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## TEST REPORT

**Racom\_150413TR\_FCC version: A**

**Test of RipEX-200 Radio modem**

The tests have been carried out with reference to 47CFR Parts 2 and 90

Measured by: Radek Holý

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# 1. Technical Summary And Test Results

## 1.1 Technical Summary

Applicant: **Racom s r.o.**  
**Mírová 1283**  
**592 31 Nové Město na Moravě**

Manufacturer: **Racom s.r.o.**  
**Mírová 1283**  
**592 31 Nové Město na Moravě**  
**Czech Republic**

Produced By: **Racom s.r.o., Czech Republic**

Kind Of Equipment: **Radio modem**

Type Designation(s): **RipEX-200**  
Code: **RipEX-215S**

RF Power: **4-CPFSK 0.1 W to 10 W for 216 – 217 MHz**  
**4-CPFSK 0.1W to 2W for 217 – 220 MHz**  
**16-DEQAM 0.5W to 2W**  
**D8PSK 0.5W to 2W**  
 **$\pi/4$ -DQPSK 0.5W to 2W**

Alignment Range: **216 – 217 MHz and 217 – 220 MHz**

Switching Range: **4 MHz**

Number Of Units: **1**

Finish Of Test: **13.4. 2015**  
Test made in **Racom s r.o.**  
**Mírová 1283**  
**592 31 Nové Město na Moravě**

## 1.2 Test Results

Type Designation: **RipEX-200**  
Code: **RipEX-215S**  
Serial No.: **11844454**  
Channel Separation: **6.25 kHz, 12.5 kHz, 25 kHz, 50 kHz**  
FW version **1.4.4.0**

Transmitter Part:  
CH 1 **216.025 MHz**  
CH 2 **219.975 MHz**

Receiver Part:  
CH 1 **216.025 MHz**  
CH 2 **219.975 MHz**

Power Supply Range: **Vnom = 24.0 V DC**  
**Vmin = 10.0 V DC**  
**Vmax = 30.0 V DC**

Temperature Range: **Tnom = Ambient temperature**  
**Tmin = -30 °C**  
**Tmax = +60 °C**

Ambient temperature: (21±1) °C

Relative humidity: (47±10) %

Rated output power: maximum power (unmodulated carrier - constant envelope modulation)

1.2.1. RF POWER OUTPUT AT TERMINALS

RULE PART NUMBER: 2.1046; 90.259 (a)  
TEST METHOD: TIA-603-D; 2.2.1

TEST RESULTS:

| TEST CONDITIONS         |      | TRANSMITTER POWER [W] |      |      |
|-------------------------|------|-----------------------|------|------|
|                         |      | CH 1                  | CH 2 | CH 3 |
| Tnom                    | Vnom | 7.73                  | 1.99 | - -  |
| Measurement uncertainty |      | ±0.6 dB               |      |      |

**LIMIT:** 90.259 (a) In the 217 – 220 MHz band, the maximum transmitter output power is 2 watts.  
The maximum antenna height above average terrain (HAAT) is 152m (500 feet).

TEST EQUIPMENT USED: 34; 11; 35

REMARKS: - -

Ambient temperature: (21±1) °C

Relative humidity: (47±10) %

Rated output power: maximum power (unmodulated carrier – non constant envelope modulation)

1.2.2. RF POWER OUTPUT AT TERMINALS

RULE PART NUMBER: 2.1046; 90.259 (a)  
TEST METHOD: TIA-603-D; 2.2.1

TEST RESULTS:

| TEST CONDITIONS         |      | TRANSMITTER POWER [W] |      |      |
|-------------------------|------|-----------------------|------|------|
|                         |      | CH 1                  | CH 2 | CH 3 |
| Tnom                    | Vnom | 2.00                  | 1.99 | - -  |
| Measurement uncertainty |      | ±0.6 dB               |      |      |

**LIMIT:** 90.259 (a) In the 217 – 220 MHz band, the maximum transmitter output power is 2 watts.  
The maximum antenna height above average terrain (HAAT) is 152m (500 feet).

TEST EQUIPMENT USED: 34; 11; 35

REMARKS: - -

Ambient temperature: (20±1) °C

Relative humidity: (47±10) %

The measurement was carried out at maximum power level

### 1.2.3. FREQUENCY STABILITY WITH TEMPERATURE VARIATION

RULE PART NUMBER: 2.1055; 90.213

TEST METHOD: TIA-603-D; 2.2.2

TEST RESULTS:

| TEST CONDITIONS<br>Temperature (°C) | FREQUENCY ERROR [ppm]           |       |      |
|-------------------------------------|---------------------------------|-------|------|
|                                     | CH 1                            | CH 2  | CH 3 |
| -30                                 | +0.17                           | +0.19 | --   |
| -20                                 | +0.11                           | +0.11 | --   |
| -10                                 | +0.15                           | +0.14 | --   |
| 0                                   | -0.02                           | -0.02 | --   |
| 10                                  | -0.05                           | -0.06 | --   |
| 20                                  | +0.07                           | +0.09 | --   |
| 30                                  | -0.10                           | -0.08 | --   |
| 40                                  | -0.18                           | -0.17 | --   |
| 50                                  | -0.23                           | -0.22 | --   |
| 60                                  | -0.20                           | -0.20 | --   |
| Maximum frequency error             | -0.23/+0.19 ppm (limit 1.0 ppm) |       |      |
| Measurement uncertainty             | ±45 Hz                          |       |      |

LIMIT:

| Frequency range<br>[MHz] | Fixed and base stations<br>[ppm] | Mobile stations [ppm]        |                                 |
|--------------------------|----------------------------------|------------------------------|---------------------------------|
|                          |                                  | Over 2 watts output<br>power | 2 watts or less output<br>power |
| 216-220                  | 1.0                              | --                           | 1.0                             |

TEST EQUIPMENT USED: 5; 11; 35

REMARKS: --

Ambient temperature: (22±1) °C

Relative humidity: (53±10) %

The measurement was carried out at maximum power level

#### 1.2.4. FREQUENCY STABILITY WITH PRIMARY VOLTAGE VARIATION

RULE PART NUMBER: 2.1055; 90.213

TEST METHOD: TIA-603-D; 2.2.2

TEST RESULTS:

| TEST CONDITIONS<br>Voltage (V) | FREQUENCY ERROR [ppm]     |       |      |
|--------------------------------|---------------------------|-------|------|
|                                | CH 1                      | CH 2  | CH 3 |
| 10.0                           | -0.07                     | -0.07 | --   |
| 15.0                           | -0.07                     | -0.07 | --   |
| 20.0                           | -0.07                     | -0.07 | --   |
| 25.0                           | -0.07                     | -0.07 | --   |
| 30.0                           | -0.07                     | -0.07 | --   |
| Maximum frequency error        | -0.07 ppm (limit 1.0 ppm) |       |      |
| Measurement uncertainty        | ±45 Hz                    |       |      |

LIMIT:

| Frequency range<br>[MHz] | Fixed and base stations<br>[ppm] | Mobile stations [ppm]        |                                 |
|--------------------------|----------------------------------|------------------------------|---------------------------------|
|                          |                                  | Over 2 watts output<br>power | 2 watts or less output<br>power |
| 216-220                  | 1.0                              | --                           | 1.0                             |

TEST EQUIPMENT USED: 5; 11; 35

REMARKS: --

Ambient temperature: (21±1) °C

Relative humidity: (47±10) %

Rated output power: 0.1 W

Test signal: 4-CPFSK, 41.67kbps; Random bit sequence

### 1.2.5. TRANSMITTER UNWANTED EMISSIONS: CONDUCTED SPURIOUS (0.1 W)

RULE PART NUMBER: 2.1051, 90.210 (b,3)

TEST METHOD: TIA-603-D, 2.2.13

TEST RESULTS:

| SPURIOUS EMISSIONS                                                                       |                 |             |                 |                 |             |             |                 |             |
|------------------------------------------------------------------------------------------|-----------------|-------------|-----------------|-----------------|-------------|-------------|-----------------|-------------|
| CH1                                                                                      |                 |             | CH2             |                 |             | CH3         |                 |             |
| Freq. [MHz]                                                                              | Bandwidth [kHz] | Level [dBm] | Freq. [MHz]     | Bandwidth [kHz] | Level [dBm] | Freq. [MHz] | Bandwidth [kHz] | Level [dBm] |
| -.-                                                                                      | 1000            | --          | --              | 1000            | --          | --          | --              | --          |
| For all frequencies the spurious emissions were detected at least 20 dB below the limit. |                 |             |                 |                 |             |             |                 |             |
| Measurement uncertainty                                                                  |                 |             | +2.8 dB/-3.3 dB |                 |             |             |                 |             |

**LIMIT:**

|                               |                            |
|-------------------------------|----------------------------|
| CHANNEL BANDWIDTH             | 6.25; 12.5; 25.0; 50.0 kHz |
| FREQUENCY RANGE               | $f_o > 250\%Bw$            |
| SPURIOUS EMISSION LEVEL [dBc] | $43+10\log_{10}(P)$        |

$$\text{Limit}_{(\text{dBc})} = 43+10\log_{10}(P) = 43+10\log_{10}(0.1) = 33\text{dBc}$$

$$\text{Limit}_{(\text{dBm})} = 10\log_{10}(P_{\text{mW}}) - \text{Limit}_{(\text{dBc})} = 10\log_{10}(100) - 33 = -13\text{dBm}$$

where P = RF output power in watts

where  $P_{\text{mW}}$  = RF output power in mW

TEST EQUIPMENT USED: 11; 35; 36; 37

REMARKS: - -

Ambient temperature: (21±1) °C

Relative humidity: (47±10) %

Rated output power: CH2 - 2.0W and CH1 - 10.0 W

Test signal: 4-CPFSK, 10.42kbps; Random bit sequence

## 1.2.6. TRANSMITTER UNWANTED EMISSIONS: CONDUCTED SPURIOUS (2.0; 10 W)

RULE PART NUMBER: 2.1051, 90.210 (b,3)

TEST METHOD: TIA-603-D, 2.2.13

### TEST RESULTS:

| SPURIOUS EMISSIONS                                                                       |                 |             |                 |                 |             |             |                 |             |
|------------------------------------------------------------------------------------------|-----------------|-------------|-----------------|-----------------|-------------|-------------|-----------------|-------------|
| CH1                                                                                      |                 |             | CH2             |                 |             | CH3         |                 |             |
| Freq. [MHz]                                                                              | Bandwidth [kHz] | Level [dBm] | Freq. [MHz]     | Bandwidth [kHz] | Level [dBm] | Freq. [MHz] | Bandwidth [kHz] | Level [dBm] |
| -.-                                                                                      | 1000            | --          | --              | 1000            | --          | --          | --              | --          |
| For all frequencies the spurious emissions were detected at least 20 dB below the limit. |                 |             |                 |                 |             |             |                 |             |
| Measurement uncertainty                                                                  |                 |             | +2.8 dB/-3.3 dB |                 |             |             |                 |             |

### LIMIT:

|                               |                            |
|-------------------------------|----------------------------|
| CHANNEL BANDWIDTH             | 6.25; 12.5; 25.0; 50.0 kHz |
| FREQUENCY RANGE               | $f_o > 250\%Bw$            |
| SPURIOUS EMISSION LEVEL [dBc] | $43+10\log_{10}(P)$        |

$$\text{Limit}_{(dBc)} = 43+10\log_{10}(P) = 43+10\log_{10}(10) = 53dBc$$

where P = RF output power in watts

$$\text{Limit}_{(dBm)} = 10\log_{10}(P_{mW}) - \text{Limit}_{(dBc)} = 10\log_{10}(10000) - 53 = -13dBm$$

where  $P_{mW}$  = RF output power in mW

$$\text{Limit}_{(dBc)} = 43+10\log_{10}(P) = 43+10\log_{10}(2) = 46dBc$$

where P = RF output power in watts

$$\text{Limit}_{(dBm)} = 10\log_{10}(P_{mW}) - \text{Limit}_{(dBc)} = 10\log_{10}(2000) - 46 = -13dBm$$

where  $P_{mW}$  = RF output power in mW

TEST EQUIPMENT USED: 11; 35; 36; 37

REMARKS: - -

Ambient temperature: (21±1) °C

Relative humidity: (47±10) %

Rated output power: 2.0 W

Test signal: 16-DEQAM 34.72kbps; Random bit sequence

### 1.2.7. TRANSMITTER UNWANTED EMISSIONS: CONDUCTED SPURIOUS (2.0 W)

RULE PART NUMBER: 2.1051, 90.210 (b,3)

TEST METHOD: TIA-603-D, 2.2.13

#### TEST RESULTS:

| SPURIOUS EMISSIONS                                                                       |                 |             |                 |                 |             |             |                 |             |
|------------------------------------------------------------------------------------------|-----------------|-------------|-----------------|-----------------|-------------|-------------|-----------------|-------------|
| CH1                                                                                      |                 |             | CH2             |                 |             | CH3         |                 |             |
| Freq. [MHz]                                                                              | Bandwidth [kHz] | Level [dBm] | Freq. [MHz]     | Bandwidth [kHz] | Level [dBm] | Freq. [MHz] | Bandwidth [kHz] | Level [dBm] |
| --                                                                                       | 1000            | --          | --              | 1000            | --          | --          | --              | --          |
| For all frequencies the spurious emissions were detected at least 20 dB below the limit. |                 |             |                 |                 |             |             |                 |             |
| Measurement uncertainty                                                                  |                 |             | +2.8 dB/-3.3 dB |                 |             |             |                 |             |

#### LIMIT:

|                               |                            |
|-------------------------------|----------------------------|
| CHANNEL BANDWIDTH             | 6.25; 12.5; 25.0; 50.0 kHz |
| FREQUENCY RANGE               | $f_o > 250\%Bw$            |
| SPURIOUS EMISSION LEVEL [dBc] | $43+10\log_{10}(P)$        |

$$\text{Limit}_{(dBc)} = 43+10\log_{10}(P) = 43+10\log_{10}(2) = 46\text{dBc}$$

where P = RF output power in watts

$$\text{Limit}_{(dBm)} = 10\log_{10}(P_{mW}) - \text{Limit}_{(dBc)} = 10\log_{10}(2000) - 46 = -13\text{dBm}$$

where P<sub>mW</sub> = RF output power in mW

TEST EQUIPMENT USED: 11; 35; 36; 37

REMARKS: --

Ambient temperature: (21±1) °C

Relative humidity: (47±10) %

Rated output power: 0.5 W

Test signal: 16-DEQAM 34.72kbps; Random bit sequence

### 1.2.8. TRANSMITTER UNWANTED EMISSIONS: CONDUCTED SPURIOUS (0.5 W)

RULE PART NUMBER: 2.1051, 90.210 (b,3)

