

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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

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

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

Report No. NOKI0054.0



EUT: Airscale Base Transceiver Station Remote Radio Head Model AHFII
Serial Number: BL2235N41PG
Customer: Nokia of America Corporation Work Order: NOKI0054 Date: 03/03/2023 Temperature: 24.8°C Humidity: 36% Barometric Pres.: 983.7 mbar Attendees: John Rattanavong, David Le Project: None Tested by: Brandon Hobbs and Jarrod Brenden TEST SPECIFICATIONS Power: 54 VDC
Test Method Job Site: TX07 FCC 27:2023 RSS-139 Issue 4:2022 COMMENTS All measurment path losses were accounted for in the reference level offset including any attenuators, filters, and DC blocks. The LTE 1.4 MHz carriers are enabled at 20 watts/carrier. The following is the output power measurements at the radio output ports. The output power was measured for a single carrier over the carrier channel bandwidthon port 1. The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI C63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout) The total output power for two port operation is the single port power +3 dB [i.e. 10 log(2)]. The total power for four port operations is single port power +6 dB [i.e. 10\*log(4)].
DEVIATIONS FROM TEST STANDARD None Configuration # NOKI0054-2 Signature Initial Value dBm/Carrier BW Duty Cycle Factor (dB) Single Port dBm/Carrier BW Two Port (2x2 MIMO) Four Port (4x4 MIMO) dBm/Carrier BW dBm/Carrier BW Band 66 2110 MHz - 2200 MHz, LTE Port 1 **QPSK Modulation** Mid Channel 2155 MHz 42.639 0 42.6 45.6 48.6 16-QAM Modulation Mid Channel 2155 MHz 64-QAM Modulation 42.629 Mid Channel 2155 MHz 42.593 42.6 45.6 48.6 256-QAM Modulation Low Channel 2110.7 MHz 42.546 45.5 Mid Channel 2155 MHz 42.6 42.7 42.602 45.6 48.6 High Channel 2199.3 MHz

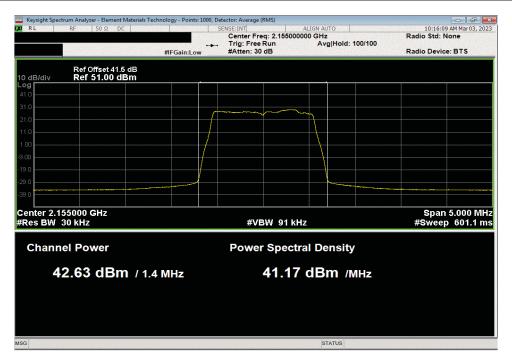
Report No. NOKI0054.0 69/197



Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, QPSK Modulation, Mid Channel 2155 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)
dBm/Carrier BW Factor (dB) dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW
42.639 0 42.639 45.639 48.639



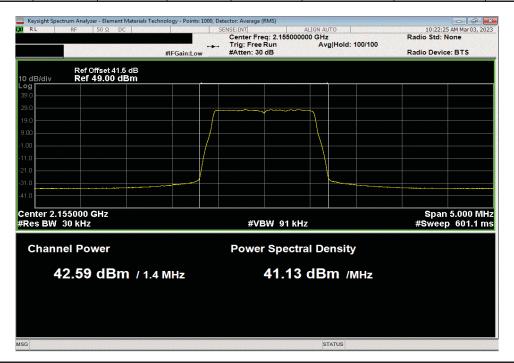
	Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 16-QAM Modulation, Mid Channel 2155 MHz							
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)								
		dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
		42.629	0	42.629	45.629	48.629		



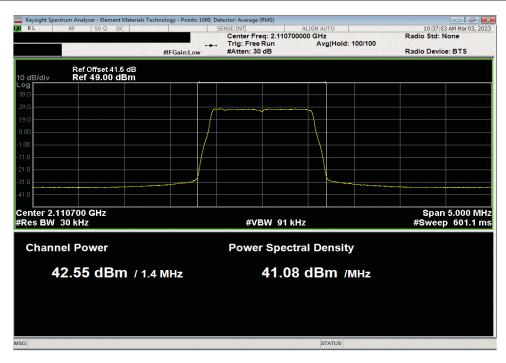
Report No. NOKI0054.0 70/197



Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 64-QAM Modulation, Mid Channel 2155 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)
dBm/Carrier BW Factor (dB) dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW
42.593 0 42.593 45.593 48.593



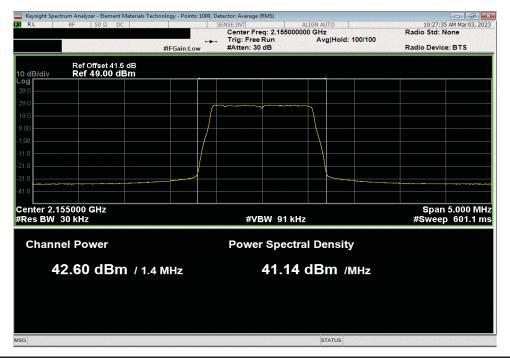




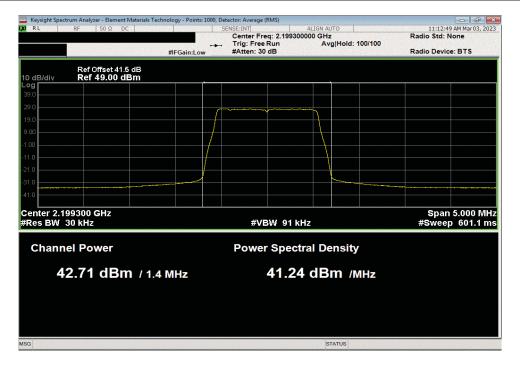
Report No. NOKI0054.0 71/197



Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)
dBm/Carrier BW Factor (dB) dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW
42.602 0 42.602 45.602 48.602







Report No. NOKI0054.0 72/197



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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

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

The total average transmit power of all antenna ports was determined per ANSI C63.26-2105 paragraph 6.4.3.1.

Report No. NOKI0054.0

200 KHz Bandwidth

NTM Modulation

High Channel 2199.8 MH



TbtTx 2022.05.02.0 EUT: Airscale Base Transceiver Station Remote Radio Head Model AHFII Work Order: NOKI0054 Serial Number: BL2235N41PG Date: 03/03/2023 Customer: Nokia of America Corporation Temperature: 27°C Humidity: 29.9%
Barometric Pres.: 984 mbar
Job Site: TX07 Attendees: John Rattanavong, David Le Project: None
Tested by: Brandon Hobbs and Jarrod Brenden
TEST SPECIFICATIONS Power: 54 VDC Test Method FCC 27:2023 ANSI C63.26:2015 RSS-139 Issue 4:2022 ANSI C63.26:2015 COMMENTS All measurment path losses were accounted for in the reference level offset including any attenuators, filters, and DC blocks. The NB IoT SA carriers are enabled at maximum power (20 watts/carrier). The following is the output power measurements at the radio output ports. The output power was measured for a single carrier over the carrier channel bandwidthon port 1. The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI C63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout) The total output power for two port operation is the single port power +3 dB [i.e. 10\*log(2)]. The total power for four port operations is single port power +6 dB [i.e. 10\*log(4)]. The NB IoT SA carrier power level was reduced from maximum (20 watts/carrier) to meet the 62.15 and 62 dBm/MHz EIRP limits. DEVIATIONS FROM TEST STANDARD Configuration # NOKI0054-2 Signature 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 Band 66 2110 MHz - 2200 MHz, NB-loT Port 1 200 KHz Bandwidth NTM Modulation Low Channel 2110.2 MHz 42.012 0 42.0 45.0 48.0 Mid Channel 2155 MHz 42.060 0 42.1 45.1 48.1 High Channel 2199.8 MH Band 66 2110 MHz - 2200 MHz, NB-IoT - Reduced Power Port 1

