

TEST REPORT

Product Name: NB-IoT module
Trademark:   安信可科技
Model Number: EC-01F, EC-01, EC-01G
Prepared For: Shenzhen Ai-Thinker Technology Co., Ltd
Address: 410, Block C, Huafeng Smart Innovation Port. Gushu 2nd Road, Gushu Community, Xixiang Street, Baoan District, Shenzhen, China
Manufacturer: Shenzhen Ai-Thinker Technology Co., Ltd
Address: 410, Block C, Huafeng Smart Innovation Port. Gushu 2nd Road, Gushu Community, Xixiang Street, Baoan District, Shenzhen, China
Prepared By: Shenzhen CTB Testing Technology Co., Ltd.
Address: Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong China
Sample Received Date: Sep. 1, 2021
Sample tested Date: Sep. 1, 2021 to Sep. 10, 2021
Issue Date: Sep. 23, 2021
Report No.: CTB210910044RFX
Test Standards: ETSI EN 301 908-1 V13.1.1 (2019-11)
ETSI EN 301 908-13 V13.1.1 (2019-11)
Test Results: PASS
Remark: This is LTE radio test report.

Compiled by:

He Xiaona

He Xiaona

Reviewed by:

Arron Liu

Arron Liu

Approved by:

Bin Mei / Director

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

TABLE OF CONTENT

Test Report Declaration	Page
1. VERSION	5
2. TEST SUMMARY	6
3. MEASUREMENT UNCERTAINTY	7
4. PRODUCT INFORMATION AND TEST SETUP	8
4.1 Product Information	8
4.2 Test Setup Configuration	9
4.3 Support Equipment	10
4.4 Channel List	10
4.5 Test Mode	10
4.6 Test Environment	11
5. TEST FACILITY AND TEST INSTRUMENT USED	12
5.1 Test Facility	12
5.2 Test Instrument Used	12
6. TRANSMITTER MAXIMUM OUTPUT POWER FOR SINGLE CARRIER	14
6.1 Definition	14
6.2 Limit	14
6.3 EUT Operation Condition	14
6.4 Test Procedure	14
6.5 Measurement Record	15
7. TRANSMITTER SPECTRUM EMISSION MASK FOR SINGLE CARRIER	16
7.1 Definition	16
7.2 Limit	16
7.3 EUT Operation Condition	17
7.4 Test Procedure	17
7.5 Measurement Record	17
8. TRANSMITTER SPURIOUS EMISSIONS FOR SINGLE CARRIER	18
8.1 Definition:	18
8.2 Limit:	18
8.3 EUT Operation Condition:	18
8.4 Test Procedure:	18
8.5 Measurement Record	18
9. TRANSMITTER MINIMUM OUTPUT POWER FOR SINGLE CARRIER	19
9.1 Definition	19
9.2 Limit	19
9.3 EUT Operation Condition	19
9.4 Test Procedure	19
9.5 Measurement Record	19
10. ADJACENT CHANNEL SELECTIVITY (ACS)	20
10.1 Definition	20
10.2 Limit	20
10.3 EUT Operation Condition	21

10.4 Test Procedure	21
10.5 Measurement Record	22
11. IN-BAND BLOCKING	23
11.1 Definition	23
11.2 Limit	23
11.3 EUT Operation Condition:	24
11.4 Test Procedure	24
11.5 Measurement Record	24
12. OUT-BAND BLOCKING	25
12.1 Definition	25
12.2 Limit	25
12.3 EUT Operation Condition	26
12.4 Test Procedure	26
12.5 Measurement Record	26
13. NARROW-BAND BLOCKING	27
13.1 Definition	27
13.2 Limit	27
13.3 EUT Operation Condition:	28
13.4 Test Procedure	28
13.5 Measurement Record	28
14. RECEIVER INTERMODULATION CHARACTERISTICS	29
14.1 Definition	29
14.2 Limit	29
14.3 EUT Operation Condition	29
14.4 Test Procedure	29
14.5 Measurement Record	30
15. RECEIVER SPURIOUS EMISSIONS	31
15.1 Definition	31
15.2 Limit	31
15.3 EUT Operation Condition	31
15.4 Test Procedure	31
15.5 Measurement Record	31
16. TRANSMITTER ADJACENT CHANNEL LEAKAGE POWER RATIO FOR SINGLE CARRIER(ACLR)	32
16.1 Definition	32
16.2 Limit	32
16.3EUT Operation Condition	33
16.4Test Procedure	33
16.5 Measurement Record	33
17. RECEIVER REFERENCE SENSITIVITY LEVEL	34
17.1 Definition	34
17.2 Limit	34
17.3 EUT Operation Condition	35
17.4 Test Procedure	35
17.5 Measurement Record	35

18. RADIATED EMISSIONS	36
18.1 Definition	36
18.2 Limit	36
18.3 EUT Operation Condition	36
18.4 Test Procedure	36
18.5 Measurement Record	37
19. CONTROL AND MONITORING FUNCTIONS	38
19.1 Definition	38
19.2 Limit	38
19.3 EUT Operation Condition	38
19.4 Test Procedure:	38
19.5 Measurement Record	38
20. EUT PHOTOGRAPHS	39
21. EUT TEST SETUP PHOTOGRAPHS	40

(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB210910044RFX	Sep. 23, 2021	Original	valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test Method	Limit	Test Conditions	Test data	Result
Transmitter maximum output power for Single Carrier	ETSI EN 301 908-13 V13.1.1 Clause 4.2.2.1	ETSI EN 301 908-13 V13.1.1 Clause 5.3.1	Table 4.2.2.1.2-1	NTNV* LTLV LTHV HTLV HTHV	APPENDIX	PASS
Transmitter spectrum emission mask for Single Carrier	ETSI EN 301 908-13 V13.1.1 Clause 4.2.3.1	ETSI EN 301 908-13 V13.1.1 Clause 5.3.2	Table 4.2.3.1.2-1 and 4.2.3.1.2-2.	NTNV	APPENDIX	PASS
Transmitter spurious emissions for Single Carrier	ETSI EN 301 908-13 V13.1.1 Clause 4.2.4.1	ETSI EN 301 908-13 V13.1.1 Clause 5.3.3	table 4.2.4.1.2-1/-2/-3/-4	NTNV	APPENDIX	PASS
Transmitter minimum output power for Single Carrier	ETSI EN 301 908-13 V13.1.1 Clause 4.2.5.1	ETSI EN 301 908-13 V13.1.1 Clause 5.3.4	Table 4.2.5.1.2-1.	NTNV* LTLV LTHV HTLV HTHV	APPENDIX	PASS
Adjacent Channel Selectivity (ACS)	ETSI EN 301 908-13 V13.1.1 Clause 4.2.6	ETSI EN 301 908-13 V13.1.1 Clause 5.3.5	Table 4.2.6.2-1/-2/-3.	NTNV	APPENDIX	PASS
In-band blocking	ETSI EN 301 908-13 V13.1.1 Clause 4.2.7	ETSI EN 301 908-13 V13.1.1 Clause 5.3.6	Table 4.2.7.2-1/-2	NTNV	APPENDIX	PASS
Out-band blocking	ETSI EN 301 908-13 V13.1.1 Clause 4.2.7	ETSI EN 301 908-13 V13.1.1 Clause 5.3.6	Table 4.2.7.2-1-3/-4	NTNV	APPENDIX	PASS
Narrow-band blocking	ETSI EN 301 908-13 V13.1.1 Clause 4.2.7	ETSI EN 301 908-13 V13.1.1 Clause 5.3.6	Table 4.2.7.2-1-5	NTNV	APPENDIX	PASS
Receiver spurious response	ETSI EN 301 908-13 V13.1.1 Clause 4.2.8	ETSI EN 301 908-13 V13.1.1 Clause 5.3.7	Table 4.2.8.2-1/-2	NTNV	APPENDIX	NA
Receiver Intermodulation Characteristics	ETSI EN 301 908-13 V13.1.1 Clause 4.2.9	ETSI EN 301 908-13 V13.1.1 Clause 5.3.8	Table 4.2.9.2-1	NTNV	APPENDIX	PASS
Receiver spurious emissions	ETSI EN 301 908-13 V13.1.1 Clause 4.2.10	ETSI EN 301 908-13 V13.1.1 Clause 5.3.9	Table 4.2.10.2-1	NTNV	APPENDIX	PASS
Transmitter adjacent channel leakage power ratio for Single Carrier(ACLR)	ETSI EN 301 908-13 V13.1.1 Clause 4.2.11.1	ETSI EN 301 908-13 V13.1.1 Clause 5.3.10	table 4.2.11.1.2-1/-2	NTNV* LTLV LTHV HTLV HTHV	APPENDIX	PASS
Receiver Reference Sensitivity Level	ETSI EN 301 908-13 V13.1.1 Clause 4.2.12.1	ETSI EN 301 908-13 V13.1.1 Clause 5.3.11	Table 4.2.12.1.2-1	NTNV	APPENDIX	PASS
Radiated emissions	ETSI EN 301 908-1 V13.1.1 Clause 4.2.2	ETSI EN 301 908-1 V13.1.1 Clause 5.3.1	Table 4.2.2.2-1	NTNV	Reference to the Section 18.5	PASS
Control and monitoring functions	ETSI EN 301 908-1 V13.1.1 Clause 4.2.4	ETSI EN 301 908-1 V13.1.1 Clause 5.3.3	not exceed -30 dBm.	NTNV	Reference to the Section 19.5	PASS

