



## Accredited testing-laboratory

**DAR registration number: DAT-P-176/94-D1**

**Federal Motor Transport Authority (KBA)  
DAR registration number: KBA-P 00070-97**

**Recognized by the Federal Communications Commission  
Anechoic chamber registration no.: 90462 (FCC)  
Anechoic chamber registration no.: 3463A-1 (IC)  
Certification ID: DE 0001  
Accreditation ID: DE 0002**

**Accredited Bluetooth® Test Facility (BQTF)**

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**Test report no. : 1-0995-01-04/08-B**  
**Type identification : Short Range Radio Module  
intended for IntelliVUe X2**  
**Applicant : Philips Medizin Systeme Böblingen GmbH**  
**FCC ID : PQC-SRRBV1**  
**IC Certification No : 3549C-SRRBV1**  
**Test standards : 47 CFR Part 15  
RSS - 210 Issue 7**

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## 1 General information

### 1.1 Notes

The test results of this test report relate exclusively to the test item specified in 3.1.1. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

Test laboratory manager:

**2009-MAR-23**    **Jakob Reschke**

Date

Name

Signature



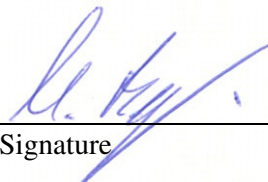
Technical responsibility for area of testing:

**2009-MAR-23**    **Michael Berg**

Date

Name

Signature



## 1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Phone: + 49 681 5 98 - 0

Fax: + 49 681 5 98 - 9075

e-mail: info@ICT.cetecom.de

Internet: http://www.cetecom-ict.de

**State of accreditation:** The test laboratory (area of testing) is accredited according to  
DIN EN ISO/IEC 17025  
DAR registration number: DAT-P-176/94-D1

**Accredited by:** Federal Motor Transport Authority (KBA)  
DAR registration number: KBA-P 00070-97

**Testing location, if different from CETECOM ICT Services GmbH:**

Name :  
Street :  
Town :  
Country :  
Phone :  
Fax :

## 1.3 Details of applicant

<b>Name:</b>	Philips Medizin Systeme Böblingen GmbH
<b>Street:</b>	Hewlett-Packard-Strasse 2
<b>Town:</b>	71034 Böblingen
<b>Country:</b>	Germany
<b>Telephone:</b>	
<b>Fax:</b>	+49 (0) 7031 463-2442
<b>Contact:</b>	Mr. Markus Stacha
<b>E-mail:</b>	markus.stacha@philips.com
<b>Telephone:</b>	+49 (0) 7031 463-2840

## 1.4 Application details

<b>Date of receipt of order:</b>	2009-JAN-27
<b>Date of receipt of test item:</b>	2009-JAN-26
<b>Date of start test:</b>	2009-JAN-26
<b>Date of end test:</b>	2009-JAN-27
<b>Persons(s) who have been present during the test:</b>	Mr. Stefan Breuer

## 2 Test standard/s:

47 CFR Part 15	2008-07	Title 47 of the Code of Federal Regulations; Chapter I- Federal Communications Commission subchapter A - general, Part 15-Radio frequency devices
RSS - 210 Issue 7	2007-06	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

### 3 Technical tests

#### 3.1 Details of manufacturer

Name:	Philips Medizin Systeme Böblingen GmbH
Street:	Hewlett-Packard-Strasse 2
Town:	71034 Böblingen
Country:	Germany

##### 3.1.1 Test item

Kind of test item	:	SRR Module
Type identification	:	Short Range Radio Module intended for IntelliVUe X2
S/N serial number	:	RA 849 000044 (Transceiver) DE83617447 (host monitor IntelliVUe X2)
HW hardware status	:	M3002-66471 Rev 0850
SW software status	:	-/-
Frequency Band [MHz]	:	2400 – 2483.5 MHz
Type of Modulation	:	DSSS
Emission Designator	:	5M00G1D
Channel Separation	:	5 MHz
Number of channels	:	16
Antenna	:	Integrated on board antenna
Power Supply	:	10.80 V DC by Li-Ion Battery
Temperature Range	:	22 °C

##### Transceiver 1:

Max. power radiated: **-11.00 dBm / 0,08 mW**  
 Max. power conducted: **not performed**

##### Transceiver 2:

Max. power radiated: **-5.00 dBm / 0,32 mW**  
 Max. power conducted: **not performed**

FCC ID: **PQC-SRRBV1**  
 IC: **3549C-SRRBV1**

##### **SAR/RF Exposure Statement:**

According to the FCC and IC regulations SAR/RF exposure tests are not required because the maximum radiated output power of the Short Range Radio module is 0.32 mW. This value is far below the SAR/RF exposure limit of 25 mW (60/F[GHz]).

**3.1.2 Additional EUT information For IC Canada (appendix 2)**

IC Registration Number:	<b>3549C-SRRBV1</b>
Model Name:	<b>Short Range Radio Module</b>
Manufacturer (complete Address):	<b>Philips Medizin Systeme Böblingen GmbH Hewlett-Packard-Strasse 2 71034 Böblingen Germany</b>
Tested to Radio Standards Specification (RSS) No.:	<b>RSS-210 Issue 7</b>
Open Area Test Site Industry Canada Number:	<b>IC 3463A-1</b>
Frequency Range (or fixed frequency) [MHz]:	<b>2400 – 2483.5 MHz</b>
RF: Power [W] (max):	<b><u>Transceiver 1:</u> Rad. EIRP: 0.08mW  <u>Transceiver 1:</u> Rad. EIRP: 0.32mW</b>
Antenna Type:	<b>Integrated on board antenna</b>
Occupied Bandwidth (99% BW) [kHz]:	<b>Not performed</b>
Type of Modulation:	<b>DSSS</b>
Emission Designator (TRC-43):	<b>2M69G1D (DSSS)</b>
Transmitter Spurious (worst case) [ $\mu$ V/m in 3m]:	<b>130</b>
Receiver Spurious (worst case) [ $\mu$ V/m in 3m]:	<b>118</b>

ATTESTATION: I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Test engineer: Jakob Reschke

Date: 2009-MAR-23

**3.1.3 RF Technical Brief Cover Sheet acc. To RSS-102**

All Fields must be completed with the requested information or the following codes: N/A for Not Applicable, N/P for Not Performed or N/V for Not Available. Where applicable, check appropriate box.

- 1. COMPANY NUMBER:           **3549C**
- 2. MODEL NUMBER:           **Short Range Radio Module**
- 3. MANUFACTURER:           **Philips Medizin Systeme Böblingen GmbH**
- 4. TYPE OF EVALUATION:    **(c) RF Evaluation**

- Evaluated against exposure limits: General Public Use  Controlled Use
- Duty cycle used in evaluation: ~10 %
- Standard used for evaluation: RSS-102 Issue 2 (2005-11)
- Measurement distance: 0.20 m
- RF value: 0.064 V/m  A/m  W/m<sup>2</sup>
- Measured  Computed  Calculated

**Declaration of RF Exposure Compliance**

**ATTESTATION:** I attest that the information provided in this test report is correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.



Name:           Jakob Reschke  
Title:           Engineer  
Company:       Cetecom ICT Services GmbH



### 3.1.4 EUT operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
Op. 0	Normal mode	Normal temperature and power source conditions
Op. 1		low temperature, low power source conditions
Op. 2		low temperature, high power source conditions
Op. 3		high temperature, low power source conditions
Op. 4		high temperature, high power source conditions

\*) EUT operating mode no. is used to simplify the test plan

### 3.1.5 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T <sub>nom</sub>	°C	22
Nominal Humidity	H <sub>nom</sub>	%	52
Nominal Power Source	V <sub>nom</sub>	V	10.80

Type of power source: DC by Li-Ion Battery

Deviations from these values are reported in chapter 2

#### 4 Summary of Measurement Results and list of all performed test cases

- No deviations from the technical specifications were ascertained
- There were deviations from the technical specifications ascertained

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 15 - CANADA RSS-210	PASS	2009-01-29	For more information refer to sec. 5.2. and 5.3 of this test report

Test Specification Clause	Test Case	Pass	Fail	Not applicable	Not performed
None	Antenna Gain				Yes
§15.247 (e)	Peak power spectral density				Yes
§15.247(a)(2)	Spectrum Bandwidth of a DSSS System / 6dB BW				Yes
§15.247(a)(2)	Spectrum Bandwidth of a DSSS System / 20dB BW				Yes
§ 15.247 (b)(3)	Maximum output power (conducted)				Yes
§ 15.247 (b)(3)	Max. peak output power (radiated)	Yes			
§15.247 (d)	Band-edge compliance of conducted emissions				Yes
§15.205	Band-edge compliance of radiated emissions	Yes			
§15.247 (d)	Spurious Emission - conducted (Transmitter)				Yes
§ 15.209	Spurious Emission -radiated (Transmitter)	Yes			
§ 15.109	Spurious Emissions-radiated (Receiver)	Yes			
§ 15.209	Spurious Emissions-radiated <30 MHz	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	Yes			

## 5 RF measurement testing

### 5.1 Description of test set-up

#### 5.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

Antennas are confirmed with ANSI C63.2-1996 item 15.

9 kHz - 150 MHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.

150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120 kHz Bandwidth, biconical antenna

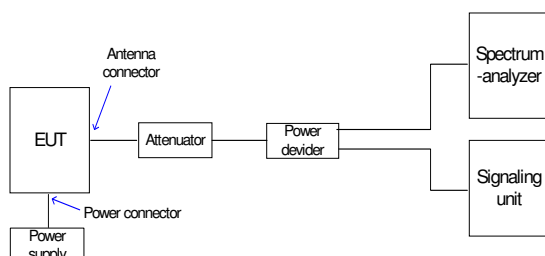
200MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.209 and 15.207

#### 5.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is connected to the spectrum analyzer. The specific losses for signal path are first checked within a calibration. The measurement readings on the spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



## 5.2 Referenced Documents

The compliance tests on the Short Range Radio (SRR) module for the IntelliVue Patient Monitors MP5 and MP5T, according to the FCC and IC regulations are documented in the following test reports:  
No.: 1-0384-01-03-08-C (all tests, SRR stand-alone) and No.: 1-0384-01-09-08-B (additional tests, SRR built-in in host monitor).

## 5.3 Additional comments

The Short Range Radio (SRR) module tested in this report includes two similar transceivers arranged on one common PCB, see pictures 10 to 13 in sec 8 of this test report.

The manufacturer provided software which was used to set the channel (modulated or unmodulated) and the output power to get the EUT in continuous transmitting mode.

Every test was performed with the highest output power and modulated carrier.

The module is only used in hosts from the following manufacturer:  
Philips Medizin Systeme Böblingen

The SRR module covered by this report is intended for the IntelliVue MP2/X2.  
The SRR module covered by the report referenced in section 5.2 is intended for the IntelliVue MP5/MP5T

Complete compliance tests to the FCC and IC regulations were performed on the SRR module intended for the IntelliVue Patient Monitors, models MP5 and MP5T. The performed testing included tests on the SRR module stand-alone and built-in in the host monitor, as documented in the test reports referenced in Sec. 5.2 above.

The SRR module intended for use in the IntelliVue models MP2 and X2 was slightly modified due to the limited space availability in these monitors. The modification of the SRR module comprises the following:

### ➤ Components

RF processor and clock oscillator are identical.

The MP5/MP5T radio uses a “WE-MCA” chip antenna (part no. 7488920245) from Würth Elektronik for both radio modules on that board.

The MP2/X2 radio uses two different chip antennas:

- “Micro Reach Xtend” chip antenna (part no. FR05-S1-N-0-110) from Fractus for radio 1
- “Comata” chip antenna (part no. 3030A6111) from Antenova

Likewise the antenna matching circuit has been adapted for the different antennas.

