

**TEST REPORT CONCERNING THE COMPLIANCE
OF AN INTEL® DUAL BAND WIRELESS CARD
MODEL 9462NGW, WITH THE STANDARDS:
47 CFR PART 15-SUBPART B (10-1-16)**

FCC listed : 90828
Industry Canada : 2932G-2

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MEASUREMENT/TECHNICAL REPORT

Intel Dual Band Wireless card 9462NGW

November 7, 2017

This report concerns: Verification

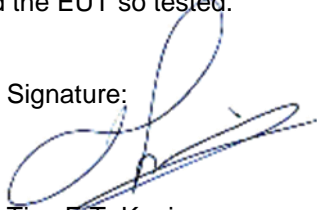
Equipment type: Intel Dual Band Wireless card 9462NGW

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The data taken for this test and report herein was done in accordance with 47 CFR Part 15: 2016 and the measurement procedures of ANSI C63.4-2014. TÜV Rheinland Nederland B.V. at Leek, 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: November 7, 2017

Signature:



Ties E.T. Koning
Senior Engineer EMC

Summary



The device 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 items	:	Intel Dual Band Wireless card
Manufacturer	:	Intel Mobile Communications SAS
Brand	:	Intel
Model/Version	:	9462NGW
Serial number	:	---
Receipt date	:	October 9, 2017
Applicant's representative	:	Mrs. L. Peignot
Company	:	Intel Mobile Communications SAS
Address	:	Le Navigator B / 505 route des Lucioles / CS 70293
City	:	06905 Sophia Antipolis Cedex
Country	:	France
Telephone number	:	+33 (0)4 93 00 14 14
Telefax number	:	+33 (0)4 93 00 14 01

Test(s) performed

Location	:	Leek
Test(s) started	:	October 19, 2017
Test(s) completed	:	November 7, 2017
Purpose of test(s)	:	Compliance with relevant standards
Test specification(s)	:	47 CFR PART 15-SUBPART B (10-1-16)
Test engineer(s)	:	K.F. van der Molen / W. Brouwer 
Report written by	:	W. Brouwer 
Report date	:	November 7, 2017

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The test results relate only to the item(s) tested.

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1 General information.

1.1 Description of EUT.

The Intel® Dual band wireless card, Model 9462NGW will be referred to as EUT for the purpose of this test report.



Photo 1: photo of the EUT

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

1.2.1 General.

Not applicable

1.2.2 Description of test configuration.

Test item (EUT) : Intel® Dual Band Wireless card with WiFi, Bluetooth
Manufacturer : Intel Mobile Communication SAS
Brand mark : Intel
Model : 9462NGW
Serial number : ---
Remark : Tested via laptop AUX1 and Extender Aux1a

Test item (AUX 1) : Laptop
Manufacturer : Dell
Brand mark : Dell
Model : Latitude E5470
Serial number : n.a.
Remark : Powered by AC adapter PDU-90W CN0JCF3V

Test item (AUX2) : Wireless Router
Manufacturer : Netgear
Brand mark : Netgear
Model : WNDR3300
Serial number : 1TR2837100A88
Remark : --

Test item (AUX3) : Mobile phone with Bluetooth
Manufacturer : Samsung
Brand mark : Samsung
Model : Galaxy J7
Serial number : --
Remark : --

1.2.3 Description of tested input and output ports.

Number	Terminal	From	To	Remarks
1	Mains	Mains (power supply)	AUX1a	Used for powering/charging AUX1a

Table 1

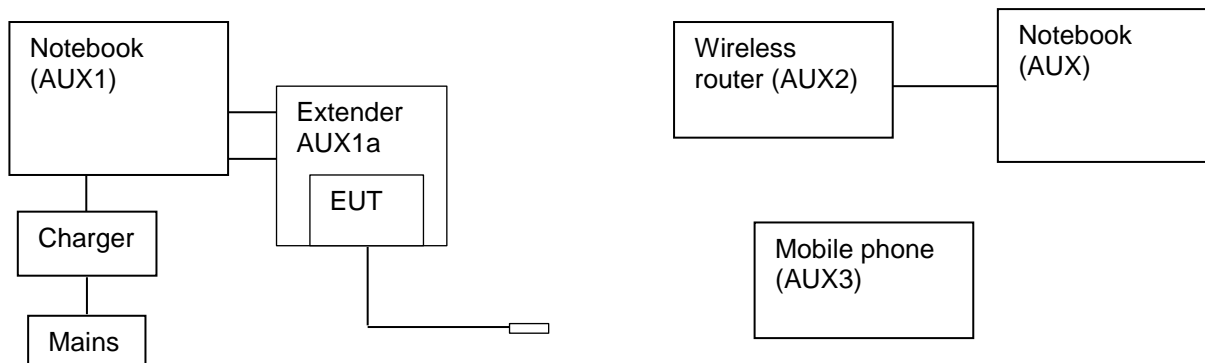


Figure 1: Basic test setup and connections

Test Summary

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

Test Standard		Description	Page	Pass / Fail
47 CFR Part 15 Subpart B (10-1-15 Edition)	ICES-003 Issue 6, January 2016			
15.107(a)	Section 6.1 Table 2	AC power Lines Conducted emissions	13 – 16	Pass
15.109(a)	Section 6.2.1 Table 5	Radiated emissions	10 – 12	Pass

Table 2 : test specifications

1.3 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15, Subpart B (10-1-16 Edition), sections 15.107, 15.109 and ICES-003 Issue 6 (January 2016) Sections 6.1 and 6.2

The test methods, which have been used, are based on ANSI C63.4: 2014.