Remark:

The tested samples and the sample information are provided by the client.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radiated Frequency.

CH: In this whole report CH means channel.

N/A: In this whole report not application.

*: All condition have test, only shows the worst case mode which were recorded in this report.

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	54.3kHz
Conducted output power Above 1G	0.9dB
Conducted output power below 1G	0.9dB
Power Spectral Density , Conduction	0.9dB
Conduction spurious emissions	2.0dB
Out of band emission	2.0dB
3m camber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
Receiver Reference Sensitivity level	1.9dB
Transmitter spectrum emission mask	0.9dB
Adjacent channel power below 1G	2.6dB
Adjacent channel power Above 1G	2.8dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63°C
frequency	1×10 ⁻⁷

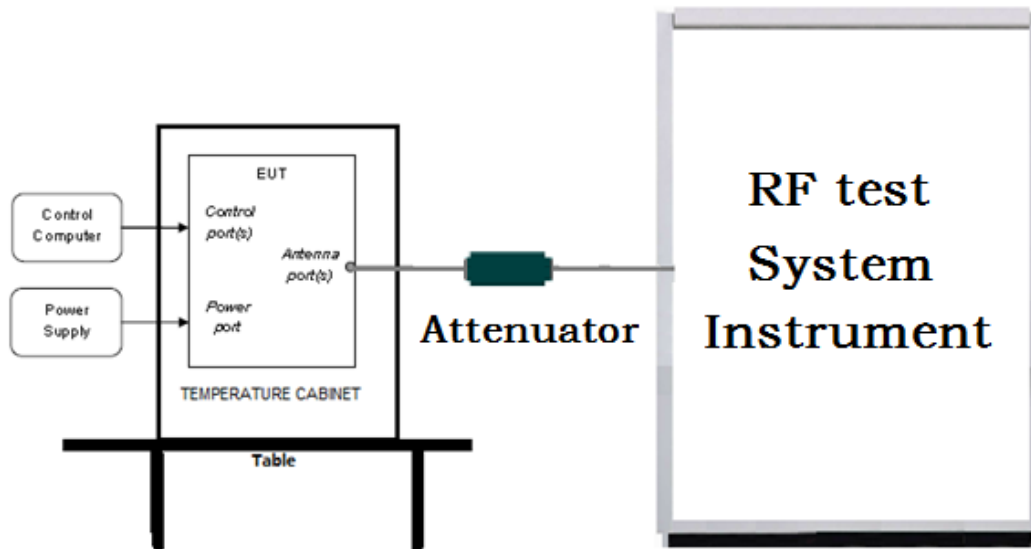
4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	EC-01F, EC-01, EC-01G
Model Description:	All the model are the same circuit and RF module, only for model name. Test sample model: EC-01F
LTE Band(s):	Band 3, 8
Power class	3
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	FDD-LTE BAND 3: TX:1710-1785MHz, RX: 1805-1880 MHz FDD-LTE BAND 8: TX:880-915 MHz, RX: 925-960MHz
Max. RF output power:	FDD-LTE BAND 3: 23.02dBm FDD-LTE BAND 8: 22.65dBm
Type of Modulation:	LTE : QPSK & 16QAM
Antenna installation:	LTE: SMA antenna
Antenna Gain:	LTE Band3: 1dBi LTE Band8: 1 dBi
Ratings:	DC 5.0V powering from PC

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.



