element

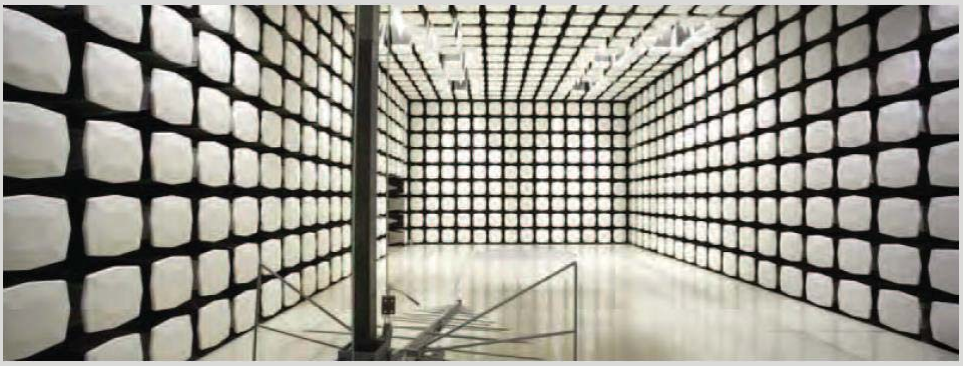
**Radio Test Report**
**Application for a Permissive Change of Equipment Authorization**
**FCC Part 22 and IC RSS-132**
**[869MHz – 894MHz]**

**FCC Part 27 and IC RSS-130**
**[746MHz – 756MHz]**

**FCC ID: VBNAHBCC-01**
**IC ID: 661W-AHBCC**

**Nokia Solutions and Networks**
**Airscale Base Transceiver Station Remote Radio Head**
**Model: AHBCC**

**Report: NOKI0069.0 Rev. 0, Issue Date: September 19, 2023**



ilac-MRA

A2LA ACCREDITED
CERT #3310.03

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element
2023.04.17

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# CERTIFICATE OF TEST

**Last Date of Test: August 15, 2023**
**Nokia Solutions and Networks**
**EUT: Airscale Base Transceiver Station Remote Radio Head**
**Model: AHBCC**

## Radio Equipment Testing

### Standards

| Specification | Method |
|---|---|
| Code of Federal Regulations (CFR) Title 47 Part 2<br>FCC CFR 47 Part 22 subpart H<br>FCC CFR 47 Part 27 subpart C<br>(Radio Standards Specification) RSS-Gen Issue 5– April 2018<br>IC RSS-130 Issue 2 – February 2019<br>IC RSS-132 Issue 4 - January 31, 2023<br>SRSP-518 Issue 2 – February 2019 | ANSI C63.26-2015<br>FCC KDB 971168 D01 v03r01<br>FCC KDB 662911D01 v02r01<br>FCC KDB 662911D02 v01 |

### Results

| Test Description | Result | Comments |
|---|---|---|
| Duty Cycle | N/A | Not requested. |
| Power Spectral Density | Pass | |
| Occupied Bandwidth | Pass | |
| Average Power | Pass | |
| Peak to Average Power (PAPR)CCDF | Pass | |
| Band Edge Compliance | Pass | |
| Spurious Conducted Emissions | Pass | |
| Spurious Radiated Emissions | N/A | Not requested. |

### Deviations From Test Standards

None

### Approved By:

*Adam Bruno, Operations Manager*

***Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.***

# REVISION HISTORY

| Revision Number | Description | Date (yyyy-mm-dd) | Page Number |
|---|---|---|---|
| 00 | None | | |

# ACCREDITATIONS AND AUTHORIZATIONS

## United States

**FCC** - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

**A2LA** - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

## Canada

**ISED** - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

## European Union

**European Commission** – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

## United Kingdom

**BEIS** – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

## Australia/New Zealand

**ACMA** - Recognized by ACMA as a CAB for the acceptance of test data.

## Korea

**MSIT / RRA** - Recognized by KCC's RRA as a CAB for the acceptance of test data.

## Japan

**VCCI** - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

## Taiwan

**BSMI** – Recognized by BSMI as a CAB for the acceptance of test data.

**NCC** - Recognized by NCC as a CAB for the acceptance of test data.

## Singapore

**IDA** – Recognized by IDA as a CAB for the acceptance of test data.

## Israel

**MOC** – Recognized by MOC as a CAB for the acceptance of test data.

## Hong Kong

**OFCA** – Recognized by OFCA as a CAB for the acceptance of test data.

## Vietnam

**MIC** – Recognized by MIC as a CAB for the acceptance of test data.

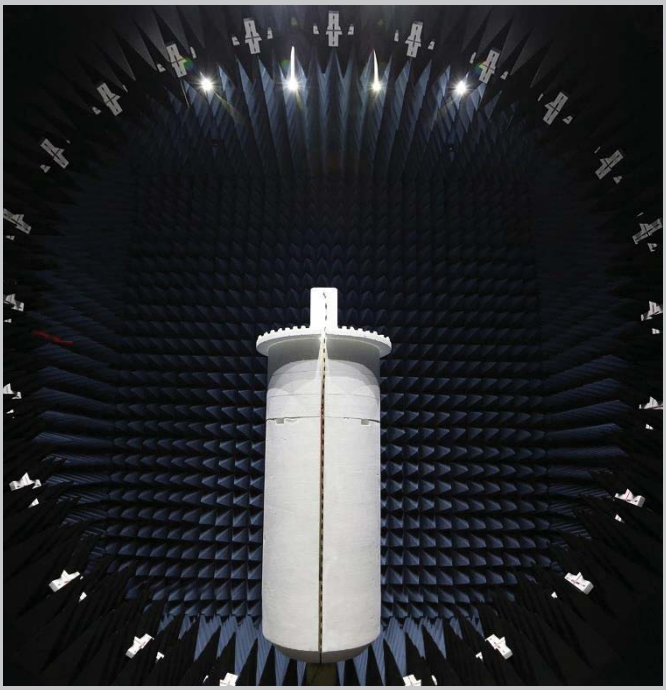
## SCOPE

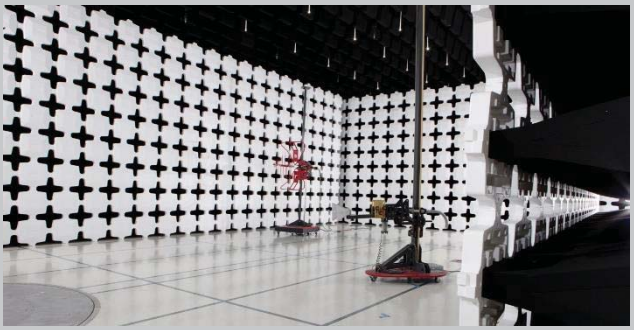
For details on the Scopes of our Accreditations, please visit:

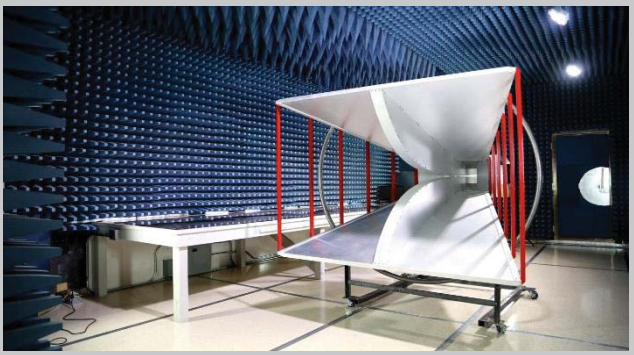
California Minnesota Oregon Texas Washington

# FACILITIES

| California | Minnesota | Oregon | Texas | Washington |
|---|---|---|---|---|
| Labs OC01-17<br>41 Tesla<br>Irvine, CA 92618<br>(949) 861-8918 | Labs MN01-11<br>9349 W Broadway Ave.<br>Brooklyn Park, MN 55445<br>(612) 638-5136 | Labs EV01-12<br>6775 NE Evergreen Pkwy #400<br>Hillsboro, OR 97124<br>(503) 844-4066 | Labs TX01-09<br>3801 E Plano Pkwy<br>Plano, TX 75074<br>(469) 304-5255 | Labs NC01-05<br>19201 120th Ave NE<br>Bothell, WA 98011<br>(425) 984-6600 |
| **A2LA** | | | | |
| Lab Code: 3310.04 | Lab Code: 3310.05 | Lab Code: 3310.02 | Lab Code: 3310.03 | Lab Code: 3310.06 |
| **Innovation, Science and Economic Development Canada** | | | | |
| 2834B-1, 2834B-3 | 2834E-1, 2834E-3 | 2834D-1 | 2834G-1 | 2834F-1 |
| **BSMI** | | | | |
| SL2-IN-E-1154R | SL2-IN-E-1152R | SL2-IN-E-1017 | SL2-IN-E-1158R | SL2-IN-E-1153R |
| **VCCI** | | | | |
| A-0029 | A-0109 | A-0108 | A-0201 | A-0110 |
| **Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA** | | | | |
| US0158 | US0175 | US0017 | US0191 | US0157 |







# MEASUREMENT UNCERTAINTY

element
RP.2023.05.08.0

## Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (k=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test Location: Texas

| Test | + MU | - MU |
|---|---|---|
| Frequency Accuracy | 0.0007% | -0.0007% |
| Amplitude Accuracy (dB) | 1.2 dB | -1.2 dB |
| Conducted Power (dB) | 1.2 dB | -1.2 dB |
| Radiated Power via Substitution (dB) | 0.7 dB | -0.7 dB |
| Temperature (degrees C) | 0.7°C | -0.7°C |
| Humidity (% RH) | 2.5% RH | -2.5% RH |
| Voltage (AC) | 1.0% | -1.0% |
| Voltage (DC) | 0.7% | -0.7% |
| Field Strength (dB) | 5.1 dB | -5.1 dB |
| AC Powerline Conducted Emissions (dB) | 3.1 dB | -3.1 dB |

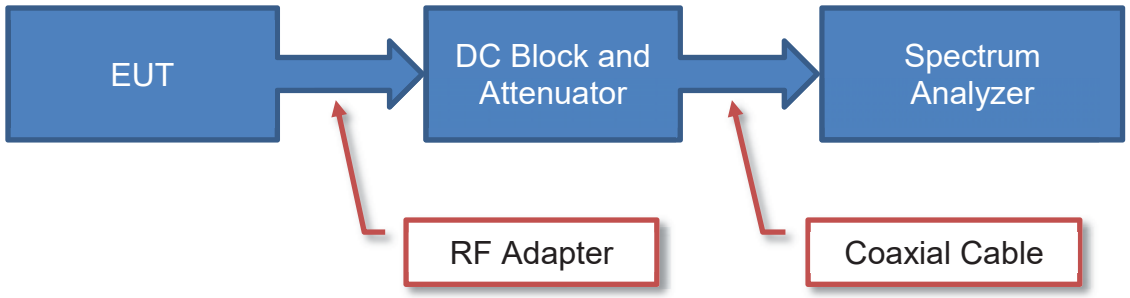
# TEST SETUP BLOCK DIAGRAMS

## Measurement Bandwidths

| Frequency Range (MHz) | Peak Data (kHz) | Quasi-Peak Data (kHz) | Average Data (kHz) |
|---|---|---|---|
| 0.01 - 0.15 | 1.0 | 0.2 | 0.2 |
| 0.15 - 30.0 | 10.0 | 9.0 | 9.0 |
| 30.0 - 1000 | 100.0 | 120.0 | 120.0 |
| Above 1000 | 1000.0 | N/A | 1000.0 |

*Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.*

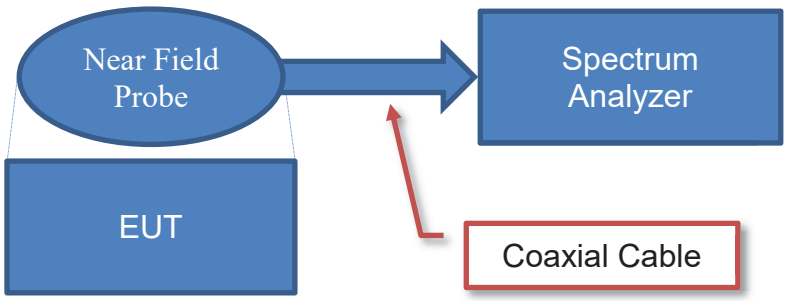
## Antenna Port Conducted Measurements




### Sample Calculation (logarithmic units)

| Measured Value | | Measured Level | | Reference Level Offset |
|---|---|---|---|---|
| **71.2** | = | 42.6 | + | 28.6 |

## Near Field Test Fixture Measurements

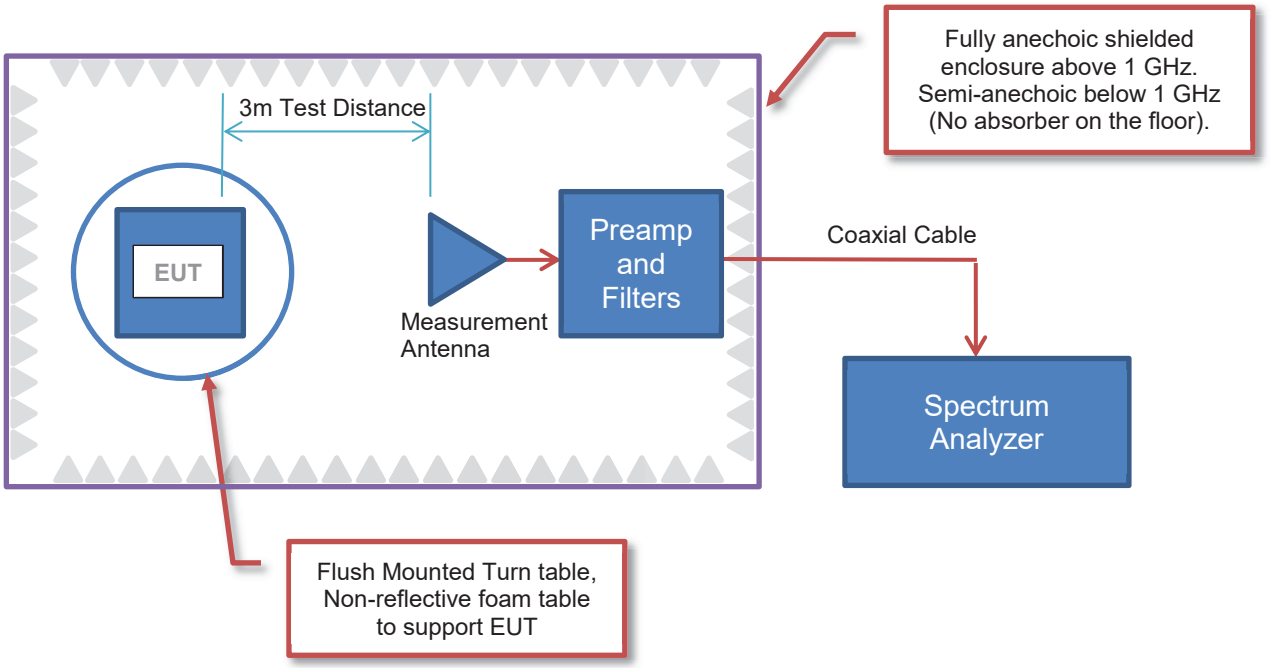



### Sample Calculation (logarithmic units)

| Measured Value | | Measured Level | | Reference Level Offset |
|---|---|---|---|---|
| **71.2** | = | 42.6 | + | 28.6 |

# TEST SETUP BLOCK DIAGRAMS

## Emissions Measurements




## Sample Calculation (logarithmic units)

### Radiated Emissions:

| Measured Level (Amplitude) | | Factor: Antenna Factor | | Factor: Cable Factor | | Factor: Amplifier Gain | | Distance Adjustment Factor | | External Attenuation | | Field Strength |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 42.6 | + | 28.6 | + | 3.1 | - | 40.8 | + | 0.0 | + | 0.0 | = | **33.5** |

### Conducted Emissions:

| Measured Level (Amplitude) | | Factor: Transducer Factor | | Factor: Cable Factor | | External Attenuation | | Adjusted Level |
|---|---|---|---|---|---|---|---|---|
| 26.7 | + | 0.3 | + | 0.1 | + | 20.0 | = | **47.1** |

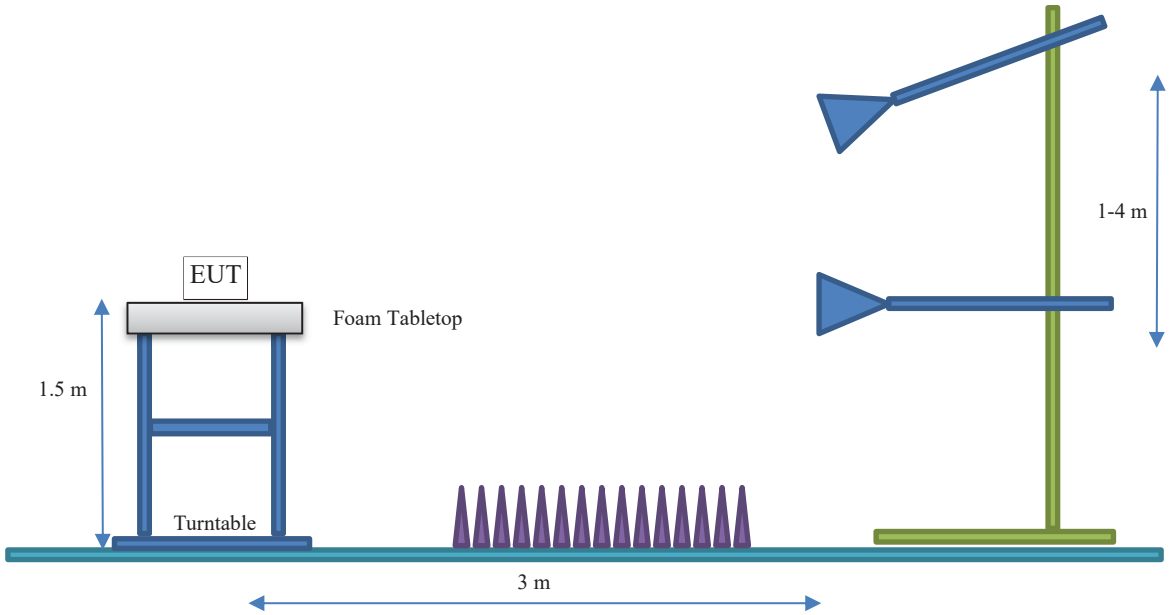
### Radiated Power (ERP/EIRP) – Substitution Method:

| Measured Level into Substitution Antenna (Amplitude dBm) | | Substitution Antenna Factor (dBi) | | EIRP to ERP (if applicable) | | Measured power (dBm ERP/EIRP) |
|---|---|---|---|---|---|---|
| 10.0 | + | 6.0 | - | 2.15 | = | **13.9/16.0** |

# TEST SETUP BLOCK DIAGRAMS

## Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



# PRODUCT DESCRIPTION

## Client and Equipment under Test (EUT) Information

| | |
|---|---|
| **Company Name:** | Nokia Solutions and Networks |
| **Address:** | 3201 Olympus Blvd |
| **City, State, Zip:** | Dallas, TX 75019 |
| **Test Requested By:** | Steve Mitchell |
| **EUT:** | AirScale Base Transceiver Station remote Radio Head Model AHBCC |
| **First Date of Test:** | August 11, 2023 |
| **Last Date of Test:** | August 15, 2023 |
| **Receipt Date of Samples:** | August 11, 2023 |
| **Equipment Design Stage:** | Production |
| **Equipment Condition:** | No Damage |
| **Purchase Authorization:** | Verified |

## Information Provided by the Party Requesting the Test

**Functional Description of the EUT:**

A permissive change on the original filing is being pursued to add 5G NR (new radio) 5MHz and 10MHz channel bandwidth Band n13 carriers along with 5G NR multicarrier operations to the AirScale Base Transceiver Station Remote Radio Head Model AHBCC FCC and ISED radio certifications. Please refer to test reports on the original/previous certifications for details on all required testing.

All conducted RF testing performed for the original certification testing has been repeated using 5G NR 5MHz and 10MHz channel bandwidth Band n13 carriers for this permissive change per correspondence/guidance from Nemko TCB. The same test methodology used in the original certification testing was used in this permissive change test effort. Tests performed under the change effort include RF power, PSD, CCDF, emission bandwidth (99% and 26 dB down), band edge spurious emissions, and conducted spurious emissions.

The testing was performed on the same hardware version (AHBCC) as the original certification test. The base station and remote radio head software for this testing is an updated release that includes 5G NR 5MHz and 10MHz channel bandwidth carrier support to 5GNR band n13.

The radiated emissions and frequency stability measurements performed in the original certification were not repeated under this effort per TCB guidance. The radiated emission and frequency stability/accuracy results from the original certification had enough margin to preclude requiring additional testing. The same frequency stability/accuracy radio design is the same for all radio technologies/modulation types.

Remote Radio Head (RRH) variant AHBCC is being developed under this effort. The AHBCC remote radio head is a multi-standard multi-carrier radio module designed to support 4G LTE and 5G NR FCC/ISED within Bands n/5 and n/13. The scope of this testing is to add NR5 and NR10 bandwidths to band n13 along with n5/n13 multiband/multicarrier support for FCC/ISED certification.

The AHBCC RRH has four transmit/four receive antenna ports (4TX/4RX for Band n5 and 4TX/4RX for Band n13). Each antenna port supports 3GPP 5G NR frequency band n5 (BTS Rx: 824 to 849 MHz/ BTS TX:869 to 894MHz) and 3GPP 5G NR frequency band n13 (BTS Rx: 777 to 787 MHz/BTS TX: 746 to 756 MHz). The maximum RF output power of the RRH is 320 Watts (40 watts per carrier, 80 watts per antenna port). The RRH can be operated as a 4x4 MIMO, 2x2 MIMO or as non-MIMO. The TX and RX instantaneous bandwidth covers the full operational RRH bandwidth. The RRH supports 5 and 10MHz 5G-NR bandwidths. The RRH supports four 5G-NR downlink modulation types (QPSK, 16QAM, 64QAM and 256QAM). The 5G-NR modulation types are setup according to 3GPP TS 38.141 NR FR1 Test Models NR-FR1-TM 1.1 (QPSK modulation type), NR-FR1-TM 3.2 (16QAM modulation type), NR-FR1-TM 3.1 (64QAM modulation type), and NR-FR1-TM 3.1a (256QAM modulation type). Multi-carrier operation is supported within this permissive change.

The RRH has external interfaces including DC power (DC In), ground, transmit/receive (ANT), external alarm (EAC), optical CPRI (OPT) and remote electrical tilt (RET). The RRH with applicable installation kit may be pole or wall mounted. The RRH may be configured with optional cooling fan.

The 3GPP frequency band n13 (746 - 756 MHz) band edge downlink (BTS Transmit) ARFCNs for 5G NR channel bandwidths (5 and 10 MHz) are provided below for the AHBCC. The ARFCN is defined as an Absolute Radio Frequency Channel Number. The channel spacing is 100 kHz between channel numbers.

| | Downlink ARFCN | Downlink Frequency (MHz) | 5G NR Channel Bandwidth | |
|---|---|---|---|---|
| | | | 5 MHz | 10 MHz |
| AHBCC Band n13 (Ant 1, 2, 3, 4) | 149200 | 746.0 | Band Edge | Band Edge |
| | …… | | | |
| | 149700 | 748.5 | Bottom Channel | |
| | …… | | | |
| | 150200 | 751 | Middle Channel | Bottom Channel<br>Middle Channel<br>Top Channel |
| | …… | | | |
| | 150700 | 753.5 | Top Channel | |
| | …… | | | |
| | 151200 | 756 | Band Edge | Band Edge |

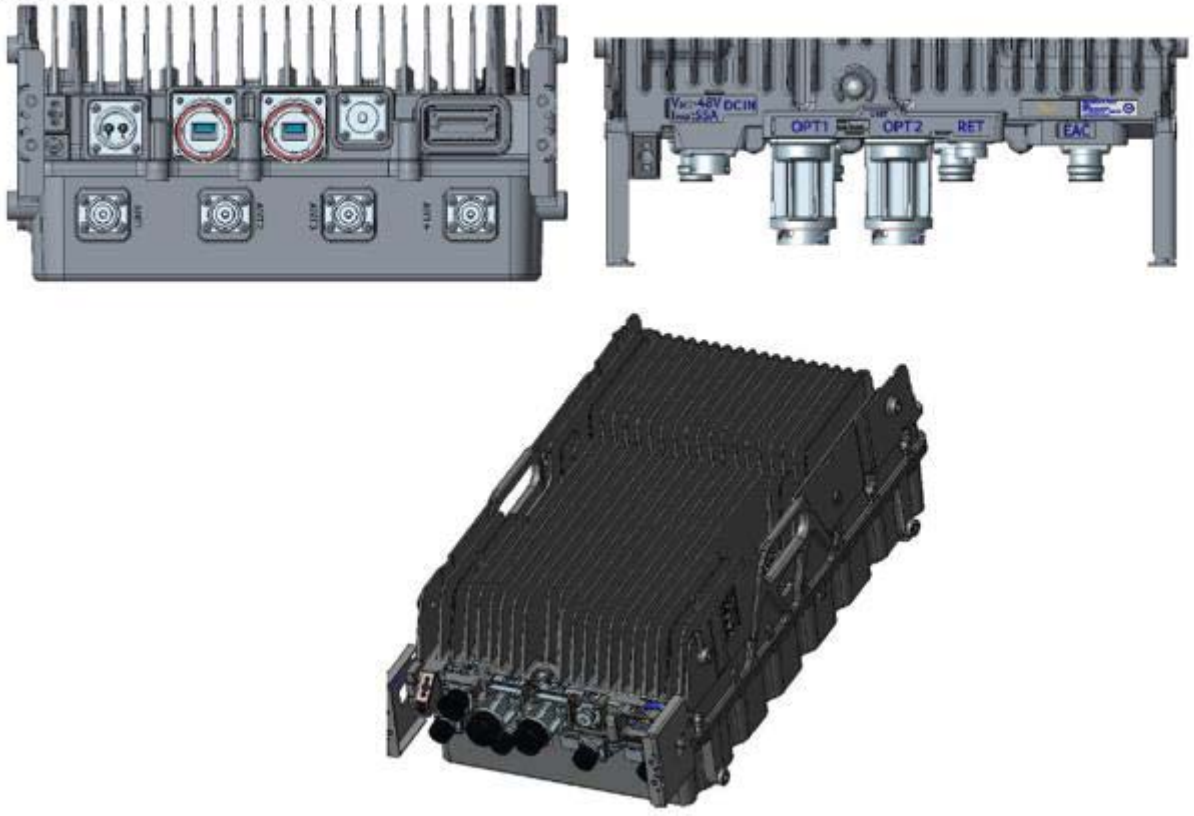
AHBCC Downlink Band Edge 5GNR Band n13 Frequency Channels

The 3GPP frequency band n5 (869-894 MHz) band edge downlink (BTS Transmit) ARFCNs for 5G NR channel bandwidths (5 and 10MHz) are provided below. The ARFCN is defined as Absolute Radio Frequency Channel Number.

| | Downlink ARFCN | Downlink Frequency (MHz) | 5G NR Channel Bandwidth | |
|---|---|---|---|---|
| | | | 5 MHz | 10 MHz |
| AHBCC Band n5 (Ant 1, 2, 3, 4) | 173800 | 869.0 | Band Edge | Band Edge |
| | …… | | | |
| | 174300 | 871.5 | Bottom Ch | |
| | …… | | | |
| | 174800 | 874.0 | | Bottom Ch |
| | …… | | | |
| | 174100 | 876.5 | | |
| | …… | | | |
| | 176300 | 881.5 | Middle Ch | Middle Ch |
| | …… | | | |
| | 177800 | 886.5 | | |
| | …… | | | |
| | 177800 | 889.0 | | Top Channel |
| | …… | | | |
| | 178300 | 891.5 | Top Channel | |
| | …… | | | |

# PRODUCT DESCRIPTION

AHBCC Connector Layout




EUT External Interfaces

| Name | Qty | Connector Type | Purpose (and Description) |
|---|---|---|---|
| DC In | 1 | Quick Disconnect | 2-pole Power Circular Connector |
| GND | 1 | Screw lug (2xM5/1xM8) | Ground |
| ANT | 4 | 4.3-10 | RF signal for Transmitter/Receiver (50 Ohm) |
| Unit | 1 | LED | Unit Status LED |
| EAC | 1 | MDR26 | External Alarm Interface (4 alarms) |
| OPT | 2 | SFP+ cage | Optical CPRI Interface up to 10 Gps. |
| RET | 1 | 8-pin circular connector conforming to IEC 60130-9 – Ed.3.0 | AISG 2.0 to external devices |
| Fan | 1 | Molex Microfit | Power for RRH Fan. Located on the side of RRH. |

**Testing Objective:**

A permissive change on the original filing is being pursued to add 5G NR (new radio) band n13 carriers along with 5G NR multicarrier functionality to the AirScale Base Transceiver Station Remote Radio Head Model AHBCC FCC and ISED radio certifications.

