

Test report

284168-1TRFWL

Date of issue: November 30, 2018

Applicant:

Deltanode Solutions AB

Product:

700 UC

Model:

DHR804

FCC ID: V5FDHR001


IC: 11014A-DHR001

Specifications:

FCC Part 27, RSS-131 Issue 3, RSS-130 Issue 1

Test location

| | |
|--------------|---|
| Company name | Nemko Canada Inc. |
| Address | 303 River Road |
| City | Ottawa |
| Province | Ontario |
| Postal code | K1V 1H2 |
| Country | Canada |
| Telephone | +1 613 737 9680 |
| Facsimile | +1 613 737 9691 |
| Toll free | +1 800 563 6336 |
| Website | www.nemko.com |
| Site number | FCC: CA2040, FCC Test Firm Registration Number: 175281; IC: 2040A-4 (3 m SAC) |

| | |
|-------------|---|
| Tested by | Kevin Rose, Wireless / EMC Specialist |
| Reviewed by | Russell Grant, Senior Technical Assessor |
| Date | November 30, 2018 |
| Signature |  |

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. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Applicant and manufacturer

| | |
|-----------------|------------------------|
| Company name | Deltanode Solutions AB |
| Address | Hammarby Fabriksvag 61 |
| City | Stockholm |
| Province/State | |
| Postal/Zip code | SE-120 30 |
| Country | Sweden |

1.2 Test specifications

| | |
|--|--|
| FCC Part 27 | Miscellaneous Wireless Communications Services |
| RSS-131 Issue 3 | Zone Enhancers |
| RSS-130 Issue 1 | Mobile Broadband Services (MBS), Equipment Operating in the Frequency, Bands 698-756 MHz and 777-787 MHz |
| KDB 935210 D05 Indus Booster Basic Meas v01r02 | MEASUREMENTS GUIDANCE FOR INDUSTRIAL AND NON-CONSUMER SIGNAL BOOSTER, REPEATER, AND AMPLIFIER DEVICES |

1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.4 Exclusions

None

1.5 Test report revision history

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

Section 2. Summary of test results

2.1 FCC Part 27, RSS-131 Issue 3, RSS-130 Issue 1

| Part | Test description | Verdict |
|--|---|------------------|
| KDB 935210 D05 3.2 | Measuring AGC threshold level | Reported |
| RSS-131 5.2.1, KDB 935210 D05 3.3 | Out-of-band-rejection | Pass |
| RSS-131 5.2.2, KDB 935210 D05 3.4, | Input-versus-output signal comparison | Pass |
| FCC 27.50(b), RSS-131 5.2.3, RSS-130 4.4, KDB 935210 D05 3.5 | Mean output power and amplifier/booster gain | Pass |
| FCC 27.53(c), RSS-130 4.6, KDB 935210 D05 3.6.2, | Out-of-band/out-of-block emissions conducted measurements | Pass |
| FCC 27.53(c)(f), RSS-130 4.6, KDB 935210 D05 3.6.3 | Spurious emissions conducted measurements | Pass |
| FCC 27.54, RSS-131 5.2.4, RSS-130 4.3, KDB 935210 D05 3.7 | Frequency stability measurements | N/A ¹ |
| FCC 27.53(c)(f), RSS-130 4.6, KDB 935210 D05 3.8 | Spurious emissions radiated measurements | Pass |

Notes: ¹The signal booster does not alter the input signal in any way

Section 3. Equipment under test (EUT) details

3.1 Sample information

| | |
|------------------------|----------------|
| Receipt date | April 29, 2015 |
| Nemko sample ID number | 13300322 |

3.2 EUT information

| | |
|---------------|--------|
| Product name | 700 UC |
| Model | DHR804 |
| Serial number | 10504 |

3.3 Technical information

| | |
|---------------------|--|
| Operating band | Canada: 746-756/777-787 MHz USA: 746-758/776-788 MHz |
| Modulation type | LTE |
| Channel Spacing | Standard |
| Power requirements | 110 V _{AC} , ~3 A for entire system tested |
| Emission designator | 1M40D7W, 3M00D7W, 5M00D7W, and 10M0D7W |
| Gain | 85 dB |
| Antenna information | External Antenna is not provided EUT used a 50 Ω termination. |

3.4 Product description and theory of operation

Off air high power repeater 33dBm of output power on DL, 25dBm of output power on UL, 85 dB gain in both DL and UL

3.5 EUT exercise details

The EUT was controlled via a Laptop interface with GUI to configure the system. The EUT uses set channels Bandwidths user settable to a maximum of 15 MHz.

3.6 EUT setup diagram

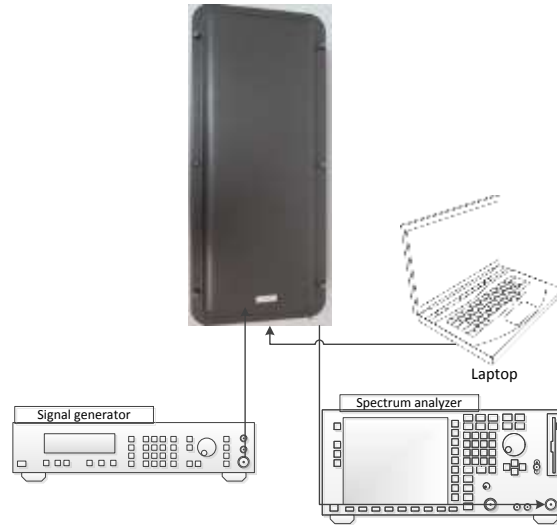


Figure 3.6-1: Setup diagram

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

| | |
|-------------------|---------------|
| Temperature | 15–30 °C |
| Relative humidity | 20–75 % |
| Air pressure | 860–1060 mbar |

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.

5.2 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.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of $K = 2$ with 95% certainty.

| Test name | Measurement uncertainty, dB |
|-------------------------------|-----------------------------|
| All antenna port measurements | 0.55 |
| Conducted spurious emissions | 1.13 |
| Radiated spurious emissions | 3.78 |

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|-----------------------------|-----------------|-----------|-----------|-----------|-------------|
| 3 m EMI test chamber | TDK | SAC-3 | FA002047 | 1 year | Dec. 09/18 |
| Flush mount turntable | Sunol | FM2022 | FA002082 | — | NCR |
| Controller | Sunol | SC104V | FA002060 | — | NCR |
| Antenna mast | Sunol | TLT2 | FA002061 | — | NCR |
| Receiver/spectrum analyzer | Rohde & Schwarz | ESU 26 | FA002043 | 1 year | March 26/19 |
| Spectrum analyzer | Rohde & Schwarz | FSP | FA001920 | 1 year | Aug. 08/18 |
| Bilog antenna (20–3000 MHz) | Sunol | JB3 | FA002108 | 1 year | Aug. 31/18 |
| Horn antenna (1–18 GHz) | EMCO | 3115 | FA000825 | 1 year | Sept 1/18 |
| Preamp (1–18 GHz) | ETS-Lindgren | 124334 | FA002873 | 1 year | Nov. 3/18 |
| 50 Ω coax cable | Huber + Suhner | None | FA002074 | 1 year | May 12/18 |
| 50 Ω coax cable | Huber + Suhner | None | FA002830 | 1 year | May 08/19 |
| DFS and Adaptivity system | Aeroflex | PXI 30xx | FA002628 | 1 year | Aug 26/18 |
| Spectrum analyzer | Rohde & Schwarz | FSW43 | FA002971 | 1 year | Mar. 16/19 |
| Vector Signal Generator | Rohde & Schwarz | SMW200A | FA002970 | 1 year | Feb. 2/19 |

Note: NCR - no calibration required, VOU - verify on use

Section 8. Testing data

8.1 KDB 935210 D05 3.2, Measuring AGC threshold level

8.1.1 Definitions and limits

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

8.1.2 Test summary

| | | | |
|---------------|---------------|-------------------|----------|
| Test date | July 10, 2018 | Temperature | 22 °C |
| Test engineer | Kevin Rose | Air pressure | 995 mbar |
| Verdict | Pass | Relative humidity | 47 % |

8.1.3 Observations, settings and special notes

Test receiver settings:

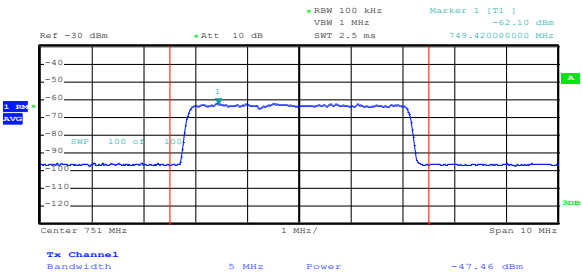
| | |
|-----------------------|--|
| Detector mode | RMS (for average), Peak (for peak) |
| Resolution bandwidth | 100 kHz |
| Integration bandwidth | >OBW |
| Video bandwidth | >RBW |
| Trace mode | Power Average (for average), Max Hold (for peak) |
| Measurement time | Auto |



8.1.4 Test data

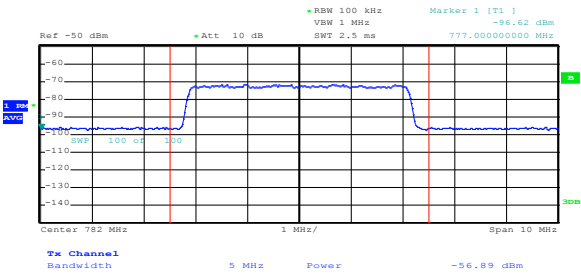
Table 8.1-1: AGC Threshold

| Modulation | Frequency, MHz | RF input power AVG, dBm |
|------------|----------------|-------------------------|
| AWGN | 751 | -47.46 |
| AWGN | 782 | -56.89 |



Date: 11.JUL.2018 21:37:48

Figure 8.1-1: AWGN AGC +1 dB DL 751 MHz input power average



Date: 11.JUL.2018 11:54:40

Figure 8.1-2: AWGN AGC +1 dB UL 782 MHz input power average

8.2 RSS-131 5.2.1, KDB 935210 D05 3.3, Out-of-band-rejection

8.2.1 Definitions and limits

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.

