**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

**DAT-P-225/96**

# Test Report
# acc. to the relevant standard
# 47 CFR Part 15 C – Intentional Radiators
# Measurement Procedure:
# ANSI C63.4-2003
# relating to
# SICK AG
# RFI341-1503S04

**Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range 9 kHz to 40 GHz**

**DAT-P-225/96**



**m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920**

**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

| **Manufacturer's details** | |
|---|---|
| Manufacturer | SICK AG |
| Manufacturer's grantee code | **WRM** |
| Manufacturer's address | Poppenbütteler Bogen 44 |
| | D-22399 Hamburg |
| | Germany |
| | Mr. Andreas Günther |
| | Phone: +49 (0)40 611 3603-19 |
| | Fax: +49 (0)40 611 3603-31 |
| | Email: andreas.guenther@sick.de |
| Relevant standard used | 47 CFR Part 15C - Intentional Radiators |
| | ANSI C63.4-2003 |

| **Test report prepared by** | |
|---|---|
| Technical engineer | Ralf Trepper |
| | m.dudde hochfrequenz-technik (laboratory) |
| | Rottland 5a |
| | 51429 Bergisch Gladbach |
| | Germany |
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| | E-mail: m.duddelabor@dudde.com |

| **E**quipment **U**nder **T**est **(EUT)** | |
|---|---|
| Equipment category | RFID (Radio frequency interrogator) |
| Trade name | SICK |
| Type designation | RFI341-1503S04 |
| Serial no. | |
| Variants | The FCC device is only addressing the FCC rules with the antenna RFA331-1020 and RFA341-3520.<br>Usage of additional Filters required to address FCC rules |



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## 1. Test result summary

| CFR Section | Report Chapter | Requirements Headline | Test result | | |
|---|---|---|---|---|---|
| 15.203 | 11.1 | Antenna Requirement | Pass | ~~Fail~~ | ~~N.t.~~ |
| 15.205 | 11.2 | Restricted bands of operation | Pass | ~~Fail~~ | ~~N.t.~~ |
| 15.225(a)(b)(c)(d) 15.209 | 11.3 | Radiated spurious emissions | Pass | ~~Fail~~ | ~~N.t.~~ |
| 15.225(e) | 11.4 | Frequency tolerance | Pass | ~~Fail~~ | ~~N.t.~~ |

| The equipment meets the requirements | Yes | ~~No~~ |
|---|---|---|

Signature Technician ..... Ralf Trepper

Signature Manager ..... Manfried Dudde

Digital unterschrieben von Andreas Morsbach
DN: cn=Andreas Morsbach, o=m.dudde hf-technik, ou=Management, email=m.duddeconsult@dudde.com, c=DE
Datum: 2009.02.13 15:20:43 +01'00'



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## 2. Test laboratory

| | |
|---|---|
| Company name | : m.dudde hochfrequenz-technik |
| Street | : Rottland 5a |
| City | : 51429 Bergisch Gladbach |
| Country | : Germany |
| Laboratory | : FCC Registration Number: 699717<br>This site has been fully described in a report submitted to the FCC, and renewed with letter dated July 12, 2008, Registration Number 699717. |
| Phone | : +49-2207-9689-0 |
| Fax | : +49-2207-9689-20 |
| E-Mail | : manfred.dudde@t-online.de |
| Web | : http://www.dudde.com |

## 3. Introduction

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 m. dudde hochfrequenz - technik.

This report contains the result of tests performed by m. dudde hochfrequenz - technik for the purpose of a type approval. The order for carrying out these tests has been placed by:

**Manufacturer**

| | |
|---|---|
| Company name | : SICK AG |
| Address | : Poppenbütteler Bogen 44 |
| Postcode | : D-22399 |
| City/town | : Hamburg |
| Country | : Germany |
| Telephone | : +49 (0)40 611 3603-19 |
| Telefax | : +49 (0)40 611 3603-31 |
| E-mail | : andreas.guenther@sick.de |
| Date of order | : 2008-12-02 |
| References | : Mr. Andreas Günther |

## 4. Product

Samples of the following apparatus were submitted for testing:

| | | |
|---|---|---|
| Type of equipment | : | RFID (Radio frequency interrogator) |
| Trademark | : | SICK |
| Type designation | : | RFI341-1503S04 |
| Hardware version(s) | : | RFI341-1503S04, Splitter - FCC, Multiplexer - FCC, Filter - FCC |
| | | Antennas: RFA341-3520, RFA331-1020 |
| Serial number(s) | : | RFI341-1503S04 : S/N 08 048 0001 |
| | | Splitter – FCC : S/N 07 051 0001 |
| | | Multiplexer – FCC : S/N 07 051 0001 |
| | | Filter – FCC : S/N 08 34 0001 - S/N 08 34 0005 |
| | | RFA341-3520 : S/N 06 27 0014; S/N 06 27 0016 |
| | | RFA331-1020 : S/N 06 27 0035; S/N 07 45 0001 |
| Software release | : | DSP Firmware: V1.2.10, ARM7 Firmware: V0.24 |
| Power used | : | 20V…29V DC |
| Frequency used | : | 13.560MHz |
| Generated or used frequencies | : | 13.560MHz (crystal), 18.432MHz (crystal), 25.000MHz (crystal) |
| ITU emission class | : | 3K00A1D |
| **FCC ID** | **:** | **WRMRFI3411503S04** |

## 5. Test schedule

The tests were carried out in accordance with the specifications detailed in chapter 7 “Summary“ of this report at:

**- m. dudde hochfrequenz - technik, D-51429 Bergisch Gladbach**

The test sample was received on:

**- 2008-12-02**

The tests were carried out in the following period of time:

**- 2008-12-02 - 2009-01-12**

## 6. Product and measurement documentation

For issuing this report the following product documentation was used and the following annexes were created:

| Description | Date | Identifications |
|---|---|---|
| External photographs of the **E**quipment **U**nder **T**est | 2009-01-24 | Annex no. 1 |
| Internal photographs of the **E**quipment **U**nder **T**est | 2009-01-24 | Annex no. 2 |
| Occupied bandwidth plot | 2009-01-24 | Annex no. 3 |
| FCC ID label sample | 2009-01-24 | Annex no. 4 |
| Functional description / User Manual | 2009-01-24 | Annex no. 5 |
| Test setup photos | 2009-01-24 | Annex no. 6 |
| Block diagram | 2009-01-24 | Annex no. 7 |
| Schematics | 2009-01-24 | Annex no. 8a |
| Parts list | 2009-01-24 | Annex no. 8b |
| Operational description | 2009-01-24 | Annex no. 9 |

The above mentioned documentation will be filed at m. dudde hochfrequenz - technik for a period of 10 years following the issue of this test report.

## 7. Observations and comments

***To address the FCC requirements the power supply cable as well as the interface cable must be a shielded version. It needs to be ensured, that the shield is direct connected to the PG gland. The FCC device is only addressing the FCC rules with the antenna RFA331-1020 and RFA341-3520. Usage of additional Filters required addressing FCC rules. The number of Filters required depends on the usage of external components/antennas:***

***1.) One antenna used direct at the antenna output of the RFI341 requires the usage of an FCC Filter at the RFI341 antenna output.***

***2.) If the splitter is used a Filter is required at the RFI341 antenna output***

***3.) If a Multiplexer is used a Filter need to be used at the RFI341 Antenna output and at each RF outputs of the Multiplexer.***

## 8. Summary

The product is intended for the use in the following areas of application:

**Radio-Noise Emissions from Low- Voltage Electrical and Electronic Equipment in the frequency range of 9 kHz to 40 GHz**

The samples were tested according to the following specification:

**47 CFR Part 15 – Intentional Radiators, ANSI C63.4-2003**



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## 9. Conclusions

Samples of the apparatus were found to **CONFORM WITH** the specifications stated in chapter 8 "Summary" of this report.

In the opinion of m. dudde hochfrequenz - technik, the samples satisfied all applicable requirements relating to the network interface types specified in chapter 8.

The results of the type tests as stated in this report are exclusively applicable to the product item as identified in this report. m. dudde hochfrequenz - technik does not accept any responsibility for the results stated in this report, with respect to the properties of product items not involved in these tests.

This report consists of a main module, modules with test results and annexes listed in chapter 6. All pages have been numbered consecutively and bear the m. dudde hochfrequenz - technik logo, the report number and sub-numbers.

The total number of pages in this report is **44.**

### Technical inspector:

Date : 2009-01-24

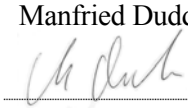
Name : Ralf Trepper

Signature : 

### Technical responsibility for area of testing:

Date : 2009-01-24

Name : Manfried Dudde

Signature : 



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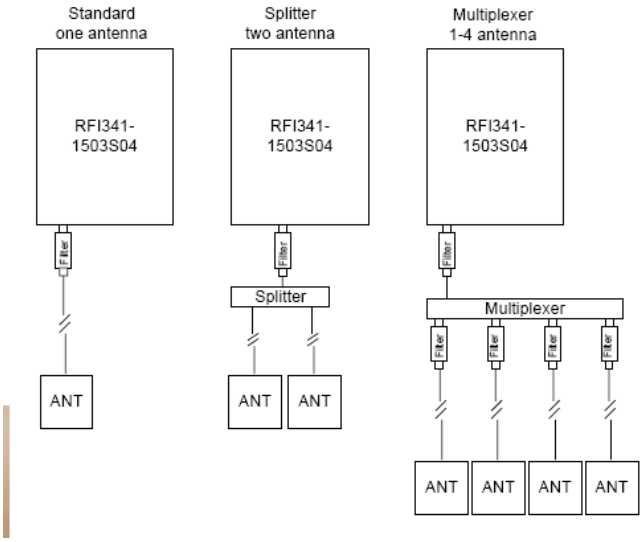
# 10. Operational description

10.1 EUT details

The RFI341 is designed to detect and decode 13.56 MHz, ISO 15693 compliant RFID transponder signals. It is used together with antennas installed in a reading station and reads from and writes to RFID transponders on objects positioned, e.g., on a conveyor belt. The RFI341 enables the bi-directional communication with a host for, e.g., further processing.

10.2 EUT configuration

To address the FCC requirements the power supply cable as well as the interface cable must be a shielded version. It needs to be ensured, that the shield is direct connected to the PG gland. The FCC device is only addressing the FCC rules with the antenna RFA331-1020 and RFA341-3520. Usage of additional Filters required addressing FCC rules. The number of Filters required depends on the usage of external components/antennas:
1.) One antenna used direct at the antenna output of the RFI341 requires the usage of an FCC Filter at the RFI341 antenna output.
2.) If the splitter is used a Filter is required at the RFI341 antenna output
3.) If a Multiplexer is used a Filter need to be used at the RFI341
Antenna output and at each RF outputs of the Multiplexer.




10.3 EUT measurement description

The **EUT** will be tested in all combinations of hardware and software configuration (e.g. modulation grade, antenna type (see picture above and user manual). The output power will be set to maximum. Measurements with the Multiplexer have been conducted with a 2-antenna-configuration, since the outputs of the Multiplexer are switched consecutively and thus the output level is always generated on one antenna only. That means that in every case only one antenna is active which means that measuring with 4 connected antennas is not necessary. During primary emission tests there had been examined all adjustments of the EUT. In the final measurement there was chosen the adjustment in which there had been established before the highest level. One configuration will be tested with Splitter and the two antenna variants. One configuration will be tested with Multiplexer and the two antenna variants. In order to establish the maximum radiation, firstly, there have been viewed all orthogonal adjustments of the test sample. Secondly the test sample have been rotated at all adjustments around the own axis between 0° and 360°, and thirdly, the antenna polarization between horizontal and vertical has been varied. All generated frequencies, e.g. harmonics and oscillator frequencies of the **EUT,** have been viewed.



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# 11.1 Antenna requirement

## 11.1.1 Regulation

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

## 11.1.2 Result

| | | | |
|---|---|---|---|
| The equipment meets the requirements | **Yes** | ~~**No**~~ | ~~**N.t.**~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~Yes~~ | **No** | Page no. |

**See user manual section 2: Safety information**

n.a.* See page no. 38



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## 11.2 Restricted bands of operation

### 11.2.1 Regulation

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | ([2]) |
| 13.36 - 13.41 | | | |

**[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.**
**[2] Above 38.6**

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e), regardless of the field strength limits specified elsewhere in this Subpart, the provisions of this Section apply to emissions from any intentional radiator.



