

**REPORT: FCC / IC Radio Frequency (RF) test report**

**PRODUCT:**

Test item description:	Mobile computer for data collection
Trade Mark:	Nordic ID Morphic
Model/Type reference:	811-4A
Serial number:	N121300049 / N121300051
Customer:	NordicID Oy Myllyojankatu 2A 24100 SALO FINLAND
Contact person:	Pekka Maunu
Manufacturer:	NordicID Oy Myllyojankatu 2A 24100 SALO FINLAND

**DATE:** 23.05.2012

**TESTED BY:**



Matti Virkki ; Test engineer

**APPROVED BY:**



Tuomo Hahl ; Test engineer

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## 1 LABORATORY INFORMATION

<b>Test Laboratory</b>	Intertek ETL Semko OY Koneenkatu 12 / K17 05830 Hyvinkää FINLAND
<b>FCC registration number:</b> <b>IC file number:</b>	910391 (January 27, 2003) IC 2042C-1 (May 14, 2003)

## 2 SUMMARY OF TEST RESULTS

The tests listed in this report have been done to demonstrate compliance to the FCC rules section §15.107, §15.109, §15.247 and IC standard RSS-GEN / RSS-210.

### Transmitter measurements

Section in CFR 47	Section in RSS-210	Test	Result
15.247, a 1	A8.1 (2)	Carrier frequency separation	PASS
15.247, a 1 iii	A8.1 (4)	Number of hopping frequencies	PASS
15.247, a 1 iii	A8.1 (4)	Time of occupancy	PASS
15.247, a	A8.1 (1)	20dB bandwidth	PASS
15.247, b 1	A8.4 (2)	Peak output power	PASS
15.247, d	A8.5	Band-edge compliance of RF emissions	PASS
15.247, d	A8.5	Spurious RF conducted emissions	PASS
15.247, d	A8.5	Spurious radiated emissions	PASS

### Receiver measurements

Section in CFR 47	Section in RSS-GEN	Section in ICES-003	Test	Result
§15.107	7.2.2	5.3	Conducted emissions to AC-power lines	PASS
§15.109	7.2.3	5.5	Radiated emissions	PASS

PASS Pass  
 FAIL Fail  
 X Measured, but there is no applicable performance criteria  
 - Not done

### 3 EUT INFORMATION

The EUT and accessories used in the tests are listed below. Later in this report only EUT numbers are used as reference.

	Device	Type	S/N	EUT number
<b>EUT</b>	Nordic ID Morphic	811-4A	N121300051	1
	Nordic ID Morphic	811-4A	N121300049	2 *
<b>Accessories</b>	-	-	-	
	-	-	-	

Notes:

\* Antennas replaced with SMA-connector

#### 3.1 EUT description

EUT is battery powered portable data terminal running Windows CE 6.0 or later  
Battery can be charged with charger.

EUT contains an RFID interrogator operating on 902-928MHz ISM band.  
EUT contains 802.11a/b/g/n WLAN / Bluetooth module SDC-SSD40NBT  
FCC ID: TWG-SDC SSD40NBT  
IC ID: 6616A-SDC SSD40NBT

The EUT was not modified during the tests.

## 4 EUT TEST SETUPS

For each test the EUT was exercised to find out the worst case of operation modes and device configuration.

Two different test setups were used: one for conducted measurements, another for radiated measurements. One EUT was equipped with an external antenna connector for conductive measurements.

The test setup photographs are in the document referenced in section 16.

## 5 APPLICABLE STANDARDS

The tests were performed in guidance of:

CFR 47 Part:

§15.107

§15.109

§15.209

§15.247

ANSI C63.4 (2003)

IC standard:

RSS-GEN, Issue 1

RSS-210, Issue 7

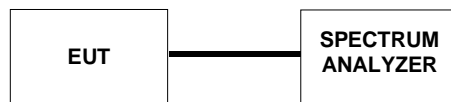
CISPR 22, 2002

Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method" for each test case.

## 6 CARRIER FREQUENCY SEPARATION

<b>EUT</b>	2		
<b>Accessories</b>	-		
<b>Temp, Humidity, Air Pressure</b>	°C	RH%	hPa
<b>Date of measurement</b>	April 16 <sup>th</sup> 2012		
<b>FCC rule part</b>	15.247, a 1		
<b>RSS-210 section</b>	A8.1 (2)		
<b>Measured by</b>	Matti Virkki		

### 6.1 Test setup and testing method



Picture 1: Test setup for carrier frequency separation measurement

Spectrum analyzer was set to sweep the middle of the 902-928 MHz ISM band. 2 MHz span, 10 kHz resolution bandwidth and maximum hold function was used to cover at least 2 channels

Carrier frequency separation was read from the screen with delta marker function.

## 6.2 EUT operation mode

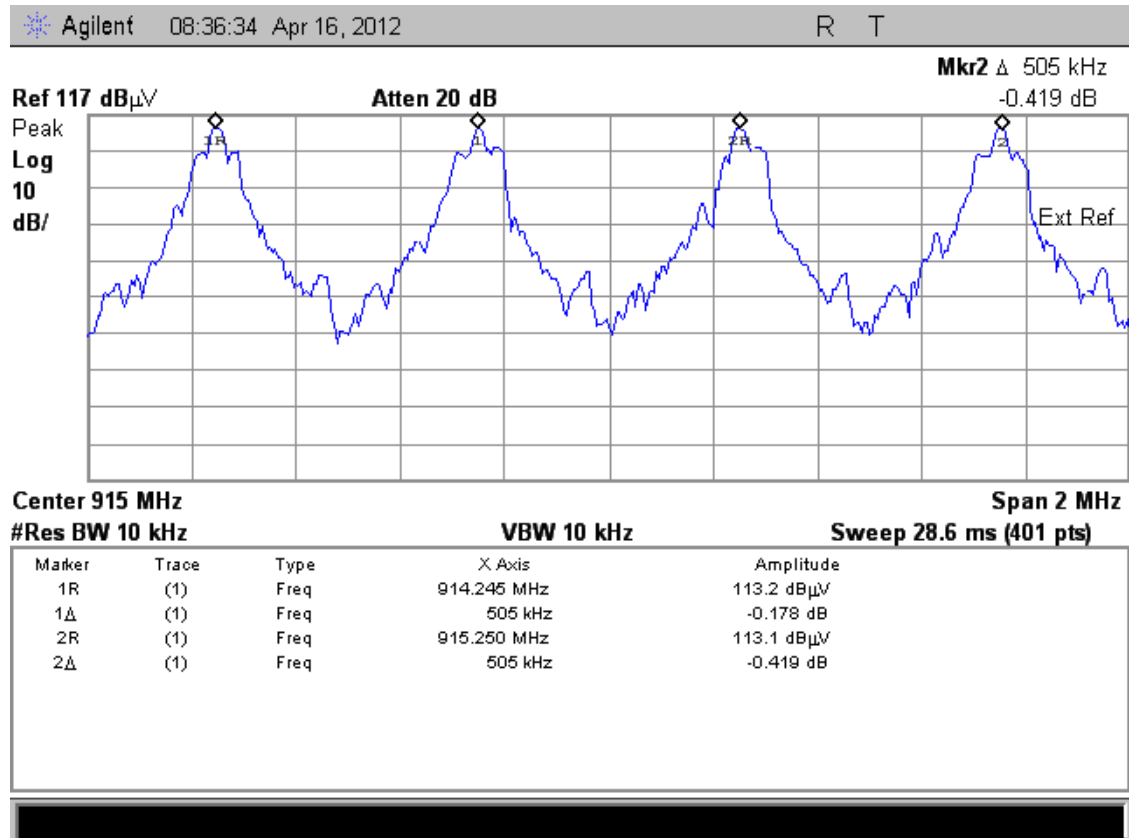
<b>EUT operation mode</b>	Connection, PR-ASK modulation,
<b>EUT channel</b>	Hopping
<b>EUT TX power level</b>	max

## 6.3 Results

Table 1: Carrier frequency separation measurement results

Limit	Result
	505 kHz

## 6.4 Screen shots



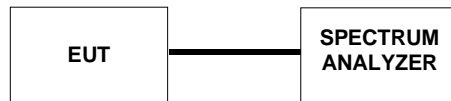
Picture 2: Carrier frequency separation,



## 7 NUMBER OF HOPPING FREQUENCIES

<b>EUT</b>	2		
<b>Accessories</b>	-		
<b>Temp, Humidity, Air Pressure</b>	°C	RH%	hPa
<b>Date of measurement</b>	April 16 <sup>th</sup> 2012		
<b>FCC rule part</b>	15.247, a 1 iii		
<b>RSS-210 section</b>	A8.1 (4)		
<b>Measured by</b>	Matti Virkki		

### 7.1 Test setup



Picture 3: Test setup for measurement of number of hopping frequencies

Spectrum analyzer was set to sweep the 902-928 MHz ISM band 30 kHz resolution bandwidth and maximum hold function was used to measure the EUT transmission over sufficient time. Number of hopping frequencies was calculated from the screen.

