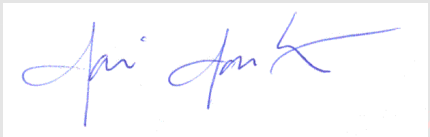
TCC Nokia

FINAS Finnish Accreditation Service T117 (EN ISO/IEC 17025)

FCC Part 15C Compliance Test Report

Test Report no.:	Tre_FCC_0749_05.doc	**Date of Report:**	3.1.2008
Number of pages:	20	**Customer's Contact person:**	Alison Kingston
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 3608		
Tested devices/ accessories:	**GSM phone RM-235 / Battery BL-6F, AC charger AC-5E, Audio adapter AD-54, Headset HS-45**		
FCC ID:	QFXRM-235	**IC:**	661Z-RM235
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), Public Notice DA 00-705, DTS procedures KDB 558074, IC standards RSS-GEN (Issue 2, June 2007) and 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: 2008.01.03 09:40:31 +02'00'		

Jari Jantunen, System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	27.11.2007
Testing completed	2.1.2007
The customer's contact person	Alison Kingston
Test Plan referred to	T:\Projects\
Notes	-
Document name	T:\Projects\RM-235\EMC\Results\FCC\Tre_FCC_0749_05.doc

1.1. EUT and Accessory Information

The EUT is a 6-band (GSM850/900/1800/1900 and WCDMA Band I/VIII) mobile phone with GPRS, EGPRS, Bluetooth and WLAN. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
GSM phone	RM-235	004401011432032	4500	-	0.67EE	**41330**
GSM phone	RM-235	004401011431695	4500	-	0.130EE	**41344**
Battery	BL-6F	-	-	-	-	**41333**
AC Charger	AC-5E	-	-	-	-	**41334**
Audio adapter	AD-54	-	-	-	-	**41335**
Headset	HS-45	-	-	-	-	**41336**

1.2. Summary of Test Results

Bluetooth:

Section in CFR 47	Section in *RSS-GEN* or RSS-210	Name of the test	Result
15.247(b)(1)	A8.4 (2)	Conducted peak output power	NP
15.247(d)	A8.5	Band edge compliance of RF emissions	NP
15.247(d)	A8.5	Spurious RF conducted emissions	NP
15.247(d), 15.209	A8.5	Spurious radiated emissions	PASSED
15.207	*7.2.2*	AC powerline conducted emissions	PASSED
15.247(a)(1)	A8.1 (1)	20 dB bandwidth	NP
15.247(a)(1)	A8.1 (2)	Carrier frequency separation	NP
15.247(a)(1)(iii)	A8.1 (4)	Number of hopping frequencies	NP
15.247(a)(1)(iii)	A8.1 (4)	Time of occupancy	NP

WLAN:

Section in CFR 47	Section in RSS-210	Name of the test	Result
15.247(b)(1)	A8.4 (4)	Conducted peak output power	NP
15.247(d)	A8.5	Band edge compliance of RF emissions	NP
15.247(d)	A8.5	Spurious RF conducted emissions	NP
15.247(d), 15.209	A8.5	Spurious radiated emissions	PASSED
15.207	*7.2.2*	AC powerline conducted emissions	PASSED
15.247(a)(2)	A8.2 (1)	6 dB bandwidth	NP
15.247(e)	A8.2 (2)	Power spectral density	NP

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 Tampere 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

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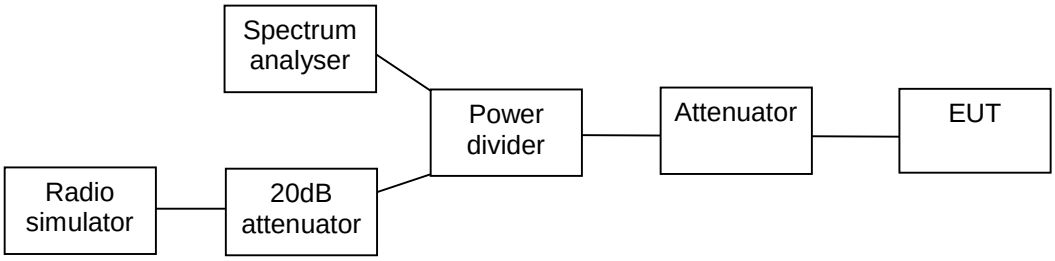
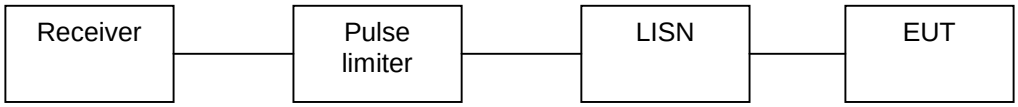
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

