

TEST REPORT



EUT Description	GSM, WCDMA and LTE Cellular adapter card
Brand Name	INTEL
Model Name	7262M2WW
Serial Number	IMEI: 004402523029712 (see section 4)
FCC/IC ID	FCC ID: PD97262WW / IC ID: 1000M-7262WW
Antenna type	Dipole, Pulse, Part Number SPDA24700/2700
Hardware/Software Version	HW PR2.3, SW 1509
Date of Sample Receipt	2015-05-11
Date of Test Start / End	2015-05-27 / 2015-06-17
Features	2G: GSM/GPRS/EDGE 850 / 1900 3G: WCDMA/HSPA/DC-HSDPA FDD II / IV / V 4G LTE- FDD 2, 4, 5, 7, 12, 13, 17, 30 LTE-TDD 41 (see section 5)
Applicant	Intel Mobile Communications
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Reference Standards	FCC CFR Title 47 Part 2, 22, 24, 27 RSS 132 issue 3, RSS 133 issue 6, RSS 139 issue 2, RSS-195 issue 2 (see section 1)
Test Report number	15051102.TR02
Revision Control	Rev. 01

The test results relate only to the samples tested. The test report shall not be reproduced in full, without written approval of the laboratory.

Issued by	Reviewed by	Approved by		
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1. Standards, reference documents and applicable test methods

- 1. FCC 47 CFR part 2 Subpart J EQUIPMENT AUTHORIZATION PROCEDURES
- 2. FCC 47 CFR part 22 Subpart H Cellular Radiotelephone Service
- 3. FCC 47 CFR part 24 Subpart E Broadband PCS.
- 4. FCC 47 CFR part 27 Subpart L 1695-1710, 1710-1755 MHz, 1755-1780 MHz, 2110-2155 MHz, 2155-2180 MHz, 2180-2200 MHz Bands
- 5. FCC 47 CFR part 90 Subpart S—Regulations Governing Licensing and Use of Frequencies in the 806-824, 851-869, 896-901, and 935-940 MHz Bands
- 6. FCC OET KDB 971168 D01 v02r02 Measurement guidance for certification of licensed digital transmitters
- RSS130 issue 1 Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz
- RSS 132 issue 3 Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
- 9. RSS 133 issue 6 2 GHz Personal Communications Services
- 10. RSS 139 issue 2 Advanced Wireless Services Equipment Operating in the Bands 1710–1755 MHz and 2110–2155 MHz
- 11. RSS-195 issue 2 Wireless Communication Service (WCS) Equipment Operating in the Bands 2305-2320 MHz and 2345-2360 MHz
- 12. TIA 603 D June 2010 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
- ANSI C63.4-2009 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2. General conditions, competences and guarantees

- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is a testing laboratory accredited by the American Association for Laboratory Accreditation (A2LA).
- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm listed by the FCC, with Designation Number FR0011.
- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by IC, with IC Assigned Code 1000Y.
- Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.
- ✓ Complete or partial reproduction of the report cannot be made without written permission of Intel WRF Lab.

3. Environmental Conditions

✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature	20.1°C ± 1°C
Humidity	59% ± 10%

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt
#01	15051102.S02	Cellular module	7262M2WW	004402523029712	2015-05-11
	14112401.S07	Antenna	Pulse SPDA24700/2700	NA	2014-11-24
	14112401.S08	Antenna	Pulse SPDA24700/2700	NA	2014-11-24
	15051102.S04	Extender Board	SB0NFF2BK0D	NFFTC00332500211	2015-05-11

NA: Not Applicable

✓ Sample #01 has undergone all the test(s) requested by the applicant, following the standards specified in section 1.

5. EUT features

These are the detailed bands and modes supported by the Equipment Under Test:

GSM / GPRS / EDGE	GSM 850 (824.2 – 848.8 MHz) PCS 1900 (1850.2 – 1909.9 MHz)
WCDMA / HSPA+	FDD II (1850.0 – 1910.0 MHz) FDD IV (1710.0 – 1755.0 MHz) FDD V (824.0 – 849.0 MHz)
LTE FDD	Band 2 (1850.0 – 1910.0 MHz) Band 4 (1710.0 – 1755.0 MHz) Band 5 (824.0 – 849.0 MHz) Band 7 (2500 – 2570 MHz) Band 12 (699 – 716 MHz) Band 13 (777 – 787 MHz) Band 17 (704.0 – 716.0 MHz) Band 26 (814 – 849 MHz) Band 30 (2305 – 2315 MHz)
LTE TDD	Band 41 (2496 – 2690 MHz)



LTE emission designator

Pond	Type of modulation			
Danu	QPSK	16QAM		
LTE Band 2, Bandwidth 1.4MHz	1M11G7D	1M11W7D		
LTE Band 2, Bandwidth 3MHz	2M73G7D	2M74W7D		
LTE Band 2, Bandwidth 5MHz	4M52G7D	4M52W7D		
LTE Band 2, Bandwidth 10MHz	9M04G7D	9M04W7D		
LTE Band 2, Bandwidth 15MHz	13M5G7D	13M5W7D		
LTE Band 2, Bandwidth 20MHz	17M92G7D	17M91W7D		
LTE Band 4, Bandwidth 1.4MHz	1M11G7D	1M11W7D		
LTE Band 4, Bandwidth 3MHz	2M73G7D	2M72W7D		
LTE Band 4, Bandwidth 5MHz	4M53G7D	4M51W7D		
LTE Band 4, Bandwidth 10MHz	9M04G7D	9M02W7D		
LTE Band 4, Bandwidth 15MHz	13M57G7D	13M51W7D		
LTE Band 4, Bandwidth 20MHz	17M87G7D	17M9W7D		
LTE Band 5, Bandwidth 1.4MHz	1M10G7D	1M10W7D		
LTE Band 5, Bandwidth 3MHz	2M74G7D	2M73W7D		
LTE Band 5, Bandwidth 5MHz	4M51G7D	4M51W7D		
LTE Band 5, Bandwidth 10MHz	9M04G7D	9M03W7D		
LTE Band 12, Bandwidth 1.4MHz	1M11G7D	1M10W7D		
LTE Band 12, Bandwidth 3MHz	2M74G7D	2M73W7D		
LTE Band 12, Bandwidth 5MHz	4M50G7D	4M51W7D		
LTE Band 12, Bandwidth 10MHz	9M03G7D	9M04W7D		

Pond	Type of modulation		
Dallu	QPSK	16QAM	
LTE Band 17, Bandwidth 5MHz	4M52G7D	4M54W7D	
LTE Band 17, Bandwidth 10MHz	9M05G7D	9M02W7D	
LTE Band 13, Bandwidth 5MHz	4M51G7D	4M51W7D	
LTE Band 13, Bandwidth 10MHz	8M99G7D	8M98W7D	
LTE Band 26, Bandwidth 1.4MHz	1M10G7D	1M10W7D	
LTE Band 26, Bandwidth 3MHz	2M72G7D	2M73W7D	
LTE Band 26, Bandwidth 5MHz	4M51G7D	4M52W7D	
LTE Band 26, Bandwidth 10MHz	9M05G7D	9M04W7D	
LTE Band 41, Bandwidth 5MHz	4M52G7D	4M54W7D	
LTE Band 41, Bandwidth 10MHz	9M02G7D	9M01W7D	
LTE Band 41, Bandwidth 15MHz	13M5G7D	13M5W7D	
LTE Band 41, Bandwidth 20MHz	17M9G7D	17M9W7D	
LTE Band 7, Bandwidth 5MHz	4M51G7D	4M51W7D	
LTE Band 7, Bandwidth 10MHz	9M04G7D	9M02W7D	
LTE Band 7, Bandwidth 15MHz	13M6G7D	13M5W7D	
LTE Band 7, Bandwidth 20MHz	17M9G7D	17M9W7D	



Rend	Type of modulation		
Ballu	QPSK	16QAM	
LTE Band 30, Bandwidth 5MHz	4M51G7D	4M54W7D	
LTE Band 30, Bandwidth 10MHz	9M01G7D	9M02W7D	

6. Remarks and comments

1. According to Applicants declaration, between the EUT version HW PR2.0, SW 1445, EUT version HW PR2.1 SW 1449 and EUT version HW PR2.3, SW 1509 there are no differences regarding the GSM850, GSM1900, WCDMA II, IV, V and LTE band 2, 4, 5, 7, 12, 13, 17, 26 and 41. For these bands only worst cases radiated found on EUT PR2.0 and EUT PR 2.1 are reported (Annex C).