As a reference, the specified antenna gains for the used antennas are:

- Würth “WE-MCA”: 1.3 dBi peak, 0.0 dBi average
- Fractus “Micro Reach Xtend”: - 0.5 dBi peak
- Antenova “Comata”: 0.0 dBi peak, -3.5 dBi average

Details of the schematics can be seen in drawings D-M8100-96471-1 rev. 0818 (MP5/MP5T) and D-M3002-96471-1 rev. 0850 (MP2/X2).

---

➤ **Placement and PCB Layout**

Placement and PCB layout have been adjusted to the different space restrictions inside the IntelliVue MP2/X2.

Details of the placement can be seen in drawing C-M8100-66491-8 rev. 0818 (MP5/MP5T) and C-M3002-66471-8 rev. 0831 (MP2/X2).

The referenced documents are kept on file at CETECOM ICT"

Class A spurious emissions tests were carried out at the lowest, middle and highest operating frequency and in idle mode. Additionally, the hosting monitor was tested alone without the short range radio module in order to distinguish the spurious emissions of the transmitter module from those originated by the class A hosting monitor.

**IntelliVue MP2 Reference**

The IntelliVue MP2 is the marketing variant of the IntelliVue X2, which provides reduced functionality. Both monitor models, the MP2 and the X2, have the same hardware and software.

Compared to the X2, the MP2 lacks the capability to communicate directly with another IntelliVue patient monitor.

For this reason, all radio tests performed on the X2 are also representative for the MP2.

#### 5.4 Antenna gain

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.

**Not performed**

	low channel	mid channel	high channel
Conducted power [dBm] <i>(measured)</i>			
Radiated power [dBm] <i>(measured)</i>			
Gain [dBi] <i>(calculated)</i>			

**5.5 Peak Power Spectral density (digitally modulated systems) §15.247(e)**

**Not performed**

Limits :

Under normal test conditions only	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission
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**5.6 Spectrum Bandwidth of a DSSS System / 6 dB Bandwidth §15.247(a)(2)**

**Not performed**

Results:

Test conditions		6 dB BANDWIDTH [MHz]		
Frequency [MHz]				
$T_{nom}$	$V_{nom}$			
Measurement uncertainty		$\pm 1\text{kHz}$		

RBW: 100 kHz / VBW 100 kHz

Limits:

Under normal test conditions only	> 500 kHz
-----------------------------------	-----------

**5.7 Spectrum Bandwidth of a DSSS System / 20 dB Bandwidth**

**Not performed**

Results:

Test conditions		20 dB BANDWIDTH [MHz]		
Frequency [MHz]				
T <sub>nom</sub>	V <sub>nom</sub>			
Measurement uncertainty		±1kHz		

RBW: 100 kHz / VBW 100 kHz

**5.8 Maximum output power (conducted) §15.247 (b)(3)**

**Not performed**

Results:

Test conditions		Max. peak output power [dBm]		
Frequency [MHz]				
T <sub>nom</sub>	V <sub>nom</sub>	PK		
		PK corrected		
De facto EIRP (Peak) [dBm]				
Antenna gain: [dBi]				
Measurement uncertainty		±3dB		

RBW / VBW: 10 MHz

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt / 30 dBm
--	------------------------



### MPE calculation

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2$$

where S = power density ( in appropriate units, e.g. mW/cm<sup>2</sup>)  
P = power input to the antenna (in appropriate units e.g. mW)  
G = power gain of the antenna in the direction of interest relative to the isotropic radiator  
R = distance to the centre of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

#### Calculation:

(Calculated for max. EIRP)

EIRP: -5.00 dBm (0.32 mW)

calculated at distance of 20 cm:

$$\text{power density} = 0.32/4\pi 20^2 = 0.0064 \text{ mW/ cm}^2$$

Limit:

1mW/ cm <sup>2</sup> is the reference level for general public exposure according to the OET Bulletin 65, Edition 97-01 Table 1.
---

**5.9 Max. peak output power (radiated) §15.247 (b)(3)**

Transceiver 1:

Results:

Test conditions Frequency [MHz]		Max. peak output power EIRP [dBm]		
		Lowest frequency	Middle frequency	Highest frequency
T <sub>nom</sub>	V <sub>nom</sub>	-13.00	-15.00	-11.00
Measurement uncertainty		±3dB		

Transceiver 2:

Results:

Test conditions Frequency [MHz]		Max. peak output power EIRP [dBm]		
		Lowest frequency	Middle frequency	Highest frequency
T <sub>nom</sub>	V <sub>nom</sub>	-8.60	-5.00	-5.00
Measurement uncertainty		±3dB		

RBW / VBW: 10 MHz

Measured at a distance of 3m

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt
--	---------------

**5.10 Band-edge compliance of conducted emissions §15.247 (d)**

**Not performed**

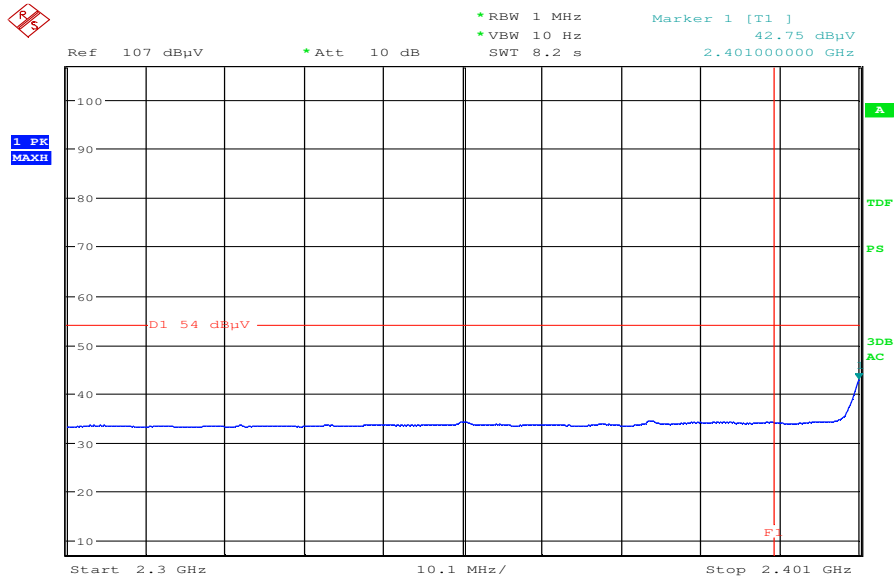
Limits:

<p>Under normal test conditions only</p>	<p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).</p>
--	---

### 5.11 Band-edge compliance of radiated emissions §15.205

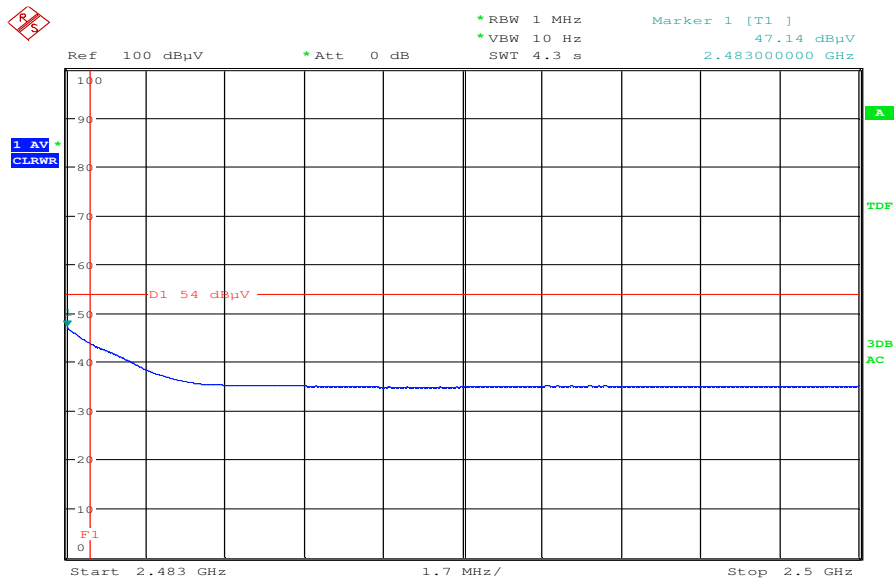
Transceiver 1:

Plot 1: Band edge compliance with far away spurious emissions (Lowest Channel)



Date: 26.JAN.2009 13:30:25

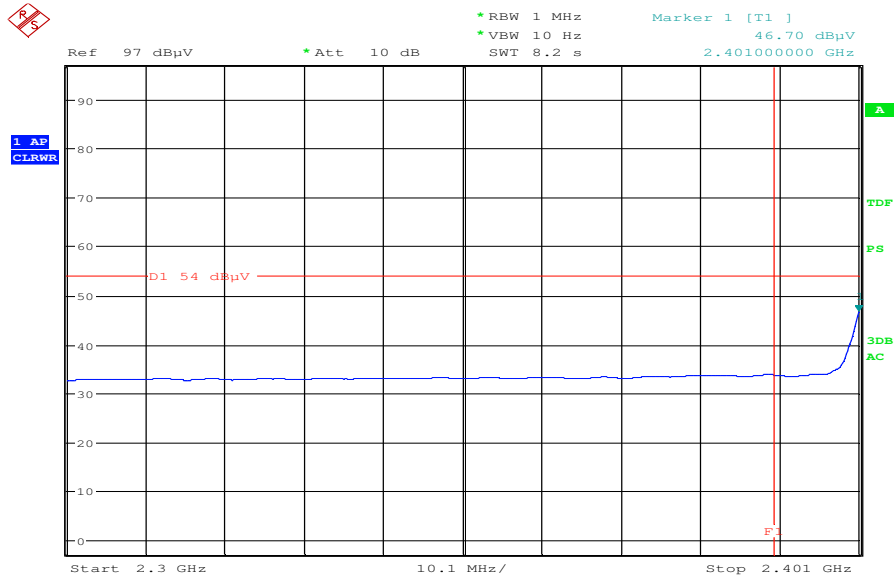
Plot 2: Band edge compliance with far away spurious emissions (Highest Channel)



Date: 26.JAN.2009 13:07:13

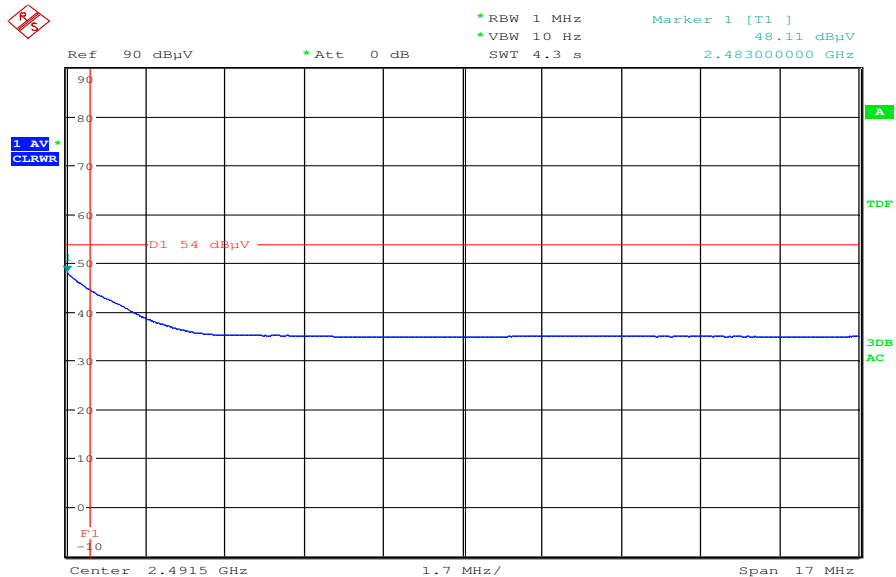
Transceiver 2:

Plot 1: Band edge compliance with far away spurious emissions (Lowest Channel)



Date: 26.JAN.2009 10:45:08

Plot 2: Band edge compliance with far away spurious emissions (Highest Channel)



Date: 26.JAN.2009 10:31:43

Limit: 54dBμV/m @ 3m

Result: Pass

**5.12 Spurious Emissions - conducted (Transmitter) §15.247 (c)**

**Not performed**

Result & Limits:

Emission Limitations					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
			30 dBm	-	Operating frequency
			-20 dBc		
			30 dBm		Operating frequency
			-20 dBc		
			30 dBm		Operating frequency
			-20 dBc		
Measurement uncertainty		± 3dB			

F < 1 GHz: RBW: 100 kHz VBW: 100 kHz  
 F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
-----------------------------------	--

Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

### 5.13 Spurious Emissions - radiated (Transmitter) §15.209

Transceiver 1:

Plot 1: 0.03 - 1 GHz (lowest channel)

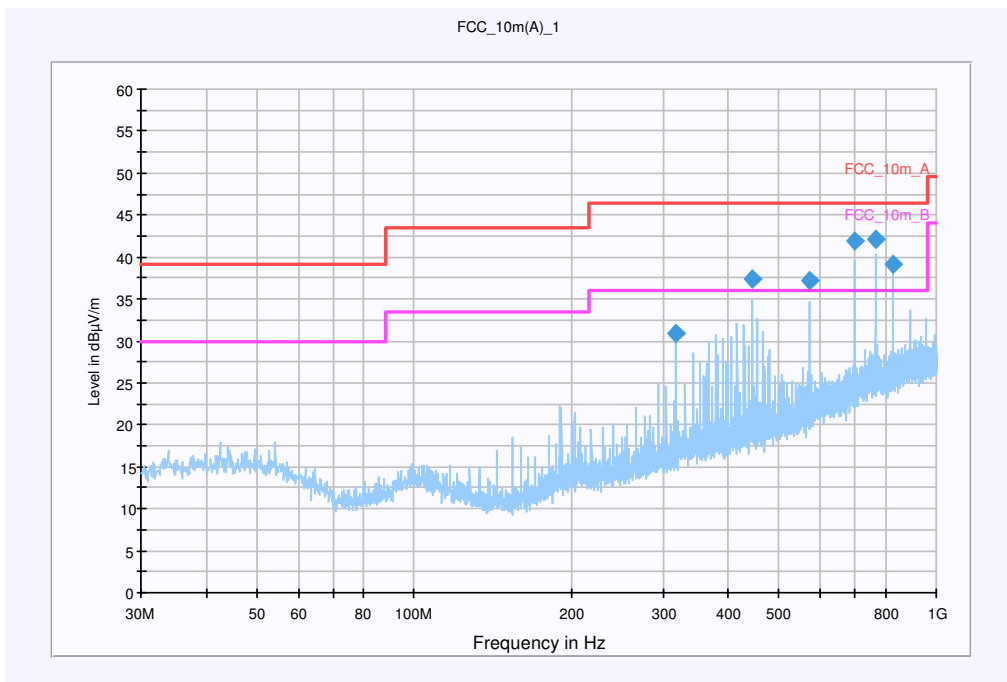
**Common Information**

EUT:	SRR module built in IntelliVue X2
Serial Number:	RA 849 000044 (transceiver) DE83617447 (IntelliVue X2 host monitor)
Test Description:	FCC Part 15
Operating Conditions:	Tx Mode CH 11
Operator Name:	ZAK
Comment:	Battery powered ; Modul 1

**Scan Setup: STAN\_Fin [EMI radiated]**

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



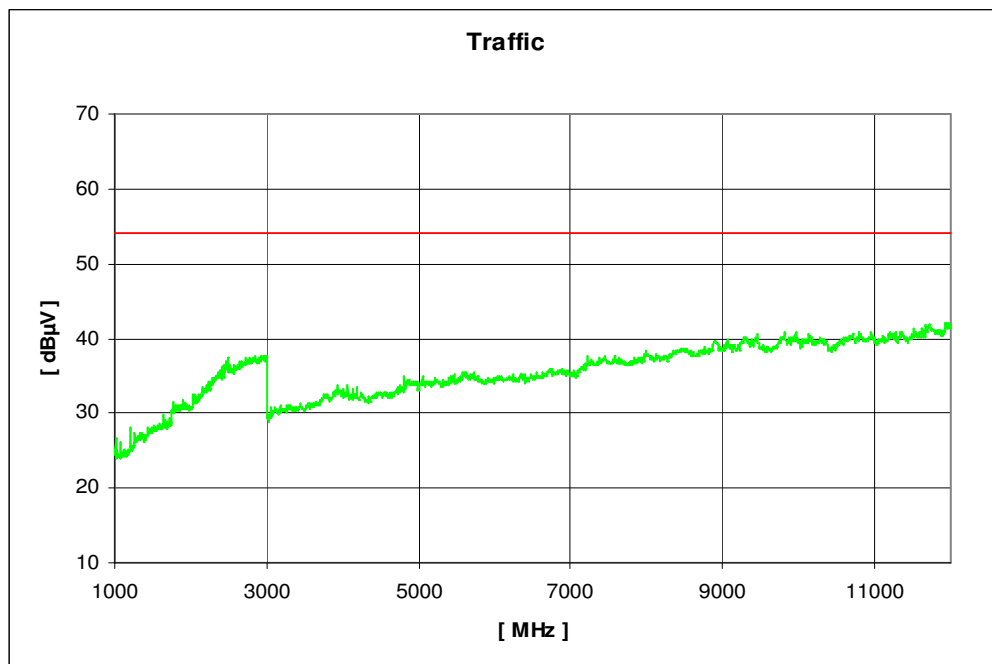
**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
317.648050	31.0	15000.000	120.000	301.0	H	163.0	15.4	15.4	46.4	
444.736050	37.3	15000.000	120.000	200.0	H	188.0	18.0	9.1	46.4	
571.821200	37.2	15000.000	120.000	138.0	H	163.0	20.5	9.2	46.4	
698.843700	41.8	15000.000	120.000	118.0	H	45.0	23.0	4.6	46.4	
762.385600	42.2	15000.000	120.000	100.0	H	22.0	24.2	4.2	46.4	
825.918450	39.2	15000.000	120.000	100.0	H	9.0	24.7	7.2	46.4	

**Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]**

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

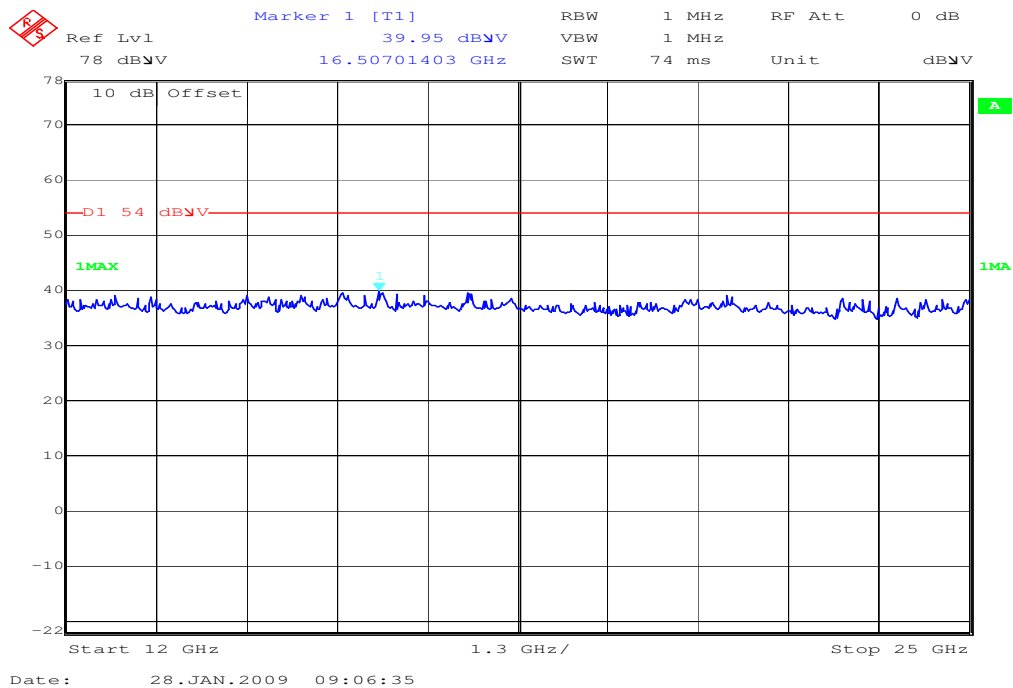
Plot 2: 1 - 12 GHz (lowest channel)



Carrier notched with 2.4 GHz rejection filter.



Plot 3: 12- 25 GHz (valid for all channels)



Plot 4: 0.03 - 1 GHz (middle channel)

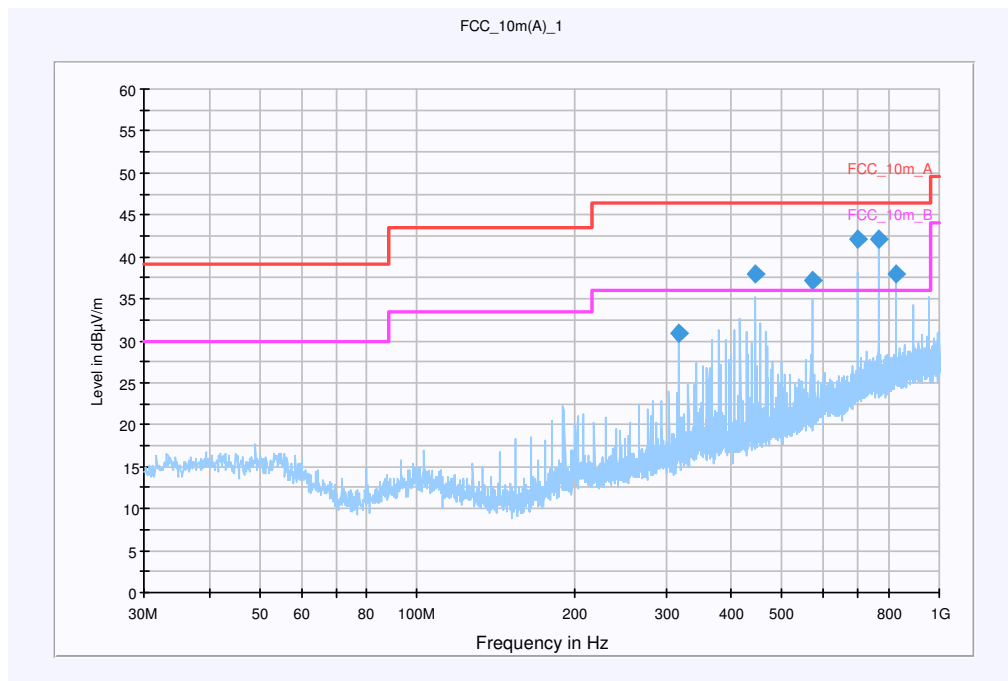
### Common Information

EUT:	SRR module built in IntelliVue X2
Serial Number:	RA 849 000044 (transceiver) DE83617447 (IntelliVue X2 host monitor)
Test Description:	FCC Part 15
Operating Conditions:	Tx Mode CH 18
Operator Name:	ZAK
Comment:	Battery powered ; Modul 1

### Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dB $\mu$ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