## 7.2 EUT operation mode

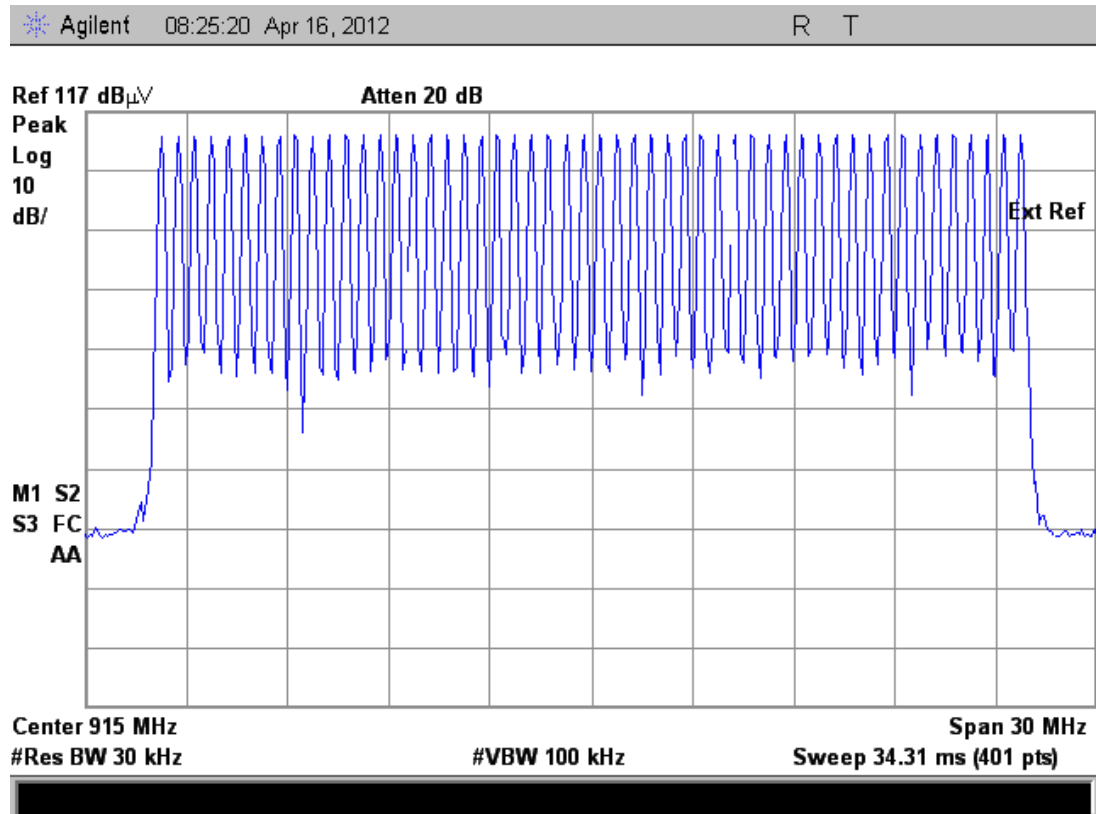
<b>EUT operation mode</b>	Connection, PR-ASK modulation,
<b>EUT channel</b>	Hopping
<b>EUT TX power level</b>	max

## 7.3 Results

Table 2: Number of hopping frequencies measurement results

Limit	Result
$\geq 50$	52

## 7.4 Screen shots

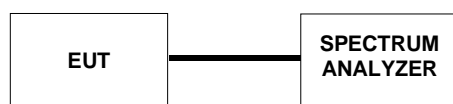


Picture 4: Number of hopping frequencies measurement

## 8 TIME OF OCCUPANCY

<b>EUT</b>	2		
<b>Accessories</b>			
<b>Temp, Humidity, Air Pressure</b>	°C	RH%	hPa
<b>Date of measurement</b>	April 16 <sup>th</sup> 2012		
<b>FCC rule part</b>	15.247, a 1 iii		
<b>RSS-210 section</b>	A8.1 (4)		
<b>Measured by</b>	Matti Virkki		

### 8.1 Test setup and testing method



Picture 5: Test setup for time of occupancy measurement

Spectrum analyzer with single sweep and 0 Hz span was used to monitor the transmitter operation over time.

#### 8.1.1 EUT operation mode

<b>EUT operation mode</b>	Connection, PR-ASK modulation
<b>EUT channel</b>	Hopping
<b>EUT TX power level</b>	max

#### 8.1.2 Results

Table 3: Time of occupancy during connection mode measurement results

Limit	Result
≤ 0,4 s over 20s period	0,088s

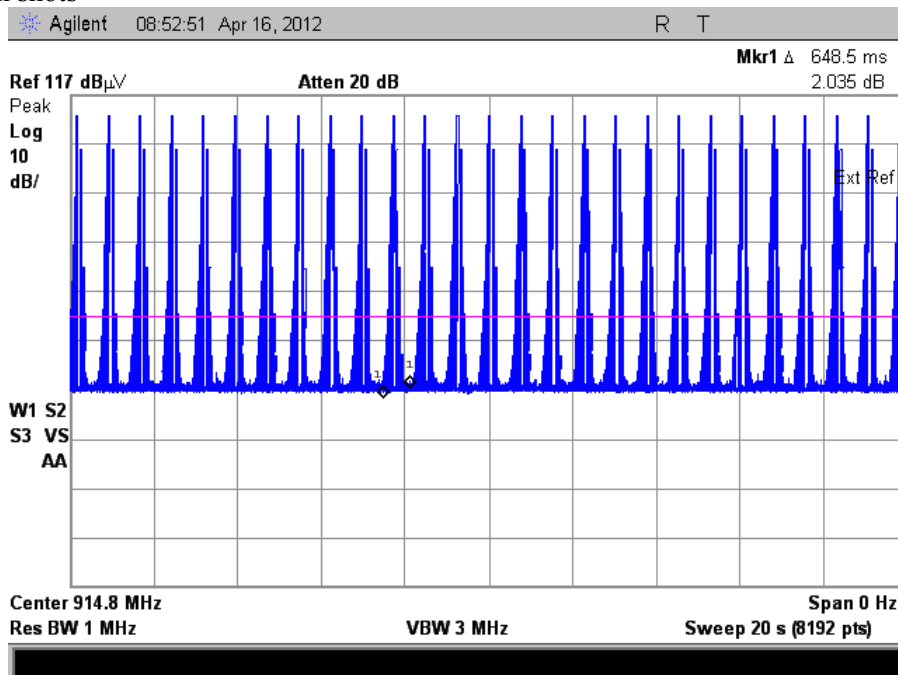
Limit:

In the connection mode RFID uses 52 channels. As defined in 15.247, a 1 i, the limit for time of occupancy is 0,4s over time of 20 s.

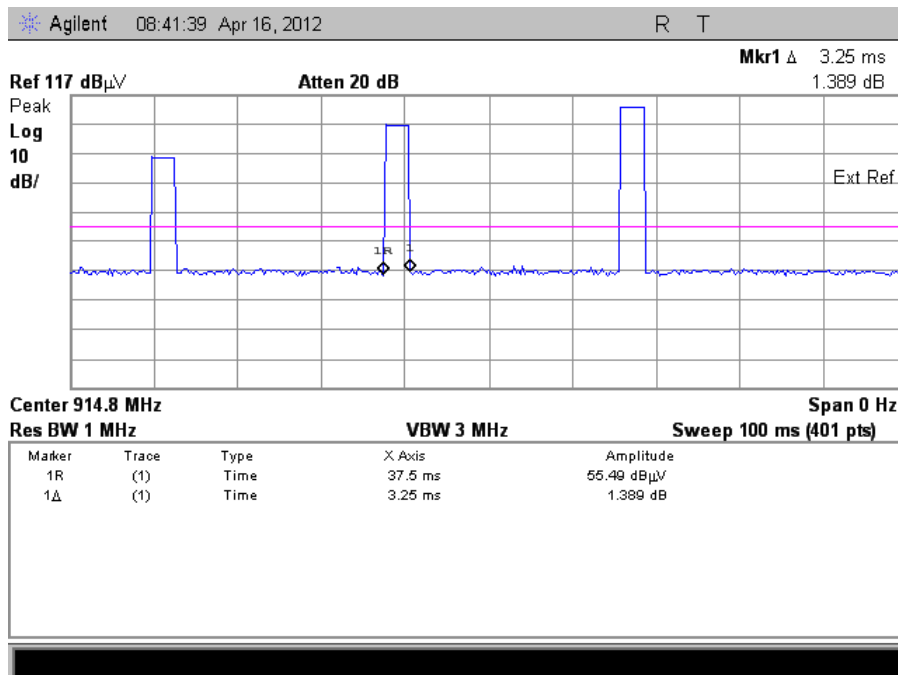
Results:

In measurement time of 20s, total of 27 transmissions occurred. The duration of one transmission was 3,25ms. Based on these measurements the transmitter operated  $27 * 3,25 \text{ ms} = 0,0877\text{s}$  during the 20s period.