Conducted test setup

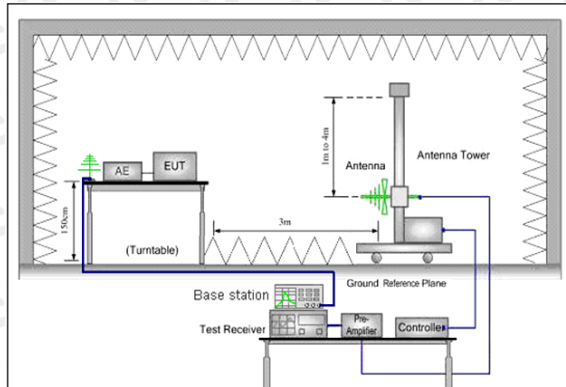


Figure 1. 30MHz to 1GHz

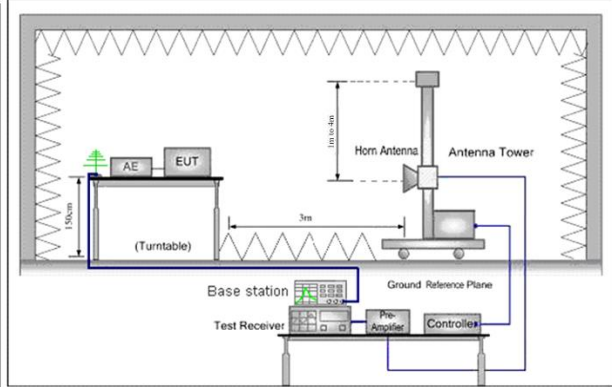


Figure 2. Above 1GHz

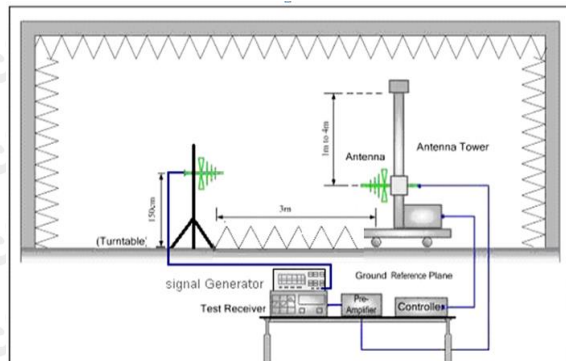


Figure 1. 30MHz to 1GHz

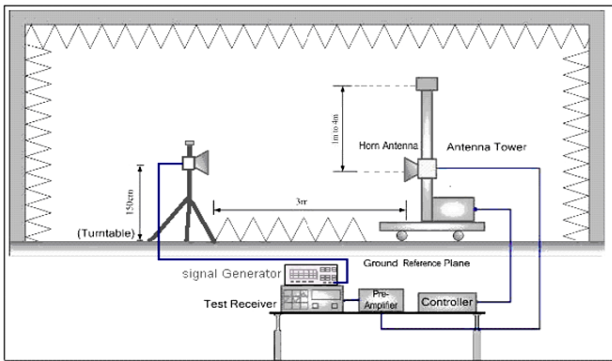


Figure 2. Above 1GHz

Radiated emissions setup

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1.	---	---	---	---	---	---

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

N/A

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Test Frequency	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)	Number [DL]	Frequency of Downlink(MHz)
FDD band 3 TX 1710 – 1785 MHz RX 1805 – 1880 MHz	Low Range	1.4	19207	1710.7	1207	1805.7
		3	19215	1711.5	1215	1806.5
		5	19225	1712.5	1225	1807.5
		10	19250	1715	1250	1810
		15	19275	1717.5	1275	1812.5
		20	19300	1720	1300	1815
	Mid Range	1.4/3/5/10/15/20	19575	1747.5	1575	1842.5
	High Range	1.4	19943	1784.3	1943	1879.3
		3	19935	1783.5	1935	1878.5
		5	19925	1782.8	1925	1877.5
		10	19900	1780	1900	1875
		15	19875	1777.5	1875	1872.5
		20	19850	1775	1850	1870

Test Mode	Test Frequency	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)	Number [DL]	Frequency of Downlink(MHz)
FDD band 8 TX 880 – 915 MHz RX 925 – 960 MHz	Low Range	1.4	21457	880.7	3457	925.7
		3	21465	881.5	3465	926.5
		5	21475	882.5	3475	927.5
		10	21500	885	3500	930
	Mid Range	1.4/3/5/10	21625	897.5	3625	942.5
	High Range	1.4	21793	914.3	3793	959.3
		3	21785	913.5	3785	958.5
		5	21775	912.5	3775	957.5
		10	21750	910	3750	955

4.6 Test Environment

Humidity(%):	50
Atmospheric Pressure(kPa):	101
Normal Temperature(°C):NT	23
Low Temperature(°C) :LT	0
High Temperature(°C) :HT	40
Normal Voltage(DC):NV	5V
Low Voltage(DC):LV	5.63V
High Voltage(DC):HV	5.67V

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2021.09.27
2	Power Sensor	Agilent	U2021XA	MY56120032	2021.09.27
3	Power Sensor	Agilent	U2021XA	MY56120034	2021.09.27
4	Communication test set	R&S	CMW500	108058	2021.09.27
5	Spectrum Analyzer	R&S	FSP40	100550	2021.09.27
6	Signal Generator	Agilent	N5181A	MY49060920	2021.09.27
7	Signal Generator	Agilent	N5182A	MY47420195	2021.09.27
8	Communication test set	Agilent	E5515C	MY50102567	2021.09.27
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2021.09.27
10	band rejection filter	Shenxiang	MSF5150-5850 MS-1155	20181015001	2021.09.27
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	2021.09.27
12	BT&WI-FI Automatic test software	Microwave	MTS8310	Ver. 2.0.0.0	2021.09.27
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2021.09.27
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2021.09.27
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	2021.09.27
16	966 chamber	C.R.T.	966 Room	966	2021.09.27
17	Receiver	R&S	ESPI	100362	2021.09.27
18	Amplifier	HP	8447E	2945A02747	2021.09.27
19	Amplifier	Agilent	8449B	3008A01838	2021.09.27
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	869	2021.09.27

21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	2021.09.27
22	Software	Fala	EZ-EMC	FA-03A2 RE	2021.09.27
23	3-Loop Antenna	Daze	ZN30401	17014	2021.09.27
24	loop antenna	ZHINAN	ZN30900A	/	2021.09.27
25	Horn antenna	A/H/System	SAS-574	588	2021.09.27
26	Amplifier	AEROFLEX	/	S/N/ 097	2021.09.27

6. TRANSMITTER MAXIMUM OUTPUT POWER FOR SINGLE CARRIER

6.1 Definition

The following UE Power Classes define the maximum output power for any transmission bandwidth within the channel bandwidth. The period of measurement shall be at least one sub-frame (1 ms).

6.2 Limit

The UE maximum output power shall be within the shown value in table 4.2.2.1.2-1.

Table 4.2.2.1.2-1: UE power classes

E-UTRA Band	Power Class 3 (dBm)	Tolerance (dB)
1	23	$\pm 2,7$
3	23	$\pm 2,7$ (see note)
7	23	$\pm 2,7$ (see note)
8	23	$\pm 2,7$ (see note)
20	23	$\pm 2,7$ (see note)
22	23	+3,0/-4,5
28	23	+2,7/-3,2
33	23	$\pm 2,7$
34	23	$\pm 2,7$
38	23	$\pm 2,7$
40	23	$\pm 2,7$
42	23	+3,0/-4,0
43	23	+3,0/-4,0
NOTE: For transmission bandwidths (ETSI TS 136 521-1 [1], clause 5) confined within F_{UL_low} and $F_{UL_low} + 4$ MHz or $F_{UL_high} - 4$ MHz and F_{UL_high} , the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1,5 dB (tolerance = +2,7/-4,2).		

NOTE 1: These requirements do not take into account the maximum power reductions allowed to the UE in subject to certain transmission conditions specified in ETSI TS 136 101 [3], clauses 6.2.3 and 6.2.4.

NOTE 2: The range of UE maximum output power for the various power classes are specified in ETSI TS 136 101 [3], clause 6.2.2. The values in table 4.2.2.1.2-1 correspond to the measurement limits taking into account the measurement uncertainty of measurement equipment (see clause 5.2).

6.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

6.4 Test Procedure

- 1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to table 6.2.2.1.4.1-1 of ETSI TS 136 521-1 [1]. Since the UE has no

payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

- 2) Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200 ms for the UE to reach PUMAX level.
- 3) Measure the mean power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one sub-frame (1 ms). For TDD slots with transient periods are not under test.
- 4) Repeat for applicable test frequencies, channel bandwidths, operating bands and environmental conditions.

6.5 Measurement Record

Please refer to the Appendix

7. TRANSMITTER SPECTRUM EMISSION MASK FOR SINGLE CARRIER

7.1 Definition

The spectrum emission mask of the UE applies to frequencies (Δf_{OOB}) starting from the \pm edge of the assigned E-UTRA channel bandwidth.

7.2 Limit

The power of any UE emission shall fulfil requirements in tables 4.2.3.1.2-1 to 4.2.3.1.2-3.

Table 4.2.3.1.2-1: General E-UTRA spectrum emission mask, E UTRA bands ≤ 3 GHz

Δf_{OOB} (MHz)	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth
0 to 1	-8,5	-11,5	-13,5	-16,5	-18,5	-19,5	30 kHz
1 to 2,5	-8,5	-8,5	-8,5	-8,5	-8,5	-8,5	1 MHz
2,5 to 2,8	-23,5	-8,5	-8,5	-8,5	-8,5	-8,5	1 MHz
2,8 to 5		-8,5	-8,5	-8,5	-8,5	-8,5	1 MHz
5 to 6		-23,5	-11,5	-11,5	-11,5	-11,5	1 MHz
6 to 10			-23,5	-11,5	-11,5	-11,5	1 MHz
10 to 15				-23,5	-11,5	-11,5	1 MHz
15 to 20					-23,5	-11,5	1 MHz
20 to 25						-23,5	1 MHz

NOTE 1: The first and last measurement position with a 30 kHz filter is at Δf_{OOB} equals to 0,015 MHz and 0,985 MHz.

