

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1105_09_ant2.docx	Date of Report:	23-Sep-2015
Number of pages:	33	Customer's Contact person:	Jari Rontu
Testing laboratory:	TCC Microsoft Tampere Laboratory P.O.Box 403 Visiokatu 3 FIN-33101 TAMPERE, FINLAND Tel. +358 71 800 8000 Fax. +358 71 804 6880	Customer:	Microsoft P.O.Box(86) Joensuunkatu 7E FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 71 80 44122
FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-1105 / Battery BV-T5E / Charger AC-100E / Headset WH-308		
FCC ID:	PYARM-1105	IC:	661X-RM1105
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 22/24/27, TIA-603-C-2004 and IC standards, RSS-GEN (Issue 4, November 2014), RSS-133 (Issue 6, January 2013), RSS-139 (Issue 2, February 2009), RSS-132 (Issue 3, January 2013), RSS-199 (Issue 2, October 2014), RSS-130 (Issue 1, October 2013), RSS-195 (Issue 2, April 2014). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Microsoft.		
Test Results:	The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document		
Date and signature for the contents:			

Timo Raiskio, System Manager, EMC

1. Summary for FCC Part 22/24/27 Compliance Test Report

Date of receipt	01-Aug-2015
Testing completed	23-Sep-2015
The customer's contact person	Jari Rontu
Test Plan referred to	T:\Projects\RM-1105\TestPlan\RS_testplan_RM-1105.xlsm
Notes	LTE conducted output power results can be found in chapter 5. Appendix.
Document name	T:\Projects\RM-1105\EMC\FCC_Cellular_RM-1105_09_ant2.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:
GSM/WCDMA/WLAN
The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-1105	004402741813020	2030	-	01068.00000.15294.36000	400035
Battery	BV-T5E	4955405211010400583;0670775	LG v4.0	-	-	400027
Charger	AC-100E	40904951255803017590675758	0.3	-	-	400013
Headset	WH-308	-	-	-	-	400014
Phone	RM-1105	004402741813103	2030	-	01068.00000.15294.36000	400039

1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	-
§22.913(a)	4.4	Radiated RF output power	PASSED
N/A	5.4	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§22.917(a)	4.5	Band edge compliance	-
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	-
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	-
§2.1055(d)	4.3	Frequency stability, voltage variation	-

GSM 1900:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	-
§24.232(b)	6.4	Radiated RF output power	PASSED
N/A	6.4	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§24.238(a)	6.5	Band edge compliance	-
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	-
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	-
§2.1055(d)	6.3	Frequency stability, voltage variation	-

WCDMA2:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	-
§24.232(b)	6.4	Radiated RF output power	PASSED
N/A	6.4	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§24.238(a)	6.5	Band edge compliance	-
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	-
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	-
§2.1055(d)	6.3	Frequency stability, voltage variation	-

WCDMA4:

Section in CFR 47	Section in RSS-GEN or RSS-139	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	-
§27.50(d)(2)	6.4	Radiated RF output power	PASSED
N/A	6.4	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§27.53(g)	6.5	Band edge compliance	-
§27.53(g), §2.1051	6.5	Spurious emissions at antenna terminals	-
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	-
§2.1055(d)	6.3	Frequency stability, voltage variation	-

WCDMA5:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	-
§22.913(a)	4.4	Radiated RF output power	PASSED
N/A	5.4	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§22.917(a)	4.5	Band edge compliance	-
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	-
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	-
§2.1055(d)	4.3	Frequency stability, voltage variation	-

LTE2:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	-
§24.232(b)	6.4	Radiated RF output power	PASSED
N/A	6.4	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§24.238(a)	6.5	Band edge compliance	-
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	-
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	-
§2.1055(d)	6.3	Frequency stability, voltage variation	-

LTE4:

Section in CFR 47	Section in RSS-GEN or RSS-139	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	-
§27.50(d)(4)	6.4	Radiated RF output power	PASSED
N/A	6.4	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§27.53(h)	6.5	Band edge compliance	-
§27.53(h), §2.1051	6.5	Spurious emissions at antenna terminals	-
§27.53(h), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	-
§2.1055(d)	6.3	Frequency stability, voltage variation	-

LTE5:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	-
§22.913(a)	4.4	Radiated RF output power	PASSED
N/A	5.4	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§22.917(a)	4.5	Band edge compliance	-
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	-
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	-
§2.1055(d)	4.3	Frequency stability, voltage variation	-

LTE12:

Section in CFR 47	Section in RSS-GEN or RSS-130	Name of the test	Result
§2.1046(a)	4.4	Conducted RF output power	-
§27.50(c)10	4.4	Radiated RF output power	PASSED
N/A	N/A	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§27.53(f)	4.6	Band edge compliance	-
§27.53(f)	4.6	Spurious emissions at antenna terminals	-
§27.53(f)	4.6	Spurious radiated emissions	PASSED
§27.54	4.3	Frequency stability, temperature variation	-
§27.54	4.3	Frequency stability, voltage variation	-

LTE13:

Section in CFR 47	Section in RSS-GEN or RSS-130	Name of the test	Result
§2.1046(a)	4.4	Conducted RF output power	-
§27.50(b)(10)	4.4	Radiated RF output power	PASSED
N/A	4.4	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§27.53(c)(2)(4)	4.6	Band edge compliance	-
§27.53(c)(2)(4).(f), §2.1051	4.6	Spurious emissions at antenna terminals	-
§27.53(c)(2)(4).(f), §2.1053	4.6	Spurious radiated emissions	PASSED
§2.1055(a)	4.3 (a)	Frequency stability, temperature variation	-
§2.1055(d)	4.3 (a)	Frequency stability, voltage variation	-

LTE17:

Section in CFR 47	Section in RSS-GEN or RSS-130	Name of the test	Result
§2.1046(a)	4.4	Conducted RF output power	-
§27.50(c)(10)	4.4	Radiated RF output power	PASSED
N/A	N/A	Peak to average power ratio	-
§2.1049(h)	6.6	99 % occupied bandwidth	-
§27.53(g)	4.6	Band edge compliance	-
§27.53(g), §2.1051	4.6	Spurious emissions at antenna terminals	-
§27.53(g), §2.1051	4.6	Spurious radiated emissions	PASSED
§2.1055(a)	4.3 (a)	Frequency stability, temperature variation	-
§2.1055(d)	4.3 (a)	Frequency stability, voltage variation	-

PASSED
 FAILED
 NP

The EUT complies with the essential requirements in the standard.
 The EUT does not comply with the essential requirements in the standard.
 The test was not performed by the TCC Microsoft Laboratory.

