TCC Nokia

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

FCC Part 15C Compliance Test Report

Test Report no.:	Cph_FCC_0701_06.doc	**Date of Report:**	02-01-2007
Number of pages:	46	**Customer's Contact person:**	Timo Seppälä
Testing laboratory:	TCC Nokia Copenhagen Laboratory Frederikskaj 1790 COPENHAGEN V DENMARK Tel. +45 33 292929 Fax. +45 33 292934	**Customer:**	Nokia Corporation P.O. Box 86 Joensuunkatu 7 FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 44277
FCC listing no.: **IC recognition no.:**	99059 4820 and 4820-1		
Tested devices/ accessories:	**Phone: RM-227 (HW: 2004), Battery: BP-4L, Headset: HS-23 AC Charger: AC-3**		
FCC ID:	PYARM-227	**IC:**	661V-RM227
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 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:	Test Engineer	Digitally signed by Allan Franch Henriksen DN: cn=Allan Franch Henriksen, c=DK, o=Nokia, ou=CertMT, email=allan.f.henriksen@nokia.com Date: 2007.01.02 12:07:00 +01'00'	

Allan F. Henriksen, Engineer

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	30-11-2006
Testing completed	02-01-2007
The customer's contact person	Timo Seppälä
Test Plan referred to	T:\Projects\RM-294\TestPlan_RS\RS_Testplan_RM-294.xls
Notes	None
Document name	T:\Projects\RM-294\EMC\Results\FCC\Cph_FCC_0649_01.doc

1.1. EUT and Accessory Information

The EUT is a 4-band (GSM850/900/1800/1900) mobile phone with Bluetooth and WLAN. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-227	004400/96/165032/0	1.0633.08.01	-	2004	29109
Phone	RM-227	004400/96/164417/4	1.0633.08.01	-	2004	27777
Battery	BP-4L	Proto 4/06wk28/Tue	-	-	-	27763
Battery	BP-4L	Proto4 WK28 Tue	-	-	-	27761
Headset	HS-23	FM2550741Q	-	-	-	28104
AC Charger	AC-3E	399791547205120576 8;0675370	1.3	1.1	-	27766

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	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 powerline 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

WLAN:

Section in CFR 47	Section in RSS-210	Name of the test	Result
15.247(b)(1)	A8.4 (4)	Conducted 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 powerline conducted emissions	Passed
15.247(a)(2)	A8.2 (1)	6 dB bandwidth	Passed
15.247(e)	A8.2 (2)	Power spectral density	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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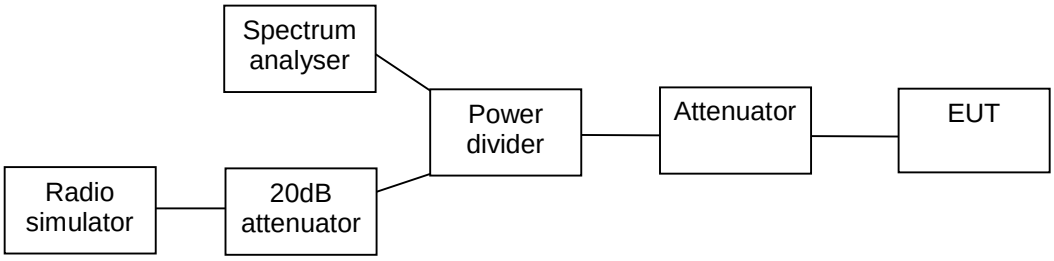
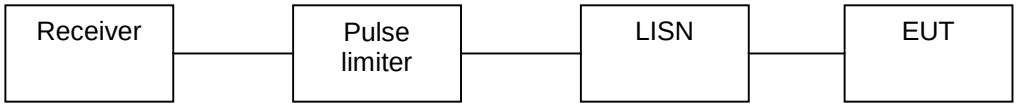
2. Test setups

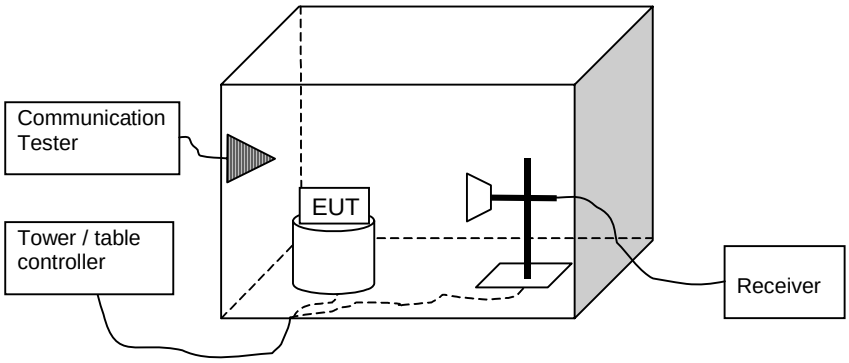
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Spurious radiated emissions test setup



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3. Conducted peak output power

(FCC §15.247(b)(1), RSS-210 A8.4 (2))

EUT with DUT number	RM-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	25.1 / 32.0 993.9
Date of measurements	5-12-2006
Measured by	Jan Engelbrechtsen

3.1. Test method and limit

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

Limits for conducted peak output power measurements

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

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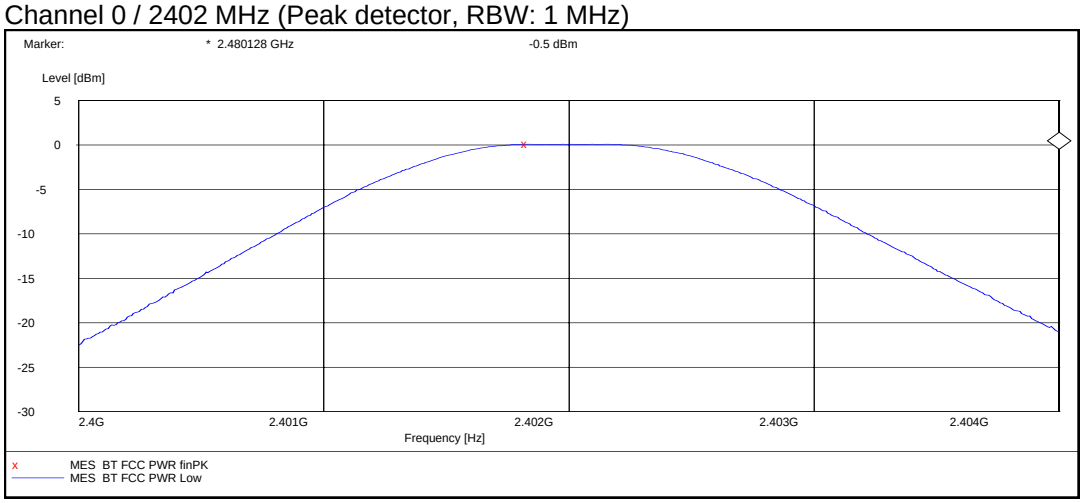
3.2. Bluetooth Test results

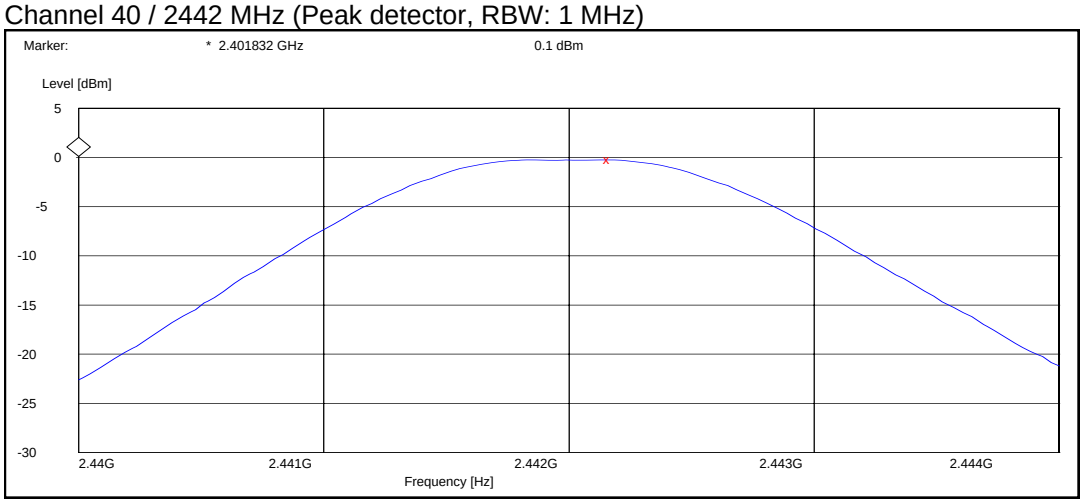
3.2.1 GFSK modulation, PRBS packet type

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
0 / 2402	0.10	1.023	Passed
40 / 2442	-0.20	0.955	Passed
78 / 2480	-0.50	0.891	Passed

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



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



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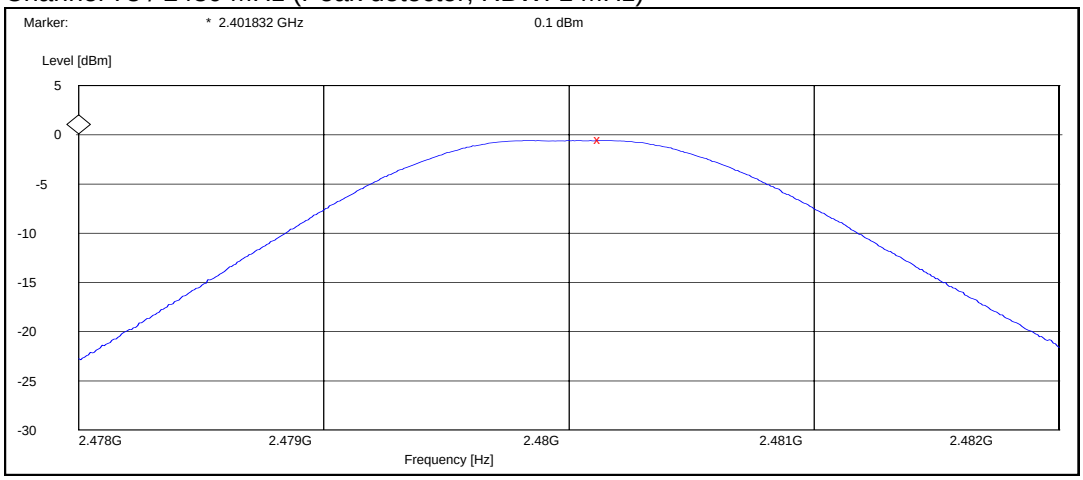
Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz)