7. Test Verdicts summary

7.1. GSM/EDGE/GPRS

Mode	FCC part	RSS part	Test name	Verdict
PCS 1900	24.238	133-ch.6.5.1	Radiated spurious emission	Р
GSM 850	22.917, 2.1053	RSS.132-ch.5.5	Radiated spurious emission	Р

P: Pass F: Fail NM: Not Measured NA: Not Applicable

7.2. WCDMA

Mode	Band	FCC part	RSS part	Test name	Verdict
WCDMA / HSPA+ FDD	2	24.238	133-ch.6.5.1	Radiated spurious emission	Ρ
WCDMA / HSPA+ FDD	4	27.53, 2.1053	139-ch.6.5	Radiated spurious emission	Ρ
WCDMA / HSPA+ FDD	5	22.917, 2.1053	RSS.132-ch.5.5	Radiated spurious emission	Ρ

P: Pass F: Fail NM: Not Measured NA: Not Applicable

7.3. LTE

Mode	Band	FCC part	RSS part	Test name	Verdict
LTE	2	24.238	133-ch.6.5.1	Radiated spurious emission	Р
LTE	4	27.53, 2.1053	139-ch.6.5	Radiated spurious emission	Р
LTE	5	22.917, 2.1053	132-ch.5.5	Radiated spurious emission	Р
LTE	7	27.53 (m), 2.1053	199-ch.4.6	Radiated spurious emission	Р
LTE	12	27.53 (g), 2.1053	130-ch.4.6	Radiated spurious emission	Р
LTE	13	27.53 (c), 2.1053	130-ch.4.6	Radiated spurious emission	Р
LTE	17	27.53 (g), 2.1053	130-ch.4.6	Radiated spurious emission	Р
LTE	26	22.917, 2.1053, 90.691	-	Radiated spurious emission	Р
		2.1046	Gen-ch.6.12	Conducted output power	Р
		27.50 (a)	195-ch.5.5	Equivalent isotropic radiated power	Р
		27.53 (a)		Emission bandwidth	Р
		2.1049	Gen-ch.6.6	Occupied bandwidth (99%)	Р
LTE	30	-	195-ch.5.5	Peak to average ratio	Р
		27.54, 2.1055	195-ch.5.4	Frequency Stability	Р
		27.53 (a), 2.1051	195-ch.5.6	Conducted band-edge	Р
		27.53 (a)	195-ch.5.6	Conducted spurious emission	Р
		27.53 (a), 2.1053	195-ch.5.6	Radiated spurious emission	Р
LTE	41	27.53 (m), 2.1053	-	Radiated spurious emission	Р

P: Pass F: Fail NM: Not Measured NA: Not Applicable





8. Document Revision History

Revision #	Date	Modified by	Details
Rev. 00	2015-06-18	O. Fargant	First Issue
Rev. 01	2015-06-24	O. Fargant	Minor modification according to Steven Hackett



Annex A. Test & System Description

A.1 Measurement system

Measurements were performed using the following setups. A communication tester was used to establish a communication link with the EUT, and the communication tester parameters were set to get the maximum output power from the EUT.

Conducted Setup 1



Conducted Setup 2



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Conducted Setup 3



Radiated Setup < 1GHz



Radiated Setup Frequency range 1 GHz to 18 GHz



Radiated Setup > 18GHz





A.2 Test Equipment List

Conducted Setup

ID Number	Device	Type/Model	Serial Number	Manufacturer	Calibration Date	Calibration Due Date
0319	Communication tester	CMW500	129337	Rohde & Schwarz	2015-03- 19	2017-03- 19
00315	Spectrum analyzer	FSV30	103307	, Rohde & Schwarz		2017-03- 20
0046	Power splitter	11667B	MY51360447	Agilent	NA	NA
0098	USB Power sensor	NRP-Z81	102278	Rohde & Schwarz	2013-07- 17	2015-07- 17
NA	10 dB attenuator	NA	4882640	RS	NA	NA
0036	Multimeter	IDM103	03902163	ISO Tech	2014-01- 06	2016-01- 06
0293	Power supply	E3640A	MY40006885	Agilent	NA	NA
0300	Climatic Chamber	SLT34/40	56746020930010	SECASI	2015-03- 09	2017-03- 09

Radiated Setup

ID Number	Device	Type/Model	Serial Number	Manufacturer	Calibration Date	Calibration Due Date
0210	Communication tester	CMW500	147712	Rohde & Schwarz	NA	NA
0133	Spectrum analyzer	FSV40	101358	Rohde & Schwarz	2014-05- 03	2016-05- 03
0137	Log Antenna 30 MHz – 1 GHz	3142E	00156946	ETS Lindgren	2014-05- 03	2016-05- 03
0138	Horn Antenna 1 GHz – 18 GHz	3117	00152266	ETS Lindgren	2014-03- 04	2016-03- 04
0141	Horn Antenna + Preamplifier 1 GHz – 18 GHz	3117P	00157736	ETS Lindgren	2014-06- 03	2016-06- 03
0139	Horn Antenna 18 GHz – 26 GHz	114514	00167100	ETS Lindgren	2014-04- 25	2016-04- 25
0135	Anechoic chamber	Fact 3	RFD_FA_100	ETS Lindgren	NA	NA

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

Measurement type	Uncertainty [±dB]
Conducted Power (power meter)	± 1.0
Conducted spurious emission	± 2.9
Radiated test < 1GHz	± 3.8
Radiated test 1GHz - 26 GHz	± 4.7



Annex B. Test Results

B.1 Test Conditions

For cellular transmission modes GPRS/EGPRS/WCDMA and LTE, the device was put into operation by using an R&S CMW 500 as base station simulator.

The output power of the device was set to transmit at maximum power for all tests.

B.2 Test results

B.2.1 Conducted RF output power

Test limits

BAND	FCC part	RSS part	Power Limits [Watts]	Max Antenna Gain [dBi]	Power Limit at antenna terminal [dBm]
LTE 30	2.1046, 27.50	195-ch.5.5	< 50 mW/5MHz EIRP	2.0	< 31.0

Test procedure

The setup below was used to measure the conducted output power. The antenna terminal of the EUT is connected to the power meter and the communication tester through an attenuator and a power splitter. The power meter reading is compensated to include the RF. This test was performed according to the KDB 971168 D01 § 5.2.