CONTENTS

1. Summary for FCC Part 22/24/27 Compliance Test Report	2
1.1. EUT and Accessory Information	2
1.2. Summary of Test Results	3
2. Radiated RF output power (FCC §24.232(b), §27.50(d)(2), §27.50(c)(10), §27.50(b)(10), §27.50(c)10, §22.913(a), §27.50(d)(4), RSS-133 6.4, RSS-139 6.4, RSS-132 4.4, RSS-130 4.4)	8
2.2. Test method and limit	8
2.3. GSM 850 test results	10
2.4. GSM 850 E-GPRS (MSC9) test results.....	10
2.5. GSM 1900 test results	10
2.6. GSM 1900 E-GPRS (MSC9) test results.....	10
2.7. WCDMA2 test results	11
2.8. WCDMA4 test results	11
2.9. WCDMA5 test results	11
2.10. LTE2 test results.....	11
2.11. LTE4 test results.....	12
2.12. LTE5 test results.....	13
2.13. LTE12 test results.....	14
2.14. LTE13 test results.....	15
2.15. LTE17 test results.....	16
3. Spurious radiated emissions (FCC §24.238(a), §24.238(a), §2.1053, §27.53(l), §2.1053, §27.53 a 4 i ii iii, §27.53(g), §2.1051, §27.53(c)(2)(4),(f), §2.1053, §27.53(f), §27.53(l), §2.1053, §22.917(a), §2.1053, §27.53(h), §2.1053, §2.1053, RSS-133 6.5, RSS-139 6.5, RSS-132 4.5, RSS- 199 4.5(b), RSS-130 4.6, RSS-195 5.6.2).....	17
3.2. Test method and limit	18
3.3. GSM 850 test results	19
3.4. GSM 850 E-GPRS (MSC9) test results.....	19
3.5. GSM 1900 test results	19
3.6. GSM 1900 E-GPRS (MSC9) test results.....	19
3.7. WCDMA2 test results	20
3.8. WCDMA4 test results	21
3.9. WCDMA5 test results	21
3.10. LTE2 test results.....	22
3.11. LTE4 test results.....	22
3.12. LTE5 test results.....	23
3.13. LTE12 test results.....	23
3.14. LTE13 test results.....	24

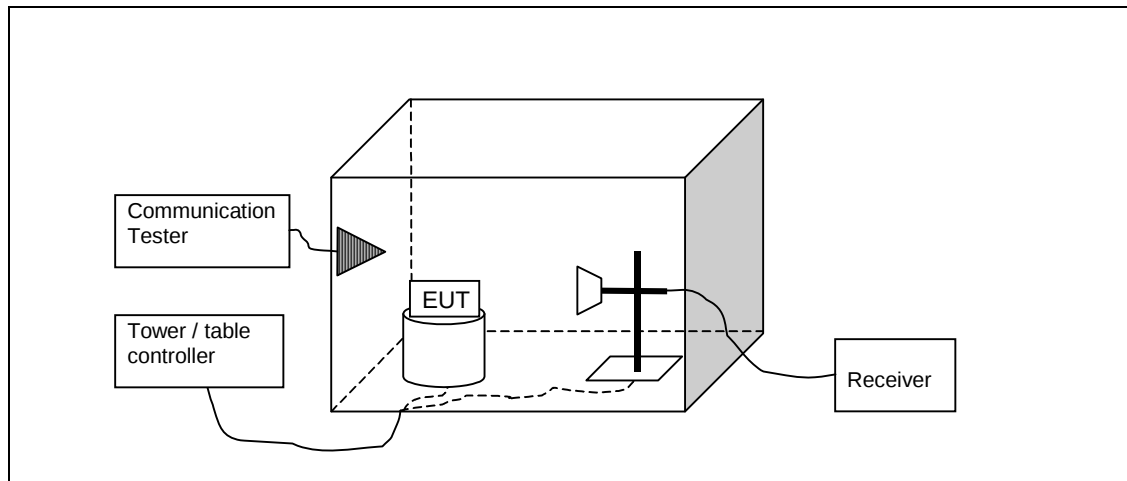
3.15.	LTE17 test results	25
4.	Test Equipment.....	26
4.1.	Conducted measurements	26
4.2.	Radiated measurements	27
5.	Appendix	28
5.1.	Conducted LTE RF output power values measured by the customer.....	28

2. Radiated RF output power

(FCC §24.232(b), §27.50(d)(2), §27.50(c)(10), §27.50(b)(10), §27.50(c)10, §22.913(a), §27.50(d)(4), RSS-133 6.4, RSS-139 6.4, RSS-132 4.4, RSS-130 4.4)

EUT with DUT number	RM-1105, DUT 400039
Accessories with DUT numbers	BV-T5E, DUT 400027
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 48 / 101.3
Date of measurements	23-Sep-2015
Measured by	Timo Raiskio

2.1.1 Test setup



2.2. Test method and limit

The measurement is made according to TIA-603-C-2004 as follows:

The measurement is performed in the Anechoic Chamber with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system. The turntable is rotated 360 degrees and this is repeated for both horizontal and vertical receive antenna polarizations.

The EUT is placed on a nonconductive plate at 170 cm height.

The substitution method is used. The measurement results are obtained as described below:

$$P[dBm] = P_{SUBST\ TX} + P_{MEAS} - P_{SUBST\ RX} - L_{SUBST\ CABLES} + G_{SUBST\ TX\ ANT}$$

Where $P_{SUBST\ TX}$ is signal generator level. P_{MEAS} is measured power level from the EUT. $P_{SUBST\ RX}$ is measured power level in substitute measurement. $L_{SUBST\ CABLE}$ is the loss of the cable between the signal generator and the substitution antenna and $G_{SUBST\ TX\ ANT}$ is substitution antenna gain.

Limits for radiated RF output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
1850 - 1910	2 EIRP	33

824 - 849	7 ERP	38.5
699 - 712	2 ERP	33
777 - 787	3 ERP	34.8
704 - 716	3 ERP	34.8
1710 - 1755	1 EIRP	30

2.3. GSM 850 test results

RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
128 / 824.2	28	0.632	-4.33	32.33	VERTICAL	PASSED
190 / 836.6	28.08	0.643	-3.55	31.63	HORIZONTAL	PASSED
251 / 848.8	26.79	0.477	-3.61	30.4	HORIZONTAL	PASSED

2.4. GSM 850 E-GPRS (MSC9) test results

RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
128 / 824.2	23.19	0.208	-9.14	32.33	VERTICAL	PASSED
190 / 836.6	23.32	0.215	-8.31	31.63	HORIZONTAL	PASSED
251 / 848.8	22.86	0.193	-7.95	30.81	VERTICAL	PASSED

2.5. GSM 1900 test results

RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
512 / 1850.2	27.74	0.594	-15.03	42.77	HORIZONTAL	PASSED
661 / 1880	27.91	0.618	-14.85	42.76	HORIZONTAL	PASSED
810 / 1909.8	27.81	0.605	-15.1	42.91	HORIZONTAL	PASSED

2.6. GSM 1900 E-GPRS (MSC9) test results

RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
512 / 1850.2	23.91	0.246	-18.86	42.77	HORIZONTAL	PASSED
661 / 1880	23.93	0.247	-18.83	42.76	HORIZONTAL	PASSED
810 / 1909.8	23.82	0.241	-19.09	42.91	HORIZONTAL	PASSED

2.7. WCDMA2 test results

RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
9262 / 1852.4	22.94	0.197	-19.85	42.79	HORIZONTAL	PASSED
9400 / 1880	22.49	0.177	-20.27	42.76	HORIZONTAL	PASSED
9538 / 1907.6	21.59	0.144	-21.26	42.85	HORIZONTAL	PASSED