2. Test setups

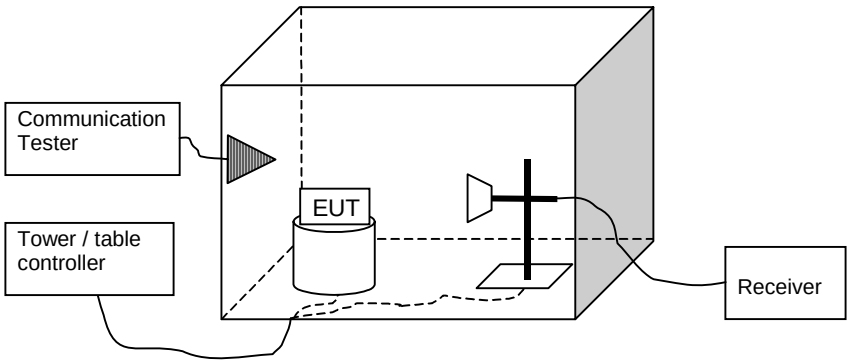
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Spurious radiated emissions test setup



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. Spurious radiated emissions

(FCC §15.247(d), §15.209, RSS-210 A8.5)

EUT with DUT number	RM-235 DUT 41330
Accessories with DUT numbers	BL-6F DUT 41333, AC-5E DUT 41334, AD-54 DUT 41335, HS-45 DUT 41336
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 50 / 100.6
Date of measurements	3.12.2007
Measured by	Jari Jantunen

3.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210 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 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 ($A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$).

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

Limits for spurious radiated emissions measurements (3 m measurement distance)

Frequency range [MHz[	Limit [µV/m]	Limit [dBµV/m]	Detector
30 – 88	100	40	Quasi peak
88 – 216	150	43.5	Quasi peak
216 – 960	200	46	Quasi peak
960 – 1000	500	54	Quasi peak
Above 1000	500	54	Average
Above 1000	5000	74	Peak

3.2. Bluetooth Test results

3.2.1 GFSK modulation, PRBS packet type

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	Result
4804.000000	43.50	149.62	45.30	-1.8	HORIZONTAL	PASSED
7206.000000	42.60	134.90	40.00	2.6	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
4804.000000	31.40	37.15	33.20	-1.8	HORIZONTAL	PASSED
7206.000000	29.80	30.90	27.20	2.6	HORIZONTAL	PASSED

Channel 40 / 2442 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
38.035872	23.60	15.14	38.50	-14.9	VERTICAL	PASSED
63.145892	19.00	8.91	45.80	-26.8	HORIZONTAL	PASSED
74.848497	15.90	6.24	41.30	-25.4	HORIZONTAL	PASSED
75.169940	17.30	7.33	42.70	-25.4	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4883.769539	41.90	124.45	43.70	-1.8	HORIZONTAL	PASSED
4912.827655	39.30	92.26	41.10	-1.8	HORIZONTAL	PASSED
7283.565130	43.00	141.25	40.00	3.0	VERTICAL	PASSED
7291.583166	42.60	134.90	39.60	3.0	VERTICAL	PASSED
7408.811623	43.70	153.11	40.00	3.7	HORIZONTAL	PASSED
7417.833667	43.60	151.36	39.90	3.7	HORIZONTAL	PASSED
17911.327655	53.80	489.78	34.20	19.6	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

