

# EMI - TEST REPORT

- FCC Part 15.225, RSS210 A2.6 -

**Type / Model Name** : RF310R-G2, RF340R-G2, RF350R-G2

**Product Description** : RFID reader 13.56MHz

**Applicant** : Siemens AG

**Address** : Gleiwitzer Str. 555

90475 Nürnberg

GERMANY

**Manufacturer** : Siemens AG

**Address** : Östliche Rheinbrückenstr. 50

76187 Karlsruhe

GERMANY

**Test Result** according to the standards listed in clause 1 test standards:

**POSITIVE**

**Test Report No. :** **T40265-00-06JP**

04. July 2016

Date of issue



Deutsche  
Akkreditierungsstelle  
D-PL-12030-01-01  
D-PL-12030-01-02

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

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# **1 TEST STANDARDS**

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (February, 2016)

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (February, 2016)

Part 15, Subpart C, Section 15.207

Part 15, Subpart C, Section 15.209

Part 15, Subpart C, Section 15.225

Conducted limits

Radiated emission limits, general requirements

Operation within the band 13.110 - 14.010 MHz

RSS-Gen Issue 4, Nov 2014

General Requirements and Information for the Certification of Radio Apparatus

RSS-210 Issue 8, Dec 2010

Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

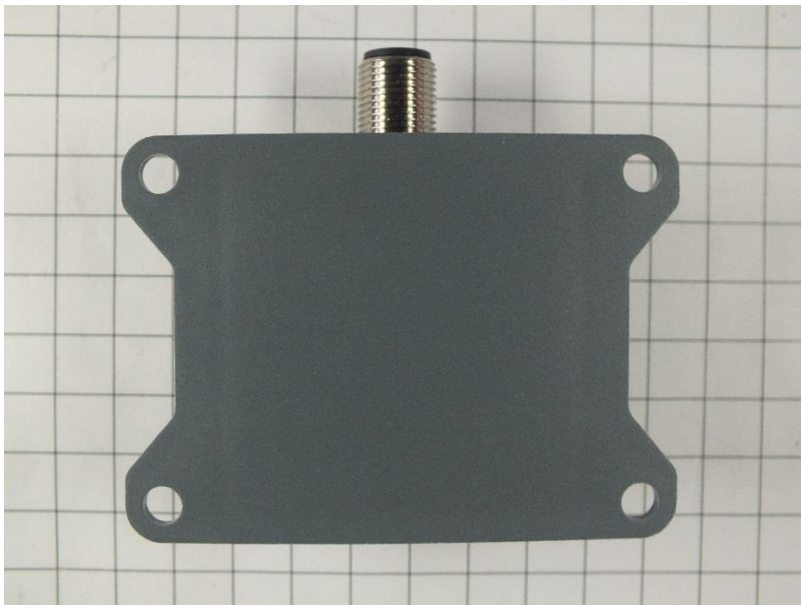
ANSI C63.10: 2013

Testing Unlicensed Wireless Devices

## 2 EQUIPMENT UNDER TEST

### 2.1 Photo documentation of the EUT

RF310R-G2



RF310R-G2



RF340R-G2



RF340R-G2



RF350R-G2





RF350R-G2



RF350R-G2



## 2.2 Equipment category

RFID device; operating frequency 13.56MHz

## 2.3 Short description of the equipment under test (EUT)

The EuTs are RFID reader using the frequency 13.56MHz. The RF310R-G2 and the RF340R-G2 have an internal antenna. RF350R-G2 has an external antenna connector.

Number of tested samples: 1  
Serial number: none

### EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

## 2.4 Operation frequency

The operating frequency is 13.56MHz.

## 2.5 Antenna

### RF310R-G2

Model name	Brand	performed tests on EuT/antenna combination
internal	--	field strength of fundamental, spurious emissions, AC power line

### RF340R-G2

Model name	Brand	performed tests on EuT/antenna combination
internal	--	field strength of fundamental, spurious emissions, AC power line

### RF350R-G2:

Model name	Brand	performed tests on EuT/antenna combination
ANT1	Siemens	full (highest TX power)
ANT3	Siemens	field strength of fundamental, spurious emissions
ANT3s	Siemens	field strength of fundamental, spurious emissions
ANT8	Siemens	field strength of fundamental, spurious emissions
ANT12	Siemens	field strength of fundamental, spurious emissions
ANT18	Siemens	field strength of fundamental, spurious emissions
ANT30	Siemens	field strength of fundamental, spurious emissions

### EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- continous TAG reading/writing 112 Byte @ 13.56MHz

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## 2.6 Power supply system utilised

Power supply voltage : 24 V / DC

## 2.7 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

- Control Unit (PLC) Model : SIMATIC S7-300, Siemens AG

### 3 SUMMARY

#### 3.1 Test results

FCC Rule Part	RSS Rule Part	Description	Result
15.207	RSS Gen, 8.8	AC power line conducted emissions	passed
15.225	RSS-210, A2.6	Field strength of fundamental	passed
15.209	RSS Gen, 8.9	Spurious emissions	passed
15.225	RSS-210, A2.6	Frequency tolerance	passed
15.215	RSS-Gen, 6.6	Occupied bandwidth	passed
15.225	RSS-210, A2.6	Transmitter spectrum mask	passed

#### 3.2 General Remarks:

The EuT was tested together with Siemens TAG MDS D426 supplied by client. For RF350R-G2 full testing was performed with ANT1 (highest TX power). For remaining antennas/models partial testing was performed, refer to subclause 2.5 of this report.

#### 3.3 Final assessment

The equipment under test fulfills the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 20 April 2016

Testing concluded on : 16 June 2016

Checked by:

Klaus Gegenfurtner  
I confirm the correctness  
and Integrity of this  
document  
2016.07.05 08:05:59  
+02'00'



Klaus Gegenfurtner  
Teamleader Radio

Tested by:



Jürgen Pessinger  
2016.07.04  
16:01:08 +02'00'

Jürgen Pessinger

## 4 TEST ENVIRONMENT

### 4.1 Address of the test laboratory

**CSA Group Bayern GmbH  
Ohmstrasse 1-4  
94342 STRASSKIRCHEN  
GERMANY**

### 4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

### 4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor  $k = 2$ . The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	$\pm 3.29$ dB
20 dB Bandwidth	Center frequency of EuT	95%	$\pm 2.5 \times 10^{-7}$
99% Occupied Bandwidth	Center frequency of EuT	95%	$\pm 2.5 \times 10^{-7}$
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	$\pm 3.53$ dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	$\pm 3.71$ dB
Radiated Spurious Emissions	1000 MHz to 10000 MHz	95%	$\pm 2.34$ dB
Peak conducted output power	902 MHz to 928 MHz	95%	$\pm 0.35$ dB
Conducted Spurious Emissions	9 kHz to 10000 MHz	95%	$\pm 2.15$ dB

## 4.4 Measurement protocol for FCC and IC

### 4.4.1 General information

#### 4.4.1.1 Test methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

The Open Area test sites are listed Open Sites under the Canadian Test-Sites File-No:

### **IC 3009A-1 (OATS1) and IC 3009A-3 (OATS3)**

The anechoic chamber site is listed chamber under the Canadian Test-Sites File-No:

### **IC 3009A-2**

In compliance with RSS 210 testing for RSS compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

#### 4.4.1.2 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

#### 4.4.1.3 Details of test procedures

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

## **5 TEST CONDITIONS AND RESULTS**

### **5.1 AC power line conducted emissions**

For test instruments and accessories used see section 6 Part A 4.

#### **5.1.1 Description of the test location**

Test location:               Shielded Room S2

#### **5.1.2 Photo documentation of the test set-up**

RF 310R-G2



RF 340R-G2



RF 350R-G2



### 5.1.3 Applicable standard

FCC Part 15, Section 15.207 and RSS-Gen 8.8

### 5.1.4 Test result

Frequency range: 0.15 MHz - 30 MHz  
 Min. limit margin 2.97 dB at 13.56 MHz

Limit according to FCC Part 15, Section 15.207(a) and RSS-Gen 8.8 Table 3:

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency

The requirements are **FULFILLED**.

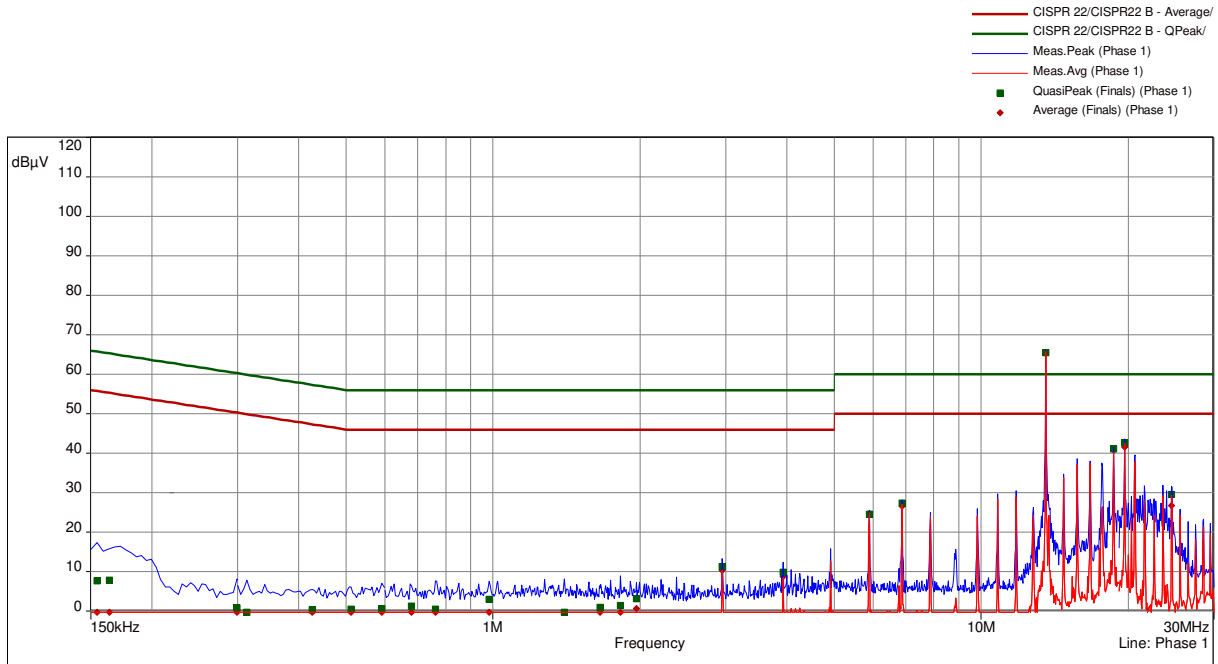
**Remarks:** Test was performed on the AC input of the used AC/DC power supply (CSA ID: 01-05/50-11-011)  
The test was performed with antenna connected. Measurement was repeated with 50Ohm  
termination of the antenna port for the fundamental frequency (according to KDB 174176D01)



### 5.1.5 Test protocol

Test point: L1  
 Operation mode: continuous TAG reading/writing 112 Byte @ 13.56MHz  
 Remarks: RF310R-G2, internal antenna connected