41.314

41.3

44.3

47.3

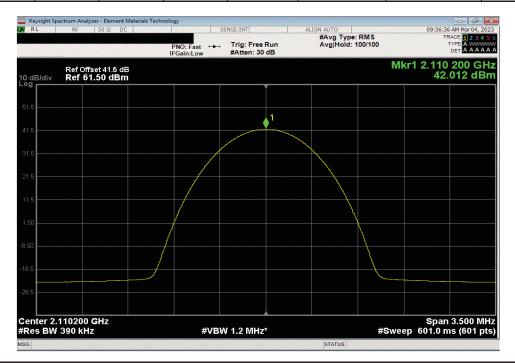
Report No. NOKI0054.0 74/197



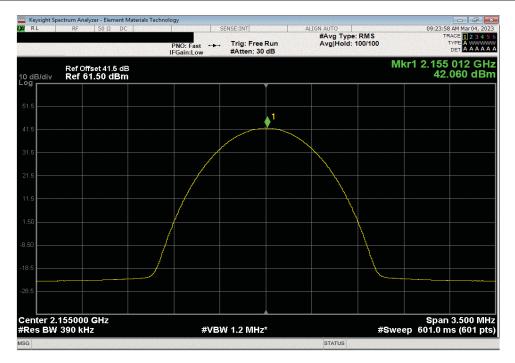
Band 66 2110 MHz - 2200 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, Low Channel 2110.2 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

dBm/MHz Factor (dB) dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW

42.012 0 42.012 45.012 48.012



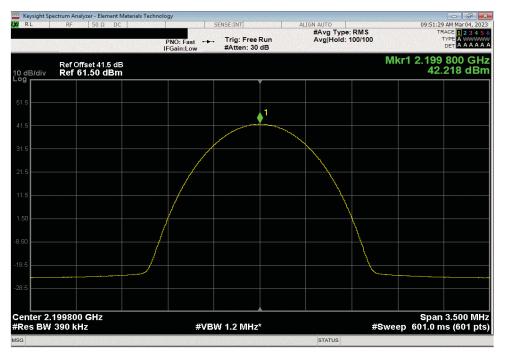


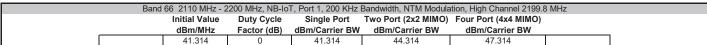


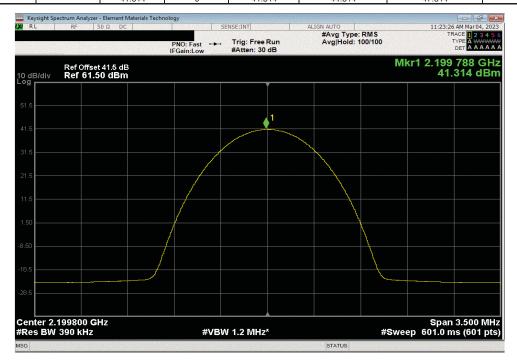
Report No. NOKI0054.0 75/197



Band 66 2110 MHz - 2200 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, High Channel 2199.8 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
42.218 0 42.218 45.218 48.218







Report No. NOKI0054.0 76/197



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#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

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

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

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4. The PAPR was measured using the CCDF function of the spectrum analyzer.

Per FCC part 24.232(d) and RSS 133 6.4, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

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



		er Station Remote Radio Head Mode	el AHFII	Wo	rk Order:	NOKI0054	
	BL2235N41PG					03/02/2023	
Customer:	Nokia of America Corpor	ration			perature:		
Attendees:					Humidity:		
Project:				Barome		977.3 mbar	
	Brandon Hobbs and Jari	od Brenden	Power: 54 VDC		Job Site:	TX07	
TEST SPECIFICAT	TIONS		Test Method				
CC 24E:2022			ANSI C63.26:2015				
RSS-133 Issue 6:20	013+A1:2018		ANSI C63.26:2015				
COMMENTS							
DEVIATIONS EDO	M TEST STANDARD						
lone	WITEST STANDARD						
10110							
Configuration #	NOKI0054-2	Signature	J. J.				
	NOKI0054-2	Signature	J- J-1	*****	PAPR	PAPR Limit (dB)	Results
Configuration #	z - 1995 MHz, 5G NR	Signature	J. J.	*****			Results
Configuration #	z - 1995 MHz, 5G NR Port 1	Signature	J.J.A	*****			Results
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	Signature -	J. J.	*****			Results
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	Signature swidth QPSK Modulation		Valu	e (dB)	Limit (dB)	
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	Signature  dwidth  QPSK Modulation  Mid Channel 1962.5 MH.		Valu			Results Pass
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	Signature dwidth QPSK Modulation Mid Channel 1962.5 MH. 16-QAM Modulation	z	Valu	.06	Limit (dB)	Pass
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	signature  dwidth QPSK Modulation Mid Channel 1962.5 MH. 16-QAM Modulation Mid Channel 1962.5 MH.	z	Valu	e (dB)	Limit (dB)	
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	Signature  dwidth QPSK Modulation Mid Channel 1962.5 MH. 16-QAM Modulation Mid Channel 1962.5 MH. 64-QAM Modulation	z z	Valu 7 7	.06	Limit (dB)  13	Pass Pass
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	Signature  dwidth QPSK Modulation Mid Channel 1962.5 MH. 16-QAM Modulation Mid Channel 1962.5 MH. 64-QAM Modulation Mid Channel 1962.5 MH.	z z	Valu 7 7	.06	Limit (dB)	Pass
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	Signature  dwidth QPSK Modulation Mid Channel 1962.5 MH. 16-QAM Modulation Mid Channel 1962.5 MH. 64-QAM Modulation Mid Channel 1962.5 MH. 256-QAM Modulation	iz Iz	Valu 7 7 7	.06 .14	13 13 13	Pass Pass Pass
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	Signature  dwidth QPSK Modulation Mid Channel 1962.5 MH. 16-QAM Modulation Mid Channel 1962.5 MH. 64-QAM Modulation Mid Channel 1962.5 MH. 256-QAM Modulation Low Channel 1942.5 MH.	iz iz iz	Valu 7 7 7	.06 .14 .06	13 13 13 13 13	Pass Pass Pass Pass
Configuration #	z - 1995 MHz, 5G NR Port 1 25 MHz Band	Signature  dwidth QPSK Modulation Mid Channel 1962.5 MH. 16-QAM Modulation Mid Channel 1962.5 MH. 64-QAM Modulation Mid Channel 1962.5 MH. 256-QAM Modulation	IZ IZ IZ IZ	Valu 7 7 7 7	.06 .14	13 13 13	Pass Pass Pass

