

|                             |               |
|-----------------------------|---------------|
| <b>Report Reference ID:</b> | 372462-5TRFWL |
|-----------------------------|---------------|

|                            |                                                                                                                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test specification:</b> | Title 47 – Telecommunication<br>Chapter I – Federal Communications Commission<br>Part 90 – Private land mobile radio services<br><br>RSS-131 Issue 3<br>Zone Enhancers<br><br>RSS-119 Issue 12<br>Land Mobile and Fixed Equipment Operating in the Frequency Range 27.41-960 MHz |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                |                                                                                |
|--------------------------------|--------------------------------------------------------------------------------|
| <b>Applicant:</b>              | <b>Andrew Wireless Systems</b><br>Industriering, 10 – 86675 Buchdorf – Germany |
| <b>Apparatus:</b>              | Carrier Access Point                                                           |
| <b>Model:</b>                  | CAP M 4/70/80 F-AC;<br>CAP M 4/70/80 F-DC                                      |
| <b>FCC ID:</b>                 | XS5-CAPM47080                                                                  |
| <b>IC Registration Number:</b> | 2237E-CAPM47080                                                                |

|                            |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| <b>Testing laboratory:</b> | <b>Nemko Spa</b><br>Via del Carroccio, 4 – 20853 Biassono (MB) – Italy |
|----------------------------|------------------------------------------------------------------------|

|                     | Name, function and signature                                                                                   | Date       |
|---------------------|----------------------------------------------------------------------------------------------------------------|------------|
| <b>Tested by:</b>   | Tessa S.  (project handler) | 2019-09-09 |
| <b>Reviewed by:</b> | Barbieri P.  (verifier)     | 2019-09-09 |

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## Table of contents

|                                                                             |           |
|-----------------------------------------------------------------------------|-----------|
| <b>Section 1: Report summary .....</b>                                      | <b>4</b>  |
| 1.1 Test specification .....                                                |           |
| 1.2 Statement of compliance .....                                           |           |
| 1.3 Exclusions .....                                                        |           |
| 1.4 Registration number .....                                               |           |
| 1.5 Test report revision history .....                                      |           |
| 1.6 Limits of responsibility.....                                           |           |
| <b>Section 2: Summary of test results .....</b>                             | <b>5</b>  |
| 2.1 FCC Part 90, test results .....                                         |           |
| 2.2 RSS-131 and RSS-119, test results.....                                  |           |
| <b>Section 3: Equipment under test (EUT) and application details.....</b>   | <b>6</b>  |
| 3.1 Applicant details .....                                                 |           |
| 3.2 Modular equipment.....                                                  |           |
| 3.3 Product details.....                                                    |           |
| 3.4 Application purpose .....                                               |           |
| 3.5 Certification details .....                                             |           |
| 3.6 Composite/related equipment.....                                        |           |
| 3.7 Sample information.....                                                 |           |
| 3.8 EUT technical specifications.....                                       |           |
| 3.9 Accessories and support equipment.....                                  |           |
| 3.10 Operation of the EUT during testing.....                               |           |
| 3.11 EUT setup diagram.....                                                 |           |
| 3.12 Software version.....                                                  |           |
| <b>Section 4: Engineering considerations .....</b>                          | <b>9</b>  |
| 4.1 Modifications incorporated in the EUT .....                             |           |
| 4.2 Deviations from laboratory tests procedures.....                        |           |
| 4.3 Technical judgment .....                                                |           |
| <b>Section 5: Test conditions .....</b>                                     | <b>10</b> |
| 5.1 Deviations from laboratory tests procedures.....                        |           |
| 5.2 Test conditions, power source and ambient temperatures .....            |           |
| 5.3 Equipment used for the monitoring of the environmental conditions ..... |           |
| 5.4 Measurement uncertainty .....                                           |           |
| 5.5 Test equipment.....                                                     |           |
| <b>Section 6: Test results.....</b>                                         | <b>13</b> |
| 6.1 AGC threshold .....                                                     |           |
| 6.2 Out-of-band-rejection.....                                              |           |

|                                                         |                                                                |           |
|---------------------------------------------------------|----------------------------------------------------------------|-----------|
| 6.3                                                     | Input-versus-output signal comparison .....                    |           |
| 6.4                                                     | Input/output power and amplifier/booster gain .....            |           |
| 6.5                                                     | Noise figure measurements .....                                |           |
| 6.6                                                     | Out-of-band/out-of-block emissions conducted measurements..... |           |
| 6.7                                                     | EUT spurious emissions conducted measurements .....            |           |
| 6.8                                                     | Frequency stability measurements .....                         |           |
| 6.9                                                     | Spurious emissions radiated measurements .....                 |           |
| <b>Appendix A: Block diagrams of test set-ups .....</b> |                                                                | <b>58</b> |
| <b>Appendix B: Photos.....</b>                          |                                                                | <b>59</b> |

## Section 1: Report summary

### 1.1 Test specification

|                       |                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------|
| <b>Specifications</b> | FCC Part 90 – Private land mobile radio services                                                  |
|                       | RSS-131 Issue 3 – Zone Enhancers                                                                  |
|                       | RSS-119 Issue 12 – Land Mobile and Fixed Equipment Operating in the Frequency Range 27.41-960 MHz |

### 1.2 Statement of compliance

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Compliance</b> | In the configuration tested the EUT was found compliant                                                                                                                                                                                                                                                                                                                                                             |
|                   | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                 |
|                   | This report contains an assessment of apparatus against specifications based upon tests carried out on samples submitted at Nemko Spa. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 90, RSS-131 Issue 3 and RSS-119 Issue 12. The tests were conducted in accordance with ANSI C63.26-2015 and KDB 935210 D05 Indus Booster Basic Meas v01r03. |

### 1.3 Exclusions

|                   |      |
|-------------------|------|
| <b>Exclusions</b> | None |
|-------------------|------|

### 1.4 Registration number

|                   |                                                   |
|-------------------|---------------------------------------------------|
| <b>Test site:</b> | FCC ID number 682159 (10 m Semi anechoic chamber) |
|-------------------|---------------------------------------------------|

### 1.5 Test report revision history

| Revision # | Details of changes made to test report |
|------------|----------------------------------------|
| 1          | Original report issued                 |

### 1.6 Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report. This test report has been completed in accordance with the requirements of ISO/IEC 17025. Nemko Spa authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Spa accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

## Section 2: Summary of test results

### 2.1 FCC Part 90, test results

| Part                            | Methods                          | Test description                                             | Verdict |
|---------------------------------|----------------------------------|--------------------------------------------------------------|---------|
| --                              | 935210 D05v01r03<br>Clause 4.2   | AGC threshold                                                | Pass    |
| --                              | 935210 D05v01r03<br>Clause 4.3   | Out of band rejection                                        | Pass    |
| 90.210(b)(c)(d)<br>90.219(e)(4) | 935210 D05v01r03<br>Clause 4.4   | Input-versus-output signal comparison                        | Pass    |
| 90.205(r)<br>90.219(e)(1)       | 935210 D05v01r03<br>Clause 4.5   | Input/output power and amplifier/booster gain                | Pass    |
| 90.219(e)(2)                    | 935210 D05v01r03<br>Clause 4.6   | Noise Figure                                                 | Pass    |
| 90.210(b)(c)(d)<br>90.219(e)(3) | 935210 D05v01r03<br>Clause 4.7.2 | Out-of-band/out-of-block emissions<br>conducted measurements | Pass    |
| 90.210(b)(c)(d)                 | 935210 D05v01r03<br>Clause 4.7.3 | EUT spurious emissions conducted<br>measurements             | Pass    |
| 90.213                          | 935210 D05v01r03<br>Clause 4.8   | Frequency stability measurements                             | Pass    |
| 90.210(b)(c)(d)                 | 935210 D05v01r03<br>Clause 4.9   | Spurious emissions radiated<br>measurements                  | Pass    |
| Notes:                          |                                  |                                                              |         |