8.2.2 Test summary

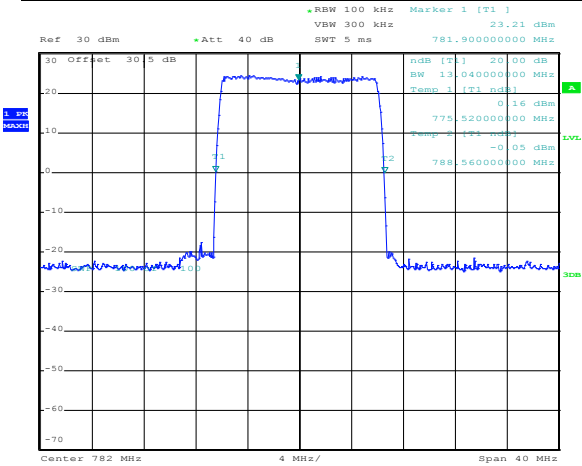
| | | | |
|---------------|---------------|-------------------|-----------|
| Test date | June 27, 2018 | Temperature | 21 °C |
| Test engineer | Kevin Rose | Air pressure | 1000 mbar |
| Verdict | Pass | Relative humidity | 42 % |

8.2.3 Observations, settings and special notes

| | |
|----------------------------|--|
| Frequency range | Frequency range = ± 250 % of the passband, |
| Detector mode | Peak |
| Resolution bandwidth sweep | 1 % to 5 % of the EUT passband, |
| Video bandwidth | >RBW |
| Trace mode | Max Hold |
| Measurement time | Auto |

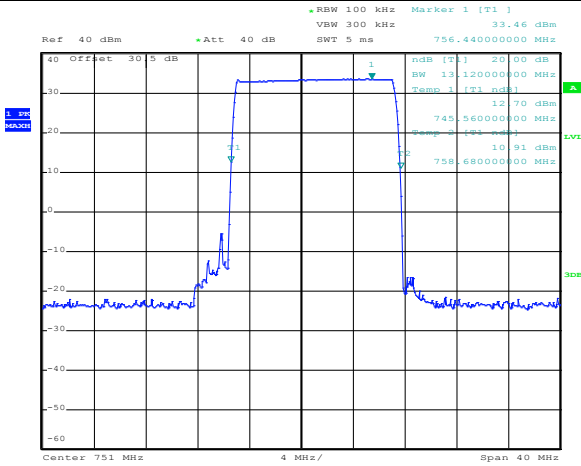


8.2.4 Test data



Date: 11.JUL.2018 12:08:53

Figure 8.2-1: AWGN UL Pass Band



Date: 11.JUL.2018 22:23:14

Figure 8.2-2: AWGN DL Pass Band

8.3 RSS-131 5.2.2, KDB 935210 D05 3.4, Input-versus-output signal comparison

8.3.1 Definitions and limits

The spectral growth of the 26 dB bandwidth of the output signal shall be less than 5% of the input signal spectrum.

A 26 dB bandwidth measurement shall be performed on the input signal and the output signal; alternatively, the 99% OBW can be measured and used.

8.3.2 Test summary

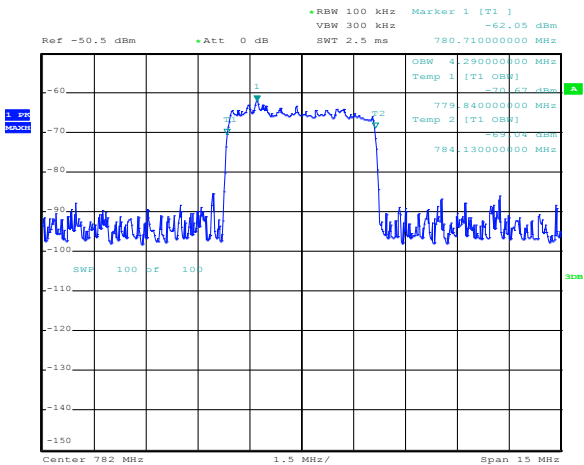
| | | | |
|---------------|---------------|-------------------|-----------|
| Test date | July 11, 2018 | Temperature | 22 °C |
| Test engineer | Kevin Rose | Air pressure | 1005 mbar |
| Verdict | Pass | Relative humidity | 42 % |

8.3.3 Observations, settings and special notes

Receiver settings were:

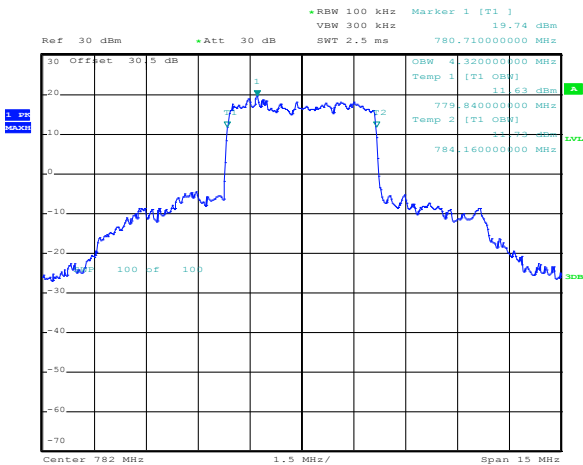
| | |
|----------------------|-----------------------------------|
| Frequency range | 250% of OBW |
| Detector mode | Peak |
| Resolution bandwidth | 1 % to 5 % of the anticipated OBW |
| Video bandwidth | >RBW |
| Trace mode | Max Hold |