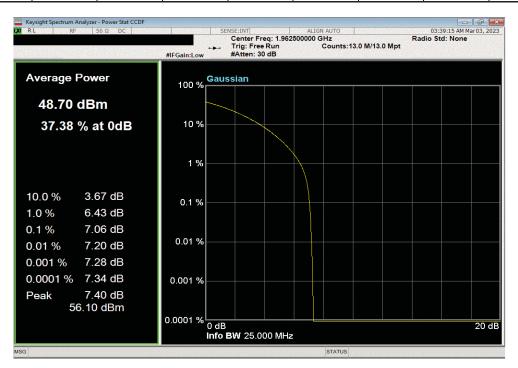
Report No. NOKI0054.0 78/197

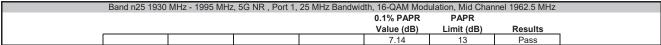


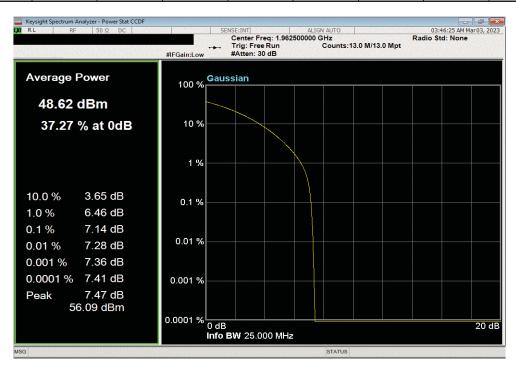
Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, QPSK Modulation, Mid Channel 1962.5 MHz

0.1% PAPR PAPR
Value (dB) Limit (dB) Results

7.06 13 Pass







Report No. NOKI0054.0 79/197

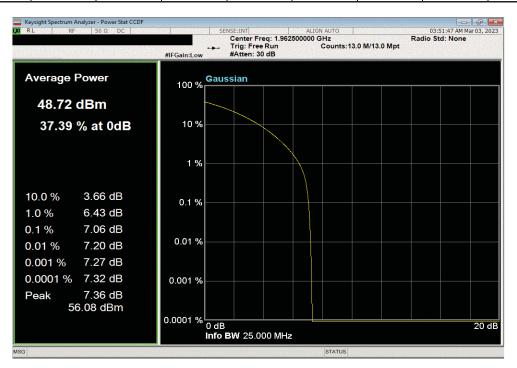


Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 64-QAM Modulation, Mid Channel 1962.5 MHz

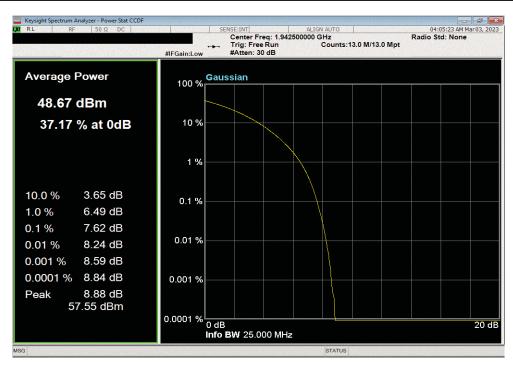
0.1% PAPR PAPR

Value (dB) Limit (dB) Results

7.06 13 Pass







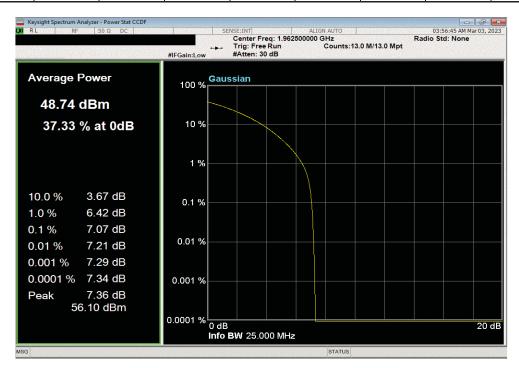
Report No. NOKI0054.0 80/197

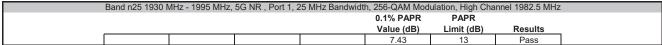


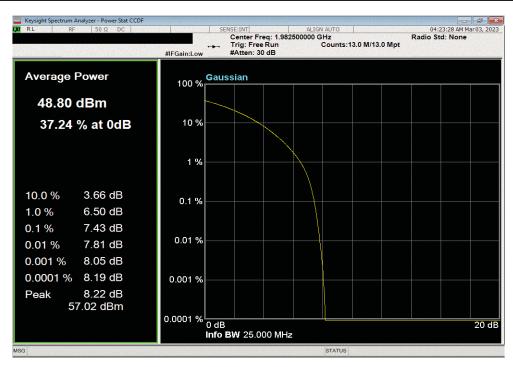
Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Mid Channel 1962.5 MHz

0.1% PAPR PAPR
Value (dB) Limit (dB) Results

7.07 13 Pass







Report No. NOKI0054.0 81/197



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#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

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

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

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4. The PAPR was measured using the CCDF function of the spectrum analyzer.

Per FCC part 24.232(d) and RSS 133 6.4, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

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

Report No. NOKI0054.0



			TbtTx 2022.05.02.0	XMit 2022.12.2
EUT: Airscale Base Transceiver Station Remote Radio Head Model AHFII		Work Order:	NOKI0054	
Serial Number: BL2235N41PG		Date:	03/03/2023	
Customer: Nokia of America Corporation		Temperature:	24°C	
Attendees: John Rattanavong, David Le		Humidity:	37.9%	
Project: None		Barometric Pres.:		
	er: 54 VDC	Job Site:	TX07	
TEST SPECIFICATIONS	Test Method			
FCC 24E:2022	ANSI C63.26:2015			
RSS-133 Issue 6:2013+A1:2018	ANSI C63.26:2015			
COMMENTS  All measurment path losses were accounted for in the reference level offset including an				
DEVIATIONS FROM TEST STANDARD				
Configuration # NOKI0054-2	111			
Signature	7			
Signature		0.1% PAPR Value (dB)	PAPR Limit (dB)	Results
				Results
	7			Results
and 25 1930 MHz - 1995 MHz, LTE				Results
and 25 1930 MHz - 1995 MHz, LTE Port 1 1.4 MHz Bandwidth				Results
and 25 1930 MHz - 1995 MHz, LTE  Port 1  1.4 MHz Bandwidth  QPSK Modulation		Value (dB)	Limit (dB)	
and 25 1930 MHz - 1995 MHz, LTE Port 1  1.4 MHz Bandwidth  QPSK Modulation  Mid Channel 1962.5 MHz		Value (dB)	Limit (dB)	
and 25 1930 MHz - 1995 MHz, LTE Port 1  1.4 MHz Bandwidth QPSK Modulation Mid Channel 1962.5 MHz 16-QAM Modulation		Value (dB) 8.05	Limit (dB)	Pass
and 25 1930 MHz - 1995 MHz, LTE  Port 1  1.4 MHz Bandwidth  QPSK Modulation  Mid Channel 1962.5 MHz  16-QAM Modulation  Mid Channel 1962.5 MHz		Value (dB) 8.05	Limit (dB)	Pass
and 25 1930 MHz - 1995 MHz, LTE  Port 1  1.4 MHz Bandwidth  QPSK Modulation  Mid Channel 1962.5 MHz  16-QAM Modulation  Mid Channel 1962.5 MHz  64-QAM Modulation		Value (dB) 8.05 8.11	Limit (dB)  13	Pass Pass
Port 1  1.4 MHz Bandwidth  QPSK Modulation  Mid Channel 1962.5 MHz  16-QAM Modulation  Mid Channel 1962.5 MHz  64-QAM Modulation  Mid Channel 1962.5 MHz  64-QAM Modulation  Mid Channel 1962.5 MHz  64-QAM Modulation  Low Channel 1930.7 MHz		Value (dB) 8.05 8.11	Limit (dB)  13	Pass Pass
Port 1  1.4 MHz Bandwidth QPSK Modulation Mid Channel 1962.5 MHz 16-QAM Modulation Mid Channel 1962.5 MHz 64-QAM Modulation Mid Channel 1962.5 MHz 65-QAM Modulation Mid Channel 1962.5 MHz		8.05 8.11 8.10	13 13 13	Pass Pass Pass
nd 25 1930 MHz - 1995 MHz, LTE Port 1  1.4 MHz Bandwidth QPSK Modulation Mid Channel 1962.5 MHz 16-QAM Modulation Mid Channel 1962.5 MHz 64-QAM Modulation Mid Channel 1962.5 MHz 256-QAM Modulation Low Channel 1930.7 MHz		8.05 8.11 8.10 8.08	13 13 13 13	Pass Pass Pass

