

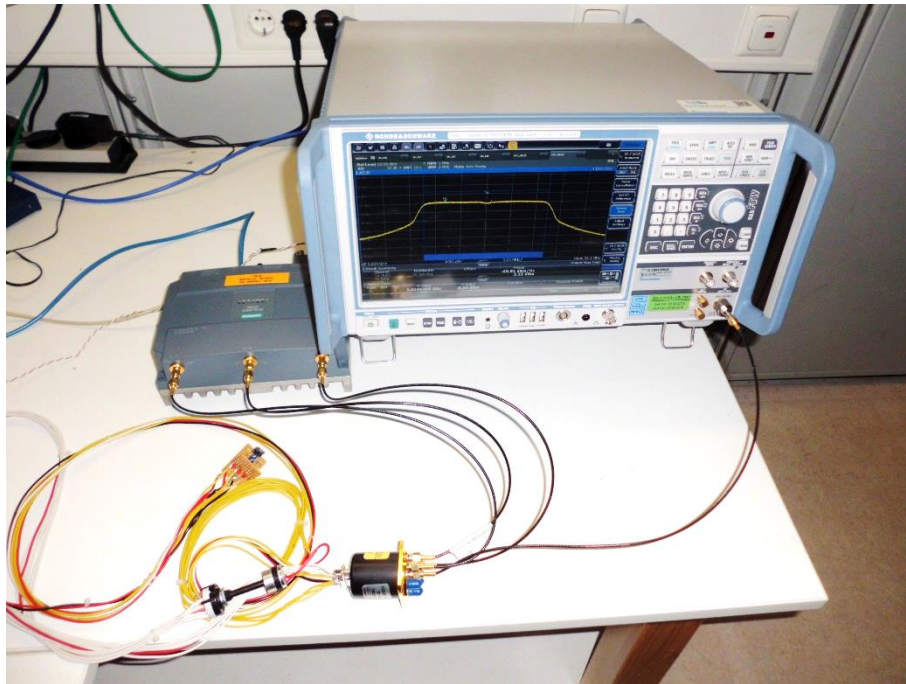
5.2 Emission bandwidth and occupied bandwidth

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

5.2.1 Description of the test location

Test location: AREA4

5.2.2 Photo documentation of the test set-up



5.2.3 Applicable standard

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

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.2.4 Description of Measurement

The minimum 6 dB bandwidth is measured conducted using a spectrum analyser with n-dB down function if applicable otherwise the 6 dB bandwidth is measured manually and following the procedure set out in ANSI C63.10, item 6.9.2 or KDB 789033 D02, item C.2. The bandwidth is measured at Port 1.

Spectrum analyser settings 6 dB bandwidth:

RBW: 100 kHz, VBW: 300 kHz, Detector: Peak, Trace mode: max hold;

Spectrum analyser settings occupied bandwidth:

For 20 MHz channels: RBW: 300 kHz, VBW: 1 MHz, Detector: Peak, Trace mode: max hold;

For 40 MHz channels: RBW: 500 kHz, VBW: 2 MHz, Detector: Peak, Trace mode: max hold;