Results tables

Band	BW	Channel	Freq	Modulation	#RB	RB	Avg	Peak
Dana	[MHz]	Number	[MHz]	modulation.	mitte	position	[dBm]	[dBm]
						0	23.2	27.9
					1	12	23.2	27.7
						24	23.2	28.0
				QPSK		0	22.2	28.4
					12	6	22.1	28.4
						11	22.1	28.5
		27685	2307 5		25	0	22.1	28.6
		27000	2007.0			0	22.1	28.1
					1	12	22.1	28.3
						24	21.9	28.3
				16QAM		0	21.2	28.3
					12	6	21.2	28.3
					11	21.2	28.4	
					25	0	21.1	28.4
						0	23.0	28.7
					1	12	23.1	28.7
						24	23.0	28.7
				QPSK		0	22.2	28.5
					12	6	22.2	28.7
						11	22.1	28.6
LTE 30	5	27710	2310		25	0	22.2	28.7
212 00	Ŭ		2010	16QAM	1	0	22.1	28.3
						12	22.2	28.3
						24	22.1	28.6
					12	0	21.3	28.4
						6	21.2	28.4
						11	21.2	28.5
					25	0	21.2	28.6
						0	23.1	28.4
					1	12	23.3	28.4
						24	23.0	28.3
				QPSK		0	22.2	28.3
					12	6	22.2	28.3
						11	22.2	28.3
		27735	2312 5		25	0	22.2	28.6
		21100	2012.0			0	22.3	28.1
					1	12	22.4	28.3
						24	22.2	28.3
				16QAM		0	21.2	28.5
					12	6	21.2	28.6
						11	21.2	28.5
				25	0	21.2	28.7	

Max values Min values



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Band	BW [MHz]	Channel Number	Freq [MHz]	Modulation.	#RB	RB position	Avg [dBm]	Peak [dBm]
						0	23.3	28.1
					1	24	23.3	28.5
						49	23.2	28.4
				QPSK		0	22.3	28.5
				25	12	22.2	28.7	
		27710	2310			24	22.2	28.7
	10				50	0	22.2	28.6
LIL JU						0	22.6	28.2
					1	24	22.4	28.5
						49	22.4	28.4
				16QAM		0	21.3	28.5
					25	12	21.2	28.7
						24	21.2	28.7
					50	0	21.2	28.6

Max values Min values



B.2.2 Occupied bandwidth

Standard references

BAND	FCC part	RSS part
LTE 30	2.1049, 27.53	Gen-ch.6.6

Test procedure

The setup below was used to measure the transmitted occupied bandwidth. The antenna terminal of the EUT is connected to the spectrum analyzer and the communication tester through an attenuator and a power splitter. This test was performed according to the KDB 971168 D01 § 4.

The occupied bandwidth was measured on the worst case configuration selected from the chapter B.2.1 and on the low, middle and high channel.





Results tables

Band	BW	Modulation.	Channel	Freq	#RB	RB	EBW	OBW
			Number			position		
			27685	2307.5		0	5.12	4.51
		QPSK	27710	2310	25	0	5.14	4.51
	5		27735	2312.5		0	5.04	4.48
		16QAM	27685	2307.5	25	0	5.09	4.54
LIE 30			27710	2310		0	5.06	4.50
			27735	2312.5		0	5.16	4.53
-	10	QPSK	27710	2240	50	0	10.24	9.01
	10	16QAM	21110	2310	50	0	10.31	9.02

Max values

Results screenshot

Spectrun	n			Occup	ied Bandwi	dth 99%			₽	
Ref Leve Att TDF	l 20.00 dBm 30 dB	SWT	e RBW 19 μs e VBW	100 kHz 300 kHz	Mode Auto) FFT				
●1Pk Max				_						
- 20 dBm	-20.000 dBm		ym	Mhrww	м ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1[1]	1	26.06 dB 2.306140290 GI 4.514858911 MI		
10 dBm							\			
0 dBm		/	4							
-10 dBm	\sim	~~~~					~~~	\sim	\sim	
-30 dBm										
-40 dBm										
-50 dBm										
-60 dBm										
CF 2.3075	GHz			3200	1 pts			Span	12.0 MHz	
	LTE 3	0 QPSI	K BW5MHz	z 2307.5	MHz Low	Channel	27685 2	5RB-0		



































Spectrum	ı)			Occup	ied Bandw	vidth 99%			₩
Ref Level Att TDF	l 20.00 dBm 30 dB	SWT 1	е RB' 8.9 µs е VB	W 200 kHz W 1 MHz	Mode A	uto FFT			•
●1Pk Max									
					N	41[1]		2.3133	16.37 dBm 92710 GHz
-20 dBm	20.000 dBm		T > 0 00	WA so to a		And and 2		9.0062	81054 MHz
10 dBm			1000	the party way	Malla Adda D. J				
0 dBm									
-10 dBm									
-20 dBm	www	www	~				man	\$	~
-30 dBm	n in the second s						A. cr. cr. d	- marky	mm
~40 dBm									
-50 dBm									
-60 dBm									
CF 2.31 GH	lz			3200	1 pts			Span	30.0 MHz
	LTE :	30 QPSI	K BW10M	Hz 2310N	/Hz Mid	Channel	27710 50	RB-0	

Spectru	ım		[Emissi	on Band	width -26	dB			□
Ref Lev	el 2	0.00 dBr	n		RBW	200 kHz						
🛛 Att		30 d	в змт	18.9 µs 👄	VBW	1 MHz	Mode	Auto FFT				
TDF												
●1Pk Max												
								M1[1]				17.05 dBm
20 d0m	-20	LOOO dea						M1			2.3134	97700 GHz
20 00.00	20				and a	1.000.0000	man	ndE				26.00 dB
10 dBm—	_			ſ	4	01100 - 100	m. sur a c	BW			10.2399	90000 MHz
								Qfactor		1 1		225.9
0 dBm	+								├			
				Ţ₽					₽2 -			
-10 dBm-	-		-	1								
-20 dBm-				nor					1			
-20 dBm-	m	~~~~		v # .						Mann	ma	ma.
-30 ubile												h
-40 dBm-								_				~
-50 dBm-	_							_				
-60 dBm-	-											
CF 2.31	GHz					3200	1 pts			1	Span	30.0 MHz
Marker							•				•	
Type F	Ref	Trc	X-va	alue	l Y	-value	l Fu	nction	1	Functio	n Result	
M1		1	2.313	34977 GHz		17.05 dB	m r	ndB down			10.2	23999 MHz
T1		1	2.3048	36454 GHz		-8.96 dB	m	ndB				26.00 dB
T2		1	2.315:	10453 GHz		-8.95 dB	m	Q factor				225.9
		LTE	30 QP	SK BW1	0MHz	z 2310N	ЛНz М	d Chan	nel	27710 50R	B-0	





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B.2.3 Peak to average ratio

Standard references

BAND	FCC part	RSS part	Peak to average ratio limit
LTE 30	-	195-ch.5.5	< 13 dB

Test procedure

The setup below was used to measure the transmitted peak power. The antenna terminal of the EUT is connected to the peak power meter and the communication tester through an attenuator and a power splitter. This test was performed according to the KDB 971168 D01 § 5.1. Then the Peak to average power ratio is computed from the average power measured previously.

The transmitted peak power was measured on the worst case configuration selected from the chapter **Error! Reference source not found.** and on the middle channel.





