TEST REPORT CONCERNING THE COMPLIANCE OF A DIGITAL TRANSMISSION SYSTEM OPERATING IN THE FREQUENCYRANGE 920.5 -922.2 MHz, BRAND THYSSENKRUPP, MODEL RECEIVER (REC) WITH 47 CFR PART 15 (10-1-09 EDITION).

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April 19, 2011

FCC listed : 90828
Industry Canada : 2932G-1
VCCI Registered : R-1518, C-1598
R&TTE, LVD, EMC Notified Body : 1856

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MEASUREMENT/TECHNICAL REPORT

ThyssenKrupp Accessibility BV
Model : Receiver (REC)

FCC ID: ZAH-1000918

April 19, 2011

This report concerns:	Original grant/certification ~~Class 2 change Verification~~
Equipment type:	Digital Transmission System

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The data taken for this test and report herein was done in accordance with 47 CFR Part 15 (10-1-09 Edition) and the measurement procedures of ANSI C63.4-2009. TÜV Rheinland EPS B.V. at Niekerk, The Netherlands, certifies that the data is accurate and contains a true representation of the emission profile of the Equipment Under Test (EUT) on the date of the test as noted in the test report. I have reviewed the test report and find it to be an accurate description of the test(s) performed and the EUT so tested.

Date: April 19, 2011 Signature:

O. Hoekstra
Senior Engineer Telecom TÜV Rheinland EPS B.V.

Summary

The equipment under test does:

✔	fulfill the general approval requirements as identified in this test report
	not fulfill the general approval requirements as identified in this test report

Description of test item

Test item	:	Digital Transmission System operating in the range 920.5 – 922.2 MHz
Manufacturer	:	ThyssenKrupp Accessibility BV
Brand	:	ThyssenKrupp
Model	:	Receiver (REC)
Serial number(s)	:	n.a.
Revision	:	n.a.

Applicant information

Applicant's representative	:	Mr. P. Kasbergen
Company	:	ThyssenKrupp Accessibility BV
Address	:	Van Utrechtweg 99
Postal code	:	2921 LN
City	:	Krimpen aan den IJssel
Country	:	The Netherlands
Telephone number	:	+31 (0) 180530962
Telefax number	:	+31 (0) 180530996

Test(s) performed

Location	:	Niekerk
Test(s) started	:	February 15, 2011
Test(s) completed	:	April 19, 2011
Purpose of test(s)	:	Equipment Authorization (Original grant/certification)
Test specification(s)	:	47 CFR Part 15 (10-1-09 Edition)
Test engineer(s)	:	R. van der Meer 
Report written by	:	R. van der Meer 
Report date	:	April 19, 2011

Table of contents

1 General information.

1.1 Product description.

The brand ThyssenKrupp, model Receiver (REC), hereafter referred to as EUT, is part of a Stairlift Wireless Control System and is used to control the lift while being moved by the chairlift. The EUT is designed to operate in the frequency band (920.5 MHz to 922.2 MHz).

1.1.1 Introduction.

The content of this report and measurement results have not been changed other than the way of presenting the data.

1.2 Related submittal(s) and/or Grant(s).

1.2.1 General.

This test report supports the original grant/certification in equipment authorization files under **FCC ID: ZAH-1000918**.

1.3 Tested system details.

Details and an overview of the system and all of its components, as it has been tested, may be found below.

EUT	:	Digital Transmission System
Manufacturer	:	ThyssenKrupp Accessibility BV
Brand	:	ThyssenKrupp
Model	:	Receiver (REC)
Serial number	:	N.a.
Operating frequency range	:	920.5 – 922.2 MHz
Voltage input rating	:	12 – 24V
Voltage output rating	:	--
Current input rating	:	not provided
Antenna	:	Internal
Remarks	:	the EUT integrated in the Stairlift system, see Exhibit 09 and 10 for Photoreports showing the system.

1.3.1 Description of input and output ports.

There were no input and/or output port connections required to operate the EUT.

1.4 Test Summary

The EUT was tested in accordance with the specifications given in the table below.

Test Standard 47 CFR Part 15 (10-1-09 Edition)	Description	Page	Pass / Fail
15.207(a)	Conducted emissions	12 - 14	Pass
15.209 and 15.249	Radiated emissions	8 - 11	Pass
15.249 (d)	Emissions radiated outside the specified bandwidth	15	Pass
15.215(c)	Occupied bandwidth	16 - 18	Pass

Table: Testspecifications

1.5 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (10-1-09 Edition), sections 15.31, 15.207, 15.209 and 15.249.

The test methods, which have been used, are based on ANSI C63.4: 2009.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters.
Radiated emission tests below 30 MHz were performed at a measurement distance of 3 meters.

The receivers are switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

1.6 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland EPS B.V., located in Niekerk, 9822 TL Smidshornerweg 18, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948, per October 23, 2000.