2.8. WCDMA4 test results

RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1312 / 1712.4	22.53	0.179	-19.27	41.8	HORIZONTAL	PASSED
1412 / 1732.4	22.81	0.191	-19.08	41.89	HORIZONTAL	PASSED
1513 / 1752.6	22.62	0.183	-19.27	41.89	HORIZONTAL	PASSED

2.9. WCDMA5 test results

RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
4132 / 826.4	18.5	0.071	-13.98	32.48	VERTICAL	PASSED
4175 / 835	18.7	0.074	-13.23	31.93	VERTICAL	PASSED
4233 / 846.6	17.6	0.058	-13.19	30.79	VERTICAL	PASSED

2.10. LTE2 test results

FDD, CBW 3MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 1851.5	23.71	0.235	-19.06	42.77	HORIZONTAL	PASSED
18900 / 1880	23.34	0.216	-19.42	42.76	HORIZONTAL	PASSED
18900 / 1908.5	22.45	0.176	-20.43	42.88	HORIZONTAL	PASSED

FDD, CBW 20MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 1860	23.94	0.248	-18.86	42.8	HORIZONTAL	PASSED
18900 / 1880	23.87	0.244	-18.89	42.76	HORIZONTAL	PASSED
18900 / 1900	23.25	0.211	-19.58	42.83	HORIZONTAL	PASSED

FDD, CBW 3MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 1851.5	23.57	0.228	-19.2	42.77	HORIZONTAL	PASSED
18900 / 1880	23.75	0.237	-19.01	42.76	HORIZONTAL	PASSED
18900 / 1908.5	22.64	0.183	-20.24	42.88	HORIZONTAL	PASSED

FDD, CBW 20MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 1860	23.39	0.218	-19.41	42.8	HORIZONTAL	PASSED
18900 / 1880	23.48	0.223	-19.28	42.76	HORIZONTAL	PASSED
18900 / 1900	22.96	0.198	-19.87	42.83	HORIZONTAL	PASSED

2.11. LTE4 test results

FDD, CBW 3MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 1711.5	24.18	0.262	-17.61	41.79	HORIZONTAL	PASSED
20175 / 1732.5	24.65	0.291	-17.24	41.89	HORIZONTAL	PASSED
20175 / 1753.5	24.6	0.288	-17.28	41.88	HORIZONTAL	PASSED

FDD, CBW 20MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 1720	24.6	0.288	-17.29	41.89	HORIZONTAL	PASSED
20175 / 1732.5	24.17	0.261	-17.72	41.89	HORIZONTAL	PASSED
20175 / 1745	23.81	0.241	-18.09	41.9	HORIZONTAL	PASSED

FDD, CBW 3MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 1711.5	23.92	0.246	-17.87	41.79	HORIZONTAL	PASSED
20175 / 1732.5	24.14	0.26	-17.75	41.89	HORIZONTAL	PASSED
20175 / 1753.5	24.53	0.284	-17.35	41.88	HORIZONTAL	PASSED

FDD, CBW 20MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 1720	24.13	0.259	-17.76	41.89	HORIZONTAL	PASSED
20175 / 1732.5	24.02	0.252	-17.87	41.89	HORIZONTAL	PASSED
20175 / 1745	23.73	0.236	-18.17	41.9	HORIZONTAL	PASSED

2.12. LTE5 test results

FDD, CBW 3MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 825.5	19.26	0.084	-13.1	32.36	VERTICAL	PASSED
20525 / 836.5	20.1	0.102	-11.54	31.64	HORIZONTAL	PASSED
20525 / 847.5	19.23	0.084	-11.55	30.78	VERTICAL	PASSED

FDD, CBW 10MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 829	19.79	0.095	-12.43	32.22	VERTICAL	PASSED
20525 / 836.5	20.46	0.111	-11.18	31.64	HORIZONTAL	PASSED
20525 / 844	19.38	0.087	-11.62	31	VERTICAL	PASSED

FDD, CBW 1.4MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 824.7	20.25	0.106	-11.99	32.24	HORIZONTAL	PASSED
20525 / 836.5	20.62	0.115	-11.02	31.64	HORIZONTAL	PASSED
20525 / 848.3	19.31	0.085	-11.1	30.41	HORIZONTAL	PASSED

FDD, CBW 10MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 829	19.58	0.091	-12.65	32.23	HORIZONTAL	PASSED
20525 / 836.5	20.03	0.101	-11.61	31.64	VERTICAL	PASSED
20525 / 844	19.33	0.086	-11.67	31	VERTICAL	PASSED

2.13. LTE12 test results

FDD, CBW 3MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 700.5	18.21	0.066	-11.33	29.54	HORIZONTAL	PASSED
23095 / 707.5	18.9	0.078	-11.25	30.15	HORIZONTAL	PASSED
23095 / 714.5	19.47	0.088	-10.86	30.33	HORIZONTAL	PASSED

FDD, CBW 10MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 704	18.42	0.069	-11.51	29.93	HORIZONTAL	PASSED
23095 / 707.5	18.72	0.074	-11.43	30.15	HORIZONTAL	PASSED
23095 / 711	19.52	0.09	-10.78	30.3	HORIZONTAL	PASSED

FDD, CBW 3MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 700.5	17.69	0.059	-11.85	29.54	HORIZONTAL	PASSED
23095 / 707.5	18.61	0.073	-11.54	30.15	HORIZONTAL	PASSED
23095 / 714.5	19.58	0.091	-10.75	30.33	HORIZONTAL	PASSED

FDD, CBW 10MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
0 / 704	18.11	0.065	-11.82	29.93	HORIZONTAL	PASSED
23095 / 707.5	18.76	0.075	-11.39	30.15	HORIZONTAL	PASSED
23095 / 711	19.84	0.096	-10.46	30.3	HORIZONTAL	PASSED

2.14. LTE13 test results

FDD, CBW 5MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
23205 / 779.5	19.33	0.086	-12.06	31.39	VERTICAL	PASSED
23230 / 782	19.08	0.081	-12.13	31.21	VERTICAL	PASSED
23255 / 784.5	18.78	0.075	-12.18	30.96	VERTICAL	PASSED

FDD, CBW 10MHz, QPSK, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
23230 / 782	18.93	0.078	-12.28	31.21	VERTICAL	PASSED

FDD, CBW 5MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
23205 / 779.5	19.15	0.082	-12.24	31.39	VERTICAL	PASSED
23230 / 782	18.63	0.073	-12.58	31.21	VERTICAL	PASSED
23255 / 784.5	18.36	0.069	-12.6	30.96	VERTICAL	PASSED

FDD, CBW 10MHz, 16QAM, 1RB mid, RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
23230 / 782	18.91	0.078	-12.3	31.21	VERTICAL	PASSED

2.15. LTE17 test results

FDD, CBW 5MHz, QPSK, 1RB mid, RMS detector

Channel / f_c [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
23755 / 706.5	18.91	0.078	-11.18	30.09	HORIZONTAL	PASSED
23790 / 710	19.45	0.088	-10.84	30.29	HORIZONTAL	PASSED
23825 / 713.5	19.92	0.098	-10.4	30.32	HORIZONTAL	PASSED