Results table

Band	BW [MHz]	Channel	Channel Number	Freq [MHz]	Mod.	#RB UL Slots	RB/UL slots position	PAPR [dB]
							0	5.65
						1	12	5.61
							24	5.69
					QPSK		0	6.32
						12	6	6.51
							11	6.48
	5					25	0	6.56
	Ŭ						0	6.17
						1	12	6.08
							24	6.54
					16QAM	12	0	7.10
			27710				6	7.20
				2310			11	7.34
LTE 30		Mid				25	0	7.43
						1	0	4.76
							24	5.09
					0.001/		49	5.18
					QPSK	05	0	6.14
						25	12	6.43
						50	24	6.34
	10						0	5 55
						1	24	5.00
						'	<u> </u>	6.00
					16QAM		0	7.31
						25	12	7.41
						20	24	7.41
						50	0	7.39



B.2.4 Conducted band-edge and spurious emission

Standard references

BAND	FCC part	RSS part	Limits
			The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P):
LTE 30	27.53 (a), 2.1051	195-ch.5.6	By a factor of not less than: $43 + 10 \log (P) dB$ on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz
			By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz
			By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

Test procedure

The setup below was used to measure the band-edge and the conducted spurious. The antenna terminal of the EUT is connected to the spectrum analyzer and the communication tester through an attenuator and a power splitter. According to the standard reference, at 1 MHz immediately outside and adjacent to the authorized operating frequency range, a resolution bandwidth of at least 1% has been applied. The video bandwidth was set to three time the resolution bandwidth.



Spectrum analyzer



Band-edge emission screenshot results

Spectrum 🔆		Ban	d Edge Low Channel		
Ref Level 15.00	dBm	Mode Auto Sweep			
●1 Max					
Limit Check		PASS			
20 dbineSPURIC	DUS_LINE_ABS	PASS			
10 dBm	i abm				
0 dBm					
-10 dBm					
-20 dBm					
-30 dBm					
SPURIOUS_LINE_A	ABS			\neg	• V V
-50 dBm					
-60 dBm					
Start 2.285 GHz		42	00 pts		Stop 2.308 GHz
Spurious Emissio	ns				
Range Low	Range Up	RBW	Frequency	Power Abs	∆Limit
2.285 GHz	2.288 GHz	1.000 MHz	2.28795 GHz	-49.04 dBm	-9.04 dB
2.288 GHz	2.292 GHz	1.000 MHz	2.29028 GHz	-48.98 dBm	-11.98 dB
2.292 GHz	2.296 GHz	1.000 MHz	2.29598 GHz	-46.42 dBm	-15.42 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29681 GHz	-40.17 dBm	-15.17 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30400 GHz	-20.71 dBm	-7.71 dB
2.304 GHz	2.305 GHz	50.000 kHz	2.30499 GHz	-14.48 dBm	-1.48 dB
2.305 GHz	2.308 GHz	50.000 kHz	2.30534 GHz	17.57 dBm	-82.43 dB
Ľ	TE 30 QPSK E	3W5MHz 2307.	5MHz Channel Lo	w 27685 1RB-0	0.

⊽ Spectrum 🐳 Band Edge Low Channel Ref Level 15.00 dBm Mode Auto Sweep ●1 Max Limit Check PASS 20 dbine -SPURIOUS_LINE_ABS PASS 15.000 dBm 10 dBm-0 dBm--10 dBm--20 dBm--30 dBm-SPURIOUS_ LINE_ABS -50 dBm -60 dBm-Start 2.285 GHz 4200 pts Stop 2.308 GHz Spurious Emissions Range Up 2.288 GHz Range Low RBW ∆Limit Frequency Power Abs 1.000 MHz 2.28741 GHz -9.06 dB 2.285 GHz -49.06 dBm 2.288 GHz 2.292 GHz 1.000 MHz 2.29199 GHz -48.31 dBm -11.31 dB 1.000 MHz 2.292 GHz 2.296 GHz 2.29591 GHz -44.60 dBm -13.60 dB 1.000 MHz -9.56 dB 2.296 GHz 2.300 GHz 2.29992 GHz -34.56 dBm 2.300 GHz 2.304 GHz 1.000 MHz 2.30399 GHz -23.86 dBm -10.86 dB 2.304 GHz 2.305 GHz 200.000 kHz 2.30500 GHz -20.36 dBm -7.36 dB 2.305 GHz 2.308 GHz 200.000 kHz 2.30669 GHz 8.63 dBm -91.37 dB LTE 30 QPSK BW5MHz 2307.5MHz Channel Low 27685 25RB-0



LTE 30 QPSK BW5MHz 2312.5MHz Channel High 27735 1RB-24.

Spectrum	Spectrum Band Edge High Channel											
Ref Level	15.00 dBm		Mode Auto Swe	ер								
●1 Max												
SPURIANIEC	HOELABS_		PASS									
20 dbine	PURIOUS	LINE_ABS_	PASS									
	15.000 dBn)										
10.dBm												
U dBm												
-10 dBm												
10 0.0												
-20 dBm												
-30 dBm												
40 - 10		\					_					
-40 aBm			-									
-50 dBm												
-60 dBm												
Start 2.312	2 GHz			4200 pts			Stop 2.341 GHz					
Spurious Er	nissions											
Range L	.ow	Range Up	RBW	Freque	ncy	Power Abs	∆Limit					
2.31	2 GHz	2.315 GHz	200.000 kH	lz 2.31	1432 GHz	8.92 dBm	-91.08 dB					
2.31	5 GHz	2.316 GHz	200.000 kH	Iz 2.31	1501 GHz	-21.80 dBm	-8.80 dB					
2.31	6 GHz	2.320 GHz	1.000 MH	Iz 2.31	1604 GHz	-25.68 dBm	-12.68 dB					
2.32	2.320 GHz 2.324 GHz			lz 2.32	2015 GHz	-36.83 dBm	-11.83 dB					
2.32	4 GHz	2.328 GHz	1.000 MH	lz 2.32	2400 GHz	-44.23 dBm	-13.23 dB					
2.32	8 GHz	2.337 GHz	1.000 MH	z 2.32	2802 GHz	-47.55 dBm	-10.55 dB					
2.33	7 GHz	2.341 GHz	1.000 MH	Iz 2.33	3718 GHz	-49.21 dBm	-18.21 dB					
	LTE 3	0 QPSK B	W5MHz 2312	2.5MHz Char	nnel Higl	h 27735 25RB-	·0.					

Rev. 01



Spectrun	n 🗶			Band	d Edge Low (Channel				[[V
Ref Level	15.00 dBm	1	Mode Au	to Sweep						````	_
●1 Max											
Limit (Check		PA	88							
20 dbine_	SPURIOUS	LINE_ABS_	PA	88					_		
10 d0m	-15.000 dBr	n							1		
TO OBIII											
0 dBm									╫		
-10 dBm—									+		1
-20 dBm								-	1		
-30 dBm								Δ.			
SPURIOUS	LINE_ABS_						h	ľΛ		$ \langle \rangle \rangle$	1
-+0 abm		_		1	\sim					V	V
-50 dBm											_
-60 dBm											
Start 2.28	5 GHz			420)0 pts			5	Stop 2	2.308 GH	İz
Spurious E	missions										
Range	Low	Range Up	RE	sw	Freque	ncy	Power Ab	os		∆Limit	
2.28	B5 GHz	2.288 GH:	z 1.	000 MHz	2.28	700 GHz	-49.06	dBm		-9.06 d	В
2.28	B8 GHz	2.292 GH:	z 1.	000 MHz	2.29	158 GHz	-49.03	dBm		-12.03 d	iВ
2.29	92 GHz	2.296 GH:	z 1.	000 MHz	2.29	600 GHz	-47.05	dBm		-16.05 d	ıВ
2.29	96 GHz	2.300 GH:	z 1.	000 MHz	2.29	656 GHz	-42.05	dBm		-17.05 d	В
2.30	DO GHZ	2.304 GH:	z 1.	000 MHz	2.30	1400 GHz	-21.85	dBm		-8.85 d	B
2.30	D4 GHz	2.305 GH:	z 50	.000 kHz	2.30	1499 GHz	-15.81	dBm		-2.81 d	B
2.30	US GHZ	2.308 GH:	z 50	.UUU KHZ	2.30	IS32 GHz	16.94	dBm		-83.06 d	В
	LTE 3	30 16QAM	BW5MH	lz 2307.	5MHz Cha	annel Lo	ow 27685 1	IRB-).		

