FCC Part 15B Compliance Test Report

Test Report no.:	FCC15B_RM-691_12.docx	**Date of Report:**	10-Feb-2011
Number of pages:	19	**Customer's Contact person:**	Allison Lenaghan
Testing laboratory:	TCC Nokia Tampere Laboratory P.O. Box 68 Sinitaival 5 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880	**Customer:**	Nokia Corporation Nokia House Summit Avenue, Southwood FARNBOROUGH HAMPSHIRE GU14 0NG UK Tel. +44 1252 866000 Fax. +44 1252 866001
FCC listing no.: **IC recognition no.:**	94436 661AK-1		
Tested devices/ accessories:	**Phone RM-691 / Battery BL-5K, AC charger AC-15E, Headset WH-102, Data cable CA-101, Laptop IBM Thinkpad T40, AC adapter 02K6543, Printer HP deskjet 1600CC3540A, Parallel cable for printer**		
FCC ID:	QFXRM-691	**IC:**	661Z-RM691
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Part 15 Subpart B, ANSI C63.4 (2003), ICES-003, CISPR 22, RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009), RSS-139 (Issue 2, February 2009), RSS-210 (Issue 7, June 2007). 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 Nokia.		
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 Jari Jantunen Date: 2011.02.10 15:11:16 +02'00'		

Jari Jantunen, System Manager, EMC

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	14-Jan-2011
Testing completed	26-Jan-2011
The customer's contact person	Allison Lenaghan
Test Plan referred to	T:\Projects\RM-691\TestPlan\RS_testplan_RM-691.xls
Notes	-
Document name	T:\Projects\RM-691\EMC\FCC15B_RM-691_12.docx

1.1. EUT and Accessory Information

The EUT is a 9-band (GSM850/900/1800/1900) and WCDMA Band (I/II(1900)/IV(1700)/V(850)/VIII/) mobile phone with GPRS, EGPRS, HSDPA, HSUPA and WLAN and Bluetooth and FM transmitter.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-691	004402134040447	5000	-	020.022	42453
Battery	BL-5K	4620400321K10100712;0670580	-	-	-	42455
AC charger	AC-15E	4090499512230700758;0675463	-	-	-	42457
Headset	WH-102	0694323939454109378	-	-	-	42459
Data cable	CA-101	07306348473	-	-	-	42461
Laptop	IBM Thinkpad T40	99ARTGD	-	-	-	41868
AC Adapter	02K6543	-	-	-		40202
Printer	HP deskjet 1600CC3540A	USB8302546	-	-	-	40077
Parallel cable for printer	-	-	-	-	-	40087

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

1.2.

1.3. Summary of Test Results

GSM850:

Section in CFR 47	Section in ICES-003 (RSS-132)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	NP
15.109, a	5.5 (4.6)	Radiated emissions	PASSED

WCDMA 850 (Band V):

Section in CFR 47	Section in ICES-003 (RSS-132)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	NP
15.109, a	5.5 (4.6)	Radiated emissions	NP

GSM1900:

Section in CFR 47	Section in ICES-003 (RSS-133)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	NP
15.109, a	5.5 (6.6)	Radiated emissions	PASSED

WCDMA 1900 (Band II):

Section in CFR 47	Section in ICES-003 (RSS-133)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	NP
15.109, a	5.5 (6.6)	Radiated emissions	NP

WCDMA 1700 (Band IV):

Section in CFR 47	Section in ICES-003 (RSS-139)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	NP
15.109, a	5.5 (6.6)	Radiated emissions	PASSED

WLAN:

Section in CFR 47	Section in ICES-003 (RSS-139)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	PASSED
15.109, a	5.5 (6.6)	Radiated emissions	PASSED

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 Nokia Laboratory.