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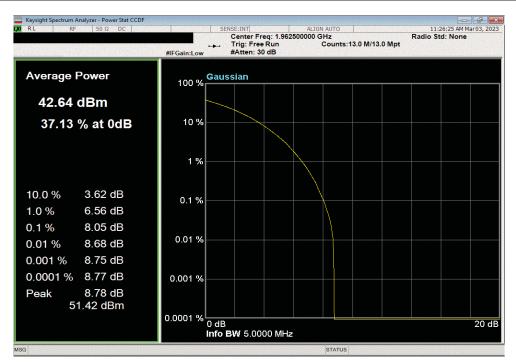


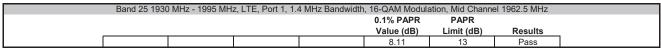
Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, QPSK Modulation, Mid Channel 1962.5 MHz

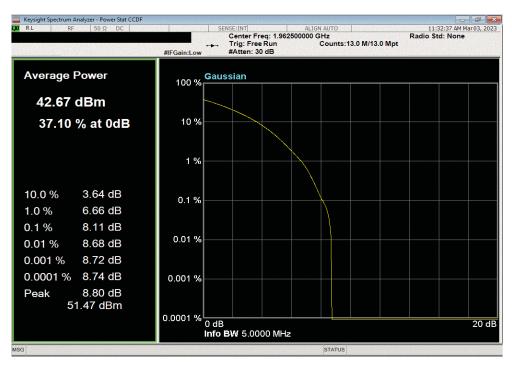
0.1% PAPR PAPR

Value (dB) Limit (dB) Results

8.05 13 Pass







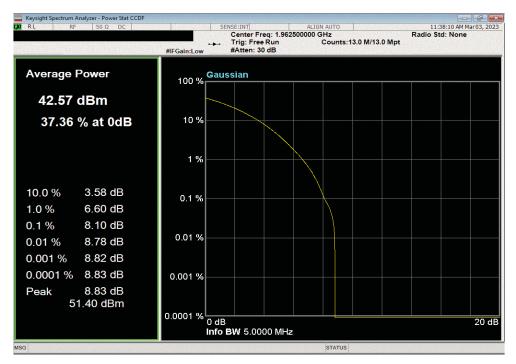
Report No. NOKI0054.0 84/197



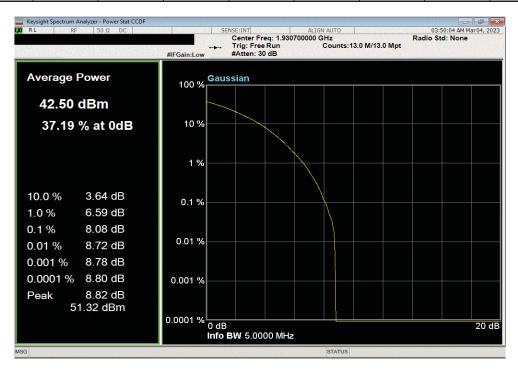
Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, 64-QAM Modulation, Mid Channel 1962.5 MHz

0.1% PAPR PAPR
Value (dB) Limit (dB) Results

8.1 13 Pass

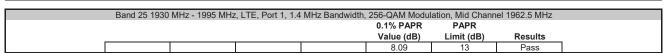


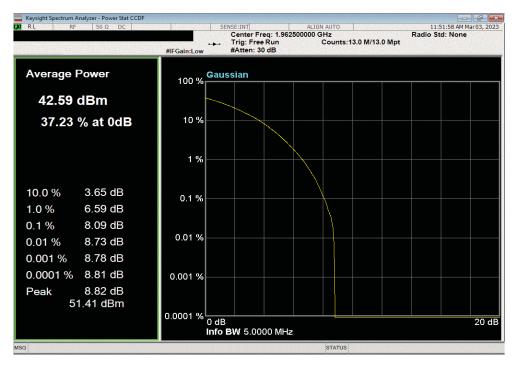
Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Low Channel 1930.7 MHz								
0.1% PAPR PAPR								
					Value (dB)	Limit (dB)	Results	
					8.08	13	Pass	



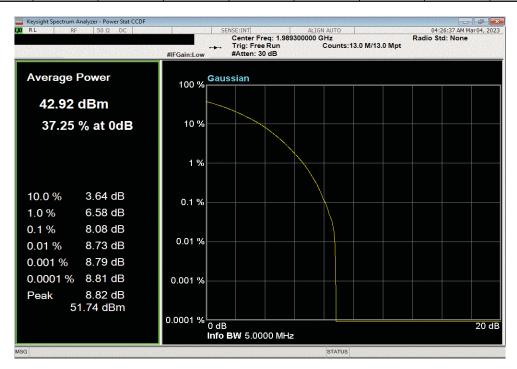
Report No. NOKI0054.0 85/197







Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, High Channel 1989.3 MHz							
0.1% PAPR PAPR							
				Value (dB)	Limit (dB)	Results	
				8.08	13	Pass	



Report No. NOKI0054.0 86/197



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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

#### **TEST DESCRIPTION**

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

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

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4. The PAPR was measured using the CCDF function of the spectrum analyzer.

Per FCC part 24.232(d) and RSS 133 6.4, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

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

Report No. NOKI0054.0



					TbtTx 2022.05.02.0	XMit 2022.12.28.0
		er Station Remote Radio Head Mode	AHFII	Work Order:		
	BL2235N41PG				03/03/2023	
	Nokia of America Corpor			Temperature:		
	John Rattanavong, David	d Le		Humidity:		
Project:			Barometric Pres.:			
	Brandon Hobbs and Jari	rod Brenden	Power: 54 VDC	Job Site:	TX07	
TEST SPECIFICAT	TIONS		Test Method			
FCC 24E:2022			ANSI C63.26:2015			
RSS-133 Issue 6:2	013+A1:2018		ANSI C63.26:2015			
COMMENTS						
All measurment pa	th losses were accounted	d for in the reference level offset inc	luding any attenuators, filters, and DC blocks. T	he NB IoT SA carrieres are enabled at	maximum power (2	20
watts/carrier).						
<b>DEVIATIONS FROI</b>	M TEST STANDARD					
None						
Configuration #	NOKI0054-2	Signature	7-1			
		-		0.1% PAPR	PAPR	
				Value (dB)	Limit (dB)	Results
Band 25 1930 MHz	- 1995 MHz, NB-IoT					
	Port 1					
	200 KHz Ban	idwidth				
		NTM Modulation				
		Low Channel 1930.2 MHz	!	7.42	13	Pass
		Mid Channel 1962.5 MHz		7.33	13	Pass
		High Channel 1994.8 MH:	i	6.82	13	Pass

