

## 8.4. INPUT/OUTPUT POWER AND AMPLIFIER/BOOSTER GAIN

### RULE PART(S)

FCC: §2.1046, §27.50

### LIMITS

#### **§ 2.1046 Measurements required: RF power output.**

- (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.
- (b) For single sideband, independent sideband, and single channel, controlled carrier radiotelephone transmitters the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.
- (c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

#### **§ 27.50 Power limits and duty cycle.**

- (d) The following power and antenna height requirements apply to stations transmitting in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz and 2180-2200 MHz bands:
  - (1) The power of each fixed or base station transmitting in the 1995-2000 MHz, 2110-2155 MHz, 2155-2180 MHz or 2180-2200 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to:
    - (i) An equivalent isotropically radiated power (EIRP) of 3280 watts when transmitting with an emission bandwidth of 1 MHz or less;
    - (ii) An EIRP of 3280 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.
  - (2) The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:
    - (i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;
    - (ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.
  - (3) A licensee operating a base or fixed station in the 2110-2155 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025-2110 MHz band. A licensee operating a base or fixed station in the 2110-2180 MHz band utilizing power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with the following licensees authorized to operate within 120 kilometers (75 miles) of the base or fixed station operating in this band: All Broadband Radio Service (BRS) licensees authorized under this part in the 2155-2160 MHz band and all advanced wireless services (AWS) licensees authorized to operate on adjacent frequency blocks in the 2110-2180 MHz band.
  - (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in

these bands must employ a means for limiting power to the minimum necessary for successful communications.

- (5) Equipment employed must be authorized in accordance with the provisions of § 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
- (6) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.
- (7) Fixed, mobile, and portable (hand-held) stations operating in the 2000-2020 MHz band are limited to 2 watts EIRP, except that the total power of any portion of an emission that falls within the 2000-2005 MHz band may not exceed 5 milliwatts. A licensee of AWS-4 authority may enter into private operator-to-operator agreements with all 1995-2000 MHz licensees to operate in 2000-2005 MHz at power levels above 5 milliwatts EIRP; except the total power of the AWS-4 mobile emissions may not exceed 2 watts EIRP.
- (8) A licensee operating a base or fixed station in the 2180-2200 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with all AWS licensees authorized to operate on adjacent frequency blocks in the 2180-2200 MHz band.
- (9) Fixed, mobile and portable (hand-held) stations operating in the 1915-1920 MHz band are limited to 300 milliwatts EIRP.
- (10) A licensee operating a base or fixed station in the 1995-2000 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with all PCS G Block licensees authorized to operate on adjacent frequency blocks in the 1990-1995 MHz band within 120 kilometers of the base or fixed station operating in this band.

## **TEST PROCEDURE**

Measurements were in accordance with the test methods KDB 935210 D05 v01r04.

### **3.5.2 Measuring input and output power levels for determining amplifier/booster gain**

- a) Connect a signal generator to the input of the EUT.
- b) Configure to generate the AWGN (broadband) test signal.
- c) The frequency of the signal generator shall be set to the frequency  $f_0$  as determined from 3.3.
- d) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
- e) Set the signal generator output power to a level that produces an EUT output level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.
- f) Measure and record the output power of the EUT; use 3.5.3 or 3.5.4 for power measurement.
- g) Remove the EUT from the measurement setup. Using the same signal generator settings, repeat the power measurement at the signal generator port, which was used as the input signal to the EUT, and record as the input power. EUT gain may be calculated as described in 3.5.5.
- h) Repeat steps f) and g) with input signal amplitude set to 3 dB above the AGC threshold level.
- i) Repeat steps e) to h) with the narrowband test signal.
- j) Repeat steps e) to i) for all frequency bands authorized for use by the EUT.

### **3.5.3 Power measurement Method 1: using a spectrum or signal analyzer**

Guidance for performing input/output power measurements using a spectrum or signal analyzer is provided in KDB Publication 971168 [R8].

### **3.5.5 Calculating the mean gain of the CMRS non-consumer amplifier, repeater, or industrial booster**

After the mean input and output power levels have been measured as described in the preceding subclauses, the mean gain of the EUT can be determined from:

Gain (dB) = output power (dBm) – input power (dBm).

Report the mean gain for each authorized operating frequency band and each test signal stimulus.

## RESULTS

### Nominal input signal

| Band        | Signal     | Frequency [MHz] | Input [dBm] | Output [dBm] | Gain [dB] | 0.1% PARR [dB] |
|-------------|------------|-----------------|-------------|--------------|-----------|----------------|
| AWS-1&-3&-4 | Narrowband | 2110.5040       | -0.01       | 34.24        | 34.25     | 0.32           |
|             | Broadband  | 2150.0000       | -0.01       | 33.39        | 33.40     | 8.34           |

