

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15C_RM-596_65.doc	Date of Report:	05-May-2011
Number of pages:	14	Customer's Contact person:	Tuomo Pursiheimo
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-596 / AC charger AC-15E, Headset WH-701		
FCC ID:	PDNRM-596X	IC:	661R-RM596
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 3, December 2010) and RSS-210 (Issue 8, December 2010). 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:			

Jari Jantunen, Test System Manager, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	19-Mar-2010
Testing completed	23-Mar-2010
The customer's contact person	Tuomo Pursiheimo
Test Plan referred to	T:\Projects\RM-596\TestPlan\RS_testplan_RM-596_2nd.xls
Notes	-
Document name	FCC15C_RM-596_08.doc

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, Bluetooth, WLAN and FM transmitter. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-596	004402130475365	3630	-	010.008	42210
AC charger	AC-15E	4090499512230700960;0675463	-	-	-	42190
Headset	WH-701	06944289501G2R01954	-	-	-	42192

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.

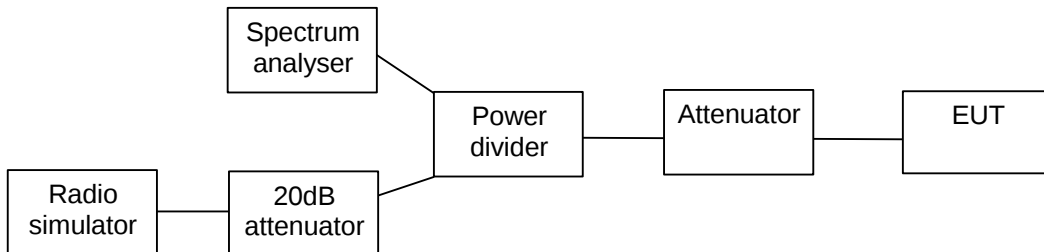
The test was not performed by the TCC Nokia Tampere Laboratory.

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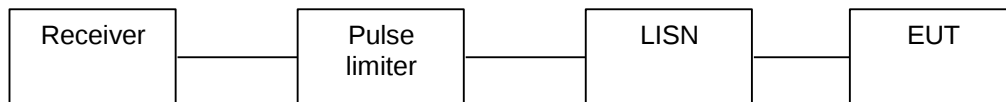
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2. Test setups

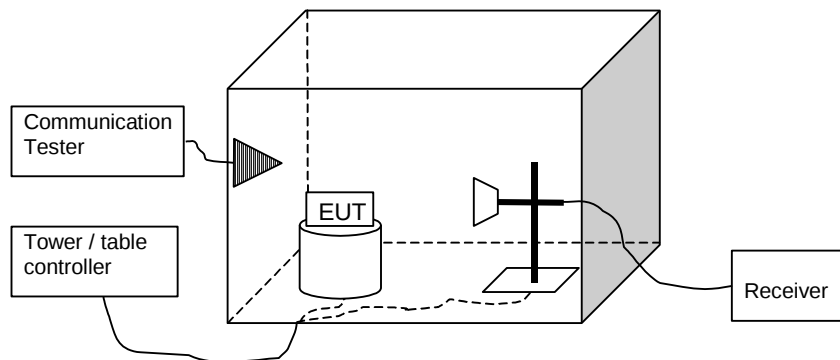
2.1. Conducted RF test setup



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-596 DUT 42210
Accessories with DUT numbers	AC-15E DUT42190, WH-701 DUT42192
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23-24 / 43-44 / 100.9
Date of measurements	22.. 23-Mar-2010
Measured by	Jari Jantunen

3.1. Test method and limit

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

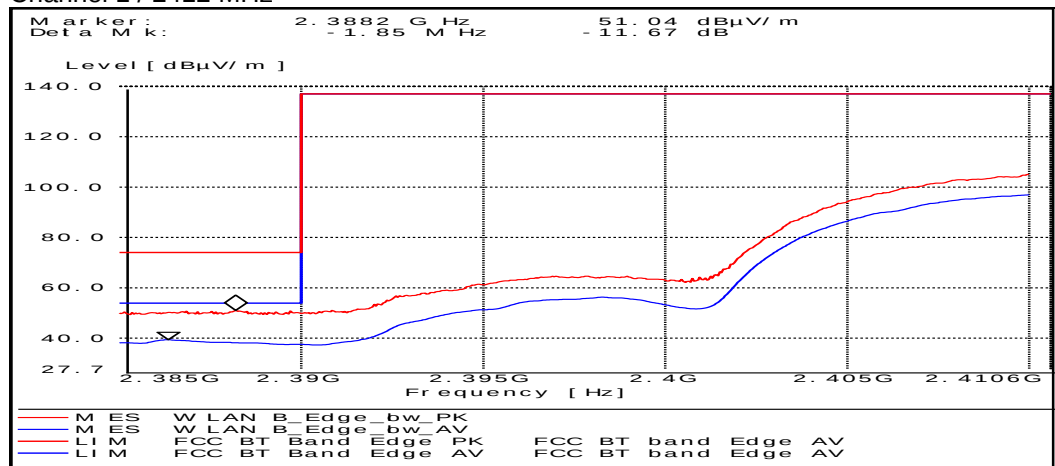
Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

