

FCC Part 15B Compliance Test Report

Test Report no.:	FCC15B_RM-1105_21.docx	Date of Report:	08-Oct-2015
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-1105 / Battery BV-T5E / AC charger AC-100E / Headset WH-308 / Laptop Asus T100TA-DK024H / Charger AC-60E / USB Cable CA-190CD		
FCC ID:	PYARM-1105	IC:	661X-RM-1105
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart B, ANSI C63.4 (2014), CISPR 22 and IC standards, RSS-GEN (Issue 4, November 2014), RSS-199 (Issue 2, October 2014), RSS-130 (Issue 1, October 2013), RSS-132 (Issue 3, January 2013), RSS-133 (Issue 6, January 2013), RSS-139 (Issue 2, February 2009). 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:			

Hannu Söderholm, Engineer, EMC

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	17-Jun-2015
Testing completed	25-Sep-2015
The customer's contact person	Jari Rontu
Test Plan referred to	T:\Projects\RM-1104\TestPlan\RS_SAR_testplan_RM-1114.xlsm
Notes	-
Document name	T:\Projects\RM-1105\EMC\FCC15B_RM-1105_21.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:

GSM/WCDMA/WLAN/Bluetooth

The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-1104	004402742178365	2012	-	01065.00000.15264.47000	400026
Battery	BV-T5E	4181575182S10605121;0670775	V6	-	-	400028
AC charger	AC-100E	40904951255803017590675758	0.3	-	-	400013
Headset	WH-308	-	-	-	-	400014
USB Cable	CA-232CD	-	-	-	-	400033
Headset	WH-308	-	-	-	-	400014
Laptop	Asus T100TA- DK024H	E6NOBCO54692236	FCC DoC	-	-	43219
Charger	AC-60E	4090493116580300870;0675677	-	-	-	400002
USB cable	CA-190CD	-	-	-	-	42720

1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result
15.107, a	8.8	AC powerline conducted emissions	-
15.109, a	6.1	Radiated emissions	PASSED

GSM 1900:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result
15.107, a	8.8	AC powerline conducted emissions	-
15.109, a	6.1	Radiated emissions	PASSED

WCDMA4:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result
15.107, a	8.8	AC powerline conducted emissions	-
15.109, a	6.1	Radiated emissions	PASSED

LTE7:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result
15.107, a	8.8	AC powerline conducted emissions	-
15.109, a	6.1	Radiated emissions	PASSED

LTE12:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result
15.107, a	8.8	AC powerline conducted emissions	-
15.109, a	6.1	Radiated emissions	PASSED

LTE17:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result
15.107, a	8.8	AC powerline conducted emissions	-
15.109, a	6.1	Radiated emissions	PASSED

The test results of RM-1104 are re-used for certification of the RM-1105. The table above indicates the results, which will be re-used.

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.

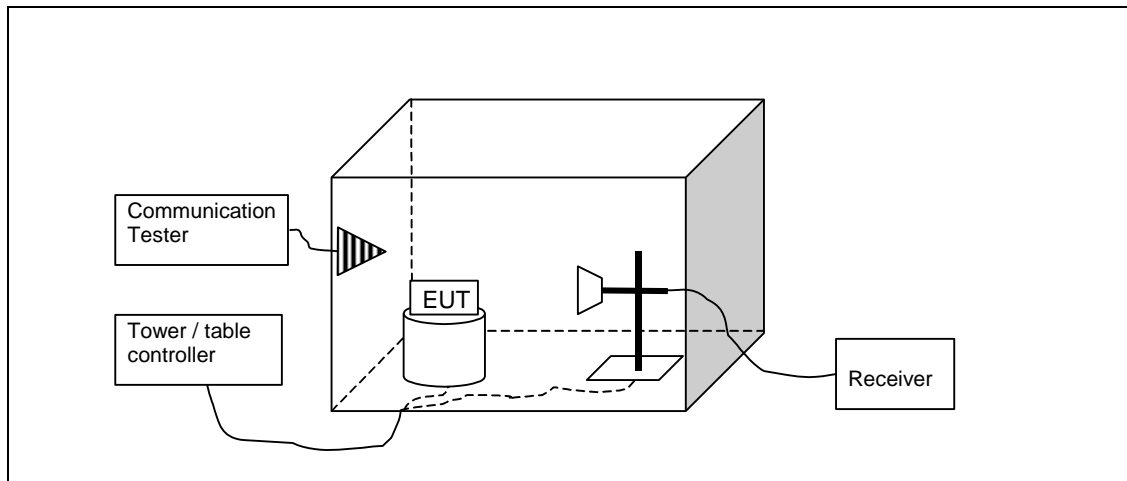
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2. Radiated emissions (FCC 15.109, a, RSS-199 6.1, RSS-130 6.1, RSS-132 6.1, RSS-133 6.1, RSS-139 6.1)