8.1.3 Screen shots



Picture 6: Number of transmissions on connection state, middle channel



Picture 7: Duration of one transmission on connection state, middle channel

## 9 20 dB BANDWIDTH

<b>EUT</b>	2		
<b>Accessories</b>			
<b>Temp, Humidity, Air Pressure</b>	°C	RH%	hPa
<b>Date of measurement</b>	April 16 <sup>th</sup> 2012		
<b>FCC rule part</b>	15.247, a		
<b>RSS-210 section</b>	A8.1 (1)		
<b>Measured by</b>	Matti Virkki		

### 9.1 Test setup and measurement method



Picture 8: Test setup for 20dB bandwidth measurement

The 20dB bandwidth was measured using 3 kHz resolution bandwidth and maximum hold function of the spectrum analyzer. 20dB bandwidth was defined by measuring the maximum level on the measured channel and by placing delta markers 20 dB below this value and read the value.

### 9.2 EUT operation mode

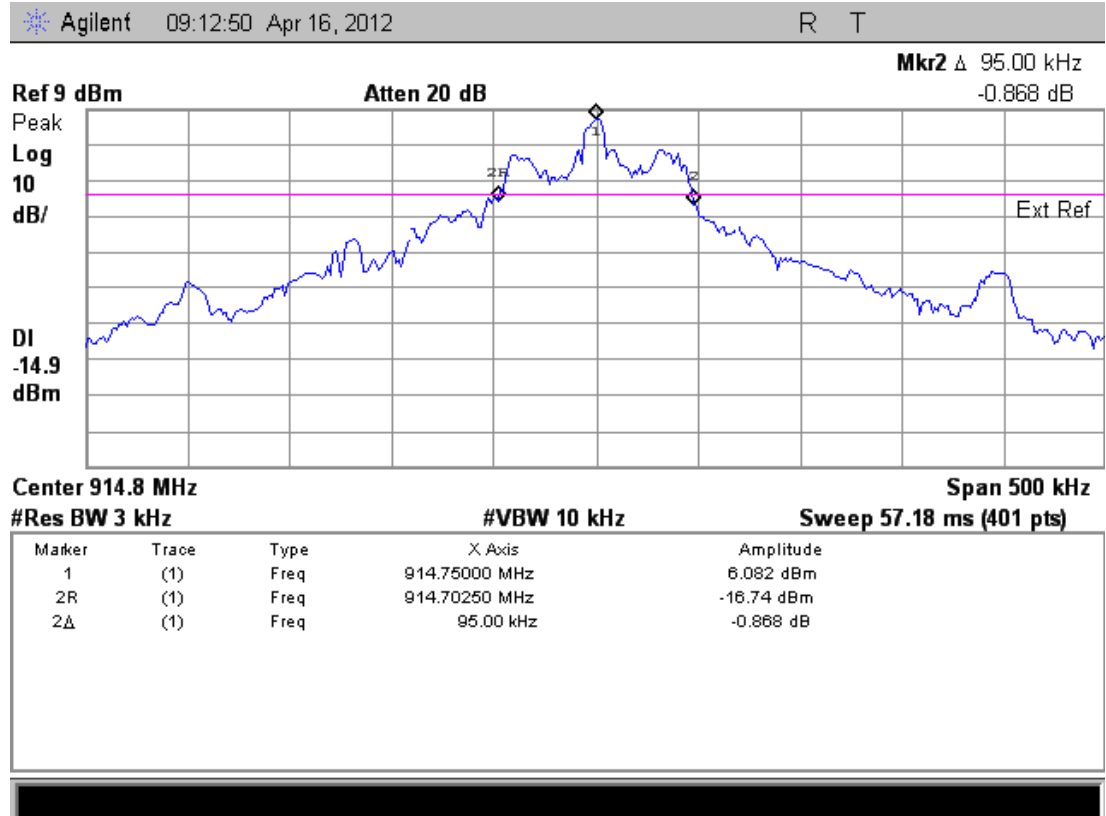
<b>EUT operation mode</b>	Connection, PR-ASK modulation
<b>EUT channel</b>	Middle channel
<b>EUT TX power level</b>	max

9.3 Results

Table 4: 20dB bandwidth measurement results

EUT Channel	Limit (MHz)	Measured value (MHz)
middle	<0,250	0,095

9.4 Screen shots

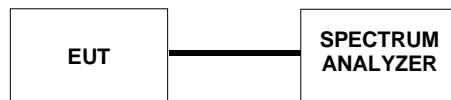


Picture 9: 20dB Bandwidth measurement result, middle channel

## 10 PEAK OUTPUT POWER

<b>EUT</b>	2		
<b>Accessories</b>			
<b>Temp, Humidity, Air Pressure</b>	°C	RH%	hPa
<b>Date of measurement</b>	April 16 <sup>th</sup> 2012		
<b>FCC rule part</b>	15.247, b 1		
<b>RSS-210 section</b>	A8.4 (2)		
<b>Measured by</b>	Matti Virkki		

### 10.1 Test setup and measurement method



Picture 10: Test setup for conducted RF output power measurement

In the peak output power measurement the power splitter and cable attenuations were measured prior to the power measurement and set as parameter for cable loss in the spectrum analyzer to correct the reading of the peak output power. Spectrum analyzer subtracts the set attenuation value from the measured reading.

The measurement was made using 3 MHz resolution bandwidth and 3 MHz video bandwidth and maximum hold function to record the maximum peak output power.

### 10.2 EUT operation mode

<b>EUT operation mode</b>	Connection, PR-ASK modulation
<b>EUT channel</b>	1, 26 and 52
<b>EUT TX power level</b>	max

