

Radio Test Report Application for a Permissive Change of Equipment Authorization FCC Part 24 and IC RSS-133 [1930MHz – 1995MHz]

FCC Part 27 and IC RSS 139 [2110MHz – 2200MHz] FCC ID: VBNAHFIB-01 IC ID: 661W-AHFIB Nokia Solutions and Networks Airscale Base Transceiver Station Remote Radio Head Model: AHFIB

Report: NOKI0049.0, Issue Date: November 7, 2022





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CERTIFICATE OF TEST



Last Date of Test: September 30, 2022 Nokia Solutions and Networks EUT: Airscale Base Transceiver Station Remote Radio Head Model AHFIB

Radio Equipment Testing

Standards

| Specification | Method |
|--|---|
| Code of Federal Regulations (CFR) Title 47 Part 2 (Radio Standards Specification) RSS-Gen Issue 5 CFR Title 47 Part 24 Subpart E – Broadband PCS RSS-133 Issue 6 - January 18, 2018 – 2GHz Personal Communications Services CFR Title 47 Part 27 RSS-139 Issue 4 - September 29, 2022– Advanced Wireless Services (AWS) SRSP 513 Issue 4 - September 29, 2022 SRSP 519 Issue 2 - September 29, 2022 | ANSI C63.26-2015 with FCC KDB 971168 D01 v03r01 FCC KDB 971168 D03 v01 FCC KDB 662911D01 v02r01 FCC KDB 662911D02 v01 |

Results

| Test Description | Applied | Results | Comments |
|----------------------------------|---------|---------|----------------|
| Duty Cycle | No | N/A | Not requested. |
| Occupied Bandwidth | Yes | Pass | |
| Frequency Stability | No | N/A | Not requested. |
| Output Power | Yes | Pass | |
| Power Spectral Density | Yes | Pass | |
| Peak to Average Power (PAPR)CCDF | Yes | Pass | |
| Band Edge Compliance | Yes | Pass | |
| Spurious Conducted Emissions | Yes | Pass | |

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.

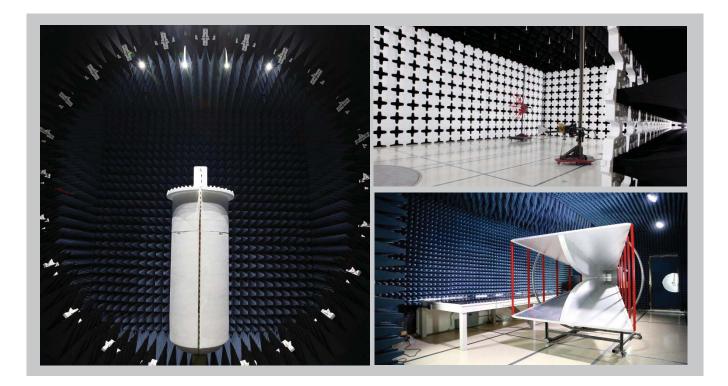
| | | SCOPE | | | | | |
|-------------------|--|--------|-------|------------|--|--|--|
| | For details on the Scopes of our Accreditations, please visit: | | | | | | |
| <u>California</u> | <u>Minnesota</u> | Oregon | Texas | Washington | | | |

FACILITIES





| California Labs OC01-17 41 Tesla | Minnesota Labs MN01-11 9349 W Broadway Ave, | Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 | Texas Labs TX01-09 3801 E Plano Pkwy | Washington Labs NC01-05 19201 120 th Ave NE | | | | | |
|--|---|---|--|---|--|--|--|--|--|
| Irvine, CA 92618 (949) 861-8918 | Brooklyn Park, MN 55445 (612)-638-5136 | Hillsboro, OR 97124 (503) 844-4066 | Plano, TX 75074 (469) 304-5255 | Bothell, WA 98011 (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



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 | + 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

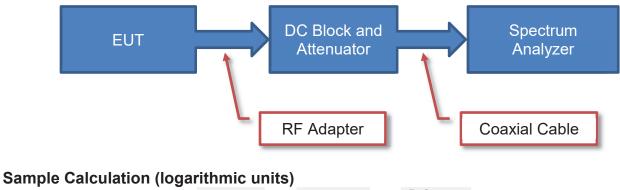


Measurement Bandwidths

| 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 |

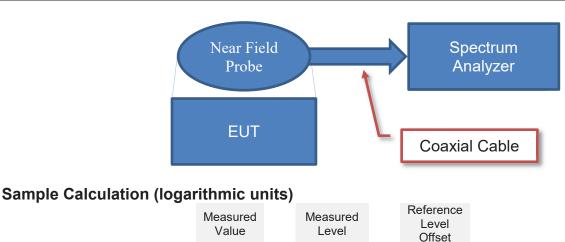
Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

Antenna Port Conducted Measurements



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

Near Field Test Fixture Measurements



42.6

+

28.6

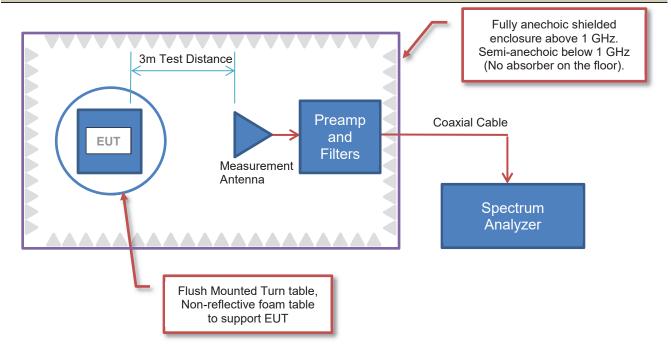
71.2

=

TEST SETUP BLOCK DIAGRAMS



Emissions Measurements

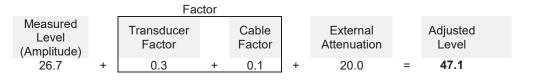


Sample Calculation (logarithmic units)

Radiated Emissions:

| | | | | Factor | | | | | | | | |
|----------------------------------|---|-------------------|---|-----------------|---|-------------------|---|----------------------------------|---|-------------------------|---|-------------------|
| Measured Level (Amplitude) | | Antenna Factor | | Cable 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:



Radiated Power (ERP/EIRP) – Substitution Method:

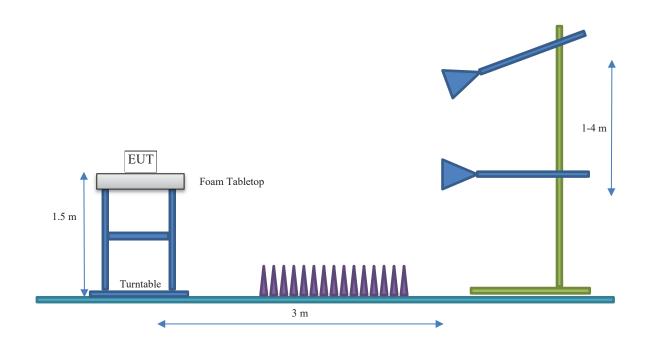
| Measured Level into Substitution Antenna (Amplitude dBm) | | Substitution Antenna Factor (dBi) | | EIRP to ERP (if applicable) | | Measured power (dBm ERP/EIRP) |
|--|---|---|---|-----------------------------|---|----------------------------------|
| 10.0 | + | 6.0 | - | 2.15 | = | 13.9/16.0 |

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



| Company Name: | Nokia of America Corporation |
|--------------------------|---|
| Address: | 3201 Olympus Blvd. |
| City, State, Zip: | Dallas, TX 75019 |
| Test Requested By: | Steve Mitchell |
| EUT: | Airscale Base Transceiver Station Remote Radio Head Model AHFIB |
| First Date of Test: | September 28, 2022 |
| Last Date of Test: | September 30, 2022 |
| Receipt Date of Samples: | September 28, 2022 |
| Equipment Design Stage: | Production |
| Equipment Condition: | No Damage |
| Purchase Authorization: | Verified |

Client and Equipment under Test (EUT) Information

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) 30MHz channel bandwidth carriers to the AirScale Base Transceiver Station Remote Radio Head Model AHFIB FCC and ISED radio certifications. The original test effort includes testing for 4G LTE technologies. Please refer to the test report on the original certification for details on all required testing.

All conducted RF testing performed for the original certification testing has been repeated using 5G NR 30MHz channel bandwidth 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 (AHFIB) as the original certification test. The base station and remote radio head software for this testing is an updated release that includes 5G NR 30MHz channel bandwidth carrier support.

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.

Nokia Solutions and Networks AirScale Base Transceiver Station (BTS) Remote Radio Head (RRH) module, model AHFIB is being developed under this effort. The AHFIB remote radio head is a multi-standard multi-carrier radio module designed to support GSM/EDGE, WCDMA, LTE, LTE Narrow Band Internet of Things (NB IoT) operations (in-band, guard band, standalone) and 5G NR. The scope of testing in this effort is for 5G NR FDD operations.

The AHFIB RRH has four transmit/four receive antenna ports (4TX/4RX for Band n25 and 4TX/4RX for Band n66). Each antenna port supports 3GPP frequency band n25 (BTS Rx: 1850 to 1915 MHz/BTS TX: 1930 to 1995 MHz) and 3GPP frequency band n66 (BTS Rx: 1710 to 1780 MHz/BTS TX: 2110 to 2200 MHz). The maximum RF output power of the RRH is 320 Watts (40 watts per carrier, 80 watts per antenna port x 4 port). The maximum power per band (Band n25 or Band n66) is 40 watts. The maximum single carrier power level is 40 watts. The TX and RX instantaneous bandwidth cover the full operational RRH bandwidth. Multi-carrier operation is supported.

The RRH can be operated as a 4x4 MIMO, 2x2 MIMO or as non-MIMO for 5G NR FDD. The RRH supports 5, 10, 15, 20, and 30MHz 5G NR bandwidths. The RRH supports four 5G NR downlink modulation types (QPSK, 16QAM, 64QAM and 256QAM). The 5G NR carriers/modulation types for this testing are setup according to 3GPP TS 38.141-1 Test Models and are 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). The RRH has external interfaces including DC power (DC In), ground, transmit/receive (ANT), external alarm (EAC), optical (OPT) and remote electrical tilt (RET). The RRH with applicable installation kit may be pole or wall mounted.

PRODUCT DESCRIPTION



Multicarrier Tests Configurations:

Multicarrier Test Case 1 (PCS Multicarrier LBE): In the PCS band _Two NR 30MHz carriers (with minimum spacing between carrier frequencies) at the lower band edge (1945.0 & 1975.0MHz). In AWS band NR 5MHz carrier is enable at middle channel (2155.0MHz) at full power (40W). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~20W/PCS carrier and 40W/AWS carrier) with a total port power of 80 watts.

Multicarrier Test Case 2 (PCS Multicarrier UBE): In the PCS band _Two NR 30MHz carriers (with minimum spacing between carrier frequencies) at the upper band edge (1950.0 & 1980.0MHz). In AWS band NR 5MHz carrier is enable at middle channel (2155.0MHz) at full power (40W). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~20W/PCS carrier and 40W/AWS carrier) with a total port power of 80 watts.

Multicarrier Test Case 3 (AWS Multicarrier LBE): In the AWS band _Two NR 30MHz carriers (with minimum spacing between carrier frequencies) at the lower band edge (2125.0 & 2155.0MHz). In PCS band NR 5MHz carrier is enable at middle channel (1962.5MHz) at full power (40W). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~20W/AWS carrier and 40W/PCS carrier) with a total port power of 80 watts.

Multicarrier Test Case 4 (AWS Multicarrier UBE): In the AWS band _Two NR 30MHz carriers (with minimum spacing between carrier frequencies) at the upper band edge (2155.0 & 2185.0MHz). In PCS band NR 5MHz carrier is enable at middle channel (1962.5MHz) at full power (40W). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~20W/AWS carrier and 40W/PCS carrier) with a total port power of 80 watts.

Multicarrier Multiband Test Case 5 : In the PCS band _Three NR 5MHz carriers with Two NR 5MHz (minimum spacing between carrier frequencies) at the lower band edge (1932.5 & 1937.5 MHz) and one NR 5MHz carrier (maximum spacing with other two) at the upper band edge (1992.5 MHz) . In AWS band_ Three NR 5MHz carriers with Two NR 5MHz (minimum spacing between carrier frequencies) at the lower band edge (2112.5 & 2117.5 MHz) and one NR 5MHz carrier (maximum spacing between carrier frequencies) at the upper band edge (2112.5 & 2117.5 MHz) and one NR 5MHz carrier (maximum spacing with other two) at the upper band edge (2197.5 MHz) and one NR 5MHz carrier (maximum spacing with other two) at the upper band edge (2197.5 MHz). The smallest channel bandwidth was selected to maximize carrier power spectral density. The carriers are operated at maximum power (~13.3W/AWS carrier and ~13.3W/PCS carrier) with a total port power of 80 watts.



| | Downlink | Downlink | 5G NR Channel Bandwidth | | | | | | | | |
|----------------------------------|-----------------------|--------------------|-------------------------|-------------|-------------|-------------|-------------|--|--|--|--|
| | 5G NR NR- ARFCN | Frequency (MHz) | 5 MHz | 10 MHz | 15 MHz | 20 MHz | 30 MHz | | | | |
| | 386000 | 1930.0 | Band Edge | Band Edge | Band Edge | Band Edge | Band Edge | | | | |
| | 386500 | 1932.5 | Bottom Ch | | | | | | | | |
| | 387000 | 1935.0 | | Bottom Ch | | | | | | | |
| h 4) | 387500 | 1937.5 | | | Bottom Ch | | | | | | |
| throug | 388000 | 1940.0 | | | | Bottom Ch | | | | | |
| 5 (Ant 1 | 389000 | 1945.0 | | | | | Bottom Ch | | | | |
| and n2 | 392500 | 1962.5 | Middle Ch | Middle Ch | Middle Ch | Middle Ch | Middle Ch | | | | |
| AHFIB Band n25 (Ant 1 through 4) | 396000 | 1980.0 | | | | | Top Channel | | | | |
| V | 397000 | 1985.0 | | | | Top Channel | | | | | |
| | 397500 | 1987.5 | | | Top Channel | | | | | | |
| | 398000 | 1990.0 | | Top Channel | | | | | | | |
| | 398500 | 1992.5 | Top Channel | | | | | | | | |
| | 399000 | 1995.0 | Band Edge | Band Edge | Band Edge | Band Edge | Band Edge | | | | |

The PCS Band 5G NR channel bandwidths are 5, 10, 15, 20 and 30MHz. The downlink channel numbers are provided in table 1.