FDD, CBW 10MHz, QPSK, 1RB mid, RMS detector

Channel / f_c [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
23780 / 709	19.82	0.096	-10.41	30.23	HORIZONTAL	PASSED
23790 / 710	19.66	0.093	-10.63	30.29	HORIZONTAL	PASSED
23800 / 711	19.58	0.091	-10.72	30.3	HORIZONTAL	PASSED

FDD, CBW 5MHz, 16QAM, 1RB mid, RMS detector

Channel / f_c [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
23755 / 706.5	18.67	0.074	-11.42	30.09	HORIZONTAL	PASSED
23790 / 710	19.25	0.084	-11.04	30.29	HORIZONTAL	PASSED
23825 / 713.5	19.23	0.084	-11.09	30.32	HORIZONTAL	PASSED

FDD, CBW 10MHz, 16QAM, 1RB mid, RMS detector

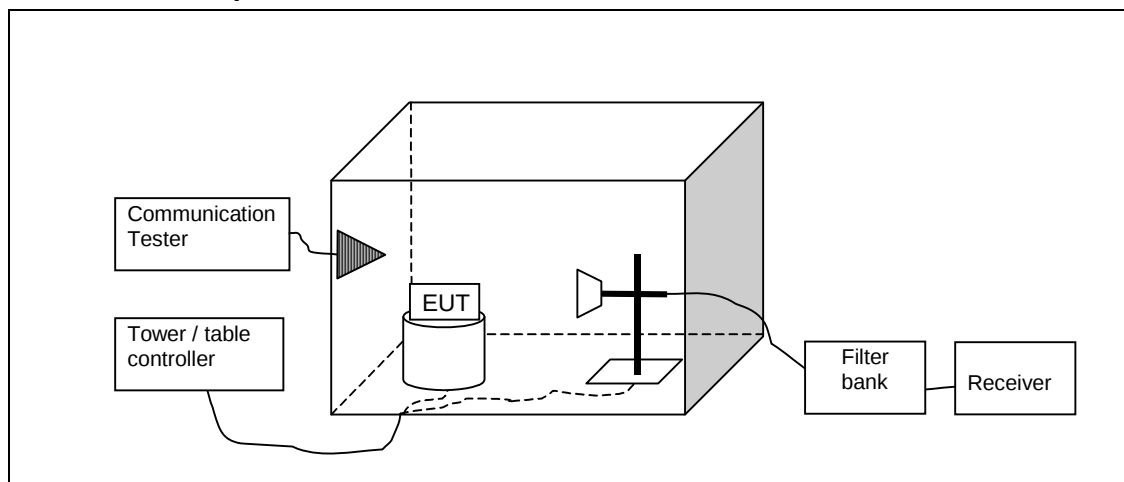
Channel / f_c [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
23780 / 709	19.61	0.091	-10.62	30.23	HORIZONTAL	PASSED
23790 / 710	19.46	0.088	-10.83	30.29	HORIZONTAL	PASSED
23800 / 711	19.71	0.093	-10.59	30.3	HORIZONTAL	PASSED

3. Spurious radiated emissions

(FCC §24.238(a), §24.238(a), §2.1053, §27.53(l), §2.1053, §27.53 a 4 i ii iii, §27.53(g), §2.1051, §27.53(c)(2)(4),(f), §2.1053, §27.53(f), §27.53(l), §2.1053, §22.917(a), §2.1053, §27.53(h), §2.1053, §2.1053, RSS-133 6.5, RSS-139 6.5, RSS-132 4.5, RSS-199 4.5(b), RSS-130 4.6, RSS-195 5.6.2)

EUT with DUT number	RM-1105, DUT 400035
Accessories with DUT numbers	BV-T5E, DUT 400027 ; AC-100E, DUT 400013 ; WH-308, DUT 400014
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 102.8
Date of measurements	13-Aug-2015
Measured by	Timo Raiskio

3.1.1 Test setup



3.2. Test method and limit

The measurement is made according to TIA-603-C-2004 as follows:

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The measurement is made up to 10th harmonic of the EUT highest TX channel.

The substitution method is used.

The measurement results are obtained as described below:

$$P [dBm] = P_{SUBST\ TX} + G_{SUBST\ TX\ ANT} - L_{SUBST\ CABLE}$$

Where $P_{SUBST\ TX}$ is signal generator level, which produces the same receiver reading P_{MEAS} in dBm as EUT. $G_{SUBST\ TX\ ANT}$ is substitution antenna gain and $L_{SUBST\ CABLE}$ is the loss of the cable between the signal generator and the substitution antenna.

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850	30 - 8500	-13
GSM 1900	30 - 19100	-13
WCDMA2	30 - 19100	-13
WCDMA4	30 - 17500	-13
WCDMA5	30 - 8500	-13
LTE2	30 - 19100	-13
LTE4	30 - 17500	-13
LTE5	30 - 8500	-13
LTE7	30 - 25700	-13
LTE12	30 - 7200	-13
LTE13	30 - 8000 763-775 and 793-805 1559 - 1610 1559 - 1610	-13 (RBW = 100 kHz, ERP) -35 (RBW = 6.25 kHz, ERP) -40 (RBW = 1 MHz) -50 (RBW = 700 Hz)
LTE17	30 - 7200	-13 (RBW = 100 kHz, ERP)
LTE30	30 - 23100	-13
LTE41	30 - 25700	-13

3.3. GSM 850 test results

Channel 190 / 836.6 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1673.307	-44.66	0.0342	-37.96	-6.7	HORIZONTAL	PASSED
1673.347	-45.6	0.02754	-38.9	-6.7	HORIZONTAL	PASSED
2509.699	-38.97	0.12677	-39.17	0.2	HORIZONTAL	PASSED
2509.9	-38.93	0.12794	-39.13	0.2	HORIZONTAL	PASSED
3380.24	-60.24	0.00095	-60.84	0.6	VERTICAL	PASSED

3.4. GSM 850 E-GPRS (MSC9) test results

Channel 190 / 836.6 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1673.26	-54.03	0.00395	-47.33	-6.7	HORIZONTAL	PASSED
2509.78	-49.19	0.01205	-49.39	0.2	HORIZONTAL	PASSED

3.5. GSM 1900 test results

Channel 661 / 1880.0 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
5647.174	-52.27	0.00593	-60.37	8.1	HORIZONTAL	PASSED
7574.028	-48.51	0.01409	-63.01	14.5	VERTICAL	PASSED
9226.453	-45.29	0.02958	-64.59	19.3	VERTICAL	PASSED
9282.725	-44	0.03981	-63.5	19.5	VERTICAL	PASSED
9321.683	-44.9	0.03236	-64	19.1	VERTICAL	PASSED
10826.733	-44.77	0.03334	-63.07	18.3	VERTICAL	PASSED