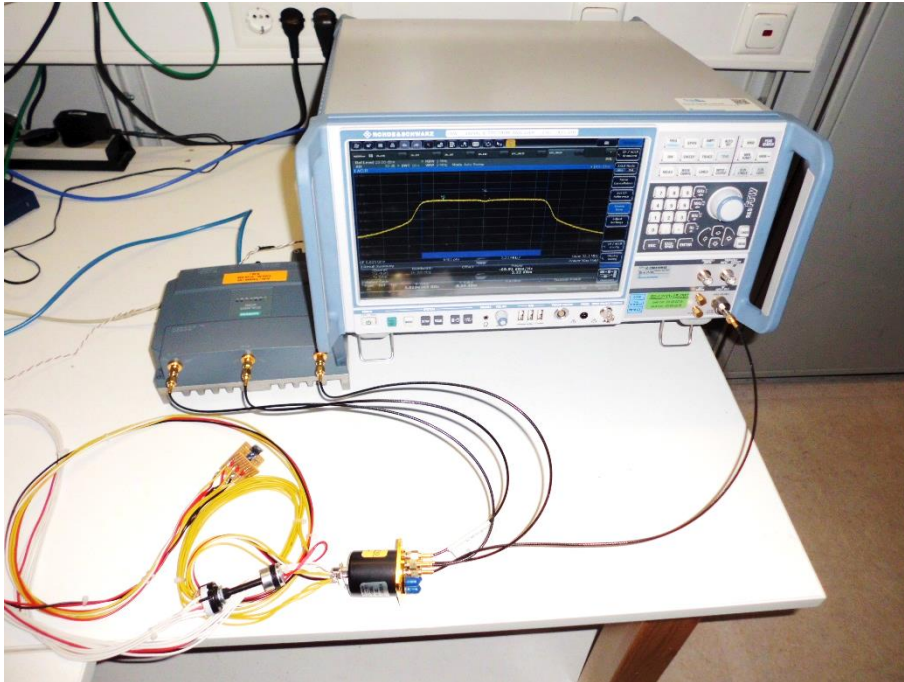
5.3 Maximum conducted output power

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

5.3.1 Description of the test location

Test location: AREA 4

5.3.2 Photo documentation of the test set-up



5.3.3 Applicable standard

According to FCC Part 15, Section 15.407(a)(3):

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

5.3.4 Description of Measurement

The maximum conducted output power is measured using a spectrum analyser with the function “integrated band power measurement” following the procedure set out in KDB 789033 D02, item C.f) Method SA-3. The EUT is set in TX continuous mode while measuring. The EUT is measured following the procedure set out in KDB 662911 for MIMO devices. The output power is measured separate at chain 1, 2 and chain 3. The measurement values are converted into linear values, summed and converted back into log values. The resulting values are listed in the following tables.

Spectrum analyser settings:

RBW: 1 MHz,	VBW: 3 MHz,	Detector: RMS (power averaging),	Trace mode: max hold;
Number of points: 6401,	Sweep time: 10 s,	Band power function;	

