

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15C_RM-648_17.docx	Date of Report:	8-July-2010
Number of pages:	17	Customer's Contact person:	Mohammad El-Haj
Testing laboratory:	TCC Nokia Copenhagen Laboratory Frederikskaj 1790 COPENHAGEN V DENMARK Tel. +45 33 292929 Fax. +45 33 292934	Customer:	Nokia Corporation Frederikskaj 1790 COPENHAGEN V DENMARK Tel. +45 33 292929 Fax. +45 33 292934
FCC listing no.:	99059		
IC recognition no.:	661AL-1		
Tested devices/ accessories:	Phone RM-648 / Battery BL-5F / AC-Charger AC-6E / Headset WH-102		
FCC ID:	QTKRM-648	IC:	661AD-RM648
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-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:			

Ruben Hansen, System Manager, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	03-Jun-2010
Testing completed	29-June-2010
The customer's contact person	Mohammad El-Haj
Test Plan referred to	T:\Projects\RM-627\TestPlan\RS_testplan_RM-627_CR_HW0300.xls
Notes	-
Document name	\\satcc01nmp\tcc_salol\Projects\RM-627\EMC\FCC15C_RM-627_02.docx

1.1. EUT and Accessory Information

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

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-627	352713/04/000906/2	0300	-	041.017	24229
Battery	BL-5F	3635639366311608734;0670498	-	-	-	24375
AC-Charger	AC-6E	3943499401141210125;0675590	-	-	-	24385
Headset	WH-102	0694786945311R00419	-	-	-	24377

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(0.4(4))	Conducted peak output power	NP
15.247(d)	A8(0.5)	Band edge compliance of RF emissions	PASSED
15.247(d)	A8(0.5)	Spurious RF conducted emissions	NP
15.247(d), 15.209	A8(0.5)	Spurious radiated emissions	PASSED
15.207	7.2.2	AC powerline conducted emissions	NP
15.247(a)(2)	A8(0.1(1))	6dB(bandwidth)	NP
		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 Laboratory.

The test results of QTKRM-627 are re-used for certification of the QTKRM-648. The table above indicates the results, which will be re-used.