3.6. GSM 1900 E-GPRS (MSC9) test results

Channel 661 / 1880.0 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3763.747	-56.93	0.00203	-61.43	4.5	VERTICAL	PASSED
5640.02	-44.16	0.03837	-52.36	8.2	HORIZONTAL	PASSED

3.7. WCDMA2 test results

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1910.662	-45.36	0.02911	-42.16	-3.2	HORIZONTAL	PASSED
3754.85	-56.44	0.00227	-60.84	4.4	HORIZONTAL	PASSED
5643.347	-48.85	0.01303	-56.95	8.1	HORIZONTAL	PASSED
7517.335	-48.58	0.01387	-62.58	14	HORIZONTAL	PASSED
9248.397	-44.69	0.03396	-63.79	19.1	VERTICAL	PASSED
9329.399	-44.4	0.03631	-63.2	18.8	VERTICAL	PASSED
9330.762	-43.82	0.0415	-62.52	18.7	VERTICAL	PASSED
9391.242	-44.31	0.03707	-62.71	18.4	VERTICAL	PASSED
9563.948	-45.62	0.02742	-62.82	17.2	HORIZONTAL	PASSED
9903.427	-44.88	0.03251	-63.08	18.2	VERTICAL	PASSED
11274.248	-44.54	0.03516	-63.34	18.8	HORIZONTAL	PASSED
13152.285	-53.16	0.00483	-64.66	11.5	HORIZONTAL	PASSED
15048.317	-51.1	0.00776	-65.5	14.4	VERTICAL	PASSED
16913.327	-50.75	0.00841	-67.15	16.4	VERTICAL	PASSED

3.8. WCDMA4 test results

Channel 1412 / 1732.4 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1714.94	-33.92	0.40551	-29.42	-4.5	HORIZONTAL	PASSED
1755.281	-44.3	0.03715	-39.9	-4.4	HORIZONTAL	PASSED
1755.4	-44.85	0.03273	-40.45	-4.4	HORIZONTAL	PASSED
1759.399	-46.72	0.02128	-42.32	-4.4	HORIZONTAL	PASSED
3465.181	-55.9	0.00257	-59.9	4	HORIZONTAL	PASSED
5194.054	-46.03	0.02495	-53.73	7.7	VERTICAL	PASSED
6923.768	-47.5	0.01778	-58.6	11.1	VERTICAL	PASSED
7513.206	-49.76	0.01057	-63.46	13.7	VERTICAL	PASSED
8661.299	-46.17	0.02415	-62.77	16.6	HORIZONTAL	PASSED
9268.717	-43.97	0.04009	-63.67	19.7	VERTICAL	PASSED
10402.757	-45.12	0.03076	-63.12	18	VERTICAL	PASSED
12118.443	-45.76	0.02655	-64.16	18.4	HORIZONTAL	PASSED
13854.851	-52.43	0.00571	-64.33	11.9	HORIZONTAL	PASSED
15595.107	-50.39	0.00914	-66.09	15.7	VERTICAL	PASSED
17317.287	-49.33	0.01167	-67.13	17.8	VERTICAL	PASSED

3.9. WCDMA5 test results

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
821.759	-45.47	0.02838	-77.67	32.2	HORIZONTAL	PASSED
848.402	-46.4	0.02291	-77.2	30.8	VERTICAL	PASSED
848.517	-47.28	0.01871	-78.08	30.8	VERTICAL	PASSED
1006.874	-62.72	0.00053	-52.42	-10.3	VERTICAL	PASSED
1673.467	-59.12	0.00122	-52.52	-6.6	VERTICAL	PASSED
2501.543	-54.73	0.00337	-54.63	-0.1	HORIZONTAL	PASSED
2504.339	-54.77	0.00333	-54.67	-0.1	HORIZONTAL	PASSED
2516.012	-53.73	0.00424	-54.33	0.6	HORIZONTAL	PASSED
3348.798	-58.54	0.0014	-59.24	0.7	VERTICAL	PASSED
4184.559	-56.59	0.00219	-60.19	3.6	HORIZONTAL	PASSED
5018.958	-54.67	0.00341	-60.67	6	VERTICAL	PASSED
5844.419	-54.17	0.00383	-59.97	5.8	HORIZONTAL	PASSED
6674.529	-50.96	0.00802	-59.26	8.3	VERTICAL	PASSED
7514.619	-50.93	0.00807	-62.83	11.9	HORIZONTAL	PASSED
8341.283	-50.15	0.00966	-63.45	13.3	HORIZONTAL	PASSED

3.10. LTE2 test results

Channel 18900 / 1880.0 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1894.765	-55.67	0.00271	-52.37	-3.3	HORIZONTAL	PASSED
3762.625	-66.48	0.00022	-70.98	4.5	HORIZONTAL	PASSED
5636.092	-62.57	0.00055	-70.77	8.2	HORIZONTAL	PASSED
7513.727	-59.87	0.00103	-73.97	14.1	HORIZONTAL	PASSED

Channel 18900 / 1880.0 MHz

FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1865.316	-54.06	0.00393	-50.86	-3.2	HORIZONTAL	PASSED
1894.41	-57.83	0.00165	-54.53	-3.3	HORIZONTAL	PASSED
1895.266	-52.33	0.00585	-49.03	-3.3	HORIZONTAL	PASSED
3760.541	-66.24	0.00024	-70.74	4.5	HORIZONTAL	PASSED
5633.607	-62.36	0.00058	-70.56	8.2	HORIZONTAL	PASSED
7518.697	-59.95	0.00101	-73.95	14	HORIZONTAL	PASSED

3.11. LTE4 test results

Channel 20175 / 1732.5 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3465.541	-66.3	0.00023	-70.3	4	HORIZONTAL	PASSED
5198.041	-63.24	0.00047	-70.74	7.5	VERTICAL	PASSED
6925.01	-58.49	0.00142	-69.69	11.2	VERTICAL	PASSED
8669.454	-57.31	0.00186	-74.31	17	VERTICAL	PASSED
10387.645	-55.9	0.00257	-73.9	18	VERTICAL	PASSED

Channel 20175 / 1732.5 MHz

FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3465.581	-66.52	0.00022	-70.52	4	HORIZONTAL	PASSED
5190.266	-62.95	0.00051	-70.75	7.8	VERTICAL	PASSED
6925.01	-58.69	0.00135	-69.89	11.2	VERTICAL	PASSED
8671.578	-57.24	0.00189	-74.24	17	VERTICAL	PASSED
10387.645	-55.9	0.00257	-73.9	18	VERTICAL	PASSED

3.12. LTE5 test results

Channel 20525 / 836.5 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
858.619	-61.77	0.00067	-93.07	31.3	HORIZONTAL	PASSED
1673.261	-71.61	7E-05	-64.91	-6.7	HORIZONTAL	PASSED
2509.961	-68.91	0.00013	-69.11	0.2	HORIZONTAL	PASSED
3338.285	-78.49	1E-05	-79.09	0.6	HORIZONTAL	PASSED

Channel 20525 / 836.5 MHz

FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
857.978	-61.84	0.00065	-93.04	31.2	HORIZONTAL	PASSED
1673.461	-72.46	6E-05	-65.76	-6.7	HORIZONTAL	PASSED
2510.843	-73.96	4E-05	-74.26	0.3	HORIZONTAL	PASSED
3343.856	-77.96	2E-05	-78.46	0.5	HORIZONTAL	PASSED