# CONFIGURATIONS

element
2018-07-17

**CONFIGURATION – NOKI0069-1**

| Software/Firmware Running during test | |
|---|---|
| **Description** | **Version** |
| Radio Module Software | RF.FRM5.23R3.20230719.003 |
| BTS Software Version: 23r3 | SBTS23R3_ENB_0000_000530 |

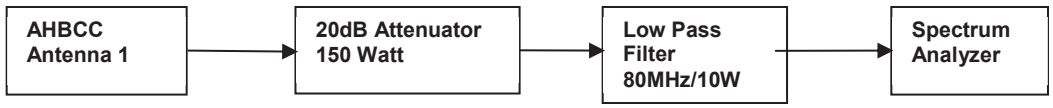
| Equipment being tested (include Peripherals) | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| AMIA (BTS System Module) | Nokia Solutions and Networks | 473098.204 | UK222201001 |
| ASIB (BTS System Module) | Nokia Solutions and Networks | 473764A.102 | L1224904439 |
| ABIO (BTS System Module) | Nokia Solutions and Networks | 475266A.103 | L1205105870 |
| ABIO (BTS System Module) | Nokia Solutions and Networks | 475266A.103H | DH223246457 |
| AHBCC (Radio Module Model) | Nokia Solutions and Networks | 474341A.101 | K9180332366 |
| Low Pass Filter 80MHz/10W | Mini-Circuits,Inc. | VLFX-80+ | RUU9571952 |
| Attenuator 150W/20dB | AeroflexWeinschel | 66-20-33 | BZ1165 |
| SFP+ 9.8G,300M,850NM | Finisar Corp. | 474900A | VF2023004CF |
| SFP+ 9.8G,300M,850NM | HG GENUINE | P306180 | KR17030010027 |
| SFP+ 9.8G,300M,850NM | FINISAR CORP. | 474900A | VF20180016Z |
| SFP+ 9.8G,300M,850NM | HG GENUINE | P306180 | KR16180020006 |
| Lenovo | HP | Thinkpad | PF26RVZ0 |
| Keysight- DC System power supply | HP | N8757A | US21D5054S |
| FPAD (DC-pwr supply) | Nokia | 472805A.101 | A9124600282 |
| 1 Meter RF cable | Huber+suhner | SUCOFLEX 104 | SN 551432 /4 |
| 6 Meter RF cable | Huber+suhner | SUCOFLEX 106 | SN 528837 /6 |
| 250W -50ohm -Terminating Load | API Weinschel inc | 1433-3-LIM | TC863 |
| 250W -50ohm -Terminating Load | API Weinschel inc | 1433-3-LIM | TC864 |
| 250W -50ohm -Terminating Load | API Weinschel inc | 1433-3-LIM | TC865 |
| Fiber Optic cable 3m | AMPHENOL Fiber | 995109C | E201648 |
| CAT5e data cable | BELKIN | #R7J304 | E178882 |
| CAT5e data cable | LEONI L | 64867m | 146180 |
| FYGB GPS receiver | Nokia | 472748A | 71231431 |
| Cat-5e cable | CSA | LL73189 | E151955 |
| 2 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297387 |
| 2 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297386 |
| 2 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297388 |

# CONFIGURATIONS

| Cables (Peripheral) | | | | | |
|---|---|---|---|---|---|
| **Description** | **Shield (Y/N)** | **Length (m)** | **Ferrite (Y/N)** | **Connection 1** | **Connection 2** |
| Fiber Optic cable 2 pc | N | 3 meters | N | ASIB | AHBCC |
| Cat-5e cable (CSA) | Y | 100 meters | N | ASIB | FYGB GPS receiver |
| Cat-5e cable | Y | 25 meters | N | ASIB | WebEM- PC |
| Times Microwave Systems | Y | 2 meters | N | EUT [RRH] Ant ports 2, 3, 4 | 40MHz/ 250W -50ohm -Load |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Description** | **Shield (Y/N)** | **Length (m)** | **Ferrite (Y/N)** | **Connection 1** | **Connection 2** |
| HS-SUCOFLEX_106 | Y | 6 meters | N | EUT [AHBCC] Ant port #1 | Attenuator 150W/20dB [BZ1165] |
| Attenuator 150W/40dB [BZ1165] | N | NA | N | RF cable HS-SUCOFLEX_106 | Low Pass Filter 80MHz/10W |
| Low Pass Filter 80MHz/10W | N | NA | N | Attenuator 150W/20dB [BZ21165] | RF cable HS-SUCOFLEX_104 |
| HS-SUCOFLEX_104 | Y | 1 meter | N | Low Pass Filter 80MHz/10W | Analyzer |

**RF Test Setup Diagram:**



# CONFIGURATIONS

**CONFIGURATION – NOKI0069-2**

| Software/Firmware Running during test | |
|---|---|
| **Description** | **Version** |
| Radio Module Software | RF.FRM5.23R3.20230719.003 |
| BTS Software Version: 23r3 | SBTS23R3_ENB_0000_000530 |

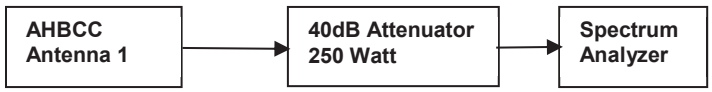
| Equipment being tested (include Peripherals) | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| AMIA (BTS System Module) | Nokia Solutions and Networks | 473098.204 | UK222201001 |
| ASIB (BTS System Module) | Nokia Solutions and Networks | 473764A.102 | L1224904439 |
| ABIO (BTS System Module) | Nokia Solutions and Networks | 475266A.103 | L1205105870 |
| ABIO (BTS System Module) | Nokia Solutions and Networks | 475266A.103 | DH223246457 |
| AHBCC (Radio Module Model) | Nokia Solutions and Networks | 474341A.101 | K9180332366 |
| Attenuator 250W/40dB | AeroflexWeinschel | 58-40-43 | UN619 |
| SFP+ 9.8G,300M,850NM | Finisar Corp. | 474900A | VF2023004CF |
| SFP+ 9.8G,300M,850NM | HG GENUINE | P306180 | KR17030010027 |
| SFP+ 9.8G,300M,850NM | FINISAR CORP. | 474900A | VF20180016Z |
| SFP+ 9.8G,300M,850NM | HG GENUINE | P306180 | KR16180020006 |
| Lenovo | HP | Thinkpad | PF26RVZ0 |
| Keysight- DC System power supply | HP | N8757A | US21D5054S |
| FPAD (DC-pwr supply) | Nokia | 472805A.101 | A9124600282 |
| 1 Meter RF cable | Huber+suhner | SUCOFLEX 104 | SN 551432 /4 |
| 6 Meter RF cable | Huber+suhner | SUCOFLEX 106 | SN 528837 /6 |
| 250W -50ohm -Terminating Load | API Weinschel inc | 1433-3-LIM | TC863 |
| 250W -50ohm -Terminating Load | API Weinschel inc | 1433-3-LIM | TC864 |
| 250W -50ohm -Terminating Load | API Weinschel inc | 1433-3-LIM | TC865 |
| Fiber Optic cable 3m | AMPHENOL Fiber | 995109C | E201648 |
| CAT5e data cable | BELKIN | #R7J304 | E178882 |
| CAT5e data cable | LEONI L | 64867m | 146180 |
| FYGB GPS receiver | Nokia | 472748A | 71231431 |
| Cat-5e cable | CSA | LL73189 | E151955 |
| 2 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297387 |
| 2 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297386 |
| 2 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297388 |

# CONFIGURATIONS

| Cables (Peripheral) | | | | | |
|---|---|---|---|---|---|
| **Description** | **Shield (Y/N)** | **Length (m)** | **Ferrite (Y/N)** | **Connection 1** | **Connection 2** |
| Fiber Optic cable 2 pc | N | 3 meters | N | ASIB | AHBCC |
| Cat-5e cable (CSA) | Y | 100 meters | N | ASIB | FYGB GPS receiver |
| Cat-5e cable | Y | 25 meters | N | ASIB | WebEM- PC |
| Times Microwave Systems | Y | 2 meters | N | EUT [RRH] Ant ports 2, 3, 4 | 250W -50ohm -Load |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Description** | **Shield (Y/N)** | **Length (m)** | **Ferrite (Y/N)** | **Connection 1** | **Connection 2** |
| HS-SUCOFLEX_106 | Y | 6 meters | N | EUT [AHBCC] Ant port #1 | Attenuator 250W/40dB |
| Attenuator 250W/40dB | N | NA | N | RF cable HS-SUCOFLEX_106 | HS-SUCOFLEX_104 |
| HS-SUCOFLEX_104 | Y | 1 meter | N | Attenuator 250W/40dB | Analyzer |

**RF Test Setup Diagram:**



# CONFIGURATIONS

**CONFIGURATION – NOKI0069-3**

| Software/Firmware Running during test | |
|---|---|
| **Description** | **Version** |
| Radio Module Software | RF.FRM5.23R3.20230719.003 |
| BTS Software Version: 23r3 | SBTS23R3_ENB_0000_000530 |

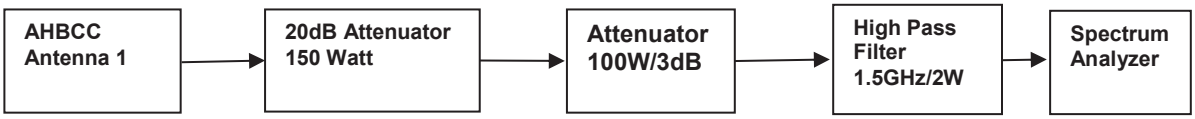
| Equipment being tested (include Peripherals) | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| AMIA (BTS System Module) | Nokia Solutions and Networks | 473098.204 | UK222201001 |
| ASIB (BTS System Module) | Nokia Solutions and Networks | 473764A.102 | L1224904439 |
| ABIO (BTS System Module) | Nokia Solutions and Networks | 475266A.103 | L1205105870 |
| ABIO (BTS System Module) | Nokia Solutions and Networks | 475266A.103H | DH223246457 |
| AHBCC (Radio Module Model) | Nokia Solutions and Networks | 474341A.101 | K9180332366 |
| High Pass Filter 1.5GHz/2W | Microwave Circuits, Inc. | H1G513G5 | SN 8015-01 DC0434 |
| Attenuator 100W/3dB | Weinschel Corp. | 24-3-43-LIM | BH5812 |
| Attenuator 150W/20dB | AeroflexWeinschel | 66-20-33 | BZ2075 |
| SFP+ 9.8G,300M,850NM | Finisar Corp. | 474900A | VF2023004CF |
| SFP+ 9.8G,300M,850NM | HG GENUINE | P306180 | KR17030010027 |
| SFP+ 9.8G,300M,850NM | FINISAR CORP. | 474900A | VF20180016Z |
| SFP+ 9.8G,300M,850NM | HG GENUINE | P306180 | KR16180020006 |
| Lenovo | HP | Thinkpad | PF26RVZ0 |
| Keysight- DC System power supply | HP | N8757A | US21D5054S |
| FPAD (DC-pwr supply) | Nokia | 472805A.101 | A9124600282 |
| 1 Meter RF cable | Huber+suhner | SUCOFLEX 104 | SN 551432 /4 |
| 6 Meter RF cable | Huber+suhner | SUCOFLEX 106 | SN 528837 /6 |
| 250W -50ohm -Terminating Load | API Weinschel inc | 1433-3-LIM | TC863 |
| 250W -50ohm -Terminating Load | API Weinschel inc | 1433-3-LIM | TC864 |
| 250W -50ohm -Terminating Load | API Weinschel inc | 1433-3-LIM | TC865 |
| Fiber Optic cable 3m | AMPHENOL Fiber | 995109C | E201648 |
| CAT5e data cable | BELKIN | #R7J304 | E178882 |
| CAT5e data cable | LEONI L | 64867m | 146180 |
| FYGB GPS receiver | Nokia | 472748A | 71231431 |
| Cat-5e cable | CSA | LL73189 | E151955 |
| 2 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297387 |
| 2 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297386 |
| 2 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297388 |

# CONFIGURATIONS

| Cables (Peripheral) | | | | | |
|---|---|---|---|---|---|
| **Description** | **Shield (Y/N)** | **Length (m)** | **Ferrite (Y/N)** | **Connection 1** | **Connection 2** |
| Fiber Optic cable 2 pc | N | 3 meters | N | ASIB | AHBCC |
| Cat-5e cable (CSA) | Y | 100 meters | N | ASIB | FYGB GPS receiver |
| Cat-5e cable | Y | 25 meters | N | ASIB | WebEM- PC |
| Times Microwave Systems | Y | 2 meters | N | EUT [RRH] Ant ports 2, 3, 4 | 250W -50ohm -Load |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Description** | **Shield (Y/N)** | **Length (m)** | **Ferrite (Y/N)** | **Connection 1** | **Connection 2** |
| HS-SUCOFLEX_106 | Y | 6 meters | N | EUT [AHBCC] RF port #1 | Attenuator 150W/20dB |
| Attenuator 150W/20dB | N | NA | N | HS-SUCOFLEX_106 | Attenuator 100W/3dB |
| Attenuator 100W/3dB | | | | Attenuator 150W/20dB | High Pass Filter 1.5GHz/2W |
| High Pass Filter 1.5GHz/2W | N | NA | N | Attenuator 100W/3dB | RF cable HS-SUCOFLEX_104 |
| HS-SUCOFLEX_104 | Y | 1 meter | N | High Pass Filter 1.5GHz/2W | Analyzer |

**RF Test Setup Diagram:**



# MODIFICATIONS

## Equipment Modifications

| Item | Date | Test | Modification | Note | Disposition of EUT |
|---|---|---|---|---|---|
| 1 | 2023-08-11 | Occupied Bandwidth | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 2 | 2023-08-11 | Average Power | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 3 | 2023-08-11 | Average Power - Multicarrier | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 4 | 2023-08-11 | Peak to Average Power (PAPR) CCDF | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 5 | 2023-08-11 | Power Spectral Density and EIRP Calculation | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 6 | 2023-08-15 | Band Edge Compliance | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 7 | 2023-08-15 | Band Edge Compliance - Multicarrier | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | Schedule testing was completed. |

# POWER SPECTRAL DENSITY AND EIRP CALCULATION

XMit 2023.02.14.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Block - DC | Fairview Microwave | SD3239 | ANE | 2023-02-16 | 2024-02-16 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2023-02-09 | 2024-02-09 |
| Generator - Signal | Agilent | N5173B | TIW | 2023-08-07 | 2026-08-07 |

**TEST DESCRIPTION**

The method of section 5.2.4.5 of ANSI C63.26 was used to make the measurement. The method uses trace averaging across ON and OFF times of EUT transmissions using the spectrum analyzer's RMS detector. Following the measurement, a duty cycle correction was applied by adding [10log(1/D)], where D is the duty cycle, to the measured power to compute the PSD during the transmit times.

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHBCC) as the original certification test. The AHBCC antenna ports are essentially electrically identical and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4. The total PSD of all antenna ports (at the radio output) were determined per ANSI C63.26-2015 paragraph 6.4.3.2.4. The EIRP calculations were based upon ANSI C63.26-2015 paragraph 6.4 for a four port MIMO

**FCC EIRP Requirements:**
**Part 27 subpart C 27.50**
27.50(b) The following power and antenna height limits apply to transmitters operating in the 746–758 MHz, 775–788 MHz and 805–806 MHz bands:
(4) Fixed and base stations transmitting a signal in the 746–757 MHz and 776–787 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP in accordance with Table 3 of this section.
(5) Fixed and base stations located in a 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, and transmitting a signal in the 746–757 MHz and 776–787 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section.

Note: EIRP = ERP + 2.15dB
1000 watts = 60.00 dBm, EIRP = (60 dBm + 2.15dB) /MHz = 62.15dBm/MHz or 1640W/MHz
2000 watts = 63.01 dBm, EIRP = (63 dBm + 2.15dB) /MHz = 65.16dBm/MHz or 3280W/MHz

**ISED EIRP Requirements:**
**RSS-130 Section 4.6.3**
4.6.3 Frequency bands **698-756 MHz** and **777-787 MHz**
The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.
For base and fixed equipment other than fixed subscriber equipment, refer to SRSP-518 for the e.i.r.p. limits.

**SRSP-518 section 5.1 Radiated power and antenna height limits for base stations**
21. For fixed and base stations transmitting in accordance with section 4, the maximum permissible equivalent isotropically radiated power (e.i.r.p.) is 1640 watts and 1640 watts/MHz for a channel bandwidth less than or equal to 1 MHz and greater than 1 MHz, respectively. These e.i.r.p. limits apply for stations with an antenna height above average terrain (HAAT) up to 305 metres.
22. Fixed and base stations located in geographical areas at a distance greater than 26 km from large or medium population centresand transmitting in accordance with section 4, may increase their e.i.r.p. up to a maximum of 3280 watts/MHz (i.e. no more than 3280 watts e.i.r.p. in any 1 MHz band segment), with an antenna HAAT up to 305 meters.

# POWER SPECTRAL DENSITY AND EIRP CALCULATION

TbtTx 2022.05.02.0 XMit 2023.02.14.0

| | | | | | |
|---|---|---|---|---|---|
| EUT: | AirScale Base Transceiver Station Remote Radio Head Model AHBCC | | | Work Order: | NOKI0069 |
| Serial Number: | See Configuration | | | Date: | 08/11/2023 |
| Customer: | Nokia Solutions and Networks | | | Temperature: | 21.7°C |
| Attendees: | Mitchell Hill | | | Humidity: | 53.3% |
| Project: | None | | | Barometric Pres.: | 1008 mbar |
| Tested by: | Brandon Hobbs | Power: | 54VDC | Job Site: | TX07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 27:2023 | ANSI C63.26:2015 |
| RSS-130 Issue 2:2019 | ANSI C63.26:2015 |

**COMMENTS**

All losses in the measurement path were accounted for: attenuators, cables, DC block and filter when in use. Band n13 carriers are enabled at maximum power (40 watts/carrier). The following is the power spectral density (PSD) measurements at the radio output ports. The PSD was measured for a single carrier on port 1. The total PSD for multiport (2x2 MIMO & 4x4 MIMO) operation was determinded based upon ANSI 63.26 clause 6.4.3.2.4 (10 Log Nout). The total PSD for two port operation is single port PSD +3dB [i.e. 10 Log(2)]. The total PSD for four port operation is single port PSD +6dB [i.e. 10

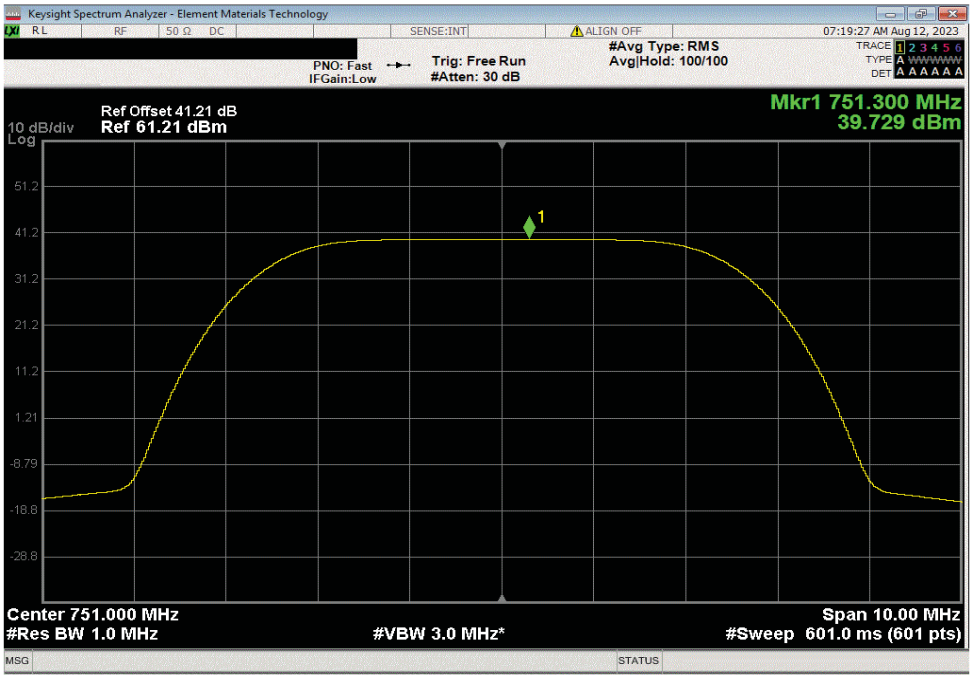
**DEVIATIONS FROM TEST STANDARD**

None

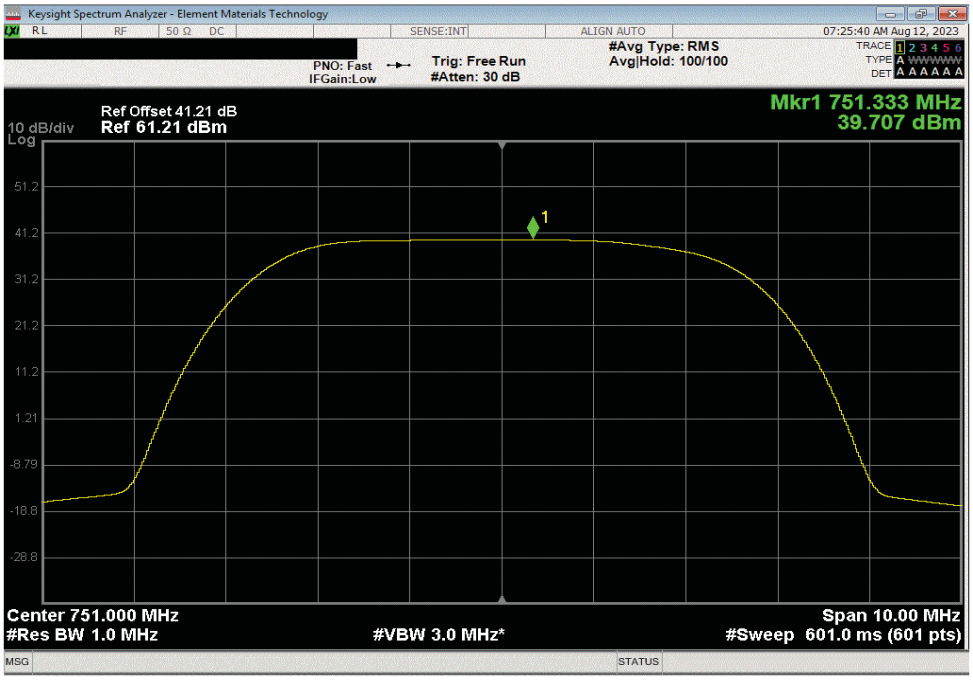
| Configuration # | NOKI0069-2 | Signature |
|---|---|---|

| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD |
|---|---|---|---|---|---|
| Port 1 | | | | | |
| Band n13, 746 - 756 MHz | | | | | |
| 5 MHz Bandwidth | | | | | |
| QPSK Modulation | | | | | |
| Mid Channel, 751 MHz | 39.729 | 0 | 39.7 | 42.7 | 45.7 |
| 16QAM Modulation | | | | | |
| Mid Channel, 751 MHz | 39.707 | 0 | 39.7 | 42.7 | 45.7 |
| 64QAM Modulation | | | | | |
| Mid Channel, 751 MHz | 39.751 | 0 | 39.8 | 42.8 | 45.8 |
| 256QAM Modulation | | | | | |
| Low Channel, 748.5 MI | 39.746 | 0 | 39.7 | 42.7 | 45.7 |
| Mid Channel, 751 MHz | 39.755 | 0 | 39.8 | 42.8 | 45.8 |
| High Channel, 753.5 M | 39.699 | 0 | 39.7 | 42.7 | 45.7 |
| 10 MHz Bandwidth | | | | | |
| QPSK Modulation | | | | | |
| Mid Channel, 751 MHz | 36.509 | 0 | 36.5 | 39.5 | 42.5 |
| 16QAM Modulation | | | | | |
| Mid Channel, 751 MHz | 37.159 | 0 | 37.2 | 40.2 | 43.2 |
| 64QAM Modulation | | | | | |
| Mid Channel, 751 MHz | 36.51 | 0 | 36.5 | 39.5 | 42.5 |
| 256QAM Modulation | | | | | |
| Mid Channel, 751 MHz | 36.533 | 0 | 36.5 | 39.5 | 42.5 |

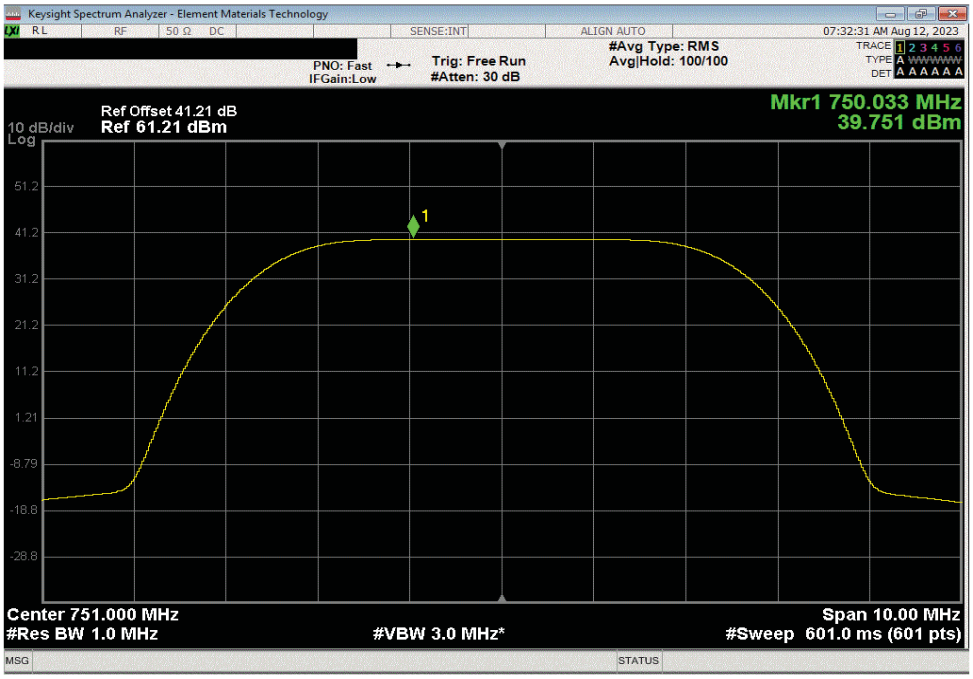
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 39.729 | 0 | 39.729 | 42.729 | 45.729 | |



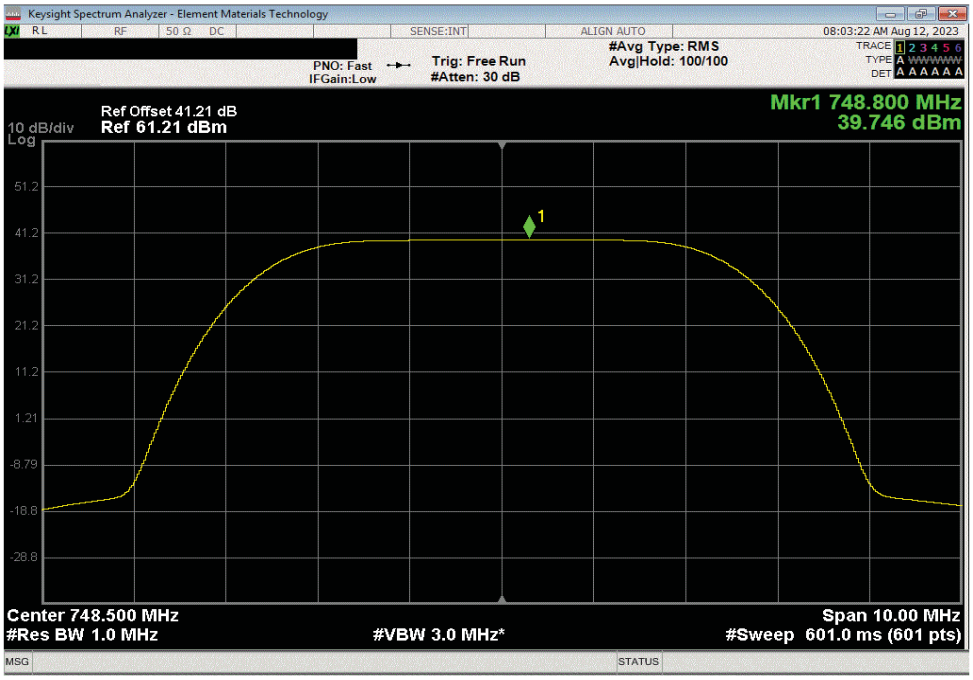

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 39.707 | 0 | 39.707 | 42.707 | 45.707 | |



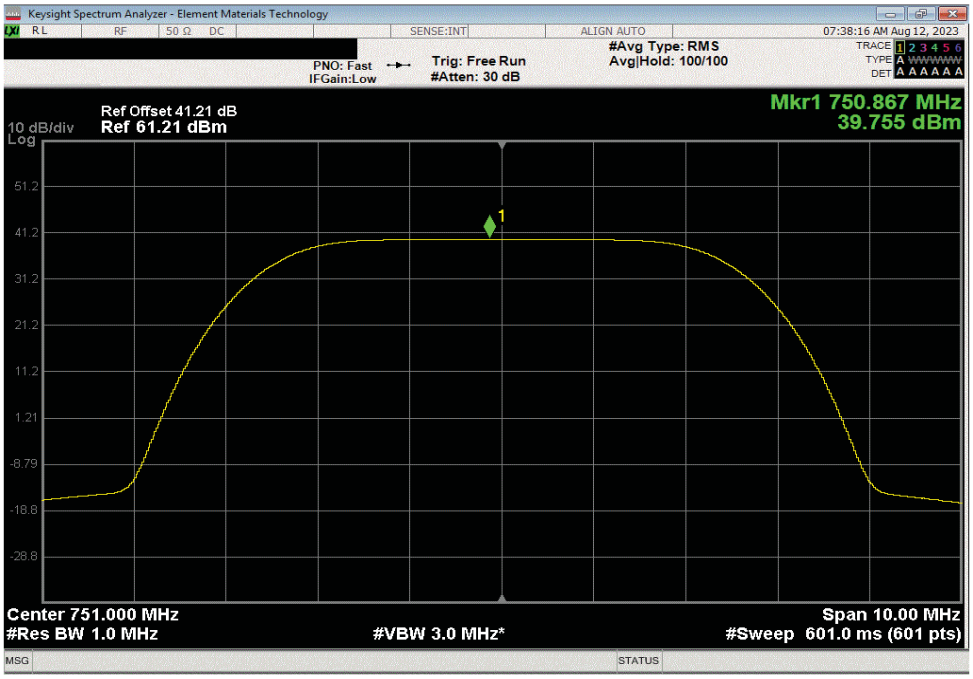
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 39.751 | 0 | 39.751 | 42.751 | 45.751 | |



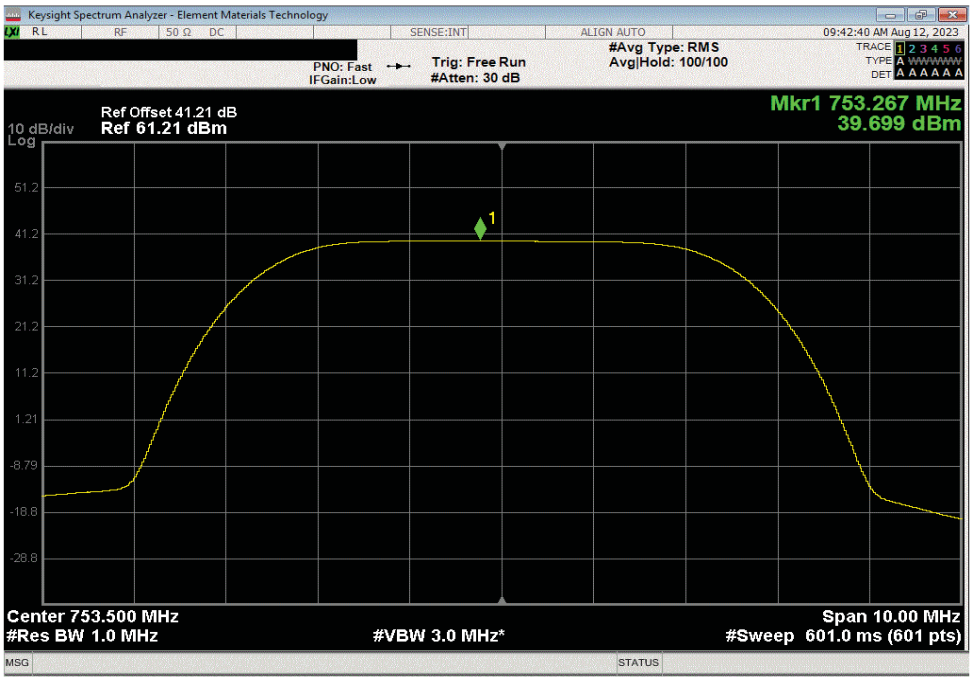

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 748.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 39.746 | 0 | 39.746 | 42.746 | 45.746 | |



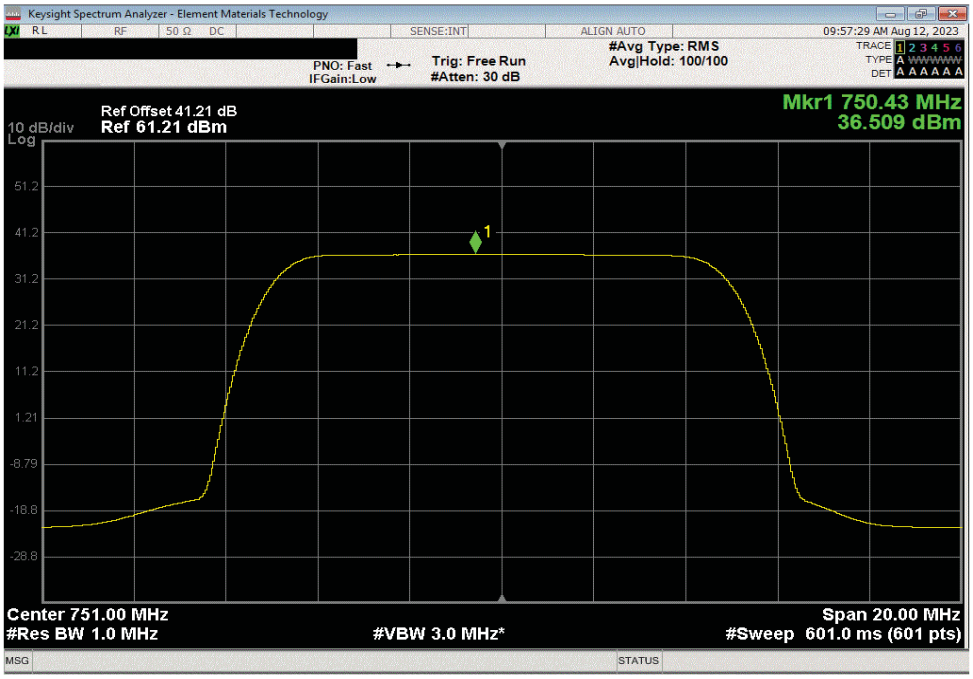
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 39.755 | 0 | 39.755 | 42.755 | 45.755 | |



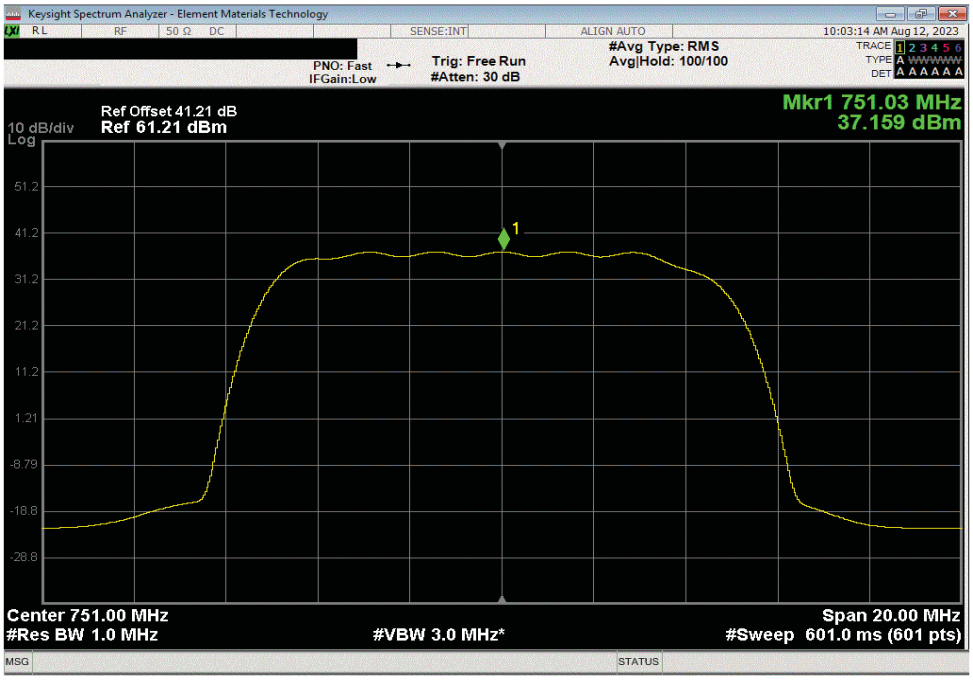

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 39.699 | 0 | 39.699 | 42.699 | 45.699 | |