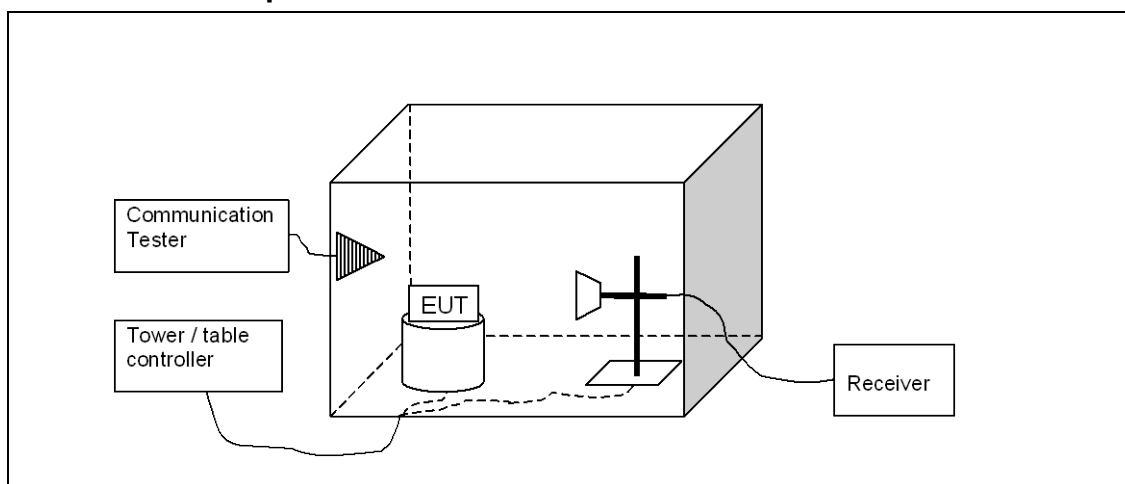
CONTENTS

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. Band edge compliance of RF emissions (FCC §15.247(d), RSS-210 A8.5)	4
2.1. Test Setup.....	4
2.2. Test method and limit	4
2.3. Bluetooth Test results.....	5
3. Spurious radiated emissions (FCC §22.917(a), §24.238(a), §2.1053, RSS-132 4.5, RSS-133 6.5).....	10
3.1. BLUETOOTH	10
3.2. Test Setup.....	10
3.3. Test method and limit	10
3.4. Bluetooth Test results Spurious.....	12
3.5. GFSK modulation, PRBS packet type	14
4. Test Equipment	16
4.1. Conducted measurements	16
4.2. Radiated measurements	16

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

EUT with DUT number	RM-627, DUT 24229
Accessories with DUT numbers	BL-5F, DUT 24375 ; AC-6E, DUT 24385 ; WH-102, DUT 24377
Operation Voltage [V] / [Hz]	-
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] /	23 / 45
Date of measurements	29-Jun-2010
Measured by	Ruben Hansen

2.1. Test Setup



2.2. Test method and limit

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

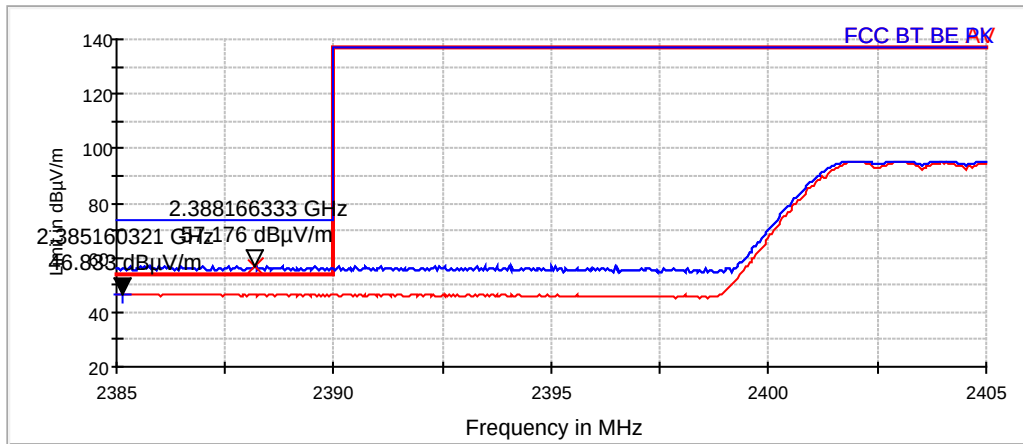
The measurement results are obtained as described below:

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

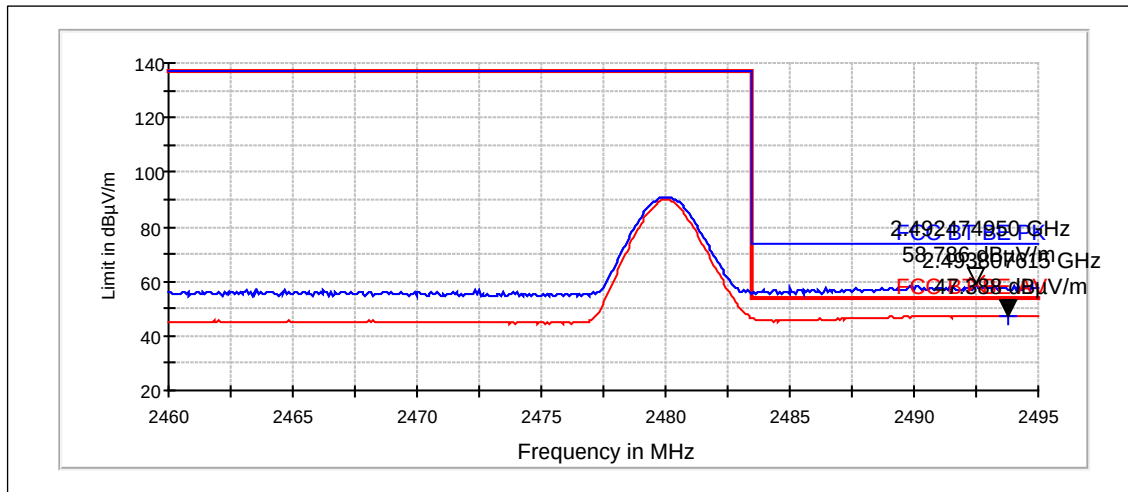
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