### Nominal input signal + 3dB

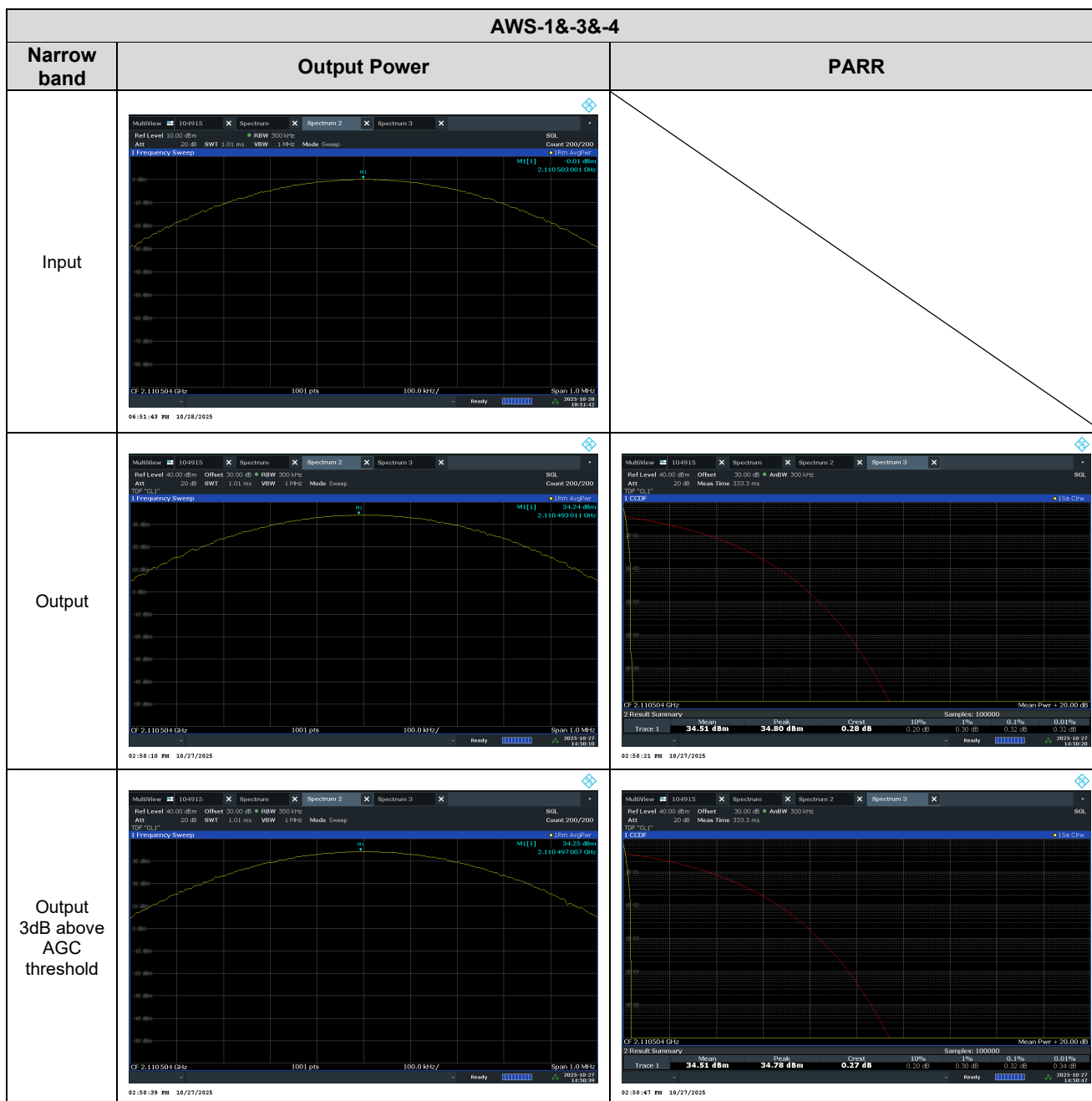
| Band        | Signal     | Frequency [MHz] | Input [dBm] | Output [dBm] | Gain [dB] | 0.1% PARR [dB] |
|-------------|------------|-----------------|-------------|--------------|-----------|----------------|
| AWS-1&-3&-4 | Narrowband | 2110.5040       | 2.99        | 34.25        | 31.26     | 0.32           |
|             | Broadband  | 2150.0000       | 2.99        | 33.32        | 30.33     | 8.32           |

