

# FCC Measurement/Technical Report on WLAN and Bluetooth Module MAYA W161

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IC: 8595A-MAYAW161

Test Report Reference: MDE\_UBLOX\_2110\_FCC\_02

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D-PL-12140-01-01  
D-PL-12140-01-02  
D-PL-12140-01-03

**Note:**

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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## 1 APPLIED STANDARDS AND TEST SUMMARY

### 1.1 APPLIED STANDARDS

#### Type of Authorization

Certification for an Intentional Radiator (Digital Device / Spread Spectrum).

#### Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 2 (10-1-20 Edition) and 15 (10-1-20 Edition). The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

Part 15, Subpart C – Intentional Radiators

§ 15.201 Equipment authorization requirement

§ 15.207 Conducted limits

§ 15.209 Radiated emission limits; general requirements

Part 15, Subpart E – Unlicensed National Information Infrastructure Devices

§ 15.403 Definitions

§ 15.407 General technical requirements

Note:

**The tests were selected and performed with reference to the FCC Public Notice “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, 789033 D02 General U-NII Test Procedures New Rules v02r01, 2017-12-14”.**

COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION - 905462 D02 UNII DFS Compliance Procedures New Rules v02

ANSI C63.10-2013 is applied.

## 1.2 FCC-IC CORRELATION TABLE

### Correlation of measurement requirements for UNII / LE-LAN (e.g. WLAN 5 GHz) equipment from FCC and IC

#### UNII equipment

| Measurement  | FCC reference                             | IC reference  |
|--|---|---|
| Conducted emissions on AC Mains  | § 15.207                                  | RSS-Gen Issue 5: 8.8  |
| Occupied bandwidth   | § 15.403 (26 dB) /<br>§ 15.407 (e) (6 dB) | RSS-247 Issue 2: 6.2.1.1,<br>6.2.2.1, 6.2.3.1 (99%)<br>RSS-247 Issue 2: 6.2.4.1 (6<br>dB)               |
| Maximum conducted output power   | § 15.407 (a) (1) to (8),<br>(11)          | RSS-247 Issue 2: 6.2.1.1,<br>6.2.2.1, 6.2.3.1, 6.2.4.1  |
| Maximum power spectral density   | § 15.407 (a) (1) to (8),<br>(12)          | RSS-247 Issue 2: 6.2.1.1,<br>6.2.2.1, 6.2.3.1, 6.2.4.1  |
| Transmitter undesirable emissions;<br>General Field Strength Limits,<br>Restricted Bands | § 15.407 (b)<br>§ 15.209 (a)              | RSS-Gen Issue 5:<br>6.13/8.9/8.10;<br>RSS-247 Issue 2: 3.3/6.2<br>6.2.1.2, 6.2.2.2, 6.2.3.2,<br>6.2.4.2 |
| Frequency stability  | § 15.407 (g)                              | RSS-Gen Issue 5: 6.11/8.11  |
| Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS)                       | § 15.407 (h)                              | RSS-247 Issue 2: 6.2.2.1,<br>6.2.3.1, 6.3   |
| Antenna requirement  | § 15.203 / 15.204<br>§ 15.407 (a) (9)     | RSS-Gen Issue 5: 8.3  |
| Receiver spurious emissions  | -   | -   |

### 1.3 MEASUREMENT SUMMARY

47 CFR CHAPTER I FCC PART 15                      FCC §15.207  
Subpart E §15.407

AC Conducted Emissions

The measurement was performed according to ANSI C63.10 6.2                      Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC    | IC     |
|--|--------------|------------|--------|--------|
| WLAN a, mid, U-NII-2C  | S03_161_AB01 | 2022-06-22 | Passed | Passed |

47 CFR CHAPTER I FCC PART 15                      FCC §15.31, §15.403 (i)  
Subpart E §15.407

26 dB Bandwidth

The measurement was performed according to ANSI C63.10 12.4.1                      Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC       | IC  |
|--|--------------|------------|-----------|-----|
| WLAN a, high, U-NII-1  | S01_161_AD01 | 2022-07-05 | Performed | N/A |
| WLAN a, high, U-NII-2A                                       | S01_161_AC01 | 2022-05-05 | Performed | N/A |
| WLAN a, high, U-NII-2C                                       | S01_161_AC01 | 2022-05-05 | Performed | N/A |
| WLAN a, high, U-NII-3  | S01_161_AC01 | 2022-05-05 | Performed | N/A |
| WLAN a, low, U-NII-1   | S01_161_AC01 | 2022-05-05 | Performed | N/A |
| WLAN a, low, U-NII-2A  | S01_161_AD01 | 2022-07-05 | Performed | N/A |
| WLAN a, low, U-NII-2C  | S01_161_AC01 | 2022-05-05 | Performed | N/A |
| WLAN a, low, U-NII-3   | S01_161_AD01 | 2022-07-05 | Performed | N/A |
| WLAN a, mid, U-NII-1   | S01_161_AD01 | 2022-07-05 | Performed | N/A |
| WLAN a, mid, U-NII-2A  | S01_161_AD01 | 2022-07-05 | Performed | N/A |
| WLAN a, mid, U-NII-2C  | S01_161_AC01 | 2022-05-05 | Performed | N/A |
| WLAN a, mid, U-NII-3   | S01_161_AD01 | 2022-07-05 | Performed | N/A |
| WLAN n 20 MHz, high, U-NII-1                                 | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, high, U-NII-2A                                | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, high, U-NII-2C                                | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, low, U-NII-1                                  | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, low, U-NII-2A                                 | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, low, U-NII-2C                                 | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, mid, U-NII-1                                  | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, mid, U-NII-2A                                 | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, mid, U-NII-2C                                 | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 20 MHz, mid, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Performed | N/A |
| WLAN n 40 MHz, high, U-NII-1                                 | S01_161_AD01 | 2022-07-07 | Performed | N/A |
| WLAN n 40 MHz, high, U-NII-2A                                | S01_161_AD01 | 2022-07-07 | Performed | N/A |
| WLAN n 40 MHz, high, U-NII-2C                                | S01_161_AD01 | 2022-07-07 | Performed | N/A |
| WLAN n 40 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-07-07 | Performed | N/A |
| WLAN n 40 MHz, low, U-NII-1                                  | S01_161_AD01 | 2022-07-07 | Performed | N/A |

47 CFR CHAPTER I FCC PART 15                      FCC §15.31, §15.403 (i)  
 Subpart E §15.407

26 dB Bandwidth

The measurement was performed according to ANSI C63.10 12.4.1                      Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC       | IC  |
|--|--------------|------------|-----------|-----|
| WLAN n 40 MHz, low, U-NII-2A                                 | S01_161_AD01 | 2022-07-07 | Performed | N/A |
| WLAN n 40 MHz, low, U-NII-2C                                 | S01_161_AD01 | 2022-07-07 | Performed | N/A |
| WLAN n 40 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-07-07 | Performed | N/A |
| WLAN n 40 MHz, mid, U-NII-2C                                 | S01_161_AD01 | 2022-07-07 | Performed | N/A |

47 CFR CHAPTER I FCC PART 15                      FCC §15.31, §15.407 (e)  
 Subpart E §15.407

6 dB Bandwidth

The measurement was performed according to ANSI C63.10 6.9.2                      Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC    | IC     |
|--|--------------|------------|--------|--------|
| WLAN a, high, U-NII-3  | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, low, U-NII-3   | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, mid, U-NII-3   | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, mid, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-07-07 | Passed | Passed |

47 CFR CHAPTER I FCC PART 15                      FCC §15.31, IC RSS 247 Ch. 6.2.x  
 Subpart E §15.407

99 % Bandwidth

The measurement was performed according to ANSI C63.10 12.4.2 (6.9.3)                      Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC       | IC        |
|--|--------------|------------|-----------|-----------|
| WLAN a, high, U-NII-1  | S01_161_AD01 | 2022-07-05 | Performed | Performed |
| WLAN a, high, U-NII-2A                                       | S01_161_AC01 | 2022-05-05 | Performed | Performed |
| WLAN a, high, U-NII-2C                                       | S01_161_AC01 | 2022-05-05 | Performed | Performed |
| WLAN a, high, U-NII-3  | S01_161_AC01 | 2022-05-05 | Performed | Performed |
| WLAN a, low, U-NII-1   | S01_161_AC01 | 2022-05-05 | Performed | Performed |
| WLAN a, low, U-NII-2A  | S01_161_AD01 | 2022-07-05 | Performed | Performed |
| WLAN a, low, U-NII-2C  | S01_161_AC01 | 2022-05-05 | Performed | Performed |
| WLAN a, low, U-NII-3   | S01_161_AD01 | 2022-07-05 | Performed | Performed |
| WLAN a, mid, U-NII-1   | S01_161_AD01 | 2022-07-05 | Performed | Performed |
| WLAN a, mid, U-NII-2A  | S01_161_AC01 | 2022-05-05 | Performed | Performed |
| WLAN a, mid, U-NII-2C  | S01_161_AC01 | 2022-05-05 | Performed | Performed |
| WLAN a, mid, U-NII-3   | S01_161_AD01 | 2022-07-05 | Performed | Performed |
| WLAN n 20 MHz, high, U-NII-1                                 | S01_161_AD01 | 2022-07-06 | Performed | Performed |

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Subpart E §15.407

FCC §15.31, IC RSS 247 Ch. 6.2.x

99 % Bandwidth

The measurement was performed according to ANSI C63.10 12.4.2 (6.9.3) Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC       | IC        |
|--|--------------|------------|-----------|-----------|
| WLAN n 20 MHz, high, U-NII-2A                                | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, high, U-NII-2C                                | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, low, U-NII-1                                  | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, low, U-NII-2A                                 | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, low, U-NII-2C                                 | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, mid, U-NII-1                                  | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, mid, U-NII-2A                                 | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, mid, U-NII-2C                                 | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 20 MHz, mid, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Performed | Performed |
| WLAN n 40 MHz, high, U-NII-1                                 | S01_161_AD01 | 2022-04-27 | Performed | Performed |
| WLAN n 40 MHz, high, U-NII-2A                                | S01_161_AD01 | 2022-04-27 | Performed | Performed |
| WLAN n 40 MHz, high, U-NII-2C                                | S01_161_AD01 | 2022-04-27 | Performed | Performed |
| WLAN n 40 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-04-27 | Performed | Performed |
| WLAN n 40 MHz, low, U-NII-1                                  | S01_161_AD01 | 2022-04-29 | Performed | Performed |
| WLAN n 40 MHz, low, U-NII-2A                                 | S01_161_AD01 | 2022-04-27 | Performed | Performed |
| WLAN n 40 MHz, low, U-NII-2C                                 | S01_161_AD01 | 2022-04-27 | Performed | Performed |
| WLAN n 40 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-04-27 | Performed | Performed |
| WLAN n 40 MHz, mid, U-NII-2C                                 | S01_161_AD01 | 2022-04-27 | Performed | Performed |

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Subpart E §15.407

FCC §15.31, §15.407 (a)(1)

Maximum Conducted Output Power

The measurement was performed according to ANSI C63.10 12.3.3.2 Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC    | IC     |
|--|--------------|------------|--------|--------|
| WLAN a, high, U-NII-1  | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, high, U-NII-2A                                       | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, high, U-NII-2C                                       | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, high, U-NII-3  | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, low, U-NII-1   | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, low, U-NII-2A  | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, low, U-NII-2C  | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, low, U-NII-3   | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, mid, U-NII-1   | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, mid, U-NII-2A  | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, mid, U-NII-2C  | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, mid, U-NII-3   | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-1                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |

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Subpart E §15.407

FCC §15.31, §15.407 (a)(1)

Maximum Conducted Output Power

The measurement was performed according to ANSI C63.10 12.3.3.2 Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC    | IC     |
|--|--------------|------------|--------|--------|
| WLAN n 20 MHz, high, U-NII-2A                                | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-2C                                | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-1                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-2A                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-2C                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, mid, U-NII-1                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, mid, U-NII-2A                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, mid, U-NII-2C                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, mid, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-1                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-2A                                | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-2C                                | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-1                                  | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-2A                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-2C                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, mid, U-NII-2C                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |

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Subpart E §15.407

FCC §15.31, §15.407 (a) (1),(5)

Peak Power Spectral Density

The measurement was performed according to ANSI C63.10 12.5 (SA-3) Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC    | IC     |
|--|--------------|------------|--------|--------|
| WLAN a, high, U-NII-1  | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, high, U-NII-2A                                       | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, high, U-NII-2C                                       | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, high, U-NII-3  | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, low, U-NII-1   | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, low, U-NII-2A  | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, low, U-NII-2C  | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, low, U-NII-3   | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, mid, U-NII-1   | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, mid, U-NII-2A  | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN a, mid, U-NII-2C  | S01_161_AC01 | 2022-05-05 | Passed | Passed |
| WLAN a, mid, U-NII-3   | S01_161_AD01 | 2022-07-05 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-1                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |



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Subpart E §15.407

FCC §15.31, §15.407 (a) (1),(5)

Peak Power Spectral Density

The measurement was performed according to ANSI C63.10 12.5 (SA-3) Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC    | IC     |
|--|--------------|------------|--------|--------|
| WLAN n 20 MHz, high, U-NII-2A                                | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-2C                                | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-1                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-2A                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-2C                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, mid, U-NII-1                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, mid, U-NII-2A                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, mid, U-NII-2C                                 | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 20 MHz, mid, U-NII-3                                  | S01_161_AD01 | 2022-07-06 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-1                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-2A                                | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-2C                                | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-3                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-1                                  | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-2A                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-2C                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-3                                  | S01_161_AD01 | 2022-07-07 | Passed | Passed |
| WLAN n 40 MHz, mid, U-NII-2C                                 | S01_161_AD01 | 2022-07-07 | Passed | Passed |

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Subpart E §15.407

FCC §15.407 (b), (1),(2),(3),(4); FCC  
§15.205, §15.209, §15.407 (b) (5),(6)

Undesirable Emissions; General Field Strength Limits

The measurement was performed according to ANSI C63.10 6.4, 6.5, 6.6.5 Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Measurement range, Subband | Setup        | Date       | FCC    | IC     |
|---|--------------|------------|--------|--------|
| WLAN a, high, 1GHz - 26GHz, U-NII-1<br>Remark: harmonics measured only          | S02_161_AB01 | 2022-06-01 | Passed | Passed |
| WLAN a, high, 1GHz - 26GHz, U-NII-1   | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, high, 1GHz - 26GHz, U-NII-2A  | S02_161_AC01 | 2022-04-08 | Passed | Passed |
| WLAN a, high, 1GHz - 26GHz, U-NII-2A  | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, high, 1GHz - 26GHz, U-NII-2C  | S02_161_AB01 | 2022-04-12 | Passed | Passed |
| WLAN a, high, 1GHz - 26GHz, U-NII-2C  | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, high, 1GHz - 26GHz, U-NII-3   | S02_161_AB01 | 2022-04-19 | Passed | Passed |
| WLAN a, high, 1GHz - 26GHz, U-NII-3   | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, high, 9kHz - 30MHz, U-NII-2C  | S02_161_AB01 | 2022-05-09 | Passed | Passed |
| WLAN a, low, 1GHz - 26GHz, U-NII-1  | S02_161_AC01 | 2022-04-07 | Passed | Passed |
| WLAN a, low, 1GHz - 26GHz, U-NII-1  | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, low, 1GHz - 26GHz, U-NII-2A<br>Remark: harmonics measured only          | S02_161_AB01 | 2022-06-02 | Passed | Passed |

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FCC §15.407 (b), (1),(2),(3),(4); FCC  
§15.205, §15.209, §15.407 (b) (5),(6)

Undesirable Emissions; General Field Strength Limits

The measurement was performed according to ANSI C63.10 6.4, 6.5, 6.6.5 Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Measurement range, Subband | Setup        | Date       | FCC    | IC     |
|---|--------------|------------|--------|--------|
| WLAN a, low, 1GHz - 26GHz, U-NII-2A   | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, low, 1GHz - 26GHz, U-NII-2C   | S02_161_AB01 | 2022-04-11 | Passed | Passed |
| WLAN a, low, 1GHz - 26GHz, U-NII-2C   | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, low, 1GHz - 26GHz, U-NII-3<br>Remark: harmonics measured only           | S02_161_AB01 | 2022-05-25 | Passed | Passed |
| WLAN a, low, 1GHz - 26GHz, U-NII-3  | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, low, 9kHz - 30MHz, U-NII-1  | S02_161_AB01 | 2022-05-09 | Passed | Passed |
| WLAN a, mid, 1GHz - 26GHz, U-NII-1<br>Remark: harmonics measured only           | S02_161_AB01 | 2022-06-01 | Passed | Passed |
| WLAN a, mid, 1GHz - 26GHz, U-NII-1  | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, mid, 1GHz - 26GHz, U-NII-2A<br>Remark: harmonics measured only          | S02_161_AB01 | 2022-06-02 | Passed | Passed |
| WLAN a, mid, 1GHz - 26GHz, U-NII-2A   | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, mid, 1GHz - 26GHz, U-NII-2C   | S02_161_AB01 | 2022-05-05 | Passed | Passed |
| WLAN a, mid, 1GHz - 26GHz, U-NII-2C   | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, mid, 1GHz - 26GHz, U-NII-3<br>Remark: harmonics measured only           | S02_161_AB01 | 2022-05-25 | Passed | Passed |
| WLAN a, mid, 1GHz - 26GHz, U-NII-3  | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, mid, 26GHz - 40GHz, U-NII-1   | S02_161_AB01 | 2022-05-05 | Passed | Passed |
| WLAN a, mid, 26GHz - 40GHz, U-NII-1   | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, mid, 26GHz - 40GHz, U-NII-2A  | S02_161_AB01 | 2022-05-05 | Passed | Passed |
| WLAN a, mid, 26GHz - 40GHz, U-NII-2A  | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, mid, 26GHz - 40GHz, U-NII-2C  | S02_161_AB01 | 2022-05-05 | Passed | Passed |
| WLAN a, mid, 26GHz - 40GHz, U-NII-2C  | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, mid, 26GHz - 40GHz, U-NII-3   | S02_161_AB01 | 2022-05-05 | Passed | Passed |
| WLAN a, mid, 26GHz - 40GHz, U-NII-3   | S01_161_AD01 | 2022-06-03 | Passed | Passed |
| WLAN a, mid, 30MHz - 1GHz, U-NII-1  | S02_161_AB01 | 2022-03-28 | Passed | Passed |
| WLAN a, mid, 30MHz - 1GHz, U-NII-1  | S01_161_AD01 | 2022-06-14 | Passed | Passed |
| WLAN a, mid, 30MHz - 1GHz, U-NII-2A   | S02_161_AB01 | 2022-03-28 | Passed | Passed |
| WLAN a, mid, 30MHz - 1GHz, U-NII-2A   | S01_161_AD01 | 2022-06-14 | Passed | Passed |
| WLAN a, mid, 30MHz - 1GHz, U-NII-2C   | S02_161_AB01 | 2022-04-07 | Passed | Passed |
| WLAN a, mid, 30MHz - 1GHz, U-NII-2C   | S01_161_AD01 | 2022-06-14 | Passed | Passed |
| WLAN a, mid, 30MHz - 1GHz, U-NII-3  | S02_161_AB01 | 2022-04-07 | Passed | Passed |
| WLAN a, mid, 30MHz - 1GHz, U-NII-3  | S01_161_AD01 | 2022-06-14 | Passed | Passed |
| WLAN a, mid, 9kHz - 30MHz, U-NII-1  | S01_161_AD01 | 2022-06-14 | Passed | Passed |
| WLAN a, mid, 9kHz - 30MHz, U-NII-2A   | S01_161_AD01 | 2022-06-14 | Passed | Passed |
| WLAN a, mid, 9kHz - 30MHz, U-NII-2C   | S01_161_AD01 | 2022-06-14 | Passed | Passed |
| WLAN a, mid, 9kHz - 30MHz, U-NII-3  | S01_161_AD01 | 2022-06-14 | Passed | Passed |
| WLAN n 20 MHz, low, 1GHz - 26GHz, U-NII-3                                       | S01_161_AD01 | 2022-06-17 | Passed | Passed |
| WLAN n 20 MHz, mid, 1GHz - 26GHz, U-NII-2C                                      | S01_161_AD01 | 2022-06-17 | Passed | Passed |
| WLAN n 40 MHz, low, 1GHz - 26GHz, U-NII-3                                       | S01_161_AD01 | 2022-06-17 | Passed | Passed |

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FCC §15.407 (b), (1), (2), (3), (4)

Band Edge

The measurement was performed according to ANSI C63.10 6.6.5

Final Result

| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC    | IC     |
|--|--------------|------------|--------|--------|
| WLAN a, high, U-NII-2A                                       | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN a, high, U-NII-2A                                       | S02_161_AC01 | 2022-04-08 | Passed | Passed |
| WLAN a, high, U-NII-2C                                       | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN a, high, U-NII-2C                                       | S02_161_AB01 | 2022-04-12 | Passed | Passed |
| WLAN a, high, U-NII-3  | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN a, high, U-NII-3  | S02_161_AB01 | 2022-05-25 | Passed | Passed |
| WLAN a, low, U-NII-1   | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN a, low, U-NII-1   | S02_161_AC01 | 2022-04-07 | Passed | Passed |
| WLAN a, low, U-NII-2C  | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN a, low, U-NII-2C  | S02_161_AB01 | 2022-04-11 | Passed | Passed |
| WLAN a, low, U-NII-3   | S01_161_AA01 | 2022-07-22 | Passed | Passed |
| WLAN a, low, U-NII-3   | S02_161_AB01 | 2022-05-25 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-2A                                | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-2C                                | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 20 MHz, high, U-NII-3                                 | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-1                                  | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-2C                                 | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 20 MHz, low, U-NII-3                                  | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-2A                                | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-2C                                | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 40 MHz, high, U-NII-3                                 | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-1                                  | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-2C                                 | S01_161_AA01 | 2022-03-16 | Passed | Passed |
| WLAN n 40 MHz, low, U-NII-3                                  | S01_161_AA01 | 2022-03-16 | Passed | Passed |

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FCC §15.31, §15.407 (h)

Dynamic Frequency Selection

The measurement was performed according to KDB 905462 D02

Final Result

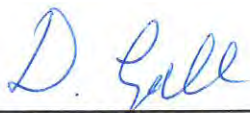
| OP-Mode<br>Radio Technology, Operating Frequency,<br>Subband | Setup        | Date       | FCC    | IC     |
|--|--------------|------------|--------|--------|
| WLAN n 40 MHz, mid, U-NII-2C                                 | S01_161_AD01 | 2022-06-22 | Passed | Passed |

N/A: Not applicable  
N/P: Not performed

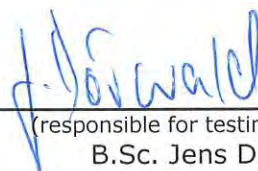
## 2 REVISION HISTORY / SIGNATURES

| Report version control |              |                    |                  |
|------------------------|--------------|--------------------|------------------|
| Version                | Release date | Change Description | Version validity |
| initial                | 2022-08-08   | --                 | valid            |
| --                     | --           | --                 | --               |

COMMENT: -



(responsible for accreditation scope)  
Dipl.-Ing. Daniel Gall



(responsible for testing and report)  
B.Sc. Jens Dörwald



7 layers GmbH, Borsigstr. 11  
40880 Ratingen, Germany  
Phone +49 (0)2102 749 0

### 3 ADMINISTRATIVE DATA

#### 3.1 TESTING LABORATORY

Company Name: 7layers GmbH  
Address: Borsigstr. 11  
40880 Ratingen  
Germany

The test facility is accredited by the following accreditation organisation:

Laboratory accreditation no: DAKKS D-PL-12140-01-01 | -02 | -03  
FCC Designation Number: DE0015  
FCC Test Firm Registration: 929146  
ISED CAB Identifier: DE0007; ISED#: 3699A

Responsible for accreditation scope: Dipl.-Ing. Daniel Gall

Report Template Version: 2021-09-09

#### 3.2 PROJECT DATA

Responsible for testing and report: B.Sc. Jens Dörwald  
Employees who performed the tests: documented internally at 7Layers  
Date of Report: 2022-08-08  
Testing Period: 2022-03-16 to 2022-07-22

#### 3.3 APPLICANT DATA

Company Name: u-blox AG  
Address: Zürcherstrasse 68  
8800 Thalwil  
Switzerland  
Contact Person: Filip Kruzela

### 3.4 MANUFACTURER DATA

Company Name: please see Applicant Data

Address:

Contact Person:

## 4 TEST OBJECT DATA

### 4.1 GENERAL EUT DESCRIPTION

| Kind of Device product description | Host-based module with WLAN and Bluetooth technology  |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
|------------------------------------|---|------------|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------|----|--|----|--|----|--|----|--|----|--|----|--|-----|----|--|----|--|----|--|----|-----|
| Product name                       | MAYA W161-00B-00  |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Type                               | MAYA W161-00B-00  |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Declared EUT data by the supplier  |   |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Voltage Type                       | DC  |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Voltage Level                      | 1.8 V + 3.3 V   |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Tested Modulation Type             | OFDM  |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Specific product description       | <p>The EUT is a Bluetooth and WLAN module.</p> <p>In the 5 GHz band it supports SISO Mode only.</p> <p>Supported WLAN modes are a and n with a 20 MHz BW, n with 40 MHz BW.</p> <p>The U-NII bands 1, 2A, 2C and 3 are supported. For this report the EUT is a slave without radar detection in the relevant DFS bands.</p>   |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Ports of the device                | <p>Enclosure</p> <p>Data</p> <p>DC Power</p> <p>Antenna</p> <p>The EUT is a module with solder pads for surface mounting, so no cables were connected to the EUT itself.</p>  |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Antenna 1                          | 2 dBi   |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Tested Datarates                   | <p>WLAN a: 6 Mbit</p> <p>WLAN n: MCS 0</p>  |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Special software used for testing  | Scripts were provided by the applicant on a laptop that control a board computer, which sets the test modes of the EUT.   |            |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| Used output power                  | <table border="1"> <thead> <tr> <th>Mode   Ch.</th> <th>36</th> <th>40</th> <th>44</th> <th>48</th> <th>52</th> <th>56</th> <th>60</th> <th>64</th> <th>100</th> <th>104</th> <th>108</th> <th>112</th> <th>116</th> <th>132</th> <th>136</th> <th>140</th> <th>149</th> <th>153</th> <th>157</th> <th>161</th> <th>165</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>17</td> <td>17</td> <td>17</td> <td>17</td> <td>17</td> <td>17</td> <td>17</td> <td>16</td> <td>16</td> <td>18</td> <td>18</td> <td>18</td> <td>18</td> <td>18</td> <td>16</td> <td>14</td> <td>16</td> <td>16</td> <td>17</td> <td>18</td> <td>18</td> </tr> <tr> <td>N20 SISO</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>15</td> <td>15</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>14</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> </tr> <tr> <td>N40 SISO</td> <td>14</td> <td></td> <td>16</td> <td></td> <td>16</td> <td></td> <td>14</td> <td></td> <td>13</td> <td></td> <td>16</td> <td></td> <td>N/A</td> <td>13</td> <td></td> <td>16</td> <td></td> <td>16</td> <td></td> <td>16</td> <td>N/A</td> </tr> </tbody> </table> | Mode   Ch. | 36 | 40 | 44 | 48 | 52 | 56 | 60  | 64  | 100 | 104 | 108 | 112 | 116 | 132 | 136 | 140 | 149 | 153 | 157 | 161 | 165 | A | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 16 | 16 | 18 | 18 | 18 | 18 | 18 | 16 | 14 | 16 | 16 | 17 | 18 | 18 | N20 SISO | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 15 | 15 | 16 | 16 | 16 | 16 | 16 | 16 | 14 | 16 | 16 | 16 | 16 | 16 | N40 SISO | 14 |  | 16 |  | 16 |  | 14 |  | 13 |  | 16 |  | N/A | 13 |  | 16 |  | 16 |  | 16 | N/A |
| Mode   Ch.                         | 36  | 40         | 44 | 48 | 52 | 56 | 60 | 64 | 100 | 104 | 108 | 112 | 116 | 132 | 136 | 140 | 149 | 153 | 157 | 161 | 165 |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| A                                  | 17  | 17         | 17 | 17 | 17 | 17 | 17 | 16 | 16  | 18  | 18  | 18  | 18  | 18  | 16  | 14  | 16  | 16  | 17  | 18  | 18  |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| N20 SISO                           | 16  | 16         | 16 | 16 | 16 | 16 | 16 | 15 | 15  | 16  | 16  | 16  | 16  | 16  | 16  | 14  | 16  | 16  | 16  | 16  | 16  |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |
| N40 SISO                           | 14  |            | 16 |    | 16 |    | 14 |    | 13  |     | 16  |     | N/A | 13  |     | 16  |     | 16  |     | 16  | N/A |     |     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |    |  |    |  |    |  |    |  |    |  |    |  |     |    |  |    |  |    |  |    |     |

#### 4.2 EUT MAIN COMPONENTS

| Sample Name      | Sample Code                              | Description |
|------------------|--|-------------|
| MAYA W161 AA01   | DE1015158aa01                            |             |
| Sample Parameter | Value                                    |             |
| Serial No.       | M416C1DEB90BB4C0400                      |             |
| HW Version       | 04                                       |             |
| SW Version       | W16.92.21.p22-16.92.21.p22-MXM5X16298_V0 |             |
| Comment          |  |             |

| Sample Name      | Sample Code                              | Description |
|------------------|--|-------------|
| MAYA W161 AB01   | DE1015158ab01                            |             |
| Sample Parameter | Value                                    |             |
| Serial No.       | M416C1DEB90BA740400                      |             |
| HW Version       | 04                                       |             |
| SW Version       | W16.92.21.p22-16.92.21.p22-MXM5X16298_V0 |             |
| Comment          |  |             |

| Sample Name      | Sample Code                              | Description |
|------------------|--|-------------|
| MAYA W161 AC01   | DE1015158ac01                            |             |
| Sample Parameter | Value                                    |             |
| Serial No.       | M416C1DEB90BA840400                      |             |
| HW Version       | 04                                       |             |
| SW Version       | W16.92.21.p22-16.92.21.p22-MXM5X16298_V0 |             |
| Comment          |  |             |

| Sample Name      | Sample Code                              | Description |
|------------------|--|-------------|
| MAYA W161 AD01   | DE1015158ad01                            |             |
| Sample Parameter | Value                                    |             |
| Serial No.       | M416C1DEB90BB240400                      |             |
| HW Version       | 04                                       |             |
| SW Version       | W16.92.21.p22-16.92.21.p22-MXM5X16298_V0 |             |
| Comment          |  |             |

NOTE: The short description is used to simplify the identification of the EUT in this test report.

#### 4.3 ANCILLARY EQUIPMENT

For the purposes of this test report, ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless Ancillary Equipment can influence the test results.

| Device | Details<br>(Manufacturer, Type Model, OUT Code) | Description |
|--------|---|-------------|
| -      | -   | -           |



#### 4.4 AUXILIARY EQUIPMENT

For the purposes of this test report, auxiliary equipment is defined as equipment which is used temporarily to enable operational and control features especially used for the tests of the EUT which is not used during normal operation or equipment that is used during the tests in combination with the EUT but is not subject of this test report. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless Auxiliary Equipment can influence the test results.

| Device | Details<br>(Manufacturer, Type Model, HW,<br>SW, S/N)    | Description   |
|--------|--|---|
| AUX1   | UBLOX, MAYA-W1 EVK, Rev. A, -, ,<br>10000002626314002004 | Evaluation Board for<br>module providing ports                          |
| AUX10  | Toradex, Ixora, V1.2A, -, , 10824714                     | Board Computer<br>connected to<br>Evaluation board for<br>setting modes |
| AUX11  | Toradex, Ixora, V1.2A, -, , 10824739                     | Board Computer<br>connected to<br>Evaluation board for<br>setting modes |
| AUX12  | DELL, Latitude E7250, -, -, ,<br>43283371358             | Laptop computer with<br>prepared scripts<br>controlling AUX10           |
| AUX13  | DELL, Latitude E7270, 2016, -, ,<br>14393036990          | Laptop computer with<br>prepared scripts<br>controlling AUX11           |
| AUX2   | UBLOX, MAYA-W1 EVK, Rev. A, -, ,<br>10000002626314002001 | Evaluation Board for<br>module providing ports                          |
| AUX3   | UBLOX, MAYA-W1 EVK, Rev. A, -, ,<br>10000002626314002002 | Evaluation Board for<br>module providing ports                          |
| AUX4   | UBLOX, MAYA-W1 EVK, Rev. A, -, ,<br>10000002626314001001 | Evaluation Board for<br>module providing ports                          |
| ACDC1  | Agilent, E3631A, -, -, , MY40018563                      | 120 V 60 Hz AC<br>laboratory power<br>supply                            |

## 4.5 EUT SETUPS

This chapter describes the combination of EUTs and equipment used for testing. The rationale for selecting the EUTs, ancillary and auxiliary equipment and interconnecting cables, is to test a representative configuration meeting the requirements of the referenced standards.

| Setup        | Combination of EUTs                               | Description and Rationale |
|--------------|---|---------------------------|
| S01_161_AD01 | MAYA W161 AD01, AUX11, AUX4, AUX12, AUX10, AUX13, | Conducted Setup           |
| S01_161_AC01 | MAYA W161 AC01, AUX3, AUX11, AUX12, AUX10, AUX13, | Conducted Setup           |
| S02_161_AC01 | MAYA W161 AC01, AUX3                              | Radiated Setup            |
| S01_161_AA01 | MAYA W161 AA01, AUX11, AUX12, AUX10, AUX13, AUX1, | Conducted Setup           |
| S01_161_AB01 | MAYA W161 AB01, AUX11, AUX2, AUX12, AUX10, AUX13, | Conducted Setup           |
| S02_161_AB01 | MAYA W161 AB01, AUX2                              | Radiated Setup            |
| S03_161_AB01 | MAYA W161 AB01, AUX2, ACDC1                       | Radiated Setup            |

## 4.6 OPERATING MODES / TEST CHANNELS

This chapter describes the operating modes of the EUTs used for testing.

| U-NII-Subband 1<br>5150 - 5250 MHz |      |      | U-NII-Subband 2A<br>5250 - 5350 MHz |      |      | U-NII-Subband 2C<br>5470 - 5725 MHz |      |      | U-NII-Subband 3<br>5725 - 5850 MHz |      |      | Nom.<br>BW |
|------------------------------------|------|------|-------------------------------------|------|------|-------------------------------------|------|------|------------------------------------|------|------|------------|
| low                                | mid  | high | low                                 | mid  | high | low                                 | mid  | high | low                                | mid  | high | 20 MHz     |
| 36                                 | 40   | 48   | 52                                  | 60   | 64   | 100                                 | 116  | 140  | 149                                | 157  | 165  | Ch.-No.    |
| 5180                               | 5200 | 5240 | 5260                                | 5300 | 5320 | 5500                                | 5580 | 5700 | 5745                               | 5785 | 5825 | MHz        |

| low  | mid | high | low  | mid | high | low  | mid  | high | low  | mid | high | 40 MHz  |
|------|-----|------|------|-----|------|------|------|------|------|-----|------|---------|
| 38   | -   | 46   | 54   | -   | 62   | 102  | 110  | 138  | 151  | -   | 159  | Ch.-No. |
| 5190 | -   | 5230 | 5270 | -   | 5310 | 5510 | 5550 | 5690 | 5755 | -   | 5795 | MHz     |

## 4.7 PRODUCT LABELLING

### 4.7.1 FCC ID LABEL

Please refer to the documentation of the applicant.

### 4.7.2 LOCATION OF THE LABEL ON THE EUT

Please refer to the documentation of the applicant.

## 5 TEST RESULTS

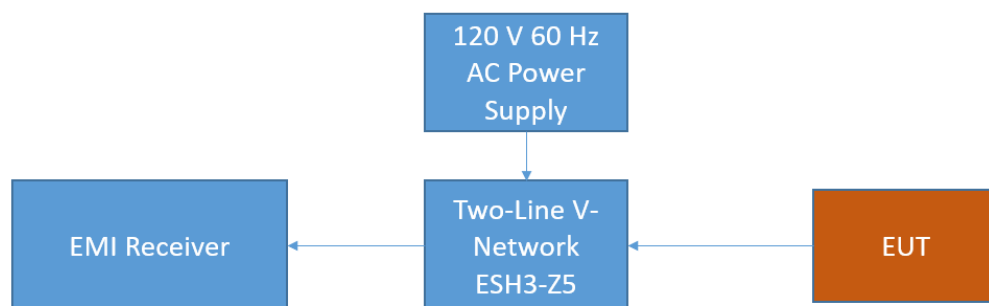
### 5.1 AC CONDUCTED EMISSIONS

Standard FCC Part 15 Subpart E

The test was performed according to:  
ANSI C63.10 6.2

#### 5.1.1 TEST DESCRIPTION

The test set-up was made in accordance to the general provisions of ANSI C 63.10. The Equipment Under Test (EUT) was setup in a shielded room to perform the conducted emissions measurements in a typical installation configuration. The EUT was powered from **50 $\mu$ H || 50 Ohm Line Impedance Stabilization Network (LISN)**. The LISN's unused connections were terminated with 50 Ohm loads.



FCC Conducted Emissions on AC

The measurement procedure consists of two steps. It is implemented into the EMI test software EMC-32 from R&S.

#### Step 1: Preliminary scan

Intention of this step is, to determine the conducted EMI-profile of the EUT.

EMI receiver settings:

- Detector: Peak – Maxhold & Average
- Frequency range: 150 kHz – 30 MHz
- Frequency steps: 2.5 kHz
- IF-Bandwidth: 9 kHz
- Measuring time / Frequency step: 100 ms (FFT-based)
- Measurement on phase + neutral lines of the power cords

On basis of this preliminary scan the highest amplitudes and the corresponding frequencies relative to the limit are identified. Emissions above the limit and emissions which are in the 10 dB range below the limit are considered.

#### Step 2: Final measurement

Intention of this step is, to determine the highest emissions with the settings defined in the test specification for the frequencies identified in step 1.

EMI receiver settings:

- Detector: Quasi-Peak & (CISPR) Average

- IF Bandwidth: 9 kHz
- Measuring time: 1 s / frequency

At each frequency determined in step 1, four measurements are performed in the following combinations:

- 1) Neutral lead - reference ground (PE grounded)
- 2) Phase lead - reference ground (PE grounded)
- 3) Neutral lead - reference ground (PE floating)
- 4) Phase lead - reference ground (PE floating)

The highest value is reported.

### 5.1.2 TEST REQUIREMENTS / LIMITS

#### FCC Part 15, Subpart C, §15.207

| Frequency (MHz) | QP Limits (dB $\mu$ V) | AV Limits (dB $\mu$ V) |
|-----------------|------------------------|------------------------|
| 0.15 - 0.5      | 66 - 56                | 56 - 46                |
| 0.5 - 5         | 56                     | 46                     |
| 5 - 30          | 60                     | 50                     |

### 5.1.3 TEST PROTOCOL

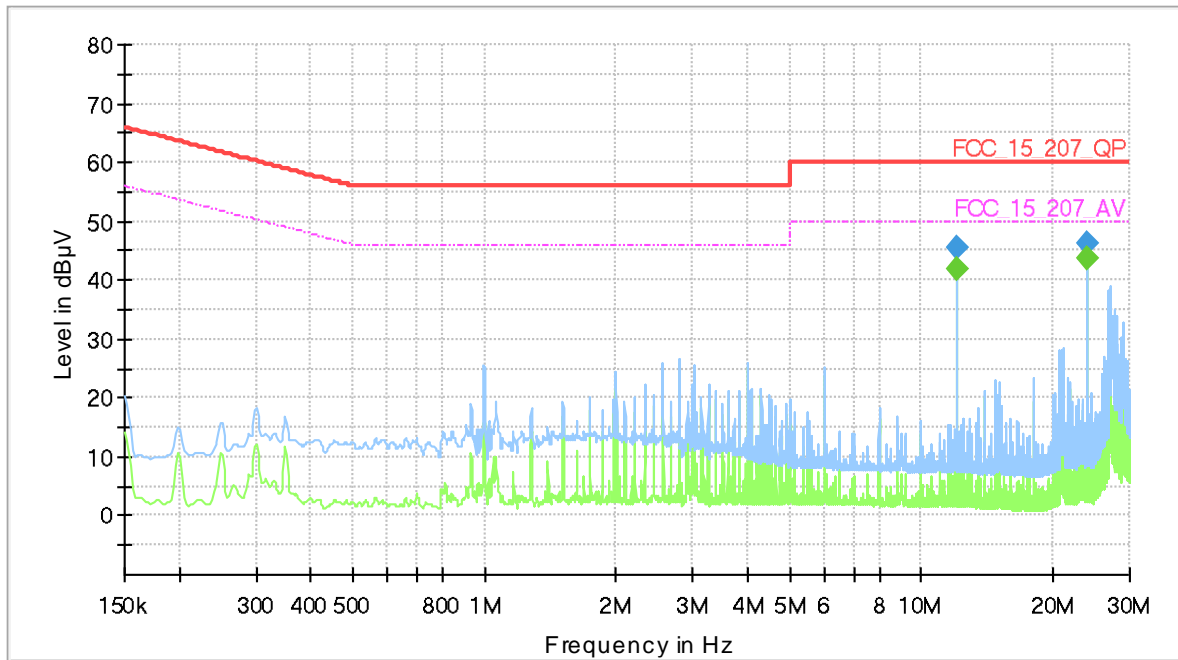
Temperature: 28 °C  
 Air Pressure: 1008 hPa  
 Humidity: 40 %

| Power line | PE  | Frequency [MHz] | Measured value QP [dB $\mu$ V] | Measured value AV [dB $\mu$ V] | Limit [dB $\mu$ V] | Margin [dB] |
|------------|-----|-----------------|--------------------------------|--------------------------------|--------------------|-------------|
| N          | GND | 12.005          | 45.7                           | -                              | 60.0               | 14.3        |
| N          | GND | 12.005          | -                              | 42.0                           | 50.0               | 8.0         |
| N          | FLO | 24.009          | 46.2                           | -                              | 60.0               | 13.8        |
| N          | FLO | 24.009          | -                              | 43.7                           | 50.0               | 6.3         |

Remark: Please see next sub-clause for the measurement plot.

5.1.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

(S03\_161\_AB01)



**Final Result**

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time | Bandwidth (kHz) | Line | PE  | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------------|-----------------|------|-----|------------|
| 12.005250       | ---              | 41.96           | 50.00        | 8.04        | 1000.0     | 9.000           | N    | GND | 10.7       |
| 12.005250       | 45.68            | ---             | 60.00        | 14.32       | 1000.0     | 9.000           | N    | GND | 10.7       |
| 24.009000       | 46.17            | ---             | 60.00        | 13.83       | 1000.0     | 9.000           | N    | FLO | 11.2       |
| 24.009000       | ---              | 43.66           | 50.00        | 6.34        | 1000.0     | 9.000           | N    | FLO | 11.2       |

WLAN a mode TX on 5580 MHz

5.1.5 TEST EQUIPMENT USED

- Conducted Emissions FCC

## 5.2 26 DB BANDWIDTH

Standard FCC Part 15 Subpart E

The test was performed according to:  
ANSI C63.10 12.4.1

### 5.2.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up to perform the occupied bandwidth measurements.

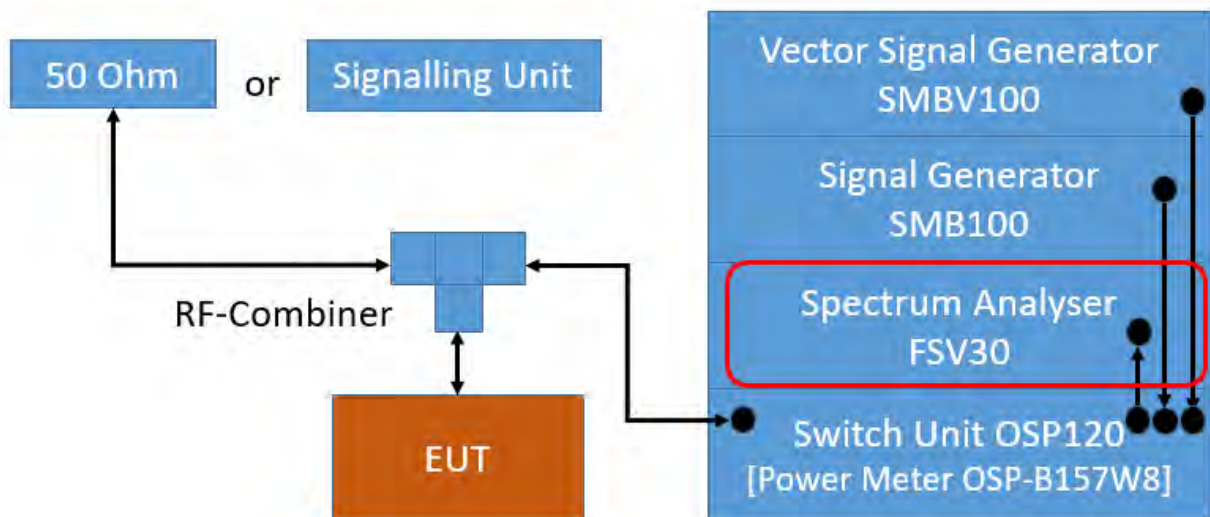
The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

The results recorded were measured with the modulation which produce the worst-case (widest) emission bandwidth.

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

Analyzer settings:

- Resolution Bandwidth (RBW): initially approx. 1 % of nominal emission bandwidth
- Video Bandwidth (VBW): > RBW
- Span: 40 / 80 / 160 / 320 MHz (for 20 / 40 / 80 / 160 MHz nominal bandwidth)
- Trace: Maxhold
- Sweeps: Until the trace is stable
- Sweeptime: Auto
- Detector: Peak



TS8997; Occupied Channel Bandwidth 6 dB / 26 dB / 99 %

## 5.2.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart E

There exist no applicable limits. The test was performed to determine the limits for the **“Maximum Conducted Output Power” and DFS test cases.**

Therefore no result was applied.

### 5.2.3 TEST PROTOCOL

Ambient temperature: 23 - 25°C  
 Air Pressure: 990 - 1018 hPa  
 Humidity: 30 - 40%

| Radio Technology | Operating Frequency | Subband  | 26 dB Bandwidth [MHz] |
|------------------|---------------------|----------|-----------------------|
| WLAN a           | low                 | U-NII-1  | 19.8                  |
| WLAN a           | mid                 | U-NII-1  | 19.8                  |
| WLAN a           | high                | U-NII-1  | 20.1                  |
| WLAN a           | low                 | U-NII-2A | 20.2                  |
| WLAN a           | mid                 | U-NII-2A | 20.6                  |
| WLAN a           | high                | U-NII-2A | 20.2                  |
| WLAN a           | low                 | U-NII-2C | 20.0                  |
| WLAN a           | mid                 | U-NII-2C | 20.0                  |
| WLAN a           | high                | U-NII-2C | 19.7                  |
| WLAN a           | low                 | U-NII-3  | 20.3                  |
| WLAN a           | mid                 | U-NII-3  | 20.0                  |
| WLAN a           | high                | U-NII-3  | 20.9                  |
| WLAN n 20 MHz    | low                 | U-NII-1  | 20.5                  |
| WLAN n 20 MHz    | mid                 | U-NII-1  | 20.5                  |
| WLAN n 20 MHz    | high                | U-NII-1  | 20.6                  |
| WLAN n 20 MHz    | low                 | U-NII-2A | 20.5                  |
| WLAN n 20 MHz    | mid                 | U-NII-2A | 20.9                  |
| WLAN n 20 MHz    | high                | U-NII-2A | 21.2                  |
| WLAN n 20 MHz    | low                 | U-NII-2C | 21.2                  |
| WLAN n 20 MHz    | mid                 | U-NII-2C | 21.0                  |
| WLAN n 20 MHz    | high                | U-NII-2C | 20.6                  |
| WLAN n 20 MHz    | low                 | U-NII-3  | 20.4                  |
| WLAN n 20 MHz    | mid                 | U-NII-3  | 20.5                  |
| WLAN n 20 MHz    | high                | U-NII-3  | 21.0                  |
| WLAN n 40 MHz    | low                 | U-NII-1  | 41.1                  |
| WLAN n 40 MHz    | high                | U-NII-1  | 41.1                  |
| WLAN n 40 MHz    | low                 | U-NII-2A | 41.6                  |
| WLAN n 40 MHz    | high                | U-NII-2A | 41.6                  |
| WLAN n 40 MHz    | low                 | U-NII-2C | 41.0                  |
| WLAN n 40 MHz    | mid                 | U-NII-2C | 41.9                  |
| WLAN n 40 MHz    | high                | U-NII-2C | 41.3                  |
| WLAN n 40 MHz    | low                 | U-NII-3  | 41.7                  |
| WLAN n 40 MHz    | high                | U-NII-3  | 41.6                  |

Remark: Please see next sub-clause for the measurement plot.