### 2.2 RSS-131 and RSS-119, test results

| Part                                 | Methods                          | Test description                                             | Verdict |
|--------------------------------------|----------------------------------|--------------------------------------------------------------|---------|
| --                                   | 935210 D05v01r03<br>Clause 4.2   | AGC threshold                                                | Pass    |
| --                                   | 935210 D05v01r03<br>Clause 4.3   | Out of band rejection                                        | Pass    |
| RSS-131 §6.6(1)(2)<br>RSS-119 §5.8.3 | 935210 D05v01r03<br>Clause 4.4   | Input-versus-output signal comparison                        | Pass    |
| RSS-131 §6.2<br>RSS-119 §5.4         | 935210 D05v01r03<br>Clause 4.5   | Input/output power and amplifier/booster gain                | Pass    |
| RSS-131 §6.4                         | 935210 D05v01r03<br>Clause 4.6   | Noise Figure                                                 | Pass    |
| RSS-131 §6.5<br>RSS-119 §5.8.3       | 935210 D05v01r03<br>Clause 4.7.2 | Out-of-band/out-of-block emissions<br>conducted measurements | Pass    |
| RSS-131 §6.6(2)<br>RSS-119 §5.8.3    | 935210 D05v01r03<br>Clause 4.7.3 | EUT spurious emissions conducted<br>measurements             | Pass    |
| RSS-119 §5.3                         | 935210 D05v01r03<br>Clause 4.8   | Frequency stability measurements                             | Pass    |
| RSS-131 §6.6(2)<br>RSS-119 §5.8.3    | 935210 D05v01r03<br>Clause 4.9   | Spurious emissions radiated<br>measurements                  | Pass    |
| Notes:                               |                                  |                                                              |         |

## Section 3: Equipment under test (EUT) and application details

### 3.1 Applicant details

|                     |                                    |                         |
|---------------------|------------------------------------|-------------------------|
| <b>Applicant</b>    | Name:                              | Andrew Wireless Systems |
|                     | Address:                           | Industriering, 10       |
|                     | City:                              | Buchdorf                |
|                     | Province/State:                    | --                      |
|                     | Post code:                         | 86675                   |
|                     | Country:                           | Germany                 |
|                     | Federal Registration Number (FRN): | --                      |
|                     | Grantee code                       | --                      |
| <b>Manufacturer</b> | IC company number:                 | --                      |
|                     | Name:                              | Andrew Wireless Systems |
|                     | Address:                           | Industriering, 10       |
|                     | City:                              | Buchdorf                |
|                     | Province/State:                    | --                      |
|                     | Post code:                         | 86675                   |
|                     | Country:                           | Germany                 |
|                     | <b>Canadian representative</b>     | Name:                   |
| Address:            |                                    | Industriering, 10       |
| City:               |                                    | Buchdorf                |
| Province/State:     |                                    | --                      |
| Post code:          |                                    | 86675                   |
| Country:            |                                    | Germany                 |

### 3.2 Modular equipment

|                                           |                                                                                                        |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>a) Single modular approval</b>         | Single modular approval<br>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>         |
| <b>b) Limited single modular approval</b> | Limited single modular approval<br>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |

### 3.3 Product details

|                                                 |                                                                                                                                             |                                           |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>FCC ID</b>                                   | Grantee code:                                                                                                                               | XS5                                       |
|                                                 | Product code:                                                                                                                               | -CAPM47080                                |
| <b>IC ID</b>                                    | Proposed certification number:                                                                                                              | 2237E-CAPM47080                           |
| <b>Equipment class</b>                          | B9B                                                                                                                                         |                                           |
| <b>Description of product as it is marketed</b> | Carrier Access Point                                                                                                                        |                                           |
|                                                 | Model name:                                                                                                                                 | CAP M 4/70/80 F-AC;<br>CAP M 4/70/80 F-DC |
|                                                 | Serial number:                                                                                                                              | TEST 5                                    |
| <b>Product</b>                                  | The EUT is also classified as Terminal Equipment subject to IC CS-03<br>No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> |                                           |
|                                                 | Network interface type:                                                                                                                     |                                           |
|                                                 | Ringer equivalence number:                                                                                                                  |                                           |
|                                                 | Single line equipment: No <input type="checkbox"/> Yes <input type="checkbox"/>                                                             |                                           |
|                                                 | Terminal equipment category:                                                                                                                |                                           |

### 3.4 Application purpose

|                            |                                                                                                                                                                                                                                                                                                                     |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of application</b> | <input checked="" type="checkbox"/> Original certification<br><input type="checkbox"/> Change in identification of presently authorized equipment<br><input type="checkbox"/> Original FCC ID: Grant date:<br><input type="checkbox"/> Class II permissive change or modification of presently authorized equipment |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 3.5 Certification details

|                                                 |                                                                                                                                                                                                                                 |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Services requested</b><br>Type of assessment | <input checked="" type="checkbox"/> New certification<br><input type="checkbox"/> New family<br><input type="checkbox"/> Re-assessment<br><input type="checkbox"/> Existing family<br><input type="checkbox"/> Multiple listing |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 3.6 Composite/related equipment

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>a) Composite equipment</b> | The EUT is a composite device subject to an additional equipment authorization<br>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                      |
| <b>b) Related equipment</b>   | The EUT is part of a system that operates with, or is marketed with, another device that requires an equipment authorization<br>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                                                                                                                                                                                                        |
| <b>c) Related FCC ID</b>      | If either of the above is "yes":<br><input type="checkbox"/> has been granted under the FCC ID(s) listed below:<br><input type="checkbox"/> is in the process of being filled under the FCC ID(s) listed below:<br><input type="checkbox"/> is pending with the FCC ID(s) listed below:<br><input type="checkbox"/> has a mix of pending and granted statuses under the FCC ID(s) listed below:<br>i FCC ID:<br>ii FCC ID: |

### 3.7 Sample information

|                         |            |
|-------------------------|------------|
| <b>Receipt date:</b>    | 2019-06-06 |
| <b>Nemko sample ID:</b> | 372462-1/2 |

### 3.8 EUT technical specifications

|                             |                                                                                                        |
|-----------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Operating band:</b>      | 406.1 – 420 MHz                                                                                        |
| <b>Operating frequency:</b> | Wideband                                                                                               |
| <b>Modulation type:</b>     | F3E, D7W and D1W                                                                                       |
| <b>Occupied bandwidth:</b>  | 12.5 kHz                                                                                               |
| <b>Channel spacing:</b>     | Standard                                                                                               |
| <b>Emission designator:</b> | F3E, D7W and D1W                                                                                       |
| <b>RF Output</b>            | Down Link: 22 dBm (0.16 W)<br>Up Link: The EUT does not transmit over the air in the up-link direction |
| <b>Gain</b>                 | Down Link: 22 dB<br>Up Link: The EUT does not transmit over the air in the up-link direction           |
| <b>Antenna type:</b>        | equipment with a 50 $\Omega$ RF connector (antenna not provided)                                       |
| <b>Power source:</b>        | 100-240 Vac                                                                                            |