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4. Spurious RF conducted emissions
(FCC §15.247(c), RSS-A8.5)

EUT with DUT number	RM-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	25.1 / 32.0 993.9
Date of measurements	5-12-2006
Measured by	Jan Engelbrechtsen

4.1. Test method and limit

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

Limits for spurious RF conducted emissions measurements

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

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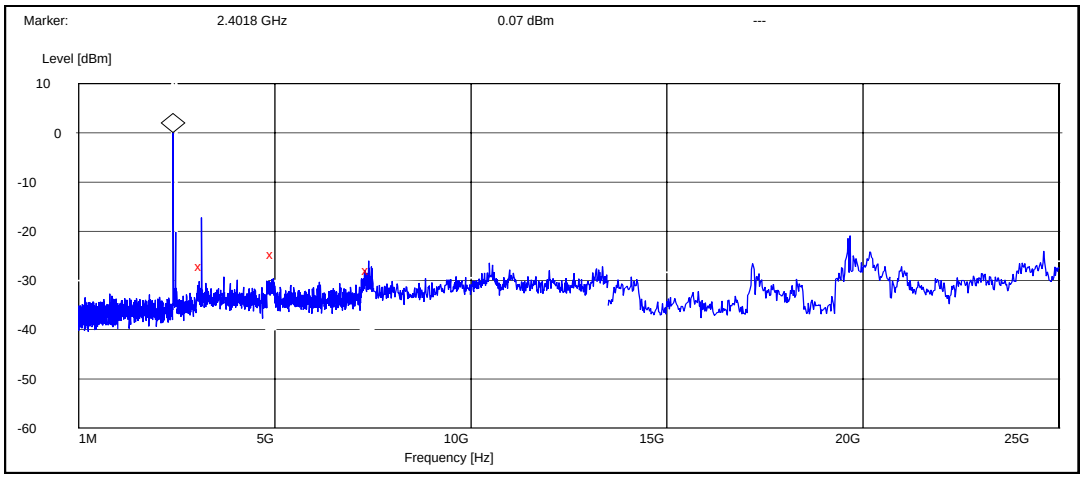
4.2. Bluetooth Test results

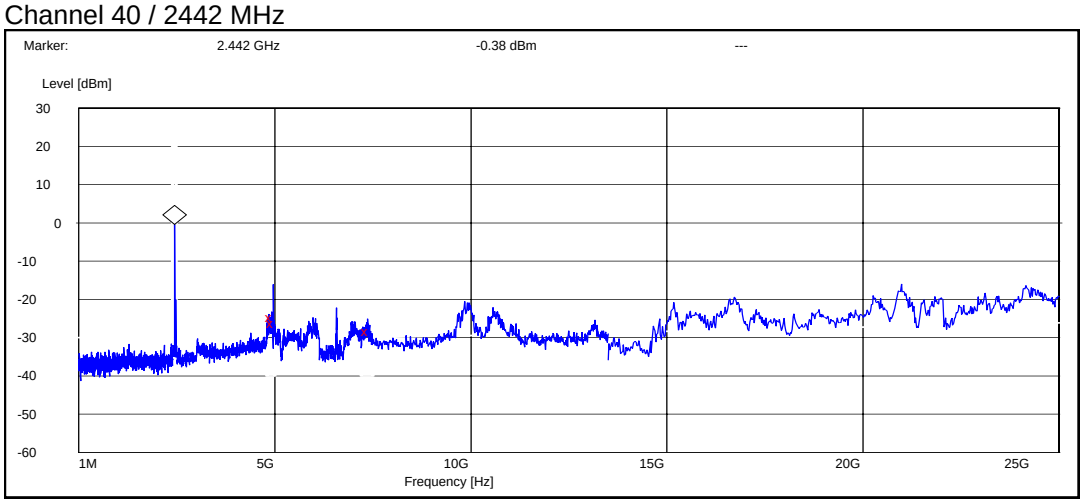
4.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



Frequency [MHz]	P [dBc]	Result
3134.800000	-27.167111	Passed
4957.600000	-24.767111	Passed
7399.800000	-27.967111	Passed

Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4926.000000	-24.417552	Passed
4965.600000	-25.917552	Passed
7363.200000	-28.017552	Passed

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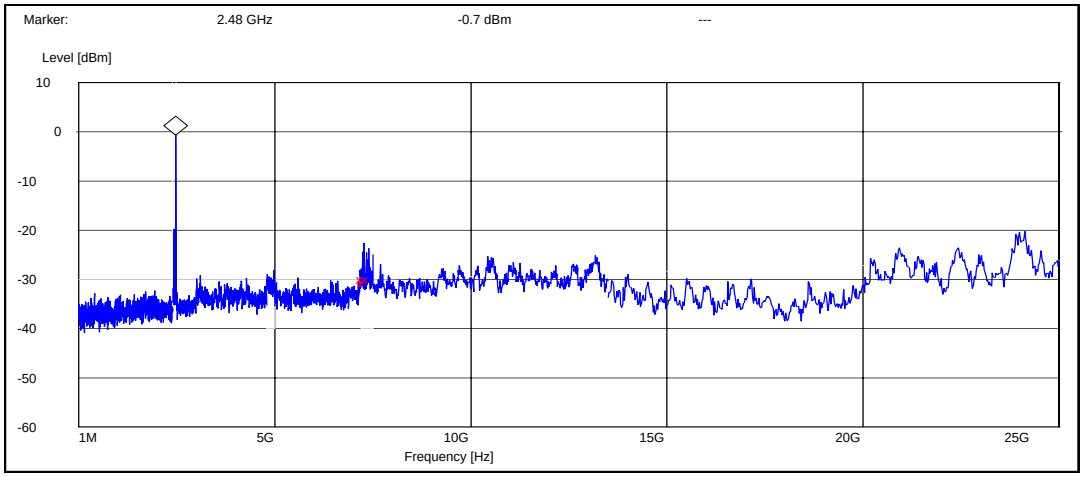
Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
7248.600000	-29.295040	Passed
7275.600000	-30.095040	Passed
7393.200000	-29.295040	Passed

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5. AC powerline conducted emissions
(FCC §15.207, RSS-GEN 7.2.2)

EUT with DUT number	RM-227 Dut 29109
Accessories with DUT numbers	BP-4L Dut # 27763 + AC-4E Dut # 27778 + HS-23 Dut # 27772
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23.4 / 45.0 998.0
Date of measurements	04-12-2006
Measured by	Allan F. Henriksen

5.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-GEN as follows:

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

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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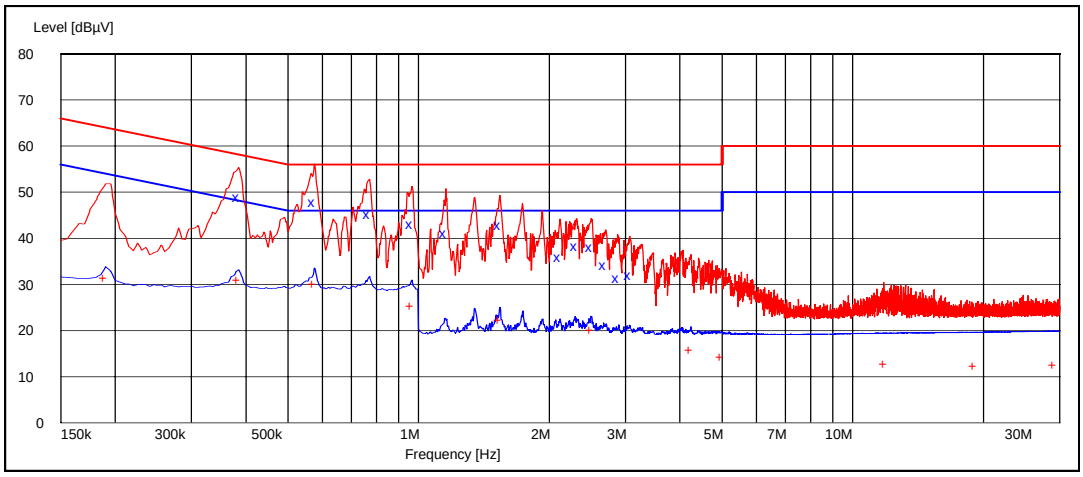
5.2. Bluetooth Test results

5.2.1 GFSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.385000	48.90	L1	Passed
0.575000	47.90	L1	Passed
0.770000	45.20	L1	Passed
0.965000	43.10	L1	Passed
1.155000	41.20	L1	Passed
1.540000	43.00	N	Passed
2.120000	36.00	L1	Passed
2.315000	38.40	N	Passed
2.505000	38.10	N	Passed
2.700000	34.10	L1	Passed
2.885000	31.40	L1	Passed
3.075000	32.00	L1	Passed

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.190000	31.30	L1	Passed
0.385000	31.00	N	Passed
0.575000	30.20	N	Passed
0.965000	25.20	N	Passed
1.540000	22.30	N	Passed
2.505000	20.20	N	Passed
4.245000	15.70	N	Passed
5.000000	14.20	N	Passed
11.905000	12.80	L1	Passed
19.125000	12.30	L1	Passed
29.225000	12.60	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-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	25.1 / 32.0 993.9
Date of measurements	5-12-2006
Measured by	Jan Engelbrechtsen

6.1. Test method and limit

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

Limits for 20 dB bandwidth measurements

Limit [MHz]
N/A

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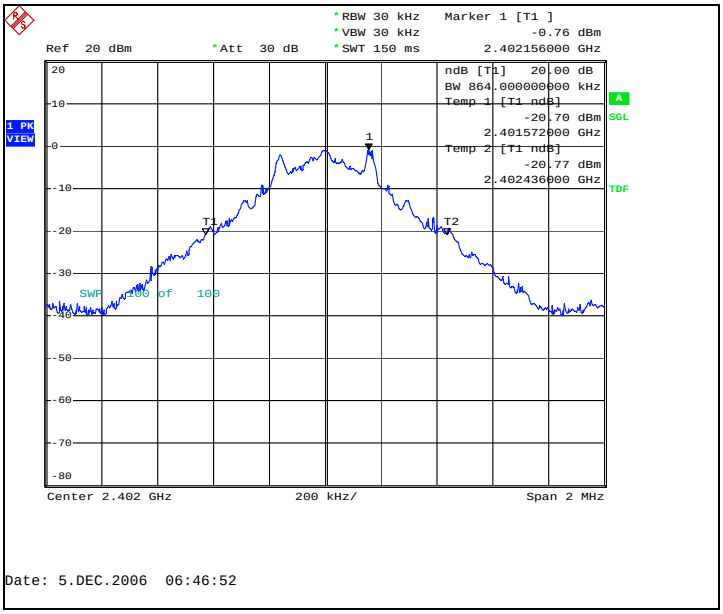
6.2. Bluetooth Test results