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

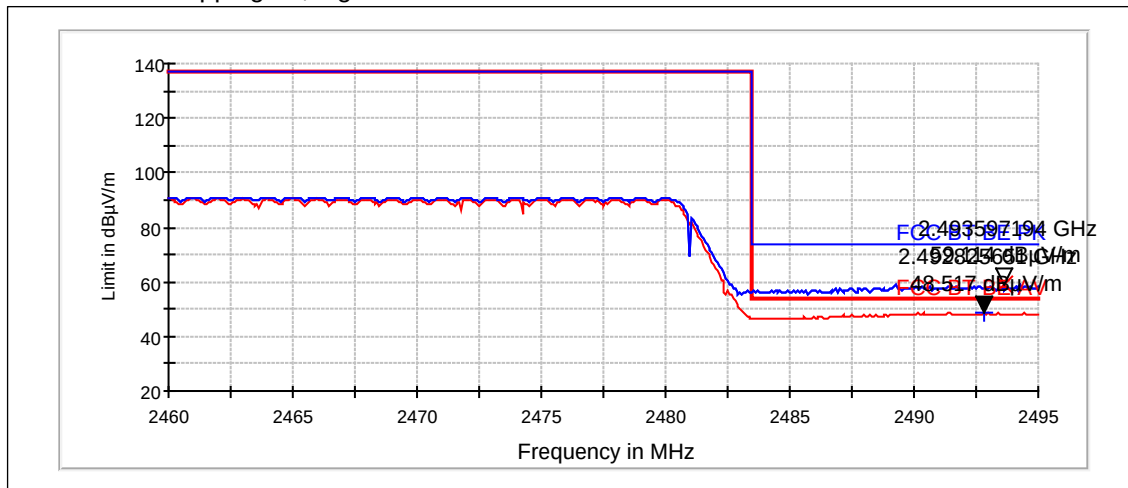
Frequency range [MHz]	Limit Average [dBμV/m]	Limit Peak [dBμV/m]
Below 2390 and above 2483.5	<=54	<=74



GFSK mode. Channel 78 / 2480 MHz



GFSK mode. Hopping on, high end



2.3.2 8DPSK modulation, PRBS packet type

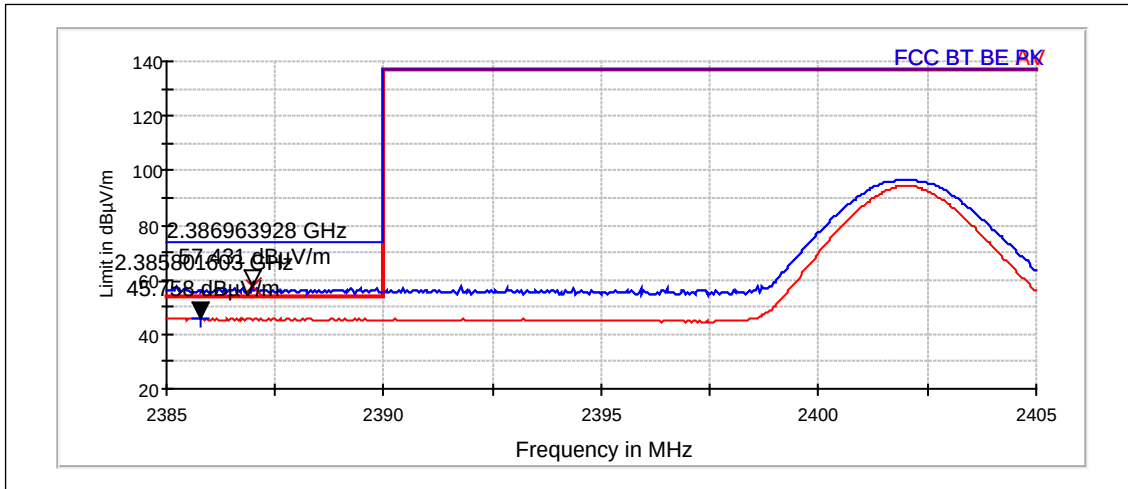
Average (RBW: 1 MHz, VBW: 1 MHz)

