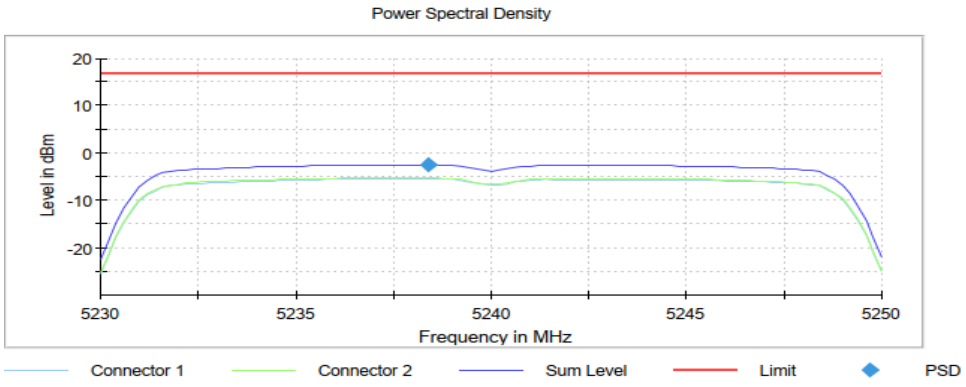
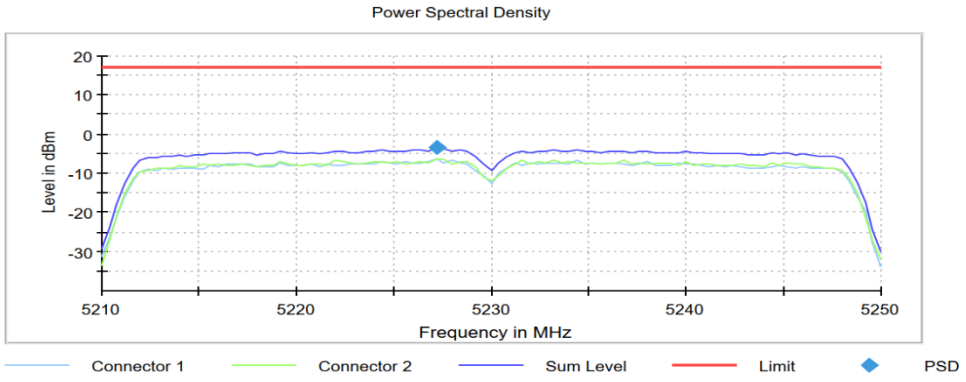
Radio Technology = WLAN n20 MIMO, Operating Frequency = high, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.23000 GHz
Stop Frequency	5.25000 GHz
Span	20.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweeptime	505.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	119
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.05 dB

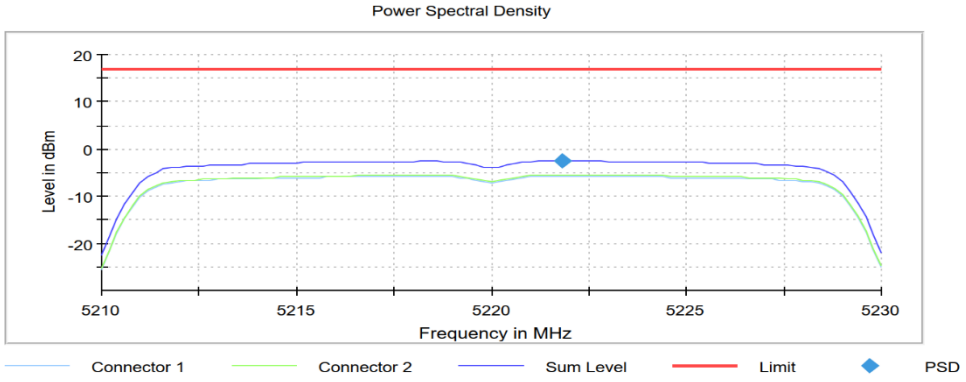
Radio Technology = WLAN n40 MIMO, Operating Frequency = high, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.21000 GHz
Stop Frequency	5.25000 GHz
Span	40.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweeptime	1.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	0
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	15 / max. 15
Stable	2 / 3
Max Stable Difference	0.00 dB

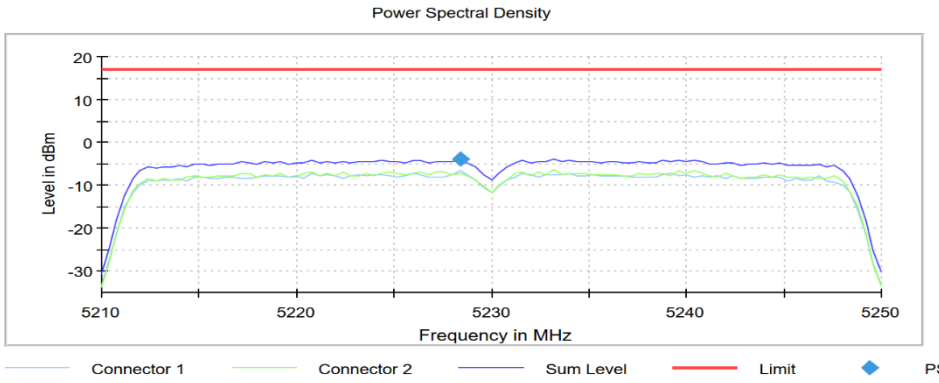
Radio Technology = WLAN ac20 MIMO, Operating Frequency = mid, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.21000 GHz
Stop Frequency	5.23000 GHz
Span	20.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweeptime	505.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	119
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.00 dB

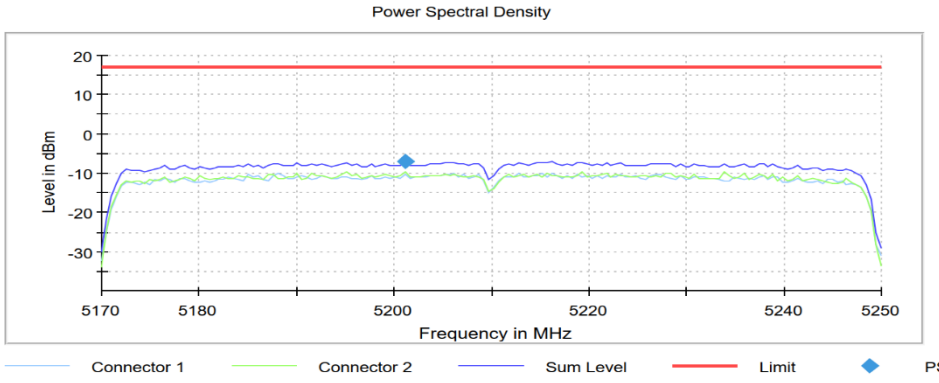
Radio Technology = WLAN ac40 MIMO, Operating Frequency = high, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.21000 GHz
Stop Frequency	5.25000 GHz
Span	40.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweeptime	1.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	0
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	15 / max. 15
Stable	2 / 3
Max Stable Difference	0.00 dB

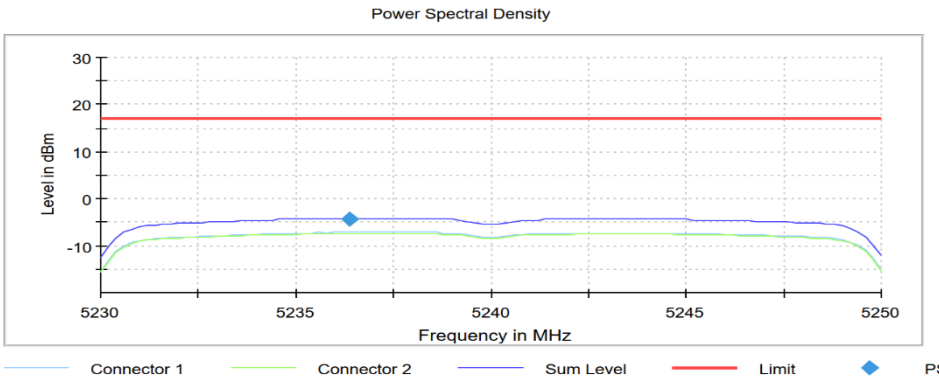
Radio Technology = WLAN ac80 MIMO, Operating Frequency = mid, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.17000 GHz
Stop Frequency	5.25000 GHz
Span	80.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	160
Sweeptime	1.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	0
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	15 / max. 15
Stable	1 / 3
Max Stable Difference	0.00 dB

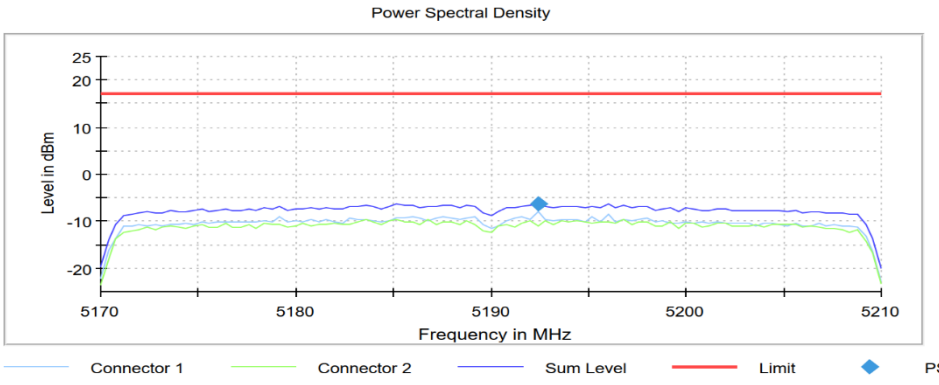
Radio Technology = WLAN ax20 MIMO(SU), Operating Frequency = high, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.23000 GHz
Stop Frequency	5.25000 GHz
Span	20.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweeptime	505.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	119
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.00 dB

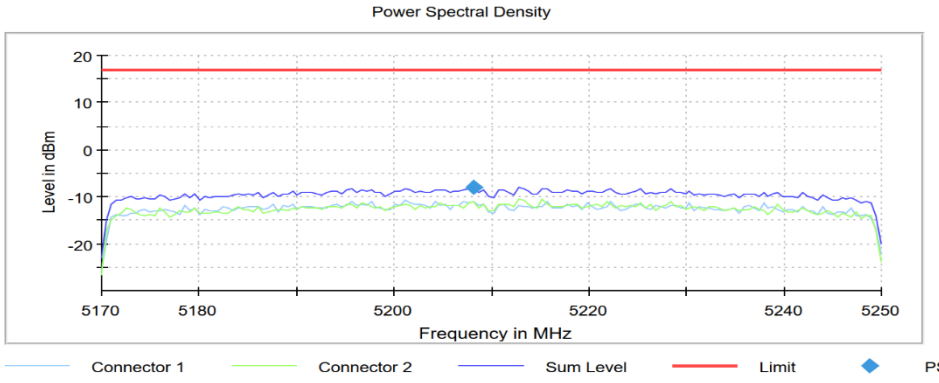
Radio Technology = WLAN ax40 MIMO(SU), Operating Frequency = low, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.17000 GHz
Stop Frequency	5.21000 GHz
Span	40.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweeptime	1.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	0
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	8 / max. 15
Stable	3 / 3
Max Stable Difference	0.00 dB