The description of the test facilities has been filed at the Office of the Federal Communications Commission under registration number 90828. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The description of the test facilities has been filed to Industry Canada under registration number 2932G-1. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

1.7 Test conditions.

Normal test conditions:

Temperature (*) : +15°C to +35°C
Relative humidity(*) : 20 % to 75 %
Supply voltage : 120Vac 50/60 Hz
Air pressure : 950 – 1050 hPa

When is was impracticable to carry out the tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests are stated separately.

2 System test configuration.

2.1 Justification.

The system was configured for testing in a typical situation as a customer would normally use it.

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4: 2009.

2.2 EUT mode of operation.

The EUT has been tested in continues transmit mode with a modulated carrier. The output power was set for maximum output by the applicant. The intentional radiator tests (47 CFR Part 15 sections, 15.207, 15.209 and 15.249) have been performed with a complete functioning EUT and interconnections, where applicable.

2.3 Special accessories.

No special accessories are used and/or needed to achieve compliance.

2.4 Equipment modifications.

No modifications have been made to the equipment in order to achieve compliance.

2.5 Product Labelling

The product labeling information is available in the technical documentation package.

2.6 Block diagram of the EUT.

The block diagram is available in the technical documentation package.

2.7 Schematics of the EUT.

The schematics are available in the technical documentation package.

2.8 Part list of the EUT.

The part list is available in the technical documentation package.

3 Radiated emission data.

3.1 Radiated field strength measurements (above 30 MHz, E-field), Av and QP values

3.1.1 Radiated field strength measurements (above 30 MHz, E-field), EUT's TX Frequency 920.5 MHz

Frequency (MHz)	Measure-ment results @3m Vertical (dBµV)	Measure-ment results @3m Horizontal (dBµV)	Detector	Correction factor (dB)	Results after correction Vertical (dBµV/m)	Results after correction Horizontal (dBµV/m)	Limits @3m (dBµV/m)	Pass/Fail
250	12.7	14.7	Qp	16.5	29.2	31.2	46	Pass
550	8.0	7.0	Qp	27.2	35.2	34.2	46	Pass
822	7.4	7.1	Qp	31.6	39.0	38.7	46	Pass
920.5 (fundamental)	55.9	55.8	Qp	33.6	89.5	89.4	94	Pass
1841.0	10.1	8.5	Av	38.1	48.2	46.6	54	Pass
2761.5	11.2	9.6	Av	38.9	50.1	48.5	54	Pass
3682.0	4.8	3.7	Av	38.9	43.7	42.6	54	Pass

Table 1a

3.1.2 Radiated field strength measurements (above 30 MHz, E-field), EUT's TX Frequency 921.5 MHz

Frequency (MHz)	Measure-ment results @3m Vertical (dBµV)	Measure-ment results @3m Horizontal (dBµV)	Detector	Correction factor (dB)	Results after correction Vertical (dBµV/m)	Results after correction Horizontal (dBµV/m)	Limits @3m (dBµV/m)	Pass/Fail
250	12.7	14.7	Qp	16.5	29.2	31.2	46	Pass
550	8.0	7.0	Qp	27.2	35.2	34.2	46	Pass
822	6.4	7.4	Qp	31.6	38.0	39.0	46	Pass
921.5 (fundamental)	54.9	56.0	Qp	33.6	88.5	89.6	94	Pass
1843.0	9.6	7.4	Av	38.1	47.7	45.2	54	Pass
2764.0	11.2	7.3	Av	38.9	50.1	46.2	54	Pass
3686.0	5.0	1.0	Av	38.9	43.9	39.9	54	Pass

Table 1b

3.1.3 Radiated field strength measurements (above 30 MHz, E-field), EUT's TX Frequency 922.2 MHz

Frequency (MHz)	Measure-ment results @3m Vertical (dBµV)	Measure-ment results @3m Horizontal (dBµV)	Detector	Correction factor (dB)	Results after correction Vertical (dBµV/m)	Results after correction Horizontal (dBµV/m)	Limits @3m (dBµV/m)	Pass/Fail
250	12.7	14.7	Qp	16.5	29.2	31.2	46	Pass
550	8.0	7.0	Qp	27.2	35.2	34.2	46	Pass
822	8.6	7.1	Qp	31.6	40.2	38.7	46	Pass
922.2 (fundamental)	54.7	55.8	Qp	33.6	88.3	89.4	94	Pass
1844.4	2.1	1.1	Av	38.1	40.2	39.2	54	Pass
2766.6	10.2	7.6	Av	38.9	49.1	46.5	54	Pass
3688.8	5.0	0.7	Av	38.9	43.9	39.6	54	Pass

Table 1c

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.209 and 15.249 with the EUT operating in continues transmit mode are depicted in Table 1a,1b and 1c.