Result: PASSED



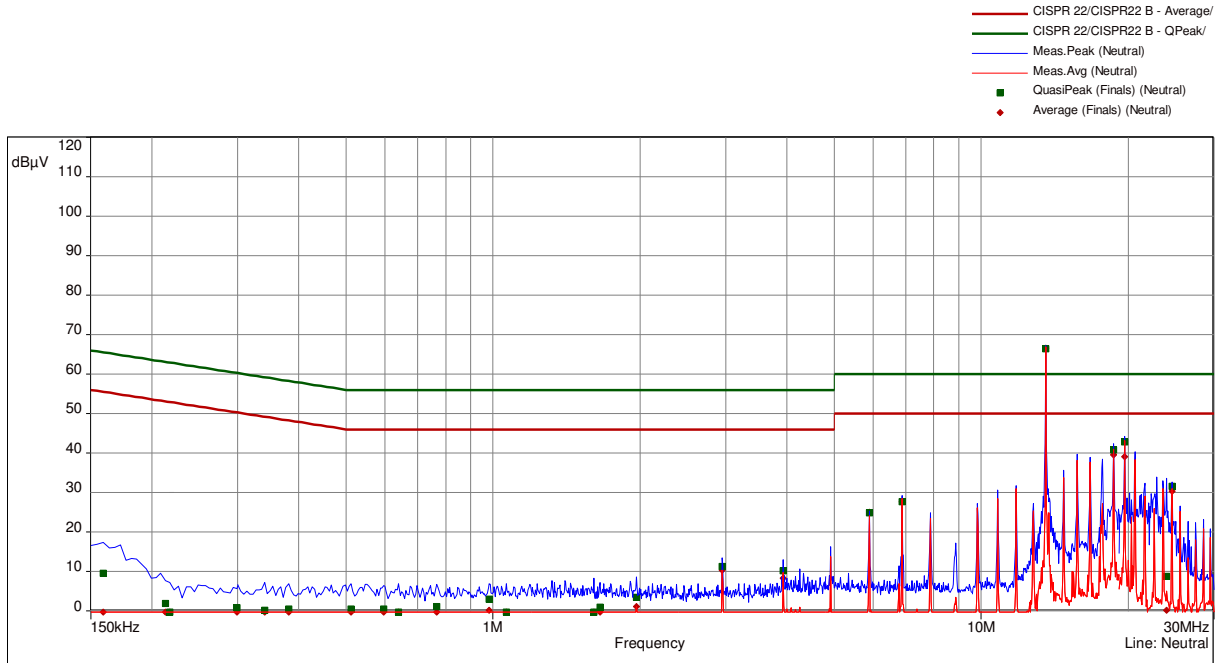
CISPR 22/CISPR22B

freq MHz	QP dB(µV)	margin dB	limit dB	AV dB(µV)	margin dB	limit dB	line	corr dB
0.1545	7.70	58.05	65.75	-2.62	58.37	55.75	Phase 1	9.84
0.1635	7.85	57.43	65.28	-2.77	58.06	55.28	Phase 1	9.84
0.2985	0.85	59.43	60.28	-2.57	52.85	50.28	Phase 1	9.82
0.3135	-1.29	61.17	59.88	-4.38	54.26	49.88	Phase 1	9.82
0.426	0.38	56.95	57.33	-2.88	50.21	47.33	Phase 1	9.81
0.5115	0.45	55.55	56.00	-2.77	48.77	46.00	Phase 1	9.82
0.5925	0.65	55.35	56.00	-2.55	48.55	46.00	Phase 1	9.82
0.681	1.23	54.77	56.00	-1.82	47.82	46.00	Phase 1	9.81
0.762	0.50	55.50	56.00	-2.41	48.41	46.00	Phase 1	9.80
0.9825	2.98	53.02	56.00	0.00	46.00	46.00	Phase 1	9.82
1.398	-0.83	56.83	56.00	-3.58	49.58	46.00	Phase 1	9.79
1.659	1.01	54.99	56.00	-1.94	47.94	46.00	Phase 1	9.79
1.8255	1.46	54.54	56.00	-1.61	47.61	46.00	Phase 1	9.80
1.965	3.07	52.93	56.00	0.69	45.31	46.00	Phase 1	9.81
2.949	11.19	44.81	56.00	10.32	35.68	46.00	Phase 1	9.79
3.93	9.84	46.16	56.00	8.70	37.30	46.00	Phase 1	9.81
5.898	24.61	35.39	60.00	24.66	25.34	50.00	Phase 1	9.83
6.8835	27.28	32.72	60.00	26.50	23.50	50.00	Phase 1	9.84
<b>13.56*</b>	<b>65.41</b>	<b>-5.41</b>	<b>60.00</b>	<b>65.51</b>	<b>-15.51</b>	<b>50.00</b>	<b>Phase 1</b>	<b>10.04</b>
18.681	41.15	18.85	60.00	40.73	9.27	50.00	Phase 1	10.27
19.6635	42.73	17.27	60.00	41.55	8.45	50.00	Phase 1	10.32
24.5775	29.57	30.43	60.00	26.67	23.33	50.00	Phase 1	10.35

\* fundamental frequency, retested with 50Ohm termination

Test point: N  
 Operation mode: continuous TAG reading/writing 112 Byte @ 13.56MHz  
 Remarks: RF310R-G2, internal antenna connected

Result: PASSED



CISPR 22/CISPR22B

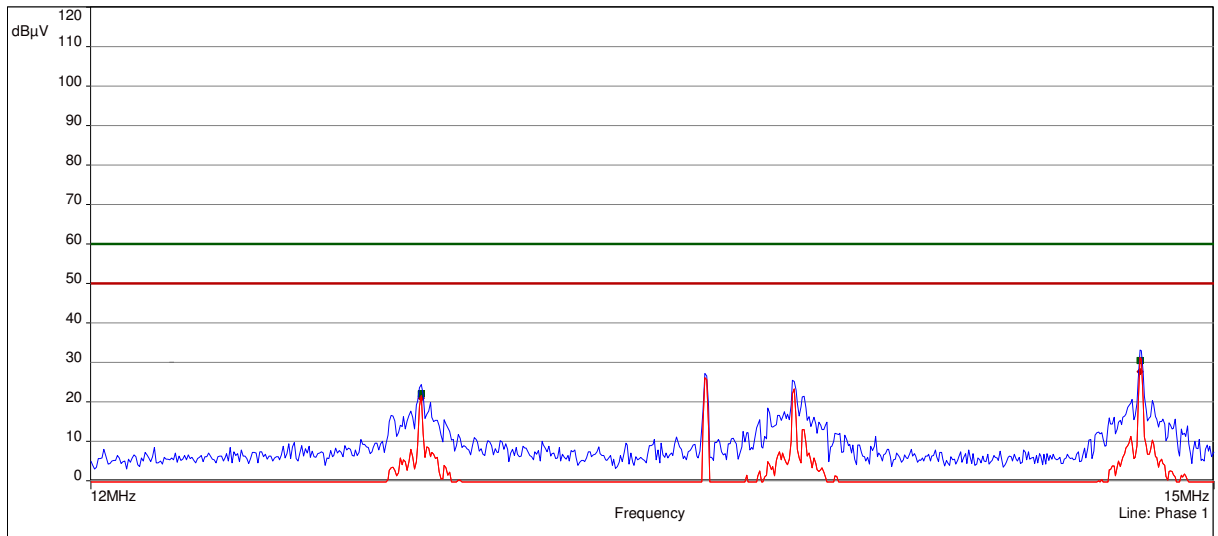
freq MHz	QP dB(µV)	margin dB	limit dB	AV dB(µV)	margin dB	limit dB	line	corr dB
0.159	9.48	56.04	65.52	-2.25	57.76	55.52	Neutral	9.85
0.213	1.87	61.22	63.09	-2.17	55.26	53.09	Neutral	9.85
0.2175	-0.24	63.15	62.91	-3.62	56.53	52.91	Neutral	9.85
0.2985	0.85	59.43	60.28	-2.54	52.83	50.28	Neutral	9.82
0.3405	0.23	58.96	59.19	-3.26	52.45	49.19	Neutral	9.81
0.381	0.44	57.82	58.26	-2.91	51.16	48.26	Neutral	9.81
0.5115	0.52	55.48	56.00	-2.74	48.74	46.00	Neutral	9.82
0.597	0.52	55.48	56.00	-2.64	48.64	46.00	Neutral	9.82
0.6405	-1.63	57.63	56.00	-4.49	50.49	46.00	Neutral	9.81
0.7665	1.16	54.84	56.00	-1.89	47.89	46.00	Neutral	9.80
0.9825	2.93	53.07	56.00	0.13	45.87	46.00	Neutral	9.82
1.0635	-0.73	56.73	56.00	-4.00	50.00	46.00	Neutral	9.81
1.6095	-1.92	57.92	56.00	-4.82	50.82	46.00	Neutral	9.79
1.659	0.95	55.05	56.00	-1.97	47.97	46.00	Neutral	9.79
1.965	3.42	52.58	56.00	1.10	44.90	46.00	Neutral	9.81
2.949	11.19	44.81	56.00	10.34	35.66	46.00	Neutral	9.79
3.9345	10.10	45.90	56.00	8.27	37.73	46.00	Neutral	9.81
5.898	24.92	35.08	60.00	24.95	25.05	50.00	Neutral	9.81
6.8835	27.73	32.27	60.00	27.62	22.38	50.00	Neutral	9.81
13.56*	66.49	-6.49	60.00	66.62	-16.62	50.00	Neutral	9.89
18.6855	40.85	19.15	60.00	39.50	10.50	50.00	Neutral	10.07
19.6635	42.81	17.19	60.00	39.13	10.87	50.00	Neutral	10.11
24.006	8.70	51.30	60.00	0.18	49.82	50.00	Neutral	9.96
24.5865	31.58	28.42	60.00	30.38	19.62	50.00	Neutral	9.94

\* fundamental frequency, retested with 50Ohm termination

Test point: L1  
 Operation mode: Reader in operational mode, transmitter / receiver powered on. RF-signal terminated into 50 ohms load  
 Remarks: RF310R-G2, 50Ohm termination of antenna port

Result: PASSED

— CISPR 22/CISPR22 B - Average/  
 — CISPR 22/CISPR22 B - QPeak/  
 — Meas.Peak (Phase 1)  
 — Meas.Avg (Phase 1)  
 ■ QuasiPeak (Finals) (Phase 1)  
 ◆ Average (Finals) (Phase 1)



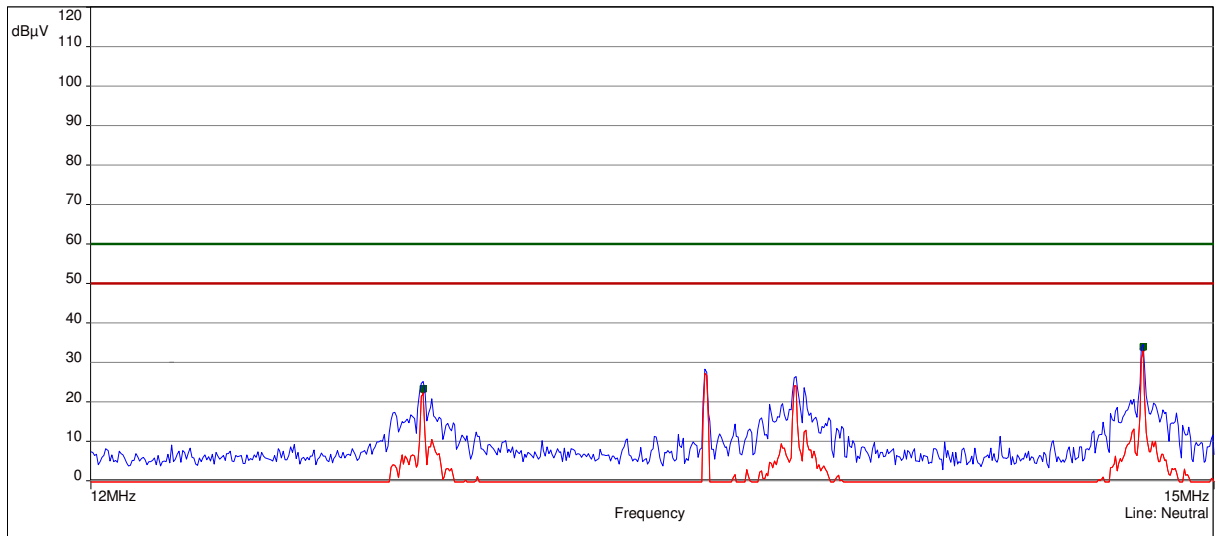
CISPR 22/CISPR22B

freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(µV)	dB	dB	dB(µV)	dB	dB		dB
13.56	26.61	-33.39	60.00	26.95	-33.05	50.00	Phase 1	10.04

Test point: N  
 Operation mode: Reader in operational mode, transmitter / receiver powered on. RF-signal terminated into 50 ohms load  
 Remarks: RF310R-G2, 50Ohm termination of antenna port

Result: PASSED

- CISPR 22/CISPR22 B - Average/
- CISPR 22/CISPR22 B - QPeak/
- Meas.Peak (Neutral)
- Meas.Avg (Neutral)
- QuasiPeak (Finals) (Neutral)
- ◆ Average (Finals) (Neutral)



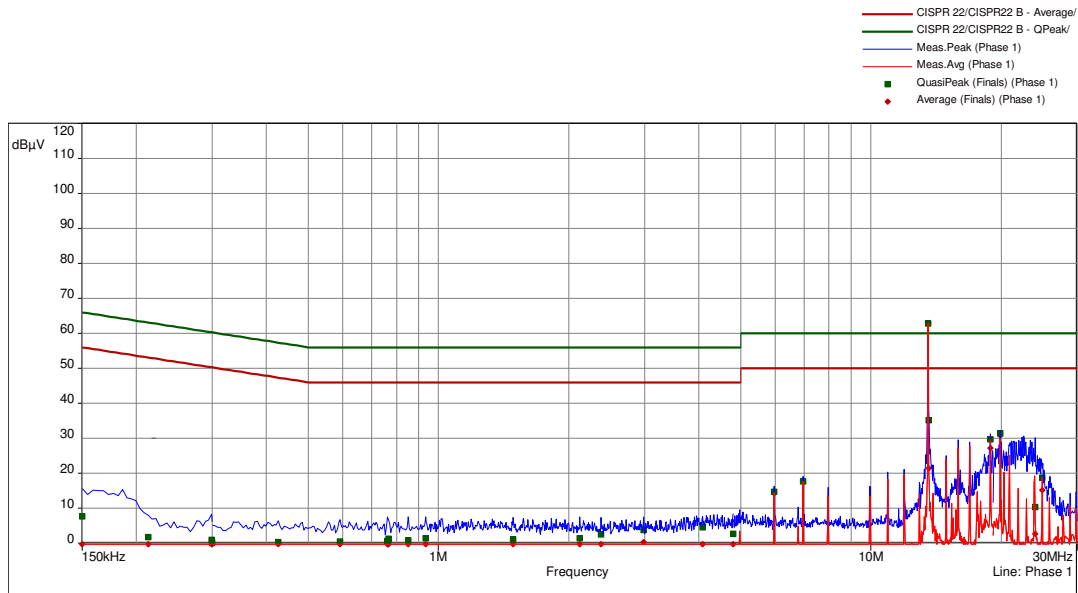
CISPR 22/CISPR22B

freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(µV)	dB	dB	dB(µV)	dB	dB		dB
13.56	26.98	-33.02	60.00	27.21	-32.79	50.00	Neutral	9.89

Test point  
Operation mode:  
Remarks:

L1  
continuous TAG reading/writing 112 Byte @ 13.56MHz  
RF340R-G2, internal antenna connected