### 3.9 Accessories and support equipment

The following information identifies accessories used to exercise the EUT during testing:

|                        |                                     |
|------------------------|-------------------------------------|
| Item # 1               |                                     |
| Type of equipment:     | Rack                                |
| Brand name:            | CommScope                           |
| Model name or number:  | 7642110-01                          |
| Serial number:         | 21319110463                         |
| Connection port:       | --                                  |
| Cable length and type: | --                                  |
| Item # 2               |                                     |
| Type of equipment:     | SUI Card                            |
| Brand name:            | CommScope                           |
| Model name or number:  | 7642125-00                          |
| Serial number:         | SZBEAC1839A0009                     |
| Connection port:       | LAN port                            |
| Cable length and type: | 2 m standard cable                  |
| Item # 3               |                                     |
| Type of equipment:     | OPT Card                            |
| Brand name:            | CommScope                           |
| Model name or number:  | 7642123-00                          |
| Serial number:         | SZBEAD1737A0070                     |
| Connection port:       | Optical port                        |
| Cable length and type: | 10 m optical fiber                  |
| Item # 4               |                                     |
| Type of equipment:     | 2 x RFD Card                        |
| Brand name:            | CommScope                           |
| Model name or number:  | 7633229-02                          |
| Serial number:         | SZBEAP1919A0036 and SZBEAP1919A0023 |
| Connection port:       | RF port with QMA connector          |
| Cable length and type: | 1 m Coaxial cable                   |
| Item # 5               |                                     |
| Type of equipment:     | Power supply unit                   |
| Brand name:            | CommScope                           |
| Model name or number:  | 7693531-00 with 7663610-00          |
| Serial number:         | PSU_1_0 + PSU12V_1_0                |
| Connection port:       | AC mains                            |
| Cable length and type: | 1.5 m standard cable                |

### 3.10 Operation of the EUT during testing

|                 |                                                                              |
|-----------------|------------------------------------------------------------------------------|
| <b>Details:</b> | In down-link direction, normal working at max gain with max RF power output. |
|-----------------|------------------------------------------------------------------------------|

### 3.11 EUT setup diagram

In this system, Remote Unit is the EUT. Master Unit includes only management module and optical module (to convert RF signal in optical signal in down link direction and vice versa optical signal in RF signal in up link direction). As described in “Operational description”, master unit is connected directly to base station, so the system doesn’t use another equipment to exercise the EUT. Signal generator is linked directly to the RF connector of the RFD card in the Master Unit.

#### Test setup:



#### Procedure

Connect the signal modulated generator to the input of the EUT, so that the EUT works at the max gain. Raise the input level to the EUT until reach the maximum output power. Connect the spectrum analyzer to the RF output connector of the EUT.

### 3.12 Software version

|                 |                                                                                                                                                                      |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Details:</b> | <b>ERA and ION-E Software V 2.7</b> (SW is preloaded into ERA systems and to setup the system it’s required a connection through LAN and access to html setup page). |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Section 4: Engineering considerations

### 4.1 Modifications incorporated in the EUT

|                      |                                                                                                                                                                                                                                 |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Modifications</b> | Modifications performed to the EUT during this assessment<br>None <input checked="" type="checkbox"/> Yes <input type="checkbox"/> , performed by Client <input type="checkbox"/> or Nemko <input type="checkbox"/><br>Details: |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 4.2 Deviations from laboratory tests procedures

|                   |                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Deviations</b> | Deviations from laboratory test procedures<br>None <input checked="" type="checkbox"/> Yes <input type="checkbox"/> - details are listed below: |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|

### 4.3 Technical judgment

|                 |      |
|-----------------|------|
| <b>Judgment</b> | None |
|-----------------|------|

## Section 5: Test conditions

### 5.1 Deviations from laboratory tests procedures

No deviations were made from laboratory test procedures.

### 5.2 Test conditions, power source and ambient temperatures

|                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Normal temperature, humidity and air pressure test conditions | <p>Unless different values are declared in the test case, following ambient conditions apply for the tests:</p> <p>Temperature: <math>18 \div 33</math> °C<br/> Relative humidity: <math>30 \div 60</math> %<br/> Air pressure: <math>980 \div 1060</math> hPa</p> <p>When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.</p> |
| Power supply range:                                           | The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5$ %, for which the equipment was designed.                                                                                                                                                                                      |

### 5.3 Equipment used for the monitoring of the environmental conditions

| Equipment                     | Manufacturer | Model   | Serial N°    |
|-------------------------------|--------------|---------|--------------|
| Thermohygrometer data loggers | Testo        | 175-H2  | 20012380/305 |
| Thermohygrometer data loggers | Testo        | 175-H2  | 38203337/703 |
| Barometer                     | MSR          | MSR145B | 330080       |