Table 1: AHFIB Downlink Band Edge 5G NR Band n25 Frequency Channels

PRODUCT DESCRIPTION



The AWS Band 5G NR channel bandwidths are 5, 10, 15, 20 and 30MHz. The downlink channel numbers are provided in table 2.

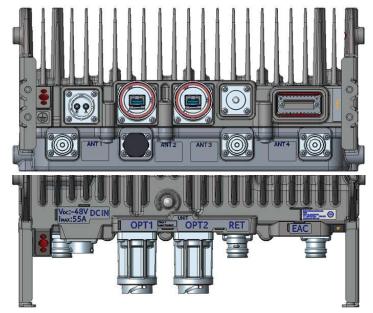
| | Downlink | Downlink | | 5G N | R Channel Ba | ndwidth | |
|--|-----------------------|--------------------|-------------|-------------|--------------|-------------|-------------|
| | 5G NR NR- ARFCN | Frequency (MHz) | 5 MHz | 10 MHz | 15 MHz | 20 MHz | 30 MHz |
| | 422000 | 2110.0 | Band Edge | Band Edge | Band Edge | Band Edge | Band Edge |
| | | | | | | | |
| | 422500 | 2112.5 | Bottom Ch | | | | |
| | 423000 | 2115.0 | | Bottom Ch | | | |
| | 423500 | 2117.5 | | | Bottom Ch | | |
| AHFIB 5G NR Band n66 (Ant 1 through 4) | 424000 | 2120.0 | | | | Bottom Ch | |
| (Ant 1 th | 425000 | 2125.0 | | | | | Bottom Ch |
| nd n66 (| 431000 | 2155.0 | Middle Ch | Middle Ch | Middle Ch | Middle Ch | Middle Ch |
| S NR Ba | 437000 | 2185.0 | | | | | Top Channel |
| IFIB 5C | 438000 | 2190.0 | | | | Top Channel | |
| AF | 438500 | 2192.5 | | | Top Channel | | |
| | 439000 | 2195.0 | | Top Channel | | | |
| | 439500 | 2197.5 | Top Channel | | | | |
| | 440000 | 2200.0 | Band Edge | Band Edge | Band Edge | Band Edge | Band Edge |

Table 2: AHFIB Downlink Band Edge 5G NR Band n66 Frequency Channels

PRODUCT DESCRIPTION



AHFIB 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) 30MHz channel bandwidth carrier operations to the Nokia Solutions and Networks AirScale Base Transceiver Station (BTS) Remote Radio Head (RRH) model AHFIB FCC and ISED radio certifications.



Test Configuration 1 RF Conducted Emissions

| Software/Firmware Running during test | | | | |
|---------------------------------------|-------------------------------|--|--|--|
| Description | Version | | | |
| 5G BTS Software Version (22R4) | SBTS00_ENB_9999_221004_000018 | | | |
| 5G RF_SW | RF.FRM5.trunk.20221003.005 | | | |

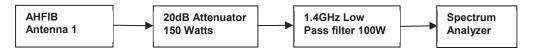
| Description | Manufacturer | Model/Part Number | Serial Number |
|---------------------------------|--------------------------|-------------------|---------------|
| | Nokia Solutions and | | |
| AMIA (BTS System Module) | Networks | 473098A.203 | RK182307104 |
| | Nokia Solutions and | 110000, 1200 | |
| ASIB (5G BTS System Module) | Networks | 473764A.102 | DH211165881 |
| | Nokia Solutions and | | |
| ABIO (5G BTS Baseband Module) | Networks | 475266A.102 | L1205105845 |
| | Nokia Solutions and | | |
| ABIO (5G BTS Baseband Module) | Networks | 475266A.102 | L1205105870 |
| · · · | Nokia Solutions and | 4740404 404 | 1/0101401111 |
| AHFIB (Radio Remote Head) | Networks | 474216A.101 | K9181401111 |
| Low Pass Filter 1.4GHz/100W | Microwave Circuits, Inc. | L13502G1 | SN2454-01 |
| Attenuator 150W/20dB | Weinschel Corp | 66-20-33 | BZ2075 |
| AOMC SFP28 70M,MM | Nokia (radio) | 474900A.101 | VF2023002TA |
| AOMC SFP28 70M,MM | Nokia (radio) | 474900A.101 | VF20230058S |
| AOMC SFP28 70M,MM | Nokia (Baseband mod) | 474900A.101 | FR214716515 |
| AOMC SFP28 70M,MM | Nokia (Baseband mod) | 474900A.101 | RF214719832 |
| Lenovo T490 | HP | T490 | PF26RVZ0 |
| Keysight N8757- DC System power | Keysight | N8757A | US21D4054S |
| supply | | N8757A | 0321040043 |
| FPAC (DC-pwr supply) | Nokia | 472438A.101 | G7111007146 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297388 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297386 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297387 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC864 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC869 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC870 |
| GPS cable 100m | FTSH | 472577A.103 | CA2029 |
| FYGC GPS receiver | Nokia | 474074A | 1294000684 |
| Cat-5e cable | CSA | LL73189 | E151955 |
| 2 Meters RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297372 |
| 1 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_104 | SN551432/4 |
| (2) Fiber Optic cable 2m | Amphenol Fiber Optic | VZ1701 | 995741A |

| Cables (Peripheral) | | | | | |
|-------------------------------|-----------------|------------|------------------|------------------------|-----------------------|
| Description | Shield (Y/N) | Length (m) | Ferrite (Y/N) | Connection 1 (5G) | Connection 2 |
| (2) Fiber Optic Cables | Ν | 2 meters | N | ABIO | AHFIB |
| Cat-5e Cable | Y | 7 meters | N | ASIB | WebEM- PC |
| HS-SUCOFLEX_106 (RF Cable) | Υ | 2 meters | Ν | EUT [AHFIB] Ant 2-4 | 250W -50ohm - Load |



| Cables | Cables | | | | | |
|-----------------------------|-----------------|------------|------------------|--------------------------------|--------------------------------|--|
| Description | Shield (Y/N) | Length (m) | Ferrite (Y/N) | Connection 1 | Connection 2 | |
| HS-SUCOFLEX_106 (RF cable) | Y | 2 meter | Ν | EUT [AHFIB] Ant port #1 | Attenuator 150W/20dB | |
| Attenuator 150W/20dB | Ν | N/A | Ν | HS-SUCOFLEX_106 (RF cable) | 1.4GHz Low Pass filter 100W | |
| 1.4GHz Low Pass filter 100W | Ν | N/A | Ν | Attenuator 150W/20dB | HS-SUCOFLEX_104 (RF cable) | |
| HS-SUCOFLEX_104 (RF cable) | Y | 1 meter | Ν | 1.4GHz Low Pass filter 100W | Spectrum Analyzer | |

RF Test Setup Diagram:





Test Configuration 2 RF Conducted Emissions

| Software/Firmware Running during test | | | | |
|---------------------------------------|-------------------------------|--|--|--|
| Description | Version | | | |
| 5G BTS Software Version (22R4) | SBTS00_ENB_9999_221004_000018 | | | |
| 5G RF_SW | RF.FRM5.trunk.20221003.005 | | | |

| Equipment being tested (includ Description | Manufacturer | Model/Part Number | Serial Number |
|---|------------------------------|-------------------|---------------|
| AMIA (BTS System Module) | Nokia Solutions and Networks | 473098A.203 | RK182307104 |
| ASIB (5G BTS System Module) | Nokia Solutions and Networks | 473764A.102 | DH211165881 |
| ABIO (5G BTS Baseband Module) | Nokia Solutions and Networks | 475266A.102 | L1205105845 |
| ABIO (5G BTS Baseband Module) | Nokia Solutions and Networks | 475266A.102 | L1205105870 |
| AHFIB (Radio Remote Head) | Nokia Solutions and Networks | 474216A.101 | K9181401111 |
| Low Pass Filter 1.4GHz/100W | Microwave Circuits, Inc. | L13502G1 | SN2454-01 |
| Attenuator 150W/20dB | Weinschel Corp | 66-20-33 | BZ2075 |
| AOMC SFP28 70M,MM | Nokia (radio) | 474900A.101 | VF2023002TA |
| AOMC SFP28 70M,MM | Nokia (radio) | 474900A.101 | VF20230058S |
| AOMC SFP28 70M,MM | Nokia (Baseband mod) | 474900A.101 | FR214716515 |
| AOMC SFP28 70M,MM | Nokia (Baseband mod) | 474900A.101 | RF214719832 |
| Lenovo T490 | HP | T490 | PF26RVZ0 |
| Keysight N8757- DC System power | Keysight | N8757A | US21D4054S |
| supply | | NOTSTA | 0321040343 |
| FPAC (DC-pwr supply) | Nokia | 472438A.101 | G7111007146 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297388 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297386 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297387 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC864 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC869 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC870 |
| GPS cable 100m | FTSH | 472577A.103 | CA2029 |
| FYGC GPS receiver | Nokia | 474074A | 1294000684 |
| Cat-5e cable | CSA | LL73189 | E151955 |
| 2 Meters RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297372 |
| 1 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_104 | SN551432/4 |
| (2) Fiber Optic cable 2m | Amphenol Fiber Optic | VZ1701 | 995741A |

| Cables (Peripheral) | | | | | |
|----------------------------|-----------------|---------------|------------------|------------------------|-------------------|
| Description | Shield (Y/N) | Length (m) | Ferrite (Y/N) | Connection 1 (5G) | Connection 2 |
| (2) Fiber Optic Cables | N | 2 meters | N | ABIO | AHFIB |
| Cat-5e Cable | Y | 7 meters | N | ASIB | WebEM- PC |
| HS-SUCOFLEX_106 (RF Cable) | Y | 2 meters | N | EUT [AHFIB] Ant 2-4 | 250W -50ohm -Load |



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

RF Test Setup Diagram:





Test Configuration 3 RF Conducted Emissions

| Software/Firmware Running during test | | | | |
|---------------------------------------|-------------------------------|--|--|--|
| Description | Version | | | |
| 5G BTS Software Version (22R4) | SBTS00_ENB_9999_221004_000018 | | | |
| 5G RF_SW | RF.FRM5.trunk.20221003.005 | | | |

| Description | Manufacturer | Model/Part Number | Serial Number |
|---------------------------------------|-------------------------|-------------------|---------------|
| | Nokia Solutions and | | |
| AMIA (BTS System Module) | Networks | 473098A.203 | RK182307104 |
| | Nokia Solutions and | | |
| ASIB (5G BTS System Module) | Networks | 473764A.102 | DH211165881 |
| · · · · · · · · · · · · · · · · · · · | Nokia Solutions and | | |
| ABIO (5G BTS Baseband Module) | Networks | 475266A.102 | L1205105845 |
| | Nokia Solutions and | | |
| ABIO (5G BTS Baseband Module) | Networks | 475266A.102 | L1205105870 |
| AHFIB (Radio Remote Head) | Nokia Solutions and | 474216A.101 | K9181401111 |
| · · · · | Networks | 474210A.101 | 101401111 |
| Low Pass Filter 1.4GHz/100W | Microwave Circuits,Inc. | L13502G1 | SN2454-01 |
| Attenuator 150W/20dB | Weinschel Corp | 66-20-33 | BZ2075 |
| AOMC SFP28 70M,MM | Nokia (radio) | 474900A.101 | VF2023002TA |
| AOMC SFP28 70M,MM | Nokia (radio) | 474900A.101 | VF20230058S |
| AOMC SFP28 70M,MM | Nokia (Baseband mod) | 474900A.101 | FR214716515 |
| AOMC SFP28 70M,MM | Nokia (Baseband mod) | 474900A.101 | RF214719832 |
| Lenovo T490 | HP | T490 | PF26RVZ0 |
| Keysight N8757- DC System power | Keysight | N8757A | US21D4054S |
| supply | | | |
| FPAC (DC-pwr supply) | Nokia | 472438A.101 | G7111007146 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297388 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297386 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297387 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC864 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC869 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC870 |
| GPS cable 100m | FTSH | 472577A.103 | CA2029 |
| FYGC GPS receiver | Nokia | 474074A | 1294000684 |
| Cat-5e cable | CSA | LL73189 | E151955 |
| 2 Meters RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297372 |
| 1 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_104 | SN551432/4 |
| (2) Fiber Optic cable 2m | Amphenol Fiber Optic | VZ1701 | 995741A |

| Cables (Peripheral) | Cables (Peripheral) | | | | | | | | | | |
|----------------------------|---------------------|------------|------------------|------------------------|-----------------------|--|--|--|--|--|--|
| Description | Shield (Y/N) | Length (m) | Ferrite (Y/N) | Connection 1 (5G) | Connection 2 | | | | | | |
| (2) Fiber Optic Cables | N | 2 meters | N | ABIO | AHFIB | | | | | | |
| Cat-5e Cable | Y | 7 meters | N | ASIB | WebEM- PC | | | | | | |
| HS-SUCOFLEX_106 (RF Cable) | Y | 2 meters | Ν | EUT [AHFIB] Ant 2-4 | 250W -50ohm - Load | | | | | | |



| Cables | | | | | | | | | | |
|------------------------------|-----------------|---------------|------------------|----------------------------------|----------------------------------|--|--|--|--|--|
| Description | Shield (Y/N) | Length (m) | Ferrite (Y/N) | Connection 1 | Connection 2 | | | | | |
| HS-SUCOFLEX_106 (RF cable) | Y | 2 meter | Ν | EUT [AHFIB] Ant port #1 | Attenuator 150W/20dB | | | | | |
| Attenuator 150W/20dB | N | NA | N | HS-SUCOFLEX_106 (RF cable) | High Pass Filter 3- 18GHz/15W | | | | | |
| High Pass Filter 3-18GHz/15W | N | NA | N | Attenuator 150W/20dB | HS-SUCOFLEX_104 (RF cable) | | | | | |
| HS-SUCOFLEX_104 (RF cable) | Y | 1 meter | Ν | High Pass Filter 3- 18GHz/15W | Spectrum Analyzer | | | | | |

