

FCC Part 15C Compliance Test Report

Test Report no.:	Cph_FCC_0908_01.doc	Date of Report:	16-Feb-2009
Number of pages:	15	Customer's Contact person:	Bill Griffin
Testing laboratory:	TCC Nokia Copenhagen Laboratory Frederikskaj 1790 COPENHAGEN V DENMARK Tel. +45 33 292929 Fax. +45 33 292934	Customer:	Nokia Corporation 12278 Scripps Summit Drive SAN DIEGO CA. 92131 USA Tel. +1 858 831 5000 Fax. +1 858 831 6500
FCC listing no.:	99059		
IC recognition no.:	661AD-1		
Tested devices/ accessories:	Phone; RM-455 (HW 0400), Battery; BP-6MT, AC Charger; AC-6U, Headset; HS-9		
FCC ID:	QMNRM-455	IC:	661X-RM455
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:			

Niels Christian Andersen, Test System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	13-Feb-2009
Testing completed	16-Feb-2009
The customer's contact person	Bill Griffin
Test Plan referred to	T:\Projects\RM-455\TestPlan_RS\RS_testplan_RM-455_CR_HW0400.xls
Notes	None
Document name	T:\Projects\RM-455\EMC\Results\FCC\Cph_FCC_0908_01.doc

1.1. EUT and Accessory Information

The EUT is a 7-band (GSM850/900/1800/1900 and WCDMA Band I/II(1900)/V(850)) mobile phone with GPRS, EGPRS and Bluetooth. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-455	004401104040221	0400	-	4.52	25291
Battery	BP-6MT	3932138203310434652;0670551	-	-	-	25297
AC Charger	AC-6U	3943497484070800664;0675591	-	-	-	25294
Headset	HS-9	-	-	-	-	25292

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	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)(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

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

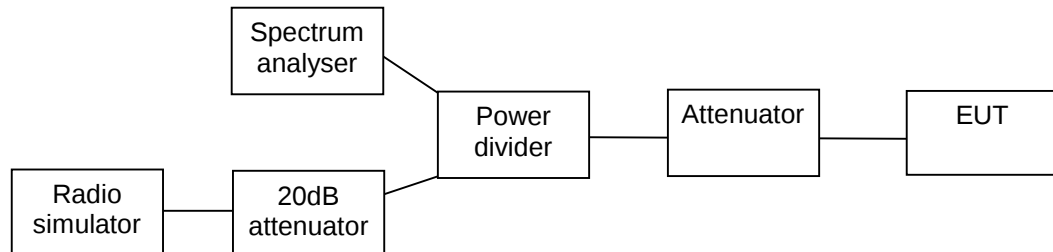
The test was not performed by the TCC Nokia Copenhagen Laboratory.

CONTENTS

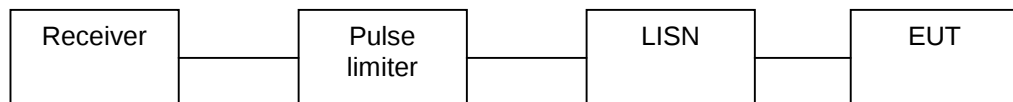
1. Summary for FCC Part 15C Compliance Test Report.....	2
1.1. EUT and Accessory Information	2
1.2. Summary of Test Results	2
2. Test setups.....	4
2.1. Conducted RF test setup	4
2.2. AC powerline conducted emissions test setup	4
2.3. Radiated test setup	4
3. Band edge compliance of RF emissions (FCC §15.247(d), RSS-210 A8.5).....	5
3.1. Test method and limit	5
3.2. Bluetooth Test results	6
4. Spurious radiated emissions (FCC §15.247(d), §15.209, RSS-210 A8.5).....	10
4.1. Test method and limit	10
4.2. Bluetooth Test results	11
5. Test Equipment.....	14
5.1. Conducted measurements	14
5.2. Radiated measurements	14