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(d) The following devices are exempt from the requirements of this Section:

(1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a), the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a), and the fundamental emission is outside of the bands listed in paragraph (a) more than 99% of the time the device is actively transmitting, without compensation for duty cycle.

(2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.

(3) Cable locating equipment operated pursuant to Section 15.213.

(4) Any equipment operated under the provisions of § 15.253, § 15.255 or § 15.257 of this part.

(5) Biomedical telemetry devices operating under the provisions of Section 15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.

(6) Transmitters operating under the provisions of Subpart D or F of this part.

(7) Devices operated pursuant to § 15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.

(8) Devices operated in the 24.075-24.175 GHz band under § 15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in § 15.245(b).

(9) Devices operated in the 24.0-24.25 GHz band under § 15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in § 15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of Section 15.245 shall not exceed the limits specified in Section 15.245(b).

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e), regardless of the field strength limits specified elsewhere in this Subpart, the provisions of this Section apply to emissions from any intentional radiator. (d) The following devices are exempt from the requirements of this Section:

(1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a), the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a), and the fundamental emission is outside of the bands listed in paragraph (a) more than 99% of the time the device is actively transmitting, without compensation for duty cycle.

(2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.

(3) Cable locating equipment operated pursuant to Section 15.213.

(4) Any equipment operated under the provisions of § 15.253, § 15.255 or § 15.257 of this part.

(5) Biomedical telemetry devices operating under the provisions of Section 15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.

(6) Transmitters operating under the provisions of Subpart D or F of this part.

(7) Devices operated pursuant to § 15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.

(8) Devices operated in the 24.075-24.175 GHz band under § 15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in § 15.245(b).

(9) Devices operated in the 24.0-24.25 GHz band under § 15.249 are exempt from 83 complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in § 15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of Section 15.245 shall not exceed the limits specified in Section 15.245(b).

### 11.2.2 Result

| | | | |
|---|---|---|---|
| The equipment meets the requirements | **Yes** | ~~**No**~~ | ~~**N.t.**~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~Yes~~ | **No** | Page no. |



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## 11.3 Radiated emission limits, general requirements

### 11.3.1 Regulation

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement distance (meters) |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

(e) The provisions in §§ 15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

(f) In accordance with Section 15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. lf measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in Section 15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in Section 15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in Section 15.109 that are applicable to the incorporated digital device.



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**Date of issue: 2009-01-24**

### 11.3.2 Test equipment

| Type | Manufacturer/ Model no. | Serial no. | Last calibration | Next calibration |
|---|---|---|---|---|
| Receiver (9 kHz –18.0 GHz) | Rohde & Schwarz Spectrum Analyzer FSL 18 (171a) | 100.117 | 2008/10 | 2010/10 |
| Pre-amplifier (100kHz - 1.3GHz) | Hewlett Packard 8447 E (166a) | 1726A00705 | 2008/02 | 2010/02 |
| Pre-amplifier (1GHz - 18GHz) | Narda --- (345) | --- | 2008/02 | 2010/02 |
| Magnetic loop antenna (9 kHz - 30 MHz) | Schwarzbeck FMZB 1516 (23) | --- | 2008/09 | 2010/09 |
| Bilog antenna (30- 1000 MHz) | Schwarzbeck VULP 9168 (406) | --- | 2007/02 | 2013/02 |
| Horn antenna (0.86-8.5 GHz) | Schwarzbeck BBHA 9120 A (284) | 236 | 2008/01 | 2013/01 |
| Horn antenna (2.0-14.0 GHz) | Schwarzbeck BBHA 9120 C (169) | 305 | 2008/01 | 2013/01 |
| RF- cable | Kabelmetal 18m [N] | K1 | 2008/01 | 2009/01 |
| RF- cable | Aircell 0.5m [BNC] | K40 | 2008/01 | 2009/01 |
| RF- cable | Aircell 1m [BNC/N] | K56 | 2008/01 | 2009/01 |
| RF- cable | Sucoflex 106 Suhner 6,4m [N] | K74 | 2008/01 | 2009/01 |
| RF- cable | Sucoflex 106 Suhner 6,4m [N] | K75 | 2008/01 | 2009/01 |



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### 11.3.3 Test procedure

The EUT and this peripheral (when additional equipment exists) are placed on a turn table which is 0.8 m above the ground. The turn table would be allowed to rotate 360 degrees to determine the position of the maximum emission level. The test distance between the EUT and the receiving antenna are 3m. To find the maximum emission, the polarization of the receiving antenna is changed in horizontal and vertical polarization; the position of the EUT was changed in different orthogonal determinations.

ANSI C63.4: 2003 Section 8 “Radiated Emissions Testing”

Measurement procedures for electric field radiated emissions above 1 GHz are covered in Clause 8 of ANSI C63.4-2003. The C63.4-2003 measurement procedure consists of both an exploratory test and a final measurement. The exploratory test is critical to determine the frequency of all significant emissions. For each mode of operation required to be tested, the frequency spectrum is monitored. Variations in antenna height, antenna orientation, antenna polarization, EUT azimuth, and cable or wire placement is explored to produce the emission that has the highest amplitude relative to the limit.

The final measurements are made based on the findings in the exploratory testing. When making exploratory and final measurements it is necessary to maximize the measured radiated emission. Subclause 8.3.1.2 of C63.4-2003 states that the measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” We consider the “cone of radiation” to be the 3 dB beamwidth of the measurement antenna.

While the “bore-sighting” technique is not explicitly mentioned in C63.4-2003, it is a useful technique for measurements using a directional antenna, such as a double-ridged waveguide antenna. Several precautions must be observed, including: knowledge of the beamwidth of the antenna and the resulting illumination area relative to the size of the EUT, estimation for source of the emission and general location within larger EUTS, measuring system sensitivity, etc.

C63.4-2003 requires that the measurement antenna is kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. That means that if the directional radiation pattern of the EUT results in a maximum emission at an upwards angle from the EUT, when a directional antenna is used to make the measurement it will be necessary for it to be pointed towards the source of the emission within the EUT. This can be done by either pointing the antenna at an angle towards the source of the emission, or by rotating the EUT, in both height and polarization, to maximize the measured emission. The emission must be kept within the illumination area of the 3 dB beamwidth of the antenna so that the maximum emission from the EUT is measured.

| **Radiated emissions test characteristics** | |
|---|---|
| Frequency range | 30 MHz - 4,000 MHz |
| Test distance | 3 m* |
| Test instrumentation resolution bandwidth | 120 kHz (30 MHz - 1,000 MHz) |
| | 1 MHz (1000 MHz - 4,000 MHz) |
| Receive antenna scan height | 1 m - 4 m |
| Receive antenna polarization | Vertical/horizontal |

* According to Section 15.31 (f) (1): At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

### 11.3.4 Calculation of the field strength

The field strength is calculated by the following calculation:

Corrected Level = Receiver Level + Correction Factor (without the use of a pre-amplifier)

Corrected Level = Receiver Level + Correction Factor – Pre-amplifier (with the use of a pre-amplifier)

Receiver Level : Receiver reading without correction factors
Correction Factor : Antenna factor + cable loss

For example:
The receiver reading is 32.7 dBµV. The antenna factor for the measured frequency is +2.5 dB (1/m) and the cable factor for the measured frequency is 0.71 dB, giving a field strength of 35.91dBµV/m.
The 35.91dBµV/m value can be mathematically converted to its corresponding level in µV/m.

Level in µV/m = Common Antilogarithm (35.91/20) = 39.8

For test distance other than what is specified, but fulfilling the requirements of Section 15.31 (f) (1) the field strength is calculated by adding additionally an extrapolation factor of 20 dB/decade (inverse linear distance for field strength measurements).



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### 11.3.5 Test result

For all emission other than harmonic spurious emissions

| TRANSMITTER SPURIOUS RADIATION BELOW 30 MHz (Section 15.205, 15.209) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz) Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m** | Margin **dBµV/m** | Polarisation EUT / antenna orientation |
| 0.1200 | PK/0.2kHz | < 4.0 | 10 | 20.2 | -59.1 | -34.90 | Pk46.0- @ 300 | 80.90 | V, H/0-360° |
| | AV/0.2kHz | < 4.0 | 10 | 20.2 | -59.1 | -34.90 | AV26.0 @ 300 | 80.90 | V, H/0-360° |
| 0.5000 | AV/0.2kHz | < 4.0 | 10 | 20.2 | -19.1 | 5.10 | AV33.6 @ 30 | 28.5 | V, H/0-360° |
| 1.5000 | AV/0.2kHz | < 4.0 | 10 | 20.2 | -19.1 | 5.10 | AV24.1 @ 30 | 19.00 | V, H/0-360° |
| 3.0000 | AV/9.0kHz | < 4.0 | 10 | 20.2 | -19.1 | 5.10 | AV29.5 @ 30 | 24.4 | V, H/0-360° |
| 5.0000 | AV/9.0kHz | < 4.0 | 10 | 20.2 | -19.1 | 5.10 | AV29.5 @ 30 | 24.4 | V, H/0-360° |
| 8.0000 | AV/9.0kHz | < 4.0 | 10 | 20.2 | -19.1 | 5.10 | AV29.5 @ 30 | 24.4 | V, H/0-360° |
| 10.0000 | AV/9.0kHz | < 4.0 | 10 | 20.2 | -19.1 | 5.10 | AV29.5 @ 30 | 24.4 | V, H/0-360° |
| 20.0000 | AV/9.0kHz | < 4.0 | 10 | 20.2 | -19.1 | 5.10 | AV29.5 @ 30 | 24.4 | V, H/0-360° |
| 30.0000 | AV/9.0kHz | < 4.0 | 10 | 20.2 | -19.1 | 5.10 | AV29.5 @ 30 | 24.4 | V, H/0-360° |
| **No emissions detected** | | | | | | | | | |
| Measurement uncertainty | 4 dB | | | | | | | | |

Remark: *[1] Noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 MHz –30 MHz)
Remark: * Peak Limit according to Section 15.35 (b).

| The equipment meets the requirements | **Yes** | ~~**No**~~ | ~~**N.t.**~~ |
|---|---|---|---|

| Further test results are attached | ~~Yes~~ | **No** | Page no. |
|---|---|---|---|



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For all emission other than harmonic spurious emissions

**TRANSMITTER SPURIOUS RADIATION ABOVE 30 MHz (Section 15.205, 15.209)**

| f (MHz) | Bandwidth (kHz) Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | AV Correction factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m** | Margin **dBµV/m** | Polaris. EUT / antenna | Antenna height **cm** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30.0000 | 100, AV | ≤ 3.5 | 3 | -2.60 | 0 | 0 | 0.90 | 40.00 | 39.10 | H,V/H,V | 100-400 |
| 88.0000 | 100, AV | ≤ 3.5 | 3 | -10.80 | 0 | 0 | -7.30 | 40.00 | 47.30 | H,V/H,V | 100-400 |
| 216.0000 | 100, AV | ≤ 3.5 | 3 | -10.30 | 0 | 0 | -6.80 | 43.50 | 50.30 | H,V/H,V | 100-400 |
| 960.0000 | 100, AV | ≤ 3.5 | 3 | 8.50 | 0 | 0 | 12.00 | 43.50 | 31.50 | H,V/H,V | 100-400 |
| 1700.0000 | 1000, AV | ≤ 4.5 | 3 | 3.80 | 0 | 0 | 8.30 | 54.00 | 45.70 | H,V/H,V | 100-400 |
| 2250.0000 | 1000, AV | ≤ 10 | 3 | 8.00 | 0 | 0 | 18.00 | 54.00 | 36.00 | H,V/H,V | 100-400 |
| 4000.0000 | 1000, AV | ≤ 10 | 3 | 8.40*[6] | 0 | 0 | 18.40 | 54.00 | 35.60 | H,V/H,V | 100-400 |
| 5000.0000 | 1000, AV | ≤ 10 | 3 | 9.10*[6] | 0 | 0 | 19.40 | 54.00 | 34.60 | H,V/H,V | 100-400 |
| 7500.0000 | 1000, AV | ≤ 14 | 3 | 12.9*[6]0 | 0 | 0 | 26.90 | 54.00 | 27.10 | H,V/H,V | 100-400 |
| 8300.0000 | 1000, AV | ≤ 14 | 3 | 14.80*[6] | 0 | 0 | 28.80 | 54.00 | 25.20 | H,V/H,V | 100-400 |
| 9400.0000 | 1000, AV | ≤ 14 | 3 | 16.00*[6] | 0 | 0 | 30.00 | 54.00 | 24.00 | H,V/H,V | 100-400 |
| 11000.0000 | 1000, AV | ≤ 14 | 3 | 18.25*[6] | 0 | 0 | 32.25 | 54.00 | 21.75 | H,V/H,V | 100-400 |
| | | | | | | | | | | | |
| Measurement uncertainty | | 4 dB | | | | | | | | | |

