

FCC REPORT

Certification

Applicant Name:

FRTEK CO., LTD.

Address: 11-25, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, Republic of Korea

Date of Issue:

December 20, 2018

Location of test lab: HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-1810-FC030-R2

| FCC ID: | 2AFEG-2100-37 | |
|------------------|---|--|
| APPLICANT: | FRTEK CO., LTD. | |
| Model: | ISO2100-70FRT | |
| EUT Type: | INOVA 5W | |
| Frequency Range: | Band Name Downlink (MHz) AWS1+3 2 110 ~ 2 180 | |
| Output Power: | 37 dBm | |
| Date of Test: | September 27, 2018 ~ October 10, 2018 | |
| FCC Rule Parts: | CFR 47 Part 2, Part 27 | |

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

Report prepared by : A Ram Han Engineer of telecommunication testing center



Approved by : Jong Seok Lee Manager of telecommunication testing center

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.



Version

| TEST REPORT NO. | DATE | DESCRIPTION |
|----------------------|-------------------|--|
| HCT-RF-1810-FC030 | October 19, 2018 | - First Approval Report |
| HCT-RF-1810-FC030-R1 | December 13, 2018 | - Change applicant address information |
| HCT-RF-1810-FC030-R2 | December 20, 2018 | - Correct reference standard of radiation test diagram |
| | | |



Table of Contents

| 1. GENERAL INFORMATION |
|--|
| 1.1. APPLICANT INFORMATION |
| 1.2. PRODUCT INFORMATION |
| 1.3. TEST INFORMATION |
| 2. FACILITIES AND ACCREDITATIONS |
| 2.1. FACILITIES |
| 2.2. EQUIPMENT |
| 3. TEST SPECIFICATIONS |
| 3.1. STANDARDS |
| 3.2. ADDITIONAL DESCRIPTIONS ABOUT TEST |
| 3.3. MEASUREMENTUNCERTAINTY9 |
| 3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS |
| 3.5. TEST DIAGRAMS 10 |
| 4. TEST EQUIPMENTS11 |
| 5. TEST RESULT |
| 5.1. AGC THRESHOLD 12 |
| 5.2. OUT-OF-BAND REJECTION |
| 5.3. INPUT-VERSUS-OUTPUT SIGNAL COMPARISON |
| 5.4. MEAN OUTPUT POWER AND AMPLIFIER/BOOSTER GAIN |
| |
| 5.5. OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS AND SPURIOUS EMISSIONS |
| 5.5. OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS AND SPURIOUS EMISSIONS |



1. GENERAL INFORMATION

1.1. APPLICANT INFORMATION

| Company Name | FRTEK CO., LTD. |
|-----------------|--|
| Company Address | 1001, Doosan Venture Digm, 415, Heungandaero, Dongan-Gu, Anyang-Si, Gyenggi-do, 431-755 Korea |

1.2. PRODUCT INFORMATION

| EUT Type | INOVA 5W | |
|-----------------------|---|---------------------------------|
| Power Supply | AC 88 ~ 132 V | |
| Frequency Range | Band Name AWS1+3 | Downlink (MHz) 2 110 ~ 2 180 |
| Tx Output Power | 37 dBm | |
| Antenna Specification | Manufacturer does not provide an antenna. | |

1.3. TEST INFORMATION

| FCC Rule Parts | CFR 47 Part 2, Part 27 |
|-----------------------|--|
| Measurement Standards | KDB 935210 D05 v01r02, ANSI C63.26-2015 |
| Test Location | HCT CO., LTD. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA |



2. FACILITIES AND ACCREDITATIONS

2.1. FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.

The site is constructed in conformance with the requirements of ANSI C63.4 (Version: 2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

2.2. EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



3. TEST SPECIFICATIONS

3.1. STANDARDS

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2 and Part 27.

| Description | Reference | Results |
|--|---------------------------|-----------|
| AGC threshold | KDB 935210 D05 v01r02 3.2 | Compliant |
| Out-of-band rejection | KDB 935210 D05 v01r02 3.3 | Compliant |
| Input-versus-output signal comparison | §2.1049 | Compliant |
| Mean output power and amplifier/booster gain | §2.1046, §27.50(d) | Compliant |
| Out-of-band/out-of-block and spurious emissions | §2.1051, §27.53(h) | Compliant |
| Spurious emissions radiated | §2.1053 | Compliant |



3.2. ADDITIONAL DESCRIPTIONS ABOUT TEST

Except for the following cases, EUT was tested under normal operating conditions.

: Out-of-band rejection test requires maximum gain condition without AGC.

The test was generally based on the method of KDB 935210 D05 v01r02 and only followed ANSI C63.26-2015 if there was no test method in KDB standard.

EUT was tested with following modulated signals provide by applicant.

| Band Name | Tested signals |
|-----------|--|
| AWS1+3 | WCDMA, LTE 5 MHz, LTE 10 MHz, LTE 15 MHz, LTE 20 MHz |

The frequency stability measurement has been omitted in accordance with section 3.7 of KDB 935210 D05 v01r02.

: It can be confirmed through input-versus-output signal comparison test that EUT does not alter the input signal.

The tests results included actual loss value for attenuator and cable combination as shown in the table below. : Input Path

| Correction factor table | | | |
|-------------------------|-------------|-----------------|-------------|
| Frequency (MHz) | Factor (dB) | Frequency (MHz) | Factor (dB) |
| 1 500 | 1.793 | 2 250 | 2.205 |
| 1 550 | 1.899 | 2 300 | 2.215 |
| 1 600 | 1.946 | 2 350 | 2.305 |
| 1 650 | 1.907 | 2 400 | 2.317 |
| 1 700 | 1.829 | 2 450 | 2.247 |
| 1 750 | 1.878 | 2 500 | 2.384 |
| 1 800 | 1.865 | 2 550 | 2.442 |
| 1 850 | 1.923 | 2 600 | 2.496 |
| 1 900 | 1.886 | 2 650 | 2.483 |
| 1 950 | 2.031 | 2 700 | 2.287 |
| 2 000 | 2.033 | 2 750 | 2.427 |
| 2 050 | 1.996 | 2 800 | 2.307 |
| 2 100 | 2.100 | 2 850 | 2.504 |
| 2 150 | 2.072 | 2 900 | 2.466 |
| 2 200 | 2.193 | | |



: Output Path

| Correction factor table | | | |
|--|--------|--------|--------|
| Frequency (MHz)Factor (dB)Frequency (MHz)Factor (dB) | | | |
| 2 | 31.154 | 4 000 | 33.844 |
| 10 | 30.706 | 5 000 | 33.971 |
| 30 | 30.632 | 6 000 | 34.270 |
| 50 | 30.615 | 7 000 | 34.290 |
| 100 | 30.698 | 8 000 | 34.165 |
| 200 | 30.848 | 9 000 | 34.791 |
| 300 | 31.205 | 10 000 | 37.064 |
| 400 | 31.388 | 11 000 | 36.286 |
| 500 | 31.497 | 12 000 | 35.465 |
| 600 | 31.613 | 13 000 | 35.388 |
| 700 | 31.747 | 14 000 | 37.352 |
| 800 | 31.764 | 15 000 | 36.335 |
| 900 | 31.792 | 16 000 | 36.429 |
| 1 000 | 31.843 | 17 000 | 36.201 |
| 1 500 | 32.321 | 18 000 | 37.106 |
| 1 900 | 32.458 | 19 000 | 38.137 |
| 2 000 | 32.621 | 20 000 | 39.472 |
| 2 100 | 32.655 | 21 000 | 42.846 |
| 2 200 | 32.741 | 22 000 | 45.727 |
| 2 300 | 32.771 | 23 000 | 40.024 |
| 2 400 | 32.917 | 24 000 | 42.947 |
| 2 500 | 33.016 | 25 000 | 43.045 |
| 2 600 | 33.069 | 26 000 | 43.172 |
| 2 700 | 32.887 | 26 500 | 43.650 |
| 3 000 | 33.301 | | |



3.3. MEASUREMENTUNCERTAINTY

| Description | Reference | Results |
|--|-------------|-----------|
| AGC threshold | - | ±0.87 dB |
| Out-of-band rejection | - | ±0.58 MHz |
| Input-versus-output signal comparison | OBW > 5 MHz | ±0.58 MHz |
| Mean output power and amplifier/booster gain | - | ±0.87 dB |
| Out-of-band/out-of-block and spurious emissions | - | ±1.08 dB |
| Spurious emissions radiated | f≤1 GHz | ±4.80 dB |
| | f > 1 GHz | ±6.07 dB |

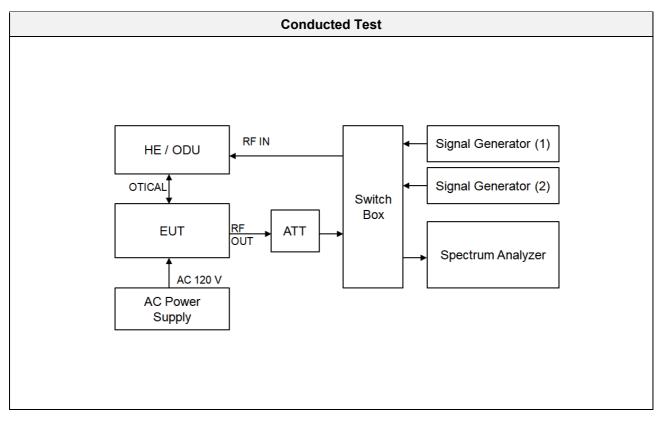
* Coverage factor k = 2, Confidence levels of 95 %

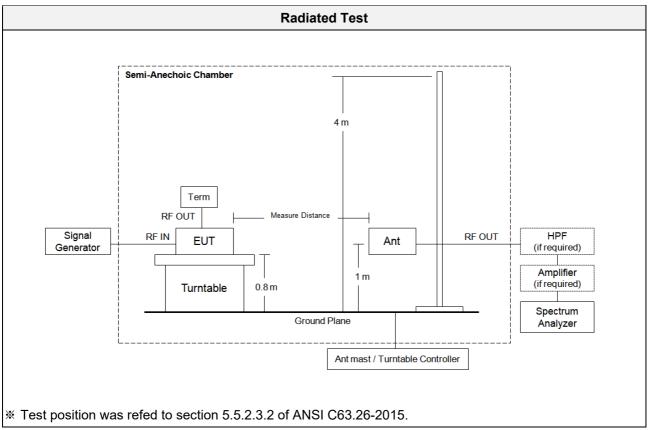
3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

| Temperature | +15 ℃ to +35 ℃ |
|-------------------|------------------------|
| Relative humidity | 30 % to 60 % |
| Air pressure | 860 mbar to 1 060 mbar |



3.5. TEST DIAGRAMS







4. TEST EQUIPMENTS

| Manufacturer | Model / Equipment | Calibration Date | Calibration Interval | Serial No. |
|---------------------------|---|---------------------|-------------------------|-------------|
| Agilent | N9020A / Spectrum Analyzer | 09/05/2018 | Annual | MY46471250 |
| Agilent | N5182A / Signal Generator | 08/09/2018 | Annual | MY50140312 |
| Agilent | N5182A / Signal Generator | 08/30/2018 | Annual | MY46240523 |
| Agilent | 8498A / Attenuator | 09/06/2018 | Annual | 51162 |
| KEITHLEY | S46 / Switch | N/A | N/A | 1088024 |
| Deayoung ENT | DFSS60 / AC Power Supply | 04/05/2018 | Annual | 1003030-1 |
| Innco system | CO3000 / Controller(Antenna mast) | N/A | N/A | CO3000-4p |
| Innco system | MA4640/800-XP-EP / Antenna Position Tower | N/A | N/A | N/A |
| Emco | 2090 / Controller | N/A | N/A | 060520 |
| Ets | - / Turn Table | N/A | N/A | N/A |
| Rohde&Schwarz | - / Loop Antenna | 04/19/2017 | Biennial | 1513-175 |
| Schwarzbeck | VULB 9168 / Hybrid Antenna | 04/06/2017 | Biennial | 760 |
| Schwarzbeck | BBHA 9120D / Horn Antenna | 06/30/2017 | Biennial | 9120D-1300 |
| Schwarzbeck | BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz) | 04/25/2017 | Biennial | BBHA9170124 |
| Rohde&Schwarz | FSP / Spectrum Analyzer | 09/19/2018 | Annual | 836650/016 |
| Wainwright Instruments | WHKX10-900-1000-15000-40SS / High Pass Filter | 07/20/2018 | Annual | 5 |
| Wainwright Instruments | WHKX10-2700-3000-18000-40SS / High Pass Filter | 07/20/2018 | Annual | 3 |
| CERNEX | CBLU1183540 / Power Amplifier | 01/03/2018 | Annual | 24613 |
| CERNEX | CBL06185030 / Power Amplifier | 01/03/2018 | Annual | 24615 |
| CERNEX | CBL18265035 / Power Amplifier | 01/10/2018 | Annual | 22966 |



5. TEST RESULT

5.1. AGC THRESHOLD

Test Requirement:

KDB 935210 D05 v01r02

Testing at and above the AGC threshold is required.

Test Procedures:

Measurements were in accordance with the test methods section 3.2 of KDB 935210 D05 v01r02.

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; see also descriptions and diagrams for typical DAS booster systems in KDB Publication 935210 D02

Devices intended to be directly connected to an RF source (donor port) only need to be evaluated for any over-the-air transmit paths.

a) Connect a signal generator to the input of the EUT.

b) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.

- c) The signal generator should initially be configured to produce either of the required test signals.
- d) Set the signal generator frequency to the center frequency of the EUT operating band.

e) While monitoring the output power of the EUT, measured using the methods of ANSI C63.26-2015 subclause 5.2.4.4.1, increase 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.

f) Record this level as the AGC threshold level.

g) Repeat the procedure with the remaining test signal.

Output power measurement in subclause 5.2.4.4.1 of ANSI C63.26

a) Set span to 2 × to 3 × the OBW.

b) Set RBW = 1% to 5% of the OBW.

- c) Set VBW \ge 3 × RBW.
- d) Set number of measurement points in sweep $\ge 2 \times \text{span} / \text{RBW}$.
- e) Sweep time: auto-couple
- f) Detector = power averaging (rms).

g) If the EUT can be configured to transmit continuously, then set the trigger to free run.

h) Omit

i) Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To



accurately determine the average power over multiple symbols, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.

j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

| Test Band | Link | Signal | Center Frequency (MHz) | AGC Threshold Level (dBm) | Output Level (dBm) |
|-----------|----------|----------|---------------------------|------------------------------|--------------------|
| | | WCDMA | 2 145.00 | -20 | 36.45 |
| | | LTE 5M | 2 145.00 | -20 | 37.00 |
| AWS1+3 | Downlink | LTE 10M | 2 145.00 | -20 | 36.90 |
| | LTE 15M | 2 145.00 | -20 | 36.36 | |
| | | LTE 20M | 2 145.00 | -20 | 36.58 |

Test Results:



5.2. OUT-OF-BAND REJECTION

Test Requirement:

KDB 935210 D05 v01r02

Out-of-band rejection required.

Test Procedures:

Measurements were in accordance with the test methods section 3.3 of KDB 935210 D05 v01r02.

Adjust the internal gain control of the EUT to the maximum gain for which equipment certification is sought.

- a) Connect a signal generator to the input of the EUT.
- b) Configure a swept CW signal with the following parameters:
 - 1) Frequency range = ± 250 % of the passband, for each applicable CMRS band.

2) Level = a sufficient level to affirm that the out-of-band rejection is > 20 dB above the noise floor and will not engage the AGC during the entire sweep.

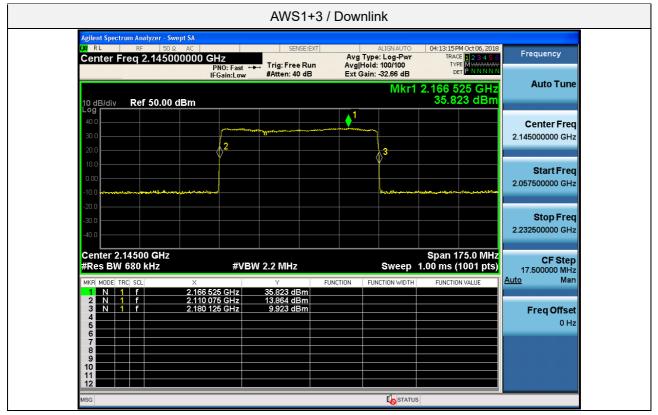
- 3) Dwell time = approximately 10 ms.
- 4) Number of points = SPAN/(RBW/2).
- c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
- d) Set the span of the spectrum analyzer to the same as the frequency range of the signal generator.
- e) Set the resolution bandwidth (RBW) of the spectrum analyzer to be 1 % to 5 % of the EUT passband,
- and the video bandwidth (VBW) shall be set to \geq 3 × RBW.
- f) Set the detector to Peak Max-Hold and wait for the spectrum analyzer's spectral display to fill.
- g) Place a marker to the peak of the frequency response and record this frequency as f_0 .
- h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the

spectral display, such that each marker is at or slightly below the -20 dB down amplitude, to determine the 20 dB bandwidth.

- i) Capture the frequency response of the EUT.
- j) Repeat for all frequency bands applicable for use by the EUT.



Test Results:





5.3. INPUT-VERSUS-OUTPUT SIGNAL COMPARISON

Test Requirement:

§2.1049 Measurements required: Occupied bandwidth.

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

Test Procedures:

Measurements were in accordance with the test methods section 3.4 of KDB 935210 D05 v01r02.

a) Connect a signal generator to the input of the EUT.

b) Configure the signal generator to transmit the AWGN signal.

c) Configure the signal amplitude to be just below the AGC threshold level (see 3.2), but not more than 0.5 dB below.

d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.

e) Set the spectrum analyzer center frequency to the center frequency of the operational band under test.

The span range of the spectrum analyzer shall be between 2 times to 5 times the emission bandwidth (EBW) or alternatively, the OBW.

f) The nominal RBW shall be in the range of 1 % to 5 % of the anticipated OBW, and the VBW shall be \ge 3 × RBW.

g) Set the reference level of the instrument as required to preclude the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope must be more than [10 log (OBW / RBW)] below the reference level.

