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# Test Report

Report Number: F121150E1

Applicant:

**SIMAC Electronics Handel GmbH**

Manufacturer:

**B-LINK ELECTRONIC LIMITED**

Equipment under Test (EUT):

**USBN**

Laboratory (CAB) accredited by  
Deutsche Gesellschaft für Akkreditierung mbH  
in compliance with DIN EN ISO/IEC 17025  
under the Reg. No. DGA-PL-105/99-22,  
FCC Test site registration number 90877 and  
Industry Canada Test site registration IC3469A-1

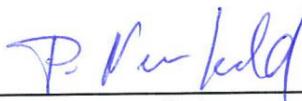
## REFERENCES

- [1] **ANSI C63.4-2009** American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
- [2] **FCC CFR 47 Part 15 (August 2011)** Radio Frequency Devices
- [3] **Publication Number 558074 (January 2012)** DTS Meas Guidance v01
- [4] **RSS-210 Issue 8 (December 2010)** Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
- [5] **RSS-Gen Issue 3 (December 2010)** General Requirements and Information for the Certification of Radiocommunication Equipment
- [6] **Publication Number 913591 (March 2007)** Measurement of radiated emissions at the edge of the band for a Part 15 RF Device

## TEST RESULT

The requirements of the tests performed as shown in the overview (clause 4) were fulfilled by the equipment under test.

The complete test results are presented in the following.

Test engineer:	Paul NEUFELD		2.05.2012
	Name	Signature	Date
Authorized reviewer:	Bernd STEINER		2.05.2012
	Name	Signature	Date

## RESERVATION

This test report is only valid in its original form.

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# 1 IDENTIFICATION

## 1.1 Applicant

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Applicant represented during the test by the following person:	-

## 1.2 Manufacturer

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eMail Address:	<a href="mailto:he@lefen.com">he@lefen.com</a> , <a href="mailto:lefenhe@hotmail.com">lefenhe@hotmail.com</a>
Applicant represented during the test by the following person:	-

## 1.3 Test laboratory

The tests were carried out at: **PHOENIX TESTLAB GmbH**  
**Königswinkel 10**  
**32825 Blomberg**  
**Germany**

accredited by DGA Deutsche Gesellschaft für Akkreditierung mbH in compliance with DIN EN ISO/IEC 17025 under Reg. No. DGA-PL-105/99-22, FCC Test site registration number 90877 and Industry Canada Test site registration IC3469A-1.

## 1.4 EUT (Equipment Under Test)

Test object: *	150Mbps Wireless N Mini USB Adapter
Type: *	USBN
FCC ID: *	AYR-N
IC: *	10206A-N
Serial number: *	Not available
PCB identifier: *	Not available
Hardware version: *	Not available
Software version: *	Not available

## 1.5 Technical data of equipment

Channel 01	RX:	2412 MHz	TX:	2412 MHz
Channel 02	RX:	2417 MHz	TX:	2417 MHz
Channel 03	RX:	2422 MHz	TX:	2422 MHz
Channel 04	RX:	2427 MHz	TX:	2427 MHz
Channel 05	RX:	2432 MHz	TX:	2432 MHz
Channel 06	RX:	2437 MHz	TX:	2437 MHz
Channel 07	RX:	2442 MHz	TX:	2442 MHz
Channel 08	RX:	2447 MHz	TX:	2447 MHz
Channel 09	RX:	2452 MHz	TX:	2452 MHz
Channel 10	RX:	2457 MHz	TX:	2457 MHz
Channel 11	RX:	2462 MHz	TX:	2462 MHz

Fulfils WLAN specification: *	IEEE 802.11n, 802.11g, 802.11b
Antenna type: *	Integral antenna
Antenna gain: *	2 dBi
Antenna connector: *	none
Power supply	Powered by USB
Type of modulation: *	802.11b: CCK, DQPSK, DBPSK 802.11g: OFDM 802.11n: OFDM
Operating frequency range: *	2412 MHz to 2462 MHz
Number of channels: *	11
Temperature range: *	0 °C to +40 °C
Lowest / highest Internal clock frequency: *	1 MHz / 2.4835 GHz

\* declared by the applicant.

## 1.6 Dates

Date of receipt of test sample:	27 February 2012
Start of test:	22 March 2012
End of test:	04 April 2012

## 2 OPERATIONAL STATES

The tests were carried out with the one delivered test sample. The EUT was plugged into a laptop PC of the brand Medion with the model number MD 96500 and the serial number 914W801DS0538122C5K000.

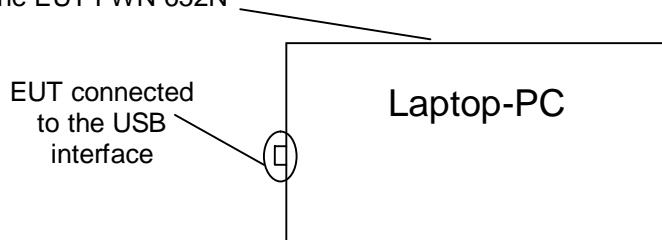
The operation was adjusted with the help of a test-software, which was installed on the test laptop PC (see paragraph 1) in which the EUT was plugged in. After selecting the desired operation mode using the test software, the transmission was started. The EUT stayed connected to the laptop PC during operation.

During the tests the test samples were powered with the normal USB supply voltage of 5V

The following operation modes were used during the tests:

Operation mode	Description of the operation mode	Modulation	Data rate / Mbps
1	Continuous transmitting on 2412 MHz	CCK (802.11b)	11
2	Continuous transmitting on 2437 MHz	CCK (802.11b)	11
3	Continuous transmitting on 2462 MHz	CCK (802.11b)	11
4	Continuous transmitting on 2412 MHz	OFDM (802.11g)	54
5	Continuous transmitting on 2437 MHz	OFDM (802.11g)	54
6	Continuous transmitting on 2462 MHz	OFDM (802.11g)	54
7	Continuous transmitting on 2412 MHz	OFDM (802.11n - 20 MHz)	54
8	Continuous transmitting on 2437 MHz	OFDM (802.11n - 20 MHz)	54
9	Continuous transmitting on 2462 MHz	OFDM (802.11n - 20 MHz)	54
10	Continuous transmitting on 2422 MHz	OFDM (802.11n - 40 MHz)	150
11	Continuous transmitting on 2437 MHz	OFDM (802.11n - 40 MHz)	150
12	Continuous transmitting on 2452 MHz	OFDM (802.11n - 40 MHz)	150

Test setup for the EUT FWN-652N



Preliminary tests were performed in different orthogonal directions and different EUT-settings, to find worst-case configuration and position. The following table shows a list of the test modes used for the results, documented in this report. The radiated emission measurement was carried out in the orthogonal direction that emits the highest spurious emission levels.

The following test modes were adjusted during the tests:

Test items	Operation mode
6 dB bandwidth	1 - 12
Maximum peak output power	1 - 12
Power spectral density	1 - 12
Band edge compliance	1, 3, 4, 6, 7, 9, 10, 12
Radiated emissions (transmitter)	1 - 12

### 3 ADDITIONAL INFORMATION

For testing purposes a special set of drivers and a control software to establish a continuous transmission were provided by the customer. This software was used to control the WLAN channels and the transmission power settings during the testing procedure. The parameters used for the testing are listed in the table below.

The values listed for the transmission power for the different WLAN modes have to be fixed in the final user firmware of the product. The actual user firmware settings are not valid and the following test results apply only for the settings as they are specified below.

Test software Version	REALTEK		
	Frequency / MHz	2412	2437
IEEE 802.11b DSSS	35	35	34
IEEE 802.11g OFDM	36	36	36
IEEE 802.11n (20 MHz)	36	36	36
Frequency / MHz	2422	2437	2452
IEEE 802.11n (40 MHz)	36	36	36

## 4 OVERVIEW

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section [2]	RSS 210, Issue 8 [4] or RSS-Gen, Issue 3 [5]	Status	Refer page
6 dB bandwidth	2400.0 - 2483.5	15.247 (a) (2)	A8.2 (a) [4]		9 et seq.
Maximum peak output power	2400.0 - 2483.5	15.247 (b) (3), (4)	A8.4 (4) [4]		17 et seq.
Power spectral density	2400.0 - 2483.5	15.247 (e)	A8.2 (b) [4]		25 et seq.
Band edge compliance	2400.0 - 2483.5	15.247 (d)	A8.5 [4]		33 et seq.
Radiated emissions (transmitter)	0.009 - 25,000	15.205 (a) 15.209 (a)	7.2.2 [5], 2.5 [4]		41 et seq.
Conducted emissions on supply line	0.15 - 30	15.207 (a)	7.2.4 [5]		87 et seq.

## 5 TEST RESULTS

### 5.1 6 dB bandwidth

#### 5.1.1 Method of measurement (6 dB bandwidth)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed.

If antenna conducted tests cannot be performed on this device, radiated tests to show compliance with the peak output power limit specified in 15.247 are acceptable.

The EUT has to be switched on, the transmitter shall work with its maximum data rate.

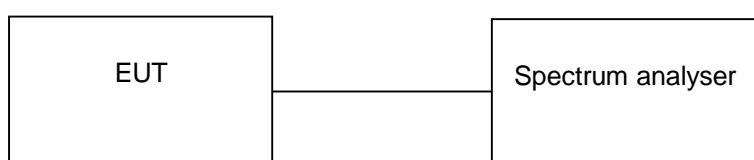
The following spectrum analyser settings shall be used:

- Span: App. 2 to 3 times the 6 dB bandwidth, centred on the actual channel.
- Resolution bandwidth: 1-5 % of the emission bandwidth.
- Video bandwidth: Three times the resolution bandwidth.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.

After trace stabilisation the marker shall be set on the signal peak. The first display line has to be set on this value. The second display line has to be set 6 dB below the first line (or the peak marker). The frequency lines shall be set on the intersection points between the second display line and the measured curve.

The measurement will be performed at the upper, the lower end and the middle of the assigned frequency band. For each WLAN mode the worst case configuration will be tested.

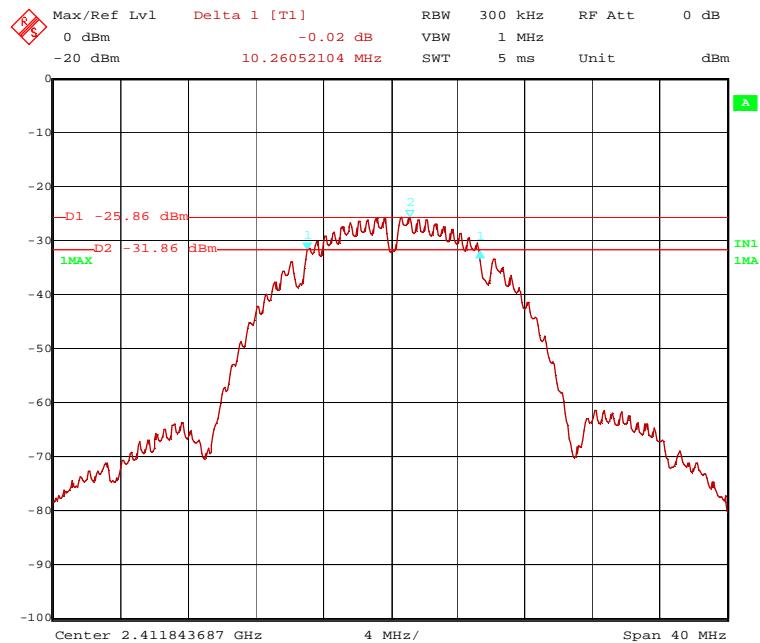
Test set-up:



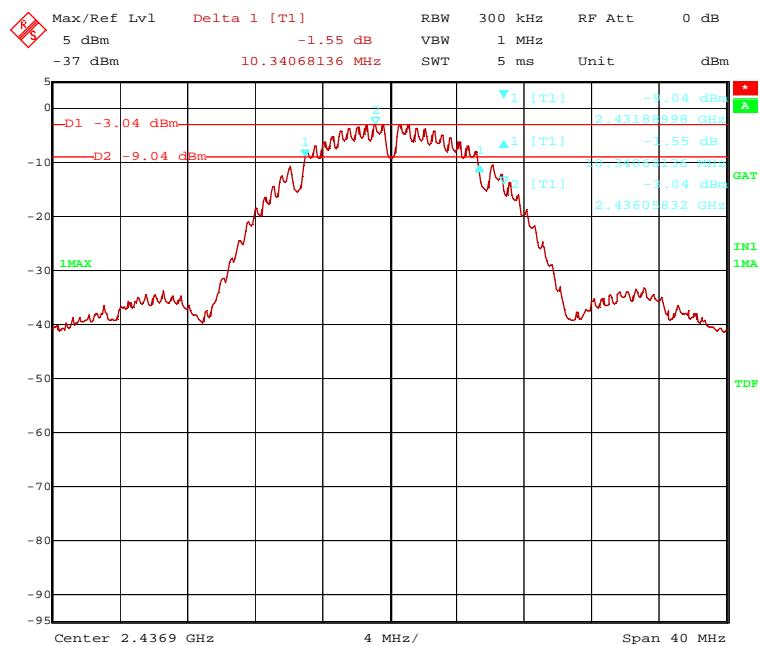
### 5.1.2 Test results (6 dB bandwidth)

Ambient temperature	21 °C	Relative humidity	20 %
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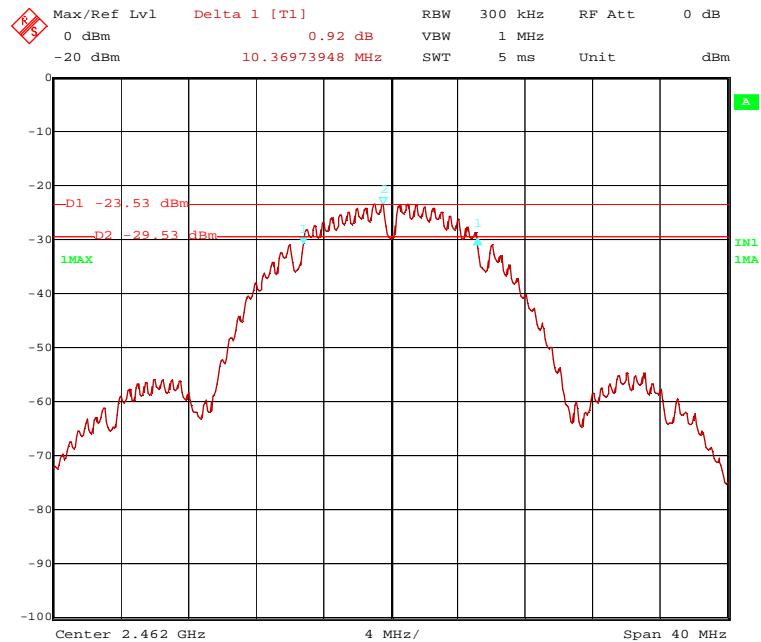
#### 121150\_01.WMF: 6 dB bandwidth (operation mode 1):



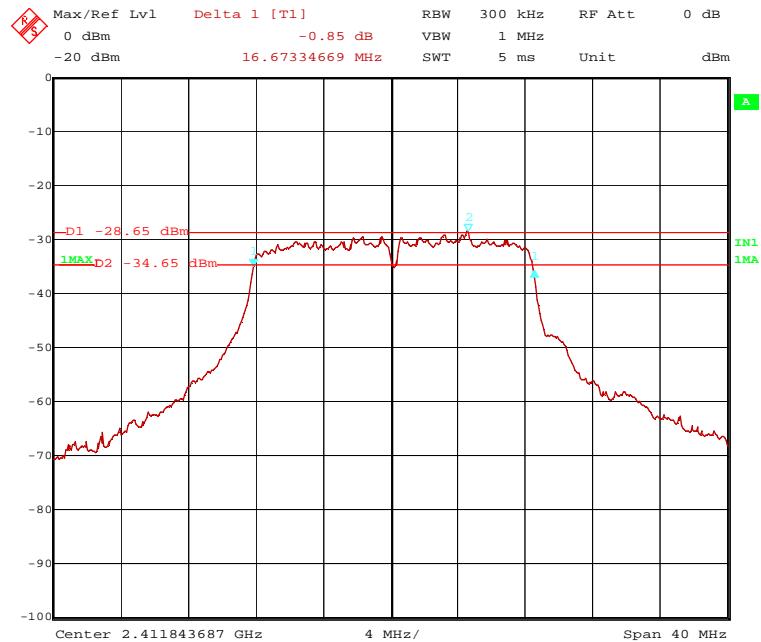
#### 121150\_08.WMF: 6 dB bandwidth (operation mode 2):



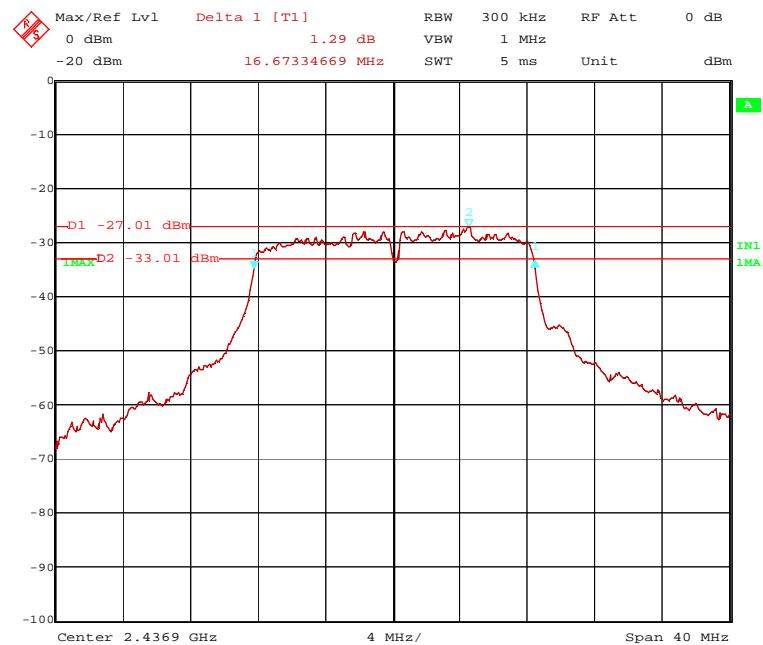
121150\_12.WMF: 6 dB bandwidth (operation mode 3):



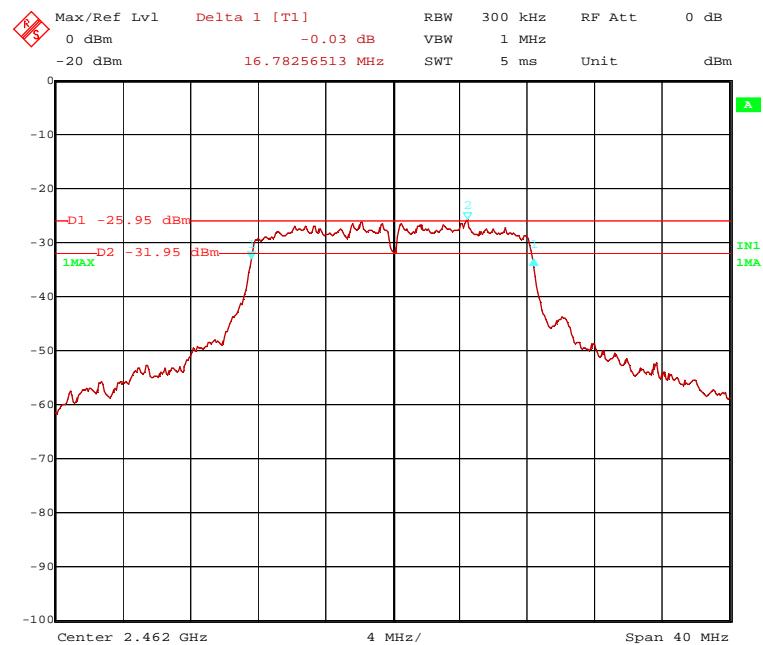
121150\_05.WMF: 6 dB bandwidth (operation mode 4):



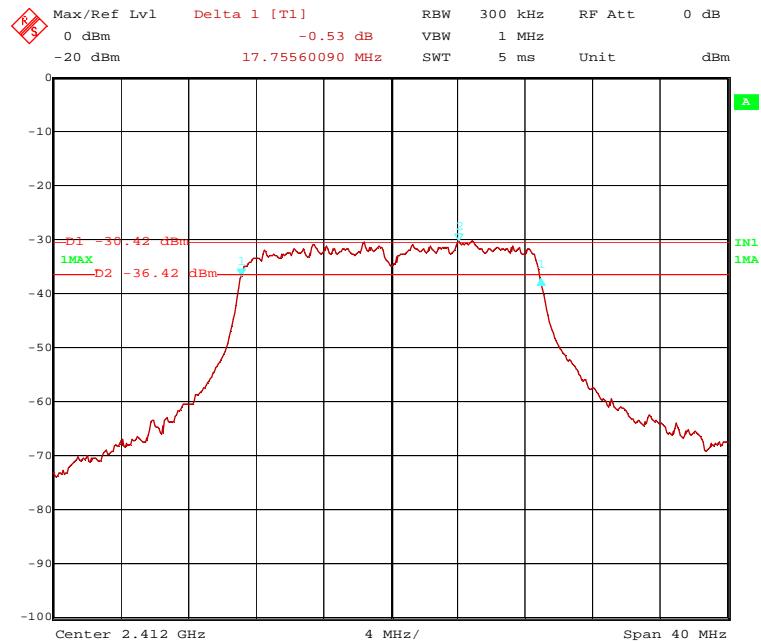
121150\_09.WMF: 6 dB bandwidth (operation mode 5):



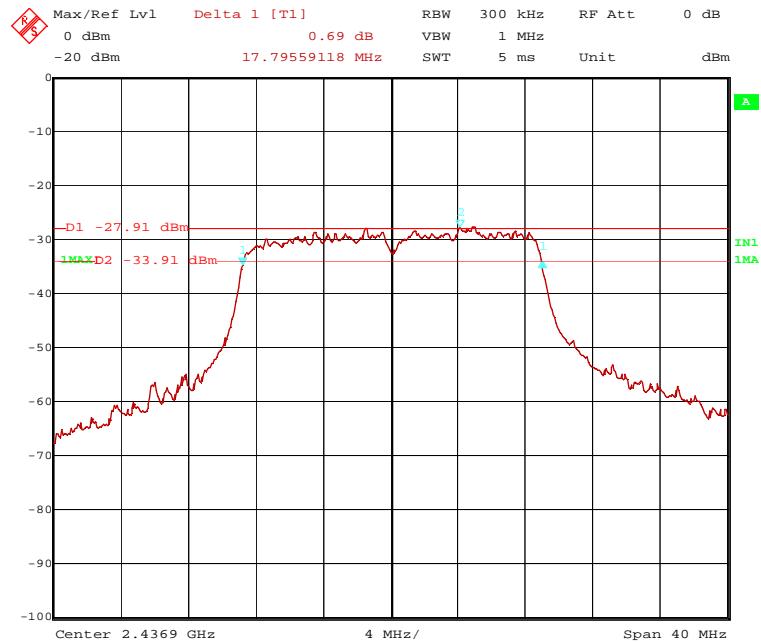
121150\_12.WMF: 6 dB bandwidth (operation mode 6):



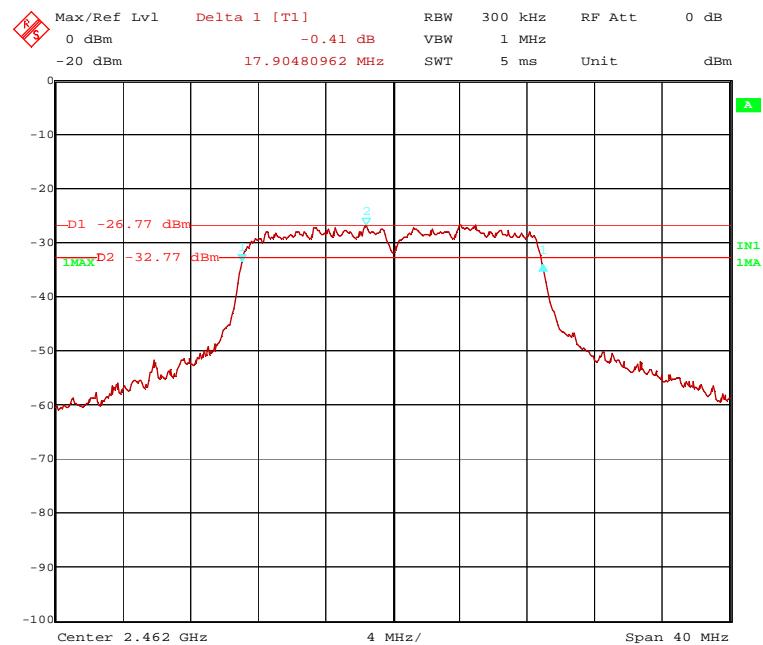
121150\_06.WMF: 6 dB bandwidth (operation mode 7):



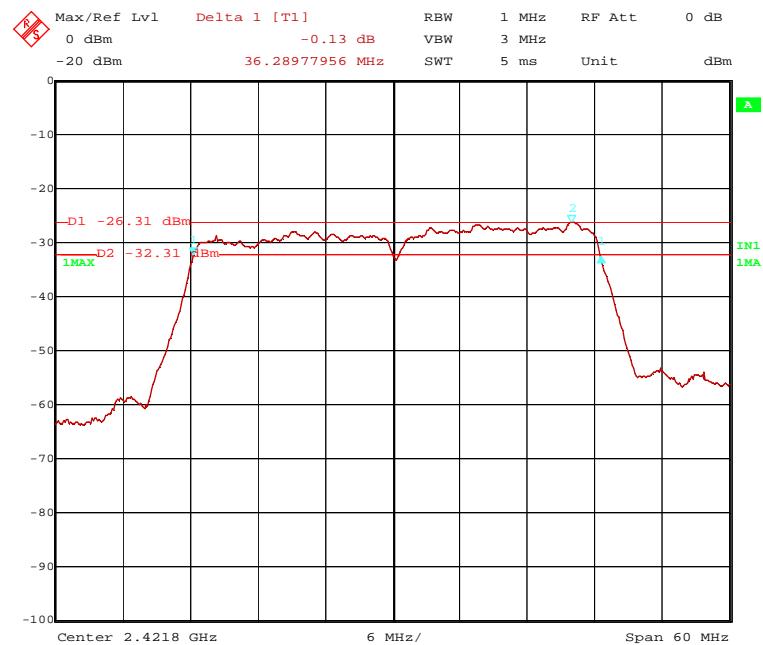
121150\_10.WMF: 6 dB bandwidth (operation mode 8):



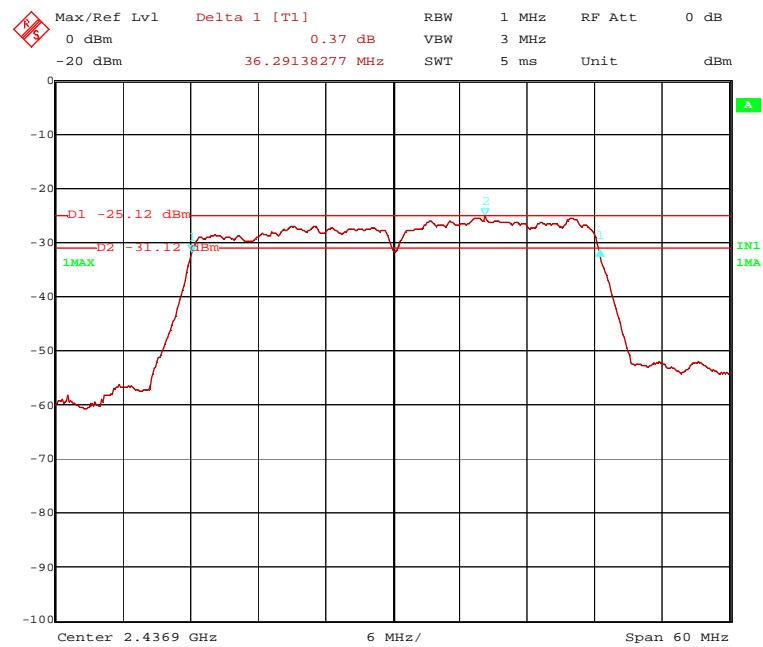
121150\_10.WMF: 6 dB bandwidth (operation mode 9):