6.2.1 GFSK modulation, PRBS packet type

Channel / f_C [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	864.000	Passed
40 / 2442	892.000	Passed
78 / 2480	876.000	Passed

Channel 0 / 2402 MHz



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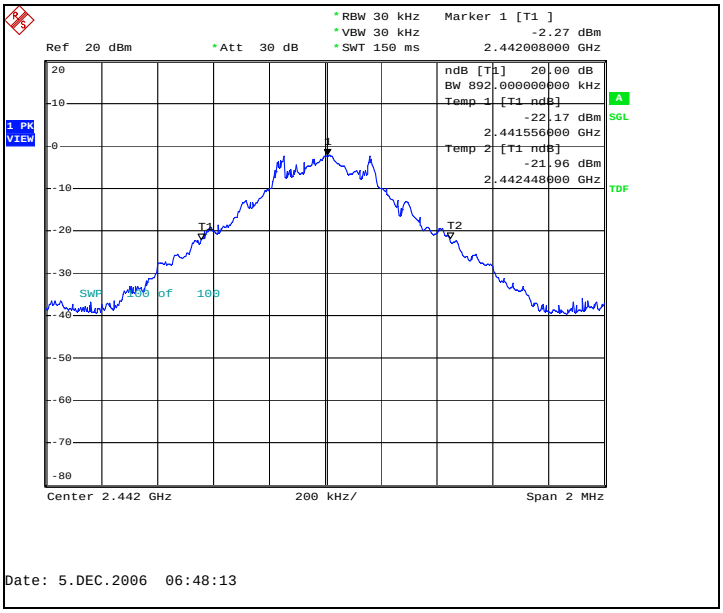
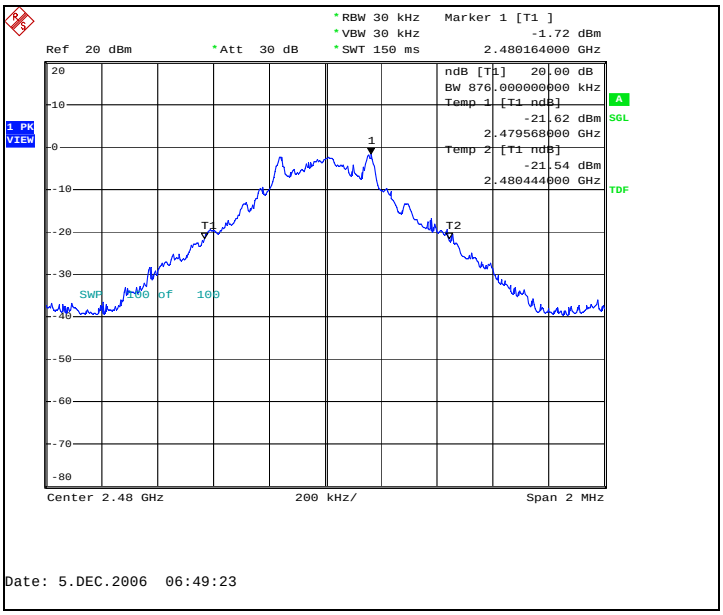
Channel 40 / 2442 MHz



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-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	25.1 / 32.0 993.9
Date of measurements	5-12-2006
Measured by	Jan Engelbrechtsen

7.1. Test method and limit

The measurement is made according to Public notice DA 00-705 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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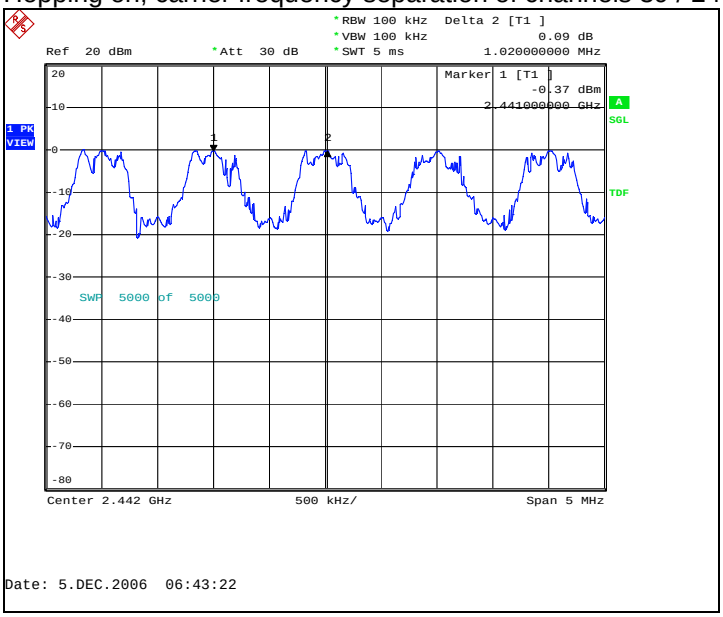
7.2. Bluetooth Test results

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



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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-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	25.1 / 32.0 993.9
Date of measurements	4-12-2006
Measured by	Jan Engelbrechtsen

8.1. Test method and limit

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

Limits for number of hopping frequencies measurements

Limit [number]
≥ 15

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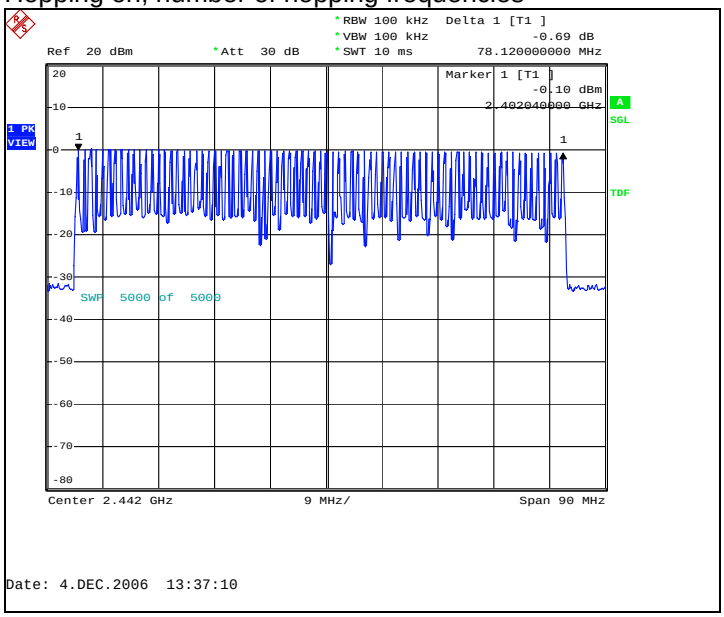
8.2. Bluetooth Test results

8.2.1 GFSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
79	Passed

Hopping on, number of hopping frequencies



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9. Time of occupancy

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

EUT with DUT number	RM-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.6 / 34.0 998.0
Date of measurements	4-12-2006
Measured by	Jan Engelbrechtsen

9.1. Test method and limit

The measurement is made according to Public notice DA 00-705 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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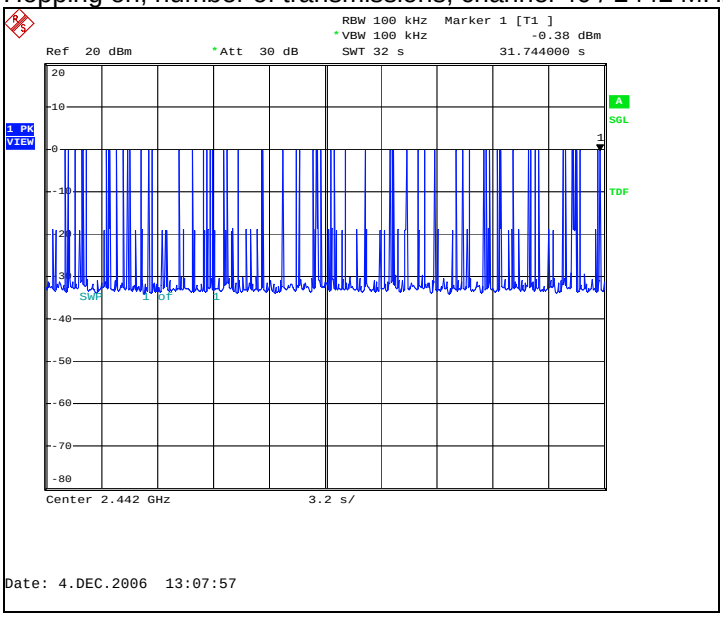
9.2. Bluetooth test results

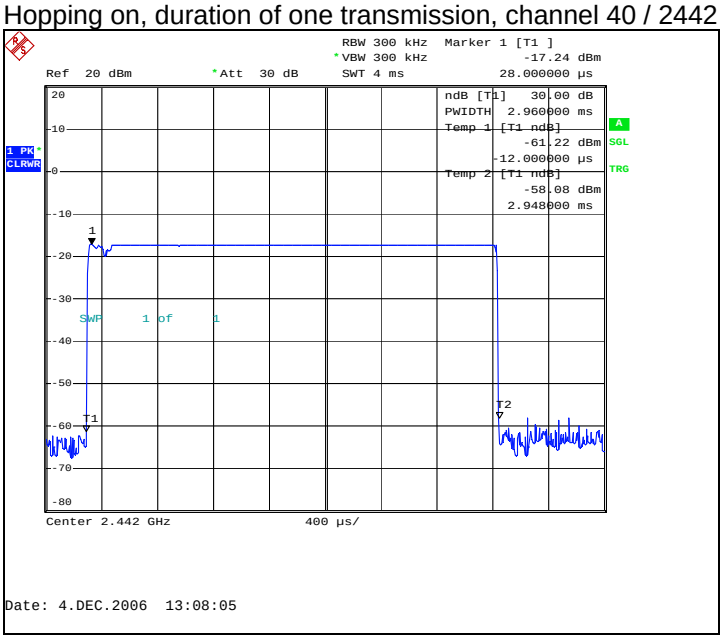
9.2.1 GFSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [µs]	Time of occupancy [s]	Result
61	2960.000	0.180560	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. Conducted peak output power