| 5.4 Measurement uncertainty |           |                                                                                         |                          |                         |       |
|-----------------------------|-----------|-----------------------------------------------------------------------------------------|--------------------------|-------------------------|-------|
| EUT                         | Type      | Test                                                                                    | Range and Setup features | Measurement Uncertainty | Notes |
| Transmitter                 | Conducted | Frequency error                                                                         | 0.001 MHz ÷ 40 GHz       | 0.08 ppm                | (1)   |
|                             |           | Carrier power<br>RF Output Power                                                        | 10 kHz ÷ 30 MHz          | 1.0 dB                  | (1)   |
|                             |           |                                                                                         | 30 MHz ÷ 18 GHz          | 1.5 dB                  | (1)   |
|                             |           |                                                                                         | 18 MHz ÷ 40 GHz          | 3.0 dB                  | (1)   |
|                             |           | Adjacent channel power                                                                  | 1 MHz ÷ 18 GHz           | 1.6 dB                  | (1)   |
|                             |           | Conducted spurious emissions                                                            | 10 kHz ÷ 26 GHz          | 3.0 dB                  | (1)   |
|                             |           |                                                                                         | 26 GHz ÷ 40 GHz          | 4.5 dB                  | (1)   |
|                             |           | Intermodulation attenuation                                                             | 1 MHz ÷ 18 GHz           | 2.2 dB                  | (1)   |
|                             |           | Attack time – frequency behaviour                                                       | 1 MHz ÷ 18 GHz           | 2.0 ms                  | (1)   |
|                             |           | Attack time – power behaviour                                                           | 1 MHz ÷ 18 GHz           | 2.5 ms                  | (1)   |
|                             |           | Release time – frequency behaviour                                                      | 1 MHz ÷ 18 GHz           | 2.0 ms                  | (1)   |
|                             |           | Release time – power behaviour                                                          | 1 MHz ÷ 18 GHz           | 2.5 ms                  | (1)   |
|                             |           | Transient behaviour of the transmitter– Transient frequency behaviour                   | 1 MHz ÷ 18 GHz           | 0.2 kHz                 | (1)   |
|                             |           | Transient behaviour of the transmitter – Power level slope                              | 1 MHz ÷ 18 GHz           | 9%                      | (1)   |
|                             |           | Frequency deviation - Maximum permissible frequency deviation                           | 0.001 MHz ÷ 18 GHz       | 1.3%                    | (1)   |
|                             |           | Frequency deviation - Response of the transmitter to modulation frequencies above 3 kHz | 0.001 MHz ÷ 18 GHz       | 0.5 dB                  | (1)   |
|                             |           | Dwell time                                                                              | -                        | 3%                      | (1)   |
|                             |           | Hopping Frequency Separation                                                            | 0.01 MHz ÷ 18 GHz        | 1%                      | (1)   |
|                             |           | Occupied Channel Bandwidth                                                              | 0.01 MHz ÷ 18 GHz        | 2%                      | (1)   |
|                             |           | Modulation Bandwidth                                                                    | 0.01 MHz ÷ 18 GHz        | 2%                      | (1)   |
| Receiver                    | Radiated  | Radiated spurious emissions                                                             | 10 kHz ÷ 26.5 GHz        | 6.0 dB                  | (1)   |
|                             |           |                                                                                         | 26.5 GHz ÷ 40 GHz        | 8.0 dB                  | (1)   |
|                             |           | Effective radiated power transmitter                                                    | 10 kHz ÷ 26.5 GHz        | 6.0 dB                  | (1)   |
|                             |           |                                                                                         | 26,5 GHz ÷ 40 GHz        | 8.0 dB                  | (1)   |
|                             | Radiated  | Radiated spurious emissions                                                             | 10 kHz ÷ 26.5 GHz        | 6.0 dB                  | (1)   |
|                             |           |                                                                                         | 26.5 GHz ÷ 40 GHz        | 8.0 dB                  | (1)   |
| Receiver                    | Radiated  | Sensitivity measurement                                                                 | 1 MHz ÷ 18 GHz           | 6.0 dB                  | (1)   |
|                             |           |                                                                                         | 1 MHz ÷ 18 GHz           | 6.0 dB                  | (1)   |
|                             | Conducted | Conducted spurious emissions                                                            | 10 kHz ÷ 26 GHz          | 3.0 dB                  | (1)   |
|                             |           |                                                                                         | 26 GHz ÷ 40 GHz          | 4.5 dB                  | (1)   |

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k = 2$  which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %

| 5.5 Test equipment                                                  |                 |                            |           |          |          |
|---------------------------------------------------------------------|-----------------|----------------------------|-----------|----------|----------|
| Equipment                                                           | Manufacturer    | Model                      | Serial N° | Cal Date | Due Date |
| Trilog Broadband Antenna                                            | Schwarzbeck     | VULB 9162                  | 9162-025  | 2018-07  | 2021-07  |
| Bilog antenna (1 ÷ 18 GHz)                                          | Schwarzbeck     | STLP 9148                  | 9148-123  | 2018-07  | 2021-07  |
| Broadband preamplifier                                              | Schwarzbeck     | BBV 9718                   | 9718-137  | 2018-08  | 2019-08  |
| EMI receiver (9 kHz ÷ 3 GHz)                                        | Rohde & Schwarz | ESCI                       | 100888    | 2018-09  | 2019-09  |
| EMI receiver (20 Hz ÷ 8 GHz)                                        | Rohde & Schwarz | ESU8                       | 100202    | 2019-01  | 2020-01  |
| EMI receiver (2 Hz ÷ 44 GHz)                                        | Rohde & Schwarz | ESW44                      | 101620    | 2018-08  | 2019-08  |
| Signal generator                                                    | Rohde & Schwarz | SMBV100A                   | 263397    | 2018-09  | 2019-09  |
| Signal generator                                                    | Rohde & Schwarz | SMBV100A                   | 263254    | 2019-03  | 2020-03  |
| Semi-anechoic chamber                                               | Nemko           | 10 m semi-anechoic chamber | 530       | 2018-09  | 2021-09  |
| Shielded room                                                       | Siemens         | 10 m control room          | 1947      | NSC      | --       |
| Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use |                 |                            |           |          |          |

## Section 6: Test results

### 6.1 AGC threshold

Test performed according to KDB 935210 D05 Indus Booster Basic Meas v01r03 clause 4.2.

In the case of fiber-optic distribution systems, the RF input port of the equipment under test (EUT) refers to the RF input of the supporting equipment RF to optical convertor. Devices intended to be directly connected to an RF source (donor port) only need to be evaluated for any over-the-air transmit paths.

The AGC threshold level is the input level until a 1 dB increase in the input signal power no longer causes a 1 dB increase in the output signal power.