TEST METHOD: TIA-603-D, 2.2.13

#### TEST RESULTS:

| SPURIOUS EMISSIONS                                                                       |                 |             |                 |                 |             |             |                 |             |
|------------------------------------------------------------------------------------------|-----------------|-------------|-----------------|-----------------|-------------|-------------|-----------------|-------------|
| CH1                                                                                      |                 |             | CH2             |                 |             | CH3         |                 |             |
| Freq. [MHz]                                                                              | Bandwidth [kHz] | Level [dBm] | Freq. [MHz]     | Bandwidth [kHz] | Level [dBm] | Freq. [MHz] | Bandwidth [kHz] | Level [dBm] |
| --                                                                                       | 1000            | --          | --              | 1000            | --          | --          | --              | --          |
| For all frequencies the spurious emissions were detected at least 20 dB below the limit. |                 |             |                 |                 |             |             |                 |             |
| Measurement uncertainty                                                                  |                 |             | +2.8 dB/-3.3 dB |                 |             |             |                 |             |

#### LIMIT:

|                               |                            |
|-------------------------------|----------------------------|
| CHANNEL BANDWIDTH             | 6.25; 12.5; 25.0; 50.0 kHz |
| FREQUENCY RANGE               | $f_o > 250\%Bw$            |
| SPURIOUS EMISSION LEVEL [dBc] | $43+10\log_{10}(P)$        |

$$\text{Limit}_{(\text{dBc})} = 43+10\log_{10}(P) = 43+10\log_{10}(0.5) = 40\text{dBc}$$

$$\text{Limit}_{(\text{dBm})} = 10\log_{10}(P_{\text{mW}}) - \text{Limit}_{(\text{dBc})} = 10\log_{10}(500) - 40 = -13\text{dBm}$$

where P = RF output power in watts

where  $P_{\text{mW}}$  = RF output power in mW

TEST EQUIPMENT USED: 11; 35; 36; 37

REMARKS: - -

Ambient temperature: (21±1) °C

Relative humidity: (47±10) %

Transmitter operating unmodulated

The measurement was carried out at minimum power level

### 1.2.9. TRANSMITTER UNWANTED EMISSIONS: RADIATED SPURIOUS (0.1W)

RULE PART NUMBER: 2.1053, 90.210 (b,3)

TEST METHOD: TIA-603-D, 2.2.12

TEST RESULTS:

| SPURIOUS EMISSIONS                                                                       |                 |             |                 |                 |             |             |                 |             |
|------------------------------------------------------------------------------------------|-----------------|-------------|-----------------|-----------------|-------------|-------------|-----------------|-------------|
| CH1                                                                                      |                 |             | CH2             |                 |             | CH3         |                 |             |
| Freq. [MHz]                                                                              | Bandwidth [kHz] | Level [dBm] | Freq. [MHz]     | Bandwidth [kHz] | Level [dBm] | Freq. [MHz] | Bandwidth [kHz] | Level [dBm] |
| For all frequencies the spurious emissions were detected at least 20 dB below the limit. |                 |             |                 |                 |             |             |                 |             |
| Measurement uncertainty                                                                  |                 |             | +4.4 dB/-4.5 dB |                 |             |             |                 |             |

**LIMIT:**

|                               |                            |
|-------------------------------|----------------------------|
| CHANNEL BANDWIDTH             | 6.25; 12.5; 25.0; 50.0 kHz |
| FREQUENCY RANGE               | $f_o > 250\%Bw$            |
| SPURIOUS EMISSION LEVEL [dBc] | $43+10\log_{10}(P)$        |

$$\text{Limit}_{(dBc)} = 43+10\log_{10}(P) = 43+10\log_{10}(0.1) = 33dBc$$

where P = RF output power in watts

$$\text{Limit}_{(dBm)} = 10\log_{10}(P_{mW}) - \text{Limit}_{(dBc)} = 10\log_{10}(100) - 33 = -13dBm$$

where P<sub>mW</sub> = RF output power in mW

TEST EQUIPMENT USED: - -

REMARKS: Measured in CMI – Laboratory TESTCOM Praha; Test report Ref. No.: 8551-PT-R0066-15

Ambient temperature: (21±1) °C

Relative humidity: (47±10) %

Transmitter operating unmodulated

The measurement was carried out at maximum power level

## 1.2.10. TRANSMITTER UNWANTED EMISSIONS: RADIATED SPURIOUS (2.0W, 10W)

RULE PART NUMBER: 2.1053, 90.210 (b,3)

TEST METHOD: TIA-603-D, 2.2.12

TEST RESULTS:

| SPURIOUS EMISSIONS                                                                             |                 |             |             |                 |             |             |                 |             |
|------------------------------------------------------------------------------------------------|-----------------|-------------|-------------|-----------------|-------------|-------------|-----------------|-------------|
| CH1                                                                                            |                 |             | CH2         |                 |             | CH3         |                 |             |
| Freq. [MHz]                                                                                    | Bandwidth [kHz] | Level [dBm] | Freq. [MHz] | Bandwidth [kHz] | Level [dBm] | Freq. [MHz] | Bandwidth [kHz] | Level [dBm] |
| For all other frequencies the spurious emissions were detected at least 20 dB below the limit. |                 |             |             |                 |             |             |                 |             |
| Measurement uncertainty                                                                        |                 |             |             |                 |             |             |                 |             |

**LIMIT:**

|                               |                            |
|-------------------------------|----------------------------|
| CHANNEL BANDWIDTH             | 6.25; 12.5; 25.0; 50.0 kHz |
| FREQUENCY RANGE               | $f_o > 250\%Bw$            |
| SPURIOUS EMISSION LEVEL [dBc] | $43+10\log_{10}(P)$        |

$$\text{Limit}_{(dBc)} = 43+10\log_{10}(P) = 43+10\log_{10}(10) = 53dBc$$

$$\text{Limit}_{(dBm)} = 10\log_{10}(P_{mW}) - \text{Limit}_{(dBc)} = 10\log_{10}(500) - 53 = -13dBm$$

$$\text{Limit}_{(dBc)} = 43+10\log_{10}(P) = 43+10\log_{10}(2) = 46dBc$$

$$\text{Limit}_{(dBm)} = 10\log_{10}(P_{mW}) - \text{Limit}_{(dBc)} = 10\log_{10}(2000) - 46 = -13dBm$$

where P = RF output power in watts

where  $P_{mW}$  = RF output power in mW

where P = RF output power in watts

where  $P_{mW}$  = RF output power in mW

TEST EQUIPMENT USED: - -

REMARKS: Measured in CMI – Laboratory TESTCOM Praha; Test report Ref. No.: 8551-PT-R0066-15

Ambient temperature: (22±1) °C

Relative humidity: (53±10) %

The measurement at maximum power level

### 1.2.17. TRANSMITTER OCCUPIED BANDWIDTH

RULE PART NUMBER: 2.201, 2.202, 2.1049 (H), 2.1041

TEST METHOD: 971168 D01 Power Meas License Digital Systems v02r02, 4.2

TEST RESULTS:

|                          |             |              |              |              |              |              |
|--------------------------|-------------|--------------|--------------|--------------|--------------|--------------|
| Channel Spacing          | 6.25 kHz    | 12.5 kHz     | 25.0 kHz     | 50.0 kHz     | 6.25 kHz     | 6.25 kHz     |
| Emission Type            | 3K60F1D     | 8K60F1D      | 16K0F1D      | 28K0F1D      | 5K00D1D      | 5K00G1D      |
| Modulation               | 4-CPFSK     | 4-CPFSK      | 4-CPFSK      | 4-CPFSK      | 16-DEQAM     | D8PSK        |
| Data Rate                | 5.21 kbit/s | 10.42 kbit/s | 20.83 kbit/s | 41.67 kbit/s | 17.36 kbit/s | 13.02 kbit/s |
| Measured Peak Deviation  | 1.52 kHz    | 3.90 kHz     | 7.10 kHz     | 11.8 kHz     | ---          | ---          |
| Measured 99% Occupied BW | 3.55 kHz    | 8.53 kHz     | 15.9 kHz     | 28.0 kHz     | 4.89 kHz     | 4.92 kHz     |

|                          |                |              |              |                |              |              |
|--------------------------|----------------|--------------|--------------|----------------|--------------|--------------|
| Channel Spacing          | 6.25 kHz       | 12.5 kHz     | 12.5 kHz     | 12.5 kHz       | 25.0 kHz     | 25.0 kHz     |
| Emission Type            | 5K00G1D        | 10K0D1D      | 10K0G1D      | 10K0G1D        | 16K0D1D      | 16K0G1D      |
| Modulation               | $\pi/4$ -DQPSK | 16-DEQAM     | D8PSK        | $\pi/4$ -DQPSK | 16-DEQAM     | D8PSK        |
| Data Rate                | 8.68 kbit/s    | 34.72 kbit/s | 26.04 kbit/s | 17.36 kbit/s   | 55.56 kbit/s | 41.67 kbit/s |
| Measured Peak Deviation  | ---            | ---          | ---          | ---            | ---          | ---          |
| Measured 99% Occupied BW | 4.91 kHz       | 9.80 kHz     | 9.85 kHz     | 9.85 kHz       | 15.9 kHz     | 15.9 kHz     |

|                          |                |               |               |                |
|--------------------------|----------------|---------------|---------------|----------------|
| Channel Spacing          | 25.0 kHz       | 50.0 kHz      | 50.0 kHz      | 50.0 kHz       |
| Emission Type            | 16K0G1D        | 40K0D1D       | 40K0G1D       | 40K0G1D        |
| Modulation               | $\pi/4$ -DQPSK | 16-DEQAM      | D8PSK         | $\pi/4$ -DQPSK |
| Data Rate                | 27.78 kbit/s   | 138.89 kbit/s | 104.17 kbit/s | 69.44 kbit/s   |
| Measured Peak Deviation  | ---            | ---           | ---           | ---            |
| Measured 99% Occupied BW | 15.9 kHz       | 39.6 kHz      | 39.7 kHz      | 39.6 kHz       |

TEST EQUIPMENT USED: 5; 11; 35; 7

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: Maximum power

Test signal: 4-CPFSK 5.21kbps; Random bit sequence

### 1.2.18. TRANSMITTER OCCUPIED BANDWIDTH (4-CPFSK, MAX. POWER, 6.25 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 1; CH2 - GRAPH 17)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal: 16-DEQAM 17.36kbps; Random bit sequence

### 1.2.19. TRANSMITTER OCCUPIED BANDWIDTH (16-DEQAM, 2.0 W, 6.25 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 2; CH2 - GRAPH 18)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal: D8PSK 13.02kbps; Random bit sequence

### 1.2.20. TRANSMITTER OCCUPIED BANDWIDTH (D8PSK, 2.0 W, 6.25 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 3; CH2 - GRAPH 19)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal:  $\pi/4$ -DQPSK 8.68kbps; Random bit sequence

### 1.2.21. TRANSMITTER OCCUPIED BANDWIDTH ( $\pi/4$ -DQPSK, 2.0 W, 6.25 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 4; CH2 - GRAPH 20)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1) ^\circ\text{C}$

Relative humidity:  $(53 \pm 10) \%$

Rated output power: Maximum power

Test signal: 4-CPFSK 10.42kbps; Random bit sequence

### 1.2.22. TRANSMITTER OCCUPIED BANDWIDTH (4-CPFSK, MAX. POWER, 12.5 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 5; CH2 - GRAPH 21)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal: 16-DEQAM 34.72kbps; Random bit sequence

### 1.2.23. TRANSMITTER OCCUPIED BANDWIDTH (16-DEQAM, 2.0 W, 12.5 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 6; CH2 - GRAPH 22)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal: D8PSK 26.04kbps; Random bit sequence

#### 1.2.24. TRANSMITTER OCCUPIED BANDWIDTH (D8PSK, 2.0 W, 12.5 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 7; CH2 - GRAPH 23)

##### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal:  $\pi/4$ -DQPSK 17.36kbps; Random bit sequence

### 1.2.25. TRANSMITTER OCCUPIED BANDWIDTH ( $\pi/4$ -DQPSK, 2.0 W, 12.5 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 8; CH2 -GRAPH 24)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: Maximum power

Test signal: 4-CPFSK 20.83kbps; Random bit sequence

### 1.2.22. TRANSMITTER OCCUPIED BANDWIDTH (4-CPFSK, MAX. POWER, 25 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 9; CH2 - GRAPH 25)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal: 16-DEQAM 55.56kbps; Random bit sequence

### 1.2.23. TRANSMITTER OCCUPIED BANDWIDTH (16-DEQAM, 2.0 W, 25 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 10; CH2 - GRAPH 26)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal: D8PSK 41.67kbps; Random bit sequence

#### 1.2.24. TRANSMITTER OCCUPIED BANDWIDTH (D8PSK, 2.0 W, 25 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 11; CH2 - GRAPH 27)

##### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal:  $\pi/4$ -DQPSK 27.78kbps; Random bit sequence

### 1.2.25. TRANSMITTER OCCUPIED BANDWIDTH ( $\pi/4$ -DQPSK, 2.0 W, 25 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 12; CH2 - GRAPH 28)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1) ^\circ\text{C}$

Relative humidity:  $(53 \pm 10) \%$

Rated output power: Maximum power

Test signal: 4-CPFSK 41.67kbps; Random bit sequence

### 1.2.22. TRANSMITTER OCCUPIED BANDWIDTH (4-CPFSK, MAX. POWER, 50 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 13; CH2 - GRAPH 29)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal: 16-DEQAM 138,89kbps; Random bit sequence

### 1.2.23. TRANSMITTER OCCUPIED BANDWIDTH (16-DEQAM, 2.0 W, 50 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 14; CH2 - GRAPH 30)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal: D8PSK 104.17kbps; Random bit sequence

#### 1.2.24. TRANSMITTER OCCUPIED BANDWIDTH (D8PSK, 2.0 W, 50 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 15; CH2 - GRAPH 31)

##### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

Ambient temperature:  $(22 \pm 1)^\circ\text{C}$

Relative humidity:  $(53 \pm 10)\%$

Rated output power: 2.0 W

Test signal:  $\pi/4$ -DQPSK 69.44kbps; Random bit sequence

### 1.2.25. TRANSMITTER OCCUPIED BANDWIDTH ( $\pi/4$ -DQPSK, 2.0 W, 50 kHz)

RULE PART NUMBER: 2.1049, 90.210

TEST METHOD: TIA-603-D; 3.2.11

TEST RESULTS: Meets minimum standards (See chapter 4, CH1 - GRAPH 16; CH2 - GRAPH 32)

#### LIMIT:

|        | Attenuator [dB]                     | Frequency offset [kHz]    |
|--------|-------------------------------------|---------------------------|
| Mask B | 0.0 dB                              | $f_o < 50\%Bw$            |
|        | 25.0 dB                             | $50\%Bw < f_o < 100\%Bw$  |
|        | 35.0 dB                             | $100\%Bw < f_o < 250\%Bw$ |
|        | $43 + 10 \cdot \log_{10}(P)$        | $250\%Bw < f_o$           |
|        | <i>Note: P is output power in W</i> |                           |

