

# EMI - TEST REPORT

- FCC Part 15.407 and RSS210 -

**Test Report No. :** T36325-00-13HS

08 April 2014

Date of issue

Type / Model Name : SCALANCE W700 / MSN

Product Description : Industrial WLAN access point

**Applicant** : Siemens AG, Industrial Automation Division

Address : Gleiwitzer Strasse 555

90475 NUERNBERG, GERMANY

**Manufacturer** : Siemens AG, Automation & Drives

Address : Oestliche Rheinbrueckenstrasse 50

76187 KARLSRUHE, GERMANY

**Licence holder** : Siemens AG, Automation & Drives

Address : Oestliche Rheinbrueckenstrasse 50

76187 KARLSRUHE, GERMANY

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

**POSITIVE**



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

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## 1 TEST STANDARDS

The tests were performed according to following standards:

### **FCC Rules and Regulations Part 15, Subpart A - General (September, 2013)**

|                                   |   |
|-----------------------------------|---|
| Part 15, Subpart A, Section 15.31 | Measurement standards                         |
| Part 15, Subpart A, Section 15.33 | Frequency range of radiated measurements      |
| Part 15, Subpart A, Section 15.35 | Measurement detector functions and bandwidths |

### **FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (September, 2013)**

|                                    |   |
|------------------------------------|---|
| Part 15, Subpart C, Section 15.203 | Antenna requirement   |
| Part 15, Subpart C, Section 15.204 | External radio frequency power amplifiers and antenna modifications |
| Part 15, Subpart C, Section 15.205 | Restricted bands of operation                                       |
| Part 15, Subpart C, Section 15.207 | Conducted limits  |
| Part 15, Subpart C, Section 15.209 | Radiated emission limits, general requirements                      |
| Part 15, Subpart C, Section 15.212 | Modular transmitters  |

### **FCC Rules and Regulations Part 15, Subpart E – Unlicensed National Information Infrastructure Devices (September, 2013)**

|                                    |   |
|------------------------------------|---|
| Part 15, Subpart E, Section 15.407 | Operation within the bands 5.15 - 5.25 GHz, 5.25 - 5.35 GHz, 5.47 - 5.725 GHz and 5.725 - 5.825 GHz |
|------------------------------------|---|

### **FCC Rules and Regulations Part 1, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969**

|                                   |   |
|-----------------------------------|---|
| Part 1, Subpart I, Section 1.1310 | Radiofrequency radiation exposure limits                      |
| Part 1, Subpart 2, Section 2.1093 | Radiofrequency radiation exposure evaluation: portable device |

### **OET Bulletin 65, 65A, 65B, 65C Edition 97-01, August 1997 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.**

|                                 |   |
|---------------------------------|---|
| ET Docket No. 03-122, FCC 06-96 | Released June 30, 2006, Memorandum Opinion and Order concerning DFS |
|---------------------------------|---|

|                  |   |
|------------------|---|
| ANSI C63.4: 2003 | Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. |
|------------------|---|

|                  |  |
|------------------|--|
| ANSI C95.1: 2005 | IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz |
|------------------|--|

|                    |                                |
|--------------------|--------------------------------|
| CISPR 16-4-2: 2003 | Uncertainty in EMC measurement |
|--------------------|--------------------------------|

|                                  |                                  |
|----------------------------------|----------------------------------|
| CISPR 22: 2005<br>EN 55022: 2006 | Information technology equipment |
|----------------------------------|----------------------------------|

|                       |   |
|-----------------------|---|
| KDB 789033 D01 v01r03 | Guidelines for compliance testing of UNII-Devices – Part 15, Subpart E, April 08, 2013. |
|-----------------------|---|

|                    |   |
|--------------------|---|
| KDB 662911 D01 v02 | Emission testing of transmitters with multiple outputs in the same band, 5/28/2013. |
|--------------------|---|

## **2 SUMMARY**

### **2.1 Test result summary**

WLAN devices using digital modulation:

Operating in the 5150 MHz - 5250 MHz band:

| FCC Rule Part   | RSS Rule Part   | Description                        | Result         |
|-----------------|-----------------|------------------------------------|----------------|
| 15.207(a)       | RSS Gen, 7.2.4. | AC power line conducted emissions  | passed         |
| 15.407(a)       |                 | EBW 26 dB                          | passed         |
| 15.407(a)       | RSS210, A9.2    | Conducted output power and PSD     | passed         |
| 15.407(a)(6)    |                 | Peak excursion                     | passed         |
| 15.407(b)       | RSS210, A9.2    | Undesirable emissions              | passed         |
| 15.205(a)       | RSS-Gen, 7.2.2  | Emissions in restricted bands      | passed         |
| 15.407(g)       | RSS-Gen, 7.2.6  | Frequency stability                | passed         |
| 15.407(f)       | RSS102, 2.5.2   | Maximum permissible exposure (MPE) | passed         |
| 15.407(h)(1)    | RSS210, A9.2    | TPC                                | not applicable |
| 15.407(a)       | RSS210, A9.2    | Antenna requirement                | passed         |
| OET Bulletin 65 | RSS102, 3.2     | Co-location, Co-transmission       | passed         |
|                 | RSS210, A9.2    | OBW 99 %                           | passed         |

The mentioned RSS Rule Parts in the above table are related to:

RSS Gen, Issue 3, December 2010

RSS 210, Issue 8, December 2010

RSS 102, Issue 4, March 2010

## 2.2 General remarks

The EUT is a 2-Port WLAN-access point. The firmware does not support ad-hoc modes. The possibility to choose the channel for data transmission or power setting in relation to the used antenna with antenna cable makes a professional installation necessary. The AP is compatible with 802.11a, 802.11n Standard. It supports the 2.4 GHz and 5 GHz frequency band and supports no beam forming.

### Variants of the EUT

| Variant | Device-Name   | WLAN-Interfaces | LAN connector | Antenna Ports | Order numbers      |
|---------|---------------|-----------------|---------------|---------------|--------------------|
| V01     | MSN-W1-RJ-E2  | 1               | RJ45          | 2             | 6GK5734-1FX00-xxxx |
| V02     | MSN-W1-M12-E2 | 1               | M12           | 2             | 6GK5774-1FY00-xxxx |

### Operation frequency and channel plan

#### Channel plan:

802.11a, HT20:

| Channel | Frequency |
|---------|-----------|
| 36      | 5180      |
| 40      | 5200      |
| 44      | 5220      |
| 48      | 5240      |

HT40:

| Channel | Frequency |
|---------|-----------|
| 36up    | 5190      |
| 44up    | 5230      |

### Transmit operating modes

The module use OFDM modulation and is capable to provide following data rates:

- 802.11a 54, 48, 36, 24, 18, 12, 9, 6 Mbps
- 802.11n HT20, MCS 0 - 15
- 802.11n HT40, MCS 0 - 15

The module use OFDM modulation and is capable to provide following data rates:

- 802.11a 54, 48, 36, 24, 18, 12, 9, 6 Mbps
- 802.11n HT20, MCS 0 – 15
- 802.11n HT40, MCS 0 – 15

HT20

| MCS Index | Modulation | R   | N <sub>BPSCS(iss)</sub> | N <sub>SD</sub> | N <sub>SP</sub> | N <sub>CBPS</sub> | N <sub>DBPS</sub> | Data rate (Mb/s) |                      |
|-----------|------------|-----|-------------------------|-----------------|-----------------|-------------------|-------------------|------------------|----------------------|
|           |            |     |                         |                 |                 |                   |                   | 800 ns GI        | 400 ns GI (see NOTE) |
| 0         | BPSK       | 1/2 | 1                       | 52              | 4               | 52                | 26                | 6.5              | 7.2                  |
| 1         | QPSK       | 1/2 | 2                       | 52              | 4               | 104               | 52                | 13.0             | 14.4                 |
| 2         | QPSK       | 3/4 | 2                       | 52              | 4               | 104               | 78                | 19.5             | 21.7                 |
| 3         | 16-QAM     | 1/2 | 4                       | 52              | 4               | 208               | 104               | 26.0             | 28.9                 |
| 4         | 16-QAM     | 3/4 | 4                       | 52              | 4               | 208               | 156               | 39.0             | 43.3                 |
| 5         | 64-QAM     | 2/3 | 6                       | 52              | 4               | 312               | 208               | 52.0             | 57.8                 |
| 6         | 64-QAM     | 3/4 | 6                       | 52              | 4               | 312               | 234               | 58.5             | 65.0                 |
| 7         | 64-QAM     | 5/6 | 6                       | 52              | 4               | 312               | 260               | 65.0             | 72.2                 |

NOTE—Support of 400 ns GI is optional on transmit and receive.

| MCS Index | Modulation | $R$ | $N_{BPSCS(i_{SS})}$ | $N_{SD}$ | $N_{SP}$ | $N_{CBPS}$ | $N_{DBPS}$ | Data rate (Mb/s) |           |
|-----------|------------|-----|---------------------|----------|----------|------------|------------|------------------|-----------|
|           |            |     |                     |          |          |            |            | 800 ns GI        | 400 ns GI |
| 8         | BPSK       | 1/2 | 1                   | 108      | 6        | 216        | 108        | 27.0             | 30.0      |
| 9         | QPSK       | 1/2 | 2                   | 108      | 6        | 432        | 216        | 54.0             | 60.0      |
| 10        | QPSK       | 3/4 | 2                   | 108      | 6        | 432        | 324        | 81.0             | 90.0      |
| 11        | 16-QAM     | 1/2 | 4                   | 108      | 6        | 864        | 432        | 108.0            | 120.0     |
| 12        | 16-QAM     | 3/4 | 4                   | 108      | 6        | 864        | 648        | 162.0            | 180.0     |
| 13        | 64-QAM     | 2/3 | 6                   | 108      | 6        | 1296       | 864        | 216.0            | 240.0     |
| 14        | 64-QAM     | 3/4 | 6                   | 108      | 6        | 1296       | 972        | 243.0            | 270.0     |
| 15        | 64-QAM     | 5/6 | 6                   | 108      | 6        | 1296       | 1080       | 270.0            | 300.0     |

HT40

| MCS Index | Modulation | $R$ | $N_{BPSCS(i_{SS})}$ | $N_{SD}$ | $N_{SP}$ | $N_{CBPS}$ | $N_{DBPS}$ | Data rate (Mb/s) |           |
|-----------|------------|-----|---------------------|----------|----------|------------|------------|------------------|-----------|
|           |            |     |                     |          |          |            |            | 800 ns GI        | 400 ns GI |
| 0         | BPSK       | 1/2 | 1                   | 108      | 6        | 108        | 54         | 13.5             | 15.0      |
| 1         | QPSK       | 1/2 | 2                   | 108      | 6        | 216        | 108        | 27.0             | 30.0      |
| 2         | QPSK       | 3/4 | 2                   | 108      | 6        | 216        | 162        | 40.5             | 45.0      |
| 3         | 16-QAM     | 1/2 | 4                   | 108      | 6        | 432        | 216        | 54.0             | 60.0      |
| 4         | 16-QAM     | 3/4 | 4                   | 108      | 6        | 432        | 324        | 81.0             | 90.0      |
| 5         | 64-QAM     | 2/3 | 6                   | 108      | 6        | 648        | 432        | 108.0            | 120.0     |
| 6         | 64-QAM     | 3/4 | 6                   | 108      | 6        | 648        | 486        | 121.5            | 135.0     |
| 7         | 64-QAM     | 5/6 | 6                   | 108      | 6        | 648        | 540        | 135.0            | 150.0     |

| MCS Index | Modulation | $R$ | $N_{BPSCS(i_{SS})}$ | $N_{SD}$ | $N_{SP}$ | $N_{CBPS}$ | $N_{DBPS}$ | Data rate (Mb/s) |           |
|-----------|------------|-----|---------------------|----------|----------|------------|------------|------------------|-----------|
|           |            |     |                     |          |          |            |            | 800 ns GI        | 400 ns GI |
| 8         | BPSK       | 1/2 | 1                   | 108      | 6        | 216        | 108        | 27.0             | 30.0      |
| 9         | QPSK       | 1/2 | 2                   | 108      | 6        | 432        | 216        | 54.0             | 60.0      |
| 10        | QPSK       | 3/4 | 2                   | 108      | 6        | 432        | 324        | 81.0             | 90.0      |
| 11        | 16-QAM     | 1/2 | 4                   | 108      | 6        | 864        | 432        | 108.0            | 120.0     |
| 12        | 16-QAM     | 3/4 | 4                   | 108      | 6        | 864        | 648        | 162.0            | 180.0     |
| 13        | 64-QAM     | 2/3 | 6                   | 108      | 6        | 1296       | 864        | 216.0            | 240.0     |
| 14        | 64-QAM     | 3/4 | 6                   | 108      | 6        | 1296       | 972        | 243.0            | 270.0     |
| 15        | 64-QAM     | 5/6 | 6                   | 108      | 6        | 1296       | 1080       | 270.0            | 300.0     |

| Symbol              | Explanation  |
|---------------------|--|
| $N_{SS}$            | Number of spatial streams  |
| $R$                 | Coding rate  |
| $N_{BPSC}$          | Number of coded bits per single carrier (total across spatial streams)                       |
| $N_{BPSCS(i_{SS})}$ | Number of coded bits per single carrier for each spatial stream, $i_{SS} = 1, \dots, N_{SS}$ |
| $N_{SD}$            | Number of complex data numbers per spatial stream per OFDM symbol                            |
| $N_{SP}$            | Number of pilot values per OFDM symbol   |
| $N_{CBPS}$          | Number of coded bits per OFDM symbol   |
| $N_{DBPS}$          | Number of data bits per OFDM symbol  |
| $N_{ES}$            | Number of BCC encoders for the DATA field  |
| $N_{TBPS}$          | Total bits per subcarrier  |

## Antennas

Antennas intended for use are classified into 3 gain groups:

- Antenna gain group 1:                   Antennas 0 to 6 dBi
- Antenna gain group 2:                   Antennas 6 to 9 dBi
- Antenna gain group 3:                   Antennas 9 to 14 dBi

The following antennas shall be used with the EUT:

| Number | Manufacturer Number | Characteristic | Model number            | Connector   | Frequency (GHz) | Gain 5GHz (dBi) | Cable loss (dB) | Effective gain 5 GHz (dBi) | Group    |
|--------|---------------------|----------------|-------------------------|-------------|-----------------|-----------------|-----------------|----------------------------|----------|
| 1      | 6GK5793-8DK00-0AA0  | Directed       | <b>ANT 793-8DK</b>      | 2x N-female | 5 GHz           | 23              | 8.8             | 14.2                       | 9-14 dBi |
| 2      | 6GK5793-8DJ00-0AA0  | Directed       | <b>ANT 793-8D</b>       | 2x N-female | 5 GHz           | 18              | 4.4             | 13.6                       | 9-14 dBi |
| 3      | 6GK5793-8DP00-0AA0  | Directed       | <b>ANT 793-8DP</b>      | N-female    | 5 GHz           | 13.5            | 0               | 13.5                       | 9-14 dBi |
| 4      | 6GK5795-6DC00-0AA0  | Wide angle     | <b>ANT 795-6DC</b>      | N-female    | 2.4 + 5 GHz     | 9               | 0               | 9                          | 6-9 dBi  |
| 5      | 6GK5793-6DG00-0AA0  | Wide angle     | <b>ANT 793-6DG</b>      | 2x N-female | 5 GHz           | 9               | 0               | 9                          | 6-9 dBi  |
| 6      | 6GK5795-6MN10-0AA6  | Omni           | <b>ANT 795-6MN</b>      | N-female    | 2.4 + 5 GHz     | 8               | 0               | 8                          | 6-9 dBi  |
| 7      | 6GK5 793-4MN00-0AA6 | Omni           | <b>ANT 793-4MN</b>      | N-female    | 5 GHz           | 6               | 0               | 6                          | 0-6 dBi  |
| 8      | 6GK5795-4MD00-0AA3  | Omni           | <b>ANT 795-4MD</b>      | N-male      | 2.4 + 5 GHz     | 5               | 0               | 5                          | 0-6 dBi  |
| 9      | 6GK5795-4MC00-0AA3  | Omni           | <b>ANT 795-4MC</b>      | N-male      | 2.4 + 5 GHz     | 5               | 0               | 5                          | 0-6 dBi  |
| 10     | 6GK5795-4MA00-0AA3  | Omni           | <b>ANT 795-4MA</b>      | R-SMA male  | 2.4 + 5 GHz     | 5               | 0               | 5                          | 0-6 dBi  |
| 11     | 6GK5793-6MN00-0AA6  | Omni           | <b>ANT 793-6MN</b>      | N-female    | 5 GHz           | 5               | 0               | 5                          | 0-6 dBi  |
| 12     | 6XV1875-2D          | Omni           | <b>IWLAN Rcoax 1/2"</b> | N-female    | 5 GHz           | 0               | 0               | 0                          | 0-6 dBi  |

Note: The directed antenna number 1 may be used only with minimum 10 m antenna cable,

Type 6XV 1875-5CN10 with cable loss 8.8 dB at 5.7 GHz.

The directed antenna number 2 may be used only with minimum 5 m antenna cable,

Type 6XV 1875-5CH50 with cable loss 4.4 dB at 5.7 GHz.

## 2.3 Final assessment

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

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

Testing commenced on : 7 November 2013

Testing concluded on : 28 February 2014

Checked by:

Tested by:

---

Eduard Stangl  
Technical director

---

Hermann Smetana  
Radio Team



### 3 EQUIPMENT UNDER TEST

#### 3.1 Photo documentation of the EUT – Detailed photos see attachment C

#### 3.2 Power supply system utilised

Power supply voltage : 100 - 120 VAC

$V_{nom}$  = 110 V

$V_{min}$  = 100 V

$V_{max}$  = 120 V

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

The EUT is a 2-Port WLAN-access point. The firmware does not support ad-hoc modes. The possibility to choose the channel for data transmission or power setting in relation to the used antenna with antenna cable makes a professional installation necessary. The AP is compatible with 802.11a/n Standard. It supports the 5 GHz frequency band and has no beam forming.

Number of tested samples: 1

Serial number: VPDN198359

#### EUT operation mode:

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

- WLAN transmission

- TX continuous mode

- RX continuous mode

#### EUT configuration:

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

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

- LAN cable, 3m Model : CAT5

- Power supply cable, 1m Model : Self-made

- Model :

## 4 TEST ENVIRONMENT

### 4.1 Address of the test laboratory

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

### 4.2 Environmental conditions

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

Temperature: 15-35 °C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

### 4.3 Statement of the measurement uncertainty

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

## 4.1 Measurement protocol for FCC and IC

### 4.1.1 General information

#### 4.1.1.1 Test methodology

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

The Open Area test site is a listed Open Site under the Canadian Test-Sites File-No:

### **IC 3009A**

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

#### 4.1.1.2 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left without termination. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

#### 4.1.1.3 Details of test procedures

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

## 4.2 Determination of worst case measurement conditions

Measurements have been made in all three orthogonal axes and the settings of the EUT were changed to locate at which position and at what setting of the EUT produce the maximum of the emissions. For the further measurement the EUT is set on cap rail test rack.

The tests are carried out in the following frequency bands:

### **5.15 - 5.25 GHz**

Preliminary tests are performed to find the worst case mode from all possible combinations between available modulations, data rates and small antenna system is determined through pre-scans. The maximum output power depends on used data rate. As worse case the HT20 mode (MCS0) and HT40 mode (MCS8) is used.

The EUT is controlled for several tests with special test software used for testing only where continuous signals are needed. For the tests a maximum duty cycle (x) is set.

Following channels and test modes were selected for the final test as listed below:

| Technology    | Available channels | Tested channels | Modulation | Modulation type | Data rate (Mbps)      |
|---------------|--------------------|-----------------|------------|-----------------|-----------------------|
| 802.11a       | 36 - 48            | 36, 40, 48      | OFDM       | BPSK            | 6 Mbps<br>(BW=20 MHz) |
| 802.11n, HT20 | 36 - 48            | 36, 40, 48      | OFDM       | BPSK            | MCS0<br>(BW=20 MHz)   |
| 802.11n, HT40 | 36up – 44up        | 36up, 44up      | OFDM       | BPSK            | MCS8<br>(BW=40 MHz)   |

## 5 TEST CONDITIONS AND RESULTS

### 5.1 Conducted emissions

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

#### 5.1.1 Description of the test location

Test location: Shielded Room S2

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



#### 5.1.3 Applicable standard

According to FCC Part 15C, Section 15.207(a):

Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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

\* Decreases with the logarithm of the frequency

#### 5.1.4 Description of Measurement

The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a line impedance stabilization network (LISN) with 50Ω/50 μH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver with quasi-peak and average detection and recorded.

To convert between dBμV and μV, the following conversions apply:

$$\text{dB}\mu\text{V} = 20 \log \mu\text{V}$$

$$\mu\text{V} = 10^{(\text{dB}\mu\text{V}/20)}$$

#### 5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin -1.5 dB at 0.318 MHz

The requirements are **FULFILLED**.

Remarks: For detailed test result please see following test protocols.

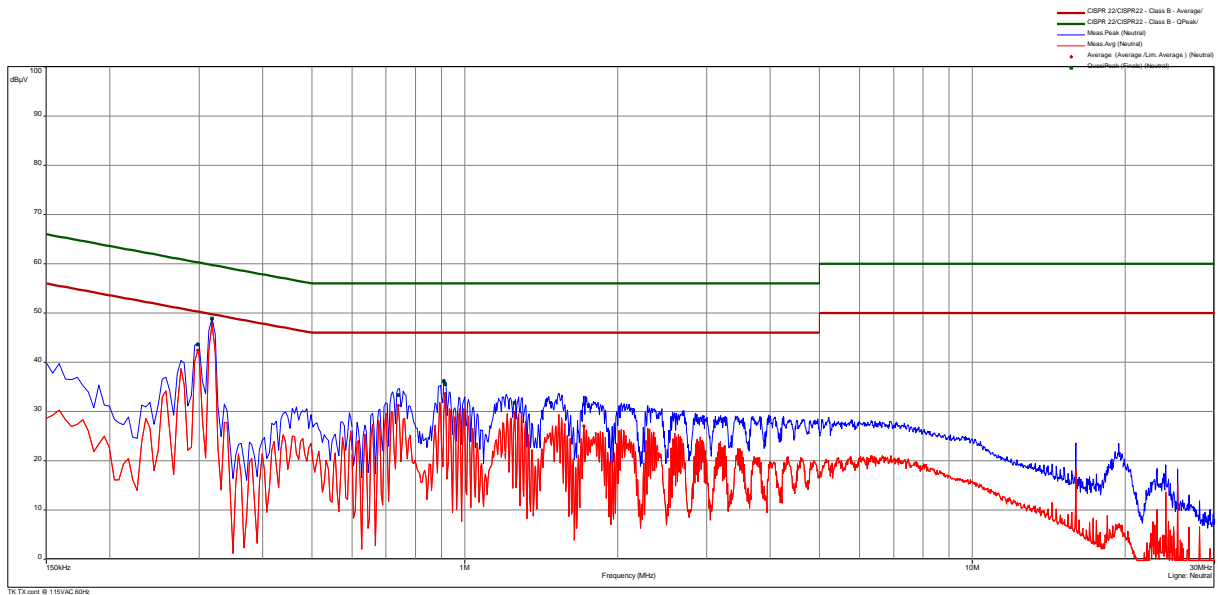
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**5.1.6 Test protocol**

Test point: N  
 Operation mode: WLAN transmission  
 Remarks:

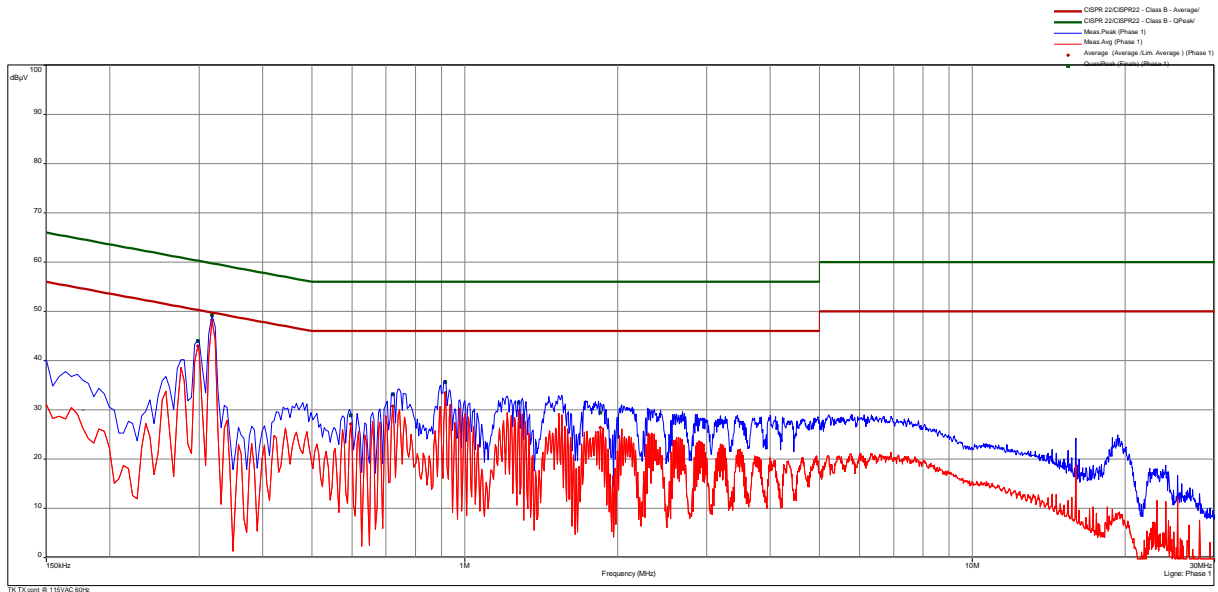
Result: passed



| freq<br>MHz | SR | QP<br>dB(µV) | margin<br>dB | limit<br>dB | AV<br>dB(µV) | margin<br>dB | limit<br>dB | line    |
|-------------|----|--------------|--------------|-------------|--------------|--------------|-------------|---------|
| 0.299       | 1  | 43.7         | -16.6        | 60.3        | 42.5         | -7.8         | 50.3        | Neutral |
| 0.318       | 2  | 48.9         | -10.9        | 59.8        | 47.8         | -1.9         | 49.8        | Neutral |
| 0.740       | 3  | 33.3         | -22.7        | 56.0        | 31.1         | -14.9        | 46.0        | Neutral |
| 0.911       | 3  | 36.1         | -19.9        | 56.0        | 30.1         | -15.9        | 46.0        | Neutral |
| 0.915       | 3  | 35.6         | -20.4        | 56.0        | 33.7         | -12.3        | 46.0        | Neutral |
| 1.254       | 4  | 31.8         | -24.3        | 56.0        | 29.7         | -16.3        | 46.0        | Neutral |
| 1.718       | 4  | 31.4         | -24.6        | 56.0        | 26.8         | -19.2        | 46.0        | Neutral |

Test point: L1  
 Operation mode: WLAN transmission  
 Remarks:

Result: passed



| freq<br>MHz | SR | QP<br>dB(µV) | margin<br>dB | limit<br>dB | AV<br>dB(µV) | margin<br>dB | limit<br>dB | line    |
|-------------|----|--------------|--------------|-------------|--------------|--------------|-------------|---------|
| 0.299       | 9  | 44.0         | -16.3        | 60.3        | 42.9         | -7.4         | 50.3        | Phase 1 |
| 0.318       | 10 | 49.2         | -10.5        | 59.8        | 48.3         | -1.5         | 49.8        | Phase 1 |
| 0.597       | 10 | 28.9         | -27.1        | 56.0        | 27.1         | -18.9        | 46.0        | Phase 1 |
| 0.722       | 11 | 33.2         | -22.9        | 56.0        | 30.7         | -15.3        | 46.0        | Phase 1 |
| 0.915       | 11 | 35.7         | -20.3        | 56.0        | 33.5         | -12.5        | 46.0        | Phase 1 |
| 1.277       | 12 | 31.5         | -24.5        | 56.0        | 29.9         | -16.2        | 46.0        | Phase 1 |
| 1.853       | 12 | 29.5         | -26.5        | 56.0        | 26.4         | -19.6        | 46.0        | Phase 1 |

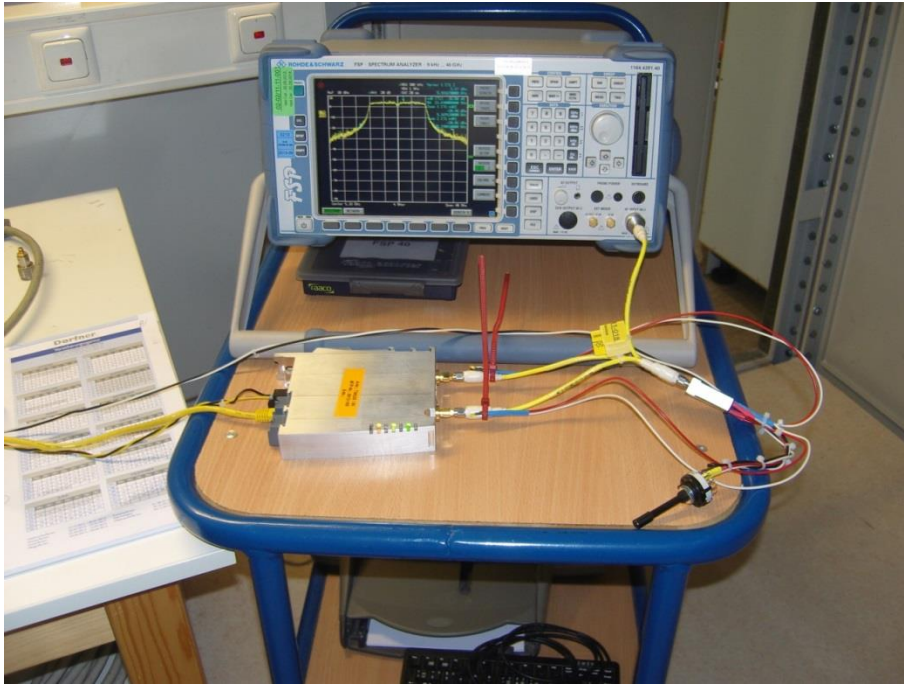
## 5.2 EBW and OBW

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

### 5.2.1 Description of the test location

Test location: AREA 4

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



### 5.2.3 Applicable standard

According to FCC Part 15E, Section 15.407(a)(1):

For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or  $4 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz.

### 5.2.4 Description of Measurement

The bandwidth is measured conducted using a spectrum analyser and following the procedures according the OET 789033, item C. The spectrum analyser function “n-dB-down” is used to determine the bandwidth. For the OBW the analyser function “OBW” is used to determine the bandwidth. The procedures according the OET 789033, item D are followed in this case.



**5.2.5 Test result**

802.11a, Mbps 6, Port1:

Spectrum analyser settings: RBW: 300 kHz VBW: 1 MHz Detector: Peak

| Channel | Centre frequency<br>(MHz) | 26 dB bandwidth<br>(MHz) | 99% OBW<br>(MHz) |
|---------|---------------------------|--------------------------|------------------|
| 36      | 5180                      | 21.69                    | 17.12            |
| 40      | 5200                      | 22.47                    | 16.75            |
| 48      | 5240                      | 21.72                    | 17.03            |

HT20 mode, MCS0, Port1:

Spectrum analyser settings: RBW: 300 kHz VBW: 1 MHz Detector: Peak

| Channel | Centre frequency<br>(MHz) | 26 dB bandwidth<br>(MHz) | 99% OBW<br>(MHz) |
|---------|---------------------------|--------------------------|------------------|
| 36      | 5180                      | 23.87                    | 18.04            |
| 40      | 5200                      | 22.25                    | 17.98            |
| 48      | 5240                      | 22.41                    | 18.06            |

HT40 mode, MCS8, Port1:

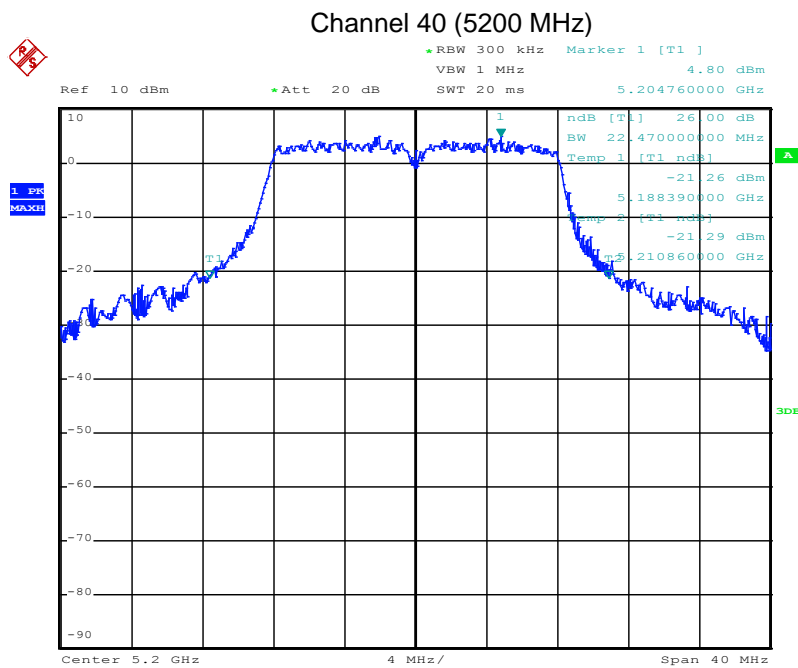
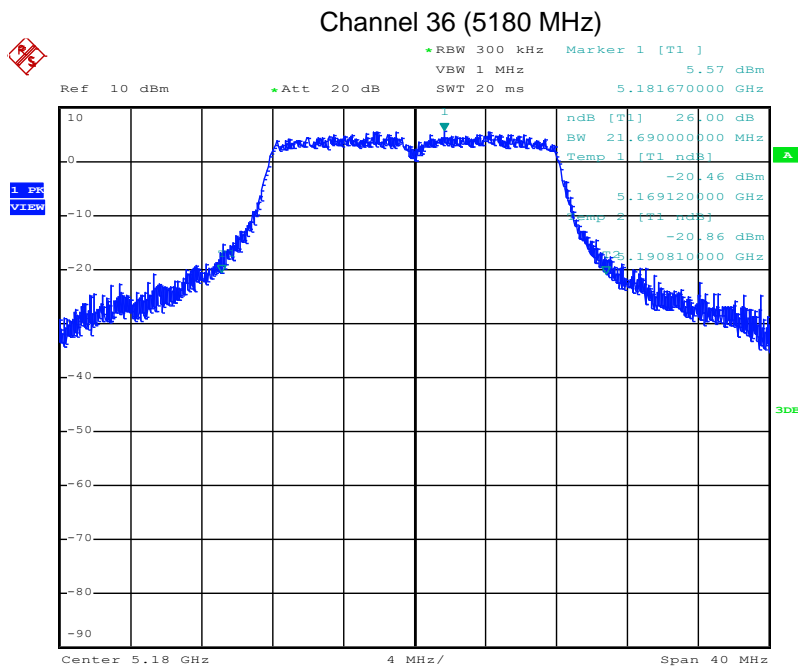
Spectrum analyser settings: RBW: 1 MHz VBW: 3 MHz Detector: Peak

| Channel | Centre frequency<br>(MHz) | 26 dB bandwidth<br>(MHz) | 99% OBW<br>(MHz) |
|---------|---------------------------|--------------------------|------------------|
| 36up    | 5190                      | 46.90                    | 37.54            |
| 44up    | 5230                      | 46.04                    | 37.52            |

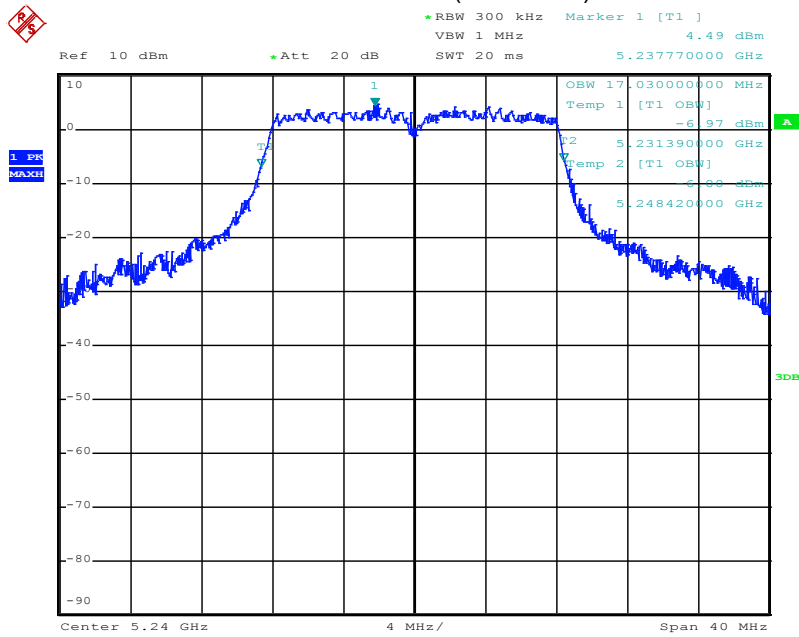
**Remarks:** For detailed test results please see the following test protocols. No limit is defined for EBW and OBW!

5.2.6 Test protocol EBW (26dB bandwidth measurement)

802.11a:

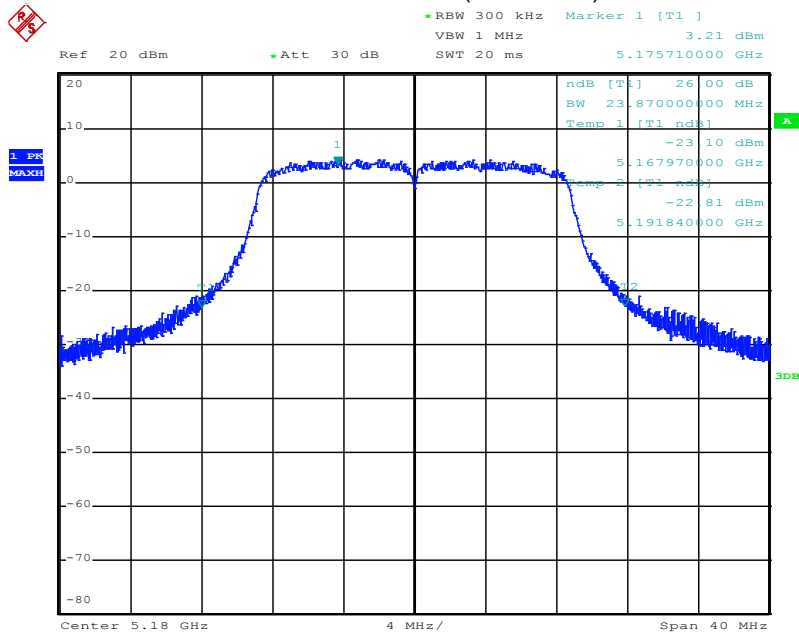


Channel 48 (5240 MHz)

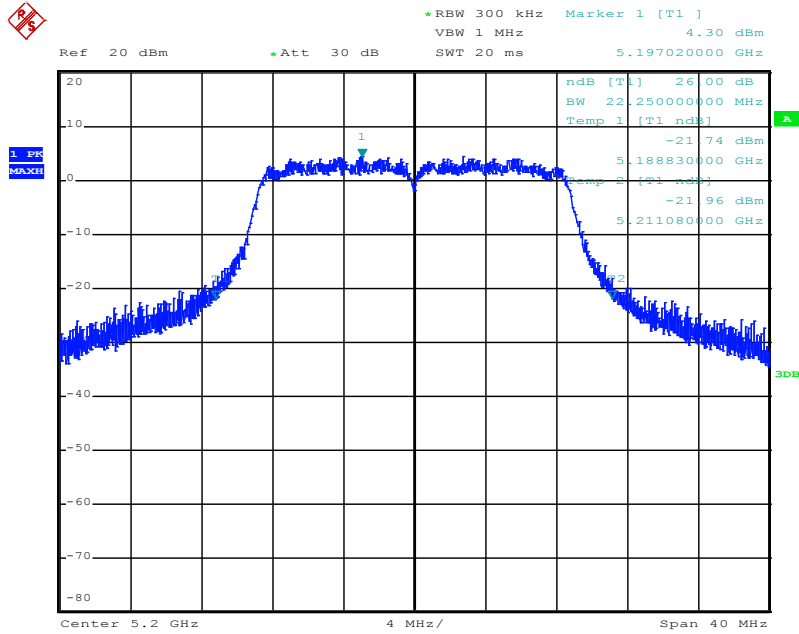


HT20:

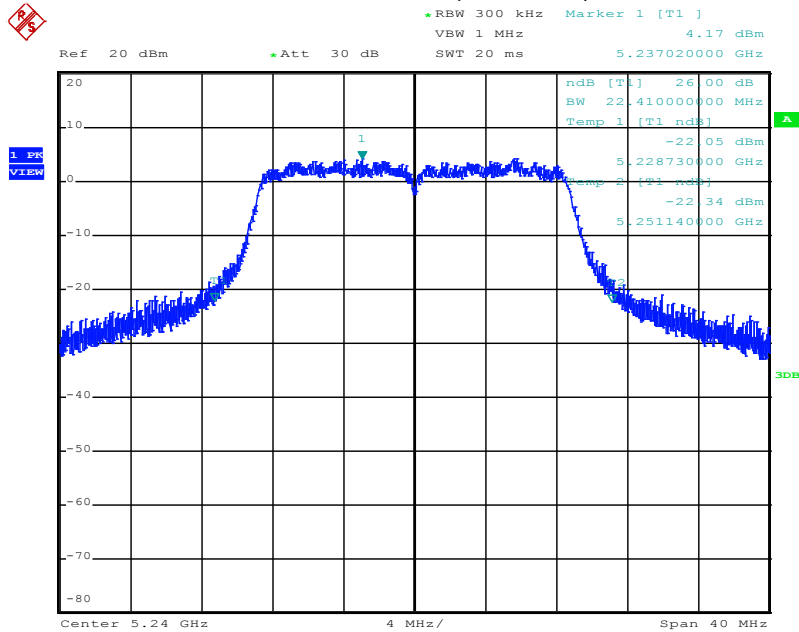
Channel 36 (5180 MHz)



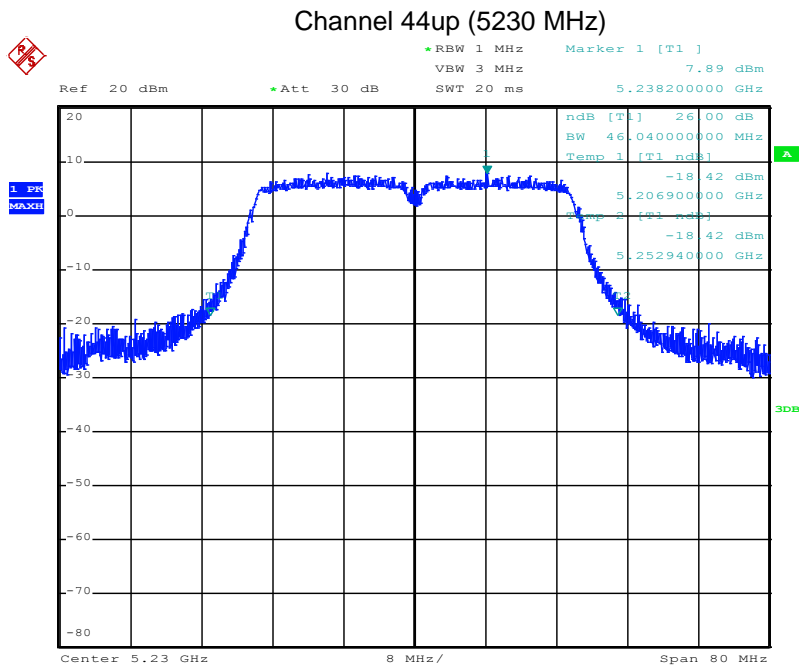
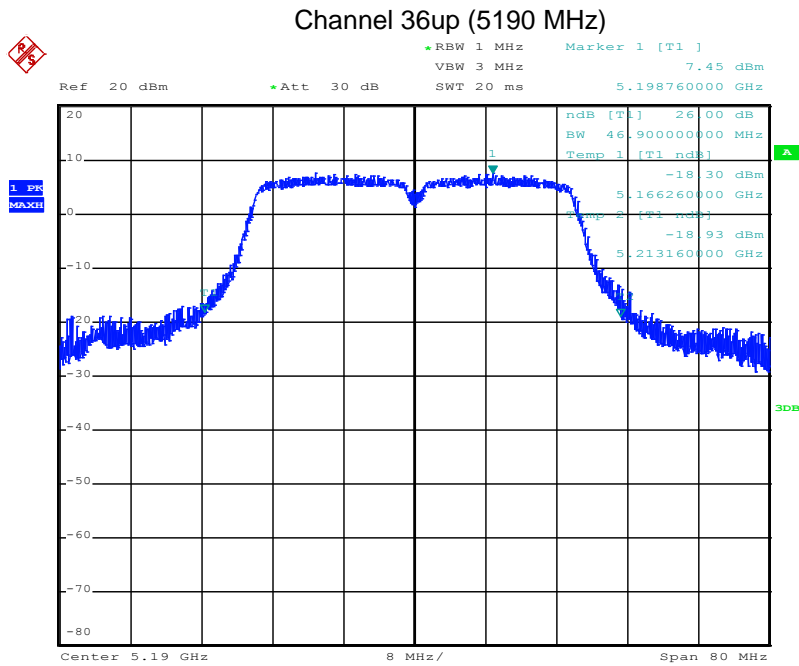
Channel 40 (5200 MHz)



Channel 48 (5240 MHz)

