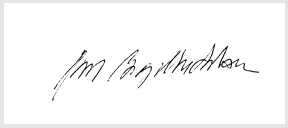
TCC Nokia

FINAS Finnish Accreditation Service T117 (EN ISO/IEC 17025)

FCC Part 15C Compliance Test Report

Test Report no.:	Cph_FCC_0632_07.doc	**Date of Report:**	22-09-2006
Number of pages:	31	**Customer's Contact person:**	Ole Soerensen
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.: **IC recognition no.:**	99059 4820 and 4820-1		
Tested devices/ accessories:	**Phone: RM-140 (hw0330), Battery: BP-5M, Headset:HS-60 AC Charger: AC-3E**		
FCC ID:	QTKRM-140	**IC:**	661AD-RM140
Supplement reports:	None		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), IC standards RSS-GEN and RSS-210. 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:	 Jan Engelbrechtsen cn=Jan Engelbrechtsen, c=DK, o=Nokia Mobile Phones, ou=Cph - TCC, email=jan.engelbrechtsen@nokia.com 2006.08.22 16:28:25 +02'00'		

Jan Engelbrechtsen, Engineer

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	09-08-2006
Testing completed	22-08-2006
The customer's contact person	Ole Soerensen
Test Plan referred to	\\satcc01nmp\tcc_salo\Projects\RM-140\TestPlan_RS\RS_testplan_RM-140.xls
Notes	None
Document name	\\satcc01nmp\tcc_salo\Projects\RM-140\EMC\Results\FCC\Cph_FCC_0632_07.doc

1.1. EUT and Accessory Information

The EUT is a quadric band (GSM900/1800/1900 and WCDMA2100) mobile phone with GPRS, EGPRS and Bluetooth. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-140	004400/97/170279/8	0330	-	Vp 03.14	27864
Phone	RM-140	004400/97/170357/2	0330	-	Vp 03.14	27872
Battery	BP-5M	393213N172110102524;0670509	-	-	-	27865
Battery	BP-5M	393213N172110102525;0670509	-	-	-	27871
Headset	HS-60	-	-	-	-	27866
Headset	HS-60	-	-	-	-	27868
AC Charger	AC-3E	110333613314130173 4;0675370	-	-	-	27860
AC-Charger	AC-3E	110333613314130173 7;0675370	-	-	-	27869

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)	Peak output power	Passed
15.247(c)	A8.5	Band edge compliance of RF emissions	NP
15.247(c)	A8.5	Spurious RF conducted emissions	Passed
15.247(c), 15.209	A8.5	Spurious radiated emissions	NP
15.207	*7.2.2*	AC power line conducted emissions	Passed
15.247(a)(1)	A8.1 (1)	20 dB bandwidth	Passed
15.247(a)(1)	A8.1 (2)	Carrier frequency separation	Passed
15.247(a)(1)(iii)	A8.1 (4)	Number of hopping frequencies	Passed
15.247(a)(1)(iii)	A8.1 (4)	Time of occupancy	Passed

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.

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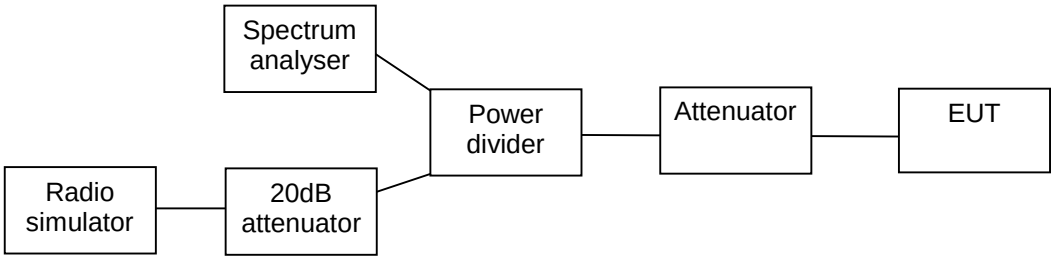
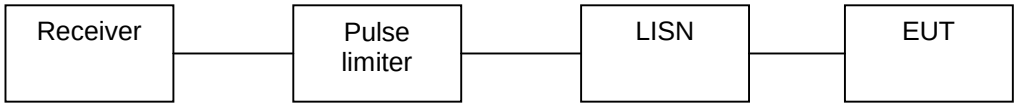
2. Test setups

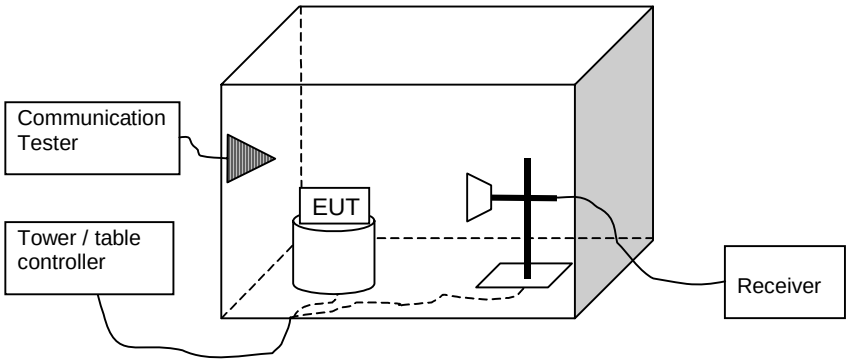
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Spurious radiated emissions test setup



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3. Peak output power

(FCC §15.247(b)(1), RSS-210 A8.4 (2))

EUT with DUT number	RM-140 dut 27864, BP-5M dut 27865
Accessories with DUT numbers	AC-3E dut 27860, HS-60 dut 27866
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.5 / 46.5 1006.4
Date of measurements	14-08-2006
Measured by	Jan Engelbrechtsen

3.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

Limits for peak output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

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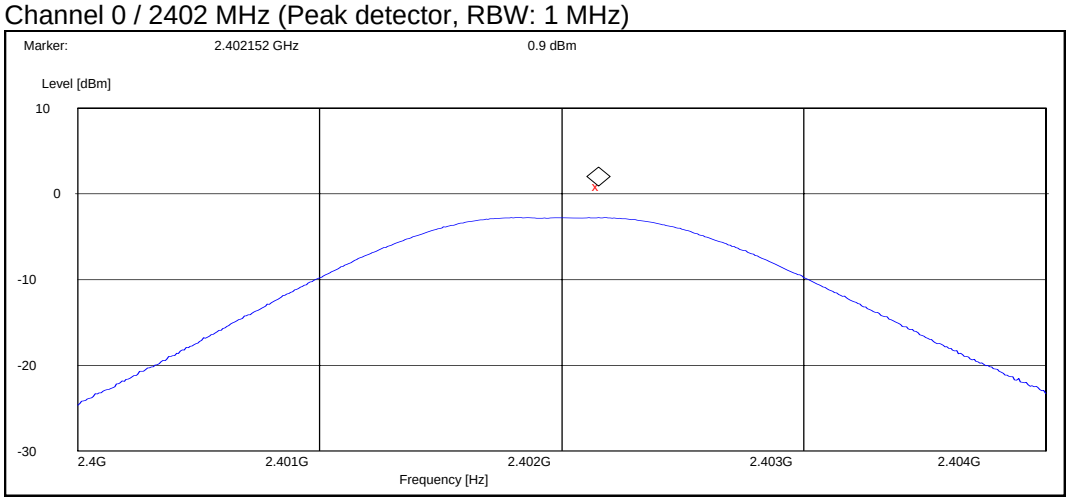
3.2. Bluetooth Test results