(FCC §15.247(b)(1), RSS-210 A8.4 (4))

EUT with DUT number	RM-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	25.1 / 32.0 993.9
Date of measurements	5-12-2006
Measured by	Jan Engelbrechtsen

10.1. Test method and limit

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

Limits for conducted peak output power measurements

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

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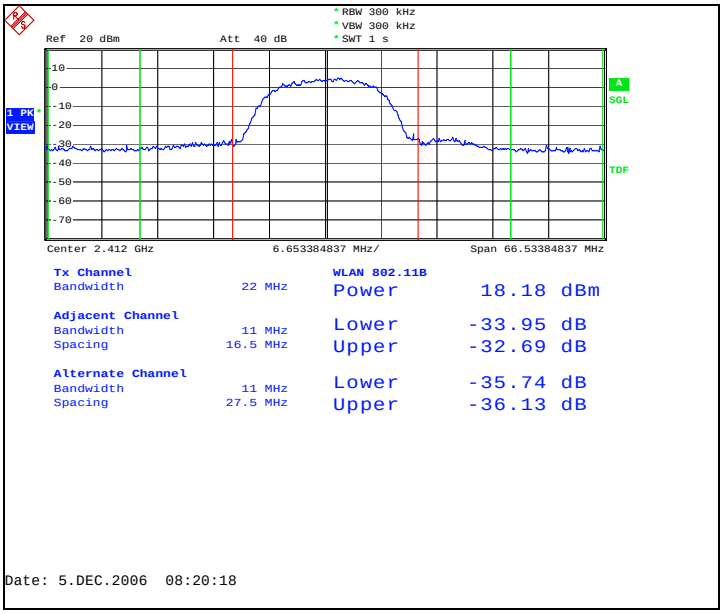
10.2. WLAN Test results

10.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [W]	Result
1 / 2412	18.18	0.066	Passed
7 / 2442	17.84	0.061	Passed
11 / 2462	17.43	0.055	Passed

Channel 1 / 2412 MHz



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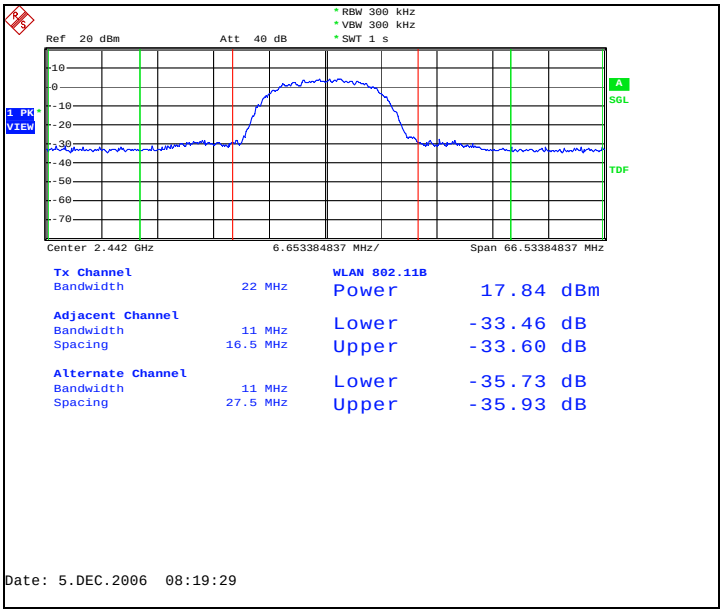
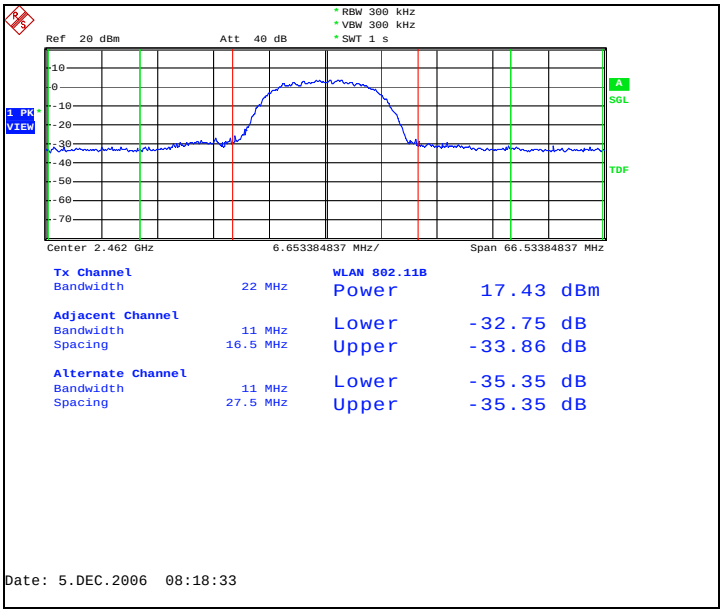
Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



10.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [W]	Result
1 / 2412	15.71	0.037	Passed
7 / 2442	15.64	0.037	Passed
11 / 2462	15.23	0.033	Passed

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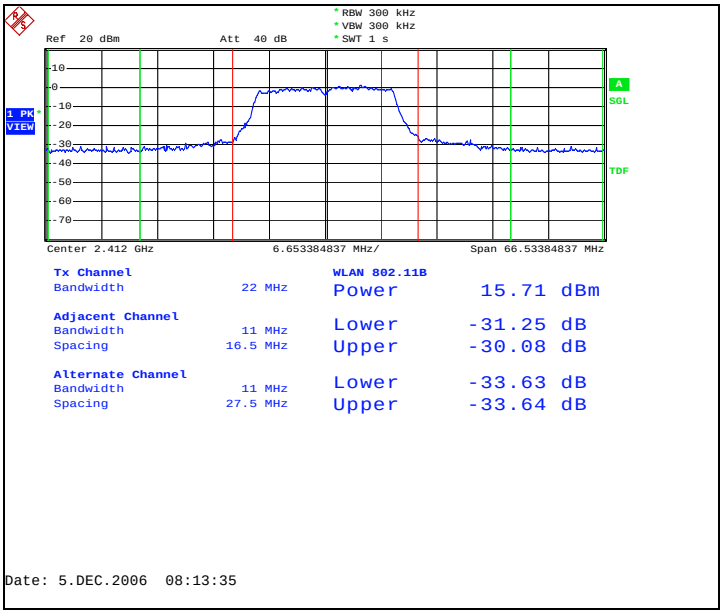
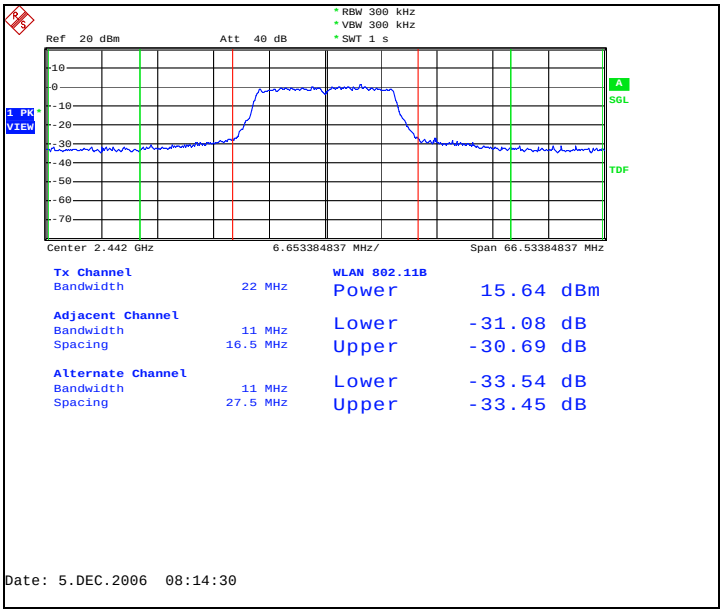
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



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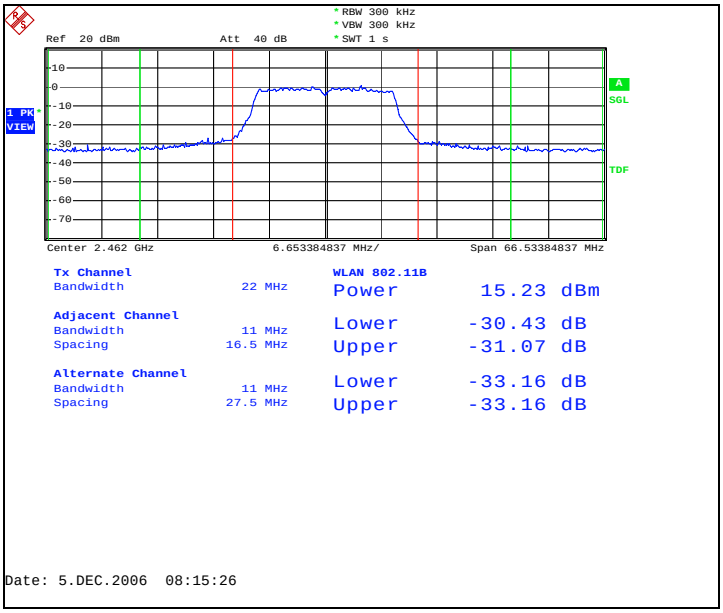
Channel 11 / 2462 MHz



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11. Spurious RF conducted emissions

(FCC §15.247(c), RSS-210 A8.5)

EUT with DUT number	RM-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	25.1 / 32.0 993.9
Date of measurements	5-12-2006
Measured by	Jan Engelbrechtsen