8.3.4 Test data



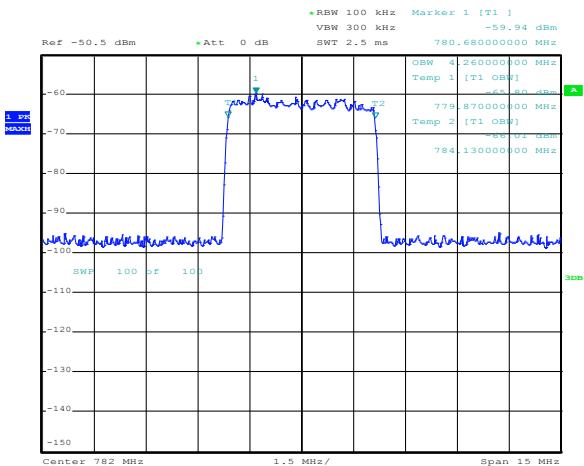
Date: 11.JUL.2018 12:59:14

Figure 8.3-1: AWGN AGC-0.5 dB 782 MHz input 99% BW



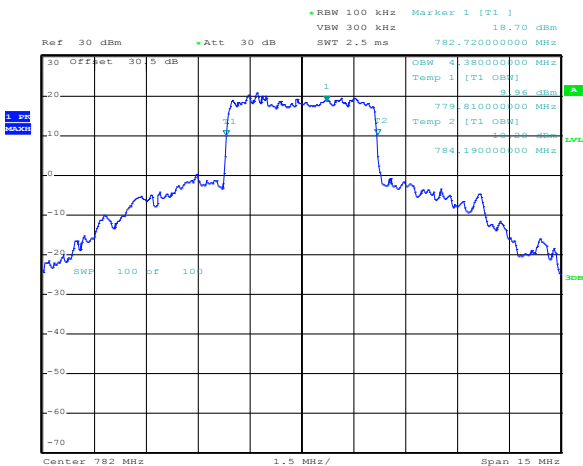
Date: 11.JUL.2018 12:57:44

Figure 8.3-2: AWGN AGC-0.5 dB 782 MHz output 99% BW



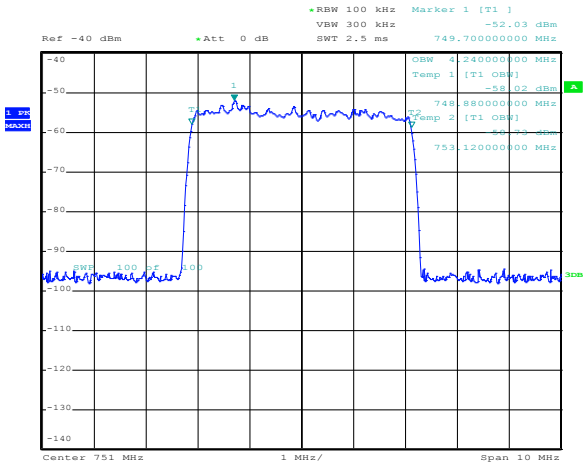
Date: 11.JUL.2018 12:59:45

Figure 8.3-3: AWGN AGC +3 dB 782 MHz input 99% BW



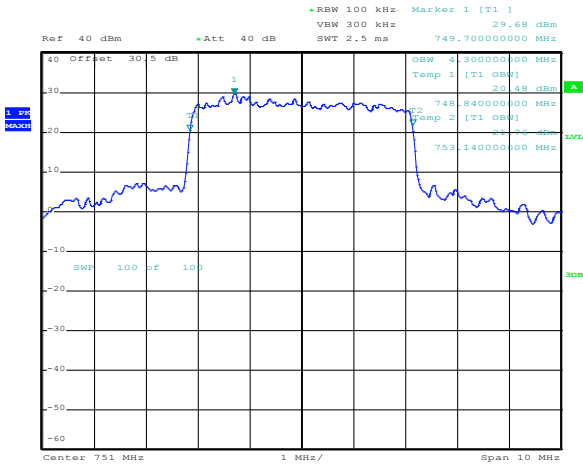
Date: 11.JUL.2018 12:56:58

Figure 8.3-4: AWGN AGC +3 dB 782 MHz output 99% BW



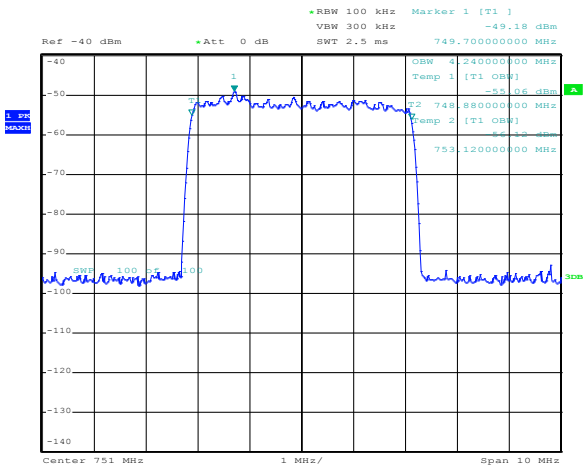
Date: 11.JUL.2018 21:48:39

Figure 8.3-5: AWGN AGC -0.5 dB 751 MHz input 99% BW



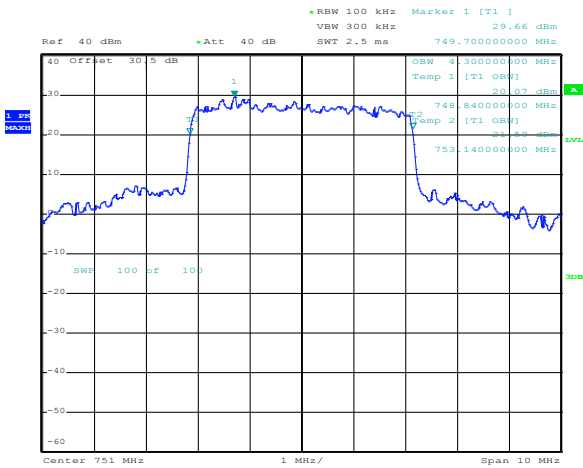
Date: 11.JUL.2018 21:46:18

Figure 8.3-6: AWGN AGC -0.5 dB 751 MHz output 99% BW



Date: 11.JUL.2018 21:48:04

Figure 8.3-7: AWGN AGC +3 dB 751 MHz input 99% BW



Date: 11.JUL.2018 21:46:47

Figure 8.3-8: AWGN AGC +3 dB 751 MHz output 99% BW

8.4 FCC 27.50(b), RSS-131 5.2.3, RSS-130 4.4, KDB 935210 D05 3.5, Mean output power and amplifier/booster gain

8.4.1 Definitions and limits

FCC 27.50(b)

(2)(4) High Density, 1000 W ERP or 1000 W/MHz ERP with an emission bandwidth greater than 1 MHz

(3)(5) Low Density, 2000 W ERP or 2000 W/MHz ERP with an emission bandwidth greater than 1 MHz

RSS-131 5.2.3 The zone enhancer gain shall not exceed the nominal gain by more than 1.0 dB. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point

RSS-130 4.4, refer to SRSP-518. In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

8.4.2 Test summary

| | | | |
|---------------|---------------|-------------------|-----------|
| Test date | June 28, 2018 | Temperature | 21 °C |
| Test engineer | Kevin Rose | Air pressure | 1006 mbar |
| Verdict | Pass | Relative humidity | 45 % |

8.4.3 Observations, settings and special notes

Spectrum analyzer settings:

| | |
|-----------------------|--|
| Detector mode | RMS (for average), Peak (for peak) |
| Resolution bandwidth | 100 kHz |
| Integration bandwidth | >OBW |
| Video bandwidth | >RBW |
| Trace mode | Power Average (for average), Max Hold (for peak) |
| Measurement time | Auto |

Section 8
Test name
Specification

Testing data
Mean output power and amplifier/booster gain
FCC 27.50(b), RSS-131 5.2.3, RSS-130 4.4, KDB 935210 D05 3.5, Mean output power and amplifier/booster gain



Table 8.4-1: Peak to Average results

| Modulation | Frequency, MHz | RF output power AVG, dBm | RF output power Peak, dBm | Peak to Average Ratio, dB | Peak to Average Ratio Limit, dBm | Peak to Average Margin, dB |
|------------|----------------|--------------------------|---------------------------|---------------------------|----------------------------------|----------------------------|
| AWGN | 751 | 33.19 | 42.95 | 9.76 | 13 | 3.24 |
| AWGN | 782 | 24.55 | 34.30 | 9.75 | 13 | 3.25 |

Table 8.4-2: +3 dB Average results

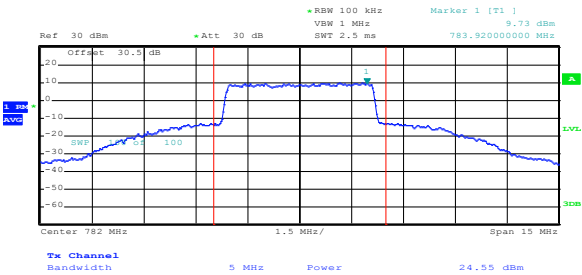
| Modulation | Frequency, MHz | RF output power AVG, dBm |
|------------|----------------|--------------------------|
| AWGN | 751 | 33.14 |
| AWGN | 782 | 24.56 |

Table 8.4-3: Amplifier Gain

| Modulation | Frequency, MHz | RF output power AVG, dBm | RF input power AVG, dBm | Gain, dB | Rated Gain, dB | Margin, dB |
|------------|----------------|--------------------------|-------------------------|----------|----------------|------------|
| AWGN | 751 | 33.19 | -48.39 | 81.58 | 85 | 3.42 |
| AWGN | 782 | 24.55 | -56.95 | 81.50 | 85 | 3.50 |

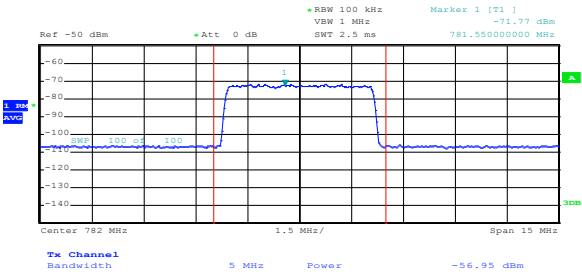


8.4.1 Test data



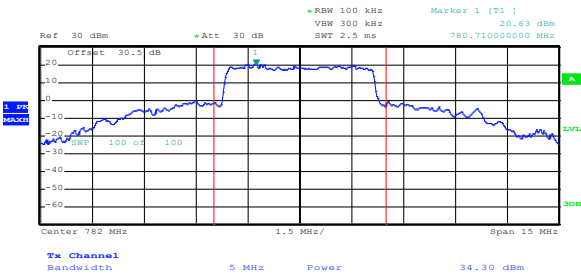
Date: 11.JUL.2018 13:06:08

Figure 8.4-1: AWGN AGC-0.5 dB 782 MHz output power average



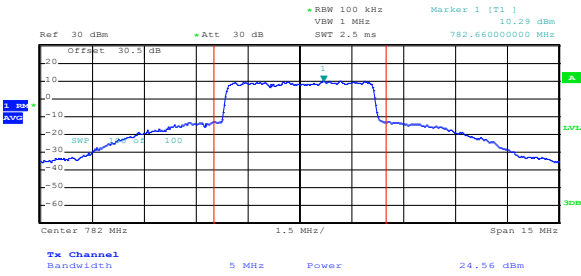
Date: 11.JUL.2018 13:10:50

Figure 8.4-3: AWGN AGC-0.5 dB DL 782 MHz input power average



Date: 11.JUL.2018 13:08:25

Figure 8.4-2: AWGN AGC-0.5 dB 782 MHz output power peak

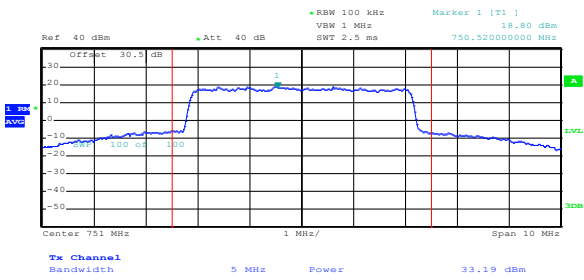


Date: 11.JUL.2018 13:07:49

Figure 8.4-4: AWGN AGC +3 dB 782 MHz output power average

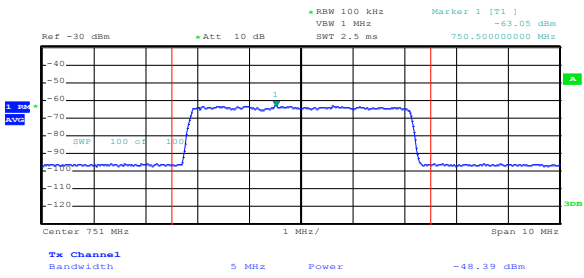
Section 8
Test name
Specification

Testing data
Mean output power and amplifier/booster gain
FCC 27.50(b), RSS-131 5.2.3, RSS-130 4.4, KDB 935210 D05 3.5, Mean output power and amplifier/booster gain