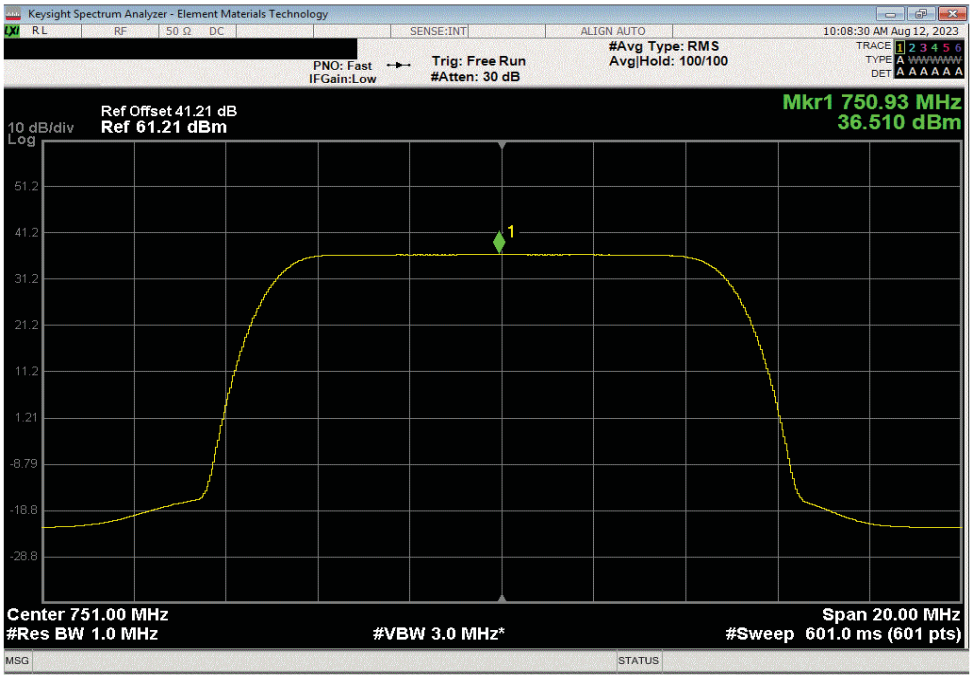
| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, QPSK Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 36.509 | 0 | 36.509 | 39.509 | 42.509 | |



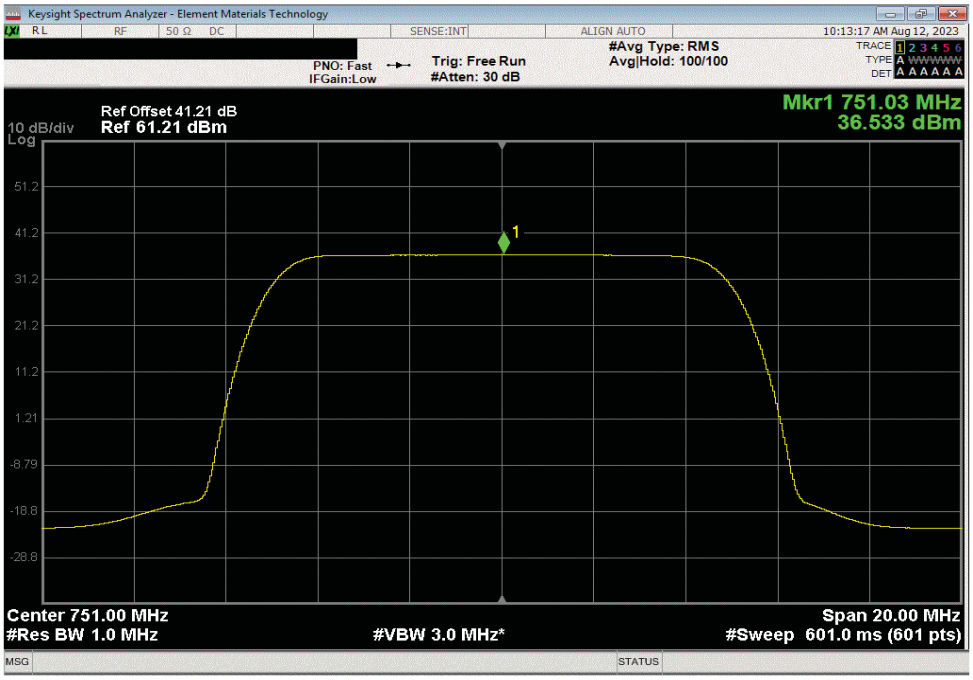

| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 16QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 37.159 | 0 | 37.159 | 40.159 | 43.159 | |



| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 64QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 36.51 | 0 | 36.51 | 39.51 | 42.51 | |




| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/MHz == PSD | Two Port (2x2 MIMO) dBm/MHz == PSD | Four Port (4x4 MIMO) dBm/MHz == PSD | |
| | 36.533 | 0 | 36.533 | 39.533 | 42.533 | |



**EIRP Calculations for Four Port MIMO Operations for Band n13 Single NR Carriers**

EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements. Each cell site installation needs to consider the power measurements in the radio certification report as well as site specific regulatory requirements (such as antenna height, population density, etc.), site installation parameters (line loss between antenna and radio, antenna parameters, etc.) and base station operational parameters (MIMO operational setup, carrier power level, channel bandwidth, modulation type, etc.) to optimize performance. Transmitter output power may be reduced (from maximum) by base station setup parameters. Base station antennas are selected by the customer.

The base station antenna is selected by the customer and this EIRP calculation is based upon a sample worst case antenna. The EIRP calculation is based upon CommScope antenna assembly model "FF-65C-R1". The maximum Band n13 gain (15.8dBi) for this antenna was used for the EIRP calculation. This antenna assembly has a pair of ±45° cross-polarized radiators used for Band n13. The four antenna RF inputs on the antenna assembly are labeled as R1 +45°, R1 -45°, R2 +45° and R2 -45°. The four AHBCC transmitter outputs are connected to the antenna assembly RF inputs.

Equivalent Isotropically Radiated Power (EIRP) is calculated (as specified in ANSI C63.26-2015 section 6.4 for uncorrelated output signals) from the results of power measurements (highest measured PSD for each channel bandwidth type). The maximum antenna gain was used for this calculation. The cable loss between the antenna and transmitter is site dependent (will not be 0 dB) but for this worst case EIRP calculation 0 dB was used. Calculations of worst-case EIRP for four port MIMO are as follows:

| Parameter | 5 MHz Ch BW | 10 MHz Ch BW |
|---|---|---|
| Worst Case PSD/Antenna Port | 39.8dBm/MHz | 37.2dBm/MHz |
| Number of Ant Ports per Polarization | 2 | 2 |
| Total PSD per Polarization 10*Log (2) = +3 | 42.8 | 40.2 |
| Cable Loss (site dependent) | 0 dB | 0dB |
| Dir Gain = Maximum Antenna Gain (GAnt) See Note 1 | 15.8 dBi | 15.8 dBi |
| EIRP per Polarization | 58.6dBm/MHz | 56.0dBm/MHz |
| Number of Polarizations | 2 | 2 |
| EIRP Total = R1 ±45°and R2 ±45° See Note 2 | 58.6dBm/MHz | 56.0dBm/MHz |
| Passing FCC and ISED EIRP Limits | 62.15 & 65.16 dBm/MHz | 62.15 & 65.16 dBm/MHz |

**Note 1**: The directional gain is equal to antenna gain since the transmit signals are completely uncorrelated. See ANSI C63.26 sections 6.4.5.2.3b) and 6.4.5.3.1b) for guidance.
**Note 2**: The EIRP per antenna polarity is required to be below the regulatory limit as described in ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the two transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).

**EIRP Calculation Summary**

The worst case AHBCC four port MIMO Band n13 EIRP levels using antenna assembly model "FF-65C-R1" are:
(1) Less than the FCC and ISED (3280 W/MHz or 65.16 dBm/MHz) EIRP Regulatory Limits for 5 and 10MHz channel bandwidths.
(2) Less than the FCC and ISED (1640 W/MHz or 62.15 dBm/MHz) EIRP Regulatory Limits for 5 and 10MHz channel bandwidths.

# OCCUPIED BANDWIDTH

XMit 2023.02.14.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Block - DC | Fairview Microwave | SD3239 | ANE | 2023-02-16 | 2024-02-16 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2023-02-09 | 2024-02-09 |
| Generator - Signal | Agilent | N5173B | TIW | 2023-08-07 | 2026-08-07 |

**TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The method in section 5.4 of ANSI C63.26 was used to make this measurement. The spectrum analyzer settings were as follows:

- RBW is 1% - 5% of the occupied bandwidth
- VBW is ≥ 3x the RBW
- Peak Detector was used
- Trace max hold was used

RF conducted emissions testing was performed only on one port. The AHBCC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown during output power testing on the original certification effort) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, 6.4.

A plot was taken to show the occupied bandwidth is contained within the allowable transmit band. FCC 27.53 defines the emission bandwidth to be used as 26dB down. RSS Gen Section 6.6 defines the 99% emission bandwidth requirement.

The occupied bandwidth was measured with the EUT configured in the modes called out in the data sheets.

Band n13 (746 MHz to 756 MHz) Emission Designators derived from the measurement results

| FCC and ISED Emission Designators for Band n13 (746MHz to 756MHz) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ch BW | Radio Channel | 5G-NR: QPSK | | 5G-NR: 16QAM | | 5G-NR: 64QAM | | 5G-NR: 256QAM | |
| | | FCC | ISED | FCC | ISED | FCC | ISED | FCC | ISED |
| 5MHz | Low | | | | | | | 4M85G7W | 4M50G7W |
| | Mid | 4M85G7W | 4M48G7W | 4M83G7W | 4M51G7W | 4M85G7W | 4M47G7W | 4M83G7W | 4M48G7W |
| | High | | | | | | | 4M83G7W | 4M48G7W |
| 10MHz | | | | | | | | | |
| | Mid | 9M88G7W | 9M29G7W | 9M82G7W | 9M22G7W | 9M87G7W | 9M29G7W | 9M89G7W | 9M32G7W |
| | | | | | | | | | |
| Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth. | | | | | | | | | |

# OCCUPIED BANDWIDTH

TbtTx 2022.06.03.0 XMit 2023.02.14.0

| | | | | | |
|---|---|---|---|---|---|
| EUT: | AirScale Base Transceiver Station Remote Radio Head Model AHBCC | | | Work Order: | NOKI0069 |
| Serial Number: | See Configuration | | | Date: | 08/11/2023 |
| Customer: | Nokia Solutions and Networks | | | Temperature: | 21.6°C |
| Attendees: | Mitchell Hill | | | Humidity: | 55.2% |
| Project: | None | | | Barometric Pres.: | 1008 mbar |
| Tested by: | Brandon Hobbs | Power: | 54VDC | Job Site: | TX07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 27:2023 | ANSI C63.26:2015 |
| RSS-130 Issue 2:2019 | ANSI C63.26:2015 |

**COMMENTS**

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n13 carriers are enabled at maximum power (40 Watts/carrier).

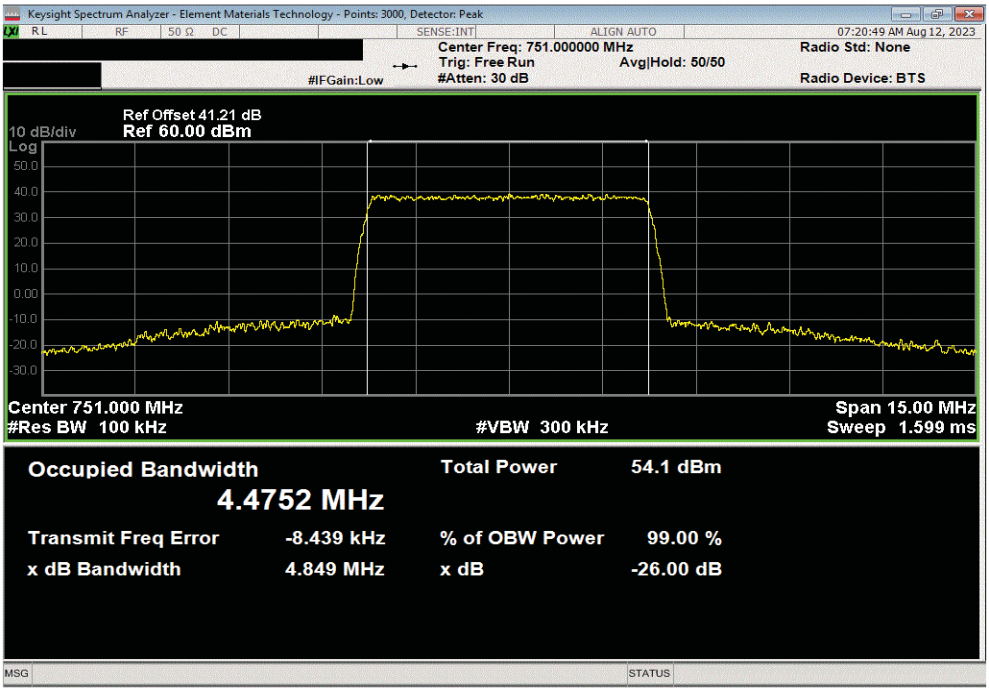
**DEVIATIONS FROM TEST STANDARD**

None

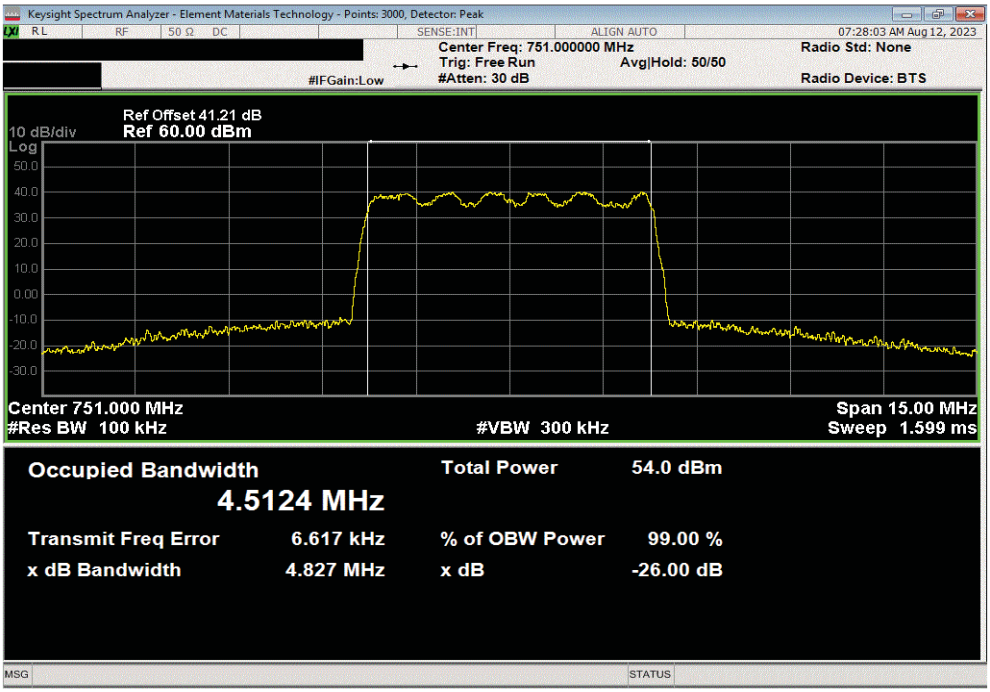
| Configuration # | NOKI0069-2 | Signature |
|---|---|---|

| | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
|---|---|---|---|---|
| Port 1 | | | | |
| Band n13, 746 - 756 MHz | | | | |
| 5 MHz Bandwidth | | | | |
| QPSK Modulation | | | | |
| Mid Channel, 751 MHz | 4.48 | 4.85 | Within Band | Pass |
| 16QAM Modulation | | | | |
| Mid Channel, 751 MHz | 4.51 | 4.83 | Within Band | Pass |
| 64QAM Modulation | | | | |
| Mid Channel, 751 MHz | 4.47 | 4.85 | Within Band | Pass |
| 256QAM Modulation | | | | |
| Low Channel, 748.5 MHz | 4.50 | 4.85 | Within Band | Pass |
| Mid Channel, 751 MHz | 4.48 | 4.83 | Within Band | Pass |
| High Channel, 753.5 MHz | 4.48 | 4.83 | Within Band | Pass |
| 10 MHz Bandwidth | | | | |
| QPSK Modulation | | | | |
| Mid Channel, 751 MHz | 9.29 | 9.88 | Within Band | Pass |
| 16QAM Modulation | | | | |
| Mid Channel, 751 MHz | 9.22 | 9.82 | Within Band | Pass |
| 64QAM Modulation | | | | |
| Mid Channel, 751 MHz | 9.29 | 9.87 | Within Band | Pass |
| 256QAM Modulation | | | | |
| Mid Channel, 751 MHz | 9.32 | 9.89 | Within Band | Pass |

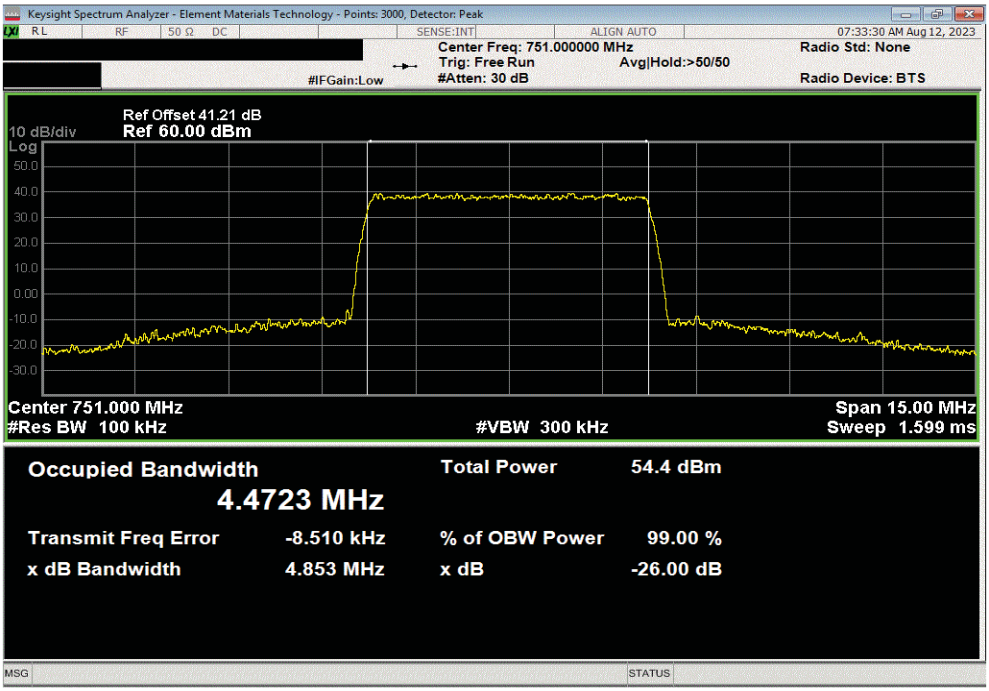
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 4.475 | 4.849 | Within Band | Pass |



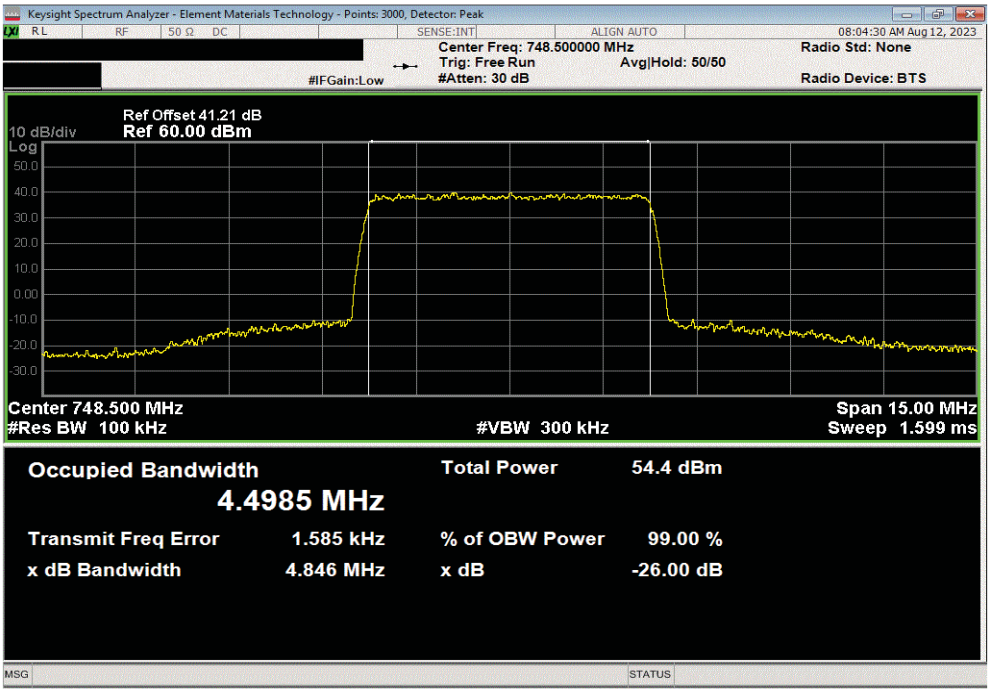

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 4.512 | 4.827 | Within Band | Pass |



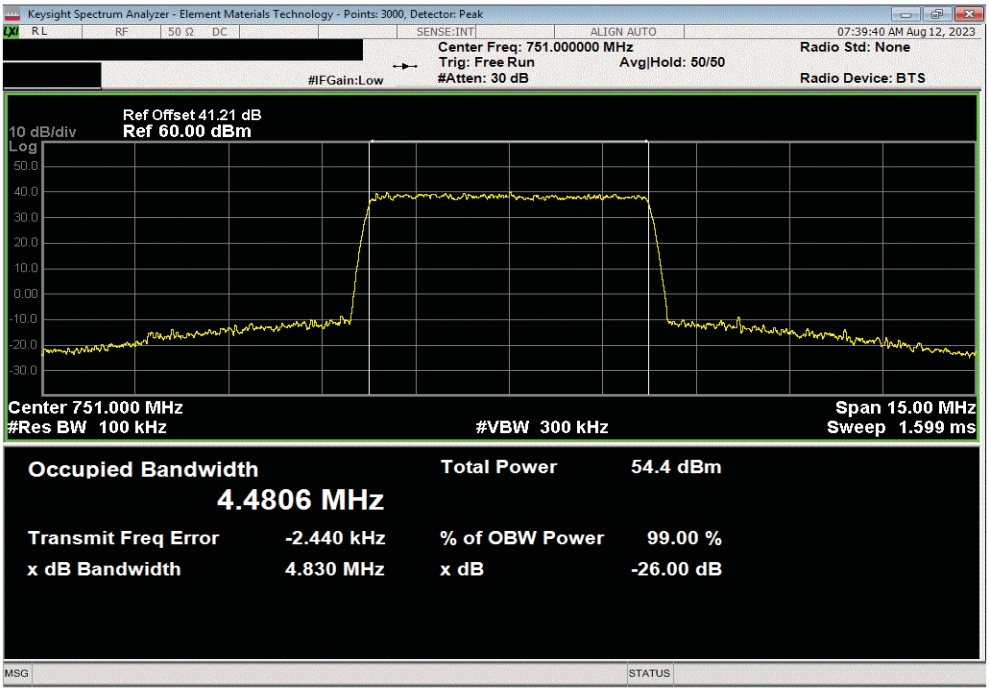
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 4.472 | 4.853 | Within Band | Pass |



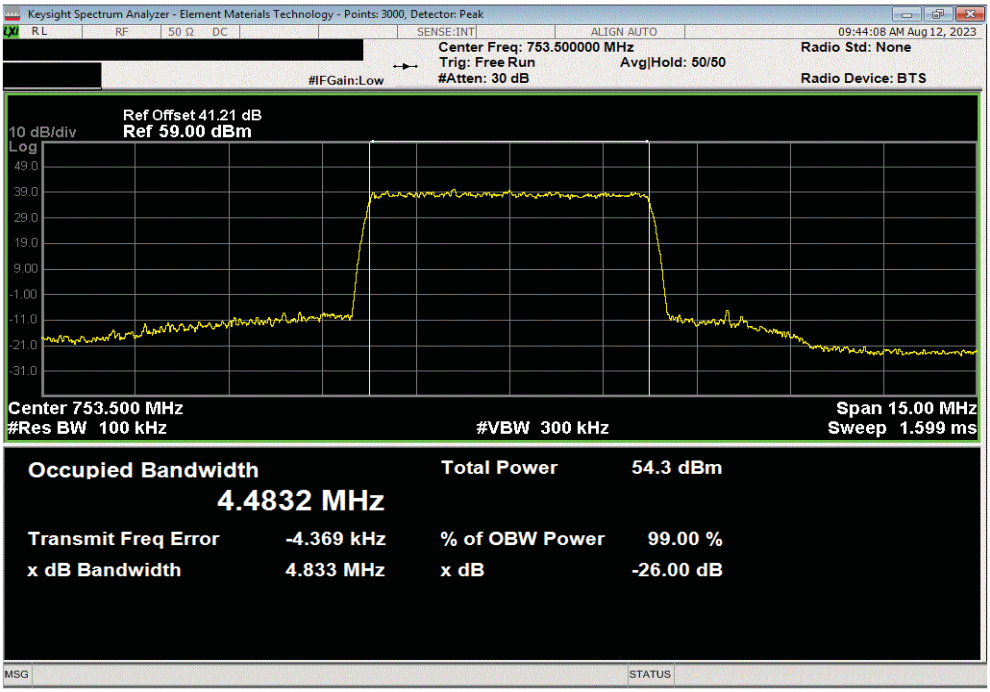

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 748.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 4.498 | 4.846 | Within Band | Pass |



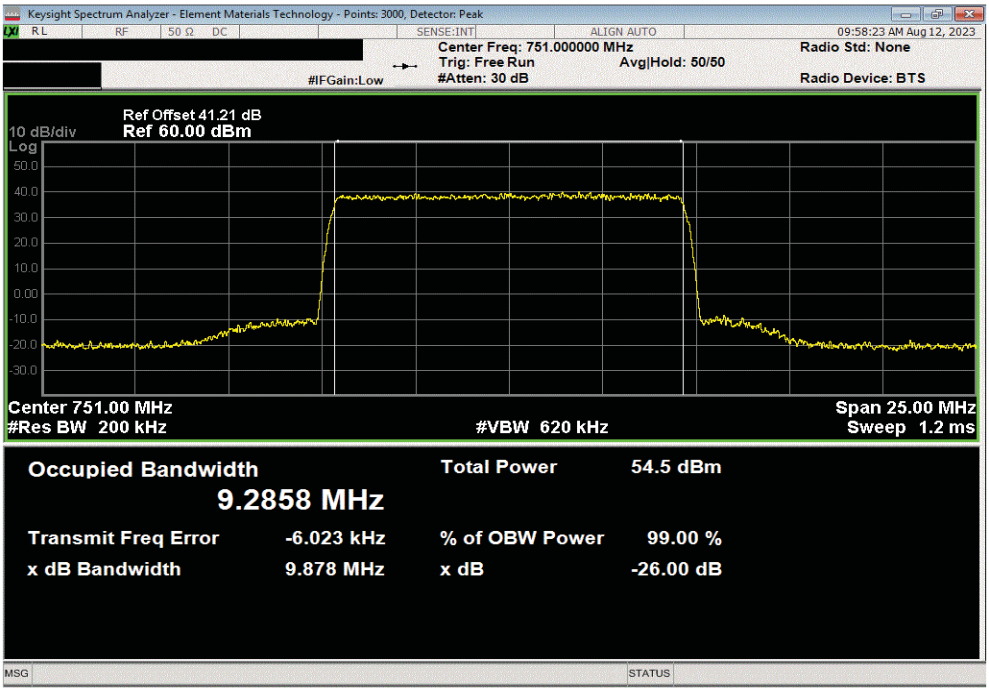
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 4.481 | 4.83 | Within Band | Pass |



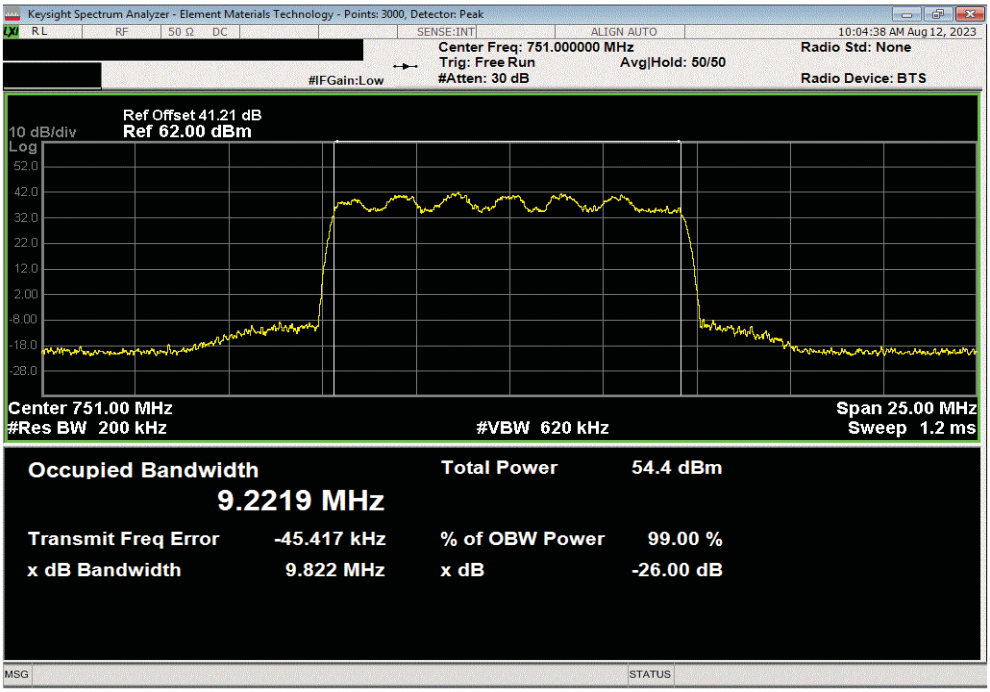

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 4.483 | 4.833 | Within Band | Pass |



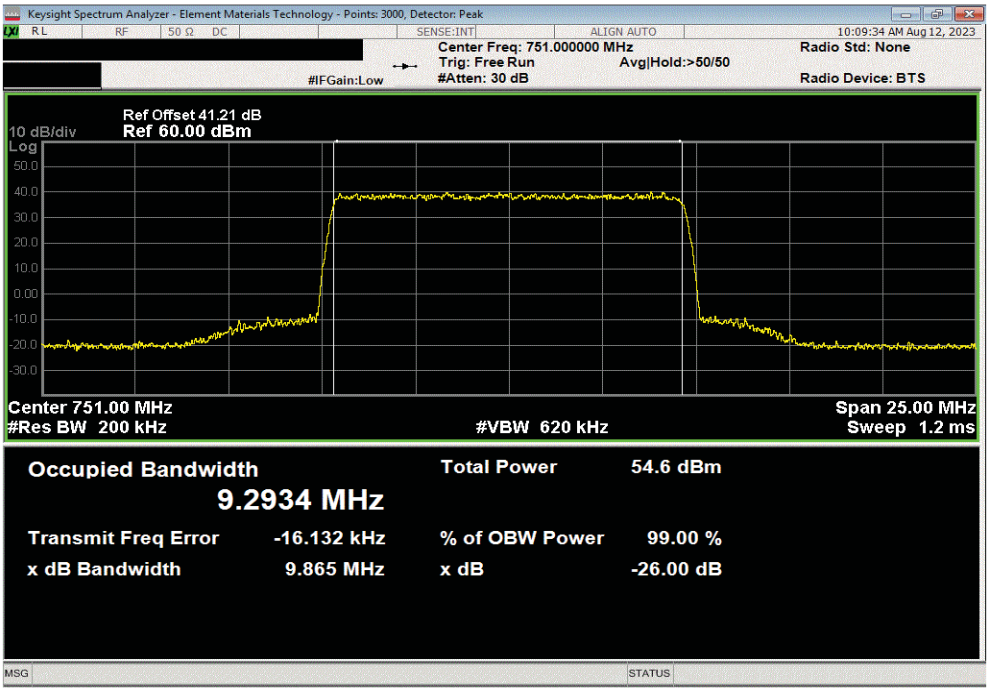
| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, QPSK Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 9.286 | 9.878 | Within Band | Pass |



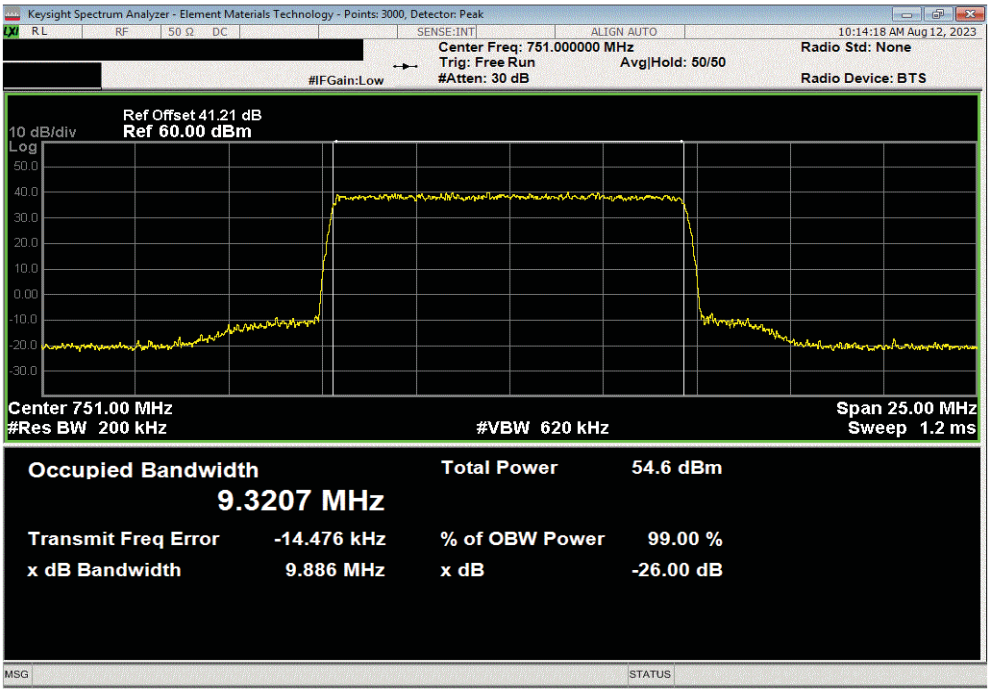

| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 16QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 9.222 | 9.822 | Within Band | Pass |



| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 64QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 9.293 | 9.865 | Within Band | Pass |




| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| | | | 9.321 | 9.886 | Within Band | Pass |



# AVERAGE POWER

XMit 2023.02.14.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Block - DC | Fairview Microwave | SD3239 | ANE | 2023-02-16 | 2024-02-16 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2023-02-09 | 2024-02-09 |
| Generator - Signal | Agilent | N5173B | TIW | 2023-08-07 | 2026-08-07 |

**TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

The method in section 5.2.4.4 of ANSI C63.26 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement, a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

RF conducted emissions testing was performed only on one port. The AHBCC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in original certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

# AVERAGE POWER

TbtTx 2022.05.02.0 XMit 2023.02.14.0

| | | | | | |
|---|---|---|---|---|---|
| EUT: | AirScale Base Transceiver Station Remote Radio Head Model AHBCC | | | Work Order: | NOKI0069 |
| Serial Number: | See Configuration | | | Date: | 08/11/2023 |
| Customer: | Nokia Solutions and Networks | | | Temperature: | 21.8°C |
| Attendees: | Mitchell Hill | | | Humidity: | 53.8% |
| Project: | None | | | Barometric Pres.: | 1008 mbar |
| Tested by: | Brandon Hobbs | Power: | 54VDC | Job Site: | TX07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 27:2023 | ANSI C63.26:2015 |
| RSS-130 Issue 2:2019 | ANSI C63.26:2015 |

**COMMENTS**

The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port + 6db [i.e. 10log(4)]. All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. Band n13 carriers are enabled at maximum power (40 watts/carrier).