Bandwidth = the measuring receiver bandwidth

Remark: *[1] noise floor noise level of the measuring instrument ≤ 3.5dBµV @ 3m distance (30 – 1,000 MHz)
Remark: *[2] noise floor noise level of the measuring instrument ≤ 4.5dBµV @ 3m distance (1,000 – 2,000 MHz)
Remark: *[3] noise floor noise level of the measuring instrument ≤ 10dBµV @ 3m distance (2,000 – 5,500 MHz)
Remark: *[4] noise floor noise level of the measuring instrument ≤ 14dBµV @ 3m distance (5,500 – 14,500 MHz)
Remark: *[5] for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
Remark: *[6] for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

| The equipment meets the requirements | **Yes** | ~~**No**~~ | ~~**N.t.**~~ |
|---|---|---|---|

| Further test results are attached | ~~Yes~~ | **No** | Page no. |
|---|---|---|---|



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RFI341-1502S04 + Multiplexer FCC + antenna RFA341-3520

## INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(a)(d), 15.209)

| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level dBµV | Test distance m | Correction factor dB | Distance extrapol. factor dB | Level corrected dBµV/m | Limit dBµV/m @ meter | Margin dBµV/m | Polaris. EUT / antenna orientation height/cm | |
|---|---|---|---|---|---|---|---|---|---|---|
| 13.560 | QPK/9kHz | **71.0** | 10 | 20.2 | -19.1 | **72.6** | 84.0 @ 30 | **11.4** | V,90° / 90° | |
| 27.120 | QPK/9kHz | **< 4.0** | 10 | 20.2 | -19.1 | **5.1** | 29.5 @ 30 | **24.4** | V,90°/ 90° | |
| 40.680 | QPK/120kHz | **21.5** | 3 | -6.9 | 0 | **14.6** | 40.0 @ 3 | **25.4** | V / V | 309 |
| 54.240 | QPK/120kHz | **28.5** | 3 | -13.2 | 0 | **15.3** | 40.0 @ 3 | **24.7** | V / V | 163 |
| 67.800 | QPK/120kHz | **35.0** | 3 | -13.3 | 0 | **21.7** | 40.0 @ 3 | **18.3** | V / V | 111 |
| 81.360 | QPK/120kHz | **23.7** | 3 | -12.2 | 0 | **11.5** | 40.0 @ 3 | **28.5** | V / V | 158 |
| 94.920 | QPK/120kHz | **30.3** | 3 | -10.7 | 0 | **19.6** | 43.5 @ 3 | **23.9** | V / V | 117 |
| 108.480 | QPK/120kHz | **22.4** | 3 | -9.7 | 0 | **12.7** | 43.5 @ 3 | **30.8** | V / V | 110 |
| 122.040 | QPK/120kHz | **31.4** | 3 | -7.4 | 0 | **24.0** | 43.5 @ 3 | **19.5** | V / V | 111 |
| 135.600 | QPK/120kHz | **13.4** | 3 | -8.6 | 0 | **4.8** | 43.5 @ 3 | **38.7** | V / V | 112 |
| 149.160 | QPK/120kHz | **23.6** | 3 | -7.6 | 0 | **16.0** | 43.5 @ 3 | **27.5** | V / V | 120 |
| 162.720 | QPK/120kHz | **26.6** | 3 | -8.7 | 0 | **17.9** | 43.5 @ 3 | **25.6** | V / V | 113 |
| 176.280 | QPK/120kHz | **23.3** | 3 | -9.8 | 0 | **13.5** | 43.5 @ 3 | **30.0** | V / V | 115 |
| 189.840 | QPK/120kHz | **21.9** | 3 | -11.5 | 0 | **10.4** | 43.5 @ 3 | **33.1** | V / V | 107 |
| 203.400 | QPK/120kHz | **28.1** | 3 | -10.3 | 0 | **17.8** | 43.5 @ 3 | **25.7** | V / V | 100 |
| 216.960 | QPK/120kHz | **37.7** | 3 | -10.5 | 0 | **27.2** | 46.0 @ 3 | **18.8** | V / H | 107 |
| 230.520 | QPK/120kHz | **38.4** | 3 | -8.0 | 0 | **30.4** | 46.0 @ 3 | **15.6** | V / H | 105 |
| 244.080 | QPK/120kHz | **29.4** | 3 | -7.0 | 0 | **22.4** | 46.0 @ 3 | **23.6** | V / V | 164 |
| 257.640 | QPK/120kHz | **22.7** | 3 | -6.5 | 0 | **16.2** | 46.0 @ 3 | **29.8** | V / H | 100 |
| 271.200 | QPK/120kHz | **26.9** | 3 | -5.0 | 0 | **21.9** | 46.0 @ 3 | **24.1** | V / V | 131 |
| 284.760 | QPK/120kHz | **28.4** | 3 | -4.5 | 0 | **23.9** | 46.0 @ 3 | **22.1** | V / V | 150 |
| 298.320 | QPK/120kHz | **26.5** | 3 | -4.3 | 0 | **22.2** | 46.0 @ 3 | **23.8** | V / V | 138 |
| 311.880 | QPK/120kHz | **29.0** | 3 | -4.3 | 0 | **24.7** | 46.0 @ 3 | **21.3** | V / V | 144 |
| 325.440 | QPK/120kHz | **40.2** | 3 | -3.8 | 0 | **36.4** | 46.0 @ 3 | **9.6** | V / V | 122 |
| 339.000 | QPK/120kHz | **41.2** | 3 | -3.6 | 0 | **37.6** | 46.0 @ 3 | **8.4** | V / V | 151 |
| 352.560 | QPK/120kHz | **35.8** | 3 | -3.0 | 0 | **32.8** | 46.0 @ 3 | **13.2** | V / V | 100 |
| 366.120 | QPK/120kHz | **35.1** | 3 | -3.0 | 0 | **32.1** | 46.0 @ 3 | **13.9** | V / V | 137 |
| 379.680 | QPK/120kHz | **30.3** | 3 | -3.0 | 0 | **27.3** | 46.0 @ 3 | **18.7** | V / H | 111 |
| 393.240 | QPK/120kHz | **11.1** | 3 | -2.4 | 0 | **8.7** | 46.0 @ 3 | **37.3** | V / V | 100 |



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| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation | height/cm |
|---|---|---|---|---|---|---|---|---|---|---|
| 406.800 | QPK/120kHz | **24.3** | 3 | -2.4 | 0 | **21.9** | 46.0 @ 3 | **24.1** | V / V | 180 |
| 420.360 | QPK/120kHz | **23.7** | 3 | -1.0 | 0 | **22.7** | 46.0 @ 3 | **23.3** | V / V | 100 |
| 433.920 | QPK/120kHz | **19.2** | 3 | -2.0 | 0 | **17.2** | 46.0 @ 3 | **28.8** | V / V | 133 |
| 447.480 | QPK/120kHz | **25.2** | 3 | -2.1 | 0 | **23.1** | 46.0 @ 3 | **22.9** | V / V | 102 |
| 461.040 | QPK/120kHz | **26.4** | 3 | -1.5 | 0 | **24.9** | 46.0 @ 3 | **21.1** | V / V | 100 |
| 474.600 | QPK/120kHz | **26.8** | 3 | -1.5 | 0 | **25.3** | 46.0 @ 3 | **20.7** | V / V | 104 |
| 488.160 | QPK/120kHz | **20.3** | 3 | -1.0 | 0 | **19.3** | 46.0 @ 3 | **26.7** | V / V | 179 |
| 501.720 | QPK/120kHz | **15.2** | 3 | -0.8 | 0 | **14.4** | 46.0 @ 3 | **31.6** | V / V | 168 |
| 528.840 | QPK/120kHz | **16.7** | 3 | 0.3 | 0 | **17.0** | 46.0 @ 3 | **29.0** | V / V | 150 |
| Measurement uncertainty | | | 4 dB | | | | | | | |

Blue marked, restricted band emissions!

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)
Remark: *[2] noise floor noise level of the measuring instrument ≤ 6.5dBµV @ 3m distance (30 – 1,000 MHz)
Remark: *[3] noise floor noise level of the measuring instrument ≤ 10 dBµV @ 3m distance (1,000 – 2,000 MHz)
Remark: *[4] noise floor noise level of the measuring instrument ≤ 17 dBµV @ 3m distance (2,000 – 5,500 MHz)
Remark: *[5] for using a pre-amplifier in the range between 100 kHz and 1,000 MHz

| The equipment meets the requirements | **yes** | ~~no~~ | ~~n.a.~~ |
|---|---|---|---|

| Further test results are attached | ~~yes~~ | **no** | page no: |
|---|---|---|---|

n.a [x] see page no. 43



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RFI341-1502S04 + Multiplexer FCC + antenna RFA331-1020

## INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(a)(d), 15.209)

| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation | height/cm |
|---|---|---|---|---|---|---|---|---|---|---|
| 13.560 | QPK/9kHz | **65.9** | 10 | 20.2 | -19.1 | **67.0** | 84.0 @ 30 | **17.0** | V,90° / 90° | |
| 27.120 | QPK/9kHz | **< 4.0** | 10 | 20.2 | -19.1 | **5.1** | 29.5 @ 30 | **24.4** | V,90°/ 90° | |
| 40.680 | QPK/120kHz | **22.1** | 3 | -6.9 | 0 | **15.2** | 40.0 @ 3 | **24.8** | V / V | 110 |
| 54.240 | QPK/120kHz | **29.3** | 3 | -13.2 | 0 | **16.1** | 40.0 @ 3 | **23.9** | V / V | 177 |
| 67.800 | QPK/120kHz | **32.6** | 3 | -13.3 | 0 | **19.3** | 40.0 @ 3 | **20.7** | V / V | 197 |
| 81.360 | QPK/120kHz | **20.5** | 3 | -12.2 | 0 | **8.3** | 40.0 @ 3 | **31.7** | V / V | 100 |
| 94.920 | QPK/120kHz | **28.7** | 3 | -10.7 | 0 | **18.0** | 43.5 @ 3 | **25.5** | V / V | 105 |
| 108.480 | QPK/120kHz | **24.6** | 3 | -9.7 | 0 | **14.9** | 43.5 @ 3 | **28.6** | V / V | 110 |
| 122.040 | QPK/120kHz | **29.4** | 3 | -7.4 | 0 | **22.0** | 43.5 @ 3 | **21.5** | V / V | 100 |
| 135.600 | QPK/120kHz | **18.3** | 3 | -8.6 | 0 | **19.7** | 43.5 @ 3 | **23.8** | V / V | 100 |
| 149.160 | QPK/120kHz | **20.9** | 3 | -7.6 | 0 | **13.3** | 43.5 @ 3 | **30.2** | V / V | 299 |
| 162.720 | QPK/120kHz | **24.7** | 3 | -8.7 | 0 | **16.0** | 43.5 @ 3 | **27.5** | V / V | 136 |
| 176.280 | QPK/120kHz | **23.0** | 3 | -9.8 | 0 | **13.2** | 43.5 @ 3 | **30.3** | V / V | 278 |
| 189.840 | QPK/120kHz | **22.2** | 3 | -11.5 | 0 | **10.7** | 43.5 @ 3 | **32.8** | V / V | 193 |
| 203.400 | QPK/120kHz | **30.1** | 3 | -10.3 | 0 | **19.8** | 43.5 @ 3 | **23.7** | V / V | 216 |
| 216.960 | QPK/120kHz | **40.0** | 3 | -10.5 | 0 | **29.5** | 46.0 @ 3 | **16.5** | V / H | 287 |
| 230.520 | QPK/120kHz | **40.9** | 3 | -8.0 | 0 | **32.9** | 46.0 @ 3 | **13.1** | V / H | 118 |
| 244.080 | QPK/120kHz | **30.6** | 3 | -7.0 | 0 | **23.6** | 46.0 @ 3 | **22.4** | V / V | 230 |
| 257.640 | QPK/120kHz | **24.3** | 3 | -6.5 | 0 | **17.8** | 46.0 @ 3 | **28.2** | V / H | 118 |
| 271.200 | QPK/120kHz | **28.5** | 3 | -5.0 | 0 | **23.5** | 46.0 @ 3 | **22.5** | V / V | 100 |
| 284.760 | QPK/120kHz | **30.6** | 3 | -4.5 | 0 | **26.1** | 46.0 @ 3 | **19.9** | V / V | 105 |
| 298.320 | QPK/120kHz | **32.1** | 3 | -4.3 | 0 | **27.8** | 46.0 @ 3 | **18.2** | V / V | 129 |
| 311.880 | QPK/120kHz | **30.5** | 3 | -4.3 | 0 | **26.2** | 46.0 @ 3 | **19.8** | V / V | 207 |
| 325.440 | QPK/120kHz | **39.8** | 3 | -3.8 | 0 | **36.0** | 46.0 @ 3 | **10.0** | V / V | 219 |
| 339.000 | QPK/120kHz | **40.0** | 3 | -3.6 | 0 | **36.4** | 46.0 @ 3 | **9.6** | V / V | 115 |
| 352.560 | QPK/120kHz | **36.6** | 3 | -3.0 | 0 | **33.6** | 46.0 @ 3 | **12.4** | V / V | 203 |
| 366.120 | QPK/120kHz | **36.2** | 3 | -3.0 | 0 | **33.2** | 46.0 @ 3 | **12.8** | V / V | 102 |
| 379.680 | QPK/120kHz | **26.5** | 3 | -3.0 | 0 | **23.4** | 46.0 @ 3 | **22.6** | V / H | 110 |
| 393.240 | QPK/120kHz | **18.4** | 3 | -2.4 | 0 | **16.0** | 46.0 @ 3 | **30.0** | V / V | 112 |