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4884.269539	28.30	26.00	30.10	-1.8	HORIZONTAL	PASSED
4911.327655	26.40	20.89	28.20	-1.8	HORIZONTAL	PASSED
7281.565130	30.30	32.73	27.30	3.0	VERTICAL	PASSED
7289.583166	30.10	31.99	27.10	3.0	VERTICAL	PASSED
7403.311623	30.70	34.28	27.00	3.7	HORIZONTAL	PASSED
7415.833667	30.70	34.28	27.00	3.7	HORIZONTAL	PASSED
17914.327655	40.60	107.15	21.00	19.6	VERTICAL	PASSED

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	Result
4960.000000	40.80	109.65	42.10	-1.3	HORIZONTAL	PASSED
7440.000000	43.60	151.36	40.00	3.6	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
4960.000000	27.50	23.71	28.80	-1.3	HORIZONTAL	PASSED
7440.000000	30.60	33.88	27.00	3.6	HORIZONTAL	PASSED

3.2.2 8DPSK modulation, PRBS packet type

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	Result
4804.000000	43.80	154.88	45.60	-1.8	HORIZONTAL	PASSED
7206.000000	44.70	171.79	42.10	2.6	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
4804.000000	33.50	47.32	35.30	-1.8	HORIZONTAL	PASSED
7206.000000	30.60	33.88	28.00	2.6	HORIZONTAL	PASSED

Channel 40 / 2442 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
38.176353	24.30	16.41	39.30	-15.0	VERTICAL	PASSED
59.900601	13.70	4.84	40.50	-26.8	HORIZONTAL	PASSED
74.367535	14.90	5.56	40.40	-25.5	HORIZONTAL	PASSED
74.369940	15.60	6.03	41.10	-25.5	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

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4883.767535	42.70	136.46	44.50	-1.8	HORIZONTAL	PASSED
7283.569138	43.20	144.54	40.20	3.0	HORIZONTAL	PASSED
7325.653307	43.90	156.68	40.90	3.0	HORIZONTAL	PASSED
7429.365731	43.40	147.91	39.80	3.6	VERTICAL	PASSED
17923.849699	53.00	446.68	33.50	19.5	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
4883.767535	31.60	38.02	33.40	-1.8	HORIZONTAL	PASSED
7287.569138	30.30	32.73	27.30	3.0	HORIZONTAL	PASSED
7326.153307	31.10	35.89	28.10	3.0	HORIZONTAL	PASSED
7436.865731	30.50	33.50	26.90	3.6	VERTICAL	PASSED
17925.349699	40.50	105.93	21.00	19.5	HORIZONTAL	PASSED

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	Result
4960.000000	40.40	104.71	41.70	-1.3	HORIZONTAL	PASSED
7440.000000	43.90	156.68	40.30	3.6	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
4960.000000	27.70	24.27	29.00	-1.3	VERTICAL	PASSED
7440.000000	30.90	35.08	27.30	3.6	VERTICAL	

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. AC powerline conducted emissions

(FCC §15.207, RSS-GEN 7.2.2)

EUT with DUT number	RM-235 DUT 41330
Accessories with DUT numbers	BL-6F DUT 41333, AC-5E DUT 41334, AD-54 DUT 41335, HS-45 DUT 41336
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 42 / 101.7
Date of measurements	11.12.2007
Measured by	Jari Jantunen

4.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-GEN 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:

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

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

CISPR 22 Class B limits

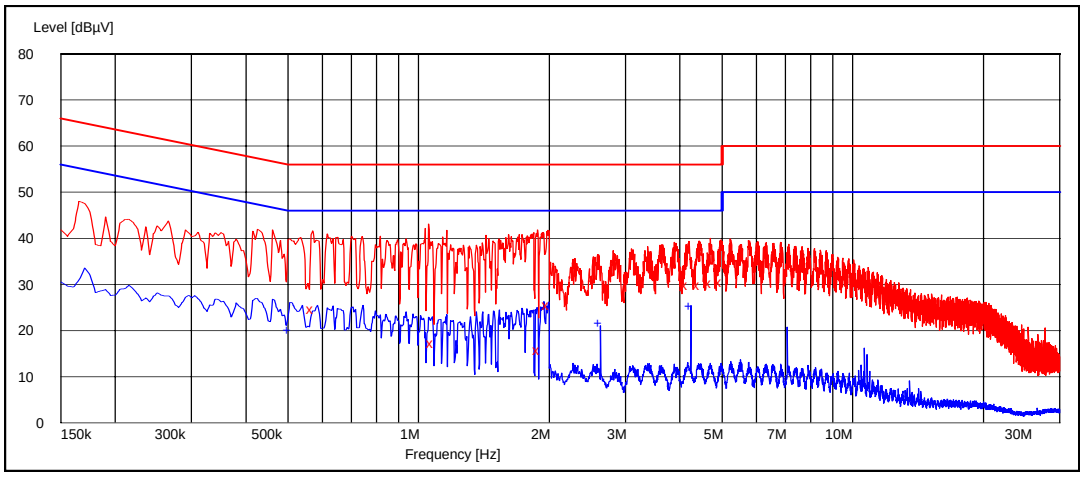
Frequency range [MHz]	Quasi peak limit [dBµV]	Average limit [dBµV]
0.15 - 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

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

4.2. Bluetooth Test results

4.2.1 GFSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.570000	24.70	L1	PASSED
1.080000	17.30	N	PASSED
1.895000	15.80	L1	PASSED
1.990000	25.60	L1	PASSED
4.165000	29.80	L1	PASSED
4.430000	29.90	L1	PASSED
4.715000	30.40	L1	PASSED
4.975000	30.60	L1	PASSED

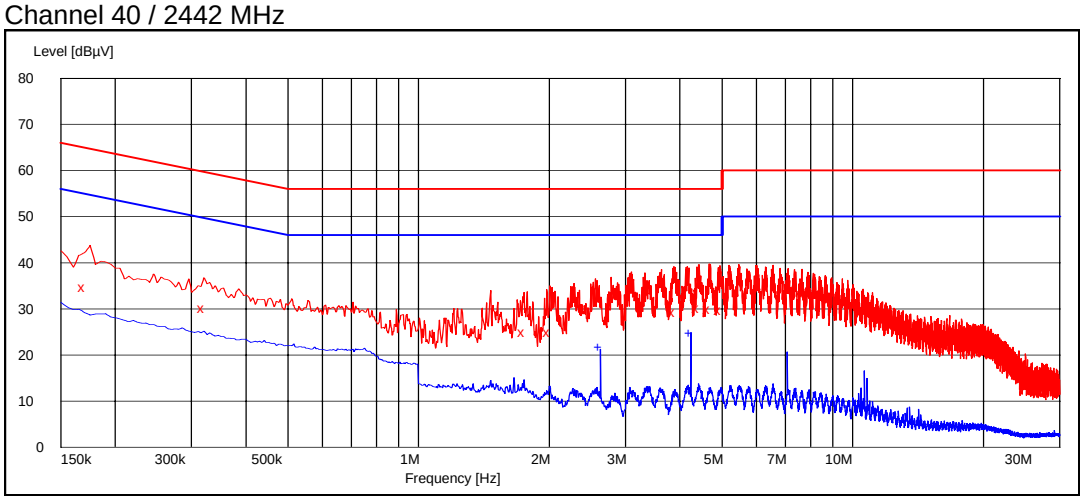
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.505000	20.20	L1	PASSED
2.625000	21.60	L1	PASSED
4.240000	25.30	L1	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

4.2.2 8DPSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.170000	34.70	L1	PASSED
0.320000	30.20	L1	PASSED
1.750000	25.10	L1	PASSED
2.000000	25.10	L1	PASSED
3.890000	29.30	L1	PASSED
4.415000	30.10	L1	PASSED
4.675000	30.00	L1	PASSED
4.965000	29.80	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
2.625000	21.70	L1	PASSED
4.240000	24.80	L1	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. Spurious radiated emissions

(FCC §15.247(d), §15.209, RSS-210 A8.5)

EUT with DUT number	RM-235 DUT 41344
Accessories with DUT numbers	BL-6F DUT 41333, AC-5E DUT 41334, AD-54 DUT 41335, HS-45 DUT 41336
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	PASSED
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 48 / 101.7
Date of measurements	21.12.2007
Measured by	Jari Jantunen

5.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-210 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 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 ($A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$).

