# CETECOM Inc.

**CETECOM Inc.**

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**FCC LISTED, REG. NO.: 101450**
**&**
**RECOGNIZED BY INDUSTRY CANADA**
**IC – 3925**

**Test report no.: 184FCC/2001**
**FCC Part 15.247**
**WL-305**

## Table of Contents



## 1 General information

### 1.1 Notes

**The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc. USA.**

**TEST REPORT PREPARED BY:**
**EMC & Radio Engineer: Harpreet Sidhu**

### 1.2 Testing laboratory

**CETECOM Inc.**
411 Dixon Landing Road, Milpitas, CA-95035, USA
Phone: +1 408 586 6200 Fax: +1 408 586 6299
E-mail: lothar.schmidt@cetecomusa.com
Internet: www.cetecom.com

### 1.3 Details of applicant

**Name : 3COM Corporation**
**Street : 5400 Bayfront Plaza**
**City : Santa Clara, CA 95051**
**Country : USA**
**Contact : David Boldy**
**Telephone : 408 326 2878**
**Telefax : 408 326 5854**
**e-mail : david_boldy@3com.com**

### 1.4 Application details

Date of receipt of application : 2001-08-25
Date of receipt of test item : 2001-09-11
Date of test : 2001-09-11/12

### 1.5 Test item

| | | |
|---|---|---|
| Manufacturer | : | applicant |
| Name of EUT | : | 3COM Model WL-305 |
| Description | : | Wireless LAN PC Card |
| Model No. | : | WL-305 |
| Serial No. | : | N/A |
| FCC ID | : | |

**Additional informations**

| | | |
|---|---|---|
| Frequency | : | 2400 – 2483.5 MHz |
| Type of modulation | : | DSSS |
| Number of channels | : | 13 |
| Antenna | : | External Antenna |
| Power supply | : | PC Card |
| Output power | : | 16dBm |
| Extreme Vol. Limits | : | 3.3V ±10% |
| Extreme Temp. Limits | : | -20°C - +55°C |

### 1.6 Test standards : FCC Part 15 §15.247

## 2 Technical test

### 2.1 Summary of test results

**No deviations from the technical specification(s) were ascertained in the course of the tests performed.**

**Technical responsibility for area of testing :**

| Date | Section | Name | Signature |
|---|---|---|---|
| 2001-10-29 | EMC & Radio | Lothar Schmidt | |

## 2.2 Testreport

**TEST REPORT**

**Testreport no. : 187FCC/2001**
**WL-305**

**TEST REPORT REFERENCE**

**LIST OF MEASUREMENTS**

**SPECTRUM BANDWITH OF DSSS-SYSTEM** **SUBCLAUSE § 15.247 (a)(2)**

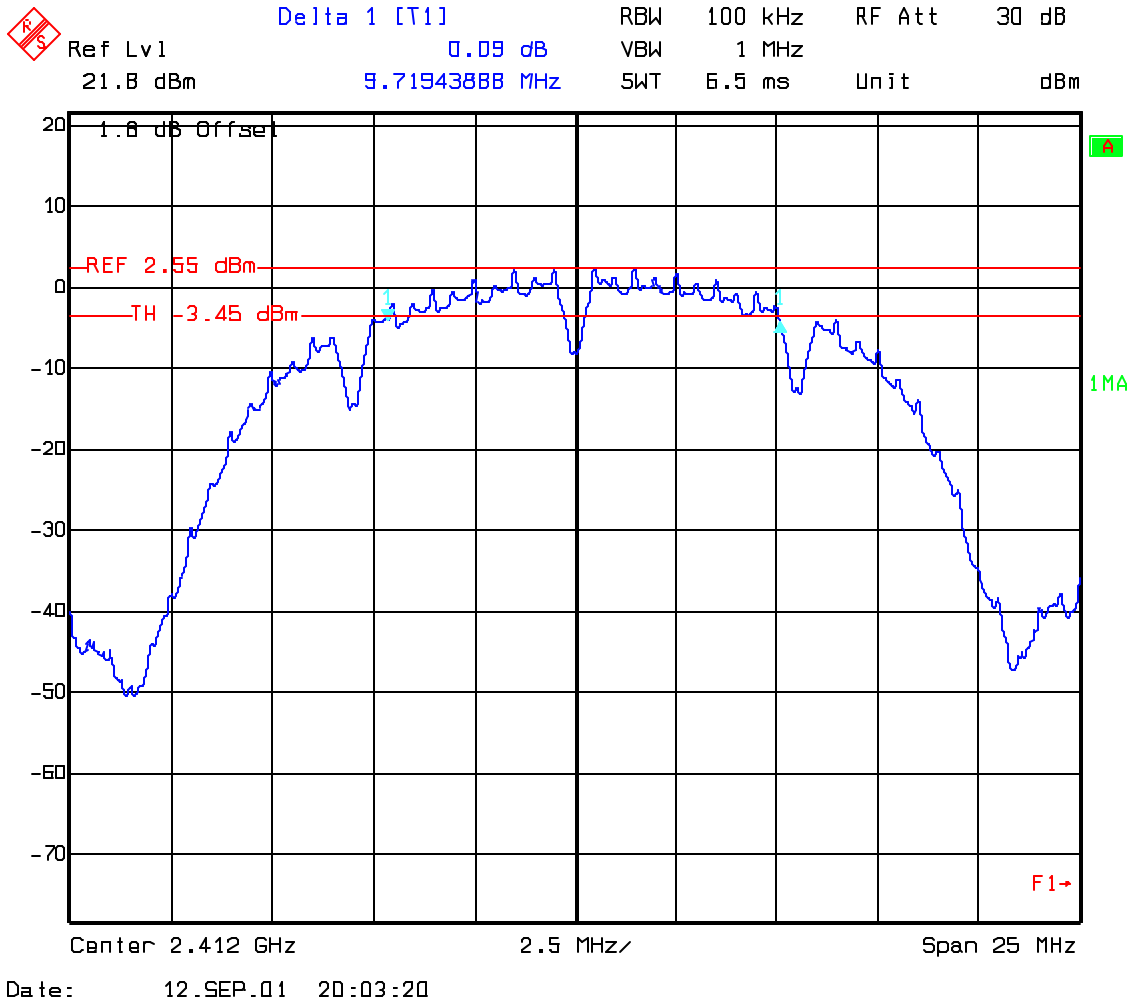
| TEST CONDITIONS | | 6 dB BANDWIDTH ( kHz ) | | |
|---|---|---|---|---|
| Frequency (MHz) | | 2412 | 2442 | 2472 |
| $T_{nom}$( 23 )° C | $V_{nom}$(3.3)V | 9719 | 9719 | 10000 |
| Measurement uncertainty | | ±3dB | | |