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

CONTENTS

1. Summary for FCC Part 15B Compliance Test Report 2

1.1. EUT and Accessory Information 2
1.2. 3
1.3. Summary of Test Results 3

2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3) 5

2.2. Test method and limit 5

3. Radiated emissions (FCC §15.109, ICES-003 section 5.5, RSS-132 4.6, RSS-133 6.6, RSS-139 6.6) 8

3.2. Test method and limit 8
3.3. GSM850 + FM radioTest results 10
3.4. GSM1900 + FM radio on Test results 11
3.5. WCDMA 1700 (Band IV) + FM radio on Test results 12
3.6. Bluetooth + GPS receiver Test results 13

4. Radiated emissions (FCC §15.109, ICES-003 section 5.5, RSS-132 4.6, RSS-133 6.6, RSS-139 6.6) 15

4.2. Test method and limit 15
4.3. WLAN RX mode 16

5. Test Equipment 18

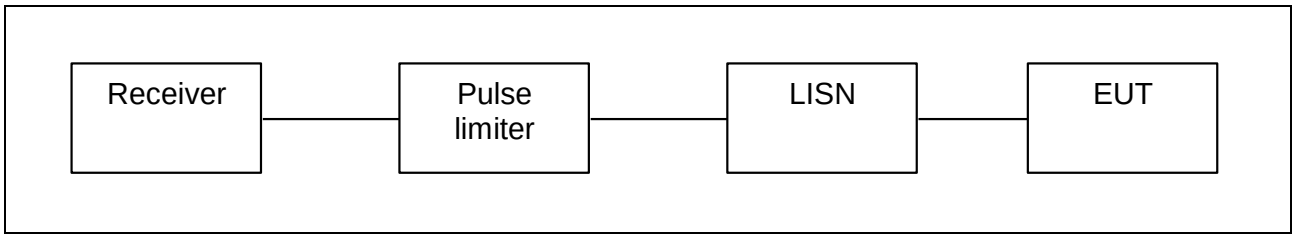
5.1. Conducted measurements 18
5.2. Radiated measurements 18

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

2. AC powerline conducted emissions
(FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-691, DUT 42453
Accessories with DUT numbers	BL-5K, DUT 42455 ; AC-15E, DUT 42457 ; WH-102, DUT 42459, CA-101 DUT IBM Thinkpad T40 DUT 41868, 02K6543 DUT 40202, HP deskjet 1600CC3540A DUT 40077, Parallel cable for printer DUT 40087
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	Continuos data transfer active between phone and computer
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 99.4
Date of measurements	26-Jan-2011
Measured by	Jari Jantunen

2.1.1 Test Setup



2.2. Test method and limit

The measurement is made according to ANSI C63.4-2003 as follows:

The EUT is placed on a wooden table 80 cm above the reference groundplane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

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

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

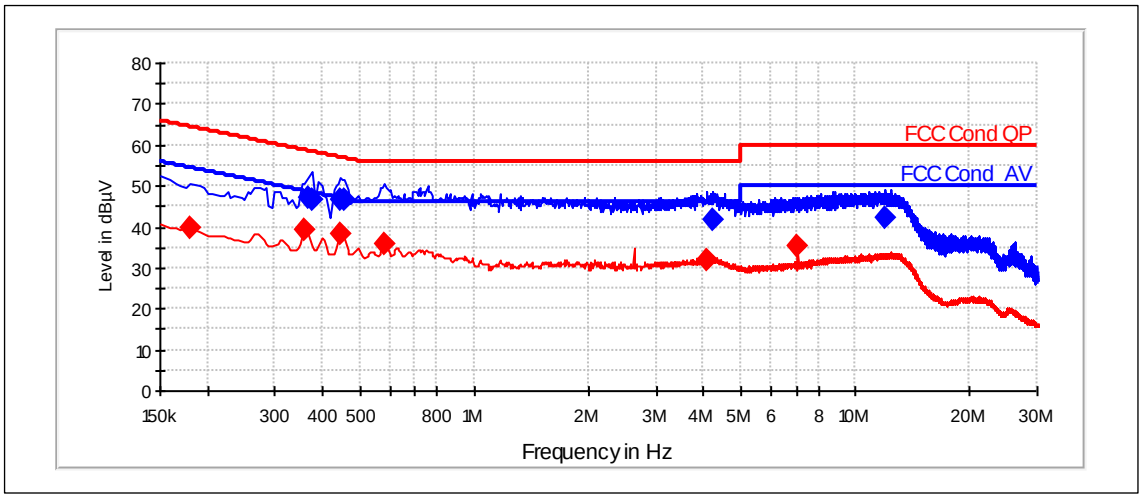
CISPR 22 Class B limits

Frequency range [MHz]	Quasi peak limit [dBµV]	Average limit [dBµV]
0.15 - 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