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Limits for spurious radiated emissions measurements (3 m measurement distance)

Frequency range [MHz[	Limit [µV/m]	Limit [dBµV/m]	Detector
30 – 88	100	40	Quasi peak
88 – 216	150	43.5	Quasi peak
216 – 960	200	46	Quasi peak
960 – 1000	500	54	Quasi peak
Above 1000	500	54	Average
Above 1000	5000	74	Peak

5.2. WLAN Test results

5.2.1 OFDM modulation, PRBS packet type

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	Result
4824.000000	39.60	95.50	41.30	-1.7	HORIZONTAL	PASSED
7236.000000	42.70	136.46	40.10	2.6	VERTICAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4824.000000	26.70	21.63	28.40	-1.7	HORIZONTAL	PASSED
7236.000000	29.80	30.90	27.20	2.6	VERTICAL	PASSED

Channel 7 / 2442 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
38.235872	24.30	16.41	39.30	-15.0	VERTICAL	PASSED
58.838677	15.30	5.82	41.80	-26.5	HORIZONTAL	PASSED
73.167535	15.60	6.03	41.20	-25.6	HORIZONTAL	PASSED
74.369940	15.30	5.82	40.80	-25.5	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4882.271543	43.70	153.11	45.50	-1.8	HORIZONTAL	PASSED
4886.773547	44.30	164.06	46.10	-1.8	HORIZONTAL	PASSED
7326.651303	48.40	263.03	45.40	3.0	HORIZONTAL	PASSED
7329.153307	48.70	272.27	45.70	3.0	HORIZONTAL	PASSED
17985.977956	53.70	484.17	34.30	19.4	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

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4884.773547	29.80	30.90	31.60	-1.8	HORIZONTAL	PASSED
4889.771543	29.30	29.17	31.10	-1.8	HORIZONTAL	PASSED
7325.151303	33.80	48.98	30.80	3.0	HORIZONTAL	PASSED
7325.153307	33.80	48.98	30.80	3.0	HORIZONTAL	PASSED
17990.977956	40.50	105.93	21.10	19.4	HORIZONTAL	PASSED

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	Result
4924.000000	41.20	114.82	43.00	-1.8	HORIZONTAL	PASSED
7386.000000	43.80	154.88	40.30	3.5	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
4924.000000	29.00	28.18	30.80	-1.8	HORIZONTAL	PASSED
7386.000000	31.00	35.48	27.50	3.5	HORIZONTAL	

5.2.2 DSSS modulation, PRBS packet type

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	Result
4824.000000	39.80	97.72	41.50	-1.7	HORIZONTAL	PASSED
7236.000000	42.10	127.35	39.50	2.6	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
4824.000000	27.30	23.17	29.00	-1.7	HORIZONTAL	PASSED
7236.000000	29.80	30.90	27.20	2.6	HORIZONTAL	PASSED

Channel 7 / 2442 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
38.035872	24.60	16.98	39.50	-14.9	VERTICAL	PASSED
74.248497	18.70	8.61	44.20	-25.5	HORIZONTAL	PASSED
74.369940	19.70	9.66	45.20	-25.5	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

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2497.524048	53.60	478.63	49.80	3.8	HORIZONTAL	PASSED
2499.548096	53.60	478.63	49.70	3.9	HORIZONTAL	PASSED
4883.769539	42.40	131.83	44.20	-1.8	HORIZONTAL	PASSED
7326.651303	44.70	171.79	41.70	3.0	HORIZONTAL	PASSED
7349.693387	43.30	146.22	40.10	3.2	HORIZONTAL	PASSED
7411.821643	43.40	147.91	39.70	3.7	HORIZONTAL	PASSED
17955.417836	53.00	446.68	33.50	19.5	VERTICAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2494.524048	41.10	113.50	37.30	3.8	HORIZONTAL	PASSED
2498.548096	40.90	110.92	37.10	3.8	HORIZONTAL	PASSED
4884.269539	29.30	29.17	31.10	-1.8	HORIZONTAL	PASSED
7327.151303	32.40	41.69	29.40	3.0	HORIZONTAL	PASSED
7347.193387	30.20	32.36	27.00	3.2	HORIZONTAL	PASSED
7408.821643	30.70	34.28	27.00	3.7	HORIZONTAL	PASSED
17958.917836	40.50	105.93	21.00	19.5	VERTICAL	PASSED