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**FCC ID: WRMRFI3411503S04**

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| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation | height/cm |
|---|---|---|---|---|---|---|---|---|---|---|
| 406.800 | QPK/120kHz | **21.7** | 3 | -2.4 | 0 | **19.3** | 46.0 @ 3 | **26.7** | V / V | 130 |
| 420.360 | QPK/120kHz | **20.2** | 3 | -1.0 | 0 | **19.2** | 46.0 @ 3 | **26.8** | V / V | 110 |
| 433.920 | QPK/120kHz | **18.1** | 3 | -2.0 | 0 | **16.1** | 46.0 @ 3 | **29.9** | V / V | 189 |
| 447.480 | QPK/120kHz | **20.9** | 3 | -2.1 | 0 | **18.8** | 46.0 @ 3 | **27.2** | V / V | 201 |
| 461.040 | QPK/120kHz | **24.8** | 3 | -1.5 | 0 | **23.3** | 46.0 @ 3 | **22.7** | V / V | 120 |
| 474.600 | QPK/120kHz | **25.0** | 3 | -1.5 | 0 | **23.5** | 46.0 @ 3 | **22.5** | V / V | 108 |
| 488.160 | QPK/120kHz | **21.3** | 3 | -1.0 | 0 | **20.3** | 46.0 @ 3 | **25.7** | V / V | 109 |
| 501.720 | QPK/120kHz | **14.5** | 3 | -0.8 | 0 | **13.7** | 46.0 @ 3 | **32.3** | V / V | 153 |
| 528.840 | QPK/120kHz | **17.1** | 3 | 0.3 | 0 | **17.4** | 46.0 @ 3 | **28.6** | V / V | 107 |
| Measurement uncertainty | | | 4 dB | | | | | | | |

Blue marked, restricted band emissions!

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)
Remark: *[2] noise floor noise level of the measuring instrument ≤ 6.5dBµV @ 3m distance (30 – 1,000 MHz)
Remark: *[3] noise floor noise level of the measuring instrument ≤ 10 dBµV @ 3m distance (1,000 – 2,000 MHz)
Remark: *[4] noise floor noise level of the measuring instrument ≤ 17 dBµV @ 3m distance (2,000 – 5,500 MHz)
Remark: *[5] for using a pre-amplifier in the range between 100 kHz and 1,000 MHz

| The equipment meets the requirements | **yes** | ~~no~~ | ~~n.a.~~ |
|---|---|---|---|

| Further test results are attached | ~~yes~~ | **no** | page no: |
|---|---|---|---|

n.a [x] see page no. 43



**m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920**

**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Splitter + antenna RFA341-3520

**INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(a)(d), 15.209)**

| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation | height/cm |
|---|---|---|---|---|---|---|---|---|---|---|
| 13.560 | QPK/9kHz | **64.1** | 10 | 20.2 | -19.1 | **65.2** | 84.0 @ 30 | **18.8** | V,90° / 90° | |
| 27.120 | QPK/9kHz | **5.2** | 10 | 20.2 | -19.1 | **6.3** | 29.5 @ 30 | **23.2** | V,90°/ 90° | |
| 40.680 | QPK/120kHz | **27.1** | 3 | -6.9 | 0 | **20.2** | 40.0 @ 3 | **19.8** | V / V | 100 |
| 54.240 | QPK/120kHz | **22.1** | 3 | -13.2 | 0 | **8.9** | 40.0 @ 3 | **31.1** | V / V | 190 |
| 67.800 | QPK/120kHz | **25.4** | 3 | -13.3 | 0 | **12.1** | 40.0 @ 3 | **27.9** | V / V | 140 |
| 81.360 | QPK/120kHz | **23.5** | 3 | -12.2 | 0 | **11.3** | 40.0 @ 3 | **28.7** | V / V | 138 |
| 94.920 | QPK/120kHz | **24.0** | 3 | -10.7 | 0 | **13.3** | 43.5 @ 3 | **30.2** | V / V | 140 |
| 108.480 | QPK/120kHz | **27.2** | 3 | -9.7 | 0 | **17.5** | 43.5 @ 3 | **26.0** | V / V | 100 |
| 122.040 | QPK/120kHz | **24.3** | 3 | -7.4 | 0 | **16.9** | 43.5 @ 3 | **26.6** | V / V | 100 |
| 135.600 | QPK/120kHz | **20.0** | 3 | -8.6 | 0 | **11.4** | 43.5 @ 3 | **32.1** | V / V | 133 |
| 149.160 | QPK/120kHz | **14.7** | 3 | -7.6 | 0 | **7.1** | 43.5 @ 3 | **36.4** | V / V | 362 |
| 176.280 | QPK/120kHz | **22.9** | 3 | -9.8 | 0 | **13.3** | 43.5 @ 3 | **30.2** | V / V | 100 |
| 189.840 | QPK/120kHz | **27.4** | 3 | -11.5 | 0 | **15.9** | 43.5 @ 3 | **27.6** | V / V | 100 |
| 203.400 | QPK/120kHz | **22.1** | 3 | -10.3 | 0 | **10.8** | 43.5 @ 3 | **32.7** | V / V | 140 |
| 216.960 | QPK/120kHz | **26.5** | 3 | -10.5 | 0 | **16.0** | 46.0 @ 3 | **30.0** | V / H | 100 |
| 230.520 | QPK/120kHz | **30.0** | 3 | -8.0 | 0 | **22.9** | 46.0 @ 3 | **23.1** | V / H | 113 |
| 244.080 | QPK/120kHz | **27.0** | 3 | -7.0 | 0 | **20.0** | 46.0 @ 3 | **26.0** | V / V | 100 |
| 257.640 | QPK/120kHz | **26.8** | 3 | -6.5 | 0 | **20.3** | 46.0 @ 3 | **25.7** | V / V | 316 |
| 271.200 | QPK/120kHz | **25.9** | 3 | -5.0 | 0 | **20.9** | 46.0 @ 3 | **25.1** | V / V | 190 |
| 284.760 | QPK/120kHz | **28.3** | 3 | -4.5 | 0 | **23.8** | 46.0 @ 3 | **22.2** | V / V | 163 |
| 298.320 | QPK/120kHz | **28.6** | 3 | -4.3 | 0 | **24.3** | 46.0 @ 3 | **21.7** | V / V | 190 |
| 311.880 | QPK/120kHz | **30.1** | 3 | -4.3 | 0 | **25.8** | 46.0 @ 3 | **20.2** | V / V | 147 |
| 325.440 | QPK/120kHz | **30.9** | 3 | -3.8 | 0 | **27.1** | 46.0 @ 3 | **18.9** | V / V | 138 |
| 339.000 | QPK/120kHz | **27.5** | 3 | -3.6 | 0 | **23.9** | 46.0 @ 3 | **22.1** | V / V | 142 |
| 352.560 | QPK/120kHz | **17.2** | 3 | -3.0 | 0 | **14.2** | 46.0 @ 3 | **31.8** | V / V | 105 |
| 366.120 | QPK/120kHz | **19.7** | 3 | -3.0 | 0 | **16.7** | 46.0 @ 3 | **29.3** | V / V | 114 |
| 379.680 | QPK/120kHz | **20.2** | 3 | -3.0 | 0 | **17.2** | 46.0 @ 3 | **28.8** | V / H | 211 |
| 393.240 | QPK/120kHz | **25.4** | 3 | -2.4 | 0 | **23.0** | 46.0 @ 3 | **23.0** | V / V | 302 |
| | | | | | | | | | | |



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**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation | height/cm |
|---|---|---|---|---|---|---|---|---|---|---|
| 406.800 | QPK/120kHz | **29.8** | 3 | -2.4 | 0 | **27.4** | 46.0 @ 3 | **18.6** | V / V | 170 |
| 420.360 | QPK/120kHz | **29.3** | 3 | -1.0 | 0 | **28.3** | 46.0 @ 3 | **17.7** | V / V | 156 |
| 433.920 | QPK/120kHz | **14.8** | 3 | -2.0 | 0 | **12.8** | 46.0 @ 3 | **33.2** | V / V | 102 |
| 447.480 | QPK/120kHz | **26.9** | 3 | -2.1 | 0 | **24.8** | 46.0 @ 3 | **21.2** | V / V | 100 |
| 461.040 | QPK/120kHz | **17.2** | 3 | -1.5 | 0 | **15.7** | 46.0 @ 3 | **30.3** | V / V | 223 |
| 474.600 | QPK/120kHz | **14.2** | 3 | -1.5 | 0 | **12.7** | 46.0 @ 3 | **33.3** | V / V | 108 |
| 488.160 | QPK/120kHz | **13.8** | 3 | -1.0 | 0 | **12.8** | 46.0 @ 3 | **33.2** | V / V | 119 |
| 501.720 | QPK/120kHz | **22.5** | 3 | -0.8 | 0 | **21.7** | 46.0 @ 3 | **24.3** | V / V | 125 |
| 528.840 | QPK/120kHz | **28.7** | 3 | 0.3 | 0 | **29.0** | 46.0 @ 3 | **17.0** | V / V | 101 |
| Measurement uncertainty | | | 4 dB | | | | | | | |

Blue marked, restricted band emissions!

