

Annex G



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Test report annex authorized:

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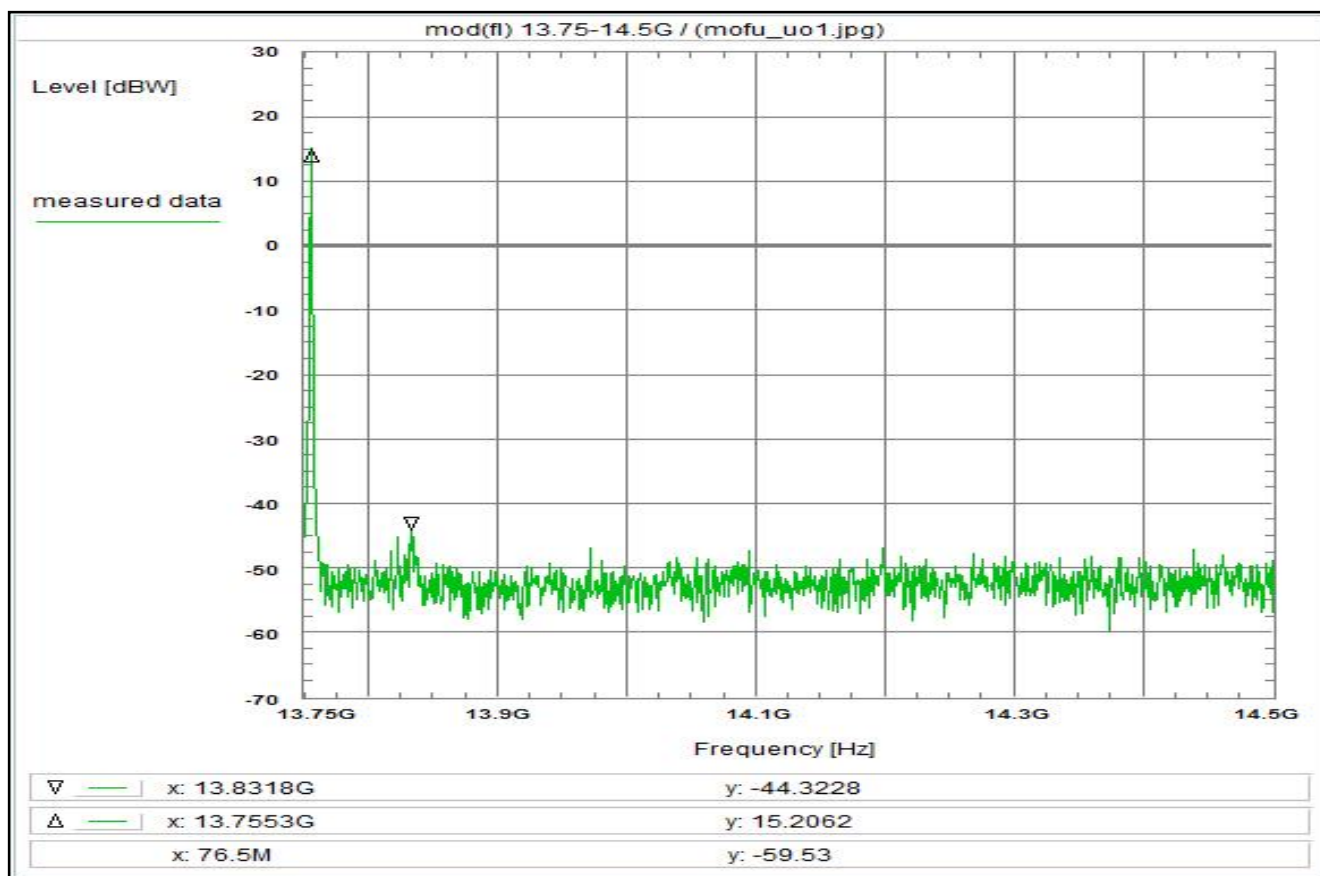
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2 Measurement results, FCC Part 25

This chapter consists of 44 pages including this page.

Plot No. 1



Subclause: -/- Function test
 Modulated rf-carrier at the lower edge of the band (fl)
 Measurement within the band

Limit:
 no limits defined
 This test serves to verify the general function of the EUT and for orientation regarding to the spurious emissions which are expected within the band, furthermore for comparison of the actual power with the rated value at modulated carrier adjusted as close to the lower edge of the operating frequency band.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

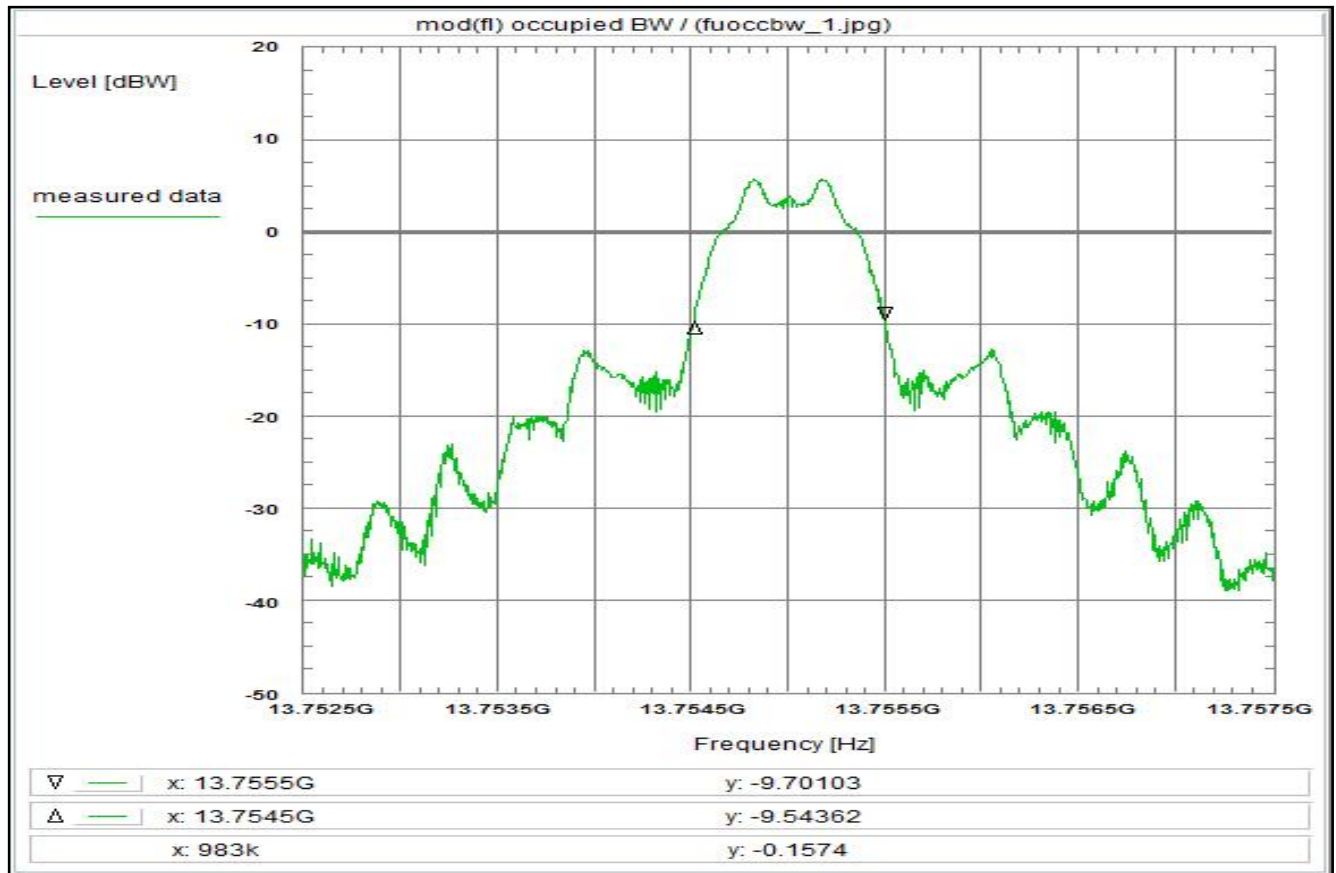
Environment condition:
 Date & Time: Mon 20/Sep/2021 09:48:01
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:
 Start frequency: 13.75 GHz
 Stop frequency: 14.5 GHz
 Center frequency: 14.125 GHz
 Frequency span: 750 MHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: Pos Peak

Correction:
 Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna (on-axis) + 0.0 dBi
 Test antenna (A037) - 11.4 dB
 BW correction factor + 0.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 59.8 dB

Remarks:
 Test of general function of the EUT and measurement for orientation

Plot No. 2



Subclause: -/- Function test
 Modulated rf-carrier at the lower edge of the band (fl)
 Determination of the occupied bandwidth

Limit:
 no limits defined

The frequency range in the plot is about 3 times the expected occupied bandwidth.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:12:31
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 13.7525 GHz
 Stop frequency: 13.7575 GHz
 Center frequency: 13.755 GHz
 Frequency span: 5 MHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: Pos Peak

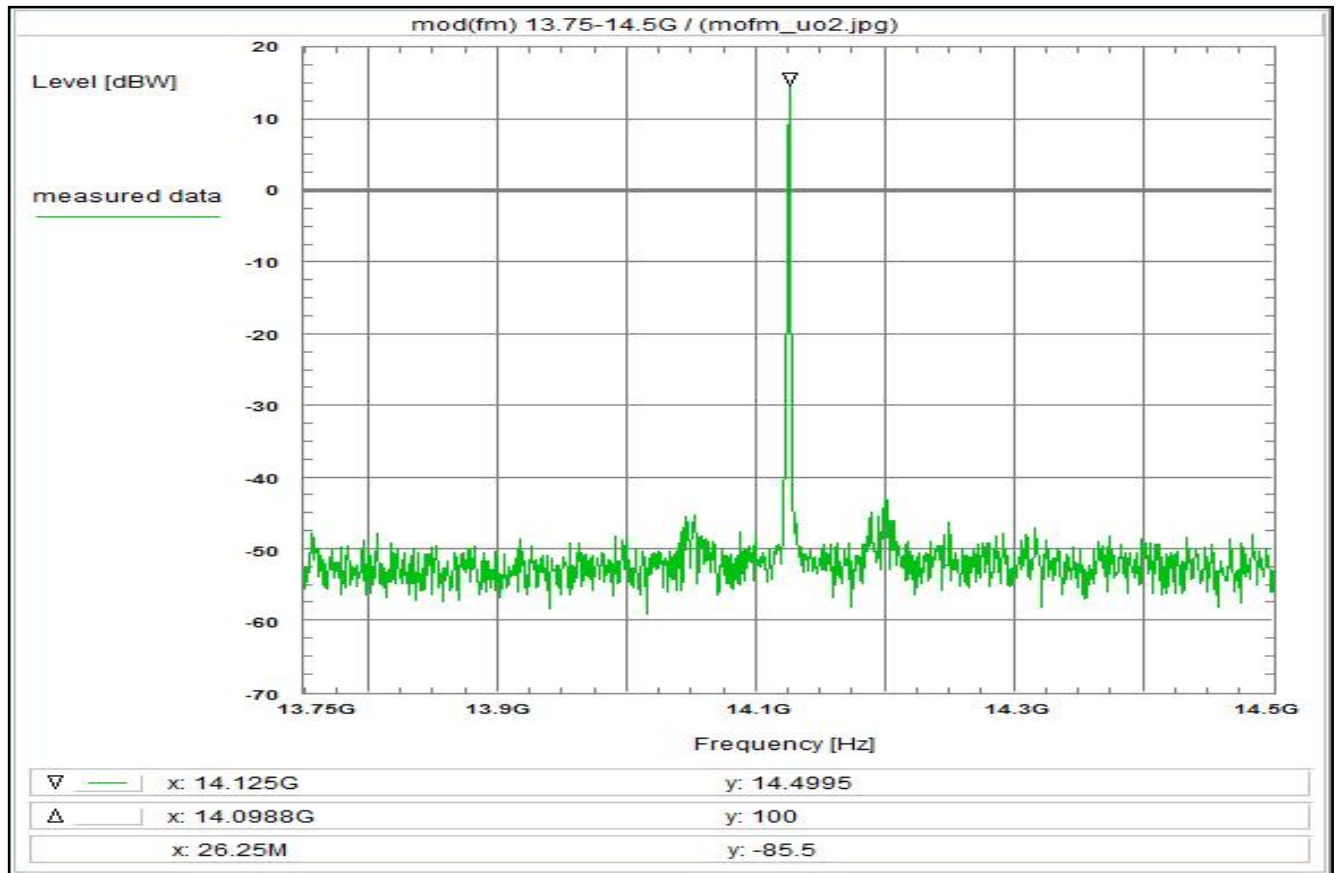
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna (on-axis) + 0.0 dBi
 Test antenna (A037) - 11.8 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 45.4 dB

Remarks:

Determination of the occupied bandwidth.
 The measured value is about 985 kHz (delta marker)
 (according to the definition: 99% of the total mean power)
 The internal function of the analyzer was used for determination.

Plot No. 3



Subclause: -/- Function test
 Modulated rf-carrier in the middle of the band (fm)
 Measurement within the band

Limit:
 no limits defined
 This test serves to verify the general function of the EUT and for orientation regarding to the spurious emissions which are expected within the band, furthermore for comparison of the actual power with the rated value at modulated carrier adjusted in the middle of the band (EIRP).

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:
 measurement for orientation

Test result: Test passed

Environment condition:

Date & Time: Thu 16/Sep/2021 10:41:35
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 13.75 GHz
 Stop frequency: 14.5 GHz
 Center frequency: 14.125 GHz
 Frequency span: 750 MHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: Pos Peak

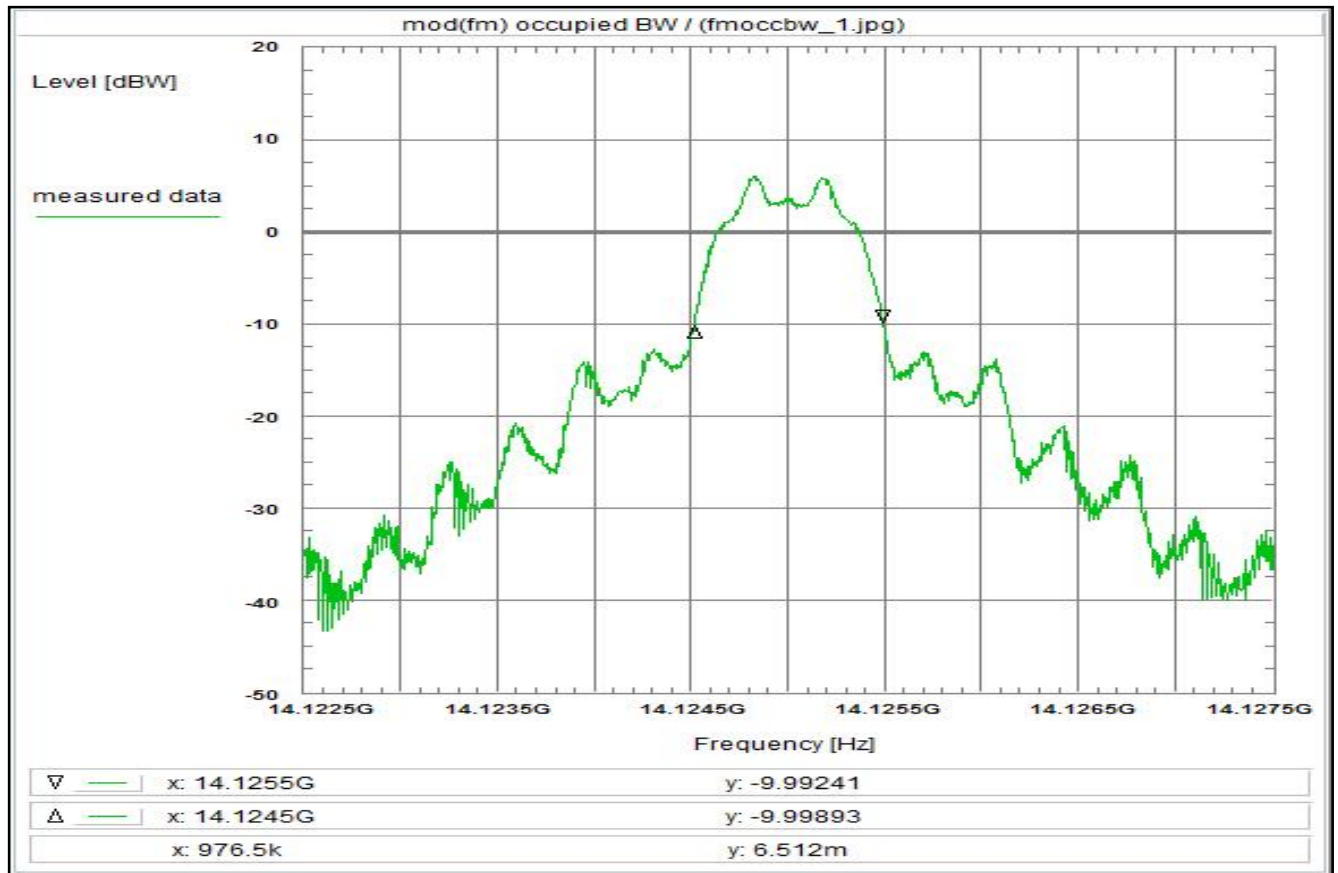
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna (on-axis) + 0.0 dBi
 Test antenna (A037) - 11.4 dB
 BW correction factor + 0.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 59.8 dB

Remarks:

Test of general function of the EUT and measurement for orientation

Plot No. 4



Subclause: -/- Function test
 Modulated rf-carrier in the middle of the band (fm)
 Determination of the occupied bandwidth

Limit:
 no limits defined

The frequency range in the plot is about 3 times the expected occupied bandwidth.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Thu 16/Sep/2021 11:00:43
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 14.1225 GHz
 Stop frequency: 14.1275 GHz
 Center frequency: 14.125 GHz
 Frequency span: 5 MHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: Pos Peak

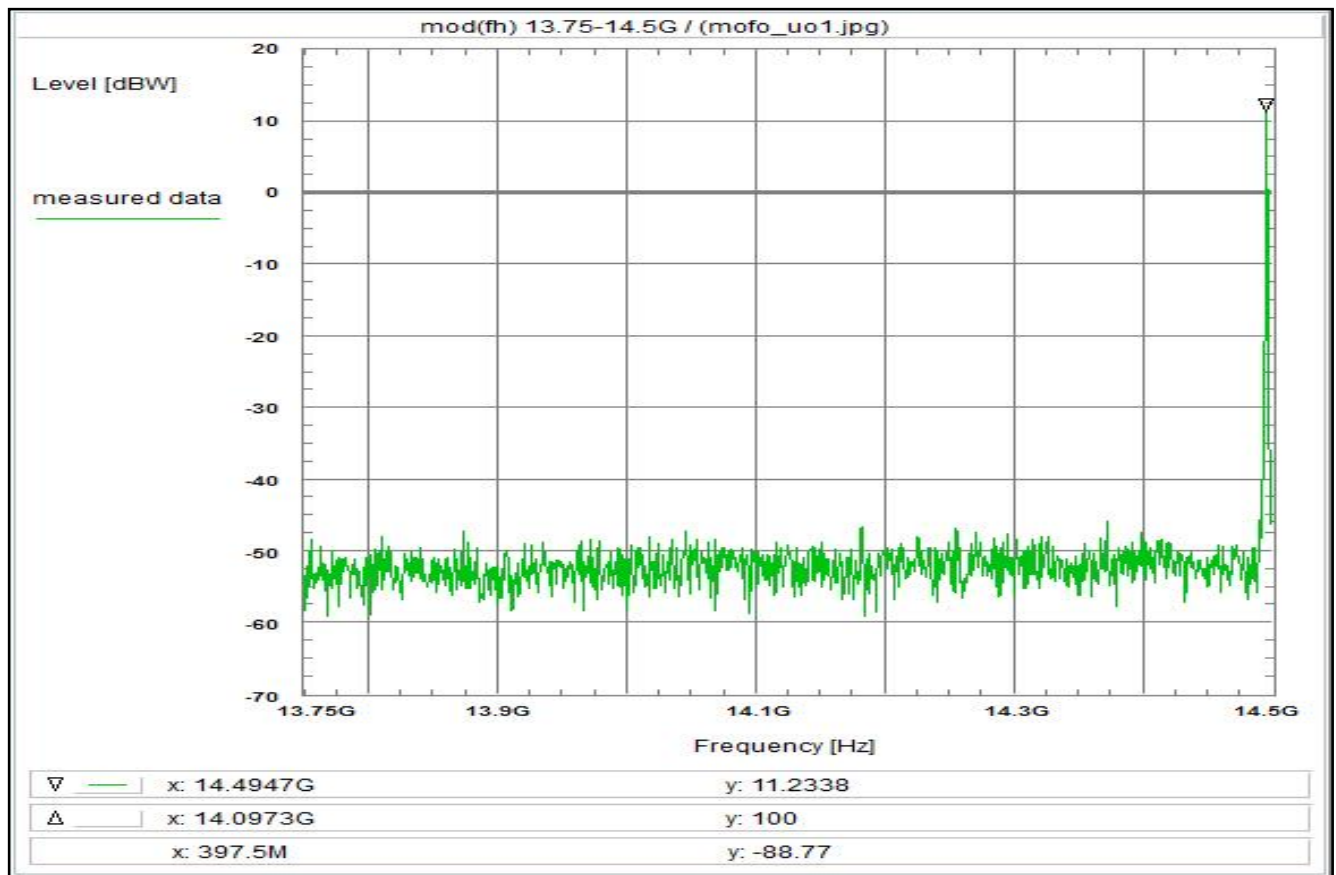
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna (on-axis) + 0.0 dBi
 Test antenna (A037) - 11.3 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 45.9 dB

Remarks:

Determination of the occupied bandwidth.
 The measured value is about 0.98 MHz (delta marker)
 (according to the definition: 99% of the total mean power)
 The internal function of the analyzer was used for determination.