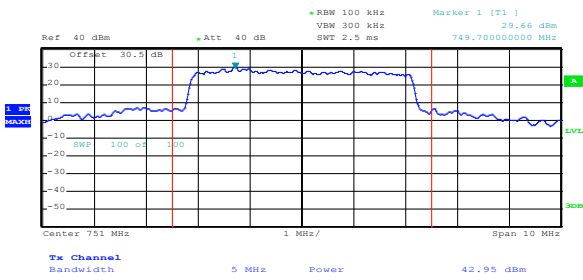
Date: 11.JUL.2018 21:41:30

Figure 8.4-5: AWGN AGC-0.5 dB 751 MHz output power average



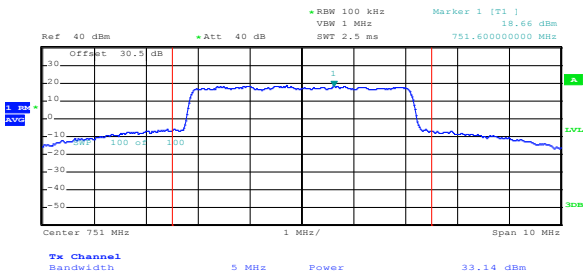
Date: 11.JUL.2018 21:36:39

Figure 8.4-7: AWGN AGC-0.5 dB DL 751 MHz input power average



Date: 11.JUL.2018 21:43:10

Figure 8.4-6: AWGN AGC-0.5 dB 751 MHz output power peak



Date: 11.JUL.2018 21:42:16

Figure 8.4-8: AWGN AGC +3 dB 751 MHz output power average

8.5 FCC 27.53(c), RSS-130 4.6, KDB 935210 D05 3.6.2, Out-of-band/out-of-block emissions conducted measurements

8.5.1 Definitions and limits

FCC 27.53(c) / RSS-130 4.6

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

8.5.2 Test summary

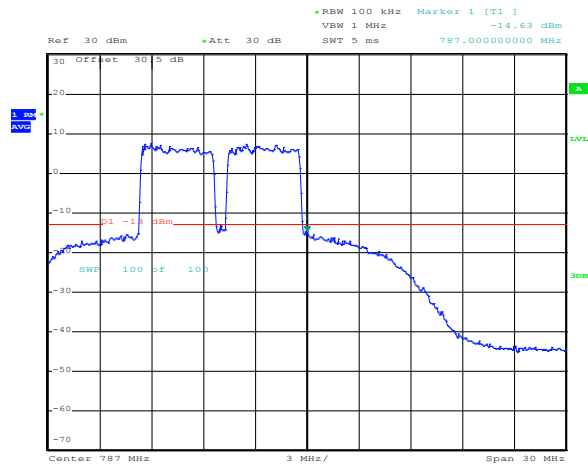
| | | | |
|---------------|---------------|-------------------|----------|
| Test date | July 10, 2018 | Temperature | 22 °C |
| Test engineer | Kevin Rose | Air pressure | 995 mbar |
| Verdict | Pass | Relative humidity | 47 % |

8.5.3 Observations, settings and special notes

Test receiver settings:

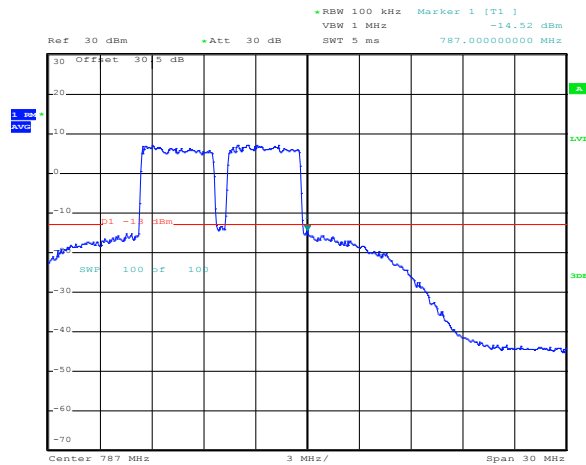
| | |
|-----------------------|----------------------------|
| Detector mode | RMS |
| Resolution bandwidth | 100 kHz (AWGN), 3 kHz(MSK) |
| Integration bandwidth | >OBW |
| Video bandwidth | >RBW |
| Trace mode | Power Average (100 sweeps) |
| Measurement time | Auto |

