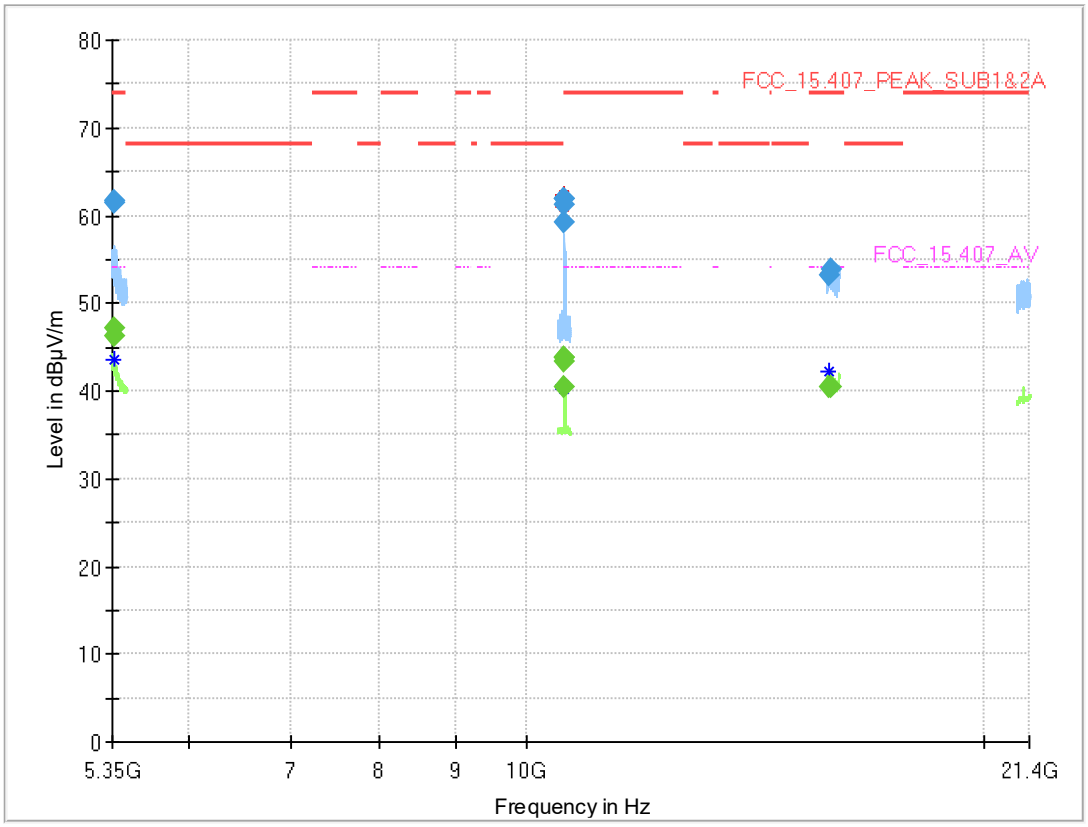
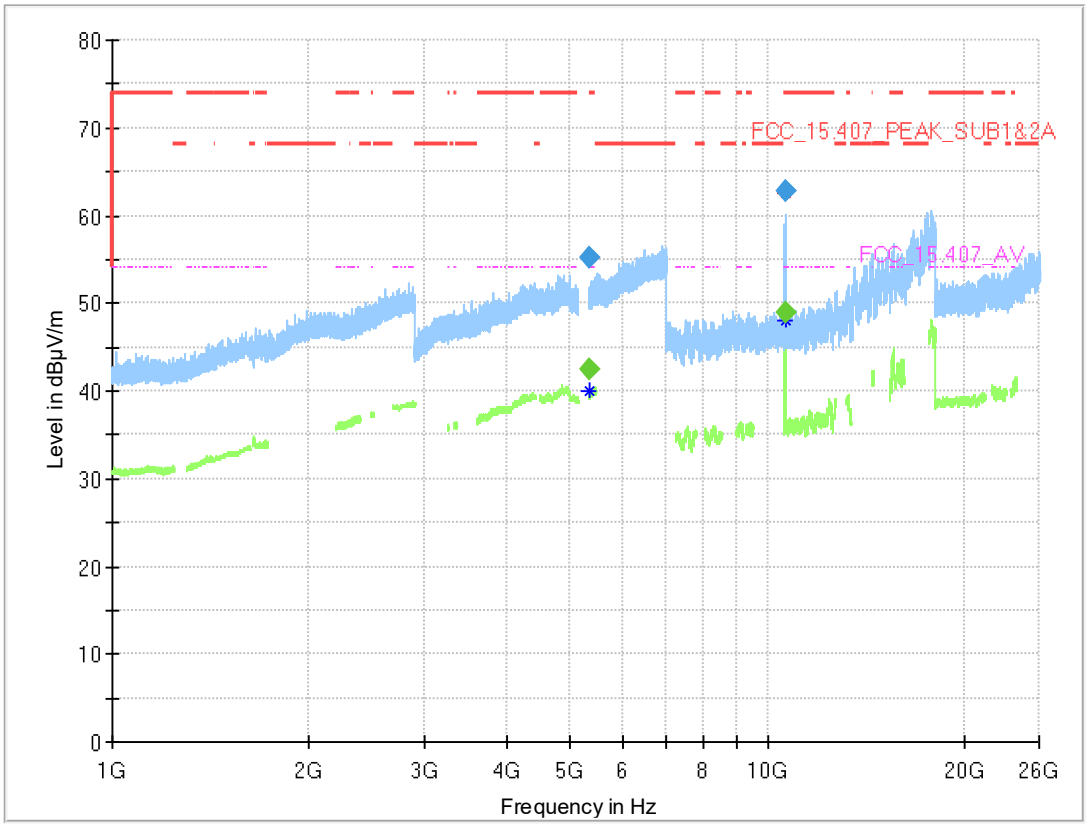
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A
(S02_161_AB01)




## 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)

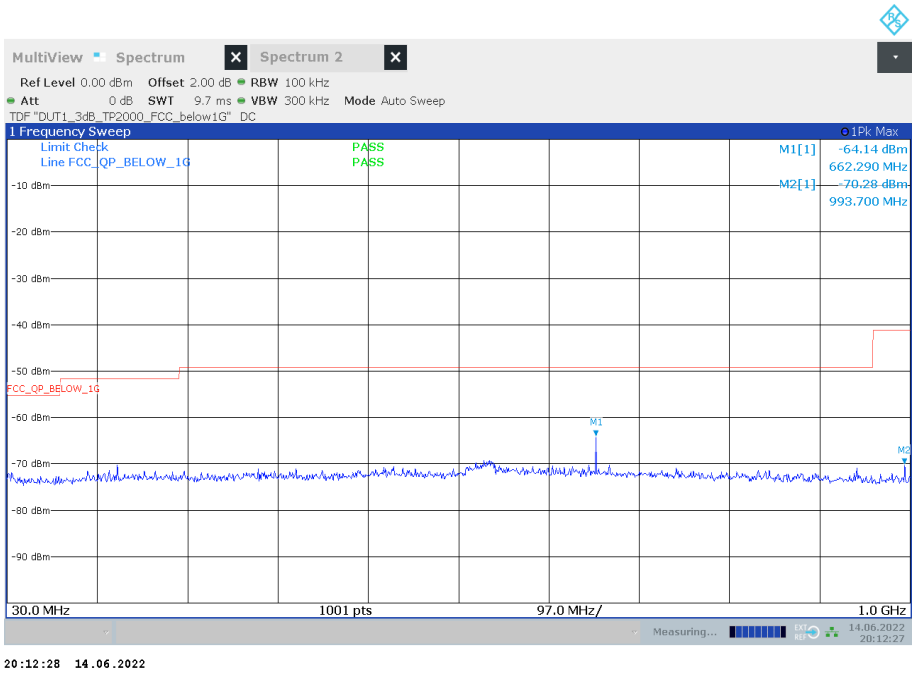



## Final_Result

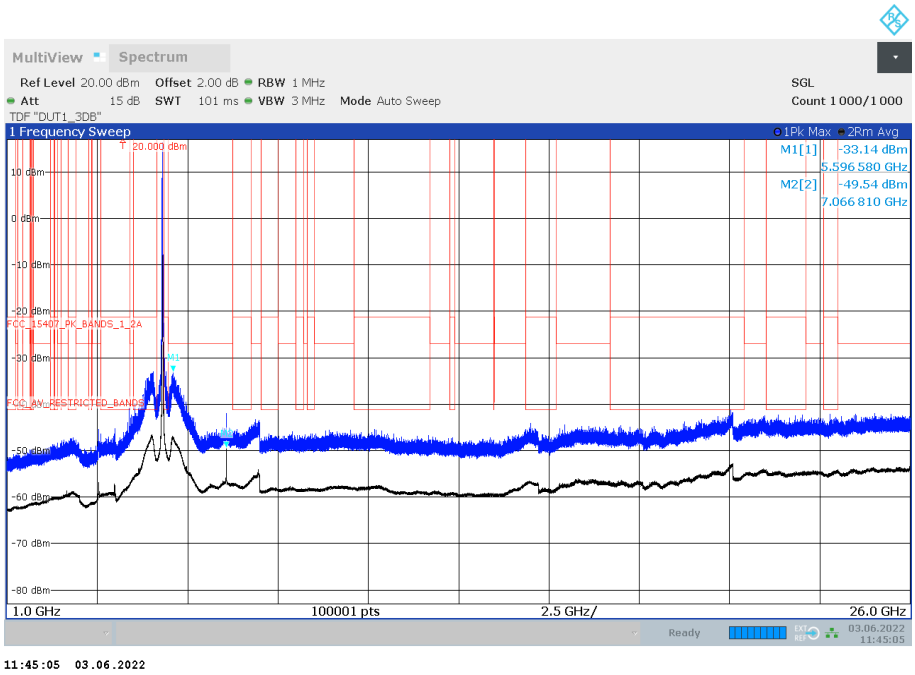
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5351.760 | 55.2 | --- | 74.00 | 18.76 | 1000.0 | 1000.000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

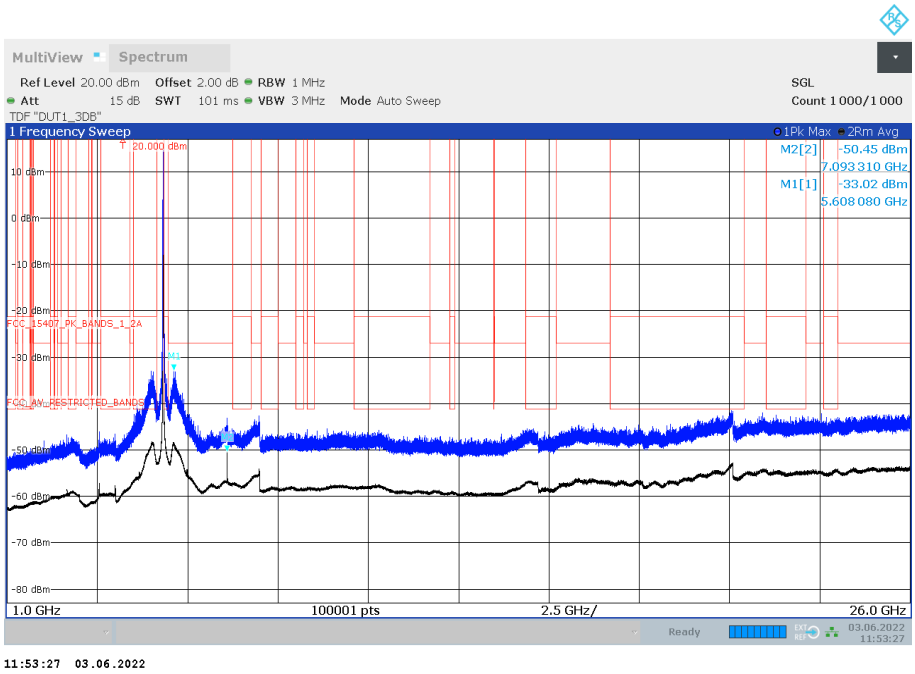
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-2A
(S01_161_AD01)




Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A
(S01_161_AD01)

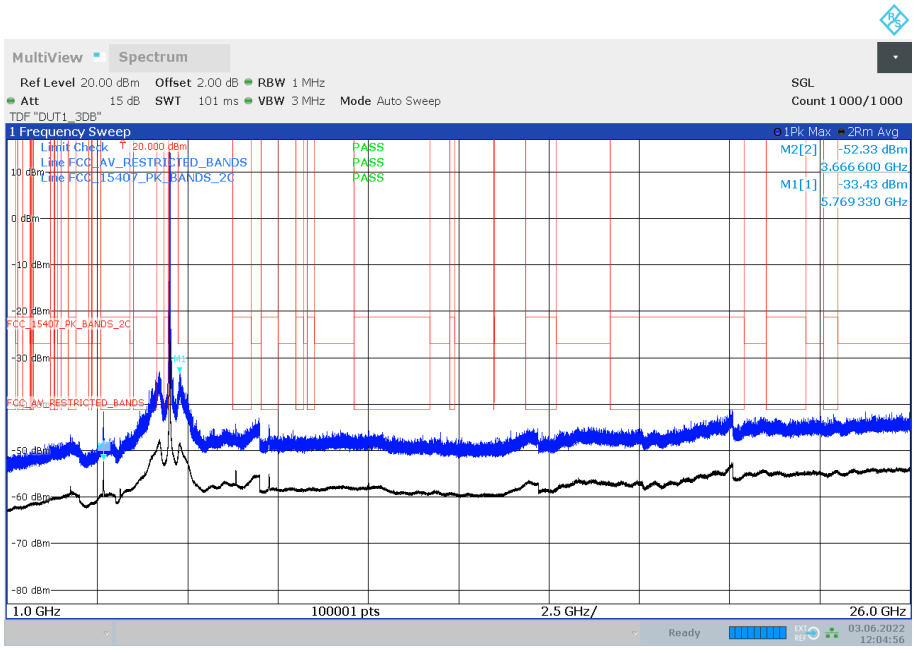


Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2A
(S01_161_AD01)



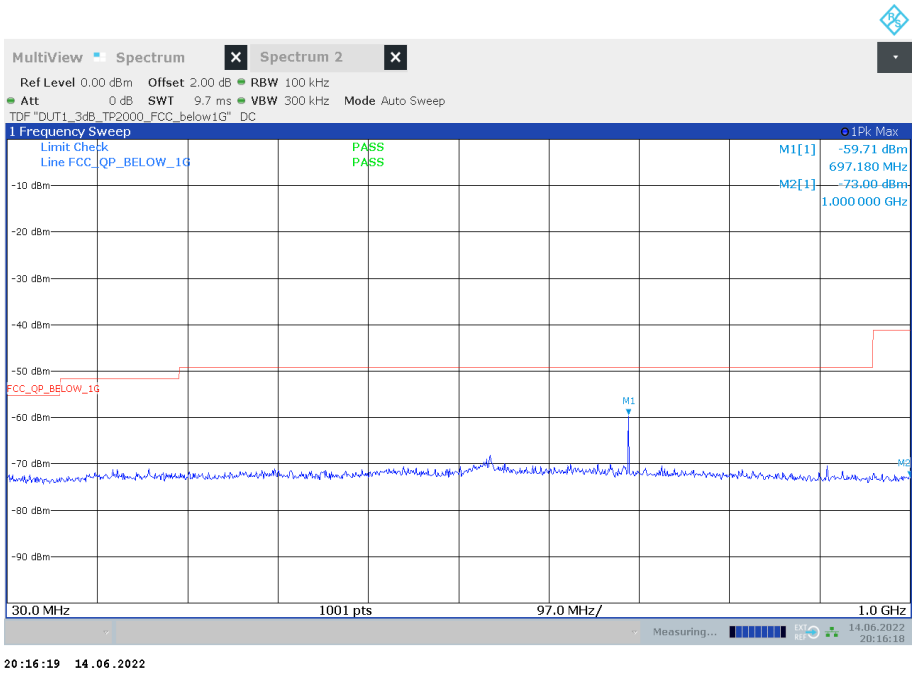

11:53:27 03.06.2022

Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C
(S01_161_AD01)