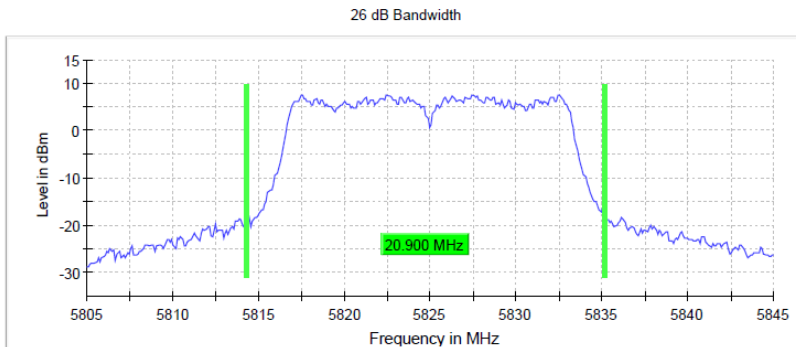


### 5.2.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3 (S01\_161\_AC01)

#### 26 dB Bandwidth

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|-----------------|--------|
| 5825.000000         | 20.900000       | ---             | ---             | 5814.250000          | 5835.150000           | 7.7             | PASS   |

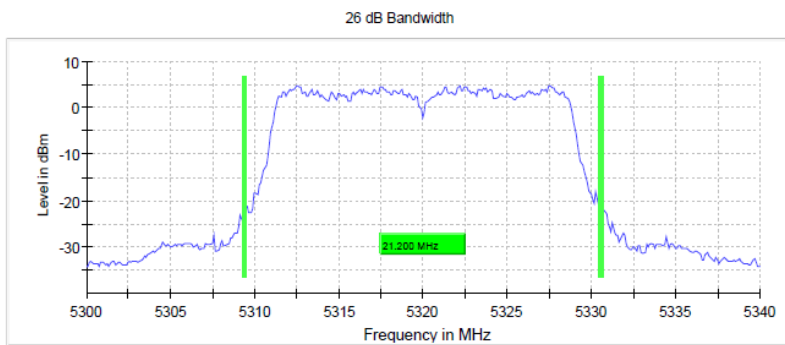


| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.80500 GHz      |
| Stop Frequency        | 5.84500 GHz      |
| Span                  | 40.000 MHz       |
| RBW                   | 200.000 kHz      |
| VBW                   | 1.000 MHz        |
| SweepPoints           | 400              |
| Sweeptime             | 1.000 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 200              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 41 / max. 150    |
| Stable                | 5 / 5            |
| Max Stable Difference | 0.07 dB          |

Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-2A (S01\_161\_AD01)

#### 26 dB Bandwidth

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|-----------------|--------|
| 5320.000000         | 21.200000       | ---             | ---             | 5309.350000          | 5330.550000           | 4.8             | PASS   |

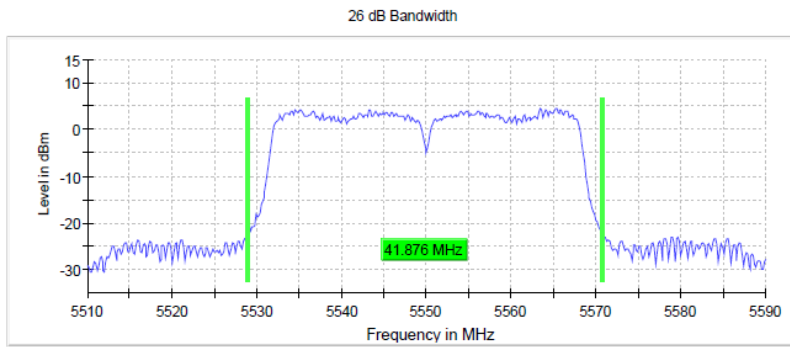


| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.30000 GHz      |
| Stop Frequency        | 5.34000 GHz      |
| Span                  | 40.000 MHz       |
| RBW                   | 200.000 kHz      |
| VBW                   | 1.000 MHz        |
| SweepPoints           | 400              |
| Sweeptime             | 1.000 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 200              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 67 / max. 150    |
| Stable                | 5 / 5            |
| Max Stable Difference | 0.06 dB          |

Radio Technology = WLAN n 40 MHz, Operating Frequency = mid, Subband = U-NII-2C (S01\_161\_AD01)

**26 dB Bandwidth**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|-----------------|--------|
| 5550.000000         | 41.876173       | ---             | ---             | 5528.836773          | 5570.712946           | 4.6             | PASS   |



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.51000 GHz      |
| Stop Frequency        | 5.59000 GHz      |
| Span                  | 80.000 MHz       |
| RBW                   | 300.000 kHz      |
| VBW                   | 1.000 MHz        |
| SweepPoints           | 533              |
| Sweeptime             | 1.000 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 200              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 106 / max. 150   |
| Stable                | 5 / 5            |
| Max Stable Difference | 0.14 dB          |

5.2.5 TEST EQUIPMENT USED

- R&S TS8997

### 5.3 6 DB BANDWIDTH

Standard FCC Part 15 Subpart E

The test was performed according to:  
ANSI C63.10 6.9.2

#### 5.3.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was setup in a shielded room to perform the occupied bandwidth measurements.

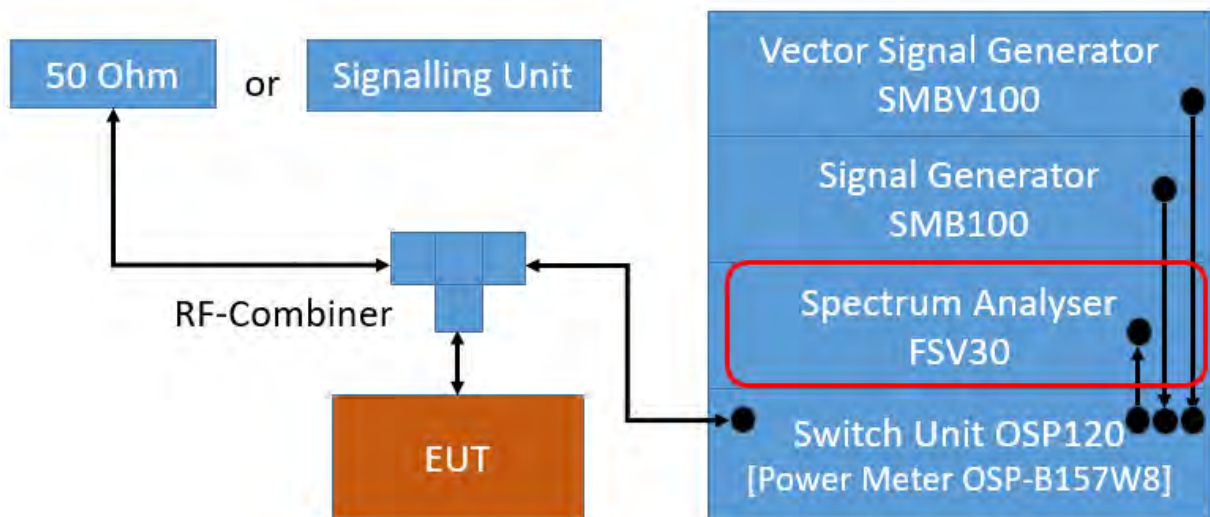
The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

The results recorded were measured with the modulation which produce the worst-case (smallest) emission bandwidth.

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

Analyzer settings:

- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Span: 40 / 80 / 160 / 320 MHz (for 20 / 40 / 80 / 160 MHz nominal bandwidth))
- Trace: Maxhold
- Sweeps: Until the trace is stable
- Sweeptime: Auto
- Detector: Peak



TS8997; Occupied Channel Bandwidth 6 dB / 26 dB / 99 %

### 5.3.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart E, §15.407 (e)

Within the 5.725-5.850 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### 5.3.3 TEST PROTOCOL

Ambient temperature: 23 - 25°C  
 Air Pressure: 990 - 1018 hPa  
 Humidity: 30 - 40%

| Radio Technology | Operating Frequency | 6 dB Bandwidth [MHz] | Limit [MHz] | Margin [MHz] | Min. 6 dB Frequency [MHz] | Max. 6 dB Frequency [MHz] |
|------------------|---------------------|----------------------|-------------|--------------|---------------------------|---------------------------|
| WLAN a           | low                 | 16.45                | 0.5         | 15.95        | 5736.78                   | 5753.23                   |
| WLAN a           | mid                 | 16.45                | 0.5         | 15.95        | 5776.78                   | 5793.23                   |
| WLAN a           | high                | 16.40                | 0.5         | 15.90        | 5816.78                   | 5833.18                   |
| WLAN n 20 MHz    | low                 | 17.65                | 0.5         | 17.15        | 5736.18                   | 5753.83                   |
| WLAN n 20 MHz    | mid                 | 17.65                | 0.5         | 17.15        | 5776.18                   | 5793.83                   |
| WLAN n 20 MHz    | high                | 17.65                | 0.5         | 17.15        | 5816.18                   | 5833.83                   |
| WLAN n 40 MHz    | low                 | 36.10                | 0.5         | 35.60        | 5692.03                   | 5728.13                   |
| WLAN n 40 MHz    | high                | 35.90                | 0.5         | 35.40        | 5777.03                   | 5812.93                   |

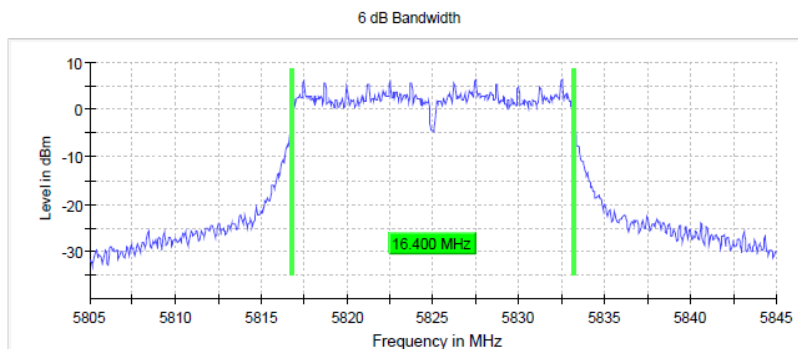
Remark: Please see next sub-clause for the measurement plot.

### 5.3.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3 (S01\_161\_AC01)

#### 6 dB Bandwidth

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|-----------------|--------|
| 5825.000000         | 16.400000       | 0.500000        | --              | 5816.775000          | 5833.175000           | 6.5             | PASS   |

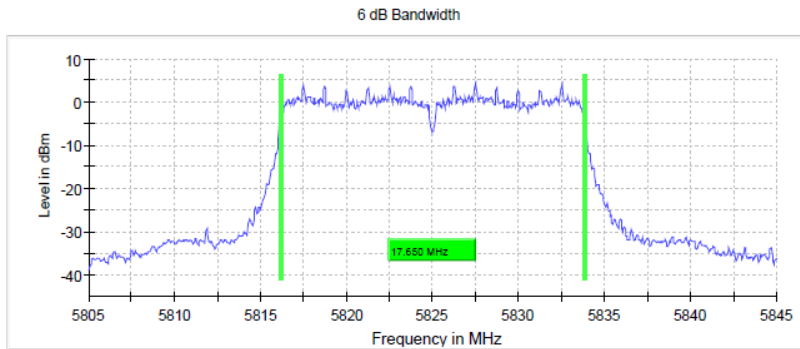


| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.80500 GHz      |
| Stop Frequency        | 5.84500 GHz      |
| Span                  | 40.000 MHz       |
| RBW                   | 100.000 kHz      |
| VBW                   | 300.000 kHz      |
| SweepPoints           | 800              |
| SweepTime             | 1.040 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 200              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 42 / max. 150    |
| Stable                | 5 / 5            |
| Max Stable Difference | 0.14 dB          |

Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S01\_161\_AD01)

**6 dB Bandwidth**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|-----------------|--------|
| 5825.000000         | 17.650000       | 0.500000        | ---             | 5816.175000          | 5833.825000           | 4.4             | PASS   |

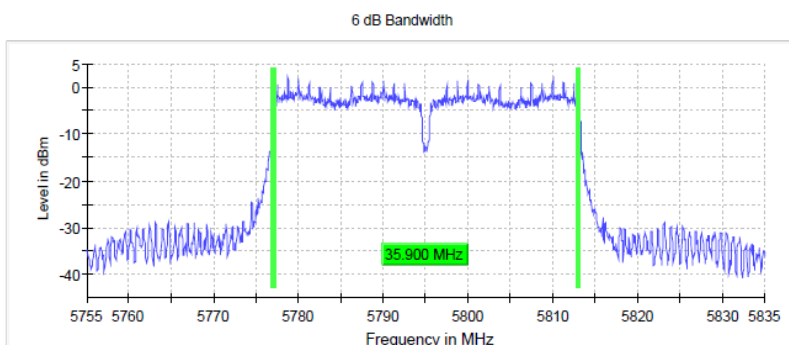


| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.80500 GHz      |
| Stop Frequency        | 5.84500 GHz      |
| Span                  | 40.000 MHz       |
| RBW                   | 100.000 kHz      |
| VBW                   | 300.000 kHz      |
| SweepPoints           | 800              |
| SweepTime             | 1.040 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 200              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 56 / max. 150    |
| Stable                | 5 / 5            |
| Max Stable Difference | 0.06 dB          |

Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S01\_161\_AD01)

**6 dB Bandwidth**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|-----------------|--------|
| 5795.000000         | 35.900000       | 0.500000        | ---             | 5777.025000          | 5812.925000           | 2.1             | PASS   |



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.75500 GHz      |
| Stop Frequency        | 5.83500 GHz      |
| Span                  | 80.000 MHz       |
| RBW                   | 100.000 kHz      |
| VBW                   | 300.000 kHz      |
| SweepPoints           | 1600             |
| SweepTime             | 1.600 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 200              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 92 / max. 150    |
| Stable                | 5 / 5            |
| Max Stable Difference | 0.11 dB          |

5.3.5 TEST EQUIPMENT USED

- R&S TS8997

## 5.4 99 % BANDWIDTH

Standard FCC Part 15 Subpart E

The test was performed according to:  
ANSI C63.10 12.4.2 (6.9.3)

### 5.4.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up to perform the occupied bandwidth measurements.

The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

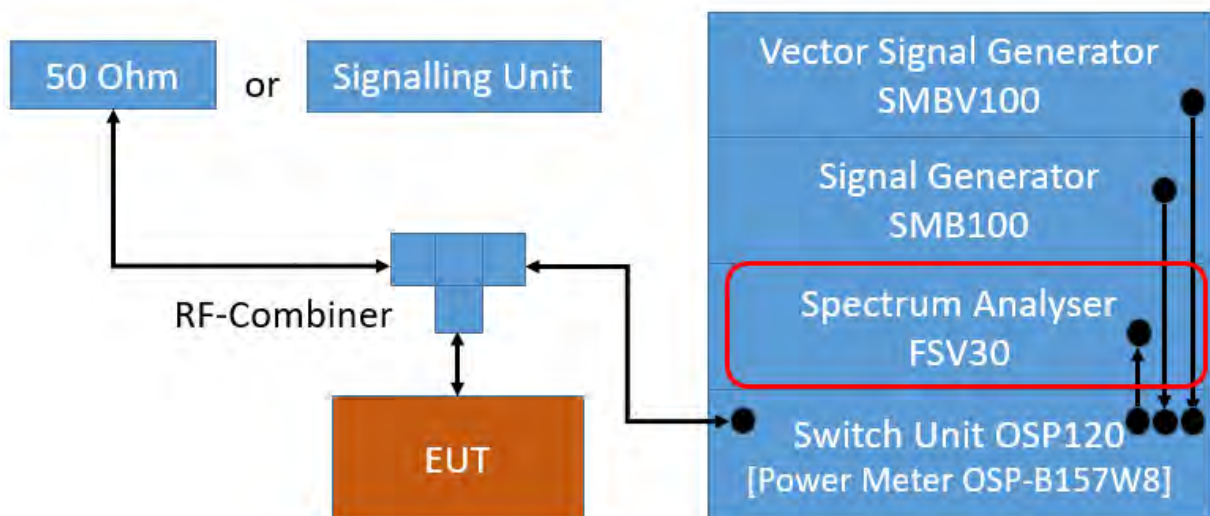
The results recorded were measured with the modulation which produce the worst-case (widest) emission bandwidth.

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

Analyzer settings:

- Resolution Bandwidth (RBW): approx.  $\geq 1\%$  of the span, but not below
- Video Bandwidth (VBW):  $\geq 3$  times the RBW
- Span: 40 / 80 / 160 / 320 MHz (for 20 / 40 / 80 / 160 MHz nominal bandwidth)
- Trace: Maxhold
- Sweeps: Until the trace is stable
- Sweeptime: Auto
- Detector: Peak

The 99 % measurement function of the spectrum analyser function was used to determine the 99 % bandwidth.



TS8997; Occupied Channel Bandwidth 6 dB / 26 dB / 99 %

### 5.4.2 TEST REQUIREMENTS / LIMITS

No applicable limit.

**The test was performed to determine the limits for the "Maximum Conducted Output Power" and DFS test cases.**

### 5.4.3 TEST PROTOCOL

Ambient temperature: 23 - 25°C  
 Air Pressure: 990 - 1018 hPa  
 Humidity: 30 - 40%

| Radio Technology | Operating Frequency | Subband  | 99% Bandwidth [MHz] |
|------------------|---------------------|----------|---------------------|
| WLAN a           | low                 | U-NII-1  | 16.7                |
| WLAN a           | mid                 | U-NII-1  | 16.7                |
| WLAN a           | high                | U-NII-1  | 16.7                |
| WLAN a           | low                 | U-NII-2A | 16.7                |
| WLAN a           | mid                 | U-NII-2A | 16.7                |
| WLAN a           | high                | U-NII-2A | 16.7                |
| WLAN a           | low                 | U-NII-2C | 16.7                |
| WLAN a           | mid                 | U-NII-2C | 16.7                |
| WLAN a           | high                | U-NII-2C | 16.7                |
| WLAN a           | low                 | U-NII-3  | 16.7                |
| WLAN a           | mid                 | U-NII-3  | 16.7                |
| WLAN a           | high                | U-NII-3  | 16.7                |
| WLAN n 20 MHz    | low                 | U-NII-1  | 17.7                |
| WLAN n 20 MHz    | mid                 | U-NII-1  | 17.7                |
| WLAN n 20 MHz    | high                | U-NII-1  | 17.7                |
| WLAN n 20 MHz    | low                 | U-NII-2A | 17.7                |
| WLAN n 20 MHz    | mid                 | U-NII-2A | 17.7                |
| WLAN n 20 MHz    | high                | U-NII-2A | 17.7                |
| WLAN n 20 MHz    | low                 | U-NII-2C | 17.7                |
| WLAN n 20 MHz    | mid                 | U-NII-2C | 17.7                |
| WLAN n 20 MHz    | high                | U-NII-2C | 17.7                |
| WLAN n 20 MHz    | low                 | U-NII-3  | 17.7                |
| WLAN n 20 MHz    | mid                 | U-NII-3  | 17.7                |
| WLAN n 20 MHz    | high                | U-NII-3  | 17.7                |
| WLAN n 40 MHz    | low                 | U-NII-1  | 36.3                |
| WLAN n 40 MHz    | high                | U-NII-1  | 36.8                |
| WLAN n 40 MHz    | low                 | U-NII-2A | 36.8                |
| WLAN n 40 MHz    | high                | U-NII-2A | 36.5                |
| WLAN n 40 MHz    | low                 | U-NII-2C | 36.5                |
| WLAN n 40 MHz    | mid                 | U-NII-2C | 36.8                |
| WLAN n 40 MHz    | high                | U-NII-2C | 36.3                |
| WLAN n 40 MHz    | low                 | U-NII-3  | 36.8                |
| WLAN n 40 MHz    | high                | U-NII-3  | 36.8                |

Remark: Please see next sub-clause for the measurement plot.



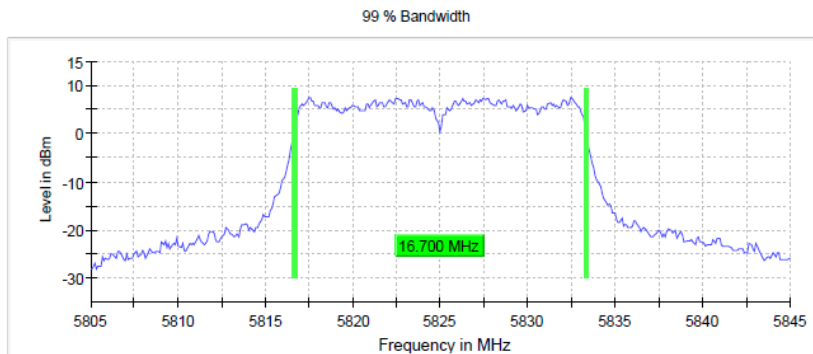
#### 5.4.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3 (S01\_161\_AC01)

##### 99 % Bandwidth

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Result |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|--------|
| 5825.000000         | 16.700000       | --              | --              | 5816.650000          | 5833.350000           | PASS   |

| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.80500 GHz      |
| Stop Frequency        | 5.84500 GHz      |
| Span                  | 40.000 MHz       |
| RBW                   | 200.000 kHz      |
| VBW                   | 1.000 MHz        |
| SweepPoints           | 400              |
| SweepTime             | 1.000 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 200              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 52 / max. 150    |
| Stable                | 5 / 5            |
| Max Stable Difference | 0.20 dB          |

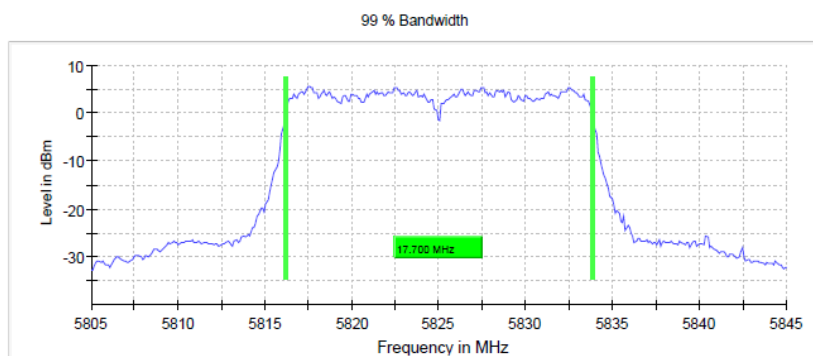


Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S01\_161\_AD01)

##### 99 % Bandwidth

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Result |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|--------|
| 5825.000000         | 17.700000       | --              | --              | 5816.150000          | 5833.850000           | PASS   |

| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.80500 GHz      |
| Stop Frequency        | 5.84500 GHz      |
| Span                  | 40.000 MHz       |
| RBW                   | 200.000 kHz      |
| VBW                   | 1.000 MHz        |
| SweepPoints           | 400              |
| SweepTime             | 1.000 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 200              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 48 / max. 150    |
| Stable                | 5 / 5            |
| Max Stable Difference | 0.19 dB          |



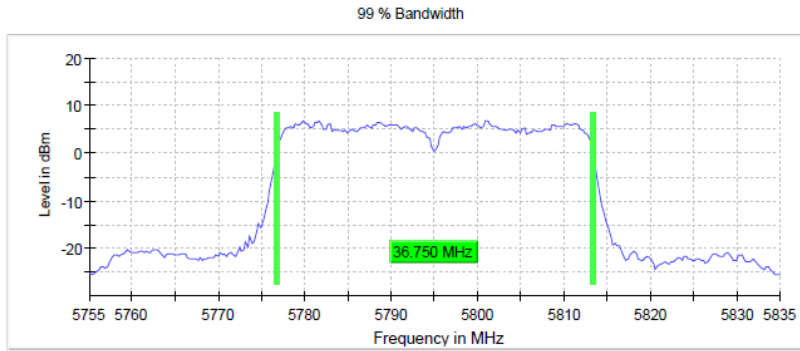


Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S01\_161\_AD01)

**99 % Bandwidth**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Result |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|--------|
| 5795.000000         | 36.750000       | ---             | ---             | 5776.625000          | 5813.375000           | PASS   |

| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.75500 GHz      |
| Stop Frequency        | 5.83500 GHz      |
| Span                  | 80.000 MHz       |
| RBW                   | 500.000 kHz      |
| VBW                   | 2.000 MHz        |
| SweepPoints           | 320              |
| SweepTime             | 1.000 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 200              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 52 / max. 150    |
| Stable                | 5 / 5            |
| Max Stable Difference | 0.23 dB          |



5.4.5 TEST EQUIPMENT USED

- R&S TS8997

## 5.5 MAXIMUM CONDUCTED OUTPUT POWER

Standard FCC Part 15 Subpart E

The test was performed according to:  
ANSI C63.10 12.3.3.2

### 5.5.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up to perform the output power measurements. The results recorded were measured with the modulation which produces the worst-case (highest) output power

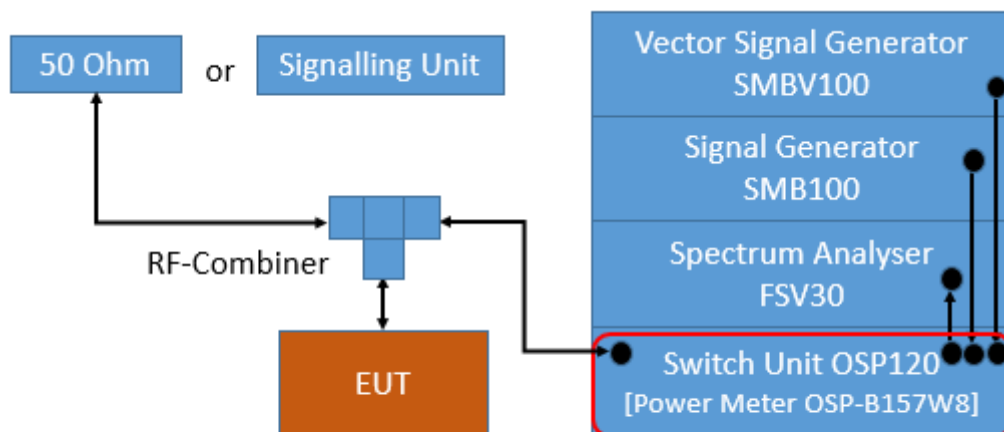
For U-NII bands 1, 2A, 2C, 3:

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

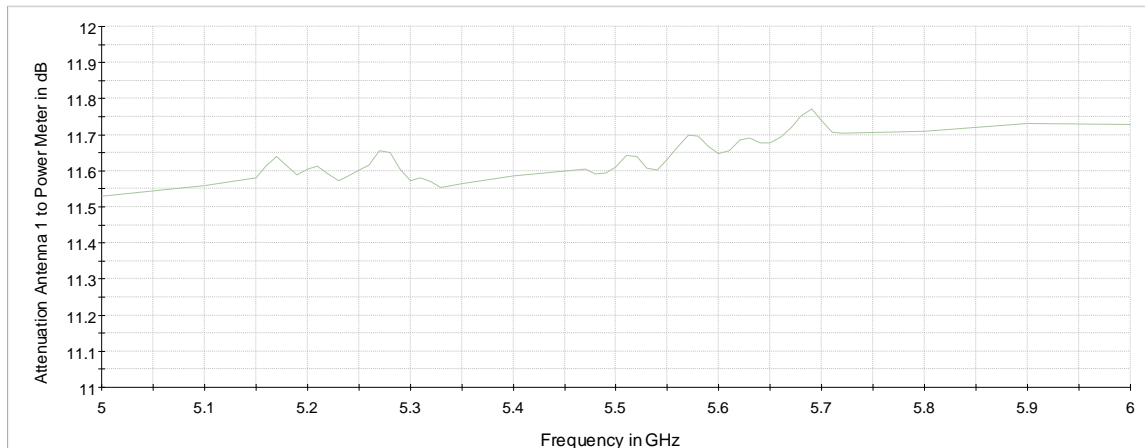
The OSP-B157W is a gated RF average power meter with a signal bandwidth > 300 MHz.

Note:

The measurement was performed according **FCC Public Note "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, 789033 D02", method PM-G.**



TS8997; Maximum Conducted Output Power



Attenuation of measurement path

For U-NII bands 5,6,7,8:

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

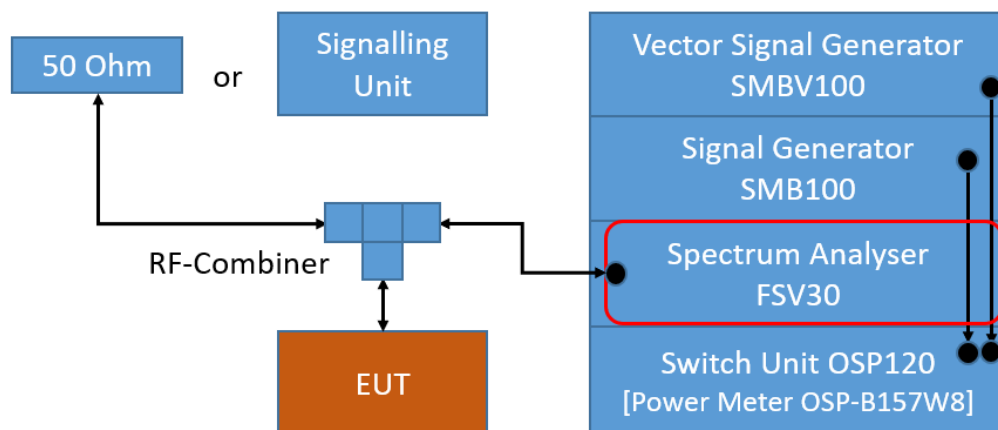
Analyzer settings:

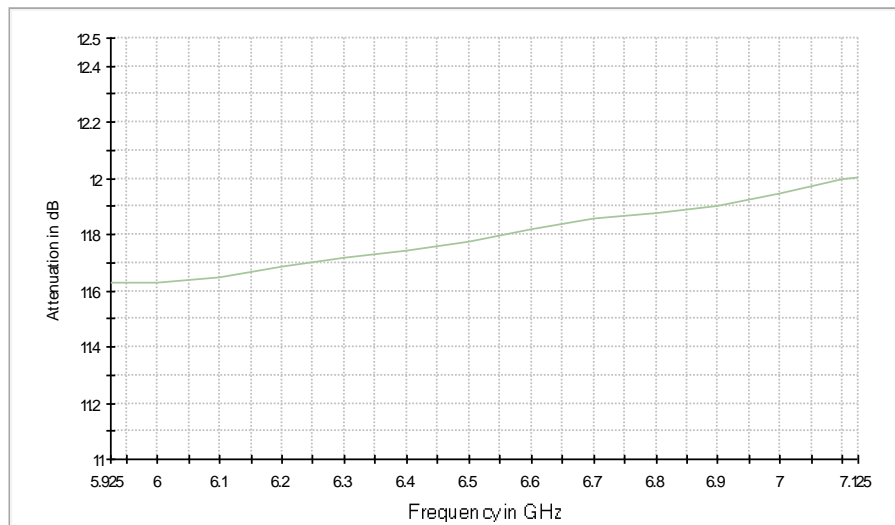
- Resolution Bandwidth (RBW): 1 MHz
- Video Bandwidth (VBW): 3 MHz
- Trace: Average, RMS power averaging mode
- Sweeps: at least 100
- Sweeptime: Auto
- Detector: RMS
- Trigger: free run (DC >98 %) or gated mode (DC < 98 %)

See worst case result plots for details

Note:

The measurement was performed according FCC Public Note "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, 789033 D02", method SA-1.





Attenuation of measurement path

## 5.5.2 TEST REQUIREMENTS / LIMITS

### A) FCC

FCC Part 15, Subpart E, §15.407 (a) (1) (i): Outdoor access point:

For systems using digital modulation techniques in the 5.15 – 5.25 GHz bands:

Limit: 1 W (30 dBm) provided the maximum antenna gain does not exceed 6 dBi.

The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

§15.407 (a) (1) (ii): Indoor access point:

Limit: 1 W (30 dBm) provided the maximum antenna gain does not exceed 6 dBi.

§15.407 (a) (1) (iii): Fixed point-to-point access points:

Limit: 1 W (30 dBm) provided the maximum antenna gain does not exceed 23 dBi.

§15.407 (a) (1) (iv): Client devices:

Limit: 250 mW (24 dBm) provided the maximum antenna gain does not exceed 6 dBi.

FCC Part 15, Subpart E, §15.407 (a) (2)

For systems using digital modulation techniques in the 5.25 – 5.35 GHz and 5.47 – 5.725 GHz bands:

Limit: 250 mW (24 dBm) or  $11 \text{ dBm} + 10 \log (26 \text{ dB bandwidth/MHz})$  whatever is the lesser.

FCC Part 15, Subpart E, §15.407 (a) (3):

For systems using digital modulation techniques in the 5.725 – 5.850 GHz bands:

Limit: 1 W (30 dBm) provided the maximum antenna gain does not exceed 6 dBi. The antenna gain limitation is not applicable for fixed point-to-point devices.

FCC Part 15, Subpart E, §15.407 (a) (4):

For a standard power access point and fixed client devices in the 5.925 – 6.425 GHz and 6.525 – 6.875 GHz bands:

Limit: 4 W (36 dBm) e.i.r.p.

For outdoor devices, the maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

FCC Part 15, Subpart E, §15.407 (a) (5):

For an indoor access point in the 5.925 – 7.125 GHz bands:

Limit: 1 W (30 dBm)e.i.r.p.

FCC Part 15, Subpart E, §15.407 (a) (6):

For a subordinate device operating under an indoor access point in the 5.925 – 7.125 GHz bands:

Limit: 1 W (30 dBm)e.i.r.p.

FCC Part 15, Subpart E, §15.407 (a) (7):

For a client device, except for fixed client devices, operating under standard power access point in the 5.925-6.425 GHz and 6.525-6.875 GHz bands:

Limit: 1 W (30 dBm)e.i.r.p.

**The client device must limit it's power to no more than 6 dB below its associated standard power access point's authorized transmit power.**

FCC Part 15, Subpart E, §15.407 (a) (8):

For client devices operating under the control of an indoor access point in the 5.925 – 7.125 GHz bands:

Limit: 250 mW (24 dBm)e.i.r.p.

FCC Part 15, Subpart E, §15.407 (a) (11):

The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

## B) IC

Different frequency bands and limits apply, as compared to the FCC requirements.

All frequency bands: B is the 99% emission bandwidth in MHz.

RSS-247, 6.2.1.1, Band 5150-5250 MHz, indoor operation only, except for OEM devices installed by vehicle manufacturers:

Limits:

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10}B$ , dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW. (e.i.r.p.)

Other devices: 200 mW (23 dBm) or  $10 + 10 \log_{10}B$  [dBm], whichever power is less.

RSS-247, 6.2.2.1, Band 5250-5350 MHz:

Limits:

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10}B$ , dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other devices than installed in vehicles:

Maximum conducted Power: 250 mW (24 dBm) or  $11 + 10 \log_{10} B$  [dBm], whichever power is less.

e.i.r.p.: 1.0 W (30 dBm) or  $17 + 10 \log_{10} B$  [dBm], whichever power is less.

Outdoor fixed devices with a maximum e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. **at different elevations, where  $\theta$  is the angle above the local horizontal plane** (of the Earth) as shown below:

- i. -13 dBW/MHz for  $0^\circ \leq \theta < 8^\circ$
- ii. **-13 - 0.716 ( $\theta - 8$ )** dBW/MHz for  $8^\circ \leq \theta < 40^\circ$
- iii. **-35.9 - 1.22 ( $\theta - 40$ )** dBW/MHz for  $40^\circ \leq \theta \leq 45^\circ$
- iv. -42 dBW/MHz for  $\theta > 45^\circ$

RSS-247, 6.2.3.1, Bands 5470-5600 MHz and 5650-5725 MHz:

Limits:

Maximum conducted Power: 250 mW (24 dBm) or  $11 + 10 \log_{10} B$  [dBm], whichever power is less.

e.i.r.p.: 1.0 W (30 dBm) or  $17 + 10 \log_{10} B$  [dBm], whichever power is less.

Note: Devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

RSS-247, 6.2.4.1, Band 5725-5850 MHz:

Limits:

Maximum conducted Power: 1 W (30 dBm)

e.i.r.p.: 4 W (36 dBm)

### 5.5.3 TEST PROTOCOL

Ambient temperature: 23 - 25°C  
 Air Pressure: 990 - 1018 hPa  
 Humidity: 30 - 40%  
 WLAN a-Mode; 20 MHz; 6 Mbit/s

| U-NII - Subband | Ch. No. | Freq. [MHz] | Cond. Power [dBm] | EIRP [dBm] | FCC Cond. Limit [dBm] | Margin [dB] | IC Cond. Limit [dBm] | Margin [dB] | IC EIRP Limit [dBm] | Margin [dB] |    |
|-----------------|---------|-------------|-------------------|------------|-----------------------|-------------|----------------------|-------------|---------------------|-------------|----|
| 1               | 36      | 5180        | 17.1              | 19.1       | 30.0                  | 12.9        | N/A                  | -           | 22.2                | 3.1         | 1) |
|                 | 40      | 5200        | 17.0              | 19.0       | 30.0                  | 13.0        | N/A                  | -           | 22.2                | 3.2         | 1) |
|                 | 48      | 5240        | 17.2              | 19.2       | 30.0                  | 12.8        | N/A                  | -           | 22.2                | 3.0         | 1) |
| 2A              | 52      | 5260        | 17.1              | 19.1       | 24.0                  | 6.9         | 23.2                 | 6.1         | 29.2                | 10.1        | 1) |
|                 | 60      | 5300        | 17.2              | 19.2       | 24.0                  | 6.8         | 23.2                 | 6.0         | 29.2                | 10.0        | 1) |
|                 | 64      | 5320        | 16.4              | 18.4       | 24.0                  | 7.6         | 23.2                 | 6.8         | 29.2                | 10.8        | 1) |
| 2C              | 100     | 5500        | 15.8              | 17.8       | 24.0                  | 8.2         | 23.2                 | 7.4         | 29.2                | 11.4        |    |
|                 | 116     | 5580        | 17.9              | 19.9       | 24.0                  | 6.1         | 23.2                 | 5.3         | 29.2                | 9.3         |    |
|                 | 140     | 5700        | 13.9              | 15.9       | 23.9                  | 10.1        | 23.2                 | 9.4         | 29.2                | 13.4        |    |
| 3               | 149     | 5745        | 16.2              | 18.2       | 30.0                  | 13.8        | 30.0                 | 13.8        | 36.0                | 17.8        |    |
|                 | 157     | 5785        | 17.0              | 19.0       | 30.0                  | 13.0        | 30.0                 | 13.0        | 36.0                | 17.0        |    |
|                 | 165     | 5825        | 17.8              | 19.8       | 30.0                  | 12.2        | 30.0                 | 12.2        | 36.0                | 16.2        |    |

WLAN n-Mode; 20 MHz; MCS0; SISO

| U-NII - Subband | Ch. No. | Freq. [MHz] | Cond. Power [dBm] | EIRP [dBm] | FCC Cond. Limit [dBm] | Margin [dB] | IC Cond. Limit [dBm] | Margin [dB] | IC EIRP Limit [dBm] | Margin [dB] |    |
|-----------------|---------|-------------|-------------------|------------|-----------------------|-------------|----------------------|-------------|---------------------|-------------|----|
| 1               | 36      | 5180        | 16.1              | 18.1       | 30.0                  | 13.9        | N/A                  | -           | 22.5                | 4.4         | 1) |
|                 | 40      | 5200        | 16.1              | 18.1       | 30.0                  | 13.9        | N/A                  | -           | 22.5                | 4.4         | 1) |
|                 | 48      | 5240        | 16.2              | 18.2       | 30.0                  | 13.8        | N/A                  | -           | 22.5                | 4.3         | 1) |
| 2A              | 52      | 5260        | 16.2              | 18.2       | 24.0                  | 7.8         | 23.5                 | 7.3         | 29.5                | 11.3        | 1) |
|                 | 60      | 5300        | 16.4              | 18.4       | 24.0                  | 7.6         | 23.5                 | 7.1         | 29.5                | 11.1        | 1) |
|                 | 64      | 5320        | 15.4              | 17.4       | 24.0                  | 8.6         | 23.5                 | 8.1         | 29.5                | 12.1        | 1) |
| 2C              | 100     | 5500        | 15.0              | 17.0       | 24.0                  | 9.0         | 23.5                 | 8.5         | 29.5                | 12.5        |    |
|                 | 116     | 5580        | 16.1              | 18.1       | 24.0                  | 7.9         | 23.5                 | 7.4         | 29.5                | 11.4        |    |
|                 | 140     | 5700        | 14.3              | 16.3       | 24.0                  | 9.7         | 23.5                 | 9.2         | 29.5                | 13.2        |    |
| 3               | 149     | 5745        | 16.3              | 18.3       | 30.0                  | 13.7        | 30.0                 | 13.7        | 36.0                | 17.7        |    |
|                 | 157     | 5785        | 16.2              | 18.2       | 30.0                  | 13.8        | 30.0                 | 13.8        | 36.0                | 17.8        |    |
|                 | 165     | 5825        | 16.1              | 18.1       | 30.0                  | 13.9        | 30.0                 | 13.9        | 36.0                | 17.9        |    |

WLAN n-Mode; 40 MHz; MCS0; SISO

| U-NII - Subband | Ch. No. | Freq. [MHz] | Cond. Power [dBm] | EIRP [dBm] | FCC Cond. Limit [dBm] | Margin [dB] | IC Cond. Limit [dBm] | Margin [dB] | IC EIRP Limit [dBm] | Margin [dB] |    |
|-----------------|---------|-------------|-------------------|------------|-----------------------|-------------|----------------------|-------------|---------------------|-------------|----|
| 1               | 38      | 5190        | 14.1              | 16.1       | 30.0                  | 15.9        | N/A                  | -           | 23.0                | 6.9         | 1) |
|                 | 46      | 5230        | 16.2              | 18.2       | 30.0                  | 13.8        | N/A                  | -           | 23.0                | 4.8         | 1) |
| 2A              | 54      | 5270        | 16.1              | 18.1       | 24.0                  | 7.9         | 24.0                 | 7.9         | 30.0                | 11.9        | 1) |
|                 | 62      | 5310        | 14.3              | 16.3       | 24.0                  | 9.7         | 24.0                 | 9.7         | 30.0                | 13.7        | 1) |
| 2C              | 102     | 5510        | 12.7              | 14.7       | 24.0                  | 11.3        | 24.0                 | 11.3        | 30.0                | 15.3        |    |
|                 | 110     | 5550        | 15.8              | 17.8       | 24.0                  | 8.2         | 24.0                 | 8.2         | 30.0                | 12.2        |    |
|                 | 134     | 5670        | 13.0              | 15.0       | 24.0                  | 11.0        | 24.0                 | 11.0        | 30.0                | 15.0        |    |
| 3               | 151     | 5755        | 16.1              | 18.1       | 30.0                  | 13.9        | 30.0                 | 13.9        | 36.0                | 17.9        |    |
|                 | 159     | 5795        | 16.0              | 18.0       | 30.0                  | 14.0        | 30.0                 | 14.0        | 36.0                | 18.0        |    |

1) No further limit applies in regards to the elevation.

Remark: None.

#### 5.5.4 MEASUREMENT PLOTS

Power Meter Measurement, no plots provided.

#### 5.5.5 TEST EQUIPMENT USED

- R&S TS8997



## 5.6 PEAK POWER SPECTRAL DENSITY

Standard FCC Part 15 Subpart E

The test was performed according to:  
ANSI C63.10 12.5 (SA-3)

### 5.6.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up in a shielded room to perform the Maximum Power Spectral Density measurements. The results recorded were measured with the modulation which produces the worst-case (highest) output power.

For U-NII bands 1, 2A, 2C, 3:

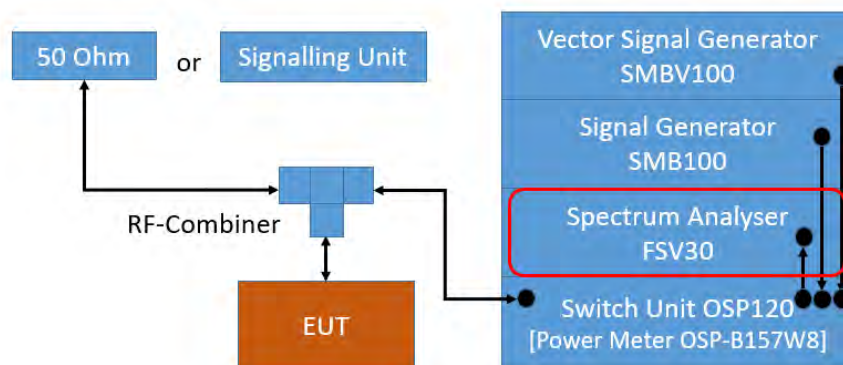
The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

Analyzer settings:

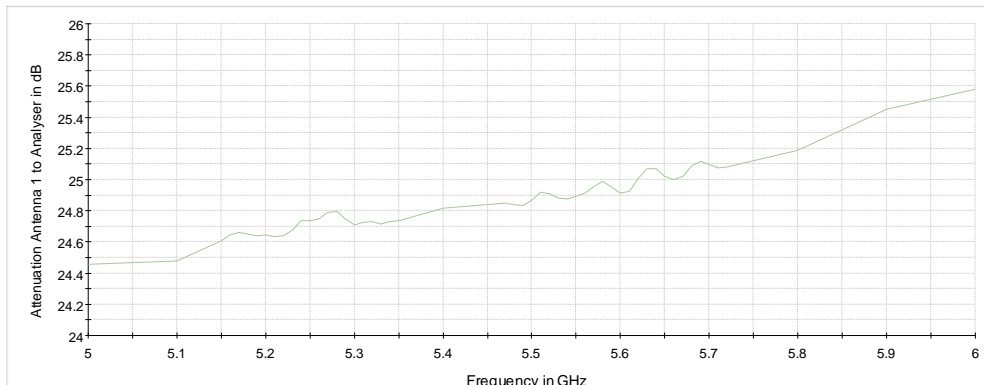
- Resolution Bandwidth (RBW): 1 MHz (for subband 3: 500 kHz)
- Video Bandwidth (VBW): 3 MHz (for subband 3: 2 MHz)
- Trace: Max Hold
- Sweeps: till stable (at least 180, max. 900)
- **Sweep time:  $\leq$  Number of sweep points x Min. Transmitter on time**
- Detector: RMS
- Trigger: free run

Note:

The analyser settings are according FCC Public Note "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, 789033 D02", method SA-3.