**LIMIT** **SUBCLAUSE §15.247(a) (2)**

| The minimum 6dB bandwith shall shall be at least 500 KHz |
|---|

**SPECTRUM BANDWITH OF DSSS-SYSTEM** **SUBCLAUSE § 15.247 (a)(2)**

**Low Channel: 2412 MHz**



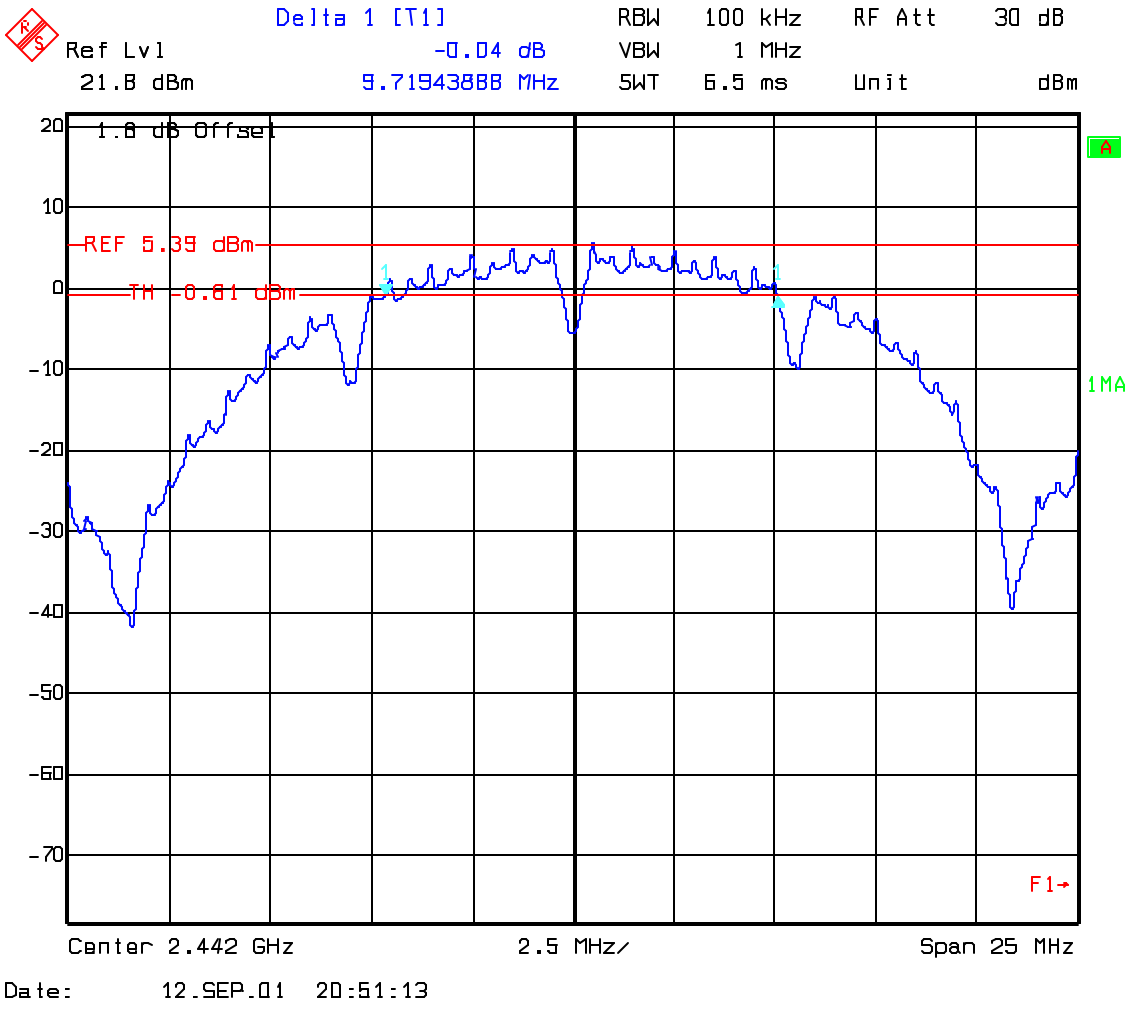

**LIMIT** **SUBCLAUSE §15.247(a) (2)**

| |
|---|
| **The minimum 6dB bandwith shall shall be at least 500 KHz** |

**ANALYZER SETTINGS: RBW=100KHz , VBW=1MHz**

**SPECTRUM BANDWITH OF DSSS-SYSTEM** **SUBCLAUSE § 15.247 (a)(2)**

**Mid Channel: 2442 MHz**



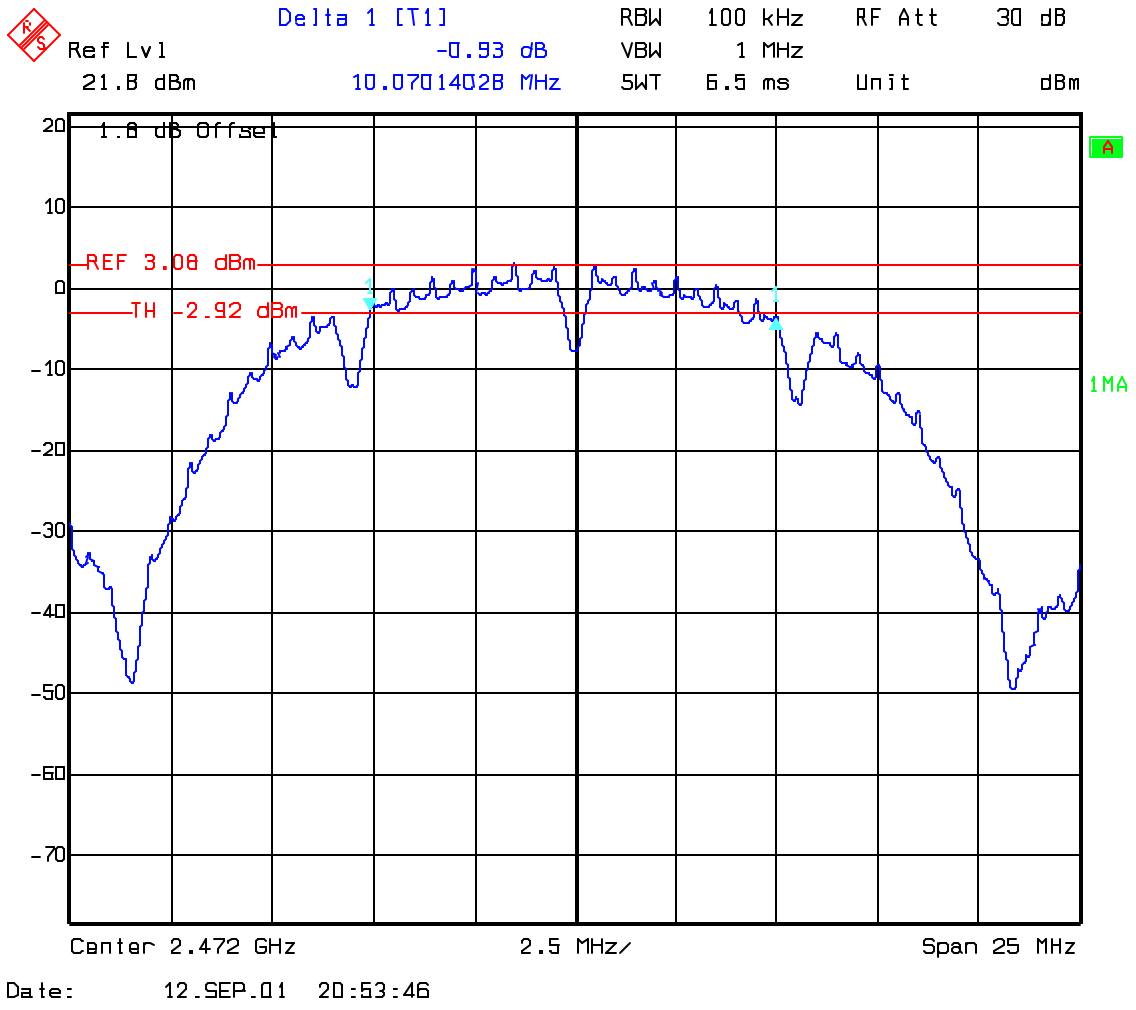

**LIMIT** **SUBCLAUSE §15.247(a) (2)**

| |
|---|
| **The minimum 6dB bandwith shall shall be at least 500 KHz** |

**ANALYZER SETTINGS: RBW=100KHz , VBW=1MHz**

**SPECTRUM BANDWITH OF DSSS-SYSTEM** **SUBCLAUSE § 15.247 (a)(2)**

**High Channel: 2472 MHz**




**LIMIT** **SUBCLAUSE §15.247(a) (2)**

| |
|---|
| **The minimum 6dB bandwith shall shall be at least 500 KHz** |

**ANALYZER SETTINGS: RBW=100KHz , VBW=1MHz**

**MAXIMUM PEAK OUTPUT POWER (CONDUCTED)** **SUBCLAUSE § 15.247 (b) (1)**

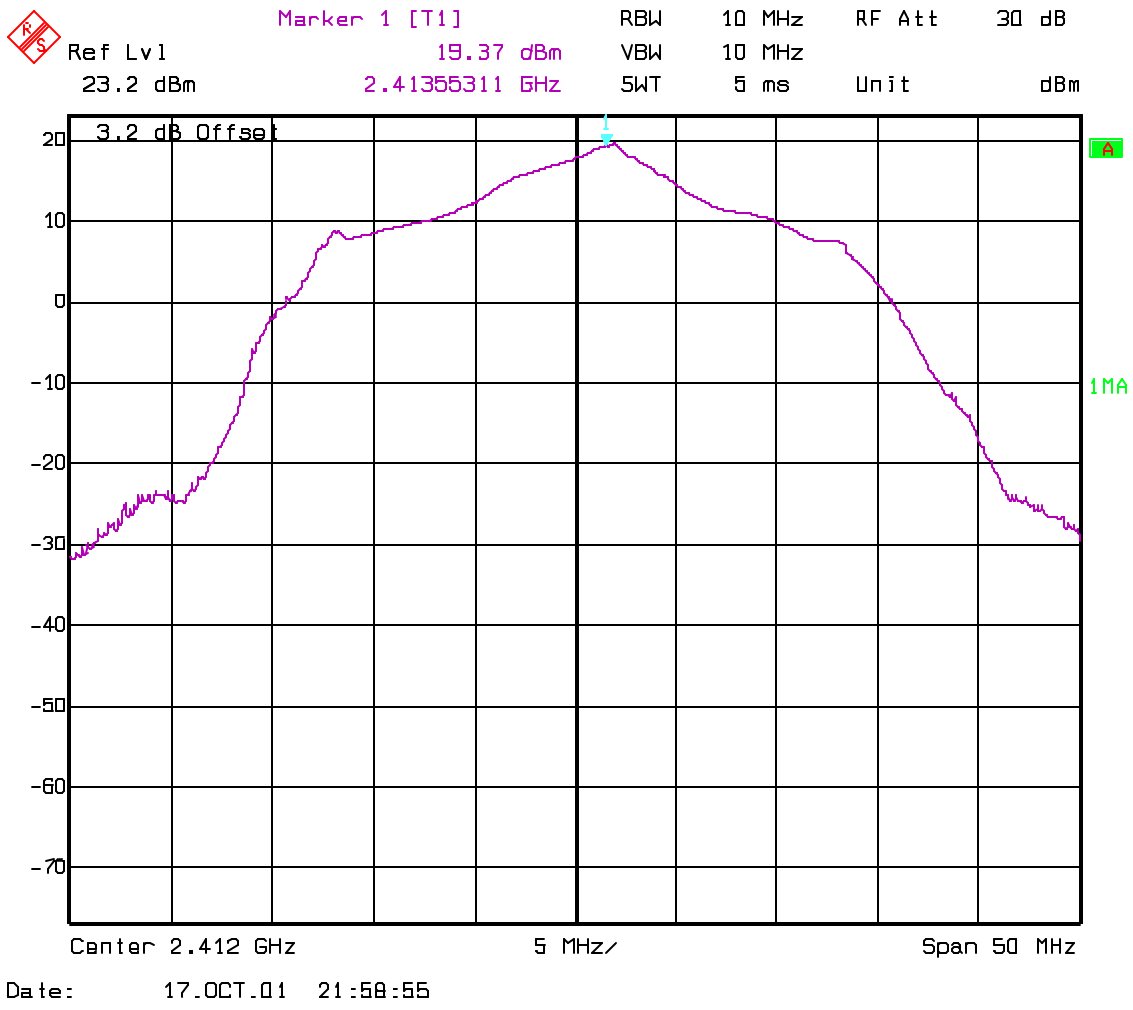
| TEST CONDITIONS | | MAXIMUM PEAK OUTPUT POWER (dBm) | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | | 2412 | | 2442 | | 2472 | |
| $T_{nom}$( 23 )° C | $V_{nom}$(3.3)V | Pk | 19.37 | Pk | 19.77 | Pk | 18.54 |
| | | Av | 11.96 | Av | 12.52 | Av | 11.34 |
| Measurement uncertainty | | ±3dB | | | | | |

**LIMIT** **SUBCLAUSE § 15.247 (b) (1)**

| Frequency range | RF power output |
|---|---|
| 2400-2483.5 MHz / 5725 – 5850 MHz | 1.0 Watt |

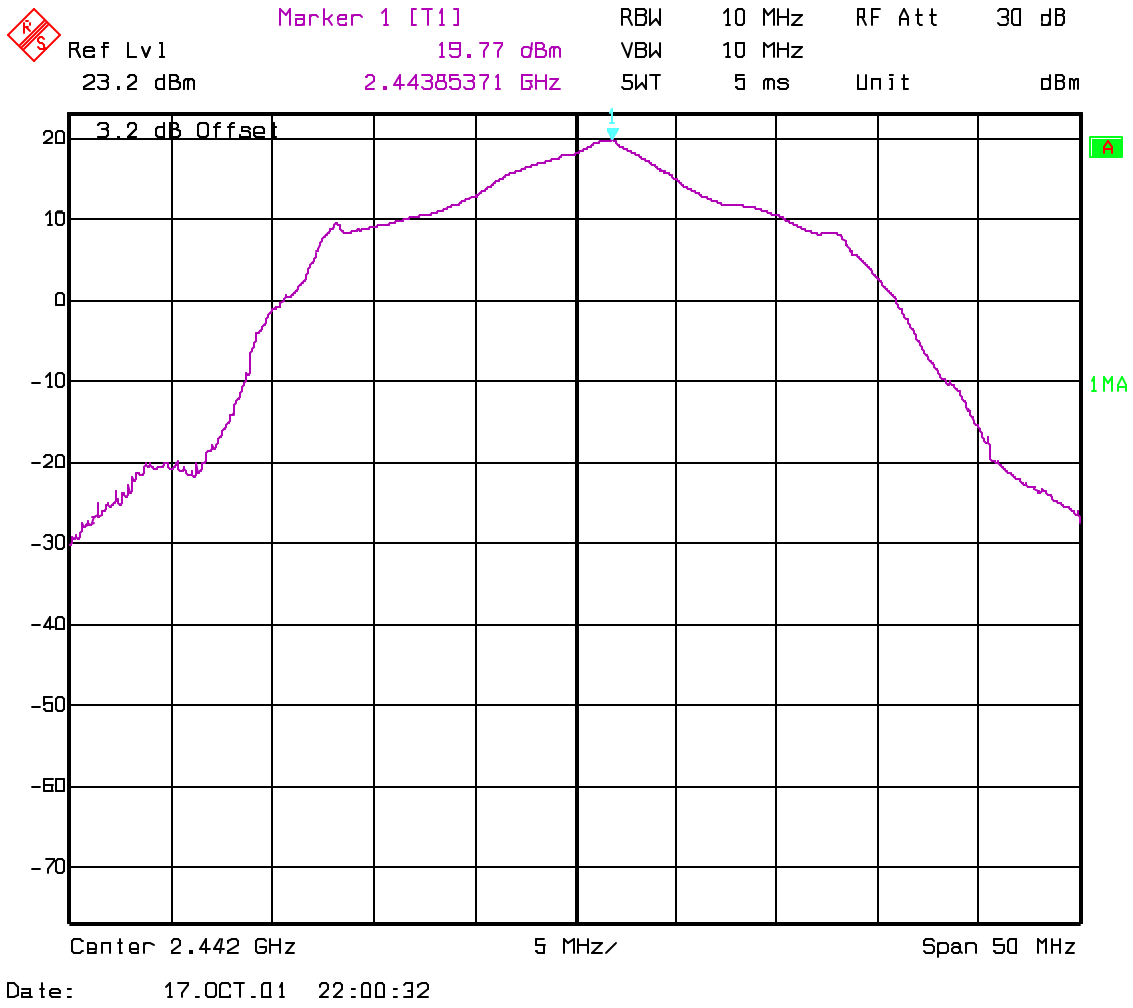
**MAXIMUM PEAK OUTPUT POWER (CONDUCTED)** **SUBCLAUSE § 15.247 (b) (1)**