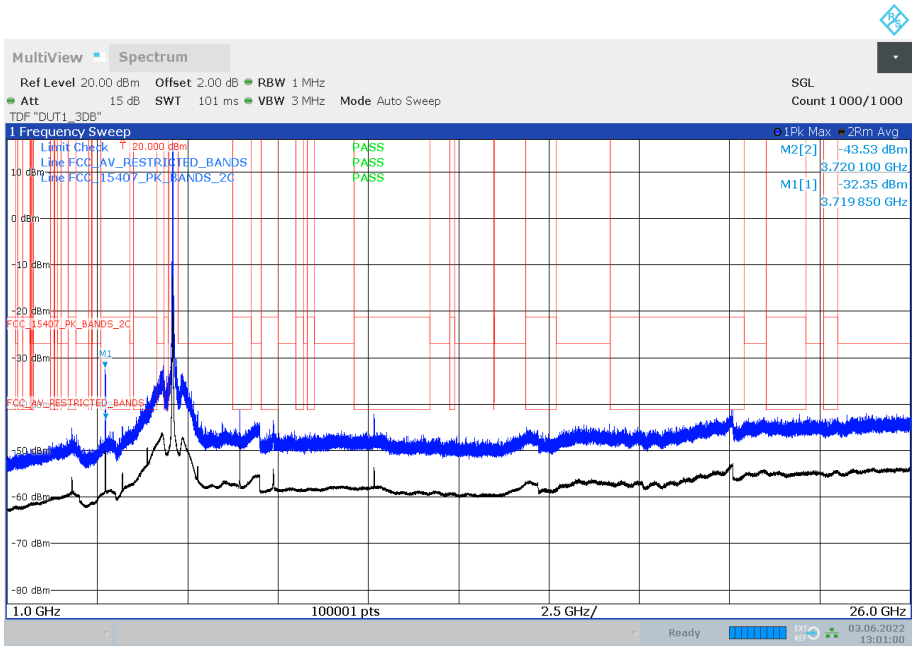

12:04:57 03.06.2022

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-2C
(S01_161_AD01)



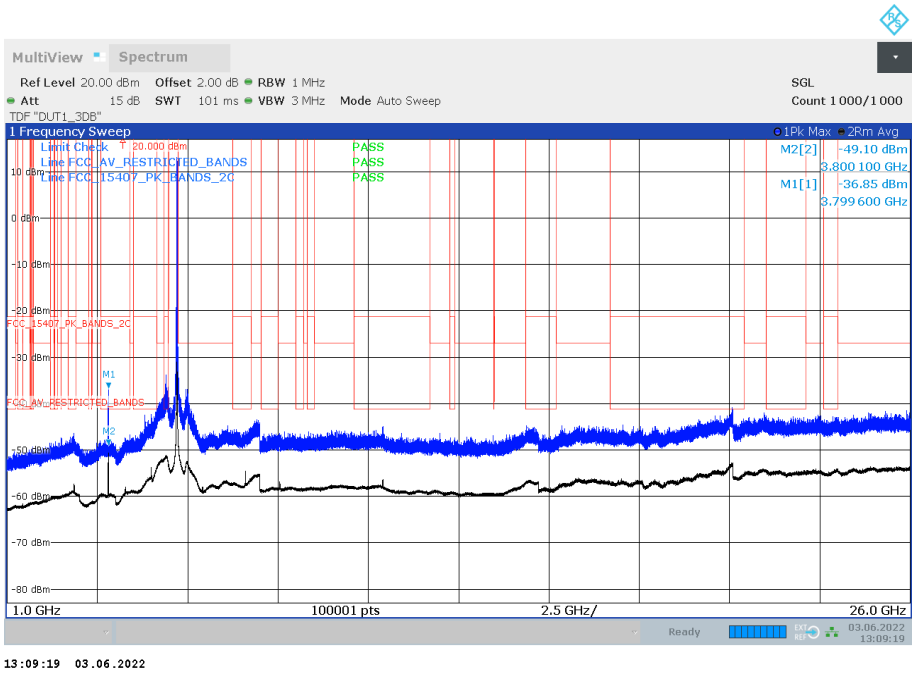

20:16:19 14.06.2022

Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C
(S01_161_AD01)

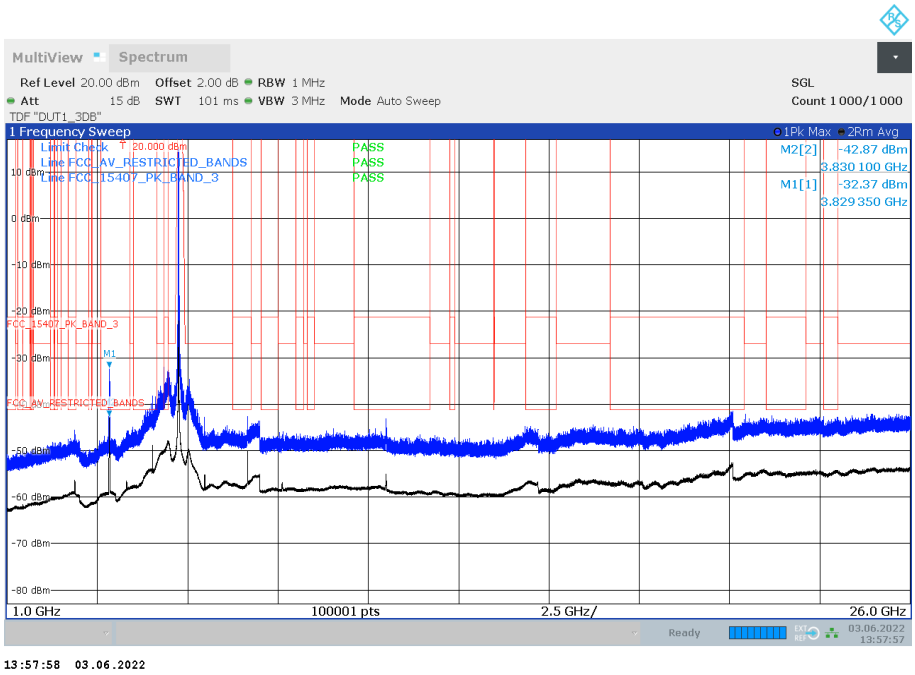



13:01:00 03.06.2022

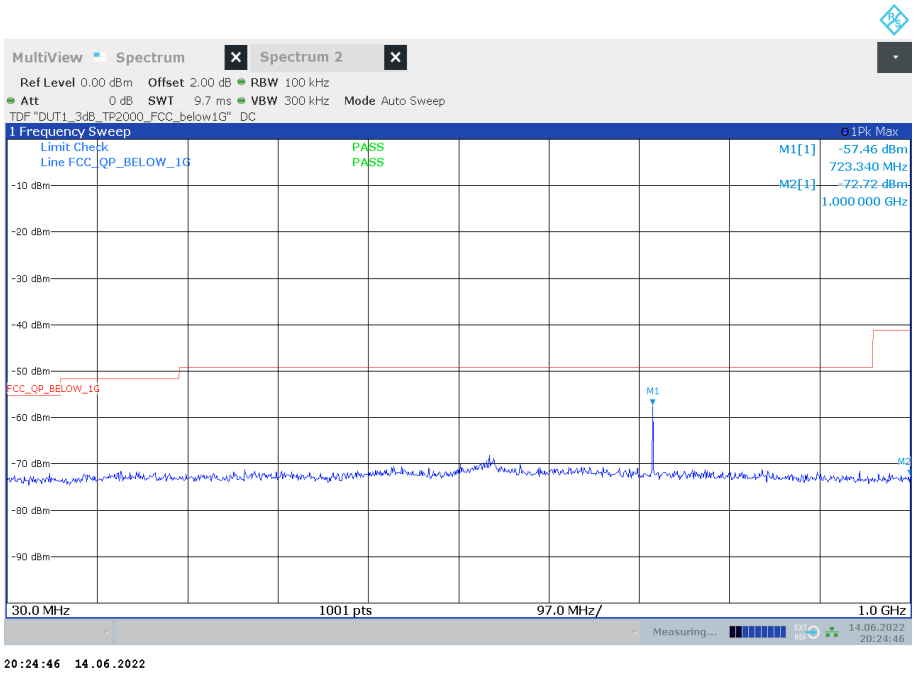
Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C
(S01_161_AD01)



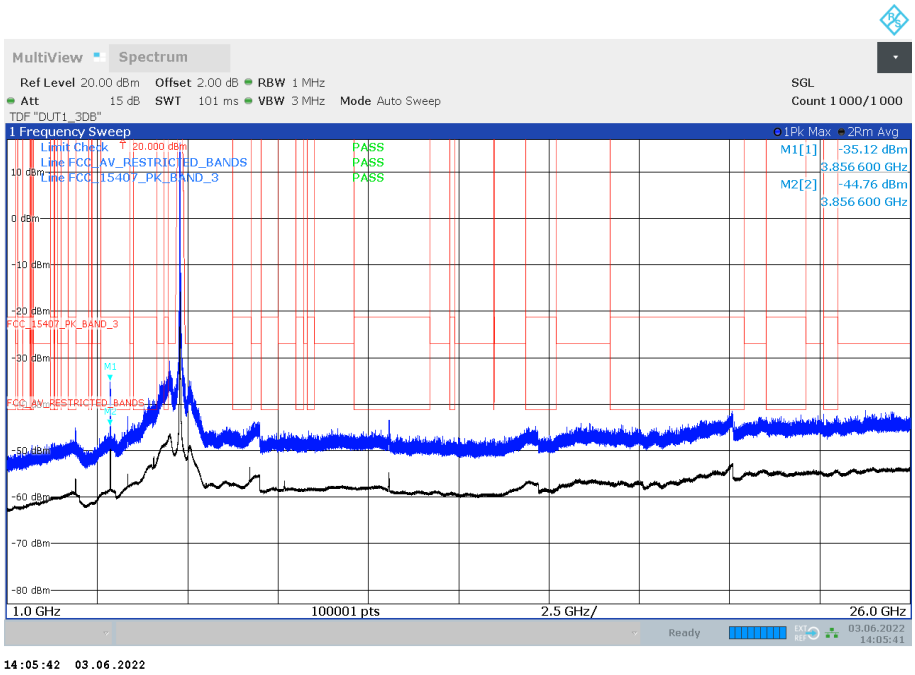

Radio Technology = WLAN a, Operating Frequency = low, Measurement range = 1GHz - 26GHz, Subband = U-NII-3
(S01_161_AD01)



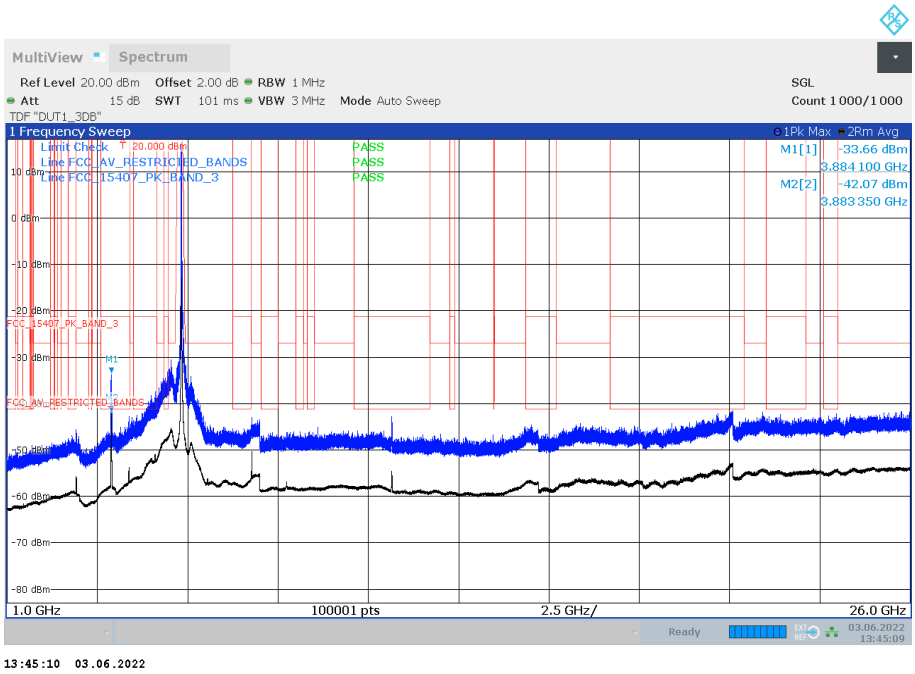
Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 30MHz - 1GHz, Subband = U-NII-3
(S01_161_AD01)




Radio Technology = WLAN a, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-3
(S01_161_AD01)

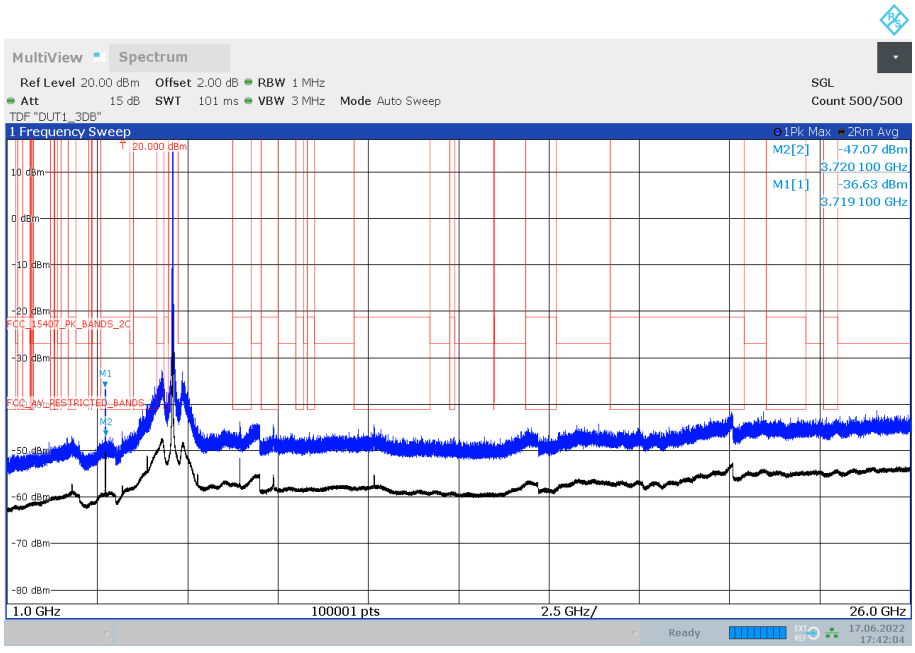


Radio Technology = WLAN a, Operating Frequency = high, Measurement range = 1GHz - 26GHz, Subband = U-NII-3
(S01_161_AD01)