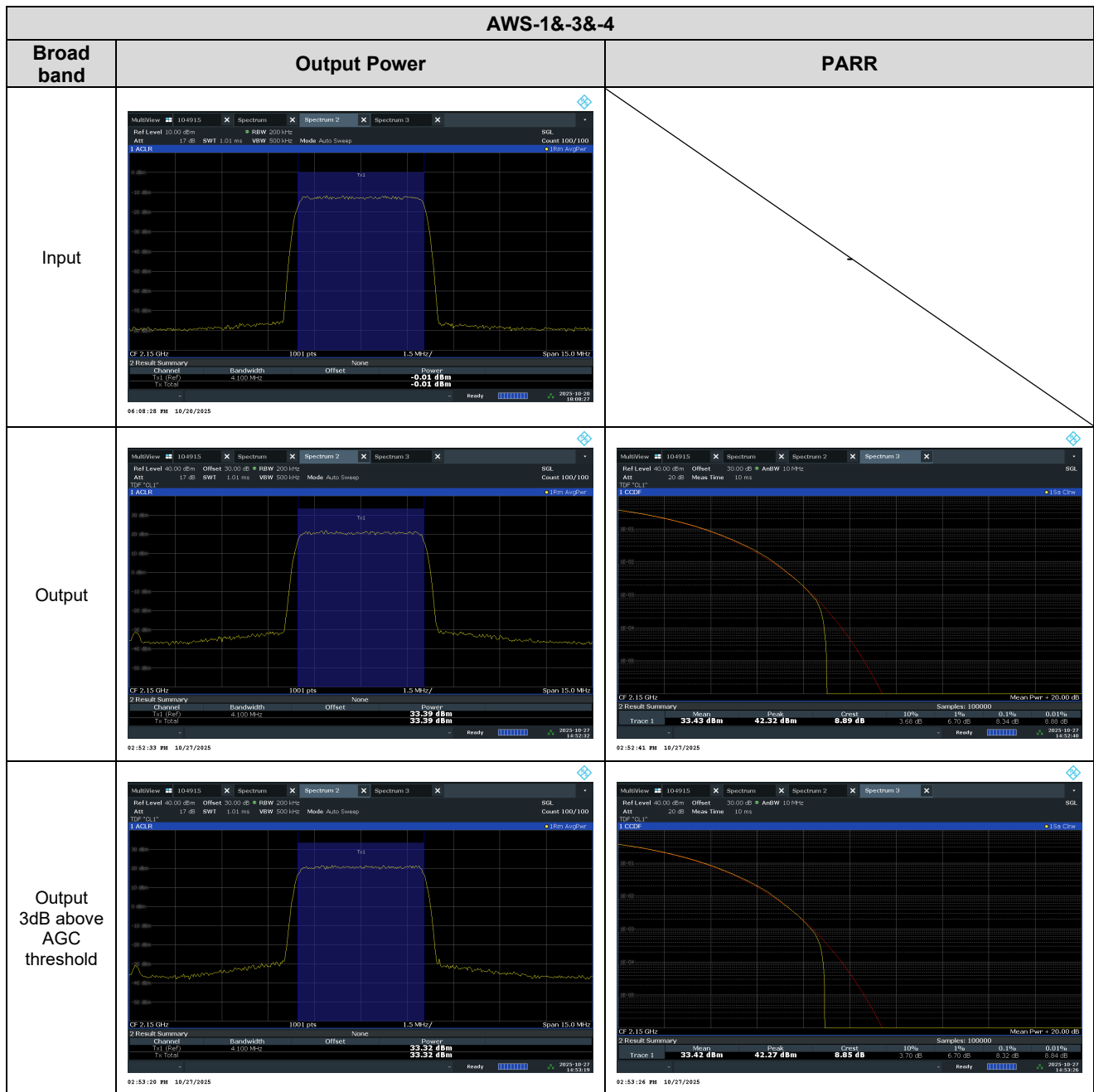
### E.I.R.P

| Band        | Max. Output power (dBm) | ANT Gain (dBi) | E.I.R.P (dBm) | E.I.R.P (W) |
|-------------|-------------------------|----------------|---------------|-------------|
| AWS-1&-3&-4 | 34.25                   | 17.00          | 51.25         | 133.35      |

Note1: E.I.R.P = Output Power + ANT Gain(dBi)

### 8.4.1. OUTPUT POWER AND PARR TEST PLOT





## 8.5. OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS AND SPURIOUS EMISSIONS

### RULE PART(S)

FCC: §2.1051, §27.53

### LIMITS

#### **§ 2.1051 Measurements required: Spurious emissions at antenna terminals.**

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

#### **§ 27.53 Emission limits.**

##### (h) AWS emission limits

- (1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.
- (2) Additional protection levels. Notwithstanding the foregoing paragraph (h)(1) of this section:
  - (i) Operations in the 2180-2200 MHz band are subject to the out-of-band emission requirements set forth in § 27.1134 for the protection of federal government operations operating in the 2200-2290 MHz band.
  - (ii) For operations in the 2000-2020 MHz band, the power of any emissions below 2000 MHz shall be attenuated below the transmitter power (P) in watts by at least  $70 + 10 \log_{10}(P)$  dB.
  - (iii) For operations in the 1915-1920 MHz band, the power of any emission between 1930-1995 MHz shall be attenuated below the transmitter power (P) in watts by at least  $70 + 10 \log_{10}(P)$  dB.
  - (iv) For operations in the 1995-2000 MHz band, the power of any emission between 2005-2020 MHz shall be attenuated below the transmitter power (P) in watts by at least  $70 + 10 \log_{10}(P)$  dB.
- (3) Measurement procedure.
  - (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
  - (ii) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.
  - (iii) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.
- (4) Private agreements.
  - (i) For AWS operations in the 2000-2020 MHz and 2180-2200 MHz bands, to the extent a licensee establishes unified operations across the AWS blocks, that licensee may choose not to observe the emission limit specified in paragraph (h)(1), above, strictly between its adjacent block licenses in a geographic area, so long as it complies with other Commission rules and is not adversely affecting the operations of other parties by virtue of exceeding the emission limit.
  - (ii) For AWS operations in the 2000-2020 MHz band, a licensee may enter into private agreements with all licensees operating between 1995 and 2000 MHz to allow the  $70 + 10 \log_{10}(P)$  dB limit to be exceeded within the 1995-2000 MHz band.

- (iii) An AWS licensee who is a party to a private agreement described in this section (4) must maintain a copy of the agreement in its station files and disclose it, upon request, to prospective AWS assignees, transferees, or spectrum lessees and to the Commission.

## **TEST PROCEDURE**

### **3.6.2 Out-of-band/out-of-block emissions conducted measurements**

- a) Connect a signal generator to the input of the EUT. If the signal generator is not capable of generating two modulated carriers simultaneously, then two discrete signal generators can be connected with an appropriate combining network to support this two-signal test.
- b) Set the signal generator to produce two AWGN signals as previously described (e.g., 4.1 MHz OBW). Set the signal generator amplitudes so that the power from each into the EUT is equivalent.
- c) Set the center frequencies such that the AWGN signals occupy adjacent channels, as defined by industry standards such as 3GPP or 3GPP2, at the upper edge of the frequency band or block under test.
- d) Set the composite power levels such that the input signal is just below the AGC threshold (see 3.2), but not more than 0.5 dB below. The composite power can be measured using the procedures provided in KDB Publication 971168 [R8], but it will be necessary to expand the power integration bandwidth so as to include both of the transmit channels. Alternatively, the composite power can be measured using an average power meter as described in KDB Publication 971168 [R8].
- e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.
- f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band (typically 1 % of the EBW or 100 kHz or 1 MHz)
- g) Set the VBW =  $3 \times$  RBW.
- h) Set the detector to power averaging (rms) detector.
- i) Set the Sweep time = auto-couple.
- j) Set the spectrum analyzer start frequency to the upper block edge frequency, and the stop frequency to the upper block edge frequency plus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively.
- k) Trace average at least 100 traces in power averaging (rms) mode.
- l) Use the marker function to find the maximum power level.
- m) Capture the spectrum analyzer trace of the power level for inclusion in the test report.
- n) Repeat steps k) to m) with the composite input power level set to 3 dB above the AGC threshold.
- o) Reset the frequencies of the input signals to the lower edge of the frequency block or band under test.
- p) Reset the spectrum analyzer start frequency to the lower block edge frequency minus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively, and the stop frequency to the lower band or block edge frequency.
- q) Repeat steps k) to n).
- r) Repeat steps a) to q) with the signal generator configured for a single test signal tuned as close as possible to the block edges.
- s) Repeat steps a) to r) with the narrowband test signal.
- t) Repeat steps a) to s) for all authorized frequency bands or blocks used by the EUT.