**Low Channel: 2412 MHz**



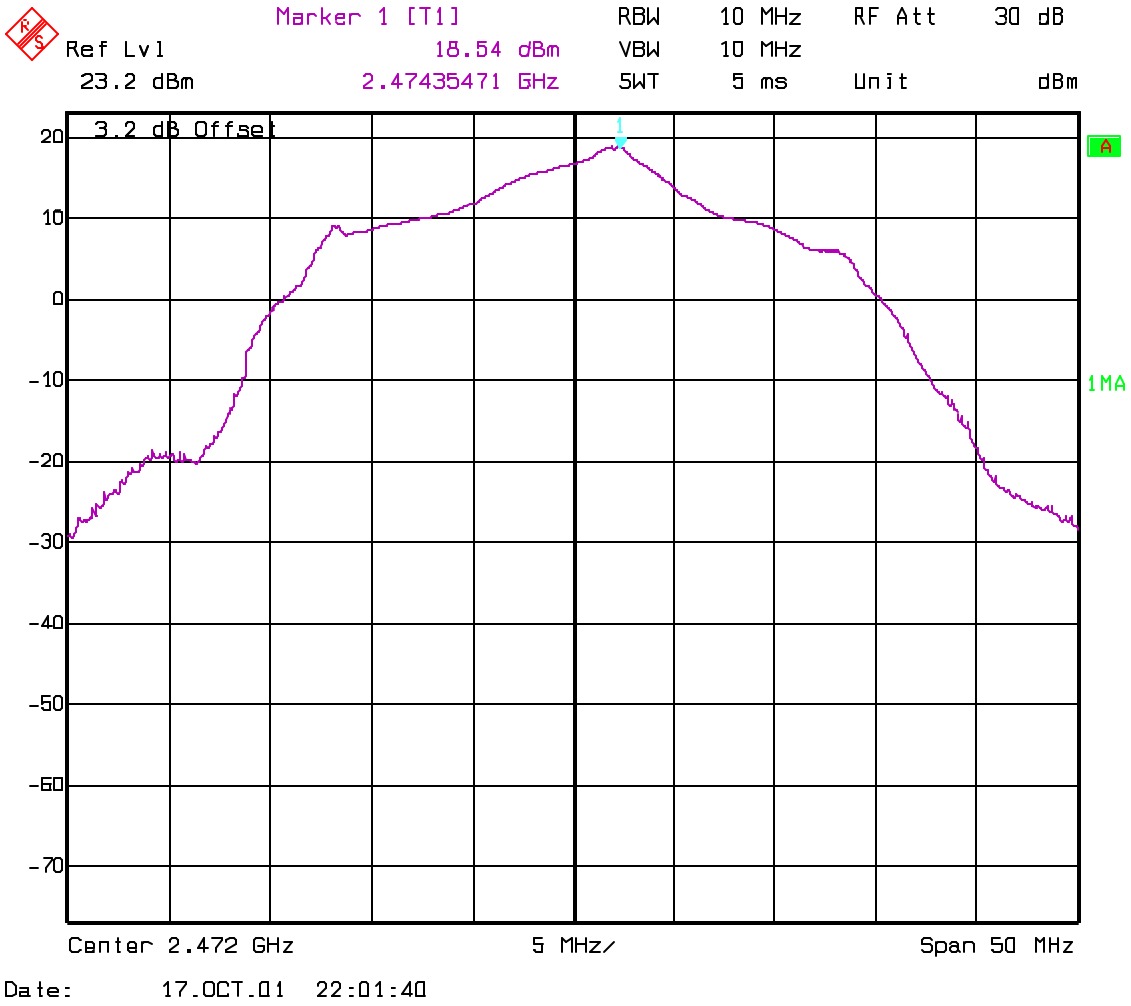
**MAXIMUM PEAK OUTPUT POWER (CONDUCTED)** **SUBCLAUSE § 15.247 (b) (1)**

**Mid Channel: 2442 MHz**



**MAXIMUM PEAK OUTPUT POWER (CONDUCTED)** **SUBCLAUSE § 15.247 (b) (1)**

**High Channel: 2472 MHz**



**MAXIMUM PEAK OUTPUT POWER (EIRP) (RADIATED)** **SUBCLAUSE § 15.247 (b) (1)**

| TEST CONDITIONS | | MAXIMUM PEAK OUTPUT POWER (dBm) | | |
|---|---|---|---|---|
| Frequency (MHz) | | 2412 | 2442 | 2472 |
| $T_{nom}$( 23 )° C | $V_{nom}$(3.3)V | 22.47 | 22.32 | 19.95 |
| Measurement uncertainty | | ±3dB | | |

**LIMIT** **SUBCLAUSE § 15.247 (b) (1)**

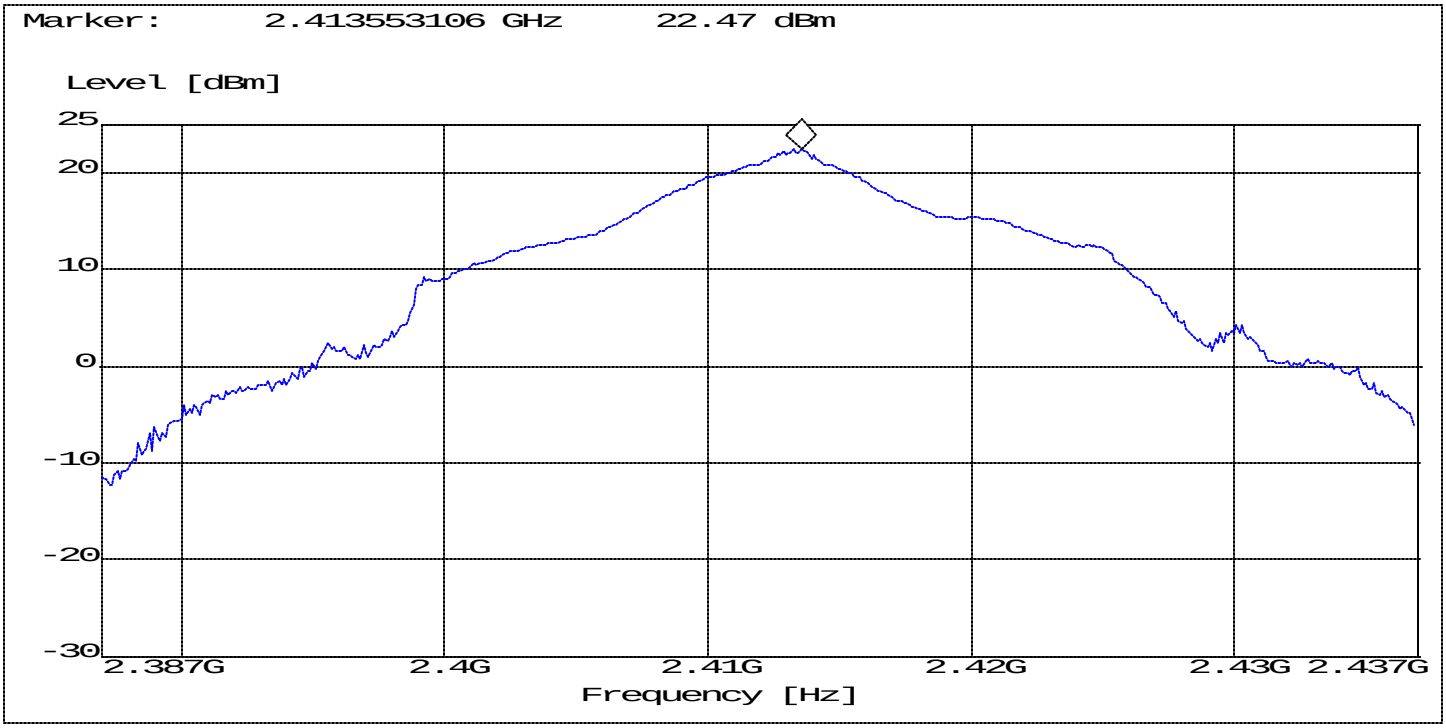
| Frequency range | RF power output |
|---|---|
| 2400-2483.5 MHz / 5725 – 5850 MHz | 1.0 Watt |

**ANALYZER SETTINGS: RBW=10MHz , VBW=10MHz**

**MAXIMUM PEAK OUTPUT POWER (EIRP) (RADIATED)** **SUBCLAUSE § 15.247 (b) (1)**

**Low Channel: 2412 MHz**

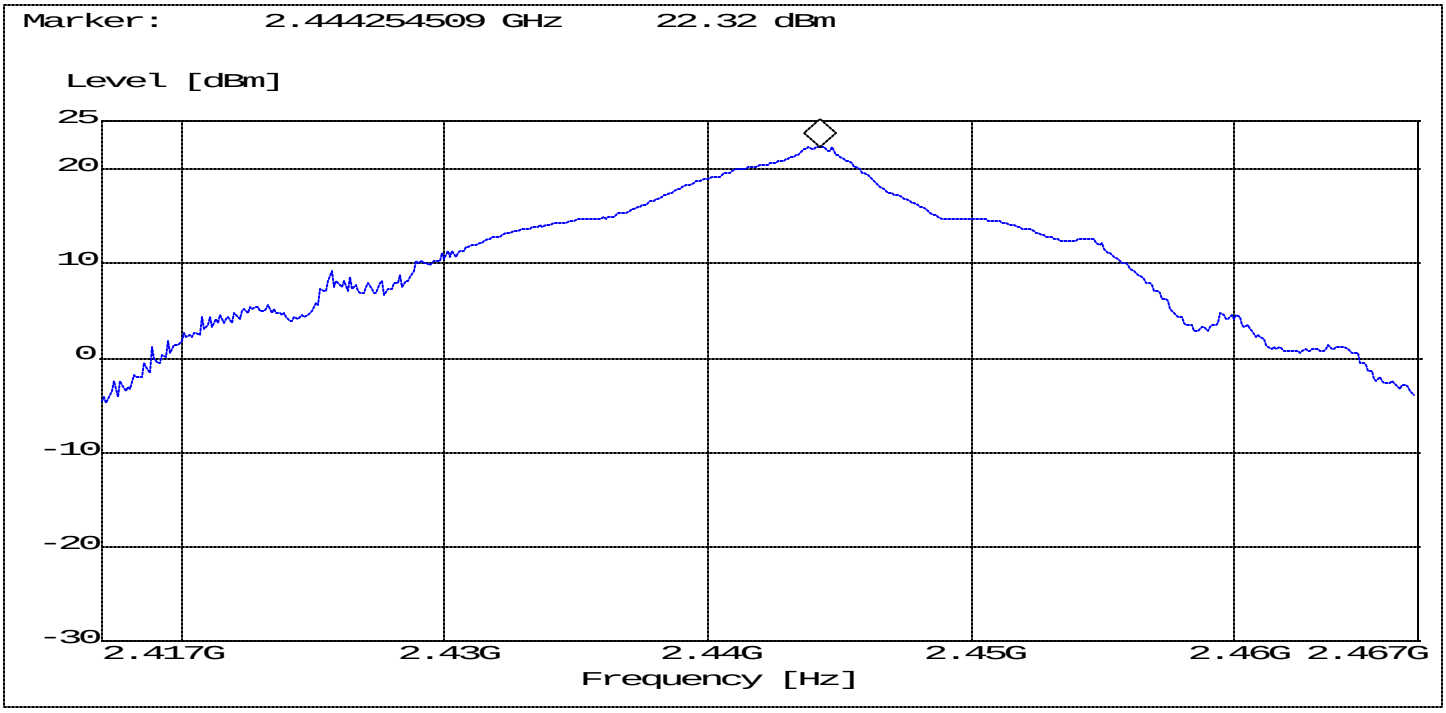
**ANALYZER SETTINGS: RBW=10MHz, VBW=10MHz**