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)
Remark: *[2] noise floor noise level of the measuring instrument ≤ 6.5dBµV @ 3m distance (30 – 1,000 MHz)
Remark: *[3] noise floor noise level of the measuring instrument ≤ 10 dBµV @ 3m distance (1,000 – 2,000 MHz)
Remark: *[4] noise floor noise level of the measuring instrument ≤ 17 dBµV @ 3m distance (2,000 – 5,500 MHz)
Remark: *[5] for using a pre-amplifier in the range between 100 kHz and 1,000 MHz

| The equipment meets the requirements | **yes** | ~~no~~ | ~~n.a.~~ |
|---|---|---|---|

| Further test results are attached | ~~yes~~ | **no** | page no: |
|---|---|---|---|

n.a [x] see page no. 43



**m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920**

**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Splitter + antenna RFA331-1020

**INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(a)(d), 15.209)**

| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm | |
|---|---|---|---|---|---|---|---|---|---|---|
| 13.560 | QPK/9kHz | **56.7** | 10 | 20.2 | -19.1 | **57.8** | 84.0 @ 30 | **26.2** | V,90° / 90° | |
| 27.120 | QPK/9kHz | **7.9** | 10 | 20.2 | -19.1 | **9.0** | 29.5 @ 30 | **20.5** | V,90°/ 90° | |
| 40.680 | QPK/120kHz | **23.4** | 3 | -6.9 | 0 | **16.5** | 40.0 @ 3 | **23.5** | V / V | 110 |
| 54.240 | QPK/120kHz | **20.9** | 3 | -13.2 | 0 | **7.7** | 40.0 @ 3 | **32.3** | V / V | 177 |
| 67.800 | QPK/120kHz | **26.3** | 3 | -13.3 | 0 | **13.0** | 40.0 @ 3 | **27.0** | V / V | 197 |
| 81.360 | QPK/120kHz | **27.1** | 3 | -12.2 | 0 | **14.9** | 40.0 @ 3 | **25.1** | V / V | 100 |
| 94.920 | QPK/120kHz | **26.0** | 3 | -10.7 | 0 | **15.3** | 43.5 @ 3 | **28.2** | V / V | 105 |
| 108.480 | QPK/120kHz | **29.4** | 3 | -9.7 | 0 | **19.7** | 43.5 @ 3 | **23.8** | V / V | 110 |
| 122.040 | QPK/120kHz | **26.2** | 3 | -7.4 | 0 | **18.8** | 43.5 @ 3 | **24.7** | V / V | 100 |
| 135.600 | QPK/120kHz | **24.9** | 3 | -8.6 | 0 | **16.3** | 43.5 @ 3 | **27.2** | V / V | 100 |
| 149.160 | QPK/120kHz | **17.2** | 3 | -7.6 | 0 | **9.6** | 43.5 @ 3 | **33.9** | V / V | 299 |
| 162.720 | QPK/120kHz | **15.7** | 3 | -8.7 | 0 | **7.0** | 43.5 @ 3 | **36.5** | V / V | 136 |
| 176.280 | QPK/120kHz | **20.0** | 3 | -9.8 | 0 | **10.2** | 43.5 @ 3 | **33.3** | V / V | 278 |
| 189.840 | QPK/120kHz | **26.4** | 3 | -11.5 | 0 | **14.9** | 43.5 @ 3 | **28.6** | V / V | 193 |
| 203.400 | QPK/120kHz | **24.8** | 3 | -10.3 | 0 | **14.5** | 43.5 @ 3 | **29.0** | V / V | 216 |
| 216.960 | QPK/120kHz | **31.2** | 3 | -10.5 | 0 | **20.7** | 46.0 @ 3 | **25.3** | V / H | 287 |
| 230.520 | QPK/120kHz | **30.4** | 3 | -8.0 | 0 | **22.4** | 46.0 @ 3 | **23.6** | V / H | 118 |
| 244.080 | QPK/120kHz | **25.6** | 3 | -7.0 | 0 | **18.6** | 46.0 @ 3 | **27.4** | V / V | 130 |
| 257.640 | QPK/120kHz | **27.9** | 3 | -6.5 | 0 | **21.4** | 46.0 @ 3 | **24.6** | V / H | 110 |
| 271.200 | QPK/120kHz | **26.3** | 3 | -5.0 | 0 | **21.3** | 46.0 @ 3 | **24.7** | V / V | 100 |
| 284.760 | QPK/120kHz | **26.4** | 3 | -4.5 | 0 | **21.9** | 46.0 @ 3 | **24.1** | V / V | 100 |
| 298.320 | QPK/120kHz | **27.3** | 3 | -4.3 | 0 | **23.0** | 46.0 @ 3 | **23.0** | V / V | 120 |
| 311.880 | QPK/120kHz | **31.2** | 3 | -4.3 | 0 | **26.9** | 46.0 @ 3 | **19.1** | V / V | 108 |
| 325.440 | QPK/120kHz | **30.9** | 3 | -3.8 | 0 | **27.1** | 46.0 @ 3 | **18.9** | V / V | 109 |
| 339.000 | QPK/120kHz | **29.6** | 3 | -3.6 | 0 | **26.0** | 46.0 @ 3 | **20.0** | V / V | 100 |
| 352.560 | QPK/120kHz | **12.8** | 3 | -3.0 | 0 | **9.8** | 46.0 @ 3 | **36.2** | V / V | 100 |
| 366.120 | QPK/120kHz | **14.9** | 3 | -3.0 | 0 | **11.9** | 46.0 @ 3 | **34.1** | V / V | 102 |
| 379.680 | QPK/120kHz | **24.5** | 3 | -3.0 | 0 | **21.5** | 46.0 @ 3 | **24.5** | V / H | 110 |
| 393.240 | QPK/120kHz | **21.6** | 3 | -2.4 | 0 | **19.2** | 46.0 @ 3 | **26.8** | V / V | 112 |



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**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation | height/cm |
|---|---|---|---|---|---|---|---|---|---|---|
| 406.800 | QPK/120kHz | **29.5** | 3 | -2.4 | 0 | **27.1** | 46.0 @ 3 | **18.9** | V / V | 125 |
| 420.360 | QPK/120kHz | **28.8** | 3 | -1.0 | 0 | **27.8** | 46.0 @ 3 | **18.2** | V / V | 210 |
| 433.920 | QPK/120kHz | **20.1** | 3 | -2.0 | 0 | **18.1** | 46.0 @ 3 | **27.9** | V / V | 189 |
| 447.480 | QPK/120kHz | **23.7** | 3 | -2.1 | 0 | **21.6** | 46.0 @ 3 | **24.4** | V / V | 114 |
| 461.040 | QPK/120kHz | **16.2** | 3 | -1.5 | 0 | **14.7** | 46.0 @ 3 | **31.3** | V / V | 127 |
| 474.600 | QPK/120kHz | **13.5** | 3 | -1.5 | 0 | **12.0** | 46.0 @ 3 | **34.0** | V / V | 201 |
| 488.160 | QPK/120kHz | **13.1** | 3 | -1.0 | 0 | **12.1** | 46.0 @ 3 | **33.9** | V / V | 109 |
| 501.720 | QPK/120kHz | **19.8** | 3 | -0.8 | 0 | **19.0** | 46.0 @ 3 | **27.0** | V / V | 102 |
| 528.840 | QPK/120kHz | **24.3** | 3 | 0.3 | 0 | **24.6** | 46.0 @ 3 | **21.4** | V / V | 100 |
| Measurement uncertainty | | | 4 dB | | | | | | | |

Blue marked, restricted band emissions!

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)
Remark: *[2] noise floor noise level of the measuring instrument ≤ 6.5dBµV @ 3m distance (30 – 1,000 MHz)
Remark: *[3] noise floor noise level of the measuring instrument ≤ 10 dBµV @ 3m distance (1,000 – 2,000 MHz)
Remark: *[4] noise floor noise level of the measuring instrument ≤ 17 dBµV @ 3m distance (2,000 – 5,500 MHz)
Remark: *[5] for using a pre-amplifier in the range between 100 kHz and 1,000 MHz

| The equipment meets the requirements | **yes** | ~~no~~ | ~~n.a.~~ |
|---|---|---|---|

| Further test results are attached | ~~yes~~ | **no** | page no: |
|---|---|---|---|

n.a [x] see page no. 43



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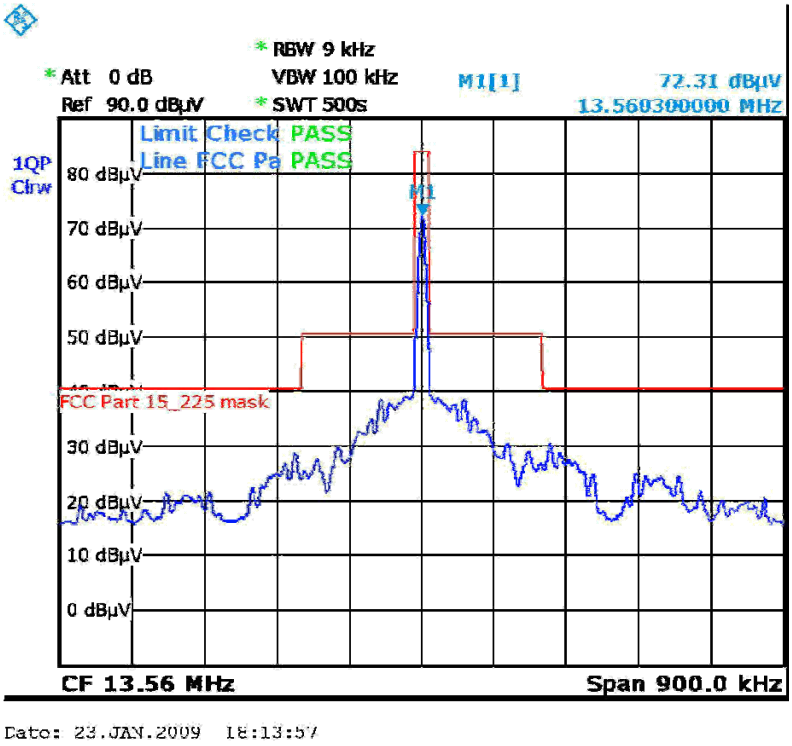
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Multiplexer FCC + antenna RFA341-3520, modulation depth = 20%

| INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c)) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.245 | QPK/9kHz | **20.1** | 10 | 20.2 | -19.1 | **21.2** | 40.5 @ 30 | **19.3** | V,90° / 90°/100 |
| 13.407 | QPK/9kHz | **27.2** | 10 | 20.2 | -19.1 | **28.3** | 40.5 @ 30 | **12.2** | V,90° / 90°/100 |
| 13.506 | QPK/9kHz | **37.5** | 10 | 20.2 | -19.1 | **38.6** | 50.5 @ 30 | **11.9** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **37.7** | 10 | 20.2 | -19.1 | **38.8** | 50.5 @ 30 | **11.7** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **29.4** | 10 | 20.2 | -19.1 | **30.5** | 40.5 @ 30 | **10.0** | V,90° / 90°/100 |
| 13.821 | QPK/ | **23.9** | 10 | 20.2 | -19.1 | **25.0** | 40.5 @ 30 | **15.5** | V,90° / 90°/100 |
| Measurement uncertainty | | 4 dB | | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| | | | |
|---|---|---|---|
| The equipment meets the requirements | **yes** | ~~no~~ | ~~n.a.~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~yes~~ | **no** | page no: |

n.a [x] see page no. 43



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**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

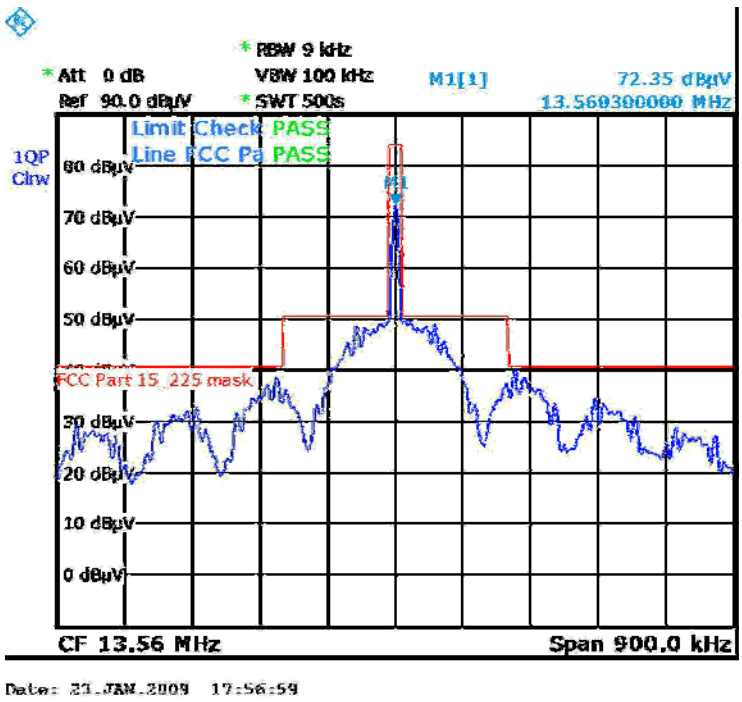
**Date of issue: 2009-01-24**

RFI341-1502S04 + Multiplexer FCC + antenna RFA341-3520, modulation depth = 100%

**INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c))**

| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level dBµV | Test distance m | Correction factor dB | Distance extrapol. factor dB | Level corrected dBµV/m | Limit dBµV/m @ meter | Margin dBµV/m | Polaris. EUT / antenna orientation height/cm |
|---|---|---|---|---|---|---|---|---|---|
| 13.182 | QPK/9kHz | **29.0** | 10 | 20.2 | -19.1 | **30.1** | 40.5 @ 30 | **10.4** | V,90° / 90°/100 |
| 13.299 | QPK/9kHz | **31.2** | 10 | 20.2 | -19.1 | **32.3** | 40.5 @ 30 | **8.2** | V,90° / 90°/100 |
| 13.407 | QPK/9kHz | **36.5** | 10 | 20.2 | -19.1 | **37.6** | 40.5 @ 30 | **2.9** | V,90° / 90°/100 |
| 13.506 | QPK/9kHz | **46.1** | 10 | 20.2 | -19.1 | **47.2** | 50.5 @ 30 | **3.3** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **46.3** | 10 | 20.2 | -19.1 | **47.4** | 50.5 @ 30 | **2.6** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **38.2** | 10 | 20.2 | -19.1 | **39.3** | 40.5 @ 30 | **1.2** | V,90° / 90°/100 |
| 13.821 | QPK/9kHz | **33.9** | 10 | 20.2 | -19.1 | **35.0** | 40.5 @ 30 | **5.5** | V,90° / 90°/100 |
| 13.938 | QPK/9kHz | **27.1** | 10 | 20.2 | -19.1 | **28.2** | 40.5 @ 30 | **12.3** | V,90° / 90°/100 |
| Measurement uncertainty | | 4 dB | | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |
|---|---|---|---|