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

3.2. WLAN Test results

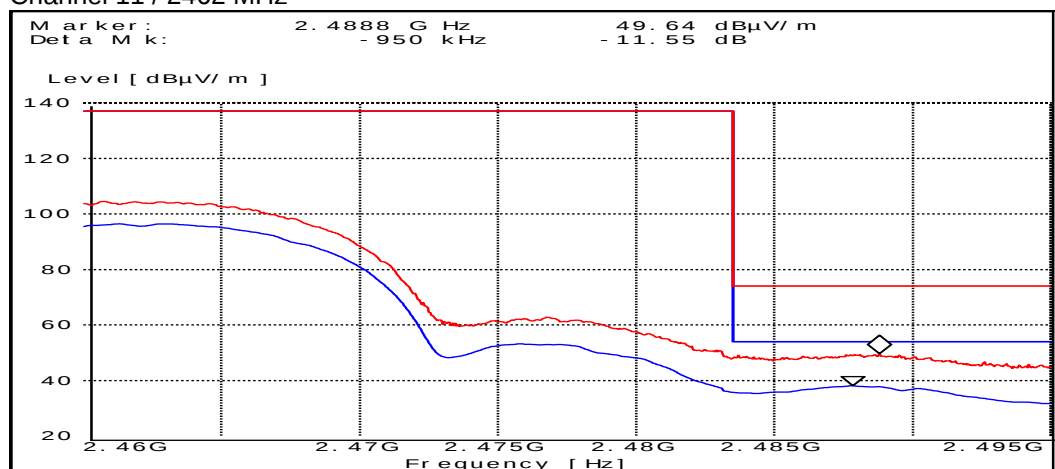
3.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	51.00	PASSED
Average	39.40	PASSED

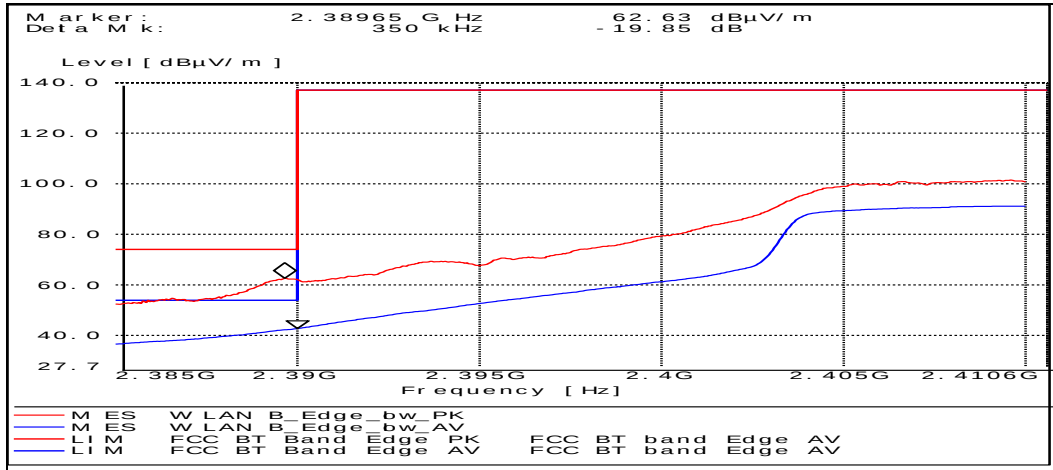
Channel 11 / 2462 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	49.60	PASSED
Average	38.10	PASSED