Steps f) and g) may require iteration to enable adjustments within the specified tolerances.

h) The noise floor of the spectrum analyzer at the selected RBW shall be at least 36 dB below the reference level.

i) Set spectrum analyzer detection function to positive peak.

j) Set the trace mode to max hold.

k) Determine the reference value: Allow the trace to stabilize. Set the spectrum analyzer marker to the highest amplitude level of the displayed trace (this is the reference value) and record the associated frequency as f_0 .

I) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the -26 dB down amplitude. The 26 dB EBW (alternatively OBW) is the positive frequency difference between the two markers. If the spectral envelope crosses the -26 dB down amplitude at multiple points, the lowest or highest frequency shall be selected as the frequencies that are the furthest removed from the center frequency at which the spectral envelope crosses the -26 dB down amplitude point.



m) Repeat steps e) to l) with the input signal connected directly to the spectrum analyzer (i.e., input signal measurement).

n) Compare the spectral plot of the input signal (determined from step m) to the output signal (determined from step I) to affirm that they are similar (in passband and rolloff characteristic features and relative spectral locations), and include plot(s) and descriptions in test report.

o) Repeat the procedure [steps e) to n)] with the input signal amplitude set to 3 dB above the AGC threshold.

- p) Repeat steps e) to o) with the signal generator set to the narrowband signal.
- q) Repeat steps e) to p) for all frequency bands authorized for use by the EUT.



Test Results:

Tabular data of Output Occupied Bandwidth

| Test awBand | Link | Signal | Center Frequency (MHz) | 99 % OBW (MHz) | 26 dB OBW (MHz) |
|-------------|----------|---------|---------------------------|----------------|-----------------|
| | | WCDMA | 2 145.00 | 4.033 5 | 4.496 |
| | | LTE 5M | 2 145.00 | 4.505 0 | 4.944 |
| AWS1+3 | Downlink | LTE 10M | 2 145.00 | 8.970 7 | 9.607 |
| | | LTE 15M | 2 145.00 | 13.482 | 14.27 |
| | | LTE 20M | 2 145.00 | 17.889 | 18.87 |

Tabular data of Input Occupied Bandwidth

| Test Band | Link | Signal | Center Frequency (MHz) | 99 % OBW (MHz) | 26 dB OBW (MHz) |
|-----------|----------|----------|---------------------------|----------------|-----------------|
| | | WCDMA | 2 145.00 | 4.176 9 | 4.694 |
| | Downlink | LTE 5M | 2 145.00 | 4.500 4 | 5.000 |
| AWS1+3 | | LTE 10M | 2 145.00 | 8.998 1 | 10.01 |
| | LTE 15M | 2 145.00 | 13.509 | 14.74 | |
| | | LTE 20M | 2 145.00 | 17.948 | 19.65 |

Tabular data of 3 dB above the AGC threshold Output Occupied Bandwidth

| Test Band | Link | Signal | Center Frequency (MHz) | 99 % OBW (MHz) | 26 dB OBW (MHz) |
|-----------|----------|---------|---------------------------|----------------|-----------------|
| | | WCDMA | 2 145.00 | 4.039 9 | 4.481 |
| | | LTE 5M | 2 145.00 | 4.496 8 | 4.947 |
| AWS1+3 | Downlink | LTE 10M | 2 145.00 | 8.983 4 | 9.612 |
| | | LTE 15M | 2 145.00 | 13.497 | 14.28 |
| | | LTE 20M | 2 145.00 | 17.907 | 18.89 |



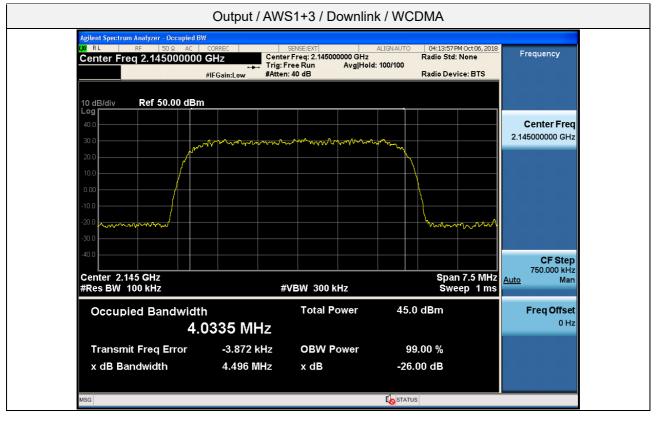
Measured Occupied Bandwidth Comparison

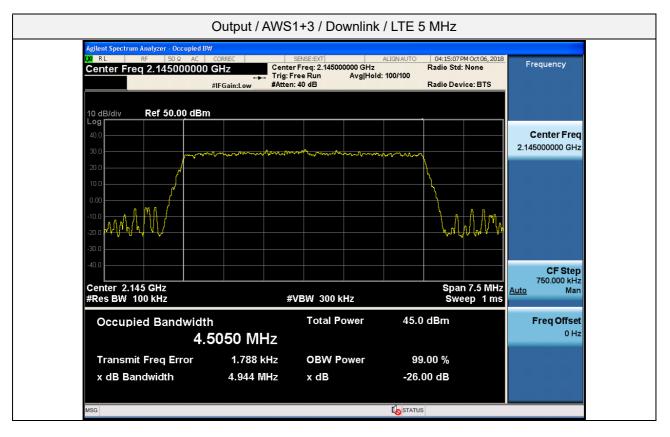
| Test Band | Link | Signal | Variant of Input and output Occupied Bandwidth (%) | Variant of Input and 3 dB above the AGC threshold output Occupied Bandwidth (%) |
|-----------|----------|---------|---|---|
| | | WCDMA | -4.218 | -4.538 |
| | | LTE 5M | -1.120 | -1.060 |
| AWS1+3 | Downlink | LTE 10M | -3.988 | -3.938 |
| | LTE 15M | -3.189 | -3.121 | |
| | | LTE 20M | -3.969 | -3.868 |

* Change in input-output OBW is less than ± 5 %.

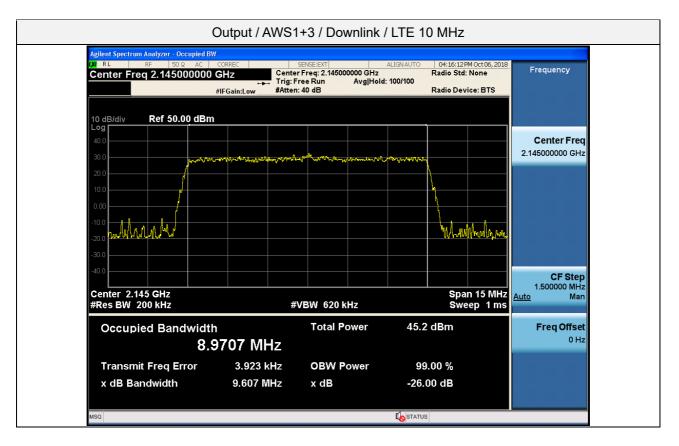


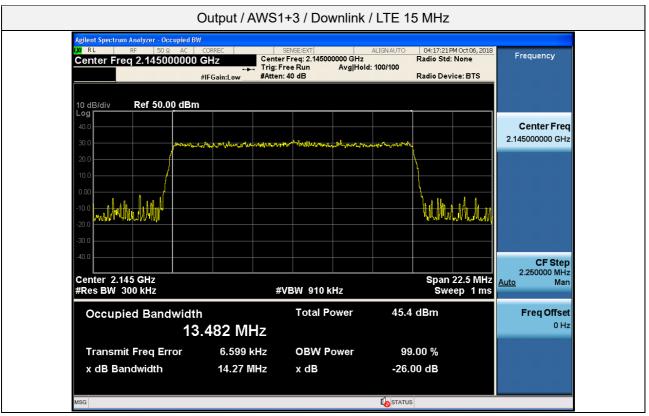
Plot data of Occupied Bandwidth



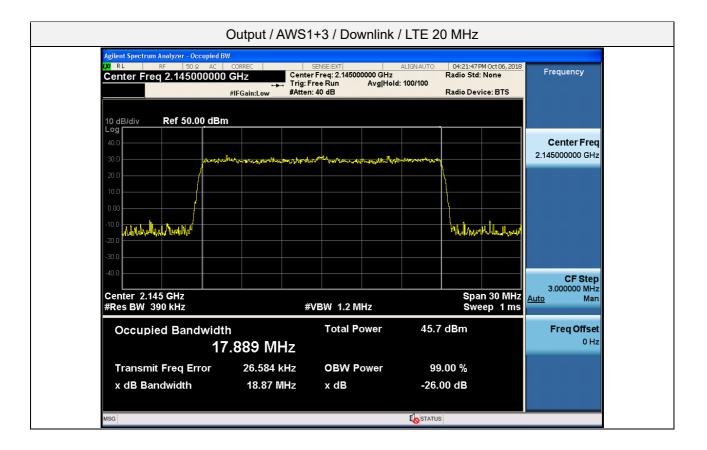




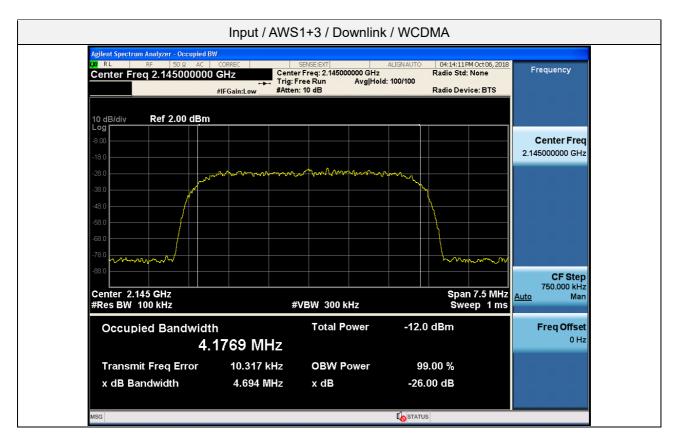


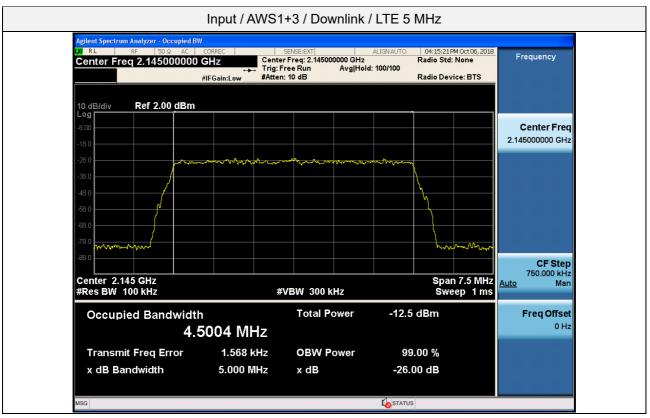




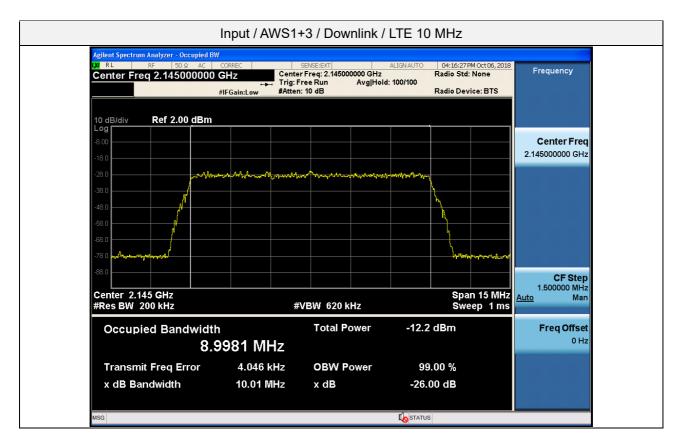


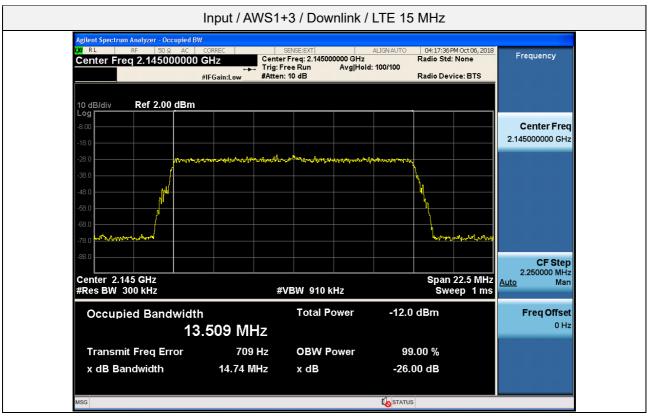




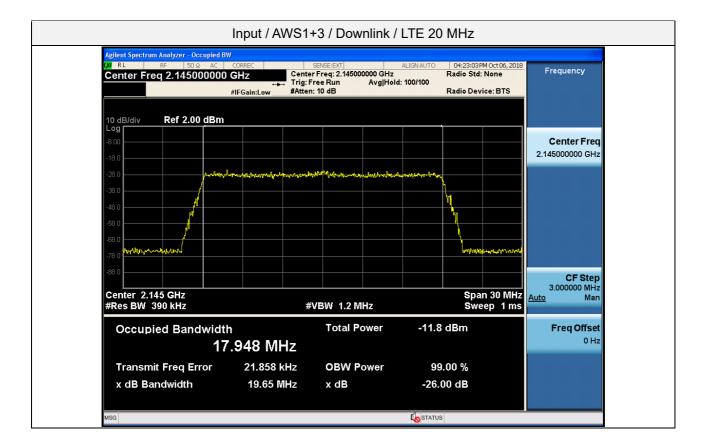






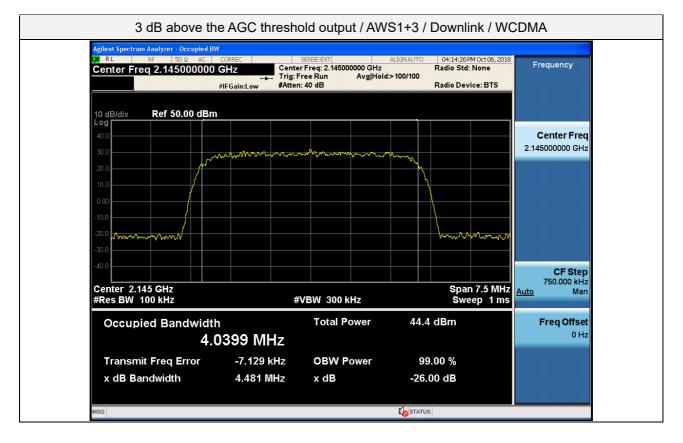


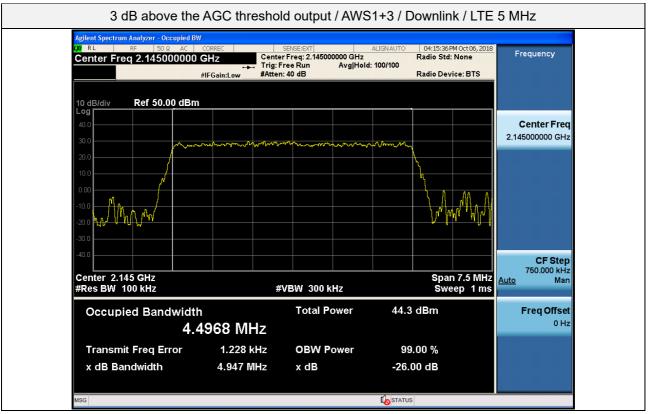






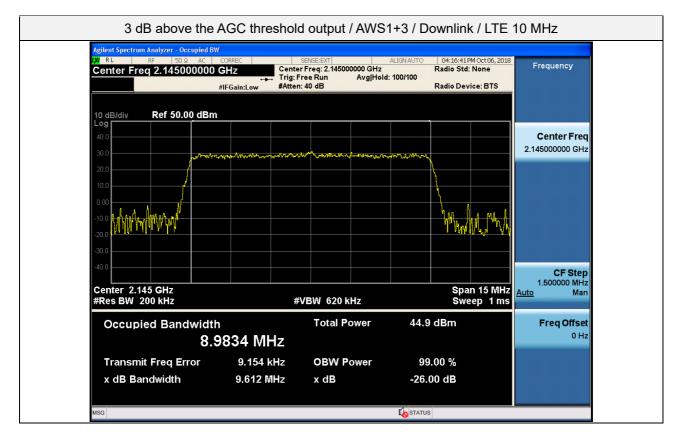


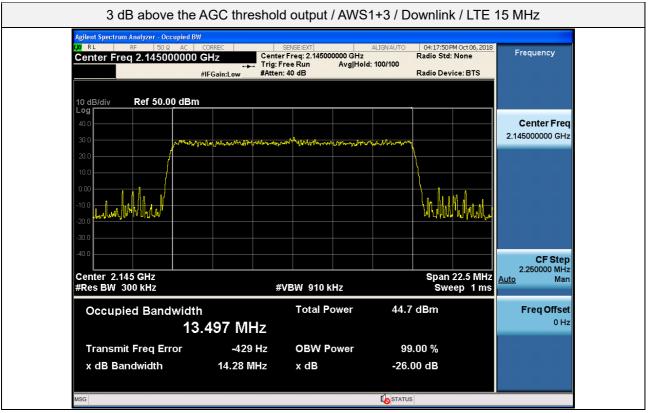






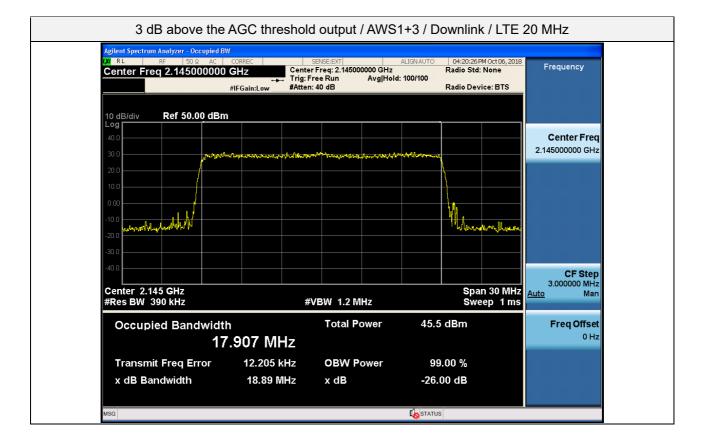














5.4. MEAN OUTPUT POWER AND AMPLIFIER/BOOSTER GAIN

Test Requirement:

§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.