RF Test Setup Diagram:





Test Configuration 4 RF Conducted Emissions

| Software/Firmware Running during test | | | | | | |
|---------------------------------------|-------------------------------|--|--|--|--|--|
| Description | Version | | | | | |
| 5G BTS Software Version (22R4) | SBTS00_ENB_9999_221004_000018 | | | | | |
| 5G RF_SW | RF.FRM5.trunk.20221003.005 | | | | | |

| Equipment being tested (includ | le Peripherals) | | |
|---------------------------------|------------------------------|-------------------|---------------|
| Description | Manufacturer | Model/Part Number | Serial Number |
| AMIA (BTS System Module) | Nokia Solutions and Networks | 473098A.203 | RK182307104 |
| ASIB (5G BTS System Module) | Nokia Solutions and Networks | 473764A.102 | DH211165881 |
| ABIO (5G BTS Baseband Module) | Nokia Solutions and Networks | 475266A.102 | L1205105845 |
| ABIO (5G BTS Baseband Module) | Nokia Solutions and Networks | 475266A.102 | L1205105870 |
| AHFIB (Radio Remote Head) | Nokia Solutions and Networks | 474216A.101 | K9181401111 |
| Low Pass Filter 1.4GHz/100W | Microwave Circuits, Inc. | L13502G1 | SN2454-01 |
| Attenuator 150W/20dB | Weinschel Corp | 66-20-33 | BZ2075 |
| AOMC SFP28 70M,MM | Nokia (radio) | 474900A.101 | VF2023002TA |
| AOMC SFP28 70M,MM | Nokia (radio) | 474900A.101 | VF20230058S |
| AOMC SFP28 70M,MM | Nokia (Baseband mod) | 474900A.101 | FR214716515 |
| AOMC SFP28 70M,MM | Nokia (Baseband mod) | 474900A.101 | RF214719832 |
| Lenovo T490 | HP | T490 | PF26RVZ0 |
| Keysight N8757- DC System power | Keysight | N8757A | US21D4054S |
| supply | Reysignt | N0757A | 0321040343 |
| FPAC (DC-pwr supply) | Nokia | 472438A.101 | G7111007146 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297388 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297386 |
| 2 Meter RF cable (Load Cable) | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297387 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC864 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC869 |
| 250W -50ohm -Terminating Load | API Weinschel | 1433-3-LIM | TC870 |
| GPS cable 100m | FTSH | 472577A.103 | CA2029 |
| FYGC GPS receiver | Nokia | 474074A | 1294000684 |
| Cat-5e cable | CSA | LL73189 | E151955 |
| 2 Meters RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_106 | SN297372 |
| 1 Meter RF cable | Huber + Suhner, Inc. | HS-SUCOFLEX_104 | SN551432/4 |
| (2) Fiber Optic cable 2m | Amphenol Fiber Optic | VZ1701 | 995741A |

| Cables (Peripheral) | | | | | |
|-------------------------------|-----------------|------------|------------------|------------------------|-----------------------|
| Description | Shield (Y/N) | Length (m) | Ferrite (Y/N) | Connection 1 (5G) | Connection 2 |
| (2) Fiber Optic Cables | N | 2 meters | N | ABIO | AHFIB |
| Cat-5e Cable | Y | 7 meters | N | ASIB | WebEM- PC |
| HS-SUCOFLEX_106 (RF Cable) | Y | 2 meters | N | EUT [AHFIB] Ant 2-4 | 250W -50ohm - Load |



| Cables | | | | | | | | | | |
|----------------------------|-----------------|---------------|------------------|---------------------------------|---------------------------------|--|--|--|--|--|
| Description | Shield (Y/N) | Length (m) | Ferrite (Y/N) | Connection 1 | Connection 2 | | | | | |
| HS-SUCOFLEX_106 (RF cable) | Y | 2 meters | Ν | EUT [AHFIB] Ant port #1 | Attenuator 100W/3dB | | | | | |
| Attenuator 100W/3dB | N | N/A | Ν | HS-SUCOFLEX_106 (RF cable) | Attenuator 50W/30dB | | | | | |
| Attenuator 50W/30dB | N | N/A | Ν | Attenuator 100W/3dB | High Pass Filter 8-40GHz/15W | | | | | |
| HS-SUCOFLEX_104 (RF cable) | Y | 1 meter | Ν | High Pass Filter 8-40GHz/15W | Spectrum Analyzer | | | | | |

RF Test Setup Diagram:



MODIFICATIONS



Equipment Modifications

| Item | Date | Test | Modification | Note | Disposition of EUT |
|------|------------|--|--|---|---|
| 1 | 2022-09-30 | 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 | 2022-09-30 | Output 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 | 2022-09-30 | 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. |
| 4 | 2022-09-30 | 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. |
| 5 | 2022-09-30 | Spurious Conducted Emissions | 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 | 2022-09-30 | Power Spectral Density | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | Scheduled testing was completed. |



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 | SD3379 | AMM | 2022-09-09 | 2023-09-09 |
| Block - DC | Fairview Microwave | SD3239 | ANC | 2022-03-02 | 2023-03-02 |
| Generator - Signal | Agilent | N5173B | TIW | 2020-07-17 | 2023-07-17 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2022-01-17 | 2023-01-17 |

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 Dectector was used
- Trace max hold was used

RF conducted emissions was performed only on one port. The testing was performed on the same version of hardware (AHFIB) as the original certification test. The AHFIB 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. The occupied bandwidth was measured with the EUT configured in the modes called out in the data sheets. FCC 24.238(b) defines the 26dB emission bandwidth requirement.

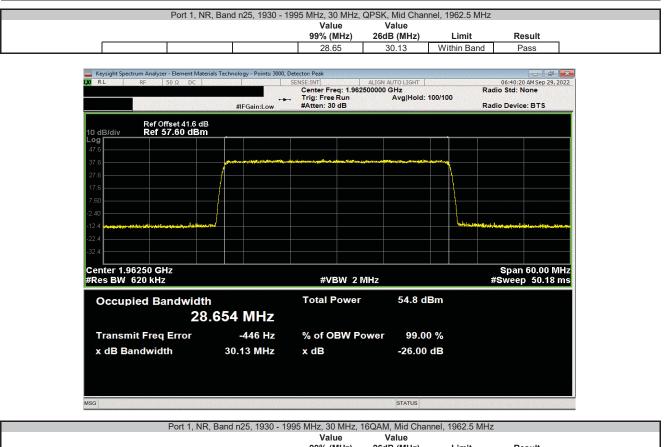
RSS GEN Section 6.6 defines the 99% emission bandwidth requirement

| | FCC and ISED Emission Designators for Band n25 (1930MHz to 1995MHz) | | | | | | | | | | |
|------------------------|---|----------------|----------------------------|---------------|----------------|-----------------|---------------|---------------|---------|--|--|
| Ch | Radio | 5G-NR | NR: QPSK 5G-NR: 16QAM | | 5G-NR: 64QAM | | 5G-NR: 256QAM | | | | |
| BW | Channel | FCC | FCC ISED FCC ISED FCC ISED | | | | | FCC | ISED | | |
| | Low | | | | | | | 30M1G7W | 28M6G7W | | |
| 30MHz | Mid | 30M1G7W | 28M7G7W | 30M1G7W | 28M5G7W | 30M1G7W | 28M6G7W | 30M1G7W | 28M6G7W | | |
| | High | | | | | | | 30M2G7W | 28M6G7W | | |
| Note: FCC bandwidth | , | gnators are ba | sed on 26dB e | mission bandw | vidth. ISED em | ission designat | ors are based | on 99% emissi | on | | |

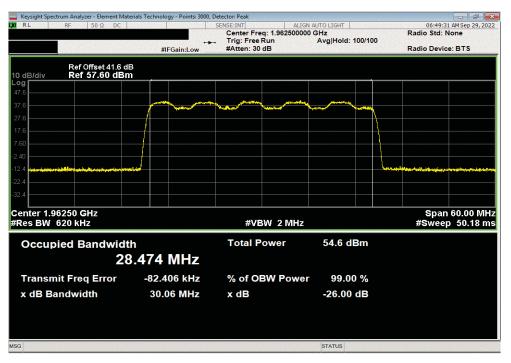


| EUT: AHFIB | | | | | | | Work Order: | | |
|---|--|--|----------|---------------|--------|--|--|--|------------------------------|
| Serial Number: K9181401 | | | | | | | | 30-Sep-22 | |
| Customer: Nokia of A | | ration | | | | | Temperature: | | |
| Attendees: John Ratt | anavong | | | | | | Humidity: | | |
| Project: None | | | | | | | Barometric Pres.: | | |
| Tested by: Marty Mar | tin | | | Power: 54 VDC | | | Job Site: | TX07 | |
| ST SPECIFICATIONS | | | | Test Met | | | | | |
| C 24E:2022 | | | | ANSI C63 | | | | | |
| SS-Gen:2019 | | | | RSS-Ger | 1:2019 | | | | |
| OMMENTS | | | | | | | | | |
| | | | | | | | | | |
| EVIATIONS FROM TEST ST | ANDAND | | | | | | | | |
| EVIATIONS FROM TEST STA | | 1 | | | | | | | |
| | 2 | 7 Signature | Marty | Marti | | | | | |
| one | | 7 Signature | Marty | Marti | | Value | Value | | |
| one onfiguration # | 2 | Signature | Monty | Marti | | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| one onfiguration # ort 1, NR, Band n25, 1930 - 19 | 2 | Signature 7 | Marty | Marti | | | | Limit | Result |
| one onfiguration # | 2 095 MHz | Signature | Metotag | Marti | | | | Limit | Result |
| nfiguration # rt 1, NR, Band n25, 1930 - 19 | 2 | Signature | Metotag | Marti | | 99% (MHz) | 26dB (MHz) | | |
| nfiguration # rt 1, NR, Band n25, 1930 - 19 | 2 095 MHz QPSK | Signature 7 Mid Channel, 1962.5 MHz | Marty | Martá | | | | Limit Within Band | Result |
| one onfiguration # ort 1, NR, Band n25, 1930 - 19 | 2 095 MHz | Mid Channel, 1962.5 MHz | Metry. | Masti | | 99% (MHz) 28.65 | 26dB (MHz) 30.13 | Within Band | Pass |
| nfiguration # rt 1, NR, Band n25, 1930 - 19 | 2 095 MHz QPSK 16QAM | Signature | Morty | Marta | | 99% (MHz) | 26dB (MHz) | | |
| ne nfiguration # rt 1, NR, Band n25, 1930 - 19 | 2 095 MHz QPSK | Mid Channel, 1962.5 MHz Mid Channel, 1962.5 MHz | Merritz | Martá | | 99% (MHz) 28.65 28.47 | 26dB (MHz) 30.13 30.06 | Within Band Within Band | Pass Pass |
| nfiguration # rt 1, NR, Band n25, 1930 - 19 | 2 095 MHz QPSK 16QAM 64QAM | Mid Channel, 1962.5 MHz | Merry | Masti | | 99% (MHz) 28.65 | 26dB (MHz) 30.13 | Within Band | Pass |
| nfiguration # rt 1, NR, Band n25, 1930 - 19 | 2 095 MHz QPSK 16QAM | Mid Channel, 1962.5 MHz Mid Channel, 1962.5 MHz Mid Channel, 1962.5 MHz | Metrity, | Marta | | 99% (MHz) 28.65 28.47 28.58 | 26dB (MHz) 30.13 30.06 30.07 | Within Band Within Band Within Band | Pass Pass Pass |
| one onfiguration # ort 1, NR, Band n25, 1930 - 19 | 2 095 MHz QPSK 16QAM 64QAM | Mid Channel, 1962.5 MHz Mid Channel, 1962.5 MHz Mid Channel, 1962.5 MHz Low Channel, 1965 MHz | Morty. | Masti | | 99% (MHz) 28.65 28.47 28.58 28.6 | 26dB (MHz) 30.13 30.06 30.07 30.13 | Within Band Within Band Within Band Within Band | Pass Pass Pass Pass |
| one onfiguration # ort 1, NR, Band n25, 1930 - 19 | 2 095 MHz QPSK 16QAM 64QAM | Mid Channel, 1962.5 MHz Mid Channel, 1962.5 MHz Mid Channel, 1962.5 MHz | Merriz | Masti | | 99% (MHz) 28.65 28.47 28.58 | 26dB (MHz) 30.13 30.06 30.07 | Within Band Within Band Within Band | Pass Pass Pass |