11.1. Test method and limit

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

Limits for spurious RF conducted emissions measurements

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

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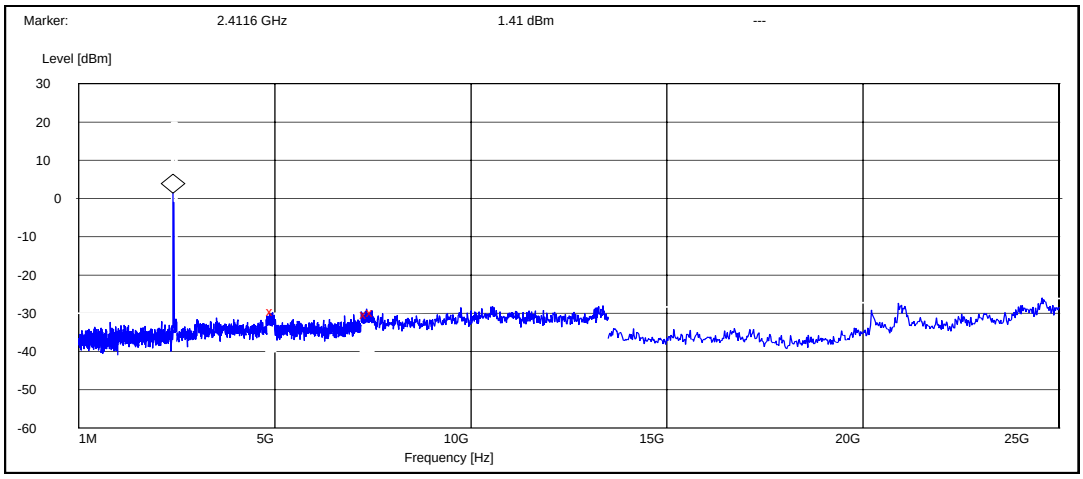
11.2. WLAN Test results

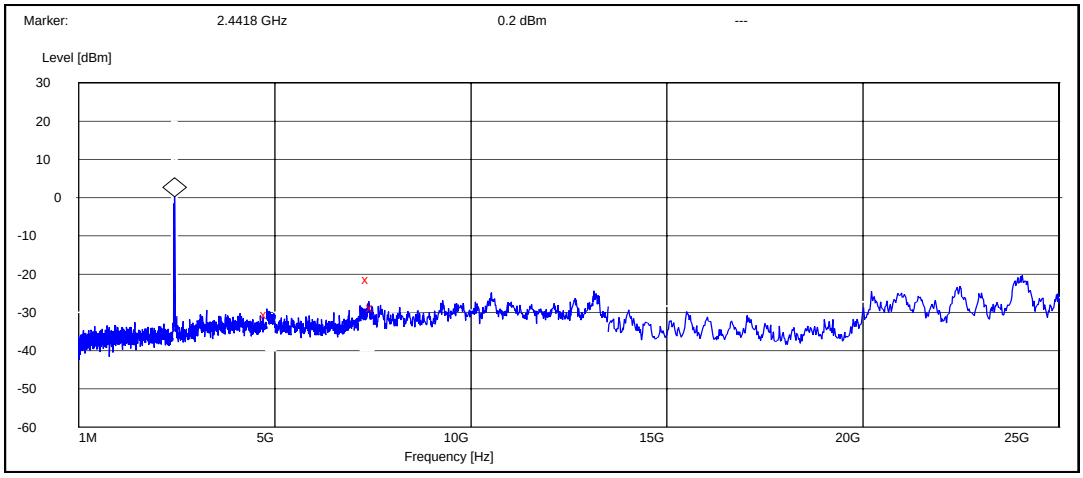
11.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 1 / 2412 MHz



Frequency [MHz]	P [dBc]	Result
4949.200000	-31.012415	Passed
7336.800000	-31.612415	Passed
7500.000000	-31.112415	Passed

Channel 7 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4802.400000	-30.800327	Passed
7389.600000	-21.600327	Passed
7500.000000	-29.000327	Passed

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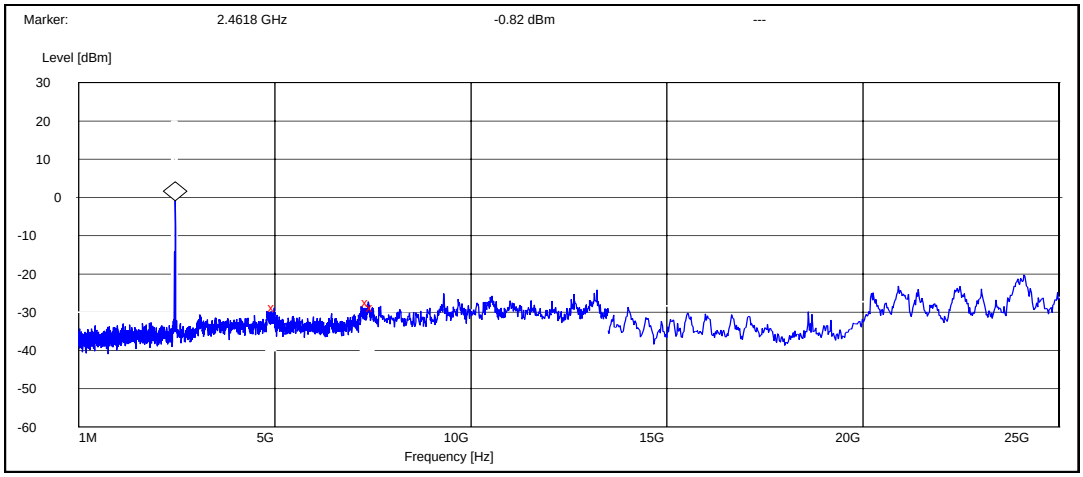
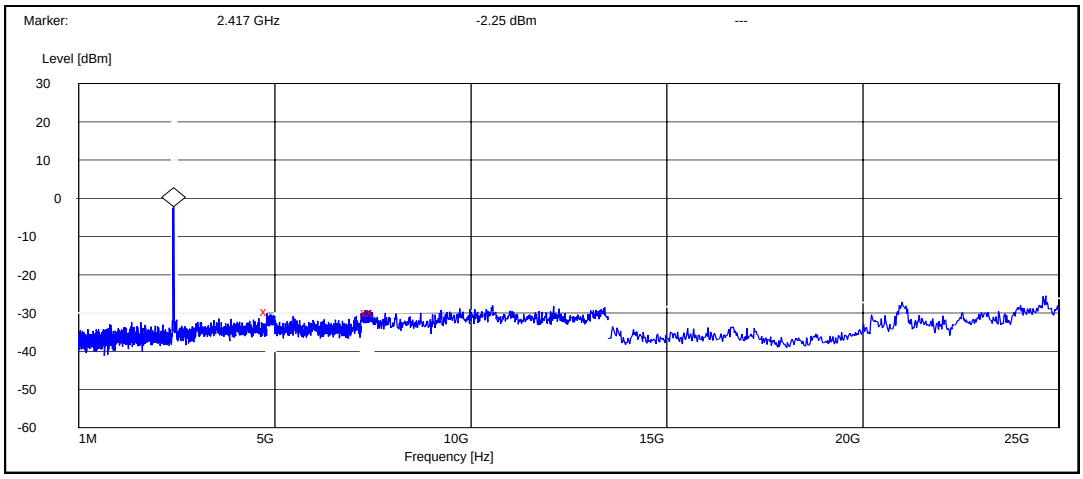
Channel 11 / 2462 MHz



Frequency [MHz]	P [dBc]	Result
4988.400000	-27.978880	Passed
7387.800000	-26.578880	Passed
7500.000000	-27.778880	Passed

11.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 1 / 2412 MHz



Frequency [MHz]	P [dBc]	Result
4802.000000	-27.452177	Passed
7353.000000	-27.652177	Passed
7500.000000	-27.652177	Passed

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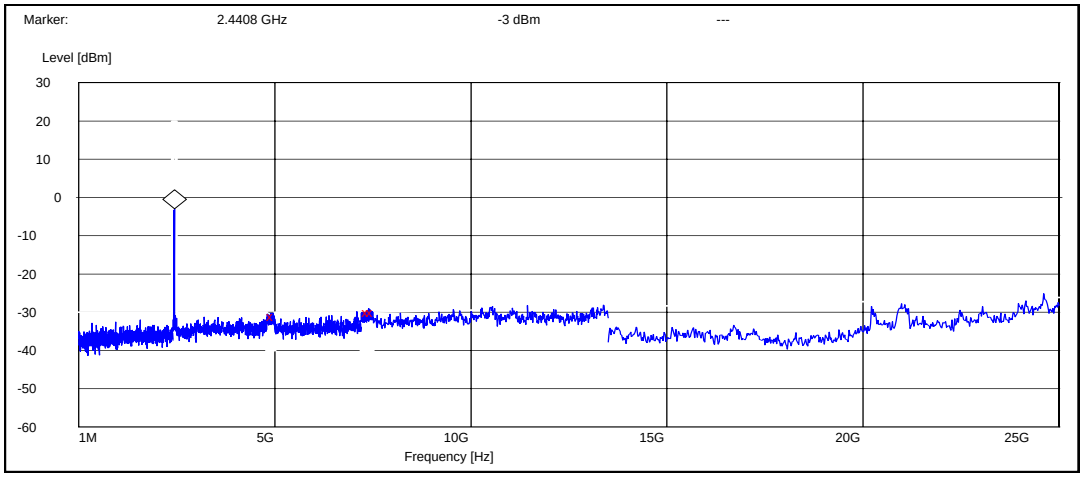
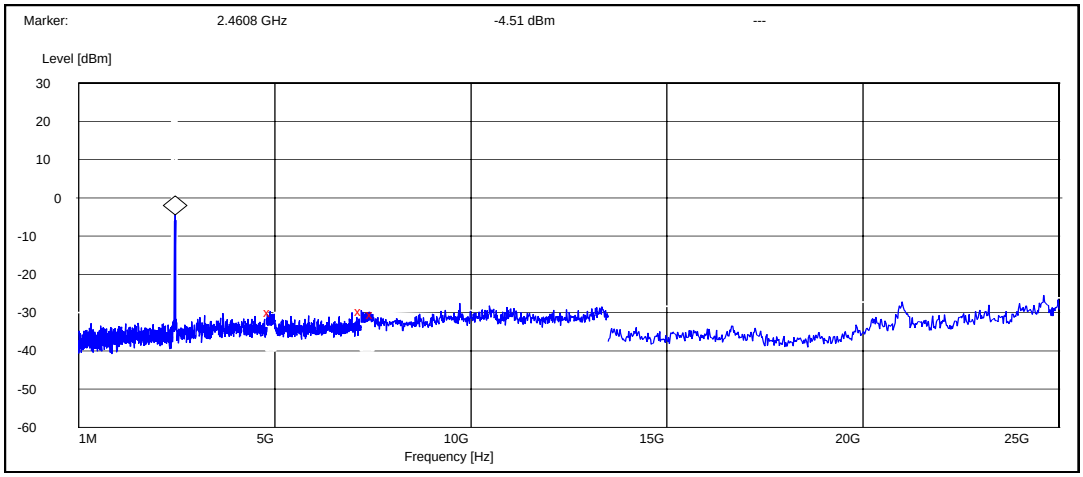
Channel 7 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4957.600000	-28.095136	Passed
7401.600000	-26.995136	Passed
7500.000000	-26.895136	Passed