(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.

Test Procedures:

Measurements were in accordance with the test methods section 3.5 of KDB 935210 D05 v01r02.

Adjust the internal gain control of the EUT to the maximum gain for which the equipment certification is being sought. Any EUT attenuation settings shall be set to their minimum value.

Input power levels (uplink and downlink) should be set to maximum input ratings while confirming that the device is not capable of operating in saturation (non-linear mode) at the rated input levels, including during the performance of the input/output power measurements.

3.5.2 Measuring the EUT mean input and output power

- a) Connect a signal generator to the input of the EUT.
- b) Configure to generate the test signal.

c) The frequency of the signal generator shall be set to the frequency f_0 as determined from out-of-band rejection test.

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, but not more than 0.5 dB below.

f) Measure and record the output power of the EUT; use ANSI C63.26-2015 subclause 5.2.4.4.1, 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.
- 3.5.5 Calculating amplifier, repeater, or industrial booster gain

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

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

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

Note1. If f_0 that determined from out-of-band test is smaller or greater than difference of test signal's center frequency and operation band block, test is performed at the lowest or the highest frequency that test signals can be passed.



Test Results:

Tabular data of Input / Output Power and Gain

| Test Band | Link | Signal | f ₀ Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Gain (dB) |
|-----------------|---------|----------|-----------------------------------|----------------------|-----------------------|-----------|
| | | WCDMA | 2 166.53 | -19.92 | 36.24 | 56.16 |
| | | LTE 5M | 2 166.53 | -19.95 | 36.85 | 56.80 |
| AWS1+3 Downlink | LTE 10M | 2 166.53 | -19.89 | 36.68 | 56.57 | |
| | LTE 15M | 2 166.53 | -19.88 | 36.67 | 56.55 | |
| | LTE 20M | 2 166.53 | -19.90 | 36.55 | 56.45 | |

Tabular data of Input / 3 dB above AGC threshold Output Power and Gain

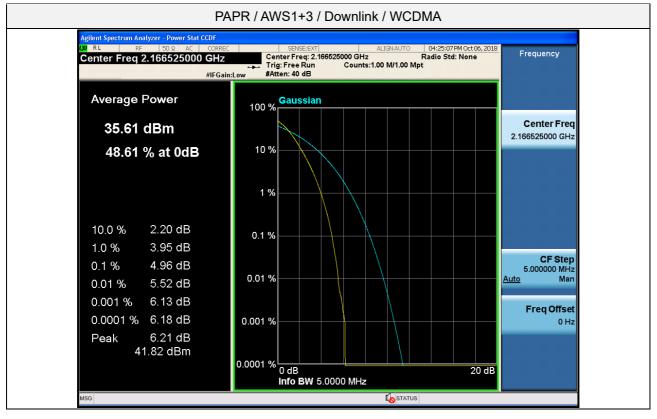
| Test Band | Link | Signal | f ₀ Frequency (MHz) | Input Power (dBm) | +3 dB Output Power (dBm) | Gain (dB) |
|-----------|----------|----------|-----------------------------------|----------------------|-----------------------------|-----------|
| | | WCDMA | 2 166.53 | -19.92 | 36.56 | 56.48 |
| | | LTE 5M | 2 166.53 | -19.95 | 36.76 | 56.71 |
| AWS1+3 | Downlink | LTE 10M | 2 166.53 | -19.89 | 36.53 | 56.42 |
| | LTE 15M | 2 166.53 | -19.88 | 37.08 | 56.96 | |
| | LTE 20M | 2 166.53 | -19.90 | 36.99 | 56.89 | |

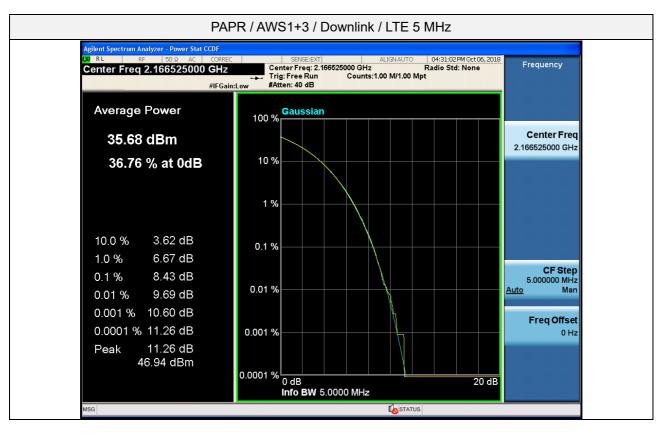
Tabular data of PAPR

| Test Band | Link | Signal | f ₀ Frequency (MHz) | 0.1 % PAPR (dB) |
|-----------|----------|---------|--------------------------------|-----------------|
| | | WCDMA | 2 166.53 | 4.96 |
| | | LTE 5M | 2 166.53 | 8.43 |
| AWS1+3 | Downlink | LTE 10M | 2 166.53 | 8.39 |
| | | LTE 15M | 2 166.53 | 8.46 |
| | | LTE 20M | 2 166.53 | 8.53 |



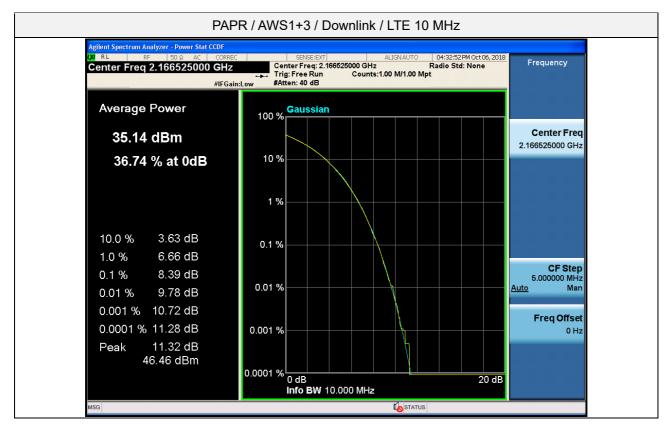
Plot data of PAPR

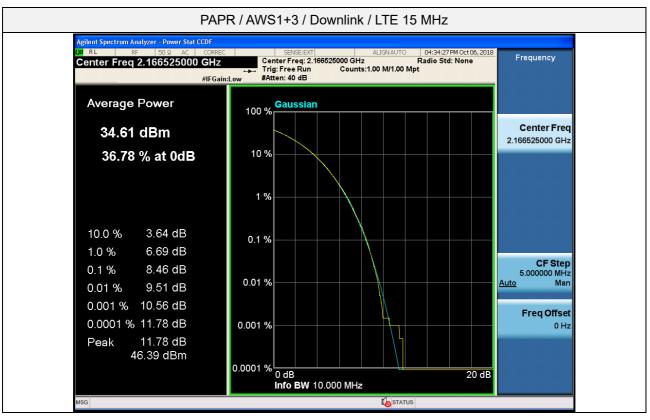






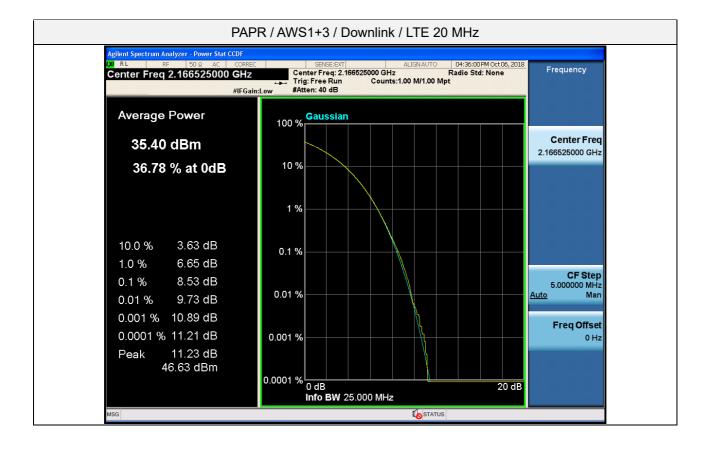














5.5. OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS AND SPURIOUS EMISSIONS

Test Requirements:

§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 log10 (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.

Test Procedures:

Measurements were in accordance with the test methods section 3.6 of KDB 935210 D05 v01r02.

Spurious emissions shall be measured using a single test signal sequentially tuned to the low, middle, and high channels or frequencies within each authorized frequency band of operation.

Out-of-band/out-of-block emissions (including intermodulation products) shall be measured under each of the following two stimulus conditions:

a) two adjacent test signals sequentially tuned to the lower and upper frequency band/block edges;

b) a single test signal, sequentially tuned to the lowest and highest frequencies or channels within the



frequency band/block under examination.

NOTE—Single-channel boosters that cannot accommodate two simultaneous signals within the passband may be excluded from the test stipulated in step a).

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.

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, but not more than 0.5 dB below. The composite power can be measured using the procedures provided in KDB Publication 971168, but it will be necessary to expand the power integration bandwidth so as to include both of the transmit channels.

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.

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.

I) 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.

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, 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.

g) Set the VBW \geq 3 × 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 1 MHz.

The number of measurement points in each sweep must be \geq (2 × span/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.

j) Select the power averaging (rms) detector function.

k) Trace average at least 10 traces in power averaging (rms) mode.

I) 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 1 MHz, and the spectrum analyzer stop frequency to 10 times the highest frequency of the fundamental emission. The number of measurement points in each sweep must be \geq (2 × span/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 b) to p) with the narrowband test signal.

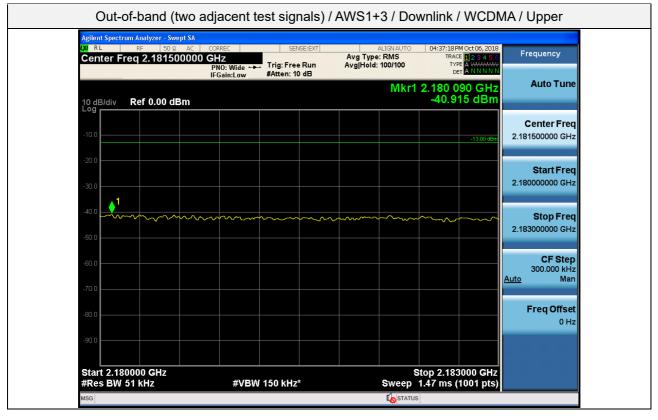
r) Repeat steps b) to q) for all authorized frequency bands/blocks used by the EUT.

Note1. In 9 kHz-150 kHz and 150 kHz-30 MHz bands, RBW was reduced to 0.1 % and 1 % of the reference bandwidth for measuring unwanted emission level (typically, 1 MHz if the authorized frequency band is above 1 GHz) and power was integrated.(1% = +30 dB, 10% = +20 dB)



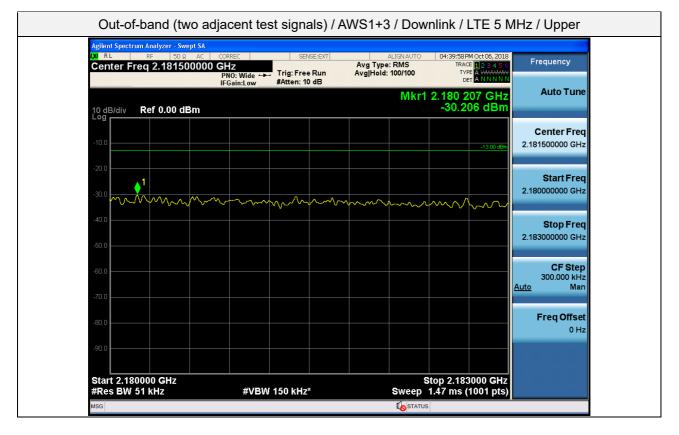
Test Results:

Plot data of Out-of-band/out-of-block emissions



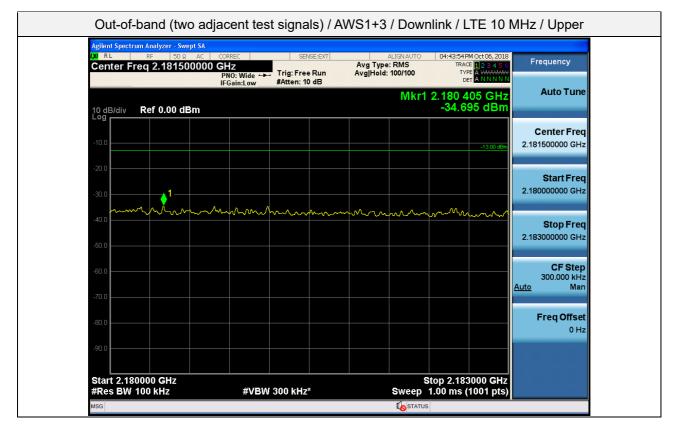
| Agilent Spectrum Analyzer - Swept SA | ORREC SENSE:EXT | ALIGNAUTO | 04:38:42 PM Oct 06, 2018 | _ |
|--------------------------------------|---|------------------------------------|---|-------------------------------------|
| | FHZ PNO: Wide ↔ Trig: Free Run IFGain:Low #Atten: 10 dB | Avg Type: RMS Avg Hold: 100/100 | TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | Mkr1 : | 2.109 628 GHz -42.043 dBm | Auto Tune |
| Log | | | | Center Freq |
| -10.0 | | | -13.00 dBm | 2.108500000 GHz |
| -20.0 | | | | Start Freq |
| -30.0 | | | | 2.107000000 GHz |
| -40.0 | | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | Stop Freq 2.110000000 GHz |
| -50.0 | | | | 2.110000000 GHz |
| -60.0 | | | | CF Step 300.000 kHz |
| -70.0 | | | | <u>Auto</u> Man |
| -80.0 | | | | Freq Offset 0 Hz |
| -90.0 | | | | |
| Start 2.107000 GHz | | | op 2.110000 GHz | |





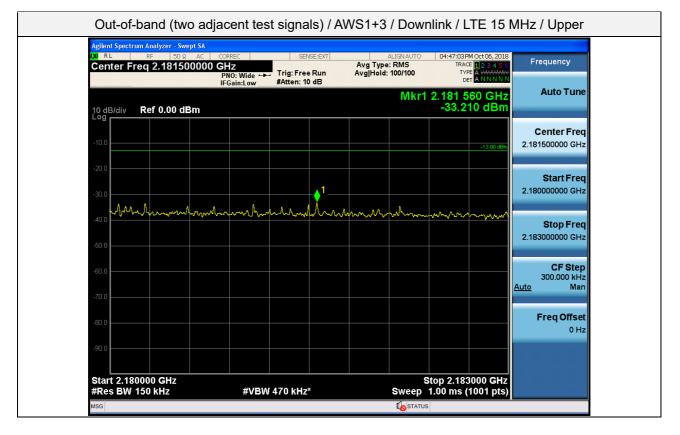
| <mark>Agilent Spectrum Analyzer - Swept SA XI RL RF 50 Ω AC CO</mark> | ORREC SENSE:EXT | ALIGNAUTO | 04:42:36 PM Oct 06, 2018 | |
|---|-----------------------|------------------------------------|---|-------------------------------|
| Center Freq 2.108500000 G | | Avg Type: RMS Avg Hold: 100/100 | TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | Gain.cow wheeld to us | Mkr1 2 | 2.109 703 GHz -40.300 dBm | Auto Tune |
| | | | | Center Freq |
| -10.0 | | | -13.00 dBm | 2.108500000 GHz |
| -20.0 | | | | |
| | | | | Start Freq 2.107000000 GHz |
| -30.0 | | | .1 | 2.107000000 GH2 |
| -40.0 | ····· | | m | Stop Freq |
| -50.0 | | | | 2.110000000 GHz |
| | | | | CF Step |
| -60.0 | | | | 300.000 kHz Auto Man |
| -70.0 | | | | |
| -80.0 | | | | Freq Offset |
| | | | | 0 Hz |
| -90.0 | | | | |
| Start 2.107000 GHz | | St | op 2.110000 GHz .47 ms (1001 pts) | |





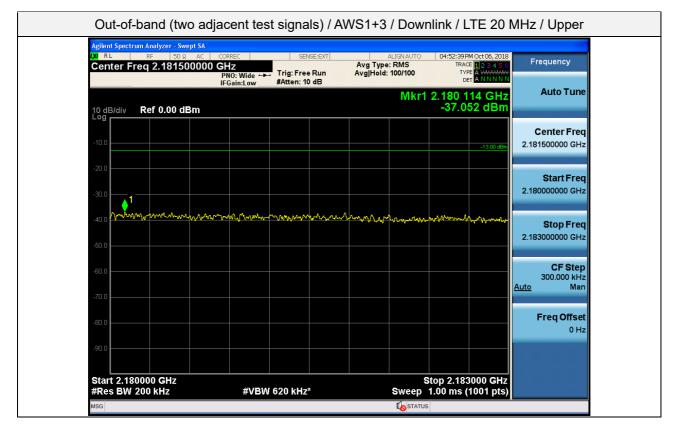
| Agilent Spectrum Analyzer - Swept SA KI RL RF 50 Q AC CORREC | SENSE:EXT | ALIGNAUTO 04:45:27F | PM Oct 06, 2018 _ |
|---|------------------------|-------------------------------|--------------------------------|
| Center Freq 2.108500000 GHz | ide ↔→→ Trig: Free Run | Avg Type: RMS TRAC | E 1 2 3 4 5 6 Frequency |
| 10 dB/div Ref 0.00 dBm | ow whiteh load | Mkr1 2.109 2 -38.1 | Auto Tune |
| | | | |
| 10.0 | | | Center Freq 2.108500000 GHz |
| | | | |
| -20.0 | | | Start Freq |
| 30.0 | | . 1 | 2.107000000 GHz |
| -40.0 mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm | | | ~~~~~ |
| | | | Stop Freq 2.11000000 GHz |
| -50.0 | | | |
| 60.0 | | | CF Step 300.000 kHz |
| | | | Auto Man |
| -70.0 | | | |
| 80.0 | | | Freq Offset |
| .90.0 | | | |
| | | | |
| Start 2.107000 GHz #Res BW 100 kHz 3 | ≠VBW 300 kHz* | Stop 2.110 Sweep 1.00 ms (| 0000 GHz |





