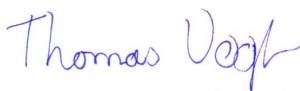


Annex F



This test report annex is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report annex authorized:


cn=Thomas Vogler, o=CTC advanced GmbH, ou=VOG-211118, email=thomas.vogler@ctcadvanced.com, c=DE
2022.02.11 10:14:18 +01'00'

Thomas Vogler
Lab Manager
Radio Communications & EMC

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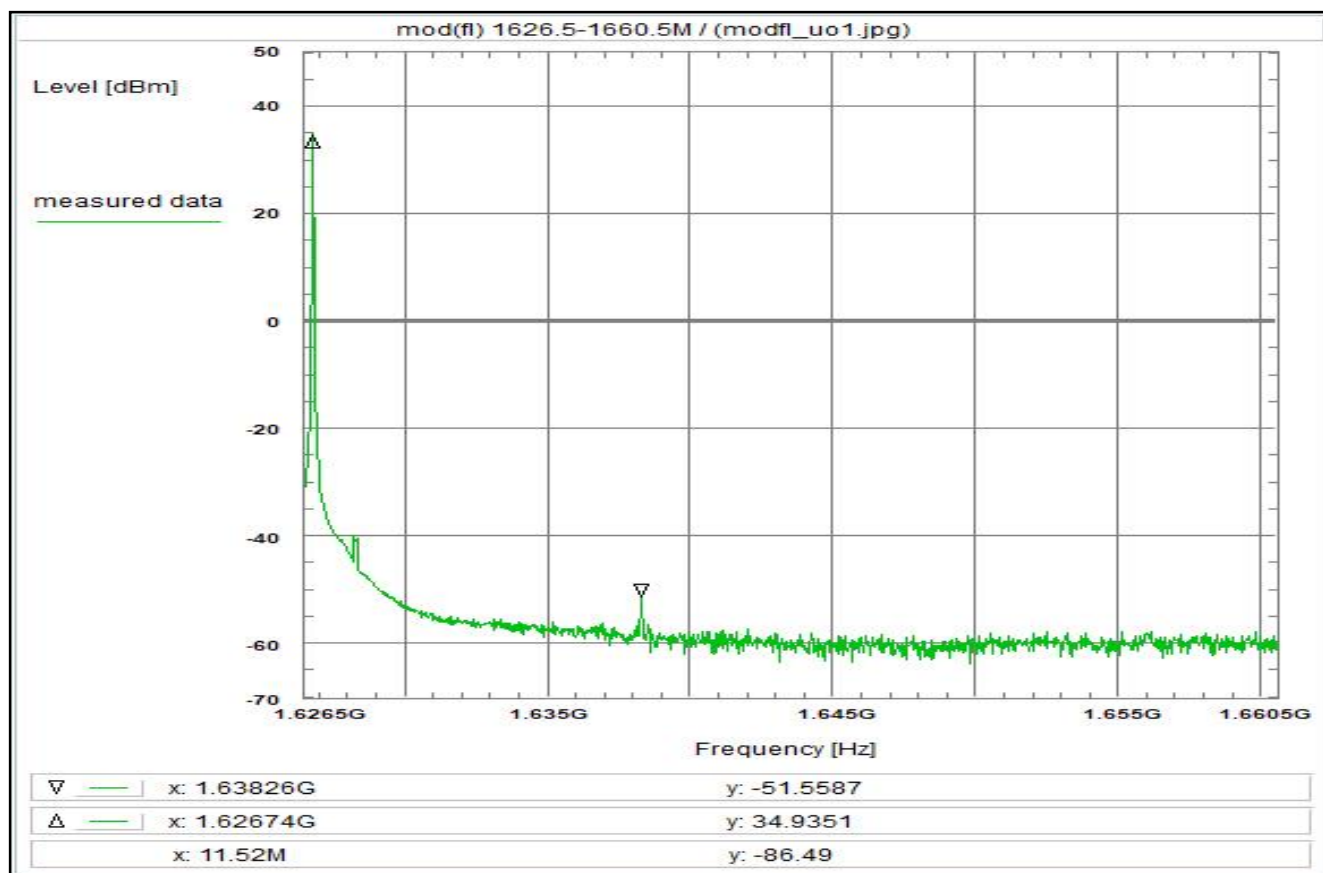
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2 Measurement results FCC Part 25, 1 – 18 GHz

This chapter consists of 32 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 5.2

Test setup:
 see test report chapter 7.2: hgi

Test equipment:
 see test report chapter 7.2: C220, R001, U312

Remark:
 measurement for orientation

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 16:01:56
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6265 GHz
 Stop frequency: 1.6605 GHz
 Center frequency: 1.6435 GHz
 Frequency span: 34 MHz
 Resolution-BW: 30 kHz
 Video-BW: 100 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

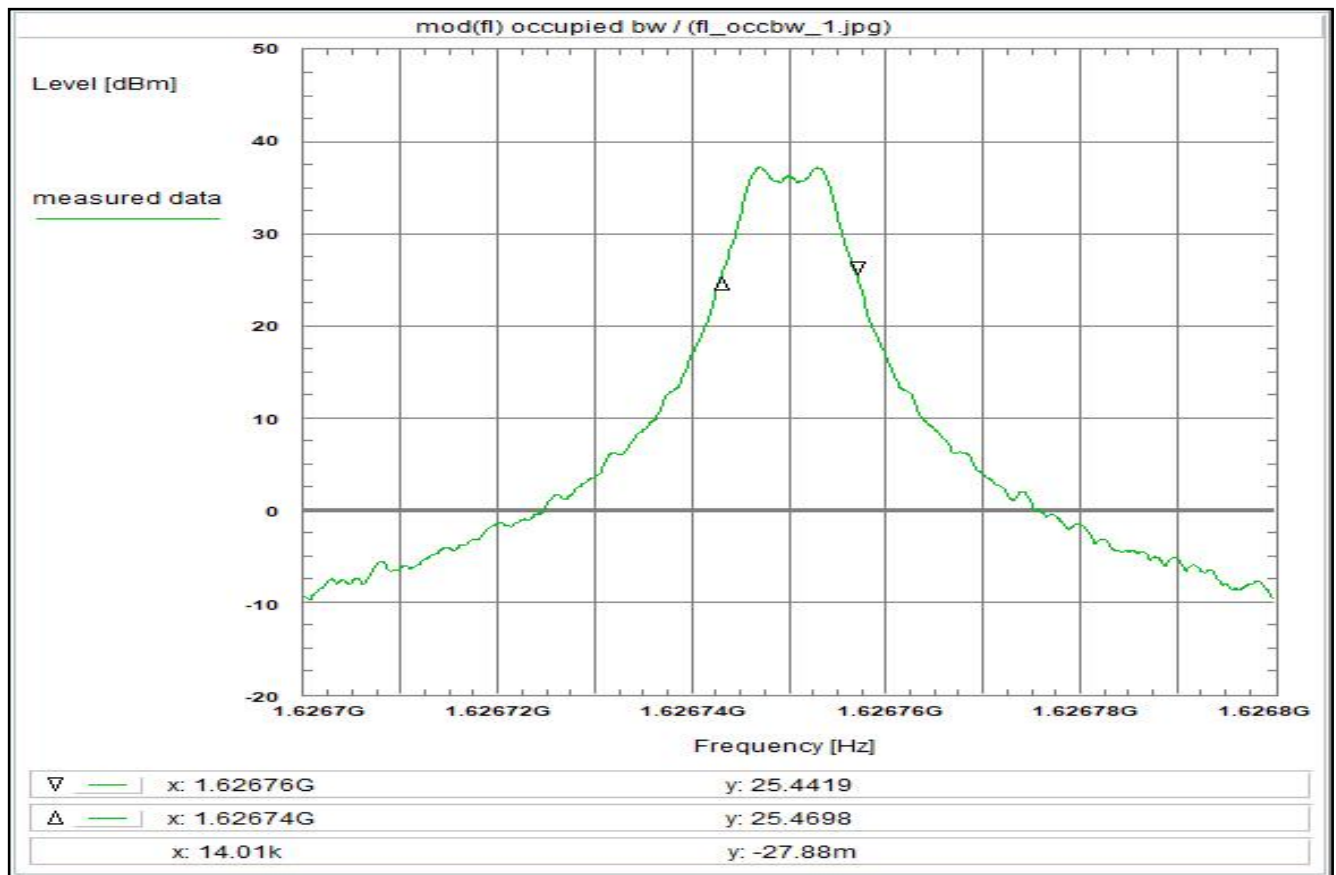
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.9 dB
DUT-Antenna (on-axis)	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor	+ 0.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 27.9 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:
 This tests serves to verify the occupied bandwidth.
 The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 % of the total mean power radiated by a given emission. (see §2.1049).

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

Operating condition of DUT:
 operating condition 1, see test report chapter 5.2

Test setup:
 see test report chapter 7.2: hgj

Test equipment:
 see test report chapter 7.2: C220, R001, U312

Remark:
 determination of the occupied bandwidth

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 16:06:20
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6267 GHz
 Stop frequency: 1.6268 GHz
 Center frequency: 1.62675 GHz
 Frequency span: 100 kHz
 Resolution-BW: 3 kHz
 Video-BW: 10 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

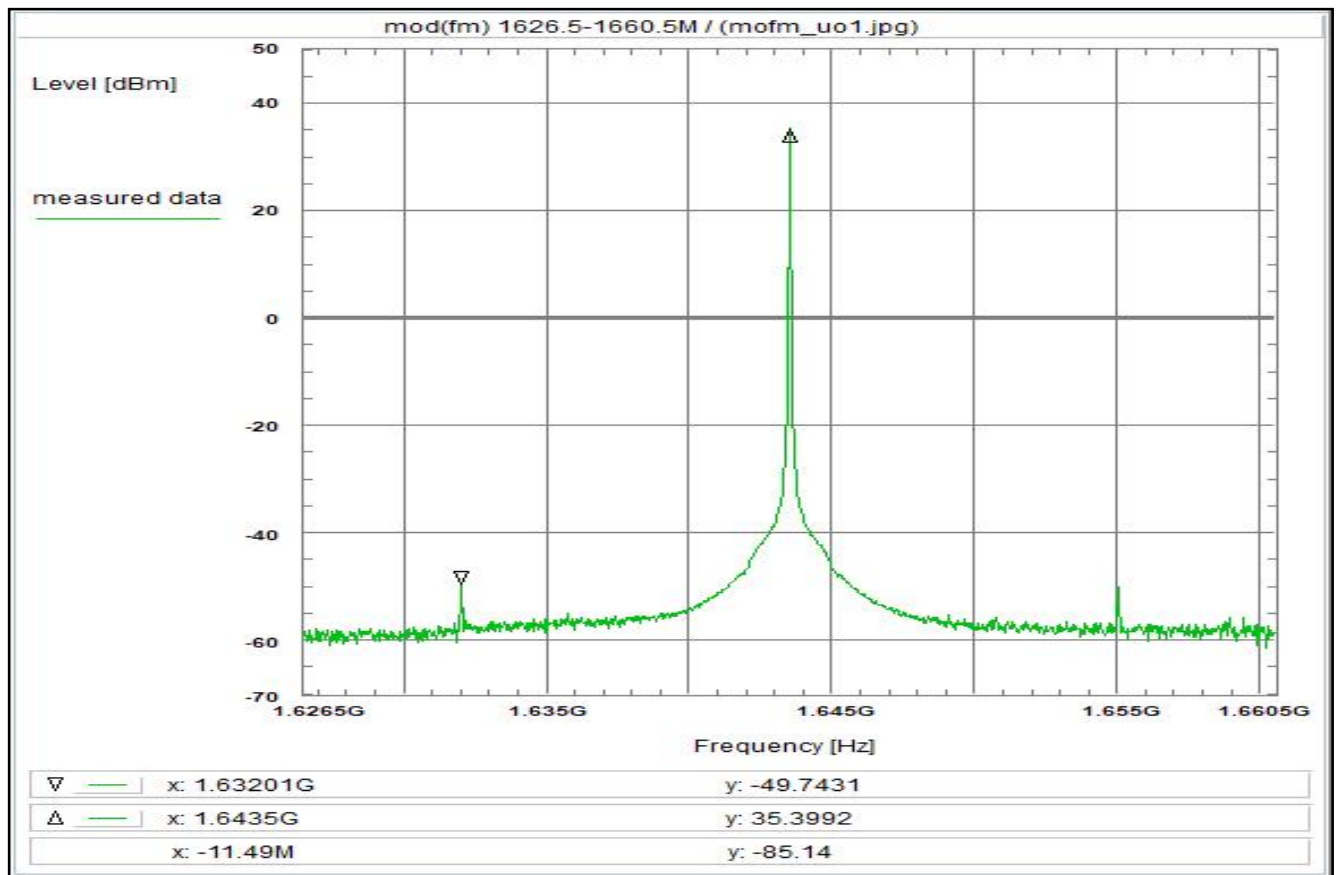
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.9 dB
DUT-Antenna (on-axis)	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor	+ 0.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 27.9 dB

Remarks:

Verification of the occupied bandwidth at fl.
 The internal function of the spectrum analyzer was used.
 The measured value is about 14 kHz (delta marker)
 Average measurement / max-hold

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 5.2

Test setup:
 see test report chapter 7.2: hgi

Test equipment:
 see test report chapter 7.2: C220, R001, U312

Remark:

Test result: measurement for orientation

Environment condition:

Date & Time: Wed 18/Aug/2021 15:08:28
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6265 GHz
 Stop frequency: 1.6605 GHz
 Center frequency: 1.6435 GHz
 Frequency span: 34 MHz
 Resolution-BW: 30 kHz
 Video-BW: 100 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

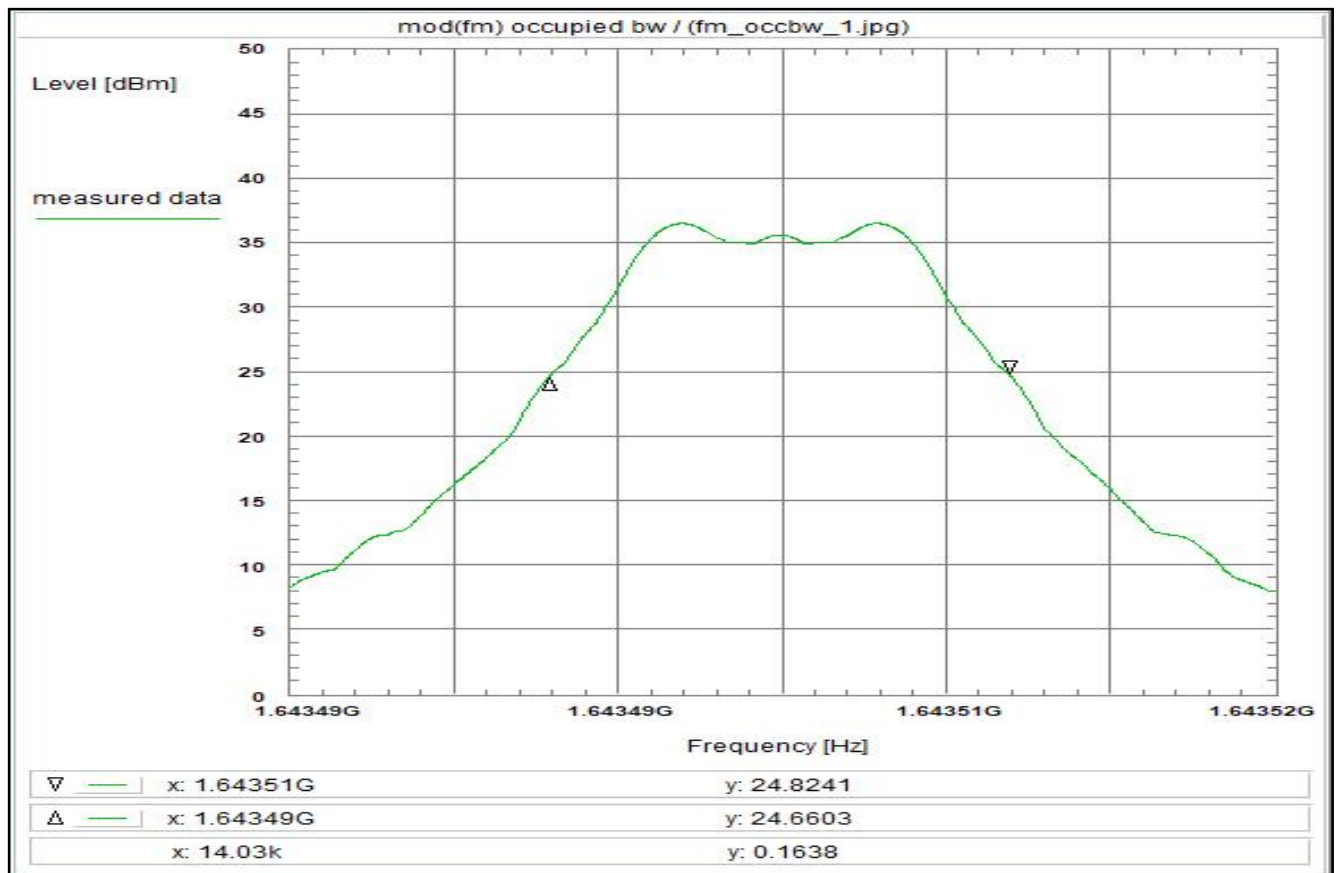
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.9 dB
DUT-Antenna	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor	+ 0.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
Freefield attenuation (U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 27.9 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:
 This tests serves to verify the occupied bandwidth.
 The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 % of the total mean power radiated by a given emission. (see §2.1049).