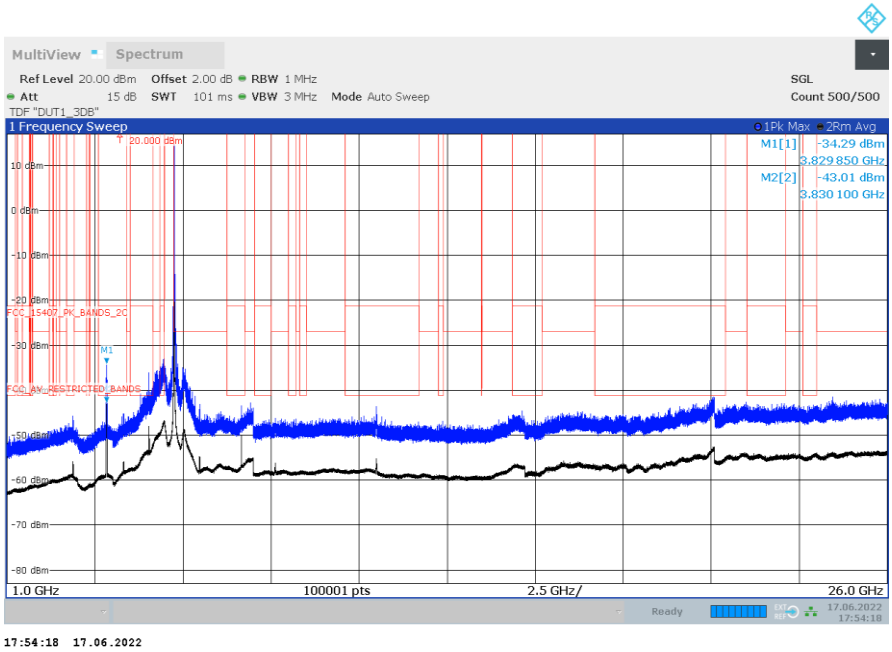

13:45:10 03.06.2022

Radio Technology = WLAN n 20 MHz, Operating Frequency = mid, Measurement range = 1GHz - 26GHz, Subband = U-NII-2C
(S01_161_AD01)

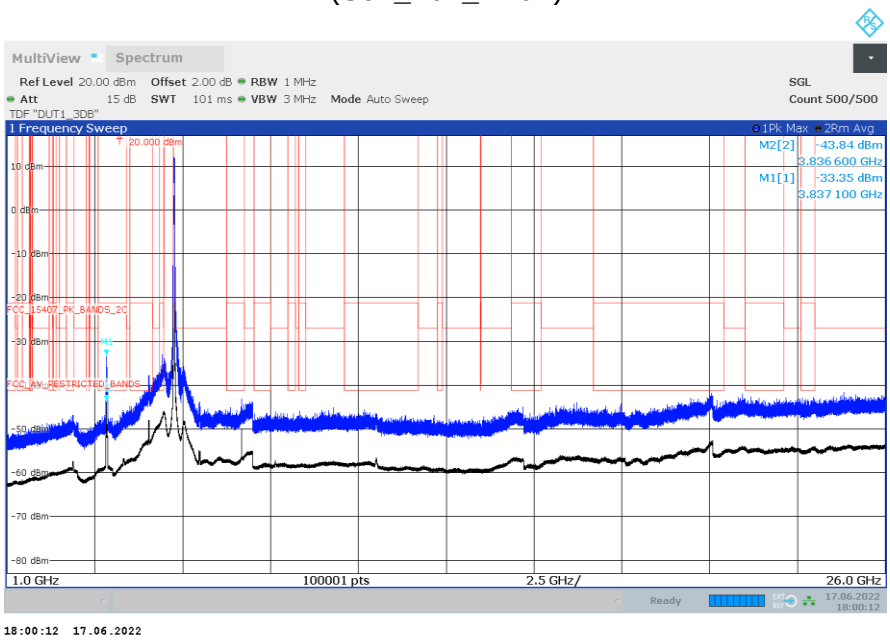



17:42:04 17.06.2022

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

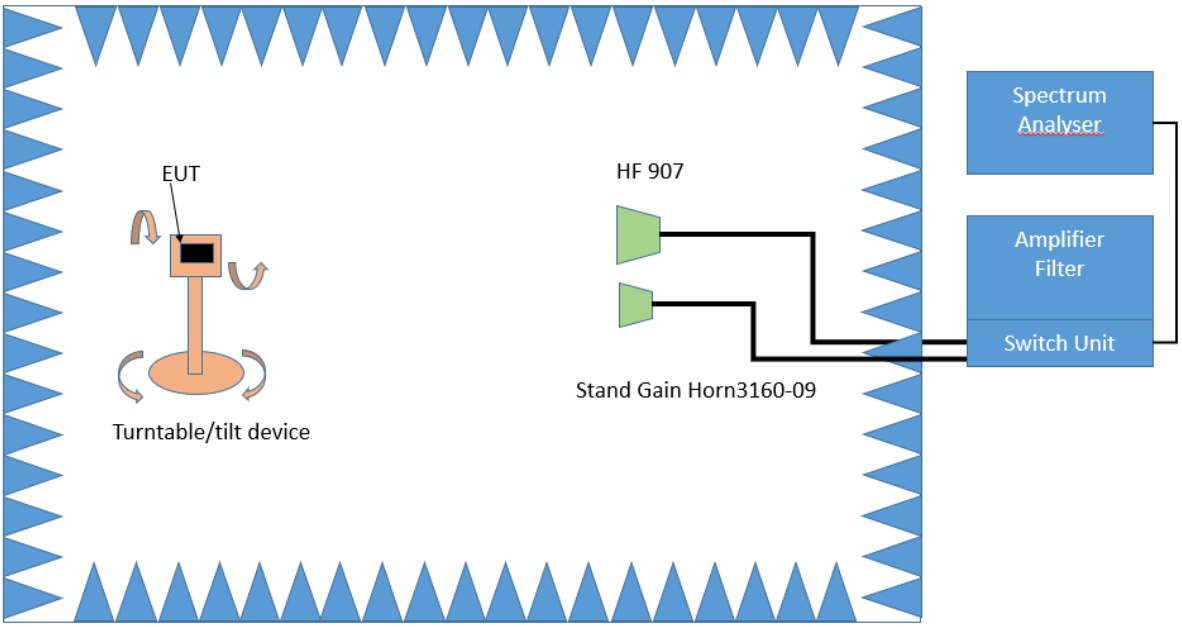
**Radiated Measurement with 50 Ohm termination at antenna ports**

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:**

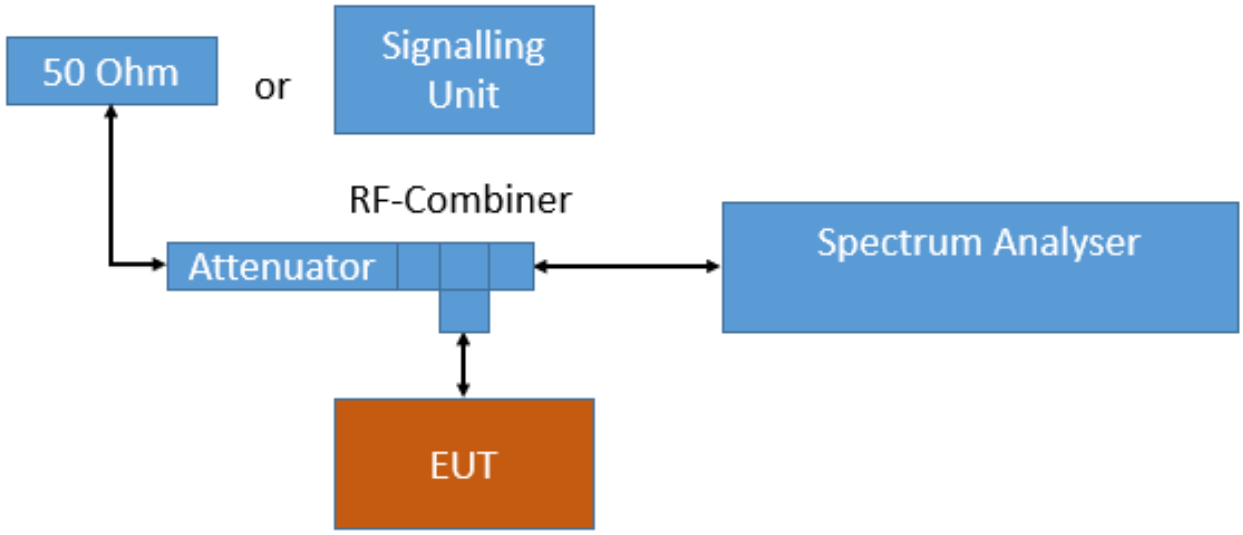
The turn table azimuth will slowly vary by ± 22.5°.
The elevation angle will slowly vary by ± 45°
Spectrum analyser settings:
- Detector: Peak

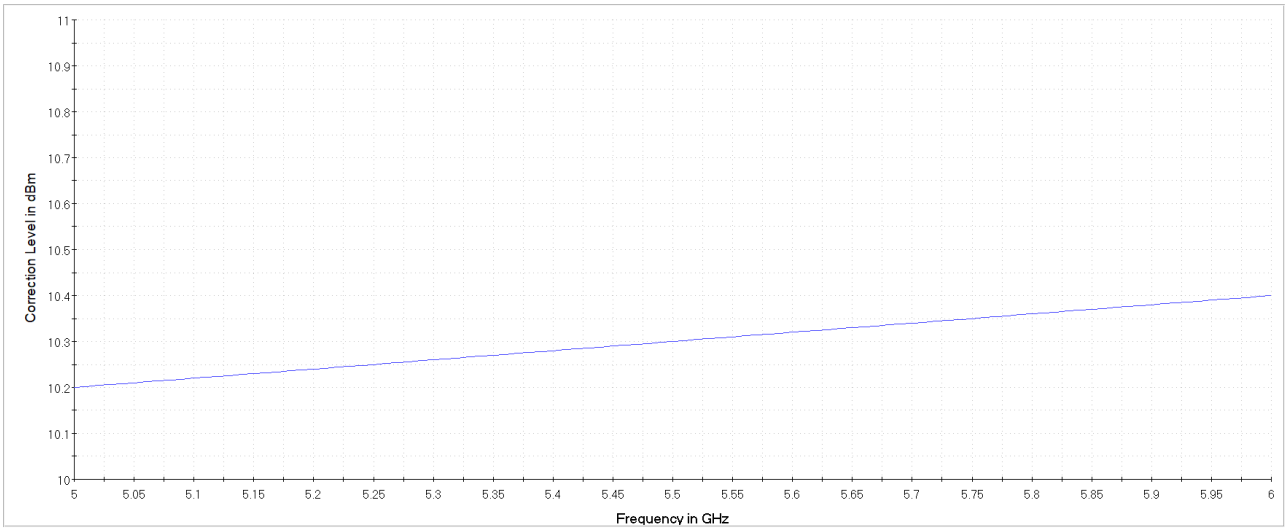
**Step 3:**
Spectrum analyser settings for step 3:
- Detector: Peak / CISPR Average
- Measured frequencies: in step 1 determined frequencies
- RBW = 1 MHz
- VBW = 3 MHz
- Measuring time: 1 s

**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 dBµV/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 ≤ 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 = 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

Value [dBµV/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 Bm/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 (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)

## 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] | Detec-tor | 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 |
| 3 | Conducted | 5745 | 5725.0 | 60.2 | PEAK | 1000 | 68.2 | 8.0 | BE-UE | FCC&IC |
| | Conducted | 5825 | 5850.0 | 65.0 | PEAK | 1000 | 68.2 | 3.2 | BE-UE | FCC&IC |
| 1 | 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 | FCC&IC |
| | 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 | FCC&IC |
| | 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 | FCC&IC |
| | 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] | Detec-tor | 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 |

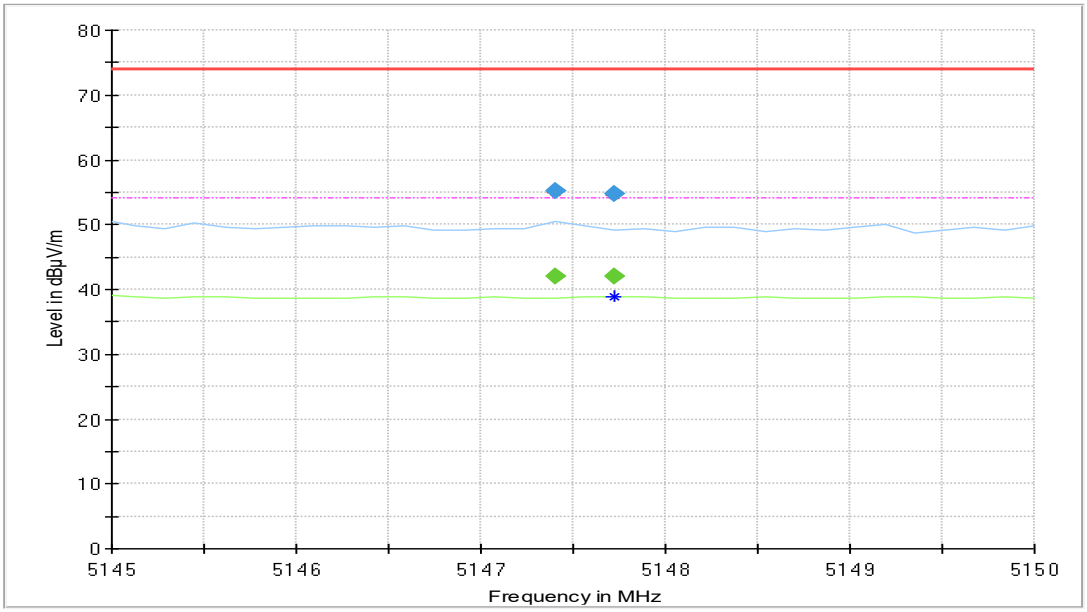
WLAN n-Mode; 40 MHz; MCS0; SISO
Applied duty cycle correction (AV): 0 dB

| U-NII-Subband | Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detec-tor | 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 |
| | Conducted | 5670 | 5725.0 | 65.1 | PEAK | 1000 | 68.2 | 3.1 | BE-UE |
| 3 | 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)

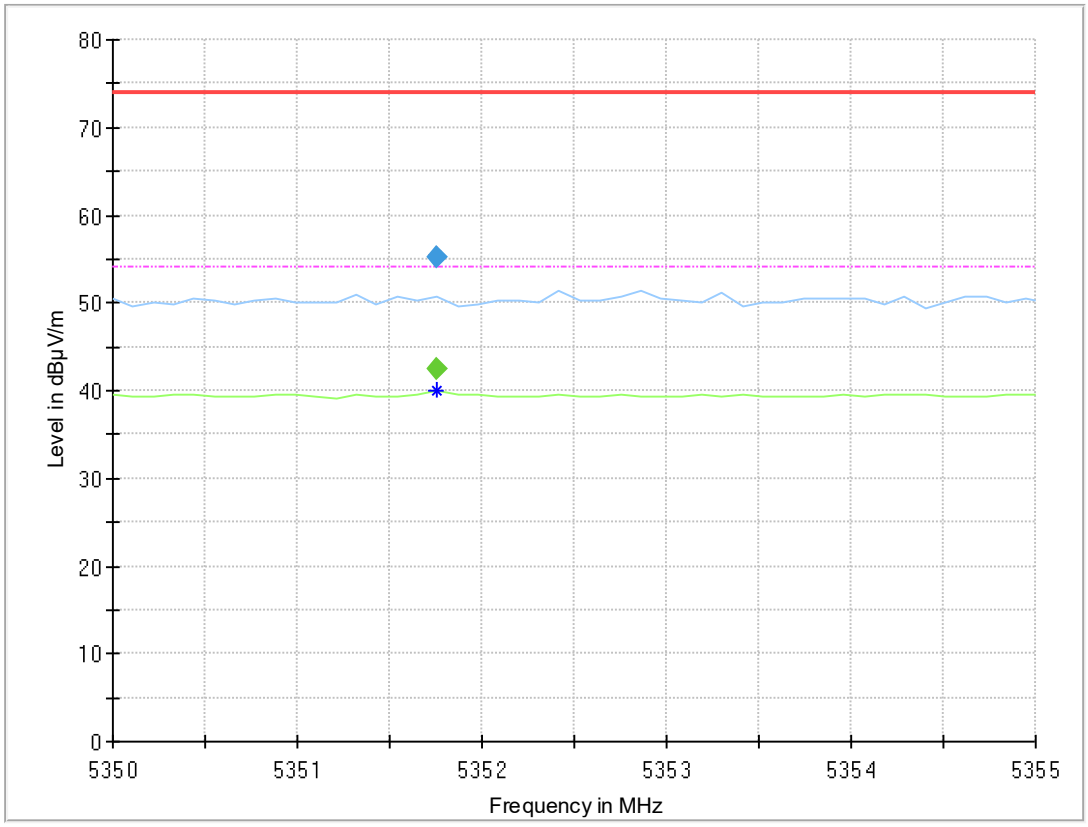
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-1 (S02_161_AC01)