Spectrun	n 🗶			Ban	d Edge Low (Channel				E ↓	
Ref Level	Ref Level 15.00 dBm Mode Auto Sweep										
●1 Max											
Limit (theck		PA	68							
20 dbine	SPURIOUS	LINE_ABS_	PA	SS					_		
	15.000 dBm								_		
10 dBm					-				~		
0 dBm											
-10 dBm—									ـــ		
-20 dBm									-		
-30 dBm					_						
CRUBTOUS								_			
	ADS										
-50 d8m											
-60 dBm											
Start 2.28	5 GHz			42	00 pts			S	top :	2.308 GHz	
Spurious E	missions										
Range I	Low	Range Up	RE	sw	Freque	ncy	Power Al	os 🛛		∆Limit	
2.28	35 GHz	2.288 GHz	1.0	000 MHz	2.28	739 GHz	-49.05	dBm		-9.05 dB	
2.28	38 GHz	2.292 GHz	1.0	000 MHz	2.29	194 GHz	-48.64	dBm		-11.64 dB	
2.29	92 GHz	2.296 GHz	1.	000 MHz	2.29	596 GHz	-44.77	dBm		-13.77 dB	
2.29	96 GHz	2.300 GHz	1.1	000 MHz	2.29	998 GHz	-35.28	dBm		-10.28 dB	
2.30	JO GHZ	2.304 GHz	1.	000 MHz	2.30	1399 GHz	-24.61	dBm		-11.61 dB	
2.30		2.305 GHz	200.	000 kHz	2.30	1499 GHZ	-22.11	dBm		-9.11 dB	
2.30	JS GHZ	2.308 GHZ	200.	.000 KHZ	2.30	ITU9 GHZ	7.59	uвm		-92.41 aB	
	LTE 30) 16QAM E	W5MH	z 2307.	5MHz Cha	nnel Lo	w 27685 2	5RB-	0.		



LTE 30 16QAM BW5MHz 2312.5MHz Channel High 27735 1RB-24.

Spectrum 🔆		Ban	d Edge High Channel		
Ref Level 15.00 d	1Bm	Mode Auto Sweep			
●1 Max					
SPUBIONIOCHINEKAE	3S_	PASS			
20 dkine_SPURIO	US_LINE_ABS_	PASS			
15.000	dBm				
10 dBm					
0 dBm					
10 d0m					
-20 dBm					
-30 dBm					
	-				
-40 dBm		The second se			
E0 d8m					
-30 ubiii					
-60 dBm					
Start 2.312 GHz		42	00 nts		Ston 2.341 GHz
Spurious Emission	c.				
Range Low	Range IIn	RBW	Frequency	Power Ahs	ALimit
2.312 GHz	2.315 GHz	200.000 kHz	2.31307 GHz	7.87 dBm	-92.13 dB
2.315 GHz	2.316 GHz	200.000 kHz	2.31500 GHz	-21.84 dBm	-8.84 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31602 GHz	-26.04 dBm	-13.04 dB
2.320 GHz	2.320 GHz 2.324 GHz 1.00		2.32002 GHz	-36.09 dBm	-11.09 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32402 GHz	-44.52 dBm	-13.52 dB
2.328 GHz	2.337 GHz	1.000 MHz	2.32802 GHz	-47.75 dBm	-10.75 dB
2.337 GHz	2.341 GHz	1.000 MHz	2.33704 GHz	-49.17 dBm	-18.17 dB
LTE	30 16QAM E	W5MHz 2312.	5MHz Channel Hig	gh 27735 25RB	-0.

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Spectrum 🐳			Band	d Edge Low (Channel			□
Ref Level 15.00	dBm	Mode Au	to Sweep					
1 Max		_			_			
Limit Check		PA	88					
20 dbine	OUS_LINE_ABS_	PA	88					
15.000) dBm					+		1
10 dBm								-
0 dBm								
								N I
-10 dBm							/	1
-20 dBm								
20 0011							A.	
-30 dBm							+	
_SPURIOUS_LINE_A	ABS_	ſ					1	
-+0 dbm					\sim			∇
-50 dBm						+ +		+
60 d0m								
-ou ubili								
Start 2 205 CUz			420	0 ptc			Ston	2 200 CU2
Sturt 2.200 Griz	205		720	io pris			зтор	2.000 0112
Pange Low	Range Un		w I	Freque	ncu İ	Dower Ab	c	ALimit
2,285 GHz	2,288 GH	1.	000 MHz	2.28	785 GHz	-45.68	dBm	-5.68 dB
2.288 GHz	2.292 GH	IZ 1.	000 MHz	2.28	806 GHz	-45.69	dBm	-8.69 dB
2.292 GHz	2.296 GH	z 1.	000 MHz	2.29	598 GHz	-46.40	dBm	-15.40 dB
2.296 GHz	2.300 GH	lz 1.	000 MHz	2.29	686 GHz	-37.30	dBm	-12.30 dB
2.300 GHz	2.304 GH	lz 1.	000 MHz	2.30	400 GHz	-21.17	dBm	-8.17 dB
2.304 GHz	2.305 GH	lz 50	.000 kHz	2.30	498 GHz	-17.44	dBm	-4.44 dB
2.305 GHz	2.308 GH	lz 50	.000 kHz	2.30	1561 GHz	17.72	dBm	-82.28 dB
1		DWAONA				. 07740 45		

LTE 30 QPSK BW10MHz 2310MHz Channel Low 27710 1RB-0.

Spectrum 🔆		Bar	nd Edge Low Channe	el	
Ref Level 15.00	dBm	Mode Auto Sweep			`
●1 Max					
Limit Check		PASS			
20 dkine_SPURI	OUS_LINE_ABS_	PASS			
15.00) dBm				
10 dBm					
0 dBm					
-10 dBm					
-20 dBm					
-30 dBm					
-30 ubiii					
-60 dBm					
Start 2.285 GHz		42	00 pts		Stop 2.308 GHz
Spurious Emissio	ins				
Range Low	Range Up	RBW	Frequency	Power Abs	∆Limit
2.285 GHz	2.288 GHz	1.000 MHz	2.28797 GH	z -48.29 dBm	-8.29 dB
2.288 GHz	2.292 GHz	1.000 MHz	2.29186 GH	z -44.71 dBm	-7.71 dB
2.292 GHz	2.296 GHz	1.000 MHz	2.29596 GH	z -41.26 dBm	-10.26 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.30000 GH	z -28.54 dBm	-3.54 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30398 GH	z -26.79 dBm	-13.79 dB
2.304 GHz	2.305 GHz	200.000 kHz	2.30498 GH	z -26.29 dBm	-13.29 dB
2.305 GHz	2.308 GHz	200.000 kHz	2.30749 GH	z 5.23 dBm	-94.77 dB
Ľ	TE 30 QPSK E	3W10MHz 2310	MHz Channel Lo	ow 27710 50RB-	0.



LTE 30 QPSK BW10MHz 2310MHz Channel High 27710 1RB-49.

