FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1077_12.docx	**Date of Report:**	09-Feb-2015
Number of pages:	11	**Customer's Contact person:**	Juha Paukku
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 403 Visiokatu 4 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880
FCC listing no.: **IC recognition no.:**	94436 661AK-1		
Tested devices/ accessories:	**Phone RM-1077 / Battery BV-T5C / Charger AC-20E Phihong / Headset WH-108**		
FCC ID:	PYARM-1077	**IC:**	-
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Parts 22/24, TIA-603-C-2004 and IC standards, RSS-GEN (Issue 4, November 2014), RSS-132 (Issue 3, January 2013), RSS-133 (Issue 6, January 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 Timo Raiskio DN: cn=Timo Raiskio, o, ou, email=timo.raiskio@microsoft.com, c=FI Date: 2015.02.09 08:27:48 +02'00'		

Timo Raiskio, Engineer, EMC & SAR

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

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

Date of receipt	03-Feb-2015
Testing completed	07-Feb-2015
The customer's contact person	Juha Paukku
Test Plan referred to	T:\Projects\RM-1077\TestPlan\RS_testplan_RM-1077 RF BOM Murata.xlsm
Notes	-
Document name	T:\Projects\RM-1077\EMC\FCC_Cellular_RM-1077_12.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-1077	004402740222728	2030	-	02162.00000.15045.58000	43261
Battery	BV-T5C	08407	-	-	-	43256
Charger	AC-20E Phihong	4868673411351126902;0675628	-	-	-	43135
Headset	WH-108	-	-	-	-	43136

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	-
N/A	5.4	Peak to average power ratio	-
§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	-
N/A	6.4	Peak to average power ratio	-
§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	-

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

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	-
N/A	6.4	Peak to average power ratio	-
§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	-

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	-
N/A	5.4	Peak to average power ratio	-
§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	-

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.

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

CONTENTS

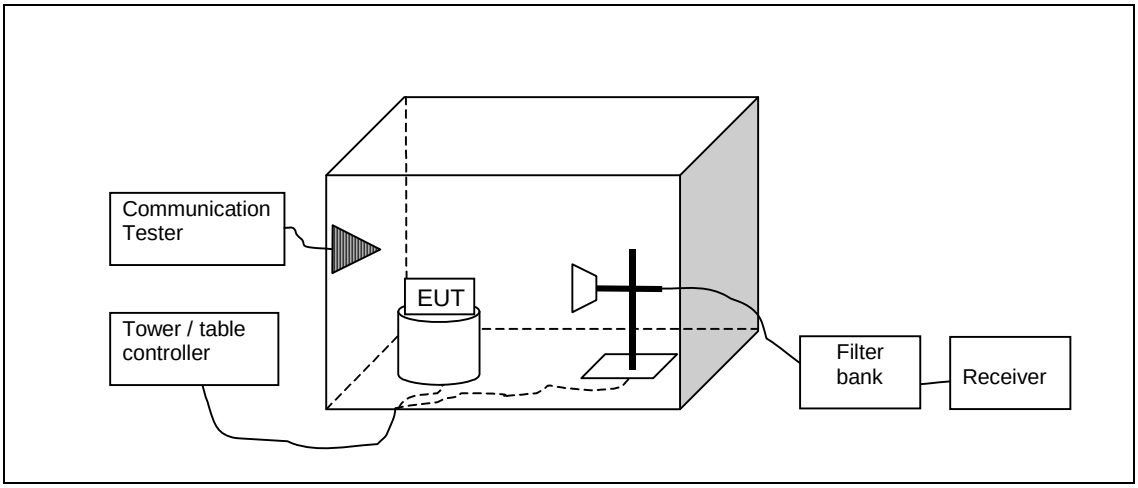
TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

2. Spurious radiated emissions

(FCC §22.917(a), §22.917(a), §2.1053, §24.238(a), §2.1053, §2.1053, RSS-132 4.5, RSS-133 6.5)

EUT with DUT number	RM-1077, DUT 43261
Accessories with DUT numbers	BV-T5C, DUT 43256 ; AC-20E Phihong, DUT 43135 ; WH-108, DUT 43136
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 45 / 99.6
Date of measurements	07-Feb-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 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.