Channel 11 / 2462 MHz



Frequency [MHz]	P [dBc]	Result
4875.200000	-25.394779	Passed
7206.000000	-25.194779	Passed
7500.000000	-26.094779	Passed

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12. AC powerline conducted emissions

(FCC §15.207, RSS-GEN 7.2.2)

EUT with DUT number	RM-227 Dut # 29109
Accessories with DUT numbers	BP-4L Dut # 27763 + AC-4E Dut # 27778 + HS-23 Dut # 27772
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	23.4 / 45.0 998.0
Date of measurements	04-12-2006
Measured by	Allan F. Henriksen

12.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-GEN as follows:

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

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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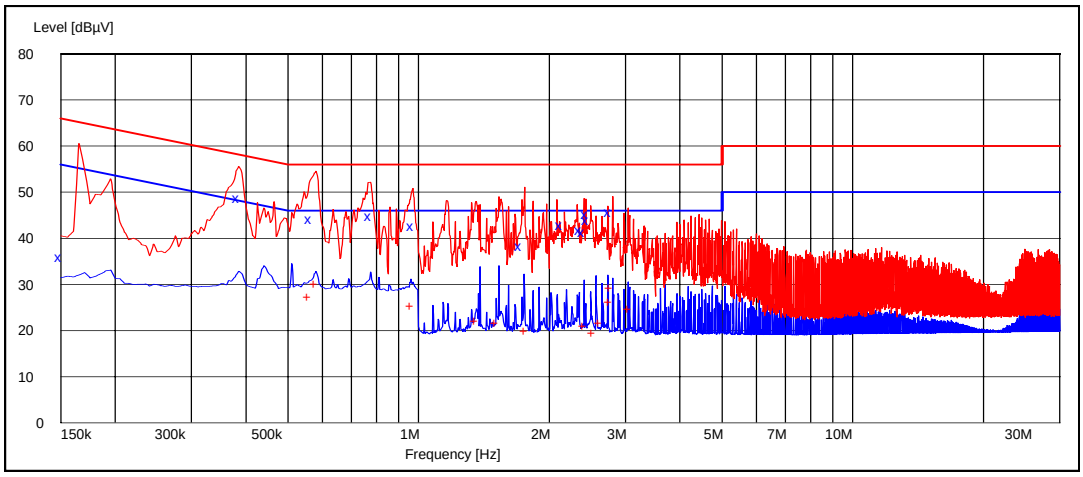
12.2. WLAN Test results

12.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 7 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.150000	35.90	L1	Passed
0.385000	48.80	L1	Passed
0.565000	44.20	L1	Passed
0.775000	44.90	L1	Passed
0.970000	42.70	L1	Passed
1.720000	38.30	N	Passed
2.135000	42.90	N	Passed
2.365000	41.80	N	Passed
2.405000	41.40	N	Passed
2.450000	45.20	N	Passed
2.455000	43.90	N	Passed
2.770000	45.60	N	Passed

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.560000	27.30	N	Passed
0.580000	30.20	N	Passed
0.965000	25.30	N	Passed
1.360000	22.00	N	Passed
1.515000	21.50	N	Passed
1.770000	19.90	N	Passed
2.415000	20.90	L1	Passed
2.535000	19.50	L1	Passed
2.625000	21.60	L1	Passed
2.770000	26.10	N	Passed
2.775000	29.30	N	Passed
3.070000	24.70	N	Passed

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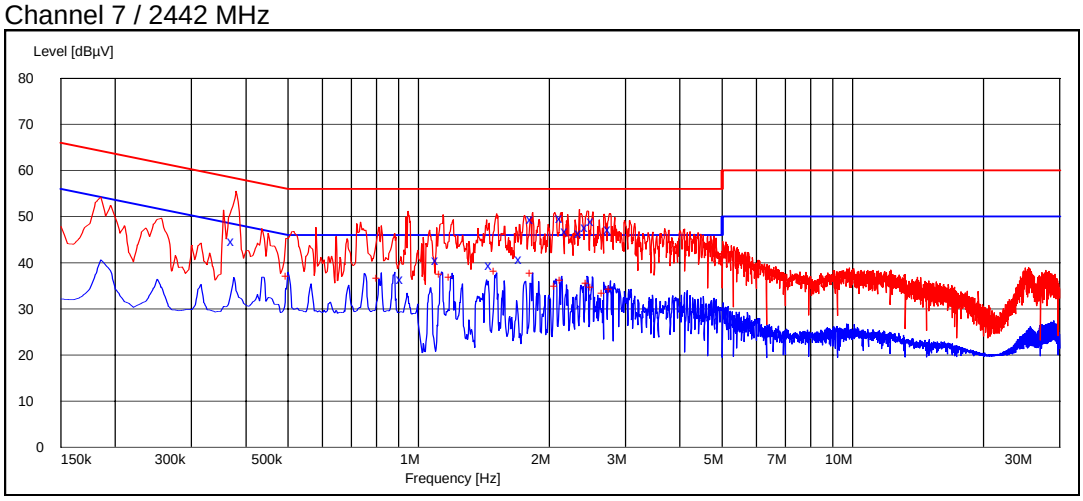
12.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 7 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.375000	44.80	L1	Passed
0.920000	36.40	L1	Passed
1.110000	40.60	L1	Passed
1.470000	39.40	L1	Passed
1.725000	40.90	N	Passed
1.830000	49.50	N	Passed
2.145000	49.70	N	Passed
2.205000	46.90	N	Passed
2.370000	46.40	N	Passed
2.450000	47.80	N	Passed
2.525000	49.10	N	Passed
2.765000	47.20	N	Passed

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.500000	37.10	N	Passed
0.810000	36.60	N	Passed
1.130000	37.60	N	Passed
1.190000	36.90	N	Passed
1.510000	38.30	N	Passed
1.825000	37.70	N	Passed
2.075000	34.90	N	Passed
2.140000	36.30	N	Passed
2.455000	35.50	N	Passed
2.520000	34.80	N	Passed
2.675000	33.30	N	Passed
2.775000	34.20	N	Passed

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13. 6 dB bandwidth

(FCC §15.247(a)(2), RSS-210 A8.2 (1))

EUT with DUT number	RM-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	25.1 / 32.0 993.9
Date of measurements	5-12-2006
Measured by	Jan Engelbrechtsen

13.1. Test method and limit

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

Limits for 6 dB bandwidth measurements

Limit [kHz]
≥ 500

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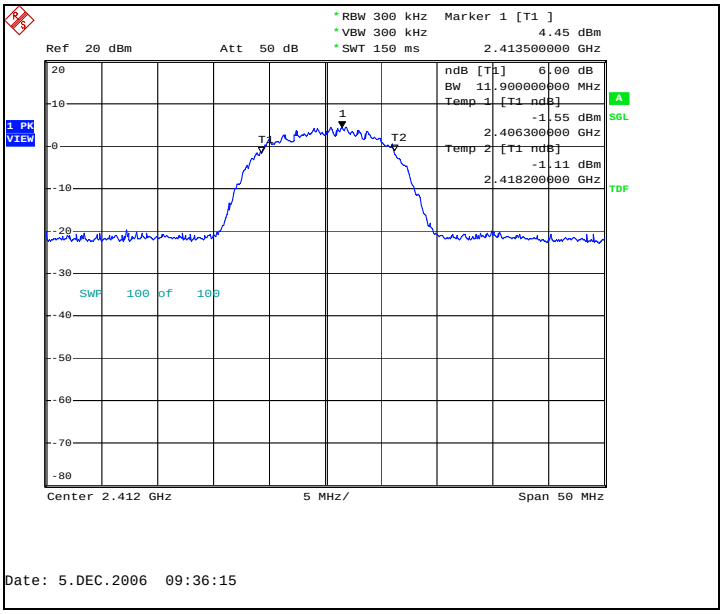
13.2. WLAN test results

13.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1	11900.000	Passed
7	12200.000	Passed
11	12500.000	Passed

Channel 1 / 2412 MHz



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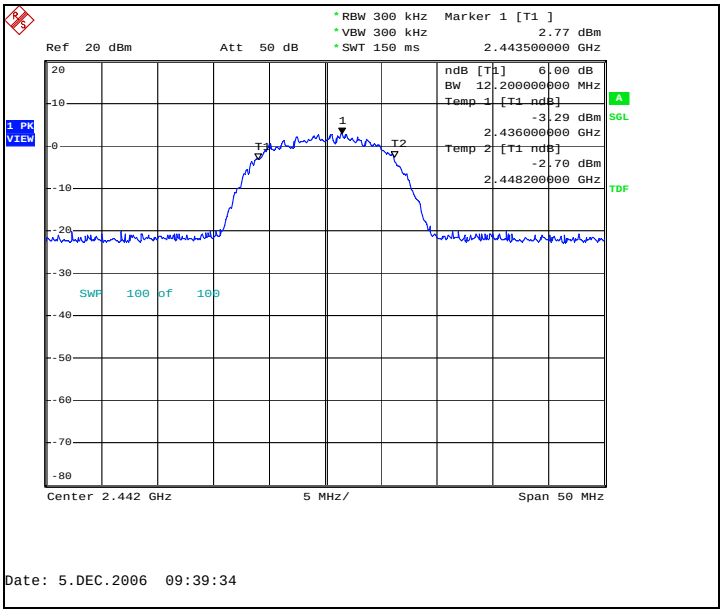
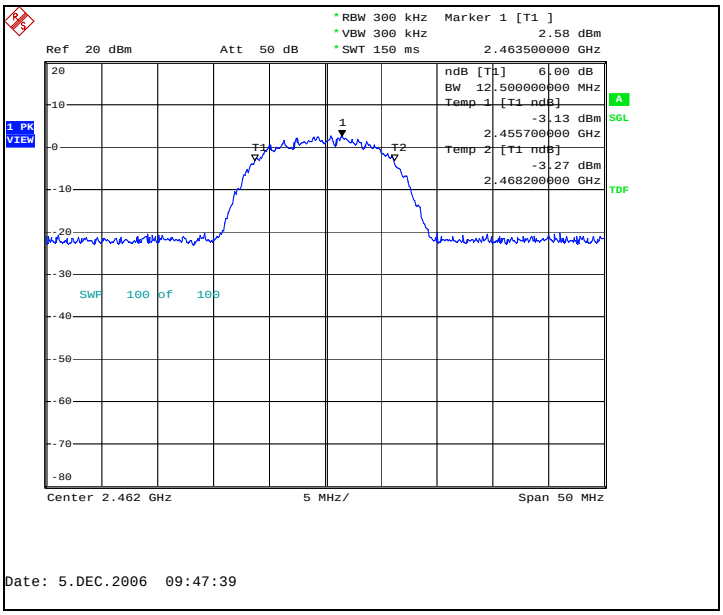
Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