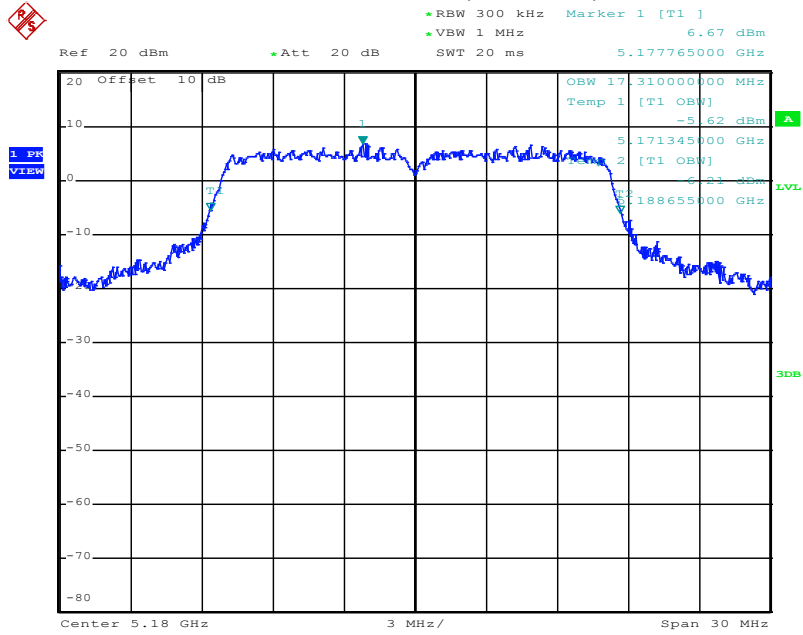


HT40:

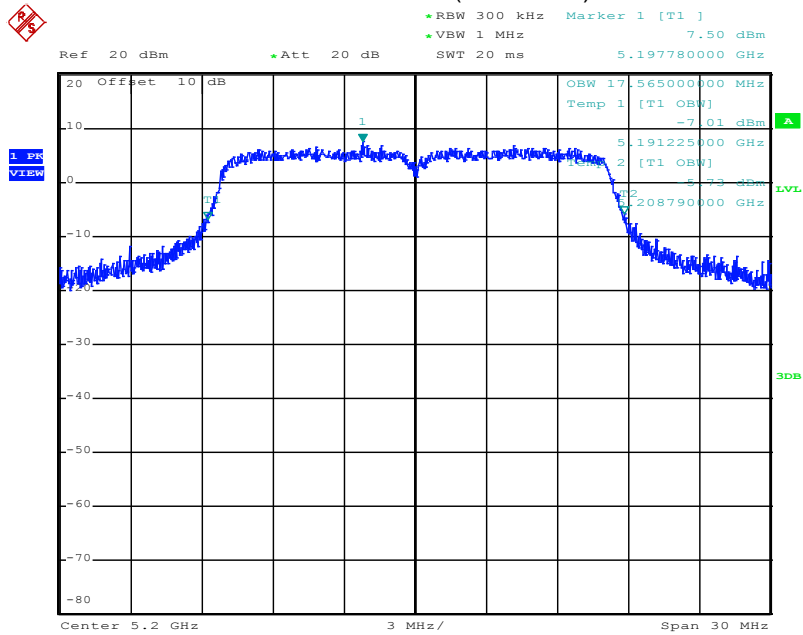


5.2.7 Test protocol OBW  
802.11a:

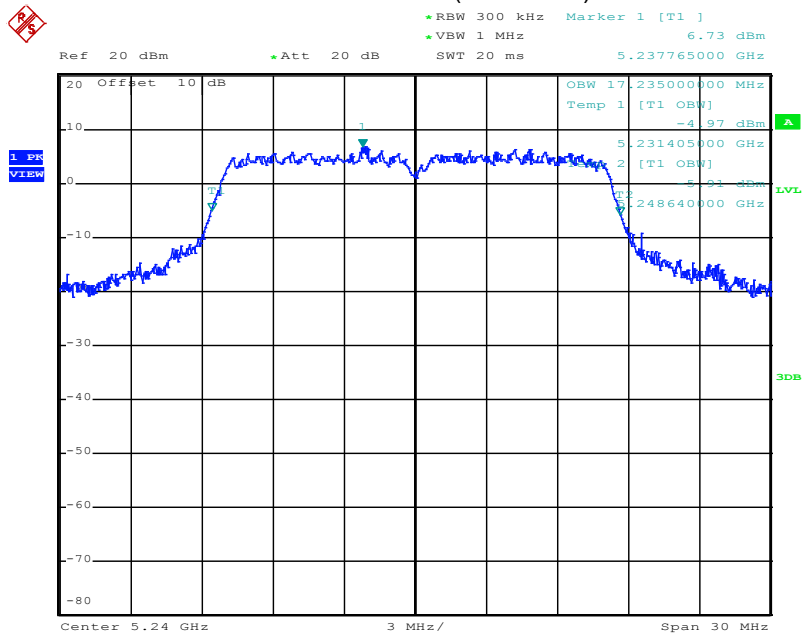
Channel 36 (5180 MHz)



Channel 40 (5200 MHz)

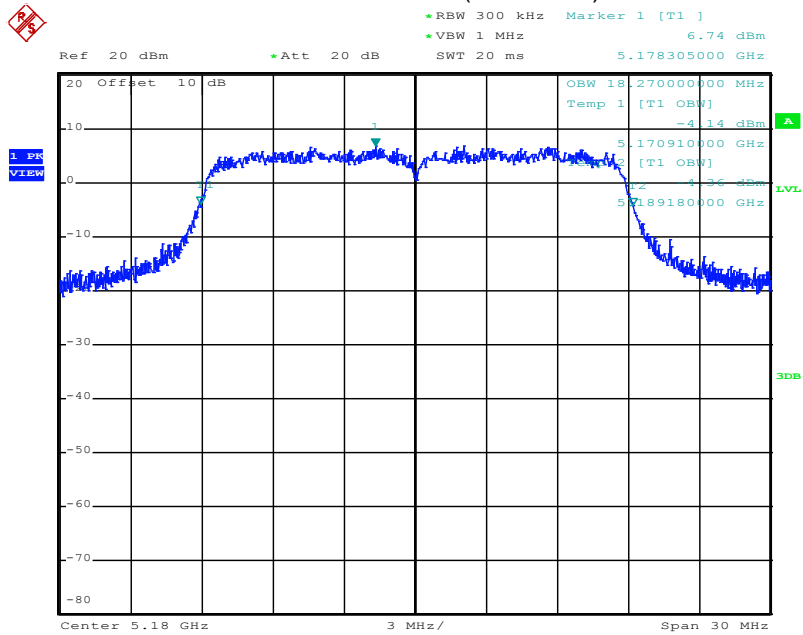


Channel 48 (5240 MHz)

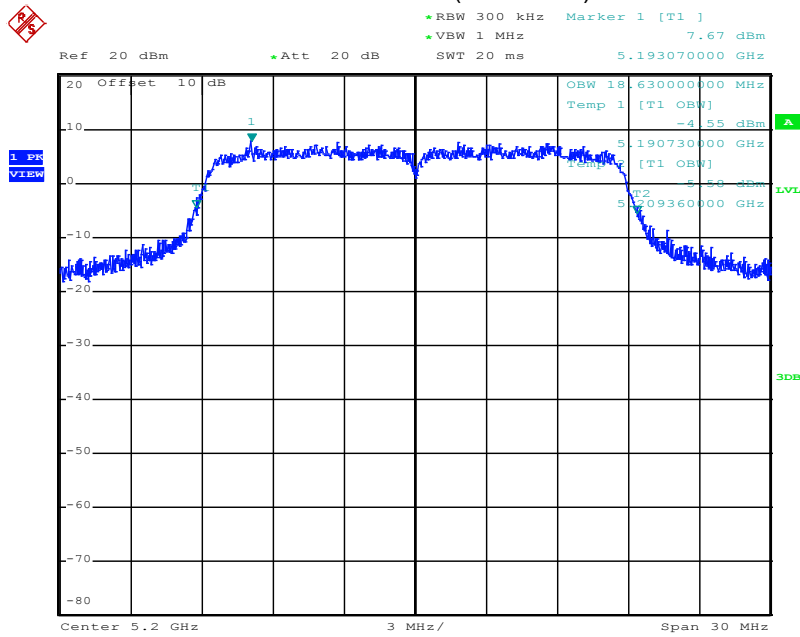


HT20:

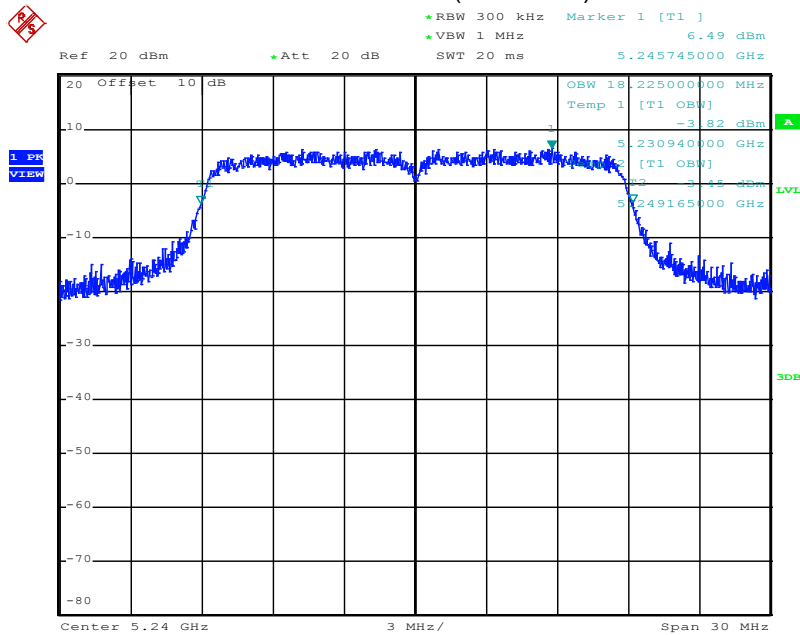
Channel 36 (5180 MHz)



Channel 40 (5200 MHz)



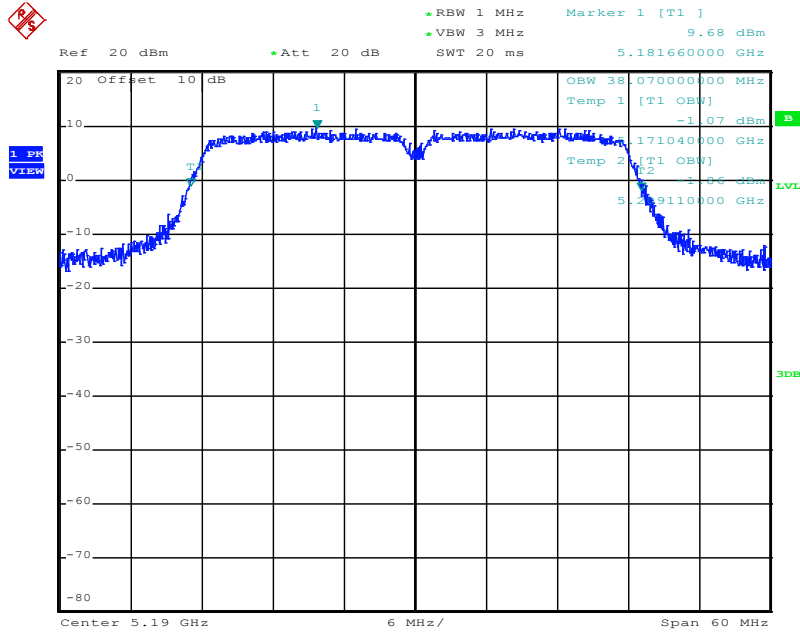
Channel 48 (5240 MHz)



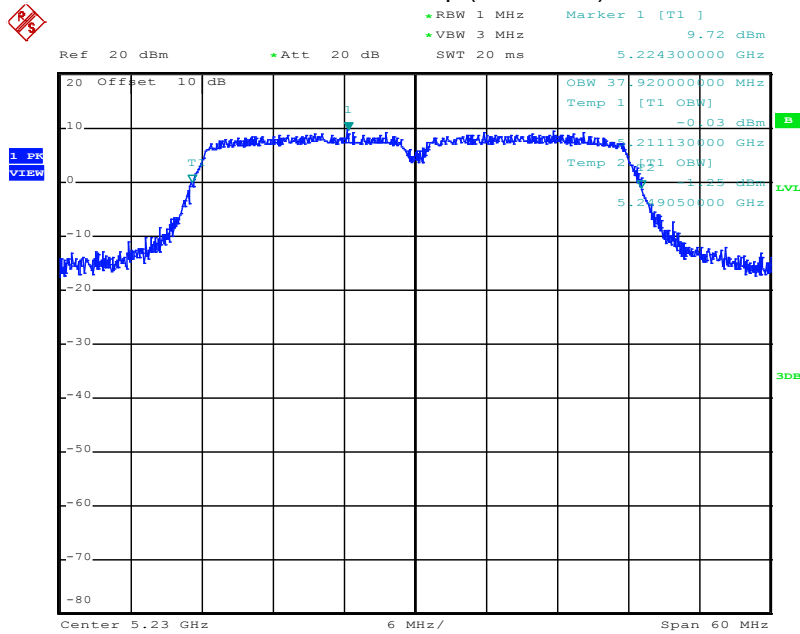


HT40:

Channel 36up (5190 MHz)



Channel 44up (5230 MHz)



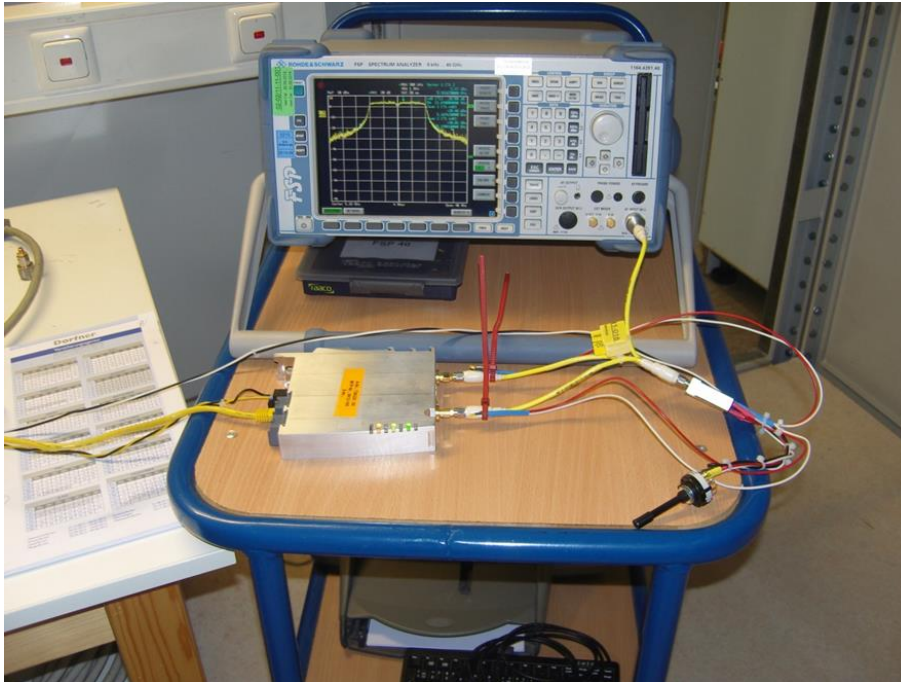
### 5.3 Maximum conducted output power

For test instruments and accessories used see section 6 Part **CPC 3**.

#### 5.3.1 Description of the test location

Test location: AREA 4

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



#### 5.3.3 Applicable standard

According to FCC Part 15E, Section 15.407(a):

The maximum conducted output power over the frequency band of operation shall not exceed the effective values. If transmitting antennas of directional gain are greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 5.3.4 Description of Measurement

The output power is measured conducted using a spectrum analyser. The EUT has no constant duty cycle and may be smaller than 98% therefore the procedure according the OET 789033, item E g) Method SA-3 Alternative is followed. The EUT is set while measuring in TX continuous mode with a maximum duty cycle. The total output power is summed over all antenna terminals of the multiple antenna system. The insertion loss of the measurement cable and switch is taken into account with a amplitude offset while measuring.

Determination of the min VBW:

| Transmission duration |  |             |         |
|-----------------------|--|-------------|---------|
| Standard              | min puls in TX continuous mode<br>(ms) | 1/T<br>(Hz) | min VBW |
| 801.11a               | 2.000                                  | 500         | 1 kHz   |
| 801.11n, HT20         | 1.850                                  | 541         | 1 kHz   |
| 801.11n, HT40         | 0.455                                  | 2198        | 3 kHz   |

Spectrum analyser settings:

Channel power measurement function, TX channel bandwidth equal to OBW;

RBW: 1 MHz, VBW: min VBW, Sweep time: auto, Detector: PK, Trace: max hold;

### 5.3.5 Test result

| Test conditions: |         |              |         |
|------------------|---------|--------------|---------|
| 801.11a, Mbps 6: |         | Test results |         |
|                  | A [P14] | A [P17]      | A [P20] |
| Chain1           | (dBm)   | (dBm)        | (dBm)   |
| CH36             | 5.1     | 7.8          | 11.0    |
| CH40             | 4.9     | 8.4          | 11.3    |
| CH48             | 4.8     | 7.9          | 10.9    |

| Test conditions: |         |              |         |
|------------------|---------|--------------|---------|
| 801.11a, Mbps 6: |         | Test results |         |
|                  | A [P14] | A [P17]      | A [P20] |
| Chain2           | (dBm)   | (dBm)        | (dBm)   |
| CH36             | 4.2     | 7.7          | 10.7    |
| CH40             | 4.6     | 8.1          | 10.9    |
| CH48             | 5.4     | 8.3          | 11.3    |

Calculating of the conducted power and EIRP:

| CH36a      | Test results |          |         |       |        |       |       |        |
|------------|--------------|----------|---------|-------|--------|-------|-------|--------|
|            | P set        | Ant gain | A1 + A2 | Limit | Margin | EIRP  | Limit | Margin |
| Chain1 + 2 |              | (dBi)    | (dBm)   | (dBm) | (dB)   | (dBm) | (dBm) | (dB)   |
| Ant_group1 | P20          | 6.0      | 13.9    | 17.0  | -3.1   | 19.9  | 23.0  | -3.1   |
| Ant_group2 | P17          | 9.0      | 10.8    | 17.0  | -6.2   | 19.8  | 23.0  | -3.2   |
| Ant_group3 | P14          | 14.2     | 7.7     | 17.0  | -9.3   | 21.9  | 23.0  | -1.1   |

| CH40a      | Test results |          |         |       |        |       |       |        |
|------------|--------------|----------|---------|-------|--------|-------|-------|--------|
|            | P set        | Ant gain | A1 + A2 | Limit | Margin | EIRP  | Limit | Margin |
| Chain1 + 2 |              | (dBi)    | (dBm)   | (dBm) | (dB)   | (dBm) | (dBm) | (dB)   |
| Ant_group1 | P20          | 6.0      | 14.1    | 17.0  | -2.9   | 20.1  | 23.0  | -2.9   |
| Ant_group2 | P17          | 9.0      | 11.0    | 17.0  | -6.0   | 20.0  | 23.0  | -3.0   |
| Ant_group3 | P14          | 14.2     | 7.9     | 17.0  | -9.1   | 22.1  | 23.0  | -0.9   |

| CH48a      | Test results |          |         |       |        |       |       |        |
|------------|--------------|----------|---------|-------|--------|-------|-------|--------|
|            | P set        | Ant gain | A1 + A2 | Limit | Margin | EIRP  | Limit | Margin |
| Chain1 + 2 |              | (dBi)    | (dBm)   | (dBm) | (dB)   | (dBm) | (dBm) | (dB)   |
| Ant_group1 | P20          | 6.0      | 14.1    | 17.0  | -2.9   | 20.1  | 23.0  | -2.9   |
| Ant_group2 | P17          | 9.0      | 11.1    | 17.0  | -5.9   | 20.1  | 23.0  | -2.9   |
| Ant_group3 | P14          | 14.2     | 8.1     | 17.0  | -8.9   | 22.3  | 23.0  | -0.7   |

| Test conditions:     |         |              |         |
|----------------------|---------|--------------|---------|
| 801.11n, HT20, MCS0: |         | Test results |         |
|                      | A [P14] | A [P17]      | A [P20] |
| Chain1               | (dBm)   | (dBm)        | (dBm)   |
| CH36                 | 4.6     | 7.8          | 10.7    |
| CH40                 | 4.8     | 8.1          | 10.8    |
| CH48                 | 4.6     | 7.5          | 11.6    |

| Test conditions:     |         |              |         |
|----------------------|---------|--------------|---------|
| 801.11n, HT20, MCS0: |         | Test results |         |
|                      | A [P14] | A [P17]      | A [P20] |
| Chain2               | (dBm)   | (dBm)        | (dBm)   |
| CH36                 | 4.1     | 7.5          | 10.2    |
| CH40                 | 4.3     | 7.8          | 10.4    |
| CH48                 | 5.0     | 8.2          | 11.4    |

Calculating of the conducted power and EIRP:

| CH36, HT20 | Test results |          |         |       |        |       |       |        |
|------------|--------------|----------|---------|-------|--------|-------|-------|--------|
|            | P set        | Ant gain | A1 + A2 | Limit | Margin | EIRP  | Limit | Margin |
| Chain1 + 2 |              | (dBi)    | (dBm)   | (dBm) | (dB)   | (dBm) | (dBm) | (dB)   |
| Ant_group1 | P20          | 6.0      | 13.5    | 17.0  | -3.5   | 19.5  | 23.0  | -3.5   |
| Ant_group2 | P17          | 9.0      | 10.7    | 17.0  | -6.3   | 19.7  | 23.0  | -3.3   |
| Ant_group3 | P14          | 14.2     | 7.4     | 17.0  | -9.6   | 21.6  | 23.0  | -1.4   |

| CH40, HT20 | Test results |          |         |       |        |       |       |        |
|------------|--------------|----------|---------|-------|--------|-------|-------|--------|
|            | P set        | Ant gain | A1 + A2 | Limit | Margin | EIRP  | Limit | Margin |
| Chain1 + 2 |              | (dBi)    | (dBm)   | (dBm) | (dB)   | (dBm) | (dBm) | (dB)   |
| Ant_group1 | P20          | 6.0      | 13.6    | 17.0  | -3.4   | 19.6  | 23.0  | -3.4   |
| Ant_group2 | P17          | 9.0      | 10.8    | 17.0  | -6.2   | 19.8  | 23.0  | -3.2   |
| Ant_group3 | P14          | 14.2     | 7.5     | 17.0  | -9.5   | 21.7  | 23.0  | -1.3   |

| CH48, HT20 | Test results |          |         |       |        |       |       |        |
|------------|--------------|----------|---------|-------|--------|-------|-------|--------|
|            | P set        | Ant gain | A1 + A2 | Limit | Margin | EIRP  | Limit | Margin |
| Chain1 + 2 |              | (dBi)    | (dBm)   | (dBm) | (dB)   | (dBm) | (dBm) | (dB)   |
| Ant_group1 | P20          | 6.0      | 14.5    | 17.0  | -2.5   | 20.5  | 23.0  | -2.5   |
| Ant_group2 | P17          | 9.0      | 10.9    | 17.0  | -6.1   | 19.9  | 23.0  | -3.1   |
| Ant_group3 | P14          | 14.2     | 7.8     | 17.0  | -9.2   | 22.0  | 23.0  | -1.0   |

| Test conditions:     |         |              |         |
|----------------------|---------|--------------|---------|
| 801.11n, HT40, MCS8: |         | Test results |         |
|                      | A [P14] | A [P17]      | A [P20] |
| Chain1               | (dBm)   | (dBm)        | (dBm)   |
| CH36up               | 5.4     | 8.8          | 11.7    |
| CH44up               | 5.4     | 8.7          | 11.4    |

| Test conditions:     |         |              |         |
|----------------------|---------|--------------|---------|
| 801.11n, HT40, MCS8: |         | Test results |         |
|                      | A [P14] | A [P17]      | A [P20] |
| Chain2               | (dBm)   | (dBm)        | (dBm)   |
| CH36up               | 5.4     | 8.4          | 11.2    |
| CH44up               | 5.8     | 9.1          | 11.8    |

Calculating of the conducted power and EIRP:

| CH36up     | Test results |          |         |       |        |       |       |        |
|------------|--------------|----------|---------|-------|--------|-------|-------|--------|
|            | P set        | Ant gain | A1 + A2 | Limit | Margin | EIRP  | Limit | Margin |
| Chain1 + 2 |              | (dBi)    | (dBm)   | (dBm) | (dB)   | (dBm) | (dBm) | (dB)   |
| Ant_group1 | P20          | 6.0      | 14.5    | 17.0  | -2.5   | 20.5  | 23.0  | -2.5   |
| Ant_group2 | P17          | 9.0      | 11.6    | 17.0  | -5.4   | 20.6  | 23.0  | -2.4   |
| Ant_group3 | P14          | 14.2     | 8.4     | 17.0  | -8.6   | 22.6  | 23.0  | -0.4   |

| CH44up     | Test results |          |         |       |        |       |       |        |
|------------|--------------|----------|---------|-------|--------|-------|-------|--------|
|            | P set        | Ant gain | A1 + A2 | Limit | Margin | EIRP  | Limit | Margin |
| Chain1 + 2 |              | (dBi)    | (dBm)   | (dBm) | (dB)   | (dBm) | (dBm) | (dB)   |
| Ant_group1 | P20          | 6.0      | 14.6    | 17.0  | -2.4   | 20.6  | 23.0  | -2.4   |
| Ant_group2 | P17          | 9.0      | 11.9    | 17.0  | -5.1   | 20.9  | 23.0  | -2.1   |
| Ant_group3 | P14          | 14.2     | 8.6     | 17.0  | -8.4   | 22.8  | 23.0  | -0.2   |

Peak power limit according to FCC Part 15E, Section 15.407(a):

| Frequency<br>(GHz) | Conducted power limit     |       |
|--------------------|---------------------------|-------|
|                    |                           | (dBm) |
| 5.150 - 5.250      | Legacy, $4 + 10 \log B =$ | 17.5  |
|                    | HT20, $4 + 10 \log B =$   | 17.8  |
|                    | HT40, $4 + 10 \log B =$   | 20.7  |

Note: The lower limit applies!

The requirements are **FULFILLED**.

Remarks:

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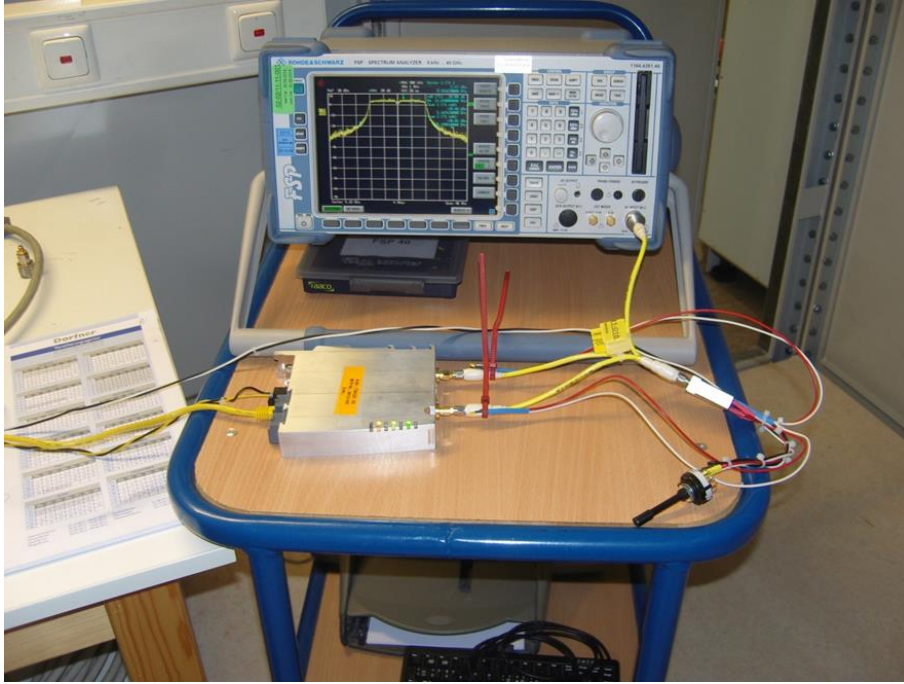
## 5.4 Peak power spectral density

For test instruments and accessories used see section 6 Part **CPC 3**.

### 5.4.1 Description of the test location

Test location: AREA 4

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



### 5.4.3 Applicable standard

According to FCC Part 15E, Section 15.407(a):

For the defined operating bands the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than the appropriate limit in any 1 MHz band during any time interval of continuous transmission.

### 5.4.4 Description of Measurement

The bandwidth is measured conducted using a spectrum analyser and following the procedures according the OET 789033, item F. Since the method SA-3 alternative was used for channel power the spectrum analyser settings are the same as under item F)g). The marker function "Marker to max" is used to set at peak power spectral density. For this MIMO transmitter the antenna chain 1 and chain 2 is measured and summed in linear terms over all antenna terminals of the multiple antenna system. The insertion loss of the measurement cable and switch is taken into account with amplitude offset while measuring.

Spectrum analyser settings:

Channel power measurement function, TX channel bandwidth equal to OBW;  
RBW: 1 MHz, VBW: min VBW, Sweep time: auto, Detector: PK, Trace: max hold;

**5.4.5 Test result**

| <b>Test conditions: 801.11a, Mbps 6, conducted</b> |                      |                     |           |                |                   |               |
|--|----------------------|---------------------|-----------|----------------|-------------------|---------------|
|  |                      | <b>Test results</b> |           |                |                   |               |
| <b>Chain1 + 2</b>                                  | <b>Power setting</b> | <b>D1</b>           | <b>D2</b> | <b>D1 + D2</b> | <b>PPSD limit</b> | <b>Margin</b> |
|  |                      | (dBm/MHz)           | (dBm/MHz) | (dBm/MHz)      | (dBm/MHz)         | (dB)          |
| <b>CH36</b>  | P14                  | -5.9                | -6.7      | -3.3           | 4                 | -7.3          |
|  | P17                  | -3.1                | -3.2      | -0.1           | 4                 | -4.1          |
|  | P20                  | 0.0                 | -0.2      | 2.9            | 4                 | -1.1          |
| <b>CH40</b>  | P14                  | -6.0                | -6.3      | -3.1           | 4                 | -7.1          |
|  | P17                  | -2.6                | -2.8      | 0.3            | 4                 | -3.7          |
|  | P20                  | 0.5                 | -0.1      | 3.2            | 4                 | -0.8          |
| <b>CH48</b>  | P14                  | -6.1                | -5.5      | -2.8           | 4                 | -6.8          |
|  | P17                  | -3.0                | -2.4      | 0.3            | 4                 | -3.7          |
|  | P20                  | 0.0                 | 0.4       | 3.2            | 4                 | -0.8          |

| <b>Test conditions: HT20, MCS0, conducted</b> |                      |                     |           |                |                   |               |
|---|----------------------|---------------------|-----------|----------------|-------------------|---------------|
|   |                      | <b>Test results</b> |           |                |                   |               |
| <b>Chain1 + 2</b>                             | <b>Power setting</b> | <b>D1</b>           | <b>D2</b> | <b>D1 + D2</b> | <b>PPSD limit</b> | <b>Margin</b> |
|   |                      | (dBm/MHz)           | (dBm/MHz) | (dBm/MHz)      | (dBm/MHz)         | (dB)          |
| <b>CH36</b>                                   | P14                  | -6.5                | -7.1      | -3.8           | 4                 | -7.8          |
|   | P17                  | -3.5                | -3.0      | -0.2           | 4                 | -4.2          |
|   | P20                  | -0.5                | -0.9      | 2.3            | 4                 | -1.7          |
| <b>CH40</b>                                   | P14                  | -6.2                | -6.7      | -3.4           | 4                 | -7.4          |
|   | P17                  | -3.2                | -3.2      | -0.2           | 4                 | -4.2          |
|   | P20                  | -0.4                | -0.7      | 2.5            | 4                 | -1.5          |
| <b>CH48</b>                                   | P14                  | -6.6                | -6.1      | -3.3           | 4                 | -7.3          |
|   | P17                  | -3.7                | -2.7      | -0.2           | 4                 | -4.2          |
|   | P20                  | -0.5                | 0.3       | 2.9            | 4                 | -1.1          |

| <b>Test conditions: HT40, MCS8, conducted</b> |                      |                     |           |                |                   |               |
|---|----------------------|---------------------|-----------|----------------|-------------------|---------------|
|   |                      | <b>Test results</b> |           |                |                   |               |
| <b>Chain1 + 2</b>                             | <b>Power setting</b> | <b>D1</b>           | <b>D2</b> | <b>D1 + D2</b> | <b>PPSD limit</b> | <b>Margin</b> |
|   |                      | (dBm/MHz)           | (dBm/MHz) | (dBm/MHz)      | (dBm/MHz)         | (dB)          |
| <b>CH36up</b>                                 | P14                  | -8.9                | -9.2      | -6.0           | 4                 | -10.0         |
|   | P17                  | -5.4                | -5.8      | -2.6           | 4                 | -6.6          |
|   | P20                  | -2.5                | -3.0      | 0.3            | 4                 | -3.7          |
| <b>CH44up</b>                                 | P14                  | -8.8                | -8.5      | -5.6           | 4                 | -9.6          |
|   | P17                  | -5.5                | -5.2      | -2.3           | 4                 | -6.3          |
|   | P20                  | -2.8                | -2.6      | 0.3            | 4                 | -3.7          |

Peak power limit according to FCC Part 15E, Section 15.407(a):

| Frequency (GHz) | Peak power spectral density limit (dBm/MHz) |
|-----------------|---|
| 5.150 - 5.250   | 4   |

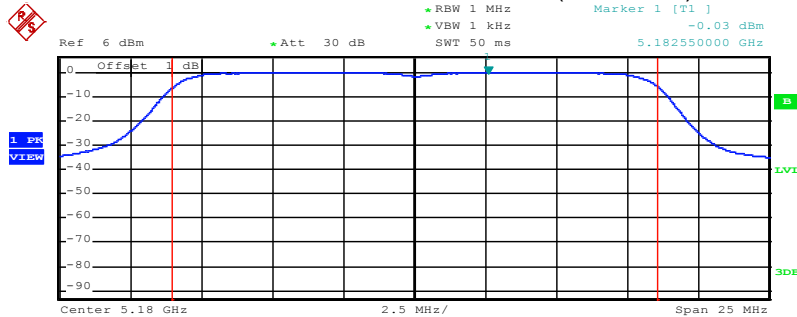
The requirements are **FULFILLED**.

**Remarks:** For detailed test results please refer to following test protocols. CH36 is listed only as representative channel.

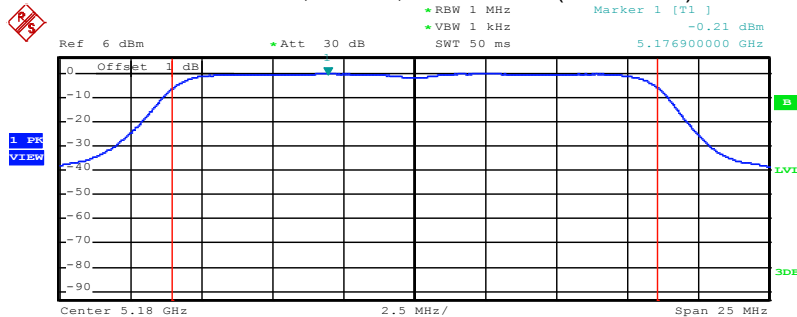
### 5.4.6 Peak Power spectral density plots

Power setting P20:

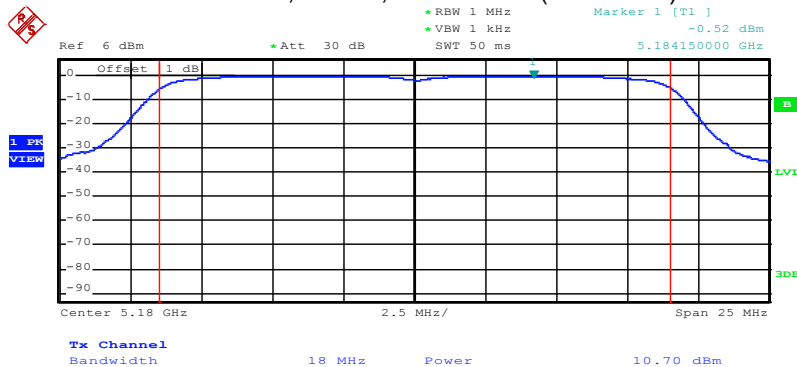
802.11a, chain1, Channel 36 (5180 MHz)



802.11a, chain2, Channel 36 (5180 MHz)

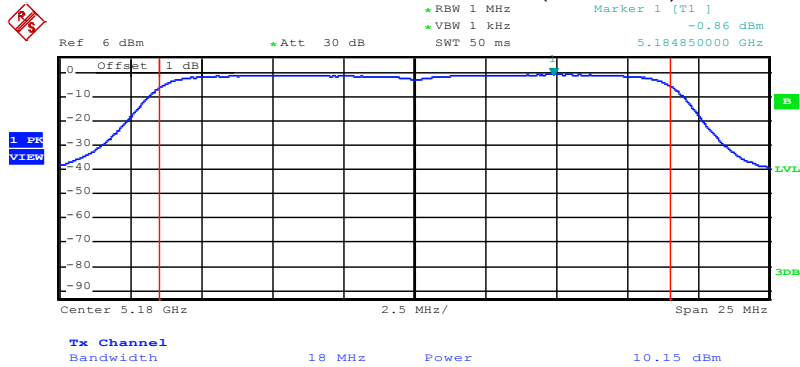


HT20, chain1, Channel 36 (5180 MHz)

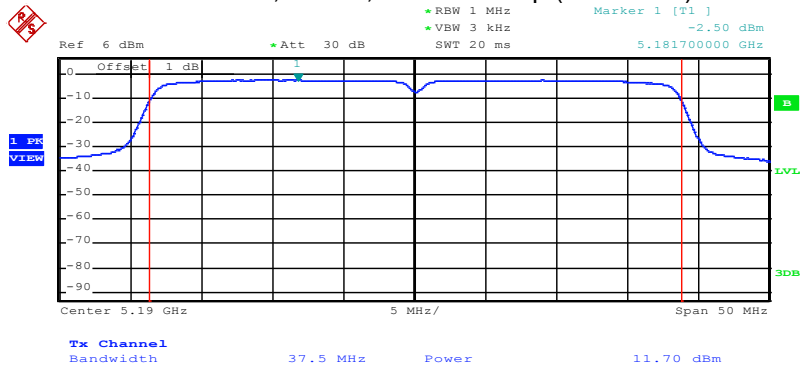




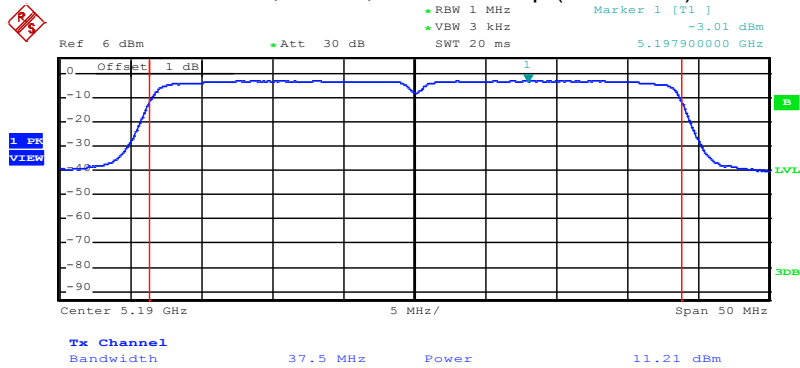
HT20, chain2, Channel 36 (5180 MHz)



HT40, chain1, Channel 36up (5190 MHz)



HT40, chain2, Channel 36up (5190 MHz)



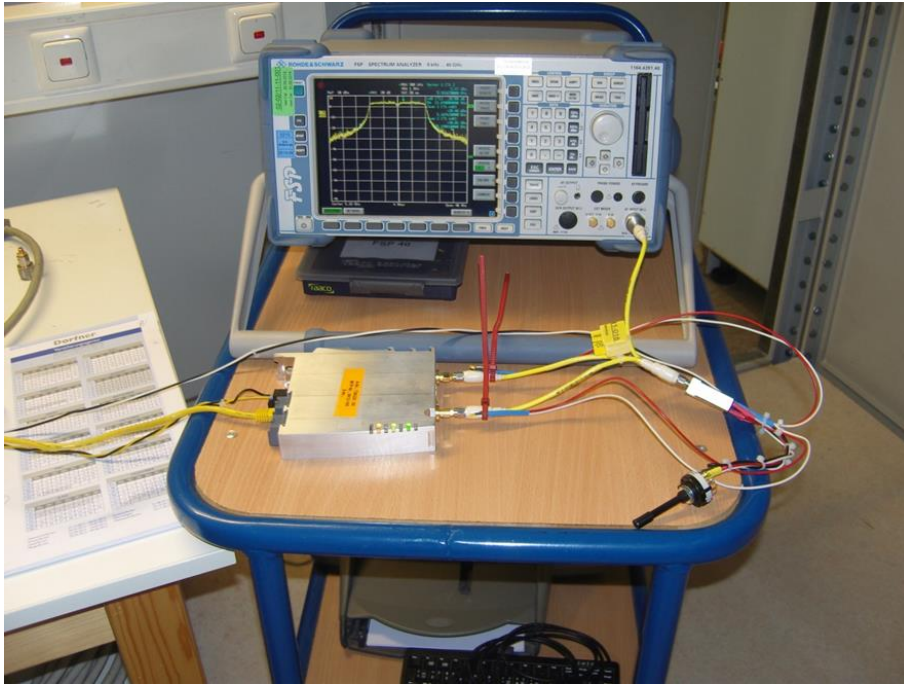
## 5.5 Peak excursion

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

### 5.5.1 Description of the test location

Test location: AREA 4

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



### 5.5.3 Applicable standard

According to FCC Part 15E, Section 15.407(a)(6):

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured like before) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### 5.5.4 Description of Measurement

Peak excursion is measured using a spectrum analyser and following the procedures according the OET 789033, item G. The peak max spectrum is determined with the analyser setting mentioned below. The ratio between peak-max-hold spectrum and average spectrum is calculated and listed as PEX in the tables below.

Spectrum analyser settings:

RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto, Detector: PK, Trace: max hold;

**5.5.5 Test result**

| <b>Test conditions: 801.11a, Mbps 6, conducted</b> |               |       |                 |      |           |        |
|--|---------------|-------|-----------------|------|-----------|--------|
| Test results                                       |               |       |                 |      |           |        |
| Chain1   | Power setting | PPSD  | Level VBW=3 MHz | PEX  | PEX limit | Margin |
|  |               | (dBm) | (dBm)           | (dB) | (dB)      | (dB)   |
| CH36   | P20           | 0.0   | 9.4             | 9.4  | 13        | -3.6   |
| CH40   | P20           | 0.5   | 9.8             | 9.3  | 13        | -3.7   |
| CH48   | P20           | 0.0   | 9.2             | 9.2  | 13        | -3.8   |

| <b>Test conditions: HT20, MCS0, conducted</b> |               |       |                 |      |           |        |
|---|---------------|-------|-----------------|------|-----------|--------|
| Test results                                  |               |       |                 |      |           |        |
| Chain1  | Power setting | PPSD  | Level VBW=3 MHz | PEX  | PEX limit | Margin |
|   |               | (dBm) | (dBm)           | (dB) | (dB)      | (dB)   |
| CH36  | P20           | -0.5  | 10.1            | 10.6 | 13        | -2.4   |
| CH40  | P20           | -0.4  | 10.0            | 10.4 | 13        | -2.6   |
| CH48  | P20           | -0.5  | 9.7             | 10.2 | 13        | -2.8   |

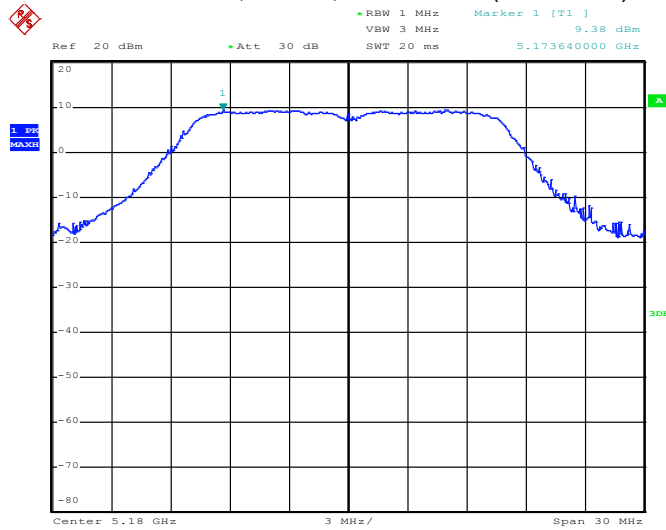
| <b>Test conditions: HT40, MCS16, conducted</b> |               |       |                 |      |           |        |
|--|---------------|-------|-----------------|------|-----------|--------|
| Test results                                   |               |       |                 |      |           |        |
| Chain1   | Power setting | PPSD  | Level VBW=3 MHz | PEX  | PEX limit | Margin |
|  |               | (dBm) | (dBm)           | (dB) | (dB)      | (dB)   |
| CH36up   | P20           | -2.5  | 6.7             | 9.2  | 13        | -3.8   |
| CH44up   | P20           | -2.8  | 7.3             | 10.1 | 13        | -2.9   |

The requirements are **FULFILLED**.