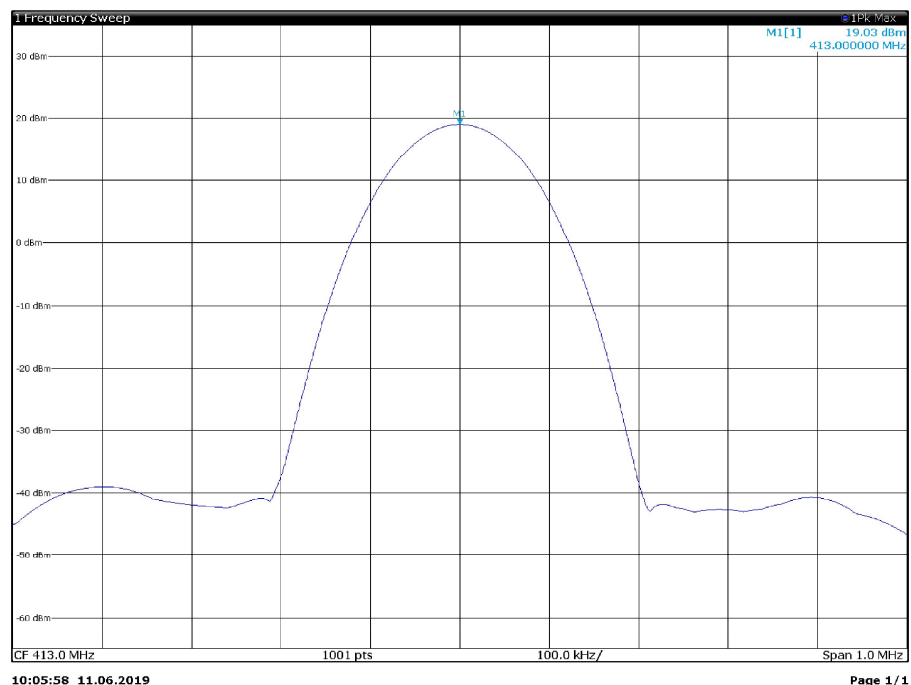
Test date: 2019-06-11

Test results: Pass

### Special notes

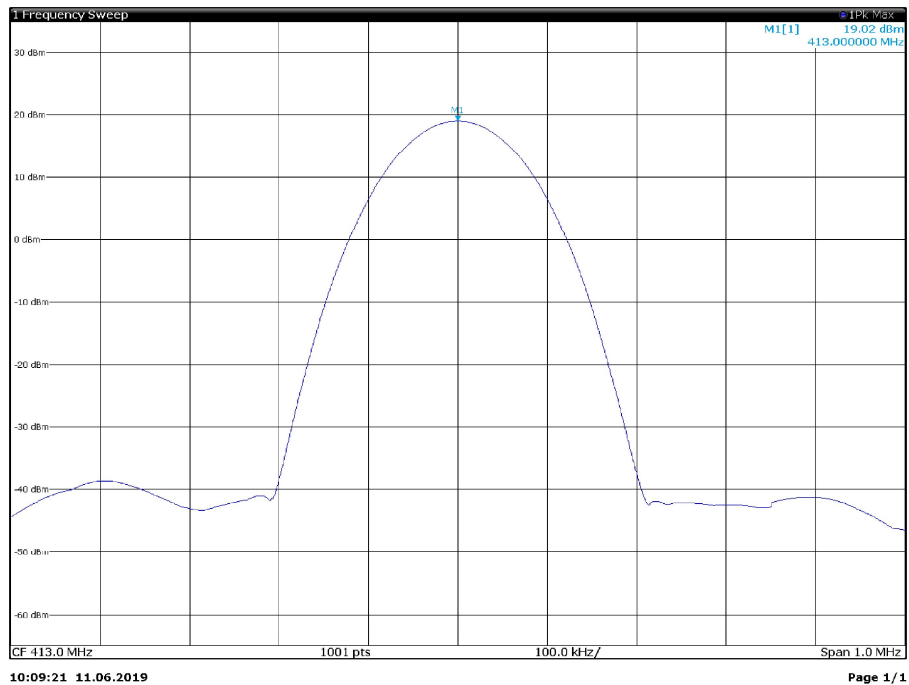
Modulation used: CW, 11K0F3E and 8K70D1W

### Test data



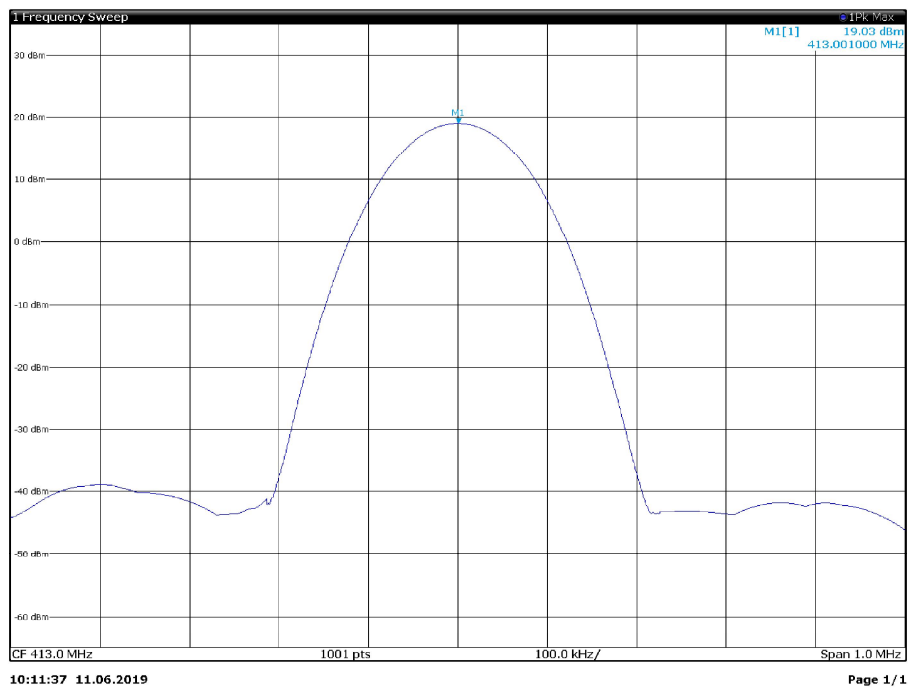
Output spectral plot with input at AGC threshold with CW signal at 413 MHz

## Test data



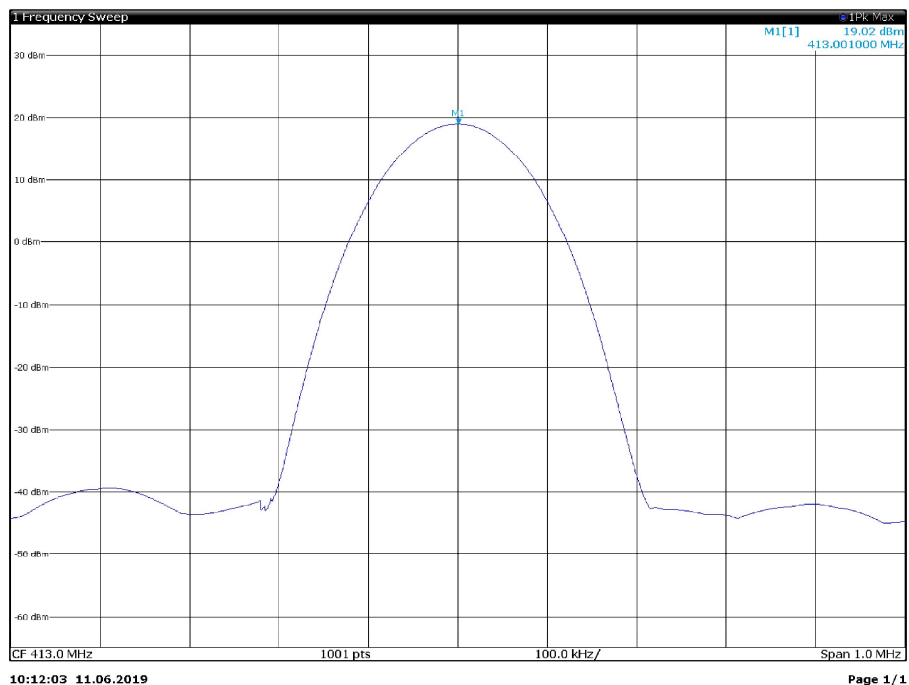
Output spectral plot with input at AGC threshold + 1 dB with CW signal at 413 MHz

## Test data



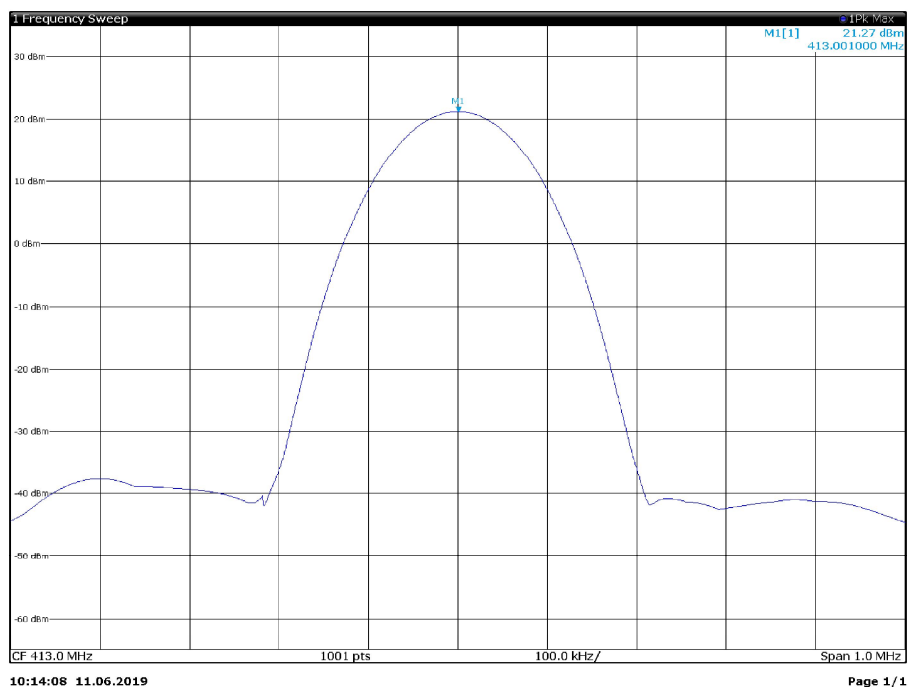
Output spectral plot with input at AGC threshold with 11K0F3E signal at 413 MHz