2.2.1 WLAN Test Results, AC-15E connected to LISN

RX mode, channel 7 / 2440 MHz



Quasi peak

Frequency [MHz]	U [dBµV]	IF-BW[kHz]	Line	Margin	Result
0.365	46.93	10	L1	11.71	PASSED
0.375	46.47	10	L1	11.89	PASSED
0.445	46.81	10	L1	10.17	PASSED
0.455	46.43	10	L1	10.38	PASSED
4.245	41.84	10	L1	14.2	PASSED
11.92	42.01	10	L1	18	PASSED

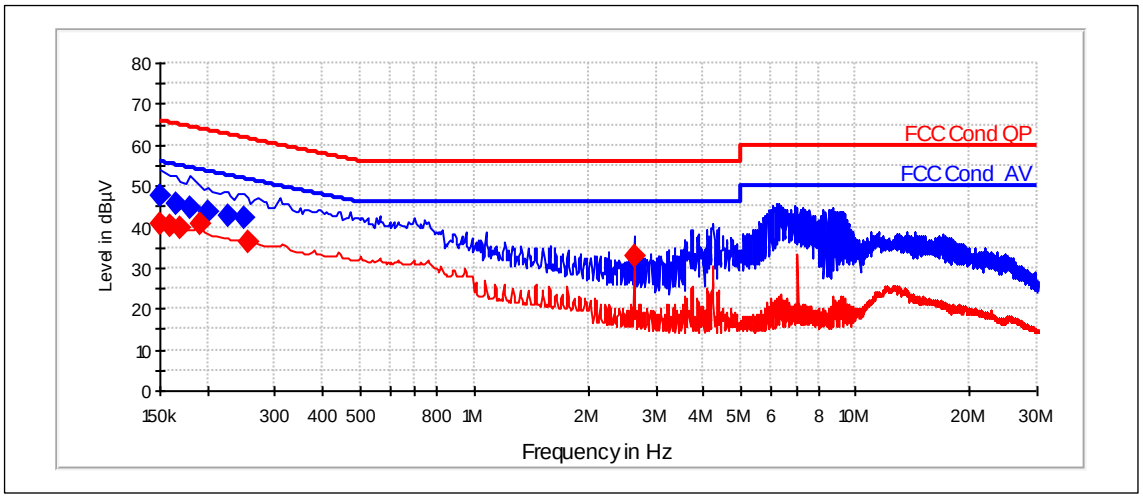
Average

Frequency [MHz]	U [dBµV]	IF-BW[kHz]	Line	Margin	Result
0.18	39.8	10	L1	14.69	PASSED
0.36	39.03	10	L1	9.73	PASSED
0.445	38.25	10	L1	8.67	PASSED
0.58	35.89	10	L1	10.1	PASSED
4.07	31.92	10	L1	14.1	PASSED
7.065	35.32	10	L1	14.7	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

2.2.2 WLAN Test Results, Laptop AC charger connected to LISN

RX mode, channel 7 / 2440 MHz



Quasi peak

Frequency [MHz]	U [dBµV]	IF-BW[kHz]	Line	Margin	Result
0.15	47.46	10	L1	18.5	PASSED
0.165	45.83	10	L1	19.41	PASSED
0.18	44.7	10	N	19.79	PASSED
0.2	43.47	10	N	20.11	PASSED
0.225	42.62	10	L1	20.03	PASSED
0.25	42.1	10	N	19.66	PASSED

Average

Frequency [MHz]	U [dBµV]	IF-BW[kHz]	Line	Margin	Result
0.15	40.86	10	N	15.1	PASSED
0.16	40.22	10	N	15.26	PASSED
0.17	39.59	10	N	15.36	PASSED
0.19	40.98	10	L1	13.04	PASSED
0.255	36.47	10	N	15.09	PASSED
2.625	33	10	N	13	PASSED

