FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1041_11.docx	**Date of Report:**	13-Nov-2014
Number of pages:	10	**Customer's Contact person:**	Helen Hu
Testing laboratory:	TCC Microsoft Salo Laboratory P.O.Box(86) Joensuunkatu 7E FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 71 80 44122	**Customer:**	Microsoft Beijing Economic and Technological Development Area No.5 Donghuan Zhonglu Beijing PRC China 100176 Tel. +86 10 8711 8888 Fax. +86 10 8711 4550
FCC listing no.: **IC recognition no.:**	533467 661V-1		
Tested devices/ accessories:	**Phone RM-1041 / Battery BV-T5A / WLC Cover CC-3086 / AC-Charger AC-301E / Headset WH-108 / Charging Pad DT-900**		
FCC ID:	QTLRM-1041	**IC:**	-
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 3, December 2010), RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009), RSS-139 (Issue 2, February 2009), RSS-130 (Issue 1, October 2013). 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:	Digitally signed by Kalle Hannila Date: 2014.10.16 15:10:37 +03'00'		

Kalle Hannila, System Manager, EMC

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

Date of receipt	26-Sep-2014
Testing completed	08-Oct-2014
The customer's contact person	Helen Hu
Test Plan referred to	T:\Projects\RM-1041\TestPlan\RS_testplan_RM-1041.xlsm
Notes	-
Document name	T:\Projects\RM-1041\EMC\FCC_Cellular_RM-1041_11.docx

1.1. EUT and Accessory Information

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

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-1041	353067060029511	0364	-	02042.00000.14372.27013	18673
Battery	BV-T5A	4175354295C108010260670740	-	-		18674
WLC Cover	CC-3086	-	-	-		18675
AC-Charger	AC-301E	409049221658020191800675638	-	-	-	18564
Headset	WH-108	2265171	-	-	-	18677
Charging Pad	DT-900	067709231530TW00028	-	-	-	18565

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	
§2.1049(h)	4.6.1	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	
§2.1049(h)	4.6.1	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	

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§2.1049(h)	4.6.1	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	

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	
§2.1049(h)	4.6.1	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	

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

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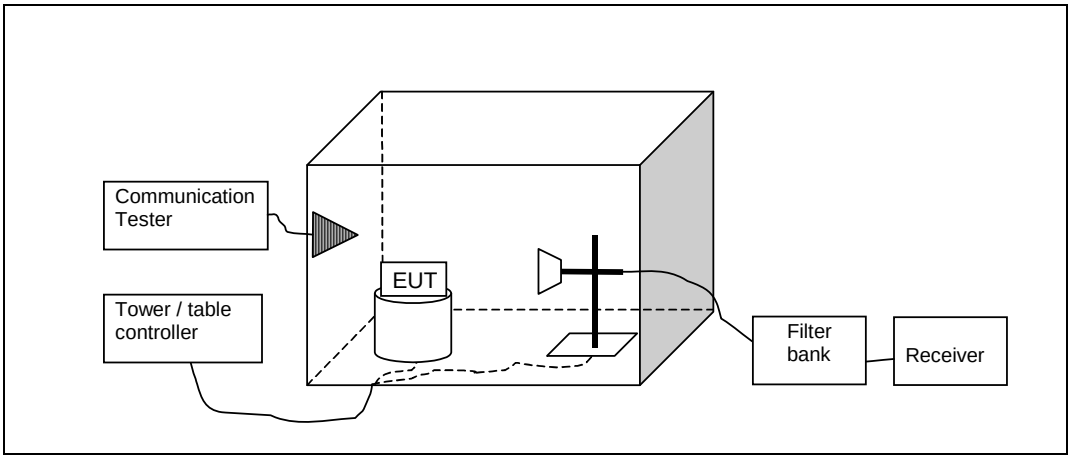
2. Spurious radiated emissions
(FCC §22.917(a), §27.53(c)(2)(4),(f),

3. §2.1053, §27.53(h), §2.1053, §24.238(a), §2.1053, §2.1053, RSS-132 4.5, RSS-133 6.5, RSS-139 6.5, RSS-130 4.6)

EUT with DUT number	RM-1041, DUT 18673
Accessories with DUT numbers	BV-T5A, DUT 18674 ; CC-3086, DUT 18675 ; AC-301E, DUT 18564 ; WH-108, DUT 18677 ; DT-900, DUT 18565
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	17 / 45 / 101.4
Date of measurements	10-Oct-2014
Measured by	Kalle Hannila

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.

