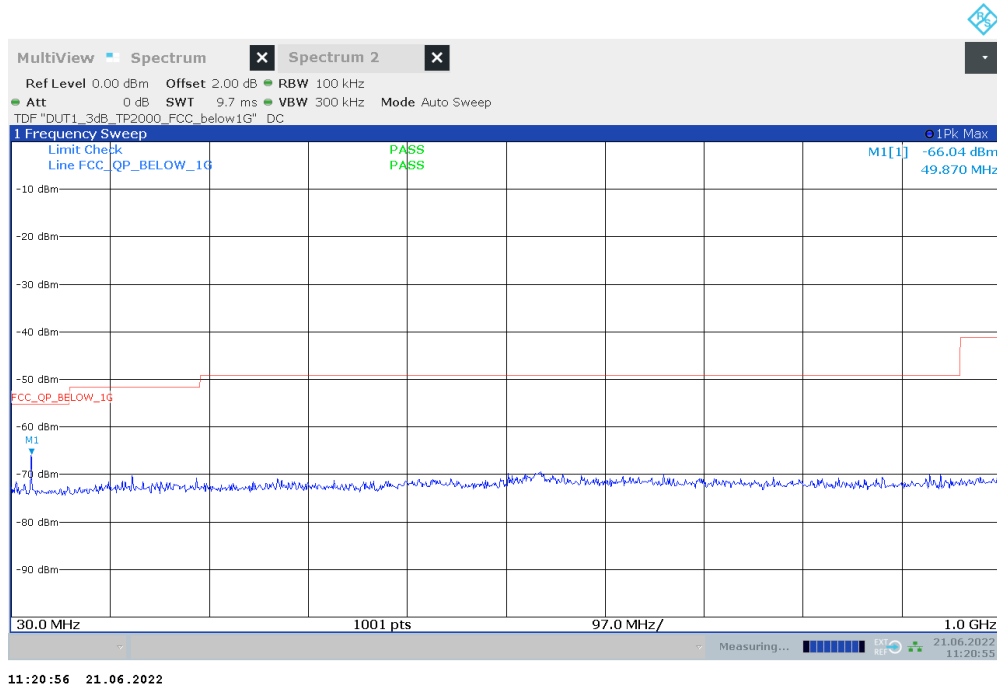
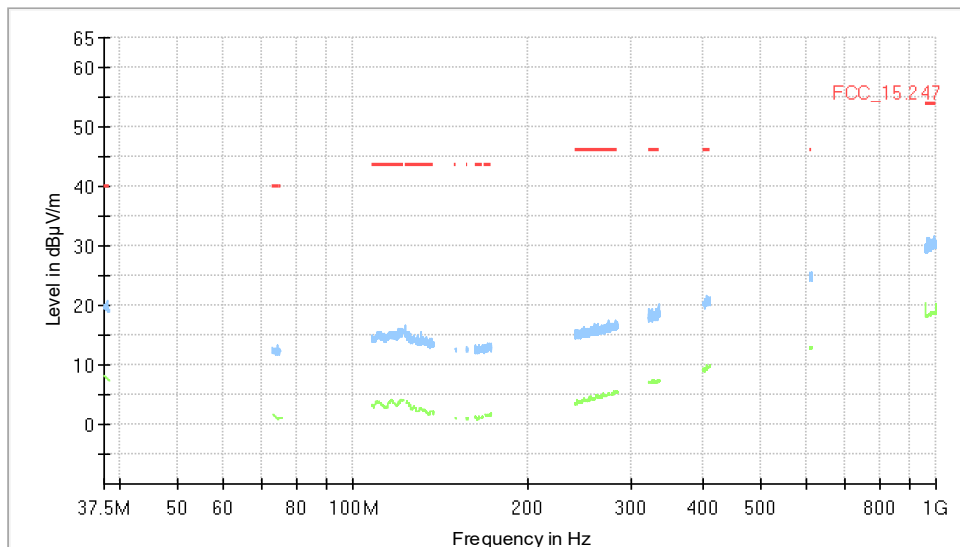


Radio Technology = Bluetooth BDR, Operating Frequency = low, Measurement range = 30 MHz - 1 GHz  
(S01\_161\_AD01)



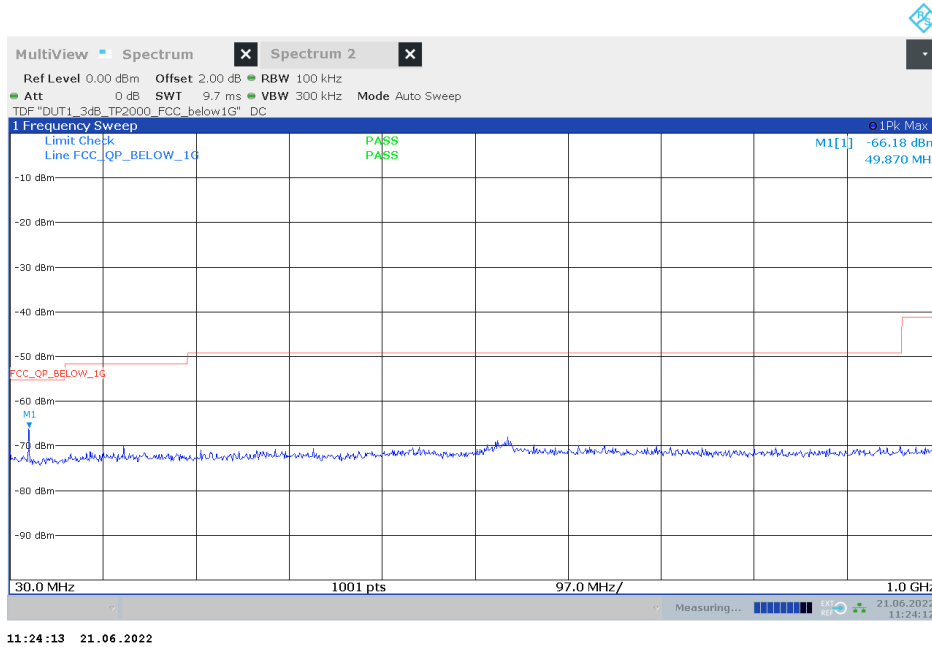
Radio Technology = Bluetooth BDR, Operating Frequency = low, Measurement range = 30 MHz - 1 GHz  
(S02\_161\_AB01)



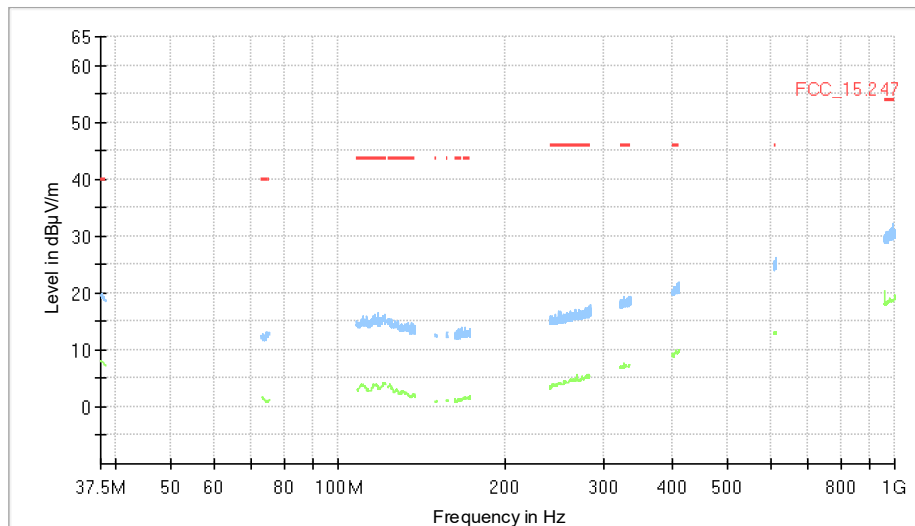
### Final Result

| 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 = Bluetooth BDR, Operating Frequency = mid, Measurement range = 30 MHz - 1 GHz  
(S01\_161\_AD01)



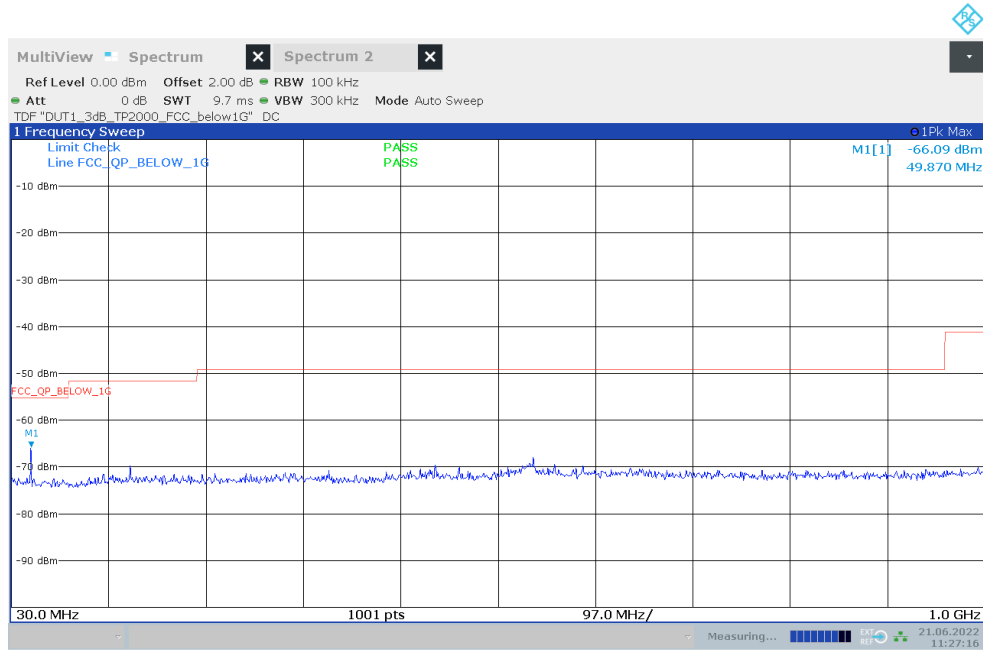
Radio Technology = Bluetooth BDR, Operating Frequency = mid, Measurement range = 30 MHz - 1 GHz  
(S02\_161\_AB01)



### Final Result

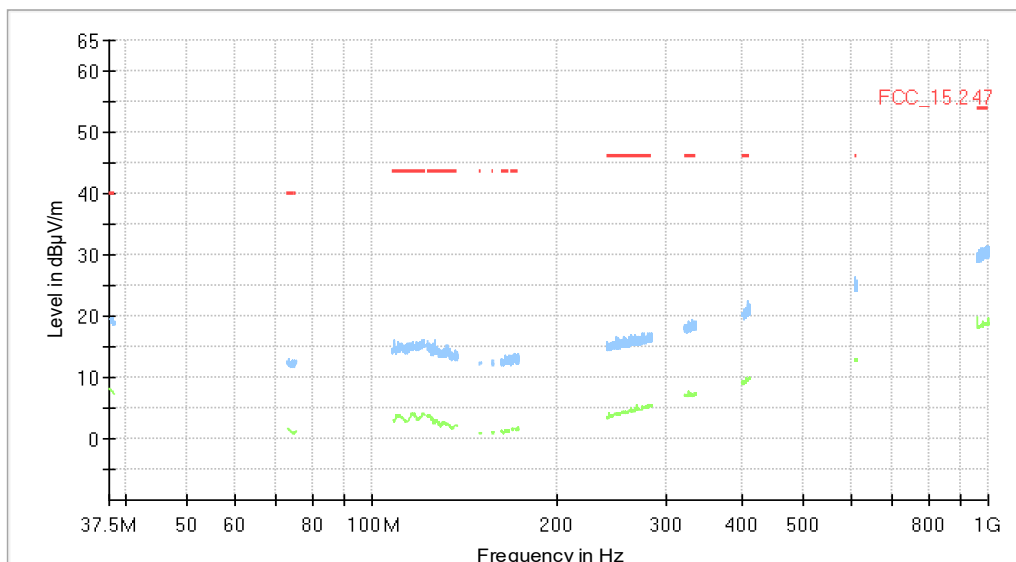
| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|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

Radio Technology = Bluetooth BDR, Operating Frequency = high, Measurement range = 30 MHz - 1 GHz  
(S01\_161\_AD01)



11:27:17 21.06.2022

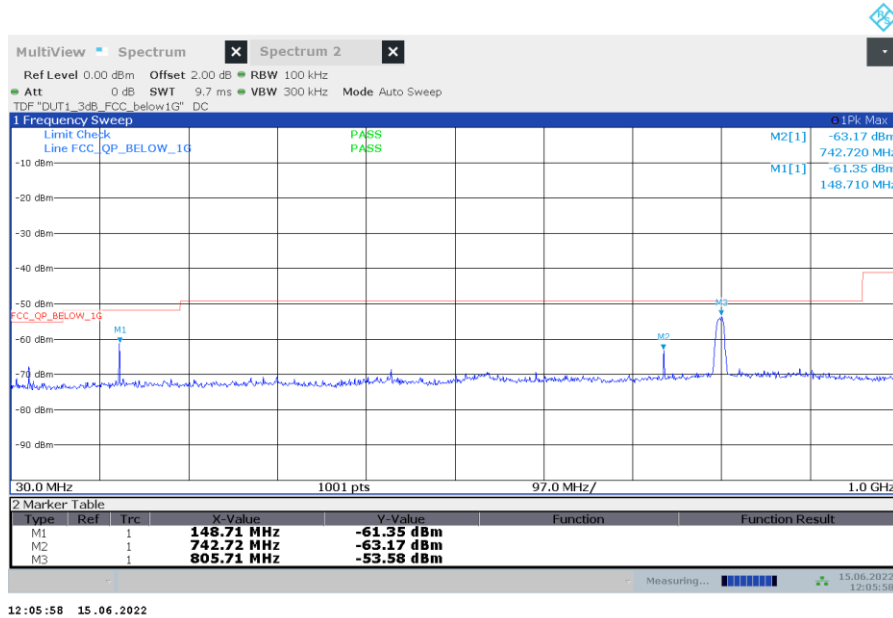
Radio Technology = Bluetooth BDR, Operating Frequency = high, Measurement range = 30 MHz - 1 GHz  
(S02\_161\_AB01)



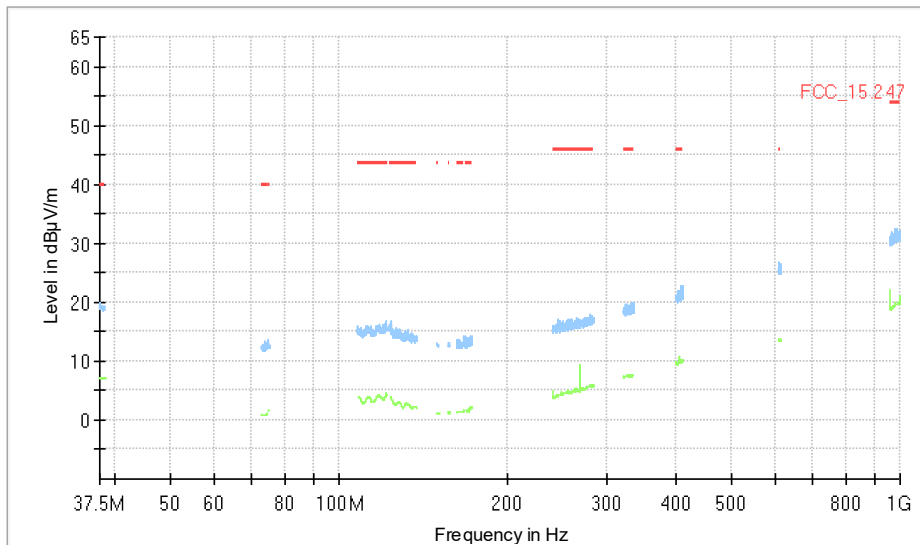
### Final Result

| 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 b, Operating Frequency = low, Measurement range = 30 MHz - 1 GHz  
(S01\_161\_AD01)



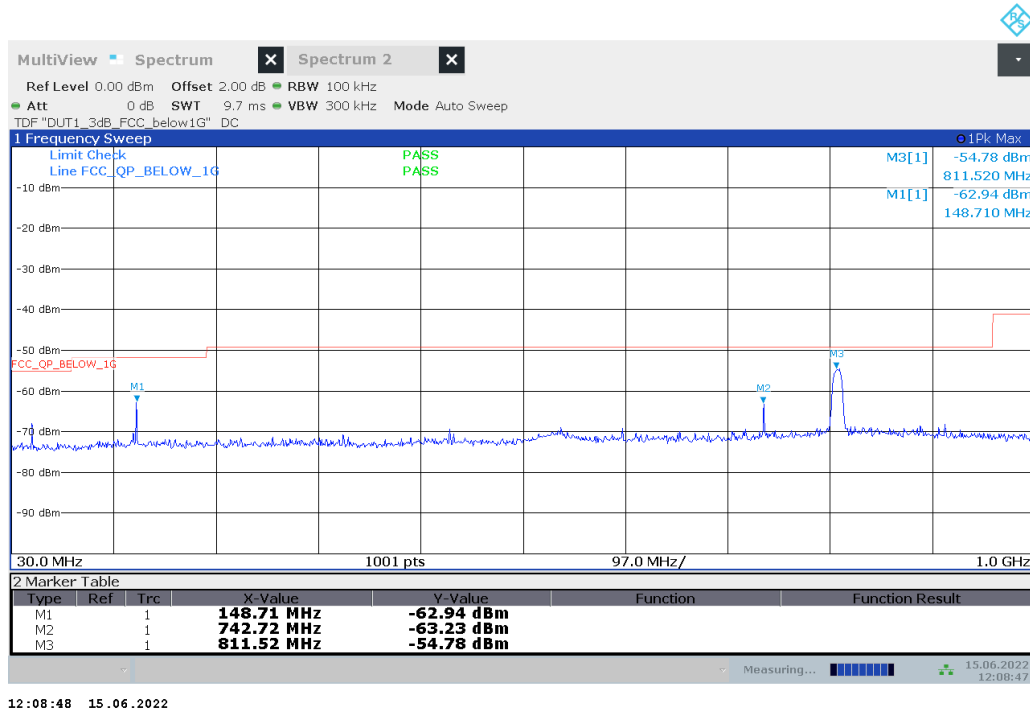
Radio Technology = WLAN b, Operating Frequency = low, Measurement range = 30 MHz - 1 GHz  
(S02\_161\_AB01)



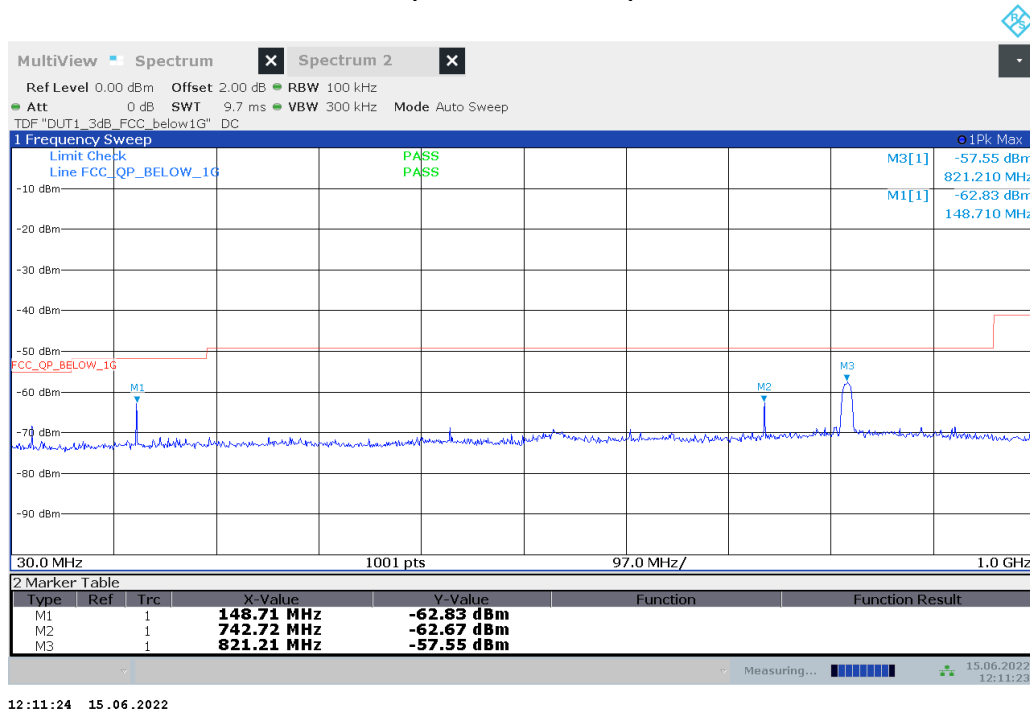
### Final Result

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

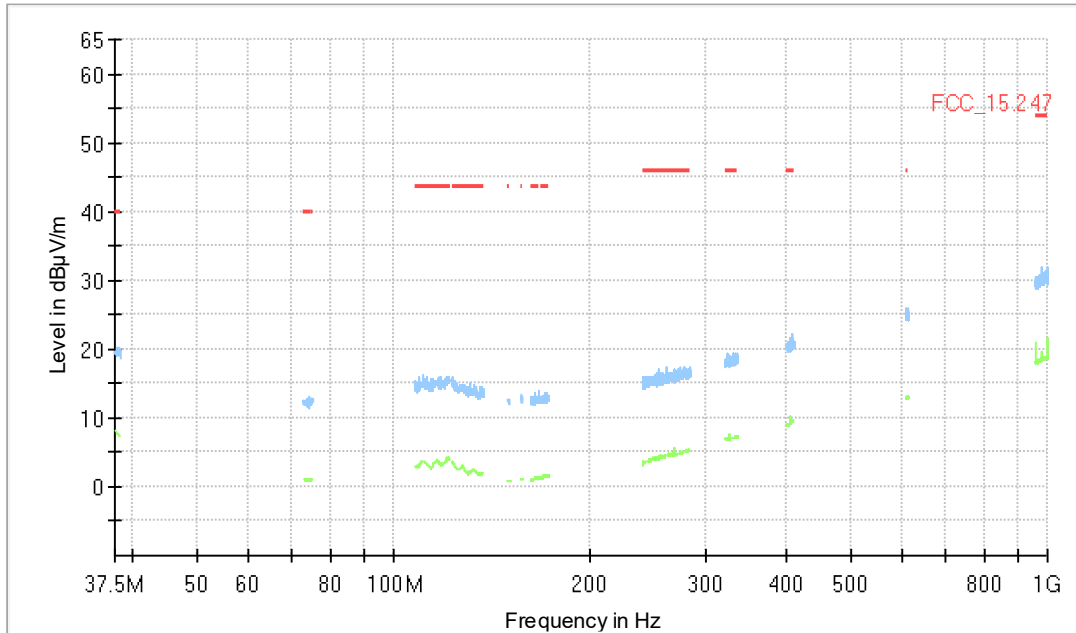
Radio Technology = WLAN b, Operating Frequency = mid, Measurement range = 30 MHz - 1 GHz  
(S02\_161\_AB01)



Radio Technology = WLAN b, Operating Frequency = high, Measurement range = 30 MHz - 1 GHz  
(S02\_161\_AB01)



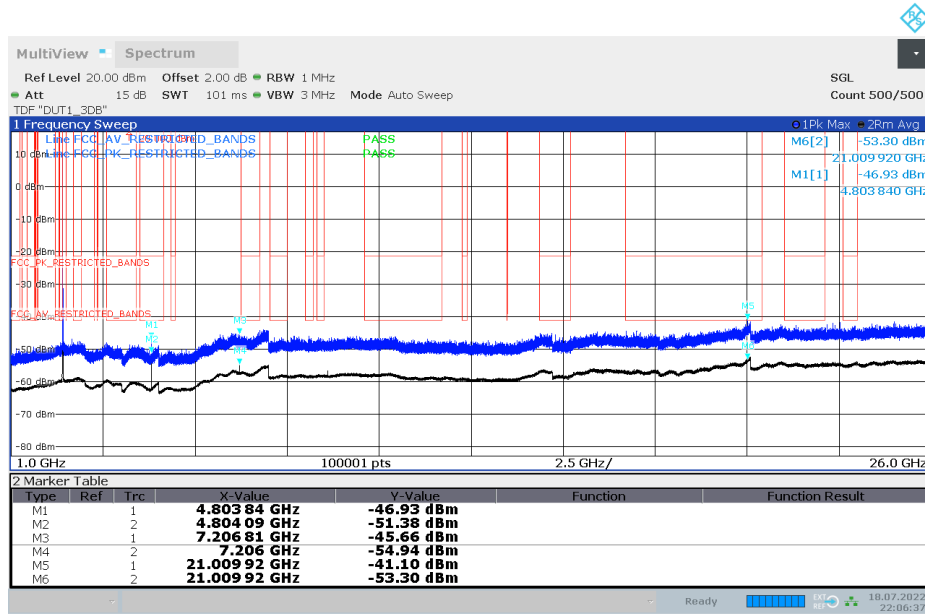
Radio Technology = WLAN b, Operating Frequency = high, Measurement range = 30 MHz - 1 GHz  
(S02\_161\_AB01)



### Final Result

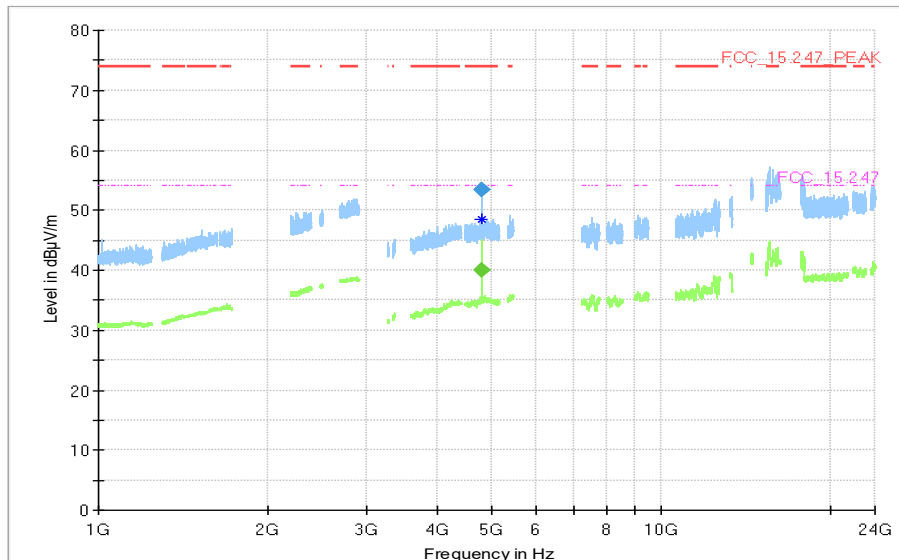
| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|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

Radio Technology = Bluetooth BDR, Operating Frequency = low, Measurement range = 1 GHz - 26 GHz  
(S01\_161\_AD01)



22:06:38 18.07.2022

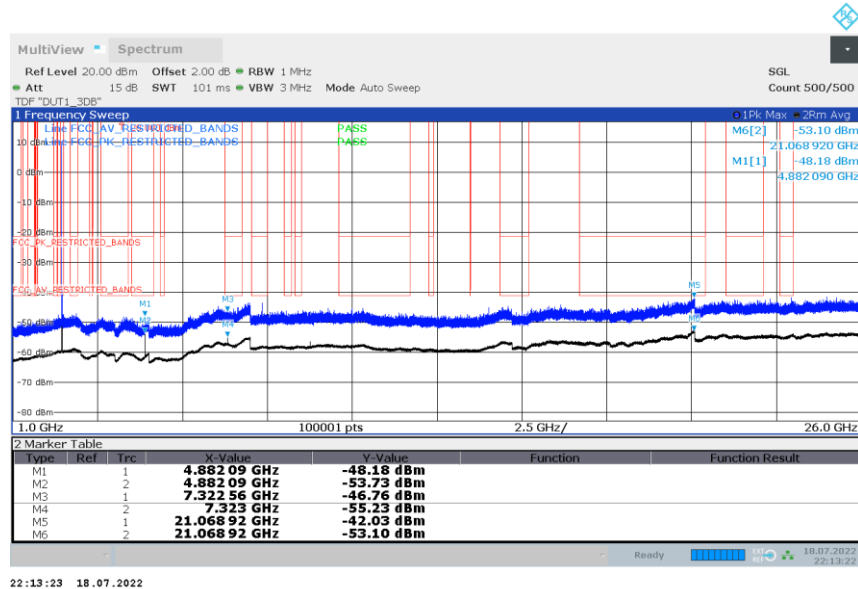
Radio Technology = Bluetooth BDR, Operating Frequency = low, Measurement range = 1 GHz - 26 GHz  
(S02\_161\_AB01)



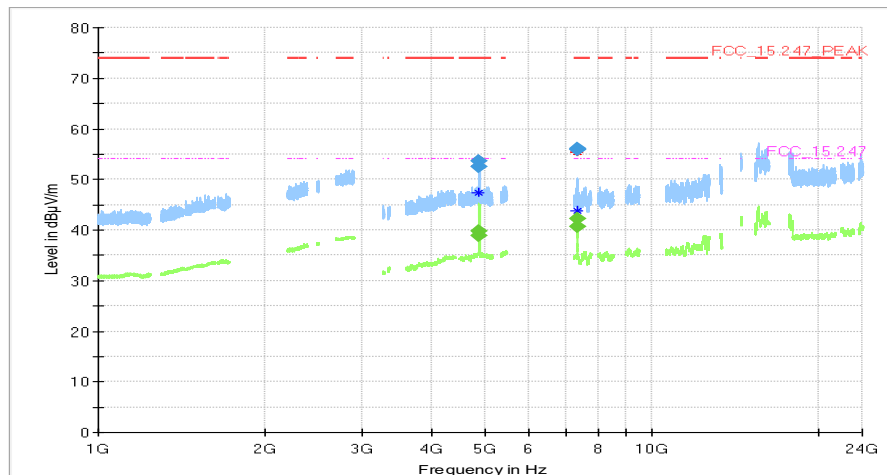
### Final Result

| 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) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 4803.713        | ---              | 40.0              | 54.00          | 13.97       | 1000.0          | 1000.000        | 150.0       | V   | -91.0         | -12.0           | 4.9          |
| 4803.713        | 53.5             | ---               | 74.00          | 20.48       | 1000.0          | 1000.000        | 150.0       | V   | -91.0         | -12.0           | 4.9          |