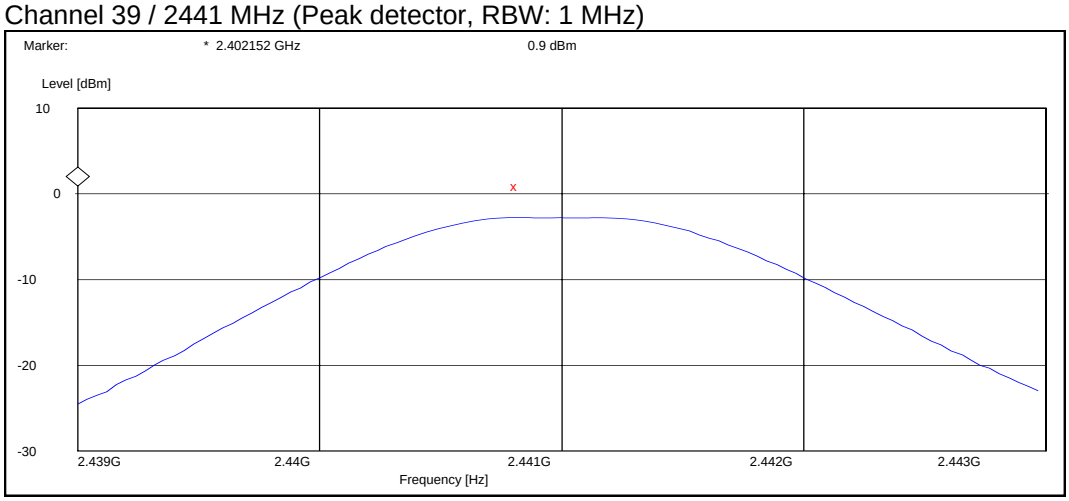
3.2.1 GSFK modulation, PRBS packet type

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
0 / 2402	0.90	1.230	Passed
	0.90	1.230	Passed
78 / 2480	0.90	1.230	Passed

Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz)



Channel 39 / 2441 MHz (Peak detector, RBW: 1 MHz)



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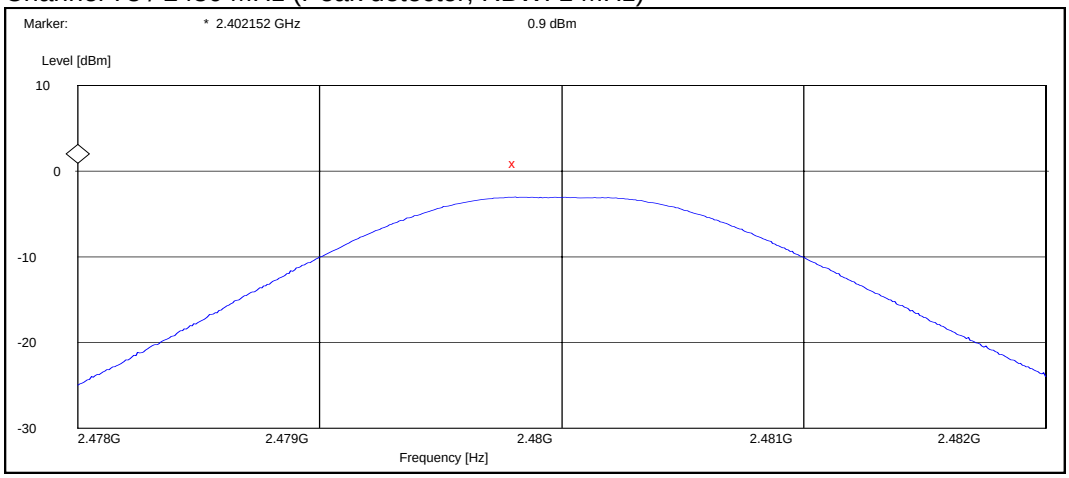
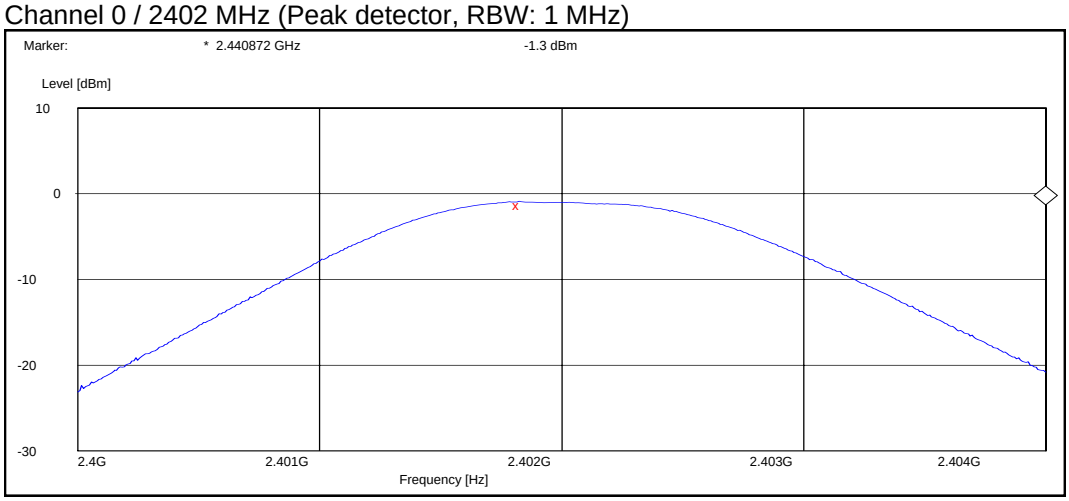
Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz)



3.2.2 8DPSK modulation, PRBS packet type

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
0 / 2402	-1.30	0.741	
	-1.30	0.741	
78 / 2480	-2.10	0.617	

Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz)



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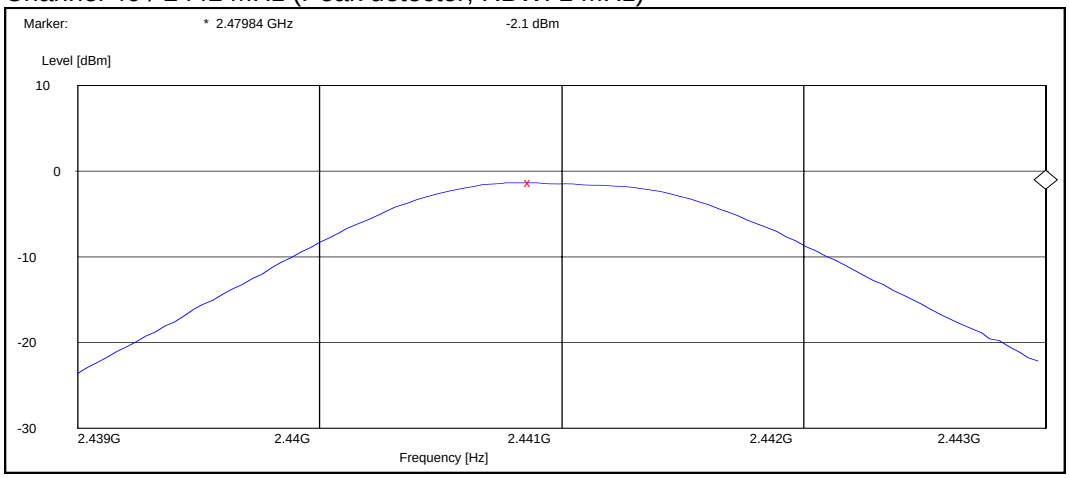
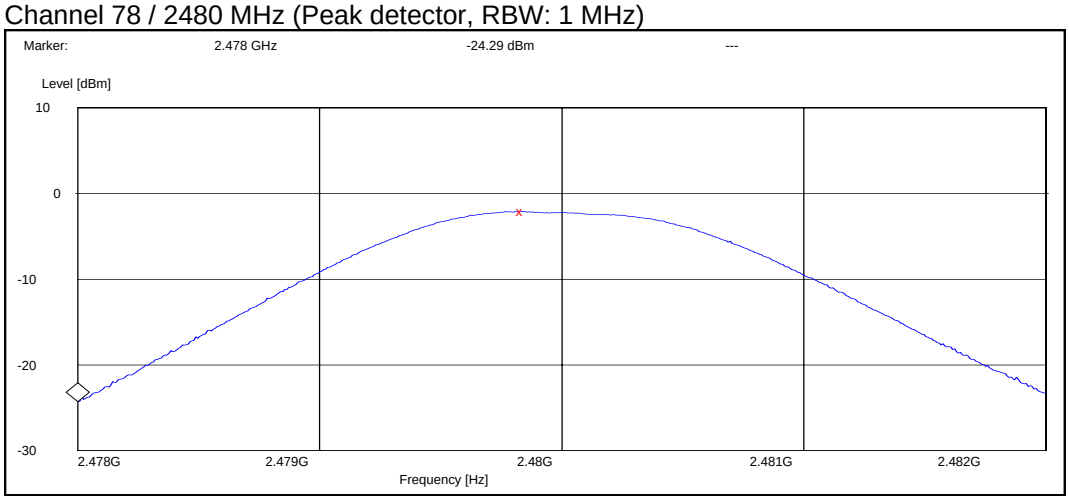
Channel 40 / 2442 MHz (Peak detector, RBW: 1 MHz)



Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz)



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4. Spurious RF conducted emissions

(FCC §15.247(c), RSS-A8.5)

EUT with DUT number	RM-140 dut 27864, BP-5M dut 27865
Accessories with DUT numbers	AC-3E dut 27860, HS-60 dut 27866
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.5 / 46.5 1006.4
Date of measurements	14-08-2006
Measured by	Jan Engelbrechtsen

4.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

Limits for spurious RF conducted emissions measurements

Frequency range [MHz]	Limit [dBc]
1 – 25000	≤ -20

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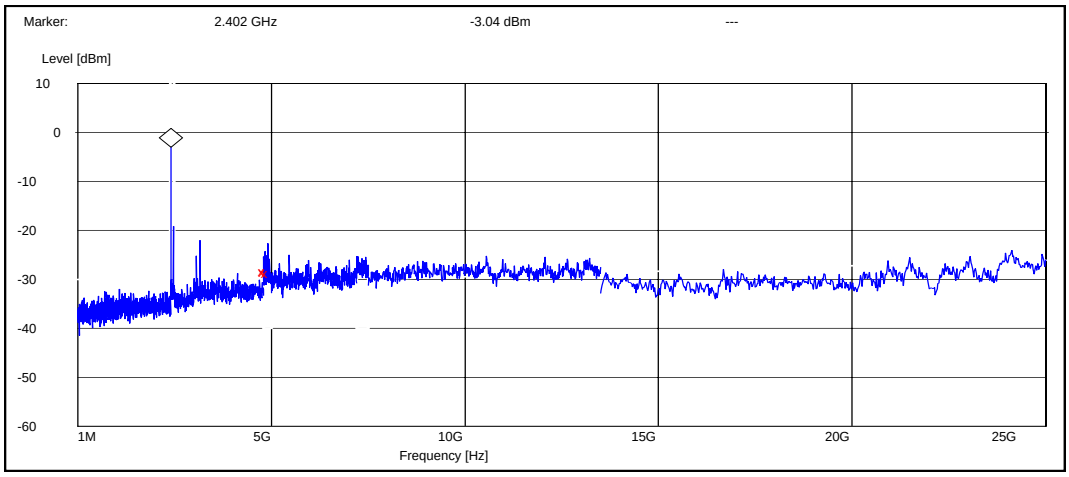
4.2. Bluetooth Test results

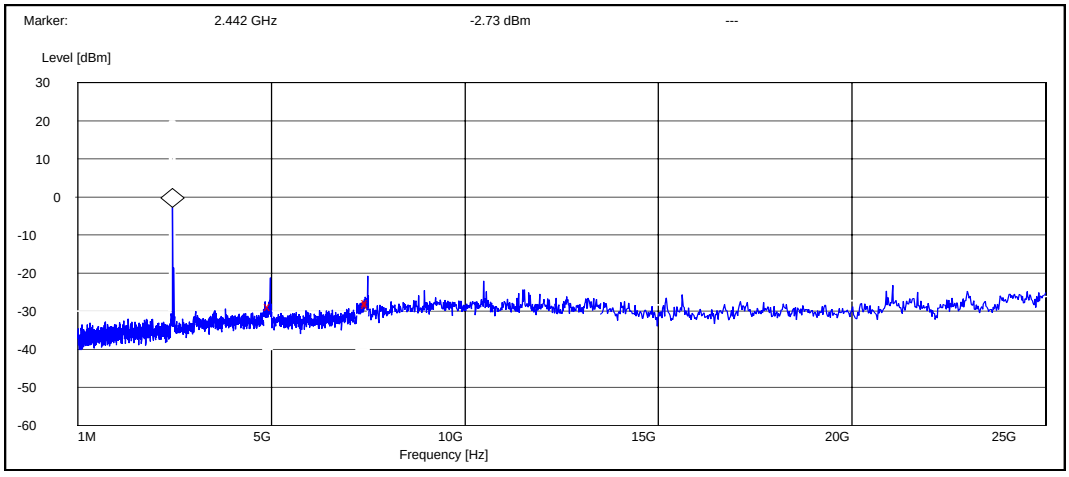
4.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



Frequency [MHz]	P [dBc]	Result
4830.400000	-25.256015	Passed
4838.000000	-25.556015	Passed
4910.800000	-25.756015	Passed

Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4974.000000	-26.074376	Passed
7486.200000	-24.874376	Passed
7489.800000	-25.374376	Passed

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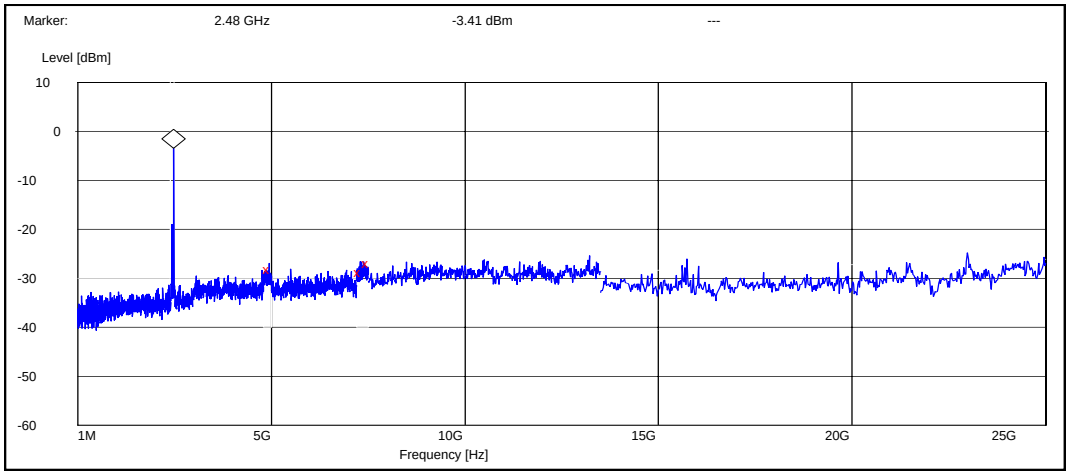
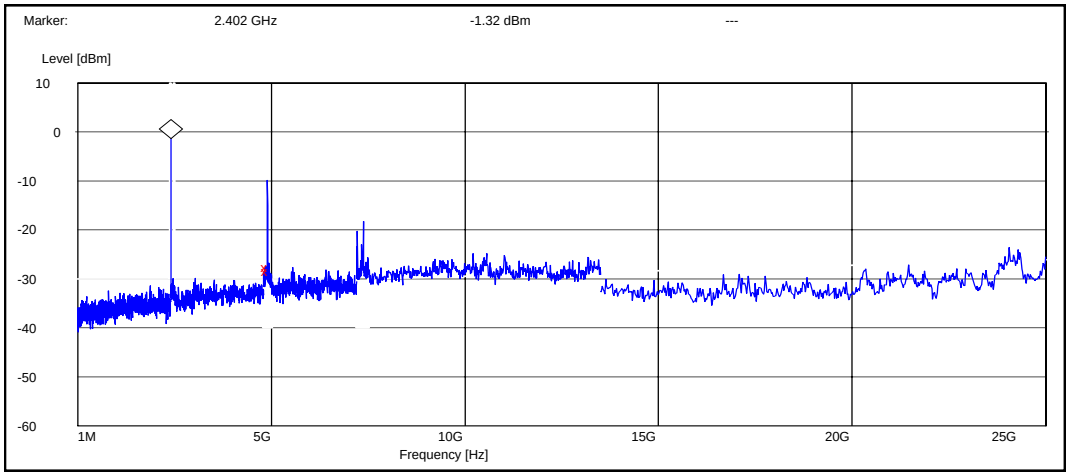
Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4951.600000	-24.688448	Passed
7296.600000	-25.388448	Passed
7500.000000	-23.588448	Passed