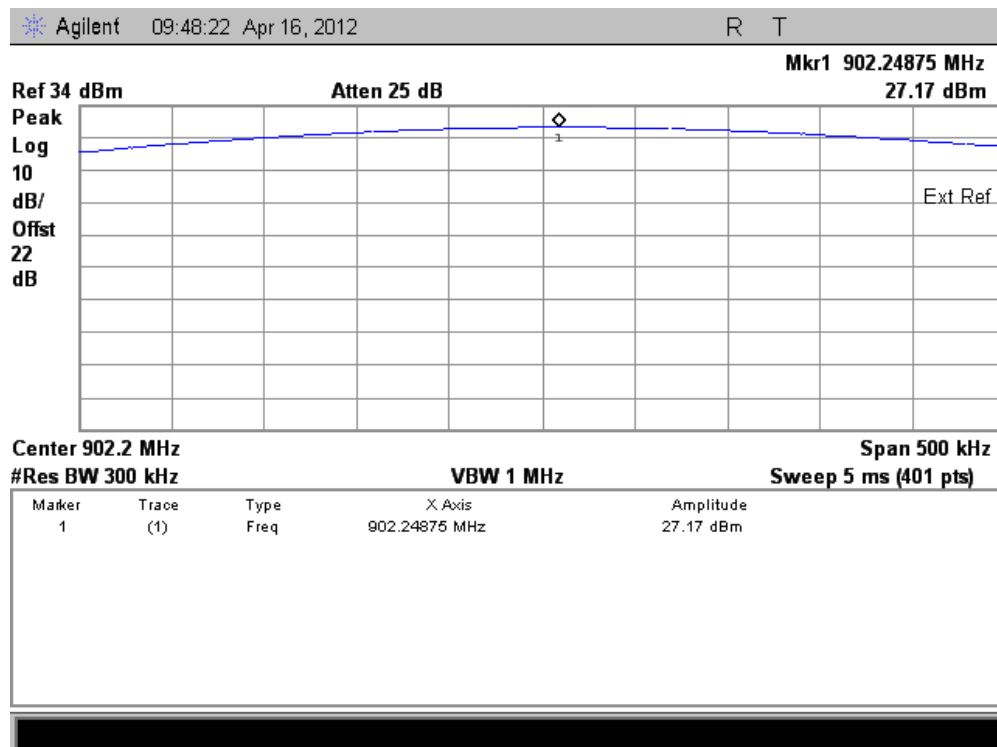
### 10.3 Results

Table 5: Peak output power measurement results

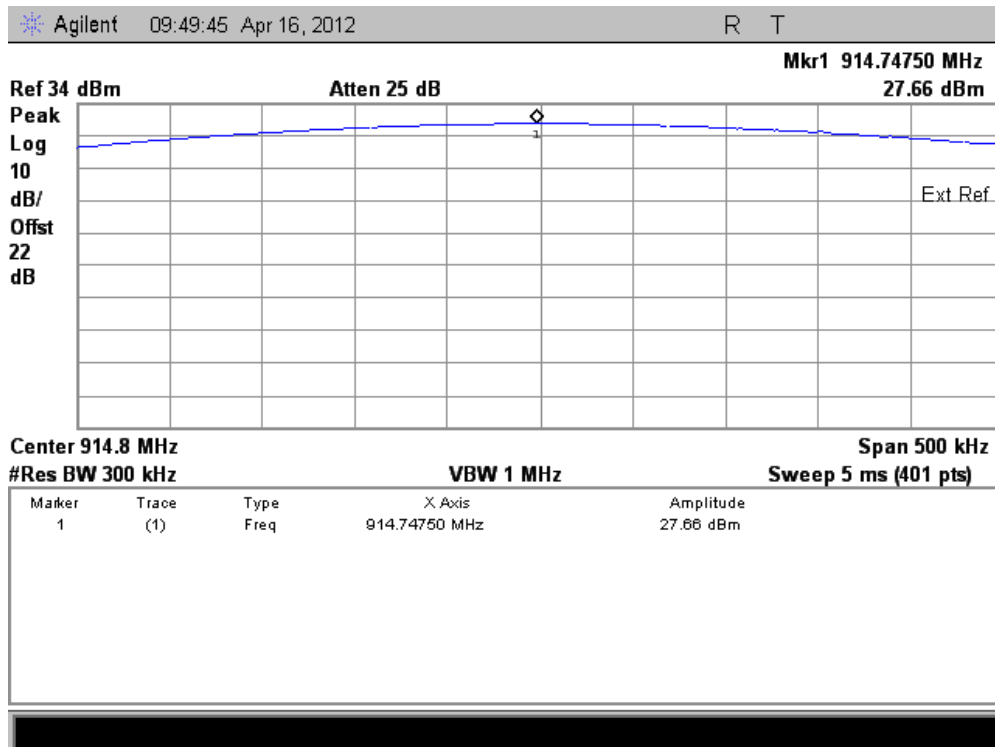
EUT Channel	Limit (W)	Test result (W)	Limit (dBm)	Test result (dBm)
1	≤ 1	0,521	≤ 30	27,17
26		0,583		27,66
52		0,594		27,74

### 10.4 Screen shots

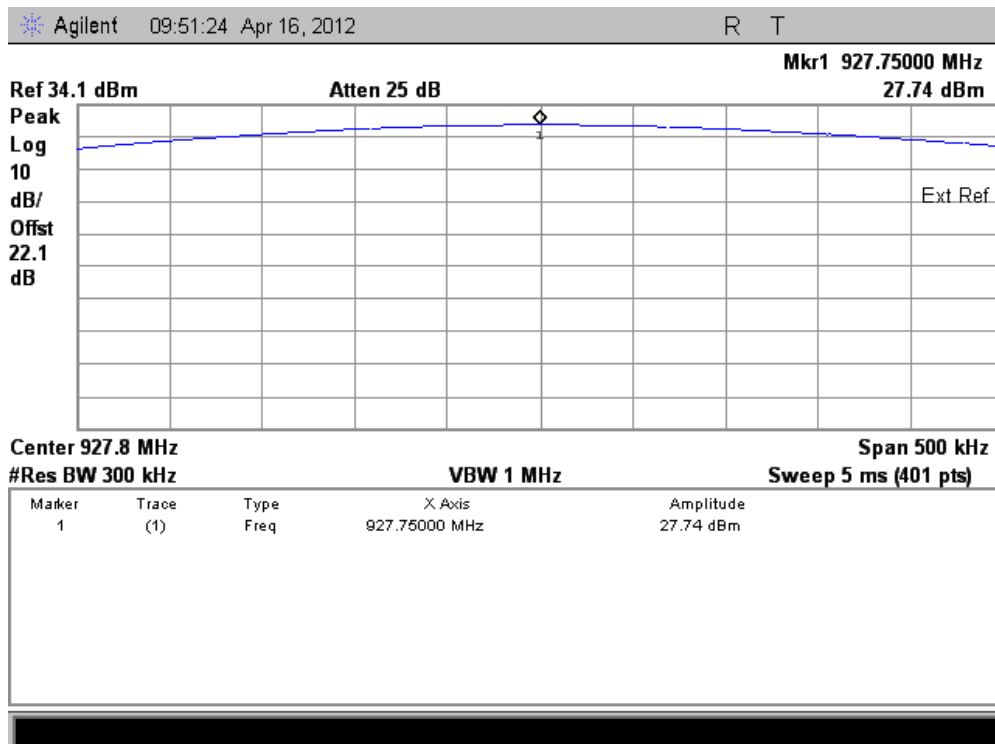
Picture 11: Peak output power, channel 1







Picture 12: Peak output power, channel 26

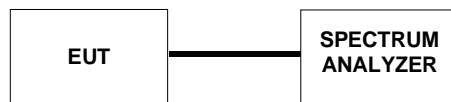


Picture 13: Peak output power, channel 52

## 11 BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS

<b>EUT</b>	2		
<b>Accessories</b>			
<b>Temp, Humidity, Air Pressure</b>	°C	RH%	hPa
<b>Date of measurement</b>	April 16 <sup>th</sup> 2012		
<b>FCC rule part</b>	15.247, d		
<b>RSS-210 section</b>	A8.5		
<b>Measured by</b>	Matti Virkki		

### 11.1 Test setup and measurement method



Picture 14: Test setup for band edge compliance measurement

Band edge compliance of RF-conducted emissions was measured by setting the band edge as center frequency in the spectrum analyzer and measuring the power on the transmission on channels 1 and 52. The measured power and power on the band edge was then compared.

### 11.2 Hopping enabled

#### 11.2.1 EUT operation mode

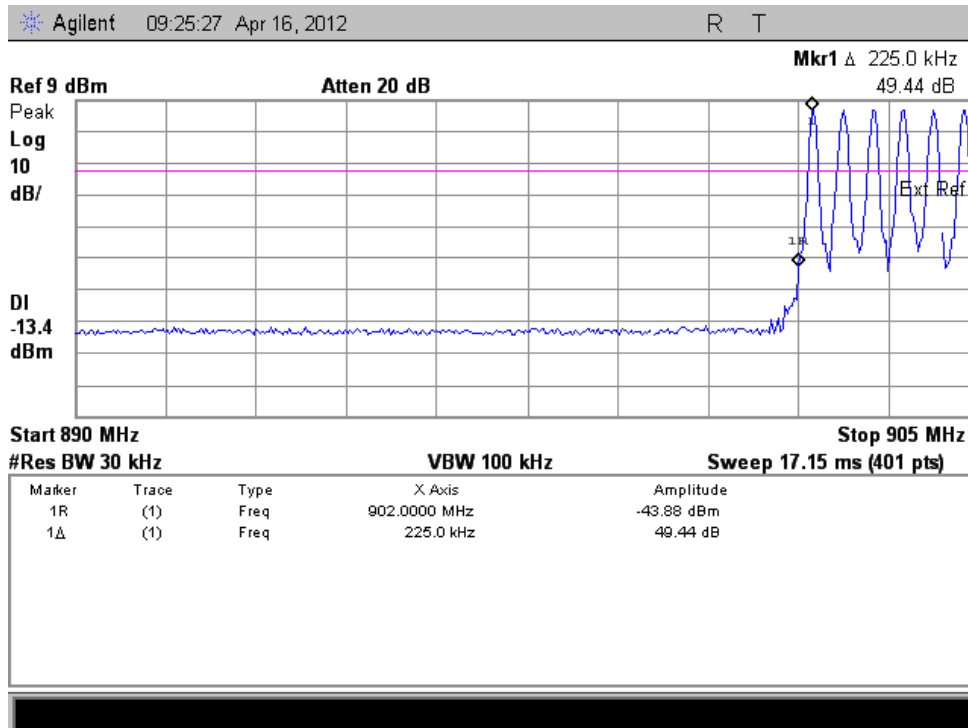
<b>EUT operation mode</b>	PR-ASK
<b>EUT channel</b>	Hopping
<b>EUT TX power level</b>	max