Notes:

1. Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
2. Measurement uncertainty is ±5.0dB
3. The reported field strength values are the worst case values at the indicated frequency. The EUT was varied in three positions, the antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. The EUT was tested in on the lowest frequency (920.5 MHz), a middle frequency (921.5 MHz) and the highest frequency (922.2 MHz) in the 920.5 – 922.2 MHz band wherein it operates.
5. A Quasi-peak detector was used with a resolution bandwidth of 120 kHz, except for frequencies above 960 MHz where an average detector was used.
6. Values are from Antenna 2 (ANT 2) which from pre-tests proved to be worst case opposite Ant1.
7. Up to the 10th harmonic of the fundamental frequency was investigated, with a maximum of 9.3 GHz.
8. Tested with Ant2 in the position as described in the installation manual and as described in exhibit 05 the antenna info document. Obtained values are only valid for this position.

Used test equipment and ancillaries:

99580	99070	99071	99107	99608	99609	99699	99547	15453
12504	12484							

Test engineer

Signature :

Name : Richard van der Meer
Date : April 19, 2011

3.2 Radiated field strength measurements (above 30 MHz, E-field), Peak values

3.2.1 Radiated field strength measurements (above 30 MHz, E-field), EUT's TX Frequency 920.5 MHz

Frequency (MHz)	Measure-ment results @3m Vertical (dBµV)	Measure-ment results @3m Horizontal (dBµV)	Detector/ Resolution bandwidth	Correction factor (dB)	Results after correction Vertical (dBµV/m)	Results after correction Horizontal (dBµV/m)	Limits @3m (dBµV/m)	Pass/Fail
1841.0	10.3	7.7	Peak / 1000 kHz	38.1	48.4	46.6	74	Pass
2761.5	11.6	10.4	Peak / 1000 kHz	38.9	50.5	49.3	74	Pass
3682.0	5.0	3.8	Peak / 1000 kHz	38.9	43.9	42.7	74	Pass

Table 1d

3.2.2 Radiated field strength measurements (above 30 MHz, E-field), EUT's TX Frequency 921.5 MHz

Frequency (MHz)	Measure-ment results @3m Vertical (dBµV)	Measure-ment results @3m Horizontal (dBµV)	Detector/ Resolution bandwidth	Correction factor (dB)	Results after correction Vertical (dBµV/m)	Results after correction Horizontal (dBµV/m)	Limits @3m (dBµV/m)	Pass/Fail
1843.0	9.8	7.4	Peak / 1000 kHz	38.1	47.9	45.2	74	Pass
2764.0	11.4	7.2	Peak / 1000 kHz	38.9	50.3	46.1	74	Pass
3686.0	5.0	0.8	Peak / 1000 kHz	38.9	43.9	39.7	74	Pass

Table 1e

3.2.3 Radiated field strength measurements (above 30 MHz, E-field), EUT's TX Frequency 922.2 MHz

Frequency (MHz)	Measure-ment results @3m Vertical (dBµV)	Measure-ment results @3m Horizontal (dBµV)	Detector/ Resolution bandwidth	Correction factor (dB)	Results after correction Vertical (dBµV/m)	Results after correction Horizontal (dBµV/m)	Limits @3m (dBµV/m)	Pass/Fail
1844.4	2.3	1.4	Peak / 1000 kHz	38.1	40.4	39.5	74	Pass
2766.6	10.5	7.6	Peak / 1000 kHz	38.9	49.4	46.5	74	Pass
3688.8	5.0	1.1	Peak / 1000 kHz	38.9	43.9	40.0	74	Pass

Table 1f

The results of the radiated emission tests (Peak values), carried out in accordance with 47 CFR Part 15 section 15.35 and 15.249 with the EUT operating in continues transmit mode are depicted in Table 1d,1e and 1f. Which are the Peak values of the Average detector measurement results as noted in Tables 1, 1b and 1c.

Notes:

1. Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
2. Measurement uncertainty is ±5.0dB
3. The reported field strength values are the worst case values at the indicated frequency. The EUT was varied in three positions, the antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. The EUT was tested in on the lowest frequency (920.5 MHz), a middle frequency (921.5 MHz) and the highest frequency (922.2 MHz) in the 920.5 – 922.2 MHz band wherein it operates.
5. Values are from Antenna 2 (ANT 2) which from pre-tests proved to be worst case opposite Ant1.
6. Tested with Ant2 in the position as described in the installation manual and as described in exhibit 05 the antenna info document. Obtained values are only valid for this position

Used test equipment and ancillaries:

99580	99070	99071	99107	99608	99609	99699	99547	15453
12504	12484							

Test engineer

Signature :