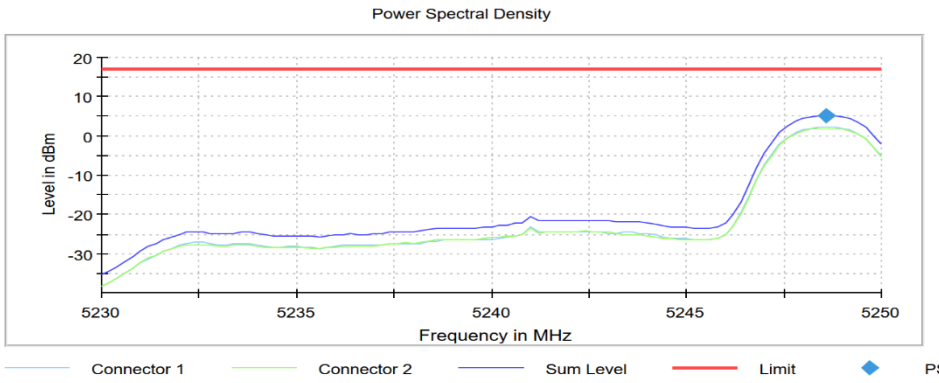
Radio Technology = WLAN ax80 MIMO(SU), Operating Frequency = mid, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.17000 GHz
Stop Frequency	5.25000 GHz
Span	80.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	160
Sweeptime	1.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	0
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	14 / max. 15
Stable	3 / 3
Max Stable Difference	0.00 dB

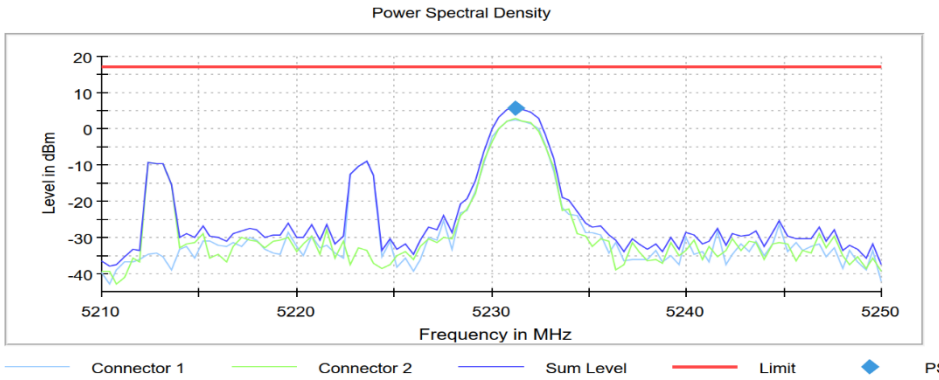
Radio Technology = WLAN ax20 MIMO(MU), Operating Frequency = high, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.23000 GHz
Stop Frequency	5.25000 GHz
Span	20.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweeptime	505.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	119
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	4 / max. 15
Stable	3 / 3
Max Stable Difference	0.02 dB

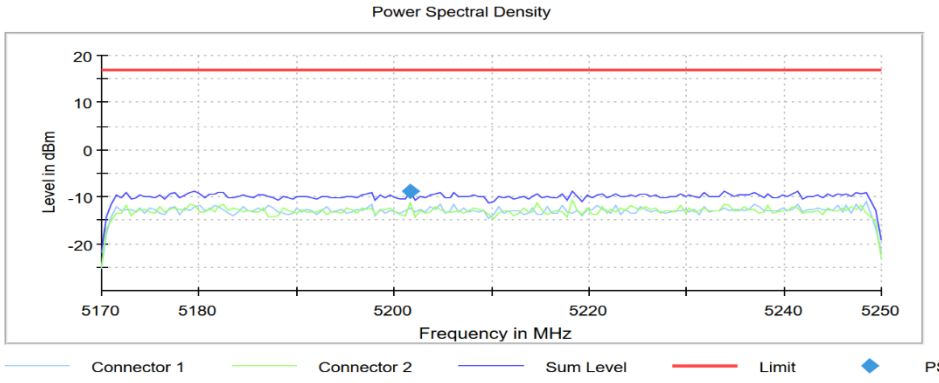
Radio Technology = WLAN ax40 MIMO(MU), Operating Frequency = high, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.21000 GHz
Stop Frequency	5.25000 GHz
Span	40.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	101
Sweeptime	1.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	0
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	10 / max. 15
Stable	3 / 3
Max Stable Difference	0.00 dB

Radio Technology = WLAN ax80 MIMO(MU), Operating Frequency = mid, Subband = U-NII-1 (S01_AA01#S3.5)



Measurement

Setting	Instrument Value
Start Frequency	5.17000 GHz
Stop Frequency	5.25000 GHz
Span	80.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
SweepPoints	160
Sweeptime	1.000 ms
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	RMS
SweepCount	0
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamp	off
Stablemode	Trace
Stablevalue	0.30 dB
Run	5 / max. 15
Stable	3 / 3
Max Stable Difference	0.00 dB

5.5.5 TEST EQUIPMENT USED

- R&S TS8997

5.6 UNDESIRABLE EMISSIONS; GENERAL FIELD STRENGTH LIMITS

Standard **FCC Part 15 Subpart E**

The test was performed according to:
ANSI C63.10, chapter 6.4, 6.5, 6.6.5

5.6.1 TEST DESCRIPTION

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

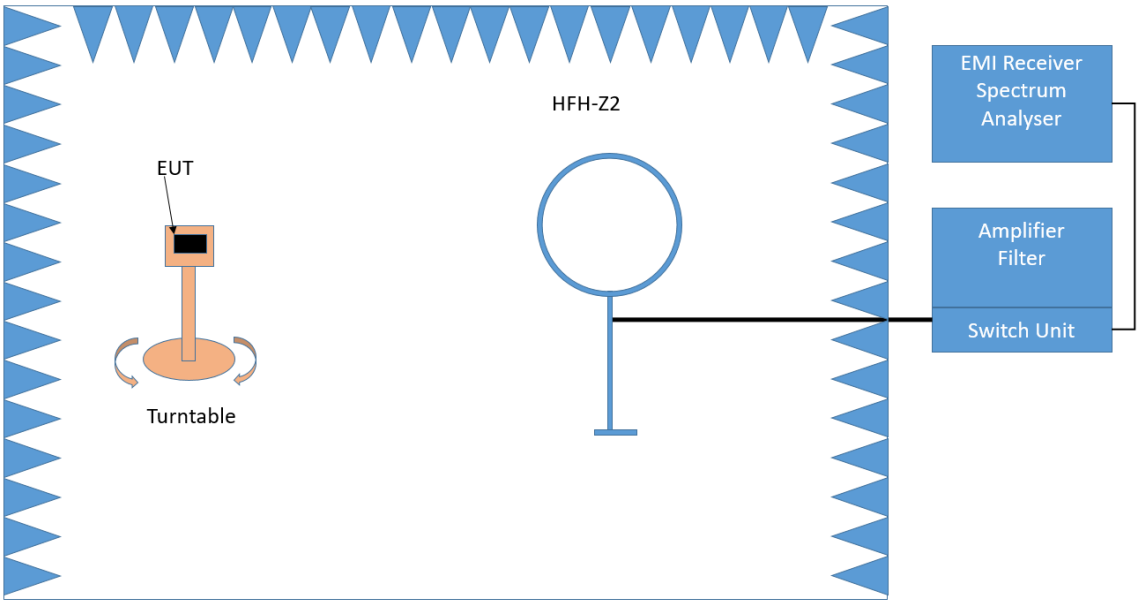
- < 30 MHz: Chapter 6.4
- 30 MHz – 1 GHz: Chapter 6.5
- > 1 GHZ: Chapter 6.6 (procedure according 6.6.5 used)

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

Below 1 GHz:

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

1. Measurement up to 30 MHz



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

The Loop antenna HFH2-Z2 is used.

Step 1: pre measurement

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

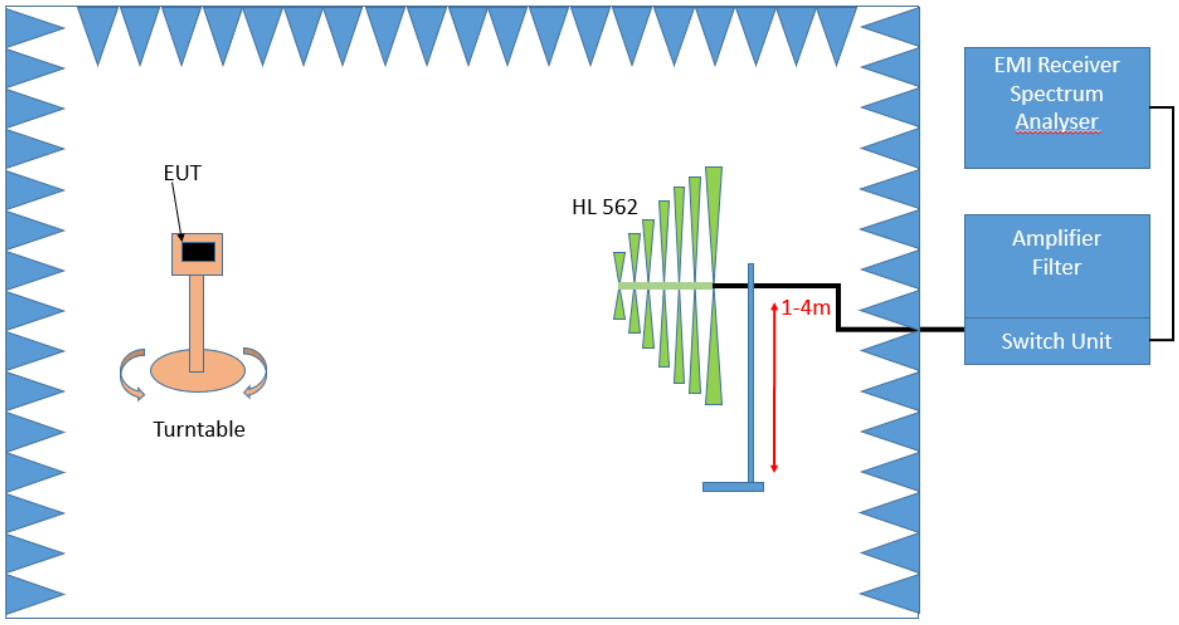
Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

Step 2: final measurement

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

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

2. Measurement above 30 MHz and up to 1 GHz



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

Step 1: Preliminary scan

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

Settings for step 1:

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

- Turntable step size: 90°
-- Height variation range: 1 – 4 m
- Height variation step size: 1.5 m
- Polarisation: Horizontal + Vertical
Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

Step 2: Adjustment measurement
In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.
For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will slowly vary by 360°. During this action, the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position, the antenna height will also slowly vary by 1 – 4 meter. During this action, the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.
- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: 360 °
- Height variation range:1 – 4 m
- Antenna Polarisation: max. value determined in step 1

