# FCC Test Report

**Test report no.: EMC_831FCC15.247_2005_FC_PA**

**FCC Part 15.247 for DSSS systems / CANADA RSS-210**

**EUT: WLAN Model: BCM94318MPAGH**
**HOST: Test Fixture (Modular Approval)**
**(C2P Change to add Fairchild PA)**
**FCC ID: QDS-BRCM1017**
**IC ID: 4324A-BRCM1017**
**(This test report covers freq. 2412-2472MHz)**

Deutscher Akkreditierungs Rat DAR
***TTI-P-G 081/94-A0***
Accredited according to **ISO/IEC 17025**

Bluetooth
**Bluetooth Qualification Test Facility (BQTF)**

CTIA Authorized Test Lab
LAB CODE 20020328-00

**FCC listed # 101450**

**IC recognized # 3925**


***CETECOM* Inc.**
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Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

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## 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 generalizations 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 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** | **:** | **Broadcom corporation** |
| **Street** | **:** | **190 Mathilda Place** |
| **City / Zip Code** | **:** | **Sunnyvale, CA 94086** |
| **Country** | **:** | **USA** |
| **Contact** | **:** | **Dan Lawless** |
| **Telephone** | **:** | **408-922-5870** |
| **Tele-fax** | **:** | **408-543-3399** |
| **e-mail** | **:** | **dlawless@broadcom.com** |

## 1.4 Application details

| | | |
|---|---|---|
| Date of receipt test item | : | 2005-03-14 |
| Date of test | : | 2005-03-14/15/17/18/22 |

## 1.5 Test item

| | | |
|---|---|---|
| Manufacturer | : | Applicant |
| Model No. (EUT) | : | BCM94318MPAGH |
| Host | : | Test Fixture |
| Description | : | WLAN MiniPCI Multiband card incorporating 2.4GHz and 5GHz radios |
| FCC ID | : | QDS-BRCM1017 |
| IC ID | : | 4324A-BRCM1017 |

**Additional information**

| | | |
|---|---|---|
| Frequency | : | 2412MHz – 2472MHz for 2.4GHz band (covered in this test report)<br>5180MHz – 5320MHz for 5GHz band (not covered in this test report)<br>5745MHz – 5825MHz for 5GHz band (not covered in this test report) |
| Type of modulation | : | DSSS / OFDM (orthogonal frequency division multiplexing) |
| Number of channels | : | 13 for 2.4GHz band<br>13 for 5GHz band |
| Antenna | : | 3.24dBi max. gain stamped metal sheet ant. for 2.4GHz band (WNC model 81.ED415.002) |
| Power supply | : | 3.3 VDC from Host |
| Output power | : | 19.1dBm (81.28mW) conducted avg. power for 2.4GHz band |
| Extreme temp. Tolerance | : | 0°C to +70°C |

## 1.6 Test standards: FCC Part 15 §15.247 / CANADA RSS-210

**PROJECT OVERVIEW:**

**This test report carries all radiated measurements required as per FCC 15.247 for doing a class-2 permissive change on WLAN mini PCI card model# BCM94318MPAGH tested in test fixture as per DA001407 requirements for modular transmitter approval. Conducted power was measured and found within limits of C2P change rules.**

**Following are the changes filed under this application;**

**Change #1 Adding alternate Fairchild power amp. The associated layout and filter circuitry is the same. The average power in packet is maintained the same as the original filing.**

**All measurements are done with under-mentioned max gain antennas for each band. WLAN was tested for spurious emissions in both DSSS & OFDM modes at different data rates (1, 2, 5.5, 6, 11, and 54) to ensure compliance of the whole device. Test report shows only worst-case test results of all data rates with following power levels. As mentioned below all measurements for 802.11g mode were done on *ch-1,6,10,11,13* and for 802.11b mode all measurements were done on *ch-1,6,11,13*.**

802.11g Mode:
Channels 1-10:19.0dBm
Channel 11:16.0dBm
Channels 12-13:10.5dBm

802.11b Mode:
Channels 1-11:19.0dBm
Channels 12-13:14.0dBm

| Antenna Manufacturer | Antenna Type | Model | Peak gain @ 2400-2483.5MHz | Peak gain 5150-5350MHz | Peak gain @ 5725-5850 |
|---|---|---|---|---|---|
| WNC | Stamped metal sheet | 81.ED415.002 | 3.24dBi (Main) | 1.51dBi (Main) | Main -0.35dBi |
| Hitachi | Stamped metal sheet | HFT17-DL03 | Main 1.5 (H) | Main 5.1 (V) | Main 5.7 (V+H) |

**For more information on antennas covered under this C2P change please refer to *BCM94318MPAGH_C2P_Fairchild_PA_Declaration_worst_case_antenna***

## 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 | |
| Final Verdict:<br>(Only “passed” if all single measurements are “passed”) | **Passed** |

**Technical responsibility for area of testing:**

| Date | Section | Name | Signature |
|---|---|---|---|
| 2005-04-07 | EMC & Radio | Lothar Schmidt (Technical Manager) |  |

**Responsible for test report and project leader:**

| Date | Section | Name | Signature |
|---|---|---|---|
| 2005-04-07 | EMC & Radio | Harpreet Sidhu (EMC Engineer) |  |

## 2.2 Test report

**TEST REPORT**

**Test report no.: EMC_831FCC15.247_2005_FC_PA**

**FCC Part 15.247 for DSSS systems / CANADA RSS-210**

## TEST REPORT REFERENCE

**MAXIMUM PEAK OUTPUT POWER** **§ 15.247 (b) (3)**
**(Conducted)**
**(Data rate – 54Mbps)**

| TEST CONDITIONS | | OUTPUT POWER (dBm) | | | | |
|---|---|---|---|---|---|---|
| Frequency (MHz) | | 2412 | 2437 | 2457 | 2462 | 2472 |
| $T_{nom}$(23)°C | $V_{nom}$(3.3) VDC | 19.1 | 19.0 | 19.1 | 16.2 | 10.5 |
| Measurement uncertainty | | ±0.5dBm | | | | |

**LIMIT** **SUBCLAUSE § 15.247 (b) (3)**

| Frequency range | RF power output |
|---|---|
| 2400-2483.5 MHz & 5725-5850 MHz | 1.0 Watt / 30dBm |

**MAXIMUM PEAK OUTPUT POWER (RADIATED)**
**(Data rate – 54Mbps)** **§ 15.247 (b) (3)**

**EIRP:**

| TEST CONDITIONS | | MAXIMUM PEAK OUTPUT POWER (dBm) | | | | |
|---|---|---|---|---|---|---|
| Frequency (MHz) | | 2412 | 2437 | 2457 | 2462 | 2472 |
| $T_{nom}$(23)°C | $V_{nom}$(3.3) VDC | *22.34 | *22.24 | *22.34 | *19.44 | *13.74 |
| Measurement uncertainty | | ±0.5dBm | | | | |

**NOTE:**
***EIRP is calculated based on 3.24dBi antenna gain and conducted peak power measurements.**

**LIMIT** **SUBCLAUSE § 15.247 (b) (3)**

| Frequency range | RF power output |
|---|---|
| 2400-2483.5 MHz & 5725-5850 MHz | 30dBm on Conducted |

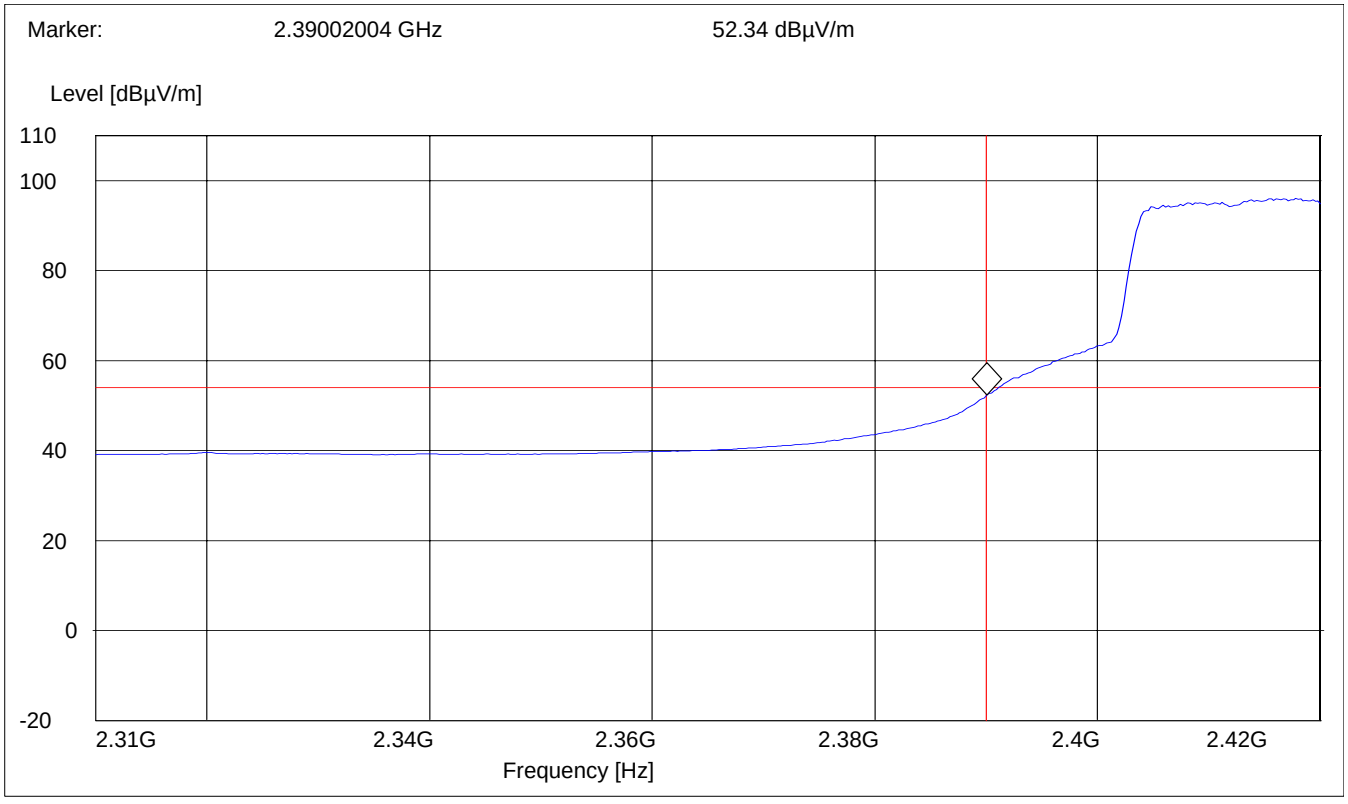
# WNC stamped metal sheet antenna
# (Freq. band: 2.4GHz, Gain: 3.24dBi, Model 81.ED415.002)

## BAND EDGE COMPLIANCE §15.247 (c)
## (Data rate – 6Mbps g-mode)
## Low frequency section (spurious in the restricted band 2310 – 2390 MHz)
## (Average measurement)

**Antenna:** **Horizontal**
**EUT plane:** **Horizontal with screen vertical @ 90˚**

**Operating condition** **:** **Tx at 2412MHz**
SWEEP TABLE : "FCC15.247 LBE_AVG"
Limit Line : 54dBµV

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 2.31 GHz | 2.412 GHz | MaxPeak | Coupled | 1 MHz | 10Hz | #326 horn (dBi) |



## BAND EDGE COMPLIANCE §15.247 (c)

**(Data rate – 54Mbps g-mode)**

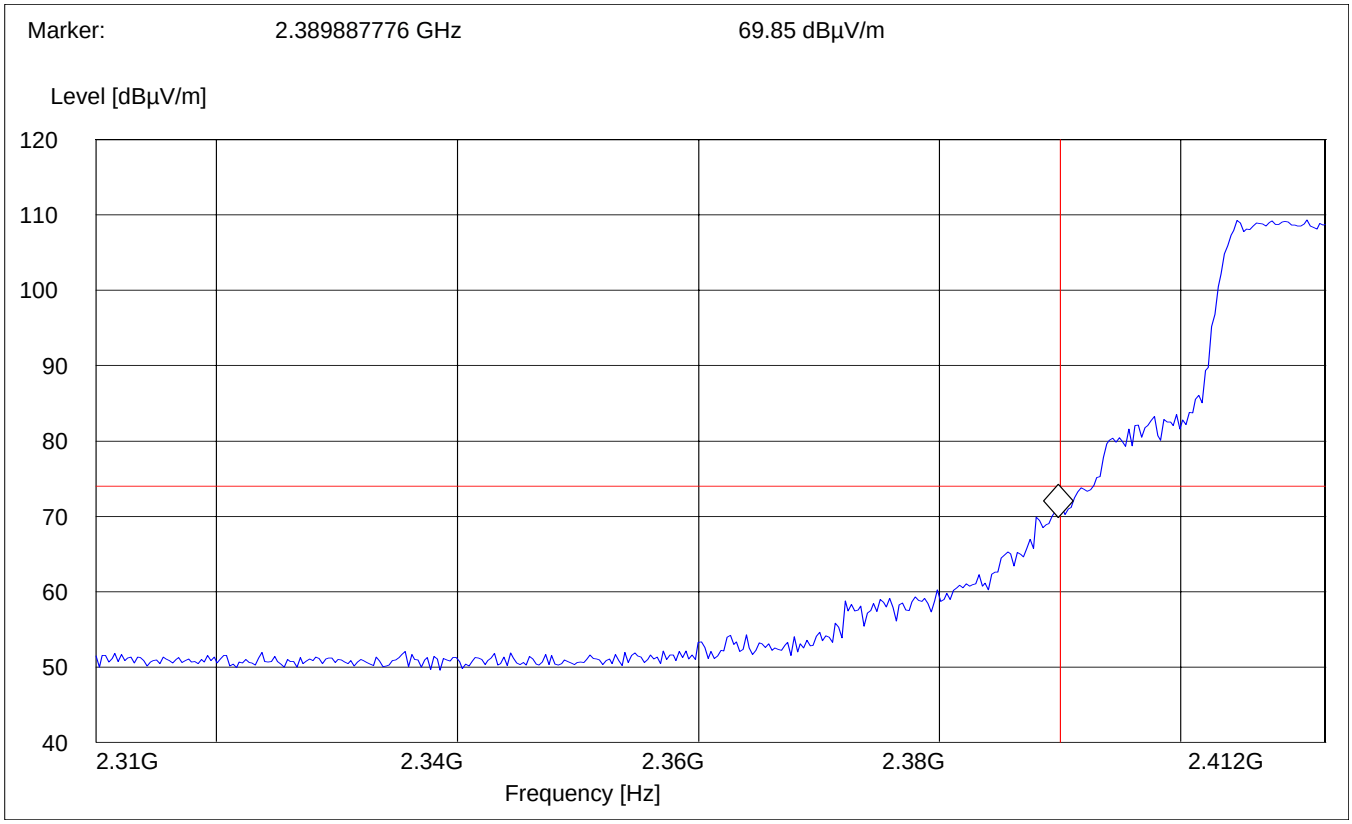
**Low frequency section (spurious in the restricted band 2310 – 2390 MHz)**

**(Peak measurement)**

**Antenna:** **Horizontal**
**EUT plane:** **Horizontal with screen vertical @ 90˚**

**Operating condition** **:** **Tx at 2412MHz**
SWEEP TABLE : "FCC15.247 LBE_Pk"
Limit Line : 74dBµV

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 2.31 GHz | 2.412 GHz | MaxPeak | Coupled | 1 MHz | 1MHz | #326 horn (dBi) |