**MAXIMUM PEAK OUTPUT POWER (EIRP) (RADIATED)** **SUBCLAUSE § 15.247 (b) (1)**

**Mid Channel: 2442 MHz**

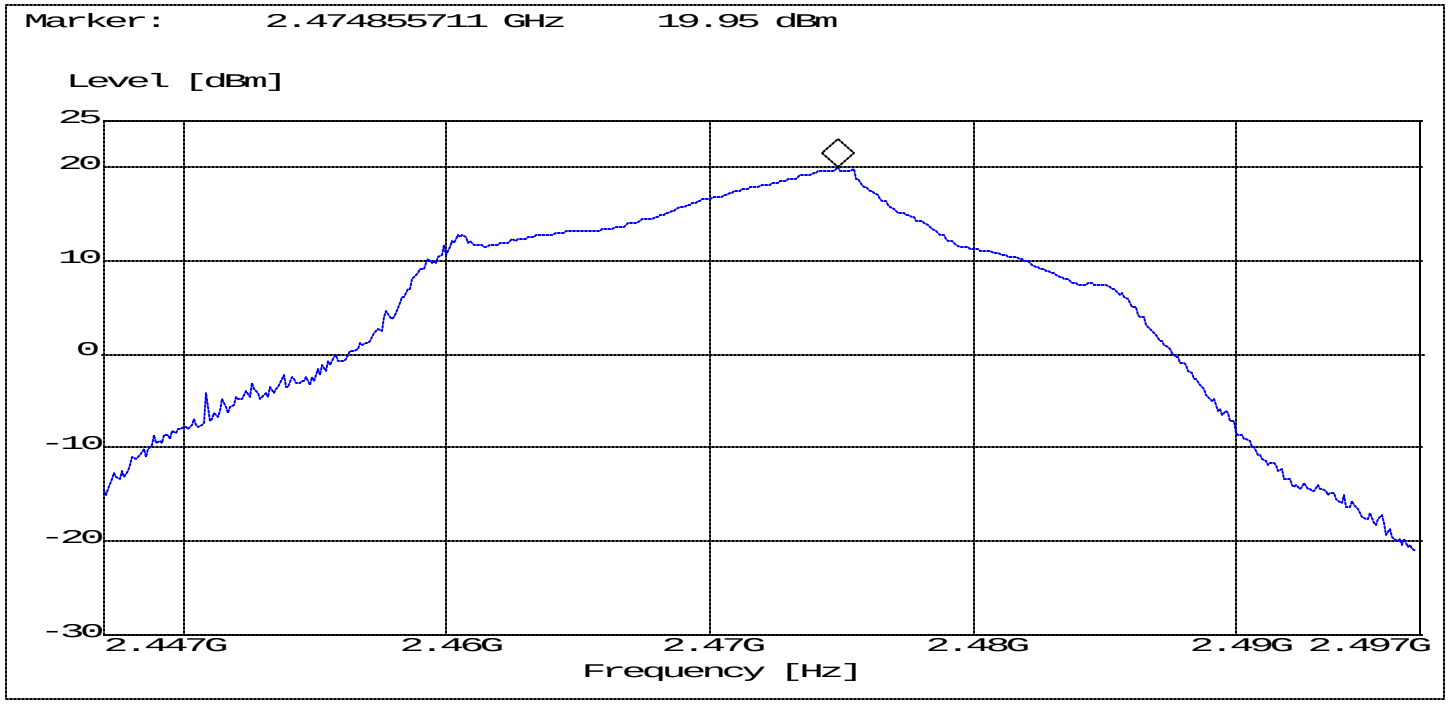
**ANALYZER SETTINGS: RBW=10MHz , VBW=10MHz**



**MAXIMUM PEAK OUTPUT POWER (EIRP) (RADIATED)** **SUBCLAUSE § 15.247 (b) (1)**

**High Channel: 2472 MHz**

**ANALYZER SETTINGS: RBW=10MHz, VBW=10MHz**



**EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**

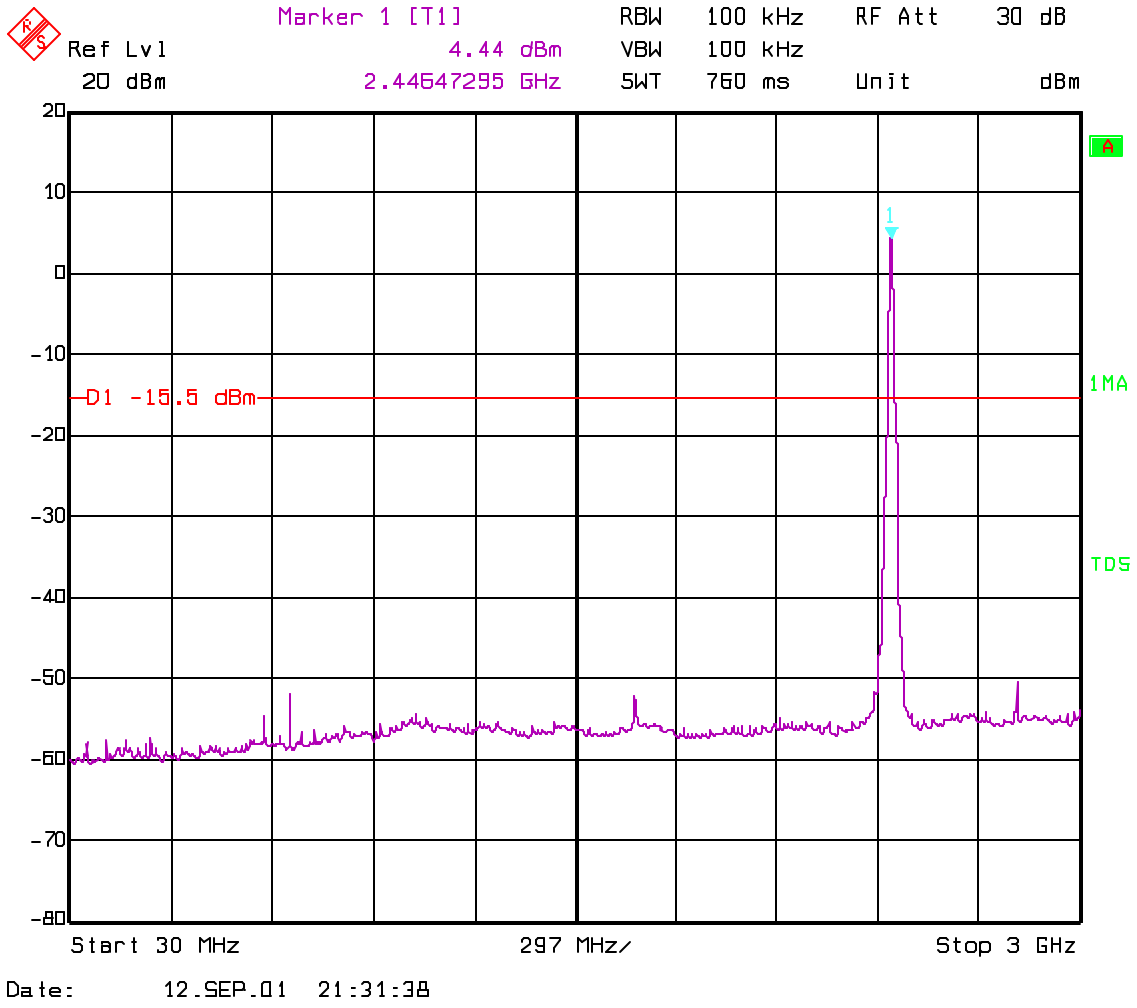
**NOTE: Since this product was originally tested at CETECOM ICT Services GmbH, Saarbrucken, Germany as per test report No. 2_2203-C/00, the Conducted & Radiated Emissions are carried out only on mddle channel (2442MHz)**

**Please refer to Test report No. 2_2203-C/00 of the original submission**

**EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**

**conducted**

**Mid Channel (2442 MHz): 30MHz – 3GHz**




**LIMITS SUBCLAUSE § 15.247 (c)**

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

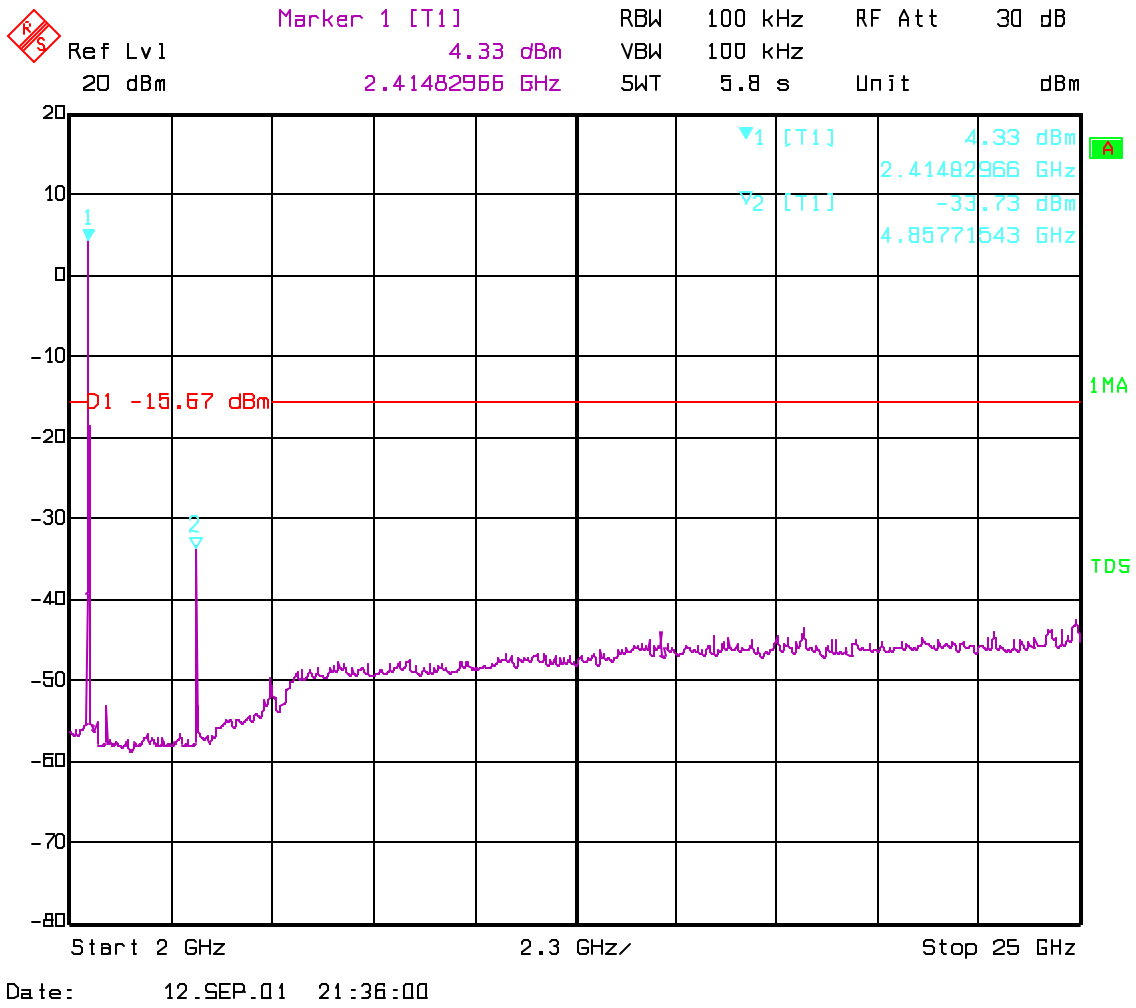
**ANALYZER SETTINGS: RBW=100KHz , VBW=100KHz**