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	Result
4924.000000	46.30	206.54	48.10	-1.8	HORIZONTAL	PASSED
7386.000000	43.60	151.36	40.10	3.5	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
4924.000000	33.20	45.71	35.00	-1.8	HORIZONTAL	PASSED
7386.000000	31.20	36.31	27.70	3.5	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

6. AC powerline conducted emissions

(FCC §15.207, RSS-GEN 7.2.2)

EUT with DUT number	RM-235 DUT 41344
Accessories with DUT numbers	BL-6F DUT 41333, AC-5E DUT 41334, AD-54 DUT 41335, HS-45 DUT 41336
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 40 / 104.8
Date of measurements	2.1.2008
Measured by	Jari Jantunen

6.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-GEN 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:

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

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

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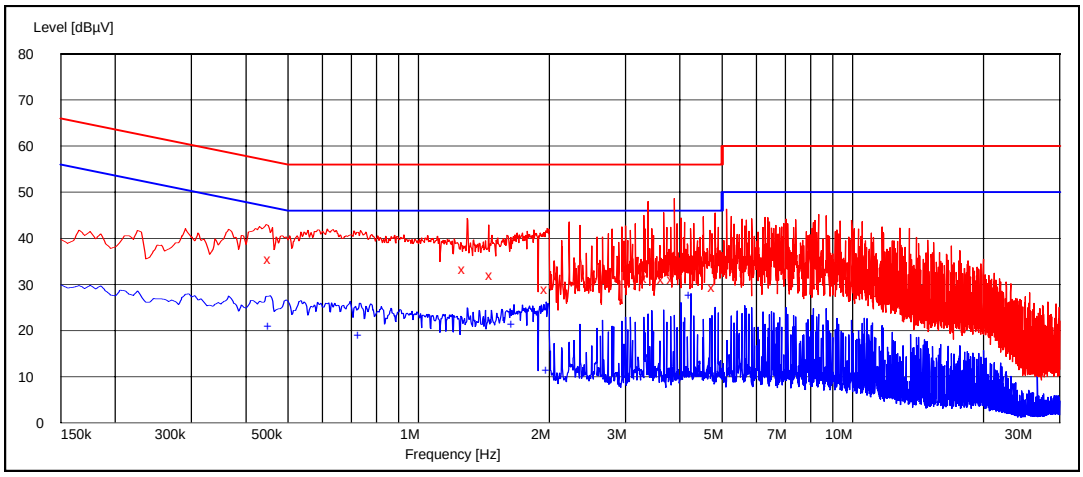
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

6.2. WLAN Test results

6.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 7 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.455000	35.50	L1	PASSED
1.275000	33.30	L1	PASSED
1.475000	32.00	L1	PASSED
1.980000	29.00	L1	PASSED
3.350000	31.40	L1	PASSED
3.665000	31.10	L1	PASSED
3.865000	31.20	L1	PASSED
4.805000	29.50	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.455000	21.00	L1	PASSED
0.735000	19.00	L1	PASSED
1.660000	21.30	L1	PASSED
1.990000	11.50	L1	PASSED
4.240000	27.70	L1	PASSED