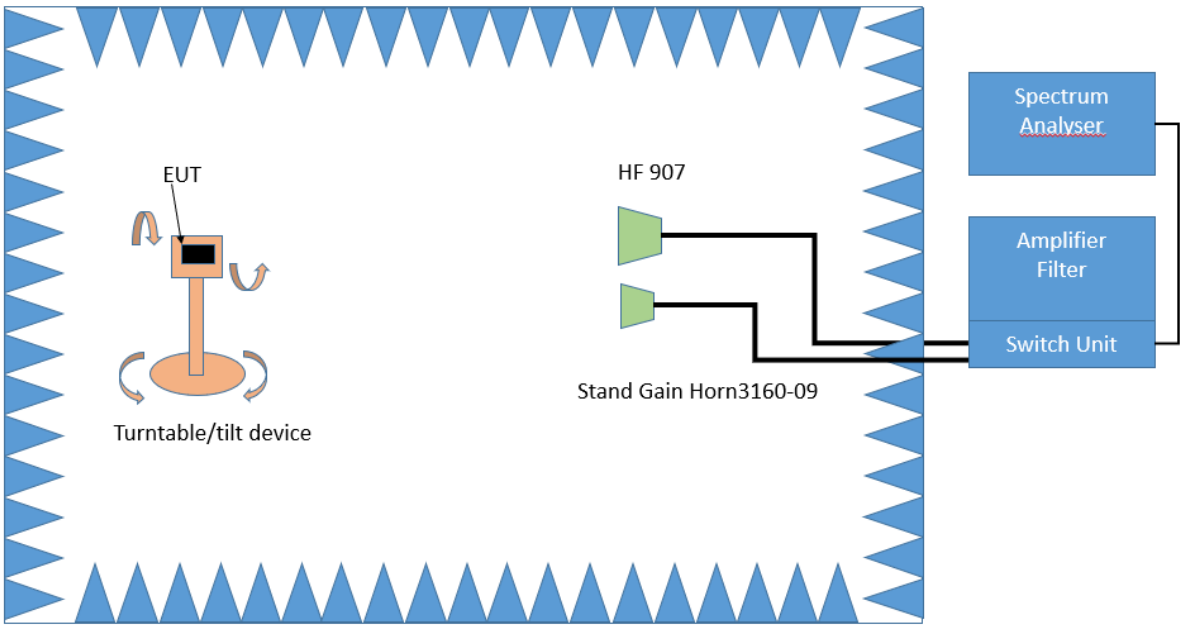
Step 3: Final measurement with QP detector
With the settings determined in step 2, the final measurement will be performed:
EMI receiver settings for step 3:
- Detector: Quasi-Peak (< 1 GHz)
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

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

Above 1 GHz:

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.
All steps were performed with one height (1.5 m) of the receiving antenna only.

3. Measurement 1 GHz up to 26.5 GHz



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

Step 1:
The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.
All steps were performed with one height (1.5 m) of the receiving antenna only.
The EUT is turned during the preliminary measurement across the elevation axis, with a step size of 90 °.
The turn table step size (azimuth angle) for the preliminary measurement is 45 °.

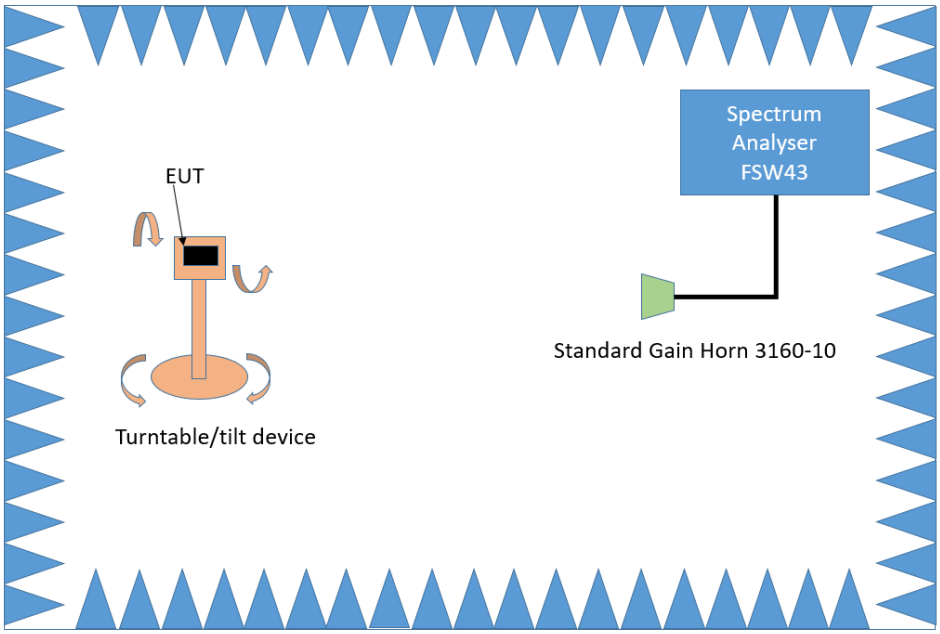
Step 2:
Due to the fact, that in this frequency range the test is performed in a fully anechoic room, the height scan of the receiving antenna instep 2 is omitted. Instead of this, a maximum search with a step size ± 45° for the elevation axis is performed.
The turn table azimuth will slowly vary by ± 22.5°.
The elevation angle will slowly vary by ± 45°
EMI receiver settings (for all steps):
- Detector: Peak, Average
- IF Bandwidth = 1 MHz

Step 3:
Spectrum analyser settings for step 3:
- Detector: Peak / Average
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 1 MHz
- Measuring time: 1 s

4. Measurement above 26.5 GHz up to 40 GHz

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

- Measurement distance: 1m



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

5.6.2 TEST REQUIREMENTS / LIMITS

A) FCC

FCC Part 15 Subpart E, §15.407 (b)(1)
For transmitters operating in the 5150–5250 MHz band:
Limit: –27 dBm/MHz EIRP outside of the band 5150–5350 MHz.

FCC Part 15 Subpart E, §15.407 (b)(4)
For transmitters operating in the 5725–5850 MHz band:
Limit: –27 dBm/MHz at 75 MHz or more above or below the band edge
increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge
increasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edge
increasing linearly to 27 dBm/MHz at the band edge.

B) IC

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

RSS-247, 6.2.1.2, Emissions outside the band 5150-5250 MHz, indoor operation only:
Limit: –27 dBm/MHz EIRP outside of the band 5150–5250 MHz.
RSS-247, 6.2.4.2, Emissions outside the band 5725-5850 MHz:

a. 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 Bm/MHz at 5 MHz above or below the band edges;

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

C) FCC & IC

FCC Part 15 Subpart E, §15.405
The provisions of §§ 15.203 and 15.205 are included.

§15.407 (b)(6)
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.

§15.407 (b)(7)
The provisions of §15.205 apply to intentional radiators operating under this section

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

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

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

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

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

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

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

Limit types (in result tables):
RB – Emissions falls into a "Restricted Band" according FCC §§15.205 and 15.209 *)
UE – "Undesirable Emission Limit" according FCC §15.407
BE-RB – Band Edge Limit basing on "Restricted Band Limits"
BE-UE – Band Edge Limit basing on "Undesirable Emission Limit"
*) Below 1 GHz the limits of §15.209 are applied for all frequencies.

5.6.3 TEST PROTOCOL

(S01_AB01#S3.5):

Ambient temperature: 19 - 23 °C
Air Pressure: 998 - 1020 hPa
Humidity: 33 - 47 %

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

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
36	5180*	- - -	- - -	- - -	1000	- - -	- - -	- - -
40	5200	126.2	39.9	QP	120	43.5	3.6	RB
40	5200	306.2	28.9	QP	120	46.0	17.1	RB
40	5200	410.0	42.3	QP	120	46.0	3.7	RB
40	5200	510.5	29.0	QP	120	46.0	17.0	RB
40	5200	617.5	20.6	QP	120	46.0	25.4	RB
40	5200	675.7	34.1	QP	120	46.0	11.9	RB
48	5240*	- - -	- - -	- - -	1000	- - -	- - -	- - -
149	5745	5194.1	59.1	PEAK	1000	68.2	9.1	UE
157	5785	125.0	37.5	QP	120	43.5	6.0	RB
157	5785	350.1	30.7	QP	120	46.0	15.3	RB
157	5785	414.6	44.0	QP	120	46.0	2.0	RB
157	5785	433.3	36.5	QP	120	46.0	9.6	RB
157	5785	614.0	30.9	QP	120	46.0	15.1	RB
157	5785	672.3	34.6	QP	120	46.0	11.4	RB
165	5825	1955.2	50.2	PEAK	1000	68.2	18.0	UE

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

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
36	5180*	- - -	- - -	- - -	1000	- - -	- - -	- - -
40	5200	2690.8	51.7	PEAK	1000	74.0	22.3	RB
40	5200	2690.8	39.0	AV	1000	54.0	15.0	RB
40	5200	5545.5	58.3	PEAK	1000	68.2	9.9	UE
48	5240*	- - -	- - -	- - -	1000	- - -	- - -	- - -
149	5745	2830.7	51.8	PEAK	1000	74.0	22.2	RB
149	5745	2830.7	39.2	AV	1000	54.0	14.8	RB
149	5745	4439.7	57.5	PEAK	1000	68.2	10.7	UE
149	5745	4812.8	58.1	PEAK	1000	74.0	15.9	RB
149	5745	4812.8	45.2	AV	1000	54.0	8.8	RB
149	5745	6940.9	61.0	PEAK	1000	68.2	7.2	UE
157	5785	5194.2	59.9	PEAK	1000	68.2	8.3	UE
165	5825*	- - -	- - -	- - -	1000	- - -	- - -	- - -

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

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
38	5190	144.2	35.9	QP	120	43.5	7.6	RB
38	5190	180.3	31.5	QP	120	43.5	12.1	RB
38	5190	306.5	39.8	QP	120	46.0	6.2	RB
38	5190	378.6	45.1	QP	120	46.0	0.9	RB

38	5190	414.7	35.8	QP	120	46.0	10.2	RB
38	5190	458.0	34.4	QP	120	46.0	11.6	RB
38	5190	729.8	34.1	QP	120	46.0	11.9	RB
46	5230*	- - -	- - -	- - -	1000	- - -	- - -	- - -
151	5755*	- - -	- - -	- - -	1000	- - -	- - -	- - -
159	5795	146.0	32.5	QP	120	43.5	11.0	RB
159	5795	166.3	33.2	QP	120	43.5	10.3	RB
159	5795	288.5	27.2	QP	120	46.0	18.8	RB
159	5795	365.2	33.8	QP	120	46.0	12.2	RB
159	5795	416.9	38.5	QP	120	46.0	7.5	RB
159	5795	432.3	36.8	QP	120	46.0	9.2	RB
159	5795	657.6	34.9	QP	120	46.0	11.1	RB
159	5795	1742.4	48.9	PEAK	1000	68.2	19.3	UE
159	5795	1942.9	50.1	PEAK	1000	68.2	18.1	UE