| Further test results are attached | ~~yes~~ | **no** | page no: |
|---|---|---|---|

n.a [x] see page no. 43



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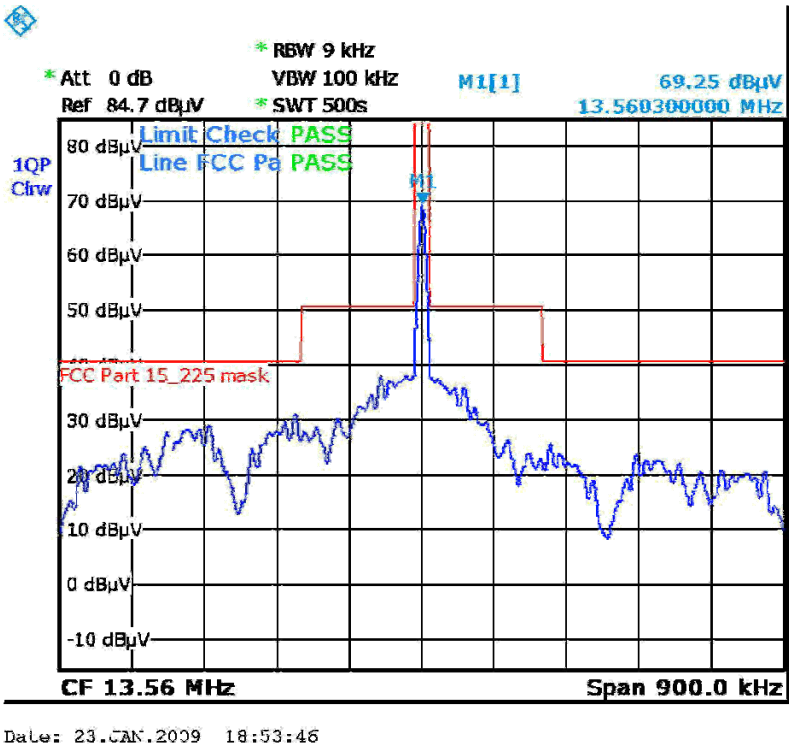
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Multiplexer FCC + antenna RFA341-3520, modulation depth = 20%/100%

| INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c)) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.290 | QPK/9kHz | **20.4** | 10 | 20.2 | -19.1 | **21.5** | 40.5 @ 30 | **19.0** | V,90° / 90°/100 |
| 13.407 | QPK/9kHz | **27.0** | 10 | 20.2 | -19.1 | **28.1** | 40.5 @ 30 | **12.4** | V,90° / 90°/100 |
| 13.506 | QPK/9kHz | **26.8** | 10 | 20.2 | -19.1 | **27.9** | 50.5 @ 30 | **22.6** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **26.9** | 10 | 20.2 | -19.1 | **28.0** | 50.5 @ 30 | **22.5** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **28.9** | 10 | 20.2 | -19.1 | **30.0** | 40.5 @ 30 | **10.5** | V,90° / 90°/100 |
| 13.821 | QPK/9kHz | **23.9** | 10 | 20.2 | -19.1 | **25.0** | 40.5 @ 30 | **15.5** | V,90° / 90°/100 |
| Measurement uncertainty | | 4 dB | | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |
|---|---|---|---|

| Further test results are attached | ~~yes~~ | **no** | page no: |
|---|---|---|---|

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

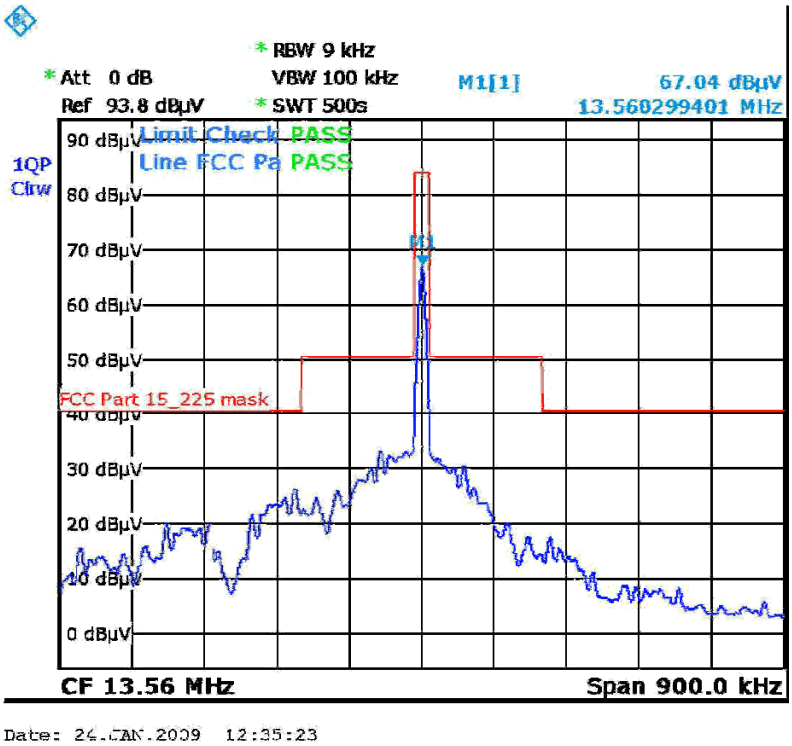
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Multiplexer FCC + antenna RFA331-1020, modulation depth = 20%

| INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c)) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.614 | QPK/9kHz | **33.4** | 10 | 20.2 | -19.1 | **34.5** | 50.5 @ 30 | **16.0** | V,90° / 90°/100 |
| Measurement uncertainty | | 4 dB | | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |
|---|---|---|---|

| Further test results are attached | ~~yes~~ | **no** | page no: |
|---|---|---|---|

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

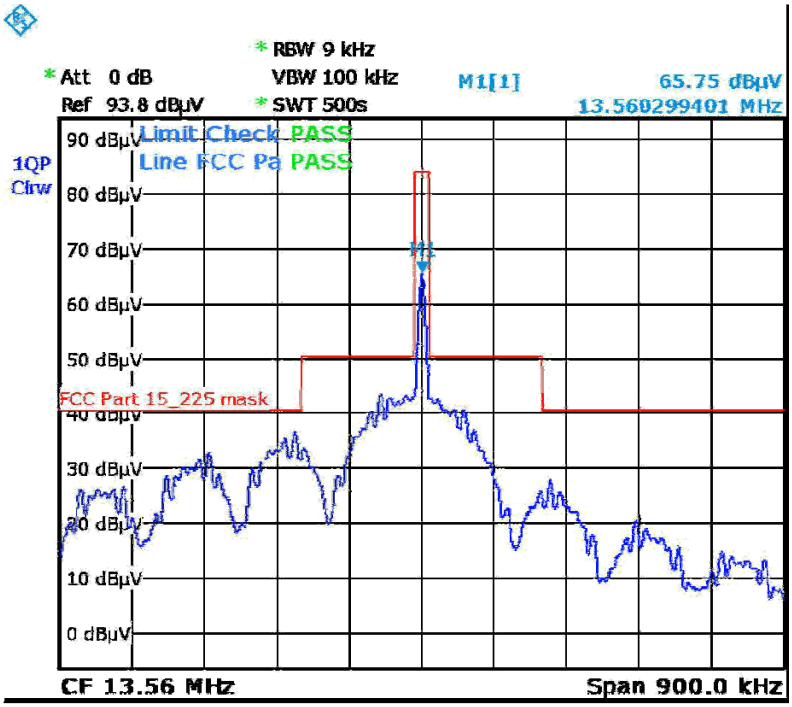
**Date of issue: 2009-01-24**

RFI341-1502S04 + Multiplexer FCC + antenna RFA331-1020, modulation depth = 100%

**INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c))**

| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level dBµV | Test distance m | Correction factor dB | Distance extrapol. factor dB | Level corrected dBµV/m | Limit dBµV/m @ meter | Margin dBµV/m | Polaris. EUT / antenna orientation height/cm |
|---|---|---|---|---|---|---|---|---|---|
| 13.182 | QPK/9kHz | **26.1** | 10 | 20.2 | -19.1 | **27.3** | 40.5 @ 30 | **13.2** | V,90° / 90°/100 |
| 13.287 | QPK/9kHz | **31.5** | 10 | 20.2 | -19.1 | **32.6** | 40.5 @ 30 | **7.9** | V,90° / 90°/100 |
| 13.398 | QPK/9kHz | **35.4** | 10 | 20.2 | -19.1 | **36.5** | 40.5 @ 30 | **4.0** | V,90° / 90°/100 |
| 13.506 | QPK/9kHz | **41.9** | 10 | 20.2 | -19.1 | **43.0** | 50.5 @ 30 | **7.5** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **39.5** | 10 | 20.2 | -19.1 | **40.6** | 50.5 @ 30 | **9.9** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **26.4** | 10 | 20.2 | -19.1 | **27.5** | 40.5 @ 30 | **13.0** | V,90° / 90°/100 |
| 13.821 | QPK/9kHz | **19.7** | 10 | 20.2 | -19.1 | **20.8** | 40.5 @ 30 | **19.7** | V,90° / 90°/100 |
| Measurement uncertainty | | | 4 dB | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| | | | |
|---|---|---|---|
| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~yes~~ | **no** | page no: |

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

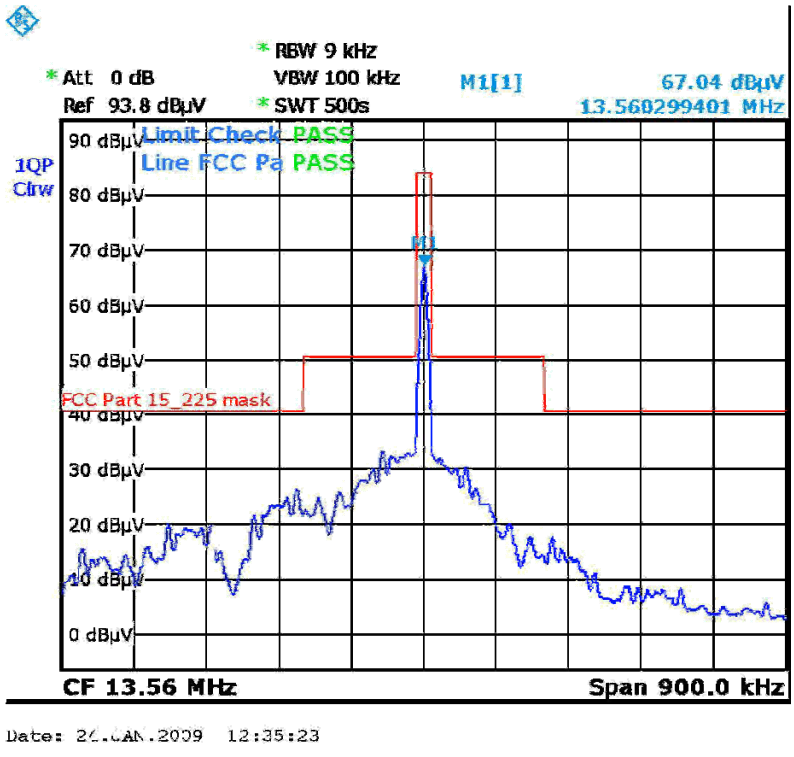
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Multiplexer FCC + antenna RFA331-1020, modulation depth = 20%/100%

| **INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c))** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.407 | QPK/9kHz | **25.3** | 10 | 20.2 | -19.1 | **26.4** | 40.5 @ 30 | **14.1** | V,90° / 90°/100 |
| 13.506 | QPK/9kHz | **31.4** | 10 | 20.2 | -19.1 | **32.5** | 50.5 @ 30 | **18.0** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **29.9** | 10 | 20.2 | -19.1 | **31.0** | 50.5 @ 30 | **19.5** | V,90° / 90°/100 |
| Measurement uncertainty | | 4 dB | | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| | | | |
|---|---|---|---|
| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~yes~~ | **no** | page no: |