TS8997; Maximum Power Spectral Density



Attenuation of the measurement path

For U-NII bands 5, 6, 7, 8:

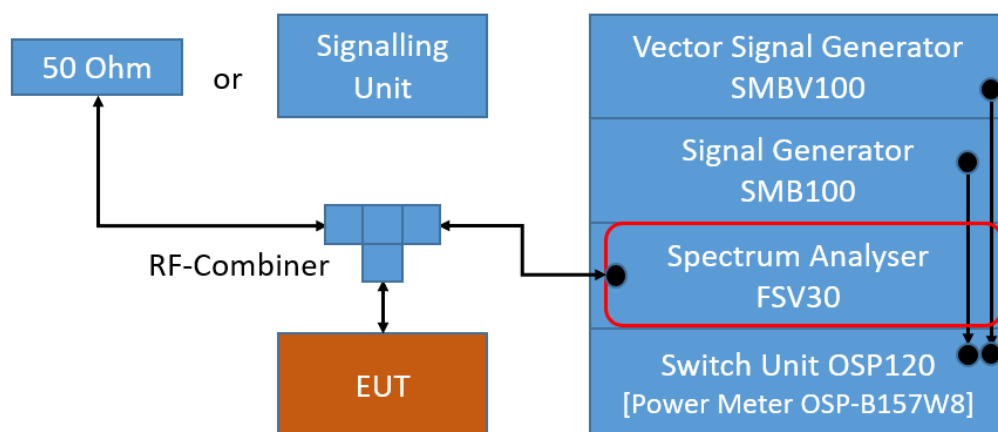
The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

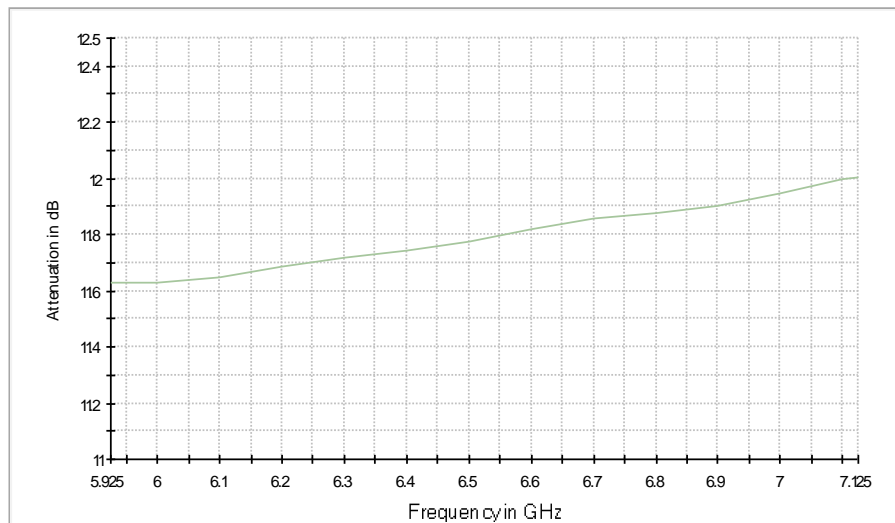
Analyzer settings:

- Resolution Bandwidth (RBW): 1 MHz
- Video Bandwidth (VBW): 3 MHz
- Trace: Average, RMS power averaging mode
- Sweeps: at least 100
- Sweeptime: Auto
- Detector: RMS
- Trigger: free run (DC >98 %) or gated mode (DC < 98 %)

Note:

The analyser settings are according FCC Public Note "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, 789033 D02", method SA-1.





Attenuation of measurement path

## 5.6.2 TEST REQUIREMENTS / LIMITS

### A) FCC

FCC Part 15, Subpart E, §15.407 (a) (1)

For systems using digital modulation techniques in the 5.15 – 5.25 GHz bands:

(i) and (ii), outdoor and indoor access points: Limit: 17 dBm/MHz.

(iv), mobile and portable client devices: Limit: 11 dBm/MHz.

FCC Part 15, Subpart E, §15.407 (a) (2)

For systems using digital modulation techniques in the 5.25 – 5.35 GHz and 5.47 – 5.725 GHz bands:

Limit: 11 dBm/MHz.

FCC Part 15, Subpart E, §15.407 (a) (3)

For systems using digital modulation techniques in the 5.725 – 5.850 GHz bands:

Limit: 30 dBm/500 kHz.

FCC Part 15, Subpart E, §15.407 (a) (4):

For a standard power access point and fixed client devices in the 5.925 – 6.425 GHz and 6.525 – 6.875 GHz bands:

Limit: 23 dBm/MHz e.i.r.p.

FCC Part 15, Subpart E, §15.407 (a) (5):

For an indoor access point in the 5.925 – 7.125 GHz bands:

Limit: 5 dBm/MHz e.i.r.p.

FCC Part 15, Subpart E, §15.407 (a) (6):

For a subordinate device operating under an indoor access point in the 5.925 – 7.125 GHz bands:

Limit: 5 dBm/MHz e.i.r.p.

FCC Part 15, Subpart E, §15.407 (a) (7):

For a client device, except for fixed client devices, operating under standard power access point in the 5.925-6.425 GHz and 6.525-6.875 GHz bands:  
Limit: 17 dBm/MHz e.i.r.p.

FCC Part 15, Subpart E, §15.407 (a) (8):

For client devices operating under the control of an indoor access point in the 5.925 – 7.125 GHz bands:  
Limit: -1 dBm/MHz e.i.r.p.

#### B) IC

Different frequency bands and limits apply, as compared to the FCC requirements.

RSS-247, 6.2.1 (1), Band 5150-5250 MHz, indoor operation only:  
Limit (e.i.r.p.): 10 dBm/MHz.

RSS-247, 6.2.2 (1), Band 5250-5350 MHz:  
Limit: 11 dBm/MHz.

RSS-247, 6.2.3 (1), Bands 5470-5600 MHz and 5650-5725 MHz:  
Limit: 11 dBm/MHz.

RSS-247, 6.2.4 (1), Band 5725-5850 MHz:  
Limit: 30 dBm/500 kHz.

### 5.6.3 TEST PROTOCOL

Ambient temperature: 23 - 25°C  
 Air Pressure: 990 - 1018 hPa  
 Humidity: 30 - 40%  
 WLAN a-Mode; 20 MHz; 6 Mbit/s

| U-NII - Subband | Ch. No. | Freq. [MHz] | MPSD [dBm/MHz] | FCC Limit [dBm/MHz] | Margin [dB] | IC Limit [dBm/MHz] | Margin [dB] | IC EIRP MPSD |
|-----------------|---------|-------------|----------------|---------------------|-------------|--------------------|-------------|--------------|
| 1               | 36      | 5180        | 5.6            | 17.0                | 11.4        | 10.0               | 2.4         | 7.6          |
|                 | 40      | 5200        | 5.2            | 17.0                | 11.8        | 10.0               | 2.8         | 7.2          |
|                 | 48      | 5240        | 5.4            | 17.0                | 11.6        | 10.0               | 2.6         | 7.4          |
| 2A              | 52      | 5260        | 5.3            | 11.0                | 5.7         | 11.0               | 5.7         | unit:        |
|                 | 60      | 5300        | 5.4            | 11.0                | 5.6         | 11.0               | 5.6         | dBm/         |
|                 | 64      | 5320        | 4.8            | 11.0                | 6.2         | 11.0               | 6.2         | MHz          |
| 2C              | 100     | 5500        | 4.3            | 11.0                | 6.7         | 11.0               | 6.7         |              |
|                 | 116     | 5580        | 6.6            | 11.0                | 4.4         | 11.0               | 4.4         |              |
|                 | 140     | 5700        | 2.3            | 11.0                | 8.7         | 11.0               | 8.7         |              |
| 3               | 149     | 5745        | 1.4            | 30.0                | 28.6        | 30.0               | 28.6        |              |
|                 | 157     | 5785        | 2.2            | 30.0                | 27.8        | 30.0               | 27.8        |              |
|                 | 165     | 5825        | 3.2            | 30.0                | 26.8        | 30.0               | 26.8        |              |

WLAN n-Mode; 20 MHz; MCS0; SISO

| U-NII - Subband | Ch. No. | Freq. [MHz] | MPSD [dBm/MHz] | FCC Limit [dBm/MHz] | Margin [dB] | IC Limit [dBm/MHz] | Margin [dB] | IC EIRP MPSD |
|-----------------|---------|-------------|----------------|---------------------|-------------|--------------------|-------------|--------------|
| 1               | 36      | 5180        | 4.1            | 17.0                | 12.9        | 10.0               | 3.9         | 6.1          |
|                 | 40      | 5200        | 4.0            | 17.0                | 13.0        | 10.0               | 4.0         | 6.0          |
|                 | 48      | 5240        | 4.2            | 17.0                | 12.8        | 10.0               | 3.8         | 6.2          |
| 2A              | 52      | 5260        | 4.1            | 11.0                | 6.9         | 11.0               | 6.9         | unit:        |
|                 | 60      | 5300        | 4.2            | 11.0                | 6.8         | 11.0               | 6.8         | dBm/         |
|                 | 64      | 5320        | 3.1            | 11.0                | 7.9         | 11.0               | 7.9         | MHz          |
| 2C              | 100     | 5500        | 2.9            | 11.0                | 8.1         | 11.0               | 8.1         |              |
|                 | 116     | 5580        | 4.3            | 11.0                | 6.7         | 11.0               | 6.7         |              |
|                 | 140     | 5700        | 2.0            | 11.0                | 9.0         | 11.0               | 9.0         |              |
| 3               | 149     | 5745        | 1.4            | 30.0                | 28.6        | 30.0               | 28.6        |              |
|                 | 157     | 5785        | 1.4            | 30.0                | 28.6        | 30.0               | 28.6        |              |
|                 | 165     | 5825        | 1.0            | 30.0                | 29.0        | 30.0               | 29.0        |              |

WLAN n-Mode; 40 MHz; MCS0; SISO

| U-NII - Subband | Ch. No. | Freq. [MHz] | MPSD [dBm/MHz] | FCC Limit [dBm/MHz] | Margin [dB] | IC Limit [dBm/MHz] | Margin [dB] | IC EIRP MPSD |
|-----------------|---------|-------------|----------------|---------------------|-------------|--------------------|-------------|--------------|
| 1               | 38      | 5190        | -0.9           | 17.0                | 17.9        | 10.0               | 8.9         | 1.2          |
|                 | 46      | 5230        | 1.3            | 17.0                | 15.7        | 10.0               | 6.7         | 3.3          |
| 2A              | 54      | 5270        | 1.2            | 11.0                | 9.8         | 11.0               | 9.8         | unit:        |
|                 | 62      | 5310        | -0.7           | 11.0                | 11.7        | 11.0               | 11.7        | dBm/         |
| 2C              | 102     | 5510        | -2.1           | 11.0                | 13.1        | 11.0               | 13.1        | MHz          |
|                 | 110     | 5550        | 1.0            | 11.0                | 10.0        | 11.0               | 10.0        |              |
|                 | 134     | 5670        | -2.0           | 11.0                | 13.0        | 11.0               | 13.0        |              |
| 3               | 151     | 5755        | -1.6           | 30.0                | 31.6        | 30.0               | 31.6        |              |
|                 | 159     | 5795        | -1.6           | 30.0                | 31.6        | 30.0               | 31.6        |              |

Remark: Please see next sub-clause for the measurement plot.

### 5.6.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

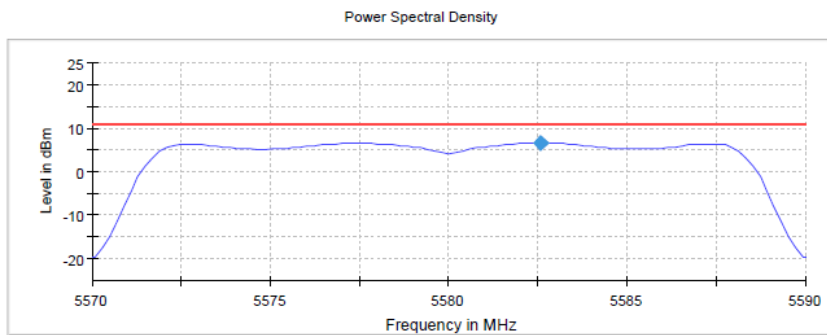
Radio Technology = WLAN a, Operating Frequency = mid, Subband = U-NII-2C (S01\_161\_AC01)

#### Result

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 5580.000000         | 5582.574257     | 6.591     | 11.0            | PASS   |

#### Ports

| Port | State |
|------|-------|
| 1    | used  |



— Limit — Sum Level ◆ PSD

| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.57000 GHz      |
| Stop Frequency        | 5.59000 GHz      |
| Span                  | 20.000 MHz       |
| RBW                   | 1.000 MHz        |
| VBW                   | 3.000 MHz        |
| SweepPoints           | 101              |
| Sweeptime             | 1.010 s          |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | RMS              |
| SweepCount            | 60               |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 4 / max. 15      |
| Stable                | 3 / 3            |
| Max Stable Difference | 0.01 dB          |

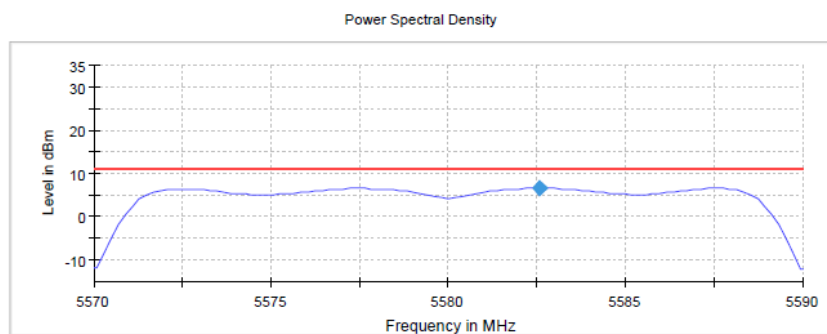
Radio Technology = WLAN n 20 MHz, Operating Frequency = mid, Subband = U-NII-2C (S01\_161\_AD01)

#### Result

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 5580.000000         | 5582.574257     | 6.535     | 11.0            | PASS   |

#### Ports

| Port | State |
|------|-------|
| 1    | used  |



— Limit — Sum Level ◆ PSD

| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.57000 GHz      |
| Stop Frequency        | 5.59000 GHz      |
| Span                  | 20.000 MHz       |
| RBW                   | 1.000 MHz        |
| VBW                   | 3.000 MHz        |
| SweepPoints           | 101              |
| Sweeptime             | 1.010 s          |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | RMS              |
| SweepCount            | 60               |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 4 / max. 15      |
| Stable                | 3 / 3            |
| Max Stable Difference | 0.00 dB          |

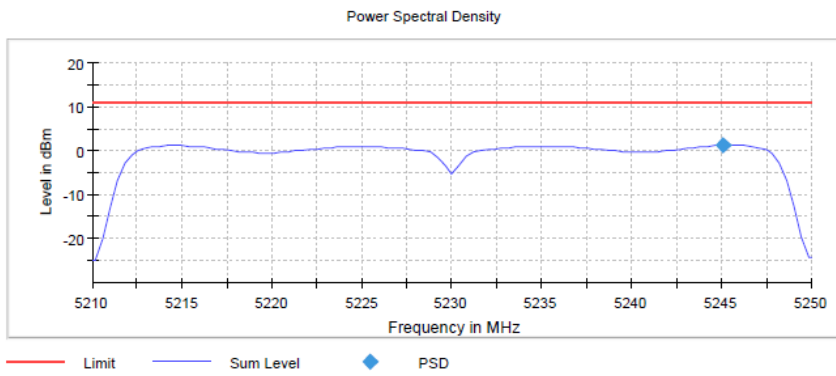
Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-1 (S01\_161\_AD01)

**Result**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 5230.000000         | 5245.049505     | 1.327     | 11.0            | PASS   |

**Ports**

| Port | State |
|------|-------|
| 1    | used  |



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 5.21000 GHz      |
| Stop Frequency        | 5.25000 GHz      |
| Span                  | 40.000 MHz       |
| RBW                   | 1.000 MHz        |
| VBW                   | 3.000 MHz        |
| SweepPoints           | 101              |
| SweepTime             | 1.010 s          |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | RMS              |
| SweepCount            | 60               |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.30 dB          |
| Run                   | 4 / max. 15      |
| Stable                | 3 / 3            |
| Max Stable Difference | 0.00 dB          |

5.6.5 TEST EQUIPMENT USED

- R&S TS8997

## 5.7 UNDESIRABLE EMISSIONS; GENERAL FIELD STRENGTH LIMITS

Standard FCC Part 15 Subpart E

The test was performed according to:  
ANSI C63.10

### 5.7.1 TEST DESCRIPTION

Radiated Measurement with 50 Ohm termination at antenna ports

The test set-up was made in accordance to the general provisions of ANSI C63.10 in a typical installation configuration. The measurements were performed according the following sub-chapters of ANSI C63.10:

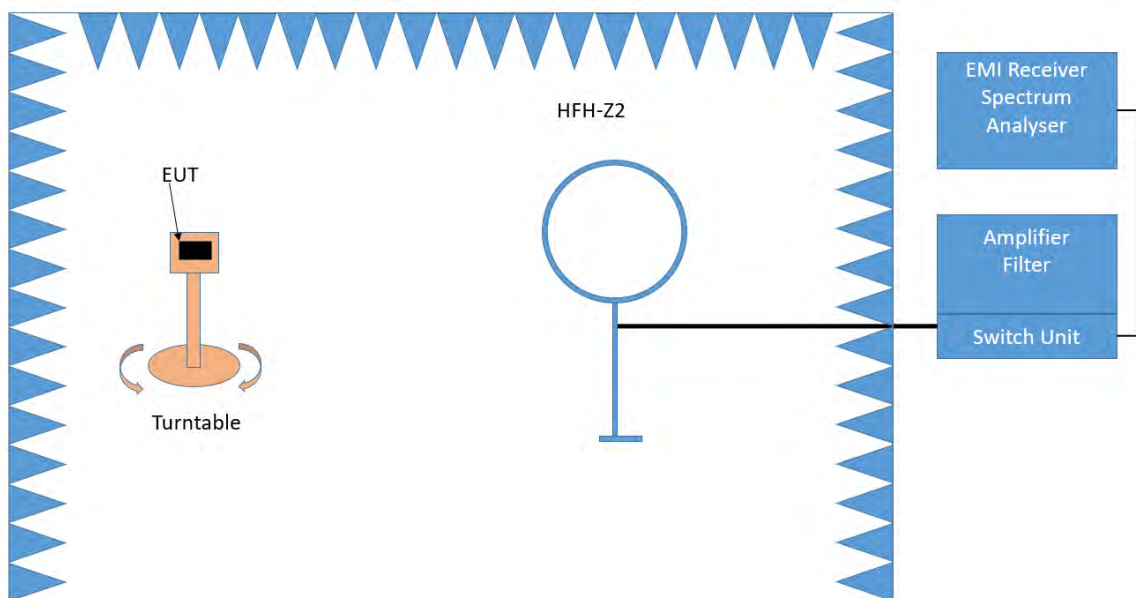
- < 30 MHz: Chapter 6.4
- 30 MHz – 1 GHz: Chapter 6.5
- > 1 GHz: Chapter 6.6 (procedure according 6.6.5 used)

The measurement procedure is implemented into the EMI test software EMC32 from R&S. Exploratory tests are performed at 3 orthogonal axes to determine the worst-case orientation of a body-worn or handheld EUT. The final test on all kind of EUTs is also performed at 3 axes. A pre-check is performed while the EUT is powered.

Below 1 GHz:

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The influence of the EUT support table that is used between 30–1000 MHz was evaluated.

#### 1. Measurement up to 30 MHz



Test Setup; Spurious Emission Radiated (SAC), 9 kHz – 30 MHz

The Loop antenna HFH2-Z2 is used.



#### Step 1: pre measurement

- Anechoic chamber
- Antenna distance: 3 m
- Detector: Peak-Maxhold
- Frequency range: 0.009 - 0.15 MHz and 0.15 - 30 MHz
- Frequency steps: 0.05 kHz and 2.25 kHz
- IF-Bandwidth: 0.2 kHz and 9 kHz
- Measuring time / Frequency step: 100 ms (FFT-based)

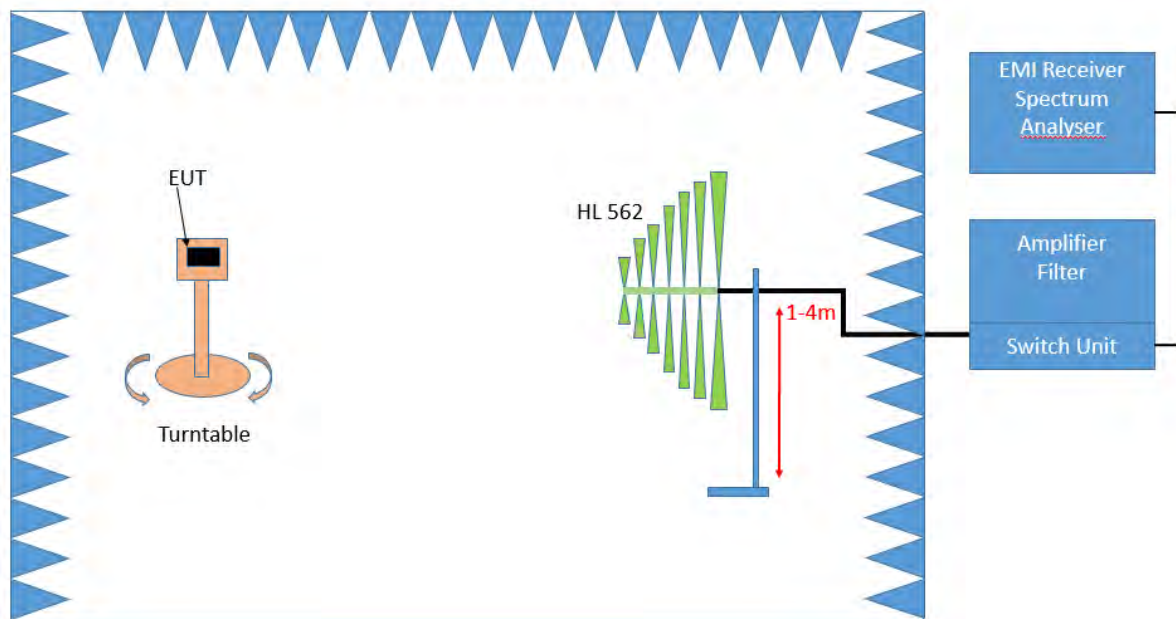
Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

#### Step 2: final measurement

For the relevant emissions determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is to find the maximum emission level.

- Open area test site
- Antenna distance: according to the Standard
- Detector: Quasi-Peak
- Frequency range: 0.009 - 30 MHz
- Frequency steps: measurement at frequencies detected in step 1
- IF-Bandwidth: 0.2 - 10 kHz
- Measuring time / Frequency step: 1 s

#### 2. Measurement above 30 MHz and up to 1 GHz



Test Setup; Spurious Emission Radiated (SAC), 30 MHz- 1GHz

#### Step 1: Preliminary scan

This is a preliminary test to identify the highest amplitudes relative to the limit.

Settings for step 1:

- Antenna distance: 3 m
- Detector: Peak-Maxhold / Quasipeak (FFT-based)
- Frequency range: 30 - 1000 MHz
- Frequency steps: 30 kHz
- IF-Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 ms
- Turntable angle range: -180° to 90°

- Turntable step size: 90°
- Height variation range: 1 – 4 m
- Height variation step size: 1.5 m
- Polarisation: Horizontal + Vertical

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

#### Step 2: Adjustment measurement

In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.

For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will slowly vary by 360°. During this action, the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position, the antenna height will also slowly vary by 1 – 4 meter. During this action, the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: 360 °
- Height variation range: 1 – 4 m
- Antenna Polarisation: max. value determined in step 1

#### Step 3: Final measurement with QP detector

With the settings determined in step 2, the final measurement will be performed:

EMI receiver settings for step 3:

- Detector: Quasi-Peak (< 1 GHz)
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

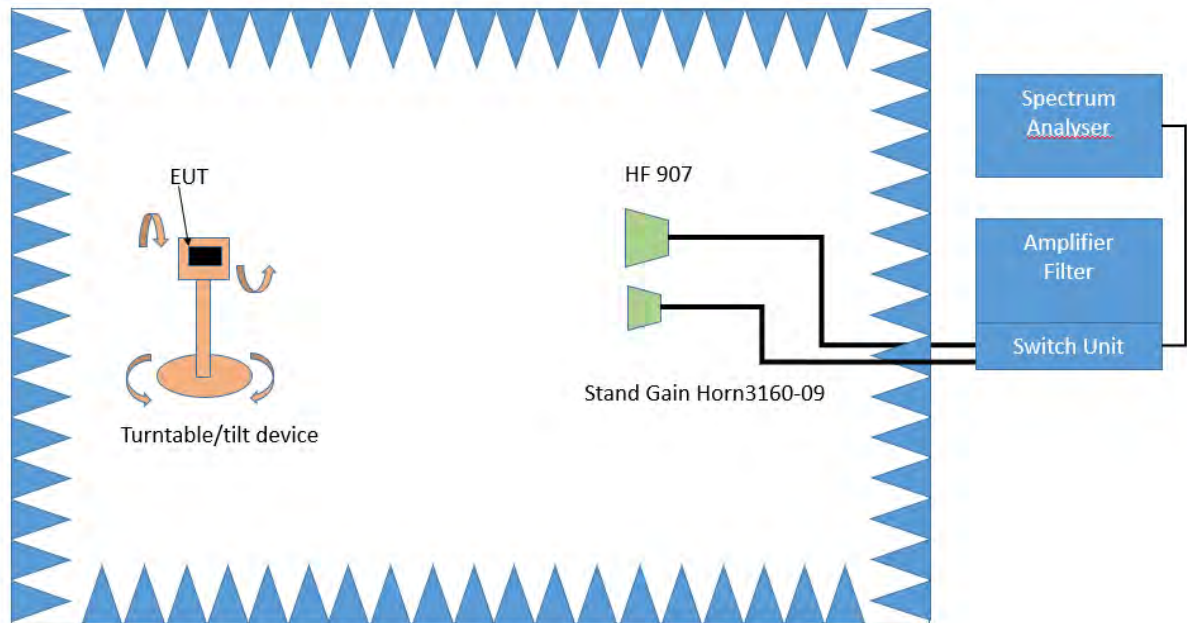
After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

Above 1 GHz:

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.

All steps were performed with one height (1.5 m) of the receiving antenna only.

### 3. Measurement 1 GHz up to 26.5 GHz



Test Setup; Spurious Emission Radiated (FAC), 1 GHz-26.5 GHz

#### Step 1:

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.

All steps were performed with one height (1.5 m) of the receiving antenna only.

The EUT is turned during the preliminary measurement across the elevation axis, with a step size of 90 °.

The turn table step size (azimuth angle) for the preliminary measurement is 45 °.

#### Step 2:

Due to the fact, that in this frequency range the test is performed in a fully anechoic room, the height scan of the receiving antenna instep 2 is omitted. Instead of this, a maximum search with a step size  $\pm 45^\circ$  for the elevation axis is performed.

The turn table azimuth will slowly vary by  $\pm 22.5^\circ$ .

The elevation angle will slowly vary by  $\pm 45^\circ$

EMI receiver settings (for all steps):

- Detector: Peak, Average
- IF Bandwidth = 1 MHz

#### Step 3:

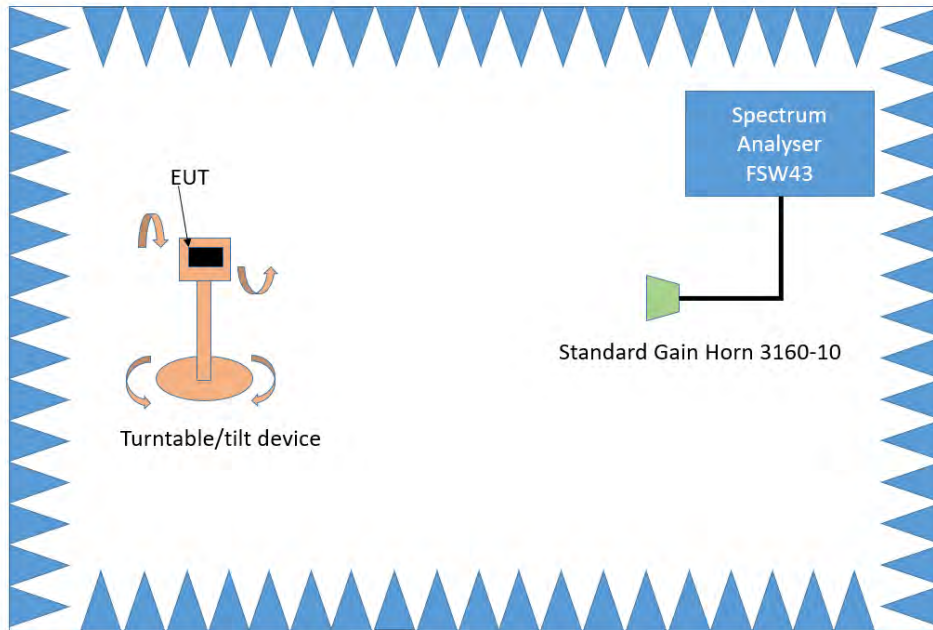
Spectrum analyser settings for step 3:

- Detector: Peak / Average
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 1 MHz
- Measuring time: 1 s

#### 4. Measurement above 26.5 GHz up to 40 GHz

The following modifications, compared to the frequency range 1 GHz – 26.5 GHz, apply to the measurement procedure for the frequency range above 26.5 GHz:

- Measurement distance: 1m

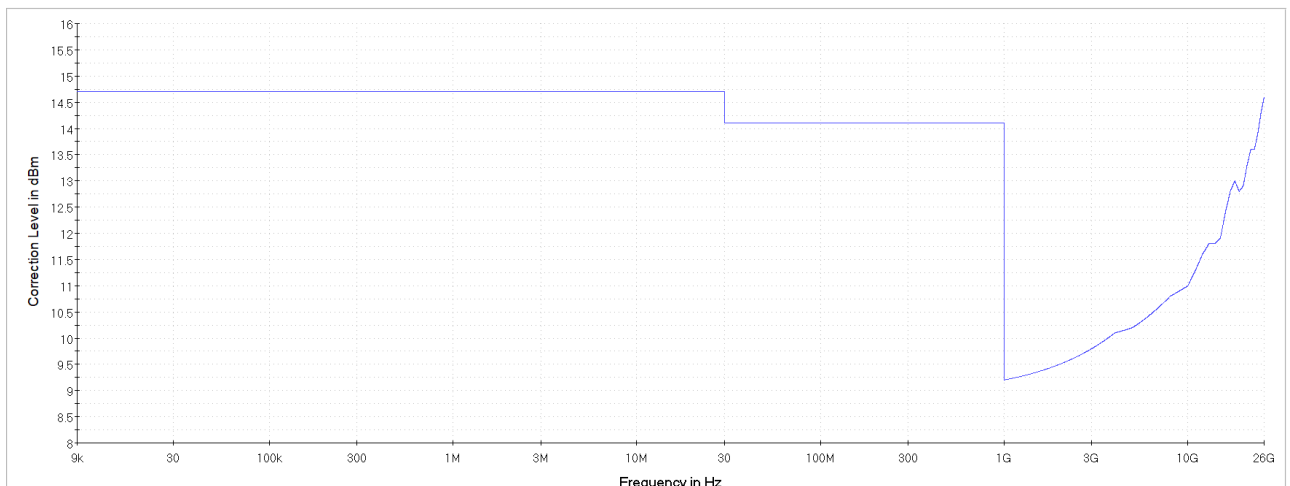
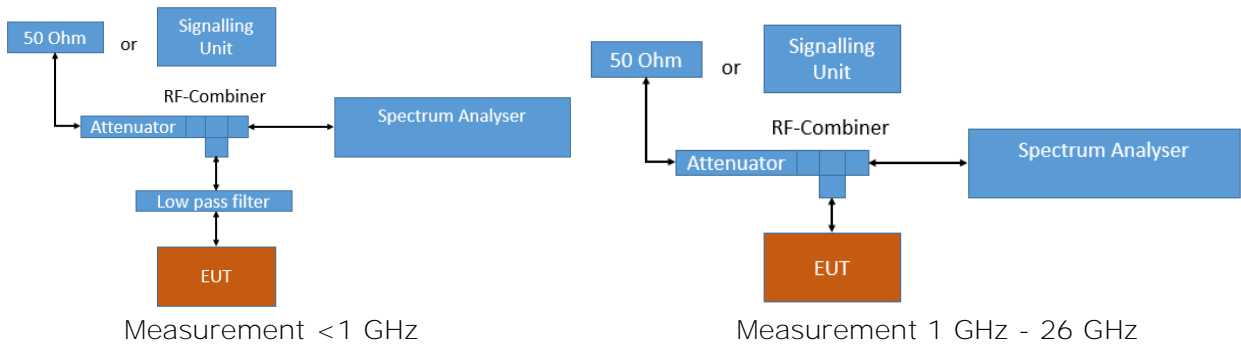


Test Setup; Spurious Emission Radiated (FAC), 26.5 – 40 GHz

### Conducted Measurements at antenna ports

The Equipment Under Test (EUT) was set up to perform the spurious emissions measurements.

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.



Measurement 26 GHz - 40 GHz

Analyser settings:

- Frequency range: 0.009 – 30 MHz
- Resolution Bandwidth (RBW): 10 kHz
- Video Bandwidth (VBW): 30 kHz
- Trace: Maxhold
- Sweeps: till stable
- Sweep Time: coupled
- Detector: Peak
  
- Frequency range: 30 – 1000 MHz
- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Trace: Maxhold
- Sweeps: till stable
- Sweep Time: coupled
- Detector: Peak
  
- Frequency range: 1000 – 26000 MHz
- Resolution Bandwidth (RBW): 1000 kHz
- Video Bandwidth (VBW): 3000 kHz
- Trace: Maxhold, Average Power
- Sweeps: 500
- Sweep Time: coupled
- Detector: Peak, RMS
  
- Frequency range: 26000 – 40000 MHz
- Resolution Bandwidth (RBW): 1000 kHz
- Video Bandwidth (VBW): 3000 kHz
- Trace: Maxhold, Average Power
- Sweeps: 1000
- Sweep Time: coupled
- Detector: Peak, RMS

For the conducted emissions in restricted bands the Value is measured in dBm and then converted to dBµV/m as given in KDB 789033:

1. Measure the conducted output power in dBm.
2. Add the maximum antenna gain in dBi. (Included in measurement result by offset)
3. Add the appropriate ground reflection factor (included in measurement result by transducer factor)

**6 dB for frequencies ≤ 30 MHz;**

4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive; and

0 dB for frequencies > 1000 MHz).

4. Convert the resultant EIRP level to an equivalent electric field strength level using the following relationship:

$$E = \text{EIRP} - 20 \log D + 104.8$$

Where E is the electric field strength in dBµV/m,

EIRP is the equivalent isotropically radiated power in dBm

D is the specified measurement distance in m

$$\text{Value [dBµV/m]} = \text{Measured value [dBm]} \text{ (including gain and ground reflection factor)} - 20 \log D + 104.8$$

## 5.7.2 TEST REQUIREMENTS / LIMITS

### A) FCC

FCC Part 15 Subpart E, §15.407 (b)(1)

For transmitters operating in the 5150–5250 MHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5150–5350 MHz.

FCC Part 15 Subpart E, §15.407 (b)(2)

For transmitters operating in the 5250–5350 MHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5150–5350 MHz.

FCC Part 15 Subpart E, §15.407 (b)(3)

For transmitters operating in the 5470–5725 MHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5470–5725 MHz.

FCC Part 15 Subpart E, §15.407 (b)(4)

For transmitters operating in the 5725–5850 MHz band:

**Limit: –27 dBm/MHz at 75 MHz or more above or below the band edge**  
increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge  
increasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edge  
increasing linearly to 27 dBm/MHz at the band edge.

FCC Part 15 Subpart E, §15.407 (b) (5)

For transmitters operating within the 5.925–7.125 GHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5.925–7.125 GHz.

FCC Part 15 Subpart E, §15.407 (b) (6)

For transmitters operating within the 5.925–7.125 GHz bands:

Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

### B) IC

Different frequency bands and limits apply, as compared to the FCC requirements.

RSS-247, 6.2.1.2, Emissions outside the band 5150–5250 MHz, indoor operation only:

Limit: –27 dBm/MHz EIRP outside of the band 5150–5250 MHz.

RSS-247, 6.2.2.2, Emissions outside the band 5250–5350 MHz:

Limit: –27 dBm/MHz EIRP outside of the band 5250–5350 MHz.

RSS-247, 6.2.3.2, Emissions outside the bands 5470–5600 MHz and 5650–5725 MHz:

Limit: –27 dBm/MHz EIRP outside of the band 5470–5725 MHz.

However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of –27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz.

Note: No operation is permitted for the frequency range 5600–5650 MHz.

RSS-247, 6.2.4.2, Emissions outside the band 5725–5850 MHz:



- a. 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
- b. 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
- c. 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
- d. -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

### C) FCC & IC

FCC Part 15 Subpart E, §15.405

The provisions of §§ 15.203 and 15.205 are included.

#### §15.407 (b)(6)

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.

#### §15.407 (b)(7)

The provisions of §15.205 apply to intentional radiators operating under this section

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

| Frequency in MHz | Limit (µV/m)     | Measurement distance (m) | Limits (dBµV/m)    |
|------------------|------------------|--------------------------|--------------------|
| 0.009 – 0.49     | 2400/F(kHz)@300m | 3                        | (48.5 – 13.8)@300m |
| 0.49 – 1.705     | 24000/F(kHz)@30m | 3                        | (33.8 – 23.0)@30m  |
| 1.705 – 30       | 30@30m           | 3                        | 29.5@30m           |

The measured values are corrected with an inverse linear distance extrapolation factor (40 dB/decade) according FCC 15.31 (2).

| Frequency in MHz | Limit (µV/m) | Measurement distance (m) | Limits (dBµV/m) |
|------------------|--------------|--------------------------|-----------------|
| 30 – 88          | 100@3m       | 3                        | 40.0@3m         |
| 88 – 216         | 150@3m       | 3                        | 43.5@3m         |
| 216 – 960        | 200@3m       | 3                        | 46.0@3m         |
| 960 – 26000      | 500@3m       | 3                        | 54.0@3m         |
| 26000 – 40000    | 500@3m       | 1                        | 54.0@3m         |

The measured values above 26 GHz are corrected with an inverse linear distance extrapolation factor (20 dB/decade).

§15.35(b) ..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit...

Used conversion factor:

- Limit (dBµV/m) = 20 log (Limit (µV/m)/1µV/m)
- Limit (dBµV/m) = EIRP [dBm] – 20 log (d [m]) + 104.8

Limit types (in result tables):

RB – Emissions falls into a "Restricted Band" according FCC §§15.205 and 15.209 \*)

UE – "Undesirable Emission Limit" according FCC §15.407

BE-RB – Band Edge Limit basing on "Restricted Band Limits"

BE-UE – Band Edge Limit basing on "Undesirable Emission Limit"

\*) Below 1 GHz the limits of §15.209 are applied for all frequencies.



### 5.7.3 TEST PROTOCOL

Ambient temperature: 23-27 °C  
 Air Pressure: 1000 - 1008 hPa  
 Humidity: 32-50 %  
 WLAN a-Mode; 20 MHz; 6 Mbit/s  
 Applied duty cycle correction (AV): 0 dB

| Measurement Method | Ch. Center Freq. [MHz] | Spurious Freq. [MHz] | Spurious Level [dBμV/m] | Detector | RBW [kHz] | Limit [dBμV/m] | Margin [dB] | Limit Type |
|--------------------|------------------------|----------------------|-------------------------|----------|-----------|----------------|-------------|------------|
| Conducted          | 5180                   | 6906.8               | 42.9                    | PEAK     | 1000      | 68.2           | 25.3        | UE         |
| Radiated           | 5180                   | 10360.2              | 62.4                    | PEAK     | 1000      | 68.2           | 5.8         | UE         |
| Conducted          | 5200                   | 649.7                | 29.7                    | PEAK     | 100       | 46.0           | 16.3        | RB         |
| Radiated           | 5200                   | 10399.9              | 66.2                    | PEAK     | 1000      | 68.2           | 2.0         | UE         |
| Conducted          | 5200                   | 5534.6               | 64.1                    | PEAK     | 1000      | 68.2           | 4.1         | UE         |
| Radiated           | 5240                   | 10474.3              | 63.2                    | PEAK     | 1000      | 68.2           | 5.0         | UE         |
| Conducted          | 5240                   | 4942.6               | 65.4                    | PEAK     | 1000      | 74.0           | 8.6         | RB         |
| Conducted          | 5240                   | 4942.6               | 48.3                    | AV       | 1000      | 54.0           | 5.7         | RB         |
| Radiated           | 5260                   | 10519.1              | 67.7                    | PEAK     | 1000      | 68.2           | 0.5         | UE         |
| Radiated           | 5260                   | 10519.7              | 67.1                    | PEAK     | 1000      | 68.2           | 1.1         | UE         |
| Conducted          | 5260                   | 4893.3               | 63.9                    | PEAK     | 1000      | 74.0           | 10.1        | RB         |
| Conducted          | 5260                   | 4893.3               | 46.8                    | AV       | 1000      | 54.0           | 7.2         | RB         |
| Radiated           | 5300                   | 10599.1              | 62.4                    | PEAK     | 1000      | 68.2           | 5.8         | UE         |
| Radiated           | 5320                   | 10640.5              | 62.7                    | PEAK     | 1000      | 74.0           | 11.3        | RB         |
| Radiated           | 5320                   | 10640.5              | 48.8                    | AV       | 1000      | 54.0           | 5.2         | RB         |
| Conducted          | 5300                   | 662.3                | 31.1                    | PEAK     | 100       | 46.0           | 14.9        | RB         |
| Conducted          | 5300                   | 5596.6               | 62.1                    | PEAK     | 1000      | 68.2           | 6.1         | UE         |
| Conducted          | 5320                   | 5608.1               | 62.2                    | PEAK     | 1000      | 68.2           | 6.0         | UE         |
| Conducted          | 5500                   | 3666.6               | 49.6                    | PEAK     | 1000      | 74.0           | 24.4        | RB         |
| Conducted          | 5500                   | 3666.6               | 42.9                    | AV       | 1000      | 54.0           | 11.1        | RB         |
| Conducted          | 5500                   | 5769.3               | 61.8                    | PEAK     | 1000      | 68.2           | 6.4         | UE         |
| Conducted          | 5580                   | 697.2                | 35.5                    | PEAK     | 100       | 46.0           | 10.5        | RB         |
| Conducted          | 5580                   | 3720.1               | 62.8                    | PEAK     | 1000      | 74.0           | 11.2        | RB         |
| Conducted          | 5580                   | 3720.1               | 51.7                    | AV       | 1000      | 54.0           | 2.3         | RB         |
| Conducted          | 5580                   | 7440.0               | 54.1                    | PEAK     | 1000      | 74.0           | 19.9        | RB         |
| Conducted          | 5580                   | 7440.0               | 46.9                    | AV       | 1000      | 54.0           | 7.1         | RB         |
| Conducted          | 5700                   | 3799.6               | 58.3                    | PEAK     | 1000      | 74.0           | 15.7        | RB         |
| Conducted          | 5700                   | 3800.1               | 46.1                    | AV       | 1000      | 54.0           | 7.9         | RB         |
| Conducted          | 5745                   | 3829.4               | 62.8                    | PEAK     | 1000      | 74.0           | 11.2        | RB         |
| Conducted          | 5745                   | 3830.1               | 52.3                    | AV       | 1000      | 54.0           | 1.7         | RB         |
| Conducted          | 5785                   | 723.3                | 37.7                    | PEAK     | 120       | 46.0           | 8.3         | RB         |
| Conducted          | 5785                   | 3856.6               | 60.1                    | PEAK     | 1000      | 74.0           | 13.9        | RB         |
| Conducted          | 5785                   | 3856.6               | 50.4                    | AV       | 1000      | 54.0           | 3.6         | RB         |
| Conducted          | 5825                   | 3884.1               | 61.5                    | PEAK     | 1000      | 74.0           | 12.5        | RB         |
| Conducted          | 5825                   | 3883.4               | 53.1                    | AV       | 1000      | 54.0           | 0.9         | RB         |

WLAN n-Mode; 20 MHz; MCS0; SISO  
 Applied duty cycle correction (AV): 0 dB

| Ch. No. | Ch. Center Freq. [MHz] | Spurious Freq. [MHz] | Spurious Level [dBμV/m] | Detector | RBW [kHz] | Limit [dBμV/m] | Margin [dB] | Limit Type |
|---------|------------------------|----------------------|-------------------------|----------|-----------|----------------|-------------|------------|
| 116     | 5580                   | 3719.1               | 58.6                    | PEAK     | 1000      | 74.0           | 15.4        | RB         |
| 116     | 5580                   | 3720.1               | 48.1                    | AV       | 1000      | 54.0           | 5.9         | RB         |
| 149     | 5745                   | 3829.9               | 60.9                    | PEAK     | 1000      | 74.0           | 13.1        | RB         |
| 149     | 5745                   | 3830.1               | 52.2                    | AV       | 1000      | 54.0           | 1.8         | RB         |

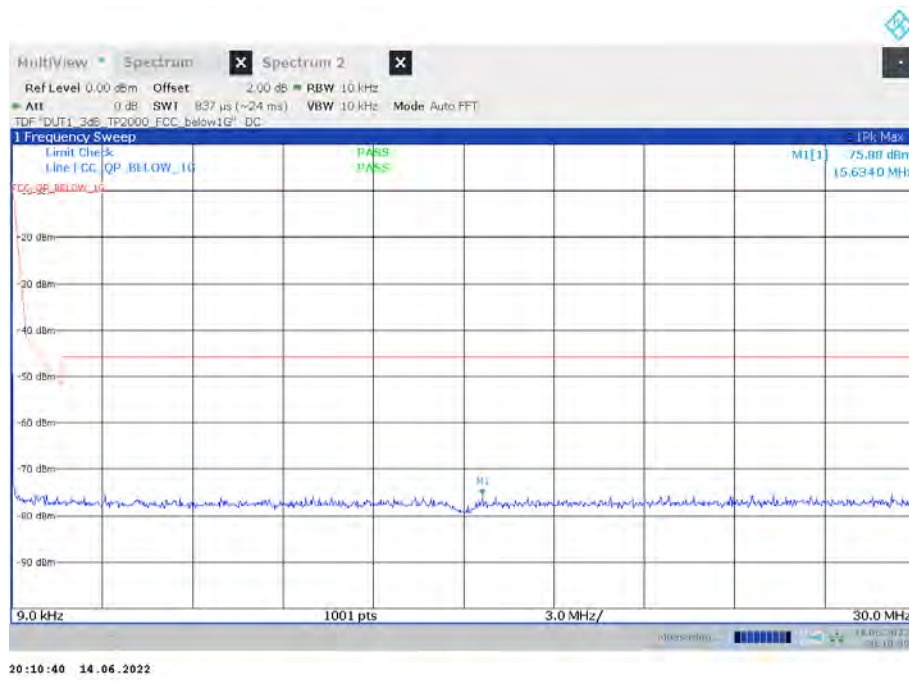
WLAN n-Mode; 40 MHz; MCS0; SISO  
 Applied duty cycle correction (AV): 0 dB

| Ch. No. | Ch. Center Freq. [MHz] | Spurious Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin [dB] | Limit Type |
|---------|------------------------|----------------------|-------------------------|----------|-----------|----------------|-------------|------------|
| 151     | 5755                   | 3837.1               | 61.8                    | PEAK     | 1000      | 74.0           | 12.2        | RB         |
| 151     | 5755                   | 3836.6               | 51.4                    | AV       | 1000      | 54.0           | 2.6         | RB         |

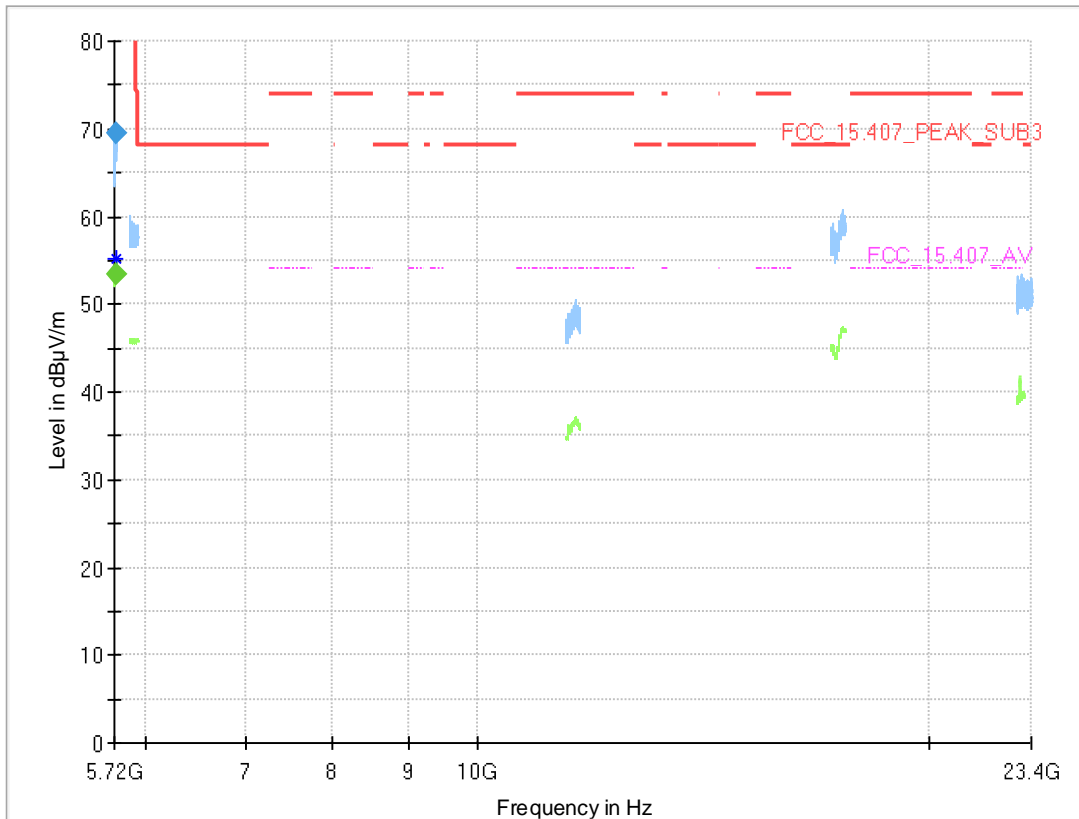
Remark: Please see next sub-clause for the measurement plot.