Name : Richard van der Meer
Date : March 10, 2011

4 Conducted emission data.

4.1 Conducted emission data of the EUT

Frequency (MHz)	Measurement results dB(µV) Neutral		Measurement results dB(µV) Line 1		Limits dB(µV)		Result
	QP	AV	QP	AV	QP	AV	
4.295	20.0	See note 4	<15	See note 4	56	46	PASS
5.159	21.7	''	14.1	''	60	50	PASS
6.449	20.5	''	<15	''	60	50	PASS
8.591	25.6	''	<15	''	60	50	PASS
9.453	<15	''	20.6	''	60	50	PASS
12.102	24.8	''	25.5	''	60	50	PASS
14.769	16.1	''	20.7	''	60	50	PASS
15.616	<15	''	19.7	''	60	50	PASS
16.777	<15	''	17.6	''	60	50	PASS
20.639	16.4	''	<15	''	60	50	PASS

Table 2 Conducted emission measurements

The results of the conducted emission tests, carried out in accordance with 47 CFR Part 15 section 15.207, at the 120 Volts AC mains connection terminals of the AC/DC power supply which was connected to the EUT, are depicted in Table 2. Maximum values recorded. The system is tested as in whole.

Notes:

1. The values of conducted emissions at frequencies not listed in the table are more than 20 dB below the applicable limit.
2. The resolution bandwidth used was 9 kHz.
3. Measurement uncertainty is ±3.5 dB
4. Qp values already within Av limits, therefore Av not measured
5. Tested on low, mid and high frequencies, max values noted

Used test equipment and ancillaries:

15667	99161	12512	13313			

Test engineer

Signature : 

Name : R. van der Meer

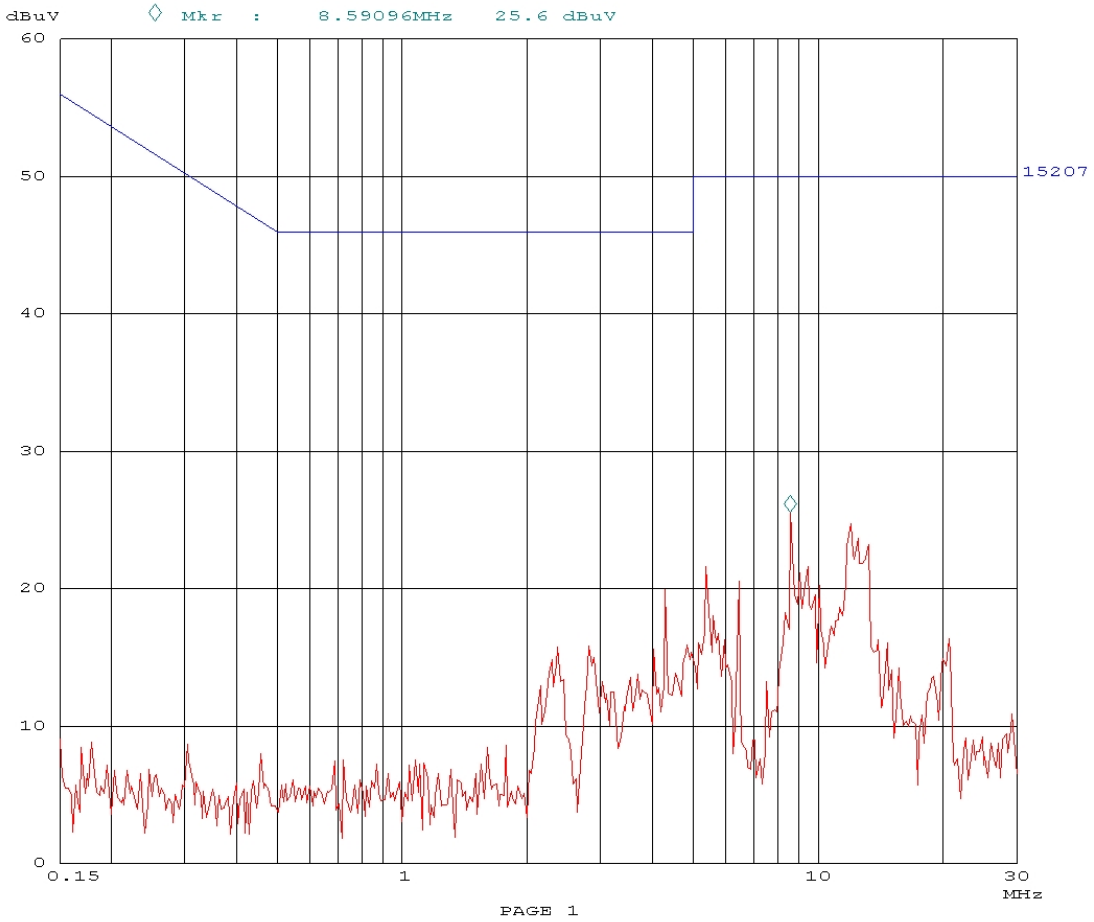
Date : March 18, 2011

4.2 Plots of the Conducted emission data of the EUT

18. Mar 11 12:35

```
Scan Settings (1 Range)
|---------- Frequencies ------------||---------- Receiver Settings ----------|
   Start         Stop          Step       IF BW   Detector   M-Time   Atten Preamp
 150k           30M             0.8%       9k        PK        1ms AUTO LN    ON

Final Measurement: x QP
                   Meas Time:     1 s
                   Subranges:    25
                   Acc Margin:   6dB
```