4.2.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz



Frequency [MHz]	P [dBc]	Result
4900.800000	-26.284035	Passed
4904.000000	-27.184035	Passed
4904.800000	-27.184035	Passed

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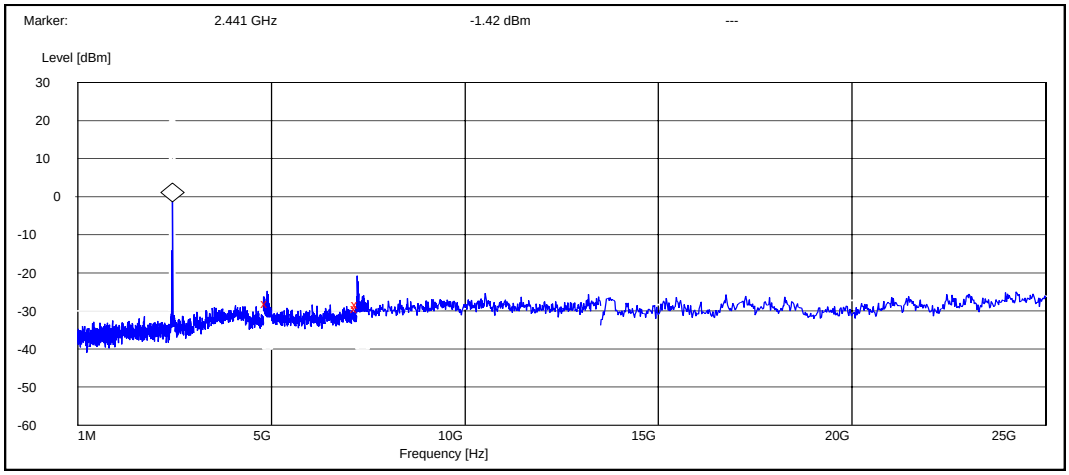
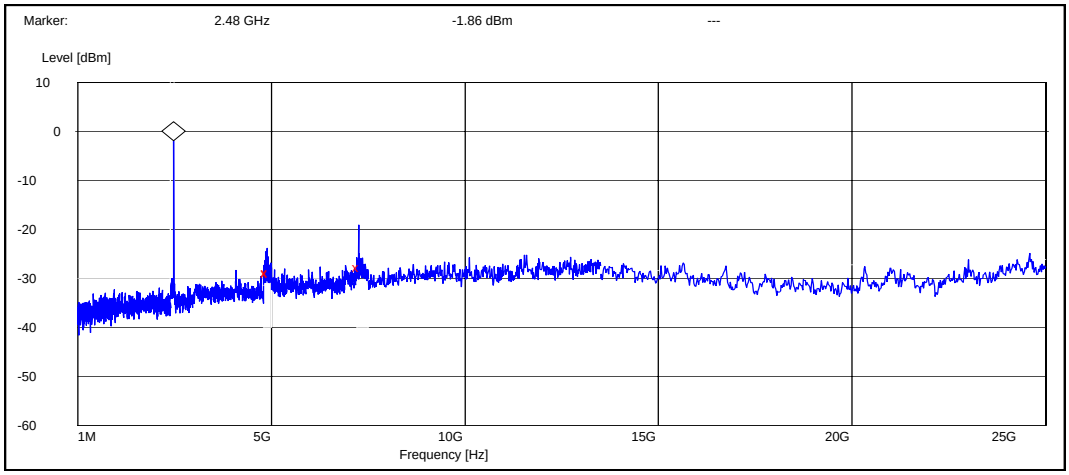
Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4893.600000	-26.583411	
7212.000000	-27.783411	
7233.600000	-26.883411	

Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4890.000000	-26.941846	
4897.200000	-27.141846	
7258.800000	-25.741846	

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5. AC power line conducted emissions

(FCC §15.207, RSS-GEN 7.2.2)

EUT with DUT number	RM-140 Dut # 27872
Accessories with DUT numbers	BP-5M Dut # 27870 + BP-5M Dut # 27871 + AC-3E Dut # 27869 + HS-60 Dut # 27868
Operation Voltage [V] / [Hz]	230/50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	23.3 / 49.5 1011.5
Date of measurements	10-08-2006
Measured by	Allan F. Henriksen

5.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-GEN as follows:

The EUT is placed on a wooden table 80 cm above the reference ground plane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

$$U\ [dB\mu V] = U_{RX} + A_{TOT}$$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

CISPR 22 Class B limits

Frequency range [MHz]	Quasi peak limit [dBµV]	Average limit [dBµV]
0.15 - 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

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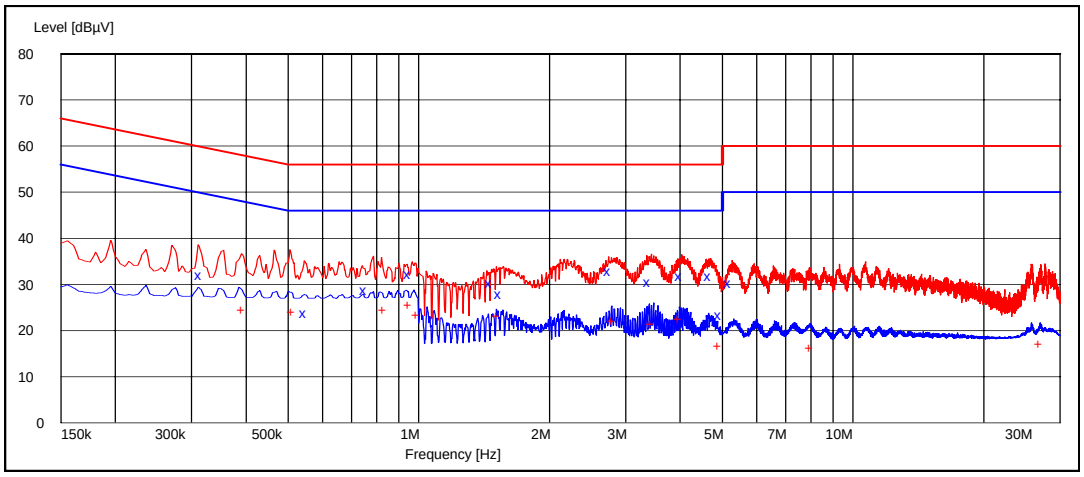
5.2. Bluetooth Test results

5.2.1 GFSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.315000	32.00	L1	Passed
0.550000	23.90	L1	Passed
0.755000	28.80	L1	Passed
0.955000	32.20	N	Passed
1.470000	30.30	N	Passed
1.545000	27.80	N	Passed
2.760000	32.80	L1	Passed
3.405000	30.60	N	Passed
4.035000	31.90	L1	Passed
4.695000	31.90	L1	Passed
4.965000	23.40	L1	Passed
5.225000	30.30	L1	Passed