Result: PASSED

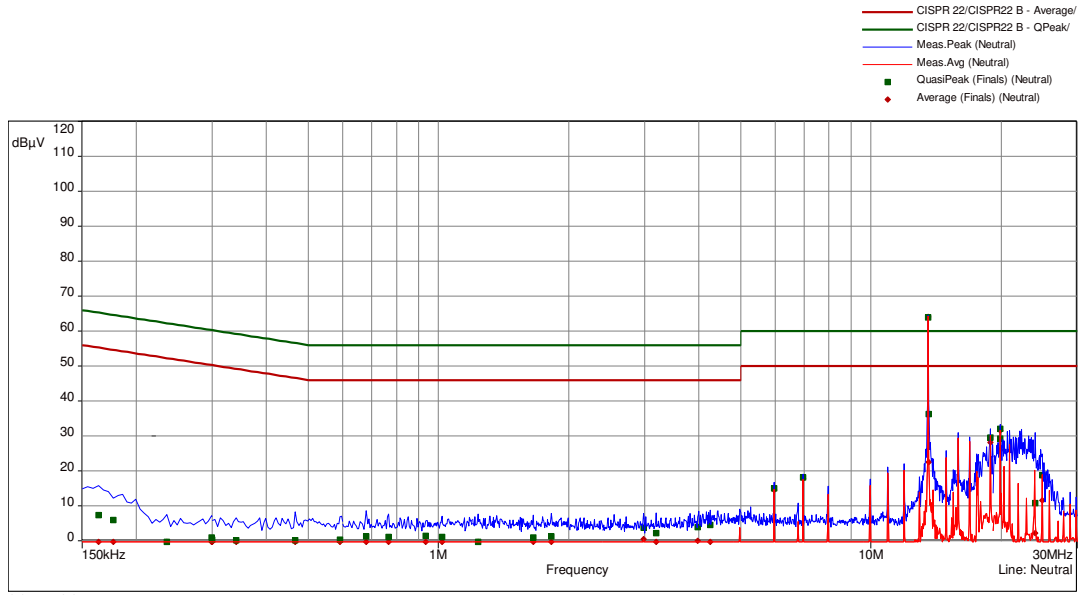


freq MHz	QP dB(µV)	margin dB	limit dB	AV dB(µV)	margin dB	limit dB	line	corr dB
0.15	7.68	58.32	66.00	-2.73	58.73	56.00	Phase 1	9.84
0.213	1.73	61.36	63.09	-2.14	55.23	53.09	Phase 1	9.83
0.2985	0.92	59.37	60.28	-2.52	52.80	50.28	Phase 1	9.82
0.3	0.17	60.07	60.24	-3.05	53.29	50.24	Phase 1	9.82
0.426	0.38	56.95	57.33	-3.01	50.34	47.33	Phase 1	9.81
0.5925	0.52	55.48	56.00	-2.57	48.57	46.00	Phase 1	9.82
0.762	0.57	55.43	56.00	-2.42	48.42	46.00	Phase 1	9.80
0.7665	1.22	54.78	56.00	-1.94	47.94	46.00	Phase 1	9.80
0.852	0.77	55.23	56.00	-2.26	48.26	46.00	Phase 1	9.81
0.933	1.35	54.65	56.00	-1.77	47.77	46.00	Phase 1	9.82
1.488	1.14	54.86	56.00	-1.94	47.94	46.00	Phase 1	9.79
2.1225	1.46	54.54	56.00	-3.16	49.16	46.00	Phase 1	9.80
2.379	2.56	53.44	56.00	-1.81	47.81	46.00	Phase 1	9.79
2.985	3.84	52.16	56.00	0.35	45.65	46.00	Phase 1	9.79
4.0785	4.58	51.42	56.00	-0.52	46.52	46.00	Phase 1	9.81
4.8	2.61	53.39	56.00	-1.90	47.90	46.00	Phase 1	9.82
5.97	14.64	45.36	60.00	14.18	35.82	50.00	Phase 1	9.83
6.9645	17.72	42.28	60.00	17.53	32.47	50.00	Phase 1	9.84
13.56*	62.89	-2.89	60.00	62.99	-12.99	50.00	Phase 1	10.04
13.587	35.20	24.80	60.00	21.38	28.62	50.00	Phase 1	10.04
18.906	29.62	30.38	60.00	27.22	22.78	50.00	Phase 1	10.28
19.8975	31.41	28.59	60.00	30.85	19.15	50.00	Phase 1	10.34
24.0105	10.31	49.69	60.00	2.60	47.40	50.00	Phase 1	10.34
24.879	18.79	41.21	60.00	15.15	34.85	50.00	Phase 1	10.35

\* fundamental frequency, retested with 50Ohm termination

Test point: N  
 Operation mode: continous TAG reading/writing 112 Byte @ 13.56MHz  
 Remarks: RF340R-G2, internal antenna connected

Result: PASSED



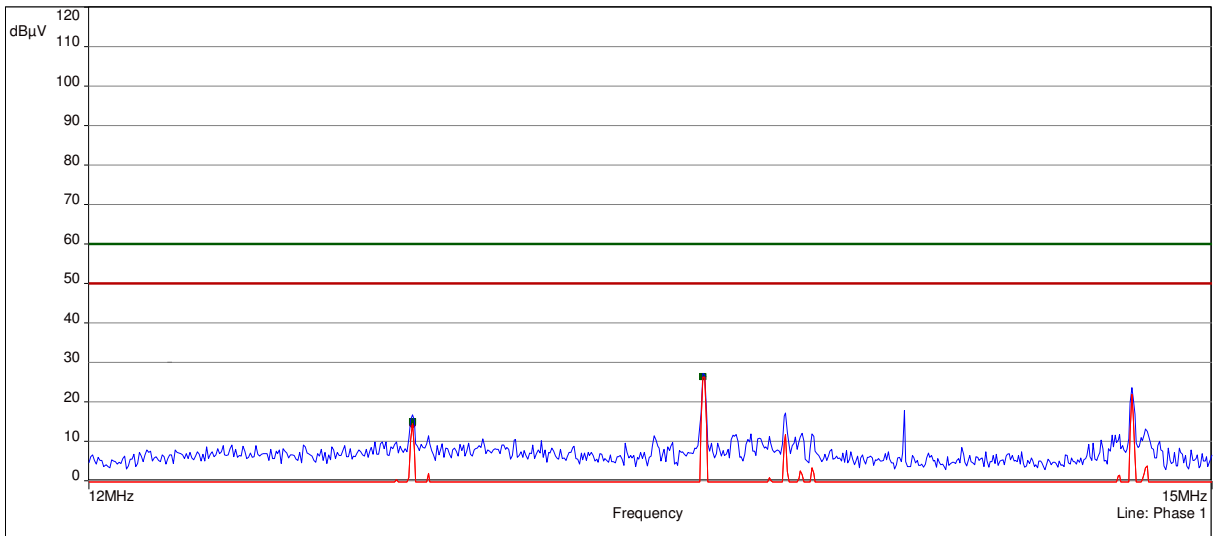
freq MHz	QP dB(µV)	margin dB	limit dB	AV dB(µV)	margin dB	limit dB	line	corr dB
0.1635	7.31	57.97	65.28	-2.82	58.10	55.28	Neutral	9.85
0.177	5.90	58.73	64.63	-2.84	57.47	54.63	Neutral	9.85
0.2355	-0.24	62.50	62.25	-3.57	55.82	52.25	Neutral	9.84
0.2985	0.92	59.37	60.28	-2.60	52.88	50.28	Neutral	9.82
0.3	0.38	59.86	60.24	-3.09	53.33	50.24	Neutral	9.82
0.3405	0.16	59.03	59.19	-3.33	52.52	49.19	Neutral	9.81
0.4665	0.17	56.41	56.58	-3.30	49.88	46.58	Neutral	9.82
0.5925	0.38	55.62	56.00	-2.67	48.67	46.00	Neutral	9.82
0.681	1.23	54.77	56.00	-1.97	47.97	46.00	Neutral	9.81
0.7665	1.09	54.91	56.00	-1.93	47.93	46.00	Neutral	9.80
0.933	1.35	54.65	56.00	-1.87	47.87	46.00	Neutral	9.82
1.0185	1.17	54.83	56.00	-1.94	47.94	46.00	Neutral	9.81
1.236	-1.14	57.14	56.00	-4.08	50.08	46.00	Neutral	9.80
1.659	0.95	55.05	56.00	-2.24	48.24	46.00	Neutral	9.79
1.8255	1.21	54.79	56.00	-1.92	47.92	46.00	Neutral	9.80
2.985	3.82	52.18	56.00	0.53	45.47	46.00	Neutral	9.79
3.1875	2.22	53.78	56.00	-2.12	48.12	46.00	Neutral	9.80
3.9795	3.85	52.15	56.00	0.08	45.92	46.00	Neutral	9.81
4.2495	4.49	51.51	56.00	-0.84	46.84	46.00	Neutral	9.80
5.97	15.05	44.95	60.00	14.60	35.40	50.00	Neutral	9.81
6.9645	18.07	41.93	60.00	17.83	32.17	50.00	Neutral	9.81
<b>13.56*</b>	<b>63.91</b>	<b>-3.91</b>	<b>60.00</b>	<b>64.04</b>	<b>-14.04</b>	<b>50.00</b>	<b>Neutral</b>	<b>9.89</b>
13.587	36.27	23.73	60.00	22.50	27.50	50.00	Neutral	9.90
18.9105	29.60	30.40	60.00	28.17	21.83	50.00	Neutral	10.08
19.902	32.02	27.98	60.00	31.52	18.48	50.00	Neutral	10.13
19.9065	29.31	30.69	60.00	25.88	24.12	50.00	Neutral	10.13
24.0105	10.80	49.20	60.00	2.21	47.79	50.00	Neutral	9.96
24.8835	18.78	41.22	60.00	11.64	38.36	50.00	Neutral	9.94

\* fundamental frequency, retested with 50Ohm termination

Test point: L1  
 Operation mode: Reader in operational mode, transmitter / receiver powered on. RF-signal terminated into 50 ohms load  
 Remarks: RF340R-G2, 50Ohm termination of antenna port

Result: PASSED

- CISPR 22/CISPR22 B - Average/
- CISPR 22/CISPR22 B - QPeak/
- Meas.Peak (Phase 1)
- Meas.Avg (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- ◆ Average (Finals) (Phase 1)



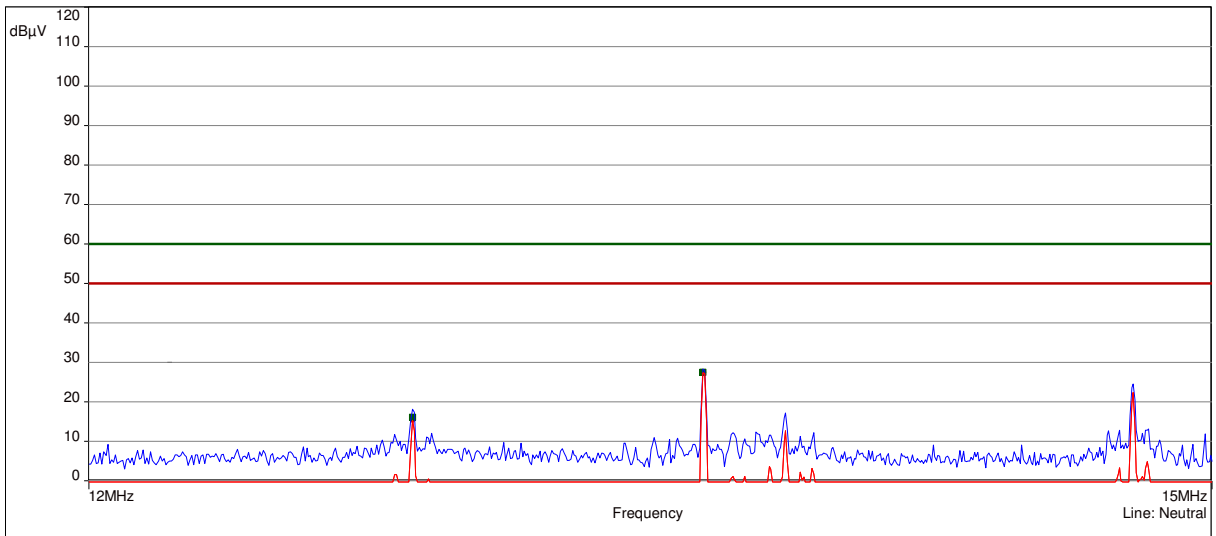
CISPR 22/CISPR22B

freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(µV)	dB	dB	dB(µV)	dB	dB		dB
13.56	26.40	33.60	60.00	26.38	23.62	50.00	Phase 1	10.04

Test point: N  
 Operation mode: Reader in operational mode, transmitter / receiver powered on. RF-signal terminated into 50 ohms load  
 Remarks: RF340R-G2, 50Ohm termination of antenna port

Result: PASSED

- CISPR 22/CISPR22 B - Average/
- CISPR 22/CISPR22 B - QPeak/
- Meas.Peak (Neutral)
- Meas.Avg (Neutral)
- QuasiPeak (Finals) (Neutral)
- ◆ Average (Finals) (Neutral)