Radio Technology = Bluetooth BDR, Operating Frequency = mid, Measurement range = 1 GHz - 26 GHz  
(S01\_161\_AD01)



Radio Technology = Bluetooth BDR, Operating Frequency = mid, Measurement range = 1 GHz - 26 GHz  
(S02\_161\_AB01)

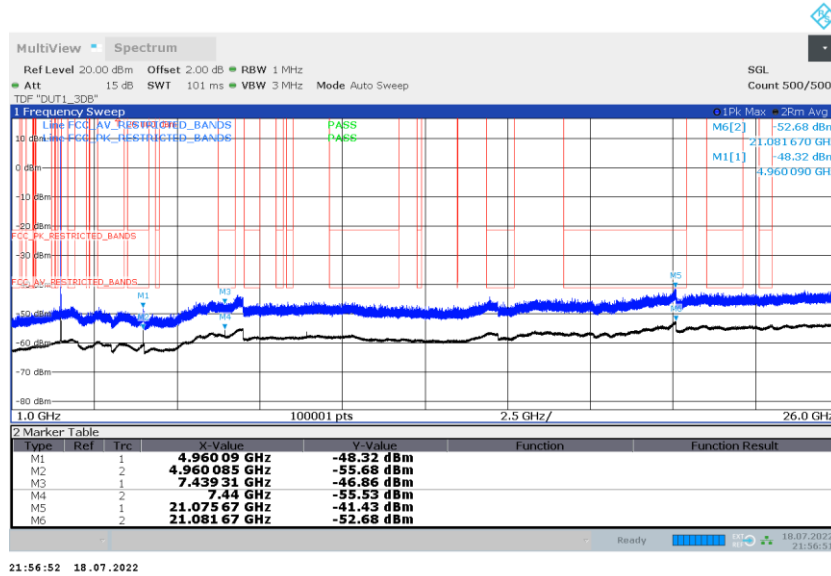


### Final Result

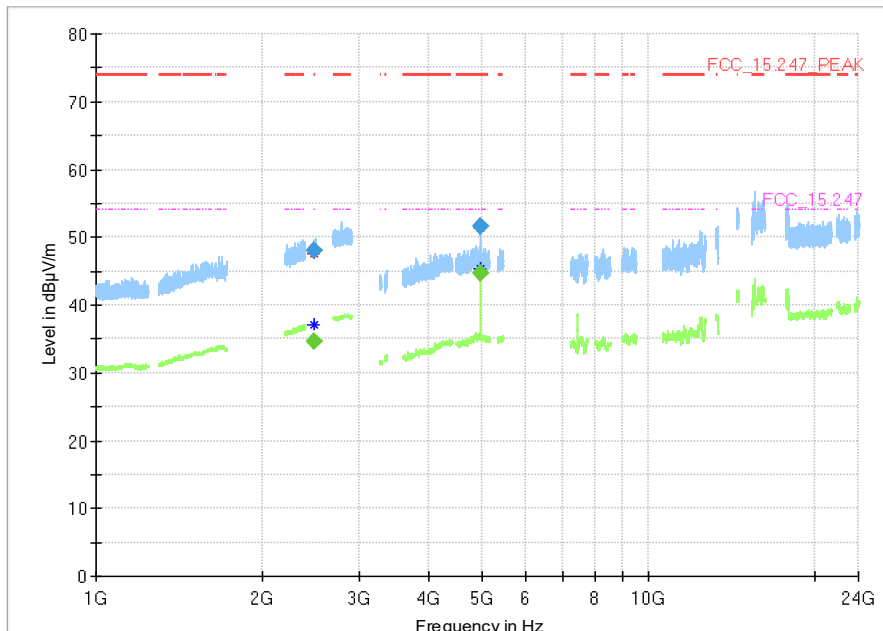
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 4881.388        | ---              | 39.0              | 54.00          | 15.02       | 1000.0          | 1000.000        | 150.0       | H   | -34.0         | 95.0            | 4.5          |
| 4881.388        | 53.7             | ---               | 74.00          | 20.31       | 1000.0          | 1000.000        | 150.0       | H   | -34.0         | 95.0            | 4.5          |
| 4882.038        | 52.5             | ---               | 74.00          | 21.54       | 1000.0          | 1000.000        | 150.0       | V   | -90.0         | -1.0            | 4.5          |
| 4882.038        | ---              | 39.8              | 54.00          | 14.17       | 1000.0          | 1000.000        | 150.0       | V   | -90.0         | -1.0            | 4.5          |
| 7322.375        | 55.9             | ---               | 74.00          | 18.11       | 1000.0          | 1000.000        | 150.0       | V   | -154.0        | -15.0           | -13.2        |
| 7322.375        | ---              | 40.7              | 54.00          | 13.32       | 1000.0          | 1000.000        | 150.0       | V   | -154.0        | -15.0           | -13.2        |
| 7323.000        | ---              | 42.3              | 54.00          | 11.67       | 1000.0          | 1000.000        | 150.0       | V   | -153.0        | -15.0           | -13.2        |
| 7323.000        | 56.0             | ---               | 74.00          | 18.00       | 1000.0          | 1000.000        | 150.0       | V   | -153.0        | -15.0           | -13.2        |



Radio Technology = Bluetooth BDR, Operating Frequency = high, Measurement range = 1 GHz - 26 GHz  
(S01\_161\_AD01)



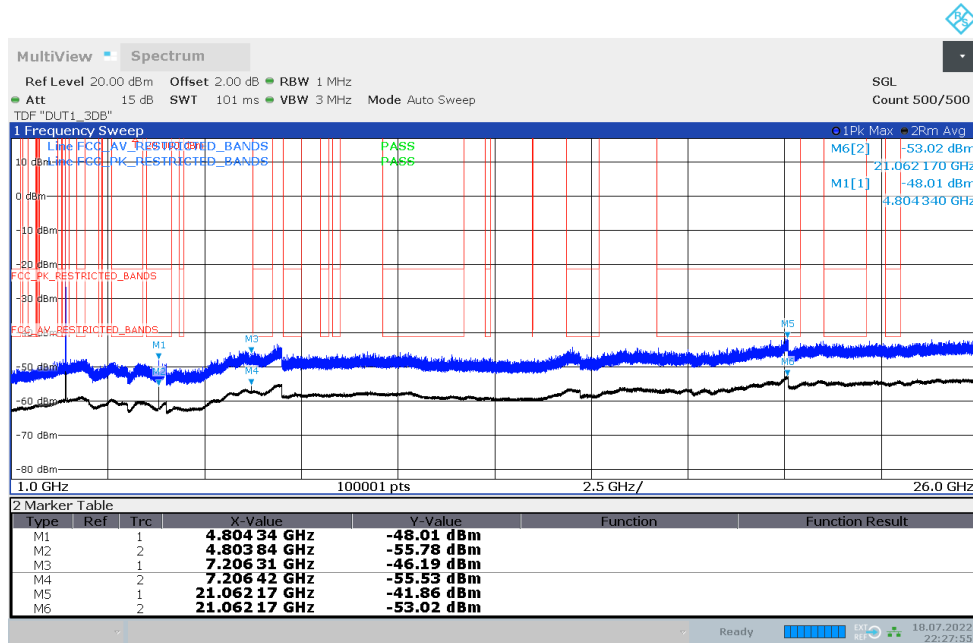
Radio Technology = Bluetooth BDR, Operating Frequency = high, Measurement range = 1 GHz - 26 GHz  
(S02\_161\_AB01)



### Final Result

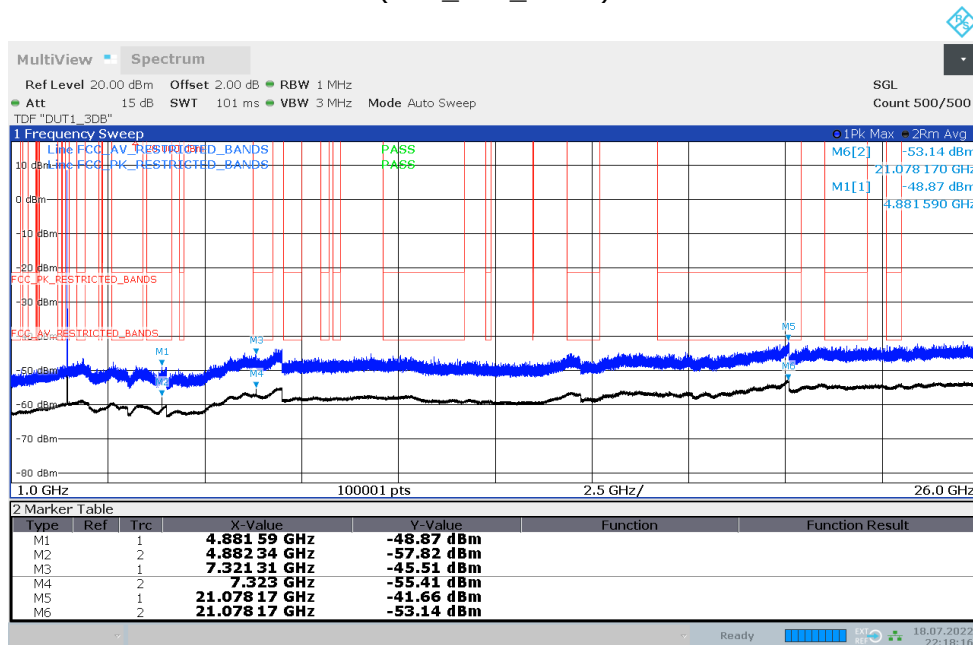
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2483.500        | ---              | 34.7              | 54.00          | 19.33       | 1000.0          | 1000.000        | 150.0       | H   | -149.0        | 8.0             | 5.3          |
| 2483.500        | 48.1             | ---               | 74.00          | 25.89       | 1000.0          | 1000.000        | 150.0       | H   | -149.0        | 8.0             | 5.3          |
| 4960.038        | ---              | 44.8              | 54.00          | 9.24        | 1000.0          | 1000.000        | 150.0       | V   | -59.0         | -12.0           | 4.4          |
| 4960.038        | 51.5             | ---               | 74.00          | 22.49       | 1000.0          | 1000.000        | 150.0       | V   | -59.0         | -12.0           | 4.4          |

Radio Technology = Bluetooth EDR 2, Operating Frequency = low, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)



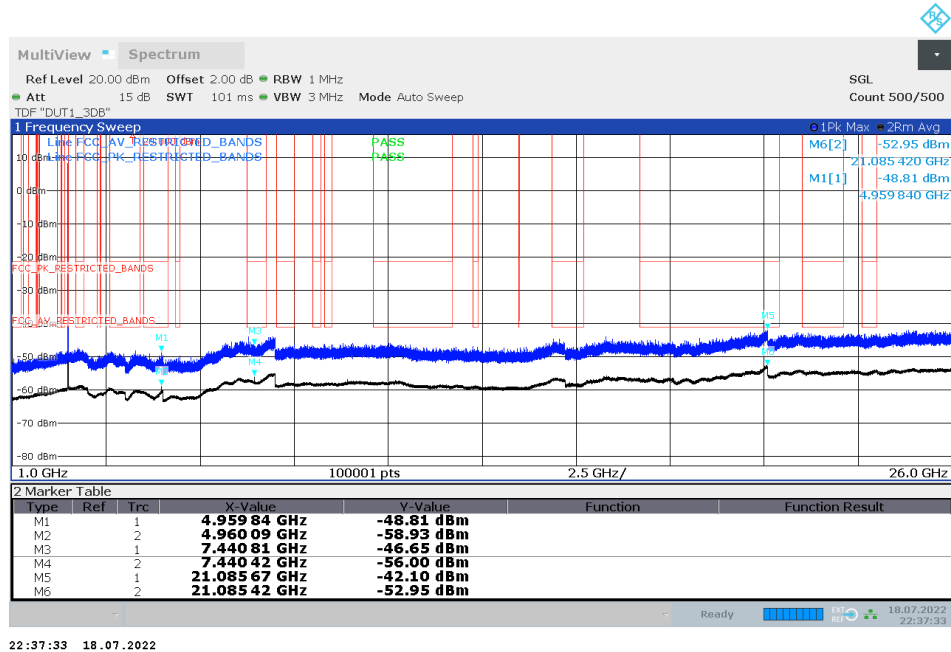
22:27:55 18.07.2022

Radio Technology = Bluetooth EDR 2, Operating Frequency = mid, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)

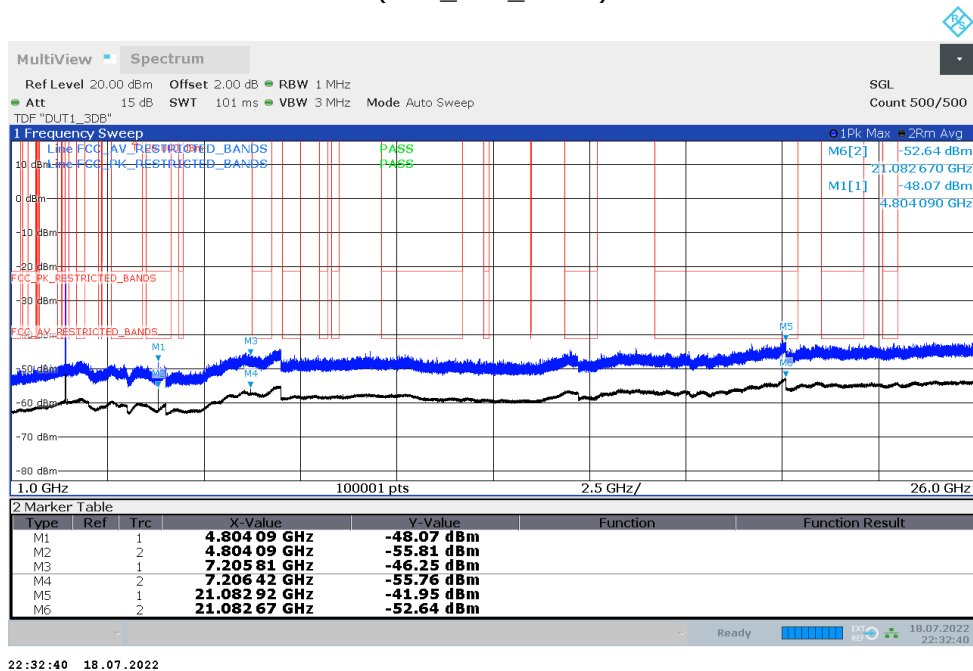


22:18:16 18.07.2022

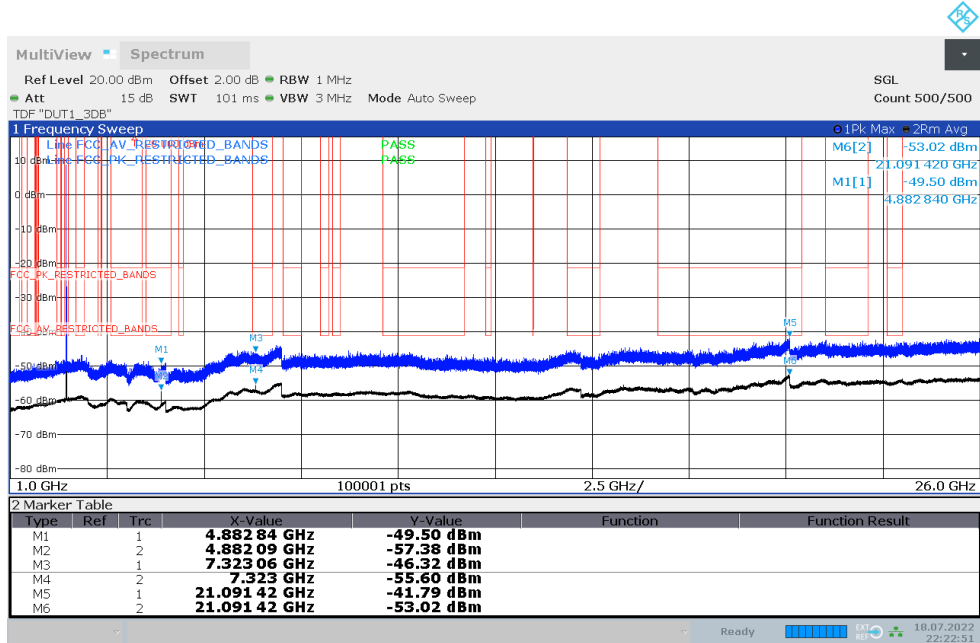
Radio Technology = Bluetooth EDR 2, Operating Frequency = high, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)



Radio Technology = Bluetooth EDR 3, Operating Frequency = low, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)

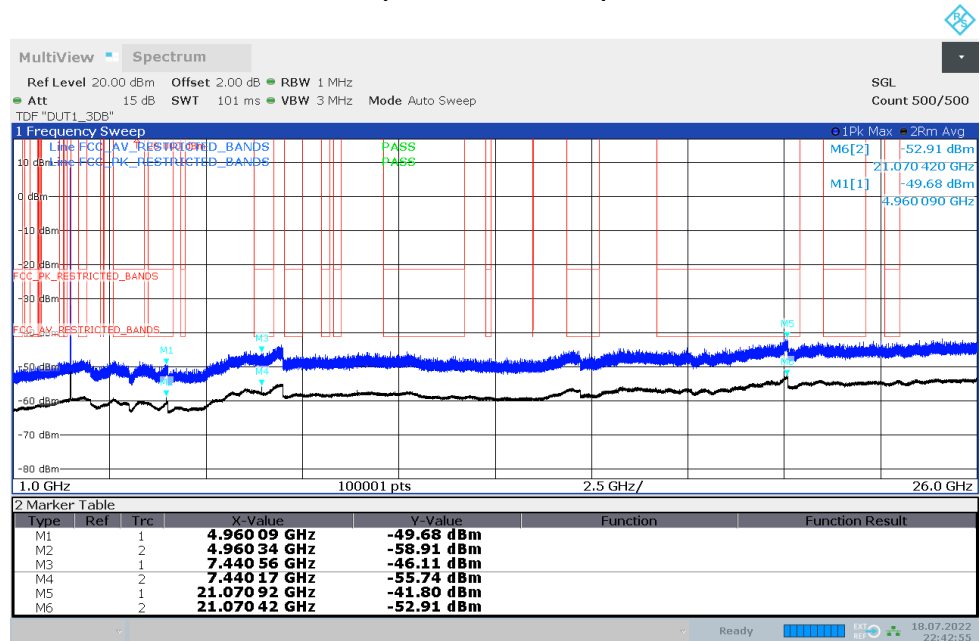


Radio Technology = Bluetooth EDR 3, Operating Frequency = mid, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)



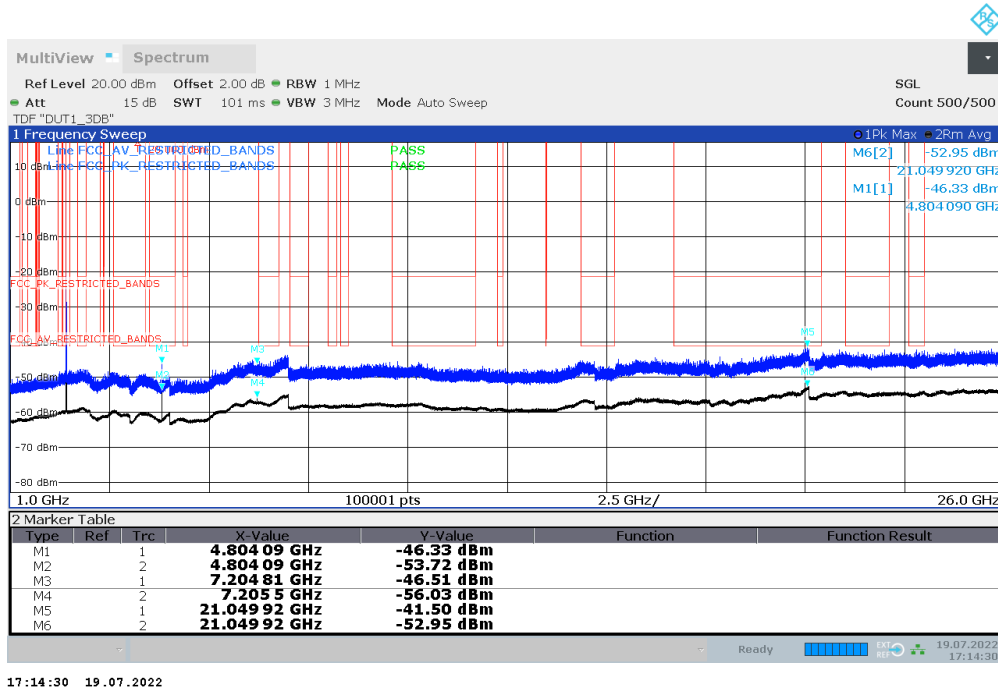
22:22:51 18.07.2022

Radio Technology = Bluetooth EDR 3, Operating Frequency = high, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)

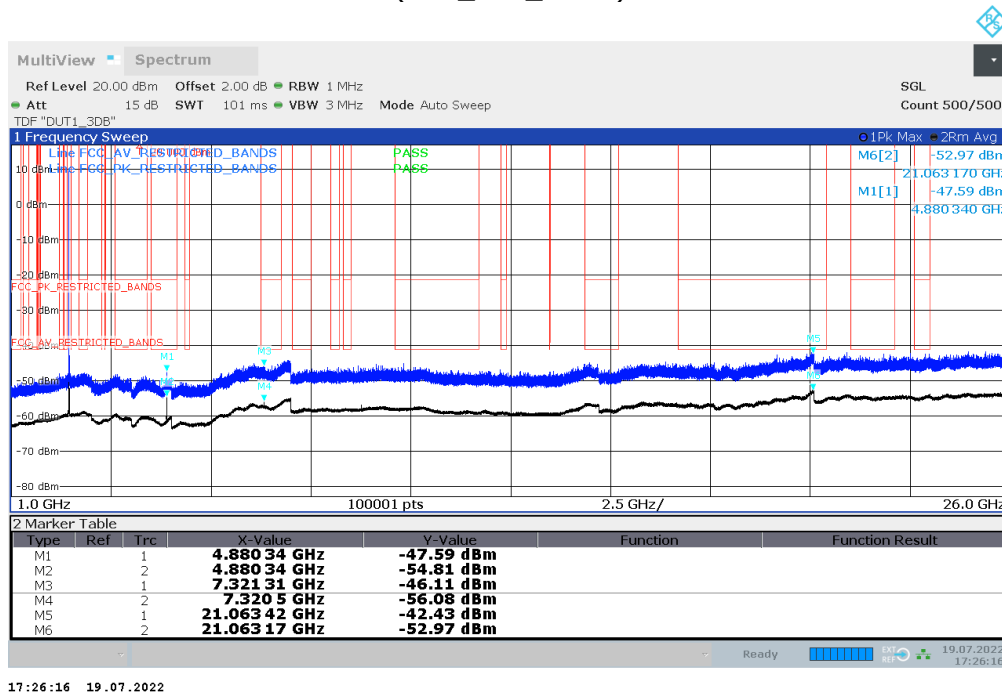


22:42:55 18.07.2022

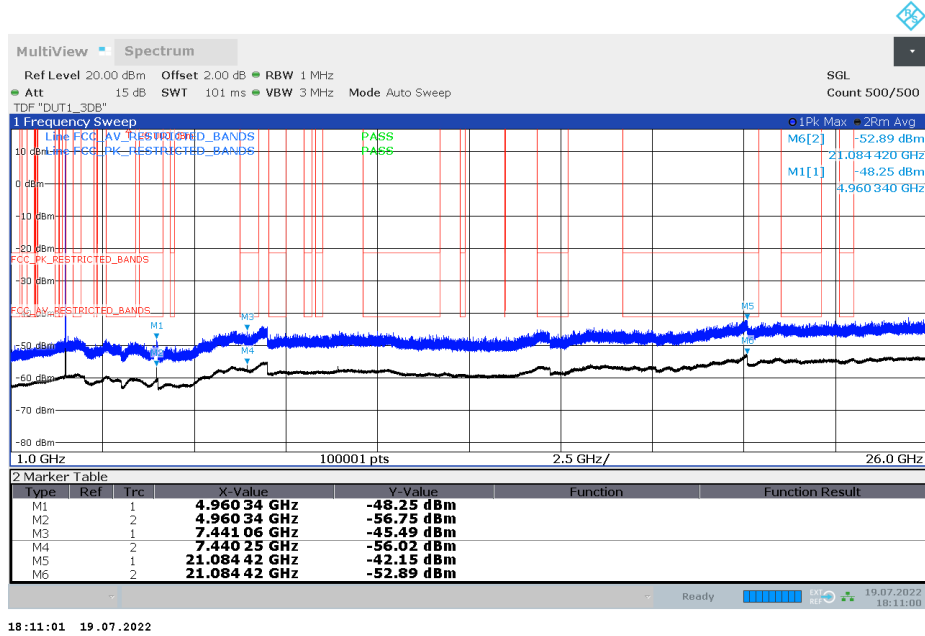
Radio Technology = Bluetooth LE 1 Mbps, Operating Frequency = low, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)



Radio Technology = Bluetooth LE 1 Mbps, Operating Frequency = mid, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)

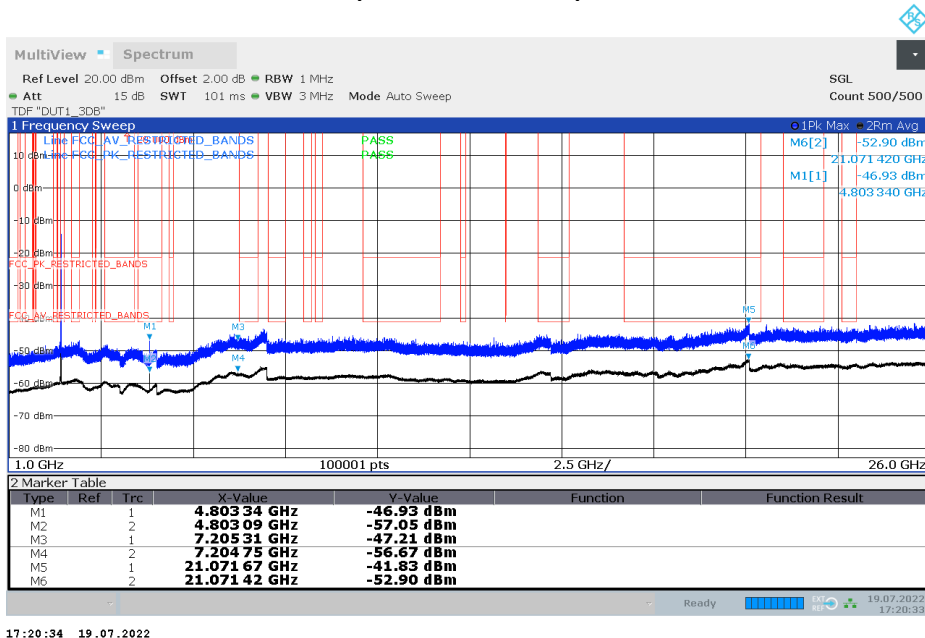


Radio Technology = Bluetooth LE 1 Mbps, Operating Frequency = high, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)



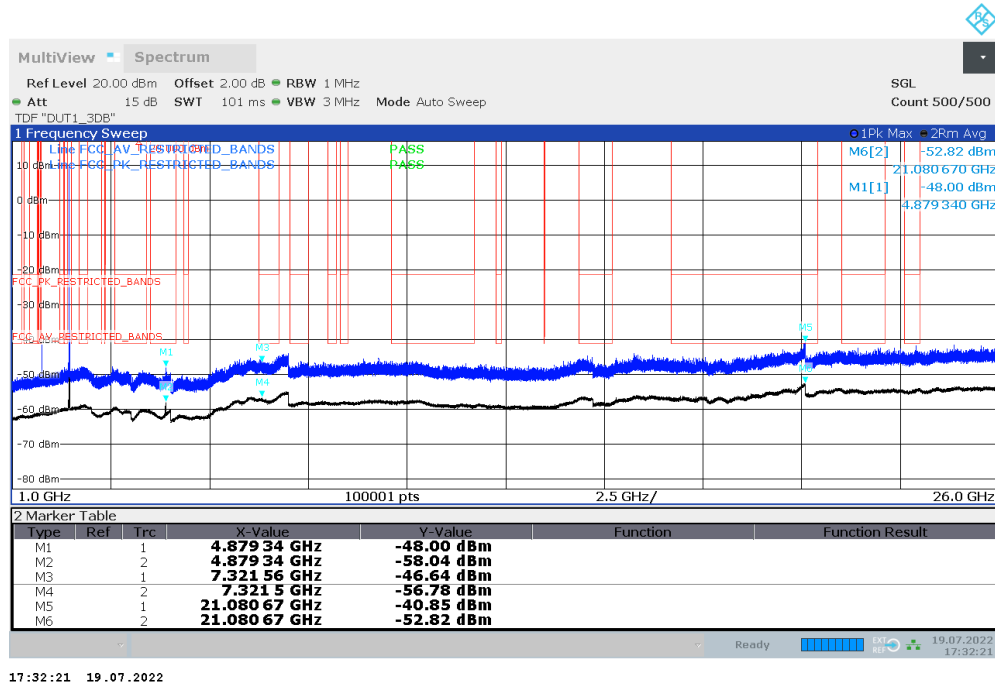
18:11:01 19.07.2022

Radio Technology = Bluetooth LE 2 Mbps, Operating Frequency = low, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)



