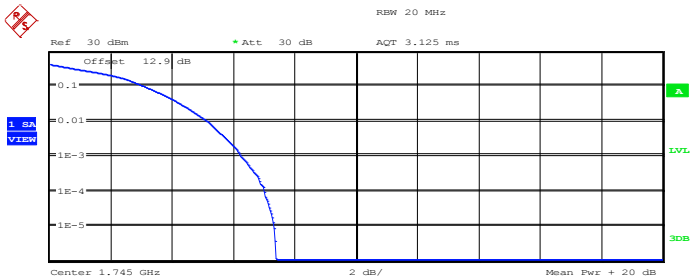
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	22.25 dBm
Peak	30.26 dBm
Crest	8.01 dB
10 %	3.08 dB
1 %	5.16 dB
.1 %	6.31 dB
.01 %	7.24 dB

Date: 9.JUL.2014 22:39:00

Peak-to-Average Ratio on LTE Band 4

20MHz / 16QAM in Ch. 20300 (100RB Size)



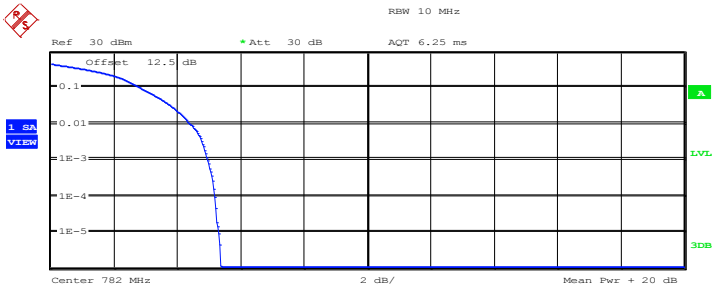
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 23.7MHz

	Trace 1
Mean	22.43 dBm
Peak	29.82 dBm
Crest	7.38 dB
10 %	3.08 dB
1 %	5.13 dB
.1 %	6.25 dB
.01 %	7.02 dB

Date: 9.JUL.2014 22:39:34

Peak-to-Average Ratio on LTE Band 13

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



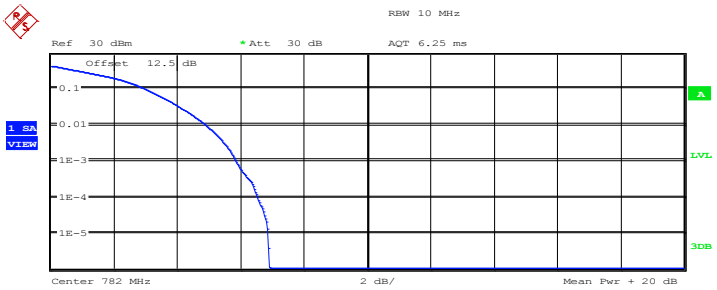
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	23.41 dBm
Peak	28.79 dBm
Crest	5.38 dB
10 %	2.82 dB
1 %	4.39 dB
.1 %	4.97 dB
.01 %	5.19 dB

Date: 11.JUL.2014 00:24:46

Peak-to-Average Ratio on LTE Band 13

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



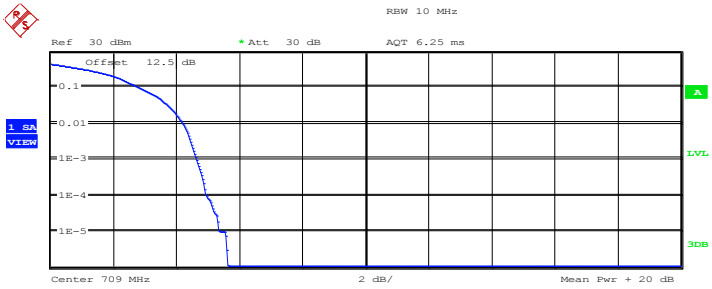
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	22.67 dBm
Peak	29.56 dBm
Crest	6.89 dB
10 %	2.98 dB
1 %	4.87 dB
.1 %	5.83 dB
.01 %	6.54 dB

Date: 11.JUL.2014 00:23:47

Peak-to-Average Ratio on LTE Band 17

10MHz / 16QAM in Ch. 23780 (1RB Size)



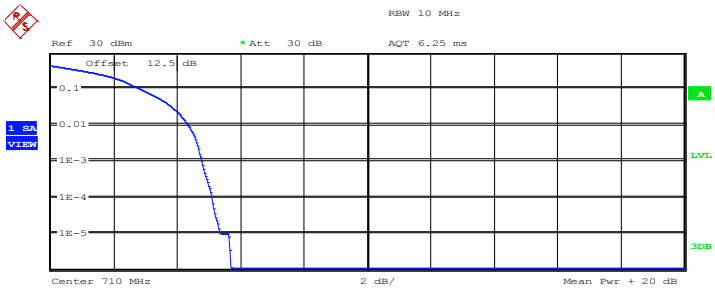
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	23.79 dBm
Peak	29.41 dBm
Crest	5.62 dB
10 %	2.82 dB
1 %	4.20 dB
.1 %	4.65 dB
.01 %	4.94 dB