TEST EQUIPMENT USED: 36; 11; 35

REMARKS: - -

## 1.5 Summary of Test Results

P = Complied with the requirements of the specification for this test  
U = The results were within measurement uncertainties  
F = Not complied with the requirements of the specification for this test  
N/A = Not applicable

### Unit No. 1

|                                                               |   |
|---------------------------------------------------------------|---|
| RF POWER OUTPUT AT TERMINALS .....                            | P |
| FREQUENCY STABILITY WITH TEMPERATURE VARIATION .....          | P |
| FREQUENCY STABILITY WITH PRIMARY VOLTAGE VARIATION .....      | P |
| TRANSMITTER UNWANTED EMISSIONS: CONDUCTED SPURIOUS .....      | P |
| TRANSMITTER UNWANTED EMISSIONS: RADIATED SPURIOUS .....       | P |
| TRANSMITTER OCCUPIED BANDWIDTH .....                          | P |
| TRANSMITTER OCCUPIED BANDWIDTH FOR EMISSION DESIGNATORS ..... | P |

## 2. Test Equipment

| No. | Id. No.   | Test equipment             | Type        | Manufacturer | Serial No.  | Calibration valid |
|-----|-----------|----------------------------|-------------|--------------|-------------|-------------------|
| 1   | 10258     | Signal Analyzer            | FSIQ3       | R&S          | 830790/0001 | 23.9.2015         |
| 2   | 10237     | Spectrum Analyzer          | FSP3        | R&S          | 100767      |                   |
| 3   | 10219/1   | Spectrum Analyzer          | FSP30       | R&S          | 100015      |                   |
| 4   | 900000574 | Attenuator 30dB/100W       | PE7021-30   | Pasternack   | - -         |                   |
| 5   | 10276     | Spectrum Analyzer          | E4446A      | Agilent      | MY48250231  | 20.03.2016        |
| 6   | 10172     | Stabilock 4040             | SI 4040     | Wavetek      | 2025057     |                   |
| 7   | 10173     | Stabilock 4040             | SI 4040     | Schlumberger | 1825233     | 27.04.2015        |
| 8   | 900000611 | Attenuator 30dB/40W        | ATE30dB/40W | APEX         | 051103      |                   |
| 9   | 900000349 | Attenuator 30dB/40W        | ATE30dB/40W | APEX         | 051106      |                   |
| 10  | 900000613 | Attenuator 30dB/40W        | ATE30dB/40W | APEX         | 051102      |                   |
| 11  | 900000681 | Attenuator 30dB/10W        | PE7015-30   | Pasternack   | - -         |                   |
| 12  | 900000575 | Step Attenuator            | PE7033-2    | Pasternack   | 900000575   |                   |
| 13  | - -       | Heating Chamber            | - -         | - -          | - -         |                   |
| 14  | 10161     | Freezing Box               | - -         | - -          | - -         |                   |
| 15  | 699385    | Digital Multimeter         | M-3850      | Metex        | EB 127 259  |                   |
| 16  | - -       | 4-Port Junction Pad        | - -         | - -          | - -         |                   |
| 17  | 10291     | Mixed Signal Oscilloscope  | MSO 2024    | Tektronix    | - -         |                   |
| 18  | 10293     | Dig. Phosphor Oscilloscope | DPO 2024    | Tektronix    | - -         |                   |
| 19  | 10203     | Digital Oscilloscope       | TDS2014     | Tektronix    | C032141     |                   |
| 20  | 10240     | Signal Generator           | IFR 2023B   | IRF          | 202306/936  |                   |
| 21  | 10046     | Signal Generator           | 8640B       | HP           | 2250A20733  |                   |
| 22  | 10238     | Signal Generator           | E4438       | Agilent      | MY45091475  |                   |
| 23  | 10219/2   | Signal Generator           | SML03       | R&S          | 100560      |                   |
| 24  | - -       | Power Splitter             | - -         | - -          | - -         |                   |
| 25  | - -       | Termination 50 Ohm/1 W     | - -         | - -          | - -         |                   |
| 26  | - -       | Termination 50 Ohm/1 W     | - -         | - -          | - -         |                   |
| 27  | - -       | Termination 50 Ohm/1 W     | - -         | - -          | - -         |                   |
| 28  | - -       | Isolating Transformer      | - -         | - -          | - -         |                   |
| 29  | - -       | Interval Counter           | - -         | - -          | - -         |                   |
| 30  | 900000609 | Power Supply               | Statron     | Statron      | 0308023     |                   |
| 31  | 900000457 | Power Supply               | Statron     | Statron      | 0510006     |                   |
| 32  | - -       | High Pass Filter (400MHz)  | - -         | - -          | - -         |                   |
| 33  | - -       | High Pass Filter (160MHz)  | - -         | - -          | - -         |                   |
| 34  | 10377     | Wideband Power Sensor      | NRP-Z85     | R&S          | 101183      | 18.10.2016        |
| 35  | 900001390 | Power Supply               | SDP2603     | Manson       | G291101202  |                   |
| 36  | 10375     | Singal & spectrum Analyzer | FSW         | R&S          | 100608      | 25.04.2015        |
| 37  | - -       | Signal Generator           | SMB 100A    | R&S          | 176216      | 12.02.2016        |

### 3. Additional Information

## 4. Graphs

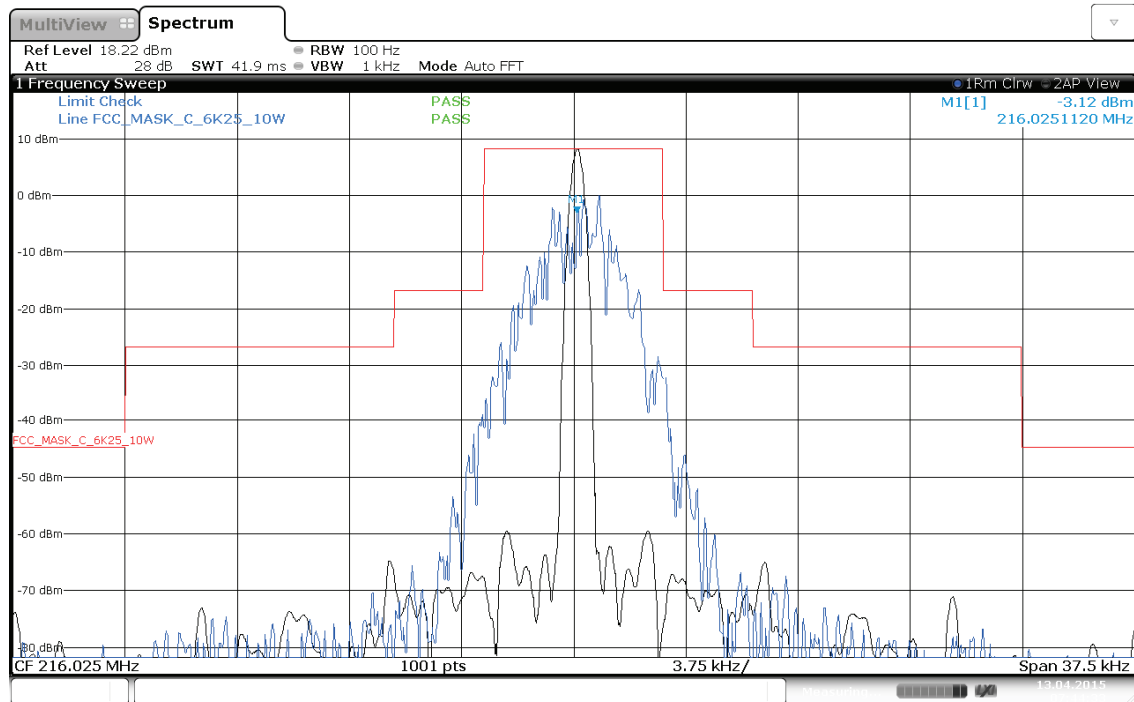
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## 4.1 Graphs – 216.025 MHz

### GRAPH 1: Spectrum for Emission 6.25 kHz 4-CPFSK

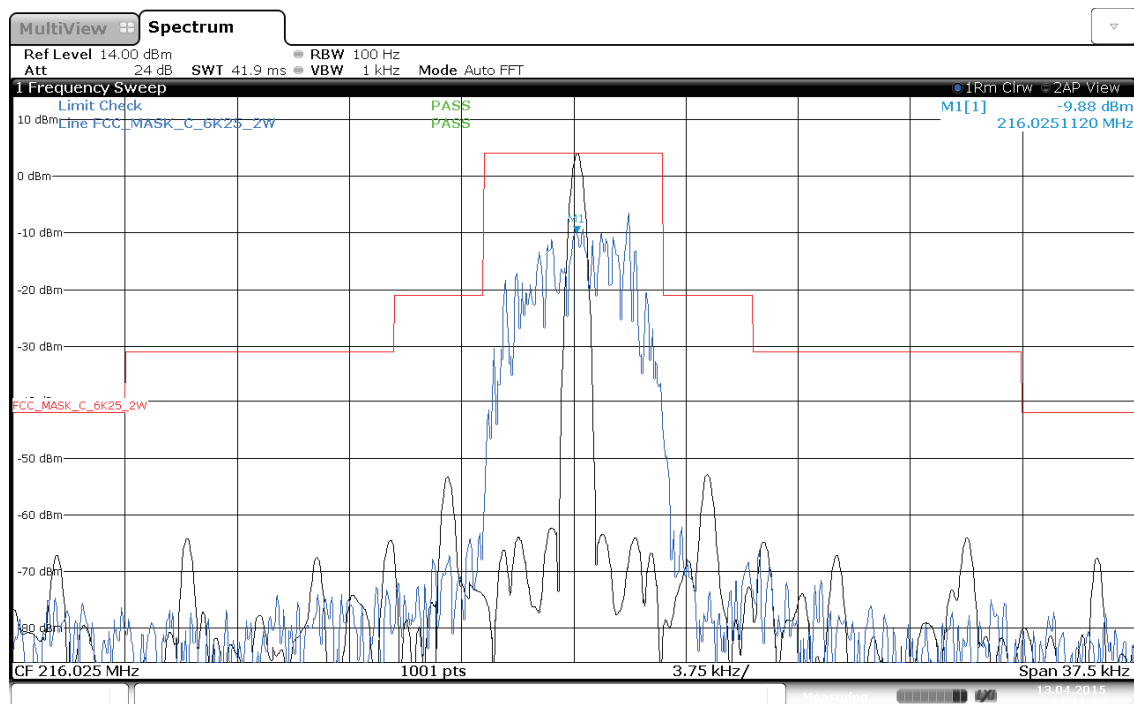
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:44:33

### GRAPH 2: Spectrum for Emission 6.25 kHz 16-DEQAM

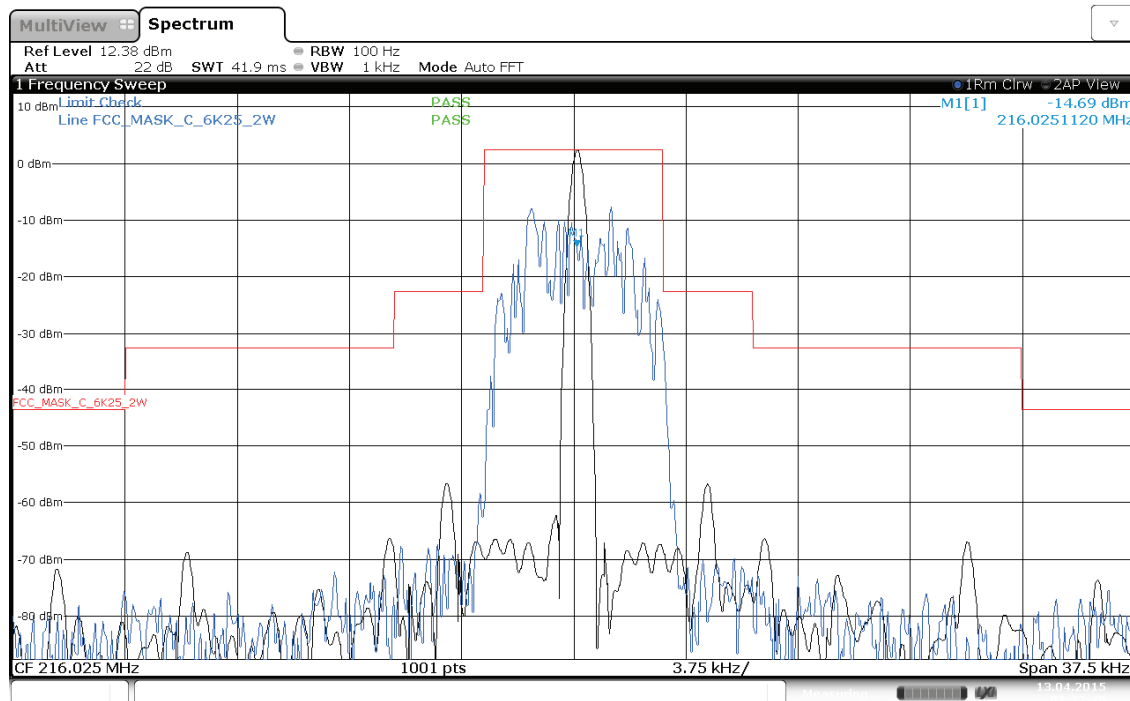
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:41:58

### GRAPH 3: Spectrum for Emission 6.25 kHz D8PSK

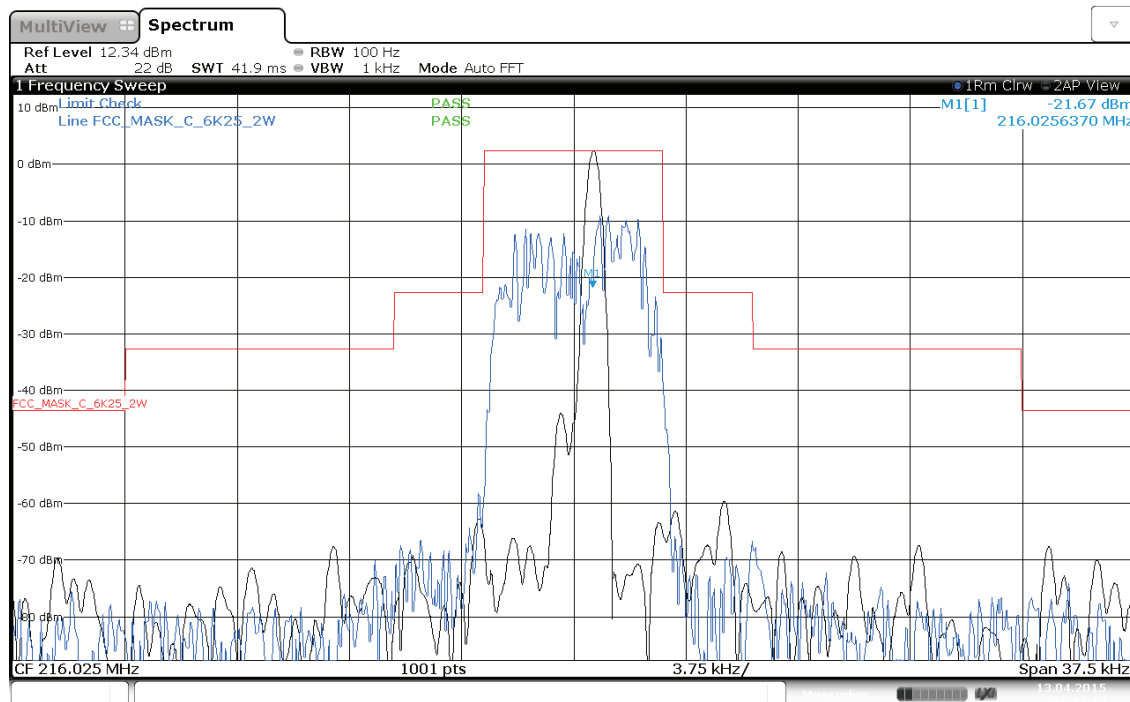
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:42:49