### **3.6.3 Spurious emissions conducted measurements**

- a) Connect a signal generator to the input of the EUT.
- b) Set the signal generator to produce the broadband test signal as previously described (i.e., 4.1 MHz OBW AWGN).
- c) Set the center frequency of the test signal to the lowest available channel within the frequency band or block.
- d) Set the EUT input power to a level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.
- e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.
- f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band of operation (e.g., reference bandwidth is typically 100 kHz or 1 MHz).

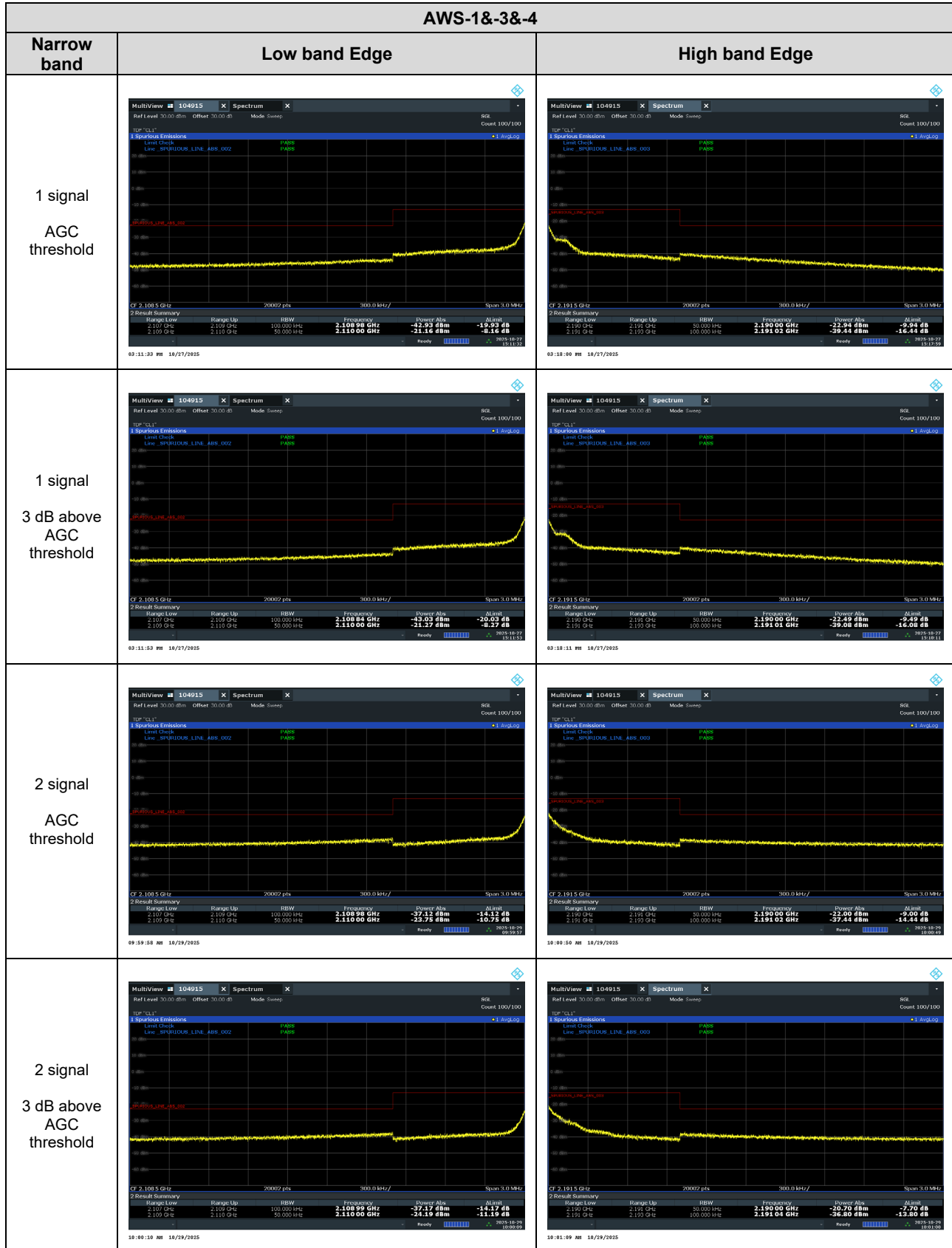
- g) Set the VBW  $\geq 3 \times$  RBW.
- h) Set the Sweep time = auto-couple.
- i) Set the spectrum analyzer start frequency to the lowest RF signal generated in the equipment, without going below 9 kHz, and the stop frequency to the lower band/block edge frequency minus 100 kHz or 1 MHz, as specified in the applicable rule part. The number of measurement points in each sweep must be  $\geq (2 \times \text{span}/\text{RBW})$ , which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.<sup>4</sup>
- j) Select the power averaging (rms) detector function.
- k) Trace average at least 10 traces in power averaging (rms) mode.
- l) Use the peak marker function to identify the highest amplitude level over each measured frequency range. Record the frequency and amplitude and capture a plot for inclusion in the test report.
- m) Reset the spectrum analyzer start frequency to the upper band/block edge frequency plus 100 kHz or 1 MHz, as specified in the applicable rule part, and the spectrum analyzer stop frequency to  $10 \times$  the highest frequency of the fundamental emission (see Section 2.1057). The number of measurement points in each sweep must be  $\geq (2 \times \text{span}/\text{RBW})$ , which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.
- n) Trace average at least 10 traces in power averaging (rms) mode.
- o) Use the peak marker function to identify the highest amplitude level over each of the measured frequency ranges. Record the frequency and amplitude and capture a plot for inclusion in the test report; also provide tabular data, if required.
- p) Repeat steps i) to o) with the input test signals firstly tuned to a middle band/block frequency/channel, and then tuned to a high band/block frequency/channel.
- q) Repeat steps c) to p) with the narrowband test signal.
- r) Repeat steps b) to q) for all authorized frequency bands/blocks used by the EUT.