## 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 |

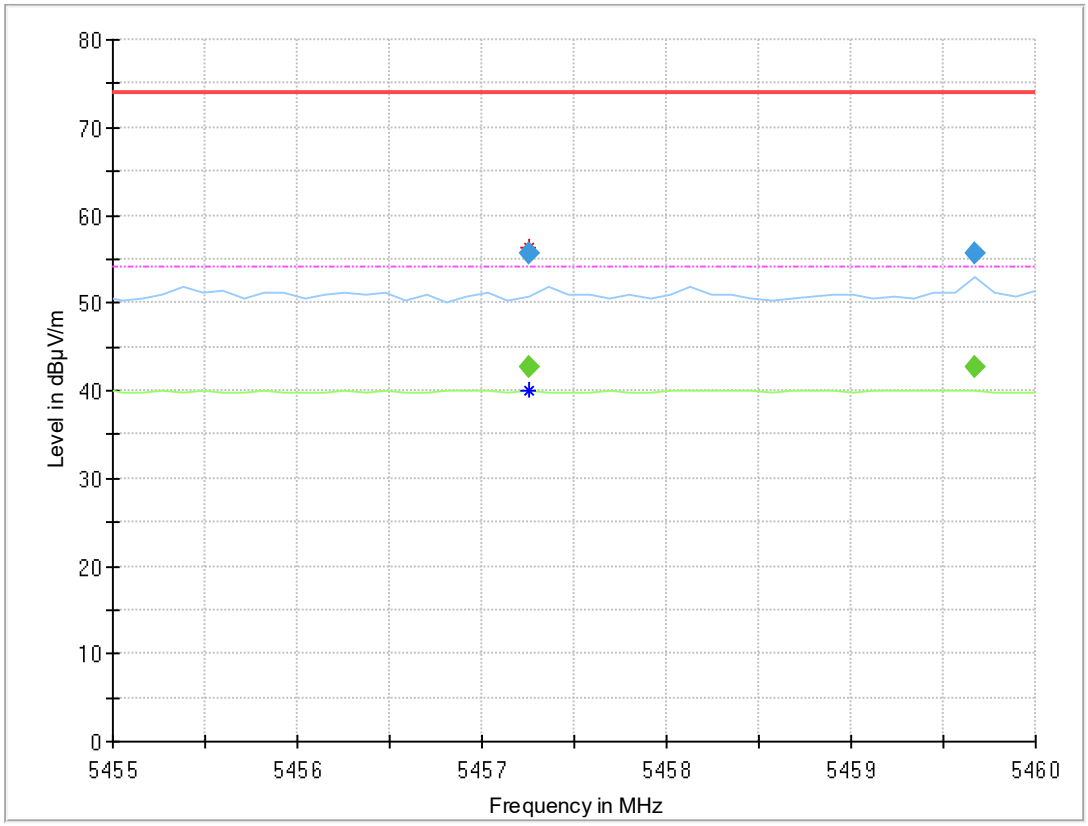
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2A (S02_161_AC01)




## 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 |

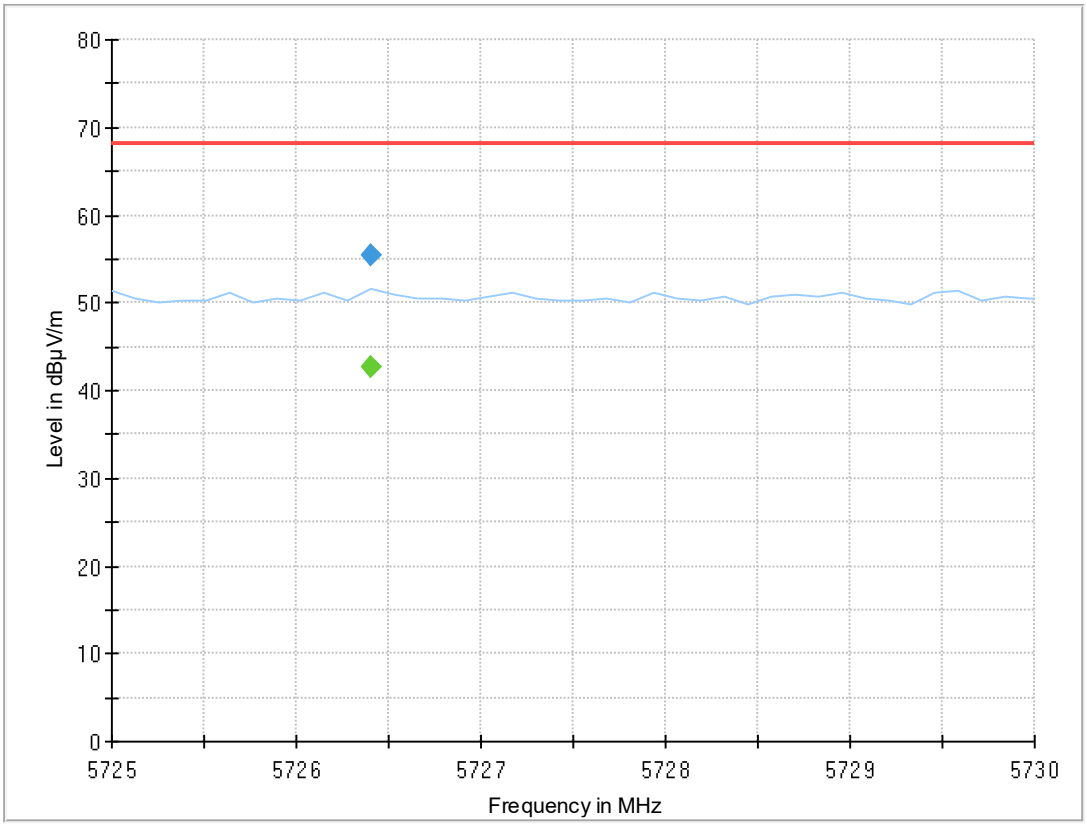
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-2C (S02_161_AB01)




## 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 |

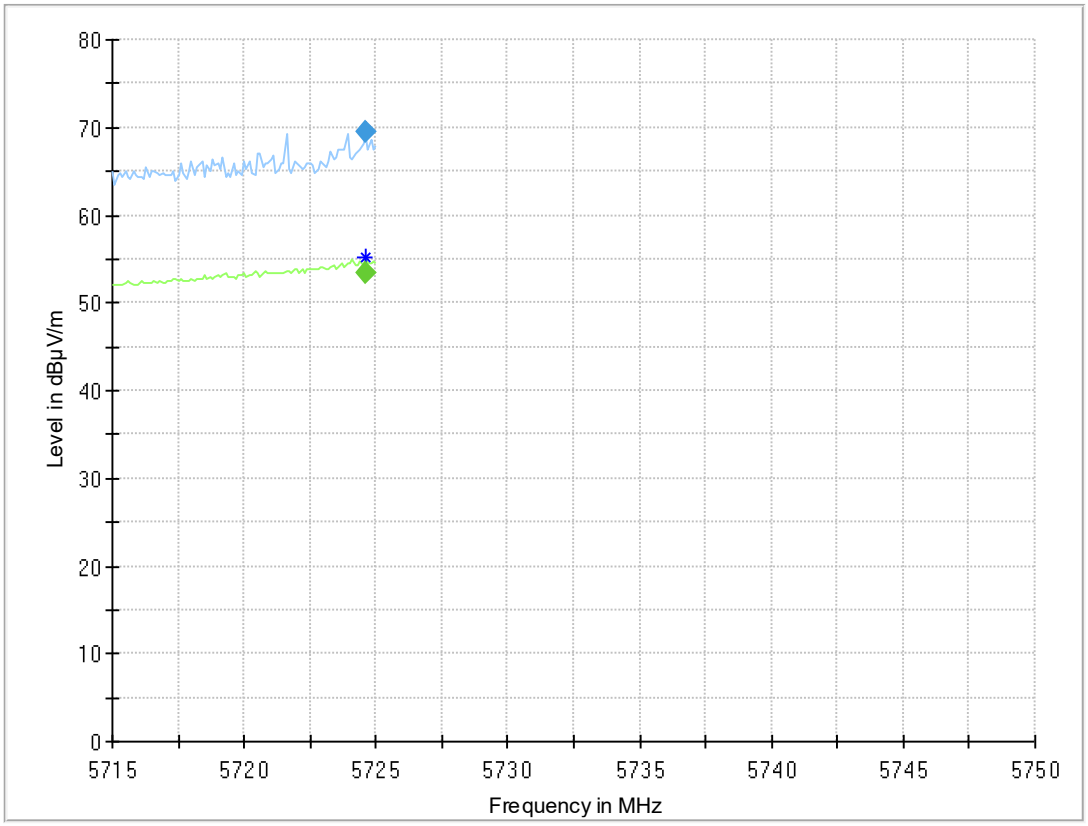
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2C (S02_161_AB01)




## Final_Result

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

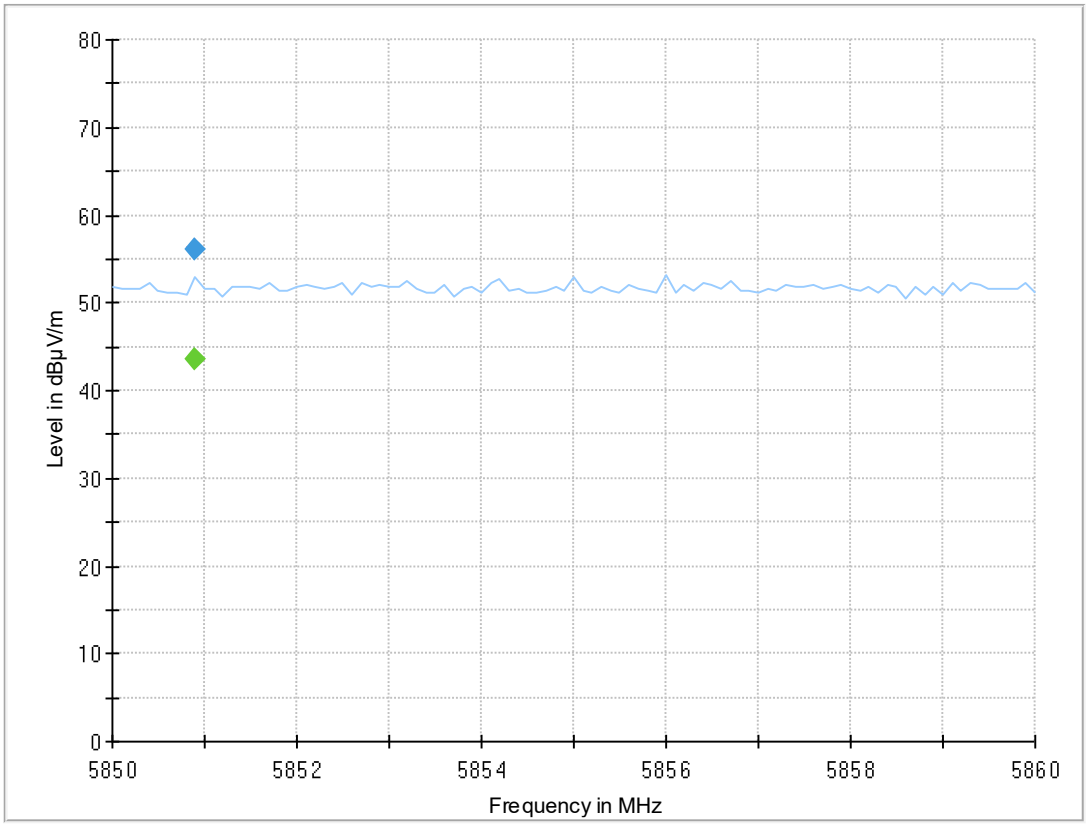
Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-3 (S02_161_AB01)




## 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 |

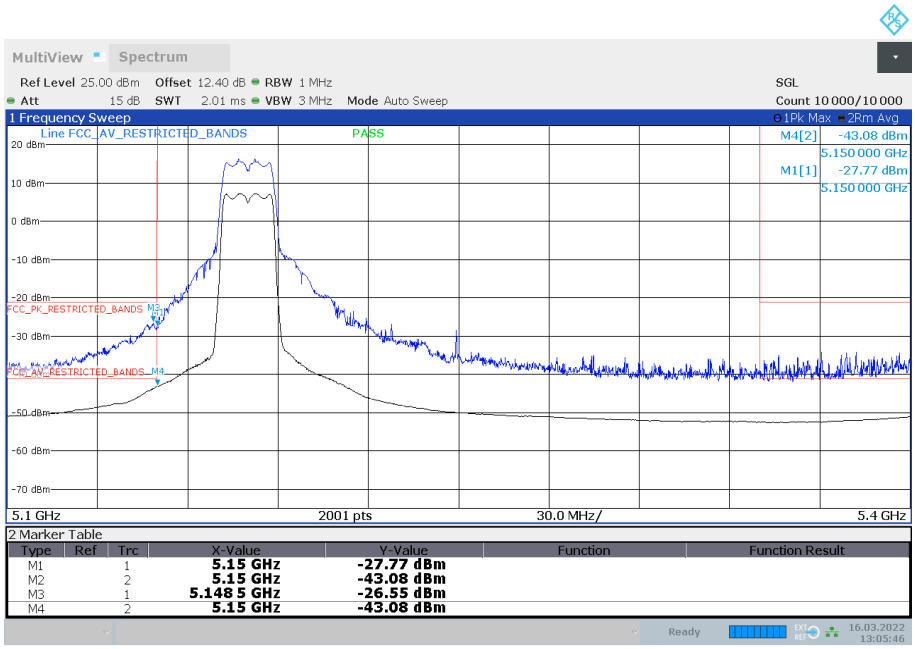
Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3 (S02_161_AB01)




## Final_Result

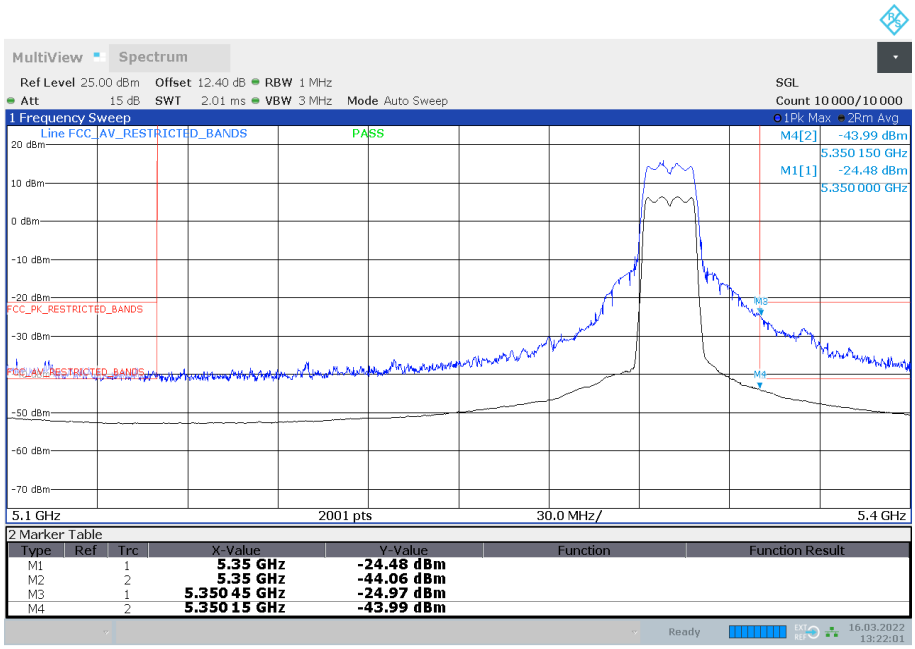
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5850.900 | --- | 43.5 | --- | --- | 1000.0 | 1000.000 | 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)