## Test data



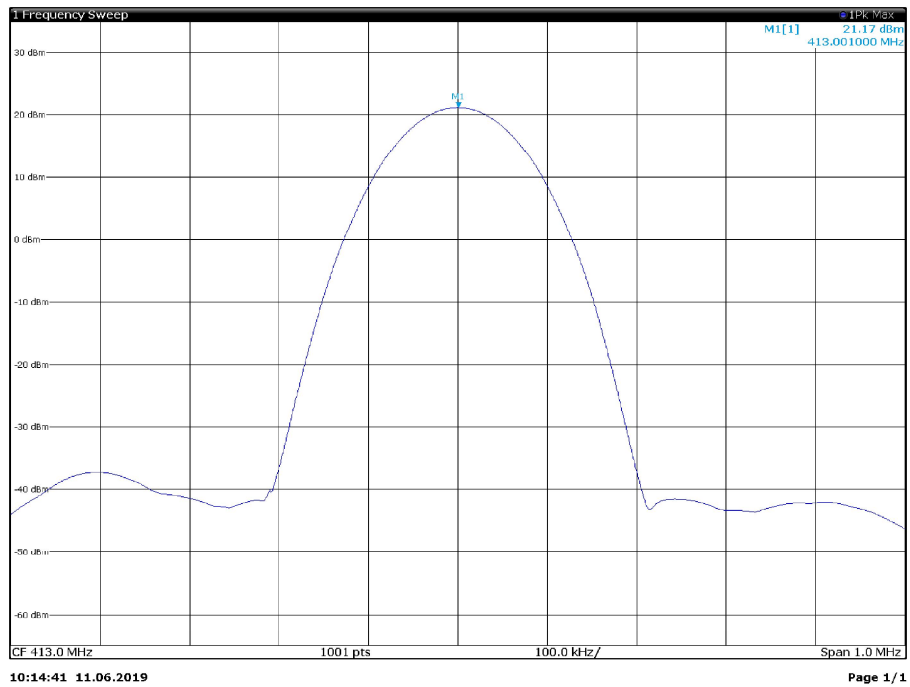
Output spectral plot with input at AGC threshold + 1 dB with 11K0F3E signal at 413 MHz

## Test data



Output spectral plot with input at AGC threshold with 8K70D1Wsignal at 413 MHz

## Test data



Output spectral plot with input at AGC threshold + 1 dB with 8K70D1Wsignal at 413 MHz

## 6.2 Out-of-band-rejection

Test performed according to KDB 935210 D05 Indus Booster Basic Meas v01r03 clause 4.3. The gain-versus-frequency response and the 20 dB bandwidth of the zone enhancer shall be reported. The zone enhancer shall reject amplification of other signals outside the passband of the zone enhancer.

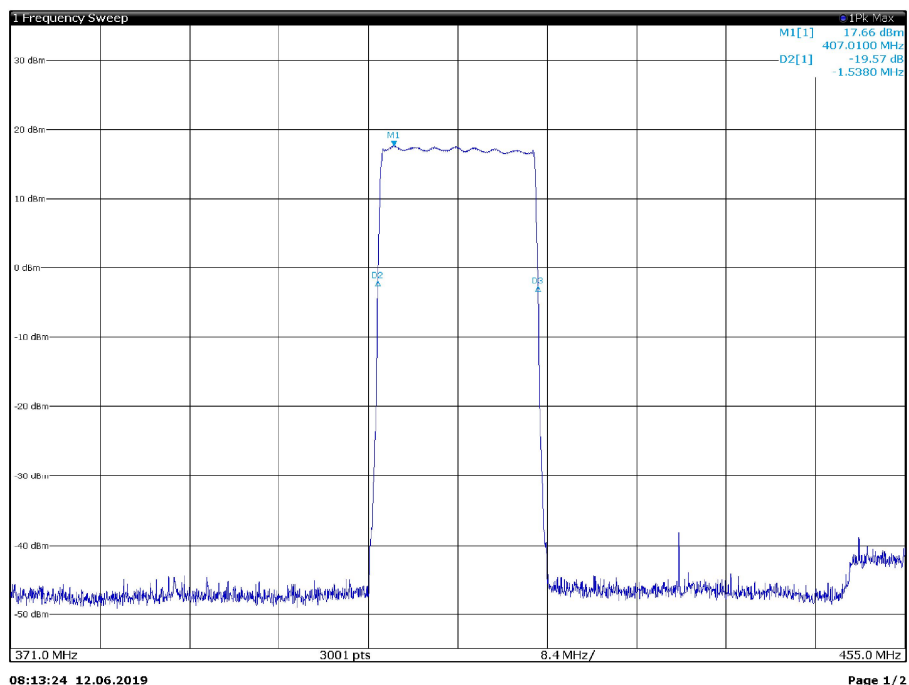
Test date: 2019-06-12

Test results: Pass

### Special notes

Modulation used: CW

### Test data



| 2 Marker Table |     |     |            |           |          |                 |
|----------------|-----|-----|------------|-----------|----------|-----------------|
| Type           | Ref | Trc | X-Value    | Y-Value   | Function | Function Result |
| M1             |     | 1   | 407.01 MHz | 17.66 dBm |          |                 |
| D2             | M1  | 1   | -1.538 MHz | -19.57 dB |          |                 |
| D3             | M1  | 1   | 13.532 MHz | -20.30 dB |          |                 |

## 6.3 Input-versus-output signal comparison

### FCC 90.210(b)

Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
- (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
- (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least  $43 + 10 \log (P)$  dB.

### FCC 90.210(c)

Emission Mask C. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:

- (1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5 kHz, but not more than 10 kHz: At least  $83 \log (f_d/5)$  dB;
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: At least  $29 \log (f_d/11)$  dB or 50 dB, whichever is the lesser attenuation;
- (3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least  $43 + 10 \log (P)$  dB.
- (4) In the 1427-1432 MHz band, licensees are encouraged to take all reasonable steps to ensure that unwanted emissions power does not exceed the following levels in the 1400-1427 MHz band:
  - (i) For stations of point-to-point systems in the fixed service:  $-45$  dBW/27 MHz.
  - (ii) For stations in the mobile service:  $-60$  dBW/27 MHz.