## BAND EDGE COMPLIANCE §15.247 (c)

**(Data rate – 6Mbps g-mode)**

**High frequency section (spurious in the restricted band 2483.5 – 2500MHz)**

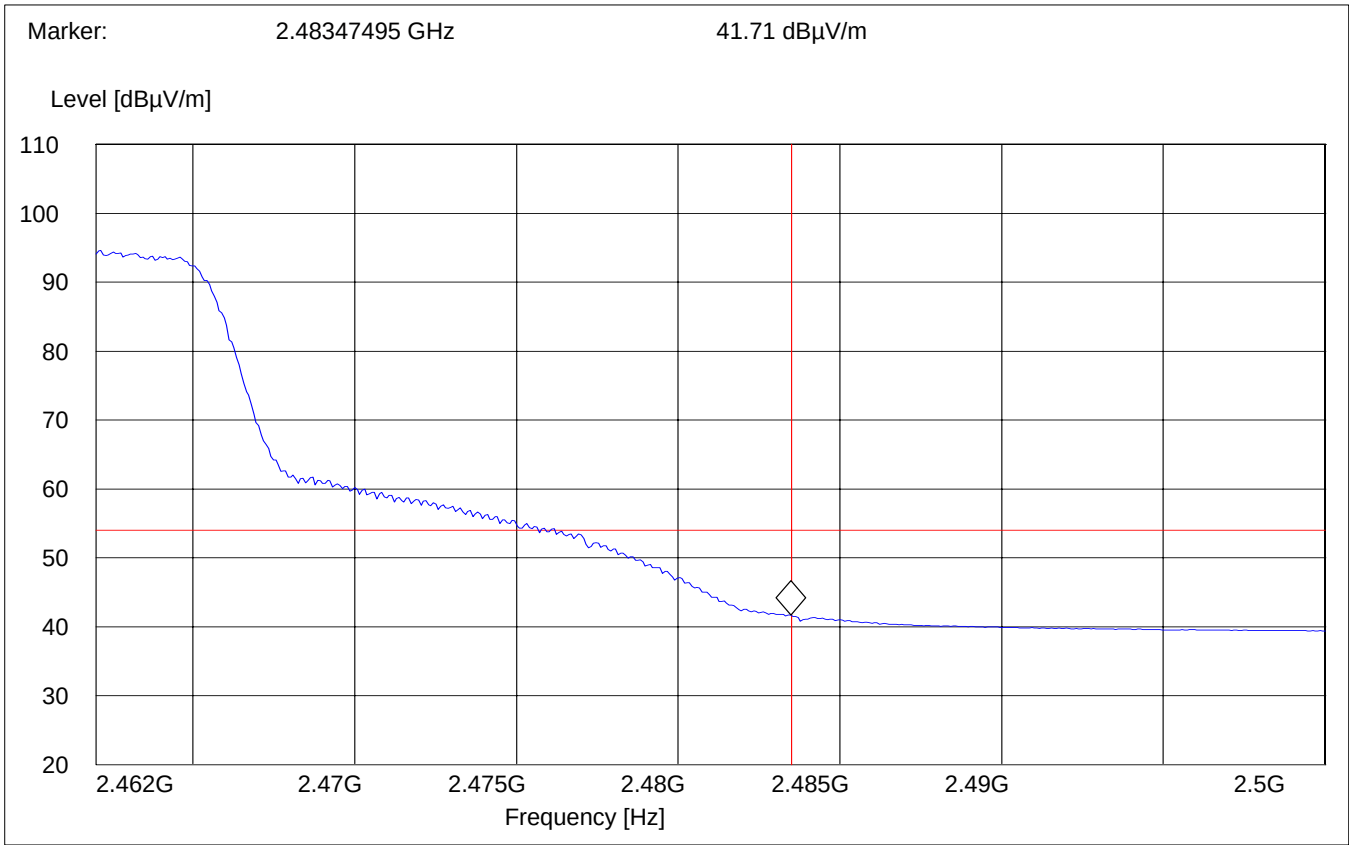
**(Average measurement)**

**Antenna:** **Horizontal**

**EUT plane:** **Horizontal with screen vertical @ 90˚**

| | | |
|---|---|---|
| **Operating condition** | **:** | **Tx at 2457MHz** |
| SWEEP TABLE | : | "FCC15.247 HBE_AVG" |
| Limit Line | : | 54dBµV |

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 2.462 GHz | 2.5 GHz | MaxPeak | Coupled | 1 MHz | 10Hz | #326 horn (dBi) |



## BAND EDGE COMPLIANCE §15.247 (c)

**(Data rate – 54Mbps g-mode)**

**High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)**

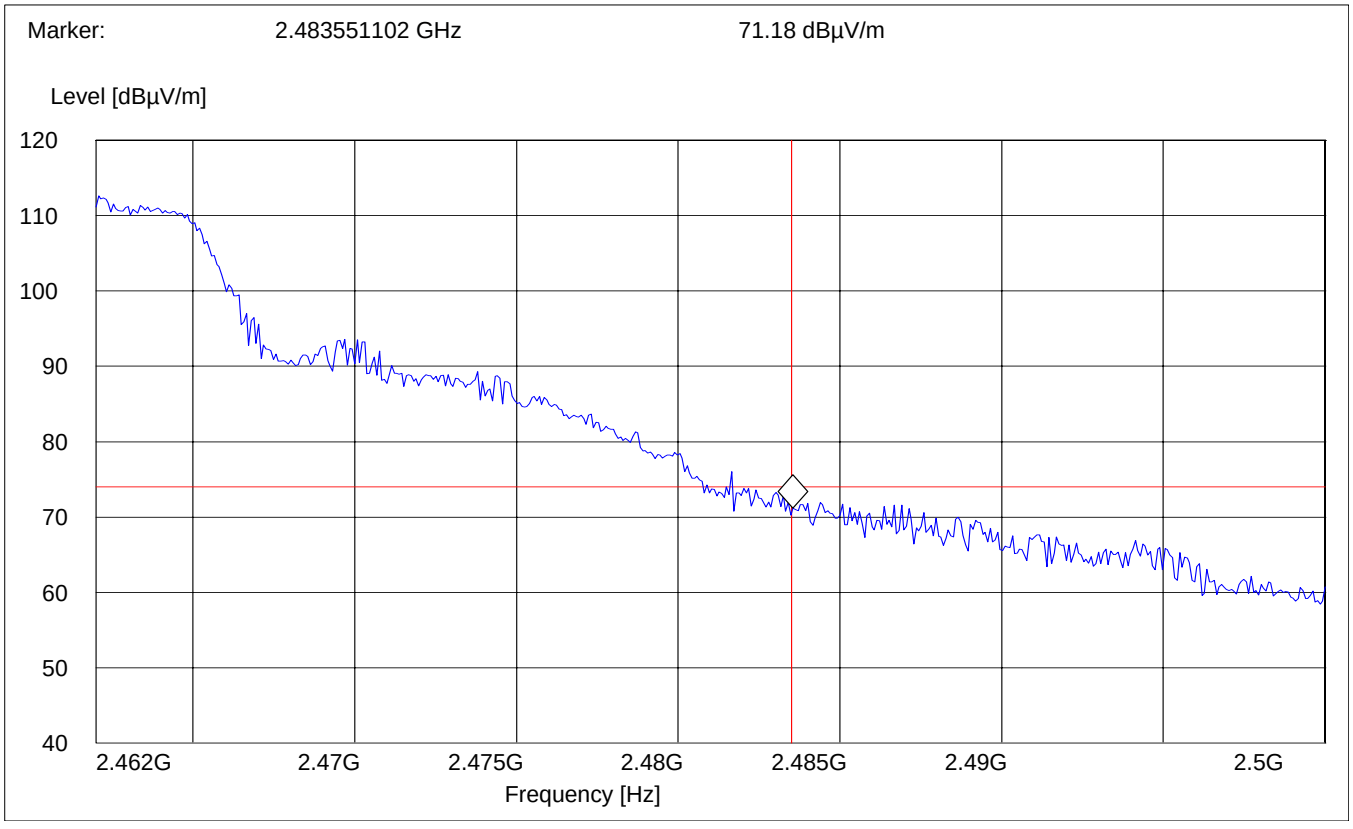
**(Peak measurement)**

**Antenna:** **Horizontal**

**EUT plane:** **Horizontal with screen vertical @ 90˚**

| | | |
|---|---|---|
| **Operating condition** | **:** | **Tx at 2457MHz** |
| SWEEP TABLE | : | "FCC15.247 HBE_PK" |
| Limit Line | : | 74dBµV |

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 2.462 GHz | 2.5 GHz | MaxPeak | Coupled | 1 MHz | 1MHz | #326 horn (dBi) |



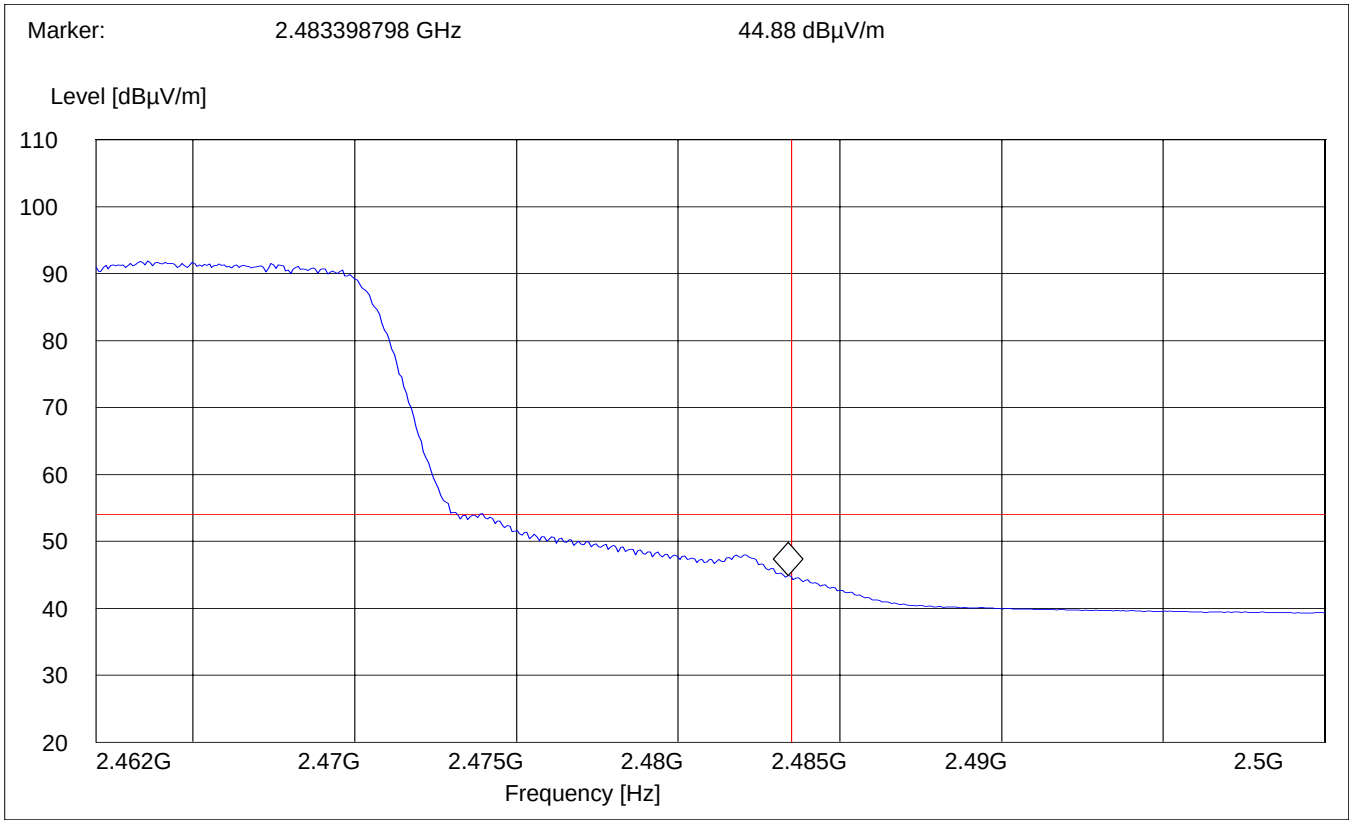
## BAND EDGE COMPLIANCE §15.247 (c)

**(Data rate – 6Mbps g-mode)**
**High frequency section (spurious in the restricted band 2483.5 – 2500MHz)**
**(Average measurement)**

**Antenna:** **Horizontal**
**EUT plane:** **Horizontal with screen vertical @ 90˚**

**Operating condition** **:** **Tx at 2462MHz**
SWEEP TABLE : "FCC15.247 HBE_AVG"
Limit Line : 54dBµV

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 2.462 GHz | 2.5 GHz | MaxPeak | Coupled | 1 MHz | 10Hz | #326 horn (dBi) |



## BAND EDGE COMPLIANCE §15.247 (c)

**(Data rate – 54Mbps g-mode)**

**High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)**

**(Peak measurement)**

**Antenna:** **Horizontal**

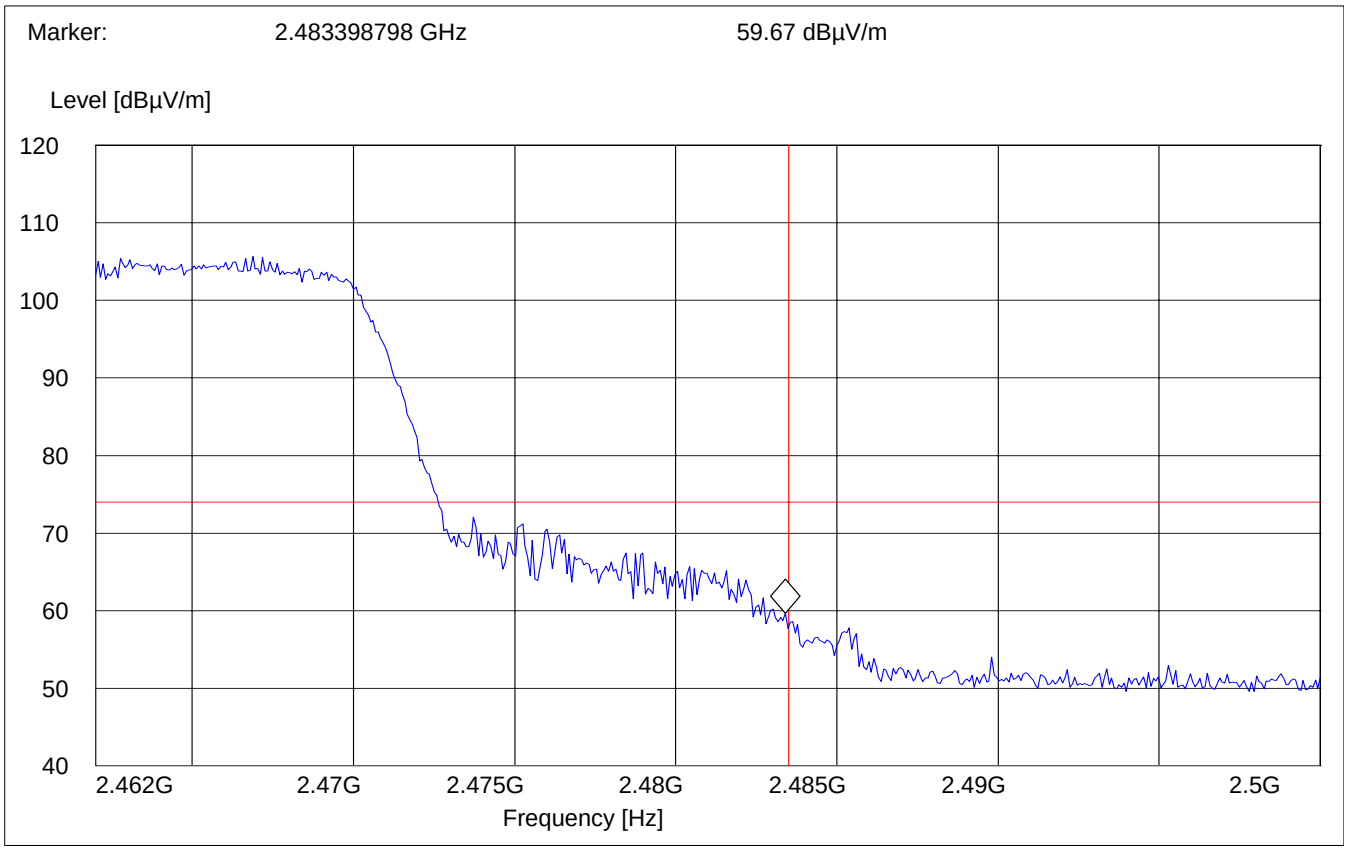
**EUT plane:** **Horizontal with screen vertical @ 90˚**

**Operating condition** **:** **Tx at 2462MHz**

SWEEP TABLE : "FCC15.247 HBE_PK"