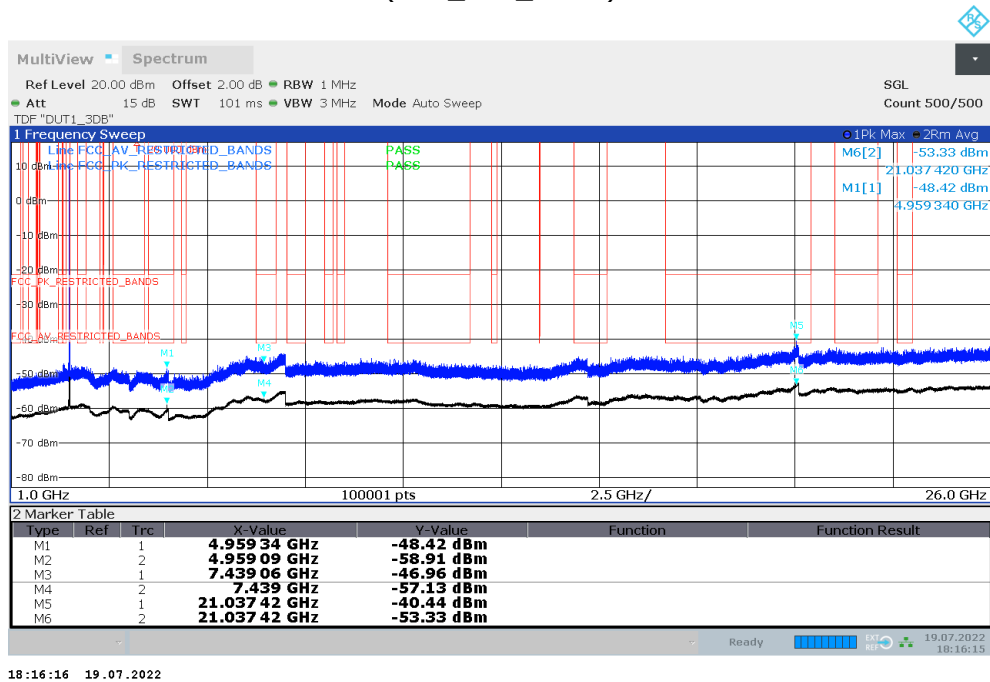
17:20:34 19.07.2022

Radio Technology = Bluetooth LE 2 Mbps, Operating Frequency = mid, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)



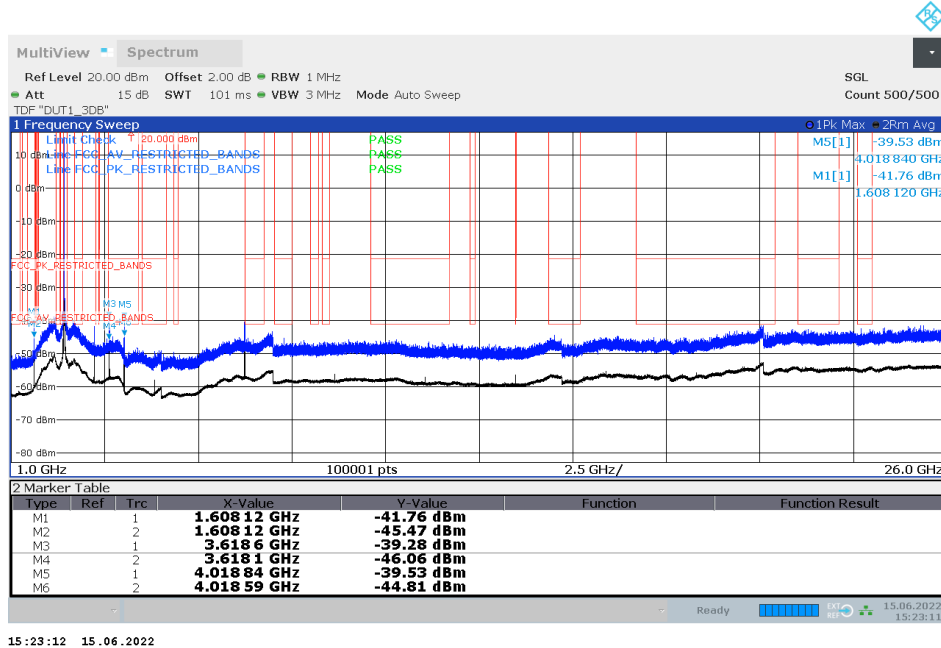
17:32:21 19.07.2022

Radio Technology = Bluetooth LE 2 Mbps, Operating Frequency = high, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)

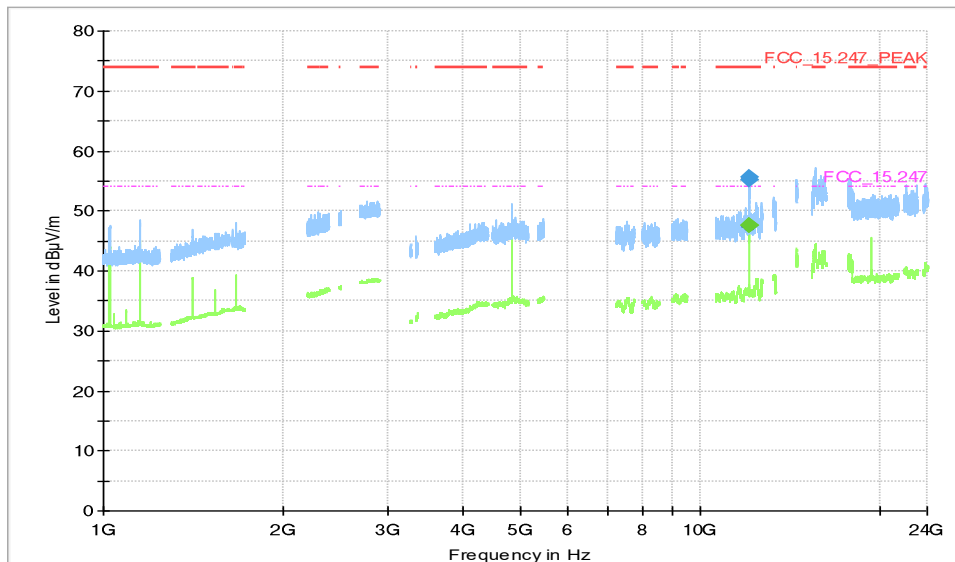


18:16:16 19.07.2022

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



Radio Technology = WLAN b, Operating Frequency = low, Measurement range = 1 GHz - 26 GHz  
 (S02\_161\_AB01)

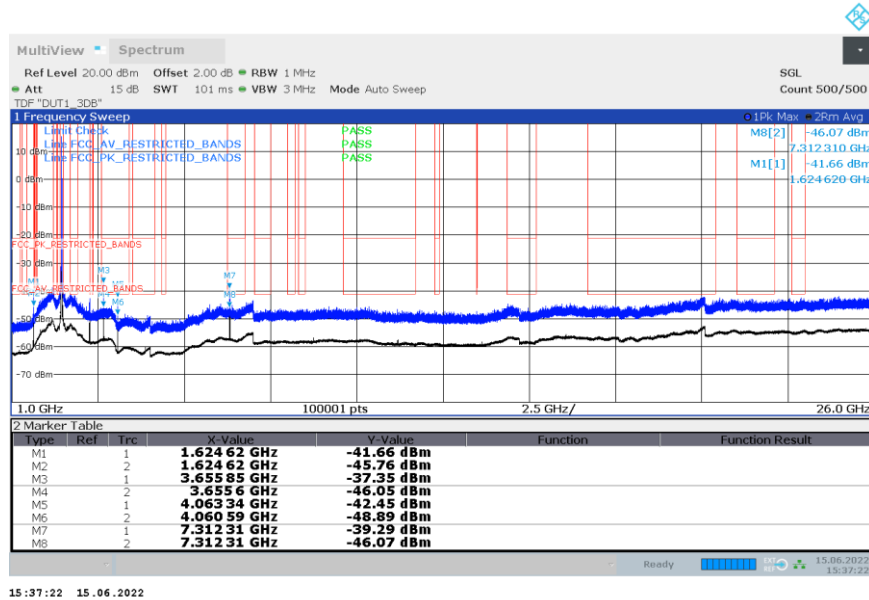


### Final Result

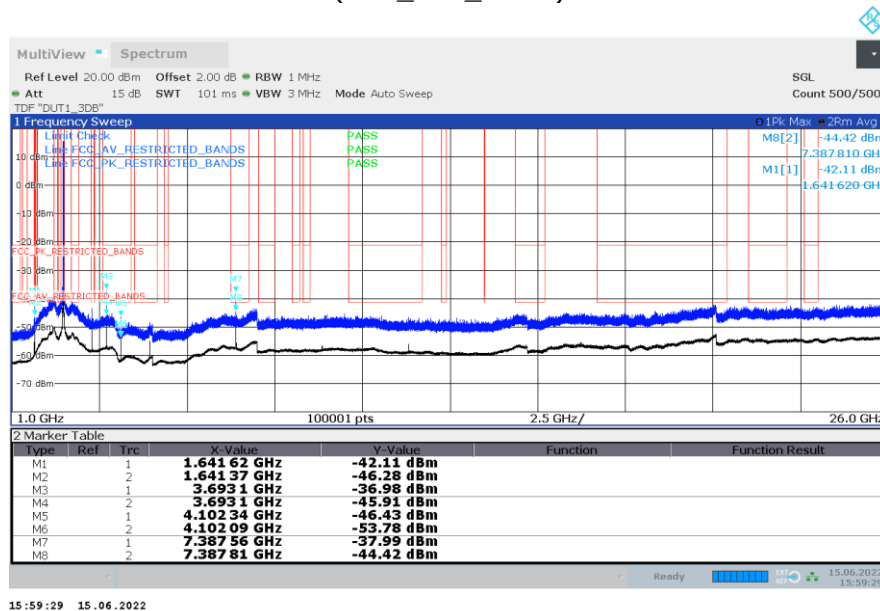
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Marg in (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Cor r. (dB/m) |
|-----------------|------------------|-------------------|----------------|--------------|-----------------|-----------------|-------------|-----|---------------|-----------------|---------------|
| 12060.865       | 55.2             | ---               | 74.0           | 18.81        | 1000.0          | 1000.00         | 150.        | H   | 52.0          | 86.0            | -7.6          |
| 12060.865       | ---              | 47.6              | 54.0           | 6.40         | 1000.0          | 1000.00         | 150.        | H   | 52.0          | 86.0            | -7.6          |
| 12061.810       | 55.7             | ---               | 74.0           | 18.33        | 1000.0          | 1000.00         | 150.        | H   | 49.0          | 88.0            | -7.6          |
| 12061.810       | ---              | 47.7              | 54.0           | 6.27         | 1000.0          | 1000.00         | 150.        | H   | 49.0          | 88.0            | -7.6          |



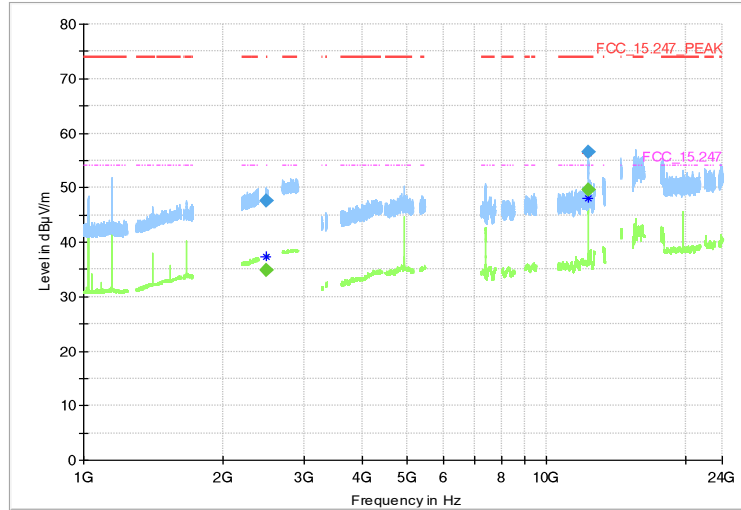
Radio Technology = WLAN b, Operating Frequency = mid, Measurement range = 1 GHz - 26 GHz  
(S01\_161\_AD01)



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



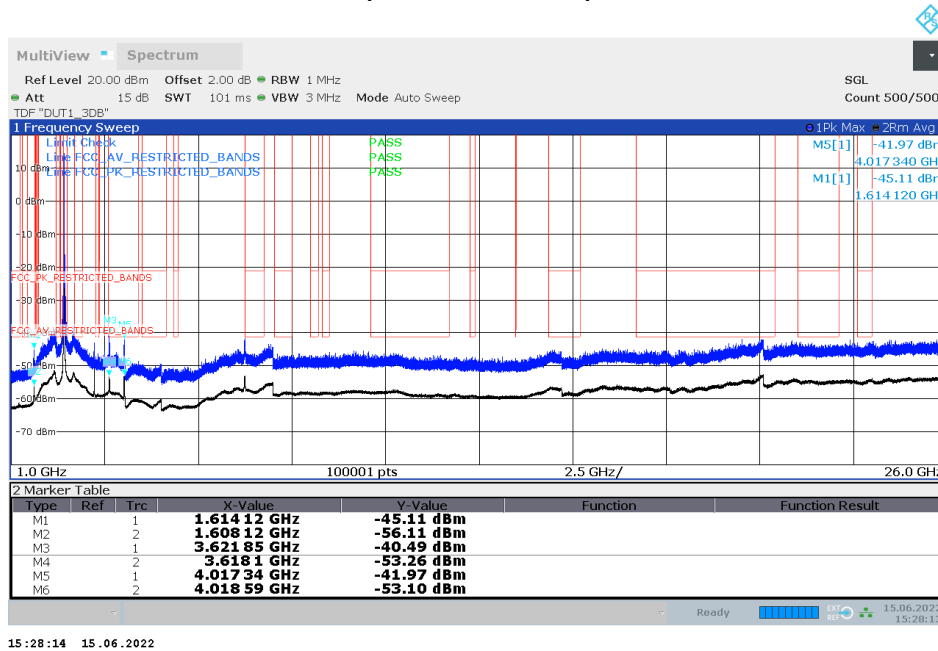
Radio Technology = WLAN b, Operating Frequency = high, Measurement range = 1 GHz - 26 GHz  
(S02\_161\_AB01)



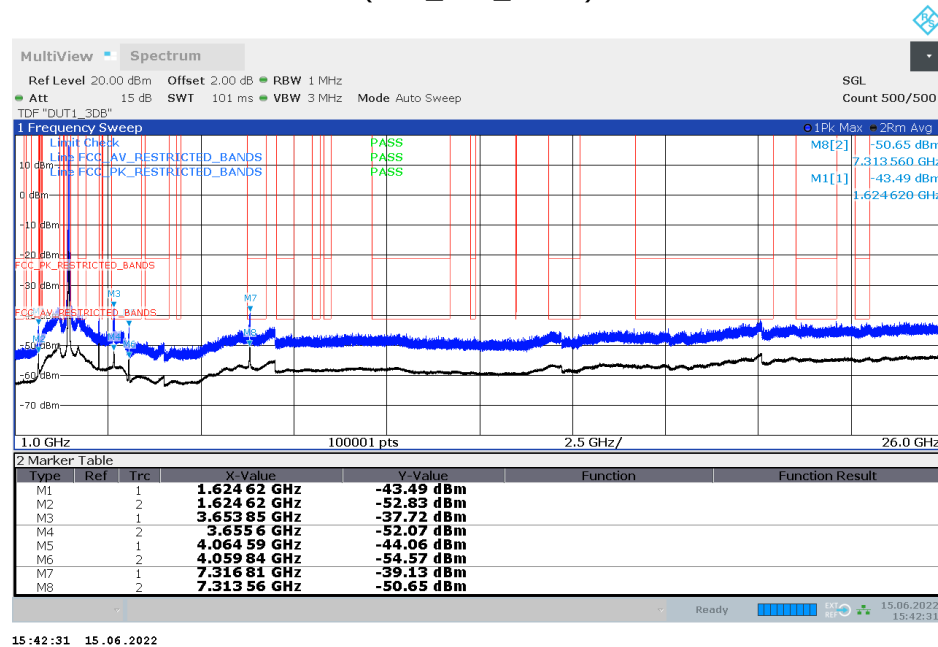
## Final\_Result

| 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) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|--------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2483.995        | ---              | 34.8              | 54.0           | 19.17        | 1000.0          | 1000.00         | 150.        | V   | -130.0        | -10.0           | 5.3          |
| 2483.995        | 47.7             | ---               | 74.0           | 26.26        | 1000.0          | 1000.00         | 150.        | V   | -130.0        | -10.0           | 5.3          |
| 12311.185       | ---              | 49.5              | 54.0           | 4.46         | 1000.0          | 1000.00         | 150.        | H   | 56.0          | 78.0            | -7.0         |
| 12311.185       | 56.6             | ---               | 74.0           | 17.40        | 1000.0          | 1000.00         | 150.        | H   | 56.0          | 78.0            | -7.0         |

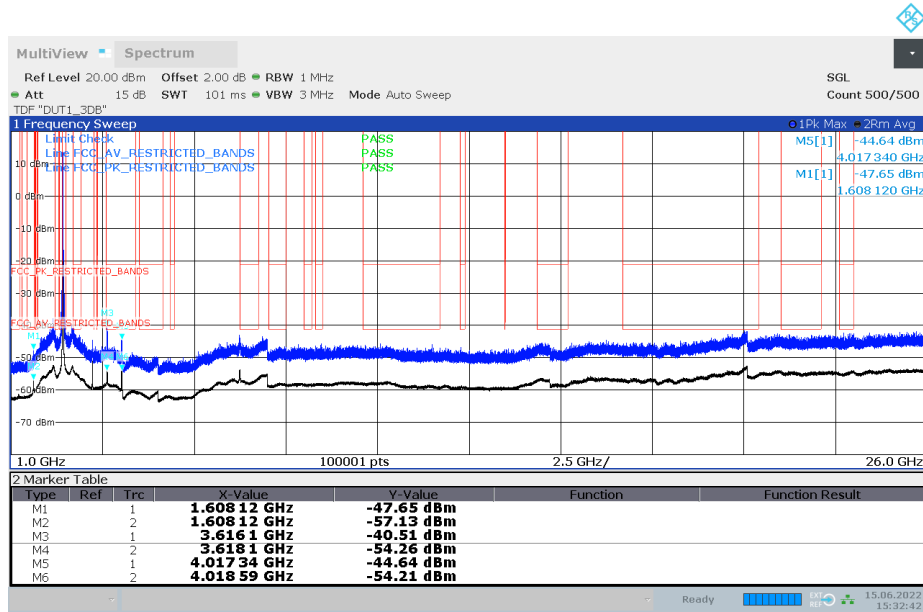
Radio Technology = WLAN g, Operating Frequency = low, Measurement range = 1 GHz - 26 GHz  
 GHz  
 (S01\_161\_AD01)



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

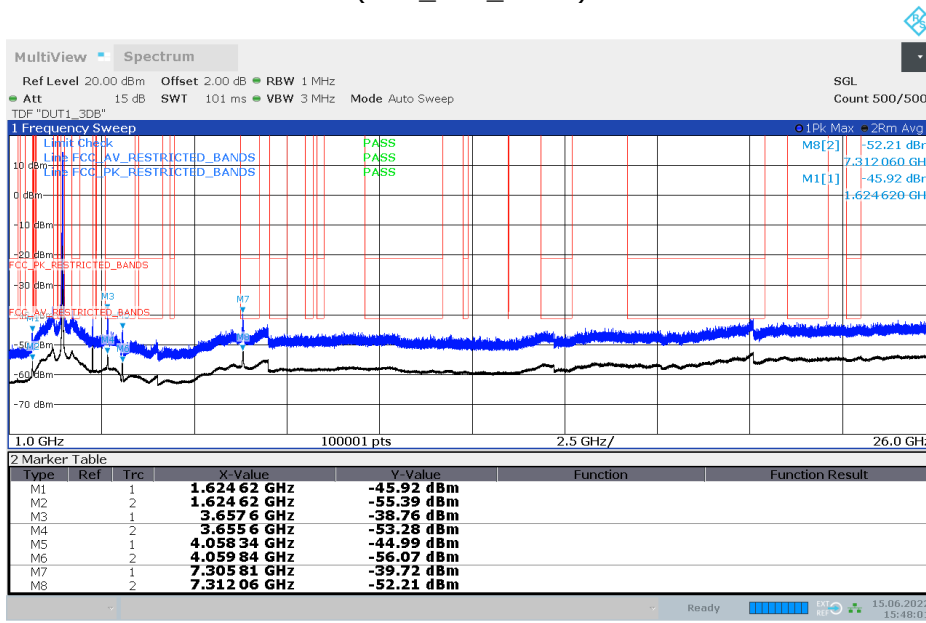


Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Measurement range = 1 GHz - 26 GHz  
(S01\_161\_AD01)



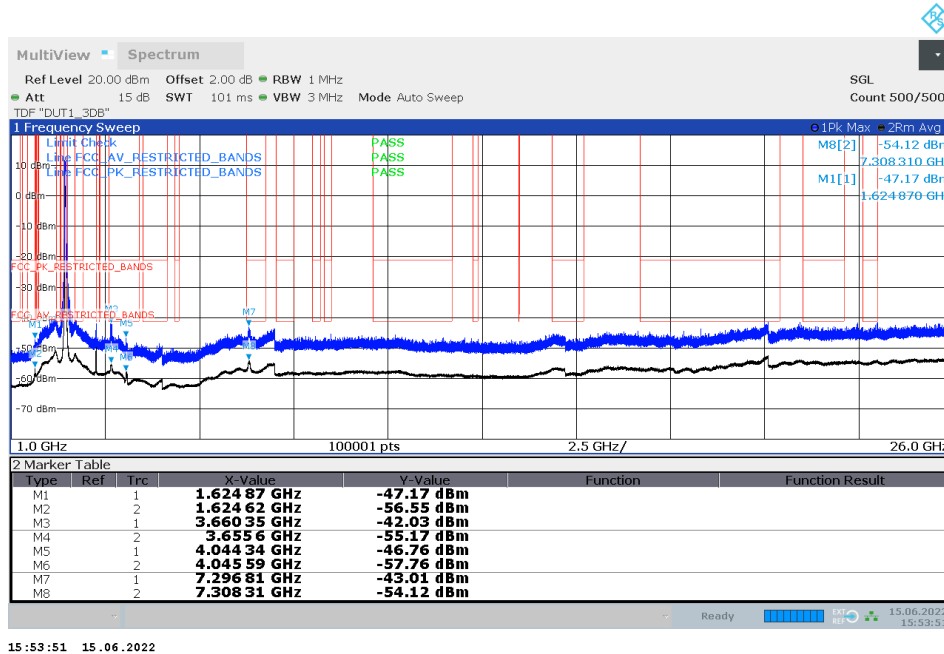
15:32:43 15.06.2022

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



15:48:01 15.06.2022

Radio Technology = WLAN n 40 MHz, Operating Frequency = mid, Measurement range = 1 GHz - 26 GHz (S01\_161\_AD01)



15:53:51 15.06.2022

### 5.6.5 TEST EQUIPMENT USED

- Radiated Emissions FAR 2.4 GHz FCC
- Radiated Emissions SAC H-Field
- Radiated Emissions SAC up to 1 GHz
- R&S TS8997

## 5.7 BAND EDGE COMPLIANCE CONDUCTED

Standard **FCC Part 15 Subpart C**

**The test was performed according to:**  
ANSI C63.10 11.11

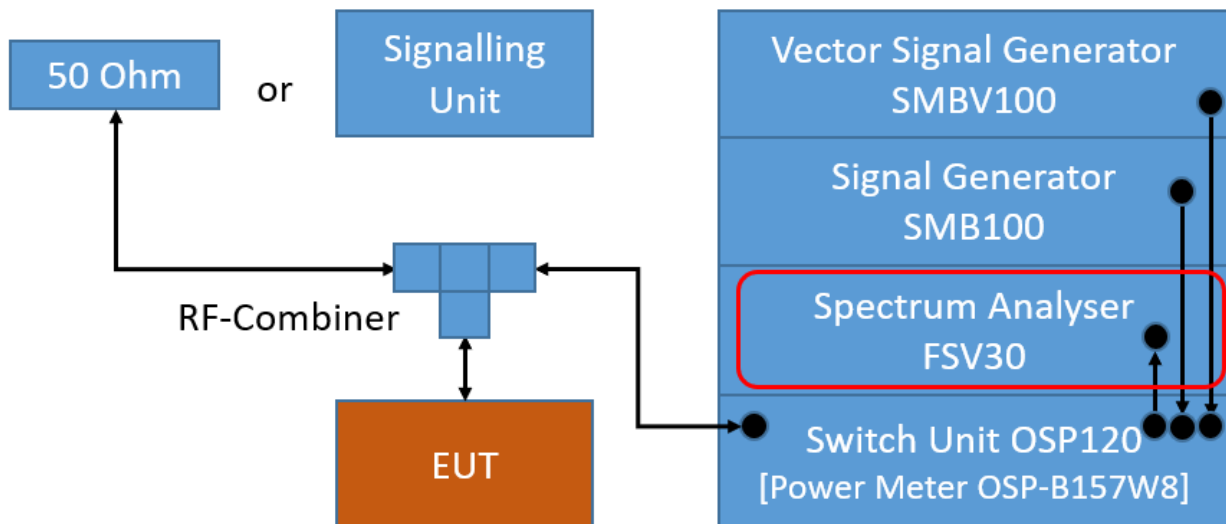
### 5.7.1 TEST DESCRIPTION

For the conducted measurement, the Equipment Under Test (EUT) is placed in a shielded room. The reference power was measured in the test case "Spurious RF Conducted Emissions".

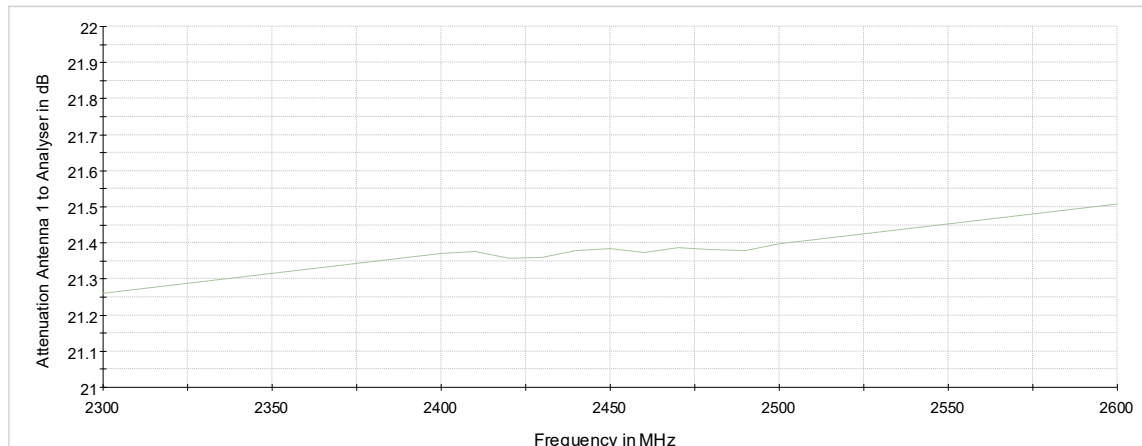
The EUT was connected to the test system as described in the block diagram below. The complete attenuation of the measurement path is known and considered.

Analyser settings:

- Lower Band Edge:  
Measured range: 2310.0 MHz to 2483.5 MHz  
Upper Band Edge  
Measured range: 2400.0 MHz to 2500 MHz
- Detector: Peak
- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Sweptime: Auto
- Sweeps: Till stable (min. 300, max. 15000)
- Trace: Maxhold



TS8997; Band Edge Conducted



Attenuation of the measurement path

## 5.7.2 TEST REQUIREMENTS / LIMITS

### FCC Part 15.247 (d)

“In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. ...

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).”

For the conducted measurement the RF power at the band edge shall be “at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power...”