8.5.4 Test data



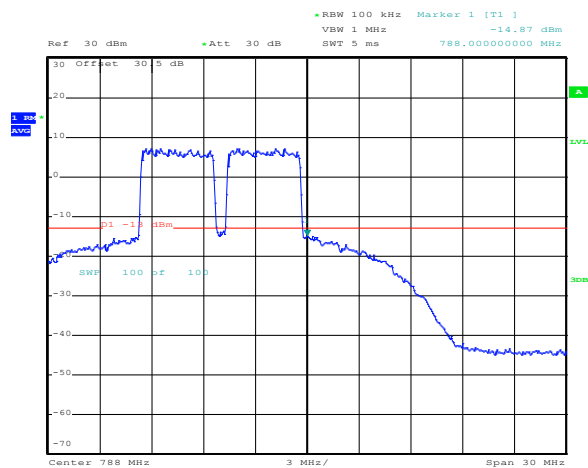
Date: 11.JUL.2018 13:26:48

Figure 8.5-1: 2X AWGN 779.5 and 784.5 MHz AGC Out-of-block



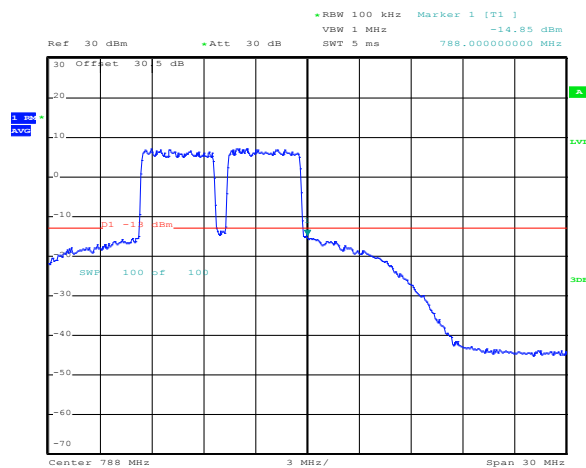
Date: 11.JUL.2018 13:27:19

Figure 8.5-2: 2X AWGN 779.5 and 784.5 MHz AGC + 3dB Out-of-block



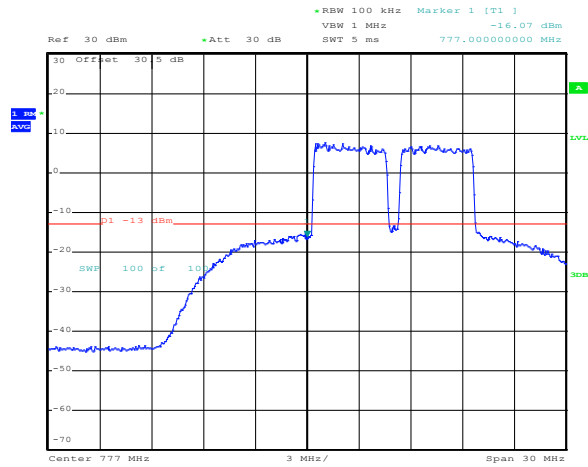
Date: 11.JUL.2018 13:30:21

Figure 8.5-3: 2X AWGN 780.5 and 785.5 MHz AGC Out-of-block



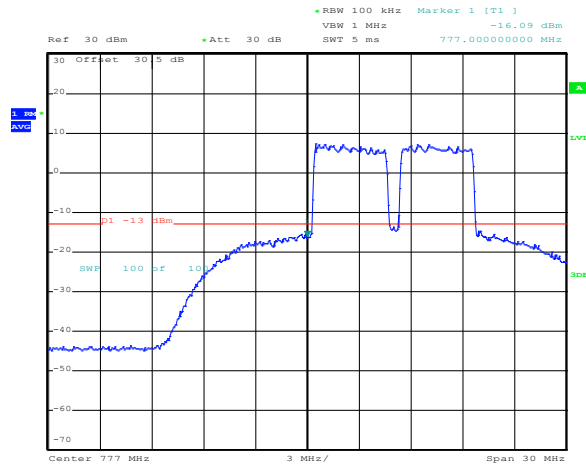
Date: 11.JUL.2018 13:29:55

Figure 8.5-4: 2X AWGN 780.5 and 785.5 MHz AGC + 3dB Out-of-block



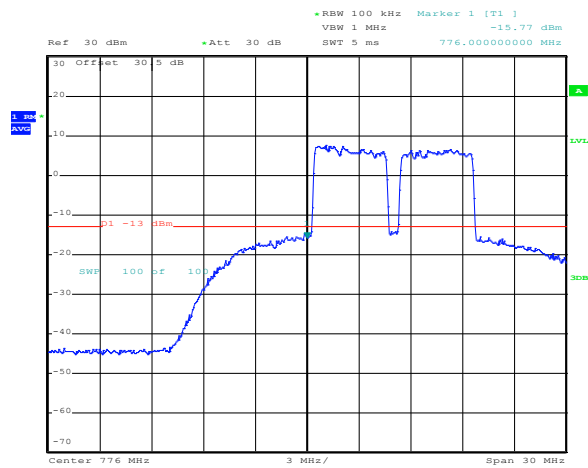
Date: 11.JUL.2018 14:45:18

Figure 8.5-5: 2x AWGN 779.5 and 784.5 MHz AGC Out-of-block



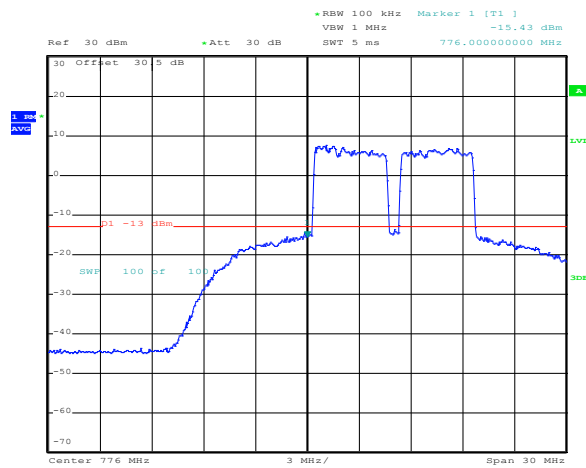
Date: 11.JUL.2018 14:46:05

Figure 8.5-6: 2x AWGN 779.5 and 784.5 MHz AGC + 3dB Out-of-block



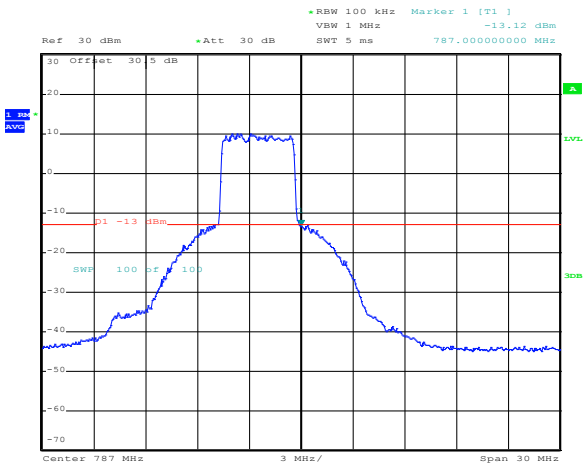
Date: 11.JUL.2018 14:48:28

Figure 8.5-7: 2x AWGN 778.5 and 783.5 MHz AGC Out-of-block



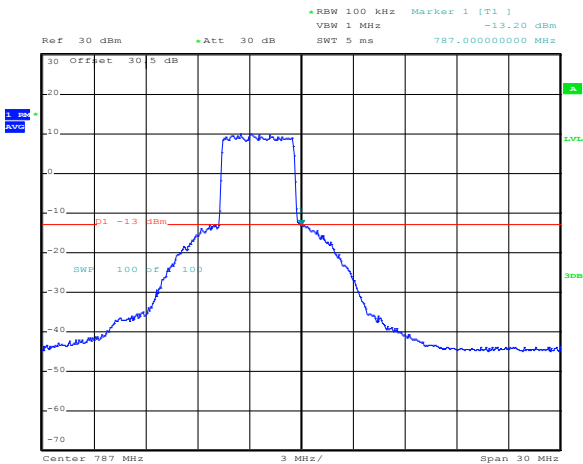
Date: 11.JUL.2018 14:47:47

Figure 8.5-8: 2x AWGN 778.5 and 783.5 MHz AGC + 3dB Out-of-block



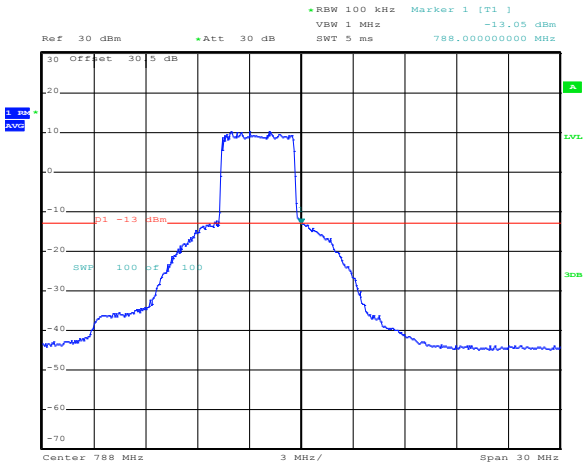
Date: 11.JUL.2018 14:53:56

Figure 8.5-9: AWGN 784.5 MHz AGC Out-of-block



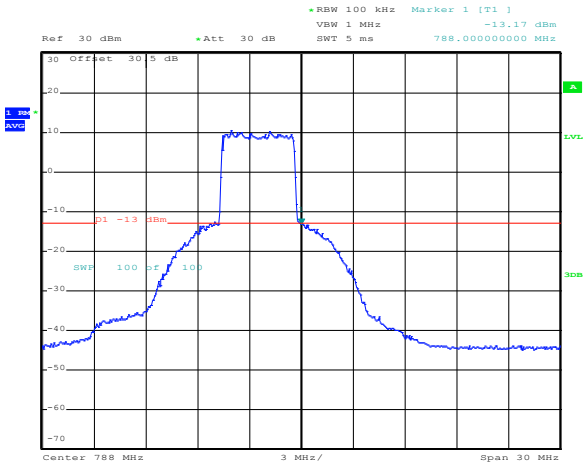
Date: 11.JUL.2018 14:55:06

Figure 8.5-10: AWGN 784.5 MHz AGC + 3dB Out-of-block



Date: 11.JUL.2018 14:58:12

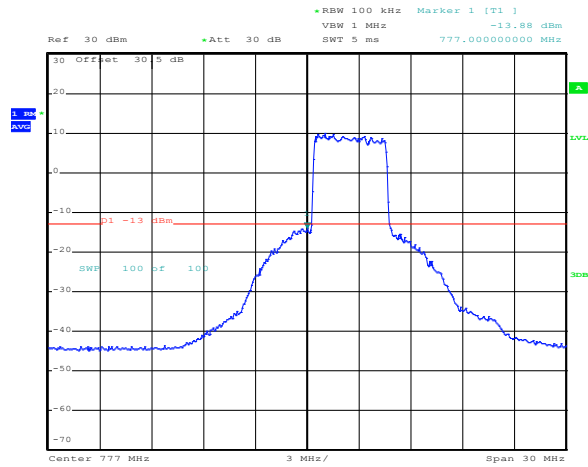
Figure 8.5-11: AWGN 785.5 MHz AGC Out-of-block



Date: 11.JUL.2018 14:58:53

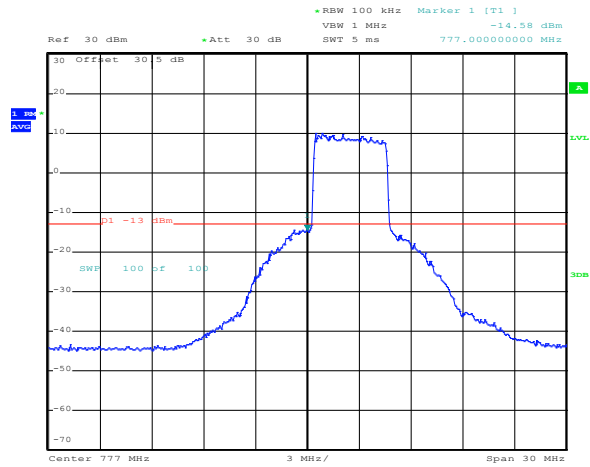
Figure 8.5-12: AWGN 785.5 MHz AGC + 3dB Out-of-block

Testing data
Out-of-band/out-of-block emissions conducted measurements
FCC 27.53(c), RSS-130 4.6, KDB 935210 D05 3.6.2