Plot No. 5



Subclause: -/- Function test
 Modulated rf-carrier at the upper edge of the band (fh)
 Measurement within the band

Limit:
 no limits defined
 This test serves to verify the general function of the EUT and for orientation regarding to the spurious emissions which are expected within the band, furthermore for comparison of the actual power with the rated value at modulated carrier adjusted as close to the upper edge of the operating frequency band.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:54:36
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 13.75 GHz
 Stop frequency: 14.5 GHz
 Center frequency: 14.125 GHz
 Frequency span: 750 MHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: Pos Peak

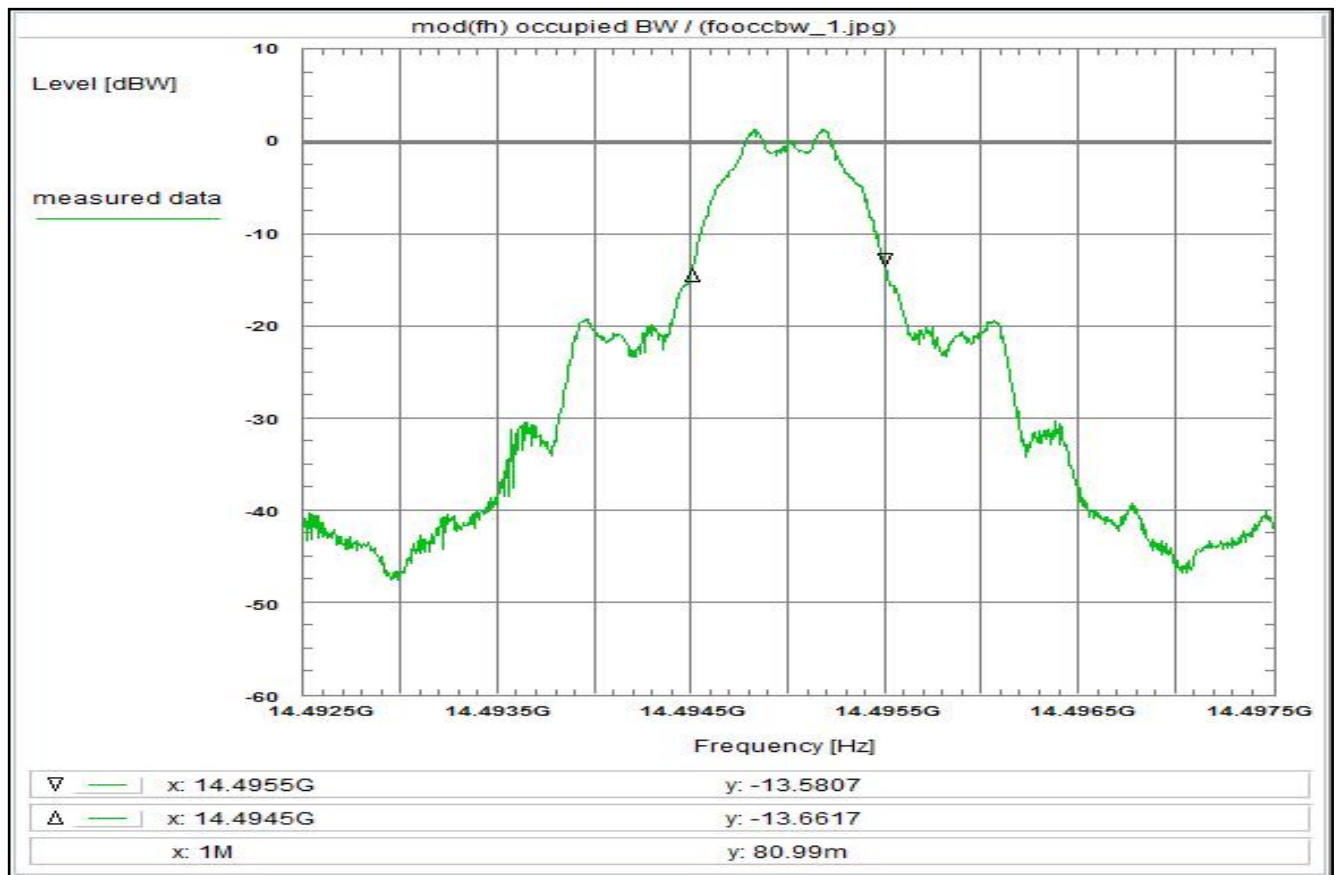
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna (on-axis) + 0.0 dBi
 Test antenna (A037) - 11.4 dB
 BW correction factor + 0.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 59.8 dB

Remarks:

Test of general function of the EUT and measurement for orientation

Plot No. 6



Subclause: -/- Function test
 Modulated rf-carrier at the upper edge of the band (fh)
 Determination of the occupied bandwidth

Limit:
 no limits defined

The frequency range in the plot is about 3 times the expected occupied bandwidth.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:
 determination of the occupied bandwidth

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:59:31
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 14.4925 GHz
 Stop frequency: 14.4975 GHz
 Center frequency: 14.495 GHz
 Frequency span: 5 MHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: Pos Peak

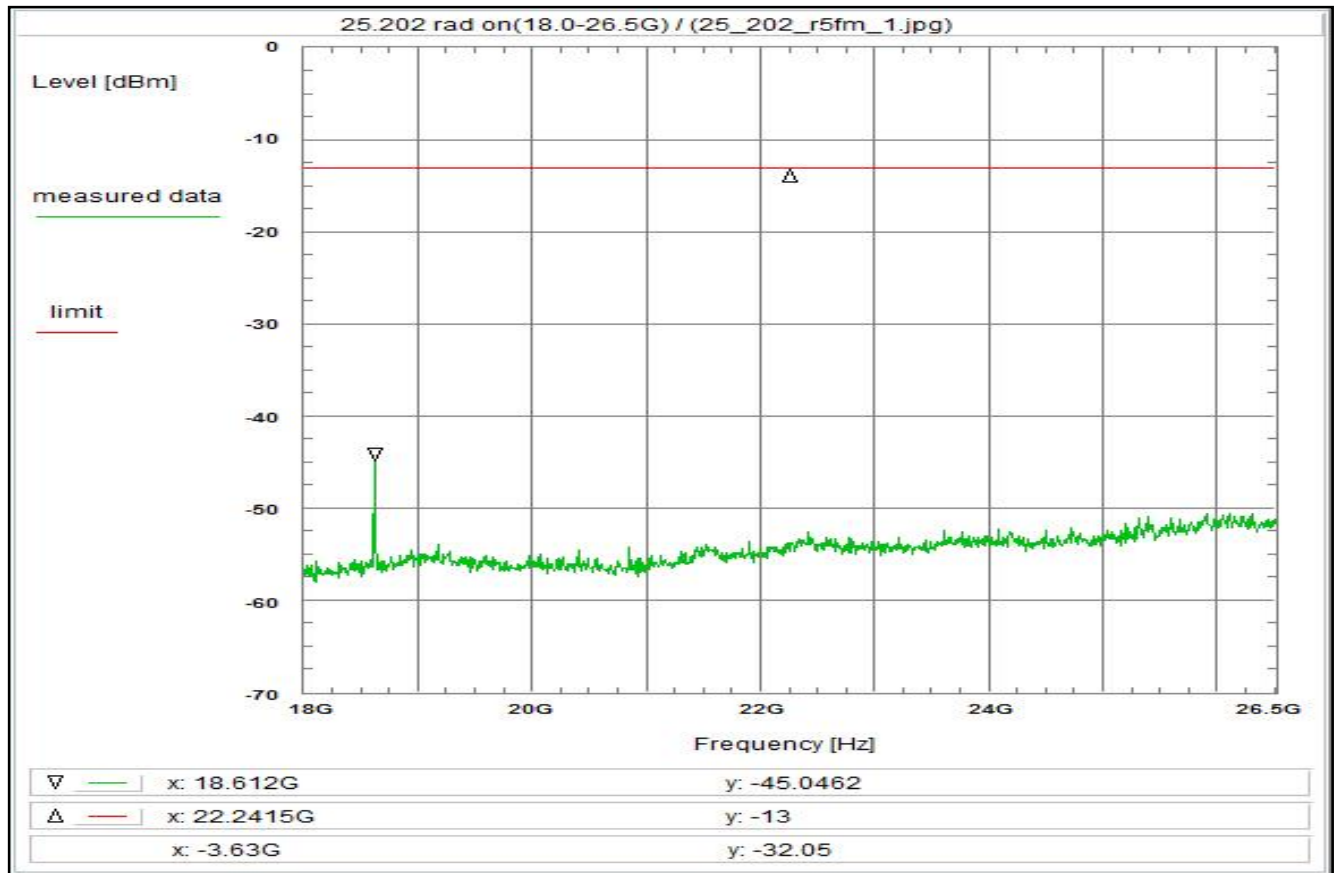
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna (on-axis) + 0.0 dBi
 Test antenna (A037) - 11.4 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 45.8 dB

Remarks:

Determination of the occupied bandwidth.
 The measured value is about 996 kHz (delta marker)
 (according to the definition: 99% of the total mean power)
 The internal function of the analyzer was used for determination.

Plot No. 7



Subclause: 25.202 Emission limitations
 Modulated rf-carrier within the band (fl/fm/fh)
 Radiation coming out of DUT-cabinet(s): 18.0 GHz - 26.5 GHz

Limit:
 Limit acc. to 25.202): -13.0 dBm

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A019, C220, R001, W065, W073, W074

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 13:58:30
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 18 GHz
 Stop frequency: 26.5 GHz
 Center frequency: 22.25 GHz
 Frequency span: 8.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: Pos Peak

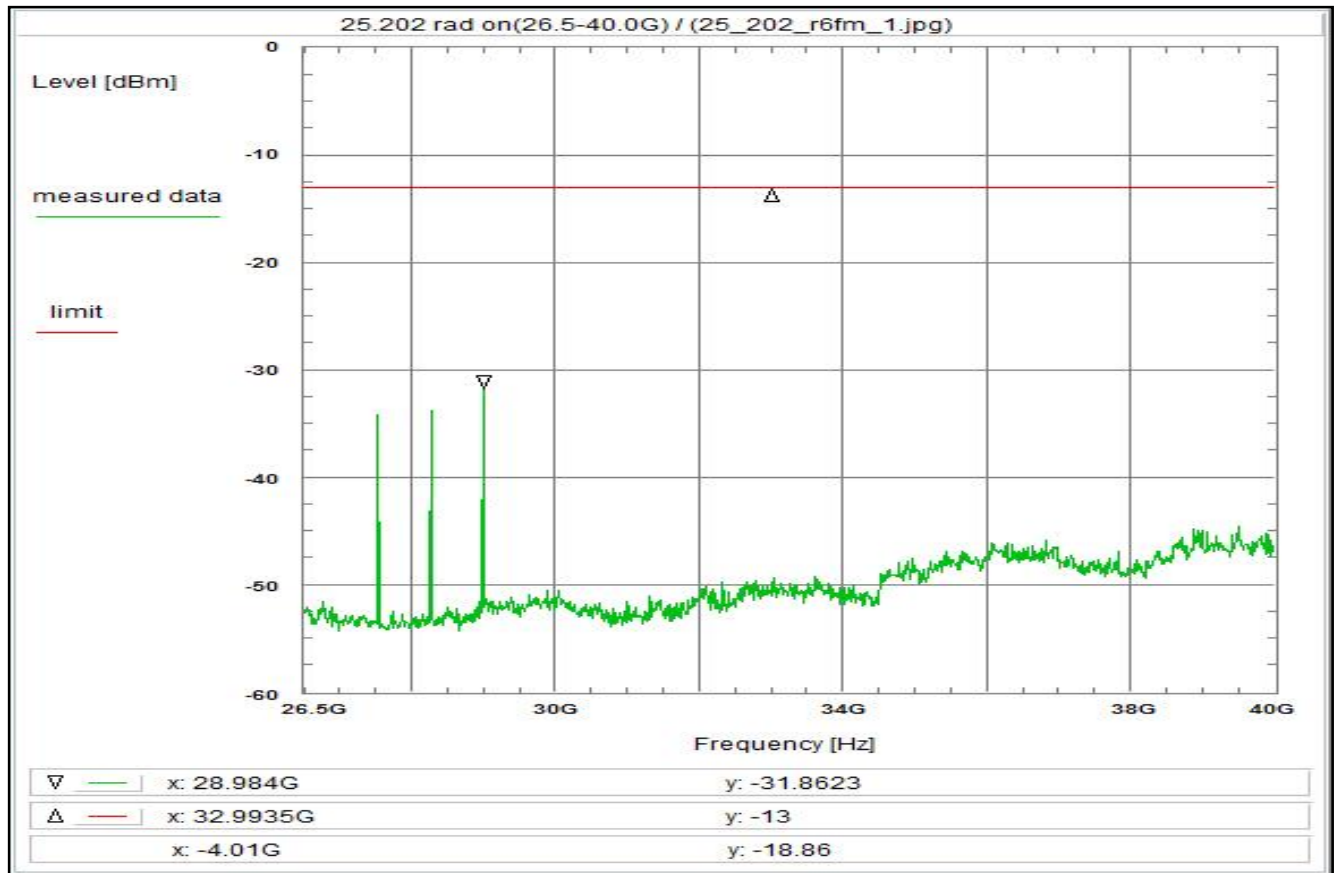
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 3.5 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A019) - 19.3 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (22.25GHz, 0.3m) + 48.9 dB
 TOTAL CORRECTION: + 19.1 dB

Remarks:

Carrier-on state / Carrier within the the band (fl/fm/fh)
 Measurement for orientation with a measuring antenna close to the DUT-cabinets.
 If any critical spurious radiations are detected a measurement
 in an exactly defined distance will be carried out.

Plot No. 8



Subclause: 25.202 Emission limitations
 Modulated rf-carrier within the band (fl/fm/fh)
 Radiation coming out of DUT-cabinet(s): 26.5 GHz - 40.0 GHz

Limit:
 Limit acc. to 25.202): -13.0 dBm

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A021, C220, R001, W065, W073, W074

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 14:02:37
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 26.5 GHz
 Stop frequency: 40 GHz
 Center frequency: 33.25 GHz
 Frequency span: 13.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: Pos Peak

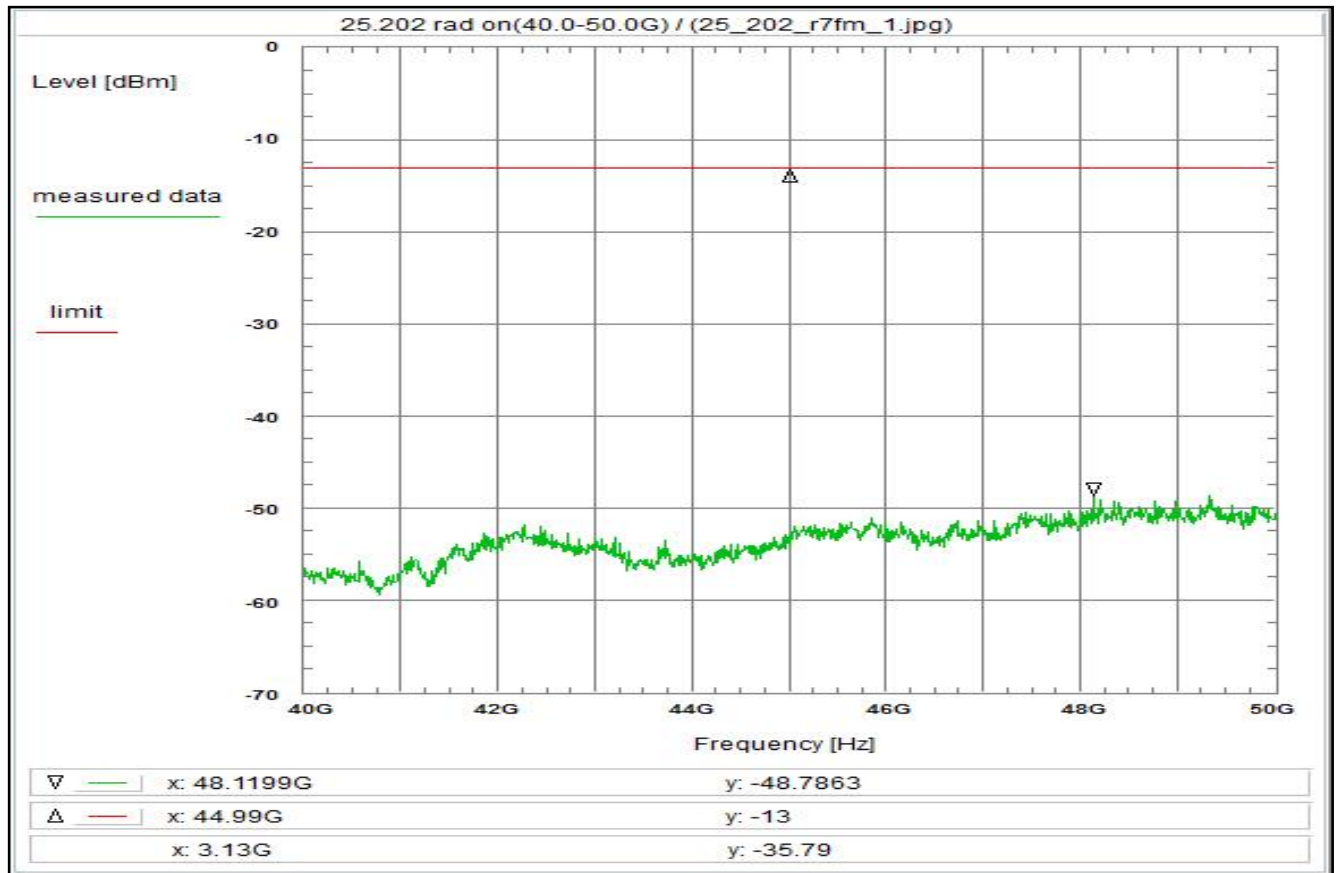
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 4.3 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A021) - 19.6 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (33.25GHz, 0.2m) + 48.9 dB
 TOTAL CORRECTION: + 19.6 dB

Remarks:

Carrier-on state / Carrier within the the band (fl/fm/fh)
 Measurement for orientation with a measuring antenna close to the DUT-cabinets.
 If any critical spurious radiations are detected a measurement in an exactly defined distance will be carried out.

Plot No. 9



Subclause: 25.202 Emission limitations
 Modulated rf-carrier within the band (fl/fm/fh)
 Radiation coming out of DUT-cabinet(s): 40.0 GHz - 50.0 GHz

Limit:
 Limit acc. to 25.202): -13.0 dBm

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A_50, R001, W022, W074, W077

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 14:05:42
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 40 GHz
 Stop frequency: 50 GHz
 Center frequency: 45 GHz
 Frequency span: 10 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: Pos Peak

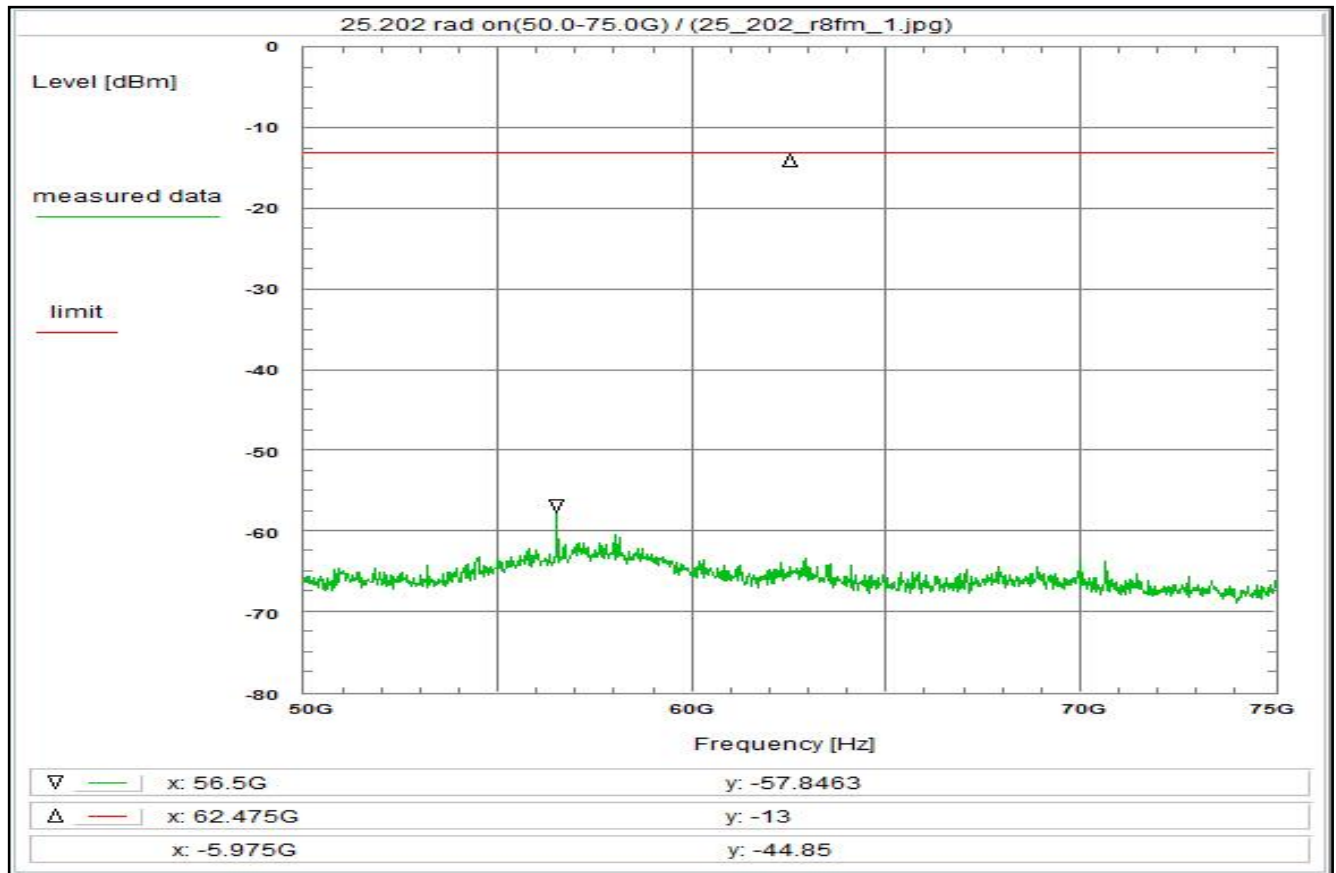
Correction:

Directional coupler + 0.0 dB
 Coaxial cable + 0.0 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A_50) - 19.9 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (45.00GHz, 0.1m) + 45.5 dB
 TOTAL CORRECTION: + 11.6 dB

Remarks:

Carrier-on state / Carrier within the the band (fl/fm/fh)
 Measurement for orientation with a measuring antenna close to the DUT-cabinets.
 If any critical spurious radiations are detected a measurement in an exactly defined distance will be carried out.