CISPR 22/CISPR22B

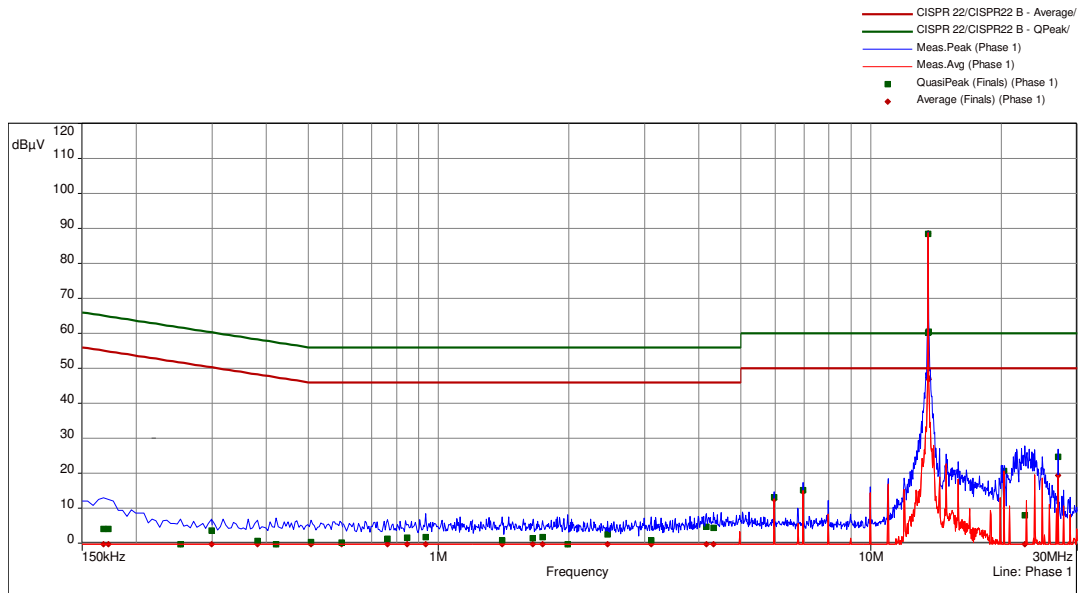
freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(µV)	dB	dB	dB(µV)	dB	dB		dB
13.56	27.47	32.53	60.00	27.46	22.54	50.00	Neutral	9.89



Test point  
Operation mode:  
Remarks:

L1  
continous TAG reading/writing 112 Byte @ 13.56MHz  
RF350R-G2, extrenal antenna ANT1 connected

Result: PASSED

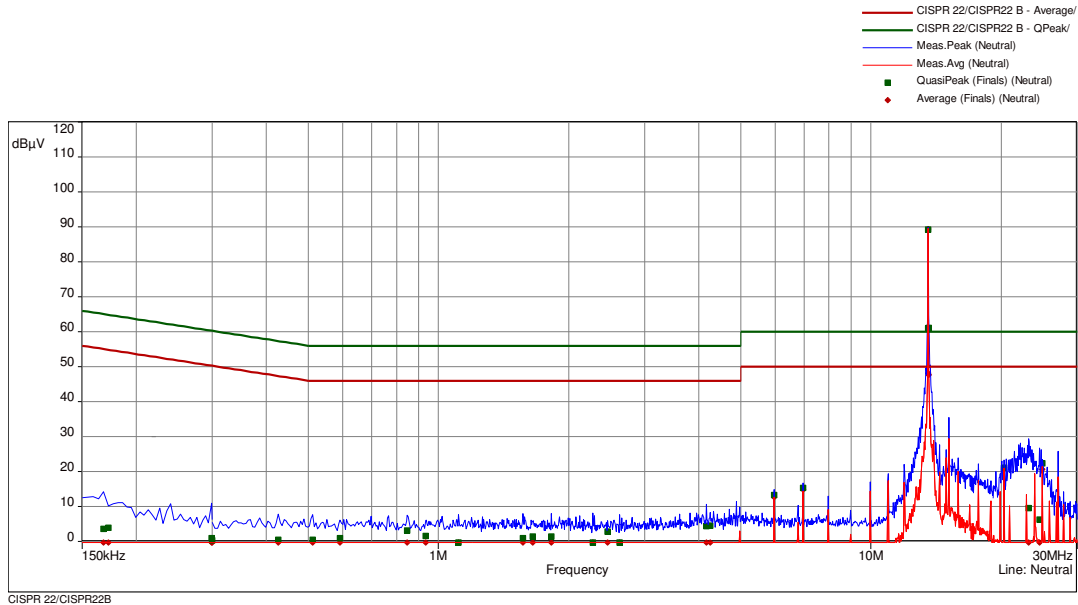


freq MHz	QP dB(µV)	margin dB	limit dB	AV dB(µV)	margin dB	limit dB	line	corr dB
0.168	4.14	60.92	65.06	-2.68	57.74	55.06	Phase 1	9.84
0.1725	4.05	60.79	64.84	-1.25	56.09	54.84	Phase 1	9.84
0.2535	-0.15	61.79	61.64	-3.64	55.29	51.64	Phase 1	9.83
0.2985	3.66	56.62	60.28	-2.46	52.75	50.28	Phase 1	9.82
0.381	0.61	57.64	58.26	-2.76	51.01	48.26	Phase 1	9.81
0.4215	-0.31	57.72	57.42	-3.45	50.87	47.42	Phase 1	9.81
0.507	0.35	55.65	56.00	-2.78	48.78	46.00	Phase 1	9.82
0.597	0.14	55.86	56.00	-2.89	48.89	46.00	Phase 1	9.82
0.762	1.19	54.81	56.00	-1.89	47.89	46.00	Phase 1	9.80
0.8475	1.57	54.43	56.00	-1.49	47.49	46.00	Phase 1	9.81
0.933	1.75	54.25	56.00	-1.41	47.41	46.00	Phase 1	9.82
1.4025	0.79	55.21	56.00	-2.39	48.39	46.00	Phase 1	9.79
1.6545	1.48	54.52	56.00	-1.59	47.59	46.00	Phase 1	9.79
1.74	1.67	54.33	56.00	-1.44	47.44	46.00	Phase 1	9.79
1.992	-0.09	56.09	56.00	-3.25	49.25	46.00	Phase 1	9.81
2.463	2.52	53.48	56.00	-1.83	47.83	46.00	Phase 1	9.79
3.102	0.82	55.18	56.00	-3.57	49.57	46.00	Phase 1	9.80
4.1595	4.66	51.34	56.00	-0.68	46.68	46.00	Phase 1	9.81
4.3305	4.31	51.69	56.00	-1.07	47.07	46.00	Phase 1	9.81
5.9745	13.13	46.87	60.00	12.49	37.51	50.00	Phase 1	9.83
6.969	15.16	44.84	60.00	14.70	35.30	50.00	Phase 1	9.84
13.56*	88.51	-28.51	60.00	88.67	-38.67	50.00	Phase 1	10.04
13.5825*	60.22	-0.22	60.00	47.39	2.61	50.00	Phase 1	10.04
13.587*	60.42	-0.42	60.00	46.96	3.04	50.00	Phase 1	10.04
20.3385	20.63	39.37	60.00	20.43	29.57	50.00	Phase 1	10.34
22.7055	8.03	51.97	60.00	-1.79	51.79	50.00	Phase 1	10.33
27.12	24.71	35.29	60.00	19.34	30.66	50.00	Phase 1	10.34

\* fundamental frequency, retested with 50Ohm termination

Test point: N  
 Operation mode: continuous TAG reading/writing 112 Byte @ 13.56MHz  
 Remarks: RF350R-G2, external antenna ANT1 connected

Result: PASSED



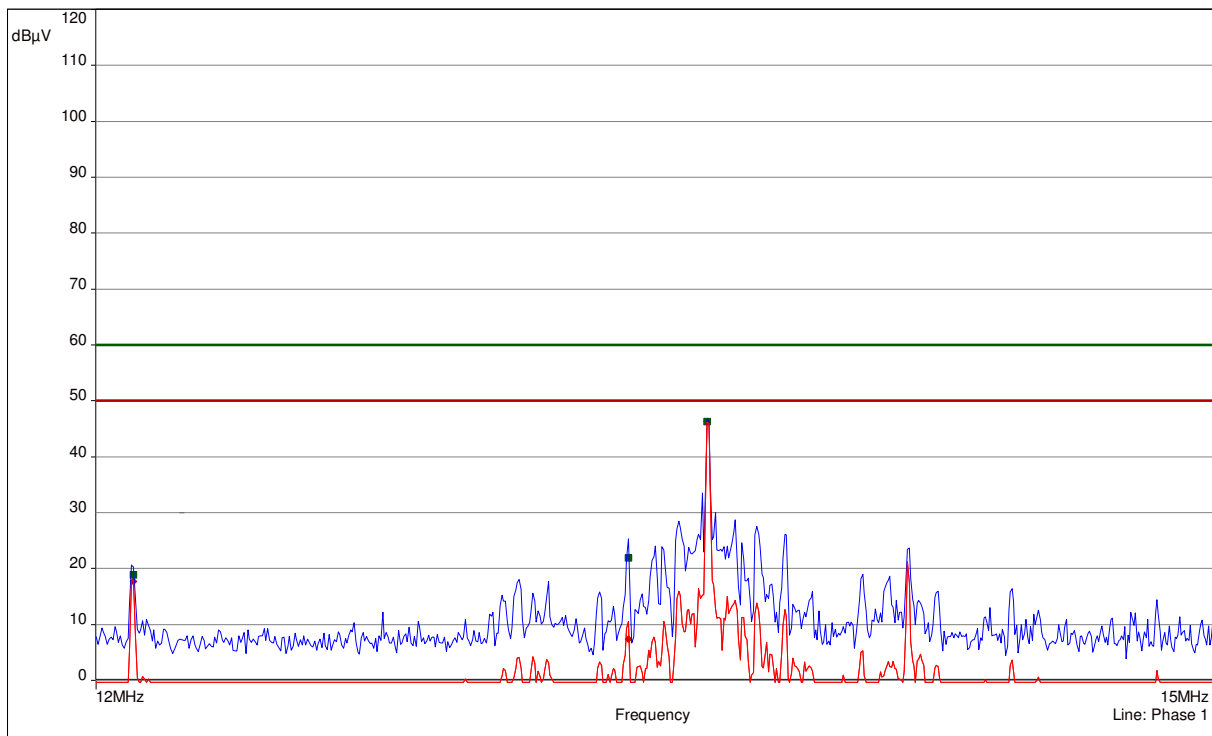
freq MHz	QP dB(µV)	margin dB	limit dB	AV dB(µV)	margin dB	limit dB	line	corr dB
0.168	3.54	61.52	65.06	-2.58	57.64	55.06	Neutral	9.85
0.1725	3.97	60.87	64.84	-1.12	55.96	54.84	Neutral	9.85
0.2985	0.95	59.33	60.28	-2.48	52.77	50.28	Neutral	9.82
0.3	0.28	59.96	60.24	-2.96	53.21	50.24	Neutral	9.82
0.426	0.41	56.92	57.33	-2.89	50.22	47.33	Neutral	9.81
0.5115	0.55	55.45	56.00	-2.70	48.70	46.00	Neutral	9.82
0.5925	1.02	54.98	56.00	-2.22	48.22	46.00	Neutral	9.82
0.8475	3.21	52.79	56.00	-1.57	47.57	46.00	Neutral	9.81
0.933	1.63	54.37	56.00	-1.55	47.55	46.00	Neutral	9.82
1.113	-0.93	56.93	56.00	-4.73	50.73	46.00	Neutral	9.81
1.569	0.92	55.08	56.00	-2.02	48.02	46.00	Neutral	9.79
1.6545	1.42	54.58	56.00	-1.71	47.71	46.00	Neutral	9.79
1.8255	1.43	54.57	56.00	-1.69	47.69	46.00	Neutral	9.80
2.2755	-0.59	56.59	56.00	-5.31	51.31	46.00	Neutral	9.80
2.463	2.82	53.18	56.00	-1.61	47.61	46.00	Neutral	9.79
2.6205	-0.70	56.70	56.00	-5.34	51.34	46.00	Neutral	9.79
4.1595	4.31	51.69	56.00	-1.13	47.13	46.00	Neutral	9.80
4.245	4.61	51.39	56.00	-0.87	46.87	46.00	Neutral	9.80
5.9745	13.33	46.67	60.00	12.72	37.28	50.00	Neutral	9.81
6.969	15.35	44.65	60.00	14.87	35.13	50.00	Neutral	9.81
13.56*	89.22	-29.22	60.00	89.38	-39.38	50.00	Neutral	9.89
13.5825*	60.98	-0.98	60.00	48.17	1.83	50.00	Neutral	9.90
13.587*	61.18	-1.18	60.00	47.70	2.30	50.00	Neutral	9.90
20.3385	21.17	38.83	60.00	21.04	28.96	50.00	Neutral	10.11
23.16	9.49	50.51	60.00	-1.77	51.77	50.00	Neutral	9.99
24.546	6.31	53.69	60.00	-2.11	52.11	50.00	Neutral	9.95
24.897	22.30	37.70	60.00	20.62	29.38	50.00	Neutral	9.94

\* fundamental frequency, retested with 50Ohm termination

Test point: L1  
 Operation mode: Reader in operational mode, transmitter / receiver powered on. RF-signal terminated into 50 ohms load  
 Remarks: RF350R-G2, 50Ohm termination of antenna port

Result: PASSED

- CISPR 22/CISPR22 B - Average/
- CISPR 22/CISPR22 B - QPeak/
- Meas.Peak (Phase 1)
- Meas.Avg (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- ◆ Average (Finals) (Phase 1)