NOTE 2: The first and last measurement position with a 1 MHz filter for 1 MHz - 2,5 MHz offset range is at Δf_{OOB} equals to 1,5 MHz and 2,0 MHz. Similarly for other Δf_{OOB} ranges.

NOTE 3: The measurements shall be performed above the upper edge of the channel and below the lower edge of the channel.

NOTE 4: For the 2,5 MHz - 2,8 MHz offset range with 1,4 MHz channel bandwidth, the measurement position is at Δf_{OOB} equals to 3 MHz.

Table 4.2.3.1.2-2: General E-UTRA spectrum emission mask, 3 GHz < E-UTRA bands $\leq 4,2$ GHz

Δf_{OOB} (MHz)	Spectrum emission limit (dBm)/Channel bandwidth						Measurement bandwidth
	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
0 to 1	-8,2	-11,2	-13,2	-16,2	-18,2	-19,2	30 kHz
1 to 2,5	-8,2	-8,2	-8,2	-8,2	-8,2	-8,2	1 MHz
2,5 to 2,8	-23,2						1 MHz
2,8 to 5							1 MHz
5 to 6		-23,2	-11,2	-11,2	-11,2	-11,2	1 MHz
6 to 10			-23,2				1 MHz
10 to 15				-23,2			1 MHz
15 to 20					-23,2		1 MHz
20 to 25						-23,2	1 MHz

NOTE 1: The first and last measurement position with a 30 kHz filter is at Δf_{OOB} equals to 0,015 MHz and 0,985 MHz.

NOTE 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0,5 MHz and -0,5 MHz, respectively.

NOTE 3: The measurements shall be performed above the upper edge of the channel and below the lower edge of the channel.

NOTE 4: For the 2,5-2,8 MHz offset range with 1,4 MHz channel bandwidth, the measurement position is at Δf_{OOB} equals to 3 MHz.

7.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

7.4 Test Procedure

- 1) SS sends uplink scheduling information via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 6.6.2.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2) Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.
- 3) Measure the power of the transmitted signal with a measurement filter of bandwidths according to tables 4.2.3.1.2-1 or 4.2.3.1.2-2 or 4.2.3.1.2-3, as applicable. The centre frequency of the filter shall be stepped in continuous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active TSs.
- 4) Repeat for applicable test frequencies, channel bandwidths and operating bands.

7.5 Measurement Record

Please refer to the Appendix

8. Transmitter spurious emissions for Single Carrier

8.1 Definition:

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.

The spurious emission limits are specified in terms of general requirements in line with Recommendation ITU-R SM.329-12 [i.4] and E-UTRA operating band requirement to address UE co-existence.

To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

8.2 Limit:

The spurious emission limits in table 4.2.4.1.2-2 apply for the frequency ranges that are more than Δf_{OOB} (MHz) from the edge of the channel bandwidth shown in table 4.2.4.1.2-1.

The measured average power of spurious emission for general requirements shall not exceed the described values in table 4.2.4.1.2-2.

The measured average power of spurious emission for E-UTRA operating band specific requirements to protected bands shall not exceed the described values in tables 4.2.4.1.2-3 and 4.2.4.1.2-6.

8.3 EUT Operation Condition:

The EUT was programmed to be in continuously transmitting mode.

8.4 Test Procedure:

- 1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 6.6.3.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2) Send continuously Up power control commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.
- 3) For each applicable requirement in tables from 4.2.4.1.2-2 to 4.2.4.1.2-6; measure the power of the transmitted signal with a measurement filter of bandwidths. The centre frequency of the filter shall be stepped in contiguous steps according to the tables. The measured power shall be verified for each step. The measurement period shall capture the active time slots.
- 4) Repeat for applicable test frequencies, channel bandwidths and operating bands.

8.5 Measurement Record

Please refer to the Appendix

9. TRANSMITTER MINIMUM OUTPUT POWER FOR SINGLE CARRIER

9.1 Definition

The minimum controlled output power of the UE is defined as the broadband transmit power of the UE, i.e. the power in the channel bandwidth for all transmit bandwidth configurations (resource blocks), when the power is set to a minimum value.

9.2 Limit

The minimum output power measured shall not exceed the values specified in table 4.2.5.1.2-1.

Table 4.2.5.1.2-1: Minimum output power

	Channel bandwidth/minimum output power/measurement bandwidth					
	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Minimum output power	For carrier frequency $f \leq 3,0$ GHz: ≤ -39 dBm For carrier frequency $3,0$ GHz $< f \leq 4,2$ GHz: $\leq -38,7$ dBm					
Measurement bandwidth	1,08 MHz	2,7 MHz	4,5 MHz	9,0 MHz	13,5 MHz	18 MHz

9.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

9.4 Test Procedure

- 1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 6.3.2.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2) Send continuous uplink power control "down" commands in the uplink scheduling information to the UE to ensure that the UE transmits at its minimum output power.
- 3) Measure the mean power of the UE in the associated measurement bandwidth specified in table 4.5.2.1-1 for the specific channel bandwidth under test. The period of measurement shall be the continuous duration of one sub-frame (1 ms). For TDD slots with transient periods are not under test.
- 4) Repeat for applicable test frequencies, channel bandwidths, operating bands and environmental conditions..

9.5 Measurement Record

Please refer to the Appendix

10. ADJACENT CHANNEL SELECTIVITY (ACS)

10.1 Definition

Adjacent Channel Selectivity (ACS) is a measure of a receiver's ability to receive an E-UTRA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

10.2 Limit

The throughput R_{av} shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in ETSI TS 136 521-1 [1] under the conditions specified in table 4.2.6.1.2-2 and also under the conditions specified in table 4.2.6.1.2-3.

Table 4.2.6.1.2-1: Adjacent channel selectivity

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
ACS	dB	33,0	33,0	33,0	33,0	30	27

Table 4.2.6.1.2-2: Test parameters for Adjacent channel selectivity, Case 1

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + 14 dB					
$P_{\text{Interferer}}$	dBm	REFSENS +45,5 dB	REFSENS +45,5 dB	REFSENS +45,5 dB	REFSENS +45,5 dB	REFSENS +42,5 dB	REFSENS +39,5 dB
$BW_{\text{Interferer}}$	MHz	1,4	3	5	5	5	5
$F_{\text{Interferer}}$ (offset)	MHz	1,4025	3,0075	5,0025	7,5075	10,0125	12,5025
NOTE 1: The transmitter shall be set to 4 dB below $P_{\text{CMAX_L}}$ or $P_{\text{CMAX_L_CA}}$ as defined in clause 6.2.5 in ETSI TS 136 101 [3].							
NOTE 2: The interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with set-up according to clause C.3.1 of ETSI TS 136 521-1 [1].							
NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							

Table 4.2.6.1.2-3: Test parameters for Adjacent channel selectivity, Case 2

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	-56,5	-56,5	-56,5	-56,5	-53,5	-50,5
$P_{\text{Interferer}}$	dBm	-25					
$BW_{\text{Interferer}}$	MHz	1,4	3	5	5	5	5
$F_{\text{Interferer (offset)}}$	MHz	1,4025	3,0075	5,0025	7,5075	10,0125	12,5025
NOTE 1: The transmitter shall be set to 24 dB below $P_{\text{CMAX,L}}$ or $P_{\text{CMAX,L,CA}}$ as defined in clause 6.2.5 in ETSI TS 136 101 [3].							
NOTE 2: The interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with set-up according to clause C.3.1 of ETSI TS 136 521-1 [1].							

10.3 EUT Operation Condition

The EUT was programmed to be in continuously receive mode.