### 5.7.3 TEST PROTOCOL

Ambient temperature: 23-25 °C  
 Air Pressure: 990-1024 hPa  
 Humidity: 30-40%  
 BT GFSK (1-DH1)

| Channel No. | Channel Center Frequency [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBm] | Detector | RBW [kHz] | Ref. Level [dBm] | Limit [dBm] | Margin to Limit [dB] |
|-------------|--------------------------------|-----------------------|----------------------|----------|-----------|------------------|-------------|----------------------|
| 0           | 2402                           | 2400.0                | -48.2                | PEAK     | 100       | 7.2              | -12.8       | 35.4                 |
| 78          | 2480                           | 2483.5                | -45.1                | PEAK     | 100       | 6.8              | -13.2       | 31.9                 |

BT π/4 DQPSK (2-DH1)

| Channel No. | Channel Center Frequency [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBm] | Detector | RBW [kHz] | Ref. Level [dBm] | Limit [dBm] | Margin to Limit [dB] |
|-------------|--------------------------------|-----------------------|----------------------|----------|-----------|------------------|-------------|----------------------|
| 0           | 2402                           | 2400.0                | -44.9                | PEAK     | 100       | 3.8              | -16.2       | 28.7                 |
| 78          | 2480                           | 2483.5                | -45.6                | PEAK     | 100       | 3.9              | -16.1       | 29.5                 |

BT 8-DPSK (3-DH1)

| Channel No. | Channel Center Frequency [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBm] | Detector | RBW [kHz] | Ref. Level [dBm] | Limit [dBm] | Margin to Limit [dB] |
|-------------|--------------------------------|-----------------------|----------------------|----------|-----------|------------------|-------------|----------------------|
| 0           | 2402                           | 2400.0                | -43.0                | PEAK     | 100       | 4.2              | -15.8       | 27.2                 |
| 78          | 2480                           | 2483.5                | -45.7                | PEAK     | 100       | 3.9              | -16.1       | 29.6                 |

BT LE 1 Mbit/s

| Channel No. | Channel Center Frequency [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBm] | Detector | RBW [kHz] | Ref. Level [dBm] | Limit [dBm] | Margin to Limit [dB] |
|-------------|--------------------------------|-----------------------|----------------------|----------|-----------|------------------|-------------|----------------------|
| 0           | 2402                           | 2400.0                | -47.5                | PEAK     | 100       | 7.5              | -12.5       | 35.0                 |
| 39          | 2480                           | 2483.5                | -51.3                | PEAK     | 100       | 7.2              | -12.8       | 38.5                 |

BT LE 2 Mbit/s

| Channel No. | Channel Center Frequency [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBm] | Detector | RBW [kHz] | Ref. Level [dBm] | Limit [dBm] | Margin to Limit [dB] |
|-------------|--------------------------------|-----------------------|----------------------|----------|-----------|------------------|-------------|----------------------|
| 0           | 2402                           | 2400.0                | -22.4                | PEAK     | 100       | 7.5              | -12.5       | 9.9                  |
| 39          | 2480                           | 2483.5                | -50.0                | PEAK     | 100       | 7.1              | -12.9       | 37.1                 |

WLAN b-Mode; 20 MHz; 1 Mbit/s

| Channel No. | Channel Center Frequency [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBm] | Detector | RBW [kHz] | Ref. Level [dBm] | Limit [dBm] | Margin to Limit [dB] |
|-------------|--------------------------------|-----------------------|----------------------|----------|-----------|------------------|-------------|----------------------|
| 1           | 2412                           | 2400.0                | -37.4                | PEAK     | 100       | 9.0              | -21.0       | 16.4                 |
| 11          | 2462                           | 2483.5                | -45.2                | PEAK     | 100       | 8.9              | -21.1       | 24.1                 |

WLAN g-Mode; 20 MHz; 6 Mbit/s

| Channel No. | Channel Center Frequency [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBm] | Detector | RBW [kHz] | Ref. Level [dBm] | Limit [dBm] | Margin to Limit [dB] |
|-------------|--------------------------------|-----------------------|----------------------|----------|-----------|------------------|-------------|----------------------|
| 1           | 2412                           | 2400.0                | -31.9                | PEAK     | 100       | 5.1              | -24.9       | 7.0                  |
| 11          | 2462                           | 2483.5                | -41.3                | PEAK     | 100       | 5.1              | -24.9       | 16.4                 |



WLAN n-Mode; 20 MHz; MCS0

| Channel No. | Channel Center Frequency [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBm] | Detector | RBW [kHz] | Ref. Level [dBm] | Limit [dBm] | Margin to Limit [dB] |
|-------------|--------------------------------|-----------------------|----------------------|----------|-----------|------------------|-------------|----------------------|
| 1           | 2412                           | 2400.0                | -33.3                | PEAK     | 100       | 4.1              | -25.9       | 7.4                  |
| 11          | 2462                           | 2483.5                | -40.7                | PEAK     | 100       | 4.1              | -25.9       | 14.8                 |

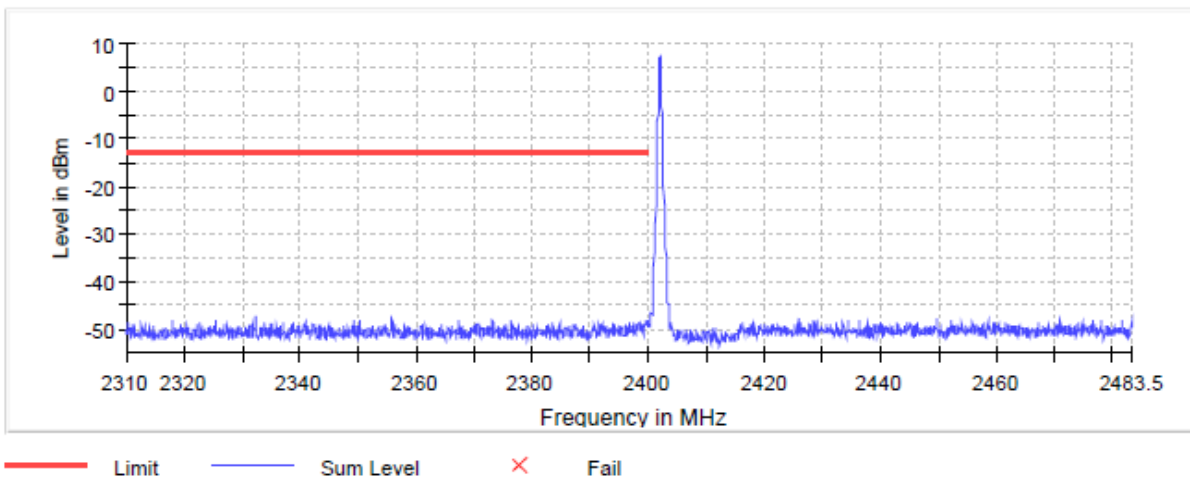
WLAN n-Mode; 40 MHz; MCS0

| Channel No. | Channel Center Frequency [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBm] | Detector | RBW [kHz] | Ref. Level [dBm] | Limit [dBm] | Margin to Limit [dB] |
|-------------|--------------------------------|-----------------------|----------------------|----------|-----------|------------------|-------------|----------------------|
| 3           | 2422                           | 2400.0                | -35.1                | PEAK     | 100       | 0.5              | -29.5       | 5.6                  |
| 9           | 2452                           | 2483.5                | -37.3                | PEAK     | 100       | 1.5              | -28.5       | 8.8                  |

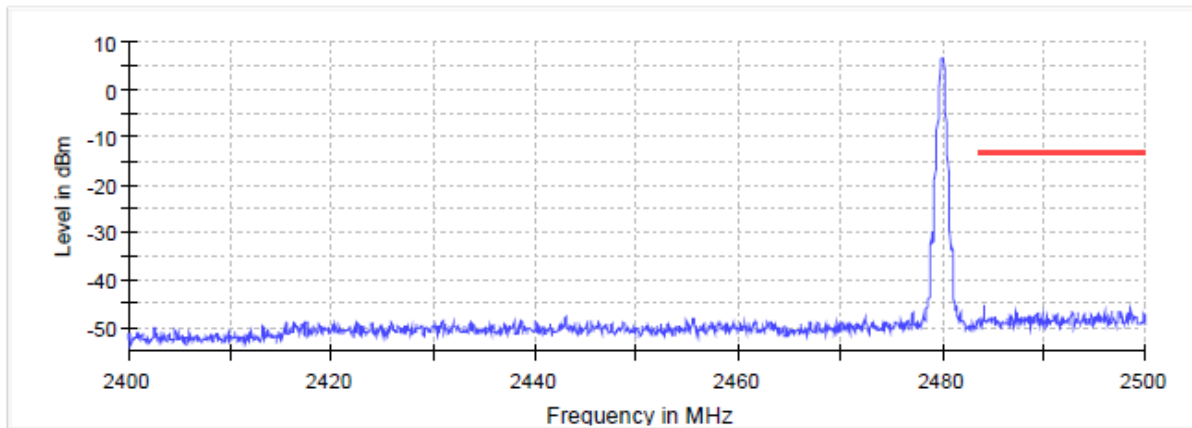
Remark: Please see next sub-clause for the measurement plot.

### 5.7.4 MEASUREMENT PLOTS

Radio Technology = Bluetooth BDR, Operating Frequency = low, Band Edge = low (S01\_161\_AD01)

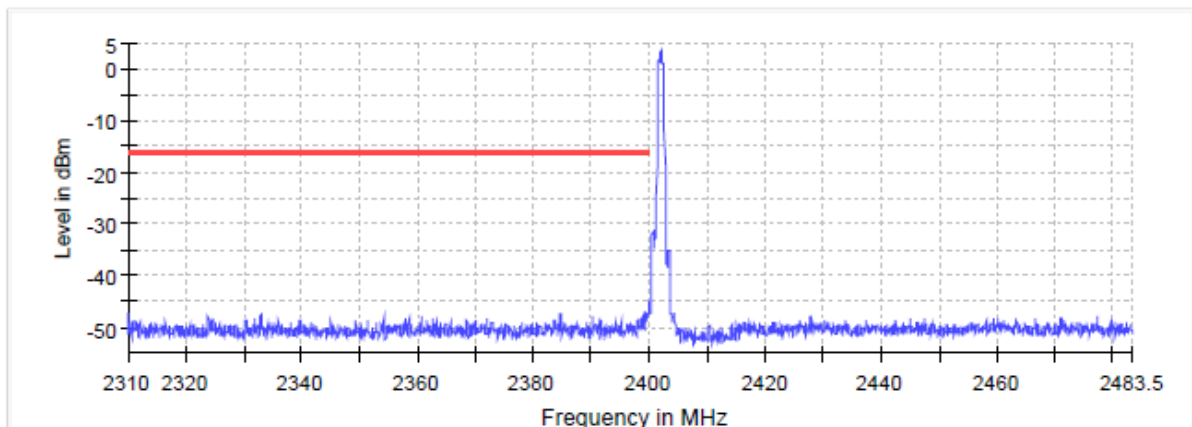


Radio Technology = Bluetooth BDR, Operating Frequency = high, Band Edge = high  
(S01\_161\_AD01)



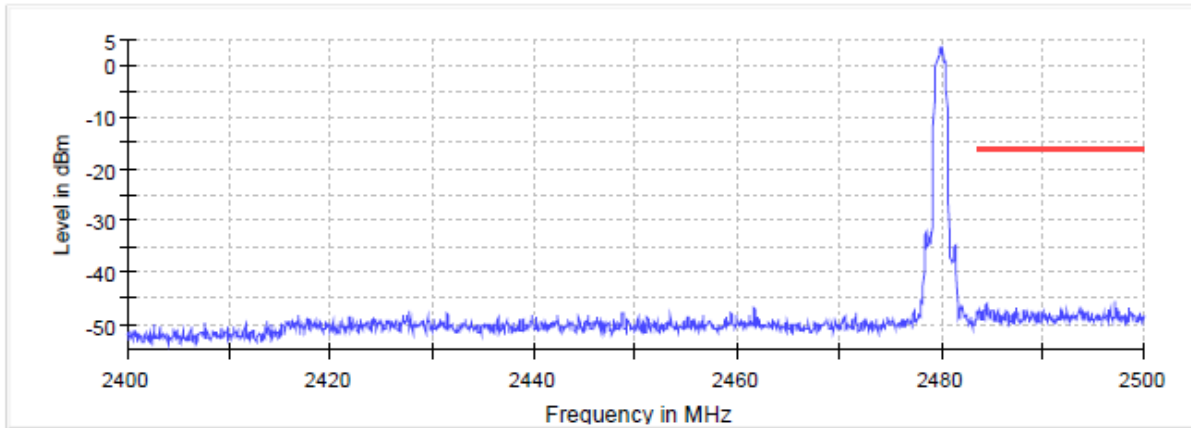
— Limit    — Sum Level    × Fail

Radio Technology = Bluetooth EDR 2, Operating Frequency = low, Band Edge = low  
(S01\_161\_AD01)



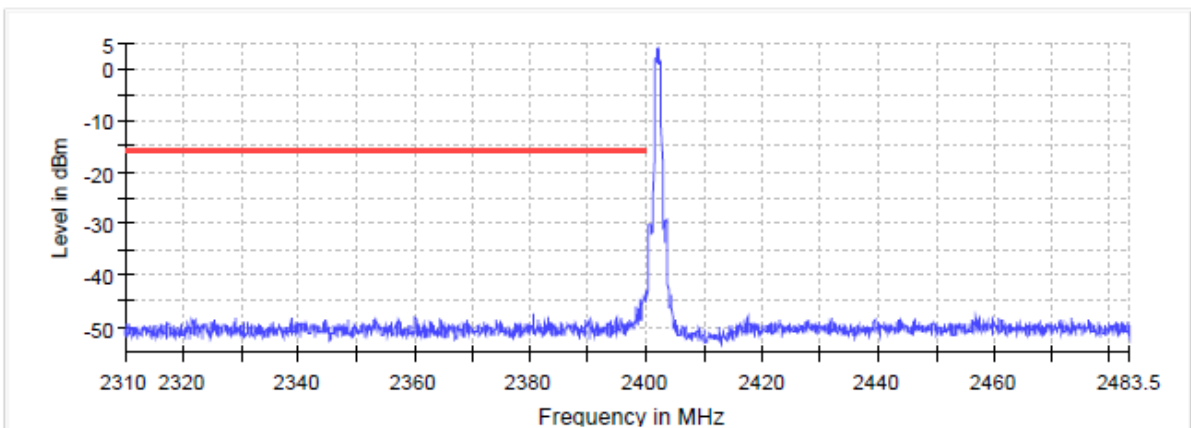
— Limit    — Sum Level    × Fail

Radio Technology = Bluetooth EDR 2, Operating Frequency = high, Band Edge = high  
(S01\_161\_AD01)



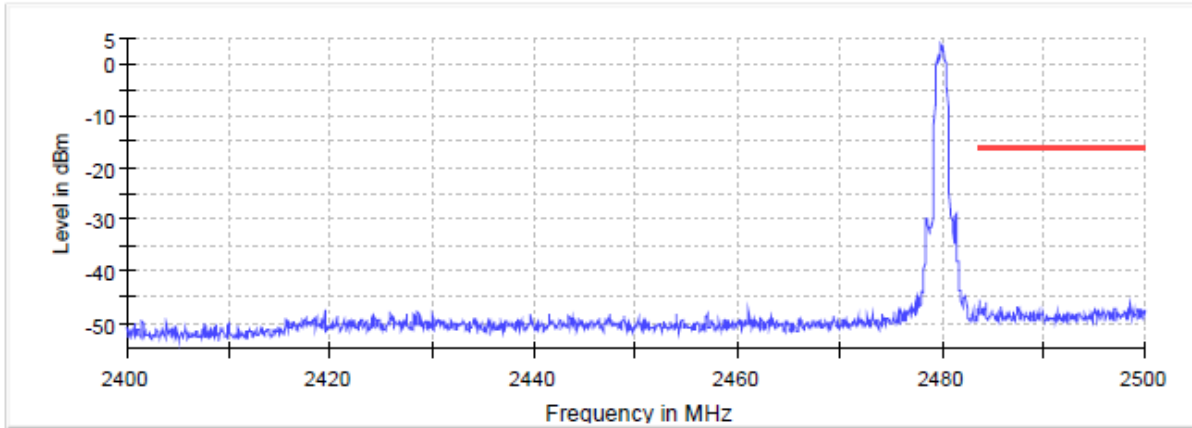
— Limit    — Sum Level    × Fail

Radio Technology = Bluetooth EDR 3, Operating Frequency = low, Band Edge = low  
(S01\_161\_AD01)



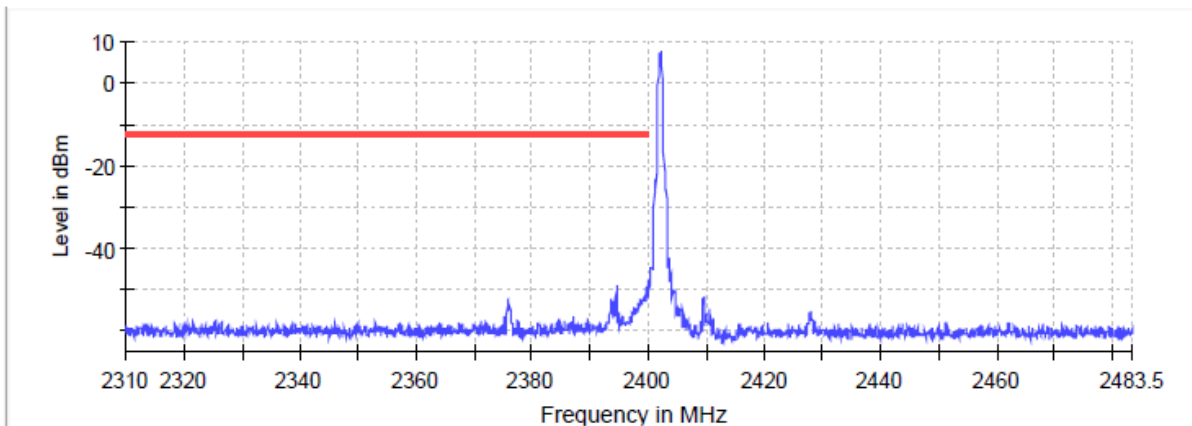
— Limit    — Sum Level    × Fail

Radio Technology = Bluetooth EDR 3, Operating Frequency = high, Band Edge = high  
(S01\_161\_AD01)



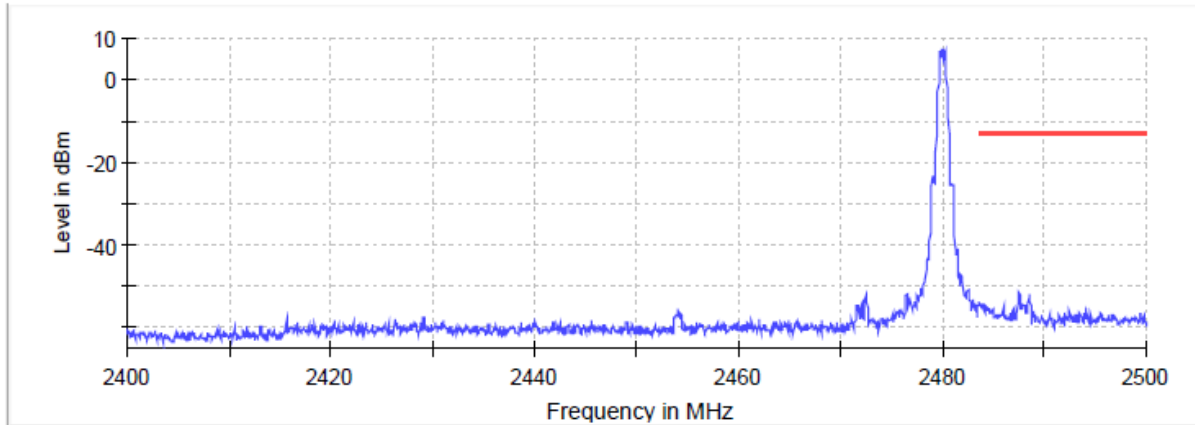
— Limit    — Sum Level    × Fail

Radio Technology = Bluetooth LE 1 Mbps, Operating Frequency = low, Band Edge = low  
(S01\_161\_AD01)



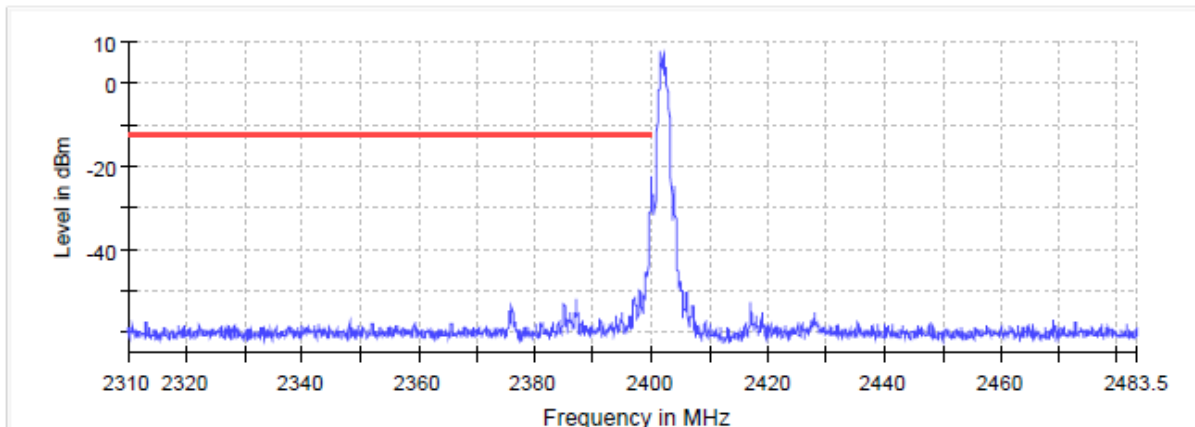
— Limit    — Sum Level    × Fail

Radio Technology = Bluetooth LE 1 Mbps, Operating Frequency = high, Band Edge = high  
(S01\_161\_AD01)



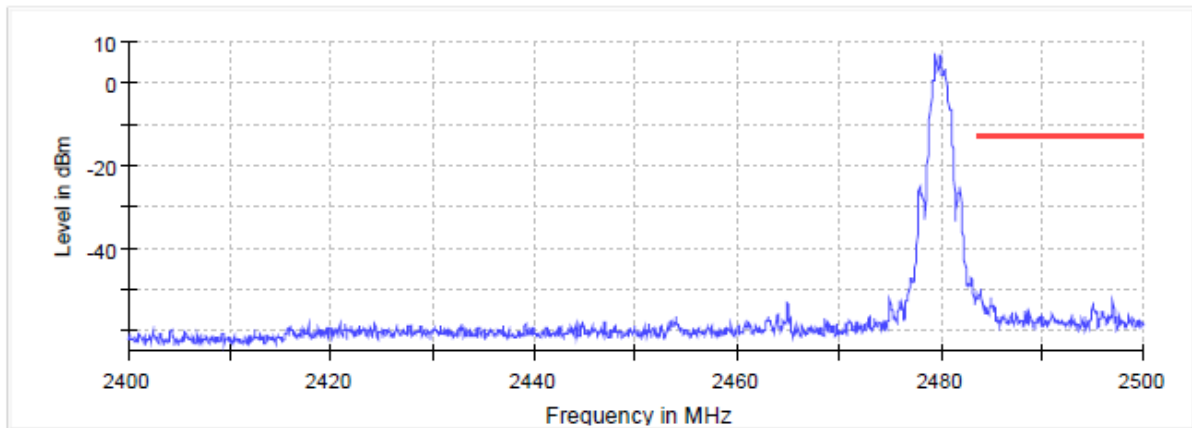
— Limit    — Sum Level    × Fail

Radio Technology = Bluetooth LE 2 Mbps, Operating Frequency = low, Band Edge = low  
(S01\_161\_AD01)



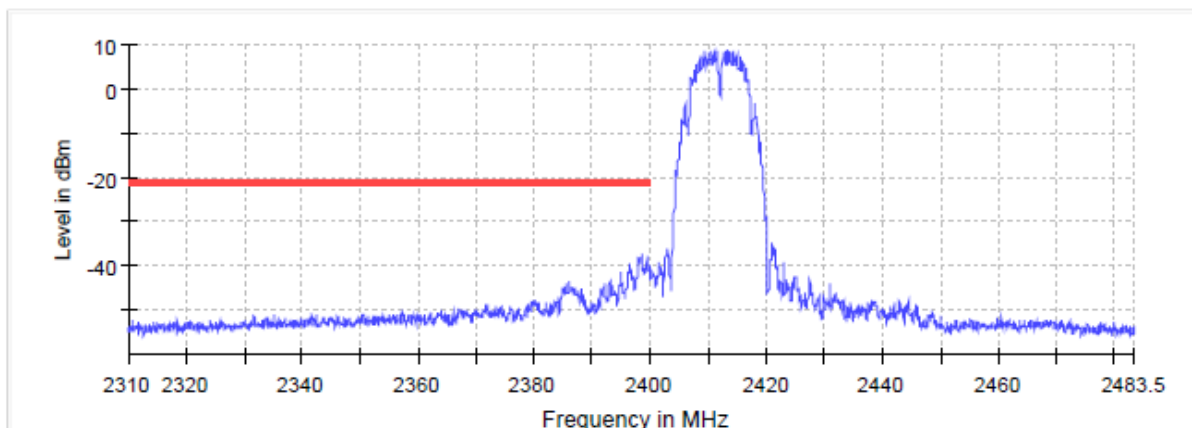
— Limit    — Sum Level    × Fail

Radio Technology = Bluetooth LE 2 Mbps, Operating Frequency = high, Band Edge = high  
(S01\_161\_AD01)



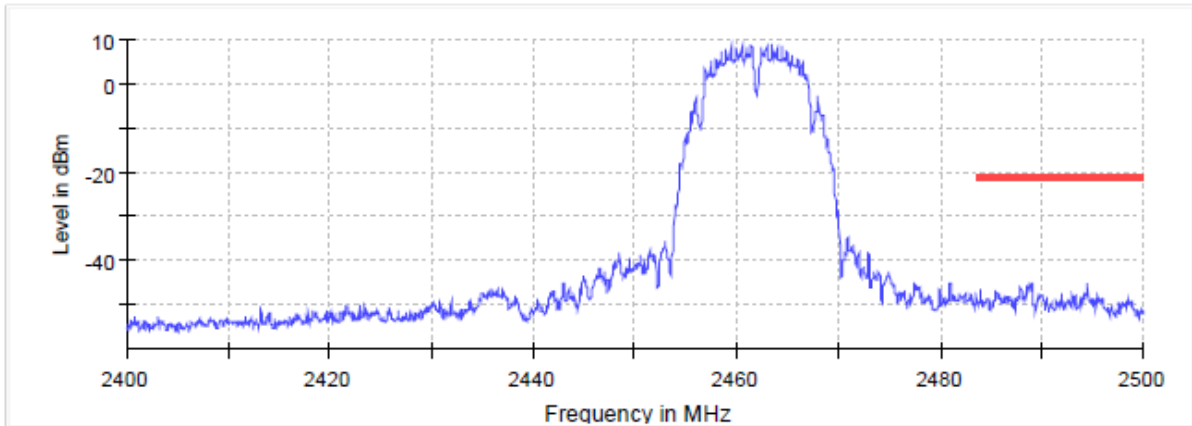
— Limit    — Sum Level    × Fail

Radio Technology = WLAN b, Operating Frequency = low, Band Edge = low  
(S01\_161\_AC01)

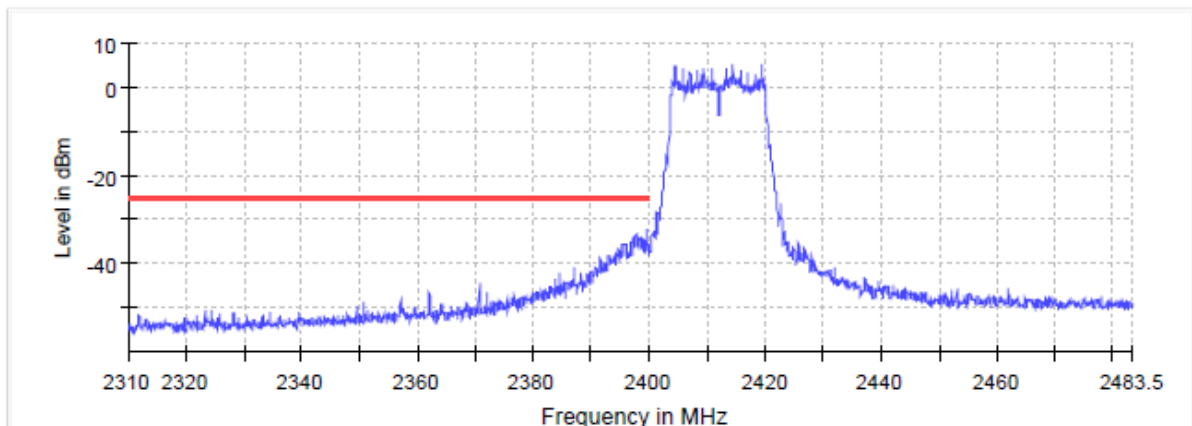


— Limit    — Sum Level    × Fail

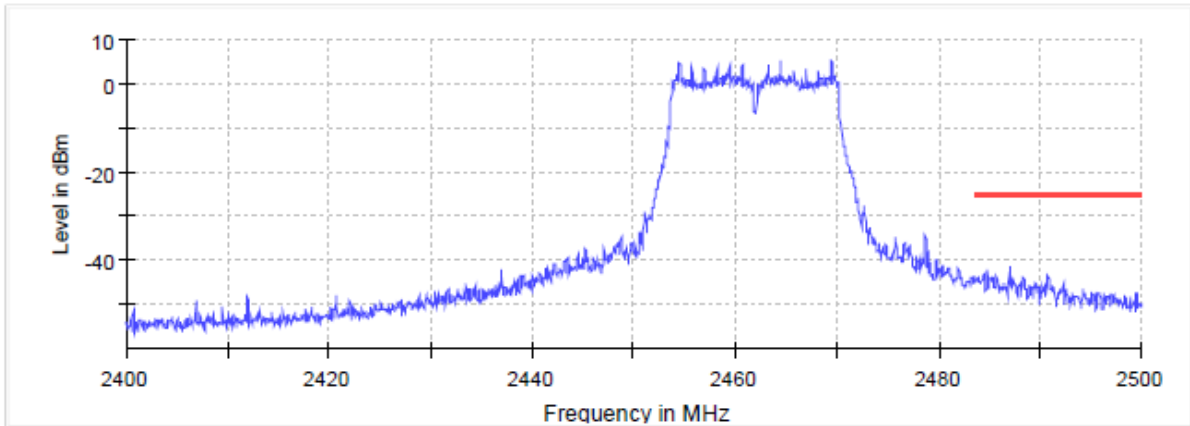
Radio Technology = WLAN b, Operating Frequency = high, Band Edge = high  
(S01\_161\_AC01)



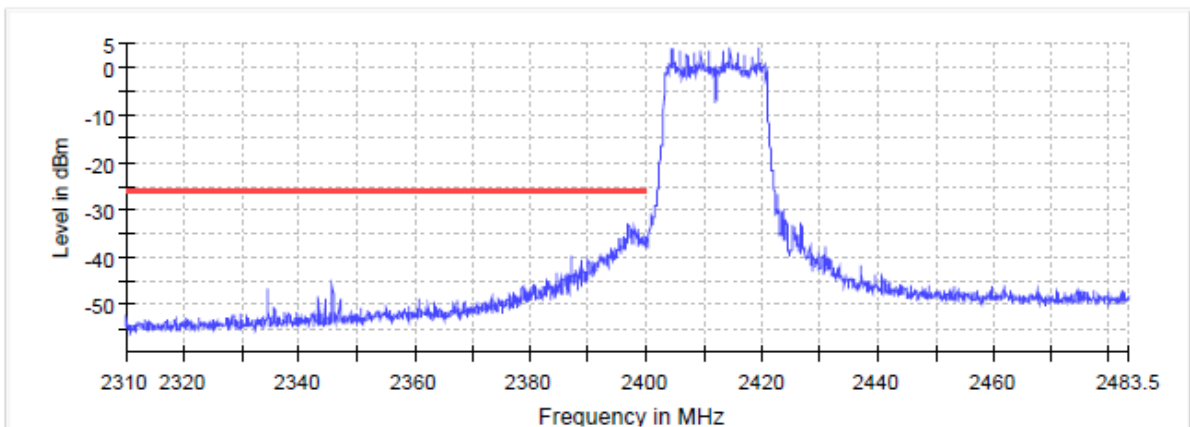
Radio Technology = WLAN g, Operating Frequency = low, Band Edge = low  
(S01\_161\_AC01)



Radio Technology = WLAN g, Operating Frequency = high, Band Edge = high  
(S01\_161\_AC01)