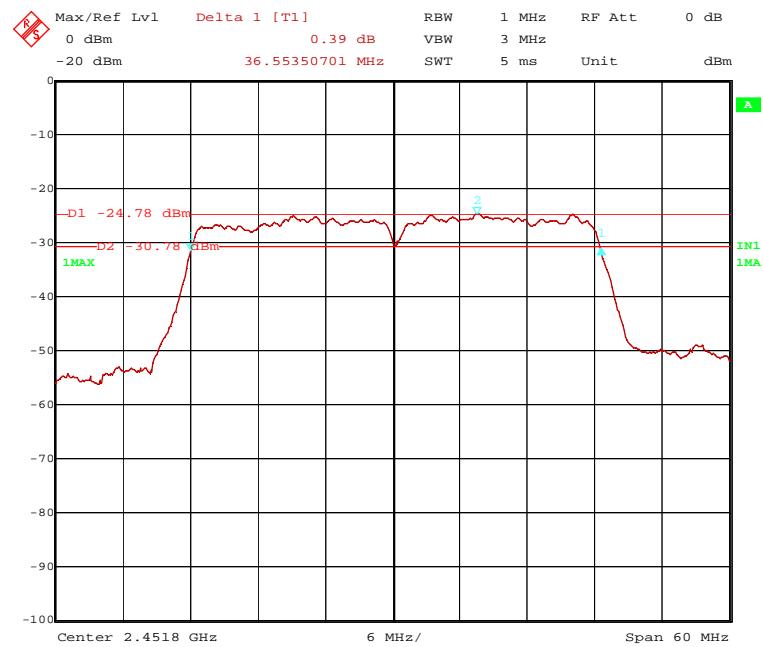
121150\_01.WMF: 6 dB bandwidth (operation mode 10):



121150\_11.WMF: 6 dB bandwidth (operation mode 11):



121150\_08.WMF: 6 dB bandwidth (operation mode 12):



Operation mode 1 to 12			
Channel number	Channel frequency [MHz]	6 dB bandwidth [MHz]	Bandwidth limit [kHz]
1 (B-Mode)	2412	10.26	>500 kHz
1 (G-Mode)	2412	16.67	>500 kHz
1 (N-Mode 20M)	2412	17.76	>500 kHz
3 (N-Mode 40M)	2422	36.29	>500 kHz
6 (B-Mode)	2437	10.34	>500 kHz
6 (G-Mode)	2437	16.78	>500 kHz
6 (N-Mode 20M)	2437	17.8	>500 kHz
6 (N-Mode 40M)	2437	36.29	>500 kHz
11 (B-Mode)	2462	10.7	>500 kHz
11 (G-Mode)	2462	16.78	>500 kHz
11 (N-Mode 20M)	2462	17.9	>500 kHz
9 (N-Mode 40M)	2452	36.55	>500 kHz
Measurement uncertainty		$< \pm 1 \times 10^{-7}$	

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

30, 73

## 5.2 Maximum peak output power

### 5.2.1 Method of measurement (maximum peak output power)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on.

#### Measurement procedure PK1:

The following spectrum analyser settings shall be used (available RBW is  $\geq$  EBW):

- Span: Zero.
- Resolution bandwidth:  $\text{RBW} \geq \text{EBW}$ .
- Video bandwidth: Three times the resolution bandwidth.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.
- Use marker function to determine the peak value

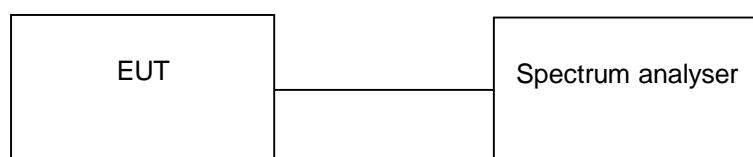
#### Measurement procedure PK2:

The following spectrum analyser settings shall be used (available RBW is  $<$  EBW):

- Span: 5-30 %  $>$  EBW.
- Resolution bandwidth: 1 MHz.
- Video bandwidth: 3 MHz.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.
- Use the spectrum analyser's integrated band power measurement function with band limits set equal to the EBW band edges.

The measurement will be performed at the upper and lower end and the middle of the assigned frequency band. For each WLAN mode the worst case configuration will be tested.

Test set-up:

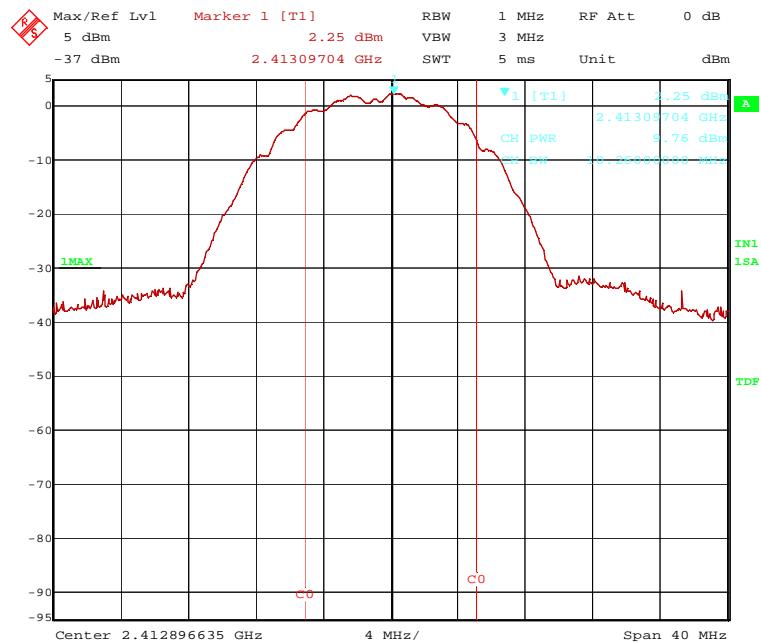


## 5.2.2 Test results (maximum peak output power)

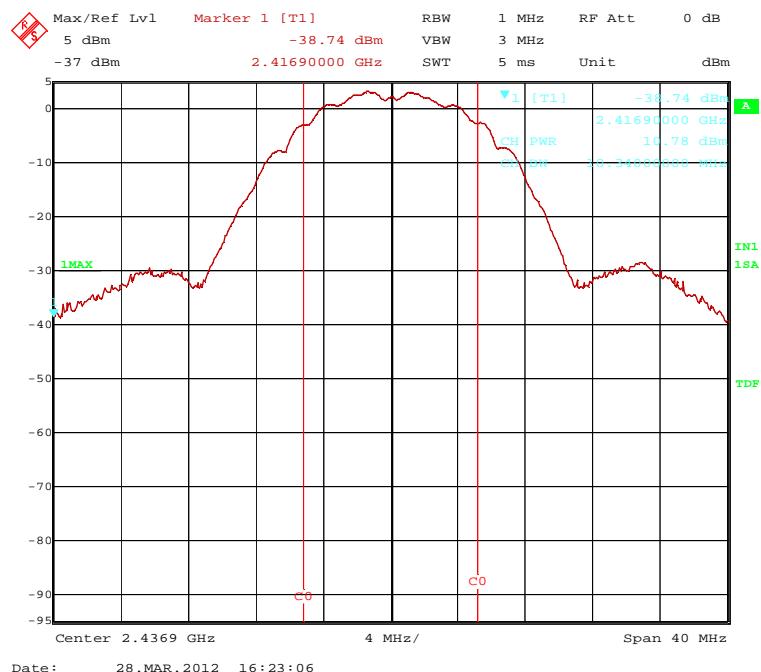
Ambient temperature	21 °C	Relative humidity	30 %
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The following test results were acquired by using measurement procedure PK2.

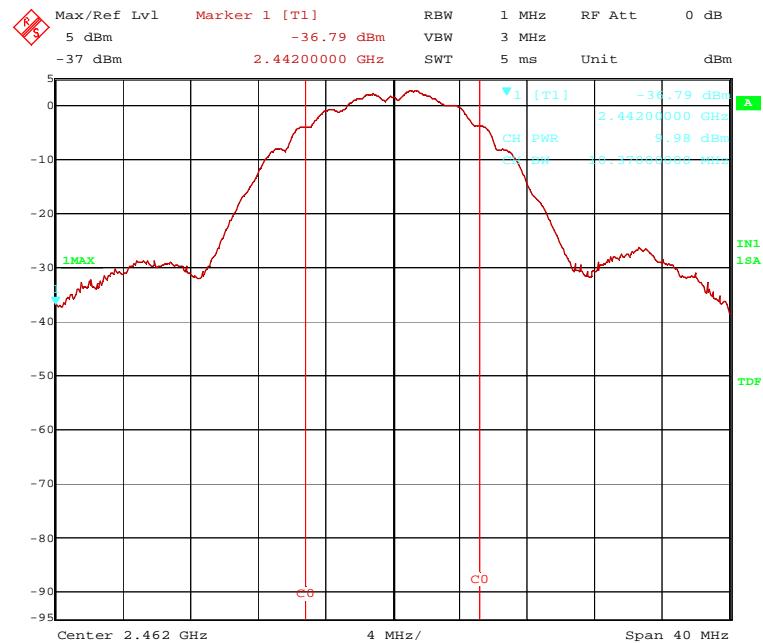
### 121150\_17.wmf: Maximum peak conducted output power (operation mode 1):



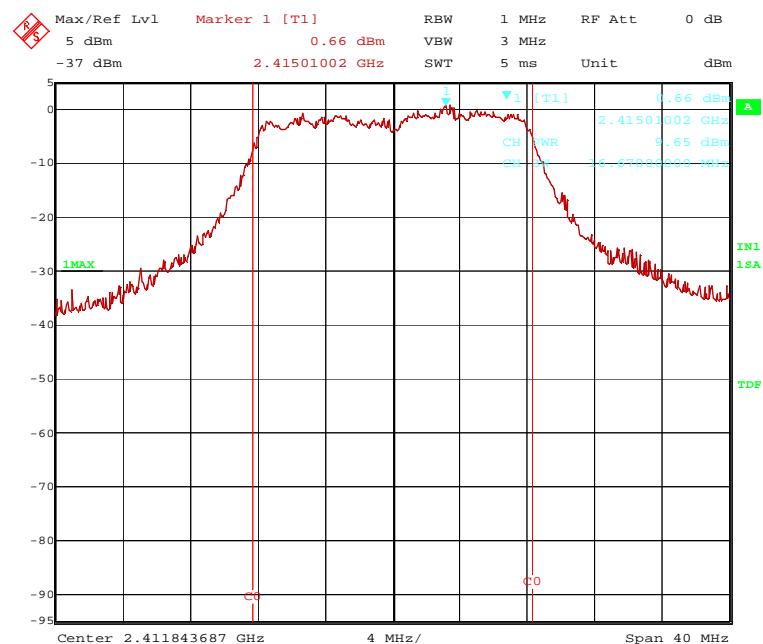
### 121150\_18.wmf: Maximum peak conducted output power (operation mode 2):



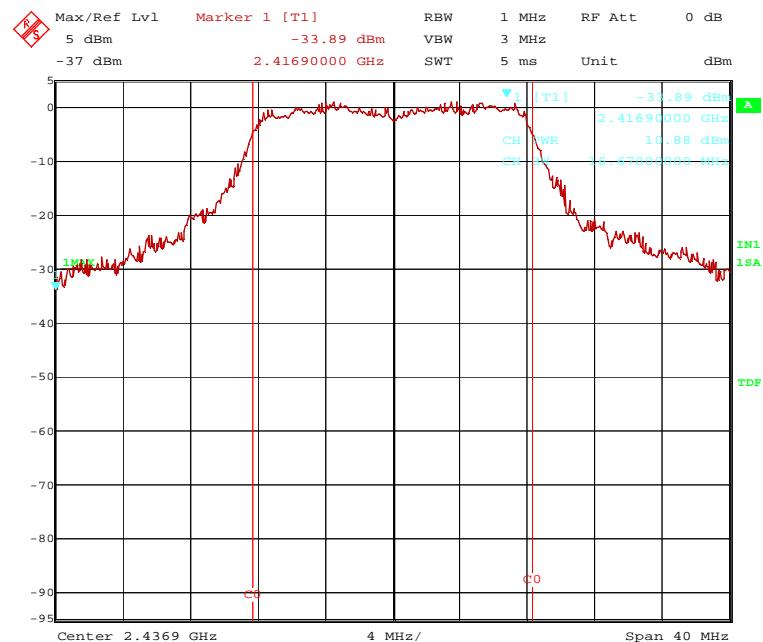
121150\_19.wmf: Maximum peak conducted output power (operation mode 3):



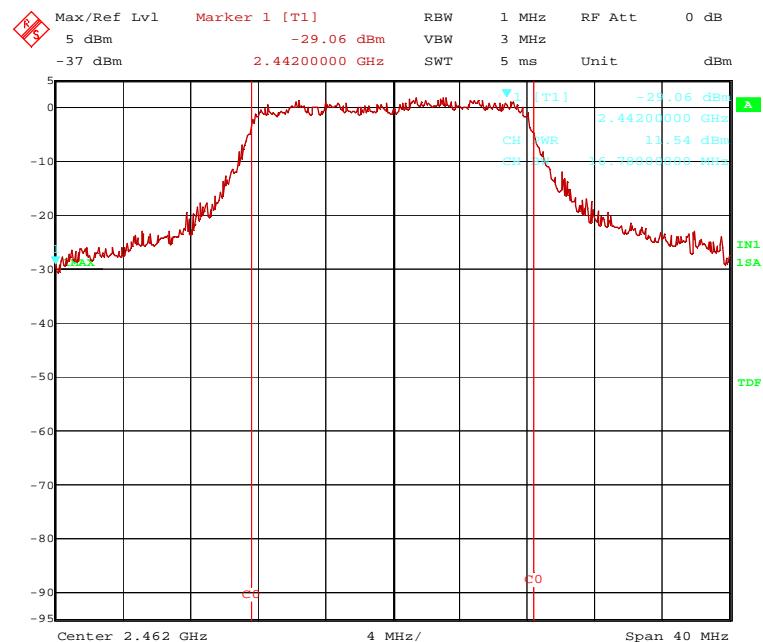
121150\_20.wmf: Maximum peak conducted output power (operation mode 4):



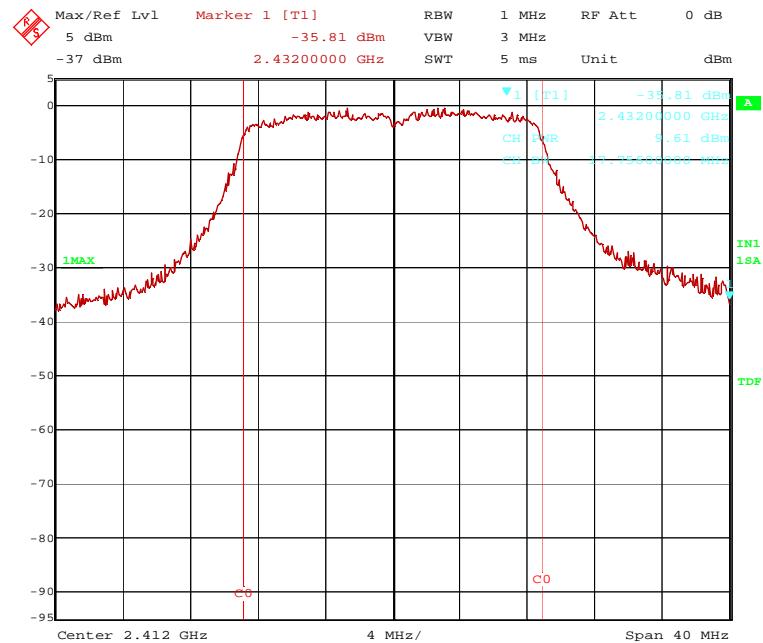
121150\_21.wmf: Maximum peak conducted output power (operation mode 5):



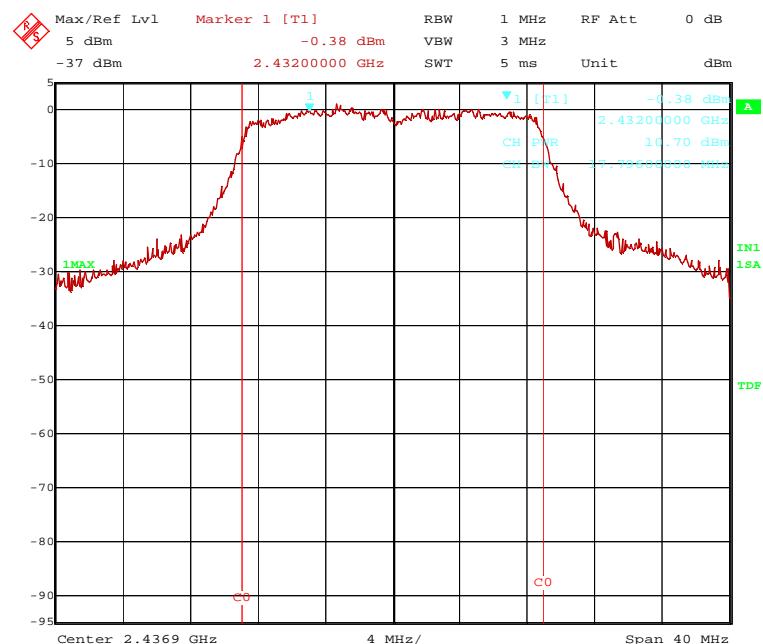
121150\_22.wmf: Maximum peak conducted output power (operation mode 6):



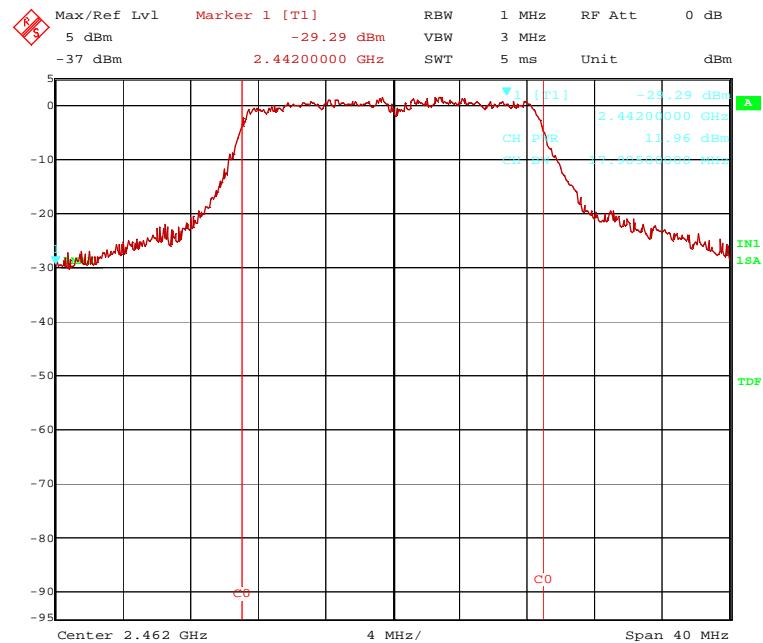
121150\_23.wmf: Maximum peak conducted output power (operation mode 7):



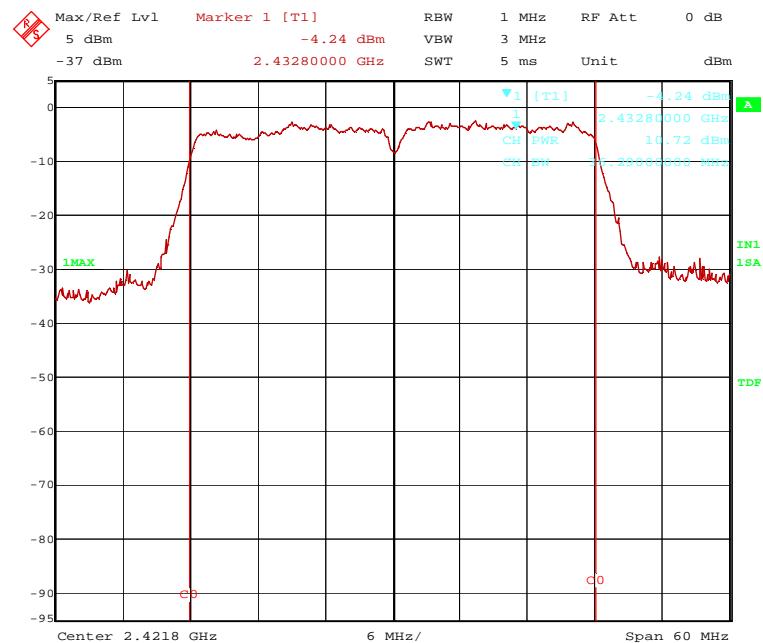
121150\_24.wmf: Maximum peak conducted output power (operation mode 8):



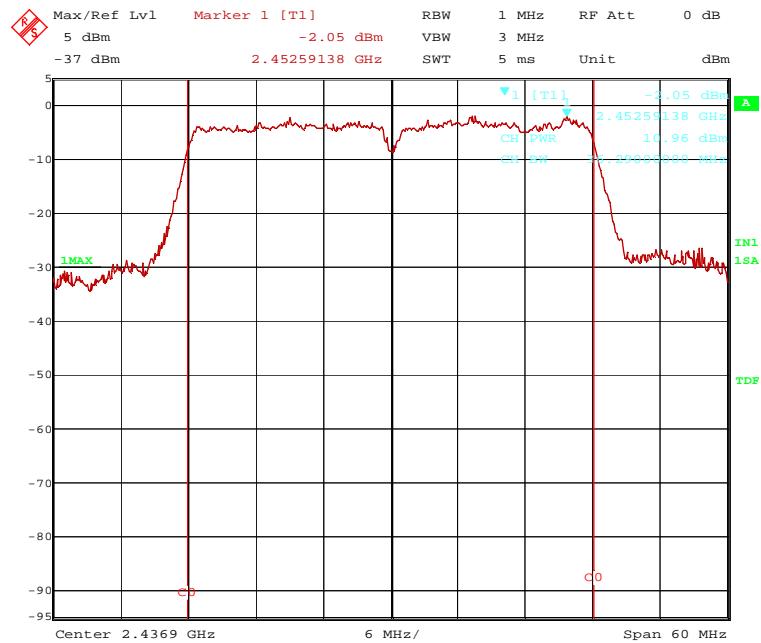
121150\_25.wmf: Maximum peak conducted output power (operation mode 9):



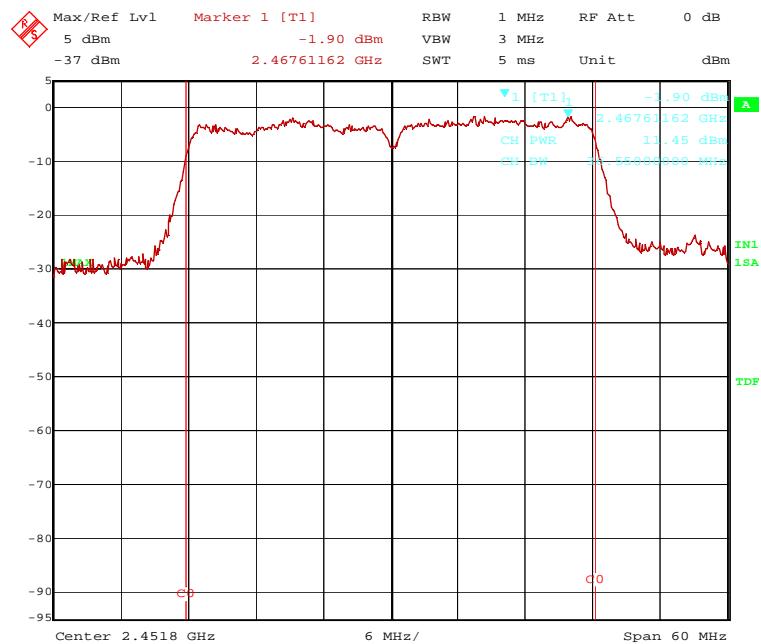
121150\_26.wmf: Maximum peak conducted output power (operation mode 10):



121150\_27.wmf: Maximum peak conducted output power (operation mode 11):



121150\_28.wmf: Maximum peak conducted output power (operation mode 12):



Used measurement procedure: PK1				
Operation mode 1 to 12				
Channel number	Channel frequency [MHz]	Maximum peak output power [dBm]	Antenna gain [dBi]	Peak power limit [dBm]
1 (B-Mode)	2412	7.76	2	30.0
1 (G-Mode)	2412	8.78	2	30.0
1 (N-Mode 20M)	2412	7.98	2	30.0
3 (N-Mode 40M)	2422	7.65	2	30.0
6 (B-Mode)	2437	8.88	2	30.0
6 (G-Mode)	2437	9.54	2	30.0
6 (N-Mode 20M)	2437	7.61	2	30.0
6 (N-Mode 40M)	2437	8.70	2	30.0
11 (B-Mode)	2462	9.96	2	30.0
11 (G-Mode)	2462	8.72	2	30.0
11 (N-Mode 20M)	2462	8.96	2	30.0
9 (N-Mode 40M)	2452	9.45	2	30.0
Measurement uncertainty			+0.66 dB / -0.72 dB	

Test: Passed

**TEST EQUIPMENT USED FOR THE TEST:**

36, 47, 31, 29

## 5.3 Power spectral density

### 5.3.1 Method of measurement (power spectral density)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed.

**Measurement procedure PKPS** (use this procedure in case of maximum peak conducted output power used to demonstrate compliance):

The following spectrum analyser settings shall be used:

- Span: 5 – 30 % greater than the EBW.
- Resolution bandwidth: 100 kHz.
- Video bandwidth: 300 kHz.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.
- Use the peak marker to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- Scale the observed power level to an equivalent value in 3 kHz by adjusting the measured power by an bandwidth correction factor of -15.2 dB.

The measurement will be performed at the upper and lower end and the middle of the assigned frequency band. For each WLAN mode the worst case configuration will be tested.