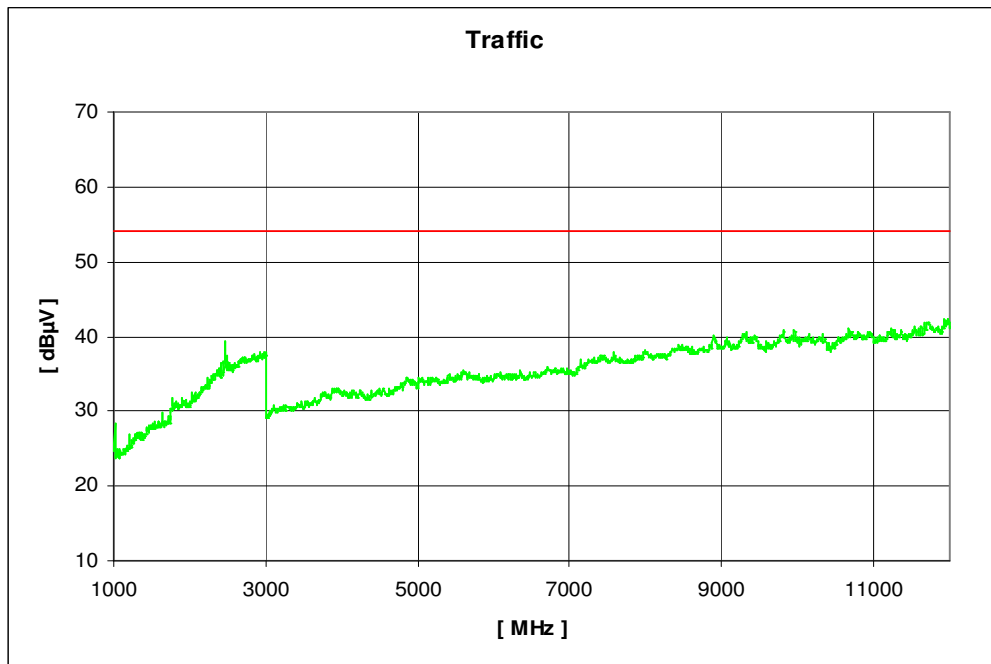
### Final Result 1

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)	Comment
317.665000	30.9	15000.000	120.000	291.0	H	157.0	15.4	15.5	46.4	
444.730950	38.1	15000.000	120.000	226.0	H	184.0	18.0	8.3	46.4	
571.744100	37.2	15000.000	120.000	151.0	H	160.0	20.5	9.2	46.4	
698.862450	42.1	15000.000	120.000	118.0	H	42.0	23.0	4.3	46.4	
762.360250	42.1	15000.000	120.000	100.0	H	18.0	24.2	4.3	46.4	
825.946700	38.0	15000.000	120.000	332.0	H	18.0	24.7	8.4	46.4	

**Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]**

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 5: 1 - 12 GHz (middle channel)



Carrier notched with 2.4 GHz rejection filter.

Plot 6: 0.03 - 1 GHz (highest channel)

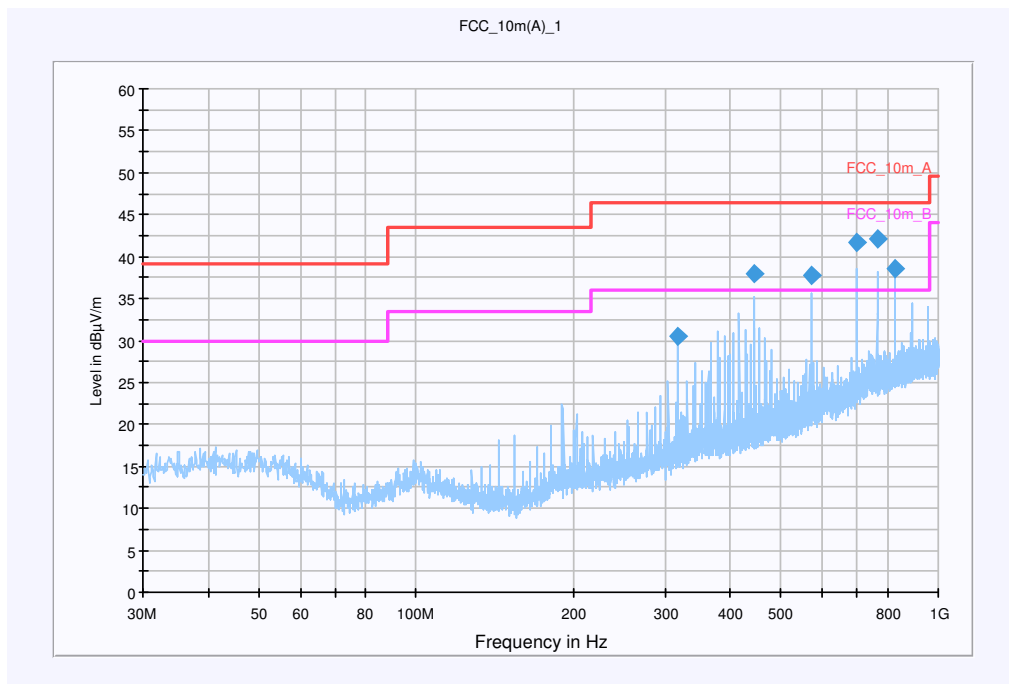
**Common Information**

EUT:	SRR module built in IntelliVue X2
Serial Number:	RA 849 000044 (transceiver) DE83617447 (IntelliVue X2 host monitor)
Test Description:	FCC Part 15
Operating Conditions:	Tx Mode CH 26
Operator Name:	ZAK
Comment:	Battery powered ; Modul 1

**Scan Setup: STAN\_Fin [EMI radiated]**

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



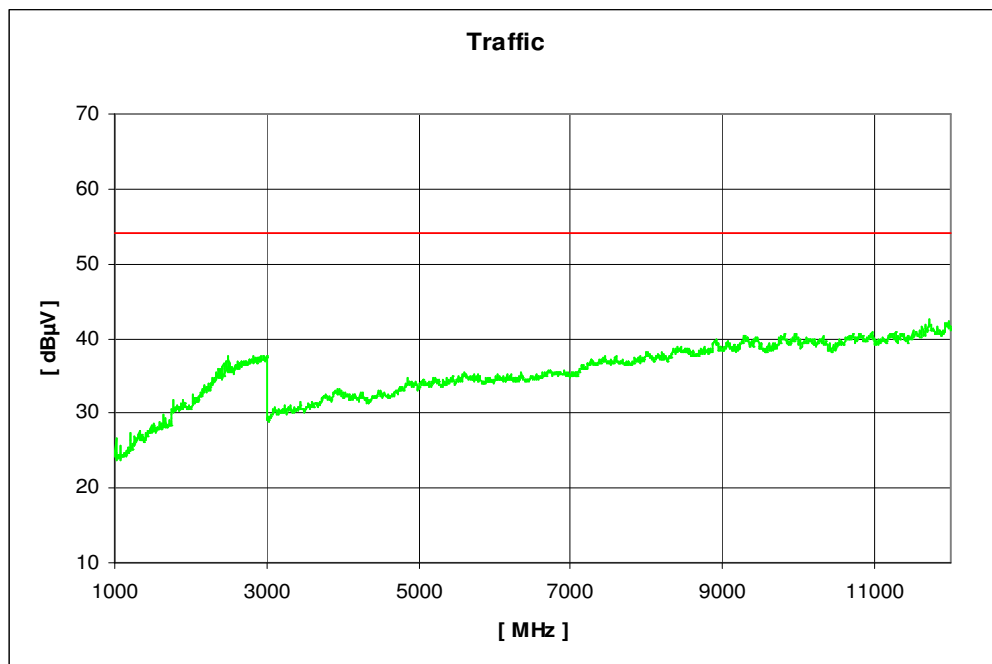
**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
317.635600	30.5	15000.000	120.000	300.0	H	158.0	15.4	15.9	46.4	
444.719000	37.9	15000.000	120.000	218.0	H	186.0	18.0	8.5	46.4	
571.800250	37.8	15000.000	120.000	154.0	H	156.0	20.5	8.6	46.4	
698.878900	41.7	15000.000	120.000	118.0	H	42.0	23.0	4.7	46.4	
762.382850	42.1	15000.000	120.000	100.0	H	32.0	24.2	4.3	46.4	
825.880550	38.5	15000.000	120.000	106.0	H	105.0	24.7	7.9	46.4	

**Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]**

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 7: 1 - 12 GHz (highest channel)



Carrier notched with 2.4 GHz rejection filter.

Results:

SPURIOUS EMISSIONS LEVEL §15.209								
2412 MHz			2437 MHz			2462 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
(for details please see table above)			(for details please see table above)			(for details please see table above)		
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Transceiver 2:

Plot 1: 0.03 - 1 GHz (lowest channel)

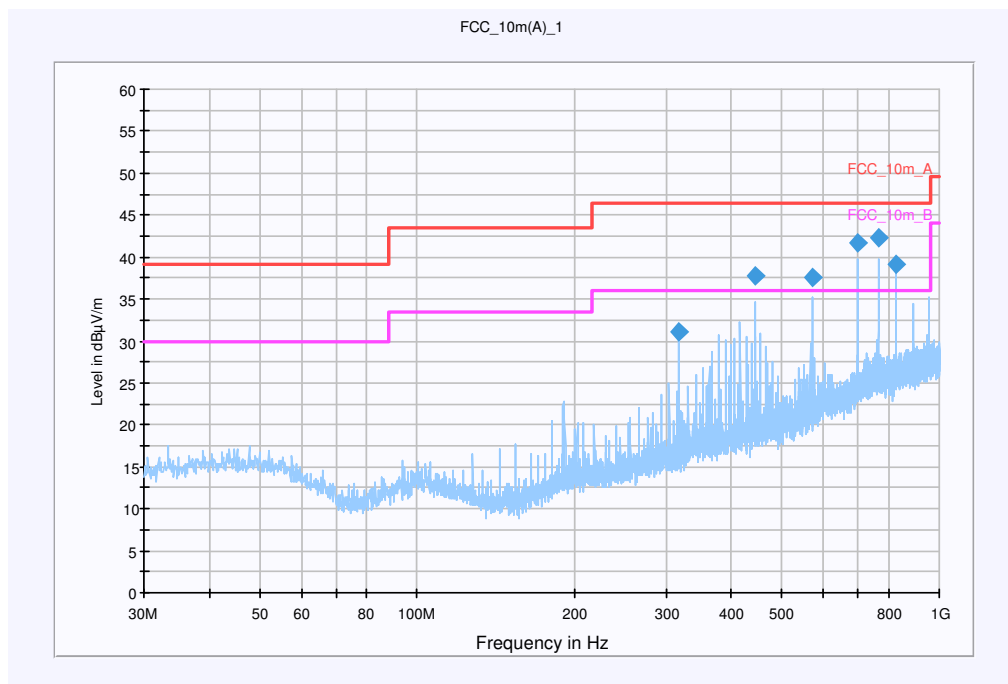
**Common Information**

EUT:	SRR module built in IntelliVue X2
Serial Number:	RA 849 000044 (transceiver) DE83617447 (IntelliVue X2 host monitor)
Test Description:	FCC Part 15
Operating Conditions:	Tx Mode CH 11
Operator Name:	ZAK
Comment:	Battery powered ; Modul 2

**Scan Setup: STAN\_Fin [EMI radiated]**

Hardware Setup:	Electric Field (NOS)
Level Unit:	dB $\mu$ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