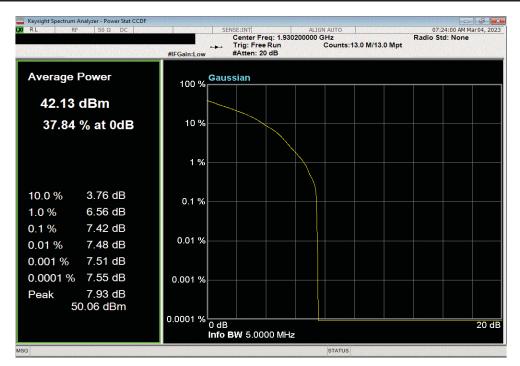
Report No. NOKI0054.0 88/197

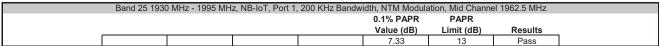


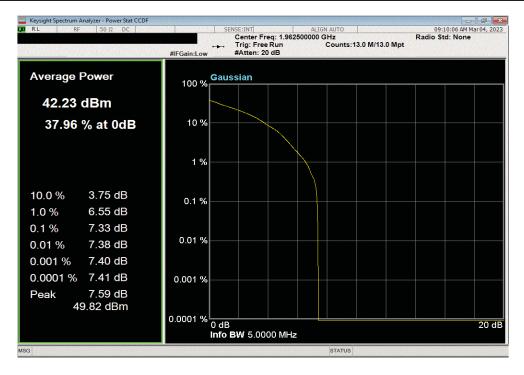
Band 25 1930 MHz - 1995 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, Low Channel 1930.2 MHz

0.1% PAPR PAPR
Value (dB) Limit (dB) Results

7.42 13 Pass







Report No. NOKI0054.0 89/197

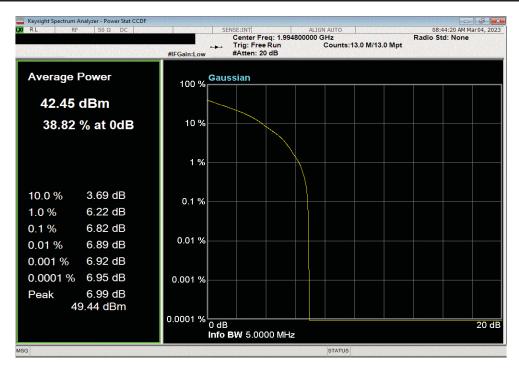


Band 25 1930 MHz - 1995 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, High Channel 1994.8 MHz

0.1% PAPR PAPR

Value (dB) Limit (dB) Results

6.82 13 Pass



Report No. NOKI0054.0 90/197



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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

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

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

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

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

Per FCC part 24.232(d) and RSS 133 6.4, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

Per FCC part 27.50(d)(5) and RSS-139 6.5, the peak-to-average power ratio (PAPR) shall not exceed 13dB.

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

Report No. NOKI0054.0



					TbtTx 2022.05.02.0	XMit 2022.12.28		
EUT:	Airscale Base Transceiv	er Station Remote Radio Head Mode	AHFII	Work Order:	NOKI0054			
Serial Number:	BL2235N41PG			Date:	03/02/2023			
Customer:	Nokia of America Corpor	ration		Temperature:	23.8°C			
Attendees:	John Rattanavong, David	d Le		Humidity: 41.8%				
Project:	None			Barometric Pres.:	977.6 mbar			
	Brandon Hobbs and Jari	rod Brenden	Power: 54 VDC	Job Site:	TX07			
TEST SPECIFICAT	TIONS		Test Method					
FCC 27:2023			ANSI C63.26:2015					
RSS-139 Issue 4:2	022		ANSI C63.26:2015					
COMMENTS								
DEVIATIONS EDO	M TEST STANDARD							
	WI TEST STANDARD							
None		1						
Configuration #	NOKI0054-2	Signature	J. J.					
				0.1% PAPR Value (dB)	PAPR Limit (dB)	Results		
Band n66 2110 MH	z - 2200 MHz, 5G NR							
	Port 1							
	25 MHz Band							
		QPSK Modulation		7.07	40	D		
		Mid Channel 2155 MHz		7.07	13	Pass		
		16-QAM Modulation Mid Channel 2155 MHz		7.14	13	D		
		64-QAM Modulation		7.14	13	Pass		
		Mid Channel 2155 MHz		7.07	13	Pass		
		256-QAM Modulation		 7.07	13	rass		
		Low Channel 2122.5 MHz	7	7.18	13	Pass		
			4					
				7 ∩Ω				
		Mid Channel 2155 MHz	<b>!</b> -	7.08 7.16	13 13	Pass		
		Mid Channel 2155 MHz High Channel 2187.5 MH	la l	7.08 7.16	13 13	Pass		

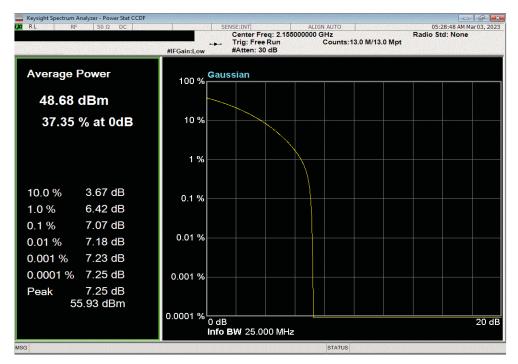
Report No. NOKI0054.0 92/197

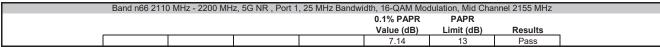


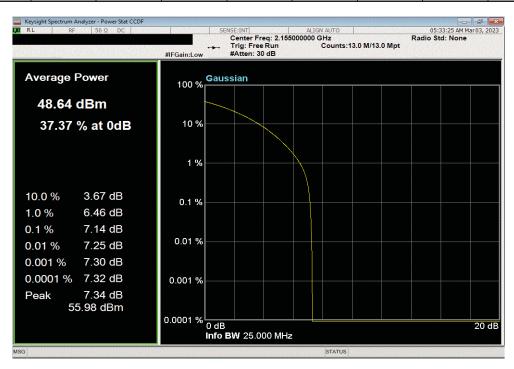
Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, QPSK Modulation, Mid Channel 2155 MHz