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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
LTE4	30 - 17500	-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)

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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
1615.471	-57.8	0.00166	-63.7	5.9	VERTICAL	PASSED
1714.429	-56.6	0.00219	-63.3	6.7	VERTICAL	PASSED
1714.509	-56.9	0.00204	-63.6	6.7	VERTICAL	PASSED
2558.998	-52.02	0.00628	-64.42	12.4	HORIZONTAL	PASSED
3335.631	-59.79	0.00105	-63.09	3.3	VERTICAL	PASSED

3.4. 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
8890.18	-45.78	0.02642	-65.68	19.9	HORIZONTAL	PASSED
9356.994	-44.24	0.03767	-66.14	21.9	HORIZONTAL	PASSED
9796.313	-43.98	0.03999	-66.28	22.3	VERTICAL	PASSED
9816.754	-43.34	0.04634	-65.84	22.5	HORIZONTAL	PASSED
9934.228	-43.62	0.04345	-65.92	22.3	HORIZONTAL	PASSED
9945.448	-43.95	0.04027	-66.15	22.2	HORIZONTAL	PASSED

3.5. LTE4 test results

Channel 20175 / 1732.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3465.341	-57.91	0.00162	-63.71	5.8	HORIZONTAL	PASSED
5198.081	-60.96	0.0008	-71.46	10.5	VERTICAL	PASSED
6930.782	-55.83	0.00261	-68.63	12.8	HORIZONTAL	PASSED
8670.616	-56.78	0.0021	-76.08	19.3	HORIZONTAL	PASSED
10404.76	-53.34	0.00463	-76.14	22.8	HORIZONTAL	PASSED

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3.6. 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
752.585	-46.27	0.0236	-80.27	34	VERTICAL	PASSED
767.215	-71.52	7E-05	-107.02	35.5	VERTICAL	PASSED
800.075	-72.48	6E-05	-106.98	34.5	VERTICAL	PASSED
1564.982	-68.19	0.00015	-73.89	5.7	HORIZONTAL	PASSED
1608.277	-67.45	0.00018	-73.65	6.2	HORIZONTAL	PASSED
2350.028	-71.7	7E-05	-82.6	10.9	VERTICAL	PASSED
3128.581	-74.95	3E-05	-79.05	4.1	HORIZONTAL	PASSED
7975.331	-67.77	0.00017	-83.47	15.7	VERTICAL	PASSED