3.13. LTE12 test results

Channel 23095 / 707.5 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1415.421	-70.46	9E-05	-61.76	-8.7	HORIZONTAL	PASSED
2123.041	-55.16	0.00305	-51.76	-3.4	HORIZONTAL	PASSED
2835.351	-72.08	6E-05	-74.58	2.5	HORIZONTAL	PASSED

Channel 23095 / 707.5 MHz

FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1415.421	-71.38	7E-05	-62.68	-8.7	HORIZONTAL	PASSED
2123.001	-55.68	0.0027	-52.28	-3.4	HORIZONTAL	PASSED
2839.439	-72.11	6E-05	-74.91	2.8	VERTICAL	PASSED

3.14. LTE13 test results

Channel 23230 / 782 MHz
FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
752.064	-55.87	0.00259	-86.97	31.1	VERTICAL	PASSED
764.575	-74.49	4E-05	-106.99	32.5	HORIZONTAL	PASSED
795.001	-75.23	3E-05	-107.03	31.8	HORIZONTAL	PASSED
1564.381	-66.37	0.00023	-58.77	-7.6	HORIZONTAL	PASSED
1609.96	-69.19	0.00012	-62.89	-6.3	VERTICAL	PASSED
2346.581	-62.36	0.00058	-60.76	-1.6	VERTICAL	PASSED
2968.597	-70.85	8E-05	-73.95	3.1	HORIZONTAL	PASSED
3118.08	-77.58	2E-05	-79.08	1.5	HORIZONTAL	PASSED
7999.783	-67.74	0.00017	-80.94	13.2	HORIZONTAL	PASSED

Channel 23230 / 782 MHz
FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
750.22	-55.87	0.00259	-86.97	31.1	VERTICAL	PASSED
764.998	-74.43	4E-05	-107.03	32.6	HORIZONTAL	PASSED
795.022	-75.23	3E-05	-107.03	31.8	HORIZONTAL	PASSED
1564.381	-67.02	0.0002	-59.42	-7.6	HORIZONTAL	PASSED
1609.88	-69.29	0.00012	-62.99	-6.3	VERTICAL	PASSED
2346.621	-66.28	0.00024	-64.68	-1.6	HORIZONTAL	PASSED
2967.956	-71.49	7E-05	-74.59	3.1	HORIZONTAL	PASSED
3118.04	-77.58	2E-05	-79.08	1.5	HORIZONTAL	PASSED
7999.98	-69.08	0.00012	-82.58	13.5	VERTICAL	PASSED

3.15. LTE17 test results

Channel 23790 / 710 MHz
FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1420.341	-62.06	0.00062	-53.36	-8.7	HORIZONTAL	PASSED
2130.581	-56.73	0.00212	-53.73	-3	VERTICAL	PASSED
2845.23	-71.93	6E-05	-74.63	2.7	HORIZONTAL	PASSED

Channel 23790 / 710 MHz
FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1420.341	-63.33	0.00046	-54.63	-8.7	HORIZONTAL	PASSED
2130.541	-54.95	0.0032	-51.65	-3.3	HORIZONTAL	PASSED
2845.311	-71.59	7E-05	-74.29	2.7	HORIZONTAL	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM210233	Communication Tester	CMU200	R&S	22/24/27
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C, 15E
TM23007	Oscilloscope	TDS684B	Tektronix	15E
TM22806	Battery	BAT 20/E	Fiskars	15C, 15B
TM22805	UPS	PS 20/1.2	Fiskars	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
-	Temperature test chamber	VT 4002	Vötsch	22/24/27
2001	Bluetooth tester	CBT	R&S	15C, 15B
2009	LISN 50 µH	ENV216	R&S	15C, 15B
2010	LISN 50 µH	ENV216	R&S	15C, 15B
2012	Power splitter	11667B	Agilent	22/24/27, 15C
2013	Attenuator	8493C	Agilent	22/24/27, 15C
2014	Attenuator	8493C	Agilent	22/24/27, 15C
2019	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2020	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2021	Communication Tester	CMW500	R&S	22/24/27
2022	Communication Tester	CMU200	R&S	22/24/27
2023	Spectrum Analyzer	ESMI-RF	R&S	15B/15C
2024	Analyzer display unit	ESAI-D	R&S	15B/15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
-	Bluetooth tester	CBT	R&S	15C, 15B
-	Communication Tester	CMU200	R&S	22/24/27, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15E, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15E, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15E, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15E, 15B
-	RF system panel	OSP130	R&S	22/24/27, 15C, 15E, 15B
-	Mini mast	2075-2	ETS Lindgren	22/24/27, 15C, 15B
TM38843	Mini mast	2075	Emco	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	Emco	22/24/27, 15C, 15B
TM30643	LISN 50 μ H	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 μ H	LISN-5-20-2	FCC	22/24/27, 15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C, 15B
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	Miteq	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	Miteq	22/24/27, 15C, 15B
TM30599	Semi anechoic chamber	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15E, 15B
TM38066	High pass filter	WHKX3.0/18G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
2028	High pass filter	WHKX 1.0/15G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
TM37545	Tunable notch filter	800.0/960.0-0.2/40-8SSK	Wainwright	22
TM26512	Tunable notch filter	WRCD1850/1910-0.2/40-10SSK	Wainwright	24
-	Band reject filter	WRCG1877/1883-1870/1890-40/6EE	Wainwright	24
-	Band reject filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
TM23892	Controller	G-1000SDX	Yaesu	22/24/27, 15C, 15E
2001	Bluetooth tester	CBT	R&S	15C, 15B
2002	Communication Tester	CMU200	R&S	22/24/27, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27
2021	Communication Tester	CMW500	R&S	22/24/27
2025	Antenna	HFH2-Z2	R&S	15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
2052	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C, 15B, 15E
-	Antenna	QSH18S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Bluetooth tester	CBT	R&S	15C, 15B