Radiated emission tests above 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.

1.4 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland Nederland B.V., located in Leek, 9351VT Eiberkamp 10, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948.

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.

1.5 Test conditions.

Normal test conditions:

Temperature (*) : 18 - 23 °C
Relative humidity(*) : 30 % to 50 %
Supply voltage : 115 V AC/60 Hz to the Power Supply
Air pressure : 950 – 1050 hPa

When it 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 fashion (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: 2014.

2.2 EUT mode of operation.

Operation mode 1: WiFi 2.4 GHz
Operation mode 2: WiFi 5 GHz
Operation mode 3: Bluetooth

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 tested equipment in order to achieve compliance.

3 Radiated field strength measurements (30 MHz – 1 GHz, E-field)

Limits

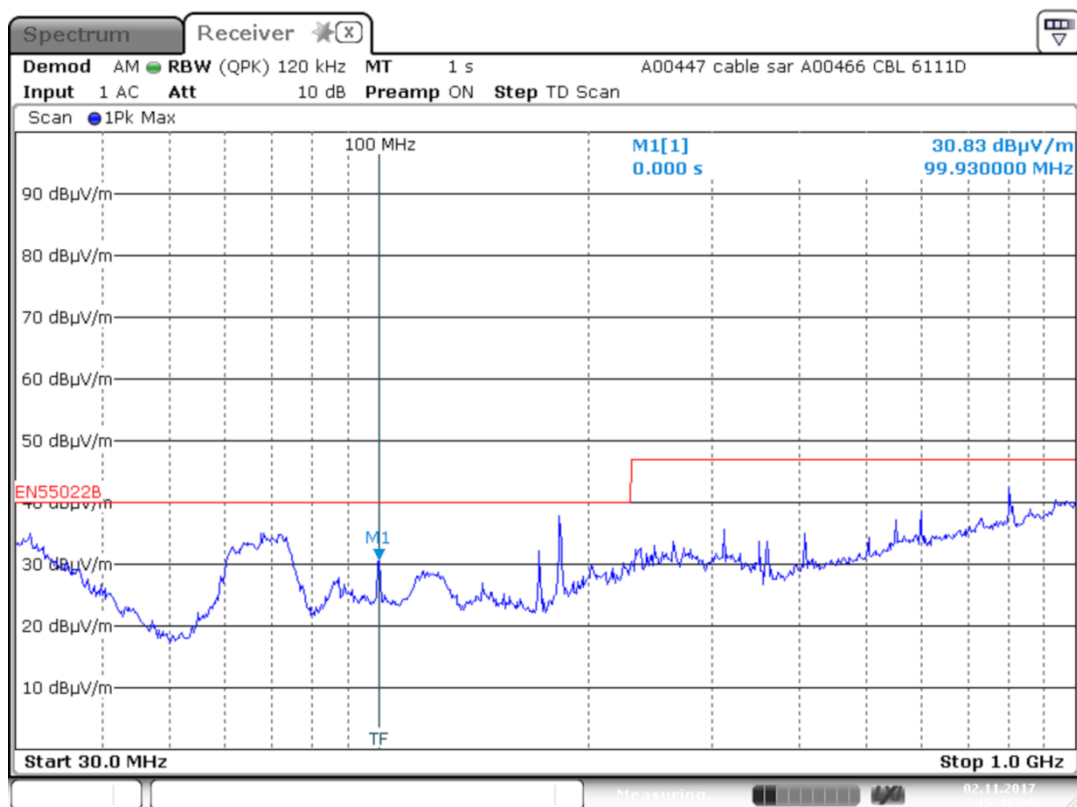
Frequency (MHz)	Limit (dB μ V/m)
30-88	49.0
88-216	53.5
216-950	56.5
> 950	59.5

3.1 Results 2.4 GHz mode

Results and limits						
Frequency (MHz)	Result (dB μ V/m)	Antenna polarization	Limit (dB μ V/m)	Margin	Height (cm)	Angle (deg)
31.39	28.0	Vertical	49.0	21.0	99.7	225.3
67.33	24.3	Vertical	49.0	24.7	100.1	71.8
99.80	27.7	Horizontal	53.5	25.8	168.8	218.3
169.50	20.3	Vertical	53.5	33.2	100.1	227.8
181.08	30.2	Vertical	53.5	23.3	99.7	174.3
600.00	35.5	Vertical	56.5	21.0	99.7	205.7
802.04	35.3	Vertical	56.5	21.2	99.7	262.1

Table 3 Results Radiated emission 2.4 GHz mode

Radiated Emissions of the EUT. The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15: 2016 section 15.109 (Class B digital devices, verification) with the EUT operating in mode switched to generate maximum levels. Maximum level recorded of the total system in Table 3.



