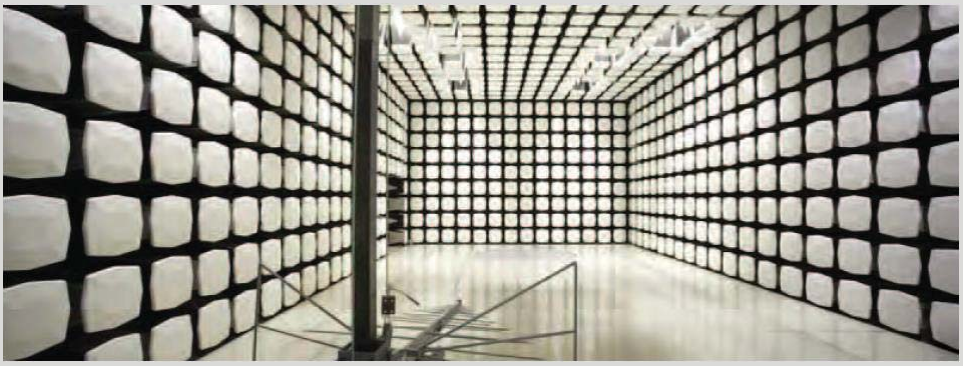
element

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



ilac-MRA

A2LA ACCREDITED
CERT #3310.03

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.

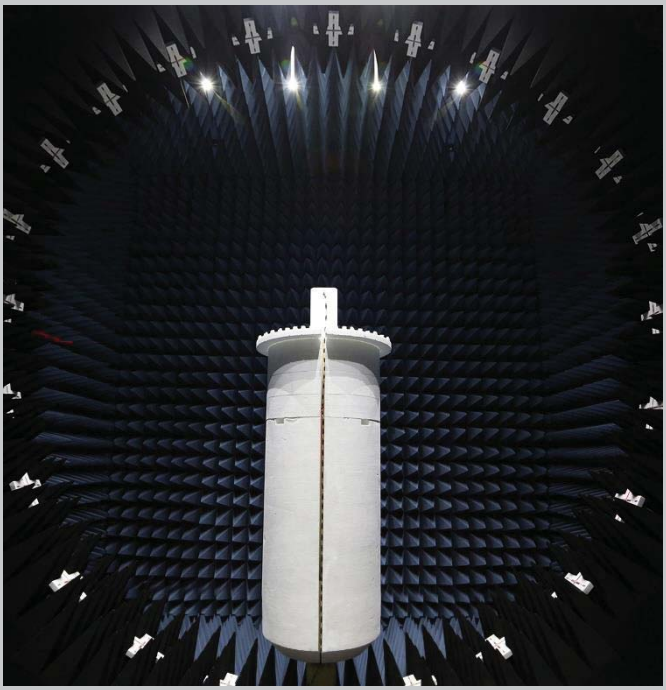
SCOPE

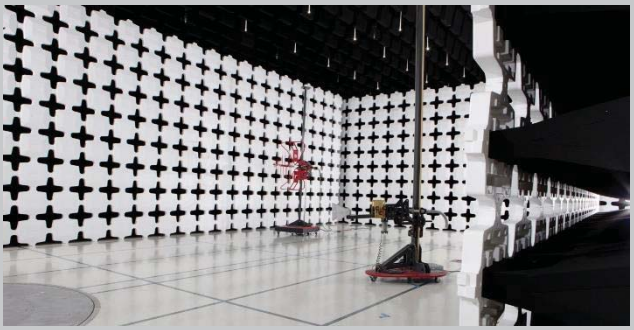
For details on the Scopes of our Accreditations, please visit:

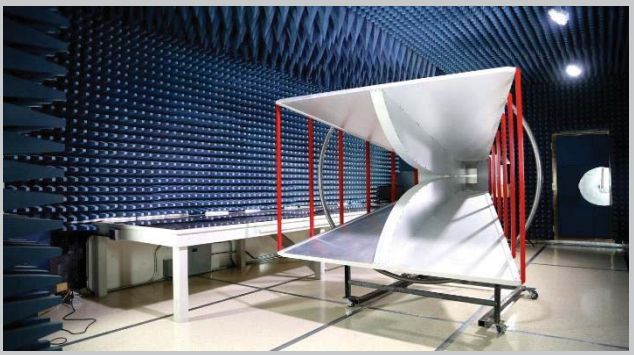
California Minnesota Oregon Texas Washington

FACILITIES

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

element
TMU.2015.07.10

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

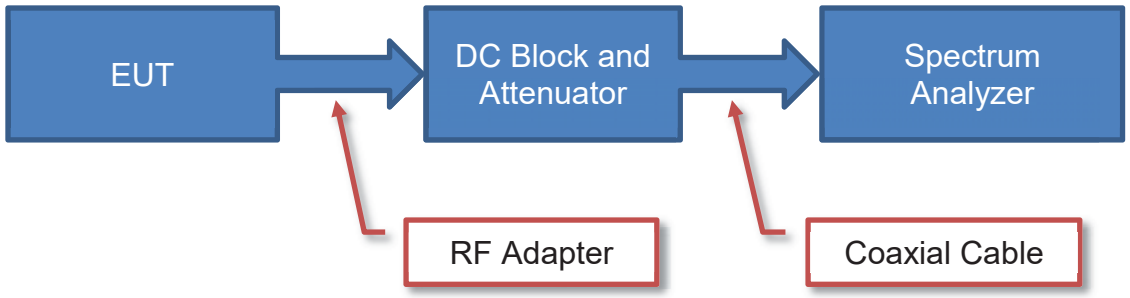
TEST SETUP BLOCK DIAGRAMS

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.

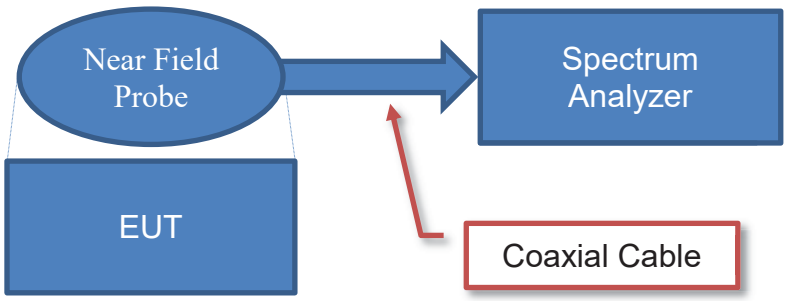
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

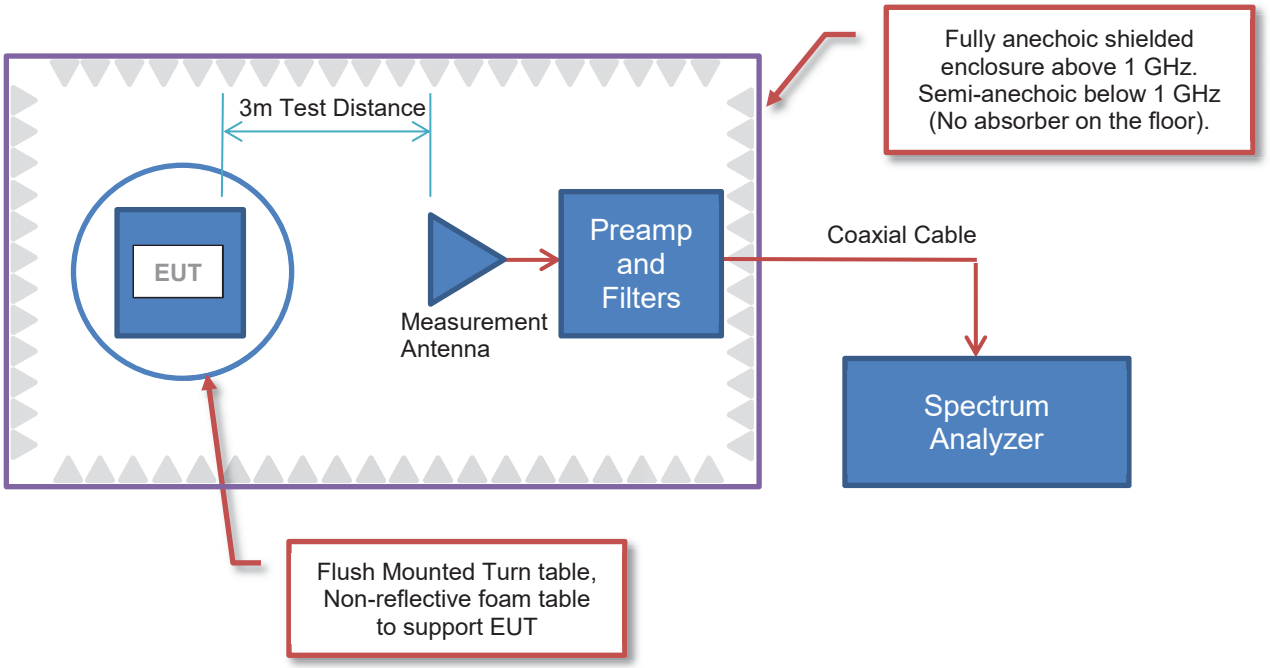


Sample Calculation (logarithmic units)

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

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

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

Conducted Emissions:

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

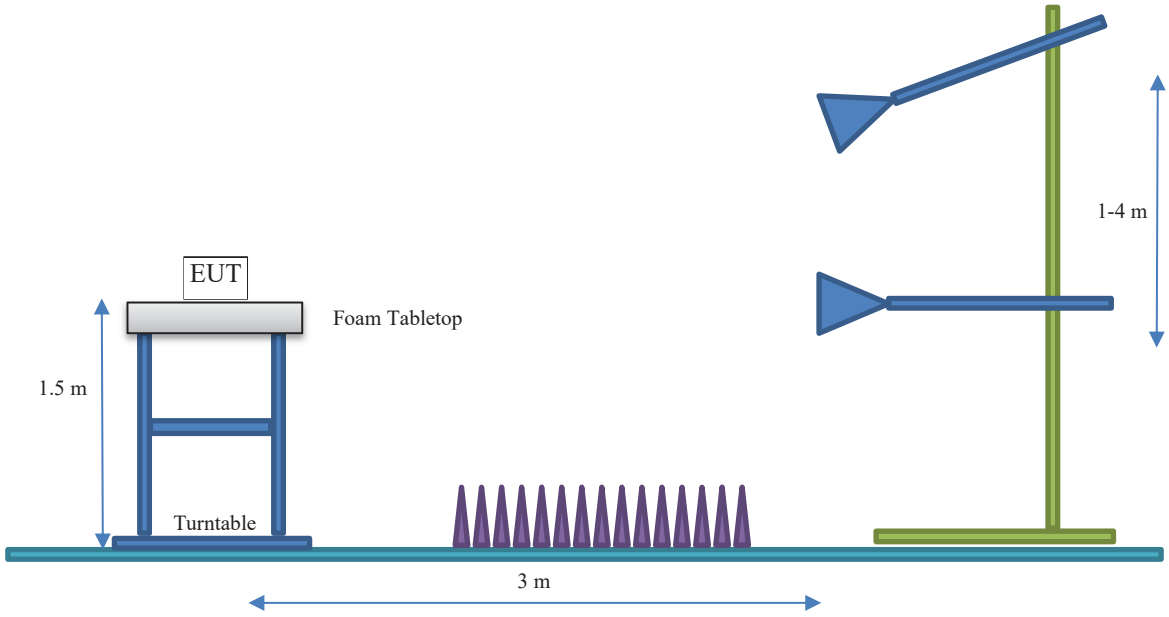
Radiated Power (ERP/EIRP) – Substitution Method:

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

TEST SETUP BLOCK DIAGRAMS

Bore Sighting (>1GHz)

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



PRODUCT DESCRIPTION

Client and Equipment under Test (EUT) Information

Company Name:	Nokia 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

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.

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 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.

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

	Downlink 5G NR NR-ARFCN	Downlink Frequency (MHz)	5G NR Channel Bandwidth				
			5 MHz	10 MHz	15 MHz	20 MHz	30 MHz
AHFIB Band n25 (Ant 1 through 4)	386000	1930.0	Band Edge	Band Edge	Band Edge	Band Edge	Band Edge
	386500	1932.5	Bottom Ch				
	387000	1935.0		Bottom Ch			
	387500	1937.5			Bottom Ch		
	388000	1940.0				Bottom Ch	
	389000	1945.0					Bottom Ch
	392500	1962.5	Middle Ch	Middle Ch	Middle Ch	Middle Ch	Middle Ch
	396000	1980.0					Top Channel
	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

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

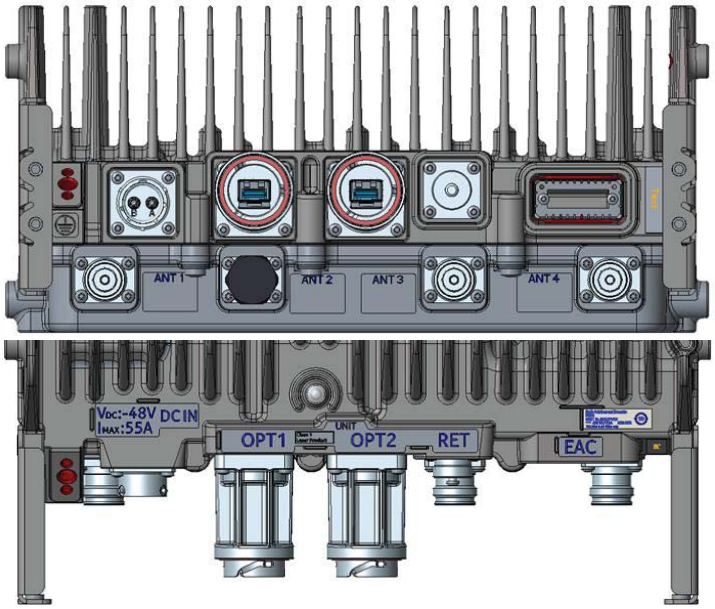
The AWS Band 5G NR channel bandwidths are 5, 10, 15, 20 and 30MHz. The downlink channel numbers are provided in table 2.

	Downlink 5G NR NR-ARFCN	Downlink Frequency (MHz)	5G NR Channel Bandwidth				
			5 MHz	10 MHz	15 MHz	20 MHz	30 MHz
AHFIB 5G NR Band n66 (Ant 1 through 4)	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		
	424000	2120.0				Bottom Ch	
	425000	2125.0					Bottom Ch
	431000	2155.0	Middle Ch	Middle Ch	Middle Ch	Middle Ch	Middle Ch
	437000	2185.0					Top Channel
	438000	2190.0				Top Channel	
	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.