**DEVIATIONS FROM TEST STANDARD**

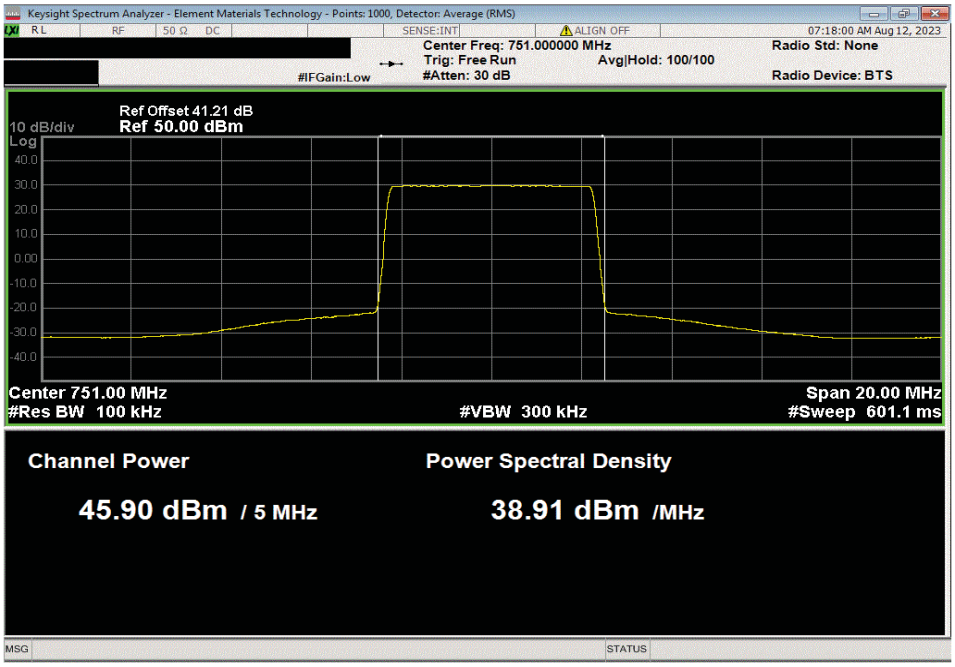
None

| Configuration # | NOKI0069-2 | Signature |
|---|---|---|

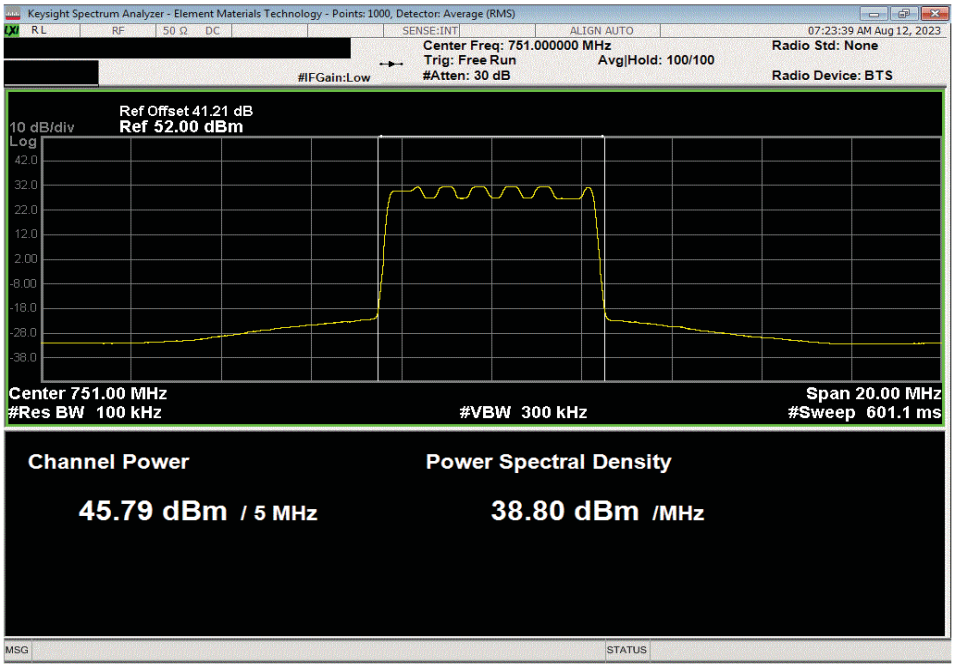
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
|---|---|---|---|---|---|---|
| Port 1 | | | | | | |
| Band n13, 746 - 756 MHz | | | | | | |
| 5 MHz Bandwidth | | | | | | |
| QPSK Modulation | | | | | | |
| Mid Channel, 751 MHz | 45.903 | 0 | 45.9 | 48.9 | 51.9 | Pass |
| 16QAM Modulation | | | | | | |
| Mid Channel, 751 MHz | 45.793 | 0 | 45.8 | 48.8 | 51.8 | Pass |
| 64QAM Modulation | | | | | | |
| Mid Channel, 751 MHz | 46.022 | 0 | 46.0 | 49.0 | 52.0 | Pass |
| 256QAM Modulation | | | | | | |
| Low Channel, 748.5 MHz | 45.986 | 0 | 46.0 | 49.0 | 52.0 | Pass |
| Mid Channel, 751 MHz | 45.990 | 0 | 46.0 | 49.0 | 52.0 | Pass |
| High Channel, 753.5 MHz | 45.775 | 0 | 45.8 | 48.8 | 51.8 | Pass |
| 10 MHz Bandwidth | | | | | | |
| QPSK Modulation | | | | | | |
| Mid Channel, 751 MHz | 45.899 | 0 | 45.9 | 48.9 | 51.9 | Pass |
| 16QAM Modulation | | | | | | |
| Mid Channel, 751 MHz | 45.767 | 0 | 45.8 | 48.8 | 51.8 | Pass |
| 64QAM Modulation | | | | | | |
| Mid Channel, 751 MHz | 45.855 | 0 | 45.9 | 48.9 | 51.9 | Pass |
| 256QAM Modulation | | | | | | |
| Mid Channel, 751 MHz | 45.867 | 0 | 45.9 | 48.9 | 51.9 | Pass |

# AVERAGE POWER

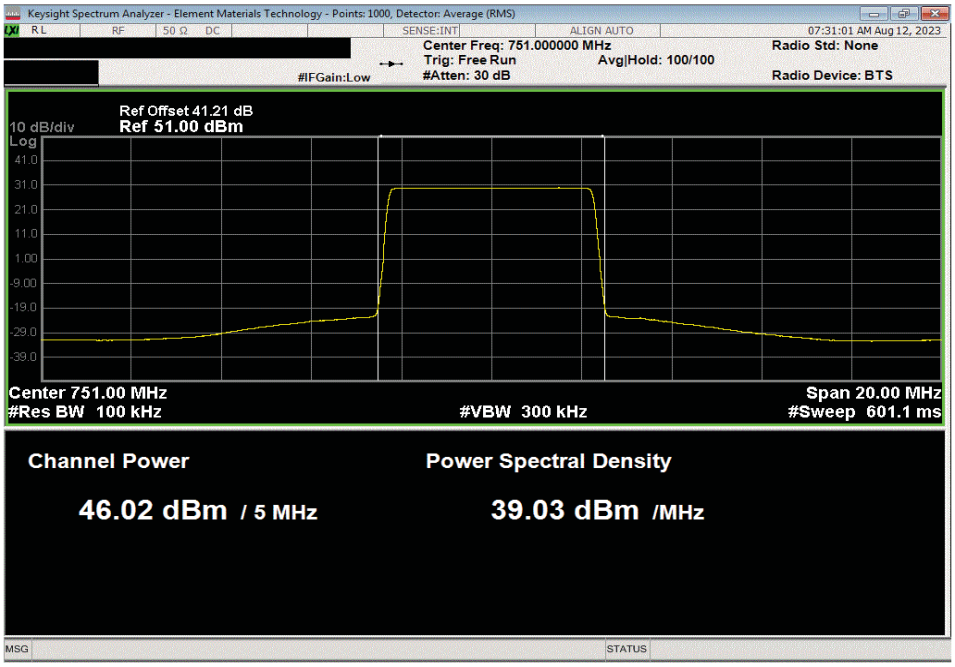
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 45.903 | 0 | 45.903 | 48.903 | 51.903 | Pass |



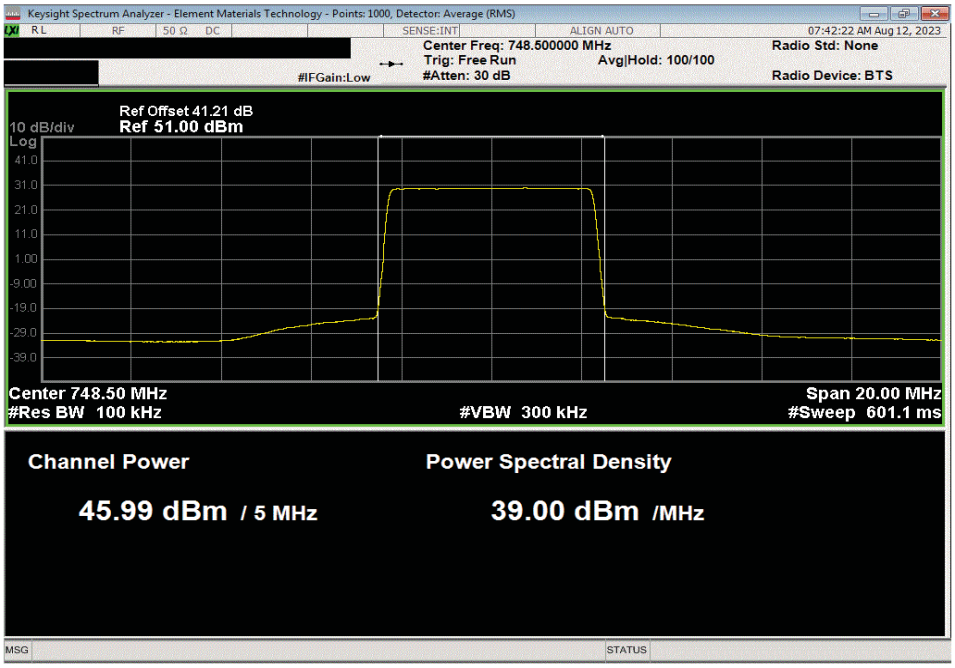

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 45.793 | 0 | 45.793 | 48.793 | 51.793 | Pass |



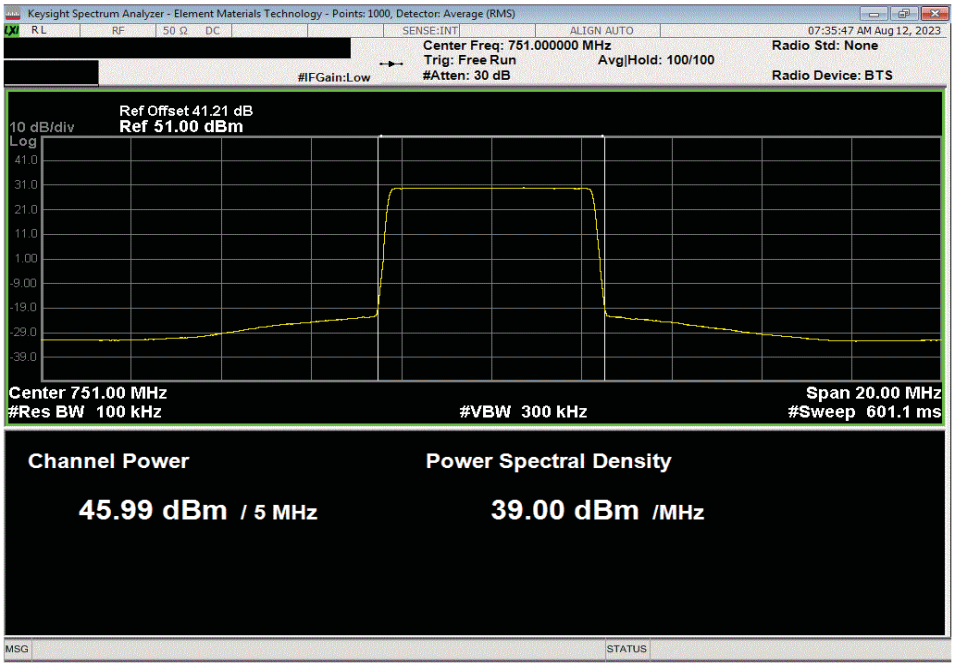
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 46.022 | 0 | 46.022 | 49.022 | 52.022 | Pass |



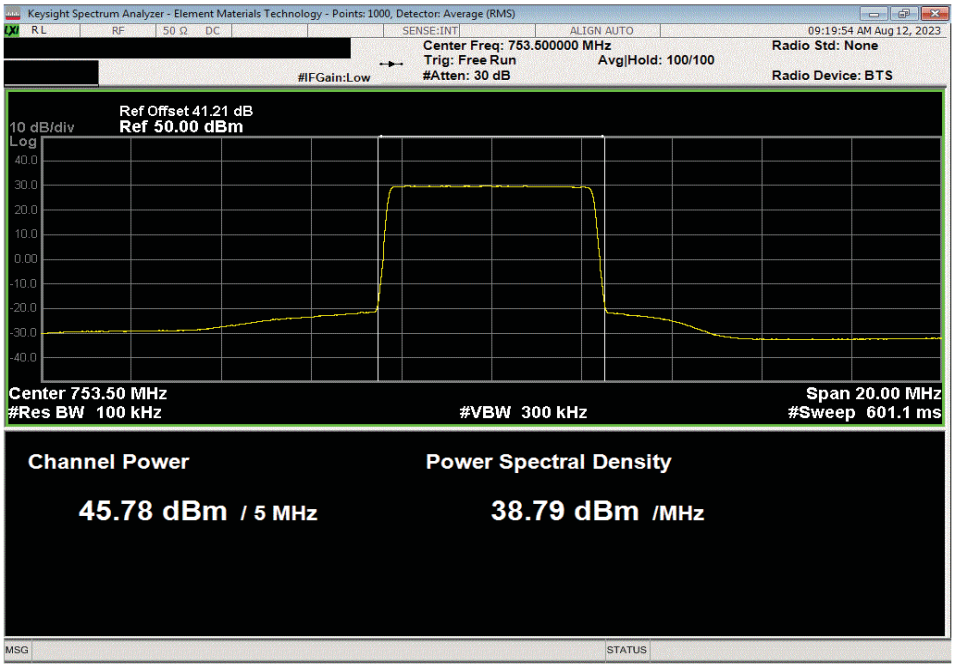

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 748.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 45.986 | 0 | 45.986 | 48.986 | 51.986 | Pass |



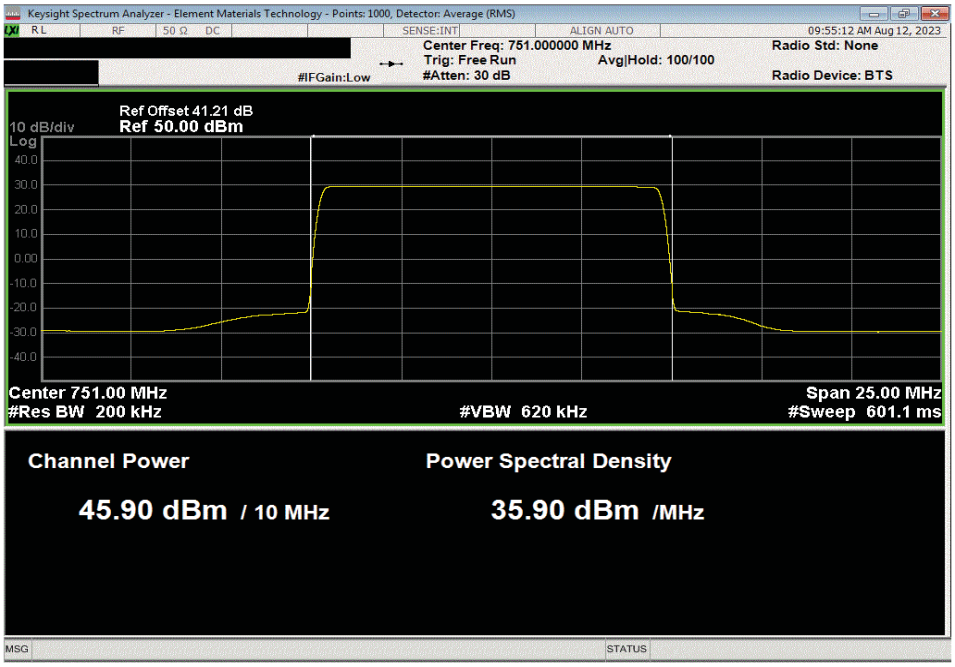
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 45.99 | 0 | 45.99 | 48.99 | 51.99 | Pass |



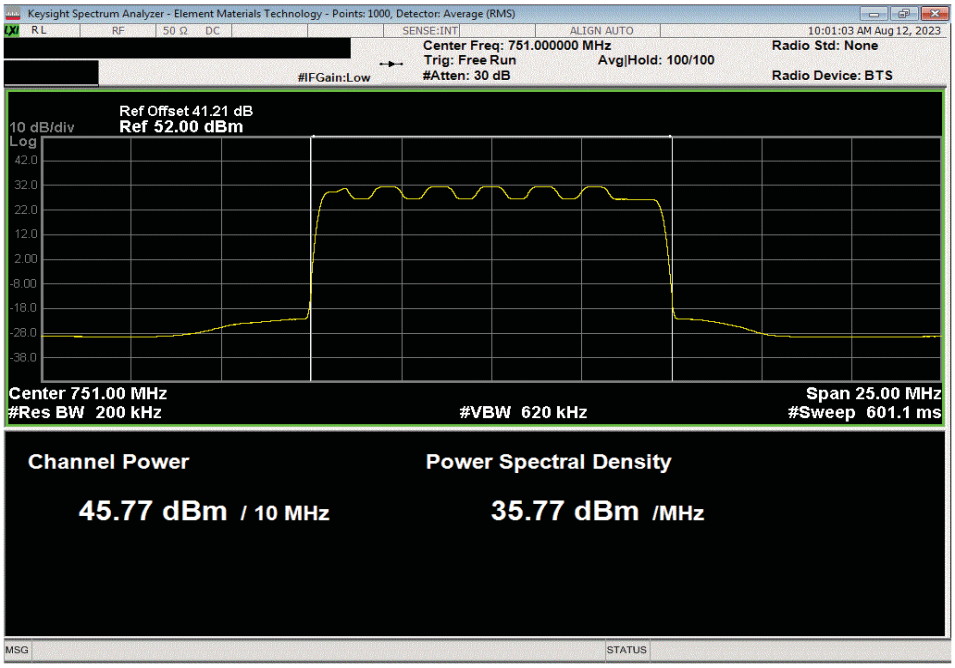

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 45.775 | 0 | 45.775 | 48.775 | 51.775 | Pass |



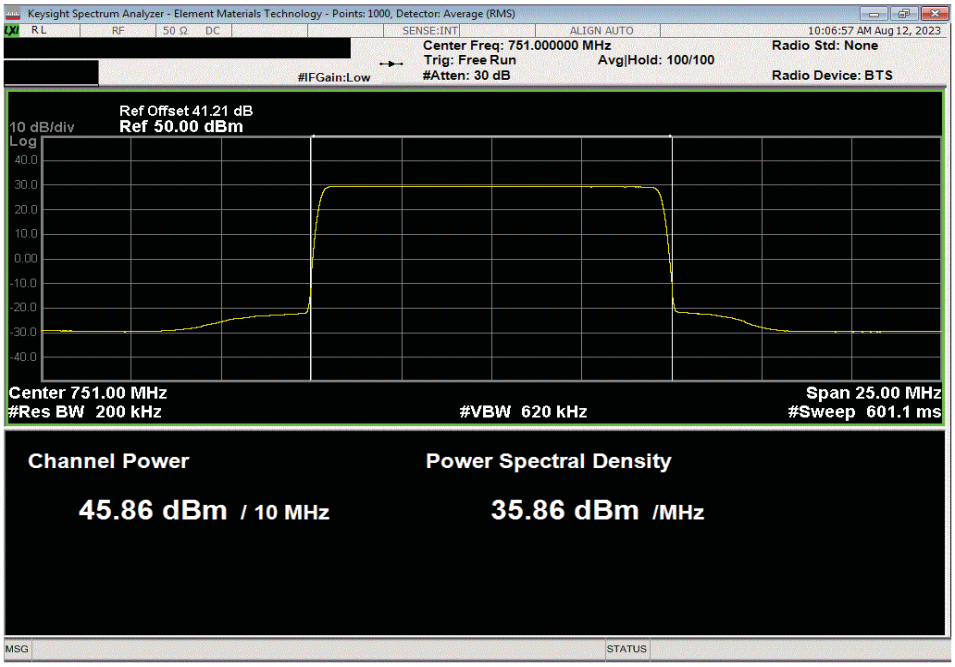
| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, QPSK Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 45.899 | 0 | 45.899 | 48.899 | 51.899 | Pass |



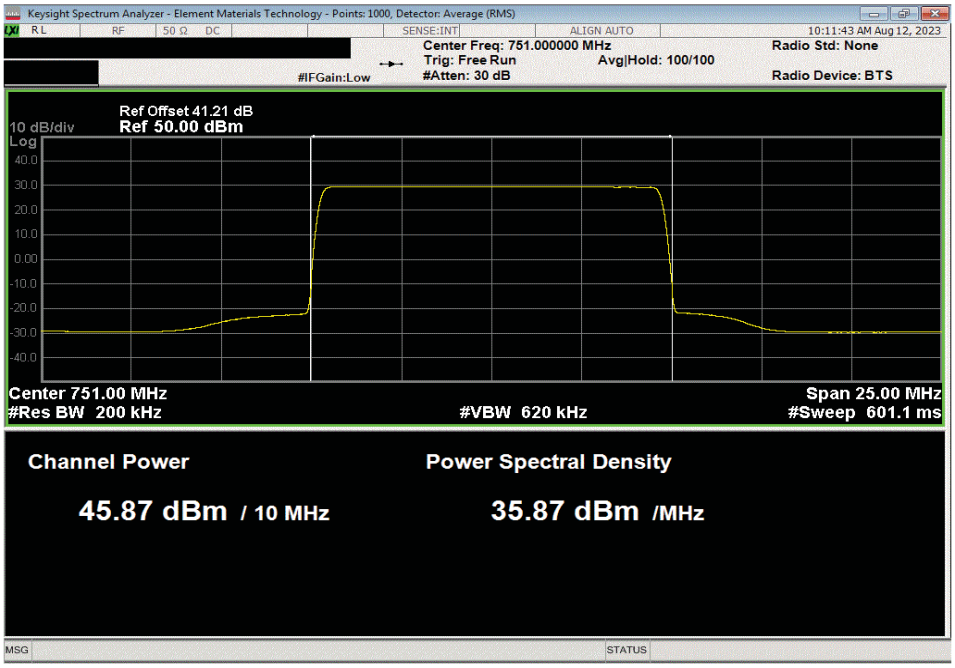

| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 16QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 45.767 | 0 | 45.767 | 48.767 | 51.767 | Pass |



| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 64QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 45.855 | 0 | 45.855 | 48.855 | 51.855 | Pass |




| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 45.867 | 0 | 45.867 | 48.867 | 51.867 | Pass |



# AVERAGE POWER - MULTICARRIER

XMit 2023.02.14.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Block - DC | Fairview Microwave | SD3239 | ANE | 2023-02-16 | 2024-02-16 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2023-02-09 | 2024-02-09 |
| Generator - Signal | Agilent | N5173B | TIW | 2023-08-07 | 2026-08-07 |

**TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

The method in section 5.2.4.4 of ANSI C63.26 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement, a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

RF conducted emissions testing was performed only on one port. The AHBCC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in original certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

Multicarrier Test Cases are comprised of Band n5 and Band n13 carriers operate simultaneously.

Three 5MHz carriers with 2 carriers at the Bottom (871.5MHz and 876.5MHz) and 1 at the top (891.5MHz) of the Band n5 are operated at (13.3W/Carrier). Two NR 5MHz carriers in Band n13 (748.5 & 753.5MHz) are operated at (20W/carrier) to provide a total maximum port power of 80 watts.

The smallest channel bandwidth was selected to maximize carrier power spectral density.

# AVERAGE POWER - MULTICARRIER

TbtTx 2022.05.02.0 XMit 2023.02.14.0

| | | | | | |
|---|---|---|---|---|---|
| EUT: | AirScale Base Transceiver Station Remote Radio Head Model AHBCC | | | Work Order: | NOKI0069 |
| Serial Number: | See Configuration | | | Date: | 08/11/2023 |
| Customer: | Nokia Solutions and Networks | | | Temperature: | 21.2°C |
| Attendees: | Mitchell Hill | | | Humidity: | 54% |
| Project: | None | | | Barometric Pres.: | 1009 mbar |
| Tested by: | Brandon Hobbs | Power: | 54VDC | Job Site: | TX07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 27:2023, FCC 22H:2023 | ANSI C63.26:2015 |
| RSS-130 Issue 2:2019, RSS-132 Issue 4:2023 | ANSI C63.26:2015 |

**COMMENTS**

The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port + 6db [i.e. 10log(4)]. All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. Band n13 carriers are operating at (20 watts/carrier), Band n5 are operating at (13.3 watts/carrier) for a total port power of 80 watts.