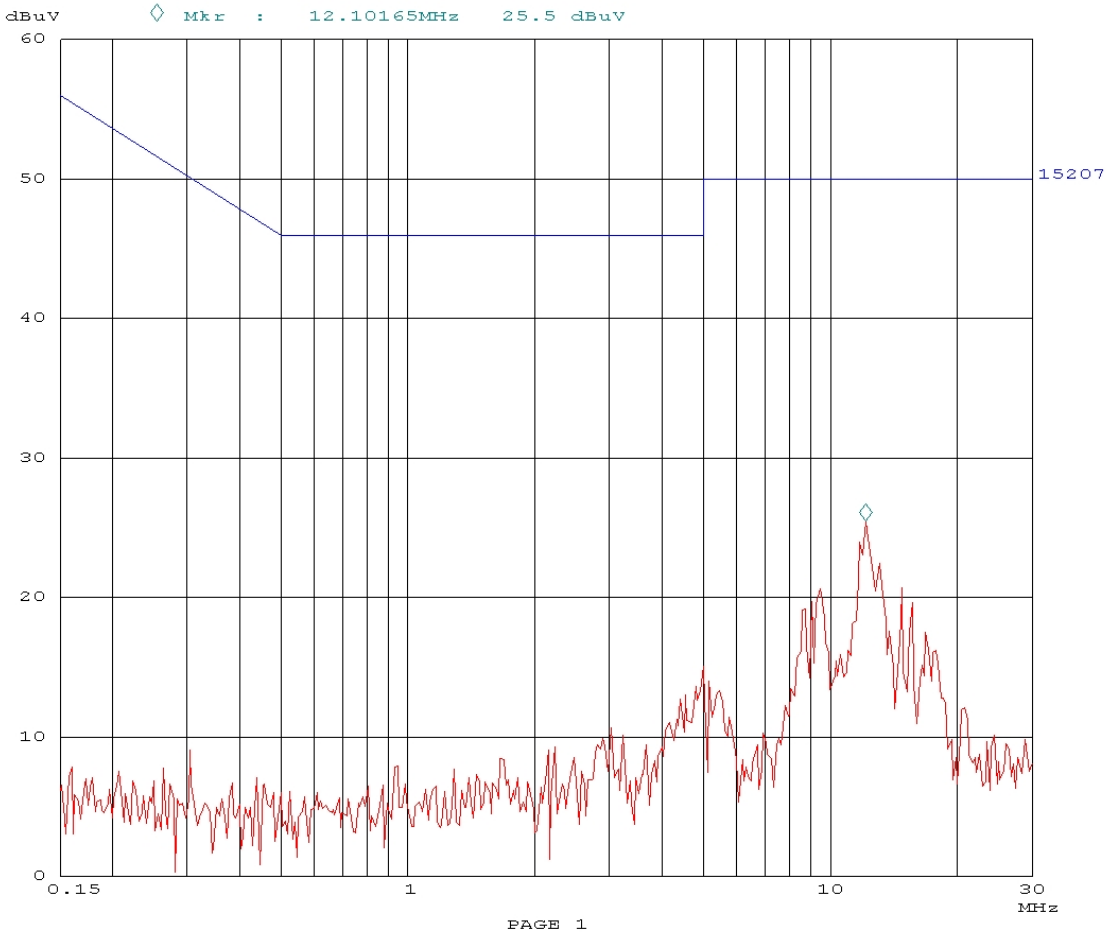
Plot 1 Conducted emissions of the EUT on L1 (Qp values)

18. Mar 11 12:30

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	0.8%	9k	PK	1ms	AUTO	LN ON

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 6dB



Plot 2 Conducted emissions of the EUT on L2/N (Qp values)

5 Emissions at the band edges

The plots below show compliance with the 47 CFR Part 15 section 15.249(d), this section requires the emissions at the 902 MHz and 928 MHz band edges to be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lower attenuation.

The EUT is tested against the limits of section 15.209 and the results are note in Table 3 below.