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

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
WCDMA5	30 - 8500	-13

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

2.3. 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
848.754	-60.57	0.00088	-44.47	-16.1	HORIZONTAL	PASSED
848.788	-60.36	0.00092	-44.26	-16.1	HORIZONTAL	PASSED
848.861	-59.16	0.00121	-43.06	-16.1	HORIZONTAL	PASSED
850.017	-61.62	0.00069	-45.42	-16.2	HORIZONTAL	PASSED
2509.619	-42.04	0.06252	-42.24	0.2	HORIZONTAL	PASSED
2509.78	-42.28	0.05916	-42.48	0.2	HORIZONTAL	PASSED

2.4. 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
1910.864	-38.1	0.15488	-35.4	-2.7	VERTICAL	PASSED
1911.152	-40.1	0.09772	-37.3	-2.8	HORIZONTAL	PASSED
1911.635	-38.99	0.12618	-36.29	-2.7	VERTICAL	PASSED
1911.844	-40.26	0.09419	-37.46	-2.8	HORIZONTAL	PASSED
9320.2	-44.26	0.0375	-63.46	19.2	VERTICAL	PASSED
9800.721	-45.75	0.02661	-64.25	18.5	VERTICAL	PASSED

2.5. 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
1673.22	-48.1	0.01549	-41.4	-6.7	HORIZONTAL	PASSED
2509.9	-52.32	0.00586	-52.52	0.2	HORIZONTAL	PASSED

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

2.6. WCDMA2 test results

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1910.501	-46.8	0.02089	-43.6	-3.2	HORIZONTAL	PASSED
1911.903	-46.53	0.02223	-43.33	-3.2	HORIZONTAL	PASSED
1926.077	-52.76	0.0053	-49.66	-3.1	VERTICAL	PASSED
3757.535	-40.39	0.09141	-44.89	4.5	HORIZONTAL	PASSED
3757.615	-40.34	0.09247	-44.84	4.5	HORIZONTAL	PASSED
5644.99	-51.83	0.00656	-59.93	8.1	HORIZONTAL	PASSED
7519.259	-48.89	0.01291	-62.89	14	HORIZONTAL	PASSED
9262.786	-43.47	0.04498	-63.07	19.6	VERTICAL	PASSED
9403.307	-44.79	0.03319	-63.19	18.4	VERTICAL	PASSED
11277.255	-43.68	0.04285	-62.58	18.9	VERTICAL	PASSED
13156.573	-52.62	0.00547	-64.22	11.6	HORIZONTAL	PASSED
15047.595	-50.48	0.00895	-64.88	14.4	VERTICAL	PASSED
16912.084	-50.44	0.00904	-66.84	16.4	VERTICAL	PASSED

2.7. WCDMA5 test results

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
847.801	-48.9	0.01288	-79.7	30.8	VERTICAL	PASSED
848.332	-48	0.01585	-78.8	30.8	VERTICAL	PASSED
1009.158	-62.22	0.0006	-52.02	-10.2	VERTICAL	PASSED
1668.778	-56.87	0.00206	-50.27	-6.6	VERTICAL	PASSED
1669.319	-58.01	0.00158	-51.31	-6.7	HORIZONTAL	PASSED
2502.184	-54.61	0.00346	-54.51	-0.1	VERTICAL	PASSED
2506.383	-54.35	0.00367	-54.45	0.1	VERTICAL	PASSED
3344.87	-53.47	0.0045	-53.97	0.5	HORIZONTAL	PASSED
3344.87	-53.26	0.00472	-53.76	0.5	HORIZONTAL	PASSED
4181.152	-45.49	0.02825	-49.09	3.6	HORIZONTAL	PASSED
5008.016	-55.18	0.00303	-60.88	5.7	HORIZONTAL	PASSED
5846.583	-53.93	0.00405	-59.83	5.9	HORIZONTAL	PASSED
6675.651	-50.78	0.00836	-58.98	8.2	VERTICAL	PASSED
7519.549	-50.81	0.0083	-62.61	11.8	HORIZONTAL	PASSED
8340	-50.02	0.00995	-63.32	13.3	HORIZONTAL	PASSED

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

2.8. 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
3760.02	-48.32	0.01472	-52.82	4.5	HORIZONTAL	PASSED
5636.333	-52.33	0.00585	-60.53	8.2	HORIZONTAL	PASSED

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

3. Test Equipment

3.1. 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

3.2. 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 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880

Eq. No	Equipment	Type	Manufacturer	Used in
-	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

TCC Microsoft Tampere Laboratory
P.O.Box 403
Visiokatu 3
FIN-33101 TAMPERE, FINLAND
Tel. +358 71 800 8000
Fax. +358 71 804 6880