Limit Line : 74dBµV

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 2.462 GHz | 2.5 GHz | MaxPeak | Coupled | 1 MHz | 1MHz | #326 horn (dBi) |



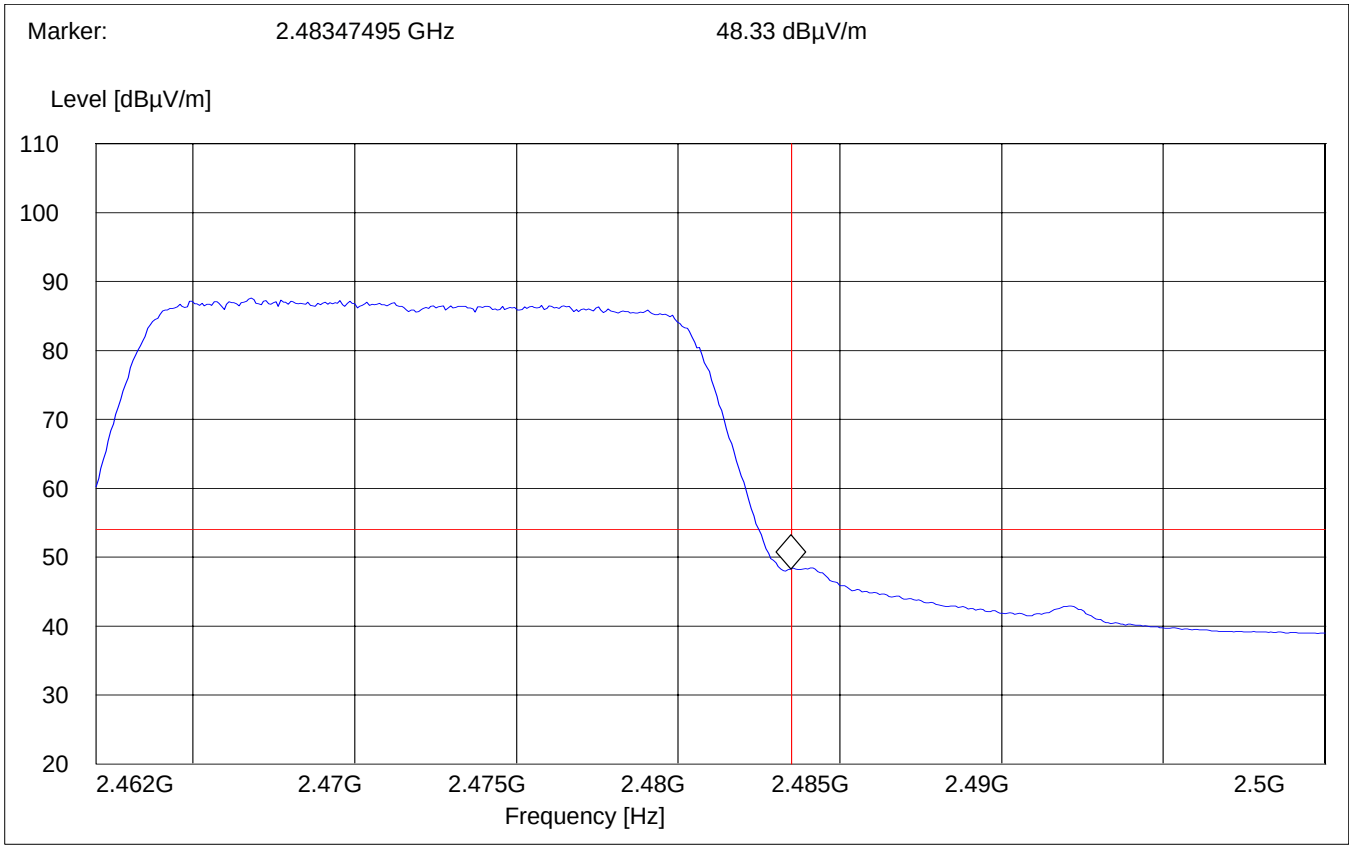
## BAND EDGE COMPLIANCE §15.247 (c)

**(Data rate – 6Mbps g-mode)**
**High frequency section (spurious in the restricted band 2483.5 – 2500MHz)**
**(Average measurement)**

**Antenna:** **Horizontal**
**EUT plane:** **Horizontal with screen vertical @ 90˚**

**Operating condition** **:** **Tx at 2472MHz**
SWEEP TABLE : "FCC15.247 HBE_AVG"
Limit Line : 54dBµV

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 2.462 GHz | 2.5 GHz | MaxPeak | Coupled | 1 MHz | 10Hz | #326 horn (dBi) |



## BAND EDGE COMPLIANCE §15.247 (c)

**(Data rate – 54Mbps)**

**High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)**

**(Peak measurement)**

**Antenna:** **Horizontal**

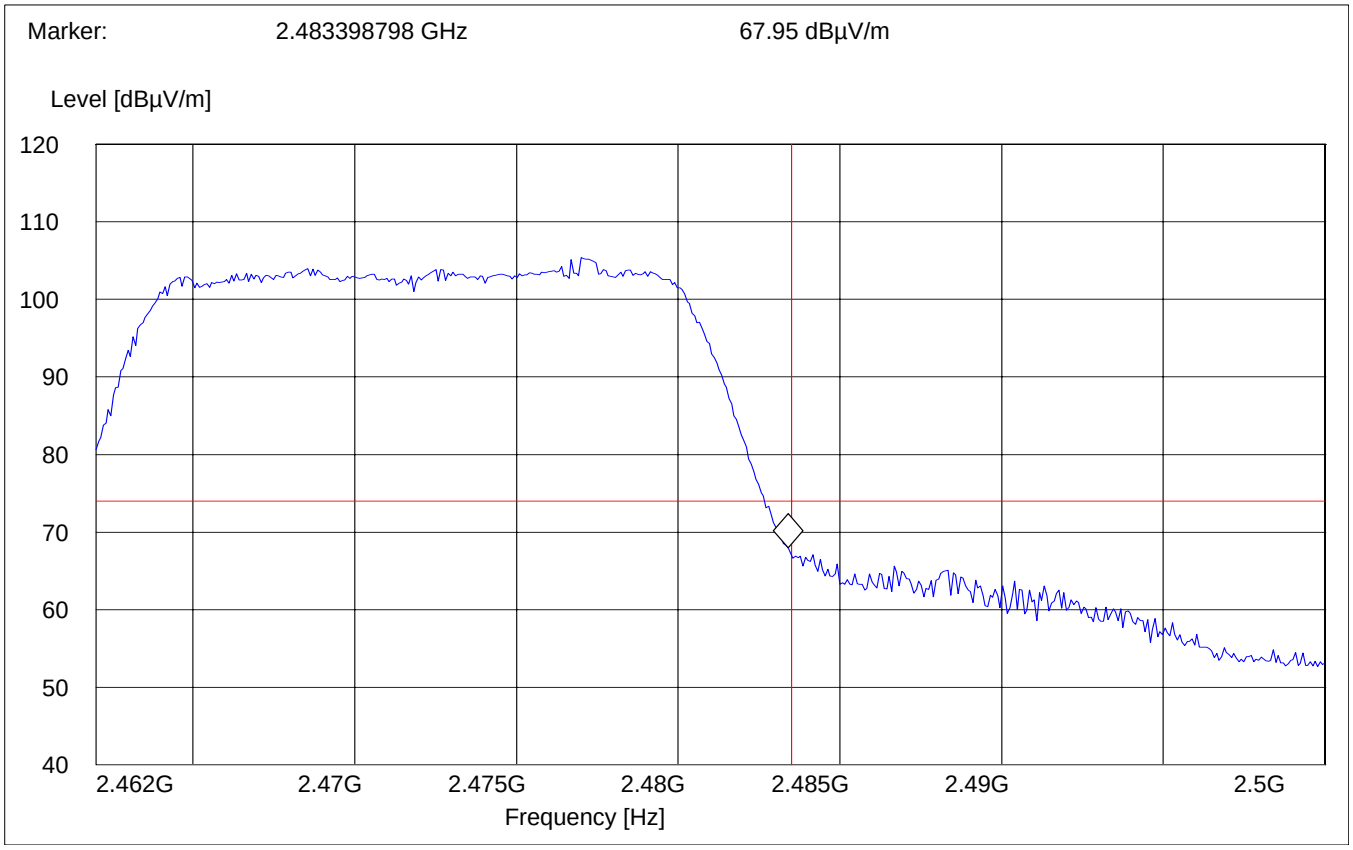
**EUT plane:** **Horizontal with screen vertical @ 90˚**

**Operating condition** **:** **Tx at 2472MHz**

SWEEP TABLE : "FCC15.247 HBE_PK"

Limit Line : 74dBµV

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 2.462 GHz | 2.5 GHz | MaxPeak | Coupled | 1 MHz | 1MHz | #326 horn (dBi) |



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

**LIMITS**

**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)).**

**NOTE:**
1. The radiated 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 3 and 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode unless specified with the plots.

**Results for the radiated measurements below 30MHz according § 15.33**

| Frequency | Measured values | Remarks |
|---|---|---|
| 9KHz – 30MHz | No emissions found, caused by the EUT | This is valid for all the tested channels |

## EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)

| Transmit at Lowest channel Frequency 2412MHz | | | |
|---|---|---|---|
| Frequency (MHz) | Level (dBµV/m) | | |
| | Peak | Quasi-Peak | Average |
| | | | |
| SEE PLOTS | | | |
| | | | |

| Transmit at Middle channel Frequency 2437MHz | | | |
|---|---|---|---|
| Frequency (MHz) | Level (dBµV/m) | | |
| | Peak | Quasi-Peak | Average |
| | | | |
| SEE PLOTS | | | |
| | | | |

| Transmit at Highest channel Frequency 2462MHz | | | |
|---|---|---|---|
| Frequency (MHz) | Level (dBµV/m) | | |
| | Peak | Quasi-Peak | Average |
| | | | |
| SEE PLOTS | | | |
| | | | |

**EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)**
**30MHz – 1GHz**
**Data rate – 54Mbps)**

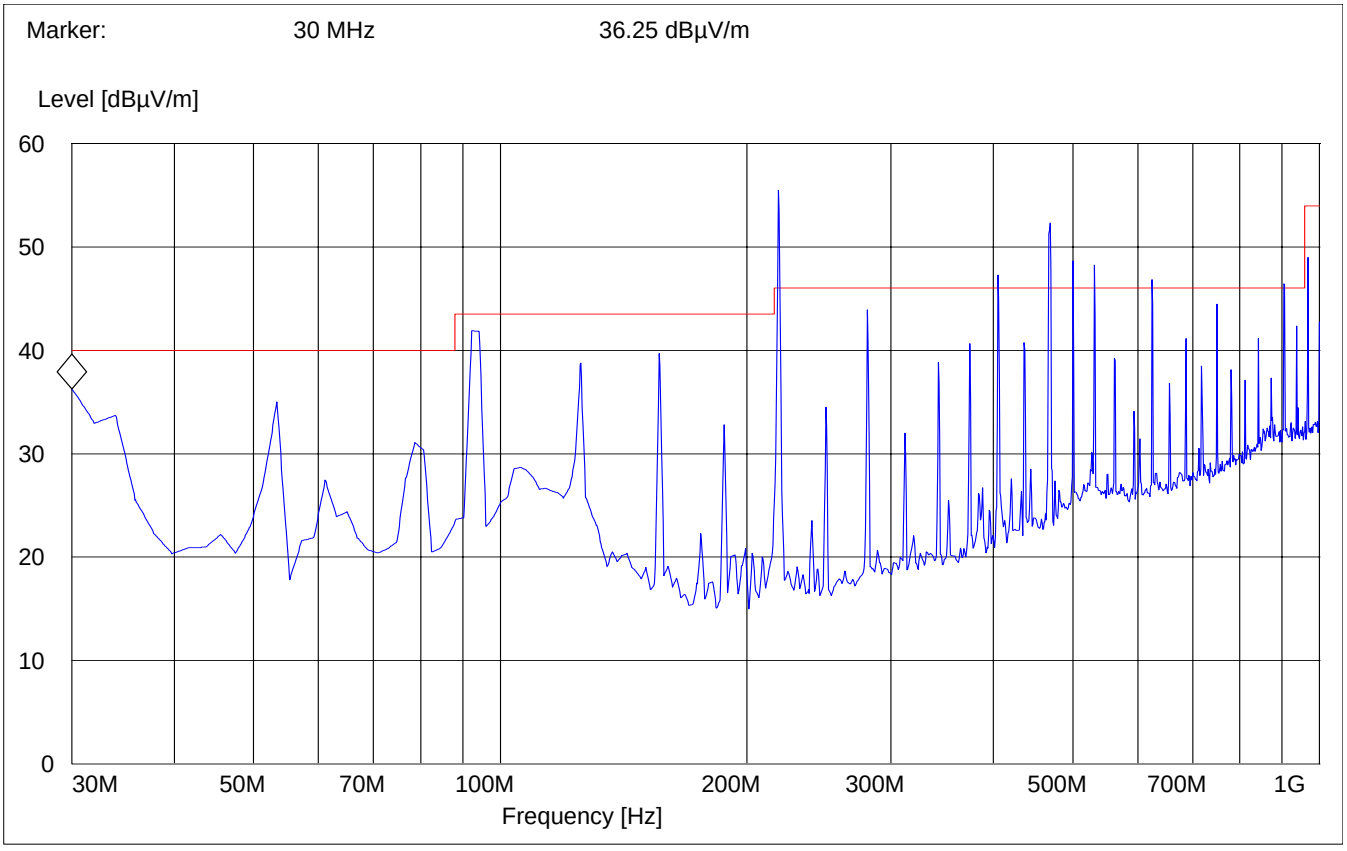
**Antenna:** **vertical**
**EUT plane:** **Horizontal with screen vertical @ 90˚**

**Note:**

1. **This plot is valid for low, mid, high channels (worst-case plot valid for all antennas)**
2. **All significant peaks were confirmed originating from test fixture, see plot on next pages with test fixture tested alone with no WLAN card**

SWEEP TABLE: "WLAN Spuri hi 30-1G"

| Start Frequency | Stop Frequency | Detector | Meas. Time | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | 3141-#1186 |



**EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)**
**30MHz – 1GHz**
**(Data rate – 54Mbps)**

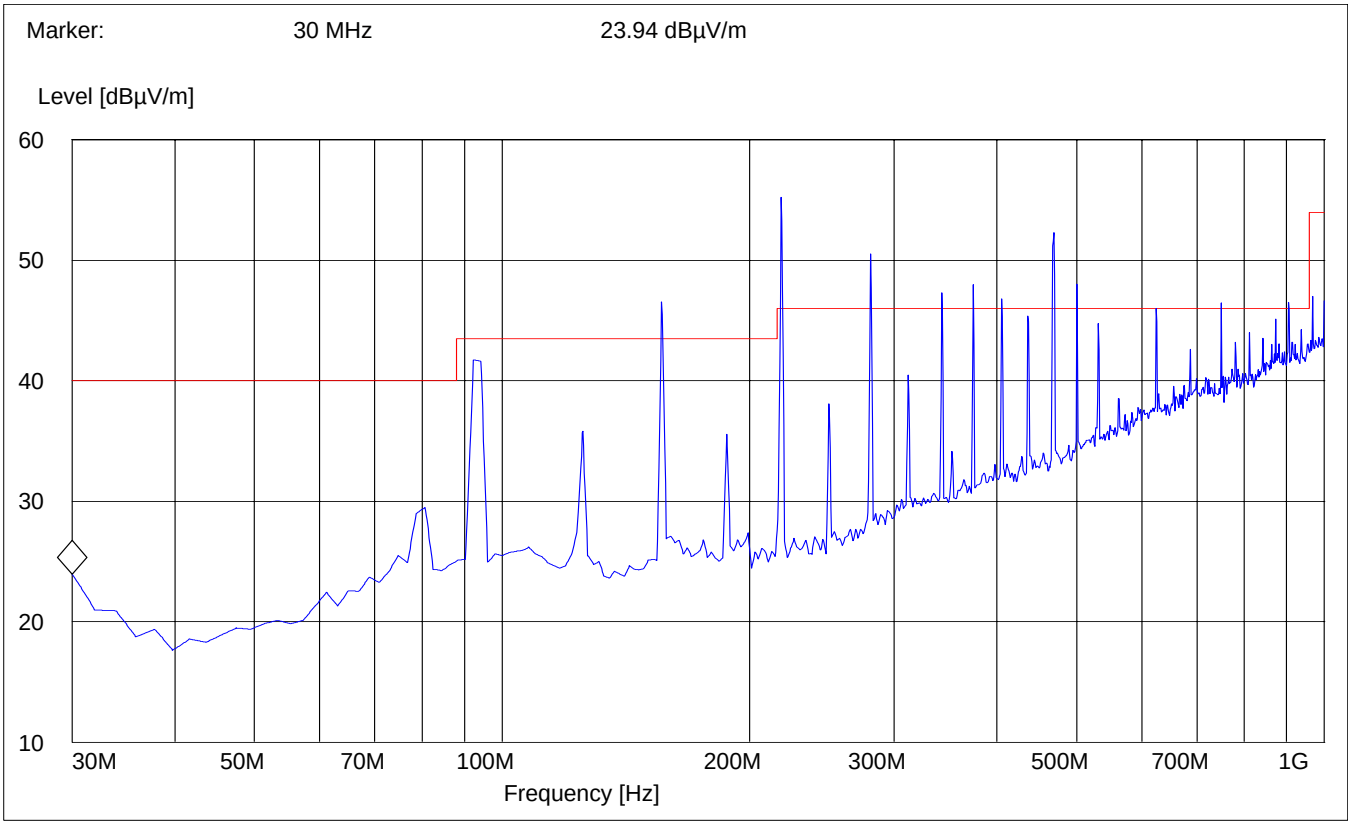
**Antenna: Horizontal**
**EUT plane: Horizontal**

