

FCC Part 15C Compliance Test Report

Test Report no.:	Salo_FCC_0804_05.doc	Date of Report:	07-May-2008
Number of pages:	15	Customer's Contact person:	Tia Melava
Testing laboratory:	TCC Nokia Salo Laboratory P.O. Box 86 Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220	Customer:	Nokia Corporation P.O. Box 86 Joensuunkatu 7 FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 44277
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-345 / Battery BL-4U, Headset HS-47 and AC- Charger AC-5		
FCC ID:	PYARM-345	IC:	661V-RM345
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:			

Sami Lehtonen, System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	08-Jan-2008
Testing completed	21-Jan-2008
The customer's contact person	Tia Melava
Test Plan referred to	T:\Projects\RM-345\TestPlan_RS\RS_Testplan_RM-345.xls
Notes	-
Document name	T:\Projects\RM-345\EMC\Results\FCC\Salo_FCC_0804_05.doc

1.1. EUT and Accessory Information

The EUT is a 6-band (GSM850/900/1800/1900 and WCDMA Band II(1900)/V(850)) 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
Phone	RM-345	004401/01/446330/7	0320	-	07.45.3	12441
Battery	BL-4U	46204074120101 00794;0670560	-	-	-	12448
Headset	HS-47	069457965150104441	-	-	-	12439
AC-Charger	AC-5E	3943496233001500838;0675540	-	-	-	12323

1.2. Summary of Test Results

WLAN:

Section in CFR 47	Section in <i>RSS-GEN</i> or <i>RSS-210</i>	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	PASSED
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	NP
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

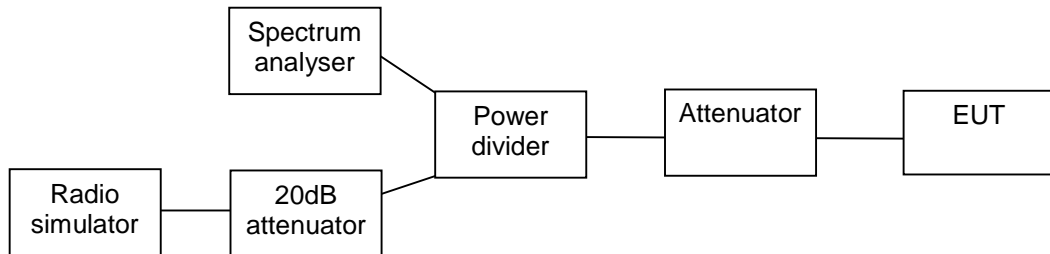
The test was not performed by the TCC Nokia Salo Laboratory.

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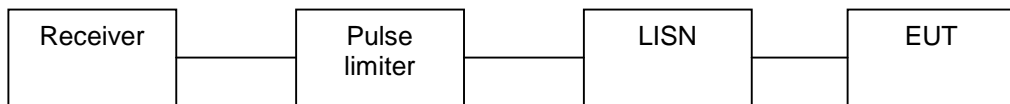
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2. Test setups

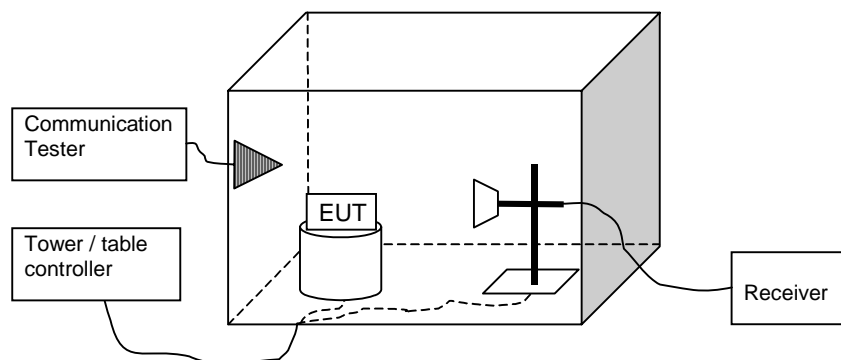
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Radiated test setup



3. Band edge compliance of RF emissions (FCC §15.247(d), RSS-210 A8.5)

EUT with DUT number	RM-345, DUT 12441
Accessories with DUT numbers	BL-4U, DUT 12448; HS-47, DUT 12439; AC-5E, DUT 12323
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Phone tested slide open mode and slide closed mode.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	18 / 45 / 98.8
Date of measurements	21-Jan-2008
Measured by	Sami Lehtonen

3.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-210.

Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

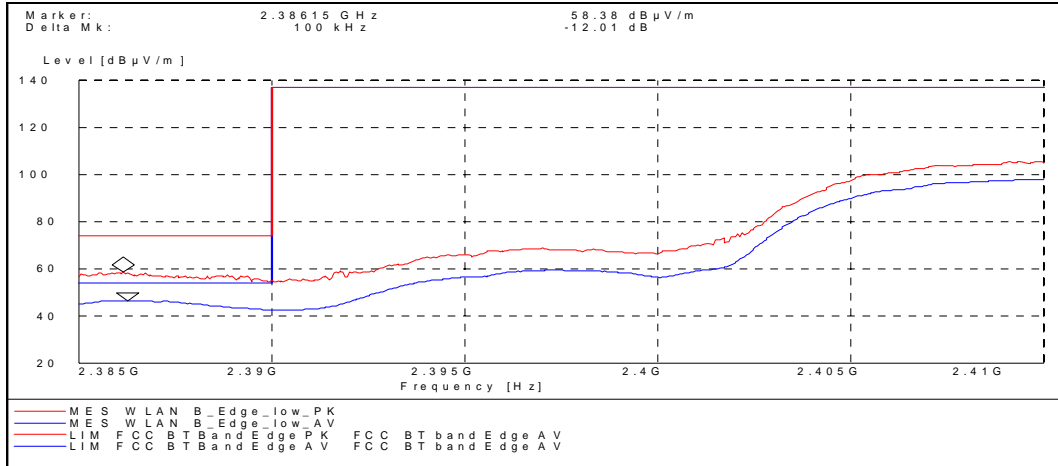
Frequency range [MHz]	Limit Average [dBµV/m]	Limit Peak [dBµV/m]
Below 2390 and above 2483.5	≤ 54	≤ 74

3.2. WLAN Test results

3.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

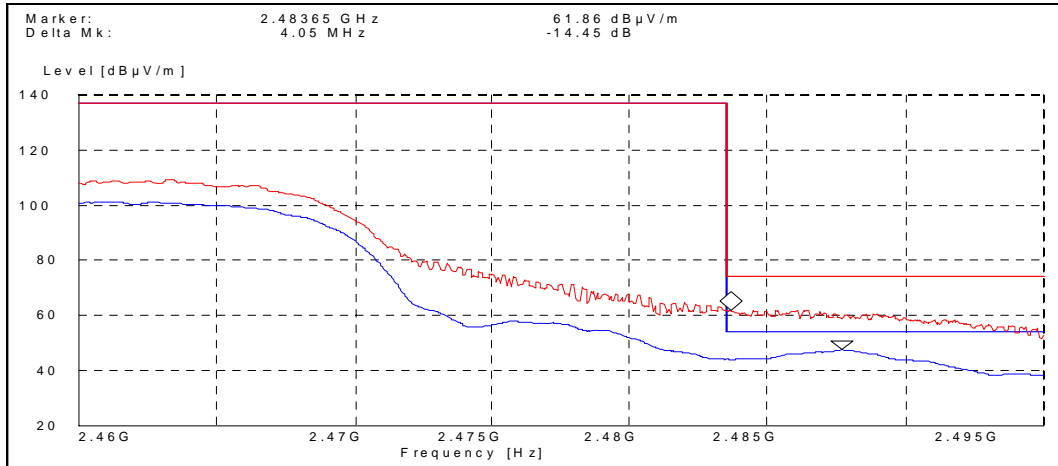
Slide Open:

Channel 1 / 2412 MHz



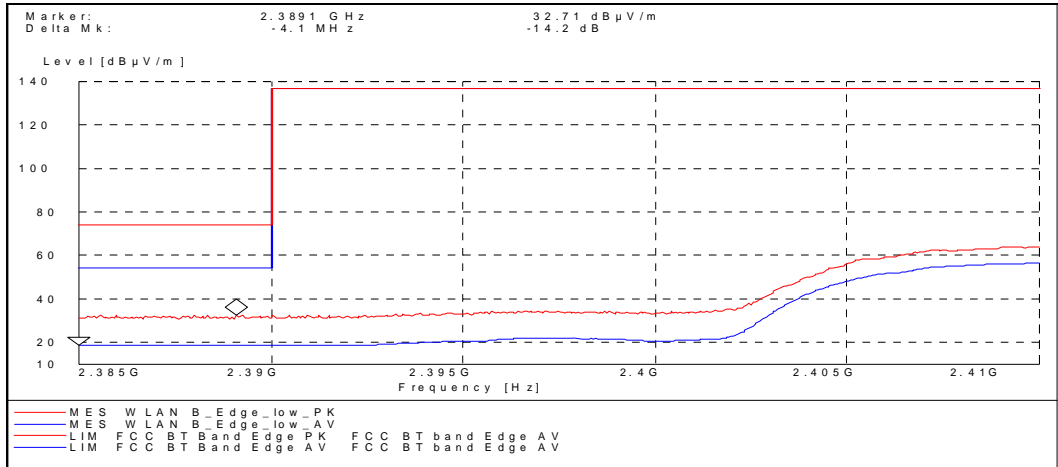
Detector (RBW: 1 MHz)	E [dBµV/m]	Result
Peak	58.40	PASSED
Average	46.40	PASSED

Channel 11 / 2462 MHz



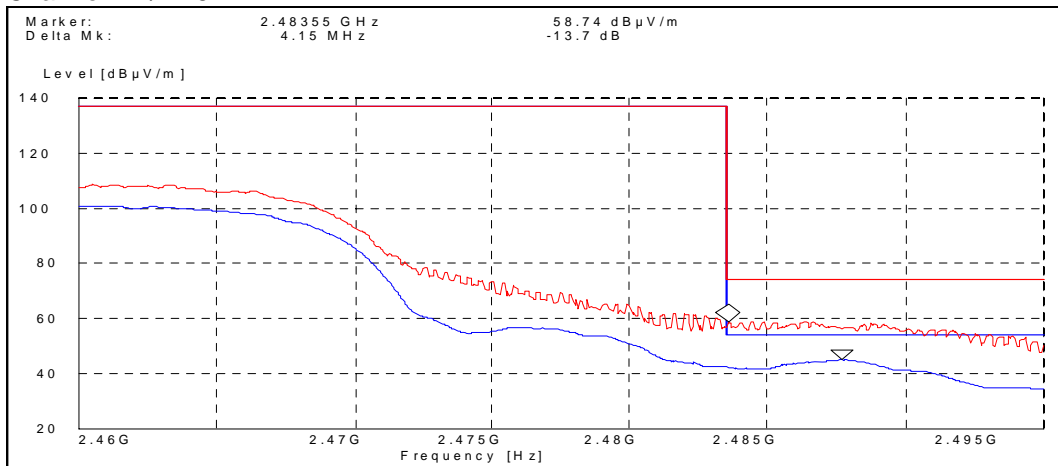
Detector (RBW: 1 MHz)	E [dBµV/m]	Result
Peak	61.90	PASSED
Average	47.40	PASSED

Slide closed:
Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dBµV/m]	Result
Peak	32.70	PASSED
Average	18.50	PASSED

