

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15C_RM-333_04.doc	Date of Report:	06-Aug-2009
Number of pages:	15	Customer's Contact person:	Sarna Janne
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 50 Mattianniemi 6-8 FIN-40101 JYVÄSKYLÄ, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 78000
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-333 / Battery BL-5K / Audio Adapter AD-54 / Headset HS-45 / AC-Charger AC-10E		
FCC ID:	QURRM-333	IC:	661AC-RM333
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:			

Kalle Hannila, Engineer, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	10-Jul-2009
Testing completed	31-Jul-2009
The customer's contact person	Sarna Janne
Test Plan referred to	Projects\RM-333\TestPlan_RS\RS_Test_Plan_RM-333_CR_HW1450_2nd.xls
Notes	-
Document name	FCC15C_RM-333_04.doc

1.1. EUT and Accessory Information

The EUT is a 7-band (GSM850/900/1800/1900 and WCDMA Band I/II(1900)/VIII) mobile phone with GPRS, EGPRS, Bluetooth, WLAN and FM transmitter. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-333	355708021810378	1450		20.175	13998
Battery	BL-5K	4620408104I10002670;0670580				12834
Audio Adapter	AD-54	0750838837362108307	-	-	-	13524
Headset	HS-45	06942358116C1M21321	-	-	-	13523
AC-Charger	AC-10E	3997918366090502862;0675408	-	-	-	13932

1.2. Summary of Test Results

WLAN:

Section in CFR 47	Section in RSS-GEN or 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	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 (a)	6 dB bandwidth	NP
15.247(e)	A8.2 (b)	Power spectral density	NP

PASSED
FAILED
NP

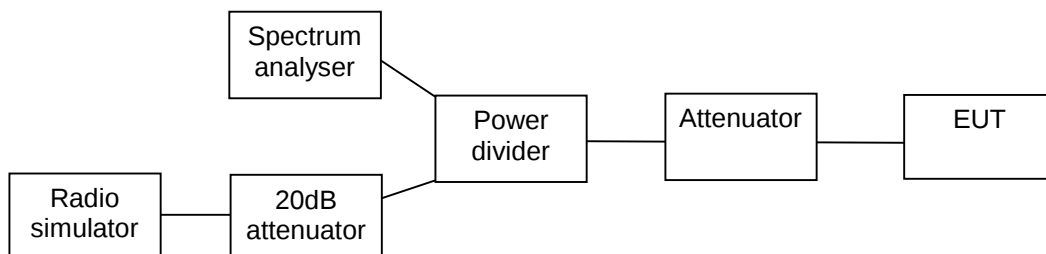
The EUT complies with the essential requirements in the standard.
The EUT does not comply with the essential requirements in the standard.
The test was not performed by the TCC Nokia Salo Laboratory.

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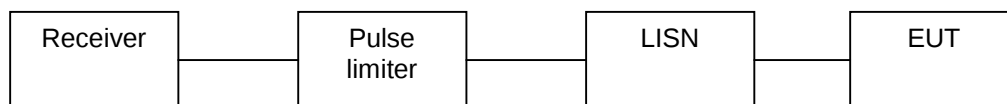
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2. Test setups

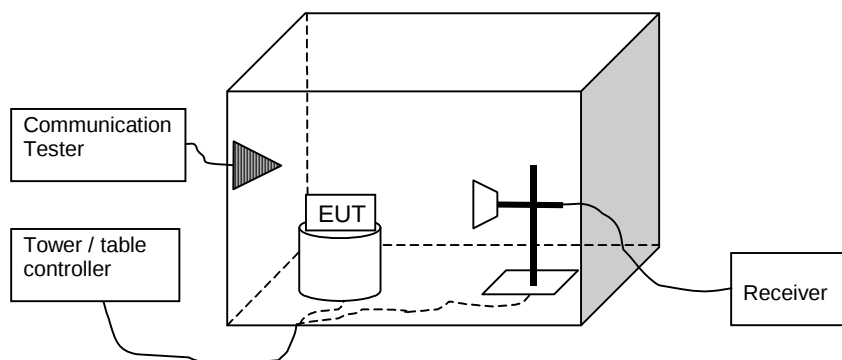
2.1. Conducted RF test setup



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-333, DUT 13998
Accessories with DUT numbers	BL-5K, DUT 12834; AD-54, DUT 13524; HS-45, DUT 13523; AC-10E, DUT 13932
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Phone tested slide closed and slide mp3 mode.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 42 / 101.6
Date of measurements	29-Jul-2009
Measured by	Kalle Hannila