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4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B
6044	V-network	ESH3-Z6	R&S	-
2059	V-network	ESH3-Z6	R&S	-
1759	LISN 50 µH	ESH3-Z5	R&S	22/24/27, 15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	22/24/27, 15C, 15B
1999	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
2180	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2390	Directional Coupler	DC2600	AR	-
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2039	Power Supply	PL330QMD	Thurlby	15C, 15B
6036	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
2359	Temperature Test Chamber	VT4002	Vötsch	22/24/27
2352	Spectrum Analyzer	FSP-30	R&S	22/24/27, 15C
6109	Communication Tester	CMU200	R&S	22/24/27, 15C
6246	Power Supply	66332A	HP	22/24/27, 15C
1992	Signal Generator	83630B	Agilent	15C, 15B
6098	Signal Generator	8648C	Agilent	-
6046	Attenuator 10dB	8493C	Agilent	22/24/27, 15C
6047	Attenuator 20dB	8493C	Agilent	22/24/27, 15C
6045	Power splitter	11667B	Agilent	22/24/27, 15C
6247	Communication Tester	CBT	R&S	22/24/27, 15C 15B
6052	Communication Tester	CMU200	R&S	22/24/27, 15C 15B
6248	Power Supply	6632B	-	22/24/27, 15C 15B
6106	Spectrum Analyzer	FSP-30	R&S	22/24/27, 15C 15B
6113	Signal Generator	SMF100A	R&S	22/24/27, 15C 15B
6202	Temperature Test Chamber	VT4002	Vötsch	22/24/27, 15C 15B
6122	Power Splitter	11667B	Agilent	22/24/27, 15C 15B
6134	Attenuator 10dB	BW-S10-2W263+	Mini-Circuits	22/24/27, 15C
6136	Attenuator 20dB	BW-S20-2W263+	Mini-Circuits	22/24/27, 15C
6103	Bluetooth tester	CBT	R&S	22/24/27, 15C 15B
6250	Power Supply	6651A	Agilent	22/24/27, 15C 15B
6108	Communication Tester	CMU200	R&S	22/24/27, 15C 15B
6105	Spectrum Analyzer	FSV-30	R&S	22/24/27, 15C 15B
6251	Temperature Test Chamber	VT4002	Vötsch	22/24/27, 15C 15B
6243	Power Splitter	1167B	Agilent	22/24/27, 15C 15B
6245	Attenuator 10dB	BW-S10-2W263+	Mini-Circuits	22/24/27, 15C 15B
6244	Attenuator 20dB	BW-S20-2W263+	Mini-Circuits	22/24/27, 15C 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
2388	Bluetooth Tester	CBT	R&S	15B
10479	Communication Tester	CMW500	R&S	22/24/27, 15C, 15B
2347	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2009	Signal Generator	SMP 22	R&S	22/24/27, 15C, 15B
2348	Controller	G-1000DXC	Yaesu	22/24/27, 15C, 15B
2349	Computer Controller	g-1000DXC	Yaesu	22/24/27, 15C, 15B
2116	Controller	EMCO 2090	ETS	22/24/27, 15C, 15B
2109	Power Supply	PL330QMD	Thurlby	22/24/27, 15C, 15B
2353	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
6115	Open switch and control unit	OSP 130	R&S	22/24/27, 15C 15B
6116	Open switch and control unit	OSP 150	R&S	22/24/27, 15C 15B

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Eq. No	Equipment	Type	Manufacturer	Used in
6117	Open switch and control unit	OSP 150	R&S	22/24/27, 15C 15B
6131	Notch Filter	WRCT902.4-0.4/40-8SS	Wainwright	22/24/27, 15C 15B
6130	Notch Filter	WRCD1880-1.1.25/50-10SS	Wainwright	22/24/27
6159	Band Reject Filter	WRCD1747.8-0.4/40-5SS	Wainwright	22/24/27,15C, 15B
6158	Band Reject Filter	WRCT836.6-0.4/40-8SS	Wainwright	22/24/27,15C, 15B
6197	Band Reject Filter	WRCJV2531/2539-2523/2547-60/12SS	Wainwright	22/24/27,15C, 15B
2231	Band Reject Filter	WRCG1947/1953-1940/1960-40/6SS	Wainwright	22/24/27,15C, 15B
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
2386	Band Reject Filter	WRCG1764.4/1770.4-1760.4/1774.4-40/6SS	Wainwright	22/24/27, 15C, 15B
2385	Band Reject Filter	WRCG1744.4/1750.4-1740.4/1754.4-40/6SS	Wainwright	22/24/27, 15C, 15B
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	15C
2188	Preamplifier	AFS4-00100300-20-23P-6	Miteq	22/24/27, 15C, 15B
6195	High Pass Filter	-	Wainwright	22/24/27, 15C, 15B
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	22/24/27, 15C, 15B
6212	Antenna Array system	-	TCC	22/24/27, 15C, 15B
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
6089	Antenna	HFH2-Z2	R&S	15C, 15B
2027	CDN	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	CDN	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2176	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2135	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2029	Power Supply	PL330	Thurlby	22/24/27, 15C
6038	Data Logger	Testo 580	Testo	22/24/27, 15C, 15B
6037	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B

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