**NOTE: The peak above the limit line is the carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.**

**EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**

**Conducted**

**Mid Channel (2442 MHz): 2GHz – 25GHz**




**LIMITS SUBCLAUSE § 15.247 (c)**

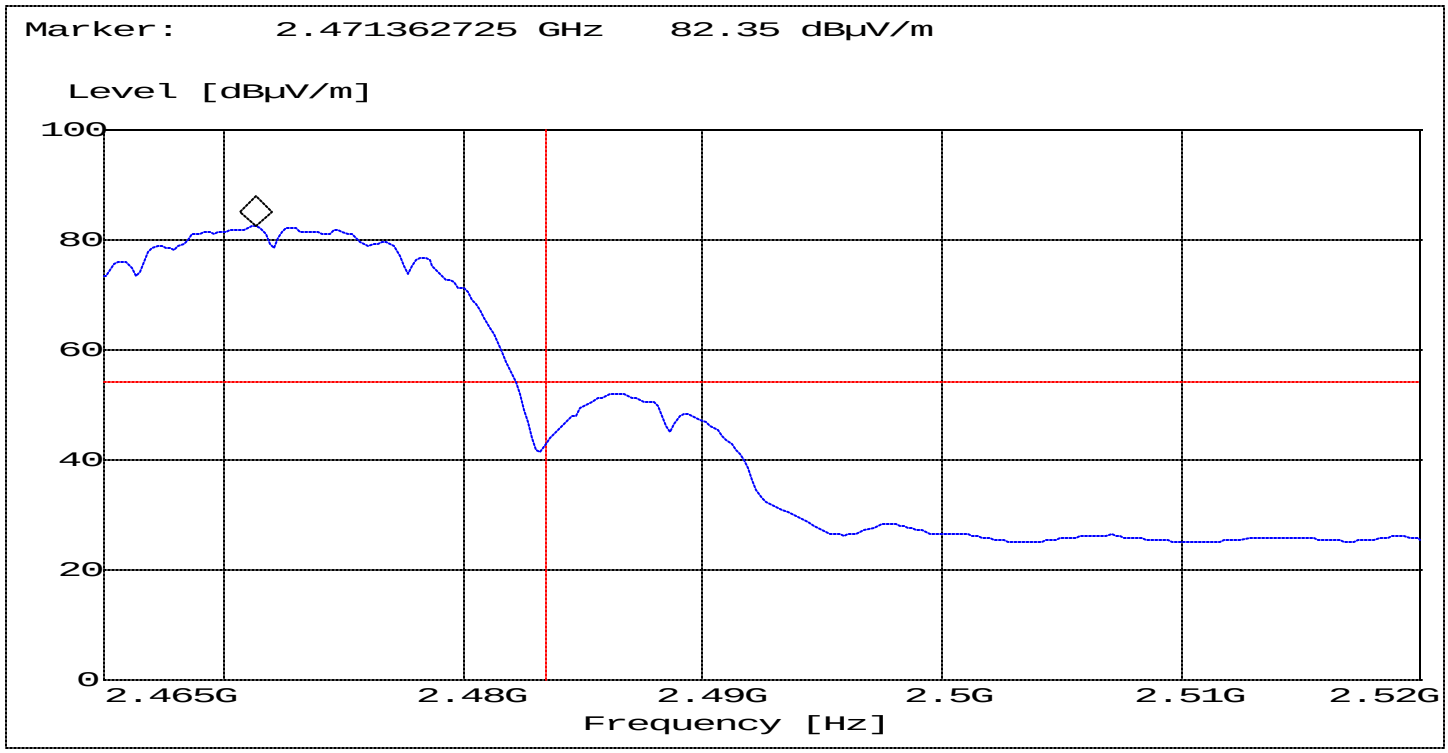
**In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).**

**ANALYZER SETTINGS: RBW=100KHz , VBW=100KHz**

**NOTE: The peak above the limit line is the carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.**

**EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (2)**

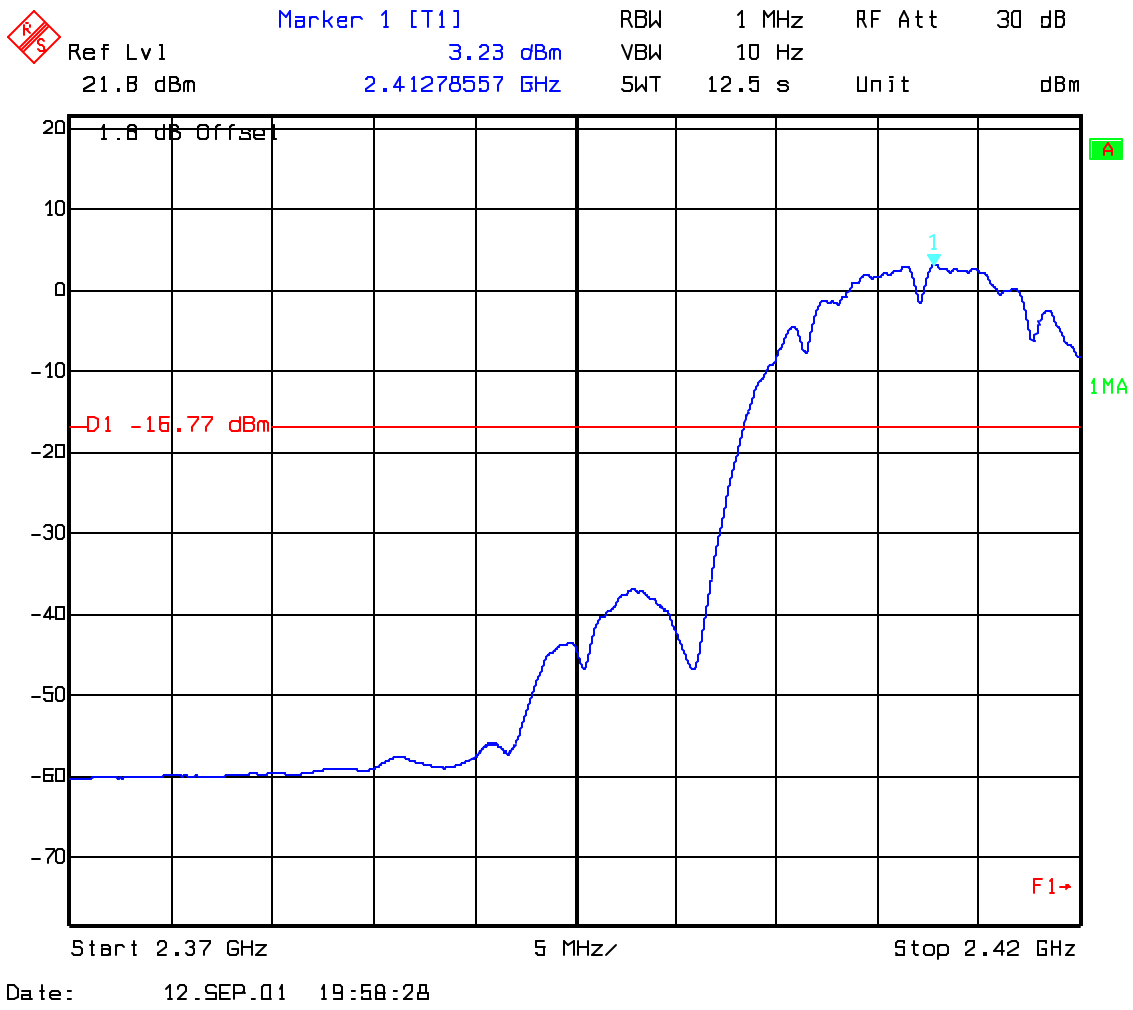
**conducted**
**spurious in the restricted band 2483.5 – 2500 MHz**
**(Higher Band Edge)**




**ANALYZER SETTINGS: RBW=1MHz VBW=10Hz**

**Lower Band Edge**

**conducted**



**EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**

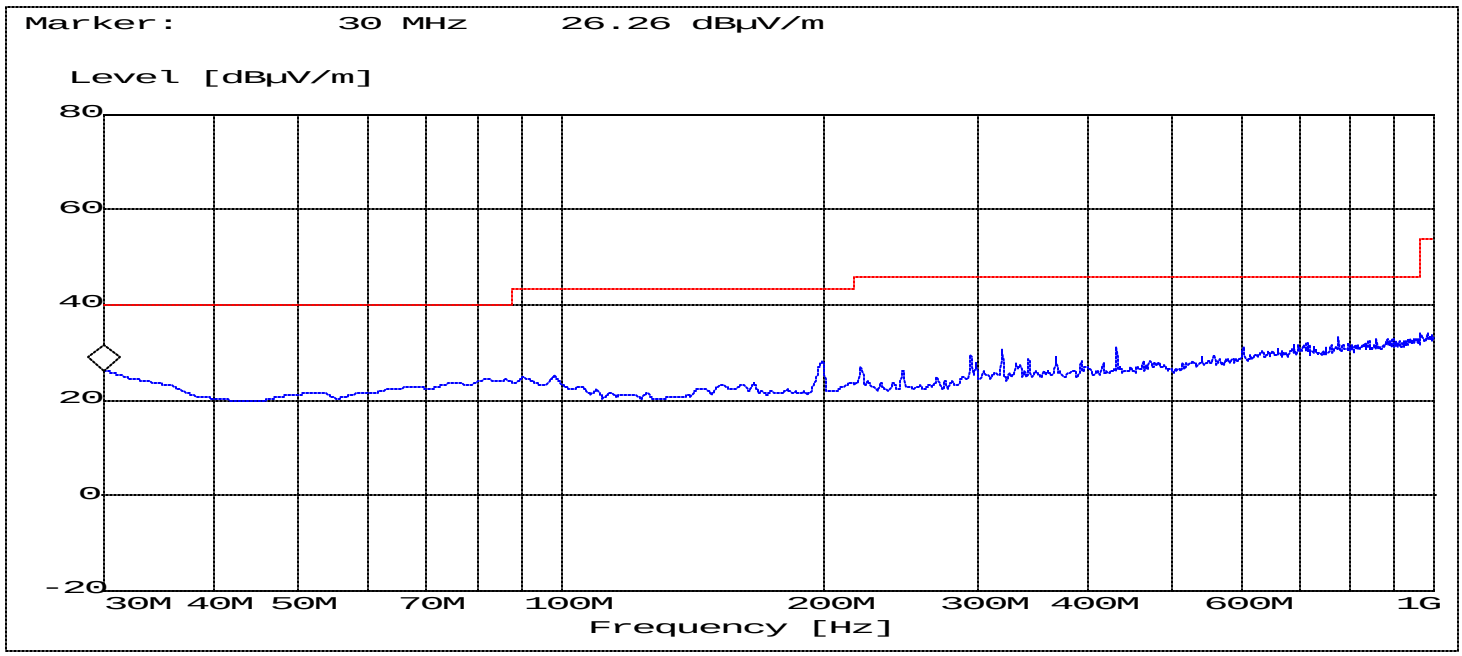
**Radiated**

**NOTE:**

**1. The Raidated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 18 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.**

**2. All emission measurements were done in Peak mode. In case limits are exceeded the measurements will be repeated and documented in the test report either with Quasi Peak ar average detector depending on the frequency range specified in FCC 15 and/or DA00-705. Bandwidth, sweeptime etc. were set according DA00-705 and recorded**