### GRAPH 4: Spectrum for Emission 6.25 kHz $\pi/4$ -DQPSK

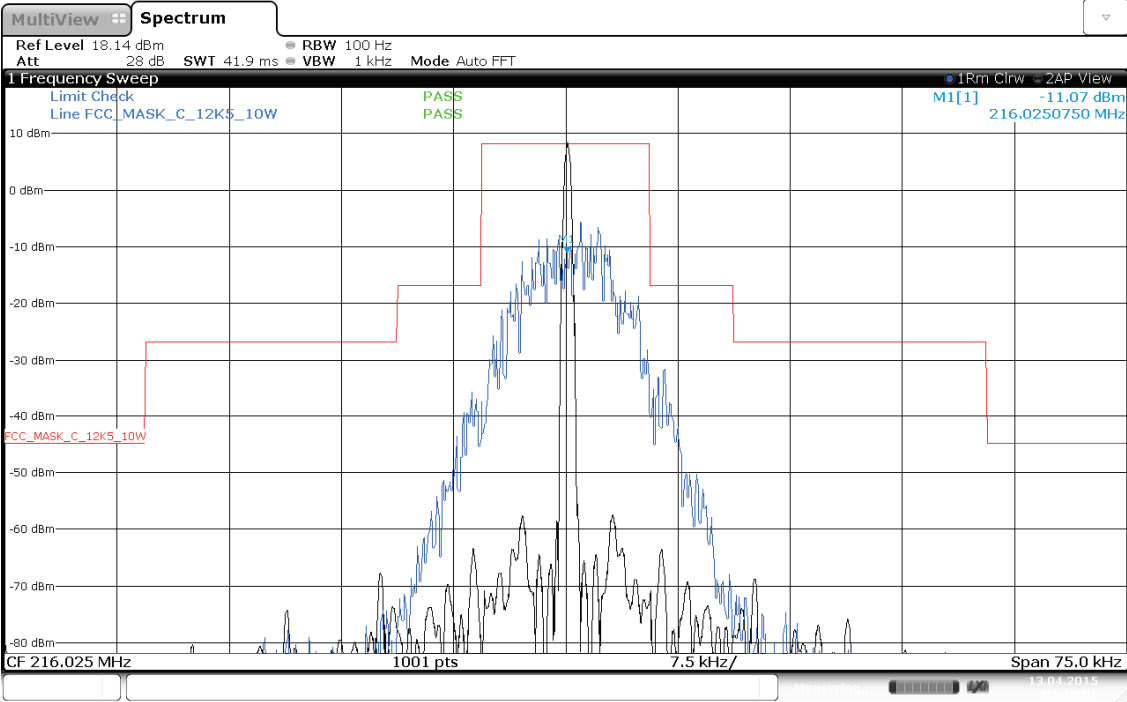
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:43:40

GRAPH 5: Spectrum for Emission 12.5 kHz 4-CPFSK

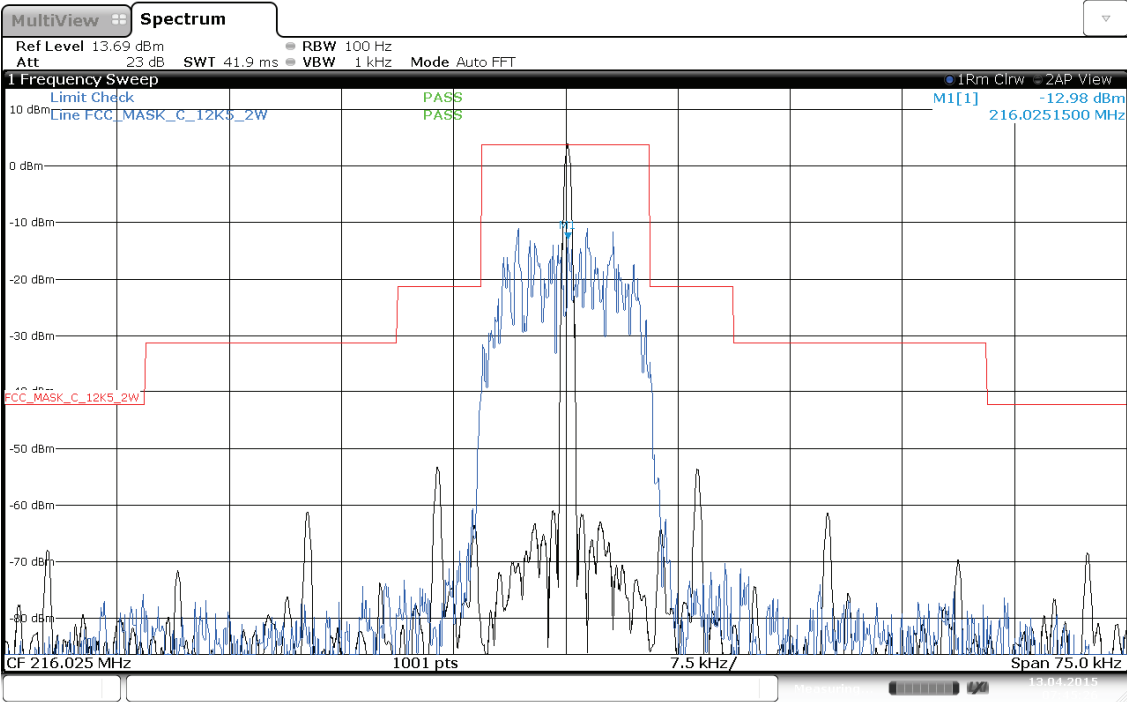
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:48:01

GRAPH 6: Spectrum for Emission 12.5 kHz 16-DEQAM

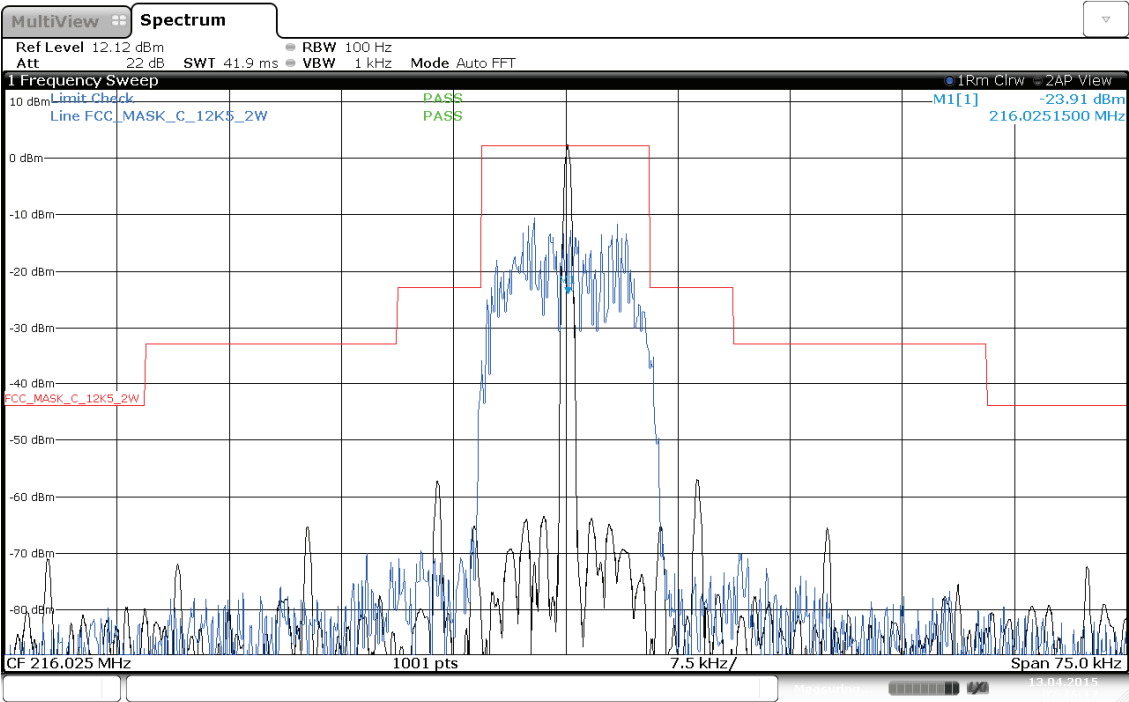
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:45:25

### GRAPH 7: Spectrum for Emission 12.5 kHz D8PSK

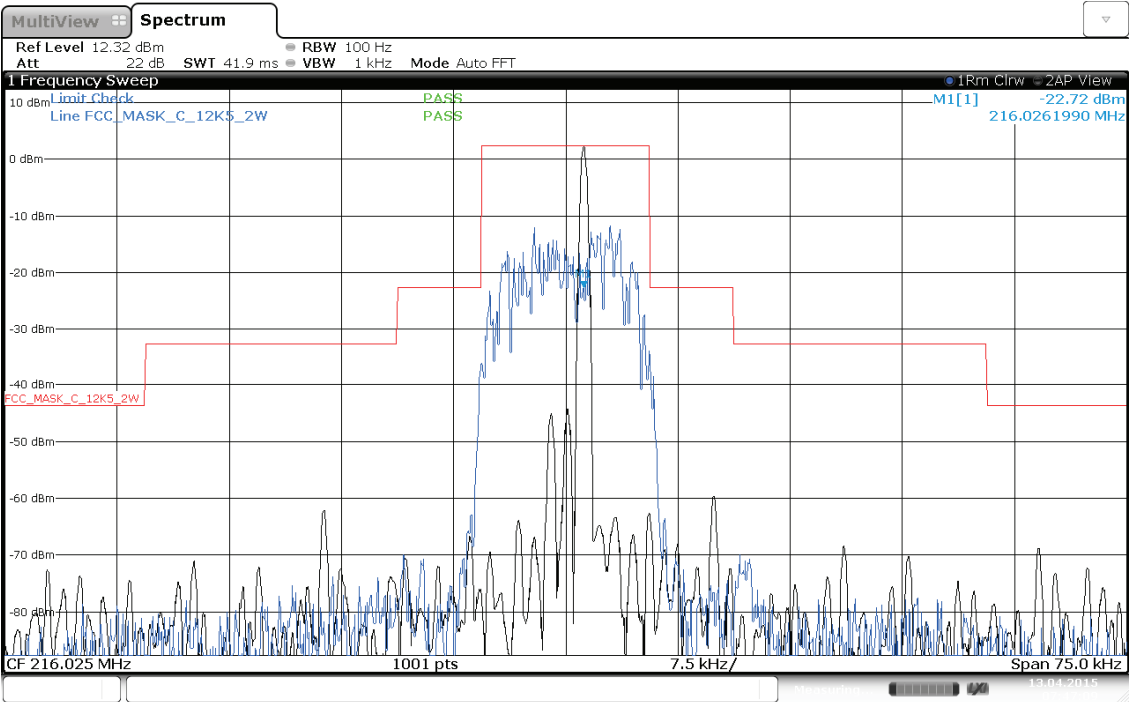
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:46:17

### GRAPH 8: Spectrum for Emission 12.5 kHz $\pi/4$ -DQPSK

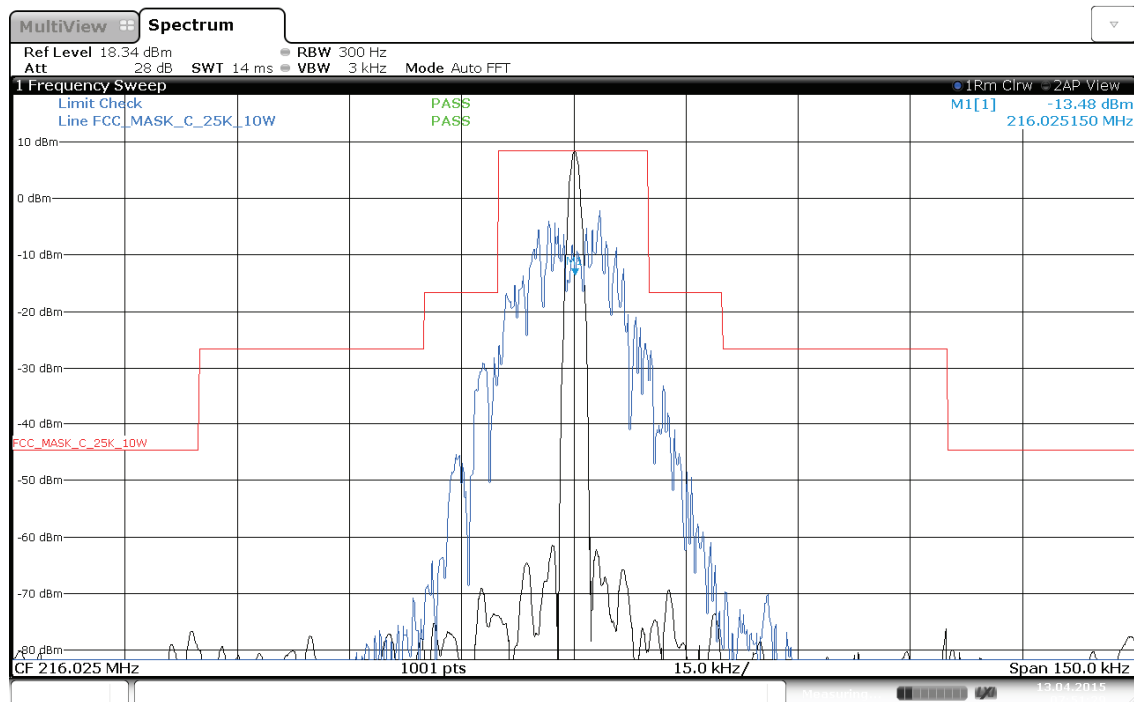
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:47:09