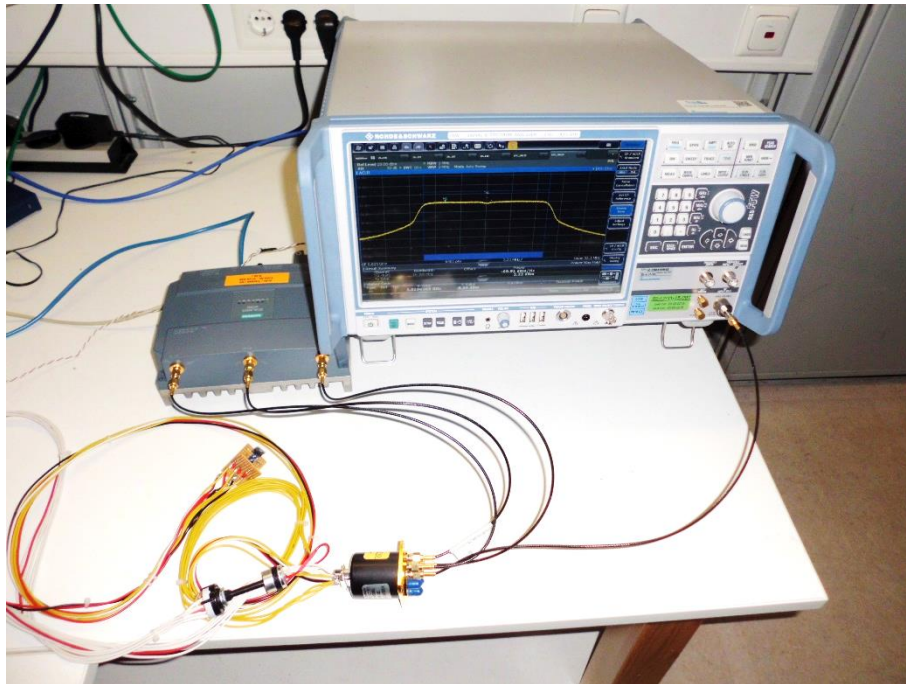
5.4 Maximum power spectral density

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

5.4.1 Description of the test location

Test location: AREA 4

5.4.2 Photo documentation of the test set-up



5.4.3 Applicable standard

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

The maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

5.4.4 Description of Measurement

The maximum conducted output power is measured using a spectrum analyser with the function “integrated band power measurement” following the procedure set out in KDB 789033 D02, item F. Therefore the PSD is measured the same way. The “integrated band power measurement” is related to PSD (dBm/Hz). The EUT is set in TX continuous mode while measuring. The EUT is measured separate at chain 1, 2 and chain 3. The measurement values are converted into linear values. The chain 1, 2 and chain 3 are summed and converted back into log values and corrected with the conversion factor Hz to 500 kHz, 57.0 dB. The resulting values are listed in the following tables. The insertion loss of cable and switch is taken into account with 4.0 dB at 5.8 GHz.

Spectrum analyser settings:

RBW: 1 MHz, VBW: 3 MHz,

Detector: RMS (power averaging), Trace mode: max hold;

Number of points: 6401, Sweep time: 10 s;

5.4.5 Test result

1 Port mode (only one port is active, port 2 and 3 are internally terminated):

Raw data as representative for all one Port measurements, used for 802.11a:

	PD1 [P12] (dBm/Hz)	PD1 [P17] (dBm/Hz)	PD1 [P20] (dBm/Hz)
CH149	-65.77	-65.77	-62.68
CH157	-66.42	-63.34	-63.35
CH165	-66.12	-63.55	-63.56

Calculation of the total output power:

802.11a, 6 Mbps, 1TX		Test results conducted				
Port 1		PD [P12] (dBm/500kHz)	PD [P17] (dBm/500kHz)	PD [P20] (dBm/500kHz)	Limit (dBm/500kHz)	Margin (dB)
Lowest						
T_{nom}	V_{nom}	-4.8	-4.8	-1.7	30.0	-31.7
Middle						
T_{nom}	V_{nom}	-5.4	-2.3	-2.4	30.0	-32.4
Highest						
T_{nom}	V_{nom}	-5.1	-2.6	-2.6	30.0	-32.6

Note. An insertion loss of 4.0 dB for measurement cable and switch is taken into account.

HT20, MCS0, 1TX		Test results conducted				
Port 1		PD [P12] (dBm/500kHz)	PD [P17] (dBm/500kHz)	PD [P20] (dBm/500kHz)	Limit (dBm/500kHz)	Margin (dB)
Lowest frequency: CH149						
T_{nom}	V_{nom}	-5.6	-2.6	-2.5	30.0	-32.5
Middle frequency: CH157						
T_{nom}	V_{nom}	-6.4	-3.0	-3.1	30.0	-33.1
Highest frequency: CH165						
T_{nom}	V_{nom}	-6.2	-3.1	-3.2	30.0	-33.2

HT40, MCS8, 1TX		Test results conducted				
Port 1		PD [P12] (dBm/500kHz)	PD [P17] (dBm/500kHz)	PD [P20] (dBm/500kHz)	Limit (dBm/500kHz)	Margin (dB)
Lowest frequency: CH149up						
T_{nom}	V_{nom}	-10.1	-7.1	-7.0	30.0	-37.0
Middle frequency: CH157up						
T_{nom}	V_{nom}	-10.7	-7.6	-7.6	30.0	-37.6

2 Port mode (two ports are active, port 3 is internally terminated):

Raw data as representative for all one Port measurements, used for 802.11a:

	PD1 [P12] (dBm/Hz)	PD2 [P12] (dBm/Hz)	PD1 [P17] (dBm/Hz)	PD2 [P17] (dBm/Hz)	PD1 [P20] (dBm/Hz)	PD2 [P20] (dBm/Hz)
CH149	-68.77	-67.60	-63.73	-63.19	-62.64	-62.42
CH157	-69.09	-68.64	-63.89	-63.46	-62.99	-62.45
CH165	-68.99	-69.91	-64.38	-64.92	-63.15	-63.91

Calculation of the total output power:

802.11a, 6 Mbps, 2TX		Test results conducted				
Port 1+2		PD [P12] (dBm/500kHz)	PD [P17] (dBm/500kHz)	PD [P20] (dBm/500kHz)	Limit (dBm/500kHz)	Margin (dB)
Lowest						
T_{nom}	V_{nom}	-4.1	-1.2	0.6	30.0	-29.4
Middle						
T_{nom}	V_{nom}	-4.8	-1.6	0.3	30.0	-29.7
Highest						
T_{nom}	V_{nom}	-5.4	-2.3	-0.6	30.0	-30.6

Note. An insertion loss of 4.0 dB for measurement cable and switch is taken into account.

HT20, MCS8, 2TX		Test results conducted				
Port 1+2		PD [P12] (dBm/500kHz)	PD [P17] (dBm/500kHz)	PD [P20] (dBm/500kHz)	Limit (dBm/500kHz)	Margin (dB)
Lowest frequency: CH149						
T_{nom}	V_{nom}	-4.7	-1.7	0.4	30.0	-29.6
Middle frequency: CH157						
T_{nom}	V_{nom}	-5.6	-2.5	-0.6	30.0	-30.6
Highest frequency: CH165						
T_{nom}	V_{nom}	-6.4	-2.9	-1.2	30.0	-31.2

HT40, MCS16, 2TX		Test results conducted				
Port 1+2		PD [P12] (dBm/500kHz)	PD [P17] (dBm/500kHz)	PD [P20] (dBm/500kHz)	Limit (dBm/500kHz)	Margin (dB)
Lowest frequency: CH149up						
T_{nom}	V_{nom}	-9.6	-6.3	-4.6	30.0	-34.6
Middle frequency: CH157up						
T_{nom}	V_{nom}	-10.3	-7.1	-5.2	30.0	-35.2

3 Port mode (all ports are active):

Raw data as representative for all one Port measurements, used for 802.11a:

	PD1 [P12] (dBm/Hz)	PD2 [P12] (dBm/Hz)	PD3 [P12] (dBm/Hz)	PD1 [P17] (dBm/Hz)	PD2 [P17] (dBm/Hz)	PD3 [P17] (dBm/Hz)	PD1 [P20] (dBm/Hz)	PD2 [P20] (dBm/Hz)	PD3 [P20] (dBm/Hz)
CH149	-70.38	-69.50	-69.86	-65.48	-64.79	-64.70	-61.50	-61.73	-62.47
CH157	-70.40	-69.78	-69.59	-65.55	-65.09	-64.53	-61.44	-62.20	-62.82
CH165	-70.53	-71.57	-69.24	-65.02	-66.43	-64.40	-62.54	-63.83	-61.55

Calculation of the total output power:

802.11a, 6 Mbps, 3TX		Test results conducted				
Port 1+2+3		PD [P12] (dBm/500kHz)	PD [P17] (dBm/500kHz)	PD [P20] (dBm/500kHz)	Limit (dBm/500kHz)	Margin (dB)
Lowest						
T_{nom}	V_{nom}	-4.1	0.8	3.9	30.0	-26.1
Middle						
T_{nom}	V_{nom}	-4.1	0.7	3.7	30.0	-26.3
Highest						
T_{nom}	V_{nom}	-4.6	0.6	3.2	30.0	-26.8

Note. An insertion loss of 4.0 dB for measurement cable and switch is taken into account.