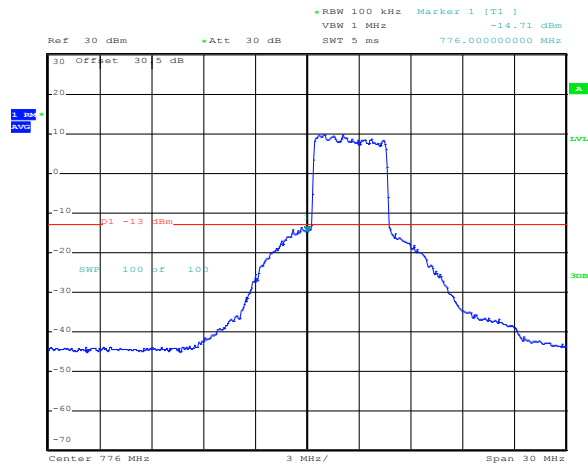
Date: 11.JUL.2018 16:31:16

Figure 8.5-13: AWGN 779.5 MHz AGC Out-of-block



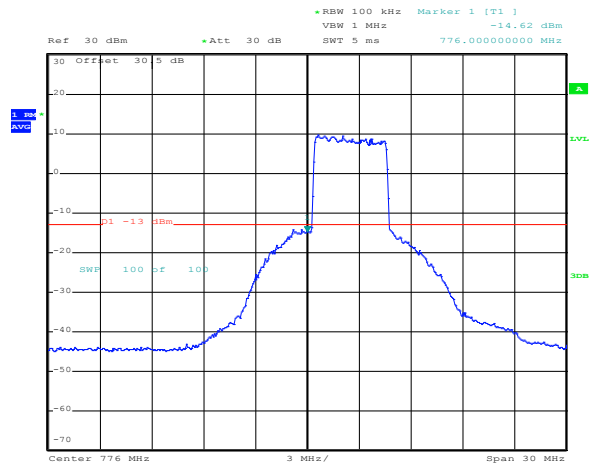
Date: 11.JUL.2018 16:30:28

Figure 8.5-14: AWGN 779.5 MHz AGC + 3dB Out-of-block



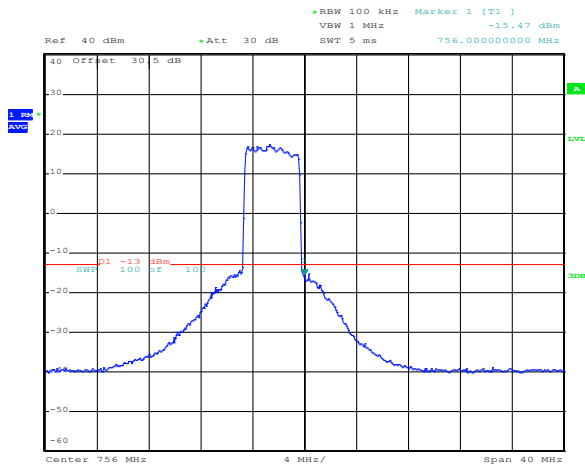
Date: 11.JUL.2018 16:33:00

Figure 8.5-15: AWGN 778.5 MHz AGC Out-of-block



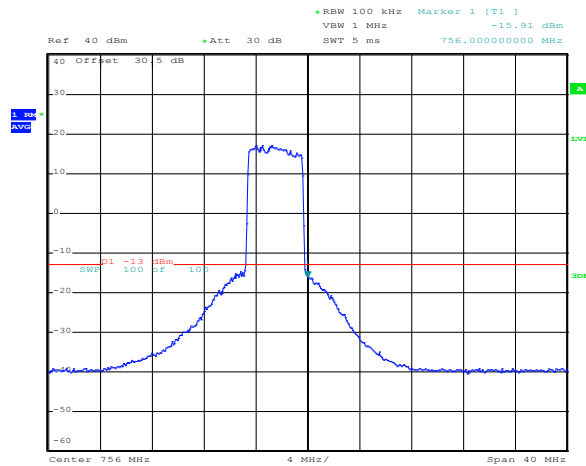
Date: 11.JUL.2018 16:33:44

Figure 8.5-16: AWGN 778.5 MHz AGC + 3dB Out-of-block



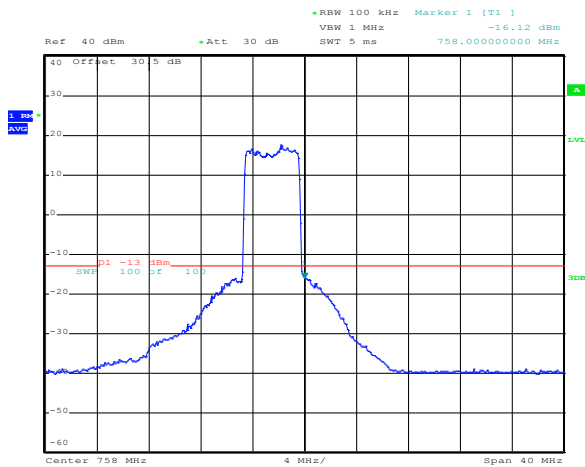
Date: 11.JUL.2018 23:11:22

Figure 8.5-17: AWGN 753.5 MHz AGC Out-of-block



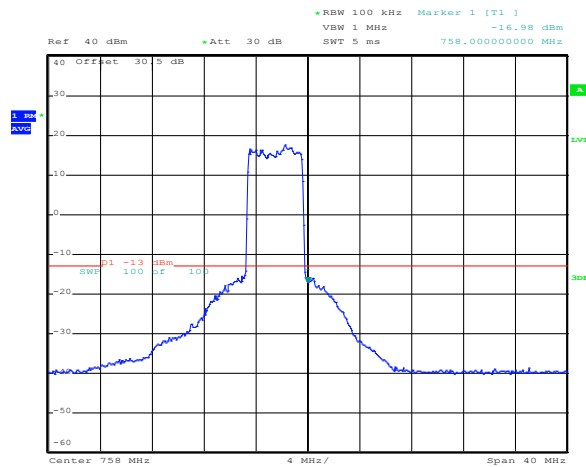
Date: 11.JUL.2018 23:12:20

Figure 8.5-18: AWGN 753.5 MHz AGC + 3dB Out-of-block



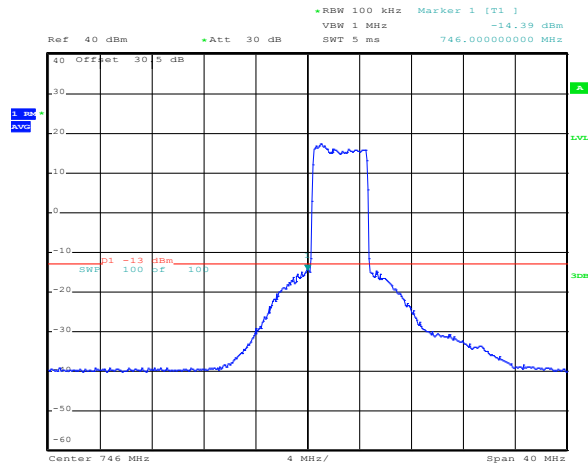
Date: 11.JUL.2018 23:16:50

Figure 8.5-19: AWGN 755.5 MHz AGC Out-of-block



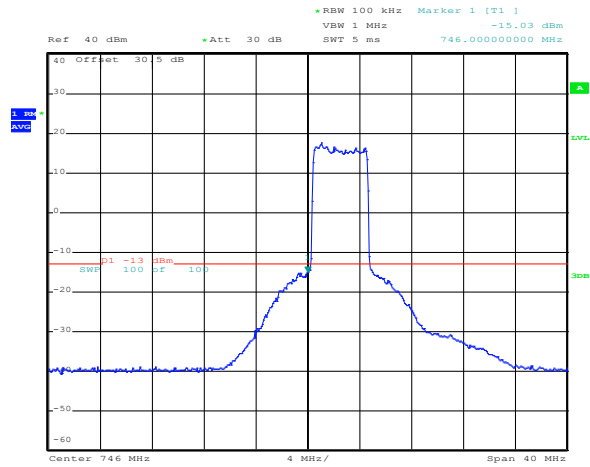
Date: 11.JUL.2018 23:16:05

Figure 8.5-20: AWGN 755.5 MHz AGC + 3dB Out-of-block



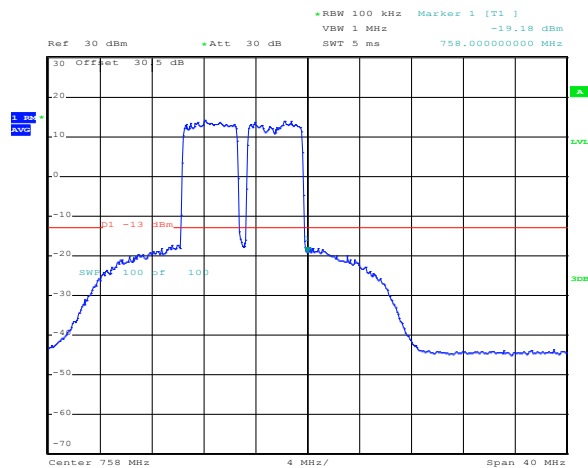
Date: 12.JUL.2018 15:12:52

Figure 8.5-21: AWGN 748.5 MHz AGC Out-of-block



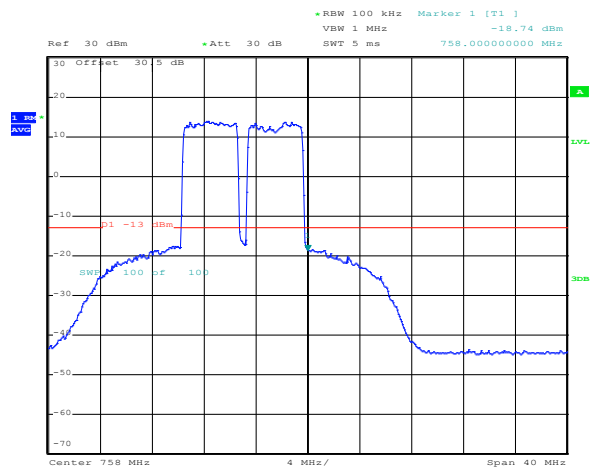
Date: 12.JUL.2018 15:13:21

Figure 8.5-22: AWGN 748.5 MHz AGC + 3dB Out-of-block



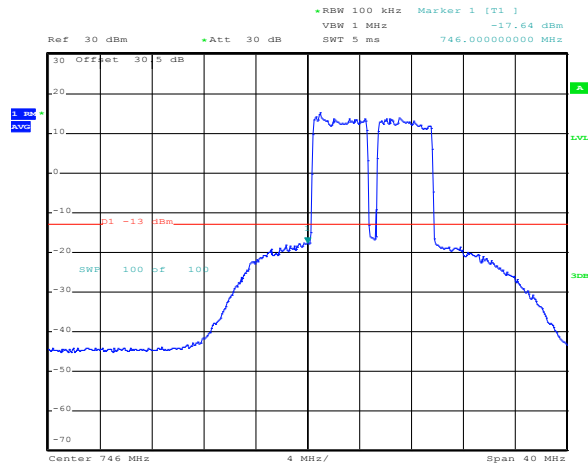
Date: 12.JUL.2018 15:21:19

Figure 8.5-23: AWGN 750.5 and 755.5 MHz AGC Out-of-block



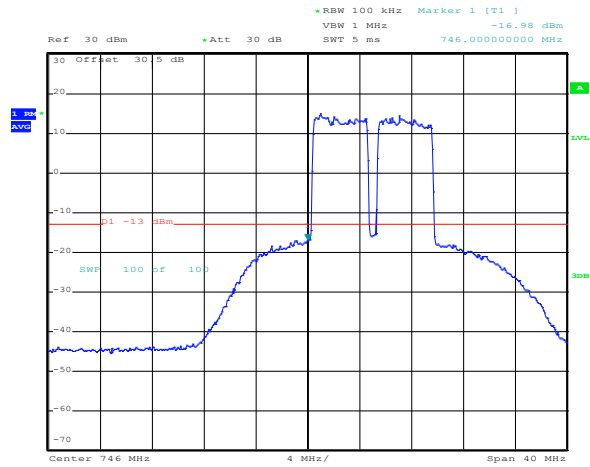
Date: 12.JUL.2018 15:21:55