2. Test setups

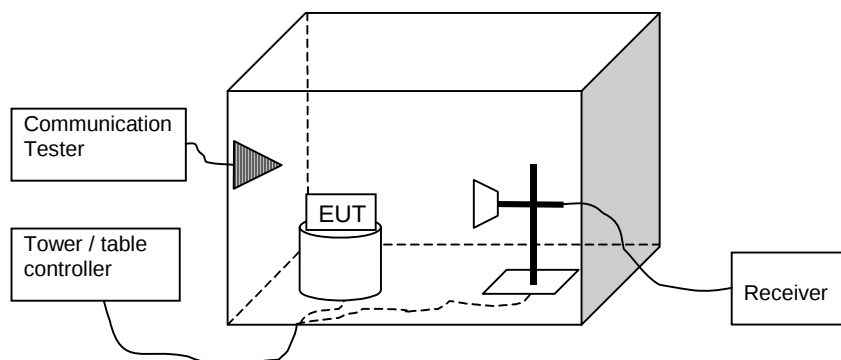
2.1. Conducted RF test setup



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-455 DUT 25291
Accessories with DUT numbers	BP-6MT DUT 25297, AC-6U DUT 25294, HS-9 DUT 25292
Operation Voltage [V] / [Hz]	115 / 60
Result	Passed
Remarks	Phone tested in flip open mode.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 39 / 101.7
Date of measurements	16-Feb-2009
Measured by	Christian Andersen

3.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

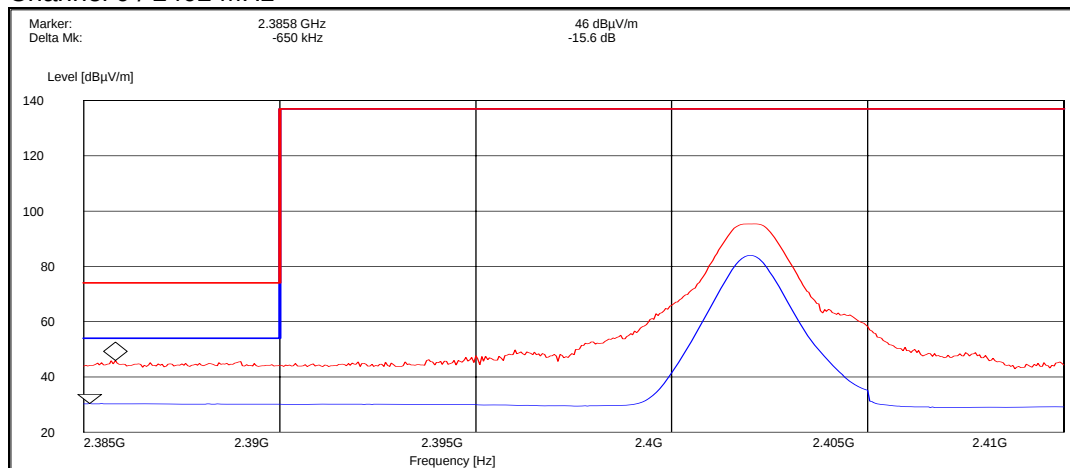
Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

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

3.2. Bluetooth Test results

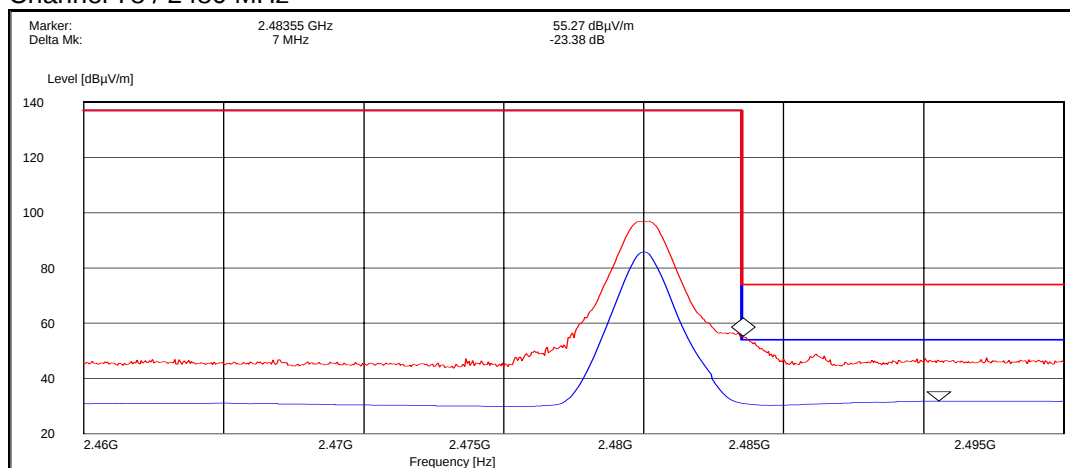
3.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