#### 11.2.2 Results

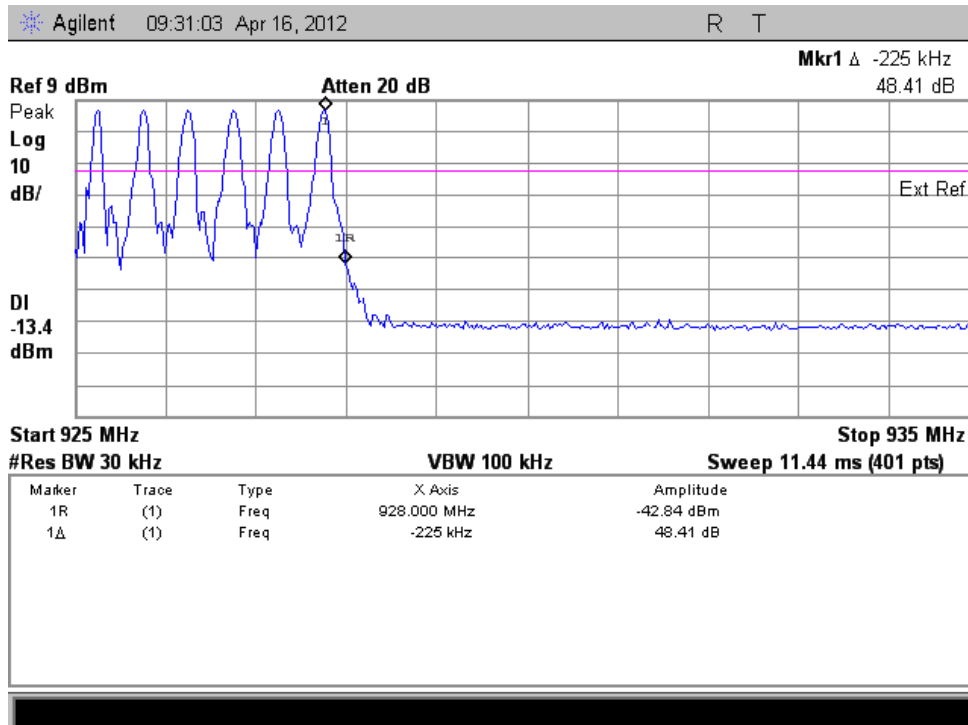
Table 6: Number of hopping frequencies measurement results

<b>EUT Channel</b>	<b>Limit (dBc)</b>	<b>Test result (dBc)</b>
1	≤ -20	-49,44
52		-48,41

11.2.3 Screen shots



Picture 15: Band edge compliance, channel 1, hopping enabled



Picture 16: Band edge compliance, channel 52, hopping enabled

### 11.3 Hopping disabled

#### 11.3.1 EUT operation mode

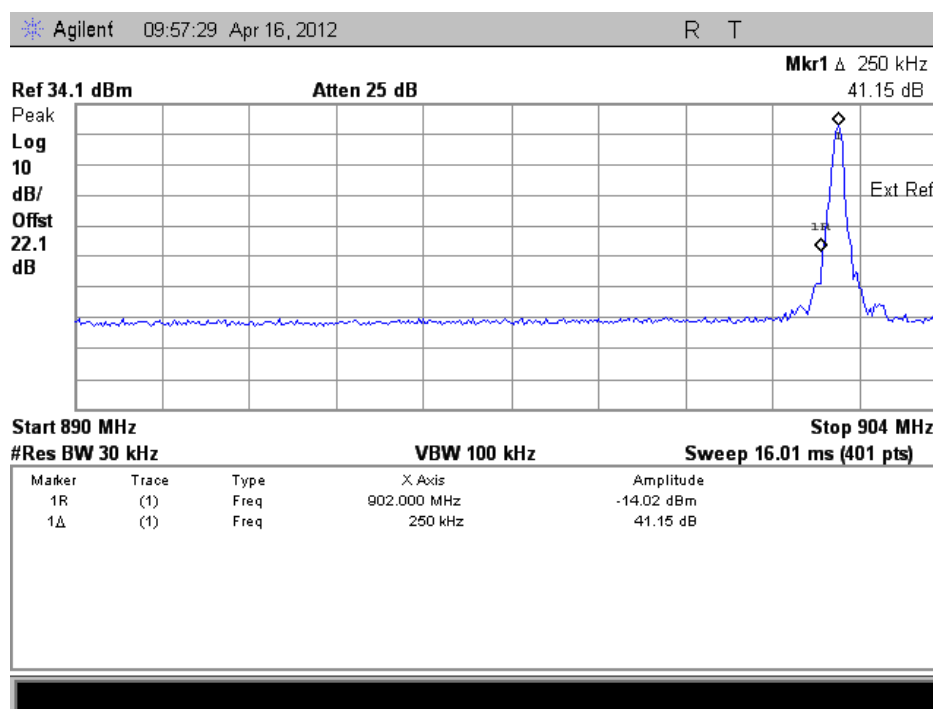
<b>EUT operation mode</b>	Connection, PR-ASK modulation
<b>EUT channel</b>	1, 52
<b>EUT TX power level</b>	max

#### 11.3.2 Results

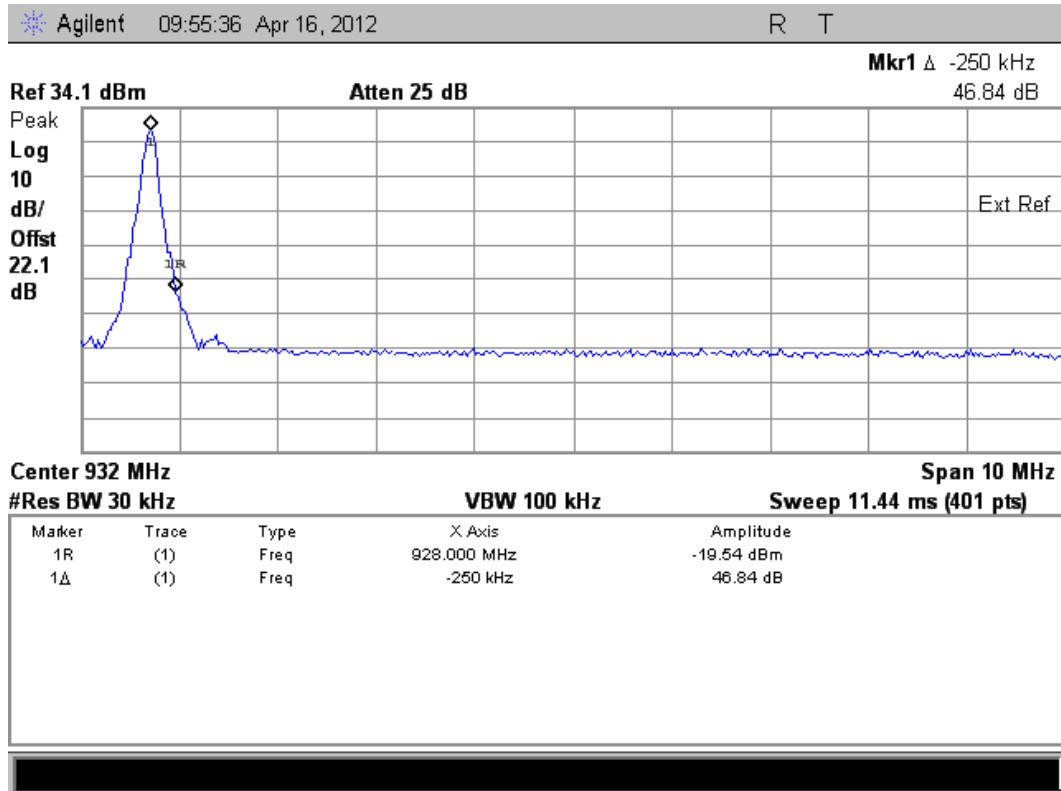
Table 7: Band edge compliance measurement results

EUT Channel	Limit (dBc)	Test result (dBc)
1	≤ -20	41,15
52		46,84

#### 11.3.3 Screen shots



Picture 17: Band edge compliance, channel 0, hopping disabled



Picture 18: Band edge compliance, channel 78, hopping disabled

## 12 SPURIOUS RF CONDUCTED EMISSIONS

<b>EUT</b>	2		
<b>Accessories</b>			
<b>Temp, Humidity, Air Pressure</b>	19 °C	27 RH%	1005 hPa
<b>Date of measurement</b>	April 16 <sup>th</sup> 2012		
<b>FCC rule part</b>	15.247, d		
<b>RSS-210 section</b>	A8.5		
<b>Measured by</b>	Matti Virkki		