Figure 8.5-24: AWGN 750.5 and 755.5 MHz AGC + 3dB Out-of-block



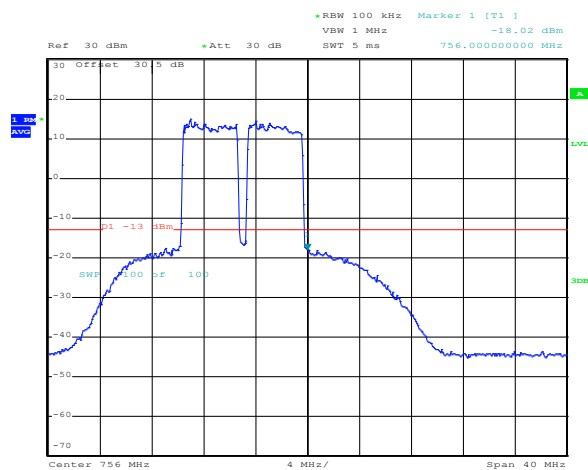
Date: 12.JUL.2018 15:16:36

Figure 8.5-25: AWGN 748.5 and 753.5 MHz AGC Out-of-block



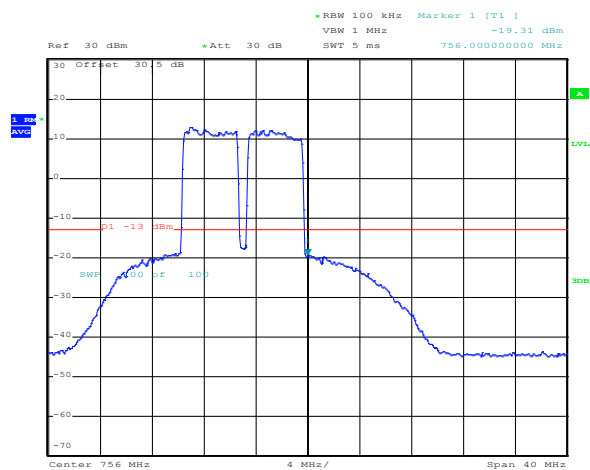
Date: 12.JUL.2018 15:17:21

Figure 8.5-26: AWGN 748.5 and 753.5 MHz AGC + 3dB Out-of-block



Date: 12.JUL.2018 15:19:04

Figure 8.5-27: AWGN 748.5 and 753.5 MHz AGC Out-of-block



Date: 12.JUL.2018 15:18:33

Figure 8.5-28: AWGN 748.5 and 753.5 MHz AGC + 3dB Out-of-block

8.6 FCC 27.53(c)(f), RSS-130 4.6, KDB 935210 D05 3.6.3, Spurious emissions conducted measurements

FCC 27.53(c) / RSS-130 4.6

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC 27.53(f), RSS-130 4.6

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

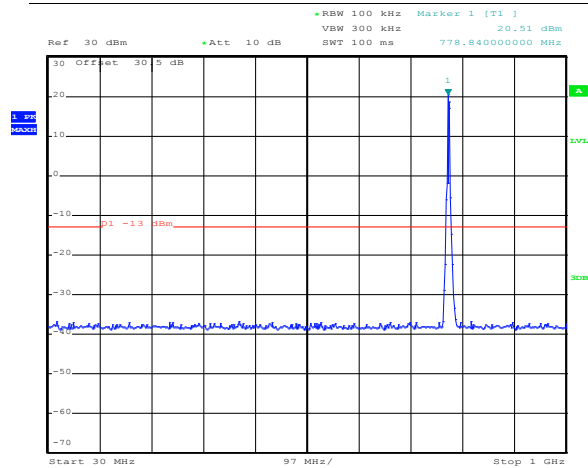
8.6.1 Test summary

| | | | |
|---------------|---------------|-------------------|-----------|
| Test date | June 27, 2018 | Temperature | 21 °C |
| Test engineer | Kevin Rose | Air pressure | 1000 mbar |
| Verdict | Pass | Relative humidity | 42 % |

8.6.2 Observations, settings and special notes

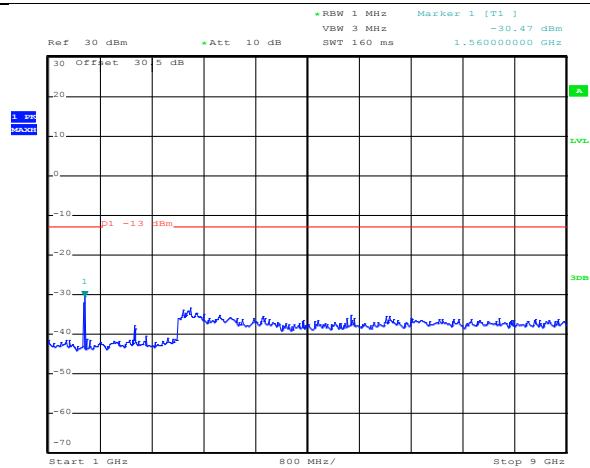
| | |
|----------------------------|---|
| Frequency range | 30 MHz to 10 th harmonic |
| Detector mode | Peak |
| Resolution bandwidth sweep | 100 kHz (below 1 GHz), 1000 kHz (above 1 GHz) |
| Video bandwidth | >RBW |
| Trace mode | Max Hold |
| Measurement time | Auto |