EUT with DUT number	RM-1104, DUT 400026
Accessories with DUT numbers	BV-T5E, DUT 400028 ; AC-100E, DUT 400013 ; WH-308, DUT 400014
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 50 / 100.4
Date of measurements	24-Jul-2015
Measured by	Timo Raiskio

2.1.1 Test setup



2.2. Test method and limit

The measurement is made according to ANSI C63.4-2014as follows:

The measurement is performed in the Semi-Anechoic Chamber with conducting metal floor.

The measurement distance is 3 m.

The EUT is placed on a nonconductive plate at 80 cm height.

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 results are obtained as described below:

$$E [dB\mu V/m] = U_{RX} + A_{TOT}$$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

CISPR 22 and FCC Part 15 Class B limits (3 m measurement distance)

Frequency range [MHz]	Quasi peak limit [dB μ V/m]	Average limit [dB μ V/m]	Peak limit [dB μ V/m]
30 - 230	40	-	-
230 – 1000	47	-	-
1000 - 3000	-	50	70
Above 3000	-	54	74

2.3. GSM 850 test results, FM Radio active

RX mode, channel 128 / 869.2 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3475.5	37.93	78.795	45.73	-7.8	74	36.07	PASSED
6951.8	47.27	230.94	47.87	-0.6	74	26.73	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3475.5	24.69	17.159	32.49	-7.8	54	29.31	PASSED
6951.8	34.13	50.874	34.73	-0.6	54	19.87	PASSED

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
31.98	23.2	14.454	50.9	-27.7	40	16.8	PASSED
38.287	16.96	7.047	47.26	-30.3	40	23.04	PASSED
44.769	16.7	6.839	50	-33.3	40	23.3	PASSED
50.352	15.94	6.266	52.34	-36.4	40	24.06	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3528.3	37.36	73.79	45.16	-7.8	74	36.64	PASSED
7051.4	44.22	162.555	44.02	0.2	74	29.78	PASSED
7832.264	45.87	196.562	42.97	2.9	74	28.13	PASSED
7839.982	46.41	209.17	43.51	2.9	74	27.59	PASSED
7845.69	46.42	209.411	43.52	2.9	74	27.58	PASSED
7857.511	46.48	210.863	43.48	3	74	27.52	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3528.3	24.74	17.258	32.54	-7.8	54	29.26	PASSED
7051.4	31.36	36.983	31.16	0.2	54	22.64	PASSED
7832.264	33.19	45.656	30.29	2.9	54	20.81	PASSED
7839.982	33.24	45.92	30.34	2.9	54	20.76	PASSED
7845.69	33.24	45.92	30.34	2.9	54	20.76	PASSED
7857.511	33.32	46.345	30.32	3	54	20.68	PASSED

RX mode, channel 251 / 893.8 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3574	37.7	76.736	45.7	-8	74	36.3	PASSED
7148.7	44.93	176.401	44.43	0.5	74	29.07	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3574	24.64	17.061	32.64	-8	54	29.36	PASSED
7148.7	31.61	38.063	31.11	0.5	54	22.39	PASSED