10.4 Test Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to ETSI TS 136 521-1 [1], table 7.5.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 7.5.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the Downlink signal level to the value as defined in table 4.2.6.1.2-2 (Case 1). Send Uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.6.1.2-2 (Case 1) for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the Throughput measurement (obtain correct UE output power as specified in ETSI TS 136 521-1 [1], table 7.5.3-2).
- 4) Set the Interferer signal level to the value as defined in table 4.2.6.1.2-2 (Case 1) and frequency below the wanted signal, using a modulated interferer as defined in ETSI TS 136 521-1 [1], annex C.
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of ETSI TS 136 521-1 [1].
- 6) Set the Downlink signal level to the value as defined in table 4.2.6.1.2-3 (Case 2). Send Uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.6.1.2-3 (Case 2) for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement (obtain correct UE output power as specified in ETSI TS 136 521-1 [1], table 7.5.3-3).
- 7) Set the Interferer signal level to the value as defined in table 4.2.6.1.2-3 (Case 2) and frequency below the

wanted signal, using a modulated interferer as defined in ETSI TS 136 521-1 [1], annex C.

8) Measure the average throughput for a duration sufficient to achieve statistical significance according to ETSI TS 136 521-1 [1], annex G.

9) Repeat for applicable channel bandwidths in both Case 1 and Case 2.

10) Repeat for applicable test frequencies, channel bandwidths and operating bands.

10.5 Measurement Record

Please refer to the Appendix

11. IN-BAND BLOCKING

11.1 Definition

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

11.2 Limit

With parameters specified in tables 4.2.7.1.2-1 and 4.2.7.1.2-2, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1].

With parameters specified in tables 4.2.7.1.2-3 and 4.2.7.1.2-4, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1], except for the spurious response frequencies.

For table 4.2.7.1.2-4 in frequency range 1, 2 and 3, up to $\max(24, 6 \cdot \lceil \text{NRB} / 6 \rceil)$ exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size, where is the number of resource blocks in the downlink transmission bandwidth configuration. For these exceptions the requirements of clause 4.2.8.1 Spurious response are applicable.

With parameters specified in table 4.2.7.1.2-5, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1].

Table 4.2.7.1.2-1: In-band blocking parameters

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
BW _{Interferer}	MHz	1,4	3	5	5	5	5
F _{offset, case 1}	MHz	2,1125	4,5075	7,5125	7,5025	7,5075	7,5125
F _{offset, case 2}	MHz	3,5075	7,5075	12,5075	12,5125	12,5025	12,5075
NOTE 1: The transmitter shall be set to 4 dB below P _{CMAX,L} at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with P _{CMAX,L} as defined in clause 6.2.5).							
NOTE 2: The interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with a set-up according to clause C.3.1 of ETSI TS 136 521-1 [1].							
NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							

Table 4.2.7.1.2-2: In-band blocking

E-UTRA band	Parameter	Units	Case 1	Case 2
	$P_{\text{Interferer}}$	dBm	-56	-44
	$F_{\text{Interferer}}$ (Offset)	MHz	$= -BW/2 - F_{\text{offset, case 1}}$ and $= +BW/2 + F_{\text{offset, case 1}}$	$\leq -BW/2 - F_{\text{offset, case 2}}$ and $\geq +BW/2 + F_{\text{offset, case 2}}$
1, 3, 7, 8, 20, 22, 28, 33, 34, 38, 40, 42, 43	$F_{\text{Interferer}}$	MHz	(note 2)	$F_{\text{DL_low}} - 15$ to $F_{\text{DL_high}} + 15$
NOTE 1: For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band.				
NOTE 2: For each carrier frequency the requirement is valid for two frequencies: a) the carrier frequency $-BW/2 - F_{\text{offset, case 1}}$; and b) the carrier frequency $+BW/2 + F_{\text{offset, case 1}}$.				
NOTE 3: $F_{\text{Interferer}}$ range values for unwanted modulated interfering signal are interferer centre frequencies.				

11.3 EUT Operation Condition:

The EUT was programmed to be in continuously receive mode.

11.4 Test Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to ETSI TS 136 521-1 [1], table 7.6.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 7.6.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the parameters of the signal generator for an interfering signal below the wanted signal in Case 1 according to tables 4.2.7.1.2-1 and 4.2.7.1.2-2 as specified in ETSI TS 136 521-1 [1].
- 4) Set the downlink signal level according to the table 4.2.7.1.2-1. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.7.1.2-1 for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement as specified in ETSI TS 136 521-1 [1].
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of ETSI TS 136 521-1 [1].
- 6) Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 3.
- 7) Repeat steps from 3 to 6, using interfering signals in Case 2 at step 3) and 6). The ranges of case 2 are covered in steps equal to the interferer bandwidth. The test frequencies are chosen in analogy to ETSI TS 136 521-1 [1], table 7.6.1.4.2-1.
- 8) Repeat for applicable test frequencies, channel bandwidths and operating bands.

11.5 Measurement Record

Please refer to the Appendix

12. OUT-BAND BLOCKING

12.1 Definition

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

12.2 Limit

With parameters specified in tables 4.2.7.1.2-1 and 4.2.7.1.2-2, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1].

With parameters specified in tables 4.2.7.1.2-3 and 4.2.7.1.2-4, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1], except for the spurious response frequencies.

For table 4.2.7.1.2-4 in frequency range 1, 2 and 3, up to $\max(24, 6 \cdot \lceil \text{NRB} / 6 \rceil)$ exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size, where is the number of resource blocks in the downlink transmission bandwidth configuration. For these exceptions the requirements of clause 4.2.8.1 Spurious response are applicable.

With parameters specified in table 4.2.7.1.2-5, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1].

d 0,001 for the parameters specified in table 4.2.6.2-1. This test condition is equivalent to the ACS value 33 dB.

Table 4.2.7.1.2-3: Out-of-band blocking parameters

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
NOTE 1: The transmitter shall be set to 4 dB below P_{CMAX_L} at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with P_{CMAX_L} as defined in clause 6.2.5).							
NOTE 2: Reference measurement channel is clause A.3.2 of ETSI TS 136 521-1 [1].							
NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							

Table 4.2.7.1.2-4: Out-of-band blocking

E-UTRA band	Parameter	Units	Frequency		
	$P_{\text{Interferer}}$	dBm	Range 1	Range 2	Range 3
1, 3, 7, 8, 20, 22, 28, 33, 34, 38, 40, 42 (NOTE 2), 43 (NOTE 2)	$F_{\text{Interferer}}$ (CW)	MHz	$F_{\text{DL_low}} - 15$ to $F_{\text{DL_low}} - 60$	$F_{\text{DL_low}} - 60$ to $F_{\text{DL_low}} - 85$	$F_{\text{DL_low}} - 85$ to 1 MHz
			$F_{\text{DL_high}} + 15$ to $F_{\text{DL_high}} + 60$	$F_{\text{DL_high}} + 60$ to $F_{\text{DL_high}} + 85$	$F_{\text{DL_high}} + 85$ to +12 750 MHz
NOTE 1: Range 3 shall be tested only with the highest channel bandwidth.					
NOTE 2: The power level of the interferer ($P_{\text{Interferer}}$) for Range 3 shall be modified to -20 dBm for $F_{\text{Interferer}} > 2\,800$ MHz and $F_{\text{Interferer}} < 4\,400$ MHz.					

12.3 EUT Operation Condition

The EUT was programmed to be in receive mode.

12.4 Test Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to ETSI TS 136 521-1 [1], table 7.6.2.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 7.6.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the parameters of the CW signal generator for an interfering signal according to table 4.2.7.1.2-4 as specified in ETSI TS 136 521-1 [1]. The frequency step size is 1 MHz.
- 4) Set the downlink signal level according to the table 4.2.7.1.2-3. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.7.1.2-3 for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement as specified in ETSI TS 136 521-1 [1].
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of ETSI TS 136 521-1 [1].
- 6) For table 4.2.7.1.2-4 record the frequencies for which the throughput does not meet the requirements.
- 7) Repeat for applicable test frequencies, channel bandwidths and operating bands.