Channel 11 / 2462 MHz

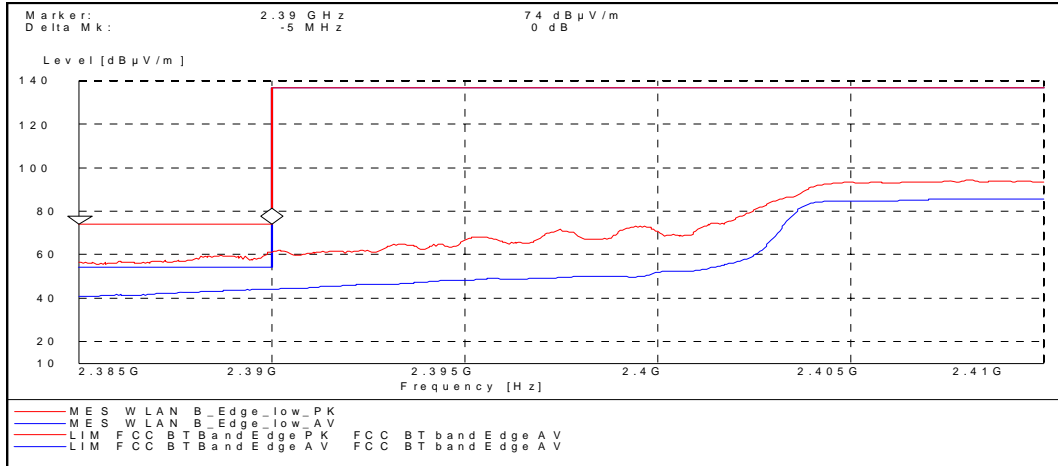


Detector (RBW: 1 MHz)	E [dBµV/m]	Result
Peak	58.70	PASSED
Average	45.00	PASSED

3.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Slide open:

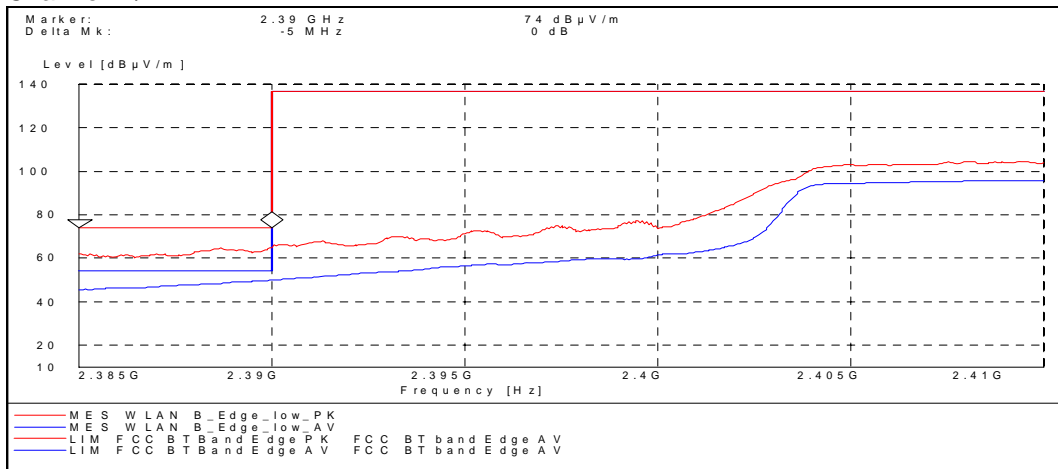
Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dBµV/m]	Result
Peak	61.30	PASSED
Average	44.20	PASSED

Slide closed:

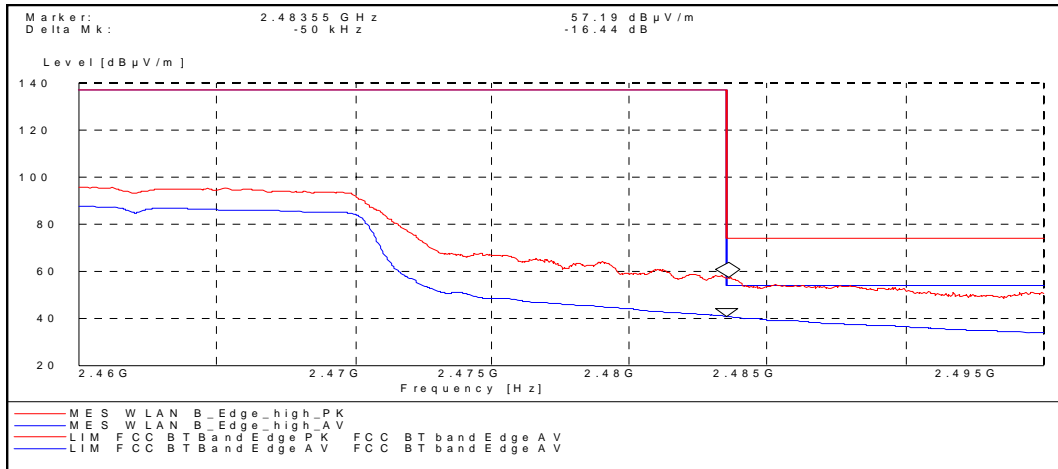
Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dBµV/m]	Result
Peak	64.90	PASSED
Average	49.80	PASSED