### FCC 90.210(d)

Emission Mask D — 12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- (1) On any frequency from the center of the authorized bandwidth  $f_0$  to 5.625 kHz removed from  $f_0$ : Zero dB.
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least  $7.27(f_d - 2.88 \text{ kHz})$  dB.
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 12.5 kHz: At least  $50 + 10 \log (P)$  dB or 70 dB, whichever is the lesser attenuation.
- (4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

#### FCC 90.219(e)(4)

A signal booster must be designed such that all signals that it retransmits meet the following requirements:

- (i) The signals are retransmitted on the same channels as received. Minor departures from the exact provider or reference frequencies of the input signals are allowed, *provided that* the retransmitted signals meet the requirements of § 90.213.
- (ii) There is no change in the occupied bandwidth of the retransmitted signals.
- (iii) The retransmitted signals continue to meet the unwanted emissions limits of § 90.210 applicable to the corresponding received signals (assuming that these received signals meet the applicable unwanted emissions limits by a reasonable margin).

#### RSS-131 clause 6.6(1)(2)

Zone enhancers shall meet the following requirements:

- 1. minor departures from the exact reference frequencies of the input signals are permitted provided the retransmitted signals meet the frequency stability limit specified in RSS-119 for the equipment with which the zone enhancer is to be used
- 2. the retransmitted signals shall meet the unwanted emission limits in the RSS that applies to the equipment with which the zone enhancer is to be used.

#### RSS-119 clause 5.8.3

Emission Mask D for Transmitters Equipped With or Without an Audio Low-Pass Filter. The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 7.

| Table 7 — Emission Mask D           |                                                          |                                            |
|-------------------------------------|----------------------------------------------------------|--------------------------------------------|
| Displacement Frequency, $f_d$ (kHz) | Minimum Attenuation (dB)                                 | Resolution Bandwidth (Hz)                  |
| $5.625 < f_d \leq 12.5$             | $7.27(f_d - 2.88)$                                       | Specified in <a href="#">Section 4.2.2</a> |
| $f_d > 12.5$                        | Whichever is the lesser:<br>70 or $50 + 10 \log_{10}(p)$ | Specified in <a href="#">Section 4.2.2</a> |

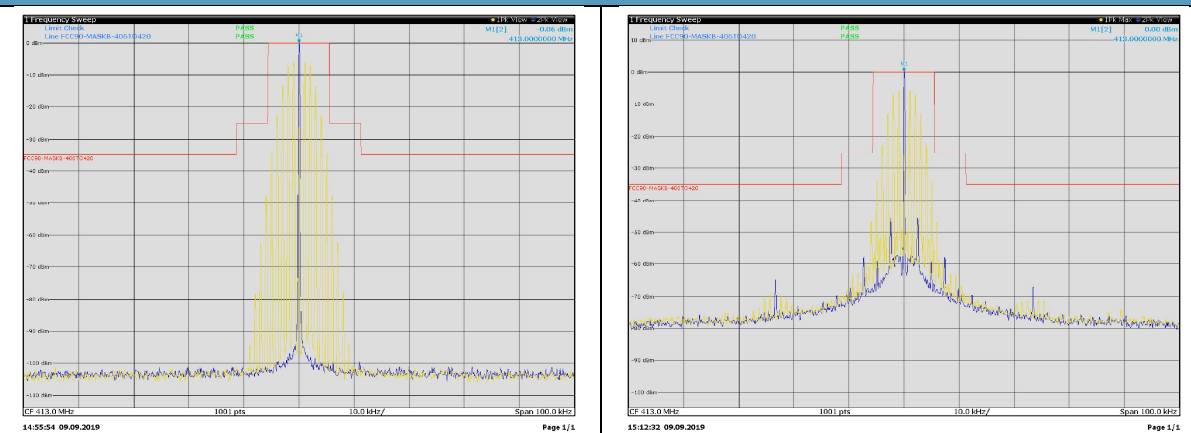
Test date: From 2019-06-12 to 2019-09-09

Test results: Pass

#### Special notes

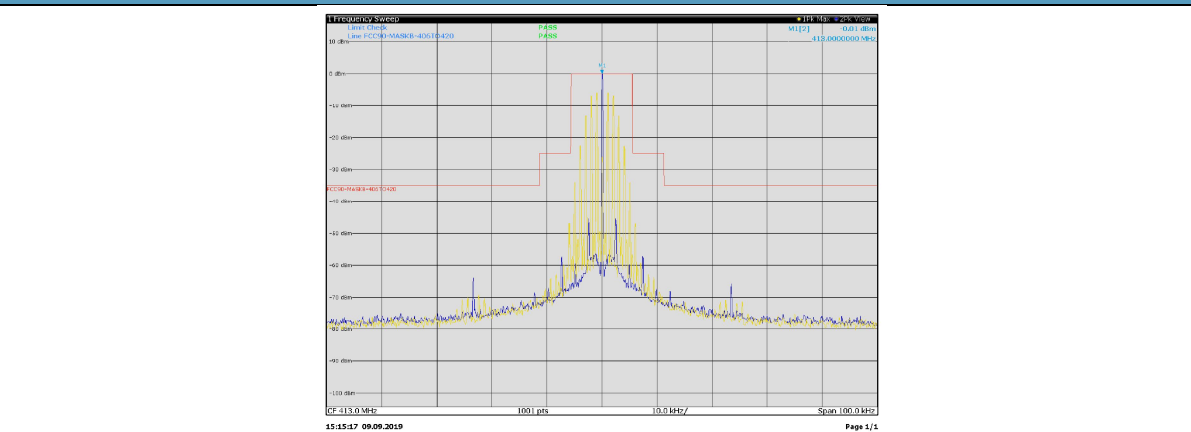
Modulation used: 11K0F3E and 8K70D1W

## Test data



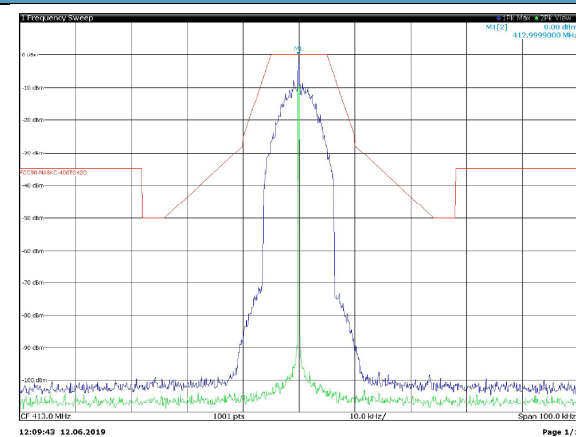
Emission mask B with input at AGC threshold with 11K0F3E signal at 413 MHz