Plot No. 10



Subclause: 25.202 Emission limitations
 Modulated rf-carrier within the band (fl/fm/fh)
 Radiation coming out of DUT-cabinet(s): 50.0 GHz - 75.0 GHz

Limit:
 Limit acc. to 25.202): -13.0 dBm

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.4:

Test equipment:
 see test report chapter 7.4: A025, R001, R025, W022, W074, W077

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 14:13:07
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 50 GHz
 Stop frequency: 75 GHz
 Center frequency: 62.5 GHz
 Frequency span: 25 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: Pos Peak

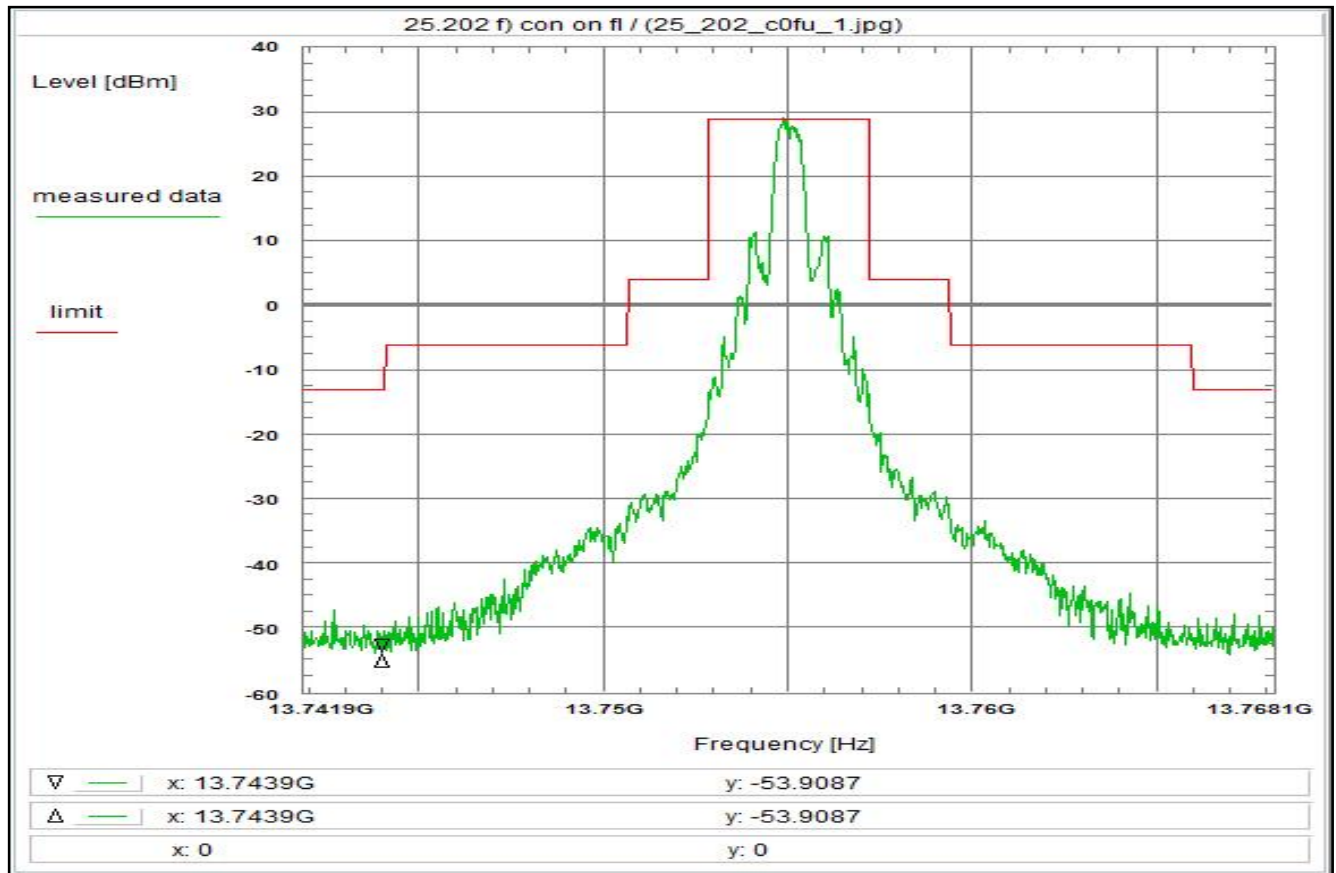
Correction:

Directional coupler + 0.0 dB
 Coaxial cable + 0.0 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A025) - 20.0 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (62.50GHz, 0.1m) + 48.4 dB
 TOTAL CORRECTION: + 14.4 dB

Remarks:

Carrier-on state / Carrier within the the band (fl/fm/fh)
 Measurement for orientation with a measuring antenna close to the DUT-cabinets.
 If any critical spurious radiations are detected a measurement
 in an exactly defined distance will be carried out.

Plot No. 11



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the lower edge of the band (fl)

Limit:Limit acc. to 25.202 f):

50-100% of assigned bw: -25 dBc/4 kHz
 100-250% of assigned bw: -35 dBc/4 kHz
 > 250% of assigned bw: -43+10log(Pmax) dBc/4 kHz

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.4

Test setup:

see test report chapter 7.3:

Test equipment:

see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:14:40
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 13.741875 GHz
 Stop frequency: 13.768125 GHz
 Center frequency: 13.755 GHz
 Frequency span: 26.25 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

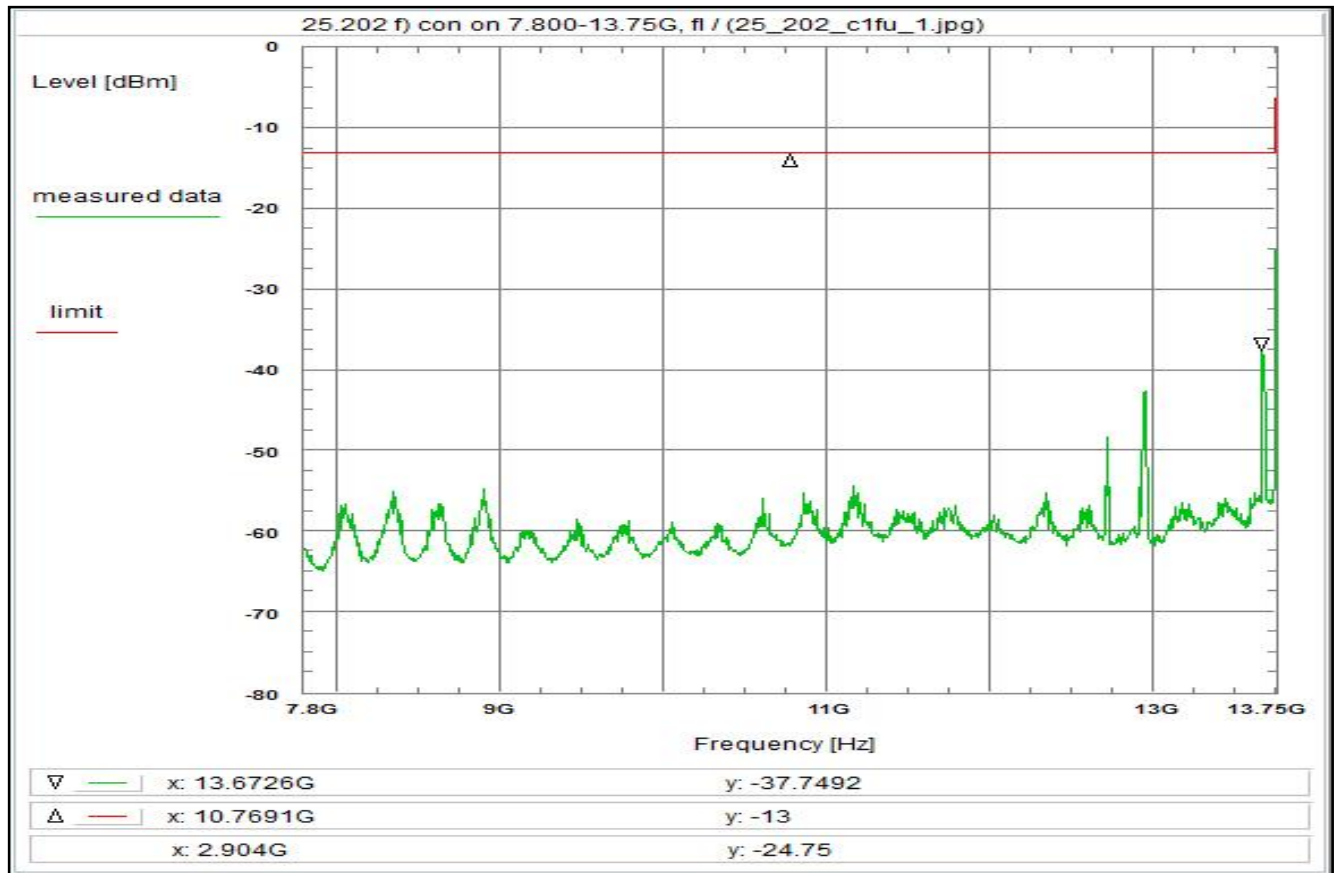
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 11.9 dB
 BW correction factor (10k -> 4k) - 4.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 55.3 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)

Plot No. 12



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the lower edge of the band (fl)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:18:27
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 7.8 GHz
 Stop frequency: 13.75 GHz
 Center frequency: 10.775 GHz
 Frequency span: 5.95 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

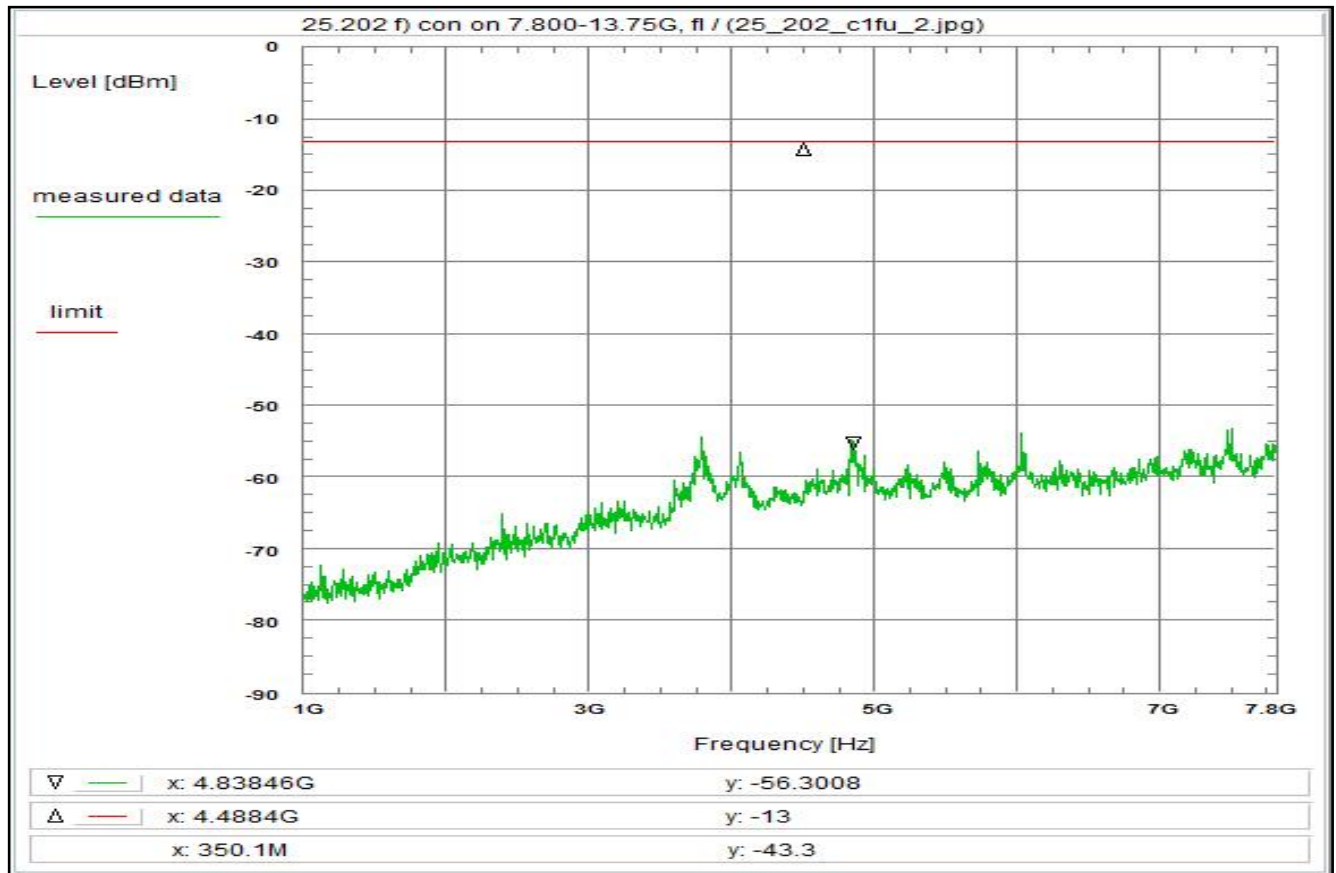
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.4 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 12.5 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (10.78GHz, 4.5m) + 66.2 dB
 TOTAL CORRECTION: + 42.1 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)

Plot No. 13



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the lower edge of the band (fl)
 Frequency Range 1 - 7.8 GHz

Limit:

Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.4

Test setup:

see test report chapter 7.3:

Test equipment:

see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:27:33
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 1 GHz
 Stop frequency: 7.8 GHz
 Center frequency: 4.4 GHz
 Frequency span: 6.8 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

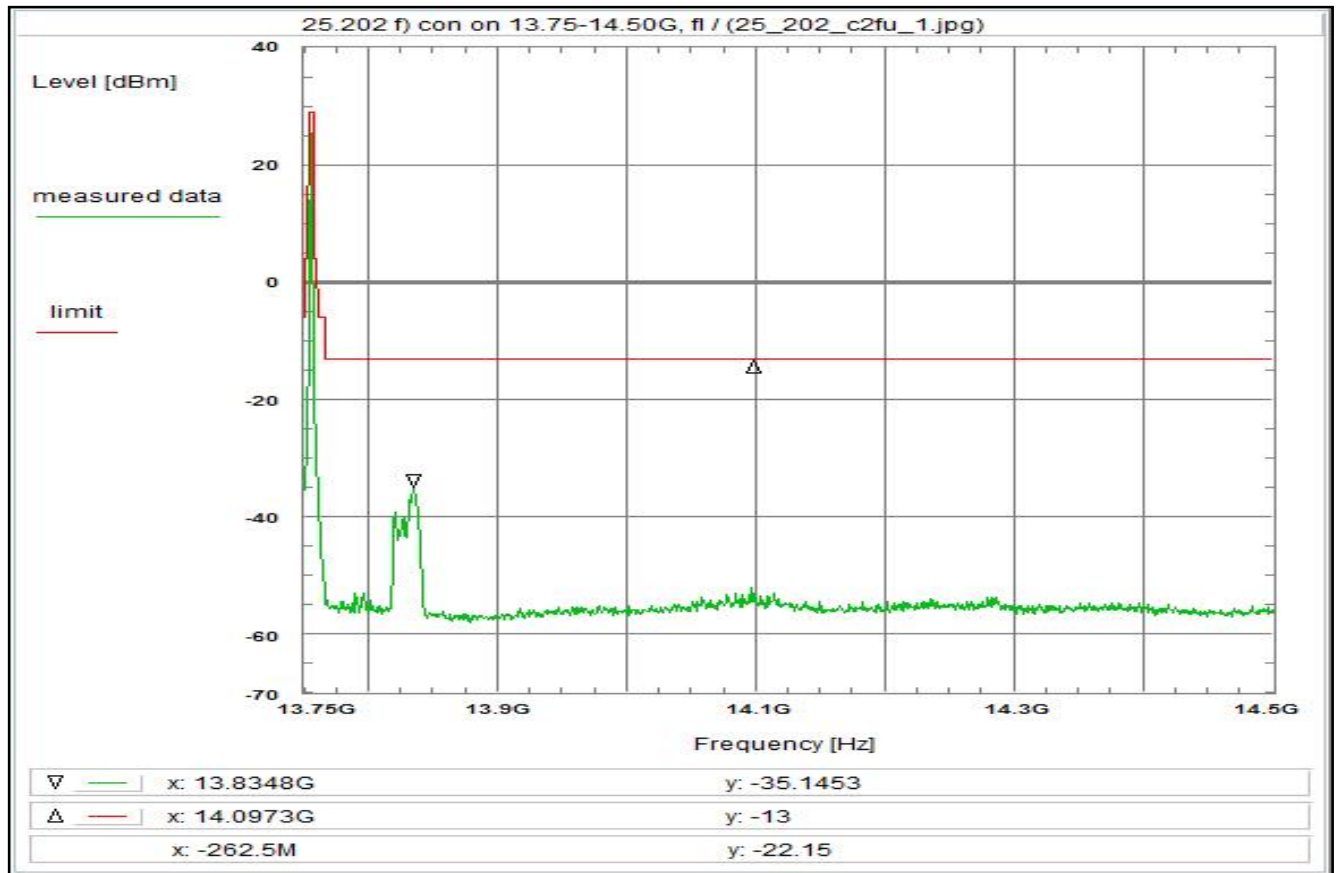
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 1.4 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 9.5 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (4.40GHz, 4.5m) + 58.4 dB
 TOTAL CORRECTION: + 36.3 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)

Plot No. 14



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the lower edge of the band (fl)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:16:21
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 13.75 GHz
 Stop frequency: 14.5 GHz
 Center frequency: 14.125 GHz
 Frequency span: 750 MHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

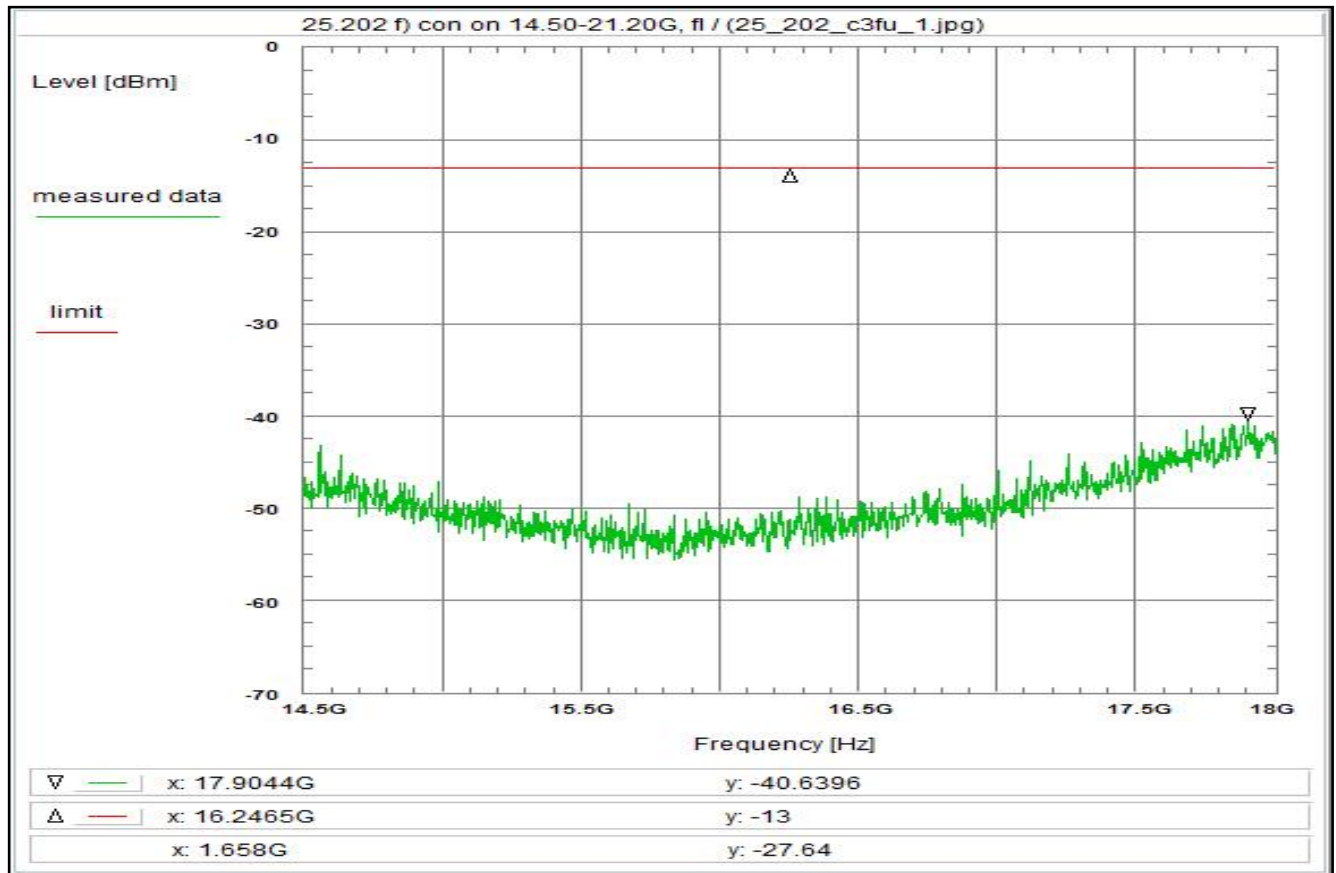
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 11.4 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 45.8 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)

Plot No. 15



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the lower edge of the band (fl)

Limit:
 Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:21:02
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 14.5 GHz
 Stop frequency: 18 GHz
 Center frequency: 16.25 GHz
 Frequency span: 3.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

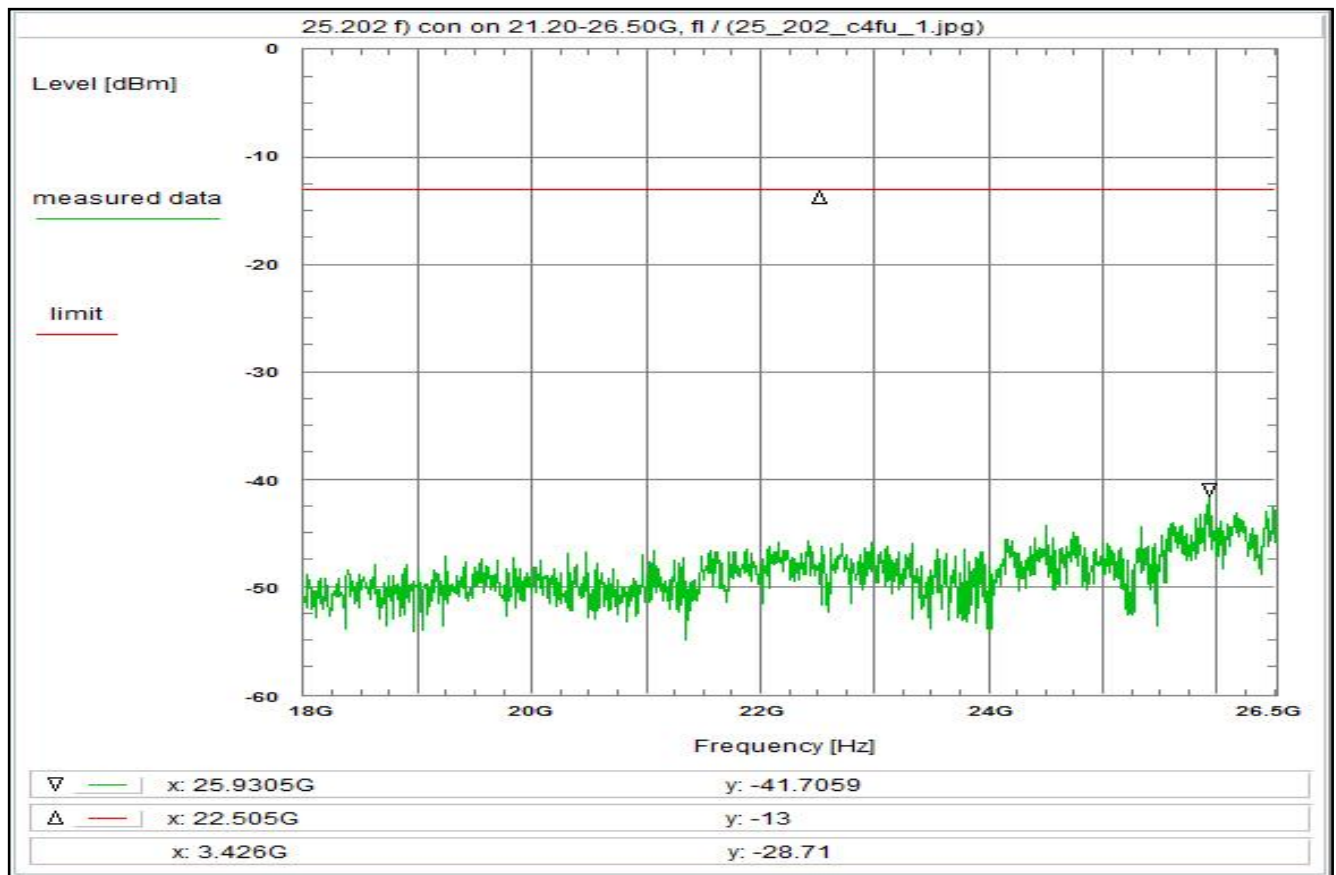
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.9 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 13.7 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (10.78GHz, 4.5m) + 66.2 dB
 TOTAL CORRECTION: + 41.4 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)