**Mid Channel(2442MHz): 30MHz-1GHz**



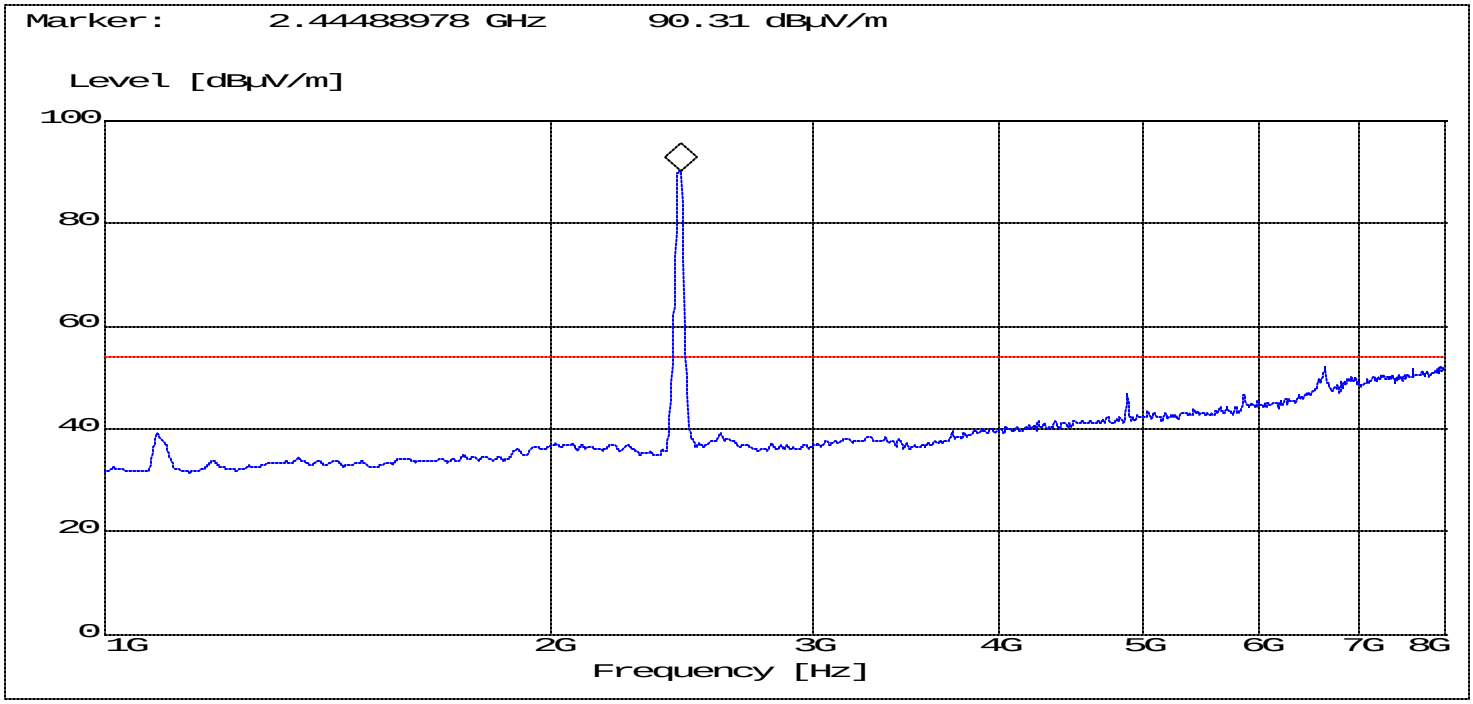

**LIMITS SUBCLAUSE § 15.247 (c)**

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

**ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz f ³ 1GHz : RBW/VBW: 1 MHz**

**EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**
**Radiated**

**Mid Channel(2442MHz): 1GHz-8GHz**




**NOTE: The peak above the limit line is the carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.**

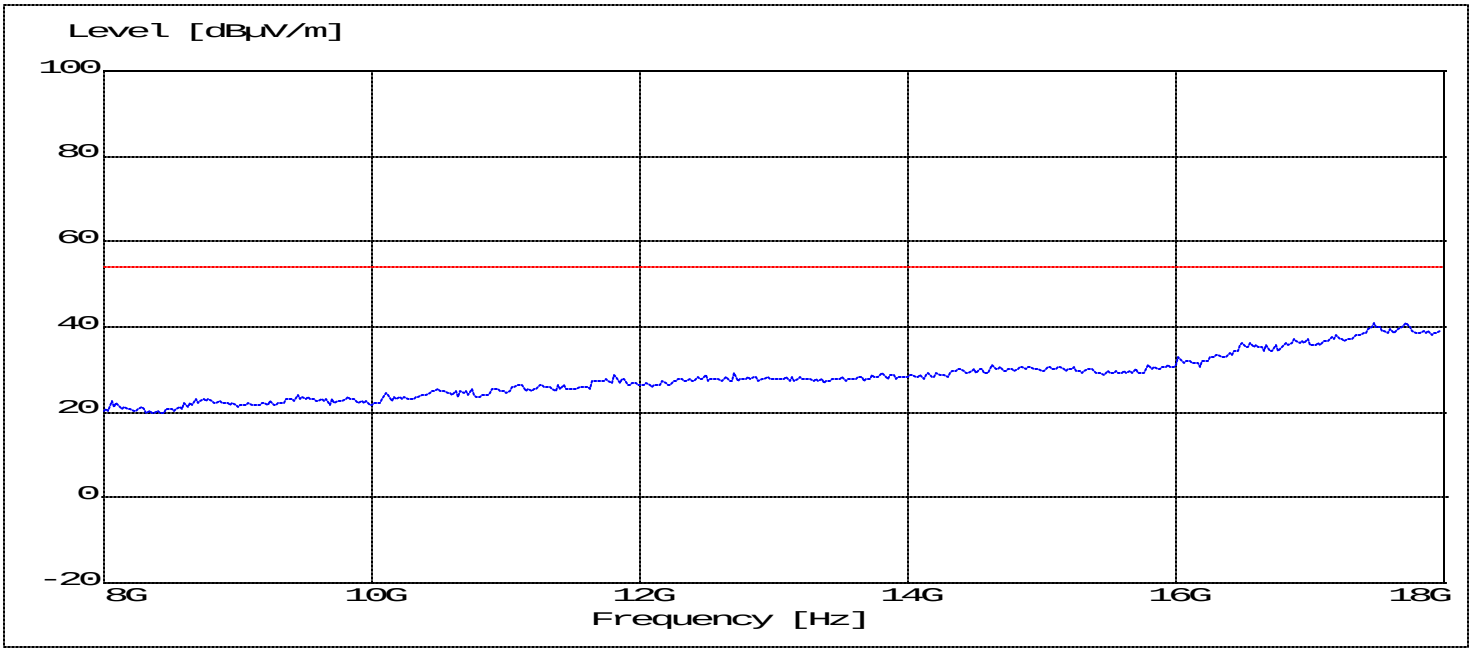
**LIMITS SUBCLAUSE § 15.247 (c)**

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

**ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz f ³ 1GHz : RBW/VBW: 1 MHz**

**EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**
**Radiated**

**Mid Channel(2442MHz): 8GHz-18GHz**



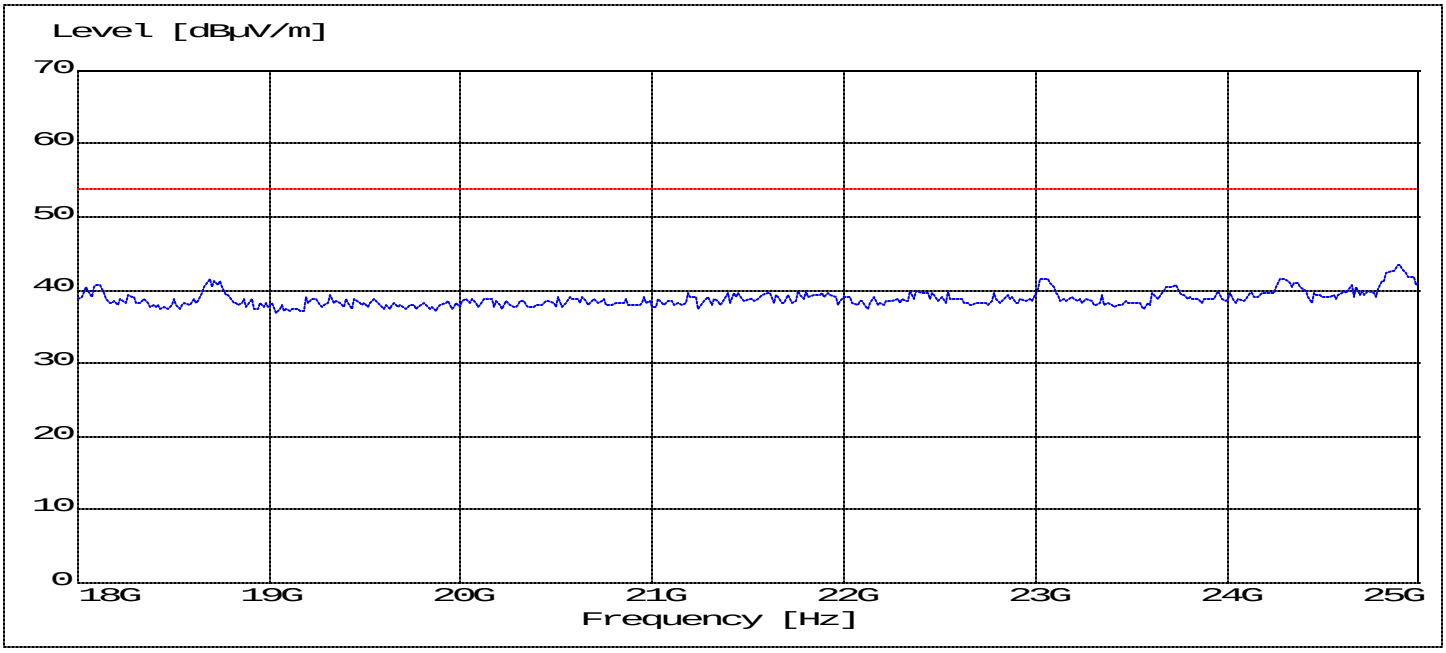

**LIMITS SUBCLAUSE § 15.247 (c)**

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

**ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz f ³ 1GHz : RBW/VBW: 1 MHz**

**EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**
**Radiated**

**Mid Channel(2442MHz): 18GHz-25GHz**




**LIMITS SUBCLAUSE § 15.247 (c)**

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

**ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz f ³ 1GHz : RBW/VBW: 1 MHz**

**POWER SPECTRAL DENSITY** **SUBCLAUSE § 15.247 (d)**

| TEST CONDITIONS | | RF POWER LEVEL IN 3 kHz BW | | |
|---|---|---|---|---|
| Frequency (MHz) | | 2412 | 2442 | 2472 |
| $T_{nom}$( 23 )° C | $V_{nom}$(3.3)V | -16.26 dBm | -13.35dBm | -15.87 dBm |
| Measurement uncertainty | | ±3dB | | |