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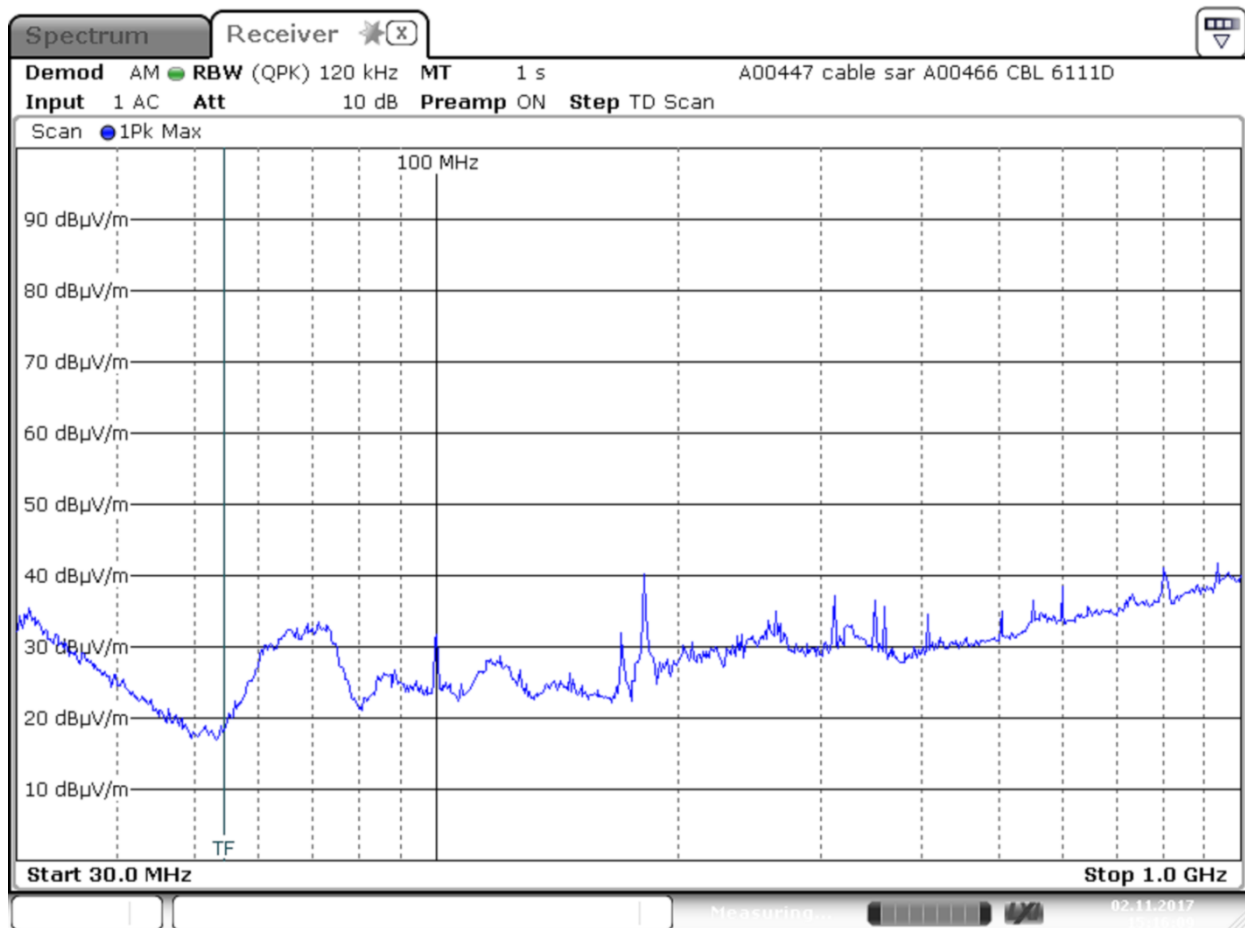
Plot 1: Pre-scan plot with peak detector. Radiated emissions from 30 MHz to 1 GHz in 2.4GHz mode

3.2 Results 5 GHz + BT mode

Results and limits						
Frequency (MHz)	Result (dB μ V/m)	Antenna polarization	Limit (dB μ V/m)	Margin	Height (cm)	Angle (deg)
31.26	27.7	Vertical	49.0	21.3	100.1	235.5
71.50	29.0	Horizontal	49.0	30.0	250.2	0.2
99.74	25.4	Horizontal	53.5	28.1	137.1	24.3
169.88	24.5	Vertical	53.5	29.0	99.7	193.4
181.20	33.3	Vertical	53.5	20.2	99.6	169.1
312.00	31.4	Vertical	56.5	25.1	151.6	339.4
801.82	35.4	Vertical	56.5	21.1	115.3	103.4

Table 4 Results Radiated emission 5 GHz + BT mode

Radiated emissions of the EUT. The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15: 2016 section 15.109 (Class B digital devices, verification) with the EUT operating in mode switched to generate maximum levels. Maximum level recorded of the total system in Table 4.



Date: 2.NOV.2017 15:16:09

Plot 2: Pre-scan plot with peak detector. Radiated emissions from 30 MHz to 1 GHz in 5 GHz + BT mode

Notes:

Field strength values of radiated emissions at frequencies not listed in the table above are more than 30 dB below the applicable limit.

1. Measurement uncertainty is ± 5.0 dB
2. The reported field strength values are the worst case values at the indicated frequency. The receiving antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
3. A Quasi-Peak detector was used with a resolution bandwidth of 120 kHz.