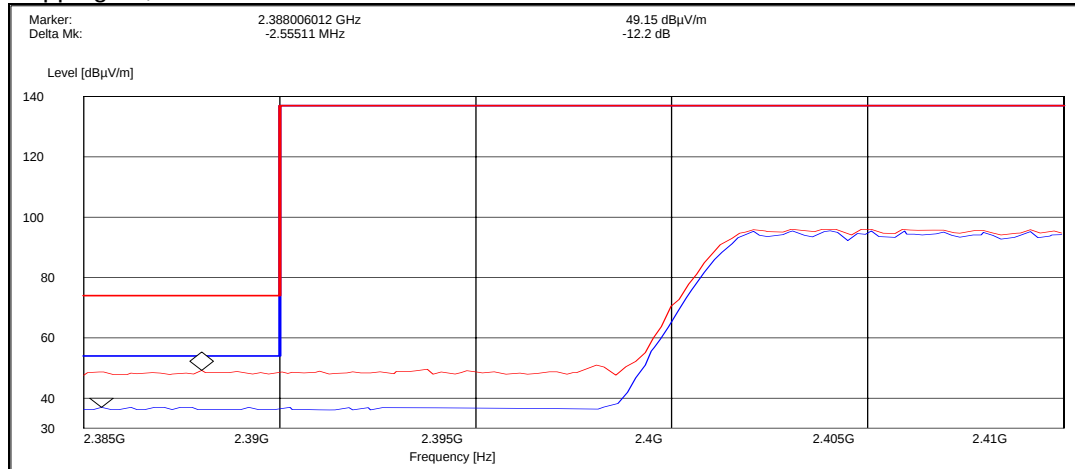
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	46.00	Passed
Average	30.40	Passed

Channel 78 / 2480 MHz



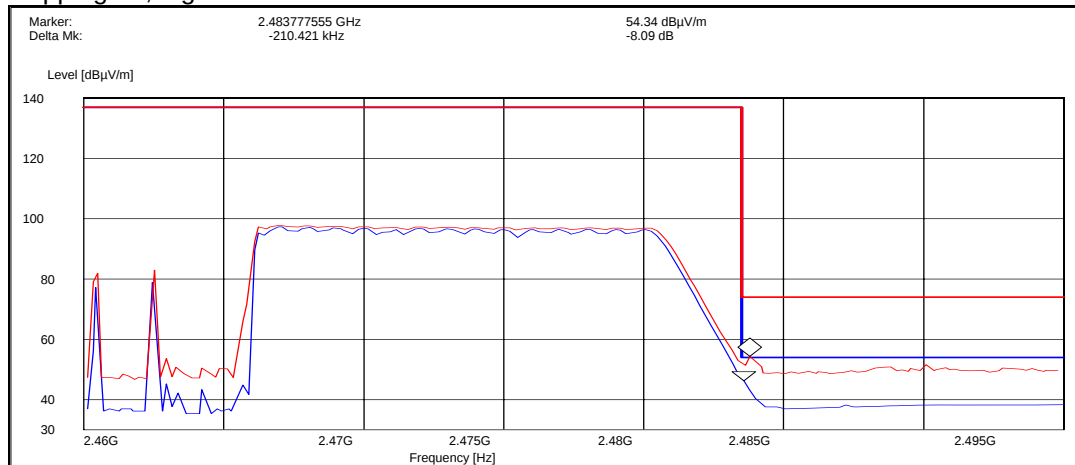
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	55.30	Passed
Average	31.90	Passed

Hopping on, low end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	49.20	Passed
Average	37.00	Passed