2.4. GSM 1900 test results, GPS Active

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3858.5	38.49	84.043	45.69	-7.2	74	35.51	PASSED
7719.7	46.03	200.217	43.63	2.4	74	27.97	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3858.5	25.11	18.009	32.31	-7.2	54	28.89	PASSED
7719.7	32.65	42.904	30.25	2.4	54	21.35	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
31.95	14.17	5.111	41.77	-27.6	40	25.83	PASSED
38.287	17.43	7.439	47.73	-30.3	40	22.57	PASSED
50.392	18.55	8.463	54.95	-36.4	40	21.45	PASSED
198.72	17.71	7.682	55.51	-37.8	40	22.29	PASSED
829.9	26.14	20.277	49.94	-23.8	47	20.86	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3918.7	38.67	85.803	45.57	-6.9	74	35.33	PASSED
7841.6	46.42	209.411	43.52	2.9	74	27.58	PASSED
7840.179	46.41	209.17	43.51	2.9	74	27.59	PASSED
7861.719	46.79	218.524	43.79	3	74	27.21	PASSED
7863.227	46.53	212.08	43.43	3.1	74	27.47	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3918.7	25.41	18.642	32.31	-6.9	54	28.59	PASSED
7841.6	33.28	46.132	30.38	2.9	54	20.72	PASSED
7840.179	33.21	45.761	30.31	2.9	54	20.79	PASSED
7861.719	33.42	46.881	30.42	3	54	20.58	PASSED
7863.227	33.4	46.774	30.3	3.1	54	20.6	PASSED

RX mode, channel 810 / 1989.8 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3978	38.8	87.096	45.4	-6.6	74	35.2	PASSED
7958.2	46.3	206.538	43.1	3.2	74	27.7	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3978	25.47	18.772	32.07	-6.6	54	28.53	PASSED
7958.2	33.47	47.152	30.27	3.2	54	20.53	PASSED

2.5. WCDMA4 test results, GPS Active

RX mode, channel 1537 / 2112.4 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
4225.2	40.18	102.094	46.28	-6.1	74	33.82	PASSED
6338.5	43.87	156.135	46.87	-3	74	30.13	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
4225.2	26.02	19.999	32.12	-6.1	54	27.98	PASSED
6338.5	30.83	34.794	33.83	-3	54	23.17	PASSED

RX mode, channel 1637 / 2132.4 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
31.95	21.62	12.05	49.22	-27.6	40	18.38	PASSED
38.257	15.65	6.06	45.95	-30.3	40	24.35	PASSED
44.739	15.98	6.295	49.28	-33.3	40	24.02	PASSED
51.111	18.43	8.346	55.23	-36.8	40	21.57	PASSED
945.952	22.9	13.964	45.8	-22.9	47	24.1	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
4280.4	38.36	82.794	44.56	-6.2	74	35.64	PASSED
6420.9	45.03	178.443	47.83	-2.8	74	28.97	PASSED
7835.872	45.87	196.562	42.97	2.9	74	28.13	PASSED
7840.08	46.13	202.535	43.23	2.9	74	27.87	PASSED
7857.715	46.36	207.97	43.36	3	74	27.64	PASSED
7863.527	46.68	215.774	43.58	3.1	74	27.32	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
4280.4	25.41	18.642	31.61	-6.2	54	28.59	PASSED
6420.9	31.59	37.975	34.39	-2.8	54	22.41	PASSED
7835.872	33.24	45.92	30.34	2.9	54	20.76	PASSED
7840.08	33.22	45.814	30.32	2.9	54	20.78	PASSED
7857.715	33.29	46.185	30.29	3	54	20.71	PASSED
7863.527	33.41	46.827	30.31	3.1	54	20.59	PASSED