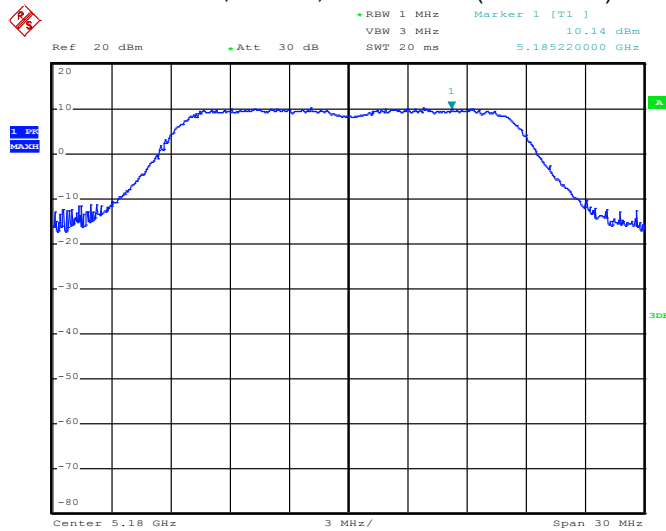
**Remarks:** For detailed test results please refer to following test protocols. CH36 is listed only as  
representative channel

5.5.6 Peak excursion plots

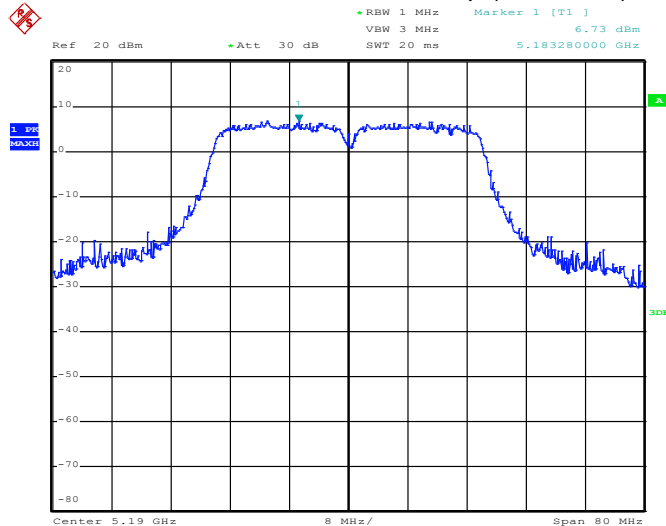
802.11a, chain1, Channel 36 (5180 MHz)



HT20, chain1, Channel 36 (5180 MHz)



HT40, chain1, Channel 36up (5190 MHz)



## 5.6 Undesirable emissions

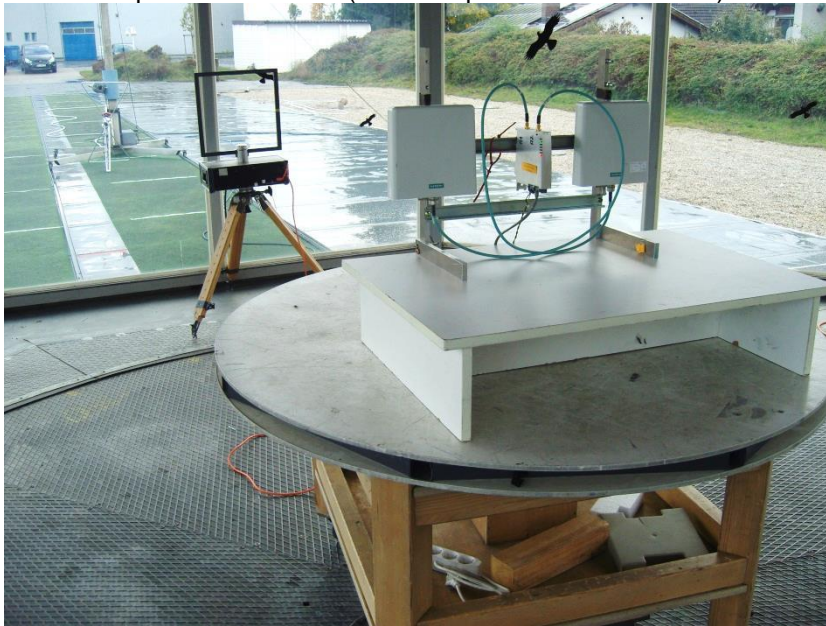
For test instruments and accessories used see section 6 Part **SER 1**, **SER 2** and **SER 3**.

### 5.6.1 Description of the test location

Test location: OATS 1  
Test location: Anechoic chamber 2  
Test distance: 3 m

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

Open area test site (Test setup for 9 kHz – 30 MHz)

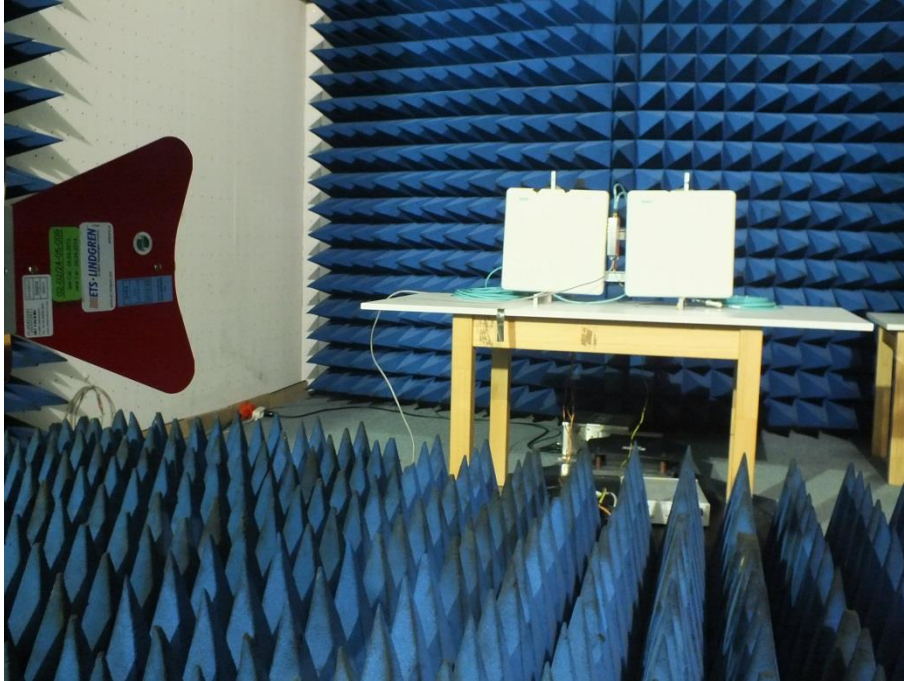


Open area test site (Test setup for 30 MHz – 1000 MHz)

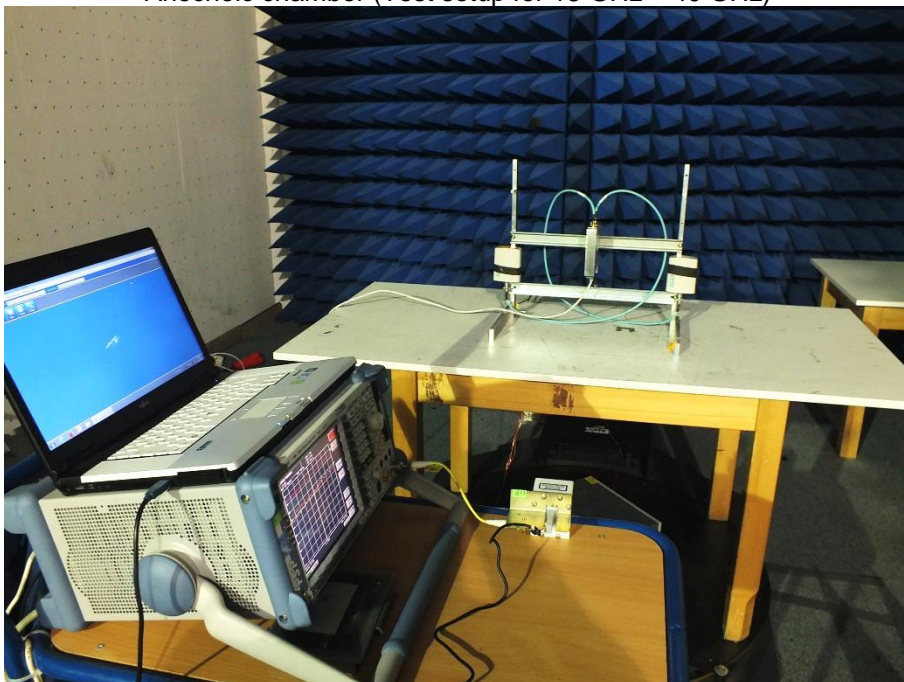


FCC ID: LYHMSN1V1    IC: 267AA-MSN1V1

Anechoic chamber (Test setup for 1 GHz – 18 GHz)



Anechoic chamber (Test setup for 18 GHz – 40 GHz)



### 5.6.3 Applicable standard

According to FCC Part 15E, Section 15.407(b):

For transmitters operating in the defined bands shall not exceed the appropriate emission limit outside of the operating bands.

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limit specified in Section 15.209(a) (see Section 15.205(c)).

**5.6.4 Description of Measurement**

Undesirable emissions are measured using a spectrum analyser and following the procedures according the OET 789033, item H. If the emission level of the EUT in peak mode complies with the average limit then testing will be stopped and peak values of the EUT will be reported, otherwise, the emission will be measured in average mode again and reported. Up from 8 GHz a HP filter is used.

Spectrum analyser settings for peak values:

RBW: 1 MHz, VBW: 3 MHz, Detector: max. peak, Sweep: Auto, Trace mode: max hold;

Spectrum analyser settings for average values:

RBW: 1 MHz VBW: 3 MHz Detector: RMS, Sweep: Auto, Trace mode: max hold;

**5.6.5 Test result radiated emissions**
**5.6.5.1 0.009 - 30 MHz:**

In the frequency range 9 kHz to 30 MHz no emission could be detected!

**5.6.5.2 Gain group 1**
**802.11a:**

| Lowest frequency: <b>5180 MHz</b>   |       |       |                  |           |           |        |
|-------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P20, 6 Mbps |       |       |                  |           | EIRP      |        |
| Test results                        |       |       |                  |           |           |        |
| Start                               | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                               | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                  | 1000  | 120   | 900              | -48.0     | -27.0     | -21.0  |
| 1000                                | 5150  | 1000  | 5097             | -35.3     | -27.0     | -8.3   |
| 5250                                | 13000 | 1000  | 6860             | -36.6     | -27.0     | -9.6   |
| 13000                               | 18000 | 1000  | 16565            | -39.1     | -27.0     | -12.1  |
| 18000                               | 40000 | 1000  | 33887            | -35.1     | -27.0     | -8.1   |
| Measurement uncertainty             |       |       |                  | ±6 dB     |           |        |

| Middle frequency: <b>5200 MHz</b>   |       |       |                  |           |           |        |
|-------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P20, 6 Mbps |       |       |                  |           | EIRP      |        |
| Test results                        |       |       |                  |           |           |        |
| Start                               | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                               | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                  | 1000  | 120   | 900              | -48.0     | -27.0     | -21.0  |
| 1000                                | 5150  | 1000  | 5117             | -35.8     | -27.0     | -8.8   |
| 5250                                | 13000 | 1000  | 7200             | -36.0     | -27.0     | -9.0   |
| 13000                               | 18000 | 1000  | 16526            | -38.9     | -27.0     | -11.9  |
| 18000                               | 40000 | 1000  | 33913            | -34.8     | -27.0     | -7.8   |
| Measurement uncertainty             |       |       |                  | ±6 dB     |           |        |

**FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1**

| Highest frequency: <b>5240 MHz</b>  |       |       |                  |           |           |        |
|-------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P20, 6 Mbps |       |       |                  |           | EIRP      |        |
| Test results                        |       |       |                  |           |           |        |
| Start                               | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                               | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                  | 1000  | 120   | 900              | -48.0     | -27.0     | -21.0  |
| 1000                                | 5150  | 1000  | 5072             | -37.6     | -27.0     | -10.6  |
| 5250                                | 13000 | 1000  | 5250             | -34.6     | -27.0     | -7.6   |
| 13000                               | 18000 | 1000  | 16523            | -38.9     | -27.0     | -11.9  |
| 18000                               | 40000 | 1000  | 33898            | -35.9     | -27.0     | -8.9   |
| Measurement uncertainty             |       |       |                  | ±6 dB     |           |        |

Note: The value at the band edge 5250 MHz is determined by integration method set out in OET 789033, item H3)d)ii) band-power measurement.

**802.11n, HT20:**

| Lowest frequency: <b>5180 MHz</b> |       |       |                  |           |           |        |
|-----------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P20, MCS0 |       |       |                  |           | EIRP      |        |
| Test results                      |       |       |                  |           |           |        |
| Start                             | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                             | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                | 1000  | 120   | 900              | -48.0     | -27.0     | -21.0  |
| 1000                              | 5150  | 1000  | 5102             | -34.6     | -27.0     | -7.6   |
| 5250                              | 13000 | 1000  | 7491             | -36.8     | -27.0     | -9.8   |
| 13000                             | 18000 | 1000  | 16480            | -37.4     | -27.0     | -10.4  |
| 18000                             | 40000 | 1000  | 39982            | -33.1     | -27.0     | -6.1   |
| Measurement uncertainty           |       |       |                  | ±6 dB     |           |        |

| Middle frequency: <b>5200 MHz</b> |       |       |                  |           |           |        |
|-----------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P20, MCS0 |       |       |                  |           | EIRP      |        |
| Test results                      |       |       |                  |           |           |        |
| Start                             | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                             | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                | 1000  | 120   | 900              | -48.0     | -27.0     | -21.0  |
| 1000                              | 5150  | 1000  | 5116             | -34.8     | -27.0     | -7.8   |
| 5250                              | 13000 | 1000  | 6906             | -36.8     | -27.0     | -9.8   |
| 13000                             | 18000 | 1000  | 16525            | -38.2     | -27.0     | -11.2  |
| 18000                             | 40000 | 1000  | 39971            | -33.3     | -27.0     | -6.3   |
| Measurement uncertainty           |       |       |                  | ±6 dB     |           |        |

| Highest frequency: <b>5240 MHz</b> |       |       |                  |           |           |        |
|------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P20, MCS0  |       |       |                  |           | EIRP      |        |
| Test results                       |       |       |                  |           |           |        |
| Start                              | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                              | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                 | 1000  | 120   | 900              | -48.0     | -27.0     | -21.0  |
| 1000                               | 5150  | 1000  | 5042             | -38.1     | -27.0     | -11.1  |
| 5250                               | 13000 | 1000  | 5250             | -31.8     | -27.0     | -4.8   |
| 13000                              | 18000 | 1000  | 17042            | -37.9     | -27.0     | -10.9  |
| 18000                              | 40000 | 1000  | 39992            | -32.7     | -27.0     | -5.7   |
| Measurement uncertainty            |       |       |                  | ±6 dB     |           |        |

Note: The value at the band edge 5250 MHz is determined by integration method set out in OET 789033, item H3)d)ii) band-power measurement.



**802.11n, HT40:**

| Lowest frequency: <b>5190 MHz</b> |             |       |                           |           |           |        |
|-----------------------------------|-------------|-------|---------------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P20, MCS8 |             |       |                           |           | EIRP      |        |
|                                   |             |       | Test results              |           |           |        |
| Start frequ.                      | Stop frequ. | RBW   | Maximum emission observed |           | Limit     | Margin |
| (MHz)                             | (MHz)       | (kHz) | (MHz)                     | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                | 1000        | 120   | 900                       | -48.0     | -27.0     | -21.0  |
| 1000                              | 5150        | 1000  | 5147                      | -33.9     | -27.0     | -6.9   |
| 5250                              | 13000       | 1000  | 6745                      | -36.2     | -27.0     | -9.2   |
| 13000                             | 18000       | 1000  | 16501                     | -38.9     | -27.0     | -11.9  |
| 18000                             | 40000       | 1000  | 39720                     | -32.7     | -27.0     | -5.7   |
| Measurement uncertainty           |             |       |                           | ±6 dB     |           |        |

| Highest frequency: <b>5210 MHz</b> |       |       |                  |           |           |        |
|------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P20, MCS8  |       |       |                  |           | EIRP      |        |
|                                    |       |       | Test results     |           |           |        |
| Start                              | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                              | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                 | 1000  | 120   | 900              | -48.0     | -27.0     | -21.0  |
| 1000                               | 5150  | 1000  | 5138             | -35.4     | -27.0     | -8.4   |
| 5250                               | 13000 | 1000  | 5250             | -37.8     | -27.0     | -10.8  |
| 13000                              | 18000 | 1000  | 17059            | -39.7     | -27.0     | -12.7  |
| 18000                              | 40000 | 1000  | 39750            | -32.9     | -27.0     | -5.9   |
| Measurement uncertainty            |       |       |                  | ±6 dB     |           |        |

Note: The value at the band edge 5250 MHz is determined by integration method set out in OET 789033, item H3)d)ii) band-power measurement.

**5.6.5.3 Gain group 2**
**802.11a:**

| Lowest frequency: <b>5180 MHz</b>   |       |       |                  |           |           |        |
|-------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P17, 6 Mbps |       |       |                  |           | EIRP      |        |
|                                     |       |       | Test results     |           |           |        |
| Start                               | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                               | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                  | 1000  | 120   | 900              | -44.0     | -27.0     | -17.0  |
| 1000                                | 5150  | 1000  | 5096             | -35.0     | -27.0     | -8.0   |
| 5250                                | 13000 | 1000  | 5400             | -35.0     | -27.0     | -8.0   |
| 13000                               | 18000 | 1000  | 16499            | -39.2     | -27.0     | -12.2  |
| 18000                               | 40000 | 1000  | 39998            | -33.1     | -27.0     | -6.1   |
| Measurement uncertainty             |       |       |                  | ±6 dB     |           |        |

| Middle frequency: <b>5200 MHz</b>   |       |       |                  |           |           |        |
|-------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P17, 6 Mbps |       |       |                  |           | EIRP      |        |
|                                     |       |       | Test results     |           |           |        |
| Start                               | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                               | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                  | 1000  | 120   | 900              | -44.0     | -27.0     | -17.0  |
| 1000                                | 5150  | 1000  | 5118             | -34.0     | -27.0     | -7.0   |
| 5250                                | 13000 | 1000  | 5357             | -35.4     | -27.0     | -8.4   |
| 13000                               | 18000 | 1000  | 16513            | -38.6     | -27.0     | -11.6  |
| 18000                               | 40000 | 1000  | 39874            | -33.3     | -27.0     | -6.3   |
| Measurement uncertainty             |       |       |                  | ±6 dB     |           |        |

| Highest frequency: <b>5240 MHz</b>  |       |       |                  |           |           |        |
|-------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P17, 6 Mbps |       |       |                  |           | EIRP      |        |
| Test results                        |       |       |                  |           |           |        |
| Start                               | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                               | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                  | 1000  | 120   | 900              | -44.0     | -27.0     | -17.0  |
| 1000                                | 5150  | 1000  | 5031             | -37.2     | -27.0     | -10.2  |
| 5250                                | 13000 | 1000  | 5250             | -33.0     | -27.0     | -6.0   |
| 13000                               | 18000 | 1000  | 17000            | -38.9     | -27.0     | -11.9  |
| 18000                               | 40000 | 1000  | 39987            | -32.7     | -27.0     | -5.7   |
| Measurement uncertainty             |       |       |                  | ±6 dB     |           |        |

Note: The value at the band edge 5250 MHz is determined by integration method set out in OET 789033, item H3)d)ii) band-power measurement.

**802.11n, HT20:**

| Lowest frequency: <b>5180 MHz</b> |       |       |                  |           |           |        |
|-----------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P17, MCS0 |       |       |                  |           | EIRP      |        |
| Test results                      |       |       |                  |           |           |        |
| Start                             | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                             | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                | 1000  | 120   | 900              | -44.0     | -27.0     | -17.0  |
| 1000                              | 5150  | 1000  | 5096             | -34.5     | -27.0     | -7.5   |
| 5250                              | 13000 | 1000  | 5443             | -35.1     | -27.0     | -8.1   |
| 13000                             | 18000 | 1000  | 17155            | -38.3     | -27.0     | -11.3  |
| 18000                             | 40000 | 1000  | 33972            | -34.4     | -27.0     | -7.4   |
| Measurement uncertainty           |       |       |                  | ±6 dB     |           |        |

| Middle frequency: <b>5200 MHz</b> |       |       |                  |           |           |        |
|-----------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P17, MCS0 |       |       |                  |           | EIRP      |        |
| Test results                      |       |       |                  |           |           |        |
| Start                             | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                             | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                | 1000  | 120   | 900              | -44.0     | -27.0     | -17.0  |
| 1000                              | 5150  | 1000  | 5113             | -34.5     | -27.0     | -7.5   |
| 5250                              | 13000 | 1000  | 5388             | -36.0     | -27.0     | -9.0   |
| 13000                             | 18000 | 1000  | 16555            | -38.8     | -27.0     | -11.8  |
| 18000                             | 40000 | 1000  | 33964            | -35.6     | -27.0     | -8.6   |
| Measurement uncertainty           |       |       |                  | ±6 dB     |           |        |

| Highest frequency: <b>5240 MHz</b> |       |       |                  |           |           |        |
|------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P17, MCS0  |       |       |                  |           | EIRP      |        |
| Test results                       |       |       |                  |           |           |        |
| Start                              | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                              | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                 | 1000  | 120   | 900              | -44.0     | -27.0     | -17.0  |
| 1000                               | 5150  | 1000  | 5048             | -37.1     | -27.0     | -10.1  |
| 5250                               | 13000 | 1000  | 5250             | -32.9     | -27.0     | -5.9   |
| 13000                              | 18000 | 1000  | 16481            | -39.1     | -27.0     | -12.1  |
| 18000                              | 40000 | 1000  | 33989            | -33.7     | -27.0     | -6.7   |
| Measurement uncertainty            |       |       |                  | ±6 dB     |           |        |

**802.11n, HT40:**

| Lowest frequency: <b>5190 MHz</b> |             |       |                           |           |           |        |
|-----------------------------------|-------------|-------|---------------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P17, MCS8 |             |       |                           |           | EIRP      |        |
|                                   |             |       | Test results              |           |           |        |
| Start frequ.                      | Stop frequ. | RBW   | Maximum emission observed |           | Limit     | Margin |
| (MHz)                             | (MHz)       | (kHz) | (MHz)                     | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                | 1000        | 120   | 900                       | -44.0     | -27.0     | -17.0  |
| 1000                              | 5150        | 1000  | 5146                      | -31.3     | -27.0     | -4.3   |
| 5250                              | 13000       | 1000  | 5358                      | -35.3     | -27.0     | -8.3   |
| 13000                             | 18000       | 1000  | 16550                     | -39.1     | -27.0     | -12.1  |
| 18000                             | 40000       | 1000  | 33994                     | -33.5     | -27.0     | -6.5   |
| Measurement uncertainty           |             |       |                           | ±6 dB     |           |        |

| Highest frequency: <b>5210 MHz</b> |       |       |                  |           |           |        |
|------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P17, MCS8  |       |       |                  |           | EIRP      |        |
|                                    |       |       | Test results     |           |           |        |
| Start                              | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                              | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                 | 1000  | 120   | 900              | -44.0     | -27.0     | -17.0  |
| 1000                               | 5150  | 1000  | 5146             | -35.8     | -27.0     | -8.8   |
| 5250                               | 13000 | 1000  | 5250             | -29.7     | -27.0     | -2.7   |
| 13000                              | 18000 | 1000  | 16559            | -38.6     | -27.0     | -11.6  |
| 18000                              | 40000 | 1000  | 33981            | -33.2     | -27.0     | -6.2   |
| Measurement uncertainty            |       |       |                  | ±6 dB     |           |        |

Note: The value at the band edge 5250 MHz is determined by integration method set out in OET 789033, item H3)d)ii) band-power measurement.

**5.6.5.4 Gain group 3**  
**802.11a:**

| Lowest frequency: <b>5180 MHz</b>   |       |       |                  |           |           |        |
|-------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P14, 6 Mbps |       |       |                  |           | EIRP      |        |
|                                     |       |       | Test results     |           |           |        |
| Start                               | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                               | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                  | 1000  | 120   | 900              | -41.0     | -27.0     | -14.0  |
| 1000                                | 5150  | 1000  | 5097             | -35.3     | -27.0     | -8.3   |
| 5250                                | 13000 | 1000  | 6860             | -36.6     | -27.0     | -9.6   |
| 13000                               | 18000 | 1000  | 16565            | -39.1     | -27.0     | -12.1  |
| 18000                               | 40000 | 1000  | 38488            | -32.3     | -27.0     | -5.3   |
| Measurement uncertainty             |       |       |                  | ±6 dB     |           |        |

| Middle frequency: <b>5200 MHz</b>   |       |       |                  |           |           |        |
|-------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P14, 6 Mbps |       |       |                  |           | EIRP      |        |
|                                     |       |       | Test results     |           |           |        |
| Start                               | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                               | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                  | 1000  | 120   | 900              | -41.0     | -27.0     | -14.0  |
| 1000                                | 5150  | 1000  | 5117             | -35.8     | -27.0     | -8.8   |
| 5250                                | 13000 | 1000  | 7200             | -35.7     | -27.0     | -8.7   |
| 13000                               | 18000 | 1000  | 16526            | -38.9     | -27.0     | -11.9  |
| 18000                               | 40000 | 1000  | 38512            | -33.9     | -27.0     | -6.9   |
| Measurement uncertainty             |       |       |                  | ±6 dB     |           |        |

| Highest frequency: <b>5240 MHz</b>  |       |       |                  |           |           |        |
|-------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P14, 6 Mbps |       |       |                  |           | EIRP      |        |
| Test results                        |       |       |                  |           |           |        |
| Start                               | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                               | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                  | 1000  | 120   | 900              | -41.0     | -27.0     | -14.0  |
| 1000                                | 5150  | 1000  | 5072             | -37.6     | -27.0     | -10.6  |
| 5250                                | 13000 | 1000  | 5250             | -30.0     | -27.0     | -3.0   |
| 13000                               | 18000 | 1000  | 16523            | -38.9     | -27.0     | -11.9  |
| 18000                               | 40000 | 1000  | 38326            | -33.4     | -27.0     | -6.4   |
| Measurement uncertainty             |       |       |                  | ±6 dB     |           |        |

Note: The value at the band edge 5250 MHz is determined by integration method set out in OET 789033, item H3)d)ii) band-power measurement.

**802.11n, HT20:**

| Lowest frequency: <b>5180 MHz</b> |       |       |                  |           |           |        |
|-----------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P14, MCS0 |       |       |                  |           | EIRP      |        |
| Test results                      |       |       |                  |           |           |        |
| Start                             | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                             | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                | 1000  | 120   | 900              | -41.0     | -27.0     | -14.0  |
| 1000                              | 5150  | 1000  | 5102             | -34.6     | -27.0     | -7.6   |
| 5250                              | 13000 | 1000  | 7491             | -36.8     | -27.0     | -9.8   |
| 13000                             | 18000 | 1000  | 16480            | -37.4     | -27.0     | -10.4  |
| 18000                             | 40000 | 1000  | 39978            | -32.7     | -27.0     | -5.7   |
| Measurement uncertainty           |       |       |                  | ±6 dB     |           |        |

| Middle frequency: <b>5200 MHz</b> |       |       |                  |           |           |        |
|-----------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P14, MCS0 |       |       |                  |           | EIRP      |        |
| Test results                      |       |       |                  |           |           |        |
| Start                             | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                             | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                | 1000  | 120   | 900              | -41.0     | -27.0     | -14.0  |
| 1000                              | 5150  | 1000  | 5116             | -34.8     | -27.0     | -7.8   |
| 5250                              | 13000 | 1000  | 6906             | -36.8     | -27.0     | -9.8   |
| 13000                             | 18000 | 1000  | 16525            | -38.2     | -27.0     | -11.2  |
| 18000                             | 40000 | 1000  | 39963            | -33.1     | -27.0     | -6.1   |
| Measurement uncertainty           |       |       |                  | ±6 dB     |           |        |

| Highest frequency: <b>5240 MHz</b> |       |       |                  |           |           |        |
|------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P14, MCS0  |       |       |                  |           | EIRP      |        |
| Test results                       |       |       |                  |           |           |        |
| Start                              | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                              | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                 | 1000  | 120   | 900              | -41.0     | -27.0     | -14.0  |
| 1000                               | 5150  | 1000  | 5042             | -38.1     | -27.0     | -11.1  |
| 5250                               | 13000 | 1000  | 5250             | -27.4     | -27.0     | -0.4   |
| 13000                              | 18000 | 1000  | 17042            | -37.9     | -27.0     | -10.9  |
| 18000                              | 40000 | 1000  | 39978            | -32.3     | -27.0     | -5.3   |
| Measurement uncertainty            |       |       |                  | ±6 dB     |           |        |

Note: The value at the band edge 5250 MHz is determined by integration method set out in OET 789033, item H3)d)ii) band-power measurement.

**802.11n, HT40:**

| Lowest frequency: <b>5190 MHz</b> |             |       |                           |           |           |        |
|-----------------------------------|-------------|-------|---------------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P14, MCS8 |             |       |                           |           | EIRP      |        |
|                                   |             |       | Test results              |           |           |        |
| Start frequ.                      | Stop frequ. | RBW   | Maximum emission observed |           | Limit     | Margin |
| (MHz)                             | (MHz)       | (kHz) | (MHz)                     | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                | 1000        | 120   | 900                       | -41.0     | -27.0     | -14.0  |
| 1000                              | 5150        | 1000  | 5147                      | -33.9     | -27.0     | -6.9   |
| 5250                              | 13000       | 1000  | 6745                      | -36.2     | -27.0     | -9.2   |
| 13000                             | 18000       | 1000  | 16501                     | -38.9     | -27.0     | -11.9  |
| 18000                             | 40000       | 1000  | 39952                     | -32.9     | -27.0     | -5.9   |
| Measurement uncertainty           |             |       |                           | ±6 dB     |           |        |

| Highest frequency: <b>5210 MHz</b> |       |       |                  |           |           |        |
|------------------------------------|-------|-------|------------------|-----------|-----------|--------|
| Test conditions: 2 TX , P14, MCS8  |       |       |                  |           | EIRP      |        |
|                                    |       |       | Test results     |           |           |        |
| Start                              | Stop  | RBW   | Maximum emission |           | Limit     | Margin |
| (MHz)                              | (MHz) | (kHz) | (MHz)            | (dBm/MHz) | (dBm/MHz) | (dB)   |
| 30                                 | 1000  | 120   | 900              | -41.0     | -27.0     | -14.0  |
| 1000                               | 5150  | 1000  | 5138             | -35.4     | -27.0     | -8.4   |
| 5250                               | 13000 | 1000  | 5250             | -31.7     | -27.0     | -4.7   |
| 13000                              | 18000 | 1000  | 17059            | -39.7     | -27.0     | -12.7  |
| 18000                              | 40000 | 1000  | 39967            | -32.6     | -27.0     | -5.6   |
| Measurement uncertainty            |       |       |                  | ±6 dB     |           |        |

Note: The value at the band edge 5250 MHz is determined by integration method set out in OET 789033, item H3)d)ii) band-power measurement.

Limit according to FCC Part 15E, Section 15.407(b) for undesirable emissions:

| Operating Frequency range<br>(MHz) | Undesirable emission limit, EIRP<br>(dBm/MHz) |
|------------------------------------|---|
| 5150 - 5250                        | -27.0   |

**5.6.6 Test result radiated emissions in restricted bands**
**5.6.6.1 Gain group 1**
**802.11a:**

| Lowest frequency: <b>5180 MHz</b>   |        |       |                  |                |                |        |
|-------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P20, 6 Mbps |        |       |                  |                |                |        |
|                                     |        |       | Test results     |                |                |        |
| Start f                             | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                               | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                                | 5150   | 1000  | 5097             | 59.9           | 74.0           | -14.1  |
| 5250                                | 13000  | 1000  | 7250             | 58.4           | 74.0           | -15.6  |
| 13000                               | 18000  | 1000  | 16565            | 56.1           | 74.0           | -17.9  |
| 18000                               | 40000  | 1000  | 33887            | 60.1           | 74.0           | -13.9  |
| Measurement uncertainty             |        |       |                  | ±6 dB          |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5096             | 53.0           | 54.0           | -1.0   |
| 7250                    | 7750   | 1000  | 7250             | 51.3           | 54.0           | -2.7   |
| Measurement uncertainty |        |       |                  | ±6 dB          |                |        |

| Middle frequency: <b>5200 MHz</b>   |        |       |                  |                |                |        |
|-------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P20, 6 Mbps |        |       |                  |                |                |        |
|                                     |        |       | Test results     |                |                |        |
| Start f                             | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                               | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                                | 5150   | 1000  | 5127             | 56.8           | 74.0           | -17.2  |
| 5250                                | 13000  | 1000  | 7320             | 58.5           | 74.0           | -15.5  |
| 13000                               | 18000  | 1000  | 16526            | 56.3           | 74.0           | -17.7  |
| 18000                               | 40000  | 1000  | 33913            | 60.4           | 74.0           | -13.6  |
| Measurement uncertainty             |        |       |                  | ±6 dB          |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5126             | 50.2           | 54.0           | -3.8   |
| 7250                    | 7750   | 1000  | 7320             | 50.1           | 54.0           | -3.9   |
| Measurement uncertainty |        |       |                  | ±6 dB          |                |        |

| Highest frequency: <b>5240 MHz</b>  |        |       |                  |                |                |        |
|-------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P20, 6 Mbps |        |       |                  |                |                |        |
|                                     |        |       | Test results     |                |                |        |
| Start f                             | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                               | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                                | 5150   | 1000  | 4893             | 56.1           | 74.0           | -17.9  |
| 5250                                | 13000  | 1000  | 7305             | 58.1           | 74.0           | -15.9  |
| 13000                               | 18000  | 1000  | 16523            | 56.3           | 74.0           | -17.7  |
| 18000                               | 40000  | 1000  | 33898            | 59.3           | 74.0           | -14.7  |
| Measurement uncertainty             |        |       |                  | ±6 dB          |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 4907             | 48.5           | 54.0           | -5.5   |
| 7250                    | 7750   | 1000  | 7305             | 51.9           | 54.0           | -2.1   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

**HT20:**

| Lowest frequency: <b>5180 MHz</b> |        |       |                  |                |                |        |
|-----------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P20, MCS0 |        |       |                  |                |                |        |
|                                   |        |       | Test results     |                |                |        |
| Start f                           | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                             | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                              | 5150   | 1000  | 5147             | 62.8           | 74.0           | -11.2  |
| 5250                              | 13000  | 1000  | 7422             | 56.7           | 74.0           | -17.3  |
| 13000                             | 18000  | 1000  | 16480            | 57.8           | 74.0           | -16.2  |
| 18000                             | 40000  | 1000  | 39982            | 62.1           | 74.0           | -11.9  |
| Measurement uncertainty           |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5149             | 46.9           | 54.0           | -7.1   |
| 7250                    | 7750   | 1000  | 7422             | 51.3           | 54.0           | -2.7   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

| Middle frequency: <b>5200 MHz</b> |        |       |                  |                |                |        |
|-----------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P20, MCS0 |        |       |                  |                |                |        |
|                                   |        |       | Test results     |                |                |        |
| Start f                           | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                             | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                              | 5150   | 1000  | 5118             | 57.6           | 74.0           | -16.4  |
| 5250                              | 13000  | 1000  | 7750             | 58.4           | 74.0           | -15.6  |
| 13000                             | 18000  | 1000  | 16525            | 57.0           | 74.0           | -17.0  |
| 18000                             | 40000  | 1000  | 39971            | 61.9           | 74.0           | -12.1  |
| Measurement uncertainty           |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5118             | 50.2           | 54.0           | -3.8   |
| 7250                    | 7750   | 1000  | 7750             | 50.2           | 54.0           | -3.8   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

| Highest frequency: <b>5240 MHz</b> |        |       |                  |                |                |        |
|------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P20, MCS0  |        |       |                  |                |                |        |
|                                    |        |       | Test results     |                |                |        |
| Start f                            | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                              | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                               | 5150   | 1000  | 5042             | 57.1           | 74.0           | -16.9  |
| 5250                               | 13000  | 1000  | 7710             | 58.1           | 74.0           | -15.9  |
| 13000                              | 18000  | 1000  | 17042            | 57.3           | 74.0           | -16.7  |
| 18000                              | 40000  | 1000  | 39992            | 62.5           | 74.0           | -11.5  |
| Measurement uncertainty            |        |       | ±6 dB            |                |                |        |

**FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1**

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5042             | 49.3           | 54.0           | -4.7   |
| 7250                    | 7750   | 1000  | 7710             | 52.4           | 54.0           | -1.6   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

**HT40:**

| Lowest frequency: <b>5190 MHz</b> |        |       |                  |                |                |        |
|-----------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P20, MCS8 |        |       |                  |                |                |        |
|                                   |        |       | Test results     |                |                |        |
| Start f                           | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                             | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                              | 5150   | 1000  | 5148             | 69.7           | 74.0           | -4.3   |
| 5250                              | 13000  | 1000  | 7725             | 58.6           | 74.0           | -15.4  |
| 13000                             | 18000  | 1000  | 16501            | 56.3           | 74.0           | -17.7  |
| 18000                             | 40000  | 1000  | 39720            | 62.5           | 74.0           | -11.5  |
| Measurement uncertainty           |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5148             | 53.9           | 54.0           | -0.1   |
| 7250                    | 7750   | 1000  | 7725             | 50.3           | 54.0           | -3.7   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

| Highest frequency: <b>5210 MHz</b> |        |       |                  |                |                |        |
|------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P20, MCS8  |        |       |                  |                |                |        |
|                                    |        |       | Test results     |                |                |        |
| Start f                            | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                              | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                               | 5150   | 1000  | 5138             | 59.8           | 74.0           | -14.2  |
| 5250                               | 13000  | 1000  | 7270             | 56.8           | 74.0           | -17.2  |
| 13000                              | 18000  | 1000  | 17059            | 55.5           | 74.0           | -18.5  |
| 18000                              | 40000  | 1000  | 39750            | 62.3           | 74.0           | -11.7  |
| Measurement uncertainty            |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5138             | 49.1           | 54.0           | -4.9   |
| 7250                    | 7750   | 1000  | 7270             | 52.4           | 54.0           | -1.6   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |



**5.6.6.2 Gain group 2**  
**802.11a:**

| Lowest frequency: <b>5180 MHz</b>   |        |       |                  |                |                |        |
|-------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P17, 6 Mbps |        |       |                  |                |                |        |
|                                     |        |       | Test results     |                |                |        |
| Start f                             | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                               | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                                | 5150   | 1000  | 5096             | 60.2           | 74.0           | -13.8  |
| 5250                                | 13000  | 1000  | 5400             | 60.2           | 74.0           | -13.8  |
| 13000                               | 18000  | 1000  | 16499            | 56.0           | 74.0           | -18.0  |
| 18000                               | 40000  | 1000  | 39998            | 62.1           | 74.0           | -11.9  |
| Measurement uncertainty             |        |       |                  | ±6 dB          |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5105             | 53.2           | 54.0           | -0.8   |
| 5350                    | 5460   | 1000  | 5400             | 49.3           | 54.0           | -4.7   |
| Measurement uncertainty |        |       |                  | ±6 dB          |                |        |

| Middle frequency: <b>5200 MHz</b>   |        |       |                  |                |                |        |
|-------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P17, 6 Mbps |        |       |                  |                |                |        |
|                                     |        |       | Test results     |                |                |        |
| Start f                             | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                               | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                                | 5150   | 1000  | 5118             | 61.2           | 74.0           | -12.8  |
| 5250                                | 13000  | 1000  | 5357             | 59.8           | 74.0           | -14.2  |
| 13000                               | 18000  | 1000  | 16513            | 56.6           | 74.0           | -17.4  |
| 18000                               | 40000  | 1000  | 39874            | 61.9           | 74.0           | -12.1  |
| Measurement uncertainty             |        |       |                  | ±6 dB          |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5123             | 53.7           | 54.0           | -0.3   |
| 5350                    | 5460   | 1000  | 5399             | 53.6           | 54.0           | -0.4   |
| Measurement uncertainty |        |       |                  | ±6 dB          |                |        |

| Highest frequency: <b>5240 MHz</b>  |        |       |                  |                |                |        |
|-------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P17, 6 Mbps |        |       |                  |                |                |        |
|                                     |        |       | Test results     |                |                |        |
| Start f                             | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                               | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                                | 5150   | 1000  | 5031             | 58.0           | 74.0           | -16.0  |
| 5250                                | 13000  | 1000  | 5364             | 60.1           | 74.0           | -13.9  |
| 13000                               | 18000  | 1000  | 17000            | 56.3           | 74.0           | -17.7  |
| 18000                               | 40000  | 1000  | 39987            | 62.5           | 74.0           | -11.5  |
| Measurement uncertainty             |        |       |                  | ±6 dB          |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5040             | 50.9           | 54.0           | -3.1   |
| 5350                    | 5460   | 1000  | 5364             | 52.6           | 54.0           | -1.4   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

**HT20:**

| Lowest frequency: <b>5180 MHz</b> |        |       |                  |                |                |        |
|-----------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P17, MCS0 |        |       |                  |                |                |        |
|                                   |        |       | Test results     |                |                |        |
| Start f                           | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                             | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                              | 5150   | 1000  | 5096             | 60.7           | 74.0           | -13.3  |
| 5250                              | 13000  | 1000  | 5443             | 60.1           | 74.0           | -13.9  |
| 13000                             | 18000  | 1000  | 17155            | 56.9           | 74.0           | -17.1  |
| 18000                             | 40000  | 1000  | 33972            | 60.8           | 74.0           | -13.2  |
| Measurement uncertainty           |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5094             | 53.8           | 54.0           | -0.2   |
| 5350                    | 5460   | 1000  | 5479             | 53.3           | 54.0           | -0.7   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

| Middle frequency: <b>5200 MHz</b> |        |       |                  |                |                |        |
|-----------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P17, MCS0 |        |       |                  |                |                |        |
|                                   |        |       | Test results     |                |                |        |
| Start f                           | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                             | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                              | 5150   | 1000  | 5113             | 60.7           | 74.0           | -13.3  |
| 5250                              | 13000  | 1000  | 5388             | 59.2           | 74.0           | -14.8  |
| 13000                             | 18000  | 1000  | 16555            | 56.4           | 74.0           | -17.6  |
| 18000                             | 40000  | 1000  | 33964            | 59.6           | 74.0           | -14.4  |
| Measurement uncertainty           |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5115             | 53.8           | 54.0           | -0.2   |
| 5350                    | 5460   | 1000  | 5388             | 49.6           | 54.0           | -4.4   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

| Highest frequency: <b>5240 MHz</b> |        |       |                  |                |                |        |
|------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P17, MCS0  |        |       |                  |                |                |        |
|                                    |        |       | Test results     |                |                |        |
| Start f                            | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                              | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                               | 5150   | 1000  | 5048             | 58.1           | 74.0           | -15.9  |
| 5250                               | 13000  | 1000  | 5400             | 60.9           | 74.0           | -13.1  |
| 13000                              | 18000  | 1000  | 16481            | 56.1           | 74.0           | -17.9  |
| 18000                              | 40000  | 1000  | 33989            | 61.5           | 74.0           | -12.5  |
| Measurement uncertainty            |        |       | ±6 dB            |                |                |        |

**FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1**

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5048             | 50.6           | 54.0           | -3.4   |
| 5350                    | 5460   | 1000  | 5400             | 48.9           | 54.0           | -5.1   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

**HT40:**

| Lowest frequency: <b>5190 MHz</b> |        |       |                  |                |                |        |
|-----------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P17, MCS8 |        |       |                  |                |                |        |
|                                   |        |       | Test results     |                |                |        |
| Start f                           | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                             | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                              | 5150   | 1000  | 5146             | 63.9           | 74.0           | -10.1  |
| 5250                              | 13000  | 1000  | 5358             | 59.9           | 74.0           | -14.1  |
| 13000                             | 18000  | 1000  | 16550            | 56.1           | 74.0           | -17.9  |
| 18000                             | 40000  | 1000  | 33994            | 61.7           | 74.0           | -12.3  |
| Measurement uncertainty           |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5150             | 51.2           | 54.0           | -2.8   |
| 5350                    | 5460   | 1000  | 5358             | 52.1           | 54.0           | -1.9   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

| Highest frequency: <b>5210 MHz</b> |        |       |                  |                |                |        |
|------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P17, MCS8  |        |       |                  |                |                |        |
|                                    |        |       | Test results     |                |                |        |
| Start f                            | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                              | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                               | 5150   | 1000  | 5146             | 59.4           | 74.0           | -14.6  |
| 5250                               | 13000  | 1000  | 5360             | 60.7           | 74.0           | -13.3  |
| 13000                              | 18000  | 1000  | 16559            | 56.6           | 74.0           | -17.4  |
| 18000                              | 40000  | 1000  | 33981            | 62.0           | 74.0           | -12.0  |
| Measurement uncertainty            |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5137             | 52.1           | 54.0           | -1.9   |
| 5350                    | 5460   | 1000  | 5360             | 51.8           | 54.0           | -2.2   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