8.6.3 Test data



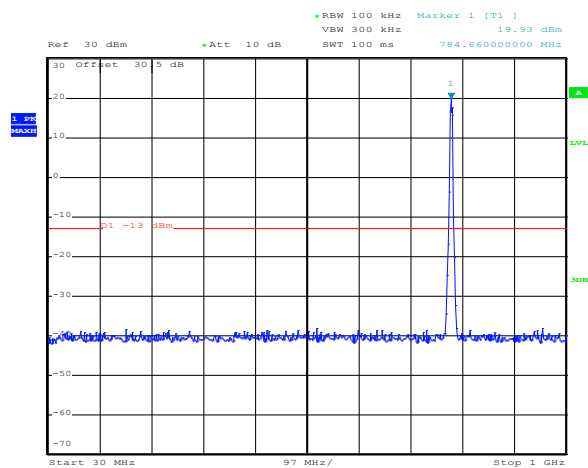
Date: 11.JUL.2018 17:02:21

Figure 8.6-1: AWGN 779.5 MHz Conducted 30-1000 MHz



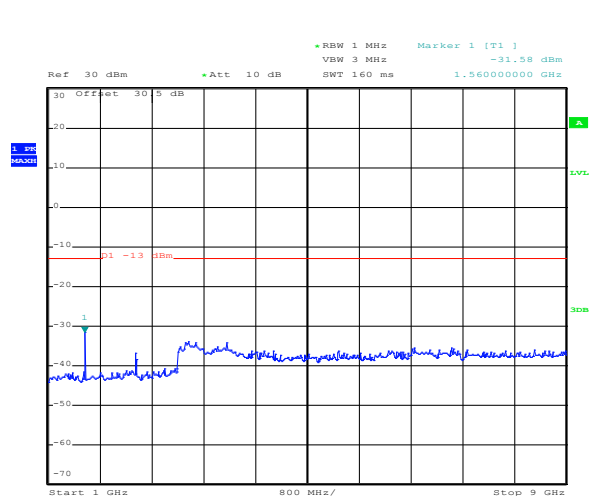
Date: 11.JUL.2018 17:03:05

Figure 8.6-2: AWGN 779.5 MHz Conducted 1-9 GHz



Date: 11.JUL.2018 17:05:49

Figure 8.6-3: AWGN 784.5 MHz Conducted 30-1000 MHz



Date: 11.JUL.2018 17:04:55

Figure 8.6-4: AWGN 784.5 MHz Conducted 1-9 GHz

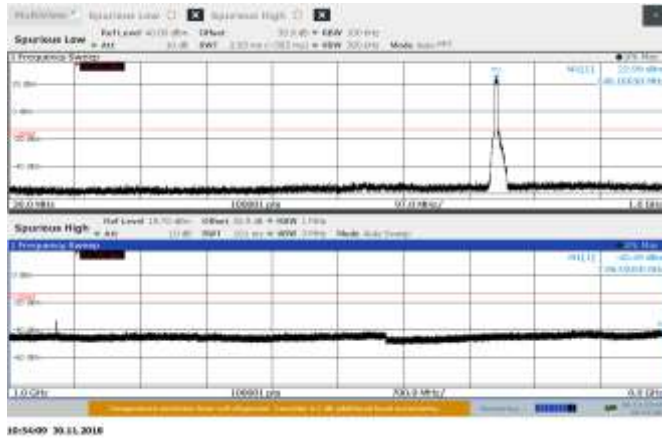


Figure 8.6-5: AWGN 748.5 MHz Conducted 30-8000 MHz

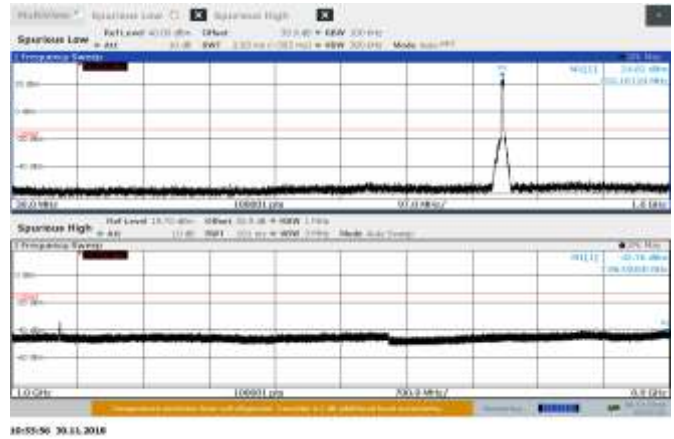


Figure 8.6-6: AWGN 753.5 MHz Conducted 30-8000 MHz

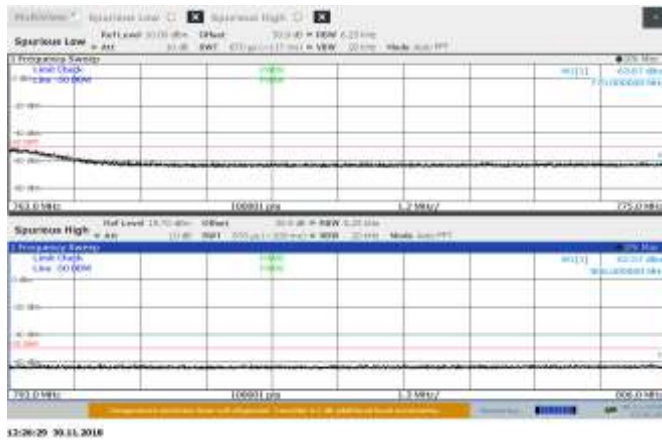


Figure 8.6-7: TX AWGN at 753.5 MHz, 763-775 and 793 - 806 MHz

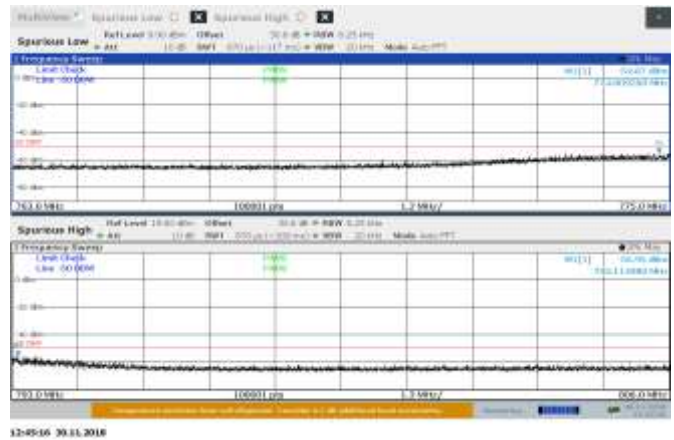


Figure 8.6-8: TX AWGN at 784.5 MHz, 763-775 and 793 - 806 MHz



Figure 8.6-9: TX AWGN at 753.5 MHz, frequency span 1559-1610 MHz



Figure 8.6-10: TX AWGN at 784.5 MHz, frequency span 1559-1610 MHz

8.7 FCC 27.53(c)(f), RSS-130 4.6, KDB 935210 D05 3.8, Spurious emissions radiated measurements

8.7.1 Definitions and limits

FCC 27.53(c) / RSS-130 4.6

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC 27.53(f), RSS-130 4.6

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

8.7.2 Test summary

| | | | |
|---------------|--------------|-------------------|-----------|
| Test date | July 5, 2018 | Temperature | 23 °C |
| Test engineer | Kevin Rose | Air pressure | 1015 mbar |
| Verdict | Pass | Relative humidity | 39 % |

8.7.3 Observations, settings and special notes

Worst case examples are provided. No emissions within 20 dB of the limit were detected.

Receiver settings were:

| | |
|----------------------|---|
| Frequency range | 30 MHz to 10 th harmonic |
| Detector mode | Peak |
| Resolution bandwidth | 100 kHz (below 1 GHz), 1000 kHz (above 1 GHz) |
| Video bandwidth | >RBW |
| Trace mode | Max Hold |

8.7.4 Test data

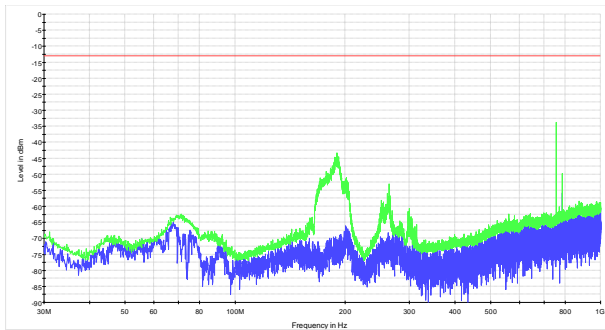


Figure 8.7-1: 30 MHz to 1 GHz

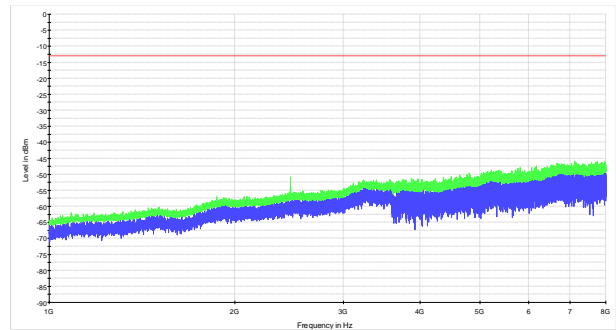


Figure 8.7-2: 1 GHz to 8 GHz

Table 8.7-1: Radiated spurious 763 to 776 MHz results

| Frequency, MHz | Field strength, dBμV/m | Substitution factor, dB | Calculated EIRP, dBm | EIRP limit, dBm/100 kHz | EIRP margin, dB |
|----------------|------------------------|-------------------------|----------------------|-------------------------|-----------------|
| 768 | 16.08 | -78.99 | -62.91 | -34 | 28.91 |

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, Substitution factor, and attenuators where applicable.

Table 8.7-2: Radiated spurious 793 to 806 MHz results

| Frequency, MHz | Field strength, dBμV/m | Substitution factor, dB | Calculated EIRP, dBm | EIRP limit, dBm/100 kHz | EIRP margin, dB |
|----------------|------------------------|-------------------------|----------------------|-------------------------|-----------------|
| 797 | 15.71 | -78.99 | -63.28 | -34 | 29.28 |

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, Substitution factor, and attenuators where applicable.

Table 8.7-3: Radiated spurious 1559 to 1610 MHz results

| Frequency, MHz | Field strength, dBμV/m | Substitution factor, dB | Calculated EIRP, dBm | EIRP limit, dBm | EIRP margin, dB |
|----------------|------------------------|-------------------------|----------------------|-----------------|-----------------|
| 1600 | 10.07 | -70.8 | -60.73 | -50 | 10.73 |

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Substitution factor includes signal generator, cable loss, and antenna factor.

Section 9. Setup Photos

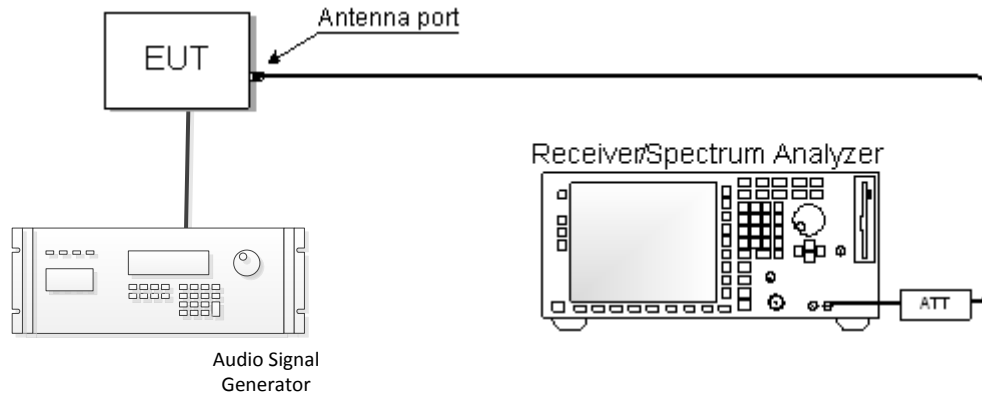
9.1 Set-up



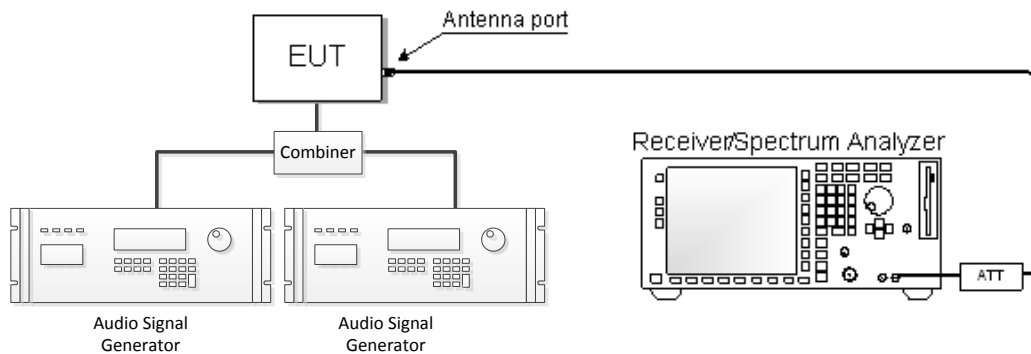
Figure 9.1-1: Radiated setup photo

Section 10. Block diagrams of test set-ups

10.1 Measuring AGC threshold level, Out-of-band-rejection, Input-versus-output signal comparison, Mean output power and amplifier/booster gain, Spurious emissions conducted measurements



10.2 Out-of-band/out-of-block emissions conducted measurements (intermodulation test)



10.3 Spurious emissions radiated measurements