Note: In accordance with ANSI C63.26-2015 section 5.7.2, measurements in certain frequency bands were conducted with a reduced RBW calculated using the following formula:

Measured with a reduced RBW per ANSI C63.26-2015 section 5.7.2, with corresponding compensation applied to the limit.

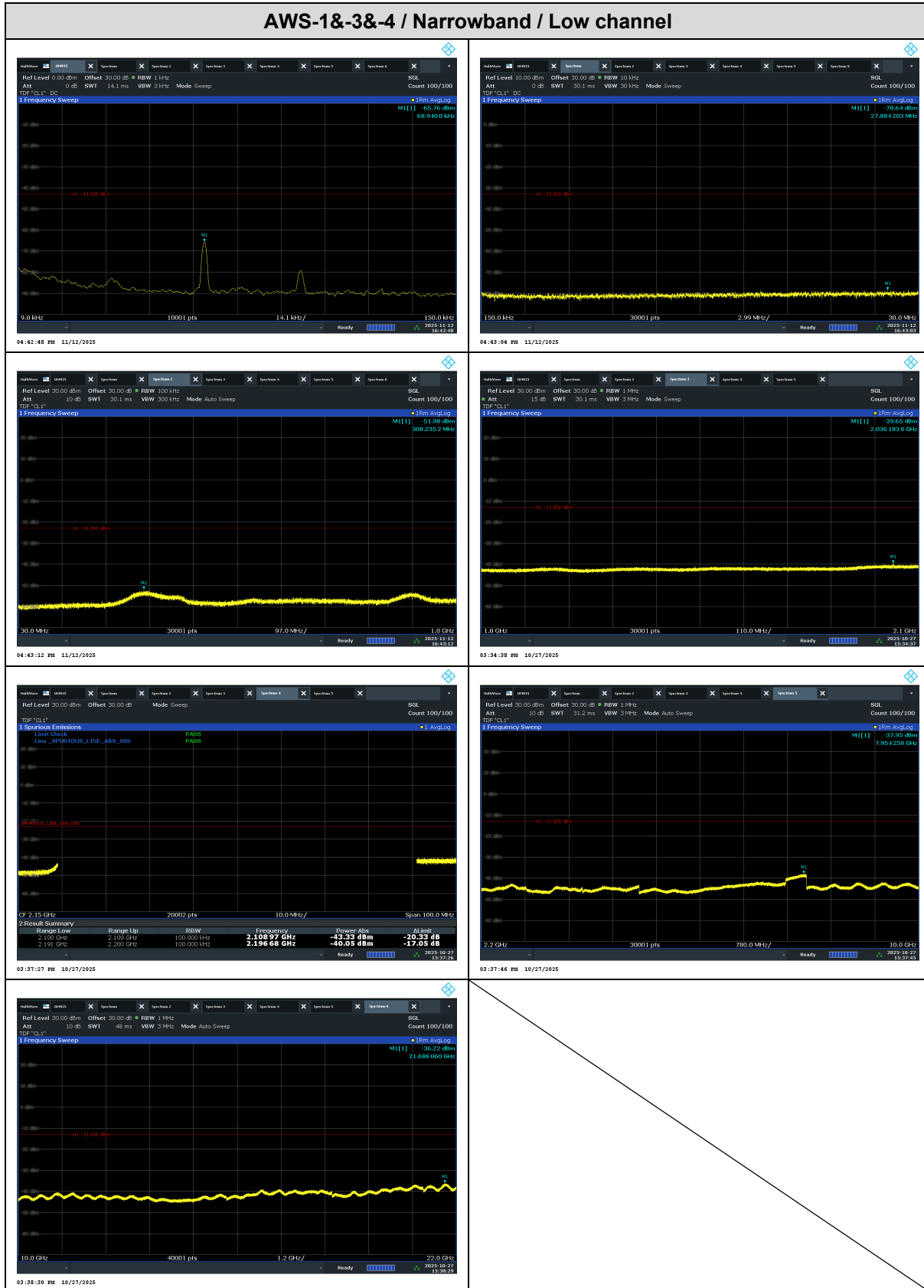
Limit RBW Factor =  $10 \log(\text{Reference RBW} / \text{Measured RBW})$