5. Appendix

5.1. Conducted LTE RF output power values measured by the customer

5.1.1 Tolerance

Tolerance [dB]	
Low	-0.5
High	0.4

5.1.2 LTE 2

SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch18607 / 1850.7 MHz	Ch18900 / 1880 MHz	Ch19193 / 1909.3 MHz	Ch18607 / 1850.7 MHz	Ch18900 / 1880 MHz	Ch19193 / 1909.3 MHz
LTE2 1.4 MHz	QPSK 16QAM	1	2	23.8	23.6	23.2			
		1	2	22.7	22.7	22.4			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch18615 / 1851.5 MHz	Ch18900 / 1880 MHz	Ch19185 / 1908.5 MHz	Ch18615 / 1851.5 MHz	Ch18900 / 1880 MHz	Ch19185 / 1908.5 MHz
LTE2 3 MHz	QPSK 16QAM	1	7	23.9	23.7	23.4	23.9	23.7	23.3
		1	7	23.3	23.1	22.9	23.1	23.2	22.9
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch18625 / 1852.5 MHz	Ch18900 / 1880 MHz	Ch19175 / 1907.5 MHz	Ch18625 / 1852.5 MHz	Ch18900 / 1880 MHz	Ch19175 / 1907.5 MHz
LTE2 5 MHz	QPSK 16QAM	1	12	23.8	23.8	23.5	23.8	23.7	23.4
		1	12	23.0	23.0	22.8	23.0	23.0	22.7
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch18650 / 1855 MHz	Ch18900 / 1880 MHz	Ch19150 / 1905 MHz	Ch18650 / 1855 MHz	Ch18900 / 1880 MHz	Ch19150 / 1905 MHz
LTE2 10 MHz	QPSK 16QAM	1	24	23.8	23.8	23.5	23.7	23.8	23.4
		1	24	23.3	22.9	22.5	23.2	22.8	22.4
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch18675 / 1857.5 MHz	Ch18900 / 1880 MHz	Ch19125 / 1902.5 MHz	Ch18675 / 1857.5 MHz	Ch18900 / 1880 MHz	Ch19125 / 1902.5 MHz
LTE2 15 MHz	QPSK 16QAM	1	36	23.7	23.6	23.6	23.7	23.6	23.6
		1	36	22.7	22.9	23.1	22.9	22.7	22.8
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch18700 / 1860 MHz	Ch18900 / 1880 MHz	Ch19100 / 1900 MHz	Ch18700 / 1860 MHz	Ch18900 / 1880 MHz	Ch19100 / 1900 MHz
LTE2 20 MHz	QPSK 16QAM	1	49	23.6	23.7	23.6	23.7	23.6	23.6
		1	49	23.1	22.8	22.9	23.2	23.1	22.9

5.1.3 LTE 4

SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch19957 / 1710.7 MHz	Ch20175 / 1732.5 MHz	Ch20393 / 1754.3 MHz	Ch19957 / 1710.7 MHz	Ch20175 / 1732.5 MHz	Ch20393 / 1754.3 MHz
LTE4	QPSK	1	2	23.9	23.7	23.7			
1.4 MHz	16QAM	1	2	23.0	23.0	23.1			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch19965 / 1711.5 MHz	Ch20175 / 1732.5 MHz	Ch20385 / 1753.5 MHz	Ch19965 / 1711.5 MHz	Ch20175 / 1732.5 MHz	Ch20385 / 1753.5 MHz
LTE4	QPSK	1	7	24.0	23.8	23.6	24.2	23.8	23.7
3 MHz	16QAM	1	7	23.1	22.8	22.6	23.1	23.3	23.2
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch19975 / 1712.5 MHz	Ch20175 / 1732.5 MHz	Ch20375 / 1752.5 MHz	Ch19975 / 1712.5 MHz	Ch20175 / 1732.5 MHz	Ch20375 / 1752.5 MHz
LTE4	QPSK	1	12	23.8	23.5	23.6	23.8	23.6	23.6
5 MHz	16QAM	1	12	23.0	22.8	23.2	23.3	22.9	23.0
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20000 / 1715 MHz	Ch20175 / 1732.5 MHz	Ch20350 / 1750 MHz	Ch20000 / 1715 MHz	Ch20175 / 1732.5 MHz	Ch20350 / 1750 MHz
LTE4	QPSK	1	24	23.7	23.6	23.6	23.8	23.7	23.7
10 MHz	16QAM	1	24	23.3	22.8	22.9	23.1	23.1	22.8
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20025 / 1717.5 MHz	Ch20175 / 1732.5 MHz	Ch20325 / 1747.5 MHz	Ch20025 / 1717.5 MHz	Ch20175 / 1732.5 MHz	Ch20325 / 1747.5 MHz
LTE4	QPSK	1	36	23.6	23.6	23.4	23.5	23.5	23.4
15 MHz	16QAM	1	36	23.0	22.9	22.7	22.6	22.4	22.5
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20050 / 1720 MHz	Ch20175 / 1732.5 MHz	Ch20300 / 1745 MHz	Ch20050 / 1720 MHz	Ch20175 / 1732.5 MHz	Ch20300 / 1745 MHz
LTE4	QPSK	1	49	23.6	23.5	23.5	23.6	23.5	23.5
20 MHz	16QAM	1	49	22.6	22.5	22.6	23.2	23.1	23.0

5.1.4 LTE 5

SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20407 / 824.7 MHz	Ch20525 / 836.5 MHz	Ch20643 / 848.3 MHz	Ch20407 / 824.7 MHz	Ch20525 / 836.5 MHz	Ch20643 / 848.3 MHz
LTE5	QPSK	1	2	23.9	24.0	24.1			
1.4 MHz	16QAM	1	2	23.2	23.5	23.7			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20415 / 825.5 MHz	Ch20525 / 836.5 MHz	Ch20635 / 847.5 MHz	Ch20415 / 825.5 MHz	Ch20525 / 836.5 MHz	Ch20635 / 847.5 MHz
LTE5	QPSK	1	7	24.1	24.1	24.4			
3 MHz	16QAM	1	7	23.1	23.2	23.6			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20425 / 826.5 MHz	Ch20525 / 836.5 MHz	Ch20625 / 846.5 MHz	Ch20425 / 826.5 MHz	Ch20525 / 836.5 MHz	Ch20625 / 846.5 MHz
LTE5	QPSK	1	12	23.9	23.9	24.0			
5 MHz	16QAM	1	12	23.3	23.1	23.1			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20450 / 829 MHz	Ch20525 / 836.5 MHz	Ch20600 / 844 MHz	Ch20450 / 829 MHz	Ch20525 / 836.5 MHz	Ch20600 / 844 MHz
LTE5	QPSK	1	24	24.0	23.9	23.9			
10 MHz	16QAM	1	24	22.9	23.2	23.1			

5.1.5 LTE 7

SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20775 / 2502.5 MHz	Ch21100 / 2535 MHz	Ch21425 / 2567.5 MHz	Ch20775 / 2502.5 MHz	Ch21100 / 2535 MHz	Ch21425 / 2567.5 MHz
LTE7	QPSK	1	12	22.3	22.9	22.6			
5 MHz	16QAM	1	12	21.9	22.3	21.9			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20800 / 2505 MHz	Ch21100 / 2535 MHz	Ch21400 / 2565 MHz	Ch20800 / 2505 MHz	Ch21100 / 2535 MHz	Ch21400 / 2565 MHz
LTE7	QPSK	1	24	22.3	22.9	22.5			
10 MHz	16QAM	1	24	21.6	22.2	22.1			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20825 / 2507.5 MHz	Ch21100 / 2535 MHz	Ch21375 / 2562.5 MHz	Ch20825 / 2507.5 MHz	Ch21100 / 2535 MHz	Ch21375 / 2562.5 MHz
LTE7	QPSK	1	36	22.4	23.0	22.7			
15 MHz	16QAM	1	36	21.5	21.8	21.7			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch20850 / 2510 MHz	Ch21100 / 2535 MHz	Ch21350 / 2560 MHz	Ch20850 / 2510 MHz	Ch21100 / 2535 MHz	Ch21350 / 2560 MHz
LTE7	QPSK	1	49	22.6	22.8	22.7			
20 MHz	16QAM	1	49	21.8	22.3	22.3			