CONFIGURATIONS

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

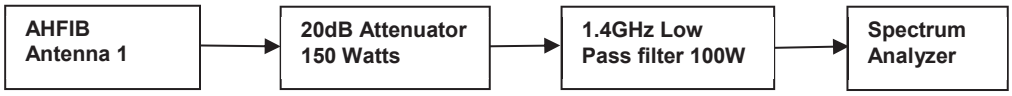
Equipment being tested (include Peripherals)			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AMIA (BTS System Module)	Nokia Solutions and Networks	473098A.203	RK182307104
ASIB (5G BTS System Module)	Nokia Solutions and Networks	473764A.102	DH211165881
ABIO (5G BTS Baseband Module)	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 supply	Keysight	N8757A	US21D4054S
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

CONFIGURATIONS

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

RF Test Setup Diagram:



CONFIGURATIONS

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

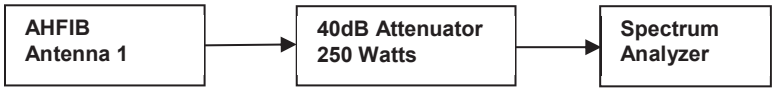
Equipment being tested (include Peripherals)			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AMIA (BTS System Module)	Nokia Solutions and Networks	473098A.203	RK182307104
ASIB (5G BTS System Module)	Nokia Solutions and Networks	473764A.102	DH211165881
ABIO (5G BTS Baseband Module)	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 supply	Keysight	N8757A	US21D4054S
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

CONFIGURATIONS

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

RF Test Setup Diagram:



CONFIGURATIONS

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

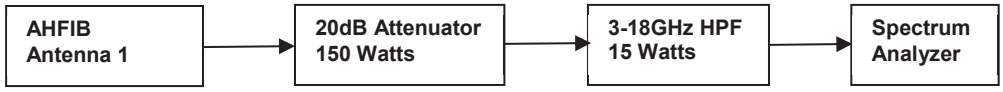
Equipment being tested (include Peripherals)			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AMIA (BTS System Module)	Nokia Solutions and Networks	473098A.203	RK182307104
ASIB (5G BTS System Module)	Nokia Solutions and Networks	473764A.102	DH211165881
ABIO (5G BTS Baseband Module)	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 supply	Keysight	N8757A	US21D4054S
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

CONFIGURATIONS

Cables					
Description	**Shield (Y/N)**	**Length (m)**	**Ferrite (Y/N)**	**Connection 1**	**Connection 2**
HS-SUCOFLEX_106 (RF cable)	Y	2 meter	N	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	N	High Pass Filter 3-18GHz/15W	Spectrum Analyzer

RF Test Setup Diagram:



CONFIGURATIONS

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

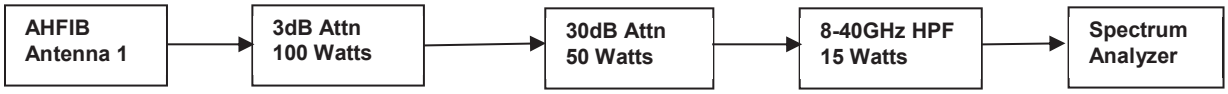
Equipment being tested (include Peripherals)			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AMIA (BTS System Module)	Nokia Solutions and Networks	473098A.203	RK182307104
ASIB (5G BTS System Module)	Nokia Solutions and Networks	473764A.102	DH211165881
ABIO (5G BTS Baseband Module)	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 supply	Keysight	N8757A	US21D4054S
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

CONFIGURATIONS

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

OCCUPIED BANDWIDTH - BAND n25

XMit 2022.02.07.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	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 BW	Radio Channel	5G-NR: QPSK		5G-NR: 16QAM		5G-NR: 64QAM		5G-NR: 256QAM	
		FCC	ISED	FCC	ISED	FCC	ISED	FCC	ISED
30MHz	Low							30M1G7W	28M6G7W
	Mid	30M1G7W	28M7G7W	30M1G7W	28M5G7W	30M1G7W	28M6G7W	30M1G7W	28M6G7W
	High							30M2G7W	28M6G7W
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.									

OCCUPIED BANDWIDTH - BAND n25

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	AHFIB			Work Order:	NOKI0049
Serial Number:	K9181401111			Date:	30-Sep-22
Customer:	Nokia of America Corporation			Temperature:	22.1 °C
Attendees:	John Rattanavong			Humidity:	52.8% RH
Project:	None			Barometric Pres.:	1008 mbar
Tested by:	Marty Martin	Power:	54 VDC	Job Site:	TX07

TEST SPECIFICATIONS	Test Method
FCC 24E:2022	ANSI C63.26:2015
RSS-Gen:2019	RSS-Gen:2019

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n25 carriers are enabled at maximum power (40 watts/carrier).

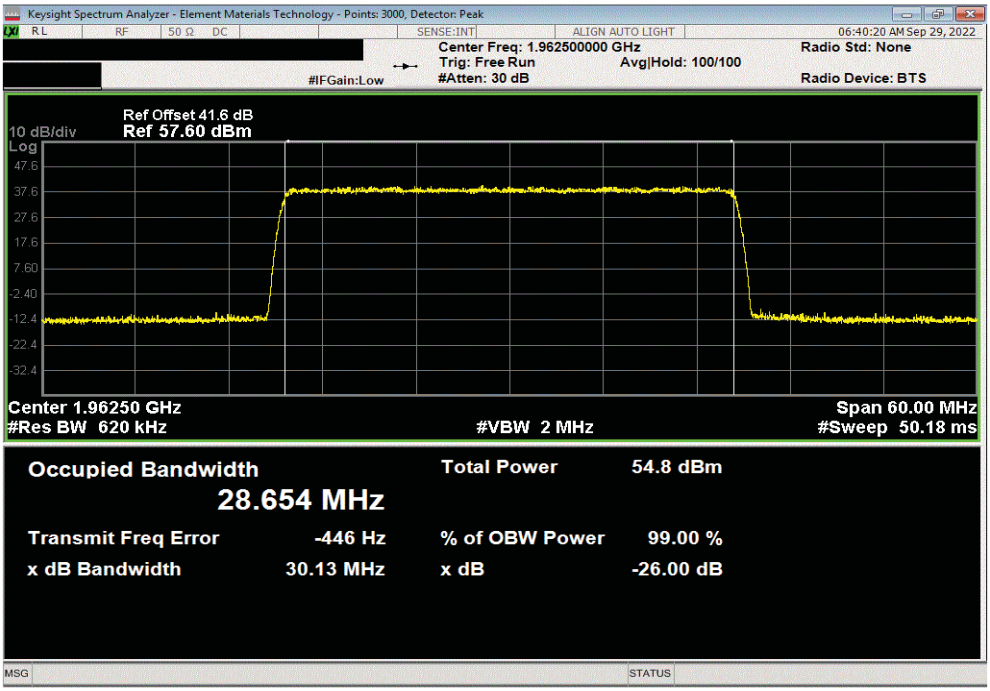
DEVIATIONS FROM TEST STANDARD

None

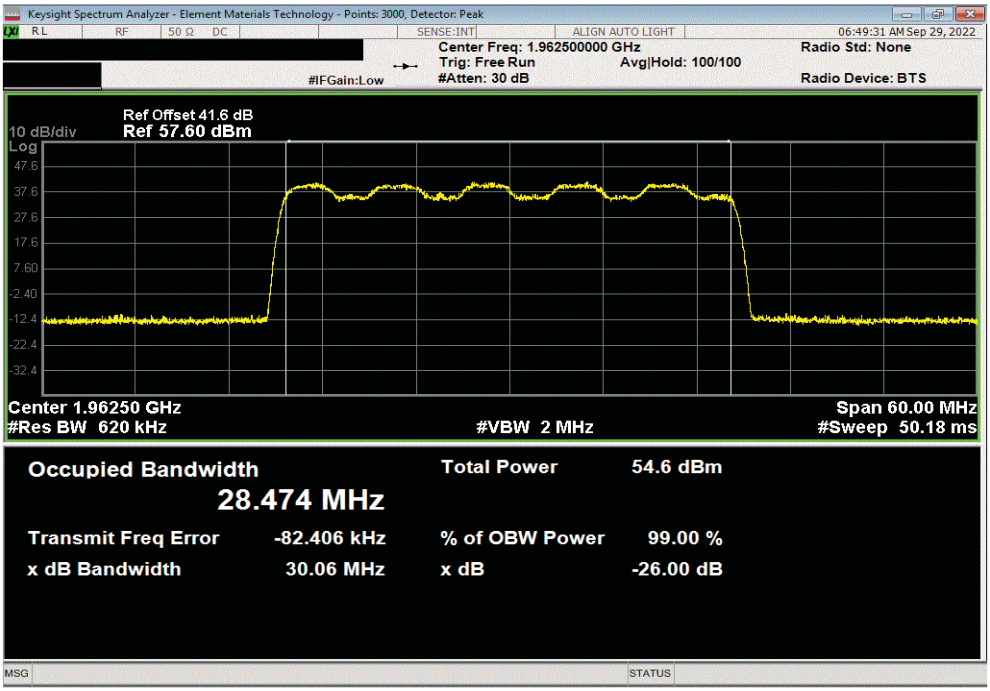
Configuration #	2	Signature

		Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
Port 1, NR, Band n25, 1930 - 1995 MHz					
30 MHz					
QPSK					
	Mid Channel, 1962.5 MHz	28.65	30.13	Within Band	Pass
16QAM					
	Mid Channel, 1962.5 MHz	28.47	30.06	Within Band	Pass
64QAM					
	Mid Channel, 1962.5 MHz	28.58	30.07	Within Band	Pass
256QAM					
	Low Channel, 1945 MHz	28.6	30.13	Within Band	Pass
	Mid Channel, 1962.5 MHz	28.63	30.12	Within Band	Pass
	High Channel, 1980 MHz	28.64	30.16	Within Band	Pass

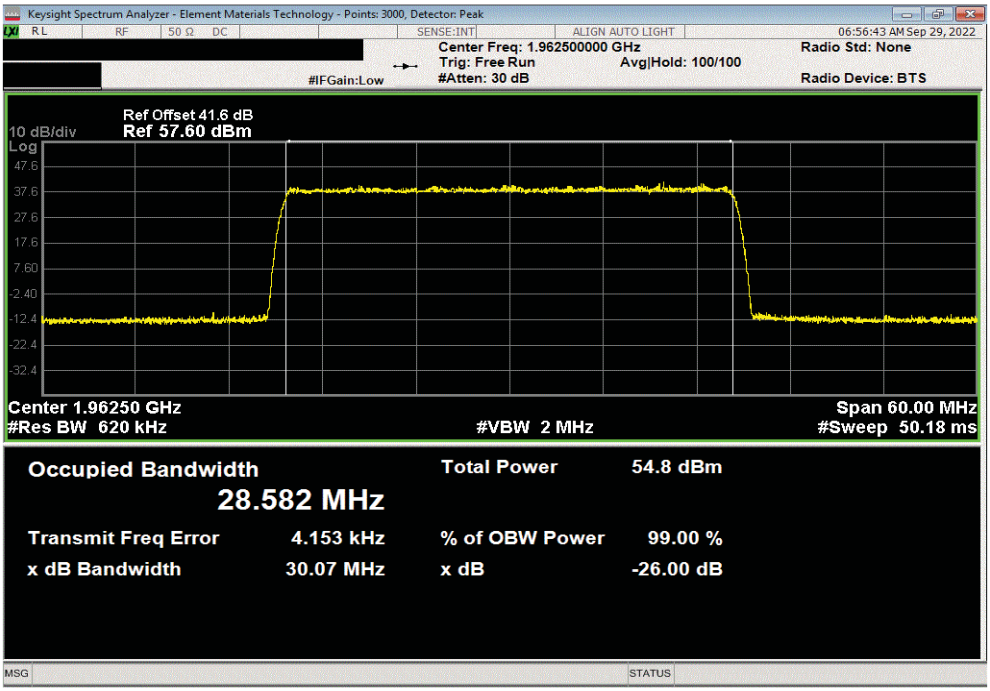
Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, QPSK, Mid Channel, 1962.5 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.65	30.13	Within Band	Pass



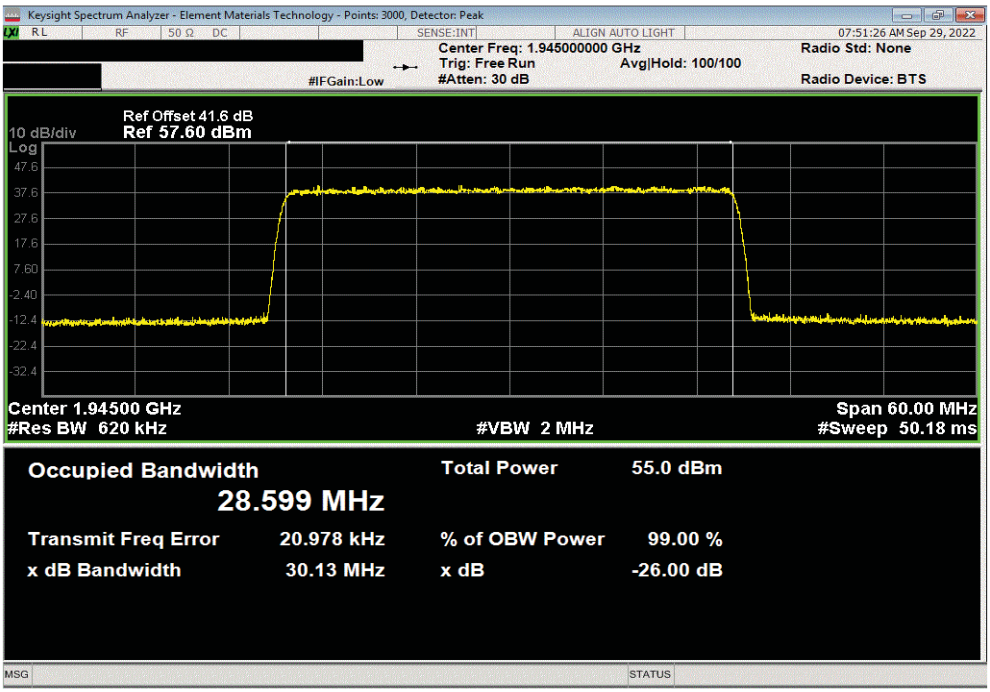
Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 16QAM, Mid Channel, 1962.5 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.47	30.06	Within Band	Pass



Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 64QAM, Mid Channel, 1962.5 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.58	30.07	Within Band	Pass