Test engineer

Signature :



Name : W. Brouwer

Date : November 2, 2017

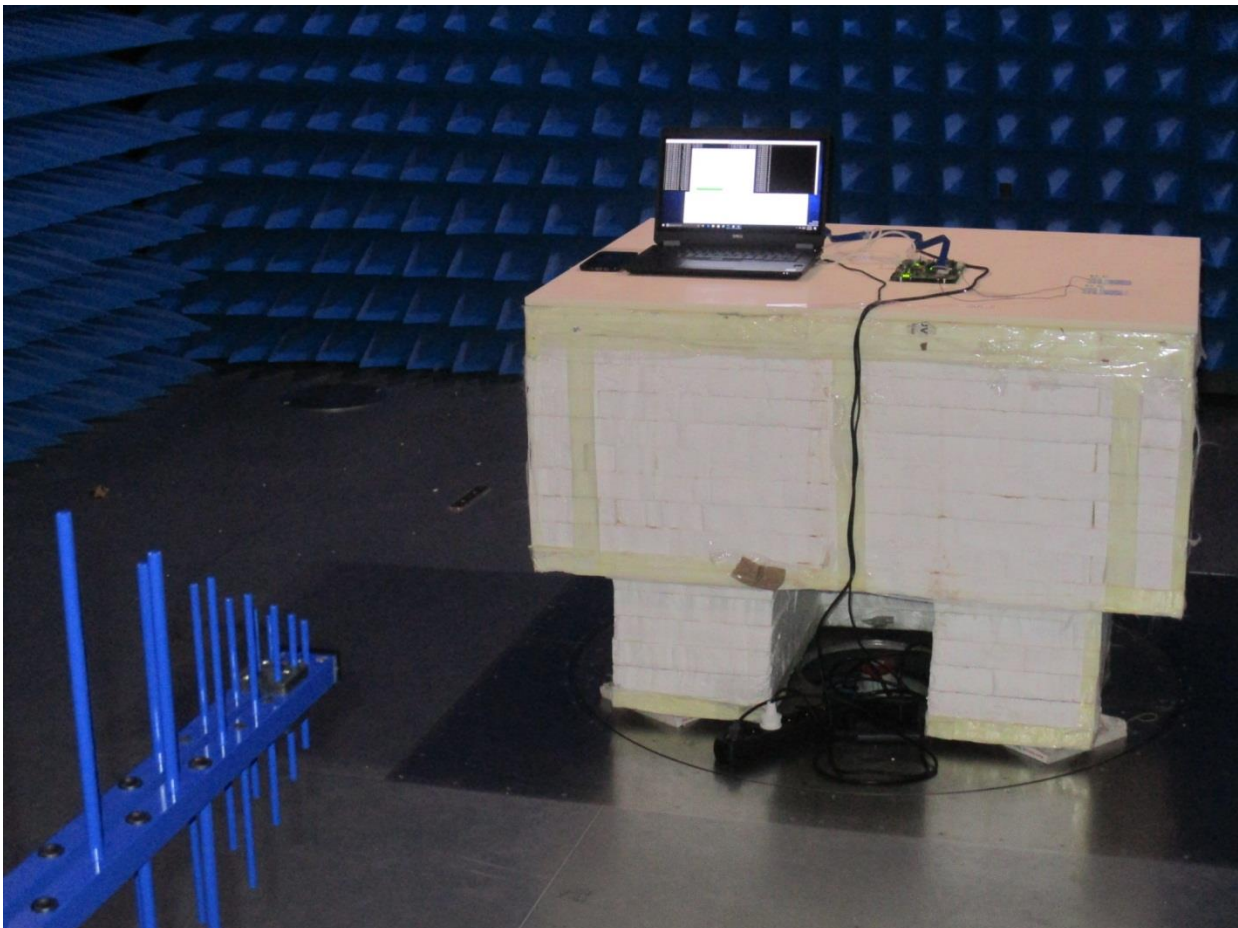


Photo 2: Test Set-up RF Radiated emission 30MHz-1GHz

4 Radiated field strength measurements (1 GHz – 29 GHz, E-field) (fx= 5.8 GHz)

Measured Peak results and limits 2.4 GHz mode			
Frequency (MHz)	Vertical Polarization (dBμV/m)	Horizontal Polarization (dBμV/m)	Limits (FCC15.35) (dBμV/m)
1000-18000	<25.0	<25.0	74.0
Except for:			
1994	59.1	66.0	74.0
2996	57.6	52.5	74.0
5816	62.7	62.9	74.0
6457	64.3	64.1	74.0
6558	59.6	59.3	74.0
11468	63.1	62.6	74.0
13731	64.8	64.3	74.0
16577	66.0	65.3	74.0
17709	69.9	65.4	74.0
Measured Average results and limits 2.4 GHz mode			
Frequency (MHz)	Vertical Polarization (dBμV/m)	Horizontal Polarization (dBμV/m)	Limits (FCC15.35) (dBμV/m)
1000-18000	<25.0	<25.0	54.0
Except for:			
1994	30.9	33.0	54.0
2996	35.1	34.9	54.0
5816	48.5	48.5	54.0
6457	50.7	50.7	54.0
6558	39.8	39.8	54.0
11468	44.8	43.6	54.0
13731	44.5	44.5	54.0
16577	43.0	43.0	54.0
17709	50.3	50.3	54.0