Channel / f _c [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Result
0 / 2402	45.76	194.049	47.38	-1.62	PASSED
Hopping on, low end	47.12	227.058	48.74	-1.62	PASSED
78 / 2480	47.39	234.125	48.63	-1.24	PASSED
Hopping on, high end	48.54	267.441	49.78	-1.24	PASSED

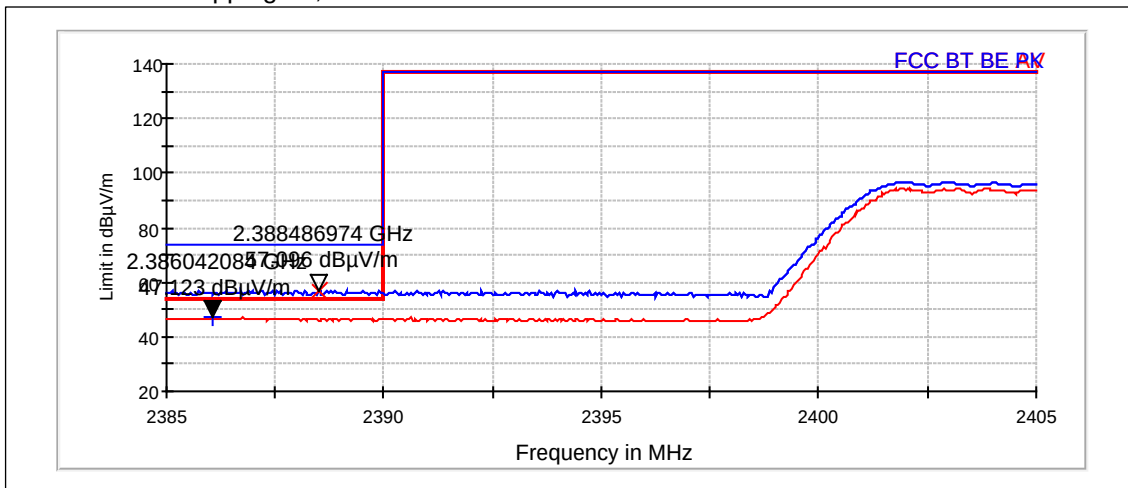
Peak (RBW: 1 MHz, VBW: 1 MHz)

Channel / f _c [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Result
0 / 2402	57.43	743.946	59.05	-1.62	PASSED
Hopping on, low end	57.1	715.83	58.72	-1.62	PASSED
78 / 2480	58.97	888.576	60.21	-1.24	PASSED
Hopping on, high end	59.68	963.958	60.92	-1.24	PASSED