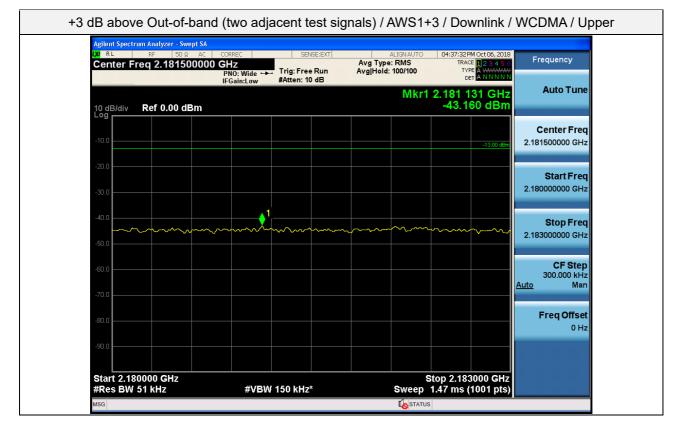
| Agilent Spectrum Analyzer - Swept S | | ISE:EXT ALIGN AUTO | 04:50:43 PM Oct 06, 2018 | |
|---------------------------------------|---|--|--|--------------------------------|
| Center Freq 2.1085000 | 00 GHz PNO: Wide +++ Trig: Free | Avg Type: RMS Run Avg Hold: 100/100 | TRACE 1 2 3 4 5 6 TYPE A WATAWAY DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | in Gam. Low | | 1 2.109 976 GHz -33.898 dBm | Auto Tune |
| | | | | |
| -10.0 | | | -13.00 dBm | Center Freq 2.108500000 GHz |
| 20.0 | | | | |
| -20.0 | | | | Start Freq |
| -30.0 | | | * | 2.107000000 GHz |
| -40.0 prochange and and | mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm | mm | mmmmm | Stop Freq |
| | | | | 2.110000000 GHz |
| -50.0 | | | | |
| -60.0 | | | | CF Step 300.000 kHz |
| -70.0 | | | | <u>Auto</u> Man |
| | | | | Freq Offset |
| -80.0 | | | | 0 Hz |
| -90.0 | | | | |
| | | | | |
| Start 2.107000 GHz #Res BW 150 kHz | #VBW 470 kHz | Sween | Stop 2.110000 GHz 1.00 ms (1001 pts) | |





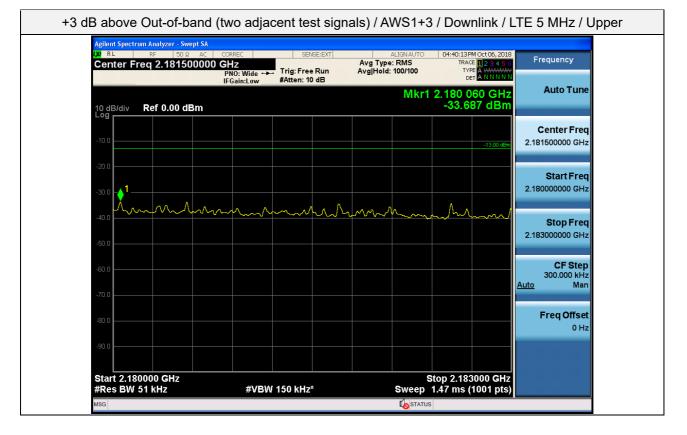
| Ag <mark>ilent Spectrum Analyzer - Swept SA</mark> XI RL RF 50 Ω AC COR | REC SENSE:EXT | ALIGNAUTO 04 | :55:17 PM Oct 06, 2018 | |
|---|---|------------------------------------|---|--------------------------------|
| Center Freq 2.108500000 GH | Z 0: Wide 🛶 Trig: Free Run | Avg Type: RMS Avg Hold: 100/100 | TRACE 123456 TYPE A WWWWW DET A N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | ain:Low #Atten: 10 dB | Mkr1 2.1 | 09 673 GHz 37.390 dBm | Auto Tune |
| | | | | |
| -10.0 | | | -13.00 dBm | Center Freq 2.108500000 GHz |
| | | | | |
| -20.0 | | | | Start Freq |
| -30.0 | | | 2 | 2.107000000 GHz |
| -40.0 mar mar and a contraction of the contraction | And the marked and the second s | man management | un mont | |
| | | | | Stop Freq 2.110000000 GHz |
| -50.0 | | | | |
| -60.0 | | | | CF Step |
| | | | Au | 300.000 kHz to Man |
| -70.0 | | | | |
| -80.0 | | | | Freq Offset 0 Hz |
| -90.0 | | | | 0112 |
| | | | | |
| Start 2.107000 GHz | | Stop | 2.110000 GHz | |





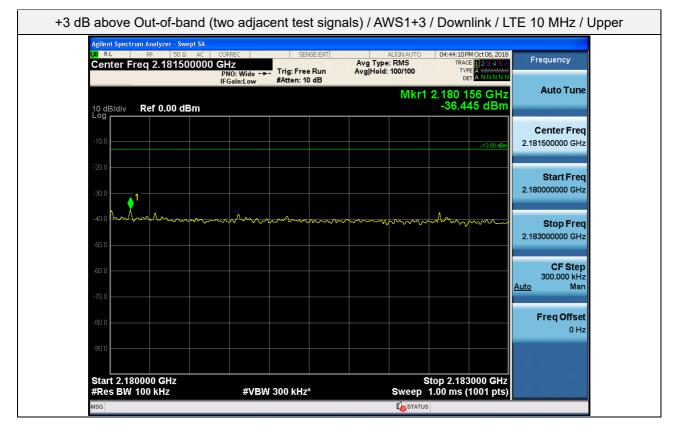
| Center Freq 2.108500000 GHz PN0: Wide ++ IFGain:Low #Atten: 10 dB Mkr1 2.109 | PM Oct 06, 2018 Frequency ACE 1 2 3 5 6 YPE A WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW |
|---|--|
| Mkr1 2.109 | |
| | 904 GHz Auto Tune 186 dBm |
| -10.0 | Center Fred 2.108500000 GHz |
| -20.0 | Start Fred 2.107000000 GH: |
| -40.0 | 1. 2.110000000 GH: |
| -60.0 | CF Step 300.000 kHz <u>Auto</u> Mar |
| -80.0 | Freq Offse |
| -90.0 | |





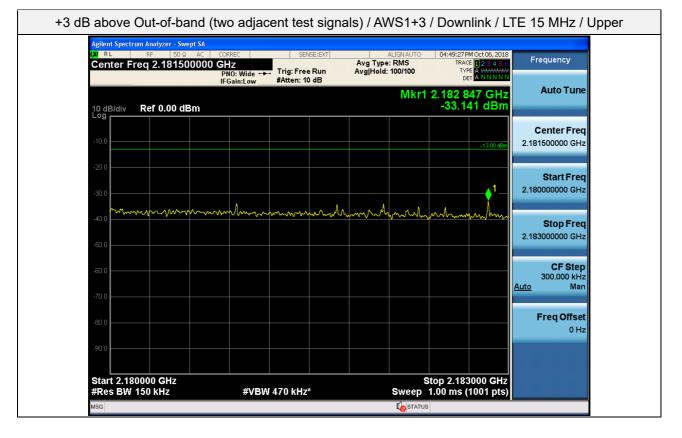
| Agilent Spectrum Analyzer - Swept SA | CORREC SENSE:EXT | | 10-F2-PM 0-H0C 2010 | |
|--------------------------------------|-------------------------------------|--|---|-------------------------------|
| Center Freq 2.108500000 | GHz PNO: Wide +++ Trig: Free Run | ALIGNAUTO 04 Avg Type: RMS Avg Hold: 100/100 | 42:52 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A N N N N N | uency |
| | IFGain:Low #Atten: 10 dB | | 08 935 GHz A | uto Tune |
| 10 dB/div Ref 0.00 dBm | | | 3.420 UBIII | |
| -10.0 | | | | nter Freq 00000 GHz |
| -20.0 | | | | |
| -30.0 | 0 | ↓ ¹ | | Start Freq 00000 GHz |
| MODIN - MANAAMANA | A MA A A MA. AA | An AMA A | 1 Mar an | |
| -40.0 W AND W AND W AA | 10 am 2 M Amman | M MMMM | | Stop Freq |
| -50.0 | | | 2.1100 | 00000 GHz |
| -60.0 | | | | CF Step |
| | | | 30 Auto | 00.000 kHz Man |
| -70.0 | | | | |
| -80.0 | | | Fr | eq Offset |
| | | | | 0 Hz |
| -90.0 | | | | |
| Start 2.107000 GHz | | Stop | 2.110000 GHz | |





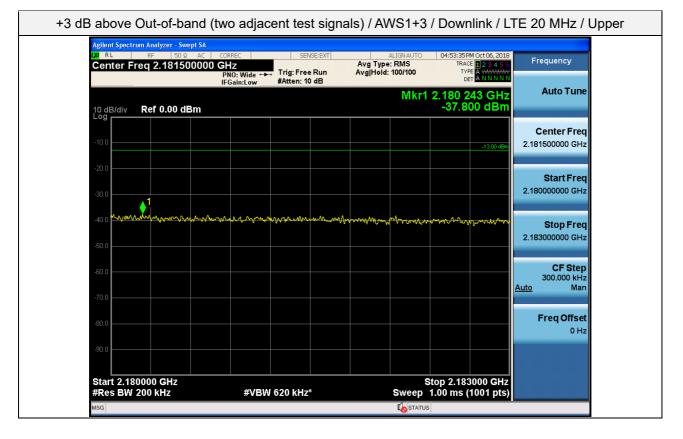
| Agilent Spectrum Analyzer - Swept SA LXI RF 50 Ω AC | CORREC | SENSE:EXT | ALIGN AUTO | 04:45:43PM Oct 06, 2018 | |
|---|---|--------------------------------|------------------------------------|--|---|
| Center Freq 2.10850000 | 0 GHz | Frig: Free Run Atten: 10 dB | Avg Type: RMS Avg Hold: 100/100 | TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | | Mkr1 | 2.109 715 GHz -32.343 dBm | Auto Tune |
| -10.0 | | | | -13.00 dBm | Center Freq 2.108500000 GHz |
| -20.0 | | | | .1 | Start Freq |
| -30.0 | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | Mmm | mm | mmhum | 2.107000000 GHz Stop Freq |
| -50.0 | | | | | 2.110000000 GHz |
| -60.0 | | | | | CF Step 300.000 kHz <u>Auto</u> Man |
| -80.0 | | | | | Freq Offset 0 Hz |
| -90.0 | | | | | 0112 |
| Start 2.107000 GHz #Res BW 100 kHz | #VBW 3 | | | Stop 2.110000 GHz 1.00 ms (1001 pts) | |





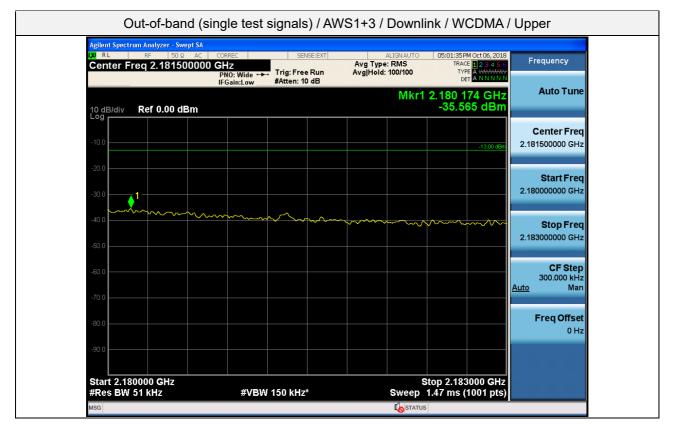
| Agilent Spectrum Analyzer - Swept SA LXI RF 50 Ω AC | CORREC SENSE:EXT | ALIGN AUTO | 04:51:33 PM Oct 06, 2018 | |
|---|---|------------------------------------|---|--------------------------------------|
| Center Freq 2.10850000 | | Avg Type: RMS Avg Hold: 100/100 | TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | Mkr1 | 2.109 109 GHz -35.847 dBm | Auto Tune |
| -10.0 | | | -13.00 dBm | Center Freq 2.108500000 GHz |
| -20.0 | | | | Start Freq 2.107000000 GHz |
| | v. M. | a han and han a ha | www.www. | Stop Freq 2.110000000 GHz |
| -60.0 | | | | CF Step 300.000 kHz |
| -70.0 | | | | <u>Auto</u> Man Freq Offset |
| -90.0 | | | | 0 Hz |
| Start 2.107000 GHz #Res BW 150 kHz | #VBW 470 kHz* | Silon | top 2.110000 GHz .00 ms (1001 pts) | |





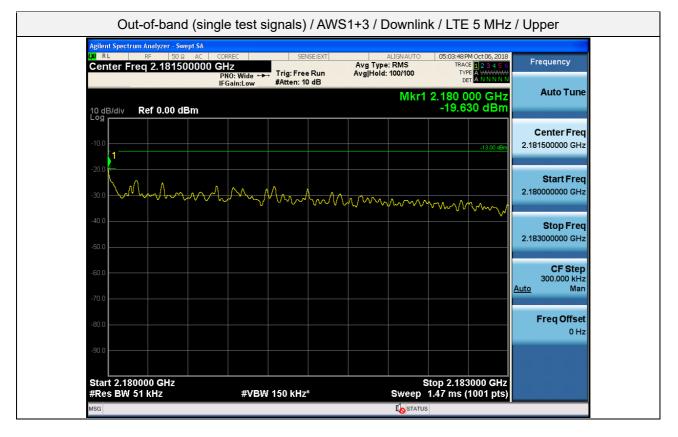
| Agilent Spectrum Analyzer - Swept SA XI RL RF 50Ω AC | CORREC | SEI | VSE:EXT | Α | LIGNAUTO | | M Oct 06, 2018 | _ |
|---|------------------------------------|------------------------|--------------|----------------------------|--|-------------------|--|------------------------------|
| Center Freq 2.10850000 | O GHz PNO: Wide ↔ IFGain:Low | Trig: Fre #Atten: 1 | | Avg Type: Avg Hold: | | TRAC TYF DE | CE 1 2 3 4 5 6 PE A WATAWA A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | | | | Mkr1 | | 32 GHz 84 dBm | Auto Tune |
| Log | | | | | | | | Center Freq |
| -10.0 | | | | | | | -13.00 dBm | 2.108500000 GHz |
| -20.0 | | | | | | | | |
| -20.0 | | | | | | | | Start Freq |
| -30.0 | | | | | | | 1 | 2.107000000 GHz |
| -40.0 | d. A.M. A. Com. And | h Nenda Alanta A | ham and mark | hard and the second second | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | man and | an hours | |
| and a factor for the factor for a set of a set | and the other a | | | | • | | | Stop Freq 2.110000000 GHz |
| -50.0 | | | | | | | | |
| -60.0 | | | | | | | | CF Step 300.000 kHz |
| | | | | | | | | Auto Man |
| -70.0 | | | | | | | | |
| -80.0 | | | | | | | | Freq Offset 0 Hz |
| | | | | | | | | UHZ |
| -90.0 | | | | | | | | |
| Start 2.107000 GHz | | | | | | ton 2 11(| 0000 GHz | |





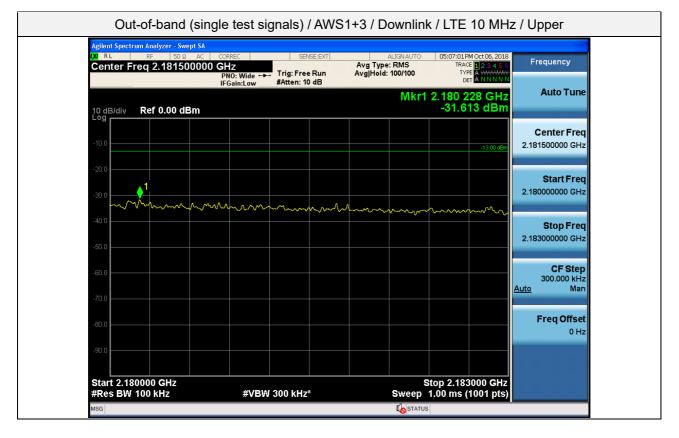
| gilent Spectrum Analyzer - Swept SA | | | |
|-------------------------------------|---|--|---|
| Center Freq 2.108500000 | CORREC SENSE:EXT GHZ PNO: Wide →→→ Trig: Free Run | ALIGN AUTO 05:02:43 Avg Type: RMS TRA Avg Hold: 100/100 TV | PM Oct 06, 2018 Frequency CE 1 2 3 4 5 6 YPE A WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW |
| | IFGain:Low #Atten: 10 dB | Mkr1 2.109 | Auto Tuno |
| IO dB/div Ref 0.00 dBm | | | 21 dBm |
| | | | Center Freq |
| 10.0 | | | -13.00 dBm 2.108500000 GHz |
| 20.0 | | | Start Freq |
| 30.0 | | | 2.107000000 GHz |
| 40.0 | | | |
| 40.0 | | | Stop Freq 2.110000000 GHz |
| 50.0 | | | |
| 60.0 | | | CF Step 300.000 kHz |
| 70.0 | | | <u>Auto</u> Man |
| 80.0 | | | Freq Offset |
| 00.0 | | | 0 Hz |
| 90.0 | | | |
| Start 2.107000 GHz | | Stop 2 11 | 0000 GHz |