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.395000	24.50	N	Passed
0.515000	24.00	N	Passed
0.835000	24.40	N	Passed
0.955000	25.50	N	Passed
0.995000	23.30	N	Passed
1.525000	23.10	N	Passed
2.810000	22.00	N	Passed
3.455000	21.30	L1	Passed
4.000000	22.50	N	Passed
4.930000	16.70	N	Passed
8.020000	16.20	N	Passed
27.075000	17.20	N	Passed

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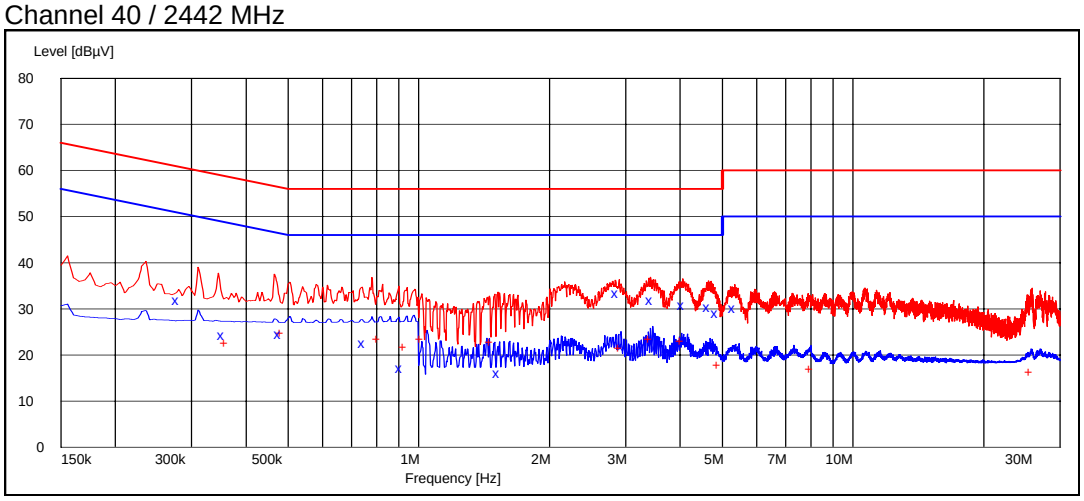
5.2.2 8DPSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.280000	32.00	L1	Passed
0.355000	24.30	N	Passed
0.480000	24.60	L1	Passed
0.750000	22.60	L1	Passed
0.915000	17.00	N	Passed
1.530000	16.10	N	Passed
2.870000	33.30	L1	Passed
3.450000	31.90	L1	Passed
4.075000	30.80	N	Passed
4.670000	30.40	L1	Passed
4.885000	29.20	L1	Passed
5.345000	30.10	L1	Passed

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.360000	22.50	N	Passed
0.485000	24.70	N	Passed
0.810000	23.40	N	Passed
0.930000	21.80	N	Passed
1.015000	23.40	N	Passed
1.470000	22.90	N	Passed
2.910000	21.60	N	Passed
3.415000	23.40	N	Passed
4.045000	23.10	N	Passed
4.915000	17.70	N	Passed
8.040000	16.80	N	Passed
25.730000	16.30	N	Passed

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6. 20 dB bandwidth

(FCC §15.247(a)(1), RSS-210 A8.1 (1))

EUT with DUT number	RM-140 dut 27864, BP-5M dut 27865
Accessories with DUT numbers	AC-3E dut 27860, HS-60 dut 27866
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.5 / 46.5 1006.4
Date of measurements	14-08-2006
Measured by	Jan Engelbrechtsen

6.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

Limits for 20 dB bandwidth measurements

Limit [MHz]
N/A

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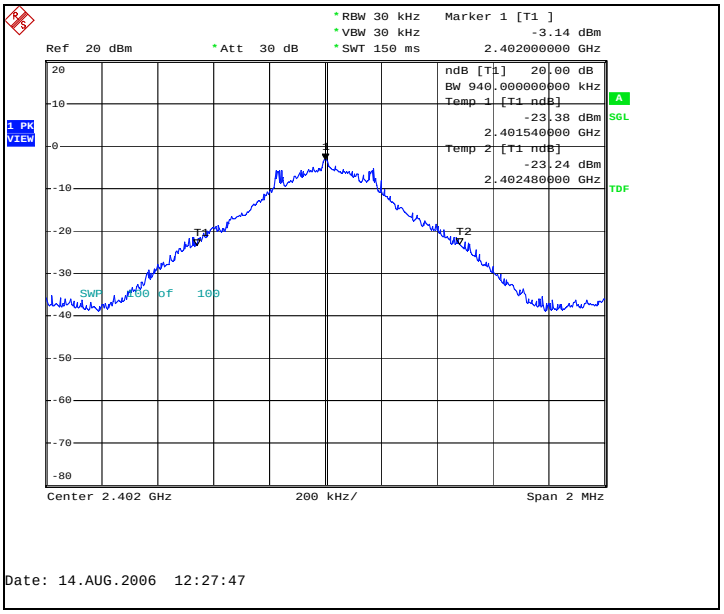
6.2. Bluetooth Test results

6.2.1 GFSK modulation, PRBS packet type

Channel / f_C [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	940.000	
	976.000	
78 / 2480	948.000	

Channel 0 / 2402 MHz



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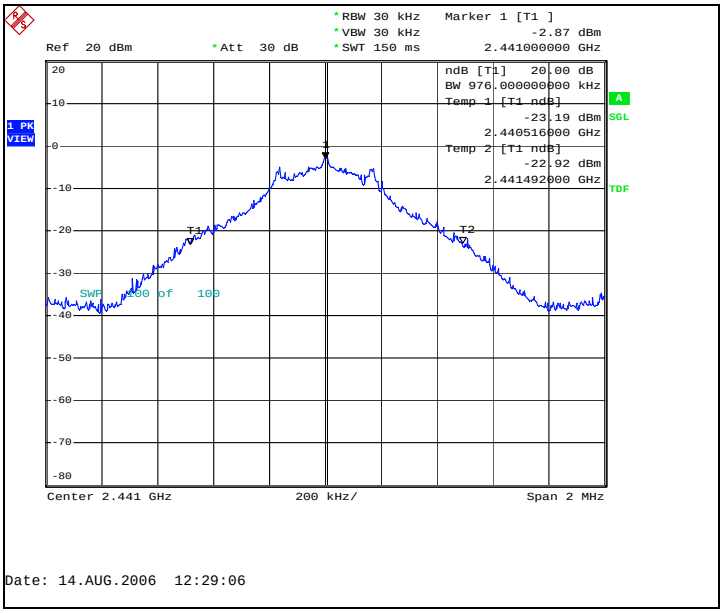
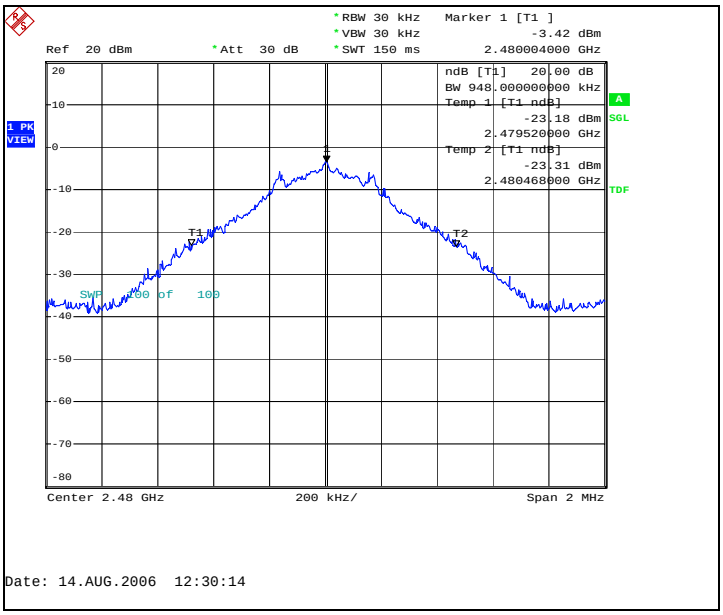
Channel 39 / 2441 MHz