WLAN ac-Mode; 40 MHz; MCS 0; MIMO
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
38	5190*	- - -	- - -	- - -	1000	- - -	- - -	- - -
46	5230*	- - -	- - -	- - -	1000	- - -	- - -	- - -
151	5755*	- - -	- - -	- - -	1000	- - -	- - -	- - -
159	5795*	- - -	- - -	- - -	1000	- - -	- - -	- - -

WLAN ax-Mode; 20 MHz; MCS 0; MIMO**(SU)**
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
36	5180*	- - -	- - -	- - -	1000	- - -	- - -	- - -
165	5825*	- - -	- - -	- - -	1000	- - -	- - -	- - -

WLAN ax-Mode; 40 MHz; MCS 0; MIMO**(SU)**
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
38	5190*	- - -	- - -	- - -	1000	- - -	- - -	- - -
159	5795*	- - -	- - -	- - -	1000	- - -	- - -	- - -

WLAN ax-Mode; 80 MHz; MCS 0; MIMO**(SU)**
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
42	5210	4937.8	45.9	AV	1000	54.0	8.1	RB
42	5210	4937.8	59.7	PEAK	1000	74.0	14.3	RB
42	5210	15642.2	39.0	AV	1000	54.0	15.0	RB
42	5210	15642.2	52.5	PEAK	1000	74.0	21.5	RB
155	5775*	- - -	- - -	- - -	1000	- - -	- - -	- - -

WLAN ax-Mode; 20 MHz; MCS 0; MIMO**(MU)**
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
36	5180*	- - -	- - -	- - -	1000	- - -	- - -	- - -
165	5825*	- - -	- - -	- - -	1000	- - -	- - -	- - -

WLAN ax-Mode; 40 MHz; MCS 0; MIMO**(MU)**
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
38	5190*	- - -	- - -	- - -	1000	- - -	- - -	- - -
159	5795*	- - -	- - -	- - -	1000	- - -	- - -	- - -

WLAN ax-Mode; 80 MHz; MCS 0; MIMO**(MU)**
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
42	5210	4801.6	45.4	AV	1000	54.0	8.6	RB
42	5210	4801.6	58.7	PEAK	1000	74.0	15.3	RB
42	5210	4939.4	45.8	AV	1000	54.0	8.2	RB
42	5210	4939.4	59.4	PEAK	1000	74.0	14.6	RB
155	5775*	- - -	- - -	- - -	1000	- - -	- - -	- - -

Simultaneous Transmission A
Applied duty cycle correction (AV): 0.1 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
36	5180*	- - -	- - -	- - -	1000	- - -	- - -	- - -

(S01_A A01#S3.0):

Ambient temperature: 19 - 23 °C
Air Pressure: 998 - 1020 hPa
Humidity: 33 - 47 %

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

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
36	5180	2723.2	38.7	AV	1000	54.0	15.3	RB
36	5180	2723.2	51.8	PEAK	1000	74.0	22.2	RB
36	5180	5117.5	44.5	AV	1000	54.0	9.5	RB
36	5180	5117.5	57.4	PEAK	1000	74.0	16.6	RB
36	5180	15630.8	39.2	AV	1000	54.0	14.8	RB
36	5180	15630.8	52.8	PEAK	1000	74.0	21.2	RB
40	5200	143.1	32.2	QP	120	43.5	11.3	RB
40	5200	389.6	24.3	QP	120	46.0	21.7	RB
40	5200	439.1	34.0	QP	120	46.0	12.0	RB
40	5200	567.0	33.2	QP	120	46.0	12.8	RB
40	5200	675.1	27.0	QP	120	46.0	19.0	RB
40	5200	747.8	28.9	QP	120	46.0	17.1	RB

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

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
38	5190	31.1	23.0	QP	120	40.0	17.0	RB
38	5190	108.2	23.5	QP	120	43.5	20.0	RB
38	5190	144.2	32.3	QP	120	43.5	11.2	RB
38	5190	250.0	33.1	QP	120	46.0	12.9	RB
38	5190	317.5	29.4	QP	120	46.0	16.6	RB
38	5190	440.1	29.7	QP	120	46.0	16.3	RB
38	5190	675.7	32.4	QP	120	46.0	13.6	RB
38	5190	747.8	28.0	QP	120	46.0	18.0	RB
38	5190	875.0	36.2	QP	120	46.0	9.8	RB
159	5795	5050.2	44.3	AV	1000	54.0	9.7	RB
159	5795	5050.2	57.7	PEAK	1000	74.0	16.3	RB

WLAN ax-Mode; 20 MHz; MCS 0; MIMO**(MU)**
Applied duty cycle correction (AV): 0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
36	5180	108.2	23.3	QP	120	43.5	20.2	RB
36	5180	144.5	25.9	QP	120	43.5	17.6	RB
36	5180	198.0	20.9	QP	120	43.5	22.7	RB
36	5180	216.3	28.5	QP	120	46.0	17.5	RB
36	5180	294.3	32.2	QP	120	46.0	13.9	RB
36	5180	440.2	32.8	QP	120	46.0	13.2	RB
36	5180	565.2	31.5	QP	120	46.0	14.5	RB
36	5180	676.1	28.6	QP	120	46.0	17.4	RB
36	5180	875.0	37.0	QP	120	46.0	9.0	RB

Simultaneous Transmission B

Applied duty cycle correction (AV): 0.0 dB

Ch. No.	Ch. Center Freq. [MHz]	Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin [dB]	Limit Type
159	5795*	- - -	- - -	- - -	1000	- - -	- - -	- - -

Remark: - Please see next sub-clause for the measurement plot.
- The measurements have been fully performed only on worst-case modes (WLAN a Diversity and WLAN n40 MIMO).

***) no peaks have been found for these operating channels /operating modes**

Comment:

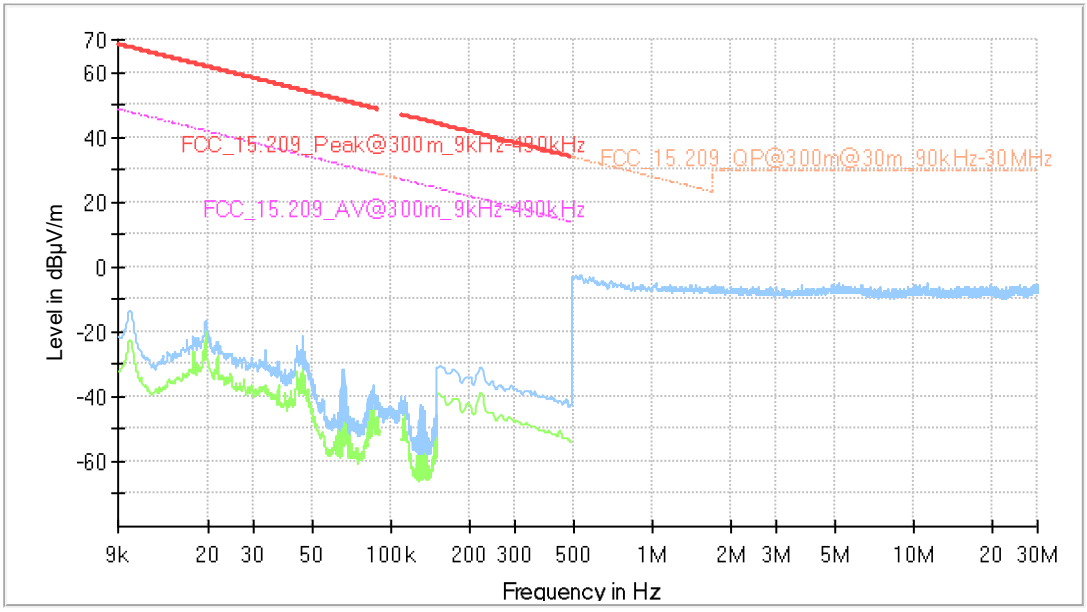
- At least spurious emissions that exceed the limit values, that come within 20 dB below these values are listed in the table above.

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

Trace:
blue = Peak (9 kHz - 40 GHz)
green = AV (9 kHz – 30 MHz and 1 - 26 GHz), QP (30 MHz - 1 GHz)

Marker:
Star = critical frequency, Rhombus = final Results

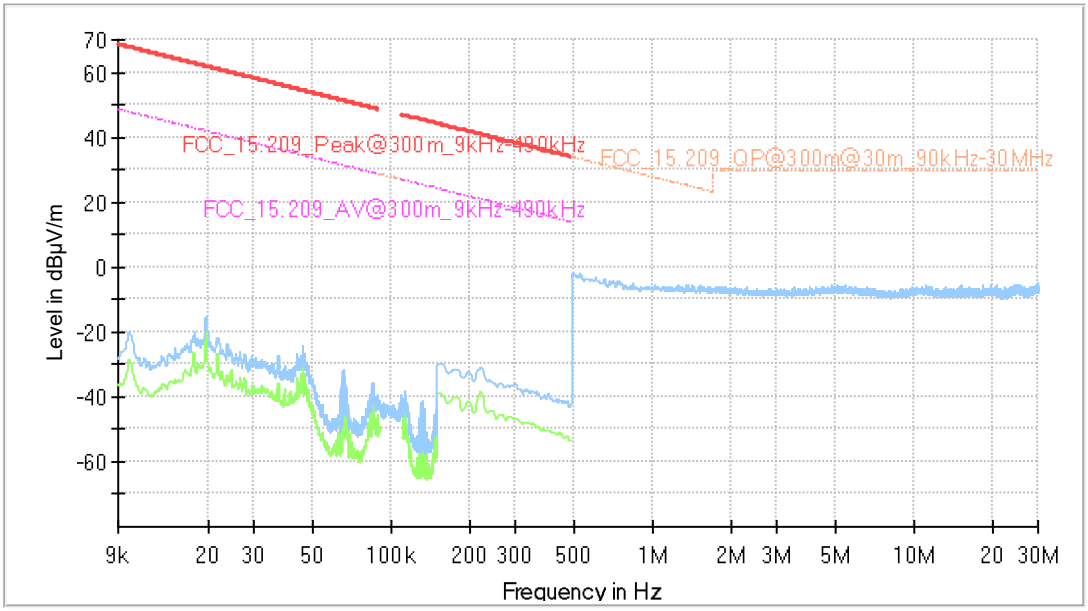
Modulation= WLAN a Diversity, Operating Channel = low, Subband = U-NII-1,
Measurement range = 9 kHz - 30 MHz
(S01_AB01#S3.5)