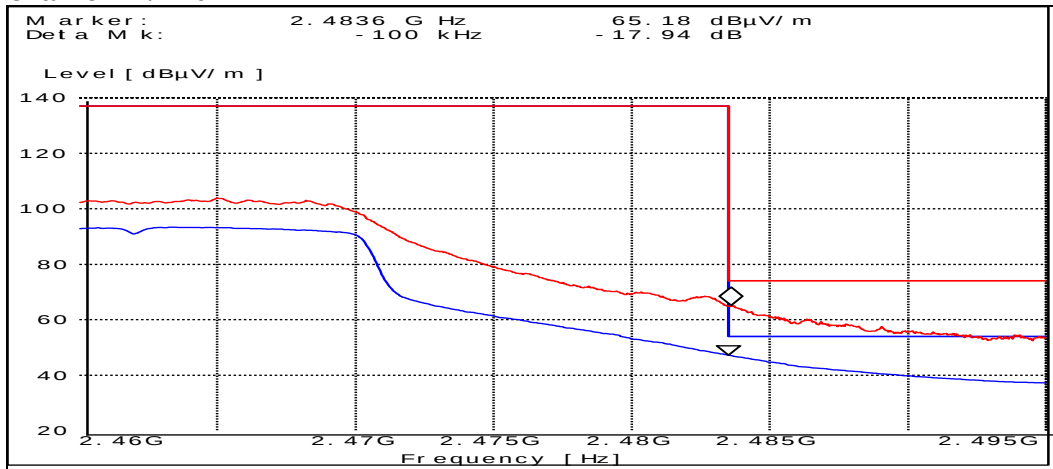
3.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	62.60	PASSED
Average	42.80	PASSED

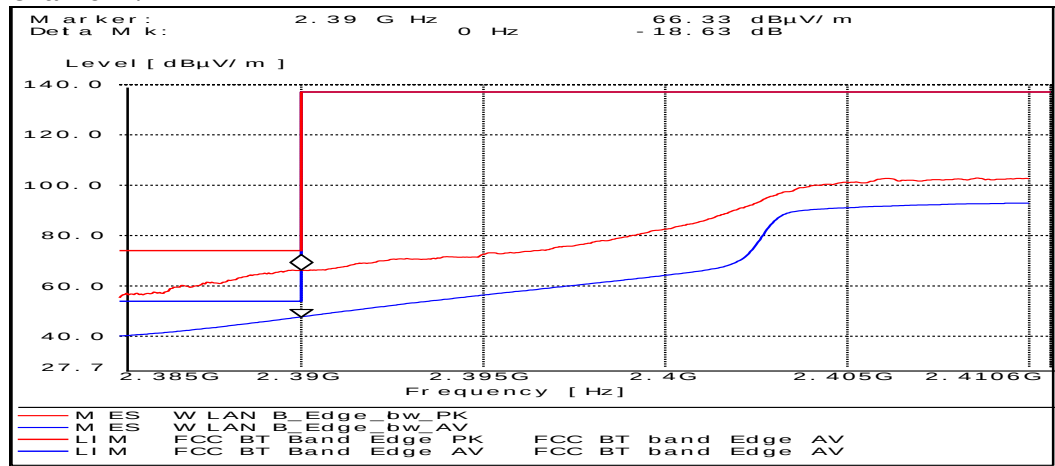
Channel 11 / 2462 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	65.20	PASSED
Average	47.20	PASSED

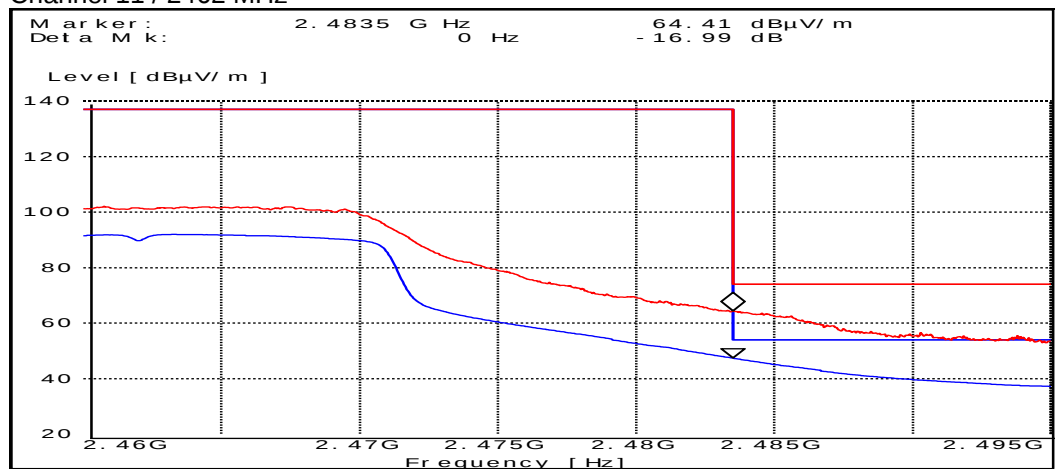
3.2.3 MIMO mode, BPSK modulation, 6.5 Mbps data rate