## 8.5.1. OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS PLOT



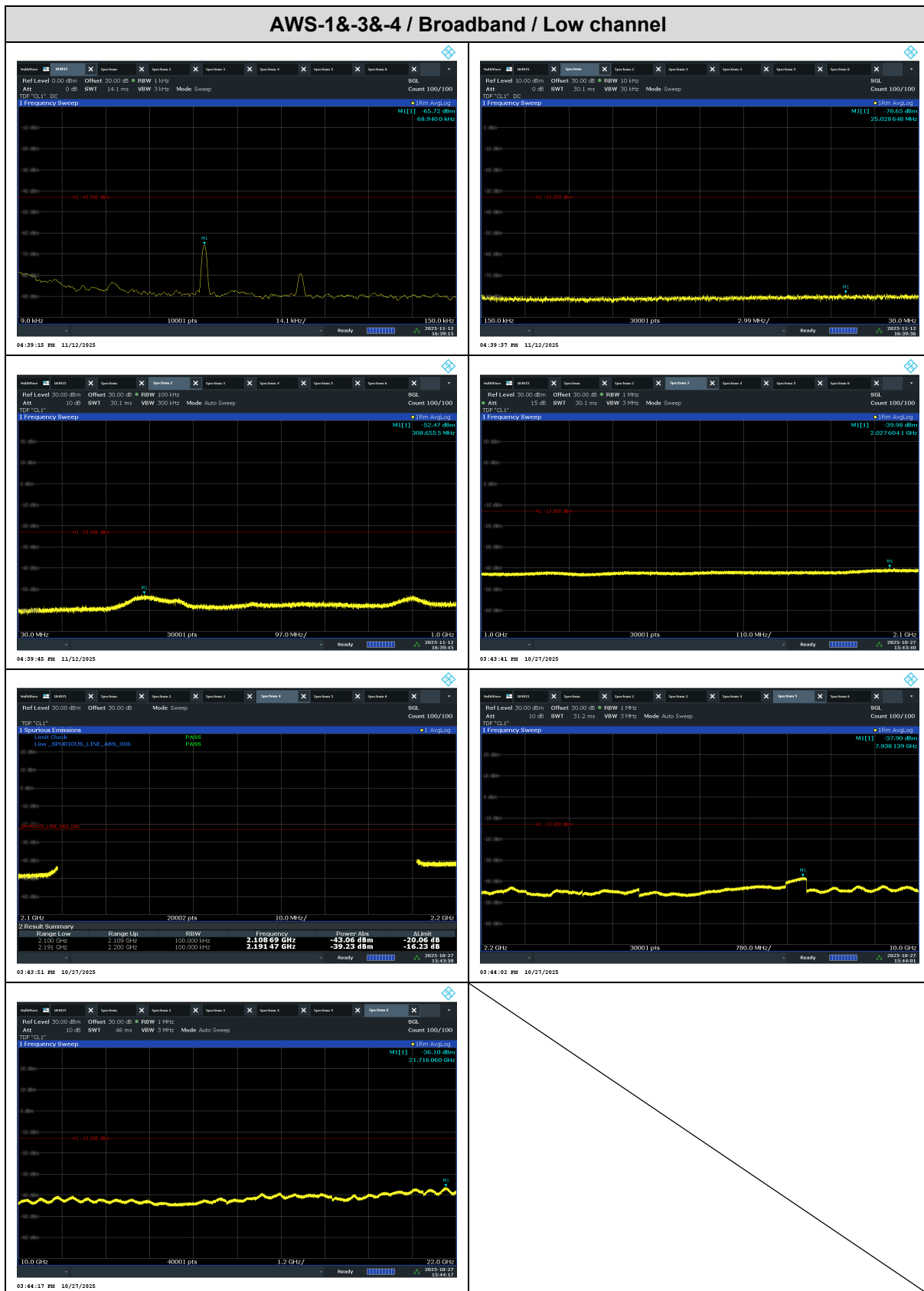
| AWS-1&-3&-4                          |               |                |
|--------------------------------------|---------------|----------------|
| Broad band                           | Low band Edge | High band Edge |
| 1 signal<br>AGC threshold            |               |                |
| 1 signal<br>3 dB above AGC threshold |               |                |
| 2 signal<br>AGC threshold            |               |                |
| 2 signal<br>3 dB above AGC threshold |               |                |

## 8.5.2. CONDUCTED SPURIOUS EMISSIONS PLOT













## 9. RADIATED RESULTS

### 9.1. RADIATED SPURIOUS EMISSIONS

#### RULE PART(S)

FCC: §2.1053

#### LIMIT

##### **§ 2.1053 Measurements required: Field strength of spurious radiation.**

- (a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.
- (b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:
  - (1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.
  - (2) All equipment operating on frequencies higher than 25 MHz.
  - (3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
  - (4) Other types of equipment as required, when deemed necessary by the Commission.

#### TEST PROCEDURE

Because KDB 935210 D05 procedure does not provide this requirement, measurements were in accordance with the test methods section 5.5 of ANSI C63.26-2015

- a) Place the EUT in the center of the turntable. The EUT shall be configured to transmit into the standard non-radiating load (for measuring radiated spurious emissions), connected with cables of minimal length unless specified otherwise. If the EUT uses an adjustable antenna, the antenna shall be positioned to the length that produces the worst case emission at the fundamental operating frequency.
- b) Each emission under consideration shall be evaluated:
  - 1) Raise and lower the measurement antenna in accordance 5.5.2, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
  - 2) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
  - 3) Return the turntable to the azimuth where the highest emission amplitude level was observed.
  - 4) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
  - 5) Record the measured emission amplitude level and frequency using the appropriate RBW.
- c) Repeat step b) for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.