## GRAPH 9: Spectrum for Emission 25 kHz 4-CPFSK

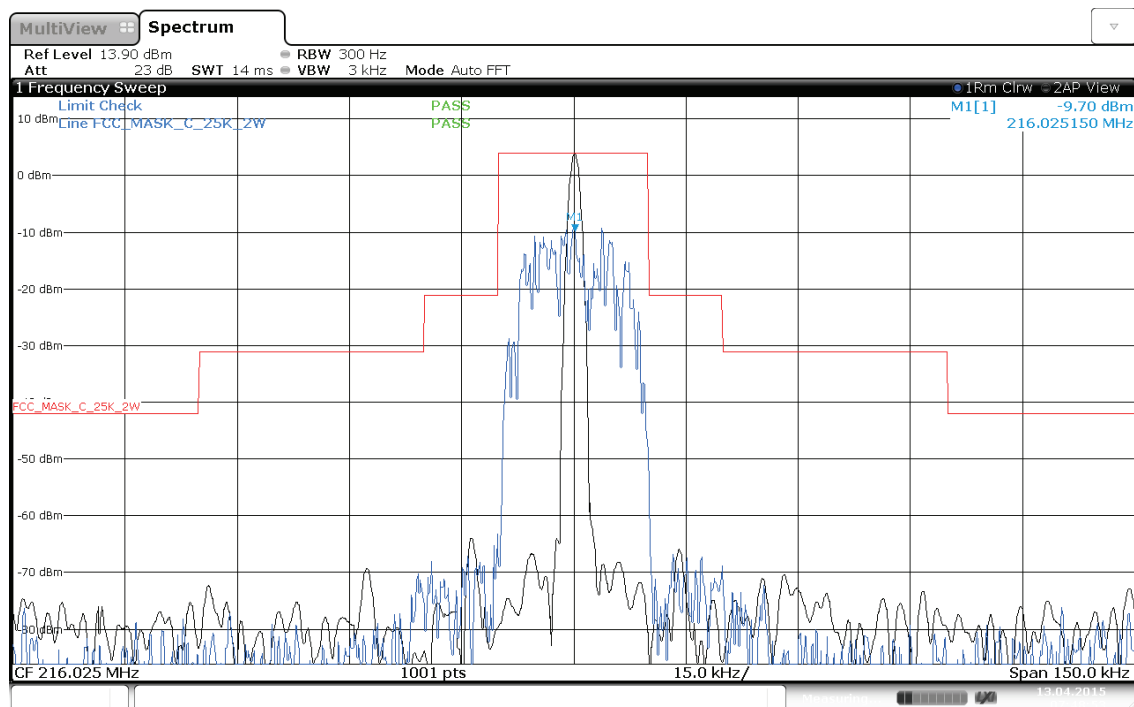
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:51:29

## GRAPH 10: Spectrum for Emission 25 kHz 16-DEQAM

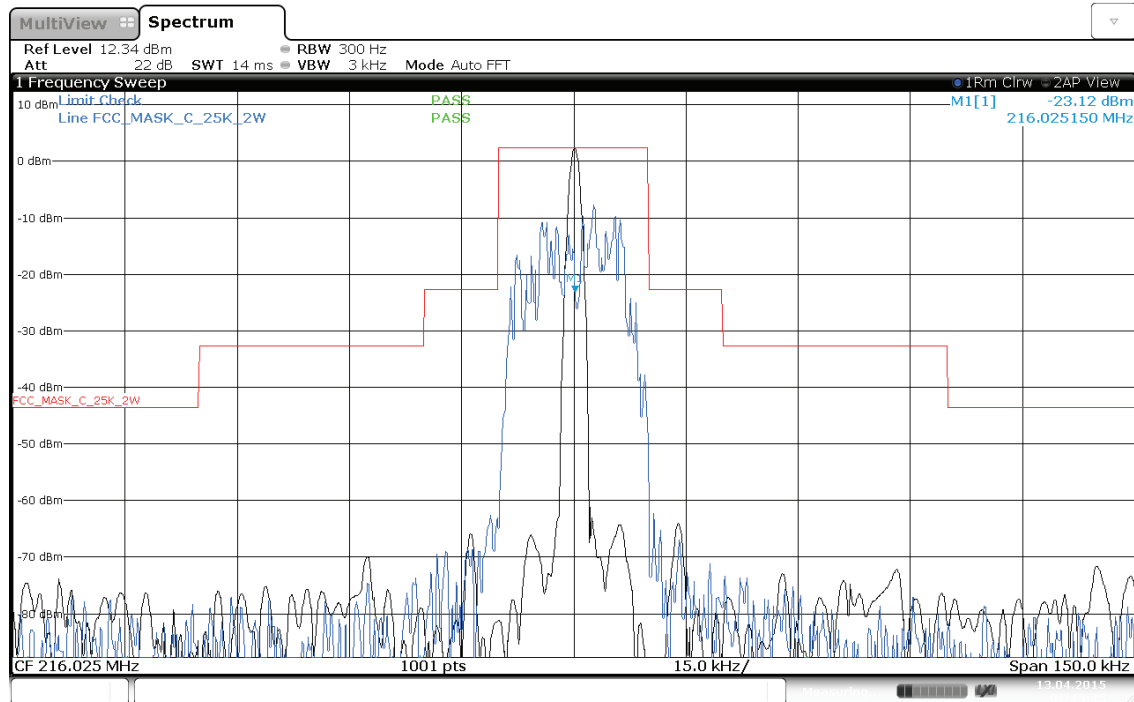
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:48:54

## GRAPH 11: Spectrum for Emission 25 kHz D8PSK

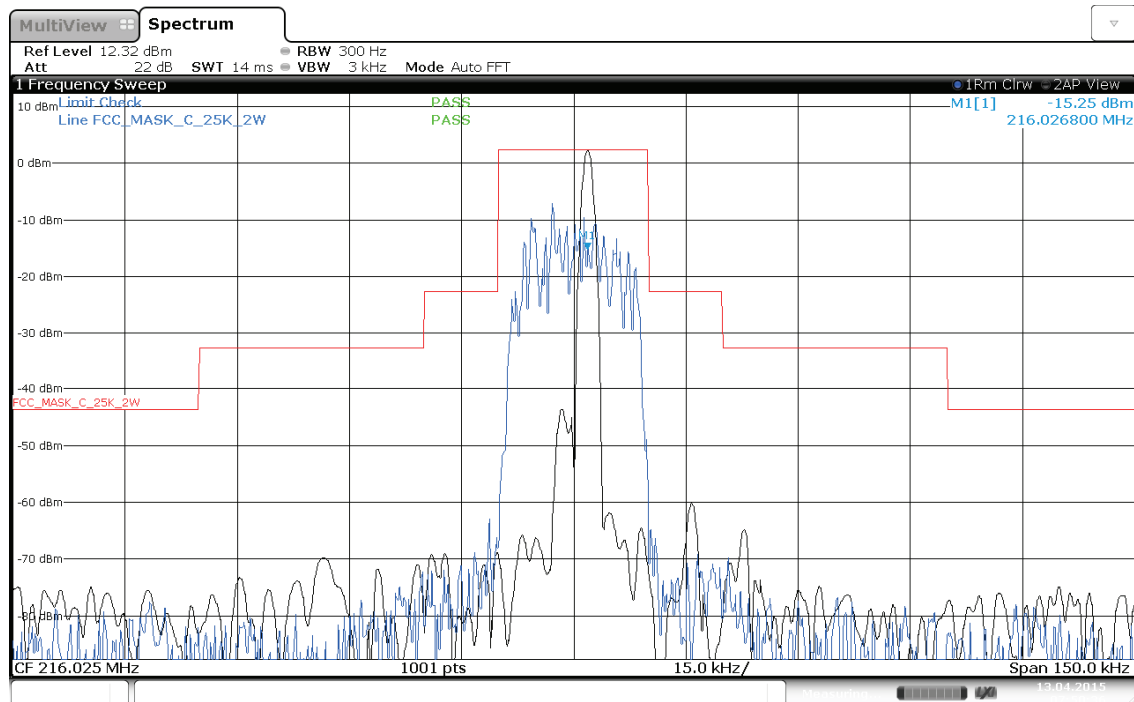
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:49:45

## GRAPH 12: Spectrum for Emission 25 kHz $\pi/4$ -DQPSK

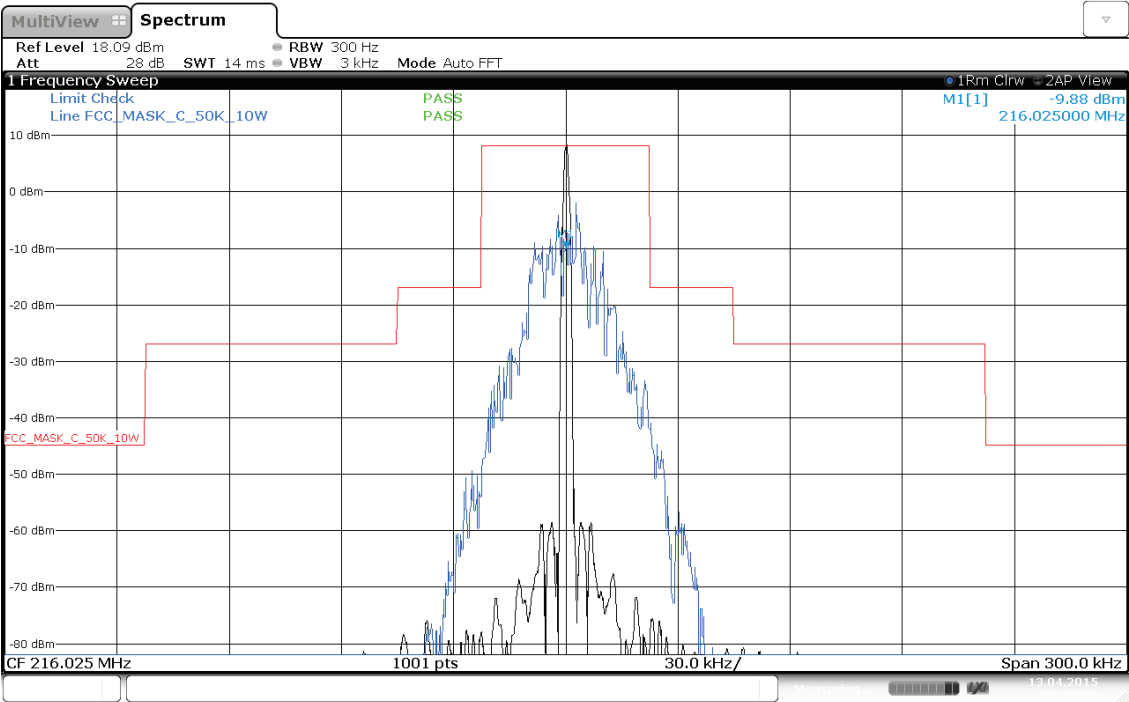
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:50:36

### GRAPH 13: Spectrum for Emission 50 kHz 4-CPFSK

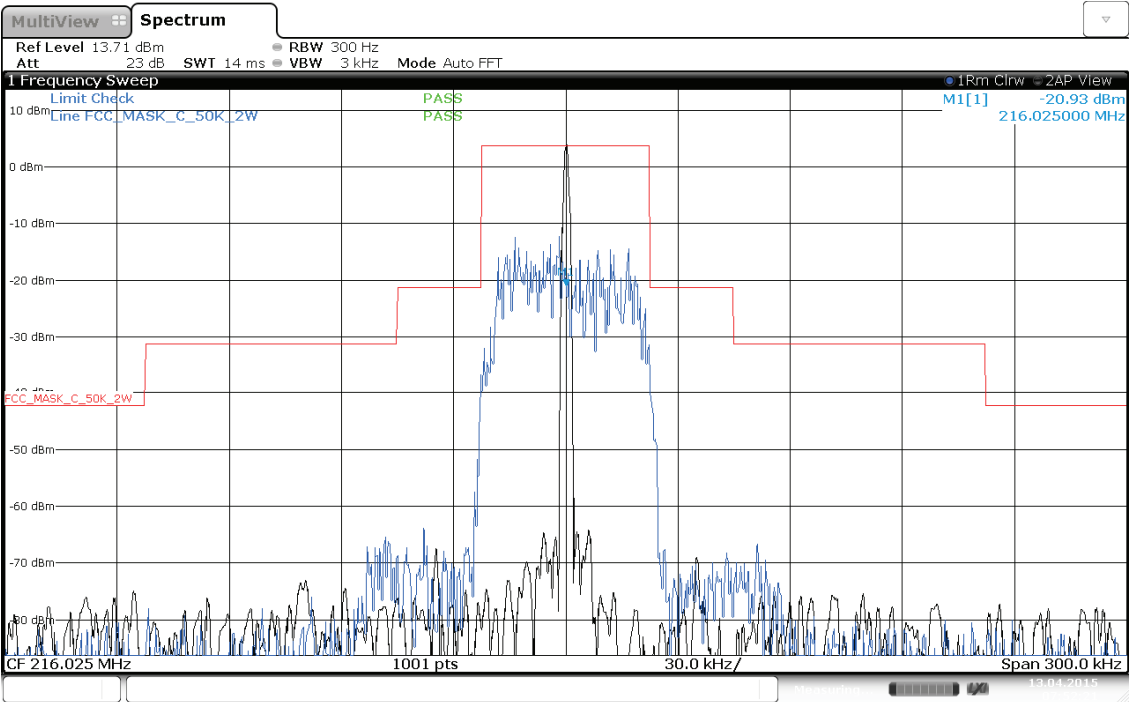
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:54:57

### GRAPH 14: Spectrum for Emission 50 kHz 16-DEQAM

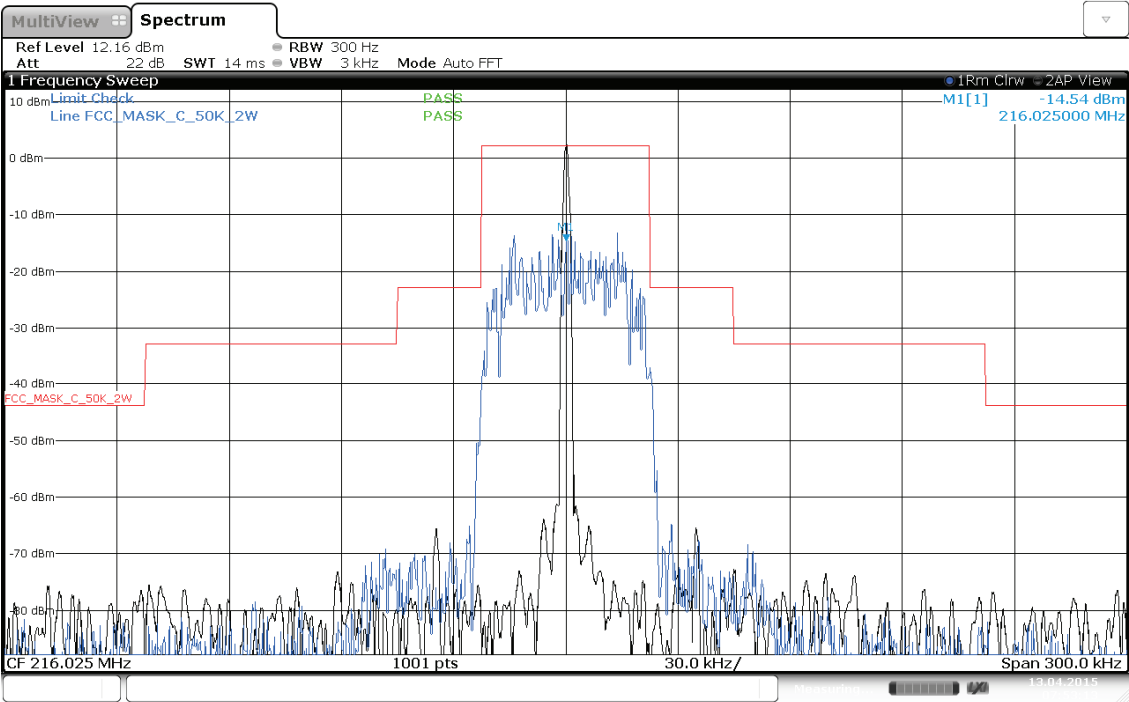
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:52:21