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

Operating condition of DUT:
 operating condition 1, see test report chapter 5.2

Test setup:
 see test report chapter 7.2: hgj

Test equipment:
 see test report chapter 7.2: C220, R001, U312

Remark:
 determination of the occupied bandwidth

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:12:10
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.643485 GHz
 Stop frequency: 1.643515 GHz
 Center frequency: 1.6435 GHz
 Frequency span: 30 kHz
 Resolution-BW: 3 kHz
 Video-BW: 10 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

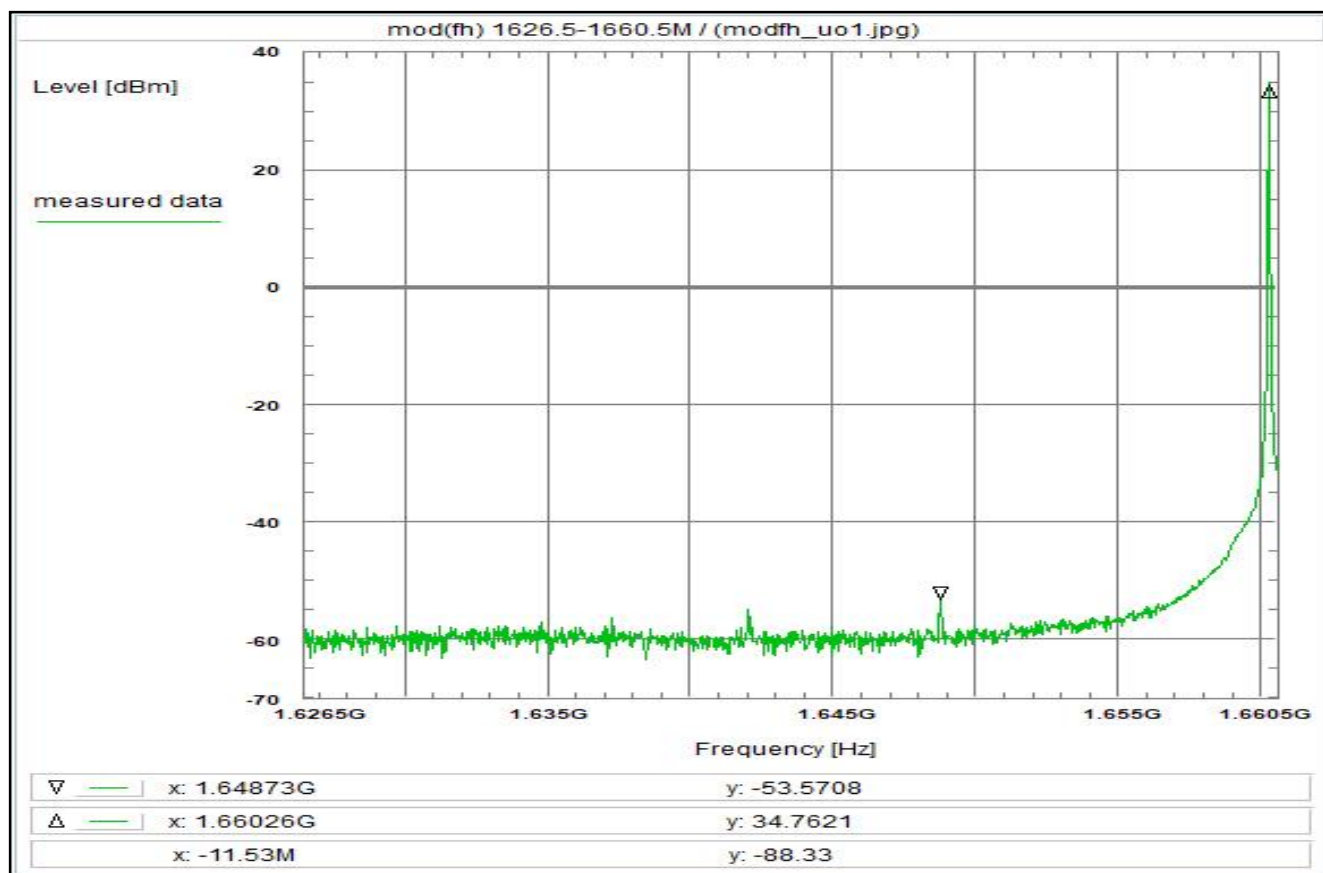
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.9 dB
 DUT-Antenna + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor + 0.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 Freefield attenuation (U312) + 19.5 dB
 TOTAL CORRECTION: + 27.9 dB

Remarks:

Verification of the occupied bandwidth at fm.
 The internal function of the spectrum analyzer was used.
 The measured value is about 14 kHz (delta marker)
 Average measurement / max-hold

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 5.2

Test setup:
 see test report chapter 7.2: hgi

Test equipment:
 see test report chapter 7.2: C220, R001, U312

Remark:
 measurement for orientation

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:57:53
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6265 GHz
 Stop frequency: 1.6605 GHz
 Center frequency: 1.6435 GHz
 Frequency span: 34 MHz
 Resolution-BW: 30 kHz
 Video-BW: 100 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

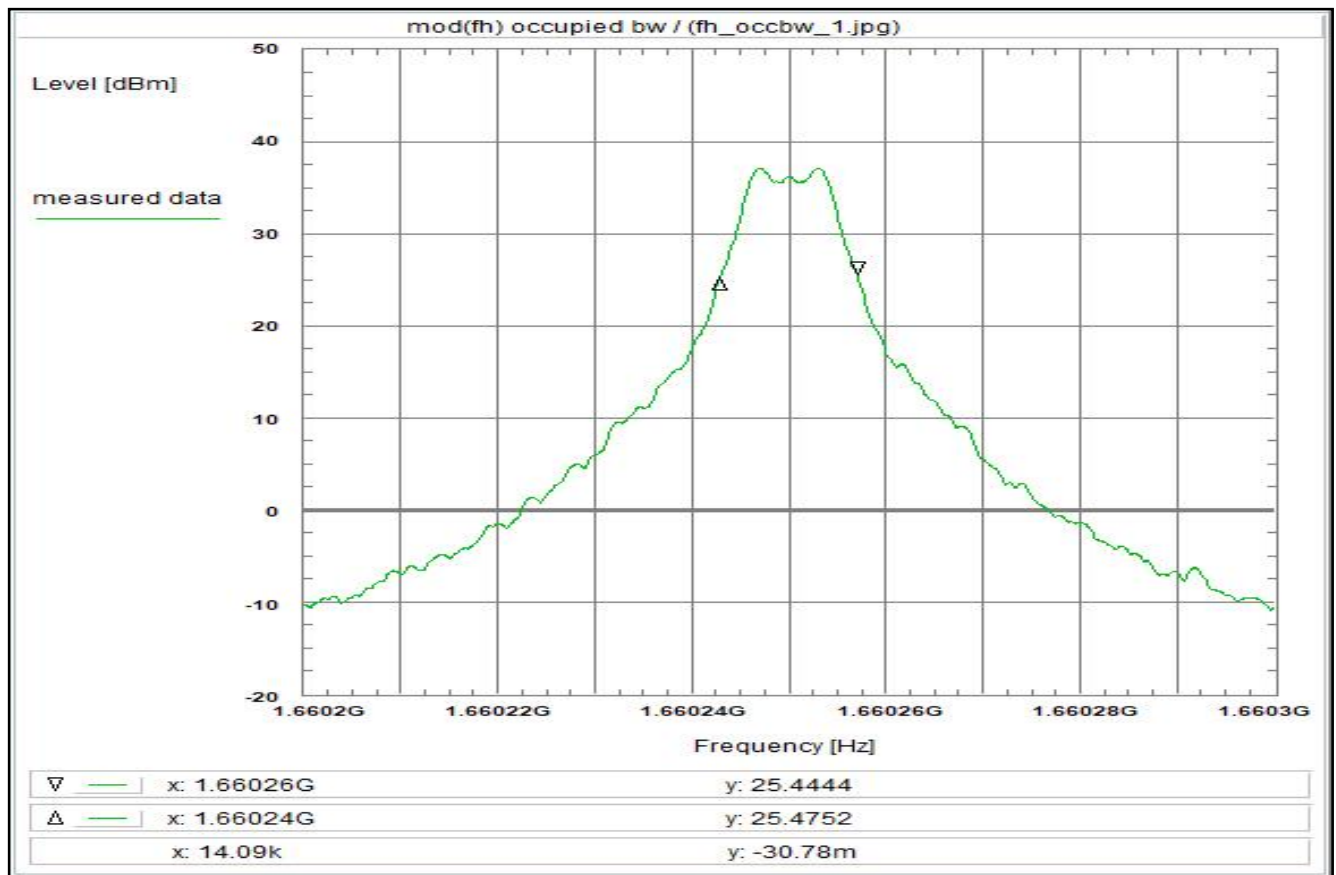
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.9 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor + 0.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.5 dB
 TOTAL CORRECTION: + 27.9 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:
 This tests serves to verify the occupied bandwidth.
 The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 % of the total mean power radiated by a given emission. (see §2.1049).

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

Operating condition of DUT:
 operating condition 1, see test report chapter 5.2

Test setup:
 see test report chapter 7.2: hgj

Test equipment:
 see test report chapter 7.2: C220, R001, U312

Remark:
 determination of the occupied bandwidth

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:59:38
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6602 GHz
 Stop frequency: 1.6603 GHz
 Center frequency: 1.66025 GHz
 Frequency span: 100 kHz
 Resolution-BW: 3 kHz
 Video-BW: 10 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

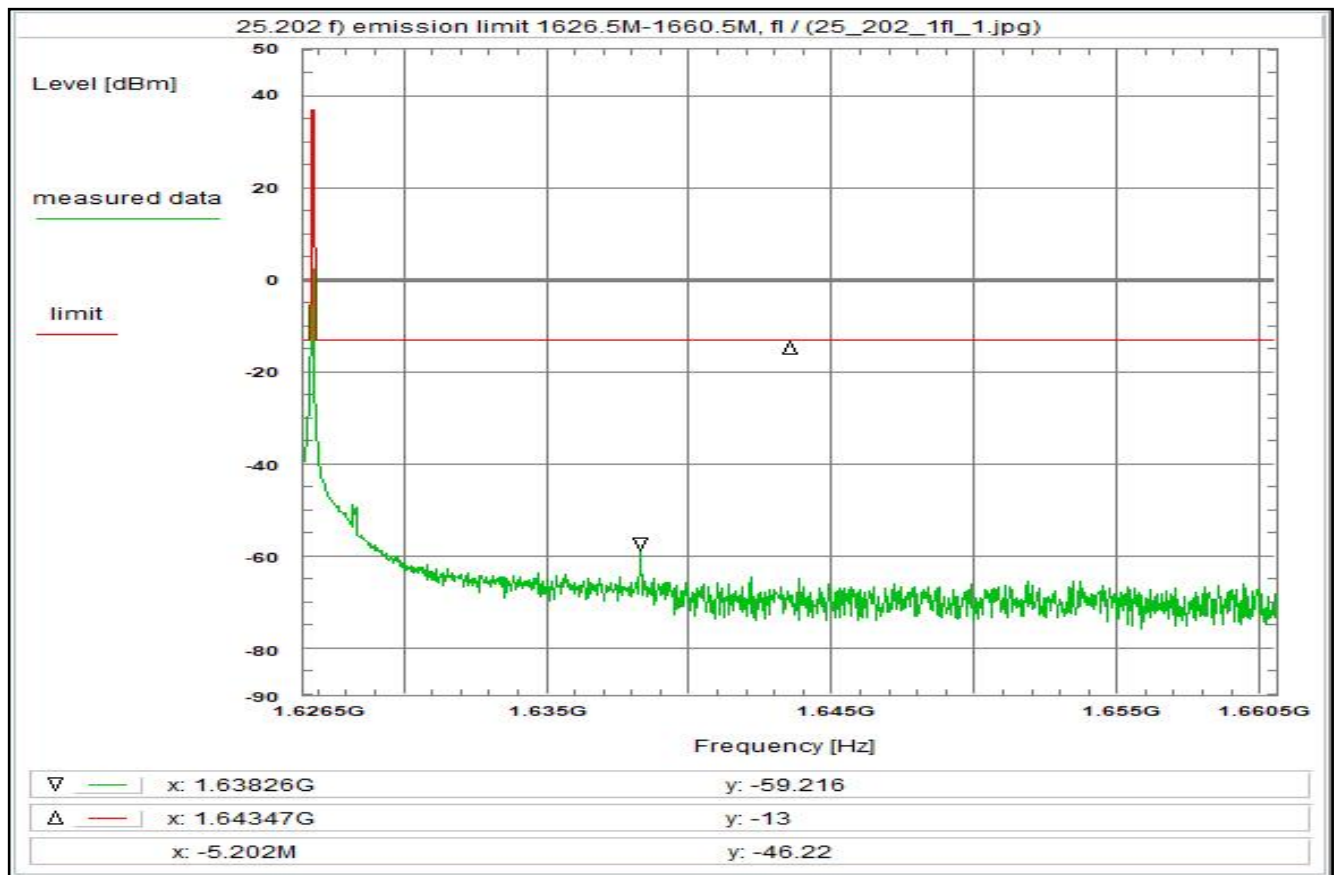
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.9 dB
DUT-Antenna (on-axis)	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor	+ 0.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 27.9 dB

Remarks:

Verification of the occupied bandwidth at fh.
 The internal function of the spectrum analyzer was used.
 The measured value is about 14 kHz (delta marker)
 Average measurement / max-hold

Plot No. 7



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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{\max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated
 below the mean output power of the transmitter
 in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:36:49
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6265 GHz
 Stop frequency: 1.6605 GHz
 Center frequency: 1.6435 GHz
 Frequency span: 34 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

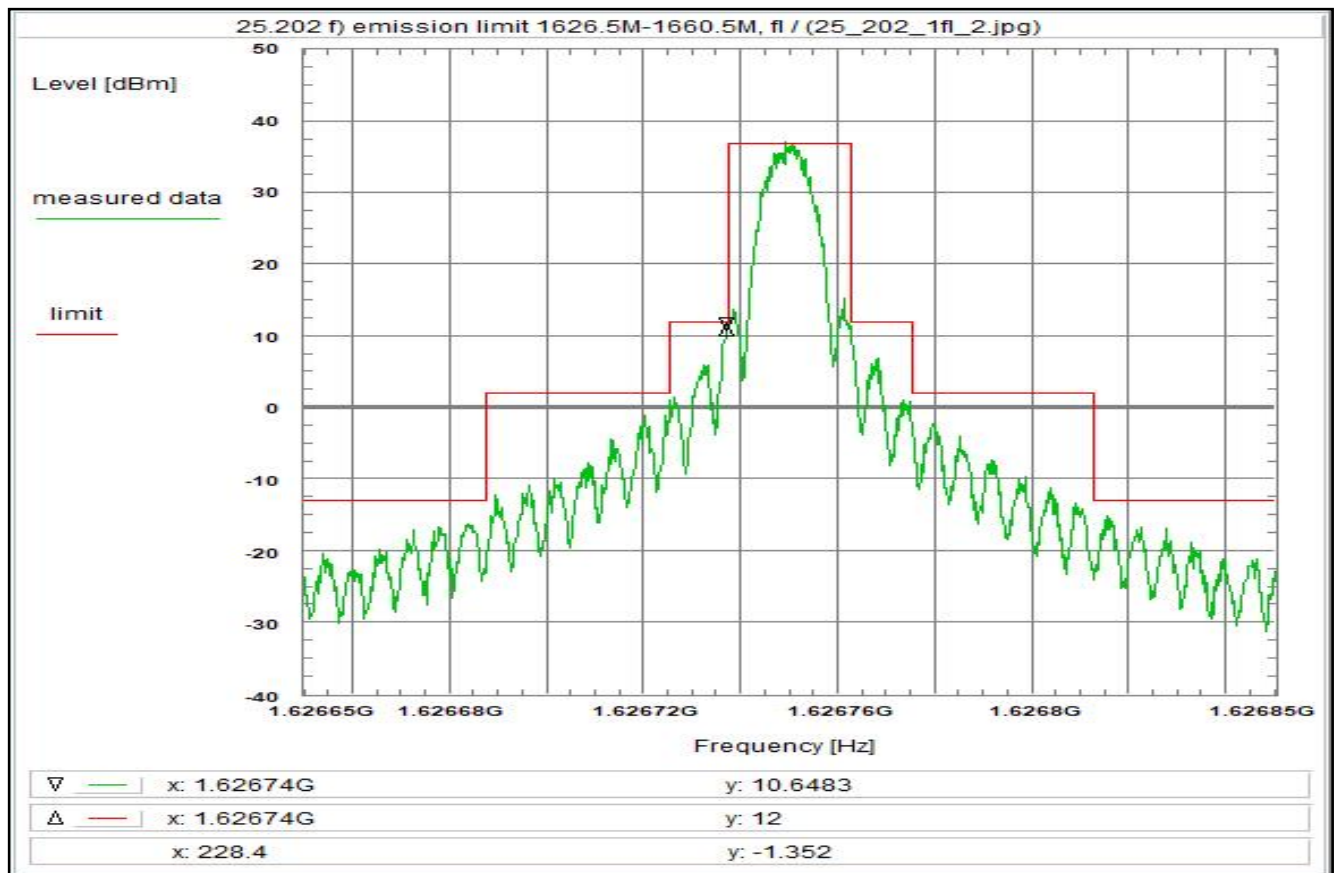
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.9 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (10k -> 4k) - 4.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.5 dB
 TOTAL CORRECTION: + 23.9 dB

Remarks:

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

Plot No. 8



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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:38:17
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.62665 GHz
 Stop frequency: 1.62685 GHz
 Center frequency: 1.62675 GHz
 Frequency span: 200 kHz
 Resolution-BW: 1 kHz
 Video-BW: 3 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