Frequency (MHz)	Measured radiated fieldstrength (dBµV)	Correction (dB)	Results after correction (dBµV/m)	Limit (dBµV/m)	Pass / Fail
902.0	7.0	32.9	39.9	46	Pass
928.0	8.0	33.8	41.8	46	Pass

Table 3 Radiated emissions at the specified bandwidth edges

Used test equipment and ancillaries:

99580	99070	99071	99107	99608	99609	99699	99547	15453

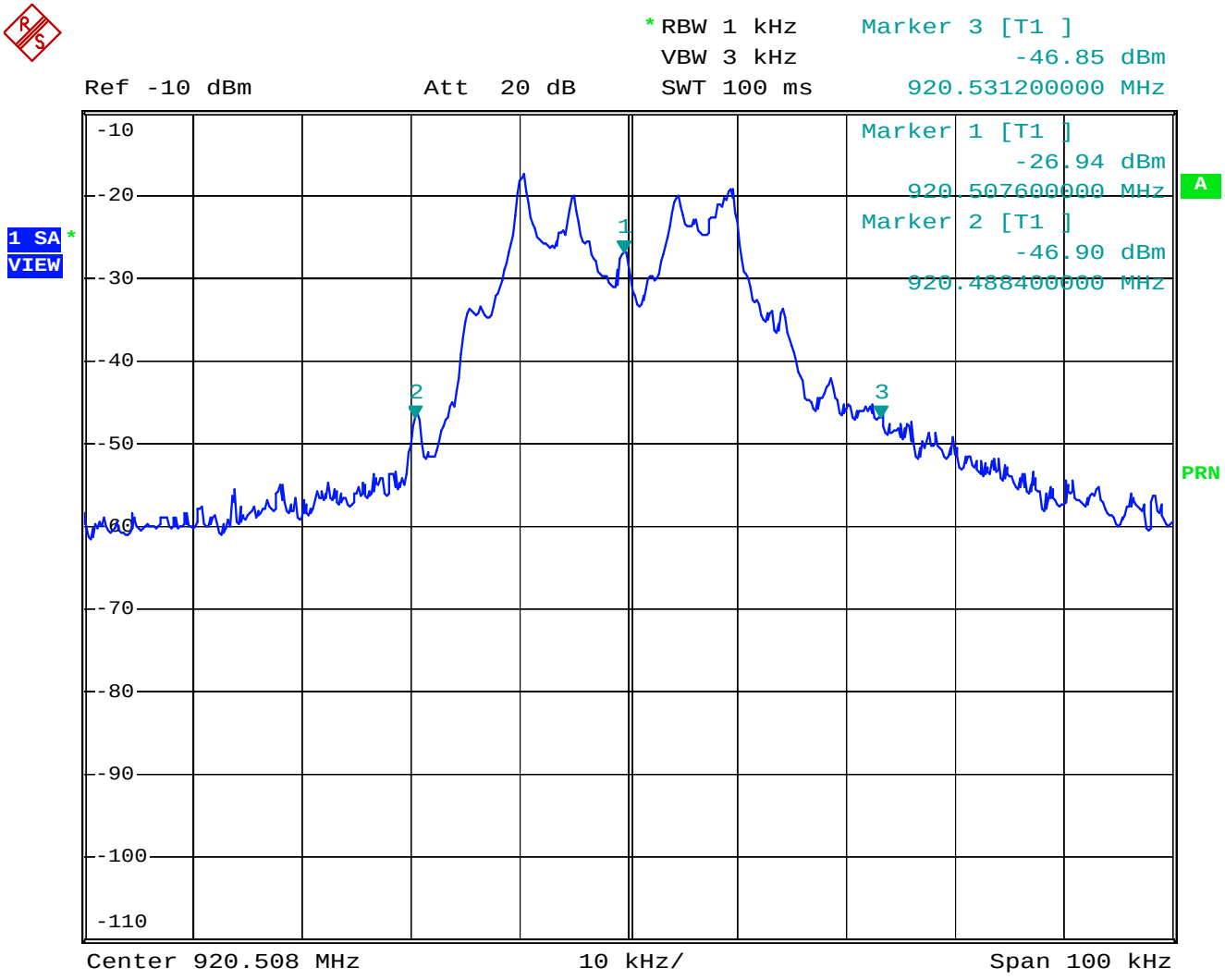
Test engineer

Signature :