### GRAPH 15: Spectrum for Emission 50 kHz D8PSK

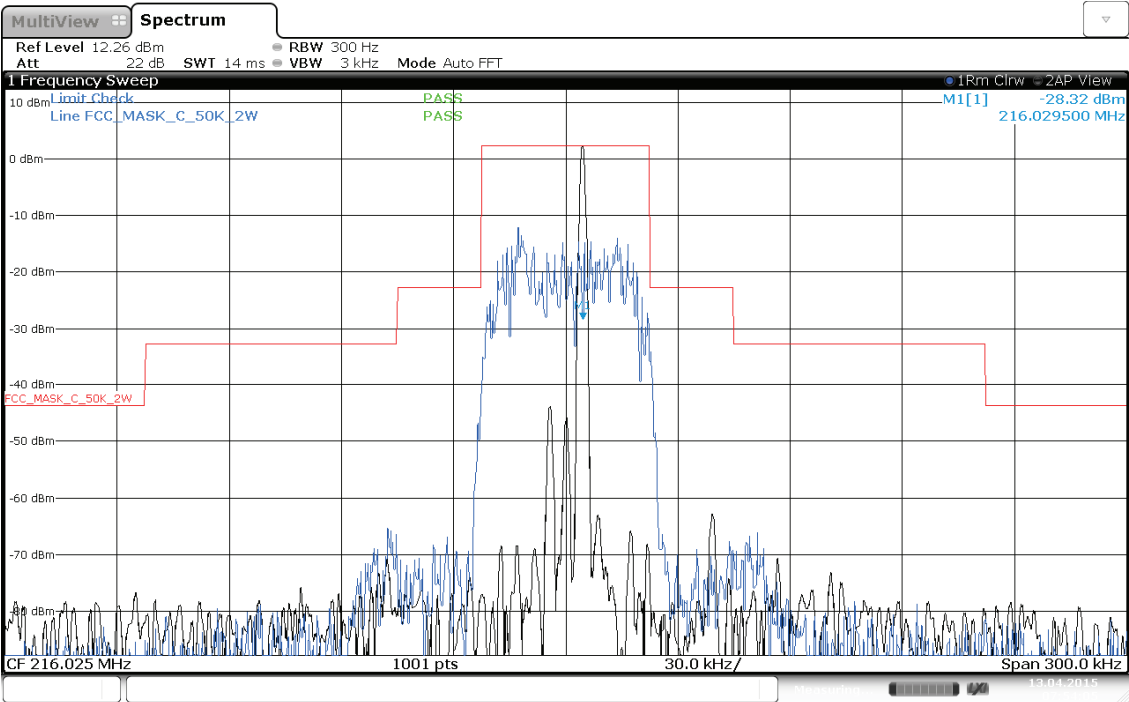
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 07:53:13

### GRAPH 16: Spectrum for Emission 50 kHz $\pi/4$ -DQPSK

The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.

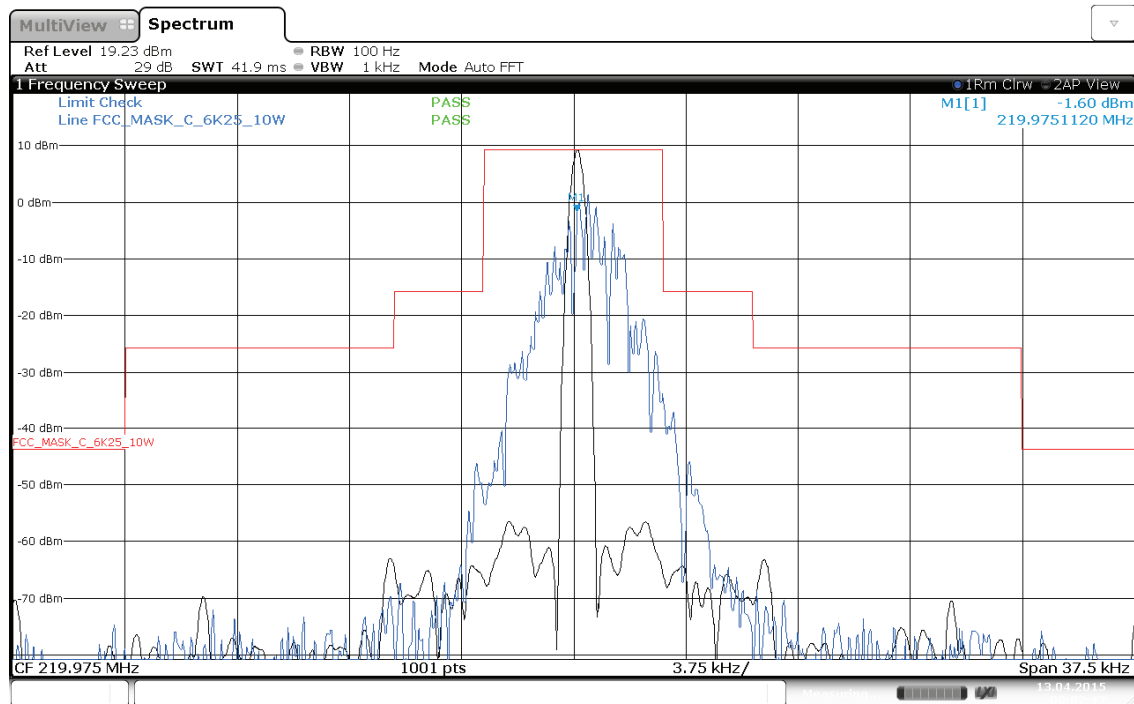


Date: 13.APR.2015 07:54:04

## 4.3 Graphs – 219.975 MHz

### GRAPH 17: Spectrum for Emission 6.25 kHz 4-CPFSK

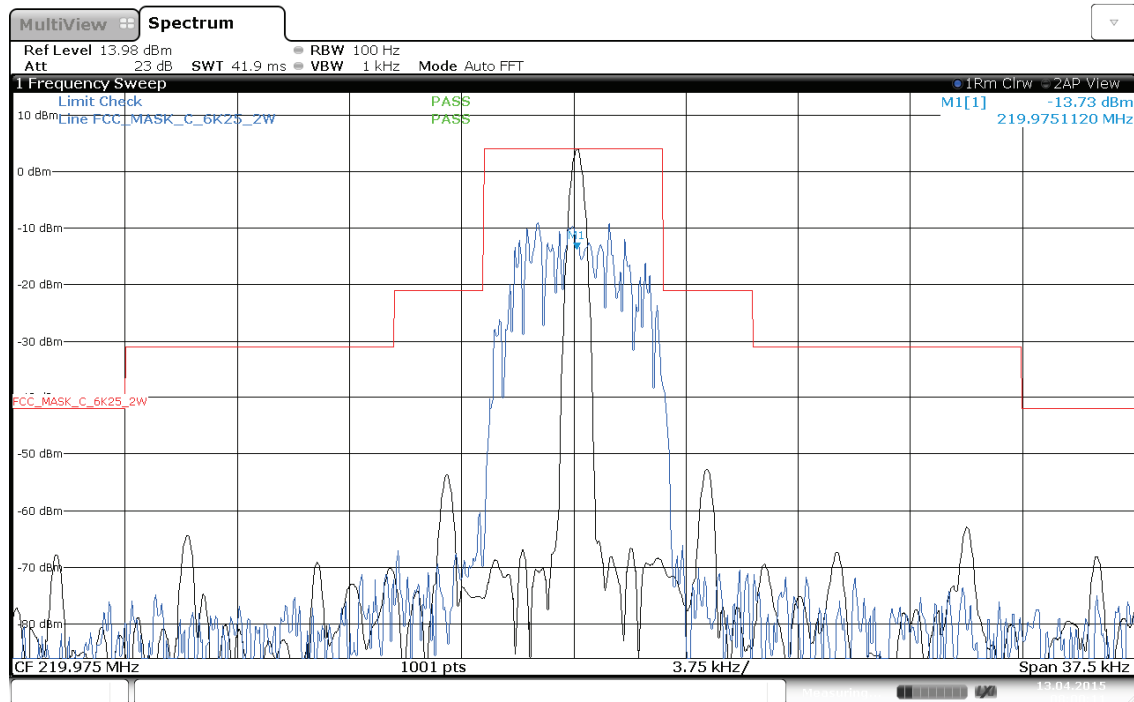
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:02:47

### GRAPH 18: Spectrum for Emission 6.25 kHz 16-DEQAM

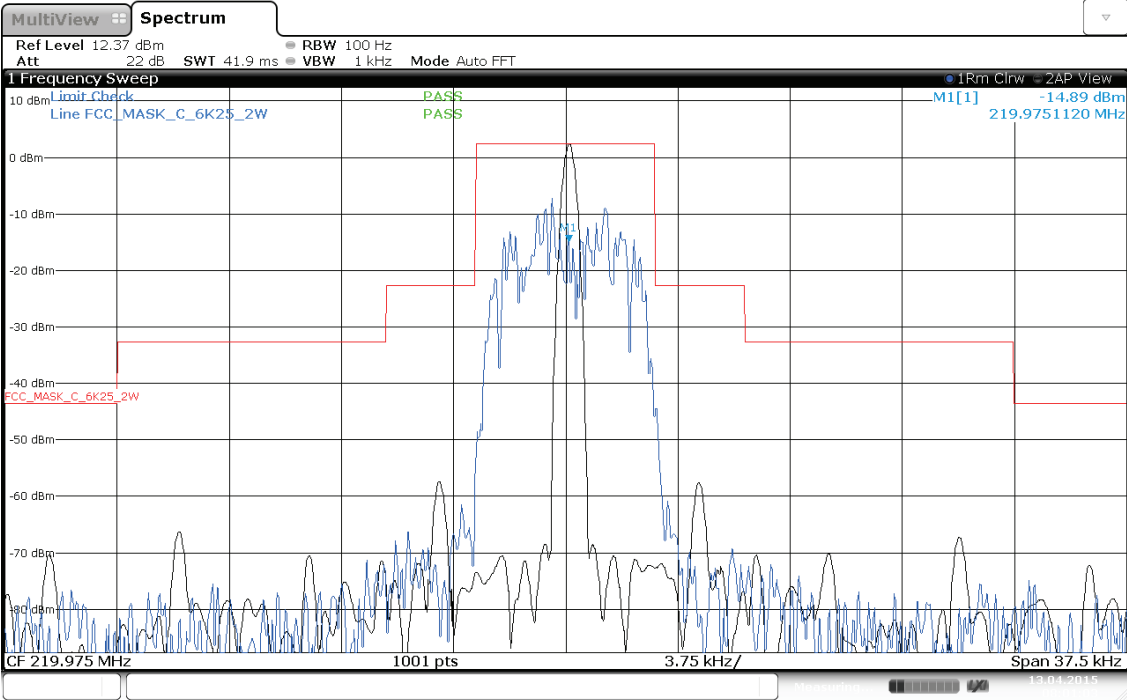
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:00:11

### GRAPH 19: Spectrum for Emission 6.25 kHz D8PSK

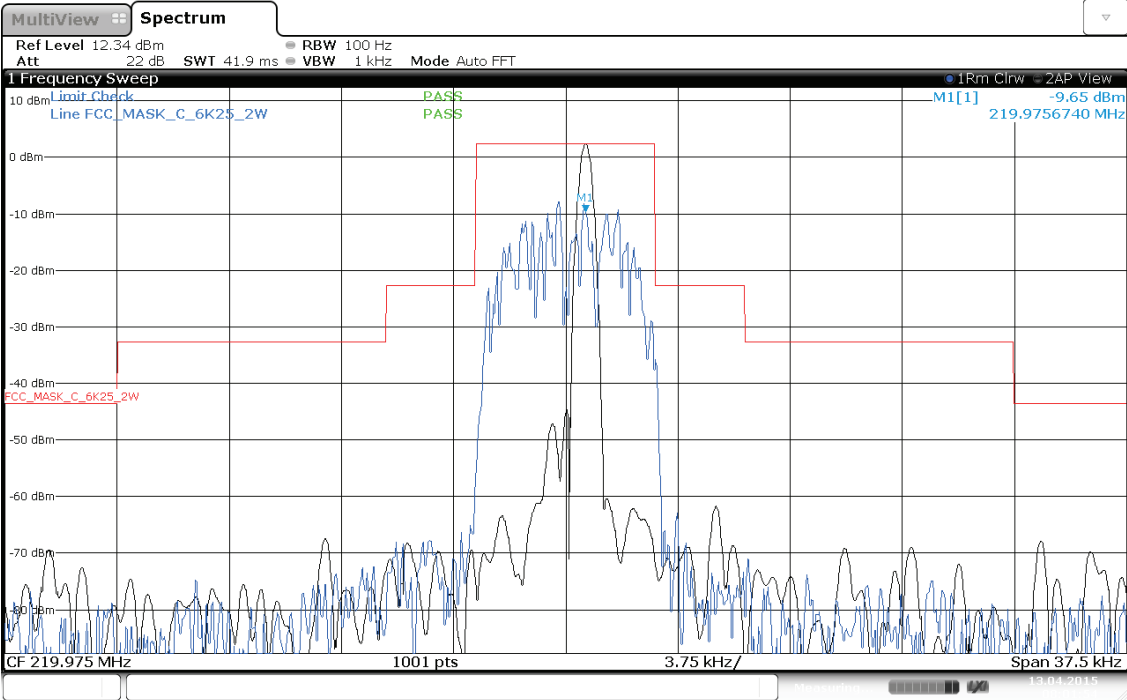
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:01:03