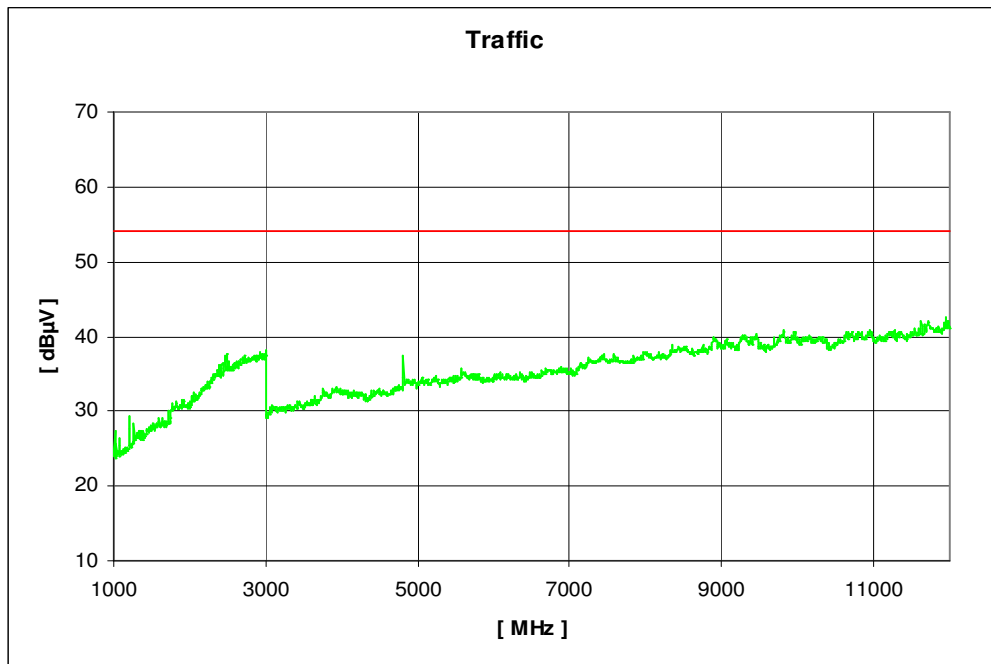
**Final Result 1**

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)	Comment
317.655700	31.1	15000.000	120.000	293.0	H	168.0	15.4	15.3	46.4	
444.727100	37.7	15000.000	120.000	217.0	H	174.0	18.0	8.7	46.4	
571.750600	37.5	15000.000	120.000	131.0	H	171.0	20.5	8.9	46.4	
698.871400	41.8	15000.000	120.000	119.0	H	51.0	23.0	4.6	46.4	
762.398900	42.3	15000.000	120.000	100.0	H	27.0	24.2	4.1	46.4	
825.887300	39.1	15000.000	120.000	100.0	H	15.0	24.7	7.3	46.4	

**Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]**

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

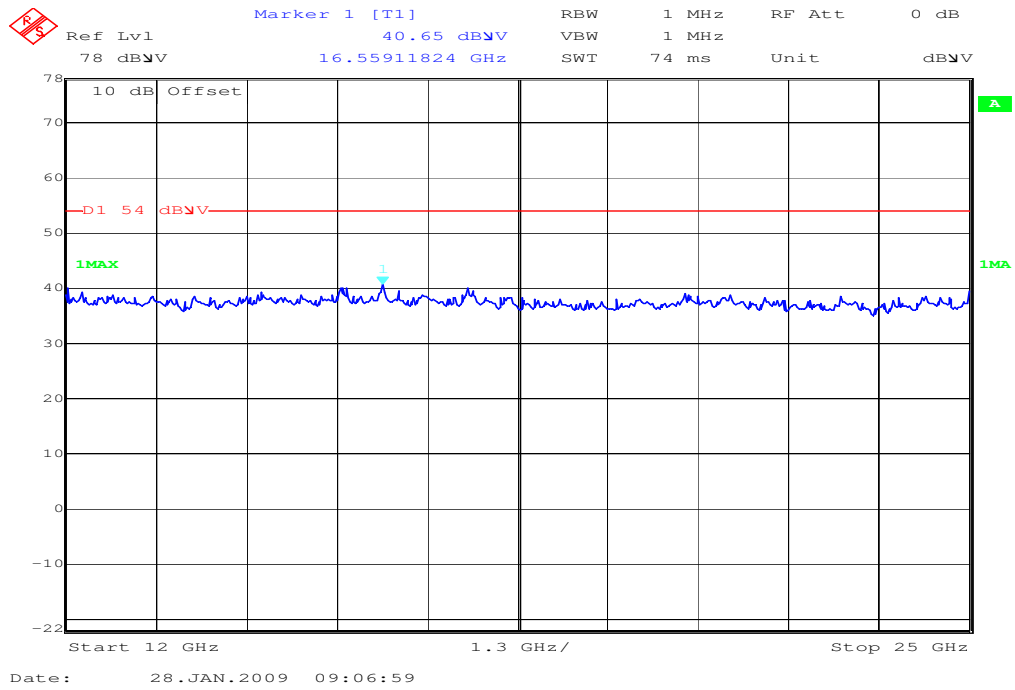
Plot 2: 1 - 12 GHz (lowest channel)



Carrier notched with 2.4 GHz rejection filter.



Plot 3: 12- 25 GHz (valid for all channels)



Plot 4: 0.03 - 1 GHz (middle channel)

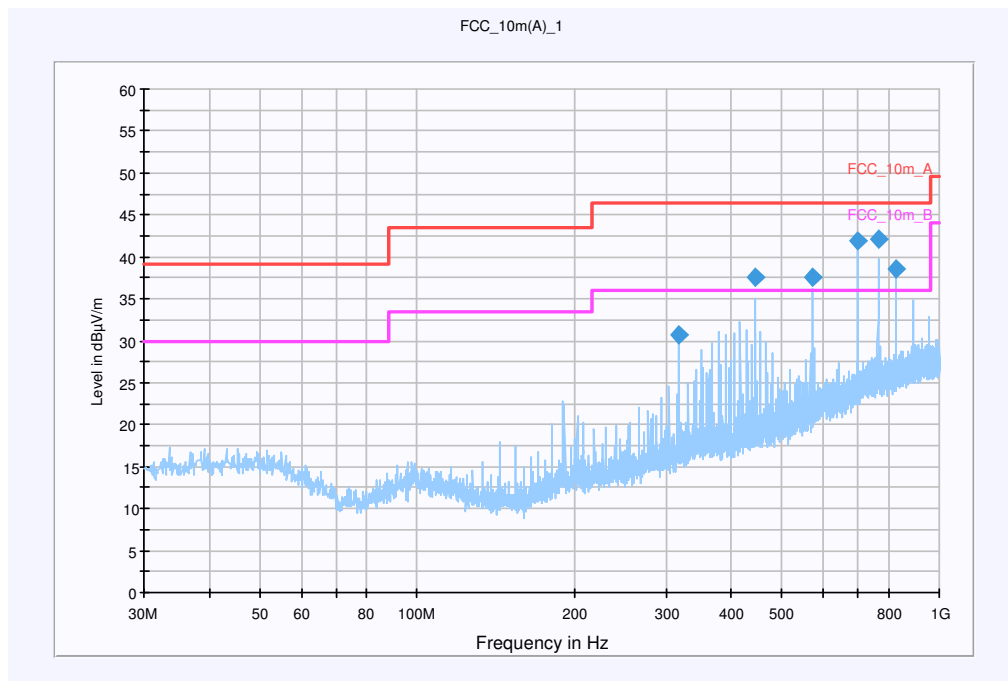
### Common Information

EUT:	SRR module built in IntelliVue X2
Serial Number:	RA 849 000044 (transceiver) DE83617447 (IntelliVue X2 host monitor)
Test Description:	FCC Part 15
Operating Conditions:	Tx Mode CH 18
Operator Name:	ZAK
Comment:	Battery powered ; Modul 2

### Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dB $\mu$ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



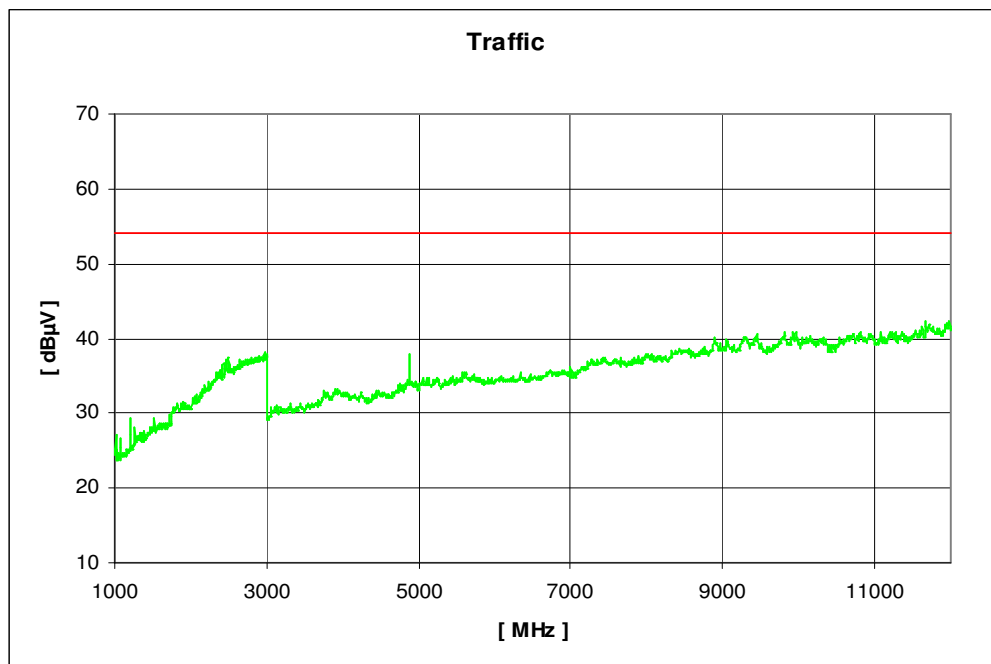
### Final Result 1

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)	Comment
317.669850	30.8	15000.000	120.000	285.0	H	182.0	15.4	15.6	46.4	
444.738050	37.7	15000.000	120.000	218.0	H	193.0	18.0	8.7	46.4	
571.811350	37.6	15000.000	120.000	154.0	H	158.0	20.5	8.8	46.4	
698.821200	41.8	15000.000	120.000	118.0	H	46.0	23.0	4.6	46.4	
762.352600	42.1	15000.000	120.000	100.0	H	27.0	24.2	4.3	46.4	
825.908400	38.6	15000.000	120.000	337.0	H	26.0	24.7	7.8	46.4	

**Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]**

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 5: 1 - 12 GHz (middle channel)



Carrier notched with 2.4 GHz rejection filter.