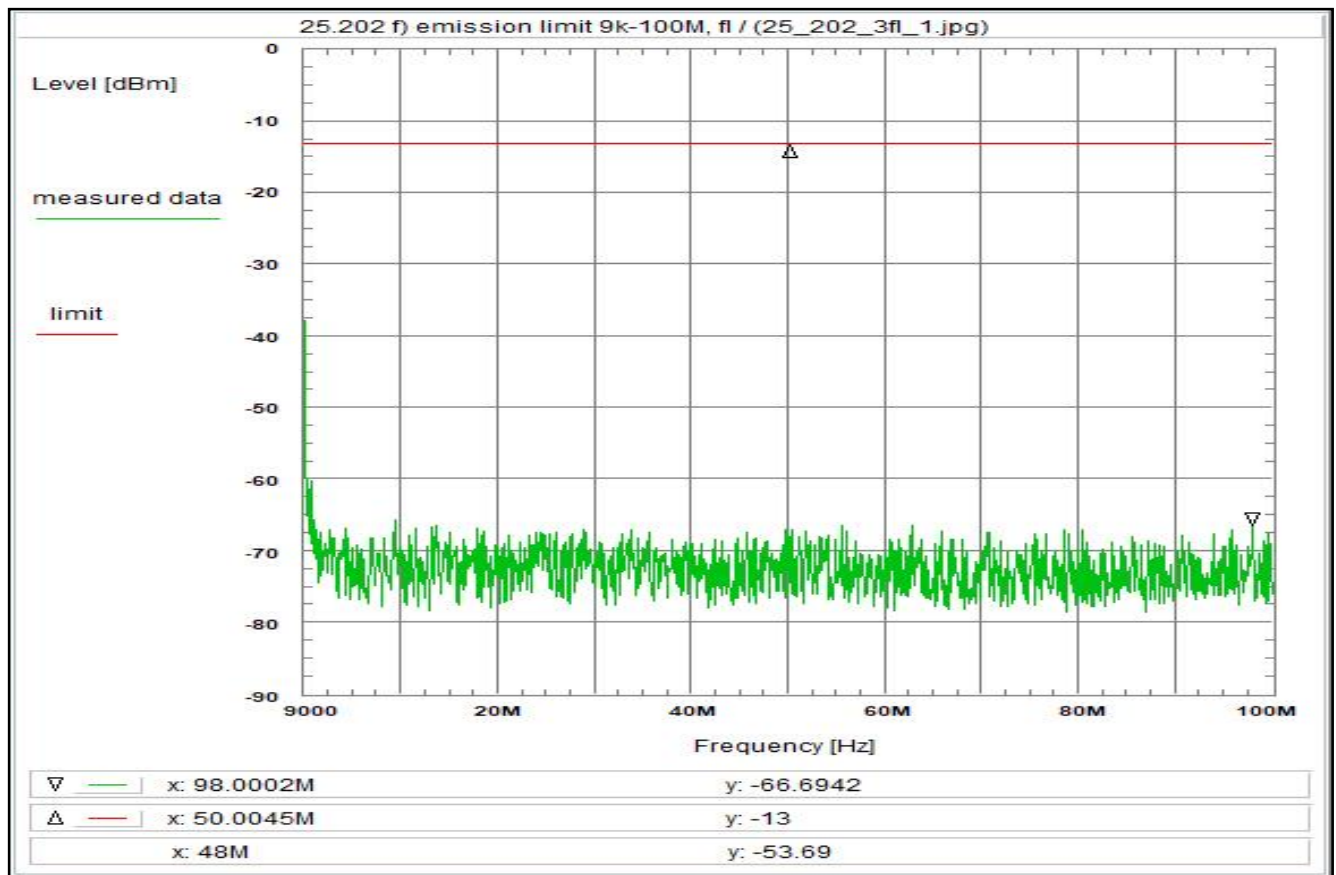
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.9 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (1k -> 4k) + 6.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.5 dB
 TOTAL CORRECTION: + 33.9 dB

Remarks:

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

Plot No. 9



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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:44:13
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 9 kHz
 Stop frequency: 100 MHz
 Center frequency: 50.0045 MHz
 Frequency span: 99.991 MHz
 Resolution-BW: 1 kHz
 Video-BW: 3 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

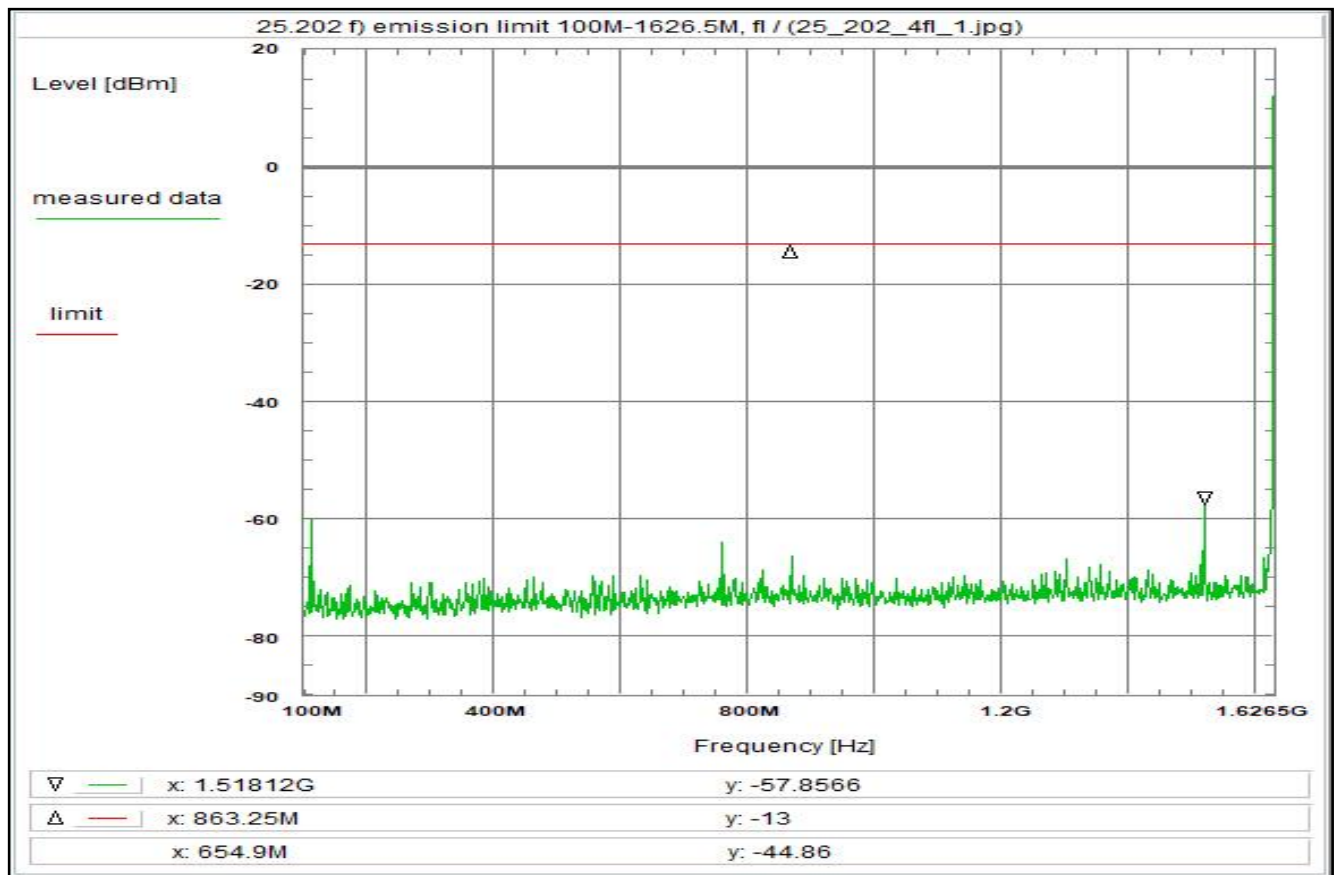
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.2 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (1k -> 4k) + 6.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.5 dB
 TOTAL CORRECTION: + 33.2 dB

Remarks:

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

Plot No. 10



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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:40:08
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 100 MHz
 Stop frequency: 1.6265 GHz
 Center frequency: 863.25 MHz
 Frequency span: 1.5265 GHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

Correction:

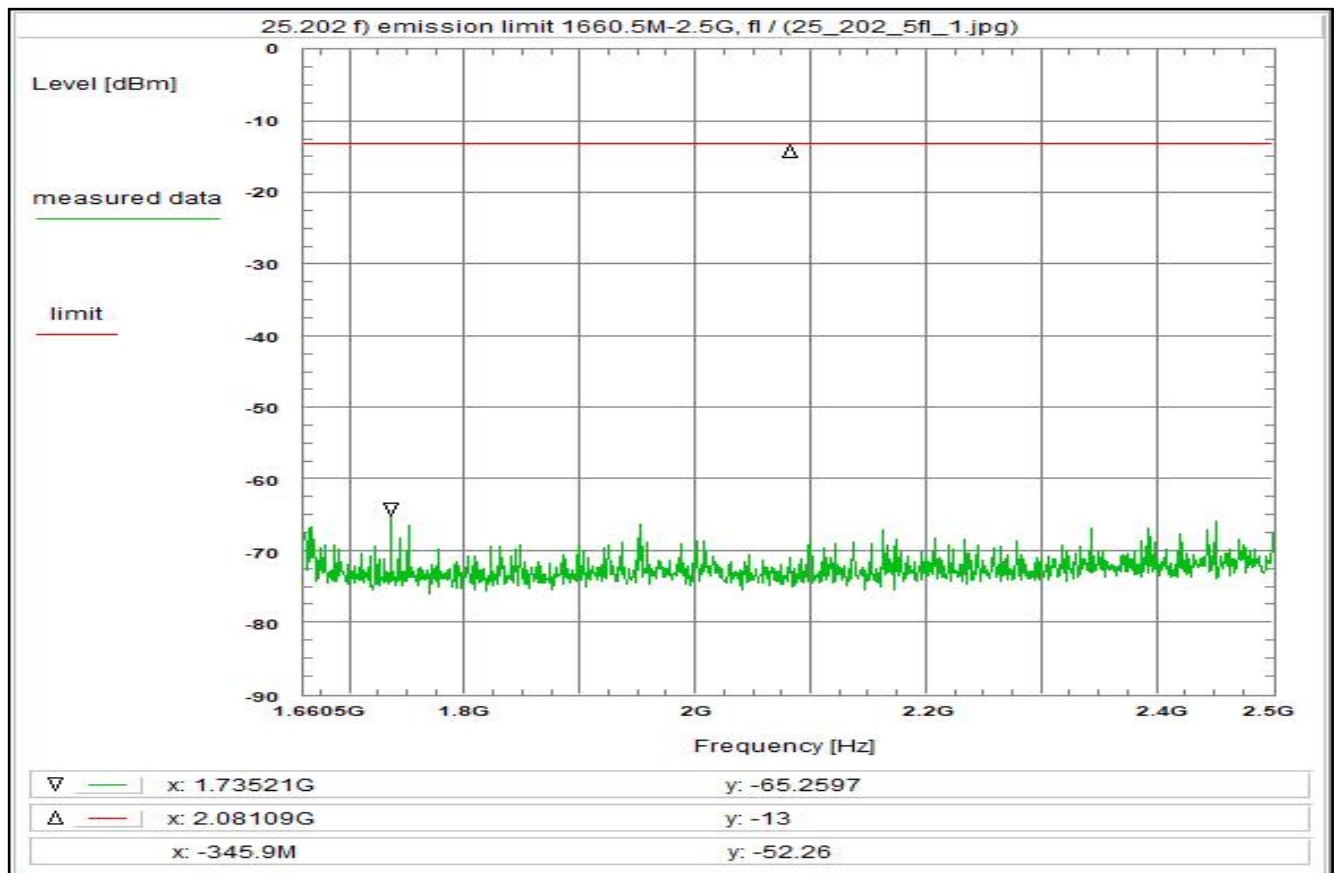
Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.6 dB
DUT-Antenna (on-axis)	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor (10k -> 4k)	- 4.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 23.6 dB

Remarks:

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

Rather right the plot shows parts of the wanted signal.

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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:40:49
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6605 GHz
 Stop frequency: 2.5 GHz
 Center frequency: 2.08025 GHz
 Frequency span: 839.5 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

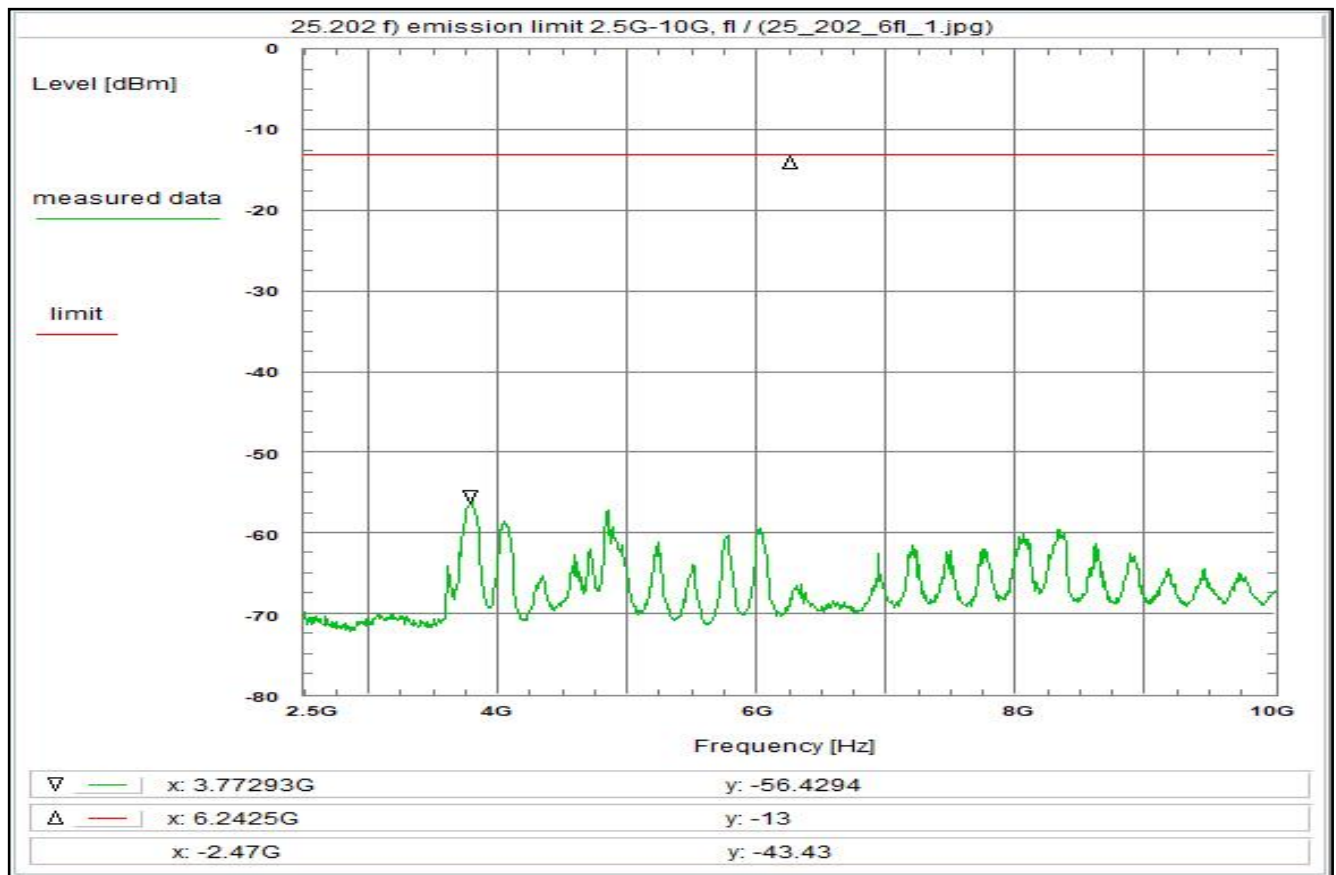
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 1.0 dB
DUT-Antenna (on-axis)	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor (10k -> 4k)	- 4.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.6 dB
TOTAL CORRECTION:	+ 24.1 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 according to 25.202 f):

50-100% of assigned bw: -25dBc/4kHz
 100-250% of assigned bw: -35dBc/4kHz
 > 250% of assigned bw: $-43+10\log(P_{max})\text{dBc/4kHz} = -43\text{ dBW}$
 The mean power of emissions shall be attenuated
 below the mean output power of the transmitter
 in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:41:45
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 2.5 GHz
 Stop frequency: 10 GHz
 Center frequency: 6.25 GHz
 Frequency span: 7.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

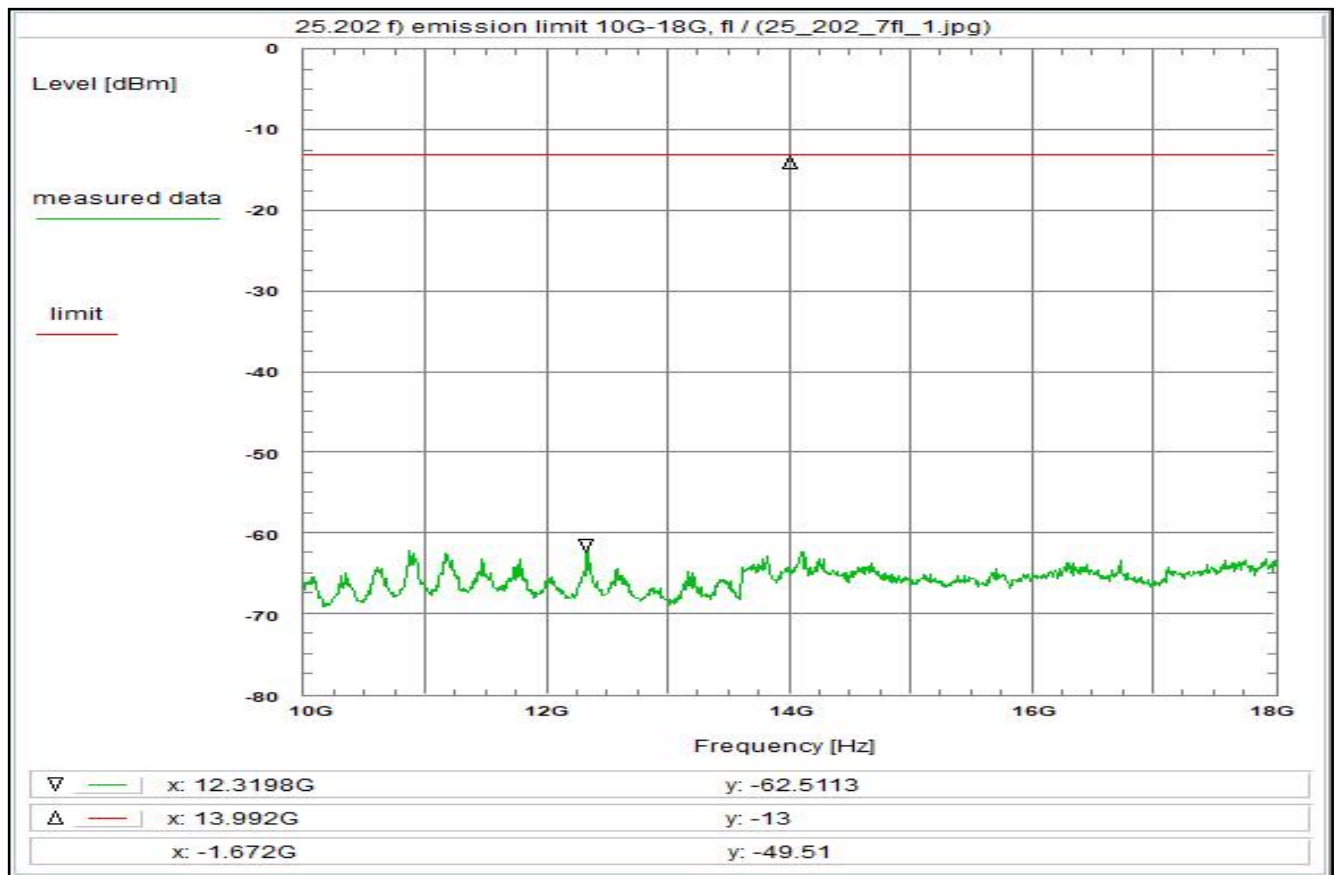
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 1.7 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.7 dB
 TOTAL CORRECTION: + 14.9 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)