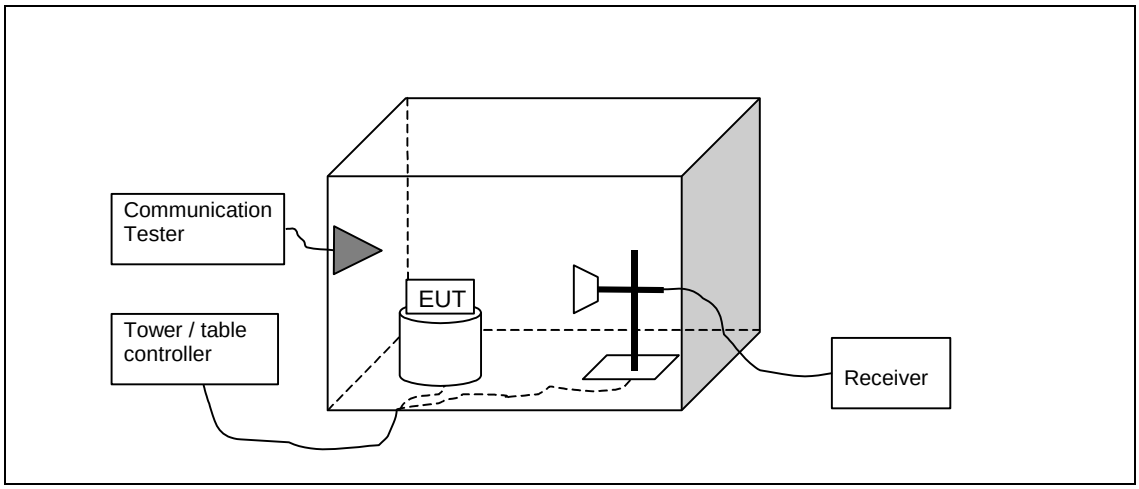
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

3. Radiated emissions

(FCC §15.109, ICES-003 section 5.5, RSS-132 4.6, RSS-133 6.6, RSS-139 6.6)

EUT with DUT number	RM-691, DUT 42453
Accessories with DUT numbers	BL-5K, DUT 42455 ; AC-15E, DUT 42457 ; WH-102, DUT 42459
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22-23 / 45-50 / 99.3-99.7
Date of measurements	20.. 24-Jan-2011
Measured by	Jari Jantunen

3.1.1 Test Setup



3.2. Test method and limit

The measurement is made according to ANSI C63.4-2003as 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.

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

The measurement results are obtained as described below:

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

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 [dBµV/m]	Average limit [dBµV/m]	Peak limit [dBµV/m]
30 - 230	40	-	-
230 – 1000	47	-	-
Above 1000	-	54	74

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

3.3. GSM850 + FM radioTest results

RX mode, channel 128 / 869.2 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3478.3	38.61	85.182	44.27	-5.66	HORIZONTAL	PASSED
6952.9	46.65	214.907	46.56	0.09	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3478.3	25.91	19.742	31.57	-5.66	HORIZONTAL	PASSED
6952.9	34.08	50.577	33.99	0.09	HORIZONTAL	PASSED

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
30.81	23.86	15.599	51.72	-27.86	VERTICAL	PASSED
36.945	24.9	17.587	55.13	-30.23	VERTICAL	PASSED
38.892	18.7	8.609	49.69	-30.99	VERTICAL	PASSED
245.581	4.66	1.71	38.84	-34.18	HORIZONTAL	PASSED
248.957	5.19	1.818	39.32	-34.13	HORIZONTAL	PASSED
251.463	7.06	2.254	41.1	-34.04	HORIZONTAL	PASSED
254.409	6.54	2.123	40.44	-33.9	HORIZONTAL	PASSED
256.734	7.69	2.424	41.45	-33.76	HORIZONTAL	PASSED
258.9	6.78	2.182	40.4	-33.62	HORIZONTAL	PASSED
261.325	5.42	1.867	38.97	-33.55	HORIZONTAL	PASSED

RX mode, channel 251 / 893.8 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3576.1	38.43	83.464	43.73	-5.3	HORIZONTAL	PASSED
7150.8	43.04	141.906	42.42	0.62	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3576.1	25.81	19.519	31.11	-5.3	HORIZONTAL	PASSED
7150.8	30.32	32.806	29.7	0.62	HORIZONTAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

3.4. GSM1900 + FM radio on Test results

RX mode, channel 512 / 1930.2 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
3861.8	41.6	120.157	44.01	-2.41	HORIZONTAL	PASSED
7720.5	44.65	170.746	42.8	1.85	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
3861.8	28.09	25.378	30.5	-2.41	HORIZONTAL	PASSED
7720.5	31.74	38.619	29.89	1.85	HORIZONTAL	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
36.092	22.07	12.687	51.96	-29.89	VERTICAL	PASSED
39.432	22.49	13.317	53.69	-31.2	VERTICAL	PASSED