#### 5.7.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 9kHz - 30MHz, Subband = U-NII-1 (S01\_161\_AD01)



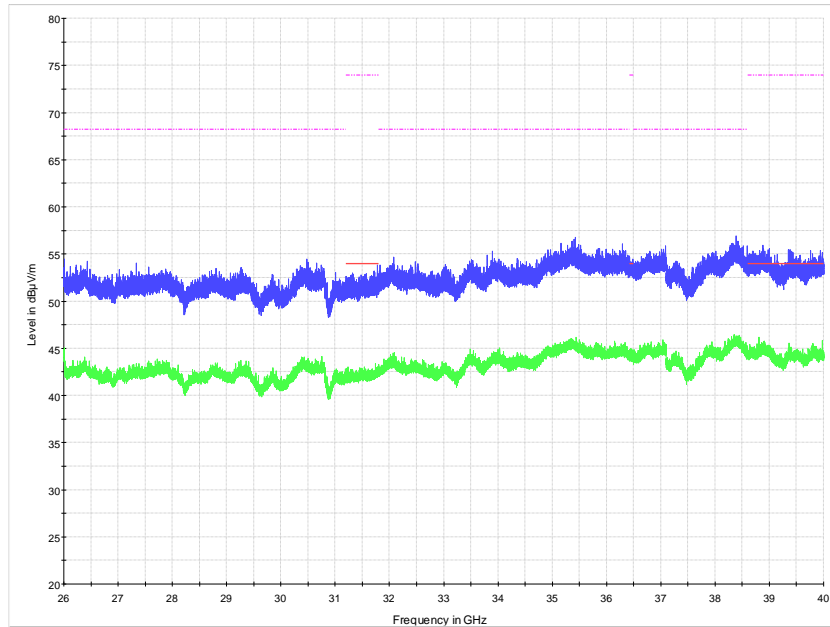
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S02\_161\_AB01)



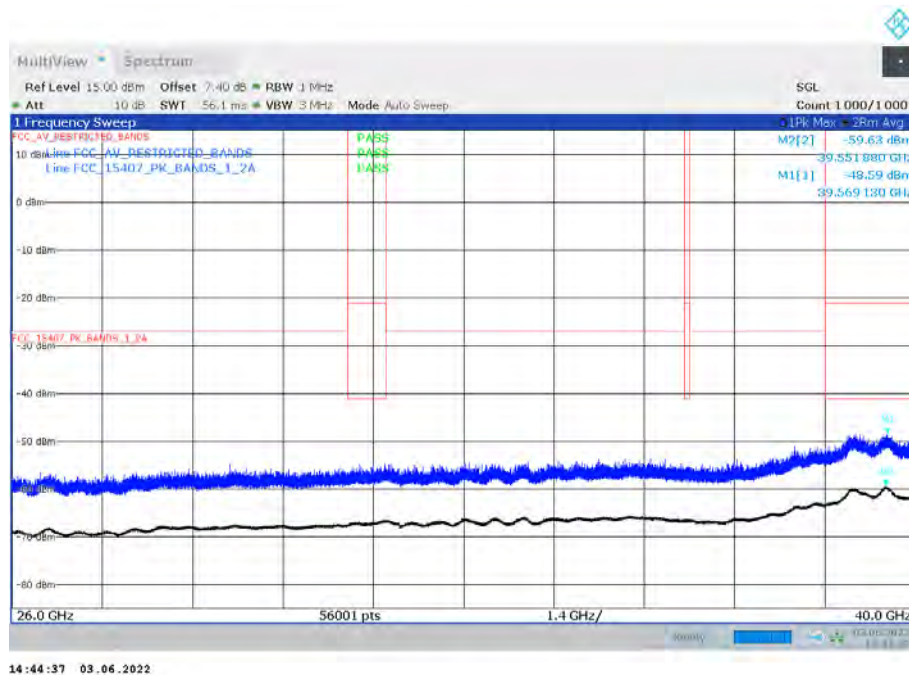
### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5724.600        | ---              | 53.4              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | H   | 52.0          | 91.0            | 14.2         |
| 5724.600        | 69.5             | ---               | 121.2          | 51.81       | 1000.0          | 1000.000        | 150.0       | H   | 52.0          | 91.0            | 14.2         |

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-1 (S02\_161\_AB01)



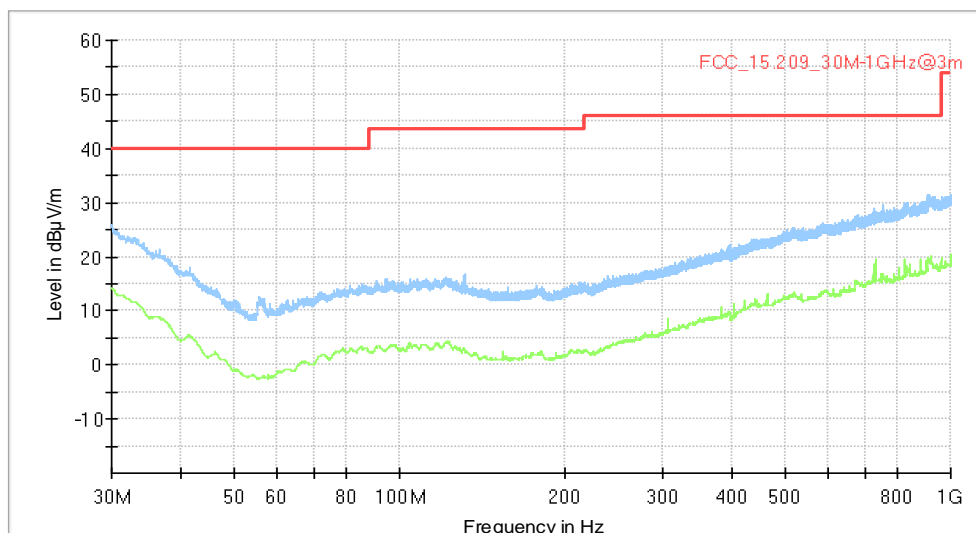
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-1 (S01\_161\_AD01)



Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 9kHz - 30MHz, Subband = U-NII-3 (S01\_161\_AD01)



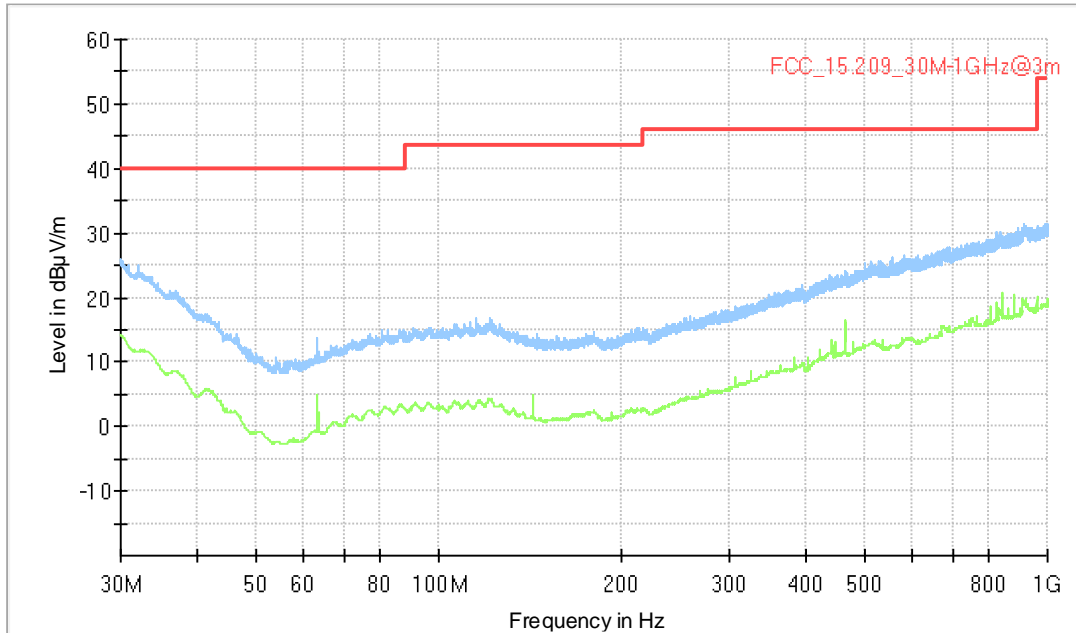
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-2C (S02\_161\_AB01)



### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|
| ---             | ---                | ---            | ---         | ---             | ---             | ---         |     | ---           | ---          |

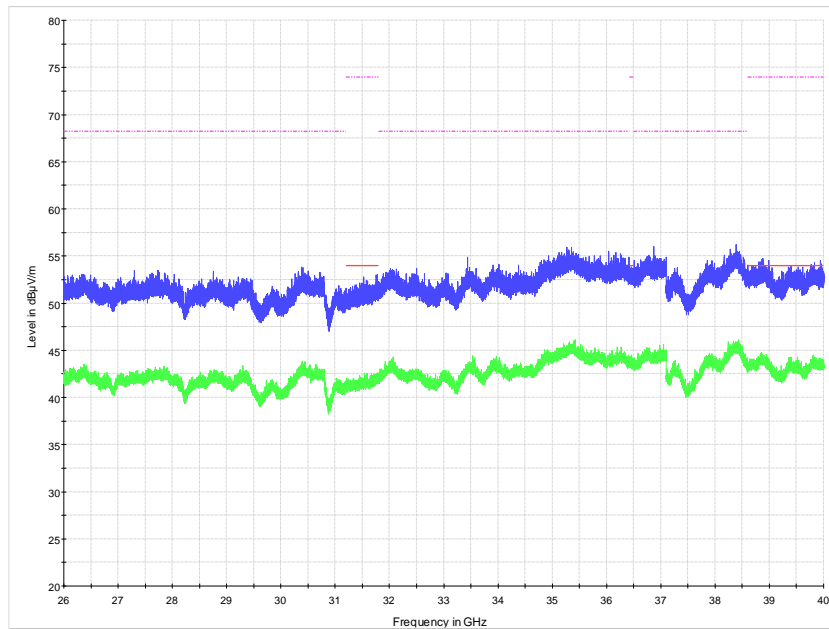
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-2A (S02\_161\_AB01)



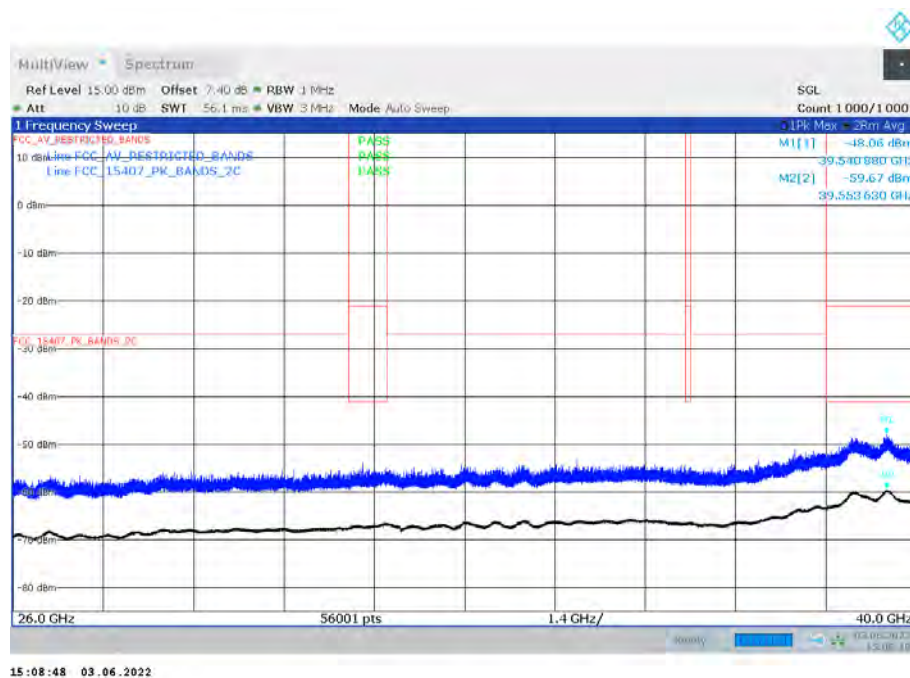
### Final\_Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|
| ---             | ---                | ---            | ---         | ---             | ---             | ---         | --- | ---           | ---          |

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-3 (S02\_161\_AB01)

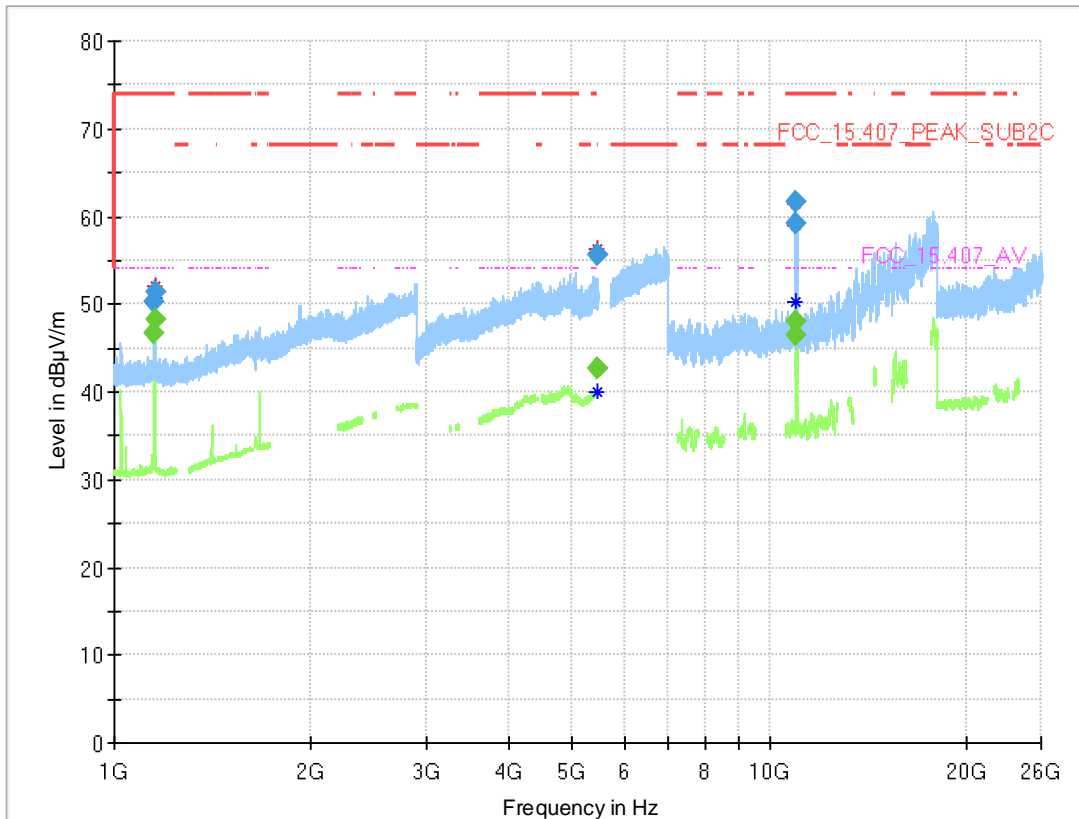


Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-3 (S01\_161\_AD01)





Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S02\_161\_AB01)

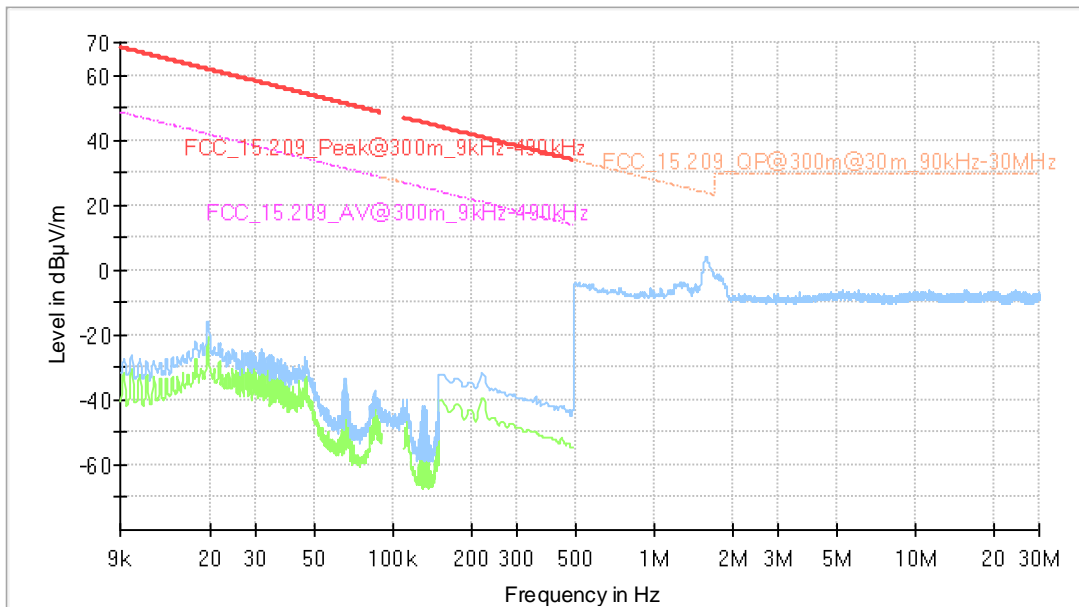


### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 1151.920        | ---              | 46.8              | 54.00          | 7.23        | 1000.0          | 1000.000        | 150.0       | H   | -34.0         | 81.0            | -1.0         |
| 1151.920        | 50.4             | ---               | 74.00          | 23.61       | 1000.0          | 1000.000        | 150.0       | H   | -34.0         | 81.0            | -1.0         |
| 1152.040        | ---              | 48.2              | 54.00          | 5.84        | 1000.0          | 1000.000        | 150.0       | H   | -41.0         | 91.0            | -1.0         |
| 1152.040        | 51.3             | ---               | 74.00          | 22.66       | 1000.0          | 1000.000        | 150.0       | H   | -41.0         | 91.0            | -1.0         |
| 5457.250        | ---              | 42.8              | 54.00          | 11.22       | 1000.0          | 1000.000        | 150.0       | V   | 11.0          | 105.0           | 14.5         |
| 5457.250        | 55.6             | ---               | 74.00          | 18.42       | 1000.0          | 1000.000        | 150.0       | V   | 11.0          | 105.0           | 14.5         |
| 5459.670        | ---              | 42.7              | 54.00          | 11.30       | 1000.0          | 1000.000        | 150.0       | H   | -182.0        | 15.0            | 14.5         |
| 5459.670        | 55.6             | ---               | 74.00          | 18.35       | 1000.0          | 1000.000        | 150.0       | H   | -182.0        | 15.0            | 14.5         |
| 10999.000       | ---              | 46.4              | 54.00          | 7.62        | 1000.0          | 1000.000        | 150.0       | V   | -90.0         | 3.0             | -9.9         |
| 10999.000       | 59.1             | ---               | 74.00          | 14.88       | 1000.0          | 1000.000        | 150.0       | V   | -90.0         | 3.0             | -9.9         |
| 11000.365       | ---              | 48.0              | 54.00          | 6.01        | 1000.0          | 1000.000        | 150.0       | V   | -91.0         | 12.0            | -9.9         |
| 11000.365       | 61.7             | ---               | 74.00          | 12.32       | 1000.0          | 1000.000        | 150.0       | V   | -91.0         | 12.0            | -9.9         |



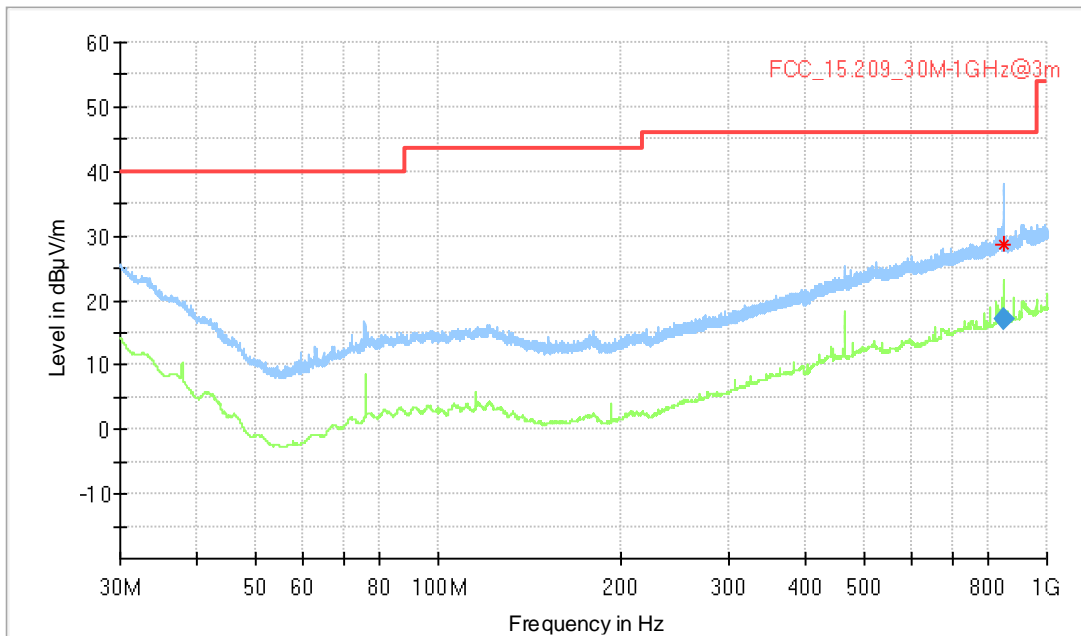
Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 9kHz - 30MHz, Subband = U-NII-2C (S02\_161\_AB01)



### Final\_Result

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|---------------|--------------|
| ---             | ---              | ---              | ---            | ---         | ---             | ---             | ---         | ---           | ---          |

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-1 (S02\_161\_AB01)



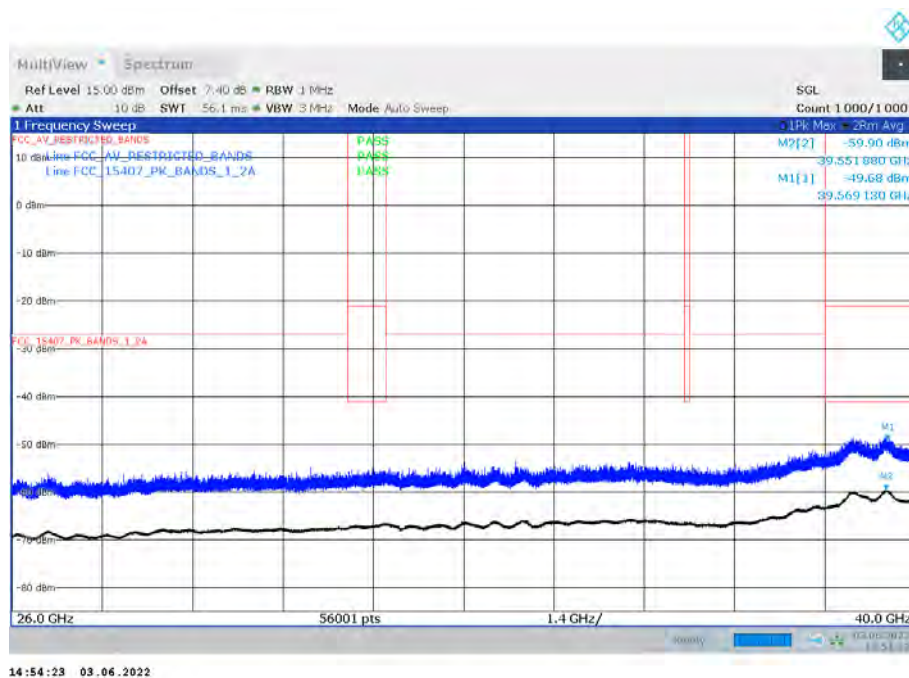
### Final\_Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|
| 848.520000      | 17.11              | 46.00          | 28.89       | 1000.0          | 120.000         | 254.0       | H   | 36.0          | 24.0         |

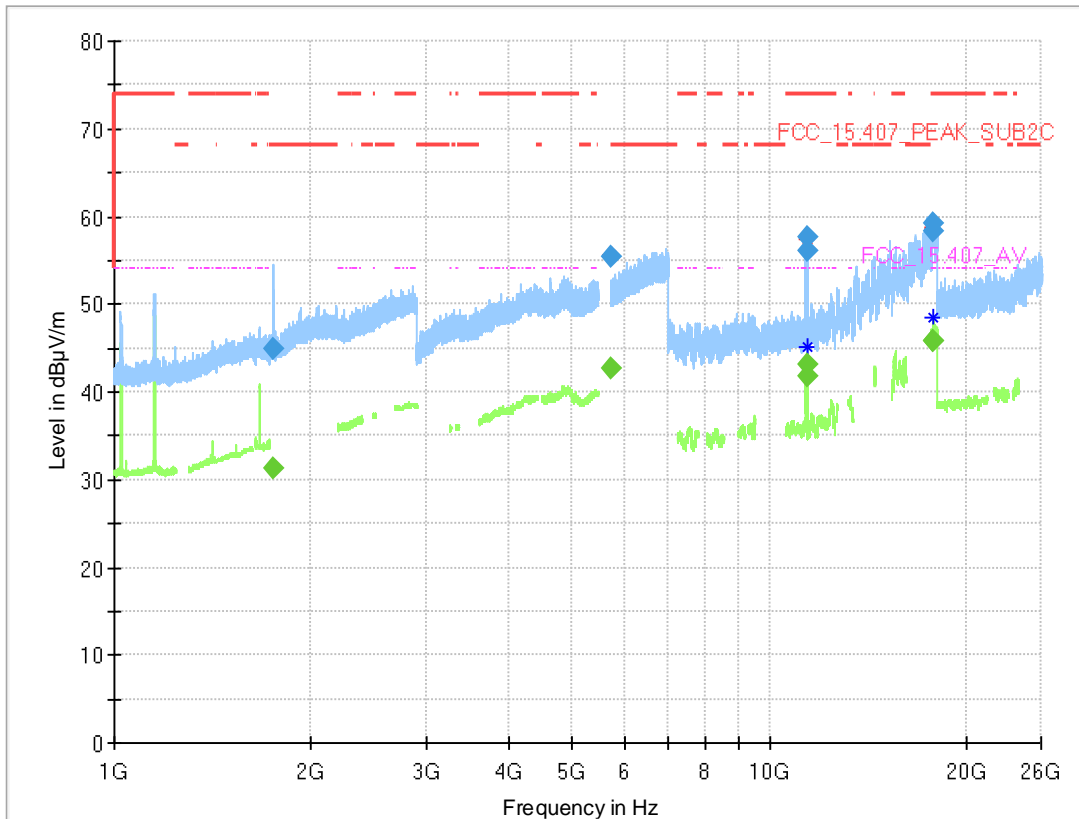
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-2A (S02\_161\_AB01)



Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-2A (S01\_161\_AD01)



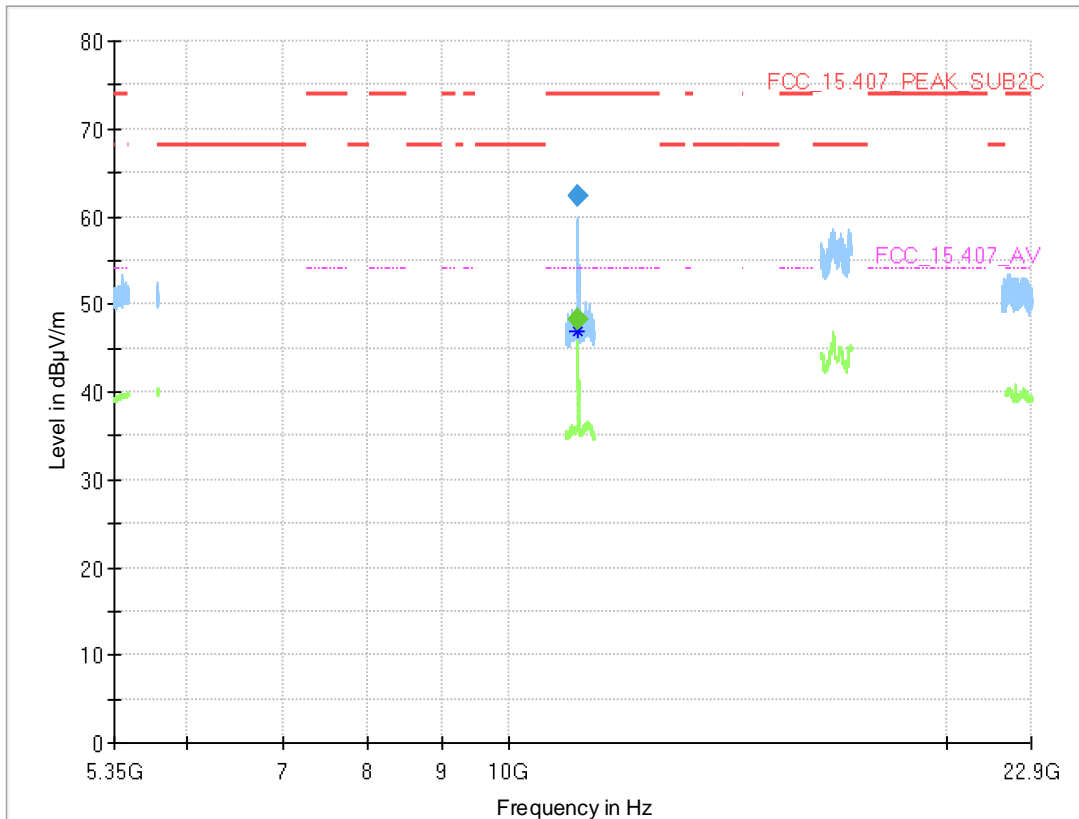
Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S02\_161\_AB01)



### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 1743.940        | ---              | 31.3              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | H   | -51.0         | -10.0           | 1.9          |
| 1743.940        | 44.9             | ---               | 68.20          | 23.27       | 1000.0          | 1000.000        | 150.0       | H   | -51.0         | -10.0           | 1.9          |
| 5726.403        | ---              | 42.6              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | 44.0          | 100.0           | 14.2         |
| 5726.403        | 55.5             | ---               | 68.20          | 12.69       | 1000.0          | 1000.000        | 150.0       | V   | 44.0          | 100.0           | 14.2         |
| 11399.575       | ---              | 43.2              | 54.00          | 10.77       | 1000.0          | 1000.000        | 150.0       | V   | -91.0         | 15.0            | -9.2         |
| 11399.575       | 57.6             | ---               | 74.00          | 16.43       | 1000.0          | 1000.000        | 150.0       | V   | -91.0         | 15.0            | -9.2         |
| 11399.995       | ---              | 41.8              | 54.00          | 12.17       | 1000.0          | 1000.000        | 150.0       | V   | -90.0         | -2.0            | -9.2         |
| 11399.995       | 56.1             | ---               | 74.00          | 17.86       | 1000.0          | 1000.000        | 150.0       | V   | -90.0         | -2.0            | -9.2         |
| 17789.250       | ---              | 45.7              | 54.00          | 8.30        | 1000.0          | 1000.000        | 150.0       | V   | 11.0          | -2.0            | 1.2          |
| 17789.250       | 59.3             | ---               | 74.00          | 14.71       | 1000.0          | 1000.000        | 150.0       | V   | 11.0          | -2.0            | 1.2          |
| 17789.850       | ---              | 45.8              | 54.00          | 8.23        | 1000.0          | 1000.000        | 150.0       | V   | -48.0         | 15.0            | 1.2          |
| 17789.850       | 58.3             | ---               | 74.00          | 15.66       | 1000.0          | 1000.000        | 150.0       | V   | -48.0         | 15.0            | 1.2          |

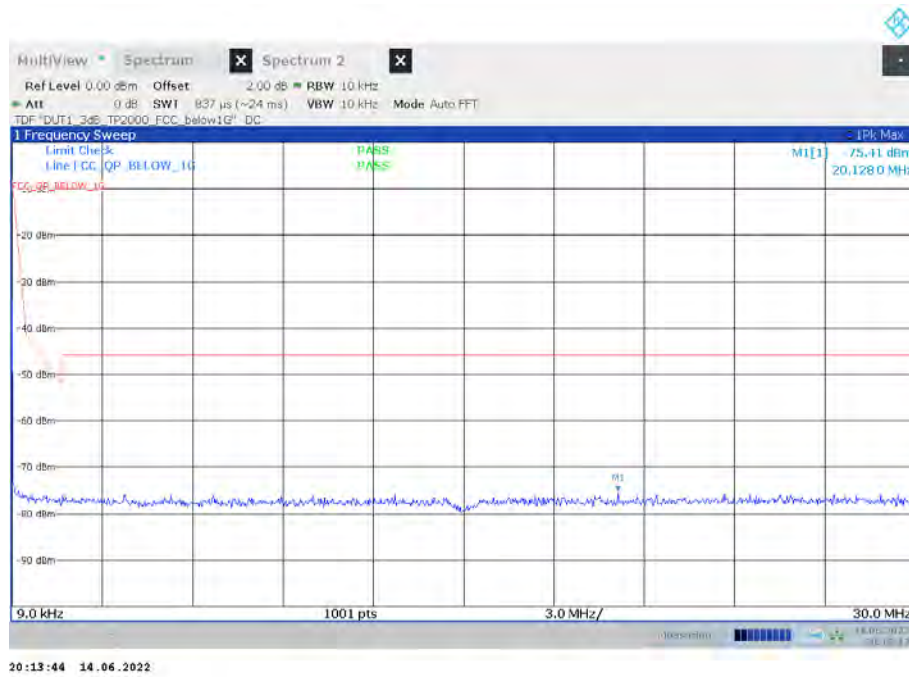
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C  
(S02\_161\_AB01)



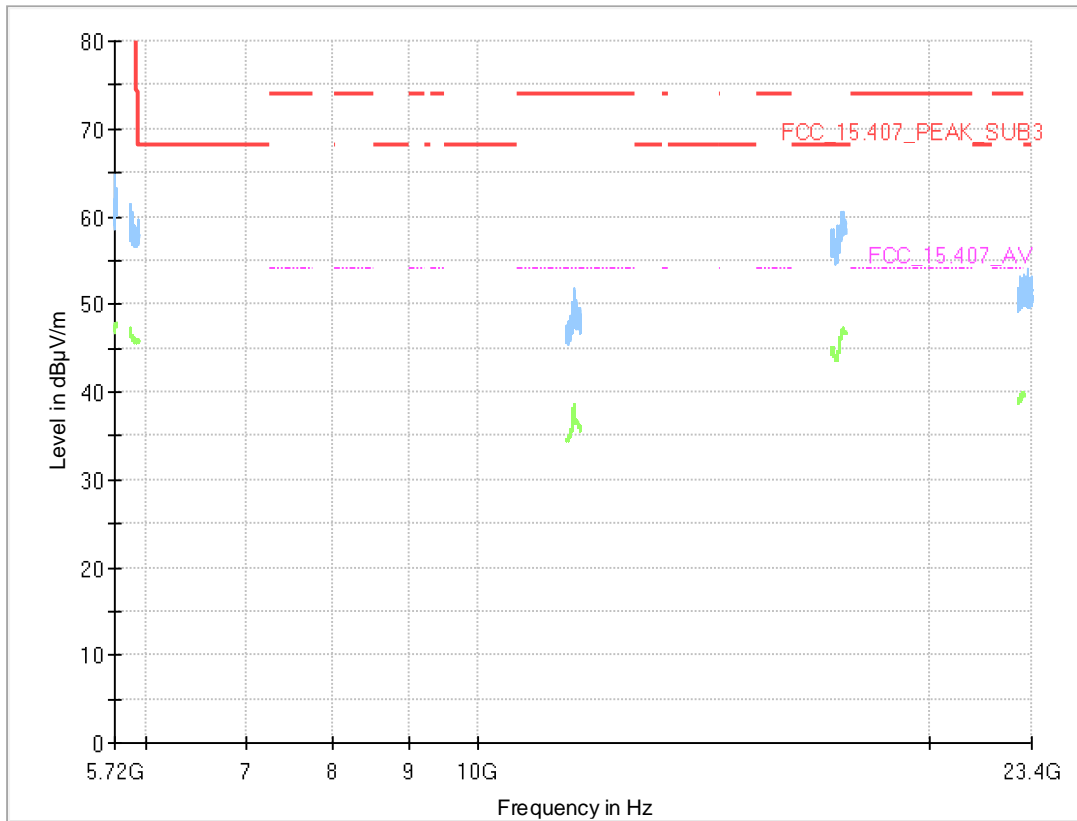
### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 11160.320       | ---              | 48.2              | 54.00          | 5.82        | 1000.0          | 1000.000        | 150.0       | H   | 79.0          | 90.0            | -10.1        |
| 11160.320       | 62.3             | ---               | 74.00          | 11.70       | 1000.0          | 1000.000        | 150.0       | H   | 79.0          | 90.0            | -10.1        |

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 9kHz - 30MHz, Subband = U-NII-2A (S01\_161\_AD01)



Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S02\_161\_AB01)

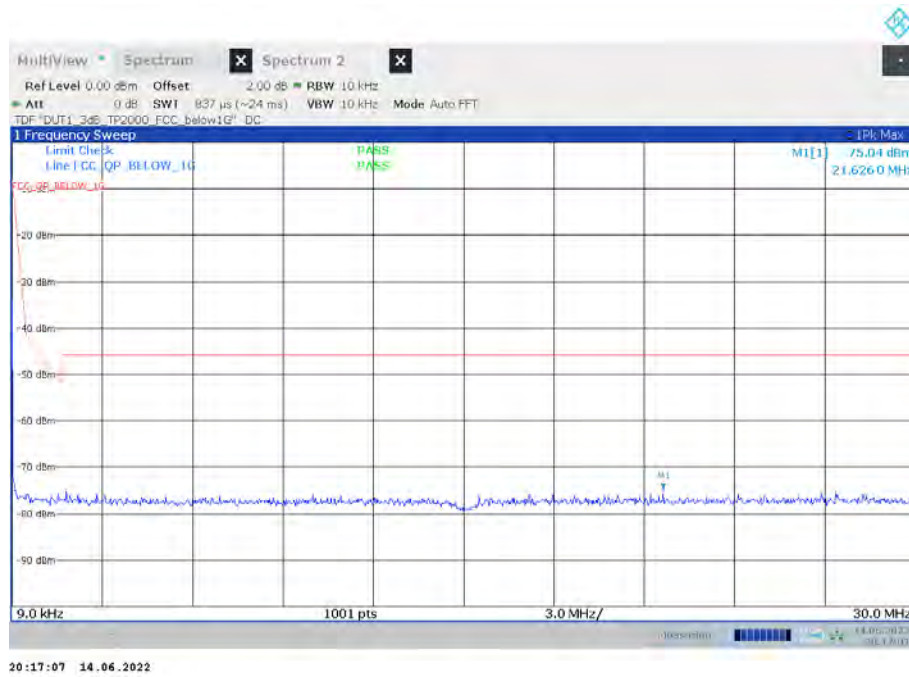


2

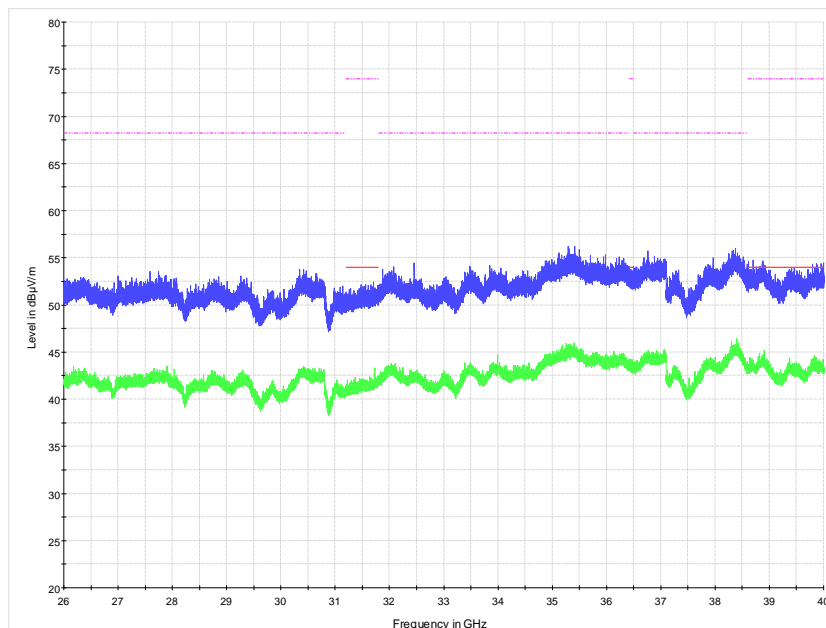
### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| ---             | ---              | ---               | ---            | ---         | ---             | ---             | ---         |     | ---           | ---             | ---          |

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 9kHz - 30MHz, Subband = U-NII-2C (S01\_161\_AD01)

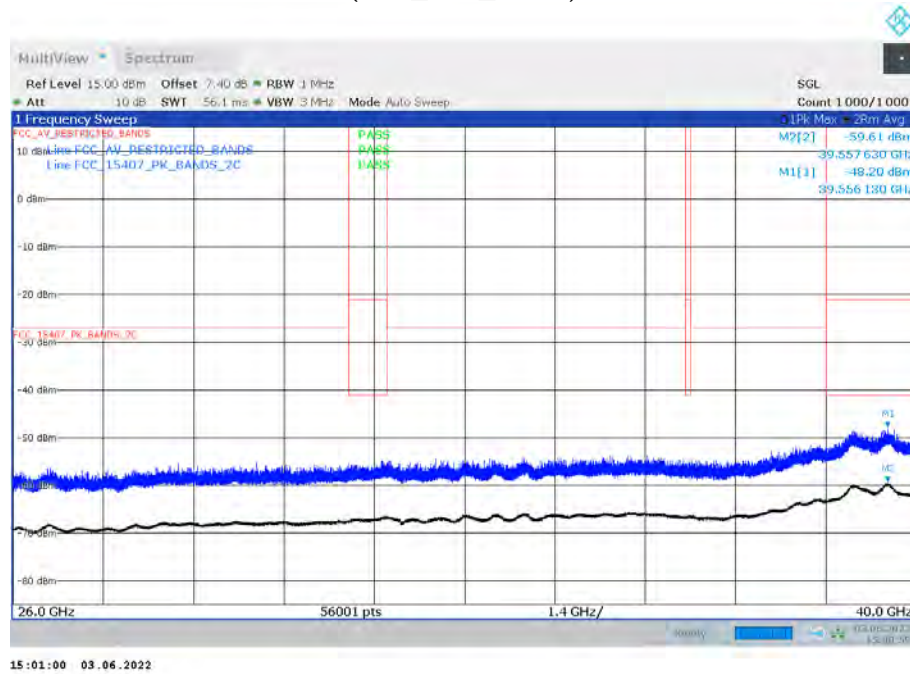


Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-2C (S02\_161\_AB01)

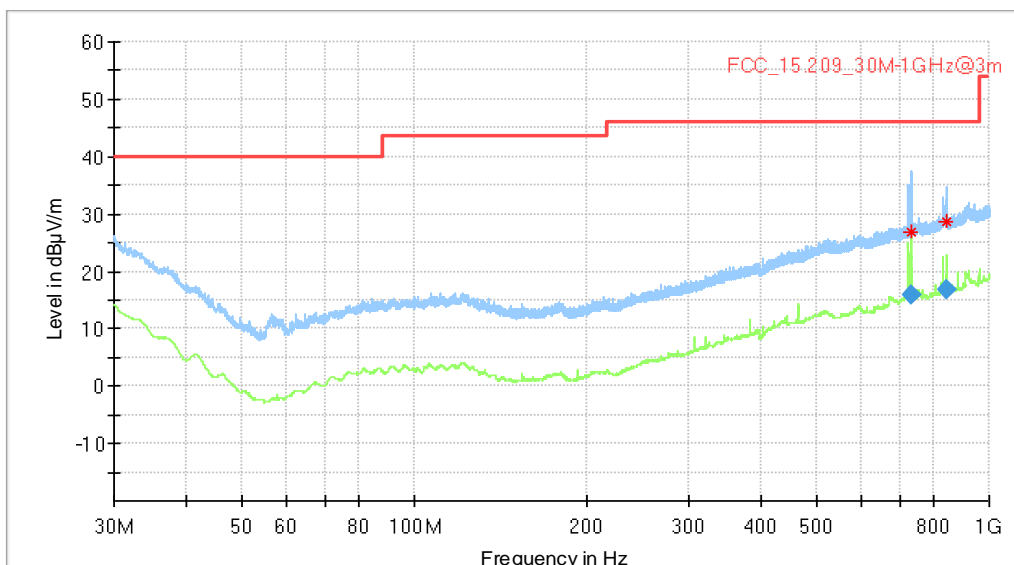




Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 26GHz - 40GHz, Subband = U-NII-2C (S01\_161\_AD01)