### 9.1.1. RADIATED SPURIOUS TEST RESULTS (ABOVE 1GHz)

#### TEST RESULTS

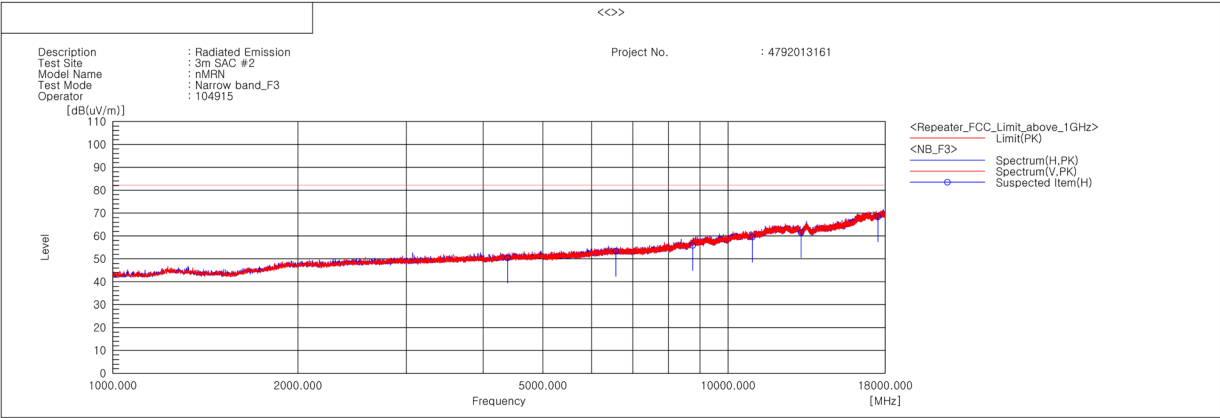
- **AWS-1&-3&-4**

| Frequency<br>[MHz] | Polarization<br>[H/V] | Measured Power<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|-------------------------|----------------|----------------|
| Not detected       |                       |                         |                |                |

Notes:

1. We performed testing for all modes at the low, middle, and high frequencies, covering up to the 10<sup>th</sup> harmonic; only the worst-case data has been reported
2. Measured Power[dBm]= SG Level (dBm) - TX Cable Loss (dB) + TX ANT Gain (dBd or dBi)
3. e.r.p(dBm)=e.i.r.p(dBm) – 2.15

SPURIOUS EMISSIONS (AWS-1&-3&-4)



Spectrum Selection

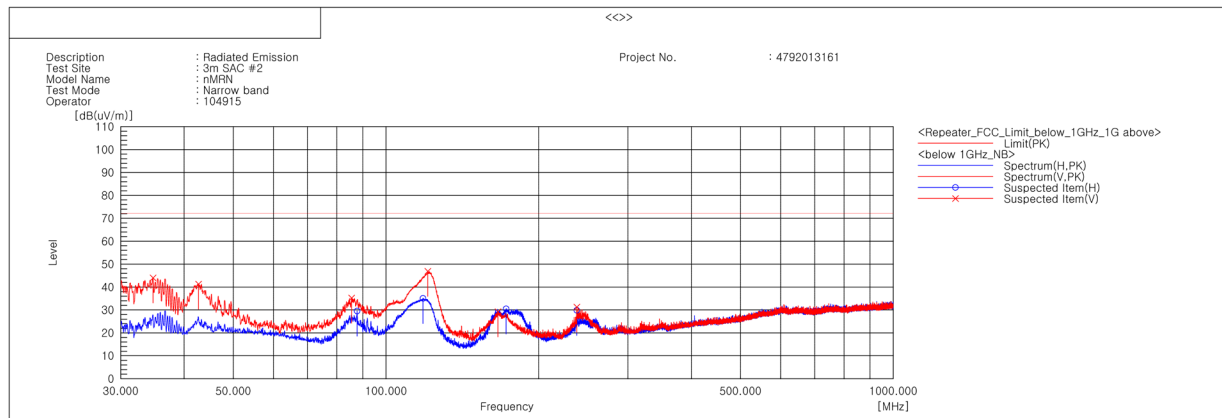
| --- Horizontal Polarization --- |           | Polarization |           | --- c.f |  | Result     | Limit      | Margin | Height | Angle | Remark |
|---------------------------------|-----------|--------------|-----------|---------|--|------------|------------|--------|--------|-------|--------|
| No.                             | Frequency | Reading      |           |         |  | PK         | PK         | PK     |        |       |        |
|                                 | [MHz]     | [dB(uV)]     | [dB(1/m)] |         |  | [dB(uV/m)] | [dB(uV/m)] | [dB]   | [cm]   | [deg] |        |
| 1                               | 4379.600  | 41.8         | 8.6       |         |  | 50.4       | 82.2       | 31.8   | 299.6  | 13.7  |        |
| 2                               | 6569.200  | 39.7         | 13.7      |         |  | 53.4       | 82.2       | 28.8   | 299.6  | 277.5 |        |
| 3                               | 8758.799  | 38.1         | 17.8      |         |  | 55.9       | 82.2       | 26.3   | 199.7  | 300.6 |        |
| 4                               | 10948.400 | 37.2         | 22.3      |         |  | 59.5       | 82.2       | 22.7   | 149.9  | 321.8 |        |
| 5                               | 13138.000 | 37.8         | 23.6      |         |  | 61.4       | 82.2       | 20.8   | 149.9  | 95.7  |        |
| 6                               | 17517.200 | 38.8         | 29.6      |         |  | 68.4       | 82.2       | 13.8   | 299.6  | 124.2 |        |

Supplementary information:

- c.f = Antenna Factor(dB/m) + Cableloss(dB) - Amp gain(dB)
- Measured distance: 3m

## 9.1.2. RADIATED SPURIOUS TEST RESULTS (BELOW 1GHz)

### SPURIOUS EMISSIONS (AWS-1&-3&-4)



#### Spectrum Selection

| --- Horizontal Polarization --- |           |          |           |            |            |        |        |       |        |
|---------------------------------|-----------|----------|-----------|------------|------------|--------|--------|-------|--------|
| No.                             | Frequency | Reading  | c.f       | Result     | Limit      | Margin | Height | Angle | Remark |
|                                 | [MHz]     | [dB(uV)] | [dB(1/m)] | [dB(uV/m)] | [dB(uV/m)] | [dB]   | [cm]   | [deg] |        |
| 1                               | 87.700    | 41.7     | -12.2     | 29.5       | 72.2       | 42.7   | 200.2  | 1.5   |        |
| 2                               | 118.250   | 46.0     | -10.9     | 35.1       | 72.2       | 37.1   | 300.2  | 108.2 |        |
| 3                               | 172.550   | 42.1     | -11.6     | 30.5       | 72.2       | 41.7   | 99.7   | 348.5 |        |
| 4                               | 237.850   | 37.9     | -8.0      | 29.9       | 72.2       | 42.3   | 200.2  | 79.1  |        |