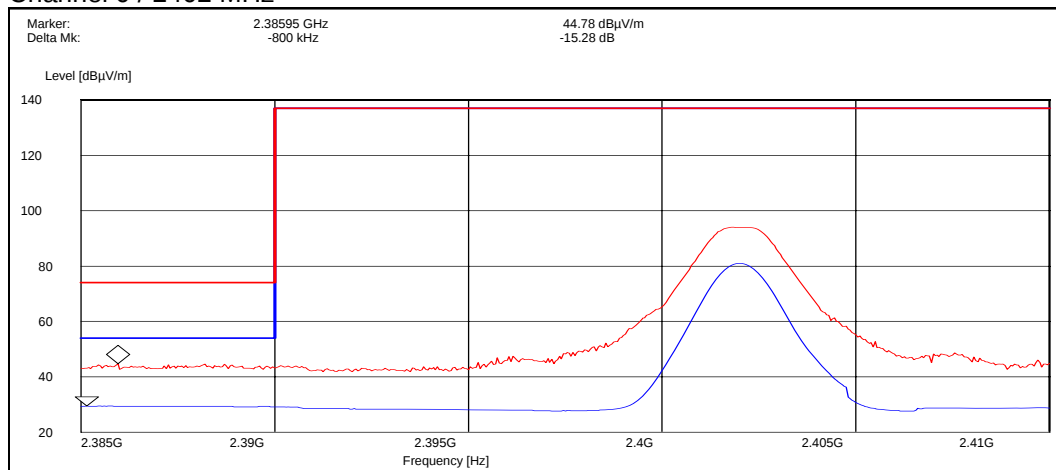
Hopping on, high end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	54.30	Passed
Average	46.30	Passed

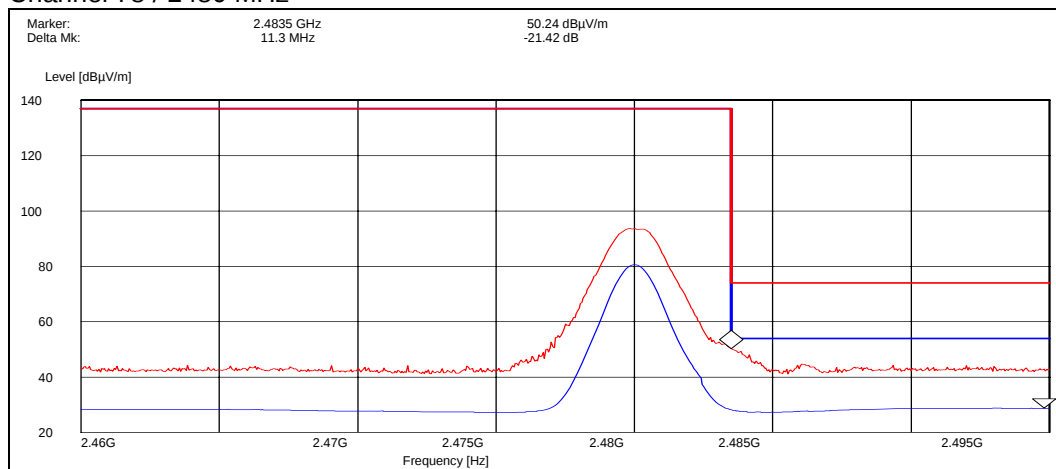
3.2.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz



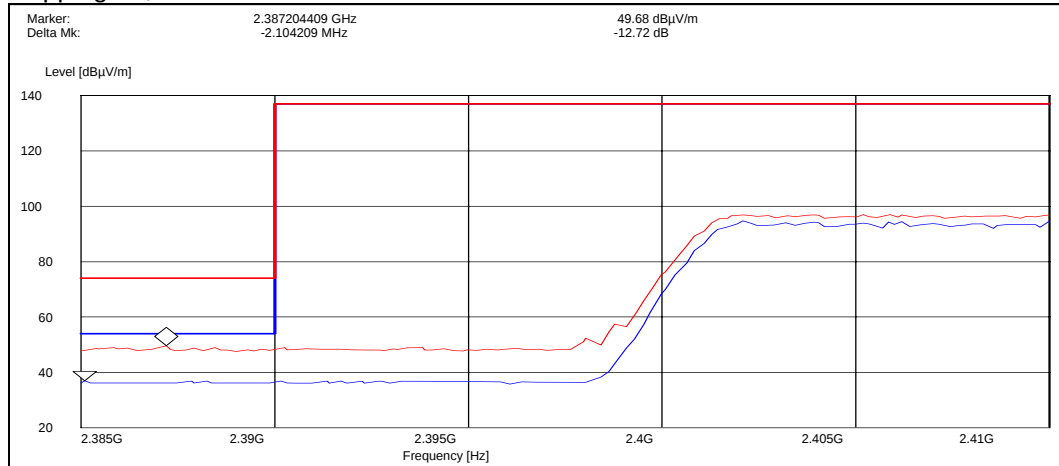
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	44.80	Passed
Average	29.50	Passed

Channel 78 / 2480 MHz



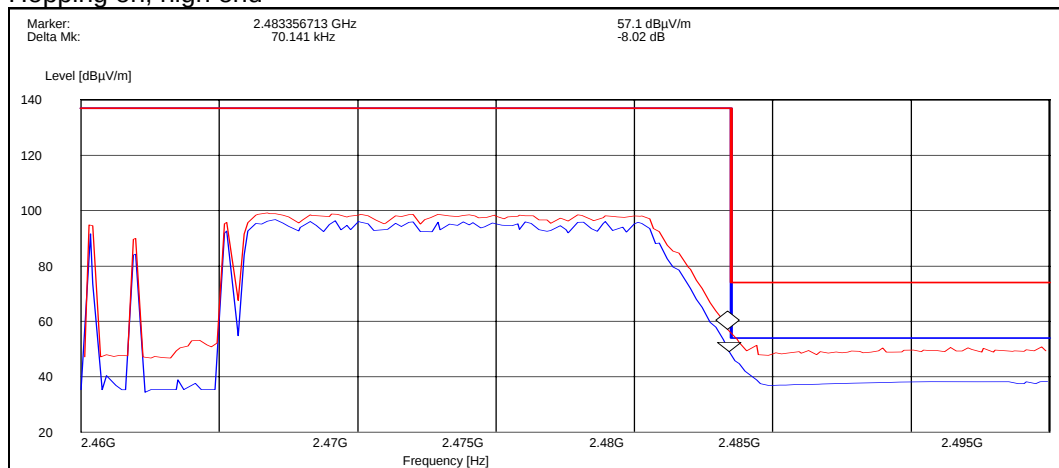
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	50.20	Passed
Average	28.80	Passed

Hopping on, low end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	49.70	Passed
Average	37.00	Passed

Hopping on, high end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	57.10	Passed
Average	49.10	Passed

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

EUT with DUT number	RM-455 DUT 25291
Accessories with DUT numbers	BP-6MT DUT 25297, AC-6U DUT 25294, HS-9 DUT 25292
Operation Voltage [V] / [Hz]	115 / 60
Result	Passed
Remarks	Phone tested in flip open mode.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 39 / 101.7
Date of measurements	16-Feb-2009
Measured by	Christian Andersen

4.1. 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:

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

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. Bluetooth Test results

4.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz

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
4804.000000	44.90	175.79	44.80	0.1	VERTICAL	Passed
7206.000000	47.70	242.66	38.80	8.9	HORIZONTAL	Passed

Average (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
4804.000000	32.80	43.65	32.70	0.1	VERTICAL	Passed
7206.000000	33.60	47.86	24.70	8.9	HORIZONTAL	Passed

Channel 40 / 2442 MHz

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

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
30.500000	25.80	19.50	37.10	-11.3	VERTICAL	Passed
37.695391	10.90	3.51	27.10	-16.2	VERTICAL	Passed
48.155110	15.50	5.96	38.70	-23.2	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
1947.895792	58.50	841.40	61.70	-3.2	VERTICAL	Passed
4883.767535	46.90	221.31	47.10	-0.2	VERTICAL	Passed
4883.769539	46.90	221.31	47.10	-0.2	VERTICAL	Passed
7326.151303	47.80	245.47	38.80	9.0	VERTICAL	Passed
17480.967936	51.90	393.55	29.00	22.9	HORIZONTAL	Passed
17946.395792	57.80	776.25	28.90	28.9	HORIZONTAL	Passed

*1947.8 MHz frequency is coming from communication tester and thus ignored.