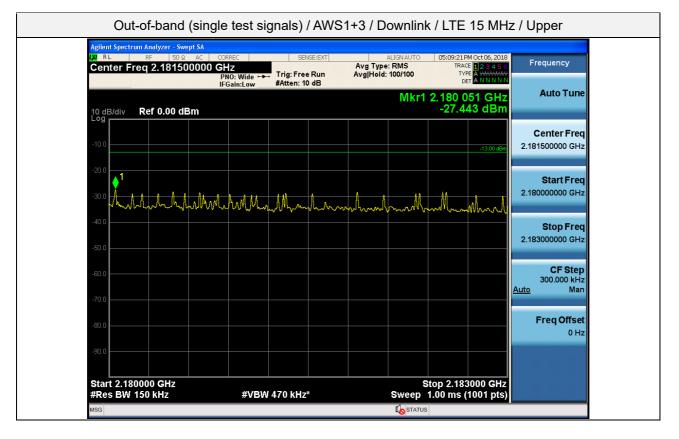
| Agilent Spectrum Analyzer - Swept SA | | | | |
|--|--------------------------|--|--|--|
| X RL RF 50Ω AC Center Freq 2.10850000 | | ALIGN AUTO Avg Type: RMS Avg Hold: 100/100 | 05:05:58 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | IFGain:LOW #Attent to da | Mkr1 | 2.110 000 GHz -21.893 dBm | Auto Tune |
| | | | -13.00 dBm | Center Freq 2.108500000 GHz |
| -20.0 | | | | Start Freq 2.107000000 GHz |
| -40.0 | ···· | mmm | | Stop Freq 2.110000000 GHz |
| -60.0 | | | | CF Step 300.000 kHz <u>Auto</u> Man |
| -60.0 | | | | Freq Offset 0 Hz |
| -90.0 | | | | |
| Start 2.107000 GHz #Res BW 51 kHz | #VBW 150 kHz* | Sween | Stop 2.110000 GHz 1.47 ms (1001 pts) | |

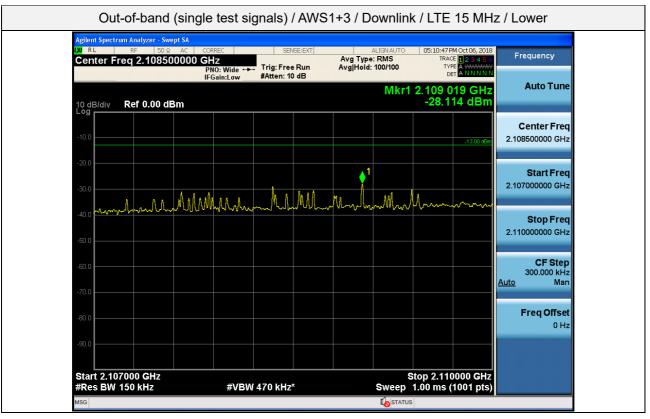




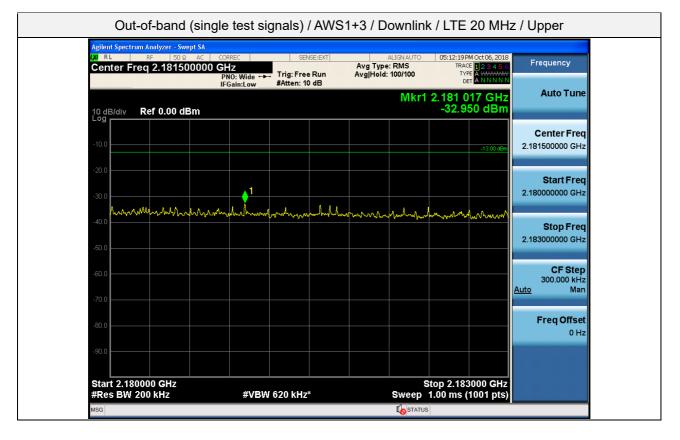
| Agilent Spectrum Analyzer - Swept S/ | | | | | |
|---------------------------------------|-------------|--|-------------------------|--|--------------------------------------|
| Center Freq 2.1085000 | 00 GHz | ENSE:EXT Avg Type ree Run Avg Hold 10 dB | e: RMS | 58 PM Oct 06, 2018 TACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | i dameda | | Mkr1 2.109 -37 | 013 GHz .021 dBm | Auto Tune |
| -10.0 | | | | -13.00 dBm | Center Freq 2.108500000 GHz |
| -20.0 | | | | | Start Freq 2.107000000 GHz |
| -40.0 | Amanan | m | | · · · · · · · · · · · · · · · · · · · | Stop Freq 2.110000000 GHz |
| -60.0 | | | | | CF Step 300.000 kHz |
| -70.0 | | | | | uto Man Freq Offset |
| -90.0 | | | | | 0 Hz |
| Start 2.107000 GHz #Res BW 100 kHz | #VBW 300 kF | | Stop 2. Sweep 1.00 m | 110000 GHz s (1001 pts) | |





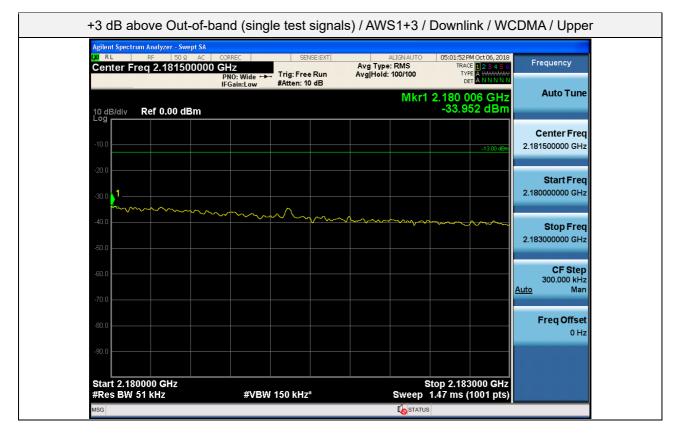






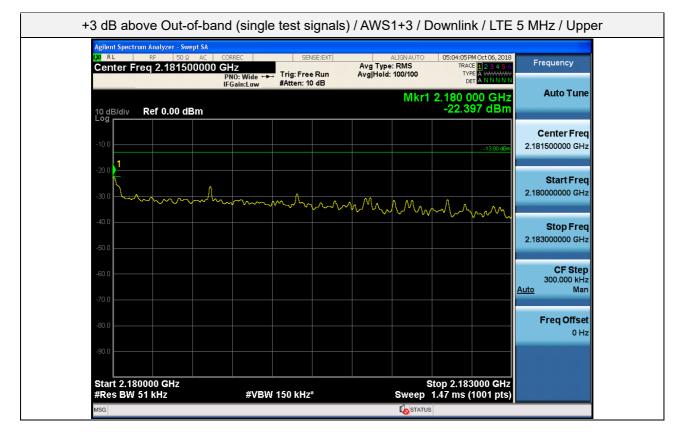
| Agilent Spectrum Analyzer - Swept SA LXI RL RF 50 Ω AC | CORREC SEN | SE:EXT ALIGN AUTO | 05:13:17 PM Oct 06, 2018 | |
|--|------------------|--|---|---|
| Center Freq 2.108500000 | | Avg Type: RMS Run Avg Hold: 100/100 | TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | Mk | r1 2.109 760 GHz -32.972 dBm | Auto Tune |
| -10.0 | | | -13.00 dBm | Center Freq 2.108500000 GHz |
| -20.0 | | | | Start Freq 2.107000000 GHz |
| -40.0 | Waynon Mary Mark | Amund how how | | Stop Freq 2.110000000 GHz |
| -60.0 | | | | CF Step 300.000 kHz <u>Auto</u> Man |
| -70.0 | | | | Freq Offset |
| -90.0 | | | | |





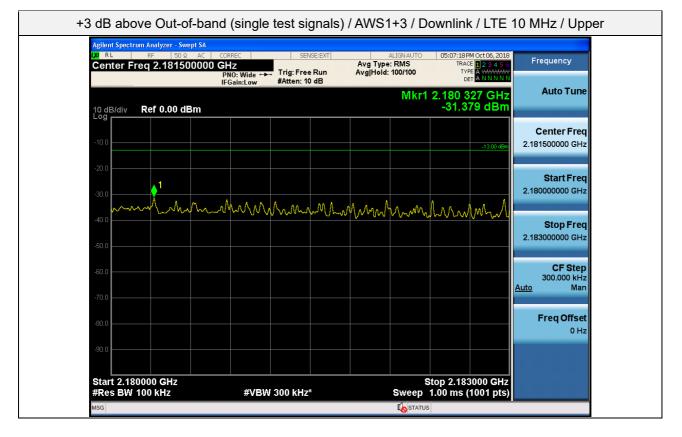
| Frequency |
|------------------------------|
| 23456 Frequency |
| GHz Auto Tune dBm |
| Center Freq |
| 2.108500000 GHz |
| |
| 2.107000000 GHz |
| A1 |
| Stop Freq 2,110000000 GHz |
| 2.110000000 GHz |
| CF Step 300.000 kHz |
| Auto Man |
| Freq Offset |
| 0 Hz |
| |
|) GHz |
| |





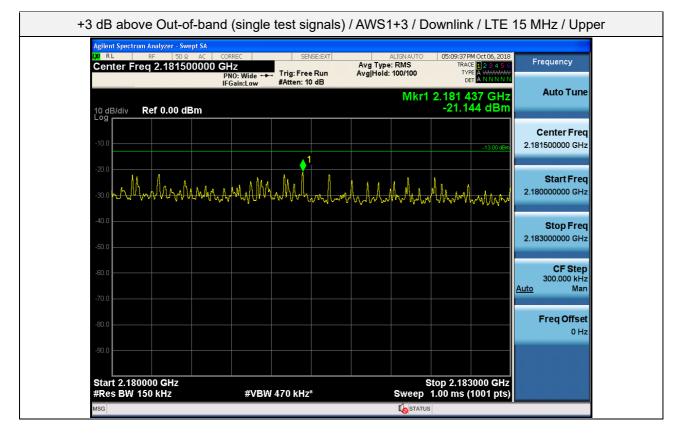
| Agilent Spectrum Analyzer - Swept SA | CORREC SENSE:EXT | ALIGNAUTO | D5:06:14 PM Oct 06, 2018 | |
|--------------------------------------|------------------|------------------------------------|---|---------------------------------|
| Center Freq 2.10850000 | | Avg Type: RMS Avg Hold: 100/100 | TRACE 123456 Free TYPE A WWWW DET A N N N N N | quency |
| 10 dB/div Ref 0.00 dBm | | | 110 000 GHz 4 -19.995 dBm | uto Tune |
| -10.0 | | | Ce | e nter Freq 00000 GHz |
| -20.0 | | <u> </u> | | Start Freq 00000 GHz |
| -30.0 | mmmMM | Munn | MM | Stop Freq |
| -50.0 | | | | 00000 GHz |
| -60.0 | | | Auto 3 | CF Step 00.000 kHz Man |
| -80.0 | | | F | e q Offset 0 Hz |
| -90.0 | | | | |





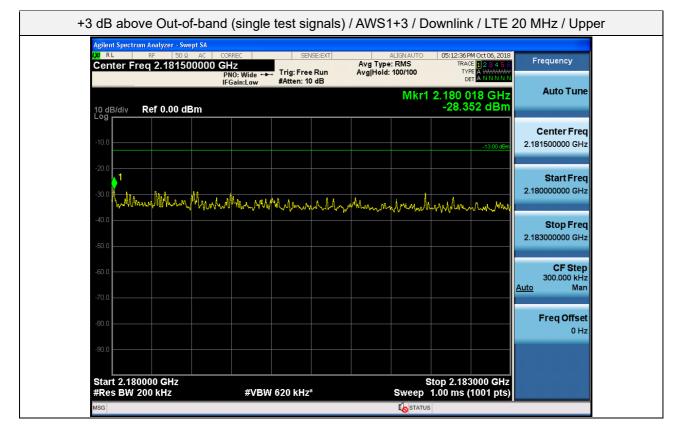
| Agilent Spectrum Analyzer - Swept S LXI RL RF 50 Ω A | C CORREC | SENSE: | | ALIGN AUTO | 05:08:14 PM Oct 06, 2018 | Frequency |
|---|----------------|----------------------------------|----------|------------|--|------------------------------|
| Center Freq 2.1085000 | PNO: Wide 🔸 | . Trig: Free Ru #Atten: 10 dE | | | TRACE 123456 TYPE A WWWW DET A N N N N N | Frequency |
| | IFGain:Low | #Atten: To de | ı | Mkr1 | 2.109 499 GHz | Auto Tune |
| 10 dB/div Ref 0.00 dBm | | | | | -26.810 dBm | |
| | | | | | | Center Freq |
| -10.0 | | | | | -13.00 dBm | 2.108500000 GHz |
| -20.0 | | | | | ▲1 | Start Freq |
| -30.0 | a AA MAAA | M Da. | | And | | |
| -40.0 Mr ~ MW VLAM | N. M. N. M. Ma | 1 man | VWV VEWV | · ~ ~ ~ | VIAMMA | |
| 40.0 | | | | | | Stop Freq 2.110000000 GHz |
| -50.0 | | | | | | |
| -60.0 | | | | | | CF Step 300.000 kHz |
| -70.0 | | | | | | <u>Auto</u> Man |
| | | | | | | Freq Offset |
| -80.0 | | | | | | 0 Hz |
| -90.0 | | | | | | |
| | | | | | | |
| Start 2.107000 GHz #Res BW 100 kHz | #\(B)A | 300 kHz* | | Sween 1 | op 2.110000 GHz .00 ms (1001 pts) | |





| Agilent Spectrum Analyzer - Swept S/ | | | | |
|---|-----------------------|----------------|--|--|
| M RL RF 50Ω AC Center Freq 2.1085000 | | Avg Type: RMS | 05:11:04 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNN | Frequency |
| 10 dB/div Ref 0.00 dBm | | Mkr1 | 2.109 841 GHz -19.916 dBm | Auto Tune |
| -10.0 | | | -13.00 dBm | Center Freq 2.108500000 GHz |
| -20.0 | white and the second | KA MAA MAAMAAN | MANAM AMAD | Start Freq 2.107000000 GHz |
| -40.0 MAJUYA ITAU MANYA I | WAMAN MALIA D.I. A AD | | Ω¢¢γis Quinitas | Stop Freq 2.110000000 GHz |
| -60.0 | | | | CF Step 300.000 kHz <u>Auto</u> Man |
| -70.0 | | | | Freq Offset 0 Hz |
| -90.0 | | | | |
| Start 2.107000 GHz #Res BW 150 kHz | #VBW 470 kHz* | Swoon | top 2.110000 GHz 1.00 ms (1001 pts) | |

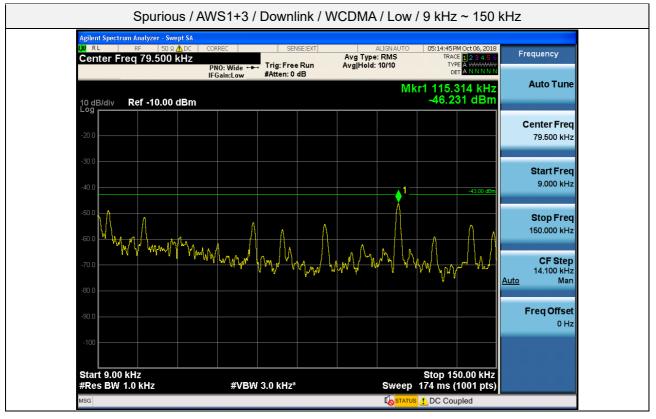




| Agilent Spectrum Analyzer - Swept SA | | | | | |
|---|----------------|--|---|---|---|
| M RL RF 50Ω AC Center Freq 2.10850000 | DO GHz | SENSE:EXT Trig: Free Run #Atten: 10 dB | ALIGNAUTO Avg Type: RMS Avg Hold: 100/100 | 05:13:34 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WANNAW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | | Mkr1 | 2.109 739 GHz -27.537 dBm | Auto Tune |
| -10.0 | | | | -13.00 dBm | Center Freq 2.108500000 GHz |
| -20.0 | | | | | Start Freq 2.107000000 GHz |
| -30.0 -40.0 0000000000000000000000000000000000 | warad manya ha | mmahanguna | have have have | Martin (h. MMrd) | Stop Freq |
| -50.0 | | | | | 2.110000000 GHz |
| -60.0 | | | | | CF Step 300.000 kHz <u>Auto</u> Man |
| -80.0 | | | | | Freq Offset 0 Hz |
| -90.0 | | | | | U HZ |
| Start 2.107000 GHz #Res BW 200 kHz | #\/B)A(6 | 20 kHz* | Sween | Stop 2.110000 GHz 1.00 ms (1001 pts) | |

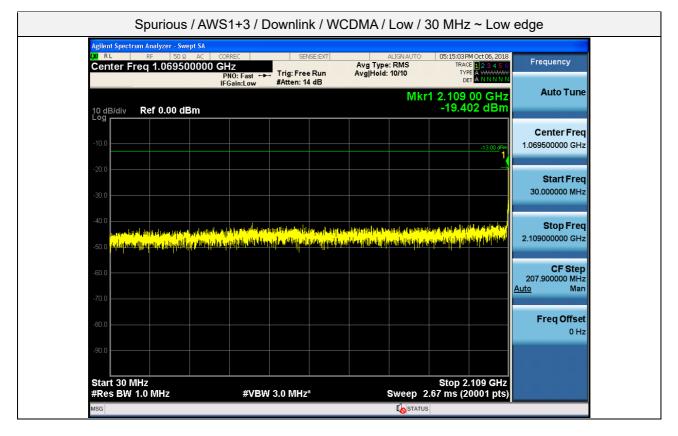


Plot data of Spurious Emissions



| Agilent Spectrum Analyzer - Swept SA | | | | |
|---|--|---|---|----------------------------------|
| 04 RL RF 50 Ω 4∆DC Center Freq 15.075000 M | | Avg Type: RMS Run Avg Hold: 10/10 | 05:14:56 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WARAWAY DET A N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | | Mkr1 598 kHz -38.649 dBm | Auto Tune |
| -10.0 | | | | Center Freq 15.075000 MHz |
| -20.0 | | | -33.00 dBm | Start Freq 150.000 kHz |
| -40.0 | A | ligning 1 of 3 | | Stop Freq 30.000000 MHz |
| -60.0 | | | | CF Step 2.985000 MHz |
| | hteres land service to did term all takes block in New all may at the service to did the service to be part | n den blende stele folkt de hurdelie. Ante dese halfe de stele In fin fostelet de stelet stelet en stelet de stelet de stelet stelet de stelet stelet de stelet de stelet de s | vákora v kvározna prve (Bakel) náhradnostva v Járov postovatních Vyvyt – Anator II. platik kom | <u>Auto</u> Man Freg Offset |
| -80.0 | | | | 0 Hz |
| Start 150 kHz #Res BW 10 kHz | #VBW 30 kHz* | | Stop 30.00 MHz 368 ms (6001 pts) | |