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)

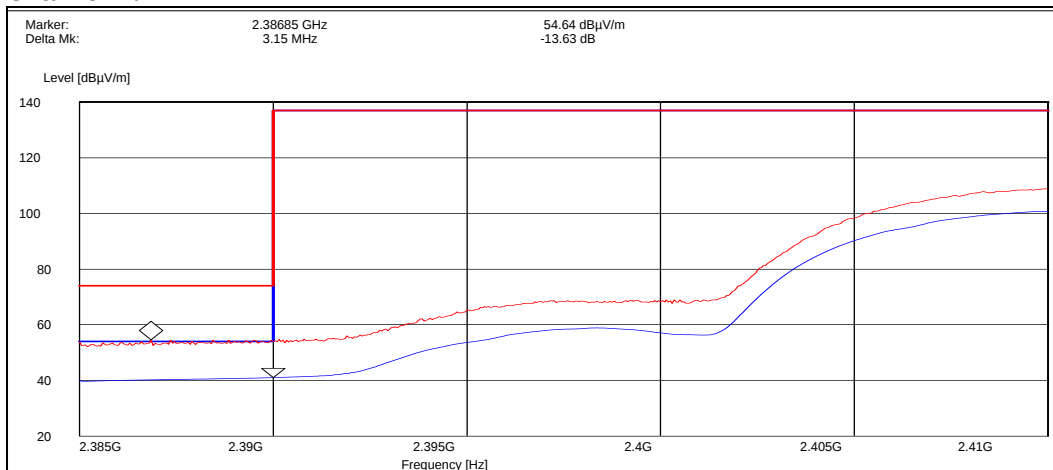
Frequency range [MHz]	Limit Average [dBμV/m]	Limit Peak [dBμV/m]
Below 2390 and above 2483.5	≤ 54	≤ 74

3.2. WLAN Test results

3.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

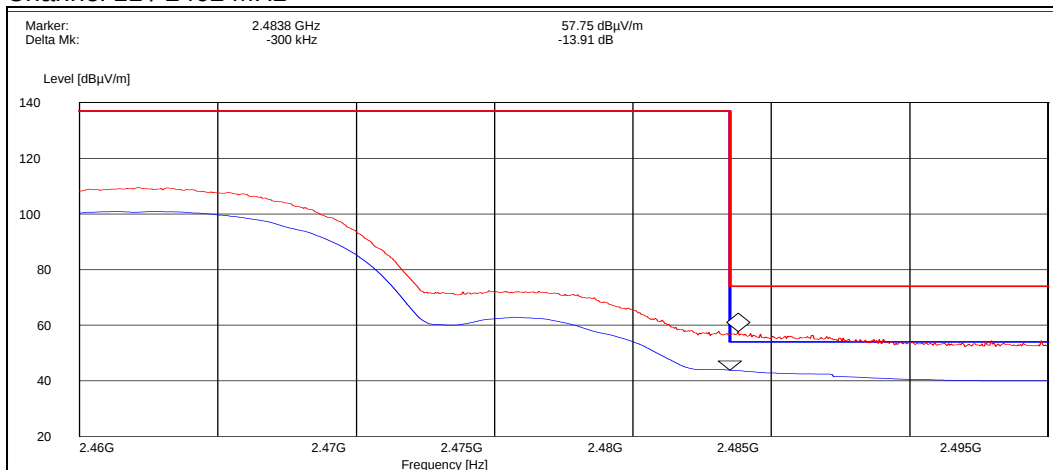
Slide Closed:

Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	54.60	PASSED
Average	41.00	PASSED

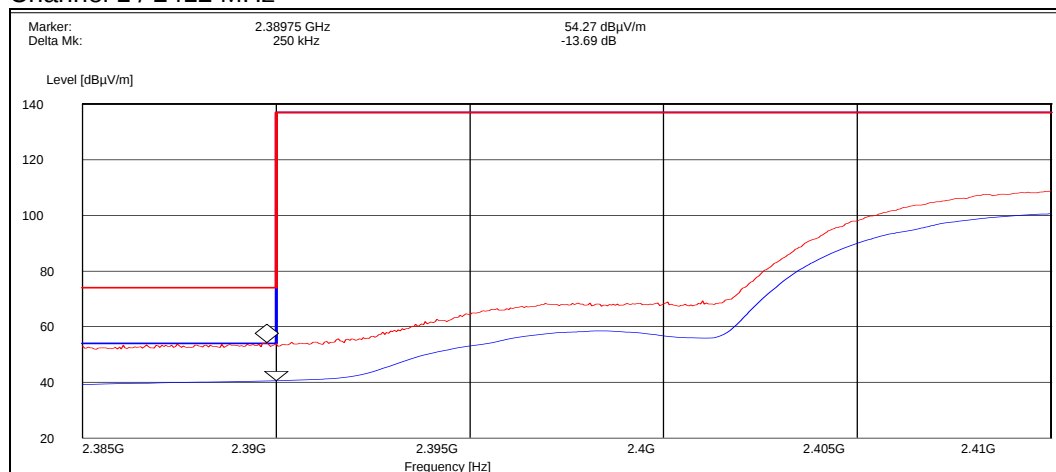
Channel 11 / 2462 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	57.70	PASSED
Average	43.80	PASSED

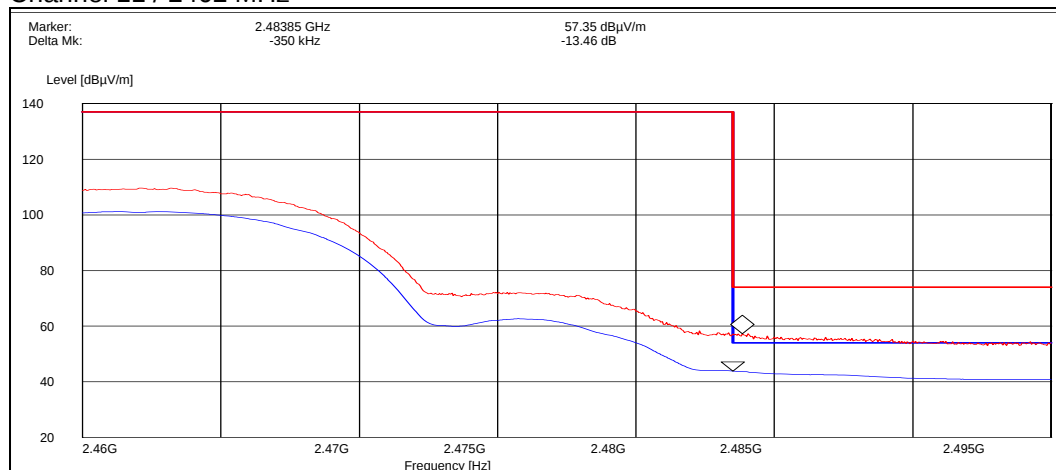
Slide MP3:

Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	54.30	PASSED
Average	40.60	PASSED