Table 5 Results Radiated emission 2.4 GHz mode

Measured Peak results and limits 5 GHz + BT mode			
Frequency (MHz)	Vertical Polarization (dB μ V/m)	Horizontal Polarization (dB μ V/m)	Limits (FCC15.35) (dB μ V/m)
1000-29000	<25.0	<25.0	74.0
Except for:			
1991	55.4	61.0	74.0
3000	56.6	50.3	74.0
5890	62.2	62.4	74.0
6459	64.1	64.4	74.0
6542	53.7	52.8	74.0
11484	57.6	55.7	74.0
13698	58.1	57.2	74.0
14131	58.2	57.9	74.0
16677	56.3	57.0	74.0
17809	64.1	64.5	74.0
18329	53.5	53.1	74.0
20020	52.2	52.2	74.0
20765	56.4	54.2	74.0
21724	53.7	53.7	74.0
22975	53.5	52.9	74.0
24160	50.0	50.3	74.0
Measured Average results and limits 5 GHz + BT mode			
Frequency (MHz)	Vertical Polarization (dB μ V/m)	Horizontal Polarization (dB μ V/m)	Limits (FCC15.35) (dB μ V/m)
1000-29000	<25.0	<25.0	54.0
Except for:			
1991	30.3	30.6	54.0
3000	35.3	35.2	54.0
5890	48.4	48.4	54.0
6459	50.5	50.5	54.0
6542	39.8	39.8	54.0
11484	44.4	42.1	54.0
13698	44.3	44.4	54.0
14131	44.5	44.6	54.0
16677	43.0	43.1	54.0
17809	51.1	51.1	54.0
18329	39.5	39.5	54.0
20020	38.6	38.5	54.0
20765	49.3	49.8	54.0
21724	40.4	40.5	54.0
22975	39.4	39.6	54.0
24160	37.9	37.9	54.0

Table 6 Results Radiated emission 5 GHz + BT mode

Radiated emissions >1GHz of the EUT. The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15: 2016 section 15.109 and 15.35 (Class B digital devices, verification) with the EUT operating in mode switched to generate maximum levels. Maximum level recorded of the total system in tables 5 and 6.

Notes:

Field strength values of radiated emissions at frequencies not listed in the table above are more than 25 dB below the applicable limit.

1. Measurement uncertainty is +/- 5.1 dB
2. The reported field strength values are the worst case values at the indicated frequency. The receiving antenna was varied in horizontal and vertical orientations and also in height (between 1m and 2m).
3. A Peak/Average detector was used with a resolution bandwidth of 1MHz.

Test engineer

Signature :