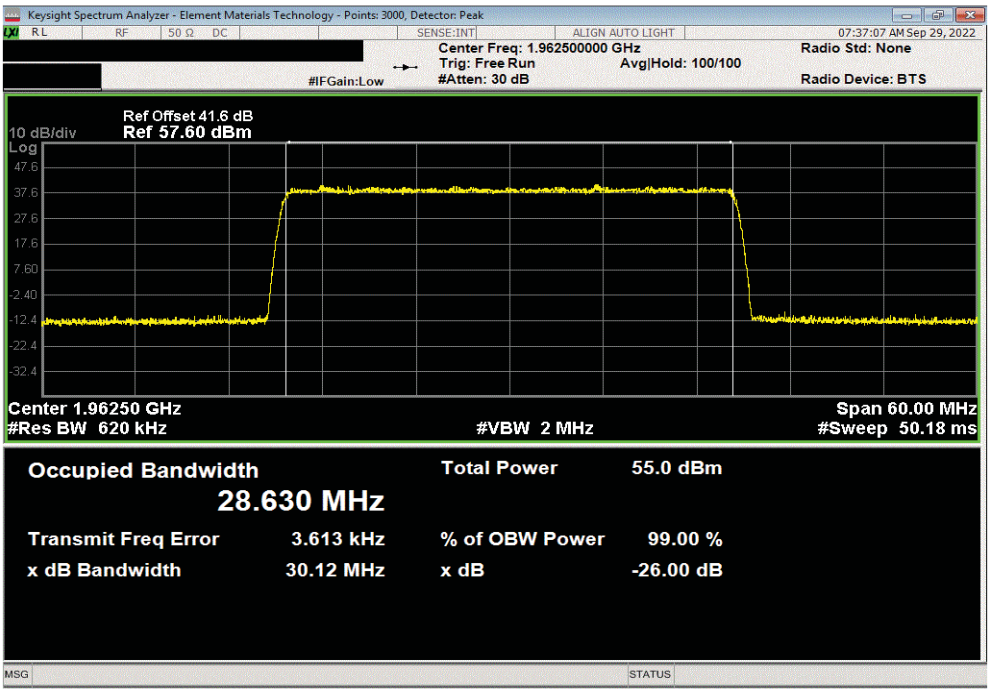


Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 256QAM, Low Channel, 1945 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.6	30.13	Within Band	Pass

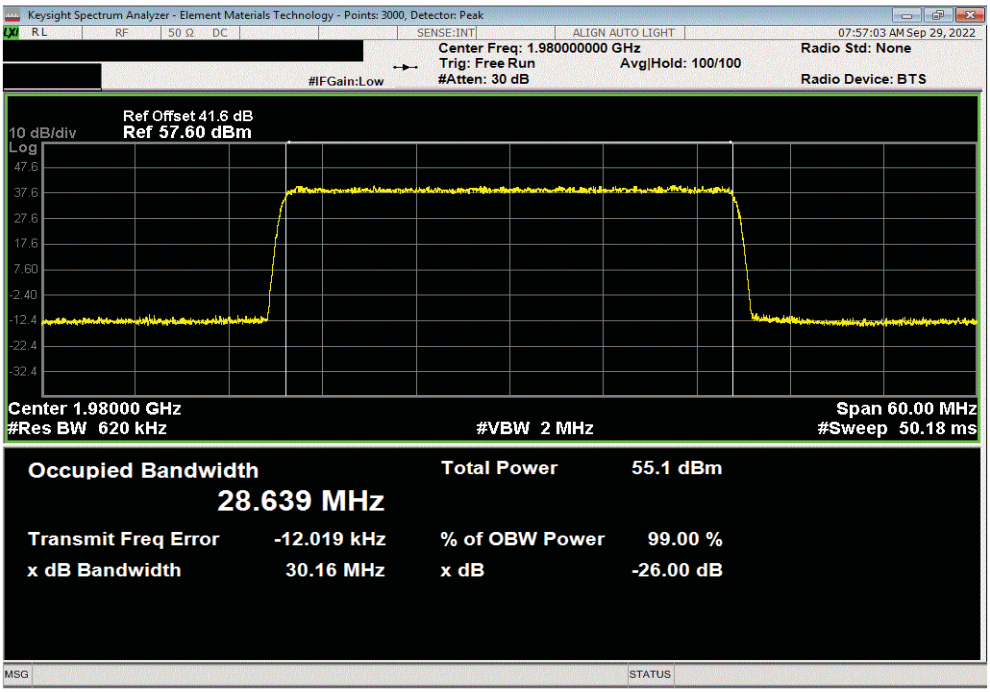


OCCUPIED BANDWIDTH - BAND n25

Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 256QAM, Mid Channel, 1962.5 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.63	30.12	Within Band	Pass



Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 256QAM, High Channel, 1980 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.64	30.16	Within Band	Pass



OCCUPIED BANDWIDTH - BAND n66

XMit 2022.02.07.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	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

FCC and ISED Emission Designators for Band n66 (2110MHz to 2200MHz)									
Ch BW	Radio Channel	5G-NR: QPSK		5G-NR: 16QAM		5G-NR: 64QAM		5G-NR: 256QAM	
		FCC	ISED	FCC	ISED	FCC	ISED	FCC	ISED
30MHz	Low							30M1G7W	28M6G7W
	Mid	30M2G7W	28M7G7W	30M0G7W	28M5G7W	30M1G7W	28M6G7W	30M1G7W	28M6G7W
	High							30M2G7W	28M6G7W
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.									

OCCUPIED BANDWIDTH - BAND n66

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	AHFIB			Work Order:	NOKI0049
Serial Number:	K9181401111			Date:	30-Sep-22
Customer:	Nokia of America Corporation			Temperature:	22.4 °C
Attendees:	John Rattanavong			Humidity:	51.3% RH
Project:	None			Barometric Pres.:	1009 mbar
Tested by:	Marty Martin	Power:	54 VDC	Job Site:	TX07

TEST SPECIFICATIONS	Test Method
FCC 27:2022	ANSI C63.26:2015
RSS-Gen:2019	RSS-Gen:2019

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n66 carriers are enabled at maximum power (40 watts/carrier).

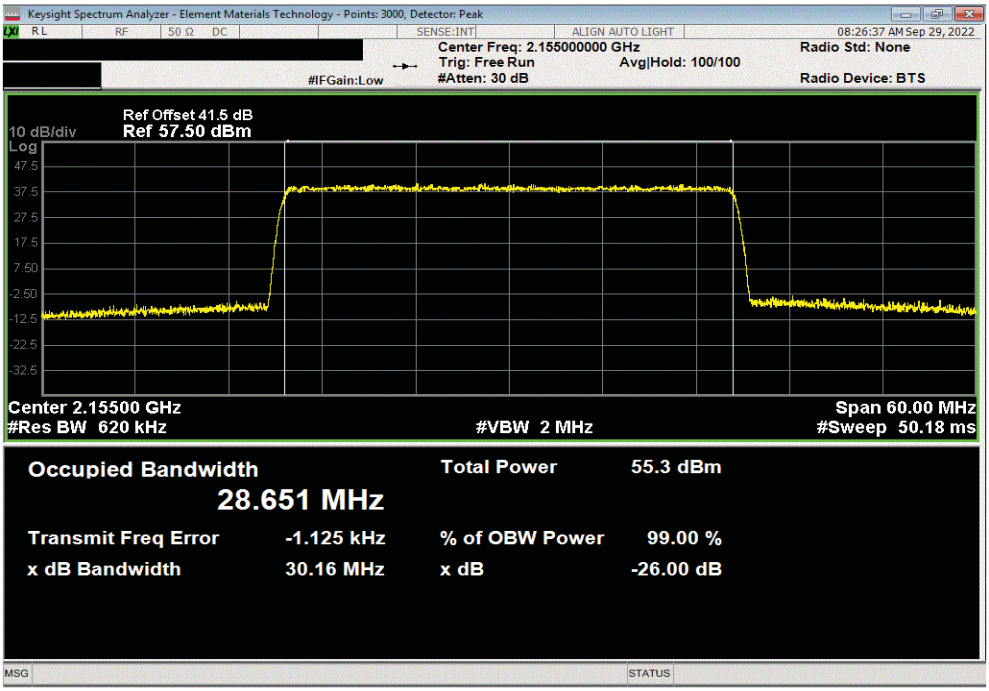
DEVIATIONS FROM TEST STANDARD

None

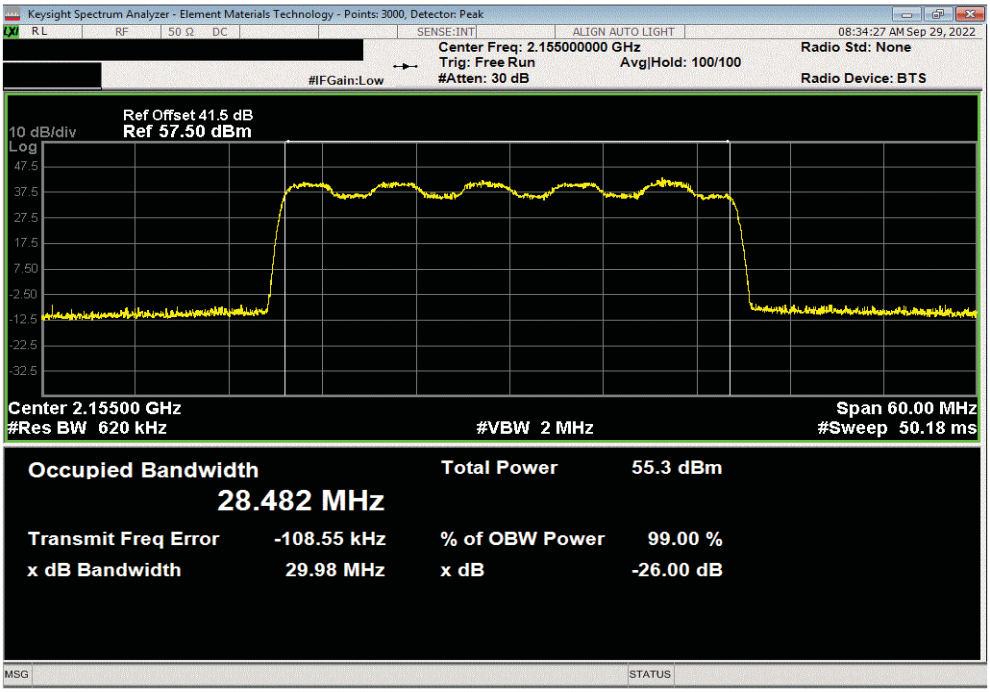
Configuration #	2	Signature

		Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
Port 1, NR, Band n66, 2110 - 2200 MHz					
30 MHz					
QPSK					
	Mid Channel, 2155 MHz	28.65	30.16	Within Band	Pass
16QAM					
	Mid Channel, 2155 MHz	28.49	29.98	Within Band	Pass
64QAM					
	Mid Channel, 2155 MHz	28.58	30.08	Within Band	Pass
256QAM					
	Low Channel, 2125 MHz	28.59	30.09	Within Band	Pass
	Mid Channel, 2155 MHz	28.64	30.12	Within Band	Pass
	High Channel, 2185 MHz	28.65	30.15	Within Band	Pass

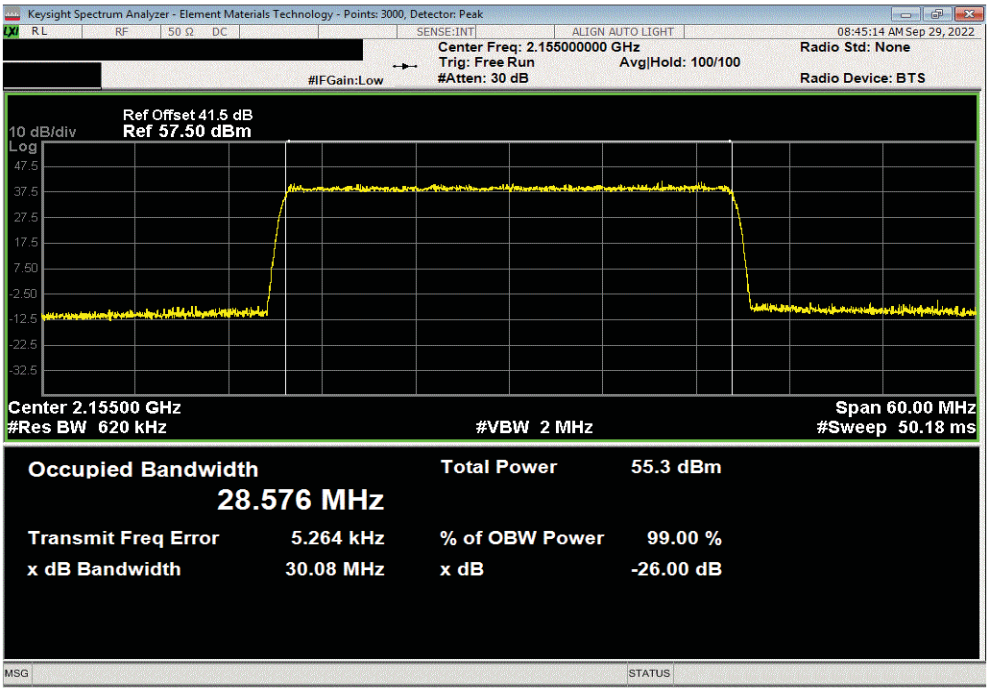
Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, QPSK, Mid Channel, 2155 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.65	30.16	Within Band	Pass



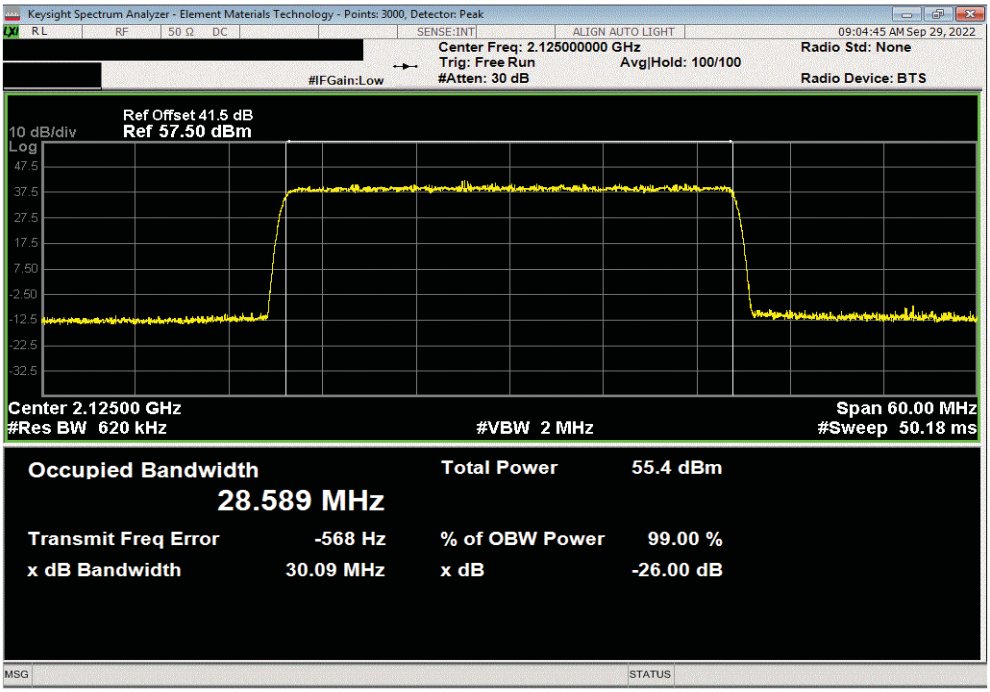
Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 16QAM, Mid Channel, 2155 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.49	29.98	Within Band	Pass