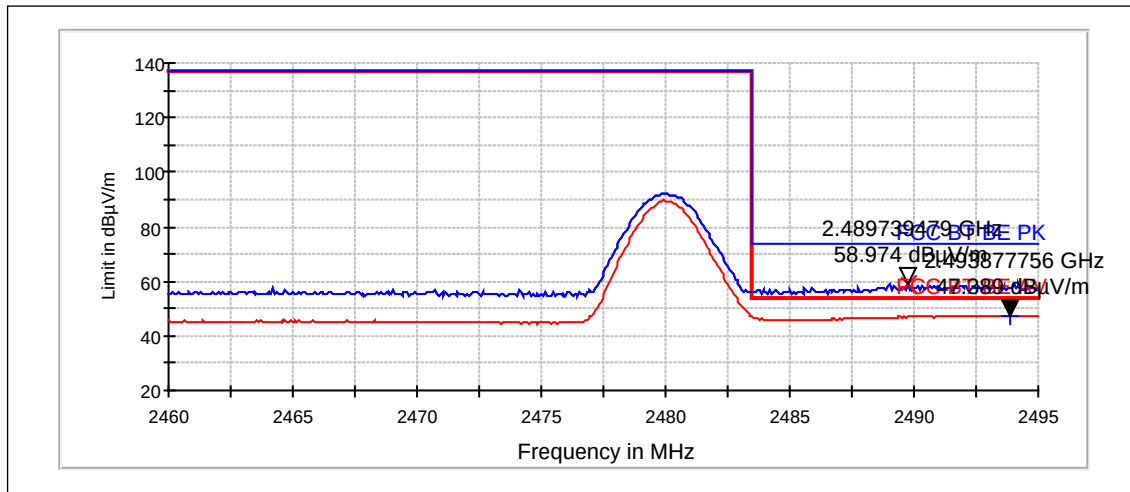
8DPSK mode. Channel 0 / 2402 MHz



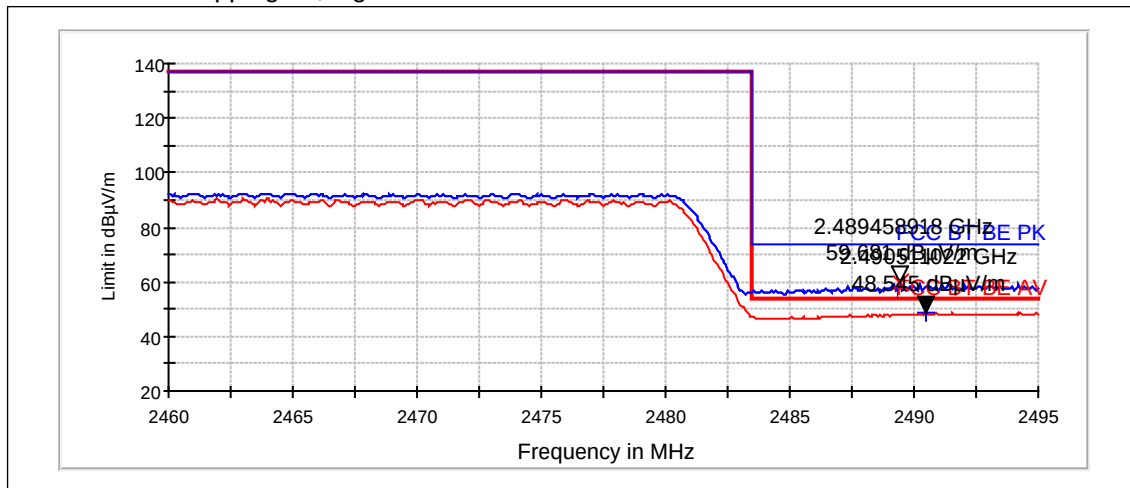
8DPSK mode. Hopping on, low end



8DPSK mode. Channel 78 / 2480 MHz



8DPSK mode. Hopping on, high end

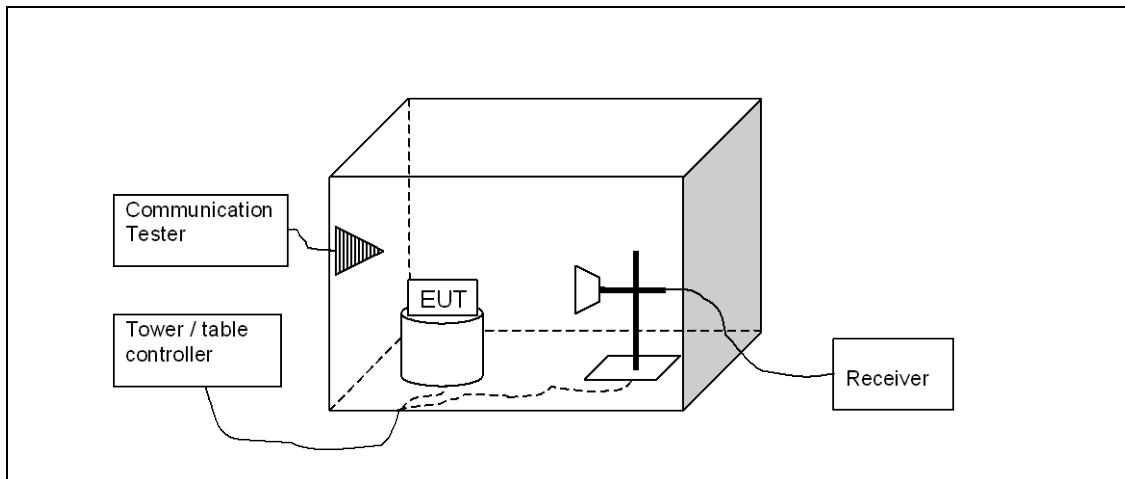


3. Spurious radiated emissions (FCC §22.917(a), §24.238(a), §2.1053, RSS-132 4.5, RSS-133 6.5)

3.1. BLUETOOTH

EUT with DUT number	RM-627, DUT 24229
Accessories with DUT numbers	BL-5F, DUT 24375 ; AC-6E, DUT 24385 ; WH-102, DUT 24377
Operation Voltage [V] / [Hz]	-
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] /	23 / 45
Date of measurements	29-Jun-2010
Measured by	Ruben Hansen

3.2. Test Setup



3.3. 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 ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

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

3.4. Bluetooth Test results Spurious

3.4.1 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4804.6	27.64	24.107	25.83	1.81	VERTICAL	PASSED
7204.5	35.57	60.027	24.25	11.32	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4804.6	40.54	106.402	38.73	1.81	VERTICAL	PASSED