Final_Result

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

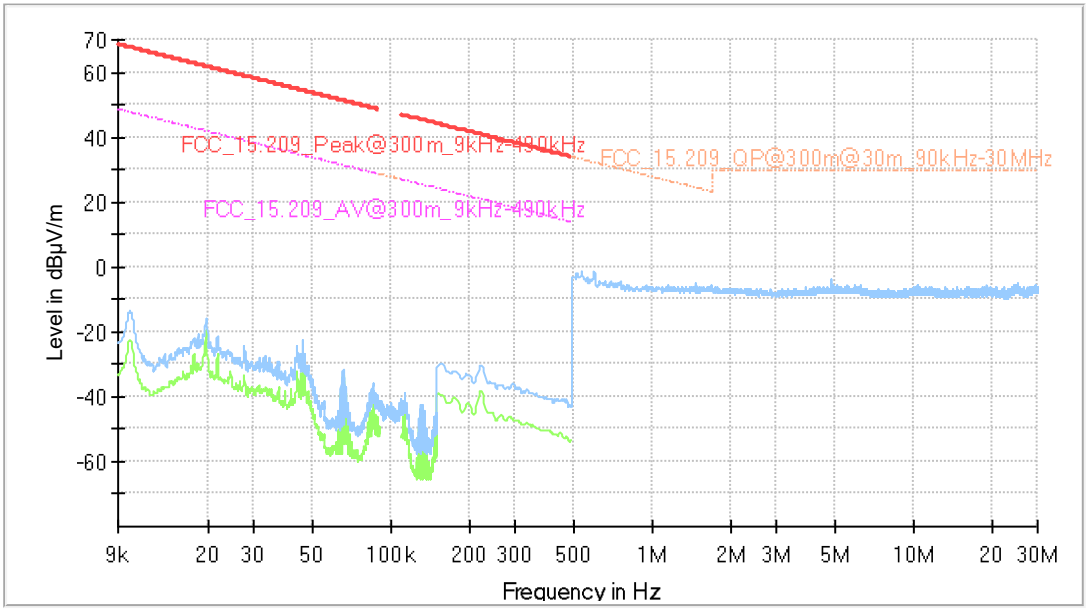
Modulation= WLAN a Diversity, Operating Channel = low, Subband = U-NII-1,
Measurement range = 9 kHz - 30 MHz
(S01_AA01#S3.0)



Final_Result

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

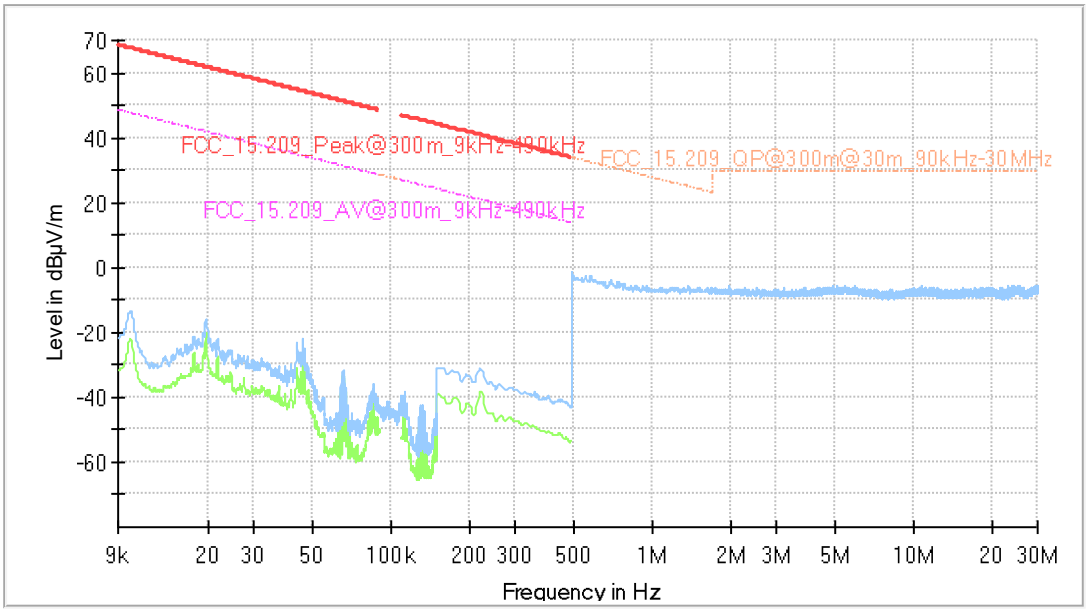
Modulation= WLAN a Diversity, Operating Channel = low, Subband = U-NII-3,
Measurement range = 9 kHz - 30 MHz
(S01_AB01#S3.5)



Final_Result

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

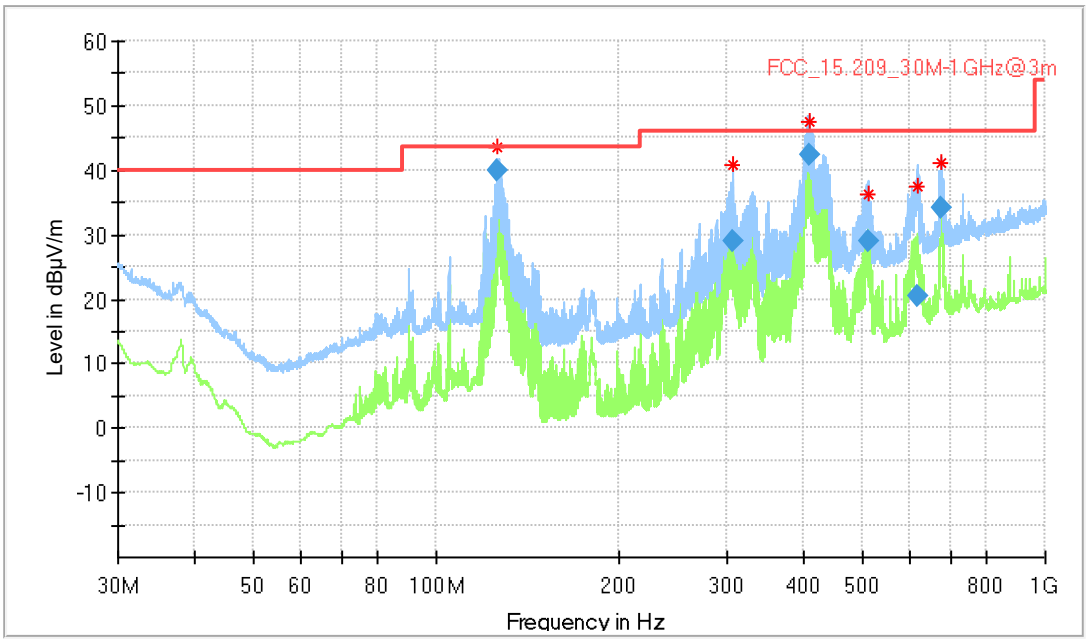
Modulation= WLAN n40 MIMO, Operating Channel = low, Subband = U-NII-1,
Measurement range = 9 kHz - 30 MHz
(S01_AB01#S3.5)



Final_Result

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

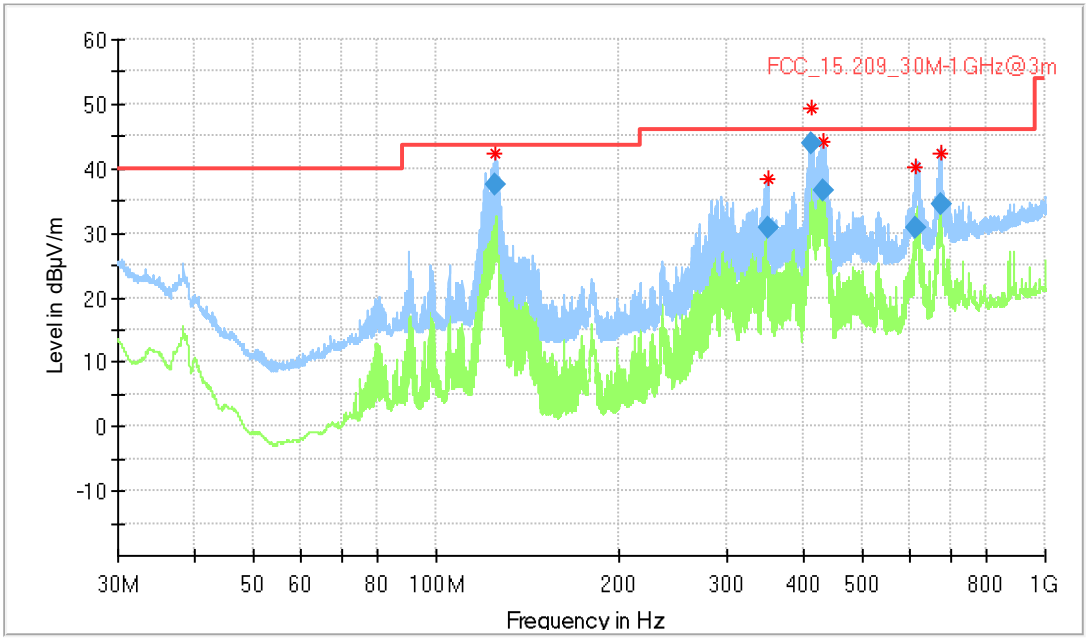
Radio Technology = WLAN a Diversity, Operating Frequency = mid, Subband = U-NII-1,
Measurement range = 30 MHz - 1 GHz
(S01_AB01#S3.5)



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)
126.180000	39.93	43.50	3.57	1000.0	120.000	100.0	V	13.0	11.7
306.150000	28.93	46.00	17.07	1000.0	120.000	110.0	H	90.0	14.8
409.950000	42.34	46.00	3.66	1000.0	120.000	102.0	H	-94.0	18.4
510.540000	29.02	46.00	16.98	1000.0	120.000	103.0	H	78.0	21.0
617.520000	20.60	46.00	25.40	1000.0	120.000	108.0	H	-75.0	23.1
675.720000	34.12	46.00	11.88	1000.0	120.000	127.0	H	-97.0	24.2

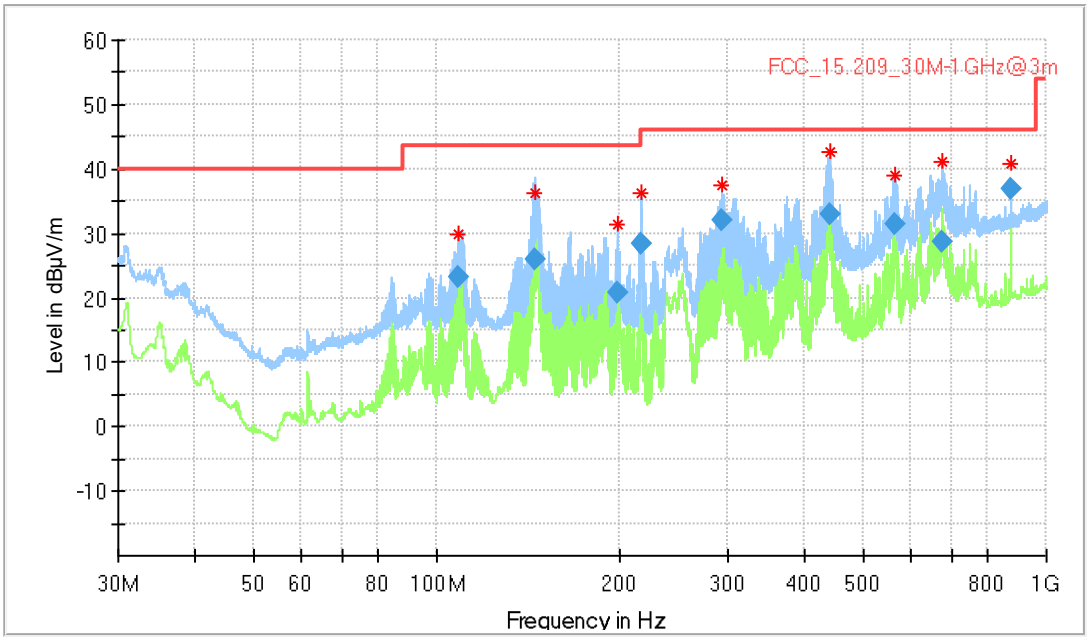
Radio Technology = WLAN a Diversity, Operating Frequency = mid, Subband = U-NII-3,
Measurement range = 30 MHz - 1 GHz
(S01_AB01#S3.5)