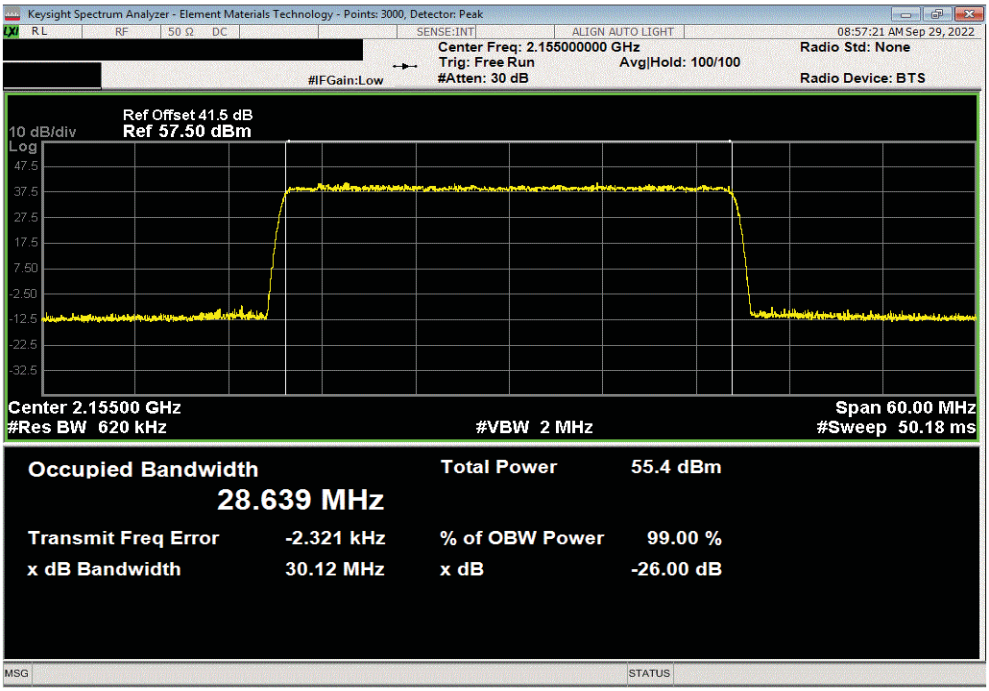
Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 64QAM, Mid Channel, 2155 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.58	30.08	Within Band	Pass



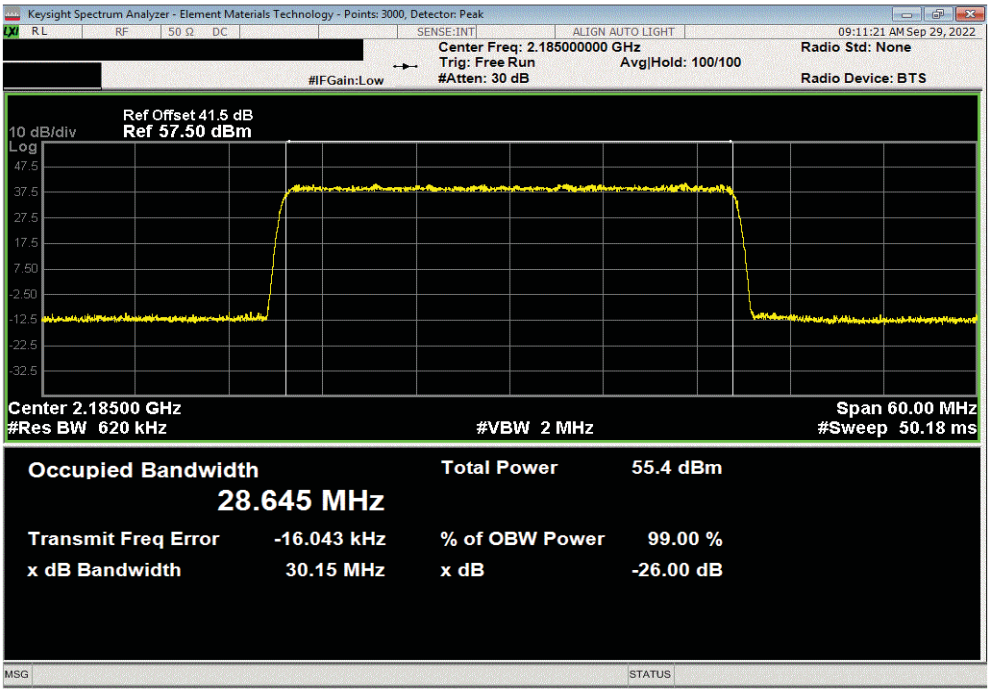
Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 256QAM, Low Channel, 2125 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.59	30.09	Within Band	Pass



Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 256QAM, Mid Channel, 2155 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.64	30.12	Within Band	Pass



Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 256QAM, High Channel, 2185 MHz						
			Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
			28.65	30.15	Within Band	Pass



OUTPUT POWER BAND n25

XMit 2022.02.07.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	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

element

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	AHFIB	Work Order:	NOKI0049
Serial Number:	K9181401111	Date:	30-Sep-22
Customer:	Nokia of America Corporation	Temperature:	22 °C
Attendees:	John Rattanavong	Humidity:	53.1% RH
Project:	None	Barometric Pres.:	1008 mbar
Tested by:	Marty Martin Power: 54 VDC	Job Site:	TX07

TEST SPECIFICATIONS	Test Method
FCC 24E:2020	ANSI C63.26:2015
RSS-133:2018	RSS-133:2018

COMMENTS

The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port + 6db [i.e. 10log(4)]. All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. Band n25 carriers are enabled at maximum power (40 watts).

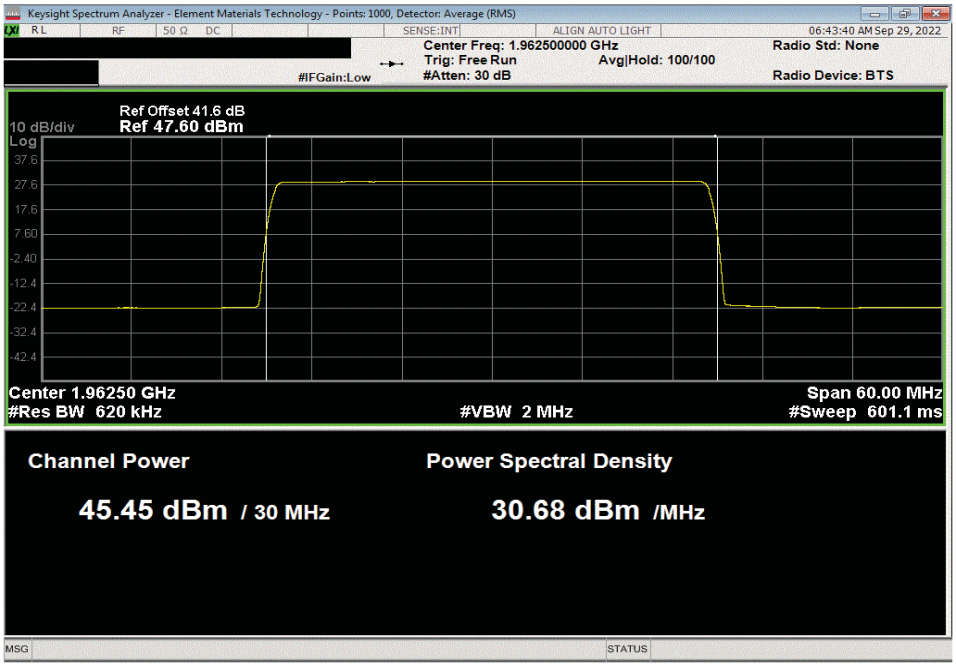
DEVIATIONS FROM TEST STANDARD

None

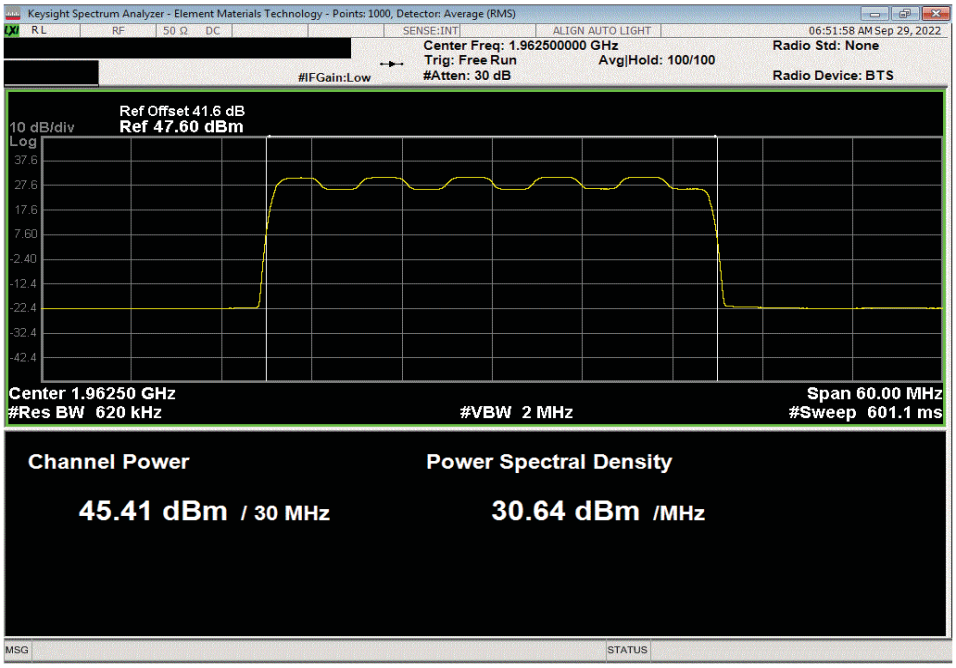
Configuration #	2	Signature

		Initial Value (dBm/MHz)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO) (dBm/Carrier BW)	Four Port (4x4 MIMO) dBm/Carrier BW
Port 1, NR, Band n25, 1930 - 1995 MHz						
30 MHz						
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						
	Mid Channel, 1962.5 MHz	45.511	0	45.5	48.5	51.5
256QAM						
	Low Channel, 1945 MHz	45.723	0	45.7	48.7	51.7
	Mid Channel, 1962.5 MHz	45.739	0	45.7	48.7	51.7
	High Channel, 1980 MHz	45.845	0	45.8	48.8	51.8

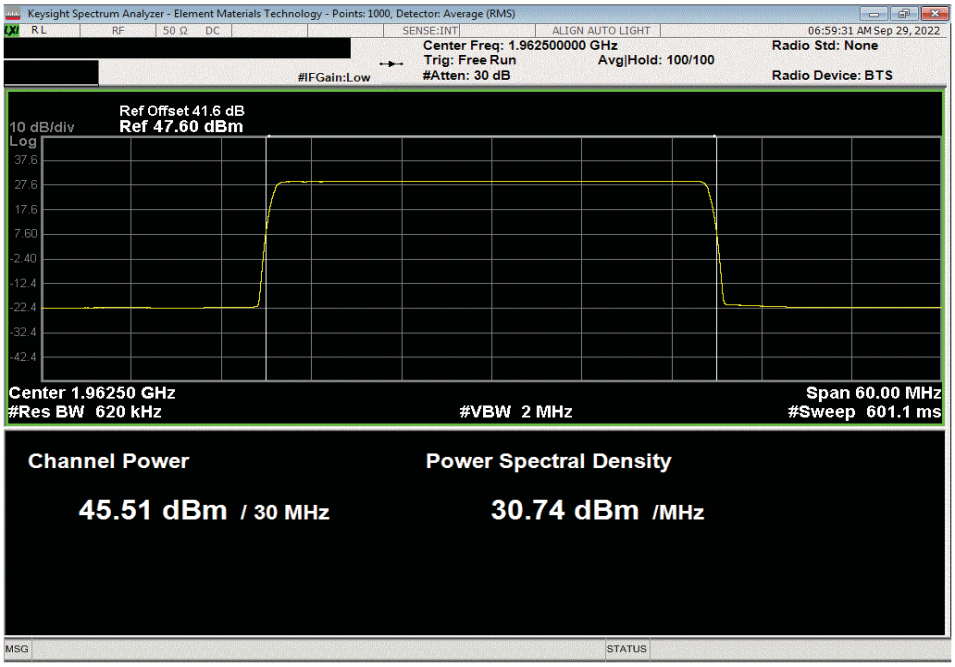
Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, QPSK, Mid Channel, 1962.5 MHz						
	Initial Value (dBm/MHz)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO) (dBm/Carrier BW)	Four Port (4x4 MIMO) dBm/Carrier BW	
	45.449	0	45.45	48.5	51.5	



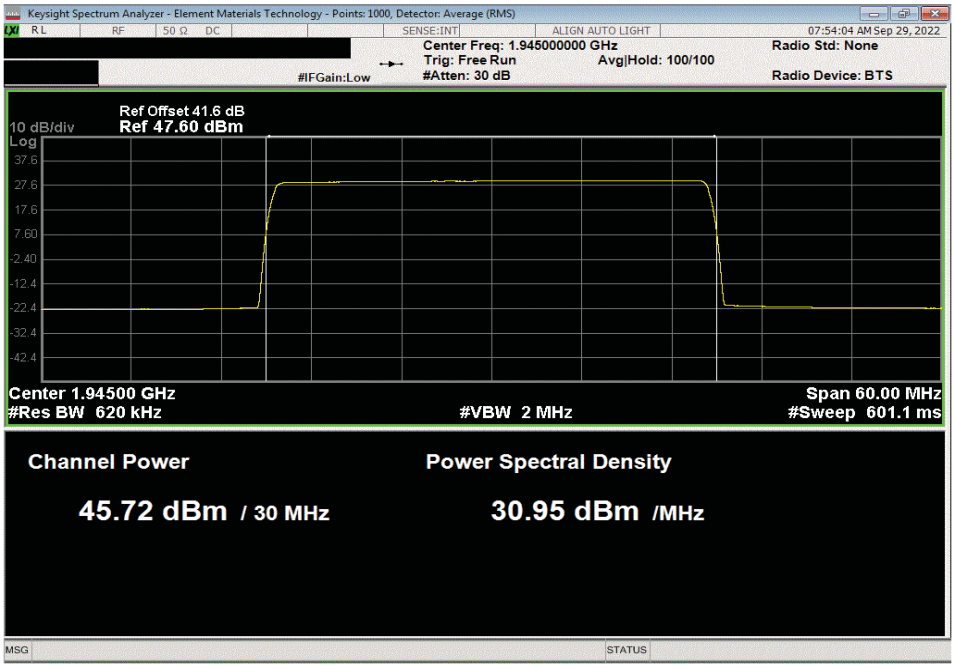
Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 16QAM, Mid Channel, 1962.5 MHz						
	Initial Value (dBm/MHz)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO) (dBm/Carrier BW)	Four Port (4x4 MIMO) dBm/Carrier BW	
	45.415	0	45.4	48.4	51.4	