**5.6.6.3 Gain group 3  
802.11a:**

| Lowest frequency: <b>5180 MHz</b>   |        |       |                  |                |                |        |
|-------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P14, 6 Mbps |        |       |                  |                |                |        |
|                                     |        |       | Test results     |                |                |        |
| Start f                             | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                               | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                                | 5150   | 1000  | 5097             | 59.9           | 74.0           | -14.1  |
| 5250                                | 13000  | 1000  | 7295             | 58.6           | 74.0           | -15.4  |
| 13000                               | 18000  | 1000  | 16565            | 56.1           | 74.0           | -17.9  |
| 18000                               | 40000  | 1000  | 38488            | 62.9           | 74.0           | -11.1  |
| Measurement uncertainty             |        |       |                  | ±6 dB          |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5096             | 53.0           | 54.0           | -1.0   |
| 7250                    | 7750   | 1000  | 7295             | 51.1           | 54.0           | -2.9   |
| Measurement uncertainty |        |       |                  | ±6 dB          |                |        |

| Middle frequency: <b>5200 MHz</b>   |        |       |                  |                |                |        |
|-------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P14, 6 Mbps |        |       |                  |                |                |        |
|                                     |        |       | Test results     |                |                |        |
| Start f                             | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                               | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                                | 5150   | 1000  | 5117             | 59.4           | 74.0           | -14.6  |
| 5250                                | 13000  | 1000  | 7273             | 59.5           | 74.0           | -14.5  |
| 13000                               | 18000  | 1000  | 16526            | 56.3           | 74.0           | -17.7  |
| 18000                               | 40000  | 1000  | 38512            | 61.3           | 74.0           | -12.7  |
| Measurement uncertainty             |        |       |                  | ±6 dB          |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5121             | 53.6           | 54.0           | -0.4   |
| 7250                    | 7750   | 1000  | 7273             | 51.2           | 54.0           | -2.8   |
| Measurement uncertainty |        |       |                  | ±6 dB          |                |        |

| Highest frequency: <b>5240 MHz</b>  |        |       |                  |                |                |        |
|-------------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P14, 6 Mbps |        |       |                  |                |                |        |
|                                     |        |       | Test results     |                |                |        |
| Start f                             | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                               | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                                | 5150   | 1000  | 5072             | 57.6           | 74.0           | -16.4  |
| 5250                                | 13000  | 1000  | 7680             | 59.1           | 74.0           | -14.9  |
| 13000                               | 18000  | 1000  | 16523            | 56.3           | 74.0           | -17.7  |
| 18000                               | 40000  | 1000  | 38326            | 61.8           | 74.0           | -12.2  |
| Measurement uncertainty             |        |       |                  | ±6 dB          |                |        |

| AV-Measurement          |                 |              | Test results              |                |                         |                |
|-------------------------|-----------------|--------------|---------------------------|----------------|-------------------------|----------------|
| Start f<br>(MHz)        | Stop f<br>(MHz) | RBW<br>(kHz) | Maximum emission<br>(MHz) | (dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 4500                    | 5150            | 1000         | 5087                      | 50.0           | 54.0                    | -4.0           |
| 7250                    | 7750            | 1000         | 7680                      | 50.9           | 54.0                    | -3.1           |
| Measurement uncertainty |                 |              |                           | ±6 dB          |                         |                |

**HT20:**

| Lowest frequency: <b>5180 MHz</b> |                 |              |                           |                |                         |                |
|-----------------------------------|-----------------|--------------|---------------------------|----------------|-------------------------|----------------|
| Test conditions: 2 TX , P14, MCS0 |                 |              |                           |                |                         |                |
|                                   |                 |              | Test results              |                |                         |                |
| Start f<br>(MHz)                  | Stop f<br>(MHz) | RBW<br>(kHz) | Maximum emission<br>(MHz) | (dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 1000                              | 5150            | 1000         | 5102                      | 60.6           | 74.0                    | -13.4          |
| 5250                              | 13000           | 1000         | 7491                      | 58.4           | 74.0                    | -15.6          |
| 13000                             | 18000           | 1000         | 16480                     | 57.8           | 74.0                    | -16.2          |
| 18000                             | 40000           | 1000         | 39978                     | 62.5           | 74.0                    | -11.5          |
| Measurement uncertainty           |                 |              |                           | ±6 dB          |                         |                |

| AV-Measurement          |                 |              | Test results              |                |                         |                |
|-------------------------|-----------------|--------------|---------------------------|----------------|-------------------------|----------------|
| Start f<br>(MHz)        | Stop f<br>(MHz) | RBW<br>(kHz) | Maximum emission<br>(MHz) | (dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 4500                    | 5150            | 1000         | 5104                      | 53.8           | 54.0                    | -0.2           |
| 7250                    | 7750            | 1000         | 7491                      | 50.1           | 54.0                    | -3.9           |
| Measurement uncertainty |                 |              |                           | ±6 dB          |                         |                |

| Middle frequency: <b>5200 MHz</b> |                 |              |                           |                |                         |                |
|-----------------------------------|-----------------|--------------|---------------------------|----------------|-------------------------|----------------|
| Test conditions: 2 TX , P14, MCS0 |                 |              |                           |                |                         |                |
|                                   |                 |              | Test results              |                |                         |                |
| Start f<br>(MHz)                  | Stop f<br>(MHz) | RBW<br>(kHz) | Maximum emission<br>(MHz) | (dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 1000                              | 5150            | 1000         | 5116                      | 60.4           | 74.0                    | -13.6          |
| 5250                              | 13000           | 1000         | 7460                      | 58.4           | 74.0                    | -15.6          |
| 13000                             | 18000           | 1000         | 16525                     | 57.0           | 74.0                    | -17.0          |
| 18000                             | 40000           | 1000         | 39963                     | 62.1           | 74.0                    | -11.9          |
| Measurement uncertainty           |                 |              |                           | ±6 dB          |                         |                |

| AV-Measurement          |                 |              | Test results              |                |                         |                |
|-------------------------|-----------------|--------------|---------------------------|----------------|-------------------------|----------------|
| Start f<br>(MHz)        | Stop f<br>(MHz) | RBW<br>(kHz) | Maximum emission<br>(MHz) | (dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 4500                    | 5150            | 1000         | 5115                      | 53.1           | 54.0                    | -0.9           |
| 7250                    | 7750            | 1000         | 7460                      | 50.1           | 54.0                    | -3.9           |
| Measurement uncertainty |                 |              |                           | ±6 dB          |                         |                |

| Highest frequency: <b>5240 MHz</b> |                 |              |                           |                |                         |                |
|------------------------------------|-----------------|--------------|---------------------------|----------------|-------------------------|----------------|
| Test conditions: 2 TX , P14, MCS0  |                 |              |                           |                |                         |                |
|                                    |                 |              | Test results              |                |                         |                |
| Start f<br>(MHz)                   | Stop f<br>(MHz) | RBW<br>(kHz) | Maximum emission<br>(MHz) | (dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 1000                               | 5150            | 1000         | 5042                      | 57.1           | 74.0                    | -16.9          |
| 5250                               | 13000           | 1000         | 7310                      | 58.5           | 74.0                    | -15.5          |
| 13000                              | 18000           | 1000         | 17042                     | 57.3           | 74.0                    | -16.7          |
| 18000                              | 40000           | 1000         | 39978                     | 62.9           | 74.0                    | -11.1          |
| Measurement uncertainty            |                 |              |                           | ±6 dB          |                         |                |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5064             | 49.6           | 54.0           | -4.4   |
| 7250                    | 7750   | 1000  | 7310             | 50.3           | 54.0           | -3.7   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

**HT40:**

| Lowest frequency: 5190 MHz        |        |       |                  |                |                |        |
|-----------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P14, MCS8 |        |       |                  |                |                |        |
|                                   |        |       | Test results     |                |                |        |
| Start f                           | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                             | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                              | 5150   | 1000  | 5147             | 61.3           | 74.0           | -12.7  |
| 5250                              | 13000  | 1000  | 7453             | 59.0           | 74.0           | -15.0  |
| 13000                             | 18000  | 1000  | 16501            | 56.3           | 74.0           | -17.7  |
| 18000                             | 40000  | 1000  | 39952            | 62.3           | 74.0           | -11.7  |
| Measurement uncertainty           |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5150             | 51.4           | 54.0           | -2.6   |
| 7250                    | 7750   | 1000  | 7453             | 51.3           | 54.0           | -2.7   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

| Highest frequency: 5210 MHz       |        |       |                  |                |                |        |
|-----------------------------------|--------|-------|------------------|----------------|----------------|--------|
| Test conditions: 2 TX , P14, MCS8 |        |       |                  |                |                |        |
|                                   |        |       | Test results     |                |                |        |
| Start f                           | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                             | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 1000                              | 5150   | 1000  | 5138             | 59.8           | 74.0           | -14.2  |
| 5250                              | 13000  | 1000  | 7621             | 58.7           | 74.0           | -15.3  |
| 13000                             | 18000  | 1000  | 17059            | 55.5           | 74.0           | -18.5  |
| 18000                             | 40000  | 1000  | 39967            | 62.6           | 74.0           | -11.4  |
| Measurement uncertainty           |        |       | ±6 dB            |                |                |        |

| AV-Measurement          |        |       | Test results     |                |                |        |
|-------------------------|--------|-------|------------------|----------------|----------------|--------|
| Start f                 | Stop f | RBW   | Maximum emission |                | Limit          | Margin |
| (MHz)                   | (MHz)  | (kHz) | (MHz)            | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |
| 4500                    | 5150   | 1000  | 5145             | 50.9           | 54.0           | -3.1   |
| 7250                    | 7750   | 1000  | 7621             | 51.7           | 54.0           | -2.3   |
| Measurement uncertainty |        |       | ±6 dB            |                |                |        |

**FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1**

Radiated limits according to FCC Part 15C, Section 15.209(a):

| Frequency<br>(MHz) | Field strength of spurious emissions |                | Measurement distance<br>(metres) |
|--------------------|--------------------------------------|----------------|----------------------------------|
|                    | ( $\mu$ V/m)                         | dB( $\mu$ V/m) |                                  |
| 0.009 - 0.490      | 2400/F(kHz)                          |                | 300                              |
| 0.490 - 1.705      | 24000/F(kHz)                         |                | 30                               |
| 1.705 - 30         | 30                                   | 29.5           | 30                               |
| 30 - 88            | 100                                  | 40             | 3                                |
| 88 - 216           | 150                                  | 43.5           | 3                                |
| 216 - 960          | 200                                  | 46             | 3                                |
| Above 960          | 500                                  | 54             | 3                                |

FCC Part 15C, Section 15.205, restricted bands of operation:

| MHz                 | MHz                   | MHz             | GHz           |
|---------------------|-----------------------|-----------------|---------------|
| 0.090 – 0.110       | 16.42 – 16.423        | 399.9 – 410     | 4.5 – 5.15    |
| 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     | Above 38.6    |

 The requirements are **FULFILLED**.

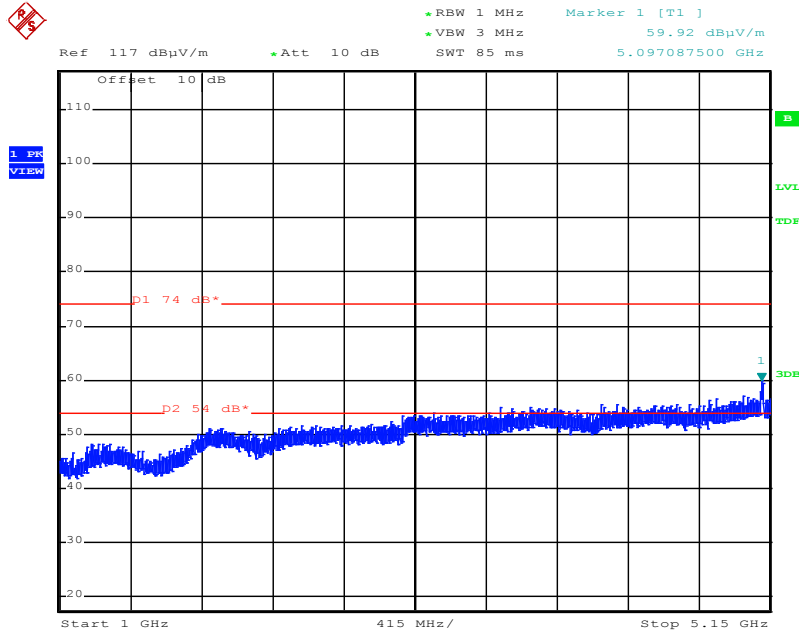
**Remarks:** The measurement is performed from 9 kHz up to 40 GHz. For detailed test results please see the following test protocols. CH36 is listed only as representative channel.

5.6.7 Test protocols undesirable emission

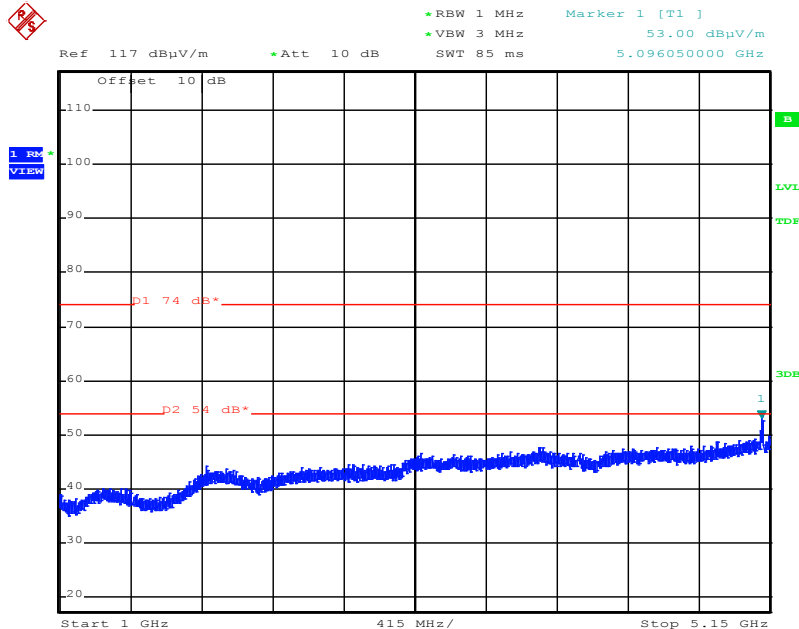
5.6.7.1 Gain group 1 (6 dBi)

802.11a, Channel 36 (5180 MHz)

1 GHz – 5.15 GHz

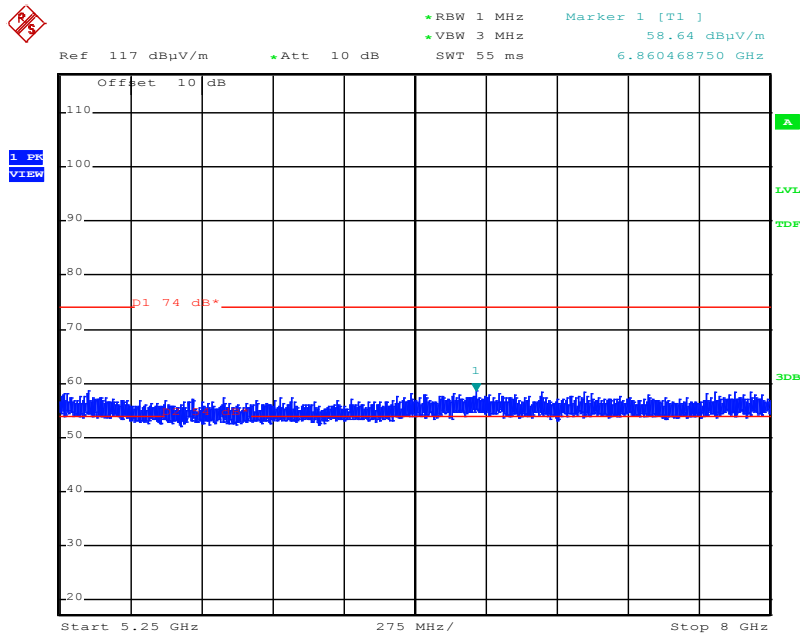


1 GHz – 5.15 GHz, AV

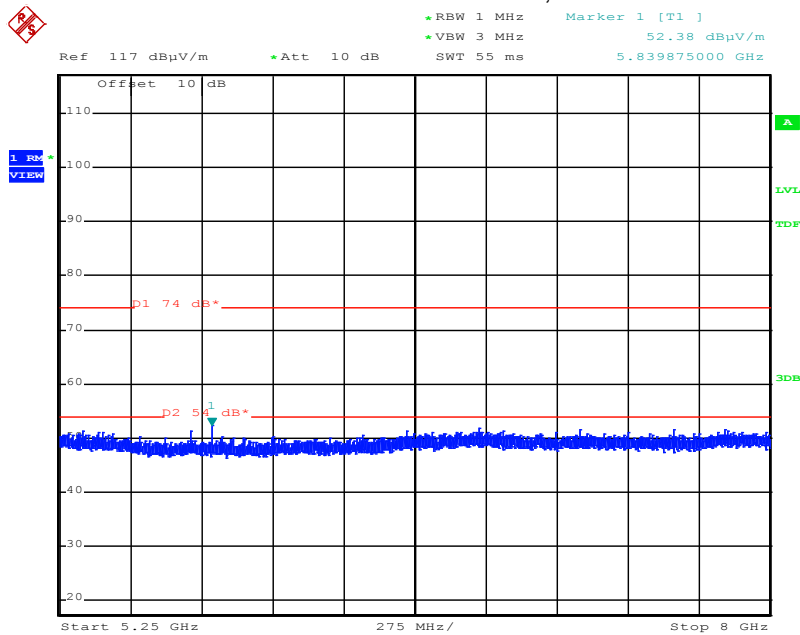




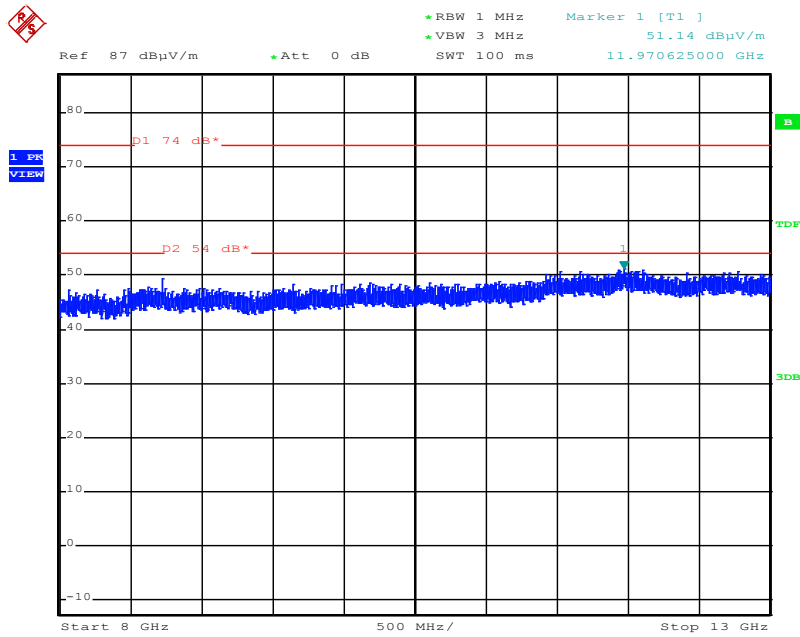
5.25 GHz – 8 GHz



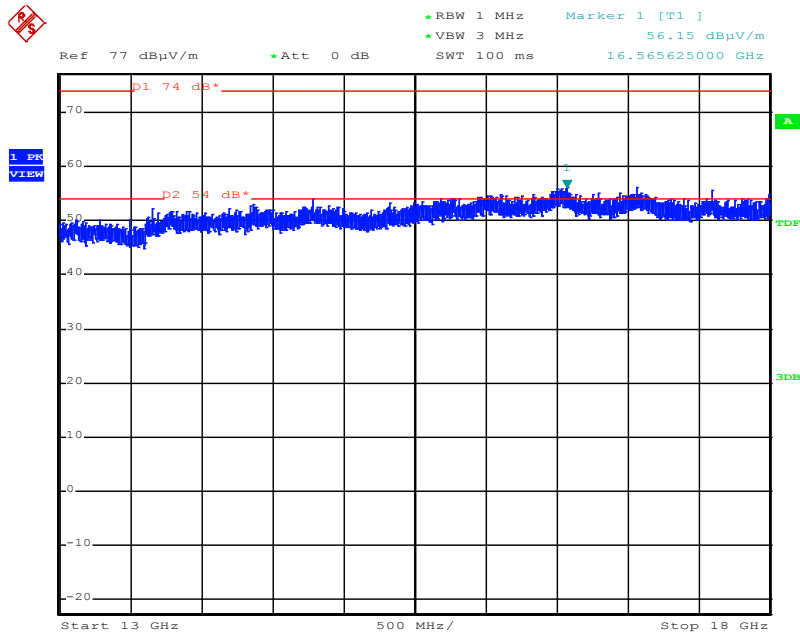
5.25 GHz – 8 GHz; AV



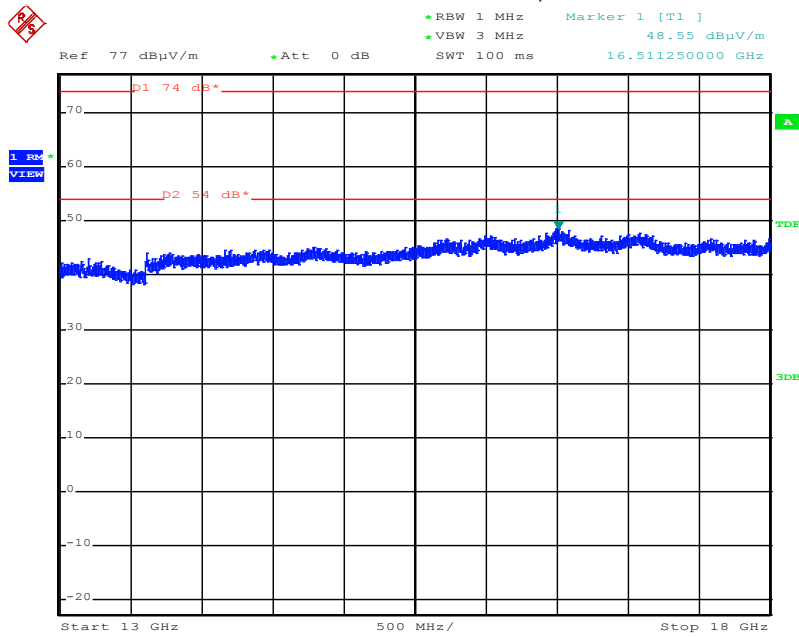
8 GHz – 13 GHz



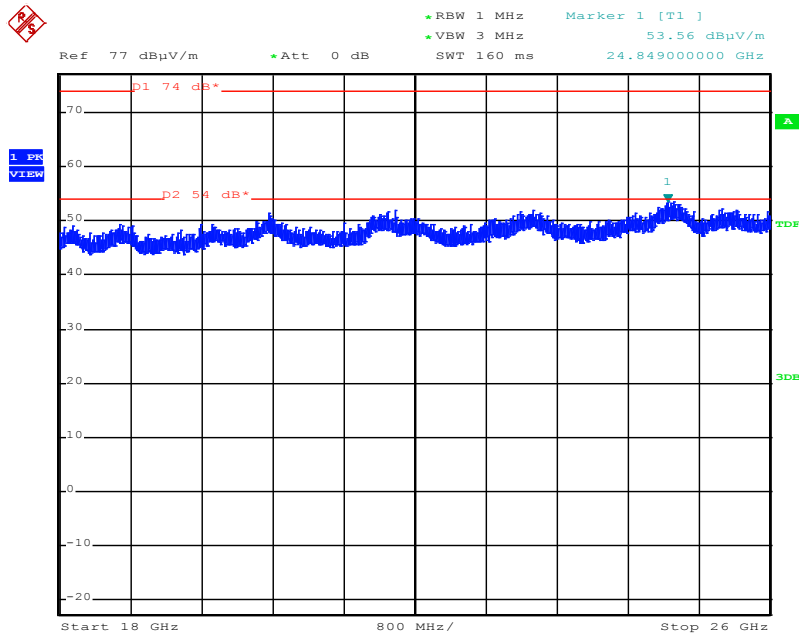
13 GHz - 18 GHz



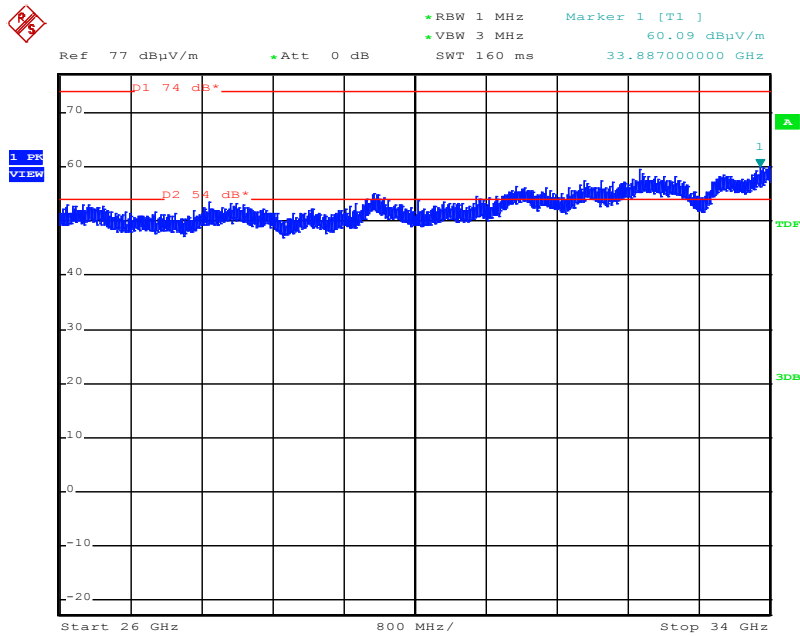
13 GHz - 18 GHz, AV



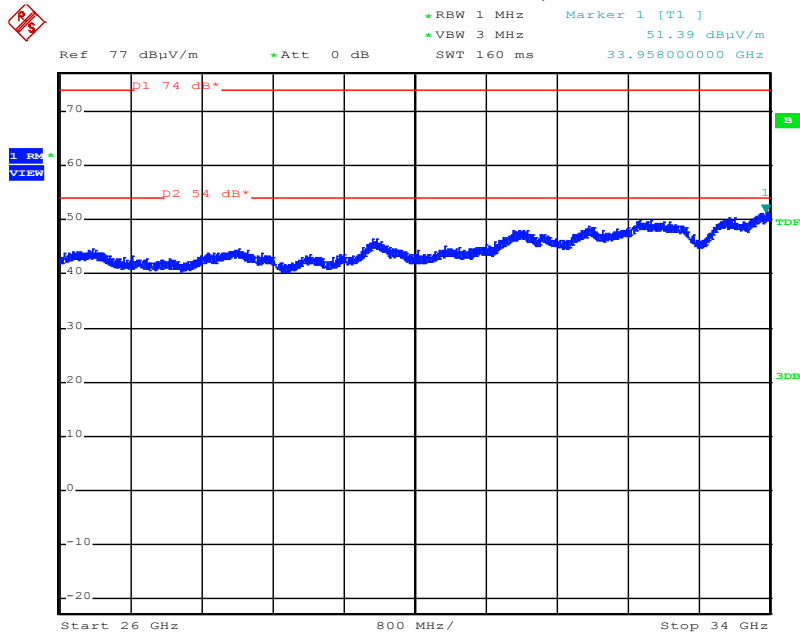
18 GHz - 26 GHz



26 GHz – 34 GHz

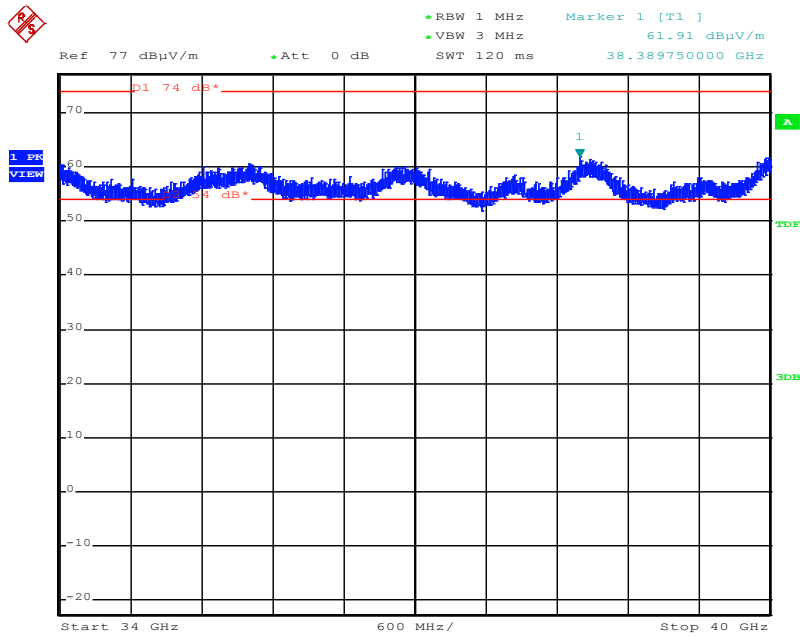


26 GHz – 34 GHz, AV

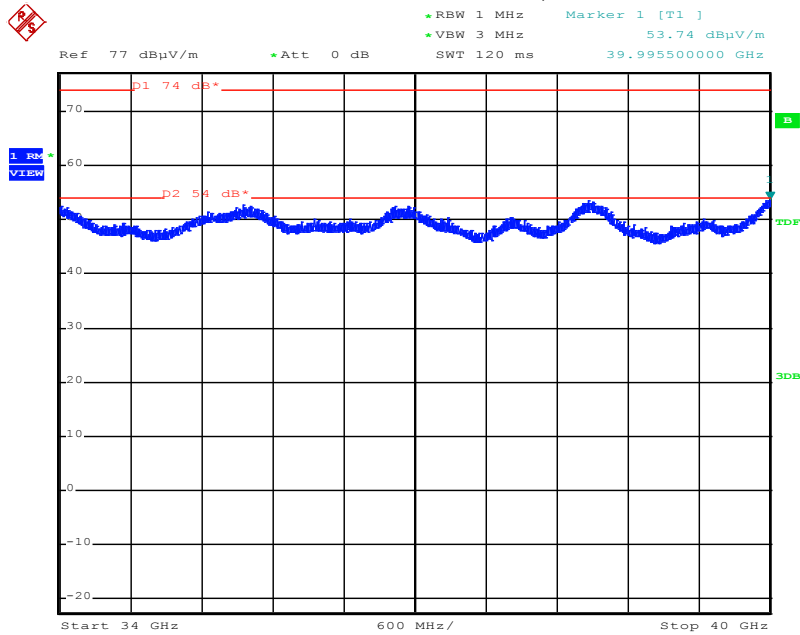


FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1

34 GHz – 40 GHz

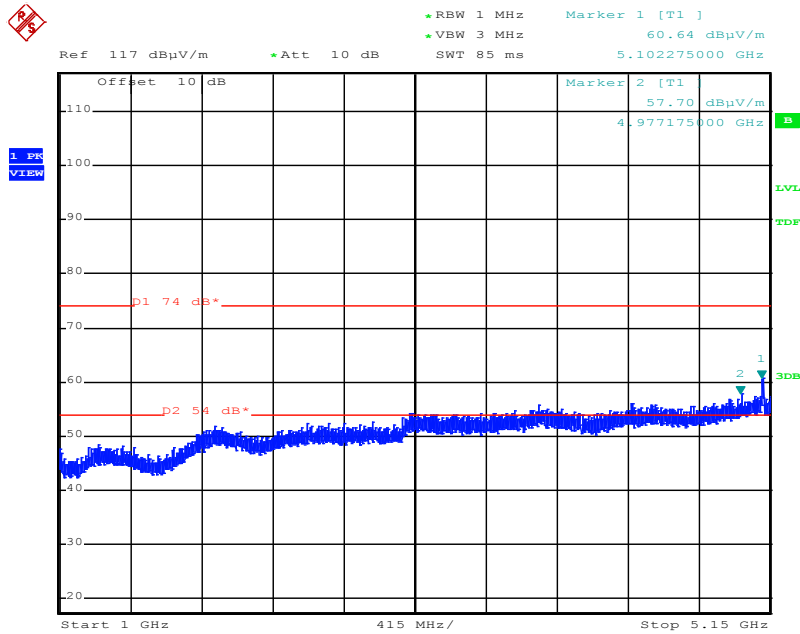


34 GHz – 40 GHz, AV

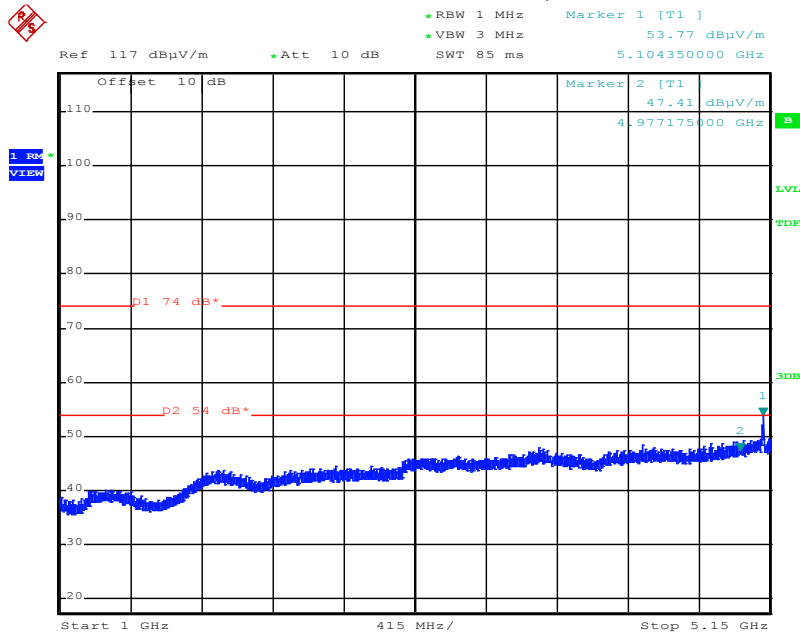


802.11n, HT20, Channel 36 (5180 MHz)