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
1947.895792	57.60	758.58	60.80	-3.2	VERTICAL	Passed
4884.267535	32.90	44.16	33.10	-0.2	VERTICAL	Passed
4884.269539	33.00	44.67	33.20	-0.2	VERTICAL	Passed
7326.151303	33.90	49.55	24.90	9.0	VERTICAL	Passed
17481.467936	39.00	89.13	16.10	22.9	HORIZONTAL	Passed
17944.895792	45.10	179.89	16.30	28.8	HORIZONTAL	Passed

*1947.8 MHz frequency is coming from communication tester and thus ignored.

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	44.80	173.78	44.50	0.3	VERTICAL	Passed
7440.000000	45.90	197.24	36.40	9.5	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
4960.000000	33.10	45.19	32.80	0.3	VERTICAL	Passed
7440.000000	31.80	38.90	22.30	9.5	VERTICAL	Passed

4.2.2 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	45.80	194.98	45.70	0.1	VERTICAL	Passed
7206.000000	51.10	358.92	42.20	8.9	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	36.70	68.39	36.60	0.1	VERTICAL	Passed
7206.000000	38.40	83.18	29.50	8.9	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
31.000000	22.80	13.80	34.50	-11.7	VERTICAL	Passed
37.595391	11.00	3.55	27.10	-16.1	VERTICAL	Passed
45.109820	14.90	5.56	35.90	-21.0	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
1947.895792	54.00	501.19	57.20	-3.2	VERTICAL	Passed
4883.769539	46.70	216.27	46.90	-0.2	VERTICAL	Passed
7326.151303	50.20	323.59	41.20	9.0	VERTICAL	Passed
17477.449900	51.90	393.55	28.90	23.0	HORIZONTAL	Passed
17899.799599	59.00	891.25	30.00	29.0	HORIZONTAL	Passed

*1947.8 MHz frequency is coming from communication tester and thus ignored.

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
1947.895792	57.40	741.31	60.60	-3.2	VERTICAL	Passed
4883.769539	37.40	74.13	37.60	-0.2	VERTICAL	Passed
7326.151303	38.10	80.35	29.10	9.0	VERTICAL	Passed
17470.949900	39.10	90.16	16.20	22.9	HORIZONTAL	Passed
17902.299599	45.70	192.75	16.80	28.9	HORIZONTAL	Passed

*1947.8 MHz frequency is coming from communication tester and thus ignored.

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	46.00	199.53	45.70	0.3	VERTICAL	Passed
7440.000000	46.70	216.27	37.20	9.5	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
4960.000000	37.40	74.13	37.10	0.3	VERTICAL	Passed
7440.000000	34.80	54.95	25.30	9.5	VERTICAL	Passed

5. Test Equipment

5.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15C, 15B
13513	Pulse Limiter 9KHz-30MHz	ESH3Z2	Rohde&Schwarz	15C, 15B
13666	EMI Test Reciever 9KHz-2,5GHz	ESPC	Rohde&Schwarz	15C, 15B
13935	Two Lines Artificial Mains Network	ESH3-Z5	Rohde&Schwarz	15C, 15B
16995	Directional Coupler 20dB 0,5-2,0 GHz SMA Conn.	1538RA-20	Weinschel	15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
19171	Universal Radio Communication Tester	CMU200	Rohde&Schwarz	15C, 15B
11386	System DC Power Supply	HP6632A	Hewlett Packard	22/24/27, 15C, 15B
19678	Spectrum Analyzer 26 GHz	FSP	Rohde&Schwarz	22/24/27, 15C, 15B
16601	Universal Radio Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
19625	Vötsch Climatic Chamber	VT4002EMC	Vötsch	22/24/27, 15C, 15B
13357	Rohde & Schwartz Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
20168	Bluetooth EDR Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B