13.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1	16400.000	Passed
7	16500.000	Passed
11	16500.000	Passed

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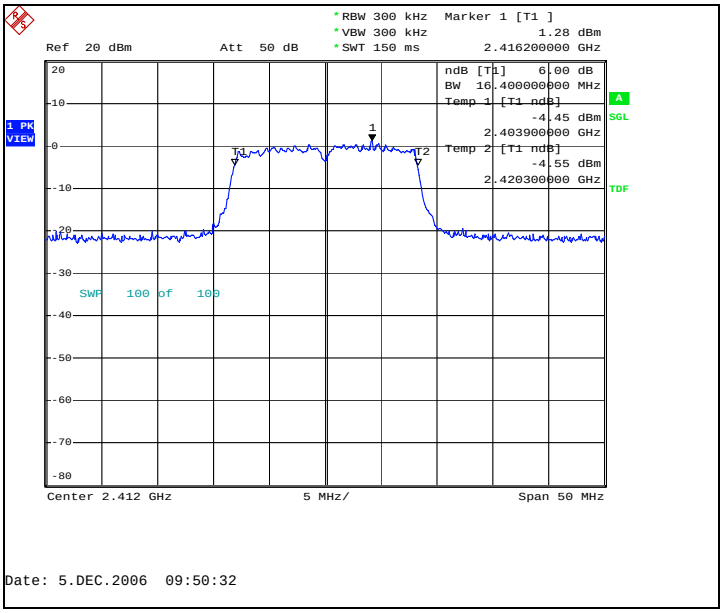
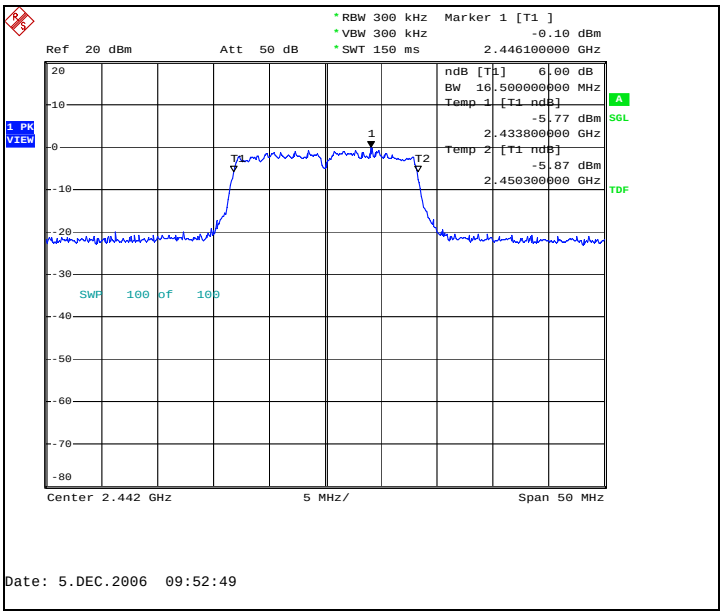
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



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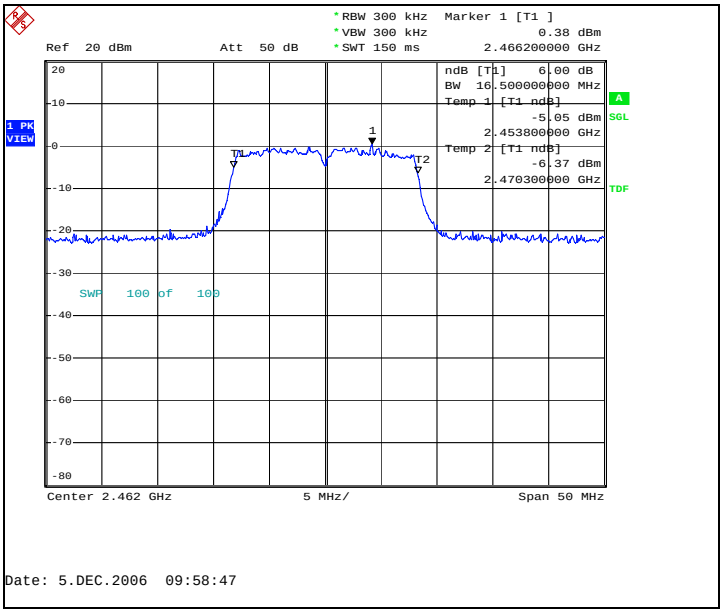
Channel 11 / 2462 MHz



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14. Power spectral density
(FCC §15.247(e), RSS-210 A8.2 (2))

EUT with DUT number	RM-227 dut 27777, BP-4L dut 27761
Accessories with DUT numbers	HS-23 dut 28104, AC-3E dut 27766
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	25.1 / 32.0 993.9
Date of measurements	5-12-2006
Measured by	Jan Engelbrechtsen

14.1. Test method and limit

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

Limits for power spectral density measurements

Limit [dBm] @ 3 kHz
≤ 8

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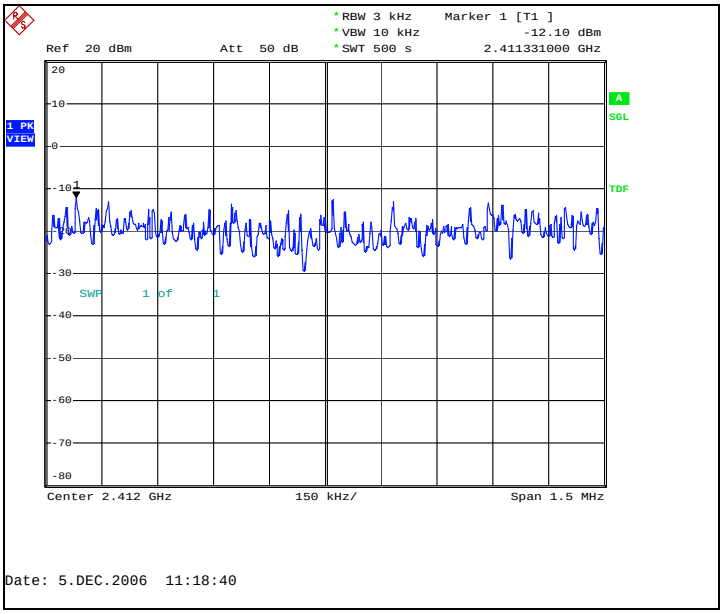
14.2. WLAN test results

14.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-12.10	Passed
7 / 2442	-13.88	Passed
11 / 2462	-13.86	Passed

Channel 1 / 2412 MHz



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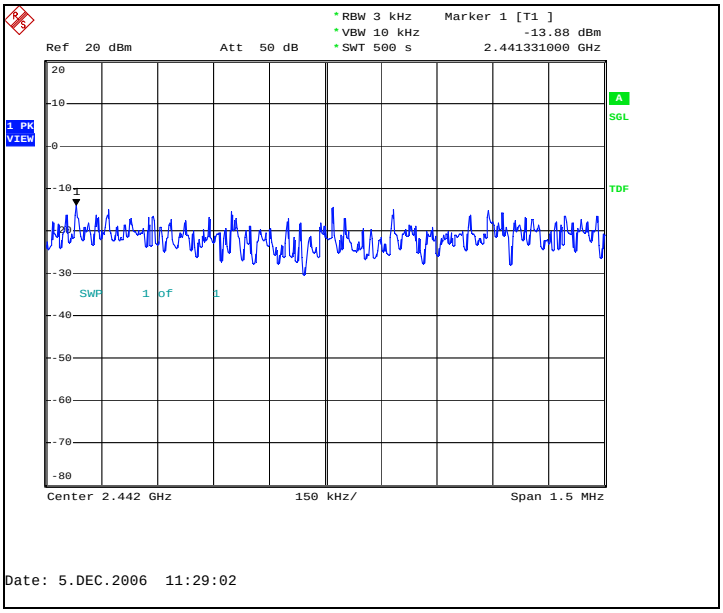
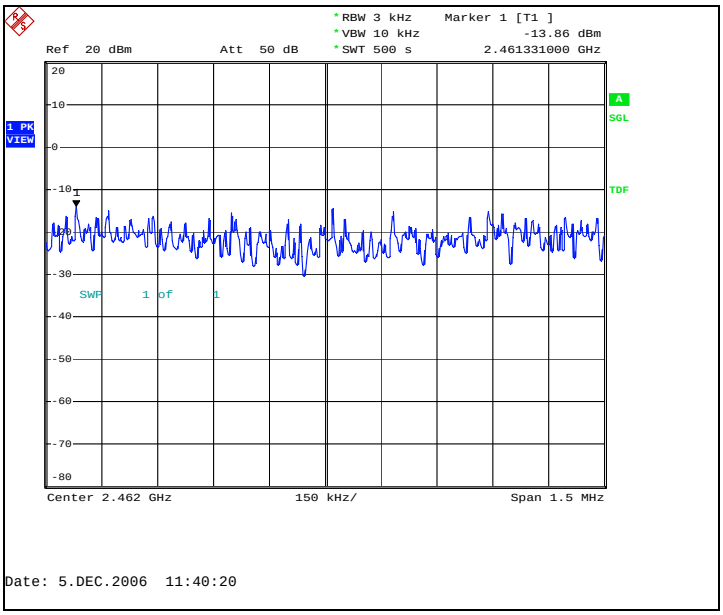
Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