### 12.1 EUT operation mode

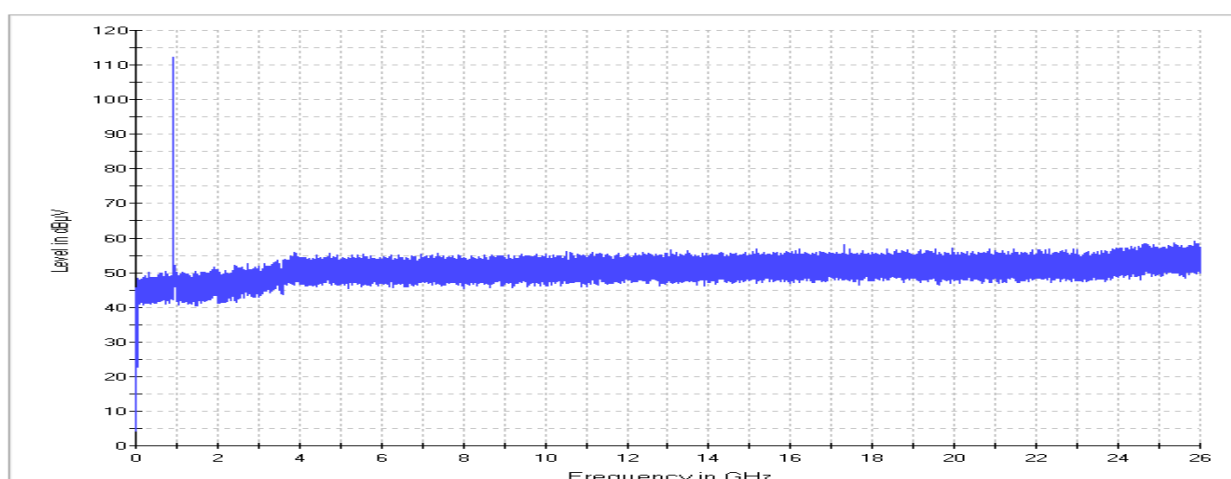
<b>EUT operation mode</b>	Connection, PR-ASK modulation,
<b>EUT channel</b>	1, 26, 52
<b>EUT TX power level</b>	max

### 12.2 Limit

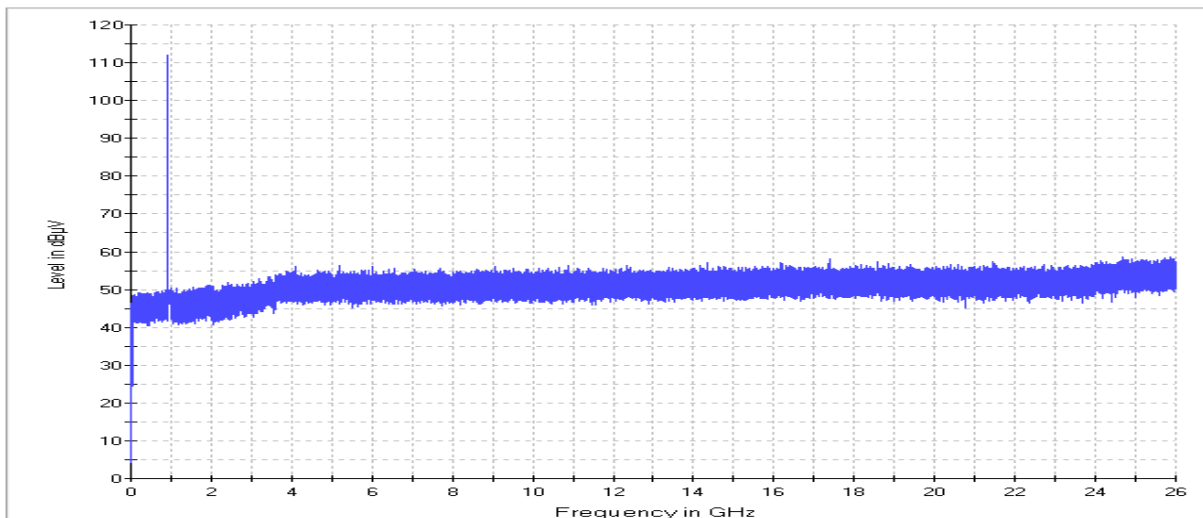
<b>EUT Channel</b>	<b>Limit (dBc)</b>
1	$\leq -20$
26	
52	

### 12.3 Results

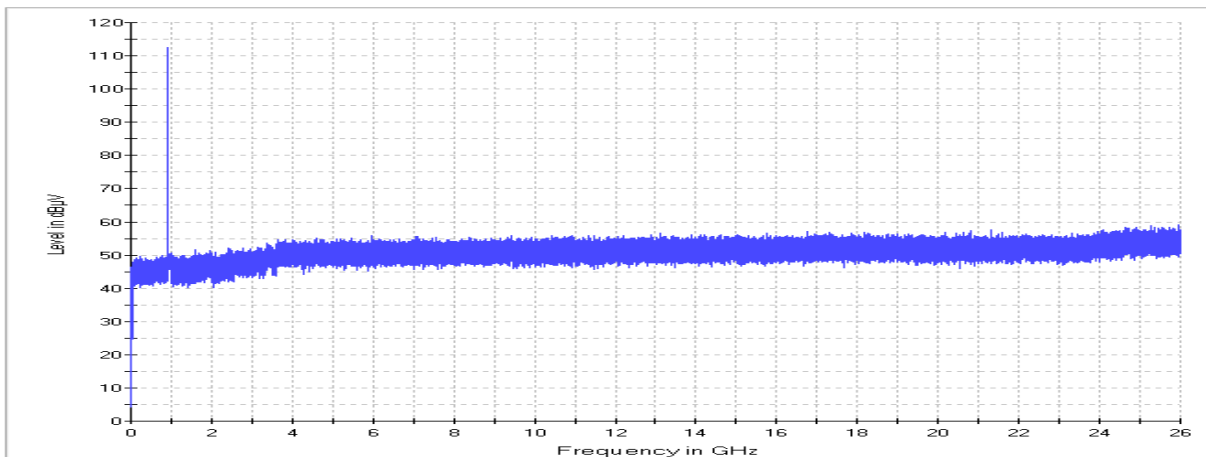
All spurious emissions measured were least 35 dB below the carrier level.



Picture 19: Conducted spurious emissions on antenna port, Channel 1



Picture 20: Conducted spurious emissions on antenna port, Channel 26



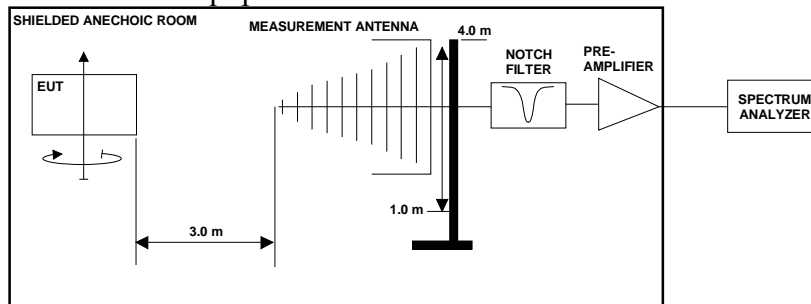
Picture 21: Conducted spurious emissions on antenna port, Channel 52

### 13 RADIATED SPURIOUS EMISSIONS

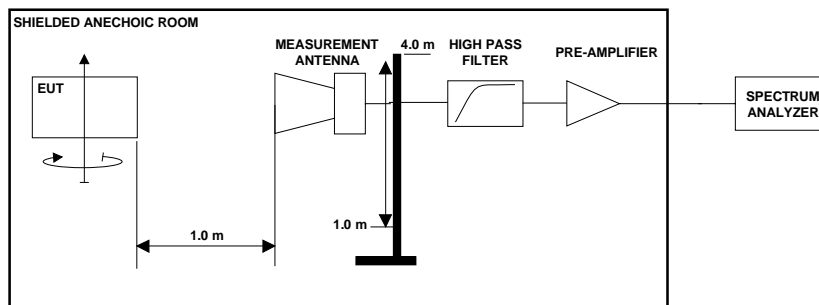
<b>EUT</b>	1		
<b>Accessories</b>			
<b>Temp, Humidity, Air Pressure</b>	22 °C	25 RH%	999 hPa
<b>Date of measurement</b>	April 2 <sup>nd</sup> 2012		
<b>FCC rule part</b>	15.247, d		
<b>RSS-210 section</b>	A8.5		
<b>Measured by</b>	Matti Virkki		

#### 13.1 Test setup

The test was done using an automated test system, where a computer controlled the measurement equipment.