7204.5	48.47	265.125	37.15	11.32	VERTICAL	PASSED

Channel 7 / 2442 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
1147.196	21.29	11.605	30.46	-9.17	VERTICAL	PASSED
3929.161	25.05	17.892	26.13	-1.08	HORIZONTAL	PASSED
10861.725	42.59	134.664	24.67	17.92	HORIZONTAL	PASSED

Quasi peak (RBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
43.591	15.13	5.709	29.19	-14.06	HORIZONTAL	PASSED
71.806	27.34	23.289	47.19	-19.85	HORIZONTAL	PASSED
72.775	27.76	24.423	47.48	-19.72	HORIZONTAL	PASSED
72.975	26.07	20.114	45.76	-19.69	HORIZONTAL	PASSED
120.264	18.1	8.032	35.54	-17.44	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
1147.196	33.86	49.323	43.03	-9.17	VERTICAL	PASSED
3929.161	37.52	75.188	38.6	-1.08	HORIZONTAL	PASSED
10861.725	56.78	690.399	38.86	17.92	HORIZONTAL	PASSED

Channel 78 / 2480 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4959.1	30.33	32.844	27.98	2.35	HORIZONTAL	PASSED
7441.3	35.6	60.263	24	11.6	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4959.1	43.32	146.538	40.97	2.35	HORIZONTAL	PASSED
7441.3	48.62	269.867	37.02	11.6	HORIZONTAL	PASSED