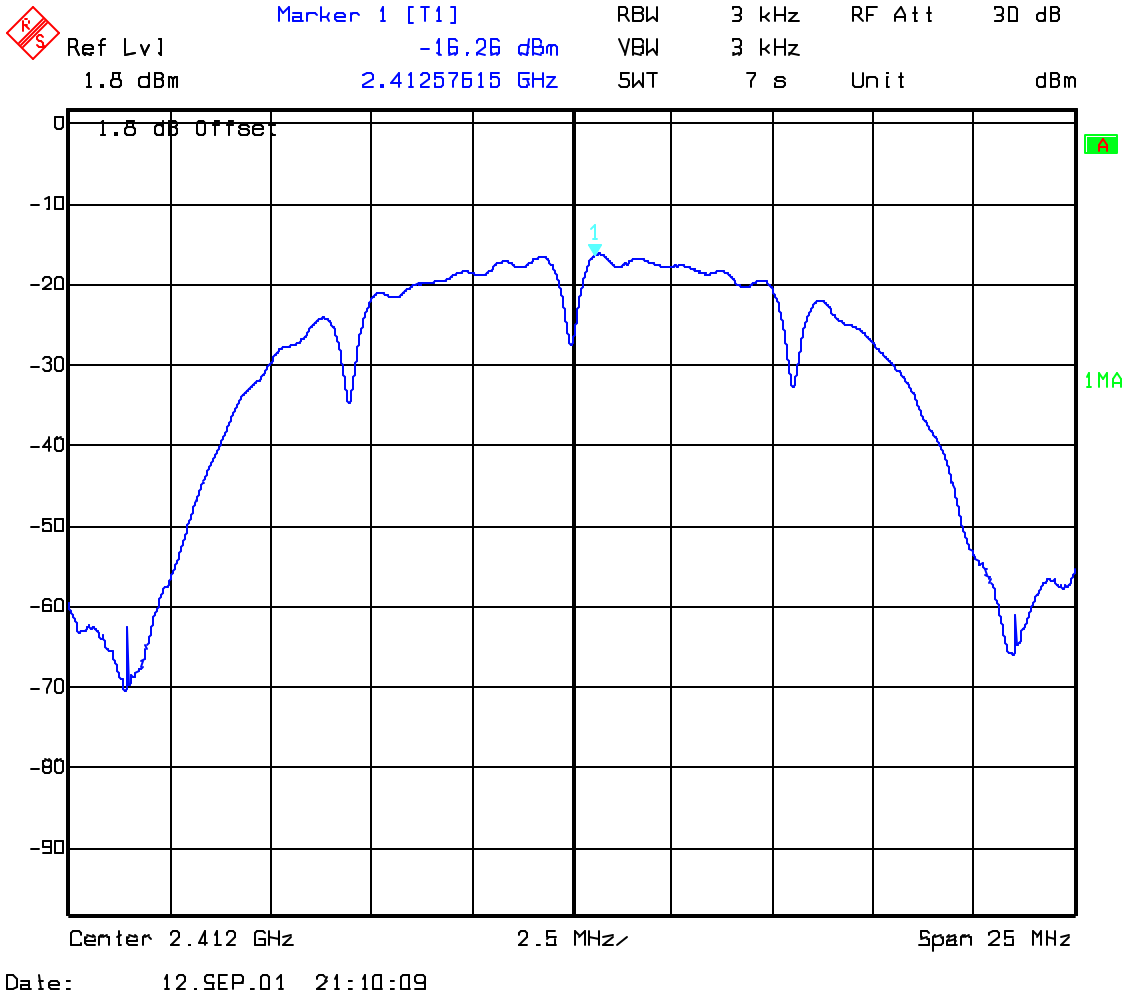
**LIMIT** **SUBCLAUSE §15.247(d)**

| The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band |
|---|

**ANALYZER SETTINGS: RBW=3KHz , VBW=3KHz**

**POWER SPECTRAL DENSITY** **SUBCLAUSE § 15.247 (d)**

**Low Channel: 2412 MHz**

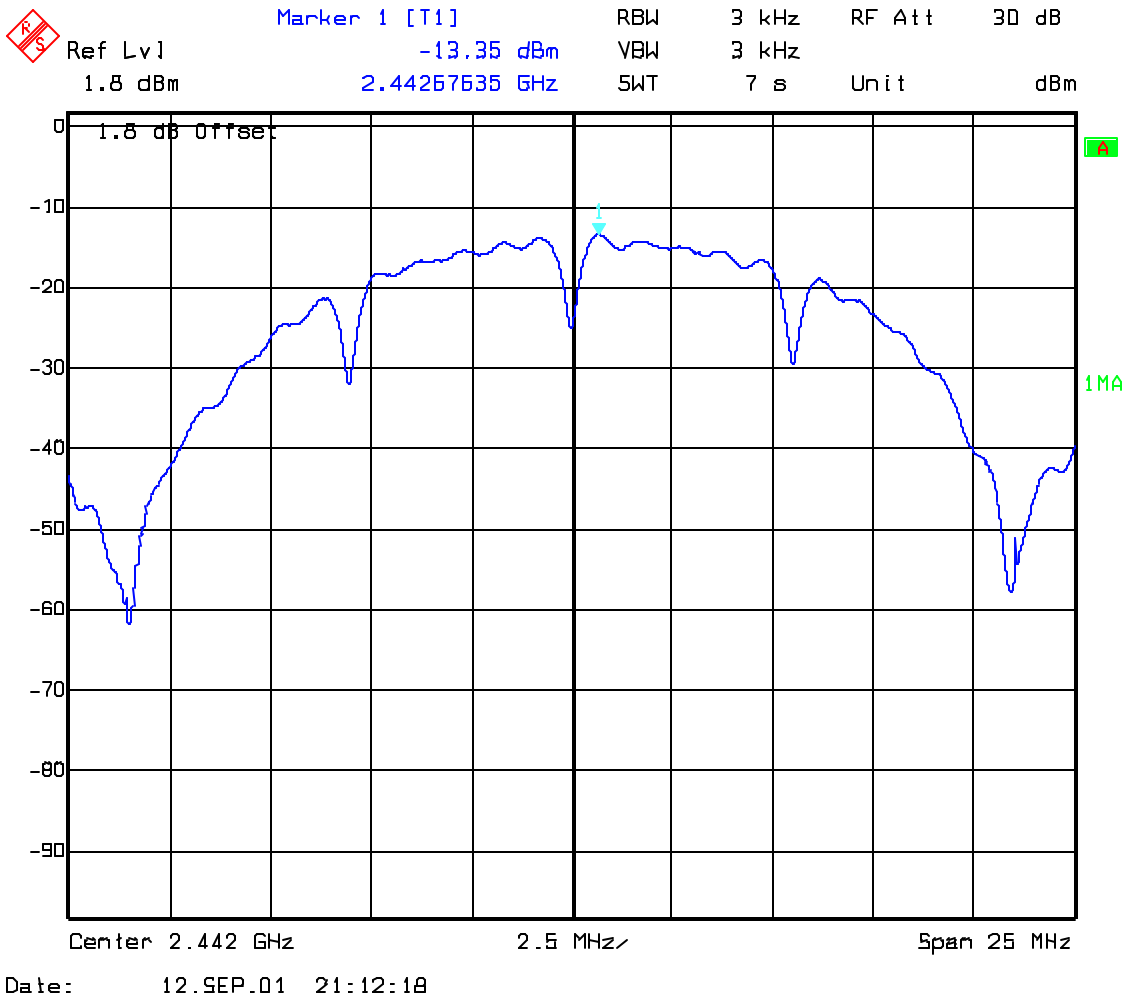



**LIMIT** **SUBCLAUSE §15.247(d)**

| |
|---|
| **The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band** |

**POWER SPECTRAL DENSITY** **SUBCLAUSE § 15.247 (d)**

**Mid Channel: 2442 MHz**

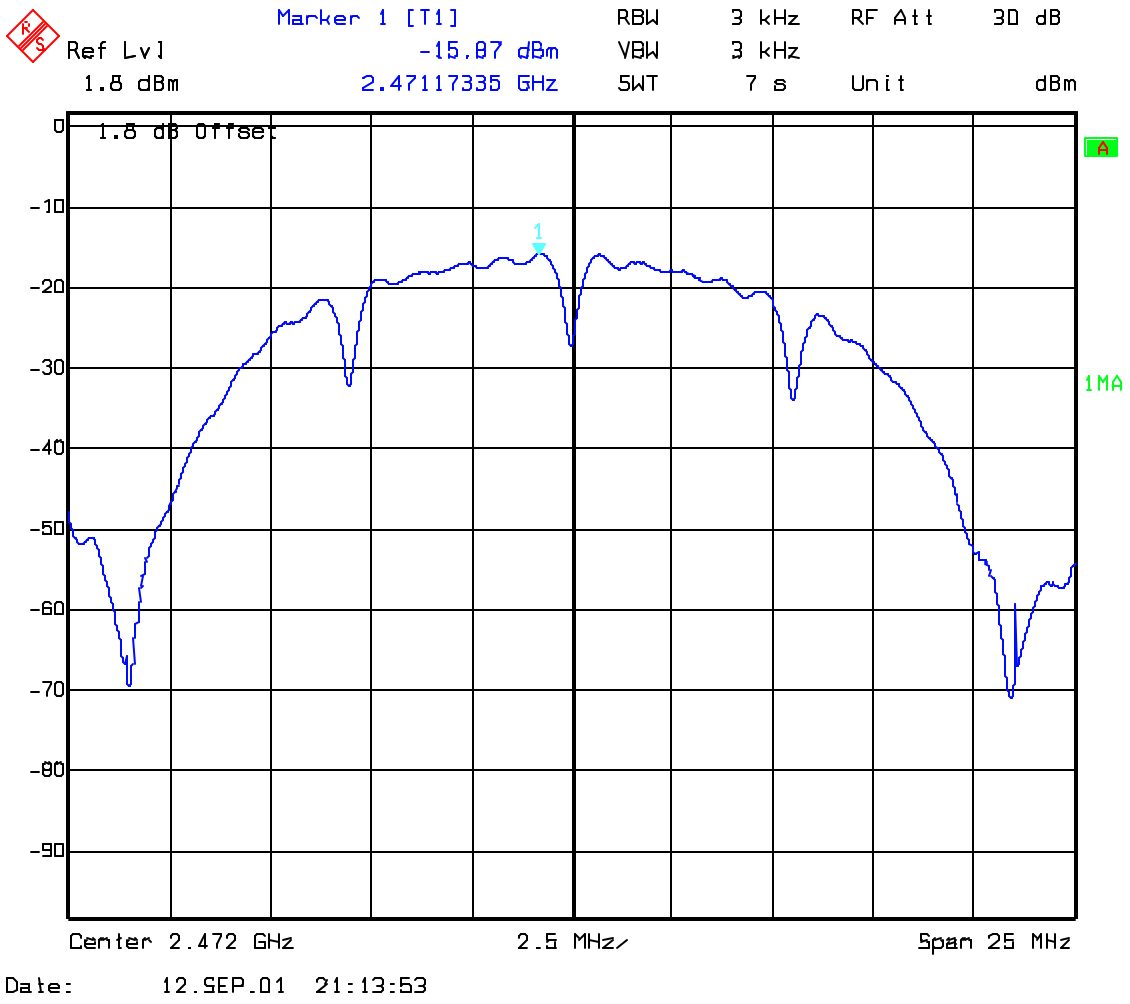



**LIMIT** **SUBCLAUSE §15.247(d)**

| |
|---|
| **The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band** |

**POWER SPECTRAL DENSITY** **SUBCLAUSE § 15.247 (d)**

**High Channel: 2472 MHz**




**LIMIT** **SUBCLAUSE §15.247(d)**

| |
|---|
| **The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band** |

## PROCESSING GAIN OF DSSS SYSTEMS SUBCLAUSE §15.247 (e)

**(NOTE: The processing gain data is provided by Chip Set Manufacturer – see separate test report)**

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**CONDUCTED EMISSIONS** **§ 15.107/207**

Measured with AC/DC power adapter plugged in LISN

**This test is covered by Test report No. 2_2203-C/00 issued by CETECOM ICT Services GmbH, Saarbrucken, Germany.**

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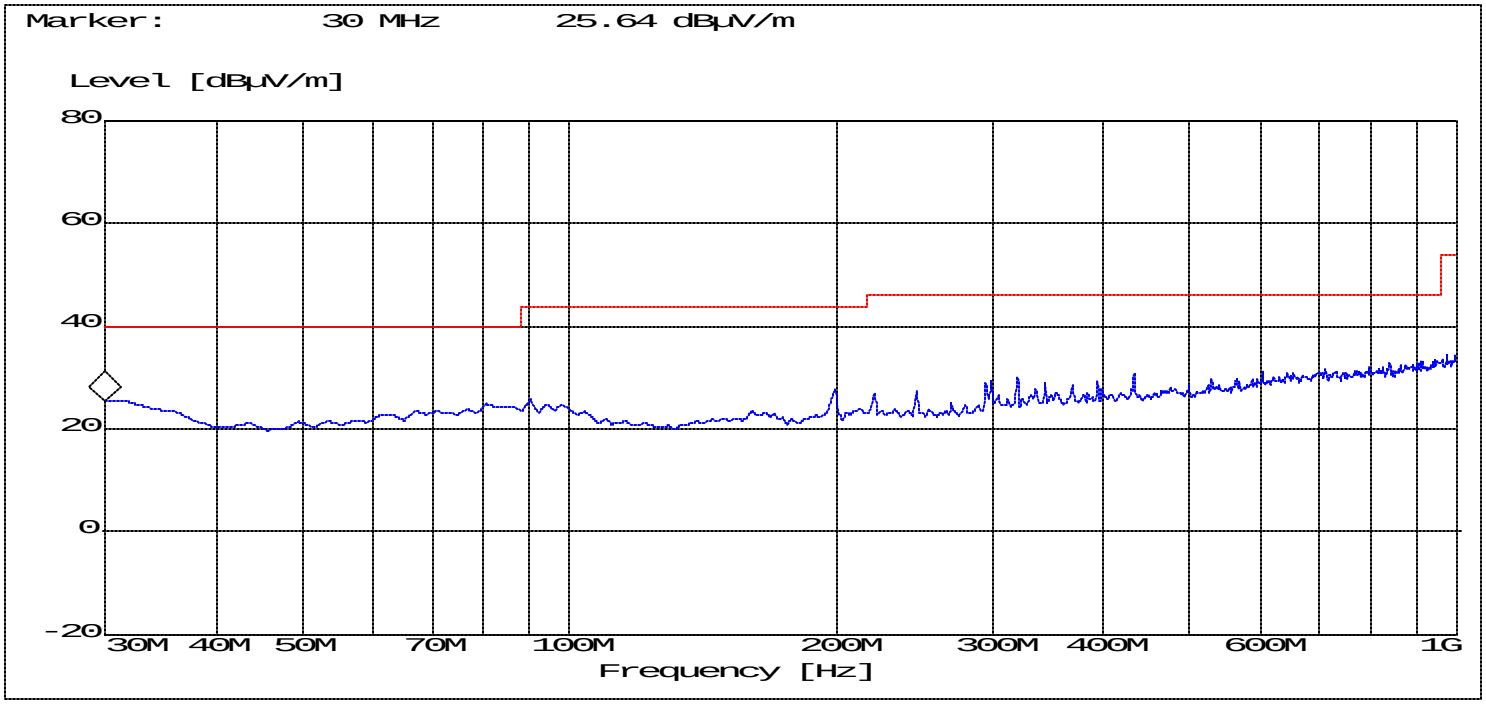
**RECEIVER SPURIOUS RADIATION** **§ 15.209**