Plot 6: 0.03 - 1 GHz (highest channel)

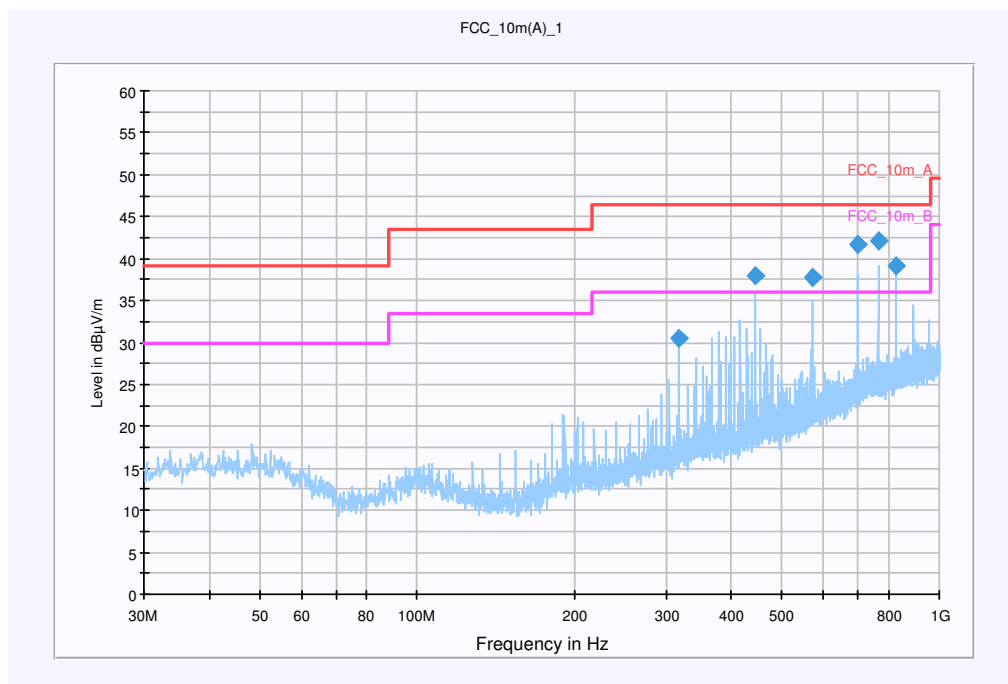
### Common Information

EUT:	SRR module built in IntelliVue X2
Serial Number:	RA 849 000044 (transceiver) DE83617447 (IntelliVue X2 host monitor)
Test Description:	FCC Part 15
Operating Conditions:	Tx Mode CH 26
Operator Name:	ZAK
Comment:	Battery powered ; Modul 2

### Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dB $\mu$ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



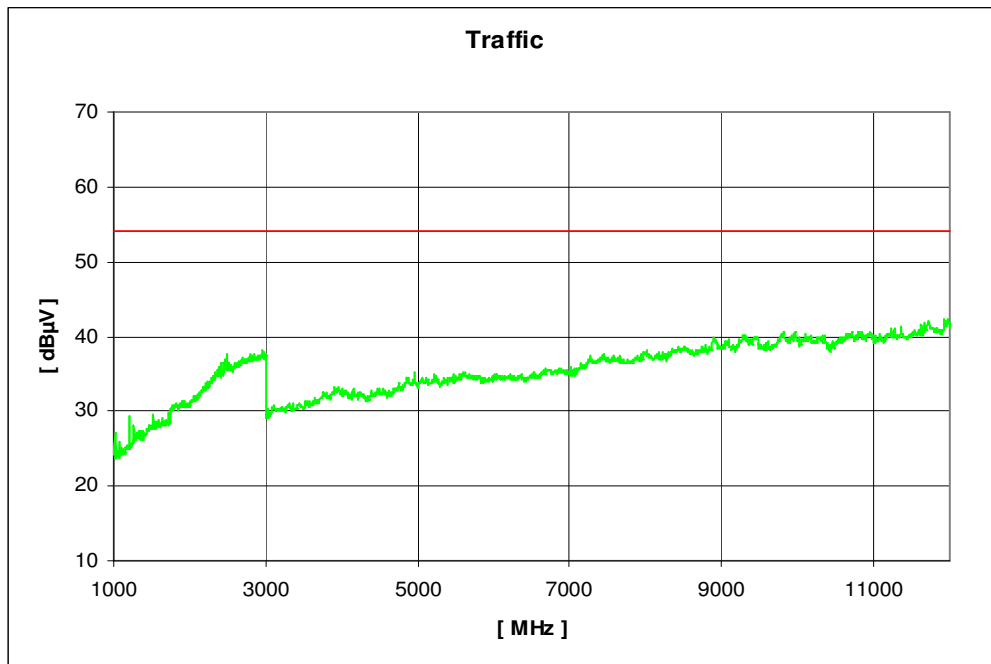
### Final Result 1

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)	Comment
317.642350	30.5	15000.000	120.000	254.0	H	176.0	15.4	15.9	46.4	
444.724850	38.0	15000.000	120.000	226.0	H	186.0	18.0	8.4	46.4	
571.786100	37.7	15000.000	120.000	126.0	H	150.0	20.5	8.7	46.4	
698.861400	41.7	15000.000	120.000	106.0	H	46.0	23.0	4.7	46.4	
762.363800	42.2	15000.000	120.000	100.0	H	26.0	24.2	4.2	46.4	
825.911150	39.1	15000.000	120.000	100.0	H	18.0	24.7	7.3	46.4	

**Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]**

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 7: 1 - 12 GHz (highest channel)



Carrier notched with 2.4 GHz rejection filter.

Results:

SPURIOUS EMISSIONS LEVEL §15.209								
2412 MHz			2437 MHz			2462 MHz		
F [MHz]	Detector	Level [dBμV/m]	F [MHz]	Detector	Level [dBμV/m]	F [MHz]	Detector	Level [dBμV/m]
(for details please see table above)			(for details please see table above)			(for details please see table above)		
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz                      f ≥ 1GHz : RBW/VBW: 1 MHz

Limits: § 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Limits: § 15.109

Frequency (MHz)	Field strength (dBμV/m)	Measurement distance (m)
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
above 960	54.0	3

### 5.14 Spurious Emissions - radiated (Receiver) §15.109 / 209

Plot 1: 0.03 - 1 GHz vertical / horizontal (receiver)

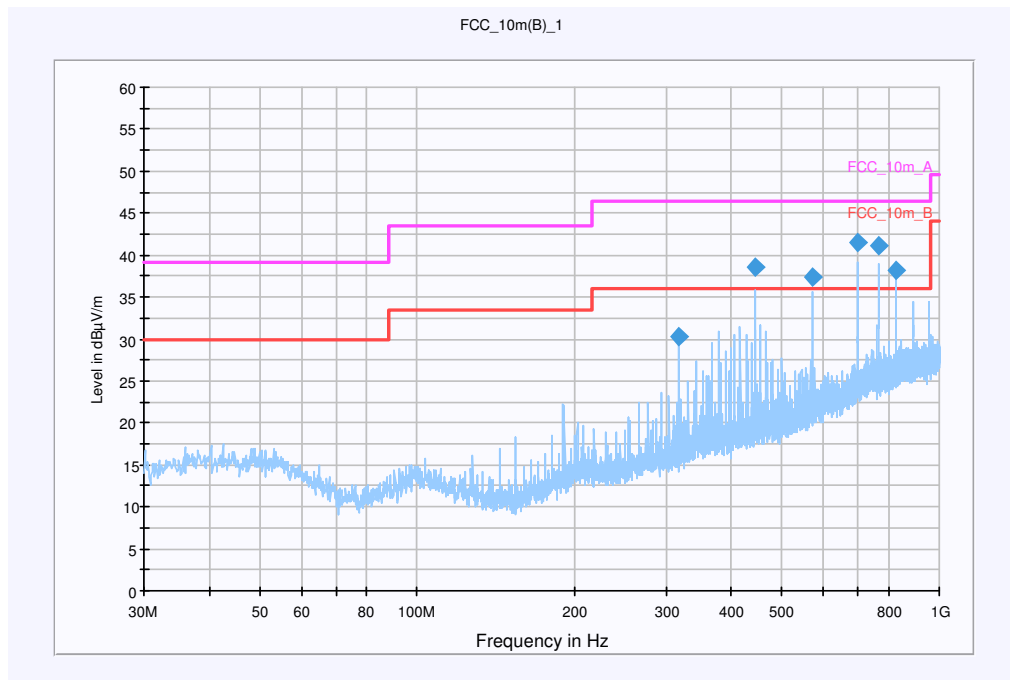
#### Common Information

EUT:	SRR module built in IntelliVue X2
Serial Number:	RA 849 000044 (transceiver) DE83617447 (IntelliVue X2 host monitor)
Test Description:	FCC Part 15
Operating Conditions:	RX / Idle
Operator Name:	Kraus
Comment:	Battery powered

#### Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



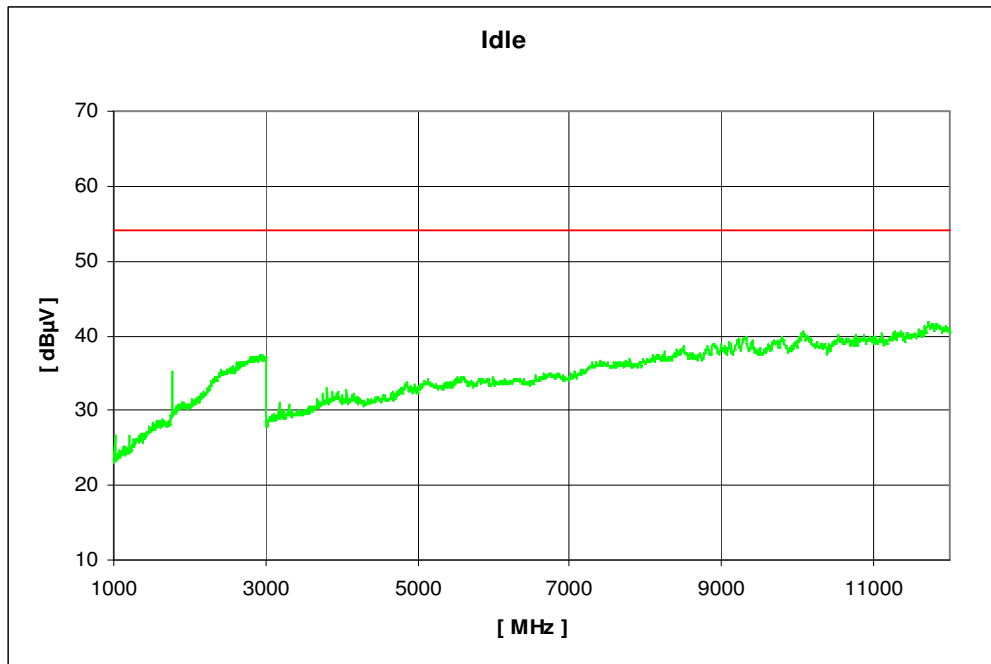
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin Class A	Limit (dBµV/m)	Comment
317.623750	30.2	15000.000	120.000	276.0	H	4.0	15.4	16.2	46.4	
444.709100	38.5	15000.000	120.000	157.0	H	0.0	18.0	7.9	46.4	
571.743850	37.5	15000.000	120.000	151.0	H	-1.0	20.5	8.9	46.4	
698.848800	41.5	15000.000	120.000	143.0	H	228.0	23.0	4.9	46.4	
762.365800	41.1	15000.000	120.000	118.0	H	217.0	24.2	5.3	46.4	
825.966200	38.2	15000.000	120.000	100.0	H	285.0	24.7	8.2	46.4	

**Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]**

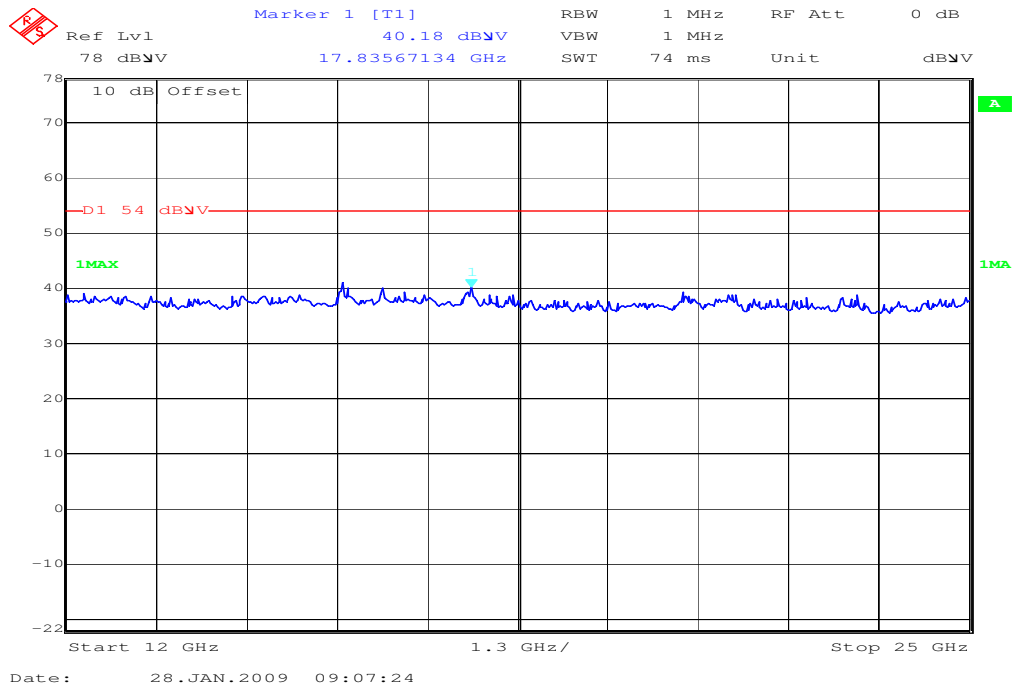
Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 2: 1 - 12 GHz vertical / horizontal (receiver)