Limit:

Limit according to 25.202 f):

50-100% of assigned bw: -25dBc/4kHz
 100-250% of assigned bw: -35dBc/4kHz
 > 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$
 The mean power of emissions shall be attenuated
 below the mean output power of the transmitter
 in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:42:54
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 10 GHz
 Stop frequency: 18 GHz
 Center frequency: 14 GHz
 Frequency span: 8 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

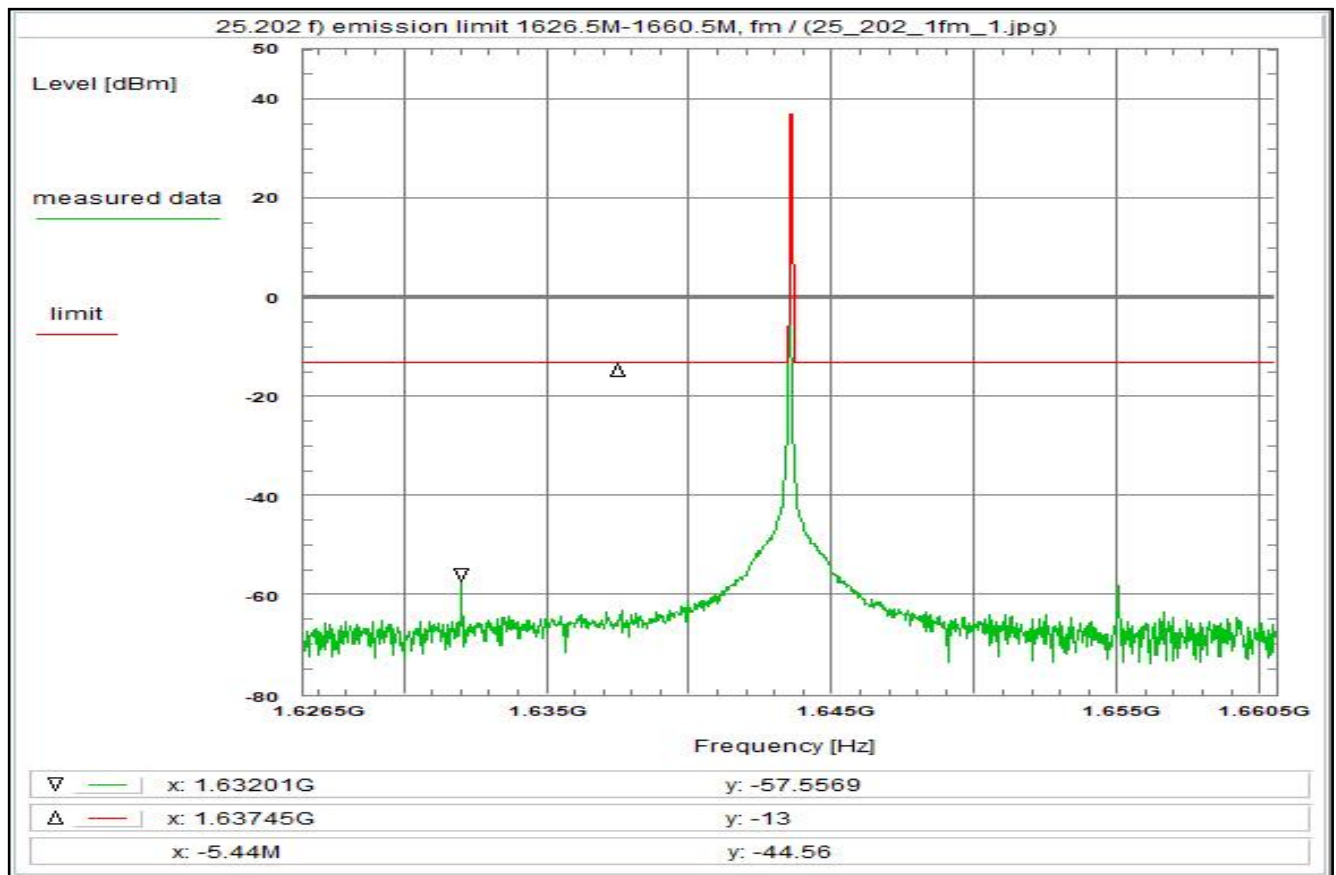
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.9 dB
 TOTAL CORRECTION: + 16.1 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 in the middle of the band (fm)

Limit:

Limit according to 25.202 f):

50-100% of assigned bw: -25dBc/4kHz
 100-250% of assigned bw: -35dBc/4kHz
 > 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$
 The mean power of emissions shall be attenuated
 below the mean output power of the transmitter
 in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgi

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:18:56
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6265 GHz
 Stop frequency: 1.6605 GHz
 Center frequency: 1.6435 GHz
 Frequency span: 34 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

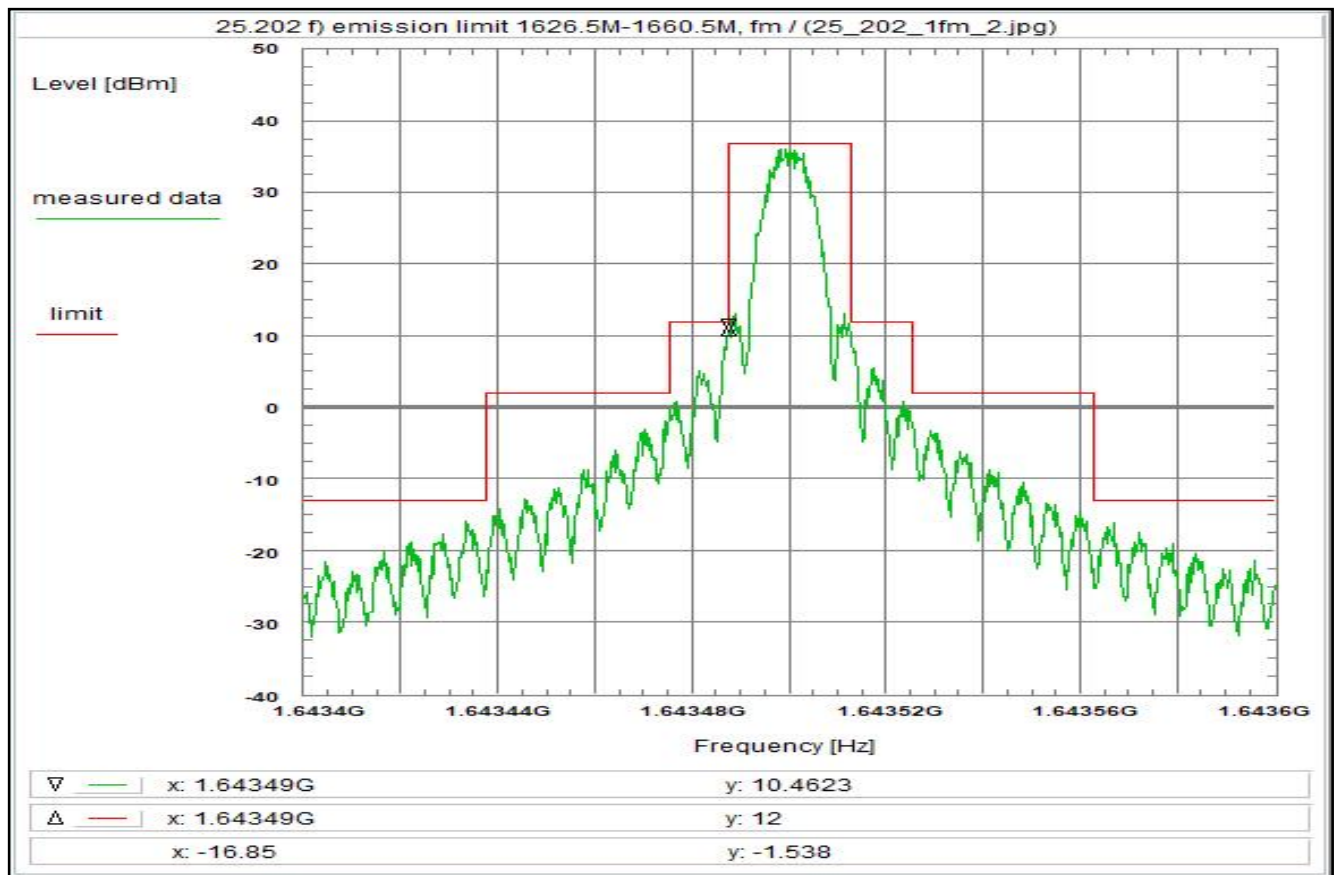
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.9 dB
DUT-Antenna	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor (10k -> 4k)	- 4.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 23.9 dB

Remarks:

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

Plot No. 15



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

Limit:

Limit according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:30:02
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6434 GHz
 Stop frequency: 1.6436 GHz
 Center frequency: 1.6435 GHz
 Frequency span: 200 kHz
 Resolution-BW: 1 kHz
 Video-BW: 3 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

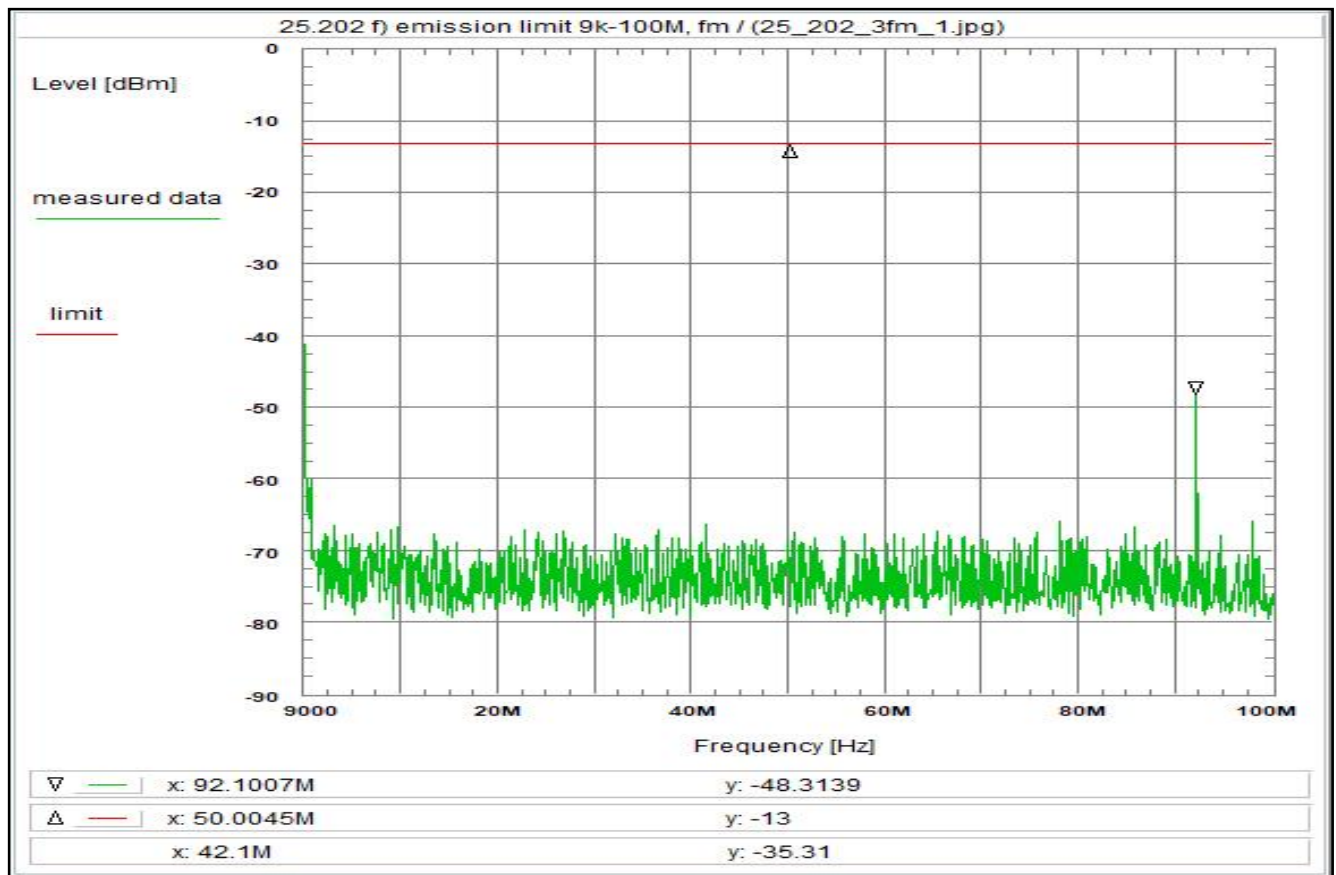
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.9 dB
DUT-Antenna	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor (1k -> 4k)	+ 6.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 33.9 dB

Remarks:

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

Plot No. 16



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

Limit:

Limit according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:15:03
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 9 kHz
 Stop frequency: 100 MHz
 Center frequency: 50.0045 MHz
 Frequency span: 99.991 MHz
 Resolution-BW: 1 kHz
 Video-BW: 3 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

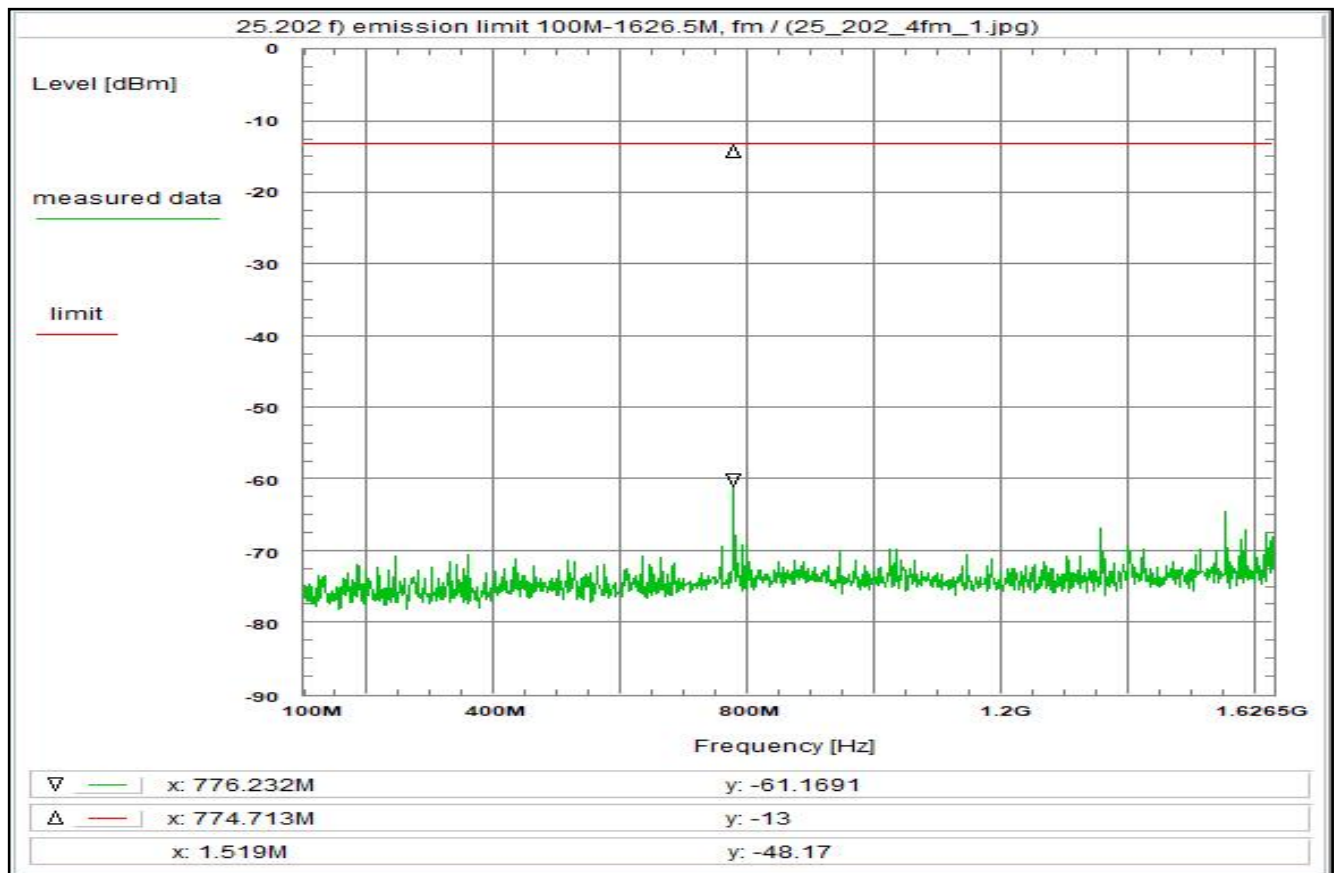
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.2 dB
DUT-Antenna	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor (1k -> 4k)	+ 6.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 33.2 dB