12.5 Measurement Record

Please refer to the Appendix

13. Narrow-band blocking

13.1 Definition

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

13.2 Limit

With parameters specified in tables 4.2.7.1.2-1 and 4.2.7.1.2-2, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1].

With parameters specified in tables 4.2.7.1.2-3 and 4.2.7.1.2-4, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1], except for the spurious response frequencies.

For table 4.2.7.1.2-4 in frequency range 1, 2 and 3, up to $\max(24, 6 \cdot \lceil \text{NRB} / 6 \rceil)$ exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size, where is the number of resource blocks in the downlink transmission bandwidth configuration. For these exceptions the requirements of clause 4.2.8.1 Spurious response are applicable.

With parameters specified in table 4.2.7.1.2-5, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1].

Table 4.2.7.1.2-5: Narrow-band blocking

Parameter	Units	Channel Bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
P_w	dBm	$P_{\text{REFSENS}} + \text{channel-bandwidth specific value below}$					
		22	18	16	13	14	16
$P_{\text{uw}} \text{ (CW)}$	dBm	-55	-55	-55	-55	-55	-55
$F_{\text{uw}} \text{ (offset for } \Delta f = 15 \text{ kHz)}$	MHz	0,9075	1,7025	2,7075	5,2125	7,7025	10,2075
NOTE 1: The transmitter shall be set a 4 dB below P_{CMAX_L} at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with P_{CMAX_L} as defined in clause 6.2.5).							
NOTE 2: Reference measurement channel is in clause A.3.2 of ETSI TS 136 521-1 [1].							
NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							

13.3 EUT Operation Condition:

The EUT was programmed to be in receive mode.

13.4 Test Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to ETSI TS 136 521-1 [1], table 7.6.3.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 7.6.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the parameters of the CW signal generator for an interfering signal below the wanted signal according to table 4.2.7.1.2-5 as specified in ETSI TS 136 521-1 [1].
- 4) Set the downlink signal level according to the table 4.2.7.1.2-5. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.7.1.2-5 for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement as specified in ETSI TS 136 521-1 [1].
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of ETSI TS 136 521-1 [1].
- 6) Repeat steps from 3 to 5, using an interfering signal above the wanted signal at step 3.
- 7) Repeat for applicable test frequencies, channel bandwidths and operating bands.

13.5 Measurement Record

Please refer to the Appendix

14. Receiver Intermodulation Characteristics

14.1 Definition

Intermodulation response rejection is a measure of the capability of the receiver to receive a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

14.2 Limit

The throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in clauses A.5.1.1 and A.5.2.1) in ETSI TS 136 521-1 [1] with parameters specified in table 4.2.9.1.2-1 for the specified wanted signal mean power in the presence of two interfering signals.

Table 4.2.9.1.2-1: Test parameters for Wide band intermodulation

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		12	8	6	6	7	9
P _{Interferer 1 (CW)}	dBm	-46					
P _{Interferer 2 (Modulated)}	dBm	-46					
BW _{Interferer 2}		1,4	3	5			
F _{Interferer 1 (Offset)}	MHz	-BW/2 - 2,1 / +BW/2 + 2,1	-BW/2 - 4,5 / +BW/2 + 4,5	-BW/2 - 7,5 / +BW/2 + 7,5			
F _{Interferer 2 (Offset)}	MHz	2 × F _{Interferer 1}					
NOTE 1: The transmitter shall be set to 4 dB below P _{CMAX,L} at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with P _{CMAX,L} as defined in clause 6.2.5).							
NOTE 2: Reference measurement channel is clause A.3.2 of ETSI TS 136 521-1 [1].							
NOTE 3: The modulated interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with set-up according to clause C.3.1 of ETSI TS 136 521-1 [1]. The interfering modulated signal is 5 MHz E-UTRA signal as described in annex C of ETSI TS 136 521-1 [1] for channel bandwidth ≥ 5 MHz.							
NOTE 4: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							

14.3 EUT Operation Condition

The EUT was programmed to be in receive mode.

14.4 Test Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to ETSI TS 136 521-1 [1], table 7.8.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 7.8.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the Downlink signal level to the value as defined in table 4.2.9.1.2-1. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power

is within +0, -3,4 dB of the target level in table 4.2.9.1.2-1 for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement as specified in ETSI TS 136 521-1 [1].

- 4) Set the Interfering signal levels to the values as defined in table 4.2.9.1.2-1, using a modulated interferer bandwidth as defined in annex C of ETSI TS 136 521-1 [1].
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of ETSI TS 136 521-1 [1].
- 6) Repeat for applicable test frequencies, channel bandwidths and operating bands.

14.5 Measurement Record

Please refer to the Appendix

15. RECEIVER SPURIOUS EMISSIONS

15.1 Definition

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the UE antenna connector.

15.2 Limit

The measured spurious emissions derived in clause 5.3.9 shall not exceed the maximum level specified in table 4.2.10.1.2-1.

Table 4.2.10.1.2-1: General receiver spurious emission requirements

Frequency Band	Measurement bandwidth	Maximum level	Note
$30 \text{ MHz} \leq f < 1 \text{ GHz}$	100 kHz	-57 dBm	
$1 \text{ GHz} \leq f \leq 12,75 \text{ GHz}$	1 MHz	-47 dBm	
$12,75 \text{ GHz} \leq f \leq 5^{\text{th}}$ harmonic of the upper frequency edge of the DL operating band in GHz	1 MHz	-47 dBm	Note 1
NOTE 1: Shall apply only for Band 22, 42 and Band 43.			
NOTE 2: Unused PDCCH resources are padded with resource element groups with power level given by PDCCH_RA/RB as defined in ETSI TS 136 101 [3], clause C.3.1.			

15.3 EUT Operation Condition

The EUT was programmed to be in receiving mode.

15.4 Test Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to ETSI TS 136 521-1 [1], table 7.6.2.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 7.6.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the parameters of the CW signal generator for an interfering signal according to table 4.2.8.1.2-2. The spurious frequencies are taken from step 5) records in clause 5.3.6.1.1.2.
- 4) Set the downlink signal level according to the table 4.2.8.1.2-1. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.8.1.2-1 for carrier frequency $f \leq 3,0 \text{ GHz}$ or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement as specified in ETSI TS 136 521-1 [1].
- 5) For the spurious frequency, measure the average throughput for a duration sufficient to achieve statistical significance.

15.5 Measurement Record

Please refer to the Appendix

16. TRANSMITTER ADJACENT CHANNEL LEAKAGE POWER RATIO FOR SINGLE CARRIER(ACLR)

16.1 Definition

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency.

16.2 Limit

If the measured adjacent channel power is greater than -50 dBm then the measured E-UTRAACLR shall be higher than the limits in table 4.2.11.1.2-1.

Table 4.2.11.1.2-1: E-UTRA UE ACLR

	Channel bandwidth/E-UTRA _{ACLR1} /measurement bandwidth					
	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
E-UTRA _{ACLR1}	29,2 dB	29,2 dB	29,2 dB	29,2 dB	29,2 dB	29,2 dB
E-UTRA channel Measurement bandwidth	1,08 MHz	2,7 MHz	4,5 MHz	9,0 MHz	13,5 MHz	18 MHz
UE channel	+1,4 MHz or -1,4 MHz	+3 MHz or -3 MHz	+5 MHz or -5 MHz	+10 MHz or -10 MHz	+15 MHz or -15 MHz	+20 MHz or -20 MHz

If the measured UTRA channel power is greater than -50 dBm then the measured UTRAACLR1, UTRAACLR2 shall be higher than the limits in table 4.2.11.2-2.