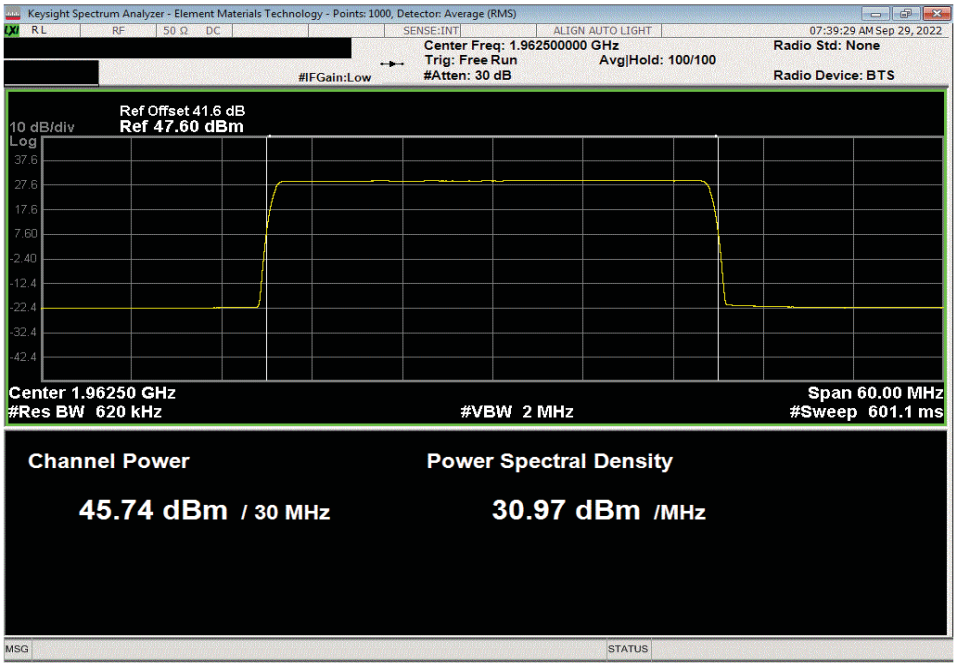
Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 64QAM, Mid Channel, 1962.5 MHz						
	Initial Value (dBm/MHz)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO (dBm/Carrier BW)	Four Port (4x4 MIMO) dBm/Carrier BW	
	45.511	0	45.5	48.5	51.5	



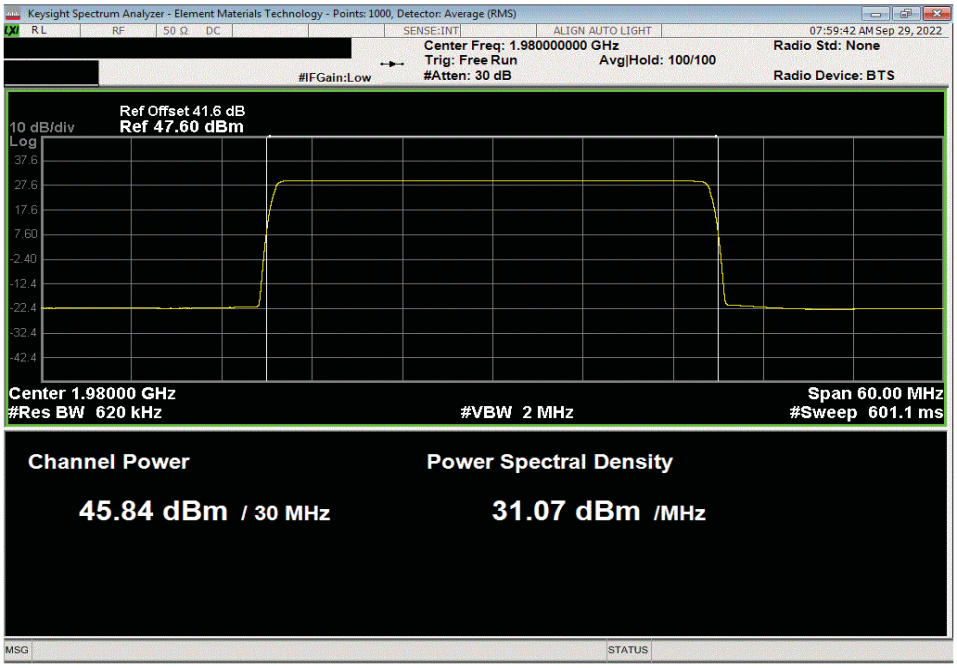
Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 256QAM, Low Channel, 1945 MHz						
	Initial Value (dBm/MHz)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO (dBm/Carrier BW)	Four Port (4x4 MIMO) dBm/Carrier BW	
	45.723	0	45.7	48.7	51.7	



Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 256QAM, Mid Channel, 1962.5 MHz						
	Initial Value (dBm/MHz)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO) (dBm/Carrier BW)	Four Port (4x4 MIMO) dBm/Carrier BW	
	45.739	0	45.7	48.7	51.7	



Port 1, NR, Band n25, 1930 - 1995 MHz, 30 MHz, 256QAM, High Channel, 1980 MHz						
	Initial Value (dBm/MHz)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO) (dBm/Carrier BW)	Four Port (4x4 MIMO) dBm/Carrier BW	
	45.845	0	45.8	48.8	51.8	



OUTPUT POWER BAND n66

XMit 2022.02.07.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	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.

OUTPUT POWER BAND n66

element

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	AHFIB			Work Order:	NOKI0049
Serial Number:	K9181401111			Date:	30-Sep-22
Customer:	Nokia of America Corporation			Temperature:	22.6 °C
Attendees:	John Rattanavong			Humidity:	50.3% RH
Project:	None			Barometric Pres.:	1008 mbar
Tested by:	Marty Martin	Power:	54 VDC	Job Site:	TX07

TEST SPECIFICATIONS	Test Method
FCC 27:2022	ANSI C63.26:2015
RSS-139 Issue 4: 2022	RSS-139-Issue 4: 2022

COMMENTS

The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port + 6db [i.e. 10log(4)]. All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. Band n66 carriers are enabled at maximum power (40 watts).

DEVIATIONS FROM TEST STANDARD

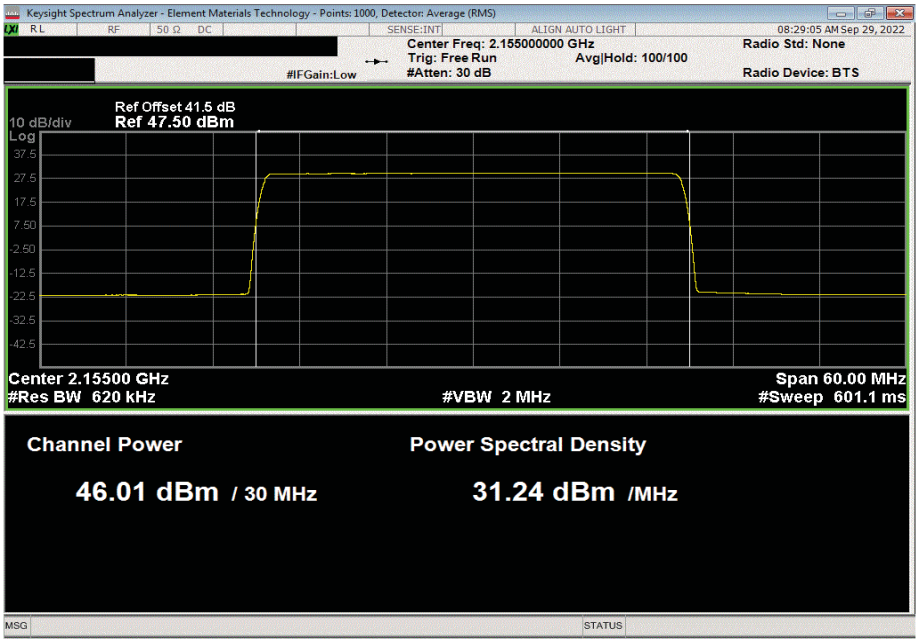
None

Configuration #	2	Signature

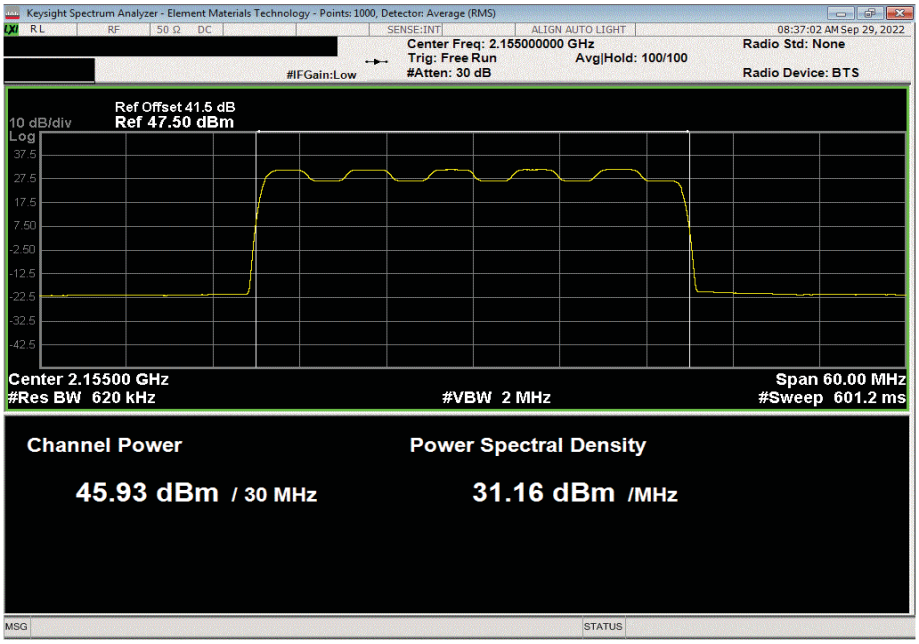
		Initial Power (dBm/MHz)	Duty Cycle Factor (dB)	Single Port (dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW
Port 1, NR, Band n66, 2110 - 2200 MHz						
30 MHz						
QPSK						
	Mid Channel, 2155 MHz	46.007	0	46	49	52
16QAM						
	Mid Channel, 2155 MHz	45.934	0	45.9	48.9	51.9
64QAM						
	Mid Channel, 2155 MHz	45.966	0	46	49	52
256QAM						
	Low Channel, 2125 MHz	45.959	0	46	49	52
	Mid Channel, 2155 MHz	46.056	0	46.1	49.1	52.1
	High Channel, 2185 MHz	45.97	0	46	49	52

OUTPUT POWER BAND n66

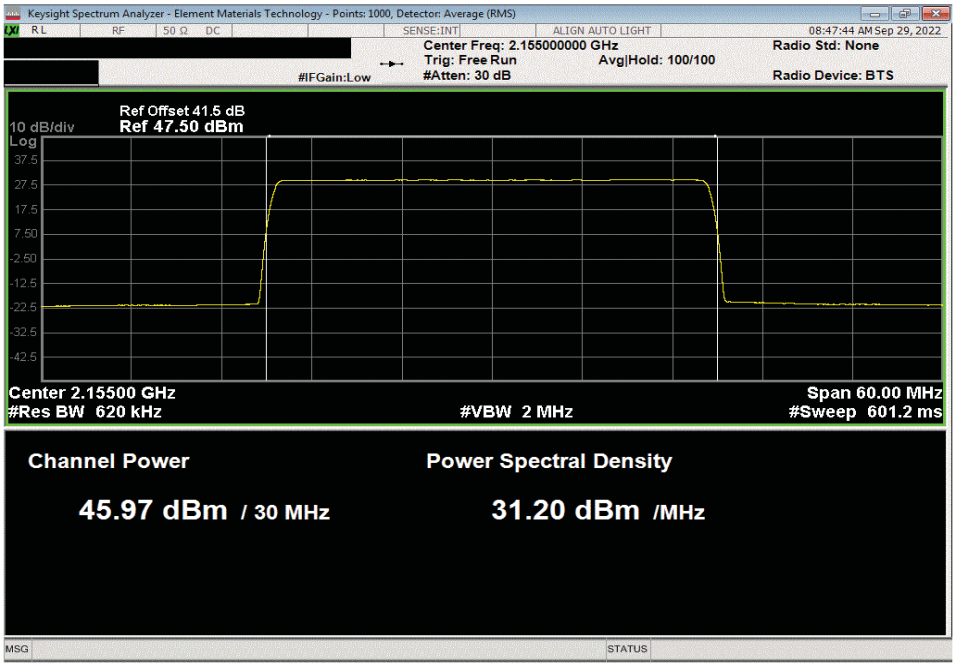
Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, QPSK, Mid Channel, 2155 MHz						
	Initial Power (dBm/MHz)	Duty Cycle Factor (dB)	Single Port (dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW	
	46.007	0	46	49	52	



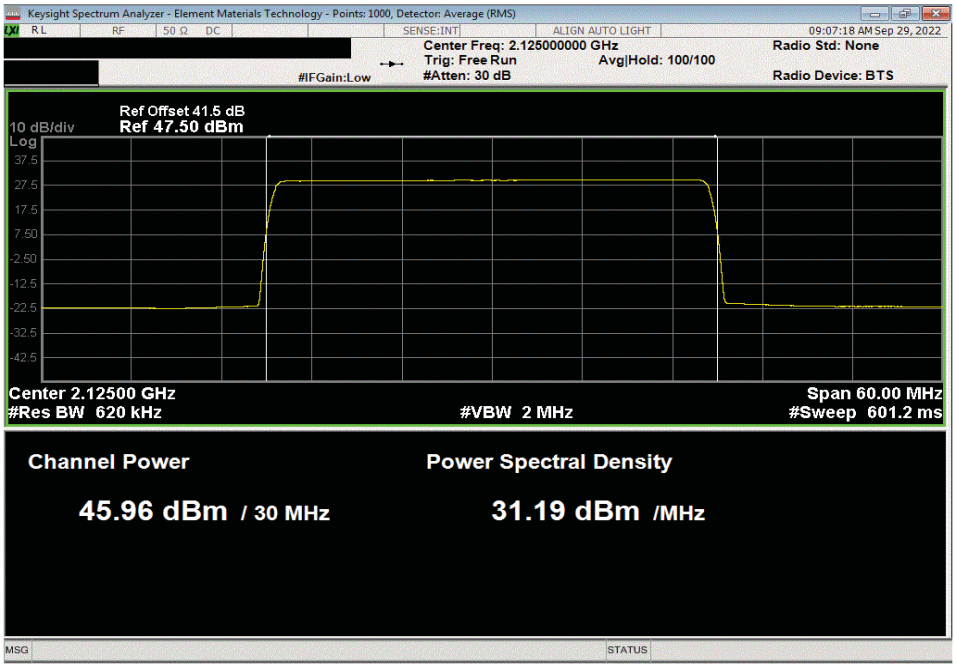
Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 16QAM, Mid Channel, 2155 MHz						
	Initial Power (dBm/MHz)	Duty Cycle Factor (dB)	Single Port (dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW	
	45.934	0	45.9	48.9	51.9	