RX mode, channel 1738 / 2152.6 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
4307	38.67	85.803	44.87	-6.2	74	35.33	PASSED
6458.1	44.76	172.982	47.46	-2.7	74	29.24	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
4307	25.74	19.364	31.94	-6.2	54	28.26	PASSED
6458.1	31.98	39.719	34.68	-2.7	54	22.02	PASSED

2.6. LTE7 test results, GPS Active

RX mode, channel 3100 / 2655 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
31.95	15.53	5.977	43.13	-27.6	40	24.47	PASSED
44.739	16.1	6.383	49.4	-33.3	40	23.9	PASSED
51.091	17.15	7.203	53.95	-36.8	40	22.85	PASSED
186.562	18.97	8.882	56.67	-37.7	40	21.03	PASSED
191.994	19.86	9.84	57.76	-37.9	40	20.14	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
2656.213	66.96	2228.435	74.96	-8	70	3.04	PASSED

RX mode, channel 3100 / 2655 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
5309.9	41.41	117.625	45.51	-4.1	74	32.59	PASSED
7826.556	45.77	194.312	42.87	2.9	74	28.23	PASSED
7844.688	46.42	209.411	43.52	2.9	74	27.58	PASSED
7859.215	46.37	208.209	43.37	3	74	27.63	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
5309.9	27.97	25.032	32.07	-4.1	54	26.03	PASSED
7826.556	33.13	45.342	30.23	2.9	54	20.87	PASSED
7844.688	33.18	45.604	30.28	2.9	54	20.82	PASSED
7859.215	33.29	46.185	30.29	3	54	20.71	PASSED

RX mode, channel 3425 / 2687.5 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
5373.5	42.2	128.825	46.2	-4	74	31.8	PASSED
8061.6	47.82	246.037	44.22	3.6	74	26.18	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
5373.5	28.61	26.946	32.61	-4	54	25.39	PASSED
8061.6	34.06	50.466	30.46	3.6	54	19.94	PASSED

2.7. LTE12 test results, GPS Active

RX mode, channel 5035 / 731.5 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
1462.8	35.31	58.277	53.31	-18	70	34.69	PASSED
2193.6	40.3	103.514	52.1	-11.8	70	29.7	PASSED
3001.6	37.93	78.795	45.73	-7.8	74	36.07	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
1462.8	22.69	13.63	40.69	-18	50	27.31	PASSED
2193.6	27.03	22.465	38.83	-11.8	50	22.97	PASSED
3001.6	25.17	18.134	32.97	-7.8	54	28.83	PASSED

RX mode, channel 5095 / 737.5 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
31.95	21.86	12.388	49.46	-27.6	40	18.14	PASSED
38.227	17.02	7.096	47.32	-30.3	40	22.98	PASSED
51.112	17.32	7.345	54.12	-36.8	40	22.68	PASSED
727.371	21.67	12.12	46.57	-24.9	47	25.33	PASSED

RX mode, channel 5095 / 737.5 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
2211.1	39.87	98.514	51.47	-11.6	70	30.13	PASSED
7845.592	46.29	206.3	43.39	2.9	74	27.71	PASSED
7859.119	46.49	211.106	43.49	3	74	27.51	PASSED
7862.328	46.67	215.526	43.67	3	74	27.33	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
2211.1	27.35	23.308	38.95	-11.6	50	22.65	PASSED
7845.592	33.15	45.446	30.25	2.9	54	20.85	PASSED
7859.119	33.28	46.132	30.28	3	54	20.72	PASSED
7862.328	33.38	46.666	30.38	3	54	20.62	PASSED

RX mode, channel 5155 / 743.5 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
1486.6	35.31	58.277	53.51	-18.2	70	34.69	PASSED
2232.3	40.16	101.859	51.46	-11.3	70	29.84	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
1486.6	22.48	13.305	40.68	-18.2	50	27.52	PASSED
2232.3	27.64	24.099	38.94	-11.3	50	22.36	PASSED