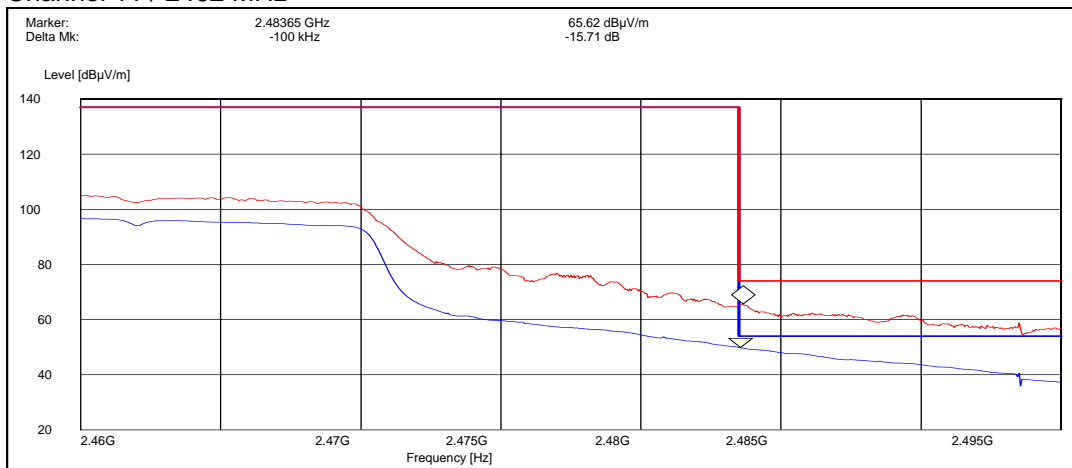
Slide open:

Channel 11 / 2462 MHz



Detector (RBW: 1 MHz)	E [dBµV/m]	Result
Peak	57.20	PASSED
Average	40.70	PASSED

Slide closed:
Channel 11 / 2462 MHz



Detector (RBW: 1 MHz)	E [dBµV/m]	Result
Peak	65.60	PASSED
Average	49.90	PASSED

4. Spurious radiated emissions (FCC §15.247(d), §15.209, RSS-210 A8.5)

EUT with DUT number	RM-345, DUT 12441
Accessories with DUT numbers	BL-4U, DUT 12448; HS-47, DUT 12439; AC-5E, DUT 12323
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	18 / 45 / 98.8
Date of measurements	21-Jan-2008
Measured by	Sami Lehtonen

4.1. 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 ($A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$).

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

Frequency range [MHz]	Limit [$\mu\text{V/m}$]	Limit [$\text{dB}\mu\text{V/m}$]	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

4.2. WLAN Test results

4.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 1 / 2412 MHz

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

Frequency [MHz]	E [$\text{dB}\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U_{RX} [$\text{dB}\mu\text{V}$]	A_{TOT} [dB]	Polarisation	Result
4824.000000	52.00	398.11	51.50	0.5	HORIZONTAL	PASSED
7236.000000	46.00	199.53	43.70	2.3	VERTICAL	PASSED

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

Frequency [MHz]	E [$\text{dB}\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U_{RX} [$\text{dB}\mu\text{V}$]	A_{TOT} [dB]	Polarisation	Result
4824.000000	39.70	96.61	39.20	0.5	HORIZONTAL	PASSED
7236.000000	33.20	45.71	30.90	2.3	VERTICAL	PASSED

Channel 7 / 2442 MHz

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

Frequency [MHz]	E [$\text{dB}\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U_{RX} [$\text{dB}\mu\text{V}$]	A_{TOT} [dB]	Polarisation	Result
37.576353	32.60	42.66	52.80	-20.2	VERTICAL	PASSED
108.196794	25.80	19.50	52.00	-26.2	HORIZONTAL	PASSED
129.580561	24.60	16.98	53.40	-28.8	VERTICAL	PASSED