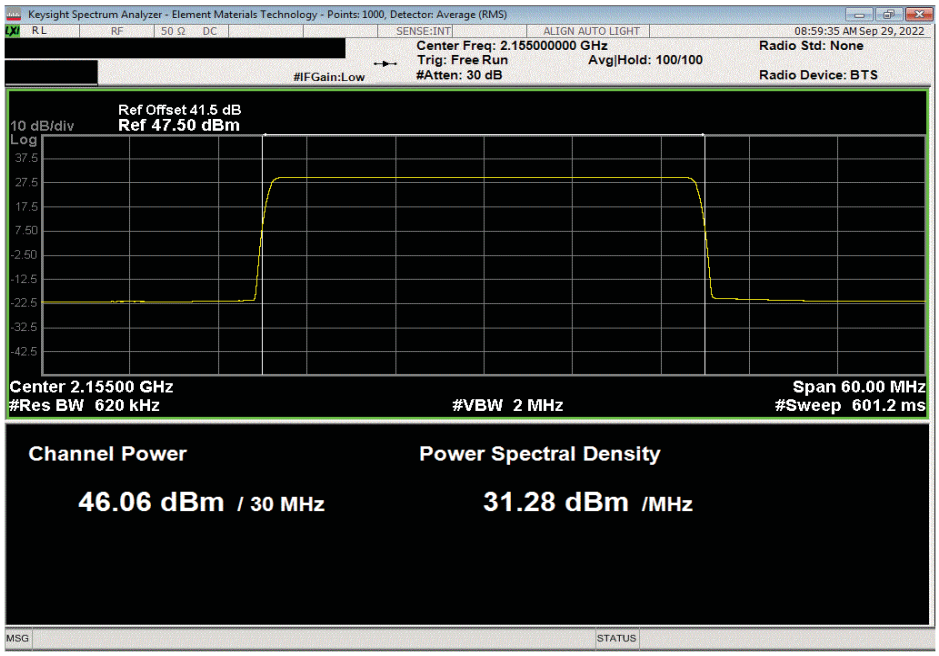
Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 64QAM, Mid Channel, 2155 MHz						
	Initial Power (dBm/MHz)	Duty Cycle Factor (dB)	Single Port (dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW	
	45.966	0	46	49	52	



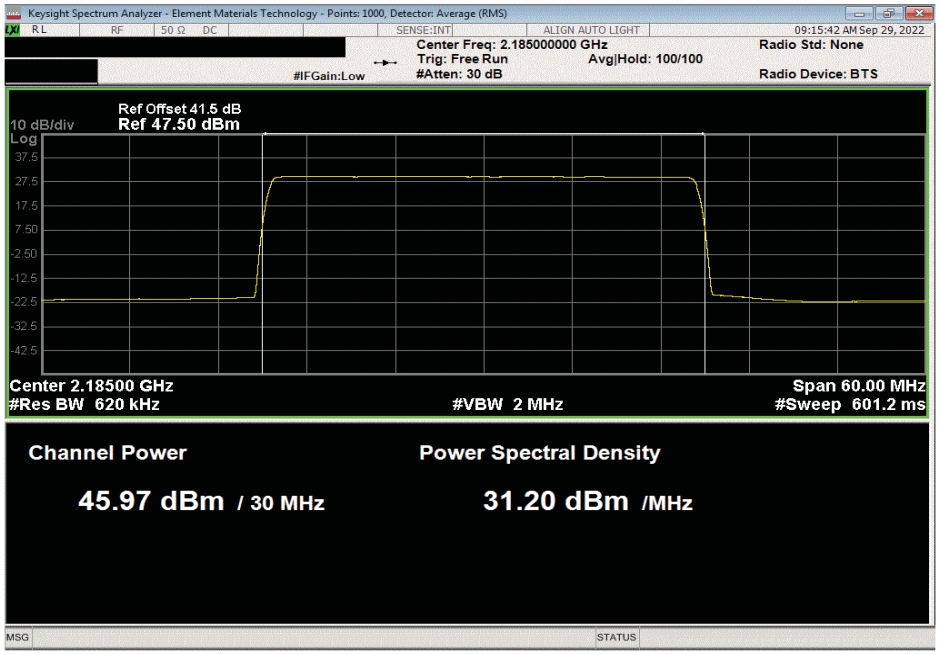
Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 256QAM, Low Channel, 2125 MHz						
	Initial Power (dBm/MHz)	Duty Cycle Factor (dB)	Single Port (dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW	
	45.959	0	46	49	52	



Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 256QAM, Mid Channel, 2155 MHz						
	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	
	46.056	0	46.1	49.1	52.1	



Port 1, NR, Band n66, 2110 - 2200 MHz, 30 MHz, 256QAM, High Channel, 2185 MHz						
	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	
	45.97	0	46	49	52	



OUTPUT POWER - MULTIBAND MULTICARRIER

XMit 2022.02.07.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	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.

OUTPUT POWER - MULTIBAND MULTICARRIER

element

TbiTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	AHFIB			**Work Order:**	NOKI0049
Serial Number:	K9181401111			**Date:**	30-Sep-22
Customer:	Nokia of America Corporation			**Temperature:**	21 °C
Attendees:	John Rattanavong			**Humidity:**	41.6% RH
Project:	None			**Barometric Pres.:**	1012 mbar
Tested by:	Marty Martin	**Power:**	54 VDC	**Job Site:**	TX07

TEST SPECIFICATIONS	Test Method
FCC 27:2022	ANSI C63.26:2015
RSS-139: 2022	RSS-139: 2022

COMMENTS

The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port + 6db [i.e. 10log(4)]. All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. Multi carrier test case 1 and 2: The carriers are operated at maximum power (~20W/PCS carrier and 40W/AWS carrier) with a total port power of 80 watts.
Multi carrier test case 3 and 4: The carriers are operated at maximum power (~20W/AWS carrier and 40W/PCS carrier) with a total port power of 80 watts.
Multi carrier test case 5: The carriers are operated at maximum power (~13.3W/AWS carrier and ~13.3W/PCS carrier) with a total port power of 80 watts.

DEVIATIONS FROM TEST STANDARD

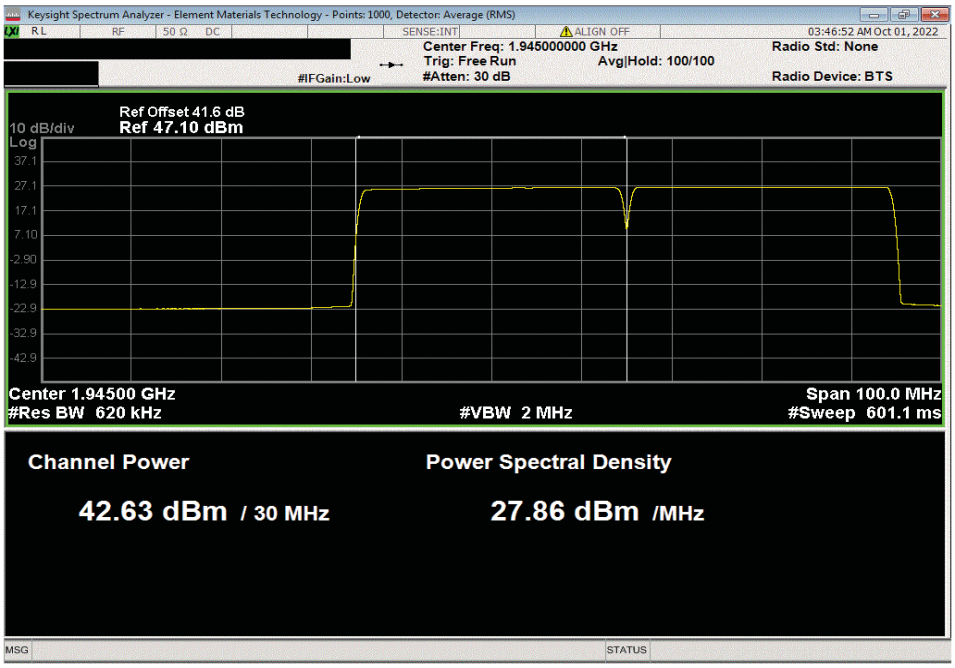
None

Configuration #	2	Signature

	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
Port 1, NR, PCS Band and AWS Band, MultiCarrier					
QPSK					
MultiCarrier Test Case 1, PCS Band 20W 30 MHz BW (1945.0 and 1975.0 MHz), AWS Band 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 1980.0 MHz), AWS Band 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 MHz BW (2125.0 and 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 MHz BW (2155.0 and 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, 1937.5 and 1992.5 MHz), AWS Band 13.3W 5 MHz BW (2112.5, 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	0	41.6	44.6	47.6
Carrier Frequency 2197.5 MHz	41.216	0	41.2	44.2	47.2

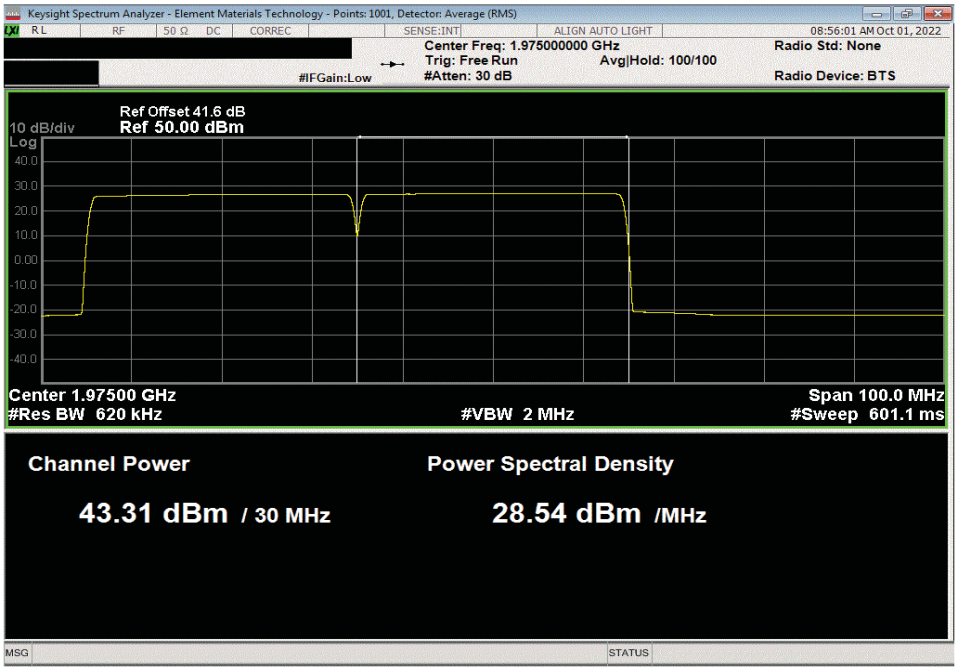
Port 1, NR, QPSK, MultiCarrier Test Case 1, PCS Band 20W 30 MHz BW (1945.0 and 1975.0 MHz), AWS Band 40W 5 MHz BW (2155.0 MHz), Carrier Frequency 1945 MHz

	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	
	42.631	0	42.6	45.6	48.6	



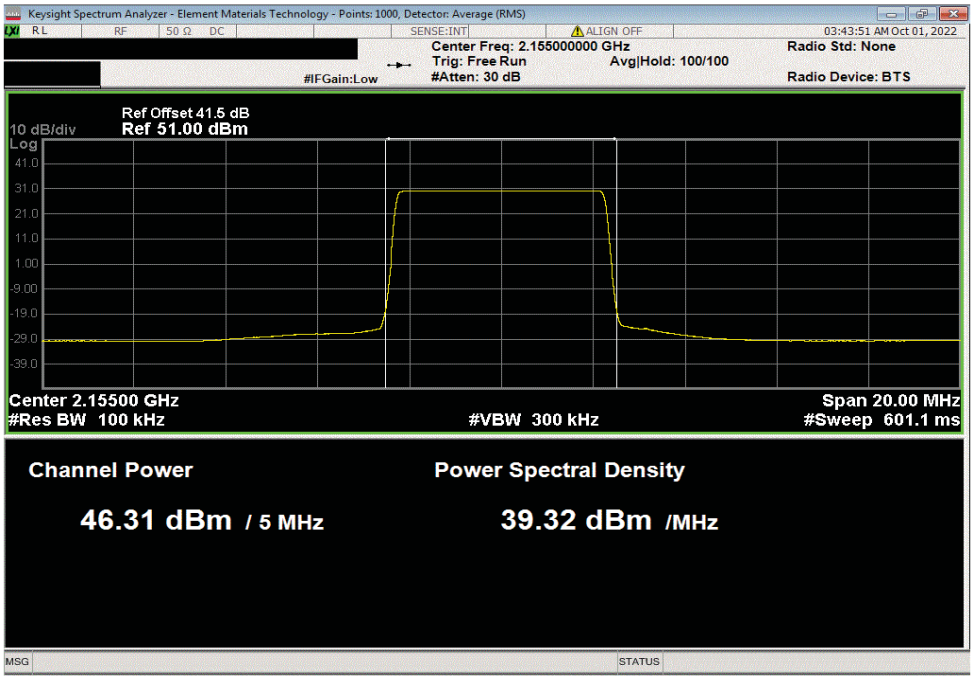
Port 1, NR, QPSK, MultiCarrier Test Case 1, PCS Band 20W 30 MHz BW (1945.0 and 1975.0 MHz), AWS Band 40W 5 MHz BW (2155.0 MHz), Carrier Frequency 1975 MHz

	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	
	43.31	0	43.3	46.3	49.3	



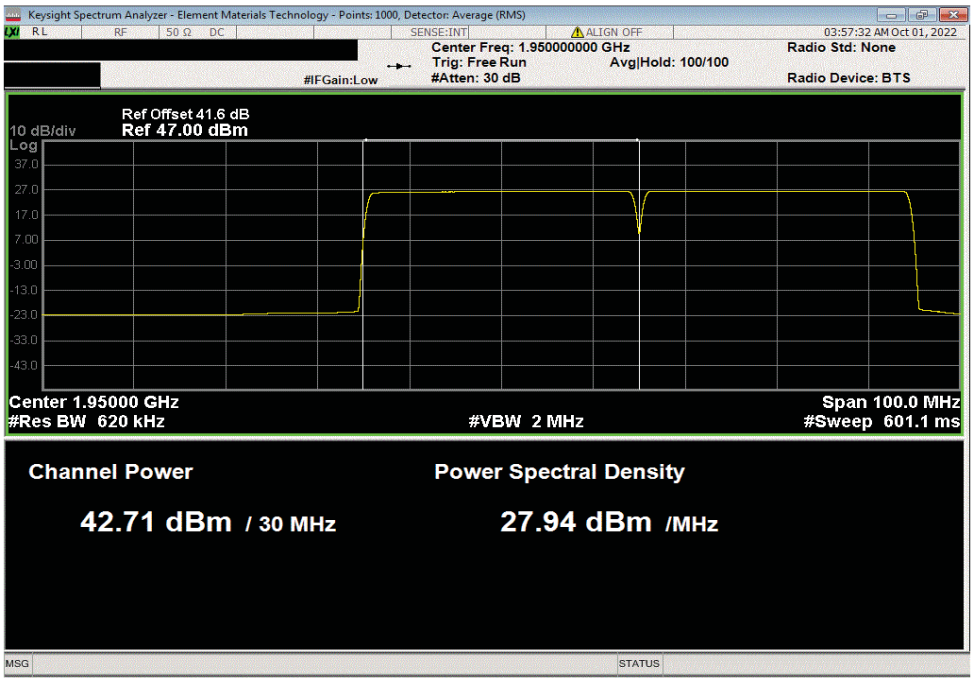
Port 1, NR, QPSK, MultiCarrier Test Case 1, PCS Band 20W 30 MHz BW (1945.0 and 1975.0 MHz), AWS Band 40W 5 MHz BW (2155.0 MHz), Carrier Frequency 2155 MHz