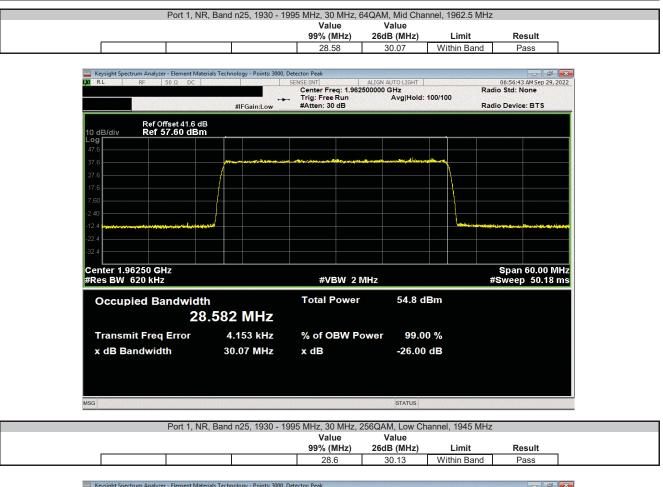


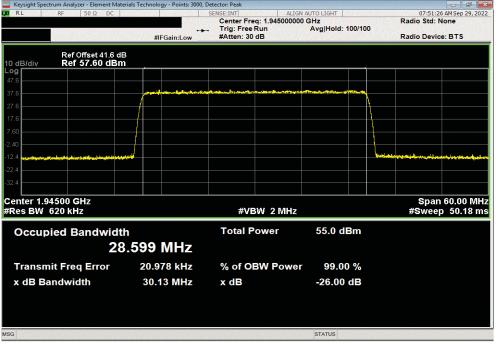


| | Port I, NR, Band | i nzo, 1930 - 199: | 5 MHZ, 30 MHZ, | I 6QAIVI, IVIId Char | nnei, 1962.5 MHZ | |
|--|------------------|--------------------|----------------|----------------------|------------------|--------|
| | | | Value | Value | | |
| | | | 99% (MHz) | 26dB (MHz) | Limit | Result |
| | | | 28.47 | 30.06 | Within Band | Pass |

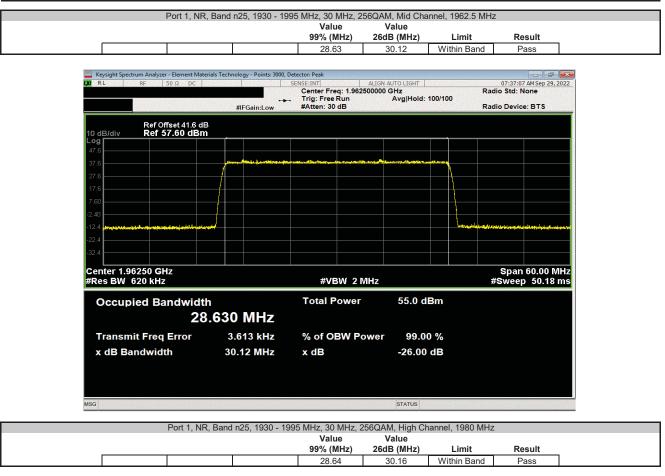


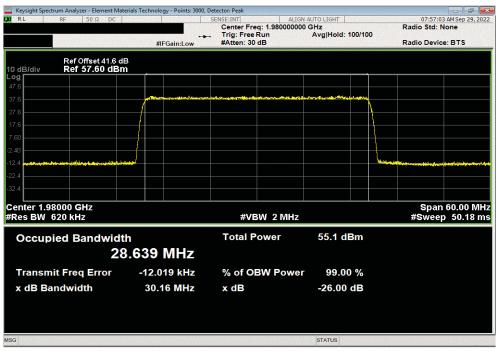














Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this 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 | SD3379 | AMM | 2022-09-09 | 2023-09-09 |
| Block - DC | Fairview Microwave | SD3239 | ANC | 2022-03-02 | 2023-03-02 |
| Generator - Signal | Agilent | N5173B | TIW | 2020-07-17 | 2023-07-17 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2022-01-17 | 2023-01-17 |

TEST DESCRIPTION

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

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

RF conducted emissions was performed only on one port. The testing was performed on the same version of hardware (AHFIB) as the original certification test. The AHFIB 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. The occupied bandwidth was measured with the EUT configured in the modes called out in the data sheets.

FCC 27.53(h)(3) defines he 26dB emission bandwidth requirement.

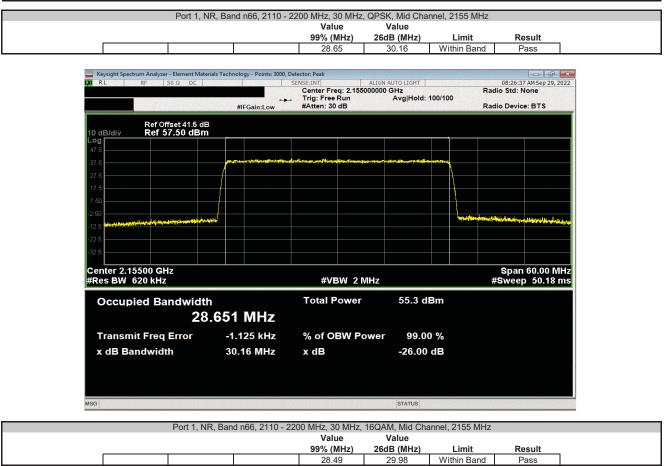
RSS GEN Section 6.6 defines the 99% emission bandwidth requirement

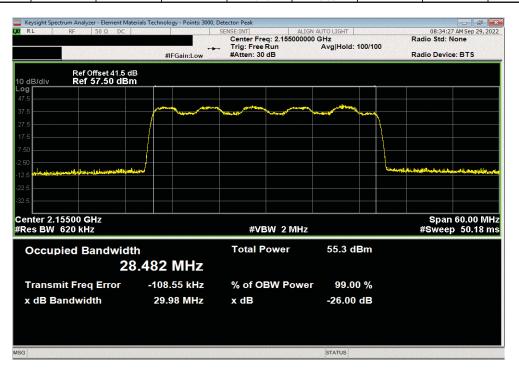
| | F | CC and ISED | Emission E |)esignators | for Band ne | 66 (2110MF | lz to 2200N | /Hz) | |
|-----------------------|---------|----------------|---------------|---------------|-----------------|-----------------|---------------|---------------|---------|
| Ch | Radio | 5G-NR: QPSK | | 5G-NR: 16QAM | | 5G-NR: 64QAM | | 5G-NR: 256QAM | |
| BW | Channel | FCC | ISED | FCC | ISED | FCC | ISED | FCC | ISED |
| | Low | | | | | | | 30M1G7W | 28M6G7W |
| 30MHz | Mid | 30M2G7W | 28M7G7W | 30M0G7W | 28M5G7W | 30M1G7W | 28M6G7W | 30M1G7W | 28M6G7W |
| | High | | | | | | | 30M2G7W | 28M6G7W |
| Note: FCC bandwidt | | gnators are ba | sed on 26dB e | mission bandw | vidth. ISED emi | ission designat | ors are based | on 99% emissi | on |



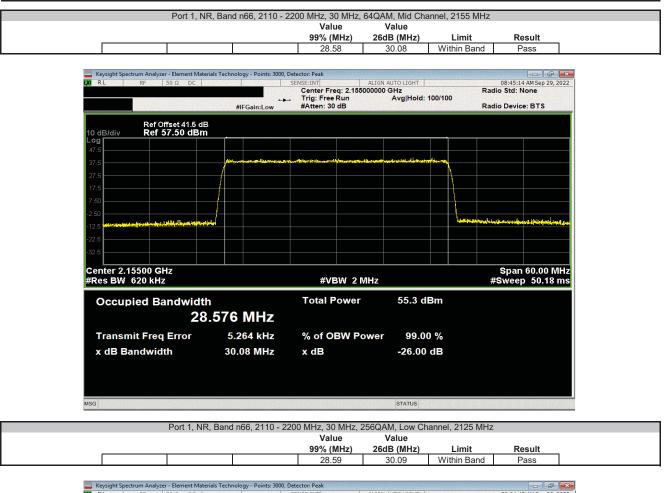
| EUT: AHFIE | | | | | | | Work Order: | | |
|---|--|--|---------|--------|------------------|---|--|--|------------------------------|
| Serial Number: K9181 | | | | | | | | 30-Sep-22 | |
| Customer: Nokia | | oration | | | | | Temperature: | | |
| Attendees: John | Rattanavong | | | | | | Humidity: | | |
| Project: None | | | | | | | Barometric Pres.: | | |
| Tested by: Marty | Martin | | | Power: | 54 VDC | | Job Site: | TX07 | |
| ST SPECIFICATIONS | | | | | Test Method | | | | |
| C 27:2022 | | | | | ANSI C63.26:2015 | | | | |
| S-Gen:2019 | | | | | RSS-Gen:2019 | | | | |
| OMMENTS | | | | | | | | | |
| VIATIONS FROM TEST | STANDARD | | | | | | | | |
| | | | | | | | | | |
| one | | - | | | | | | | |
| one onfiguration # | 2 | Sianature | Monty | Marti | e | | | | |
| | 2 | Signature | Marty | Marti | - | Value | Value | Limit | Popult |
| onfiguration # | | Signature | Monty | Marti | - | Value 99% (MHz) | Value 26dB (MHz) | Limit | Result |
| nfiguration # rt 1, NR, Band n66, 2110 | - 2200 MHz | Signature | Monty | Marti | - | | | Limit | Result |
| onfiguration # | - 2200 MHz Iz | Signature | Monty | Marti | | | | Limit | Result |
| nfiguration # rt 1, NR, Band n66, 2110 | - 2200 MHz | | Monty | Marta | | 99% (MHz) | 26dB (MHz) | | |
| nfiguration # rt 1, NR, Band n66, 2110 | - 2200 MHz Iz QPSK | Signature Mid Channel, 2155 MHz | Marty | Masti | | | | Limit Within Band | Result Pass |
| nfiguration # rt 1, NR, Band n66, 2110 | - 2200 MHz Iz | Mid Channel, 2155 MHz | Morty | Marta | | 99% (MHz) 28.65 | 26dB (MHz) 30.16 | Within Band | Pass |
| nfiguration # | - 2200 MHz Iz QPSK 16QAM | | Morty | Marti | - | 99% (MHz) | 26dB (MHz) | | |
| nfiguration # rt 1, NR, Band n66, 2110 | - 2200 MHz Iz QPSK | Mid Channel, 2155 MHz Mid Channel, 2155 MHz | Mosty | Masta | | 99% (MHz) 28.65 28.49 | 26dB (MHz) 30.16 29.98 | Within Band Within Band | Pass Pass |
| nfiguration # rt 1, NR, Band n66, 2110 | - 2200 MHz Iz QPSK 16QAM 64QAM | Mid Channel, 2155 MHz | Mcooty, | Marti | - | 99% (MHz) 28.65 | 26dB (MHz) 30.16 | Within Band | Pass |
| nfiguration # rt 1, NR, Band n66, 2110 | - 2200 MHz Iz QPSK 16QAM | Mid Channel, 2155 MHz Mid Channel, 2155 MHz Mid Channel, 2155 MHz | Mootz | Marti. | - | 99% (MHz) 28.65 28.49 28.58 | 26dB (MHz) 30.16 29.98 30.08 | Within Band Within Band Within Band | Pass Pass Pass |
| nfiguration # rt 1, NR, Band n66, 2110 | - 2200 MHz Iz QPSK 16QAM 64QAM | Mid Channel, 2155 MHz Mid Channel, 2155 MHz Mid Channel, 2155 MHz Low Channel, 2125 MHz | Mcorty. | Marti | · | 99% (MHz) 28.65 28.49 28.58 28.59 | 26dB (MHz) 30.16 29.98 30.08 30.09 | Within Band Within Band Within Band Within Band | Pass Pass Pass Pass |
| nfiguration # rt 1, NR, Band n66, 2110 | - 2200 MHz Iz QPSK 16QAM 64QAM | Mid Channel, 2155 MHz Mid Channel, 2155 MHz Mid Channel, 2155 MHz | Morty. | Marti. | - | 99% (MHz) 28.65 28.49 28.58 | 26dB (MHz) 30.16 29.98 30.08 | Within Band Within Band Within Band | Pass Pass Pass |