**DEVIATIONS FROM TEST STANDARD**

None

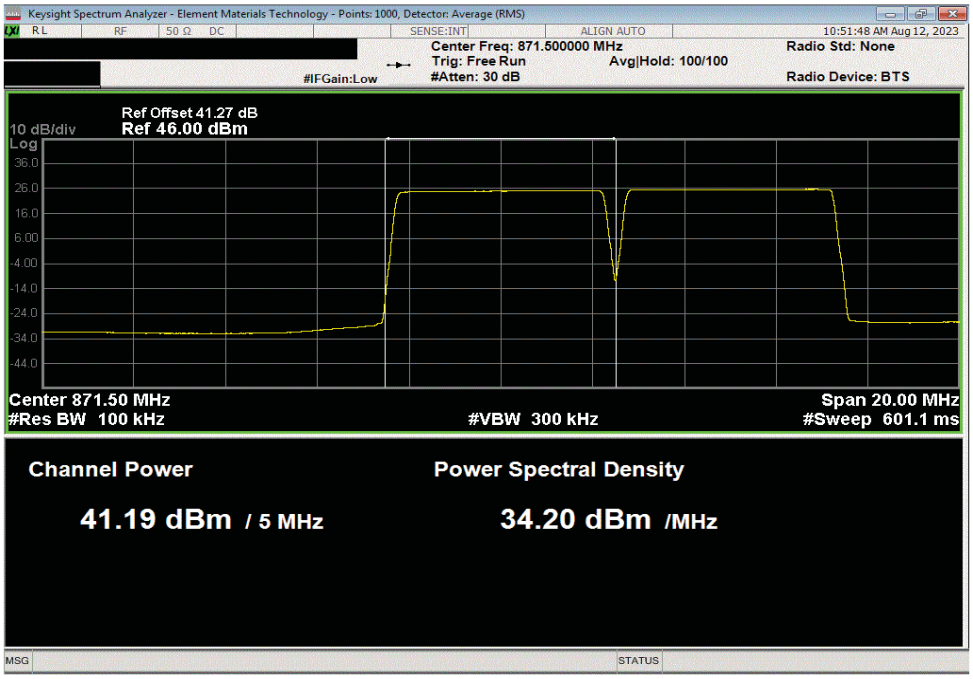
| Configuration # | NOKI0069-2 | *Signature* |
|---|---|---|

| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
|---|---|---|---|---|---|---|
| Port 1 | | | | | | |
| Multi-Carrier Test Case 1 | | | | | | |
| QPSK Modulation | | | | | | |
| Low 871.5 MHz n5 NR5 13.3W | 41.189 | 0 | 41.2 | 44.2 | 47.2 | Pass |
| Mid 876.5 MHz n5 NR5 13.3W | 41.687 | 0 | 41.7 | 44.7 | 47.7 | Pass |
| High 891.5 MHz n5 NR5 13.3W | 41.125 | 0 | 41.1 | 44.1 | 47.1 | Pass |
| Low 748.5 MHz n13 NR5 20W | 42.910 | 0 | 42.9 | 45.9 | 48.9 | Pass |
| High 753.5 MHz n13 NR5 20W | 42.687 | 0 | 42.7 | 45.7 | 48.7 | Pass |

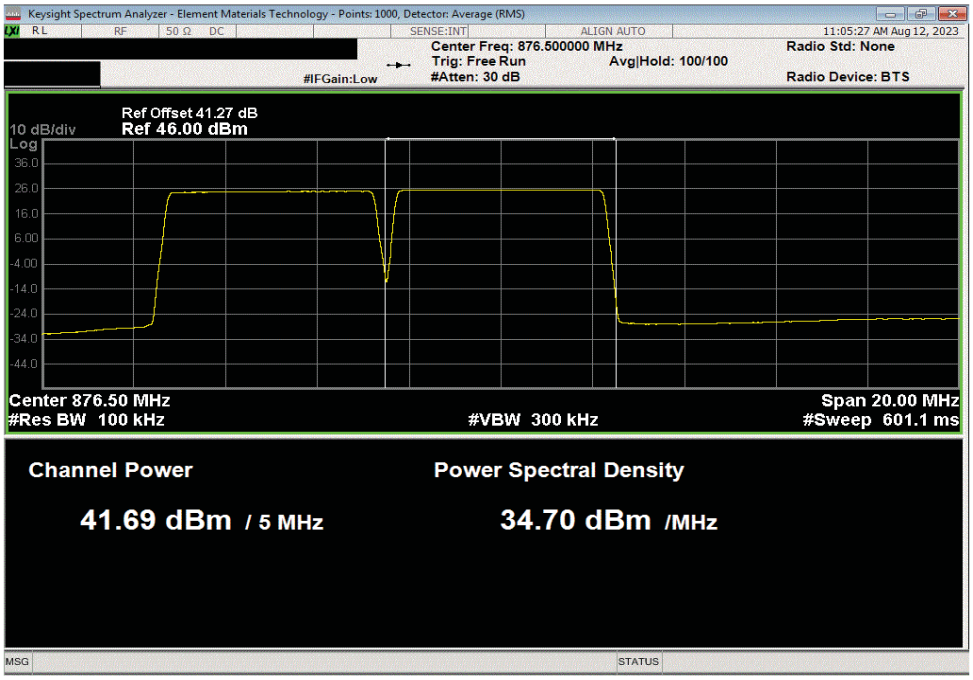
# AVERAGE POWER - MULTICARRIER



| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, Low 871.5 MHz n5 NR5 13.3W | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 41.189 | 0 | 41.189 | 44.189 | 47.189 | Pass |



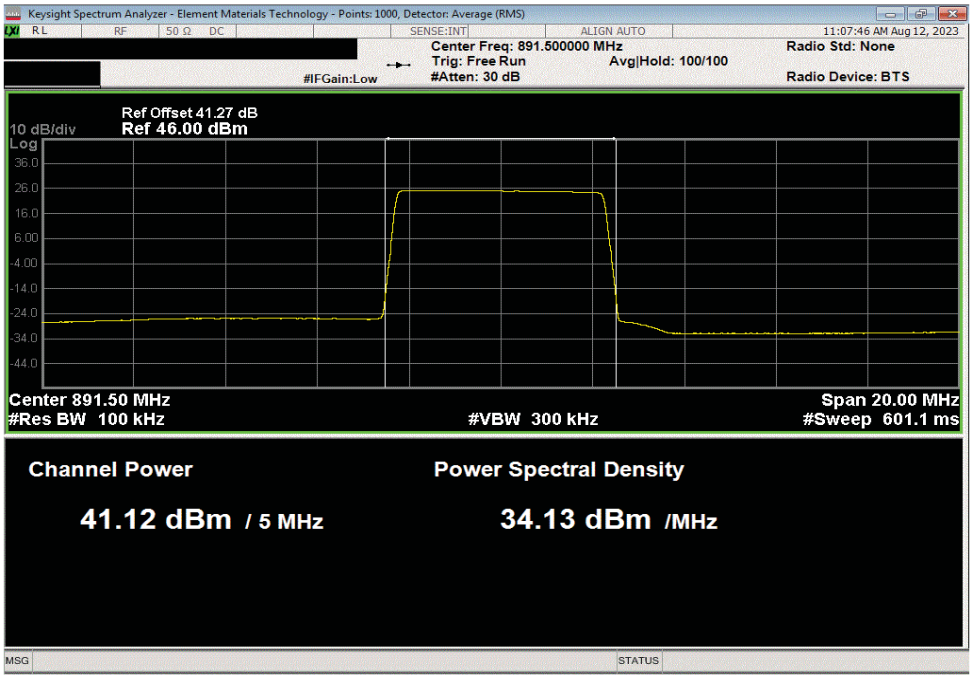

| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, Mid 876.5 MHz n5 NR5 13.3W | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 41.687 | 0 | 41.687 | 44.687 | 47.687 | Pass |



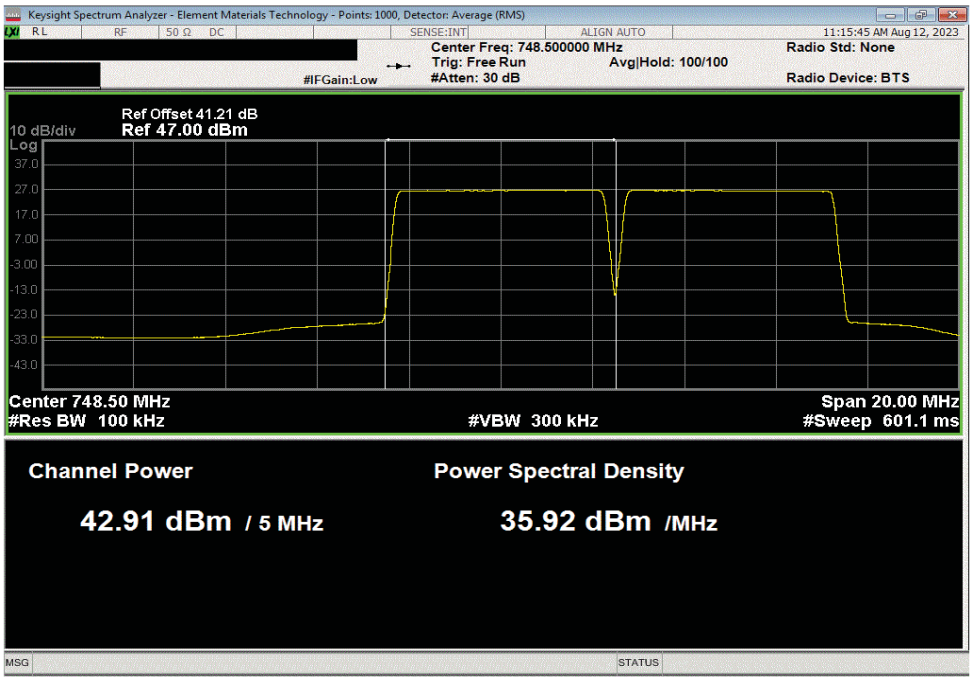
# AVERAGE POWER - MULTICARRIER



| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, High 891.5 MHz n5 NR5 13.3W | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 41.125 | 0 | 41.125 | 44.125 | 47.125 | Pass |



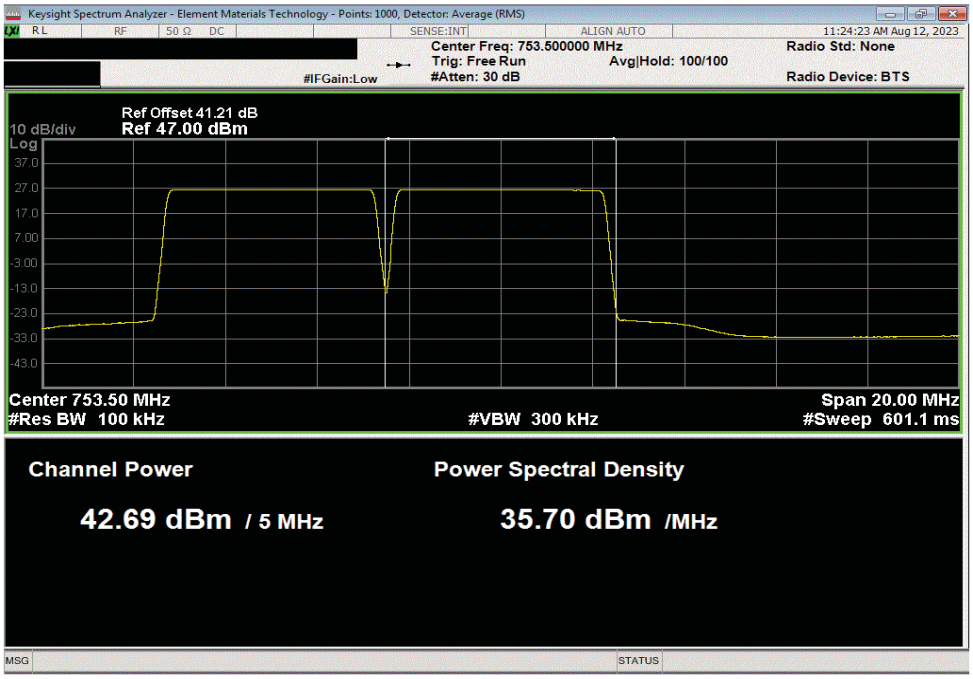

| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, Low 748.5 MHz n13 NR5 20W | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 42.91 | 0 | 42.91 | 45.91 | 48.91 | Pass |



# AVERAGE POWER - MULTICARRIER



| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, High 753.5 MHz n13 NR5 20W | | | | | | |
|---|---|---|---|---|---|---|
| | Initial Value dBm/MHz | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | Results |
| | 42.687 | 0 | 42.687 | 45.687 | 48.687 | Pass |



# PEAK TO AVERAGE POWER (PAPR) CCDF

XMit 2023.02.14.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Block - DC | Fairview Microwave | SD3239 | ANE | 2023-02-16 | 2024-02-16 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2023-02-09 | 2024-02-09 |
| Generator - Signal | Agilent | N5173B | TIW | 2023-08-07 | 2026-08-07 |

**TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Power Ratio (PAPR) was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed 13 dB.

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4.

The PAPR was measured using the CCDF function of the spectrum analyzer.

Per FCC Part 27.50 and RSS-130 section 4.4, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

RF conducted emissions testing was performed only on one port. The AHBCC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in original certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

# PEAK TO AVERAGE POWER (PAPR) CCDF

TbtTx 2022.05.02.0 XMit 2023.02.14.0

| | | | | | |
|---|---|---|---|---|---|
| EUT: | AirScale Base Transceiver Station Remote Radio Head Model AHBCC | | | Work Order: | NOKI0069 |
| Serial Number: | See Configuration | | | Date: | 08/11/2023 |
| Customer: | Nokia Solutions and Networks | | | Temperature: | 21.8°C |
| Attendees: | Mitchell Hill | | | Humidity: | 53.3% |
| Project: | None | | | Barometric Pres.: | 1008 mbar |
| Tested by: | Brandon Hobbs | Power: | 54VDC | Job Site: | TX07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 27:2023 | ANSI C63.26:2015 |
| RSS-130 Issue 2:2019 | ANSI C63.26:2015 |

**COMMENTS**

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n13 carriers are enabled at maximum power (40 Watts/carrier).

**DEVIATIONS FROM TEST STANDARD**

None

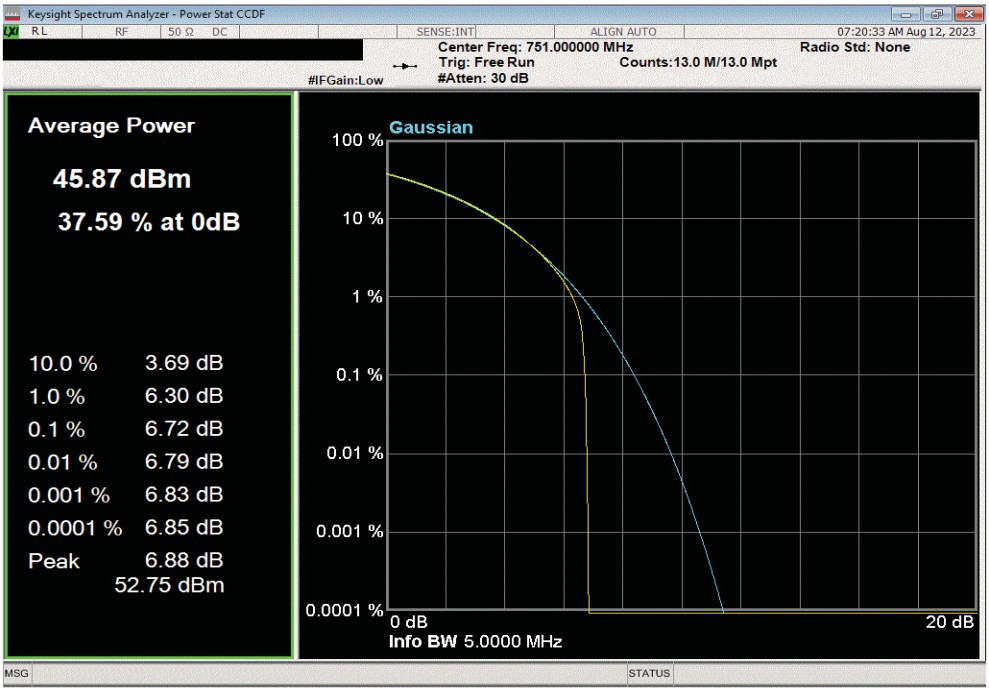
| Configuration # | NOKI0069-2 | Signature |
|---|---|---|

| | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
|---|---|---|---|
| Port 1 | | | |
| Band n13, 746 - 756 MHz | | | |
| 5 MHz Bandwidth | | | |
| QPSK Modulation | | | |
| Mid Channel, 751 MHz | 6.72 | 13 | Pass |
| 16QAM Modulation | | | |
| Mid Channel, 751 MHz | 6.89 | 13 | Pass |
| 64QAM Modulation | | | |
| Mid Channel, 751 MHz | 6.66 | 13 | Pass |
| 256QAM Modulation | | | |
| Low Channel, 748.5 MHz | 6.71 | 13 | Pass |
| Mid Channel, 751 MHz | 6.70 | 13 | Pass |
| High Channel, 753.5 MHz | 6.74 | 13 | Pass |
| 10 MHz Bandwidth | | | |
| QPSK Modulation | | | |
| Mid Channel, 751 MHz | 6.83 | 13 | Pass |
| 16QAM Modulation | | | |
| Mid Channel, 751 MHz | 6.93 | 13 | Pass |
| 64QAM Modulation | | | |
| Mid Channel, 751 MHz | 6.82 | 13 | Pass |
| 256QAM Modulation | | | |
| Mid Channel, 751 MHz | 6.83 | 13 | Pass |

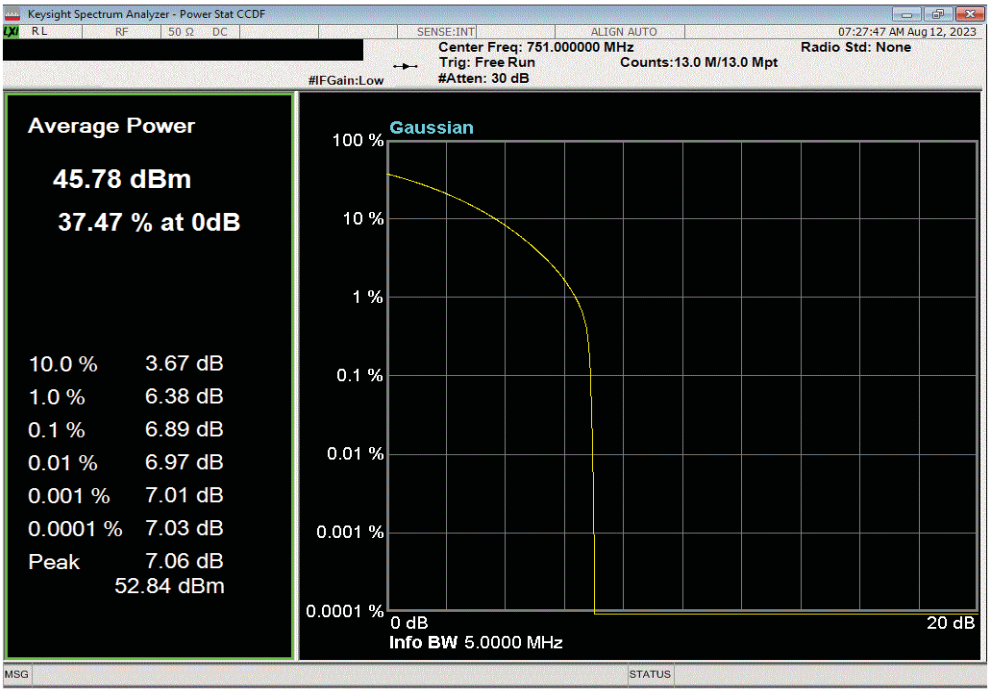
# PEAK TO AVERAGE POWER (PAPR) CCDF



| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.72 | 13 | Pass |



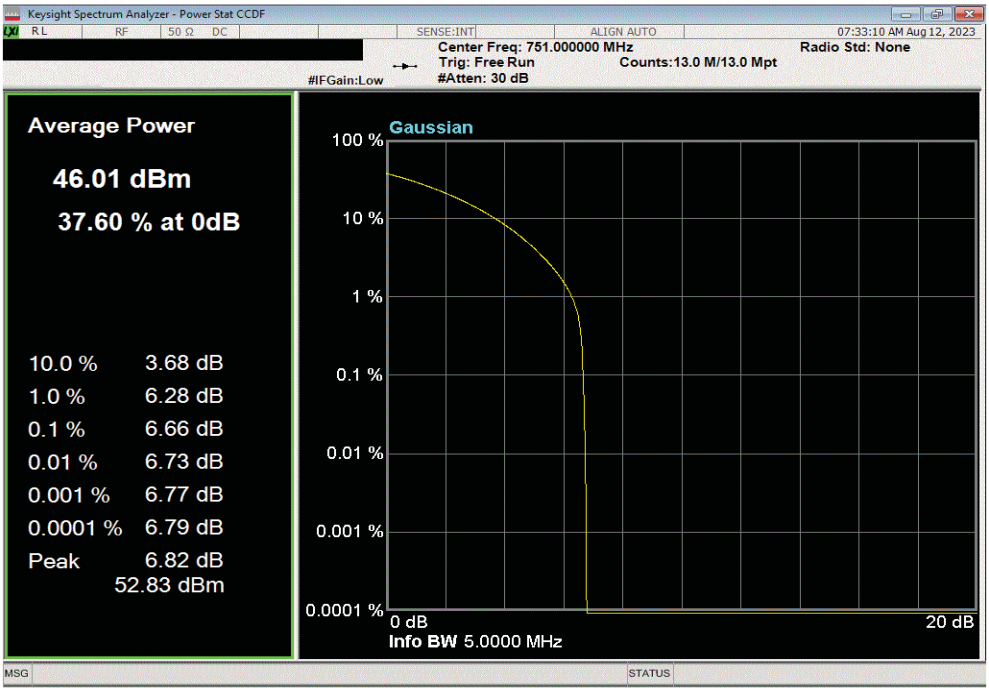

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.89 | 13 | Pass |



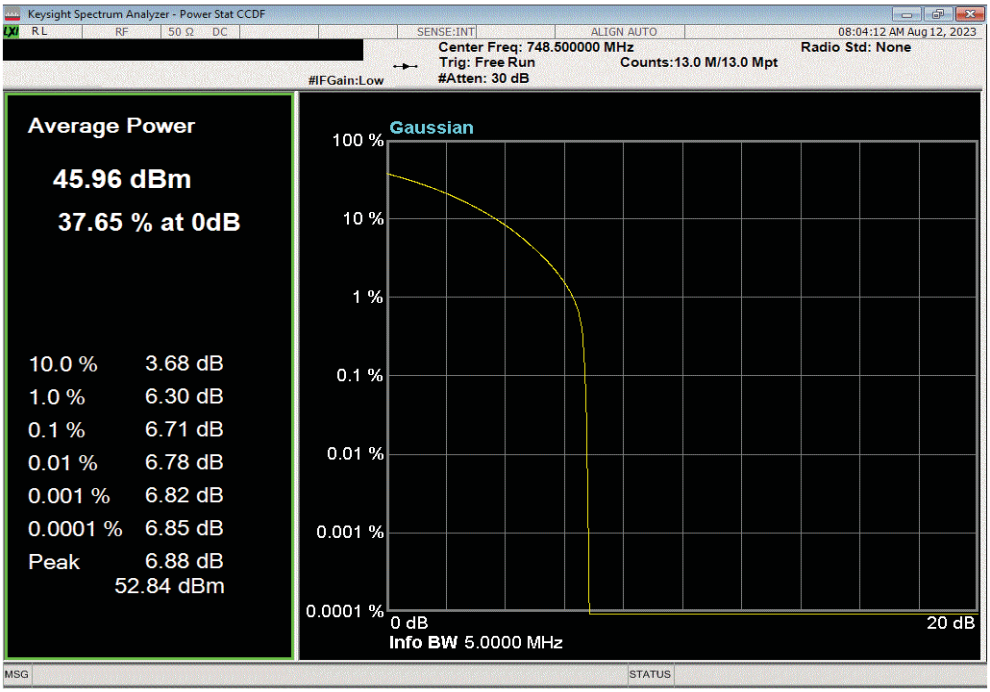
# PEAK TO AVERAGE POWER (PAPR) CCDF



| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.66 | 13 | Pass |



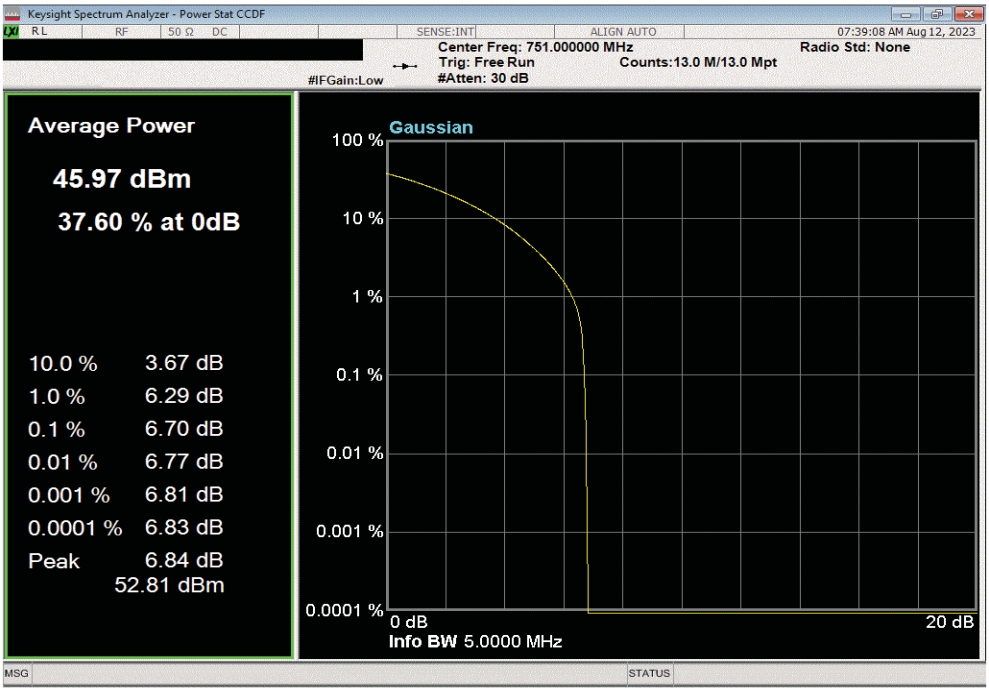

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 748.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.71 | 13 | Pass |



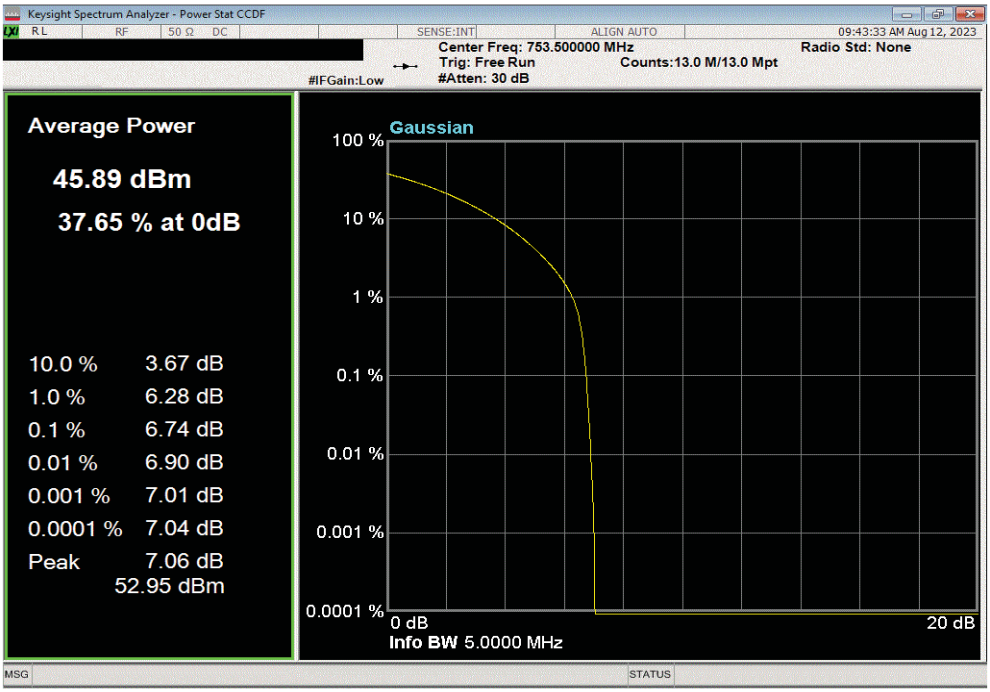
# PEAK TO AVERAGE POWER (PAPR) CCDF



| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.7 | 13 | Pass |



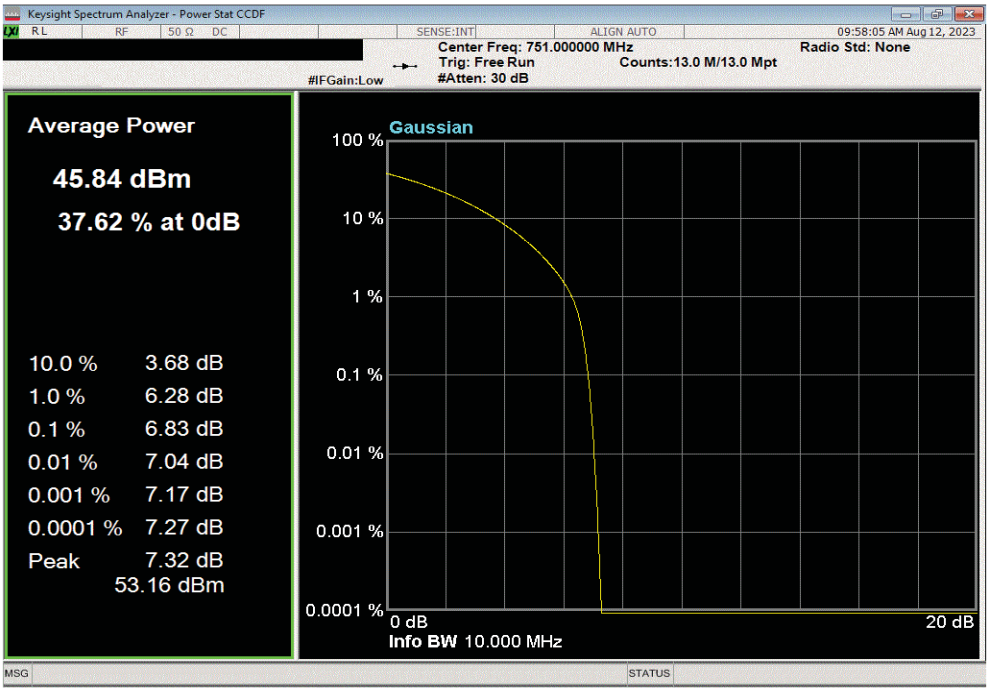

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.74 | 13 | Pass |



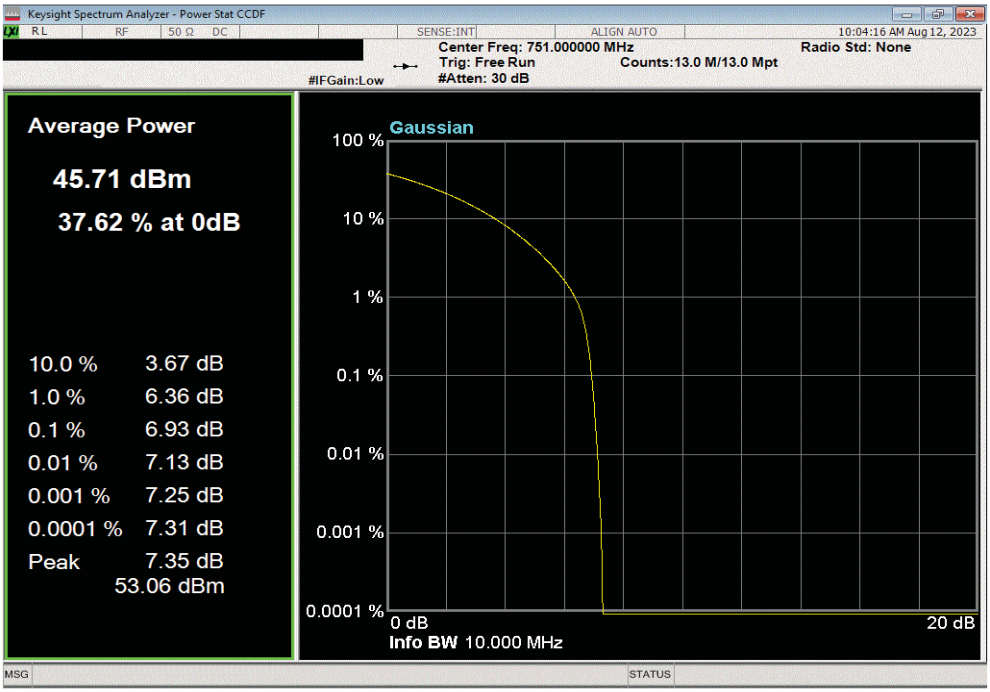
# PEAK TO AVERAGE POWER (PAPR) CCDF



| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, QPSK Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.83 | 13 | Pass |



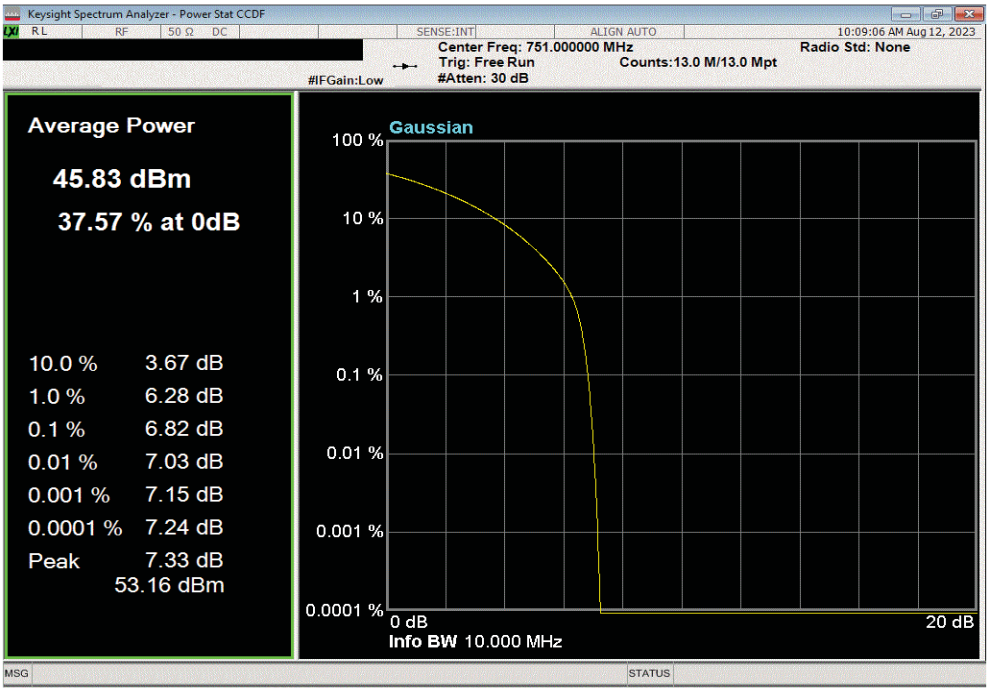

| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 16QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.93 | 13 | Pass |



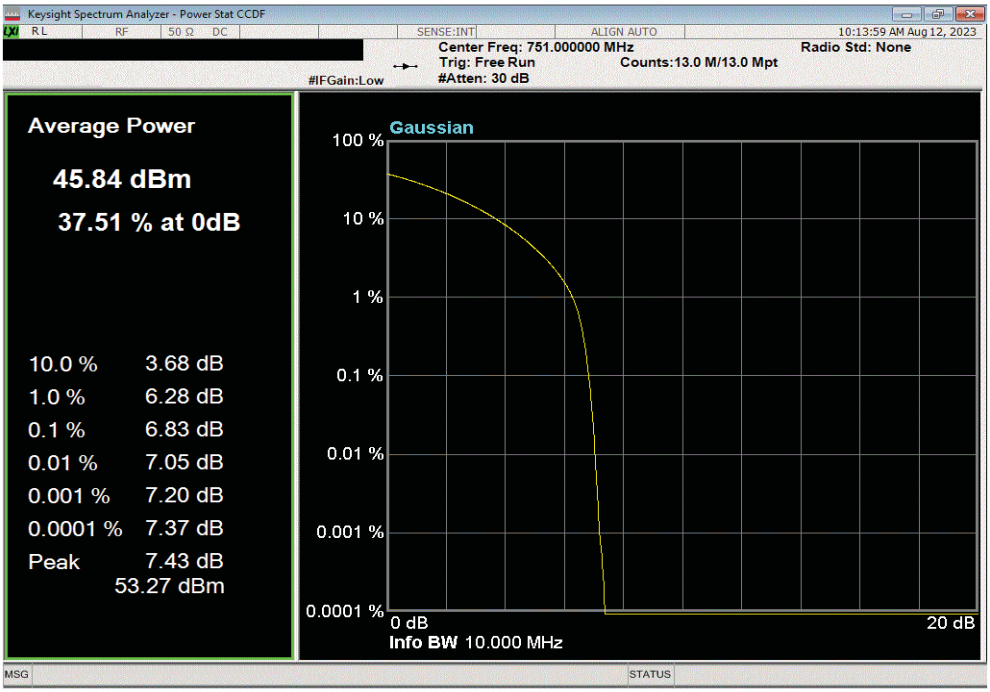
# PEAK TO AVERAGE POWER (PAPR) CCDF



| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 64QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.82 | 13 | Pass |




| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 0.1% PAPR Value (dB) | 0.1% PAPR Limit (dB) | Results |
| | | | | 6.83 | 13 | Pass |



# BAND EDGE COMPLIANCE

XMit 2023.02.14.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Block - DC | Fairview Microwave | SD3239 | ANE | 2023-02-16 | 2024-02-16 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2023-02-09 | 2024-02-09 |
| Generator - Signal | Agilent | N5173B | TIW | 2023-08-07 | 2026-08-07 |

**TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

All limits were adjusted by a factor of [-10*log(4)] dB to account for the device operation as a 4 port MIMO transmitter, as per FCC KDB 622911.