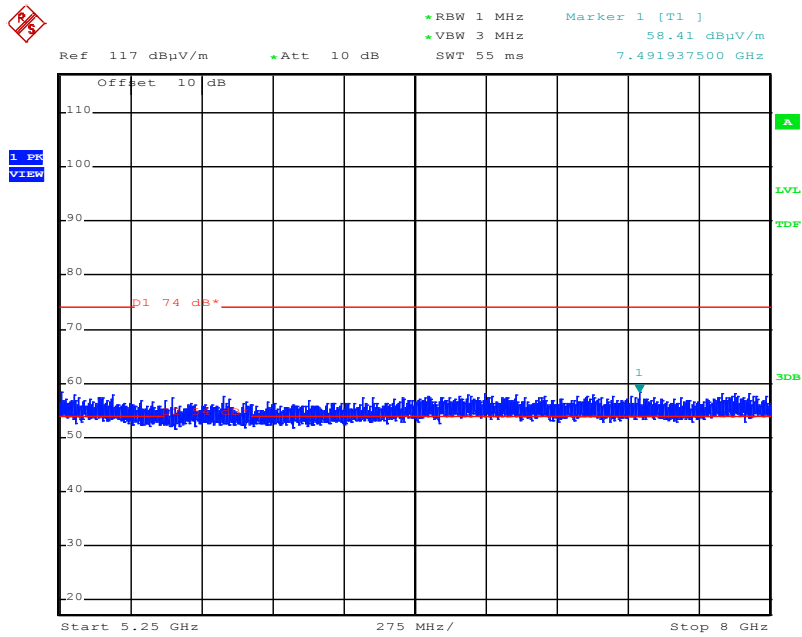
1 GHz – 5.15 GHz



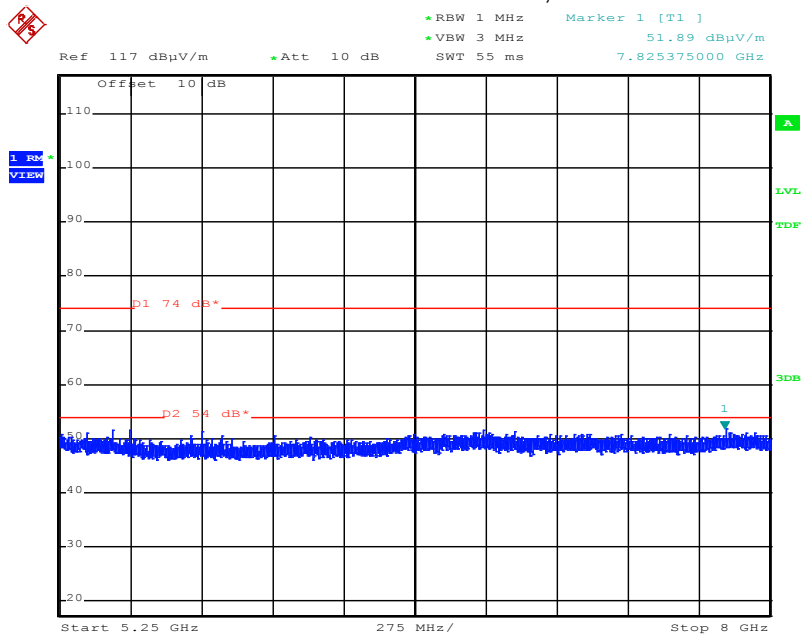
1 GHz – 5.15 GHz, AV



5.25 GHz – 8 GHz

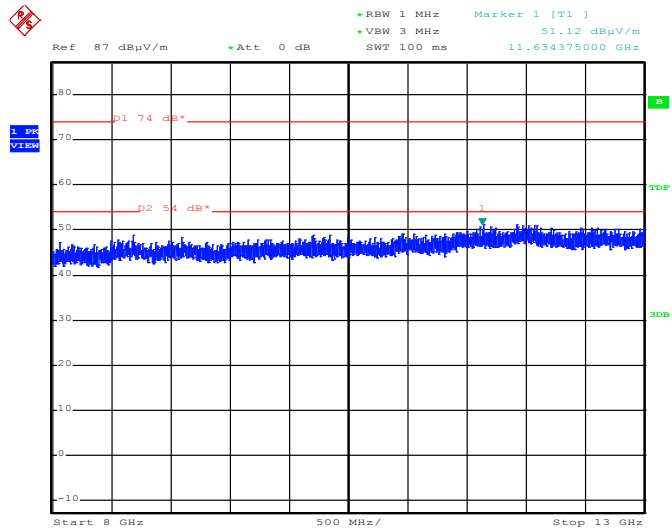


5.25 GHz – 8 GHz, AV

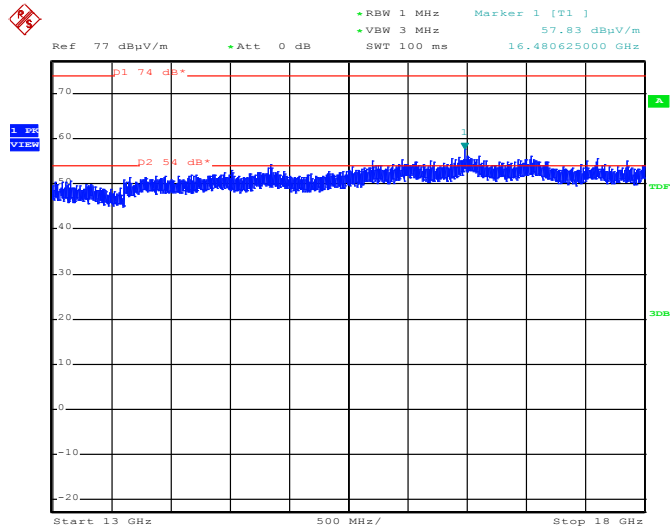


FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1

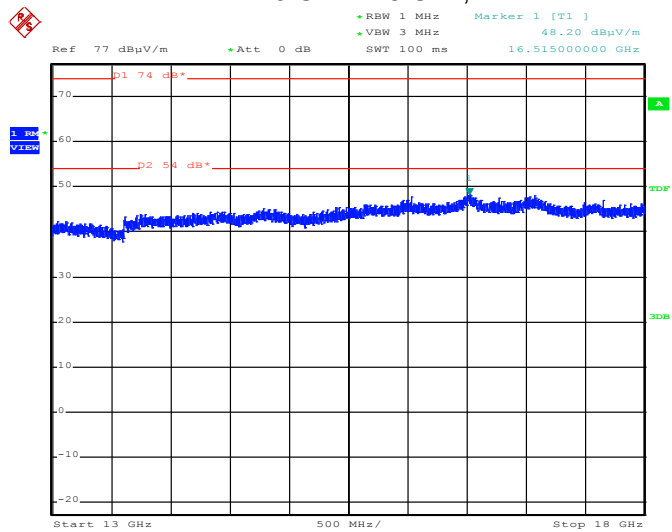
8 GHz – 13 GHz



13 GHz - 18 GHz

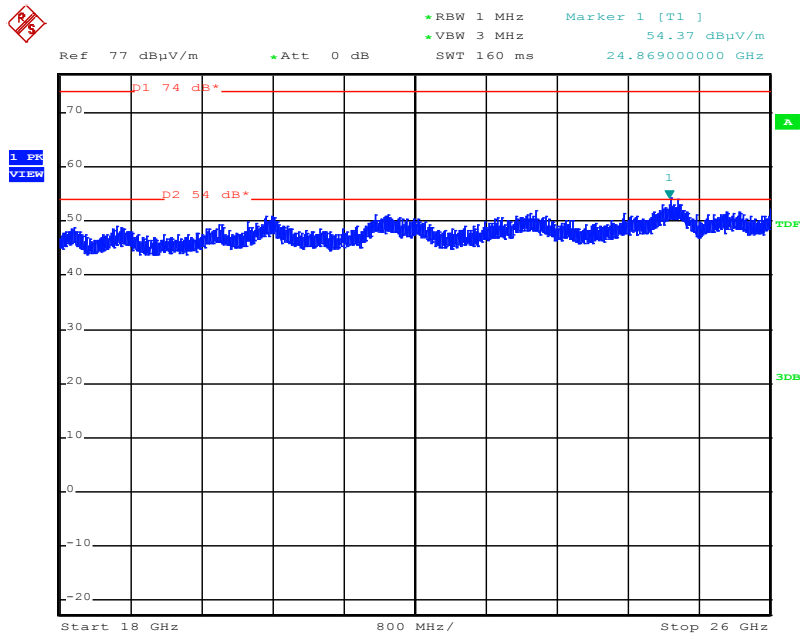


13 GHz - 18 GHz, AV

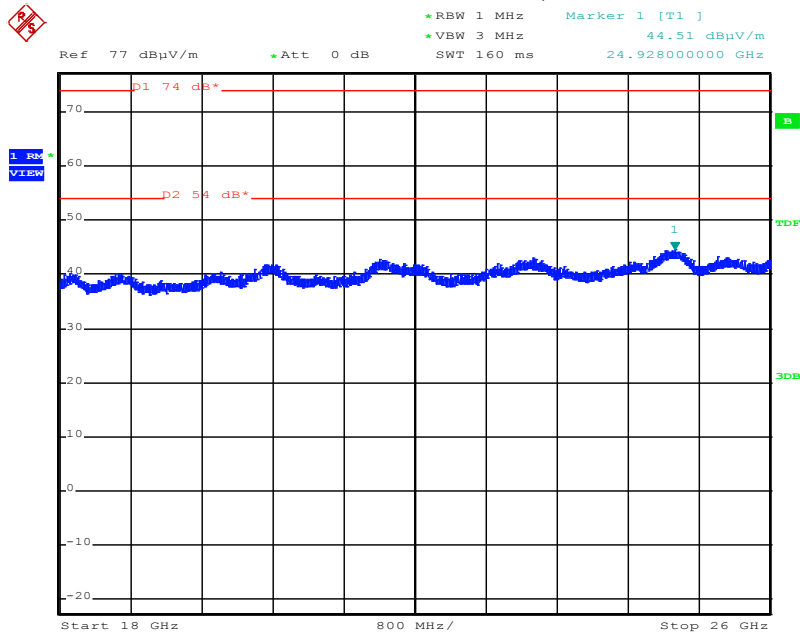




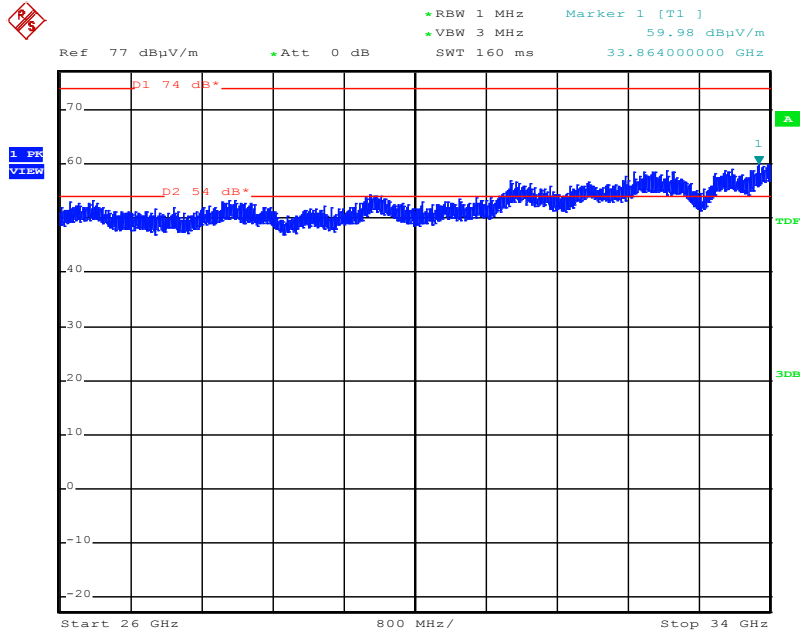
18 GHz – 26 GHz



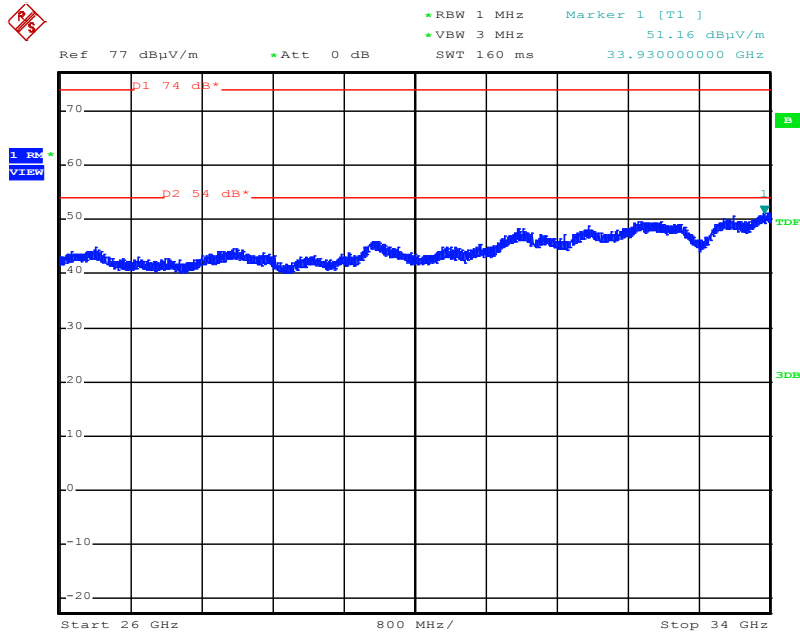
18 GHz – 26 GHz, AV



26 GHz – 34 GHz

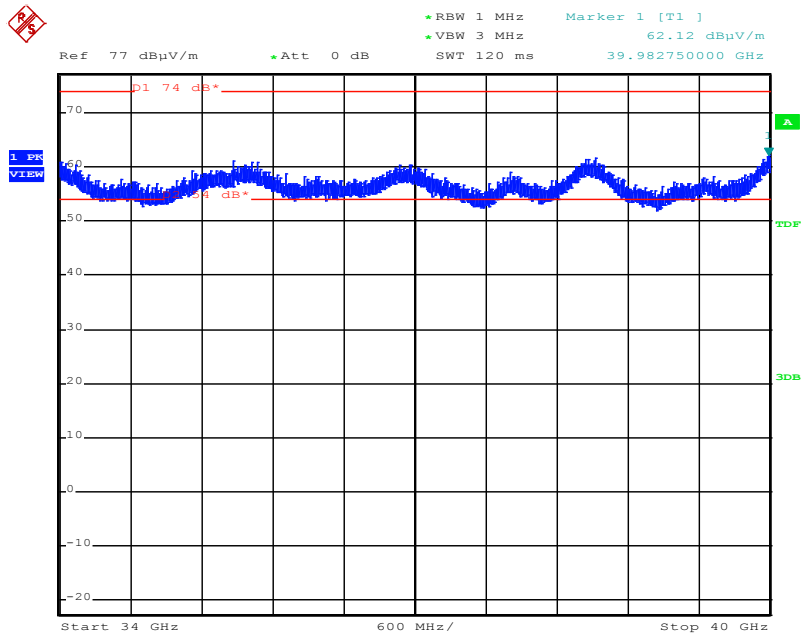


26 GHz – 34 GHz, AV

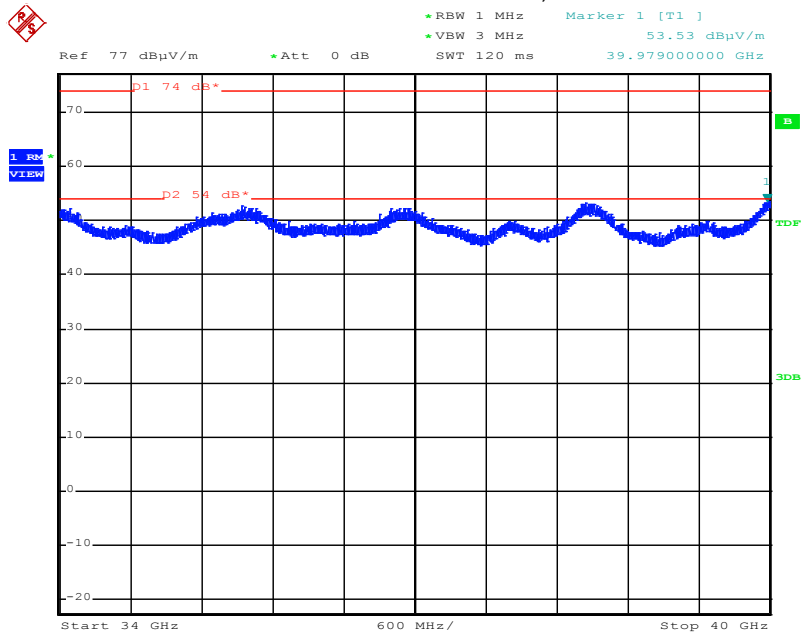


FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1

34 GHz – 40 GHz

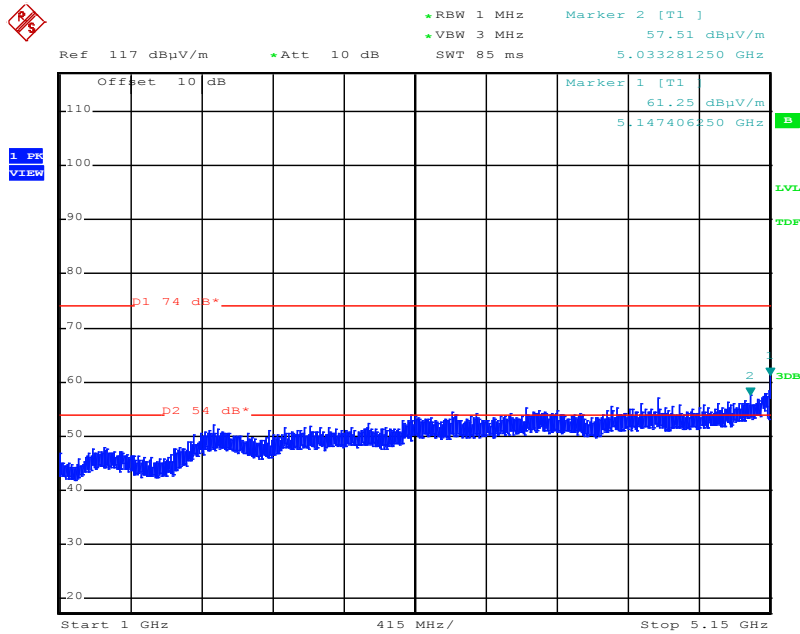


34 GHz – 40 GHz, AV

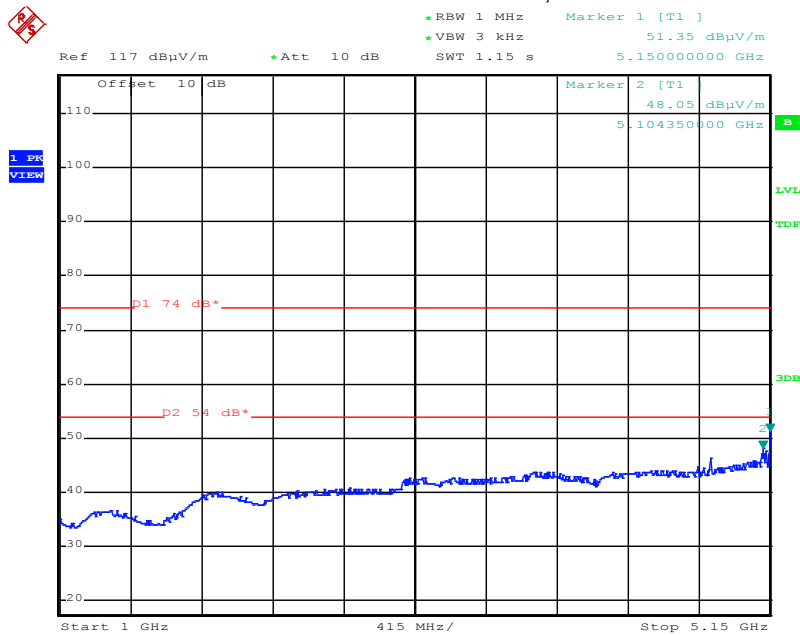


HT40, Channel 36up (5190 MHz)

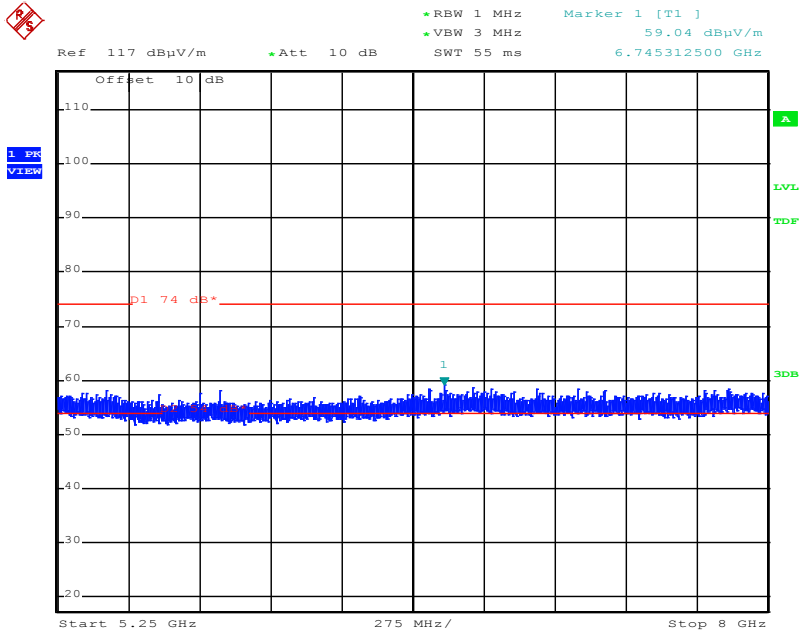
1 GHz – 5.15 GHz



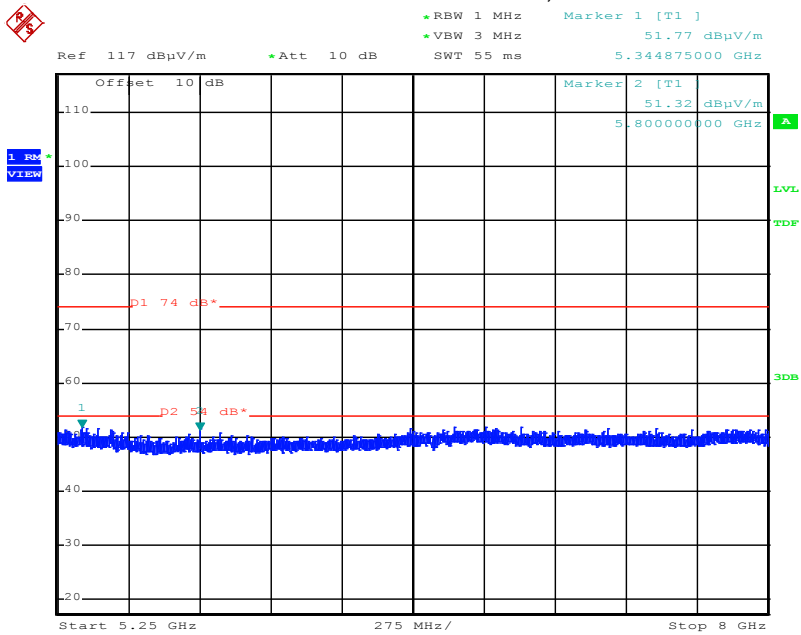
1 GHz – 5.15 GHz, AV



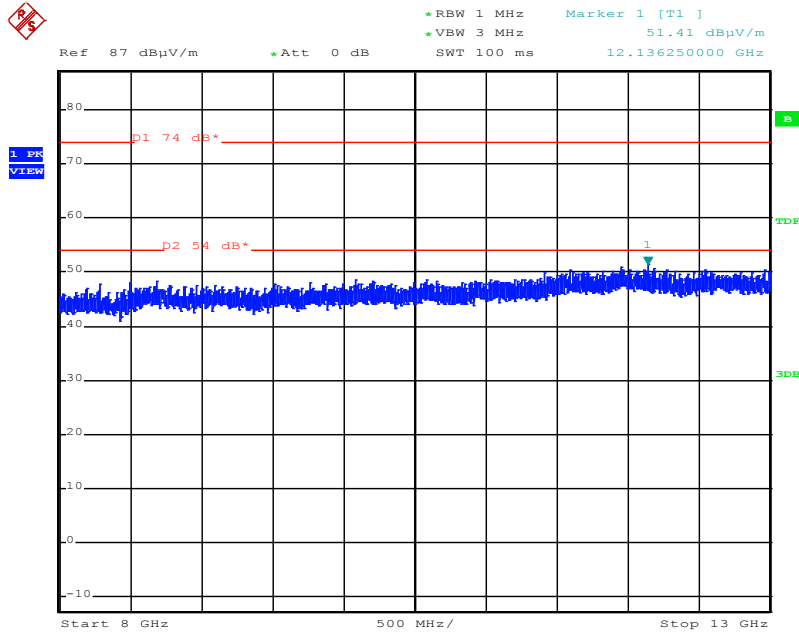
5.25 GHz – 8 GHz



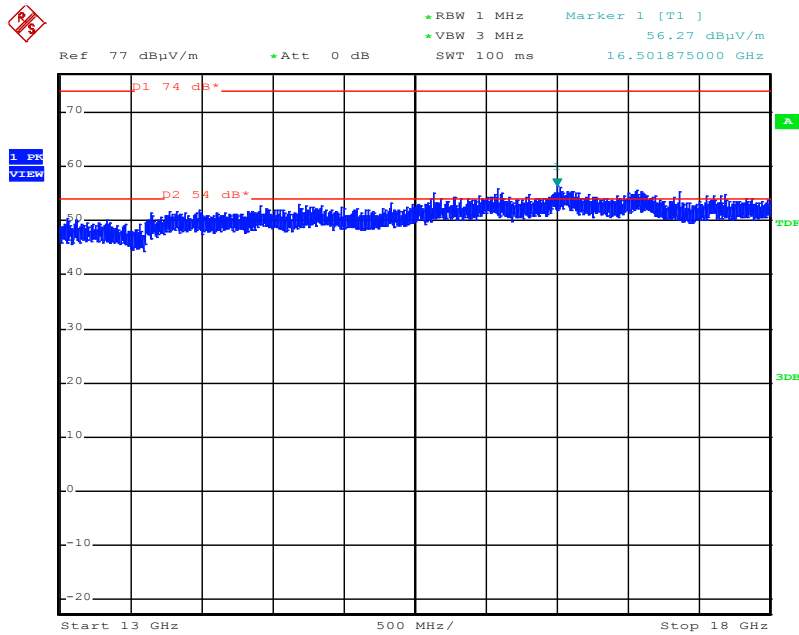
5.25 GHz – 8 GHz;AV



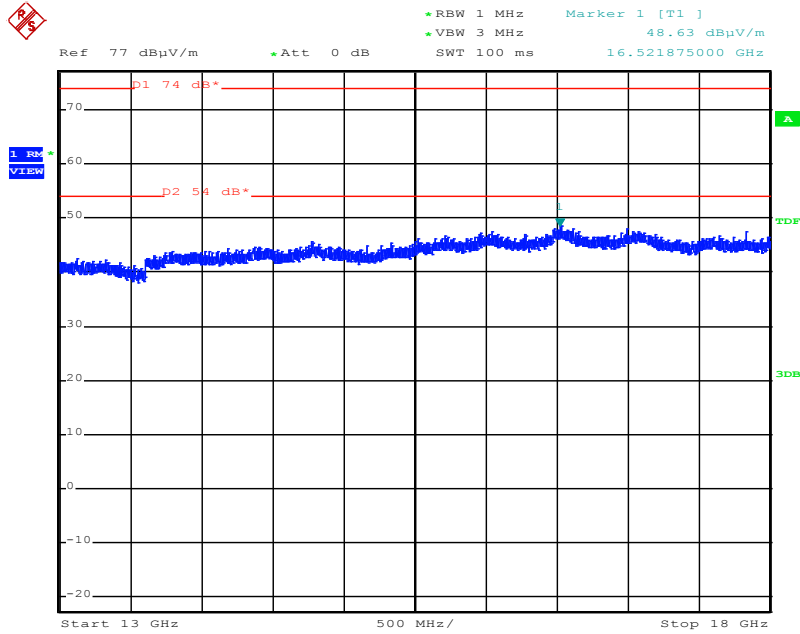
8 GHz – 13 GHz



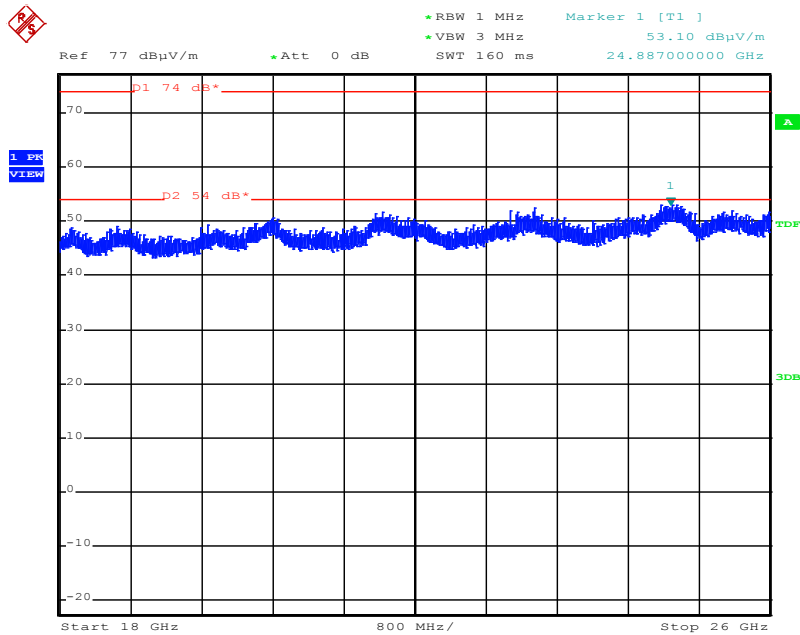
13 GHz - 18 GHz



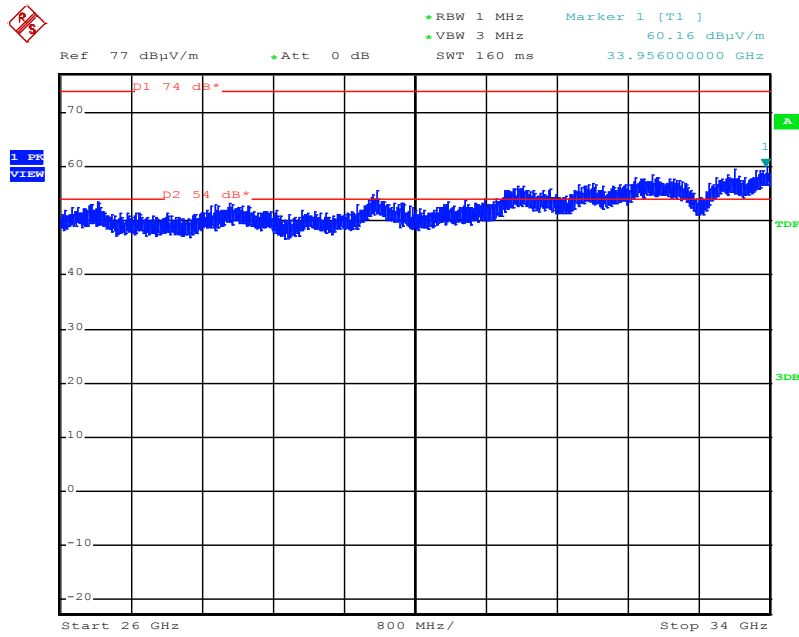
13 GHz - 18 GHz, AV



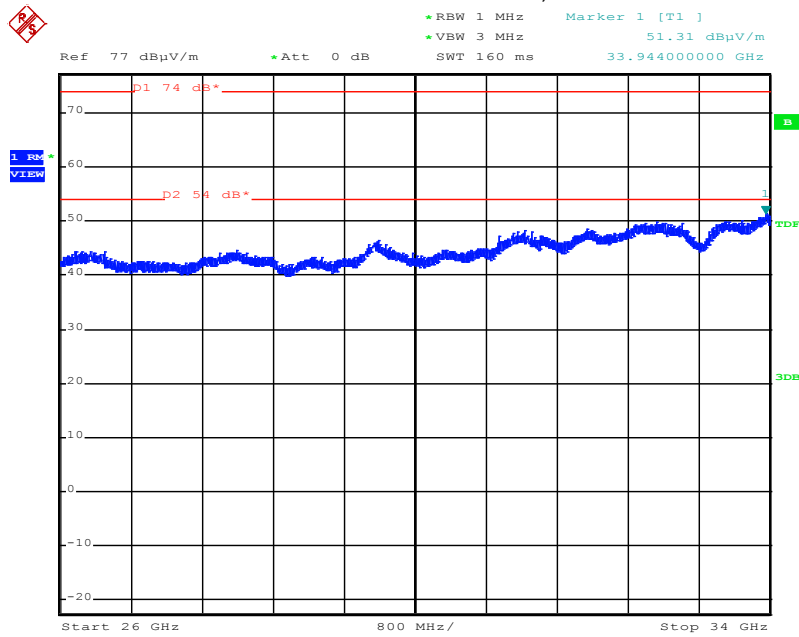
18 GHz - 26 GHz



26 GHz – 34 GHz



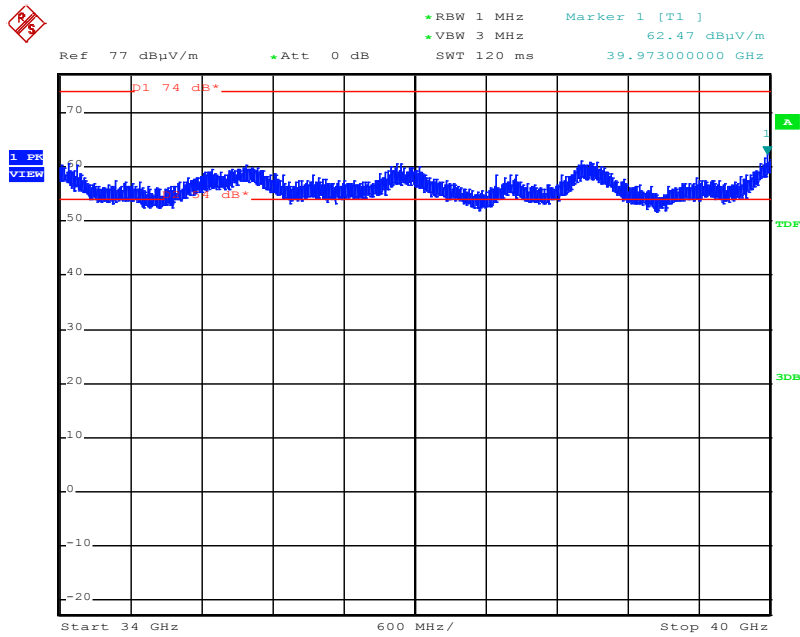
26 GHz – 34 GHz, AV



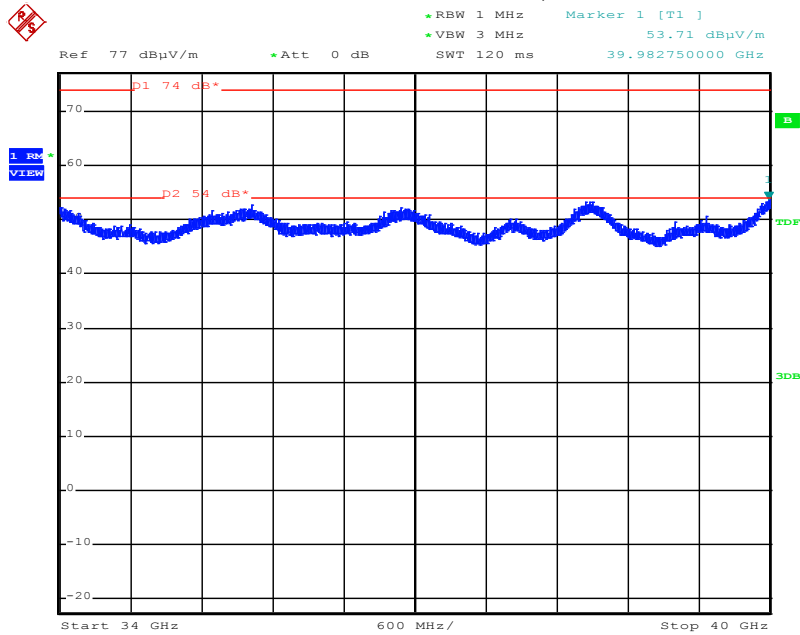


FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1

34 GHz – 40 GHz



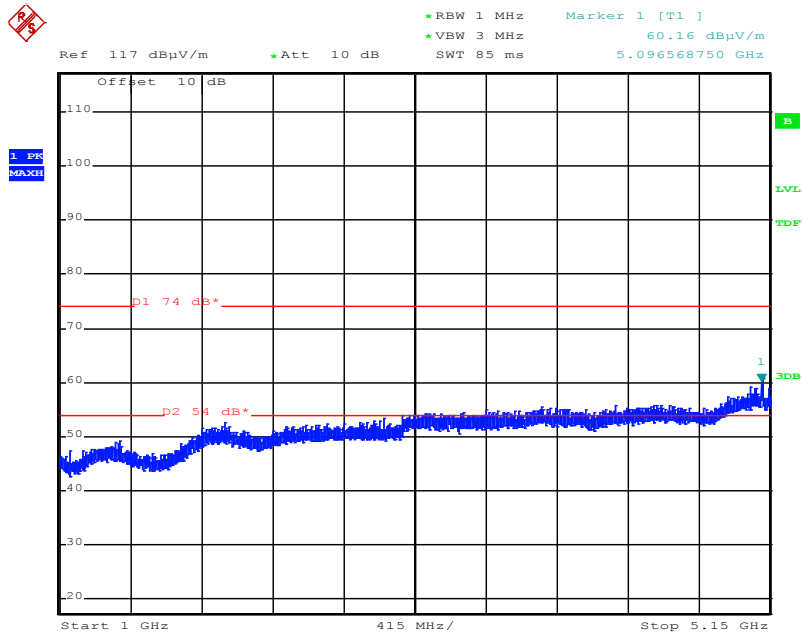
34 GHz – 40 GHz, AV



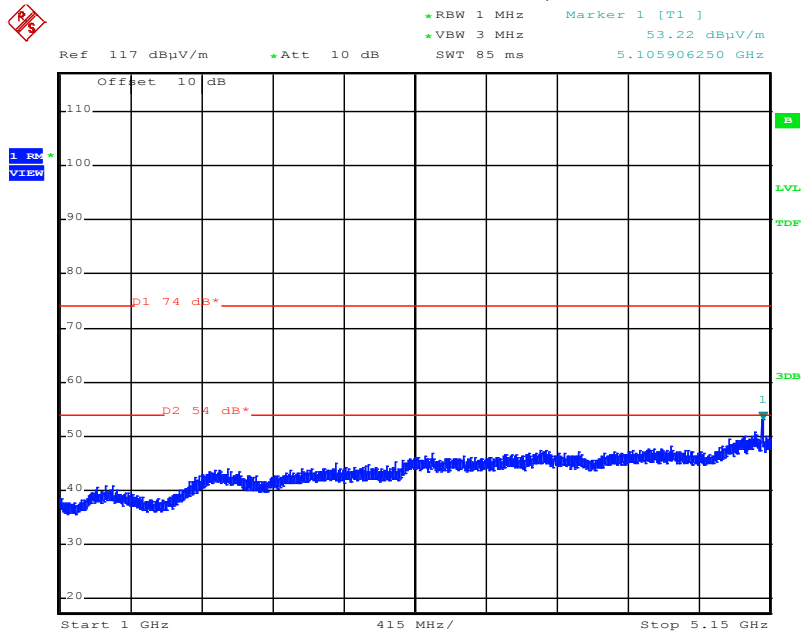
5.6.7.2 Gain group 2 (9 dBi)

802.11a, Channel 36 (5180 MHz)

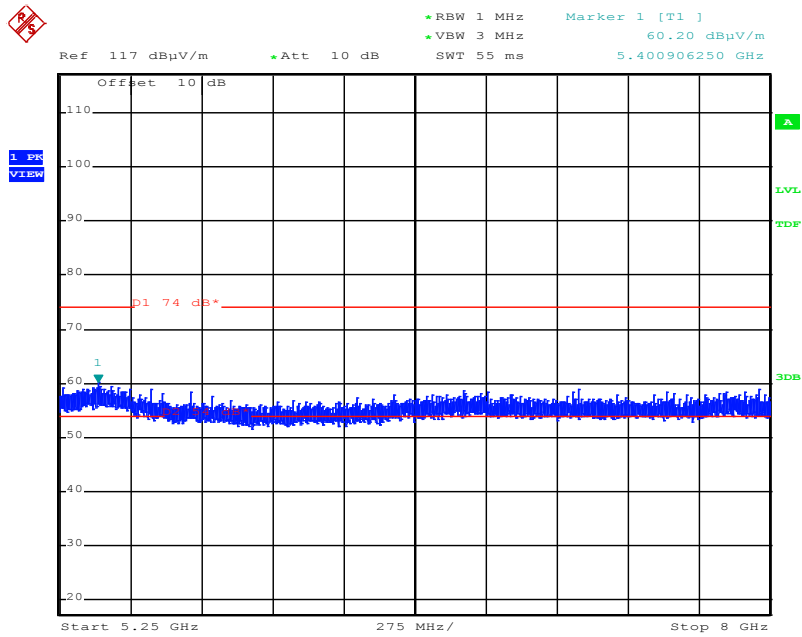
1 GHz – 5.15 GHz



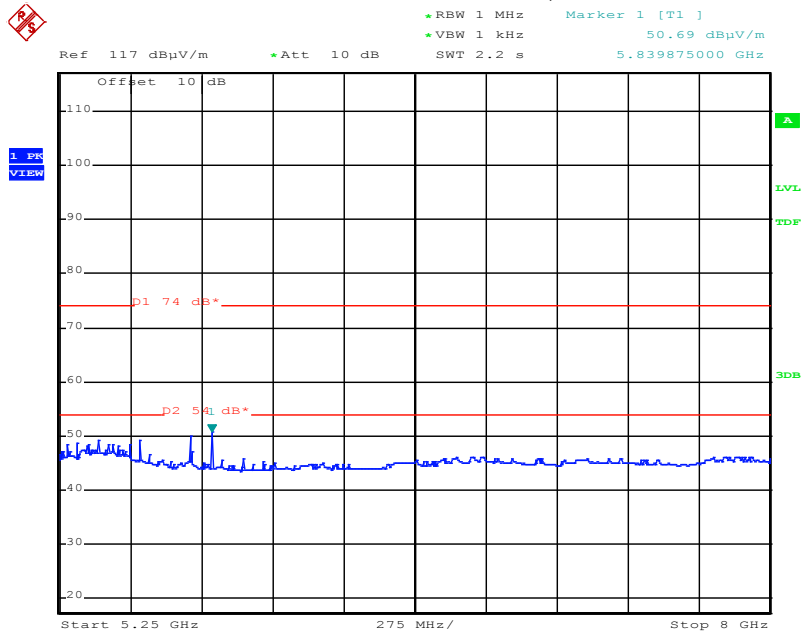
1 GHz – 5.15 GHz, AV



5.25 GHz – 8 GHz

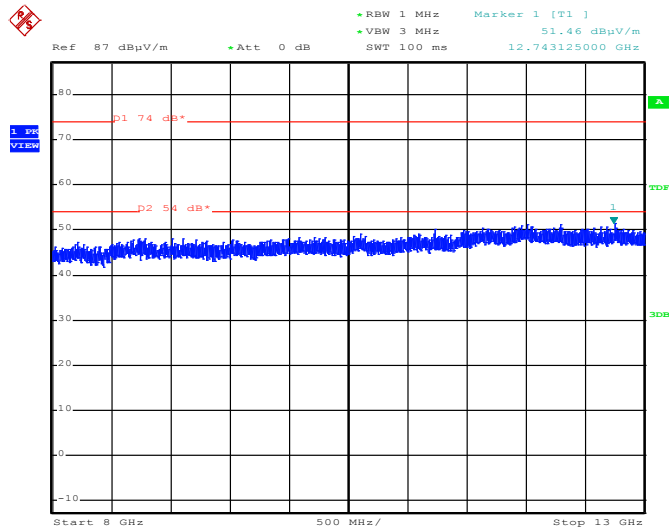


5.25 GHz – 8 GHz;AV

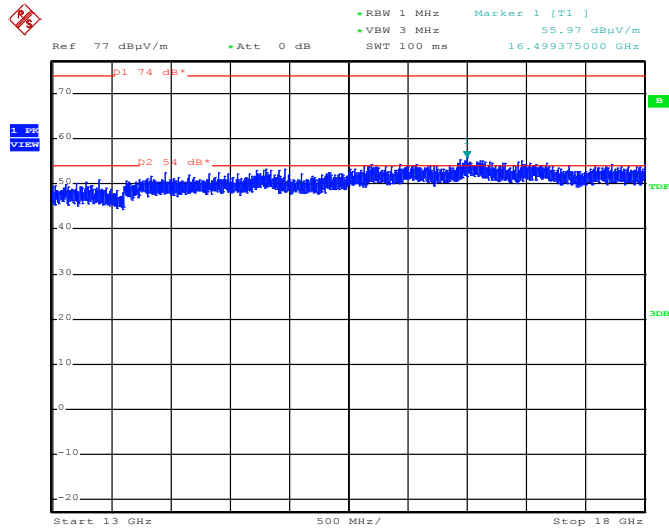


FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1

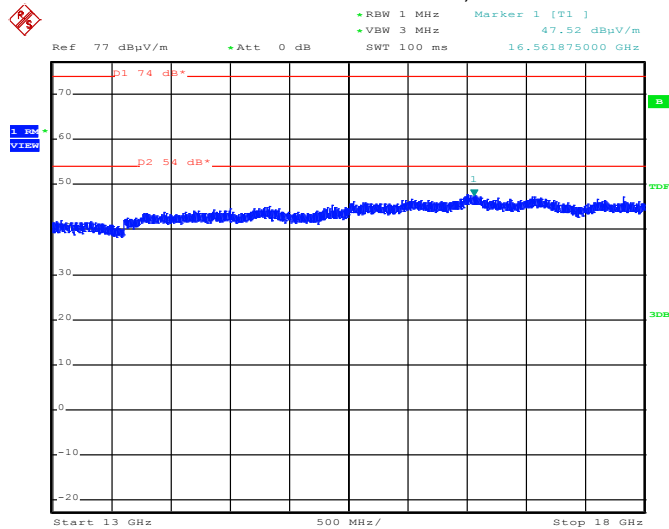
8 GHz – 13 GHz



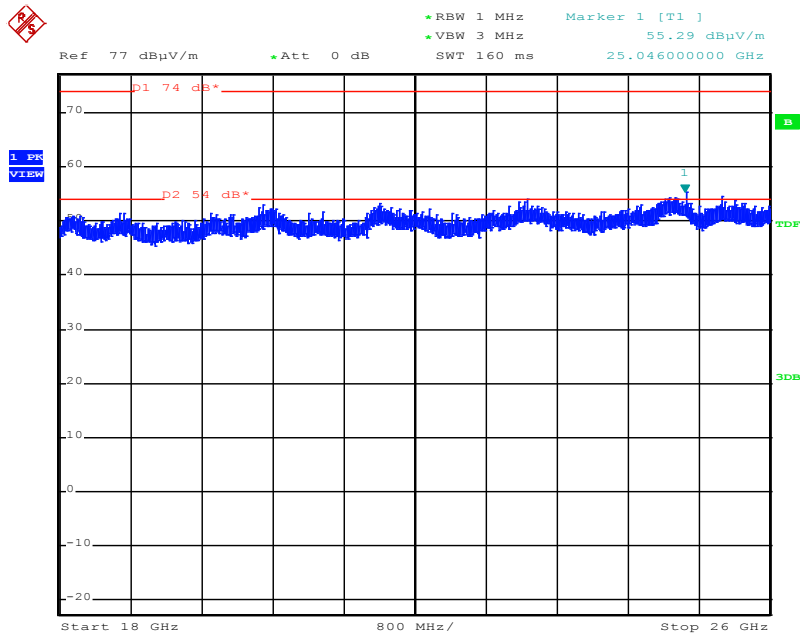
13 GHz - 18 GHz



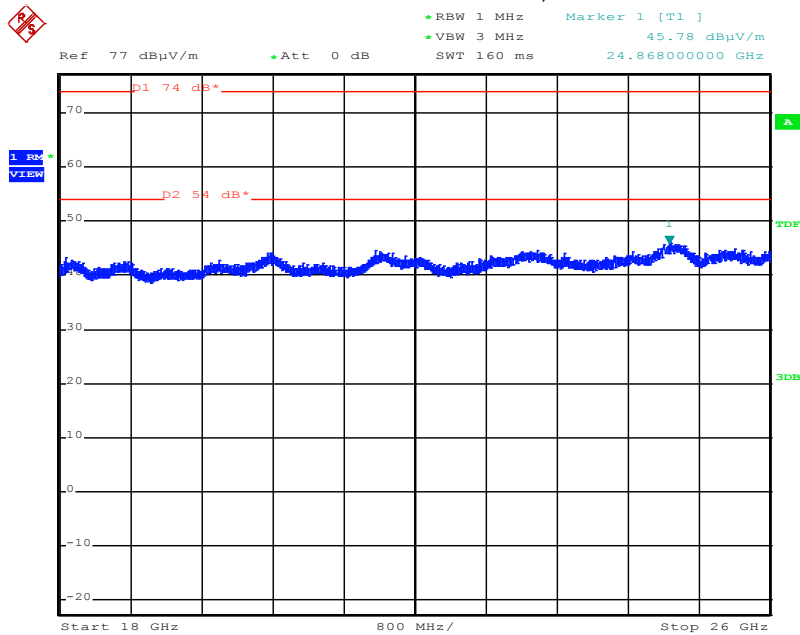
13 GHz - 18 GHz, AV



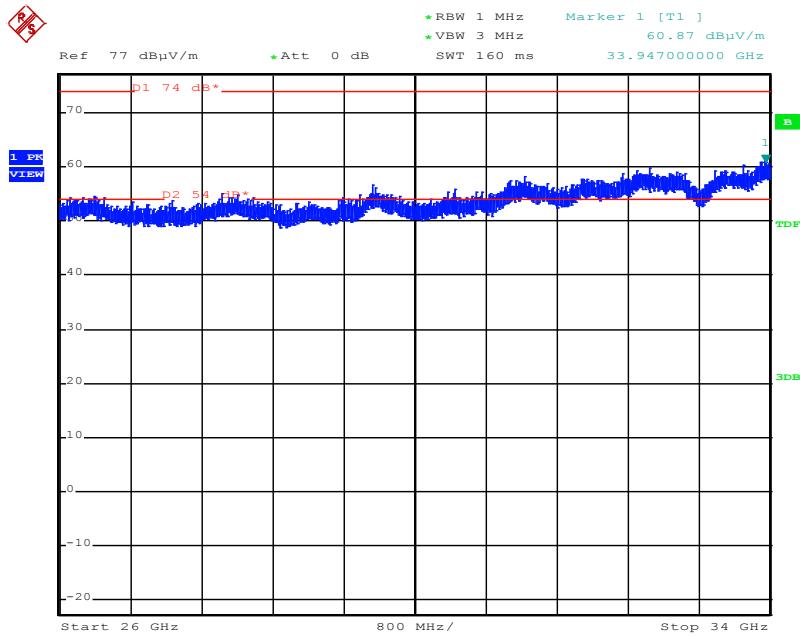
18 GHz – 26 GHz



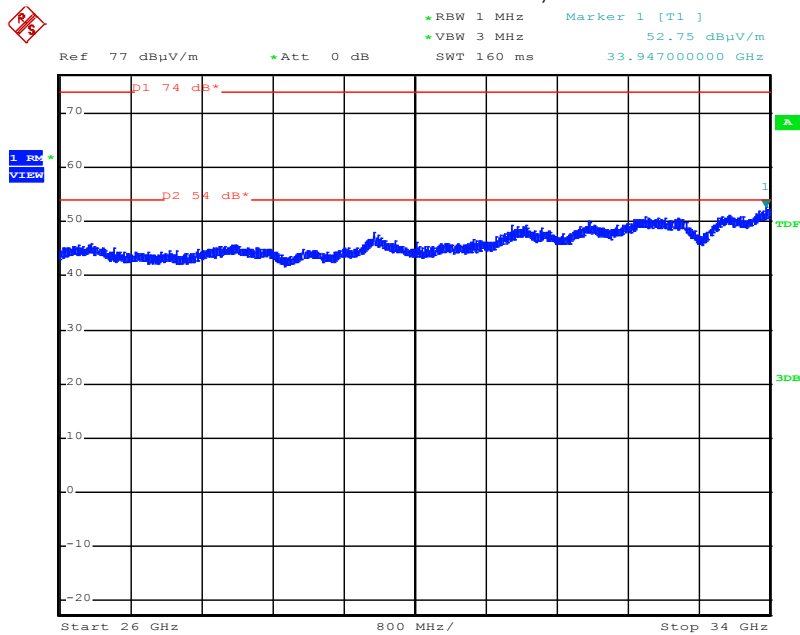
18 GHz – 26 GHz, AV



26 GHz – 34 GHz

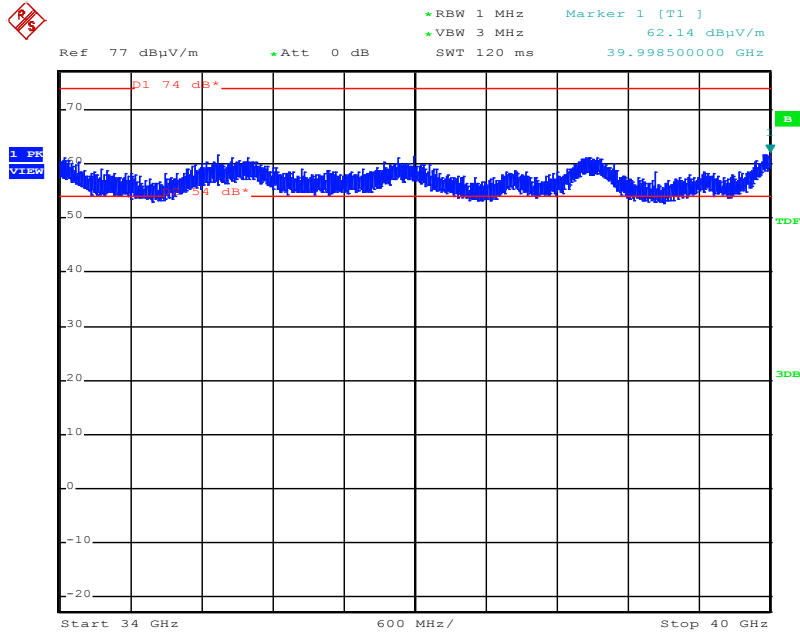


26 GHz – 34 GHz, AV

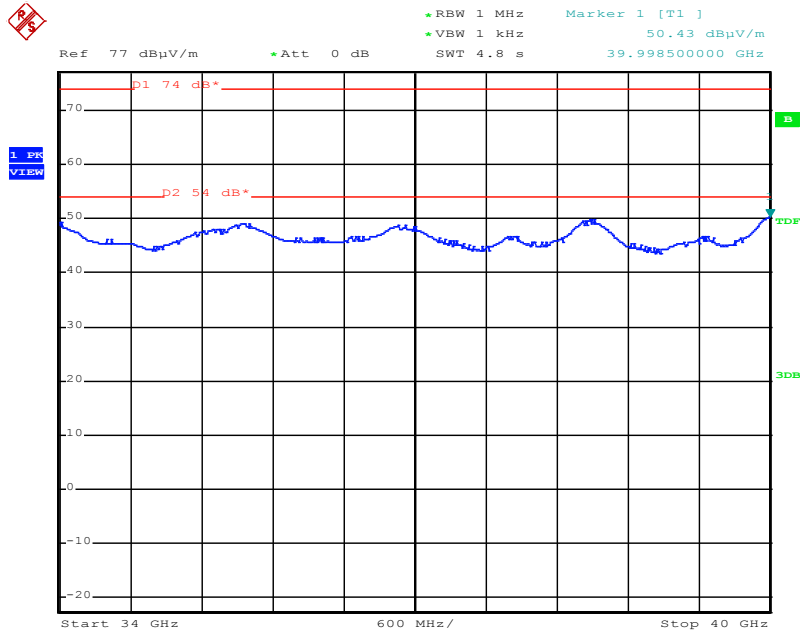


FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1

34 GHz – 40 GHz

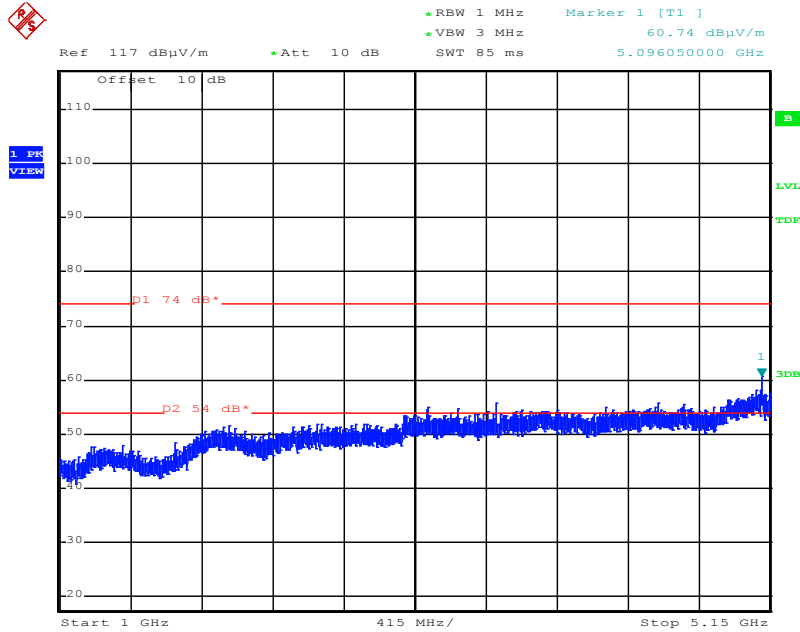


34 GHz – 40 GHz, AV

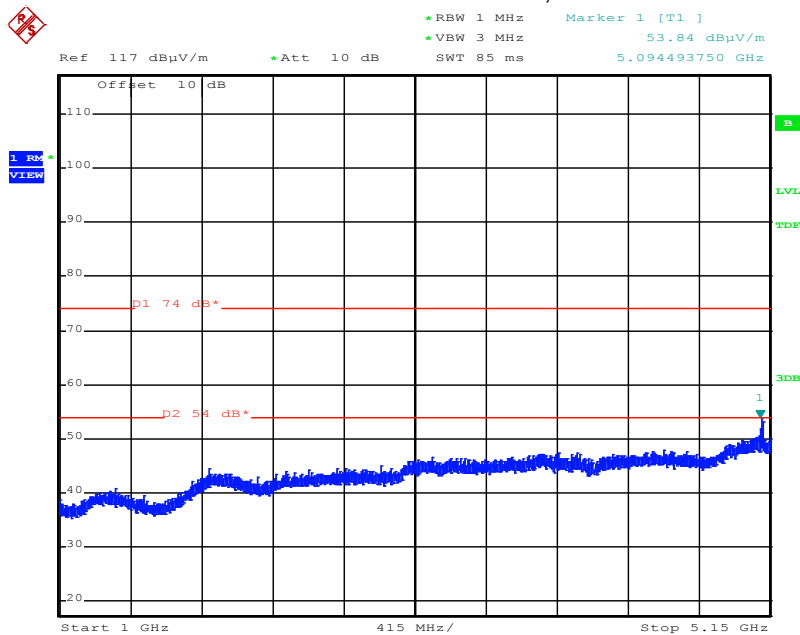


802.11n, HT20, Channel 36 (5180 MHz)