Spectrum 🐳		Ban	d Edge High Channel		
Ref Level 15.00 de	3m I	Mode Auto Sweep			
●1 Max					
SPURIAN/GOHINELABS	5	PASS			
20 dkine_SPURIOU	IS_LINE_ABS_	PASS			
15.000 d	IBm				
10 dBm					
0 dBm					
-10 dBm					
-20 dBm					
<u>ا</u>		<u> </u>			
-30 dBm 🚽 🗖 🛶					
-40 dBm			and the second design of the second distance		
-50 dBm					
-56 dbiii					
-60 dBm					
Start 2.312 GHz		420	00 pts		stop 2.341 GHz
Spurious Emissions	5				
Range Low	Range Up	RBW	Frequency	Power Abs	∆Limit
2.312 GHz	2.315 GHz	200.000 kHz	2.31412 GHz	6.14 dBm	-93.86 dB
2.315 GHz	2.316 GHz	200.000 kHz	2.31501 GHz	-26.33 dBm	-13.33 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31603 GHz	-29.45 dBm	-16.45 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32142 GHz	-31.99 dBm	-6.99 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32400 GHz	-38.53 dBm	-7.53 dB
2.328 GHz	2.337 GHz	1.000 MHz	2.32801 GHz	-40.04 dBm	-3.04 dB
2.337 GHz	2.341 GHz	1.000 MHz	2.33888 GHz	-49.25 dBm	-18.25 dB
LTE	30 QPSK B	W10MHz 2310	MHz Channel Hig	n 27710 50RB-	0.