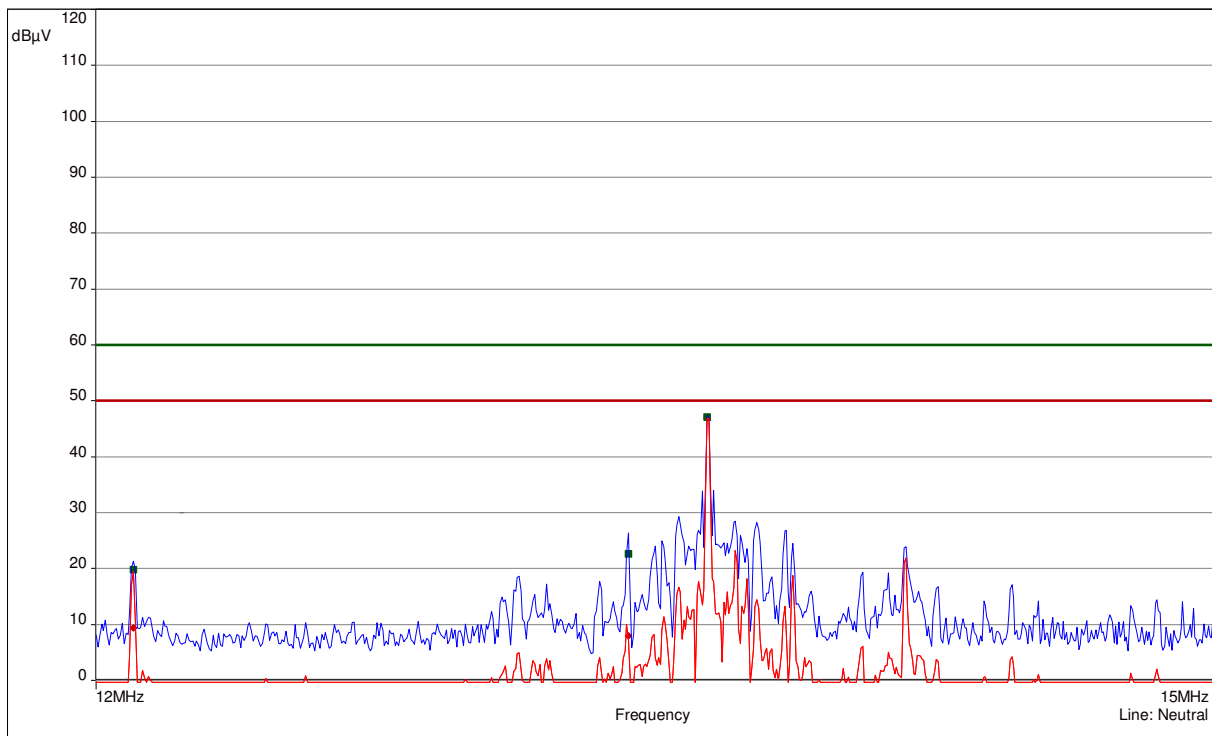
CISPR 22/CISPR22B

freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(µV)	dB	dB	dB(µV)	dB	dB		dB
13.56	46.32	13.68	60.00	46.26	3.74	50.00	Phase 1	10.04

Test point: N  
 Operation mode: Reader in operational mode, transmitter / receiver powered on. RF-signal terminated into 50 ohms load  
 Remarks: RF350R-G2, 50Ohm termination of antenna port

Result: PASSED

- CISPR 22/CISPR22 B - Average/
- CISPR 22/CISPR22 B - QPeak/
- Meas.Peak (Neutral)
- Meas.Avg (Neutral)
- QuasiPeak (Finals) (Neutral)
- ◆ Average (Finals) (Neutral)



CISPR 22/CISPR22B

freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(µV)	dB	dB	dB(µV)	dB	dB		dB
13.56	47.06	12.94	60.00	47.03	2.97	50.00	Neutral	9.89

## 5.2 Field strength of fundamental

For test instruments and accessories used see section 6 Part **CPR 1**.

### 5.2.1 Description of the test location

Test location: OATS 3  
Test distance: 3 m

### 5.2.2 Photo documentation of the test set-up

RF 310R-G2



RF 340R-G2



RF 350R-G2



### 5.2.1 Applicable standard

FCC Part 15, Section 15.225 and RSS-210 A2.6

### 5.2.2 Test result

Measurement result at 3m measurement distance

EuT	Antenna	Frequency (MHz)	Level (dB $\mu$ V)	Corr. factor (dB)	Corr. Level dB( $\mu$ V/m)
RF310-G2	internal	13.56	49.7	20.5	70.2
RF340-G2	internal	13.56	55.0	20.5	75.5
RF350-G2	ANT1	13.56	56.1	20.5	76.6
	ANT3	13.56	43.9	20.5	64.4
	ANT3s	13.56	39.3	20.5	59.8
	ANT8	13.56	34.6	20.5	55.1
	ANT12	13.56	43.7	20.5	64.2
	ANT18	13.56	40.6	20.5	61.1
	ANT30	13.56	37.0	20.5	57.5

Extrapolated values to a distance of 30m

EuT	Antenna	Frequency (MHz)	Level (dB $\mu$ V)	Corr. factor (dB)	Corr. Level dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
RF310-G2	internal	13.56	9.7	20.5	30.2	84	53.8
RF340-G2	internal	13.56	15.0	20.5	35.5	84	48.5
RF350-G2	ANT1	13.56	16.1	20.5	36.6	84	47,4
	ANT3	13.56	3.9	20.5	24.4	84	59.6
	ANT3s	13.56	-0.7	20.5	19.8	84	64.2
	ANT8	13.56	-5.4	20.5	15.1	84	68.9
	ANT12	13.56	3.7	20.5	24.2	84	59.8
	ANT18	13.56	0.6	20.5	21.1	84	62.9
	ANT30	13.56	-3.0	20.5	17.5	84	66.5

Limit according to FCC Part 15, Section 15.225(a) and RSS-210 A2.6(a):

Frequency (MHz)	Field strength of fundamental wave		Measurement distance (metres)
	( $\mu$ V/m)	dB( $\mu$ V/m)	
13.553 - 13.567	15848	84	30

The requirements are **FULFILLED**.

Remarks: none

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### 5.3 Spurious emissions

For test instruments and accessories used see section 6 Part **SER1**, **SER 2**, **SER 3**.

#### 5.3.1 Description of the test location

Test location: OATS3 (RF310R-G2 & RF340R-G2)  
OATS1 (RF350R-G2)

Test location: Anechoic chamber 1

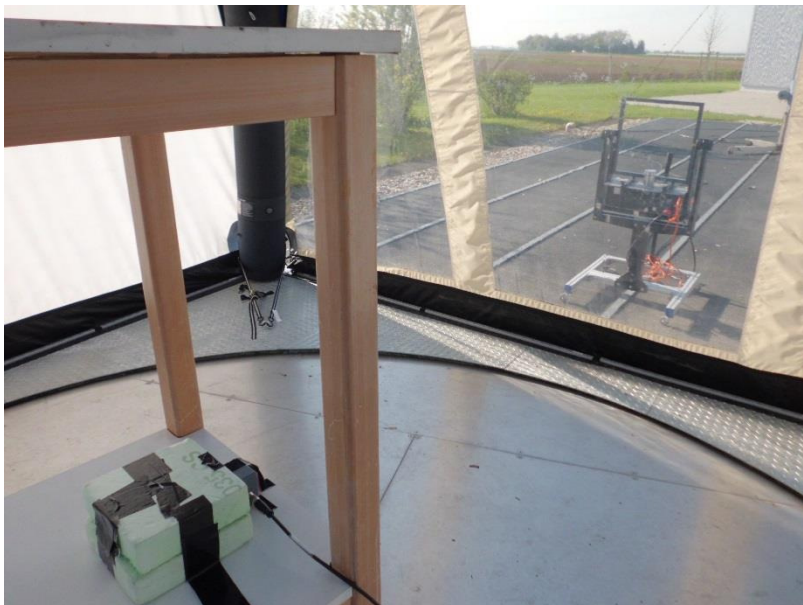
Test distance: 3 m

#### 5.3.2 Photo documentation of the test set-up

Test setup 9 kHz – 30 MHz:  
RF310R-G2



RF340R-G2

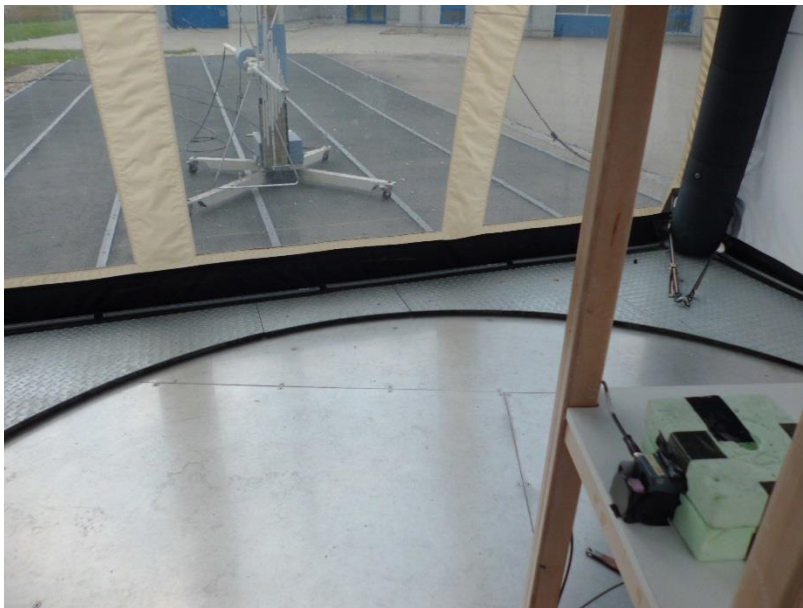




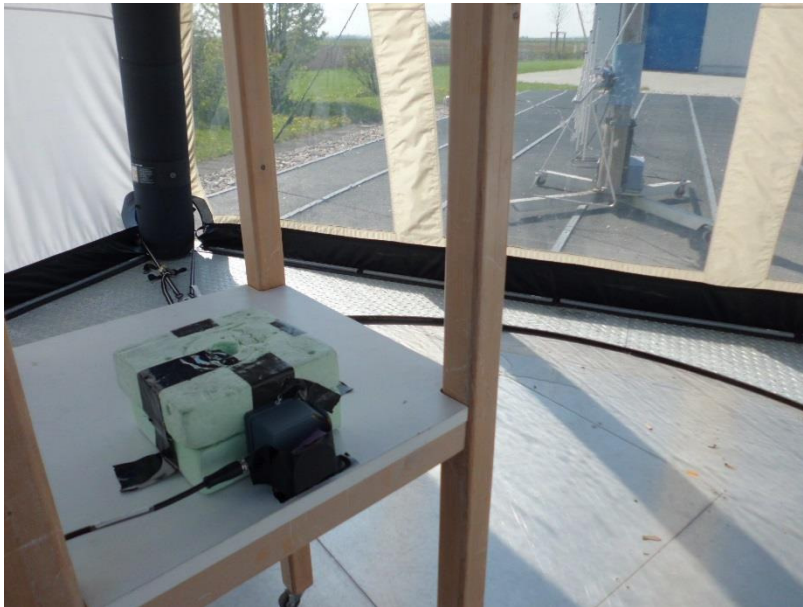
RF350R-G2



Test setup 30 MHz – 1000 MHz:  
RF310R-G2



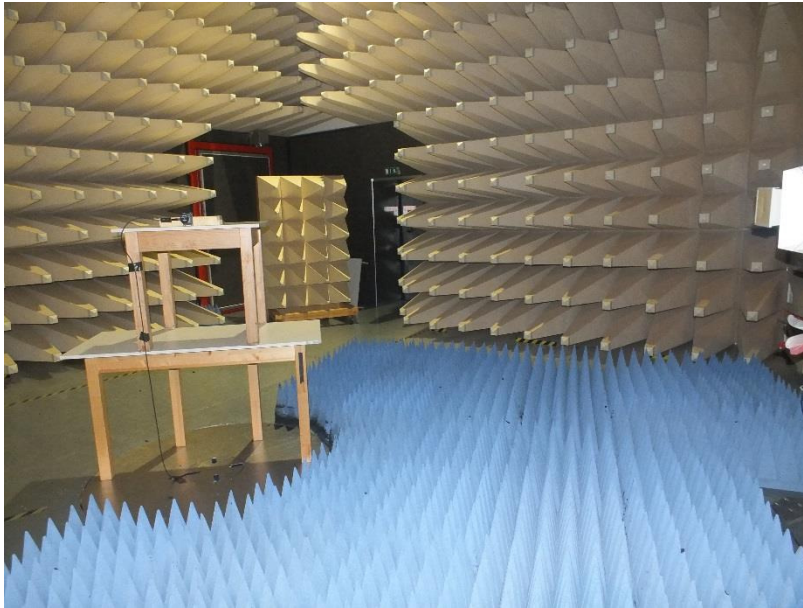
RF340R-G2



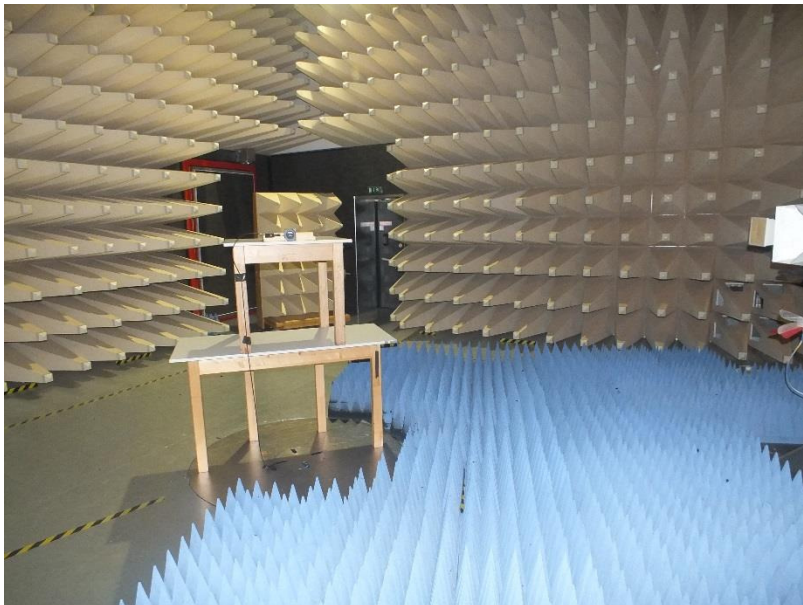
RF350R-G2



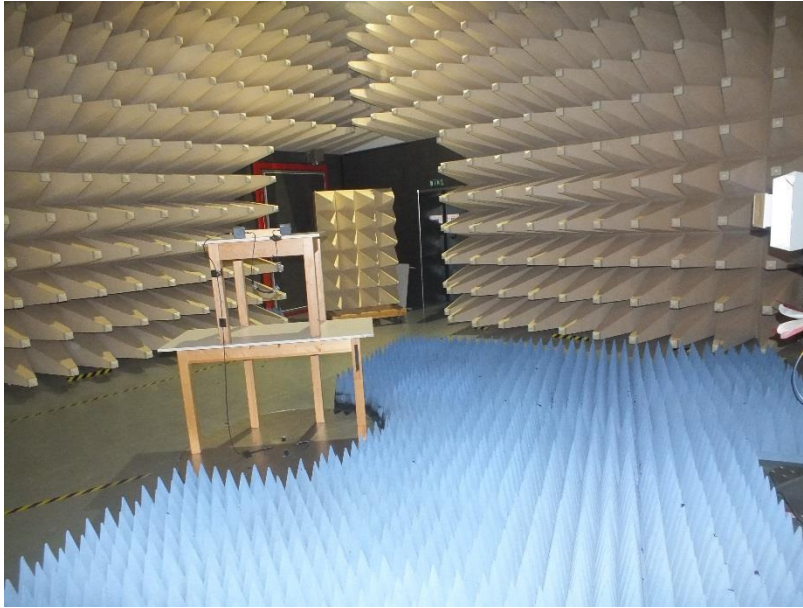
Test setup 1 GHz – 4 GHz:  
RF310R-G2



RF340R-G2



RF350R-G2



### 5.3.3 Applicable standard

FCC Part 15, Section 15.209 and RSS-Gen 8.9

Instrument settings:

9 kHz – 150 kHz	RBW:	200 Hz
150 kHz - 30 MHz	RBW:	9 kHz
30 MHz – 1000 MHz:	RBW:	120 kHz
1000 MHz – 4 GHz	RBW:	1 MHz

### 5.3.1 Test result $f < 30$ MHz

Note: In the frequency range 9 kHz to 30 MHz the measurement results from 3m distance are extrapolated (D factor) to the specified distance.

RF310R-G2

Frequency (MHz)	Reading level QP (dB $\mu$ V) @ 3m	D-factor (dB)	Extrapolated level QP (dB $\mu$ V) @ specified distance	Correction factor (dB/m)	Corrected level QP dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
27.12	1.6	40	-38.4	20.5	-17.9	29.5	47.4

RF340R-G2

Frequency (MHz)	Reading level QP (dB $\mu$ V) @ 3m	D-factor (dB)	Extrapolated level QP (dB $\mu$ V) @ specified distance	Correction factor (dB/m)	Corrected level QP dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
27.12	1.7	40	-38.3	20.5	-17.8	29.5	47.3

RF350R-G2 & ANT1

Frequency (MHz)	Reading level QP (dB $\mu$ V) @ 3m	D-factor (dB)	Extrapolated level QP (dB $\mu$ V) @ specified distance	Correction factor (dB/m)	Corrected level QP dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
27.12	4.2	40	-35.8	20.5	-15.3	29.5	44.8

**RF350R-G2 & ANT3**

Frequency (MHz)	Reading level QP (dB $\mu$ V) @ 3m	D-factor (dB)	Extrapolated level QP (dB $\mu$ V) @ specified distance	Correction factor (dB/m)	Corrected level QP dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
27.12	4.2	40	-35.8	20.5	-15.3	29.5	44.8

**RF350R-G2 & ANT3s**

Frequency (MHz)	Reading level QP (dB $\mu$ V) @ 3m	D-factor (dB)	Extrapolated level QP (dB $\mu$ V) @ specified distance	Correction factor (dB/m)	Corrected level QP dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
27.12	5.6	40	-34.4	20.5	-13.9	29.5	43.4

**RF350R-G2 & ANT8**

Frequency (MHz)	Reading level QP (dB $\mu$ V) @ 3m	D-factor (dB)	Extrapolated level QP (dB $\mu$ V) @ specified distance	Correction factor (dB/m)	Corrected level QP dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
27.12	5.6	40	-34.4	20.5	-13.9	29.5	43.4

**RF350R-G2 & ANT12**

Frequency (MHz)	Reading level QP (dB $\mu$ V) @ 3m	D-factor (dB)	Extrapolated level QP (dB $\mu$ V) @ specified distance	Correction factor (dB/m)	Corrected level QP dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
27.12	6.9	40	-33.1	20.5	-12.6	29.5	42.1

**RF350R-G2 & ANT18**

Frequency (MHz)	Reading level QP (dB $\mu$ V) @ 3m	D-factor (dB)	Extrapolated level QP (dB $\mu$ V) @ specified distance	Correction factor (dB/m)	Corrected level QP dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
27.12	3.8	40	-36.2	20.5	-15.7	29.5	45.2

**RF350R-G2 & ANT30**

Frequency (MHz)	Reading level QP (dB $\mu$ V) @ 3m	D-factor (dB)	Extrapolated level QP (dB $\mu$ V) @ specified distance	Correction factor (dB/m)	Corrected level QP dB( $\mu$ V/m)	Limit dB( $\mu$ V/m)	Margin (dB)
27.12	3.6	40	-36.4	20.5	-15.9	29.5	45.4

### 5.3.2 Test result 30 MHz < f < 1 GHz

#### RF310R-G2

Frequency (MHz)	Reading Vert. (dB $\mu$ V)	Reading Hor. (dB $\mu$ V)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dB $\mu$ V/m)	Level Hor. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
40,68	23,8	12,8	15,2	15,2	39,0	28,0	40,0	1,0
67,80	16,0	10,9	11,9	11,9	27,9	22,8	40,0	12,1
108,48	17,4	7,2	13,4	13,4	30,8	20,6	43,5	12,7
149,16	13,9	11,6	10,7	10,7	24,6	22,3	43,5	18,9
176,28	17,8	11,3	11,9	11,9	29,7	23,2	43,5	13,8
203,40	15,7	8,4	13,6	13,6	29,3	22,0	43,5	14,2
230,52	16,3	11,6	14,5	14,5	30,8	26,1	46,0	15,2
257,64	10,6	9,2	15,4	15,4	26,0	24,6	46,0	20,0
311,88	15,9	13,2	16,9	16,9	32,8	30,1	46,0	13,2
325,44	14,5	15,3	17,2	17,2	31,7	32,5	46,0	13,5

#### RF340R-G2

Frequency (MHz)	Reading Vert. (dB $\mu$ V)	Reading Hor. (dB $\mu$ V)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dB $\mu$ V/m)	Level Hor. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
40,68	23,4	14,6	15,2	15,2	38,6	29,8	40,0	1,4
67,80	17,5	8,5	11,9	11,9	29,4	20,4	40,0	10,6
108,48	17,1	13,3	13,4	13,4	30,5	26,7	43,5	13,0
149,16	15,0	12,2	10,7	10,7	25,7	22,9	43,5	17,8
176,28	17,4	16,8	11,9	11,9	29,3	28,7	43,5	14,2
203,40	19,8	18,0	13,6	13,6	33,4	31,6	43,5	10,1
244,08	17,5	14,5	15,0	15,0	32,5	29,5	46,0	13,5
257,64	15,7	13,5	15,4	15,4	31,1	28,9	46,0	14,9
271,20	11,5	8,4	15,8	15,8	27,3	24,2	46,0	18,7
298,32	11,5	8,6	16,6	16,6	28,1	25,2	46,0	17,9
352,56	14,6	10,8	17,9	17,9	32,5	28,7	46,0	13,5
366,12	13,1	11,0	18,2	18,2	31,3	29,2	46,0	14,7
379,68	21,5	18,3	18,5	18,5	40,0	36,8	46,0	6,0
350,00	10,0	8,3	17,8	17,8	27,8	26,1	46,0	18,2

**RF350R-G2 & ANT1**

Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
40,68	22,8	10,5	15,2	15,2	38,0	25,7	40,0	2,0
54,24	14,5	6,4	14,7	14,7	29,2	21,1	40,0	10,8
67,80	26,8	19,7	11,9	11,9	38,7	31,6	40,0	1,3
149,16	14,0	12,3	10,7	10,7	24,7	23,0	43,5	18,8
162,72	13,2	7,6	11,2	11,2	24,4	18,8	43,5	19,1
176,28	20,2	11,6	11,9	11,9	32,1	23,5	43,5	11,4
203,40	22,2	15,7	13,6	13,6	35,8	29,3	43,5	7,7
216,96	22,2	16,0	14,1	14,1	36,3	30,1	46,0	9,7
230,52	19,5	10,4	14,5	14,5	34,0	24,9	46,0	12,0
244,08	13,2	13,0	15,0	15,0	28,2	28,0	46,0	17,8
257,64	16,8	16,4	15,4	15,4	32,2	31,8	46,0	13,8
271,20	17,7	17,1	15,8	15,8	33,5	32,9	46,0	12,5
284,76	16,2	14,8	16,2	16,2	32,4	31,0	46,0	13,6
298,32	20,8	21,7	16,6	16,6	37,4	38,3	46,0	7,7
311,88	14,2	17,7	16,9	16,9	31,1	34,6	46,0	11,4
325,44	24,8	24,7	17,2	17,2	42,0	41,9	46,0	4,0
339,00	12,4	11,2	17,5	17,5	29,9	28,7	46,0	16,1
352,56	24,9	21,4	17,9	17,9	42,8	39,3	46,0	3,2
366,12	12,9	8,0	18,2	18,2	31,1	26,2	46,0	14,9

**RF350R-G2 & ANT3**

Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
40,68	23,9	9,4	14,7	13,5	38,6	22,9	40,0	1,4
67,80	18,2	12,7	14,2	13,4	32,4	26,1	40,0	7,6
149,16	20,2	10,6	13,9	14,7	34,1	25,3	43,5	9,4
176,28	15,3	12,1	13,6	14,3	28,9	26,4	43,5	14,6
203,40	10,4	18,5	11,4	12,1	21,8	30,6	43,5	12,9
230,52	10,8	19,9	12,8	13,2	23,6	33,1	46,0	12,9
257,64	22,5	19,9	14,3	14,4	36,8	34,3	46,0	9,2
271,20	18,7	14,8	15,1	15,0	33,8	29,8	46,0	12,2
298,32	14,1	14,4	16,8	16,4	30,9	30,8	46,0	15,1
325,44	18,6	19,7	17,6	17,3	36,2	37,0	46,0	9,0
352,56	15,8	17,8	18,4	18,1	34,2	35,9	46,0	10,1

**RF350R-G2 & ANT3s**

Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
40,68	21,3	9,9	14,7	13,5	36,0	23,4	40,0	4,0
67,80	19,7	9,2	14,2	13,4	33,9	22,6	40,0	6,1
149,16	17,6	11,8	13,9	14,7	31,5	26,5	43,5	12,0
176,28	12,9	18,6	13,6	14,3	26,5	32,9	43,5	10,6
203,40	14,5	8,5	11,4	12,1	25,9	20,6	43,5	17,6
230,52	11,6	18,2	12,8	13,2	24,4	31,4	46,0	14,6
257,64	17,0	25,6	14,3	14,4	31,3	40,0	46,0	6,0
271,20	14,6	23,4	15,1	15,0	29,7	38,4	46,0	7,6
298,32	14,5	16,0	16,8	16,4	31,3	32,4	46,0	13,6
325,44	12,7	16,2	17,6	17,3	30,3	33,5	46,0	12,5
352,56	9,9	19,5	18,4	18,1	28,3	37,6	46,0	8,4

**RF350R-G2 & ANT8**

Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
40,68	23,1	10,9	14,7	13,5	37,8	24,4	40,0	2,2
67,80	20,4	8,6	14,2	13,4	34,6	22,0	40,0	5,4
149,16	20,1	14,7	13,9	14,7	34,0	29,4	43,5	9,5
176,28	14,6	17,8	13,6	14,3	28,2	32,1	43,5	11,4
203,40	13,4	11,4	11,4	12,1	24,8	23,5	43,5	18,7
230,52	12,9	18,8	12,8	13,2	25,7	32,0	46,0	14,0
257,64	12,6	21,2	14,3	14,4	26,9	35,6	46,0	10,4
271,20	14,8	26,4	15,1	15,0	29,9	41,4	46,0	4,6
298,32	20,3	21,8	16,8	16,4	37,1	38,2	46,0	7,8
325,44	16,5	13,8	17,6	17,3	34,1	31,1	46,0	11,9
352,56	12,9	20,6	18,4	18,1	31,3	38,7	46,0	7,3



**RF350R-G2 & ANT12**

Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
40,68	23,7	11,6	14,7	13,5	38,4	25,1	40,0	1,6
67,80	18,2	9,9	14,2	13,4	32,4	23,3	40,0	7,6
149,16	18,3	14,5	13,9	14,7	32,2	29,2	43,5	11,3
176,28	11,6	17,3	13,6	14,3	25,2	31,6	43,5	11,9
203,40	11,7	16,7	11,4	12,1	23,1	28,8	43,5	14,7
230,52	15,9	15,3	12,8	13,2	28,7	28,5	46,0	17,3
257,64	14,6	18,2	14,3	14,4	28,9	32,6	46,0	13,4
271,20	13,0	19,9	15,1	15,0	28,1	34,9	46,0	11,1
298,32	17,6	15,8	16,8	16,4	34,4	32,2	46,0	11,6
325,44	17,8	16,6	17,6	17,3	35,4	33,9	46,0	10,6
352,56	7,8	22,8	18,4	18,1	26,2	40,9	46,0	5,1