Plot No. 16



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the lower edge of the band (fl)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A019, C220, R001, W019, W022, W063

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:37:25
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 18 GHz
 Stop frequency: 26.5 GHz
 Center frequency: 22.25 GHz
 Frequency span: 8.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

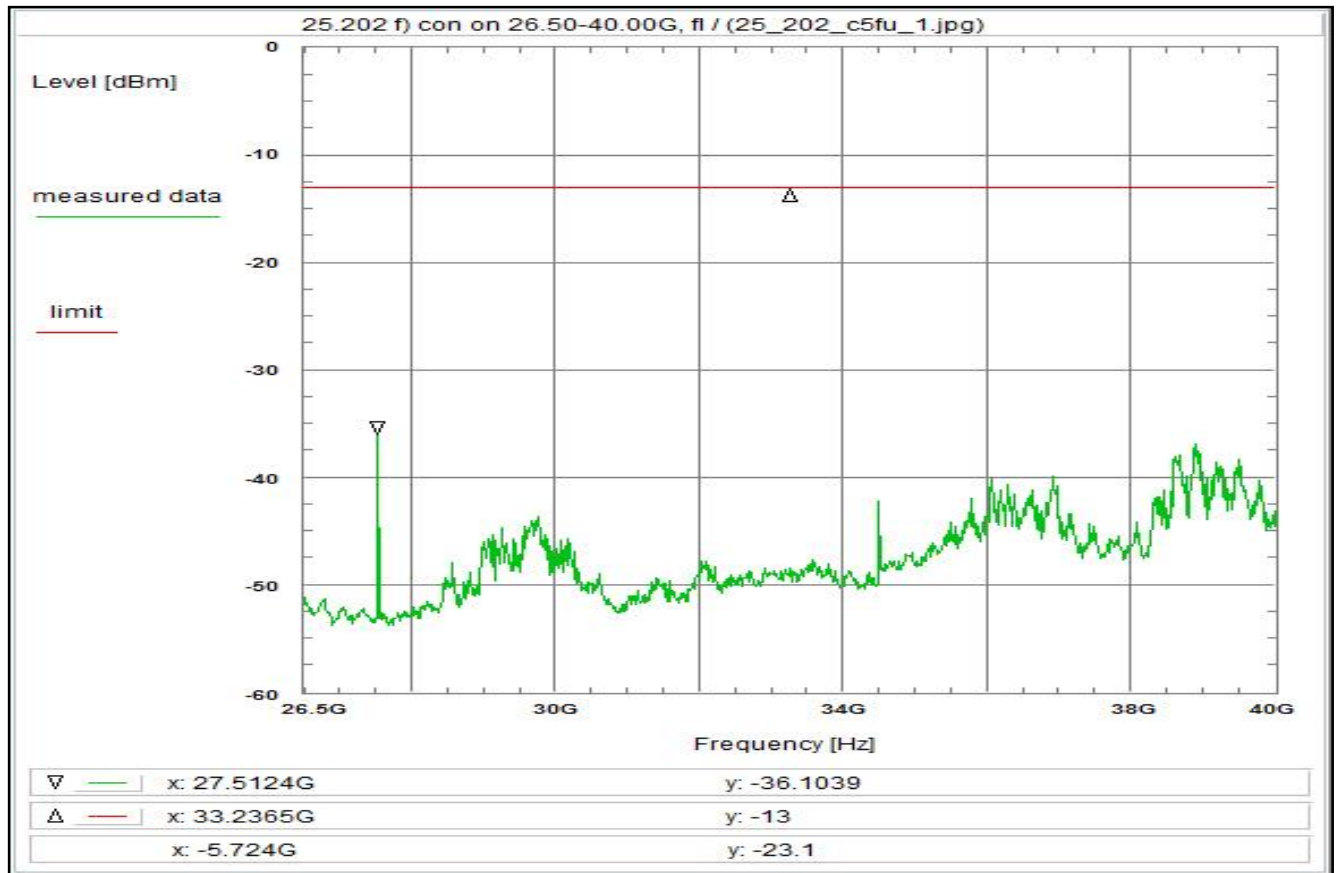
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 3.5 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A019) - 19.3 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (22.25GHz, 4.5m) + 72.5 dB
 TOTAL CORRECTION: + 42.7 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)

Plot No. 17



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
Emission limitations
Modulated rf-carrier at the lower edge of the band (fl)

Limit:
Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
This corresponds to a limit of -13 dBm.

Test results:
see plot (an explicit table was not generated)

Operating condition of DUT:
operating condition 1, see test report chapter 5.4

Test setup:
see test report chapter 7.3:

Test equipment:
see test report chapter 7.4: A021, C220, R001, W019, W022, W065

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:44:19
Location: CTC advanced GmbH, Laboratory RC-SYS
Temperature: 22 °C
Humidity: 55 %
Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 26.5 GHz
Stop frequency: 40 GHz
Center frequency: 33.25 GHz
Frequency span: 13.5 GHz
Resolution-BW: 100 kHz
Video-BW: 300 kHz
Input attenuation: 10 dB
Trace-Mode: Max-Hold
Detector-Mode: AVG

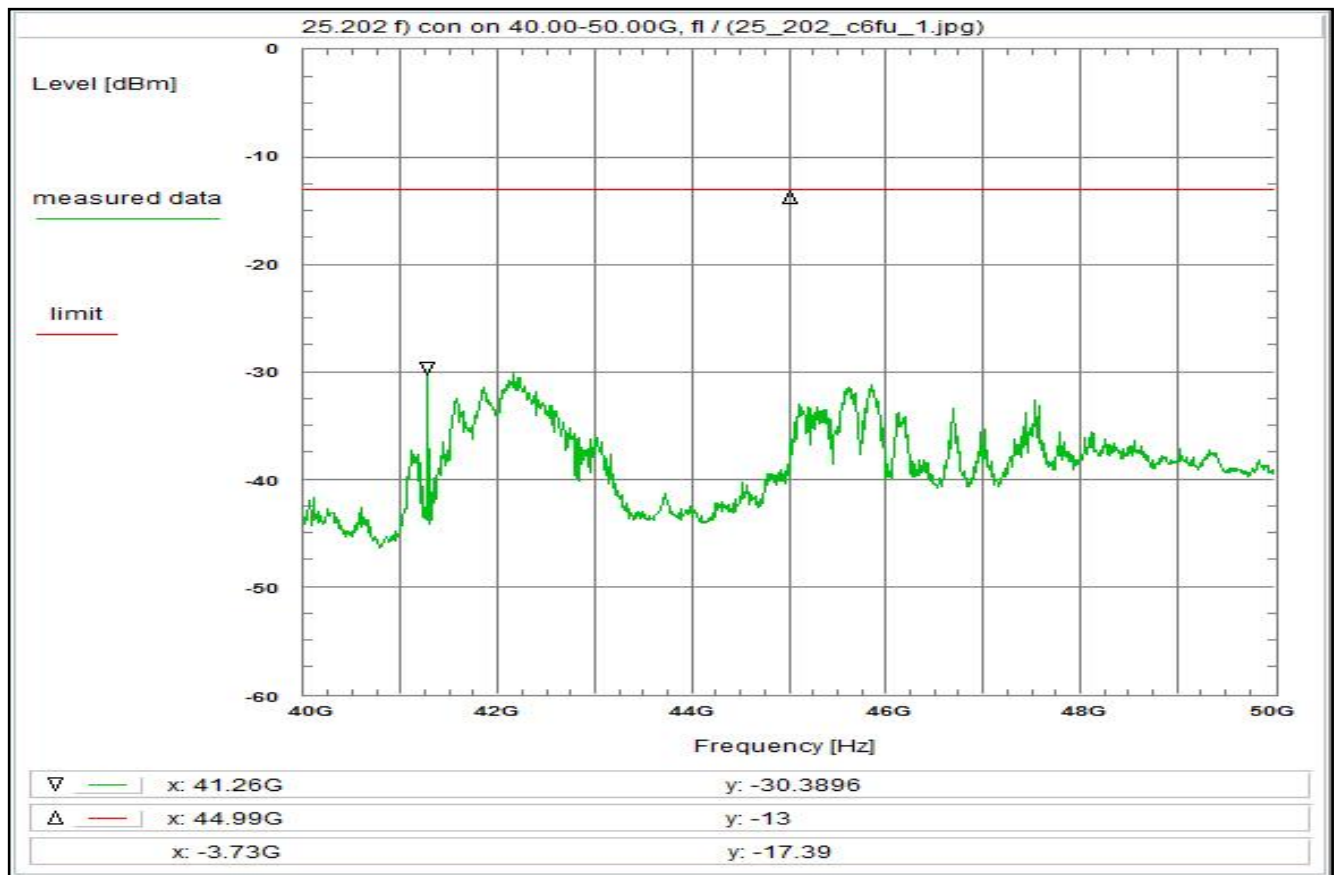
Correction:

Directional coupler + 0.0 dB
Coaxial cable (C220) + 4.3 dB
DUT-Antenna + 0.0 dBi
Test antenna (A021) - 19.6 dB
BW correction factor (100k -> 4k) - 14.0 dB
Atten. between HPA and feedhorn - 0.0 dB
Freefield attenuation (22.25GHz, 4.5m) + 72.5 dB
TOTAL CORRECTION: + 43.2 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)

Plot No. 18



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the lower edge of the band (fl)

Limit:
 Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A_50, C220, R001, W019, W022, W0xx

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:53:44
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 40 GHz
 Stop frequency: 50 GHz
 Center frequency: 45 GHz
 Frequency span: 10 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

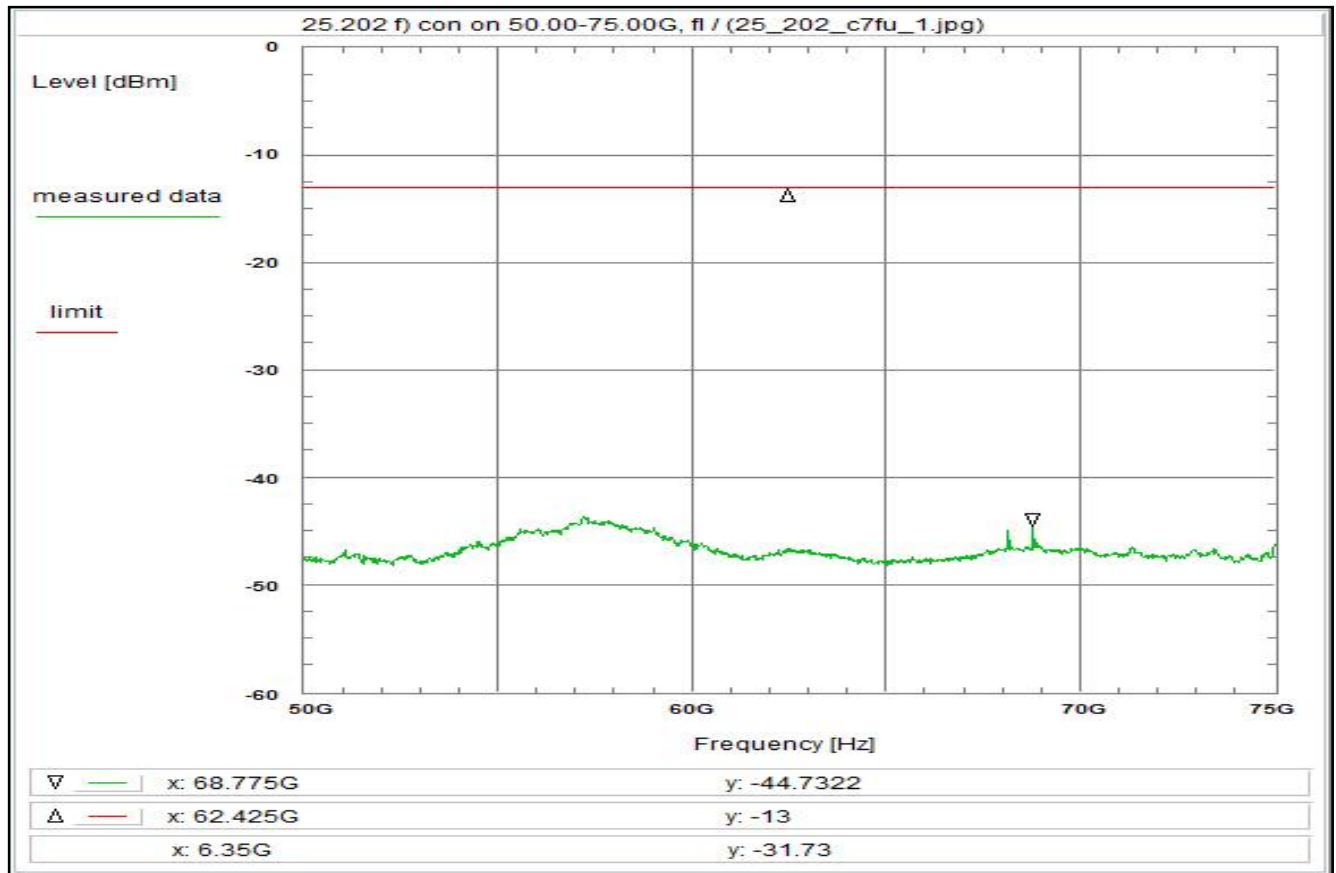
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 5.2 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A_50) - 19.9 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (45.00GHz, 4.5m) + 78.6 dB
 TOTAL CORRECTION: + 49.9 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)

Plot No. 19



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the lower edge of the band (fl)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.4:

Test equipment:
 see test report chapter 7.4: A_75, R001, W019, W022, R025

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 13:02:33
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 50 GHz
 Stop frequency: 75 GHz
 Center frequency: 62.5 GHz
 Frequency span: 25 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

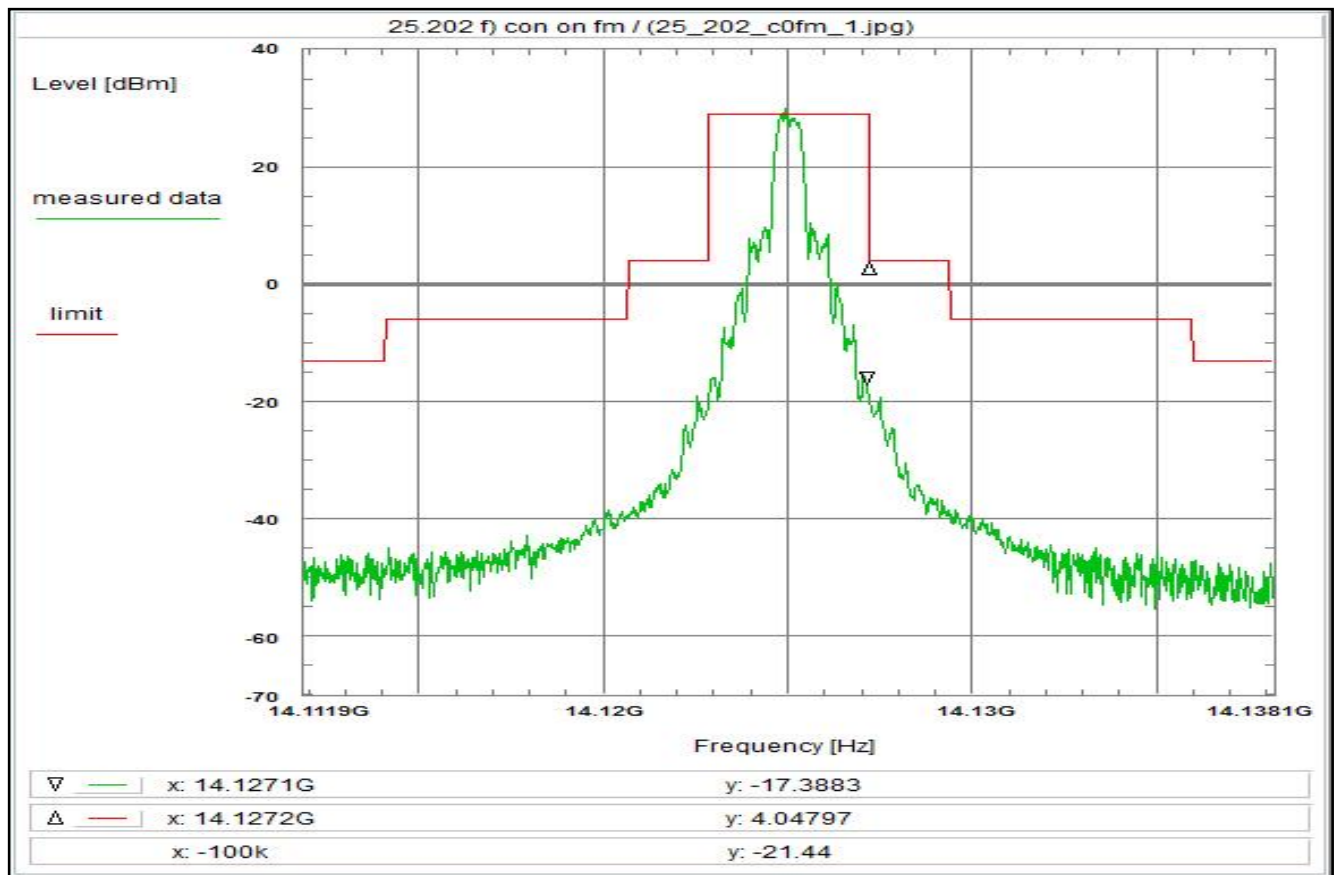
Correction:

Directional coupler + 0.0 dB
 Coaxial cable + 0.0 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A_75) - 20.1 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (62.50GHz, 4.5m) + 81.4 dB
 TOTAL CORRECTION: + 47.3 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)

Plot No. 20



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
Emission limitations
Modulated rf-carrier in the middle of the band (fm)

Limit:**Limit acc. to 25.202 f):**

50-100% of assigned bw: -25 dBc/4 kHz

100-250% of assigned bw: -35 dBc/4 kHz

> 250% of assigned bw: -43+10log(Pmax) dBc/4 kHz

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.4

Test setup:

see test report chapter 7.3:

Test equipment:

see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed**Environment condition:**

Date & Time: Thu 16/Sep/2021 10:50:19
Location: CTC advanced GmbH, Laboratory RC-SYS
Temperature: 22 °C
Humidity: 55 %
Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 14.111875 GHz
Stop frequency: 14.138125 GHz
Center frequency: 14.125 GHz
Frequency span: 26.25 MHz
Resolution-BW: 10 kHz
Video-BW: 30 kHz
Input attenuation: 10 dB
Trace-Mode: Max-Hold
Detector-Mode: AVG

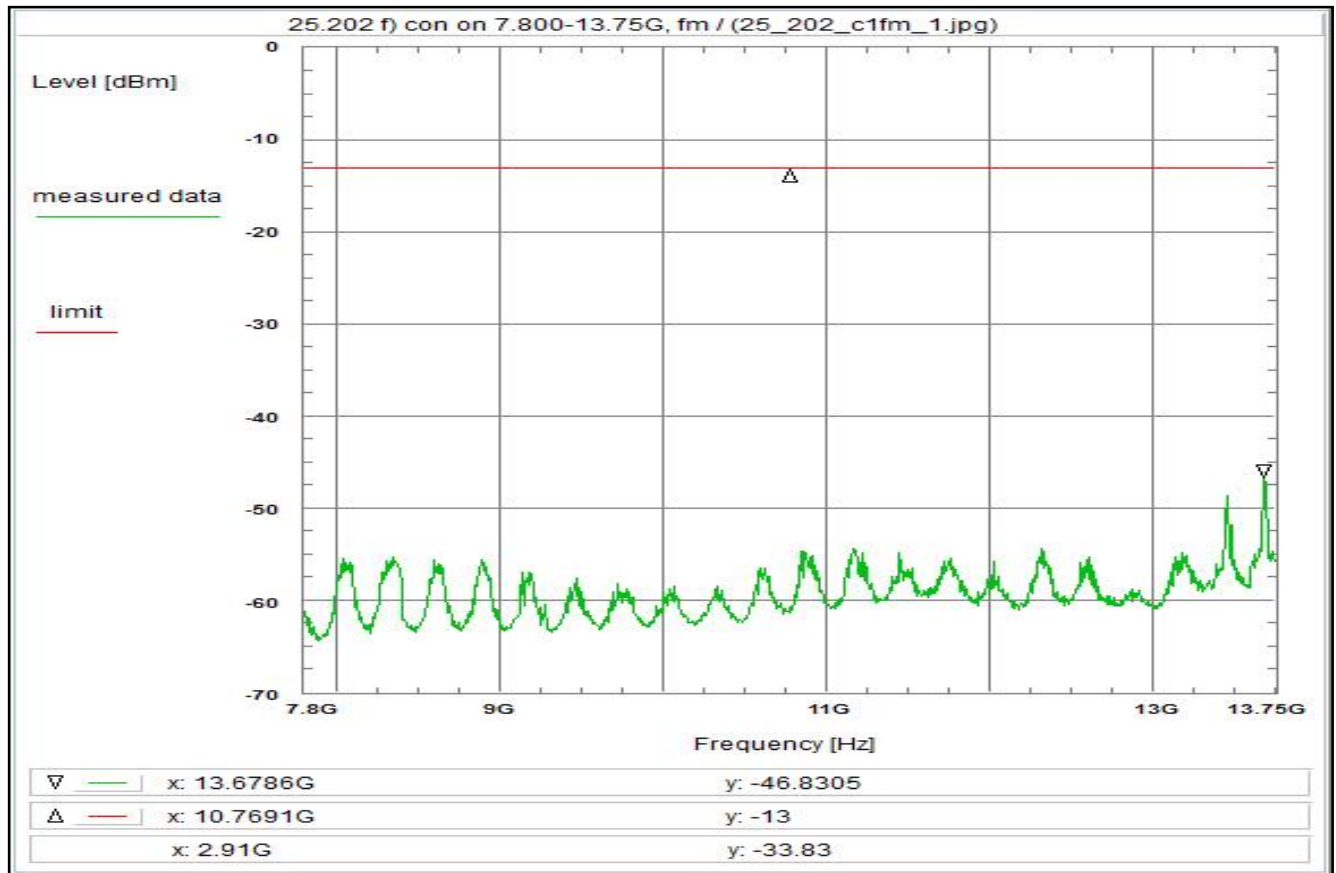
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 2.7 dB
DUT-Antenna	+ 0.0 dBi
Test antenna (A037)	- 11.3 dB
BW correction factor (10k -> 4k)	- 4.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
Freefield attenuation (14.13GHz, 4.5m)	+ 68.5 dB
TOTAL CORRECTION:	+ 55.9 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)