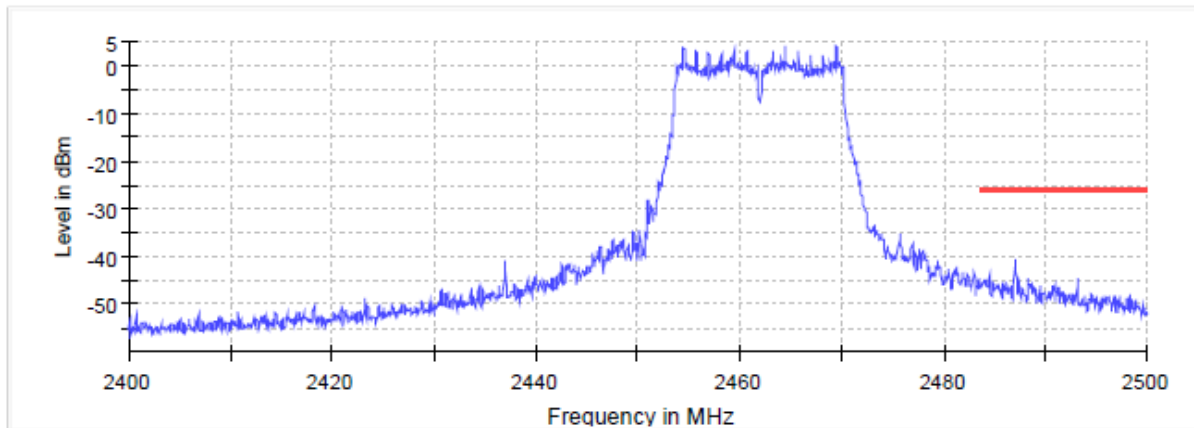


Radio Technology = WLAN n 20 MHz, Operating Frequency = low, Band Edge = low  
(S01\_161\_AC01)



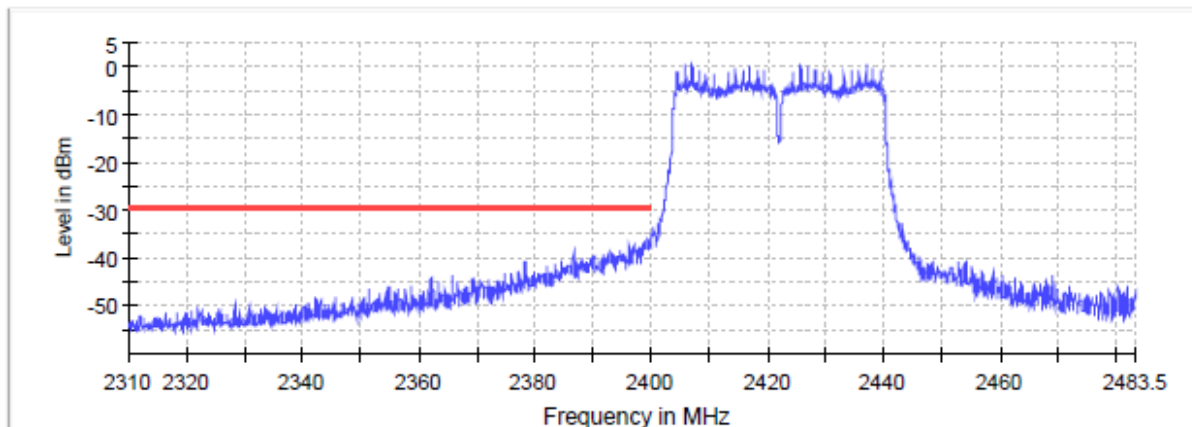


Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Band Edge = high  
(S01\_161\_AC01)



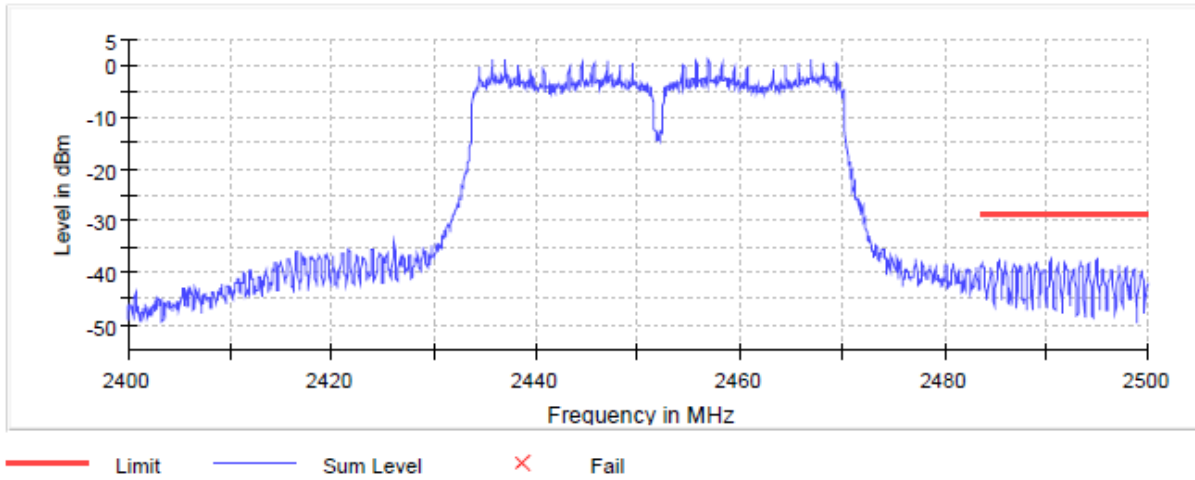
— Limit    — Sum Level    × Fail

Radio Technology = WLAN n 40 MHz, Operating Frequency = low, Band Edge = low  
(S01\_161\_AC01)



— Limit    — Sum Level    × Fail

Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Band Edge = high  
(S01\_161\_AC01)



### 5.7.5 TEST EQUIPMENT USED

- R&S TS8997

## 5.8 BAND EDGE COMPLIANCE RADIATED

Standard **FCC Part 15 Subpart C**

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

### 5.8.1 TEST DESCRIPTION

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

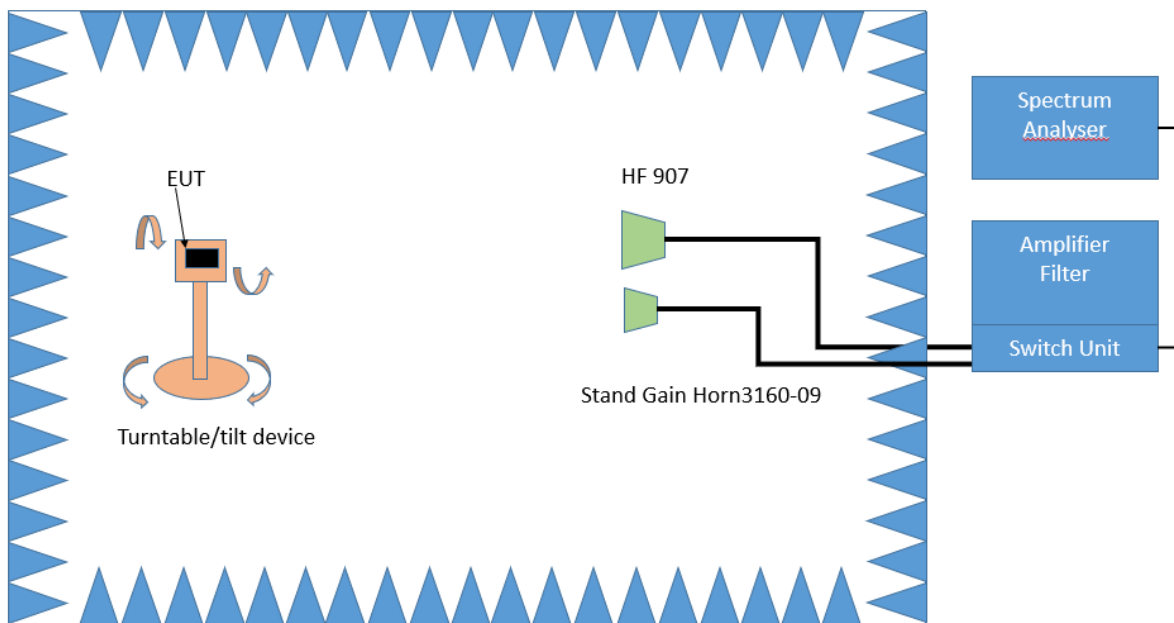
The test set-up was made in accordance to the general provisions of ANSI C63.10 in a typical installation configuration. The measurements were performed according the following sub-chapter of ANSI C63.10:

- 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:

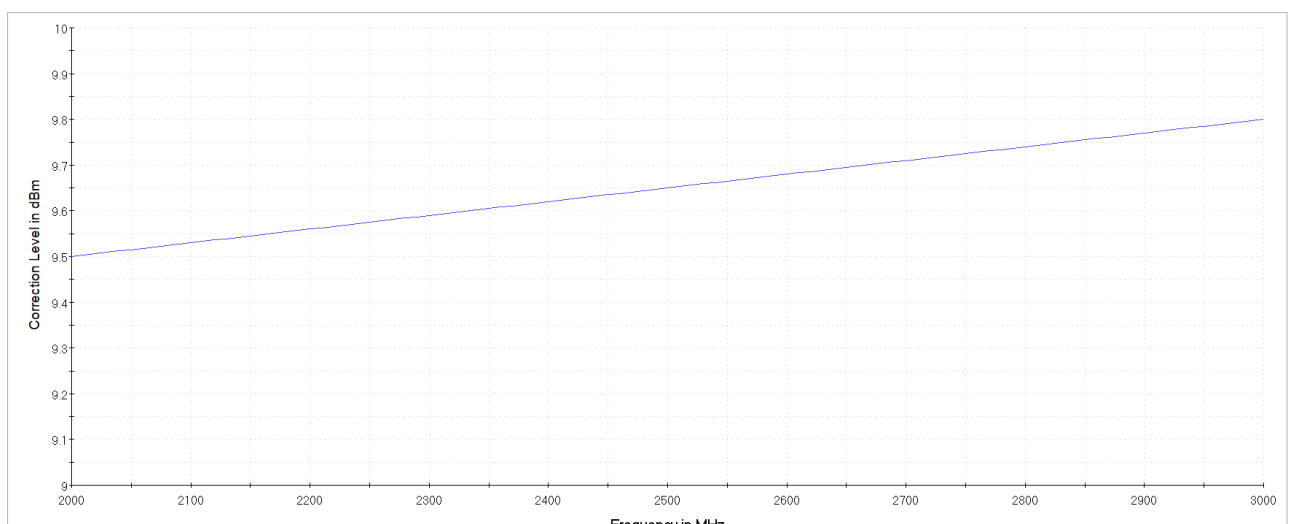
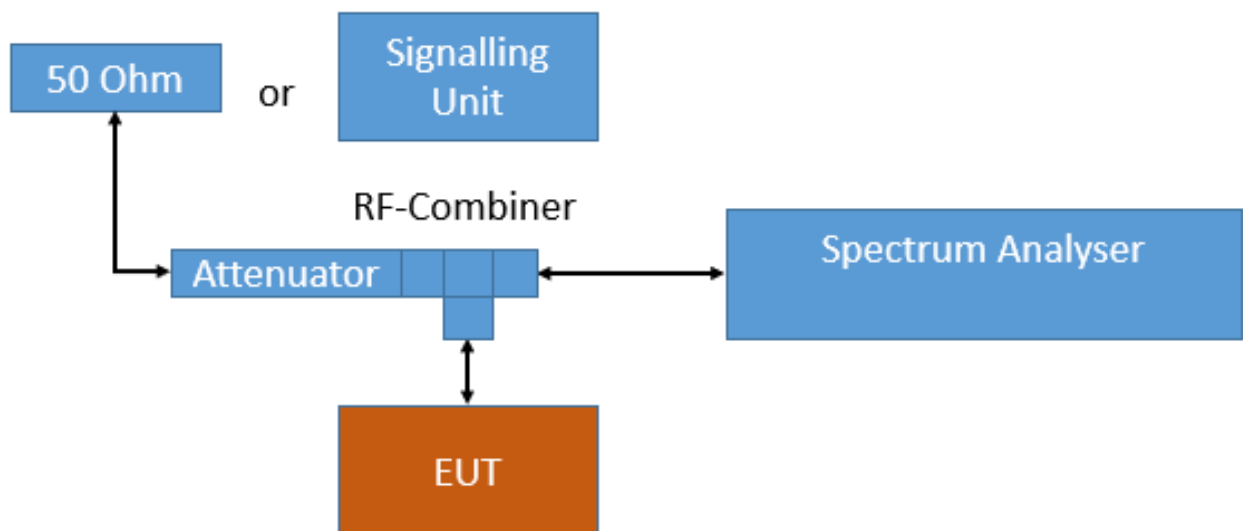
Spectrum analyser settings for step 3:

- 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: 2350 – 2500 MHz
- 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

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: 1006–1018 hPa  
 Humidity: 35–40 %  
 BT GFSK  
 Applied duty cycle correction (AV): 0.1 dB

| Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin to Limit [dB] |
|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|----------------------|
| Radiated           | 2480                   | 2483.5                | 54.2                    | PEAK     | 1000      | 74.0           | 19.8                 |
| Radiated           | 2480                   | 2483.5                | 34.9                    | AV       | 1000      | 54.0           | 19.1                 |
| Conducted          | 2402                   | 2390                  | 44.6                    | PEAK     | 1000      | 74.0           | 29.4                 |
| Conducted          | 2402                   | 2390                  | 34.3                    | AV       | 1000      | 54.0           | 19.7                 |
| Conducted          | 2480                   | 2483.5                | 53.6                    | PEAK     | 1000      | 74.0           | 20.4                 |
| Conducted          | 2480                   | 2483.5                | 41.5                    | AV       | 1000      | 54.0           | 12.5                 |

BT n/4 DQPSK  
 Applied duty cycle correction (AV): 0.2 dB

| Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin to Limit [dB] |
|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|----------------------|
| Radiated           | 2480                   | 2483.5                | 47.8                    | PEAK     | 1000      | 74.0           | 26.2                 |
| Radiated           | 2480                   | 2483.5                | 34.9                    | AV       | 1000      | 54.0           | 19.1                 |
| Conducted          | 2402                   | 2390                  | 47.3                    | PEAK     | 1000      | 74.0           | 26.7                 |
| Conducted          | 2402                   | 2390                  | 33.6                    | AV       | 1000      | 54.0           | 20.4                 |
| Conducted          | 2480                   | 2483.5                | 58.8                    | PEAK     | 1000      | 74.0           | 15.2                 |
| Conducted          | 2480                   | 2483.5                | 41.0                    | AV       | 1000      | 54.0           | 13.0                 |

BT 8-DPSK  
 Applied duty cycle correction (AV): 0.3 dB

| Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin to Limit [dB] |
|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|----------------------|
| Radiated           | 2480                   | 2483.5                | 48.5                    | PEAK     | 1000      | 74.0           | 25.5                 |
| Radiated           | 2480                   | 2483.5                | 35.0                    | AV       | 1000      | 54.0           | 19.0                 |
| Conducted          | 2402                   | 2390                  | 45.0                    | PEAK     | 1000      | 74.0           | 29.0                 |
| Conducted          | 2402                   | 2390                  | 33.7                    | AV       | 1000      | 54.0           | 20.3                 |
| Conducted          | 2480                   | 2483.5                | 58.7                    | PEAK     | 1000      | 74.0           | 15.3                 |
| Conducted          | 2480                   | 2483.5                | 42.9                    | AV       | 1000      | 54.0           | 11.1                 |

BT LE 1 Mbit/s  
 Applied duty cycle correction (AV): 7.4 dB

| Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin to Limit [dB] |
|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|----------------------|
| Conducted          | 2402                   | 2390                  | 43.8                    | PEAK     | 1000      | 74.0           | 30.2                 |
| Conducted          | 2402                   | 2390                  | 32.9                    | AV       | 1000      | 54.0           | 21.1                 |
| Conducted          | 2480                   | 2483.5                | 50.5                    | PEAK     | 1000      | 74.0           | 23.5                 |
| Conducted          | 2480                   | 2483.5                | 36.5                    | AV       | 1000      | 54.0           | 17.5                 |

BT LE 2 Mbit/s  
 Applied duty cycle correction (AV): 7.4 dB

| Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin to Limit [dB] |
|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|----------------------|
| Radiated           | 2480                   | 2483.5                | 47.7                    | PEAK     | 1000      | 74.0           | 26.3                 |
| Radiated           | 2480                   | 2483.5                | 42.1                    | AV       | 1000      | 54.0           | 11.9                 |
| Conducted          | 2402                   | 2390                  | 43.1                    | PEAK     | 1000      | 74.0           | 30.9                 |
| Conducted          | 2402                   | 2390                  | 32.8                    | AV       | 1000      | 54.0           | 21.3                 |
| Conducted          | 2480                   | 2483.5                | 57.4                    | PEAK     | 1000      | 74.0           | 16.6                 |
| Conducted          | 2480                   | 2483.5                | 40.2                    | AV       | 1000      | 54.0           | 13.8                 |

WLAN b-Mode; 20 MHz; 1 Mbit/s  
Applied duty cycle correction (AV): 0 dB

| Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin to Limit [dB] |
|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|----------------------|
| Radiated           | 2462                   | 2483.5                | 47.7                    | PEAK     | 1000      | 74.0           | 26.3                 |
| Radiated           | 2462                   | 2483.5                | 34.8                    | AV       | 1000      | 54.0           | 19.2                 |
| Conducted          | 2412                   | 2390.0                | 61.1                    | PEAK     | 1000      | 74.0           | 12.9                 |
| Conducted          | 2412                   | 2390.0                | 52.8                    | AV       | 1000      | 54.0           | 1.2                  |
| Conducted          | 2462                   | 2483.5                | 58.8                    | PEAK     | 1000      | 74.0           | 15.2                 |
| Conducted          | 2462                   | 2483.5                | 50.0                    | AV       | 1000      | 54.0           | 4.0                  |

WLAN g-Mode; 20 MHz; 6 Mbit/s  
Applied duty cycle correction (AV): 0.1 dB

| Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin to Limit [dB] |
|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|----------------------|
| Radiated           | 2462                   | 2483.5                | 49.6                    | PEAK     | 1000      | 74.0           | 24.4                 |
| Radiated           | 2462                   | 2483.5                | 34.8                    | AV       | 1000      | 54.0           | 19.2                 |
| Conducted          | 2412                   | 2390.0                | 71.4                    | PEAK     | 1000      | 74.0           | 2.6                  |
| Conducted          | 2412                   | 2390.0                | 51.6                    | AV       | 1000      | 54.0           | 2.4                  |
| Conducted          | 2417                   | 2390.0                | 70.9                    | PEAK     | 1000      | 74.0           | 3.1                  |
| Conducted          | 2417                   | 2390.0                | 52.6                    | AV       | 1000      | 54.0           | 1.4                  |
| Conducted          | 2452                   | 2483.5                | 72.2                    | PEAK     | 1000      | 74.0           | 1.8                  |
| Conducted          | 2452                   | 2483.5                | 50.7                    | AV       | 1000      | 54.0           | 3.3                  |
| Conducted          | 2457                   | 2483.5                | 72.8                    | PEAK     | 1000      | 74.0           | 1.3                  |
| Conducted          | 2457                   | 2483.5                | 49.3                    | AV       | 1000      | 54.0           | 4.7                  |
| Conducted          | 2462                   | 2483.5                | 71.9                    | PEAK     | 1000      | 74.0           | 2.1                  |
| Conducted          | 2462                   | 2483.5                | 50.7                    | AV       | 1000      | 54.0           | 3.3                  |

WLAN n-Mode; 20 MHz; MCS0  
Applied duty cycle correction (AV): 0.1 dB

| Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin to Limit [dB] |
|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|----------------------|
| Radiated           | 2462                   | 2483.5                | 47.9                    | PEAK     | 1000      | 74.0           | 26.1                 |
| Radiated           | 2462                   | 2483.5                | 34.9                    | AV       | 1000      | 54.0           | 19.1                 |
| Conducted          | 2412                   | 2390.0                | 71.6                    | PEAK     | 1000      | 74.0           | 2.4                  |
| Conducted          | 2412                   | 2390.0                | 51.0                    | AV       | 1000      | 54.0           | 3.0                  |
| Conducted          | 2417                   | 2390.0                | 68.5                    | PEAK     | 1000      | 74.0           | 5.5                  |
| Conducted          | 2417                   | 2390.0                | 49.4                    | AV       | 1000      | 54.0           | 4.6                  |
| Conducted          | 2457                   | 2483.5                | 69.5                    | PEAK     | 1000      | 74.0           | 4.5                  |
| Conducted          | 2457                   | 2483.5                | 49.6                    | AV       | 1000      | 54.0           | 4.4                  |
| Conducted          | 2462                   | 2483.5                | 71.7                    | PEAK     | 1000      | 74.0           | 2.3                  |
| Conducted          | 2462                   | 2483.5                | 49.0                    | AV       | 1000      | 54.0           | 5.0                  |

WLAN n-Mode; 40 MHz; MCS0  
Applied duty cycle correction (AV): 0.2 dB

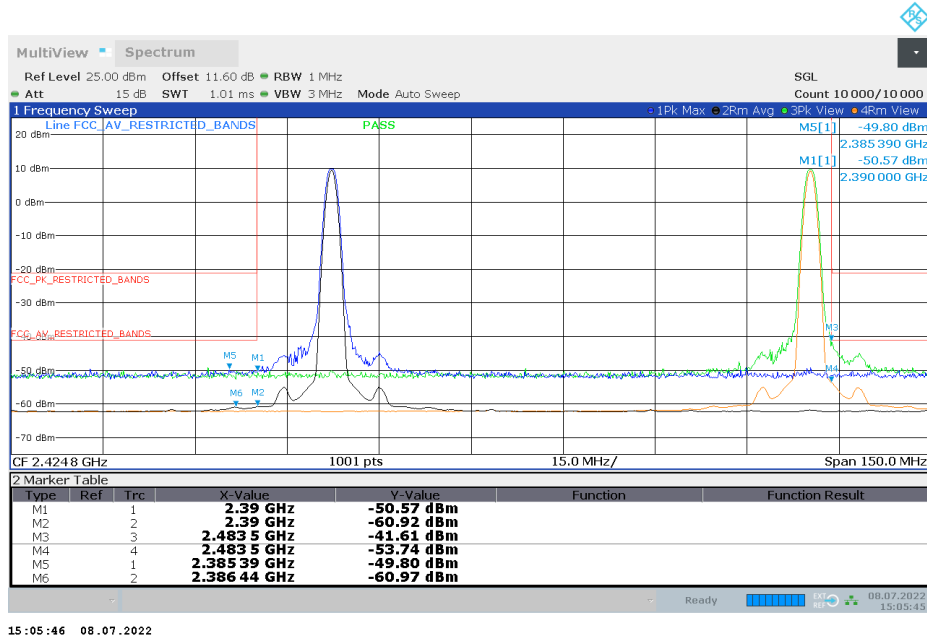
| Measurement Method | Ch. Center Freq. [MHz] | Band Edge Freq. [MHz] | Spurious Level [dBµV/m] | Detector | RBW [kHz] | Limit [dBµV/m] | Margin to Limit [dB] |
|--------------------|------------------------|-----------------------|-------------------------|----------|-----------|----------------|----------------------|
| Radiated           | 2452                   | 2483.5                | 47.7                    | PEAK     | 1000      | 74.0           | 26.3                 |
| Radiated           | 2452                   | 2483.5                | 35.0                    | AV       | 1000      | 54.0           | 19.0                 |
| Conducted          | 2432                   | 2390.0                | 71.3                    | PEAK     | 1000      | 74.0           | 2.7                  |
| Conducted          | 2432                   | 2390.0                | 50.9                    | AV       | 1000      | 54.0           | 3.1                  |
| Conducted          | 2437                   | 2390.0                | 70.3                    | PEAK     | 1000      | 74.0           | 3.7                  |
| Conducted          | 2437                   | 2390.0                | 50.9                    | AV       | 1000      | 54.0           | 3.1                  |
| Conducted          | 2437                   | 2483.5                | 72.0                    | PEAK     | 1000      | 74.0           | 2.0                  |
| Conducted          | 2437                   | 2483.5                | 49.2                    | AV       | 1000      | 54.0           | 4.8                  |
| Conducted          | 2452                   | 2483.5                | 73.0                    | PEAK     | 1000      | 74.0           | 1.0                  |
| Conducted          | 2452                   | 2483.5                | 51.4                    | AV       | 1000      | 54.0           | 2.6                  |

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

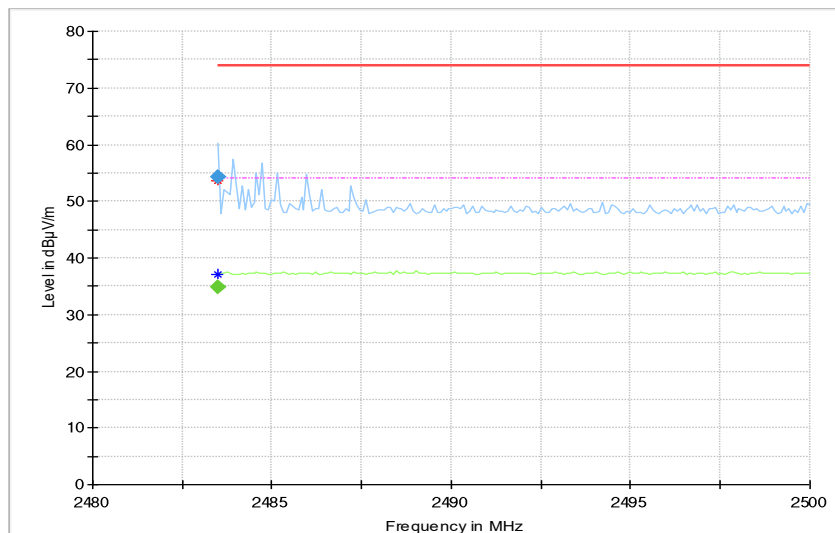


### 5.8.4 MEASUREMENT PLOT (EXAMPLE PLOT, SHOWING WORST CASE, IF APPLICABLE)

Radio Technology = Bluetooth BDR, Operating Frequency = low + high, Band Edge = low + high  
(S01\_161\_AD01)



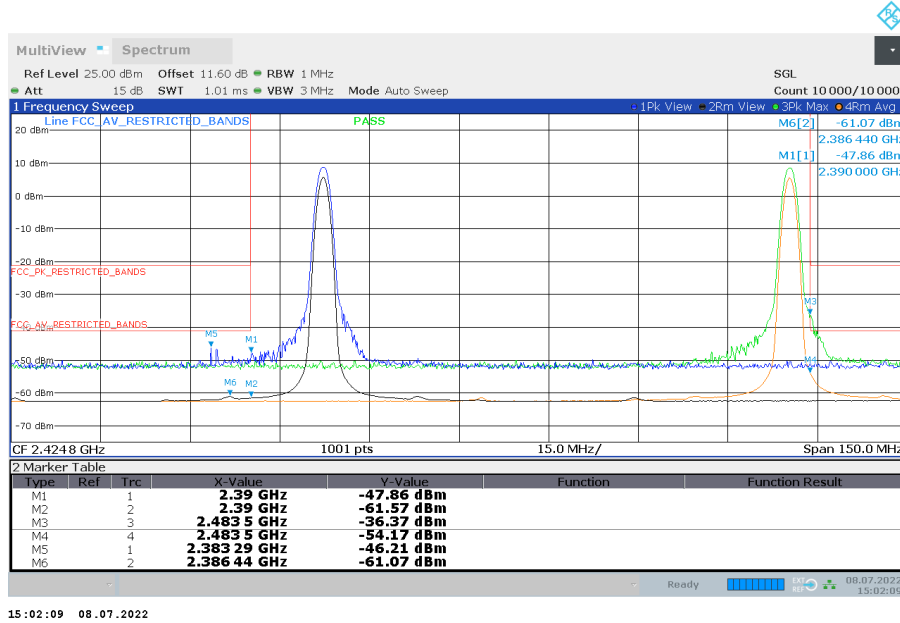
Radio Technology = Bluetooth BDR, Operating Frequency = high, Band Edge = high  
(S02\_161\_AB01)



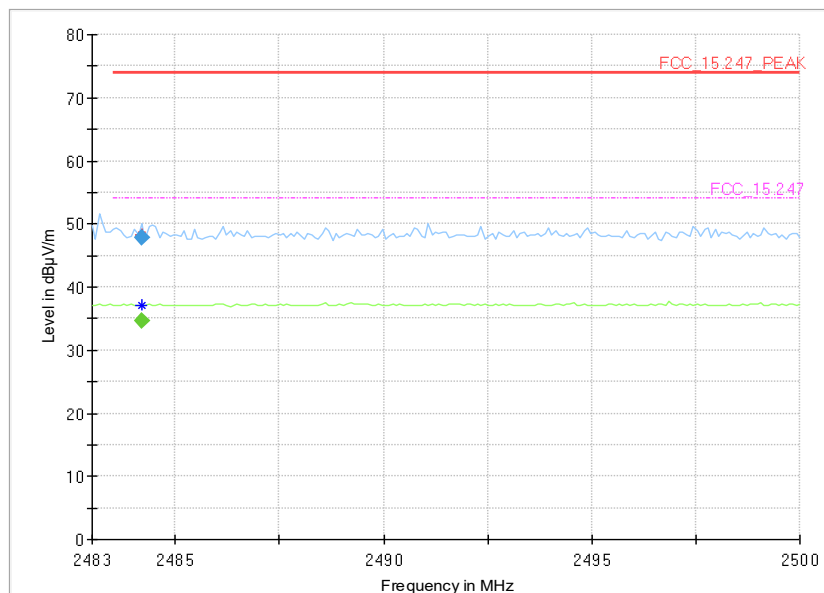
### Final Result

| 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) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2483.500        | ---              | 34.8              | 54.00          | 19.17       | 1000.0          | 1000.000        | 150.0       | H   | 154.0         | 15.0            | 5.3          |
| 2483.500        | 54.2             | ---               | 74.00          | 19.76       | 1000.0          | 1000.000        | 150.0       | H   | 154.0         | 15.0            | 5.3          |

Radio Technology = Bluetooth EDR 2, Operating Frequency = low + high, Band Edge = low + high  
(S01\_161\_AD01)