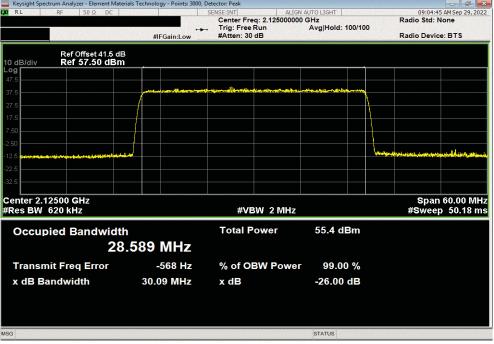




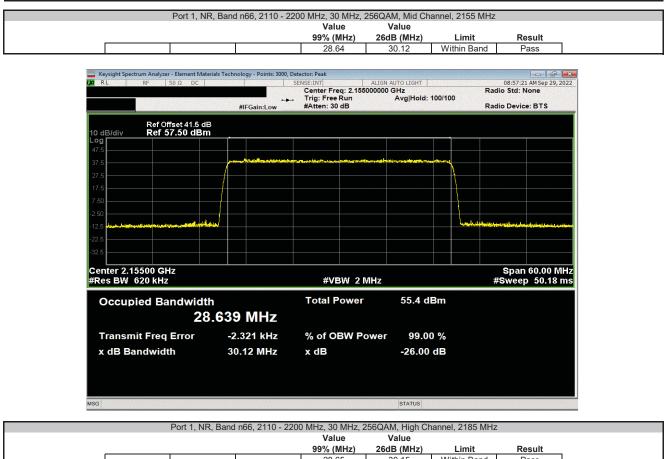


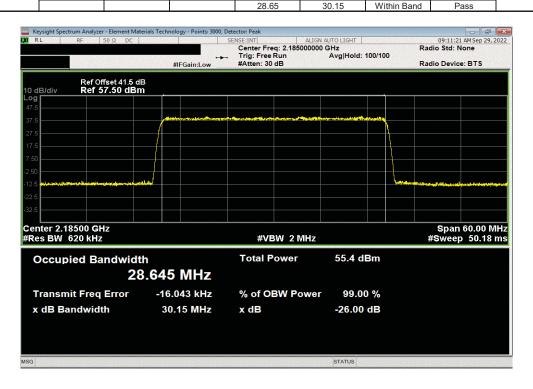












OUTPUT POWER BAND n25



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 | SD3379 | AMM | 2022-09-09 | 2023-09-09 |
| Block - DC | Fairview Microwave | SD3239 | ANC | 2022-03-02 | 2023-03-02 |
| Generator - Signal | Agilent | N5173B | TIW | 2020-07-17 | 2023-07-17 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2022-01-17 | 2023-01-17 |

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 measurements. This method uses trace averaging across the 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 in decimal, to the measured power to compute the average power during the actual transmission times

RF conducted emissions was performed only on one port. The testing was performed on the same version of hardware (AHFIB) as the original certification test. The AHFIB 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.

OUTPUT POWER BAND n25



AC 03.0 VIII 2003.03.07.0

| Attendees: John Project: None | 1401111 a of America Corpo | | | | | | | | |
|--|-------------------------------|-----------------------------|-----------------------------------|---------------------|-----------------------|--------------------------|-------------------------------|-------------|--|
| Customer: Noki Attendees: John Project: None | a of America Corpo | | | | | Work Order: | NOKI0049 | | |
| Attendees: John Project: None | | | | | | | 30-Sep-22 | | |
| Project: None | | oration | | | Temperature: 22 °C | | | | |
| | | | | | | Humidity: | | | |
| | | | | | | Barometric Pres.: | | | |
| Tested by: Mart | y Martin | | Power: 54 VDC | | | Job Site: | TX07 | | |
| EST SPECIFICATIONS | | | Test Method | | | | | | |
| CC 24E:2020 | | | ANSI C63.26:2015 | | | | | | |
| RSS-133:2018 | | | RSS-133:2018 | | | | | | |
| COMMENTS | | | | | | | | | |
| he total output power f | or multiport (2x2 M | IMO, 4x4 MIMO) operation v | vas determined based upon AN | SI 63.26 clauses | 6.4.3.1 and 6.4.3.2.4 | (10 log Nout). The total | output power for two port of | peration is | |
| ingle port power + 3dB | [i.e. 10log(2)]. The | total output power for four | port operation is single port + 6 | 6db [i.e. 10loa(4)] | . All measurement p | ath losses were accour | nted for in the reference lev | el offset | |
| | | | enabled at maximum power (4 | | | | | | |
| EVIATIONS FROM TES | | | | , | | | | | |
| lone | TOTAIDAILD | | | | | | | | |
| IOTIE | | T | - | | | | | | |
| Configuration # | 2 | | Monty Martin | - | | | | | |
| Joiniguration # | - | Signature | many marta | | | | | | |
| | | olghataro | Initial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | | |
| | | | (dBm/MHz) | Factor (dB) | dBm/Carrier BW | (dBm/Carrier BW) | dBm/Carrier BW | | |
| ort 1. NR. Band n25, 19 | 30 - 1995 MHz | | | | | | | | |
| 30 M | Hz | | | | | | | | |
| | QPSK | | | | | | | | |
| | | Mid Channel, 1962.5 MHz | 45.449 | 0 | 45.45 | 48.5 | 51.5 | | |
| | 16QAM | | | | | | | | |
| | | Mid Channel, 1962.5 MHz | 45.415 | 0 | 45.4 | 48.4 | 51.4 | | |
| | 64QAM | | | | | | | | |
| | | | 45.511 | 0 | 45.5 | 48.5 | 54.5 | | |
| | | Mid Channel, 1962.5 MHz | | | | | 51.5 | | |
| | 256QAM | Mid Channel, 1962.5 MHZ | | | | | 51.5 | | |
| | 256QAM | Low Channel, 1962.5 MHz | 45.723 | 0 | 45.7 | 48.7 | 51.5 | | |
| | 256QAM | | | 0 | 45.7 45.7 | | | | |

OUTPUT POWER BAND n25



| | | Initial Value (dBm/MHz) | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | (dBm/Carrier BW) | Four Port (4x4 MIMO) dBm/Carrier BW | |
|-------------|----------|---|----------------------------|--------------------------------------|-------------------|---|--|
| | | 45.449 | 0 | 45.45 | 48.5 | 51.5 | |
| | | | | | | | |
| | | | nnology - Points: 1000, De | | | - F X | |
| LXI RL | RF 50 | OΩ DC | S | ENSE:INT AL Center Freq: 1.962500 | IGN AUTO LIGHT | 06:43:40 AM Sep 29, 2022 Radio Std: None | |
| | | | ++→ #IFGain:Low | Trig: Free Run #Atten: 30 dB | Avg Hold: 100/100 | Radio Device: BTS | |
| 10 dB/div | Ref Offs | set 41.6 dB 7.60 dBm | | | | | |
| Log | | | | | | | |
| 37.6 | | | | | | | |
| 27.6 | | / | | | | | |
| 17.6 | | | | | | | |
| 7.60 | | | | | | | |
| -2.40 | | | | | | | |
| -12.4 | | | | | | | |
| -22.4 | | | | | \ | | |
| -32.4 | | | | | | | |
| -42.4 | | | | | | | |
| Center 1.96 | 250 GHz | z – – – – – – – – – – – – – – – – – – – | I | l | | Span 60.00 MHz | |
| #ResBW 6 | 20 kHz | | | #VBW 2 MH | Z | #Sweep 601.1 ms | |
| Channe | el Pow | er | | Power Spect | al Density | | |
| 4 | 5.45 c | dBm / 30 | MHz | 30.68 | dBm /мнz | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| MSG | | | | | STATUS | | |

| Port 1, | NR, Band n25, 1 | 930 - 1995 MHz, 30 | MHz, 16QAM, Mid Chan | nel, 1962.5 MHz | |
|---------------|-----------------|--------------------|----------------------|----------------------|--|
| Initial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
| (dBm/MHz) | Factor (dB) | dBm/Carrier BW | (dBm/Carrier BW) | dBm/Carrier BW | |
| 45.415 | 0 | 45.4 | 48.4 | 51.4 | |

| RL RF 50 Ω DC | | | ALIGN AUTO LIGHT | 06:51:58 AM Sep 29, 202 | |
|--|-------------|--|--------------------------------------|-----------------------------------|--|
| | #IFGain:Low | Center Freq: 1.9625 Trig: Free Run #Atten: 30 dB | Radio Std: None Radio Device: BTS | | |
| Ref Offset 41.6 dB/div Ref 47.60 dB | | | | | |
| 6 | | | | | |
| 6 | | | | | |
| 6 | | | | | |
| 0 | | | | | |
| 4 | | | | | |
| 4 | | | <u>\</u> | | |
| 4 | | | | | |
| 4 | | | | | |
| enter 1.96250 GHz es BW 620 kHz | | #VBW 2M | Hz | Span 60.00 MH #Sweep 601.1 ms | |
| Channel Power | | Power Spec | tral Density | | |
| 45.41 dBm | / 30 MHz | 30.6 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |



| | Initial Value (dBm/MHz) | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | Two Port (2x2 MIMC (dBm/Carrier BW) | | |
|--------------------------------------|-----------------------------------|---------------------------|---------------------------------|--|---|---------|
| | 45.511 | 0 | 45.5 | 48.5 | 51.5 | |
| | · · · | | | | ÷ | <u></u> |
| 🔤 Keysight Spectrum Analyze | | | | | | |
| LXI RL RF | 50 Ω DC | S | Center Freq: 1.9625000 | SN AUTO LIGHT | 06:59:31 AM Sep 29, 2022 Radio Std: None | |
| | | | Trig: Free Run #Atten: 30 dB | Avg Hold: 100/100 | Radio Device: BTS | |
| Ref O 10 dB/div Ref 4 | ffset 41.6 dB 17.60 dBm | | | | | |
| Log | | | | | | |
| 37.6 | | | | | | |
| 27.6 | \sim | | | | | |
| 17.6 | | | | | | |
| 7.60 | | | | | | |
| -2.40 | | | | | | |
| -12.4 | | | | l | | |
| -32.4 | | | | | | |
| -42.4 | | | | | | |
| | | | | | | |
| Center 1.96250 GI #Res BW 620 kHz | | | #VBW 2 MHz | | Span 60.00 MHz #Sweep 601.1 ms | |
| Channel Pov | wer | | Power Spectra | al Density | | |
| 45 51 | dBm / 30 M | 1Hz | 30 74 | dBm /мнz | | |
| | | | 00114 | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| MSG | | | | STATUS | | |
| MSG | | desta de desta de de | la de la Carleya, esteriaria | STATUS | | |

| | Initial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO | Four Port (4x4 MIMO) | |
|--|---------------|-------------|----------------|--------------------|----------------------|--|
| | (dBm/MHz) | Factor (dB) | dBm/Carrier BW | (dBm/Carrier BW) | dBm/Carrier BW | |
| | 45.723 | 0 | 45.7 | 48.7 | 51.7 | |

| RL | rum Analyzer - Element RF 50 Ω D | | | SENSE:INT | | GN AUTO LIGHT | | 07:54 | :04 AM Sep 29, 202 | |
|----------------------|--------------------------------------|----------|------------------|---|-----------|---------------|-----------|--------------------------------------|--------------------------|--|
| | | | ⊶ #IFGain:Low | Center Freq: 1.945000000 GHz Trig: Free Run Avg Hold: 100/100 #Atten: 30 dB | | | | Radio Std: None Radio Device: BTS | | |
| dB/div | Ref Offset 41. Ref 47.60 d | | | | | | | | _ | |
| 6 | | | | | | | | | | |
| 6 | | \sim | | | | | <u>⊨_</u> | | | |
| 6 | | / | | | | | | | | |
| • | | | | | | | | | | |
|) | | | | | | | | | | |
| 1 | | | | | | | | | | |
| 1 | | | | | | | | | | |
| 1 | | | | | | | | | | |
| | | | | | | | | | | |
| nter 1.94 es BW 6 | 500 GHz 20 kHz | | | #V | BW 2 MHz | 2 | | Spa #Swe | n 60.00 MH ep 601.1 m | |
| Channe | el Power | | | Powe | r Spectra | al Density | 1 | | | |
| 45 | 5.72 dBn | n / 30 N | ١Hz | | 30.95 | dBm // | ИНz | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |



| | 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 | |
|--------------------|----------------------------------|---------------------------|---|---|--|---------|
| | 45.739 | 0 | 45.7 | 48.7 | 51.7 | |
| | | | | | · ··· · | ······· |
| | alyzer - Element Materials Techr | nology - Points: 1000, De | tector: Average (RMS) | | | |
| IXI RL RF | 50 Q DC | | ENSE:INT A | LIGN AUTO LIGHT | 07:39:29 AM Sep 29, 2022 | |
| | | | Center Freq: 1.962500 Trig: Free Run | Avg Hold: 100/100 | Radio Std: None | |
| | | #IFGain:Low | #Atten: 30 dB | | Radio Device: BTS | |
| Re 10 dB/div Re | f Offset 41.6 dB ef 47.60 dBm | | | | | |
| | 1 47.00 abin | | | | | |
| 37.6 | | | | | | |
| 27.6 | | | | | | |
| 17.6 | | | | | | |
| 7.60 | | | | | | |
| -2.40 | | | | | | |
| -12.4 | | | | | | |
| -22.4 | | | | <u>L</u> | • | |
| -32.4 | | | | | | |
| -42.4 | | | | | | |
| Center 1.96250 | GH7 | | | | Span 60.00 MHz | |
| #Res BW 620 k | | | #VBW 2 MF | z | #Sweep 601.1 ms | |
| Channel P | ower | | Power Spect | ral Density | | |
| | | | | | | |
| 45.7 | 4 dBm / 30 r | MHz | 30.97 | ′ dBm /мнz | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| MSG | | | | STATUS | | |

| Port 1, | NR, Band n25, 1 | 930 - 1995 MHz, 30 | MHz, 256QAM, High Char | nnel, 1980 MHz | |
|---------------|-----------------|--------------------|------------------------|----------------------|--|
| Initial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
| (dBm/MHz) | Factor (dB) | dBm/Carrier BW | (dBm/Carrier BW) | dBm/Carrier BW | |
| 45.845 | 0 | 45.8 | 48.8 | 51.8 | |

| RL | RF 50 Ω D | c | S | ENSE:INT | | N AUTO LIGHT | | | 12 AM Sep 29, 202 | |
|---|-------------------------------|-----------|--|----------|----------|--------------|--------|--------------------------------------|-------------------|--|
| | | #IF(| Center Freq: 1.98000000 GHz Trig: Free Run Avg Hold: 100/100 #/FGain:Low #Atten: 30 dB | | | | 00/100 | Radio Std: None Radio Device: BTS | | |
| dB/div | Ref Offset 41. Ref 47.60 d | | | | | | | | | |
| '. 6 | | | | | | | | | | |
| .6 | | - | | | | | | | | |
| .6 50 | | | | | | | | | | |
| ю — — — — — — — — — — — — — — — — — — — | | | | | | | | | | |
| .4 | | | | | | | | | | |
| 4 | | | | | | | (| | | |
| .4 | | | | | | | | | | |
| | 8000 GHz | | | | | | | Spar | n 60.00 MH | |
| tes BW | 620 kHz | | | #VE | SW 2 MHz | | | #Swee | p 601.1 m | |
| Chann | el Power | | | Power | Spectra | I Density | | | | |
| 4 | 5.84 dBn | n / 30 мн | Z | | 31.07 | dBm /M | IHz | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |



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 | SD3379 | AMM | 2022-09-09 | 2023-09-09 |
| Block - DC | Fairview Microwave | SD3239 | ANC | 2022-03-02 | 2023-03-02 |
| Generator - Signal | Agilent | N5173B | TIW | 2020-07-17 | 2023-07-17 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2022-01-17 | 2023-01-17 |

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.