Remarks:

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

Plot No. 17



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

Limit:Limit according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:14:16
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 100 MHz
 Stop frequency: 1.6265 GHz
 Center frequency: 863.25 MHz
 Frequency span: 1.5265 GHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

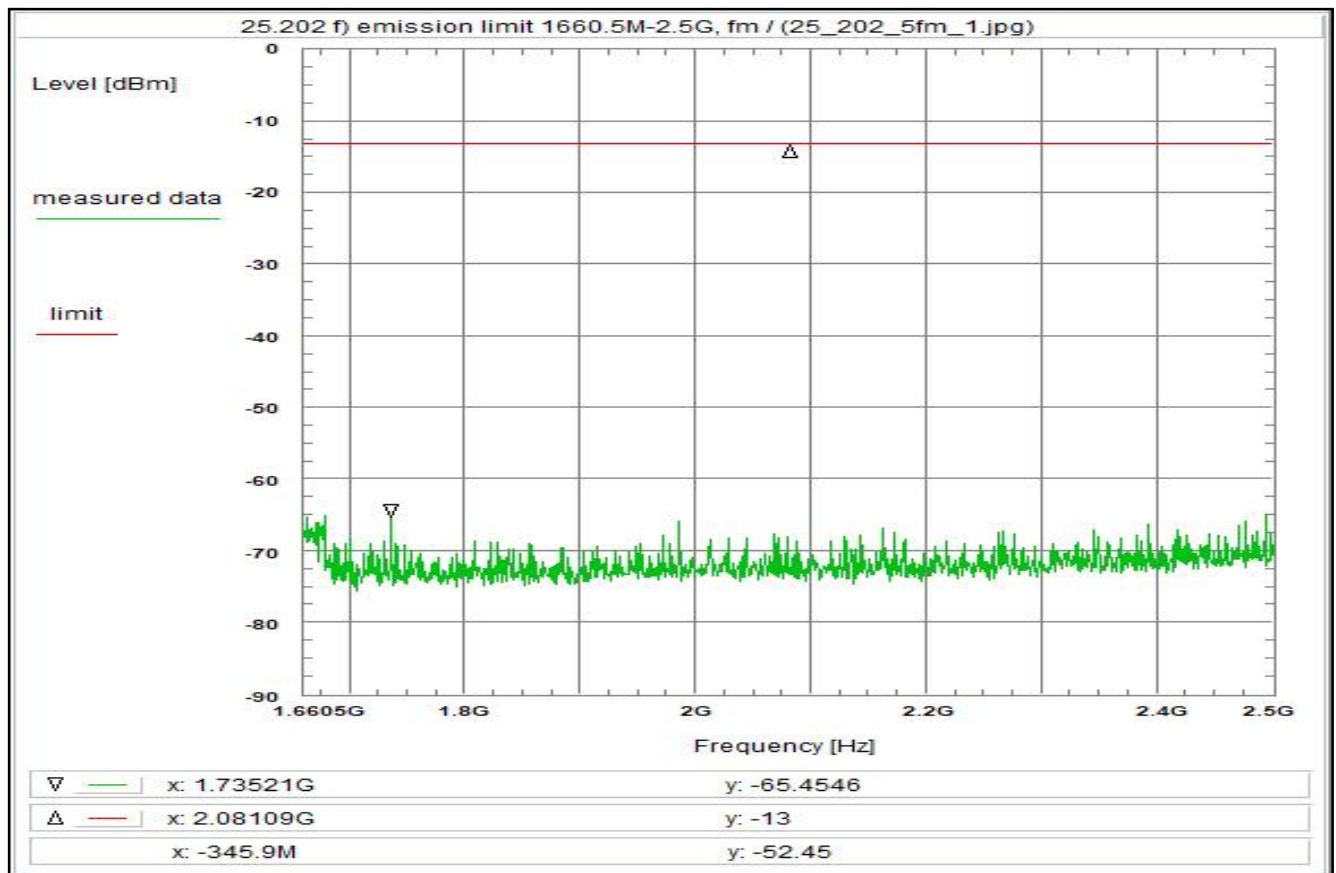
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.6 dB
DUT-Antenna	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor (10k -> 4k)	- 4.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
Freefield attenuation (U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 23.6 dB

Remarks:

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

Plot No. 18



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

Limit:

Limit according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:16:05
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6605 GHz
 Stop frequency: 2.5 GHz
 Center frequency: 2.08025 GHz
 Frequency span: 839.5 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

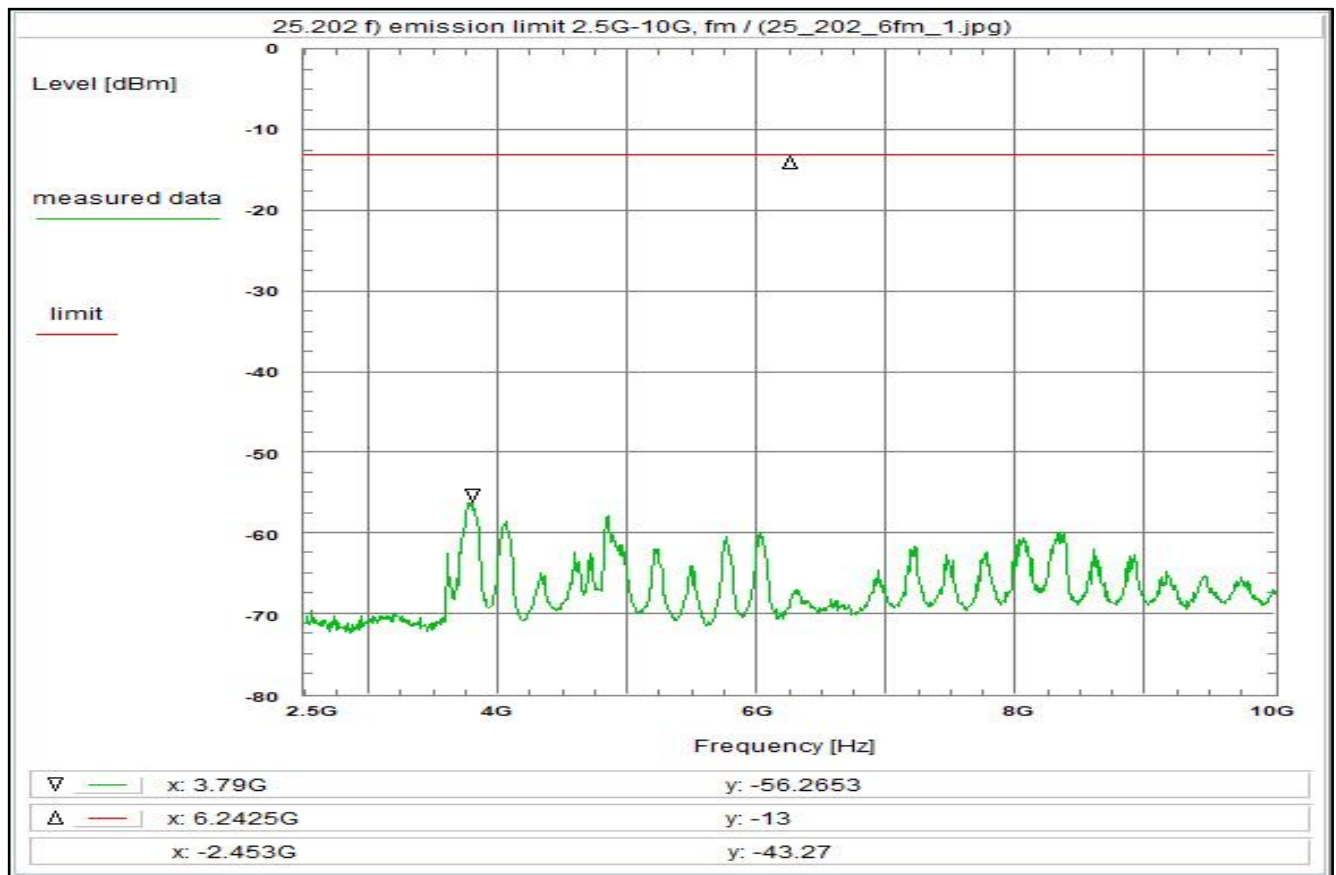
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 1.0 dB
 DUT-Antenna + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (10k -> 4k) - 4.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.6 dB
 TOTAL CORRECTION: + 24.1 dB

Remarks:

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

Plot No. 19



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

Limit:

Limit according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:16:46
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 2.5 GHz
 Stop frequency: 10 GHz
 Center frequency: 6.25 GHz
 Frequency span: 7.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

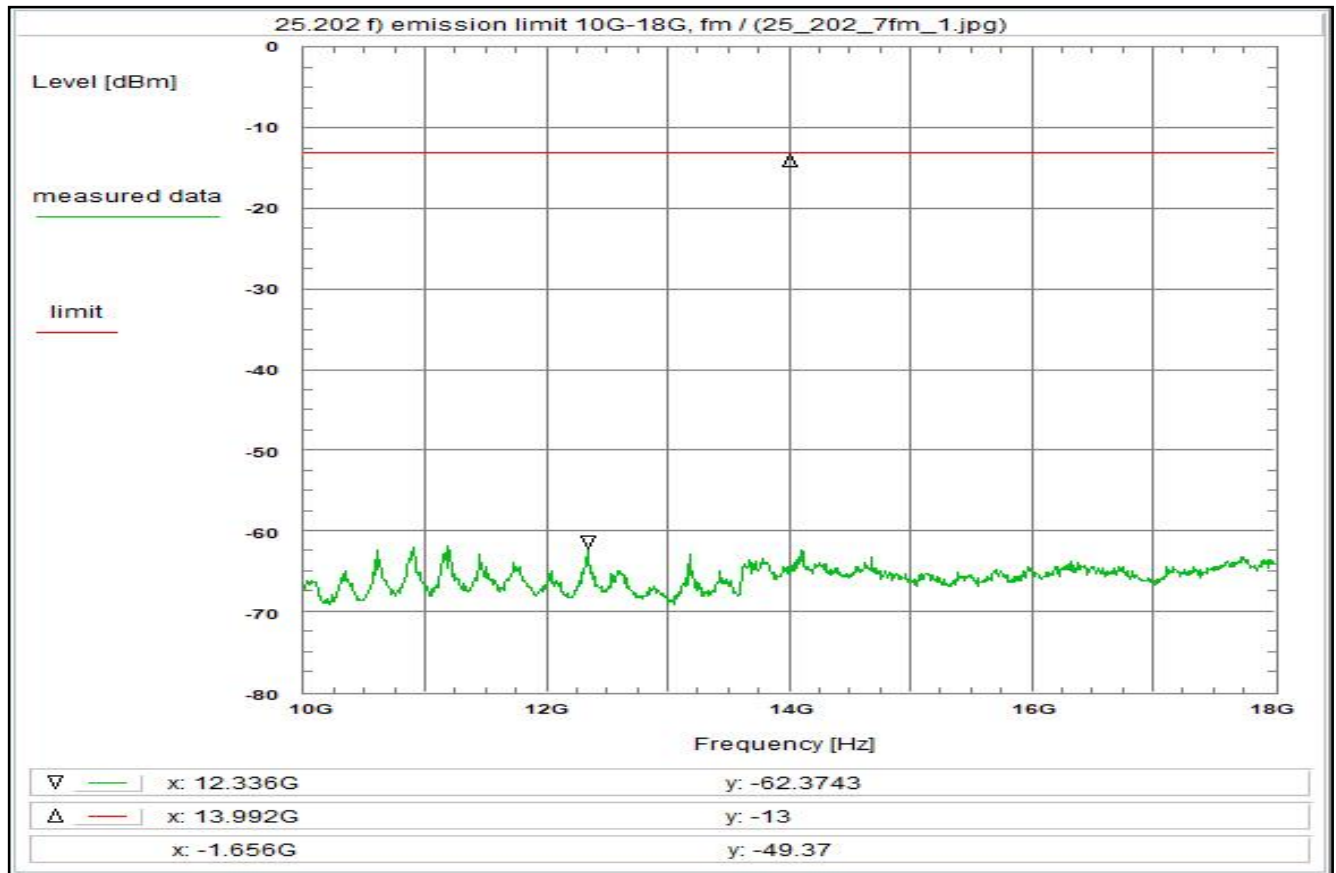
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 1.7 dB
 DUT-Antenna + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.7 dB
 TOTAL CORRECTION: + 14.9 dB

Remarks:

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

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 according to 25.202 f):

50-100% of assigned bw: -25dBc/4kHz
 100-250% of assigned bw: -35dBc/4kHz
 > 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$
 The mean power of emissions shall be attenuated
 below the mean output power of the transmitter
 in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:17:29
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 10 GHz
 Stop frequency: 18 GHz
 Center frequency: 14 GHz
 Frequency span: 8 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

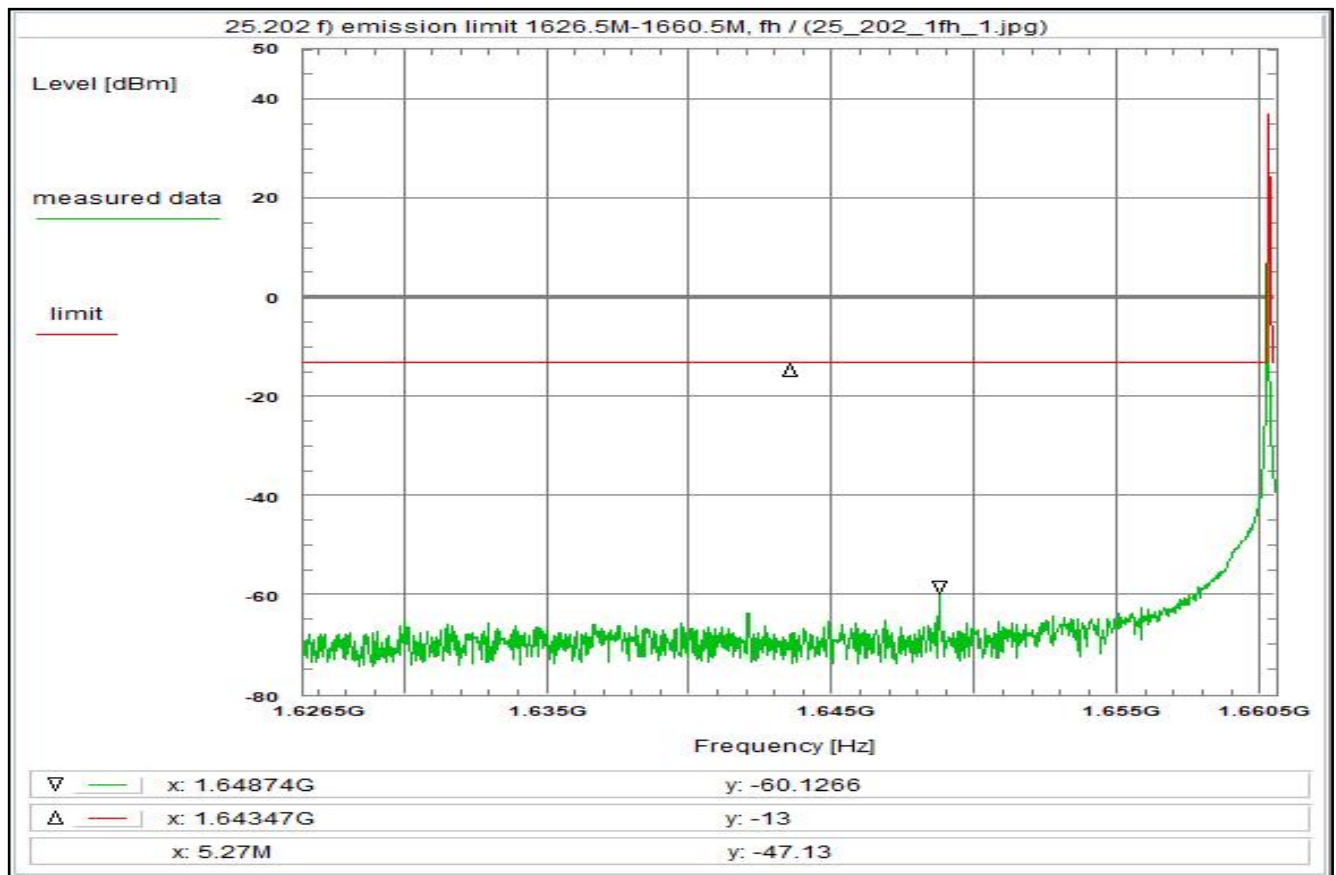
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.9 dB
 TOTAL CORRECTION: + 16.1 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 at the upper edge of the band (fh)

Limit:Limit according to 25.202 f):

50-100% of assigned bw: -25dBc/4kHz
 100-250% of assigned bw: -35dBc/4kHz
 > 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$
 The mean power of emissions shall be attenuated
 below the mean output power of the transmitter
 in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:48:15
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6265 GHz
 Stop frequency: 1.6605 GHz
 Center frequency: 1.6435 GHz
 Frequency span: 34 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