Channel 11 / 2462 MHz

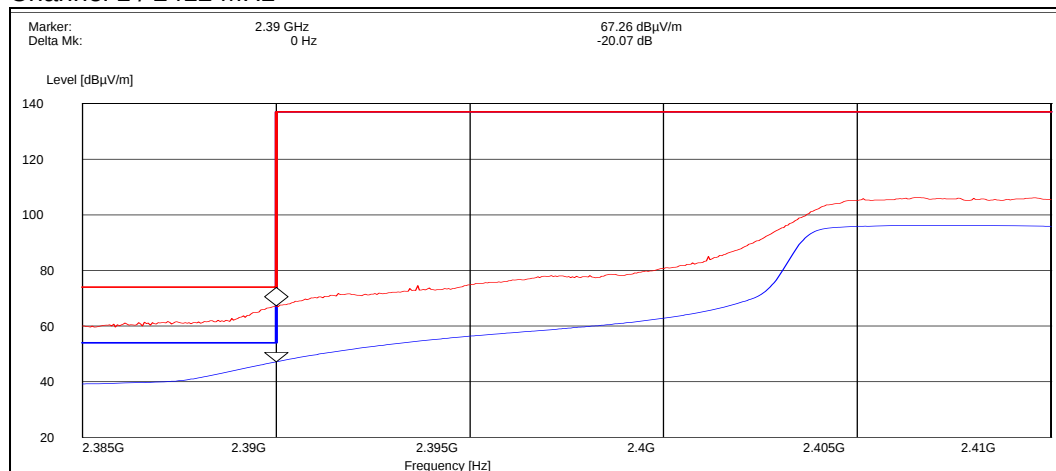


Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	57.30	PASSED
Average	43.90	PASSED

3.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

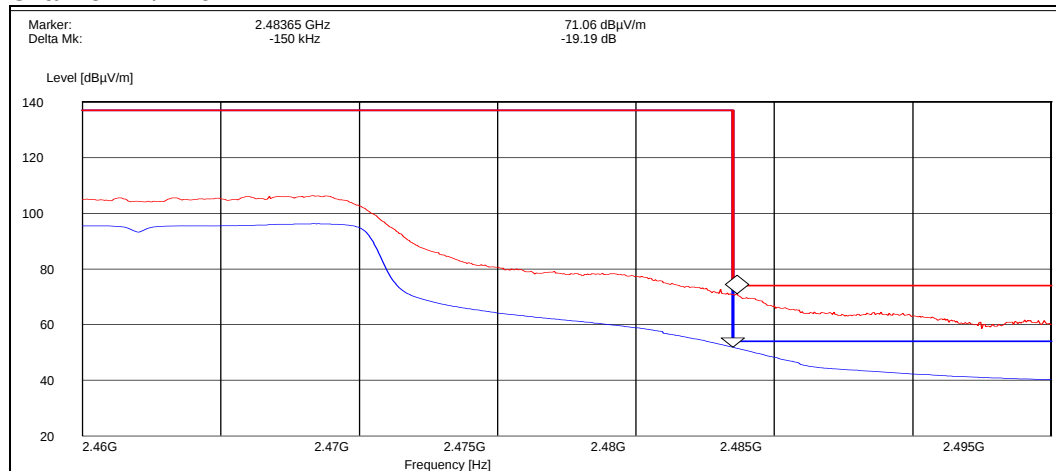
Slide Closed:

Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	67.30	PASSED
Average	47.20	PASSED

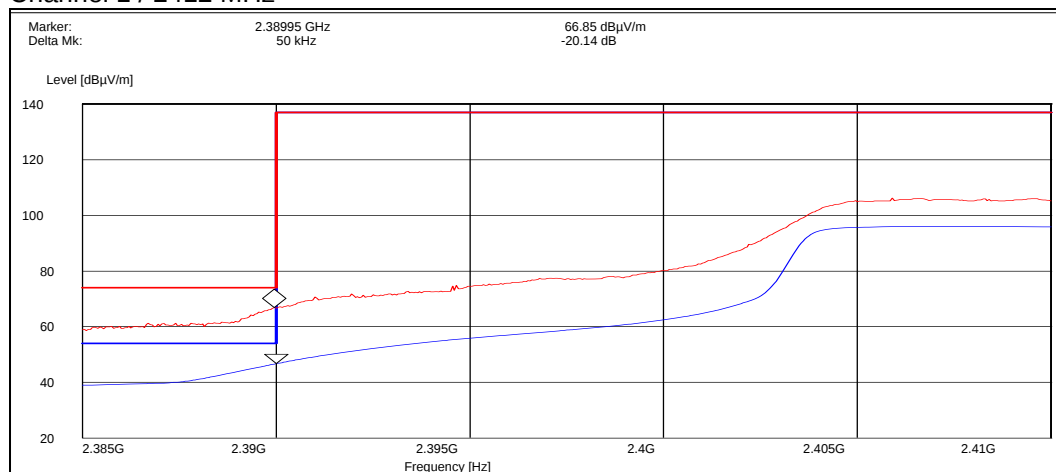
Channel 11 / 2462 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	71.10	PASSED
Average	51.90	PASSED