5.1.6 LTE 12

SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch23017 / 699.7 MHz	Ch23095 / 707.5 MHz	Ch23173 / 715.3 MHz	Ch23017 / 699.7 MHz	Ch23095 / 707.5 MHz	Ch23173 / 715.3 MHz
LTE12	QPSK	1	2	24.3	24.5	24.6			
1.4 MHz	16QAM	1	2	23.8	23.9	23.8			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch23025 / 700.5 MHz	Ch23095 / 707.5 MHz	Ch23165 / 714.5 MHz	Ch23025 / 700.5 MHz	Ch23095 / 707.5 MHz	Ch23165 / 714.5 MHz
LTE12	QPSK	1	7	24.5	24.6	24.7			
3 MHz	16QAM	1	7	23.6	23.9	24.1			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch23035 / 701.5 MHz	Ch23095 / 707.5 MHz	Ch23155 / 713.5 MHz	Ch23035 / 701.5 MHz	Ch23095 / 707.5 MHz	Ch23155 / 713.5 MHz
LTE12	QPSK	1	12	24.3	24.5	24.6			
5 MHz	16QAM	1	12	23.5	23.4	23.7			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch23060 / 704 MHz	Ch23095 / 707.5 MHz	Ch23130 / 711 MHz	Ch23060 / 704 MHz	Ch23095 / 707.5 MHz	Ch23130 / 711 MHz
LTE12	QPSK	1	24	24.5	24.5	24.6			
10 MHz	16QAM	1	24	23.7	24.0	24.2			

5.1.7 LTE 13

SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch23205 / 779.5 MHz	Ch23230 / 782 MHz	Ch23255 / 784.5 MHz	Ch23205 / 779.5 MHz	Ch23230 / 782 MHz	Ch23255 / 784.5 MHz
LTE13	QPSK	1	12	23.1	23.1	23.2			
5 MHz	16QAM	1	12	22.3	22.4	22.3			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch23230 / 782 MHz	Ch23230 / 782 MHz	Ch23230 / 782 MHz	Ch23230 / 782 MHz	Ch23230 / 782 MHz	Ch23230 / 782 MHz
LTE13	QPSK	1	24			23.1			23.2
10 MHz	16QAM	1	24			22.3			21.5

5.1.8 LTE 17

SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch23755 / 706.5 MHz	Ch23790 / 710 MHz	Ch23825 / 713.5 MHz	Ch23755 / 706.5 MHz	Ch23790 / 710 MHz	Ch23825 / 713.5 MHz
LTE17	QPSK	1	12	24.2	24.4	24.4			
5 MHz	16QAM	1	12	23.3	23.5	23.5			
SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch23780 / 709 MHz	Ch23790 / 710 MHz	Ch23800 / 711 MHz	Ch23780 / 709 MHz	Ch23790 / 710 MHz	Ch23800 / 711 MHz
LTE17	QPSK	1	24	24.4	24.5	24.5			
10 MHz	16QAM	1	24	23.9	24.1	23.8			

5.1.9 LTE 30

SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch27685 / 2307.5 MHz	Ch27710 / 2310 MHz	Ch27735 / 2312.5 MHz	Ch27685 / 2307.5 MHz	Ch27710 / 2310 MHz	Ch27735 / 2312.5 MHz
LTE30	QPSK	1	12	22.8	22.8	22.8			
5 MHz	16QAM	1	12	22.3	22.2	22.4			

SN: 004402741813103				Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Ch27710 / 2310 MHz	Ch27710 / 2310 MHz	Ch27710 / 2310 MHz	Ch27710 / 2310 MHz	Ch27710 / 2310 MHz	Ch27710 / 2310 MHz
LTE30	QPSK	1	24			23.0			
10 MHz	16QAM	1	24			22.4			

5.1.10 LTE 41

SN: 004402741813103				Nominal					A-MPR active				
Band / BW	Modulation	RB Allocation	RB Offset	Ch39675 / 2498.5 MHz	Ch40148 / 2545.8 MHz	Ch40620 / 2593 MHz	Ch41092 / 2640.2 MHz	Ch41565 / 2687.5 MHz	Ch39675 / 2498.5 MHz	Ch40148 / 2545.8 MHz	Ch40620 / 2593 MHz	Ch41092 / 2640.2 MHz	Ch41565 / 2687.5 MHz
LTE41	QPSK	1	12	22.3	22.5	22.4	22.6	22.5	22.4	22.5	22.4	22.6	22.5
5 MHz	16QAM	1	12	21.4	21.6	21.5	21.6	21.7	21.4	21.6	21.5	21.7	21.7

SN: 004402741813103				Nominal					A-MPR active				
Band / BW	Modulation	RB Allocation	RB Offset	Ch39700 / 2501 MHz	Ch40160 / 2547 MHz	Ch40620 / 2593 MHz	Ch41080 / 2639 MHz	Ch41540 / 2685 MHz	Ch39700 / 2501 MHz	Ch40160 / 2547 MHz	Ch40620 / 2593 MHz	Ch41080 / 2639 MHz	Ch41540 / 2685 MHz
LTE41	QPSK	1	24	22.3	22.4	22.3	22.3	22.6	22.3	22.3	22.2	22.3	22.6
10 MHz	16QAM	1	24	21.5	21.5	21.4	21.4	21.8	21.5	21.5	21.4	21.4	21.7

SN: 004402741813103				Nominal					A-MPR active				
Band / BW	Modulation	RB Allocation	RB Offset	Ch39725 / 2503.5 MHz	Ch40172 / 2548.2 MHz	Ch40620 / 2593 MHz	Ch41068 / 2637.8 MHz	Ch41515 / 2682.5 MHz	Ch39725 / 2503.5 MHz	Ch40172 / 2548.2 MHz	Ch40620 / 2593 MHz	Ch41068 / 2637.8 MHz	Ch41515 / 2682.5 MHz
LTE41	QPSK	1	36	22.1	22.4	22.2	22.1	21.9	22.0	22.4	22.1	22.2	21.9
15 MHz	16QAM	1	36	21.4	21.7	21.5	21.4	21.2	21.4	21.6	21.5	21.4	21.2

SN: 004402741813103				Nominal					A-MPR active				
Band / BW	Modulation	RB Allocation	RB Offset	Ch39750 / 2506 MHz	Ch40185 / 2549.5 MHz	Ch40620 / 2593 MHz	Ch41055 / 2636.5 MHz	Ch41490 / 2680 MHz	Ch39750 / 2506 MHz	Ch40185 / 2549.5 MHz	Ch40620 / 2593 MHz	Ch41055 / 2636.5 MHz	Ch41490 / 2680 MHz
LTE41	QPSK	1	49	22.0	22.3	22.2	22.1	21.9	22.0	22.3	22.2	22.0	21.9
20 MHz	16QAM	1	49	21.3	21.6	21.5	21.3	21.3	21.3	21.6	21.5	21.3	21.3