1 GHz – 5.15 GHz

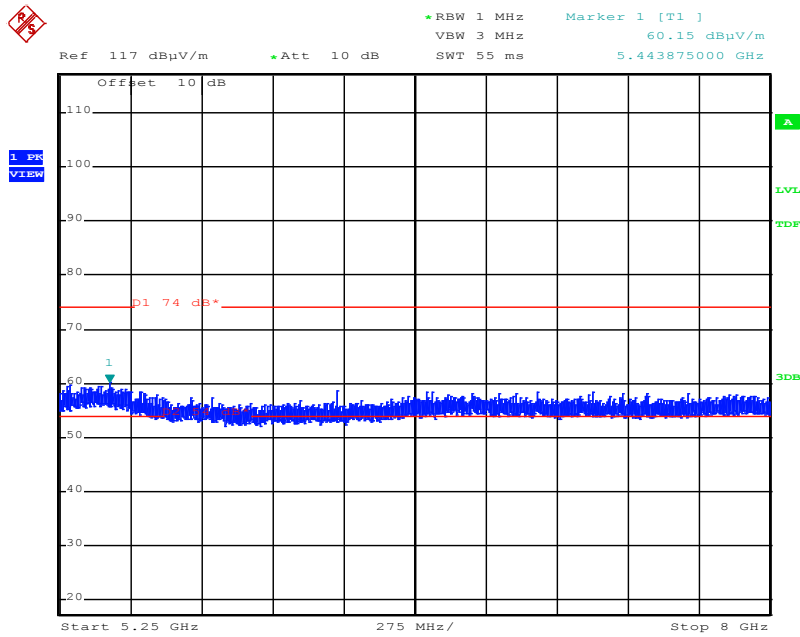


1 GHz – 5.15 GHz, AV

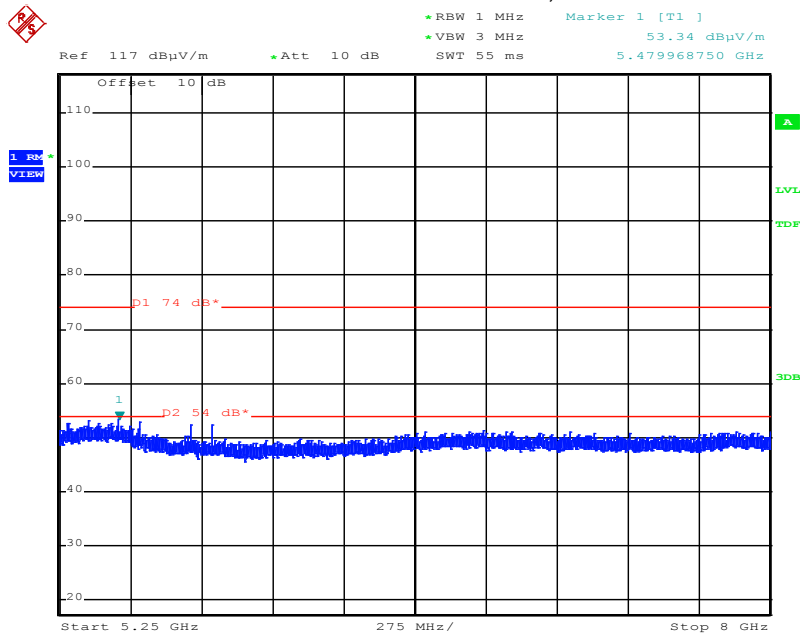




5.25 GHz – 8 GHz

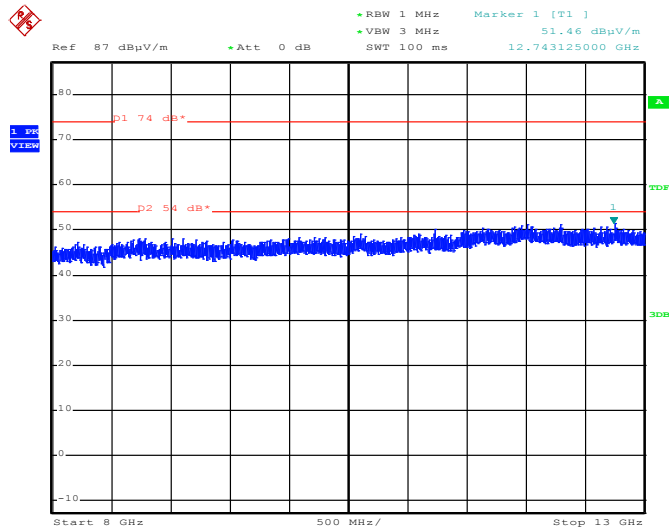


5.25 GHz – 8 GHz;AV

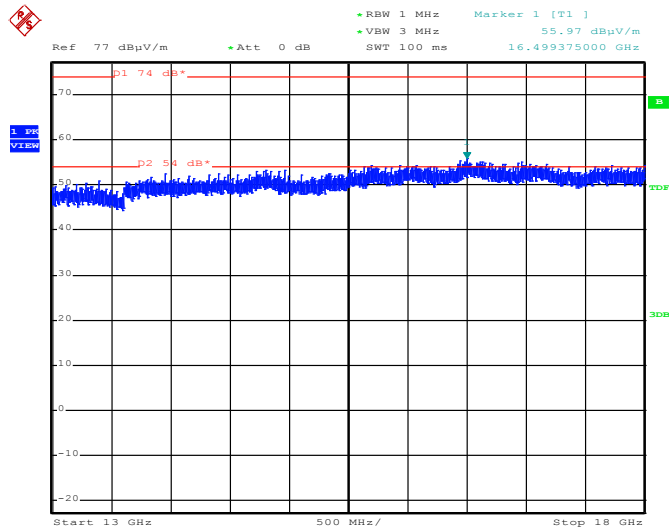


FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1

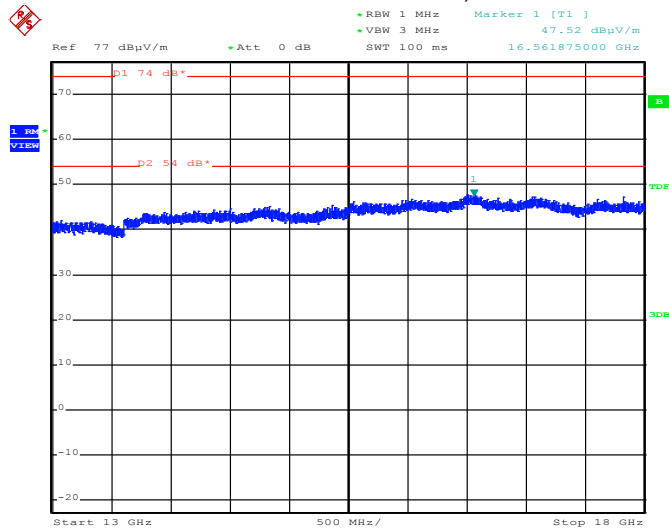
8 GHz – 13 GHz



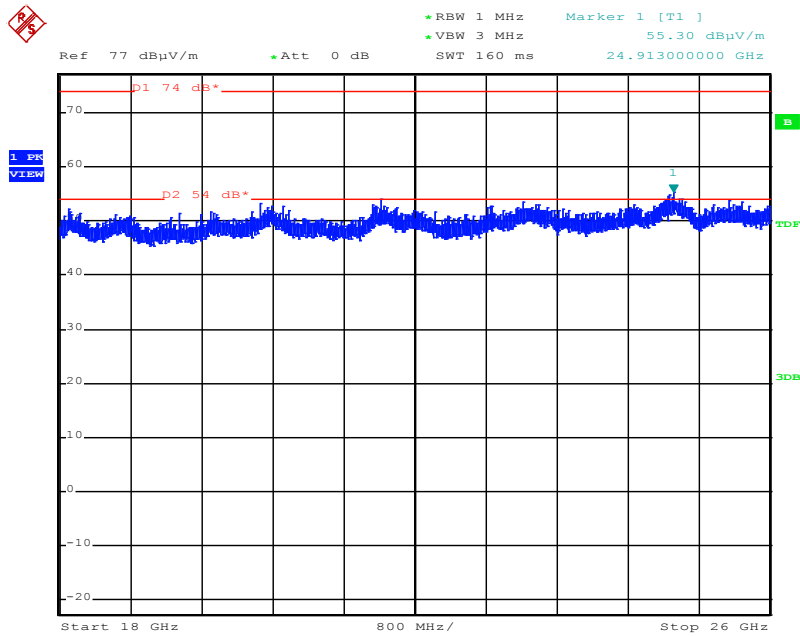
13 GHz - 18 GHz



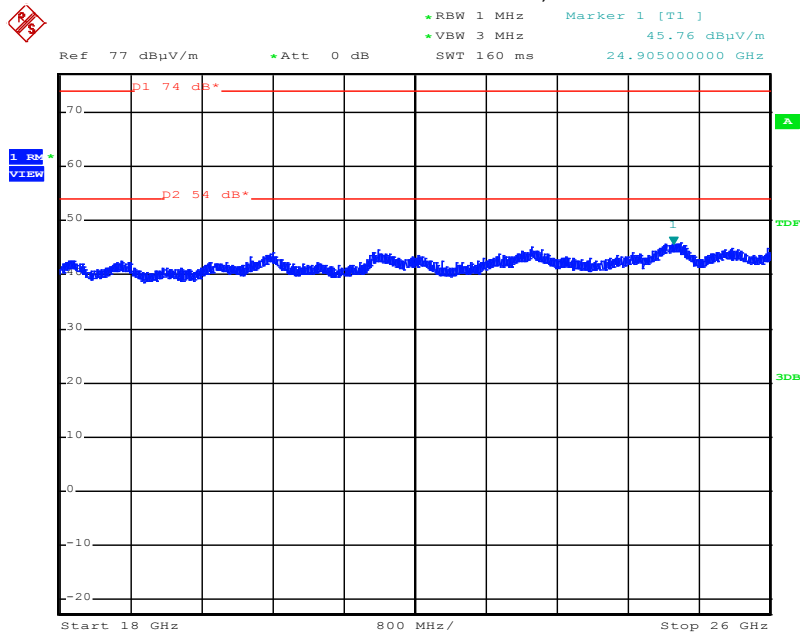
13 GHz - 18 GHz, AV



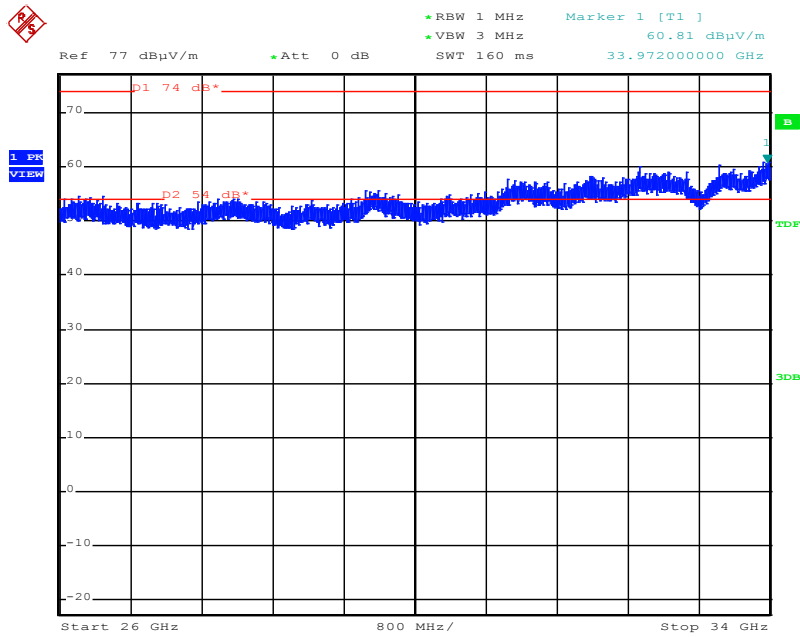
18 GHz – 26 GHz



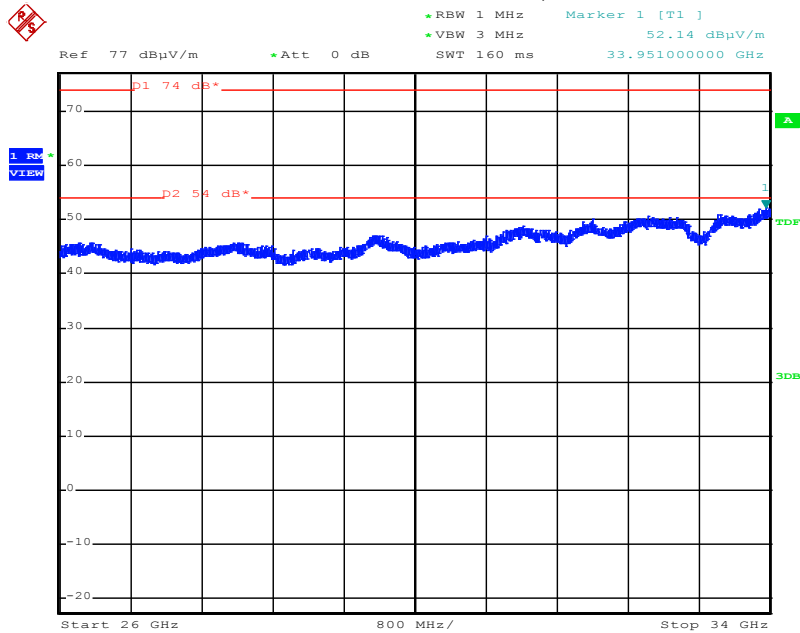
18 GHz – 26 GHz, AV



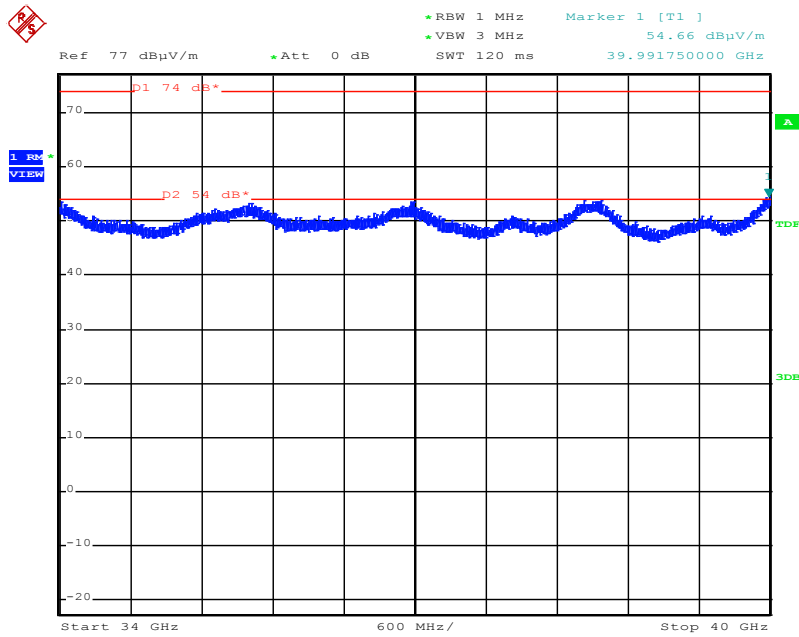
26 GHz – 34 GHz



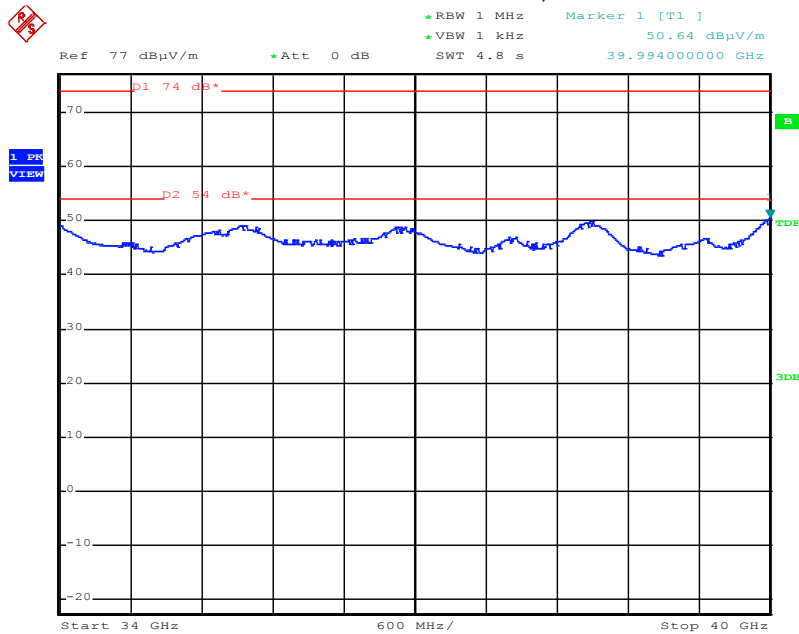
26 GHz – 34 GHz, AV



34 GHz – 40 GHz

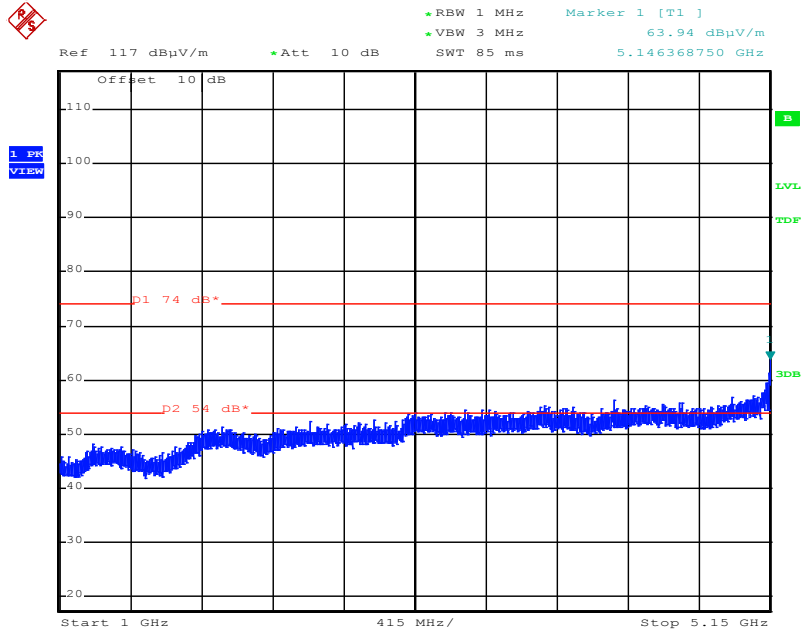


34 GHz – 40 GHz, AV

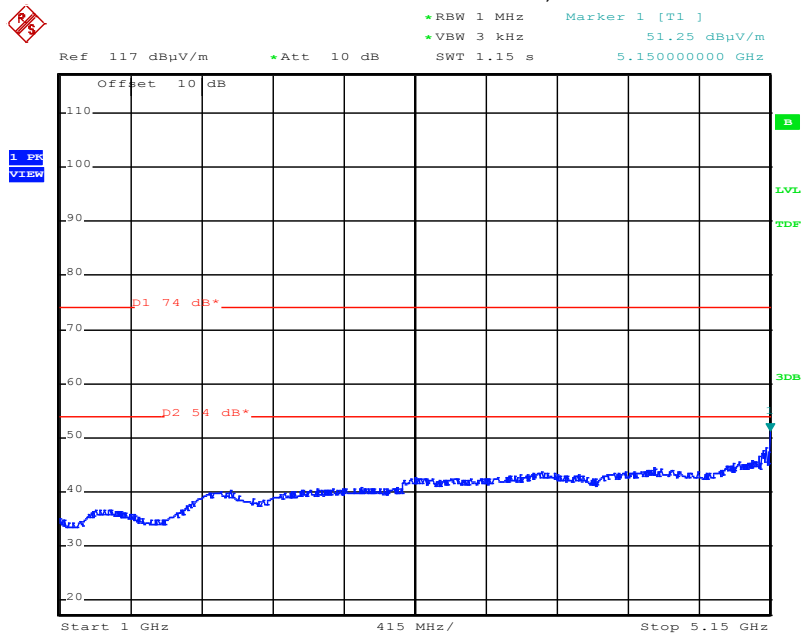


HT40, Channel 36up (5190 MHz)

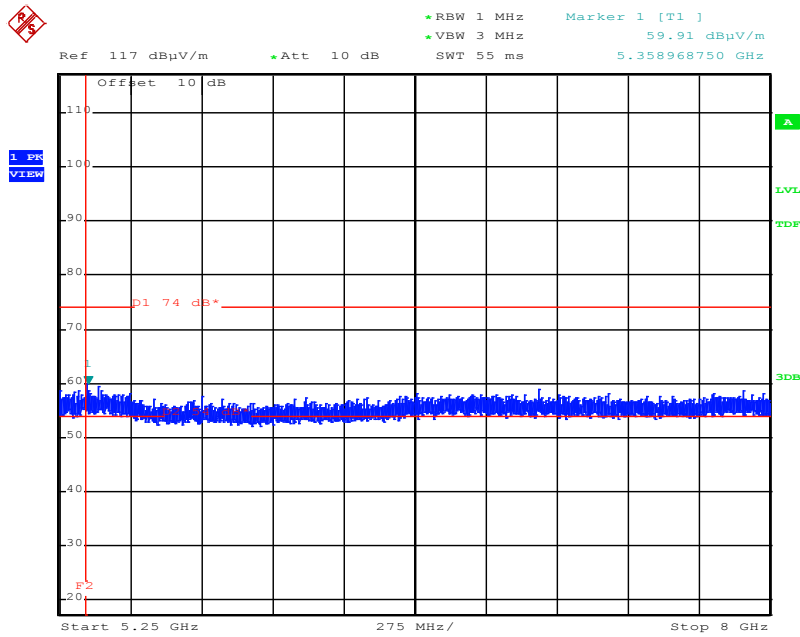
1 GHz – 5.15 GHz



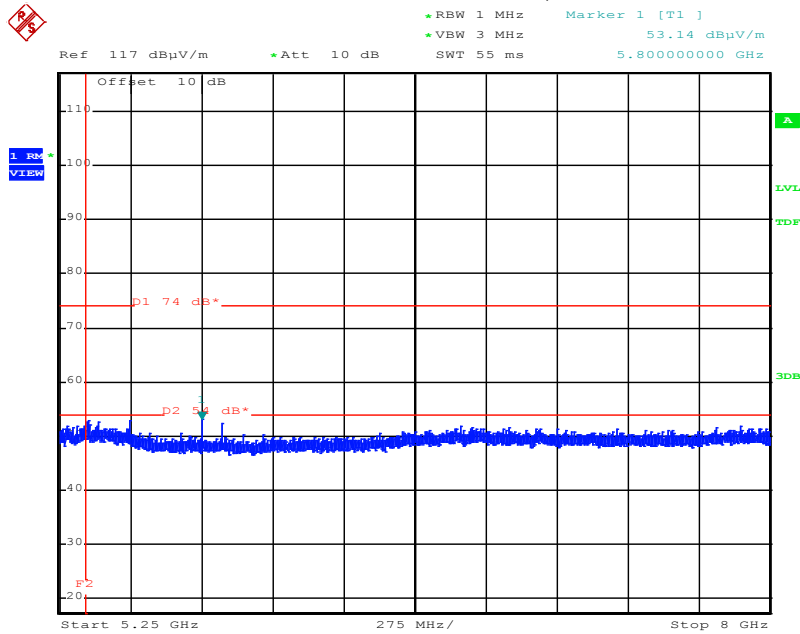
1 GHz – 5.15 GHz, AV



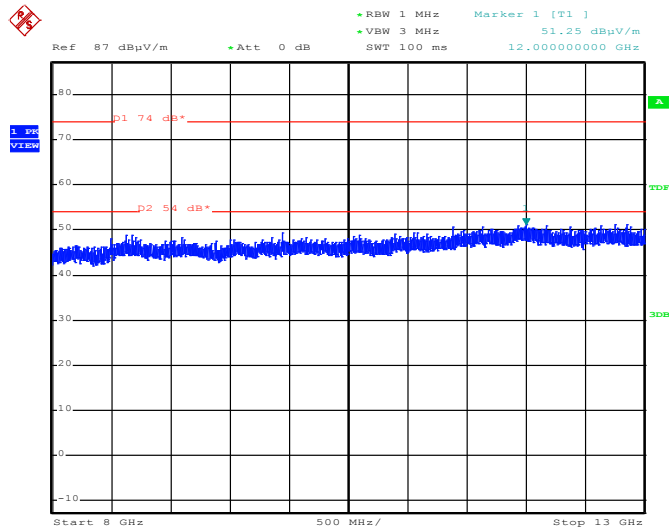
5.25 GHz – 8 GHz



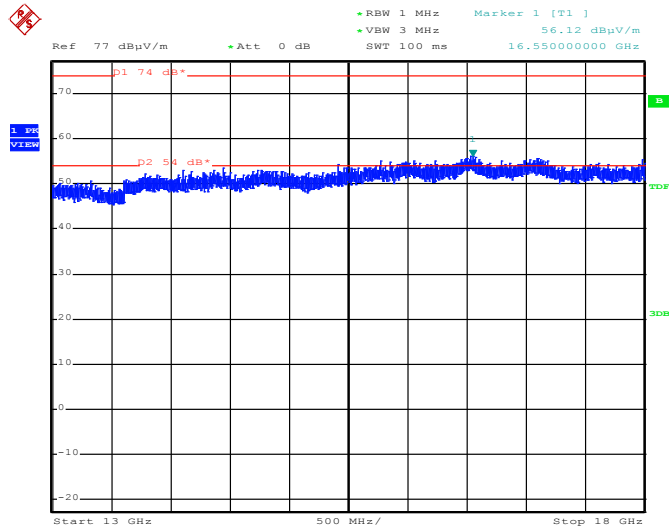
5.25 GHz – 8 GHz, AV



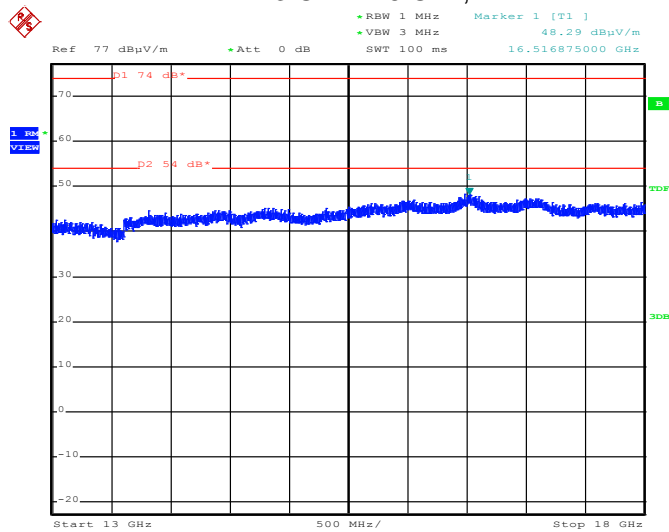
8 GHz – 13 GHz



13 GHz - 18 GHz

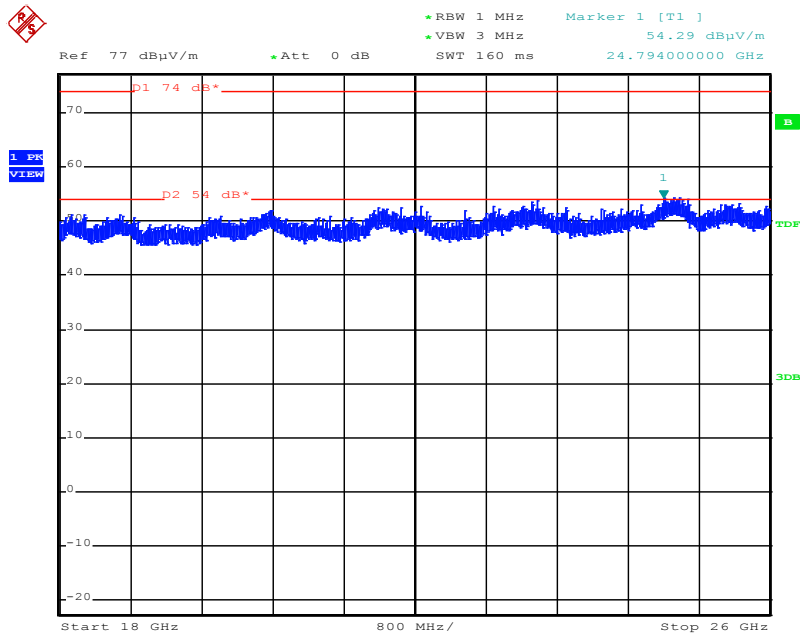


13 GHz - 18 GHz, AV

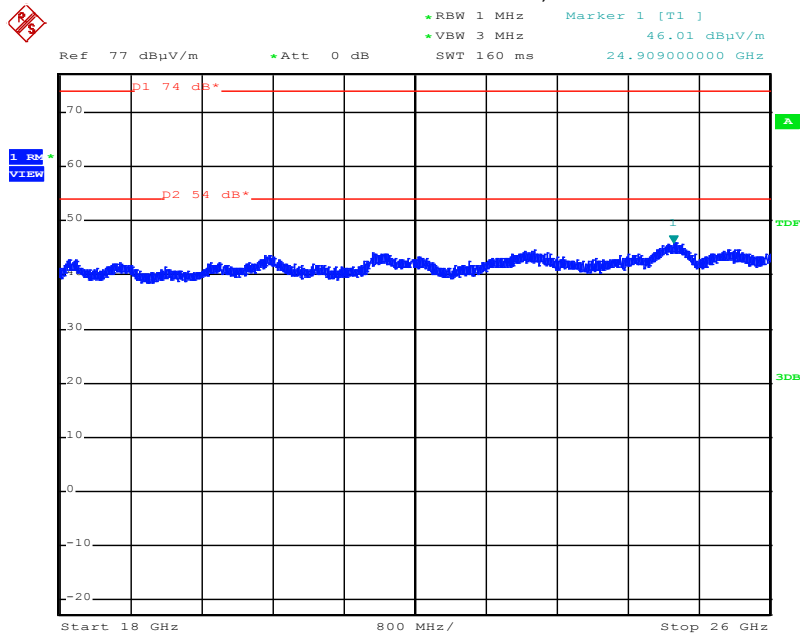




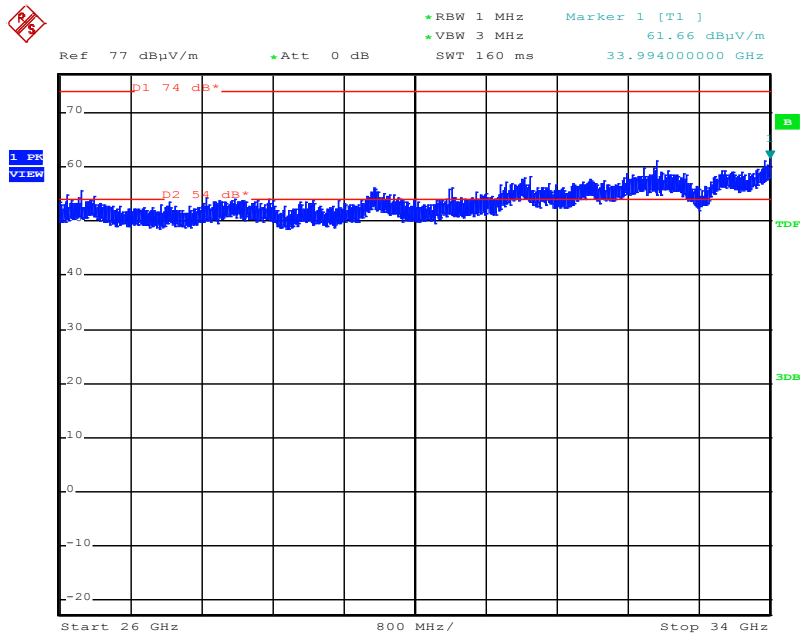
18 GHz – 26 GHz



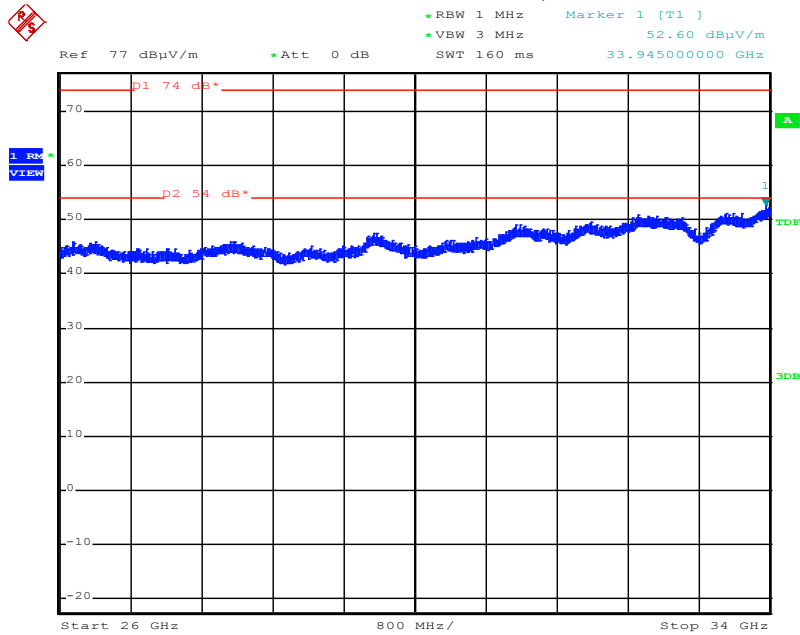
18 GHz – 26 GHz, AV



26 GHz – 34 GHz

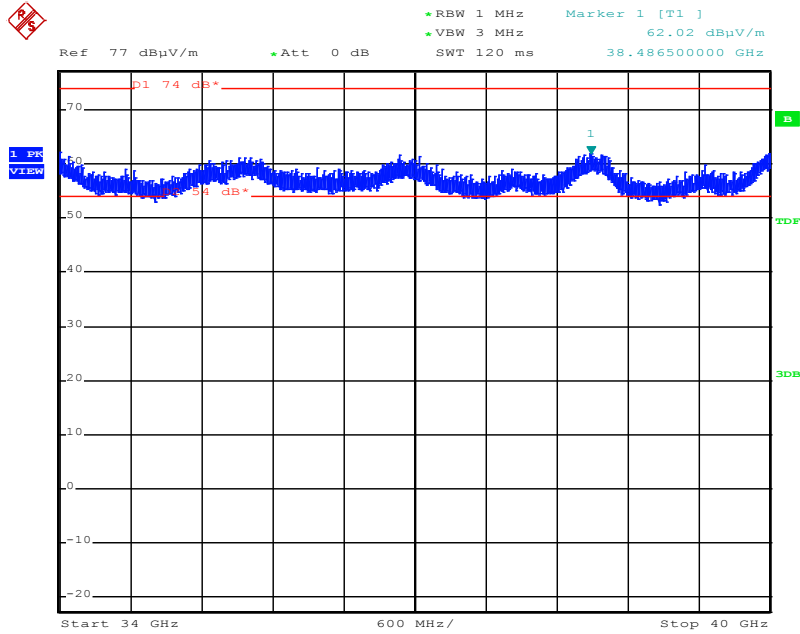


26 GHz – 34 GHz, AV

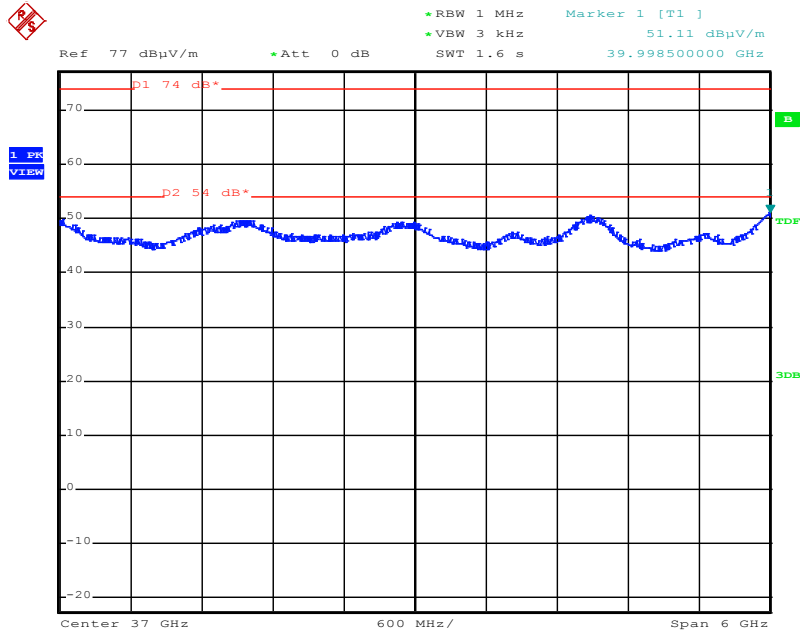


FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1

34 GHz – 40 GHz



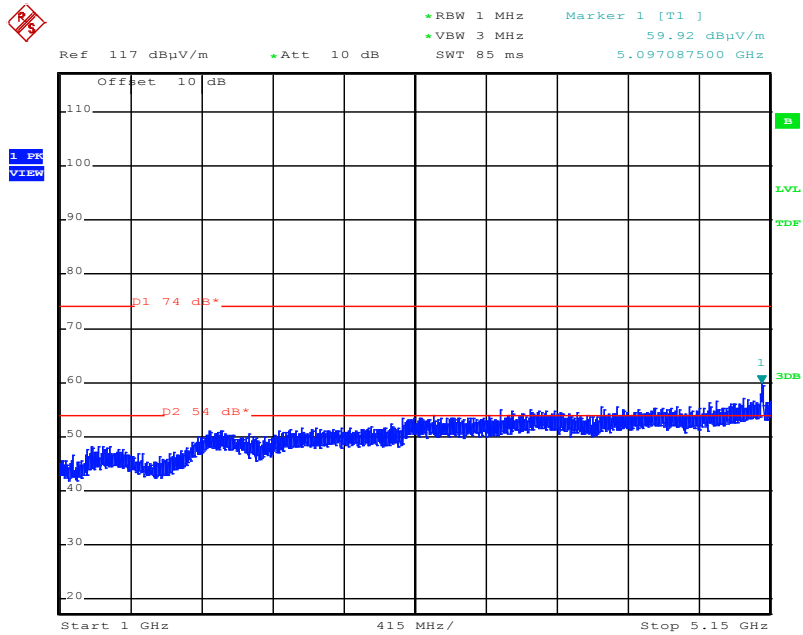
34 GHz – 40 GHz, AV



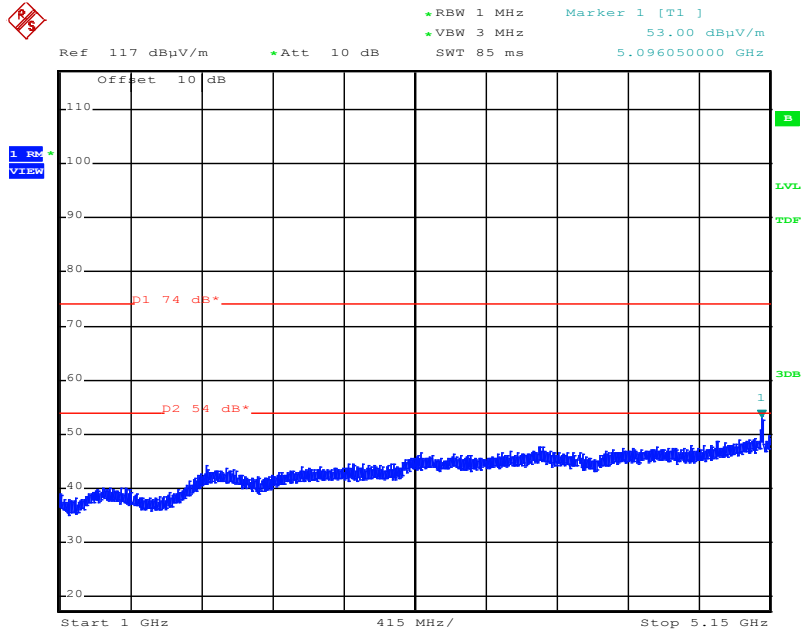
5.6.7.3 Gain group 3 (14 dBi)

802.11a, Channel 36 (5180 MHz)