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Spectrun	n 🗶 🔪			Band	d Edge Low (Channel				[₩
Ref Level	15.00 dBm		Mode Au	to Sweep						
1 Max										
Limit (Check		PA	88						
20 d <mark>hine _</mark>	SPURIOUS_	LINE_ABS_	PA	88						
	15.000 dBm	,					_			
10 dBm										
0 dBm										
-10 dBm					_					
-20 dBm										$\mathbf{\lambda}$
-20 dBm				Г				Λ		
-30 aBm						· · · ·				
SPURIOUS	LINE_ABS_1		-					1		
			-			~~~				\sim
-56 0511										
-60 dBm									_	
Start 2.28	5 GHz			420)0 pts			St	op 2	2.308 GHz
Spurious E	missions									
Range	Low	Range Up	RI	зw	Freque	ncy	Power Ab	is	- 2	4Limit
2.28	35 GHz	2.288 GH	lz 1.	000 MHz	2.28	778 GHz	-46.85	dBm		-6.85 dB
2.28	38 GHz	2.292 GH	lz 1.	000 MHz	2.28	824 GHz	-46.81	dBm		-9.81 dB
2.29	92 GHz	2.296 GH	lz 1.	000 MHz	2.29	226 GHz	-46.37	dBm		-15.37 dB
2.29	96 GHz	2.300 GH	IZ 1.	000 MHz	2.29	672 GHz	-39.94	dBm		-14.94 dB
2.30	DO GHZ	2.304 GH	Iz 1.	000 MHz	2.30	398 GHz	-22.08	dBm		-9.08 dB
2.30	J4 GHz	2.305 GH	iz 50	.000 kHz	2.30	ISOD GHZ	-17.65	dBm		-4.65 dB
2.30	JS GHZ	2,308 GF	iz 50	.000 KHZ	2,30	1563 GHZ	17.30	авт		-82.70 dB
	LTE 3	30 16QAN	BW10N	1Hz 231	0MHz Cha	annel Lo	w 27710 1	RB-0.		

Spectrum 💥	-]			Ban	d Edge Low (Channel				(₩
Ref Level 15.0	0 dBm	Mod	le Aut	to Sweep							
●1 Max											
Limit Check	(PA	88							
20 dhine_SPUR	IOUS_LINE_A	38	PA	88							
15.00	00 dBm										
10 dBm											-
0 dBm									-1		
-10 dBm									H		
-20 dBm									-		
-30 dBm							_		Д		
_SPURIOUS_LINE	_ABS_			_							
-+0 ubm											
-50 dBm									_		
-60 dBm											
Start 2.285 GH	Z			420	00 pts			St	op 2	2.308 G	Hz
Spurious Emissi	ons										
Range Low	Range L	p	RE	SW .	Freque	ncy	Power Ab)S		Limit	
2.285 GH	z 2.288	GHz	1.0	000 MHz	2.28	796 GHz	-48.46	dBm		-8.46	dB
2.288 GH	z 2.292	GHz	1.0	000 MHz	2.29	192 GHz	-45.89	dBm		-8.89	dB
2.292 GH	z 2.296	GHz	1.0	000 MHz	2.29	596 GHz	-40.56	dBm		-9.56	dB
2.296 GH	z 2.300	GHz	1.0	000 MHz	2.29	998 GHz	-29.42	dBm		-4.42	dB
2.300 GH	z 2.304	GHZ	1.0	UUU MHZ	2.30	392 GHz	-26.35	aBm		-13.35	aB
2.304 GH	z 2.305	GHZ	200.	.000 kHz	2.30	SUU GHZ	-27.84	dBm		-14.84	쁪
2.305 GH	2 2.308	GHZ	200.	.000 KHZ	2,30	754 GHZ	4.30	URIN		-95.64	uв
Ľ	TE 30 16QA	AM BW	10M	Hz 2310	MHz Cha	nnel Lov	v 27710 5	ORB-0			



LTE 30 16QAM BW10MHz 2310MHz Channel High 27710 1RB-49.

Spectrum 💥		Ban	d Edge High Channel		
Ref Level 15.00 d	Bm M	Mode Auto Sweep			
●1 Max					
SPURIONIC CHINEKAB	S	PASS			
20 dkine_SPURIO	JS_LINE_ABS_	PASS			
15.000	18m				
10 dBm					
0 dBm					
10 10					
-10 aBm					
-20 dBm					
-30 dBm 🕂 🛌					
-40 dBm		-			
			The second		
-50 dBm					
60 dBm					
-ou ubili					
Start 2.312 GHz		420	JU pts		stop 2.341 GHz
Spurious Emission	s				
Range Low	Range Up	RBW	Frequency	Power Abs	∆Limit
2.312 GHz	2.315 GHz	200.000 kHz	2.31380 GHz	5.14 dBm	-94.86 dB
2.315 GHz	2.316 GHz	200.000 kHz	2.31500 GHz	-26.44 dBm	-13.44 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31600 GHz	-28.49 dBm	-15.49 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32008 GHz	-32.35 dBm	-7.35 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32402 GHz	-36.87 dBm	-5.87 dB
2.328 GHz	2.337 GHz	1.000 MHz	2.32802 GHz	-40.95 dBm	-3.95 dB
2.337 GHz	2.341 GHz	1.000 MHz	2.33793 GHz	-49.19 dBm	-18.19 dB
LTE	30 16QAM B	W10MHz 2310	MHz Channel Hig	h 27710 50RB	-0.

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Conducted spurious emission screenshot results







Test Report N°15051102.TR02







Test Report N°15051102.TR02







B.2.5 Radiated spurious emission

Standard references

BAND	FCC part	RSS part	Limits
			The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P): By a factor of not less than: 43 + 10 log (P) dB
LTE 30	27.53 (a), 2.1051	195-ch.5.6	on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz
			By a factor of not less than $43 + 10 \log (P) dB$ on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz
			By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.



Test procedure

The setup below was used to measure the radiated spurious emissions. The test was done following the FCC OET KDB 971168 D01 v02r02 § 7.

Depending of the frequency range and bands being tested, different antennas and filters were used. The final measurement is done by varying the antenna height from 1 to 4 meters, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

The radiated spurious emission was measured on the worst case configuration selected from the chapter B.2.1 and on the low, middle and high channel.

Radiated Setup < 1GHz





Radiated Setup Frequency range 1 GHz to 18 GHz



Radiated Setup > 18GHz





Test results LTE Band 30

Radiated measurement from 30MHz to 26.5GHz

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
32.6	-61.8		150.0	Н	45.0	-100.5	-40
32.61		-63.1	150.0	Н	45.0	-100.5	-40
2857.8	-42.0		150.0	Н	0.0	-57.6	-40
2857.8		-43.5	150.0	Н	0.0	-57.6	-40
9241.0		-50.5	150.0	Н	15.0	-98.3	-40
9241.03	-48.6		150.0	Н	15.0	-98.3	-40
18088.9		-49.0	150.0	V	65.0	-90.7	-40
18112.7	-43.3		150.0	Н	341.0	-90.8	-40

LTE Band 30 QPSK 1RB Low channel 39675

LTE Band 30 QPSK 1RB Mid channel 40620

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
32.6	-61.3		150.0	Н	45.0	-100.5	-40
32.6		-632	150.0	Н	45.0	-100.5	-40
2857.3	-44.5		150.0	Н	0.0	-57.6	-40
2857.3		-42.4	150.0	Н	0.0	-57.6	-40
9241.3		-50.5	150.0	Н	15.0	-98.3	-40
9241.3	-48.6		150.0	Н	15.0	-98.3	-40
18088.9		-49.6	150.0	V	65.0	-90.7	-40
18112.9	-43.5		150.0	Н	341.0	-90.8	-40

LTE Band 30 QPSK 1RB High channel 41565

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
32.6	-61.8		150.0	Н	45.0	-100.5	-40
32.6		-63.1	150.0	Н	45.0	-100.5	-40
2857.2	-42.6		150.0	Н	0.0	-57.6	-40
2857.2		-44.8	150.0	Н	0.0	-57.6	-40
9241.0		-51.2	150.0	Н	15.0	-98.3	-40
9241.0	-49.1		150.0	Н	15.0	-98.3	-40
18112.3		-47.9	150.0	V	65.0	-90.7	-40
18112.3	-43.8		150.0	Н	341.0	-90.8	-40



B.2.6 Frequency stability over voltage and temperature variations

Standard references

BAND	FCC part	RSS part	Comment
LTE 30	27.54, 2.1055	195-ch.5.6	The frequency stability shall be measured with variation of ambient temperature from -30° to +50° centigrade. Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation. The frequency stability shall be measured with variation of primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

Test procedure

The EUT is placed inside a temperature chamber and supplied by an external power supply. The supply voltage is monitored with the multimeter.

For the transmission modes tested, the device was put into operation by using an R&S CMW 500 as base station simulator, the output power of the device was set to transmit at maximum power.

The temperature is varied from +50°C to -30 °C by 10 °C increment. For each temperature increment the frequency error is measured. For voltage variation test the temperature was set to 25 °C, the frequency error was measured for voltage set at 85% and 115% of nominal voltage.





Results tables of tests over temperatures

FDD Band 30, channel frequency 2310 MHz MODULATION QPSK (10MHz, RB 50)

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	-23.75	-0.010281385	-0.000001028
+40	-16.78	-0.007264069	-0.00000726
+30	-28.75	-0.012445887	-0.000001245
+20	-20.13	-0.008714286	-0.00000871
+10	-26.01	-0.01125974	-0.000001126
0	-24.49	-0.010601732	-0.000001060
-10	-22.13	-0.009580087	-0.000000958
-20	-20.24	-0.008761905	-0.00000876
-30	-23.73	-0.010272727	-0.000001027

FDD Band 30, channel frequency 2310 MHz MODULATION 16QAM (10MHz, RB 50)

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	-20.77	-0.008991342	-0.00000899
+40	-20.46	-0.008857143	-0.00000886