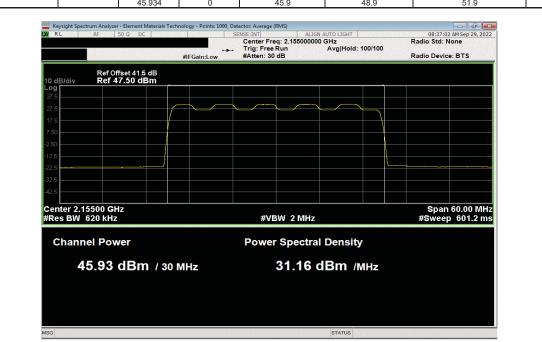
RF conducted emissions was performed only on one port. The testing was performed on the same version of hardware (AHFIB) as the original certification test. The AHFIB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in original certification 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.



| EUT: AHFIB | | | | | | | | Work Order | | |
|--|--|--|-----|---------|--|---|-------------------------------------|---------------------------------------|--|--|
| Serial Number: K91814 | | | | | | | | | : 30-Sep-22 | |
| Customer: Nokia | | oration | | | | | | Temperature | | |
| Attendees: John R | Rattanavong | | | | | | | | : 50.3% RH | |
| Project: None | | | | | | | | Barometric Pres. | | |
| Tested by: Marty | Martin | | | Power: | | | | Job Site | : TX07 | |
| EST SPECIFICATIONS | | | | | Test Method | | | | | |
| CC 27:2022 | | | | | ANSI C63.26:2015 | | | | | |
| SS-139 Issue 4: 2022 | | | | | RSS-139-Issue 4: 2 | 2022 | | | | |
| | | | | | | | | | | |
| OMMENTS | | | | | | | | | | |
| locks. Band not carriers | are enabled at r | naximum power (40 watts |). | | | | | | | |
| EVIATIONS FROM TEST | | naximum power (40 watts | .). | | | | | | | |
| EVIATIONS FROM TEST | | Signature | _ | Marta | | | | | | |
| EVIATIONS FROM TEST | STANDARD 2 | | _ | . Marti | Initial Power (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 | |
| EVIATIONS FROM TEST | 2 - 2200 MHz | | _ | Marta | Initial Power | | | | | |
| EVIATIONS FROM TEST one onfiguration # ort 1, NR, Band n66, 2110 | 2 - 2200 MHz | | _ | . Masta | Initial Power | | | | | |
| EVIATIONS FROM TEST one onfiguration # port 1, NR, Band n66, 2110 | 2 - 2200 MHz | | _ | . Masti | Initial Power | | | | | |
| EVIATIONS FROM TEST one onfiguration # ort 1, NR, Band n66, 2110 | 2 - 2200 MHz | Signature | _ | Martá | Initial Power (dBm/MHz) | Factor (dB) | (dBm/Čarrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| EVIATIONS FROM TEST one onfiguration # ort 1, NR, Band n66, 2110 | 2 - 2200 MHz 2 QPSK | Signature | _ | . Marta | Initial Power (dBm/MHz) | Factor (dB) | (dBm/Čarrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| EVIATIONS FROM TEST one onfiguration # ort 1, NR, Band n66, 2110 | 2 - 2200 MHz 2 QPSK | Signature Mid Channel, 2155 MHz | _ | Masta | Initial Power (dBm/MHz) 46.007 | Factor (dB) | (dBm/Čarrier BW 46 | dBm/Carrier BW | dBm/Carrier BW | |
| EVIATIONS FROM TEST one onfiguration # ort 1, NR, Band n66, 2110 | 2 - 2200 MHz z QPSK 16QAM | Signature Mid Channel, 2155 MHz | _ | Martá | Initial Power (dBm/MHz) 46.007 | Factor (dB) | (dBm/Čarrier BW 46 | dBm/Carrier BW | dBm/Carrier BW | |
| EVIATIONS FROM TEST one onfiguration # ort 1, NR, Band n66, 2110 | 2 - 2200 MHz z QPSK 16QAM | Signature Mid Channel, 2155 MHz Mid Channel, 2155 MHz | _ | . Mosti | Initial Power (dBm/MHz) 46.007 45.934 | Factor (dB) 0 | (dBm/Čarrier BW 46 45.9 | dBm/Carrier BW 49 48.9 | dBm/Carrier BW | |
| IEVIATIONS FROM TEST Ione | 2 - 2200 MHz 2 QPSK 16QAM 64QAM | Signature Mid Channel, 2155 MHz Mid Channel, 2155 MHz | _ | . Mastá | Initial Power (dBm/MHz) 46.007 45.934 | Factor (dB) 0 | (dBm/Čarrier BW 46 45.9 | dBm/Carrier BW 49 48.9 | dBm/Carrier BW | |
| IEVIATIONS FROM TEST Ione | 2 - 2200 MHz 2 QPSK 16QAM 64QAM | Signature Mid Channel, 2155 MHz Mid Channel, 2155 MHz Mid Channel, 2155 MHz | _ | . Marta | Initial Power (dBm/MHz) 46.007 45.934 45.966 | Factor (dB) 0 0 0 0 0 | (dBm/Čarrier BW 46 45.9 46 | dBm/Carrier BW 49 48.9 49 | dBm/Carrier BW 52 51.9 52 | |



| | (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 | |
|---------------------|---|---------------------------|---------------------------------|---------------------------------------|--|--|
| | 46.007 | 0 | 46 | 49 | 52 | |
| 1000A | | | | | | |
| Keysight Spectrum A | nalyzer - Element Materials Tech 50 Ω DC | | | AUTO LIGHT | 08:29:05 AM Sep 29, 2022 | |
| | 10000 000 | | Center Freq: 2.155000000 | GHz F | Radio Std: None | |
| | | #IFGain:Low | Trig: Free Run #Atten: 30 dB | Avg Hold: 100/100 F | Radio Device: BTS | |
| | | in dameon | | | | |
| R 10 dB/div R | ef Offset 41.5 dB ef 47.50 dBm | | | | | |
| Log | | | | | | |
| 37.5 | | | | | | |
| 27.5 | | | | | | |
| 17.5 | | | | | | |
| 7.50 | | | | | | |
| -2.50 | | | | | | |
| -12.5 | | | | | | |
| -22.5 | | | | | | |
| -32.5 | | | | | | |
| -42.5 | | | | | | |
| Center 2.15500 | | | | | Span 60.00 MHz | |
| #Res BW 620 | kHz | | #VBW 2 MHz | | #Sweep 601.1 ms | |
| Ob service by | | | D 0 (1 | Davas 14 a | | |
| Channel F | ower | | Power Spectral | Density | | |
| 46.0 | 01 dBm / 30 | | 21 24 4 | IBm /мнz | | |
| 40.0 | | MHZ | 31.24 0 | | | |
| | | | | | | |
| | | | | | | |
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| | | | | | | |
| MSG | | | | STATUS | | |
| | | | | | | |



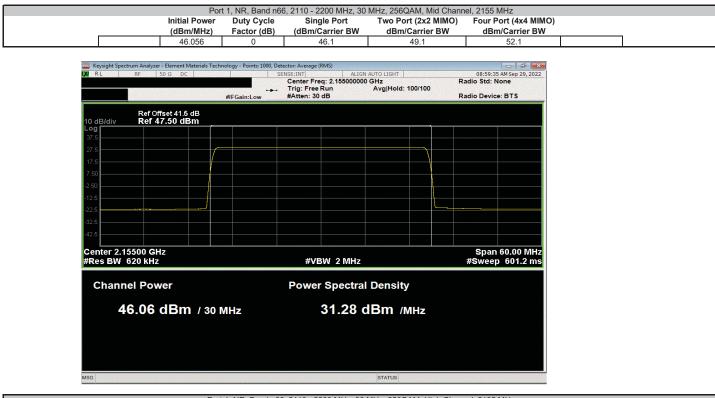


| | Initial Power (dBm/MHz) | Duty Cycle Factor (dB) | Single Port (dBm/Carrier BW | Two Port (2x2 MIMO) dBm/Carrier BW | Four Port (4x4 MIMO) dBm/Carrier BW | |
|----------------------------|----------------------------|---------------------------|--|---------------------------------------|---|---|
| | 45.966 | 0 | 46 | 49 | 52 | |
| | | | | | | |
| Keysight Spectrum Analyzer | | | | | | |
| KI RE 5 | 50 Ω DC | SI | ENSE:INT ALI Center Freg: 2.1550000 | GN AUTO LIGHT | 08:47:44 AM Sep 29, 202. Radio Std: None | 2 |
| | | | Trig: Free Run | Avg Hold: 100/100 | | |
| | # | IFGain:Low | #Atten: 30 dB | | Radio Device: BTS | |
| Ref Off 10 dB/div Ref 4 | set 41.5 dB 7.50 dBm | | | | | |
| | 7.50 GBIII | | | | | |
| 37.5 | | | | | | |
| 27.5 | | | | | | |
| 17.5 | / | | | | | |
| 7.50 | | | | | | |
| -2.50 | | | | | | |
| -12.5 | | | | | | |
| -22.5 | | | | | | |
| -32.5 | | | | | | |
| -42.5 | | | | | | |
| Center 2.15500 GH | z | | | | Span 60.00 MH: | z |
| #Res BW 620 kHz | | | #VBW 2 MHz | 2 | #Sweep 601.2 ms | S |
| Channel Pow | er | | Power Spectr | al Density | | |
| 45.07 | | | 24 00 | | | |
| 45.97 0 | dBm / 30 м | HZ | 31.20 | dBm /мнz | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| MSG | | | | STATUS | | |
| | | | | | | |

| Initial Power | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
|---------------|-------------|-----------------|---------------------|----------------------|--|
| (dBm/MHz) | Factor (dB) | (dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| 45.959 | 0 | 46 | 49 | 52 | |

| RL | rum Analyzer - Element № RF 50 Ω DC | | | | | AUTO LIGHT | | 00:07:1 | 8 AM Sep 29, 2022 |
|------------|--|--|---|---|--|--------------------------------|---------|---|---------------------------------------|
| | 10 100 32 00 | | | | eq: 2.12500000 | | | Radio Std: I | |
| | | | | Trig: Free | Run | Avg Hold: | 100/100 | | |
| | | #1 | FGain:Low | #Atten: 30 | dB | | | Radio Devic | e: BTS |
| | | annan an òmra an | ern binnen oder nær den mönnaren om om om o | andersende else en en ser den de reserven | an den märninden sähnn den är märninde | and index a concernment of the | | General Control of Control Cont | Caran arteria a control son a carante |
| | Ref Offset 41.5 | | | | | | | | |
| dB/div | Ref 47.50 dE | 3m | | | | | | | |
| 1 | | | | | | | | | |
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| 5 | | | | | | | | | |
| | | | | | | | | | |
| | 2500 GHz | | | | | | | span | 60.00 MHz |
| es BW 6 | 520 KHZ | | | #VE | 3W 2 MHz | | | #Swee | p 601.2 ms |
| | | | | | | | | | |
| Channe | el Power | | | Power | Spectra | Density | , | | |
| ontainin | | | | | opeeda | Demony | | | |
| | | | | | | | | | |
| 4 | 5.96 dBm | / 30 MI | z | | 31.19 | dBm /M | ИHz | | |
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| Port | 1, NR, Band n66 | , 2110 - 2200 MHz, 30 | MHz, 256QAM, High Chanr | el, 2185 MHz | |
|---------------|-----------------|-----------------------|-------------------------|----------------------|--|
| Initial Power | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
| (dBm/MHz) | Factor (dB) | (dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| 45.97 | 0 | 46 | 49 | 52 | |

| | 50 Ω DC | | S | ENSE:INT | | N AUTO LIGHT | | | 12 AM Sep 29, 20 |
|---------------------------------------|------------------------------------|----------|----------|--|----------|--------------------|---------|--------------------------|-------------------------|
| | | #IFC | Gain:Low | Center Fre Trig: Free #Atten: 30 | | 0 GHz Avg Hold: | 100/100 | Radio Std: Radio Devi | |
| B/div Ref | Offset 41.5 dB 47.50 dBm | | | | | | | | |
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| · · · · · · · · · · · · · · · · · · · | | | | | | | | | |
| nter 2.18500 G | Hz | | j | #VE | SW 2 MHz | | · | Spar #Swee | n 60.00 MH p 601.2 m |
| esBW 620 kH | | | | | | | | | |
| | | | | | 0 | . D ! 4 | | | |
| | | | | Power | Spectra | I Density | / | | |
| Channel Po | | 30 MH | z | | Spectra | | | | |
| es BW 620 kH Channel Po 45.97 | wer | 30 MH | z | | | | | | |
| Channel Po | wer | 30 MH | Z | | | | | | |
| Channel Po | wer | 30 MH | Z | | | | | | |
| Channel Po | wer | 30 MH | Z | | | | | | |