Picture 22: Test setup for radiated spurious emissions measurement  
30 MHz - 1 GHz frequencies



Picture 23: Test setup for radiated spurious emissions measurement  
1 GHz – 10 GHz frequencies



### 13.2 Test method

1. The emissions were searched and maximized by moving the turntable, changing the measuring antenna polarization and height and manipulating the EUT.
2. Levels of suspicious signals and levels of EUT transmitter harmonics were recorded.
3. The recorded levels were corrected in the automated test system with the measurement antenna factor, cable attenuations and filter attenuation.
4. The corrected values, giving the EUT radiated spurious emission levels as dB $\mu$ V/m at 3 m distance, are reported.
5. Test was repeated in three different EUT positions

### 13.3 EUT operation mode

<b>EUT operation mode</b>	Connection, PR-ASK modulation,
<b>EUT channel</b>	1, 26 52
<b>EUT TX power level</b>	max

### 13.4 Limit

Table 8: Radiated spurious emission limits at measurement distance 3m

Frequency band (MHz)	3m Limit ( $\mu$ V/m)	3m Limit (dB $\mu$ V/m)	Detector
30 – 88	100	40	QP
88 -216	150	43,5	QP
216 - 960	200	46	QP
960 - 1000	500	54,0	QP
1000 - 25000	500	54,0	AVG
1000 - 25000	5000	74,0	PEAK

As default, all emissions were compared against the general limits. If any emission exceeded that limit, it was further checked, if it was outside the restricted band thus complying with the -20dBc requirement.

### 13.5 Results

Measurement system noise level was at least 15 dB below the spurious emission limit. Only levels of suspicious signals and transmitter harmonic frequencies, which were above the measurement system noise, are reported.

Example calculation for measurement result.

$$E_{\text{dB}\mu\text{V}/\text{m}} = V_{\text{dB}\mu\text{V}} + AF_{\text{dB}/\text{m}} + C_{\text{dB}} - G_{\text{dB}}$$

Where:

E = Result as electrical field strength

V = measured voltage

AF = Antenna factor

C = cable and filter losses

G = pre-amplifier gain

Table 9: Emission levels PEAK (QP) detector, channel 1

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	EUT Position
345,80	38,7	1000,0	120	100,0	H	270,0	18,8	7,3	46,0	3
412,32	40,0	1000,0	120	100,0	H	267,0	20,9	6,0	46,0	3
425,60	43,0	1000,0	120	200,0	H	273,0	21,2	3,0	46,0	3
425,92	23,2	1000,0	120	225,0	H	270,0	21,2	22,8	46,0	1
452,00	25,8	1000,0	120	125,0	V	294,0	21,6	20,2	46,0	1
899,68	46,6*	1000,0	120	100,0	H	197,0	26,1	-0,6*	46,0	3
899,76	44,6	1000,0	120	100,0	H	205,0	26,1	1,4	46,0	3
901,32	59,2*	1000,0	120	100,0	H	187,0	26,1	-13,2*	46,0	3
901,40	58,9*	1000,0	120	100,0	H	203,0	26,1	-12,9*	46,0	3
1804,34	37,6	1000,0	1000	100,0	H	206,0	-17,7	36,3	73,9	2
1804,53	35,0	1000,0	1000	100,0	V	320,0	-17,7	38,9	73,9	3
2706,67	47,3	1000,0	1000	100,0	H	305,0	-13,3	26,6	73,9	1
3441,73	34,8	1000,0	1000	100,0	H	148,0	-12,2	39,1	73,9	2
3905,64	35,3	1000,0	1000	100,0	V	297,0	-10,4	38,6	73,9	2
4511,33	37,7	1000,0	1000	100,0	V	244,0	-9,6	36,2	73,9	2
8975,88	44,6	1000,0	1000	100,0	V	316,0	2,6	29,3	73,9	2
8982,37	44,5	1000,0	1000	100,0	V	316,0	2,6	29,4	73,9	2

\* Frequency is not on restricted band and level is >20dB attenuated from transmitter peak level

Table 10: Emission levels PEAK (QP) detector, channel 26

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	EUT Position
31,28	31,5	1000,0	120	175,0	V	135,0	26,0	8,5	40,0	1
460,84	25,7	1000,0	120	217,0	H	111,0	21,7	20,3	46,0	1
1829,500	38,7	1000,0	1000	100,0	V	227,0	-17,5	35,2	73,9	1
2197,116	34,7	1000,0	1000	100,0	V	270,0	-14,3	39,2	73,9	1
2744,110	37,2	1000,0	1000	100,0	V	117,0	-13,2	36,7	73,9	2
3166,883	35,4	1000,0	1000	100,0	V	130,0	-12,0	38,5	73,9	1
4573,800	39,9	1000,0	1000	100,0	V	224,0	-9,2	34,0	73,9	3
6402,518	40,1	1000,0	1000	100,0	V	52,0	-2,9	33,8	73,9	2
8259,740	43,6	1000,0	1000	100,0	V	18,0	1,4	30,3	73,9	2

Table 11: Emission levels PEAK (QP) detector, channel 52

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	EUT Position
928,44*	65,6*	1000,0	120	150,0	H	201,0	26,3	-19,6*	46,0	1
1855,36	38,0	1000,0	1000,0	100,0	H	21,0	-17,3	35,9	73,9	3
2783,15	41,9	1000,0	1000,0	100,0	H	299,0	-13,1	32,0	73,9	1

\* Frequency is not on restricted band and level is >20 dB attenuated from transmitter peak level

Table 12: Transmitter peak levels on channels 1,26 and 52

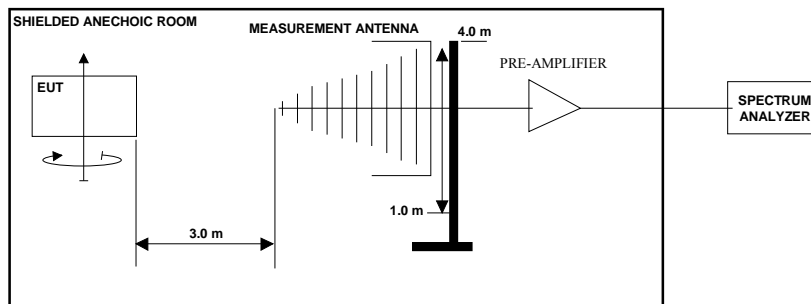
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
902,24	122,5	5000,0	120	100,0	H	197,0	26,1	-76,5	46,0	
914,76	123,2	5000,0	120	100,0	H	198,0	26,2	-77,2	46,0	
927,76	123,9	5000,0	120	167,0	H	213,0	26,3	-77,9	46,0	

## 14 RECEIVER RADIATED EMISSION

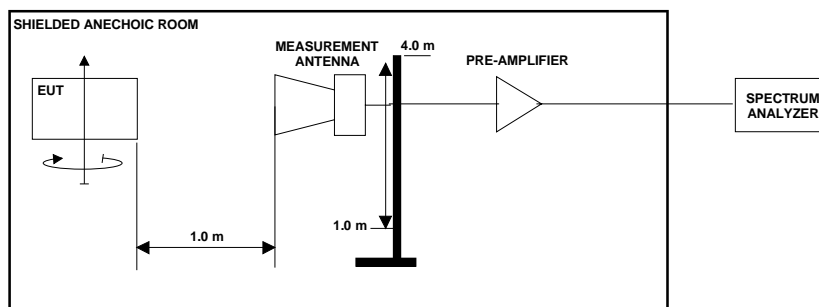
<b>EUT</b>	1		
<b>Accessories</b>	3		
<b>Temp, Humidity, Air Pressure</b>	20 °C	24 RH%	999 hPa
<b>Date of measurement</b>	5.4.2012		
<b>FCC rule part</b>	§15.109		
<b>RSS-GEN section</b>	7.2.3		
<b>ICES-003 section</b>	5.5		
<b>Measured by</b>	Matti Virkki		

### 14.1 Test setup

The test was done using an automated test system, where a computer controlled the measurement equipments.