14.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-19.44	Passed
7 / 2442	-20.20	Passed
11 / 2462	-20.19	Passed

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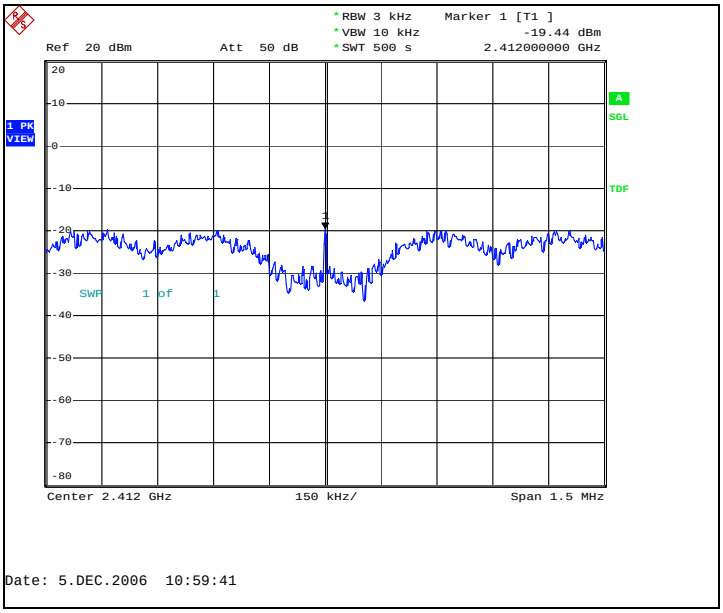
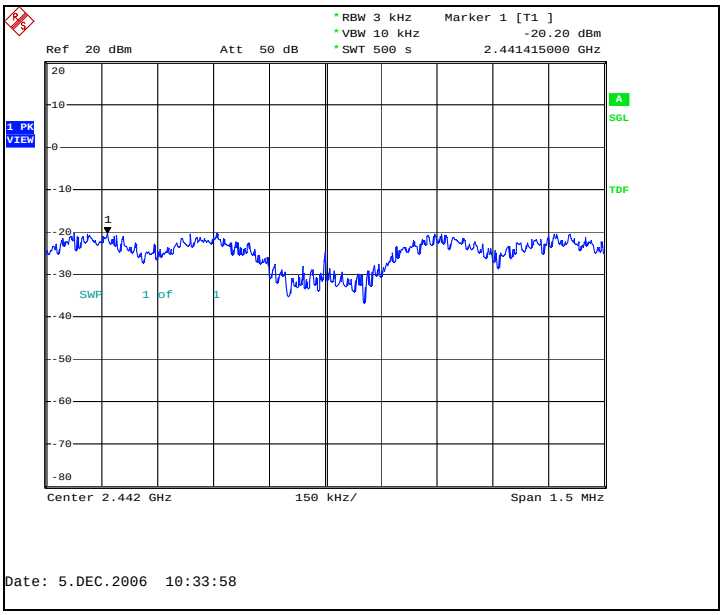
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



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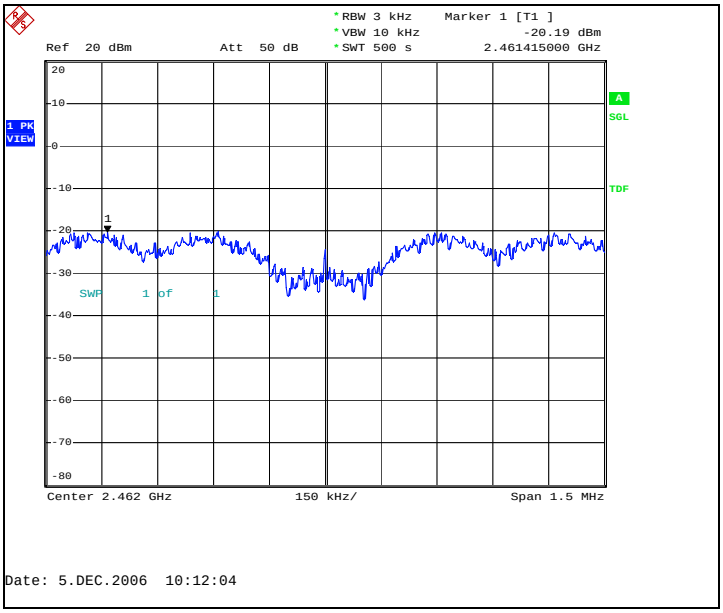
Channel 11 / 2462 MHz



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15. Test Equipment

15.1. 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, 15C, 15B
19678	Spectrum Analyzer 26 GHz	FSP	Rohde&Schwarz	22/24, 15C, 15B
16601	Universal Radio Communication Tester	CMU200	Rohde&Schwarz	22/24, 15C, 15B
19625	Vötsch Climatic Chamber	VT4002EMC	Vötsch	22/24, 15C, 15B
13357	Rohde & Schwartz Signal Generator	SMP02	Rohde&Schwarz	22/24, 15C, 15B

15.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
18416	Universal Radio Communication Tester	CMU200	Rohde&Schwarz	22/24, 15C, 15B
	Programmable Relay Switching System	----------	Pickering	22/24, 15C, 15B
15742	Programmable Relay Switching System	----------	Pickering	22/24, 15C, 15B
14020	Power Supply Module Relay Switching System 45W	10-910-002	Pickering	22/24, 15C, 15B
15743	Power Supply Module Relay Switching System 50W	10-910L-001	Pickering	22/24, 15C, 15B
16490	RS-232/IEEE-488.2 Interface	10-921-001	Pickering	22/24, 15C, 15B
	RS-232/IEEE-488.2 Interface	10-921-001	Pickering	22/24, 15C, 15B
20078	Relay 2x6 Chnl µWave Mux	10-785B-522	Pickering	22/24, 15C, 15B
14021	Relay Dual 6 Chnl µWave Mux	10-785-522		22/24, 15C, 15B
	Relay Dual 6 Chnl µWave Mux	10-785-522		22/24, 15C, 15B
17644	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24, 15C, 15B
16948	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24, 15C, 15B
16949	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24, 15C, 15B
18792	Multi Device Controller	2090	ETS-EMCO	22/24, 15C, 15B
14963	RF Preamplifier 100MHz-4GHz (Metal Chassis)	AFS3-00100400	Miteq/NMP Cph	22/24, 15C, 15B
18861	EMI Test Receiver 20Hz-26,5GHz	ESI	Rohde&Schwarz	22/24, 15C, 15B

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Eq. No	Equipment	Type	Manufacturer	Used in
18860	Ultra Broadband Antenna Ultralog 30-3000MHz	HL562	Rohde&Schwarz	22/24, 15C, 15B
19830	Ultra Broadband Antenna Ultralog 30-3000MHz	HL562	Rohde&Schwarz	22/24, 15C, 15B
18773	Shielded Chamber	RFD-100	ETS-Lindgren	22/24, 15C, 15B
18774	Shielded Chamber	RFSD-F/A-100	ETS-Lindgren	22/24, 15C, 15B
19151	High Pass Filter 3GHz WHK3.0/18G-10ss	WHJS3000-10SS	Wainwright	22/24, 15C, 15B
13937	Ultra Stable Notch Filter 850MHz	WRCA902.4-0.2/40-6SS	Wainwright Instruments	22/24, 15C, 15B
13936	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	22/24, 15C, 15B
13917	Highpass Filter 1000-3000MHz 50OHM SMA Conn	WHKS1000-10SS	Wainwright Instruments	22/24, 15C, 15B
14188	Ultra Stable Notch Filter 902,4MHz	WRCA902.4-0.2/40-6SS	Wainwright	22/24, 15C, 15B
14187	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright	22/24, 15C, 15B
16633	Ultra Stable Notch Filter 1880,0MHz	WRCD1880.0-0.2/40-10SS	Wainwright	22/24, 15C, 15B
19587	BT/WLAN Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	22/24, 15C, 15B
	WDCMA Band 4 filter	WRCG1737/1743-1733/1747-40/6SS	Wainwright	22/24, 15C, 15B
	WDCMA Band 5&6 filter	WRCG832/83/-825/845-40/5SS	Wainwright	22/24, 15C, 15B
	WDCMA Band 8 filter	WRCG894.6/900.6-890.6/904.6-40/80SS	Wainwright	22/24, 15C, 15B
18323	Band reject filter 1947-1953MHz 40dB	WRCG1947/1953-1940/1960-40/6SS	Wainwright	22/24, 15C, 15B
20031	Double Ridged Broadband Horn	BBHA 9120 D	SCHWARZBECK	22/24, 15C, 15B
15190	Infra Red Remote Control Unit	4630	Emco	22/24, 15C, 15B
14993	EMI Test Receiver 9KHz-2750MHz	ESCS30	Rohde&Schwarz	22/24, 15C, 15B
15191	Turntable Contoller Unit	G-800SDX	YAESU	22/24, 15C, 15B
14900	Antenna Controller	HD100	HD GmbH	22/24, 15C, 15B
15105	Attenuator 30dB DC-1000MHz 50 Ohm Nf - Nm	NAT-30	Mini-Circuits	22/24, 15C, 15B
13302	Spectrum Analyzer 9KHz-12.8GHz	HP8596E	Hewlett Packard	22/24, 15C, 15B
11584	Spectrum analyzer 50Hz-6,5GHz	HP8561B	Hewlett Packard	22/24, 15C, 15B
13134	Tracking generator	HP85645A	Hewlett Packard	22/24, 15C, 15B
19374	Resonant Dipole Antenna 850MHz SMA m Conn.	---------	NMP Cph	22/24, 15C, 15B
19375	Resonant Dipole Antenna 1900MHz SMA m Conn.	----------	NMP Cph	22/24, 15C, 15B
11487	Network analyzer 300KHz-3,0GHz	HP8753A	Hewlett Packard	22/24, 15C, 15B
14807	S - Parameter Test Set 300KHz-6GHz	HP85047A	Hewlett Packard	22/24, 15C, 15B
17277	Multimeter Digital 6 1/2 Digit	AT34401A	Agilent Technologies	22/24, 15C, 15B

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