Per FCC section 27.53(c) and RSS-130 section 4.7.1, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

FCC 27.53(c) and RSS-130 section 4.7.1 requires a >100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range. FCC 27.53(c) and RSS-130 section 4.7.1 requires a >30 kHz measurement bandwidth for emissions between 100 kHz outside of the RRH operating frequency range and band edge of the operating frequency range.

Section 27.53(c)(3) and RSS-130 4.7.2(a) requires an emission limit of -46dBm for any 6.25 kHz bandwidth between frequency bands 763-775 MHz and 793-806MHz. Adjusting for the four port MIMO requirement the emission limit in these frequency ranges is -52 dBm [i.e.: Limit = -46 dBm/6.25kHz (FCC/IC Limit) - 6dB (4 port MIMO)].

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHBCC) as the original certification test. The AHBCC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the original certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

The testing was performed using only one modulation type because the Occupied Bandwidth variation between modulation types is small, the average output power variation between modulation types is small, there is good passing margins, and there was small variation in measurements over modulation types from previous certification testing for other channel types. (See ANSI C63.26. clause 5.7.2e).

# BAND EDGE COMPLIANCE

element

TbtTx 2022.05.02.0 XMit 2023.02.14.0

| | | | | | |
|---|---|---|---|---|---|
| EUT: | AirScale Base Transceiver Station Remote Radio Head Model AHBCC | | | Work Order: | NOKI0069 |
| Serial Number: | See Configuration | | | Date: | 08/15/2023 |
| Customer: | Nokia solutions and Networks | | | Temperature: | 20.7°C |
| Attendees: | Mitchell Hill | | | Humidity: | 49.7% |
| Project: | None | | | Barometric Pres.: | 1022 mbar |
| Tested by: | Brandon Hobbs | Power: | 54VDC | Job Site: | TX07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 27:2023 | ANSI C63.26:2015 |
| RSS-130 Issue 2:2019 | ANSI C63.26:2015 |

**COMMENTS**

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n13 carriers are enabled at maximum power (40 Watts/carrier).

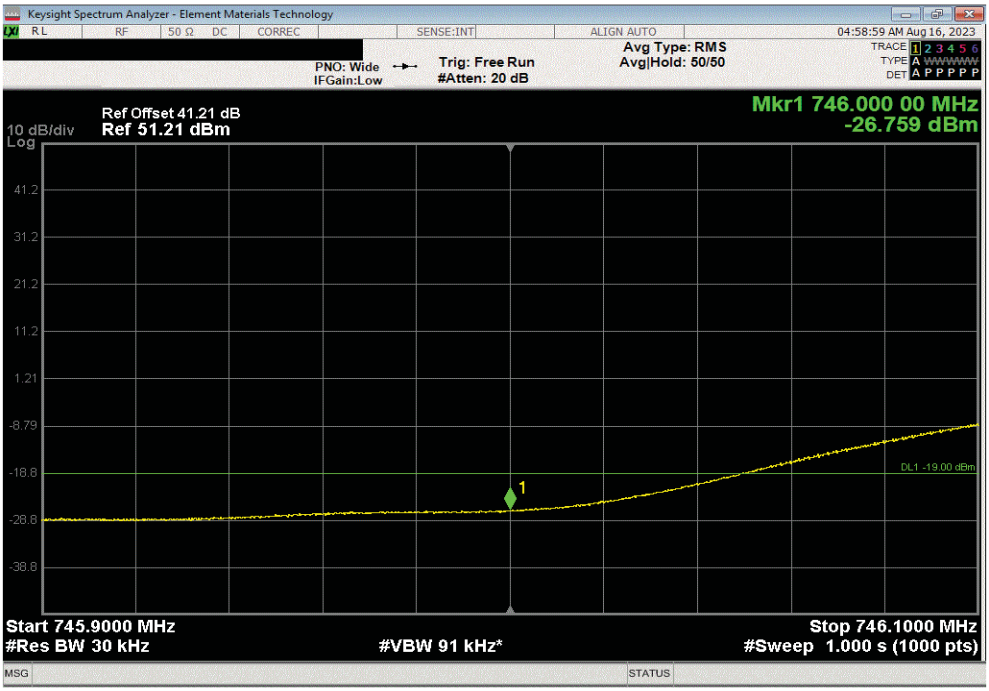
**DEVIATIONS FROM TEST STANDARD**

None

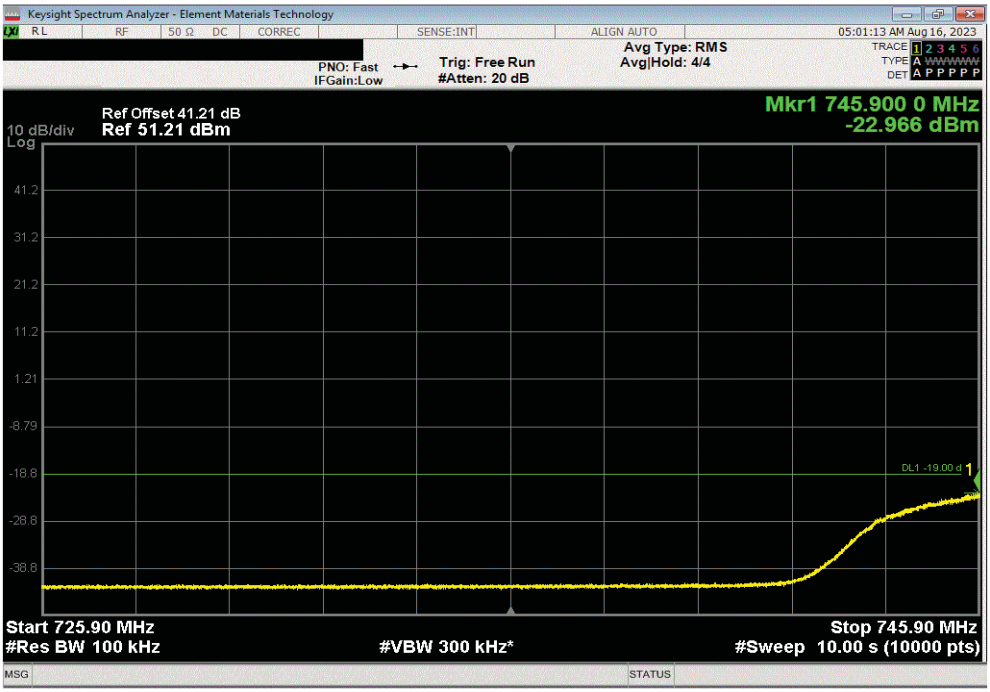
| Configuration # | NOKI0069-2 | Signature |
|---|---|---|

| | | Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
|---|---|---|---|---|---|---|
| Port 1 | | | | | | |
| Band n13, 746 - 756 MHz | | | | | | |
| 5 MHz Bandwidth | | | | | | |
| 256QAM Modulation | | | | | | |
| Low Channel, 748.5 MHz | | 1 | 746.0 | -26.76 | -19 | Pass |
| Low Channel, 748.5 MHz | | 2 | 745.9 | -22.97 | -19 | Pass |
| High Channel, 753.5 MHz | | 1 | 756.0 | -25.29 | -19 | Pass |
| High Channel, 753.5 MHz | | 2 | 756.1 | -21.28 | -19 | Pass |
| High Channel, 753.5 MHz | | 3 | 763.1 | -60.87 | -52 | Pass |
| 10 MHz Bandwidth | | | | | | |
| 256QAM Modulation | | | | | | |
| Low Channel, 748.5 MHz | | 1 | 746.0 | -29.9 | -19 | Pass |
| Low Channel, 748.5 MHz | | 2 | 745.9 | -24.83 | -19 | Pass |
| High Channel, 753.5 MHz | | 1 | 756.0 | -29.46 | -19 | Pass |
| High Channel, 753.5 MHz | | 2 | 756.1 | -24.05 | -19 | Pass |
| High Channel, 753.5 MHz | | 3 | 763.1 | -58.07 | -52 | Pass |

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 748.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 1 | | 746 | -26.76 | -19 | Pass |

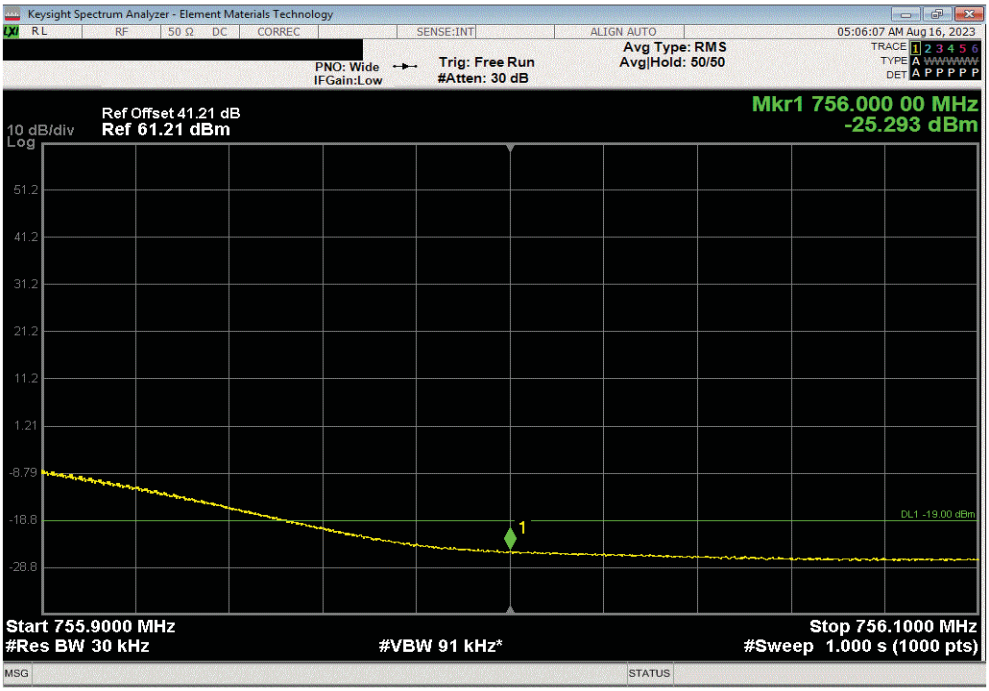



| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 748.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 2 | | 745.9 | -22.97 | -19 | Pass |



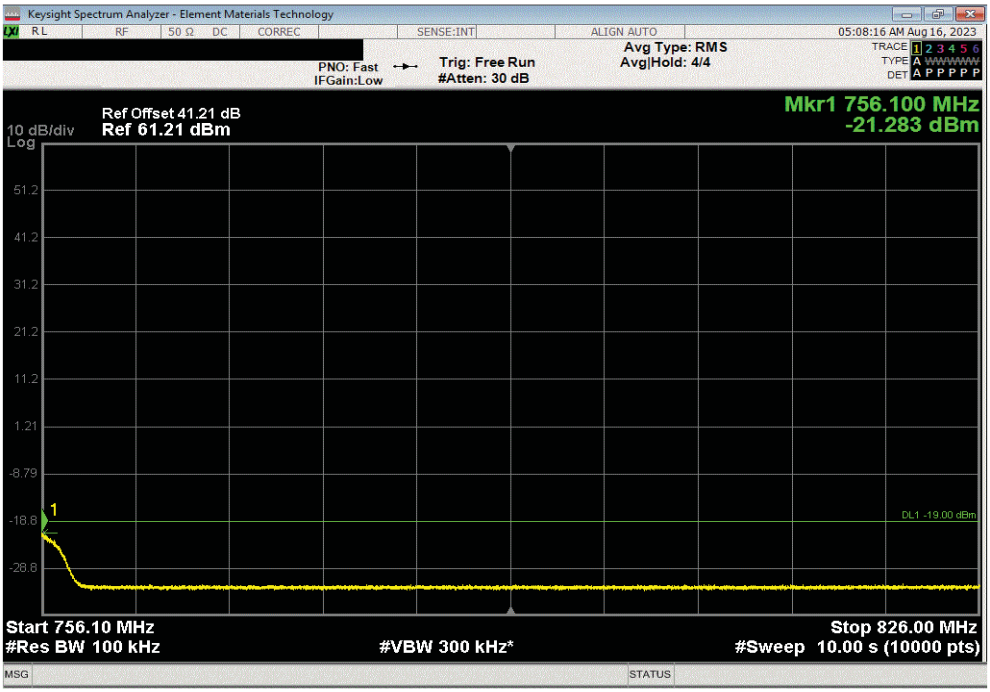
Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz

| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
|---|---|---|---|---|---|---|
| | 1 | | 756 | -25.29 | -19 | Pass |

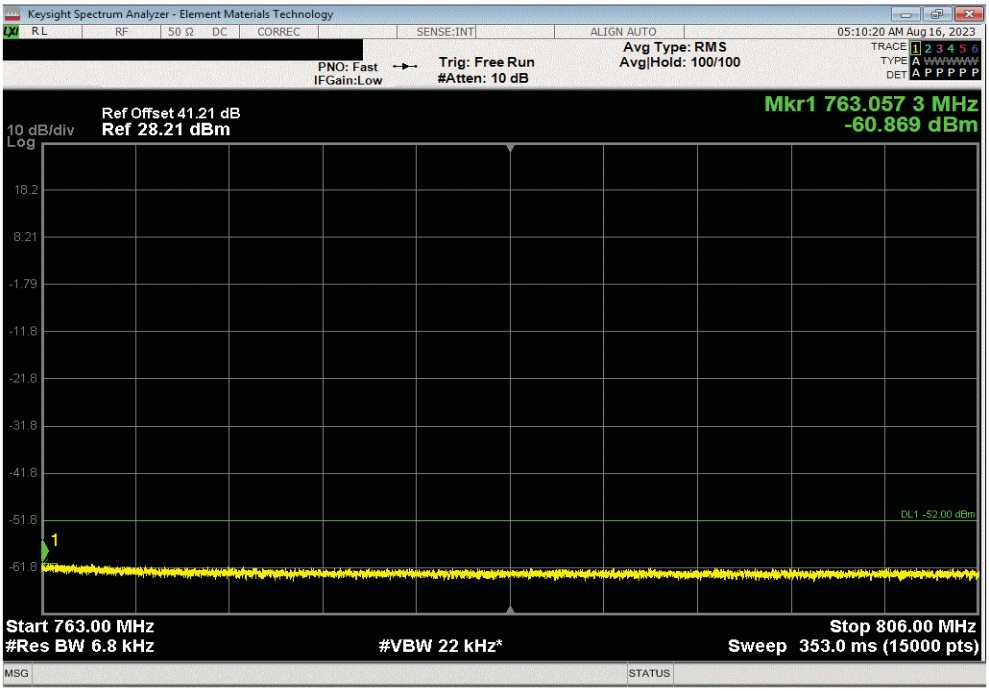



Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz

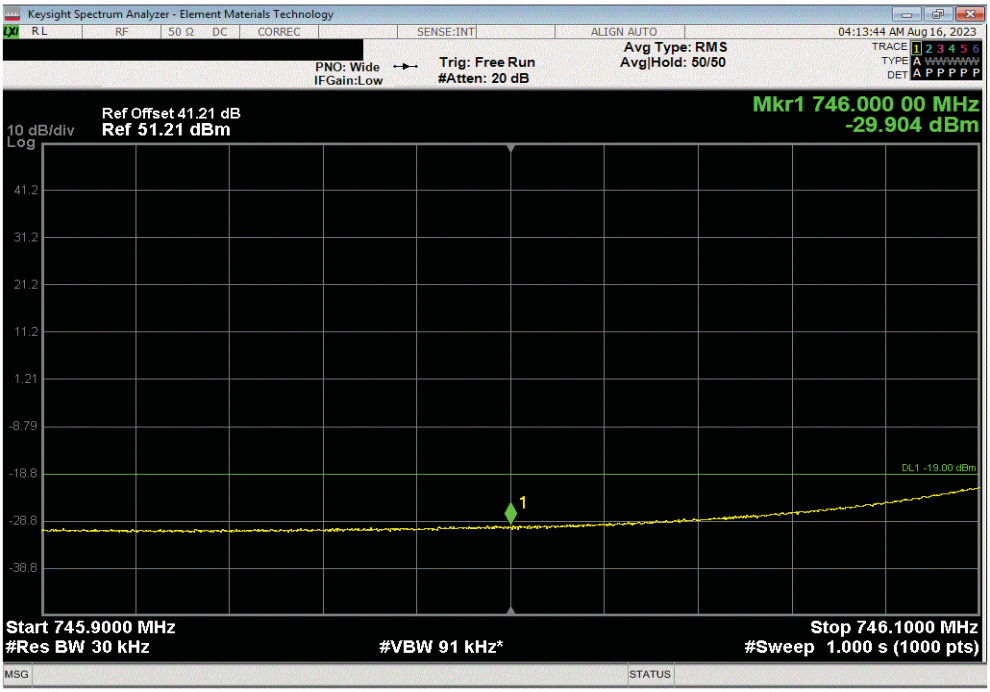
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
|---|---|---|---|---|---|---|
| | 2 | | 756.1 | -21.28 | -19 | Pass |



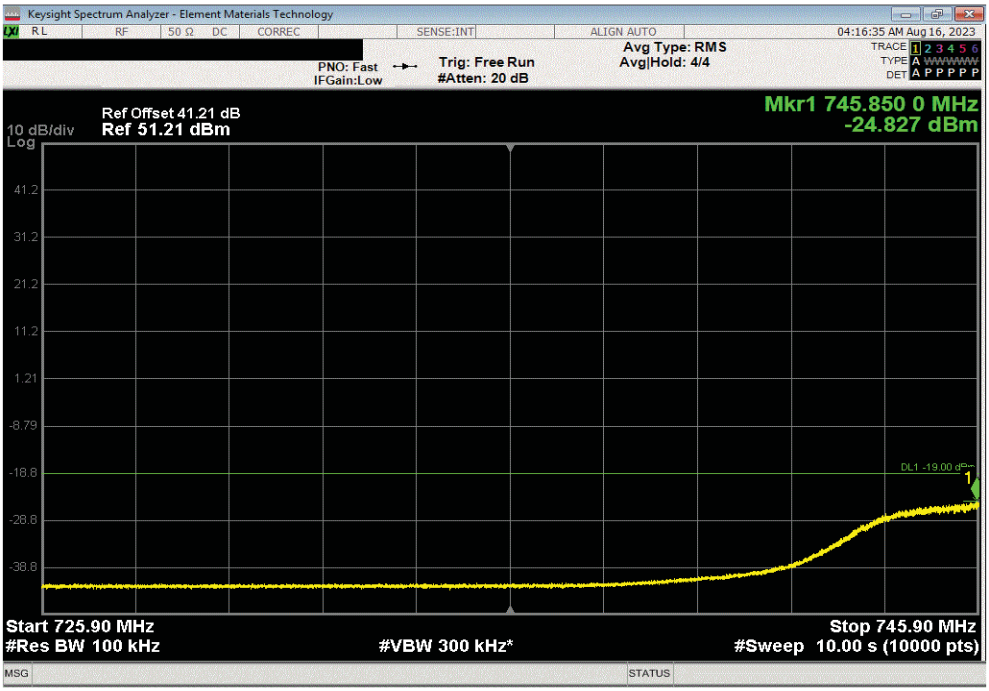
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 3 | | 763.06 | -60.87 | -52 | Pass |



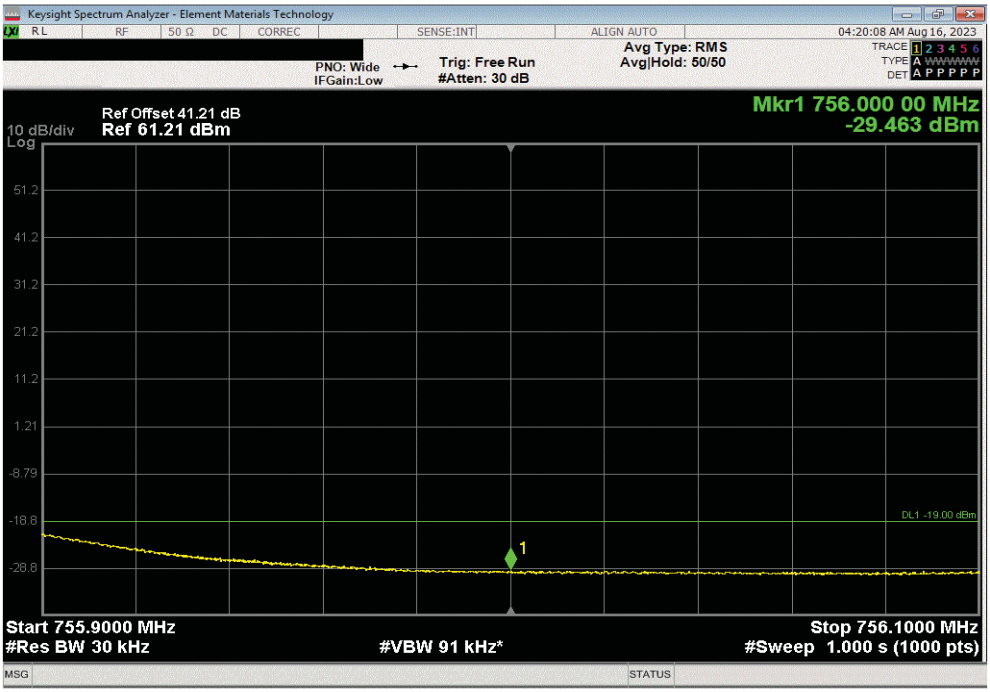

| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Low Channel, 748.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 1 | | 746 | -29.9 | -19 | Pass |



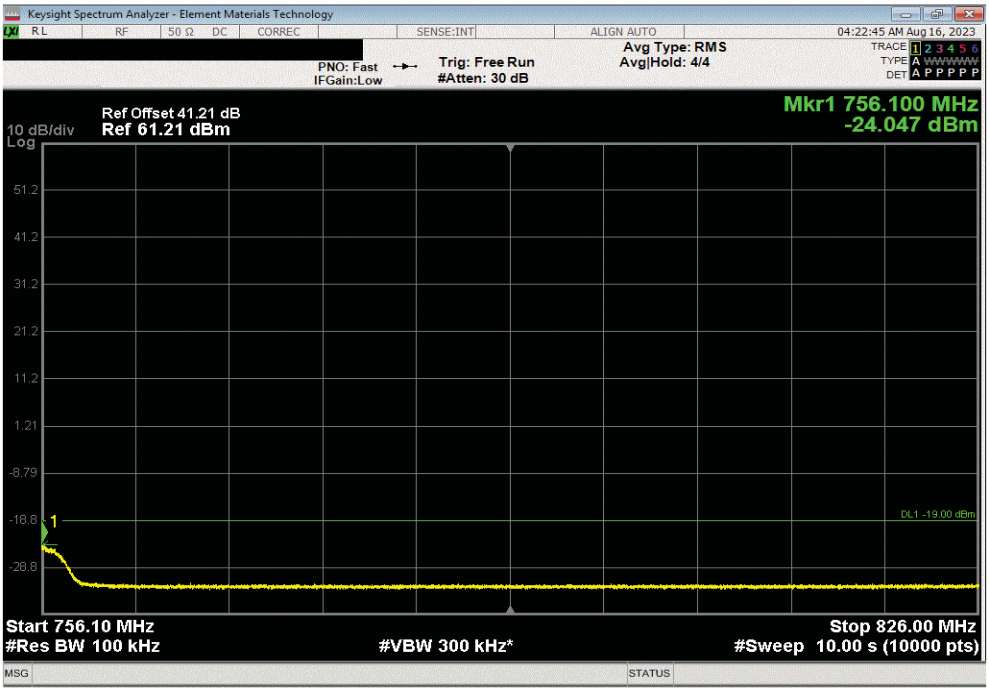
| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Low Channel, 748.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 2 | | 745.85 | -24.83 | -19 | Pass |



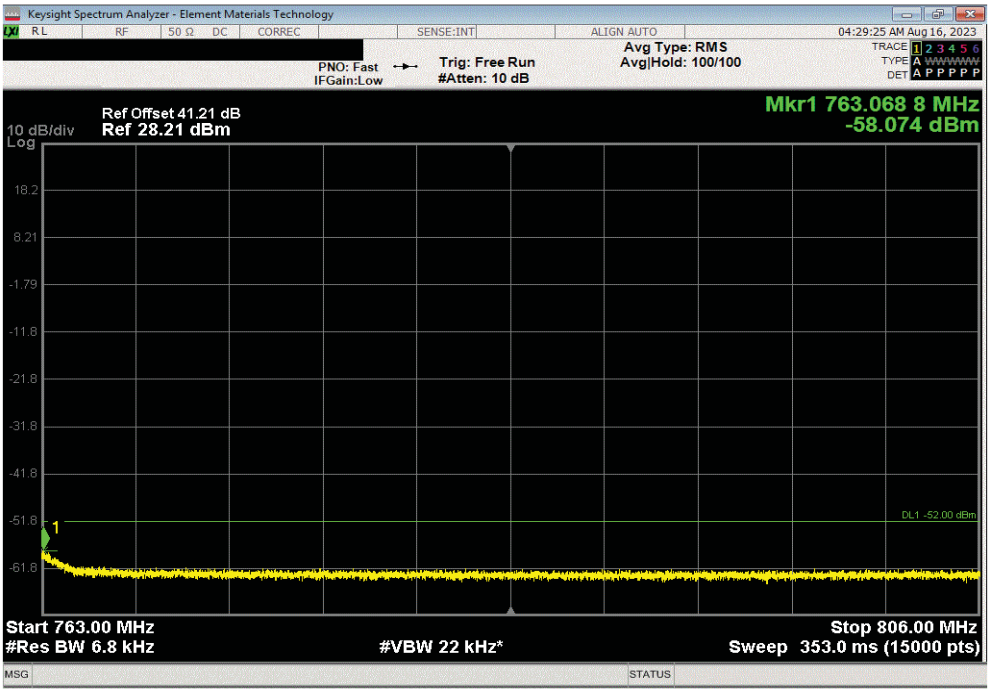

| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 1 | | 756 | -29.46 | -19 | Pass |



| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 2 | | 756.1 | -24.05 | -19 | Pass |




| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 753.5 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 3 | | 763.07 | -58.07 | -52 | Pass |



# BAND EDGE COMPLIANCE - MULTICARRIER

XMit 2023.02.14.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Block - DC | Fairview Microwave | SD3239 | ANE | 2023-02-16 | 2024-02-16 |
| Generator - Signal | Agilent | N5173B | TIW | 2023-08-07 | 2026-08-07 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2023-02-09 | 2024-02-09 |

**TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

All limits were adjusted by a factor of [-10*log(4)] dB to account for the device operation as a 4 port MIMO transmitter, as per FCC KDB 622911.

Per FCC section 27.53(c) and RSS-130 section 4.7.1, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

FCC 27.53(c) and RSS-130 section 4.7.1 requires a >100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range. FCC 27.53(c) and RSS-130 section 4.7.1 requires a >30 kHz measurement bandwidth for emissions between 100 kHz outside of the RRH operating frequency range and band edge of the operating frequency range.

Section 27.53(c)(3) and RSS-130 4.7.2(a) requires an emission limit of -46dBm for any 6.25 kHz bandwidth between frequency bands 763-775 MHz and 793-806MHz. Adjusting for the four port MIMO requirement the emission limit in these frequency ranges is -52 dBm [i.e.: Limit = -46 dBm/6.25kHz (FCC/IC Limit) - 6dB (4 port MIMO)].

Per section FCC 22.917 and RSS 132 5.5, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. In the first 1.0 MHz bands immediately outside and adjacent to the frequency block, the RBW is 1% of the measured emission bandwidth per FCC 22.917(b) and RSS 132 5.5i. After the first 1.0 MHz bands immediately outside and adjacent to the frequency block, the RBW is 100kHz per 22.917(b) and RSS 132 5.5ii.

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHBCC) as the original certification test. The AHBCC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the original certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

The testing was performed using only one modulation type because the Occupied Bandwidth variation between modulation types is small, the average output power variation between modulation types is small, there is good passing margins, and there was small variation in measurements over modulation types from previous certification testing for other channel types. (See ANSI C63.26. clause 5.7.2e).

Three 5MHz carriers with 2 carriers at the Bottom (871.5MHz and 876.5MHz) and 1 at the top (891.5MHz) of the Band n5 are operated at (13.3W/Carrier). Two NR 5MHz carriers in Band n13 (748.5 & 753.5MHz) are operated at (20W/Carrier) to provide a total maximum port power of 80Watts.

# BAND EDGE COMPLIANCE - MULTICARRIER

element

TbtTx 2022.05.02.0 XMit 2023.02.14.0

| | | | | | |
|---|---|---|---|---|---|
| EUT: | AirScale Base Transceiver Station Remote Radio Head Model AHBCC | | | Work Order: | NOKI0069 |
| Serial Number: | See Configuration | | | Date: | 08/15/2023 |
| Customer: | Nokia Solutions and Networks | | | Temperature: | 20.9°C |
| Attendees: | Mitchell Hill | | | Humidity: | 49.3% |
| Project: | None | | | Barometric Pres.: | 1022 mbar |
| Tested by: | Brandon Hobbs | Power: | 54VDC | Job Site: | TX07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 27:2023, FCC 22H:2023 | ANSI C63.26:2015 |
| RSS-130 Issue 2:2019, RSS-132 Issue 4:2023 | ANSI C63.26:2015 |

**COMMENTS**

All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. Band n13 carriers are operating at (20 watts/carrier), Band n5 are operating at (13.3 watts/carrier) for a total port power of 80 watts.