0.1% PAPR PAPR
Value (dB) Limit (dB) Results

7.07 13 Pass

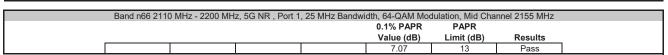


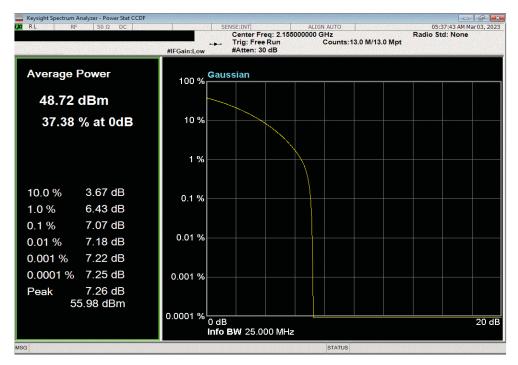


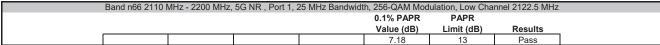


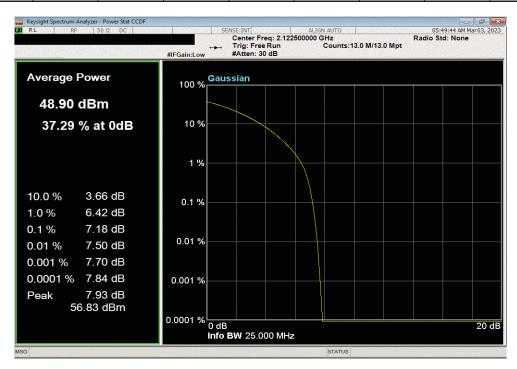
Report No. NOKI0054.0 93/197











Report No. NOKI0054.0 94/197

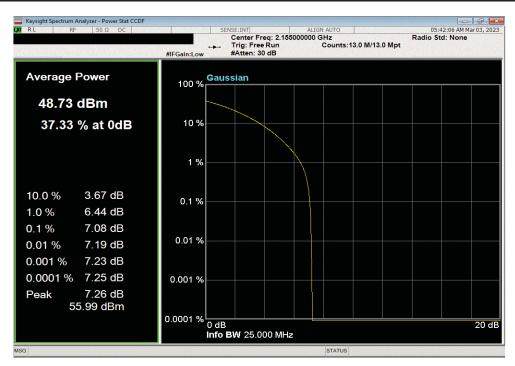


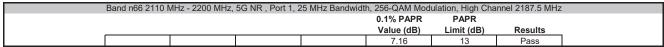
Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz

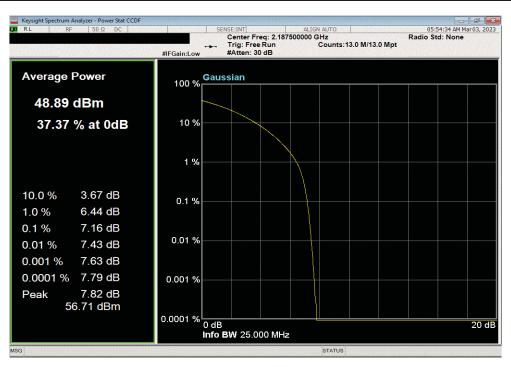
0.1% PAPR PAPR

Value (dB) Limit (dB) Results

7.08 13 Pass







Report No. NOKI0054.0 95/197



XMit 2022.12.28.0

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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Power Ratio (PAPR) was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed the rule part defined limit.

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

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

Per FCC part 24.232(d) and RSS 133 6.4, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

Per FCC part 27.50(d)(5) and RSS-139 6.5, the peak-to-average power ratio (PAPR) shall not exceed 13dB.

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



EUT: Airscale Base Transceiver Station R						TbtTx 2022.05.02.0	XMit 2022.12.28.
	emote Radio Head Model	AHFII			Work Order:		
Serial Number: BL2235N41PG						03/03/2023	
Customer: Nokia of America Corporation					Temperature:		
Attendees: John Rattanavong, David Le					Humidity:		
Project: None					Barometric Pres.:		
Tested by: Brandon Hobbs and Jarrod Brenden	1	Power:	54 VDC		Job Site:	TX07	
TEST SPECIFICATIONS			Test Method				
FCC 27:2023			ANSI C63.26:2015				
RSS-139 Issue 4:2022			ANSI C63.26:2015				
COMMENTS							
All measurment path losses were accounted for in the I	reference level offset incl	uding any attenua	tors, filters, and DC block	s. The LTE 1.4 MHz	carriers are enable	d at 20 watts/carrie	er.
DEVIATIONS FROM TEST STANDARD							
None							
			// .				
Configuration # NOKI0054-2	/=	2	1-1				
Configuration # NOKI0054-2	Signature	2.7	Jan				
Configuration # NOKI0054-2	Signature	7.7	JA		0.1% PAPR	PAPR	
	Signature	2 7	Jan		0.1% PAPR Value (dB)	PAPR Limit (dB)	Results
Band 66 2110 MHz - 2200 MHz, LTE	Signature	2	Jal		,		Results
Band 66 2110 MHz - 2200 MHz, LTE Port 1	Signature		Jan		,		Results
Band 66 2110 MHz - 2200 MHz, LTE    Port 1	Signature	77	Jan		,		Results
Band 66 2110 MHz - 2200 MHz, LTE Port 1	Signature	J. Y	Jan		Value (dB)	Limit (dB)	
Band 66 2110 MHz - 2200 MHz, LTE Port 1 1.4 MHz Bandwidth QPSK Modu	Signature  lation Mid Channel 2155 MHz	In y	Jal		,		Results Pass
Band 66 2110 MHz - 2200 MHz, LTE    Port 1	Signature  lation Mid Channel 2155 MHz dulation	In Y	JA		Value (dB) 8.13	Limit (dB)	Pass
Band 66 2110 MHz - 2200 MHz, LTE Port 1 1.4 MHz Bandwidth QPSK Modu	Signature  lation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz		J		Value (dB)	Limit (dB)	
Band 66 2110 MHz - 2200 MHz, LTE Port 1 1.4 MHz Bandwidth QPSK Modu	Signature  lation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz dulation		Jal		8.13 8.22	Limit (dB)  13	Pass Pass
Band 66 2110 MHz - 2200 MHz, LTE Port 1  1.4 MHz Bandwidth QPSK Modu  16-QAM Mod	Signature  lation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz		Jal		Value (dB) 8.13	Limit (dB)	Pass
Band 66 2110 MHz - 2200 MHz, LTE Port 1  1.4 MHz Bandwidth QPSK Modu  16-QAM Mod  64-QAM Modulation   256-QAM Modu	Signature  lation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz odulation		J		8.13 8.22 8.16	13 13 13	Pass Pass Pass
Band 66 2110 MHz - 2200 MHz, LTE Port 1  1.4 MHz Bandwidth QPSK Modu  16-QAM Modulation   64-QAM Modulation   256-QAM Modulation   256-	Signature  lation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz odulation Low Channel 2110.7 MHz		J		8.13 8.22 8.16 8.08	13 13 13 13 13	Pass Pass Pass Pass
Band 66 2110 MHz - 2200 MHz, LTE Port 1  1.4 MHz Bandwidth QPSK Modu  16-QAM Modulation   64-QAM Modulation   256-QAM Modulation   256-	Signature  lation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz dulation Mid Channel 2155 MHz odulation		J		8.13 8.22 8.16	13 13 13	Pass Pass Pass

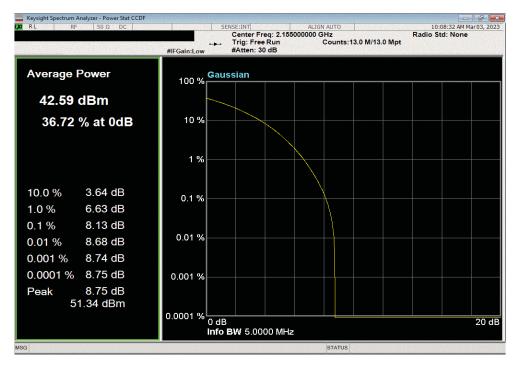
Report No. NOKI0054.0 97/197



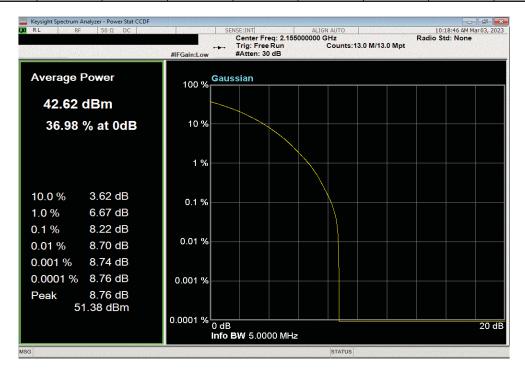
Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, QPSK Modulation, Mid Channel 2155 MHz