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

Frequency [MHz]	E [$\text{dB}\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U_{RX} [$\text{dB}\mu\text{V}$]	A_{TOT} [dB]	Polarisation	Result
4884.267535	49.40	295.12	48.80	0.6	HORIZONTAL	PASSED
12455.907816	53.00	446.68	42.20	10.8	VERTICAL	PASSED
13332.665331	53.30	462.38	40.20	13.1	VERTICAL	PASSED
13357.209419	53.20	457.09	39.80	13.4	VERTICAL	PASSED
15829.163327	54.30	518.80	37.50	16.8	VERTICAL	PASSED
16177.352705	55.30	582.10	38.20	17.1	VERTICAL	PASSED
17915.831663	55.90	623.73	37.00	18.9	VERTICAL	PASSED

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

Frequency [MHz]	E [$\text{dB}\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U_{RX} [$\text{dB}\mu\text{V}$]	A_{TOT} [dB]	Polarisation	Result
4883.767535	38.00	79.43	37.40	0.6	HORIZONTAL	PASSED
12454.907816	39.40	93.33	28.60	10.8	VERTICAL	PASSED

13335.665331	40.40	104.71	27.30	13.1	VERTICAL	PASSED
13357.709419	40.40	104.71	27.00	13.4	VERTICAL	PASSED
15835.663327	41.40	117.49	24.80	16.6	VERTICAL	PASSED
16173.352705	41.80	123.03	24.80	17.0	VERTICAL	PASSED
17914.831663	43.40	147.91	24.60	18.8	VERTICAL	PASSED

Channel 11 / 2462 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]	Polarisation	Result
4924.000000	51.70	384.59	51.60	0.1	HORIZONTAL	PASSED
7386.000000	47.20	229.09	44.10	3.1	VERTICAL	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]	Polarisation	Result
4924.000000	40.10	101.16	40.00	0.1	HORIZONTAL	PASSED
7386.000000	34.30	51.88	31.20	3.1	VERTICAL	PASSED

4.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 1 / 2412 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]	Polarisation	Result
4824.000000	47.30	231.74	46.80	0.5	HORIZONTAL	PASSED
7236.000000	46.60	213.80	44.30	2.3	VERTICAL	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]	Polarisation	Result
4824.000000	34.50	53.09	34.00	0.5	HORIZONTAL	PASSED
7236.000000	33.20	45.71	30.90	2.3	VERTICAL	PASSED

Channel 7 / 2442 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]	Polarisation	Result
37.695391	32.90	44.16	53.10	-20.2	VERTICAL	PASSED
108.056313	32.10	40.27	58.30	-26.2	HORIZONTAL	PASSED
128.678156	25.50	18.84	54.10	-28.6	VERTICAL	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]	Polarisation	Result
2384.728457	53.20	457.09	57.10	-3.9	VERTICAL	PASSED
4881.769539	48.10	254.10	47.50	0.6	HORIZONTAL	PASSED

13277.053106	53.50	473.15	40.90	12.6	VERTICAL	PASSED
13363.719439	53.30	462.38	39.90	13.4	VERTICAL	PASSED
15437.867735	52.60	426.58	37.30	15.3	VERTICAL	PASSED
15871.751503	54.60	537.03	38.20	16.4	VERTICAL	PASSED
16196.886774	55.40	588.84	37.90	17.5	VERTICAL	PASSED
17904.303607	55.80	616.60	37.30	18.5	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
2387.728457	40.10	101.16	43.70	-3.6	VERTICAL	PASSED
4881.769539	33.00	44.67	32.40	0.6	HORIZONTAL	PASSED
13278.553106	40.30	103.51	27.70	12.6	VERTICAL	PASSED
13361.219439	40.50	105.93	27.10	13.4	VERTICAL	PASSED
15430.867735	39.70	96.61	24.40	15.3	VERTICAL	PASSED
15879.751503	41.50	118.85	25.00	16.5	VERTICAL	PASSED
16193.886774	42.30	130.32	24.80	17.5	VERTICAL	PASSED
17900.803607	43.30	146.22	24.90	18.4	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	50.20	323.59	50.10	0.1	HORIZONTAL	PASSED
7386.000000	47.20	229.09	44.10	3.1	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	35.40	58.88	35.30	0.1	HORIZONTAL	PASSED
7386.000000	34.20	51.29	31.10	3.1	VERTICAL	PASSED