Test set-up(conducted measurement):



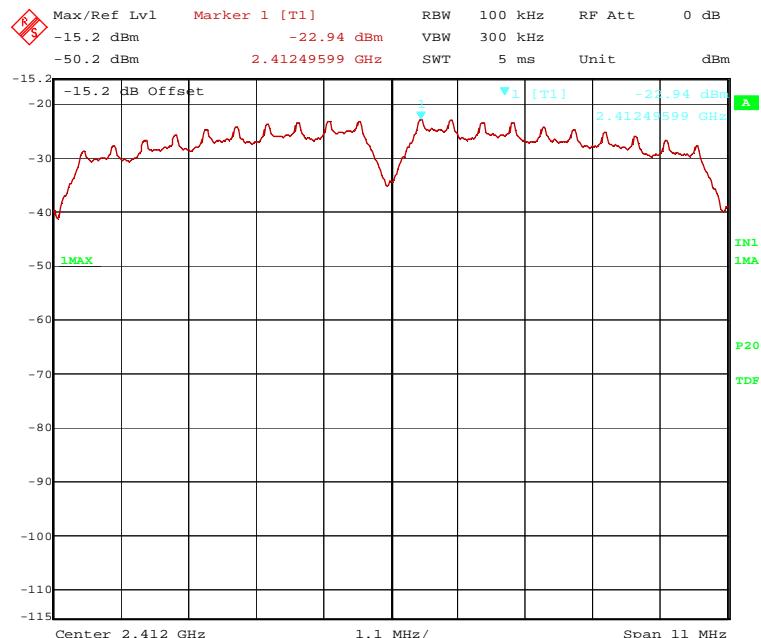
Test set-up (radiated measurement): The test set-up and the test procedure shall be according to the applicable test instruction as it is described in chapter 5.5

### 5.3.2 Test results (power spectral density)

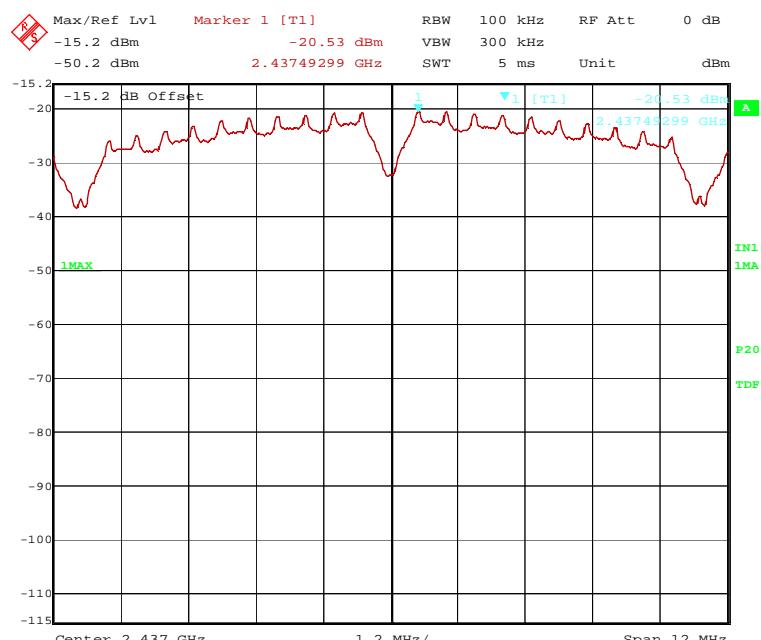
Ambient temperature	21 °C
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Relative humidity	30 %
-------------------	------

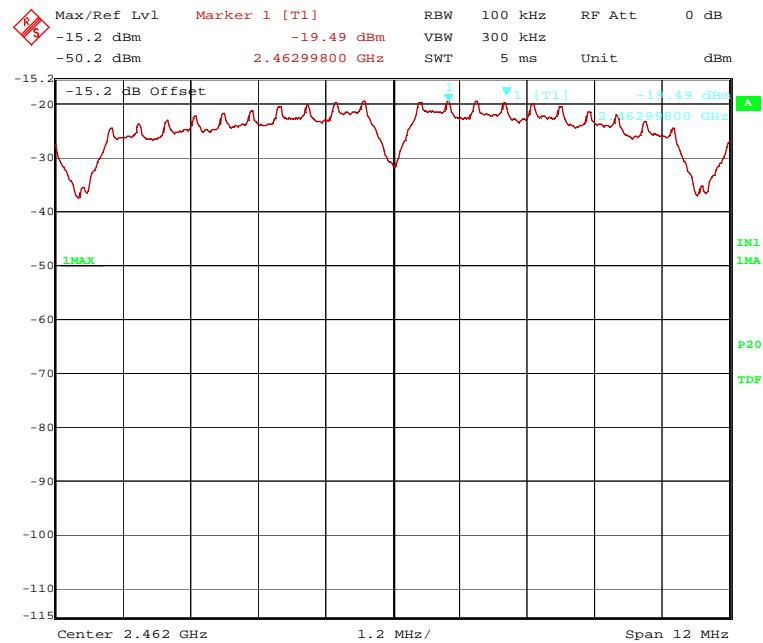
#### 121150\_39.wmf: Power spectral density (operation mode 1):



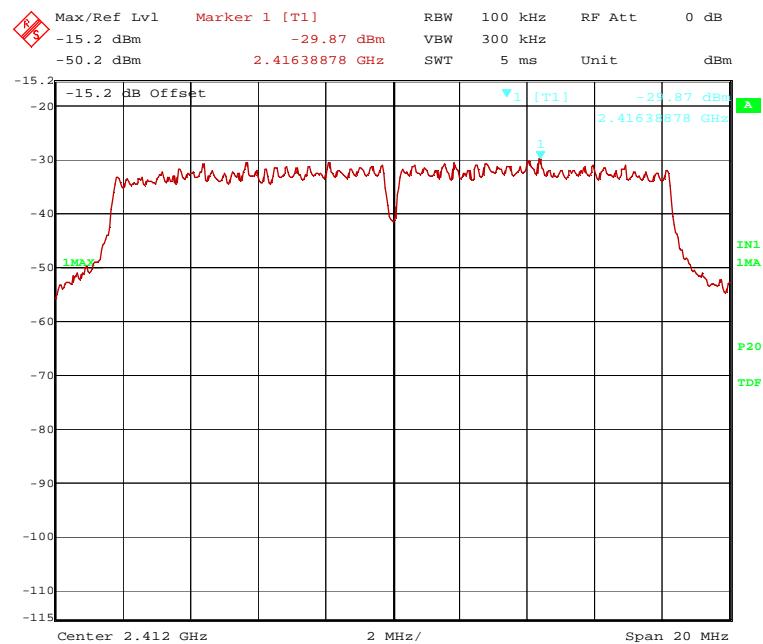
#### 121150\_43.wmf: Power spectral density (operation mode 2):



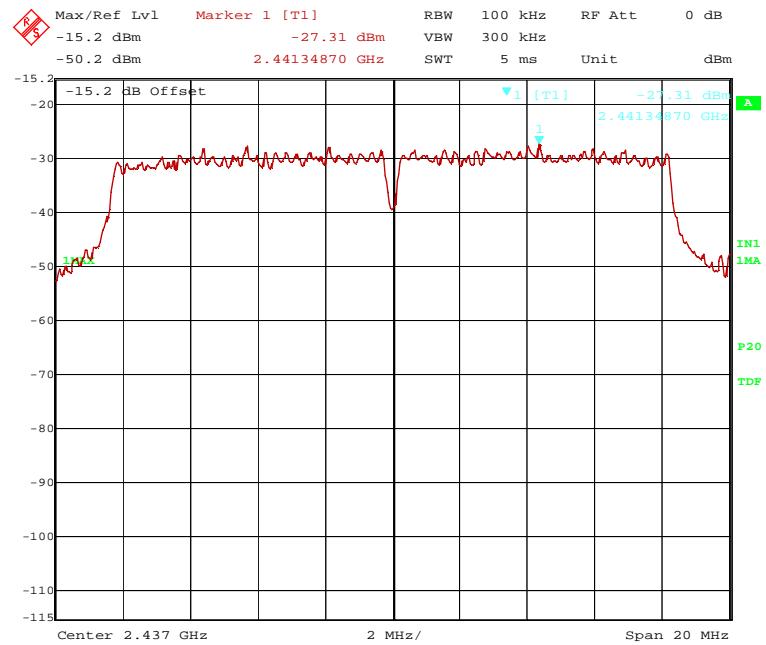
121150\_47.wmf: Power spectral density (operation mode 3):



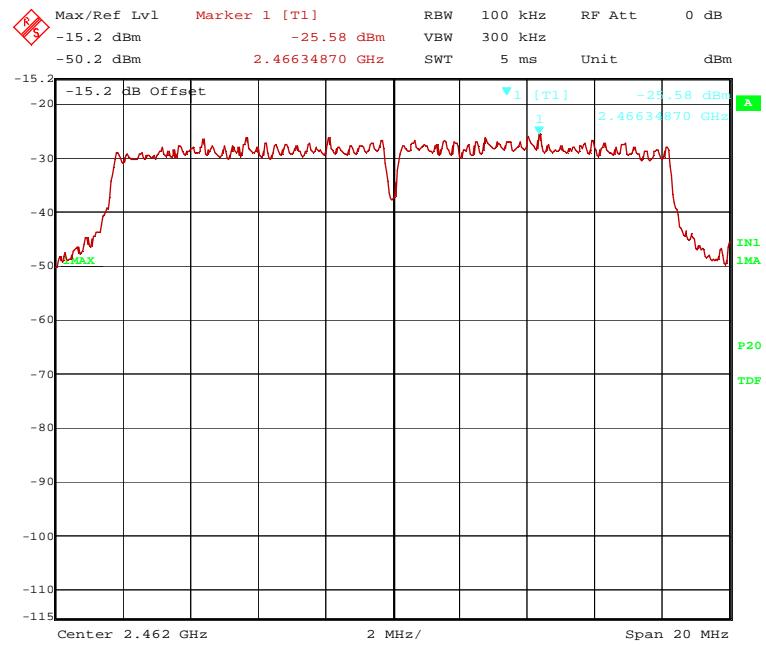
121150\_40.wmf: Power spectral density (operation mode 4):



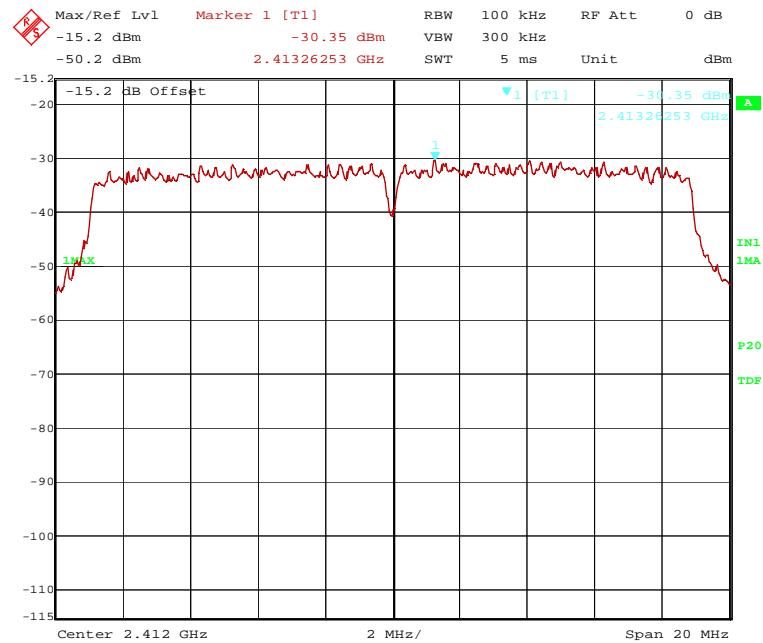
121150\_44.wmf: Power spectral density (operation mode 5):



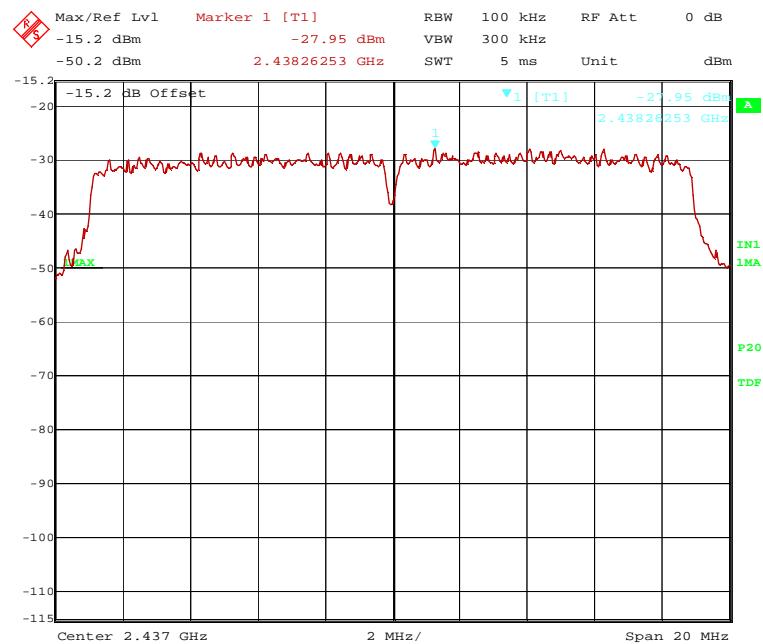
121150\_48.wmf: Power spectral density (operation mode 6):



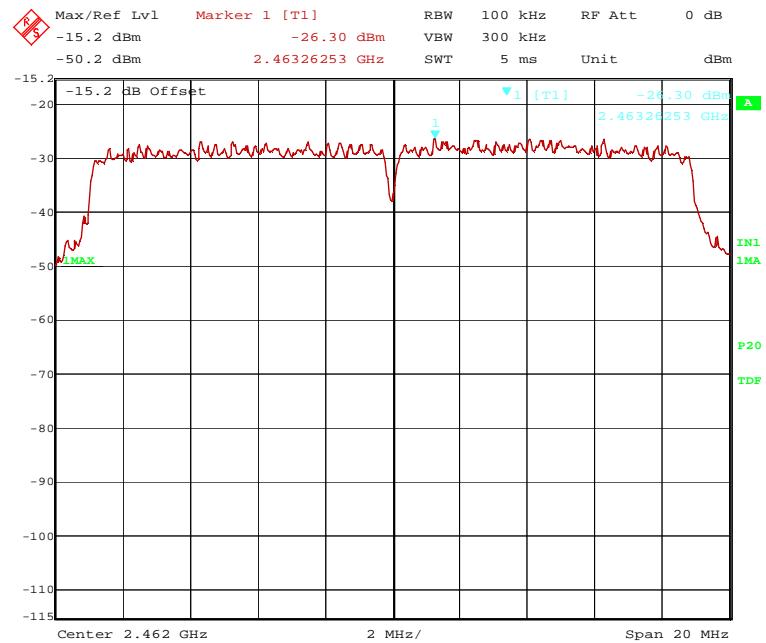
121150\_41.wmf: Power spectral density (operation mode 7):



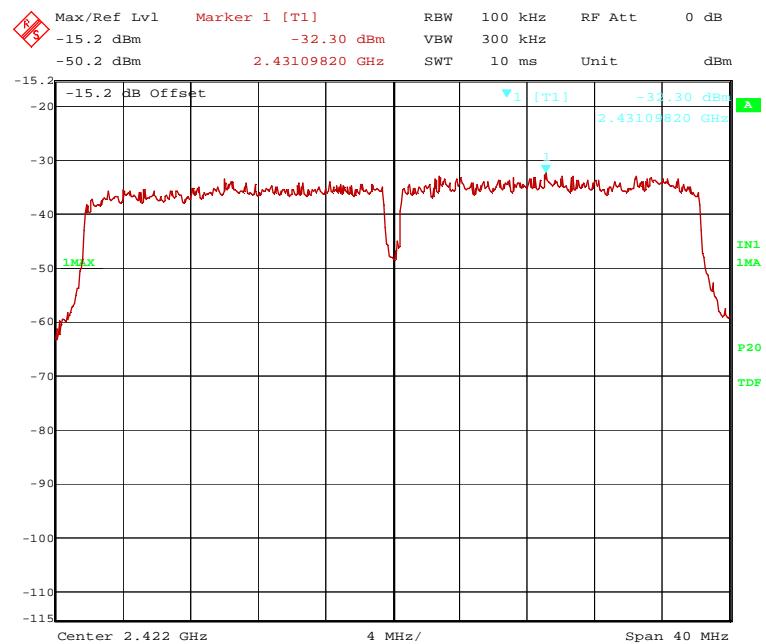
121150\_45.wmf: Power spectral density (operation mode 8):



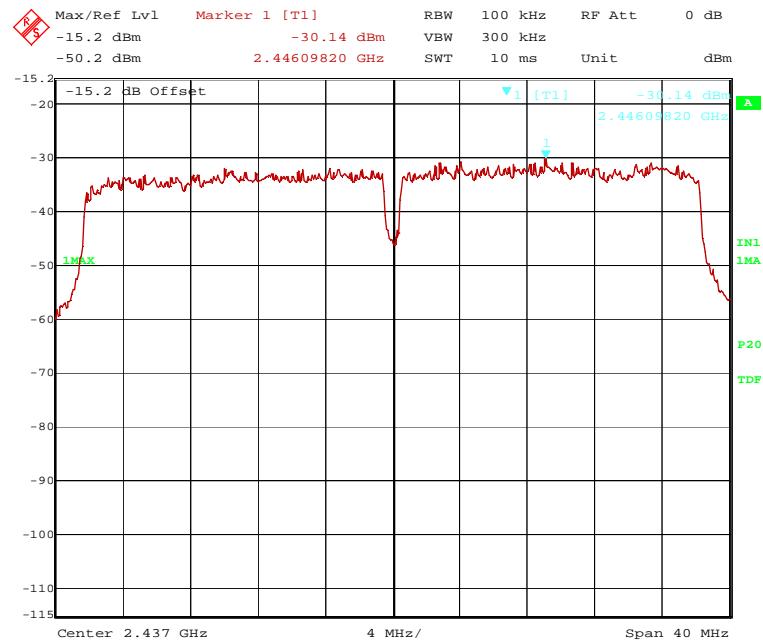
121150\_49.wmf: Power spectral density (operation mode 9):



121150\_42.wmf: Power spectral density (operation mode 10):



121150\_46.wmf: Power spectral density (operation mode 11):



121150\_50.wmf: Power spectral density (operation mode 12):



Used measurement procedure: PKPSD				
Operation mode 1 to 3				
Channel number	Channel frequency [MHz]	Power spectral density [dBm / 3 kHz]	Antenna gain [dBi]	Power spectral density limit [dBm / 3 kHz]
1 (B-Mode)	2412	-24.94	2	8.0
1 (G-Mode)	2412	-22.53	2	8.0
1 (N-Mode 20M)	2412	-21.49	2	8.0
3 (N-Mode 40M)	2422	-31.87	2	8.0
6 (B-Mode)	2437	-29.31	2	8.0
6 (G-Mode)	2437	-27.58	2	8.0
6 (N-Mode 20M)	2437	-32.35	2	8.0
6 (N-Mode 40M)	2437	-29.95	2	8.0
11 (B-Mode)	2462	-28.30	2	8.0
11 (G-Mode)	2462	-32.35	2	8.0
11 (N-Mode 20M)	2462	-32.14	2	8.0
9 (N-Mode 40M)	2452	-31.39	2	8.0
Measurement uncertainty			+1.1 dB / -1.5 dB	

Test: Passed

**TEST EQUIPMENT USED FOR THE TEST:**

36, 47, 31, 29

## 5.4 Band-edge compliance

### 5.4.1 Method of measurement (band-edge compliance (radiated))

The same test set-up as used for the final radiated emission measurement shall be used (refer also subclause 5.5 of this test report).

The following spectrum analyser settings shall be used:

- Span: Wide enough to capture the peak level of the emission on the channel closest to the band-edge, as well as any modulation products, which fall outside the authorized band of operation.
- Resolution bandwidth:  $\geq 1\%$  of the span.
- Video bandwidth:  $\geq$  the resolution bandwidth.
- Sweep: Auto.
- Detector function: Peak.
- Trace mode: Max hold.

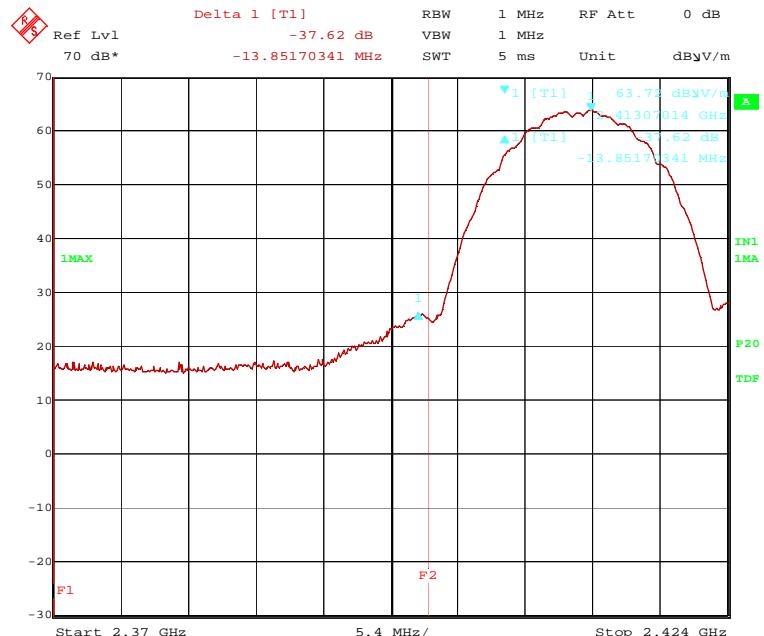
After trace stabilisation the marker shall be set on the signal peak. The first display line has to be set on this value. The second display line has to be set 20 dB below the first line (or the peak marker). The frequency line shall be set on the edge of the assigned frequency band. Now set the marker on the emission at the band-edge, or on the highest modulation product outside of the band, if this level is higher than that at the band-edge (use Marker count function). This frequency shall be measured with the EMI receiver as described in subclause 5.5 of this test report. If the level of the measured field strength is below the general limits specified in § 15.205, the specified limits have to be considered instead of the calculated difference.

The measurement will be performed at the lower and the upper end of the assigned frequency band. For each WLAN mode the worst case configuration will be tested.

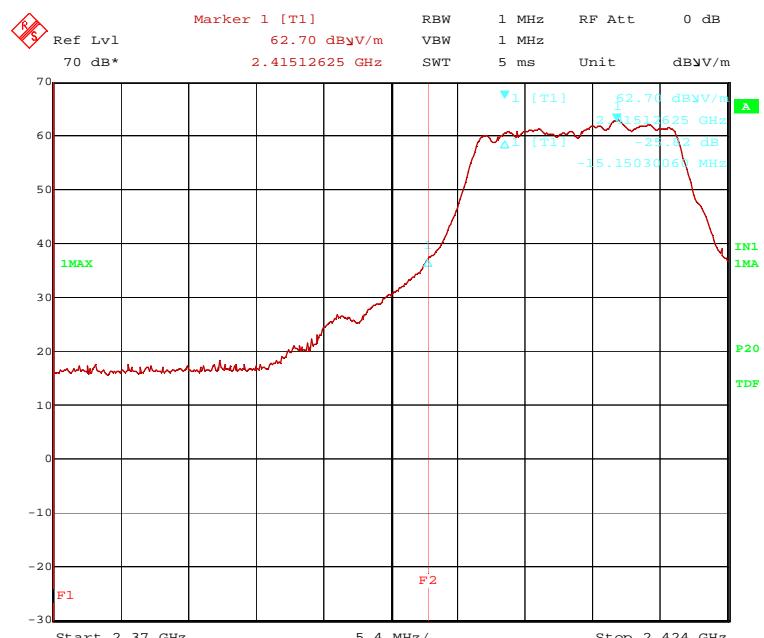
### 5.4.2 Test result (band-edge compliance (radiated)) with internal antenna

Ambient temperature	20 °C	Relative humidity	30 %
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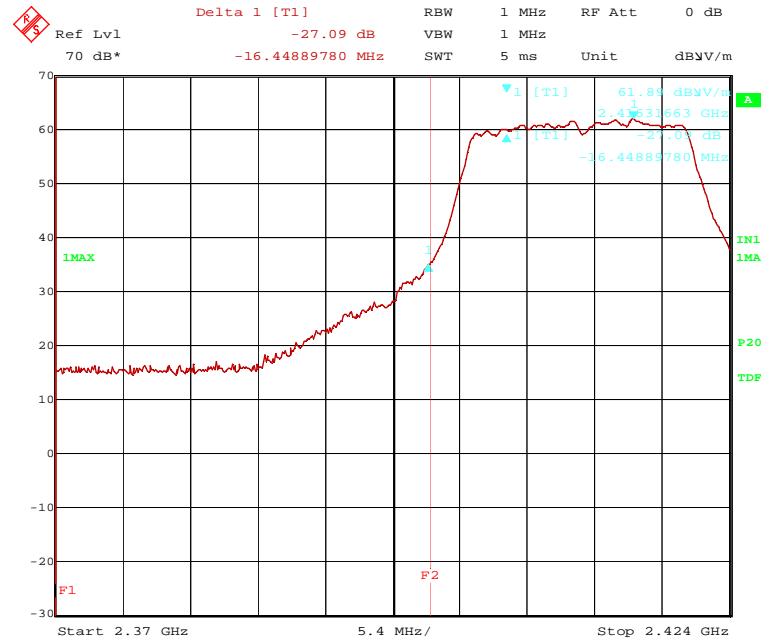
121150\_29.wmf: Radiated band-edge compliance, lower band edge (operation mode 1):



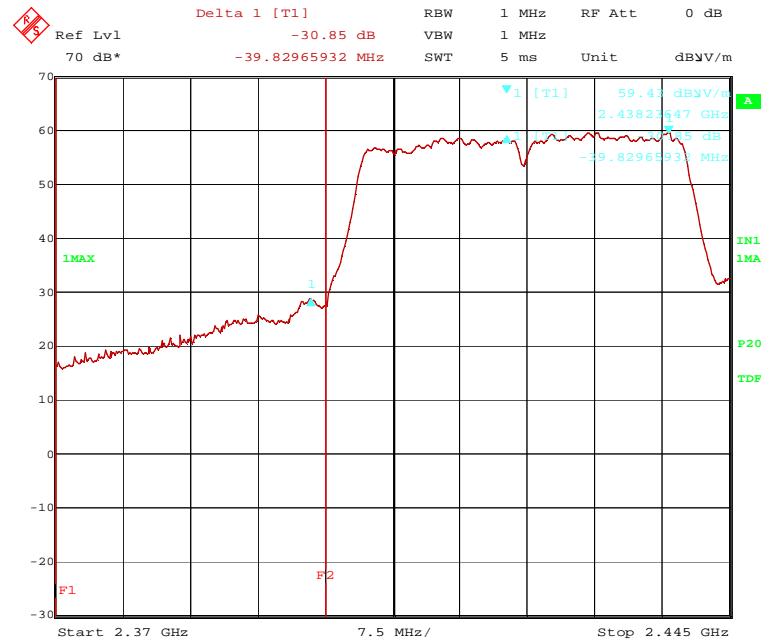
121150\_30.wmf: Radiated band-edge compliance, lower band edge (operation mode 4):



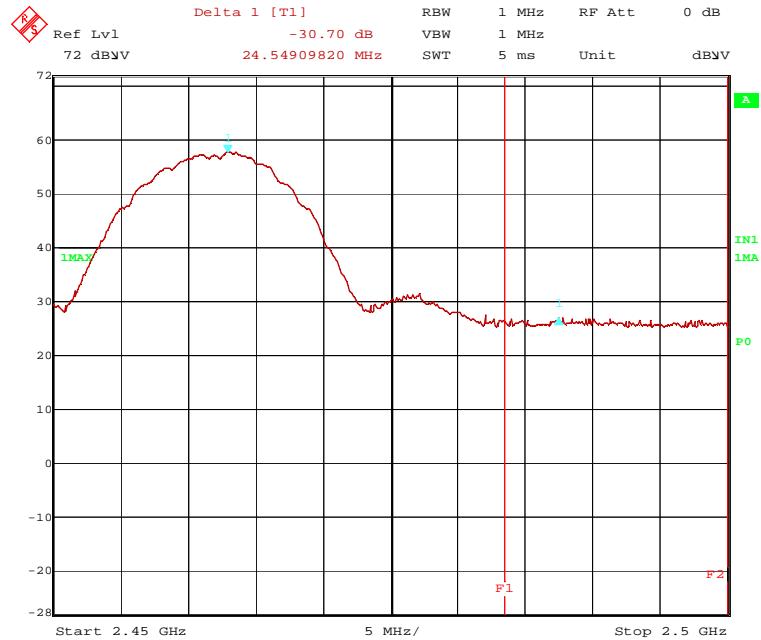
121150\_31.wmf: Radiated band-edge compliance, lower band edge (operation mode 7):