Name : W. Brouwer

Date : November 1, 2017

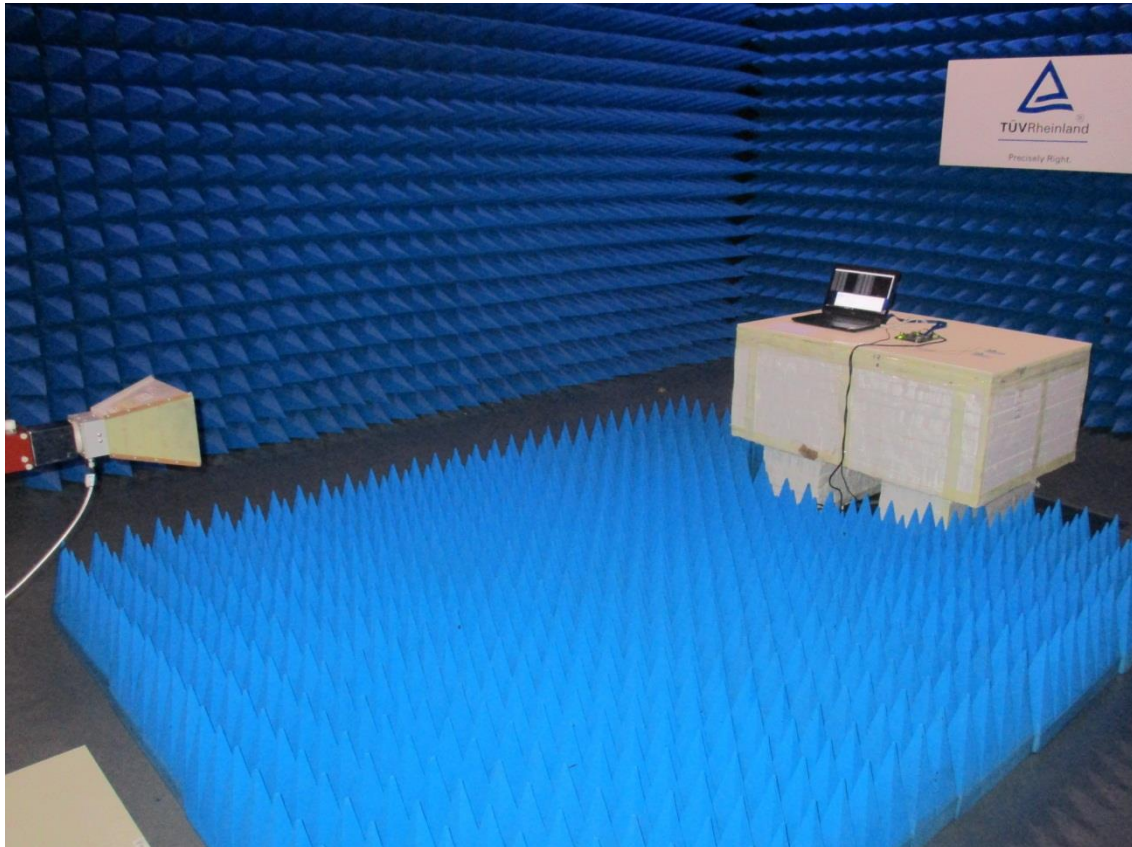


Photo 3: Test Set-up RF Radiated emission 1GHz – 18 GHz

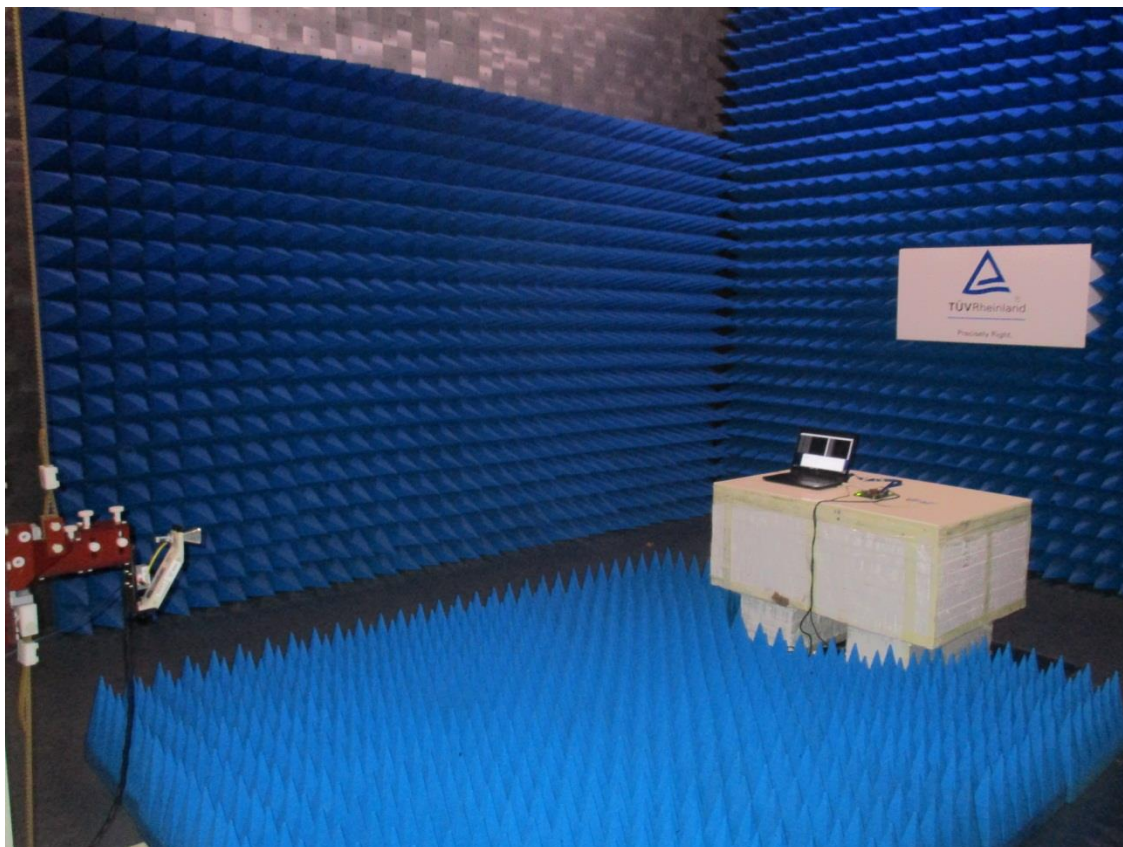


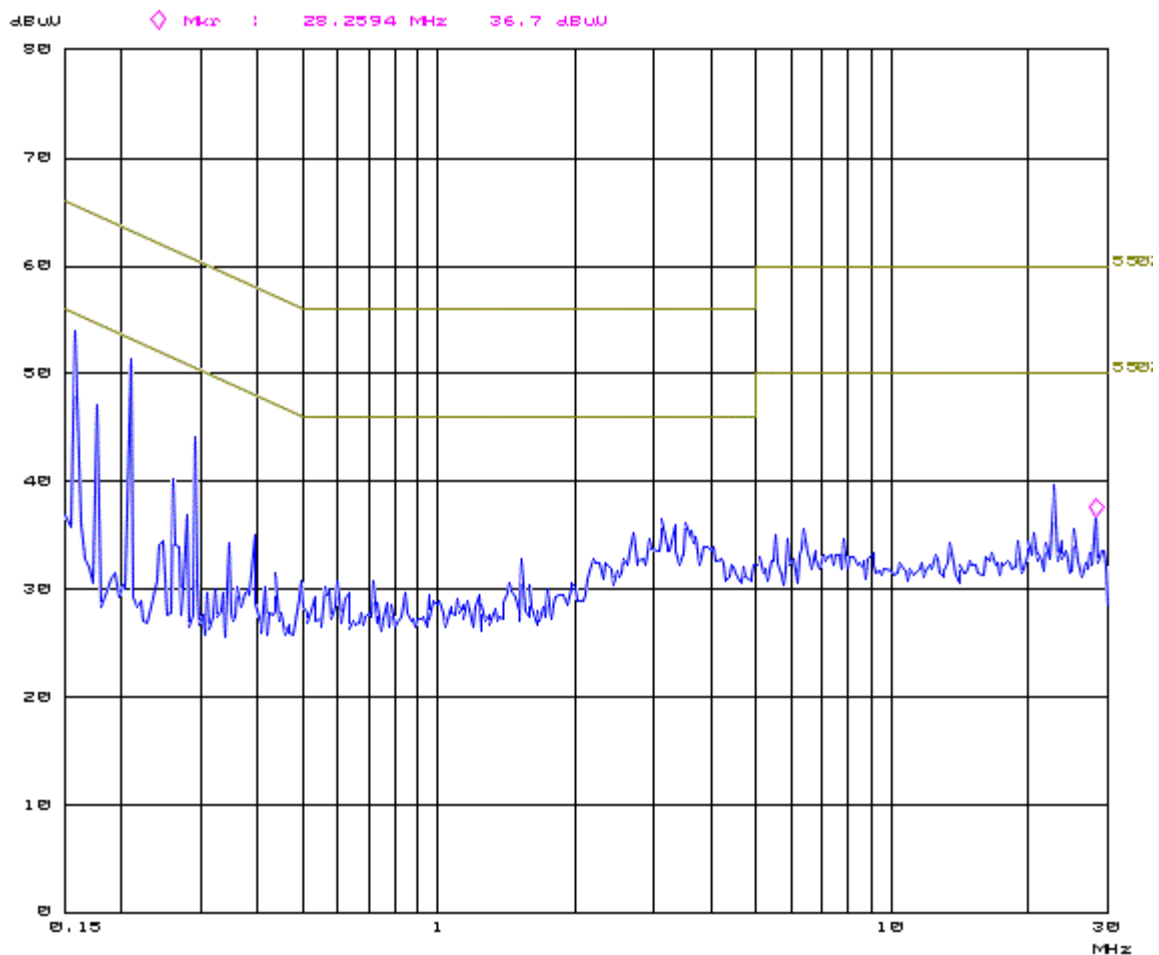
Photo 4: Test Set-up RF Radiated emission 18GHz – 29GHz

5 Conducted emission AC Power Line (to AUX1)

Results and limits Neutral						
Frequency (MHz)	Quasi peak detector			Average detector		
	Result	Limit	Margin	Result	Limit	Margin
0.16	51.0	65.5	14.4	31.2	55.5	24.2
0.18	50.4	64.5	14.1	34.7	54.5	19.8
0.21	51.8	63.2	11.4	32.9	53.2	20.3
0.29	36.8	60.5	23.8	19.1	50.5	31.4
3.11	28.1	56.0	27.9	21.2	46.0	24.9

Results and limits L1						
Frequency (MHz)	Quasi peak detector			Average detector		
	Result	Limit	Margin	Result	Limit	Margin
0.16	58.6	65.5	6.9	31.6	55.5	23.9
0.18	50.0	64.5	14.5	34.9	54.5	19.6
0.21	47.8	63.2	15.5	33.1	53.2	20.1
0.29	42.9	60.5	17.6	18.6	50.5	31.9
3.11	31.0	56.0	25.1	24.2	46.0	21.8