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 | SD3379 | AMM | 2022-09-09 | 2023-09-09 |
| Block - DC | Fairview Microwave | SD3239 | ANC | 2022-03-02 | 2023-03-02 |
| Generator - Signal | Agilent | N5173B | TIW | 2020-07-17 | 2023-07-17 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFQ | 2022-01-17 | 2023-01-17 |

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 was performed only on one port. The testing was performed on the same version of hardware (AHFIB) as the original certification test. The AHFIB 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.



| | | | | | | | XMit 2022.02.07.0 |
|---|--|------------------------|----------------------|----------------------|------------------------|--|-------------------|
| EUT: | AHFIB | | | | Work Order: | NOKI0049 | |
| Serial Number: | | | | | | 30-Sep-22 | |
| Customer: | Nokia of America Corporation | | | | Temperature: | | |
| | John Rattanavong | | | | | 41.6% RH | |
| Project: | | | | | Barometric Pres.: | | |
| | | er: 54 VDC | | | Job Site: | TX07 | |
| TEST SPECIFICAT | IONS | Test Method | | | | | |
| FCC 27:2022 | | ANSI C63.26:2015 | | | | | |
| RSS-139: 2022 | | RSS-139: 2022 | | | | | |
| COMMENTS | | | | | | | |
| The total output po | wer for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upo | on 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 |
| | Olog(2)]. The total output power for four port operation is single port + 6db [i.e | | | | | | |
| | Iti carrier test case 1 and 2: The carriers are operated at maximum power (~2 | | | | | 3 , 1 | , |
| | ase 3 and 4: The carriers are operated at maximum power (~20W/AWS carrier | | | | | | |
| | ase 5: The carriers are operated at maximum power (~13.3W/AWS carrier and | | | | | | |
| | | | inter a total port p | | | | |
| DEVIATIONS FRO | I TEST STANDARD | | | | | | |
| None | | | | | | | |
| | 22 | | | | | | |
| Configuration # | 2 Marty Mart | - | | | | | |
| , i i i i i i i i i i i i i i i i i i i | Signature | ú | | | | | |
| | | Intial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
| | | (dBm/MHz) | Factor (dB) | dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| Port 1, NR, PCS Ba | nd and AWS Band, MultiCarrier | / | | | | | |
| , , . | QPSK | | | | | | |
| | MultiCarrier Test Case 1, PCS Band 20W 30 MHz BW (1945.0 and 1 | 975.0 MHz), AWS Ban | d 40W 5 MHz BW | (2155.0 MHz) | | | |
| | Carrier Frequency 1945 MHz | 42.631 | 0 | 42.6 | 45.6 | 48.6 | |
| | Carrier Frequency 1975 MHz | 43.31 | 0 | 43.3 | 43.3 | 49.3 | |
| | Carrier Frequency 2155 MHz | 46.309 | 0 | 46.3 | 49.3 | 52.3 | |
| | MultiCarrier Test Case 2, PCS Band 20W 30 MHz BW (1950.0 and 1 | 980.0 MHz), AWS Ban | d 40W 5 MHz BW | (2155.0 MHz) | | | |
| | Carrier Frequency 1950 MHz | 42.709 | 0 | 42.7 | 45.7 | 48.7 | |
| | Carrier Frequency 1980 MHz | 42.932 | 0 | 42.9 | 45.9 | 48.9 | |
| | Carrier Frequency 2150 MHz | 46.233 | 0 | 46.2 | 49.2 | 52.3 | |
| | MultiCarrier Test Case 3, PCS Band 40W 5 MHz BW (1962.5 MHz), | AWS Band 20W 30 MH | Iz BW (2125.0 an | d 2155.0 MHz) | | | |
| | Carrier Frequency 2125 MHz | 43.014 | 0 | 43 | 46 | 49 | |
| | Carrier Frequency 2155 MHz | 43.076 | 0 | 43.1 | 46.1 | 49.1 | |
| | Carrier Frequency 1962.5 MHz | 45.955 | 0 | 46 | 49 | 52 | |
| | MultiCarrier Test Case 4, PCS Band 40W 5 MHz BW (1962.5 MHz), | AWS Band 20W 30 MH | Iz BW (2155.0 an | d 2185 MHz) | | | |
| | Carrier Frequency 2155 MHz | 42.98 | 0 | 43 | 46 | 49 | |
| | Carrier Frequency 2185 MHz | 42.985 | 0 | 43 | 46 | 49 | |
| | Carrier Frequency 1962.5 MHz | 45.993 | 0 | 46 | 49 | 52 | |
| | MultiCarrier Test Case 5, PCS Band 13.3W 5 MHz BW (1932.5, 193 | 7.5 and 1992.5 MHz), A | WS Band 13.3W | 5 MHz BW (2112.5, 2 | 2117.5 and 2197.5 MHz) | | |
| | Carrier Frequency 1932.5 MHz | 40.755 | 0 | 40.8 | 43.8 | 46.8 | |
| | Carrier Frequency 1937.5 MHz | 41.101 | 0 | 41.1 | 44.1 | 47.1 | |
| | Carrier Frequency 1992.5 MHz | 41.538 | 0 | 41.5 | 44.5 | 47.5 | |
| | Carrier Frequency 2112.5 MHz | 40.988 | 0 | 41 | 44 | 47 | |
| | Carrier Frequency 2117.5 MHz | 41.6 | Ő | 41.6 | 44.6 | 47.6 | |
| | Carrier Frequency 2197.5 MHz | 41.216 | 0 | 41.2 | 44.2 | 47.2 | |
| | . , | | | | | | |

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TbtTx 2022.0

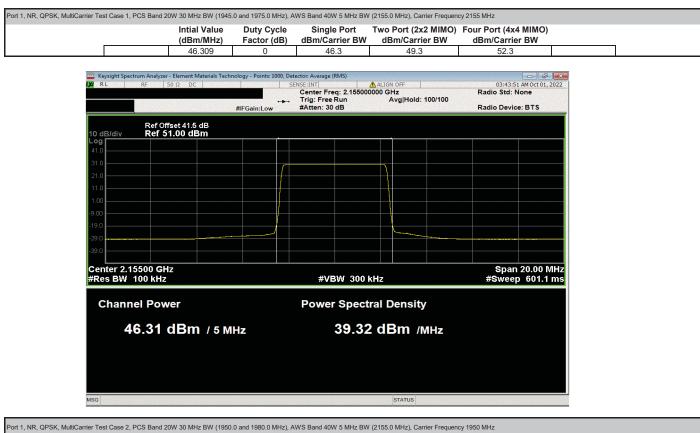
1 2022.02.07.0



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|---------------|--------------|-------------------------|----------------|--------------------------------------|----------------------|--|
| | Intial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
| | (dBm/MHz) | Factor (dB) | dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| | 43.31 | 0 | 43.3 | 46.3 | 49.3 | |

| | um Analyzer - Eleme | | ology - Points: 1 | | | | | | |
|-----------|---------------------------|-----------|-------------------|-----------|------------------------------------|-----------------|------------|--------------------------|-------------------|
| RL | RF 50 Ω | DC CORREC | | SENSE:INT | | LIGN AUTO LIGHT | | 08:56: Radio Std: | 01 AM Oct 01, 202 |
| | | | #IFGain:Low | | Freq: 1.975000 ree Run 30 dB | | d: 100/100 | Radio Std: Radio Devi | |
| dB/div | Ref Offset 4 Ref 50.00 | | | | | | | | |
| 9 | | | | | | | | | |
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| nter 1.97 | 500 GHz | | | | | | | Spar | n 100.0 MH |
| es BW 6 | 20 kHz | | | # | VBW 2 MH | IZ | | | p 601.1 m |
| Channe | l Power | | | Pow | er Spect | ral Densi | tv | | |
| ontainite | | | | 1 0 1 | er opeet | | -9 | | |
| 43 | 3.31 dB | m / 30 N | ٨Hz | | 28.54 | l dBm | /MHz | | |
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| | | | | | | STATUS | | | |

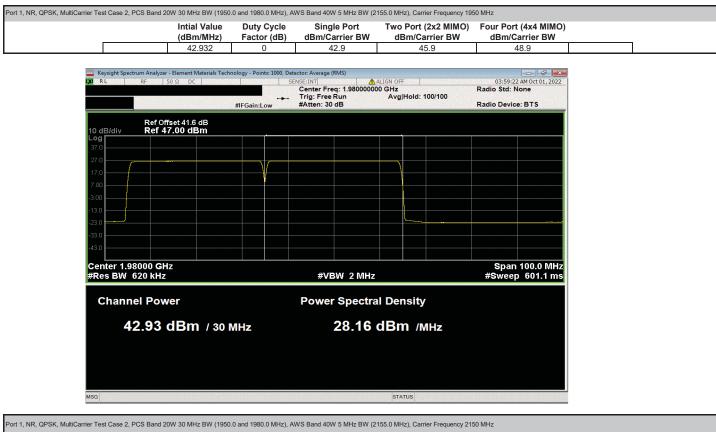




| Intial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
|--------------|-------------|----------------|---------------------|----------------------|--|
| (dBm/MHz) | Factor (dB) | dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| 42.709 | 0 | 42.7 | 45.7 | 48.7 | |

| | trum Analyzer - Element Materials | | | | | | |
|--------|-------------------------------------|-------------|---|-----------------------------|--------|------------------------|-----------------------|
| RL | RF 50 Ω DC | | SENSE:INT | ALIGN OFF | | | 2 AM Oct 01, 202 |
| | | #IFGain:Low | Center Freq: 1.9 Trig: Free Run #Atten: 30 dB | 50000000 GHz Avg Hold: 1 | 00/100 | Radio Std: Madio Devic | |
| dB/div | Ref Offset 41.6 dB Ref 47.00 dBm | | | | | | |
| g | | | | | | | |
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| .0 | | | | | | | |
| .0 | | | | | | | |
| | 5000 GHz 620 kHz | | #VBW 2 | 2 MHz | | Span #Sweej | 100.0 MH p 601.1 m |
| Chann | el Power | | Power Sp | ectral Density | | | |
| 4 | 2.71 dBm / 3 | 0 MHz | 27 | .94 dBm /м | Hz | | |
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|-----------|--------------|-------------|----------------|---------------------|----------------------|--|
| | Intial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
| | (dBm/MHz) | Factor (dB) | dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| | 46.233 | 0 | 46.2 | 49.2 | 52.3 | |

| R L RF | 50 Ω DC | | 9 | ENSE:INT | ALIG | | | 04:01:1 | 7 AM Oct 01, 202 |
|-----------------------------|---------------------------------|-------------|----------|---|----------|-------------------|--------|---------------------------|-------------------------|
| | | #IFGain:Low | . | Center Freq: 2.155 Trig: Free Run #Atten: 30 dB | 000000 G | Hz Avg Hold: ' | 00/100 | Radio Std: Radio Devid | |
| dB/div Re | f Offset 41.5 dB f 50.00 dBm | | | | | | | | |
| g 0 | | | | | | | | | |
| 0 | | | r | | | | | | |
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| 0 | | | | | | | | | |
| 0 | | | | | | | | | |
| 0 | | | | | | | | | |
| nter 2.15500 es BW 100 k | | | | #VBW 30 | 0 kHz | | | Spar #Swee | n 20.00 MH p 601.1 m |
| Channel P | ower | | | Power Spe | ctral I | Density | | | |
| 46.2 | 3 dBm / | 5 MHz | | 39.2 | 24 d | Bm /M | IHz | | |
| | | | | | | | | | |
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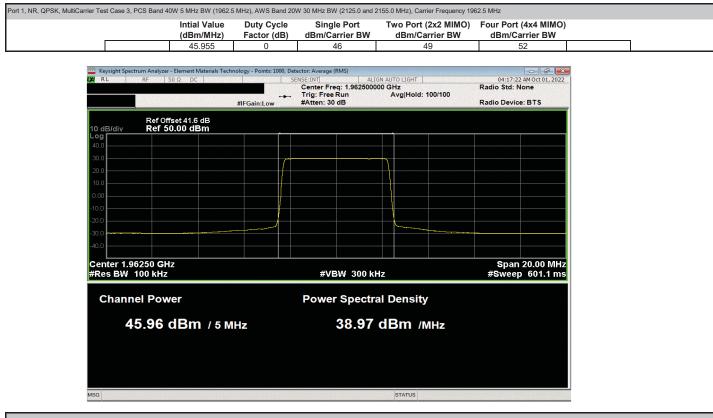