**RF350R-G2 & ANT18**

Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
40,68	22,9	14,5	14,7	13,5	37,6	28,0	40,0	2,4
54,24	8,6	0,6	15,0	14,0	23,6	14,6	40,0	16,4
67,80	22,6	5,8	14,2	13,4	36,8	19,2	40,0	3,2
81,36	18,8	5,4	10,8	10,6	29,6	16,0	40,0	10,4
108,48	5,3	9,4	10,4	11,3	15,7	20,7	43,5	22,8
122,04	13,5	15,6	12,5	13,0	26,0	28,6	43,5	14,9
135,60	1,1	6,9	13,1	13,9	14,2	20,8	43,5	22,7
149,16	14,7	18,0	13,9	14,7	28,6	32,7	43,5	10,8
162,72	2,5	7,2	14,4	15,2	16,9	22,4	43,5	21,1
176,28	8,5	16,4	13,6	14,3	22,1	30,7	43,5	12,8
203,40	13,2	19,0	11,4	12,1	24,6	31,1	43,5	12,4
216,96	8,2	8,5	12,1	12,6	20,3	21,1	46,0	24,9
230,52	14,6	20,1	12,8	13,2	27,4	33,3	46,0	12,7
244,08	7,6	14,2	13,5	13,7	21,1	27,9	46,0	18,1
257,64	16,1	22,6	14,3	14,4	30,4	37,0	46,0	9,0
271,20	16,9	24,5	15,1	15,0	32,0	39,5	46,0	6,5
284,76	12,8	5,2	15,9	15,7	28,7	20,9	46,0	17,3
298,32	17,8	15,6	16,8	16,4	34,6	32,0	46,0	11,4
311,88	7,3	9,2	17,2	16,8	24,5	26,0	46,0	20,0
325,44	19,8	16,8	17,6	17,3	37,4	34,1	46,0	8,6
339,00	1,8	4,3	18,0	17,7	19,8	22,0	46,0	24,0
352,56	9,8	14,4	18,4	18,1	28,2	32,5	46,0	13,5
366,12	2,1	3,3	18,8	18,5	20,9	21,8	46,0	24,2

**RF350R-G2 & ANT30**

Frequency (MHz)	Reading Vert. (dB $\mu$ V)	Reading Hor. (dB $\mu$ V)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dB $\mu$ V/m)	Level Hor. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
40,68	20,0	8,2	14,7	13,5	34,7	21,7	40,0	5,3
54,24	8,1	0,5	15,0	14,0	23,1	14,5	40,0	16,9
67,80	24,6	13,2	14,2	13,4	38,8	26,6	40,0	1,2
81,36	20,4	4,0	10,8	10,6	31,2	14,6	40,0	8,8
108,48	11,2	3,7	10,4	11,3	21,6	15,0	43,5	21,9
122,04	10,9	19,1	12,5	13,0	23,4	32,1	43,5	11,4
135,60	1,2	1,0	13,1	13,9	14,3	14,9	43,5	28,6
149,16	13,0	13,8	13,9	14,7	26,9	28,5	43,5	15,0
162,72	2,3	4,7	14,4	15,2	16,7	19,9	43,5	23,6
176,28	12,7	15,6	13,6	14,3	26,3	29,9	43,5	13,6
203,40	21,9	13,1	11,4	12,1	33,3	25,2	43,5	10,2
216,96	9,4	9,3	12,1	12,6	21,5	21,9	46,0	24,1
230,52	23,2	20,9	12,8	13,2	36,0	34,1	46,0	10,0
244,08	18,9	17,9	13,5	13,7	32,4	31,6	46,0	13,6
257,64	24,6	6,2	14,3	14,4	38,9	20,6	46,0	7,1
271,20	22,7	20,6	15,1	15,0	37,8	35,6	46,0	8,2
284,76	13,8	9,0	15,9	15,7	29,7	24,7	46,0	16,3
298,32	15,7	19,5	16,8	16,4	32,5	35,9	46,0	10,1
311,88	5,9	5,6	17,2	16,8	23,1	22,4	46,0	22,9
325,44	17,8	18,6	17,6	17,3	35,4	35,9	46,0	10,1
339,00	3,2	9,0	18,0	17,7	21,2	26,7	46,0	19,3
352,56	11,2	23,0	18,4	18,1	29,6	41,1	46,0	4,9
366,12	0,8	7,4	18,8	18,5	19,6	25,9	46,0	20,1

**5.3.3 Test result f > 1 GHz**
**RF310R-G2**

Frequency (MHz)	Reading PK Vert. (dB $\mu$ V)	Reading PK Hor. (dB $\mu$ V)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level PK Vert. (dB $\mu$ V/m)	Level PK Hor. (dB $\mu$ V/m)	Limit AV (dB $\mu$ V/m)	Margin (dB)
1336,00	57,0	--	-19,5	--	37,5	--	54,0	16,5
1324,00	--	54,5	--	-19,5	--	35,0	54,0	19,0
1540,00	--	58,3	--	-20,8	--	37,5	54,0	16,5
2020,00	59,6	--	-15,6	--	44,0	--	54,0	10,0

Note: Peak values are below average limit no duty cycle correction was performed.

**RF340R-G2**

Frequency (MHz)	Reading PK Vert. (dB $\mu$ V)	Reading PK Hor. (dB $\mu$ V)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level PK Vert. (dB $\mu$ V/m)	Level PK Hor. (dB $\mu$ V/m)	Limit AV (dB $\mu$ V/m)	Margin (dB)
1210,00	56,7	--	-19,4	--	37,3	--	54,0	16,7
1324,00	--	57,6	--	-19,5	--	38,1	54,0	15,9
1474,00	57,5	--	-20,7	--	36,8	--	54,0	17,2
1540,00	--	57,9	--	-20,8	--	37,1	54,0	16,9

Note: Peak values are below average limit no duty cycle correction was performed.

**RF350R-G2 & ANT1**

Frequency (MHz)	Reading PK Vert. (dB $\mu$ V)	Reading PK Hor. (dB $\mu$ V)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level PK Vert. (dB $\mu$ V/m)	Level PK Hor. (dB $\mu$ V/m)	Limit AV (dB $\mu$ V/m)	Margin (dB)
1216,00	56,0	56,0	-19,2	-19,2	36,8	36,7	54,0	17,2
1492,00	58,0	--	-20,6	--	37,4	--	54,0	16,6
1540,00	--	58,7	--	-20,8	--	37,9	54,0	16,1
1870,00	58,7	--	-16,4	--	42,3	--	54,0	11,7
1912,00	--	56,4	--	-16,0	--	40,4	54,0	13,6

Note: Peak values are below average limit no duty cycle correction was performed.

**RF350R-G2 & ANT3**

Frequency (MHz)	Reading PK Vert. (dB $\mu$ V)	Reading PK Hor. (dB $\mu$ V)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level PK Vert. (dB $\mu$ V/m)	Level PK Hor. (dB $\mu$ V/m)	Limit AV (dB $\mu$ V/m)	Margin (dB)
1330,00	57,8	59,5	-19,6	-19,6	38,2	39,9	54,0	14,1
1420,00	56,5	--	-20,0	--	36,5	--	54,0	17,5
1534,00	--	59,4	--	-20,8	--	38,5	54,0	15,5
1660,00	56,5	--	-20,2	--	36,3	--	54,0	17,7
1672,00	--	58,1	--	-20,1	--	38,0	54,0	16,0

Note: Peak values are below average limit no duty cycle correction was performed.

**RF350R-G2 & ANT3s**

Frequency (MHz)	Reading PK Vert. (dBµV)	Reading PK Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level PK Vert. (dBµV/m)	Level PK Hor. (dBµV/m)	Limit AV (dBµV/m)	Margin (dB)
1324,00	57,2	--	-19,5	--	37,7	--	54,0	16,3
1330,00	--	61,8	--	-19,6	--	42,1	54,0	11,9
1438,00	--	59,0	--	-20,2	--	38,8	54,0	15,2
1492,00	55,8	--	-20,6	--	35,3	--	54,0	18,7
1990,00	57,1	--	-15,7	--	41,4	--	54,0	12,6
1996,00	--	59,7	--	-15,6	--	44,1	54,0	9,9

Note: Peak values are below average limit no duty cycle correction was performed.

**RF350R-G2 & ANT8**

Frequency (MHz)	Reading PK Vert. (dBµV)	Reading PK Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level PK Vert. (dBµV/m)	Level PK Hor. (dBµV/m)	Limit AV (dBµV/m)	Margin (dB)
1054,00	56,2	56,9	-21,1	-21,1	35,2	35,9	54,0	18,1
1324,00	59,0	--	-19,5	--	39,5	--	54,0	14,5
1438,00	--	58,8	--	-20,2	--	38,6	54,0	15,4
1996,00	--	58,0	--	-15,6	--	42,3	54,0	11,7
2062,00	56,4	--	-15,8	--	40,7	--	54,0	13,3

Note: Peak values are below average limit no duty cycle correction was performed.

**RF350R-G2 & ANT12**

Frequency (MHz)	Reading PK Vert. (dBµV)	Reading PK Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level PK Vert. (dBµV/m)	Level PK Hor. (dBµV/m)	Limit AV (dBµV/m)	Margin (dB)
1054,00	56,2	--	-21,1	--	35,1	--	54,0	18,9
1150,00	--	56,8	--	-20,1	--	36,7	54,0	17,3
1324,00	56,5	--	-19,5	--	37,0	--	54,0	17,0
1534,00	--	59,3	--	-20,8	--	38,5	54,0	15,5
1990,00	56,6	--	-15,7	--	40,9	--	54,0	13,1
2050,00	--	59,4	--	-15,6	--	43,9	54,0	10,1

Note: Peak values are below average limit no duty cycle correction was performed.

RF350R-G2 & ANT18

Frequency (MHz)	Reading PK Vert. (dBµV)	Reading PK Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level PK Vert. (dBµV/m)	Level PK Hor. (dBµV/m)	Limit AV (dBµV/m)	Margin (dB)
1054,00	56,5	--	-21,1	--	35,4	--	54,0	18,6
1078,00	--	56,4	--	-21,1	--	35,4	54,0	18,6
1534,00	--	58,3	--	-20,8	--	37,4	54,0	16,6
1666,00	56,8	--	-20,1	--	36,6	--	54,0	17,4
2032,00	--	55,3	--	-15,7	--	39,6	54,0	14,4
2062,00	55,1	--	-15,8	--	39,4	--	54,0	14,6

Note: Peak values are below average limit no duty cycle correction was performed.

RF350R-G2 & ANT30

Frequency (MHz)	Reading PK Vert. (dBµV)	Reading PK Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level PK Vert. (dBµV/m)	Level PK Hor. (dBµV/m)	Limit AV (dBµV/m)	Margin (dB)
1054,00	55,7	56,6	-21,1	-21,1	34,6	35,6	54,0	18,4
1216,00	57,3	--	-19,2	--	38,0	--	54,0	16,0
1438,00	--	57,6	--	-20,2	--	37,4	54,0	16,6
2020,00	--	56,5	--	-15,6	--	40,9	54,0	13,1
2062,00	57,5	--	-15,8	--	41,7	--	54,0	12,3

Note: Peak values are below average limit no duty cycle correction was performed.

Note: The correction factor includes cable loss and antenna factor.

Limit according to FCC Part 15, Section 15.209(a) and RSS-Gen 8.9 Tables 4 and 5:

Frequency (MHz)	Field strength of spurious emissions		Measurement distance
	(µV/m)	dB(µV/m)	(metres)
0.009 - 0.490	2400/F(kHz)	--	300
0.490 - 1.705	24000/F (kHz)	--	30
1.705 - 30.0	30	29.5	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

The requirements are **FULFILLED**.

**Remarks:** The measurement was performed up to 4000 MHz.

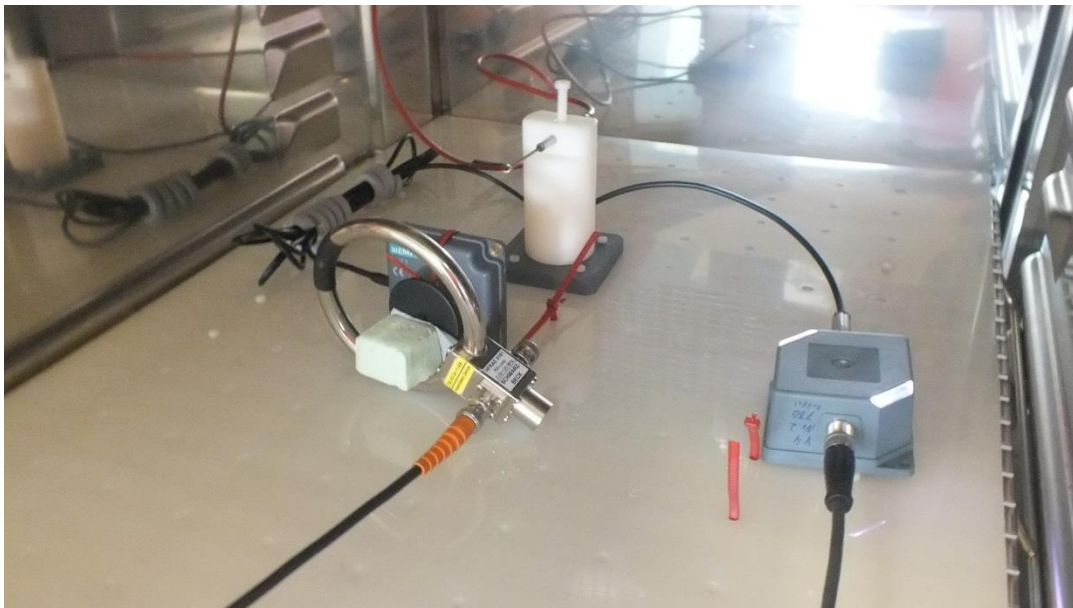
## 5.4 Frequency tolerance

For test instruments and accessories used see section 6 Part FE.