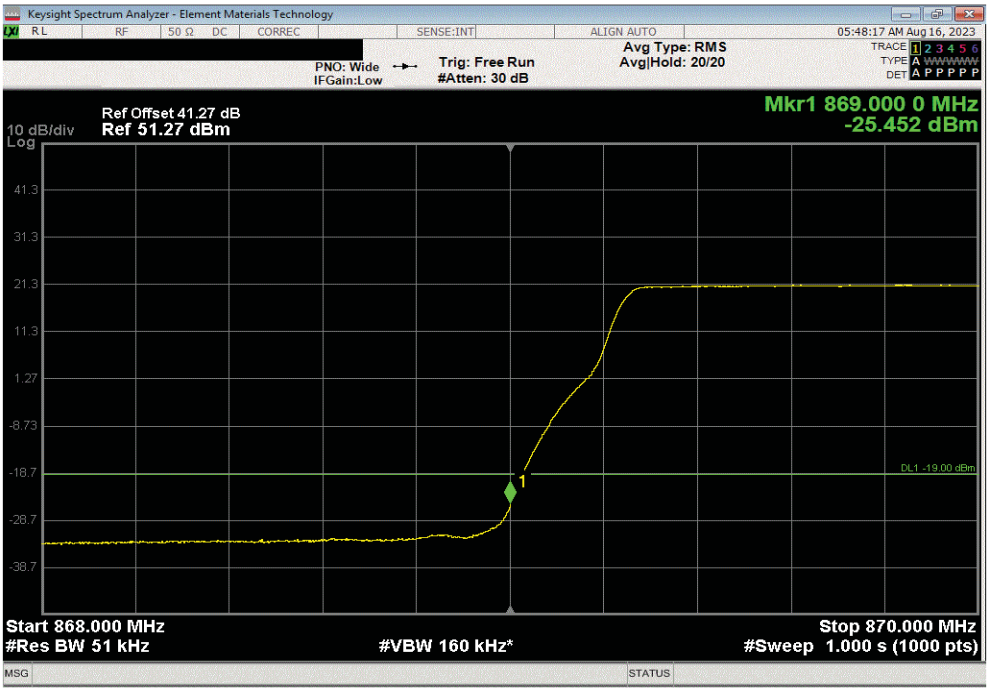
**DEVIATIONS FROM TEST STANDARD**

None

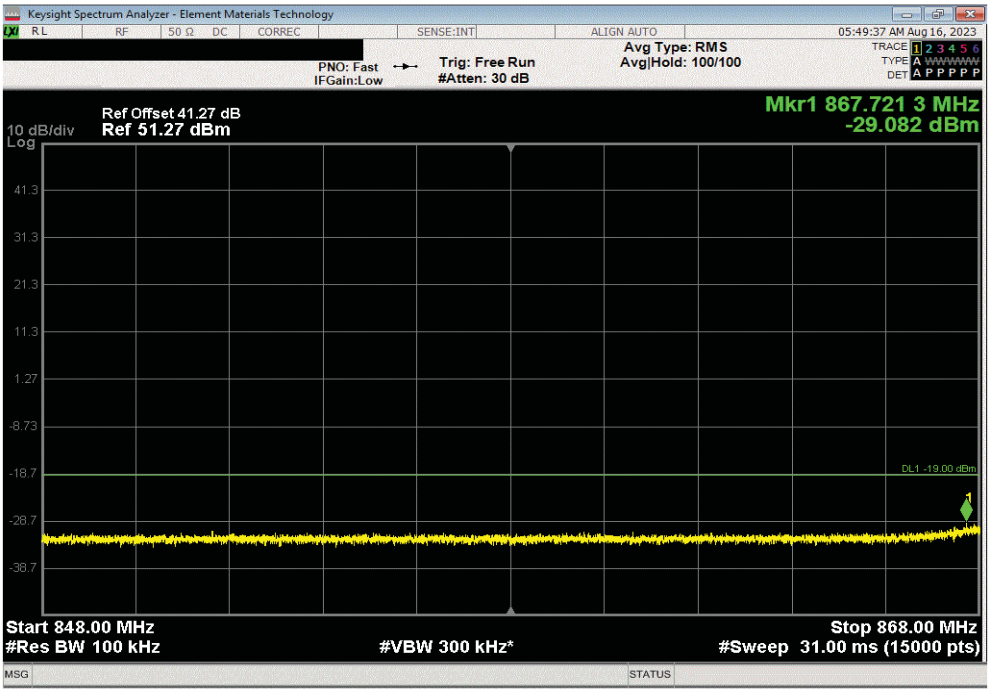
| Configuration # | NOKI0069-2 | Signature |
|---|---|---|

| | | Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
|---|---|---|---|---|---|---|
| Port 1 | | | | | | |
| | Multi-Carrier Test Case 1 | | | | | |
| | QPSK Modulation | | | | | |
| | Low 871.5 MHz n5 NR5 13.3W | 1 | 869.0 | -25.45 | -19 | Pass |
| | Low 871.5 MHz n5 NR5 13.3W | 2 | 867.7 | -29.08 | -19 | Pass |
| | High 891.5 MHz n5 NR5 13.3W | 1 | 894.0 | -25.55 | -19 | Pass |
| | High 891.5 MHz n5 NR5 13.3W | 2 | 895.0 | -30.36 | -19 | Pass |
| | Low 748.5 MHz n13 NR5 20W | 1 | 746.0 | -29.79 | -19 | Pass |
| | Low 748.5 MHz n13 NR5 20W | 2 | 745.8 | -26.12 | -19 | Pass |
| | High 753.5 MHz n13 NR5 20W | 1 | 756.0 | -29.41 | -19 | Pass |
| | High 753.5 MHz n13 NR5 20W | 2 | 756.3 | -25.43 | -19 | Pass |
| | High 753.5 MHz n13 NR5 20W | 3 | 766.9 | -56.22 | -52 | Pass |

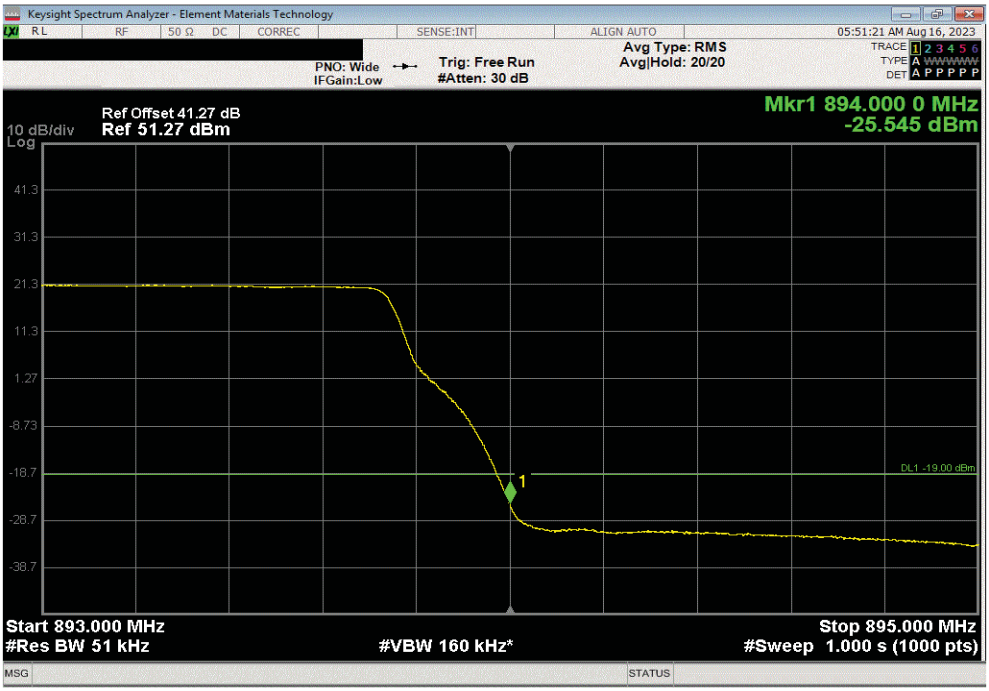
| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, Low 871.5 MHz n5 NR5 13.3W | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 1 | | 869 | -25.45 | -19 | Pass |



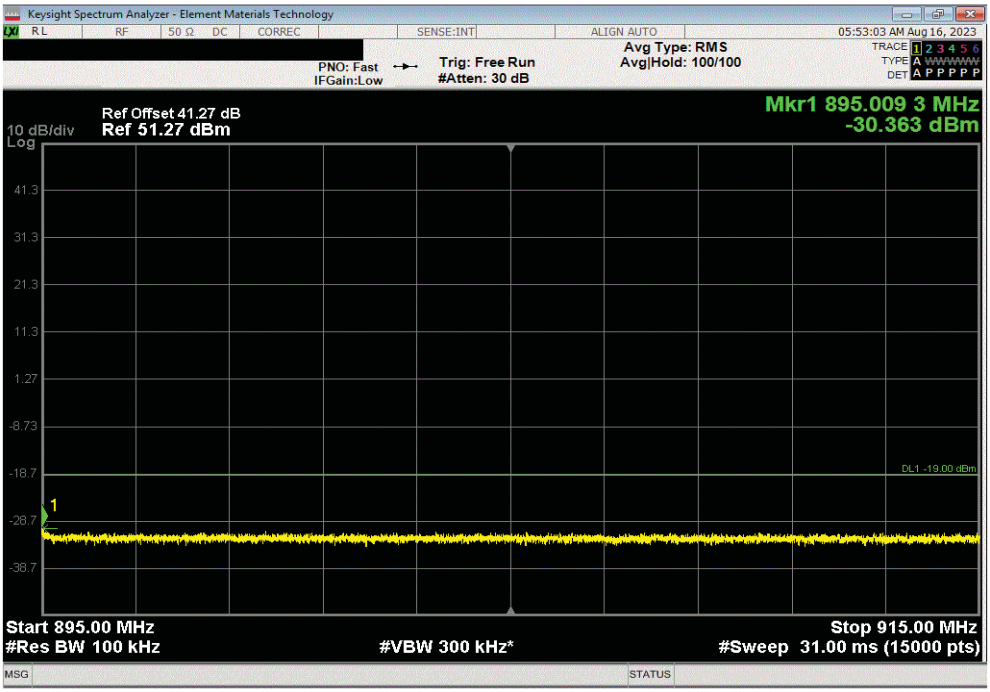

| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, Low 871.5 MHz n5 NR5 13.3W | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 2 | | 867.72 | -29.08 | -19 | Pass |



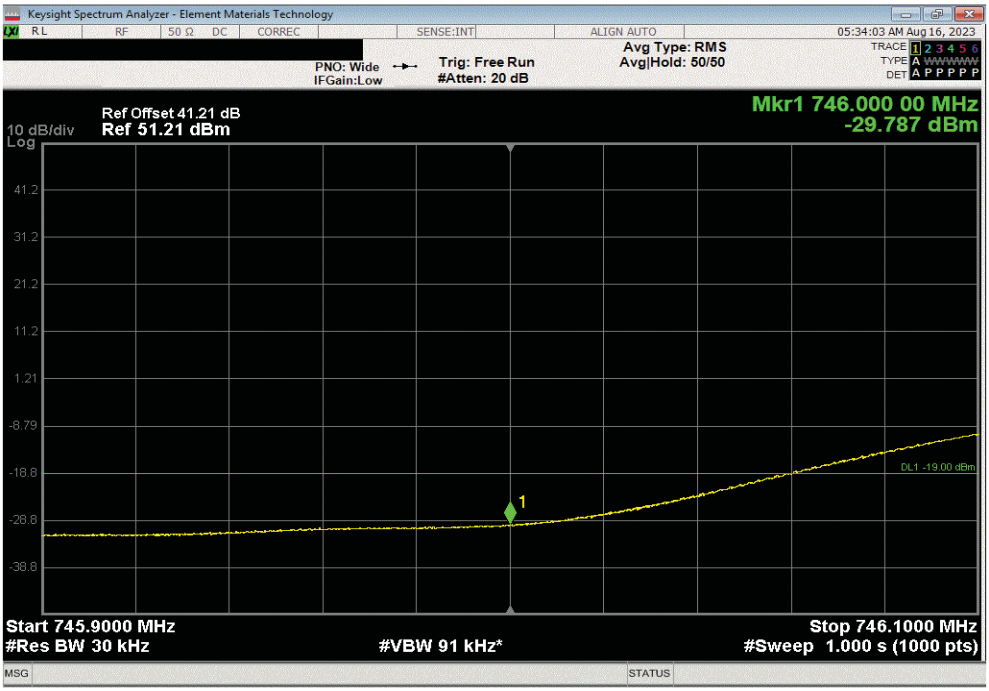
| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, High 891.5 MHz n5 NR5 13.3W | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 1 | | 894 | -25.55 | -19 | Pass |



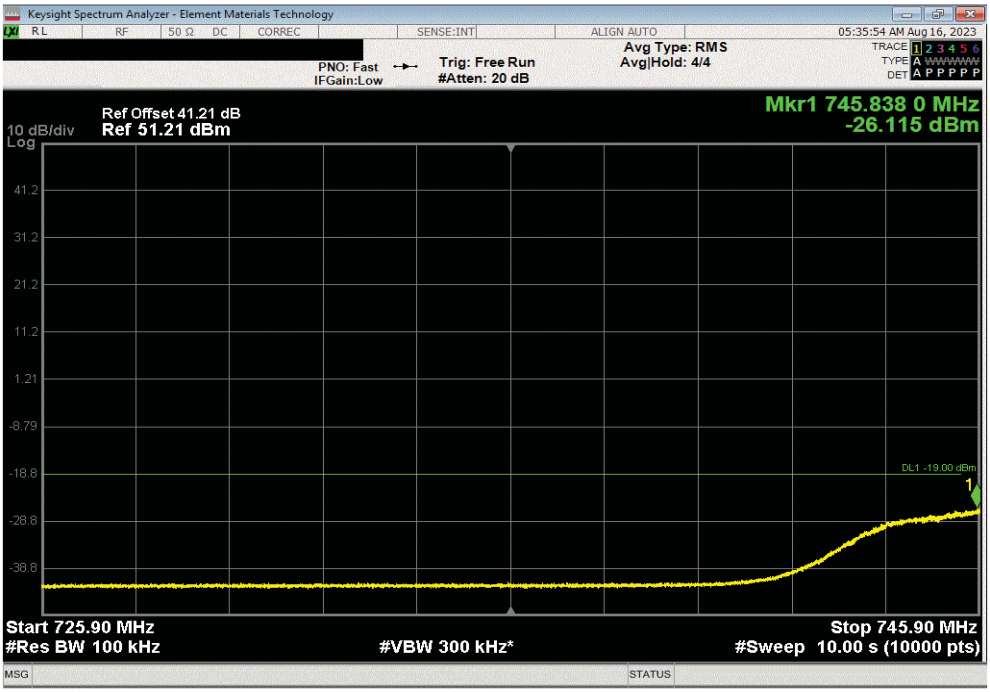

| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, High 891.5 MHz n5 NR5 13.3W | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 2 | | 895.01 | -30.36 | -19 | Pass |



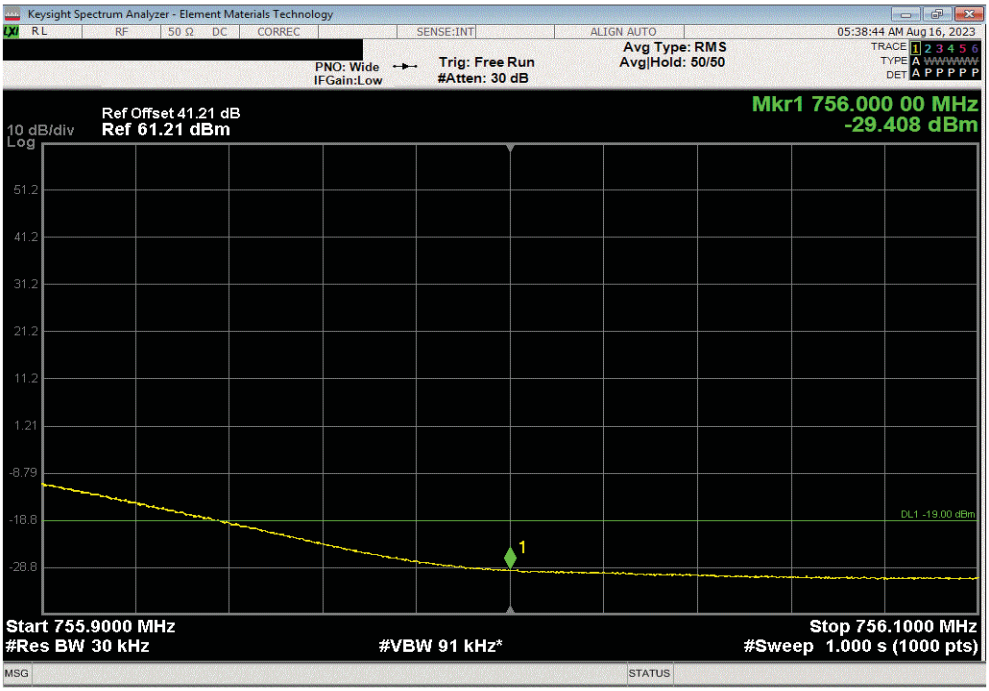
| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, Low 748.5 MHz n13 NR5 20W | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 1 | | 746 | -29.79 | -19 | Pass |



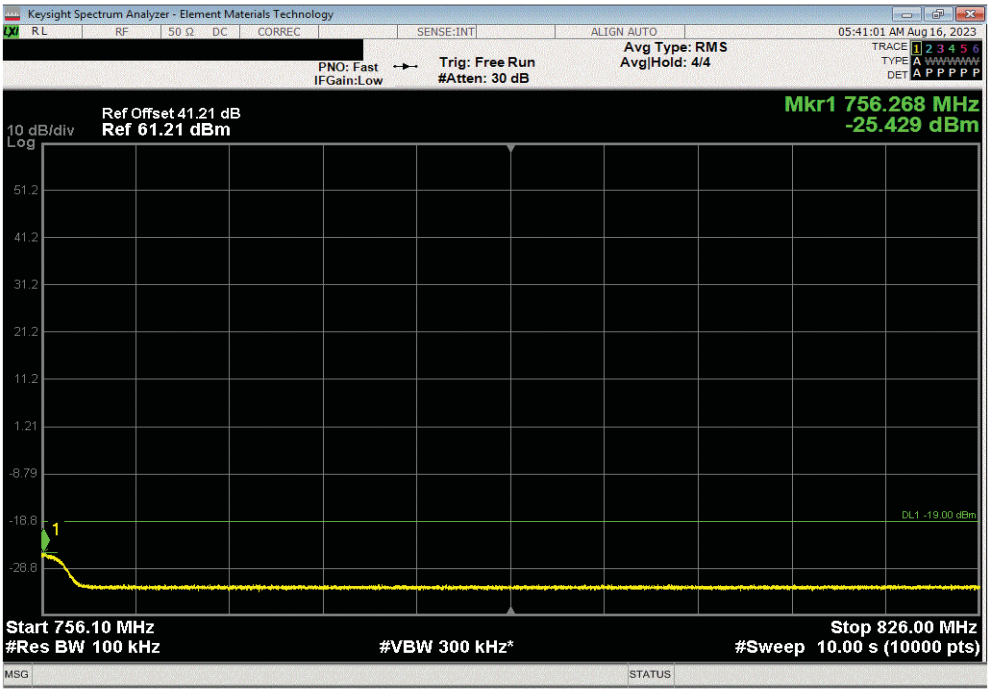

| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, Low 748.5 MHz n13 NR5 20W | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 2 | | 745.84 | -26.12 | -19 | Pass |



| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, High 753.5 MHz n13 NR5 20W | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 1 | | 756 | -29.41 | -19 | Pass |



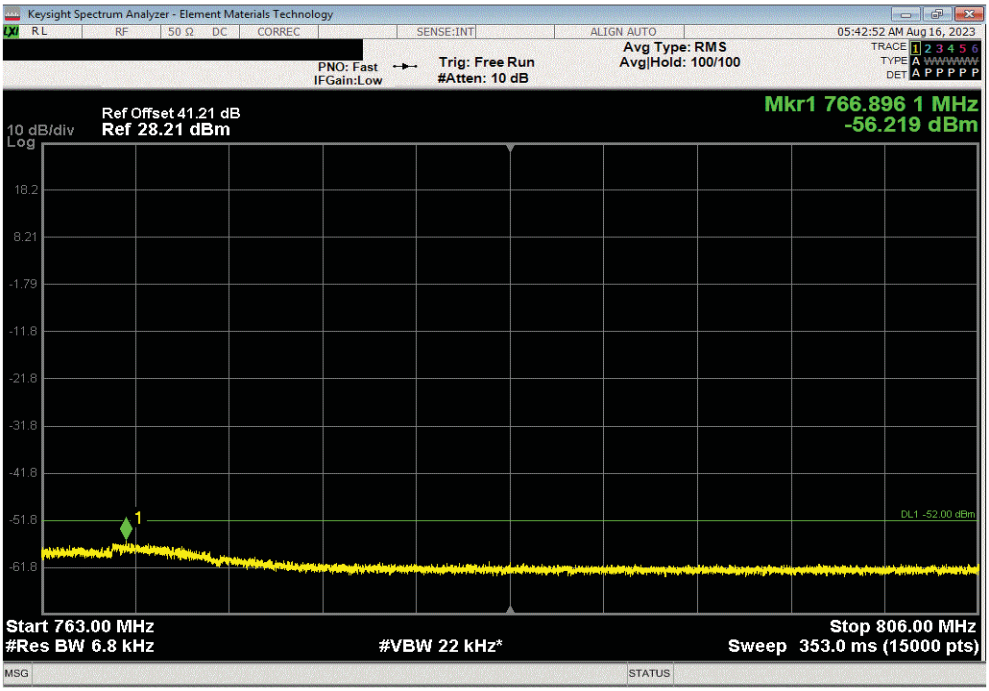

| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, High 753.5 MHz n13 NR5 20W | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 2 | | 756.27 | -25.43 | -19 | Pass |



# BAND EDGE COMPLIANCE - MULTICARRIER



| Port 1, Multi-Carrier Test Case 1, QPSK Modulation, High 753.5 MHz n13 NR5 20W | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 3 | | 766.9 | -56.22 | -52 | Pass |



# SPURIOUS CONDUCTED EMISSIONS

XMit 2023.02.14.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2023-02-09 | 2024-02-09 |
| Generator - Signal | Agilent | N5173B | TIW | 2023-08-07 | 2026-08-07 |
| Block - DC | Fairview Microwave | SD3239 | ANE | 2023-02-16 | 2024-02-16 |
| Block - DC | Fairview Microwave | SD3379 | AMM | 2023-08-04 | 2024-08-04 |

**TEST DESCRIPTION**

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 3 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 9 GHz. The conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.

The measurement methods are detailed in KDB 971168 D01v03 section 6 and ANSI C63.26-2015.

Per FCC 2.1057(a)(1) and RSS Gen 6.13, the upper level of measurement is the 10th harmonic of the highest fundamental frequency.

These measurements are for the frequency band after the first 1.0 MHz bands immediately outside and adjacent to the frequency block.

RF conducted emissions testing was performed only on one port. The AHBCC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in original certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

Per section 27.53(c) and RSS 130 4.7.1, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. FCC 27.53(c) and RSS 130 4.7.1 requires a >100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range.

Per FCC 2.1057(a)(1) and RSS Gen 6.13, the upper level of measurement is the $10^{th}$ harmonic of the highest fundamental frequency. As such, the upper level of the measurement is approximately 9 GHz (highest fundamental frequency is Band n5 @894 MHz * 10).

Per section 27.53(f) and RSS 130 4.7.2(b), for the frequency range 1559-1610 MHz the EIRP limit is -70dBW/MHz for wideband signals and -80dBW for discrete emissions of bandwidths less than 700Hz. This equates to an EIRP of -40dBm/MHz for wideband emissions and -50dBm/MHz for discrete emissions. The limit is adjusted to -46 dBm [-40 dBm -10 log (4)] for wideband signals and -56dBm [-50 dBm -10 log (4)] for discrete emissions per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. See spurious emission measurements.

The limit for the 9kHz to 150kHz frequency range was adjusted to –39dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 100kHz [i.e.: -39dBm = -19dBm -10log(100kHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to –29dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 100kHz [i.e.: -29dBm = -19dBm -10log(100kHz/10kHz)]. The required limit of -19dBm with a RBW of $\geq$ 100kHz was used for all other frequency ranges.

The testing was performed using only one modulation type because the Occupied Bandwidth variation between modulation types is small, the average output power variation between modulation types is small, there is good passing margins, and there was small variation in measurements over modulation types from previous certification testing for other channel types. (See ANSI C63.26. clause 5.7.2e).

# SPURIOUS CONDUCTED EMISSIONS

element

TbtTx 2022.05.02.0 XMit 2023.02.14.0

| | | | | | |
|---|---|---|---|---|---|
| EUT: | AirScale Base Transceiver Station Remote Radio Head Model AHBCC | | | Work Order: | NOKI0069 |
| Serial Number: | See Configuration | | | Date: | 08/15/2023 |
| Customer: | Nokia Solutions and Networks | | | Temperature: | 21.3°C |
| Attendees: | Mitchell Hill | | | Humidity: | 48.6% |
| Project: | None | | | Barometric Pres.: | 1022 mbar |
| Tested by: | Brandon Hobbs | Power: | 54VDC | Job Site: | TX07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 27:2023 | ANSI C63.26:2015 |
| RSS-130 Issue 2:2019 | ANSI C63.26:2015 |

**COMMENTS**

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n13 carriers are enabled at maximum power (40 Watts/carrier).

**DEVIATIONS FROM TEST STANDARD**

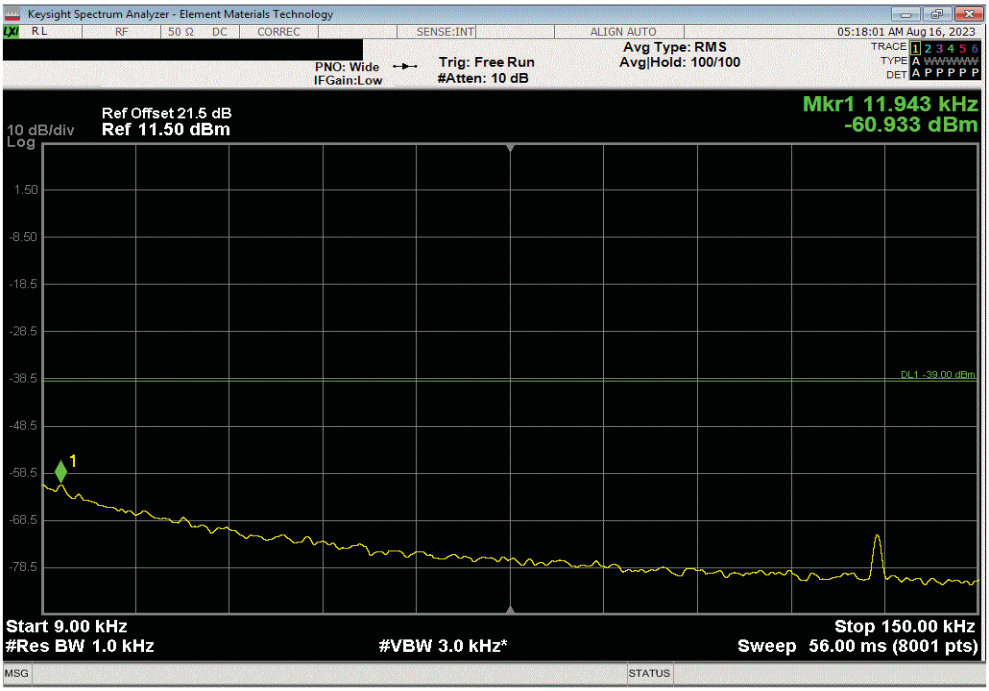
None

| Configuration # | |
|---|---|
| | NOKI0069-1 |
| | NOKI0069-2 |
| | NOKI0069-3 |

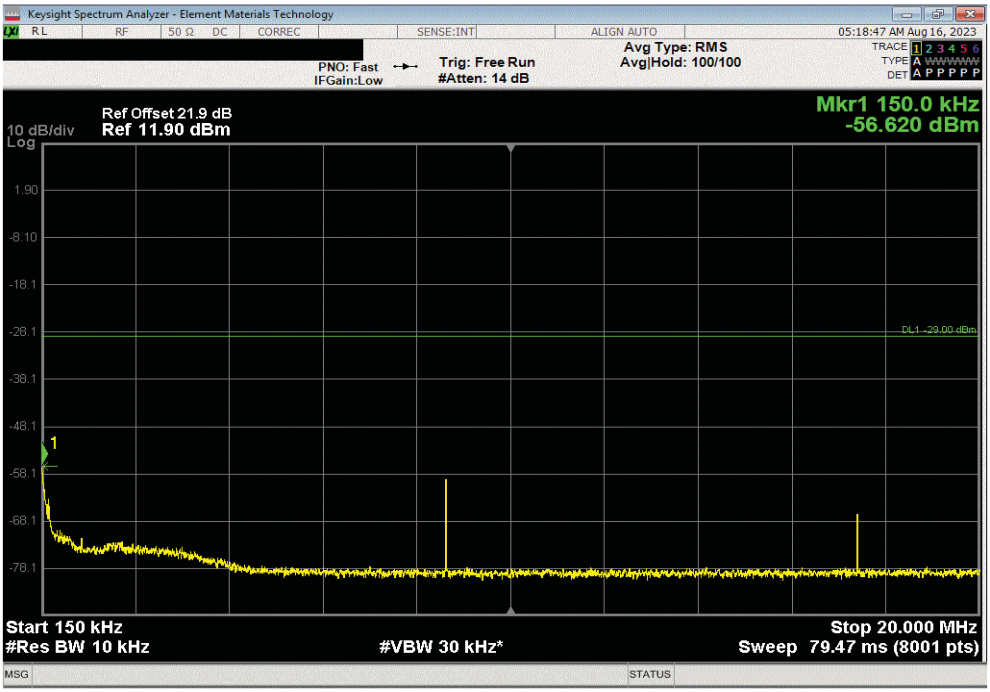
*Signature*

| | | Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
|---|---|---|---|---|---|---|
| Port 1 | | | | | | |
| Band n13, 746 - 756 MHz | | | | | | |
| 5 MHz Bandwidth | | | | | | |
| 256QAM Modulation | | | | | | |
| | Mid Channel, 751 MHz | 9kHz to 150kHz | 0.01 | -60.9 | -39 | Pass |
| | Mid Channel, 751 MHz | 150kHz to 20MHz | 0.15 | -56.6 | -29 | Pass |
| | Mid Channel, 751 MHz | 20MHz to 1.5GHz | 906.47 | -33.5 | -19 | Pass |
| | Mid Channel, 751 MHz | 1559MHz to 1610MHz | 1595.76 | -61.4 | -56 | Pass |
| | Mid Channel, 751 MHz | 1.5GHz to 9GHz | 2254.13 | -46.8 | -19 | Pass |
| 10 MHz Bandwidth | | | | | | |
| 256QAM Modulation | | | | | | |
| | Mid Channel, 751 MHz | 9kHz to 150kHz | 0.01 | -60.4 | -39 | Pass |
| | Mid Channel, 751 MHz | 150kHz to 20MHz | 0.15 | -56.8 | -29 | Pass |
| | Mid Channel, 751 MHz | 20MHz to 1.5GHz | 919.89 | -33.7 | -19 | Pass |
| | Mid Channel, 751 MHz | 1559MHz to 1610MHz | 1593.99 | -61.2 | -56 | Pass |
| | Mid Channel, 751 MHz | 1.5GHz to 9GHz | 2252.63 | -49.4 | -19 | Pass |

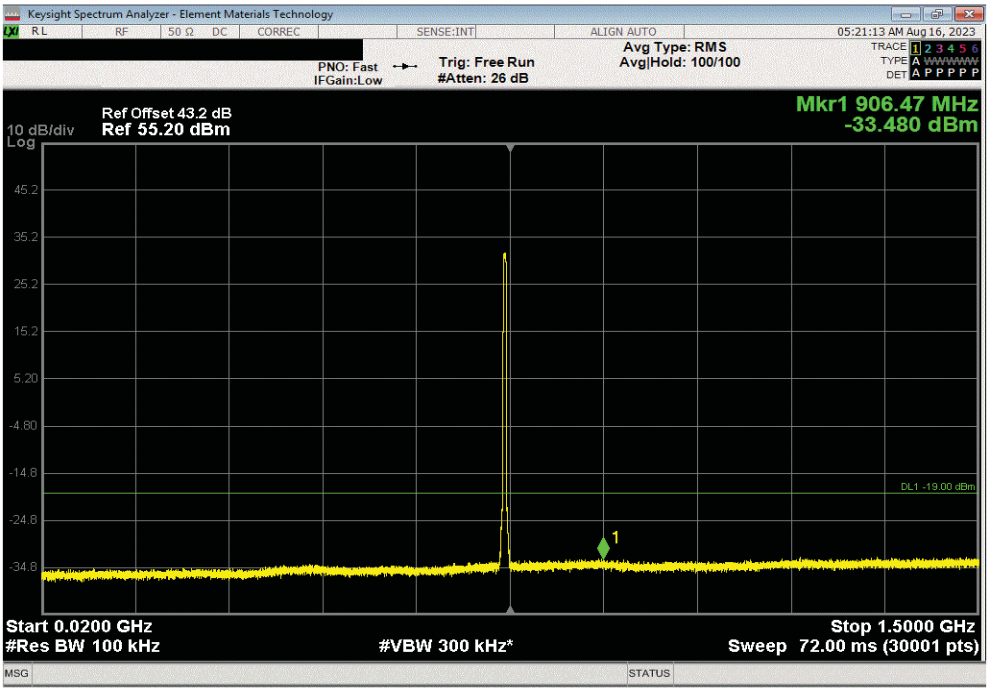
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | |
|---|---|---|---|---|---|
| Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 9kHz to 150kHz | | 0.01 | -60.93 | -39 | Pass |