	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	
	46.309	0	46.3	49.3	52.3	



Port 1, NR, QPSK, MultiCarrier Test Case 2, PCS Band 20W 30 MHz BW (1950.0 and 1980.0 MHz), AWS Band 40W 5 MHz BW (2155.0 MHz), Carrier Frequency 1950 MHz

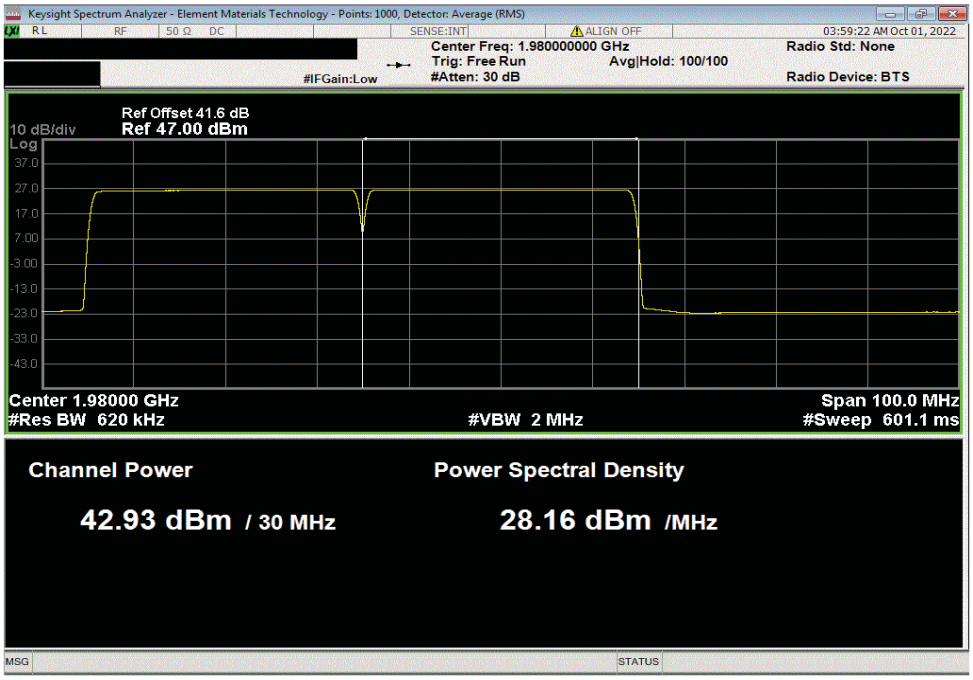
	Intial Value (dBm/MHz)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW	
	42.709	0	42.7	45.7	48.7	



OUTPUT POWER - MULTIBAND MULTICARRIER

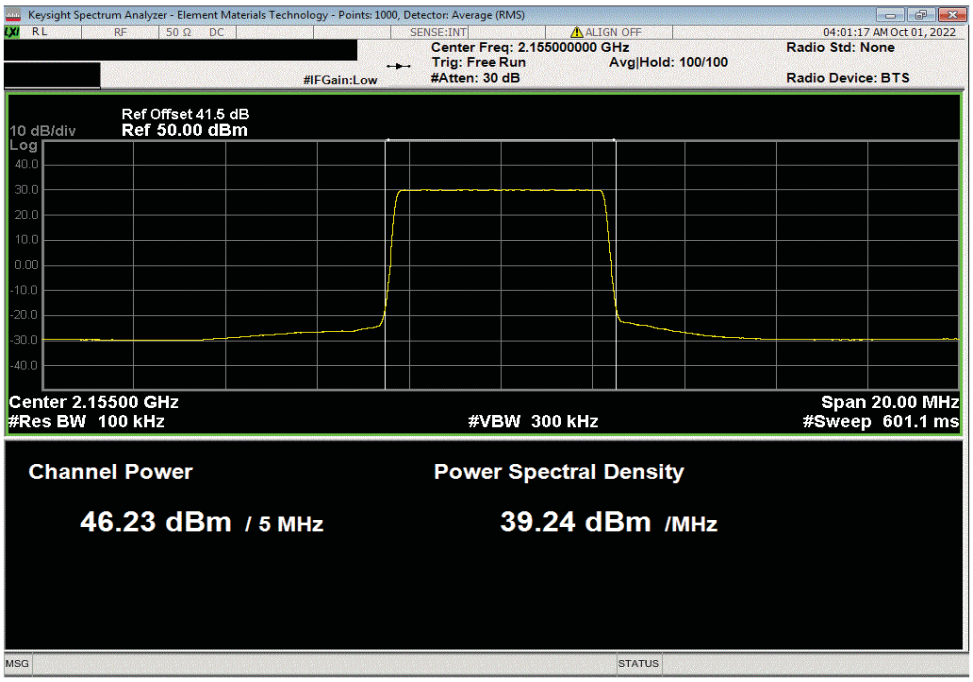
Port 1, NR, QPSK, MultiCarrier Test Case 2, PCS Band 20W 30 MHz BW (1950.0 and 1980.0 MHz), AWS Band 40W 5 MHz BW (2155.0 MHz), Carrier Frequency 1950 MHz

	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	
	42.932	0	42.9	45.9	48.9	



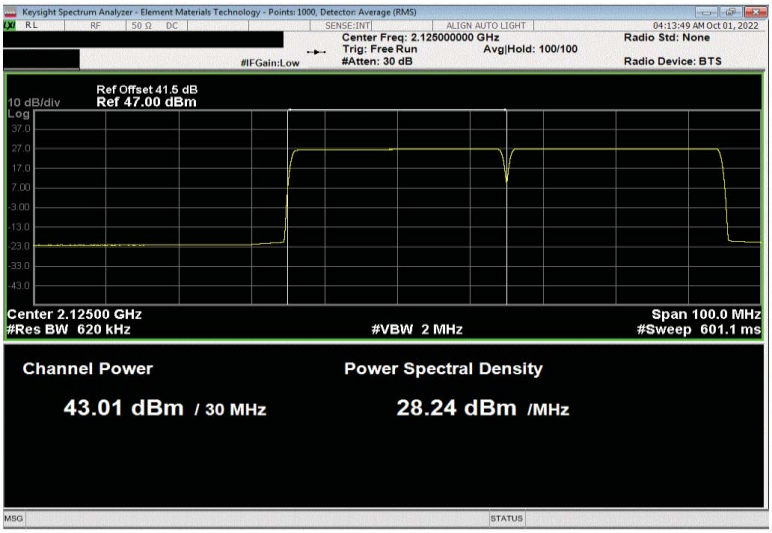
Port 1, NR, QPSK, MultiCarrier Test Case 2, PCS Band 20W 30 MHz BW (1950.0 and 1980.0 MHz), AWS Band 40W 5 MHz BW (2155.0 MHz), Carrier Frequency 2150 MHz

	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	
	46.233	0	46.2	49.2	52.3	



Port 1, NR, QPSK, MultiCarrier Test Case 3, PCS Band 40W 5 MHz BW (1962.5 MHz), AWS Band 20W 30 MHz BW (2125.0 and 2155.0 MHz), Carrier Frequency 2125 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	
	43.014	0	43	46	49	



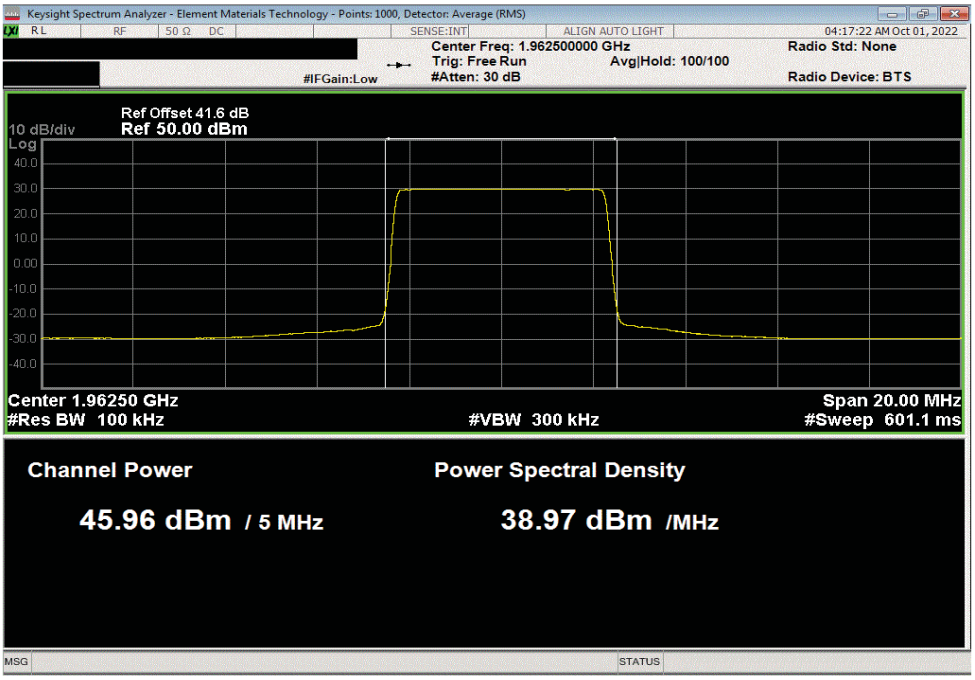
Port 1, NR, QPSK, MultiCarrier Test Case 3, PCS Band 40W 5 MHz BW (1962.5 MHz), AWS Band 20W 30 MHz BW (2125.0 and 2155.0 MHz), Carrier Frequency 2155 MHz

	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	
	43.076	0	43.1	46.1	49.1	

OUTPUT POWER - MULTIBAND MULTICARRIER

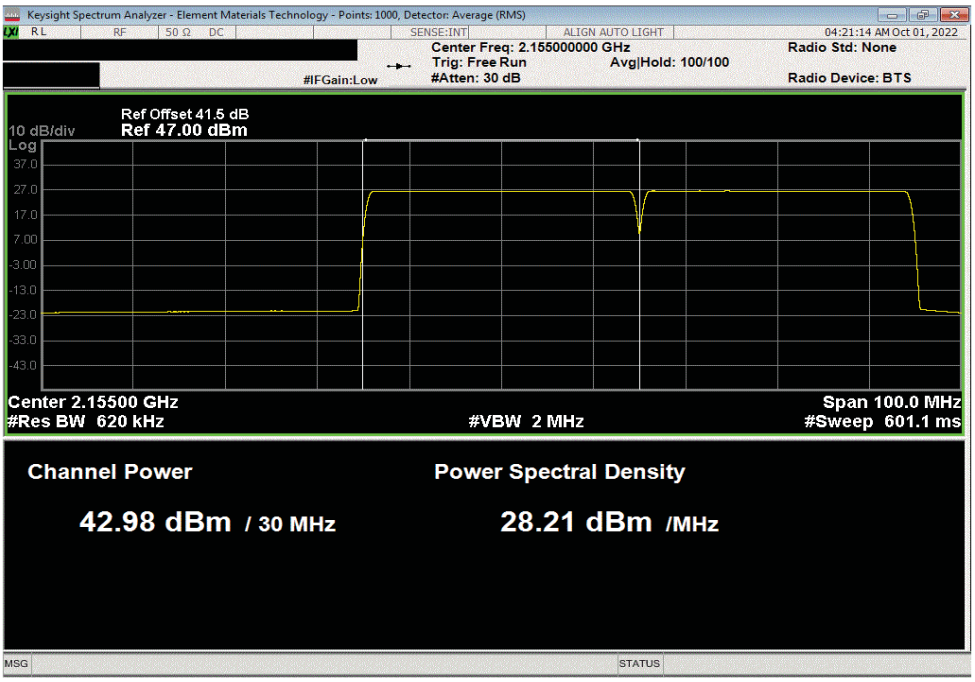
Port 1, NR, QPSK, MultiCarrier Test Case 3, PCS Band 40W 5 MHz BW (1962.5 MHz), AWS Band 20W 30 MHz BW (2125.0 and 2155.0 MHz), Carrier Frequency 1962.5 MHz

	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	
	45.955	0	46	49	52	



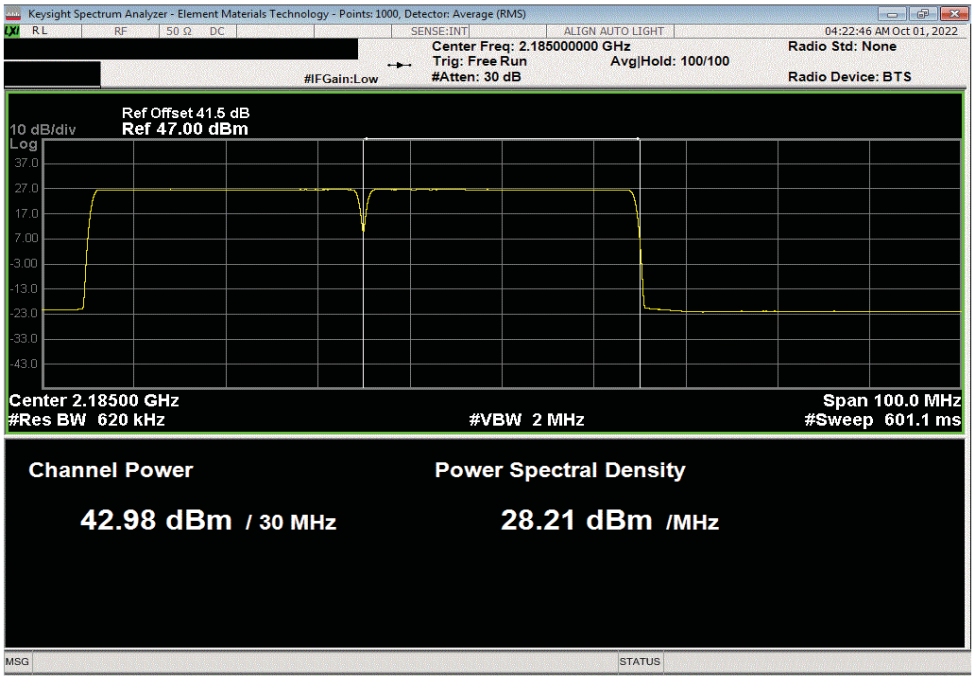
Port 1, NR, QPSK, MultiCarrier Test Case 4, PCS Band 40W 5 MHz BW (1962.5 MHz), AWS Band 20W 30 MHz BW (2155.0 and 2185 MHz), Carrier Frequency 2155 MHz