2.8. LTE17 test results, GPS Active

RX mode, channel 5755 / 736.5 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
1471.7	36.22	64.714	54.32	-18.1	70	33.78	PASSED
2210.7	40.11	101.274	51.71	-11.6	70	29.89	PASSED
3001.9	38.44	83.56	46.24	-7.8	74	35.56	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
1471.7	22.57	13.443	40.67	-18.1	50	27.43	PASSED
2210.7	27.32	23.227	38.92	-11.6	50	22.68	PASSED
3001.9	25.19	18.176	32.99	-7.8	54	28.81	PASSED

RX mode, channel 5790 / 740.0 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
31.92	21.38	11.722	48.98	-27.6	40	18.62	PASSED
38.347	15.94	6.266	46.24	-30.3	40	24.06	PASSED
51.101	18.43	8.346	55.23	-36.8	40	21.57	PASSED
946.012	23.91	15.686	46.81	-22.9	47	23.09	PASSED

RX mode, channel 5790 / 740.0 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
2220.7	40.49	105.803	51.99	-11.5	70	29.51	PASSED
7825.554	46.68	215.774	43.78	2.9	74	27.32	PASSED
7834.067	45.87	196.562	42.97	2.9	74	28.13	PASSED
7862.324	46.4	208.93	43.4	3	74	27.6	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
2220.7	27.48	23.659	38.98	-11.5	50	22.52	PASSED
7825.554	33.16	45.499	30.26	2.9	54	20.84	PASSED
7834.067	33.15	45.446	30.25	2.9	54	20.85	PASSED
7862.324	33.39	46.72	30.39	3	54	20.61	PASSED

RX mode, channel 5825 / 743.5 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
1486.3	35.82	61.802	54.02	-18.2	70	34.18	PASSED
2231.2	41.41	117.625	52.71	-11.3	70	28.59	PASSED

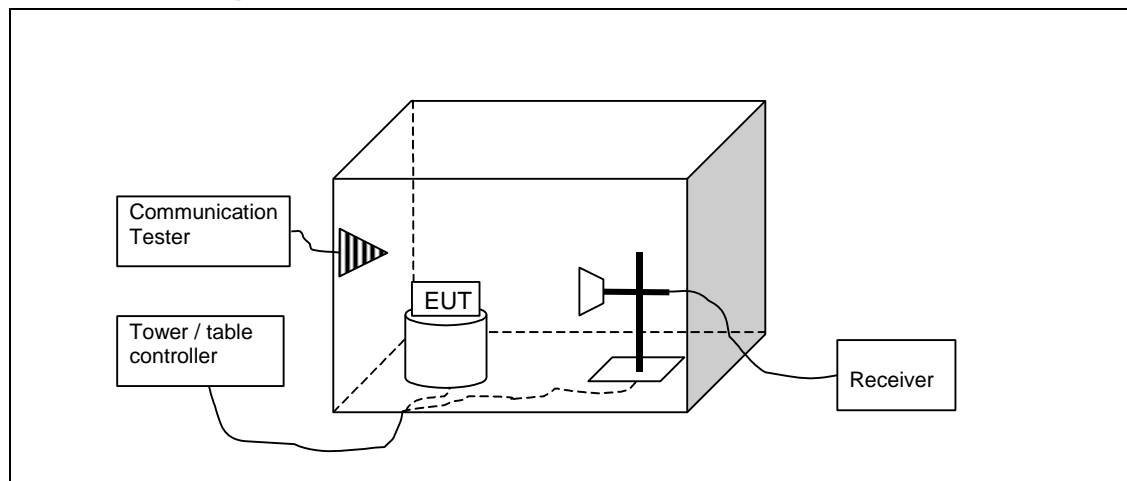
Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
1486.3	22.4	13.183	40.6	-18.2	50	27.6	PASSED
2231.2	27.62	24.044	38.92	-11.3	50	22.38	PASSED