Date: 9.JUL.2014 23:25:48

Peak-to-Average Ratio on LTE Band 17

10MHz / 16QAM in Ch. 23790 (1RB Size)



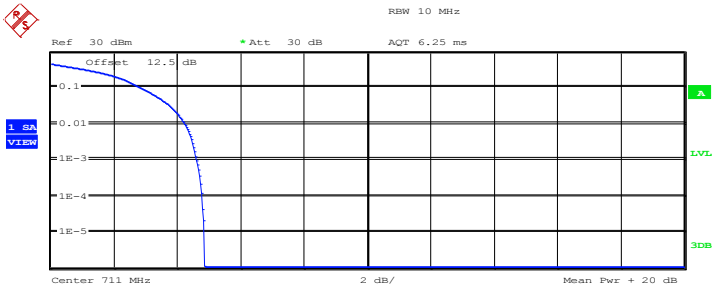
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	23.74 dBm
Peak	29.42 dBm
Crest	5.69 dB
10 %	2.85 dB
1 %	4.33 dB
.1 %	4.78 dB
.01 %	5.10 dB

Date: 9.JUL.2014 23:26:14

Peak-to-Average Ratio on LTE Band 17

10MHz / 16QAM in Ch. 23800 (1RB Size)



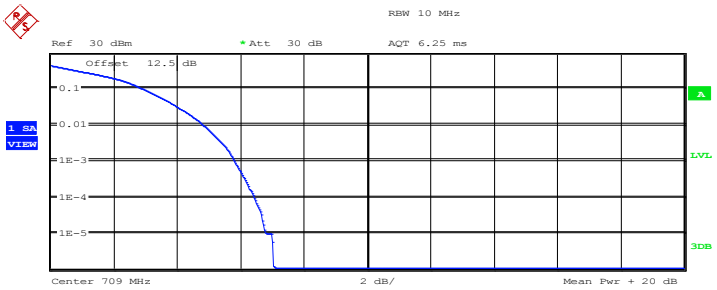
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	23.72 dBm
Peak	28.58 dBm
Crest	4.86 dB
10 %	2.82 dB
1 %	4.23 dB
.1 %	4.62 dB
.01 %	4.78 dB

Date: 9.JUL.2014 23:26:41

Peak-to-Average Ratio on LTE Band 17

10MHz / 16QAM in Ch. 23780 (50RB Size)



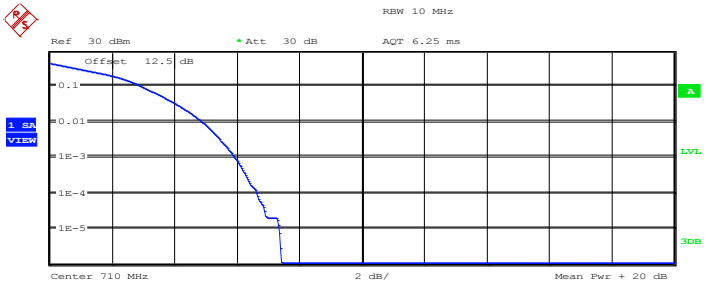
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	22.65 dBm
Peak	29.70 dBm
Crest	7.05 dB
10 %	2.92 dB
1 %	4.81 dB
.1 %	5.80 dB
.01 %	6.41 dB

Date: 9.JUL.2014 23:26:00

Peak-to-Average Ratio on LTE Band 17

10MHz / 16QAM in Ch. 23790 (50RB Size)



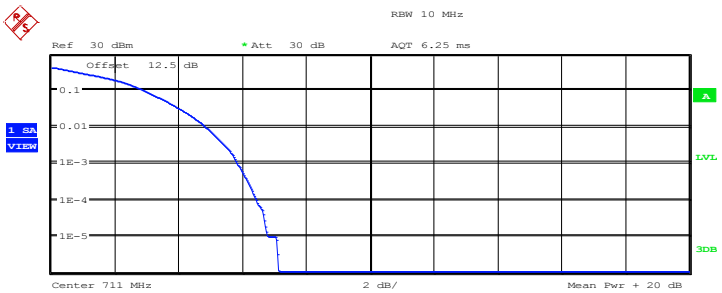
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	22.86 dBm
Peak	30.27 dBm
Crest	7.41 dB
10 %	2.92 dB
1 %	4.87 dB
.1 %	5.90 dB
.01 %	6.63 dB

Date: 9.JUL.2014 23:26:29

Peak-to-Average Ratio on LTE Band 17

10MHz / 16QAM in Ch. 23800 (50RB Size)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	22.66 dBm
Peak	29.78 dBm
Crest	7.13 dB
10 %	2.92 dB
1 %	4.84 dB
.1 %	5.83 dB
.01 %	6.44 dB

Date: 9.JUL.2014 23:26:53