### 5.4.1 Description of the test location

Test location: AREA4

### 5.4.2 Photo documentation of the test set-up



### 5.4.3 Applicable standard

FCC Part 15, Section 15.225 and RSS-210 A2.6

#### 5.4.4 Test result

Test conditions		Test result
		Frequency (MHz)
$T_{min} (-20)^{\circ}C$	$V_{nom} (24,0 V)$	13,55924
$T (-10)^{\circ}C$	$V_{nom} (24,0 V)$	13,55918
$T (0)^{\circ}C$	$V_{nom} (24,0 V)$	13,55914
$T (10)^{\circ}C$	$V_{nom} (24,0 V)$	13,55906
$T_{nom} (20)^{\circ}C$	$V_{min} (20,4 V)$	13,55894
	$V_{nom} (24,0 V)$	13,55894
	$V_{max} (27,6 V)$	13,55894
$T (30)^{\circ}C$	$V_{nom} (24,0 V)$	13,55890
$T (40)^{\circ}C$	$V_{nom} (24,0 V)$	13,55880
$T_{max} (50)^{\circ}C$	$V_{nom} (24,0 V)$	13,55876

Carrier frequency:  $f_c = 13.56 \text{ MHz}$   
 Max. tolerance:  $\pm 0.01 \% \text{ of } 13.56 \text{ MHz} = \pm 1.356 \text{ kHz}$

Highest frequency:  $f_h = 13,55924 \text{ MHz}$   
 Lowest frequency:  $f_l = 13,55876 \text{ MHz}$

Negative tolerance:  $f_l - f_c = -1.24 \text{ kHz} < - 1.356 \text{ kHz}$   
 Positive tolerance:  $f_h - f_c = 0,76 \text{ kHz} < + 1.356 \text{ kHz}$

Limit according to FCC Part 15, Section 15.225(e) and RSS-210 A2.6  
 Carrier frequency stability shall be maintained to  $\pm 0.01\%$  ( $\pm 100 \text{ ppm}$ ).

**Remarks:** Test was performed on RF350R-G2 & ANT1

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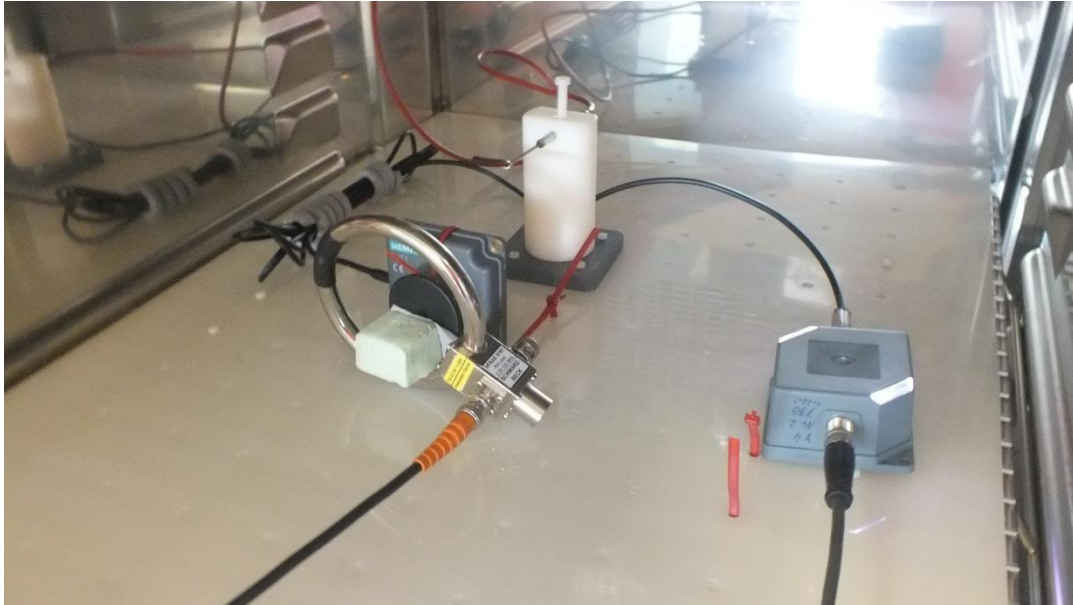
## 5.5 Occupied Bandwidth

For test instruments and accessories used see section 6 Part MB.

### 5.5.1 Description of the test location

Test location: AREA4

### 5.5.2 Photo documentation of the test set-up



### 5.5.3 Applicable standard

FCC Part 15, Section 15.215 and RSS-Gen, 6.6

### 5.5.4 Test result

Measured Bandwidth	result (kHz)	Limit (kHz)
20dB	2,70	--
99%	2,28	--

The requirements are **FULFILLED**.

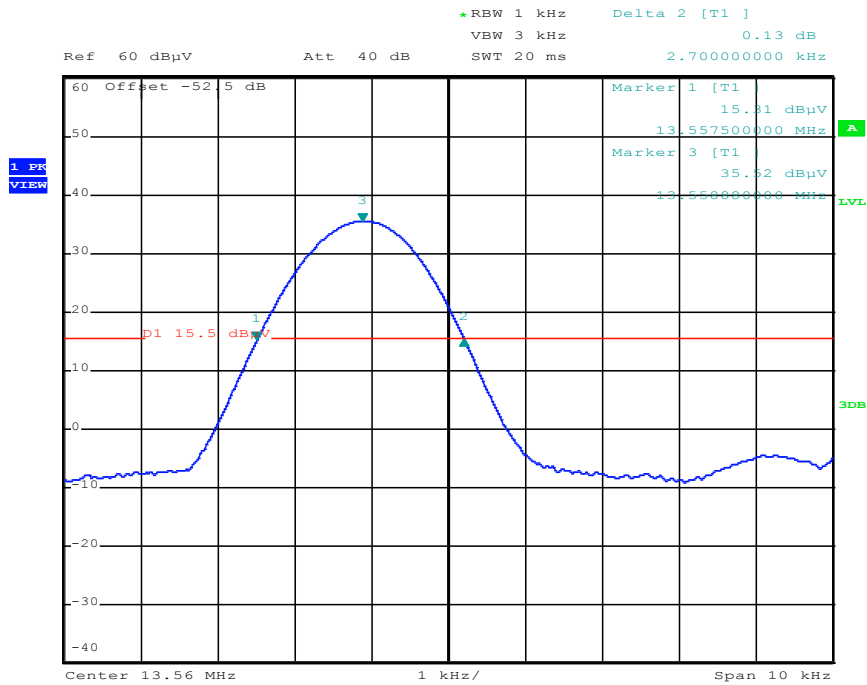
**Remarks:** Test was performed on RF350R-G2 & ANT1

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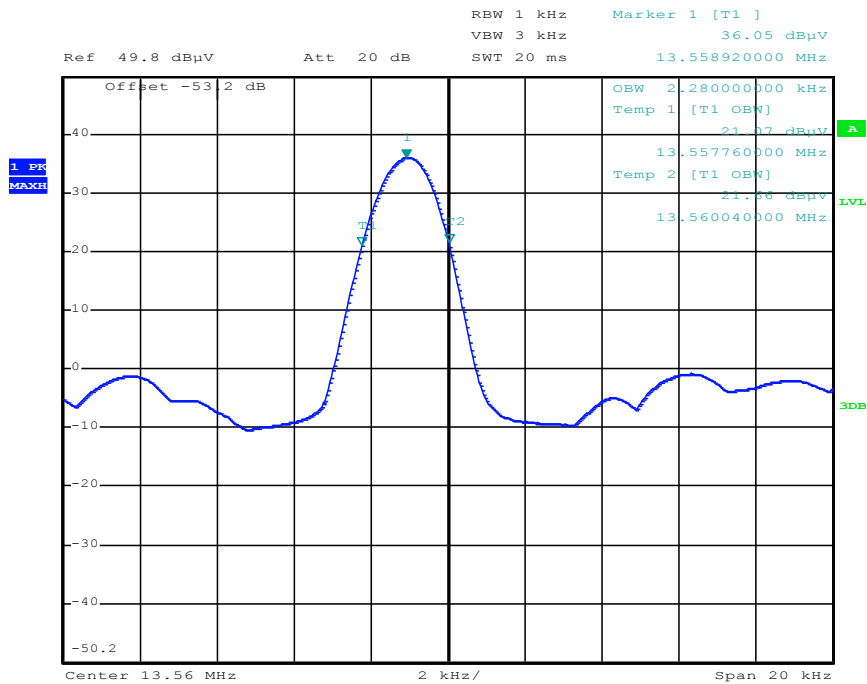


## 5.5.5 Test protocols

### 20 dB bandwidth



### OBW 99%



## 5.6 Transmitter spectrum mask

For test instruments and accessories used see section 6 Part MB.

### 5.6.1 Description of the test location

Test location: AREA4

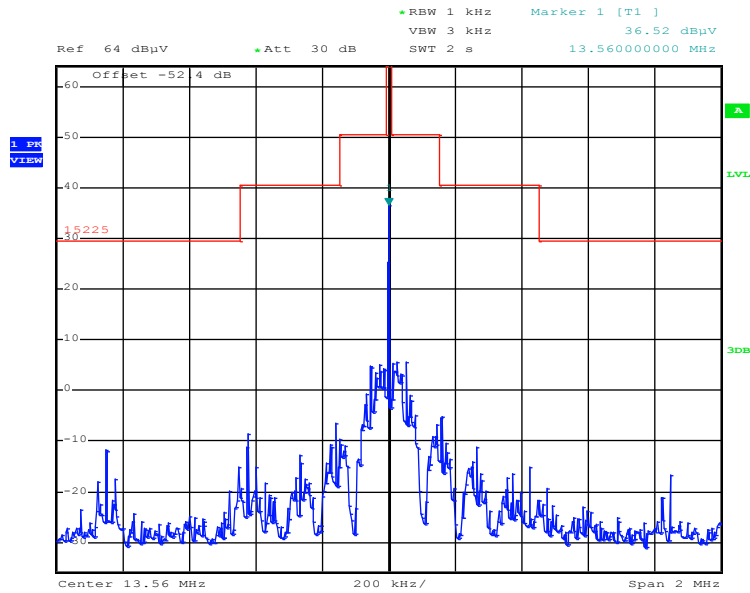
### 5.6.2 Photo documentation of the test set-up



### 5.6.3 Applicable standard

FCC Part 15, Section 15.225 and RSS-210 A2.6

### 5.6.4 Test result



Limit according to FCC Part 15, Section 15.225(a) and RSS-210 A2.6:

Frequency band (MHz)	Emission level limit at 30 m (μV/m)	Emission level limit at 30 m (dBμV/m)
13.110 – 13.410	106	40.5
13.410 - 13.553	334	50.5
13.553 - 13.567	15,848	84.0
13.567 – 13.710	334	50.5
13.710 – 14.010	106	40.5
outside of 13.110 – 14.010	30	29.5

The requirements are **FULFILLED**.

**Remarks:** Test was performed on RF350R-G2 & ANT1

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## **6 USED TEST EQUIPMENT AND ACCESSORIES**

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

<b>Test ID</b>	<b>Model Type</b>	<b>Equipment No.</b>	<b>Next Calib.</b>	<b>Last Calib.</b>	<b>Next Verif.</b>	<b>Last Verif.</b>
A 4	ESCI	02-02/03-05-004	17/09/2016	17/09/2015		
	ESH 2 - Z 5	02-02/20-05-004	26/10/2017	26/10/2015	09/12/2016	09/06/2016
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2	02-02/50-05-155	06/11/2016	06/11/2015	21/09/2016	21/03/2016
CPR 1	ESPI 3	01-02/03-03-004	01/10/2016	01/10/2015		
	FMZB 1516	01-02/24-01-018			21/01/2017	21/01/2016
	N-40000-N	01-02/50-05-043				
	N-30000-N	01-02/50-05-044				
FE	FSP 30	02-02/11-05-001	01/10/2016	01/10/2015		
	HFRAE 5161 _ 50 kHz-120	02-02/24-11-004				
	METRAHIT WORLD	02-02/32-15-001	24/11/2016	24/11/2015		
	WK-340/40	02-02/45-05-001	07/07/2016	07/07/2015		
	6543A	02-02/50-05-157				
MB	FSP 30	02-02/11-05-001	01/10/2016	01/10/2015		
	HFRAE 5161 _ 50 kHz-120	02-02/24-11-004				
SER 1	ESPI 3	01-02/03-03-004	01/10/2016	01/10/2015		
	FMZB 1516	01-02/24-01-018			21/01/2017	21/01/2016
	N-40000-N	01-02/50-05-043				
	N-30000-N	01-02/50-05-044				
	ESR 7	02-02/03-13-001	15/06/2017	15/06/2016		
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
SER 2	ESPI 3	01-02/03-03-004	01/10/2016	01/10/2015		
	VULB 9163	01-02/24-01-006	17/11/2017	17/11/2014	13/07/2016	13/01/2016
	N-40000-N	01-02/50-05-043				
	N-30000-N	01-02/50-05-044				
	ESVS 30	02-02/03-05-003	09/07/2016	09/07/2015		
	VULB 9168	02-02/24-05-005	20/04/2017	20/04/2016	20/10/2016	20/04/2016
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
SER 3	FSP 30	02-02/11-05-001	01/10/2016	01/10/2015		
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	AFS4-01000400-10-10P-4	02-02/17-13-002				
	AMF-4F-04001200-15-10P 3117	02-02/17-13-003				
	Sucoflex N-2000-SMA	02-02/24-05-009	24/05/2017	24/05/2016		
	SF104/11N/11N/1500MM	02-02/50-05-075				
		02-02/50-13-015				