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)
125.010000	37.51	43.50	5.99	1000.0	120.000	107.0	V	20.0	11.7
350.070000	30.69	46.00	15.31	1000.0	120.000	147.0	H	2.0	16.3
414.630000	44.02	46.00	1.98	1000.0	120.000	102.0	H	-60.0	18.5
433.260000	36.45	46.00	9.55	1000.0	120.000	100.0	H	-46.0	19.0
614.010000	30.93	46.00	15.07	1000.0	120.000	106.0	H	-173.0	23.1
672.270000	34.56	46.00	11.44	1000.0	120.000	106.0	H	89.0	24.2

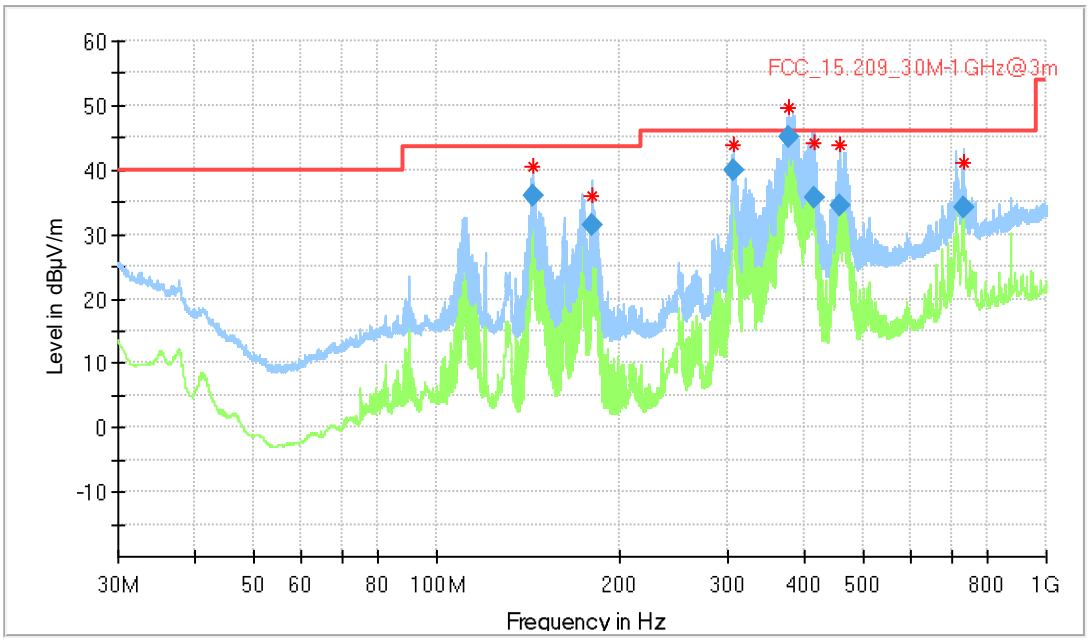
Radio Technology = WLAN ax20 MIMO(MU), Operating Frequency = low, Subband = U-NII-1,
Measurement range = 30 MHz - 1 GHz
(S01_AA01#S3.0)



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)
108.180000	23.32	43.50	20.18	1000.0	120.000	112.0	V	-142.0	12.1
144.510000	25.93	43.50	17.57	1000.0	120.000	117.0	V	-161.0	10.3
198.030000	20.85	43.50	22.65	1000.0	120.000	100.0	V	37.0	10.4
216.330000	28.48	46.00	17.52	1000.0	120.000	127.0	H	155.0	11.4
294.270000	32.15	46.00	13.85	1000.0	120.000	102.0	V	-199.0	14.4
440.220000	32.81	46.00	13.19	1000.0	120.000	110.0	H	-85.0	19.2
565.200000	31.52	46.00	14.48	1000.0	120.000	108.0	H	-4.0	22.1
676.050000	28.58	46.00	17.42	1000.0	120.000	105.0	H	-87.0	24.2
875.010000	37.00	46.00	9.00	1000.0	120.000	118.0	V	30.0	27.4

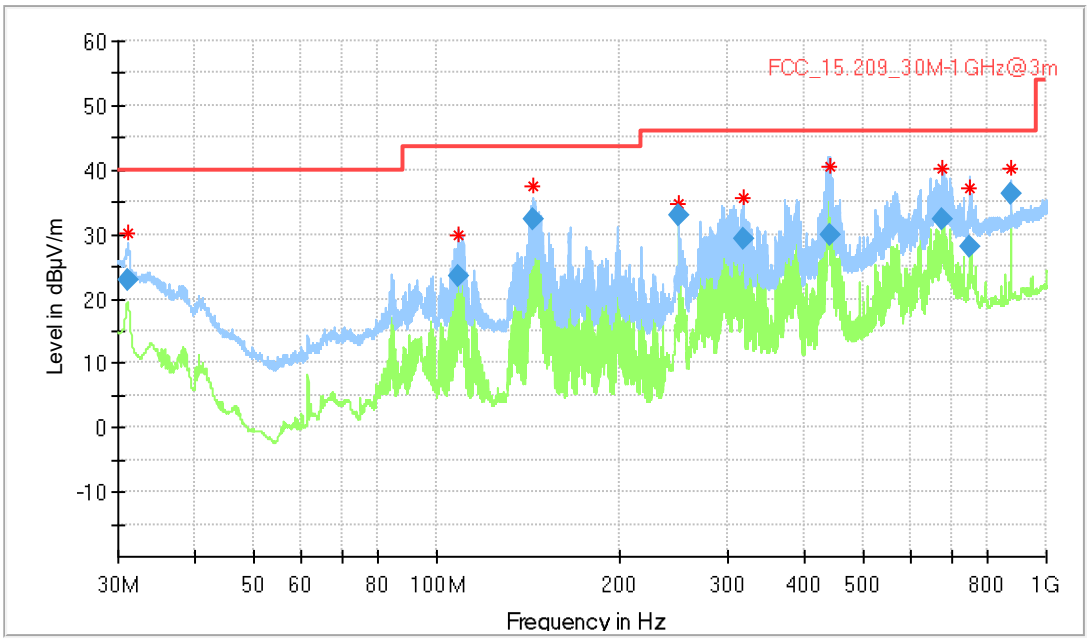
Radio Technology = WLAN n40 MIMO, Operating Frequency = low, Subband = U-NII-1,
Measurement range = 30 MHz - 1 GHz
(S01_AB01#S3.5)



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)
144.210000	35.93	43.50	7.57	1000.0	120.000	100.0	V	45.0	10.3
180.300000	31.45	43.50	12.05	1000.0	120.000	103.0	V	26.0	11.1
306.450000	39.82	46.00	6.18	1000.0	120.000	103.0	H	-163.0	14.8
378.570000	45.14	46.00	0.86	1000.0	120.000	108.0	H	-180.0	17.3
414.660000	35.77	46.00	10.23	1000.0	120.000	103.0	H	-63.0	18.5
457.950000	34.43	46.00	11.57	1000.0	120.000	111.0	H	104.0	19.8
729.780000	34.06	46.00	11.94	1000.0	120.000	108.0	H	114.0	25.4

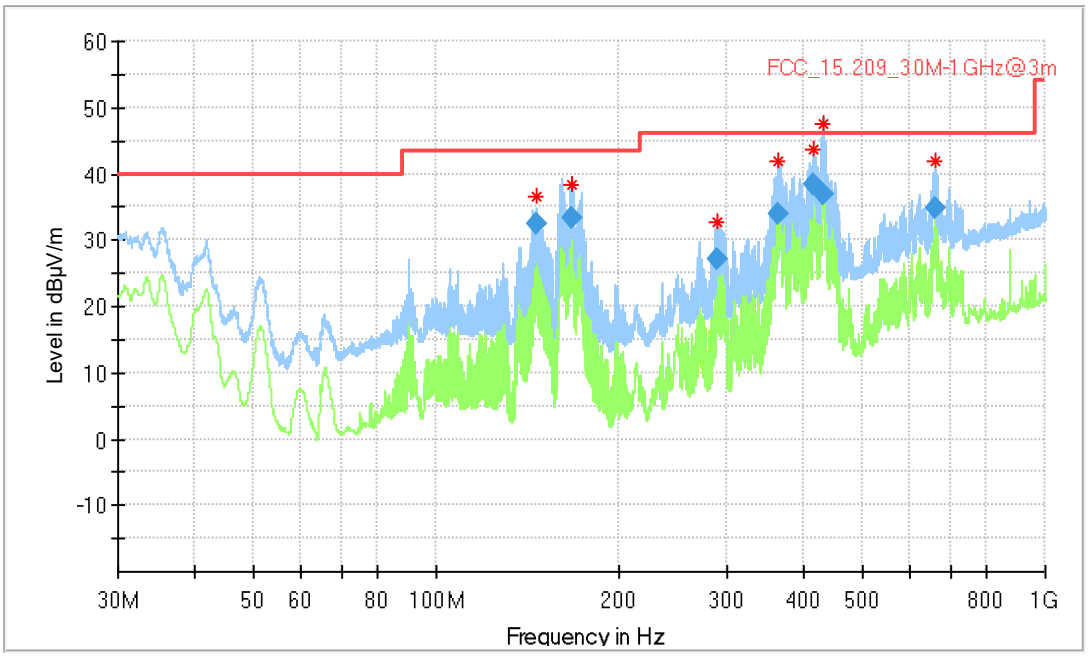
Radio Technology = WLAN n40 MIMO, Operating Frequency = low, Subband = U-NII-1,
Measurement range = 30 MHz - 1 GHz
(S01_AA01#S3.0)



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)
31.110000	23.01	40.00	16.99	1000.0	120.000	109.0	V	-47.0	18.9
108.150000	23.54	43.50	19.96	1000.0	120.000	108.0	V	-144.0	12.1
144.210000	32.31	43.50	11.19	1000.0	120.000	111.0	V	-137.0	10.3
249.990000	33.06	46.00	12.94	1000.0	120.000	125.0	H	117.0	12.7
317.490000	29.42	46.00	16.58	1000.0	120.000	105.0	H	-199.0	15.2
440.130000	29.74	46.00	16.26	1000.0	120.000	110.0	H	-88.0	19.2
675.690000	32.38	46.00	13.62	1000.0	120.000	107.0	H	-9.0	24.2
747.810000	28.03	46.00	17.97	1000.0	120.000	102.0	H	-145.0	25.5
874.980000	36.18	46.00	9.82	1000.0	120.000	108.0	V	62.0	27.4