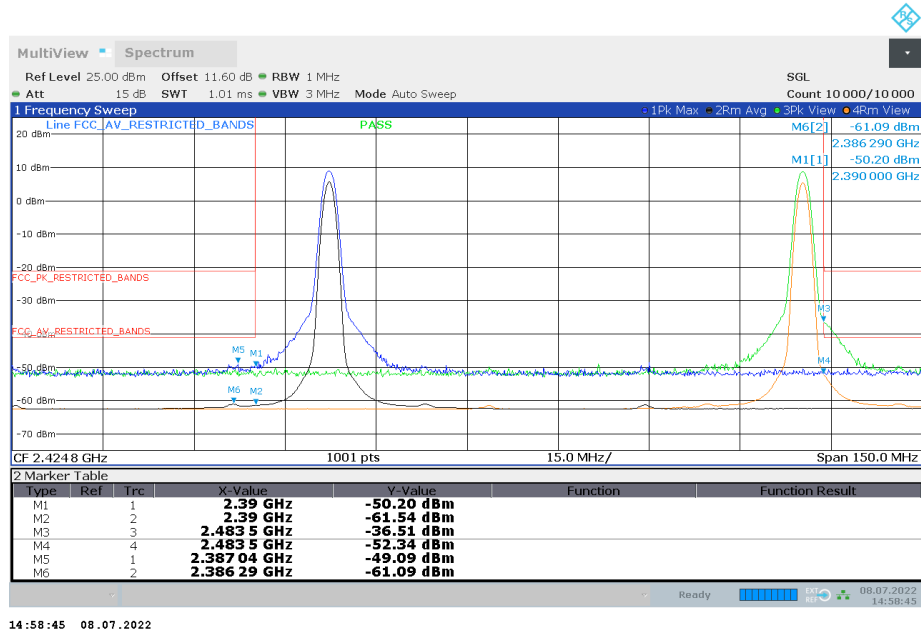
Radio Technology = Bluetooth EDR 2, Operating Frequency = high, Band Edge = high  
(S02\_161\_AB01)



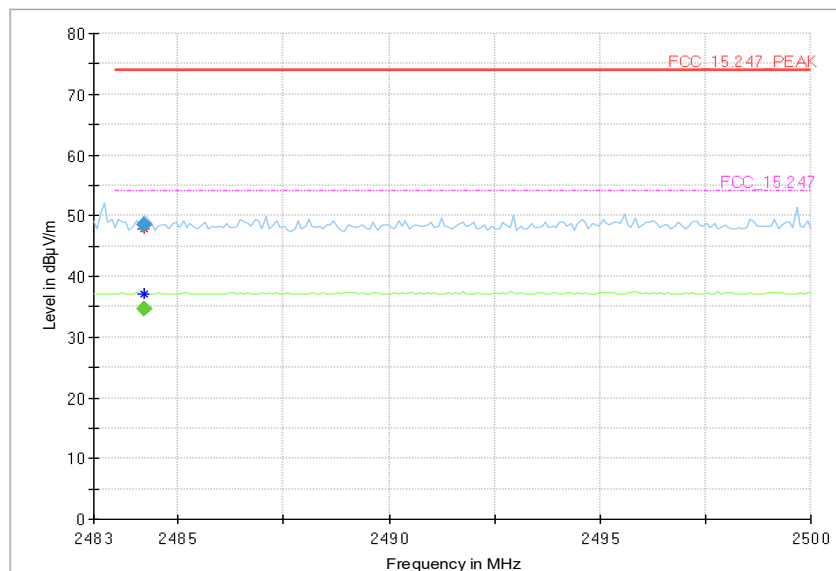
### Final Result

| 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) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2484.190        | ---              | 34.7              | 54.00          | 19.30       | 1000.0          | 1000.000        | 150.0       | V   | 144.0         | 15.0            | 5.3          |
| 2484.190        | 47.8             | ---               | 74.00          | 26.20       | 1000.0          | 1000.000        | 150.0       | V   | 144.0         | 15.0            | 5.3          |

Radio Technology = Bluetooth EDR 3, Operating Frequency = low + high, Band Edge = low + high  
(S01\_161\_AD01)



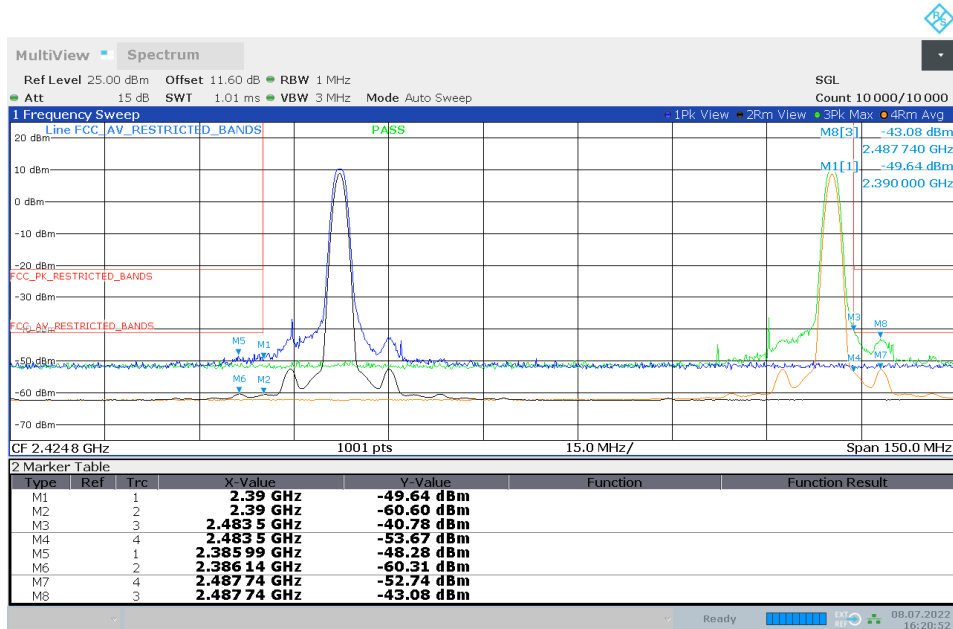
Radio Technology = Bluetooth EDR 3, Operating Frequency = high, Band Edge = high  
(S02\_161\_AB01)



### Final Result

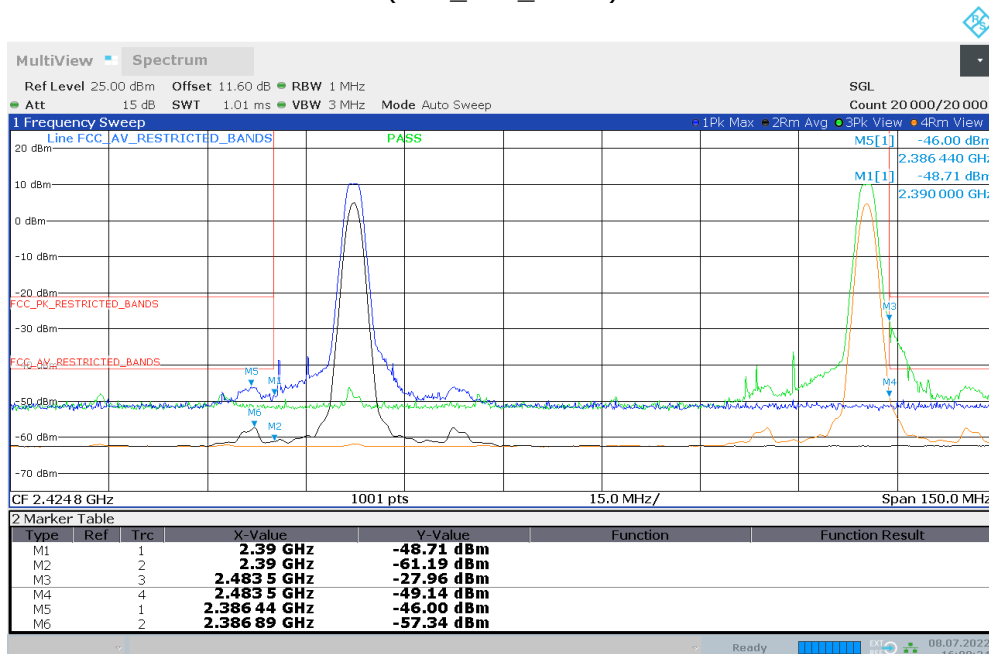
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2484.190        | ---              | 34.7              | 54.00          | 19.31       | 1000.0          | 1000.000        | 150.0       | V   | -115.0        | 15.0            | 5.3          |
| 2484.190        | 48.5             | ---               | 74.00          | 25.54       | 1000.0          | 1000.000        | 150.0       | V   | -115.0        | 15.0            | 5.3          |

Radio Technology = Bluetooth LE 1 Mbps, Operating Frequency = low + high, Band Edge = low + high  
(S01\_161\_AD01)



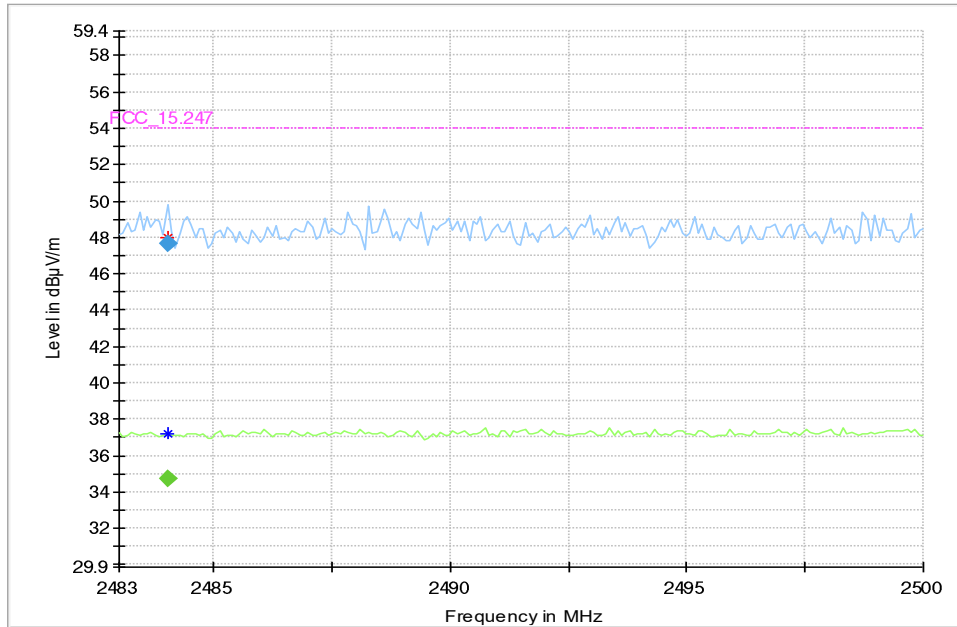
16:20:52 08.07.2022

Radio Technology = Bluetooth LE 2 Mbps, Operating Frequency = low + high, Band Edge = low + high  
(S01\_161\_AD01)



16:00:34 08.07.2022

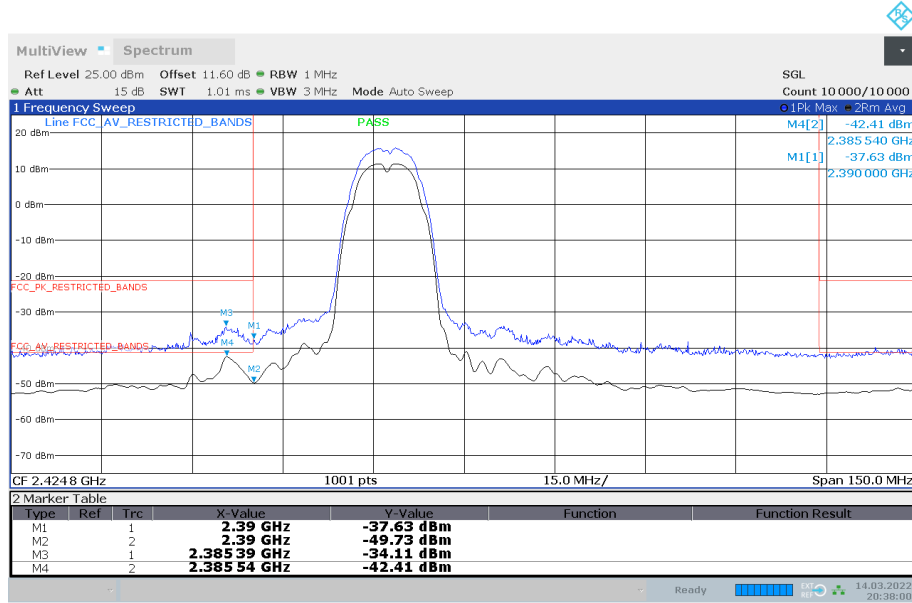
Radio Technology = Bluetooth LE 2 Mbps, Operating Frequency = high, Band Edge = high  
(S02\_161\_AB01)



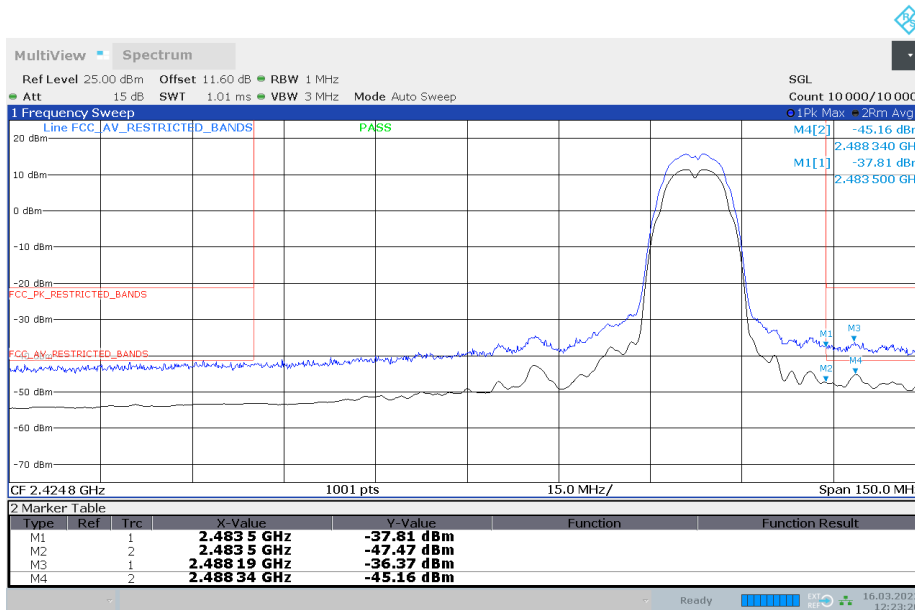
### Final\_Result

| 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) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2484.020        | 47.7             | ---               | 74.0           | 26.27       | 1000.0          | 1000.00         | 150.        | H   | -19.0         | -15.0           | 5.3          |
| 2484.020        | ---              | 34.7              | 54.0           | 19.28       | 1000.0          | 1000.00         | 150.        | H   | -19.0         | -15.0           | 5.3          |

Radio Technology = WLAN b, Operating Frequency = low + high, Band Edge = low + high (S01\_161\_AA01)

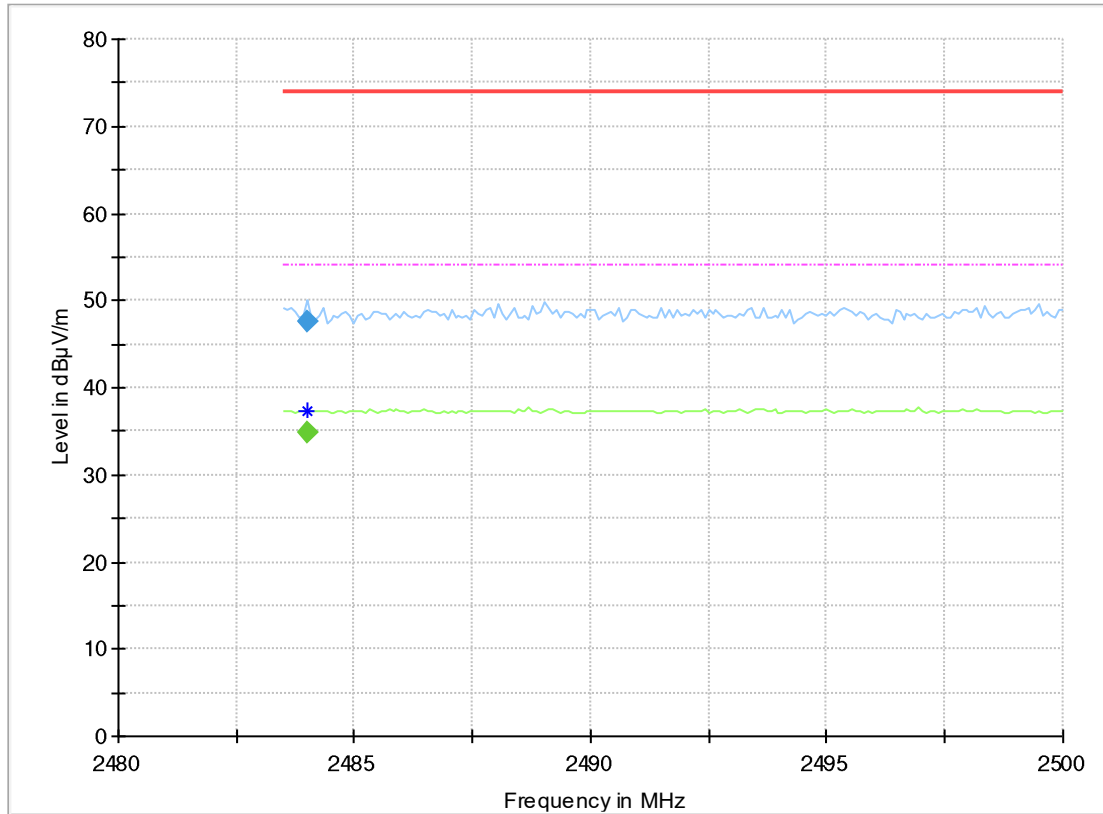


20:38:01 14.03.2022



12:23:20 16.03.2022

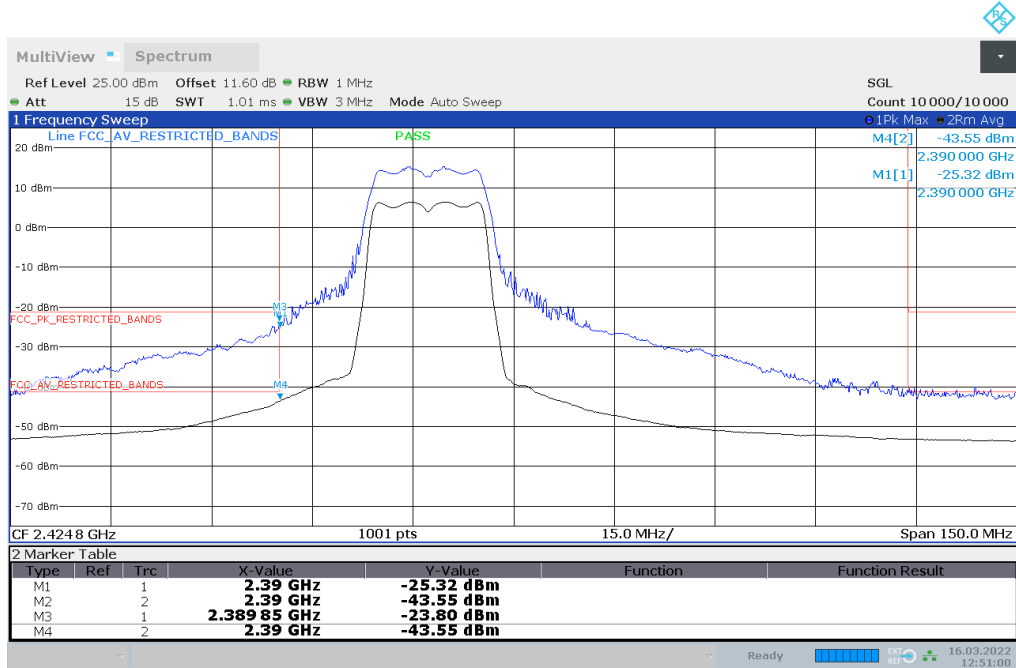
Radio Technology = WLAN b, Operating Frequency = high, Band Edge = high  
(S02\_161\_AB01)



### Final Result

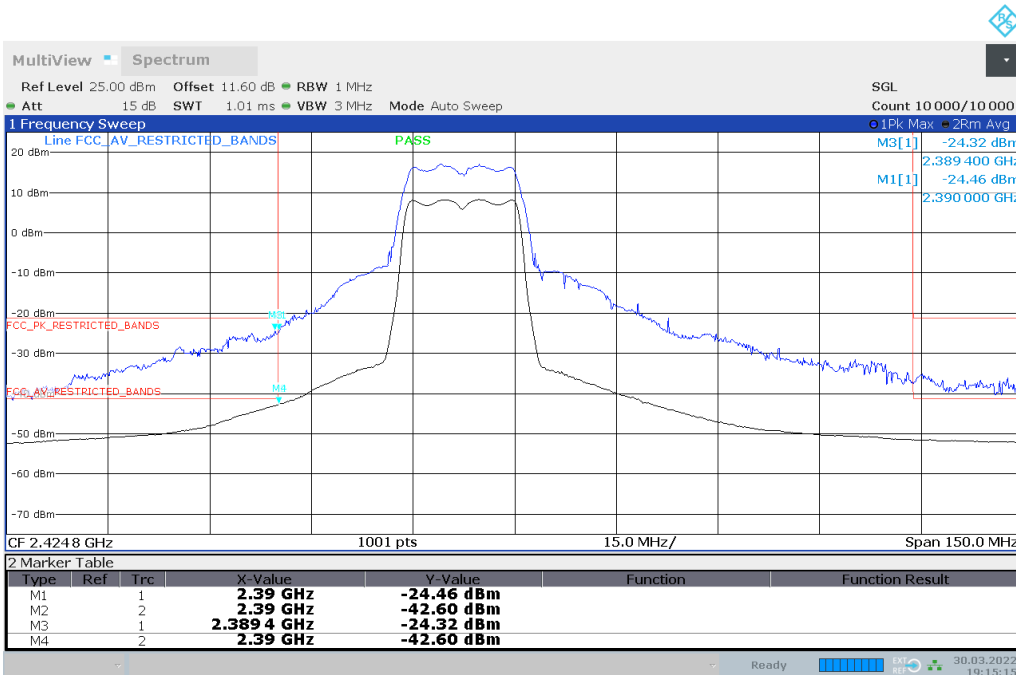
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Marg in (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|--------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2483.995        | ---              | 34.8              | 54.0           | 19.17        | 1000.0          | 1000.00         | 150.        | V   | -130.0        | -10.0           | 5.3          |
| 2483.995        | 47.7             | ---               | 74.0           | 26.26        | 1000.0          | 1000.00         | 150.        | V   | -130.0        | -10.0           | 5.3          |

Radio Technology = WLAN g, Operating Frequency = low + high, Band Edge = low + high (S01\_161\_AA01)



12:51:00 16.03.2022

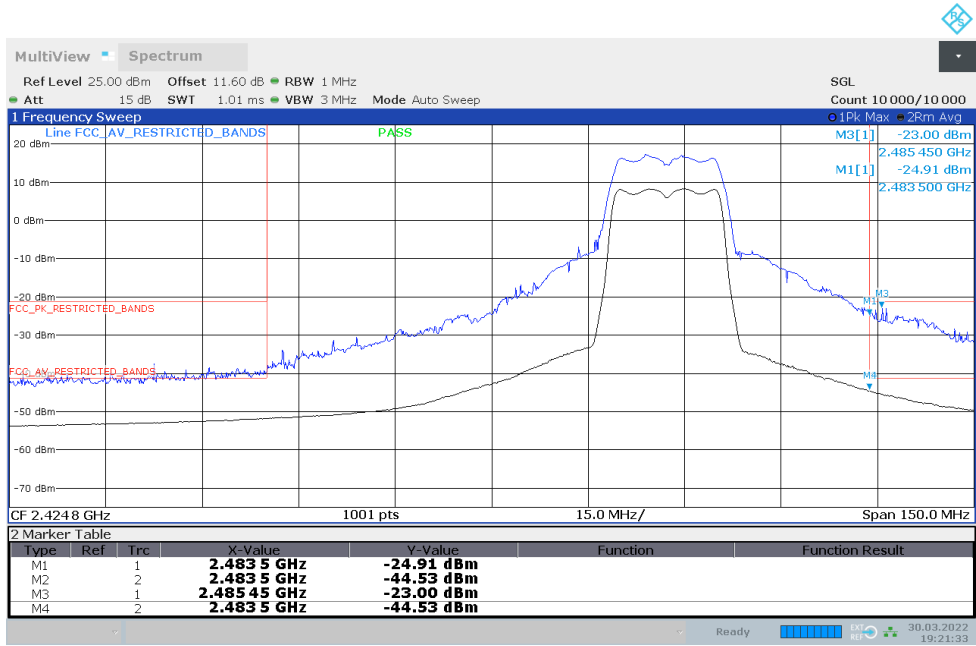
TX on 2412 MHz



19:15:16 30.03.2022

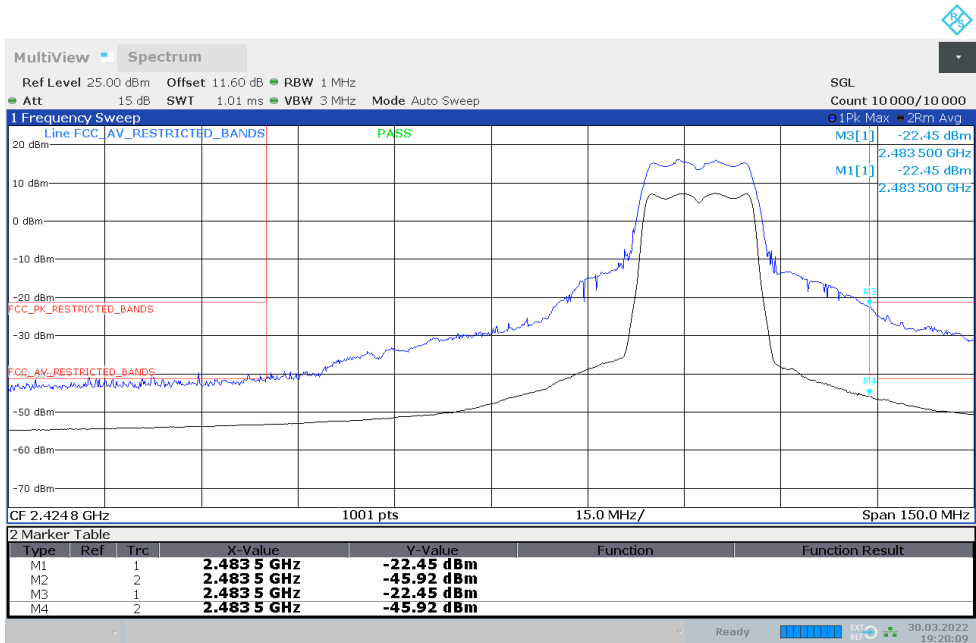
TX on 2417 MHz





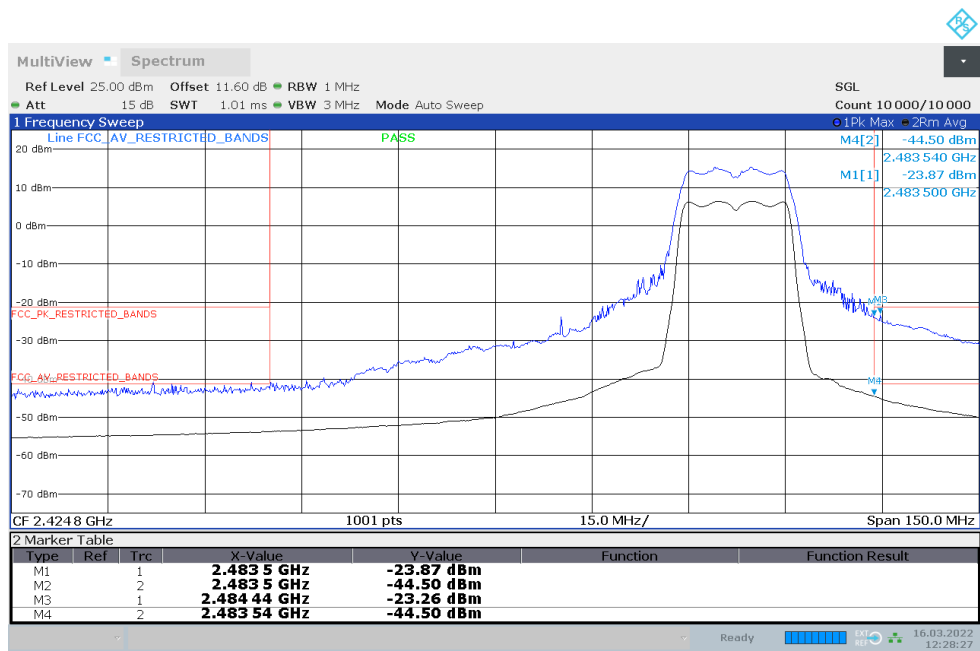
19:21:34 30.03.2022

TX on 2452 MHz



19:20:09 30.03.2022

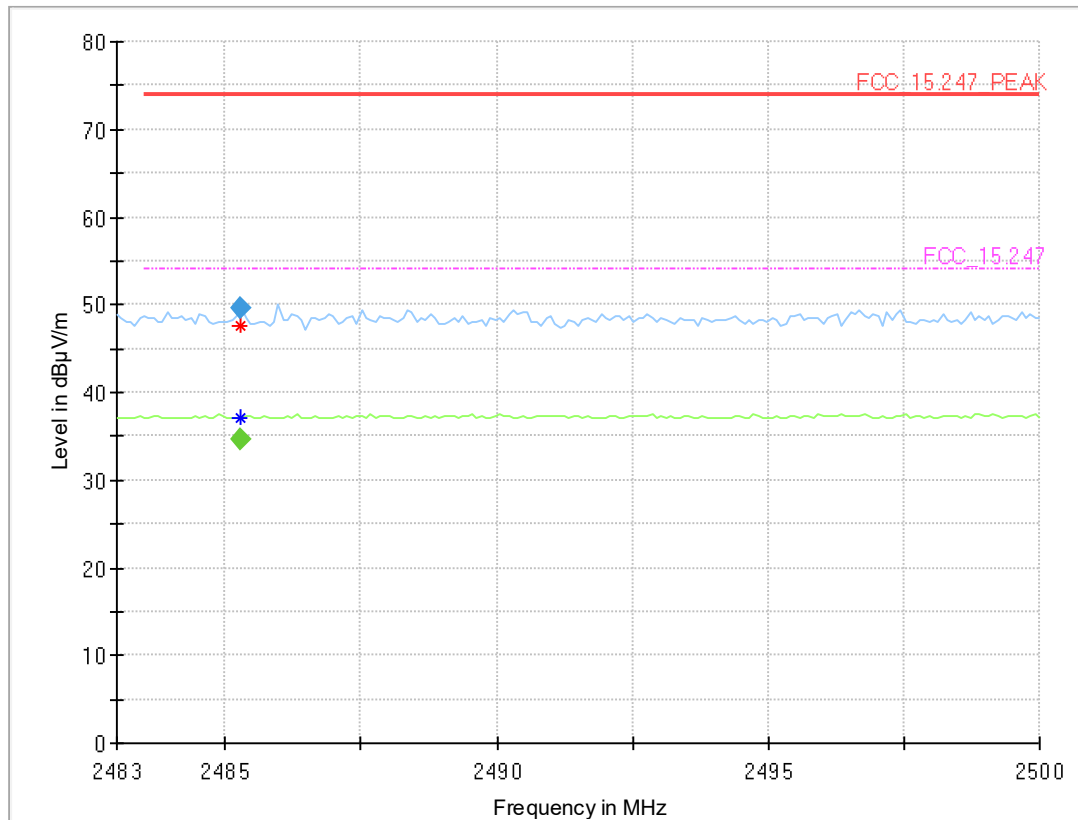
TX on 2457 MHz



12:28:28 16.03.2022

TX on 2462 MHz

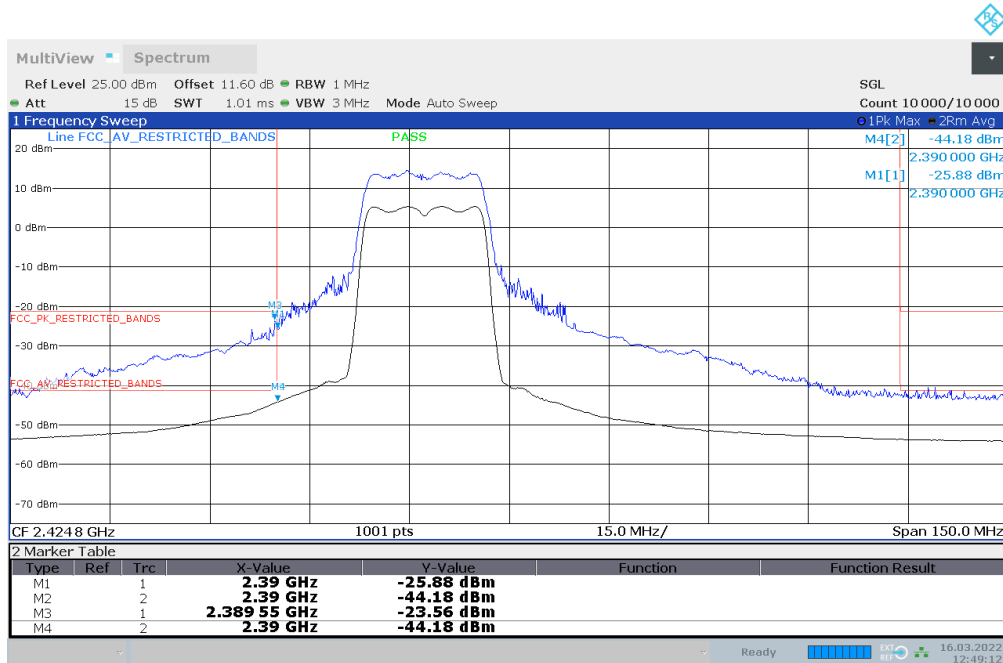
Radio Technology = WLAN g, Operating Frequency = high, Band Edge = high  
(S02\_161\_AB01)