Plot 3: 12- 25 GHz (receiver)



Plot 4: 0.03 - 1 GHz vertical / horizontal (Host Unit MP2/X2)

**Common Information**

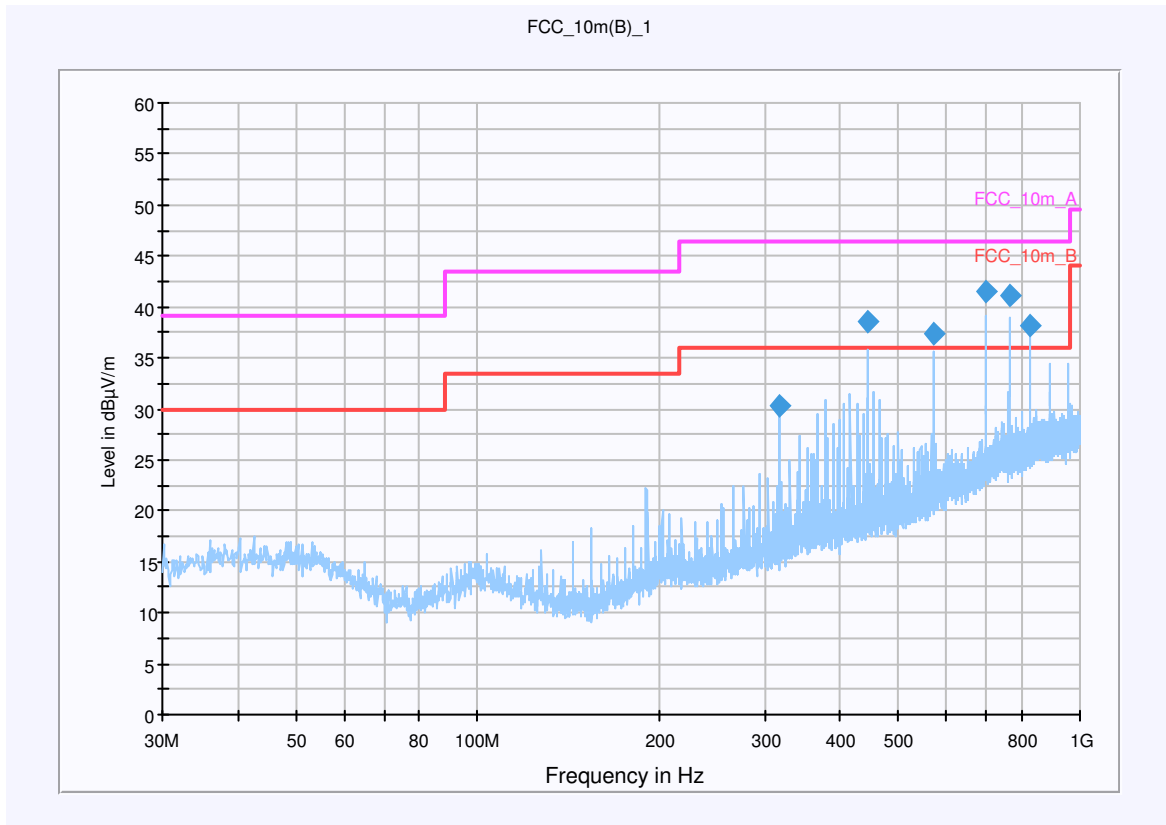
EUT: IntelliVue MP2/X2  
 Serial Number: DE83617447  
 Test Description: FCC Part 15  
 Operating Conditions: Transceiver Module inactive  
 Operator Name: COA  
 Comment: Battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

Hardware Setup: Electric Field (NOS)  
 Level Unit: dBµV/m  
**Subrange**                      **Detectors**                      **IF Bandwidth**                      **Meas. Time**                      **Receiver**  
 30 MHz - 1 GHz                      QuasiPeak                      120 kHz                      15 s                      Receiver

**Remark:**

This measurement has the purpose to show that the arising peaks are caused by the host monitor (IntelliVue MP2/X2) and not by the transceiver module.



**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin Class A	Limit (dBµV/m)	Comment
317.648050	31.1	15000.000	120.000	301.0	H	4.0	15.4	15.3	46.4	
444.730950	38.3	15000.000	120.000	226.0	H	0.0	18.0	8.1	46.4	
571.800250	37.6	15000.000	120.000	154.0	H	-1.0	20.5	8.8	46.4	
698.871400	41.7	15000.000	120.000	119.0	H	228.0	23.0	4.7	46.4	
762.352600	41.5	15000.000	120.000	100.0	H	217.0	24.2	4.9	46.4	
825.911150	38.5	15000.000	120.000	100.0	H	285.0	24.7	7.9	46.4	

**Hardware Setup: EMI radiated/Electric Field (NOS) - [EMI radiated]**

Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]  
@ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010

Signal Path: without Notch  
FW 1.0

Antenna: VULB 9163  
SN 9163-295, FW ---, CAL 08.04.2010  
Correction Table (vertical): VULP6113  
Correction Table (horizontal): VULP6113  
Correction Table: Cable\_EN\_1GHz (0109)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]  
@ GPIB0 (ADR 8), FW REV 3.12

Turntable: Turntable [EMCO Turntable]  
@ GPIB0 (ADR 9), FW REV 3.12

Results:

Spurious Emissions level [dB $\mu$ V/m]		
f[MHz]	Detector	Level [dB $\mu$ V/m]
(for details please see table above)		
Measurement uncertainty	±3 dB	

f < 1 GHz : RBW/VBW: 100 kHz      f ≥ 1GHz : RBW/VBW: 1 MHz

See above plots

Measurement distance see table

**Limits:** § 15.109

Frequency (MHz)	Field strength (dB $\mu$ V/m)	Measurement distance (m)
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
above 960	54.0	3

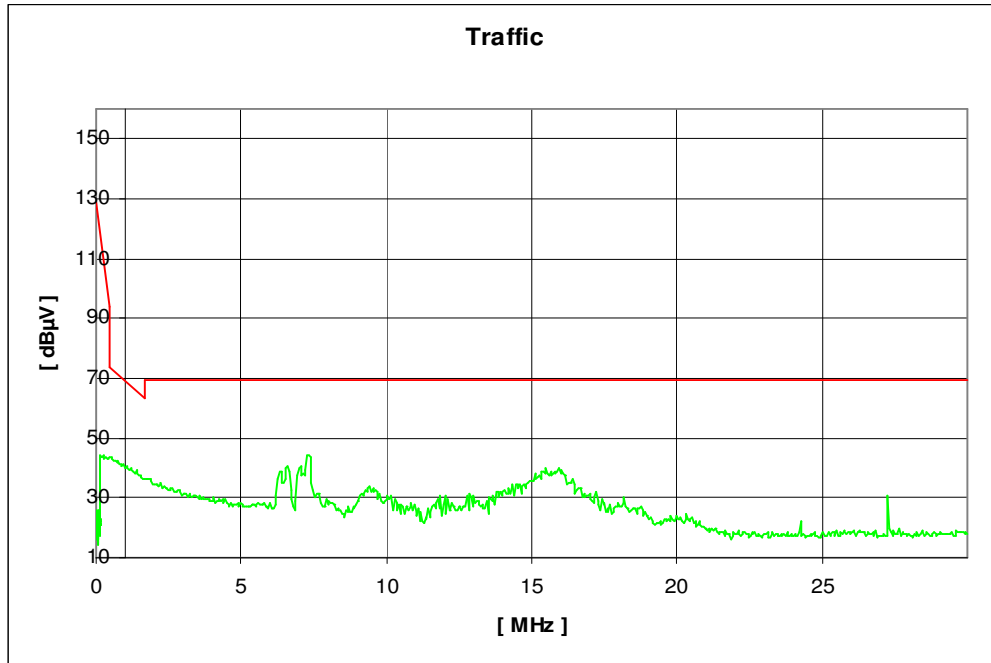
**5.15 Spurious Emissions - radiated <30 MHz §15.209**

Measured at 3 m distance.

Values recalculated with 40 dB/decade according to FCC rules.

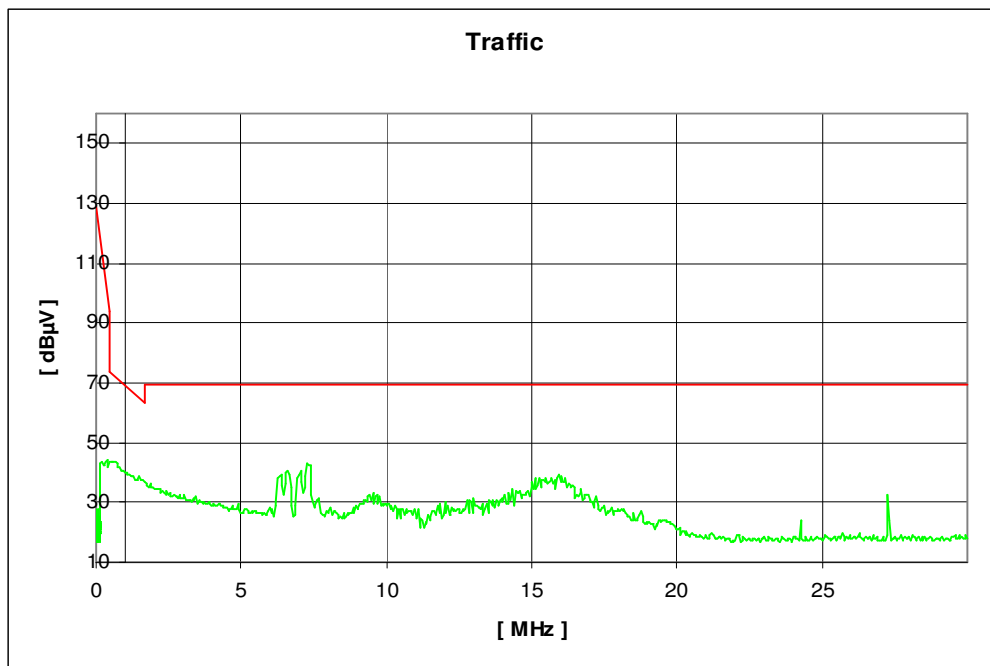
Transceiver 1:

Plot 1:



Transceiver 2:

Plot 2:

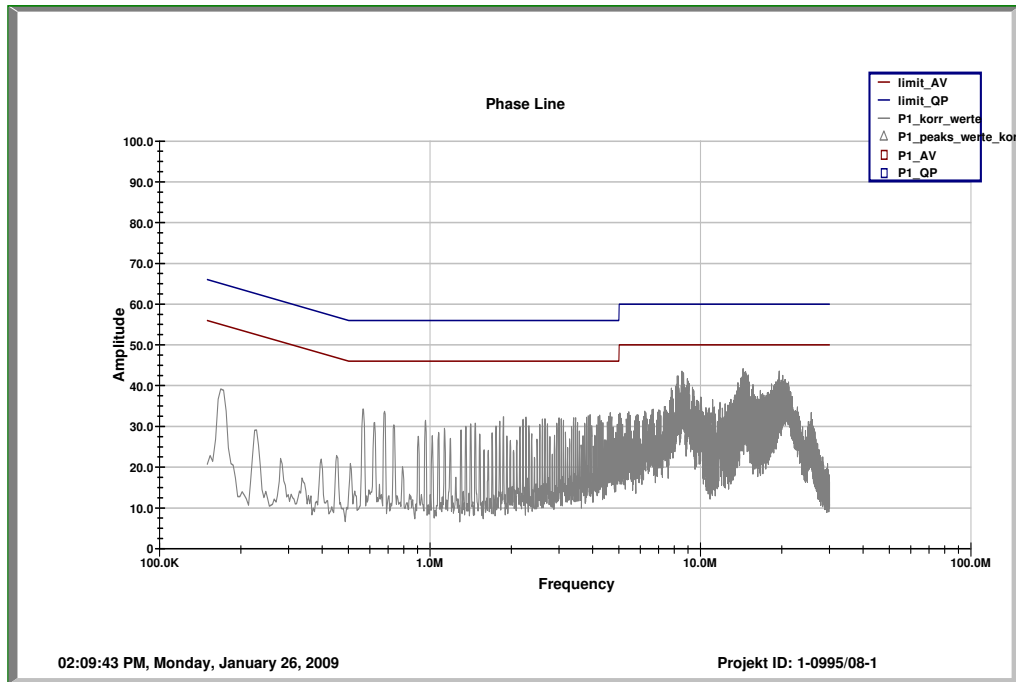


Limits:

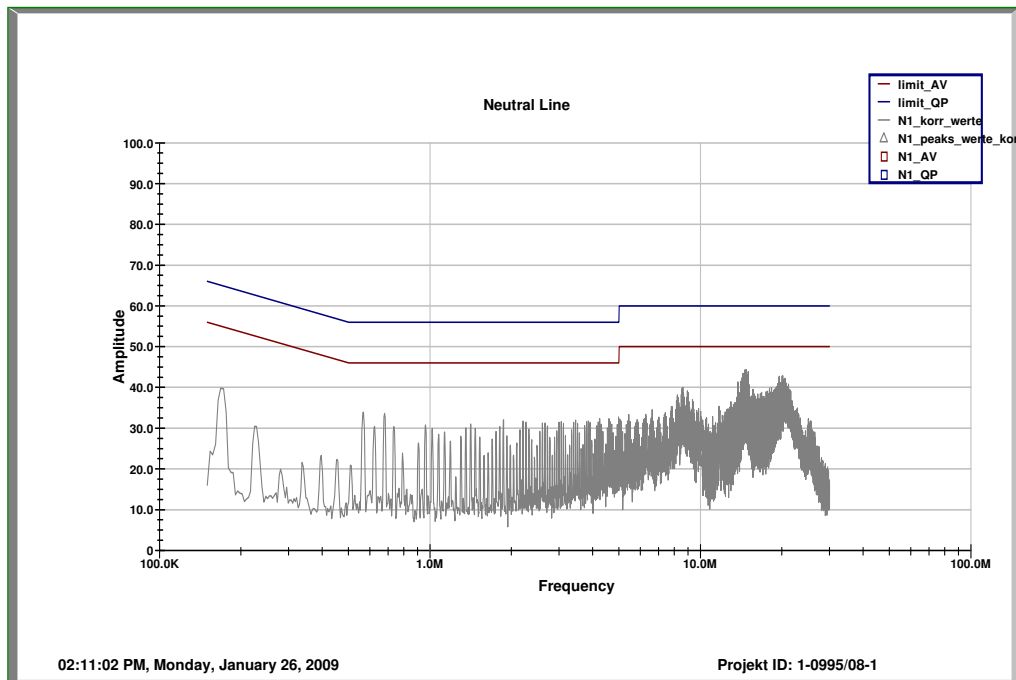
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dBµV/m	30
30 - 88	100 / 40 dBµV/m	3
88 - 216	150 / 43.5 dBµV/m	3
216 - 960	200 / 46 dBµV/m	3
above 960	54 dBµV/m	3

5.16 Conducted Emissions <30 MHz §15.107/207

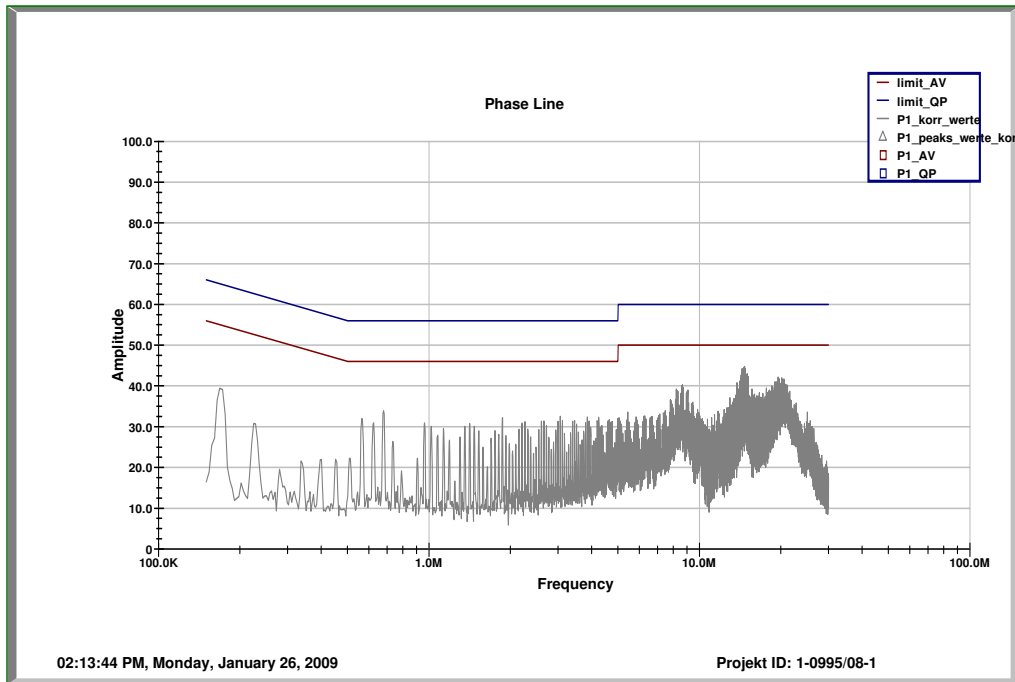
Plot 1: TX-Mode (L1)



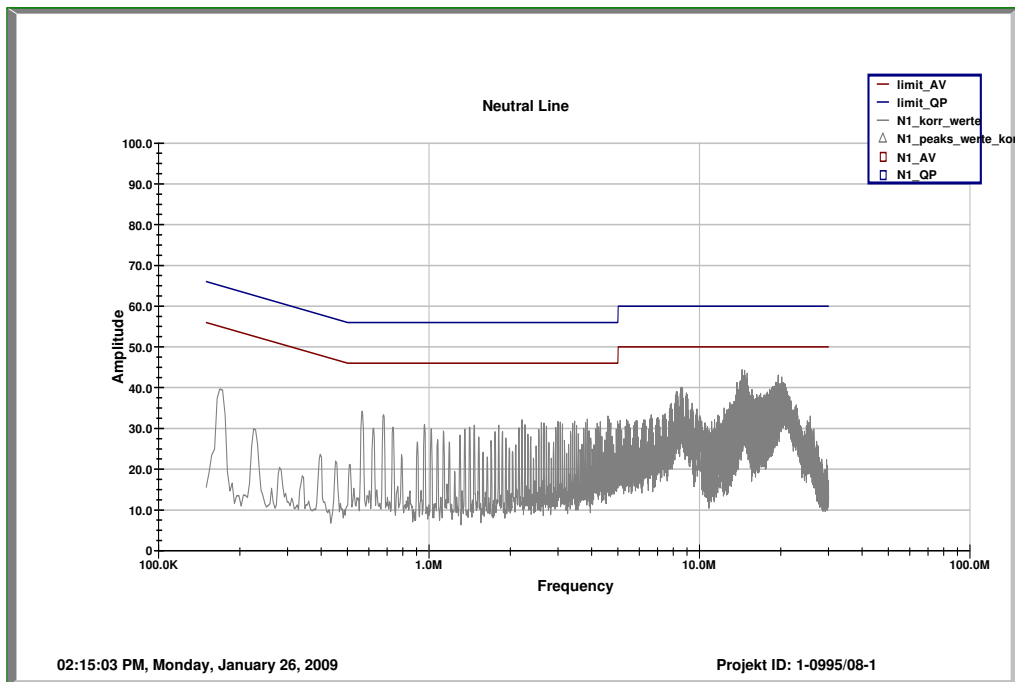
Plot 2: TX-Mode (N)



Plot 3: RX-Mode (L1)



Plot 4: RX-Mode (N)



Limits:

Under normal test conditions only	See plots
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## 6 Test equipment and ancillaries used for tests

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

All reported calibration intervals are calibrations according to the EN/ISO/IEC 17025 standard. These calibrations were performed from an accredited external calibration laboratory.

Additional to these calibrations the laboratory performed comparison measurements with other calibrated systems and performed a weekly chamber inspection.

All used devices are connected with a 10 MHz external reference.

According to the manufacturers' instruction is it possible to establish a calibration interval for the FSP unit of 24 month, if the device has an external 10 MHz reference.

### *Anechoic chamber A:*

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal identification
<b>Radiated emission in chamber A</b>					
A-1	Spectrum Analyzer	Rohde & Schwarz	ESU26	100037	300003555
A-2	Signal Generator	Rohde & Schwarz	SMR20B11	1104.0002.20	300003593
A-3	RF System Panel	Rohde & Schwarz	TS RSP	---	300003556
A-4	Relais Matrix	Rohde & Schwarz	PSN	860673/009	300001385
A-5	Horn Antenna	EMCO	3115	9709-5290	300000212
A-6	Bilog.-Log. Antenna	Schwarzbeck	VULB 9163	02/00	300003696
A-7	Notch Filter GSM 900	Wainwright	WRCD 901.9/903.1EE	9	---
A-8	Notch Filter GSM 1800	Wainwright	WRCD 1747/1748-5EE	1	---
A-9	Notch Filter GSM 1900	Wainwright	WRCD 1879.5/1880.5EE	9	---
A-10	Notch Filter GSM 850	Wainwright	WRCT 837-0.2/50-8EE	1	---
A-11	Notch Filter UMTS	Wainwright	WRCD 1800/2000-0.2/40-5EEK	2	---
A-12	Notch Filter ISM 2400	Wainwright	WRCD 2400/ 2483-2375/2505-50/10SS	26	---
A-13	High Pass Filter 1.1 GHz	Wainwright	WHK 1.1/15G-10SS	---	---
A-14	High Pass Filter 2.6 GHz	Wainwright	WHKX 2.6/18G-12SS	---	---
A-15	High Pass Filter 7 GHz	Wainwright	WHKX 7.0/18G-8SS	---	---
A-14	Amplifier	Miteq	AFS4-00201800-15-10P-6	US42-0050 2650-28-5A	300003204
A-16	Controller	Inn co	CO 2000	2020507	---
A-17	DC Power Supply	Hewlet Packard	HP6632A	---	300000924
A-18	Computer	F+W	---	---	300003303

### *Anechoic chamber F:*

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Control Computer	F+W	FW0502032	300003303	-/-	-/-	-/-
2	Trilog Antenna	9163-295	-/-	-/-	30.04.2008	24	30.04.2010
3	Amplifier - 0518C-138	Veritech Micro-wave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	31.01.2007	24	31.01.2009
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-