### GRAPH 20: Spectrum for Emission 6.25 kHz $\pi/4$ -DQPSK

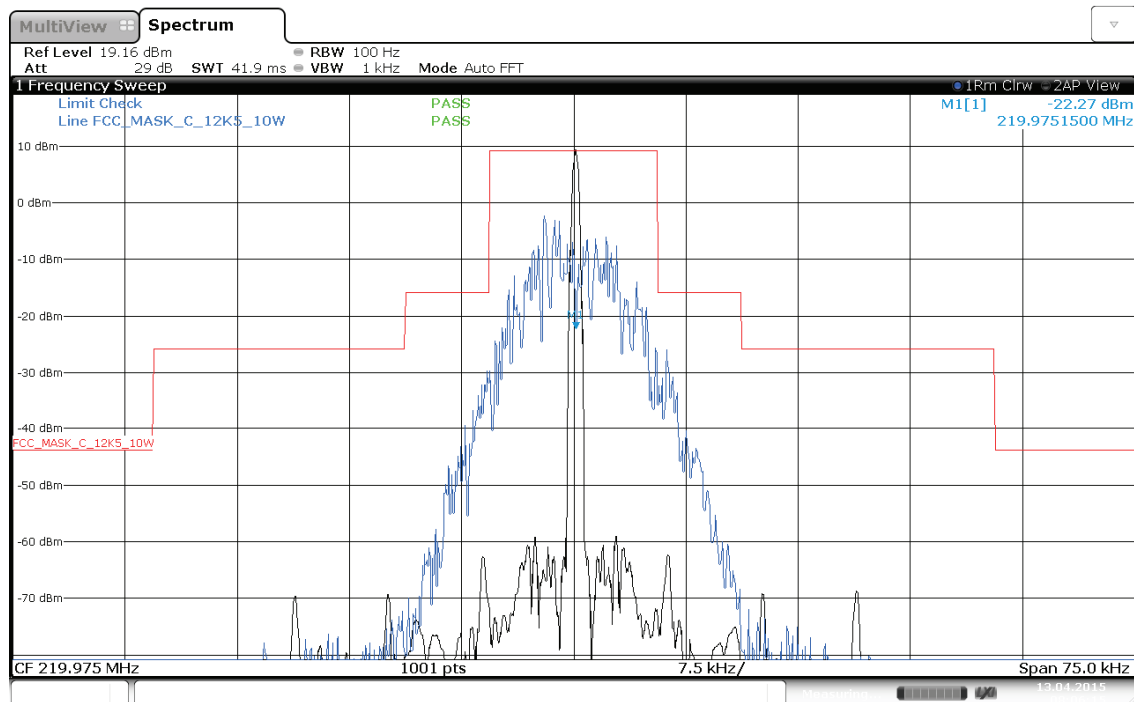
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:01:54

## GRAPH 21: Spectrum for Emission 12.5 kHz 4-CPFSK

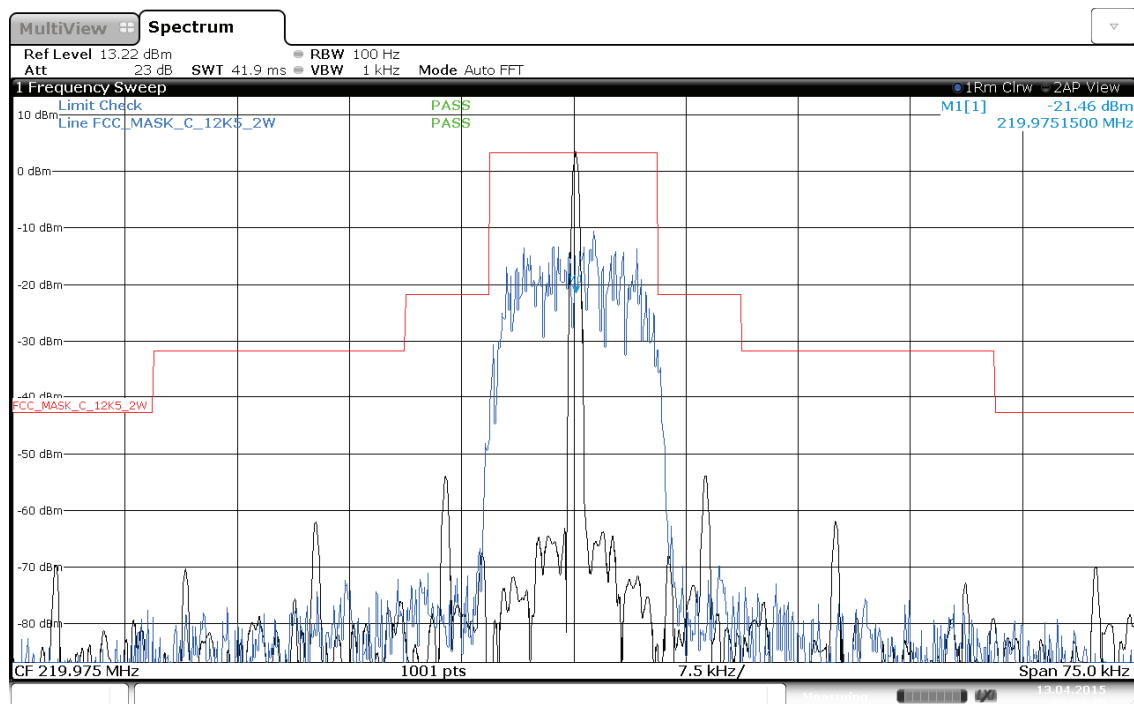
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:06:15

## GRAPH 22: Spectrum for Emission 12.5 kHz 16-DEQAM

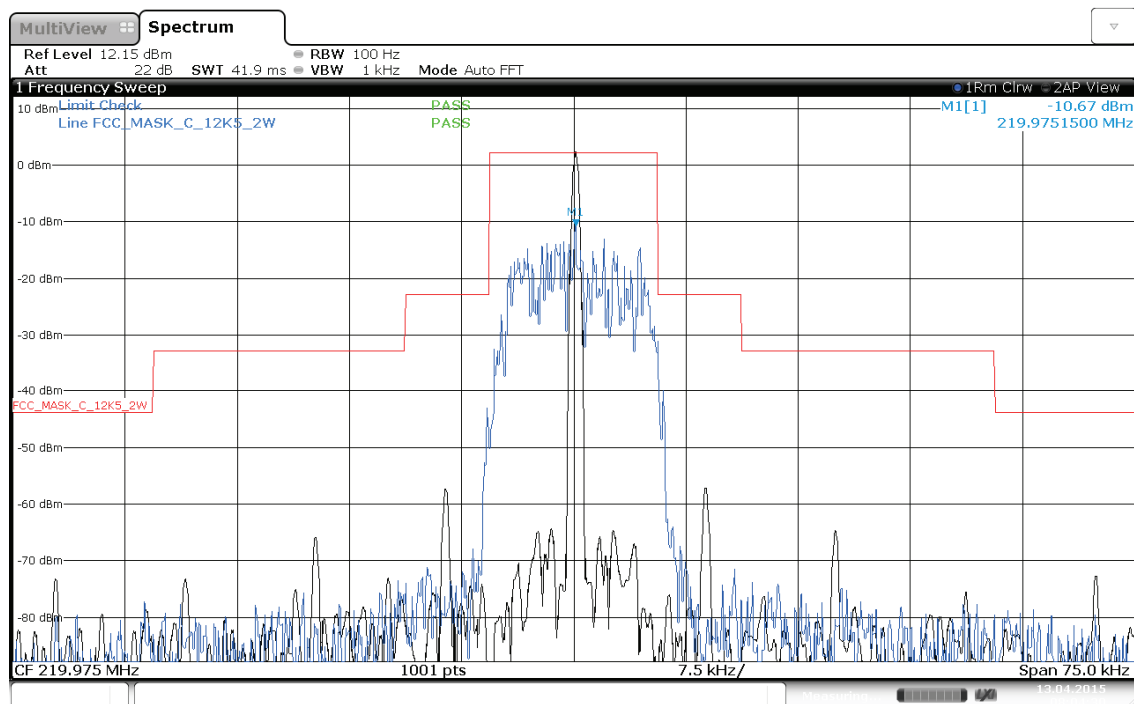
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:03:39

**GRAPH 23: Spectrum for Emission 12.5 kHz D8PSK**

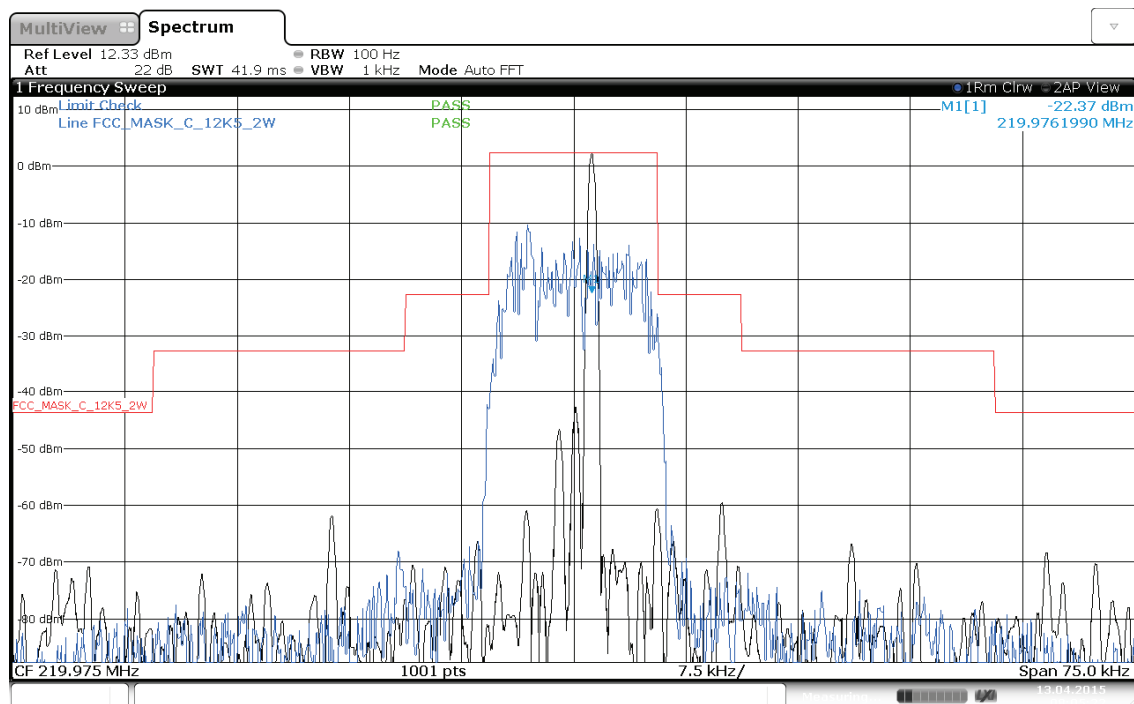
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:04:31

### GRAPH 24: Spectrum for Emission 12.5 kHz $\pi/4$ -DQPSK

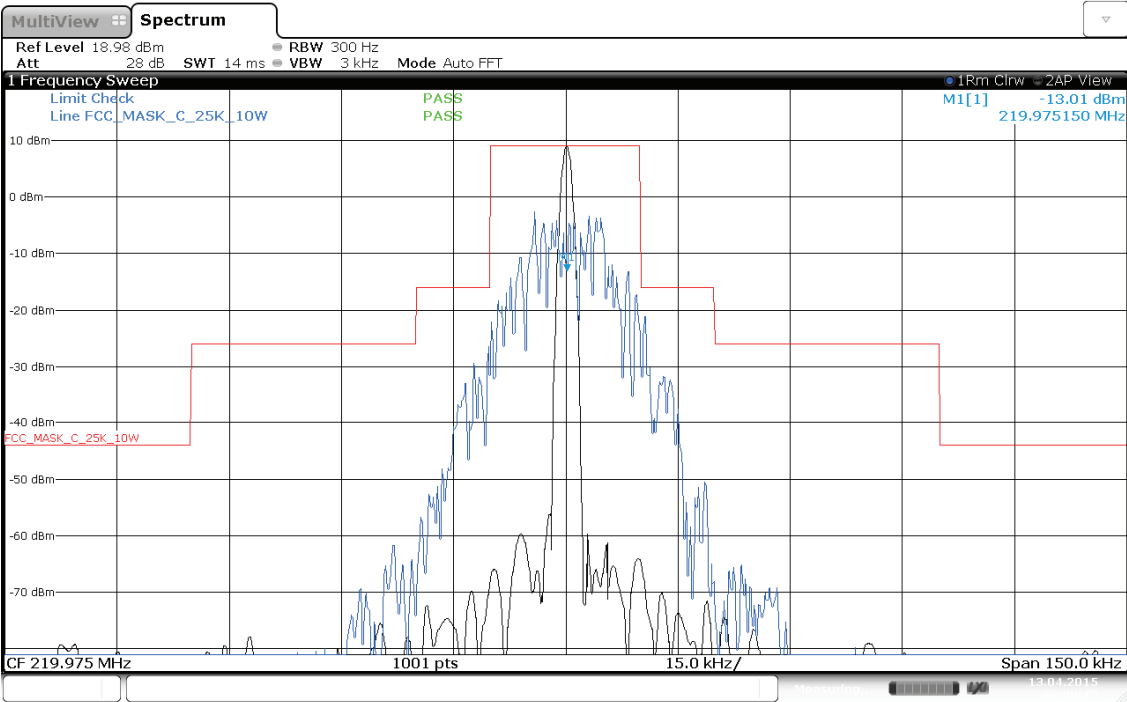
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:05:22

GRAPH 25: Spectrum for Emission 25 kHz 4-CPFSK

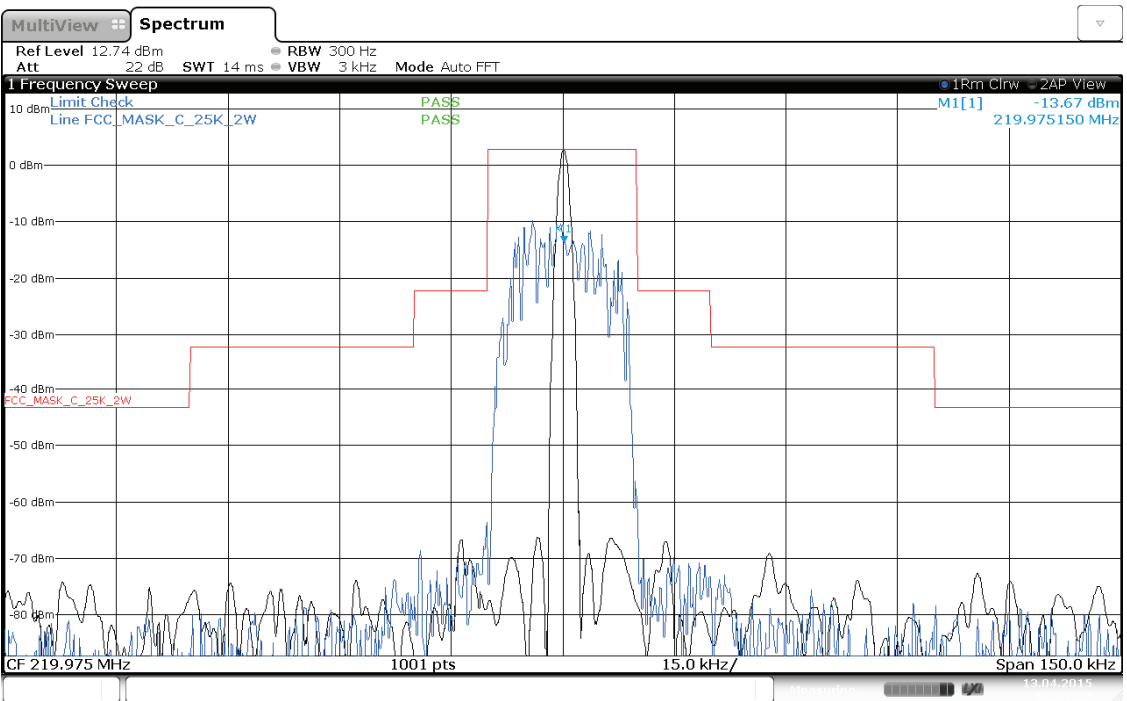
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:09:42