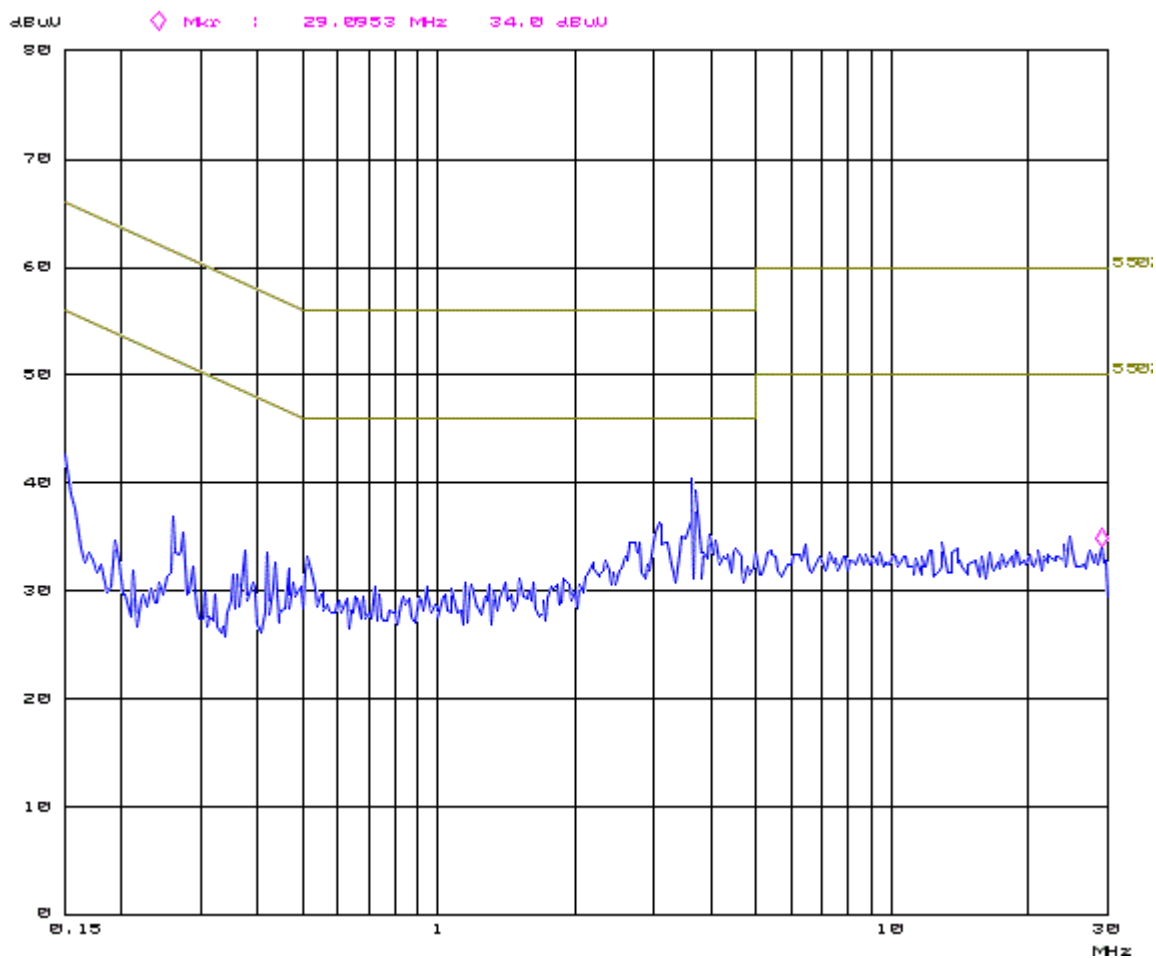
Table 7



Plot 3: Pre-scan plot with Peak detector Conducted Emissions from 0.15 MHz to 30MHz in 2.4 GHz mode

Results and limits Neutral						
Frequency (MHz)	Quasi peak detector			Average detector		
	Result	Limit	Margin	Result	Limit	Margin
2.66	27.4	56.0	28.6	20.7	46.0	25.3
3.06	30.2	56.0	25.8	23.8	46.0	22.2
3.63	29.2	56.0	26.8	23.7	46.0	22.3
3.70	29.5	56.0	26.5	21.6	46.0	24.4
3.95	29.9	56.0	26.1	24.7	46.0	21.3
Results and limits L1						
Frequency (MHz)	Quasi peak detector			Average detector		
	Result	Limit	Margin	Result	Limit	Margin
2.66	29.1	56.0	26.9	21.7	46.0	24.3
3.06	32.9	56.0	23.1	26.1	46.0	19.9
3.63	30.8	56.0	25.2	24.0	46.0	22.0
3.70	29.8	56.0	26.2	22.0	46.0	24.0
3.95	31.1	56.0	24.9	25.8	46.0	20.2

Table 8



Plot 4: Pre-scan plot with Peak detector Conducted Emissions from 0.15 MHz to 30MHz in 5 GHz + BT mode

Conducted emission measurements. The results of the conducted emission tests, carried out in accordance with 47 CFR Part 15: 2016 section 15.109 (Class B digital devices, verification), at the AC mains connection terminals which were connected to the EUT, are depicted in table 7 and 8. Maximum values recorded. The system is tested as in whole, so with all equipment in place and functioning. Being the worst case situation. Maximum results are reported.

Notes:

1. Measurement uncertainty is ± 3.5 dB
2. The resolution bandwidth used was 9 kHz.

Test engineer

Signature : 

Name : K.F. van der Molen

Date : November 3, 2017



Photo 5: Test Set-up Conducted emission 0.15 MHz to 30Mhz

7. List of utilized test equipment.

Inventory number	Description	Brand	Model
A00257	Controller (mast)	EMCS	DOC202
A00258	Antenna mast	EMCS	AP-4702C
A00257	Antenna mast	EMCS	DOC202
A01982	Measuring receiver	R&S	ESR
A00466	Biconilog antenna	TeSeq	CBL6111D
A00209	Gainhorn Antenna 18 – 26.5 GHz	EMCO	3160-09
A00378	Pre-amplifier	EMCS	99779
A00447	Low att coax cable	Gigalink	APG0500
A00339	Low att coax cable	Huber + Suhner	Sucotest 18/Sucoflex 102
A00343	Low att coax cable	Huber + Suhner	Sucotest 18/Sucoflex 102
A00450	Turntable & controller	Maturo	SCU
A00436	S-AR	Siepel	-
A00019	Artificial mains network 3-phase	R&S	ESH2-Z5
A00051	Impulse limiter	R&S	ESH3Z2.357...
A00726	EMI test receiver	R&S	ESCS 30
A00008	Gainhorn Antenna	EMCO	3115
A00337	Spectrum Analyzer 9KHz – 30GHz	R&S	FSV30
A00255	Pre-selector	EMCS	RFS06S
A00442	Temperature-Humiditymeter	Extech	SD500