**Mid Channel (2442MHz): 30MHz – 1GHz**



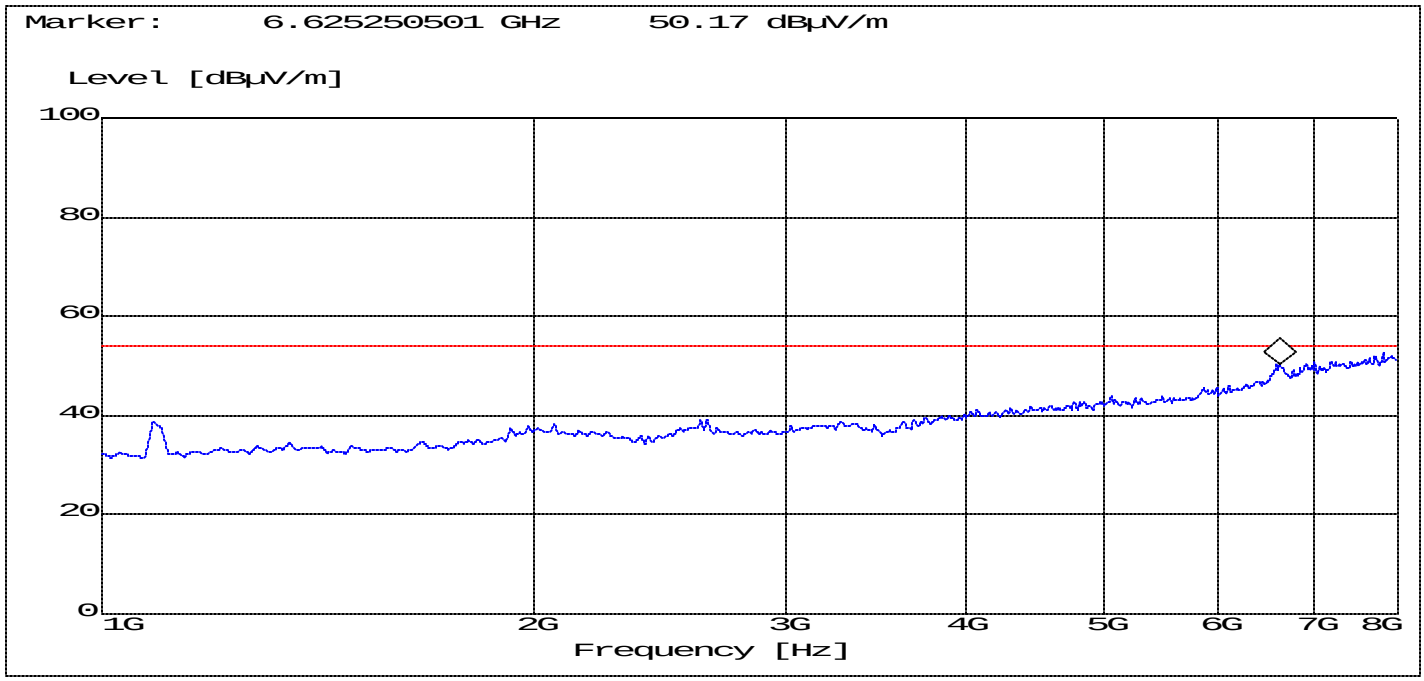

**Limits** **SUBCLAUSE § 15.209**

| Frequency (MHz) | Field strength (µV/m) | Measurement distance (m) |
|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| above 960 | 500 | 3 |

**(NOTE: All measurements were done in peak mode)**
**ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz** **f ³ 1GHz : RBW/VBW: 1 MHz**

**RECEIVER SPURIOUS RADIATION** **§ 15.209**

**Mid Channel (2442MHz): 1GHz – 8GHz**




**Limits** **SUBCLAUSE § 15.209**

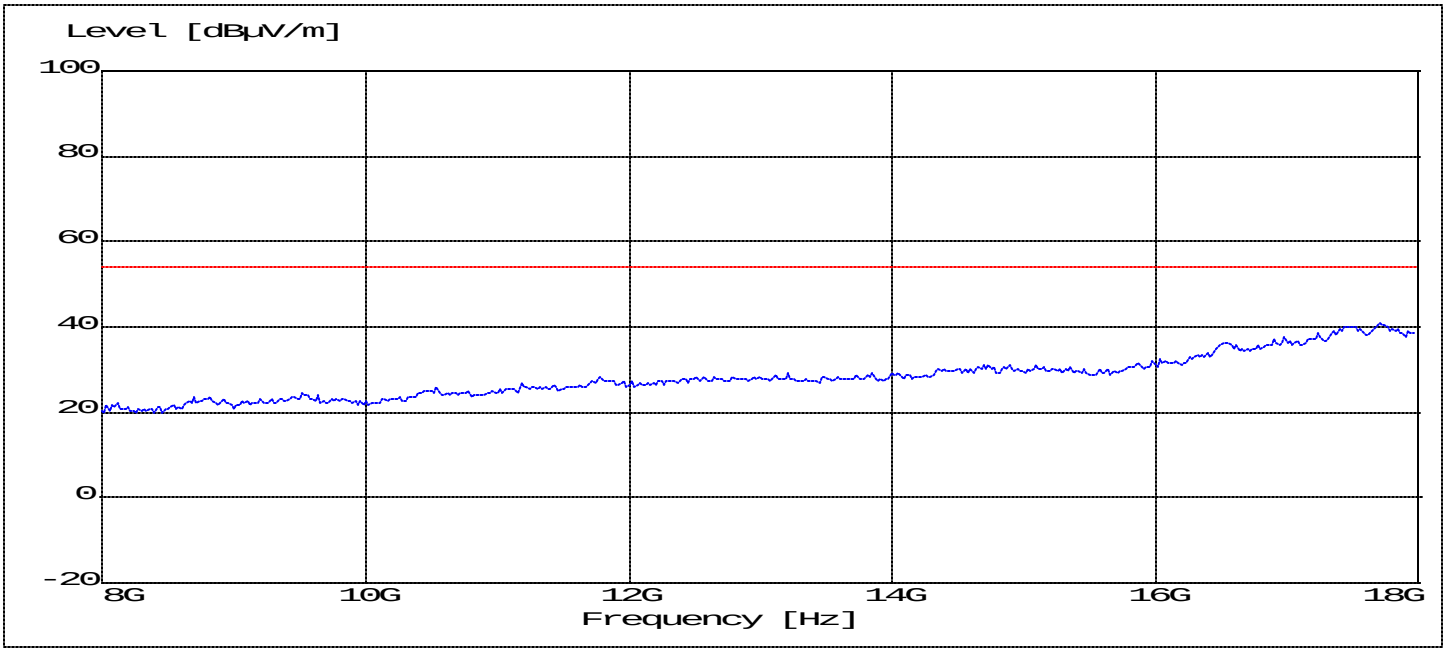
| Frequency (MHz) | Field strength (µV/m) | Measurement distance (m) |
|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| above 960 | 500 | 3 |

**(NOTE: All measurements were done in peak mode)**

**ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz** **f ³ 1GHz : RBW/VBW: 1 MHz**

**RECEIVER SPURIOUS RADIATION** **§ 15.209**

**Mid Channel (2442MHz): 8GHz – 18GHz**




**Limits** **SUBCLAUSE § 15.209**

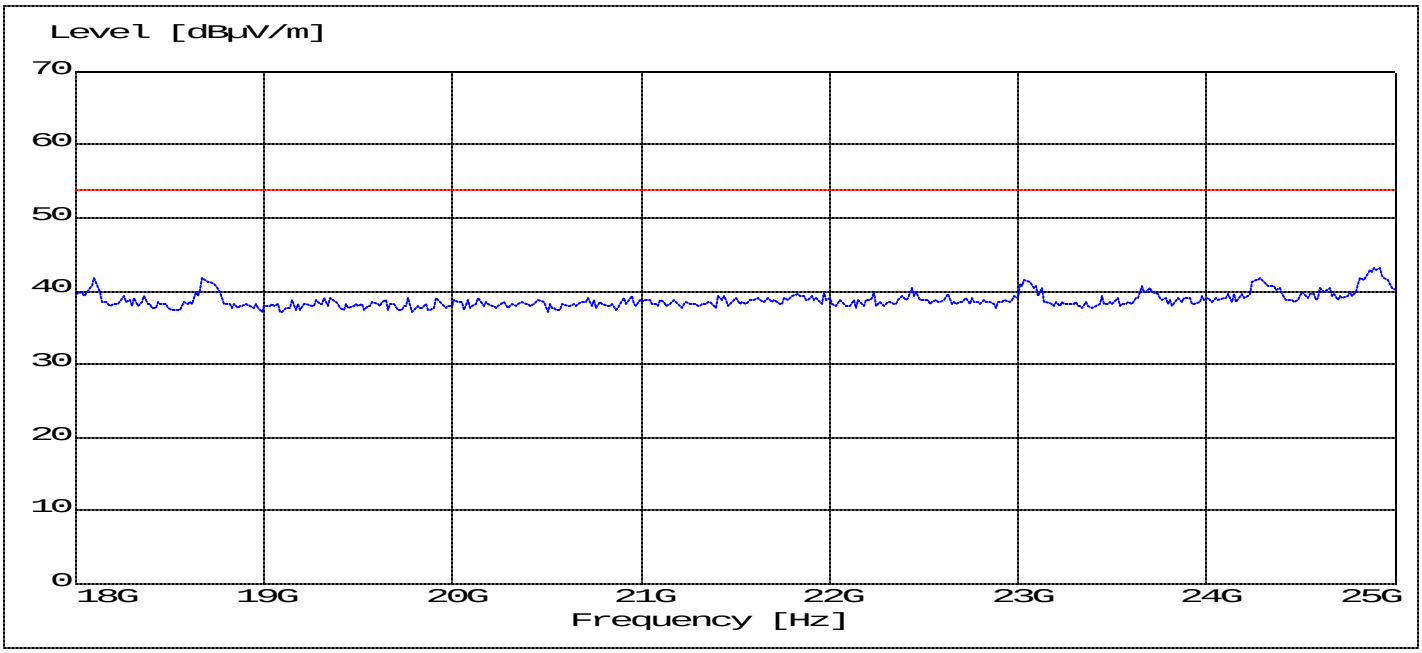
| Frequency (MHz) | Field strength (µV/m) | Measurement distance (m) |
|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| above 960 | 500 | 3 |

**(NOTE: All measurements were done in peak mode)**

**ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz** **f ³ 1GHz : RBW/VBW: 1 MHz**

**RECEIVER SPURIOUS RADIATION** **§ 15.209**

**Mid Channel (2442MHz): 18GHz – 25GHz**




**Limits** **SUBCLAUSE § 15.209**

| Frequency (MHz) | Field strength (µV/m) | Measurement distance (m) |
|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| above 960 | 500 | 3 |

**(NOTE: All measurements were done in peak mode)**
**ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz** **f ³ 1GHz : RBW/VBW: 1 MHz**

## TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

| No | Instrument/Ancillary | Type | Manufacturer | Serial No. |
|---|---|---|---|---|
| 01 | Spectrum Analyzer | FSEM 30 | Rohde & Schwarz | 826880/010 |
| 02 | Signal Generator | SMY0 | Rohde & Schwarz | 836878/011 |
| 03 | Power-Meter | NRVD | Rohde & Schwarz | 0857.8008.02 |
| 04 | Power Amlifier | 250W1000 | Amplifier Research | 300031 |
| 05 | Biconilog Antenna | 3141 | EMCO | 0005-1186 |
| 06 | Horn Antenna | SAS-200/571 | AH Systems | 325 |
| 07 | Power Splitter | 11667B | Hewlett Packard | 645348 |
| 08 | Climatic Chamber | VT4004 | Votch | G1115 |
| 09 | Pre-Amplifier | JS4-00102600 | Miteq | 00616 |
| 10 | Power Sensor | URV5-Z2 | Rohde & Schwarz | DE30807 |
| 11 | Power Sensor | URV5-Z2 | Rohde & Schwarz | DE30808 |
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