5. Test Equipment

5.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1742	EMI Test Receiver	ESMI	R&S	15C, 15B
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1872	Thermo- Hygrograph	00.02520.150700	Lambrecht	15C, 15B
1916	Radio Communication tester	CMTA84	R&S	15C, 15B
2039	Power Supply	PL330QMD	THURLBY	15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2068	CDN-Antenna line	S1	NMP	15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
2111	Multimeter	TX3	Tektronix	15C, 15B
2156	Digital Radio Communication Tester	CMU200	R&S	15C, 15B
2206	Signal generator	SMX	R&S	15C, 15B
2335	GPIB Switch 2 to 1	-	National Instruments	15C, 15B
2347	Digital Radio Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2352	Spectrum Analyzer	FSP	R&S	22/24/27, 15C
2359	Temperature Test system	VT4002	Vötsch Industrietechnik	22/24/27
2360	Serial Bus Converter	Serial 488A	IO Tech	22/24/27
2362	Power Supply	NGPX 70/5	R&S	22/24/27
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B

5.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1748	Log. per. Antenna	HL025	R&S	22/24/27, 15C
1749	Log. per. Antenna	HL025	R&S	22/24/27, 15C
1875	Thermo- Hygrograph	00.02520.150700	Lambrecht	22/24/27, 15C, 15B
1917	Radio Communication tester	CMTA84	R&S	22/24/27, 15C, 15B
1933	Precision half-wave dipole antennas	HZ-13	R&S	22/24/27, 15C
1938	Precision half-wave dipole antennas	HZ-12	R&S	22/24/27, 15C
2006	Radiation Reference Source	VSQ	MEB	22/24/27, 15C, 15B
2009	Signal generator	SMP 22	R&S	22/24/27, 15C, 15B
2019	Multimeter	34401A	HP	22/24/27, 15C, 15B
2027	Coupling and Decoupling Network	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	Coupling and Decoupling Network	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2029	Power Supply	PL330	THURLBY	22/24/27, 15C, 15B
2043	Band Reject Filter	WRCA824/849-0.2-6SS	Wainwright	22, 15C, 15B
2047	Band Reject Filter	WRCC1800/2000-0.2-10SS	Wainwright	24, 15C, 15B
2048	Band Reject Filter	WRCC1700/1800-0.2-10SS	Wainwright	27, 15C, 15B
2051	High Pass Filter	4HC1700-1-KK	R&S	22/24/27, 15C
2057	Log. per. Antenna	HL025	R&S	22/24/27, 15C
2109	Power Supply	PL330QMD	THURLBY	22/24/27, 15C, 15B
2110	Multimeter	34401A	HP	22/24/27, 15C, 15B
2112	Multimeter	TX3	Tektronix	22/24/27, 15C, 15B
2116	Controller	EMCO MODEL 2090	ETS	22/24/27, 15C, 15B
2133	Power Meter	NRVS	R&S	22/24/27, 15C
2134	Power Sensor	NRV-Z32	R&S	22/24/27, 15C
2135	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
2138	Ultra Broadband Antenna	HL562	R&S	22/24/27, 15C, 15B
2140	Biconical Antenna	EMCO93110B	EMCO	22/24/27, 15C
2142	Log.-per.-dipol Antenna	3146	EMCO	22/24/27, 15C
2144	Attenuator	6803.17B	Huber-Suhner	22/24/27, 15C, 15B
2150	High Pass Filter	F-15041	RLC ELECTRONICS	22/24/27, 15C
2176	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24/27, 15C, 15B
2180	Digital Radio Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	MITEQ	22/24/27, 15C, 15B
2330	EMI Test receiver	ESIB26	R&S	22/24/27, 15C, 15B
2334	GPIB Switch 2 to 1	-	National Instruments	22/24/27, 15C, 15B
2348	Yaesu controller	G-1000DXC	YAESU	22/24/27, 15C, 15B
2349	Computer controller (Yaesu)	GS-232B	YAESU	22/24/27, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	MITEQ	22/24/27, 15C
2361	Anechoic chamber	3 meter semi/full anechoic chamber	Euroshield	22/24/27, 15C, 15B
2398	Horn antenna	HF906	R&S	22/24/27, 15C
2363	Band Reject Filter	WRCG 832/838-825/845/5SS	Wainwright	22/24/27
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	22/24/27
2365	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2366	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2384	Band Reject Filter	WRCG832/838-825/845-40/5SS	Wainwright	22/24/27
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B