### Final Result

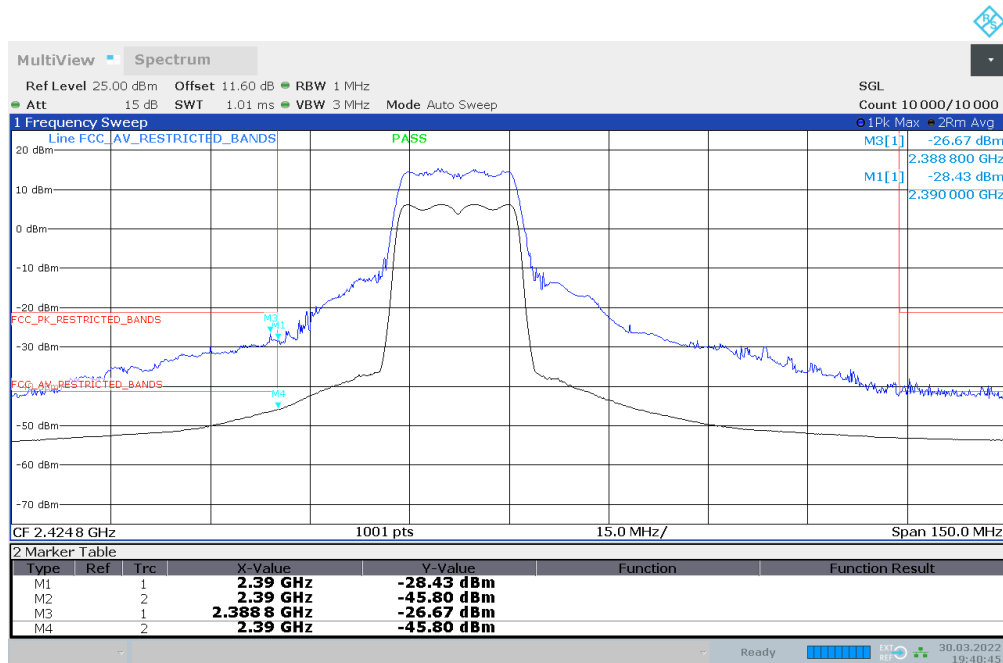
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2485.295        | ---              | 34.7              | 54.00          | 19.27       | 1000.0          | 1000.000        | 150.0       | H   | -186.0        | 6.0             | 5.3          |
| 2485.295        | 49.6             | ---               | 74.00          | 24.42       | 1000.0          | 1000.000        | 150.0       | H   | -186.0        | 6.0             | 5.3          |

Radio Technology = WLAN n 20 MHz, Operating Frequency = low + high, Band Edge = low + high  
(S01\_161\_AA01)



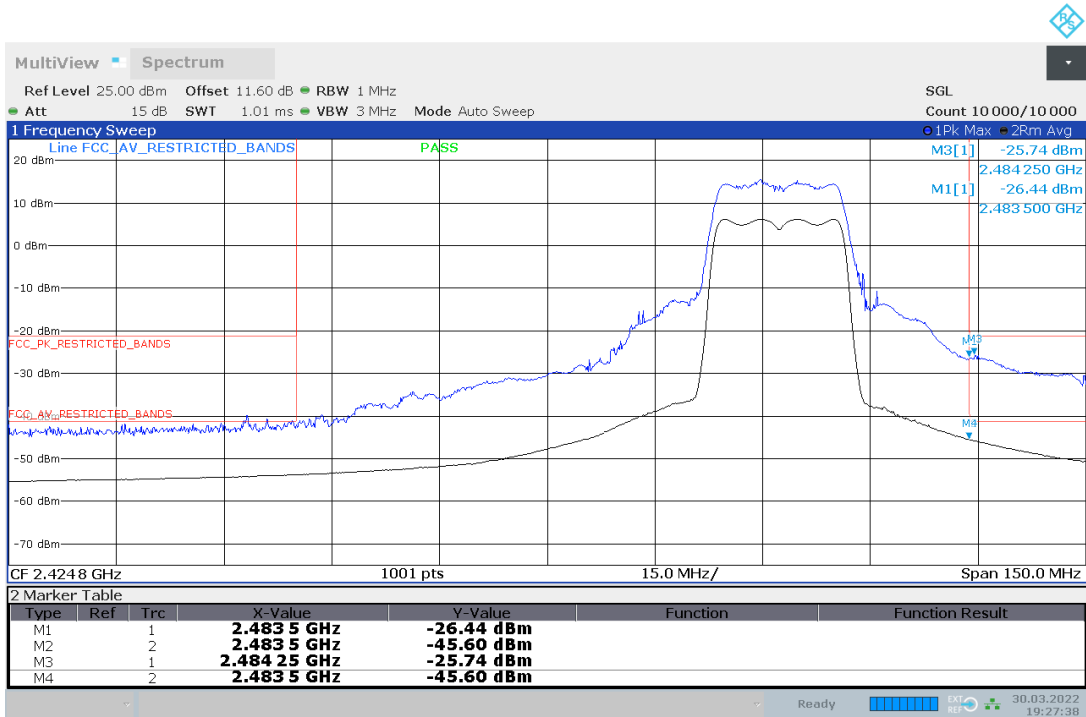
12:49:13 16.03.2022

TX on 2412 MHz



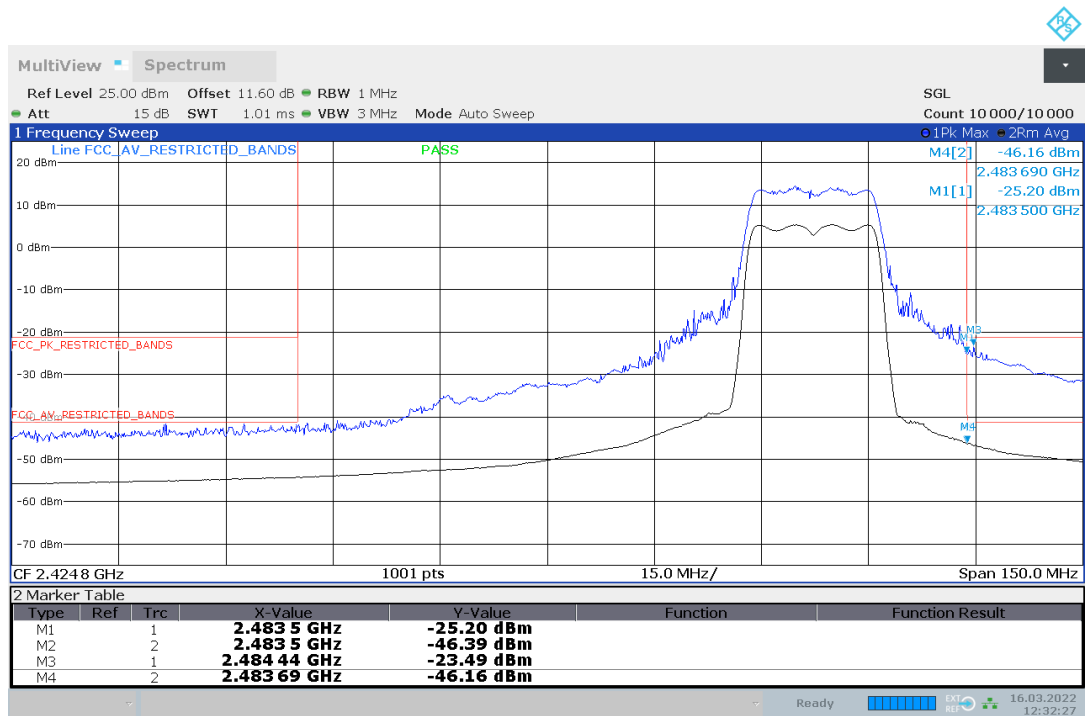
19:40:46 30.03.2022

TX on 2417 MHz



19:27:39 30.03.2022

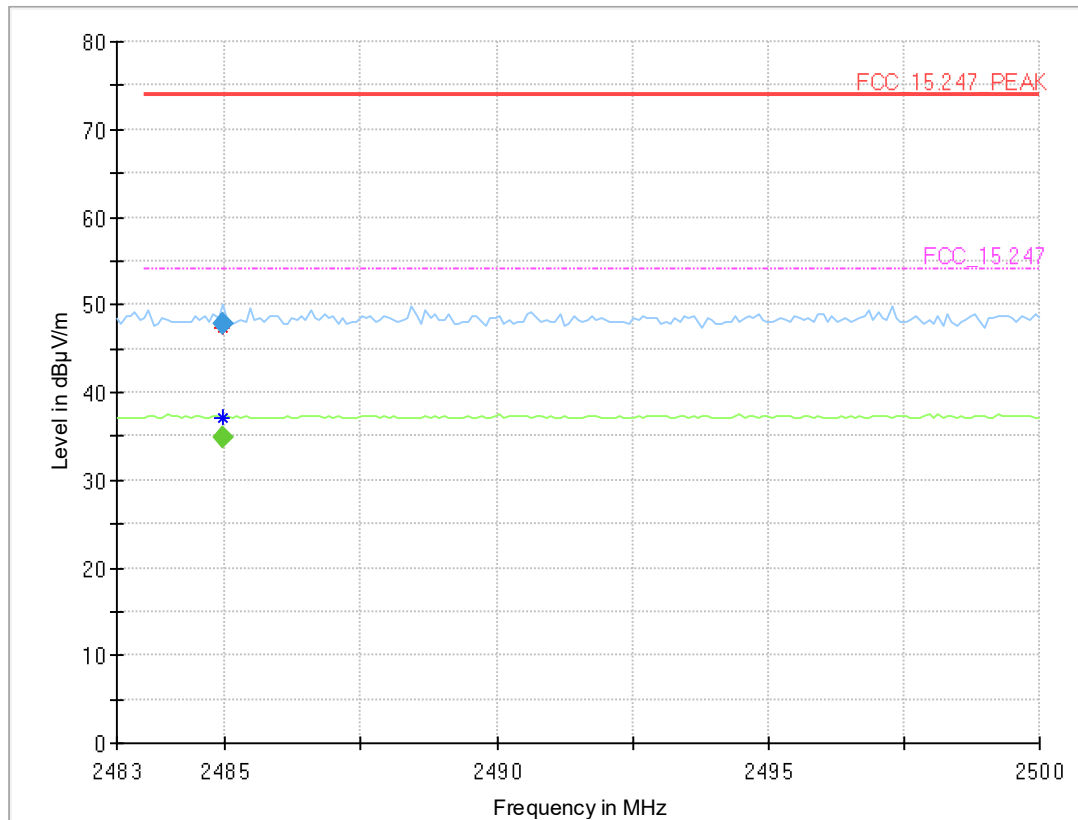
TX on 2457 MHz



12:32:28 16.03.2022

TX on 2462 MHz

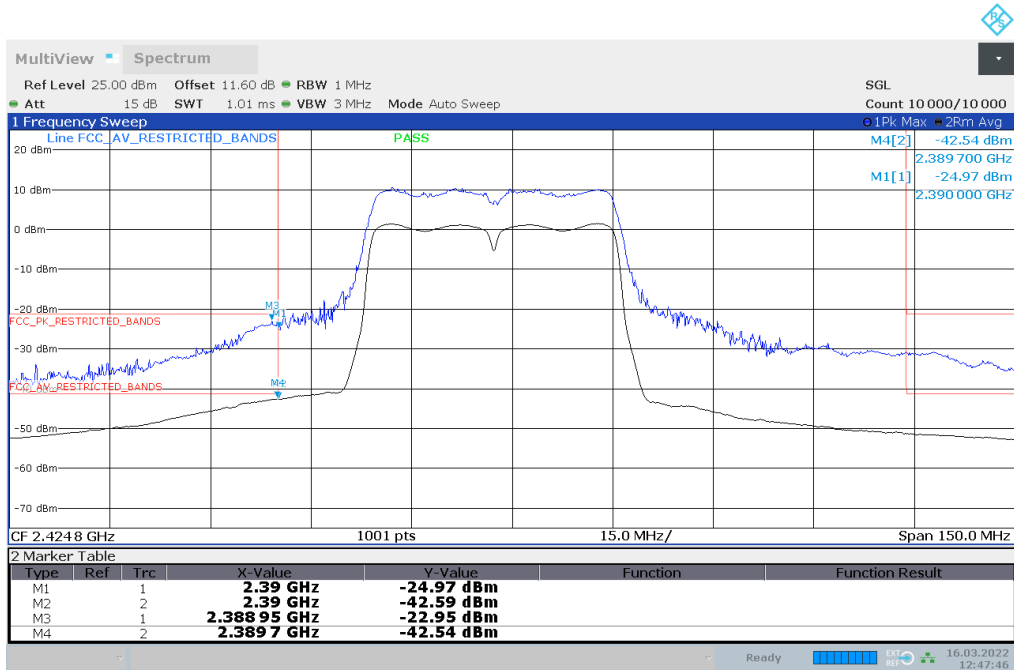
Radio Technology = WLAN n 20 MHz, Operating Frequency = high, Band Edge = high  
(S02\_161\_AB01)



### Final Result

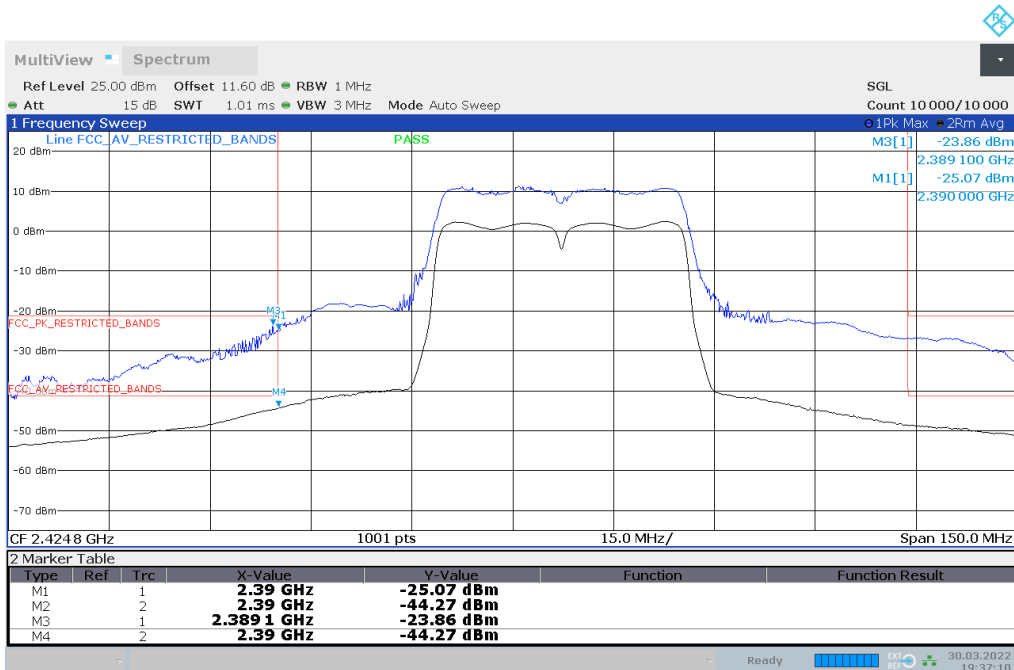
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2484.955        | ---              | 34.8              | 54.00          | 19.23       | 1000.0          | 1000.000        | 150.0       | V   | 131.0         | 87.0            | 5.3          |
| 2484.955        | 47.9             | ---               | 74.00          | 26.07       | 1000.0          | 1000.000        | 150.0       | V   | 131.0         | 87.0            | 5.3          |

Radio Technology = WLAN n 40 MHz, Operating Frequency = low + high, Band Edge = low + high  
(S01\_161\_AA01)



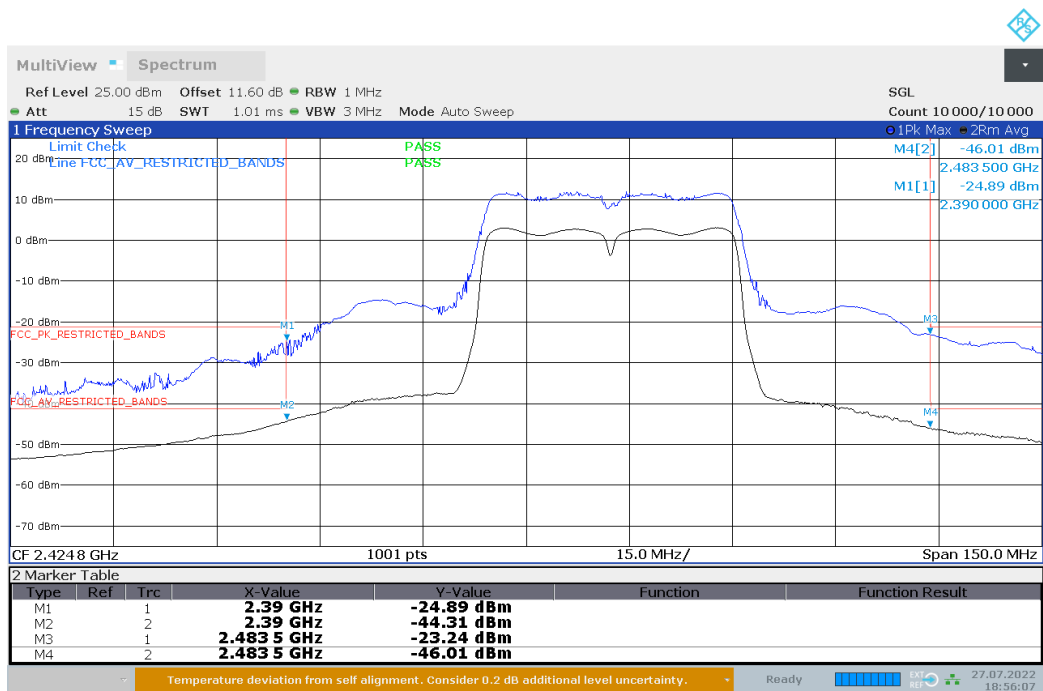
12:47:46 16.03.2022

TX on 2422 MHz



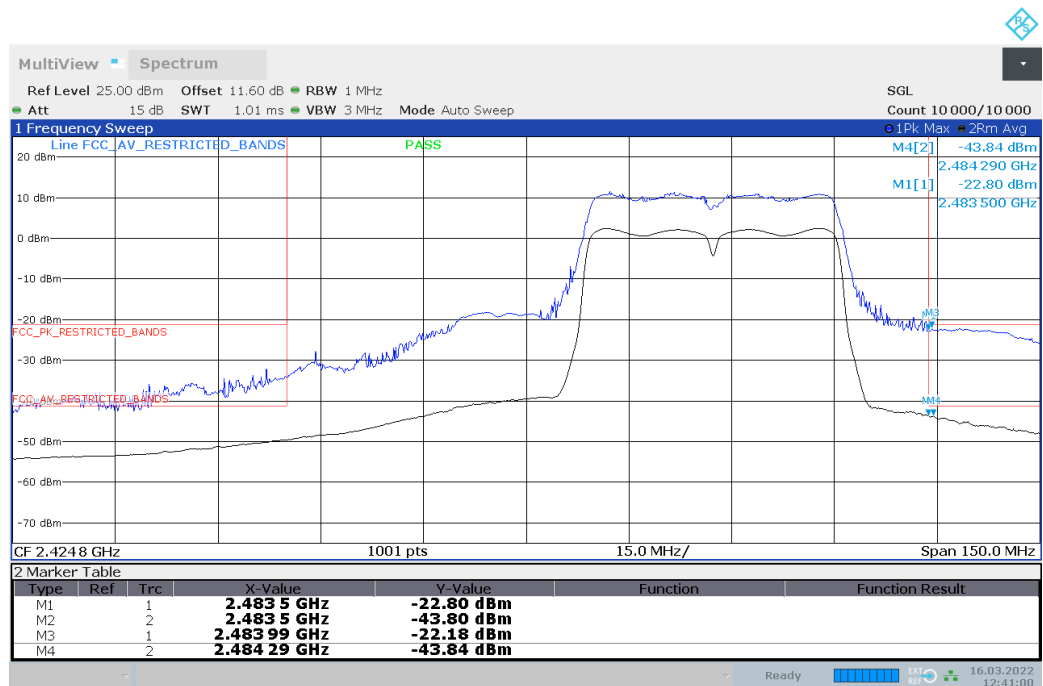
19:37:11 30.03.2022

TX on 2432 MHz



18:56:07 27.07.2022

TX on 2437 MHz

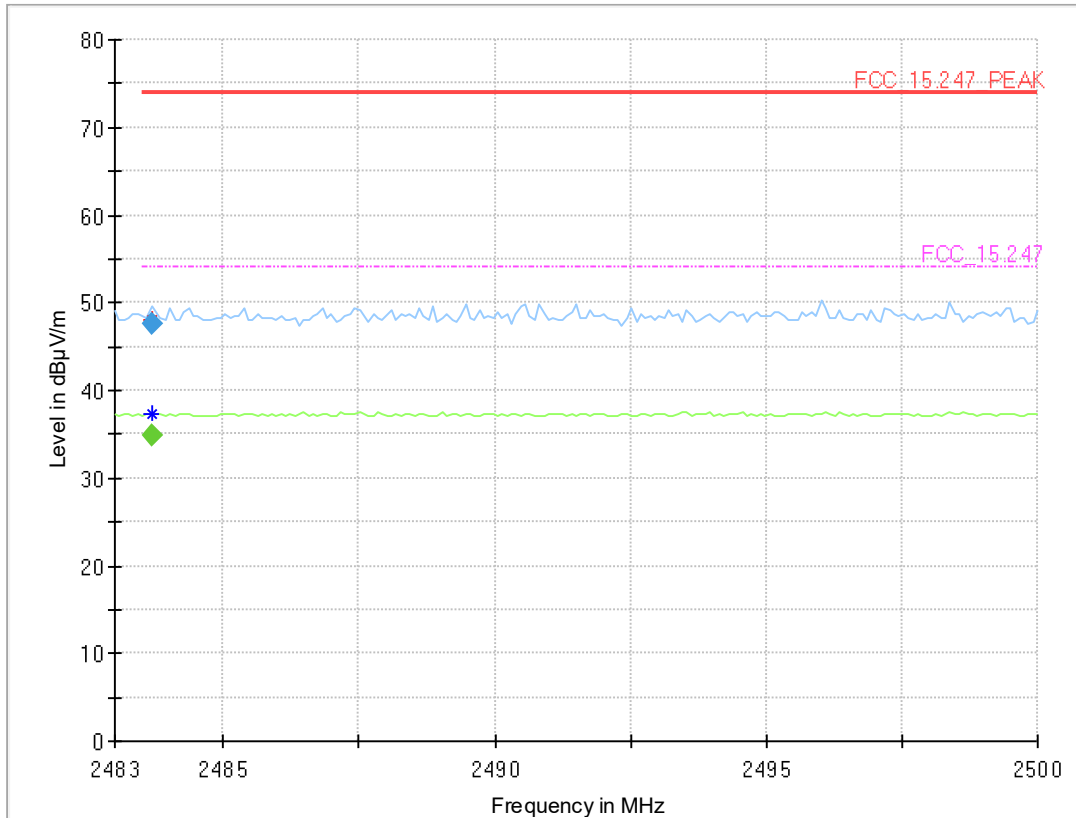


12:41:01 16.03.2022

TX on 2462 MHz



Radio Technology = WLAN n 40 MHz, Operating Frequency = high, Band Edge = high  
(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) |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|
| 2483.680        | ---              | 34.8              | 54.00          | 19.21       | 1000.0          | 1000.000        | 150.0       | V   | -38.0         | 15.0            | 5.3          |
| 2483.680        | 47.7             | ---               | 74.00          | 26.33       | 1000.0          | 1000.000        | 150.0       | V   | -38.0         | 15.0            | 5.3          |

### 5.8.5 TEST EQUIPMENT USED

- Radiated Emissions FAR 2.4 GHz FCC
- R&S TS8997

## 5.9 POWER DENSITY

Standard **FCC Part 15 Subpart C**

**The test was performed according to:**

ANSI C63.10 11.10.2, 11.10.7

### 5.9.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up in a shielded room to perform the Power Density measurements.

The results recorded were measured with the modulation which produces the worst-case (highest) power density.

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.

Maximum Peak Power Spectral Density (e.g. Bluetooth low energy):

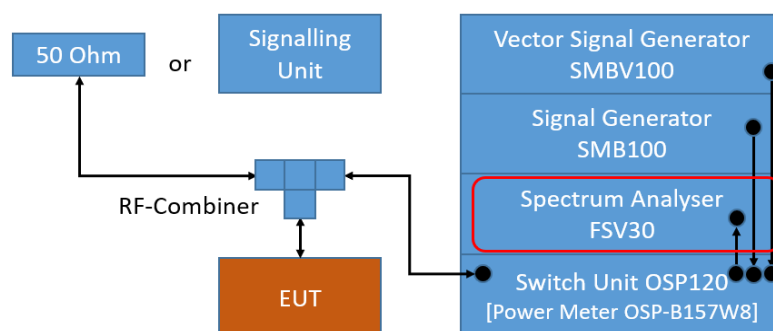
Analyser settings:

- Resolution Bandwidth (RBW): 100 kHz, 10 kHz or 3 kHz
- Video Bandwidth (VBW):  $\geq 3$  times RBW
- Trace: Maxhold
- Sweeps: Till stable (min. 200, max. 15000)
- Sweeptime: Auto
- Detector: Peak

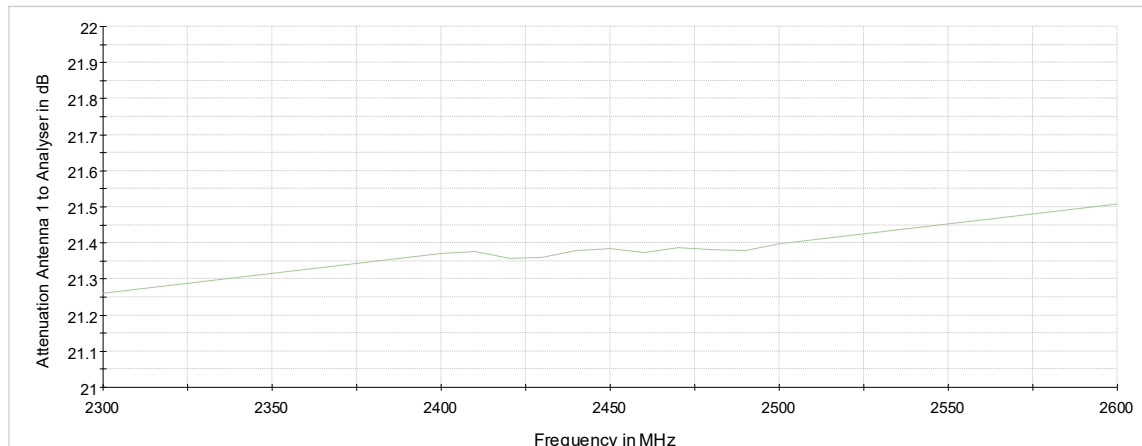
Maximum Average Power Spectral Density (e.g. WLAN):

Analyser settings:

- Resolution Bandwidth (RBW): 100 kHz, 10 kHz or 3 kHz
- Video Bandwidth (VBW):  $\geq 3$  times RBW
- Sweep Points:  $\geq 2$  times span / RBW
- Trace: Maxhold
- Sweeps: Till stable (max. 150)
- Sweeptime:  $\leq$  Number of Sweep Points x minimum transmission duration
- Detector: RMS



TS8997; Power Spectral Density



Attenuation of the measurement path

## 5.9.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart C, §15.247 (e)

For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

...