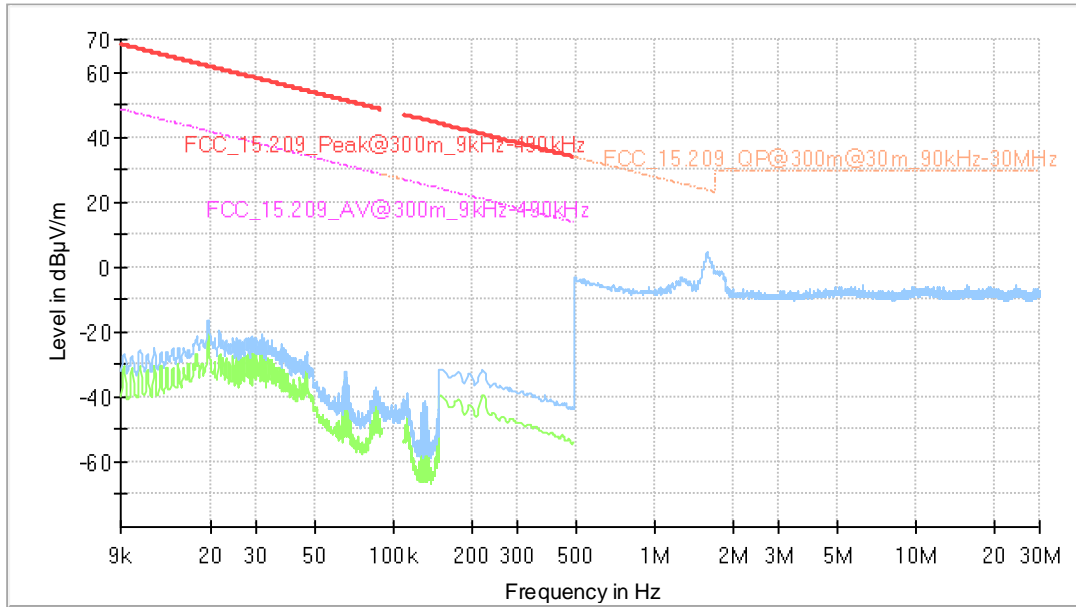
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-3 (S02\_161\_AB01)



### Final Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|
| 730.080000      | 15.94              | 46.00          | 30.06       | 1000.0          | 120.000         | 387.0       | V   | 62.0          | 23.0         |
| 840.660000      | 16.74              | 46.00          | 29.26       | 1000.0          | 120.000         | 290.0       | H   | -134.0        | 24.1         |

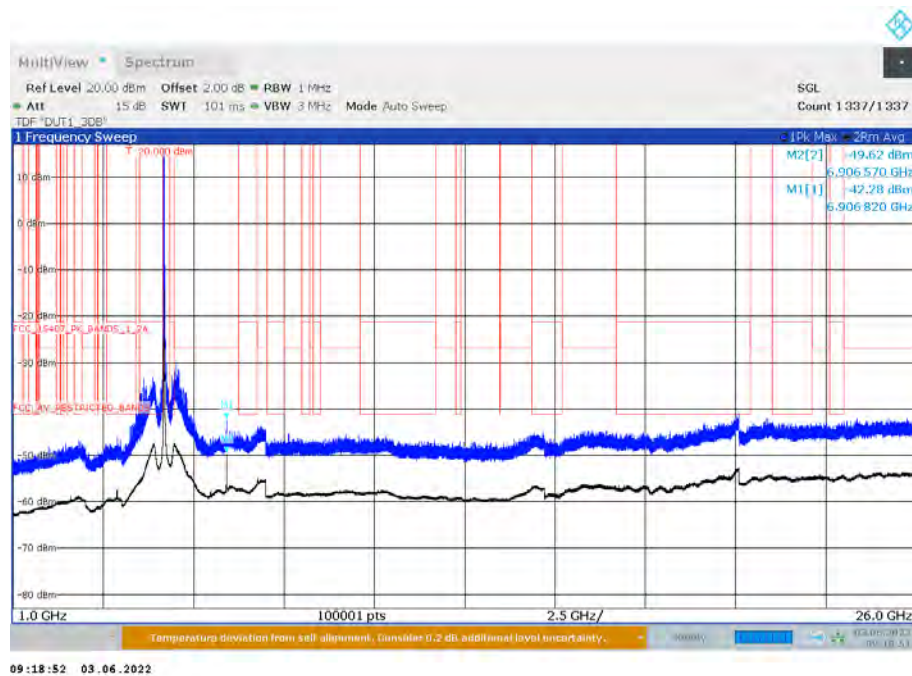
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 9kHz - 30MHz, Subband = U-NII-1 (S02\_161\_AB01)



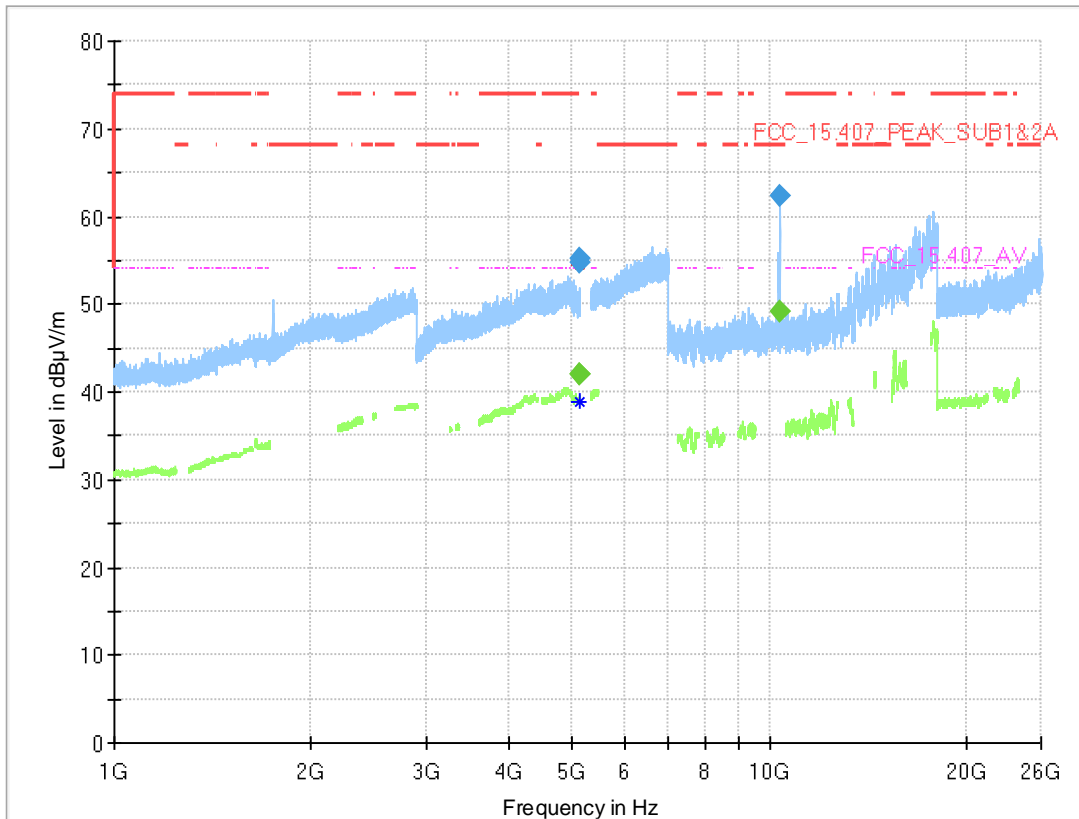
### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|---------------|--------------|
| ---             | ---              | ---              | ---            | ---         | ---             | ---             | ---         | ---           | ---          |

Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01\_161\_AD01)



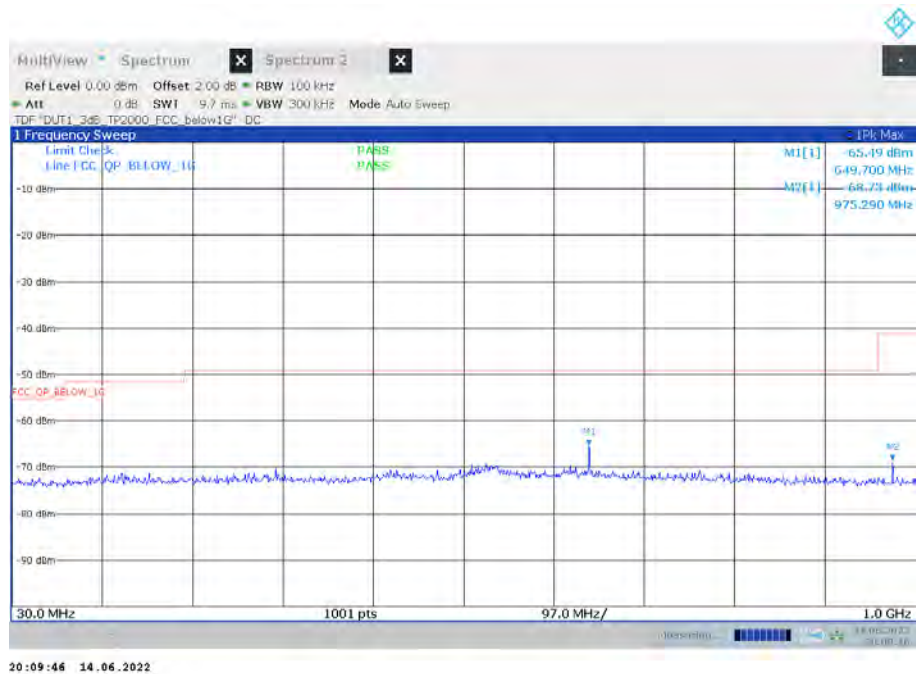
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S02\_161\_AC01)



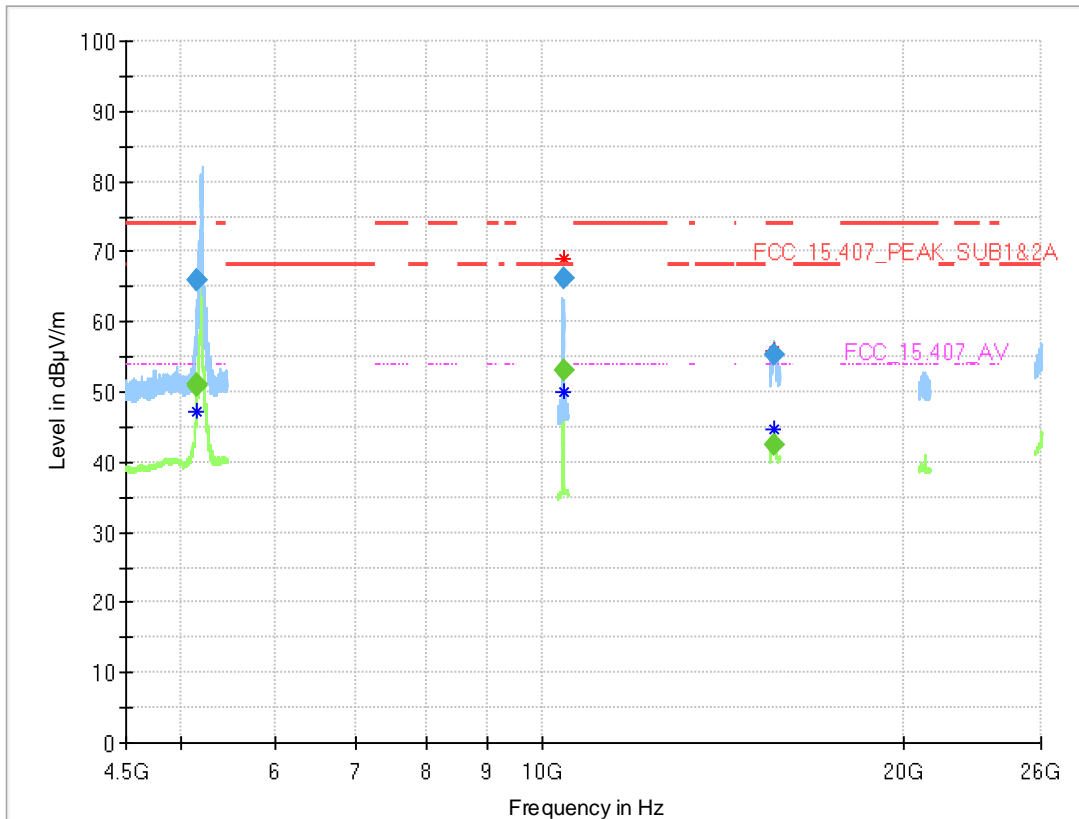
### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5147.400        | ---              | 42.0              | 54.00          | 12.03       | 1000.0          | 1000.000        | 150.0       | H   | -169.0        | 12.0            | 13.6         |
| 5147.400        | 55.2             | ---               | 74.00          | 18.79       | 1000.0          | 1000.000        | 150.0       | H   | -169.0        | 12.0            | 13.6         |
| 5147.725        | ---              | 42.0              | 54.00          | 11.99       | 1000.0          | 1000.000        | 150.0       | V   | -11.0         | 87.0            | 13.6         |
| 5147.725        | 54.8             | ---               | 74.00          | 19.24       | 1000.0          | 1000.000        | 150.0       | V   | -11.0         | 87.0            | 13.6         |
| 10360.200       | ---              | 49.1              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | H   | -49.0         | 90.0            | -12.3        |
| 10360.200       | 62.4             | ---               | 68.20          | 5.82        | 1000.0          | 1000.000        | 150.0       | H   | -49.0         | 90.0            | -12.3        |

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-1 (S01\_161\_AD01)



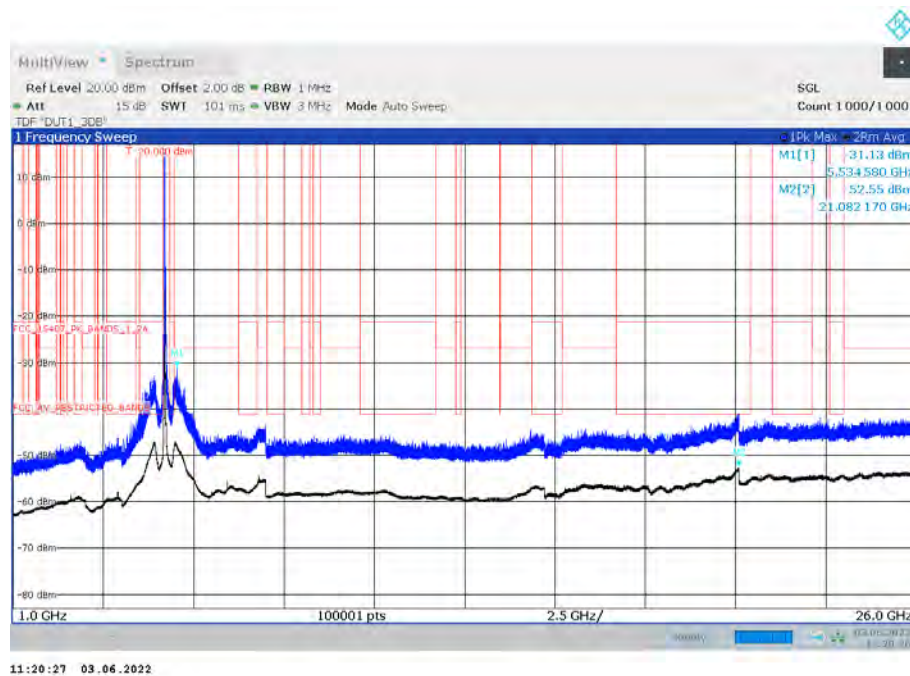
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S02\_161\_AB01)



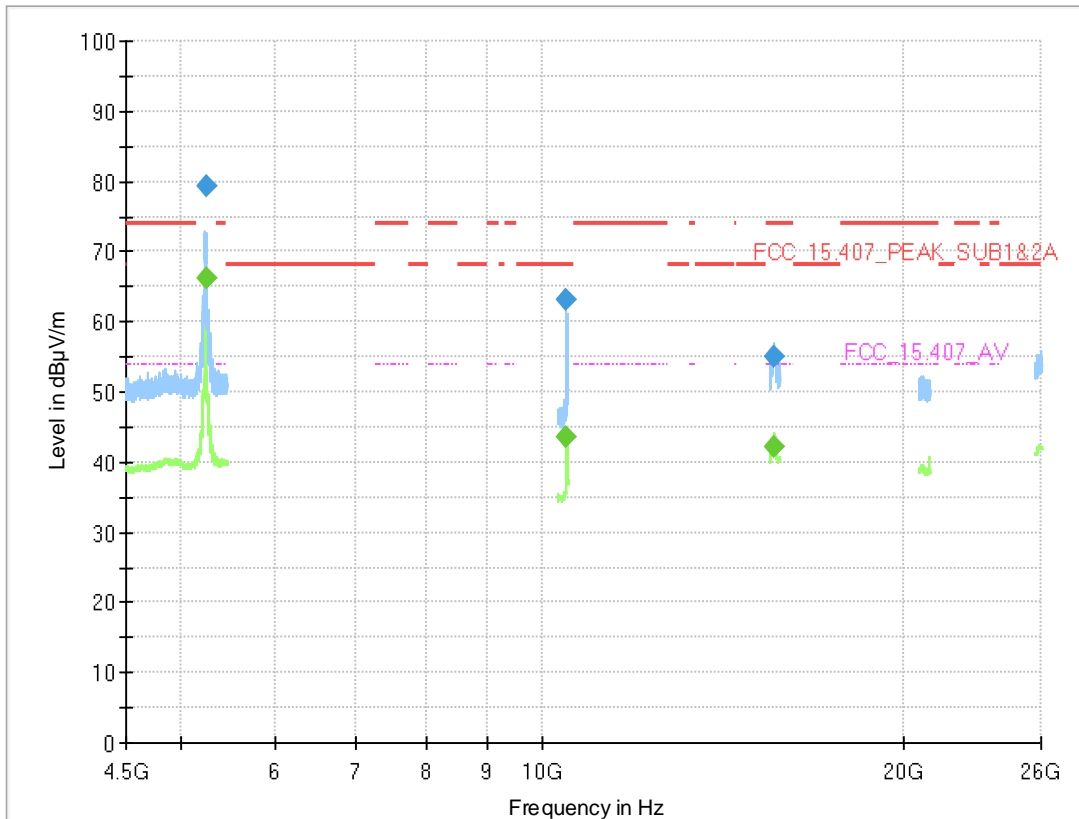
### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5150.000        | ---              | 50.7              | 54.00          | 3.28        | 1000.0          | 1000.000        | 150.0       | V   | 8.0           | 88.0            | 13.5         |
| 5150.000        | 65.8             | ---               | 74.00          | 8.18        | 1000.0          | 1000.000        | 150.0       | V   | 8.0           | 88.0            | 13.5         |
| 5150.000        | ---              | 51.0              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | -1.0          | 80.0            | 13.5         |
| 5150.000        | 66.0             | ---               | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | -1.0          | 80.0            | 13.5         |
| 10399.900       | ---              | 53.0              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | H   | 81.0          | 94.0            | -11.9        |
| 10399.900       | 66.2             | ---               | 68.20          | 1.97        | 1000.0          | 1000.000        | 150.0       | H   | 81.0          | 94.0            | -11.9        |
| 15597.231       | ---              | 42.4              | 54.00          | 11.62       | 1000.0          | 1000.000        | 150.0       | H   | 125.0         | 13.0            | -1.0         |
| 15597.231       | 55.4             | ---               | 74.00          | 18.59       | 1000.0          | 1000.000        | 150.0       | H   | 125.0         | 13.0            | -1.0         |

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01\_161\_AD01)



Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S02\_161\_AB01)

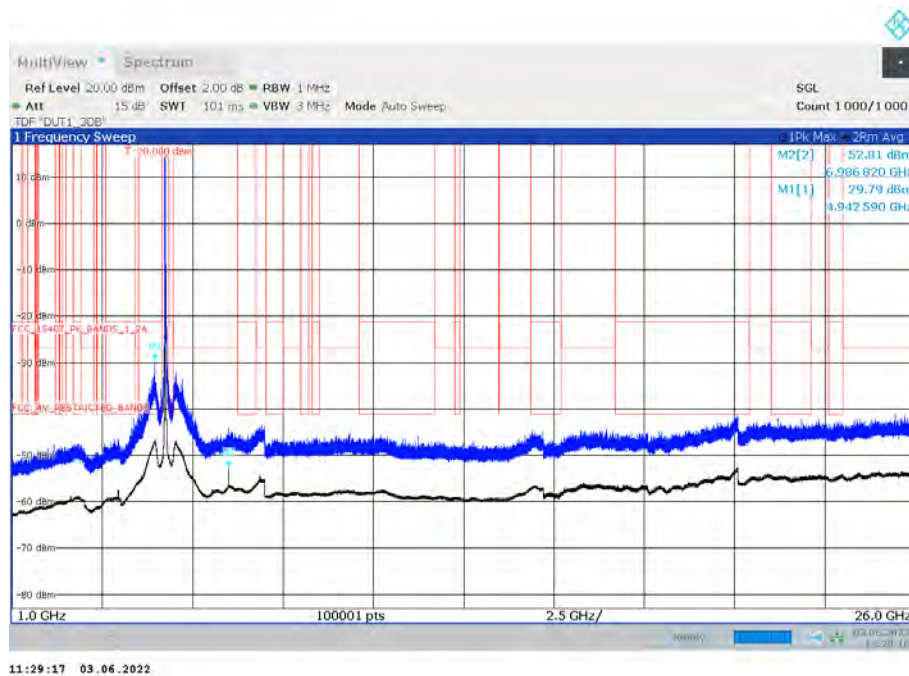


### Final Result

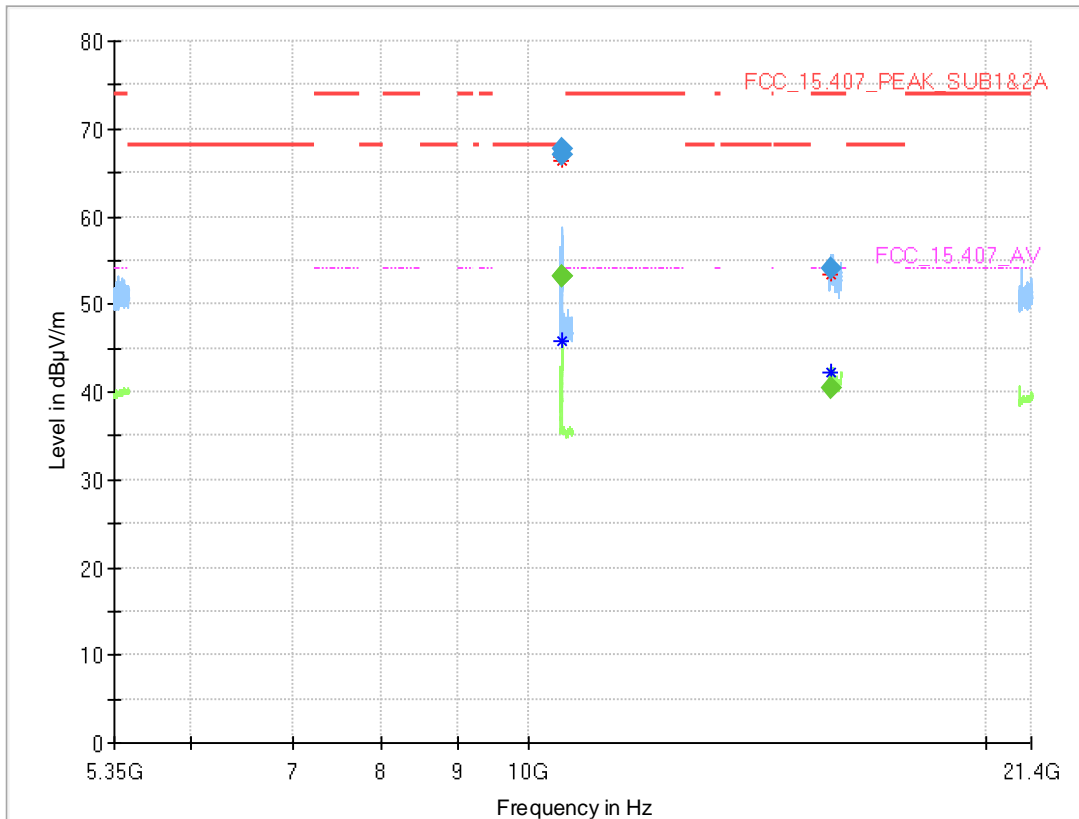
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5242.400        | ---              | 66.1              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | 0.0           | 79.0            | 13.5         |
| 5242.400        | 79.4             | ---               | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | 0.0           | 79.0            | 13.5         |
| 10474.300       | ---              | 43.7              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | -187.0        | -15.0           | -11.0        |
| 10474.300       | 63.2             | ---               | 68.20          | 5.05        | 1000.0          | 1000.000        | 150.0       | V   | -187.0        | -15.0           | -11.0        |
| 15593.885       | ---              | 42.1              | 54.00          | 11.92       | 1000.0          | 1000.000        | 150.0       | H   | -53.0         | 15.0            | -1.1         |
| 15593.885       | 54.9             | ---               | 74.00          | 19.10       | 1000.0          | 1000.000        | 150.0       | H   | -53.0         | 15.0            | -1.1         |



Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-1 (S01\_161\_AD01)



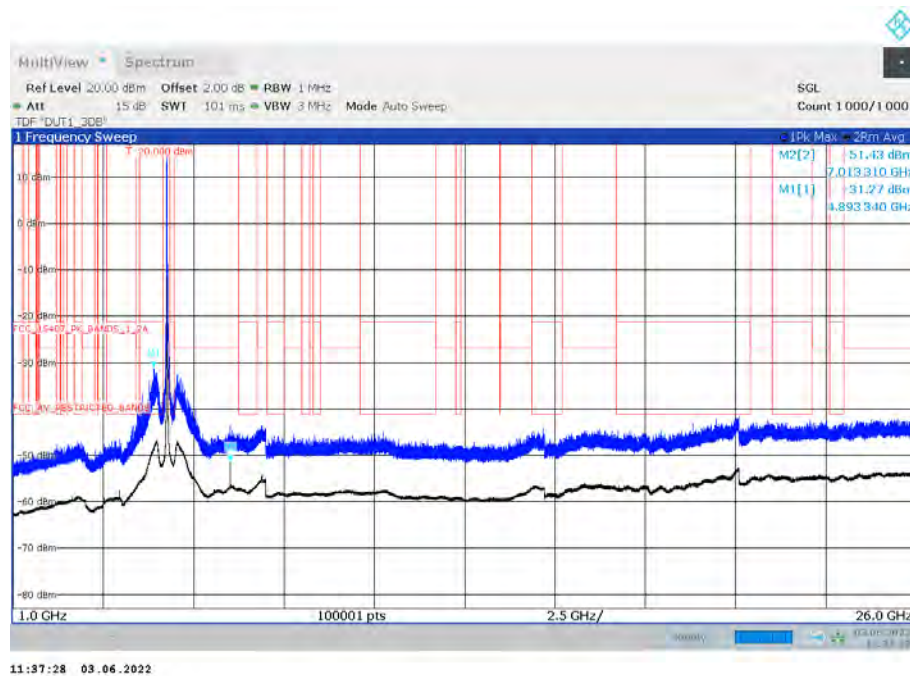
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S02\_161\_AB01)



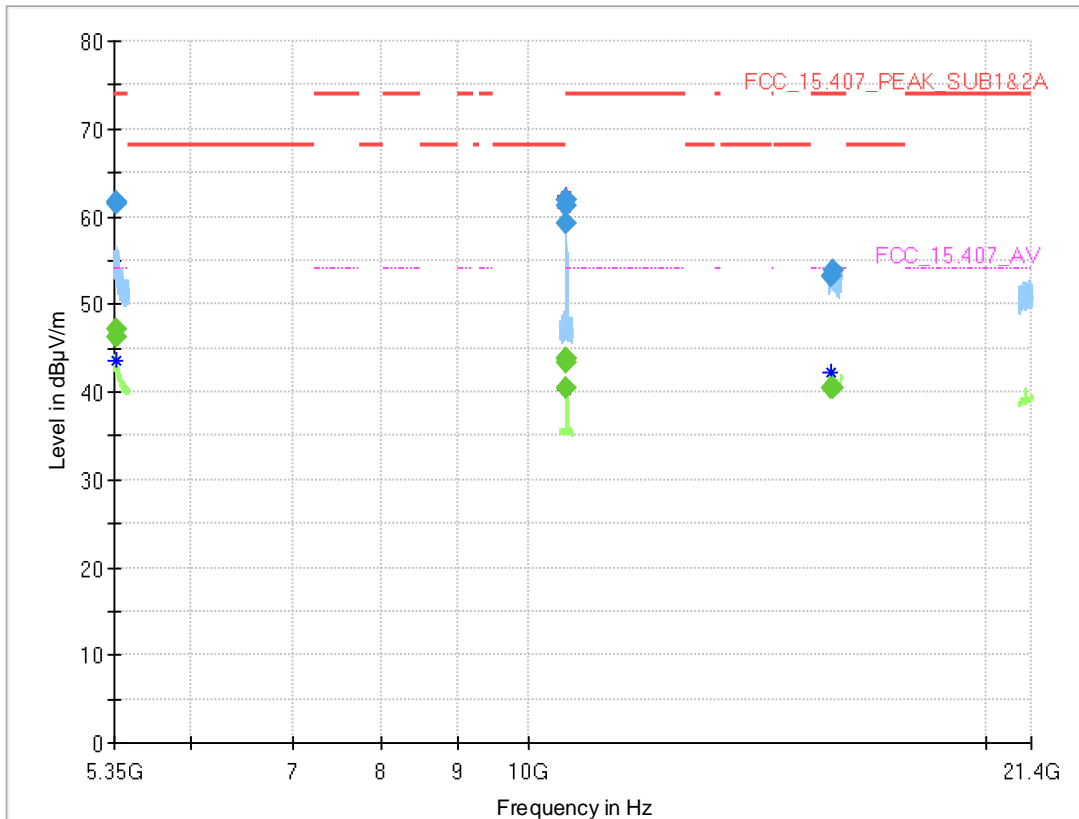
### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 10519.100       | ---              | 53.1              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | -186.0        | -15.0           | -11.1        |
| 10519.100       | 67.7             | ---               | 68.20          | 0.54        | 1000.0          | 1000.000        | 150.0       | V   | -186.0        | -15.0           | -11.1        |
| 10519.700       | ---              | 53.2              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | -186.0        | -15.0           | -11.1        |
| 10519.700       | 67.1             | ---               | 68.20          | 1.12        | 1000.0          | 1000.000        | 150.0       | V   | -186.0        | -15.0           | -11.1        |
| 15826.900       | ---              | 40.4              | 54.00          | 13.62       | 1000.0          | 1000.000        | 150.0       | H   | 8.0           | 0.0             | -2.8         |
| 15826.900       | 54.1             | ---               | 74.00          | 19.89       | 1000.0          | 1000.000        | 150.0       | H   | 8.0           | 0.0             | -2.8         |

Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01\_161\_AD01)



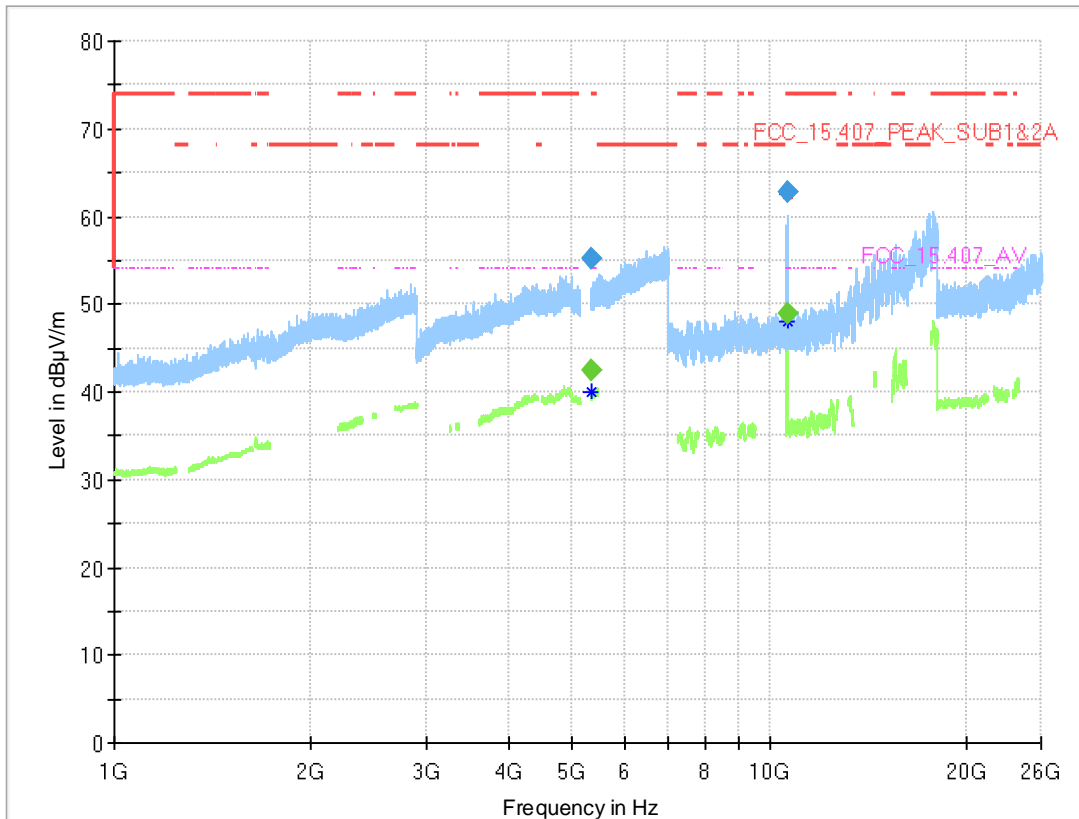
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S02\_161\_AB01)



### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5362.540        | ---              | 47.2              | 54.00          | 6.75        | 1000.0          | 1000.000        | 150.0       | H   | 127.0         | 80.0            | 14.1         |
| 5362.540        | 61.5             | ---               | 74.00          | 12.54       | 1000.0          | 1000.000        | 150.0       | H   | 127.0         | 80.0            | 14.1         |
| 5372.880        | ---              | 46.3              | 54.00          | 7.68        | 1000.0          | 1000.000        | 150.0       | H   | 130.0         | 85.0            | 14.2         |
| 5372.880        | 61.7             | ---               | 74.00          | 12.26       | 1000.0          | 1000.000        | 150.0       | H   | 130.0         | 85.0            | 14.2         |
| 10592.100       | ---              | 40.4              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | -183.0        | 15.0            | -11.9        |
| 10592.100       | 59.3             | ---               | 68.20          | 8.93        | 1000.0          | 1000.000        | 150.0       | V   | -183.0        | 15.0            | -11.9        |
| 10595.400       | ---              | 43.2              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | -190.0        | -5.0            | -11.9        |
| 10595.400       | 61.2             | ---               | 68.20          | 6.96        | 1000.0          | 1000.000        | 150.0       | V   | -190.0        | -5.0            | -11.9        |
| 10599.100       | ---              | 43.8              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | -187.0        | -5.0            | -12.0        |
| 10599.100       | 61.9             | ---               | 68.20          | 6.30        | 1000.0          | 1000.000        | 150.0       | V   | -187.0        | -5.0            | -12.0        |
| 10600.400       | ---              | 43.8              | 54.00          | 10.25       | 1000.0          | 1000.000        | 150.0       | V   | -188.0        | -15.0           | -12.1        |
| 10600.400       | 62.0             | ---               | 74.00          | 12.04       | 1000.0          | 1000.000        | 150.0       | V   | -188.0        | -15.0           | -12.1        |
| 15831.600       | ---              | 40.4              | 54.00          | 13.58       | 1000.0          | 1000.000        | 150.0       | V   | 124.0         | 105.0           | -2.8         |
| 15831.600       | 53.1             | ---               | 74.00          | 20.91       | 1000.0          | 1000.000        | 150.0       | V   | 124.0         | 105.0           | -2.8         |
| 15838.600       | ---              | 40.4              | 54.00          | 13.58       | 1000.0          | 1000.000        | 150.0       | H   | -172.0        | 0.0             | -2.8         |
| 15838.600       | 53.9             | ---               | 74.00          | 20.11       | 1000.0          | 1000.000        | 150.0       | H   | -172.0        | 0.0             | -2.8         |

Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S02\_161\_AC01)

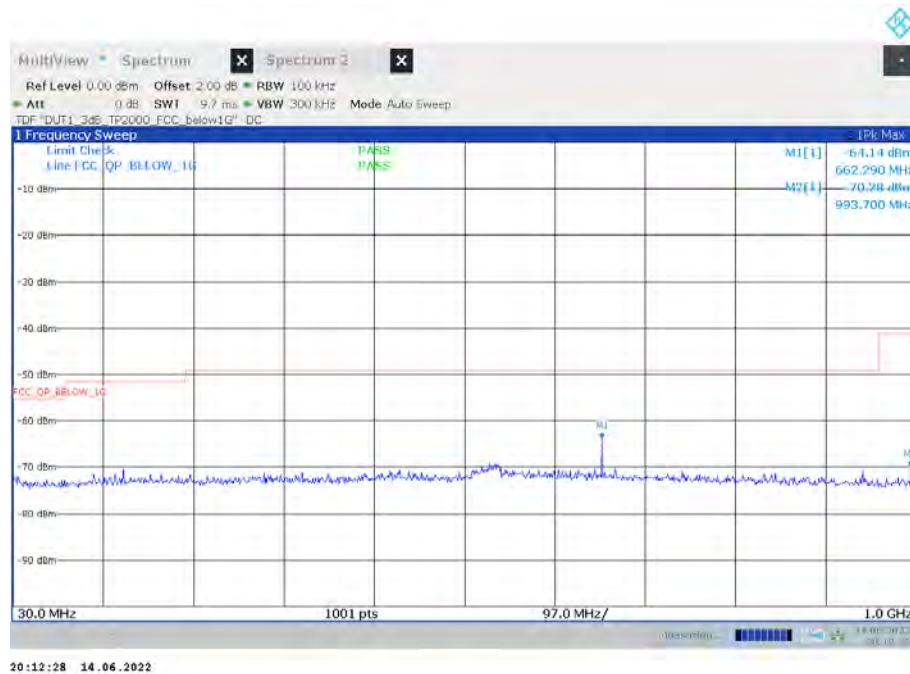


### Final\_Result

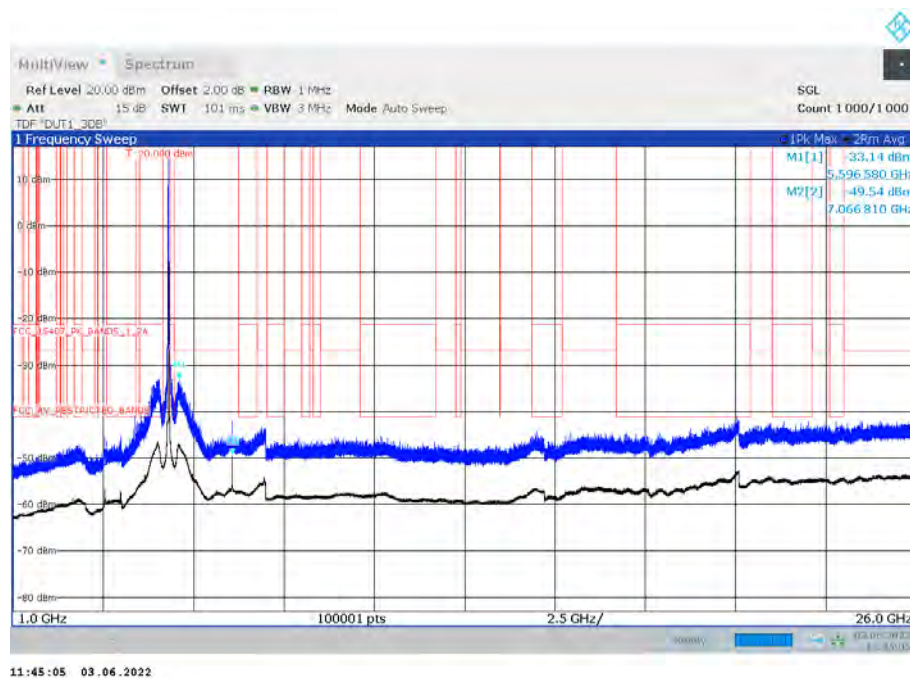
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5351.760        | 55.2             | ---               | 74.00          | 18.76       | 1000.0          | 1000.000        | 150.0       | V   | -39.0         | 96.0            | 14.1         |
| 5351.760        | ---              | 42.4              | 54.00          | 11.62       | 1000.0          | 1000.000        | 150.0       | V   | -39.0         | 96.0            | 14.1         |
| 10640.530       | 62.7             | ---               | 74.00          | 11.31       | 1000.0          | 1000.000        | 150.0       | H   | -46.0         | 105.0           | -11.7        |
| 10640.530       | ---              | 48.8              | 54.00          | 5.17        | 1000.0          | 1000.000        | 150.0       | H   | -46.0         | 105.0           | -11.7        |

(continuation of the "Final\_Result" table from column 17 ...)