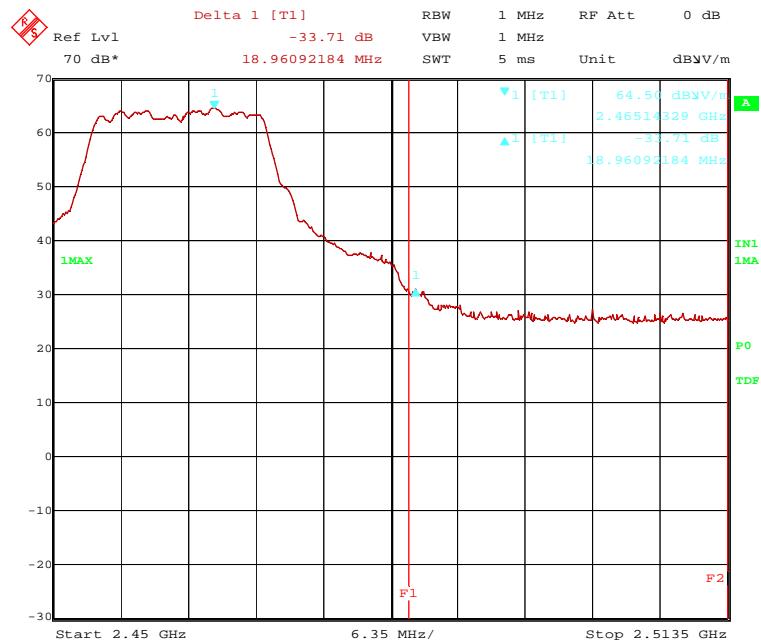
121150\_32.wmf: Radiated band-edge compliance, lower band edge (operation mode 10):



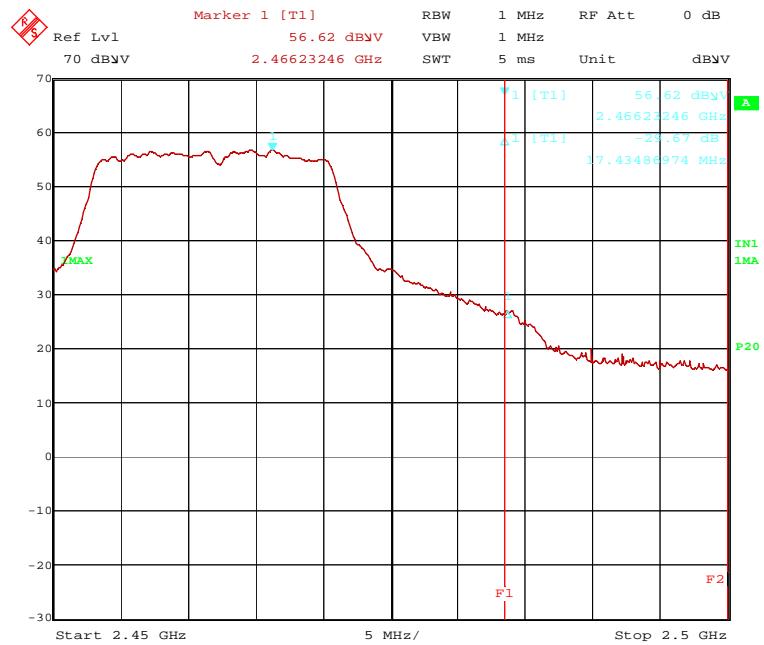
121150\_104.wmf: Radiated band-edge compliance, upper band edge (operation mode 3):



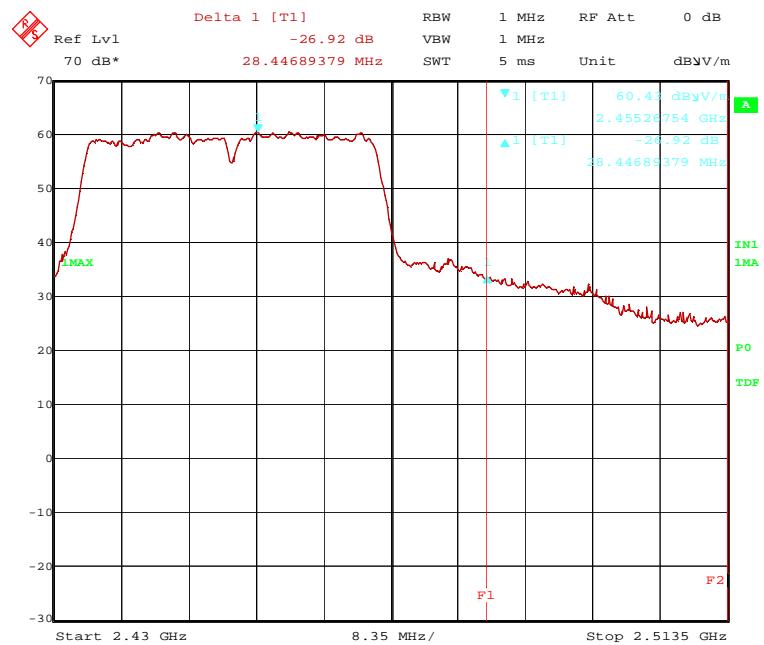
121150\_33.wmf: Radiated band-edge compliance, upper band edge (operation mode 6):



121150\_34.wmf: Radiated band-edge compliance, upper band edge (operation mode 9):



121150\_35.wmf: Radiated band-edge compliance, upper band edge (operation mode 12):



The plots on the pages before are showing the radiated band-edge compliance for the lower and upper band-edge. The frequency line 1 (F1) shows the upper and the frequency line 2 (F2) shows the lower edge of the assigned frequency band.

Band-edge compliance (lower band edge. Mode 1)											
Result measured with the peak detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.413	89.1			57.0	28.4	0.0	3.7	89.1	Hor.	-	1
2.3992	51.4	74.0	22.6	19.4	28.3	0.0	3.7	24.9	Hor.	No	1
Result measured with the average detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.413	85.1			53.0	28.4	0.0	3.7	150	Hor.	-	1
2.3992	47.4	65.1	17.7	15.4	28.3	0.0	3.7	150	Hor.	No	1
Measurement uncertainty								+2.2 dB / -3.6 dB			

Band-edge compliance (lower band edge. Mode 4)											
Result measured with the peak detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.416	87.6			55.5	28.3	0.0	3.7	150	Hor.	-	1
2.39998	61.9	74.0	12.1	29.9	28.3	0.0	3.7	150	Hor.	No	1
Result measured with the average detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.416	78.1			46.0	28.3	0.0	3.7	150	Hor.	-	1
2.39998	52.2	58.1	5.9	20.2	28.3	0.0	3.7	150	Hor.	No	1
Measurement uncertainty								+2.2 dB / -3.6 dB			

Band-edge compliance (lower band edge. Mode 7)											
Result measured with the peak detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.413	87.7			55.6	28.5	0.0	3.8	150	Hor.	-	1
2.39987	60.5	74.0	13.5	28.5	28.5	0.0	3.8	150	Hor.	No	1
Result measured with the average detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.413	78.0			45.9	28.5	0.0	3.8	150	Hor.	-	1
2.39987	50.8	58.0	7.2	18.8	28.5	0.0	3.8	150	Hor.	No	1
Measurement uncertainty								+2.2 dB / -3.6 dB			

Band-edge compliance (lower band edge. Mode 10)											
Result measured with the peak detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.431	84.1			52.0	28.5	0.0	3.8	150	Hor.	-	1
2.3984	53.2	74.0	20.9	21.2	28.5	0.0	3.8	150	Hor.	No	1
Result measured with the average detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.431	74.8			42.7	28.5	0.0	3.8	150	Hor.	-	1
2.3984	43.9	54.8	11.0	11.9	28.5	0.0	3.8	150	Hor.	No	1
Measurement uncertainty								+2.2 dB / -3.6 dB			

Band-edge compliance (upper band edge. Mode 3)											
Result measured with the peak detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.463	88.4			56.2	28.5	0.0	3.7	150	Hor.	-	1
2.398	50.5	74.0	23.5	18.5	28.3	0.0	3.7	150	Hor.	No	1
Result measured with the average detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.463	84.2			52.0	28.5	0.0	3.7	150	Hor.	-	1
2.398	37.5	64.2	26.7	5.5	28.3	0.0	3.7	150	Hor.	No	1
Measurement uncertainty								+2.2 dB / -3.6 dB			

Band-edge compliance (upper band edge. Mode 6)											
Result measured with the peak detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.466	92.2			60.0	28.3	0.0	3.7	150	Hor.	-	1
2.4841	58.6	74.0	15.4	26.3	28.3	0.0	3.7	150	Hor.	No	1
Result measured with the average detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.466	82.1			49.9	28.3	0.0	3.7	150	Hor.	-	1
2.4841	48.5	54.0	5.5	16.2	28.3	0.0	3.7	150	Hor.	No	1
Measurement uncertainty								+2.2 dB / -3.6 dB			

Band-edge compliance (upper band edge. Mode 9)											
Result measured with the peak detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.466	92.5			60.3	28.5	0.0	3.7	150	Vert.	-	1
2.484	62.9	74.0	11.1	30.6	28.5	0.0	3.8	150	Hor.	No	1
Result measured with the average detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.466	82.1			49.9	28.5	0.0	3.7	150	Vert.	-	1
2.484	52.5	54.0	1.5	20.2	28.5	0.0	3.8	150	Hor.	No	1
Measurement uncertainty								+2.2 dB / -3.6 dB			

Band-edge compliance (upper band edge. Mode 12)											
Result measured with the peak detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.461	87.8			55.6	28.5	0.0	3.8	150	Hor.	-	1
2.4837	61.0	74.0	13.0	28.7	28.5	0.0	3.8	150	Hor.	No	1
Result measured with the average detector:											
Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Reading dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.461	78.7			46.5	28.5	0.0	3.8	150	Hor.	-	1
2.4837	51.9	54.0	2.1	19.6	28.5	0.0	3.8	150	Hor.	No	1
Measurement uncertainty								+2.2 dB / -3.6 dB			

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:											
36, 47, 31, 29											

## 5.5 Radiated emissions

### 5.5.1 Method of measurement (radiated emissions)

The radiated emission measurement is subdivided into six stages.

- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 9 kHz to 30 MHz.
- A final measurement carried out on an outdoor test site without reflecting ground plane and a fixed antenna height in the frequency range 9 kHz to 30 MHz.
- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 30 MHz to 1 GHz.
- A final measurement carried out on an open area test side with reflecting ground plane and various antenna height in the frequency range 30 MHz to 1 GHz.
- A preliminary measurement carried out in a fully anechoic chamber with a variable antenna distance and height in the frequency range 1 GHz to 110 GHz.
- A final measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 1 GHz to 110 GHz.

All measurements will be carried out with the EUT working on the middle and upper and lower edge of the assigned frequency band.

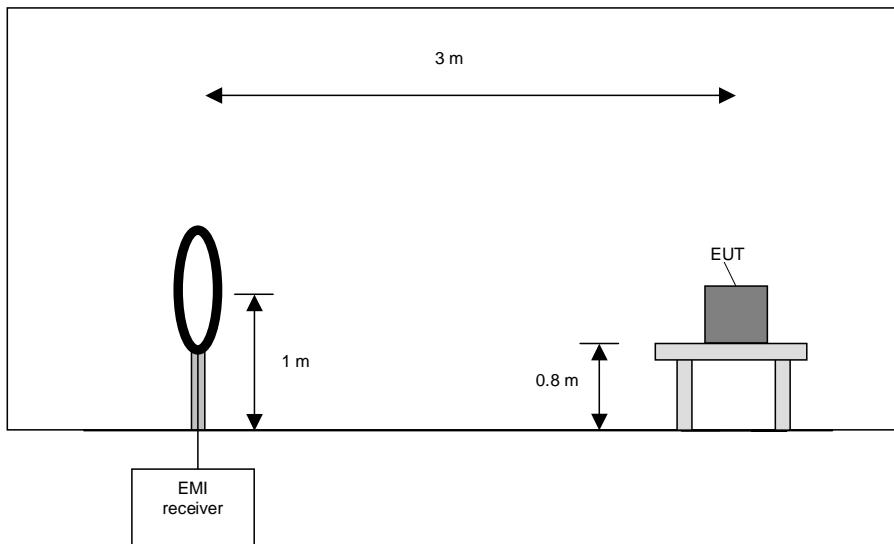
#### Preliminary measurement (9 kHz to 30 MHz):

In the first stage a preliminary measurement will be performed in a shielded room with a measuring distance of 3 meters. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2009 [1].

The frequency range 9 kHz to 30 MHz will be monitored with a spectrum analyser while the system and its cables will be manipulated to find out the configuration with the maximum emission levels if applicable. The EMI Receiver will be set to MAX Hold mode. The EUT and the measuring antenna will be rotated around their vertical axis to find the maximum emissions.

The resolution bandwidth of the spectrum analyser will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	10 kHz



#### Preliminary measurement procedure:

Prescans were performed in the frequency range 9 kHz to 150 kHz and 150 kHz to 30 MHz.

The following procedure will be used:

- 1) Monitor the frequency range at "face-to-face" polarisation and a EUT azimuth of 0 °.
- 2) Manipulate the system cables within the range to produce the maximum level of emission.
- 3) Rotate the EUT by 360 ° to maximize the detected signals.
- 4) Make a hardcopy of the spectrum.
- 5) Measure the frequencies of the highest detected emission with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
- 6) Repeat steps 1) to 4) with the other orthogonal axes of the EUT.
- 7) Rotate the measuring antenna and repeat steps 1) to 5).

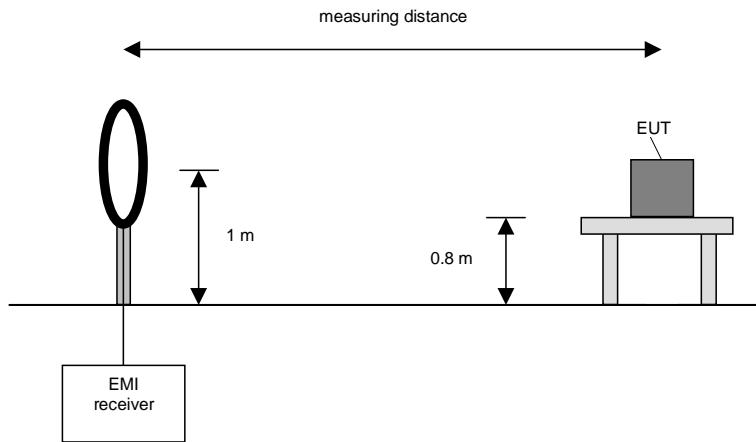
#### Final measurement (9 kHz to 30 MHz):

In the second stage a final measurement will be performed on an outdoor test site with no conducting ground plane in a measuring distances of 3 m, 10 m and 30 m. In the case where larger measuring distances are required the results will be extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2]. The final measurement will be performed with an EMI Receiver set to Quasi Peak detector except for the frequency bands 9 kHz to 90 kHz and 110 kHz to 490 kHz where an average detector will be used according Section 15.209 (d) [2].

On the during the preliminary measurement detected frequencies the final measurement will be performed while rotating the EUT and the measuring antenna in the range of 0 ° to 360 ° around their vertical axis until the maximum value is found.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz



#### Final measurement procedure:

The following procedure will be used:

- 1) Monitor the frequency range with the measuring antenna at "face-to-face" orientation parallel to the EUT at an azimuth of 0 °.
- 2) Rotate the EUT by 360 ° to maximize the detected signals and note the azimuth and orientation.
- 3) Rotate the measuring antenna to find the maximum and note the value.
- 4) Rotate the measuring antenna and repeat steps 1) to 3) until the maximum value is found.
- 5) Repeat steps 1) to 4) with the other orthogonal axes of the EUT if applicable (handheld equipment).

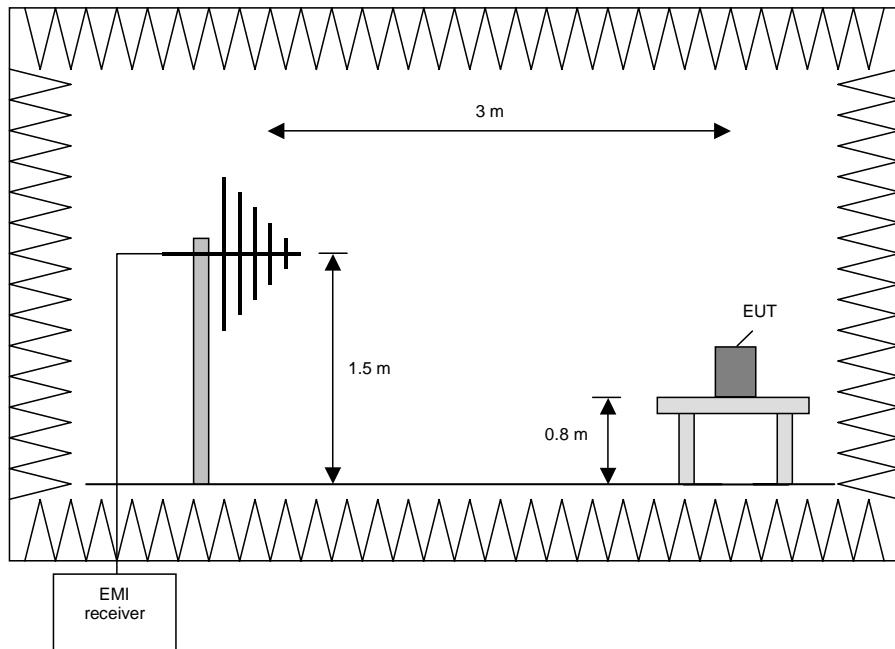
#### Preliminary measurement (30 MHz to 1 GHz)

In the first stage a preliminary measurement will be performed in a fully anechoic chamber with a measuring distance of 3 meter. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2009 [1].

The frequency range 30 MHz to 1 GHz will be measured with an EMI Receiver set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 230 MHz	100 kHz
230 MHz to 1 GHz	100 kHz



#### Procedure preliminary measurement:

Prescans were performed in the frequency range 30 MHz to 230 MHz and 230 MHz to 1 GHz. The following procedure will be used:

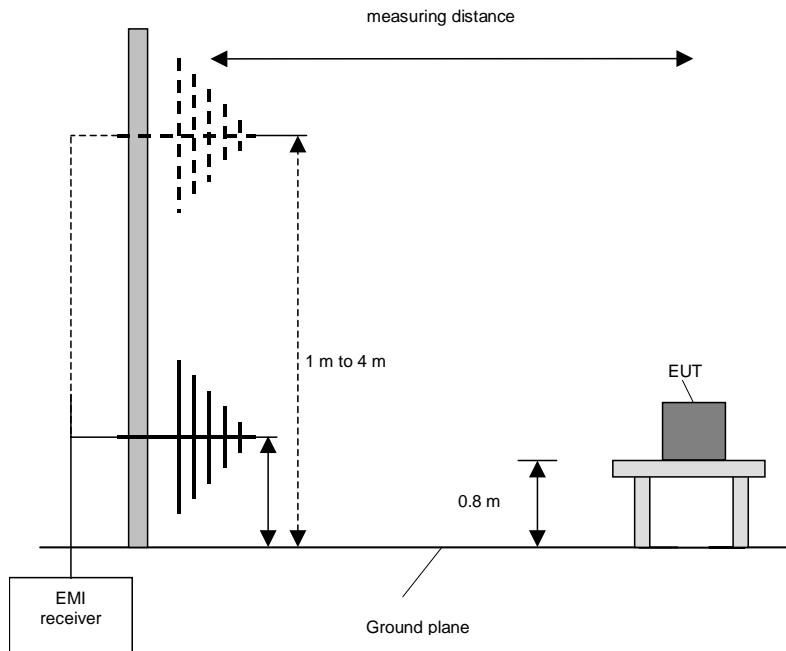
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Manipulate the system cables within the range to produce the maximum level of emission.
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Make a hardcopy of the spectrum.
5. Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
6. Repeat 1) to 4) with the other orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).
7. Repeat 1) to 5) with the vertical polarisation of the measuring antenna.

#### **Final measurement (30 MHz to 1 GHz)**

A final measurement on an open area test site will be performed on selected frequencies found in the preliminary measurement. During this test the EUT will be rotated in the range of 0 ° to 360 °, the measuring antenna will be set to horizontal and vertical polarisation and raised and lowered in the range from 1 m to 4 m to find the maximum level of emissions.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz



#### Procedure final measurement:

The following procedure will be used:

- 1) Measure on the selected frequencies at an antenna height of 1 m and a EUT azimuth of 23 °.
- 2) Move the antenna from 1 m to 4 m and note the maximum value at each frequency.
- 3) Rotate the EUT by 45 ° and repeat 2) until an azimuth of 337 ° is reached.
- 4) Repeat 1) to 3) for the other orthogonal antenna polarization.
- 5) Move the antenna and the turntable to the position where the maximum value is detected.
- 6) Measure while moving the antenna slowly +/- 1 m.
- 7) Set the antenna to the position where the maximum value is found.
- 8) Measure while moving the turntable +/- 45 °.
- 9) Set the turntable to the azimuth where the maximum value is found.
- 10) Measure with Final detector (QP and AV) and note the value.
- 11) Repeat 5) to 10) for each frequency.
- 12) Repeat 1) to 11) for each orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).

#### Preliminary and final measurement (1 GHz to 110 GHz)

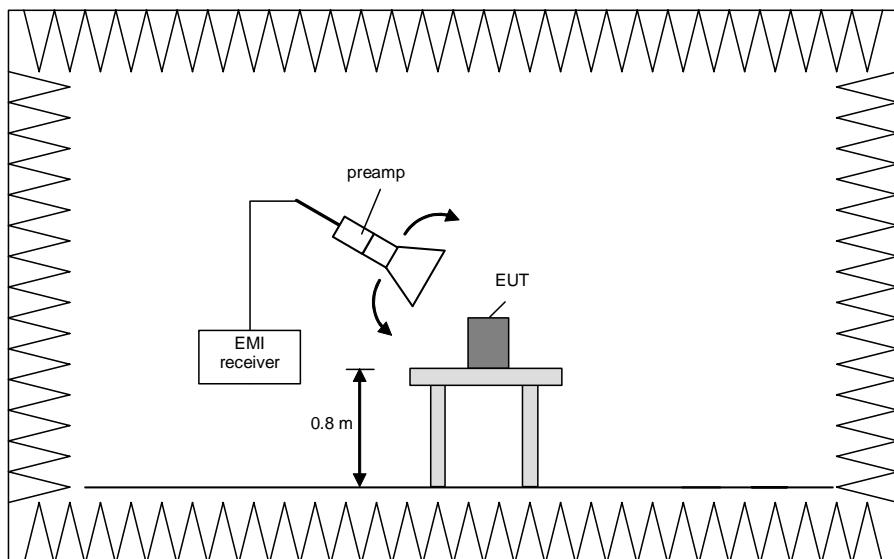
This measurement will be performed in a fully anechoic chamber. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2009 [1].

#### Preliminary measurement (1 GHz to 110 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The spectrum analyser set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna, the antenna close to the EUT and while moving the antenna over all sides of the EUT. With the spectrum analyser in CLEAR / WRITE mode the cone of the emission should be found and than the measuring distance will be set to 3 m with the receiving antenna moving in this cone of emission. At this position the final measurement will be carried out.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	100 kHz
4 GHz to 12 GHz	100 kHz
12 GHz to 18 GHz	100 kHz
18 GHz to 26.5 GHz	100 kHz
26.5 GHz to 40 GHz	100 kHz
40 GHz to 60 GHz	100 kHz
50 GHz to 75 GHz	100 kHz
75 GHz to 110 GHz	100 kHz

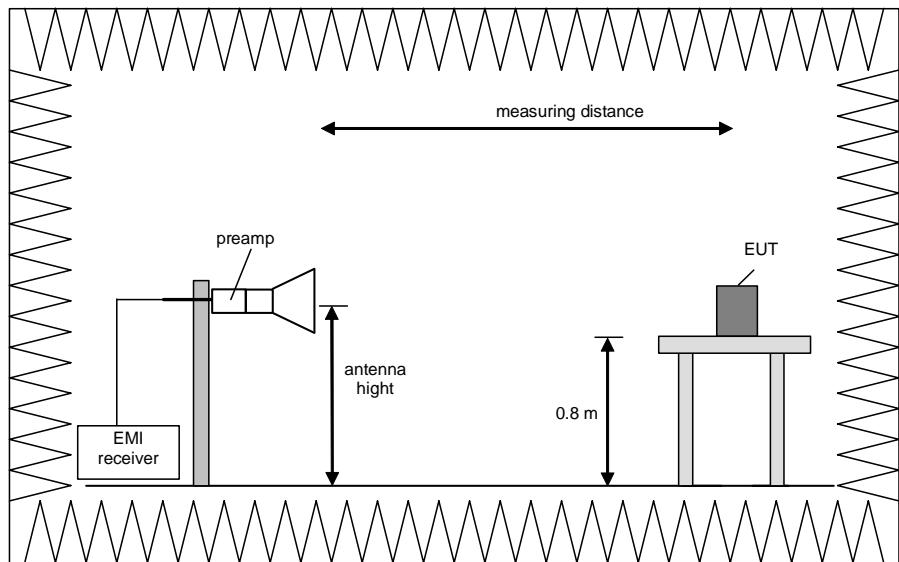


### Final measurement (1 GHz to 110 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1 MHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 ° in order to have the antenna inside the cone of radiation.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	1 MHz
4 GHz to 12 GHz	1 MHz
12 GHz to 18 GHz	1 MHz
18 GHz to 26.5 GHz	1 MHz
26.5 GHz to 40 GHz	1 MHz
40 GHz to 60 GHz	1 MHz
50 GHz to 75 GHz	1 MHz
75 GHz to 110 GHz	1 MHz



#### Procedure of measurement:

The measurements were performed in the frequency range 1 GHz to 4 GHz, 4 GHz to 12 GHz, 12 GHz to 18 GHz, 18 GHz to 26.5 GHz, 26.5 GHz to 40 GHz, 40 GHz to 60 GHz, 60 GHz to 75 GHz and 75 GHz to 110 GHz.

The following procedure will be used:

- 1) Monitor the frequency range at horizontal polarisation and move the antenna over all sides of the EUT (if necessary move the EUT to another orthogonal axis).
- 2) Change the antenna polarisation and repeat 1) with vertical polarisation.
- 3) Make a hardcopy of the spectrum.
- 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
- 5) Change the analyser mode to Clear / Write and found the cone of emission.
- 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3 m and the antenna will be still inside the cone of emission.
- 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarisation and azimuth and the peak and average detector, which causes the maximum emission.
- 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

Step 1) to 6) are defined as preliminary measurement.