0.1% PAPR PAPR
Value (dB) Limit (dB) Results

8.13 13 Pass



Band 66 211	0 MHz - 2200 MF	lz, LTE , Port 1, 1	.4 MHz Bandwidt	h, 16-QAM Modu	lation, Mid Chanr	nel 2155 MHz
				0.1% PAPR	PAPR	
				Value (dB)	Limit (dB)	Results
				8.22	13	Pass



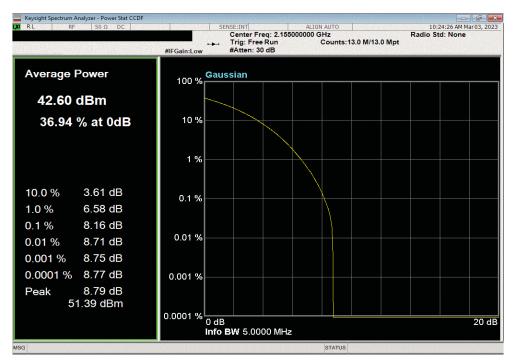
Report No. NOKI0054.0 98/197



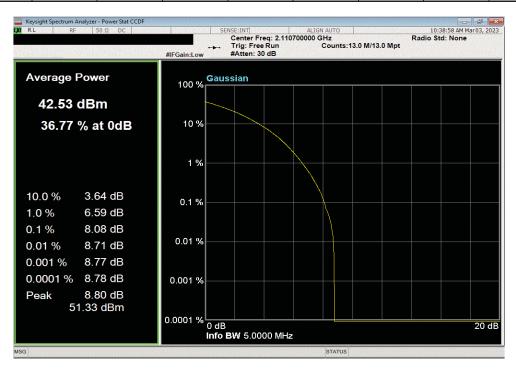
Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 64-QAM Modulation, Mid Channel 2155 MHz

0.1% PAPR PAPR
Value (dB) Limit (dB) Results

8.16 13 Pass



Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Low Channel 2110.7 MHz								
					0.1% PAPR	PAPR		
					Value (dB)	Limit (dB)	Results	
					8.08	13	Pass	



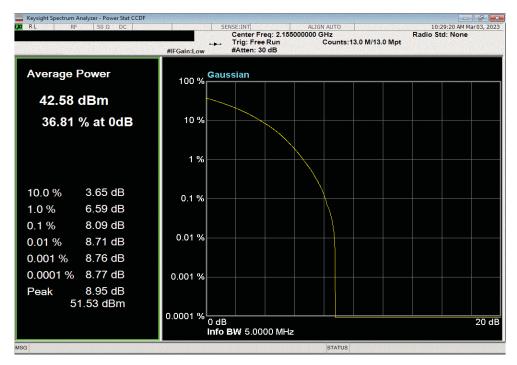
Report No. NOKI0054.0 99/197



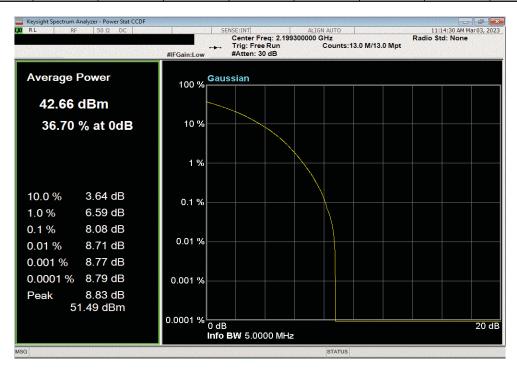
Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz

0.1% PAPR PAPR
Value (dB) Limit (dB) Results

8.09 13 Pass



Band 66 2110	MHz - 2200 MHz,	LTE , Port 1, 1.4	MHz Bandwidth,	256-QAM Modul	ation, High Chani	nel 2199.3 MHz
				0.1% PAPR	PAPR	
				Value (dB)	Limit (dB)	Results
				8.08	13	Pass



Report No. NOKI0054.0 100/197



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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

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

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

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

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

Per FCC part 24.232(d) and RSS 133 6.4, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

Per FCC part 27.50(d)(5) and RSS-139 6.5, the peak-to-average power ratio (PAPR) shall not exceed 13dB.

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

Report No. NOKI0054.0



					TbtTx 2022.05.02.0	XMit 2022.12.28.0		
EUT:	Airscale Base Transceiv	er Station Remote Radio Head Mode	I AHFII	Work Order:	NOKI0054			
Serial Number:	BL2235N41PG			Date:	03/03/2023			
Customer:	Nokia of America Corpo	ration		Temperature: 27°C				
Attendees:	John Rattanavong, Davi	d Le		Humidity:				
Project:				Barometric Pres.:				
	Brandon Hobbs and Jar	rod Brenden	Power: 54 VDC	Job Site:	TX07			
TEST SPECIFICAT	IONS		Test Method					
FCC 27:2023			ANSI C63.26:2015					
RSS-139 Issue 4:2	022							
COMMENTS								
All measurment pa	th losses were accounted	d for in the reference level offset incl	uding any attenuators, filters, and DC blocks. Th	e NB IoT SA carriers are enabled at ma	ximum power (20 w	atts/carrier).		
<b>DEVIATIONS FROM</b>	M TEST STANDARD							
None								
Configuration #	NOKI0054-2	Signature	7-1-1					
		•		0.1% PAPR Value (dB)	PAPR Limit (dB)	Results		
Band 66 2110 MHz	z - 2200 MHz, NB-IoT							
	Port 1							
	200 KHz Bar	ndwidth						
		NTM Modulation						
		Low Channel 2110.2 MHz	i	7.58	13	N/A		
		Mid Channel 2155 MHz		7.58	13			
					13	N/A		

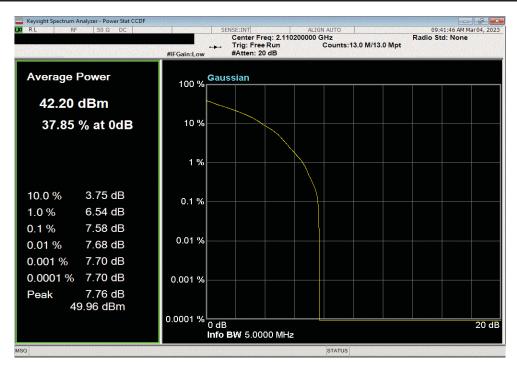
Report No. NOKI0054.0 102/197



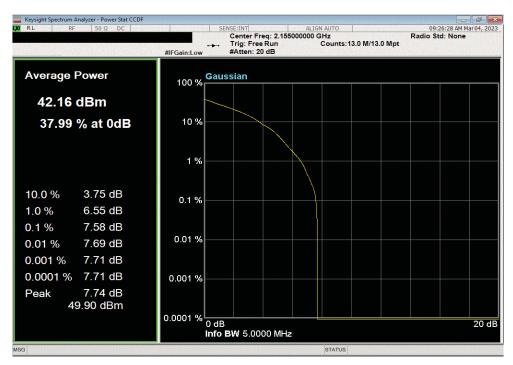
Band 66 2110 MHz - 2200 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, Low Channel 2110.2 MHz