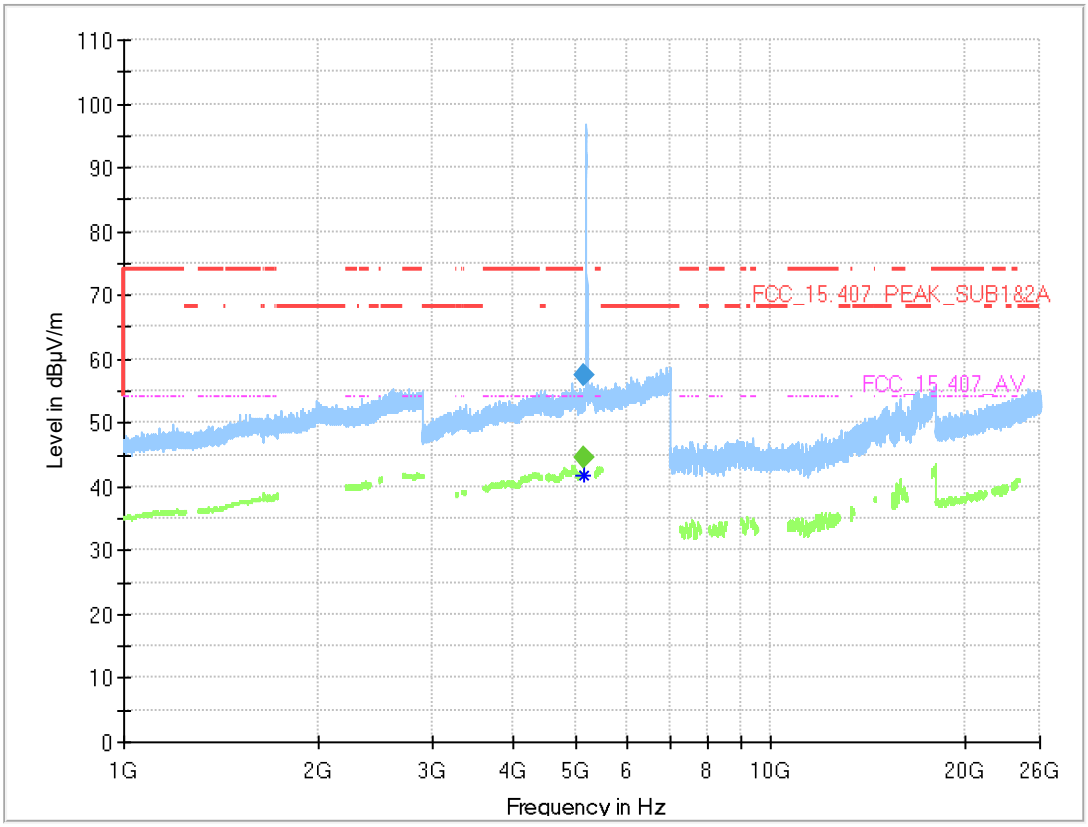
Radio Technology = WLAN n40 MIMO, Operating Frequency = high, Subband = U-NII-3,
Measurement range = 30 MHz - 1 GHz
(S01_AB01#S3.5)



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)
145.950000	32.46	43.50	11.04	1000.0	120.000	127.0	V	-126.0	10.2
166.320000	33.21	43.50	10.29	1000.0	120.000	104.0	V	40.0	10.0
288.450000	27.17	46.00	18.83	1000.0	120.000	129.0	H	-107.0	14.2
365.190000	33.79	46.00	12.21	1000.0	120.000	110.0	H	-92.0	16.9
416.940000	38.49	46.00	7.51	1000.0	120.000	100.0	H	-154.0	18.6
432.330000	36.80	46.00	9.20	1000.0	120.000	100.0	H	-154.0	18.9
657.630000	34.90	46.00	11.10	1000.0	120.000	106.0	H	-72.0	24.1

Radio Technology = WLAN a Diversity, Operating Frequency = low, Subband = U-NII-1,
Measurement range = 1 GHz - 26 GHz
(S01_AB01#S3.5)

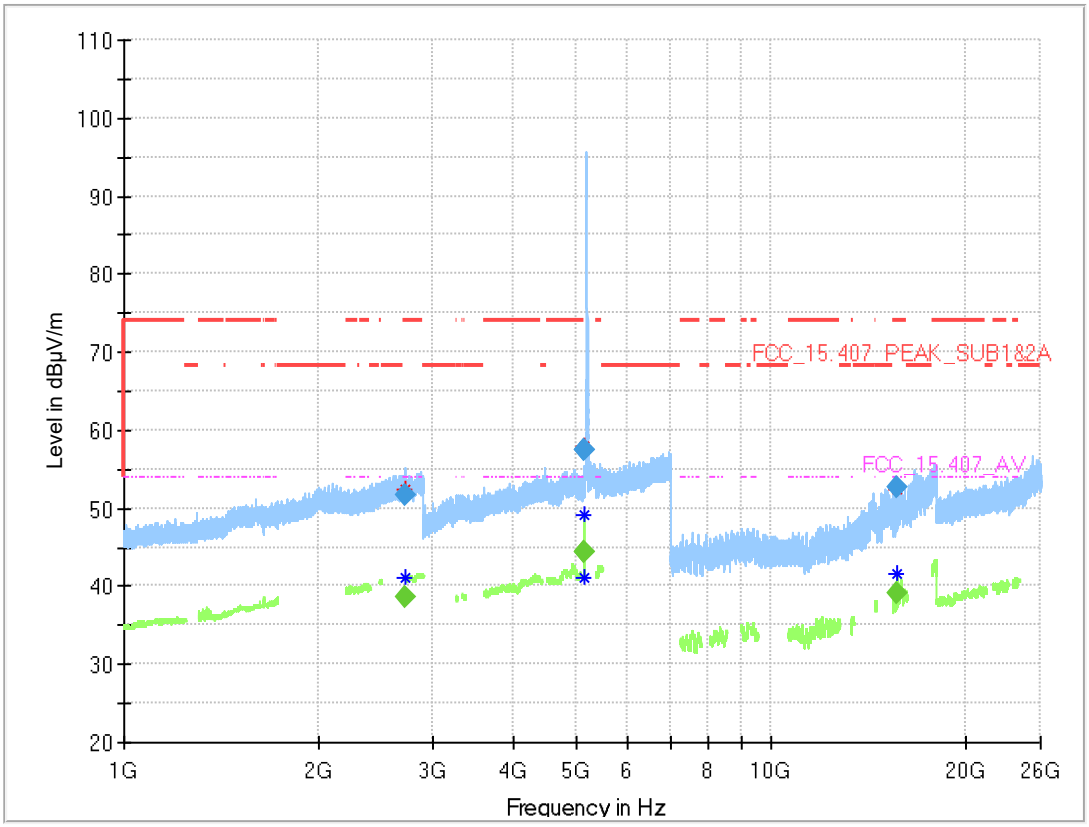


Final_Result

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)
5148.375	---	44.7	54.00	9.30	1000.0	1000.000	150.0	V	-169.0	105.0	15.0
5148.375	57.5	---	74.00	16.46	1000.0	1000.000	150.0	V	-169.0	105.0	15.0

(Note: the peak at 5180 MHz is the wanted signal)

Radio Technology = WLAN a Diversity, Operating Frequency = low, Subband = U-NII-1,
Measurement range = 1 GHz - 26 GHz
(S01_AA01#S3.0)

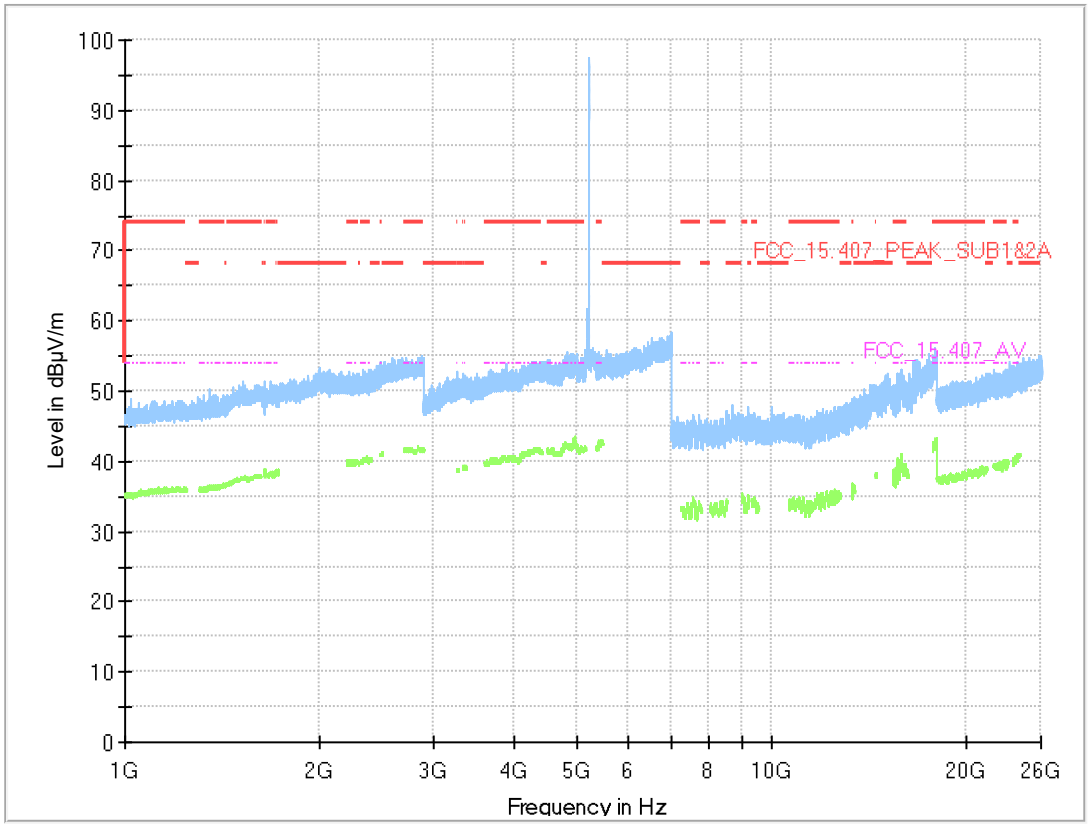


Final_Result

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)
2723.180	---	38.6	54.00	15.42	1000.0	1000.000	150.0	H	11.0	15.0	9.0
2723.180	51.8	---	74.00	22.23	1000.0	1000.000	150.0	H	11.0	15.0	9.0
5117.500	---	44.4	54.00	9.63	1000.0	1000.000	150.0	H	6.0	75.0	14.9
5117.500	57.4	---	74.00	16.57	1000.0	1000.000	150.0	H	6.0	75.0	14.9
5136.188	---	44.4	54.00	9.58	1000.0	1000.000	150.0	H	41.0	4.0	15.0
5136.188	57.4	---	74.00	16.60	1000.0	1000.000	150.0	H	41.0	4.0	15.0
15630.783	---	39.1	54.00	14.91	1000.0	1000.000	150.0	V	-176.0	12.0	11.6
15630.783	52.8	---	74.00	21.23	1000.0	1000.000	150.0	V	-176.0	12.0	11.6