## 5.5.2 Test results (radiated emissions) with internal antenna

### 5.5.2.1 Preliminary radiated emission measurement (9 kHz – 1 GHz)

Ambient temperature	20 °C	Relative humidity	30 %
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Position of EUT: The EUT was plugged into a laptop PC. The laptop PC with the inserted EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

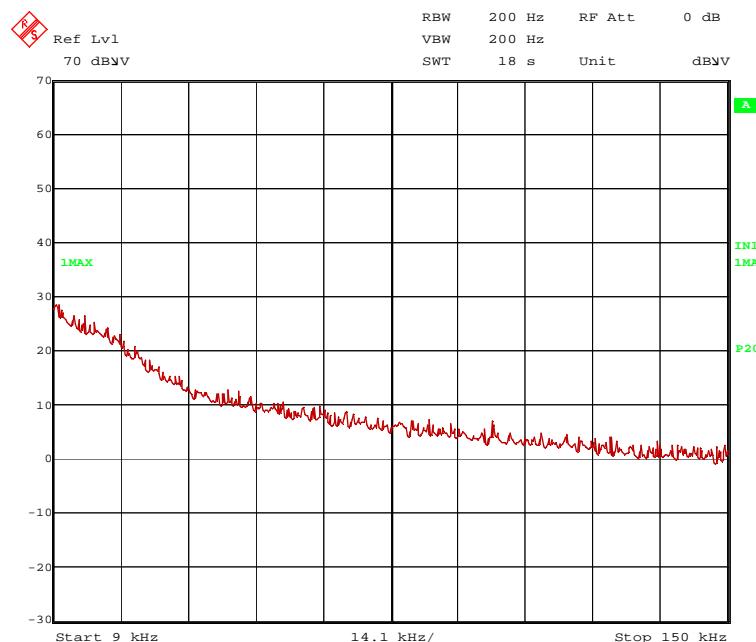
Cable guide: For detail information of test set-up and the cable guide refer to the pictures in annex A of this test report.

Test record: All results are shown in the following.

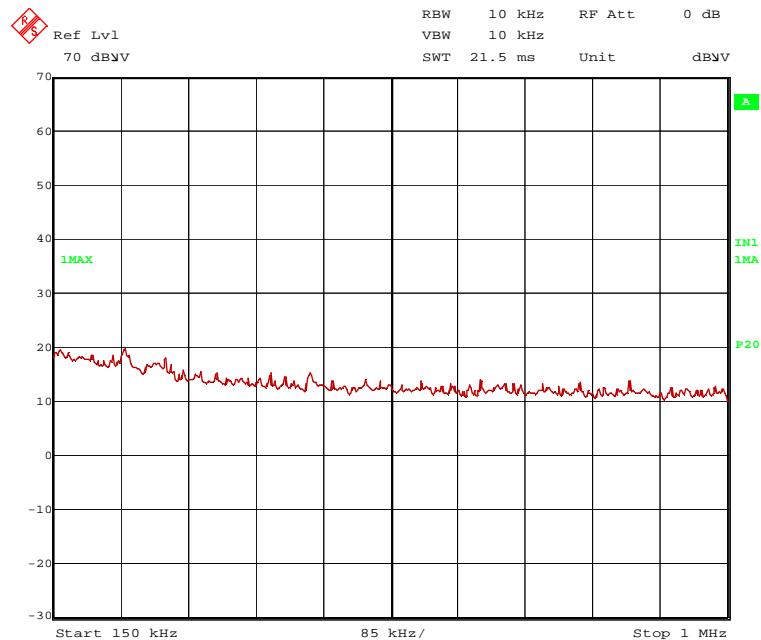
Supply voltage: During all measurements the EUT was supplied with 5 V DC via the laptop PC.

Remark: No emissions were emitted in the frequency range 9 kHz to 30 GHz independent of the transmitter operation mode. Therefore the emissions in this frequency range were documented with a continuous transmission in mode 3.

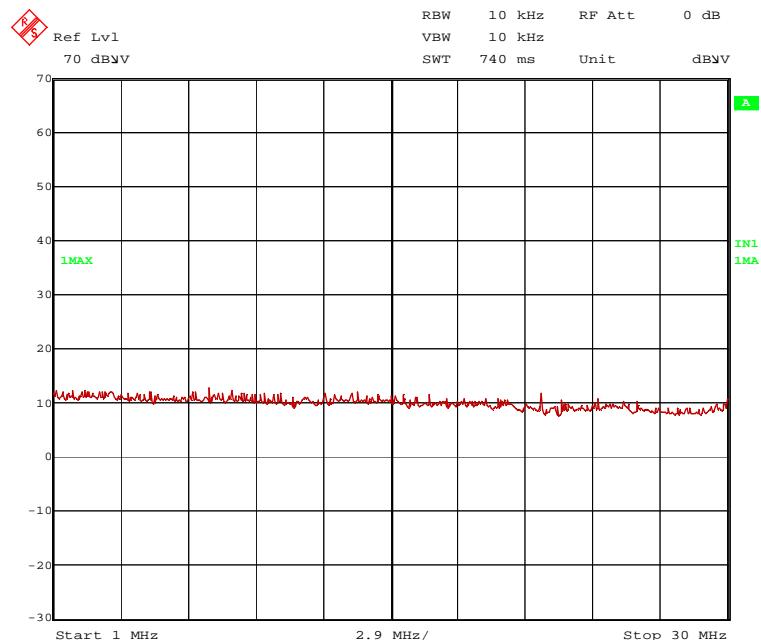
#### 121150\_87.wmf: Spurious emissions from 9 kHz to 150 kHz (operation mode 3):



121150\_88.wmf: Spurious emissions from 150 kHz to 1 MHz (operation mode 3):

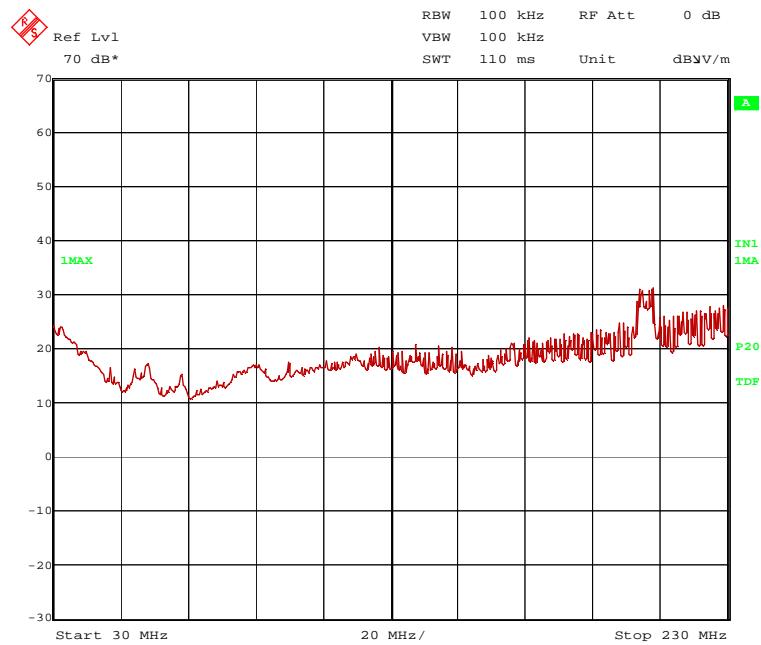


121150\_89.wmf: Spurious emissions from 1 MHz to 30 MHz (operation mode 3):

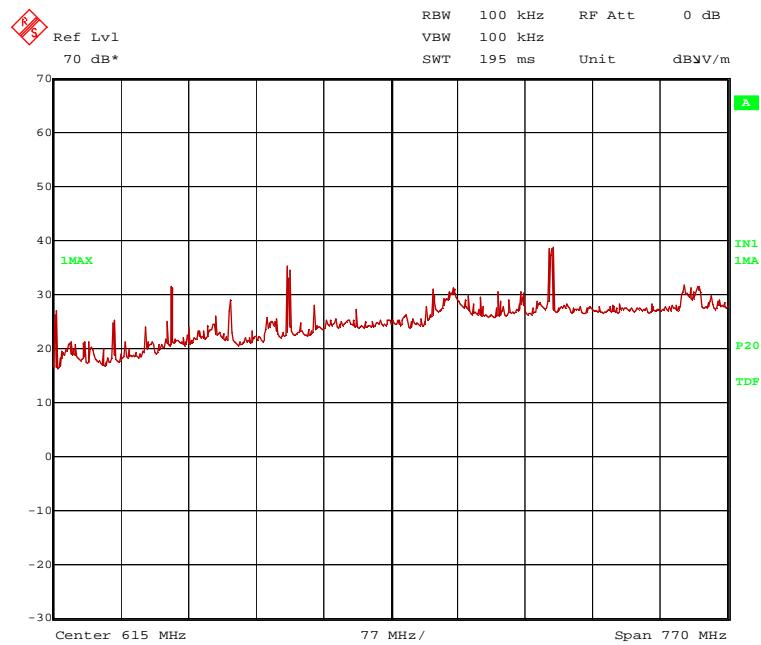


No significant frequencies above the noise floor of the system were found during the preliminary radiated emission test, so no measurements were carried out on the outdoor test site.

121150\_90.wmf: Spurious emissions from 30 MHz to 230 MHz (operation mode 3)



121150\_91.wmf: Spurious emissions from 230 MHz to 1000 MHz (operation mode 3)



The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 33.667 MHz
- 57.956 MHz
- 100 MHz
- 202.975 MHz
- 207.786 MHz
- 232.258 MHz
- 233.3 MHz
- 359.489 MHz
- 366.663 MHz
- 497.575 MHz
- 499.86 MHz
- 528.022 MHz
- 796.132 MHz
- 800.14 MHz

These frequencies have to be measured in a final measurement. The results were presented in the following.

<b>TEST EQUIPMENT USED FOR THE TEST:</b>
29, 31 - 35, 47, 55,

### 5.5.2.2 Preliminary radiated emission measurement (1 GHz – 25 GHz)

Ambient temperature	20 °C	Relative humidity	30 %
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Position of EUT: The EUT was plugged into a laptop PC. The laptop PC with the inserted EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

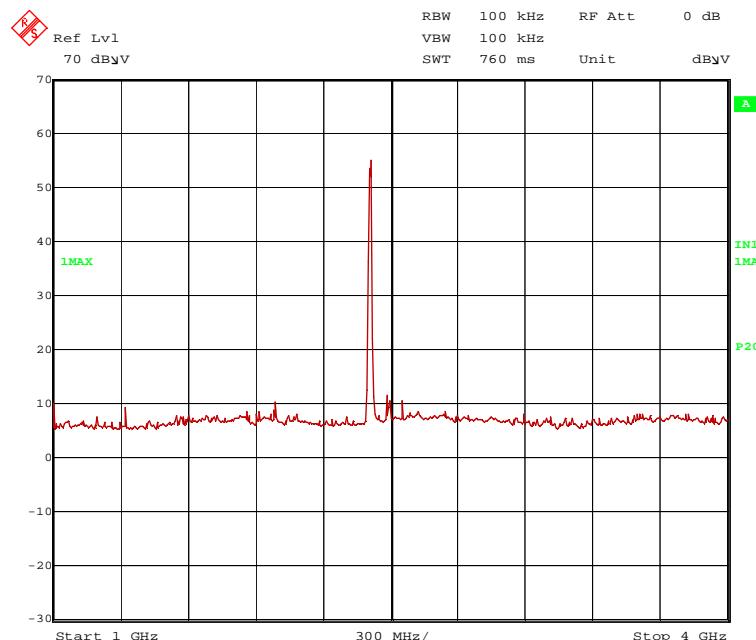
Cable guide: For detail information of test set-up and the cable guide refer to the pictures in annex A of this test report.

Test record: All results are shown in the following.

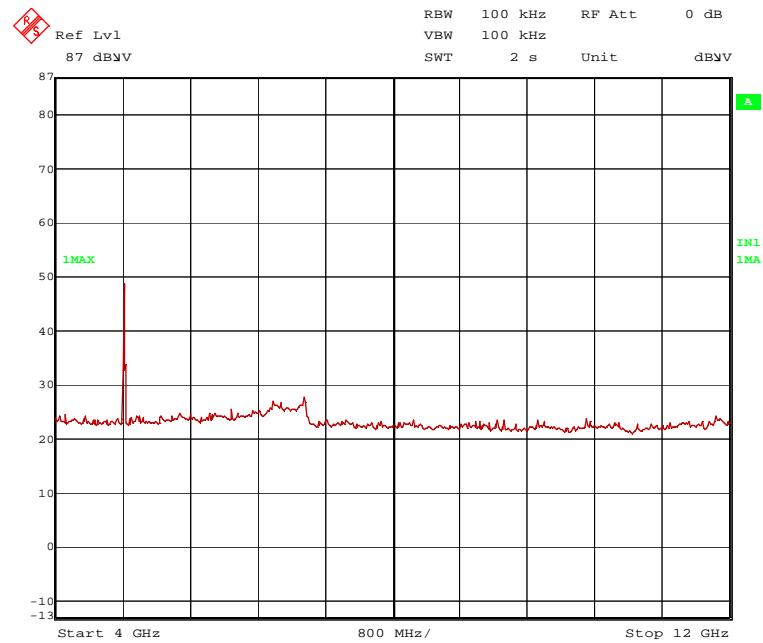
Supply voltage: During all measurements the EUT was supplied with 5 V DC via the laptop PC.

#### Transmitter operates at the lower end of the assigned frequency band (WLAN B-Mode)

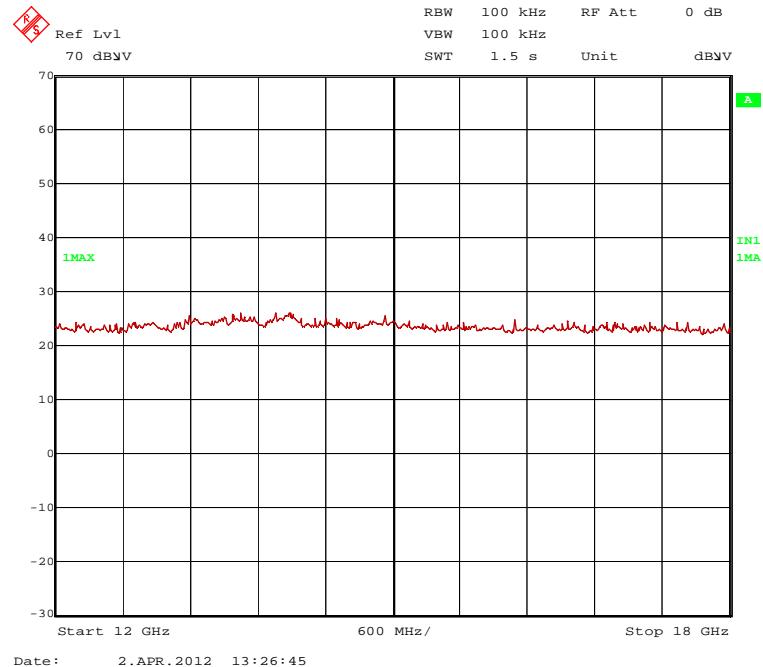
121150\_92.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 1):



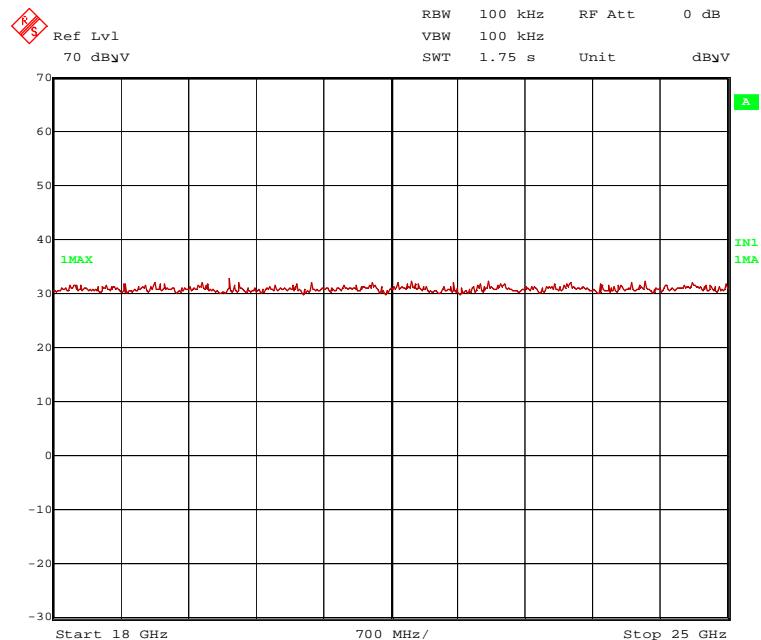
121150\_51.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 1):



121150\_74.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 1):



121150\_75.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 1):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.821 GHz.

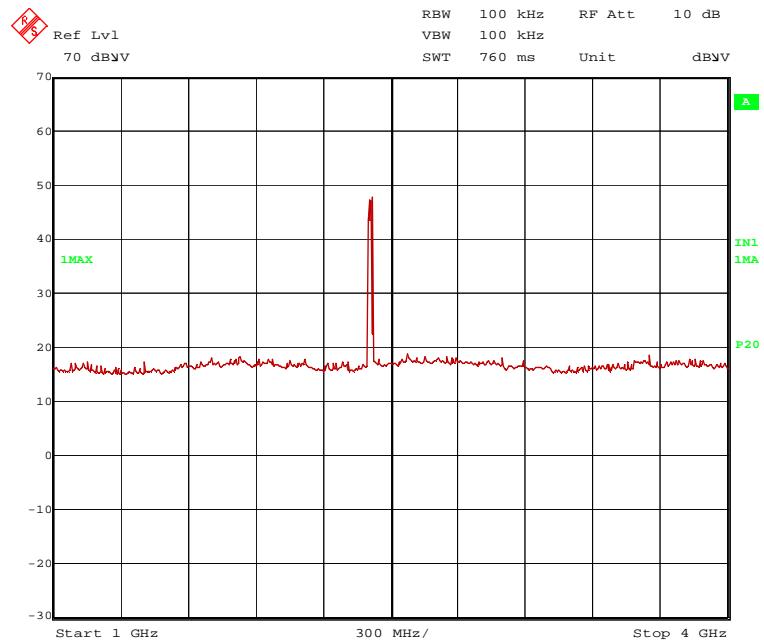
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.413 GHz.

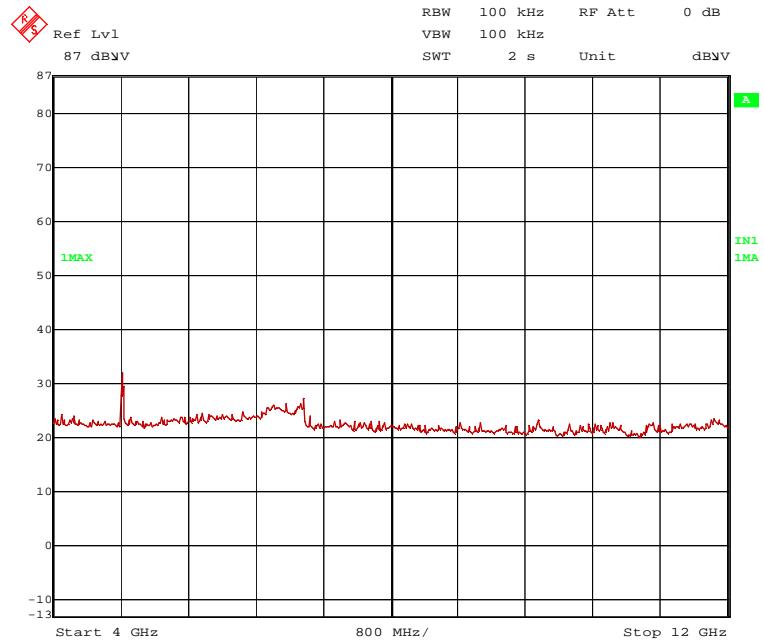
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates at the lower end of the assigned frequency band (WLAN G-Mode)**

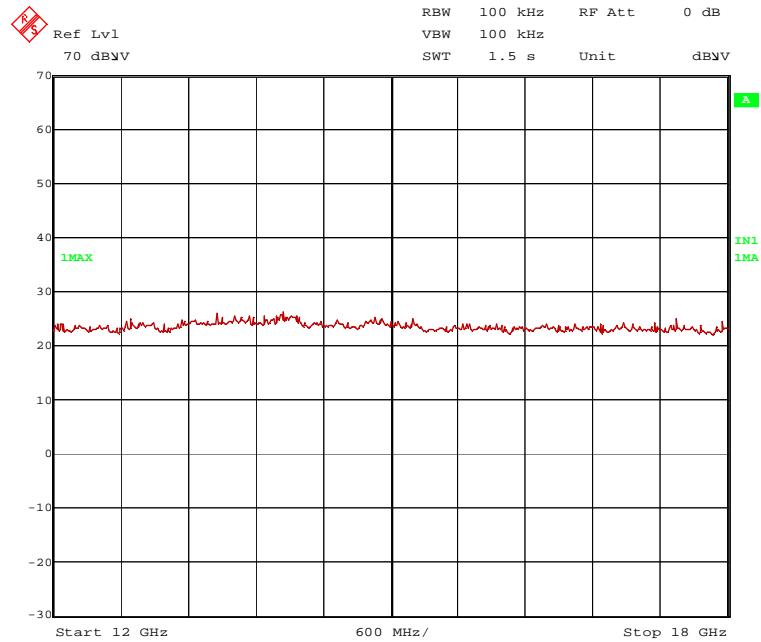
121150\_95.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 4):



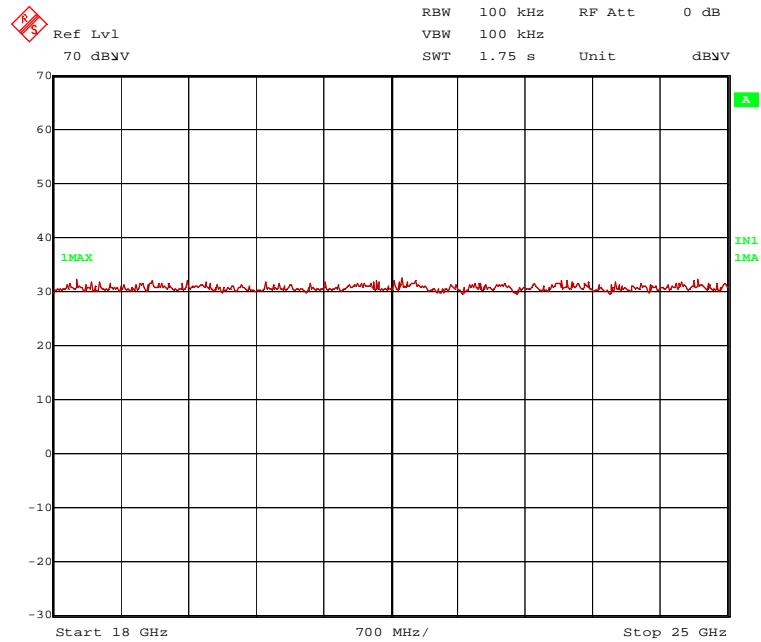
121150\_52.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 4):



121150\_73.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 4):



121150\_76.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 4):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.819 GHz.

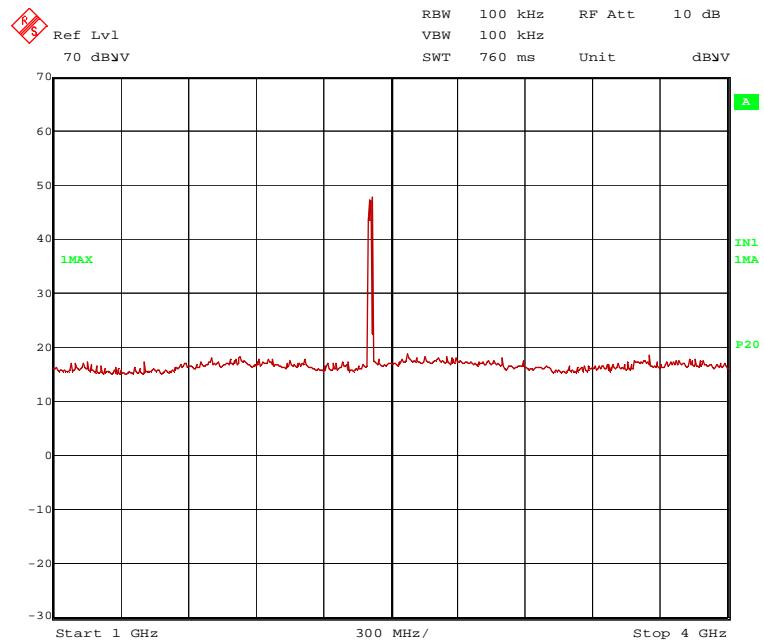
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.416 GHz.

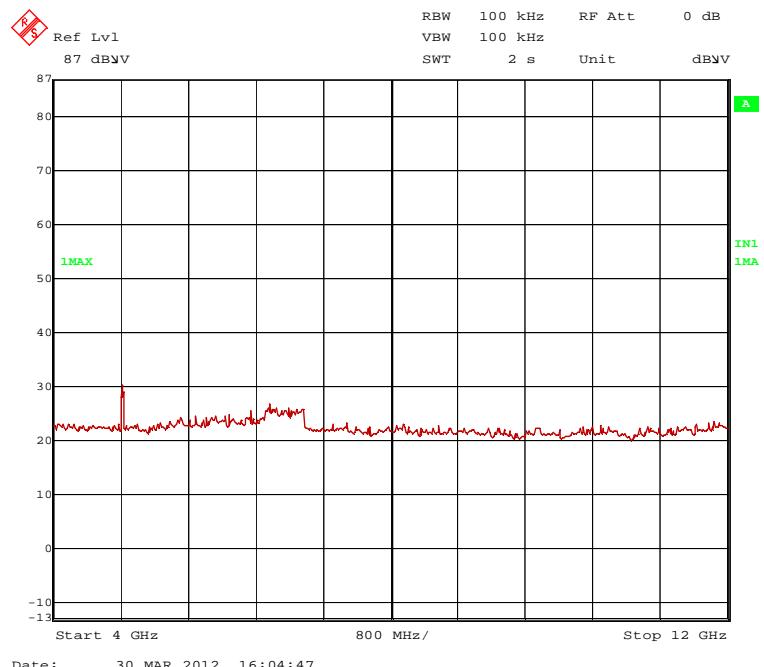
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates at the lower end of the assigned frequency band (WLAN N-Mode [20M])**

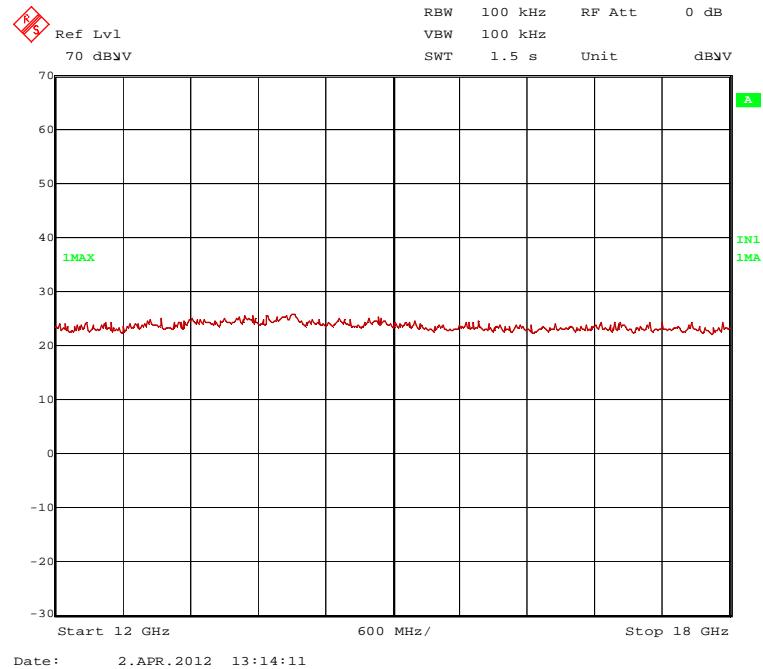
121150\_95.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 7):



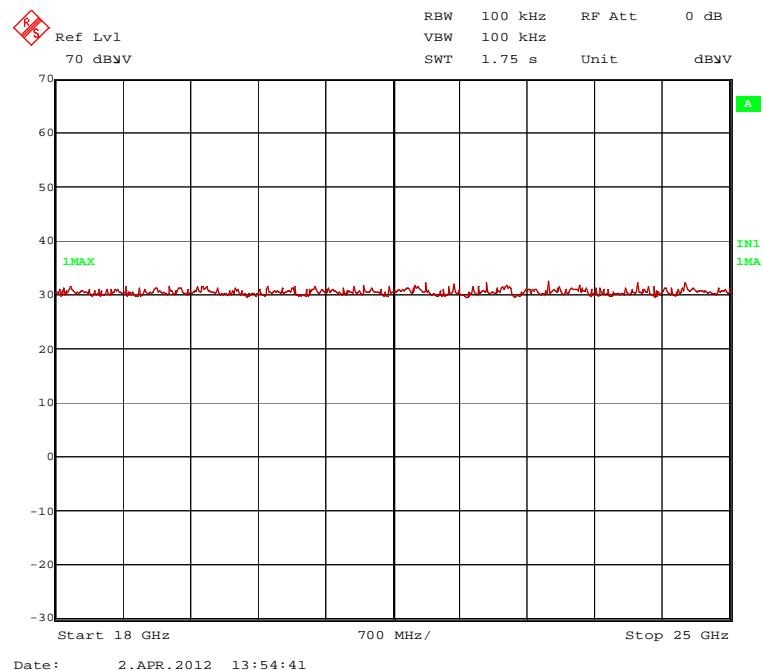
121150\_53.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 7):



121150\_72.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 7):



121150\_77.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 7):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.823 GHz.