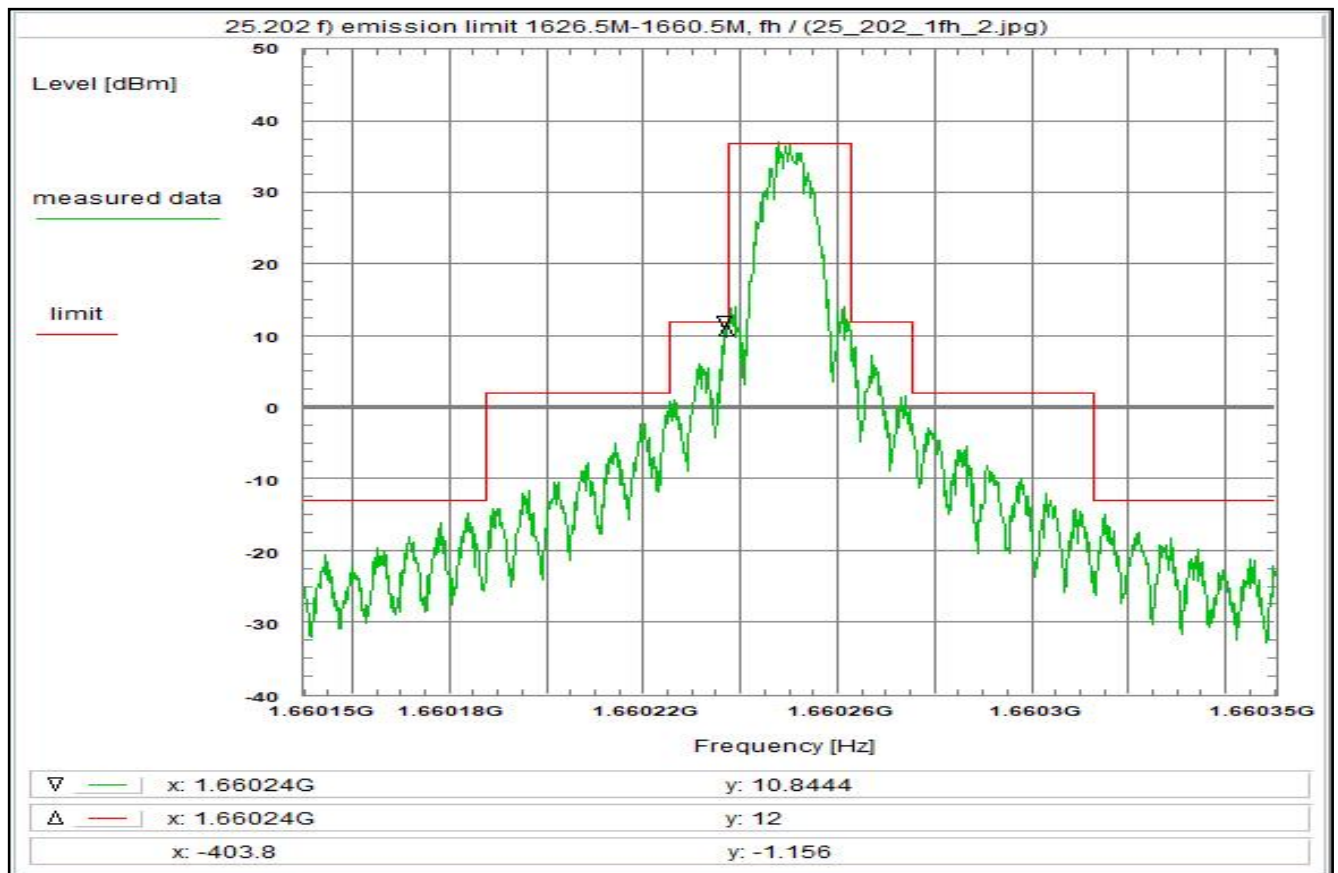
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.9 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (10k -> 4k) - 4.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.5 dB
 TOTAL CORRECTION: + 23.9 dB

Remarks:

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

Plot No. 22



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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated
 below the mean output power of the transmitter
 in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:49:11
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.66015 GHz
 Stop frequency: 1.66035 GHz
 Center frequency: 1.66025 GHz
 Frequency span: 200 kHz
 Resolution-BW: 1 kHz
 Video-BW: 3 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

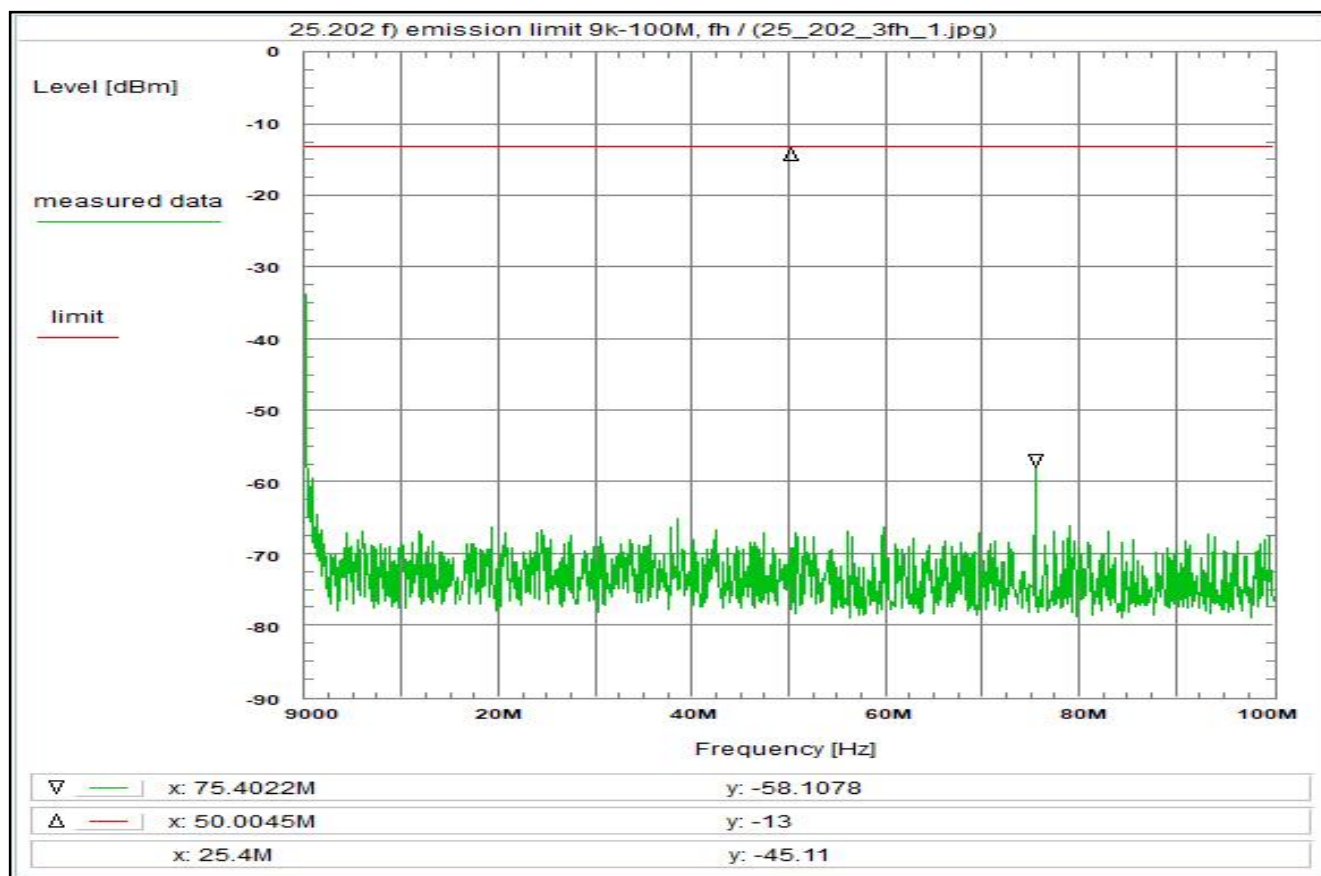
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.9 dB
DUT-Antenna (on-axis)	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor (1k -> 4k)	+ 6.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 33.9 dB

Remarks:

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

Plot No. 23



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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:52:13
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 9 kHz
 Stop frequency: 100 MHz
 Center frequency: 50.0045 MHz
 Frequency span: 99.991 MHz
 Resolution-BW: 1 kHz
 Video-BW: 3 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

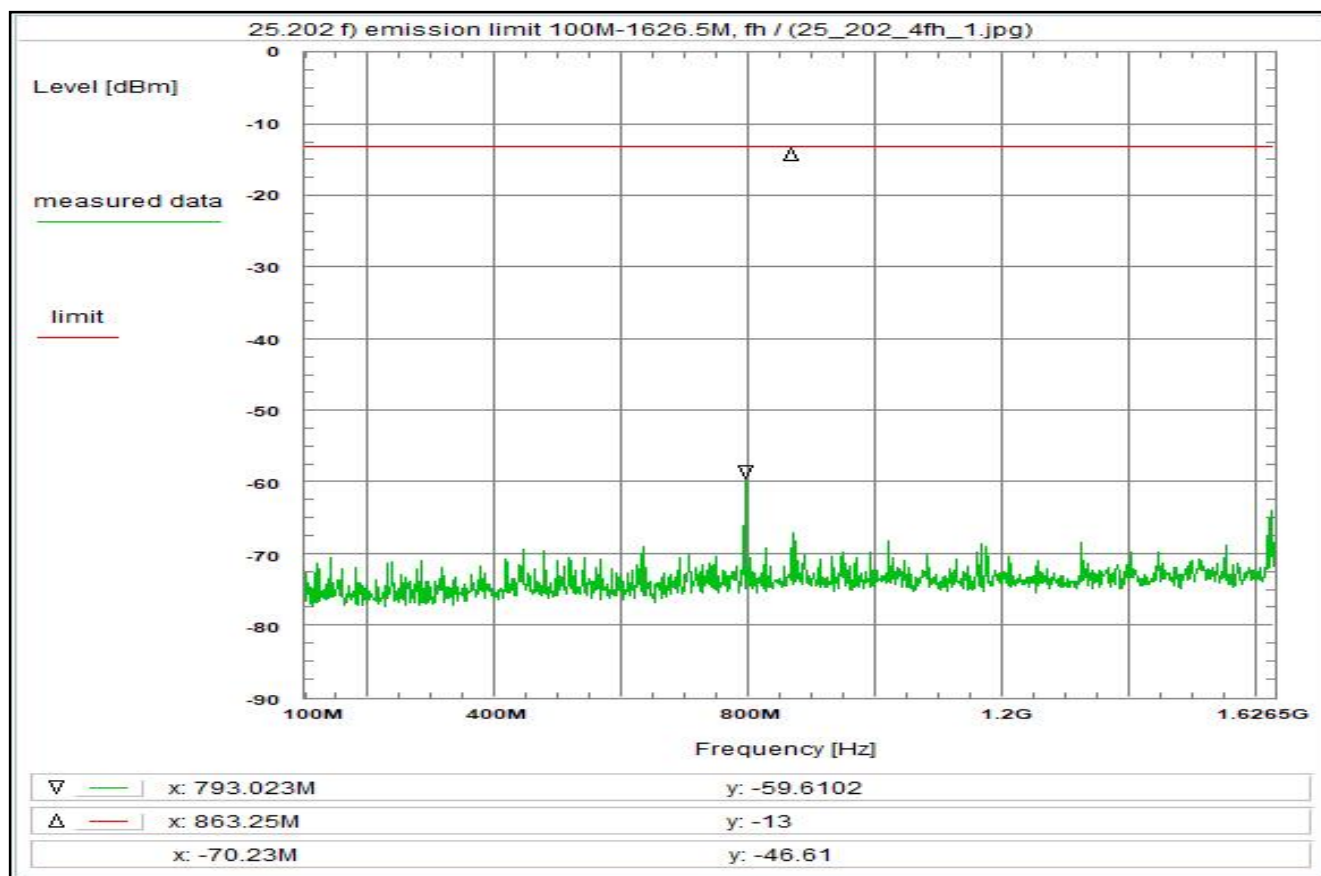
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.2 dB
DUT-Antenna (on-axis)	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor (1k -> 4k)	+ 6.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 33.2 dB

Remarks:

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

Plot No. 24



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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated
 below the mean output power of the transmitter
 in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:51:14
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 100 MHz
 Stop frequency: 1.6265 GHz
 Center frequency: 863.25 MHz
 Frequency span: 1.5265 GHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

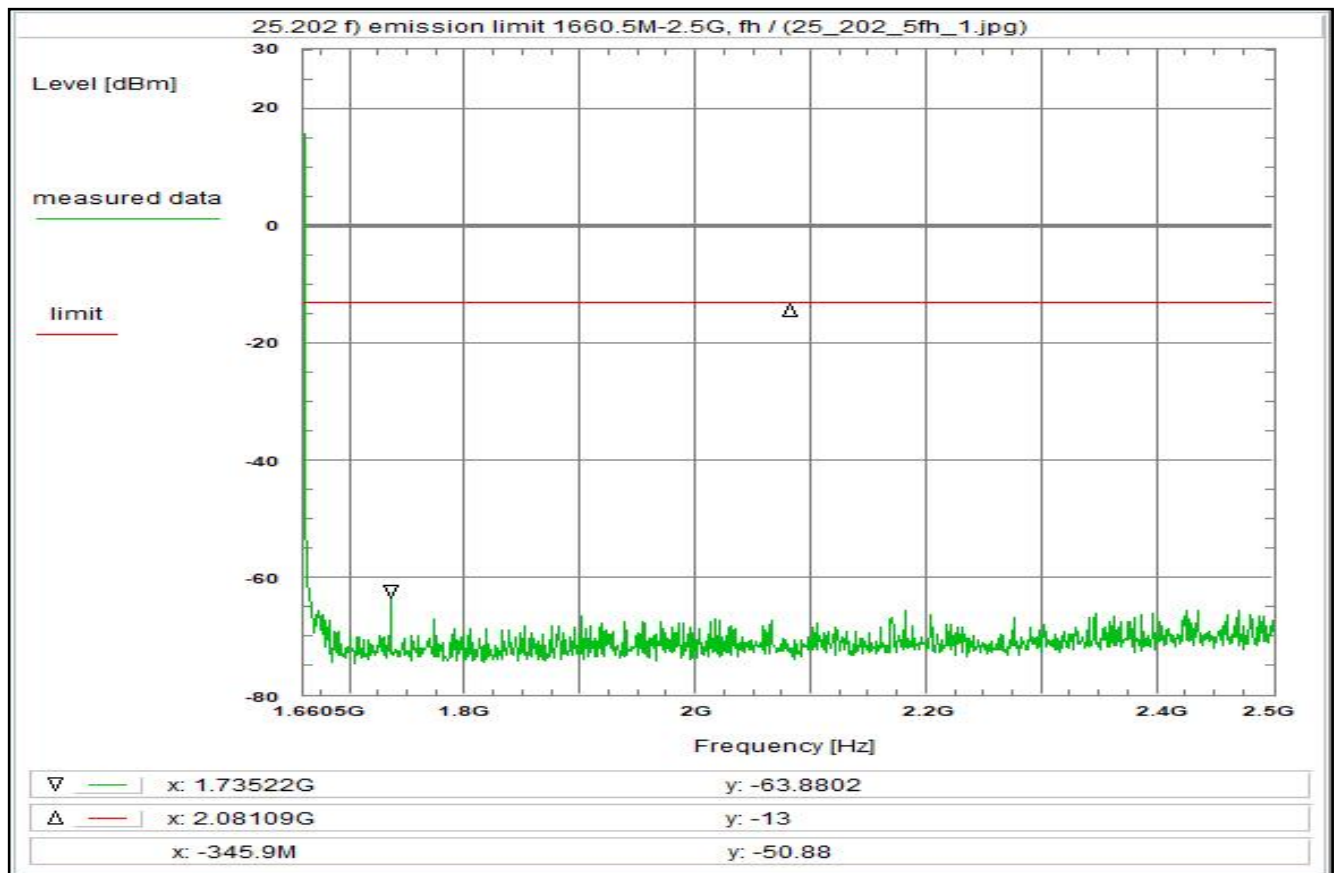
Correction:

Directional coupler	+ 0.0 dB
Coaxial cable (C220)	+ 0.6 dB
DUT-Antenna (on-axis)	+ 7.5 dBi
Test antenna	+ 0.0 dB
BW correction factor (10k -> 4k)	- 4.0 dB
Atten. between HPA and feedhorn	- 0.0 dB
(U312)	+ 19.5 dB
TOTAL CORRECTION:	+ 23.6 dB

Remarks:

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

Plot No. 25



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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:54:13
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.6605 GHz
 Stop frequency: 2.5 GHz
 Center frequency: 2.08025 GHz
 Frequency span: 839.5 MHz
 Resolution-BW: 10 kHz
 Video-BW: 30 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

Correction:

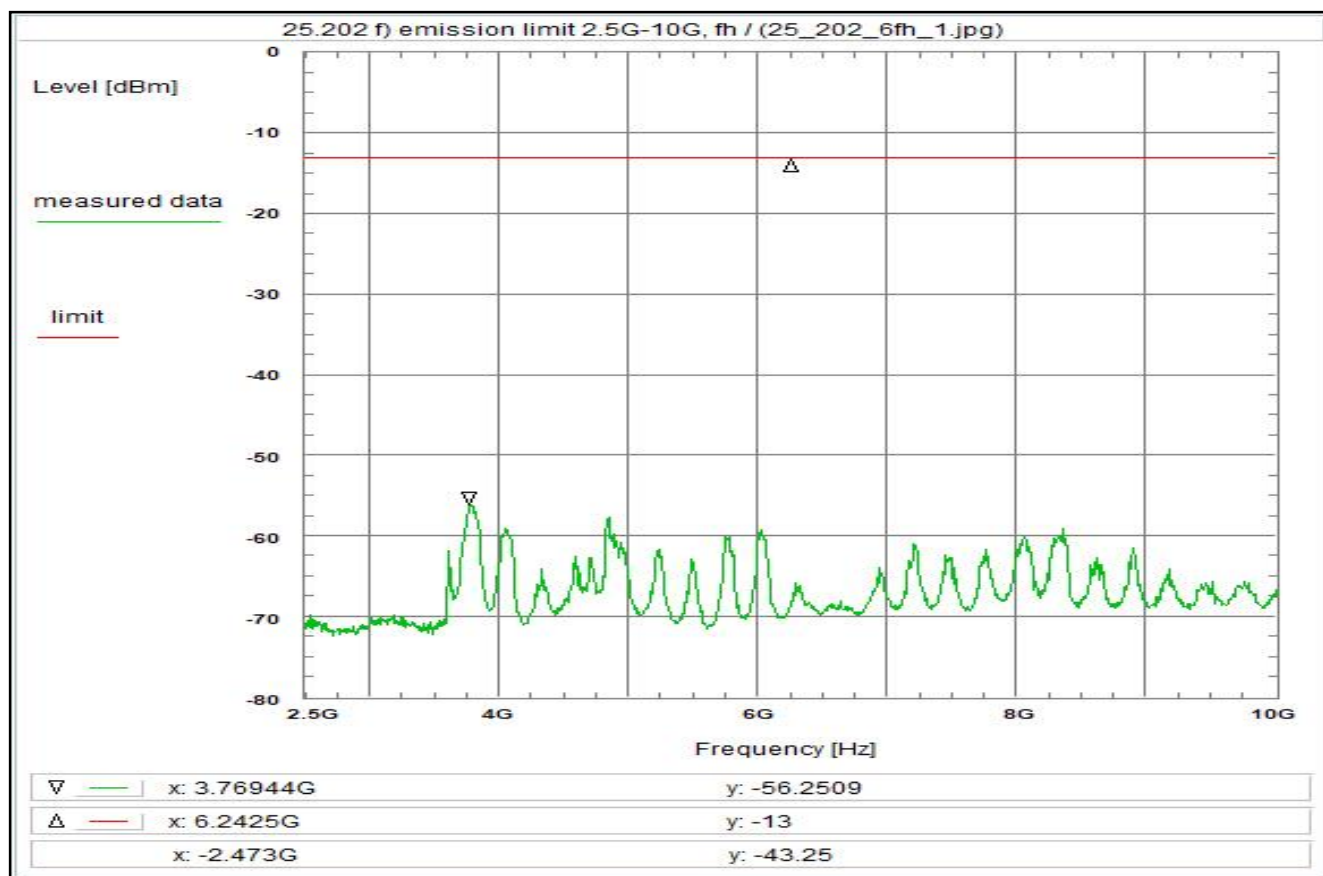
Directional coupler + 0.0 dB
 Coaxial cable (C220) + 1.0 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (10k -> 4k) - 4.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.6 dB
 TOTAL CORRECTION: + 24.1 dB

Remarks:

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

Rather left the plot shows parts of the wanted signal.