Picture 24: Test setup for radiated spurious emissions measurement  
30 MHz - 1 GHz frequencies



Picture 25: Test setup for radiated spurious emissions measurement  
1 GHz – 12,4 GHz frequencies

## 14.2 Test method

1. The emissions were searched and maximized by moving the turntable, changing the measuring antenna polarization and height and manipulating the EUT.
2. Levels of suspicious signals and levels of EUT transmitter harmonics were recorded.
3. The recorded levels were corrected in the automated test system with the measurement antenna factor, cable attenuations and filter attenuation.
4. The corrected values, giving the EUT radiated spurious emission levels as dB $\mu$ V/m at 3 m distance, are reported.

## 14.3 EUT operation mode

<b>EUT operation mode</b>	Receiver mode
<b>EUT frequency</b>	Na
<b>EUT TX power level</b>	Na

## 14.4 Limit

Table 13: Radiated spurious emission limits at measurement distance 3m

<b>Frequency band (MHz)</b>	<b>3m Limit (<math>\mu</math>V/m)</b>	<b>3m Limit (dB<math>\mu</math>V/m)</b>	<b>Detector</b>
30 – 88	100	40	QP
88 -216	150	43,5	QP
216 - 960	200	46	QP
960 - 1000	500	54,0	QP
1000 - 12400	500	54,0	AVG
1000 - 12400	5000	74,0	PEAK

As default, all emissions were compared against the general limits. If any emission exceeded that limit, it was further checked, if it was outside the restricted band thus complying with the -20dBc requirement.

## 14.5 Results

The measured interference values using Quasi peak and average detectors are shown in the pictures below.

All signals closer than 6 dB to the limit below 1 GHz have been measured using quasi peak or average detector and reported in the table 14 and 15.

Example calculation for measurement result.

$$E_{dB\mu V/m} = V_{dB\mu V} + AF_{dB/m} + C_{dB} - G_{dB}$$

Where:

E = Result as electrical field strength

V = measured voltage

AF = Antenna factor

C = cable and filter losses

G = pre-amplifier gain

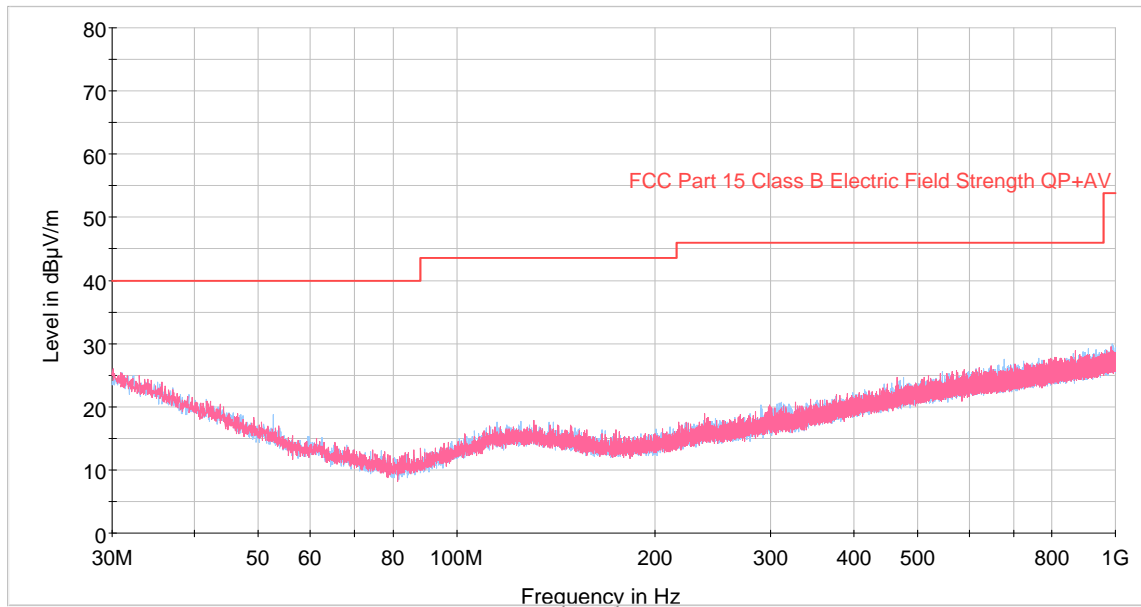
Table 14: Radiated emissions using Quasi peak detector

Frequency (MHz)	QP-MaxHold (dBμV/m)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
N/A							

Table 15: Radiated emissions using Average detector

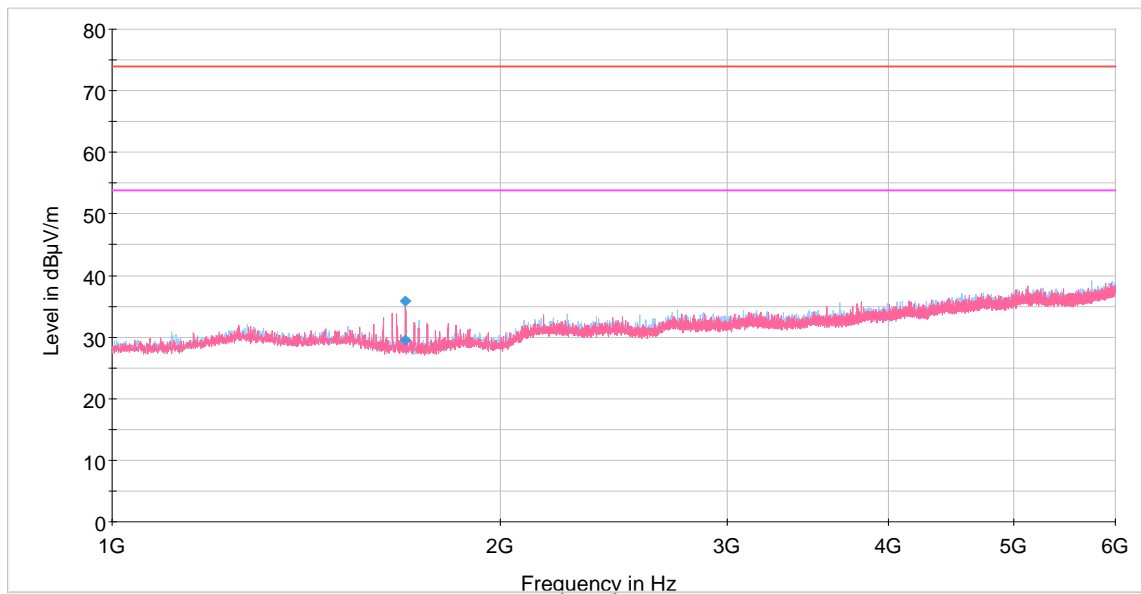
Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Average-MaxHold (dBμV/m)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/)
1688,64	35,8	29,6	125,0	V	171,0	-18,4	38,1	73,9

FCC part 15 class Class B 3m



Picture 26: radiated emission results, 30 – 1000 MHz,  
Red= horizontal polarization, blue = vertical polarization

FCC part 15 class Class B 1-16 GHz



Picture 27: radiated emission results, 1 – 12,4 GHz,  
Red= horizontal polarization, blue = vertical polarization

## 15 TEST EQUIPMENT

Spectrum analyzers signal generators and measurement receivers are calibrated annually.

Antennas are calibrated once every 3 years.

All other equipment is verified annually.

### 15.1 Conducted measurements

DEVICE	MANUFACTURER	SPKTT	SERIAL
Spectrum analyser	Agilent E7405A	131	MY42000072
Signal generator	Agilent E8254A	147	US41140103
3 dB attenuator	Huber Suhner	216	Batch: 757087
20 dB attenuator	Narda	097	-
Power splitter	Narda, 4426-2	140	03570

### 15.2 Radiated measurements

DEVICE	MANUFACTURER	SPKTT	SERIAL
EMI test receiver	Rohde & Schwarz ESU 26	225	100173
Bilog antenna	Chase CBL6143A	221	29611
3 dB attenuator	Huber+Suhner 3dB/2W	214	-
Horn Antenna	Schwarzbeck BBHA9120D	138	365
Horn Antenna	Schwarzbeck BBHA 9170	194	0313
Pre-amplifier	JCA 118-400	142	-
Pre-amplifier	Miteq 18-26GHz	191	1128879
High pass filter	Wainwright Instruments WHKS11000C11/60SS	150	1
High pass filter	Wainwright Instruments WHK3.0/18GST	141	3
Notch filter	Wainwright Instruments WRCT 800/960-0.2/40-8EEK	135	4
3m Semi-anechoic chamber	ETS Euroshield	081	-
Measuring software	Rohde & Schwarz EMC32	-	Ver 8.52



## 16 TEST SETUP PHOTOGRAPHS

Test setup photograph can be found in a separate document

100502A-RF\_PHOTOS.doc