5.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
18416	Universal Radio Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
	Programmable Relay Switching System	-----	Pickering	22/24/27, 15C, 15B
15742	Programmable Relay Switching System	-----	Pickering	22/24/27, 15C, 15B
14020	Power Supply Module Relay Switching System 45W	10-910-002	Pickering	22/24/27, 15C, 15B
15743	Power Supply Module Relay Switching System 50W	10-910L-001	Pickering	22/24/27, 15C, 15B
16490	RS-232/IEEE-488.2 Interface	10-921-001	Pickering	22/24/27, 15C, 15B
	RS-232/IEEE-488.2 Interface	10-921-001	Pickering	22/24/27, 15C, 15B
20078	Relay 2x6 Chnl μ Wave Mux	10-785B-522	Pickering	22/24/27, 15C, 15B
14021	Relay Dual 6 Chnl μ Wave Mux	10-785-522		22/24/27, 15C, 15B
	Relay Dual 6 Chnl μ Wave Mux	10-785-522		22/24/27, 15C, 15B
17644	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
16948	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
16949	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
18792	Multi Device Controller	2090	ETS-EMCO	22/24/27, 15C, 15B
14963	RF Preamplifier 100MHz-4GHz (Metal Chassis)	AFS3-00100400	Miteq/NMP Cph	22/24/27, 15C, 15B
18861	EMI Test Receiver 20Hz-26,5GHz	ESI	Rohde&Schwarz	22/24/27, 15C, 15B
20335	Ultra Broadband Antenna Ultralog 30-3000MHz	HL562	Rohde&Schwarz	22/24/27, 15C, 15B
18773	Shielded Chamber	RFD-100	ETS-Lindgren	22/24/27, 15C, 15B
18774	Shielded Chamber	RFSD-F/A-100	ETS-Lindgren	22/24/27, 15C, 15B
19151	High Pass Filter 3GHz	WHJS3000-10SS	Wainwright	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
	WHK3.0/18G-10ss			
13937	Ultra Stable Notch Filter 850MHz	WRCA902.4-0.2/40-6SS	Wainwright Instruments	22/24/27, 15C, 15B
13936	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	22/24/27, 15C, 15B
14114	Highpass filter	WHK1000-12SS	Wainwright Instruments	22/24/27, 15C, 15B
14188	Ultra Stable Notch Filter 902,4MHz	WRCA902.4-0.2/40-6SS	Wainwright	22/24/27, 15C, 15B
14187	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
16633	Ultra Stable Notch Filter 1880,0MHz	WRCD1880.0-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
19587	BT/WLAN Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	22/24/27, 15C, 15B
20115	WDCMA Band 2 filter		Wainwright	24, 15C, 15B
20114	WDCMA Band 4 filter	WRCG1737/1743-1733/1747-40/6SS	Wainwright	27, 15C, 15B
20116	WDCMA Band 5&6 filter	WRCG832/83/-825/845-40/5SS	Wainwright	22, 15C, 15B
18323	Band reject filter 1947-1953MHz 40dB	WRCG1947/1953-1940/1960-40/6SS	Wainwright	22/24/27, 15C, 15B
20031	Double Ridged Broadband Horn	BBHA 9120 D	SCHWARZBECK	22/24/27, 15C, 15B
19966	Magnetic Loop Antenna 9 kHz - 30 MHz	HFH2-Z2	Rohde&Schwarz	15C, 15B
14993	EMI Test Receiver 9KHz-2750MHz	ESCS30	Rohde&Schwarz	22/24/27, 15C, 15B
15191	Turntable Contoller Unit	G-800SDX	YAESU	22/24/27, 15C, 15B
14900	Antenna Controller	HD100	HD GmbH	22/24/27, 15C, 15B
19374	Resonant Dipole Antenna 850MHz SMA m Conn.	-----	NMP Cph	22/24/27, 15C, 15B
19375	Resonant Dipole Antenna 1900MHz SMA m Conn.	-----	NMP Cph	22/24/27, 15C, 15B
20168	Bluetooth EDR Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B