(Note: the peak at 5180 MHz is the wanted signal)

Radio Technology = WLAN a Diversity, Operating Frequency = mid, Subband = U-NII-1,
Measurement range = 1 GHz - 26 GHz
(S01_AB01#S3.5)



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)
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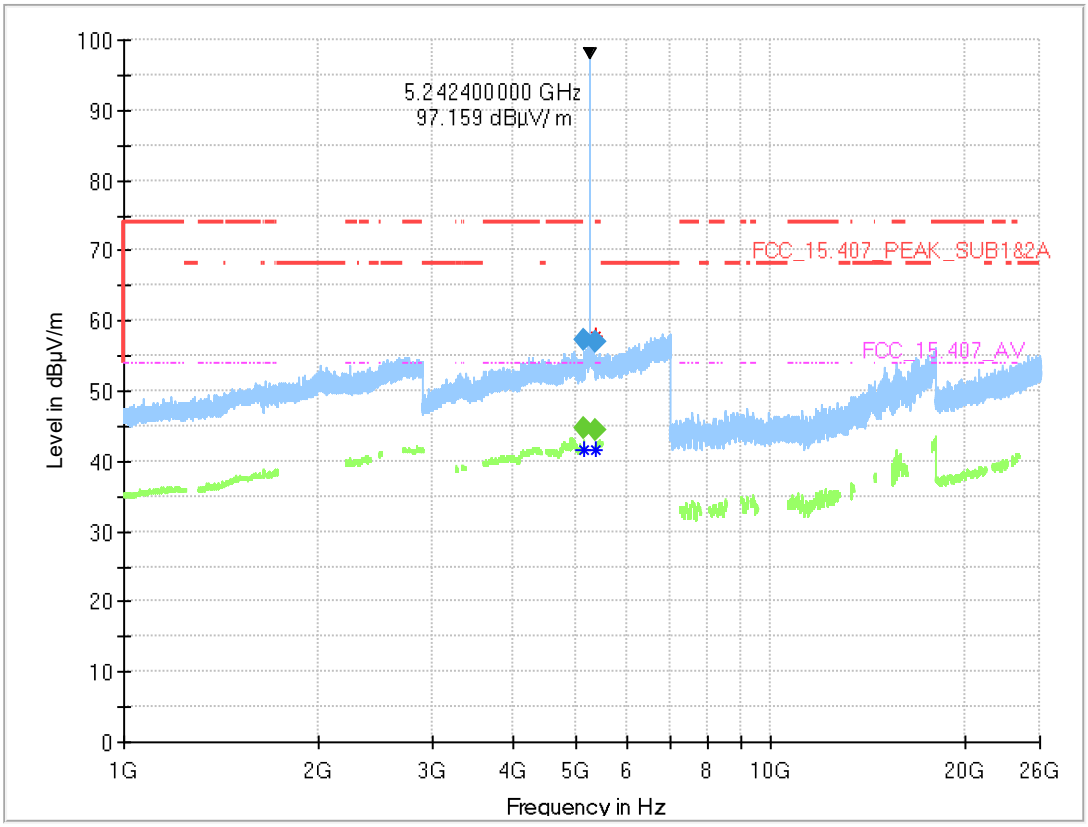
(Note: the peak at 5200 MHz is the wanted signal)

Radio Technology = WLAN a Diversity, Operating Frequency = high, Subband = U-NII-1,
Measurement range = 1 GHz - 26 GHz
(S01_AB01#S3.5)

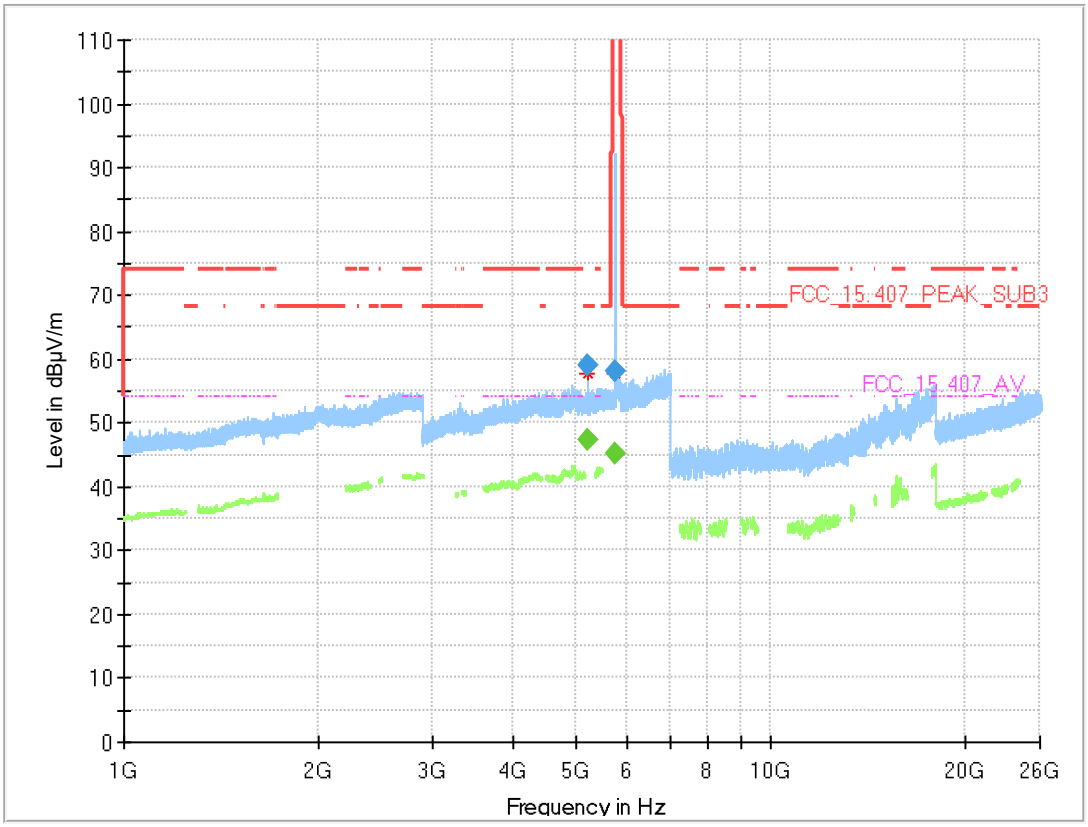


Final_Result

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)
5148.538	---	44.6	54.00	9.40	1000.0	1000.000	150.0	V	-134.0	105.0	15.0
5148.538	57.4	---	74.00	16.64	1000.0	1000.000	150.0	V	-134.0	105.0	15.0
5351.430	---	44.3	54.00	9.66	1000.0	1000.000	150.0	V	-87.0	15.0	15.2
5351.430	56.9	---	74.00	17.11	1000.0	1000.000	150.0	V	-87.0	15.0	15.2

(Note: the peak at 5240 MHz is the wanted signal)

Radio Technology = WLAN a Diversity, Operating Frequency = low, Subband = U-NII-3,
Measurement range = 1 GHz - 26 GHz
(S01_AB01#S3.5)

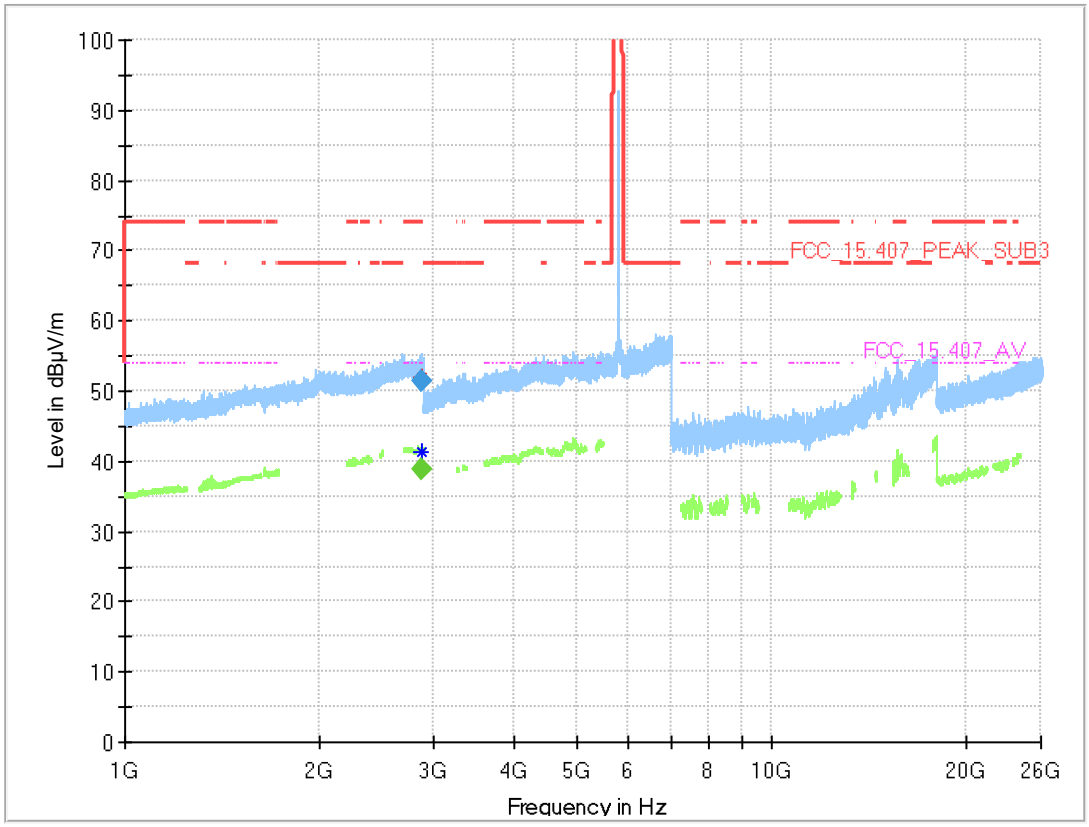


Final_Result

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)
5194.100	---	47.4	---	---	1000.0	1000.000	150.0	V	-39.0	105.0	14.9
5194.100	59.1	---	68.20	9.09	1000.0	1000.000	150.0	V	-39.0	105.0	14.9
5723.500	---	45.1	---	---	1000.0	1000.000	150.0	V	101.0	15.0	15.7
5723.500	58.0	---	118.78	60.76	1000.0	1000.000	150.0	V	101.0	15.0	15.7

(Note: the peak at 5745 MHz is the wanted signal)

Radio Technology = WLAN a Diversity, Operating Frequency = mid, Subband = U-NII-3,
Measurement range = 1 GHz - 26 GHz
(S01_AB01#S3.5)



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)
2882.570	---	38.9	54.00	15.10	1000.0	1000.000	150.0	V	101.0	1.0	8.9
2882.570	51.4	---	74.00	22.64	1000.0	1000.000	150.0	V	101.0	1.0	8.9

(Note: the peak at 5785 MHz is the wanted signal)