+30	-22	-0.00952381	-0.000000952
+20	-21.36	-0.009246753	-0.000000925
+10	-19.38	-0.00838961	-0.00000839
0	-17.56	-0.007601732	-0.000000760
-10	-23.11	-0.010004329	-0.000001000
-20	-19.32	-0.008363636	-0.00000836
-30	-22.67	-0.009813853	-0.00000981



Results tables of tests over voltages

FDD Band 30, channel frequency 2310 MHz MODULATION QPSK (10MHz, RB 50)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	3.8	10.87	0.004192056	0.000000419
Vmin	2.8	-21.5	-0.009307359	-0.000000931

FDD Band 30, channel frequency 2310 MHz MODULATION 16QAM (10MHz, RB 50)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	3.8	-24.43	-0.010575758	-0.000001058
Vmin	2.8	-23.74	-0.010277056	-0.000001028

Annex C. Spot Check

C.1 Radiated spurious emission

Test results GSM850

Radiated measurement from 30MHz to 18GHz

GSM850 GPRS/GMSK Mid channel 190

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
623.4	-37.2		150.0	Н	257.0	-64.9	-13
625.5		-47.1	150.0	Н	16.0	-64.5	-13
6321.0	-42.0		150.0	V	144.0	-91.5	-13
6313.0		-54.0	150.0	V	321.0	-91.5	-13
17983.5	-36.5		150.0	Н	0.0	-83.5	-13
17999.0		-48.1	150.0	Н	318.0	-83.1	-13

GSM850 EDGE/8PSK Mid channel 190

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
624.9		-48.2	150.0	Н	90.0	-64.5	-13
625.5	-35.5		150.0	Н	255.0	-64.5	-13
6321.0	-43.0		150.0	V	144.0	-91.5	-13
6313.0		-55.0	150.0	V	321.0	-91.5	-13
17987.4	-35.0		150.0	Н	62.0	-83.4	-13
17999.0		-47.1	150.0	Н	159.0	-83.1	-13

Test results GSM1900

Radiated measurement from 30MHz to 26GHz

GSM1900 GPRS/GMSK Mid channel 661

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
146.5		-51.1	100.0	V	164.0	-109.8	-13
146.6	-46.6		100.0	V	122.0	-109.9	-13
2995.0		-51.6	150.0	Н	4.0	-57.1	-13
2996.0	-39.2		150.0	Н	179.0	-57.1	-13
17995.1	-36.8		150.0	Н	43.0	-83.2	-13
17999.0		-48.0	150.0	Н	62.0	-83.1	-13
18089.5	-42.2		150.0	Н	261.0	-90.7	-13
18094.2		-53.8	150.0	Н	38.0	-90.7	-13

GSM1900 EDGE/8PSK Mid channel 661

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
858.563830	-46.5		100.0	Н	202.0	-96.6	-13
858.617021		-52.5	100.0	Н	202.0	-96.6	-13
2995.000000		-51.6	150.0	Н	4.0	-57.1	-13
2996.000000	-39.2		150.0	Н	179.0	-57.1	-13
17999.034483	-35.9		150.0	Н	198.0	-83.1	-13
17999.034483		-48.1	150.0	Н	198.0	-83.1	-13
18089.523810	-42.2		150.0	Н	261.0	-90.7	-13
18094.285714		-53.8	150.0	Н	38.0	-90.7	-13

Test results WCDMA 2

Radiated measurement from 30MHz to 26.5GHz

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
32.6	-63.4		150.0	Н	315.0	-100.5	-13
32.6		-65.1	150.0	Н	315.0	-100.5	-13
2951.8	-44.2		150.0	Н	135.0	-57.2	-13
2951.8		-45.3	150.0	Н	135.0	-57.2	-13
17991.3	-37.7		150.0	Н	174.0	-83.3	-13
17991.3		-44.9	150.0	Н	226.0	-83.2	-13
18064.2		-48.5	150.0	Н	12.0	-90.6	-13
18064.2	-43.1		150.0	V	199.0	-90.7	-13

WCDMA 2 RMC 12.2Kbps Mid channel 9400

Test results WCDMA 4

Radiated measurement from 30MHz to 26.5GHz

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
32.6	-65.1		150.0	Н	315.0	-100.5	-13
32.6		-66.7	150.0	Н	315.0	-100.5	-13
2821.8	-42.5		150.0	Н	0.0	-57.8	-13
2821.8		-45.4	150.0	Н	0.0	-57.8	-13
17997.1		-45.5	150.0	Н	237.0	-83.2	-13
17997.1	-37.7		150.0	Н	237.0	-83.2	-13
18064.2		-49.1	150.0	Н	12.0	-90.6	-13
18064.2	-42.3		150.0	V	199.0	-90.7	-13

WCDMA 4 RMC 12.2Kbps Mid channel 1413



Test results WCDMA 5

Radiated measurement from 30MHz to 18GHz

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
813.8	-40.7		150.0	Н	225.0	-67.6	-13
813.8		-41.1	150.0	Н	225.0	-67.6	-13
6304.4	-44.5		150.0	V	0.0	-91.5	-13
6304.4		-50.9	150.0	V	270.0	-91.5	-13
17994.2		-45.5	150.0	Н	248.0	-83.2	-13
17994.2	-38.8		150.0	Н	234.0	-83.2	-13

WCDMA 5 RMC 12.2Kbps Mid channel 4180

Test results LTE Band 2

Radiated measurement from 30MHz to 26.5GHz

MaxPeak Pol Frequency RMS Height Azimuth Corr. Limit MHz dB dBm dBm dBm cm deg -----100.5 32.6 -63.1 150.0 Н 45.0 -13 32.6 -----64.4 150.0 Н 45.0 -100.5 -13 -43.1 150.0 270.0 -57.2 -13 2970.0 Η ----45.0 -57.2 2970.0 150.0 Н 270.0 -13 ---17991.3 -38.9 150.0 Н 310.0 -83.3 -13 ---17999.0 -43.6 150.0 Н 140.0 -83.1 -13 ---18110.6 ----49.5 150.0 V 344.0 -90.8 -13 Н -13 18116.6 -43.0 ----150.0 128.0 -90.8 18110.697674 -49.5 150.0 V 344.0 -90.8 -13 ----43.0 Н 128.0 -90.8 -13 18116.627907 ----150.0

LTE Band 2 QPSK 1RB Mid channel 18900

Test results LTE Band 4

Radiated measurement from 30MHz to 26.5GHz

LTL Dariu 4 QF SK										
Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit			
MHz	dBm	dBm	cm		deg	dB	dBm			
628.7	-68.2		150.0	Н	225.0	-95.4	-13			
628.7		-69.1	150.0	Н	225.0	-95.4	-13			
2131.8	-42.5		150.0	V	315.0	-57.7	-13			
2131.8		-43.7	150.0	V	315.0	-57.7	-13			
17991.3	-38.9		150.0	Н	310.0	-83.3	-13			
17999.0		-43.6	150.0	Н	140.0	-83.1	-13			
17991.3	-39.9		150.0	Н	310.0	-83.3	-13			
17999.0		-42.6	150.0	Н	140.0	-83.1	-13			

LTE Band 4 OPSK 1RB Mid channel 20175



Test results LTE Band 5.

Radiated measurement from 30MHz to 18GHz

LTE Band 5 QPSK 1RB Mid channel 20525

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
629.0	-49.3		150.0	Н	0.0	-65.1	-13
629.0		-49.6	150.0	Н	0.0	-65.1	-13
6145.4	-43.2		150.0	V	225.0	-91.9	-13
6145.4		-47.6	150.0	V	225.0	-91.9	-13
17940.0	-37.9		150.0	Н	34.0	-84.4	-13
17940.0		-44.0	150.0	Н	96.0	-84.1	-13

Test results LTE Band 7

Radiated measurement from 30MHz to 26.5GHz

LTE Band 7 QPSK 1RB Mid channel 21100

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
32.61	-63.1		150.0	Н	45.0	-100.5	-25
32.61		-64.2	150.0	Н	45.0	-100.5	-25
1979.0	-34.7		150.0	V	180.0	-58.2	-25
1979.0		-37.2	150.0	V	180.0	-58.2	-25
7605.4		-46.1	150.0	V	88.0	-98.6	-25
7605.4	-43.8		150.0	V	88.0	-98.6	-25
10141.0		-43.8	150.0	V	358.0	-98.4	-25
10141.0	-40.3		150.0	V	358.0	-98.4	-25
18116.6	-43.2		150.0	V	53.0	-90.8	-25
18120.5		-48.9	150.0	Н	22.0	-90.8	-25
27725.9	-49.0		150.0	V	80.0	-84.7	-25
27725.9		-55.3	150.0	Н	0.0	-84.6	-25

Test results LTE Band 12

Radiated measurement from 30MHz to 18GHz

LTE Band 12 QPSK 1RB Mid channel 23095

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
851.6	-48.3		150.0	Н	135.0	-65.7	-13
851.6		-48.1	150.0	Н	135.0	-65.7	-13
6367.2	-44.2		150.0	V	315.0	-91.5	-13
6367.2		-48.7	150.0	V	315.0	-91.5	-13
17970.0	-37.8		150.0	Н	39.0	-83.7	-13
17970.0		-42.7	150.0	Н	324.0	-83.1	-13



Test results LTE Band 13

Radiated measurement from 30MHz to 18GHz

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
851.5	-47.5		150.0	Н	135.0	-65.7	-13
851.5		-46.9	150.0	Н	135.0	-65.7	-13
5939.0	-42.1		150.0	Н	135.0	-93.1	-13
5939.0		-44.7	150.0	Н	135.0	-93.1	-13
17970.0	-36.6		150.0	Н	39.0	-83.7	-13
17970.0		-42.6	150.0	Н	324.0	-83.1	-13

LTE Band 13 QPSK 1RB Mid channel 23230

Test results LTE Band 17

Radiated measurement from 30MHz to 18GHz

LTE Band 17 QPSK 1RB Mid channel 23790

Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
828.6	-48.3		150.0	Н	0.0	-66.2	-13
828.6		-49.7	150.0	Н	0.0	-66.2	-13
6231.2	-44.5		150.0	V	315.0	-91.5	-13
6231.2		-48.2	150.0	V	315.0	-91.5	-13
17970.0	-37.7		150.0	Н	39.0	-83.7	-13
17998.0		-43.5	150.0	Н	324.0	-83.1	-13

Test results LTE Band 41

Radiated measurement from 30MHz to 27GHz

LTE Band 41 QPSK TRB Mid channel 40620							
Frequency	MaxPeak	RMS	Height	Pol	Azimuth	Corr.	Limit
MHz	dBm	dBm	cm		deg	dB	dBm
32.6	-64.8		150.0	Н	315.0	-100.5	-25
32.6		-66.0	150.0	Н	315.0	-100.5	-25
2011.8	-42.2		150.0	V	270.0	-57.9	-25
2011.8		-43.3	150.0	V	270.0	-57.9	-25
7779.9	-48.3		322.1	V	135.0	-99.0	-25
7779.9		-55.7	390.1	V	151.0	-99.0	-25
18086.9		-47.9	150.0	V	7.0	-90.7	-25
18086.9	-41.8		150.0	V	7.0	-90.7	-25
26978.4	-48.5		150.0	Н	193.0	-83.2	-25
26978.4		-55.3	150.0	Н	241.0	-83.1	-25

LTE Band 41 QPSK 1RB Mid channel 40620