## Test data

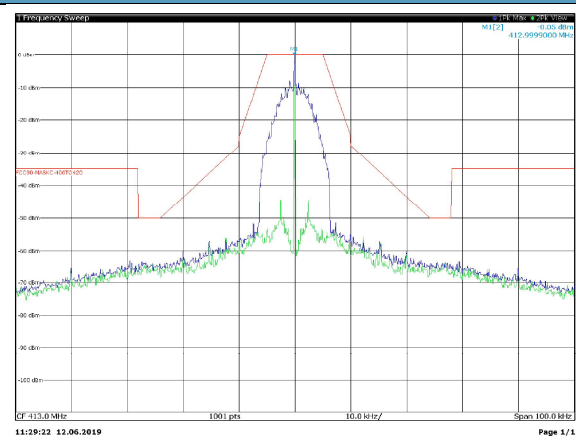


Emission mask B with input at AGC threshold +3dB with 11K0F3E signal at 413 MHz

## Test data



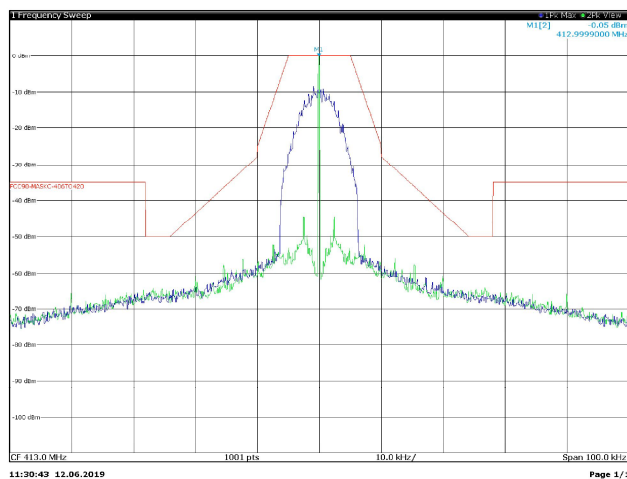
Input



Output

Emission mask C with input at AGC threshold with 11K0F3E signal at 413 MHz

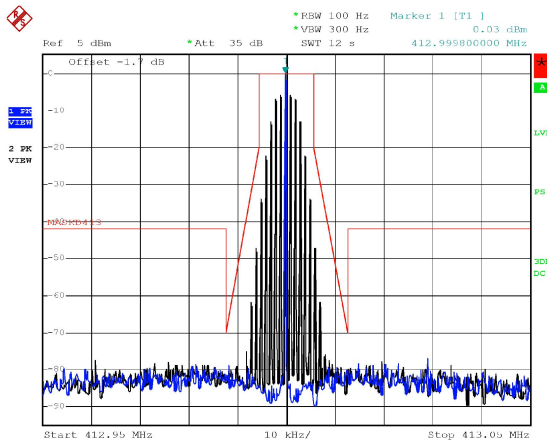
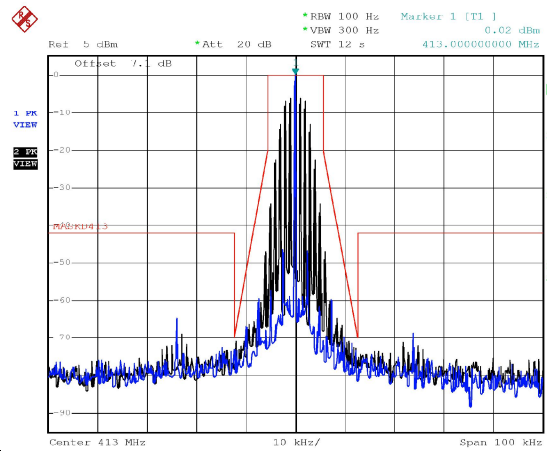
## Test data



Output

Emission mask C with input at AGC threshold +3dB with 11K0F3E signal at 413 MHz

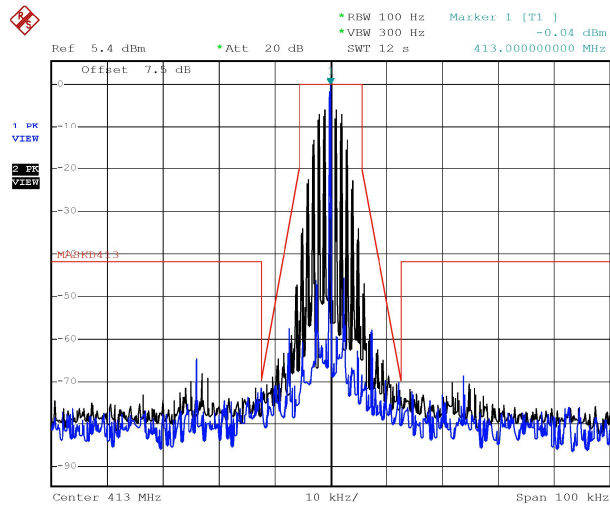
## Test data



## Output

Emission mask D with input at AGC threshold with 11K0F3E signal at 413 MHz

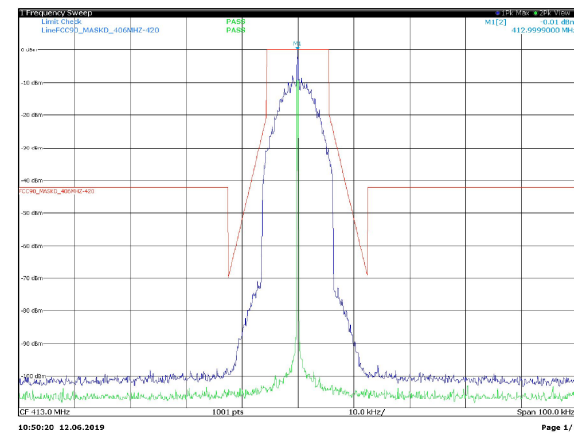
## Test data



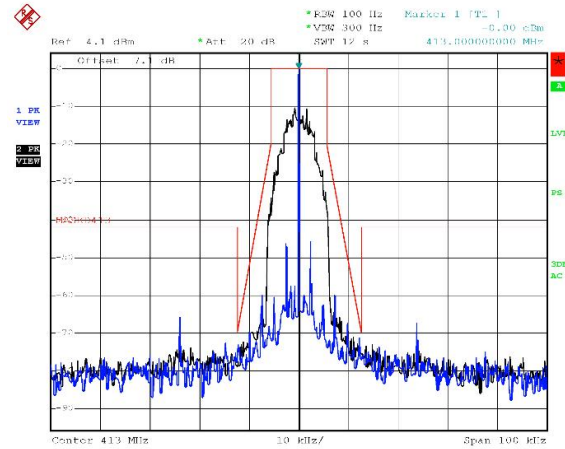
## Output

Emission mask D with input at AGC threshold +3dB with 11K0F3E signal at 413 MHz

## Test data



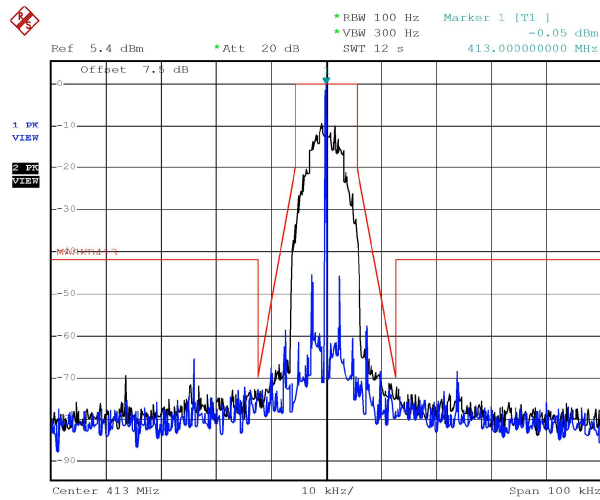
Input



Output

Emission mask D with input at AGC threshold with 8K70D1W signal at 413 MHz

## Test data



Output

Emission mask D with input at AGC threshold +3dB with 8K70D1W signal at 413 MHz