RX mode, channel 810 / 1989.8 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
3979.6	40.66	107.857	43.6	-2.94	HORIZONTAL	PASSED
7958.6	45.34	184.863	42.93	2.41	VERTICAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
3979.6	27.81	24.567	30.75	-2.94	HORIZONTAL	PASSED
7958.6	32.42	41.764	30.01	2.41	VERTICAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

3.5. WCDMA 1700 (Band IV) + FM radio on Test results

RX mode, channel 1537 / 2112.4 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4226	40.49	105.767	44.14	-3.65	HORIZONTAL	PASSED
6335.7	44.96	177.092	46.3	-1.34	VERTICAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4226	27.37	23.367	31.02	-3.65	HORIZONTAL	PASSED
6335.7	31.96	39.632	33.3	-1.34	VERTICAL	PASSED

RX mode, channel 1637 / 2132.4 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
37.403	23.7	15.302	54.11	-30.41	VERTICAL	PASSED
39.362	17.68	7.659	48.85	-31.17	VERTICAL	PASSED

RX mode, channel 1637 / 2132.4 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
7046.396	43.17	143.979	42.8	0.37	VERTICAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
7046.396	30.3	32.719	29.93	0.37	VERTICAL	PASSED

RX mode, channel 1738 / 2152.6 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4306.3	39.76	97.23	43.73	-3.97	VERTICAL	PASSED
6459.5	45.74	193.664	47.17	-1.43	VERTICAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4306.3	26.8	21.885	30.77	-3.97	VERTICAL	PASSED
6459.5	32.57	42.501	34	-1.43	VERTICAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

3.6. Bluetooth + GPS receiver Test results

3.6.1 GFSK modulation, PRBS packet type

TX mode, Channel 0 / 2402 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4805.9	40.32	103.717	43.06	-2.74	VERTICAL	PASSED
7204.3	43.23	145.111	42.41	0.82	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4805.9	27.26	23.057	30	-2.74	VERTICAL	PASSED
7204.3	30.5	33.485	29.68	0.82	HORIZONTAL	PASSED

TX mode, Channel 40 / 2442 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
37.245	23.35	14.704	53.65	-30.3	VERTICAL	PASSED
43.125	22.98	14.096	55.75	-32.77	VERTICAL	PASSED
108.284	21.47	11.839	54.93	-33.46	VERTICAL	PASSED
108.355	11.56	3.784	45.02	-33.46	VERTICAL	PASSED
903.186	16.09	6.378	37.65	-21.56	VERTICAL	PASSED
911.782	16.4	6.604	37.94	-21.54	VERTICAL	PASSED
945.932	29.96	31.481	50.43	-20.47	HORIZONTAL	PASSED
948.007	16.31	6.54	37.84	-21.53	VERTICAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
3508.615	38.77	86.816	44.26	-5.49	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
3508.615	25.98	19.9	31.47	-5.49	HORIZONTAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

TX mode, Channel 78 / 2480 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4962.2	41.88	124.18	43.59	-1.71	HORIZONTAL	PASSED
7442.3	43.4	147.826	41.91	1.49	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4962.2	29.19	28.82	30.9	-1.71	HORIZONTAL	PASSED
7442.3	30.47	33.393	28.98	1.49	HORIZONTAL	PASSED