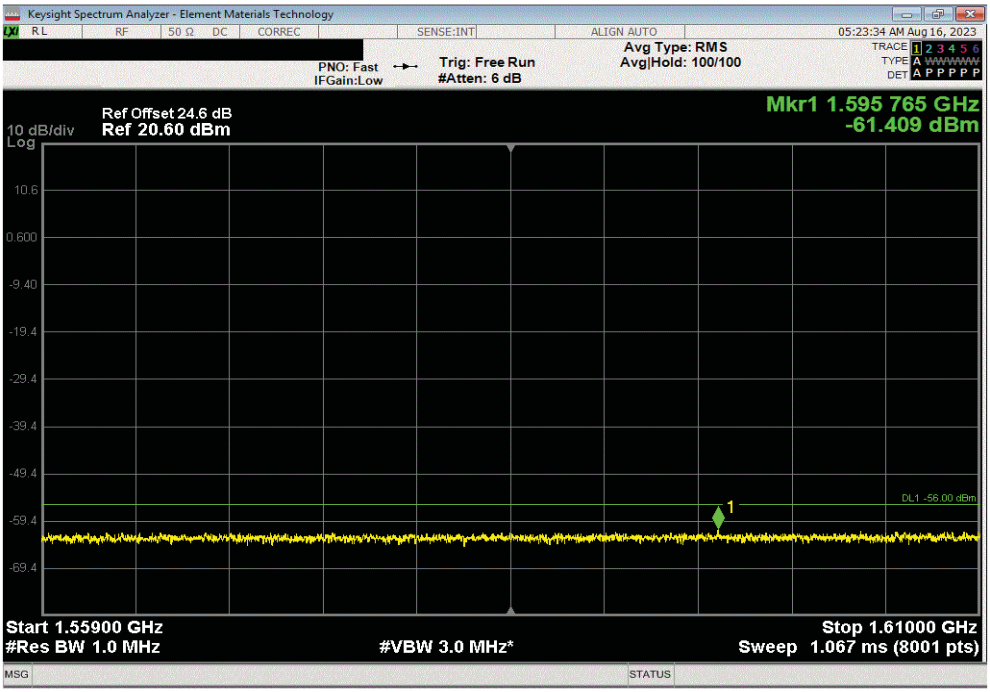

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 150kHz to 20MHz | 0.15 | -56.62 | -29 | Pass |



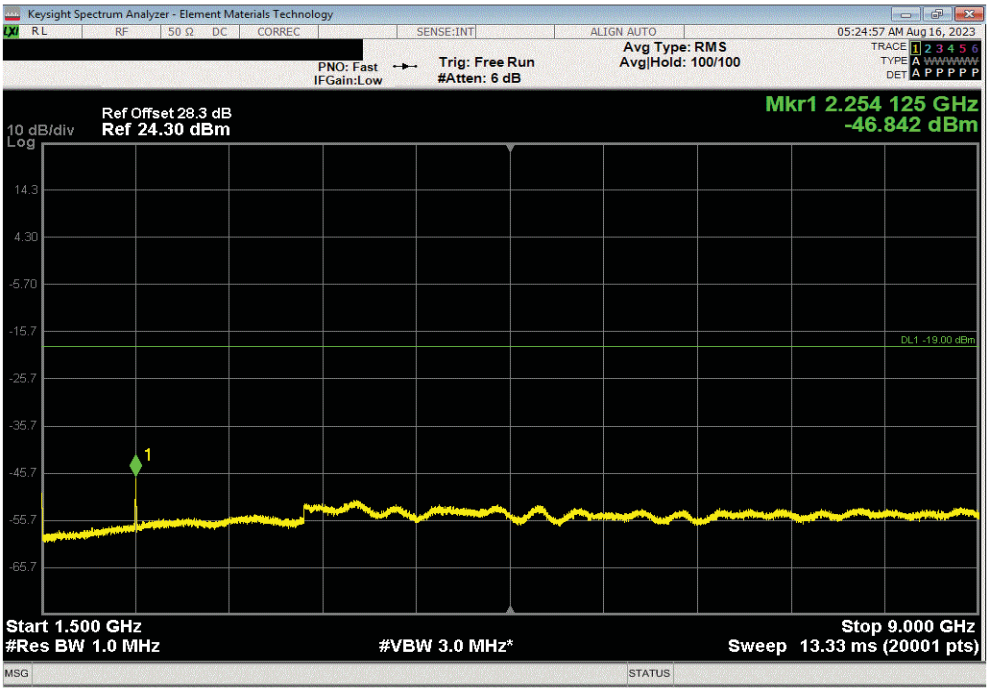
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 20MHz to 1.5GHz | 906.47 | -33.48 | -19 | Pass |



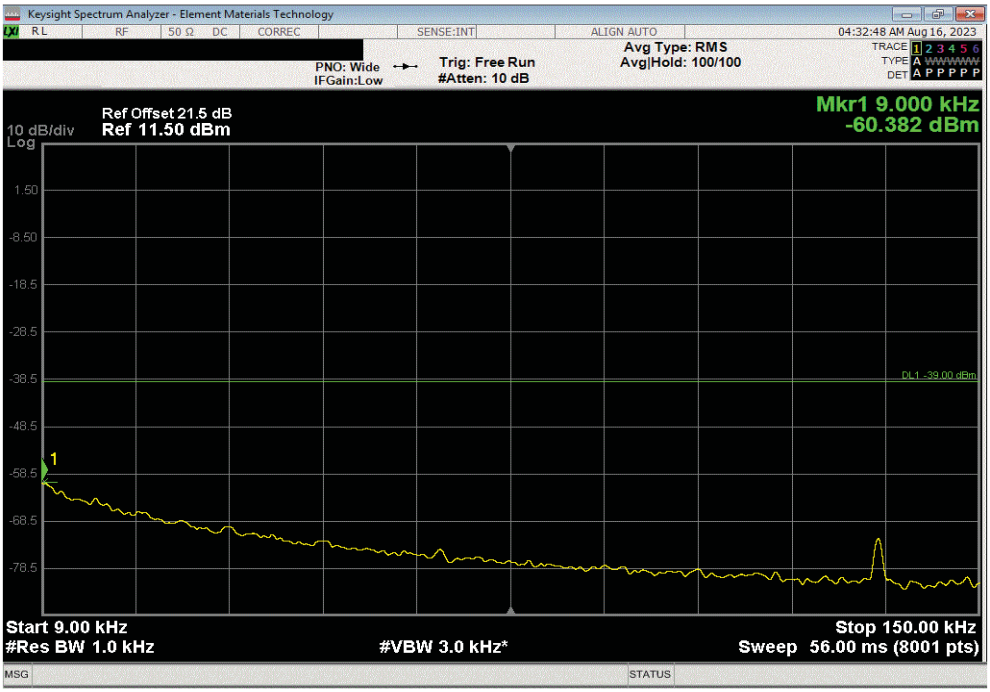

| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 1559MHz to 1610MHz | 1595.76 | -61.41 | -56 | Pass |



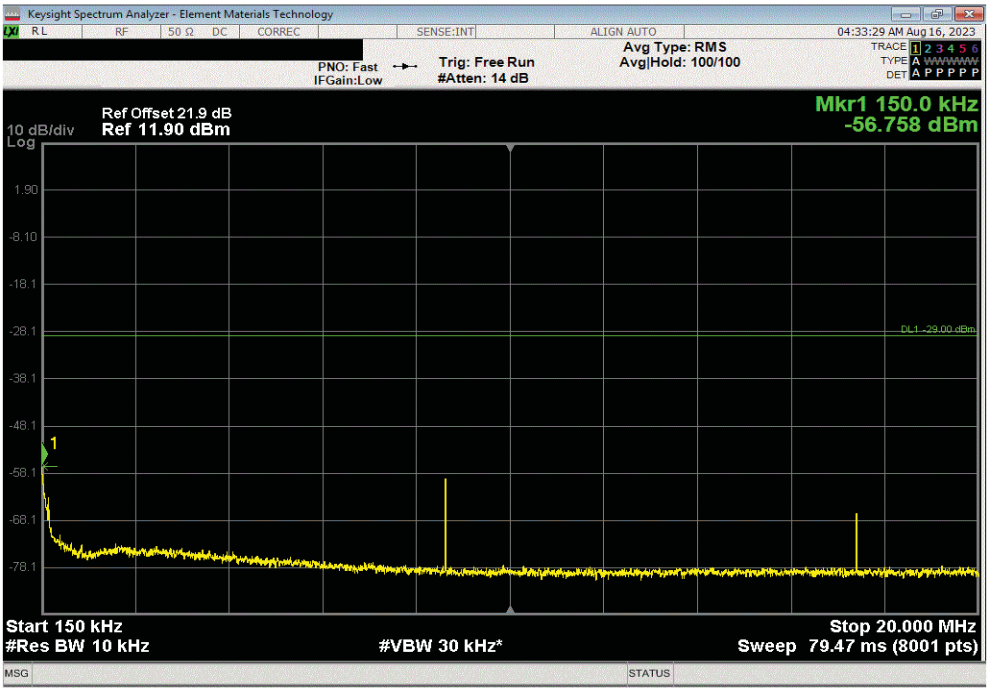
| Port 1, Band n13, 746 - 756 MHz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | |
|---|---|---|---|---|---|
| | Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 1.5GHz to 9GHz | 2254.13 | -46.84 | -19 | Pass |



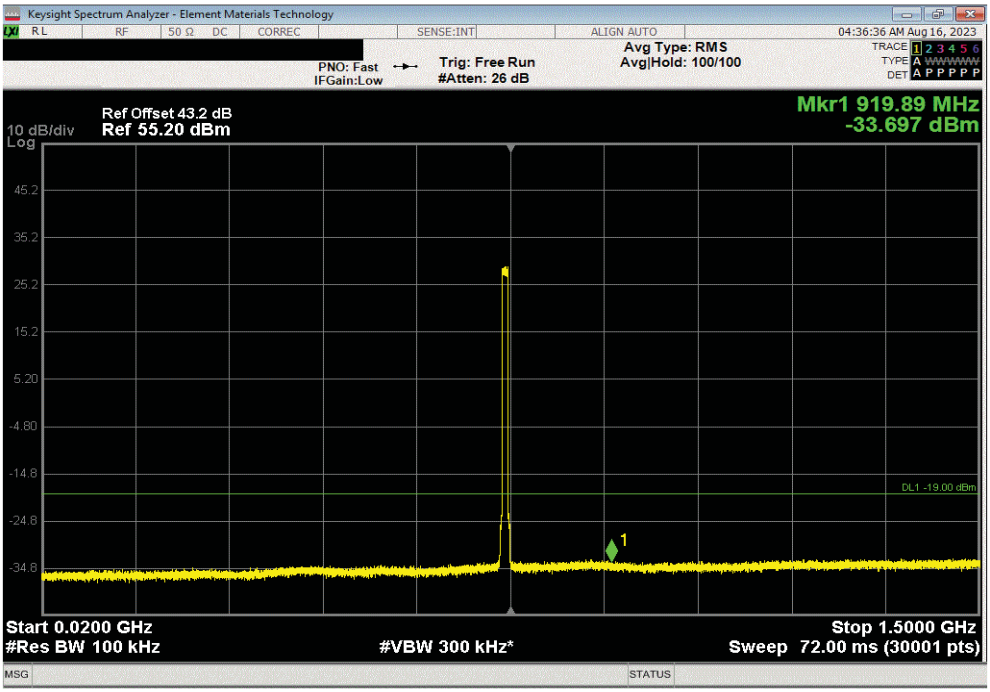

| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | | |
|---|---|---|---|---|---|
| | Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 9kHz to 150kHz | 0.01 | -60.38 | -39 | Pass |



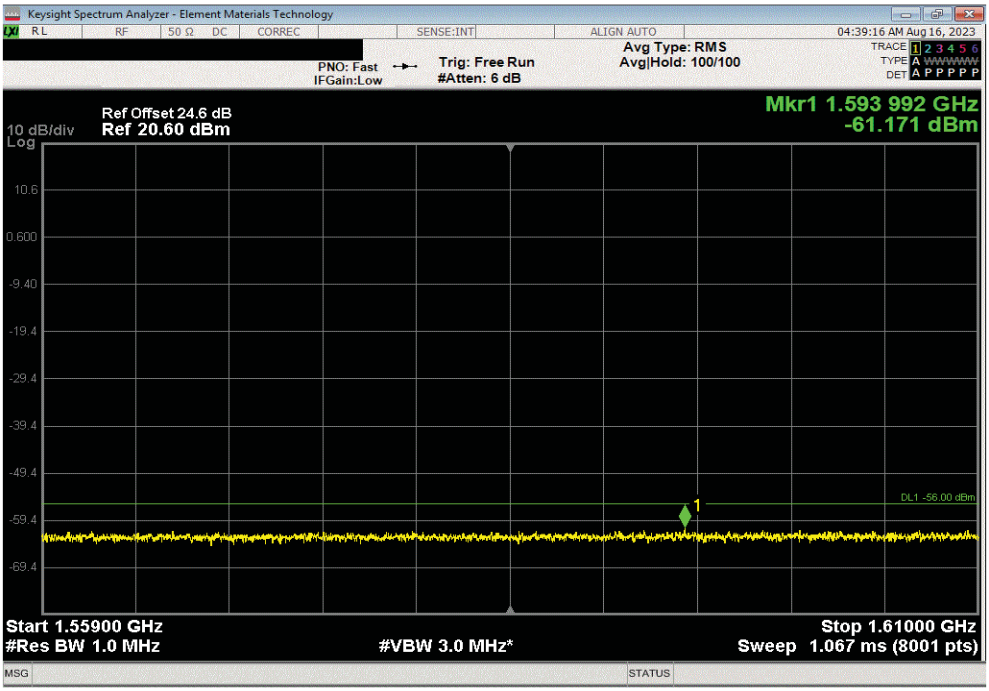
| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 150kHz to 20MHz | 0.15 | -56.76 | -29 | Pass |



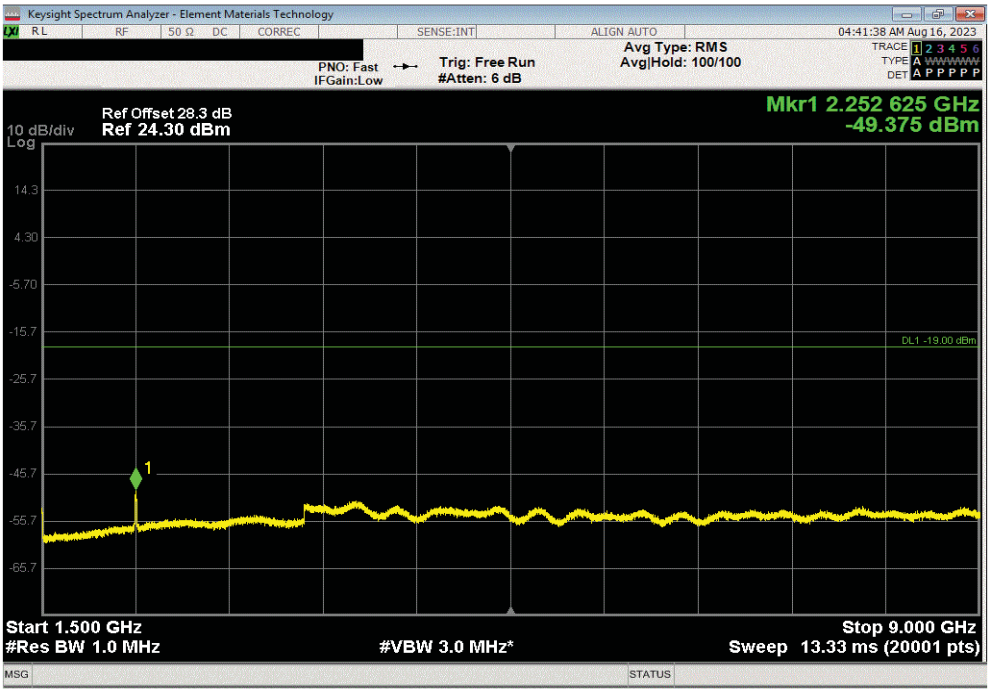

| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 20MHz to 1.5GHz | 919.89 | -33.7 | -19 | Pass |



| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 1559MHz to 1610MHz | 1593.99 | -61.17 | -56 | Pass |




| Port 1, Band n13, 746 - 756 MHz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 751 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 1.5GHz to 9GHz | 2252.63 | -49.38 | -19 | Pass |



# SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER

XMit 2023.02.14.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2023-02-09 | 2024-02-09 |
| Generator - Signal | Agilent | N5173B | TIW | 2023-08-07 | 2026-08-07 |
| Block - DC | Fairview Microwave | SD3379 | AMM | 2023-08-04 | 2024-08-04 |
| Block - DC | Fairview Microwave | SD3239 | ANE | 2023-02-16 | 2024-02-16 |

**TEST DESCRIPTION**

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 3 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 9 GHz. The conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.
The measurement methods are detailed in KDB 971168 D01v03 section 6 and ANSI C63.26-2015.
Per FCC 2.1057(a)(1) and RSS Gen 6.13, the upper level of measurement is the 10th harmonic of the highest fundamental frequency.
These measurements are for the frequency band after the first 1.0 MHz bands immediately outside and adjacent to the frequency block.
RF conducted emissions testing was performed only on one port. The AHBCC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in original certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.
Per section 27.53(c) and RSS 130 4.7.1, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Per FCC 2.1057(a)(1) and RSS Gen 6.13, the upper level of measurement is the $10^{th}$ harmonic of the highest fundamental frequency. As such, the upper level of the measurement is approximately 9 GHz (highest fundamental frequency is Band n5 @894 MHz * 10).

Per section 27.53(f) and RSS 130 4.7.2(b), for the frequency range 1559-1610 MHz the EIRP limit is -70dBW/MHz for wideband signals and -80dBW for discrete emissions of bandwidths less than 700Hz. This equates to an EIRP of -40dBm/MHz for wideband emissions and -50dBm/MHz for discrete emissions. The limit is adjusted to -46 dBm [-40 dBm -10 log (4)] for wideband signals and -56dBm [-50 dBm -10 log (4)] for discrete emissions per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. See spurious emission measurements.

The limit for the 9kHz to 150kHz frequency range was adjusted to –39dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 100kHz [i.e.: -39dBm = -19dBm -10log(100kHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to –29dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 100kHz [i.e.: -29dBm = -19dBm -10log(100kHz/10kHz)]. The required limit of -19dBm with a RBW of $\geq$ 100kHz was used for all other frequency ranges.

Per section FCC 22.917 and RSS 132 5.5, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. In the first 1.0 MHz bands immediately outside and adjacent to the frequency block, the RBW is 1% of the measured emission bandwidth per FCC 22.917(b) and RSS 132 5.5i. After the first 1.0 MHz bands immediately outside and adjacent to the frequency block, the RBW is 100kHz per 22.917(b) and RSS 132 5.5ii.

The testing was performed using only one modulation type because the Occupied Bandwidth variation between modulation types is small, the average output power variation between modulation types is small, there is good passing margins, and there was small variation in measurements over modulation types from previous certification testing for other channel types. (See ANSI C63.26. clause 5.7.2e).

Three 5MHz carriers with 2 carriers at the Bottom (871.5MHz and 876.5MHz) and 1 at the top (891.5MHz) of the Band n5 are operated at (13.3W/Carrier). Two NR 5MHz carriers in Band n13 (748.5 & 753.5MHz) are operated at (20W/Carrier) to provide a total maximum port power of 80Watts.

# SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER

TbtTx 2022.05.02.0 XMit 2023.02.14.0

| | | | | | |
|---|---|---|---|---|---|
| EUT: | AirScale Base Transceiver Station Remote Radio Head Model AHBCC | | | Work Order: | NOKI0069 |
| Serial Number: | See Configuration | | | Date: | 08/15/2023 |
| Customer: | Nokia Solutions and Networks | | | Temperature: | 21.7°C |
| Attendees: | Mitchell Hill | | | Humidity: | 48.2% |
| Project: | None | | | Barometric Pres.: | 1022 mbar |
| Tested by: | Brandon Hobbs | Power: | 54VDC | Job Site: | TX07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 27:2023 | ANSI C63.26:2015 |
| RSS-130 Issue 2:2019 | ANSI C63.26:2015 |

**COMMENTS**

All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. Band n13 carriers are operating at (20 watts/carrier), Band n5 are operating at (13.3 watts/carrier) for a total port power of 80 watts.

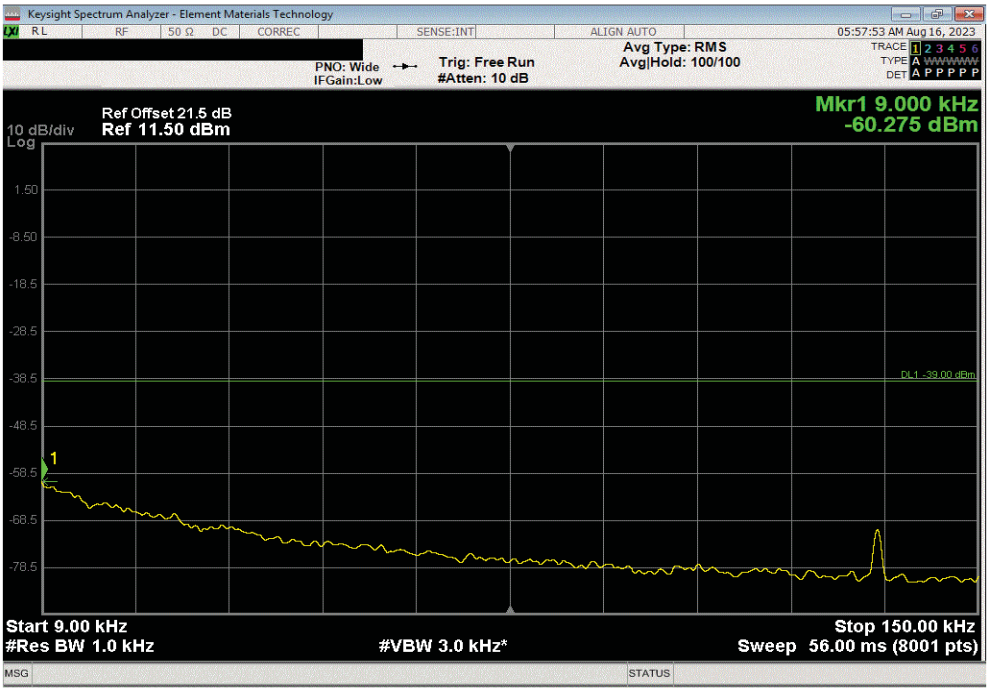
**DEVIATIONS FROM TEST STANDARD**

None

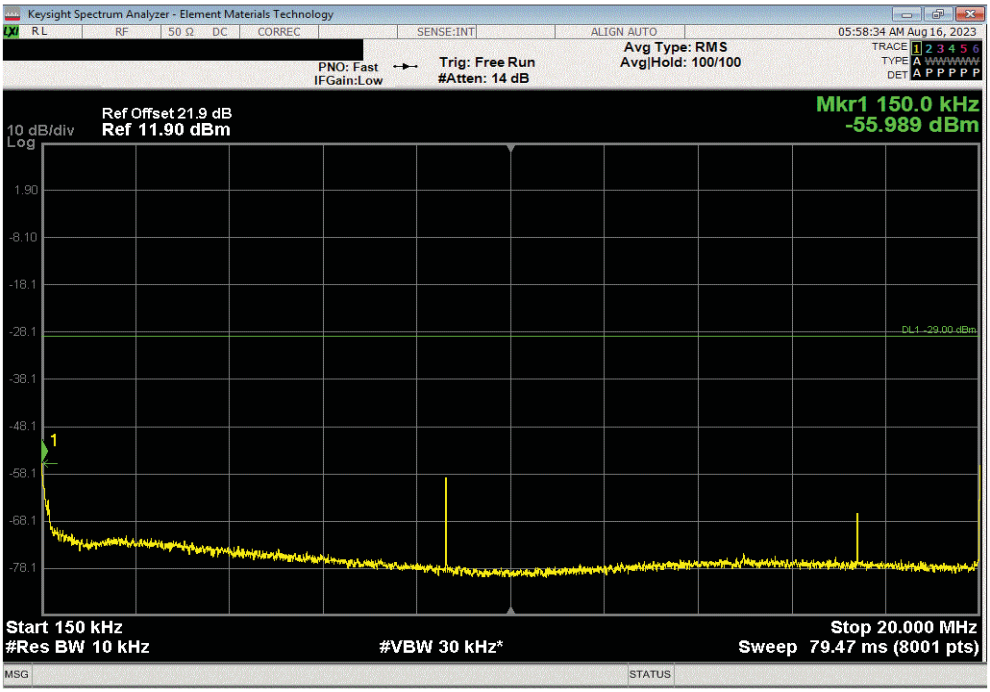
| Configuration # | NOKI0069-1<br>NOKI0069-2<br>NOKI0069-3 | Signature |
|---|---|---|

| | | Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
|---|---|---|---|---|---|---|
| Port 1 | | | | | | |
| | QPSK Modulation | | | | | |
| | Multi-Carrier Test Case 1 | 9kHz to 150kHz | 0.01 | -60.3 | -39 | Pass |
| | Multi-Carrier Test Case 1 | 150kHz to 20MHz | 0.15 | -56.0 | -29 | Pass |
| | Multi-Carrier Test Case 1 | 20MHz to 1.5GHz | 1120.58 | -33.8 | -19 | Pass |
| | Multi-Carrier Test Case 1 | 1559MHz to 1610MHz | 1567.04 | -61.5 | -56 | Pass |
| | Multi-Carrier Test Case 1 | 1.5GHz to 9GHz | 2375.63 | -48.9 | -19 | Pass |

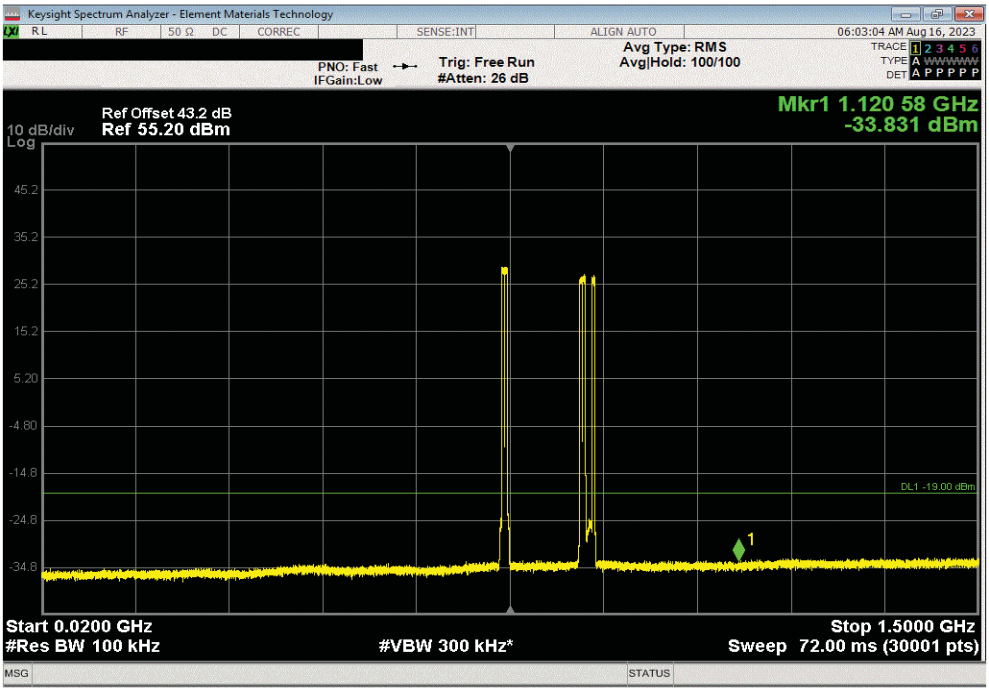
| Port 1, QPSK Modulation, Multi-Carrier Test Case 1 | | | | | |
|---|---|---|---|---|---|
| Frequency Range | | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 9kHz to 150kHz | | 0.01 | -60.28 | -39 | Pass |



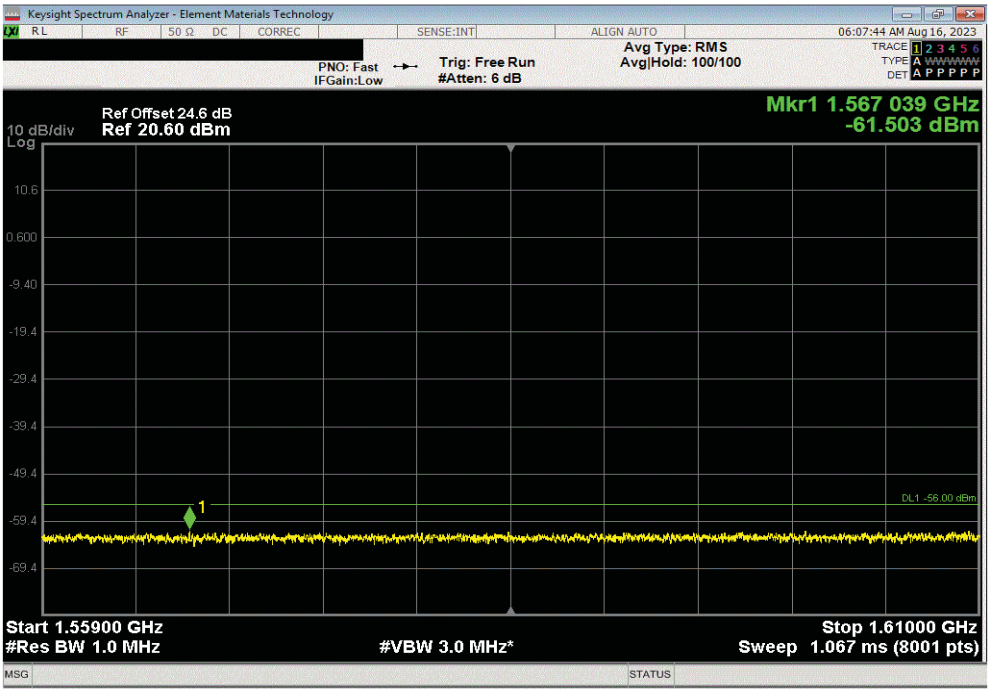

| Port 1, QPSK Modulation, Multi-Carrier Test Case 1 | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 150kHz to 20MHz | 0.15 | -55.99 | -29 | Pass |



| Port 1, QPSK Modulation, Multi-Carrier Test Case 1 | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 20MHz to 1.5GHz | 1120.58 | -33.83 | -19 | Pass |



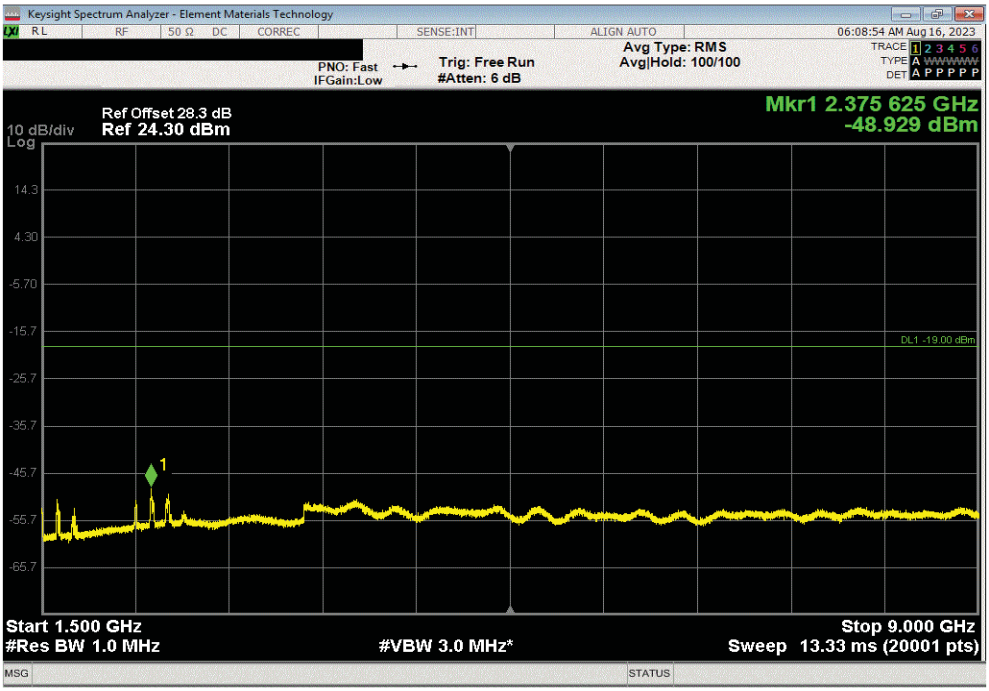

| Port 1, QPSK Modulation, Multi-Carrier Test Case 1 | | | | |
|---|---|---|---|---|
| Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| 1559MHz to 1610MHz | 1567.04 | -61.5 | -56 | Pass |



# SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER



| Port 1, QPSK Modulation, Multi-Carrier Test Case 1 | | | | | |
|---|---|---|---|---|---|
| | Frequency Range | Measured Freq (MHz) | Max Value (dBm) | Limit < (dBm) | Result |
| | 1.5GHz to 9GHz | 2375.63 | -48.93 | -19 | Pass |



End of Test Report