Channel 78 / 2480 MHz



6.2.2 8DPSK modulation, PRBS packet type

Channel / f_C [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	640.000	Passed
	636.000	Passed
78 / 2480	640.000	Passed

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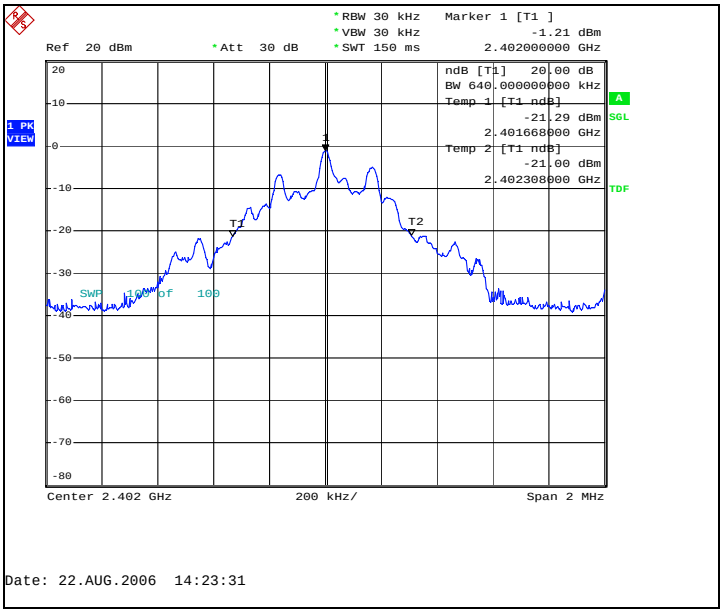
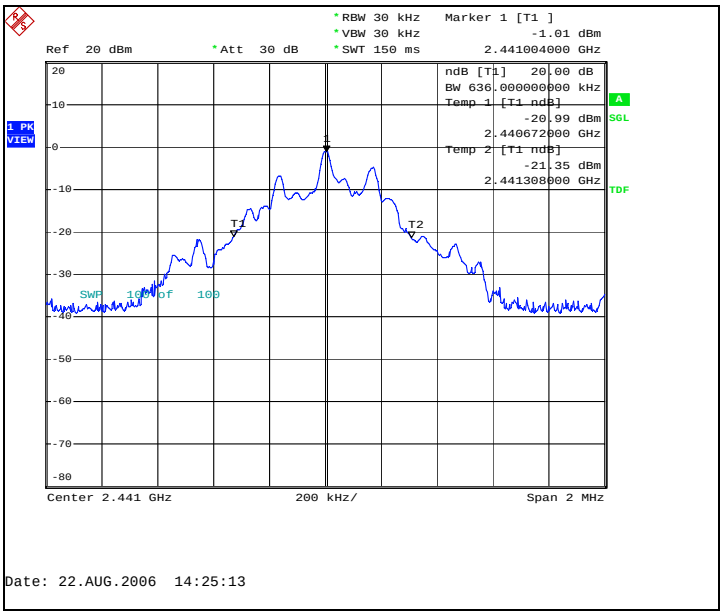
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



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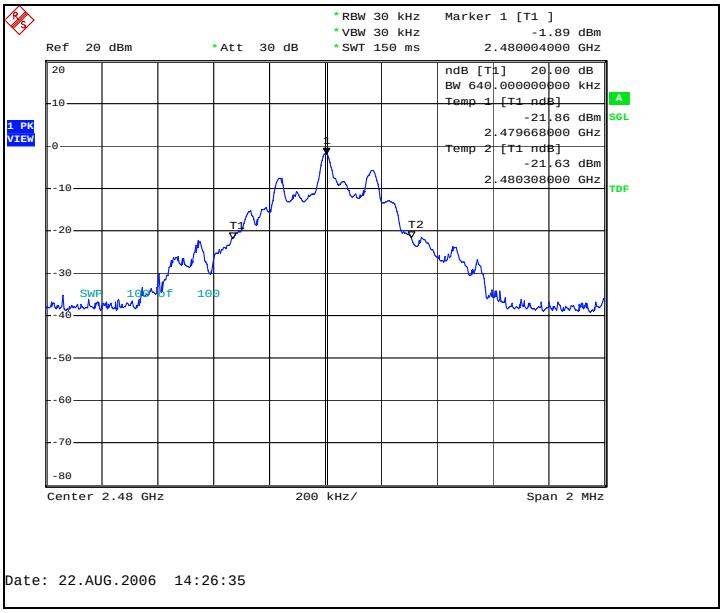
Channel 78 / 2480 MHz



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7. Carrier frequency separation

(FCC §15.247(a)(1), RSS-210 A8.1 (2))

EUT with DUT number	RM-140 dut 27864, BP-5M dut 27865
Accessories with DUT numbers	AC-3E dut 27860, HS-60 dut 27866
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.5 / 46.5 1006.4
Date of measurements	14-08-2006
Measured by	Jan Engelbrechtsen

7.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

Limits for carrier frequency separation measurements

Limit [MHz]
≥ 0.025 or 2/3 of the 20 dB bandwidth

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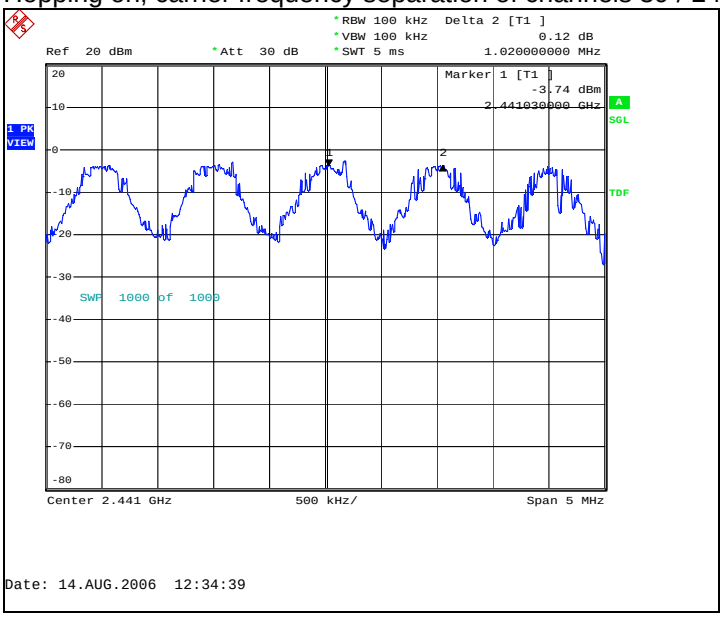
7.2. Bluetooth Test results

7.2.1 GFSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
1020	Passed

Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



7.2.2 8DPSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
990	Passed

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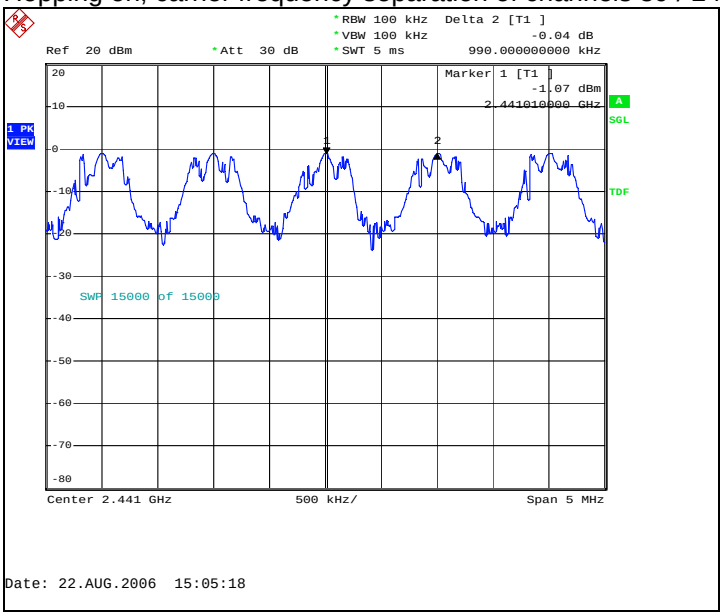
Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