Plot No. 21



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier in the middle of the band (fm)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:45:32
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 7.8 GHz
 Stop frequency: 13.75 GHz
 Center frequency: 10.775 GHz
 Frequency span: 5.95 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

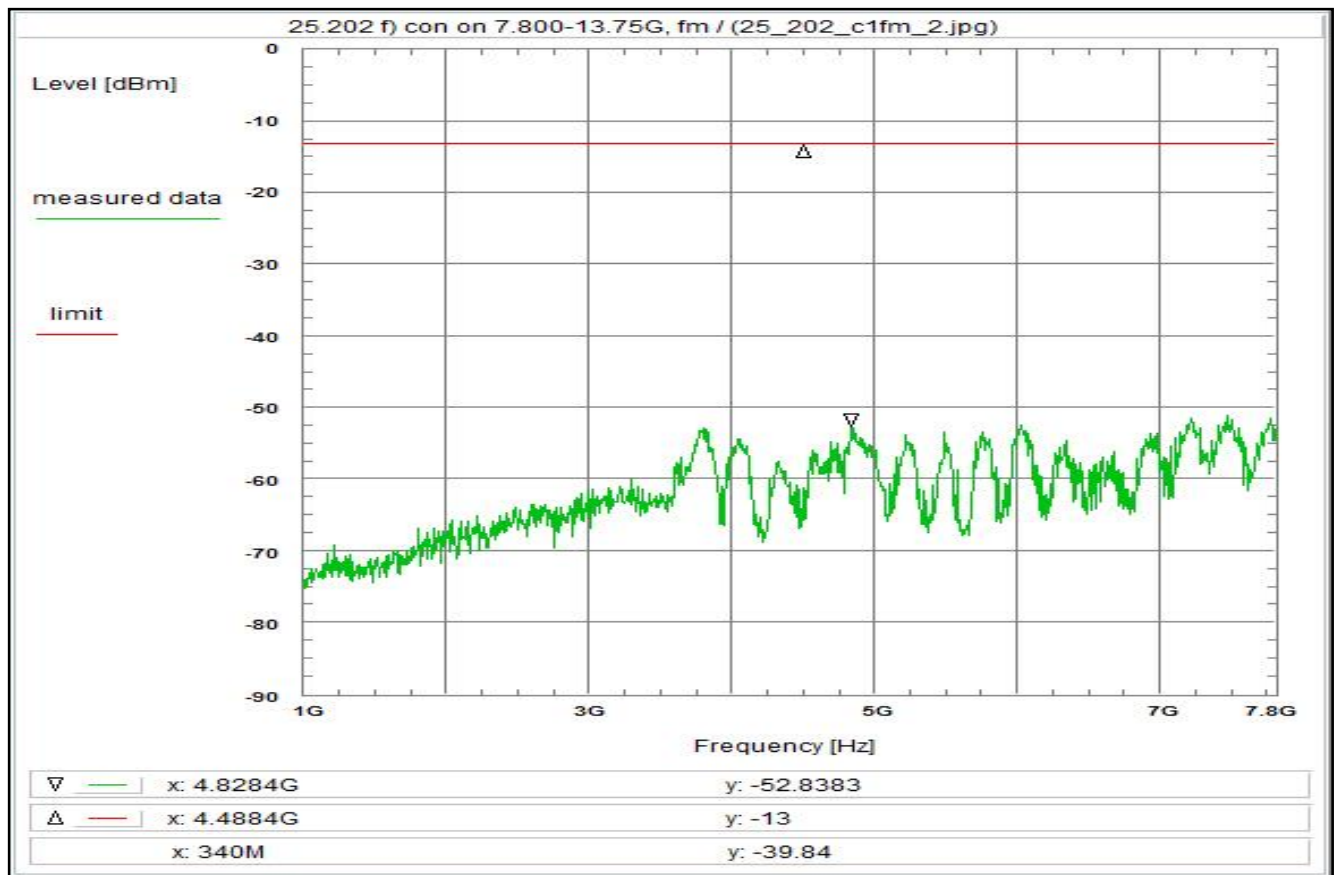
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.4 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 12.5 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (10.78GHz, 4.5m) + 66.2 dB
 TOTAL CORRECTION: + 42.1 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)

Plot No. 22



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier in the middle of the band (fm)
 Frequency range 1 - 7.8 GHz

Limit:

Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.4

Test setup:

see test report chapter 7.3:

Test equipment:

see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:46:43
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 1 GHz
 Stop frequency: 7.8 GHz
 Center frequency: 4.4 GHz
 Frequency span: 6.8 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

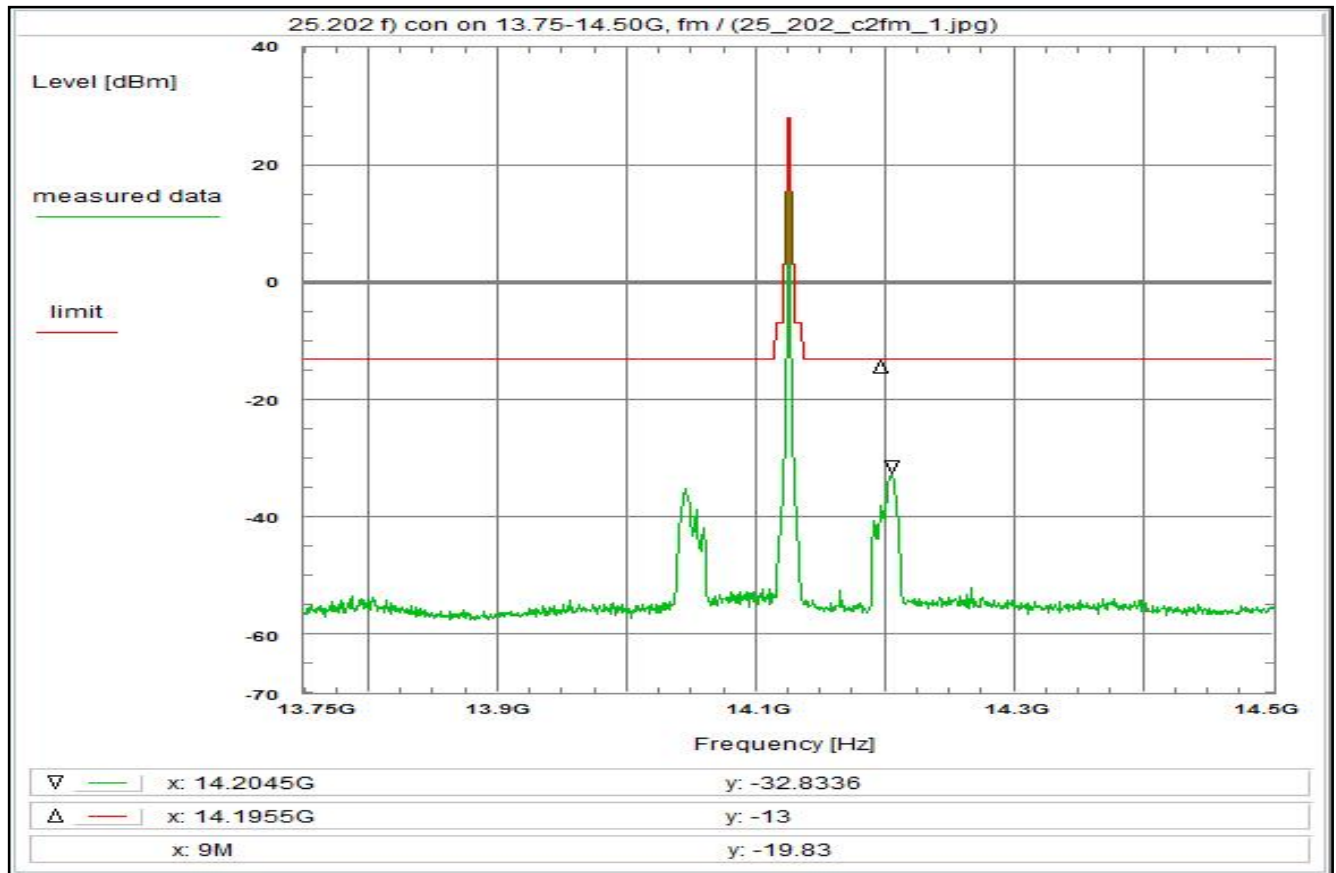
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 1.4 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 9.5 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (10.78GHz, 4.5m) + 66.2 dB
 TOTAL CORRECTION: + 44.1 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)

Plot No. 23



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier in the middle of the band (fm)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:40:47
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 13.75 GHz
 Stop frequency: 14.5 GHz
 Center frequency: 14.125 GHz
 Frequency span: 750 MHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

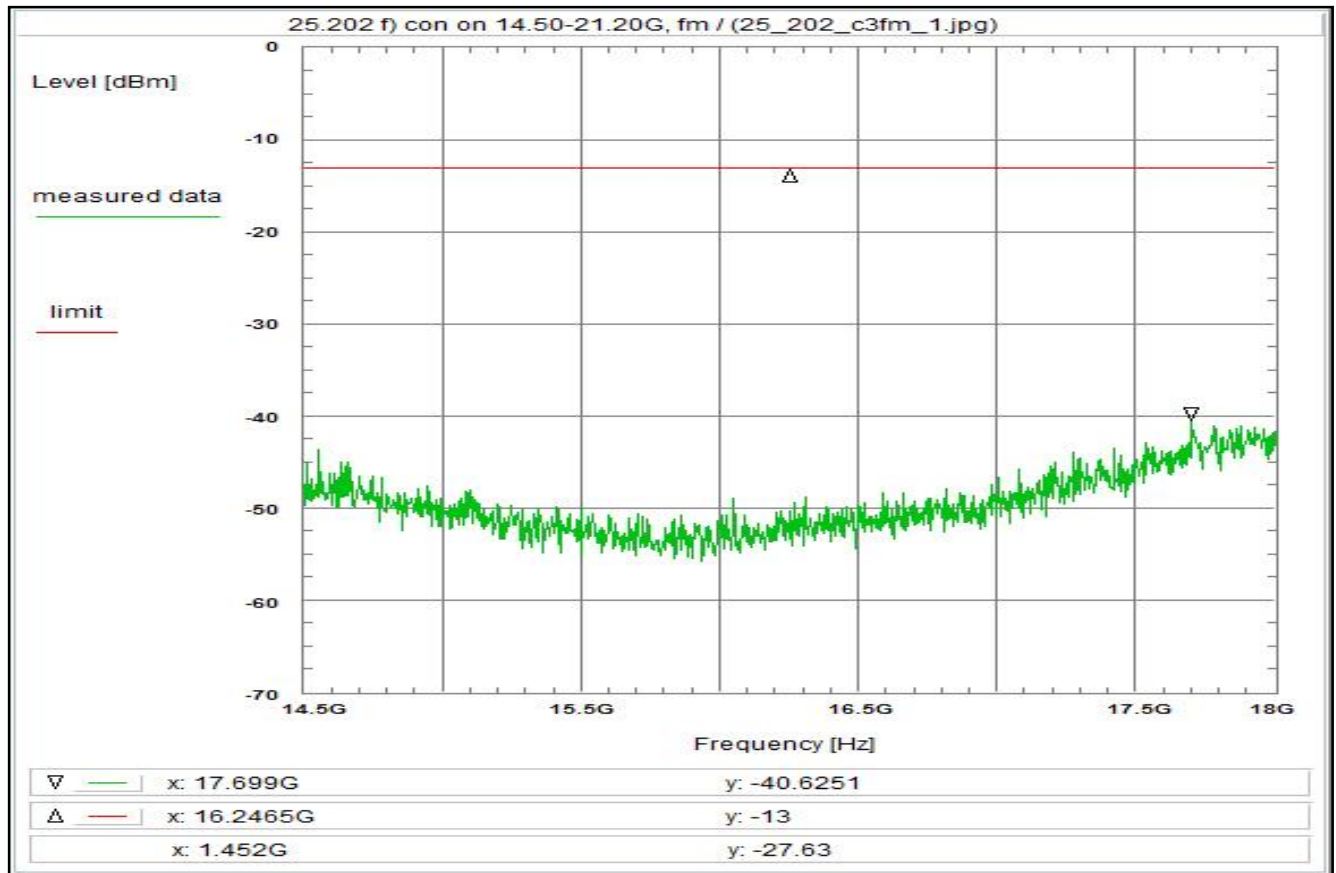
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 11.4 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 45.8 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)

Plot No. 24



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier in the middle of the band (fm)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 10:42:33
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 14.5 GHz
 Stop frequency: 18 GHz
 Center frequency: 16.25 GHz
 Frequency span: 3.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

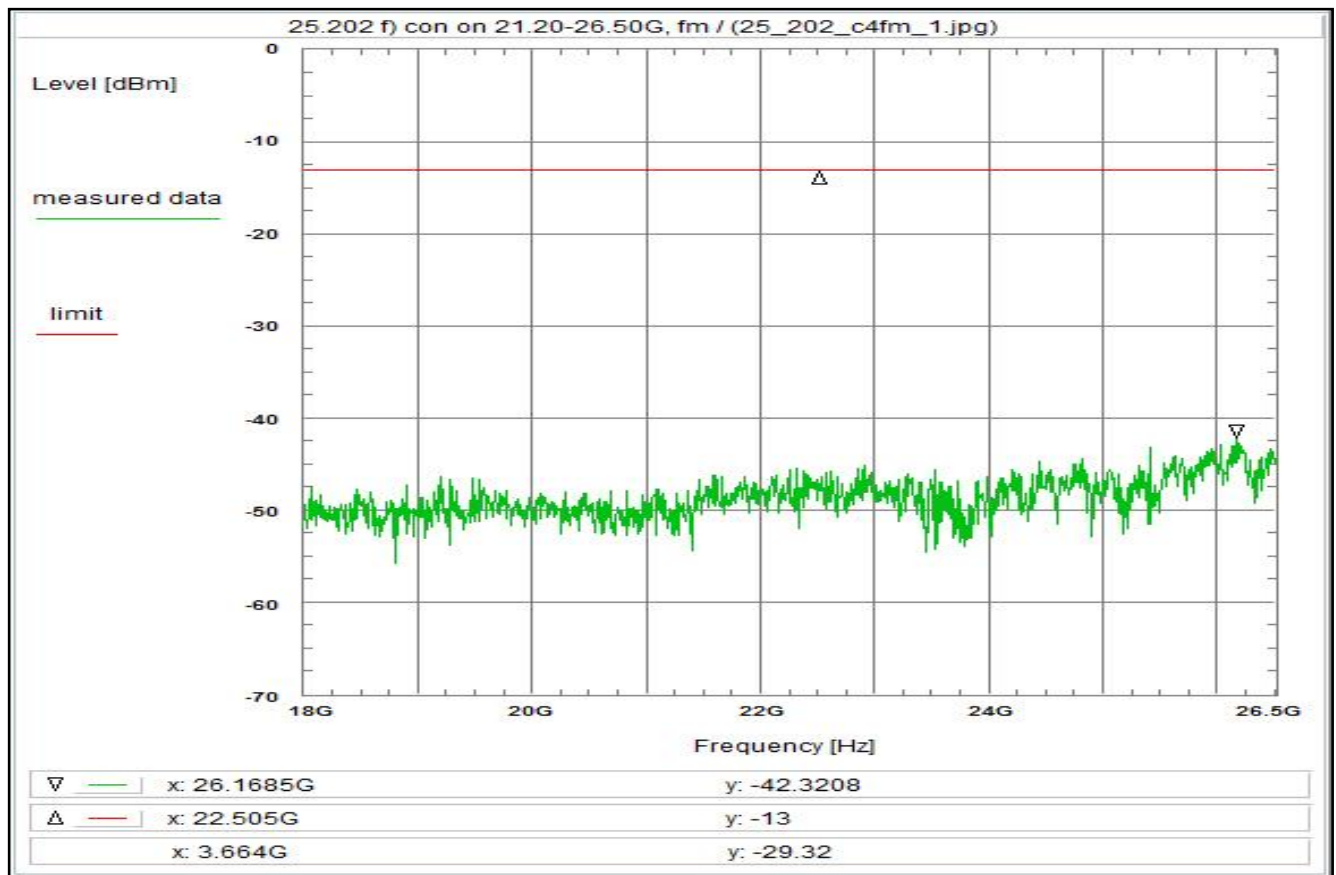
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.9 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 13.7 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (16.25GHz, 4.5m) + 69.7 dB
 TOTAL CORRECTION: + 44.9 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)

Plot No. 25



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier in the middle of the band (fm)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A019, C220, R001, W019, W022, W063

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:33:42
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 18 GHz
 Stop frequency: 26.5 GHz
 Center frequency: 22.25 GHz
 Frequency span: 8.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

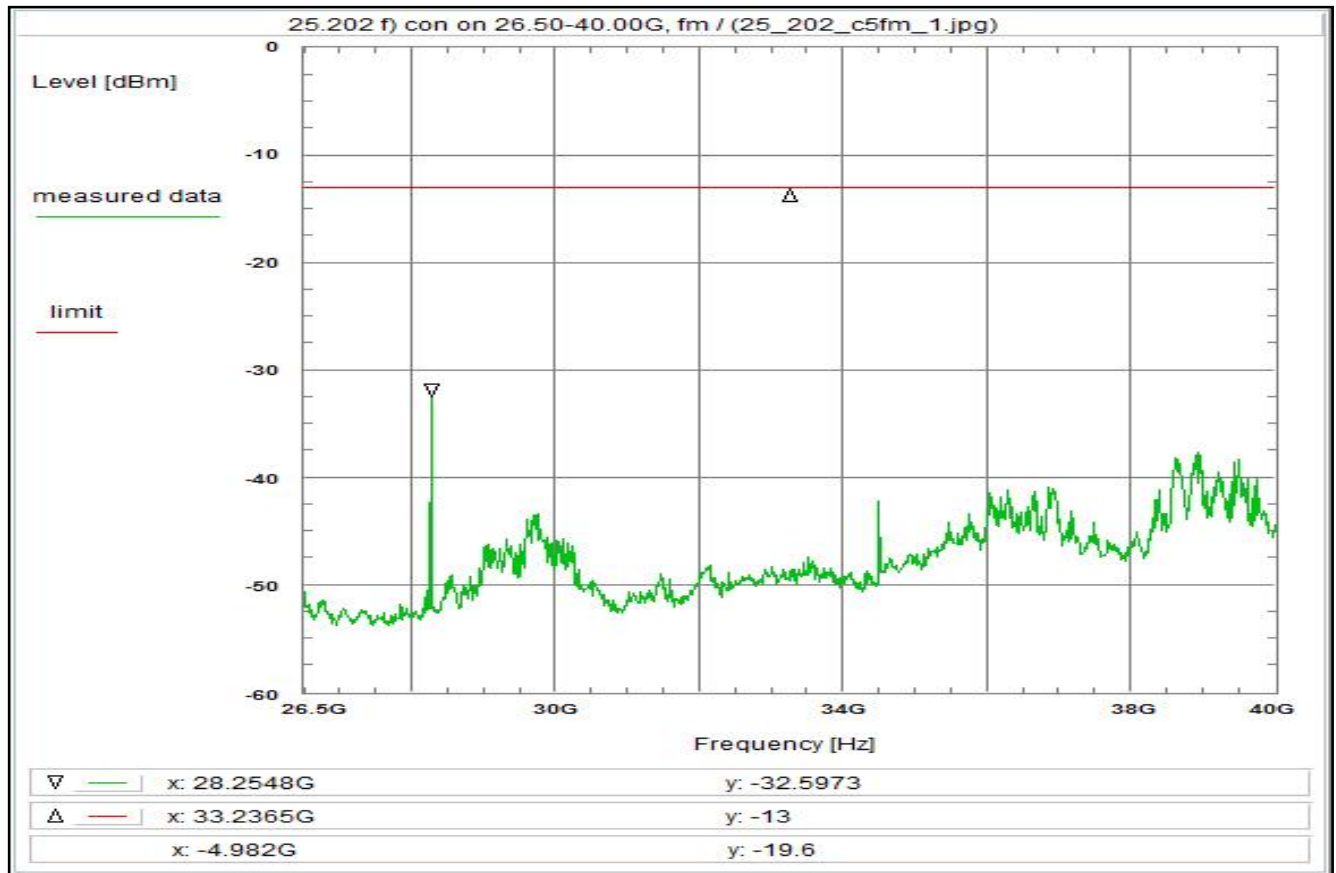
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 3.5 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A019) - 19.3 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (22.25GHz, 4.5m) + 72.5 dB
 TOTAL CORRECTION: + 42.7 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)

Plot No. 26



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier in the middle of the band (fm)

Limit:
 Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A021, C220, R001, W019, W022, W065

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:45:38
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 26.5 GHz
 Stop frequency: 40 GHz
 Center frequency: 33.25 GHz
 Frequency span: 13.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