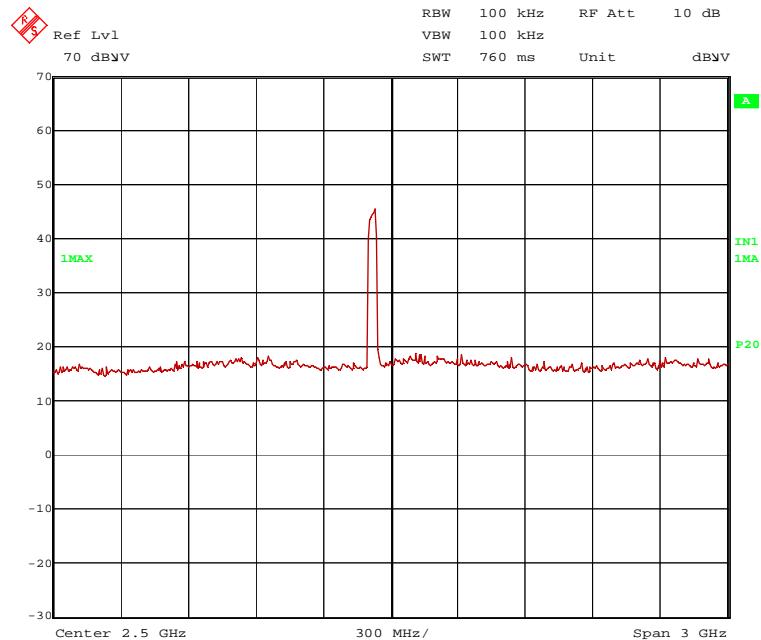
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.413 GHz.

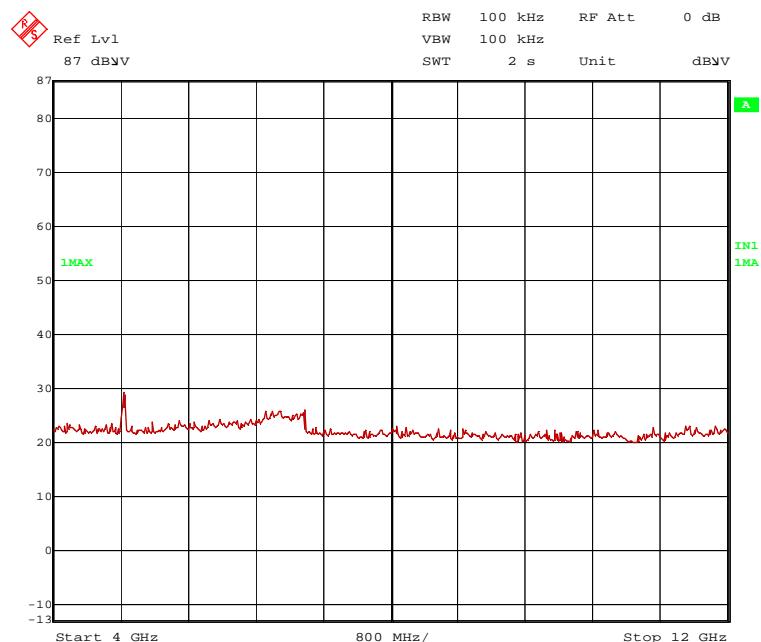
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates at the lower end of the assigned frequency band (WLAN N-Mode [40M])**

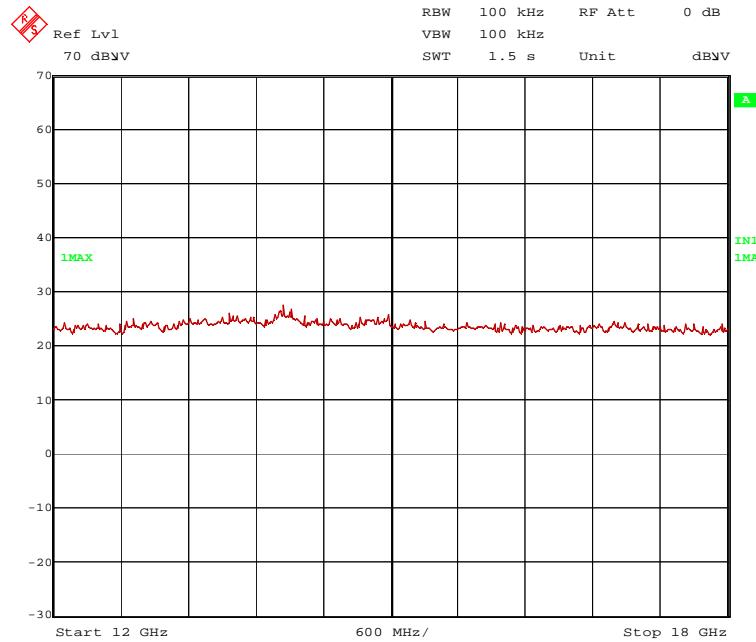
121150\_101.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 10):



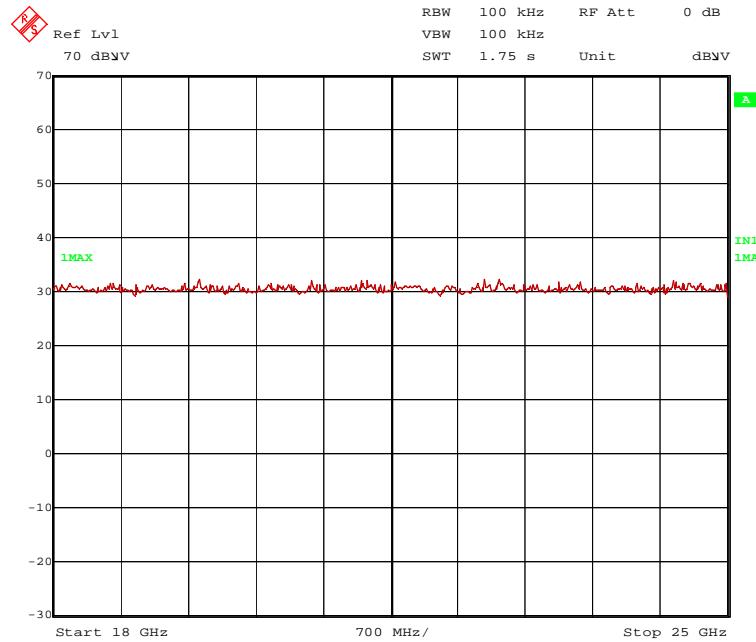
121150\_54.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 10):



121150\_71.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 10):



121150\_78.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 10):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.834 GHz.

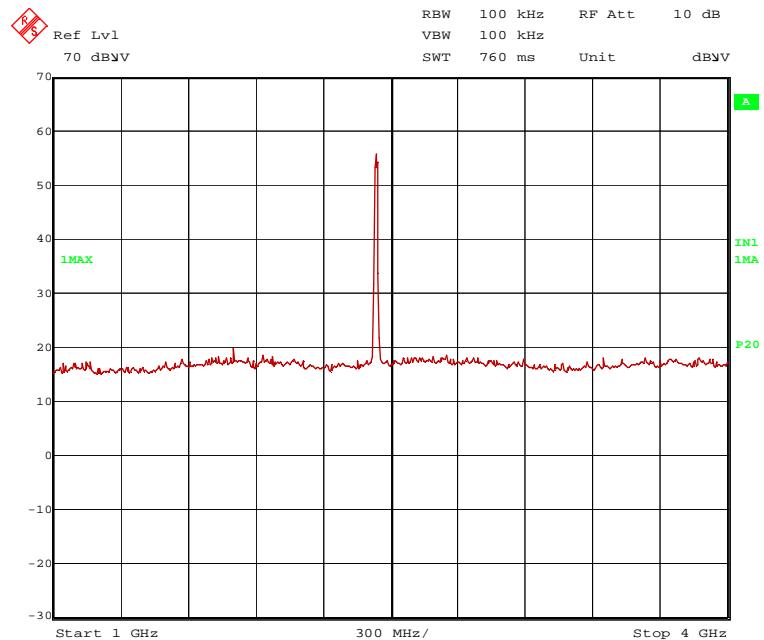
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.431 GHz.

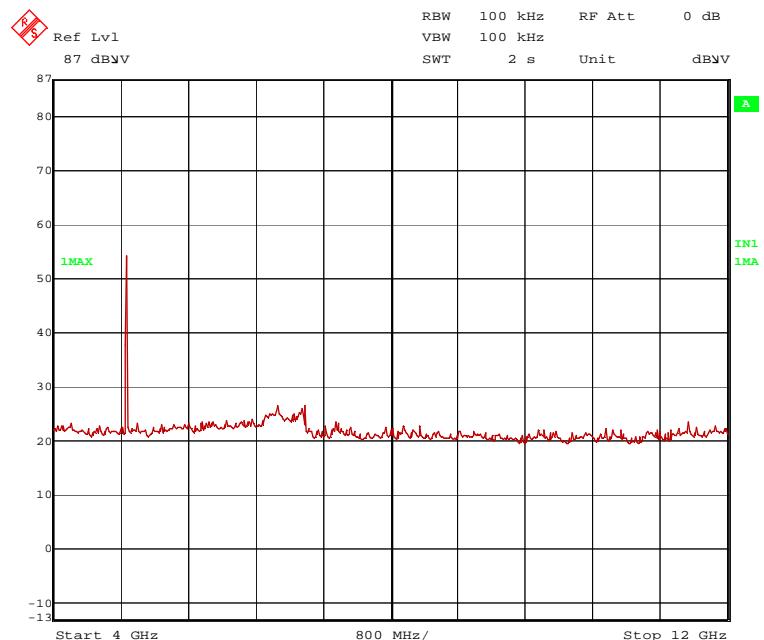
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates on the middle of the assigned frequency band (WLAN B-Mode)**

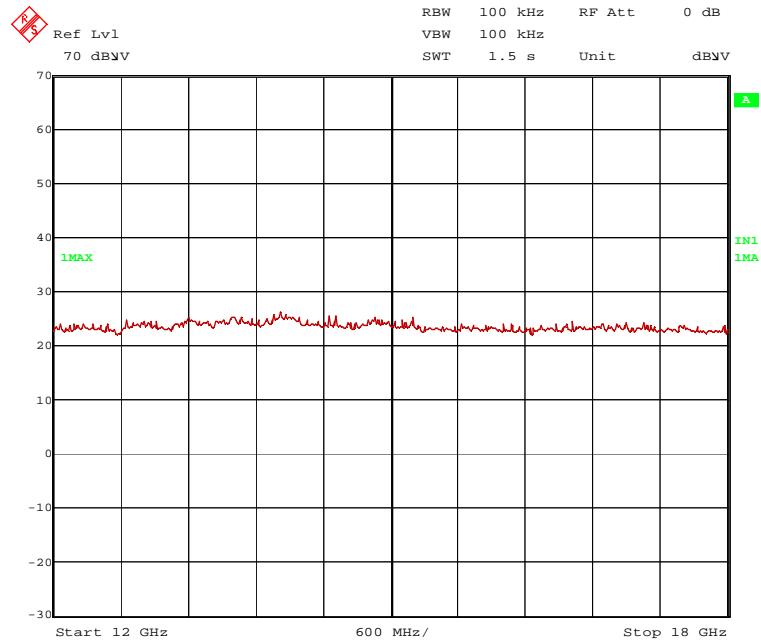
121150\_93.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 2):



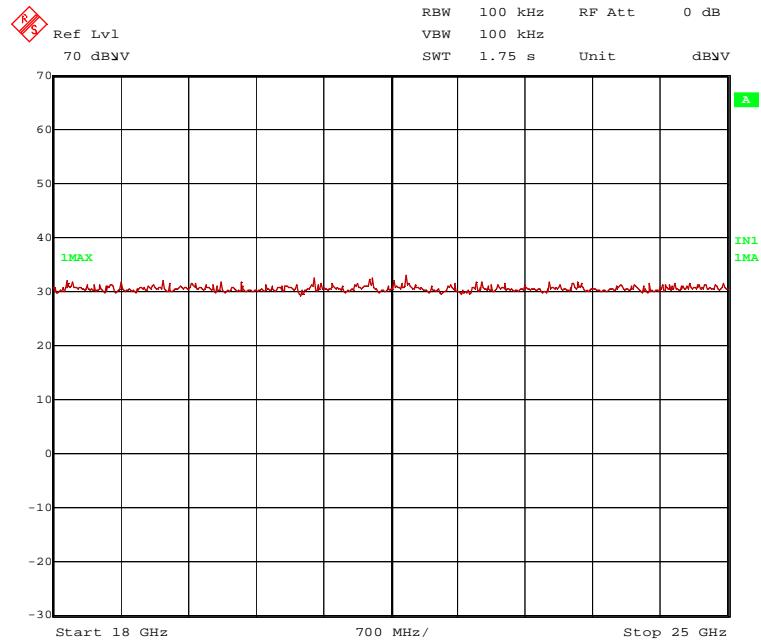
121150\_55.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 2):



121150\_70.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 2):



121150\_79.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 2):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.866 GHz.

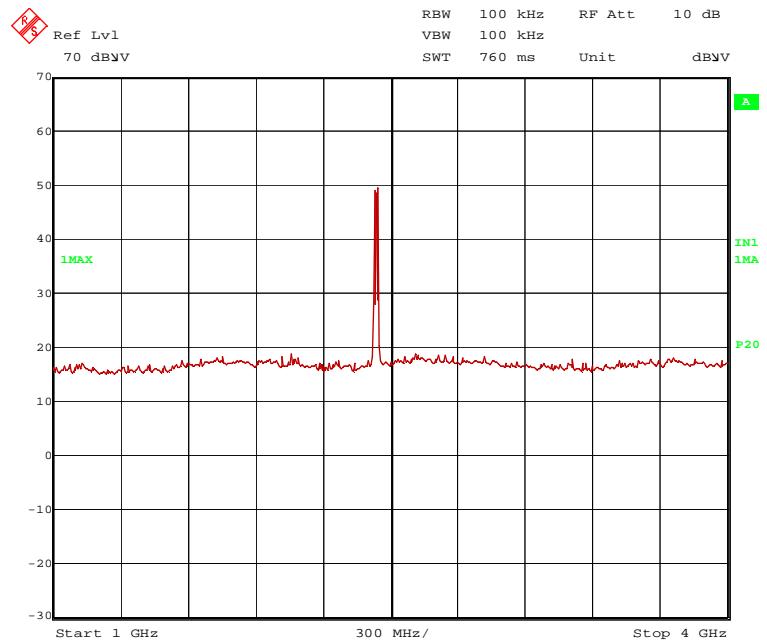
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.438 GHz.

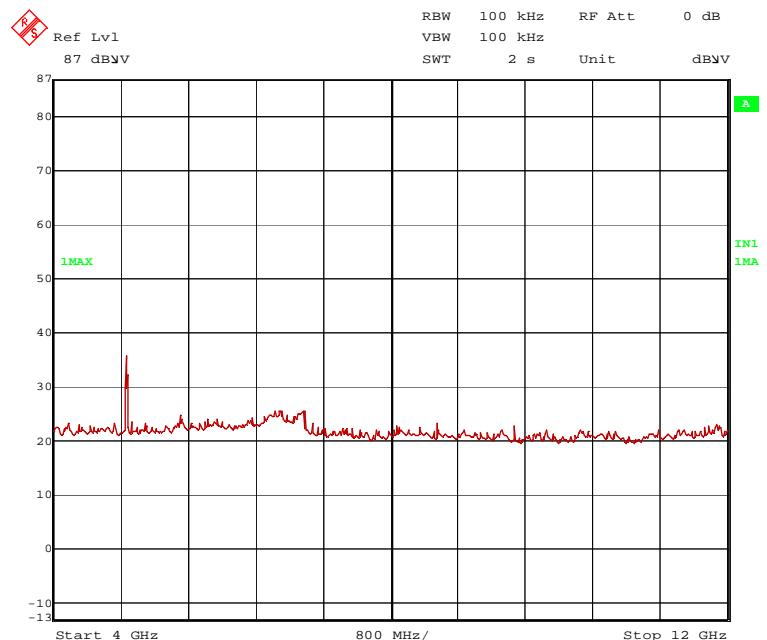
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates on the middle of the assigned frequency band (WLAN G-Mode)**

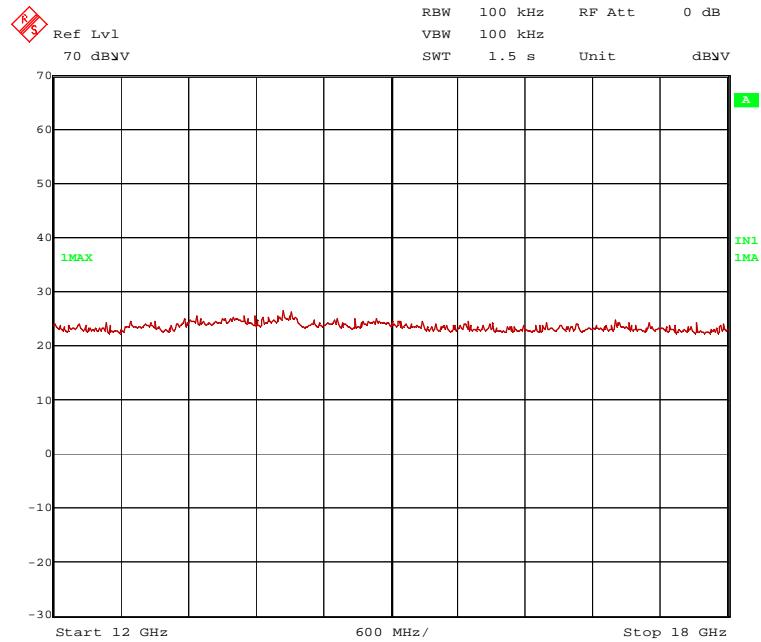
121150\_96.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 5):



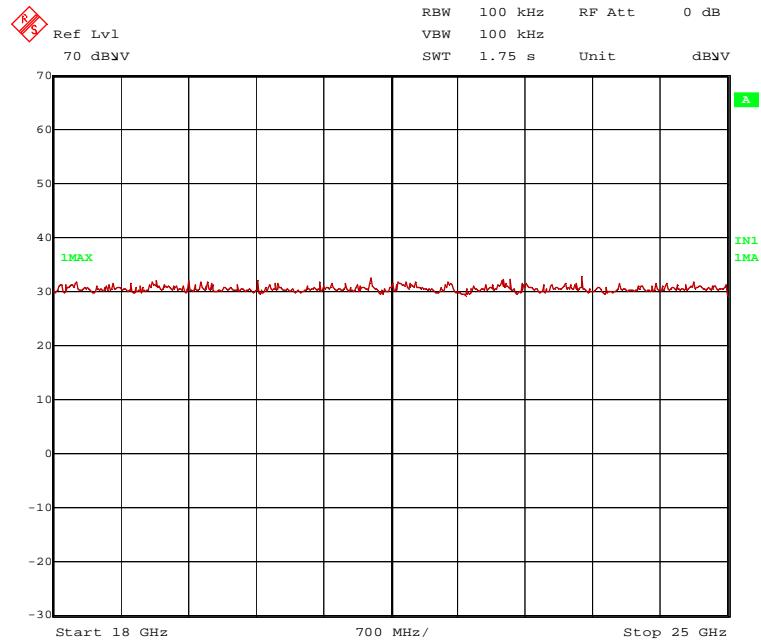
121150\_56.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 5):



121150\_69.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 5):



121150\_80.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 5):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.869 GHz.

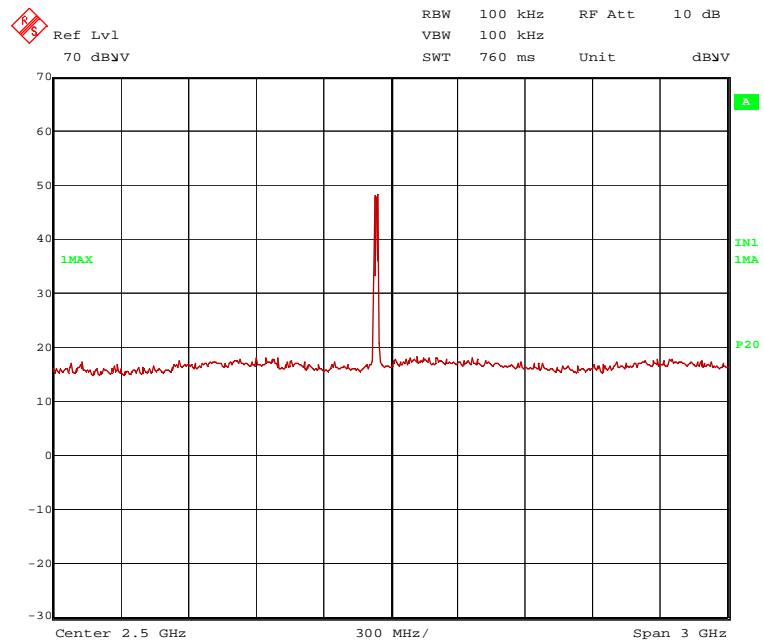
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.441 GHz.

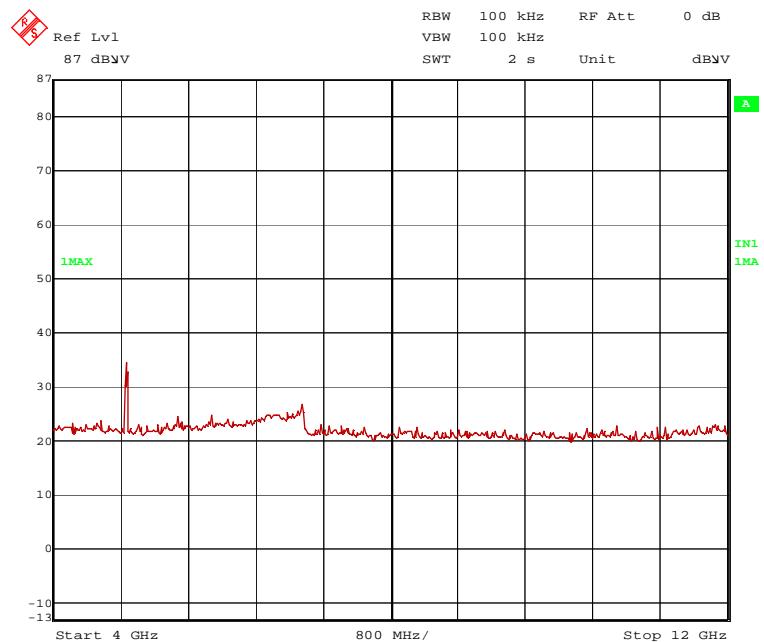
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates on the middle of the assigned frequency band (WLAN N-Mode [20M])**

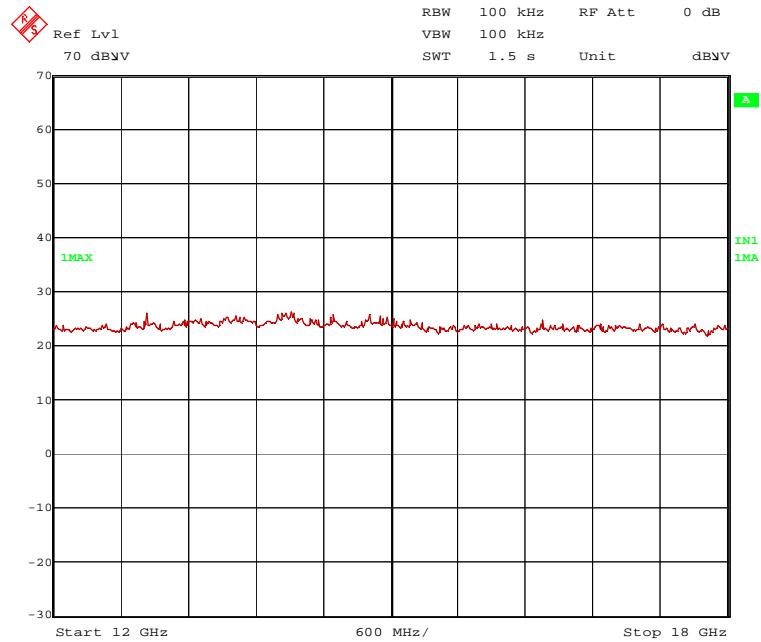
121150\_99.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 8):



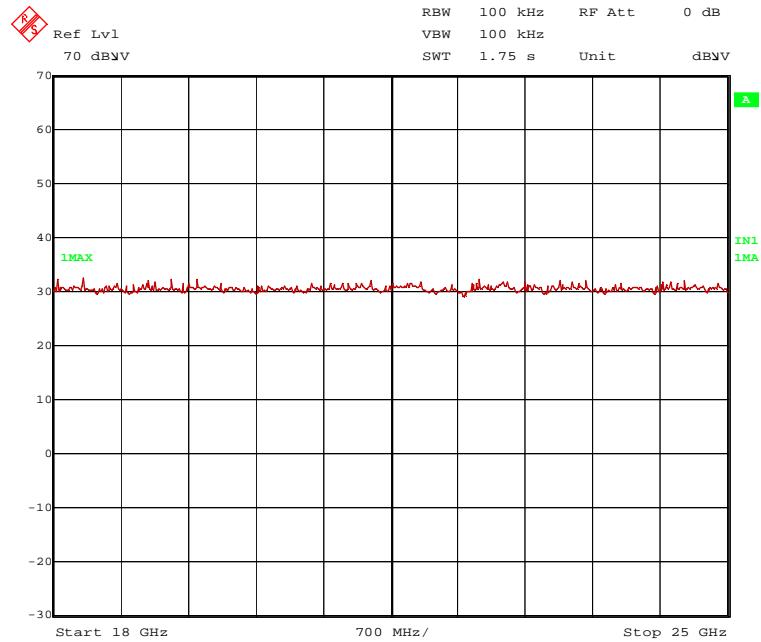
121150\_57.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 8):



121150\_68.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 8):



121150\_81.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 8):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.868 GHz.