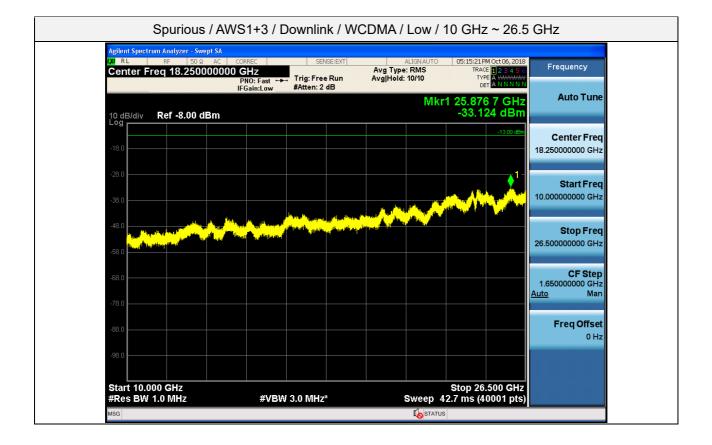




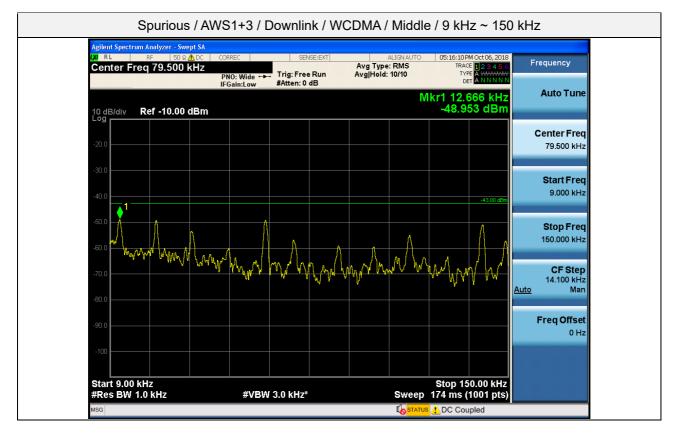
| Agilent Spectrum Analyzer - Swept | | | | |
|-------------------------------------|---|--|--|------------|
| RL RF 50 Ω Center Freq 6.090500 | 000 GHz | Avg Type: RMS | 5:15:12 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWWW | quency |
| | PNO: Fast ↔→ Trig: Free Run IFGain:Low #Atten: 12 dB | Avg Hold: 10/10 | | uto Tune |
| 10 dB/div Ref 0.00 dBn | 1 | | 7.377 1 GHz ⁴ -38.904 dBm | auto i une |
| Log | | | | enter Freg |
| -10.0 | | | | 600000 GHz |
| -20.0 | | | | |
| | | | | Start Freq |
| -30.0 | | <u> </u> | 2.1810 | 00000 GHz |
| -40.0 | | | | Stop Freq |
| 50.0 | | a possible of the state of the second state of the second state of the second state of the second state of the | 10.0000 | 000000 GHz |
| | | | | OF Otam |
| -60.0 | | | | CF Step |
| -70.0 | | | Auto | Man |
| -80.0 | | | Fi | req Offset |
| 66.0 | | | | 0 Hz |
| -90.0 | | | | |
| Start 2.181 GHz | | | op 10.000 GHz | |
| #Res BW 1.0 MHz | #VBW 3.0 MHz* | | ms (20001 pts) | |





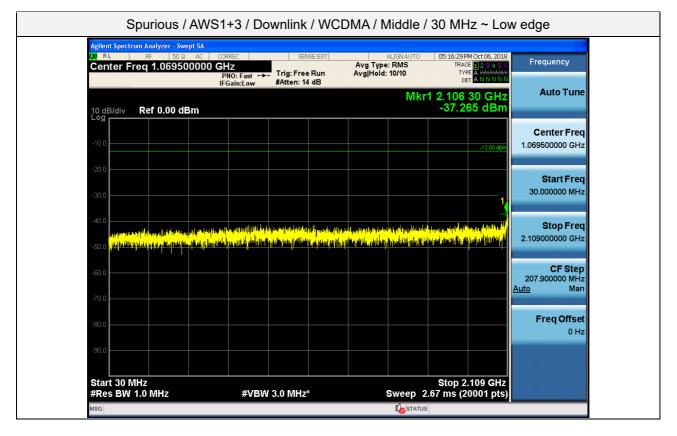






| Agilent Spectrum A | | | REC | SEN | ISE:EXT | | ALIGN AUTO | 05:16:22F | M Oct 06, 2018 | |
|-------------------------------|------------|-------------------|---|--|---------|--|------------|-----------|---|--|
| Center Freq | | 00 MHz | NO: Fast ↔ Gain:Low | | Run | Avg Type Avg Hold: | RMS | TRAC | E 123456 E A WWWWWW T A N N N N N | Frequency |
| | ef 0.00 dE | | Sain:Low | #Atten. N | | | | | 672 kHz 23 dBm | Auto Tune |
| 10 dB/div Re | 1 0.00 UE | 5111 | | | | | | | | Center Freq |
| -10.0 | | | | | | | | | | 15.075000 MHz |
| -20.0 | | | | | | | | | | |
| -30.0 | | | | | | | | | -33.00 dBm | Start Freq 150.000 kHz |
| -40.0 | | | | | | | | | -33.00 dBm | |
| | | | | | | | | | | Stop Freq 30.000000 MHz |
| -50.0 | | | | | | | | | | |
| -60.0 | | | | | | | | | | CF Step 2.985000 MHz <u>Auto</u> Man |
| -70.0 | | al ka ilenie is i | allisialata aratuk Manusian Manusian | laddin y shekiladi Taylog yang sang sang sa | | <mark>teta bi deta mila da la</mark> Referencia de la constante de la | | | the burn have a set of the | |
| -80.0 | | | | | | | | | | Freq Offset 0 Hz |
| -90.0 | | | | | | | | | | 5 HZ |
| | | | | | | | | | | |
| Start 150 kHz #Res BW 10 l | | | #VBIA | / 30 kHz* | | | Sween | Stop 3 | 0.00 MHz 6001 pts) | |

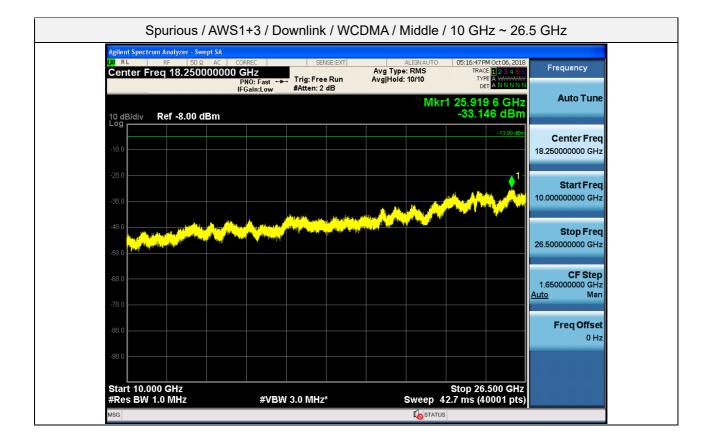




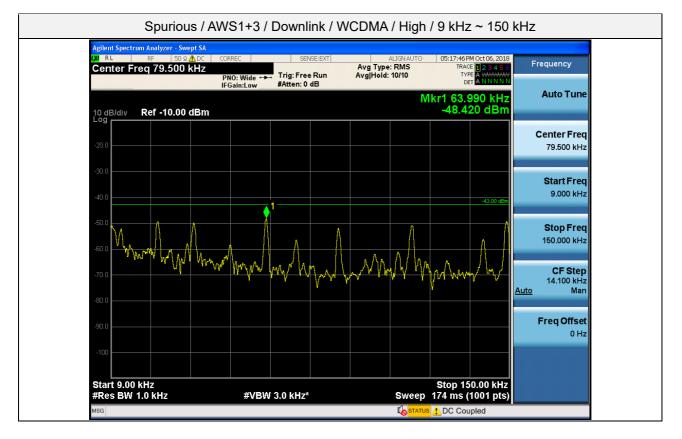
| Agilent Spectrum Analyzer - Swept SA | | | |
|--------------------------------------|--|--|--|
| Center Freg 6.090500000 | ORREC SENSE:EXT HZ PNO: Fast →→ Trig: Free Run | | 7 PM Oct 06, 2018 Frequency RACE 1 2 3 4 5 6 Frequency TYPE A WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW |
| | IFGain:Low #Atten: 12 dB | Mkr1 7.3 | Auto Turo |
| 10 dB/div Ref 0.00 dBm | | | 659 dBm |
| Log | | | Center Fred |
| -10.0 | | | -13.00 dBm 6.090500000 GHz |
| -20.0 | | | |
| 20.0 | | | 2.181000000 GHz |
| -30.0 | | ▲ 1 | |
| -40.0 | | | Stop Fred |
| -50.0 - 50.0 | | and the second state of th | 10.00000000 GHz |
| -60.0 | | | CF Step |
| | | | 781.900000 MHz <u>Auto</u> Mar |
| -70.0 | | | |
| -80.0 | | | Freq Offset |
| -90.0 | | | |
| | | | |
| Start 2.181 GHz #Res BW 1.0 MHz | #VBW 3.0 MHz* | Stop 1 Sweep 13.3 ms | 0.000 GHz |





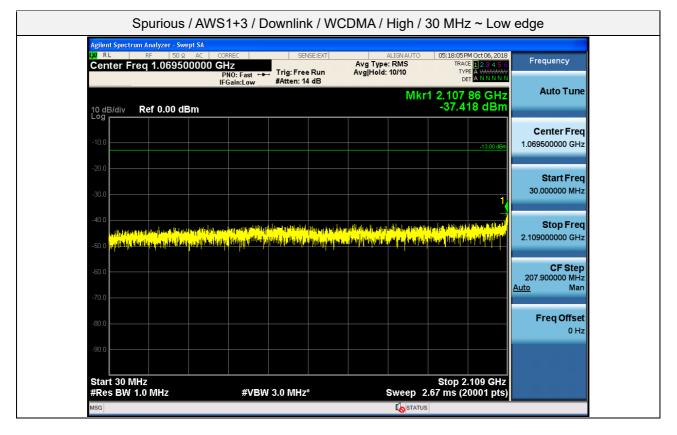






| Agilent Spectrum Analyzer - Swept SA | CORREC SENSE:EXT | ALIGNAUTO | 05:17:58 PM Oct 06, 2018 | |
|--------------------------------------|--|--|---|---------------------------------|
| Center Freq 15.075000 M | | Avg Type: RMS Avg Hold: 10/10 | TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | IFGall.LOW Britten. IG WE | | Mkr1 598 kHz -36.810 dBm | Auto Tune |
| | | | | Center Freq 15.075000 MHz |
| -20.0 | | | | Start Freq 150.000 kHz |
| -40.0 | | | -33.00 dBm | Stop Freq |
| -50.0 | | | | 30.000000 MHz |
| | el bener dels en de la malas, per l'Anan Mary milla Die del giorne anno 19 may - Mary Paul Dig Ang de Clar Die Jacob a particul de la del giorne de la mala de la del giorne de la mala | His And all the surface of the black filling to a property of the frequencies of the black filling to | والقريميان وفيلتهم مروي أفأقا بالروسانات بأتر التعاولان | 2.985000 MHz <u>Auto</u> Man |
| -80.0 | | | | Freq Offset 0 Hz |
| Start 150 kHz #Res BW 10 kHz | #VBW 30 kHz* | Silvaan | Stop 30.00 MHz 368 ms (6001 pts) | |

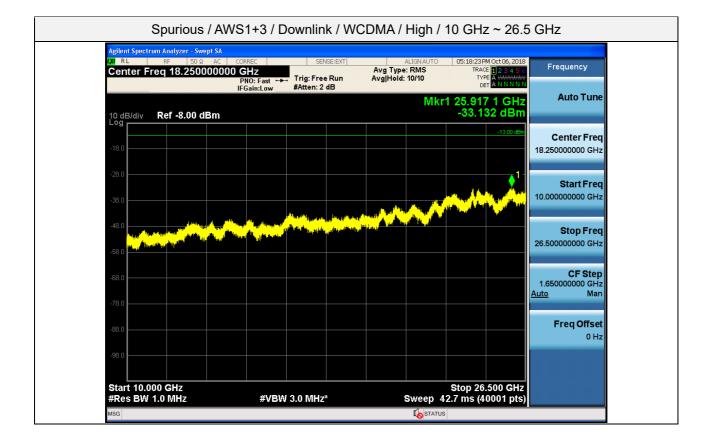




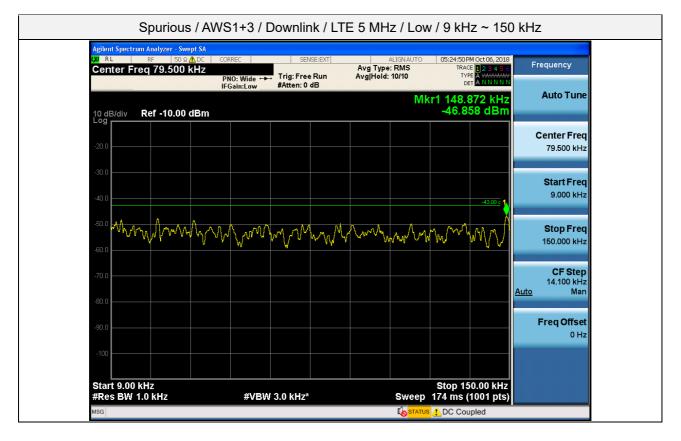
| Agilent Spectrum Analyzer - Swept SA | | |
|--|---|--|
| 🕅 RL RF 50 Ω AC 1 Center Freq 6.090500000 C | CORREC SENSE:EXT SHZ PNO: Fast +++ Trig: Free Run | ::16 PM Oct 06, 2018 Frequency TRACE 2:3:4:5:6 TYPE A WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW |
| | IFGain:Low #Atten: 12 dB | Auto Tuno |
| 10 dB/div Ref 0.00 dBm | | 181 0 GHz Auto rune).791 dBm |
| Log | | Center Freq |
| -10.0 | | -13.00 dBm 6.090500000 GHz |
| -20.0 | | |
| | | Start Freq 2.181000000 GHz |
| -30.0 | | |
| -40.0 | | Stop Freq |
| -50.0 ²⁴ - 1 ⁴ | | 10.00000000 GHz |
| -60.0 | | CF Step |
| -00.0 | | 781.900000 MHz <u>Auto</u> Man |
| -70.0 | | |
| -80.0 | | Freq Offset |
| -90.0 | | 0 Hz |
| | | |
| Start 2.181 GHz | #VBW 3.0 MHz* | 10.000 GHz s (20001 pts) |





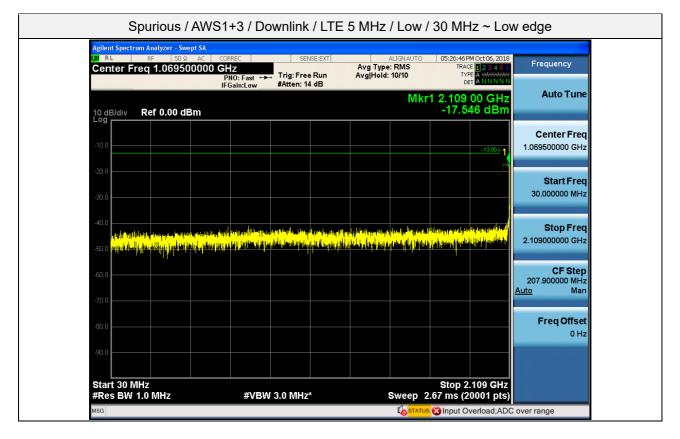






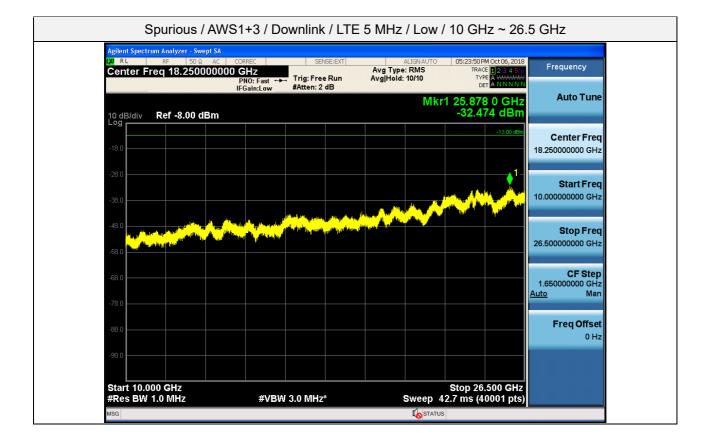
| Agilent Spectrum Analyzer - Swept SA LXI RL RL RF | | SE:EXT AL | IGN AUTO | 05:23:25 PM Oct 06, 2018 | |
|---|---|--------------------------------|--|---|----------------------------------|
| Center Freq 15.075000 M | | Avg Type: I Run Avg Hold: 1 | RMS | TRACE 1 2 3 4 5 6 TYPE A WANNAW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | | | Mkr1 667 kHz -39.027 dBm | Auto Tune |
| -10.0 | | | | | Center Freq 15.075000 MHz |
| -20.0 | | | | -33.00 dBm | Start Freq 150.000 kHz |
| -40.0 | | | | | Stop Freq 30.000000 MHz |
| -60.0 | | | | | CF Step 2.985000 MHz |
| -70.0 | und an all the group of the state of the state I want the state of t | | tele politica di la con A na politica di la con | na podravni stanov stalov stalov Na podravni stalov stalov stalov stalov | <u>Auto</u> Man |
| -80.0 | | | | | Freq Offset 0 Hz |
| -90.0 Start 150 kHz | | | | Stop 30.00 MHz | |