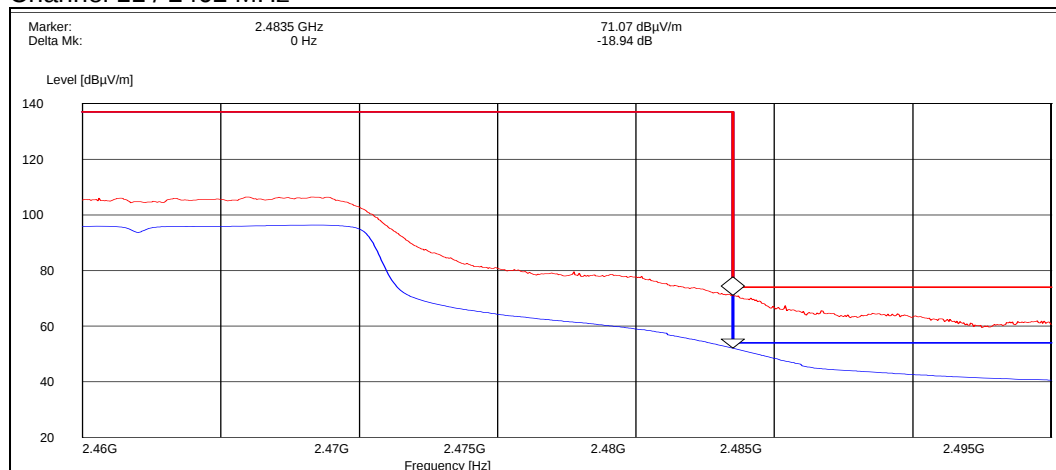
Slide MP3:

Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	66.90	PASSED
Average	46.70	PASSED

Channel 11 / 2462 MHz



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	71.10	PASSED
Average	52.10	PASSED

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

EUT with DUT number	RM-333, DUT 13998
Accessories with DUT numbers	BL-5K, DUT 12834; AD-54, DUT 13524; HS-45, DUT 13523; AC-10E, DUT 13932
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Phone tested slide closed mode.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 42 / 101.6
Date of measurements	29-Jul-2009 – 31-Jul-2009
Measured by	Kalle Hannila / Anni Manninen

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 [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

TX mode, channel 1 / 2412 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	51.00	354.81	49.70	1.3	HORIZONTAL	PASSED
7236.000000	46.30	206.54	43.30	3.0	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	37.90	78.52	36.60	1.3	HORIZONTAL	PASSED
7236.000000	34.20	51.29	31.20	3.0	VERTICAL	PASSED

TX mode, channel 7 / 2442 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
37.595391	24.80	17.38	43.30	-18.5	VERTICAL	PASSED
74.048497	18.50	8.41	46.40	-27.9	VERTICAL	PASSED
74.369940	18.20	8.13	46.10	-27.9	VERTICAL	PASSED
121.763727	23.90	15.67	51.30	-27.4	VERTICAL	PASSED
123.066132	23.00	14.13	50.50	-27.5	VERTICAL	PASSED