GRAPH 26: Spectrum for Emission 25 kHz 16-DEQAM

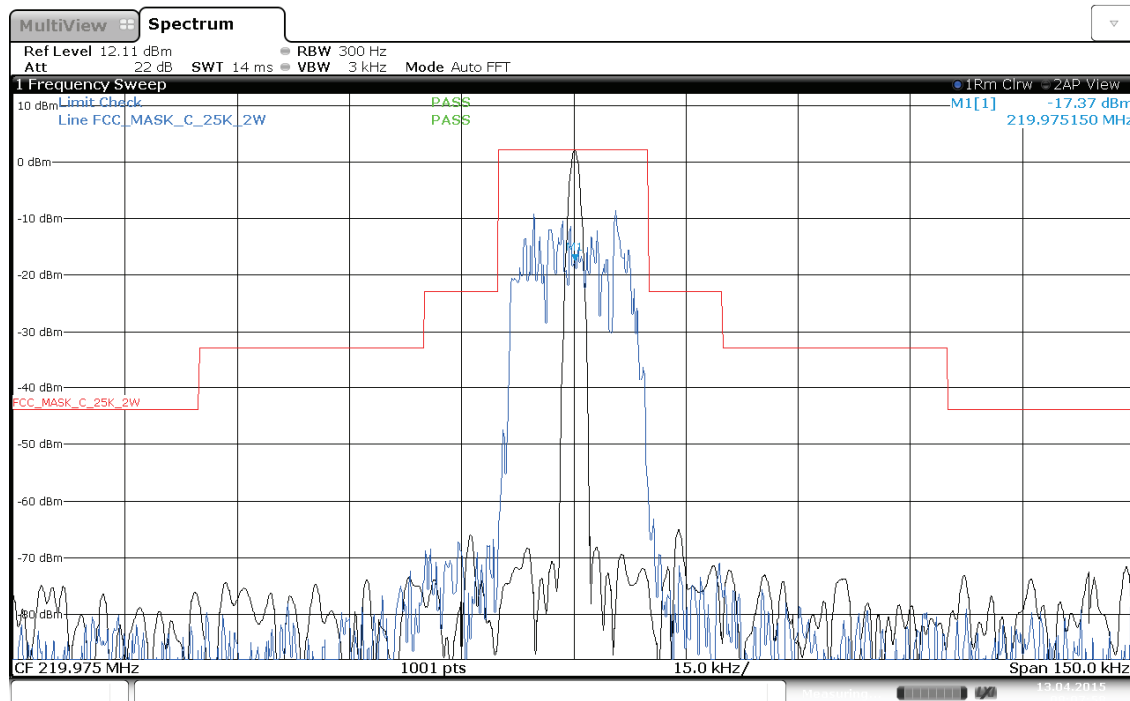
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:07:07

## GRAPH 27: Spectrum for Emission 25 kHz D8PSK

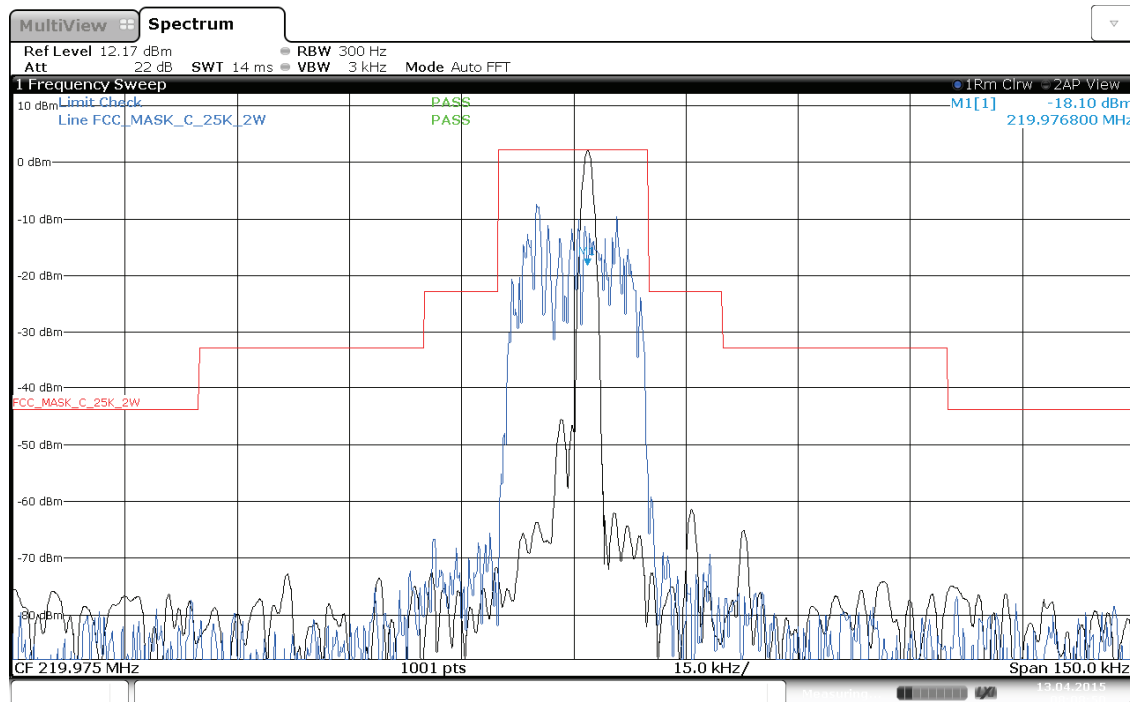
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:07:59

## GRAPH 28: Spectrum for Emission 25 kHz $\pi/4$ -DQPSK

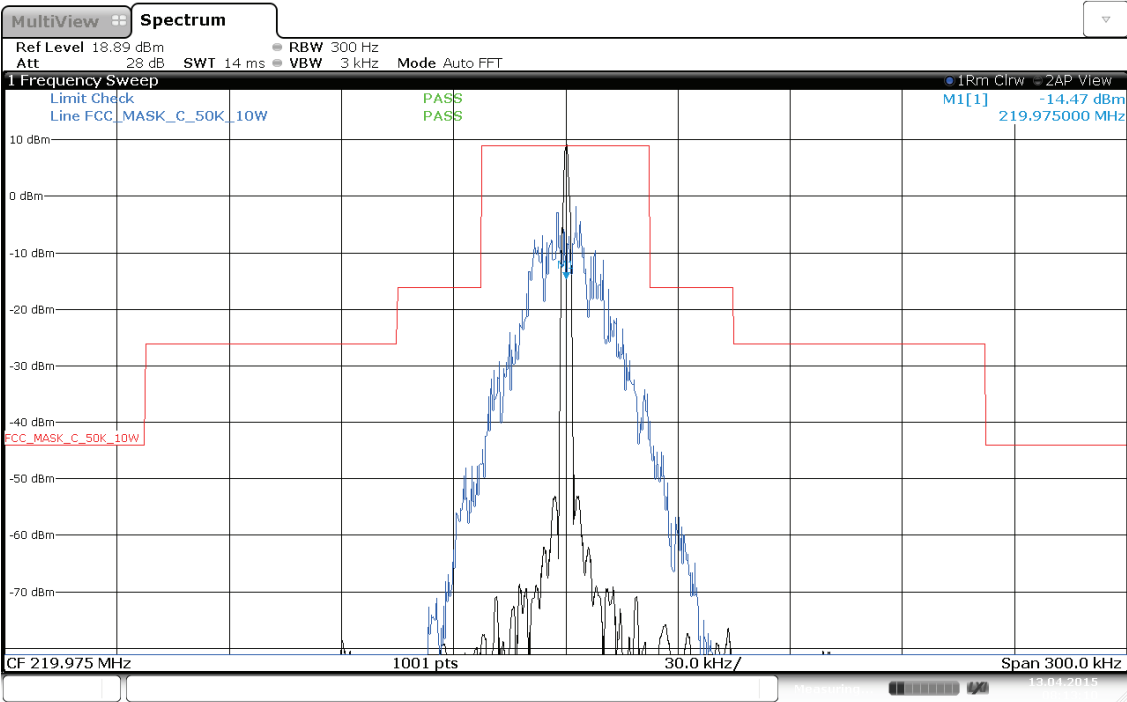
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:08:50

# GRAPH 29: Spectrum for Emission 50 kHz 4-CPFSK

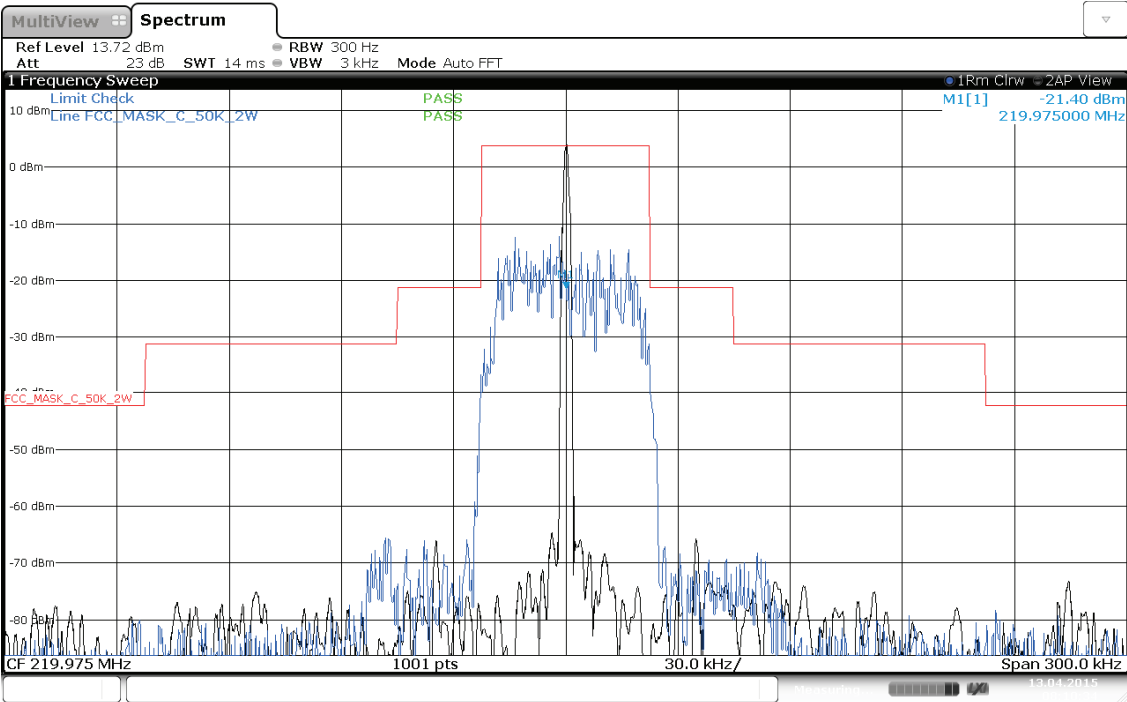
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:13:10

# GRAPH 30: Spectrum for Emission 50 kHz 16-DEQAM

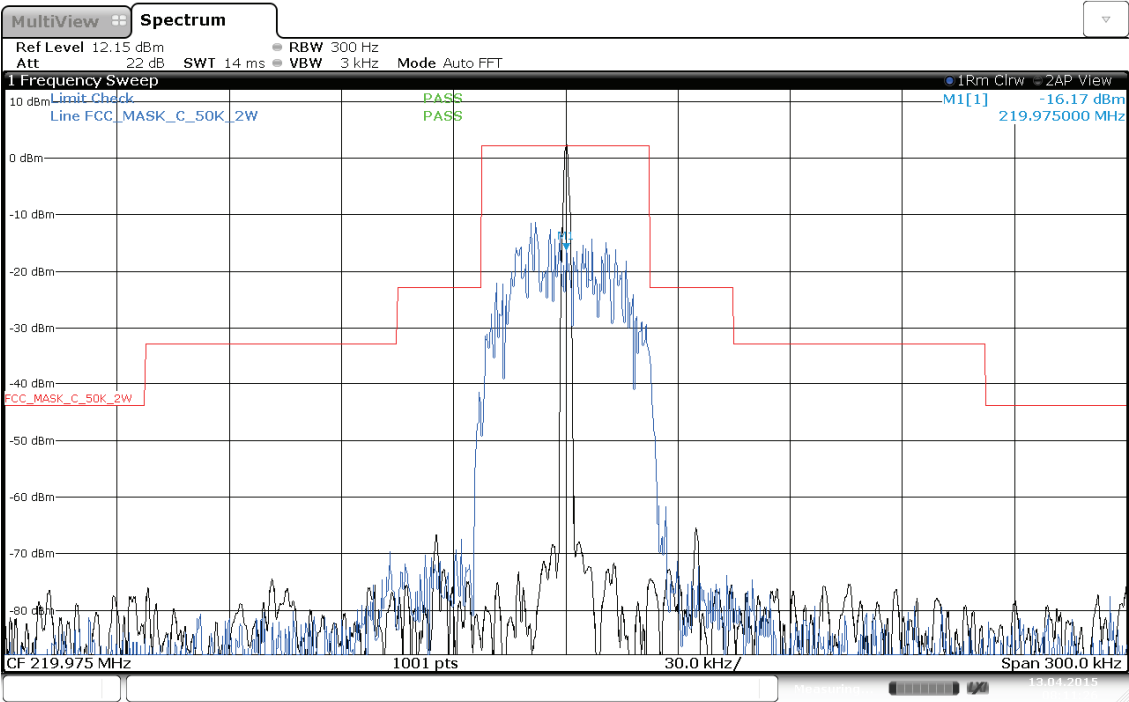
The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



Date: 13.APR.2015 08:10:35

### GRAPH 31: Spectrum for Emission 50 kHz D8PSK

The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.



### GRAPH 32: Spectrum for Emission 50 kHz $\pi/4$ -DQPSK

The total attenuation of the complete measuring assembly (at the frequency of the measurement), consisting of the 30dB attenuator, the losses of the measuring cables and connectors, is 30,5 dB.