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-2A (S01\_161\_AD01)

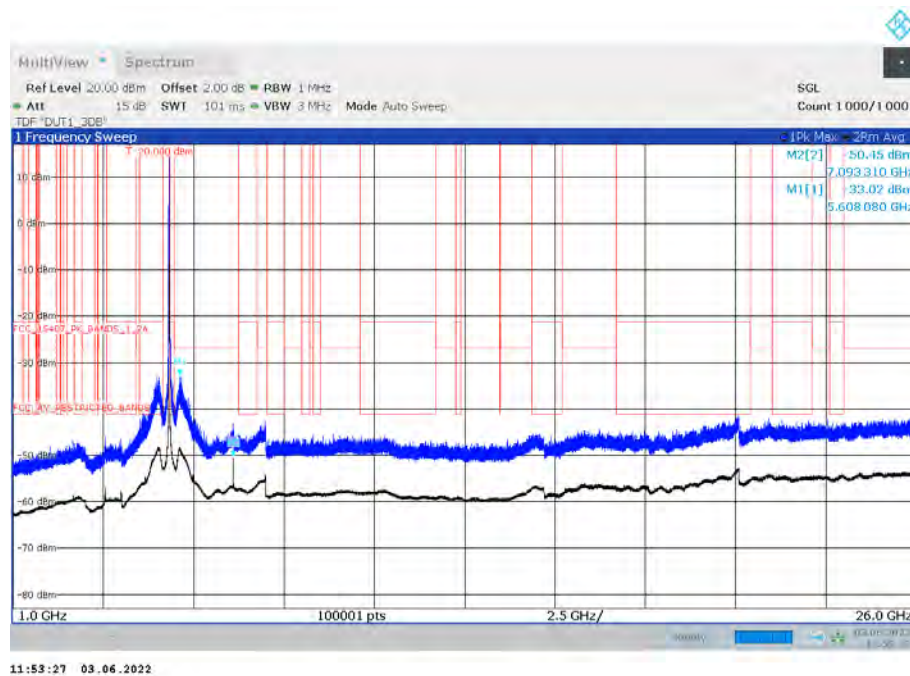


Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01\_161\_AD01)

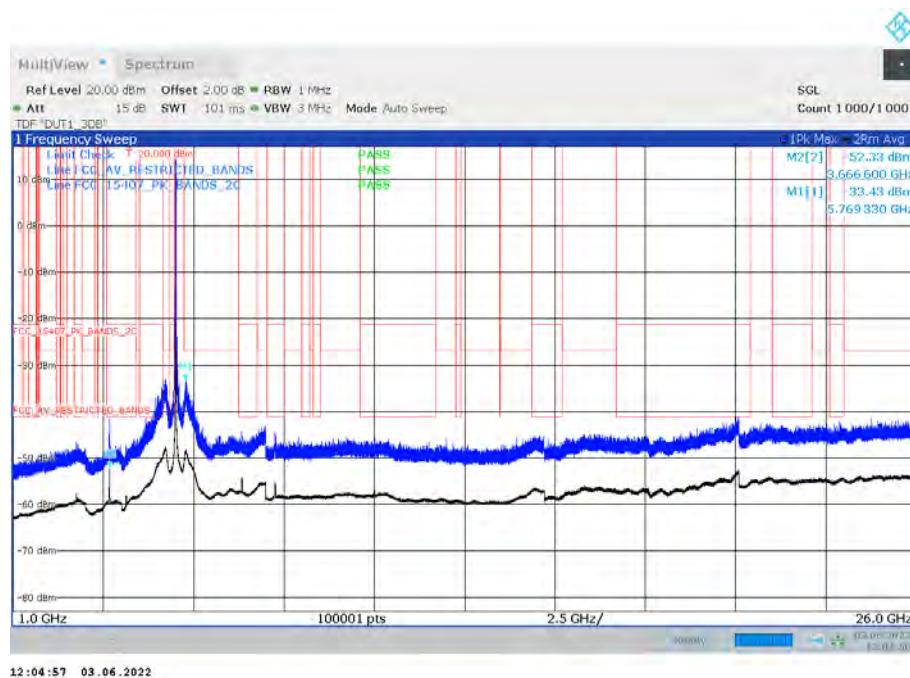




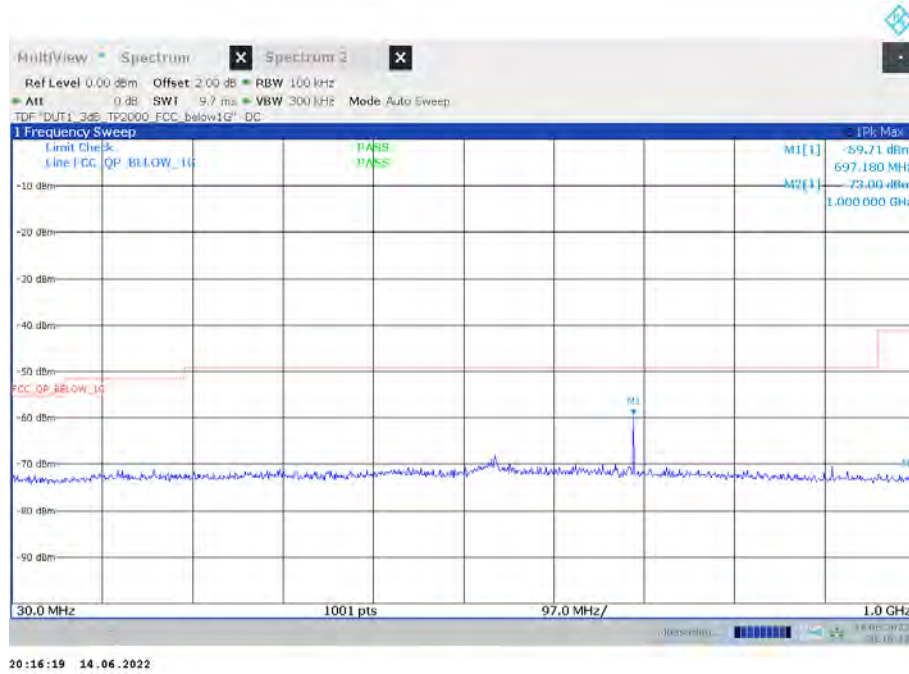
Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A (S01\_161\_AD01)



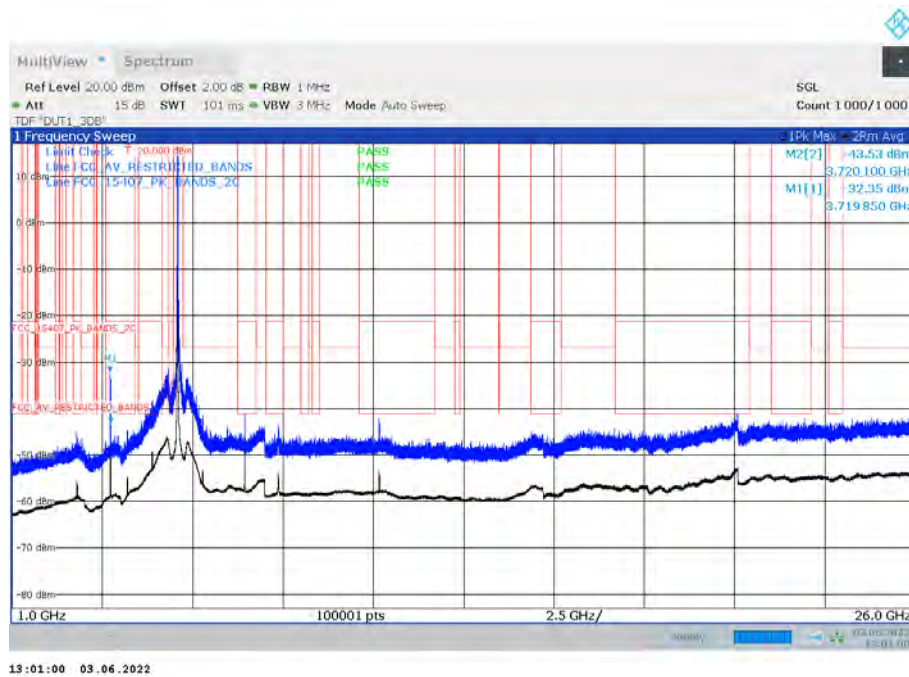
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01\_161\_AD01)



Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-2C (S01\_161\_AD01)

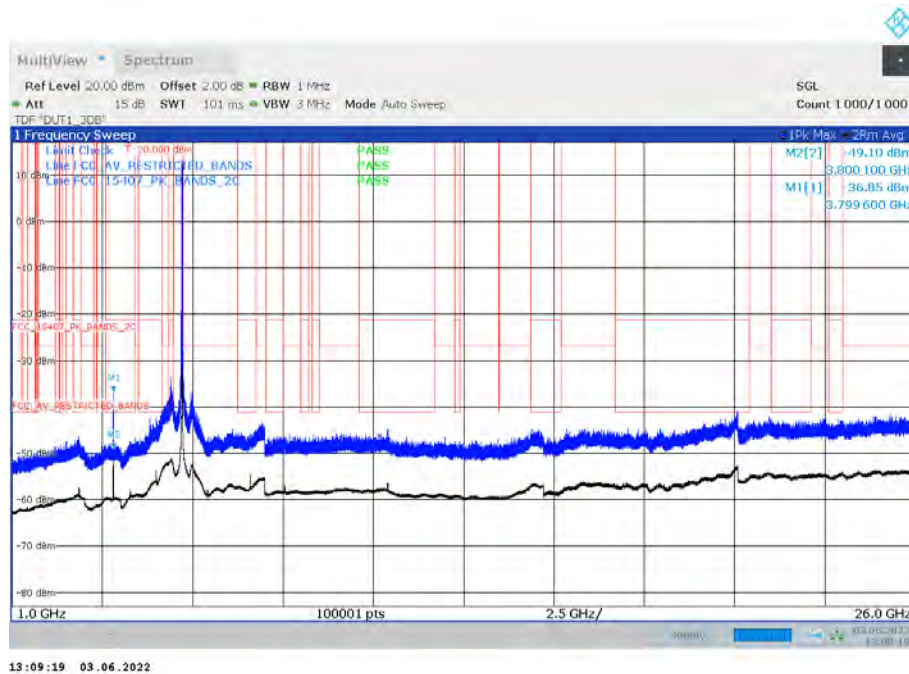


Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01\_161\_AD01)

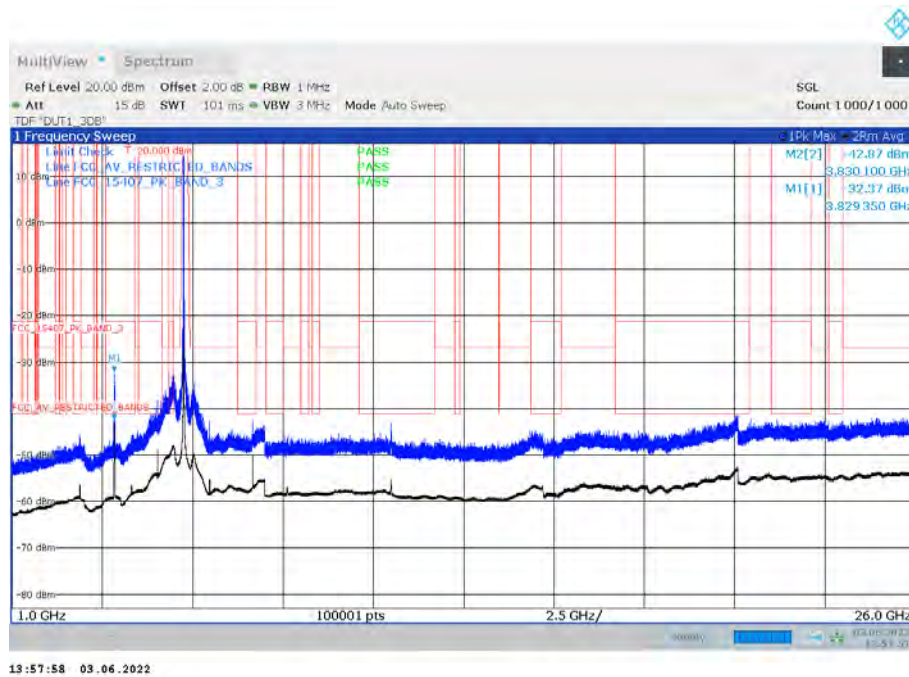




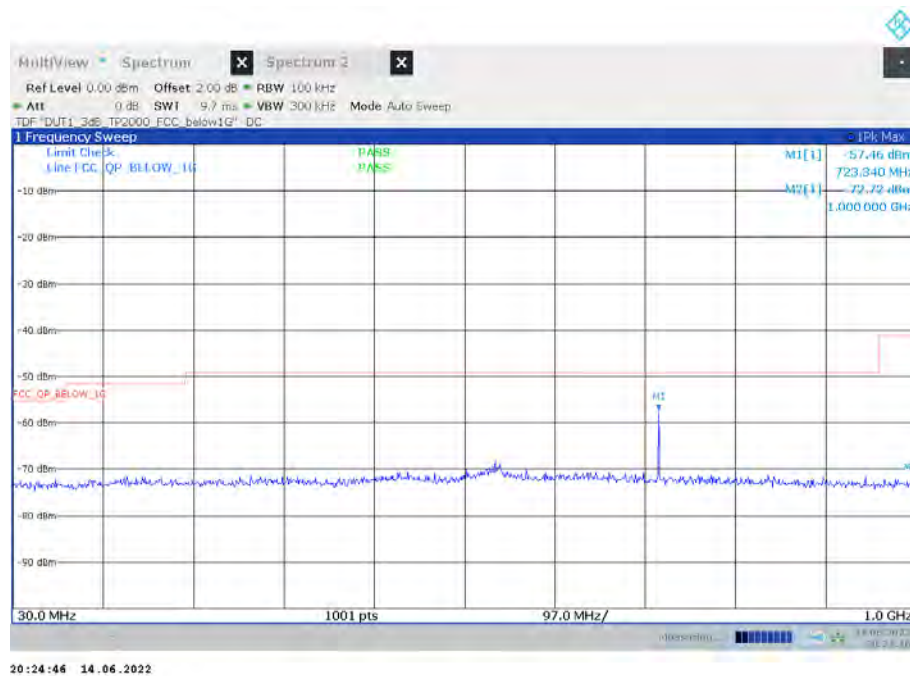
Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01\_161\_AD01)



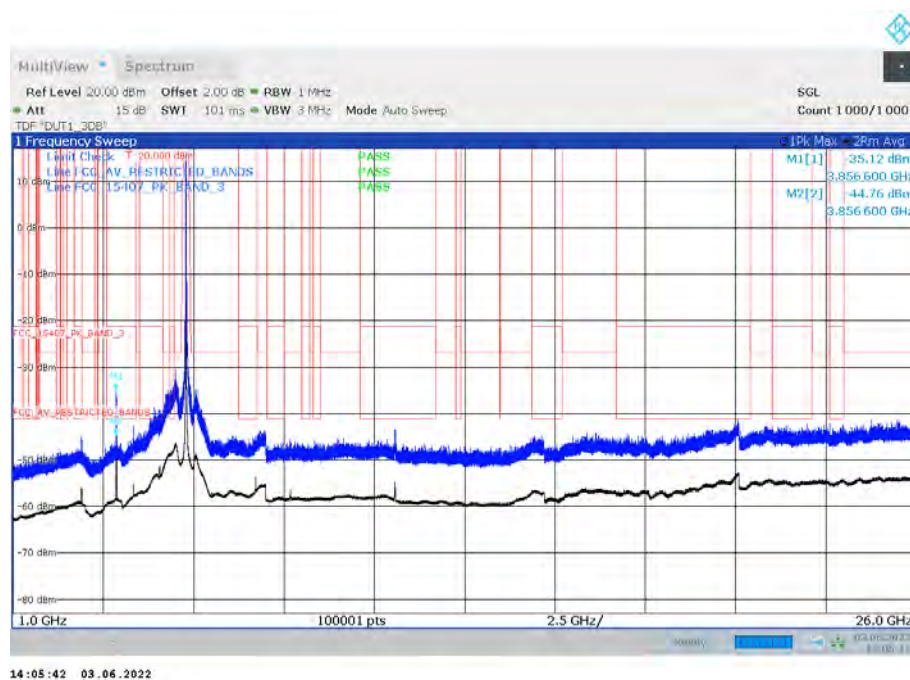
Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01\_161\_AD01)



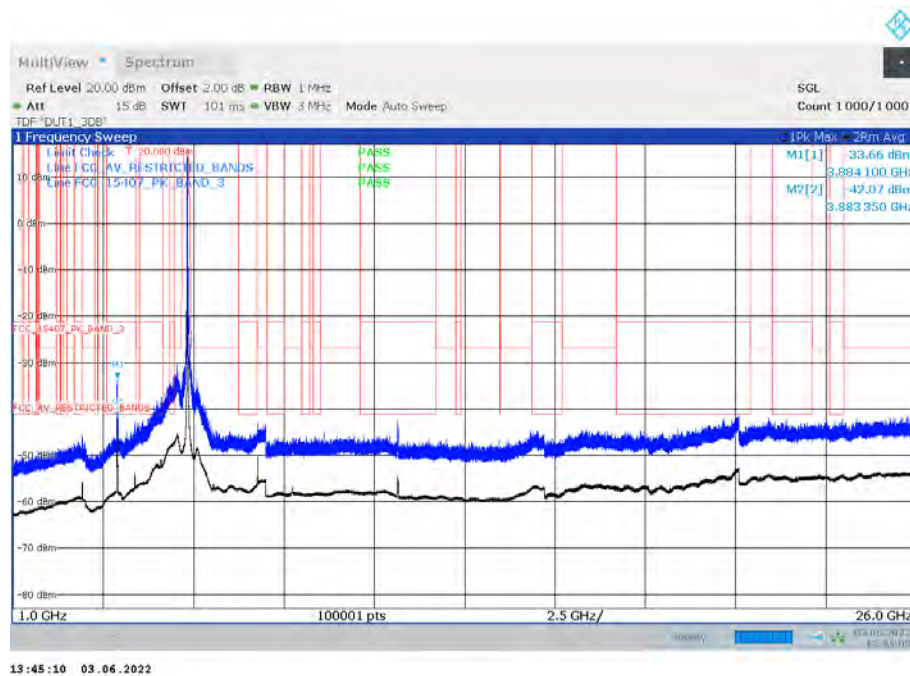
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-3 (S01\_161\_AD01)



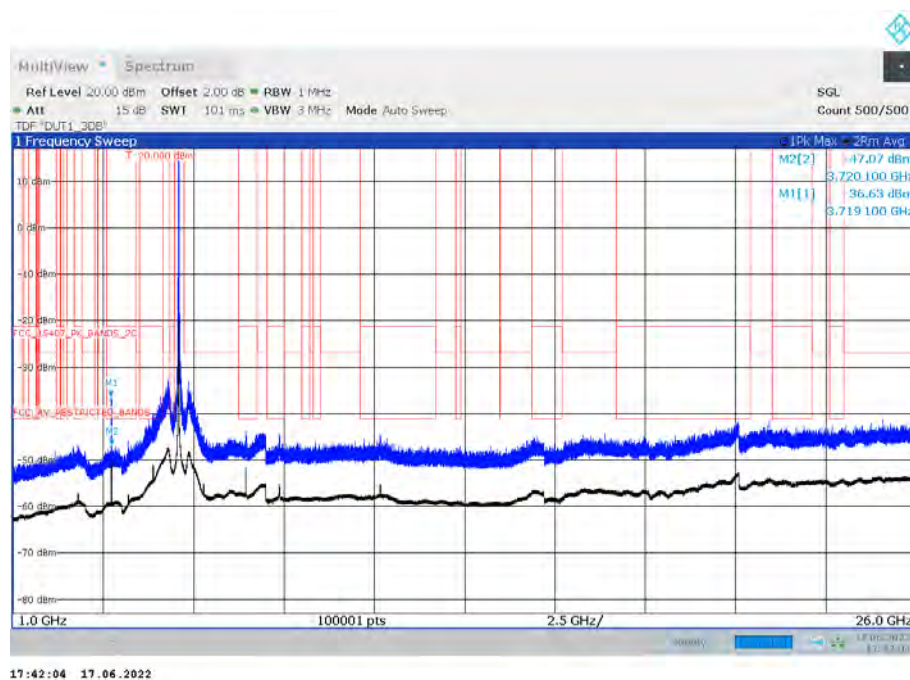
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01\_161\_AD01)



Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01\_161\_AD01)

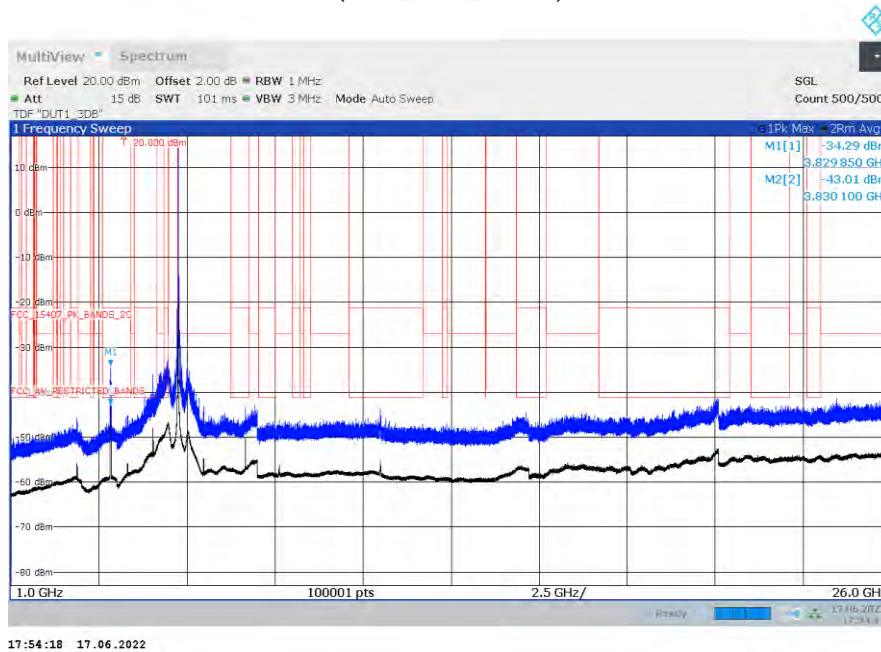


Radio Technology = WLAN n 20 MHz, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C (S01\_161\_AD01)

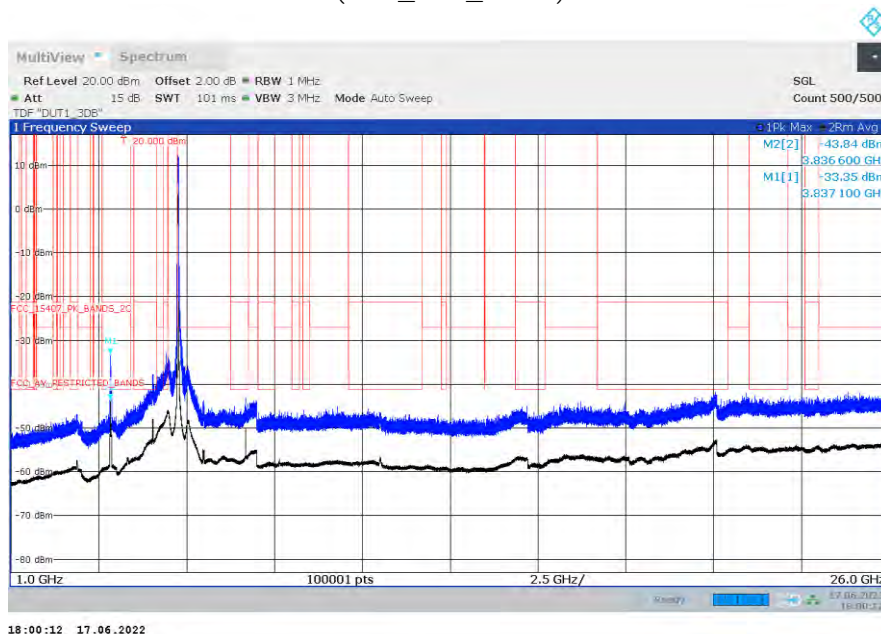




Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01\_161\_AD01)



Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-3 (S01\_161\_AD01)



### 5.7.5 TEST EQUIPMENT USED

- Radiated Emissions SAC H-Field
- Radiated Emissions FAR 5 GHz FCC
- Radiated Emissions SAC up to 1 GHz
- R&S TS8997

## 5.8 BAND EDGE

Standard FCC Part 15 Subpart E

The test was performed according to:  
ANSI C63.10

### 5.8.1 TEST DESCRIPTION

Radiated Measurement with 50 Ohm termination at antenna ports

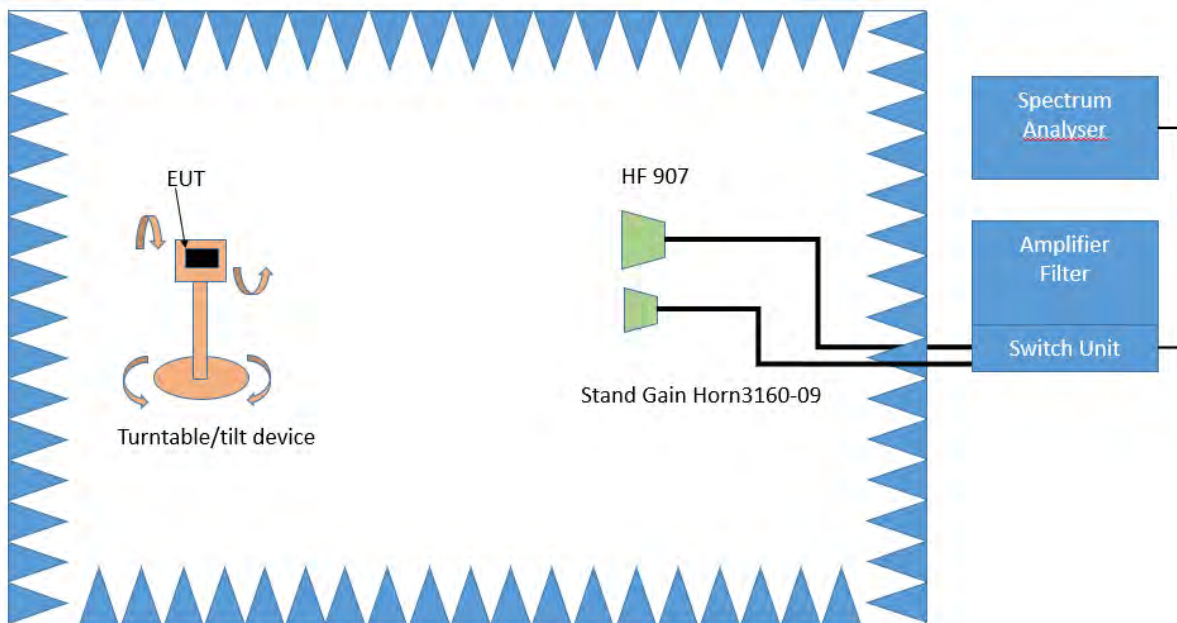
The test set-up was made in accordance to the general provisions of ANSI C63.10 in a typical installation configuration. The measurements were performed according the following sub-chapter of ANSI C63.10:

- Chapter 6.10.5

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.

All steps were performed with one height (1.5 m) of the receiving antenna only (procedure according ANSI C63.10, chapter 6.6.5).

### 3. Measurement above 1 GHz



Test Setup; Spurious Emission Radiated (FAC), 1 GHz-26.5 GHz

#### Step 1:

The EUT is turned during the preliminary measurement across the elevation axis, with a step size of 90 °.

The turn table step size (azimuth angle) for the preliminary measurement is 45 °.

Spectrum analyser settings:

- Detector: Peak, Average
- RBW = 1 MHz
- VBW = 3 MHz

#### Step 2:

The turn table azimuth will slowly vary by  $\pm 22.5^\circ$ .

The elevation angle will slowly vary by  $\pm 45^\circ$

Spectrum analyser settings:

- Detector: Peak

Step 3:

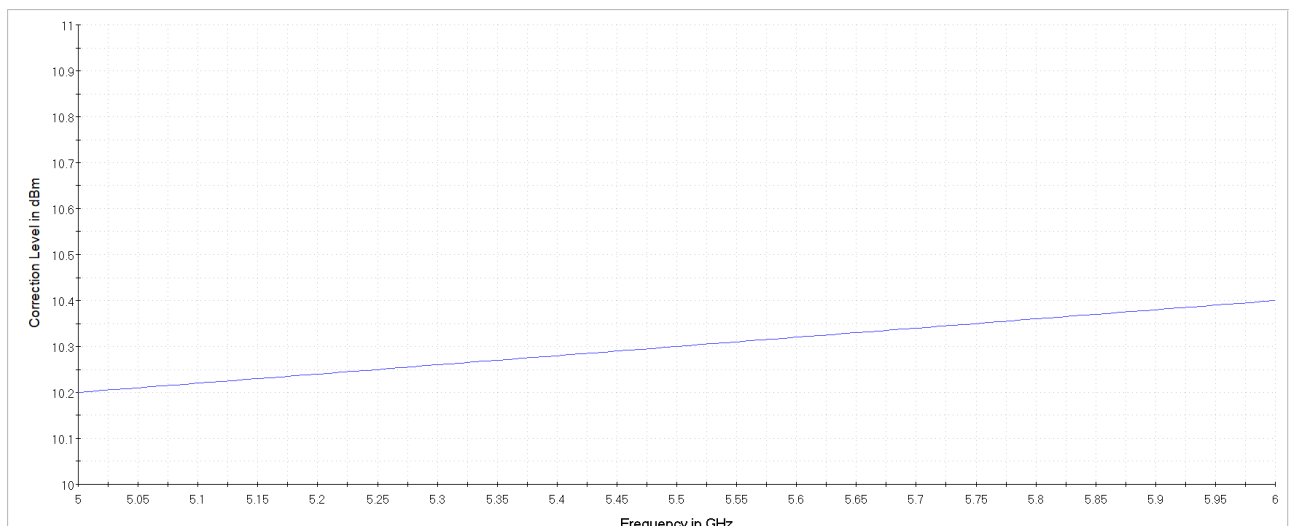
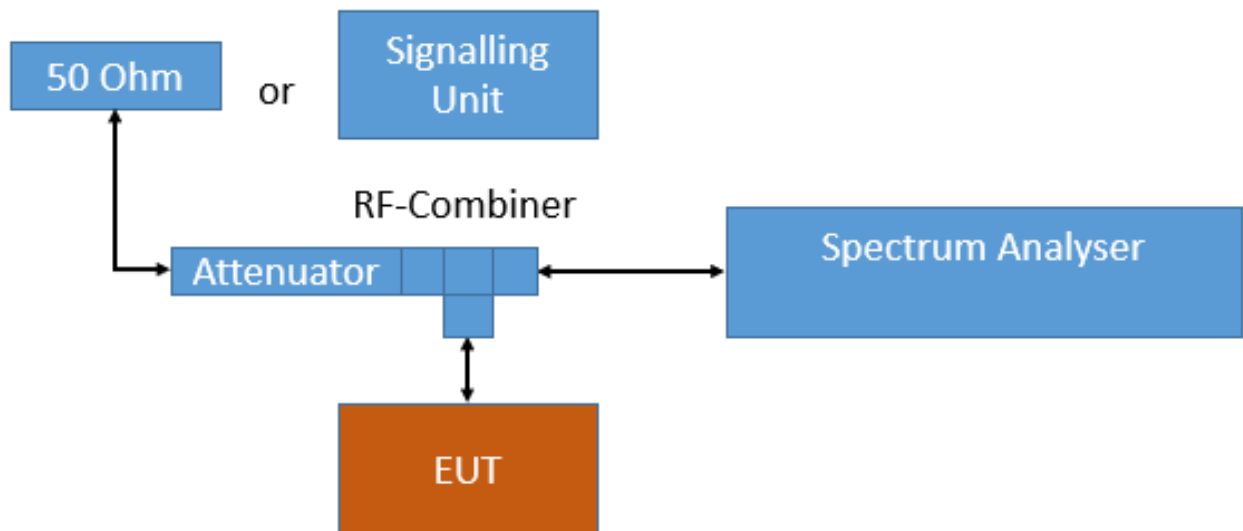
Spectrum analyser settings for step 3:

- Detector: Peak / CISPR Average
- Measured frequencies: in step 1 determined frequencies
- RBW = 1 MHz
- VBW = 3 MHz
- Measuring time: 1 s

Conducted Measurements at antenna ports

The Equipment Under Test (EUT) was set up to perform the spurious emissions measurements.

The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.



Analyser settings:

- Frequency range: 5100 – 5400 MHz (U-NII band 1/2A)  
5430 – 5530 MHz (U-NII band 2C low BE)  
5655 – 5755 MHz (U-NII band 2C high BE)  
5611 – 5811 MHz (U-NII band 3 low BE)  
5765 – 5965 MHz (U-NII band 3 high BE)
- Resolution Bandwidth (RBW): 1000 kHz
- Video Bandwidth (VBW): 3000 kHz
- Trace: Maxhold, Average Power
- Sweeps: 10000
- Sweep Time: coupled
- Detector: Peak, RMS

For the conducted emissions in restricted bands the Value is measured in dBm and then converted to dB $\mu$ V/m as given in KDB 558074:

1. Measure the conducted output power in dBm.
2. Add the maximum antenna gain in dBi. (Included in measurement result by offset)
3. Add the appropriate ground reflection factor (0 for measured range)  
**6 dB for frequencies  $\leq$  30 MHz;**  
4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive; and  
0 dB for frequencies > 1000 MHz).
4. Convert the resultant EIRP level to an equivalent electric field strength level using the following relationship:  
$$E = \text{EIRP} - 20 \log D + 104.8$$
Where E is the electric field strength in dB $\mu$ V/m,  
EIRP is the equivalent isotropically radiated power in dBm  
D is the specified measurement distance in m

Value [dB $\mu$ V/m] = Measured value [dBm] (including gain and ground reflection factor) – 20 log D + 104.8

## 5.8.2 TEST REQUIREMENTS / LIMITS

### A) FCC

FCC Part 15 Subpart E, §15.407 (b)(1)

For transmitters operating in the 5150–5250 MHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5150–5350 MHz.

FCC Part 15 Subpart E, §15.407 (b)(2)

For transmitters operating in the 5250–5350 MHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5150–5350 MHz.

FCC Part 15 Subpart E, §15.407 (b)(3)

For transmitters operating in the 5470–5725 MHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5470–5725 MHz.

FCC Part 15 Subpart E, §15.407 (b)(4)

For transmitters operating in the 5725–5850 MHz band:

**Limit: –27 dBm/MHz at 75 MHz or more above or below the band edge**  
increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge  
increasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edge  
increasing linearly to 27 dBm/MHz at the band edge.

FCC Part 15 Subpart E, §15.407 (b) (5)

For transmitters operating within the 5.925–7.125 GHz band:

Limit: –27 dBm/MHz EIRP outside of the band 5.925–7.125 GHz.

FCC Part 15 Subpart E, §15.407 (b) (6)

For transmitters operating within the 5.925–7.125 GHz bands:

Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

### B) IC

Different frequency bands and limits apply, as compared to the FCC requirements.

RSS-247, 6.2.1.2, Emissions outside the band 5150–5250 MHz, indoor operation only:

Limit: –27 dBm/MHz EIRP outside of the band 5150–5250 MHz.

RSS-247, 6.2.2.2, Emissions outside the band 5250–5350 MHz:

Limit: –27 dBm/MHz EIRP outside of the band 5250–5350 MHz.

RSS-247, 6.2.3.2, Emissions outside the bands 5470–5600 MHz and 5650–5725 MHz:

Limit: –27 dBm/MHz EIRP outside of the band 5470–5725 MHz.

However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of –27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz.

Note: No operation is permitted for the frequency range 5600–5650 MHz.

RSS-247, 6.2.4.2, Emissions outside the band 5725–5850 MHz:



- a. 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
- b. 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
- c. 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
- d. -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

### C) FCC & IC

For band edges connected to a restricted band, the limits are specified in Section 15.209(a)

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

| Frequency in MHz | Limit ( $\mu\text{V}/\text{m}$ ) | Measurement distance (m) | Limits ( $\text{dB}\mu\text{V}/\text{m}$ ) |
|------------------|----------------------------------|--------------------------|--|
| 0.009 – 0.49     | 2400/F(kHz)@300m                 | 3                        | (48.5 – 13.8)@300m                         |
| 0.49 – 1.705     | 24000/F(kHz)@30m                 | 3                        | (33.8 – 23.0)@30m                          |
| 1.705 – 30       | 30@30m                           | 3                        | 29.5@30m                                   |

The measured values are corrected with an inverse linear distance extrapolation factor (40 dB/decade) according FCC 15.31 (2).

| Frequency in MHz | Limit ( $\mu\text{V}/\text{m}$ ) | Measurement distance (m) | Limits ( $\text{dB}\mu\text{V}/\text{m}$ ) |
|------------------|----------------------------------|--------------------------|--|
| 30 – 88          | 100@3m                           | 3                        | 40.0@3m                                    |
| 88 – 216         | 150@3m                           | 3                        | 43.5@3m                                    |
| 216 – 960        | 200@3m                           | 3                        | 46.0@3m                                    |
| 960 – 26000      | 500@3m                           | 3                        | 54.0@3m                                    |
| 26000 – 40000    | 500@3m                           | 1                        | 54.0@3m                                    |

The measured values above 26 GHz are corrected with an inverse linear distance extrapolation factor (20 dB/decade).

§15.35(b) ..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor:  $\text{Limit (dB}\mu\text{V}/\text{m)} = 20 \log (\text{Limit } (\mu\text{V}/\text{m})/1\mu\text{V}/\text{m})$

### 5.8.3 TEST PROTOCOL

Ambient temperature: 23-27 °C  
 Air Pressure: 1000 - 1008 hPa  
 Humidity: 32-50 %  
 WLAN a-Mode; 20 MHz; 6 Mbit/s  
 Applied duty cycle correction (AV): 0 dB

| U-NII - Subband | Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin [dB] | Limit Type | FCC /IC? |
|-----------------|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|-------------|------------|----------|
| 1               | Conducted          | 5180                   | 5150.0                | 68.6                    | PEAK     | 1000      | 74.0           | 5.4         | BE-RB      | FCC&IC   |
|                 | Conducted          | 5180                   | 5150.0                | 52.1                    | AV       | 1000      | 54.0           | 1.9         | BE-RB      | FCC&IC   |
| 2A              |                    |                        |                       |                         |          |           |                |             |            |          |
| 2A              | Conducted          | 5320                   | 5350.0                | 70.7                    | PEAK     | 1000      | 74.0           | 3.3         | BE-RB      | FCC&IC   |
|                 | Conducted          | 5320                   | 5350.0                | 51.2                    | AV       | 1000      | 54.0           | 2.8         | BE-RB      | FCC&IC   |
| 2C              | Conducted          | 5500                   | 5460.0                | 64.1                    | PEAK     | 1000      | 74.0           | 9.9         | BE-RB      | FCC&IC   |
|                 | Conducted          | 5500                   | 5460.0                | 47.1                    | AV       | 1000      | 54.0           | 6.9         | BE-RB      | FCC&IC   |
|                 | Conducted          | 5500                   | 5470.0                | 64.7                    | PEAK     | 1000      | 68.2           | 3.5         | BE-UE      | FCC&IC   |
|                 | Conducted          | 5520                   | 5460.0                | 59.1                    | PEAK     | 1000      | 74.0           | 14.9        | BE-RB      | FCC&IC   |
|                 | Conducted          | 5520                   | 5460.0                | 46.8                    | AV       | 1000      | 54.0           | 7.2         | BE-RB      | FCC&IC   |
|                 | Conducted          | 5520                   | 5470.0                | 65.7                    | PEAK     | 1000      | 68.2           | 2.5         | BE-UE      | FCC&IC   |
|                 | Conducted          | 5660                   | 5725.0                | 67.6                    | PEAK     | 1000      | 68.2           | 0.6         | BE-UE      | FCC&IC   |
|                 | Conducted          | 5680                   | 5725.0                | 67.2                    | PEAK     | 1000      | 68.2           | 1.0         | BE-UE      | FCC&IC   |
|                 | Conducted          | 5700                   | 5725.0                | 67.6                    | PEAK     | 1000      | 68.2           | 0.6         | BE-UE      | FCC&IC   |
|                 | Conducted          | 5745                   | 5725.0                | 60.2                    | PEAK     | 1000      | 68.2           | 8.0         | BE-UE      | FCC&IC   |
| 3               | Conducted          | 5825                   | 5850.0                | 65.0                    | PEAK     | 1000      | 68.2           | 3.2         | BE-UE      | FCC&IC   |
|                 | Radiated           | 5180                   | 5150.0                | 55.2                    | PEAK     | 1000      | 74.0           | 18.8        | BE-RB      | FCC&IC   |
|                 | Radiated           | 5180                   | 5150.0                | 42.0                    | AV       | 1000      | 54.0           | 12.0        | BE-RB      | FCC&IC   |
|                 | 2A                 | Radiated               | 5320                  | 5350.0                  | 55.2     | PEAK      | 1000           | 74.0        | 18.8       | BE-RB    |
|                 | Radiated           | 5320                   | 5350.0                | 42.4                    | AV       | 1000      | 54.0           | 11.6        | BE-RB      | FCC&IC   |
|                 | 2C                 | Radiated               | 5500                  | 5460.0                  | 55.6     | PEAK      | 1000           | 74.0        | 18.4       | BE-RB    |
|                 | Radiated           | 5500                   | 5460.0                | 42.8                    | AV       | 1000      | 54.0           | 11.2        | BE-RB      | FCC&IC   |
|                 | Radiated           | 5500                   | 5470.0                | 52.5                    | PEAK     | 1000      | 68.2           | 15.7        | BE-UE      | FCC&IC   |
|                 | Radiated           | 5700                   | 5725.0                | 55.5                    | PEAK     | 1000      | 68.2           | 12.7        | BE-UE      | FCC&IC   |
|                 | 3                  | Radiated               | 5745                  | 5725.0                  | 69.5     | PEAK      | 1000           | 74.0        | 4.5        | BE-UE    |
|                 | Radiated           | 5825                   | 5850.0                | 56.1                    | PEAK     | 1000      | 68.2           | 12.1        | BE-UE      | FCC&IC   |

WLAN n-Mode; 20 MHz; MCS0; SISO  
 Applied duty cycle correction (AV): 0 dB

| U-NII - Subband | Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin [dB] | Limit Type | FCC /IC? |
|-----------------|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|-------------|------------|----------|
| 1               | Conducted          | 5180                   | 5150.0                | 72.2                    | PEAK     | 1000      | 74.0           | 1.8         | BE-RB      | FCC&IC   |
|                 | Conducted          | 5180                   | 5150.0                | 51.5                    | AV       | 1000      | 54.0           | 2.5         | BE-RB      | FCC&IC   |
| 2A              | Conducted          | 5320                   | 5350.0                | 69.9                    | PEAK     | 1000      | 74.0           | 4.1         | BE-RB      | FCC&IC   |
|                 | Conducted          | 5320                   | 5350.0                | 50.4                    | AV       | 1000      | 54.0           | 3.6         | BE-RB      | FCC&IC   |
| 2C              | Conducted          | 5500                   | 5460.0                | 63.1                    | PEAK     | 1000      | 74.0           | 10.9        | BE-RB      | FCC&IC   |
|                 | Conducted          | 5500                   | 5460.0                | 46.9                    | AV       | 1000      | 54.0           | 7.1         | BE-RB      | FCC&IC   |
|                 | Conducted          | 5500                   | 5470.0                | 64.9                    | PEAK     | 1000      | 68.2           | 3.3         | BE-UE      | FCC&IC   |
|                 | Conducted          | 5700                   | 5725.0                | 67.6                    | PEAK     | 1000      | 68.2           | 0.6         | BE-UE      | FCC&IC   |
| 3               | Conducted          | 5745                   | 5725.0                | 61.6                    | PEAK     | 1000      | 68.2           | 6.6         | BE-UE      | FCC&IC   |
|                 | Conducted          | 5825                   | 5850.0                | 61.6                    | PEAK     | 1000      | 68.2           | 6.6         | BE-UE      | FCC&IC   |

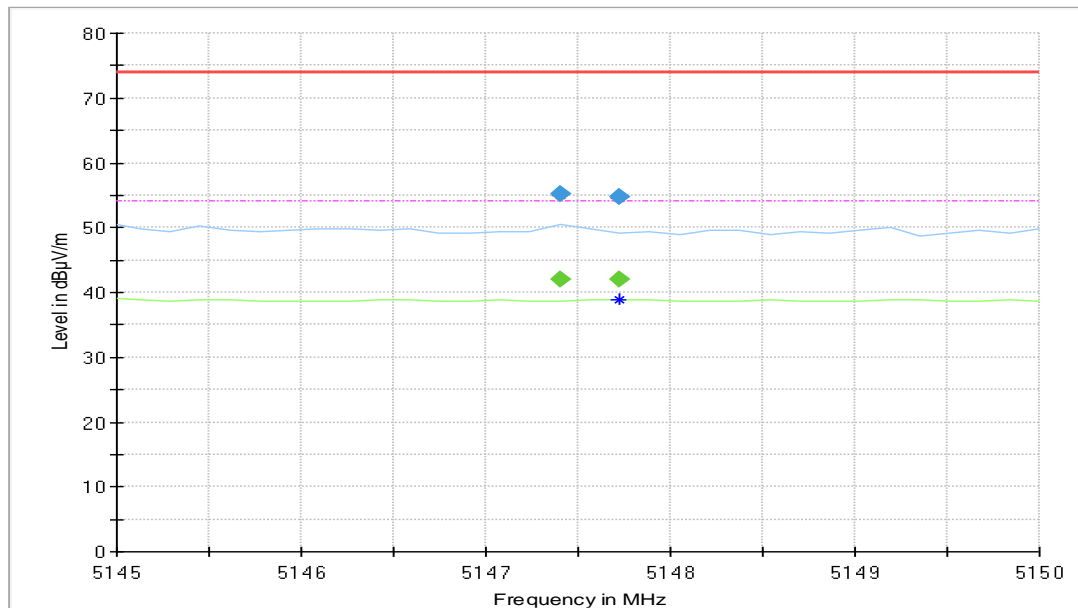
WLAN n-Mode; 40 MHz; MCS0; SISO  
 Applied duty cycle correction (AV): 0 dB

| U-NII - Subband | Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBμV/m] | Detector | RBW [kHz] | Limit [dBμV/m] | Margin [dB] | Limit Type |
|-----------------|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|-------------|------------|
| 1               | Conducted          | 5190                   | 5150.0                | 71.3                    | PEAK     | 1000      | 74.0           | 2.7         | BE-RB      |
|                 | Conducted          | 5190                   | 5150.0                | 50.9                    | AV       | 1000      | 54.0           | 3.1         | BE-RB      |
| 2A              | Conducted          | 5310                   | 5350.0                | 70.3                    | PEAK     | 1000      | 74.0           | 3.7         | BE-RB      |
|                 | Conducted          | 5310                   | 5350.0                | 50.4                    | AV       | 1000      | 54.0           | 3.6         | BE-RB      |
| 2C              | Conducted          | 5510                   | 5460.0                | 60.3                    | PEAK     | 1000      | 74.0           | 13.7        | BE-RB      |
|                 | Conducted          | 5510                   | 5460.0                | 46.6                    | AV       | 1000      | 54.0           | 7.4         | BE-RB      |
|                 | Conducted          | 5510                   | 5470.0                | 66.5                    | PEAK     | 1000      | 68.2           | 1.7         | BE-UE      |
| 3               | Conducted          | 5670                   | 5725.0                | 65.1                    | PEAK     | 1000      | 68.2           | 3.1         | BE-UE      |
|                 | Conducted          | 5755                   | 5725.0                | 61.0                    | PEAK     | 1000      | 68.2           | 7.2         | BE-UE      |
|                 | Conducted          | 5795                   | 5850.0                | 64.1                    | PEAK     | 1000      | 68.2           | 4.1         | BE-UE      |

Remark: Please see next sub-clause for the measurement plot.