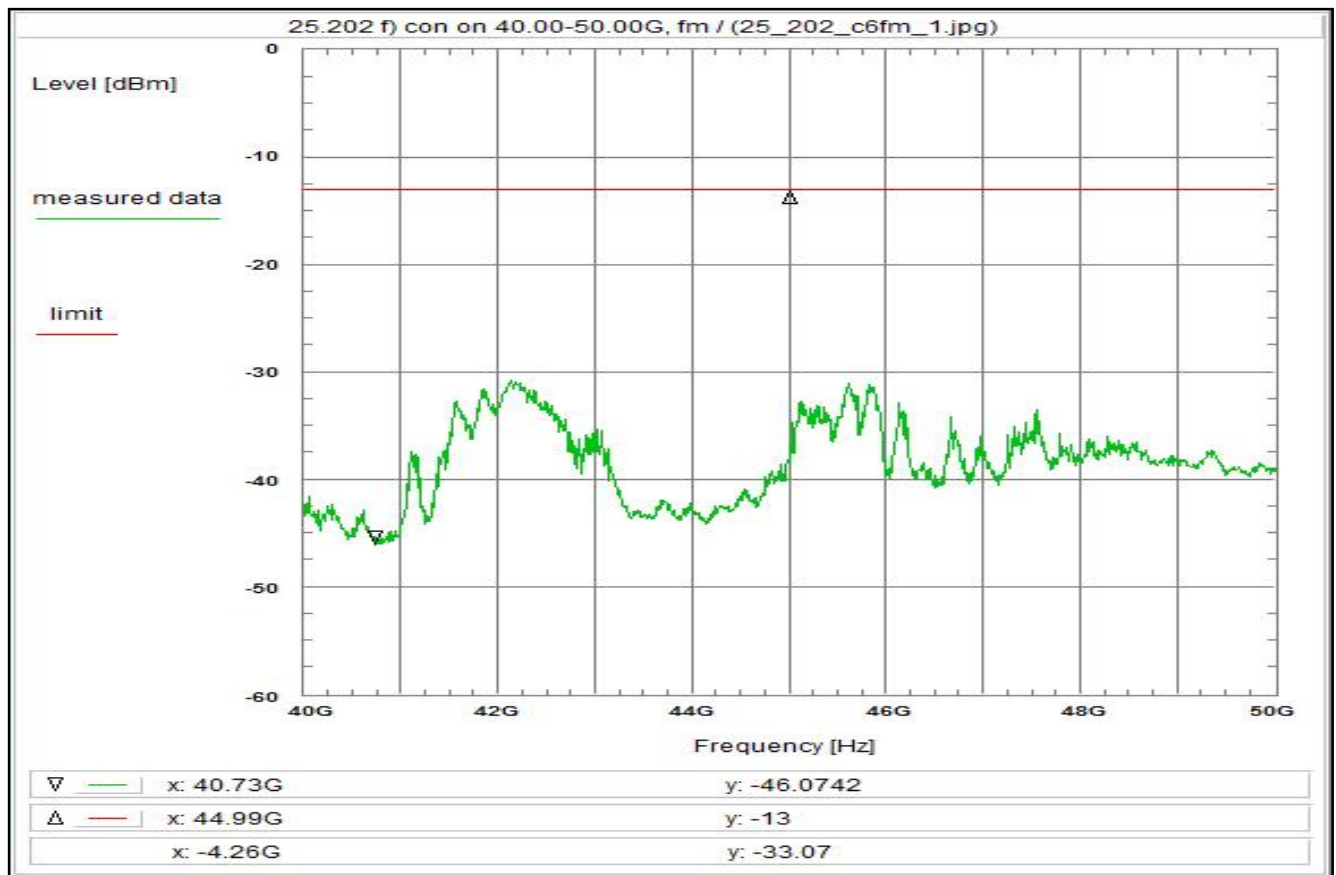
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 4.3 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A021) - 19.6 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (22.25GHz, 4.5m) + 72.5 dB
 TOTAL CORRECTION: + 43.2 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)

Plot No. 27



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier in the middle of the band (fm)

Limit:
 Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A_50, C220, R001, W019, W022, W0xx

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:56:36
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 40 GHz
 Stop frequency: 50 GHz
 Center frequency: 45 GHz
 Frequency span: 10 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

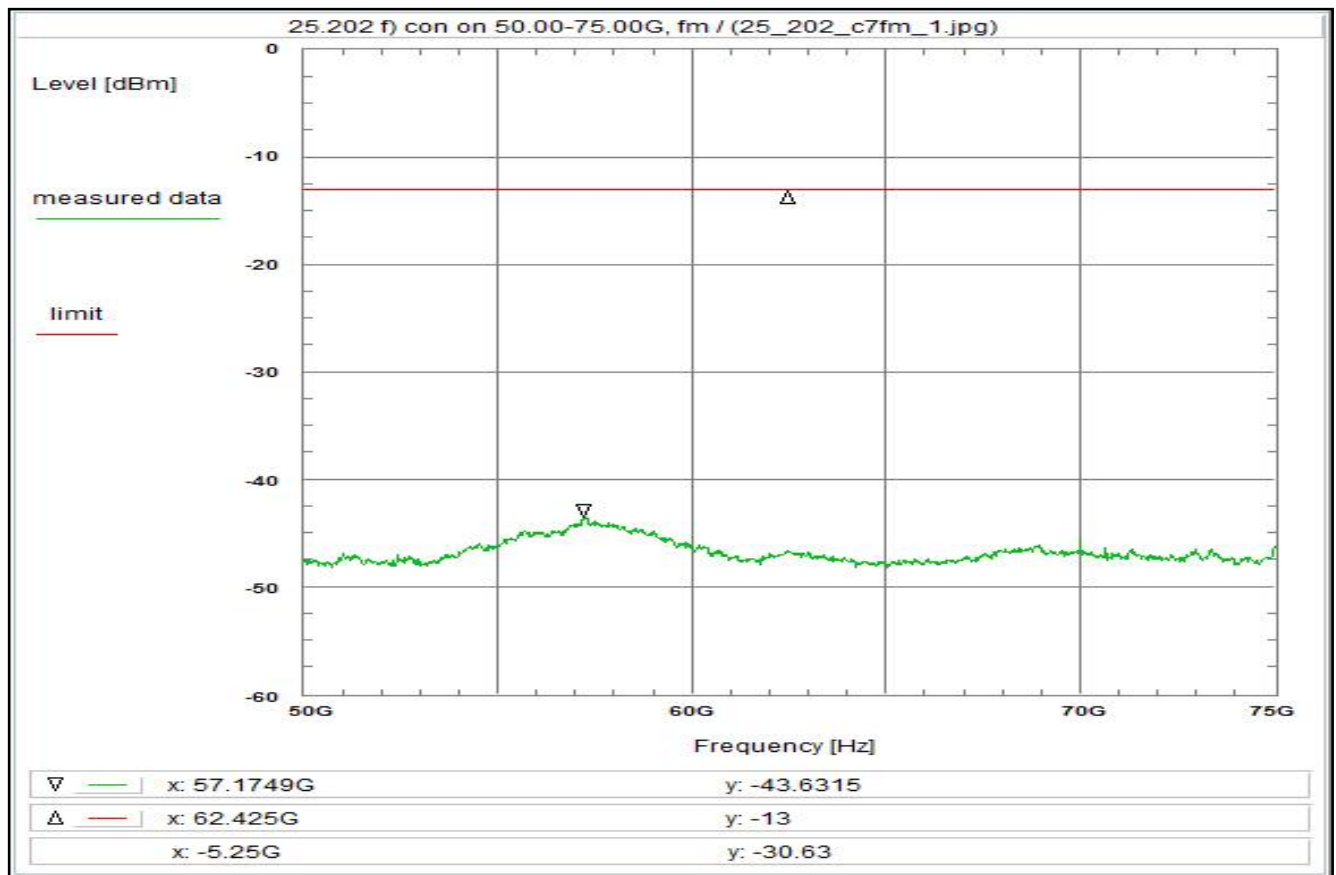
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 5.2 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A_50) - 19.9 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (45.00GHz, 4.5m) + 78.6 dB
 TOTAL CORRECTION: + 49.9 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)

Plot No. 28



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier in the middle of the band (fm)

Limit:
 Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A_75, R001, W019, W022, R025

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 12:58:48
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 50 GHz
 Stop frequency: 75 GHz
 Center frequency: 62.5 GHz
 Frequency span: 25 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

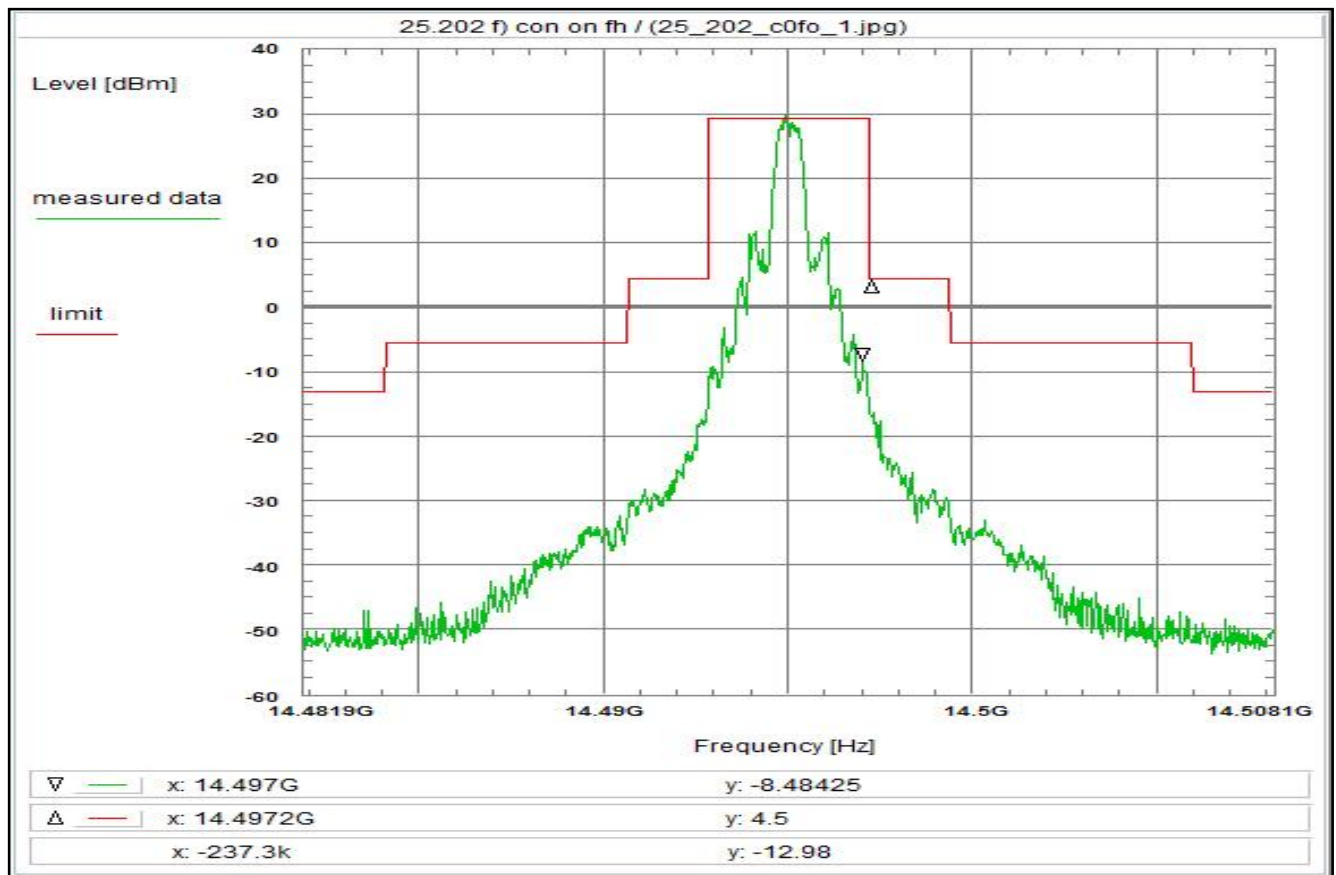
Correction:

Directional coupler + 0.0 dB
 Coaxial cable + 0.0 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A_75) - 20.1 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (62.50GHz, 4.5m) + 81.4 dB
 TOTAL CORRECTION: + 47.3 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)

Plot No. 29



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the upper edge of the band (fh)

Limit:Limit acc. to 25.202 f):

50-100% of assigned bw: -25 dBc/4 kHz
 100-250% of assigned bw: -35 dBc/4 kHz
 > 250% of assigned bw: -43+10log(Pmax) dBc/4 kHz

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.4

Test setup:

see test report chapter 7.3:

Test equipment:

see test report chapter 7.4: R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:09:29
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 14.481875 GHz
 Stop frequency: 14.508125 GHz
 Center frequency: 14.495 GHz
 Frequency span: 26.25 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

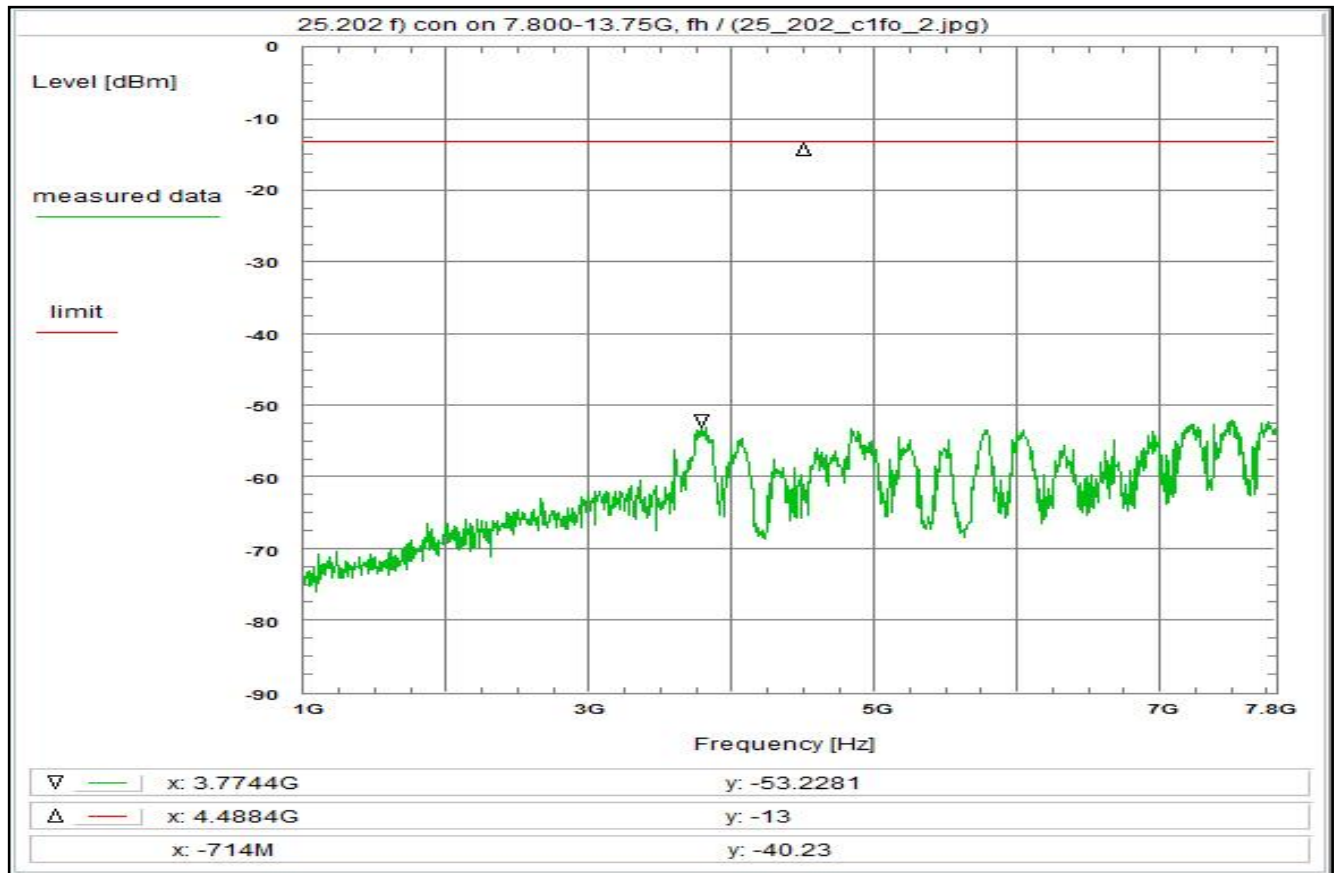
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 11.4 dB
 BW correction factor (10k -> 4k) - 4.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (16.25GHz, 4.5m) + 69.7 dB
 TOTAL CORRECTION: + 57.0 dB

Remarks:

Carrier-on state / Carrier at the upper edge of the band (fh)

Plot No. 30



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the upper edge of the band (fh)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.
 Frequency range 1 - 7.8 GHz

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:12:04
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 1 GHz
 Stop frequency: 7.8 GHz
 Center frequency: 4.4 GHz
 Frequency span: 6.8 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

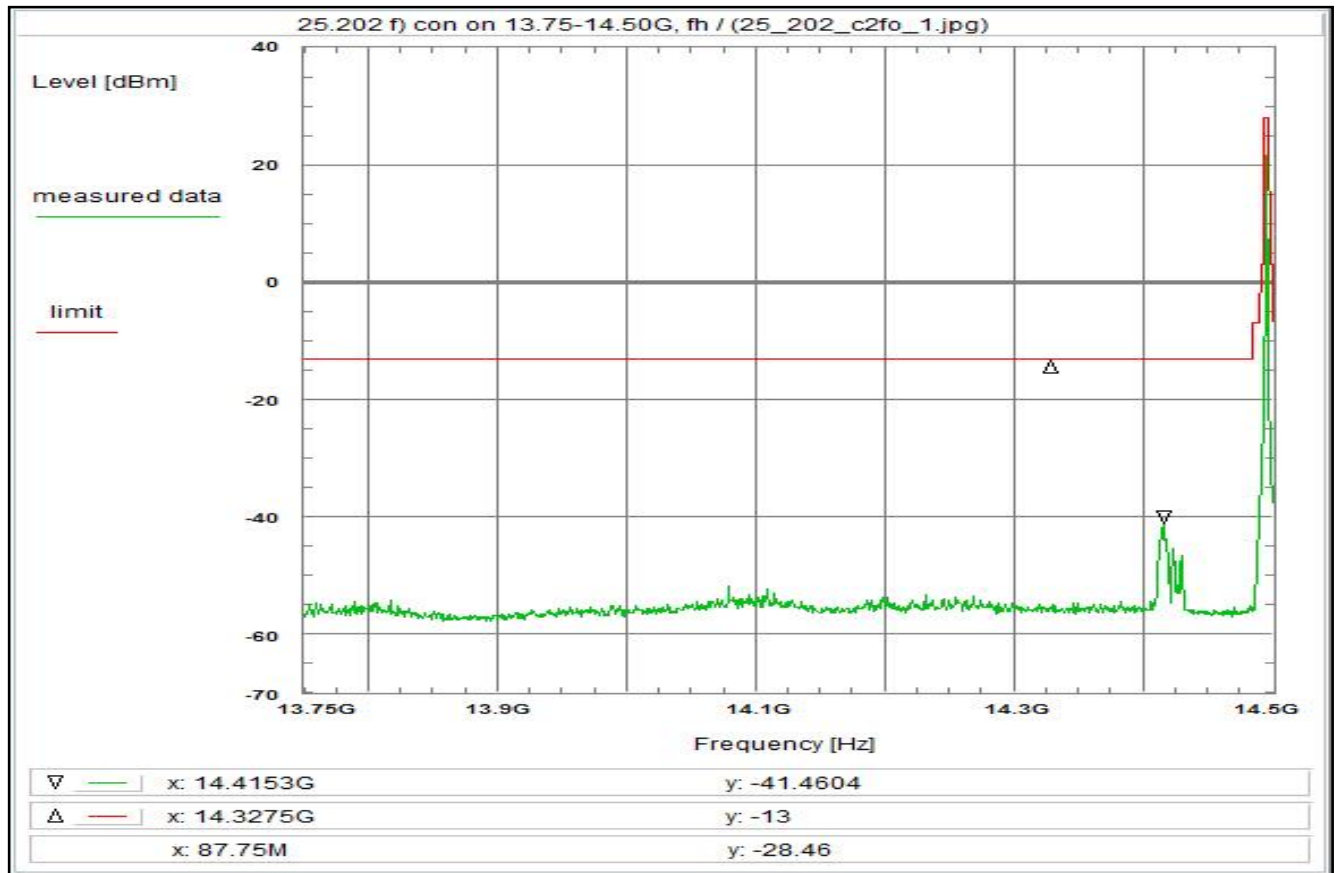
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 1.4 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 9.5 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (4.40GHz, 4.5m) + 58.4 dB
 TOTAL CORRECTION: + 36.3 dB

Remarks:

Carrier-on state / Carrier at the upper edge of the band (fh)

Plot No. 31



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the upper edge of the band (fh)

Limit:
 Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:02:01
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 13.75 GHz
 Stop frequency: 14.5 GHz
 Center frequency: 14.125 GHz
 Frequency span: 750 MHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

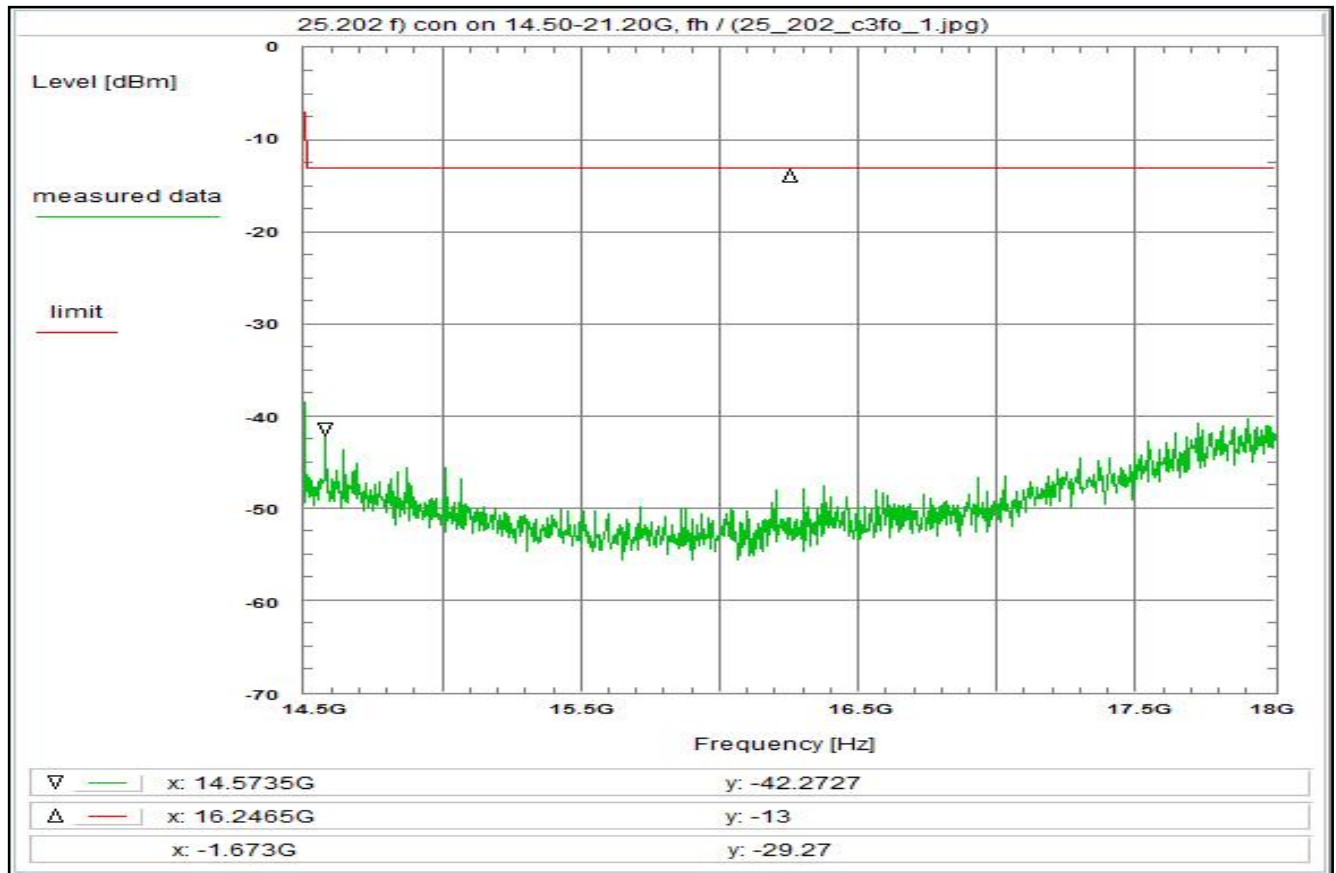
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 11.4 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 TOTAL CORRECTION: + 45.8 dB