Table 4.2.11.1.2-2: UTRA UE ACLR

	Channel bandwidth/UTRA _{ACLR1/2} /measurement bandwidth					
	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
UTRA _{ACLR1}	32,2 dB	32,2 dB	32,2 dB	32,2 dB	32,2 dB	32,2 dB
Adjacent channel centre frequency offset (in MHz)	0,7 + $BW_{UTRA}/2$ / -0,7 - $BW_{UTRA}/2$	1,5 + $BW_{UTRA}/2$ / -1,5 - $BW_{UTRA}/2$	2,5 + $BW_{UTRA}/2$ / -2,5 - $BW_{UTRA}/2$	5 + $BW_{UTRA}/2$ / -5 - $BW_{UTRA}/2$	7,5 + $BW_{UTRA}/2$ / -7,5 - $BW_{UTRA}/2$	10 + $BW_{UTRA}/2$ / -10 - $BW_{UTRA}/2$
UTRA _{ACLR2}	-	-	35,2 dB	35,2 dB	35,2 dB	35,2 dB
Adjacent channel centre frequency offset (in MHz)	-	-	2,5 + 3 × $BW_{UTRA}/2$ / -2,5 - 3 × $BW_{UTRA}/2$	5 + 3 × $BW_{UTRA}/2$ / -5 - 3 × $BW_{UTRA}/2$	7,5 + 3 × $BW_{UTRA}/2$ / -7,5 - 3 × $BW_{UTRA}/2$	10 + 3 × $BW_{UTRA}/2$ / -10 - 3 × $BW_{UTRA}/2$
E-UTRA channel Measurement bandwidth	1,08 MHz	2,7 MHz	4,5 MHz	9,0 MHz	13,5 MHz	18 MHz
UTRA 5 MHz channel Measurement bandwidth (see note 1)	3,84 MHz	3,84 MHz	3,84 MHz	3,84 MHz	3,84 MHz	3,84 MHz
UTRA 1,6 MHz channel measurement bandwidth (see note 2)	1,28 MHz	1,28 MHz	1,28 MHz	1,28 MHz	1,28 MHz	1,28 MHz

NOTE 1: Shall apply for E-UTRA FDD co-existence with UTRA FDD in paired spectrum.
NOTE 2: Shall apply for E-UTRA TDD co-existence with UTRA TDD in unpaired spectrum.
NOTE 3: BW_{UTRA} for UTRA FDD shall be 5 MHz and for UTRA TDD shall be 1,6 MHz.

16.3 EUT Operation Condition

The EUT was programmed to be in transmitting mode.

16.4 Test Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to ETSI TS 136 521-1 [1], table 7.3.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 7.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the Downlink signal level to the appropriate REFSENS value defined in table 4.2.12.1.2-1. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE to ensure the UE transmits PUMAX level for at least the duration of the Throughput measurement. (obtain correct UE output power as specified in ETSI TS 136 521-1 [1]).
- 4) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of ETSI TS 136 521-1 [1].
- 5) Repeat for applicable test frequencies, channel bandwidths and operating bands.

16.5 Measurement Record

Please refer to the Appendix

17. RECEIVER REFERENCE SENSITIVITY LEVEL

17.1 Definition

Reference sensitivity measures the UE's ability to receive data with a given average throughput for a specified reference measurement channel, under conditions of low signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the effective coverage area of an e-NodeB.

17.2 Limit

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in ETSI TS 136 521-1 [1], clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in ETSI TS 136 521-1 [1], clauses A.5.1.1 and A.5.2.1) with parameters specified in table 4.2.12.1.2-1 and table 7.3.3-2 in ETSI TS 136 521-1 [1].

Table 4.2.12.1.2-1: Reference sensitivity QPSK P_{REFSENS}

E-UTRA Band	Channel bandwidth						Duplex Mode
	1,4 MHz (dBm)	3 MHz (dBm)	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	
1	-	-	-99,3	-96,3	-94,5	-93,3	FDD
3	-101,0	-98,0	-96,3	-93,3	-91,5	-90,3	FDD
7	-	-	-97,3	-94,3	-92,5	-91,3	FDD
8	-101,5	-98,5	-96,3	-93,3	-	-	FDD
20	-	-	-96,3	-93,3	-90,5	-89,3	FDD
22	-	-	-96,0	-93,0	-91,2	-90,0	FDD
28	-	-99,5	-97,8	-94,8	-93,0	-90,3	FDD
31	-98,3	-95,0	-92,8	-	-	-	FDD
33	-	-	-99,3	-96,3	-94,5	-93,3	TDD
34	-	-	-99,3	-96,3	-94,5	-	TDD
38	-	-	-99,3	-96,3	-94,5	-93,3	TDD
40	-	-	-99,3	-96,3	-94,5	-93,3	TDD
42	-	-	-98,0	-95,0	-93,2	-92,0	TDD
43	-	-	-98,0	-95,0	-93,2	-92,0	TDD
65	-103,5	-100,5	-98,8	-95,8	-94,0	-92,8	FDD
NOTE 1: The transmitter shall be set to maximum output power level (ETSI TS 136 521-1 [1], table 7.3.5-2).							
NOTE 2: The reference measurement channel is specified in ETSI TS 136 521-1 [1], clause A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in ETSI TS 136 521-1 [1], clauses A.5.1.1 and A.5.2.1.							
NOTE 3: The signal power is specified per port.							

The reference receive sensitivity (REFSENS) requirement specified in table 4.2.12.1.2-1 shall be met for an uplink transmission bandwidth less than or equal to that specified in ETSI TS 136 521-1 [1], table 7.3.5-2.

17.3 EUT Operation Condition

The EUT was programmed to be in receiving mode.

17.4 Test Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to ETSI TS 136 521-1 [1], table 7.3.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
 - 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to ETSI TS 136 521-1 [1], table 7.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
 - 3) Set the Downlink signal level to the appropriate REFSENS value defined in table 4.2.12.1.2-1. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE to ensure the UE transmits PUMAX level for at least the duration of the Throughput measurement. (obtain correct UE output power as specified in ETSI TS 136 521-1 [1]).
 - 4) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of ETSI TS 136 521-1 [1].
 - 5) Repeat for applicable test frequencies, channel bandwidths and operating bands.
- Details of the test method can be found in ETSI TS 136 521-1 [1], clause 7.3.

17.5 Measurement Record

Please refer to the Appendix

18. Radiated emissions

18.1 Definition

This test assesses the ability of radio communications equipment and ancillary equipment to limit unwanted emissions from the enclosure port.

This test is applicable to radio communications equipment and ancillary equipment.

This test shall be performed on the radio communications equipment and/or a representative configuration of the ancillary equipment. Emission is defined to be the ratio of the carrier leakage to the modulated signal.

18.2 Limit

The frequency boundary and reference bandwidths for the detailed transitions of the limits between the requirements for out-of-band emissions and spurious emissions are based on Recommendations ITU-R SM.329-12 [1] and SM.1539-1 [i.6].

The requirements shown in table 4.2.2.2-1 are only applicable for frequencies in the spurious domain.