3. Radiated emissions (FCC 15.109, a, RSS-133 6.1)

EUT with DUT number	RM-1104, DUT 400026
Accessories with DUT numbers	BV-T5E, DUT 400028 ; CA-232CD, DUT 400033 ; WH-308, DUT 400014 ; Asus T100TA-DK024H, DUT 43219 ; AC-60E, DUT 400002 ; CA-190CD, DUT 42720
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	*Continuous data transfer was active between the phone and the computer during the test. USB I/O cable used to connect the EUT to the host PC is shielded. Measurement frequency used in measurement is 30 MHz – 8.5GHz.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 48 / 101.4
Date of measurements	25-Sep-2015
Measured by	Timo Raisio

3.1.1 Test setup



3.2. Test method and limit

The measurement is made according to ANSI C63.4-2014as follows:

The measurement is performed in the Semi-Anechoic Chamber with conducting metal floor.

The measurement distance is 3 m.

The EUT is placed on a nonconductive plate at 80 cm height.

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 results are obtained as described below:

$$E [dB\mu V/m] = U_{RX} + A_{TOT}$$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

CISPR 22 and FCC Part 15 Class B limits (3 m measurement distance)

Frequency range [MHz]	Quasi peak limit [dB μ V/m]	Average limit [dB μ V/m]	Peak limit [dB μ V/m]
30 - 230	40	-	-
230 – 1000	47	-	-
1000 - 3000	-	50	70
Above 3000	-	54	74

3.3. GSM 1900 test results, 30MHz – 8GHz

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3861.5	38.26	81.846	45.46	-7.2	74	35.74	PASSED
7719.6	45.6	190.546	43.2	2.4	74	28.4	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3861.5	25.16	18.113	32.36	-7.2	54	28.84	PASSED
7719.6	32.48	42.073	30.08	2.4	54	21.52	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
35.822	24.53	16.846	53.83	-29.3	40	15.47	PASSED
40.029	21.26	11.561	52.26	-31	40	18.74	PASSED
44.637	12.38	4.159	45.58	-33.2	40	27.62	PASSED
55.04	26.32	20.701	65.12	-38.8	40	13.68	PASSED
66.566	7.54	2.382	47.44	-39.9	40	32.46	PASSED
207.455	23.04	14.191	60.44	-37.4	40	16.96	PASSED
211.202	27.29	23.147	64.59	-37.3	40	12.71	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
2483.969	41.99	125.748	51.39	-9.4	70	28.01	PASSED
3920.4	38.8	87.096	45.7	-6.9	74	35.2	PASSED
7840.3	46.41	209.17	43.51	2.9	74	27.59	PASSED
7823.346	45.99	199.297	43.09	2.9	74	28.01	PASSED
7849.196	46.3	206.538	43.4	2.9	74	27.7	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
2483.969	28.66	27.102	38.06	-9.4	50	21.34	PASSED
3920.4	25.45	18.728	32.35	-6.9	54	28.55	PASSED
7840.3	33.33	46.398	30.43	2.9	54	20.67	PASSED
7823.346	33.17	45.551	30.27	2.9	54	20.83	PASSED
7849.196	33.3	46.238	30.4	2.9	54	20.7	PASSED

RX mode, channel 810 / 1989.8 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3978.4	38.39	83.081	44.99	-6.6	74	35.61	PASSED
7961.3	46.31	206.776	43.01	3.3	74	27.69	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
3978.4	25.53	18.902	32.13	-6.6	54	28.47	PASSED
7961.3	33.57	47.698	30.27	3.3	54	20.43	PASSED

3.4. GSM 1900 test results, 3GHz – 12 GHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
7822.448	46.29	206.3	43.39	2.9	74	27.71	PASSED
7838.374	46.2	204.174	43.3	2.9	74	27.8	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Limit [dB μ V/m]	Margin	Results
7822.448	33.23	45.867	30.33	2.9	54	20.77	PASSED
7838.374	33.41	46.827	30.51	2.9	54	20.59	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