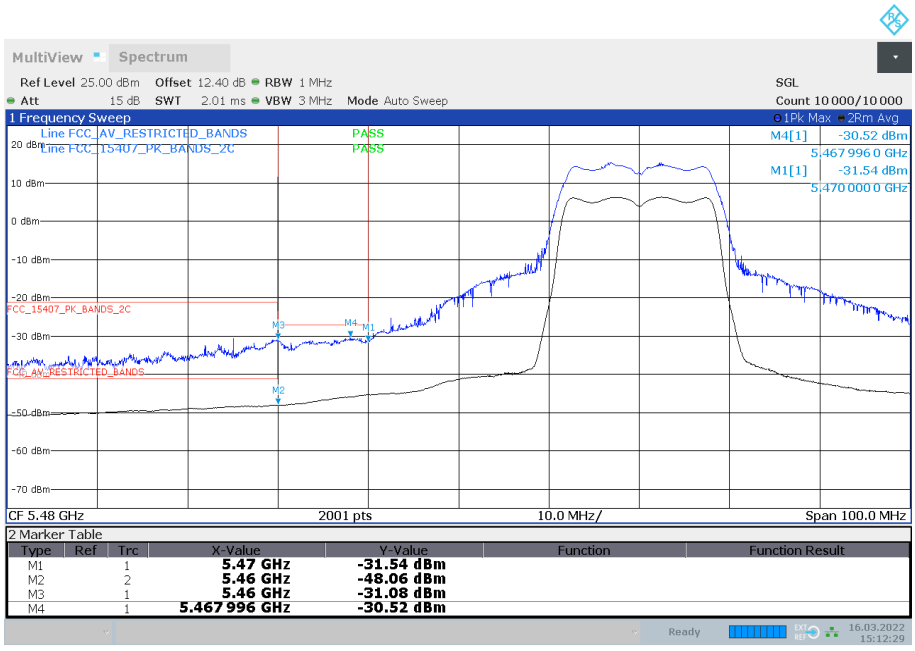

13:05:46 16.03.2022

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2A (S01_161_AA01)




13:22:02 16.03.2022

Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-2C (S01_161_AA01)



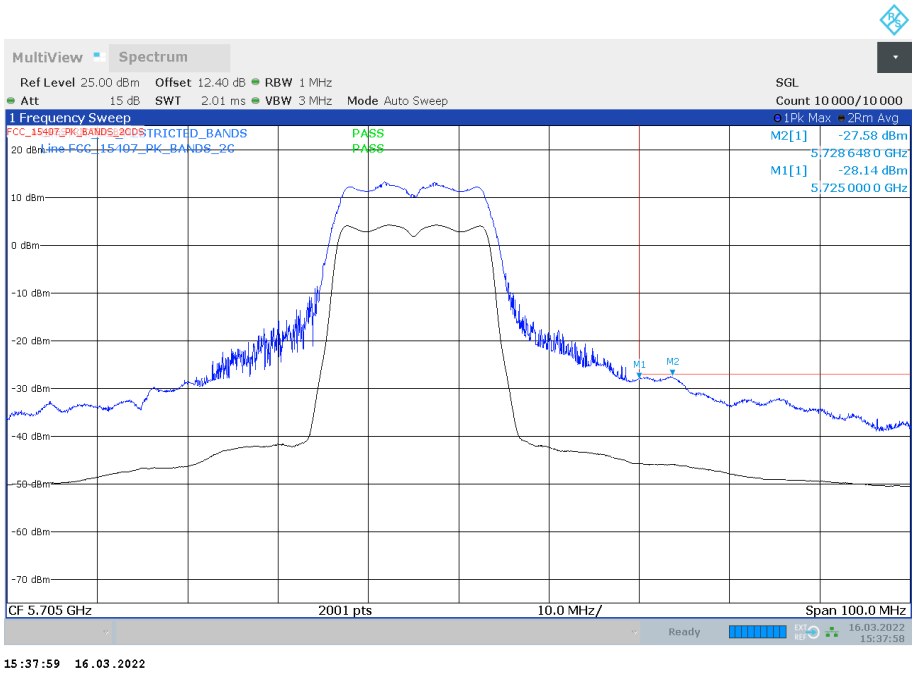

15:12:29 16.03.2022

TX on 5500 MHz


19:46:33 30.06.2022

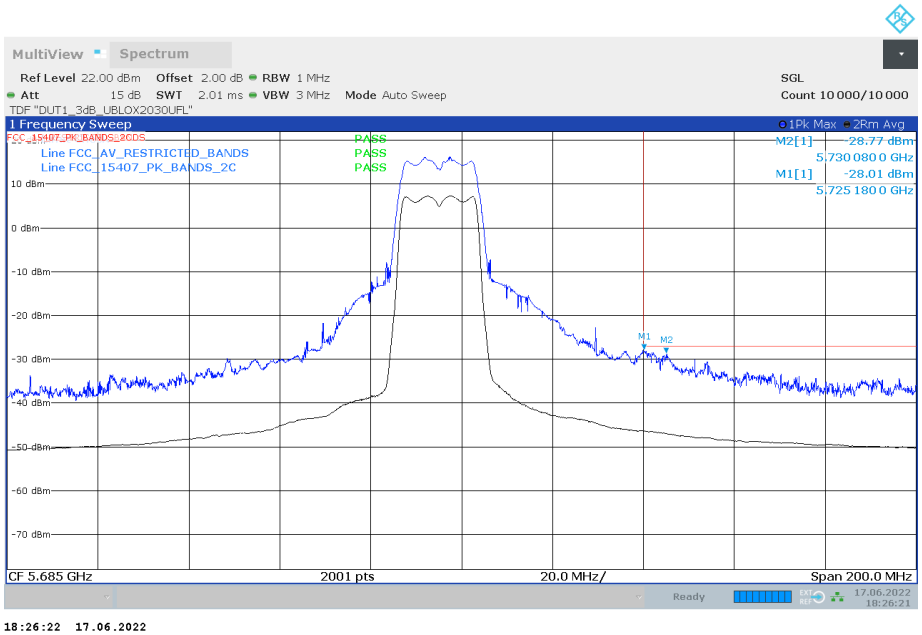
TX on 5200 MHz

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-2C (S01_161_AA01)



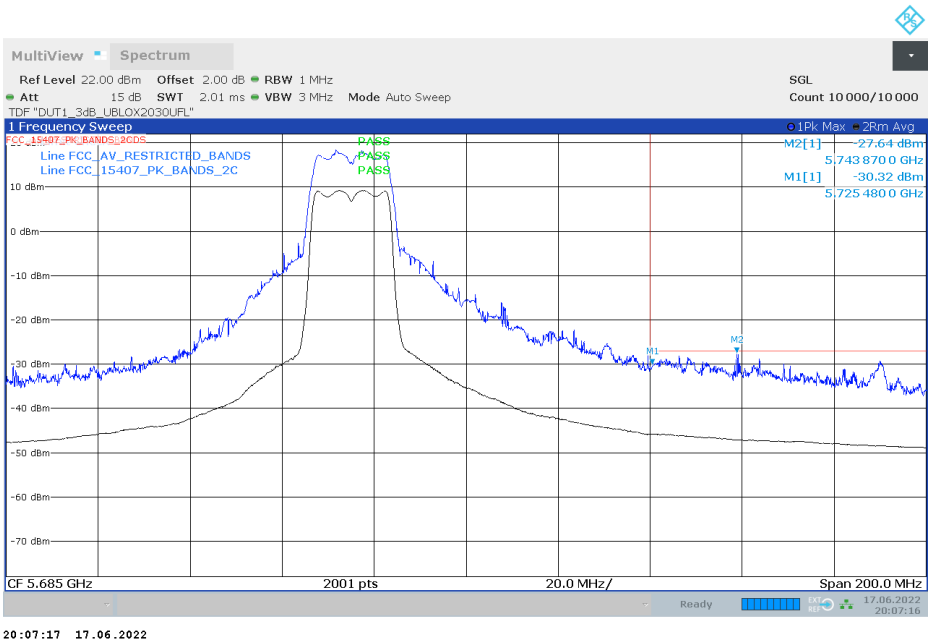

15:37:59 16.03.2022

TX on 5700 MHz




18:26:22 17.06.2022

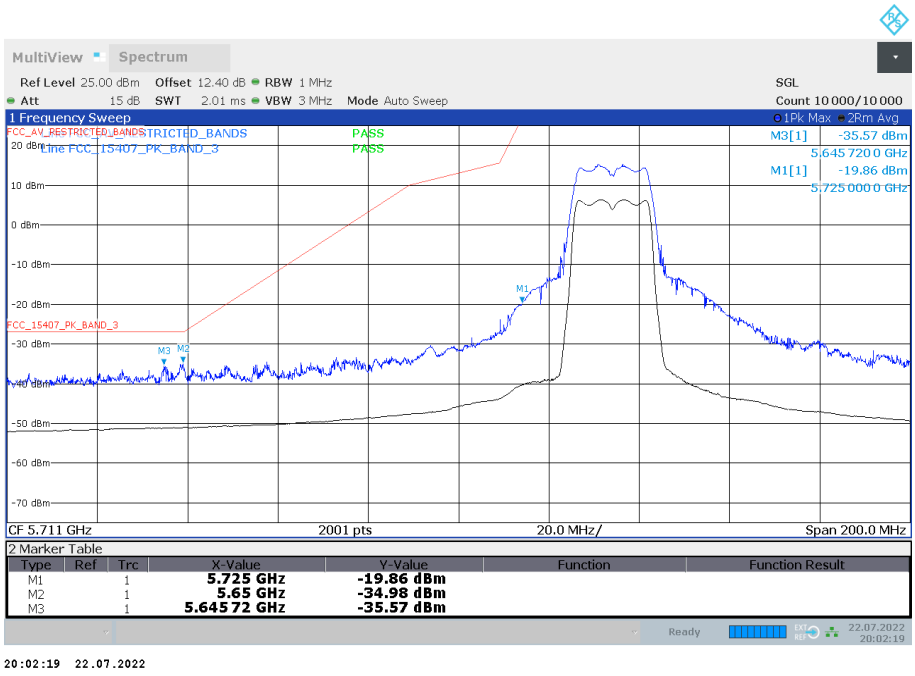
TX on 5680 MHz




20:07:17 17.06.2022

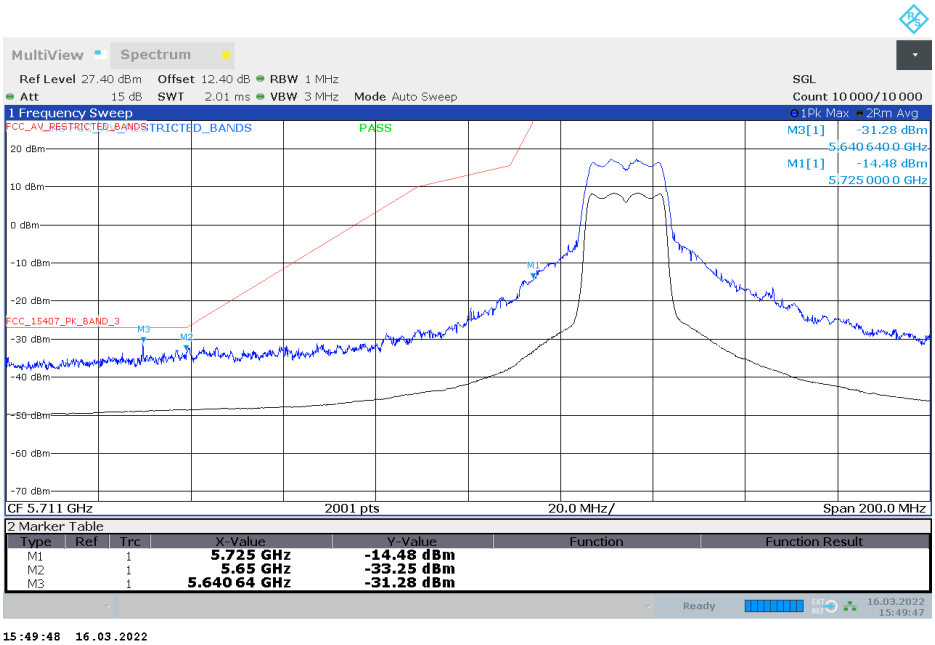
TX on 5660 MHz

Radio Technology = WLAN a, Operating Frequency = low, Subband = U-NII-3 (S01_161_AA01)




20:02:19 22.07.2022

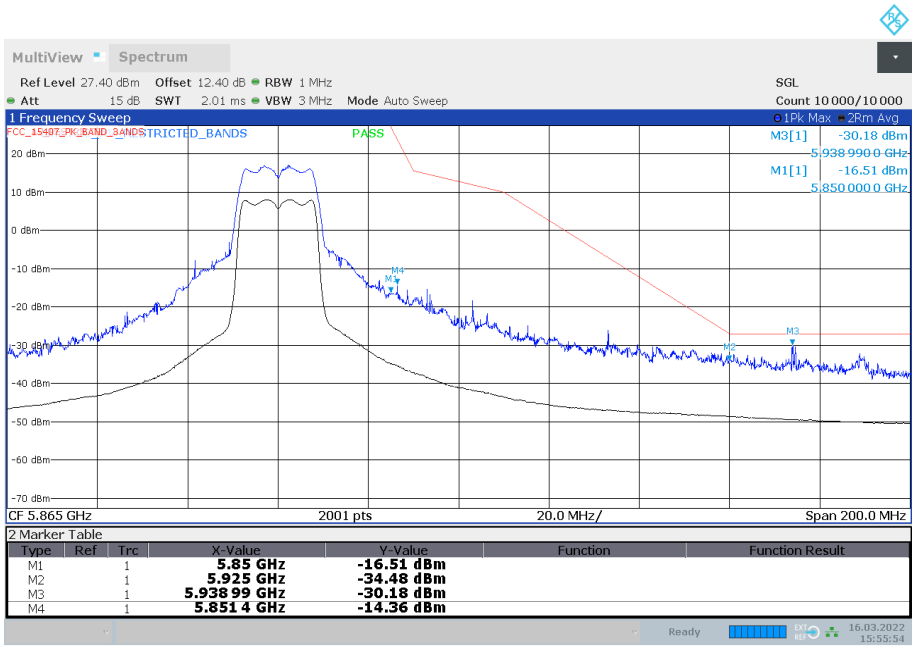
TX on 5745 MHz at 16 dBm power




15:49:48 16.03.2022

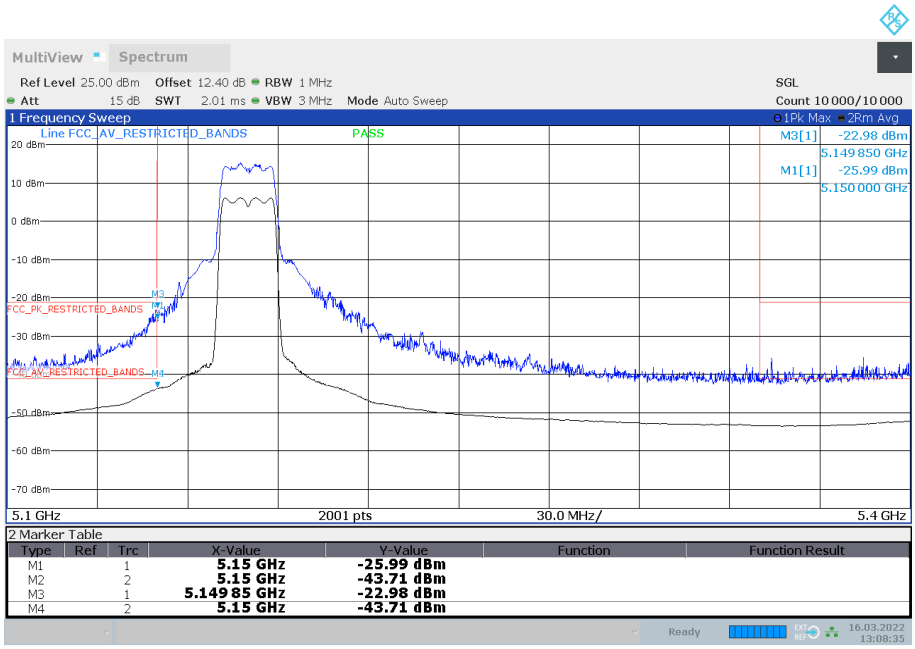
TX on 5745 MHz at 18 dBm power (since the lowest channel passes at 18 dBm, no further channels were tested for lower band edge)