**Note:**

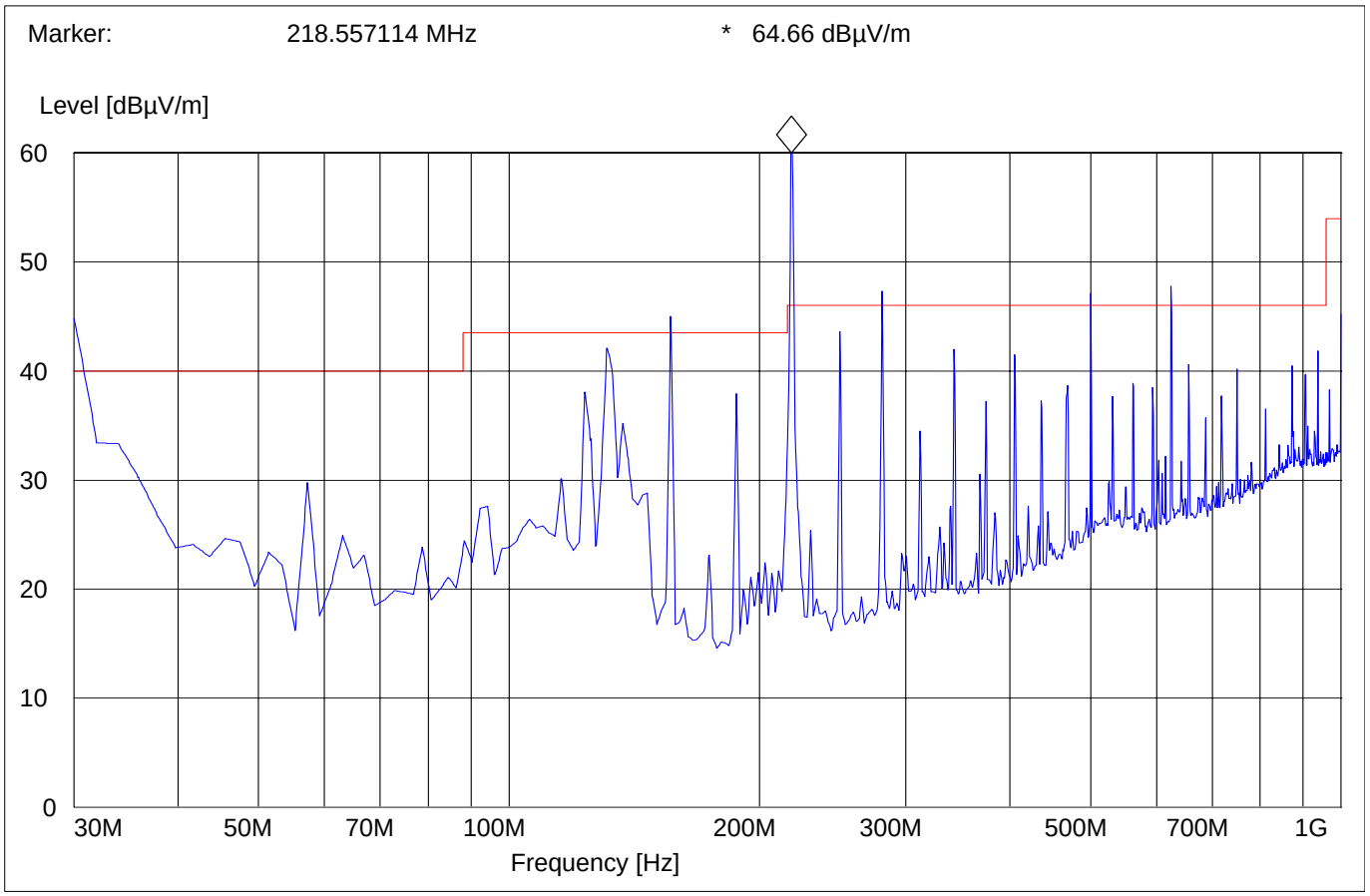
1. **This plot is valid for low, mid, high channels (worst-case plot valid for all antennas)**
2. **All significant peaks were confirmed originating from test fixture, see plot on next pages with test fixture tested alone with no WLAN card**

SWEEP TABLE: "WLAN Spuri hi 30-1G"

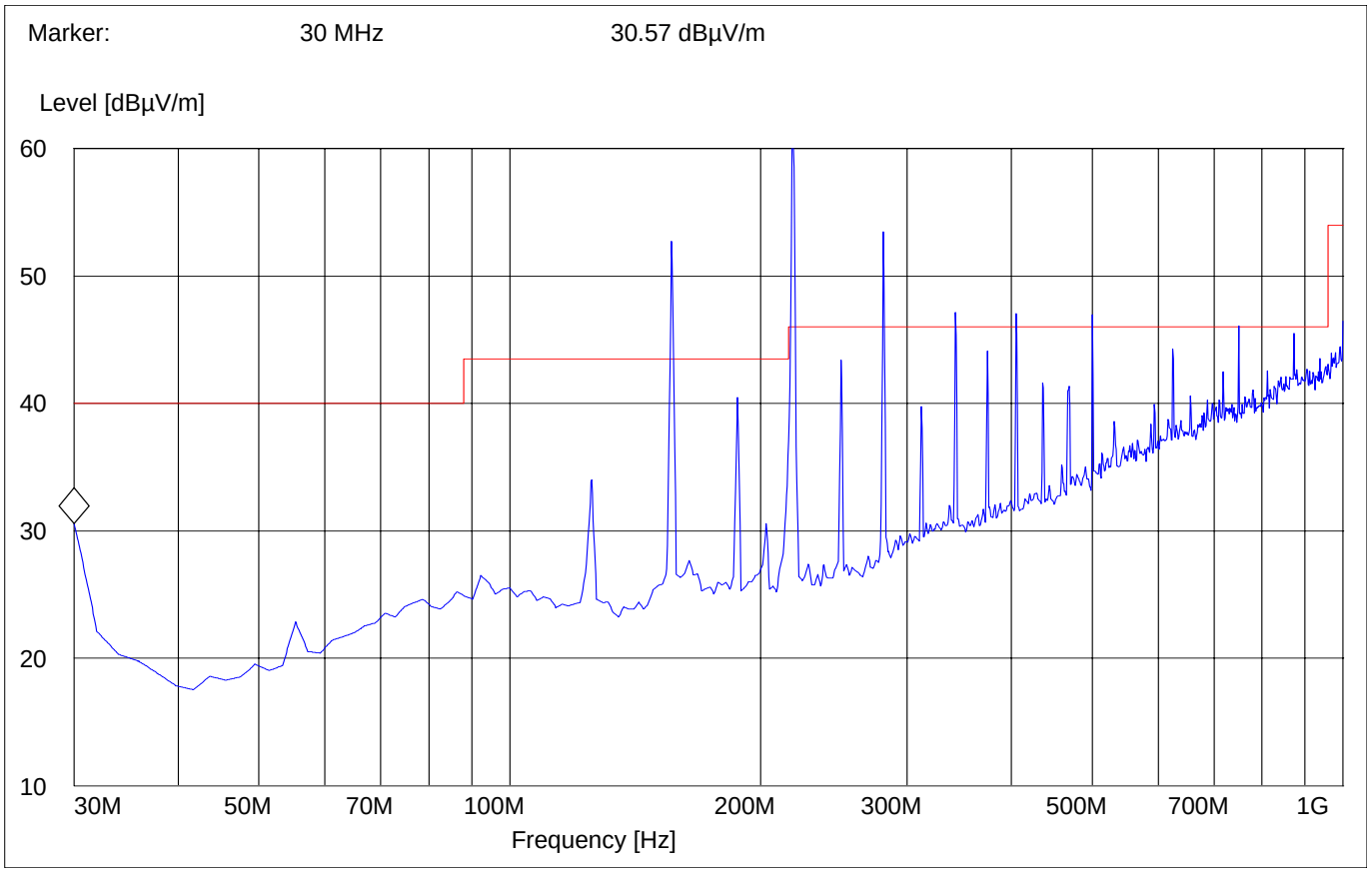
| Start Frequency | Stop Frequency | Detector | Meas. Time | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | 3141-#1186 |



**EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)**
**30MHz – 1GHz**
**Antenna: Vertical**
**Test Fixture only (no WLAN card)**



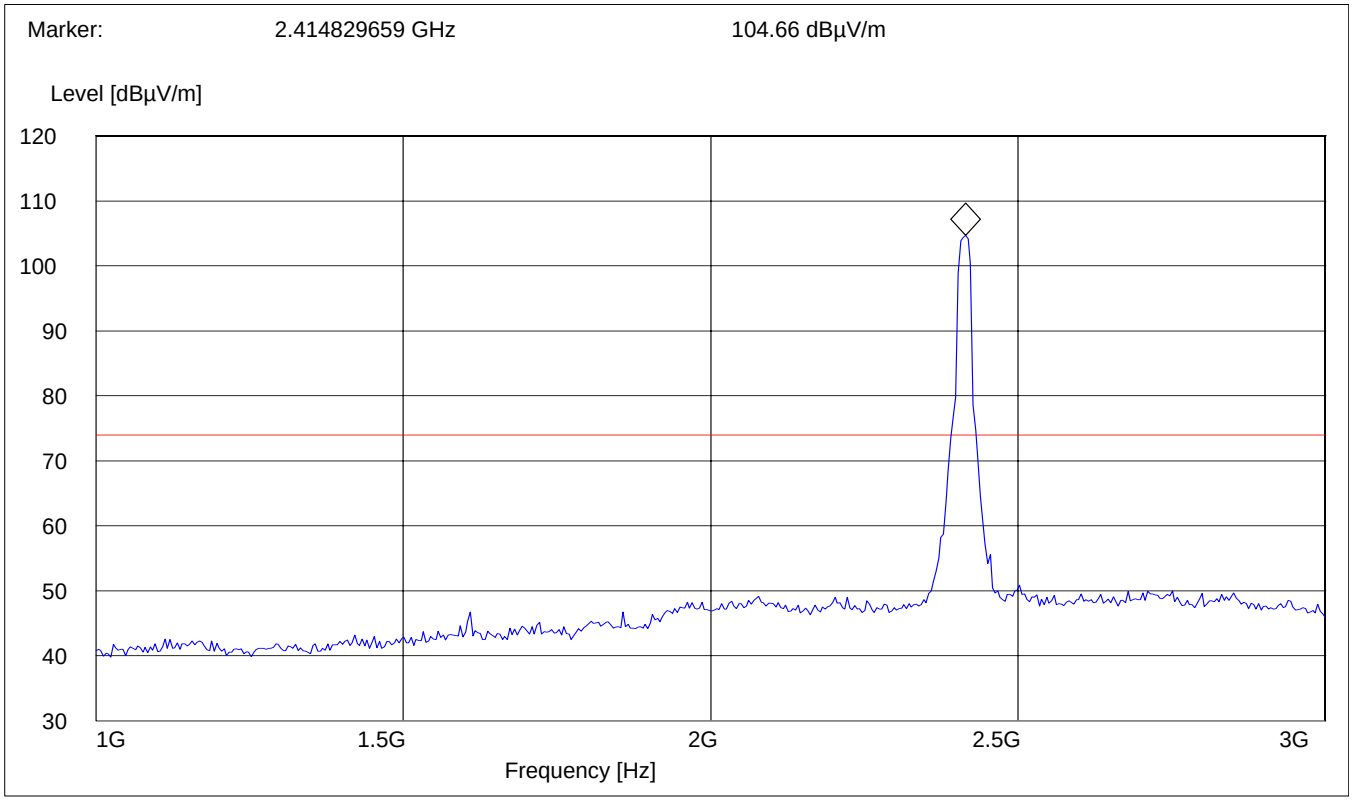
**EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)**
**30MHz – 1GHz**
**Antenna: Horizontal**
**Test Fixture only (no WLAN card)**



**EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)**
**Channel-1 (2412MHz): 1GHz – 3GHz**
**(Data rate – 54Mbps)**
**Antenna: Horizontal**
**EUT plane: Horizontal**

**Note: The peak above the limit line is the carrier freq.**

| SWEEP TABLE: | | "WLAN Spuri hi 1-3G" | | | | |
|---|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
| 1.0 GHz | 3.0 GHz | MaxPeak | Coupled | 1 MHz | 1 MHz | #326 horn (dBi) |



## EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)

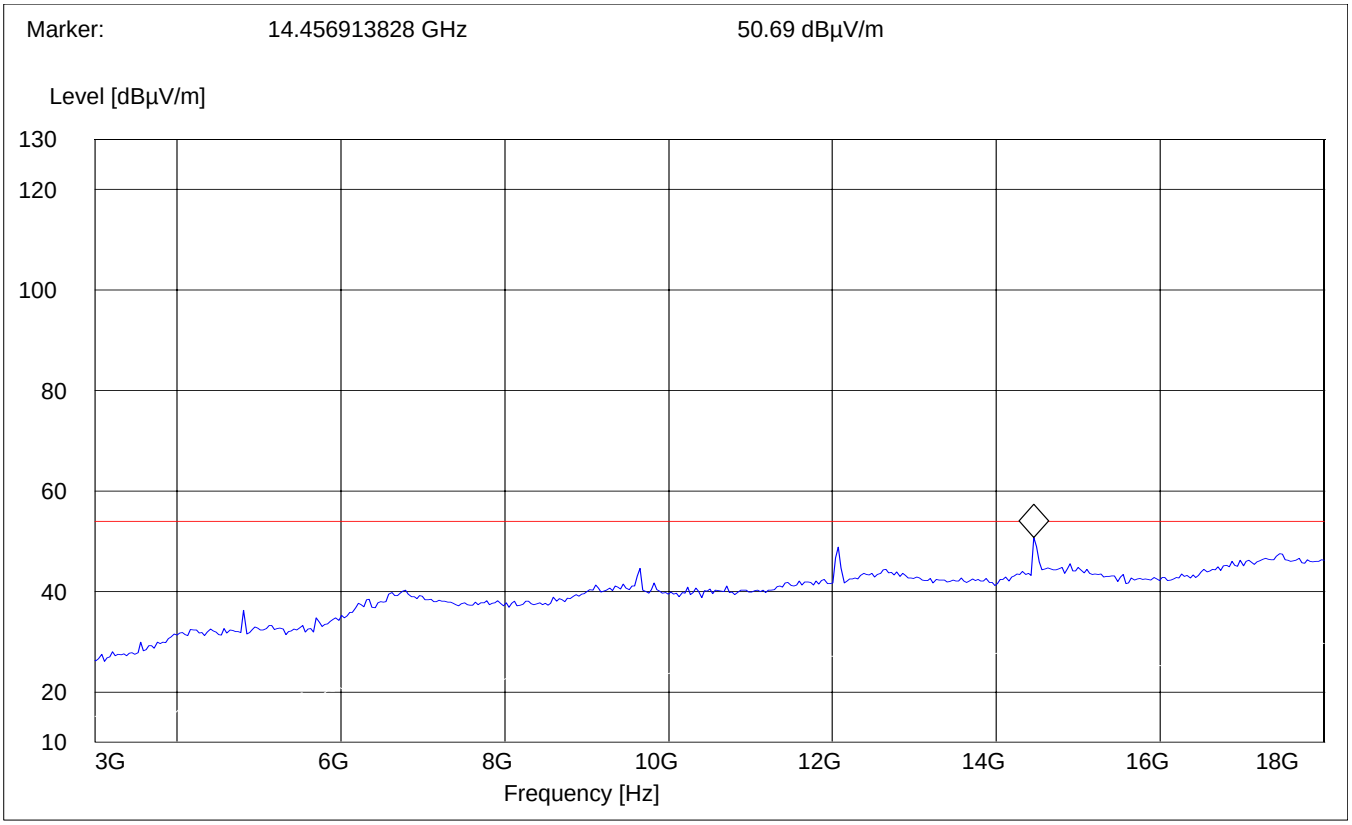
## Channel-1 (2412MHz): 3GHz – 18GHz

## (Data rate – 54Mbps)

**Antenna:** **Horizontal**
**EUT plane:** **Horizontal**

SWEEP TABLE: " WLAN Spuri hi 3-18G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 3.0 GHz | 18.0 GHz | MaxPeak | Coupled | 1 MHz | #326 horn (dBi) |