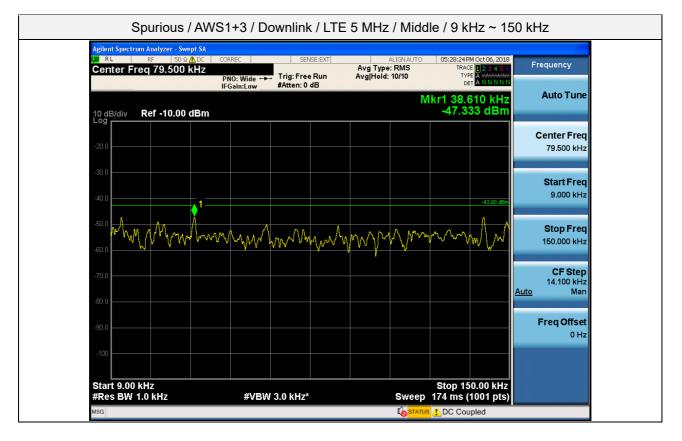


| Agilent Spectrum Analyzer - Swep | | | | |
|-------------------------------------|--|--|---|---------------------------|
| ໝ RL RF 50Ω Center Freq 6.090500 | | | 05:23:41 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dB | in our level | | kr1 2.181 0 GHz -38.800 dBm | Auto Tune |
| Log | | | | Center Freq |
| -10.0 | | | -13.00 dBm | 6.090500000 GHz |
| -20.0 | | | | Start Freq |
| -30.0 | | | | 2.181000000 GHz |
| -40.0 | | n de ser la ser la factoria de la ser la ser la del de la ser en de la ser en de la ser en de la ser en de la s Nome de la ser en ser la del de ser en ser en del de la ser en de la ser en de la ser en de la ser en de la ser | | Stop Freq |
| -50.0 | A SUL AND A SULAR AND A SU | a na | | 10.00000000 GHz |
| -60.0 | | | | CF Step 781.900000 MHz |
| -70.0 | | | | <u>Auto</u> Man |
| -80.0 | | | | Freq Offset 0 Hz |
| -90.0 | | | | 0 H2 |
| | | | | |
| Start 2.181 GHz #Res BW 1.0 MHz | #VBW 3.0 MHz | * Sween | Stop 10.000 GHz 13.3 ms (20001 pts) | |



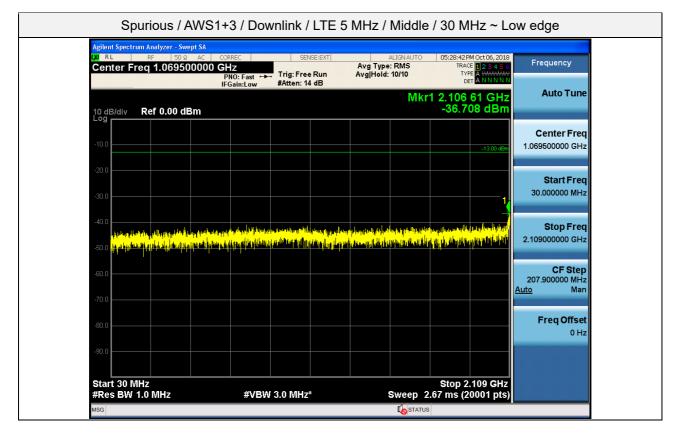






| Agilent Spectrum Analyzer - Sw LXI RL RF 50 G | vept SA | | or mar | | LICHAUTC | 05-00-000 | M 0-405 2010 | |
|--|---|-----------|--------|---|----------|---|--|--|
| Center Freq 15.075 | | | | Avg Type Avg Hold: | | TRAG | M Oct 06, 2018 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 d | - | | | | | | 672 kHz 89 dBm | Auto Tune |
| -10.0 | | | | | | | | Center Freq 15.075000 MHz |
| -20.0 | | | | | | | -33.00 dBm | Start Freq 150.000 kHz |
| -40.0 | | | | | | | | Stop Freq 30.000000 MHz |
| -60.0 | | | | | | | | CF Step 2.985000 MHz <u>Auto</u> Man |
| -70.0 70.0 70.0 70.0 70.0 70.0 70.0 70.0 | hind den staden og stædelig i den stade de generalen striger og jorder det sjoletet og som | | | an da da ka ka ka ka ka Ana ka | | an faraith ann an tao Fairreachar ann an tao | the station of a the share | Freq Offset |
| -90.0 | | | | | | | | 0 Hz |
| Start 150 kHz #Res BW 10 kHz | #VB | W 30 kHz* | | | Sweep | Stop 3 368 ms (| 0.00 MHz 6001 pts) | |

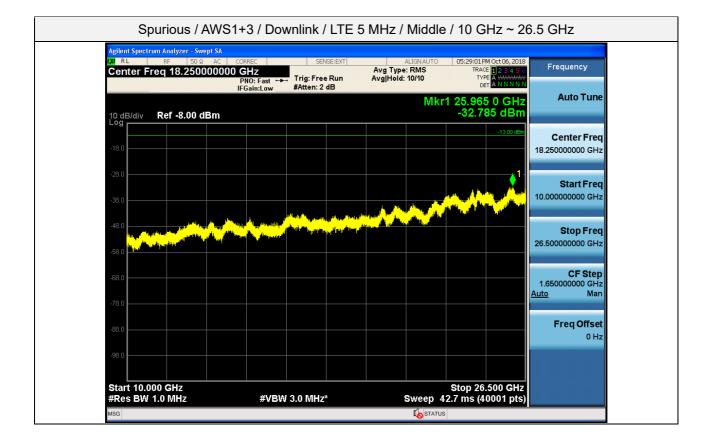




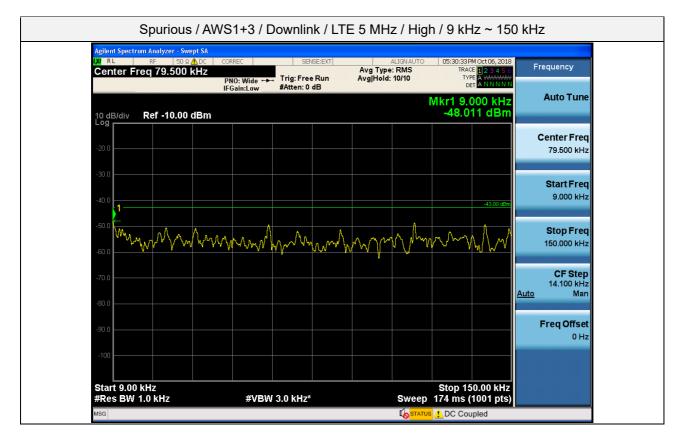
| Agilent Spectrum Analyzer - Swept SA | | | | |
|--|--|---|---|--------------------------------|
| M RL RF 50 Ω AC Center Freq 6.09050000 | 0 GHz | ALIGNAUTO Avg Type: RMS Avg Hold: 10/10 | 05:28:50 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | Frequency |
| | PNO: Fast ↔ Trig: Free Run IFGain:Low #Atten: 12 dB | | | Auto Tune |
| 10 dB/div Ref 0.00 dBm | | Mkr | 2.181 8 GHz -38.206 dBm | Auto Tune |
| | | | | 0 |
| -10.0 | | | -13.00 dBm | Center Freq 6.090500000 GHz |
| | | | | |
| -20.0 | | | | Start Freq |
| -30.0 | | | | 2.181000000 GHz |
| -40.0 | | | | |
| and the second sec | | an tha balan bara da katalan bara da ang katalan sa katalan sa katalan sa katalan sa katalan sa katalan sa kat Katalah katalan sa kata | | Stop Freq 10.00000000 GHz |
| -50.0 | La Martine Contraction and Contraction of Contracti | daa | and a state of the second s | 10.00000000 GH2 |
| -60.0 | | | | CF Step |
| | | | | 781.900000 MHz Auto Man |
| -70.0 | | | | |
| -80.0 | | | | Freq Offset |
| | | | | 0 Hz |
| -90.0 | | | | |
| Start 2.181 GHz | | | Stop 10.000 GHz | |
| #Res BW 1.0 MHz | #VBW 3.0 MHz* | Sweep 13. | 3 ms (20001 pts) | |





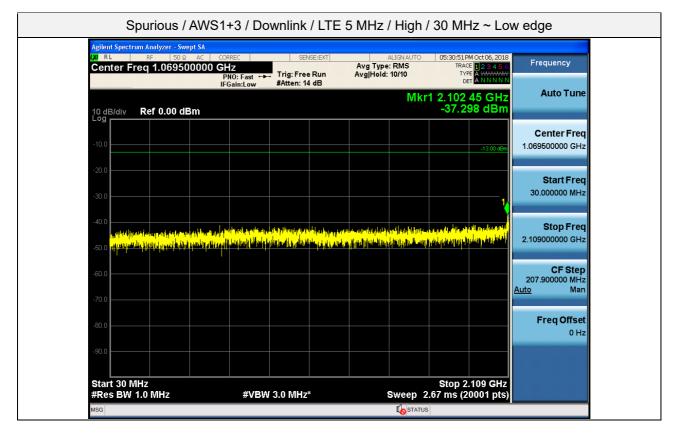






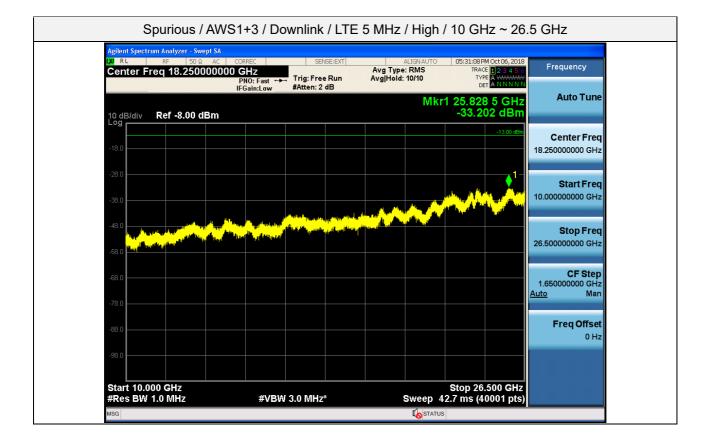
| Agilent Spectrum Analyzer - Sv LXI RL RF 50 9 | | | ENSE:EXT | | ALIGN AUTO | 05:00:401 | PM Oct 06, 2018 | |
|--|-----|--|--|-------------------------------|------------|--|---|--|
| Center Freq 15.075 | | ast 🛶 Trig:Fr | ee Run | Avg Type Avg Hold: | RMS | | CE 1 2 3 4 5 6 PE A WWWW ET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 d | IBm | | | | | | 593 kHz 63 dBm | Auto Tune |
| -10.0 | | | | | | | | Center Freq 15.075000 MHz |
| -20.0 | | | | | | | -33.00 dBm | Start Freq 150.000 kHz |
| -40.0 | | | | | | | | Stop Freq 30.000000 MHz |
| -60.0 | | | | | | | | CF Step 2.985000 MHz <u>Auto</u> Man |
| -70.0 | | <mark>luatelluatelle de la constate</mark> | di di kana di kana di Kana kana di kana | in in the state of the sector | | ng da pa <mark>ndalanan</mark> Aparanan panan | المرتقاقية ألطه الرقاد الرزيم يراقه | |
| -80.0 | | | | | | | | Freq Offset 0 Hz |
| -90.0 | | | | | | | | |
| Start 150 kHz #Res BW 10 kHz | | ¢VBW 30 kHz | | | _ | | 0.00 MHz (6001 pts) | |



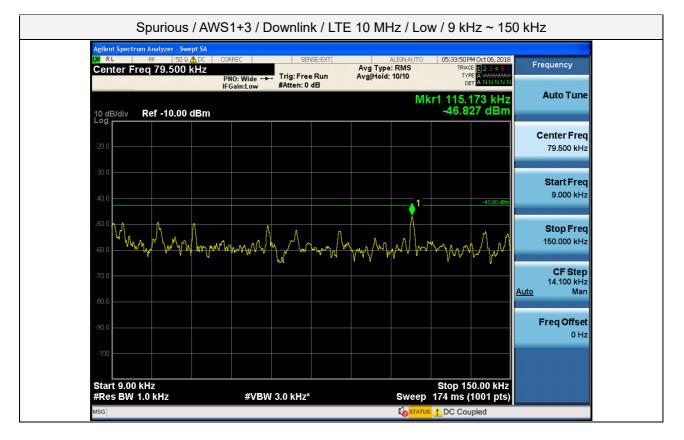


| Agilent Spectrum Analyzer - Swept SA | | | |
|--|---|---|---|
| ໝ RL RF 50Ω AC Center Freq 6.09050000 | | ALIGNAUTO 05: Avg Type: RMS Avg Hold: 10/10 | 32:49 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NINN N |
| 10 dB/div Ref 0.00 dBm | ir Gain. Low and con in 2 and | | Auto Tune 6.148 dBm |
| Log | | | Center Free |
| -10.0 1 | | | 6.090500000 GH: |
| -30.0 | | | Start Free 2.181000000 GH |
| -40.0 | | la tera quipera la marta la quipera proverti la rada di tri construction da la construcción de la construcción | Stop Fred |
| -50.0 1 -50.0 1 - 50. | provide the second s | a lite interesting produced and a produced and the second of the second second second second second second second | Contract of the second |
| -60.0 | | | CF Step 781.900000 MH |
| -70.0 | | | Auto Mar |
| -80.0 | | | Freq Offse |
| -90.0 | | | |
| Start 2.181 GHz #Res BW 1.0 MHz | #VBW 3.0 MHz* | Sto Sweep 13.3 n | p 10.000 GHz |



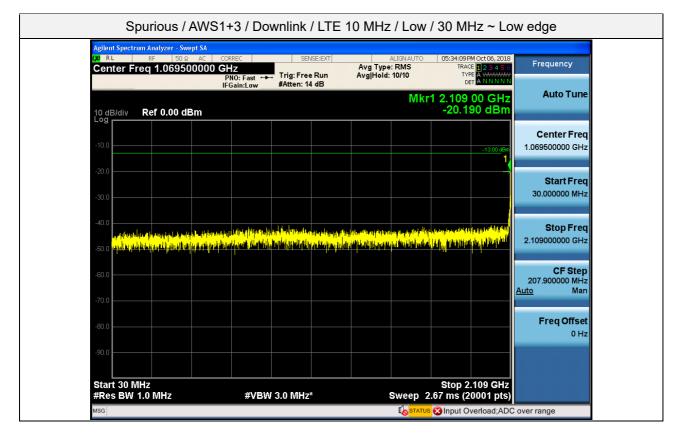






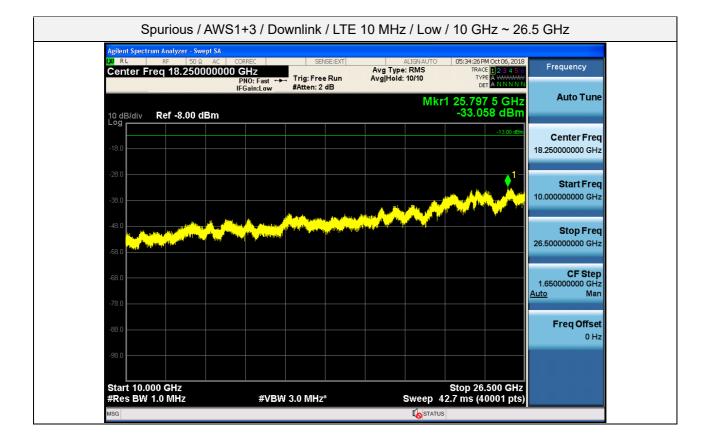
| Agilent Spectrum Analyzer - Swept SA | CORREC SENSE:EXT | ALIGNAUTO | 05:34:01 PM Oct 06, 2018 | |
|--|---|---|--|---------------------------------|
| Center Freq 15.075000 M | | Avg Type: RMS Avg Hold: 10/10 | TRACE 1 2 3 4 5 6 TYPE A WM/WWW DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | | Mkr1 667 kHz -37.587 dBm | Auto Tune |
| -10.0 | | | | Center Freq 15.075000 MHz |
| -20.0 | | | | Start Freq |
| -30.0 | | | -33.00 dBm | Stop Freq |
| -50.0 | | | | 30.000000 MHz CF Step |
| -60.0 - 11 - 11 - 12 - 12 - 12 - 12 - 12 - 1 | al dia ang ang ang ang ang ang ang ang ang an | ut est bil för para blev som eller at s ¹ a det törlattade Balander at bestellard som eller at som eller at som eller | ndef film an a flight of the problem construction and the second construction of the second construction | 2.985000 MHz <u>Auto</u> Man |
| -80.0 | a se con Masser le di rin no l'obditali addre i | tentra de atrateción de la contra | and the second sec | Freq Offset 0 Hz |
| -90.0 | | | | |
| Start 150 kHz #Res BW 10 kHz | #VBW 30 kHz* | Sweep | Stop 30.00 MHz 368 ms (6001 pts) | |