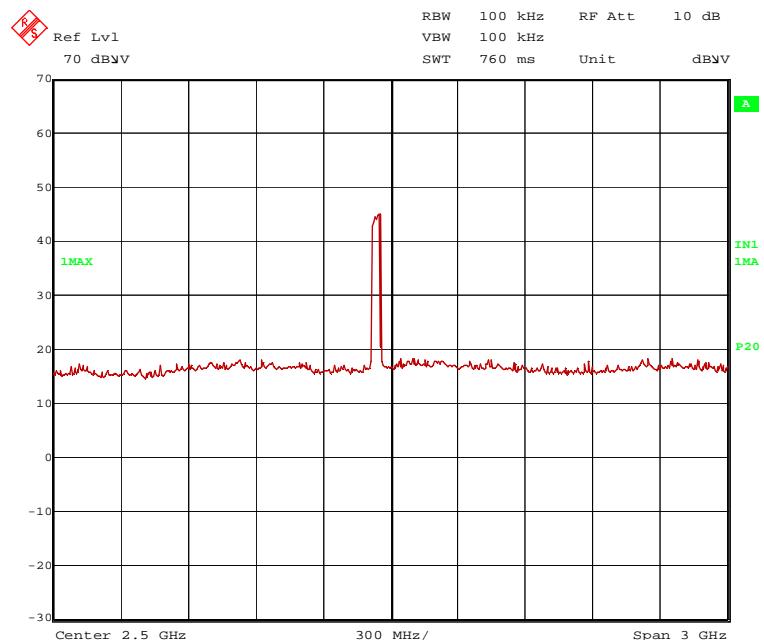
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.443 GHz.

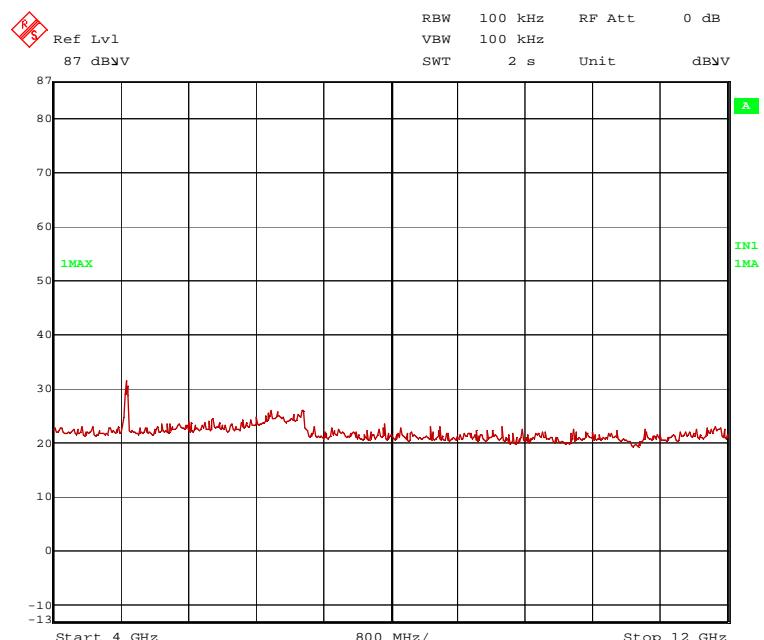
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates on the middle of the assigned frequency band (WLAN N-Mode [40M])**

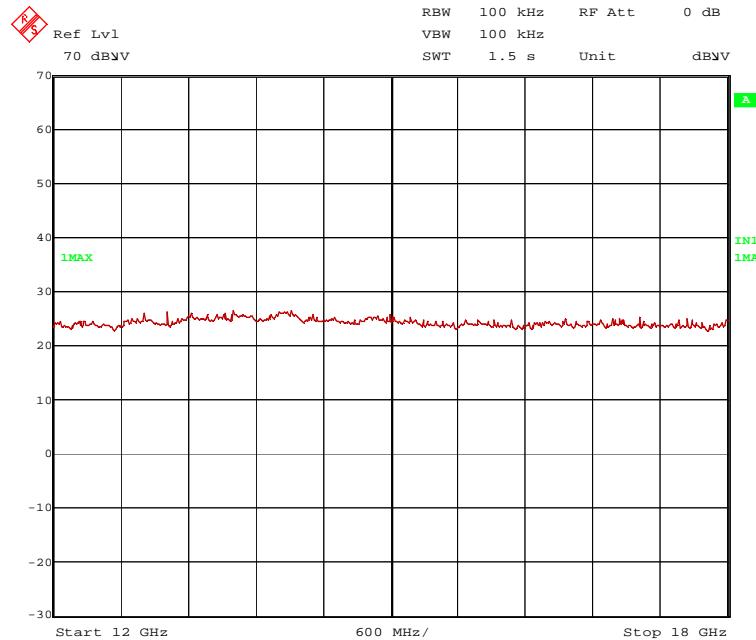
121150\_102.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 13):



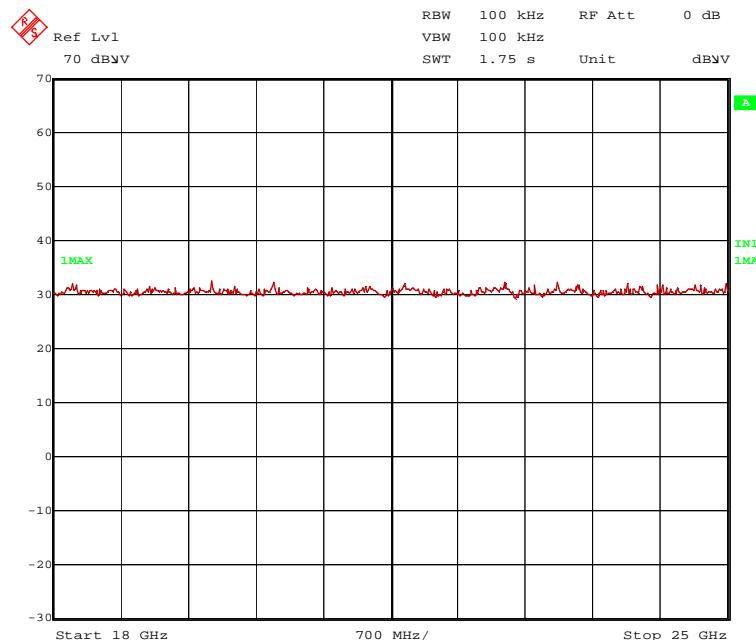
121150\_58.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 13):



121150\_67.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 13):



121150\_82.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 13):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.873 GHz.

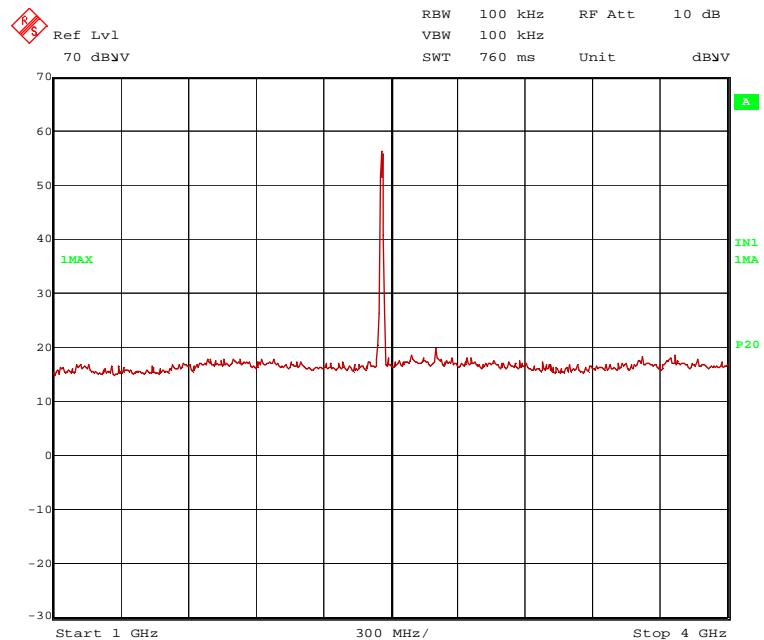
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.446 GHz.

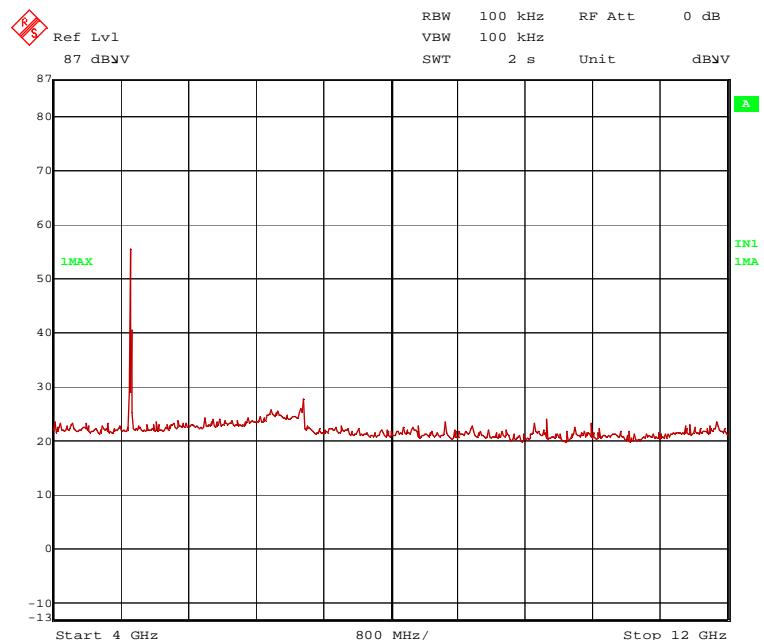
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates on the upper end of the assigned frequency band (WLAN B-Mode)**

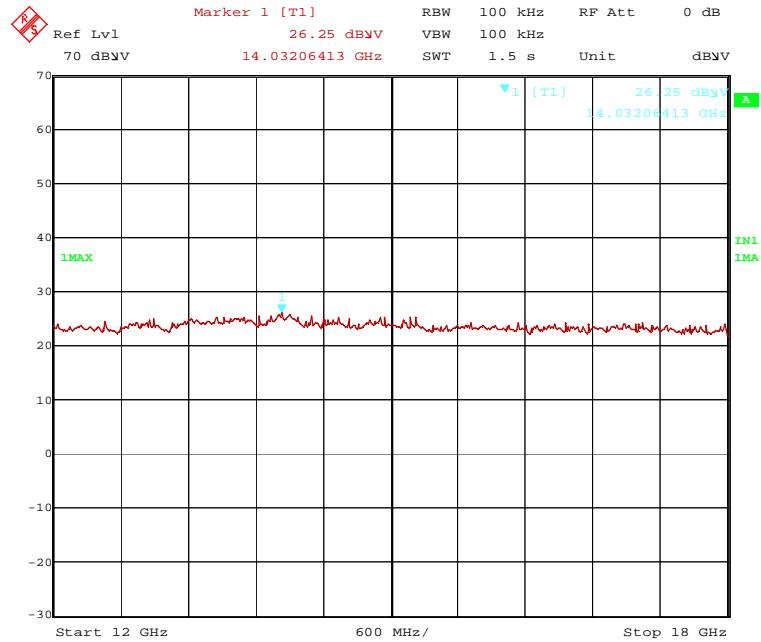
121150\_94.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 3):



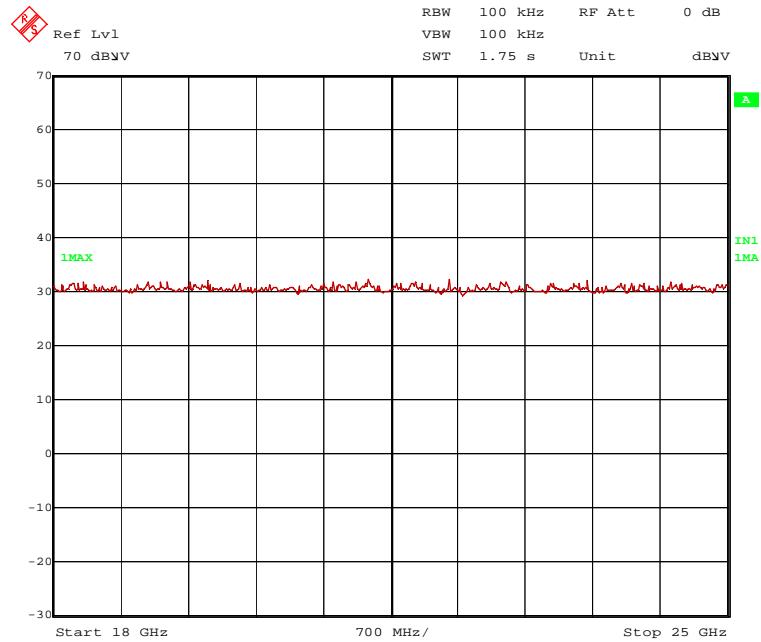
121150\_59.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 3):



121150\_66.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 3):



121150\_83.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 3):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.913 GHz.

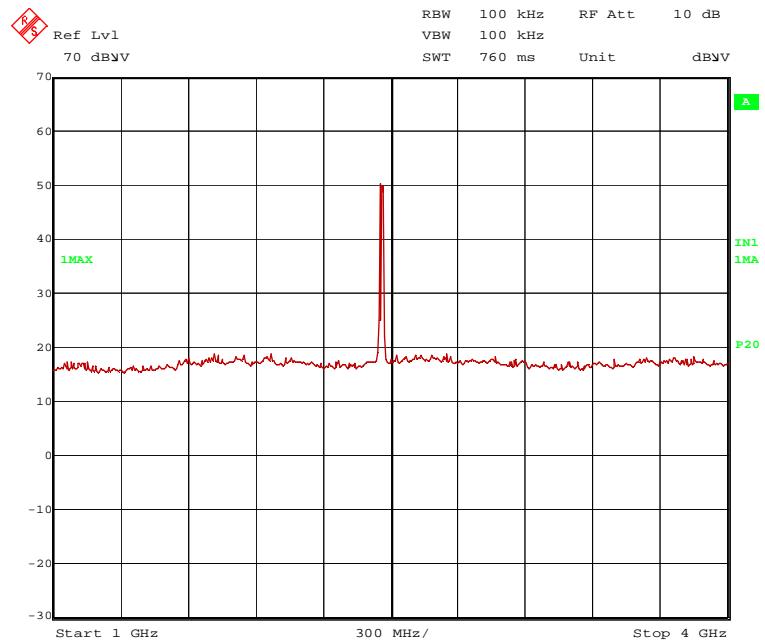
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.463 GHz.

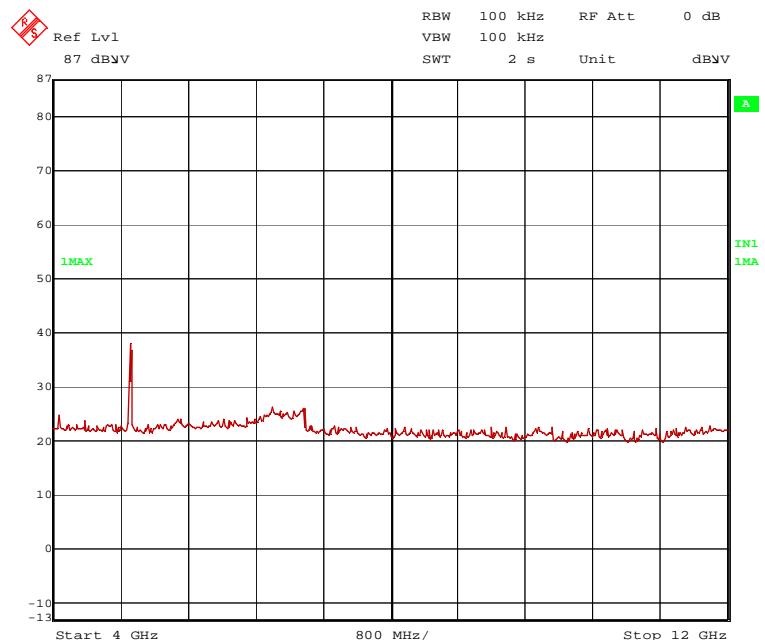
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates on the upper end of the assigned frequency band (WLAN G-Mode)**

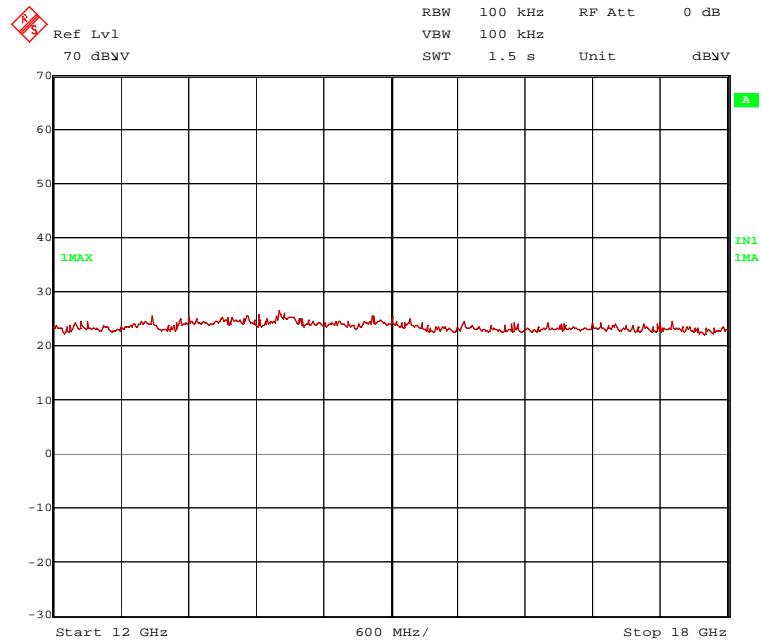
121150\_97.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 6):



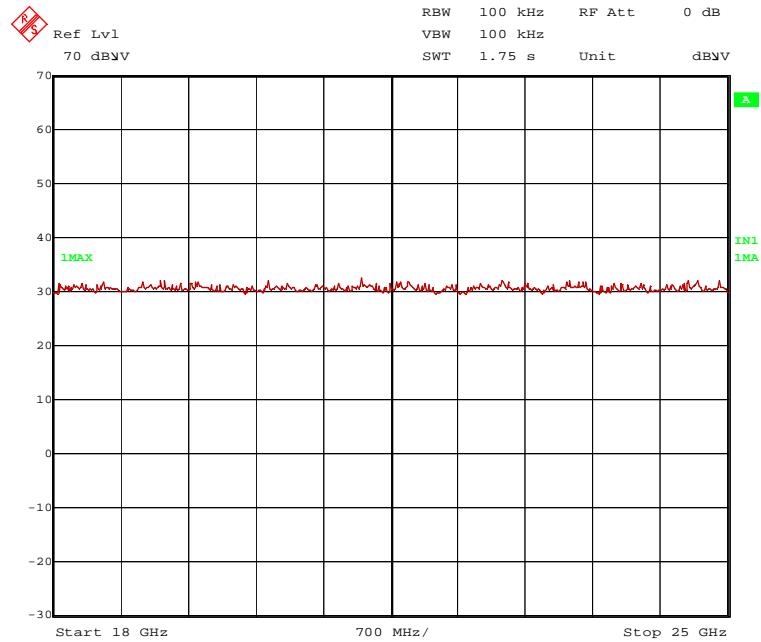
121150\_60.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 6):



121150\_65.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 6):



121150\_84.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 6):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.913 GHz.

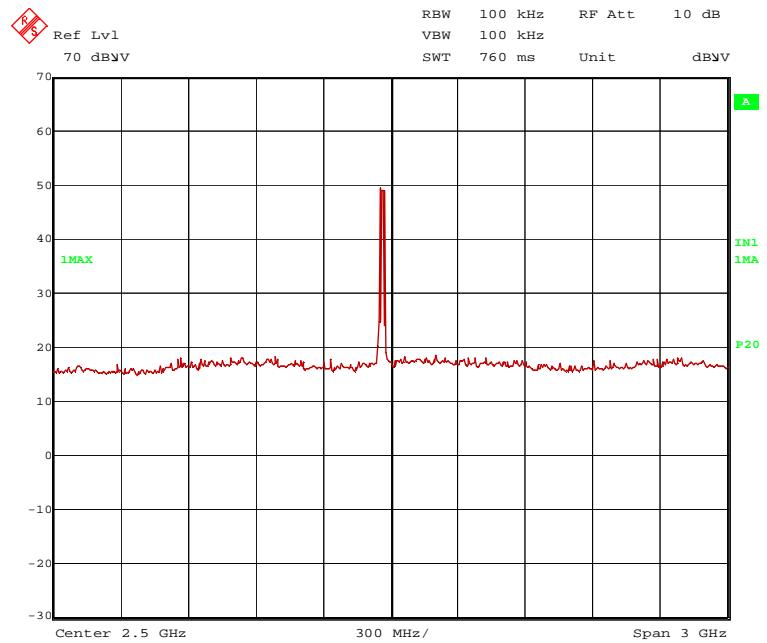
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.466 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates on the upper end of the assigned frequency band (WLAN N-Mode [20M])**

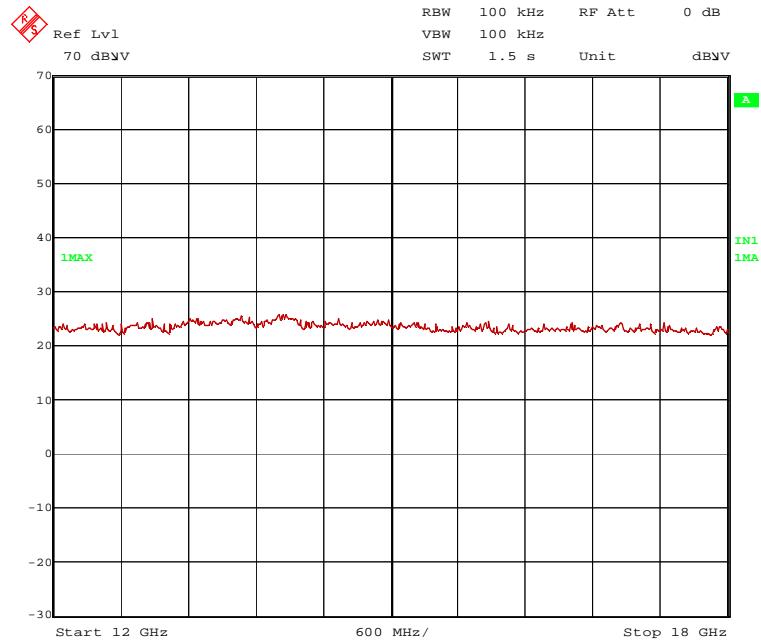
121150\_100.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 9):



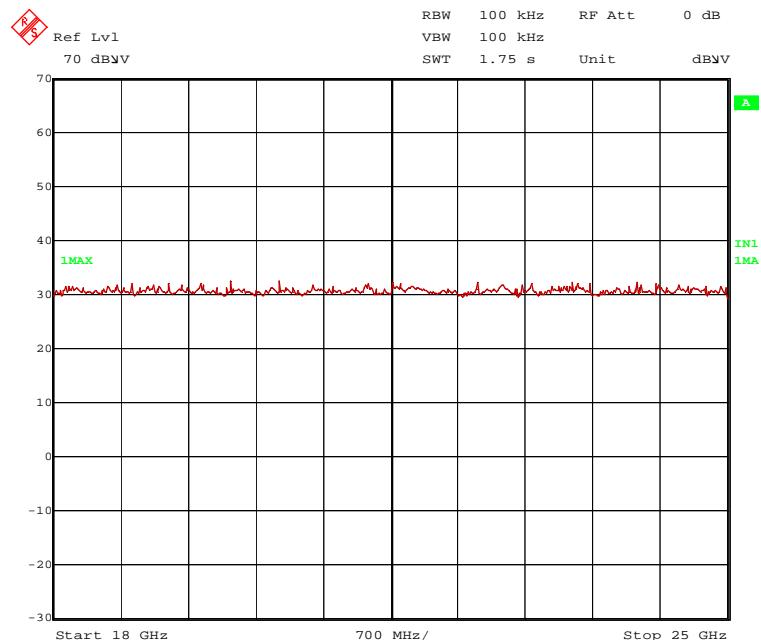
121150\_61.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 9):



121150\_64.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 9):



121150\_85.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 9):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.923 GHz.

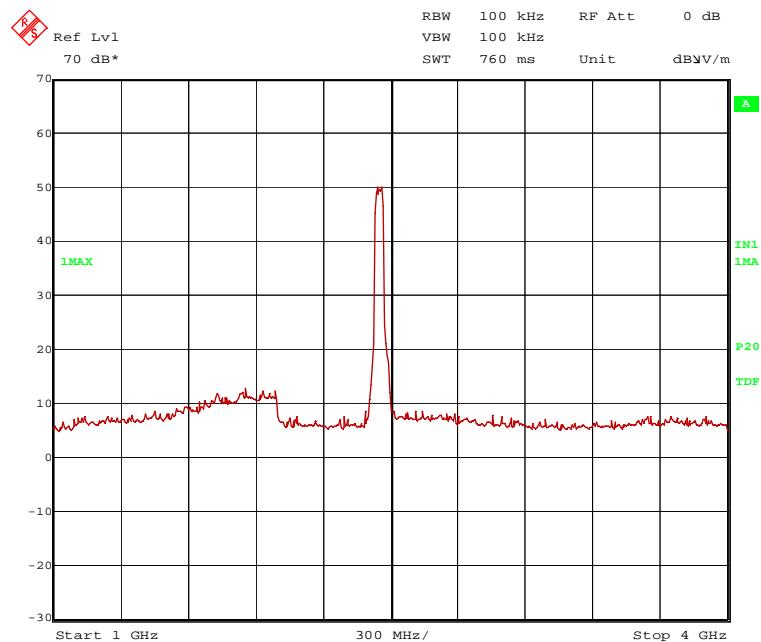
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.466 GHz.

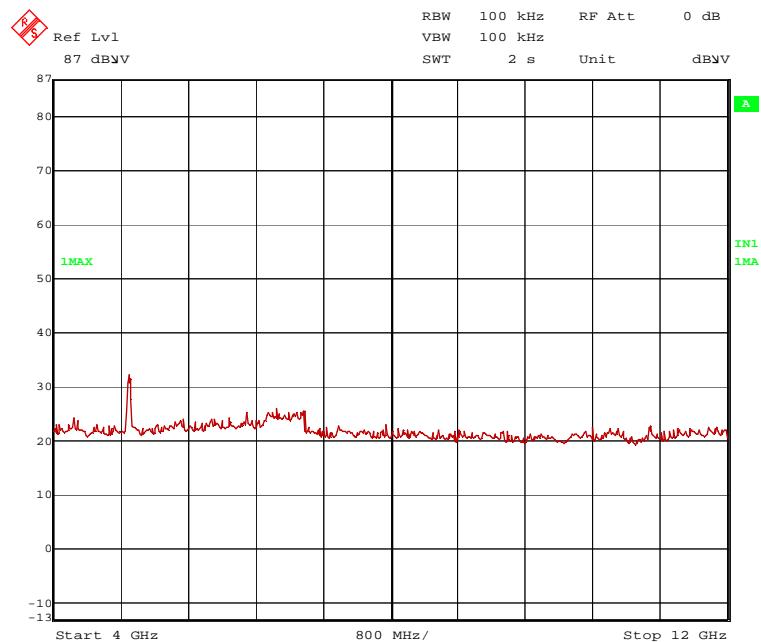
These frequencies have to be measured in a final measurement. The results were presented in the following.