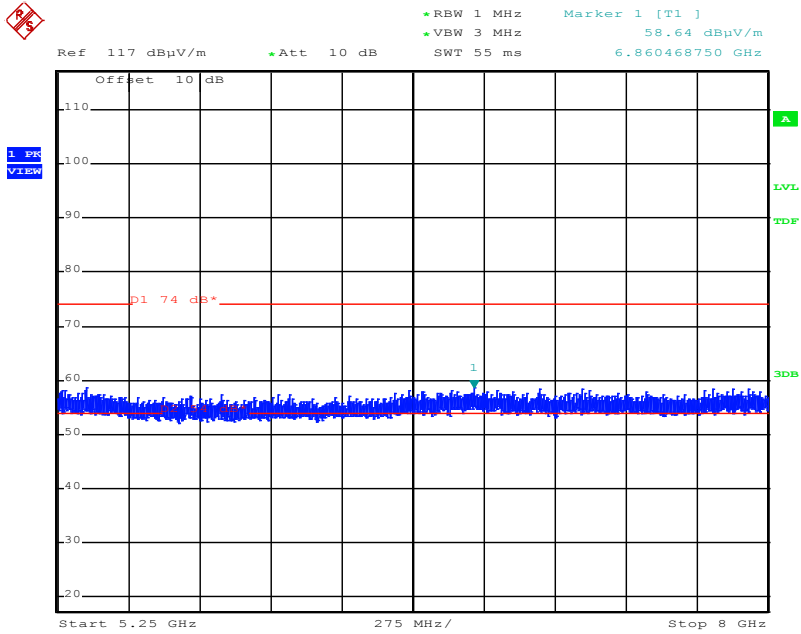
1 GHz – 5.15 GHz



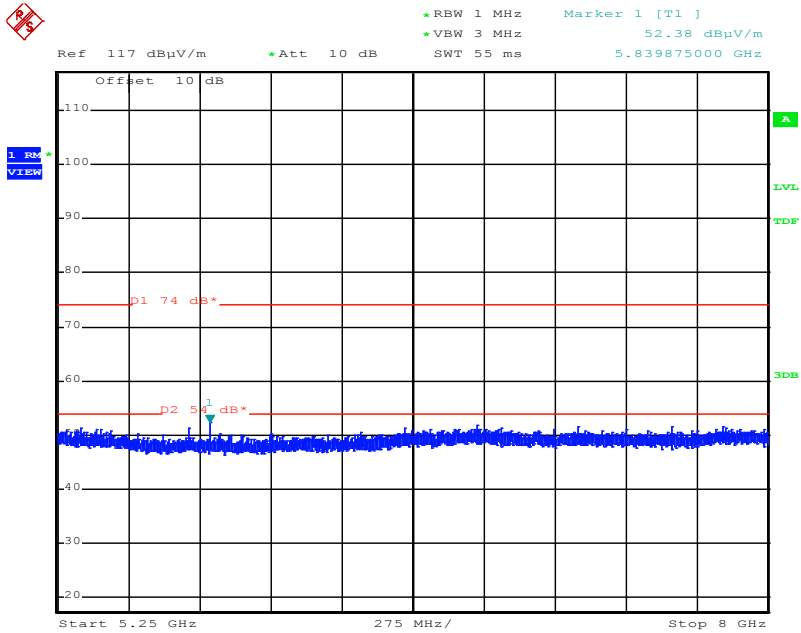
1 GHz – 5.15 GHz, AV



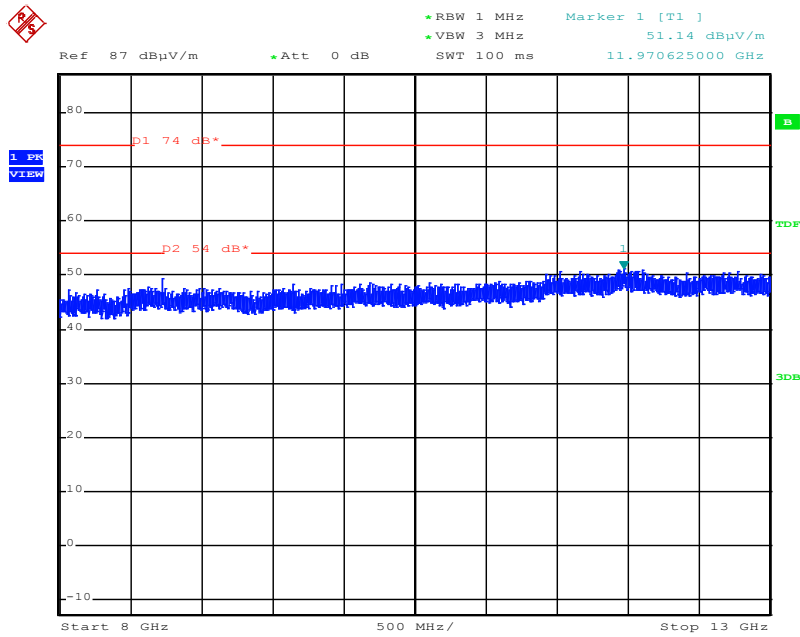
5.25 GHz – 8 GHz



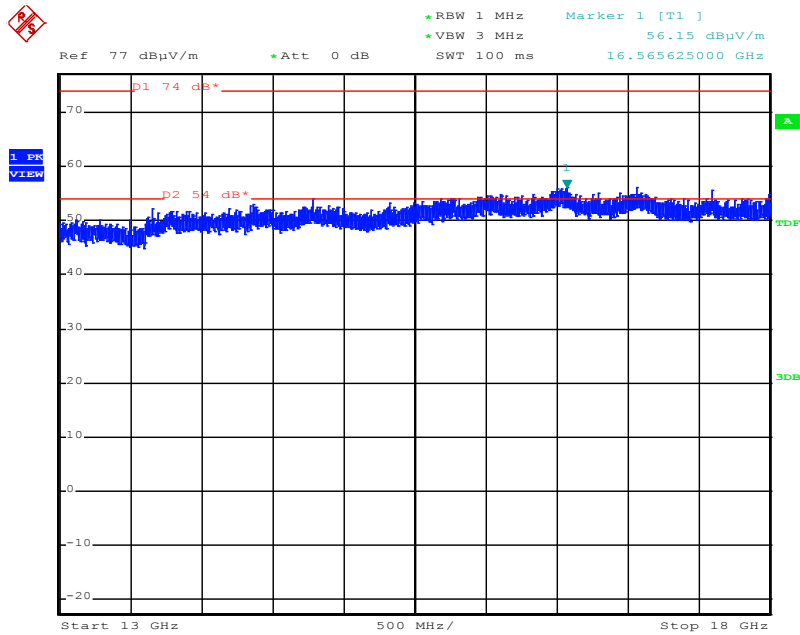
5.25 GHz – 8 GHz;AV



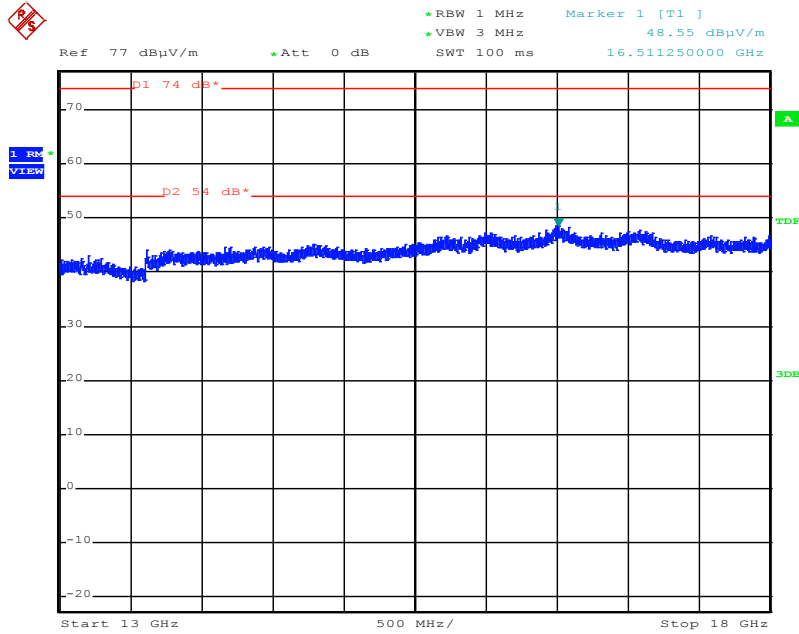
8 GHz – 13 GHz



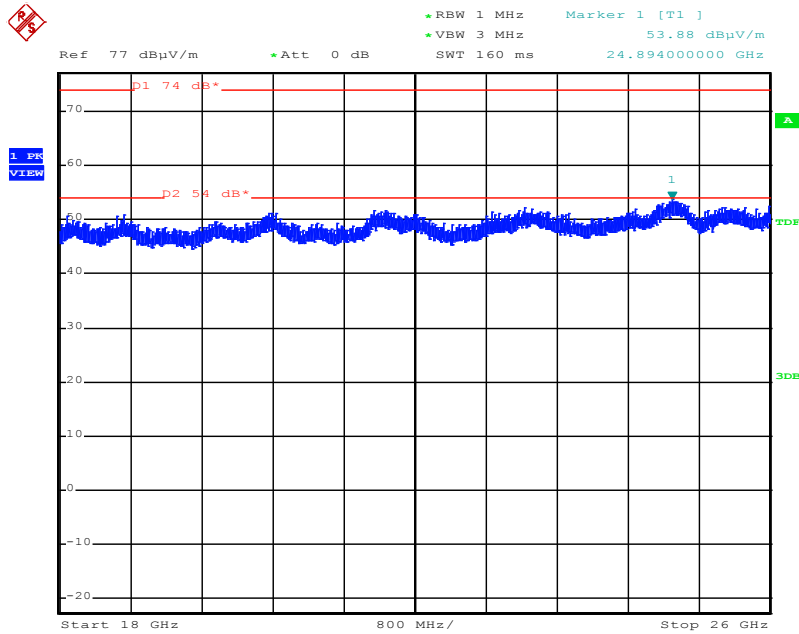
13 GHz - 18 GHz



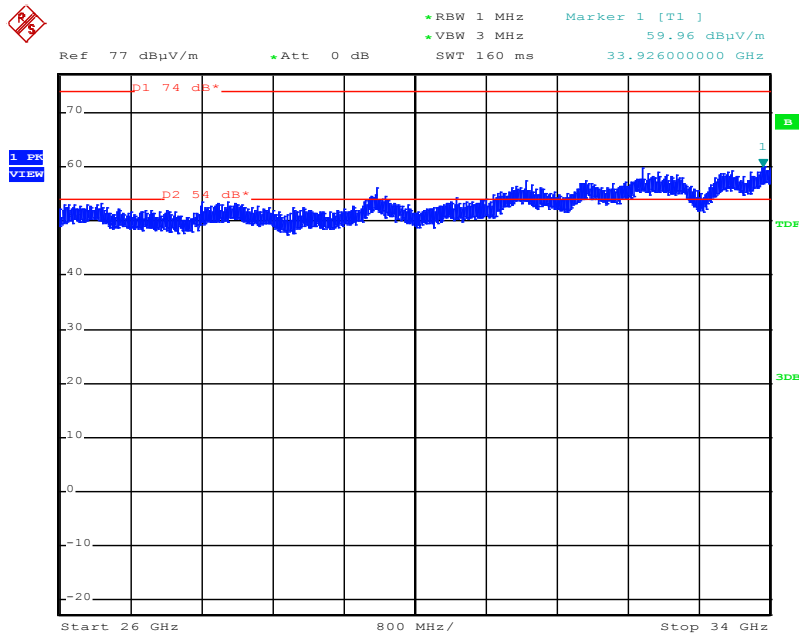
13 GHz - 18 GHz, AV



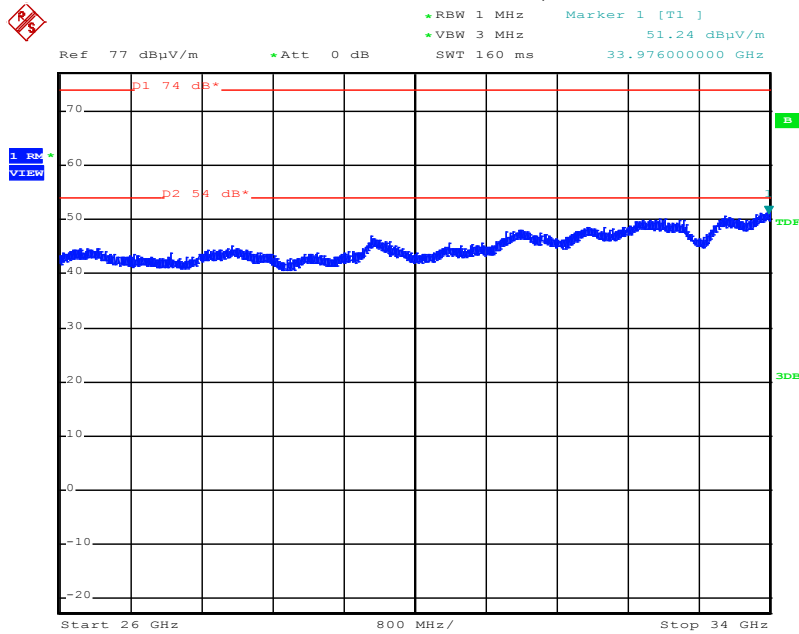
18 GHz - 26 GHz



26 GHz – 34 GHz

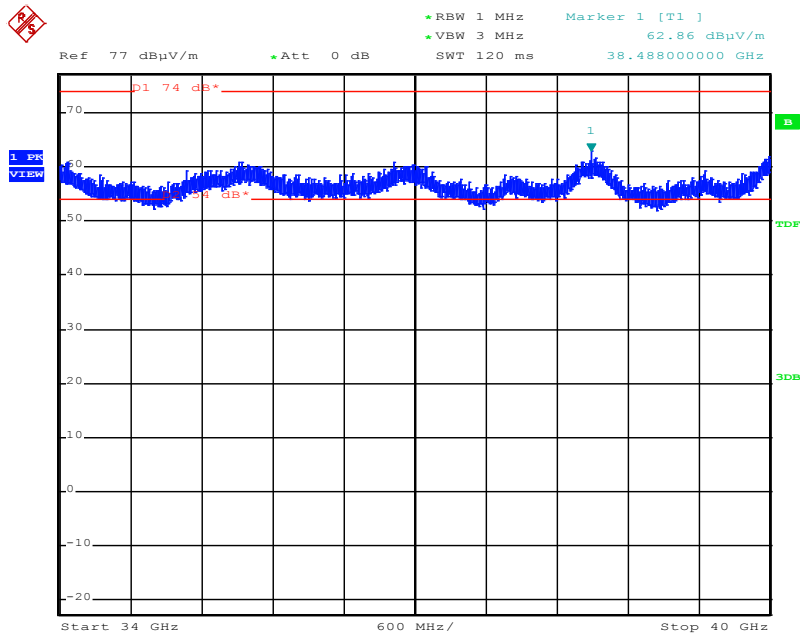


26 GHz – 34 GHz; AV

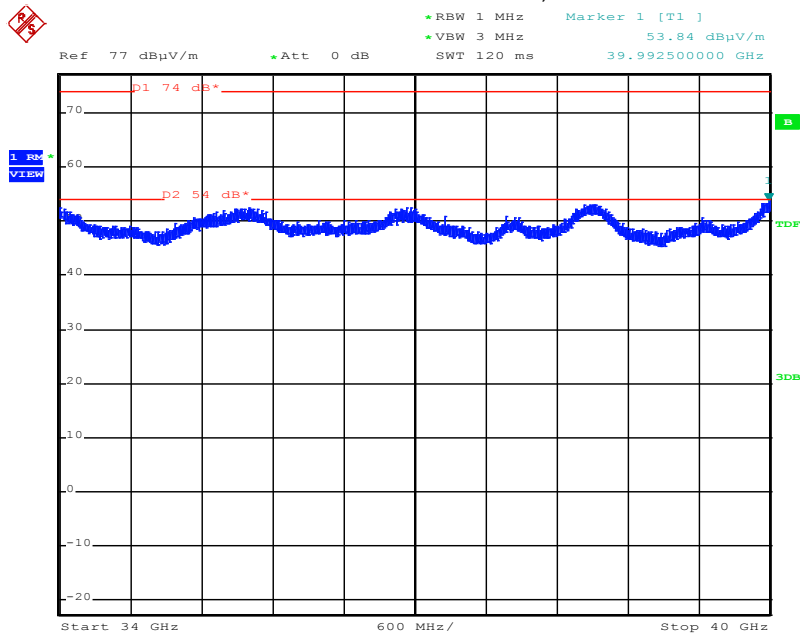




34 GHz – 40 GHz

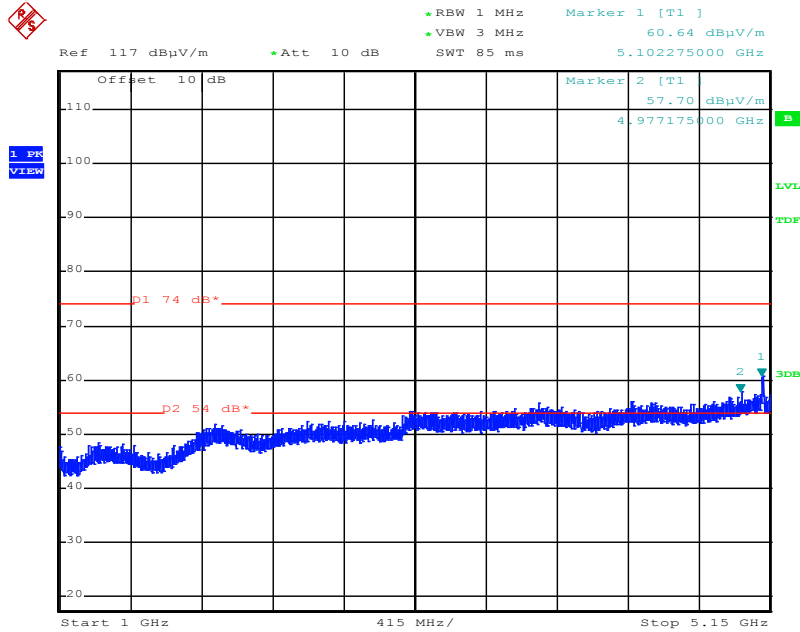


34 GHz – 40 GHz, AV

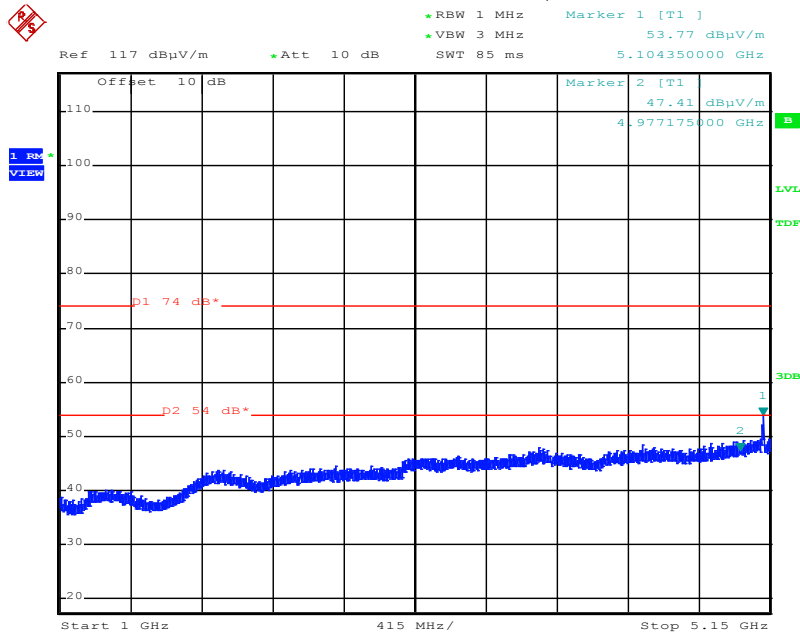


802.11n, HT20, Channel 36 (5180 MHz)

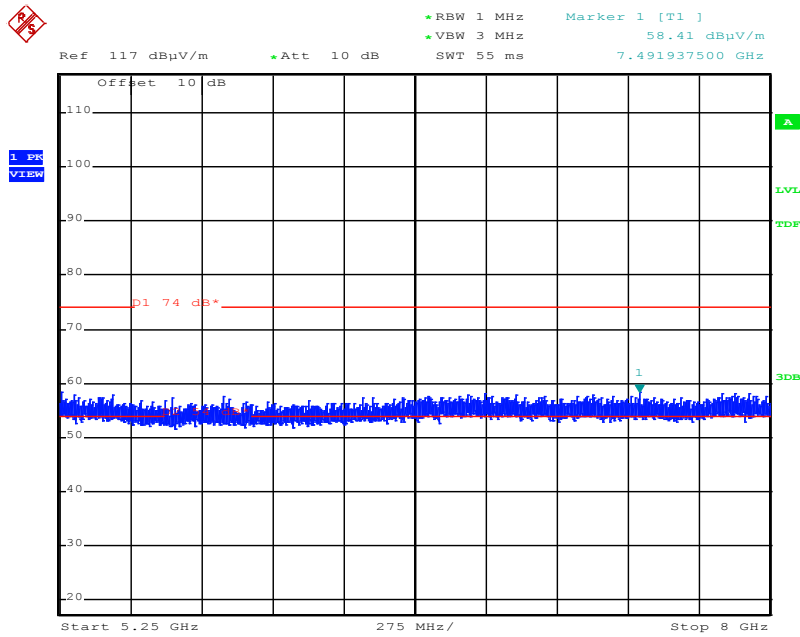
1 GHz – 5.15 GHz



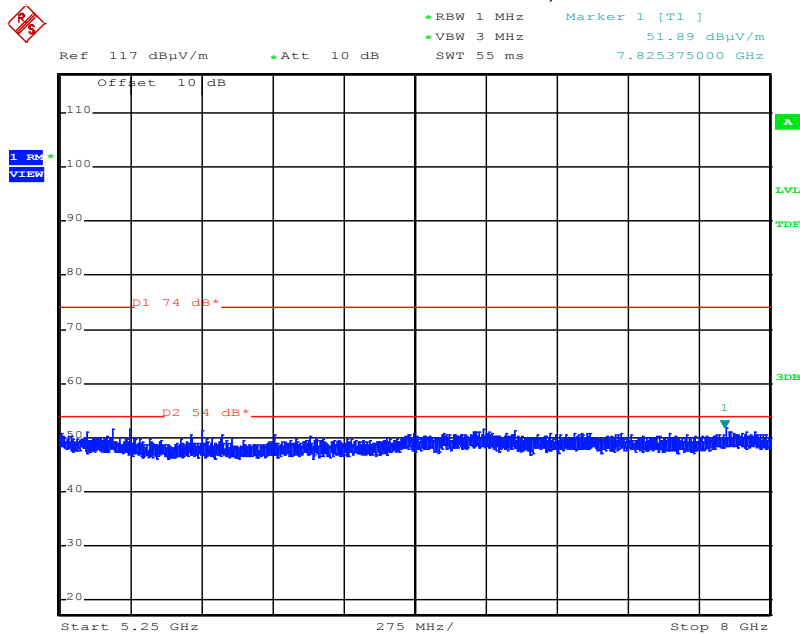
1 GHz – 5.15 GHz, AV



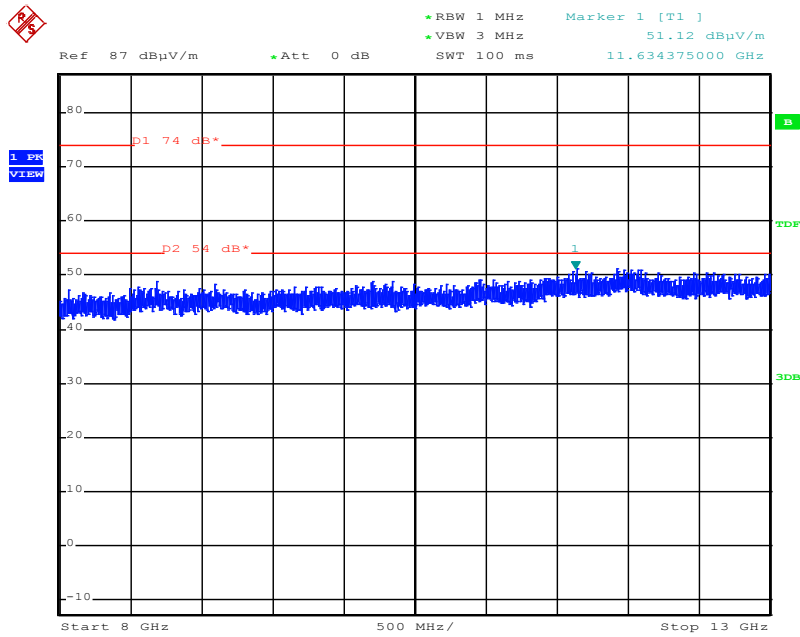
5.25 GHz – 8 GHz



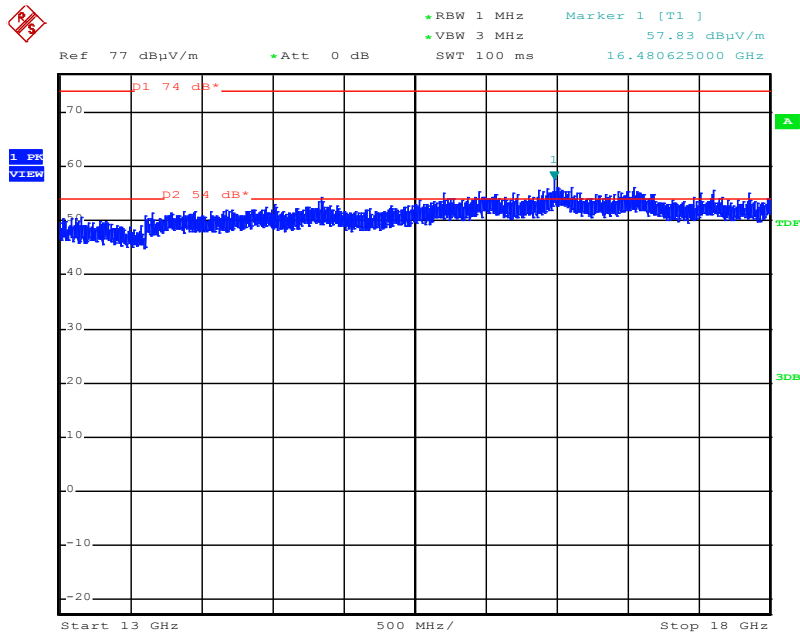
5.25 GHz – 8 GHz;AV



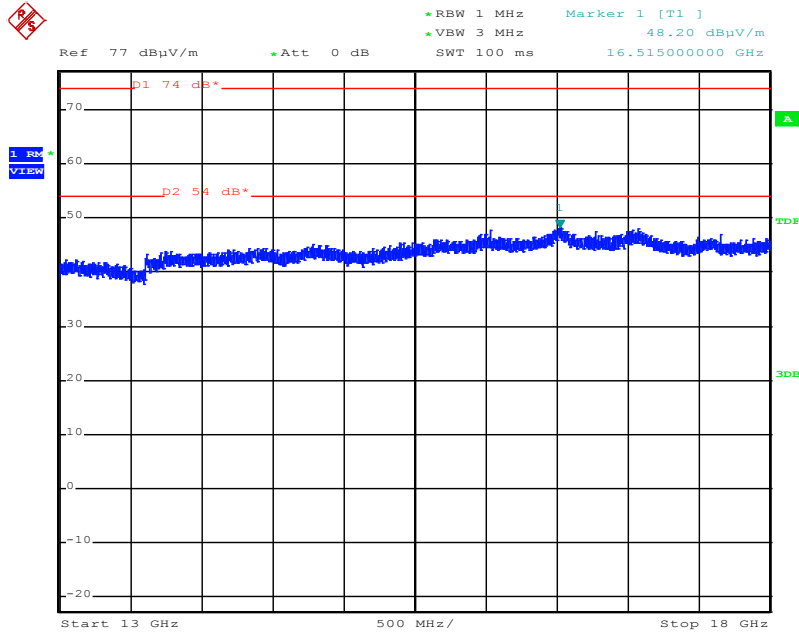
8 GHz – 13 GHz



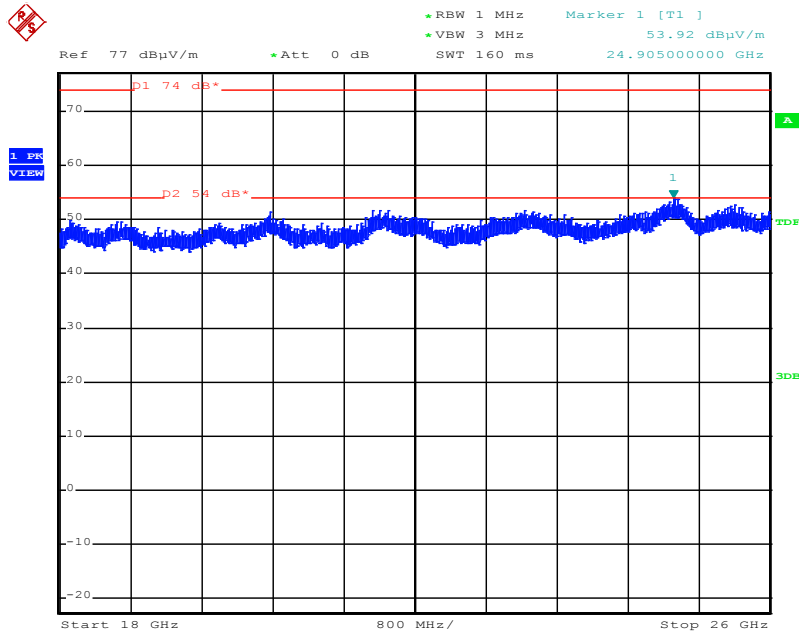
13 GHz - 18 GHz



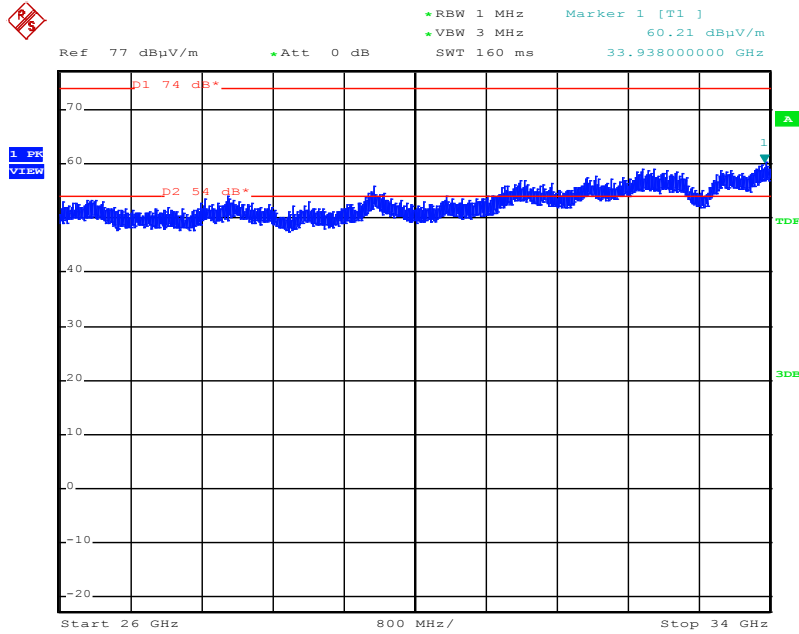
13 GHz - 18 GHz, AV



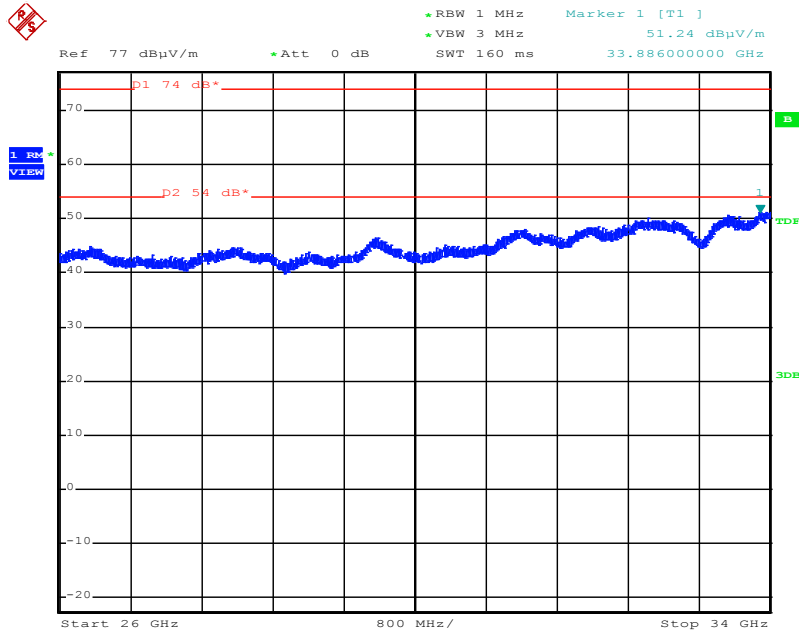
18 GHz - 26 GHz



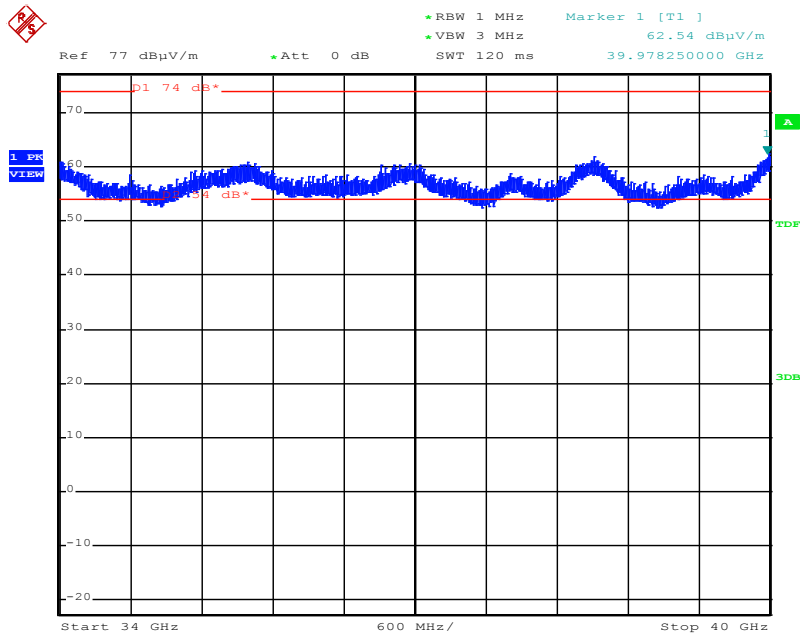
26 GHz – 34 GHz



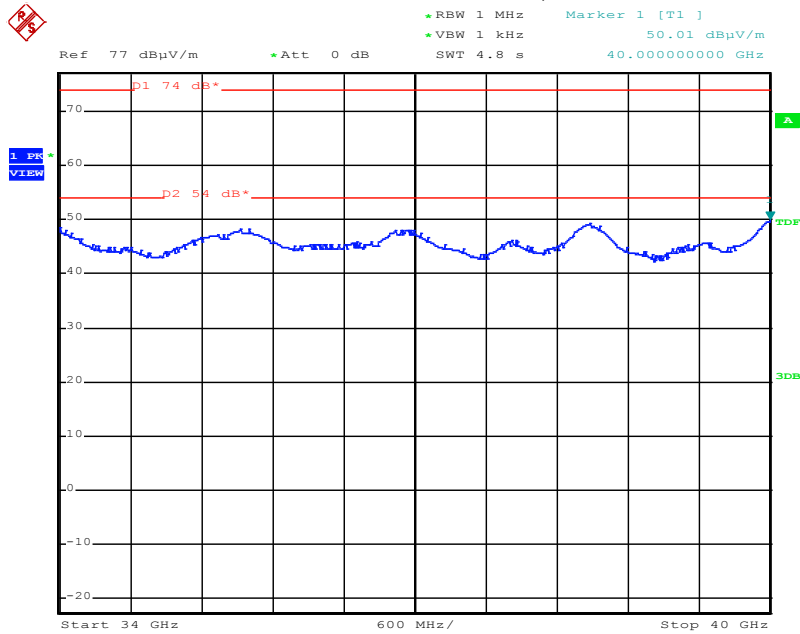
26 GHz – 34 GHz, AV



34 GHz – 40 GHz

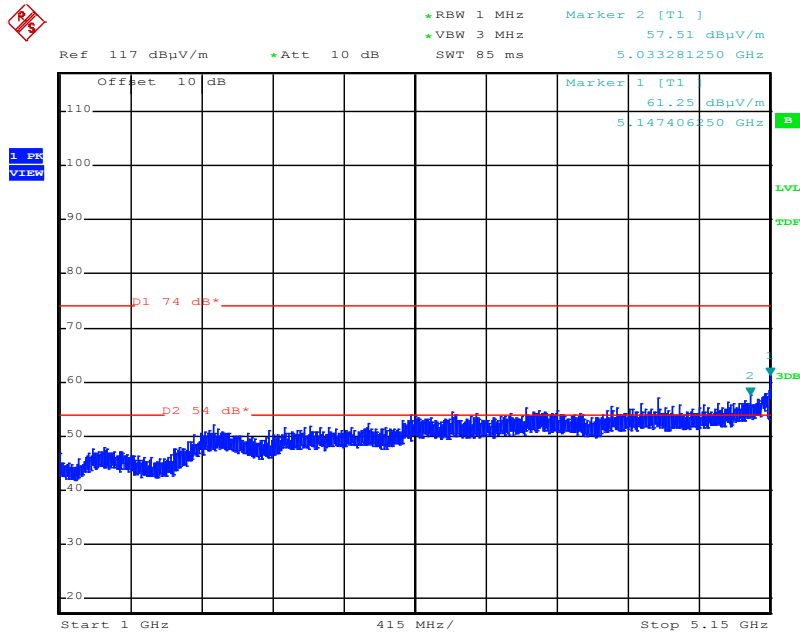


34 GHz – 40 GHz, AV

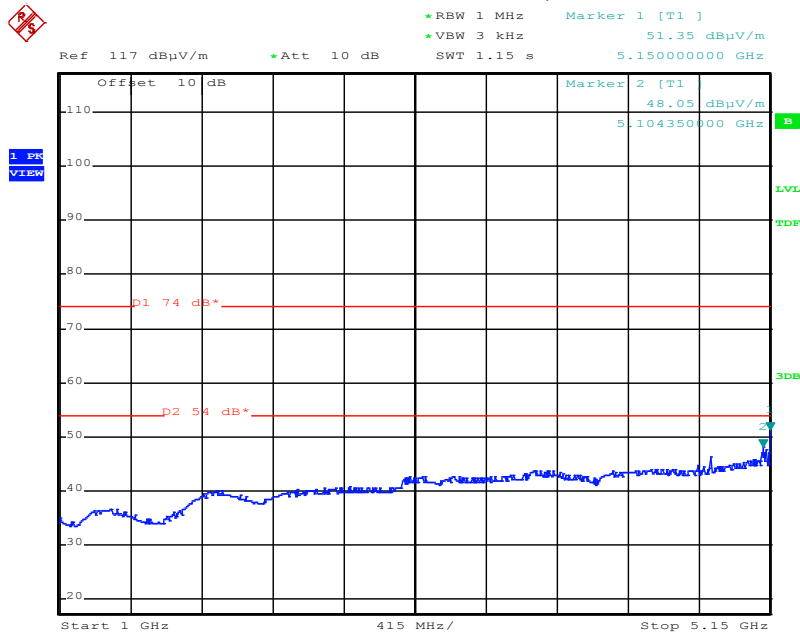


HT40, Channel 36up (5190 MHz)

1 GHz – 5.15 GHz

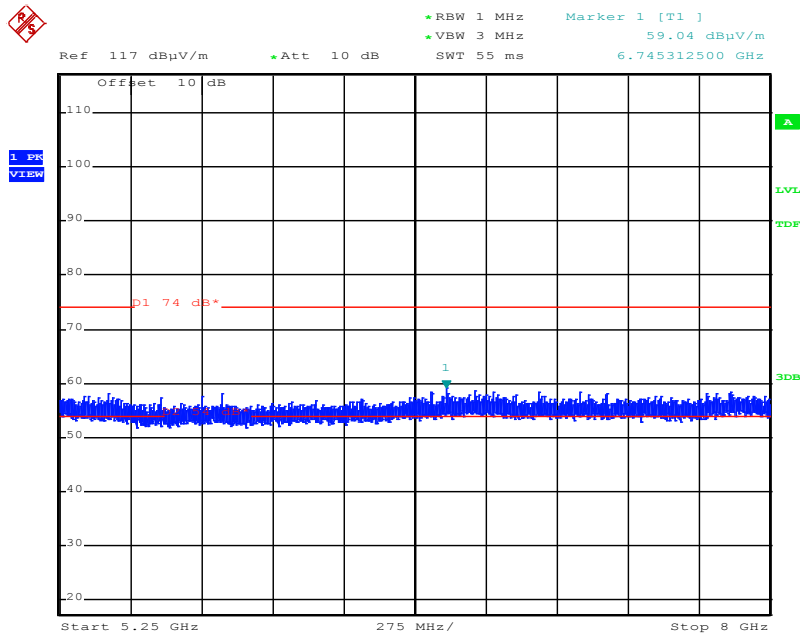


1 GHz – 5.15 GHz, AV

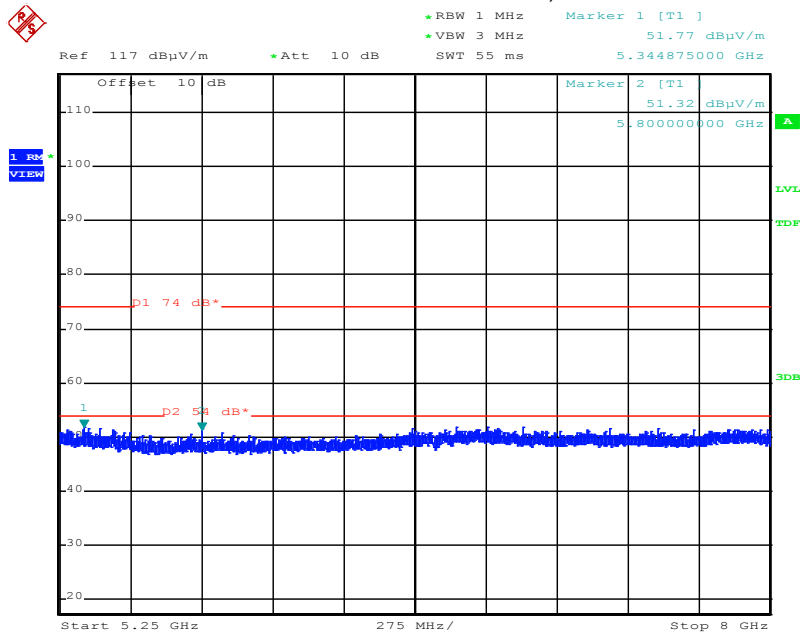




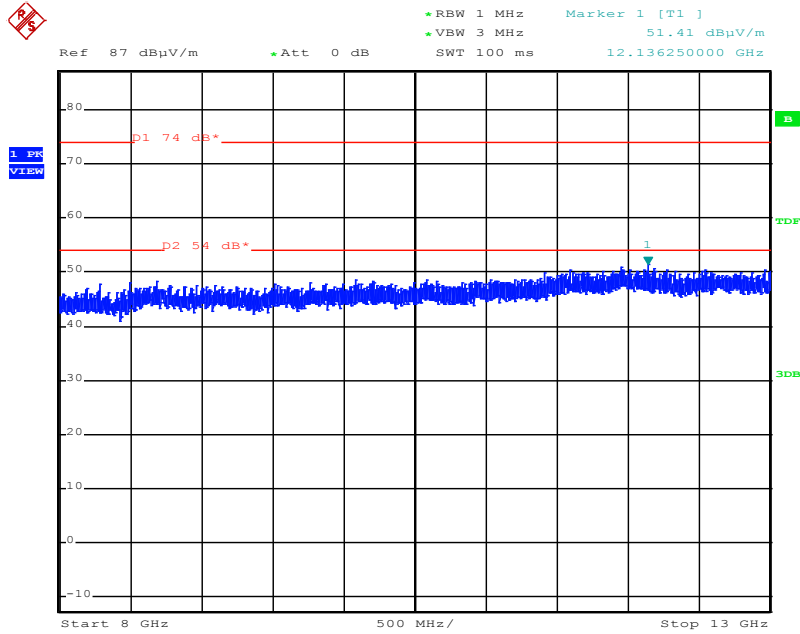
5.25 GHz – 8 GHz



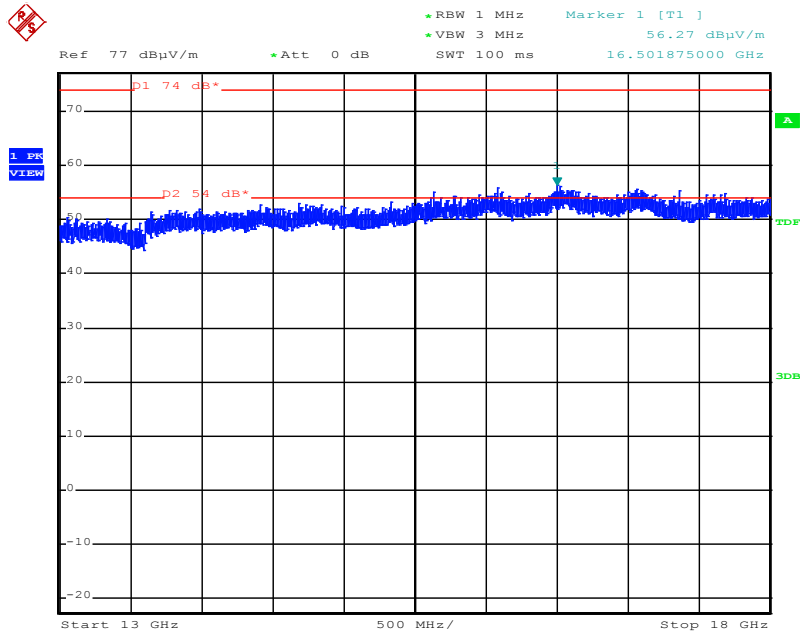
5.25 GHz – 8 GHz;AV



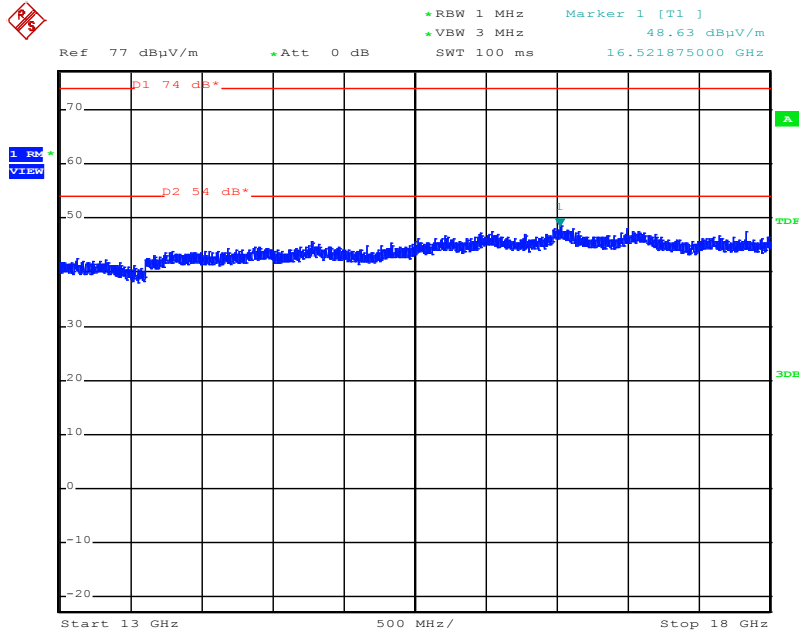
8 GHz – 13 GHz



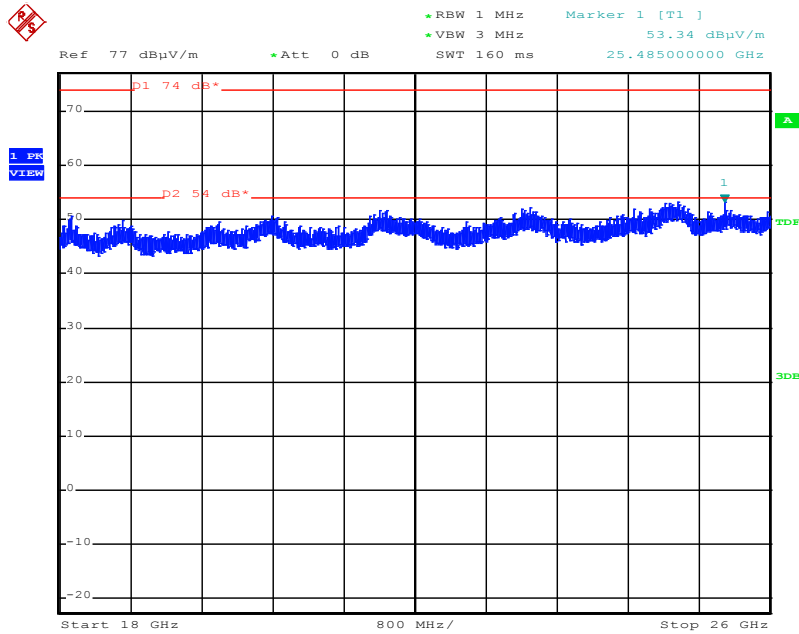
13 GHz - 18 GHz



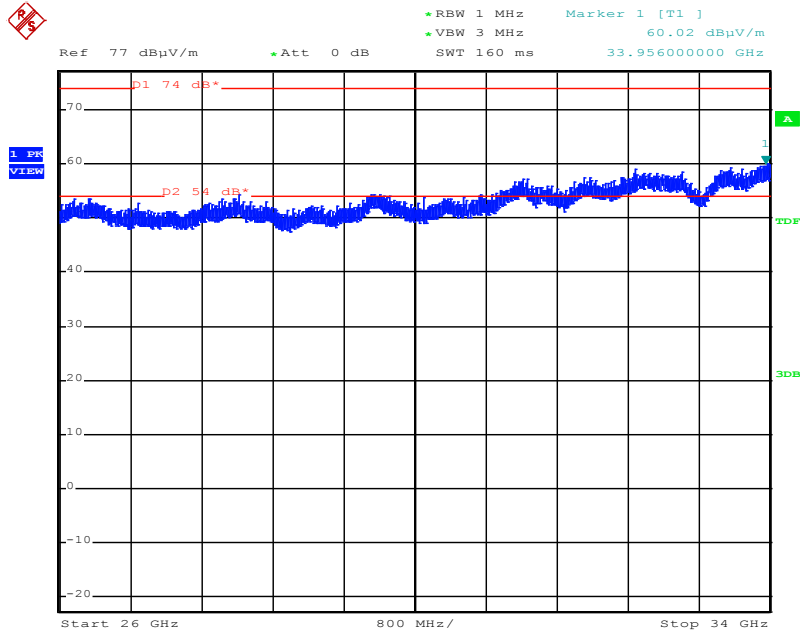
13 GHz - 18 GHz, AV



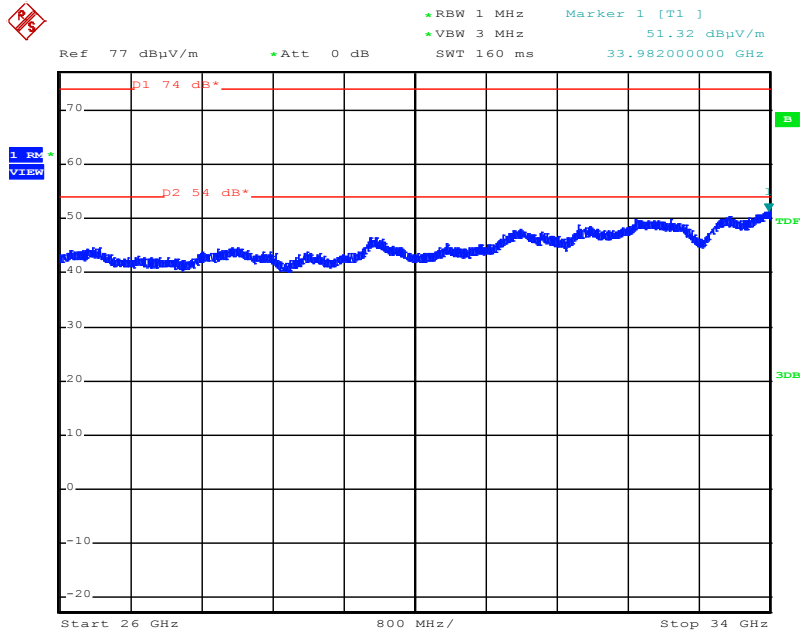
18 GHz - 26 GHz



26 GHz – 34 GHz

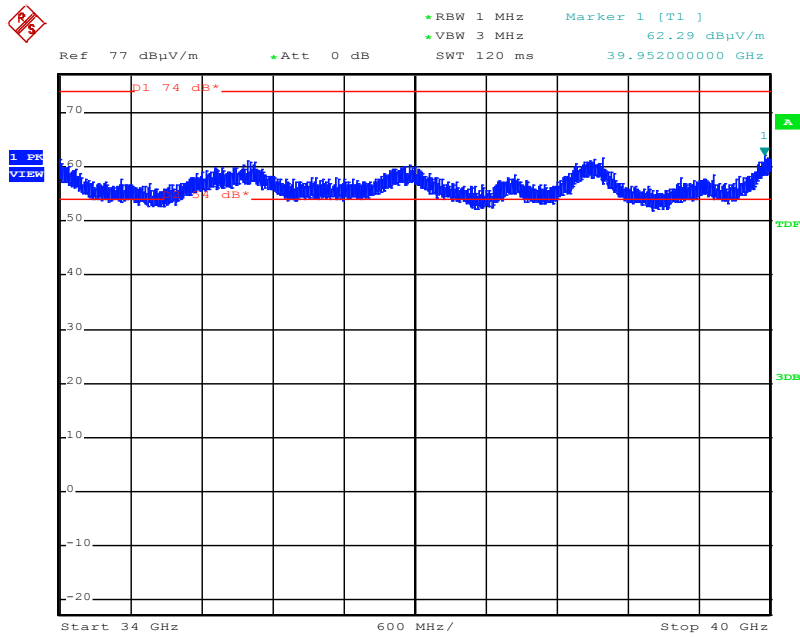


26 GHz – 34 GHz, AV

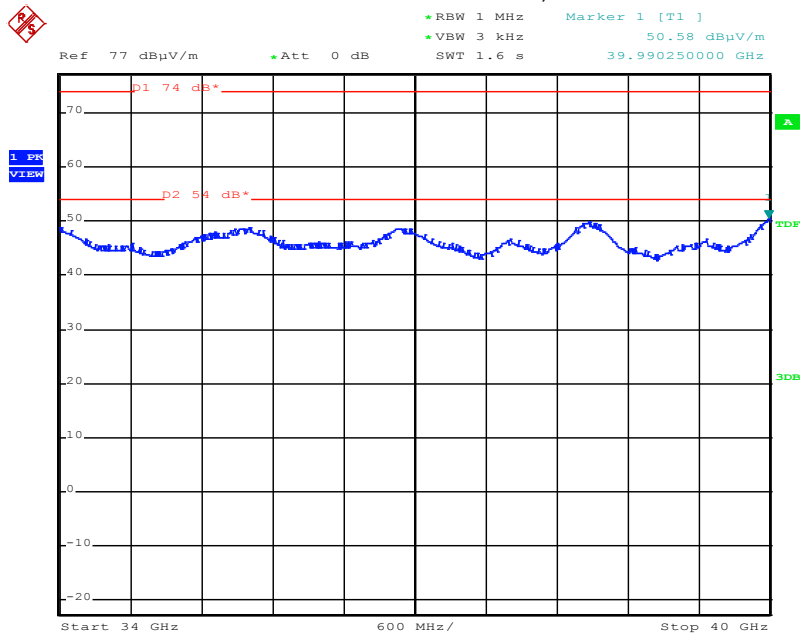


FCC ID: LYHMSN1V1 IC: 267AA-MSN1V1

34 GHz – 40 GHz



34 GHz – 40 GHz, AV



## 5.7 Frequency stability

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

### 5.7.1 Description of the test location

Test location: AREA4

### 5.7.2 Photo documentation of the test setup



### 5.7.3 Applicable standard

According to FCC Part 15, Subpart E, Section 15.407 (g):