| | | Cycle Single Por | | Four Port (4x4 MIMO) | |
|-------------------------------------|-------------|-------------------------------|-------------------|---|--|
| (| | or (dB) dBm/Carrier | | dBm/Carrier BW | |
| | 43.014 | 0 43 | 46 | 49 | |
| | | | | | |
| 🚃 Keysight Spectrum Analyzer - Eler | | | | | |
| LXI RL RF 50 Ω | DC | SENSE:INT Center Freq: 2.1 | ALIGN AUTO LIGHT | 04:13:49 AM Oct 01, 2022 Radio Std: None | |
| | | Trig: Free Run | Avg Hold: 100/100 | Constant And State State State | |
| | #IFGain: | .ow #Atten: 30 dB | | Radio Device: BTS | |
| Ref Offset | 44.5. dD | | | | |
| 10 dB/div Ref 47.0 | 0 dBm | | | | |
| Log | | | | | |
| 37.0 | | | | | |
| 27.0 | | 1 | | | |
| 17.0 | | | V | | |
| 7.00 | | | | | |
| -3.00 | | | | | |
| | | | | | |
| -13.0 | | | | | |
| -23.0 | | | | | |
| -33.0 | | | | | |
| -43.0 | | | | | |
| Center 2,12500 GHz | | | | 0 100 0 MU- | |
| #Res BW 620 kHz | | #VBW 2 | | Span 100.0 MHz #Sweep 601.1 ms | |
| WRCS BW 020 KH2 | | #VBW | - WI112 | #Sweep 001.1 ms | |
| | | - | | | |
| Channel Power | | Power Sp | ectral Density | | |
| | | | | | |
| 43.01 di | 3m / 30 MHz | 28 | .24 dBm /мнz | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Port | t 1, NR, QPSK, MultiCarrier Te | st Case 3, PCS Band 4 | 0W 5 MHz BW (1962. | 5 MHz), AWS Band 2 | 0W 30 MHz BW (2125.0 a | and 2155.0 MHz), Carrier Frequ | ency 2155 MHz | |
|------|--------------------------------|-----------------------|---------------------------|---------------------------|-------------------------------|--------------------------------|--|--|
| | | | Intial Value (dBm/MHz) | Duty Cycle Factor (dB) | Single Port dBm/Carrier BW | | Four Port (4x4 MIMO) dBm/Carrier BW | |
| | | | 43.076 | 0 | 43.1 | 46.1 | 49.1 | |

| | | | logy - Points: 1000, | Detector: Average (RMS) | | | | 00 |
|----------|---|-------------------------------|------------------------|---|--------------------|--------------|------------------------------|-----------------|
| RL | RF 50 Ω | DC | a second states of the | SENSE:INT Center Freq: 2.15 | ALIGN AUTO LIG | HT | 04:15:14 Radio Std: N | 3 AM Oct 01, 2 |
| | _ | | | | AvalH | old: 100/100 | Radio Std: P | ione |
| | 100000000000000000000000000000000000000 | Electronic and | #FGain:Low | #Atten: 30 dB | | | Radio Devic | e: BTS |
| | | | | | | | | |
| | Ref Offset | 41.5 dB | | | | | | |
| 0 dB/div | Ref 47.0 | 0 dBm | | | | | | |
| 37.0 | | | | | | | | |
| | | | | | | | | |
| 27.0 | / | | | | | | | |
| 7.0 | 1 | | V | | | | | |
| .00 | | | | | | | | |
| .00 | | | | | | | | |
| 3.0 | | | | | | | | |
| | | | | | | | | |
| 3.0 | | | | | | | | |
| 3.0 | | | | | | | | |
| 3.0 | | | | | | | | |
| _ | | | | | | | | |
| | 15500 GHz | | | | | | Span | 100.0 N |
| Res BW | 620 kHz | | | #VBW 2 | MHz | | #Sweep | 601.1 |
| | | | | | | | | |
| Chan | nel Power | | | Power Spe | ectral Den | sity | | |
| | | | | | | | | |
| | 43.08 dE | | | 20 | 30 dBm | | | |
| 4 | 43.08 ac | 5111 / 30 M | HZ | 28. | зо ав т | /IVIHZ | | |
| | | | | | | | | |
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| 1944 | | | | | | | | |

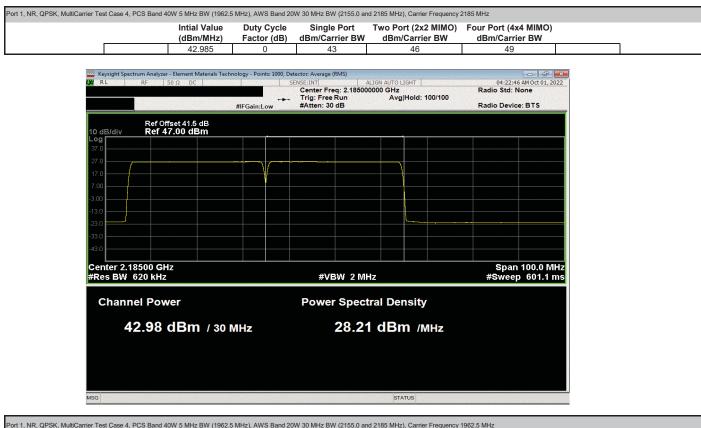




| Port 1, NR, QPSK, MultiCarrier Te | st Case 4, PCS Band 40 | 0W 5 MHz BW (1962.5 | MHz), AWS Band 20V | V 30 MHz BW (2155.0 and 2 | 185 MHz), Carrier Frequency 2155 | MHz | |
|-----------------------------------|------------------------|---------------------------|---------------------------|-------------------------------|---------------------------------------|--|--|
| | | Intial 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 | |
| | | 42.98 | 0 | 43 | 46 | 49 | |

| RL | RF 50 Ω DC | | S | ENSE:INT | ALIGN AUTO | LIGHT | | 04:21:1 | 4 AM Oct 01, 202 |
|------------------------|---------------------------------|----------|-------|--|------------|------------|--------|-----------------------------|-------------------------|
| | | #IFGaiı | n:Low | Center Freq: 2.10 Trig: Free Run #Atten: 30 dB | | g Hold: 10 | 00/100 | Radio Std: Radio Devid | |
| dB/div | Ref Offset 41.5 Ref 47.00 dB | | | 1 | | . | | | 1 |
| 9 .0 | | | _ | | | _ | | | |
| .0 | | | | | | \sqrt{c} | | | |
| 0 | | | | | | Y | | | |
| 0 | | | | | | | | | |
| 0 | | | _ | | | | | | |
| o | | <u> </u> | | | | | | | <u> </u> |
| 0 | | | | | | | | | |
| .0 | | | | | | | | | |
| enter 2.15 tes BW 6 | 5500 GHz 520 kHz | | | #VBW 2 | MHz | | | Spar #Swee | n 100.0 MH p 601.1 m |
| Channe | el Power | | | Power Sp | | | | | |
| 42.98 dBm / 30 мнz | | | | 28. | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

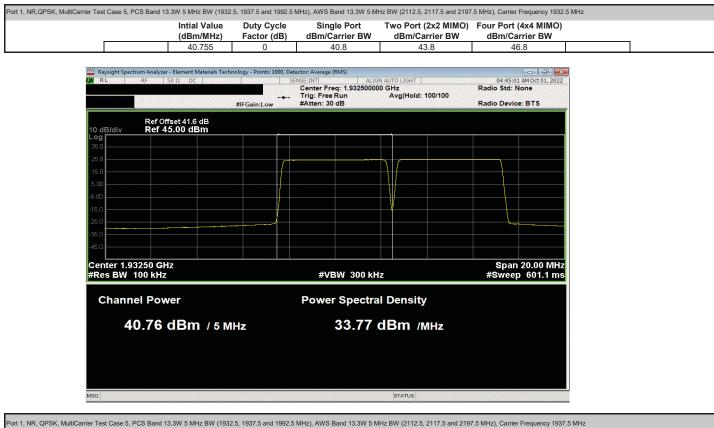




| FOILT, NR, QFSR, MultiCarrier res | | | | | | | | | | |
|-----------------------------------|--|--------------|-------------|----------------|---------------------|----------------------|--|--|--|--|
| | | Intial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | | | | |
| | | (dBm/MHz) | Factor (dB) | dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | | | | |
| | | 45.993 | 0 | 46 | 49 | 52 | | | | |

| | trum Analyzer - Element Mater | ials Technology - Points: 10 | | | | | | |
|-----------------------|-------------------------------------|------------------------------|---|-------------|-------|---------|---|-----------------------|
| XI RL | RL RF 50 Ω DC #IFGain | | | | | | 04:25:03 AM Oct 01, 202 Radio Std: None Radio Device: BTS | |
| 10 dB/div | Ref Offset 41.6 dB Ref 50.00 dBm | | | | | | | |
| 40.0 | | | | | | | | |
| 30.0 | | | ~ | | - | | | |
| 20.0 | | | | | -+ | | | |
| 10.0 | | | + | | | | | |
| 0.00 | | | | | | | | |
| 20.0 | | | | | | | | |
| 30.0 | | | | | | | | |
| 40.0 | | | | | | | | |
| | | | | | | | | |
| Center 1.9 #Res BW | 6250 GHz 100 kHz | | | #VBW 300 | kHz | | Span #Sweep | 20.00 MHz 601.1 ms |
| Chann | el Power | | | Power Spect | ral C | Density | | |
| 4 | 5.99 dBm / | 5 MHz | | 39.00 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ISG | | | | | | STATUS | | |

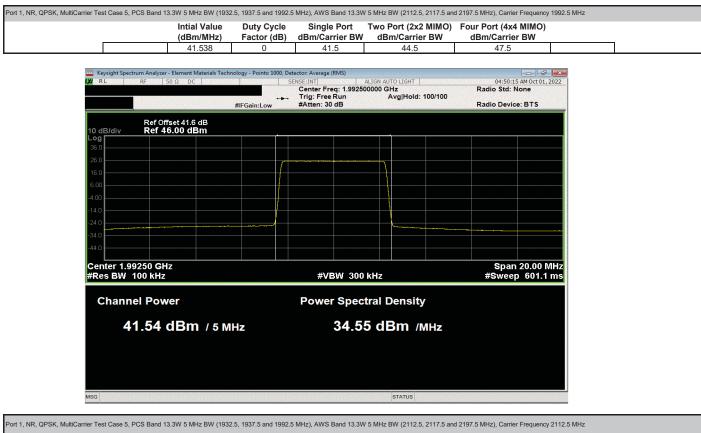




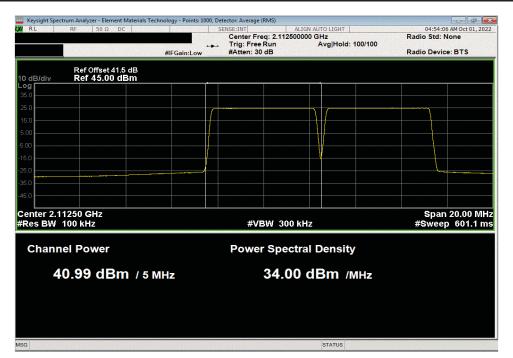
| For 1, NR, QF SR, Multicaller res | | | | | | | | | | | |
|-----------------------------------|--|--------------|-------------|----------------|---------------------|----------------------|--|--|--|--|--|
| | | Intial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | | | | | |
| | | (dBm/MHz) | Factor (dB) | dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | | | | | |
| | | 41.101 | 0 | 41.1 | 44.1 | 47.1 | | | | | |

| RL | RF 50 Ω DC | | SENSE:INT | ALIG | AUTO LIGH | т | 04:47:4 | 5 AM Oct 01, 202 |
|---------------|-------------------------------------|----------------|--------------------------------------|-------------------------------|------------|-------------|-----------------------------|---------------------|
| | | #IFGain:Low | Center Fr Trig: Free #Atten: 3 | eq: 1.93750000 Run 0 dB | | ld: 100/100 | Radio Std: 1 Radio Devic | |
| dB/div | Ref Offset 41.6 dB Ref 45.00 dBm | | | | | | | |
| g .0 | | | | | | | | |
| 0 | | | | | _ | | | |
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| | | | | | | | | |
| | | | | | | | | |
| | 3750 GHz 100 kHz | | #V | BW 300 kH | z | | Span #Sweej | 20.00 MH 601.1 m |
| Chann | el Power | | Powe | r Spectra | l Dens | ity | | |
| 4 | 1.10 dBm / (| 5 MHz | | 34.11 | dBm | /MHz | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |





| | Intial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
|---|--------------|-------------|----------------|---------------------|----------------------|--|
| _ | (dBm/MHz) | Factor (dB) | dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| | 40.988 | 0 | 41 | 44 | 47 | |







| | | | | · · · · | |
|---------------|-------------|----------------|---------------------|----------------------|--|
| Intial Value | Duty Cycle | Single Port | Two Port (2x2 MIMO) | Four Port (4x4 MIMO) | |
| (dBm/MHz) | Factor (dB) | dBm/Carrier BW | dBm/Carrier BW | dBm/Carrier BW | |
| 41.216 | 0 | 41.2 | 44.2 | 47.2 | |