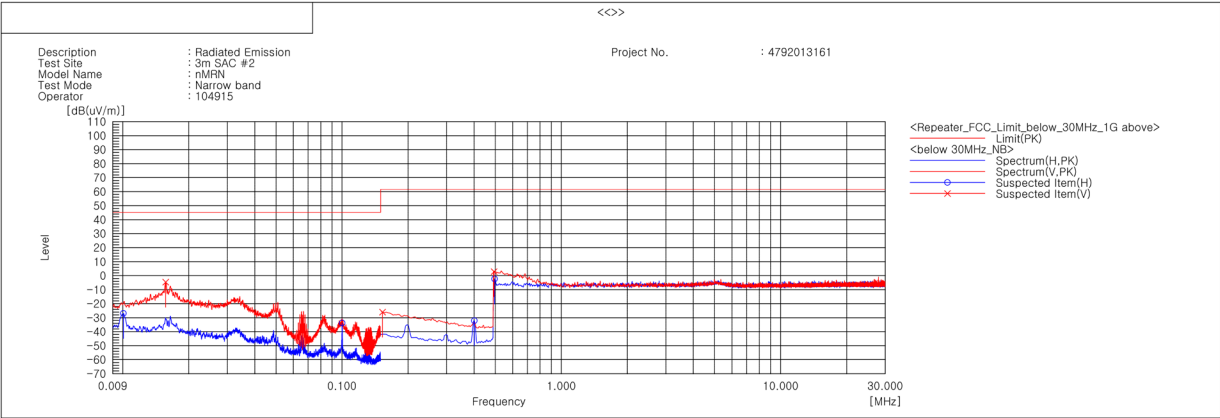
| --- Vertical Polarization --- |           |          |           |            |            |        |        |       |        |
|-------------------------------|-----------|----------|-----------|------------|------------|--------|--------|-------|--------|
| No.                           | Frequency | Reading  | c.f       | Result     | Limit      | Margin | Height | Angle | Remark |
|                               | [MHz]     | [dB(uV)] | [dB(1/m)] | [dB(uV/m)] | [dB(uV/m)] | [dB]   | [cm]   | [deg] |        |
| 1                             | 34.750    | 54.5     | -10.5     | 44.0       | 72.2       | 28.2   | 99.8   | 140.8 |        |
| 2                             | 42.700    | 49.4     | -8.1      | 41.3       | 72.2       | 30.9   | 99.8   | 7.6   |        |
| 3                             | 85.550    | 48.3     | -13.0     | 35.3       | 72.2       | 36.9   | 99.8   | 339.5 |        |
| 4                             | 120.900   | 58.2     | -11.3     | 46.9       | 72.2       | 25.3   | 99.8   | 339.5 |        |
| 5                             | 166.250   | 41.1     | -11.8     | 29.3       | 72.2       | 42.9   | 199.8  | 11.5  |        |
| 6                             | 237.800   | 39.2     | -8.0      | 31.2       | 72.2       | 41.0   | 99.8   | 49.1  |        |

#### Supplementary information:

- c.f = Antenna Factor(dB/m) + Cableloss(dB) - Amp gain(dB)
- Measured distance: 3m

9.1.3. RADIATED SPURIOUS TEST RESULTS (BELOW 30MHz)

SPURIOUS EMISSIONS (AWS-1&-3&-4)



Spectrum Selection

| --- Horizontal Polarization --- |           |          |           |            |            |        |        |       |        |
|---------------------------------|-----------|----------|-----------|------------|------------|--------|--------|-------|--------|
| No.                             | Frequency | Reading  | c.f       | Result     | Limit      | Margin | Height | Angle | Remark |
|                                 | [MHz]     | [dB(uV)] | [dB(1/m)] | [dB(uV/m)] | [dB(uV/m)] | [dB]   | [cm]   | [deg] |        |
| 1                               | 0.010     | 33.5     | -60.3     | -26.8      | 45.2       | 72.0   | 99.8   | 137.6 |        |
| 2                               | 0.100     | 27.3     | -61.0     | -33.7      | 45.2       | 78.9   | 99.8   | 281.7 |        |
| 3                               | 0.401     | 29.4     | -61.5     | -32.1      | 61.8       | 93.9   | 99.8   | 88.2  |        |
| 4                               | 0.496     | 17.0     | -19.3     | -2.3       | 61.8       | 64.1   | 99.8   | 152.3 |        |

| --- Vertical Polarization --- |           |          |           |            |            |        |        |       |        |
|-------------------------------|-----------|----------|-----------|------------|------------|--------|--------|-------|--------|
| No.                           | Frequency | Reading  | c.f       | Result     | Limit      | Margin | Height | Angle | Remark |
|                               | [MHz]     | [dB(uV)] | [dB(1/m)] | [dB(uV/m)] | [dB(uV/m)] | [dB]   | [cm]   | [deg] |        |
| 1                             | 0.016     | 55.7     | -60.3     | -4.6       | 45.2       | 49.8   | 99.8   | 2.1   |        |
| 2                             | 0.153     | 35.7     | -61.7     | -26.0      | 61.8       | 87.8   | 99.8   | 32.2  |        |
| 3                             | 0.493     | 22.3     | -19.3     | 3.0        | 61.8       | 58.8   | 99.8   | 219.4 |        |

Supplementary information:  
- c.f = Antenna Factor(dB/m) + Cableloss(dB) - Amp gain(dB)  
- Measured distance: 3m

END OF REPORT