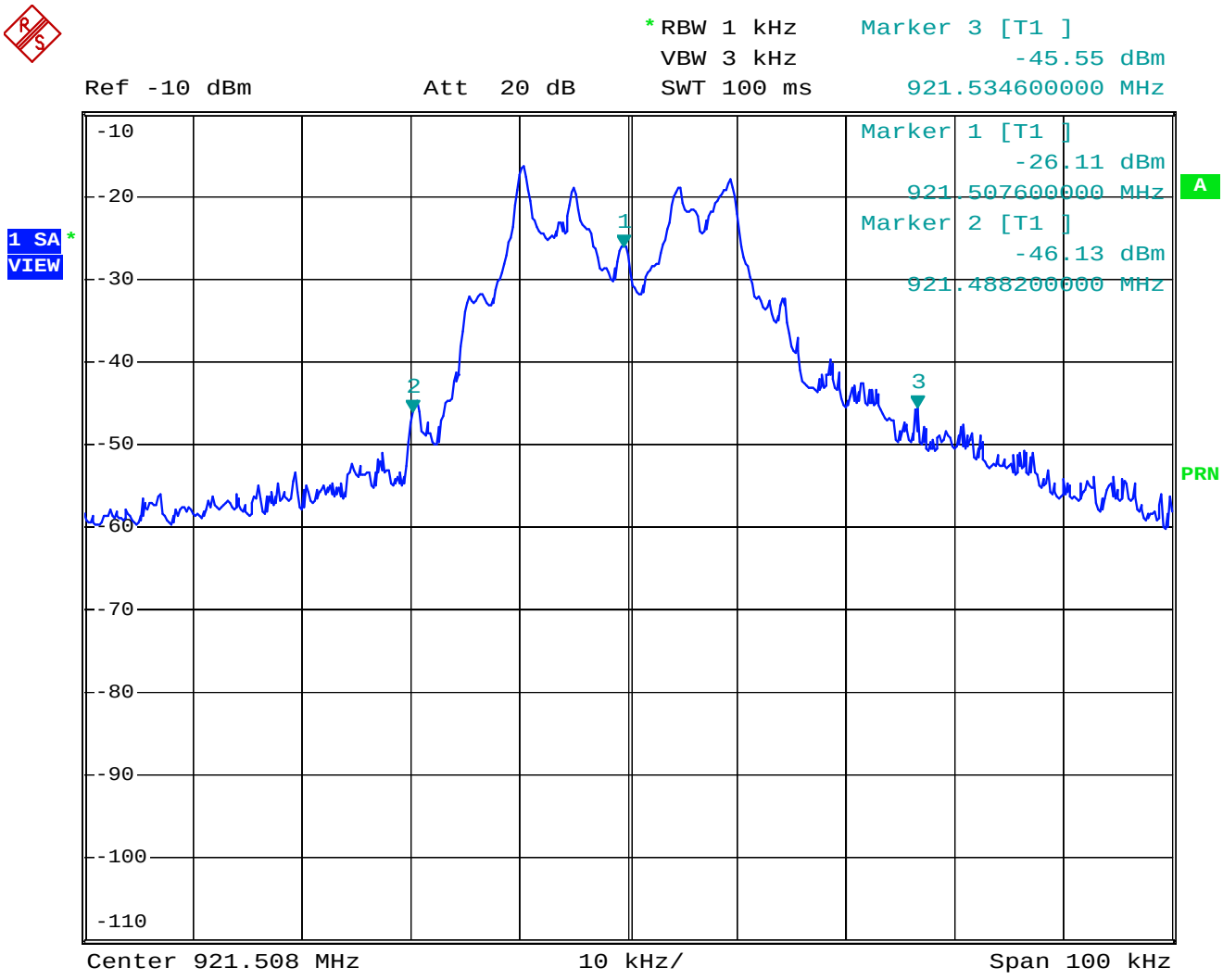
Name : Richard van der Meer
Date : March 10, 2011

6 Bandwidth of the emission

The plots below, as measured on a spectrum analyzer, show compliance with the 47 CFR Part 15 section 15.215(c), this section requires the 20 dB emission bandwidth is within the frequencyband designated in section 15.249.