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

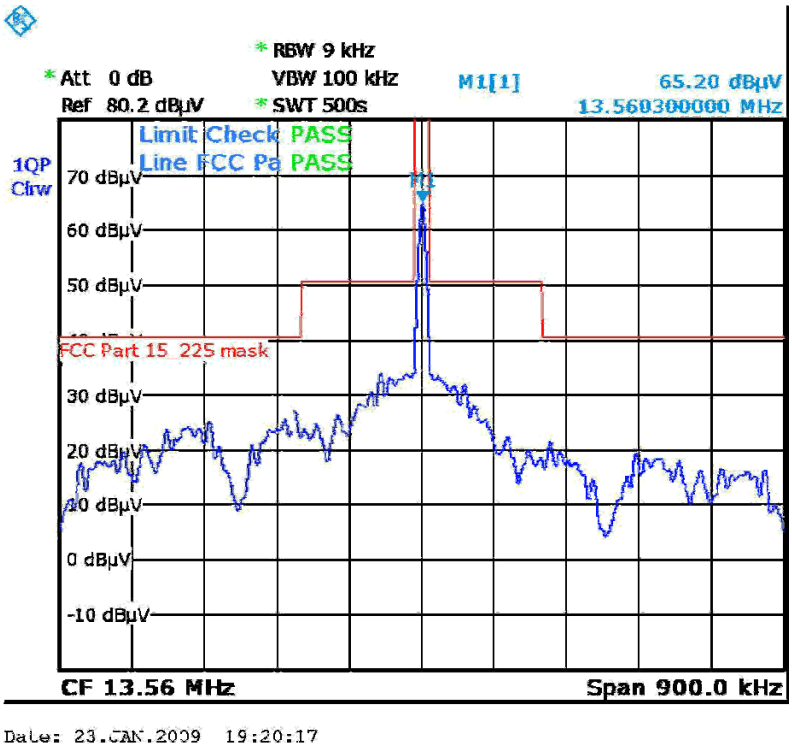
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Splitter + antenna RFA341-3520, modulation depth = 20%

| INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c)) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.299 | QPK/9kHz | **27.5** | 10 | 20.2 | -19.1 | **28.6** | 40.5 @ 30 | **11.9** | V,90° / 90°/100 |
| 13.407 | QPK/9kHz | **29.7** | 10 | 20.2 | -19.1 | **30.8** | 40.5 @ 30 | **9.7** | V,90° / 90°/100 |
| 13.506 | QPK/9kHz | **36.3** | 10 | 20.2 | -19.1 | **37.4** | 50.5 @ 30 | **13.1** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **35.8** | 10 | 20.2 | -19.1 | **36.9** | 50.5 @ 30 | **13.6** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **23.7** | 10 | 20.2 | -19.1 | **24.8** | 40.5 @ 30 | **15.7** | V,90° / 90°/100 |
| 13.821 | QPK/9kHz | **23.0** | 10 | 20.2 | -19.1 | **24.1** | 40.5 @ 30 | **16.4** | V,90° / 90°/100 |
| Measurement uncertainty | | 4 dB | | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| | | | |
|---|---|---|---|
| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~yes~~ | **no** | page no: |

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

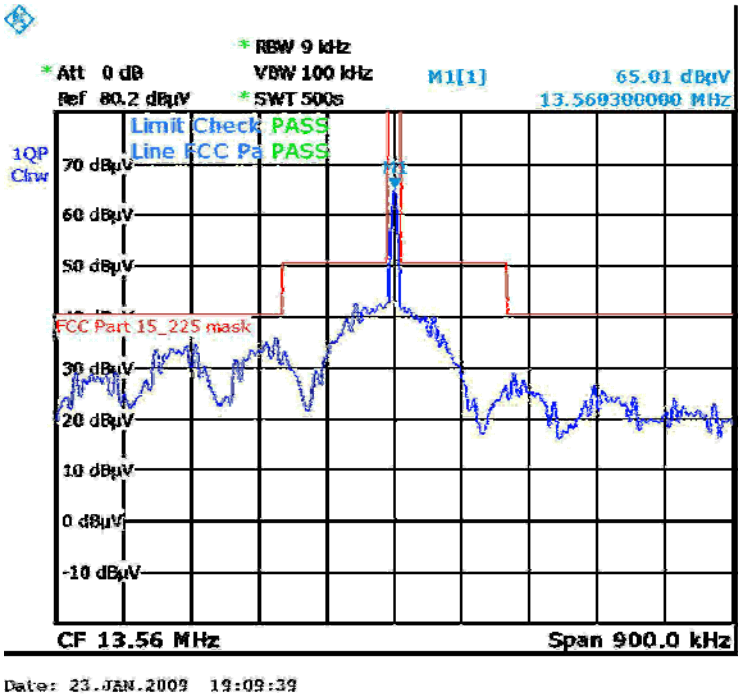
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Splitter + antenna RFA341-3520, modulation depth = 100%

| INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c)) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.182 | QPK/9kHz | **29.4** | 10 | 20.2 | -19.1 | **30.5** | 40.5 @ 30 | **10.0** | V,90° / 90°/100 |
| 13.299 | QPK/9kHz | **23.9** | 10 | 20.2 | -19.1 | **35.0** | 40.5 @ 30 | **5.5** | V,90° / 90°/100 |
| 13.407 | QPK/9kHz | **35.7** | 10 | 20.2 | -19.1 | **36.8** | 40.5 @ 30 | **3.7** | V,90° / 90°/100 |
| 13.506 | QPK/9kHz | **41.8** | 10 | 20.2 | -19.1 | **42.9** | 50.5 @ 30 | **7.6** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **39.0** | 10 | 20.2 | -19.1 | **40.1** | 50.5 @ 30 | **10.4** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **27.4** | 10 | 20.2 | -19.1 | **28.5** | 40.5 @ 30 | **12.0** | V,90° / 90°/100 |
| 13.821 | QPK/9kHz | **25.6** | 10 | 20.2 | -19.1 | **26.7** | 40.5 @ 30 | **13.8** | V,90° / 90°/100 |
| 13.938 | QPK/9kHz | **23.4** | 10 | 20.2 | -19.1 | **24.5** | 40.5 @ 30 | **16.0** | V,90° / 90°/100 |
| Measurement uncertainty | | | 4 dB | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| | | | |
|---|---|---|---|
| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~yes~~ | **no** | page no: |

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

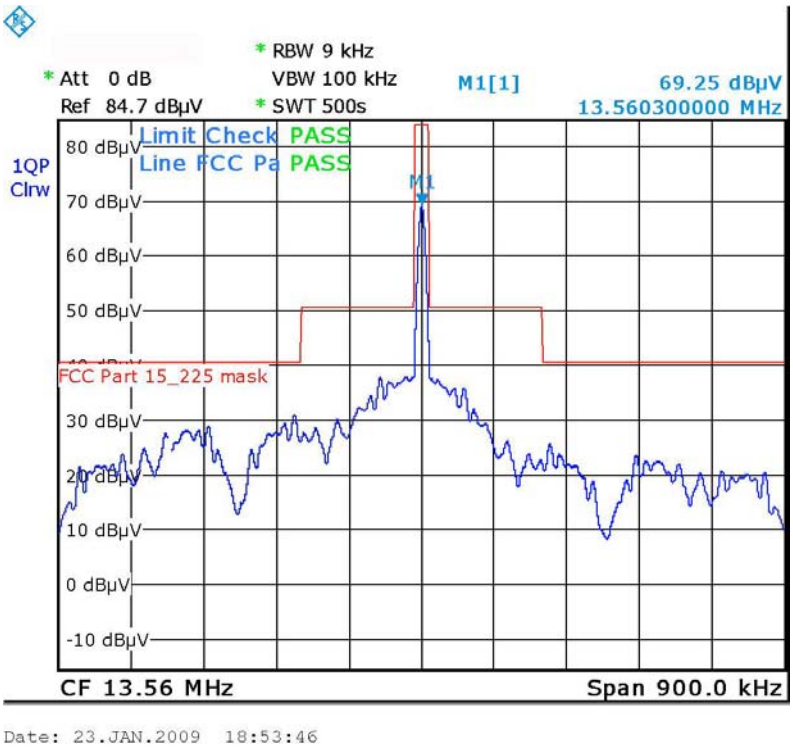
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Splitter + antenna RFA341-3520, modulation depth = 20%/100%

| INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c)) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.299 | QPK/9kHz | **23.6** | 10 | 20.2 | -19.1 | **24.7** | 40.5 @ 30 | **15.8** | V,90° / 90°/100 |
| 13.407 | QPK/9kHz | **26.1** | 10 | 20.2 | -19.1 | **27.2** | 40.5 @ 30 | **13.3** | V,90° / 90°/100 |
| 13.506 | QPK/9kHz | **33.3** | 10 | 20.2 | -19.1 | **34.4** | 50.5 @ 30 | **16.1** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **31.0** | 10 | 20.2 | -19.1 | **32.1** | 50.5 @ 30 | **18.4** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **19.9** | 10 | 20.2 | -19.1 | **21.0** | 40.5 @ 30 | **19.5** | V,90° / 90°/100 |
| 13.821 | QPK/9kHz | **18.7** | 10 | 20.2 | -19.1 | **19.8** | 40.5 @ 30 | **20.7** | V,90° / 90°/100 |
| Measurement uncertainty | | | 4 dB | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| | | | |
|---|---|---|---|
| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~yes~~ | **no** | page no: |

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

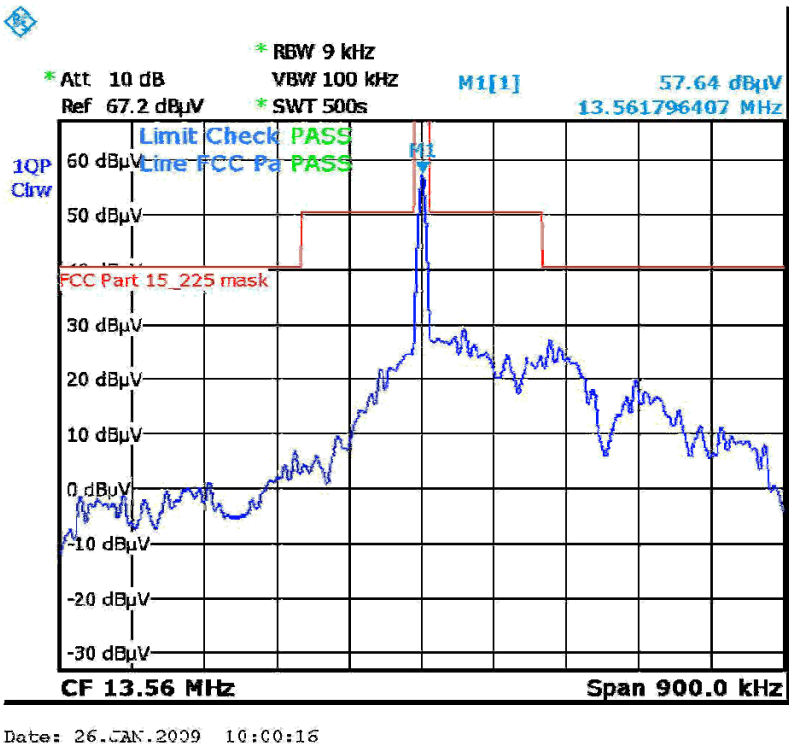
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Splitter + antenna RFA331-1020, modulation depth = 20%

| INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c)) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.506 | QPK/9kHz | **20.8** | 10 | 20.2 | -19.1 | **21.9** | 50.5 @ 30 | **18.6** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **27.4** | 10 | 20.2 | -19.1 | **28.5** | 50.5 @ 30 | **22.0** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **24.9** | 10 | 20.2 | -19.1 | **26.0** | 40.5 @ 30 | **14.5** | V,90° / 90°/100 |
| 13.821 | QPK/9kHz | **18.7** | 10 | 20.2 | -19.1 | **19.8** | 40.5 @ 30 | **20.7** | V,90° / 90°/100 |
| Measurement uncertainty | | 4 dB | | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| | | | |
|---|---|---|---|
| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~yes~~ | **no** | page no: |