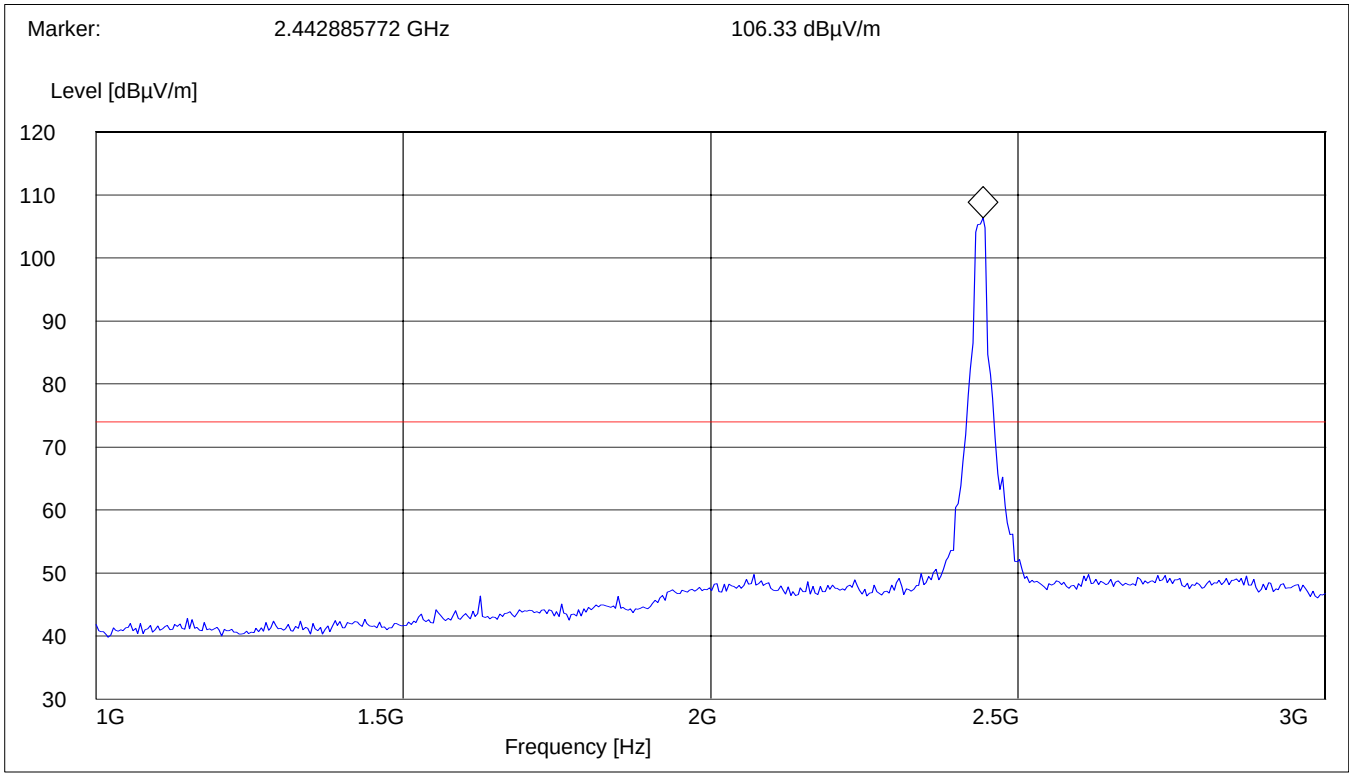


**EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)**
**Channel-6 (2437MHz): 1GHz – 3GHz**
**(Data rate – 54Mbps)**
**Antenna: Horizontal**
**EUT plane: Horizontal**

**Note: The peak above the limit line is the carrier freq.**

SWEEP TABLE: " WLAN Spuri hi 1-3G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 1.0 GHz | 3.0 GHz | MaxPeak | Coupled | 1 MHz | 1MHz | #326 horn (dBi) |



## EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)

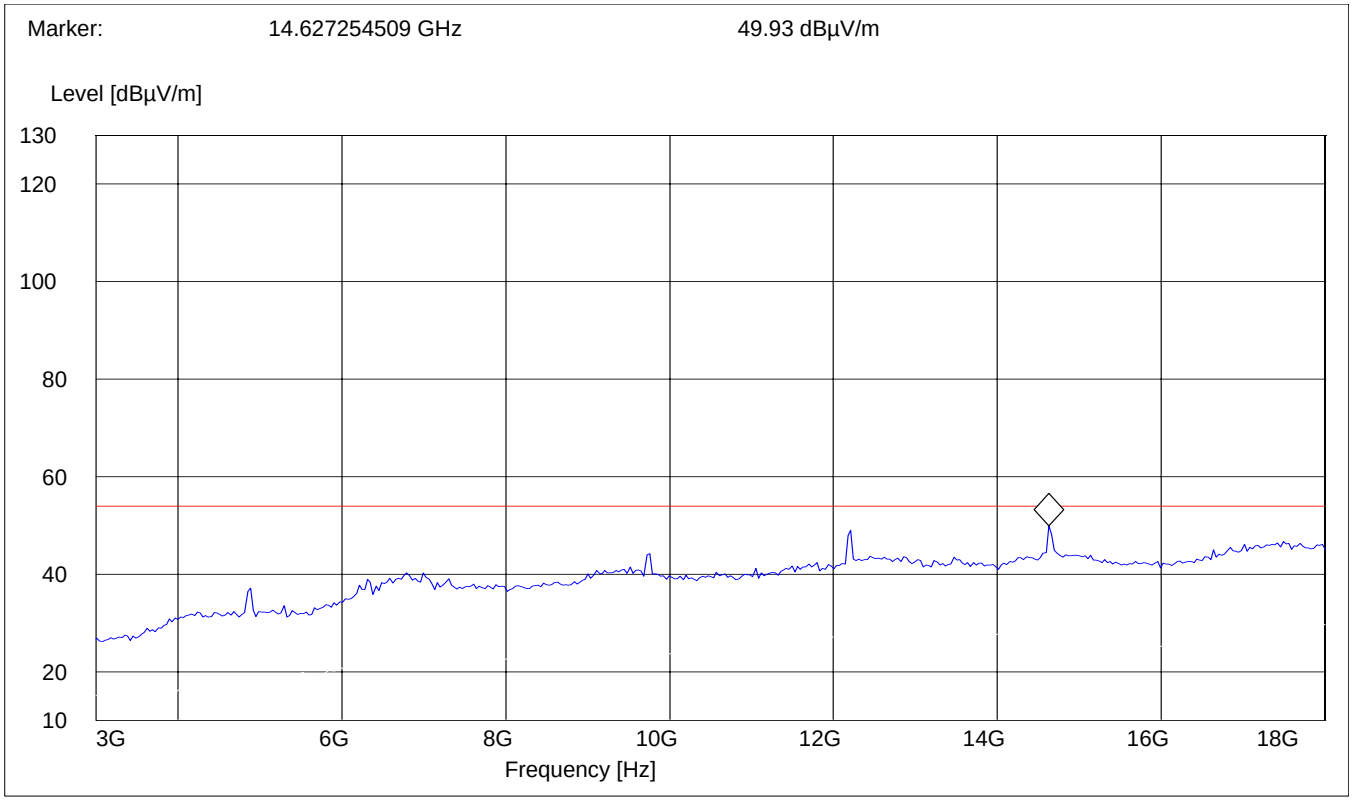
## Channel-6 (2437MHz): 3GHz – 18GHz

## (Data rate – 54Mbps)

**Antenna:** **Horizontal**
**EUT plane:** **Horizontal**

SWEEP TABLE: " WLAN Spuri hi 3-18G"

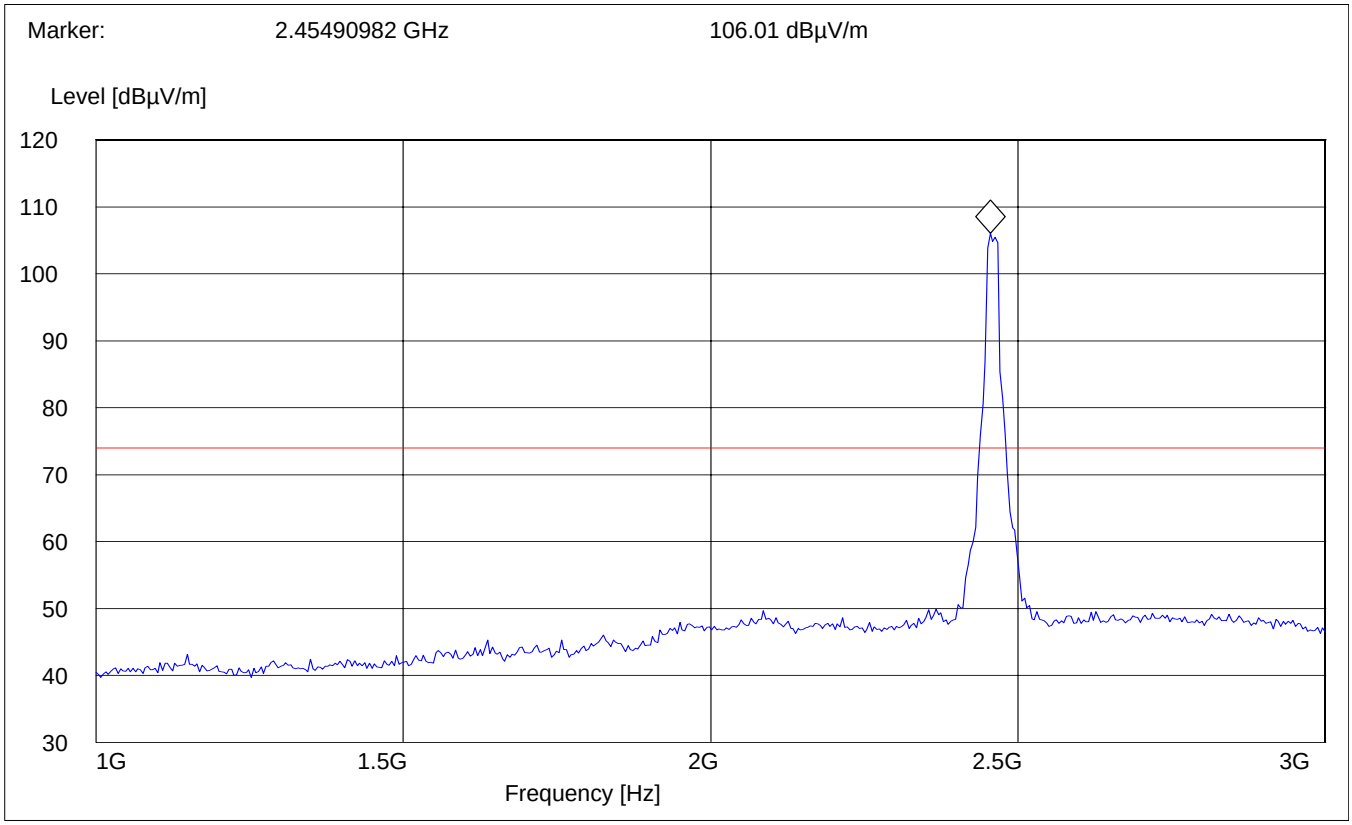
| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | Transducer |
|---|---|---|---|---|---|
| 3.0 GHz | 18.0 GHz | MaxPeak | Coupled | 1 MHz | #326 horn (dBi) |



**EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)**
**Channel-10 (2457MHz): 1GHz – 3GHz**
**(Data rate – 54Mbps)**
**Antenna: Horizontal**
**EUT plane: Horizontal**

**Note: The peak above the limit line is the carrier freq.**

| SWEEP TABLE: | | " WLAN Spuri hi 1-3G" | | | | |
|---|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
| 1.0 GHz | 3.0 GHz | MaxPeak | Coupled | 1 MHz | 1MHz | #326 horn (dBi) |



## EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)

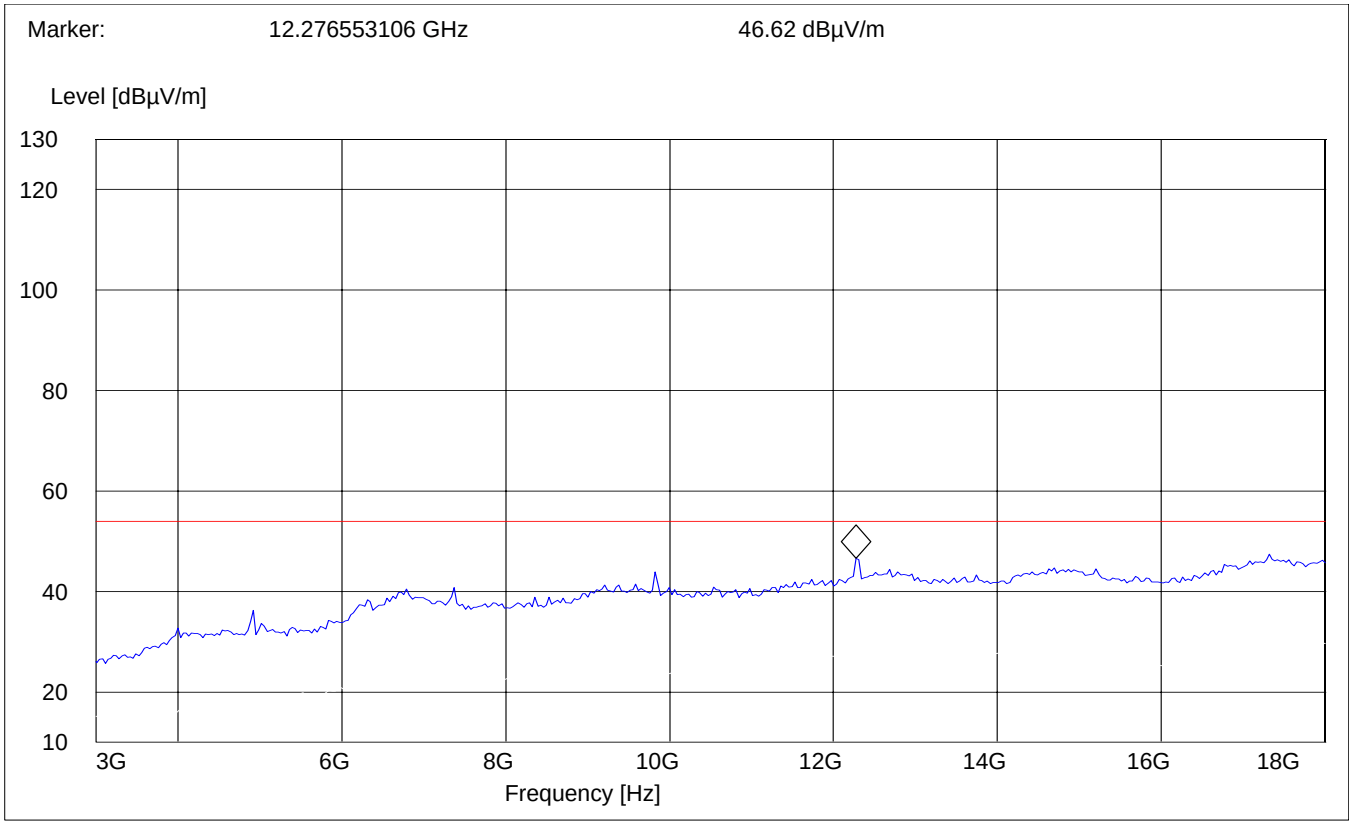
## Channel-10 (2457MHz): 3GHz – 18GHz

## (Data rate – 54Mbps)

**Antenna:** **Horizontal**
**EUT plane:** **Horizontal**

SWEEP TABLE: " WLAN Spuri hi 3-18G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 3.0 GHz | 18.0 GHz | MaxPeak | Coupled | 1 MHz | #326 horn (dBi) |



## EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)

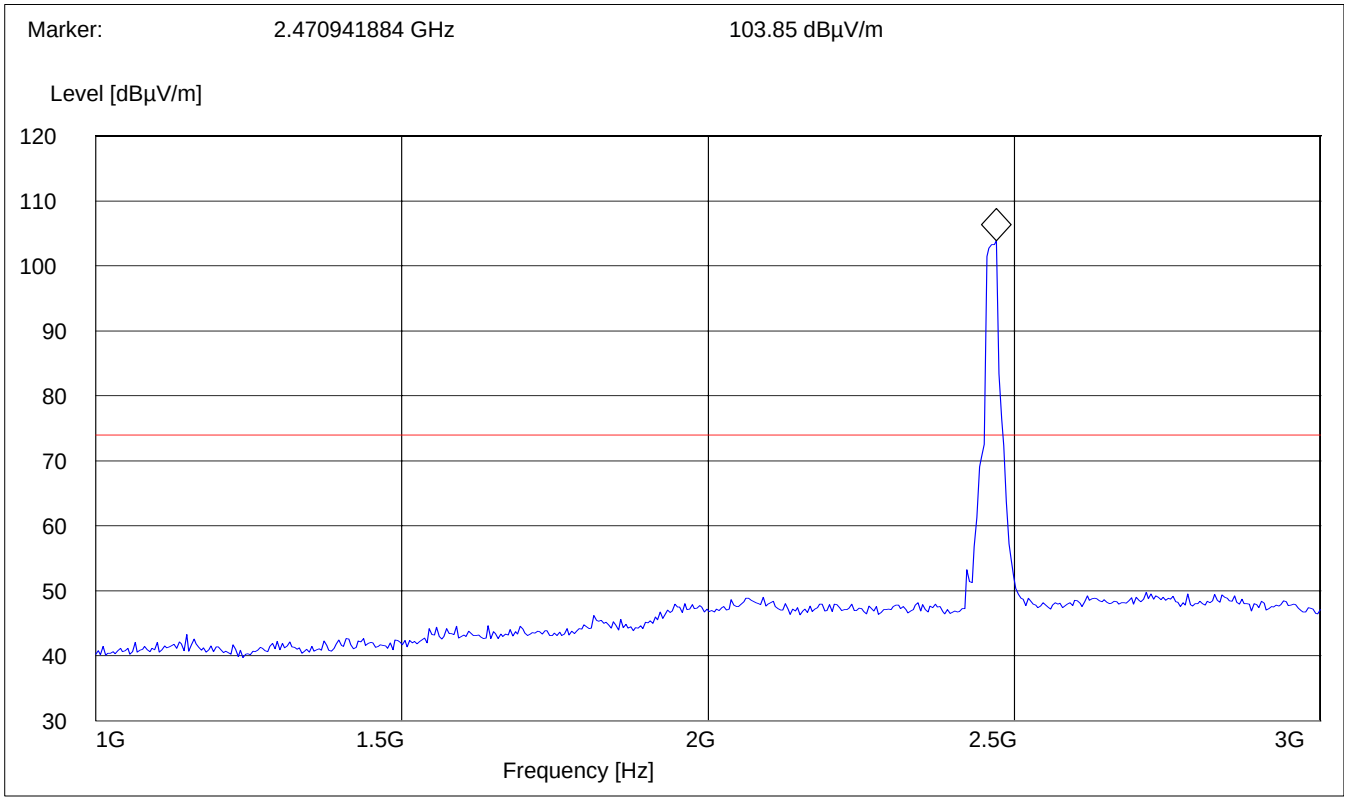
**Channel-11 (2462MHz): 1GHz – 3GHz**
**(Data rate – 54Mbps)**

**Antenna:** **Horizontal**
**EUT plane:** **Horizontal**

**Note: The peak above the limit line is the carrier freq.**

SWEEP TABLE: " WLAN Spuri hi 1-3G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 1.0 GHz | 3.0 GHz | MaxPeak | Coupled | 1 MHz | 1MHz | #326 horn (dBi) |



## EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)

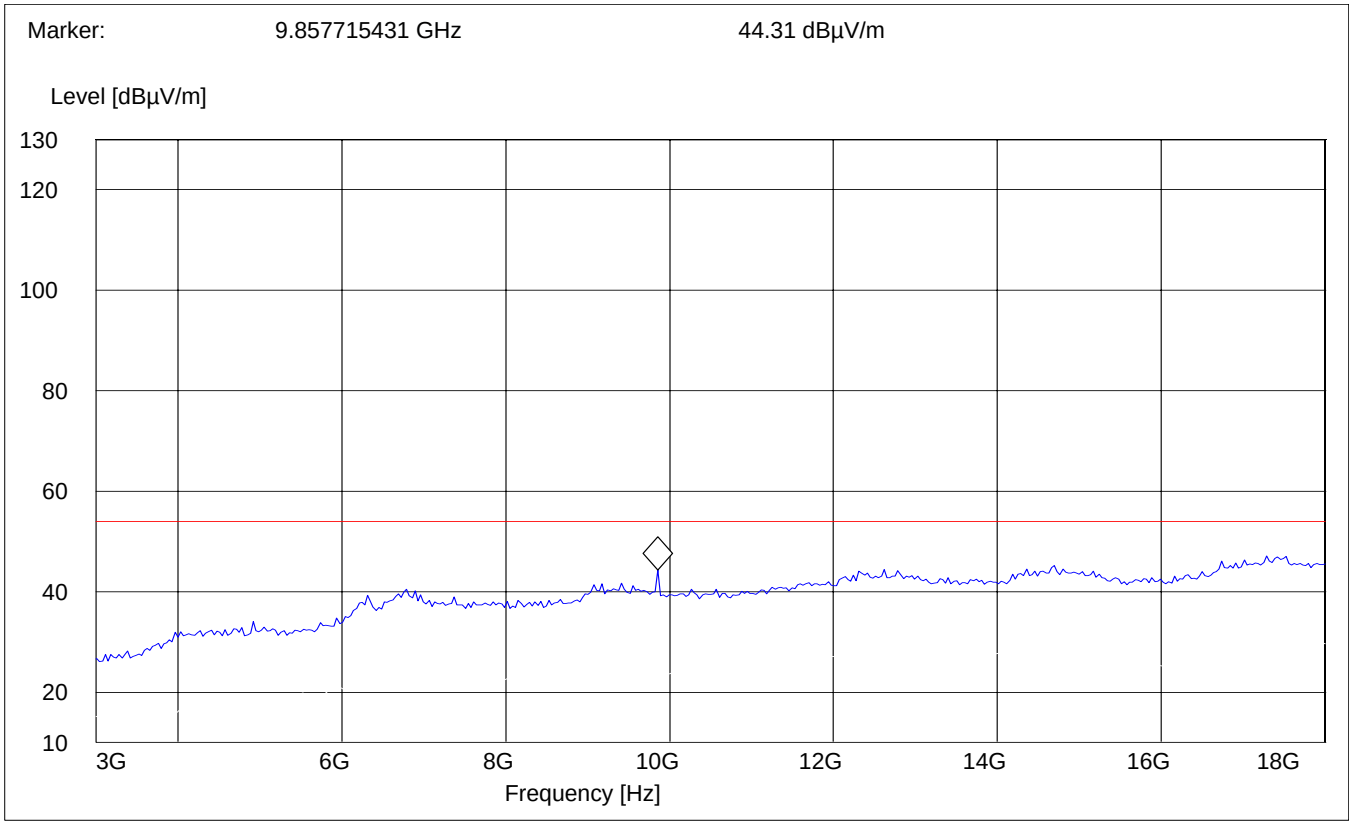
## Channel-11 (2462MHz): 3GHz – 18GHz

## (Data rate – 54Mbps)

**Antenna:** **Horizontal**
**EUT plane:** **Horizontal**

SWEEP TABLE: " WLAN Spuri hi 3-18G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 3.0 GHz | 18.0 GHz | MaxPeak | Coupled | 1 MHz | #326 horn (dBi) |

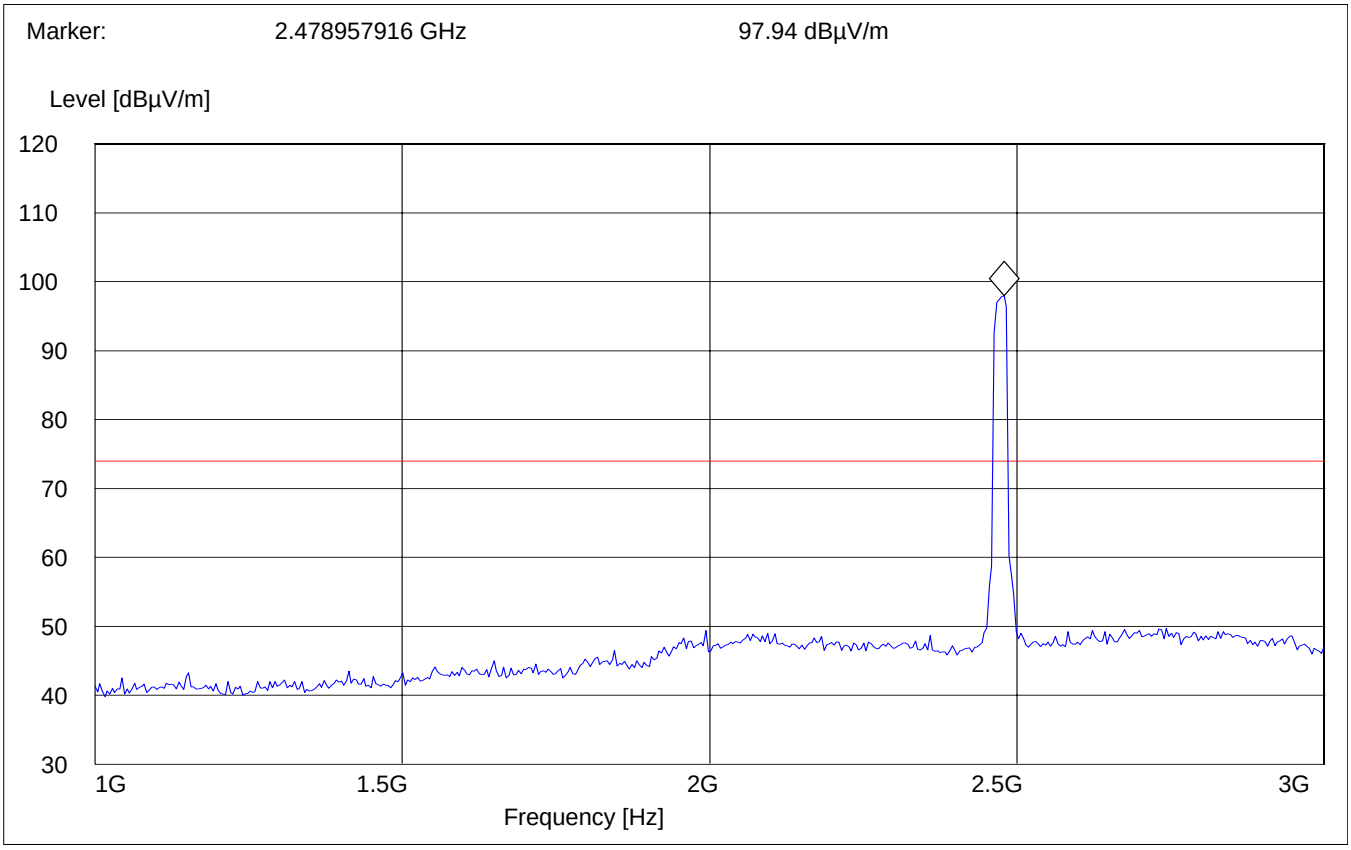


**EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)**
**Channel-13 (2472MHz): 1GHz – 3GHz**
**(Data rate – 54Mbps)**
**Antenna: Horizontal**
**EUT plane: Horizontal**

**Note: The peak above the limit line is the carrier freq.**

SWEEP TABLE: " WLAN Spuri hi 1-3G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 1.0 GHz | 3.0 GHz | MaxPeak | Coupled | 1 MHz | 1MHz | #326 horn (dBi) |



## EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)

## Channel-13 (2472MHz): 3GHz – 18GHz

## (Data rate – 54Mbps)

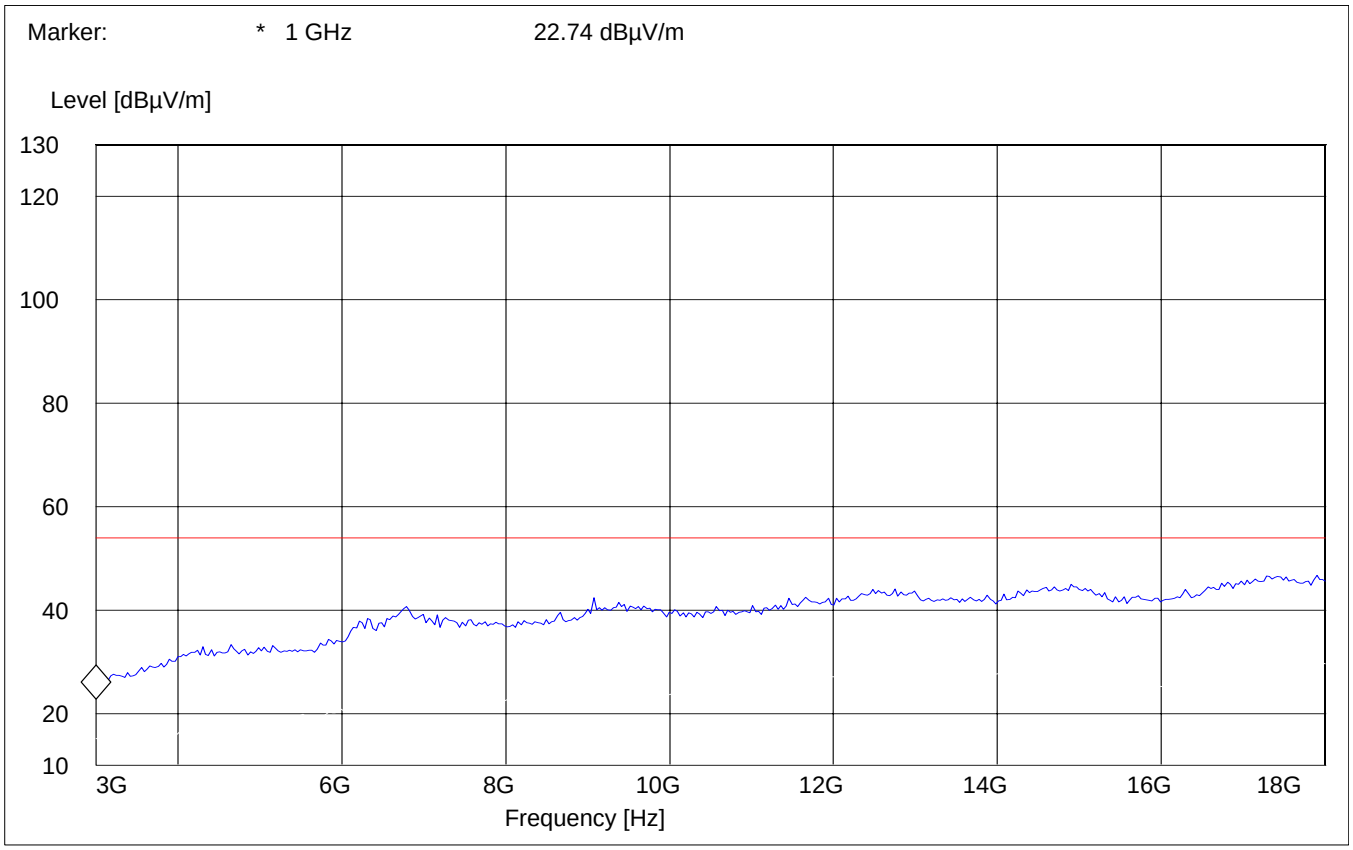
**(Average Measurement)**

**Antenna:** **Horizontal**

**EUT plane:** **Horizontal**

SWEEP TABLE: " WLAN Spuri hi 3-18G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 3.0 GHz | 18.0 GHz | MaxPeak | Coupled | 1 MHz | #326 horn (dBi) |