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P.O. Box 68
Sinitaival 5
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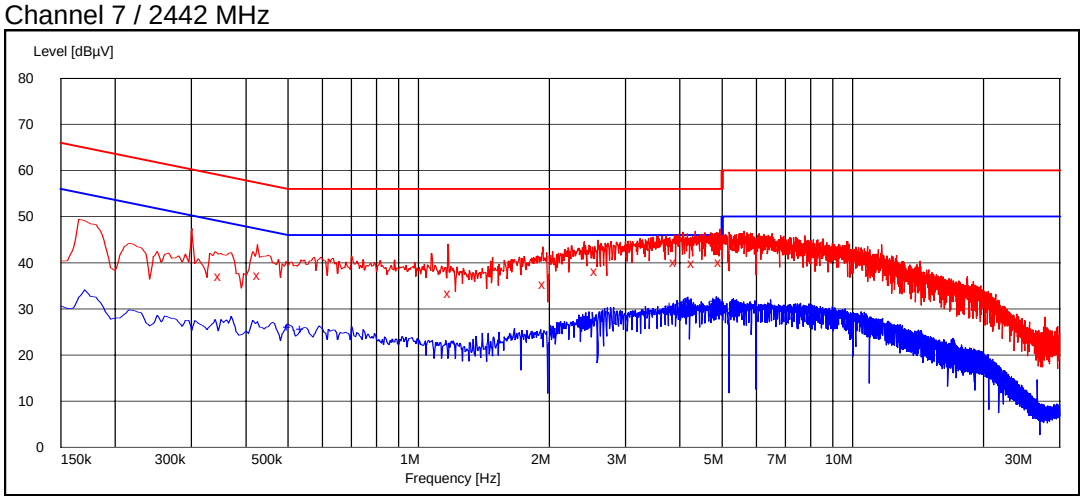
Fax. +358 (0) 7180 46880

6.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 7 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.350000	37.10	L1	PASSED
0.430000	37.40	L1	PASSED
1.185000	33.40	L1	PASSED
1.955000	35.40	L1	PASSED
2.580000	38.10	L1	PASSED
3.915000	40.20	L1	PASSED
4.315000	39.80	L1	PASSED
4.975000	40.20	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.505000	26.10	L1	PASSED
0.540000	25.70	L1	PASSED
1.660000	23.90	N	PASSED
1.860000	24.60	L1	PASSED
3.845000	30.50	L1	PASSED
4.145000	31.40	L1	PASSED
4.240000	31.80	L1	PASSED
4.835000	31.70	L1	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

7. Test Equipment

7.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30597	Power splitter	11667A	Agilent	22/24/27, 15C
TM37499	Power splitter	11667A	Agilent	22/24/27, 15C
TM38111	Multimeter	34401A	Agilent	22/24/27, 15C
TM38112	DC power supply	6632A	Agilent	22/24/27, 15C
TM22901	Attenuator	8496A	Agilent	22/24/27, 15C
TM30636	Artificial mains net	L2-16	PMM	15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM30600	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum analyzer	FSU	R&S	22/24/27, 15C
TM22835	Multimeter	87	Fluke	15C, 15B
TM37500	Microwave switch system	7116-MSW	Keithley	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transformatic	22/24/27, 15C, 15B
	Temperature chamber	VT4002	Vötsch	22/24/27, 15C
2058	EMI Test receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B

7.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	22/24/27, 15C, 15B
TM38845	EMI receiver	ESI 40	R&S	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	22/24/27, 15C, 15B
TM37516	Biconilog antenna	HL562	R&S	22/24/27, 15C, 15B
TM26496	Double ridged waveguide antenna	3115	EMCO	22/24/27, 15C, 15B
TM39158	Horn antenna	3116	EMCO	22/24/27, 15C, 15B
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	22/24/27, 15C, 15B
TM37501	Dipole antenna	3125-870	EMCO	22/24/27
TM37502	Dipole antenna	3125-1880	EMCO	22/24/27
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM38631	Signal generator	83640L	Agilent	22/24/27, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24/27
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24/27
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Mast/Turntable controller	HD-100	Deisel	22/24/27, 15C, 15B
TM26500	Turntable	DS412	Deisel	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	EMCO	22/24/27, 15C, 15B
TM38843	Antenna mast	2075	EMCO	22/24/27, 15C, 15B
TM38114	DC power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transformatic	22/24/27, 15C, 15B

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P.O. Box 68
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FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Eq. No	Equipment	Type	Manufacturer	Used in
TM23892	Yaesu controller	G-1000SDX	Yaesu	22/24/27, 15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B

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