#### 5.8.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

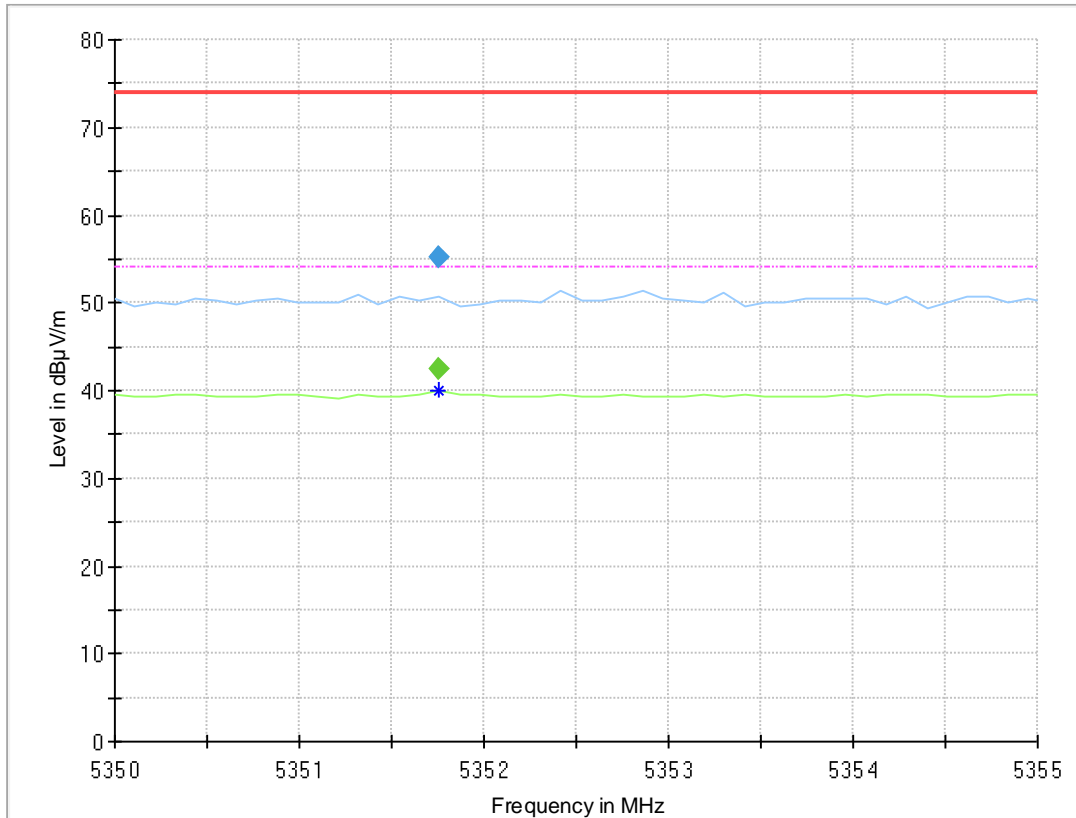
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-1 (S02\_161\_AC01)



### Final Result

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5147.400        | 55.2             | ---               | 74.0           | 18.79       | 1000.0          | 1000.00         | 150.        | H   | -169.0        | 12.0            | 13.6         |
| 5147.400        | ---              | 42.0              | 54.0           | 12.03       | 1000.0          | 1000.00         | 150.        | H   | -169.0        | 12.0            | 13.6         |
| 5147.725        | 54.8             | ---               | 74.0           | 19.24       | 1000.0          | 1000.00         | 150.        | V   | -11.0         | 87.0            | 13.6         |
| 5147.725        | ---              | 42.0              | 54.0           | 11.99       | 1000.0          | 1000.00         | 150.        | V   | -11.0         | 87.0            | 13.6         |

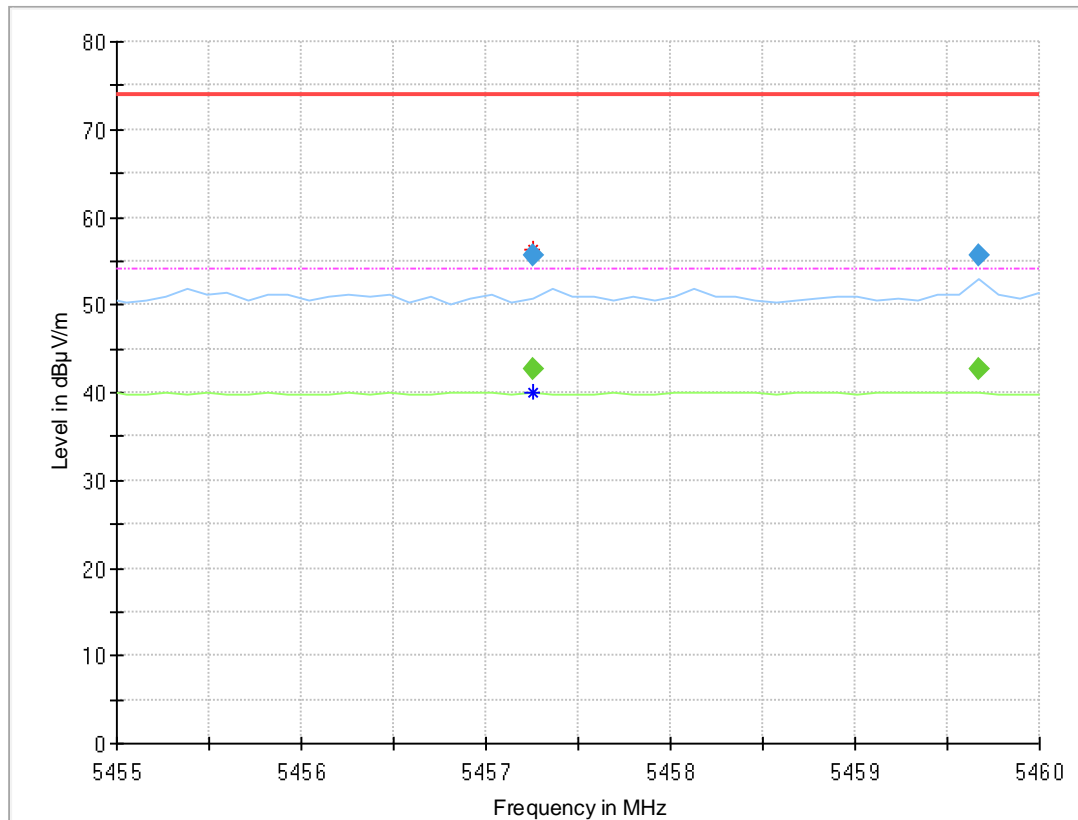
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2A (S02\_161\_AC01)



### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5351.760        | 55.2             | ---               | 74.00          | 18.76       | 1000.0          | 1000.000        | 150.0       | V   | -39.0         | 96.0            | 14.1         |
| 5351.760        | ---              | 42.4              | 54.00          | 11.62       | 1000.0          | 1000.000        | 150.0       | V   | -39.0         | 96.0            | 14.1         |

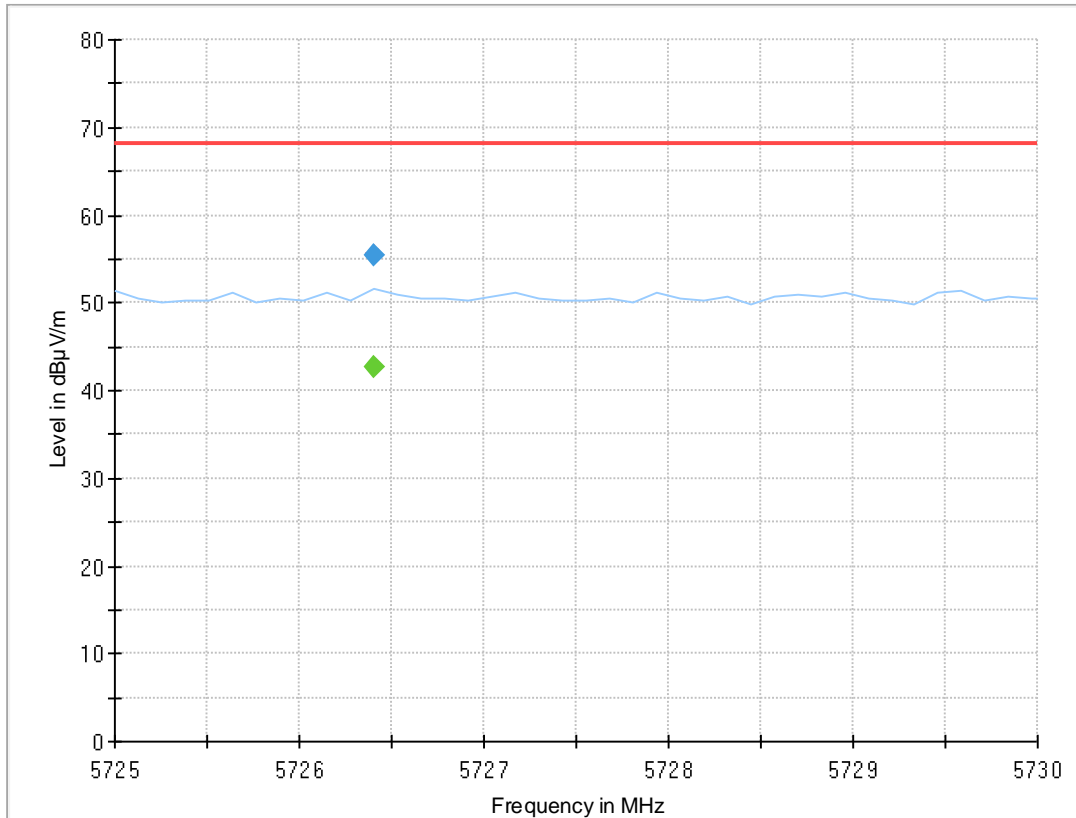
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-2C  
(S02\_161\_AB01)



### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5457.250        | ---              | 42.8              | 54.00          | 11.22       | 1000.0          | 1000.000        | 150.0       | V   | 11.0          | 105.0           | 14.5         |
| 5457.250        | 55.6             | ---               | 74.00          | 18.42       | 1000.0          | 1000.000        | 150.0       | V   | 11.0          | 105.0           | 14.5         |
| 5459.670        | ---              | 42.7              | 54.00          | 11.30       | 1000.0          | 1000.000        | 150.0       | H   | -182.0        | 15.0            | 14.5         |
| 5459.670        | 55.6             | ---               | 74.00          | 18.35       | 1000.0          | 1000.000        | 150.0       | H   | -182.0        | 15.0            | 14.5         |

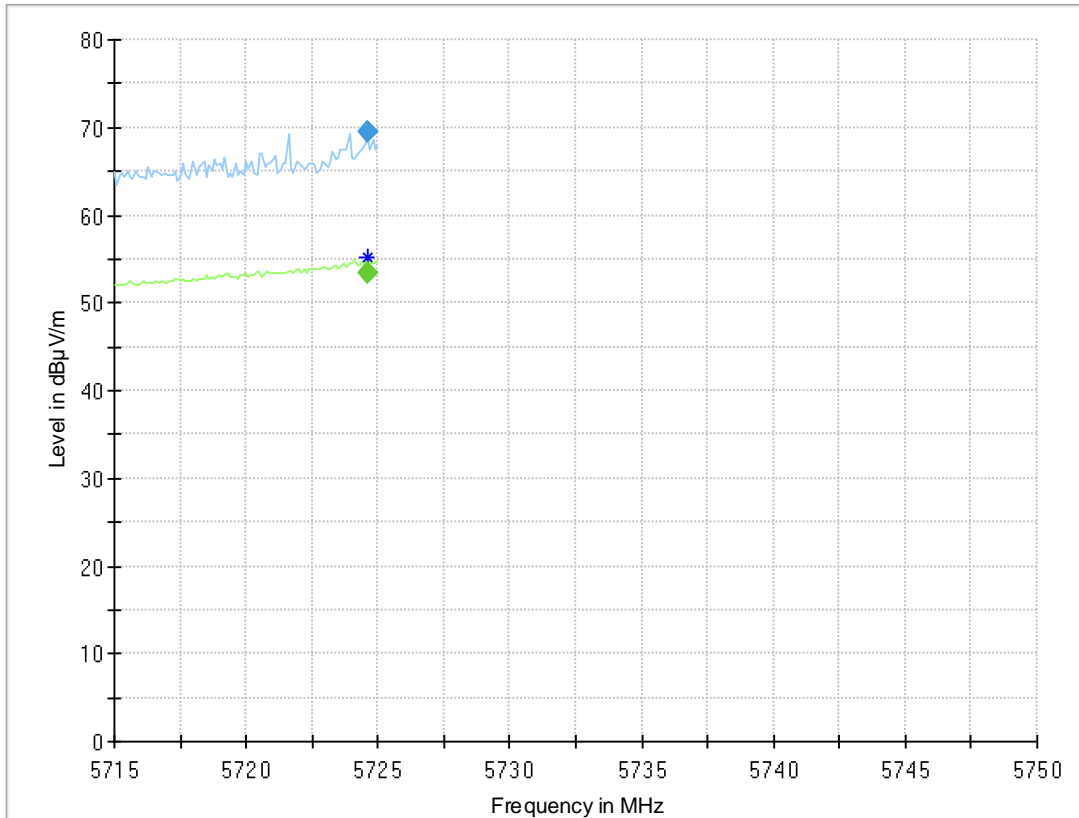
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2C  
(S02\_161\_AB01)



## Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Marg in (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Cor. (dB/m) |
|-----------------|------------------|-------------------|----------------|--------------|-----------------|-----------------|-------------|-----|---------------|-----------------|-------------|
| 5726.403        | 55.5             | ---               | 68.2           | 12.69        | 1000.0          | 1000.00         | 150.        | V   | 44.0          | 100.0           | 14.2        |
| 5726.403        | ---              | 42.6              | ---            | ---          | 1000.0          | 1000.00         | 150.        | V   | 44.0          | 100.0           | 14.2        |

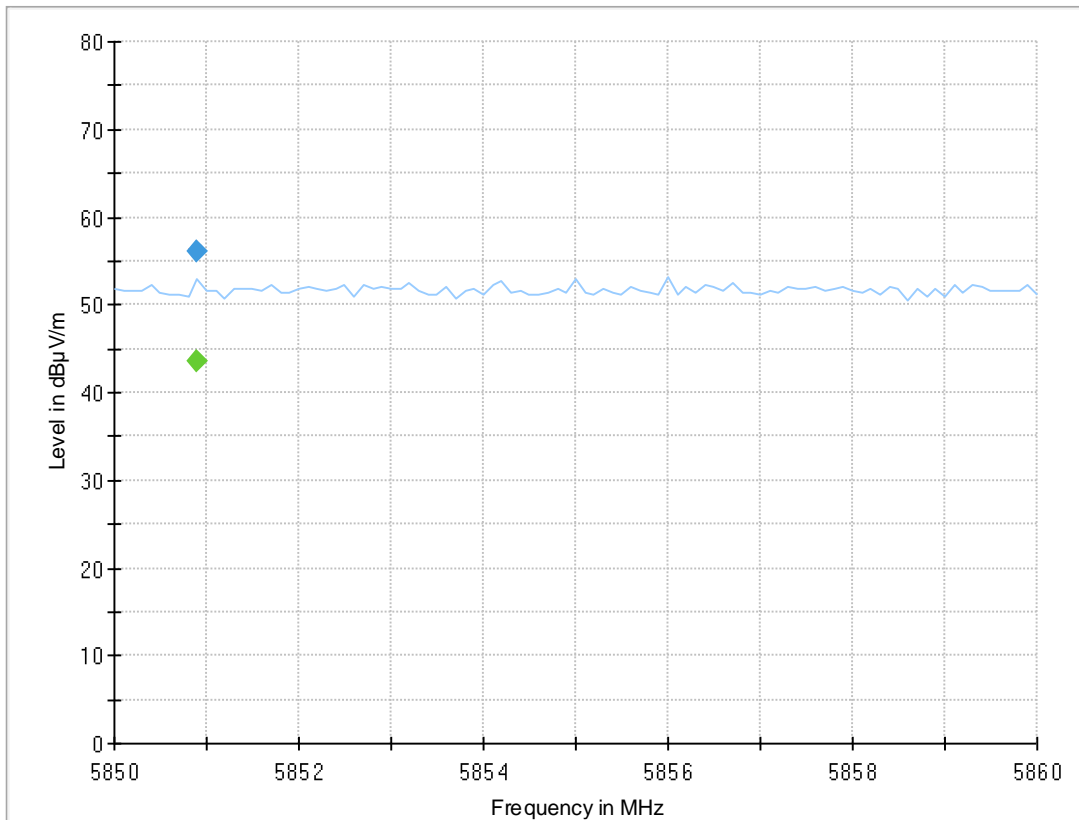
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-3 (S02\_161\_AB01)



### Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5724.600        | ---              | 53.4              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | H   | 52.0          | 91.0            | 14.2         |
| 5724.600        | 69.5             | ---               | 121.2          | 51.81       | 1000.0          | 1000.000        | 150.0       | H   | 52.0          | 91.0            | 14.2         |

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3  
(S02\_161\_AB01)

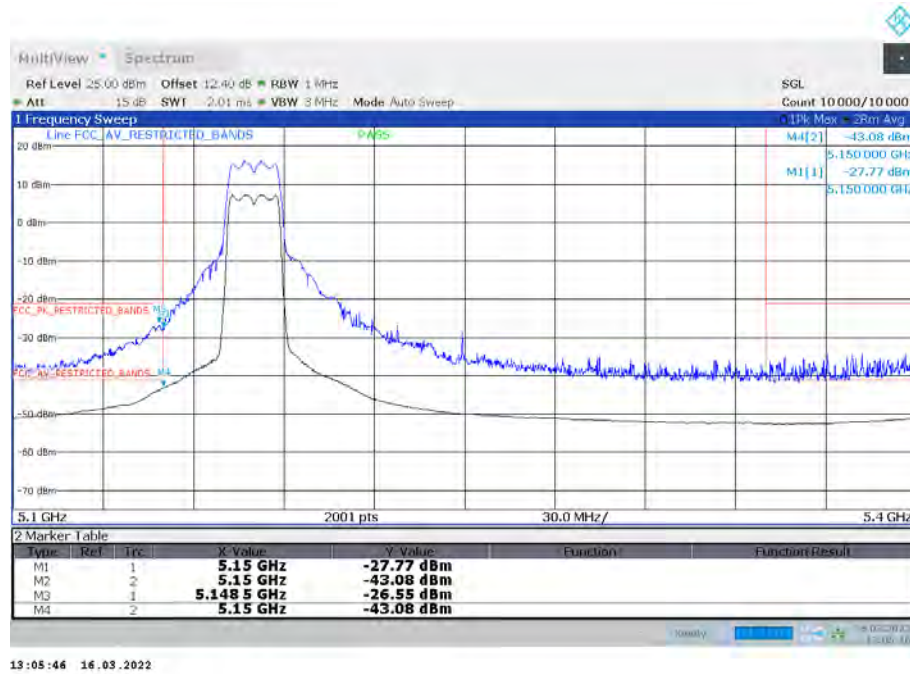


### Final Result

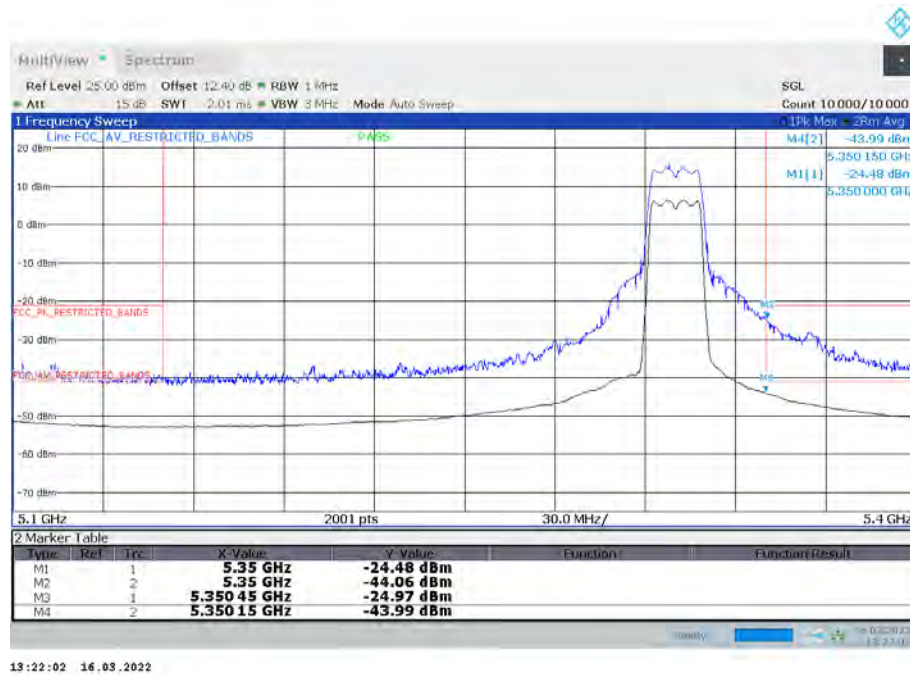
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 5850.900        | ---              | 43.5              | ---            | ---         | 1000.0          | 1000.000        | 150.0       | V   | -145.0        | -12.0           | 14.9         |
| 5850.900        | 56.1             | ---               | 120.1          | 64.05       | 1000.0          | 1000.000        | 150.0       | V   | -145.0        | -12.0           | 14.9         |



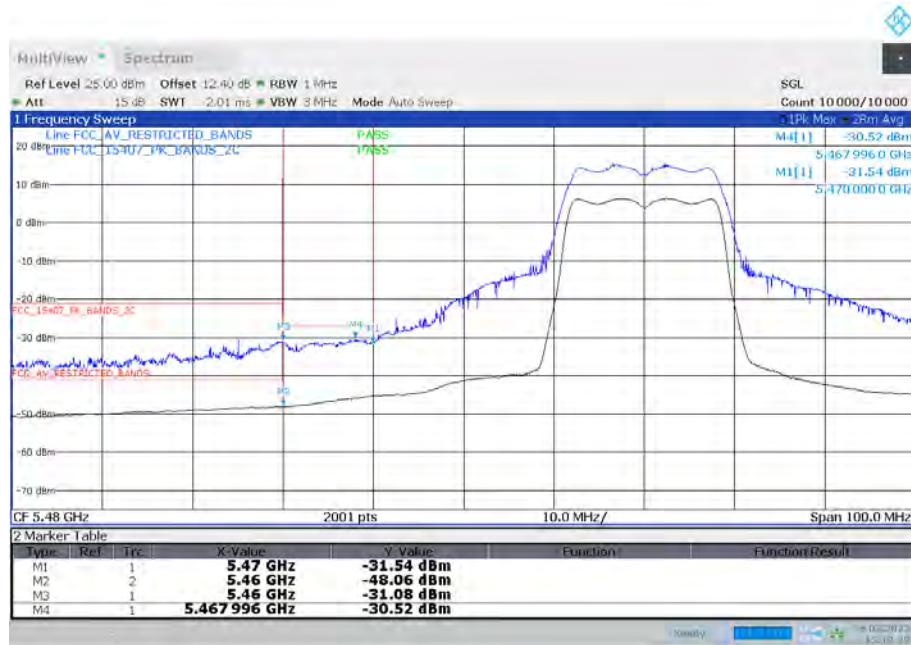
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-1  
(S01\_161\_AA01)



Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2A  
(S01\_161\_AA01)



Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-2C (S01\_161\_AA01)

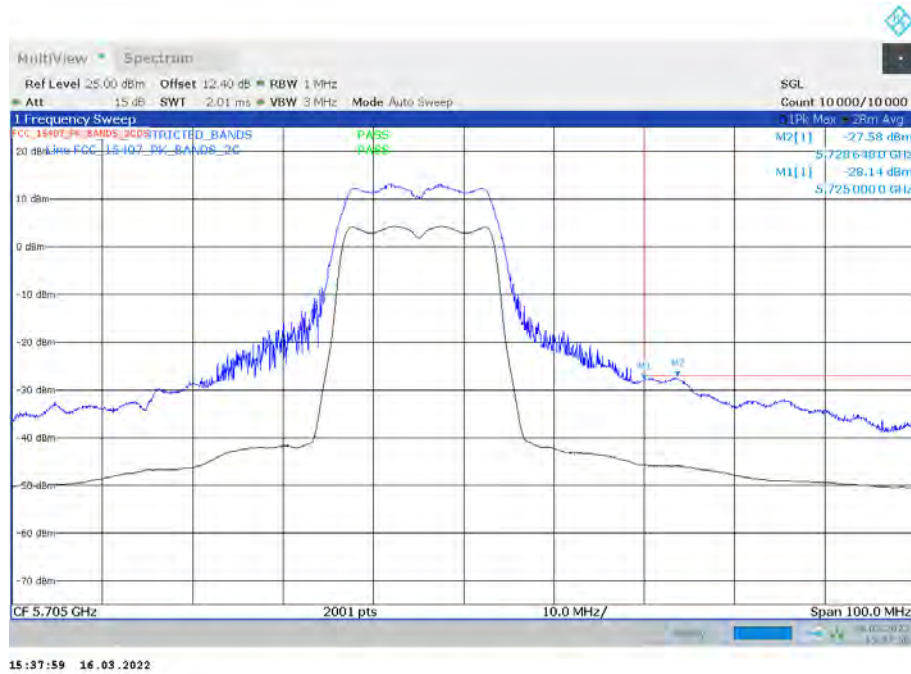


TX on 5500 MHz

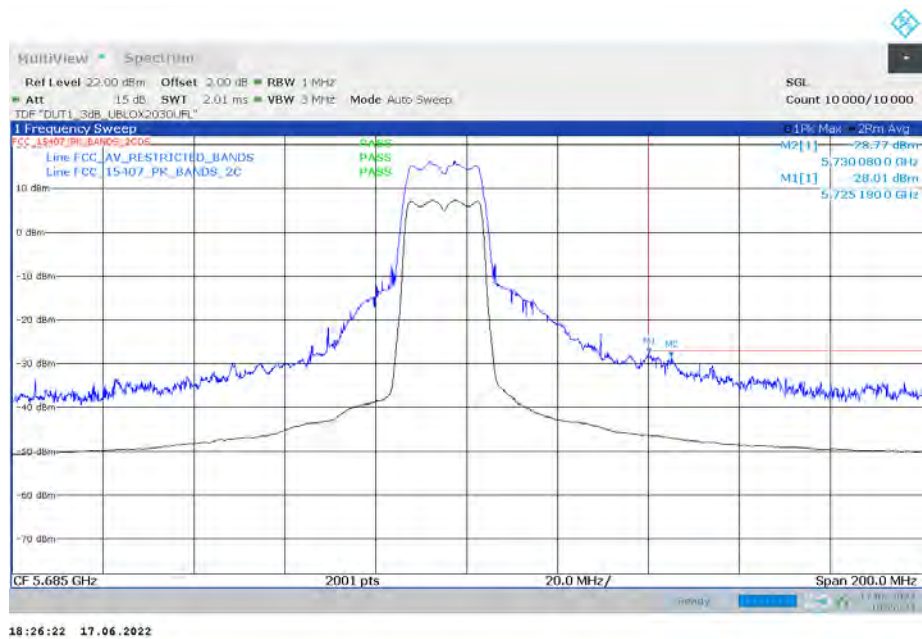


TX on 5200 MHz

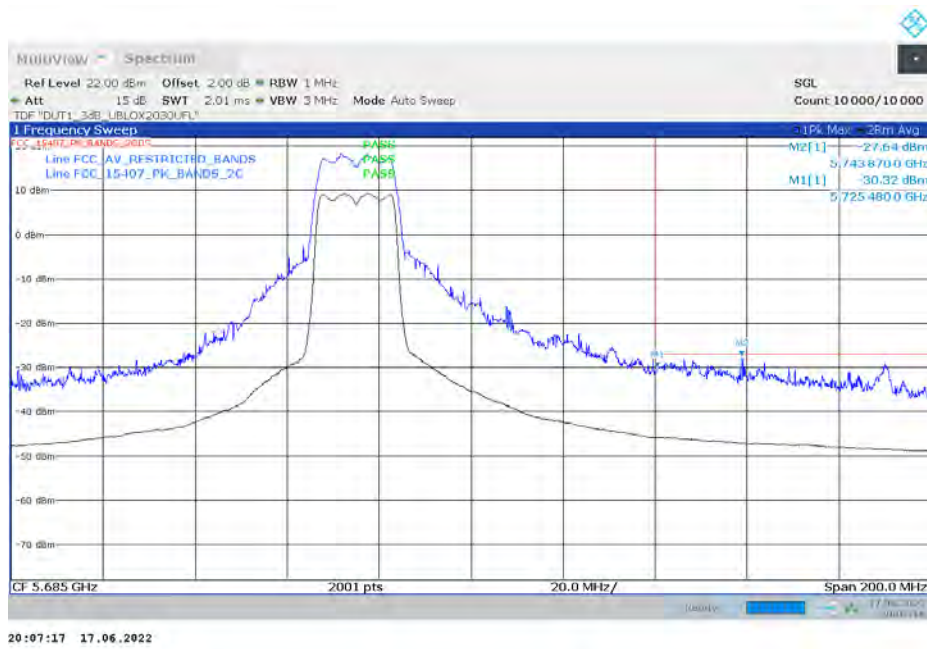
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2C (S01\_161\_AA01)



TX on 5700 MHz



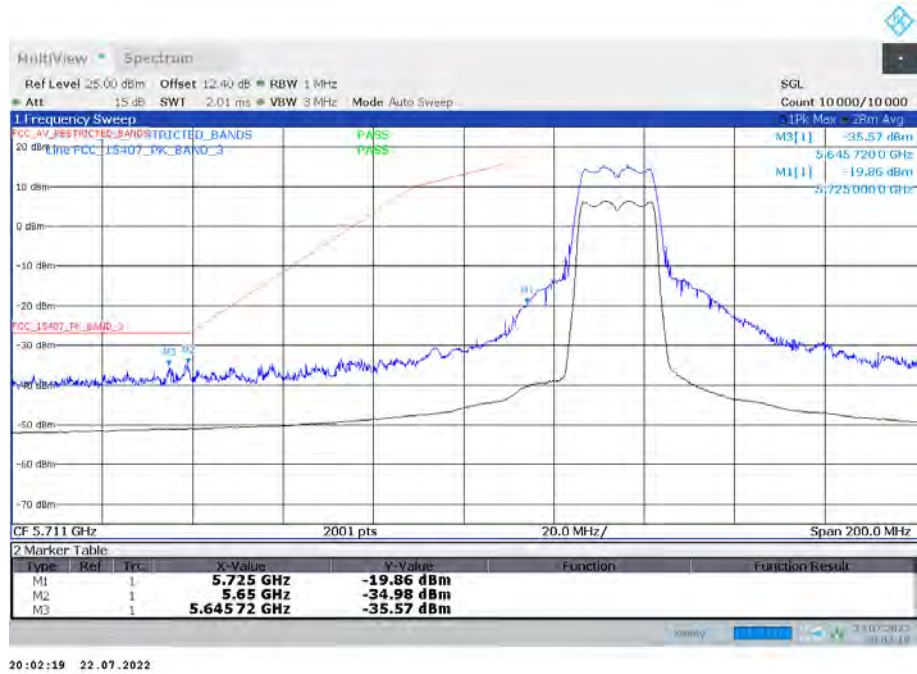
TX on 5680 MHz



TX on 5660 MHz

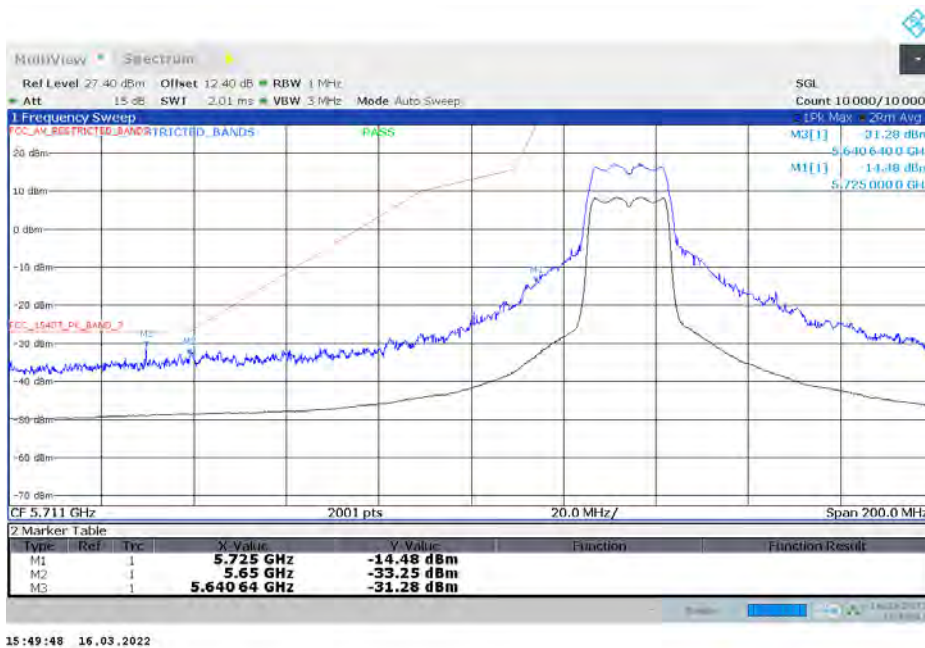


Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-3 (S01\_161\_AA01)



20:02:19 22.07.2022

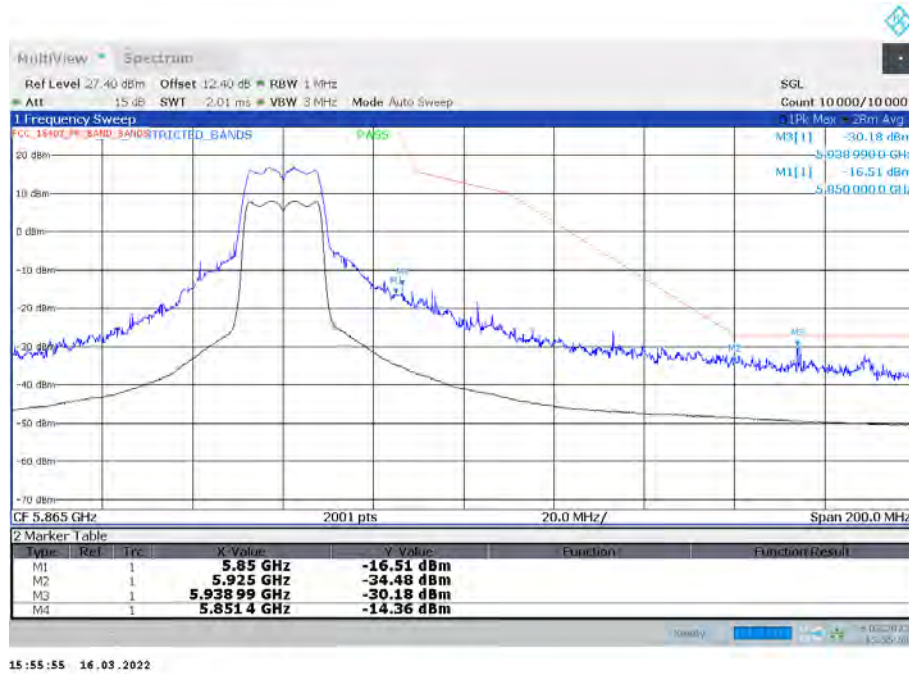
TX on 5745 MHz at 16 dBm power



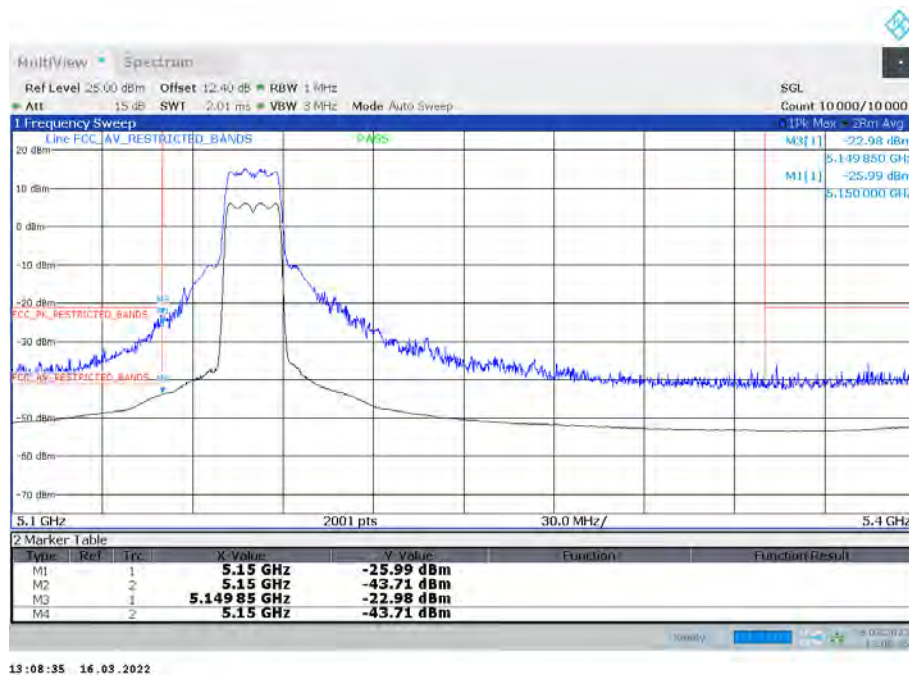
15:49:48 16.03.2022

TX on 5745 MHz at 18 dBm power (since the lowest channel passes at 18 dBm, no further channels were tested for lower band edge)

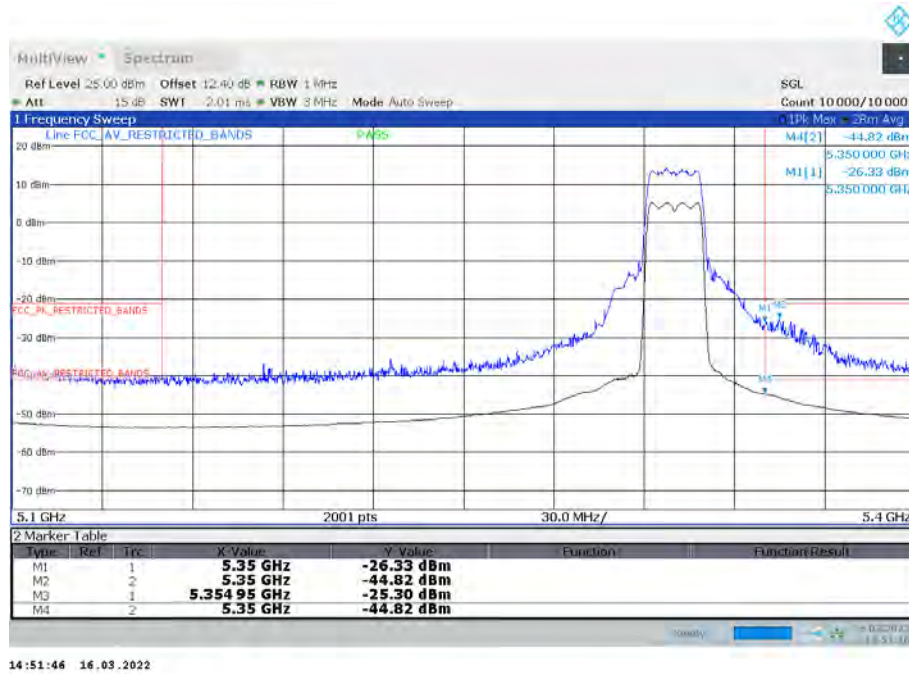
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3  
(S01\_161\_AA01)



Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-1  
(S01\_161\_AA01)



Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-2A (S01\_161\_AA01)

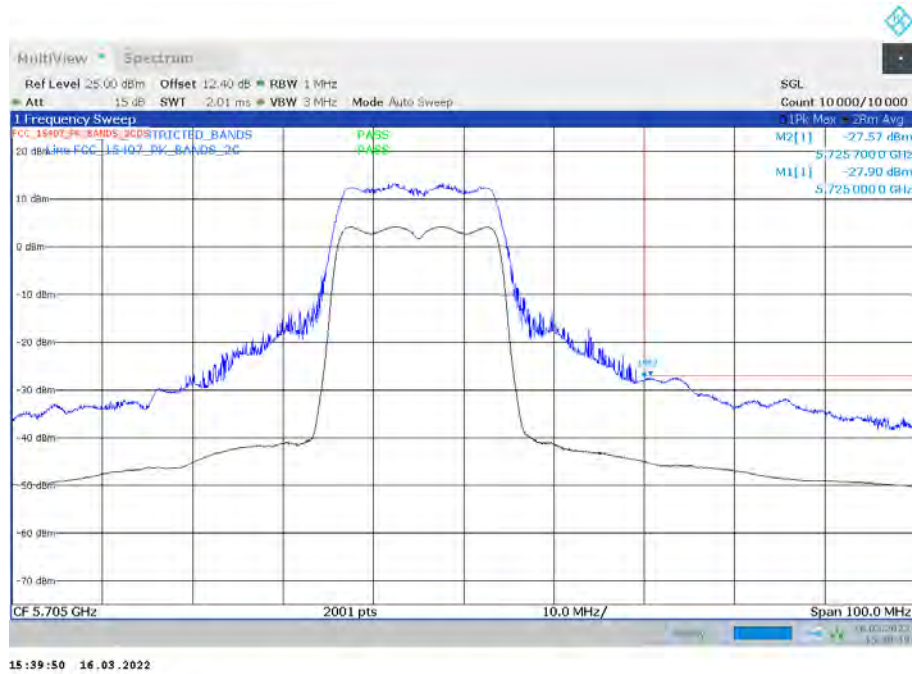


Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-2C (S01\_161\_AA01)

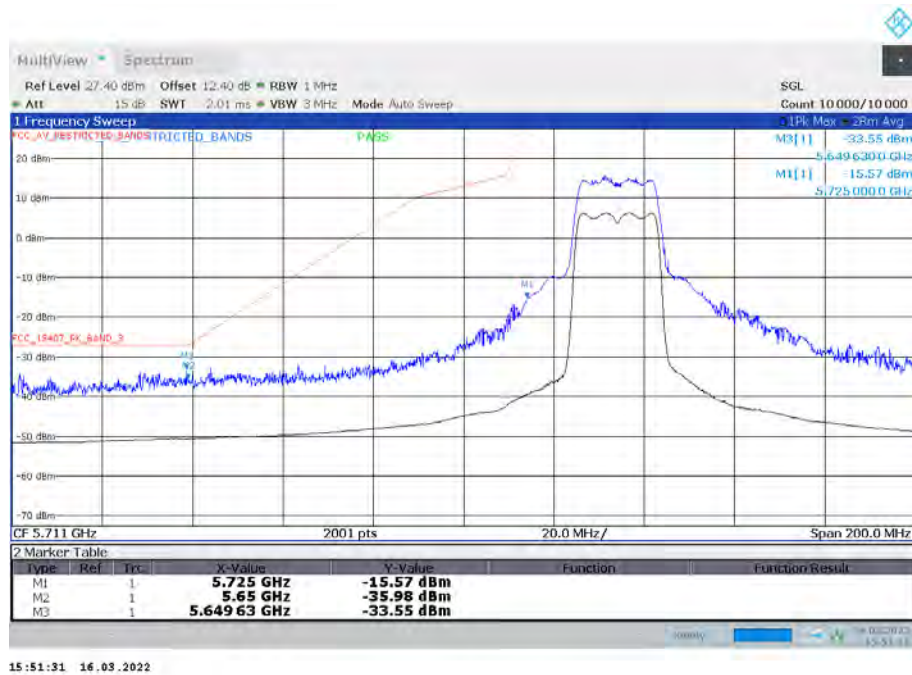




Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-2C (S01\_161\_AA01)

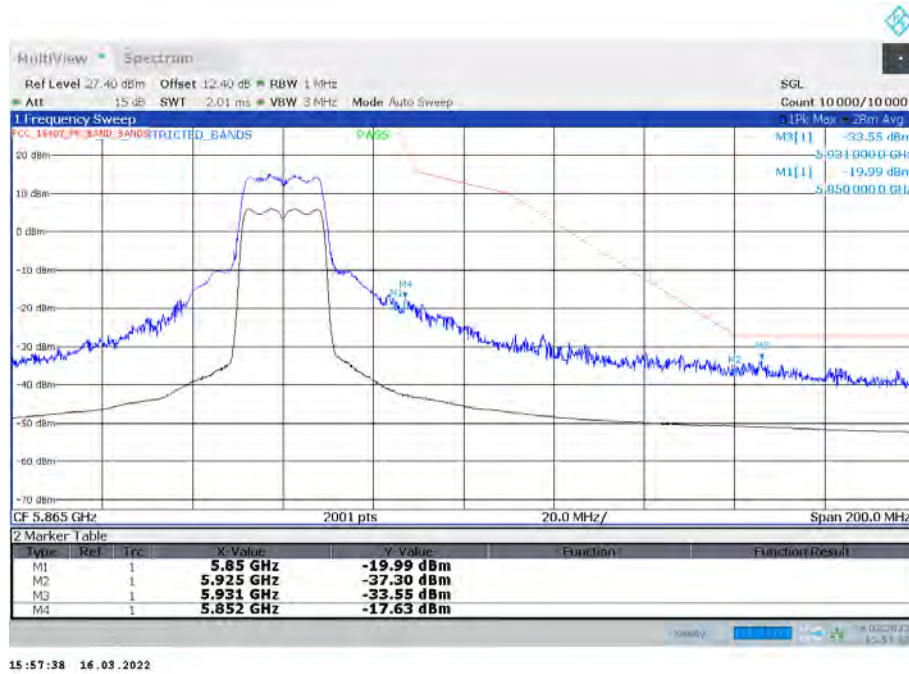


Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S01\_161\_AA01)

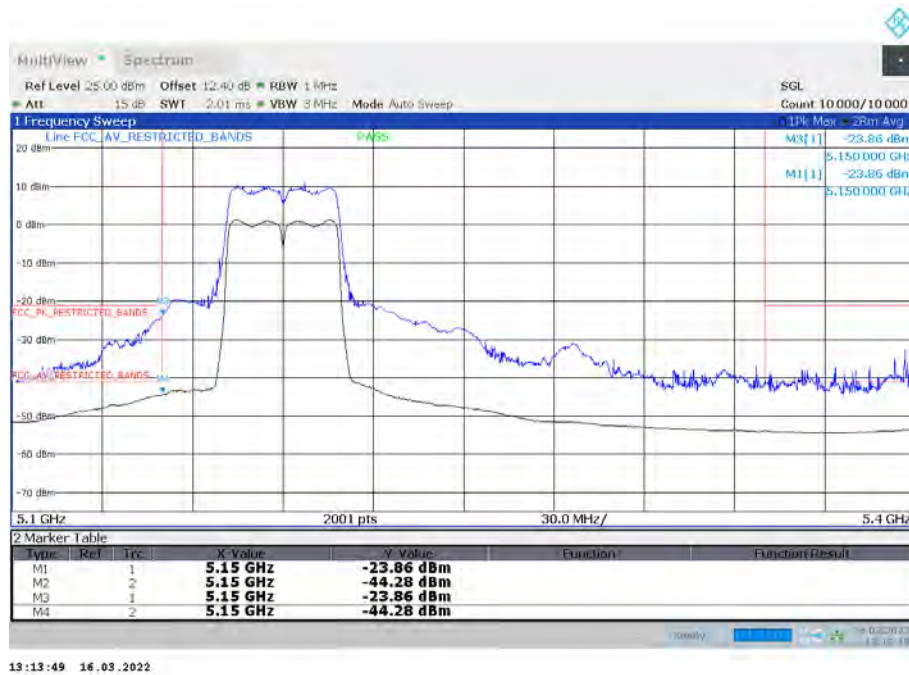




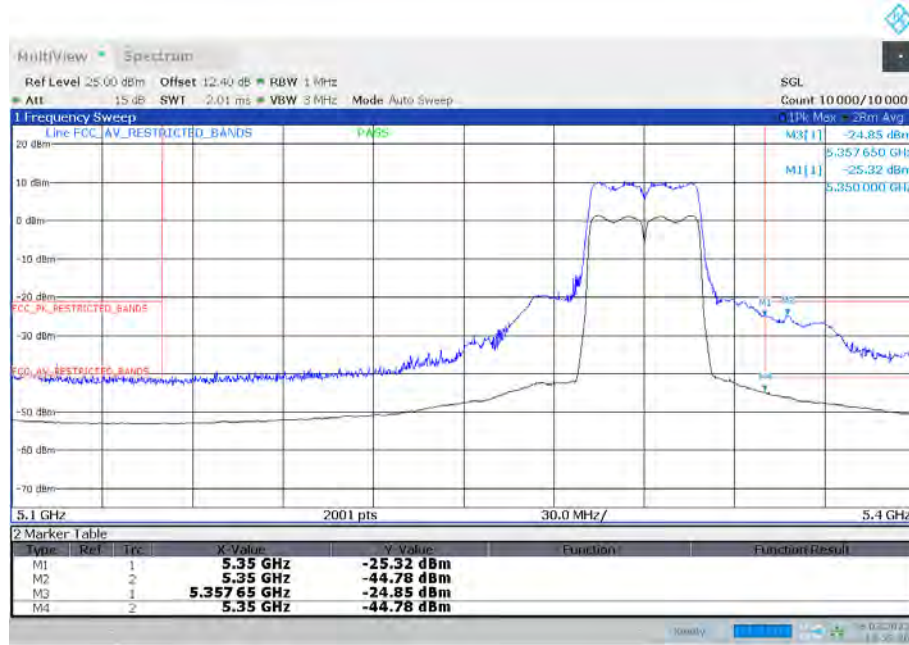
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S01\_161\_AA01)



Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S01\_161\_AA01)



Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-2A (S01\_161\_AA01)



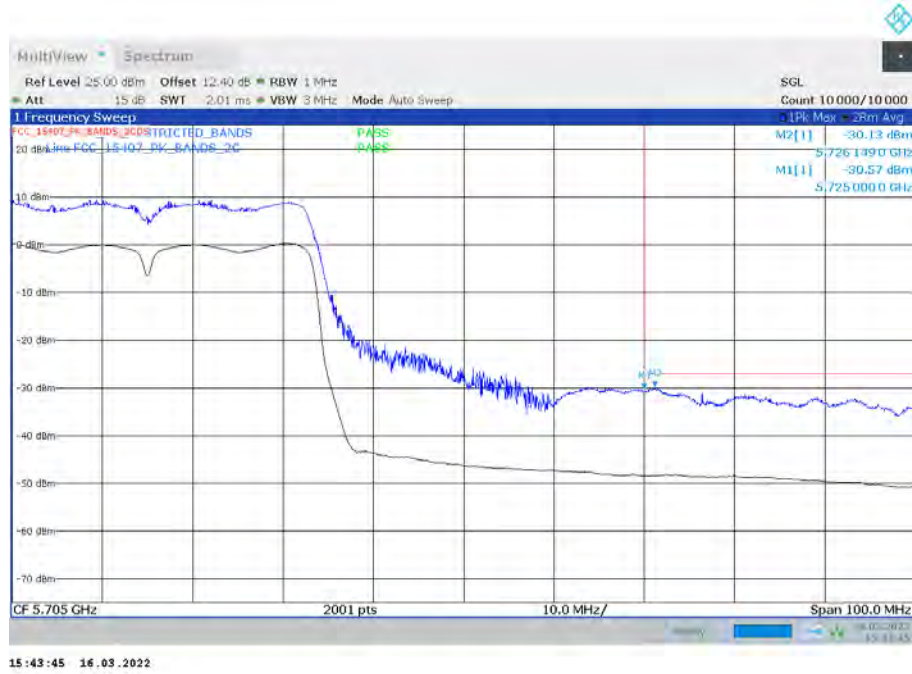
14:53:27 16.03.2022

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-2C (S01\_161\_AA01)



15:27:15 16.03.2022

Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-2C (S01\_161\_AA01)



Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S01\_161\_AA01)



Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-3 (S01\_161\_AA01)



### 5.8.5 TEST EQUIPMENT USED

- Radiated Emissions FAR 5 GHz FCC
- R&S TS8997



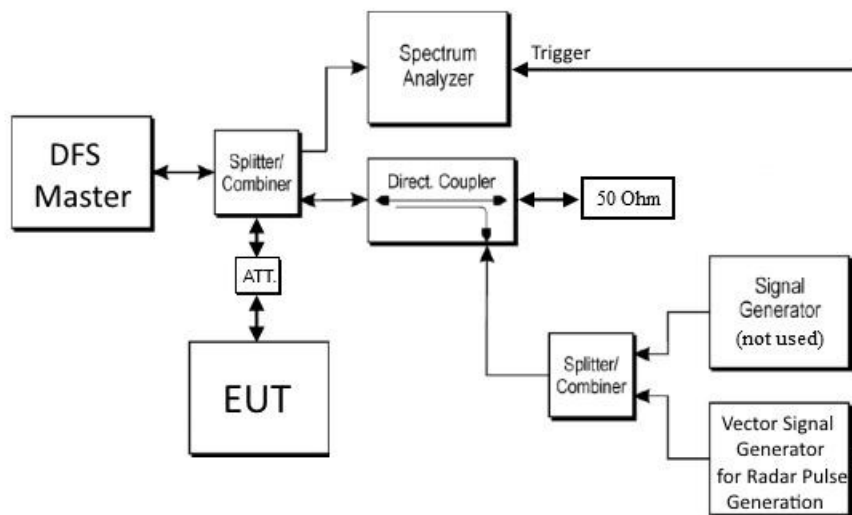
## 5.9 DYNAMIC FREQUENCY SELECTION

Standard FCC Part 15 Subpart E

The test was performed according to:  
KDB 905462 D02

### 5.9.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up in a shielded room for the DFS measurements. Since the EUT is a slave device without radar detection, it was connected to another device acting as master with radar detection.