**Transmitter operates on the upper end of the assigned frequency band (WLAN N-Mode [40M])**

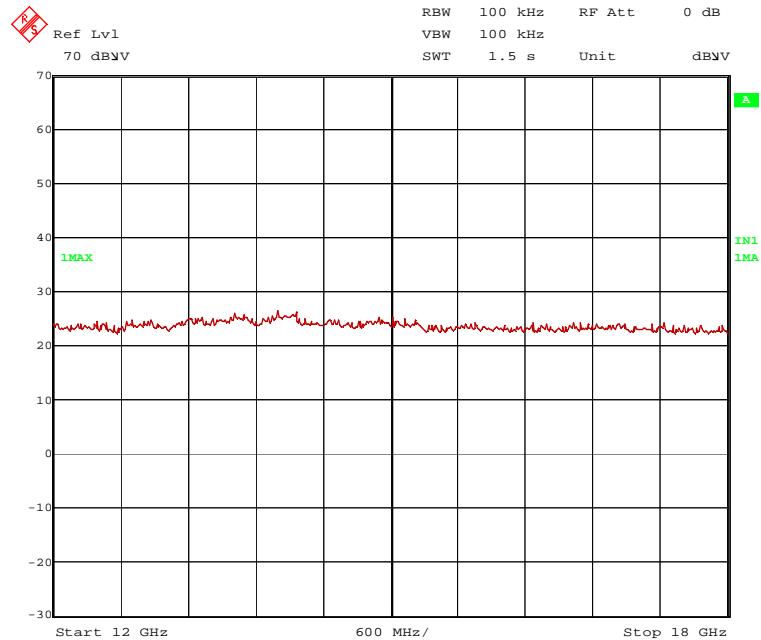
121150\_103.wmf: Spurious emissions from 1 GHz to 4 GHz (operation mode 12):



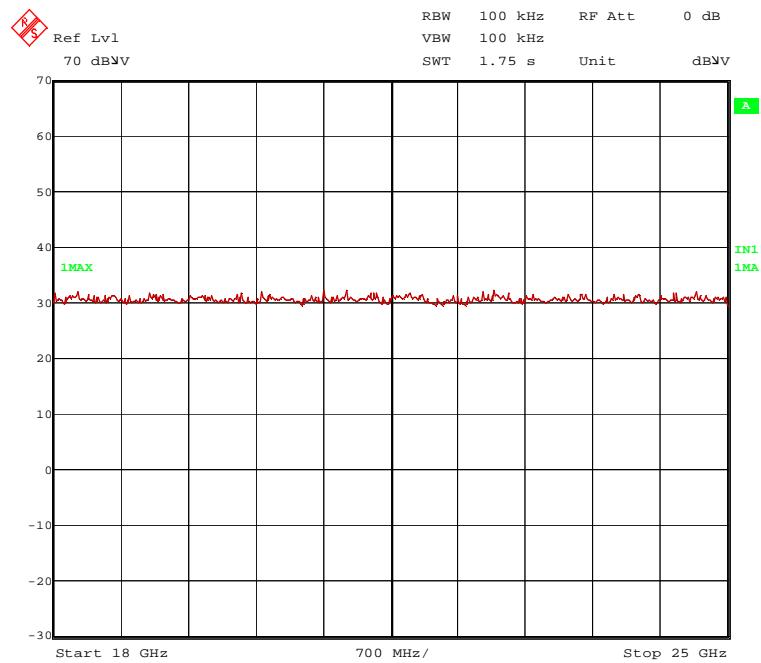
121150\_62.wmf: Spurious emissions from 4 GHz to 12 GHz (operation mode 12):



121150\_63.wmf: Spurious emissions from 12 GHz to 18 GHz (operation mode 12):



121150\_86.wmf: Spurious emissions from 18 GHz to 25 GHz (operation mode 12):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.905 GHz.

The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.461 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.

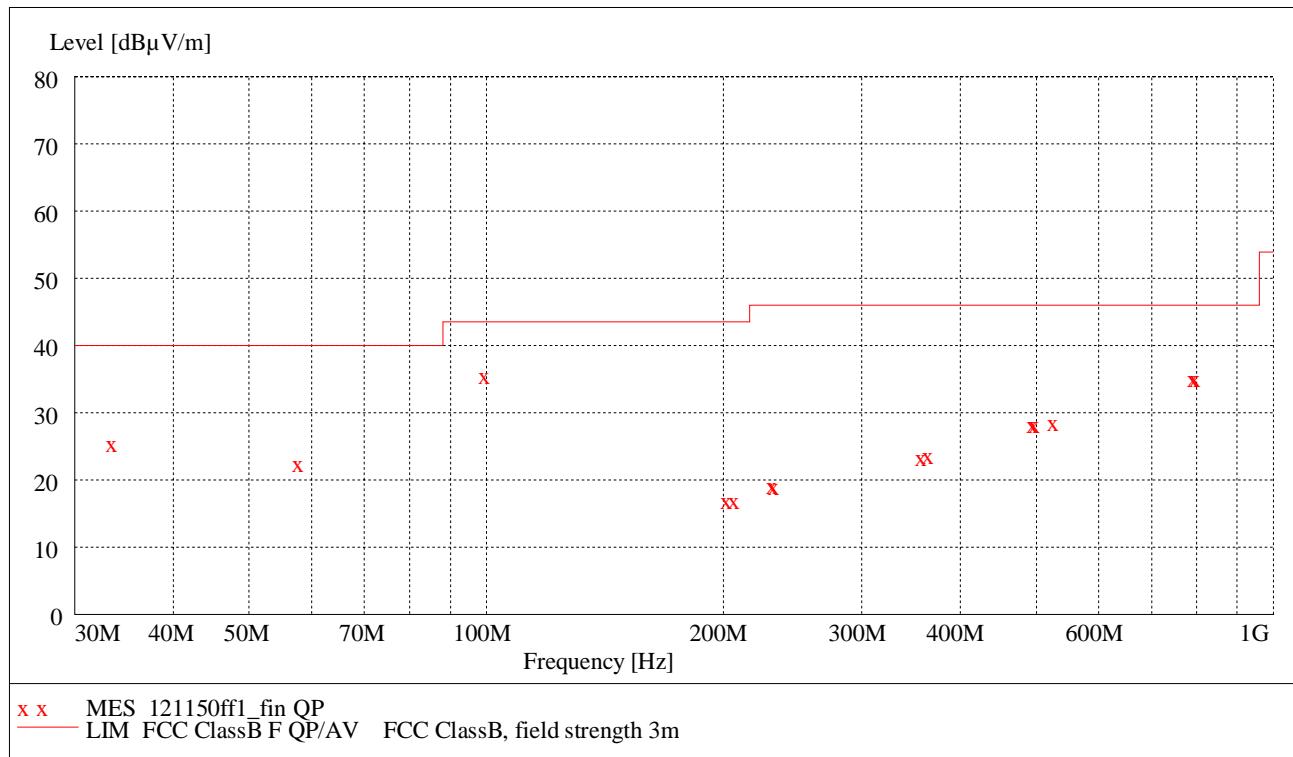
<b>TEST EQUIPMENT USED FOR THE TEST:</b>
29, 31 – 34, 36, 37, 39, 41 - 43, 44, 46, 49 - 51, 72

### 5.5.2.3 Final radiated emission measurement (30 MHz to 1 GHz)

Ambient temperature	20 °C	Relative humidity	30 %
---------------------	-------	-------------------	------

Position of EUT:	The EUT was plugged into a laptop PC. The laptop PC with the inserted EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.
Cable guide:	For detail information of test set-up and the cable guide refer to the pictures in annex A of this test report.
Test record:	All results are shown in the following.
Supply voltage:	During all measurements the EUT was supplied by USB with 5 V DC via the laptop PC.
Resolution bandwidth:	For all measurements a resolution bandwidth of 1 MHz was used.
Title:	Final measurement on open area test site M6 receiver ESIB26 by Rohde & Schwarz
EUT:	USB WLAN dongle
Manufacturer:	SIMAC
Operating Condition:	Cont. transmission in 802.11b mode @ ch. 9
Test site:	PHOENIX TESTLAB GmbH; Open area test site M6
Operator:	P. Neufeld
Test Specification:	With medion laptop
Comment:	03.04.2012 / 14:35:58

The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the above mentioned standard. The measured points marked with "x" are the measured results of the standard subsequent measurement on the open area test site.



Data record name: 121150ff1

of 03.04.2012

The results of the standard subsequent measurement on the open area test site are indicated in the table below. The limits as well as the measured results (levels) refer to the above mentioned standard while taking account of the specified requirements for a 3 m measuring distance.

**Result measured with the quasipeak detector (marked by x):**

Frequency MHz	Level dB $\mu$ V/m	Transducer dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
33.667000	25.70	18.6	40.0	14.3	325.0	176.00	VERTICAL
57.956000	22.70	7.5	40.0	17.3	225.0	0.00	VERTICAL
100.000000	35.90	12.7	43.5	7.6	395.0	218.00	HORIZONTAL
202.975000	17.30	11.2	43.5	26.2	398.0	136.00	HORIZONTAL
207.786000	17.30	11.2	43.5	26.2	395.0	331.00	VERTICAL
232.258000	19.60	12.9	46.0	26.4	315.0	0.00	VERTICAL
233.300000	19.40	12.9	46.0	26.6	125.0	266.00	VERTICAL
359.489000	23.70	17.2	46.0	22.3	333.0	106.00	VERTICAL
366.663000	24.00	17.4	46.0	22.0	115.0	1.00	VERTICAL
497.575000	28.60	21.1	46.0	17.4	388.0	209.00	VERTICAL
499.860000	28.60	21.1	46.0	17.4	109.0	106.00	VERTICAL
528.022000	28.90	21.4	46.0	17.1	125.0	248.00	VERTICAL
796.132000	35.50	25.8	46.0	10.5	375.0	33.00	HORIZONTAL
800.140000	35.50	25.8	46.0	10.5	389.0	1.00	VERTICAL

Test: Passed

**TEST EQUIPMENT USED FOR THE TEST:**

14 - 19

### 5.5.2.4 Final radiated emission measurement (1 GHz to 25 GHz)

Ambient temperature	20 °C	Relative humidity	30 %
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Position of EUT: The EUT was plugged into a laptop PC. The laptop PC with the inserted EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

Cable guide: For detail information of test set-up and the cable guide refer to the pictures in annex A of this test report.

Test record: All results are shown in the following.

Supply voltage: During all measurements the EUT was supplied by USB with 5 V DC via the laptop PC.

Resolution bandwidth: For all measurements a resolution bandwidth of 1 MHz was used.

#### Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

##### Result measured with the peak detector:

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.413	89.1			57.0	28.4	0.0	3.7	150	Hor.	-	1
4.821	51.9	74.0	22.1	39.7	32.6	25.7	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

##### Result measured with the average detector:

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.413	85.1			53.0	28.4	0.0	3.7	150	Hor.	-	1
4.821	47.6	54.0	6.4	35.4	32.6	25.7	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the middle of the assigned frequency band (operation mode 2)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.438	91.1			59.0	28.4	0.0	3.7	150	Hor.	-	1
4.866	54.1	74.0	19.9	41.8	32.8	25.7	5.2	150	Hor.	Yes	2
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.438	87.0			54.9	28.4	0.0	3.7	150	Hor.	-	1
4.866	50.7	54.0	3.3	38.4	32.8	25.7	5.2	150	Hor.	Yes	2
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the upper end of the assigned frequency band (operation mode 3)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.463	93.7			61.5	28.5	0.0	3.7	150	Vert.	carrier	1
4.913	57.2	74.0	16.8	44.7	32.8	25.6	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.463	89.4			57.2	28.5	0.0	3.7	150	Vert.	-	1
4.913	52.2	54.0	1.8	39.7	32.8	25.6	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the lower end of the assigned frequency band (operation mode 4)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.416	87.6			55.5	28.4	0.0	3.7	150	Hor.	carrier	1
4.819	53.9	74.0	20.1	41.7	32.6	25.7	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.416	78.1			46.0	28.4	0.0	3.7	150	Hor.	-	1
4.819	38.8	54.0	15.2	26.6	32.6	25.7	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the middle of the assigned frequency band (operation mode 5)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.441	88.9			56.8	28.4	0.0	3.7	150	Hor.	carrier	1
4.869	58.3	74.0	15.7	46.0	32.8	25.7	5.2	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.441	79.3			47.2	28.4	0.0	3.7	150	Hor.	-	1
4.869	43.9	54.0	10.1	31.6	32.8	25.7	5.2	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the upper end of the assigned frequency band (operation mode 6)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.466	92.2			60.0	28.5	0.0	3.7	150	Vert.	carrier	1
4.913	59.6	74.0	14.4	47.1	32.8	25.6	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.466	82.1			49.9	28.5	0.0	3.7	150	Vert.	-	1
4.913	44.9	54.0	9.1	32.4	32.8	25.6	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the lower end of the assigned frequency band (operation mode 7)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.413	87.7			55.6	28.4	0.0	3.7	150	Hor.	carrier	1
4.823	55.2	74.0	18.8	43.0	32.6	25.7	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.413	78.0			45.9	28.4	0.0	3.7	150	Hor.	-	1
4.823	39.9	54.0	14.1	27.7	32.6	25.7	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the middle of the assigned frequency band (operation mode 8)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.443	88.3			56.2	28.4	0.0	3.7	150	Hor.	carrier	1
4.868	58.4	74.0	15.6	46.1	32.8	25.7	5.2	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.443	79.0			46.9	28.4	0.0	3.7	150	Hor.	-	1
4.868	43.3	54.0	10.7	31.0	32.8	25.7	5.2	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the upper end of the assigned frequency band (operation mode 9)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.466	92.5			60.3	28.5	0.0	3.7	150	Vert.	carrier	1
4.923	61.6	74.0	12.4	49.0	32.9	25.6	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.466	82.1			49.9	28.5	0.0	3.7	150	Vert.	-	1
4.923	47.2	54.0	6.8	34.6	32.9	25.6	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the lower end of the assigned frequency band (operation mode 10)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.431	84.1			52.0	28.4	0.0	3.7	150	Hor.	carrier	1
4.834	51.4	74.0	22.6	39.2	32.7	25.7	5.2	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.431	74.8			42.7	28.4	0.0	3.7	150	Hor.	-	1
4.834	37.2	54.0	16.8	25.0	32.7	25.7	5.2	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the middle of the assigned frequency band (operation mode 11)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.446	85.7			53.6	28.4	0.0	3.7	150	Hor.	carrier	1
4.873	54.0	74.0	20.0	41.7	32.8	25.7	5.2	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.446	76.7			44.6	28.4	0.0	3.7	150	Hor.	-	1
4.873	41.3	54.0	12.7	29.0	32.8	25.7	5.2	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Transmitter operates at the upper end of the assigned frequency band (operation mode 12)**

**Result measured with the peak detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.461	87.8			55.6	28.5	0.0	3.7	150	Vert.	carrier	1
4.905	57.8	74.0	16.2	19.7	32.8	0.0	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

**Result measured with the average detector:**

Frequency GHz	Corr. value dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Readings dB $\mu$ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	Pos.
2.461	78.7			46.5	28.5	0.0	3.7	150	Vert.	-	1
4.905	44.4	54.0	9.6	6.3	32.8	0.0	5.3	150	Hor.	Yes	1
Measurement uncertainty						+2.2 dB / -3.6 dB					

Test: Passed

**TEST EQUIPMENT USED FOR THE TEST:**

29, 31 –34, 36, 37, 39, 44, 49, 72

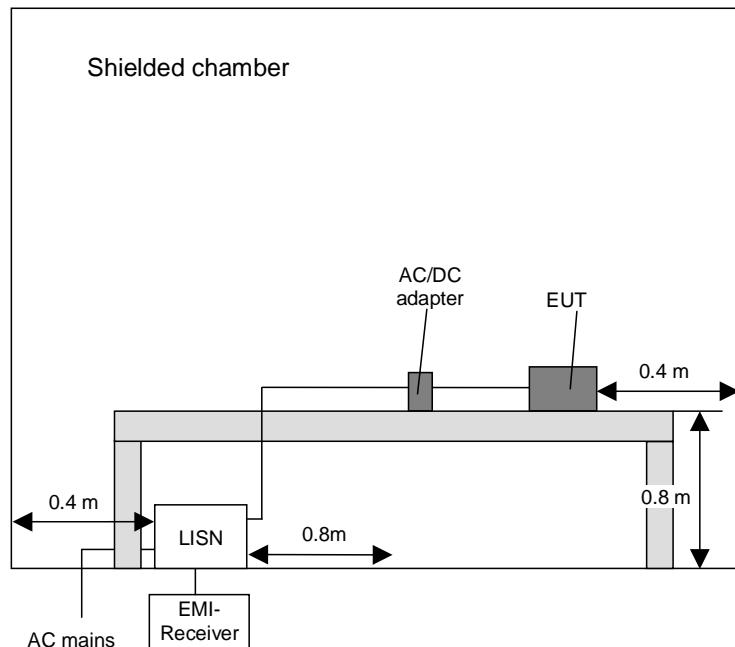
## 5.6 Conducted emissions on power supply lines (150 kHz to 30 MHz)

### 5.6.1 Method of measurement

This test will be carried out in a shielded chamber. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm above the ground plane. Floor-standing devices will be placed directly on the ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2009 [1].

The frequency range 150 kHz to 30 MHz will be measured with an EMI Receiver set to MAX Hold mode with peak and average detector and a resolution bandwidth of 9 kHz. A scan will be carried out on the phase (or plus pole in case of DC powered devices) of the AC mains network. If levels detected 10 dB below the appropriate limit, this emission will be measured with the average and quasi-peak detector on all lines.

Frequency range	Resolution bandwidth
150 kHz to 30 MHz	9 kHz



## 5.6.2 Test results (conducted emissions on power supply lines)

Ambient temperature	20 °C	Relative humidity	27 %
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Position of EUT: The EUT was plugged into a laptop PC. The laptop PC with the inserted EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

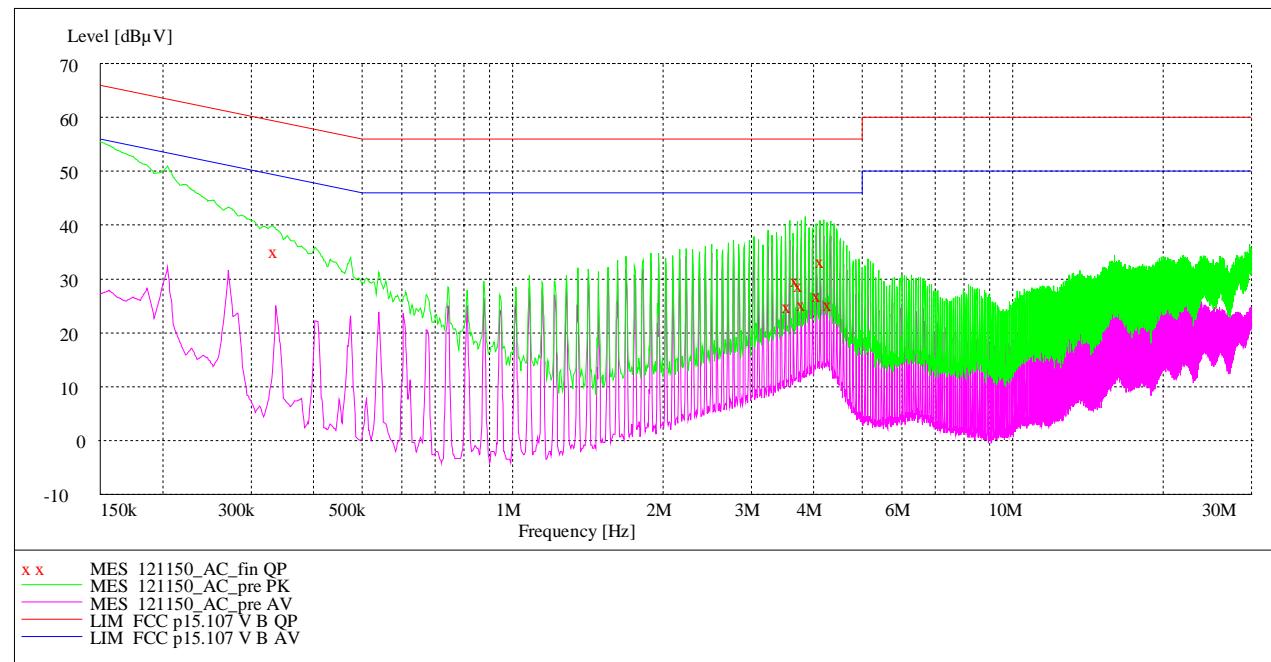
Cable guide: For detail information of test set-up and the cable guide refer to the pictures in annex A of this test report.

Test record: All results are shown in the following.

Supply voltage: During all measurements the EUT was supplied by USB with 5 V DC via the laptop PC.

The curves in the diagram only represent for each frequency point the maximum measured value of all preliminary measurements, which were made for each power supply line. The top-measured curve represents the peak measurement and the bottom-measured curve the average measurement. The quasi-peak measured points are marked by an x and the average measured points by an +.

### Measurement results of version cB-0950-03-1-01-0x:



Data record name: 120262AC1

**Result measured with the quasipeak detector:**

(These values are marked in the diagram by an x)

Frequency MHz	Level dB $\mu$ V	Transducer dB	Limit dB $\mu$ V	Margin dB	Line	PE
0.337200	35.30	0.7	59.3	24.0	N	FLO
3.578100	25.30	0.9	56.0	30.7	L1	FLO
3.714000	30.00	0.9	56.0	26.0	N	FLO
3.785100	29.00	0.9	56.0	27.0	N	FLO
3.843600	25.70	0.9	56.0	30.3	N	FLO
4.116300	27.30	1.0	56.0	28.7	N	FLO
4.175700	33.60	1.0	56.0	22.4	N	FLO
4.318800	25.50	1.0	56.0	30.5	L1	FLO
Measurement uncertainty				+3.6 dB / -4.5 dB		

Data record name: 120262AC1\_fin QP

Test: Passed

**TEST EQUIPMENT USED FOR THE TEST:**

1 – 4, 20

## 6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal. due
1	Shielded chamber M47	-	Albatross Projects	B83117-C6439-T262	480662	Weekly verification (system cal.)	
2	EMI Receiver	ESIB 26	Rohde & Schwarz	1088.7490	481182	03/09/2012	03/2014
3	LISN	NSLK8128	Schwarzbeck	8128161	480138	12/13/2011	12/2012
4	High pass filter	HR 0.13-5ENN	FSY Microwave Inc.	DC 0109 SN 002	480340	Weekly verification (system cal.)	
14	Open area test site	-	Phoenix Test-Lab	-	480085	Weekly verification (system cal.)	
15	Measuring receiver	ESIB7	Rohde & Schwarz	100304	480521	02/15/2010	02/2014
16	Controller	HD100	Deisel	100/670	480139	-	-
17	Turntable	DS420HE	Deisel	420/620/80	480087	-	-
18	Antenna support	MA240-0	Inn-Co GmbH	MA240-0/030/6600603	480086	-	-
19	Antenna	CBL6111 D	Chase	25761	480894	28/09/2011	09/2014
20	EMI Software	ES-K1	Rohde & Schwarz	-	480111	-	-
29	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439-T232	480303	Weekly verification (system cal.)	
30	Spectrum analyser	FSU	Rohde & Schwarz	200125	480956	02/15/2012	02/2014
31	Measuring receiver	ESI 40	Rohde & Schwarz	100064	480355	02/13/2012	02/2014
32	Controller	MCU	Maturo	MCU/043/971107	480832	-	-
33	Turntable	DS420HE	Deisel	420/620/80	480315	-	-
34	Antenna support	AS620P	Deisel	620/375	480325	-	-
35	Antenna	CBL6112 B	Chase	2688	480328	04/21/2011	04/2014
36	Antenna	3115 A	EMCO	9609-4918	480183	11/09/2011	11/2014
37	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	483	480294	Six month verification (system cal.)	
39	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	411	480297	Six month verification (system cal.)	
41	RF-cable No. 3	Sucoflex 106B	Huber&Suhner	0563/6B / Kabel 3	480670	Weekly verification (system cal.)	
42	RF-cable No. 40	Sucoflex 106B	Huber&Suhner	0708/6B / Kabel 40	481330	Weekly verification (system cal.)	
43	RF-cable No. 30	RTK 081	Rosenberger	-	410141	Weekly verification (system cal.)	
44	RF-cable No. 31	RTK 081	Rosenberger	-	410142	Weekly verification (system cal.)	
46	RF-cable 1 m	KPS-1533-400-KPS	Insulated Wire	-	480301	Six month verification (system cal.)	
47	RF-cable-No 36	Sucoflex 106B	Huber&Suhner	0587/6B / Kabel 36	480865	Weekly verification (system cal.)	
49	Preamplifier	JS3-00101200-23-5A	Miteq	681851	480337	Six month verification (system cal.)	
50	Preamplifier	JS3-12001800-16-5A	Miteq	571667	480343	Six month verification (system cal.)	
51	Preamplifier	JS3-	Miteq	658697	480342	Six month verification	

		18002600- 20-5A					(system cal.)
55	Loop antenna	HFH2-Z2	Rohde & Schwarz	832609/014	480059	02/16/2012	02/2014
72	4 GHz High Pass Filter	WHKX4.0/18 G-8SS	Wainwright Instruments	1	480587	Weekly verification (system cal.)	
73	Coupling Plate	50 Ω system	PHOENIX TESTLAB GmbH	-	410160		-

## REPORT HISTORY

Report Number	Date	Comment
F121150E1	16 April 2012	Document created

## 7 LIST OF ANNEXES

ANNEX A TEST SET-UP PHOTOGRAPHS 8 pages

- 121150\_15: Test set-up: fully anechoic chamber (Preliminary measurement 9 kHz – 30 MHz)
- 121150\_2: Test set-up: fully anechoic chamber (Preliminary measurement 30 MHz – 1000 MHz)
- 121150\_3: Test set-up: fully anechoic chamber (Preliminary & Final measurement 1 GHz – 12 GHz)
- 121150\_6: Test set-up: fully anechoic chamber (Preliminary & Final measurement 12 GHz – 18 GHz)
- 121150\_22: Test set-up: fully anechoic chamber (Preliminary & Final measurement 18 GHz – 22 GHz)
- 121150\_16: Test set-up: open area test site (Final measurement 30 MHz – 1 GHz)
- 121150\_17: Test set-up: Conducted emissions on power supply lines
- 121150\_23: USBN pluggend into the test laptop-PC

ANNEX B EXTERNAL PHOTOGRAPHS 4 pages

- 121150\_24: USBN Top view 1
- 121150\_25: USBN Top view 2
- 121150\_26: USBN Bottom view 1
- 121150\_27: USBN Bottom view 2

ANNEX C INTERNAL PHOTOGRAPHS 3 pages

- 121150\_29: USBN PCB top view
- 121150\_28: USBN PCB bottom view
- 121150\_30: USBN – internal antenna