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

### 5.7.4 Description of Measurement

This test is performed over variations in temperature and voltage. The lowest and the highest channel in the operating frequency bands are measured at the 20 dB bandwidth under following conditions:

1. Supply voltage from 100 VAC to 120 VAC at normal temperature
2. Extreme temperature from -40 °C to 60 °C at nominal voltage.

**5.7.5 Test result**

Frequency band 5150 – 5250 MHz:  
802.11a, chain1

| Test conditions         |                  | Test result     |          |                |          |
|-------------------------|------------------|-----------------|----------|----------------|----------|
|                         |                  | Frequency (MHz) |          |                |          |
| T (-40°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.762 | f <sub>h</sub> | 5248.342 |
| T (-30°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.751 | f <sub>h</sub> | 5248.362 |
| T (-20°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.740 | f <sub>h</sub> | 5248.378 |
| T (-10°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.733 | f <sub>h</sub> | 5248.395 |
| T (0°C)                 | V <sub>nom</sub> | f <sub>l</sub>  | 5171.724 | f <sub>h</sub> | 5248.410 |
| T (10°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.690 | f <sub>h</sub> | 5248.420 |
| T <sub>nom</sub> (20°C) | V <sub>max</sub> | f <sub>l</sub>  | 5171.680 | f <sub>h</sub> | 5248.420 |
|                         | V <sub>min</sub> | f <sub>l</sub>  | 5171.680 | f <sub>h</sub> | 5248.420 |
| T (30°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.700 | f <sub>h</sub> | 5248.445 |
| T (40°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.730 | f <sub>h</sub> | 5248.473 |
| T (50°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.750 | f <sub>h</sub> | 5248.490 |
| T (60°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.778 | f <sub>h</sub> | 5248.501 |
| Measurement uncertainty |                  |                 | ±1500 Hz |                |          |

Occupied spectrum envelope:

Measured frequency nearest at the lowest band edge: f<sub>l</sub> = 5171.680 MHz

Measured frequency nearest at the highest band edge: f<sub>h</sub> = 5248.501 MHz

802.11n, HT20, chain1

| Test conditions         |                  | Test result     |          |                |          |
|-------------------------|------------------|-----------------|----------|----------------|----------|
|                         |                  | Frequency (MHz) |          |                |          |
| T (-40°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.170 | f <sub>h</sub> | 5249.102 |
| T (-30°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.162 | f <sub>h</sub> | 5249.086 |
| T (-20°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.153 | f <sub>h</sub> | 5249.066 |
| T (-10°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.139 | f <sub>h</sub> | 5249.052 |
| T (0°C)                 | V <sub>nom</sub> | f <sub>l</sub>  | 5171.127 | f <sub>h</sub> | 5249.039 |
| T (10°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.122 | f <sub>h</sub> | 5249.025 |
| T <sub>nom</sub> (20°C) | V <sub>max</sub> | f <sub>l</sub>  | 5171.120 | f <sub>h</sub> | 5249.020 |
|                         | V <sub>min</sub> | f <sub>l</sub>  | 5171.120 | f <sub>h</sub> | 5249.020 |
| T (30°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.145 | f <sub>h</sub> | 5249.042 |
| T (40°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.163 | f <sub>h</sub> | 5249.066 |
| T (50°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.186 | f <sub>h</sub> | 5249.088 |
| T (60°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.202 | f <sub>h</sub> | 5249.108 |
| Measurement uncertainty |                  |                 | ±1500 Hz |                |          |

Occupied spectrum envelope:

Measured frequency nearest at the lowest band edge: f<sub>l</sub> = 5171.120 MHz

Measured frequency nearest at the highest band edge: f<sub>h</sub> = 5249.108 MHz

802.11n, HT40, chain1

| Test conditions         |                  | Test result     |          |                |          |
|-------------------------|------------------|-----------------|----------|----------------|----------|
|                         |                  | Frequency (MHz) |          |                |          |
| T (-40°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.944 | f <sub>h</sub> | 5248.769 |
| T (-30°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.930 | f <sub>h</sub> | 5248.756 |
| T (-20°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.921 | f <sub>h</sub> | 5248.743 |
| T (-10°C)               | V <sub>nom</sub> | f <sub>l</sub>  | 5171.907 | f <sub>h</sub> | 5248.721 |
| T (0°C)                 | V <sub>nom</sub> | f <sub>l</sub>  | 5171.898 | f <sub>h</sub> | 5248.712 |
| T (10°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.891 | f <sub>h</sub> | 5248.706 |
| T <sub>nom</sub> (20°C) | V <sub>max</sub> | f <sub>l</sub>  | 5171.880 | f <sub>h</sub> | 5248.700 |
|                         | V <sub>min</sub> | f <sub>l</sub>  | 5171.880 | f <sub>h</sub> | 5248.700 |
| T (30°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.899 | f <sub>h</sub> | 5248.709 |
| T (40°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.923 | f <sub>h</sub> | 5248.733 |
| T (50°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.937 | f <sub>h</sub> | 5248.751 |
| T (60°C)                | V <sub>nom</sub> | f <sub>l</sub>  | 5171.968 | f <sub>h</sub> | 5248.772 |
| Measurement uncertainty |                  |                 | ±1500 Hz |                |          |

Occupied spectrum envelope:

 Measured frequency nearest at the lowest band edge:  $f_l = 5171.880$  MHz

 Measured frequency nearest at the highest band edge:  $f_h = 5248.772$  MHz

According to FCC Part 15, Subpart E, Section 15.407 (g):

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

| Operating frequency range limit |       |
|---------------------------------|-------|
| (MHz)                           | (MHz) |
| 5150                            | 5250  |

 The requirements are **FULFILLED**.

Remarks:

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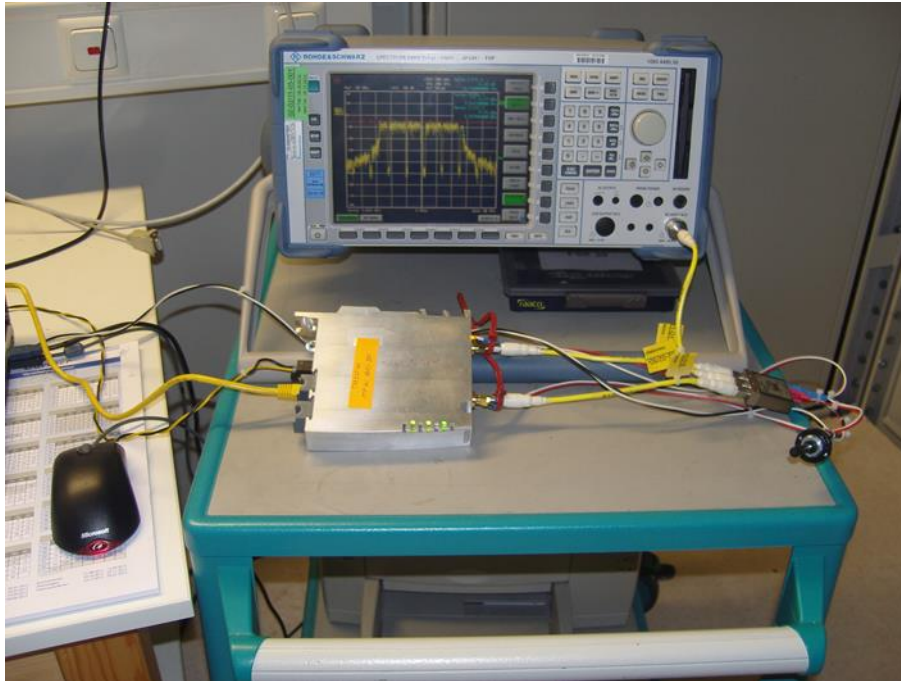
## 5.8 CDD functionality

For test instruments and accessories used see section 6 Part **CPC 3**.

### 5.8.1 Description of the test location

Test location: AREA 4

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



### 5.8.3 Applicable standard

According to FCC KDB 662911 D01, accounting for directional and array gain.

### 5.8.4 Description of Measurement

#### 5.8.5 Test result

Array gain:

The only correlated signal is sent in legacy mode. The spurious emission measurement is made radiated. Therefore it is accounted for the array gain.

Directional gain:

The directional gain calculation for in-band measurements:

If any transmit signals are correlated with each other,

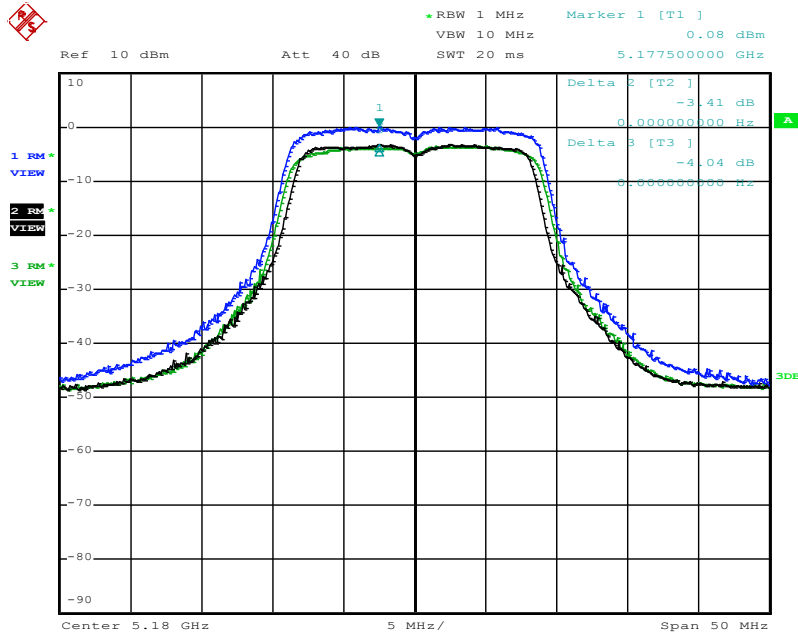
$$\text{Directional gain} = G_{\text{ANT}} + 10 \log (N_{\text{ANT}}) \text{ dBi};$$

If all transmit signals are completely uncorrelated with each other,

$$\text{Directional gain} = G_{\text{ANT}}$$

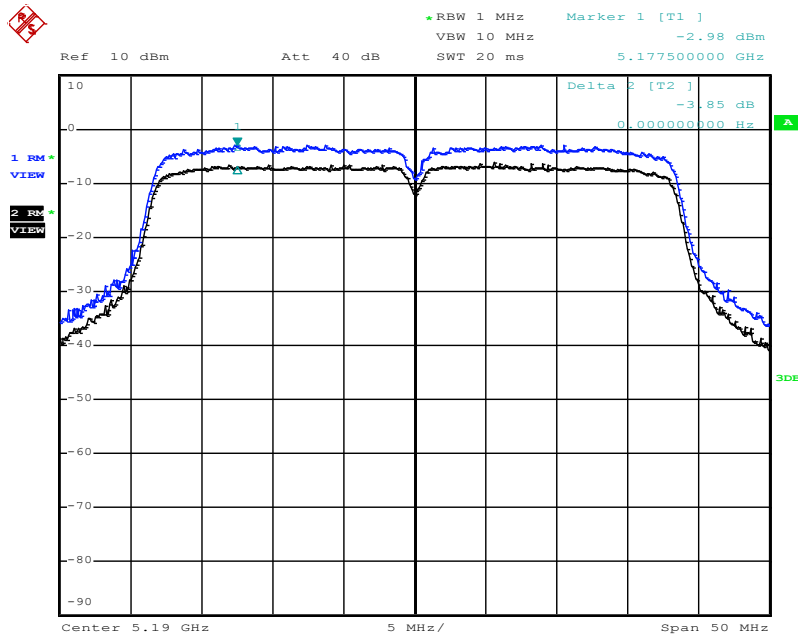
The directional gain appears when the transmission rate fall back from dual stream transmission to one stream or legacy mode. In this case the EUT reduce the output power 3 dB in order to be at the same as before.

802.11n, HT20, MCS15 to MCS7 or to 6 Mbps (P14)  
CH36



Trace1 (blue) MCS15;  
Trace2 (black) 6 Mbps;  
Trace3 (green) MCS7;

802.11n, HT40, MCS15 to MCS7 (P14)  
CH36up



Trace1 (blue) MCS15;  
Trace2 (black) MCS7;

The requirements are **FULFILLED**.

Remarks:

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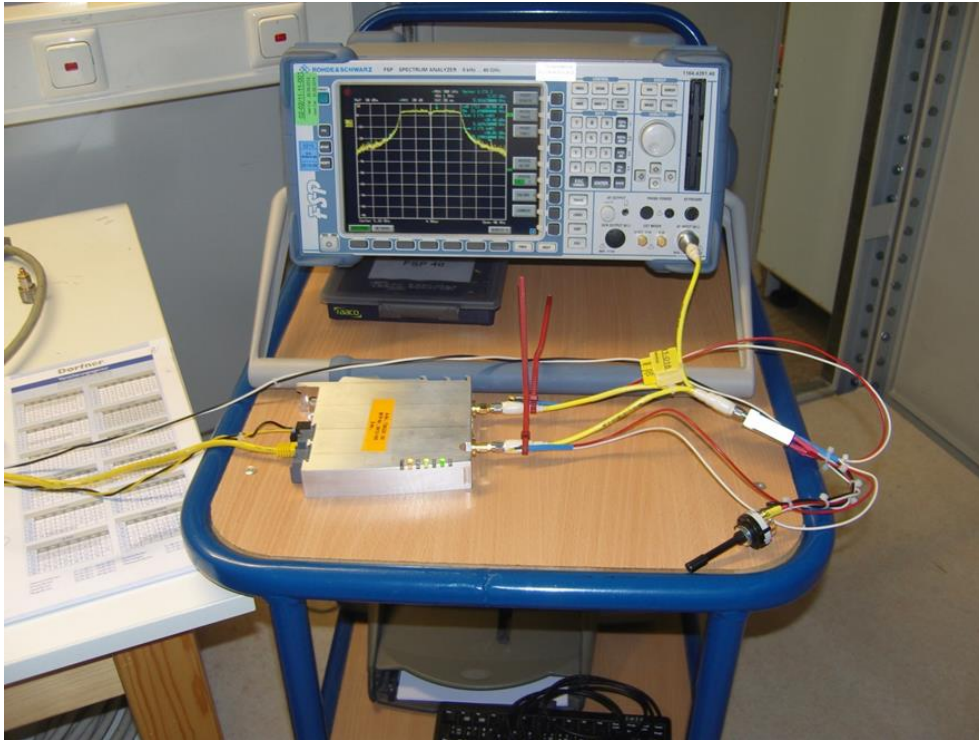
## 5.9 Maximum permissible exposure (MPE)

For test instruments and accessories used see section 6 Part **CPC 3**.

### 5.9.1 Description of the test location

Test location: AREA4

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



### 5.9.3 Applicable standard

According to FCC Part 15, Section 15.407(f):

U-NII devices are subject to the radio frequency radiation exposure requirements specified in Section 1.1307(b), 2.1091 and 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. The test methods used comply with ANSI/IEEE C95.1-2005, "IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".

### 5.9.4 Description of Measurement

The maximum total power input to the antenna has been measured and conducted as described in clause 5.3 of this document. Through the Friis transmission formula, which is a far field assumption and the known maximum gain of the antenna, the maximum MPE at a defined distance away from the product, can be calculated.

Friis transmission formula:

$$P_d = \frac{P_{out} * G}{4 * \pi * r^2}$$

Where:

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna (linear scale)

$r$  = distance between antenna and observation point (cm)

**5.9.5 Test result**

 For fixed equipment the distance  $r = 20$  cm

## Gain group 1

| Channel No. | Power setting | A1+A2 (dBm) | Antgain (dBi) | A (mW) | G linear | P (W)  | S (mW/cm <sup>2</sup> ) | Limit S <sub>eq</sub> (mW/cm <sup>2</sup> ) |
|-------------|---------------|-------------|---------------|--------|----------|--------|-------------------------|---|
| 36          | P20           | 13.9        | 6.0           | 24.34  | 3.98     | 0.0969 | 0.0193                  | 1.0   |
| 40          | P20           | 14.1        | 6.0           | 25.79  | 3.98     | 0.1027 | 0.0204                  | 1.0   |
| 48          | P20           | 14.1        | 6.0           | 25.79  | 3.98     | 0.1027 | 0.0204                  | 1.0   |

| Channel No. | Power setting | A1+A2 (dBm) | Antgain (dBi) | A (mW) | G linear | P (W)  | S (mW/cm <sup>2</sup> ) | Limit S <sub>eq</sub> (mW/cm <sup>2</sup> ) |
|-------------|---------------|-------------|---------------|--------|----------|--------|-------------------------|---|
| 36          | P20           | 13.5        | 6.0           | 22.22  | 3.98     | 0.0885 | 0.0176                  | 1.0   |
| 40          | P20           | 13.6        | 6.0           | 22.99  | 3.98     | 0.0915 | 0.0182                  | 1.0   |
| 48          | P20           | 14.5        | 6.0           | 28.26  | 3.98     | 0.1125 | 0.0224                  | 1.0   |

| Channel No. | Power setting | A1+A2 (dBm) | Antgain (dBi) | A (mW) | G linear | P (W)  | S (mW/cm <sup>2</sup> ) | Limit S <sub>eq</sub> (mW/cm <sup>2</sup> ) |
|-------------|---------------|-------------|---------------|--------|----------|--------|-------------------------|---|
| 36up        | P20           | 14.5        | 6.0           | 27.97  | 3.98     | 0.1114 | 0.0222                  | 1.0   |
| 44up        | P20           | 14.6        | 6.0           | 28.94  | 3.98     | 0.1152 | 0.0229                  | 1.0   |

## Gain group 2

| Channel No. | Power setting | A1+A2 (dBm) | Antgain (dBi) | A (mW) | G linear | P (W)  | S (mW/cm <sup>2</sup> ) | Limit S <sub>eq</sub> (mW/cm <sup>2</sup> ) |
|-------------|---------------|-------------|---------------|--------|----------|--------|-------------------------|---|
| 36          | P17           | 10.8        | 9.0           | 11.91  | 7.94     | 0.0946 | 0.0188                  | 1.0   |
| 40          | P17           | 11.0        | 9.0           | 12.48  | 7.94     | 0.0991 | 0.0197                  | 1.0   |
| 48          | P17           | 11.1        | 9.0           | 12.93  | 7.94     | 0.1027 | 0.0204                  | 1.0   |

| Channel No. | Power setting | A1+A2 (dBm) | Antgain (dBi) | A (mW) | G linear | P (W)  | S (mW/cm <sup>2</sup> ) | Limit S <sub>eq</sub> (mW/cm <sup>2</sup> ) |
|-------------|---------------|-------------|---------------|--------|----------|--------|-------------------------|---|
| 36          | P17           | 10.7        | 9.0           | 11.65  | 7.94     | 0.0925 | 0.0184                  | 1.0   |
| 40          | P17           | 10.8        | 9.0           | 12.05  | 7.94     | 0.0957 | 0.0190                  | 1.0   |
| 48          | P17           | 10.9        | 9.0           | 12.23  | 7.94     | 0.0971 | 0.0193                  | 1.0   |

| Channel No. | Power setting | A1+A2 (dBm) | Antgain (dBi) | A (mW) | G linear | P (W)  | S (mW/cm <sup>2</sup> ) | Limit S <sub>eq</sub> (mW/cm <sup>2</sup> ) |
|-------------|---------------|-------------|---------------|--------|----------|--------|-------------------------|---|
| 36up        | P17           | 11.6        | 9.0           | 14.50  | 7.94     | 0.1152 | 0.0229                  | 1.0   |
| 44up        | P17           | 11.9        | 9.0           | 15.54  | 7.94     | 0.1234 | 0.0246                  | 1.0   |

## Gain group 3

| Channel No. | Power setting | A1+A2 (dBm) | Antgain (dBi) | A (mW) | G linear | P (W)  | S (mW/cm <sup>2</sup> ) | Limit S <sub>eq</sub> (mW/cm <sup>2</sup> ) |
|-------------|---------------|-------------|---------------|--------|----------|--------|-------------------------|---|
| 36          | P14           | 7.7         | 14.2          | 5.87   | 26.30    | 0.1543 | 0.0307                  | 1.0   |
| 40          | P14           | 7.9         | 14.2          | 6.12   | 26.30    | 0.1610 | 0.0320                  | 1.0   |
| 48          | P14           | 8.1         | 14.2          | 6.49   | 26.30    | 0.1706 | 0.0339                  | 1.0   |

| Channel No. | Power setting | A1+A2 (dBm) | Antgain (dBi) | A (mW) | G linear | P (W)  | S (mW/cm <sup>2</sup> ) | Limit S <sub>eq</sub> (mW/cm <sup>2</sup> ) |
|-------------|---------------|-------------|---------------|--------|----------|--------|-------------------------|---|
| 36          | P14           | 7.4         | 14.2          | 5.45   | 26.30    | 0.1435 | 0.0285                  | 1.0   |
| 40          | P14           | 7.5         | 14.2          | 5.58   | 26.30    | 0.1467 | 0.0292                  | 1.0   |
| 48          | P14           | 7.8         | 14.2          | 6.05   | 26.30    | 0.1590 | 0.0316                  | 1.0   |

| Channel No. | Power setting | A1+A2 (dBm) | Antgain (dBi) | A (mW) | G linear | P (W)  | S (mW/cm <sup>2</sup> ) | Limit S <sub>eq</sub> (mW/cm <sup>2</sup> ) |
|-------------|---------------|-------------|---------------|--------|----------|--------|-------------------------|---|
| 36up        | P14           | 8.4         | 14.2          | 6.93   | 26.30    | 0.1824 | 0.0363                  | 1.0   |
| 44up        | P14           | 8.6         | 14.2          | 7.27   | 26.30    | 0.1912 | 0.0380                  | 1.0   |

Limits for maximum permissible exposure (MPE):

| Frequency range (MHz)                                     | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (B) Limits for General Population / Uncontrolled Exposure |                               |                               |                                     |                          |
| 0.3 – 3.0   | 614                           | 1.63                          | 100                                 | 30                       |
| 3.0 – 30  | 824/f                         | 2.19/f                        | 180/ f <sup>2</sup>                 | 30                       |
| 30 - 300  | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1500  | ---                           | ---                           | f/1500                              | 30                       |
| <b>1500-100000</b>  | ---                           | ---                           | <b>1.0</b>                          | <b>30</b>                |

f = Frequency (MHz)

The requirements are **FULFILLED**.

**Remarks:** This test report shows the compliance with the limits for maximum permissible exposure (MPE) specified in FCC 1.1310 and the criteria to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in FCC 1.1307(b).

## 5.10 Co-location and Co-transmission

### Applicable standard:

OET Bulletin 65, Edition 97-01, Section 2: Multiple-transmitter sites and complex environments

The MPE limits of FCC vary with frequency. Therefore, in mixed or broadband RF fields where several sources and frequencies are involved, the fraction of the recommended limit (in terms of power density or square of the electric or magnetic field strength) incurred within each frequency interval should be determined, and the sum of all fractional contributions should not exceed 1.0, or 100 % in terms of percentage.

There is no co-location issue the EUT provides with 2 TX streams simultaneously and use MIMO technique which is taken always into consideration.

The requirements are **FULFILLED**.

### Remarks:

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## 5.11 Antenna application

### 5.11.1 Applicable standard

According to FCC Part 15C, Section 15.203:

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 that broken antennas can be replaced by the user, but the use of a standard antenna jack is prohibited.

The EUT use the listed antennas for MIMO technique. The equipment connector is subject to the end product.

### 5.11.2 Antenna requirements

According to FCC Part 15E, Section 15.407(a):

The conducted output power limit specified in paragraph (a) of 15.407 is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from intentional radiator shall be reduced below the stated values in paragraph (a)(1), (a)(2) and (a)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds the effective value.

### 5.11.3 Defacto EIRP-Limit:

For the output power reduction of the used antennas see the following table. The limit is calculated as using following formula,  $P_{out} = 30 - (G_x - 6)$ ;

Ant. group 3 antennas with max 9 to 14 dBi gain:

| Antenna    | G <sub>x</sub><br>(dBi) | Cond. limit<br>(dBm) | max. G<br>(dBi) | A [P8]<br>(dBm) | Limit P <sub>out</sub><br>(dBm) | Reduction<br>(dB) | P set<br>5 GHz |
|------------|-------------------------|----------------------|-----------------|-----------------|---------------------------------|-------------------|----------------|
| ANT793-8DK | 14.2                    | 23.0                 | 6.0             | 8.6             | 14.8                            | -6.2              | P14            |
| ANT793-8DJ | 13.6                    | 23.0                 | 6.0             | 8.6             | 15.4                            | -6.8              | P14            |

Ant. group 2 antennas with max 6 to 9 dBi gain:

| Antenna    | Gx<br>(dBi) | Cond. limit<br>(dBm) | max. G<br>(dBi) | A [P14]<br>(dBm) | Limit P <sub>out</sub><br>(dBm) | Reduction<br>(dB) | P set<br>5 GHz |
|------------|-------------|----------------------|-----------------|------------------|---------------------------------|-------------------|----------------|
| ANT793-6DT | 9.0         | 23.0                 | 6.0             | 11.6             | 20.0                            | -8.4              | P17            |
| ANT793-6DG | 9.0         | 23.0                 | 6.0             | 11.6             | 20.0                            | -8.4              | P17            |
| ANT795-6DC | 9.0         | 23.0                 | 6.0             | 11.6             | 20.0                            | -8.4              | P17            |
| ANT795-6MN | 8.0         | 23.0                 | 6.0             | 11.6             | 21.0                            | -9.4              | P17            |
| ANT795-6MT | 7.0         | 23.0                 | 6.0             | 11.6             | 22.0                            | -10.4             | P17            |

Ant. group 1 antennas with max 0 to 6 dBi gain:

| Antenna         | Gx<br>(dBi) | Cond. limit<br>(dBm) | max. G<br>(dBi) | A [P17]<br>(dBm) | Limit P <sub>out</sub><br>(dBm) | Reduction<br>(dB) | P set<br>5 GHz |
|-----------------|-------------|----------------------|-----------------|------------------|---------------------------------|-------------------|----------------|
| ANT793-4MN      | 6.0         | 23.0                 | 6.0             | 14.6             | 23.0                            | -8.4              | P20            |
| ANT793-6MN      | 5.0         | 23.0                 | 6.0             | 14.6             | 24.0                            | -9.4              | P20            |
| ANT795-4MC      | 5.0         | 23.0                 | 6.0             | 14.6             | 24.0                            | -9.4              | P20            |
| ANT795-4MD      | 5.0         | 23.0                 | 6.0             | 14.6             | 24.0                            | -9.4              | P20            |
| ANT795-4MA      | 5.0         | 23.0                 | 6.0             | 14.6             | 24.0                            | -9.4              | P20            |
| A5E002280427-06 | 5.0         | 23.0                 | 6.0             | 14.6             | 24.0                            | -9.4              | P20            |
| Rcoax 5G        | 0.0         | 23.0                 | 6.0             | 14.6             | 29.0                            | -14.4             | P20            |

**Remarks:** No power reduction results using the listed antennas in combination with the mentioned power setting.

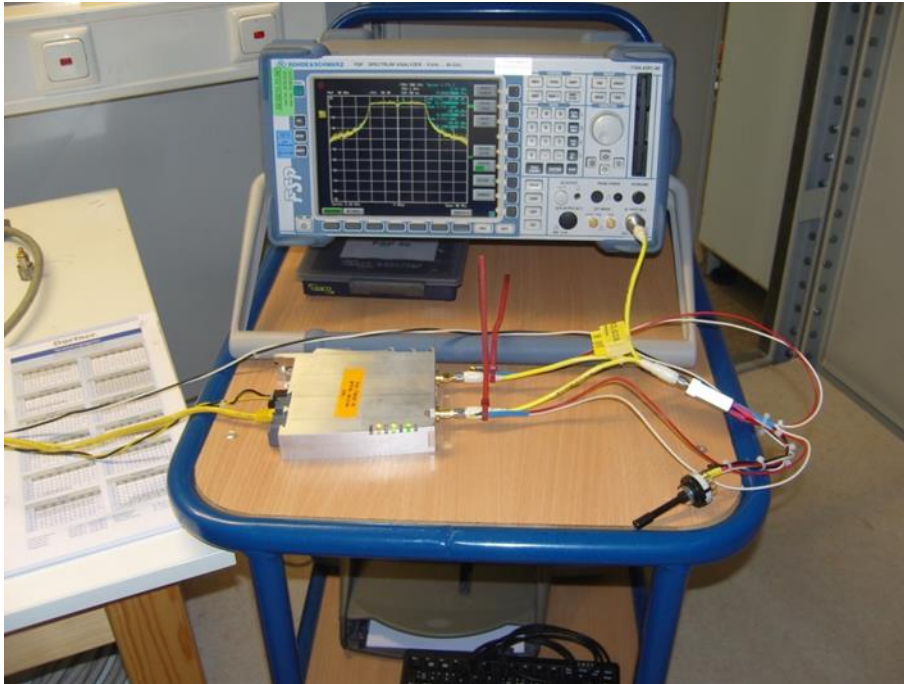
## 5.12 Band requirement 5150 – 5250 MHz

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

### 5.12.1 Description of the test location

Test location: AREA4

### 5.12.2 Photo documentation of the test setup



### 5.12.3 Applicable standard

According to FCC Part 15, Subpart C, Section 15.215 (c):

Devices must be designed to ensure that the 20 dB bandwidth of the emission is fully contained within the frequency band designated.

### 5.12.4 Description of Measurement

The spectrum analyser function “n-dB-down” is used to determine the 20 dB EBW.

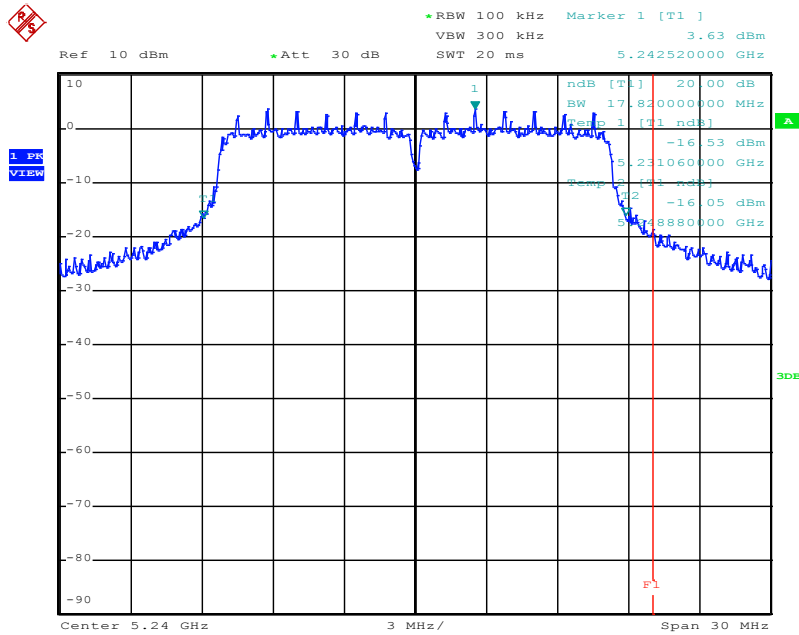
Spectrum analyser settings:

RBW: 100 kHz, VBW: 300 kHz, Sweep: Auto, Detector: max peak, Trace mode: max hold;

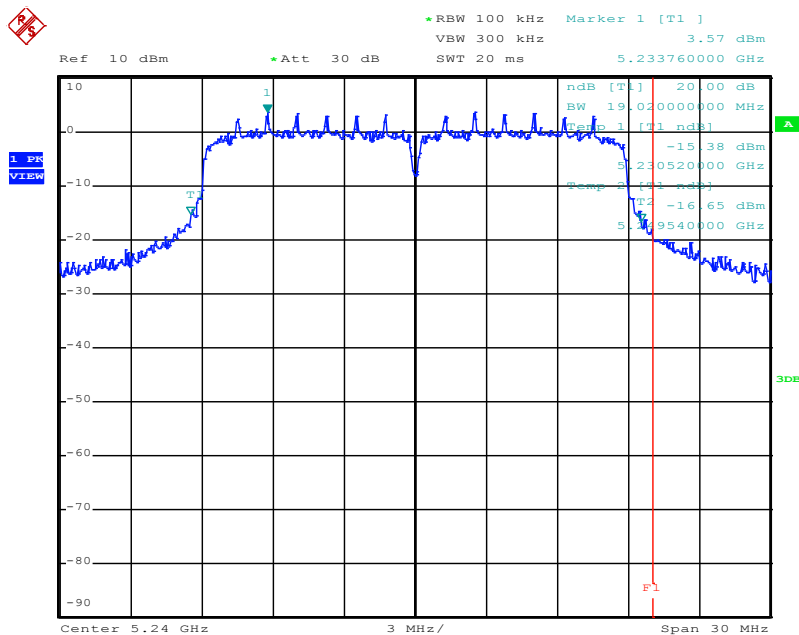


5.12.5 Test result

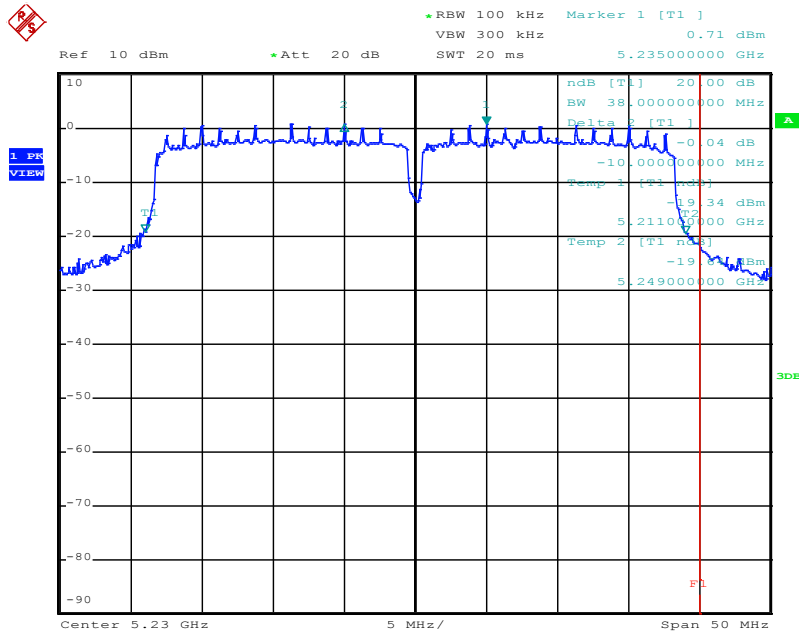
802.11a, P20, 6 Mbps, Port1:



802.11n, HT20, P20, MCS0, Port1:



802.11n, HT40, P20, MCS8, Port1:



According to FCC Part 15, Subpart C, Section 15.215 (c):

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed.

| Operating frequency range limit |       |
|---------------------------------|-------|
| (MHz)                           | (MHz) |
| 5150                            | 5250  |

The requirements are **FULFILLED**.

Remarks:

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

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

| <b>Test ID</b> | <b>Model Type</b>      | <b>Equipment No.</b> | <b>Next Calib.</b> | <b>Last Calib.</b> | <b>Next Verif.</b> | <b>Last Verif.</b> |
|----------------|------------------------|----------------------|--------------------|--------------------|--------------------|--------------------|
| A 4            | ESHS 30                | 02-02/03-05-002      | 16/07/2014         | 16/07/2013         |                    |                    |
|                | ESH 2 - Z 5            | 02-02/20-05-004      | 18/10/2014         | 18/10/2013         |                    |                    |
|                | KEMA 801               | 02-02/22-05-016      |                    |                    |                    |                    |
|                | N-4000-BNC             | 02-02/50-05-138      |                    |                    |                    |                    |
|                | N-1500-N               | 02-02/50-05-140      |                    |                    |                    |                    |
|                | ESH 3 - Z 2            | 02-02/50-05-155      | 05/04/2014         | 05/04/2013         |                    |                    |
|                | SP 103 /3.5-60         | 02-02/50-05-182      |                    |                    |                    |                    |
| CPC 3          | FSP 40                 | 02-02/11-11-001      | 30/09/2014         | 30/09/2013         |                    |                    |
|                | HM8143                 | 02-02/50-10-016      |                    |                    |                    |                    |
|                | KMS102-0,2 m           | 02-02/50-11-016      |                    |                    |                    |                    |
|                | KMS102-0,2 m           | 02-02/50-11-017      |                    |                    |                    |                    |
|                | KMS102-0,2 m           | 02-02/50-11-018      |                    |                    |                    |                    |
| MB             | FSP 40                 | 02-02/11-11-001      | 30/09/2014         | 30/09/2013         |                    |                    |
|                | WK-340/40              | 02-02/45-05-001      | 31/05/2014         | 31/05/2013         |                    |                    |
|                | HM8143                 | 02-02/50-10-016      |                    |                    |                    |                    |
|                | KMS102-0,2 m           | 02-02/50-11-016      |                    |                    |                    |                    |
|                | KMS102-0,2 m           | 02-02/50-11-017      |                    |                    |                    |                    |
|                | KMS102-0,2 m           | 02-02/50-11-018      |                    |                    |                    |                    |
| SER 1          | FMZB 1516              | 01-02/24-01-018      | 14/02/2014         | 14/02/2013         |                    |                    |
|                | ESCI                   | 02-02/03-05-005      | 03/12/2014         | 03/12/2013         |                    |                    |
|                | S10162-B               | 02-02/50-05-031      |                    |                    |                    |                    |
|                | KK-EF393-21N-16        | 02-02/50-05-033      |                    |                    |                    |                    |
|                | NW-2000-NB             | 02-02/50-05-113      |                    |                    |                    |                    |
|                | VLP-1602 PRO           | 02-02/50-10-015      |                    |                    |                    |                    |
| SER 2          | ESVS 30                | 02-02/03-05-006      | 28/06/2014         | 28/06/2013         |                    |                    |
|                | VULB 9168              | 02-02/24-05-005      | 11/04/2014         | 11/04/2013         |                    |                    |
|                | S10162-B               | 02-02/50-05-031      |                    |                    |                    |                    |
|                | NW-2000-NB             | 02-02/50-05-113      |                    |                    |                    |                    |
|                | VLP-1602 PRO           | 02-02/50-10-015      |                    |                    |                    |                    |
|                | KK-EF393/U-16N-21N20 m | 02-02/50-12-018      |                    |                    |                    |                    |
| SER 3          | FSP 40                 | 02-02/11-11-001      | 30/09/2014         | 30/09/2013         |                    |                    |
|                | AMF-4F-04001200-15-10P | 02-02/17-05-004      |                    |                    |                    |                    |
|                | AFS5-12001800-18-10P-6 | 02-02/17-06-002      |                    |                    |                    |                    |
|                | 3117                   | 02-02/24-05-009      | 04/04/2014         | 04/04/2013         |                    |                    |
|                | R1 _ 18 - 40 GHz       | 02-02/30-09-002      |                    |                    | 08/01/2015         | 08/01/2014         |
|                | Sucoflex N-1000-SMA    | 02-02/50-05-072      |                    |                    |                    |                    |
|                | Sucoflex N-1600-SMA    | 02-02/50-05-073      |                    |                    |                    |                    |
|                | Sucoflex N-2000-SMA    | 02-02/50-05-075      |                    |                    |                    |                    |
|                | VLP-1602 PRO           | 02-02/50-10-015      |                    |                    |                    |                    |