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8. Number of hopping frequencies

(FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))

EUT with DUT number	RM-140 dut 27864, BP-5M dut 27865
Accessories with DUT numbers	AC-3E dut 27860, HS-60 dut 27866
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.5 / 46.5 1006.4
Date of measurements	14-08-2006
Measured by	Jan Engelbrechtsen

8.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

Limits for number of hopping frequencies measurements

Limit [number]
≥ 15

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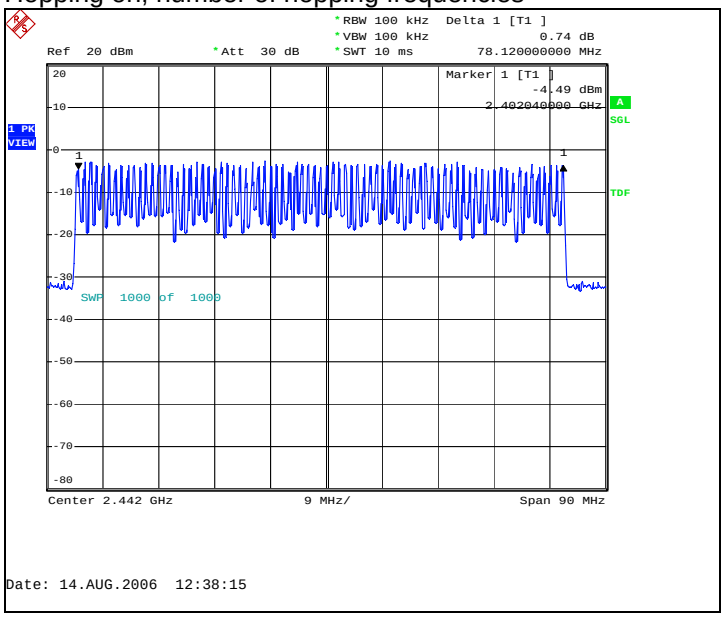
8.2. Bluetooth Test results

8.2.1 GFSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
79	Passed

Hopping on, number of hopping frequencies



8.2.2 8DPSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
79	

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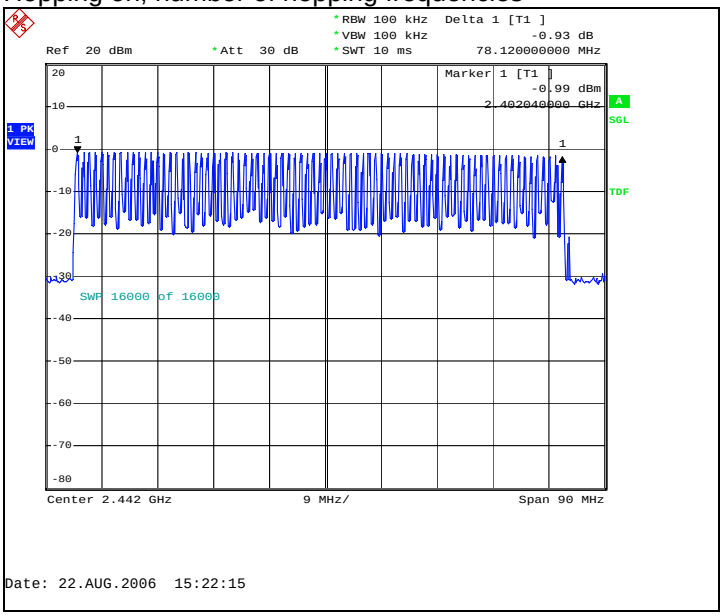
Hopping on, number of hopping frequencies



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9. Time of occupancy

(FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))

EUT with DUT number	RM-140 dut 27864, BP-5M dut 27865
Accessories with DUT numbers	AC-3E dut 27860, HS-60 dut 27866
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.5 / 46.5 1006.4
Date of measurements	14-08-2006
Measured by	Jan Engelbrechtsen

9.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210 as follows:

The total time of occupancy is get by multiplying the measured number of transmissions occurred during 31.6 second period with the duration of one transmission.

Limits for time of occupancy measurements

Limit [s]
≤ 0.4

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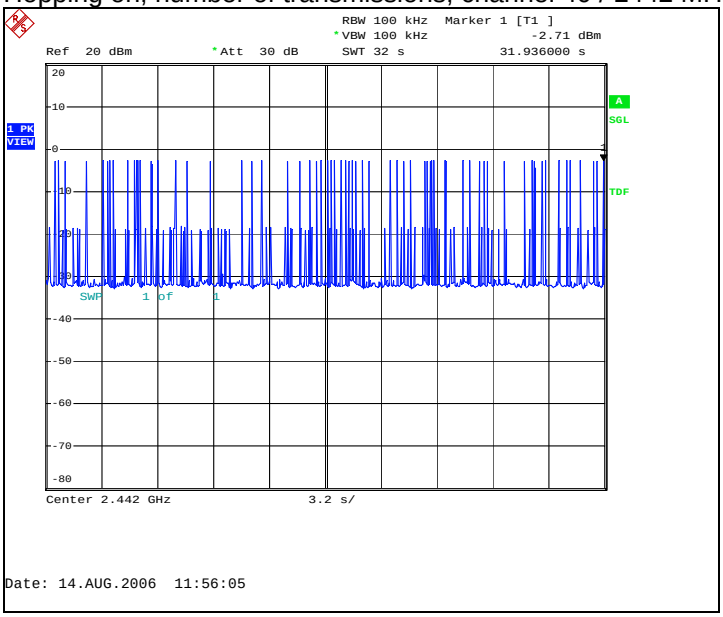
9.2. Bluetooth test results

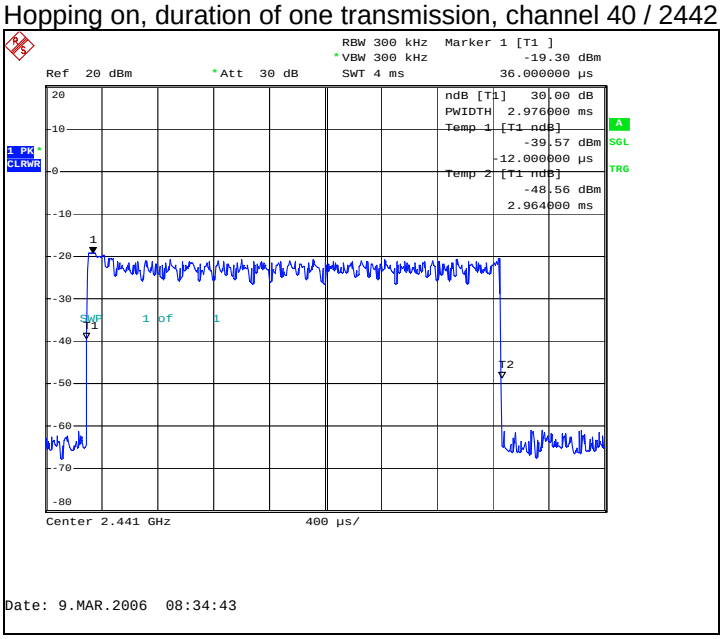
9.2.1 GFSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [µs]	Time of occupancy [s]	Result
63	2968.000	0.186984	