After setting up a connection to the Master using the maximum supported bandwidth of the EUT, a radar pulse of type 0 was sent from the vector signal generator.

At the same time the spectrum analyser is triggered by the vector signal generator and a trace is recorded:

Analyzer settings:

- Resolution Bandwidth (RBW): 3 MHz
- Video Bandwidth (VBW): 3 MHz
- Trace: Clear/Write
- Sweeps: Single Sweep
- Sweep time: 20 s
- Detector: Peak
- Trigger: External

In addition to the plot also the trace data is recorded to calculate the Channel Closing Time.

Afterwards the test is repeated with a sweep time of 32 minutes to monitor the Non-occupancy period.

### 5.9.2 TEST REQUIREMENTS / LIMITS

Limits according KDB 905462 D02 UNII DFS Compliance Procedures New Rules

| Parameter   | Value   |
|---|---|
| <i>Non-occupancy period</i>   | <b>Minimum 30 minutes</b>   |
| <i>Channel Availability Check Time</i>  | 60 seconds  |
| <i>Channel Move Time</i>  | 10 seconds<br>See Note 1.   |
| <i>Channel Closing Transmission Time</i>  | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.<br>See Notes 1 and 2. |
| <p><b>Note 1:</b> <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.</p> <p><b>Note 2:</b> The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.</p> |   |

### 5.9.3 TEST PROTOCOL

Ambient temperature: 24 °C  
 Air Pressure: 1008 hPa  
 Humidity: 40 %

| WLAN ac-Mode; 80 MHz |                        |   |            |             |                               |   |
|----------------------|------------------------|---|------------|-------------|-------------------------------|---|
| Ch. No.              | Ch. Center Freq. [MHz] | Aggregate Transmission Time from 200 ms to 10 s after end of radar pulse [ms] | Limit [ms] | Margin [ms] | Channel move time within 10 s | Transmissions within Non-occupancy period |
| 106                  | 5530                   | 6.7   | 60.0       | 53.3        | yes                           | none                                      |

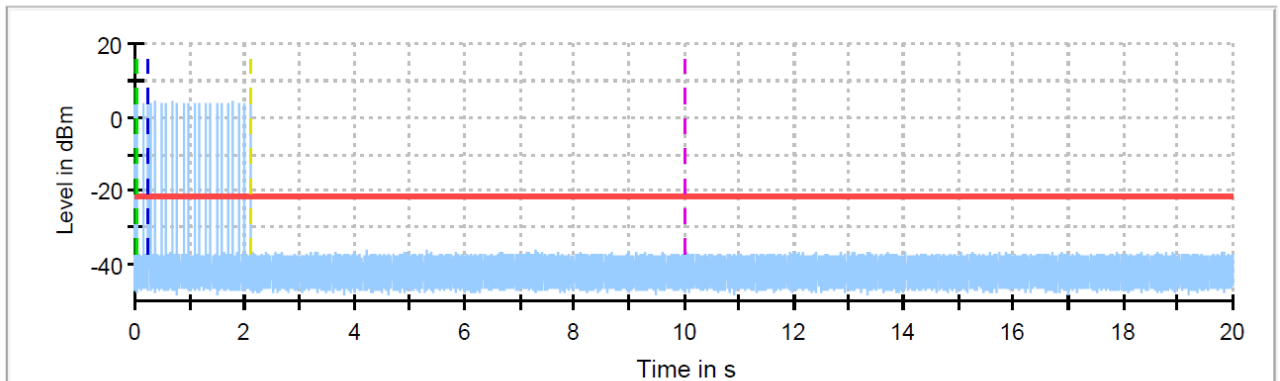
Remark: Used Master device: Linksys WRT3200ACM, S/N: 1981160B900782, SW: 1.0.8.199531, FCC ID: Q87-WRT3200ACM

Please see next sub-clause for the measurement plot.

5.9.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

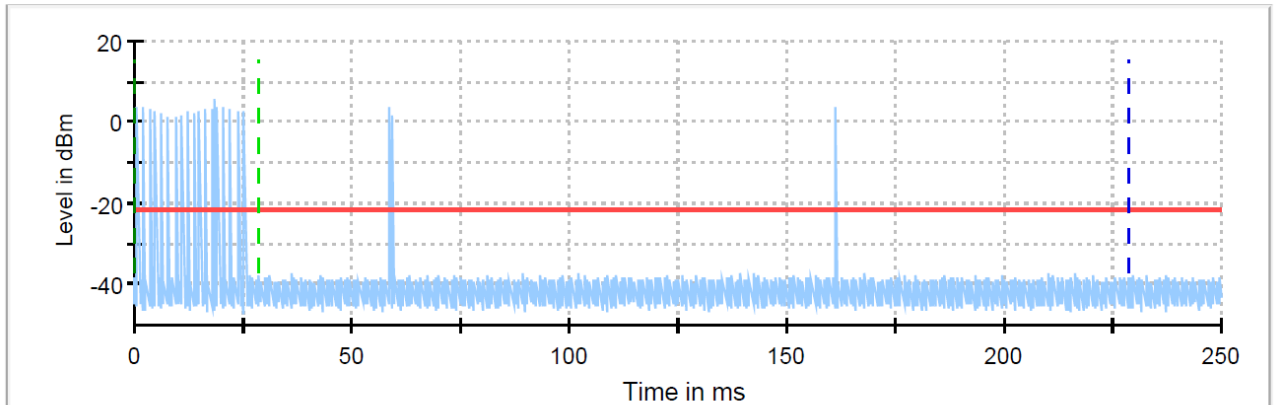
(S01\_161\_AD01)

Channel Move Time



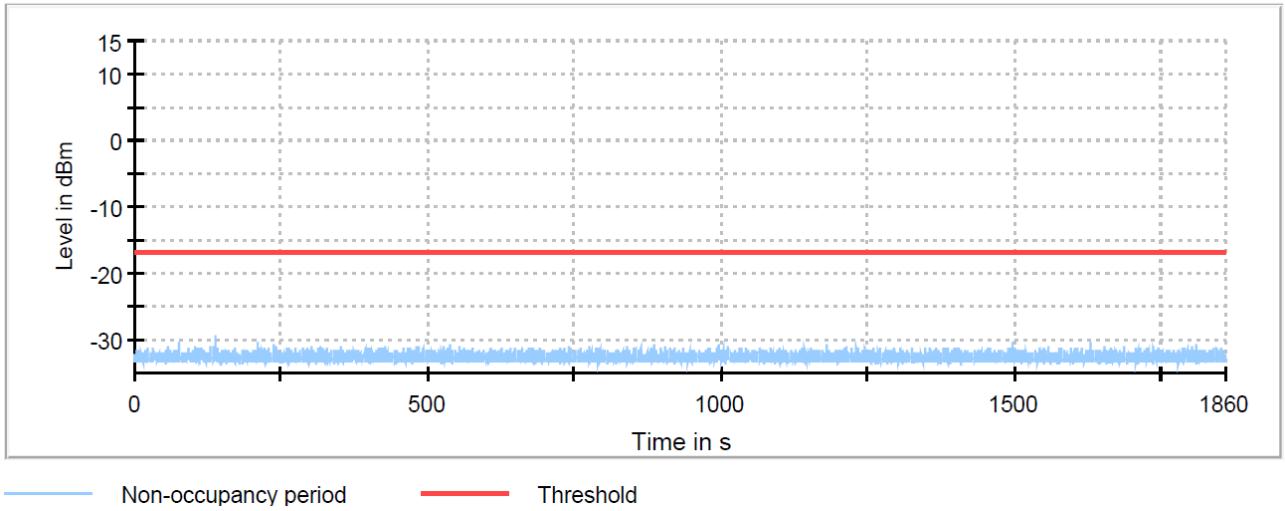
- Channel Move Time
- Threshold
- - - Start of Radar
- - - Trigger at end of Radar
- - - First 200ms of Channel Closing Tx Time
- - - 10sec Channel Move Time Limit
- - - Last measured edge of Channel Closing Tx Time

Channel Move Time first 200ms



- Channel Move Time first 200ms
- Threshold
- - - Start of Radar
- - - Trigger at end of Radar
- - - First 200ms of Channel Closing Tx Time

Non-occupancy period



- 5.9.5 TEST EQUIPMENT USED
  - R&S TS8997



## 6 TEST EQUIPMENT

- 1 Conducted Emissions FCC  
Conducted Emissions AC Mains for FCC standards

| Ref.No. | Device Name          | Description                      | Manufacturer                        | Serial Number | Last Calibration | Calibration Due |
|---------|----------------------|----------------------------------|-------------------------------------|---------------|------------------|-----------------|
| 1.1     | MFS                  | Rubidium Frequency Normal MFS    | Datum GmbH                          | 002           | 2021-11          | 2022-11         |
| 1.2     | Opus10 TPR (8253.00) | T/P Logger 13                    | Lufft Mess- und Regeltechnik GmbH   | 13936         | 2021-10          | 2023-10         |
| 1.3     | Chroma 6404          | AC Source                        | Chroma ATE INC.                     | 64040001304   |                  |                 |
| 1.4     | Shielded Room 02     | Shielded Room 4m x 3m            | Frankonia Germany EMC Solution GmbH | -             |                  |                 |
| 1.5     | ESH3-Z5              | Two-Line V-Network (EUT)         | Rohde & Schwarz GmbH & Co. KG       | 829996/002    | 2021-08          | 2023-08         |
| 1.6     | ESR 7                | EMI Receiver / Spectrum Analyzer | Rohde & Schwarz                     | 101424        | 2021-01          | 2023-01         |
| 1.7     | Opus10 THI (8152.00) | T/H Logger 02                    | Lufft Mess- und Regeltechnik GmbH   | 7489          | 2021-10          | 2023-10         |

- 2 R&S TS8997  
2.4 and 5 GHz Bands Conducted Test Lab

| Ref.No. | Device Name                    | Description  | Manufacturer                      | Serial Number  | Last Calibration | Calibration Due |
|---------|--------------------------------|--|-----------------------------------|----------------|------------------|-----------------|
| 2.1     | MFS                            | Rubidium Frequency Normal MFS                      | Datum GmbH                        | 002            | 2021-11          | 2022-11         |
| 2.2     | Opus10 TPR (8253.00)           | T/P Logger 13                                      | Lufft Mess- und Regeltechnik GmbH | 13936          | 2021-10          | 2023-10         |
| 2.3     | SMB100A                        | Signal Generator 9 kHz - 6 GHz                     | Rohde & Schwarz                   | 107695         | 2021-06          | 2024-06         |
| 2.4     | EX520                          | Digital Multimeter 12                              | Extech Instruments Corp           | 05157876       | 2022-06          | 2024-06         |
| 2.5     | NGSM 32/10                     | Power Supply                                       | Rohde & Schwarz GmbH & Co. KG     | 3456           | 2022-01          | 2024-01         |
| 2.6     | Temperature Chamber KWP 120/70 | Temperature Chamber Weiss 01                       | Weiss                             | 59226012190010 | 2022-05          | 2024-05         |
| 2.7     | Temperature Chamber VT 4002    | Temperature Chamber Vötsch 03                      | Vötsch                            | 58566002150010 | 2022-05          | 2024-05         |
| 2.8     | FSW43                          | Signal analyser                                    | Rohde & Schwarz GmbH & Co. KG     | 102013         | 2021-06          | 2023-06         |
| 2.9     | Opus10 THI (8152.00)           | T/H Logger 14                                      | Lufft Mess- und Regeltechnik GmbH | 13993          | 2021-08          | 2023-08         |
| 2.10    | SMBV100A                       | Vector Signal Generator 9 kHz - 6 GHz              | Rohde & Schwarz                   | 259291         | 2019-11          | 2022-11         |
| 2.11    | OSP120                         | Contains Power Meter and Switching Unit OSP-B157W8 | Rohde & Schwarz                   | 101158         | 2021-08          | 2024-08         |

3 Radiated Emissions FAR 5 GHz FCC  
Radiated Emissions Tests for 5 GHz bands in a fully anechoic room

| Ref.No. | Device Name             | Description  | Manufacturer                        | Serial Number          | Last Calibration | Calibration Due |
|---------|-------------------------|--|-------------------------------------|------------------------|------------------|-----------------|
| 3.1     | Opus10 TPR (8253.00)    | T/P Logger 13  | Lufft Mess- und Regeltechnik GmbH   | 13936                  | 2021-10          | 2023-10         |
| 3.2     | AMF-7D00101800-30-10P-R | Broadband Amplifier 100 MHz - 18 GHz                     | Miteq                               |                        |                  |                 |
| 3.3     | Anechoic Chamber 03     | FAR, 8.80m x 4.60m x 4.05m (l x w x h)                   | Albatross Projects                  | P26971-647-001-PRB     | 2021-04          | 2023-04         |
| 3.4     | Fluke 177               | Digital Multimeter 03 (Multimeter)                       | Fluke Europe B.V.                   | 86670383               | 2022-06          | 2024-06         |
| 3.5     | JS4-18002600-32-5P      | Broadband Amplifier 18 GHz - 26 GHz                      | Miteq                               | 849785                 |                  |                 |
| 3.6     | FSW 43                  | Spectrum Analyzer  | Rohde & Schwarz                     | 103779                 | 2021-06          | 2023-06         |
| 3.7     | EP 1200/B, NA/B1        | AC Source, Amplifier with integrated variable Oscillator | Spitzenberger & Spies GmbH & Co. KG | B6278                  |                  |                 |
| 3.8     | 3160-09                 | Standard Gain / Pyramidal Horn Antenna 26.5 GHz          | EMCO Elektronik GmbH                | 00083069               |                  |                 |
| 3.9     | WHKX 7.0/18G-8SS        | High Pass Filter   | Wainwright Instruments GmbH         | 09                     |                  |                 |
| 3.10    | TT 1.5 WI               | Turn Table   | Maturo GmbH                         | -                      |                  |                 |
| 3.11    | 3160-10                 | Standard Gain / Pyramidal Horn Antenna 40 GHz            | EMCO Elektronik GmbH                | 00086675               |                  |                 |
| 3.12    | Opus 20 THI (8120.00)   | ThermoHygro Datalogger                                   | Lufft Mess- und Regeltechnik GmbH   | 115.0318.0802.033      | 2020-10          | 2022-10         |
| 3.13    | TD1.5-10kg              | EUT Tilt Device (Rohacell)                               | Maturo GmbH                         | TD1.5-10kg/024/3790709 |                  |                 |
| 3.14    | PAS 2.5 - 10 kg         | Antenna Mast   | Maturo GmbH                         | -                      |                  |                 |
| 3.15    | AFS42-00101800-25-S-42  | Broadband Amplifier 25 MHz - 18 GHz                      | Miteq                               | 2035324                |                  |                 |
| 3.16    | HF 907                  | Double-ridged horn                                       | Rohde & Schwarz                     | 102444                 | 2021-09          | 2024-09         |

4 Radiated Emissions SAC H-Field

Radiated emission tests in the H-Field in a semi anechoic room

| Ref.No. | Device Name          | Description  | Manufacturer                        | Serial Number | Last Calibration | Calibration Due |
|---------|----------------------|--|-------------------------------------|---------------|------------------|-----------------|
| 4.1     | Opus10 TPR (8253.00) | T/P Logger 13  | Lufft Mess- und Regeltechnik GmbH   | 13936         | 2021-10          | 2023-10         |
| 4.2     | ESW44                | EMI Receiver / Spectrum Analyzer                         | Rohde & Schwarz GmbH & Co. KG       | 101603        | 2022-01          | 2024-01         |
| 4.3     | Anechoic Chamber 01  | SAC/FAR, 10.58 m x 6.38 m x 6.00 m                       | Frankonia                           | none          |                  |                 |
| 4.4     | Opus10 THI (8152.00) | T/H Logger 10  | Lufft Mess- und Regeltechnik GmbH   | 12488         | 2021-08          | 2023-08         |
| 4.5     | EP 1200/B, NA/B1     | AC Source, Amplifier with integrated variable Oscillator | Spitzenberger & Spies GmbH & Co. KG | B6278         |                  |                 |
| 4.6     | DS 420S              | Turn Table 2 m diameter                                  | HD GmbH                             | 420/573/99    |                  |                 |
| 4.7     | HFH2-Z2              | Loop Antenna + 3 Axis Tripod                             | Rohde & Schwarz GmbH & Co. KG       | 829324/006    | 2021-01          | 2024-01         |

5 Radiated Emissions SAC up to 1 GHz

Radiated emission tests up to 1 GHz in a semi anechoic room

| Ref.No. | Device Name          | Description  | Manufacturer                        | Serial Number      | Last Calibration | Calibration Due |
|---------|----------------------|--|-------------------------------------|--------------------|------------------|-----------------|
| 5.1     | Opus10 TPR (8253.00) | T/P Logger 13  | Lufft Mess- und Regeltechnik GmbH   | 13936              | 2021-10          | 2023-10         |
| 5.2     | ESW44                | EMI Receiver / Spectrum Analyzer                                   | Rohde & Schwarz GmbH & Co. KG       | 101603             | 2022-01          | 2024-01         |
| 5.3     | Anechoic Chamber 01  | SAC/FAR, 10.58 m x 6.38 m x 6.00 m                                 | Frankonia                           | none               |                  |                 |
| 5.4     | HL 562 ULTRALOG      | Biconical-log-per antenna (30 MHz - 3 GHz) with HL 562E biconicals | Rohde & Schwarz GmbH & Co. KG       | 830547/003         | 2021-09          | 2024-09         |
| 5.5     | Opus10 THI (8152.00) | T/H Logger 10  | Lufft Mess- und Regeltechnik GmbH   | 12488              | 2021-08          | 2023-08         |
| 5.6     | EP 1200/B, NA/B1     | AC Source, Amplifier with integrated variable Oscillator           | Spitzenberger & Spies GmbH & Co. KG | B6278              |                  |                 |
| 5.7     | DS 420S              | Turn Table 2 m diameter  | HD GmbH                             | 420/573/99         |                  |                 |
| 5.8     | AM 4.0               | Antenna Mast 4 m   | Maturo GmbH                         | AM4.0/180/11920513 |                  |                 |

The calibration interval is the time interval between "Last Calibration" and "Calibration Due"

## 7 ANTENNA FACTORS, CABLE LOSS AND SAMPLE CALCULATIONS

This chapter contains the antenna factors with their corresponding path loss of the used measurement path for all antennas as well as the insertion loss of the LISN.

### 7.1 LISN R&S ESH3-Z5 (150 KHZ – 30 MHZ)

| Frequency<br>MHz | Corr.<br>dB | LISN<br>insertion<br>loss<br>ESH3-<br>Z5<br>dB | cable<br>loss<br>(incl. 10<br>dB<br>atten-<br>uator)<br>dB |
|------------------|-------------|--|--|
| 0.15             | 10.1        | 0.1  | 10.0   |
| 5                | 10.3        | 0.1  | 10.2   |
| 7                | 10.5        | 0.2  | 10.3   |
| 10               | 10.5        | 0.2  | 10.3   |
| 12               | 10.7        | 0.3  | 10.4   |
| 14               | 10.7        | 0.3  | 10.4   |
| 16               | 10.8        | 0.4  | 10.4   |
| 18               | 10.9        | 0.4  | 10.5   |
| 20               | 10.9        | 0.4  | 10.5   |
| 22               | 11.1        | 0.5  | 10.6   |
| 24               | 11.1        | 0.5  | 10.6   |
| 26               | 11.2        | 0.5  | 10.7   |
| 28               | 11.2        | 0.5  | 10.7   |
| 30               | 11.3        | 0.5  | 10.8   |

#### Sample calculation

$$U_{\text{LISN}} \text{ (dB } \mu\text{V)} = U \text{ (dB } \mu\text{V)} + \text{Corr. (dB)}$$

U = Receiver reading

LISN Insertion loss = Voltage Division Factor of LISN

Corr. = sum of single correction factors of used LISN, cables, switch units (if used)

Linear interpolation will be used for frequencies in between the values in the table.

## 7.2 ANTENNA R&S HFH2-Z2 (9 KHZ – 30 MHZ)

| Frequency<br>MHz | AF<br>HFH-Z2)<br>dB (1/m) | Corr.<br>dB | cable<br>loss 1<br>(inside<br>chamber)<br>dB | cable<br>loss 2<br>(outside<br>chamber)<br>dB | cable<br>loss 3<br>(switch<br>unit)<br>dB | cable<br>loss 4<br>(to<br>receiver)<br>dB | distance<br>corr.<br>(-40 dB/<br>decade)<br>dB | d <sub>Limit</sub><br>(meas.<br>distance<br>(limit)<br>m | d <sub>used</sub><br>(meas.<br>distance<br>(used)<br>m |
|------------------|---------------------------|-------------|--|---|---|---|--|--|--|
| 0.009            | 20.50                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.01             | 20.45                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.015            | 20.37                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.02             | 20.36                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.025            | 20.38                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.03             | 20.32                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.05             | 20.35                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.08             | 20.30                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.1              | 20.20                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.2              | 20.17                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.3              | 20.14                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.49             | 20.12                     | -79.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -80  | 300  | 3  |
| 0.490001         | 20.12                     | -39.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 0.5              | 20.11                     | -39.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 0.8              | 20.10                     | -39.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 1                | 20.09                     | -39.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 2                | 20.08                     | -39.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 3                | 20.06                     | -39.6       | 0.1  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 4                | 20.05                     | -39.5       | 0.2  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 5                | 20.05                     | -39.5       | 0.2  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 6                | 20.02                     | -39.5       | 0.2  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 8                | 19.95                     | -39.5       | 0.2  | 0.1   | 0.1                                       | 0.1                                       | -40  | 30   | 3  |
| 10               | 19.83                     | -39.4       | 0.2  | 0.1   | 0.2                                       | 0.1                                       | -40  | 30   | 3  |
| 12               | 19.71                     | -39.4       | 0.2  | 0.1   | 0.2                                       | 0.1                                       | -40  | 30   | 3  |
| 14               | 19.54                     | -39.4       | 0.2  | 0.1   | 0.2                                       | 0.1                                       | -40  | 30   | 3  |
| 16               | 19.53                     | -39.3       | 0.3  | 0.1   | 0.2                                       | 0.1                                       | -40  | 30   | 3  |
| 18               | 19.50                     | -39.3       | 0.3  | 0.1   | 0.2                                       | 0.1                                       | -40  | 30   | 3  |
| 20               | 19.57                     | -39.3       | 0.3  | 0.1   | 0.2                                       | 0.1                                       | -40  | 30   | 3  |
| 22               | 19.61                     | -39.3       | 0.3  | 0.1   | 0.2                                       | 0.1                                       | -40  | 30   | 3  |
| 24               | 19.61                     | -39.3       | 0.3  | 0.1   | 0.2                                       | 0.1                                       | -40  | 30   | 3  |
| 26               | 19.54                     | -39.3       | 0.3  | 0.1   | 0.2                                       | 0.1                                       | -40  | 30   | 3  |
| 28               | 19.46                     | -39.2       | 0.3  | 0.1   | 0.3                                       | 0.1                                       | -40  | 30   | 3  |
| 30               | 19.73                     | -39.1       | 0.4  | 0.1   | 0.3                                       | 0.1                                       | -40  | 30   | 3  |

### Sample calculation

$$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

distance correction =  $-40 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$

Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values

### 7.3 ANTENNA R&S HL562 (30 MHz – 1 GHz)

( $d_{Limit} = 3\text{ m}$ )

| Frequency | AF R&S HL562 | Corr. |
|-----------|--------------|-------|
| MHz       | dB (1/m)     | dB    |
| 30        | 18.6         | 0.6   |
| 50        | 6.0          | 0.9   |
| 100       | 9.7          | 1.2   |
| 150       | 7.9          | 1.6   |
| 200       | 7.6          | 1.9   |
| 250       | 9.5          | 2.1   |
| 300       | 11.0         | 2.3   |
| 350       | 12.4         | 2.6   |
| 400       | 13.6         | 2.9   |
| 450       | 14.7         | 3.1   |
| 500       | 15.6         | 3.2   |
| 550       | 16.3         | 3.5   |
| 600       | 17.2         | 3.5   |
| 650       | 18.1         | 3.6   |
| 700       | 18.5         | 3.6   |
| 750       | 19.1         | 4.1   |
| 800       | 19.6         | 4.1   |
| 850       | 20.1         | 4.4   |
| 900       | 20.8         | 4.7   |
| 950       | 21.1         | 4.8   |
| 1000      | 21.6         | 4.9   |

| cable loss 1 (inside chamber) | cable loss 2 (outside chamber) | cable loss 3 (switch unit) | cable loss 4 (to receiver) | distance corr. (-20 dB/decade) | $d_{Limit}$ (meas. distance (limit)) | $d_{used}$ (meas. distance (used)) |
|-------------------------------|--------------------------------|----------------------------|----------------------------|--------------------------------|--------------------------------------|------------------------------------|
| dB                            | dB                             | dB                         | dB                         | dB                             | m                                    | m                                  |
| 0.29                          | 0.04                           | 0.23                       | 0.02                       | 0.0                            | 3                                    | 3                                  |
| 0.39                          | 0.09                           | 0.32                       | 0.08                       | 0.0                            | 3                                    | 3                                  |
| 0.56                          | 0.14                           | 0.47                       | 0.08                       | 0.0                            | 3                                    | 3                                  |
| 0.73                          | 0.20                           | 0.59                       | 0.12                       | 0.0                            | 3                                    | 3                                  |
| 0.84                          | 0.21                           | 0.70                       | 0.11                       | 0.0                            | 3                                    | 3                                  |
| 0.98                          | 0.24                           | 0.80                       | 0.13                       | 0.0                            | 3                                    | 3                                  |
| 1.04                          | 0.26                           | 0.89                       | 0.15                       | 0.0                            | 3                                    | 3                                  |
| 1.18                          | 0.31                           | 0.96                       | 0.13                       | 0.0                            | 3                                    | 3                                  |
| 1.28                          | 0.35                           | 1.03                       | 0.19                       | 0.0                            | 3                                    | 3                                  |
| 1.39                          | 0.38                           | 1.11                       | 0.22                       | 0.0                            | 3                                    | 3                                  |
| 1.44                          | 0.39                           | 1.20                       | 0.19                       | 0.0                            | 3                                    | 3                                  |
| 1.55                          | 0.46                           | 1.24                       | 0.23                       | 0.0                            | 3                                    | 3                                  |
| 1.59                          | 0.43                           | 1.29                       | 0.23                       | 0.0                            | 3                                    | 3                                  |
| 1.67                          | 0.34                           | 1.35                       | 0.22                       | 0.0                            | 3                                    | 3                                  |
| 1.67                          | 0.42                           | 1.41                       | 0.15                       | 0.0                            | 3                                    | 3                                  |
| 1.87                          | 0.54                           | 1.46                       | 0.25                       | 0.0                            | 3                                    | 3                                  |
| 1.90                          | 0.46                           | 1.51                       | 0.25                       | 0.0                            | 3                                    | 3                                  |
| 1.99                          | 0.60                           | 1.56                       | 0.27                       | 0.0                            | 3                                    | 3                                  |
| 2.14                          | 0.60                           | 1.63                       | 0.29                       | 0.0                            | 3                                    | 3                                  |
| 2.22                          | 0.60                           | 1.66                       | 0.33                       | 0.0                            | 3                                    | 3                                  |
| 2.23                          | 0.61                           | 1.71                       | 0.30                       | 0.0                            | 3                                    | 3                                  |

( $d_{Limit} = 10\text{ m}$ )

|      |      |      |
|------|------|------|
| 30   | 18.6 | -9.9 |
| 50   | 6.0  | -9.6 |
| 100  | 9.7  | -9.2 |
| 150  | 7.9  | -8.8 |
| 200  | 7.6  | -8.6 |
| 250  | 9.5  | -8.3 |
| 300  | 11.0 | -8.1 |
| 350  | 12.4 | -7.9 |
| 400  | 13.6 | -7.6 |
| 450  | 14.7 | -7.4 |
| 500  | 15.6 | -7.2 |
| 550  | 16.3 | -7.0 |
| 600  | 17.2 | -6.9 |
| 650  | 18.1 | -6.9 |
| 700  | 18.5 | -6.8 |
| 750  | 19.1 | -6.3 |
| 800  | 19.6 | -6.3 |
| 850  | 20.1 | -6.0 |
| 900  | 20.8 | -5.8 |
| 950  | 21.1 | -5.6 |
| 1000 | 21.6 | -5.6 |

|      |      |      |      |       |    |   |
|------|------|------|------|-------|----|---|
| 0.29 | 0.04 | 0.23 | 0.02 | -10.5 | 10 | 3 |
| 0.39 | 0.09 | 0.32 | 0.08 | -10.5 | 10 | 3 |
| 0.56 | 0.14 | 0.47 | 0.08 | -10.5 | 10 | 3 |
| 0.73 | 0.20 | 0.59 | 0.12 | -10.5 | 10 | 3 |
| 0.84 | 0.21 | 0.70 | 0.11 | -10.5 | 10 | 3 |
| 0.98 | 0.24 | 0.80 | 0.13 | -10.5 | 10 | 3 |
| 1.04 | 0.26 | 0.89 | 0.15 | -10.5 | 10 | 3 |
| 1.18 | 0.31 | 0.96 | 0.13 | -10.5 | 10 | 3 |
| 1.28 | 0.35 | 1.03 | 0.19 | -10.5 | 10 | 3 |
| 1.39 | 0.38 | 1.11 | 0.22 | -10.5 | 10 | 3 |
| 1.44 | 0.39 | 1.20 | 0.19 | -10.5 | 10 | 3 |
| 1.55 | 0.46 | 1.24 | 0.23 | -10.5 | 10 | 3 |
| 1.59 | 0.43 | 1.29 | 0.23 | -10.5 | 10 | 3 |
| 1.67 | 0.34 | 1.35 | 0.22 | -10.5 | 10 | 3 |
| 1.67 | 0.42 | 1.41 | 0.15 | -10.5 | 10 | 3 |
| 1.87 | 0.54 | 1.46 | 0.25 | -10.5 | 10 | 3 |
| 1.90 | 0.46 | 1.51 | 0.25 | -10.5 | 10 | 3 |
| 1.99 | 0.60 | 1.56 | 0.27 | -10.5 | 10 | 3 |
| 2.14 | 0.60 | 1.63 | 0.29 | -10.5 | 10 | 3 |
| 2.22 | 0.60 | 1.66 | 0.33 | -10.5 | 10 | 3 |
| 2.23 | 0.61 | 1.71 | 0.30 | -10.5 | 10 | 3 |

#### Sample calculation

|  |
|--|
| $E\text{ (dB } \mu\text{V/m)} = U\text{ (dB } \mu\text{V)} + \text{AF (dB 1/m)} + \text{Corr. (dB)}$<br>$U = \text{Receiver reading}$<br>$\text{AF} = \text{Antenna factor}$<br>$\text{Corr.} = \text{sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)}$<br>$\text{distance correction} = -20 * \text{LOG} (d_{Limit} / d_{used})$<br>Linear interpolation will be used for frequencies in between the values in the table.<br>Tables show an extract of values. |
|--|

#### 7.4 ANTENNA R&S HF907 (1 GHZ – 18 GHZ)

| Frequency | AF R&S HF907 | Corr. |
|-----------|--------------|-------|
| MHz       | dB (1/m)     | dB    |
| 1000      | 24.4         | -19.4 |
| 2000      | 28.5         | -17.4 |
| 3000      | 31.0         | -16.1 |
| 4000      | 33.1         | -14.7 |
| 5000      | 34.4         | -13.7 |
| 6000      | 34.7         | -12.7 |
| 7000      | 35.6         | -11.0 |

| cable loss 1 (relay + cable inside chamber) | cable loss 2 (outside chamber) | cable loss 3 (switch unit, attenuator & pre-amp) | cable loss 4 (to receiver) |  |  |
|---|--------------------------------|--|----------------------------|--|--|
| dB  | dB                             | dB   | dB                         |  |  |
| 0.99  | 0.31                           | -21.51   | 0.79                       |  |  |
| 1.44  | 0.44                           | -20.63   | 1.38                       |  |  |
| 1.87  | 0.53                           | -19.85   | 1.33                       |  |  |
| 2.41  | 0.67                           | -19.13   | 1.31                       |  |  |
| 2.78  | 0.86                           | -18.71   | 1.40                       |  |  |
| 2.74  | 0.90                           | -17.83   | 1.47                       |  |  |
| 2.82  | 0.86                           | -16.19   | 1.46                       |  |  |

| Frequency | AF R&S HF907 | Corr. |
|-----------|--------------|-------|
| MHz       | dB (1/m)     | dB    |
| 3000      | 31.0         | -23.4 |
| 4000      | 33.1         | -23.3 |
| 5000      | 34.4         | -21.7 |
| 6000      | 34.7         | -21.2 |
| 7000      | 35.6         | -19.8 |

| cable loss 1 (relay inside chamber) | cable loss 2 (inside chamber) | cable loss 3 (outside chamber) | cable loss 4 (switch unit, attenuator & pre-amp) | cable loss 5 (to receiver) | used for FCC 15.247 |
|-------------------------------------|-------------------------------|--------------------------------|--|----------------------------|---------------------|
| dB                                  | dB                            | dB                             | dB   | dB                         |                     |
| 0.47                                | 1.87                          | 0.53                           | -27.58   | 1.33                       |                     |
| 0.56                                | 2.41                          | 0.67                           | -28.23   | 1.31                       |                     |
| 0.61                                | 2.78                          | 0.86                           | -27.35   | 1.40                       |                     |
| 0.58                                | 2.74                          | 0.90                           | -26.89   | 1.47                       |                     |
| 0.66                                | 2.82                          | 0.86                           | -25.58   | 1.46                       |                     |

| Frequency | AF R&S HF907 | Corr. |
|-----------|--------------|-------|
| MHz       | dB (1/m)     | dB    |
| 7000      | 35.6         | -57.3 |
| 8000      | 36.3         | -56.3 |
| 9000      | 37.1         | -55.3 |
| 10000     | 37.5         | -56.2 |
| 11000     | 37.5         | -55.3 |
| 12000     | 37.6         | -53.7 |
| 13000     | 38.2         | -53.5 |
| 14000     | 39.9         | -56.3 |
| 15000     | 40.9         | -54.1 |
| 16000     | 41.3         | -54.1 |
| 17000     | 42.8         | -54.4 |
| 18000     | 44.2         | -54.7 |

| cable loss 1 (relay inside chamber) | cable loss 2 (High Pass) | cable loss 3 (pre-amp) | cable loss 4 (inside chamber) | cable loss 5 (outside chamber) | cable loss 6 (to receiver) |
|-------------------------------------|--------------------------|------------------------|-------------------------------|--------------------------------|----------------------------|
| dB                                  | dB                       | dB                     | dB                            | dB                             | dB                         |
| 0.56                                | 1.28                     | -62.72                 | 2.66                          | 0.94                           | 1.46                       |
| 0.69                                | 0.71                     | -61.49                 | 2.84                          | 1.00                           | 1.53                       |
| 0.68                                | 0.65                     | -60.80                 | 3.06                          | 1.09                           | 1.60                       |
| 0.70                                | 0.54                     | -61.91                 | 3.28                          | 1.20                           | 1.67                       |
| 0.80                                | 0.61                     | -61.40                 | 3.43                          | 1.27                           | 1.70                       |
| 0.84                                | 0.42                     | -59.70                 | 3.53                          | 1.26                           | 1.73                       |
| 0.83                                | 0.44                     | -59.81                 | 3.75                          | 1.32                           | 1.83                       |
| 0.91                                | 0.53                     | -63.03                 | 3.91                          | 1.40                           | 1.77                       |
| 0.98                                | 0.54                     | -61.05                 | 4.02                          | 1.44                           | 1.83                       |
| 1.23                                | 0.49                     | -61.51                 | 4.17                          | 1.51                           | 1.85                       |
| 1.36                                | 0.76                     | -62.36                 | 4.34                          | 1.53                           | 2.00                       |
| 1.70                                | 0.53                     | -62.88                 | 4.41                          | 1.55                           | 1.91                       |

#### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + \text{AF (dB 1/m)} + \text{Corr. (dB)}$   
 U = Receiver reading  
 AF = Antenna factor  
 Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)  
 Linear interpolation will be used for frequencies in between the values in the table.  
 Tables show an extract of values.

### 7.5 ANTENNA EMCO 3160-09 (18 GHZ – 26.5 GHZ)

| Frequency<br>MHz | AF<br>EMCO<br>3160-09<br>dB (1/m) | Corr.<br>dB |
|------------------|-----------------------------------|-------------|
| 18000            | 40.2                              | -23.5       |
| 18500            | 40.2                              | -23.2       |
| 19000            | 40.2                              | -22.0       |
| 19500            | 40.3                              | -21.3       |
| 20000            | 40.3                              | -20.3       |
| 20500            | 40.3                              | -19.9       |
| 21000            | 40.3                              | -19.1       |
| 21500            | 40.3                              | -19.1       |
| 22000            | 40.3                              | -18.7       |
| 22500            | 40.4                              | -19.0       |
| 23000            | 40.4                              | -19.5       |
| 23500            | 40.4                              | -19.3       |
| 24000            | 40.4                              | -19.8       |
| 24500            | 40.4                              | -19.5       |
| 25000            | 40.4                              | -19.3       |
| 25500            | 40.5                              | -20.4       |
| 26000            | 40.5                              | -21.3       |
| 26500            | 40.5                              | -21.1       |

| cable<br>loss 1<br>(inside<br>chamber)<br>dB | cable<br>loss 2<br>(pre-<br>amp)<br>dB | cable<br>loss 3<br>(inside<br>chamber)<br>dB | cable<br>loss 4<br>(switch<br>unit)<br>dB | cable<br>loss 5<br>(to<br>receiver)<br>dB |
|--|--|--|---|---|
| 0.72   | -35.85                                 | 6.20   | 2.81                                      | 2.65                                      |
| 0.69   | -35.71                                 | 6.46   | 2.76                                      | 2.59                                      |
| 0.76   | -35.44                                 | 6.69   | 3.15                                      | 2.79                                      |
| 0.74   | -35.07                                 | 7.04   | 3.11                                      | 2.91                                      |
| 0.72   | -34.49                                 | 7.30   | 3.07                                      | 3.05                                      |
| 0.78   | -34.46                                 | 7.48   | 3.12                                      | 3.15                                      |
| 0.87   | -34.07                                 | 7.61   | 3.20                                      | 3.33                                      |
| 0.90   | -33.96                                 | 7.47   | 3.28                                      | 3.19                                      |
| 0.89   | -33.57                                 | 7.34   | 3.35                                      | 3.28                                      |
| 0.87   | -33.66                                 | 7.06   | 3.75                                      | 2.94                                      |
| 0.88   | -33.75                                 | 6.92   | 3.77                                      | 2.70                                      |
| 0.90   | -33.35                                 | 6.99   | 3.52                                      | 2.66                                      |
| 0.88   | -33.99                                 | 6.88   | 3.88                                      | 2.58                                      |
| 0.91   | -33.89                                 | 7.01   | 3.93                                      | 2.51                                      |
| 0.88   | -33.00                                 | 6.72   | 3.96                                      | 2.14                                      |
| 0.89   | -34.07                                 | 6.90   | 3.66                                      | 2.22                                      |
| 0.86   | -35.11                                 | 7.02   | 3.69                                      | 2.28                                      |
| 0.90   | -35.20                                 | 7.15   | 3.91                                      | 2.36                                      |

#### Sample calculation

$$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values.



### 7.6 ANTENNA EMCO 3160-10 (26.5 GHZ – 40 GHZ)

| Frequency<br>GHz | AF<br>EMCO<br>3160-10<br>dB (1/m) | Corr.<br>dB | cable<br>loss 1<br>(inside<br>chamber)<br>dB | cable<br>loss 2<br>(outside<br>chamber)<br>dB | cable<br>loss 3<br>(switch<br>unit)<br>dB | cable<br>loss 4<br>(to<br>receiver)<br>dB | distance<br>corr.<br>(-20 dB/<br>decade)<br>dB | d <sub>Limit</sub><br>(meas.<br>distance<br>(limit))<br>m | d <sub>used</sub><br>(meas.<br>distance<br>(used))<br>m |
|------------------|-----------------------------------|-------------|--|---|---|---|--|---|---|
| 26.5             | 43.4                              | -11.2       | 4.4  |   |   |   | -9.5   | 3   | 1.0   |
| 27.0             | 43.4                              | -11.2       | 4.4  |   |   |   | -9.5   | 3   | 1.0   |
| 28.0             | 43.4                              | -11.1       | 4.5  |   |   |   | -9.5   | 3   | 1.0   |
| 29.0             | 43.5                              | -11.0       | 4.6  |   |   |   | -9.5   | 3   | 1.0   |
| 30.0             | 43.5                              | -10.9       | 4.7  |   |   |   | -9.5   | 3   | 1.0   |
| 31.0             | 43.5                              | -10.8       | 4.7  |   |   |   | -9.5   | 3   | 1.0   |
| 32.0             | 43.5                              | -10.7       | 4.8  |   |   |   | -9.5   | 3   | 1.0   |
| 33.0             | 43.6                              | -10.7       | 4.9  |   |   |   | -9.5   | 3   | 1.0   |
| 34.0             | 43.6                              | -10.6       | 5.0  |   |   |   | -9.5   | 3   | 1.0   |
| 35.0             | 43.6                              | -10.5       | 5.1  |   |   |   | -9.5   | 3   | 1.0   |
| 36.0             | 43.6                              | -10.4       | 5.1  |   |   |   | -9.5   | 3   | 1.0   |
| 37.0             | 43.7                              | -10.3       | 5.2  |   |   |   | -9.5   | 3   | 1.0   |
| 38.0             | 43.7                              | -10.2       | 5.3  |   |   |   | -9.5   | 3   | 1.0   |
| 39.0             | 43.7                              | -10.2       | 5.4  |   |   |   | -9.5   | 3   | 1.0   |
| 40.0             | 43.8                              | -10.1       | 5.5  |   |   |   | -9.5   | 3   | 1.0   |

#### Sample calculation

$$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

distance correction =  $-20 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$

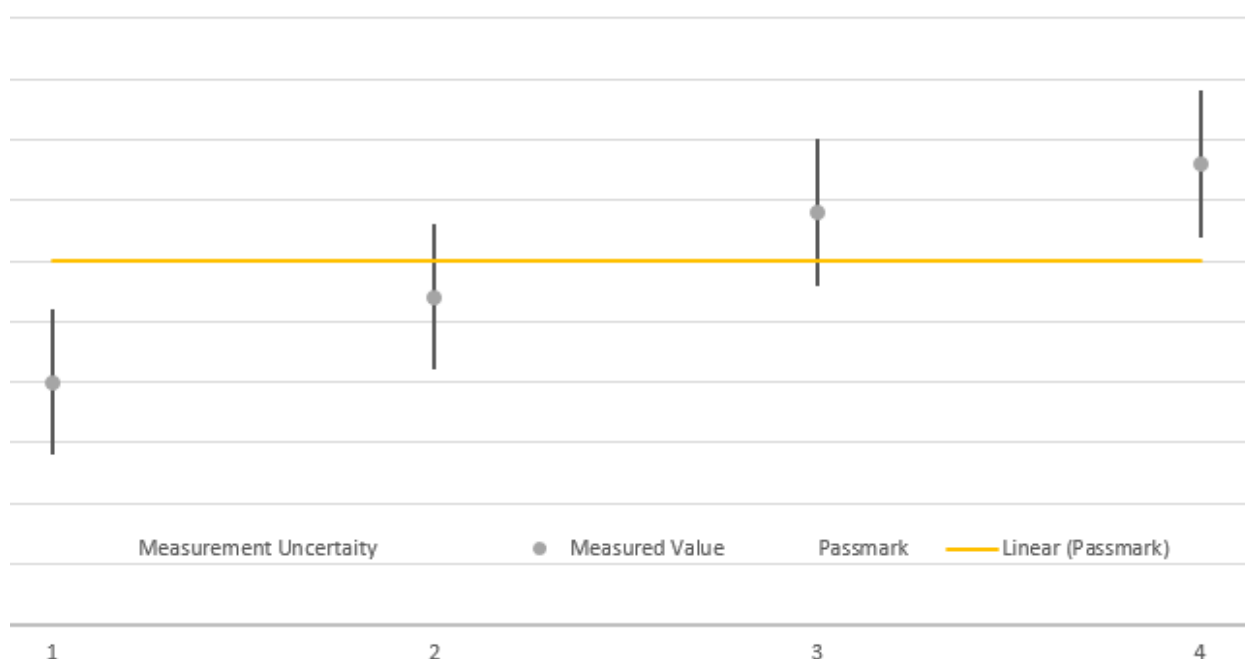
Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values.

## 8 MEASUREMENT UNCERTAINTIES

| Test Case                            | Parameter          | Uncertainty            |
|--------------------------------------|--------------------|------------------------|
| AC Power Line                        | Power              | ± 3.4 dB               |
| Field Strength of spurious radiation | Power              | ± 5.5 dB               |
| 6 dB / 26 dB / 99% Bandwidth         | Power<br>Frequency | ± 2.9 dB<br>± 11.2 kHz |
| Conducted Output Power               | Power              | ± 2.2 dB               |
| Band Edge Compliance                 | Power<br>Frequency | ± 2.2 dB<br>± 11.2 kHz |
| Frequency Stability                  | Frequency          | ± 25 Hz                |
| Power Spectral Density               | Power              | ± 2.2 dB               |

The measurement uncertainties for all parameters are calculated with an expansion factor (coverage factor)  $k = 1.96$ . This means, that the true value is in the corresponding interval with a probability of 95 %.



The verdicts in this test report are given according the above diagram:

| Case | Measured Value  | Uncertainty Range | Verdict |
|------|-----------------|-------------------|---------|
| 1    | below pass mark | below pass mark   | Passed  |
| 2    | below pass mark | within pass mark  | Passed  |
| 3    | above pass mark | within pass mark  | Failed  |
| 4    | above pass mark | above pass mark   | Failed  |

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so called shared risk principle.

## 9 PHOTO REPORT

Please see separate photo report.