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

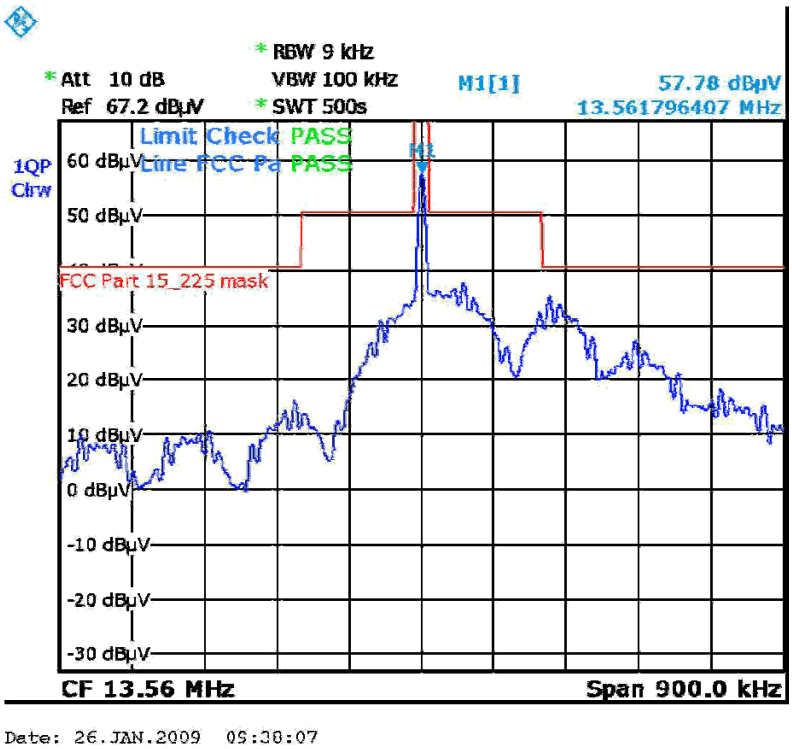
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Splitter + antenna RFA331-1020, modulation depth = 100%

| INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c)) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.506 | QPK/9kHz | **29.4** | 10 | 20.2 | -19.1 | **30.5** | 50.5 @ 30 | **20.0** | V,90° / 90°/100 |
| 13.614 | QPK/9kHz | **36.7** | 10 | 20.2 | -19.1 | **37.8** | 50.5 @ 30 | **12.7** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **34.3** | 10 | 20.2 | -19.1 | **35.4** | 40.5 @ 30 | **5.1** | V,90° / 90°/100 |
| 13.821 | QPK/9kHz | **26.1** | 10 | 20.2 | -19.1 | **27.2** | 40.5 @ 30 | **13.3** | V,90° / 90°/100 |
| Measurement uncertainty | | | 4 dB | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| | | | |
|---|---|---|---|
| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~yes~~ | **no** | page no: |

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

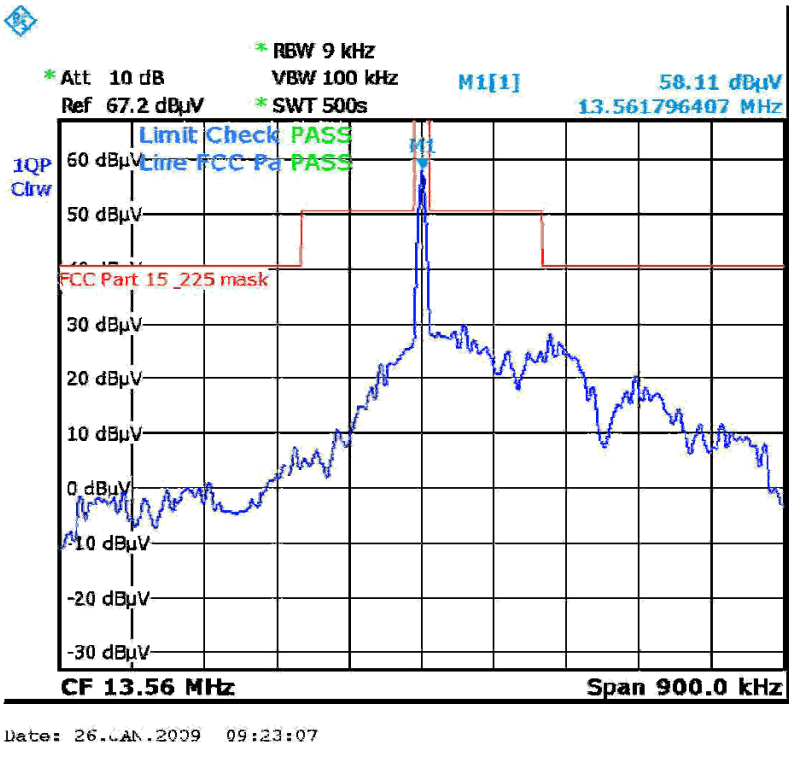
**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Splitter + antenna RFA331-1020, modulation depth = 20%/100%

| INTENTIONAL RADIATOR SPURIOUS RADIATION (Section 15.225(b)(c)) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f (MHz) | Bandwidth (kHz), Type of detector | Noted receiver level **dBµV** | Test distance **m** | Correction factor **dB** | Distance extrapol. factor **dB** | Level corrected **dBµV/m** | Limit **dBµV/m @ meter** | Margin **dBµV/m** | Polaris. EUT / antenna orientation height/cm |
| 13.614 | QPK/9kHz | **28.4** | 10 | 20.2 | -19.1 | **29.5** | 50.5 @ 30 | **21.0** | V,90° / 90°/100 |
| 13.713 | QPK/9kHz | **27.1** | 10 | 20.2 | -19.1 | **28.2** | 40.5 @ 30 | **12.3** | V,90° / 90°/100 |
| 13.821 | QPK/9kHz | **19.2** | 10 | 20.2 | -19.1 | **20.3** | 40.5 @ 30 | **20.2** | V,90° / 90°/100 |
| Measurement uncertainty | | 4 dB | | | | | | | |

Remark: *[1] noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 – 30 MHz)




| | | | |
|---|---|---|---|
| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |

| | | | |
|---|---|---|---|
| Further test results are attached | ~~yes~~ | **no** | page no: |

n.a [x] see page no. 43



m. dudde hochfrequenz - technik Rottland 5a D-51429 Bergisch Gladbach Tel. +49 2207-96890 Fax +49 2207 968920

## 11.4 Frequency tolerance

### 11.4.1 Regulation

Test Requirement: FCC CFR47, Part 15C Test Procedure: ANSI C63.4:1992
15.225 (e) Operation within the band 13.553-13.567 MHz

### 11.4.2 Test equipment

| **Type** | **Manufacturer/ Model no.** | **Serial no.** | **Last calibration** | **Next calibration** |
|---|---|---|---|---|
| **Receiver (9 kHz –18.0 GHz)** | **Rohde & Schwarz Spectrum Analyzer FSL 18 (171a)** | **100.117** | **2008/10** | **2010/10** |
| Low noise signal generator (10kHz – 5.4GHz) | Marconi Instruments 2042 (6) | 119347/003 | 2006/06 | 2008/06 |
| Test probe | EMCO 7405-901 (41) | 1408 | 2005/01 | 2010/01 |
| | | | | |

### 11.4.3 Test procedures

The frequency tolerance of the carrier signal shall be maintained within ± 0.01 % of the operating frequency over a temperature variation of -20 °C to +55 °C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20 °C.



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### 11.4.4 Result

RFI341-1502S04 + Multiplexer FCC + antenna RFA341-3520

| **INTENTIONAL RADIATOR Frequency tolerance (Section 15.225(e))** | | | |
|---|---|---|---|
| **Test conditions** | | **Carrier Frequency 13.560 MHz** | |
| | | **Frequency error / kHz** | **Limit / kHz** |
| $T_{nom}$ +20 °C | $V_{nom}$ 24.0 V DC | **0.03** | **±1.35** |
| $T_{min}$ -20 °C | $V_{min}$ 20.0 V DC | **0.12** | **±1.35** |
| | $V_{max}$ 29.0 V DC | **0.12** | **±1.35** |
| $T_{max}$ +55 °C | $V_{min}$ 20.0 V DC | **0.01** | **±1.35** |
| | $V_{max}$ 29.0 V DC | **0.01** | **±1.35** |
| Maximum frequency error (kHz) | | **0.12** | **1.35** |
| Measurement uncertainty | | $\pm 5 * 10^{-8}$ | |

RFI341-1502S04 + Multiplexer FCC + antenna RFA341-1020

| **INTENTIONAL RADIATOR Frequency tolerance (Section 15.225(e))** | | | |
|---|---|---|---|
| **Test conditions** | | **Carrier Frequency 13.560 MHz** | |
| | | **Frequency error / kHz** | **Limit / kHz** |
| $T_{nom}$ +20 °C | $V_{nom}$ 24.0 V DC | **0.04** | **±1.35** |
| $T_{min}$ -20 °C | $V_{min}$ 20.0 V DC | **0.13** | **±1.35** |
| | $V_{max}$ 29.0 V DC | **0.13** | **±1.35** |
| $T_{max}$ +55 °C | $V_{min}$ 20.0 V DC | **0.02** | **±1.35** |
| | $V_{max}$ 29.0 V DC | **0.02** | **±1.35** |
| Maximum frequency error (kHz) | | **0.13** | **1.35** |
| Measurement uncertainty | | $\pm 5 * 10^{-8}$ | |

| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |
|---|---|---|---|

| Further test results are attached | ~~yes~~ | **no** | page no: |
|---|---|---|---|

n.a [x] see page no. 43

**EUT: RFI341-1503S04**
**FCC ID: WRMRFI3411503S04**

**Date of issue: 2009-01-24**

RFI341-1502S04 + Splitter + antenna RFA341-3520

| **INTENTIONAL RADIATOR Frequency tolerance (Section 15.225(e))** | | | |
|---|---|---|---|
| **Test conditions** | | **Carrier Frequency 13.560 MHz** | |
| | | **Frequency error / kHz** | **Limit / kHz** |
| $T_{nom}$ +20 °C | $V_{nom}$ 24.0 V DC | **0.03** | **±1.35** |
| $T_{min}$ -20 °C | $V_{min}$ 20.0 V DC | **0.12** | **±1.35** |
| | $V_{max}$ 29.0 V DC | **0.12** | **±1.35** |
| $T_{max}$ +55 °C | $V_{min}$ 20.0 V DC | **0.01** | **±1.35** |
| | $V_{max}$ 29.0 V DC | **0.01** | **±1.35** |
| Maximum frequency error (kHz) | | **0.12** | **1.35** |
| Measurement uncertainty | | $\pm 5 * 10^{-8}$ | |

RFI341-1502S04 + Splitter + antenna RFA341-1020

| **INTENTIONAL RADIATOR Frequency tolerance (Section 15.225(e))** | | | |
|---|---|---|---|
| **Test conditions** | | **Carrier Frequency 13.560 MHz** | |
| | | **Frequency error / kHz** | **Limit / kHz** |
| $T_{nom}$ +20 °C | $V_{nom}$ 24.0 V DC | **0.04** | **±1.35** |
| $T_{min}$ -20 °C | $V_{min}$ 20.0 V DC | **0.13** | **±1.35** |
| | $V_{max}$ 29.0 V DC | **0.13** | **±1.35** |
| $T_{max}$ +55 °C | $V_{min}$ 20.0 V DC | **0.02** | **±1.35** |
| | $V_{max}$ 29.0 V DC | **0.02** | **±1.35** |
| Maximum frequency error (kHz) | | **0.13** | **1.35** |
| Measurement uncertainty | | $\pm 5 * 10^{-8}$ | |

| The equipment meets the requirements | yes | ~~no~~ | ~~n.a.~~ |
|---|---|---|---|

| Further test results are attached | ~~yes~~ | **no** | page no: |
|---|---|---|---|

n.a [x] see page no. 43



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## 12. Additional information to this test report

**Remarks**

n.a.[1] not applicable, because antenna is part of the PCB

n.a.[2] not applicable, because EUT is directly battery powered



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**Date of issue: 2009-01-24**

# End of test report



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