Radio Technology = WLAN a, Operating Frequency = high, Subband = U-NII-3 (S01_161_AA01)



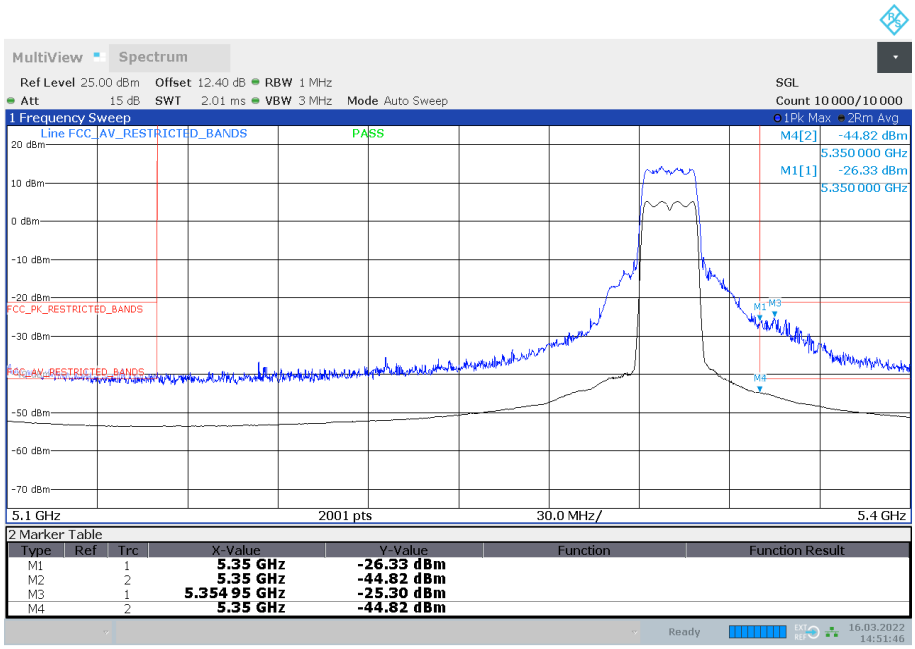

15:55:55 16.03.2022

Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-1 (S01_161_AA01)



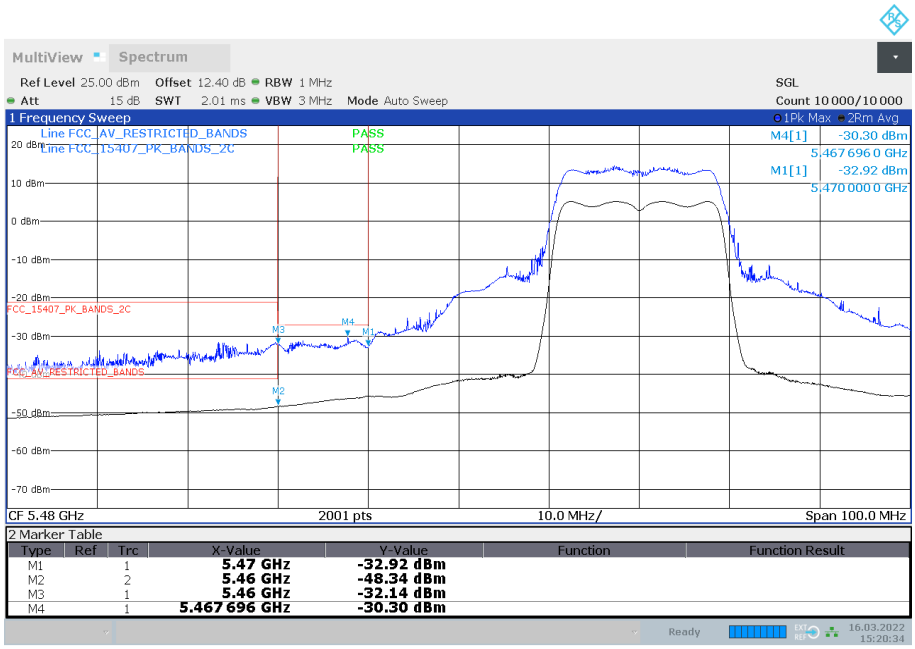

13:08:35 16.03.2022

Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-2A (S01_161_AA01)



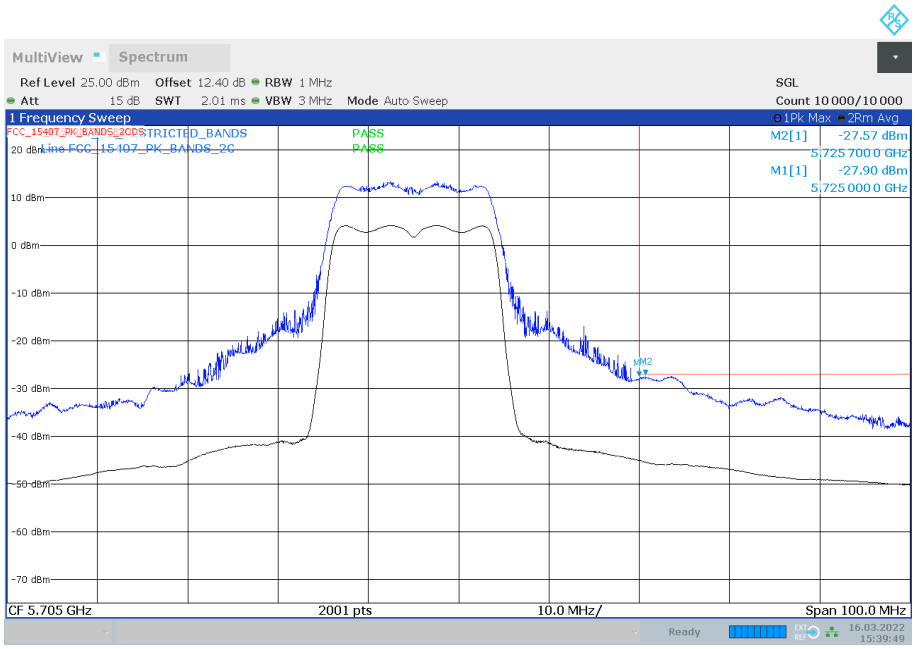

14:51:46 16.03.2022

Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-2C (S01_161_AA01)



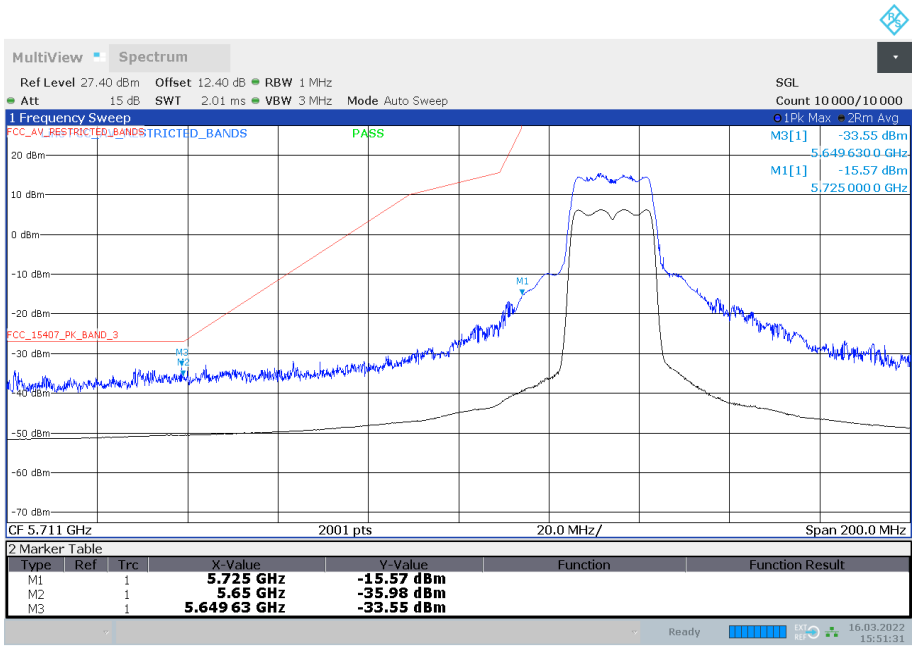

15:20:35 16.03.2022

Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-2C (S01_161_AA01)



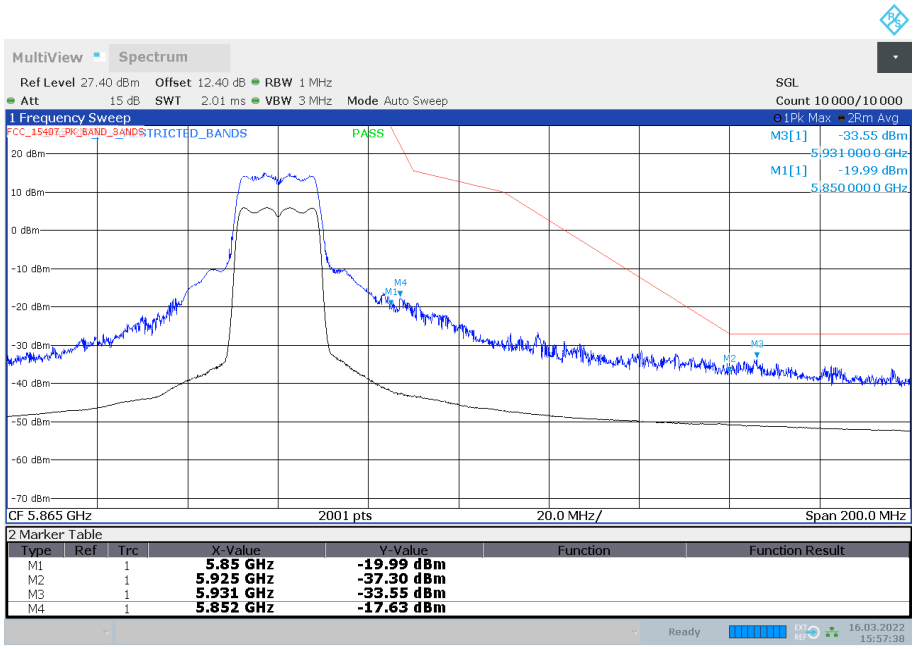

15:39:50 16.03.2022

Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Subband = U-NII-3 (S01_161_AA01)



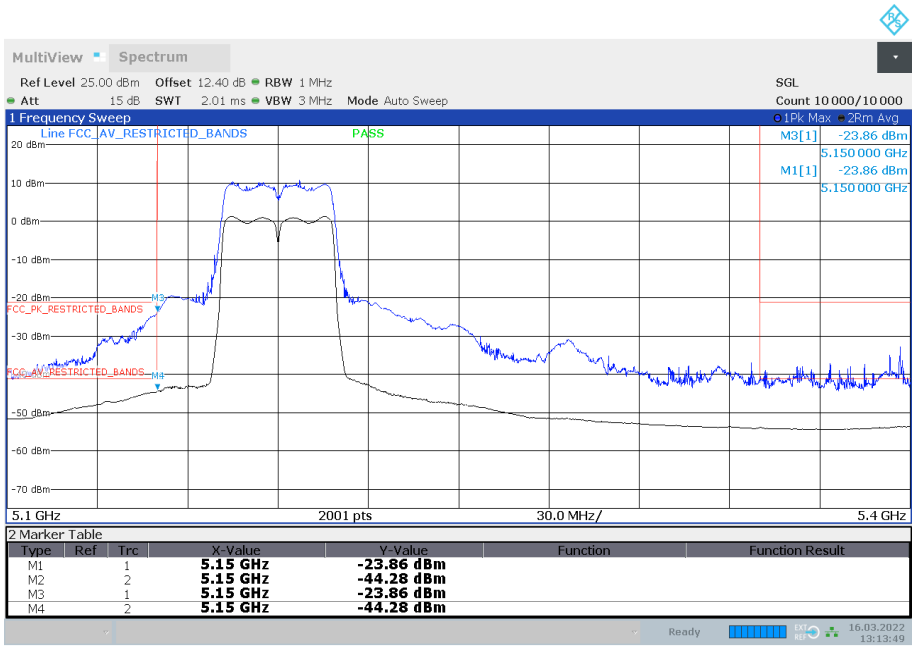

15:51:31 16.03.2022

Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Subband = U-NII-3 (S01_161_AA01)



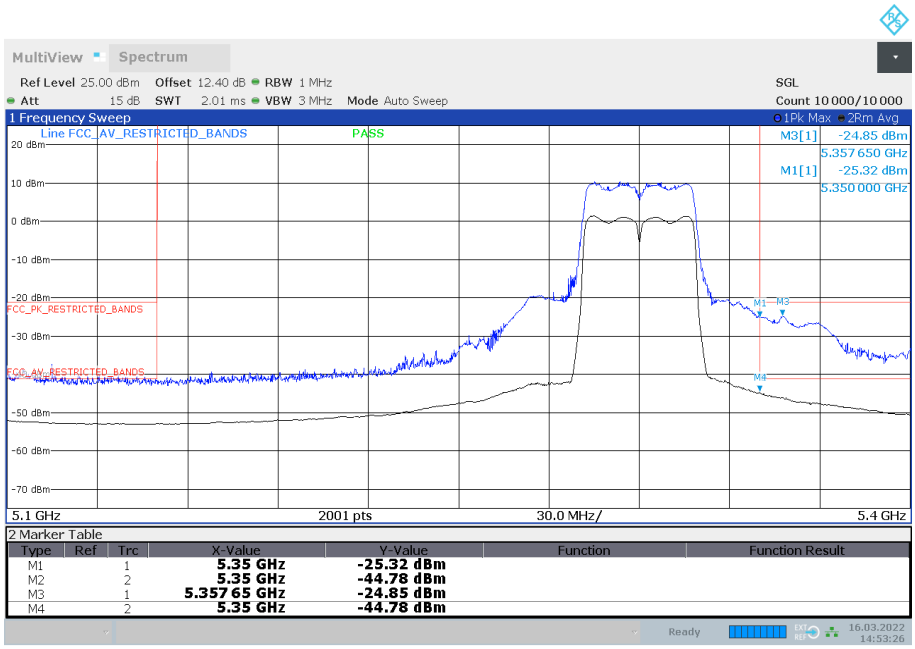

15:57:38 16.03.2022

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-1 (S01_161_AA01)