HT20, MCS8, 3TX		Test results conducted				
Port 1+2+3		PD [P12] (dBm/500kHz)	PD [P17] (dBm/500kHz)	PD [P20] (dBm/500kHz)	Limit (dBm/500k)	Margin (dB)
Lowest frequency: CH149						
T_{nom}	V_{nom}	-5.1	-0.2	2.8	30.0	-27.2
Middle frequency: CH157						
T_{nom}	V_{nom}	-5.2	-0.2	2.4	30.0	-27.6
Highest frequency: CH165						
T_{nom}	V_{nom}	-5.5	-0.8	2.1	30.0	-27.9

HT40, MCS16, 3TX		Test results conducted				
Port 1+2+3		PD [P12] (dBm/500kHz)	PD [P17] (dBm/500kHz)	PD [P20] (dBm/500kHz)	Limit (dBm/500k)	Margin (dB)
Lowest frequency: CH149up						
T_{nom}	V_{nom}	-9.7	-4.7	-2.0	30.0	-32.0
Middle frequency: CH157up						
T_{nom}	V_{nom}	-10.0	-5.0	-2.3	30.0	-32.3

Power spectral density limit according to FCC Part 15, Section 15.407(e):

The maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

Frequency (MHz)	Power spectral density limit
	(dBm/500 kHz)
5725 - 5850	30

The requirements are **FULFILLED**.

Remarks: For detailed test results please see the test protocols under 5.3.6.

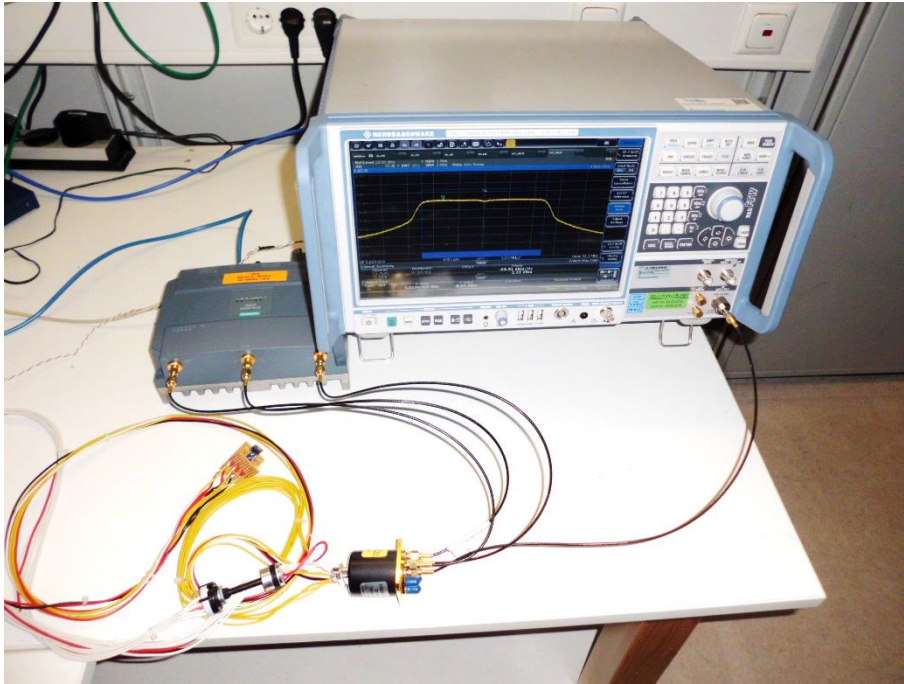
5.5 Defacto limit

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

5.5.1 Description of the test location

Test location: AREA 4

5.5.2 Photo documentation of the test set-up



5.5.3 Applicable standard

According to FCC Part 15, Section 15.407(a)(3):

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.5.4 Test result

The amount of reduction is calculated using the following formula: $P_{out} = 30 - (G_x - 6)$;

Where

P_{out} = maximum conducted output power

G_x = antenna gain of the applied antenna