Plot No. 26



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 according to 25.202 f):

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

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

> 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:55:01
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 2.5 GHz
 Stop frequency: 10 GHz
 Center frequency: 6.25 GHz
 Frequency span: 7.5 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

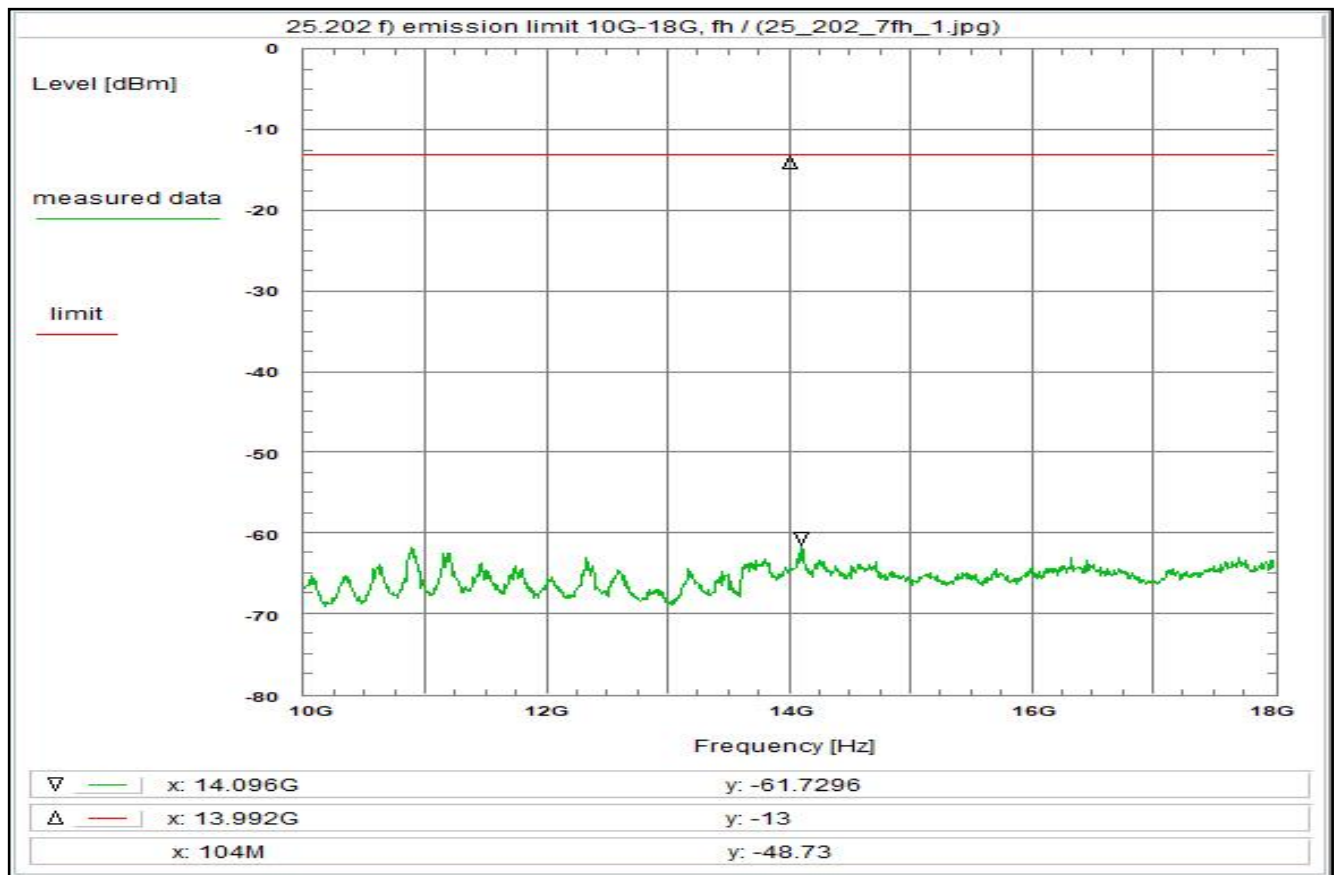
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 1.7 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.7 dB
TOTAL CORRECTION: + 14.9 dB

Remarks:

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

Plot No. 27



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 according to 25.202 f):

50-100% of assigned bw: -25dBc/4kHz
 100-250% of assigned bw: -35dBc/4kHz
 > 250% of assigned bw: $-43 + 10 \log(P_{max}) \text{ dBc/4kHz} = -43 \text{ dBW}$
 The mean power of emissions shall be attenuated
 below the mean output power of the transmitter
 in accordance with the above schedule.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:55:45
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 10 GHz
 Stop frequency: 18 GHz
 Center frequency: 14 GHz
 Frequency span: 8 GHz
 Resolution-BW: 100 kHz
 Video-BW: 300 kHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

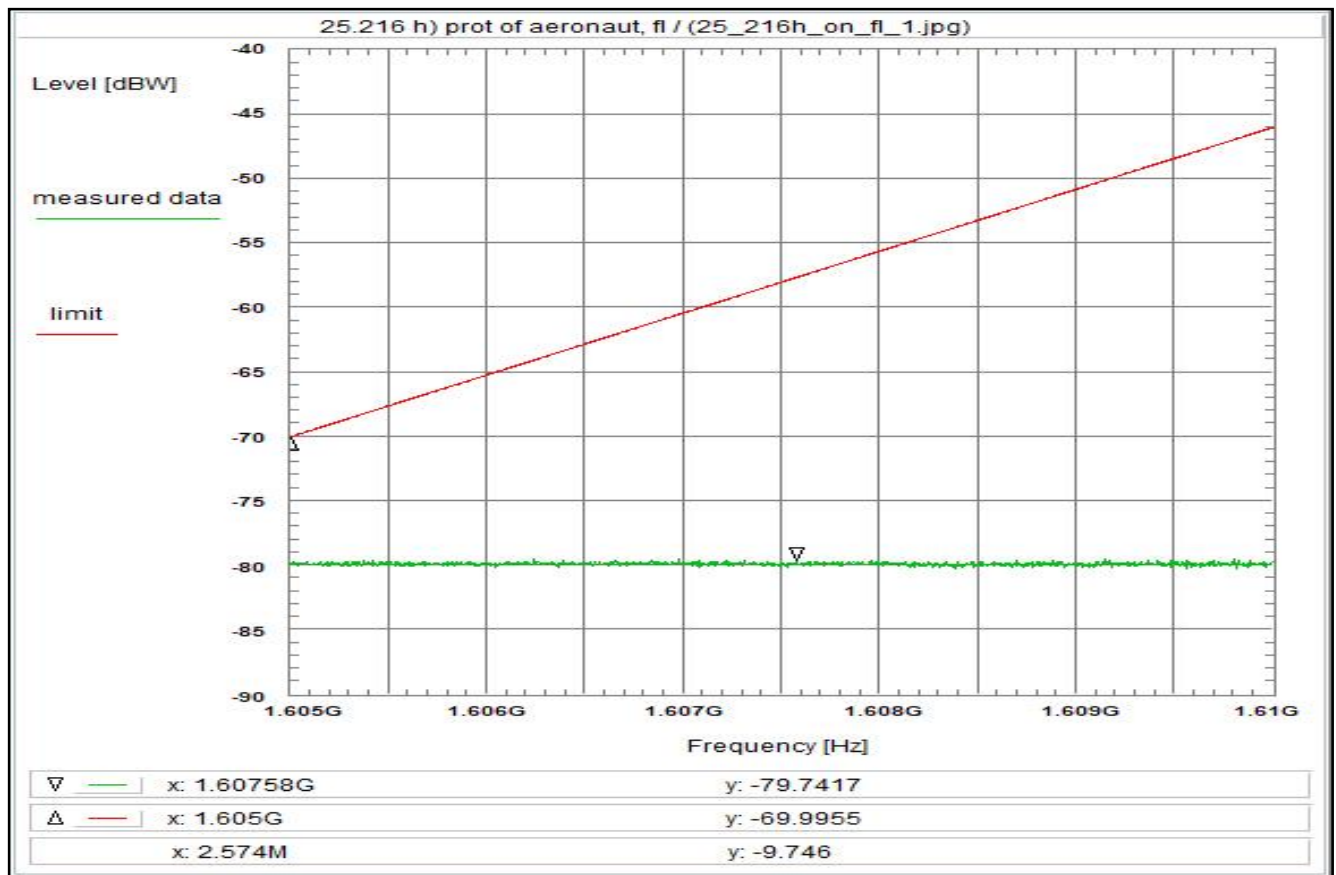
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 2.7 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor (100k -> 4k) - 14.0 dB
 Atten. between HPA and feedhorn - 0.0 dB
 (U312) + 19.9 dB
 TOTAL CORRECTION: + 16.1 dB

Remarks:

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

Plot No. 28



Subclause: 25.216 h) Protection of aeronautical radionavigation-satellite service
 Carrier-on state, modulated carrier at the lower edge of the band (fl)
 Conducted measurement at the antenna-connector

Limit:

Limit according to 25.216 h):

1605.0 - 1610MHz: -70 to -46dBW/1MHz (linear interpolated)

The EIRP, averaged over any two-millisecond active transmission interval from the MESS in the carrier-on state shall not exceed the limits above.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:35:59
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.605 GHz
 Stop frequency: 1.61 GHz
 Center frequency: 1.6075 GHz
 Frequency span: 5 MHz
 Resolution-BW: 1 MHz
 Video-BW: 3 MHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

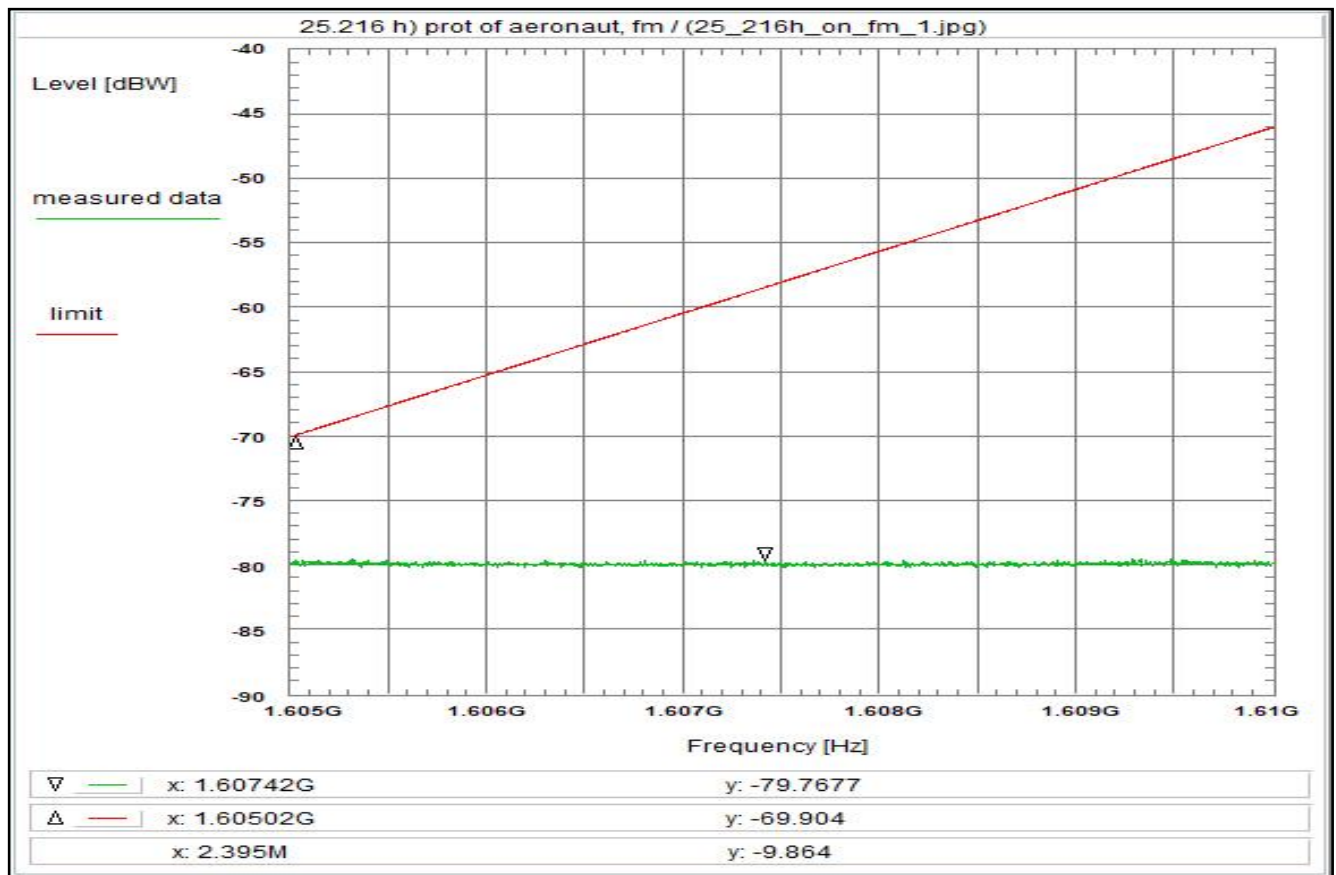
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.9 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor + 0.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 (U312) + 19.5 dB
 TOTAL CORRECTION: + 27.9 dB

Remarks:

Carrier-on state / Carrier at the lower edge of the band (fl)
 Measurement with 1 MHz resolution/video filter and RMS detector.
 For EIRP calculation:
 'worst-case' = maximum antenna gain

Plot No. 29



Subclause: 25.216 h) Protection of aeronautical radionavigation-satellite service
 Carrier-on state, modulated carrier in the middle of the band (fm)
 Conducted measurement at the antenna-connector

Limit:

Limit according to 25.216 h):

1605.0 - 1610MHz: -70 to -46dBW/1MHz (linear interpolated)

The EIRP, averaged over any two-millisecond active transmission interval from the MESS in the carrier-on state shall not exceed the limits above.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:31:08
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.605 GHz
 Stop frequency: 1.61 GHz
 Center frequency: 1.6075 GHz
 Frequency span: 5 MHz
 Resolution-BW: 1 MHz
 Video-BW: 3 MHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

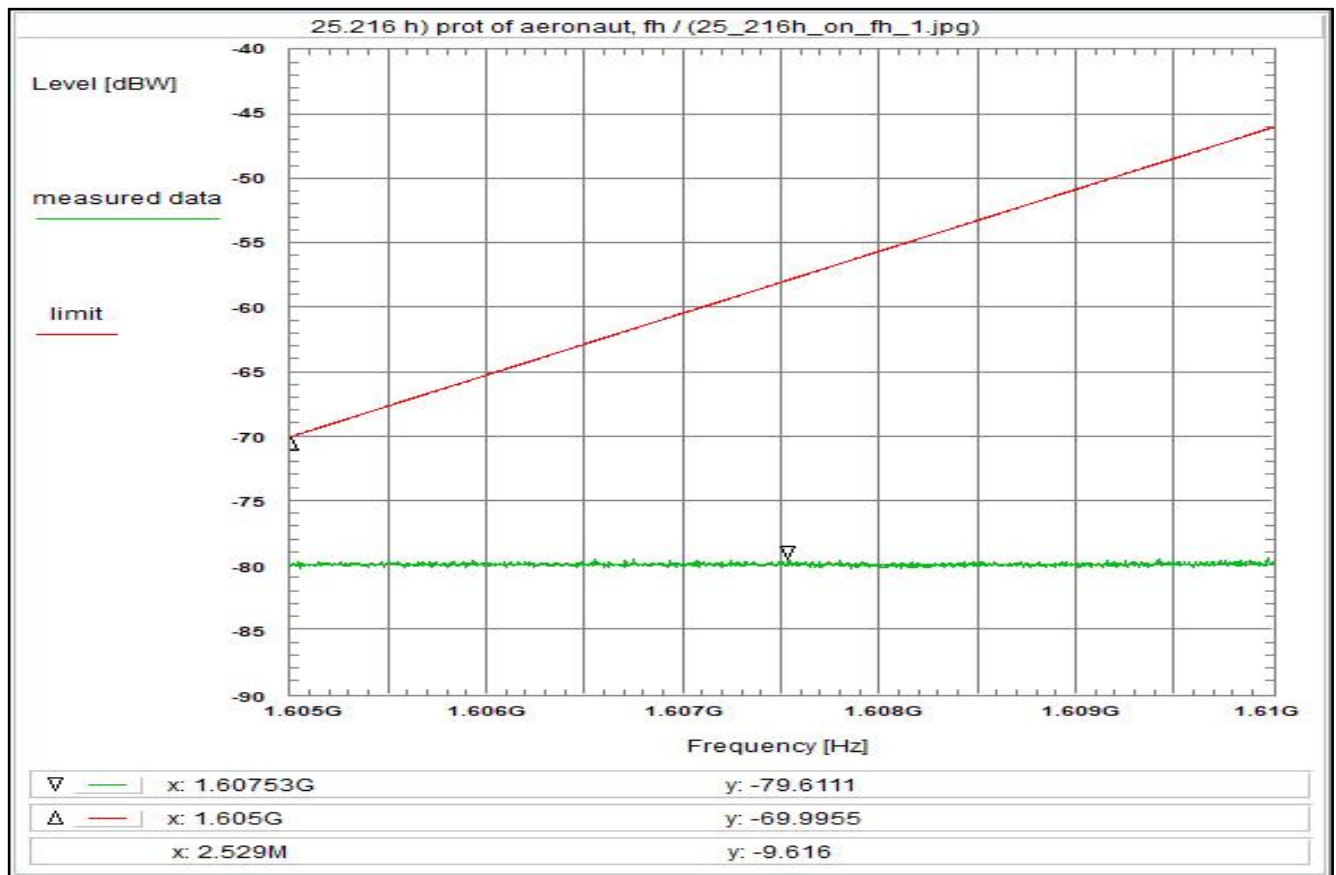
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.9 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor + 0.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 (U312) + 19.5 dB
 TOTAL CORRECTION: + 27.9 dB