Remarks:

Carrier-on state / Carrier at the upper edge of the band (fh)

Plot No. 32



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the upper edge of the band (fh)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W019, W053

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:04:01
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 14.5 GHz
 Stop frequency: 18 GHz
 Center frequency: 16.25 GHz
 Frequency span: 3.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

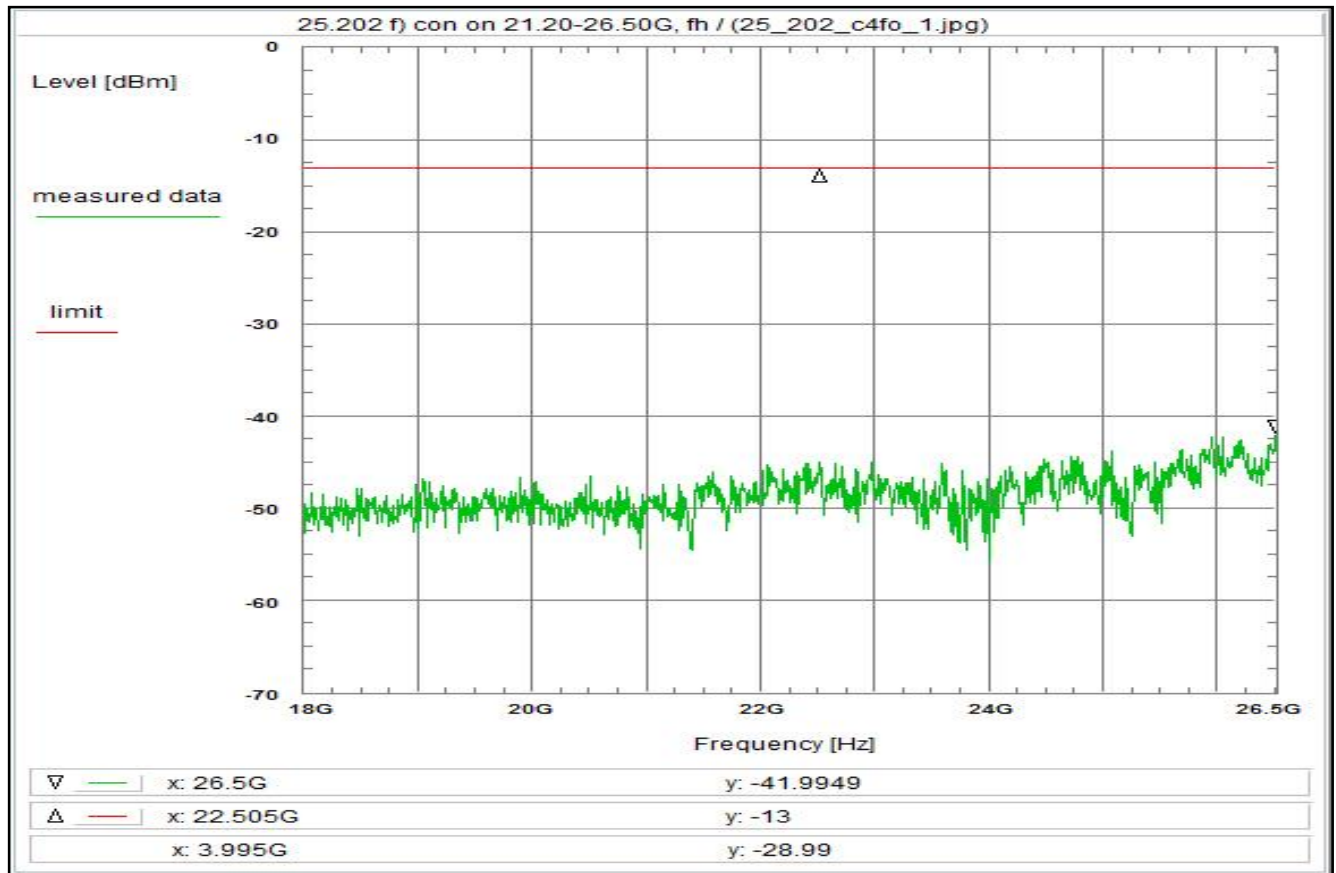
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.9 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A037) - 13.7 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (16.25GHz, 4.5m) + 69.7 dB
 TOTAL CORRECTION: + 44.9 dB

Remarks:

Carrier-on state / Carrier at the upper edge of the band (fh)

Plot No. 33



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the upper edge of the band (fh)

Limit:
 Limit acc. to 25.202 f): $-43 + 10 \log(P_{\max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A019, C220, R001, W019, W022, W063

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:35:14
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 18 GHz
 Stop frequency: 26.5 GHz
 Center frequency: 22.25 GHz
 Frequency span: 8.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

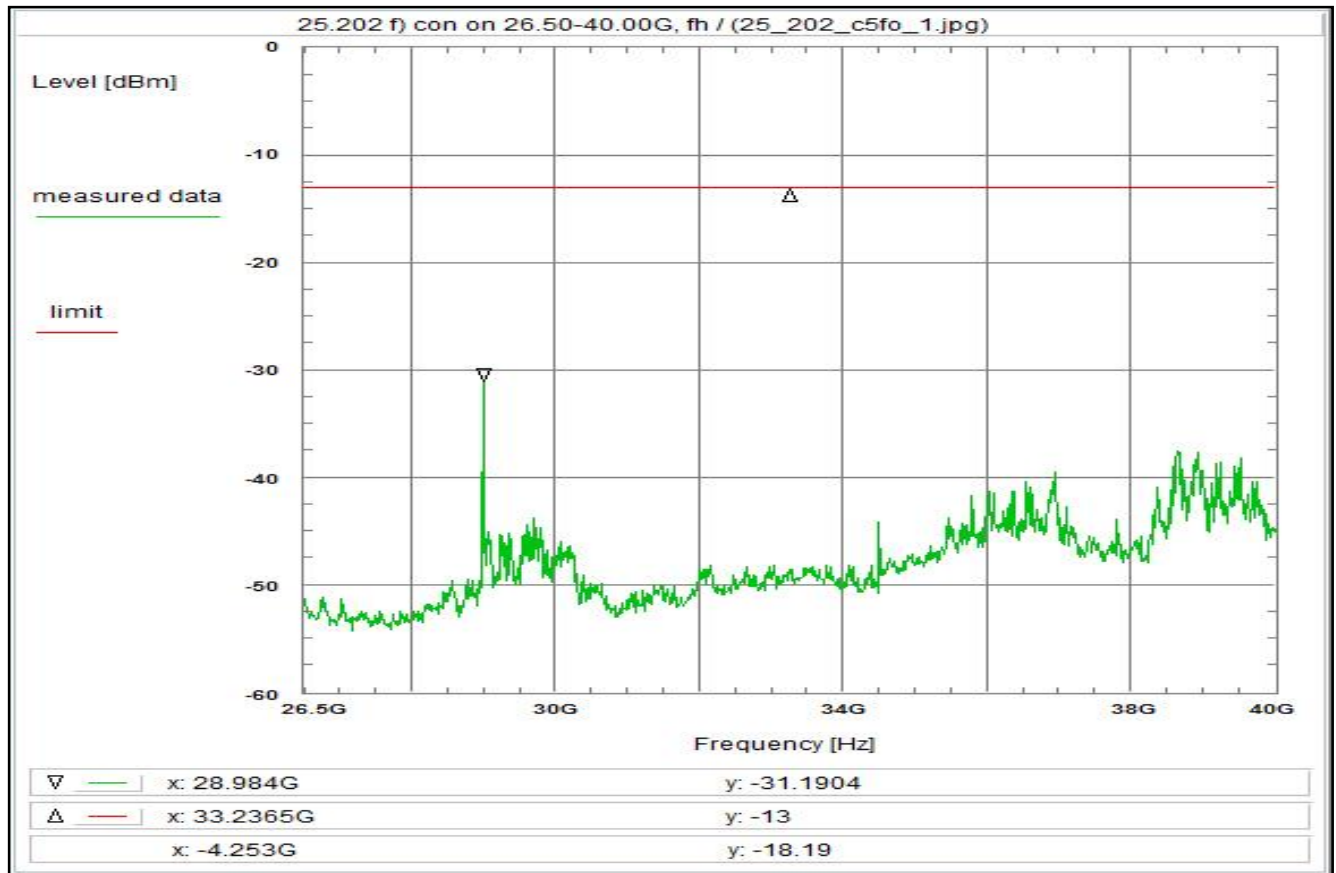
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 3.5 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A019) - 19.3 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (22.25GHz, 4.5m) + 72.5 dB
 TOTAL CORRECTION: + 42.7 dB

Remarks:

Carrier-on state / Carrier at the upper edge of the band (fh)

Plot No. 34



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the upper edge of the band (fh)

Limit:
 Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A021, C220, R001, W019, W022, W065

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:46:46
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 26.5 GHz
 Stop frequency: 40 GHz
 Center frequency: 33.25 GHz
 Frequency span: 13.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

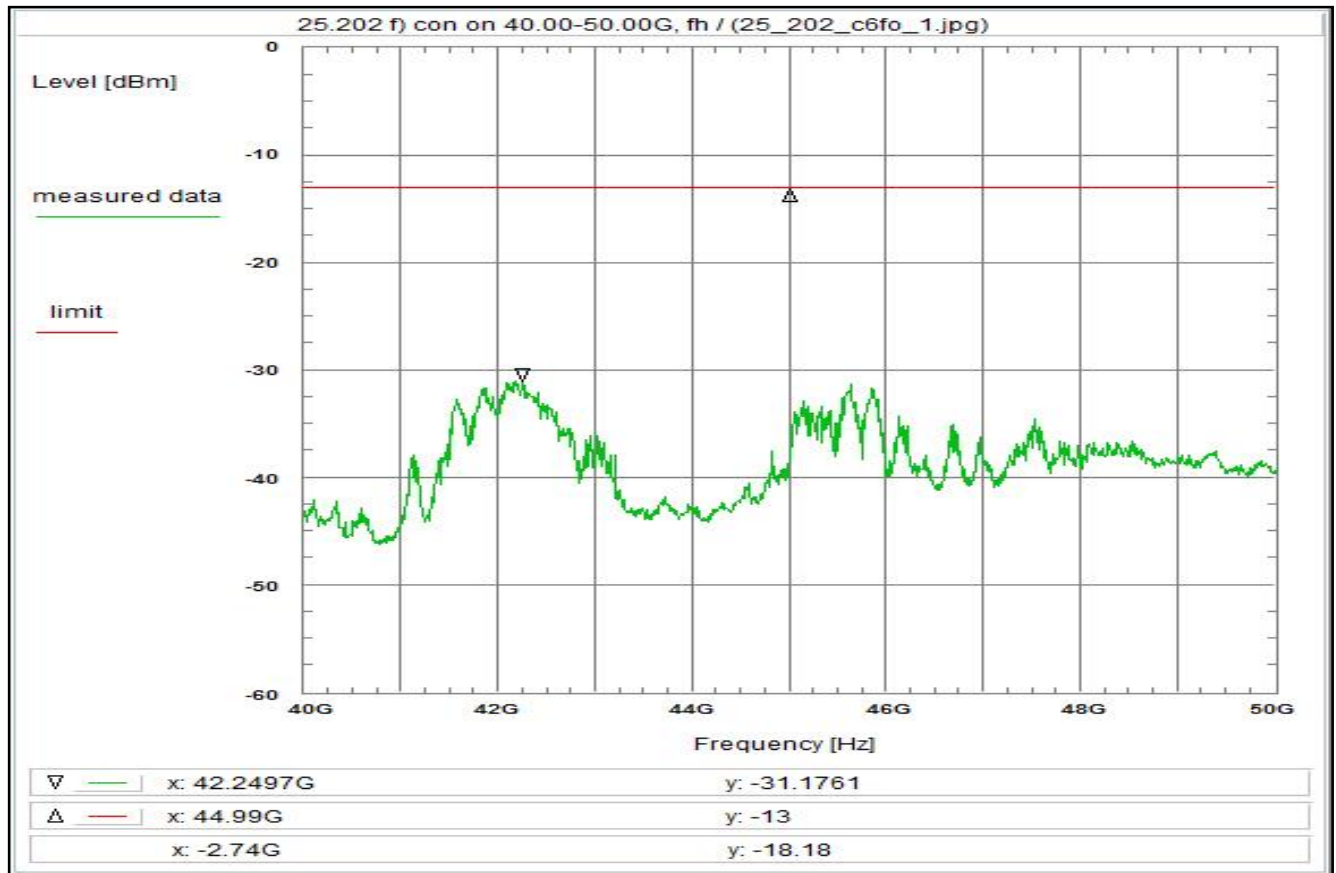
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 4.3 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A021) - 19.6 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (22.25GHz, 4.5m) + 72.5 dB
 TOTAL CORRECTION: + 43.2 dB

Remarks:

Carrier-on state / Carrier at the upper edge of the band (fh)

Plot No. 35



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the upper edge of the band (fh)

Limit:
 Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A_50, C220, R001, W019, W022, W0xx

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 11:57:51
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 40 GHz
 Stop frequency: 50 GHz
 Center frequency: 45 GHz
 Frequency span: 10 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

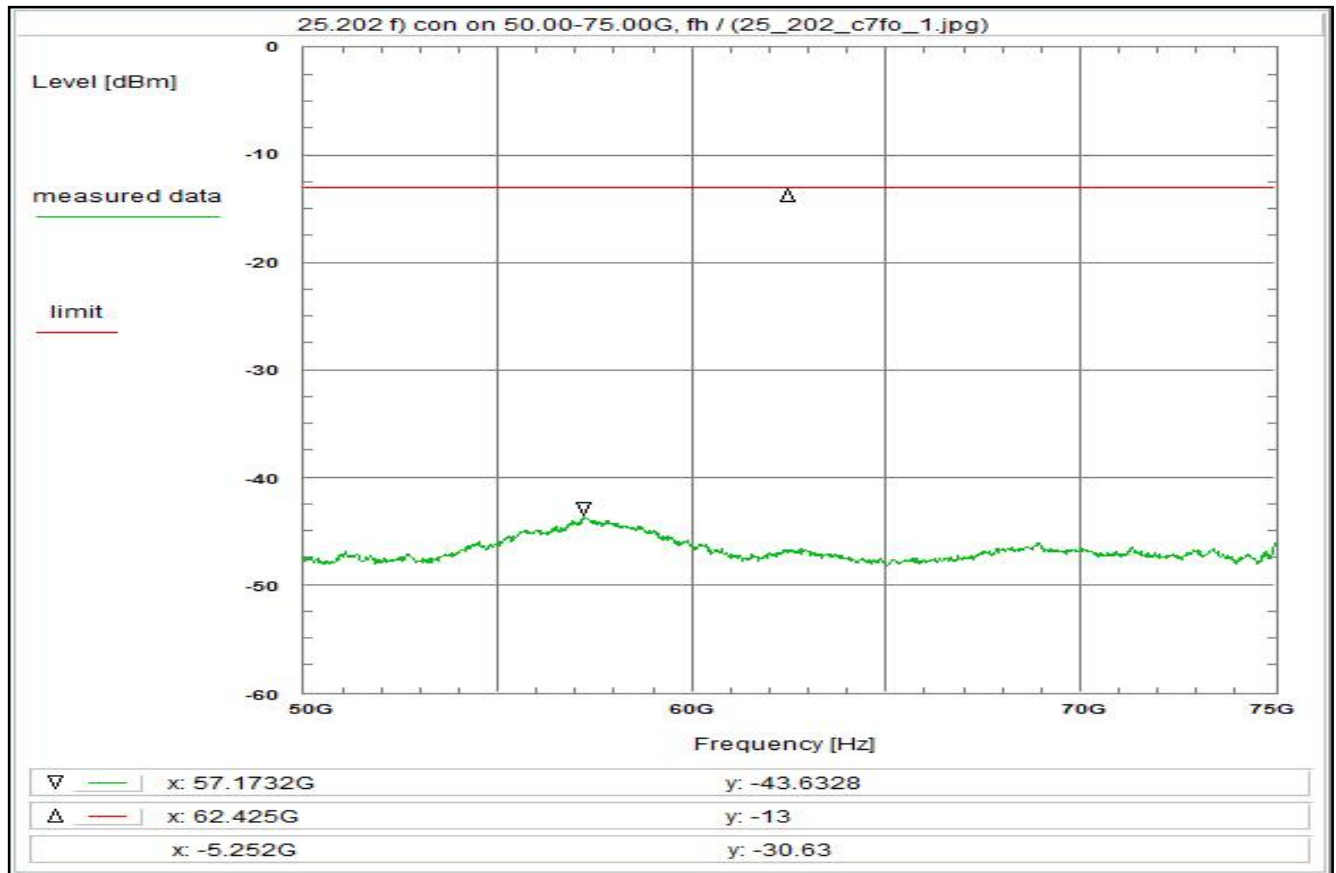
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 5.2 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A_50) - 19.9 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (45.00GHz, 4.5m) + 78.6 dB
 TOTAL CORRECTION: + 49.9 dB

Remarks:

Carrier-on state / Carrier at the upper edge of the band (fh)

Plot No. 36



Subclause: 25.202 f) Frequencies, frequency tolerance and emission limitations
 Emission limitations
 Modulated rf-carrier at the upper edge of the band (fh)

Limit:
 Limit acc. to 25.202 f): $-43+10\log(P_{max})$ dBc
 This corresponds to a limit of -13 dBm.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A_75, R001, R025

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 12:57:23
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 50 GHz
 Stop frequency: 75 GHz
 Center frequency: 62.5 GHz
 Frequency span: 25 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 10 dB
 Trace-Mode: Clear Write
 Detector-Mode: AVG

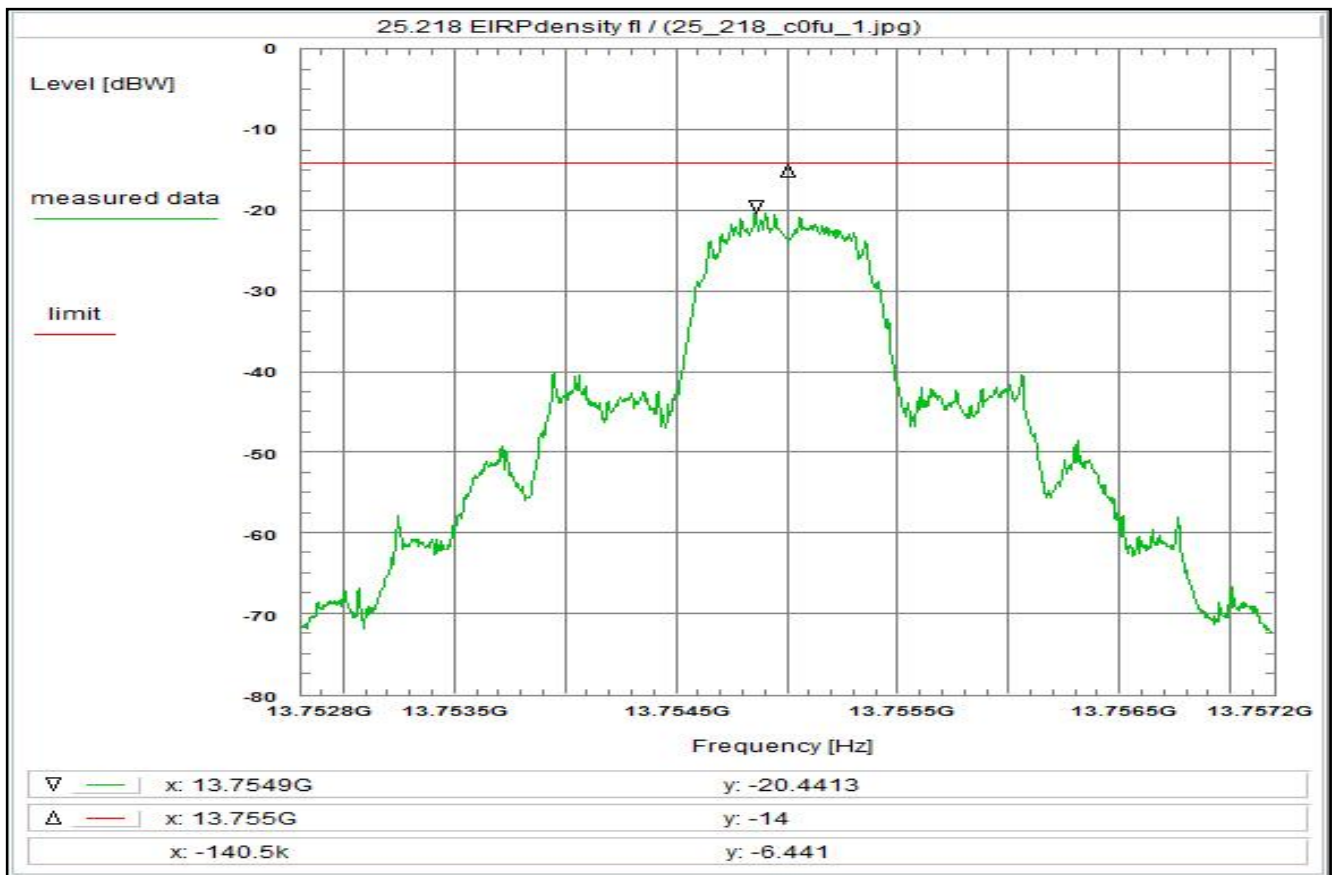
Correction:

Directional coupler + 0.0 dB
 Coaxial cable + 0.0 dB
 DUT-Antenna + 0.0 dBi
 Test antenna (A_75) - 20.1 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (62.50GHz, 4.5m) + 81.4 dB
 TOTAL CORRECTION: + 47.3 dB

Remarks:

Carrier-on state / Carrier at the upper edge of the band (fh)

Plot No. 37



Subclause: 25.218 Off-axis EIRP spectral density (co-, cross-polar) within the band
 Modulated rf-carrier at the lower edge of the band (fl)
 Measurement of the wanted signal within 5 * occupied bandwidth

Limit:

Limit acc. to 25.218: 15-25log2° dBW/4kHz
 -ant.-pattern envelope: -(29-25log2° dBi)
 ==>: -14 dBW/4kHz (copolar)
 (-10*log N for N>1: consideration in correction data)
 The subtraction of the terms results in a constant limit.
 The antenna gain is set to zero in the correction data for this calculation.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.4