Channel 1 / 2412 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	66.30	PASSED
Average	47.70	PASSED

Channel 11 / 2462 MHz



Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	64.40	PASSED
Average	47.40	PASSED

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

EUT with DUT number	RM-596 DUT 42210
Accessories with DUT numbers	AC-15E DUT42190, WH-701 DUT42192
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 43 / 100.9
Date of measurements	22-Mar-2010
Measured by	Jari Jantunen

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 [$\mu V/m$]	Limit [dB $\mu V/m$]	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

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	43.50	149.62	44.60	-1.1	VERTICAL	PASSED
7236.000000	42.30	130.32	39.70	2.6	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	26.20	20.42	27.30	-1.1	VERTICAL	PASSED
7236.000000	29.90	31.26	27.30	2.6	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
33.526253	31.90	39.36	43.00	-11.1	VERTICAL	PASSED
37.876353	26.70	21.63	40.70	-14.0	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2522.800601	59.20	912.01	57.00	2.2	HORIZONTAL	PASSED
2563.317635	56.50	668.34	54.10	2.4	HORIZONTAL	PASSED
2600.286573	61.00	1 122.02	58.20	2.8	HORIZONTAL	PASSED
4883.769539	48.40	263.03	49.60	-1.2	HORIZONTAL	PASSED
7295.583166	42.10	127.35	39.30	2.8	VERTICAL	PASSED
7327.157315	43.50	149.62	40.60	2.9	HORIZONTAL	PASSED
17484.965932	52.30	412.10	33.50	18.8	HORIZONTAL	PASSED
17966.439880	55.40	588.84	34.50	20.9	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2522.800601	32.90	44.16	30.70	2.2	HORIZONTAL	PASSED
2563.317635	31.90	39.36	29.50	2.4	HORIZONTAL	PASSED
2603.786573	31.70	38.46	29.00	2.7	HORIZONTAL	PASSED
4883.769539	38.00	79.43	39.20	-1.2	HORIZONTAL	PASSED
7294.083166	29.70	30.55	26.90	2.8	VERTICAL	PASSED
7326.657315	31.40	37.15	28.50	2.9	HORIZONTAL	PASSED
17485.965932	39.50	94.41	20.70	18.8	HORIZONTAL	PASSED
17971.439880	42.10	127.35	21.20	20.9	HORIZONTAL	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	46.20	204.17	47.30	-1.1	VERTICAL	PASSED
7386.000000	43.30	146.22	40.10	3.2	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4924.000000	34.50	53.09	35.60	-1.1	VERTICAL	PASSED
7386.000000	29.90	31.26	26.70	3.2	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	39.00	89.13	40.10	-1.1	VERTICAL	PASSED
7236.000000	42.50	133.35	39.90	2.6	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	27.20	22.91	28.30	-1.1	VERTICAL	PASSED
7236.000000	29.80	30.90	27.20	2.6	HORIZONTAL	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
32.504810	19.60	9.55	30.10	-10.5	HORIZONTAL	PASSED
38.176353	24.40	16.60	38.60	-14.2	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2524.348697	59.10	901.57	57.00	2.1	HORIZONTAL	PASSED
2524.384770	59.80	977.24	57.70	2.1	HORIZONTAL	PASSED
2557.221443	55.40	588.84	53.60	1.8	HORIZONTAL	PASSED
2564.365731	56.90	699.84	54.30	2.6	HORIZONTAL	PASSED
2607.846693	58.50	841.40	55.80	2.7	HORIZONTAL	PASSED
4885.263527	44.70	171.79	45.90	-1.2	HORIZONTAL	PASSED
4885.271543	40.10	101.16	41.30	-1.2	HORIZONTAL	PASSED
7314.131263	43.00	141.25	40.00	3.0	HORIZONTAL	PASSED
7324.151303	42.90	139.64	40.00	2.9	HORIZONTAL	PASSED
17484.965932	53.80	489.78	35.00	18.8	HORIZONTAL	PASSED
17836.167335	55.10	568.85	34.40	20.7	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2524.348697	33.90	49.55	31.80	2.1	HORIZONTAL	PASSED
2524.384770	34.20	51.29	32.10	2.1	HORIZONTAL	PASSED
2557.721443	32.10	40.27	30.30	1.8	HORIZONTAL	PASSED
2564.365731	32.70	43.15	30.10	2.6	HORIZONTAL	PASSED
2607.846693	32.20	40.74	29.50	2.7	HORIZONTAL	PASSED
4885.263527	32.50	42.17	33.70	-1.2	HORIZONTAL	PASSED