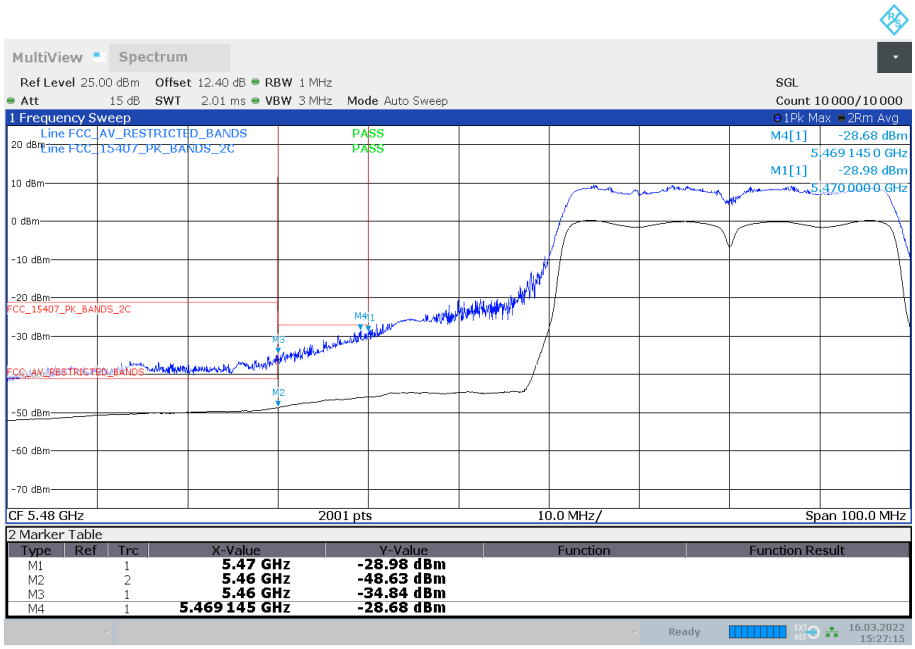

13:13:49 16.03.2022

Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-2A (S01_161_AA01)



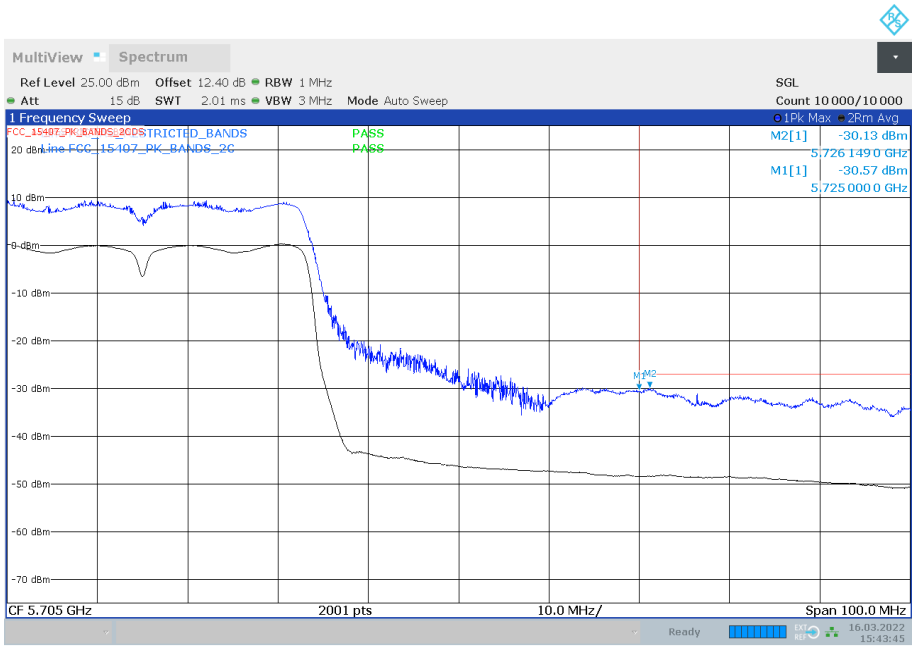

14:53:27 16.03.2022

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-2C (S01_161_AA01)



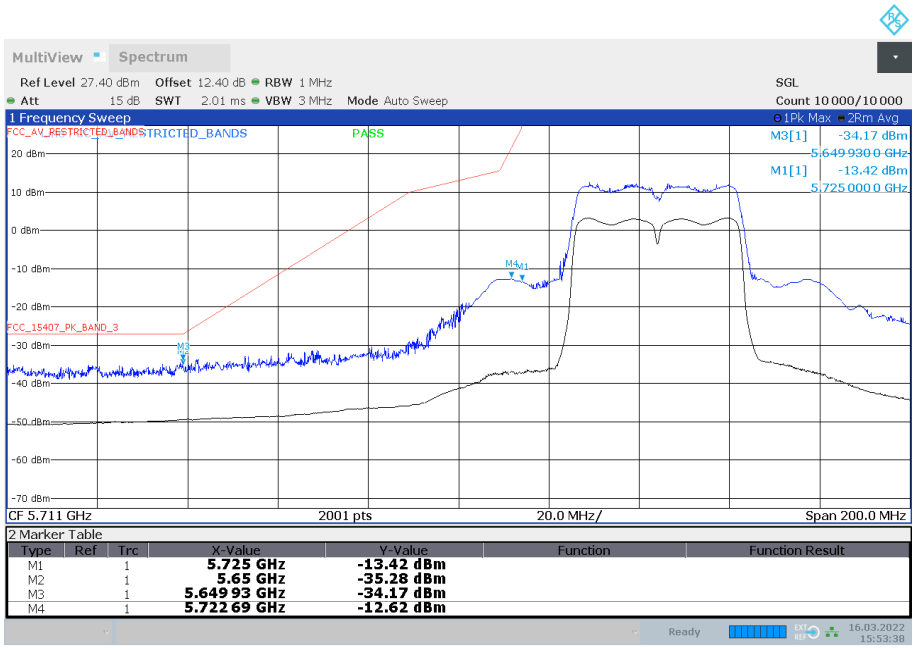

15:27:15 16.03.2022

Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Subband = U-NII-2C (S01_161_AA01)




15:43:45 16.03.2022

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Subband = U-NII-3 (S01_161_AA01)




15:53:38 16.03.2022

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

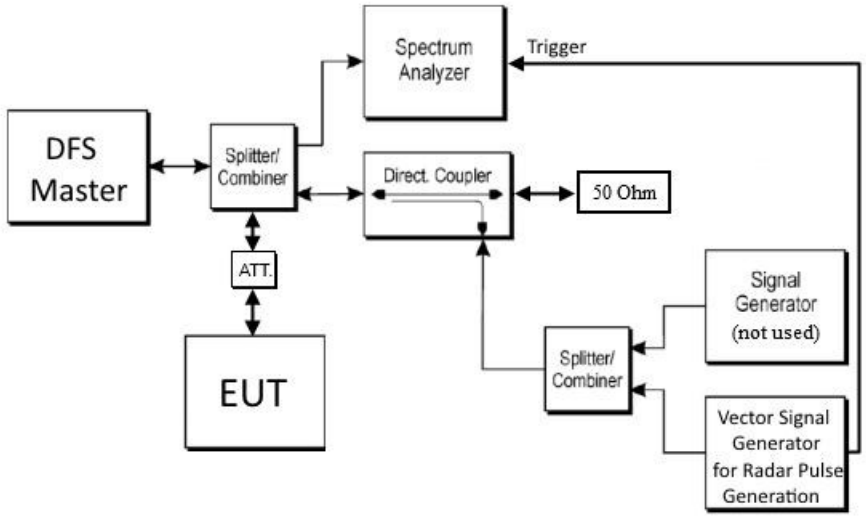
## 5.9 DYNAMIC FREQUENCY SELECTION

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 send 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
- Sweeptime: 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 |
|---|---|
| *Non-occupancy period* | Minimum 30 minutes |
| *Channel Availability Check Time* | 60 seconds |
| *Channel Move Time* | 10 seconds<br>See Note 1. |
| *Channel Closing Transmission Time* | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.<br>See Notes 1 and 2. |
| **Note 1:** *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.<br>**Note 2:** The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* 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. | |

## 5.9.3 TEST PROTOCOL

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

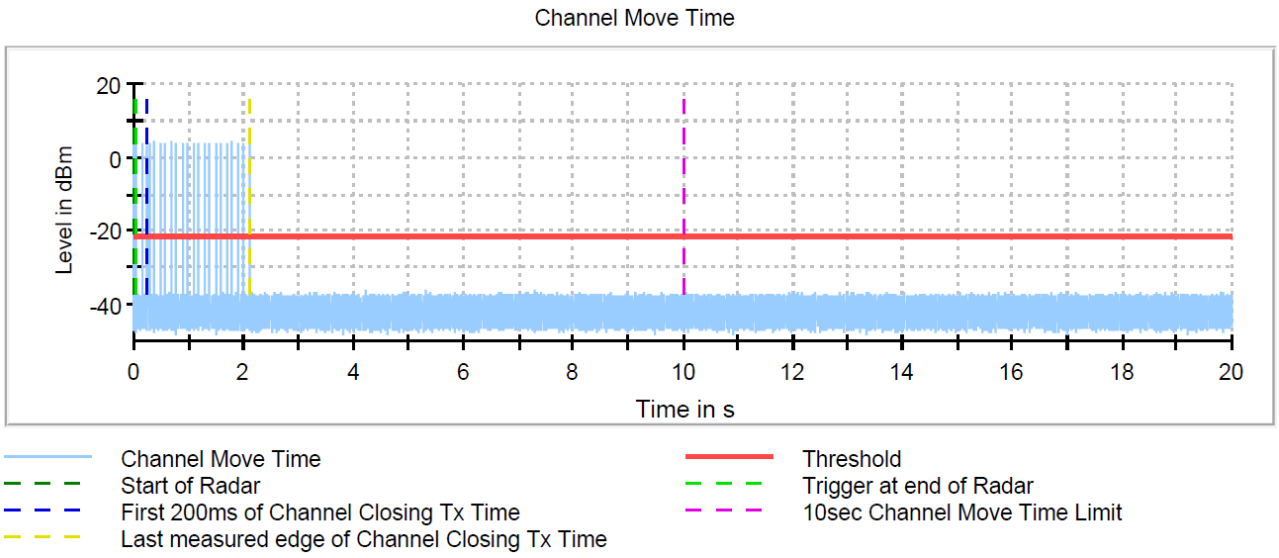
WLAN ac-Mode; 80 MHz

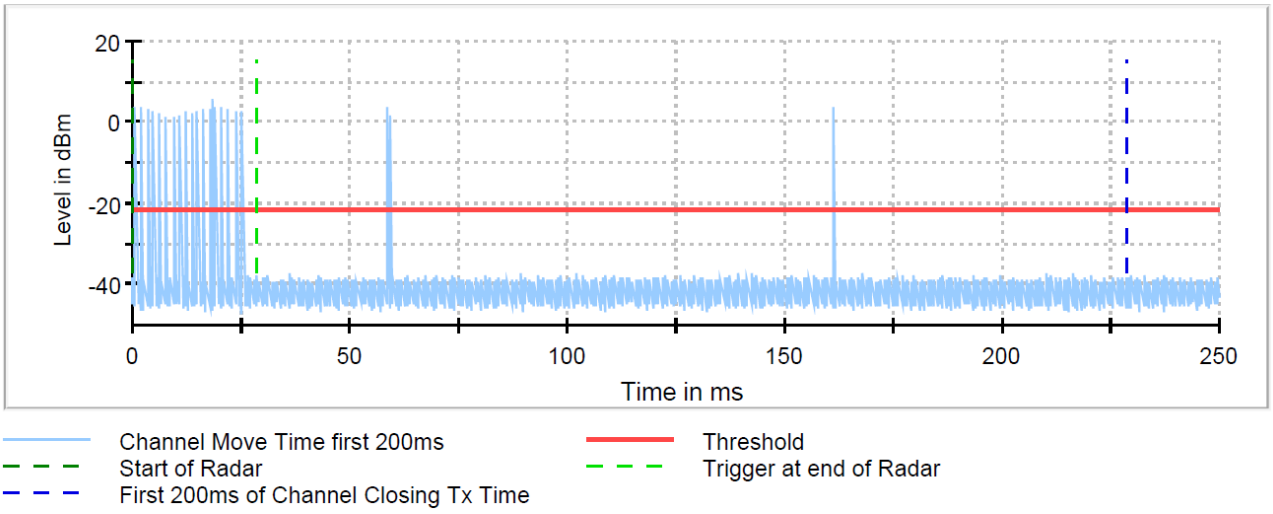
| Ch. No. | Ch. Center Freq. [MHz] | Aggregate Transmission Time from 200 ms to 10 s after end of radar pulse [ms] | Limit [ms] | Margin [ms] | Channel move time within 10 s | Transmissions within Non-occupancy period |
|---|---|---|---|---|---|---|
| 106 | 5530 | 6.7 | 60.0 | 53.3 | yes | none |

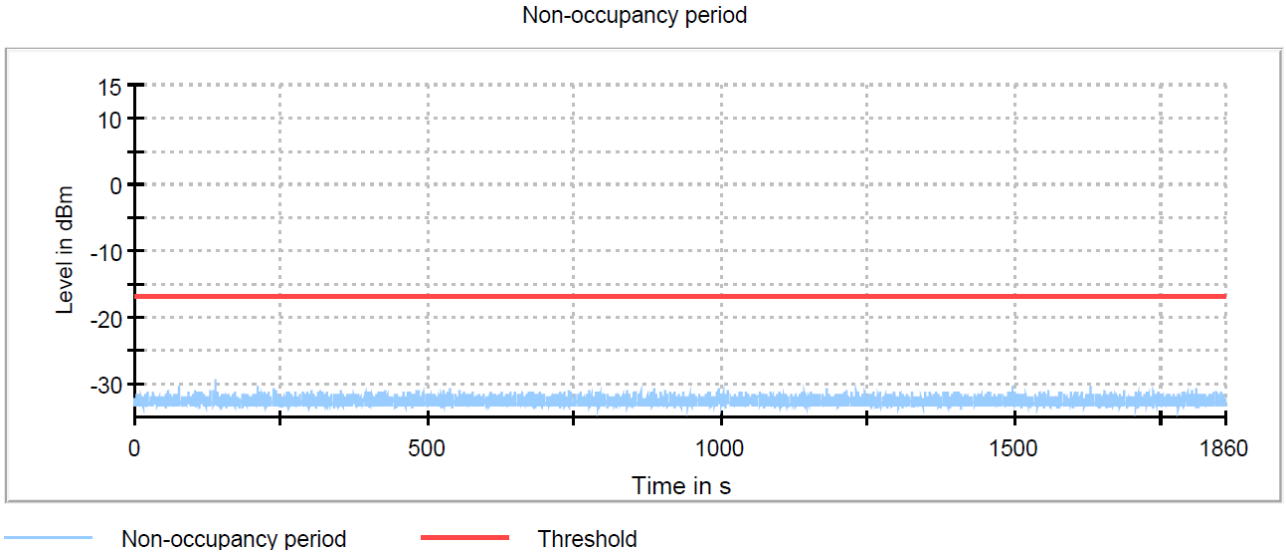
Remark: Used Master device: Linksys WRT3200ACM, S/N: 1981160B900782, SW: 1.0.8.199531,
FCC ID: Q87-WRT3200ACM
Please see next sub-clause for the measurement plot.