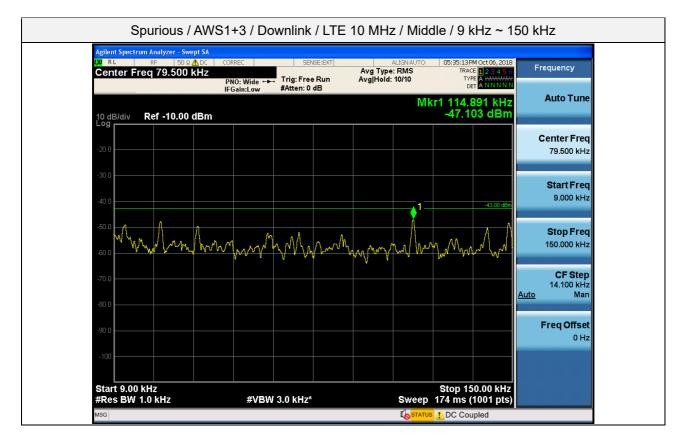


| Agilent Spectrum Analyzer - Swept SA | | | | |
|--|--|---|--|-----------------------------------|
| RL RF 50 Ω AC Center Freq 6.09050000 | 0 GHz | Avg Type: RMS | 05:34:17 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWWW | Frequency |
| | PNO: Fast ↔ Trig: Free R IFGain:Low #Atten: 12 d | 3 | DET A N N N N N | Auto Tune |
| | | Mł | r1 7.367 7 GHz -39.284 dBm | Auto Tune |
| 10 dB/div Ref 0.00 dBm | | | -00.204 abiii | |
| 40.0 | | | | Center Freq |
| -10.0 | | | -13.00 dBm | 6.090500000 GHz |
| -20.0 | | | | |
| | | | | Start Freq 2.181000000 GHz |
| -30.0 | | <u> </u> | | 2.18100000 6112 |
| -40.0 | . market a state of the state o | | adha i anditana i s ^{untur} ita i a | Stop Freq |
| | n den bereinen statiske bieden eine statiske bereinen. Rinnelse den begen statiske bieden statiske bieden bereinen. | na ang kadilati ng panakan ^{kan} ang panakan t | (And and a state of the second state of the se | 10.000000000 GHz |
| | | | | |
| -60.0 | | | | CF Step |
| | | | | 781.900000 MHz <u>Auto</u> Man |
| -70.0 | | | | |
| -80.0 | | | | Freq Offset |
| | | | | 0 Hz |
| -90.0 | | | | |
| | | | | |
| Start 2.181 GHz #Res BW 1.0 MHz | #VBW 3.0 MHz* | 0 | Stop 10.000 GHz 3.3 ms (20001 pts) | |



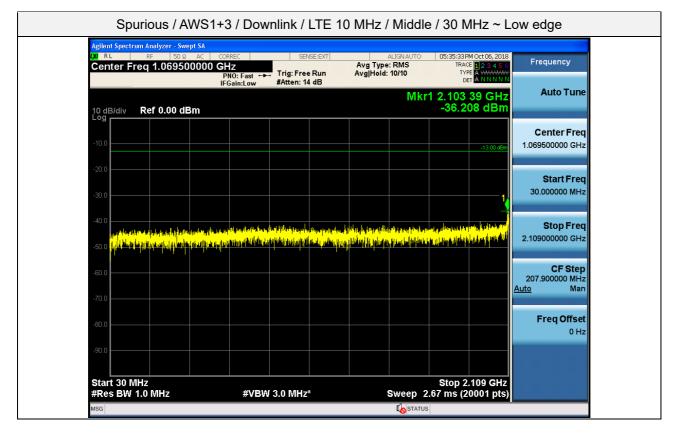






| Agilent Spectrum Analyzer - Swept SA | | | | |
|--|---|--|--|----------------------------------|
| ₩ RL RF 50 Ω ▲ DC Center Freq 15.075000 № | | ALIGNAUTO Avg Type: RMS Avg Hold: 10/10 | 05:35:24 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNN | Frequency |
| 10 dB/div Ref 0.00 dBm | | | Mkr1 593 kHz -37.310 dBm | Auto Tune |
| -10.0 | | | | Center Freq 15.075000 MHz |
| -20.0 | | | -33.00 dBm | Start Freq 150.000 kHz |
| -40.0 | | | | Stop Freq 30.000000 MHz |
| N. A | | | | CF Step 2.985000 MHz |
| -70.0 | king a 1999 - Sanga Karang Kalingga kang kang kang kang kang kang kang | tin na stradina se kateria se kateria se | a biya dina ng | <u>Auto</u> Man Freq Offset |
| -80.0 | | | | 0 Hz |
| Start 150 kHz #Res BW 10 kHz | #VBW 30 kHz* | | Stop 30.00 MHz 368 ms (6001 pts) | |

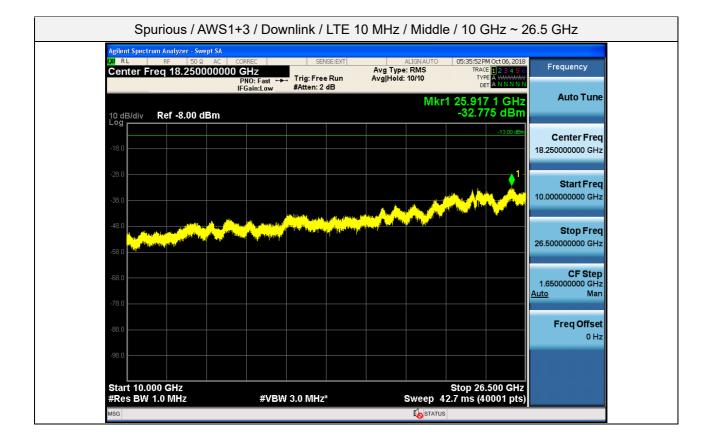




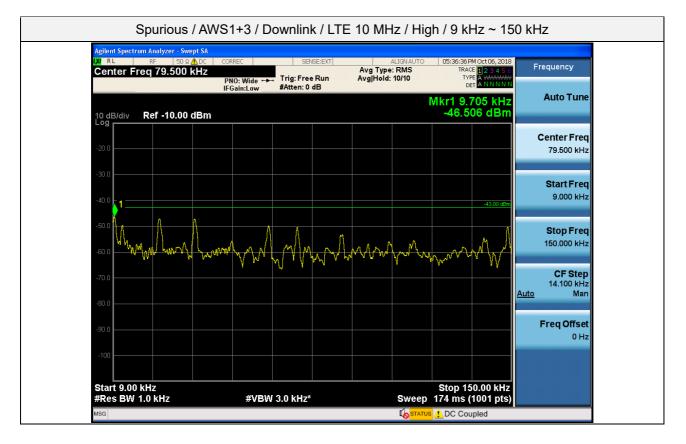
| Agilent Spectrum Analyzer - Swept SA | | | | |
|---|---|---|--|----------------------------|
| M RL RF 50 Ω AC Center Freq 6.09050000 | | ALIGNAUTO C Avg Type: RMS Avg Hold: 10/10 | 5:35:42 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | requency |
| | IFGain:Low #Atten: 12 dB | | 2.185 3 GHz | Auto Tune |
| 10 dB/div Ref 0.00 dBm | | | -39.124 dBm | |
| Log | | | | Center Freq |
| -10.0 | | | -13.00 dBm 6.0 | 90500000 GHz |
| -20.0 | | | | Oto at East |
| -30.0 | | | 2.1 | Start Freq 81000000 GHz |
| 1 | | | | |
| | | an line of the second with the local state to the second with the local state of the second state of the second | | Stop Freq |
| -50.0 | a h la shekara i A hada ya ku tu ku shekara ku shekara ku shekara ku shekara ku shekara ku shekara ku shekara Ku shekara ku ku shekara ku shekar Ku shekara ku shekara k | | hailiitiin perce ^{itiin} likin mii | 00000000 GHz |
| -60.0 | | | | CF Step |
| -70.0 | | | Auto | 31.900000 MHz Man |
| -70.0 | | | | |
| -80.0 | | | | Freq Offset 0 Hz |
| -90.0 | | | | |
| | | | | |
| Start 2.181 GHz #Res BW 1.0 MHz | #VBW 3.0 MHz* | | op 10.000 GHz ms (20001 pts) | |





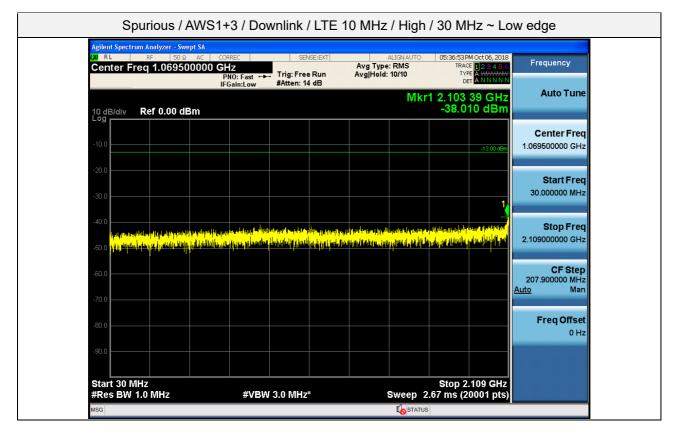






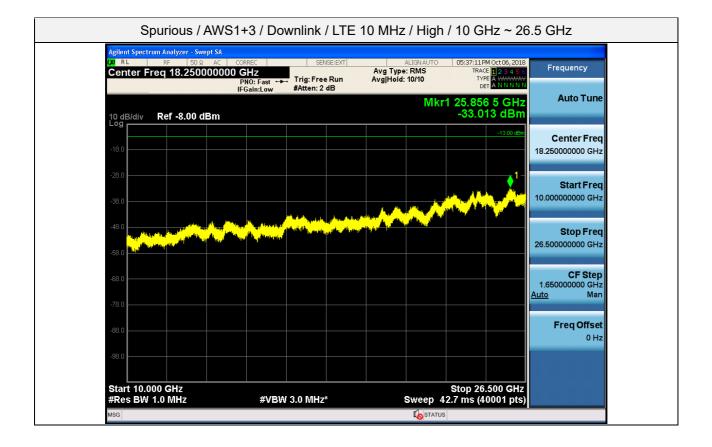
| Agilent Spectrum Analyzer - Swept SA | | | | | |
|--|---|--|------------------------------|---|---|
| IX RL RF 50 Ω ▲ DC Center Freq 15.075000 M | | Avg Type Run Avg Hold: | ALIGNAUTO :: RMS 10/10 | 05:36:46 PM Oct 06, 2018 TRACE 1 2 3 4 5 6 TYPE A WATMAN DET A N N N N N | Frequency |
| 10 dB/div Ref 0.00 dBm | | | | Mkr1 593 kHz -37.260 dBm | Auto Tune |
| -10.0 | | | | | Center Freq 15.075000 MHz |
| -20.0 | | | | -33.00 dBm | Start Freq 150.000 kHz |
| -40.0 | | | | | Stop Freq 30.000000 MHz |
| -50.0 | | | | | CF Step 2.985000 MHz <u>Auto</u> Man |
| -70.0 | allatin Jone and a statement of the restal on the down Propheny (1) has in providing the restal of providing | n a de balanda da tara balan yang di di di karang pada di karang Karang pada yang balang di di di karang di di d Karang pada yang di | | a a falandi sana a falan ing a falan ing a sana A sana a sana | |
| | | | | | Freq Offset 0 Hz |
| -90.0 | | | | | |
| Start 150 kHz #Res BW 10 kHz | #VBW 30 kHz* | | _ | Stop 30.00 MHz 368 ms (6001 pts) | |



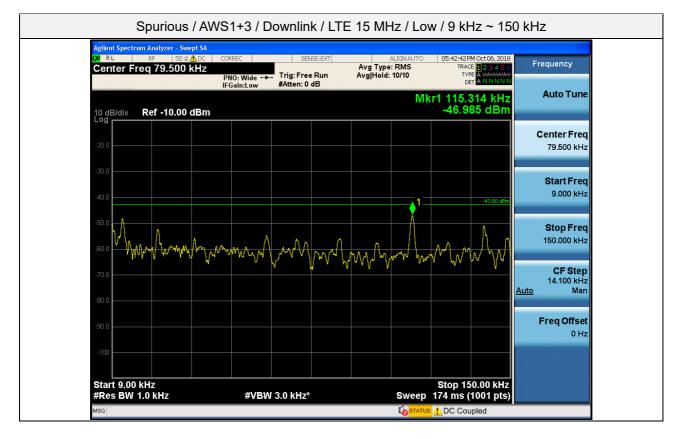


| A | | |
|---------------------|---|-----------------------------------|
| in:Low#Atten: 12 dB | DET A N N | |
| | | |
| | | |
| | | Center Freq 6.090500000 GHz |
| | | |
| | | Start Freq |
| | | 2.181000000 GHz |
| | | |
| | | Stop Freq |
| | | |
| | | CF Step |
| | | 781.900000 MHz <u>Auto</u> Man |
| | | |
| | | Freq Offset |
| | | 0 12 |
| | | |
| | Stop 10.000 (| GHZ |
| | : Fast → Trig: Free Run Av n:Low #Atten: 12 dB | Fast |



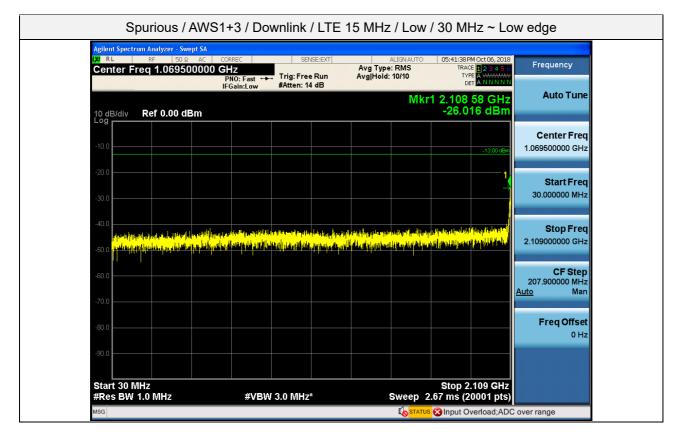






| | CORREC SENS | E:EXT ALIGN AUTO | 05:41:31 PM Oct 06, 2018 | Frequency |
|---------------------------------|---|--|---|--|
| Center Freq 15.075000 | MHZ PNO: Fast ++ Trig: Free IFGain:Low #Atten: 10 | | TRACE 1 2 3 4 5 6 TYPE A WATMAN DET A N N N N N | Trequency |
| 10 dB/div Ref 0.00 dBm | | | Mkr1 593 kHz -36.725 dBm | Auto Tune |
| -10.0 | | | | Center Freq 15.075000 MHz |
| -20.0 | | | | Start Freq |
| -30.0 | | | -33.00 dBm | 150.000 kHz |
| -50.0 | | | | Stop Freq 30.000000 MHz |
| | albigungh an ta bina bina da an ta an ta an | dus siturias construction | | CF Step 2.985000 MHz <u>Auto</u> Man |
| -80.0 | | Norgen allen i stan en de transvjeren di bila de De la transviere participation de transviere provincia de transviere De la transviere participation de transviere provincia de transviere de transviere de transviere de transviere | na lina da angalan ing ang ang ang ang ang ang ang ang ang a | Freq Offset |
| -90.0 | | | | 0 Hz |
| Start 150 kHz #Res BW 10 kHz | #VBW 30 kHz* | Sween | Stop 30.00 MHz 368 ms (6001 pts) | |





| Center Freq 6.090500000 (Frequencies) Trig: Free Run #Atten: 12 dB Avg/Hold: 10/10 Trig: Gree Run err Auto Tune 10 dB/div Ref 0.00 dBm | Start 2.181 GHz #Res BW 1.0 MHz | #VBW 3.0 MHz* | | Stop 10.000 GHz 13.3 ms (20001 pts) | |
|--|--|--|--|---|-----------------|
| Center Pred 6.090500000 GPZ PNO: Fast + | -90.0 | | | | |
| Center Freq 6.090500000 GPZ PNO: Fast + | -80.0 | | | | |
| Center Freq 6.090000000 CP2 PNO: Fast + | -70.0 | | | | Man Man |
| Center Freq 6.090500000 GHz PNO: Fast + | -60.0 | | | | 781.900000 MHz |
| Center Freq 6.090500000 GHz Trig: Free Run #Atten: 12 dB AvglHold: 10/10 AvglHold: 10/10 Trig: Gain: Low Auto Tune 10 dB/div Ref 0.00 dBm -38.190 dBm -38.190 dBm -6.090500000 GHz 10 dB/div Ref 0.00 dBm -3100 dBm -3100 dBm -3100 dBm 200 | -50.0 <mark>which is an it it is a set. Jus</mark> | and the second | | | |
| Center Freq 6.090500000 GHz Trig: Free Run IFGain:Low AvglHold: 10/10 AvglHold: 10/10 TYPE CENTRAL Auto Tune 10 dB/div Ref 0.00 dBm -38.190 dBm -38.190 dBm -38.00 dBm -38.00 dBm -38.190 dBm Center Freq 6.090500000 GHz -10.0 -1300 dBm -1300 dBm -1300 dBm -1300 dBm -1300 dBm -38.190 dBm Center Freq 6.090500000 GHz | -40.0 🗲 | المراجع المراجع مراجع المراجع ا | and a start of the st Angle of the start of | | |
| Center Freq 6.090500000 GHZ Trig: Free Run IFGain:Low AvglHold: 10/10 AvglHold: 10/10 TYPE AVIANTIAL Auto Tune 10 dB/div Ref 0.00 dBm -38.190 dBm -38.190 dBm 6.090500000 GHZ -10.0 -13.00 dBm -13.00 dBm -13.00 dBm -10.0 -11.00 dBm | -30.0 | | | | 2.181000000 GHz |
| Center Freq 6.090500000 GHZ PNO: Fast + | -20.0 | | | | |
| Center Freq 6.090500000 GHZ PNO: Fast → Trig: Free Run IFGain:Low AvglHold: 10/10 TYPE ANNINN DEF ANNINN 10 dB/div Ref 0.00 dBm -38.190 dBm | -10.0 | | | -13.00 dBm | • |
| PNO: Fast + | | | | | Center Frea |
| Center Freq 0.090300000 Griz http://www.anglige.com/ | 10 dB/div Pef 0 00 dBm | | Ν | | Auto Tune |
| | Center Freq 6.0905000 | PNO: Fast +++ Trig: Free | | TRACE 123456 TYPE A WATAWAY DET A N N N N N | Frequency |