Hopping on, number of transmissions, channel 40 / 2442 MHz



Hopping on, duration of one transmission, channel 40 / 2442 MHz



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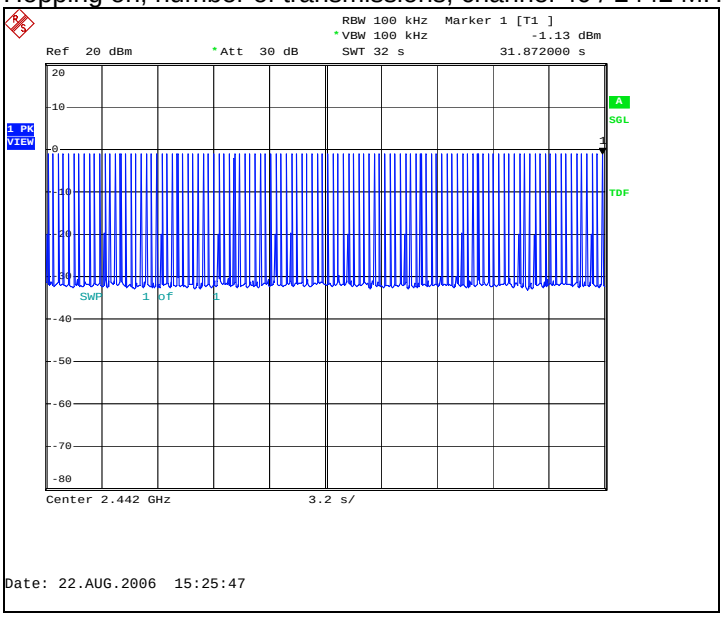
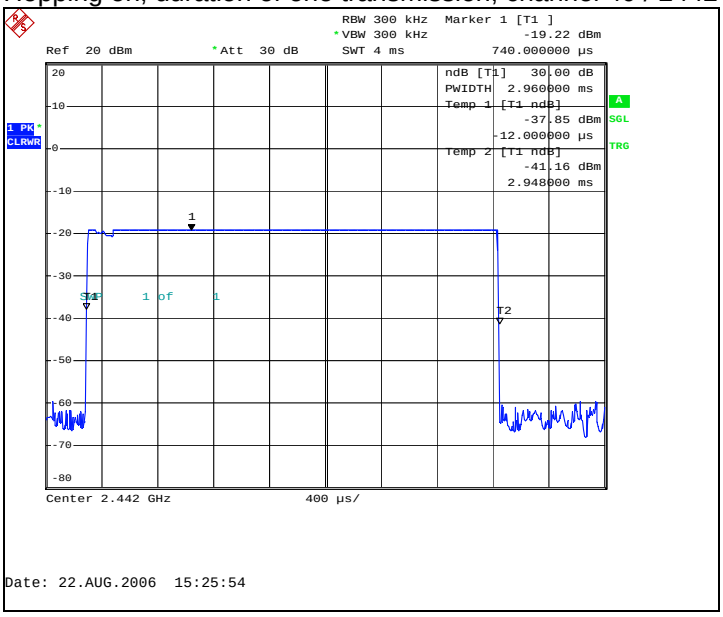
9.2.2 8DPSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [µs]	Time of occupancy [s]	Result
109	2960.000	0.322640	Passed

Hopping on, number of transmissions, channel 40 / 2442 MHz



Hopping on, duration of one transmission, channel 40 / 2442 MHz



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10. Test Equipment

10.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15B,15C
13513	Pulse Limiter 9KHz-30MHz	ESH3Z2	Rohde&Schwarz	15B,15C
13666	EMI Test Receiver 9KHz-2,5GHz	ESPC	Rohde&Schwarz	15B,15C
13935	Two Lines Artificial Mains Network	ESH3-Z5	Rohde&Schwarz	15B,15C
16995	Directional Coupler 20dB 0,5-2,0 GHz SMA Conn.	1538RA-20	Weinschel	15B,15C
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15B,15C
19171	Universal Radio Communication Tester	CMU200	Rohde&Schwarz	15B,15C
11386	System DC Power Supply	HP6632A	Hewlett Packard	22.24
11487	Network analyzer 300KHz-3,0GHz	HP8753A	Hewlett Packard	22.24
11584	Spectrum analyzer 50Hz-6,5GHz	HP8561B	Hewlett Packard	22.24
13134	Tracking generator	HP85645A	Hewlett Packard	22.24
13302	Spectrum Analyzer 9KHz-12.8GHz	HP8596E	Hewlett Packard	22.24
13371	Temperature Chamber	S-1,2C	Thermotron	22.24
13524	Digital Radiocomm. Tester	CMD55	Rohde&Schwarz	22.24
14807	S - Parameter Test Set 300KHz-6GHz	HP85047A	Hewlett Packard	22.24
15859	Digital Radio Communication Test Set	4201S	Wavetek	22.24
17277	Multimeter Digital 6 1/2 Digit	AT34401A	Agilent Technologies	22.24
17796	Radio Communication Test Set	4400M	Wavetek	22.24
19374	Resonant Dipole Antenna 850MHz SMA m Conn.	-	NMP Cph	22.24
19375	Resonant Dipole Antenna 1900MHz SMA m Conn.	-	NMP Cph	22.24
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15B,15C

10.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
14020	Programmable Relay Switching System	-	Pickering	15B,15C,22,24
18792	Multi Device Controller	2090	ETS-EMCO	15B,15C,22,24
13829	Turntable Controller	4630-100	Comtest	15B,15C,22,24
14963	RF Preamplifier 100MHz-4GHz (Metal Chassis)	AFS3-00100400	Miteq/NMP Cph	15B,15C,22,24
13668	BiLog Antenna 30-2000MHz	BiLog-CBL6112A	Chase	15B,15C,22,24
18861	EMI Test Receiver 20Hz-26,5GHz	ESI	Rohde&Schwarz	15B,15C,22,24
12679	Dual Log Periodic Antenna 1-18 GHz	HL025	Rohde&Schwarz	15B,15C,22,24
18860	Ultra Broadband Antenna	HL562	Rohde&Schwarz	15B,15C,22,24

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Eq. No	Equipment	Type	Manufacturer	Used in
	Ultralog 30-3000MHz			
18773	Shielded Chamber	RFD-100	ETS-Lindgren	15B,15C,22,24
18774	Shielded Chamber	RFSD-F/A-100	ETS-Lindgren	15B,15C,22,24
18324	High Pass Filter 3GHz SMA f Conn	WHJS3000-10SS	Wainwright	15B,15C,22,24
14114	Highpass Filter 1000MHz-4500MHz	WHK1000-12SS	Wainwright	15B,15C,22,24
13918	Highpass Filter 2000-4000MHz 50OHM SMA Conn	WHKS2000-10SS	Wainwright Instruments	15B,15C,22,24
13937	Ultra Stable Notch Filter 902,4MHz	WRCA902.4-0.2/40-6SS	Wainwright Instruments	15B,15C,22,24
13936	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	15B,15C,22,24
13917	Highpass Filter 1000-3000MHz 50OHM SMA Conn	WHKS1000-10SS	Wainwright Instruments	15B,15C,22,24
14188	Ultra Stable Notch Filter 902,4MHz	WRCA902.4-0.2/40-6SS	Wainwright	15B,15C,22,24
14187	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright	15B,15C,22,24
16633	Ultra Stable Notch Filter 1880,0MHz	WRCD1880.0-0.2/40-10SS	Wainwright	15B,15C,22,24
18323	Band reject filter 1947-1953MHz 40dB	WRCG1947/1953-1940/1960-40/6SS	Wainwright	15B,15C,22,24
15190	Infra Red Remote Control Unit	4630	Emco	22,24,15B,15C
14993	EMI Test Receiver 9KHz-2750MHz	ESCS30	Rohde&Schwarz	22,24,15B,15C
15191	Turntable Contoller Unit	G-800SDX	YAESU	22,24,15B,15C
14900	Antenna Controller	HD100	HD GmbH	22,24,15B,15C

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