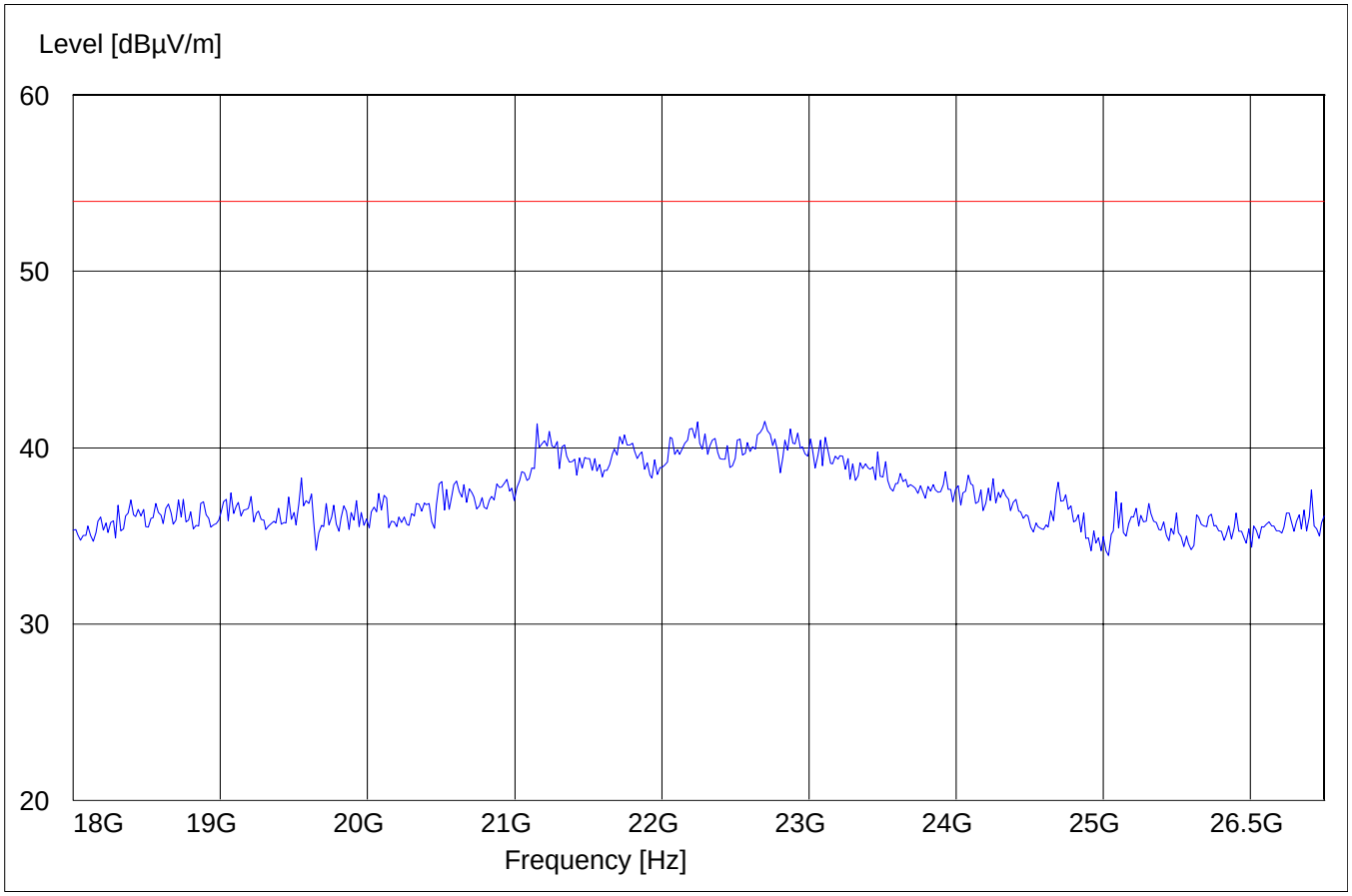


**EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)**
**18GHz – 26.5GHz**
**(Data rate – 54Mbps)**
**Antenna: Horizontal**
**EUT plane: Horizontal**

**Note: This plot is valid for low, mid, high channels (worst-case plot)**

SWEEP TABLE: "WLAN Spuri hi 18-26.5G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 18 GHz | 26.5 GHz | MaxPeak | Coupled | 1 MHz | #326 horn (dBi) |



## CONDUCTED EMISSIONS § 15.107/207

### Measured with AC/DC power adapter

***SWEEP TABLE: "55022 cond"***

Short Description: EN 55022 for 150KHz-30MHz

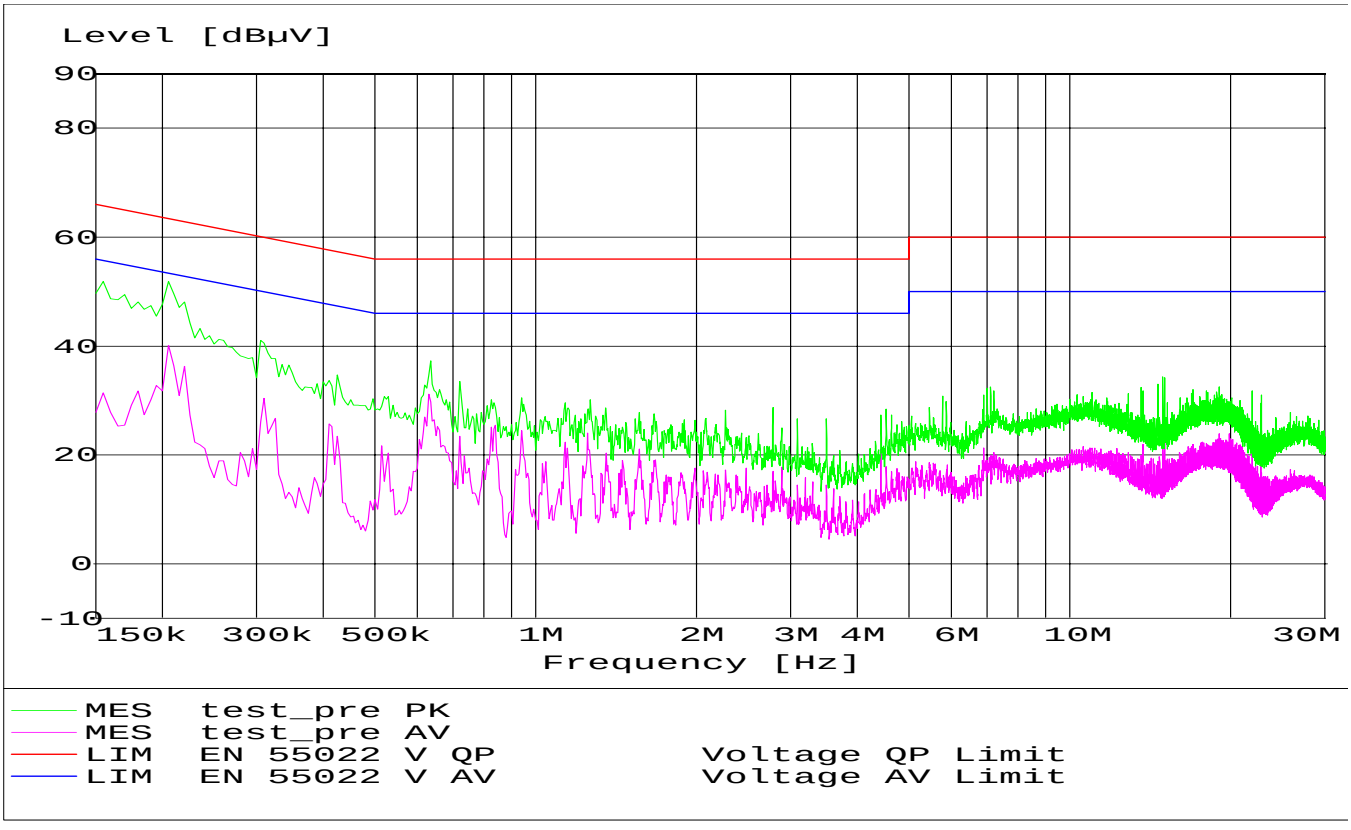
| Start Frequency | Stop Frequency | Detector | Meas Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|
| 150.0 kHz | 30.0 MHz | MaxPeak | Coupled | 10 kHz | None |

### Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)

### Limit

| Frequency of Emission (MHz) | Conducted Limit (dBµV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.15 – 0.5 | 66 to 56* | 56 to 46* |
| 0.5 – 5 | 56 | 46 |
| 5 – 30 | 60 | 50 |
| * Decreases with logarithm of the frequency | | |

**ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz**



## RECEIVER SPURIOUS RADIATION § 15.209

**Limits**

| 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:**
**The radiated 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 3 and 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.**

## RECEIVER SPURIOUS RADIATION § 15.209

**Data rate – 54Mbps**

**Antenna:** **vertical**

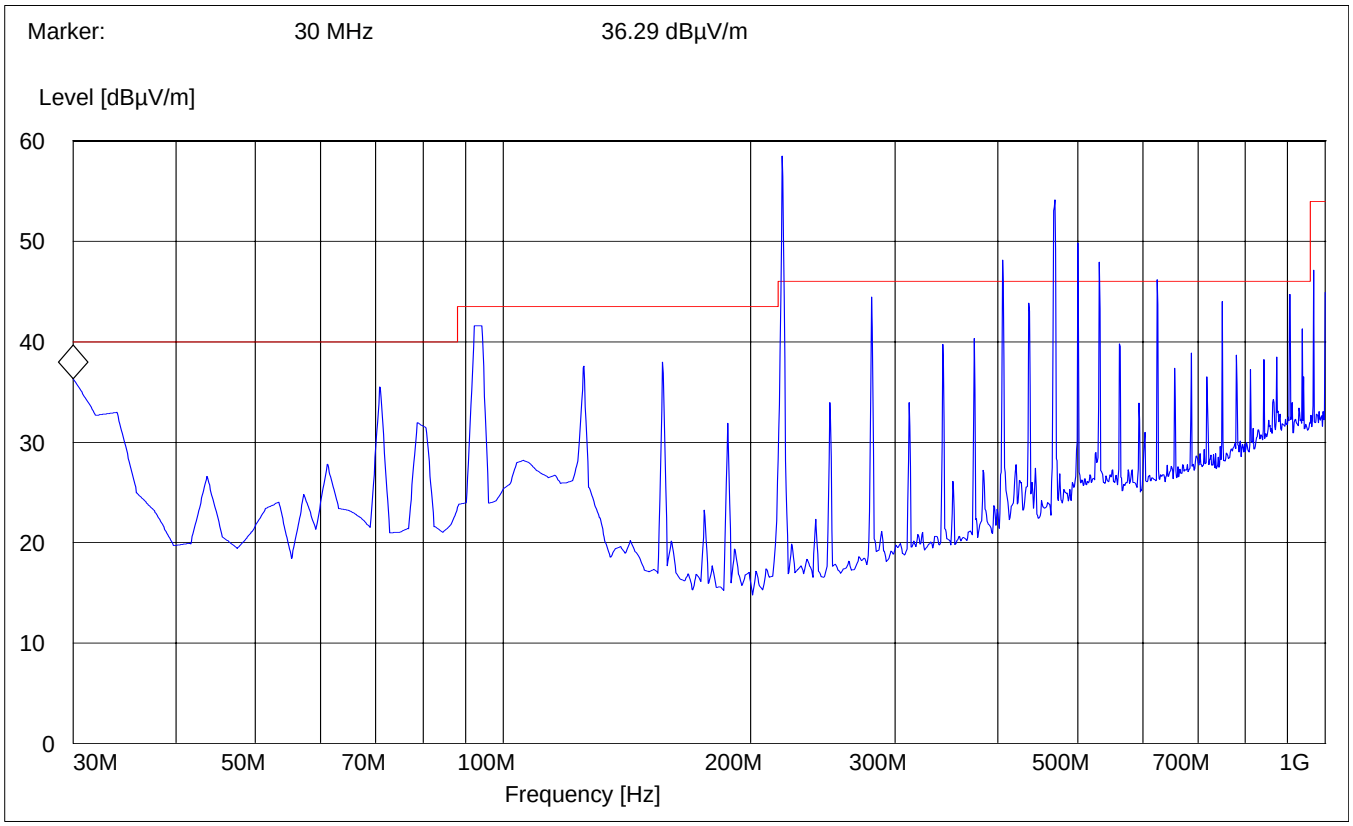
**EUT plane:** **Horizontal**

**Note:**

1. **This plot is valid for low, mid, high channels (worst-case plot valid for all antennas)**
2. **All significant peaks were confirmed originating from test fixture, see next pages with test fixture tested alone with no WLAN card**

SWEEP TABLE: "WLAN Spuri hi 30-1G"

| Start Frequency | Stop Frequency | Detector | Meas. Time | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | 3141-#1186 |



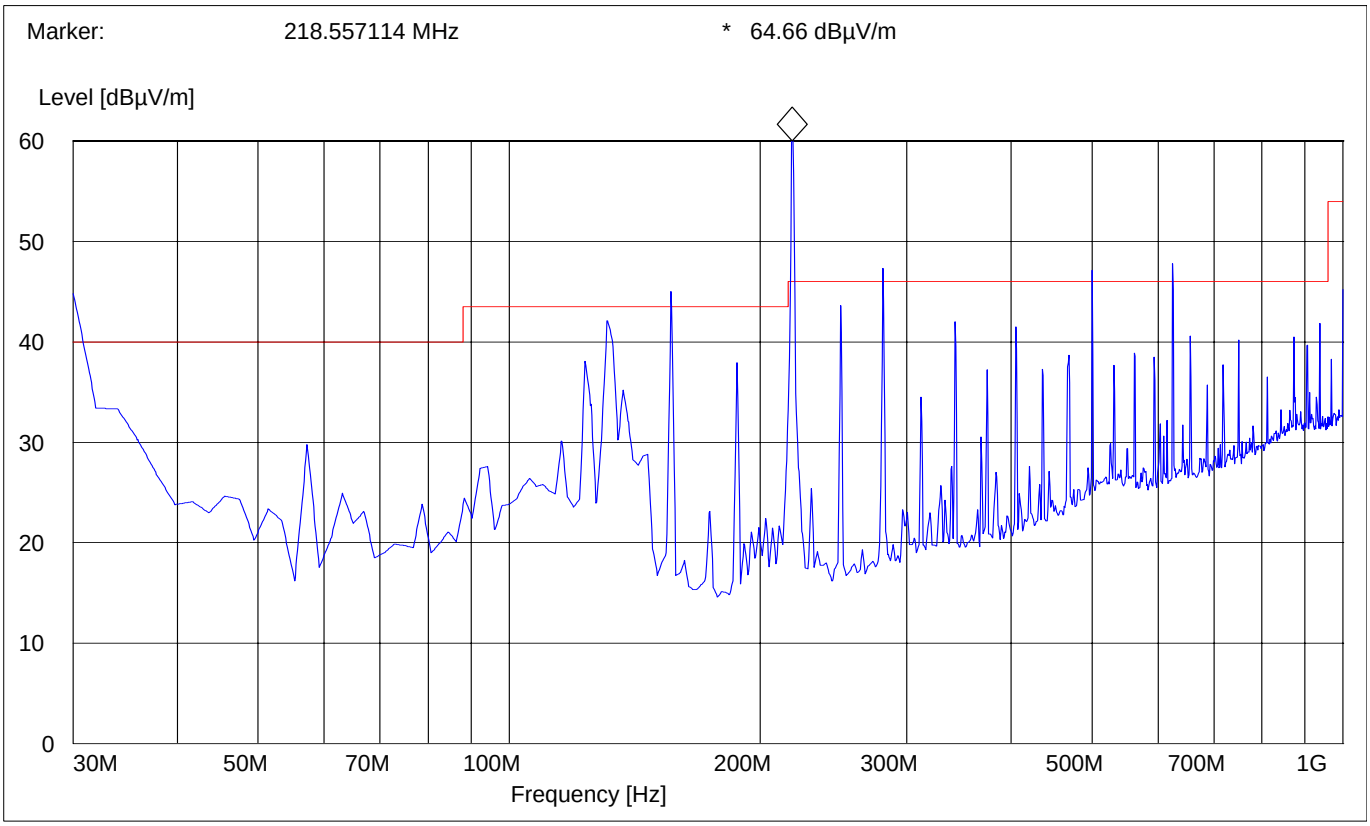
## RECEIVER SPURIOUS RADIATION § 15.209

**Antenna:** **vertical**
**EUT plane:** **Horizontal**

**Test Fixture only (no WLAN card)**

SWEEP TABLE: "WLAN Spuri hi 30-1G"

| Start Frequency | Stop Frequency | Detector | Meas. Time | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | 3141-#1186 |