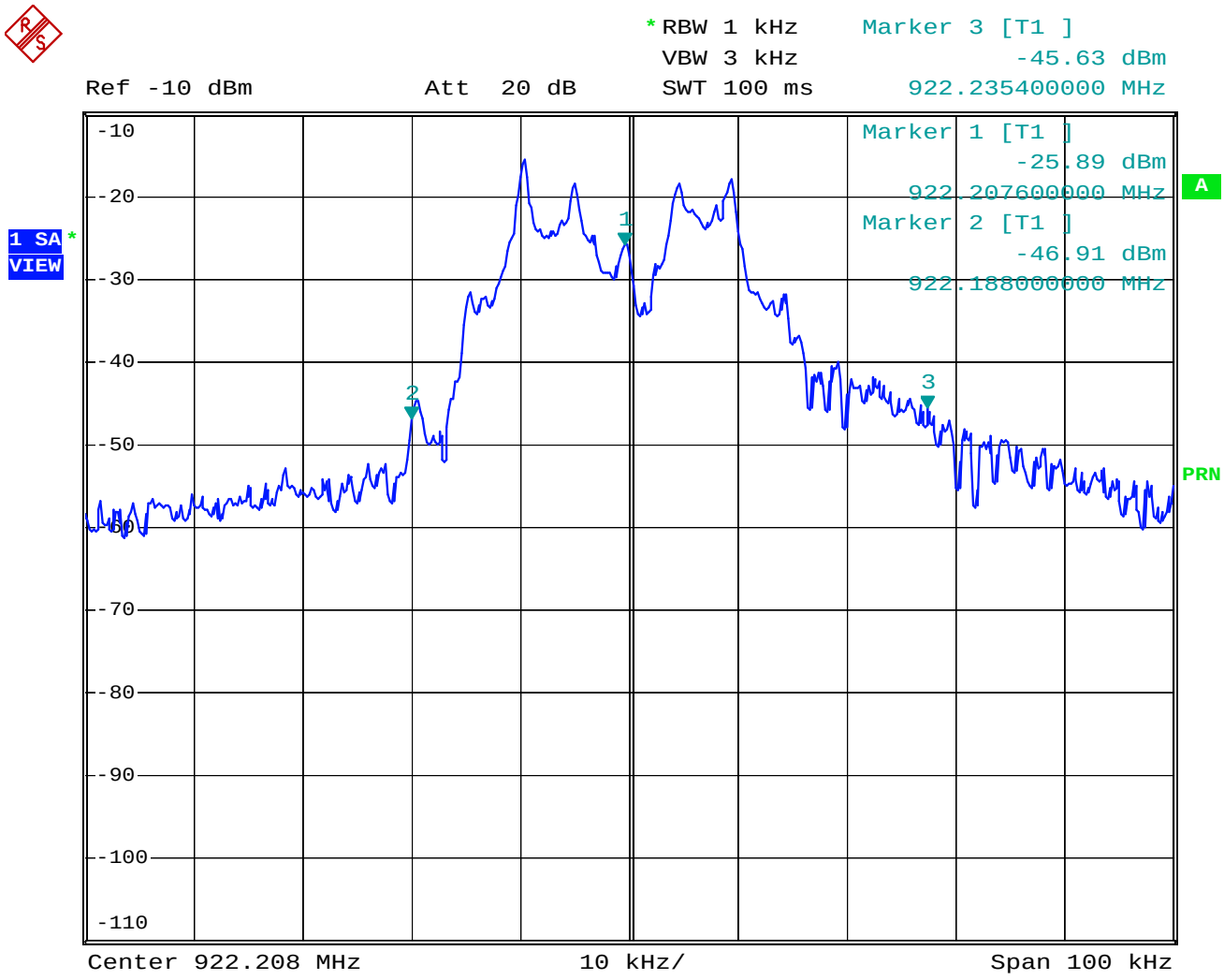


Plot 3: Occupied 20dB Bandwidth (= 42.8 kHz) of the EUT transmitting at 920.5 MHz



Date: 23.MAR.2011 13:48:39

Plot 4: Occupied 20dB Bandwidth (= 46.4 kHz) of the EUT transmitting at 921.5 MHz



Date: 23.MAR.2011 13:52:22

Plot 5: Occupied 20dB Bandwidth (= 47.4 kHz) of the EUT transmitting at 922.2 MHz

7 List of utilized test equipment.

Inventory number	Description	Brand	Model	Last cal.	Next cal.
12484	Guide horn antenna	Emco	3115	04/2010	04/2012
12504	Filter 1-4 GHz Passband	BSC	MH1288	NA	NA
12512	LISN	EMCO	3625/2	01/2010	01/2012
13313	Pulse Limiter	R&S	ESH3-Z2	02/2011	02/2012
12476	Antenna mast	EMCO	TR3	NA	NA
12477	Antenna mast 1-4 mtr	Poelstra	NA	NA	NA
15633	Biconilog Testantenna	Chase	CBL 6111B	02/2011	02/2012
15667	Measuring receiver	R&S	ESCS30	06/2010	06/2011
99070	Coax 15m RG213 OATS	NMi Certin B.V.	KABEL 15M OATS	10/2010	10/2011
99071	Coax OATS ground	NMi Certin B.V.	KABEL GROND OATS	10/2010	10/2011
99107	Controller OATS	Heinrich Deisel	4630-100	NA	NA
99161	Variac	RFT	LTS006	NA	NA
99538	Spectrum analyzer	R&S	FSP40	05/2010	05/2011
99547	Temperature-Humiditymeter	Europe supplies	WS-7082	10/2010	10/2011
99552	WLAN software	__	_	NA	NA
99580	OATS	Comtest	FCC listed: 90828	08/2008	08/2011
99608	Controller (OATS)	EMCS	DOC202	NA	NA
99609	Antenna mast	EMCS	AP-4702C	NA	NA
99613	Temperature-Humiditymeter	Europe supplies	WS-7082	10/2010	10/2011
99651	Variac	NA	Vast Activa: 08-9510	NA	NA
99699	Measuring receiver	R&S	ESCI	02/2011	02/2012

NA= Not Applicable