	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	



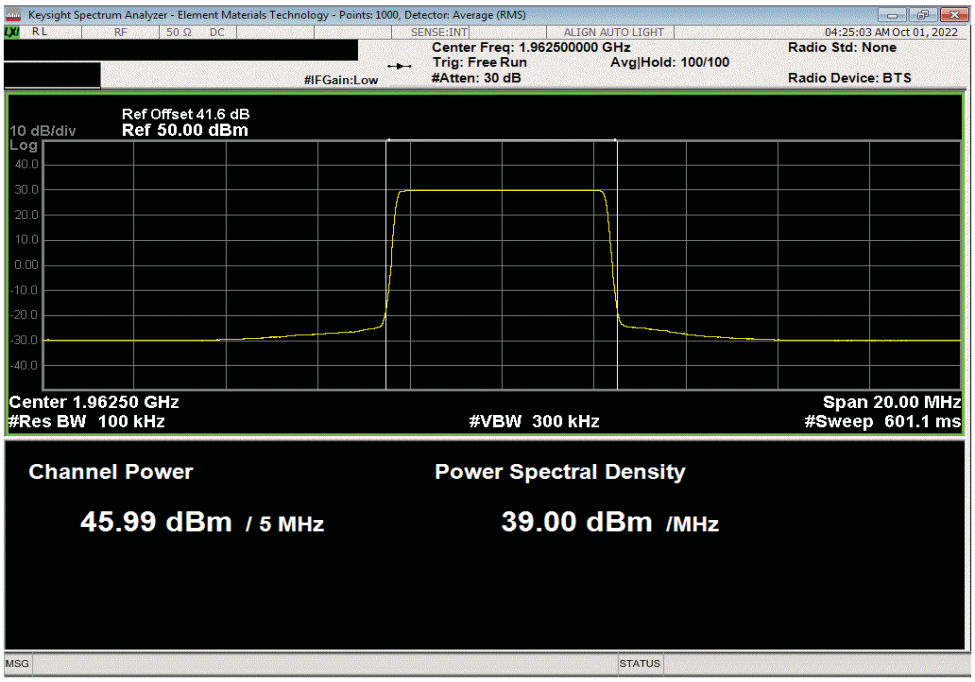
Port 1, NR, QPSK, MultiCarrier Test Case 4, PCS Band 40W 5 MHz BW (1962.5 MHz), AWS Band 20W 30 MHz BW (2155.0 and 2185 MHz), Carrier Frequency 2185 MHz

	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	
	42.985	0	43	46	49	



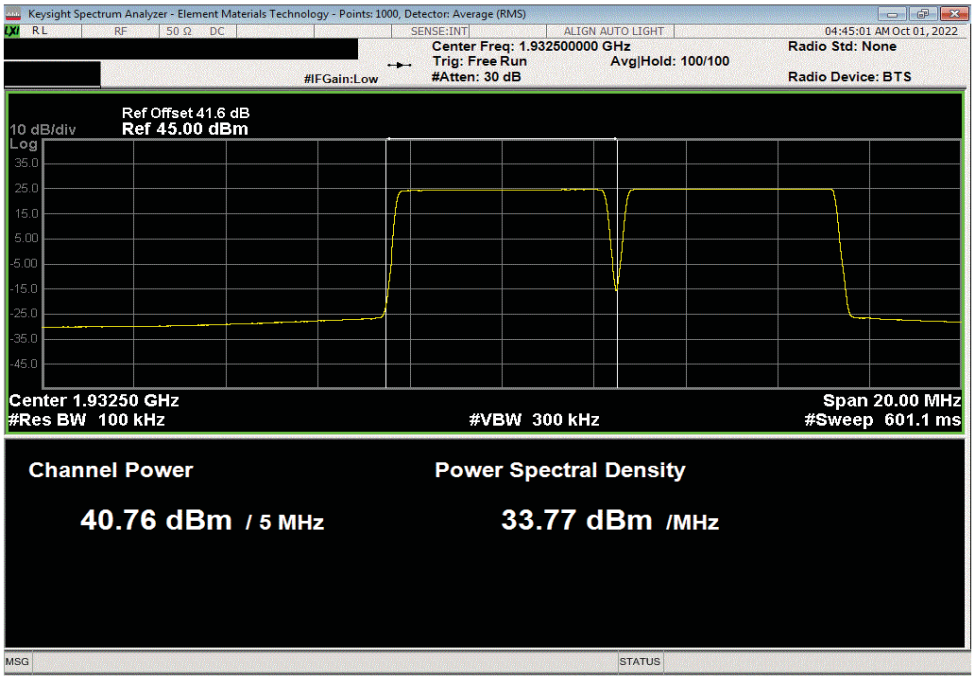
Port 1, NR, QPSK, MultiCarrier Test Case 4, PCS Band 40W 5 MHz BW (1962.5 MHz), AWS Band 20W 30 MHz BW (2155.0 and 2185 MHz), Carrier Frequency 1962.5 MHz

	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	
	45.993	0	46	49	52	



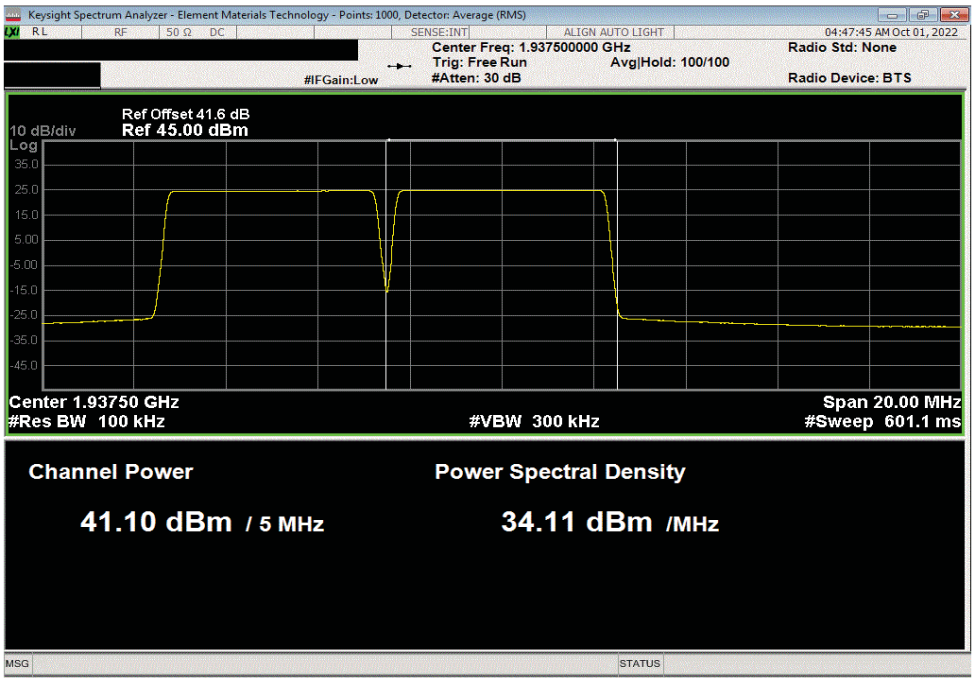
Port 1, NR,QPSK, MultiCarrier Test Case 5, PCS Band 13.3W 5 MHz BW (1932.5, 1937.5 and 1992.5 MHz), AWS Band 13.3W 5 MHz BW (2112.5, 2117.5 and 2197.5 MHz), Carrier Frequency 1932.5 MHz

	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	
	40.755	0	40.8	43.8	46.8	



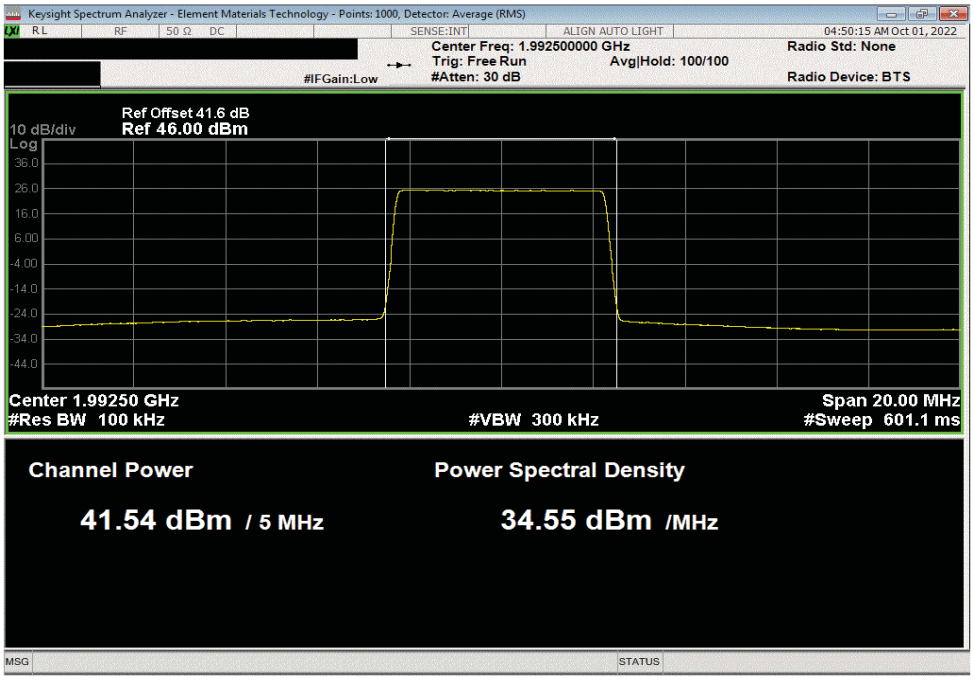
Port 1, NR, QPSK, MultiCarrier Test Case 5, PCS Band 13.3W 5 MHz BW (1932.5, 1937.5 and 1992.5 MHz), AWS Band 13.3W 5 MHz BW (2112.5, 2117.5 and 2197.5 MHz), Carrier Frequency 1937.5 MHz

	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	
	41.101	0	41.1	44.1	47.1	



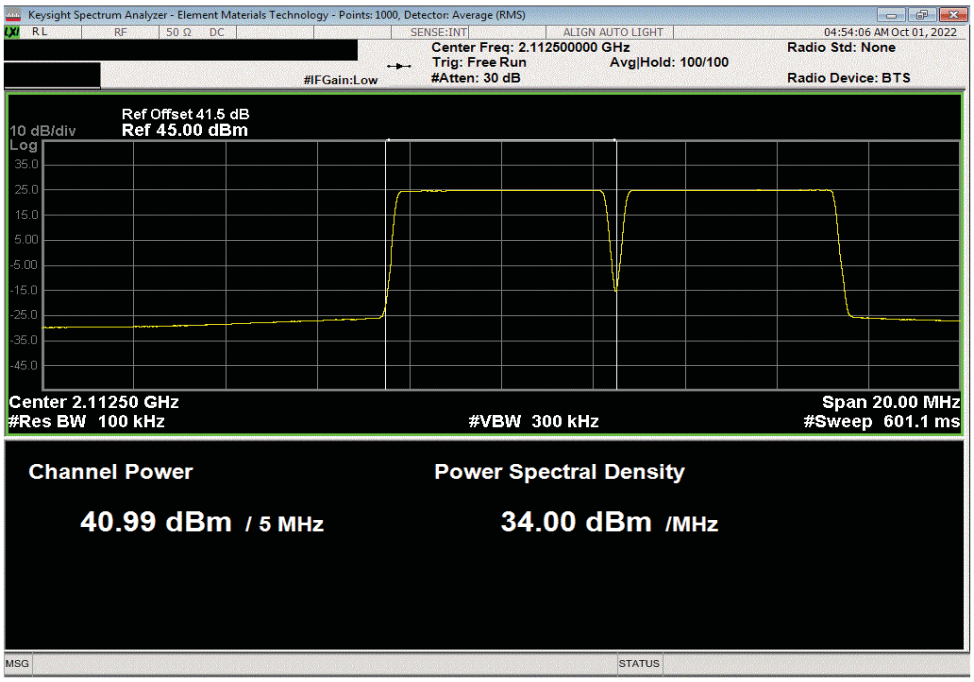
Port 1, NR, QPSK, MultiCarrier Test Case 5, PCS Band 13.3W 5 MHz BW (1932.5, 1937.5 and 1992.5 MHz), AWS Band 13.3W 5 MHz BW (2112.5, 2117.5 and 2197.5 MHz), Carrier Frequency 1992.5 MHz

	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	
	41.538	0	41.5	44.5	47.5	



Port 1, NR, QPSK, MultiCarrier Test Case 5, PCS Band 13.3W 5 MHz BW (1932.5, 1937.5 and 1992.5 MHz), AWS Band 13.3W 5 MHz BW (2112.5, 2117.5 and 2197.5 MHz), Carrier Frequency 2112.5 MHz

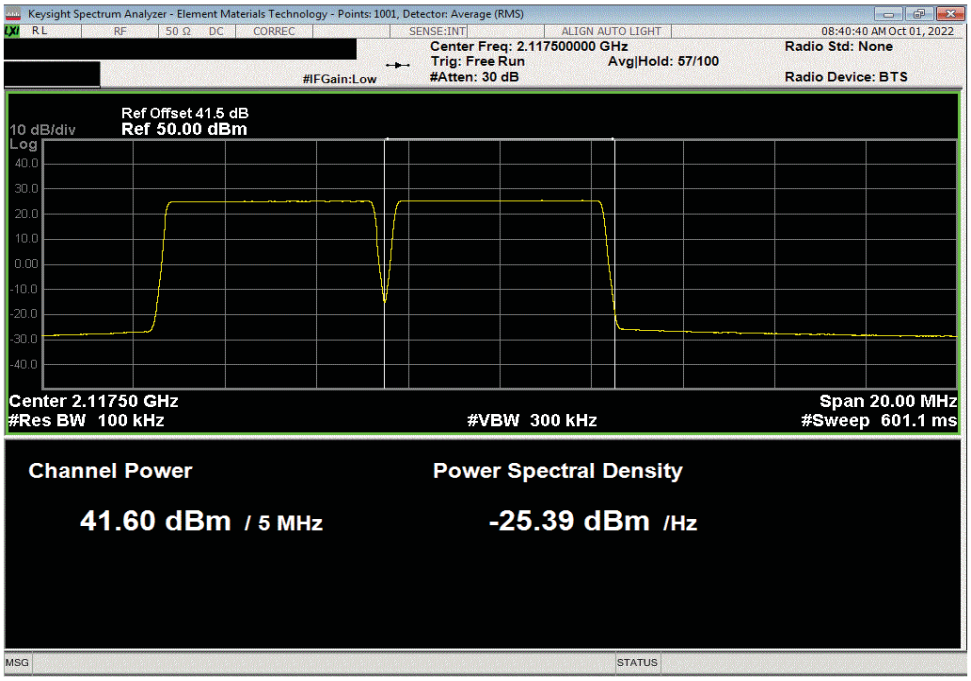
	Intial Value (dBm/MHz)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW	
	40.988	0	41	44	47	



OUTPUT POWER - MULTIBAND MULTICARRIER

Port 1, NR, QPSK, MultiCarrier Test Case 5, PCS Band 13.3W 5 MHz BW (1932.5, 1937.5 and 1992.5 MHz), AWS Band 13.3W 5 MHz BW (2112.5, 2117.5 and 2197.5 MHz), Carrier Frequency 2117.5 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	
	41.6	0	41.6	44.6	47.6	



Port 1, NR, QPSK, MultiCarrier Test Case 5, PCS Band 13.3W 5 MHz BW (1932.5, 1937.5 and 1992.5 MHz), AWS Band 13.3W 5 MHz BW (2112.5, 2117.5 and 2197.5 MHz), Carrier Frequency 2197.5 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	
	41.216	0	41.2	44.2	47.2