Test setup:

see test report chapter 7.3:

Test equipment:

see test report chapter 7.4: A037, C220, R001, W065, W074

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 13:24:43
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 13.7528125 GHz
 Stop frequency: 13.7571875 GHz
 Center frequency: 13.755 GHz
 Frequency span: 4.375 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

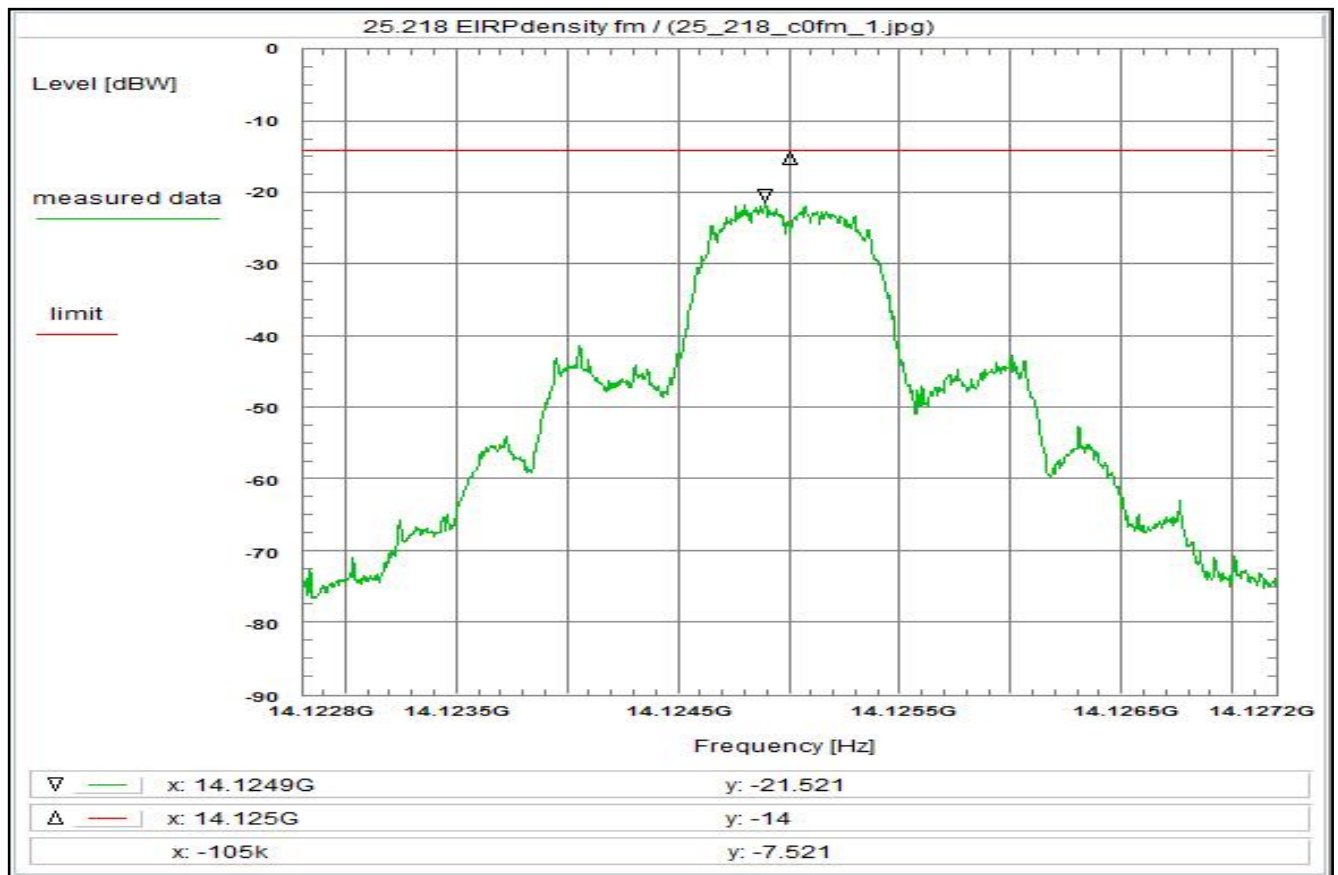
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna (see under limit) + 0.0 dBi
 Test antenna (A037) - 11.8 dB
 BW correction factor (10k -> 4k) - 4.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (14.13GHz, 4.5m) + 68.5 dB
 Antenna gain subtracted - 21.0 dB
 TOTAL CORRECTION: + 34.4 dB

Remarks:

The envelope curves for the antenna patterns ('worst case') are used for this calculation - the actual antenna patterns have to fulfill these requirements (co- and crosspolar envelope curves).
 See the separate plot after the measurement plots, too.
 Measurement with 30 kHz resolution filter and noise averaging.

Plot No. 38



Subclause: 25.218 Off-axis EIRP spectral density (co-, cross-polar) within the band
 Modulated rf-carrier in the middle of the band (fm)
 Measurement of the wanted signal within 5° occupied bandwidth

Limit:
 Limit acc. to 25.218: 15-25log2° dBW/4kHz
 -ant.-pattern envelope: -29-25log2° dBi
 ==>: -14 dBW/4kHz (copolar)
 (-10*log N for N>1: consideration in correction data)
 The subtraction of the terms results in a constant limit.
 The antenna gain is set to zero in the correction data for this calculation.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W065, W074

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 13:26:43
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 14.1228125 GHz
 Stop frequency: 14.1271875 GHz
 Center frequency: 14.125 GHz
 Frequency span: 4.375 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

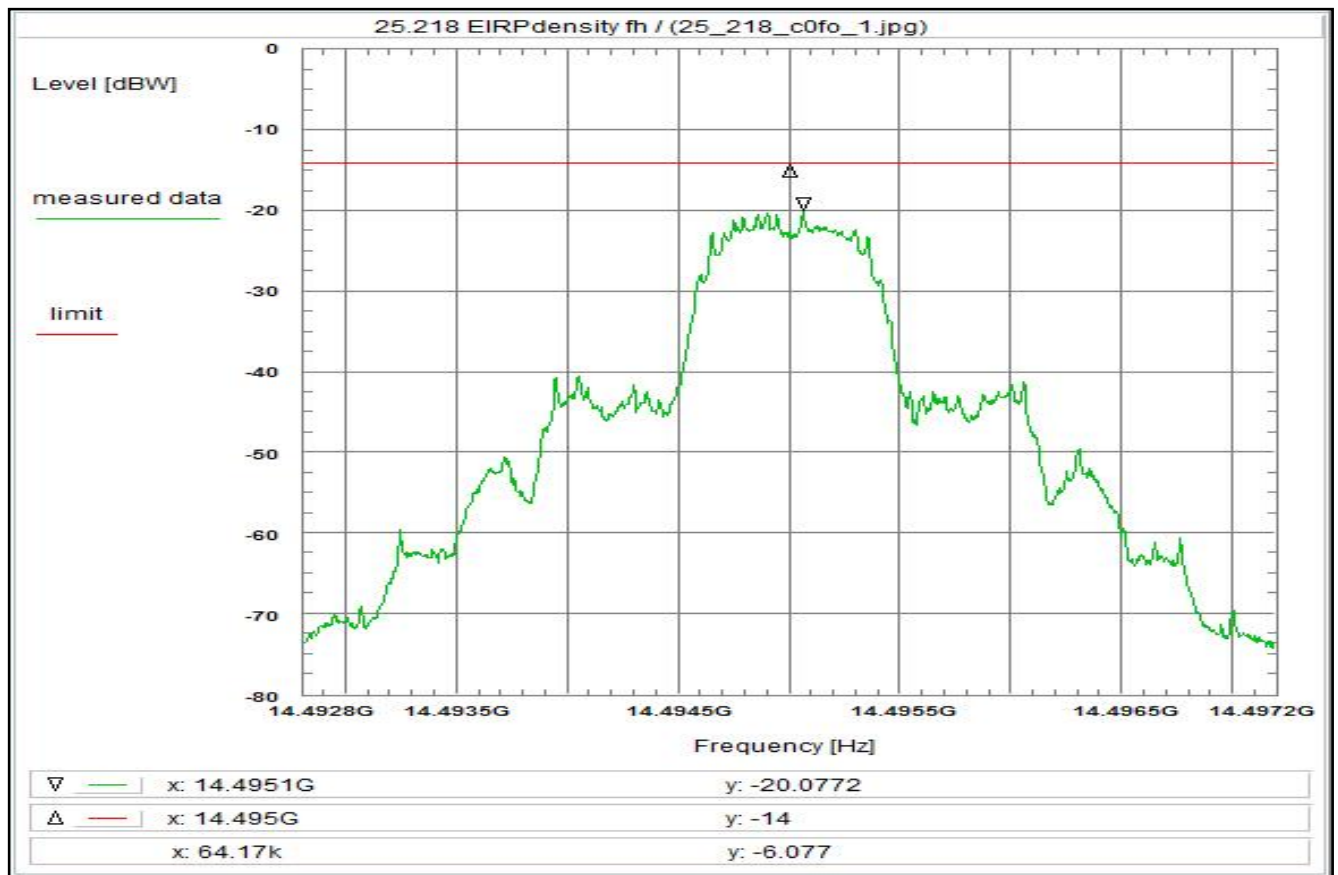
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 2.7 dB
DUT-Antenna (see under limit)	+ 0.0 dBi
Test antenna (A037)	- 11.3 dB
BW correction factor (10k -> 4k)	- 4.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
Freefield attenuation (14.13GHz, 4.5m)	+ 68.5 dB
Antenna gain subtracted	- 21.0 dB
TOTAL CORRECTION:	+ 34.9 dB

Remarks:

The envelope curves for the antenna patterns ('worst case') are used for this calculation - the actual antenna patterns have to fulfill these requirements (co- and crosspolar envelope curves).
 See the separate plot after the measurement plots, too.
 Measurement with 30 kHz resolution filter and noise averaging.

Plot No. 39



Subclause: 25.218 Off-axis EIRP spectral density (co-, cross-polar) within the band
 Modulated rf-carrier at the upper edge of the band (fh)
 Measurement of the wanted signal within 5 * occupied bandwidth

Limit:
 Limit acc. to 25.218: 15-25log2° dBW/4kHz
 -ant.-pattern envelope: -(29-25log2° dBi)
 ==>: -14 dBW/4kHz (copolar)
 (-10*log N for N>1: consideration in correction data)
 The subtraction of the terms results in a constant limit.
 The antenna gain is set to zero in the correction data for this calculation.

Test results:
 see plot (an explicit table was not generated)

Operating condition of DUT:
 operating condition 1, see test report chapter 5.4

Test setup:
 see test report chapter 7.3:

Test equipment:
 see test report chapter 7.4: A037, C220, R001, W065, W074

Remark:

Test result: Test passed

Environment condition:

Date & Time: Mon 20/Sep/2021 13:29:42
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 230 Vac

Setup of measurement equipment:

Start frequency: 14.4928125 GHz
 Stop frequency: 14.4971875 GHz
 Center frequency: 14.495 GHz
 Frequency span: 4.375 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 10 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 2.7 dB
DUT-Antenna (see under limit)	+ 0.0 dBi
Test antenna (A037)	+ 11.4 dB
BW correction factor (10k -> 4k)	- 4.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
Freefield attenuation (14.13GHz, 4.5m)	+ 68.5 dB
Antenna gain subtracted	- 21.0 dB
TOTAL CORRECTION:	+ 34.8 dB

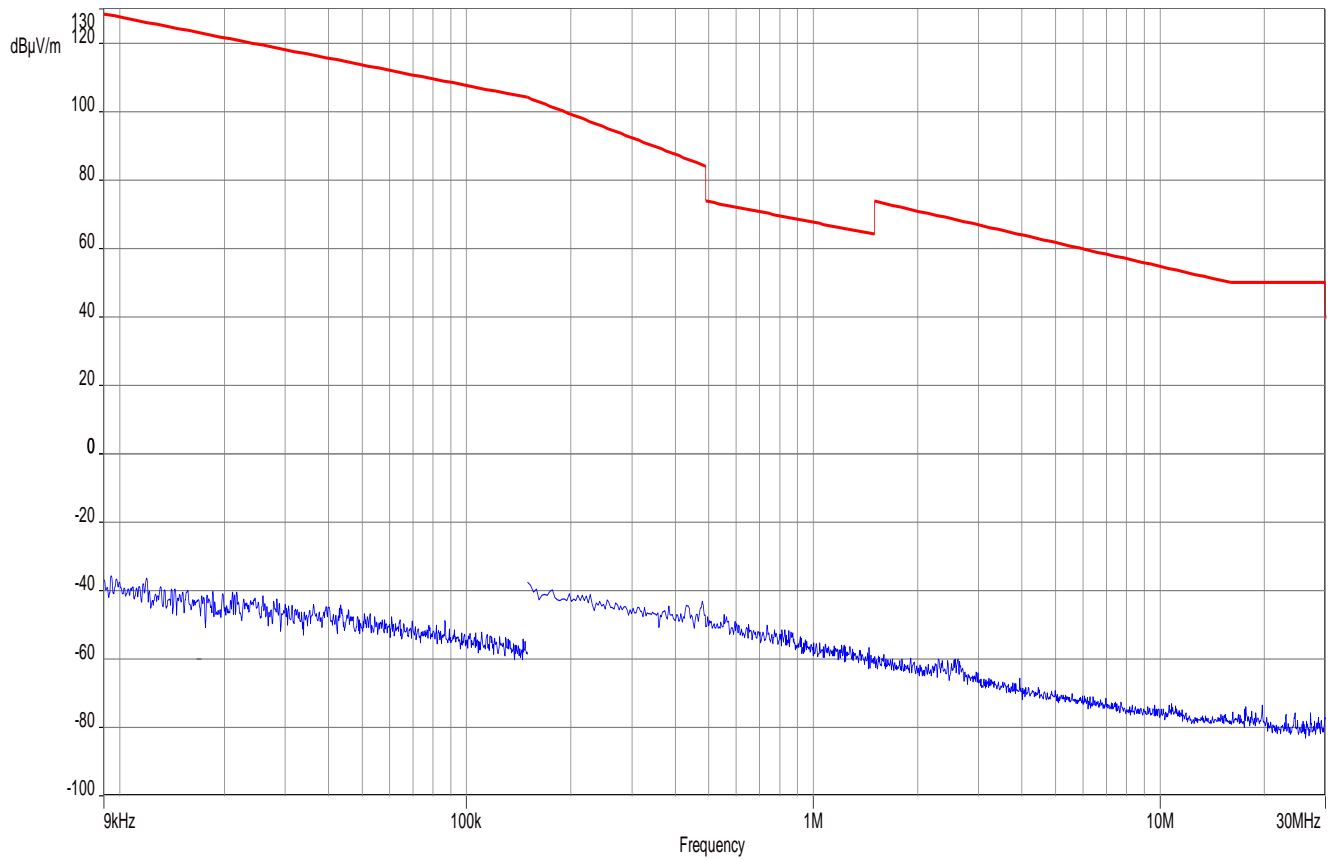
Remarks:

The envelope curves for the antenna patterns ('worst case') are used for this calculation - the actual antenna patterns have to fulfill these requirements (co- and crosspolar envelope curves).
 See the separate plot after the measurement plots, too.
 Measurement with 30 kHz resolution filter and noise averaging.

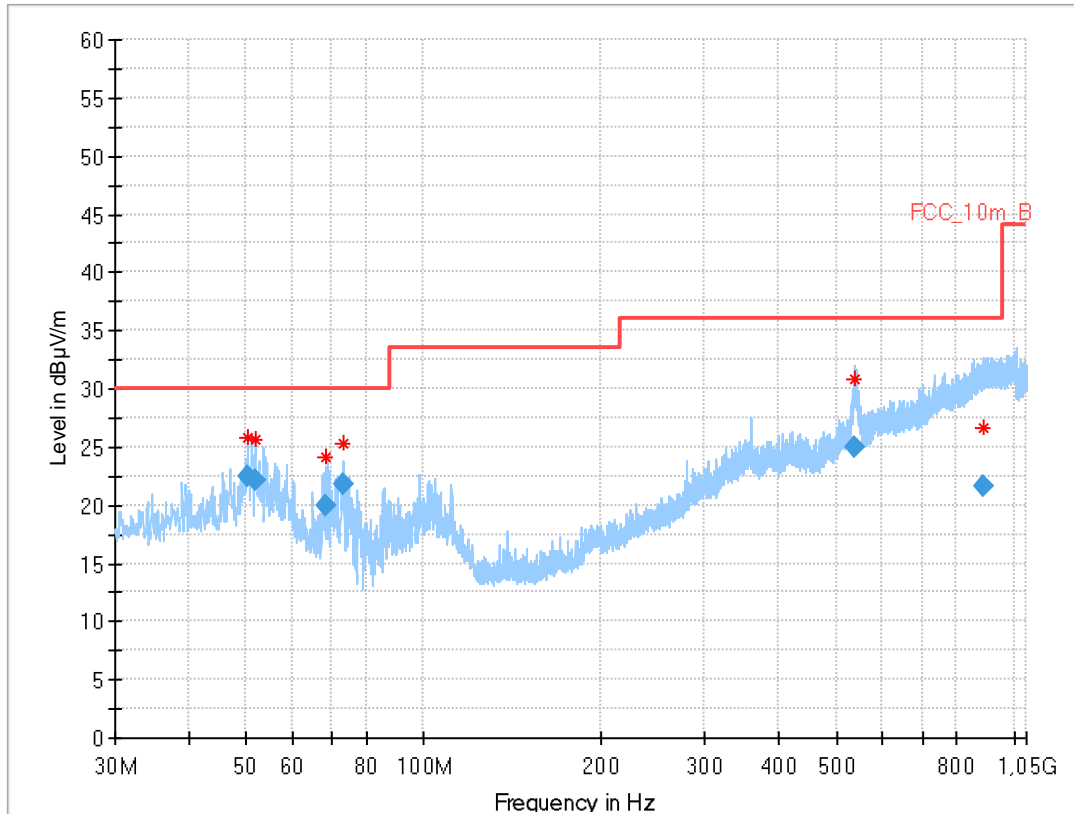
3 Measurement results, Spurious emissions 30MHz - 18 GHz

This Chapter 3 consists of 4 pages including this page.

Plot No. 1: 150 kHz – 30 MHz, antenna vertical / horizontal Tx/Rx



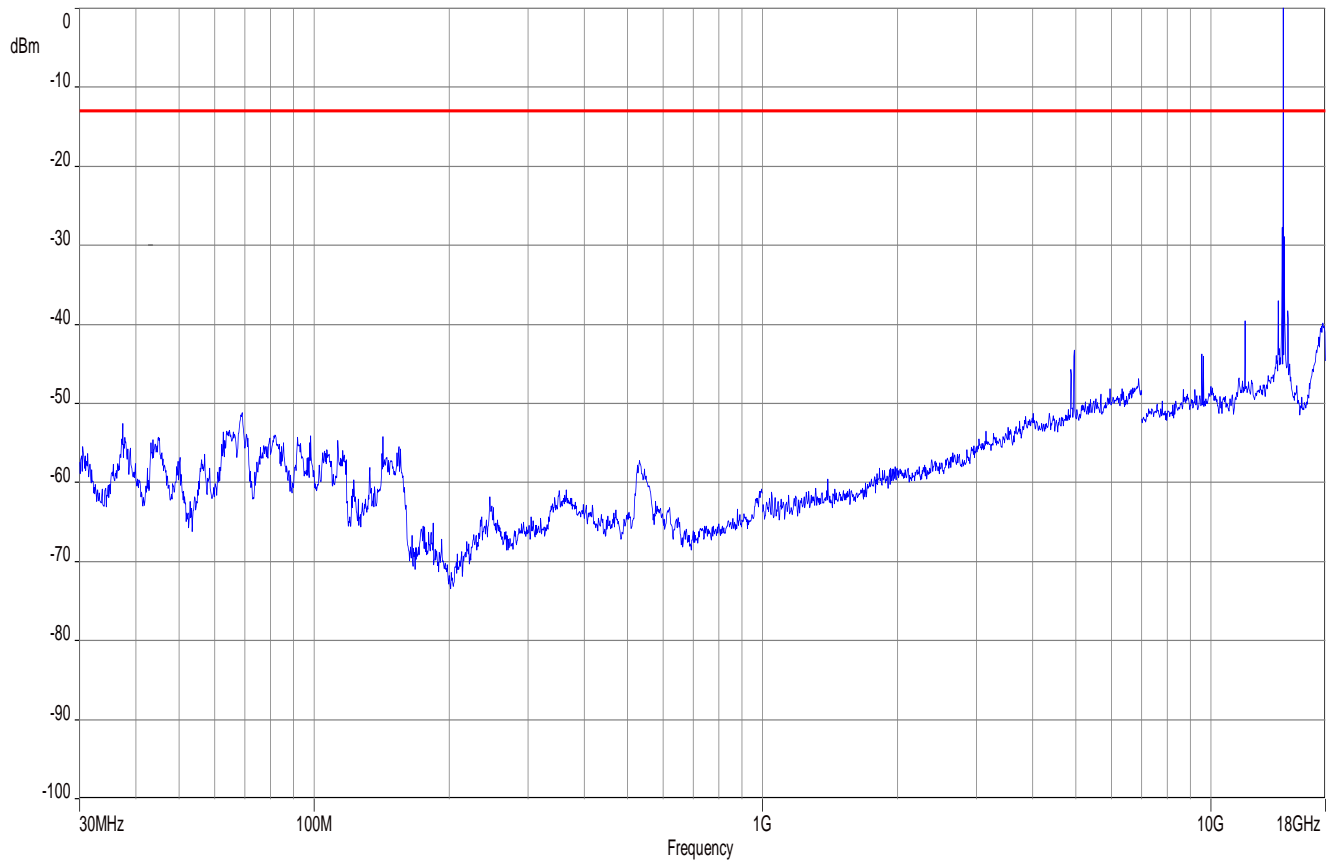
Plot No. 2: 30 MHz – 1 GHz, antenna vertical / horizontal Tx



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)
50.444	22.49	30.0	7.5	1000	120.0	103.0	V	138	15
51.793	22.09	30.0	7.9	1000	120.0	124.0	V	93	15
68.450	19.92	30.0	10.1	1000	120.0	321.0	V	52	11
73.171	21.78	30.0	8.2	1000	120.0	366.0	V	0	9
538.508	24.96	36.0	11.0	1000	120.0	139.0	H	-38	20
888.695	21.57	36.0	14.4	1000	120.0	200.0	H	270	25

Plot No. 3: 1 GHz – 18 GHz, antenna vertical / horizontal Tx



Note: carrier visible on plot

4 Measurement results, FCC Part 15B

This Chapter 3 consists of 1 pages including this page.

Refer to test report 1-2751_21-01-03.pdf

5 Document history

Version	Applied changes	Date of release
	Initial release - DRAFT	2021-10-22
	Initial release	