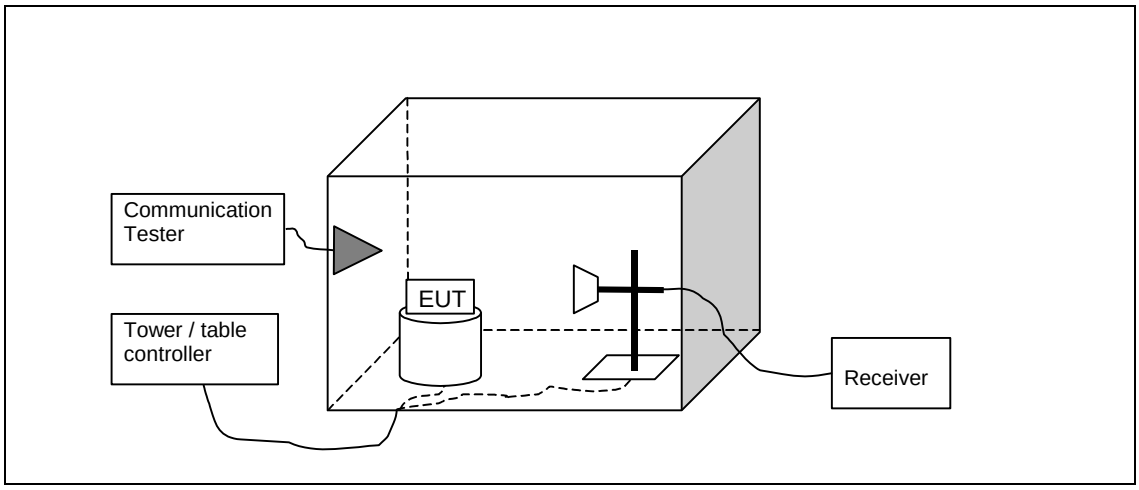
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

4. Radiated emissions

(FCC §15.109, ICES-003 section 5.5, RSS-132 4.6, RSS-133 6.6, RSS-139 6.6)

EUT with DUT number	RM-691, DUT 42453
Accessories with DUT numbers	BL-5K, DUT 42455 ; AC-15E, DUT 42457 ; WH-102, DUT 42459, CA-101 DUT IBM Thinkpad T40 DUT 41868, 02K6543 DUT 40202, HP deskjet 1600CC3540A DUT 40077, Parallel cable for printer DUT 40087
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	Continuos data transfer active between phone and computer
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 48 / 99.3
Date of measurements	20-Jan-2011
Measured by	Jari Jantunen

4.1.1 Test Setup



4.2. Test method and limit

The measurement is made according to ANSI C63.4-2003as 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.

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

The measurement results are obtained as described below:

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

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 [dBµV/m]	Average limit [dBµV/m]	Peak limit [dBµV/m]
30 - 230	40	-	-
230 – 1000	47	-	-
Above 1000	-	54	74

4.3. WLAN RX mode

Channel 1 / 2412 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4823.5	40.05	100.589	42.67	-2.62	HORIZONTAL	PASSED
7234	43.43	148.423	42.29	1.14	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4823.5	27.32	23.217	29.94	-2.62	HORIZONTAL	PASSED
7234	30.85	34.858	29.71	1.14	HORIZONTAL	PASSED

Channel 7 / 2440 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
35.312	24.18	16.181	53.77	-29.59	VERTICAL	PASSED
39.342	30	31.612	61.17	-31.17	VERTICAL	PASSED
143.186	33.45	47.016	67.66	-34.21	VERTICAL	PASSED
199.8	33.66	48.167	69.45	-35.79	HORIZONTAL	PASSED
226.062	33.11	45.217	68.37	-35.26	VERTICAL	PASSED
310.109	22.7	13.647	54.68	-31.98	HORIZONTAL	PASSED
399.48	26.96	22.277	57.57	-30.61	VERTICAL	PASSED
700.611	37.67	76.472	61.44	-23.77	HORIZONTAL	PASSED
800.992	37.01	70.876	60.65	-23.64	VERTICAL	PASSED
900.791	37.49	74.869	59.81	-22.32	VERTICAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 11 / 2462 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4924.2	41.8	123.084	43.73	-1.93	HORIZONTAL	PASSED
7386.2	43.95	157.543	42.42	1.53	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	
4924.2	29.02	28.252	30.95	-1.93	HORIZONTAL	PASSED
7386.2	30.83	34.806	29.3	1.53	HORIZONTAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

5. Test Equipment

5.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
OM06312	Signal Generator	E4422B	Agilent	22/24
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
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
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
2058	Receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Communication Tester	CMU200	R&S	22/24/27
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

5.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM26497	Antenna	3115	Emco	22/24/27, 15C, 15B
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 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
-	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

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Eq. No	Equipment	Type	Manufacturer	Used in
TM39180	Laser distance meter	Disto Pro	Leica	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 chambre	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
-	High pass filter	F-90-1500-6-R	RLC Electronics	22/24/27, 15C, 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
-	Band reject filter	WRCG832/838-825/848-40/5SS	Wainwright	22
TM23892	Controller	G-1000SDX	Yaesu	22/24/27
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27, 15C

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880