## RECEIVER SPURIOUS RADIATION § 15.209

**1GHz – 3GHz**

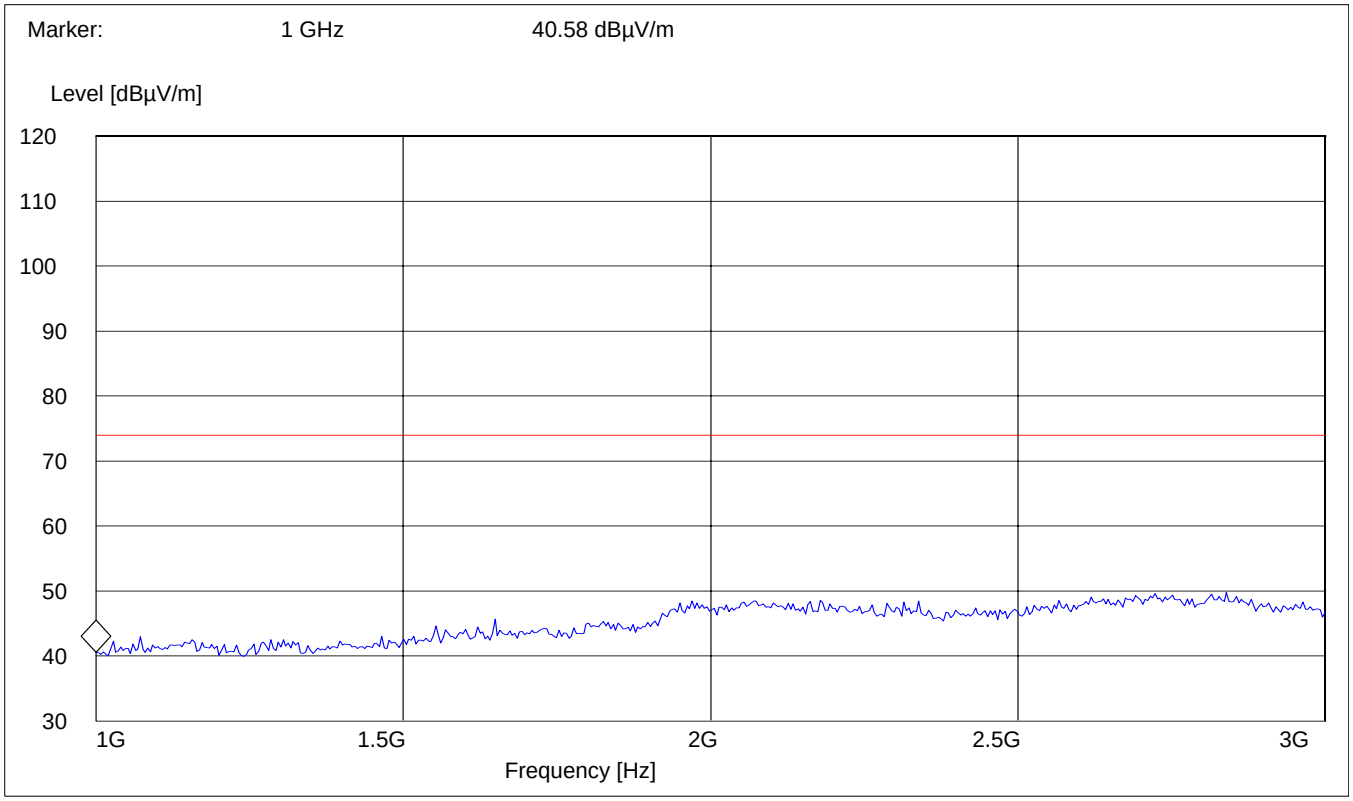
**worst-case plot valid for all antennas**

**Antenna:** **vertical**

**EUT plane:** **Horizontal**

SWEEP TABLE: "WLAN Spuri hi 1-3G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW | VBW | Transducer |
|---|---|---|---|---|---|---|
| 1.0 GHz | 3.0 GHz | MaxPeak | Coupled | 1 MHz | 1MHz | #326 horn (dBi) |

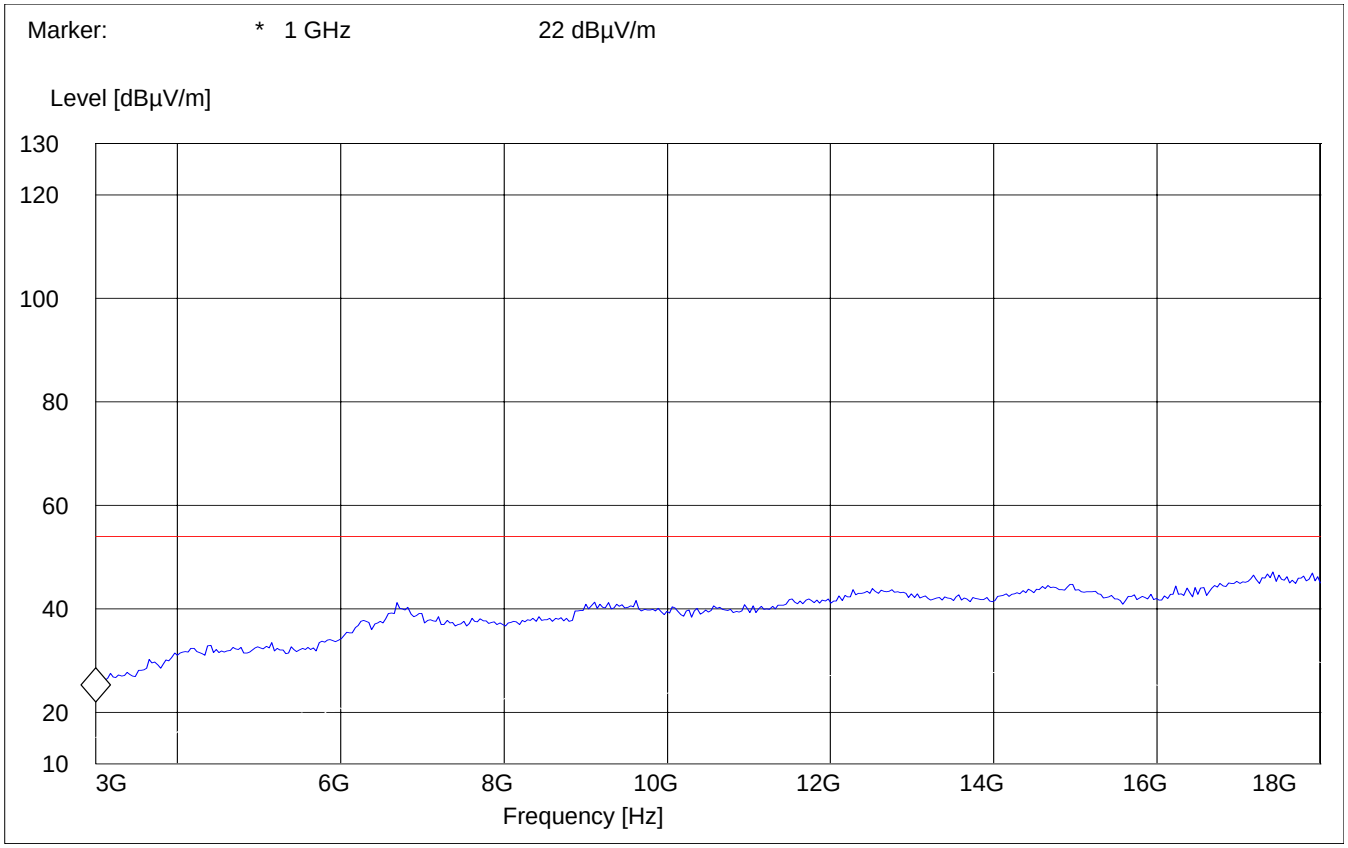


## RECEIVER SPURIOUS RADIATION § 15.209
## 3GHz – 18GHz

**Antenna:** **vertical**
**EUT plane:** **Horizontal**

SWEEP TABLE: "WLAN Spuri hi 3-18G"

| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 3.0 GHz | 18 GHz | MaxPeak | Coupled | 1 MHz | #326 horn (dBi) |

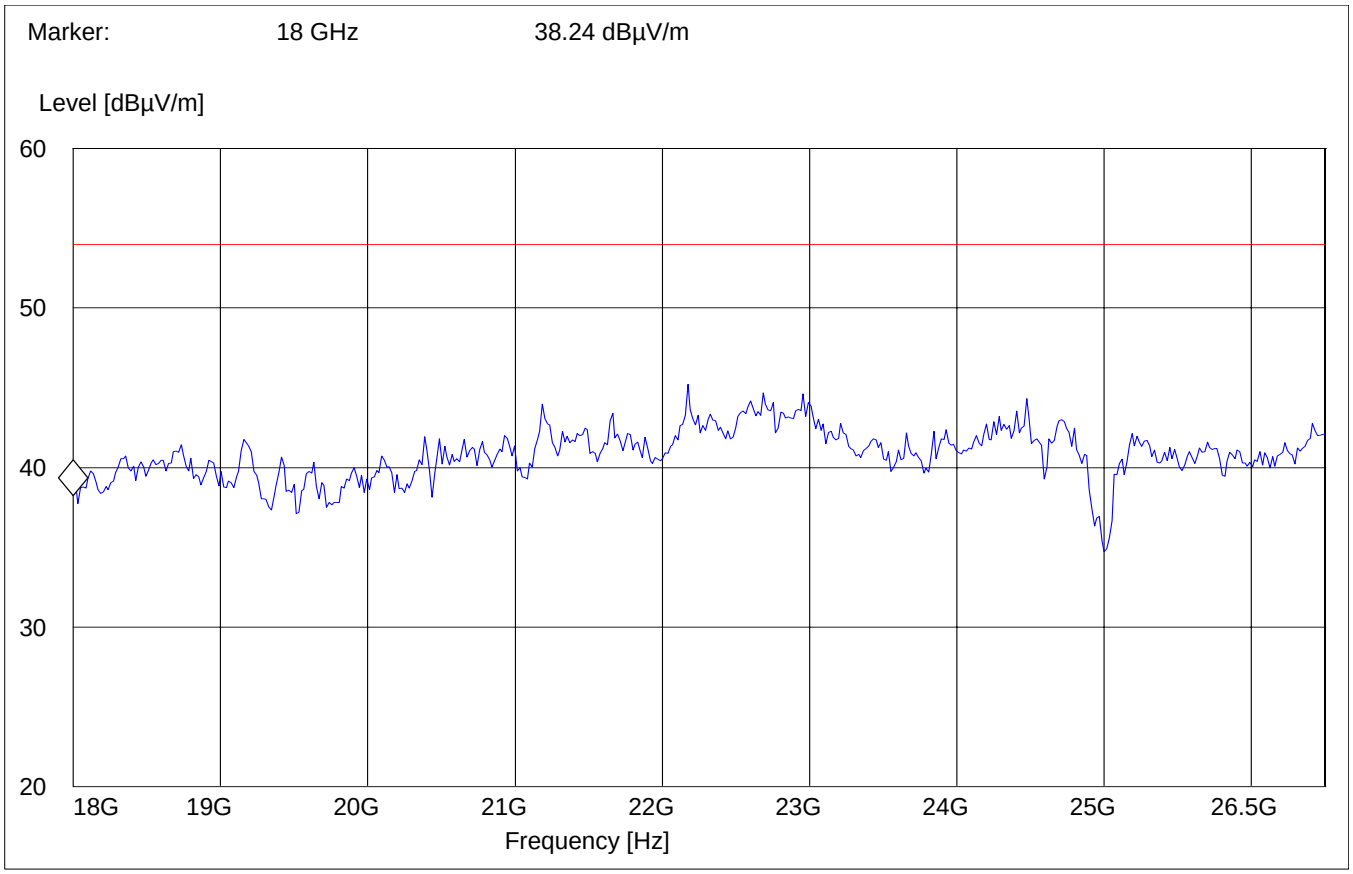


## RECEIVER SPURIOUS RADIATION § 15.209
## 18GHz – 26.5GHz

**Antenna:** **vertical**
**EUT plane:** **Horizontal**

SWEEP TABLE: "WLAN Spuri hi 18-26.5G"

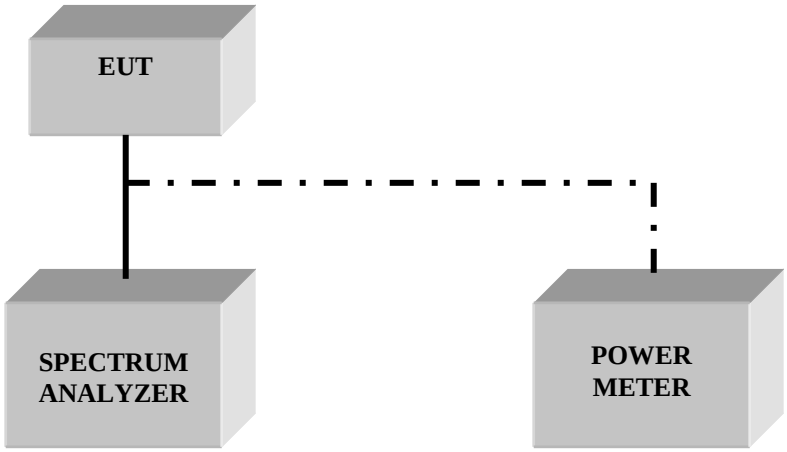
| Start Frequency | Stop Frequency | Detector Time | Meas. Bandw. | RBW VBW | Transducer |
|---|---|---|---|---|---|
| 18 GHz | 26.5 GHz | MaxPeak | Coupled | 1 MHz | #141 horn (dBi) |



## TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

| No | Instrument/Ancillary | Type | Manufacturer | Serial No. |
|---|---|---|---|---|
| **01** | Spectrum Analyzer | ESIB 40 | Rohde & Schwarz | 100107 |
| **02** | Spectrum Analyzer | FSEM 30 | Rohde & Schwarz | 826880/010 |
| **03** | Biconilog Antenna | 3141 | EMCO | 0005-1186 |
| **04** | Horn Antenna (700M-18GHz) | SAS-200/571 | AH Systems | 325 |
| **05** | Horn Antenna (18-26.5GHz) | 3160-09 | EMCO | 1240 |
| **06** | 2-3GHz Band reject filter | BRM50701 | Microtronics | 6 |
| **07** | Power-Meter | NRVD | Rohde & Schwarz | 0857.8008.02 |
| **08** | Pre-Amplifier | TS-ANA | Rohde & Schwarz | -- |
| **09** | Pre-Amplifier | JS4-00102600 | Miteq | 00616 |

**BLOCK DIAGRAMS**
**Conducted Testing**



## Radiated Testing