Remarks:

Carrier-on state / Carrier in the middle of the band (fm)
 Measurement with 1 MHz resolution/video filter and RMS detector.
 For EIRP calculation:
 'worst-case' = maximum antenna gain

Plot No. 30



Subclause: 25.216 h) Protection of aeronautical radionavigation-satellite service
 Carrier-on state, modulated carrier at the upper edge of the band (fh)
 Conducted measurement at the antenna-connector

Limit:

Limit according to 25.216 h):

1605.0 - 1610MHz: -70 to -46dBW/1MHz (linear interpolated)

The EIRP, averaged over any two-millisecond active transmission interval from the MESS in the carrier-on state shall not exceed the limits above.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:56:26
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.605 GHz
 Stop frequency: 1.61 GHz
 Center frequency: 1.6075 GHz
 Frequency span: 5 MHz
 Resolution-BW: 1 MHz
 Video-BW: 3 MHz
 Input attenuation: 30 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

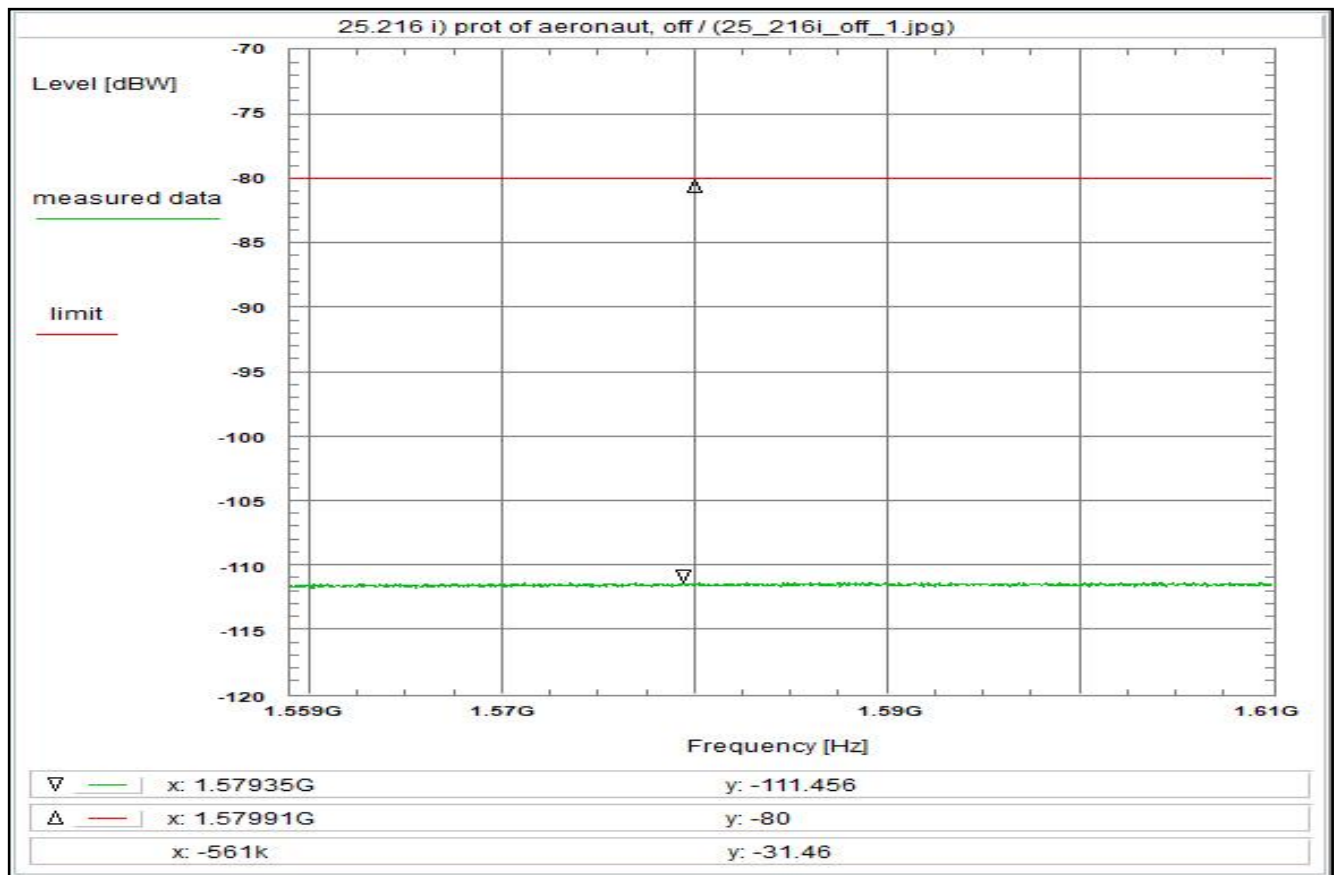
Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.9 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor + 0.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 (U312) + 19.5 dB
 TOTAL CORRECTION: + 27.9 dB

Remarks:

Carrier-on state / Carrier at the upper edge of the band (fh)
 Measurement with 1 MHz resolution/video filter and RMS detector.
 For EIRP calculation:
 'worst-case' = maximum antenna gain

Plot No. 31



Subclause: 25.216 i) Protection of aeronautical radionavigation-satellite service
 Carrier-off state, conducted measurement at the antenna-connector

Limit:

Limit according to 25.216 i): -80dBW/1MHz
 The EIRP, averaged over any two-millisecond active transmission interval from the MESS in the carrier-off state shall not exceed the limit above.

Test results:

see plot (an explicit table was not generated)

Operating condition of DUT:

operating condition 1, see test report chapter 5.2

Test setup:

see test report chapter 7.2: hgj

Test equipment:

see test report chapter 7.2: C220, R001, U312

Remark:

Test result: Test passed

Environment condition:

Date & Time: Wed 18/Aug/2021 15:33:16
 Location: CTC advanced GmbH, Laboratory RC-SYS
 Temperature: 22 °C
 Humidity: 55 %
 Voltage: 8.199999999999999 Vdc

Setup of measurement equipment:

Start frequency: 1.559 GHz
 Stop frequency: 1.61 GHz
 Center frequency: 1.5845 GHz
 Frequency span: 51 MHz
 Resolution-BW: 1 MHz
 Video-BW: 3 MHz
 Input attenuation: 0 dB
 Trace-Mode: Max-Hold
 Detector-Mode: AVG

Correction:

Directional coupler + 0.0 dB
 Coaxial cable (C220) + 0.9 dB
 DUT-Antenna (on-axis) + 7.5 dBi
 Test antenna + 0.0 dB
 BW correction factor + 0.0 dB
 Atten. between HPA and feedhorn + 0.0 dB
 (U312) + 19.5 dB
 TOTAL CORRECTION: + 27.9 dB

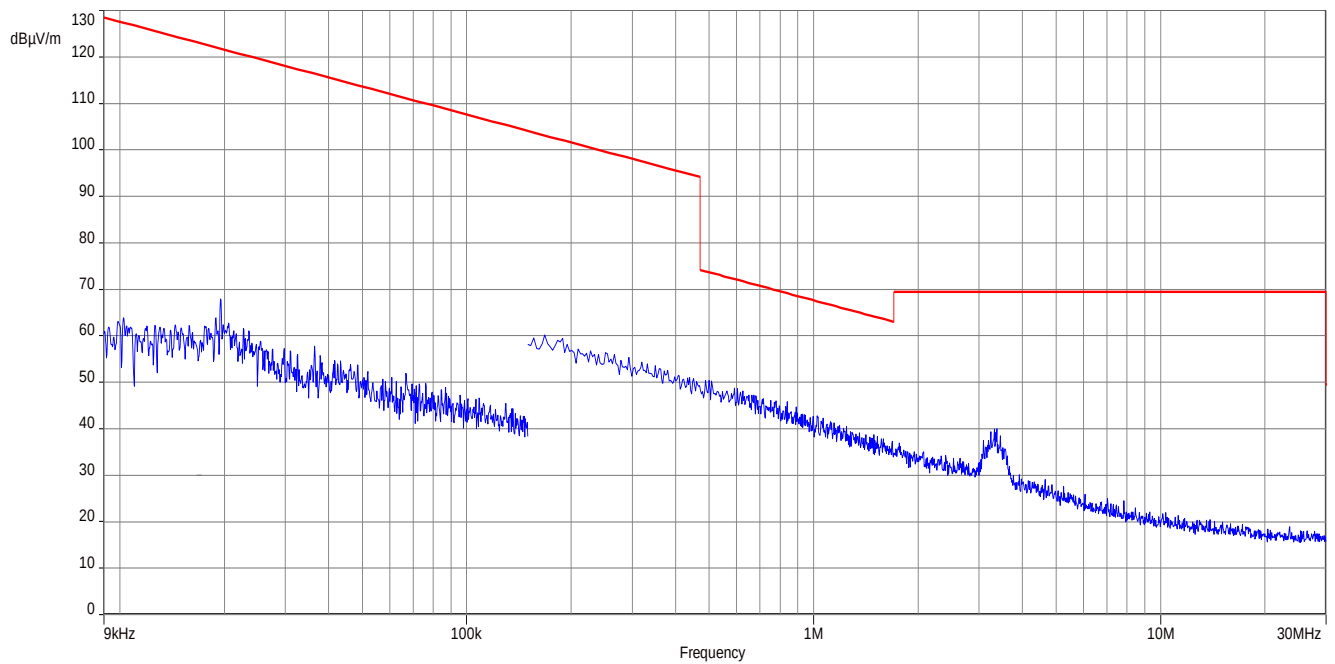
Remarks:

Carrier-off state.
 Measurement with 1 MHz resolution filter and RMS detector.
 For EIRP calculation:
 'worst-case' = maximum antenna gain

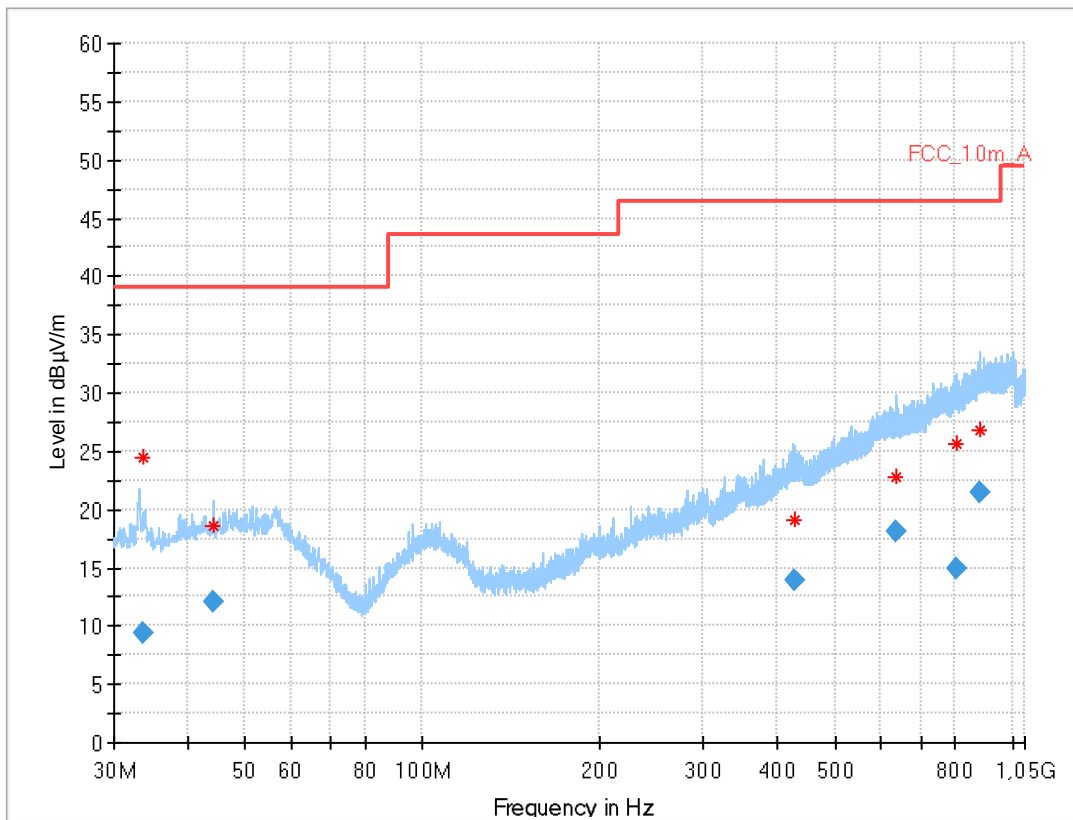
3 Measurement results FCC Part 25, 30 – 18000 MHz

This chapter consists of 2 pages including this page.

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



Plot No. 2: 30 MHz – 1000 MHz, antenna vertical / horizontal Tx-on

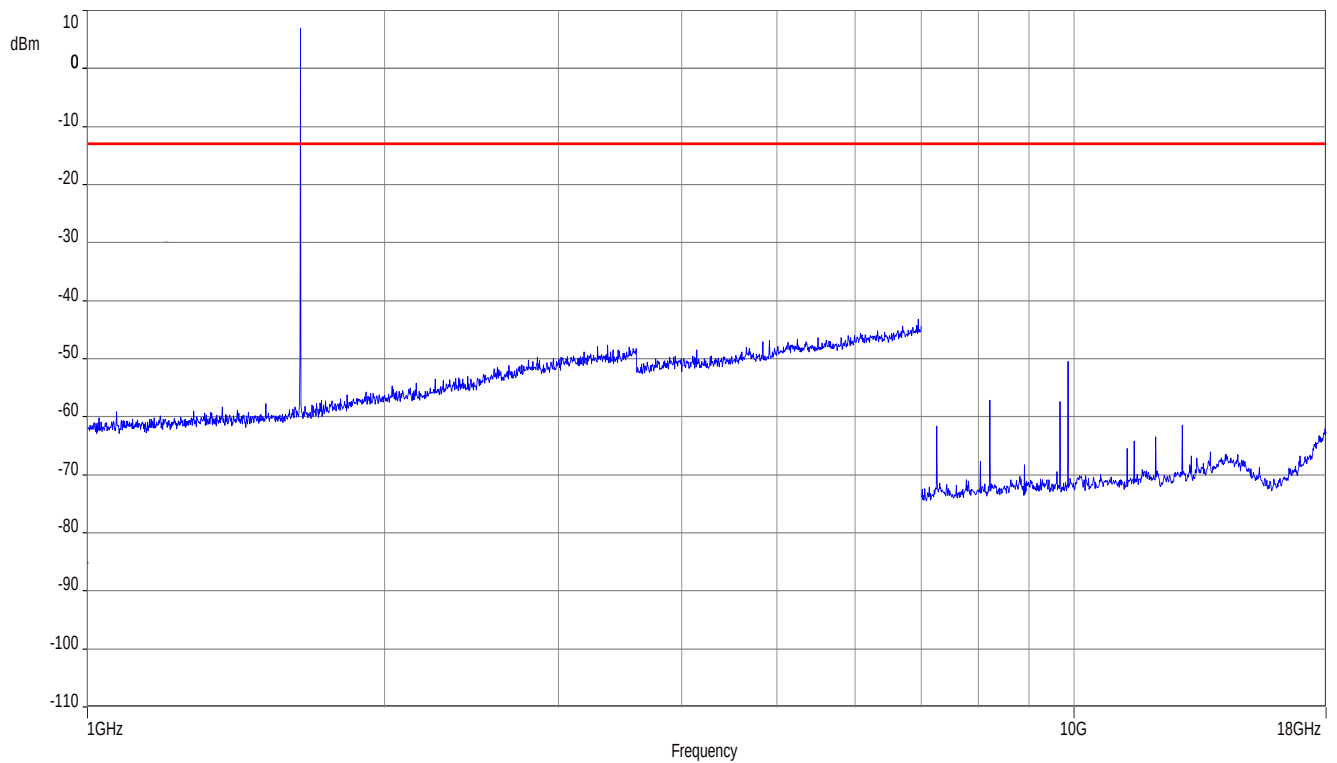


Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
33.552	9.40	39.1	29.7	1000	120.0	184.0	H	133	13
44.259	12.07	39.1	27.0	1000	120.0	157.0	V	185	15
427.294	13.85	46.4	32.6	1000	120.0	200.0	V	328	19
636.954	18.13	46.4	28.3	1000	120.0	200.0	V	98	22
803.479	14.99	46.4	31.4	1000	120.0	200.0	V	150	24
883.910	21.51	46.4	24.9	1000	120.0	393.0	H	195	25

Note: measurement valid for all frequencies

Plot No. 3: 1 GHz – 18000 GHz, antenna vertical / horizontal Tx-on



Note: Plot shows wanted signal, measurement without amplifier inside this frequency range, measurement valid for all frequencies

4 Document History

Version	Applied changes	Date of release
	Initial release	2022-02-11