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

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4884.269539	52.50	421.70	51.20	1.3	VERTICAL	PASSED
7325.153307	48.30	260.02	45.00	3.3	HORIZONTAL	PASSED
13309.123246	53.30	462.38	40.60	12.7	VERTICAL	PASSED
14495.485972	53.40	467.74	38.50	14.9	VERTICAL	PASSED
15373.251503	56.50	668.34	38.20	18.3	VERTICAL	PASSED
15570.634269	55.00	562.34	37.30	17.7	HORIZONTAL	PASSED
16046.586172	57.20	724.44	36.50	20.7	HORIZONTAL	PASSED
17724.944890	56.80	691.83	37.80	19.0	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
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4884.269539	38.70	86.10	37.40	1.3	VERTICAL	PASSED
7323.653307	34.40	52.48	31.10	3.3	HORIZONTAL	PASSED
13310.123246	40.60	107.15	27.80	12.8	VERTICAL	PASSED
14490.985972	40.50	105.93	25.70	14.8	VERTICAL	PASSED
15379.751503	43.20	144.54	25.00	18.2	VERTICAL	PASSED
15569.134269	42.50	133.35	24.80	17.7	HORIZONTAL	PASSED
16042.086172	44.30	164.06	23.80	20.5	HORIZONTAL	PASSED
17725.944890	44.20	162.18	25.20	19.0	VERTICAL	PASSED

TX mode, channel 11 / 2462 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4924.000000	55.10	568.85	54.40	0.7	VERTICAL	PASSED
7386.000000	49.30	291.74	45.10	4.2	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4924.000000	41.90	124.45	41.20	0.7	VERTICAL	PASSED
7386.000000	36.60	67.61	32.40	4.2	VERTICAL	PASSED

4.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

TX mode, channel 1 / 2412 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	48.60	269.15	47.30	1.3	HORIZONTAL	PASSED
7236.000000	46.40	208.93	43.40	3.0	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	35.50	59.57	34.20	1.3	HORIZONTAL	PASSED
7236.000000	34.00	50.12	31.00	3.0	VERTICAL	PASSED

TX mode, channel 7 / 2442 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
37.895391	24.70	17.18	43.40	-18.7	VERTICAL	PASSED
74.169940	18.50	8.41	46.40	-27.9	VERTICAL	PASSED
74.448497	18.20	8.13	46.10	-27.9	VERTICAL	PASSED
121.923246	23.30	14.62	50.70	-27.4	VERTICAL	PASSED
123.006613	23.10	14.29	50.60	-27.5	VERTICAL	PASSED

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

Frequency	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT}	Polarisation	Result
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[MHz]				[dB]		
4884.269539	47.50	237.14	46.20	1.3	VERTICAL	PASSED
13299.603206	52.90	441.57	40.20	12.7	HORIZONTAL	PASSED
14475.447896	52.80	436.52	38.20	14.6	VERTICAL	PASSED
15381.269539	56.00	630.96	37.90	18.1	VERTICAL	PASSED
15559.620240	55.00	562.34	37.30	17.7	HORIZONTAL	PASSED
16056.620240	57.10	716.14	37.00	20.1	HORIZONTAL	PASSED
17974.941884	57.30	732.82	36.80	20.5	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4883.769539	34.30	51.88	33.00	1.3	VERTICAL	PASSED
13298.103206	40.30	103.51	27.60	12.7	HORIZONTAL	PASSED
14475.447896	40.20	102.33	25.60	14.6	VERTICAL	PASSED
15382.269539	43.00	141.25	25.00	18.0	VERTICAL	PASSED
15558.620240	42.30	130.32	24.60	17.7	HORIZONTAL	PASSED
16058.120240	43.90	156.68	23.90	20.0	HORIZONTAL	PASSED
17974.441884	44.50	167.88	24.00	20.5	VERTICAL	PASSED

TX mode, channel 11 / 2462 MHz

Peak (RBW: 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	50.40	331.13	49.70	0.7	VERTICAL	PASSED
7386.000000	47.90	248.31	43.70	4.2	VERTICAL	PASSED

Average (RBW: 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	37.10	71.61	36.40	0.7	VERTICAL	PASSED
7386.000000	35.60	60.26	31.40	4.2	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	GPIO 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