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

(S01_161_AD01)






## 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 Elektronic 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 Elektronic 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 | | Corr. | LISN insertion loss ESH3-Z5 | cable loss (incl. 10 dB atten-uator) |
|---|---|---|---|---|
| MHz | | dB | dB | 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**

$U_{LISN}$ (dB µV) = U (dB µV) + 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 | AF HFH-Z2) | Corr. | cable loss 1 (inside chamber) | cable loss 2 (outside chamber) | cable loss 3 (switch unit) | cable loss 4 (to receiver) | distance corr. (-40 dB/ decade) | $d_{Limit}$ (meas. distance (limit) | $d_{used}$ (meas. distance (used) |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dB (1/m) | dB | dB | dB | dB | dB | dB | m | 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 (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (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 * LOG ($d_{Limit}$/ $d_{used}$)
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 m)**

| Frequency | AF R&S HL562 | Corr. | 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) |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dB (1/m) | dB | dB | dB | dB | dB | dB | m | m |
| 30 | 18.6 | 0.6 | 0.29 | 0.04 | 0.23 | 0.02 | 0.0 | 3 | 3 |
| 50 | 6.0 | 0.9 | 0.39 | 0.09 | 0.32 | 0.08 | 0.0 | 3 | 3 |
| 100 | 9.7 | 1.2 | 0.56 | 0.14 | 0.47 | 0.08 | 0.0 | 3 | 3 |
| 150 | 7.9 | 1.6 | 0.73 | 0.20 | 0.59 | 0.12 | 0.0 | 3 | 3 |
| 200 | 7.6 | 1.9 | 0.84 | 0.21 | 0.70 | 0.11 | 0.0 | 3 | 3 |
| 250 | 9.5 | 2.1 | 0.98 | 0.24 | 0.80 | 0.13 | 0.0 | 3 | 3 |
| 300 | 11.0 | 2.3 | 1.04 | 0.26 | 0.89 | 0.15 | 0.0 | 3 | 3 |
| 350 | 12.4 | 2.6 | 1.18 | 0.31 | 0.96 | 0.13 | 0.0 | 3 | 3 |
| 400 | 13.6 | 2.9 | 1.28 | 0.35 | 1.03 | 0.19 | 0.0 | 3 | 3 |
| 450 | 14.7 | 3.1 | 1.39 | 0.38 | 1.11 | 0.22 | 0.0 | 3 | 3 |
| 500 | 15.6 | 3.2 | 1.44 | 0.39 | 1.20 | 0.19 | 0.0 | 3 | 3 |
| 550 | 16.3 | 3.5 | 1.55 | 0.46 | 1.24 | 0.23 | 0.0 | 3 | 3 |
| 600 | 17.2 | 3.5 | 1.59 | 0.43 | 1.29 | 0.23 | 0.0 | 3 | 3 |
| 650 | 18.1 | 3.6 | 1.67 | 0.34 | 1.35 | 0.22 | 0.0 | 3 | 3 |
| 700 | 18.5 | 3.6 | 1.67 | 0.42 | 1.41 | 0.15 | 0.0 | 3 | 3 |
| 750 | 19.1 | 4.1 | 1.87 | 0.54 | 1.46 | 0.25 | 0.0 | 3 | 3 |
| 800 | 19.6 | 4.1 | 1.90 | 0.46 | 1.51 | 0.25 | 0.0 | 3 | 3 |
| 850 | 20.1 | 4.4 | 1.99 | 0.60 | 1.56 | 0.27 | 0.0 | 3 | 3 |
| 900 | 20.8 | 4.7 | 2.14 | 0.60 | 1.63 | 0.29 | 0.0 | 3 | 3 |
| 950 | 21.1 | 4.8 | 2.22 | 0.60 | 1.66 | 0.33 | 0.0 | 3 | 3 |
| 1000 | 21.6 | 4.9 | 2.23 | 0.61 | 1.71 | 0.30 | 0.0 | 3 | 3 |

**($d_{Limit}$ = 10 m)**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 30 | 18.6 | -9.9 | 0.29 | 0.04 | 0.23 | 0.02 | -10.5 | 10 | 3 |
| 50 | 6.0 | -9.6 | 0.39 | 0.09 | 0.32 | 0.08 | -10.5 | 10 | 3 |
| 100 | 9.7 | -9.2 | 0.56 | 0.14 | 0.47 | 0.08 | -10.5 | 10 | 3 |
| 150 | 7.9 | -8.8 | 0.73 | 0.20 | 0.59 | 0.12 | -10.5 | 10 | 3 |
| 200 | 7.6 | -8.6 | 0.84 | 0.21 | 0.70 | 0.11 | -10.5 | 10 | 3 |
| 250 | 9.5 | -8.3 | 0.98 | 0.24 | 0.80 | 0.13 | -10.5 | 10 | 3 |
| 300 | 11.0 | -8.1 | 1.04 | 0.26 | 0.89 | 0.15 | -10.5 | 10 | 3 |
| 350 | 12.4 | -7.9 | 1.18 | 0.31 | 0.96 | 0.13 | -10.5 | 10 | 3 |
| 400 | 13.6 | -7.6 | 1.28 | 0.35 | 1.03 | 0.19 | -10.5 | 10 | 3 |
| 450 | 14.7 | -7.4 | 1.39 | 0.38 | 1.11 | 0.22 | -10.5 | 10 | 3 |
| 500 | 15.6 | -7.2 | 1.44 | 0.39 | 1.20 | 0.19 | -10.5 | 10 | 3 |
| 550 | 16.3 | -7.0 | 1.55 | 0.46 | 1.24 | 0.23 | -10.5 | 10 | 3 |
| 600 | 17.2 | -6.9 | 1.59 | 0.43 | 1.29 | 0.23 | -10.5 | 10 | 3 |
| 650 | 18.1 | -6.9 | 1.67 | 0.34 | 1.35 | 0.22 | -10.5 | 10 | 3 |
| 700 | 18.5 | -6.8 | 1.67 | 0.42 | 1.41 | 0.15 | -10.5 | 10 | 3 |
| 750 | 19.1 | -6.3 | 1.87 | 0.54 | 1.46 | 0.25 | -10.5 | 10 | 3 |
| 800 | 19.6 | -6.3 | 1.90 | 0.46 | 1.51 | 0.25 | -10.5 | 10 | 3 |
| 850 | 20.1 | -6.0 | 1.99 | 0.60 | 1.56 | 0.27 | -10.5 | 10 | 3 |
| 900 | 20.8 | -5.8 | 2.14 | 0.60 | 1.63 | 0.29 | -10.5 | 10 | 3 |
| 950 | 21.1 | -5.6 | 2.22 | 0.60 | 1.66 | 0.33 | -10.5 | 10 | 3 |
| 1000 | 21.6 | -5.6 | 2.23 | 0.61 | 1.71 | 0.30 | -10.5 | 10 | 3 |

**Sample calculation**

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (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 = -20 * LOG ($d_{Limit}$/ $d_{used}$)
Linear interpolation will be used for frequencies in between the values in the table.
Tables show an extract of values.

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

| Frequency | AF R&S HF907 | Corr. | cable loss 1 (relay + cable inside chamber) | cable loss 2 (outside chamber) | cable loss 3 (switch unit, atten-uator & pre-amp) | cable loss 4 (to receiver) | | |
|---|---|---|---|---|---|---|---|---|
| MHz | dB (1/m) | dB | dB | dB | dB | dB | | |
| 1000 | 24.4 | -19.4 | 0.99 | 0.31 | -21.51 | 0.79 | | |
| 2000 | 28.5 | -17.4 | 1.44 | 0.44 | -20.63 | 1.38 | | |
| 3000 | 31.0 | -16.1 | 1.87 | 0.53 | -19.85 | 1.33 | | |
| 4000 | 33.1 | -14.7 | 2.41 | 0.67 | -19.13 | 1.31 | | |
| 5000 | 34.4 | -13.7 | 2.78 | 0.86 | -18.71 | 1.40 | | |
| 6000 | 34.7 | -12.7 | 2.74 | 0.90 | -17.83 | 1.47 | | |
| 7000 | 35.6 | -11.0 | 2.82 | 0.86 | -16.19 | 1.46 | | |

| Frequency | AF R&S HF907 | Corr. | cable loss 1 (relay inside chamber) | cable loss 2 (inside chamber) | cable loss 3 (outside chamber) | cable loss 4 (switch unit, atten-uator & pre-amp) | cable loss 5 (to receiver) | used for FCC 15.247 |
|---|---|---|---|---|---|---|---|---|
| MHz | dB (1/m) | dB | dB | dB | dB | dB | dB | |
| 3000 | 31.0 | -23.4 | 0.47 | 1.87 | 0.53 | -27.58 | 1.33 | |
| 4000 | 33.1 | -23.3 | 0.56 | 2.41 | 0.67 | -28.23 | 1.31 | |
| 5000 | 34.4 | -21.7 | 0.61 | 2.78 | 0.86 | -27.35 | 1.40 | |
| 6000 | 34.7 | -21.2 | 0.58 | 2.74 | 0.90 | -26.89 | 1.47 | |
| 7000 | 35.6 | -19.8 | 0.66 | 2.82 | 0.86 | -25.58 | 1.46 | |

| Frequency | AF R&S HF907 | Corr. | 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) |
|---|---|---|---|---|---|---|---|---|
| MHz | dB (1/m) | dB | dB | dB | dB | dB | dB | dB |
| 7000 | 35.6 | -57.3 | 0.56 | 1.28 | -62.72 | 2.66 | 0.94 | 1.46 |
| 8000 | 36.3 | -56.3 | 0.69 | 0.71 | -61.49 | 2.84 | 1.00 | 1.53 |
| 9000 | 37.1 | -55.3 | 0.68 | 0.65 | -60.80 | 3.06 | 1.09 | 1.60 |
| 10000 | 37.5 | -56.2 | 0.70 | 0.54 | -61.91 | 3.28 | 1.20 | 1.67 |
| 11000 | 37.5 | -55.3 | 0.80 | 0.61 | -61.40 | 3.43 | 1.27 | 1.70 |
| 12000 | 37.6 | -53.7 | 0.84 | 0.42 | -59.70 | 3.53 | 1.26 | 1.73 |
| 13000 | 38.2 | -53.5 | 0.83 | 0.44 | -59.81 | 3.75 | 1.32 | 1.83 |
| 14000 | 39.9 | -56.3 | 0.91 | 0.53 | -63.03 | 3.91 | 1.40 | 1.77 |
| 15000 | 40.9 | -54.1 | 0.98 | 0.54 | -61.05 | 4.02 | 1.44 | 1.83 |
| 16000 | 41.3 | -54.1 | 1.23 | 0.49 | -61.51 | 4.17 | 1.51 | 1.85 |
| 17000 | 42.8 | -54.4 | 1.36 | 0.76 | -62.36 | 4.34 | 1.53 | 2.00 |
| 18000 | 44.2 | -54.7 | 1.70 | 0.53 | -62.88 | 4.41 | 1.55 | 1.91 |

**Sample calculation**

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + 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 | AF EMCO 3160-09 | Corr. | cable loss 1 (inside chamber) | cable loss 2 (pre-amp) | cable loss 3 (inside chamber) | cable loss 4 (switch unit) | cable loss 5 (to receiver) |
|---|---|---|---|---|---|---|---|
| MHz | dB (1/m) | dB | dB | dB | dB | dB | dB |
| 18000 | 40.2 | -23.5 | 0.72 | -35.85 | 6.20 | 2.81 | 2.65 |
| 18500 | 40.2 | -23.2 | 0.69 | -35.71 | 6.46 | 2.76 | 2.59 |
| 19000 | 40.2 | -22.0 | 0.76 | -35.44 | 6.69 | 3.15 | 2.79 |
| 19500 | 40.3 | -21.3 | 0.74 | -35.07 | 7.04 | 3.11 | 2.91 |
| 20000 | 40.3 | -20.3 | 0.72 | -34.49 | 7.30 | 3.07 | 3.05 |
| 20500 | 40.3 | -19.9 | 0.78 | -34.46 | 7.48 | 3.12 | 3.15 |
| 21000 | 40.3 | -19.1 | 0.87 | -34.07 | 7.61 | 3.20 | 3.33 |
| 21500 | 40.3 | -19.1 | 0.90 | -33.96 | 7.47 | 3.28 | 3.19 |
| 22000 | 40.3 | -18.7 | 0.89 | -33.57 | 7.34 | 3.35 | 3.28 |
| 22500 | 40.4 | -19.0 | 0.87 | -33.66 | 7.06 | 3.75 | 2.94 |
| 23000 | 40.4 | -19.5 | 0.88 | -33.75 | 6.92 | 3.77 | 2.70 |
| 23500 | 40.4 | -19.3 | 0.90 | -33.35 | 6.99 | 3.52 | 2.66 |
| 24000 | 40.4 | -19.8 | 0.88 | -33.99 | 6.88 | 3.88 | 2.58 |
| 24500 | 40.4 | -19.5 | 0.91 | -33.89 | 7.01 | 3.93 | 2.51 |
| 25000 | 40.4 | -19.3 | 0.88 | -33.00 | 6.72 | 3.96 | 2.14 |
| 25500 | 40.5 | -20.4 | 0.89 | -34.07 | 6.90 | 3.66 | 2.22 |
| 26000 | 40.5 | -21.3 | 0.86 | -35.11 | 7.02 | 3.69 | 2.28 |
| 26500 | 40.5 | -21.1 | 0.90 | -35.20 | 7.15 | 3.91 | 2.36 |

**Sample calculation**

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + 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.
Table shows an extract of values.

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

| Frequency | AF EMCO 3160-10 | Corr. | 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) |
|---|---|---|---|---|---|---|---|---|---|
| GHz | dB (1/m) | dB | dB | dB | dB | dB | dB | m | 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 |

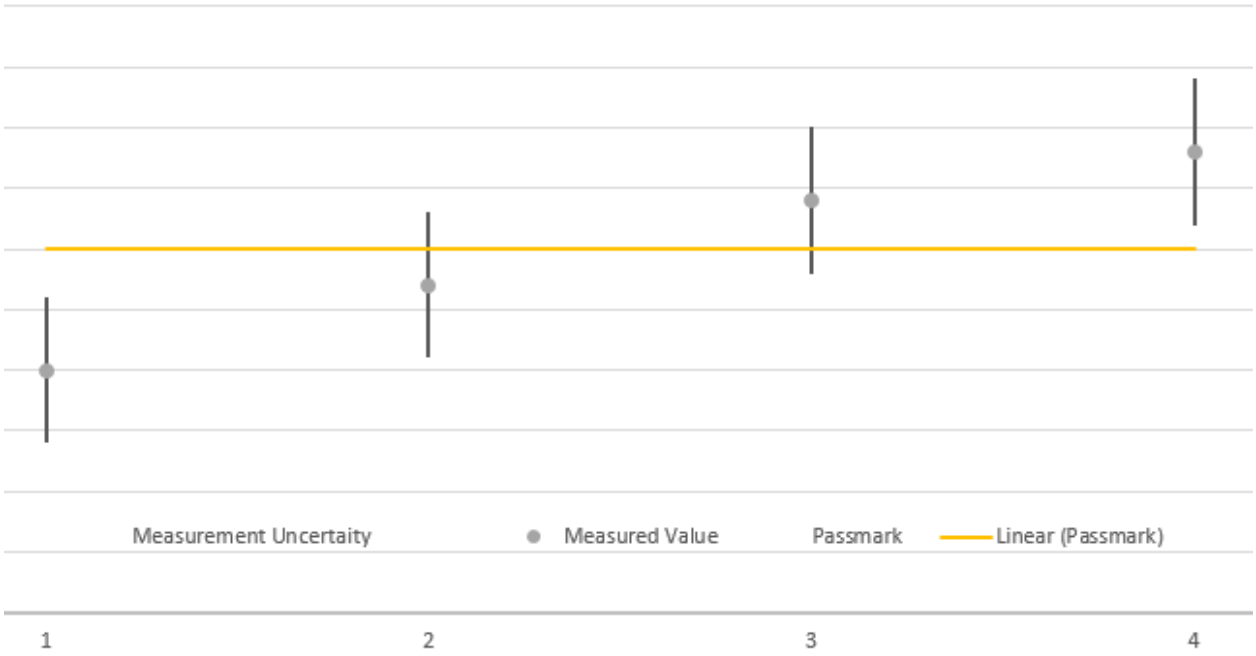
**Sample calculation**

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + 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.
distance correction = -20 * LOG ($d_{Limit}$/ $d_{used}$)
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.