4885.271543	32.80	43.65	34.00	-1.2	HORIZONTAL	PASSED
7317.131263	30.10	31.99	27.00	3.1	HORIZONTAL	PASSED
7323.651303	30.50	33.50	27.60	2.9	HORIZONTAL	PASSED
17484.465932	39.40	93.33	20.70	18.7	HORIZONTAL	PASSED
17832.667335	42.00	125.89	21.30	20.7	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	42.80	138.04	43.90	-1.1	HORIZONTAL	PASSED
7386.000000	41.90	124.45	38.70	3.2	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4924.000000	29.90	31.26	31.00	-1.1	HORIZONTAL	PASSED
7386.000000	29.80	30.90	26.60	3.2	HORIZONTAL	PASSED

4.2.3 MIMO mode, BPSK modulation, 6.5 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	42.00	125.89	43.10	-1.1	VERTICAL	PASSED
7236.000000	43.10	142.89	40.50	2.6	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	28.70	27.23	29.80	-1.1	VERTICAL	PASSED
7236.000000	30.00	31.62	27.40	2.6	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
33.366733	29.60	30.20	40.60	-11.0	VERTICAL	PASSED
38.076353	24.80	17.38	38.90	-14.1	VERTICAL	PASSED
80.020040	16.80	6.92	39.60	-22.8	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
2524.312625	60.50	1 059.25	58.40	2.1	HORIZONTAL	PASSED
2564.317635	58.10	803.53	55.50	2.6	HORIZONTAL	PASSED
2607.286573	59.30	922.57	56.60	2.7	HORIZONTAL	PASSED
2607.834669	58.70	860.99	56.00	2.7	HORIZONTAL	PASSED
4882.271543	47.10	226.46	48.30	-1.2	HORIZONTAL	PASSED
4883.769539	48.70	272.27	49.90	-1.2	HORIZONTAL	PASSED
7318.135271	42.90	139.64	39.80	3.1	HORIZONTAL	PASSED
7326.149299	44.20	162.18	41.30	2.9	HORIZONTAL	PASSED
7355.717435	42.60	134.90	39.60	3.0	VERTICAL	PASSED
17496.993988	52.10	402.72	33.20	18.9	HORIZONTAL	PASSED
17988.983968	54.60	537.03	33.70	20.9	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2524.312625	34.80	54.95	32.70	2.1	HORIZONTAL	PASSED
2564.317635	33.10	45.19	30.50	2.6	HORIZONTAL	PASSED
2607.286573	32.60	42.66	29.90	2.7	HORIZONTAL	PASSED
2607.834669	32.30	41.21	29.60	2.7	HORIZONTAL	PASSED
4882.269539	31.40	37.15	32.60	-1.2	HORIZONTAL	PASSED
4882.271543	32.60	42.66	33.80	-1.2	HORIZONTAL	PASSED
7318.135271	30.10	31.99	27.00	3.1	HORIZONTAL	PASSED
7326.149299	29.80	30.90	26.90	2.9	HORIZONTAL	PASSED
7360.217435	29.70	30.55	26.70	3.0	VERTICAL	PASSED
17492.993988	39.50	94.41	20.60	18.9	HORIZONTAL	PASSED
17995.483968	42.10	127.35	21.20	20.9	HORIZONTAL	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	44.20	162.18	45.30	-1.1	VERTICAL	PASSED
7386.000000	42.40	131.83	39.20	3.2	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4924.000000	29.70	30.55	30.80	-1.1	VERTICAL	PASSED
7386.000000	29.90	31.26	26.70	3.2	VERTICAL	PASSED

5. Test Equipment

5.1. 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 μ H	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	Transmatic	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

5.2. 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	Transmatic	22/24/27, 15C, 15B
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