The same method of determining the conducted output power shall be used to determine the power spectral density.

FCC Part 15, Subpart C, §15.247 (f)

(f) For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques.

...

The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

### 5.9.3 TEST PROTOCOL

Ambient temperature: 23-25 °C  
 Air Pressure: 990-1024 hPa  
 Humidity: 30-40%

#### BT GFSK

| Band        | Channel No. | Frequency [MHz] | Power Density [dBm / RBW] | RBW [kHz] | Limit [dBm/3kHz] | Margin to Limit [dB] |
|-------------|-------------|-----------------|---------------------------|-----------|------------------|----------------------|
| 2.4 GHz ISM | 0           | 2402            | 2.2                       | 10.0      | 8.0              | 5.8                  |
|             | 39          | 2441            | 1.9                       | 10.0      | 8.0              | 6.1                  |
|             | 78          | 2480            | 1.8                       | 10.0      | 8.0              | 6.2                  |

#### BT π/4 DQPSK

| Band        | Channel No. | Frequency [MHz] | Power Density [dBm / RBW] | RBW [kHz] | Limit [dBm/3kHz] | Margin to Limit [dB] |
|-------------|-------------|-----------------|---------------------------|-----------|------------------|----------------------|
| 2.4 GHz ISM | 0           | 2402            | -1.2                      | 10.0      | 8.0              | 9.2                  |
|             | 39          | 2441            | -1.3                      | 10.0      | 8.0              | 9.3                  |
|             | 78          | 2480            | -1.5                      | 10.0      | 8.0              | 9.5                  |

#### BT 8-DPSK

| Band        | Channel No. | Frequency [MHz] | Power Density [dBm / RBW] | RBW [kHz] | Limit [dBm/3kHz] | Margin to Limit [dB] |
|-------------|-------------|-----------------|---------------------------|-----------|------------------|----------------------|
| 2.4 GHz ISM | 0           | 2402            | -1.4                      | 10.0      | 8.0              | 9.4                  |
|             | 39          | 2441            | -1.3                      | 10.0      | 8.0              | 9.3                  |
|             | 78          | 2480            | -1.5                      | 10.0      | 8.0              | 9.5                  |

#### BT LE 1 Mbit/s

| Band        | Channel No. | Frequency [MHz] | Power Density [dBm / RBW] | RBW [kHz] | Limit [dBm/3kHz] | Margin to Limit [dB] |
|-------------|-------------|-----------------|---------------------------|-----------|------------------|----------------------|
| 2.4 GHz ISM | 0           | 2402            | -1.9                      | 10.0      | 8.0              | 9.9                  |
|             | 19          | 2440            | -2.1                      | 10.0      | 8.0              | 10.1                 |
|             | 39          | 2480            | -2.3                      | 10.0      | 8.0              | 10.3                 |

#### BT LE 2 Mbit/s

| Band        | Channel No. | Frequency [MHz] | Power Density [dBm / RBW] | RBW [kHz] | Limit [dBm/3kHz] | Margin to Limit [dB] |
|-------------|-------------|-----------------|---------------------------|-----------|------------------|----------------------|
| 2.4 GHz ISM | 0           | 2402            | -5.1                      | 10.0      | 8.0              | 13.1                 |
|             | 19          | 2440            | -5.5                      | 10.0      | 8.0              | 13.5                 |
|             | 39          | 2480            | -5.7                      | 10.0      | 8.0              | 13.7                 |

#### WLAN b-Mode; 20 MHz; 1 Mbit/s

| Band        | Channel No. | Frequency [MHz] | Power Density [dBm / RBW] | RBW [kHz] | Limit [dBm/3kHz] | Margin to Limit [dB] |
|-------------|-------------|-----------------|---------------------------|-----------|------------------|----------------------|
| 2.4 GHz ISM | 1           | 2412            | 1.1                       | 100.0     | 8.0              | 6.9                  |
|             | 6           | 2437            | 1.0                       | 100.0     | 8.0              | 7.0                  |
|             | 11          | 2462            | 0.9                       | 100.0     | 8.0              | 7.1                  |

#### WLAN g-Mode; 20 MHz; 6 Mbit/s

| Band        | Channel No. | Frequency [MHz] | Power Density [dBm / RBW] | RBW [kHz] | Limit [dBm/3kHz] | Margin to Limit [dB] |
|-------------|-------------|-----------------|---------------------------|-----------|------------------|----------------------|
| 2.4 GHz ISM | 1           | 2412            | -3.8                      | 100.0     | 8.0              | 11.8                 |
|             | 6           | 2437            | -1.8                      | 100.0     | 8.0              | 9.8                  |
|             | 11          | 2462            | -3.8                      | 100.0     | 8.0              | 11.8                 |

#### WLAN n-Mode; 20 MHz; MCS0

| Band        | Channel No. | Frequency [MHz] | Power Density [dBm / RBW] | RBW [kHz] | Limit [dBm/3kHz] | Margin to Limit [dB] |
|-------------|-------------|-----------------|---------------------------|-----------|------------------|----------------------|
| 2.4 GHz ISM | 1           | 2412            | -4.7                      | 100.0     | 8.0              | 12.7                 |
|             | 6           | 2437            | -3.7                      | 100.0     | 8.0              | 11.7                 |
|             | 11          | 2462            | -4.9                      | 100.0     | 8.0              | 12.9                 |

WLAN n-Mode; 40 MHz; MCS0

| Band        | Channel No. | Frequency [MHz] | Power Density [dBm / RBW] | RBW [kHz] | Limit [dBm/3kHz] | Margin to Limit [dB] |
|-------------|-------------|-----------------|---------------------------|-----------|------------------|----------------------|
| 2.4 GHz ISM | 3           | 2422            | -8.5                      | 100.0     | 8.0              | 16.5                 |
|             | 6           | 2437            | -6.3                      | 100.0     | 8.0              | 14.3                 |
|             | 9           | 2452            | -7.6                      | 100.0     | 8.0              | 15.6                 |

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

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

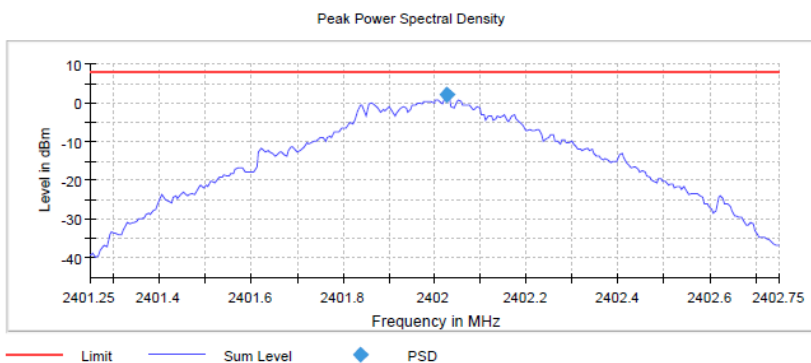
Radio Technology = Bluetooth BDR, Operating Frequency = low (S01\_161\_AD01)

#### Result

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2402.000000         | 2402.027500     | 2.170     | 8.0             | PASS   |

#### Ports

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



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 2.40125 GHz      |
| Stop Frequency        | 2.40275 GHz      |
| Span                  | 1.500 MHz        |
| RBW                   | 10.000 kHz       |
| VBW                   | 30.000 kHz       |
| SweepPoints           | 300              |
| Sweeptime             | 1.500 ms         |
| Reference Level       | 10.000 dBm       |
| Attenuation           | 20.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 100              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| Sweeptype             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.50 dB          |
| Run                   | 9 / max. 150     |
| Stable                | 2 / 2            |
| Max Stable Difference | 0.16 dB          |

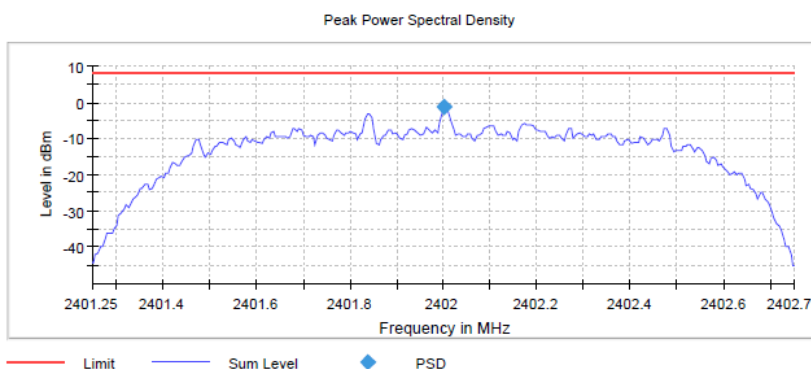
Radio Technology = Bluetooth EDR 2, Operating Frequency = low (S01\_161\_AD01)

#### Result

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2402.000000         | 2402.002500     | -1.194    | 8.0             | PASS   |

#### Ports

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



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 2.40125 GHz      |
| Stop Frequency        | 2.40275 GHz      |
| Span                  | 1.500 MHz        |
| RBW                   | 10.000 kHz       |
| VBW                   | 30.000 kHz       |
| SweepPoints           | 300              |
| Sweeptime             | 1.500 ms         |
| Reference Level       | 10.000 dBm       |
| Attenuation           | 20.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 100              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| Sweeptype             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.50 dB          |
| Run                   | 9 / max. 150     |
| Stable                | 2 / 2            |
| Max Stable Difference | 0.06 dB          |

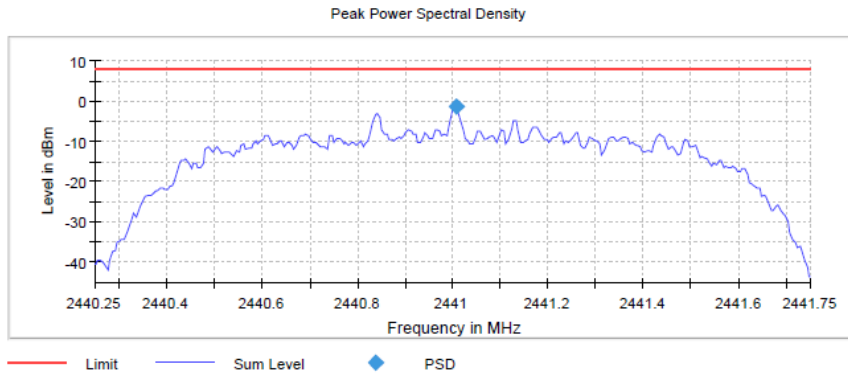
Radio Technology = Bluetooth EDR 3, Operating Frequency = mid  
(S01\_161\_AD01)

**Result**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2441.000000         | 2441.007500     | -1.282    | 8.0             | PASS   |

**Ports**

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



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 2.44025 GHz      |
| Stop Frequency        | 2.44175 GHz      |
| Span                  | 1.500 MHz        |
| RBW                   | 10.000 kHz       |
| VBW                   | 30.000 kHz       |
| SweepPoints           | 300              |
| Sweeptime             | 1.500 ms         |
| Reference Level       | 10.000 dBm       |
| Attenuation           | 20.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 100              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| Sweeptype             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.50 dB          |
| Run                   | 6 / max. 150     |
| Stable                | 2 / 2            |
| Max Stable Difference | 0.27 dB          |

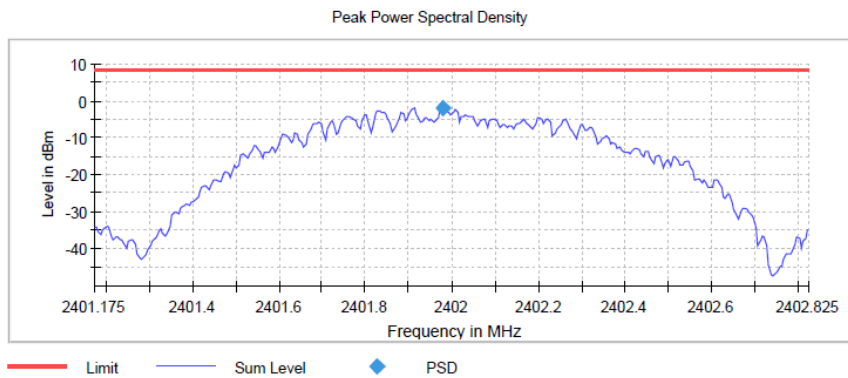
Radio Technology = Bluetooth LE 1 Mbps, Operating Frequency = low  
(S01\_161\_AD01)

**Result**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2402.000000         | 2401.977500     | -1.858    | 8.0             | PASS   |

**Ports**

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



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 2.40118 GHz      |
| Stop Frequency        | 2.40283 GHz      |
| Span                  | 1.650 MHz        |
| RBW                   | 10.000 kHz       |
| VBW                   | 30.000 kHz       |
| SweepPoints           | 330              |
| Sweeptime             | 1.650 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 100              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| Sweeptype             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.50 dB          |
| Run                   | 3 / max. 150     |
| Stable                | 2 / 2            |
| Max Stable Difference | 0.24 dB          |

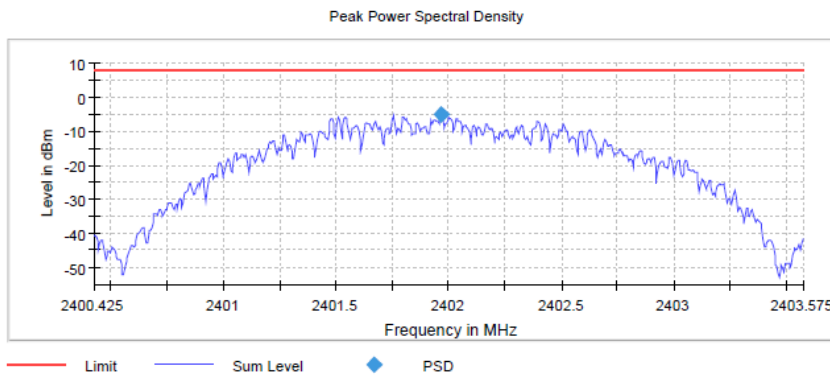
Radio Technology = Bluetooth LE 2 Mbps, Operating Frequency = low  
(S01\_161\_AD01)

**Result**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2402.000000         | 2401.967500     | -5.130    | 8.0             | PASS   |

**Ports**

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



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 2.40043 GHz      |
| Stop Frequency        | 2.40358 GHz      |
| Span                  | 3.150 MHz        |
| RBW                   | 10.000 kHz       |
| VBW                   | 30.000 kHz       |
| SweepPoints           | 630              |
| Sweeptime             | 3.150 ms         |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | MaxPeak          |
| SweepCount            | 100              |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| Sweeptype             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.50 dB          |
| Run                   | 4 / max. 150     |
| Stable                | 2 / 2            |
| Max Stable Difference | 0.20 dB          |

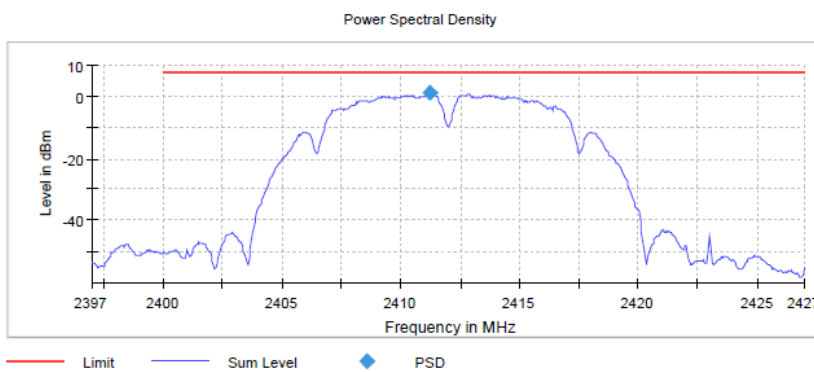
Radio Technology = WLAN b, Operating Frequency = low  
(S01\_161\_AC01)

**Result**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2412.000000         | 2411.225000     | 1.063     | 8.0             | PASS   |

**Ports**

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



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 2.39700 GHz      |
| Stop Frequency        | 2.42700 GHz      |
| Span                  | 30.000 MHz       |
| RBW                   | 100.000 kHz      |
| VBW                   | 300.000 kHz      |
| SweepPoints           | 600              |
| Sweeptime             | 600.000 ms       |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | RMS              |
| SweepCount            | 1                |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| Sweeptype             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.50 dB          |
| Run                   | 9 / max. 150     |
| Stable                | 3 / 3            |
| Max Stable Difference | 0.45 dB          |

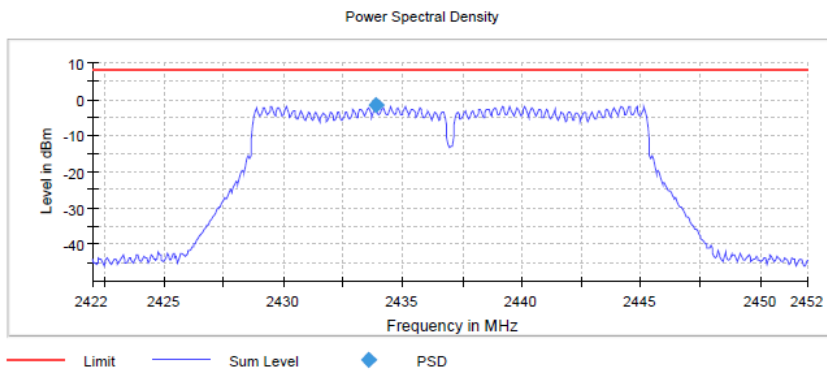
Radio Technology = WLAN g, Operating Frequency = mid  
(S01\_161\_AC01)

**Result**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2437.000000         | 2433.875000     | -1.802    | 8.0             | PASS   |

**Ports**

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



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 2.42200 GHz      |
| Stop Frequency        | 2.45200 GHz      |
| Span                  | 30.000 MHz       |
| RBW                   | 100.000 kHz      |
| VBW                   | 300.000 kHz      |
| SweepPoints           | 600              |
| SweepTime             | 600.000 ms       |
| Reference Level       | 10.000 dBm       |
| Attenuation           | 20.000 dB        |
| Detector              | RMS              |
| SweepCount            | 1                |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.50 dB          |
| Run                   | 7 / max. 150     |
| Stable                | 3 / 3            |
| Max Stable Difference | 0.39 dB          |

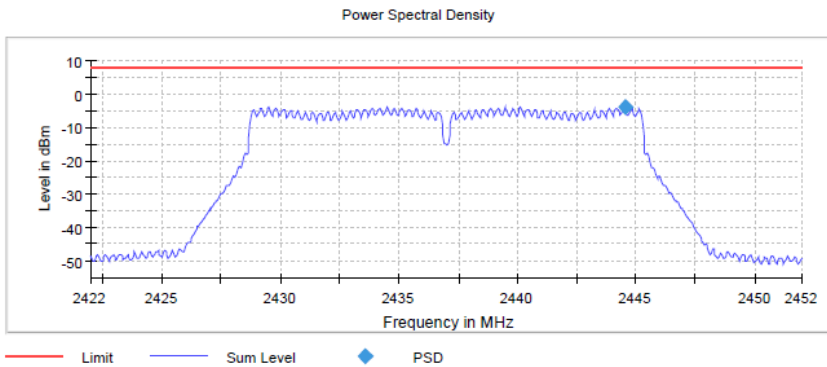
Radio Technology = WLAN n 20 MHz, Operating Frequency = mid  
(S01\_161\_AC01)

**Result**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2437.000000         | 2444.525000     | -3.727    | 8.0             | PASS   |

**Ports**

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



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 2.42200 GHz      |
| Stop Frequency        | 2.45200 GHz      |
| Span                  | 30.000 MHz       |
| RBW                   | 100.000 kHz      |
| VBW                   | 300.000 kHz      |
| SweepPoints           | 600              |
| SweepTime             | 600.000 ms       |
| Reference Level       | 0.000 dBm        |
| Attenuation           | 10.000 dB        |
| Detector              | RMS              |
| SweepCount            | 1                |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamp                | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.50 dB          |
| Run                   | 6 / max. 150     |
| Stable                | 3 / 3            |
| Max Stable Difference | 0.36 dB          |



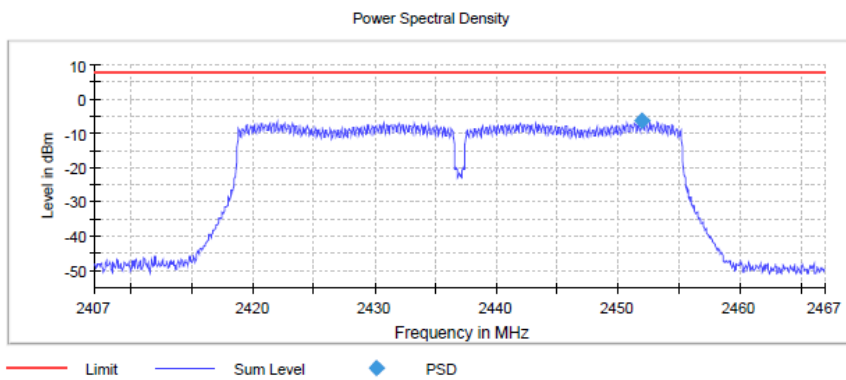
Radio Technology = WLAN n 40 MHz, Operating Frequency = mid  
(S01\_161\_AC01)

**Result**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2437.000000         | 2451.975000     | -6.320    | 8.0             | PASS   |

**Ports**

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



| Setting               | Instrument Value |
|-----------------------|------------------|
| Start Frequency       | 2.40700 GHz      |
| Stop Frequency        | 2.46700 GHz      |
| Span                  | 60.000 MHz       |
| RBW                   | 100.000 kHz      |
| VBW                   | 300.000 kHz      |
| SweepPoints           | 1200             |
| SweepTime             | 1.200 s          |
| Reference Level       | 10.000 dBm       |
| Attenuation           | 20.000 dB        |
| Detector              | RMS              |
| SweepCount            | 1                |
| Filter                | 3 dB             |
| Trace Mode            | Max Hold         |
| SweepType             | Sweep            |
| Preamplifier          | off              |
| Stablemode            | Trace            |
| Stablevalue           | 0.50 dB          |
| Run                   | 13 / max. 150    |
| Stable                | 3 / 3            |
| Max Stable Difference | 0.35 dB          |

**5.9.5 TEST EQUIPMENT USED**

- R&S TS8997

## 6 TEST EQUIPMENT

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

| 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     | SMB100A              | Signal Generator 9 kHz - 6 GHz                     | Rohde & Schwarz                   | 107695        | 2021-06          | 2024-06         |
| 1.4     | EX520                | Digital Multimeter 12                              | Extech Instruments Corp           | 05157876      | 2022-06          | 2024-06         |
| 1.5     | NGSM 32/10           | Power Supply                                       | Rohde & Schwarz GmbH & Co. KG     | 3456          | 2022-01          | 2024-01         |
| 1.6     | FSW43                | Signal analyser                                    | Rohde & Schwarz GmbH & Co. KG     | 102013        | 2021-06          | 2023-06         |
| 1.7     | Opus10 THI (8152.00) | T/H Logger 14                                      | Lufft Mess- und Regeltechnik GmbH | 13993         | 2021-08          | 2023-08         |
| 1.8     | SMBV100A             | Vector Signal Generator 9 kHz - 6 GHz              | Rohde & Schwarz                   | 259291        | 2019-11          | 2022-11         |
| 1.9     | OSP120               | Contains Power Meter and Switching Unit OSP-B157W8 | Rohde & Schwarz                   | 101158        | 2021-08          | 2024-08         |

- 2 Radiated Emissions FAR 2.4 GHz FCC  
Radiated emission tests for 2.4 GHz ISM devices in a fully anechoic room

| Ref.No. | Device Name             | Description  | Manufacturer                        | Serial Number      | Last Calibration | Calibration Due |
|---------|-------------------------|--|-------------------------------------|--------------------|------------------|-----------------|
| 2.1     | Opus10 TPR (8253.00)    | T/P Logger 13  | Lufft Mess- und Regeltechnik GmbH   | 13936              | 2021-10          | 2023-10         |
| 2.2     | AMF-7D00101800-30-10P-R | Broadband Amplifier 100 MHz - 18 GHz                     | Miteq                               |                    |                  |                 |
| 2.3     | 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         |
| 2.4     | Fluke 177               | Digital Multimeter 03 (Multimeter)                       | Fluke Europe B.V.                   | 86670383           | 2022-06          | 2024-06         |
| 2.5     | JS4-18002600-32-5P      | Broadband Amplifier 18 GHz - 26 GHz                      | Miteq                               | 849785             |                  |                 |
| 2.6     | FSW 43                  | Spectrum Analyzer  | Rohde & Schwarz                     | 103779             | 2021-06          | 2023-06         |
| 2.7     | EP 1200/B, NA/B1        | AC Source, Amplifier with integrated variable Oscillator | Spitzenberger & Spies GmbH & Co. KG | B6278              |                  |                 |

| Ref.No. | Device Name            | Description                                     | Manufacturer                      | Serial Number          | Last Calibration | Calibration Due |
|---------|------------------------|---|-----------------------------------|------------------------|------------------|-----------------|
| 2.8     | 3160-09                | Standard Gain / Pyramidal Horn Antenna 26.5 GHz | EMCO Elektronik GmbH              | 00083069               |                  |                 |
| 2.9     | WHKX 7.0/18G-8SS       | High Pass Filter                                | Wainwright Instruments GmbH       | 09                     |                  |                 |
| 2.10    | TT 1.5 WI              | Turn Table                                      | Maturo GmbH                       | -                      |                  |                 |
| 2.11    | 5HC3500/18000-1.2-KK   | High Pass Filter                                | Trilithic                         | 200035008              |                  |                 |
| 2.12    | Opus 20 THI (8120.00)  | ThermoHygro Datalogger                          | Lufft Mess- und Regeltechnik GmbH | 115.0318.0802.033      | 2020-10          | 2022-10         |
| 2.13    | TD1.5-10kg             | EUT Tilt Device (Rohacell)                      | Maturo GmbH                       | TD1.5-10kg/024/3790709 |                  |                 |
| 2.14    | PAS 2.5 - 10 kg        | Antenna Mast                                    | Maturo GmbH                       | -                      |                  |                 |
| 2.15    | AFS42-00101800-25-S-42 | Broadband Amplifier 25 MHz - 18 GHz             | Miteq                             | 2035324                |                  |                 |
| 2.16    | HF 907                 | Double-ridged horn                              | Rohde & Schwarz                   | 102444                 | 2021-09          | 2024-09         |

3 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 |
|---------|----------------------|--|-------------------------------------|---------------|------------------|-----------------|
| 3.1     | Opus10 TPR (8253.00) | T/P Logger 13  | Lufft Mess- und Regeltechnik GmbH   | 13936         | 2021-10          | 2023-10         |
| 3.2     | ESW44                | EMI Receiver / Spectrum Analyzer                         | Rohde & Schwarz GmbH & Co. KG       | 101603        | 2022-01          | 2024-01         |
| 3.3     | Anechoic Chamber 01  | SAC/FAR, 10.58 m x 6.38 m x 6.00 m                       | Frankonia                           | none          |                  |                 |
| 3.4     | Opus10 THI (8152.00) | T/H Logger 10  | Lufft Mess- und Regeltechnik GmbH   | 12488         | 2021-08          | 2023-08         |
| 3.5     | EP 1200/B, NA/B1     | AC Source, Amplifier with integrated variable Oscillator | Spitzenberger & Spies GmbH & Co. KG | B6278         |                  |                 |
| 3.6     | DS 420S              | Turn Table 2 m diameter                                  | HD GmbH                             | 420/573/99    |                  |                 |
| 3.7     | HFH2-Z2              | Loop Antenna + 3 Axis Tripod                             | Rohde & Schwarz GmbH & Co. KG       | 829324/006    | 2021-01          | 2024-01         |

4 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 |
|---------|----------------------|--|-------------------------------------|---------------------|------------------|-----------------|
| 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     | 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         |
| 4.5     | Opus10 THI (8152.00) | T/H Logger 10  | Lufft Mess- und Regeltechnik GmbH   | 12488               | 2021-08          | 2023-08         |
| 4.6     | EP 1200/B, NA/B1     | AC Source, Amplifier with integrated variable Oscillator           | Spitzenberger & Spies GmbH & Co. KG | B6278               |                  |                 |
| 4.7     | DS 420S              | Turn Table 2 m diameter  | HD GmbH                             | 420/573/99          |                  |                 |
| 4.8     | AM 4.0               | Antenna Mast 4 m   | Maturo GmbH                         | AM4.0/180/1192 0513 |                  |                 |

5 Conducted Emissions FCC  
Conducted Emissions AC Mains for FCC standards

| Ref.No. | Device Name          | Description                      | Manufacturer                        | Serial Number | Last Calibration | Calibration Due |
|---------|----------------------|----------------------------------|-------------------------------------|---------------|------------------|-----------------|
| 5.1     | MFS                  | Rubidium Frequency Normal MFS    | Datum GmbH                          | 002           | 2021-11          | 2022-11         |
| 5.2     | Opus10 TPR (8253.00) | T/P Logger 13                    | Lufft Mess- und Regeltechnik GmbH   | 13936         | 2021-10          | 2023-10         |
| 5.3     | Chroma 6404          | AC Source                        | Chroma ATE INC.                     | 64040001304   |                  |                 |
| 5.4     | Shielded Room 02     | Shielded Room 4m x 3m            | Frankonia Germany EMC Solution GmbH | -             |                  |                 |
| 5.5     | ESH3-Z5              | Two-Line V-Network (EUT)         | Rohde & Schwarz GmbH & Co. KG       | 829996/002    | 2021-08          | 2023-08         |
| 5.6     | ESR 7                | EMI Receiver / Spectrum Analyzer | Rohde & Schwarz                     | 101424        | 2021-01          | 2023-01         |
| 5.7     | Opus10 THI (8152.00) | T/H Logger 02                    | Lufft Mess- und Regeltechnik GmbH   | 7489          | 2021-10          | 2023-10         |

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.