3.5. GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4802.8	27.66	24.141	25.87	1.79	VERTICAL	PASSED
7206.1	35.68	60.806	24.22	11.46	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4802.8	40.39	104.616	38.6	1.79	VERTICAL	PASSED
7206.1	49.02	282.423	37.56	11.46	VERTICAL	PASSED

Channel 7 / 2442 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
3911.125	24.85	17.482	25.94	-1.09	VERTICAL	PASSED
3944.787	24.8	17.382	25.79	-0.99	HORIZONTAL	PASSED

Quasi peak (RBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
72.286	28.29	25.96	48.08	-19.79	HORIZONTAL	PASSED
72.424	27.02	22.439	46.79	-19.77	HORIZONTAL	PASSED
72.474	28.1	25.404	47.86	-19.76	HORIZONTAL	PASSED
73.036	27.55	23.848	47.23	-19.68	HORIZONTAL	PASSED
928.688	21.71	12.174	27.11	-5.4	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
3911.125	37.65	76.252	38.74	-1.09	VERTICAL	PASSED
3944.787	37.62	76.033	38.61	-0.99	HORIZONTAL	PASSED

Channel 78 / 2480 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	
4961.1	30.25	32.554	27.9	2.35	VERTICAL	PASSED
7438.1	35.68	60.806	24.14	11.54	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	
4961.1	44.33	164.683	41.98	2.35	VERTICAL	PASSED
7438.1	48.56	267.979	37.02	11.54	VERTICAL	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15C, 15B
13513	Pulse Limiter	ESH3Z2	Rohde&Schwarz	15C, 15B
13666	Receiver	ESPC	Rohde&Schwarz	15C, 15B
13935	LISN	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	Communication Tester	CMU200	Rohde&Schwarz	15C, 15B
11386	DC Power Supply	HP6632A	Hewlett Packard	22/24/27, 15C, 15B
19678	Spectrum Analyzer	FSP	Rohde&Schwarz	22/24/27, 15C, 15B
16601	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
19625	Climatic Chamber	VT4002EMC	Vötsch	22/24/27, 15C, 15B
13357	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
19116	Power splitter	-	various	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
18792	Mast/turntable controller	2090	ETS-EMCO	22/24/27, 15C, 15B
18416	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
13077	Power Supply	EA-3016	-	22/24/27, 15C, 15B
15742	Programmable Relay Switching System	-----	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
18861	Receiver	EMI Test Receiver 20Hz-26,5GHz ESI	Rohde&Schwarz	22/24/27, 15C, 15B
18860	Antenna	HL562	Rohde&Schwarz	22/24/27, 15C, 15B
18773	Anechoic chamber	RFD-100	ETS-Lindgren	22/24/27, 15C, 15B
18774	Anechoic chamber	RFSD-F/A-100	ETS-Lindgren	22/24/27, 15C, 15B
19151	High Pass Filter	WHJS3000-10SS	Wainwright	22/24/27, 15C, 15B
13937	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright Instruments	22/24/27, 15C, 15B
13936	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	22/24/27, 15C, 15B

16 (17)

Eq. No	Equipment	Type	Manufacturer	Used in
14114	Highpass Filter	WHK1000-12SS	Wainwright Instruments	22/24/27, 15C, 15B
14188	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright	22/24/27, 15C, 15B
14187	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
16633	Band reject filter	WRCD1880.0-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
19587	Band reject filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	22/24/27, 15C, 15B
20115	Band reject filter	-	Wainwright	22/24/27, 15C, 15B
20114	Band reject filter	WRCG1737/1743-1733/1747-40/6SS	Wainwright	22/24/27, 15C, 15B
20116	Band reject filter	WRCG832/83/-825/845-40/5SS	Wainwright	22/24/27, 15C, 15B
20698	Antenna	BBHA 9120 D	SCHWARZBECK	22/24/27, 15C, 15B
19966	Antenna	HFH2-Z2	Rohde&Schwarz	15C, 15B
13799	Signal Generator	SMP02	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
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B