Table 4.2.2.2-1: Radiated spurious emissions requirements (UE)

Frequency	Minimum requirement (e.r.p.)/ reference bandwidth idle mode	Minimum requirement (e.r.p.)/ reference bandwidth traffic mode	Applicability
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	-57 dBm/100 kHz	-36 dBm/100 kHz	All
$1 \text{ GHz} \leq f < 12.75 \text{ GHz}$	-47 dBm/1 MHz	-30 dBm/1 MHz	All
$f_c - 2.5 \times 5 \text{ MHz} < f < f_c + 2.5 \times 5 \text{ MHz}$		Not defined	UTRA FDD, UTRA TDD, 3.84 Mcps option, cdma2000, spreading rate 3
$f_c - 2.5 \times \text{BW}_{\text{Channel}} \text{ MHz} < f < f_c + 2.5 \times \text{BW}_{\text{Channel}} \text{ MHz}$		Not defined	E-UTRA FDD, E-UTRA TDD, Mobile WiMAX™
$f_c - 2.5 \times 10 \text{ MHz} < f < f_c + 2.5 \times 10 \text{ MHz}$		Not defined	UTRA TDD, 7.68 Mcps option
$f_c - 4 \text{ MHz} < f < f_c + 4 \text{ MHz}$		Not defined	UTRA TDD, 1.28 Mcps option cdma2000, spreading rate 1

NOTE: f_c is the UE transmit centre frequency.

18.3 EUT Operation Condition

The EUT was programmed to be in transmitting mode.

18.4 Test Procedure

This clause defines the configurations for emission tests as follows:

- the equipment shall be tested under normal test conditions;
- the test configuration shall be as close to normal intended use as possible;
- if the equipment is part of a system, or can be connected to ancillary equipment, then it shall be acceptable to test the equipment while connected to the minimum configuration of ancillary equipment necessary to exercise the ports;
- if the equipment has a large number of ports, then a sufficient number shall be selected to simulate actual operation conditions and to ensure that all the different types of termination are tested;

- the test conditions, test configuration and mode of operation shall be recorded in the test report;
 - ports which in normal operation are connected shall be connected to an ancillary equipment or to a representative piece of cable correctly terminated to simulate the input/output characteristics of the ancillary equipment, RF input/output ports shall be correctly terminated;
 - ports that are not connected to cables during normal operation, e.g. service connectors, programming connectors; temporary connectors, etc. shall not be connected to any cables for the purpose of this test. Where cables have to be connected to these ports, or interconnecting cables have to be extended in length in order to exercise the EUT, precautions shall be taken to ensure that the evaluation of the EUT is not affected by the addition or extension of these cables:
- emission tests shall be performed in two modes of operation:
with a communication link established (traffic mode); and in the idle mode;
- the traffic mode configuration which uses the UE maximum output power for testing shall be declared by the manufacturer.

Ancillary equipment shall be tested with it connected to a UE in which case compliance shall be demonstrated to the appropriate clauses of the present document.

The results obtained shall be compared to the limits in clause 4.2.2.2 in order to prove compliance.

18.5 Measurement Record

Above 1GHz

For FDD Traffic Mode:

FDD Band 3							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
4213.211	150	316	-54.36	-30	-24.36	Pass	H
6903.705	151	257	-52.60	-30	-22.60	Pass	H
9809.404	150	8	-52.53	-30	-22.53	Pass	H
3266.346	152	360	-55.85	-30	-25.85	Pass	V
7900.858	150	71	-53.56	-30	-23.56	Pass	V
10165.290	153	257	-53.65	-30	-23.65	Pass	V

For FDD Idle Mode:

FDD Band 3							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
2044.788	151	332	-53.66	-47	-6.66	Pass	H
5762.235	150	167	-52.58	-47	-5.58	Pass	H
8042.903	153	20	-52.40	-47	-5.40	Pass	H
1663.803	152	57	-53.83	-47	-6.83	Pass	V
2468.631	150	215	-53.74	-47	-6.74	Pass	V
10669.020	148	336	-52.42	-47	-5.42	Pass	V

Note:

1) Scan from 30MHz to 12.75GHz, the Below 1GH was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

2) Note: Absolute Level = SG Level - Cable Loss + Antenna Gain
Margin = Absolute Level - Limit

19. CONTROL AND MONITORING FUNCTIONS

19.1 Definition

This requirement, together with other control and monitoring technical requirements identified in the table of cross references in the applicable part, verifies that the control and monitoring functions of the UE prevent it from transmitting in the absence of a valid network.

This test is applicable to radio communications equipment and ancillary equipment in the operating band defined in the applicable part of this multi-part harmonised standard.

This test shall be performed on the radio communications equipment and/or a representative configuration of the ancillary equipment.

19.2 Limit

The maximum measured power during the duration of the test shall not exceed -30 dBm.

19.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

19.4 Test Procedure:

- a) At the start of the test, the UE shall be switched off. The UE antenna connector shall be connected to a power measuring equipment, with the following characteristics:
 - the RF bandwidth shall exceed the total operating transmit frequency range of the UE for operation with an applicable part;
 - the response time of the power measuring equipment shall be such that the measured power has reached within 1 dB of its steady state value within 100 μ s of a CW signal being applied;
 - it shall record the maximum power measured.

NOTE: The equipment may include a video low pass filter to minimize its response to transients or Gaussian noise peaks.

- b) The UE shall be switched on for a period of approximately fifteen minutes, and then switched off.
 - c) The EUT shall remain switched off for a period of at least thirty seconds, and shall then be switched on for a period of approximately one minute.
 - d) The maximum power emitted from the UE throughout the duration of the test shall be recorded.
- The results obtained shall be compared to the limits in clause 4.2.4.2 in order to prove compliance.

19.5 Measurement Record

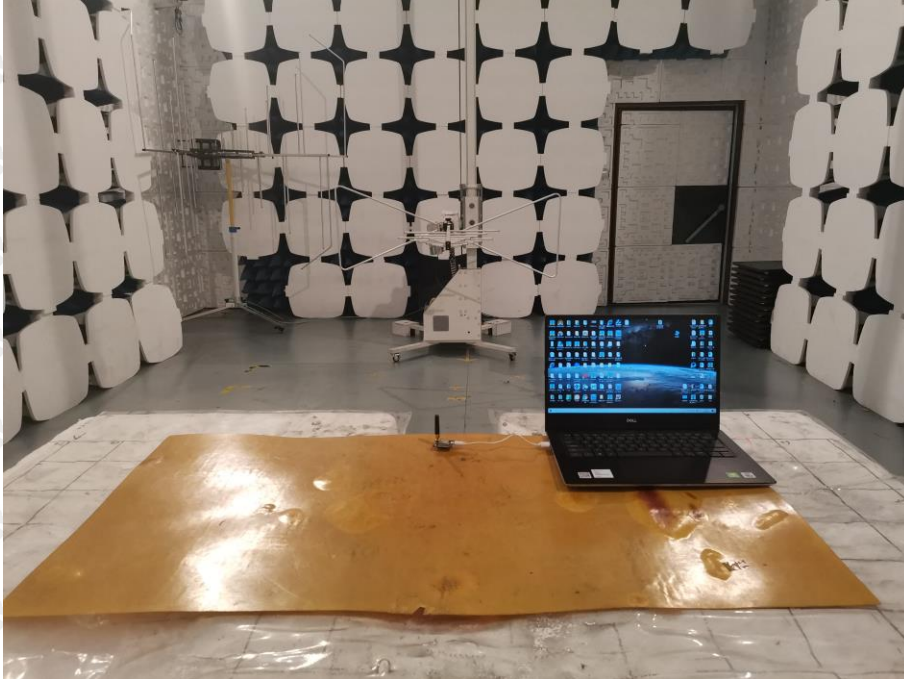
For $ \Delta f $ Within the Range(MHz)	1st	2nd	3rd	4th	Limit	Result
FDD band 3 TX 1710 – 1980 MHz (dBm/1MHz)	-43.21	-43.54	-44.17	-43.33	-30	PASS

20. EUT PHOTOGRAPHS

Refer to Report No. CTB210910043REX-for EUT external and internal photos.

21. EUT TEST SETUP PHOTOGRAPHS

Spurious emissions



***** END OF REPORT *****