0.1% PAPR
PAPR
Value (dB) Limit (dB) Results

7.58 13 N/A







Report No. NOKI0054.0 103/197

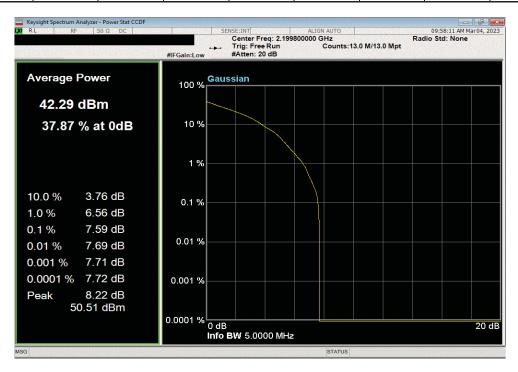
# PEAK TO AVERAGE POWER (PAPR) CCDF - BAND 66 NB-IoT-SB



Band 66 2110 MHz - 2200 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, High Channel 2199.8 MHz

0.1% PAPR PAPR
Value (dB) Limit (dB) Results

7.59 13 N/A



Report No. NOKI0054.0 104/197



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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

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

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

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

Per FCC 24.238(a) and RSS 133 6.5.1 (i). the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Per FCC 24.238(b) and RSS 133 6.5.1 (i). emissions seen up to 1 MHz outside of authorized operating frequency range band edges shell be measured with a RBW of 1% of the measured emission bandwidth. Any emission seen to be > 1 MHz further outside the band edges shall be measured with a RBW of 1 MHz. However, a narrower RBW of at least 1% of the emission bandwidth is still allowed provided that the measured power is integrated over the full reference bandwidth of 1 MHz.

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

The band edge testing was performed using only one modulation type because the Occupied Bandwidth variation between modulation types is small, the average output power variation between modulation types is small, and there was small variation in band edge measurements over modulation types from previous certification testing for other channel bandwidths. The highest rate modulation type (256QAM) was used. (See ANSI C63.26. clause 5.7.2e).

Report No. NOKI0054.0



EUT:					TbtTx 2022.05.02.0	XMit 2022.
		er Station Remote Radio Head Model AH	IFII	Work Order:		
Serial Number:	BL2235N41PG			Date:	03/02/2023	
Customer:	Nokia of America Corpor	ration		Temperature:	23.3°C	
Attendees:	John Rattanavong, David	d Le		Humidity:	42.6%	
Project:	None			Barometric Pres.:	977.4 mbar	
	Brandon Hobbs and Jari	rod Brenden	Power: 54 VDC	Job Site:	TX07	
EST SPECIFICATION	ONS		Test Method			
CC 24E:2020			ANSI C63.26:2015			
SS-133 Issue 6:20	13+A1:2018		ANSI C63.26:2015			
OMMENTS						
I measurment pat	th losses were accounted	d for in the reference level offset includir	ng any attenuators, filters, and DC bloc	ks. Band n25 carriers are enabl	led as maximum po	ower (80
atts/carrier).					·	•
EVIATIONS FROM	I TEST STANDARD					
one						
onfiguration #	NOKI0054-2		7 /1 1			
g		Signature	7			
		- grander	Frequency	Max Value	Limit	
			Range	(alDura)	< (dBm)	Result
			Range	(dBm)	< (ubiii)	Result
and n25 1930 MHz	- 1995 MHz, 5G NR		Kange	(06m)	< (ubili)	Result
	- 1995 MHz, 5G NR Port 1		Railye	(авт)	< (ubili)	Result
		dwidth	Kange	(авт)	< (ubiii)	Result
	Port 1 25 MHz Band	dwidth 256-QAM Modulation	Kange	(авт)	< (ubiii)	Result
	Port 1 25 MHz Band		range 1	-23.4	-19	Pass
	Port 1 25 MHz Band	256-QAM Modulation	1 2	, ,		
	Port 1 25 MHz Band	256-QAM Modulation Low Channel 1942.5 MHz	1	-23.4	-19	Pass
	Port 1 25 MHz Band	256-QAM Modulation Low Channel 1942.5 MHz Low Channel 1942.5 MHz	1 2	-23.4 -25.3	-19 -19	Pass Pass
	Port 1 25 MHz Band	256-QAM Modulation Low Channel 1942.5 MHz Low Channel 1942.5 MHz Low Channel 1942.5 MHz	1 2	-23.4 -25.3 -25.3	-19 -19 -19	Pass Pass Pass
	Port 1 25 MHz Band	256-QAM Modulation Low Channel 1942.5 MHz Low Channel 1942.5 MHz Low Channel 1942.5 MHz Low Channel 1942.5 MHz	1 2	-23.4 -25.3 -25.3 -25.5	-19 -19 -19 -19	Pass Pass Pass Pass
	Port 1 25 MHz Band	256-QAM Modulation  Low Channel 1942.5 MHz	1 2	-23.4 -25.3 -25.3 -25.5 -19.9	-19 -19 -19 -19 -19	Pass Pass Pass Pass Pass
	Port 1 25 MHz Band	256-QAM Modulation  Low Channel 1942.5 MHz	1 2	-23.4 -25.3 -25.3 -25.5 -19.9 -20.5	-19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass
	Port 1 25 MHz Band	256-QAM Modulation  Low Channel 1942.5 MHz  High Channel 1982.5 MHz	1 2	-23.4 -25.3 -25.3 -25.5 -19.9 -20.5 -20.7 -23.5	-19 -19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass Pass
	Port 1 25 MHz Band	256-QAM Modulation  Low Channel 1942.5 MHz  High Channel 1982.5 MHz  High Channel 1982.5 MHz	1 2	-23.4 -25.3 -25.3 -25.5 -19.9 -20.5 -20.7 -23.5 -25.4	-19 -19 -19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass Pass
	Port 1 25 MHz Band	256-QAM Modulation  Low Channel 1942.5 MHz  High Channel 1982.5 MHz  High Channel 1982.5 MHz  High Channel 1982.5 MHz	1 2 3 4 5 6 7 1 2	-23.4 -25.3 -25.3 -25.5 -19.9 -20.5 -20.7 -23.5 -25.4 -25.6	-19 -19 -19 -19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass Pass Pass
	Port 1 25 MHz Band	256-QAM Modulation  Low Channel 1942.5 MHz  High Channel 1982.5 MHz	1 2 3 4 5 6 7 1 2	-23.4 -25.3 -25.3 -25.5 -19.9 -20.5 -20.7 -23.5 -25.4 -25.6 -25.4	-19 -19 -19 -19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass Pass Pass
	Port 1 25 MHz Band	256-QAM Modulation  Low Channel 1942.5 MHz  High Channel 1982.5 MHz  High Channel 1982.5 MHz  High Channel 1982.5 MHz	1 2 3 4 5 6 7 1 2	-23.4 -25.3 -25.3 -25.5 -19.9 -20.5 -20.7 -23.5 -25.4 -25.6	-19 -19 -19 -19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass Pass Pass

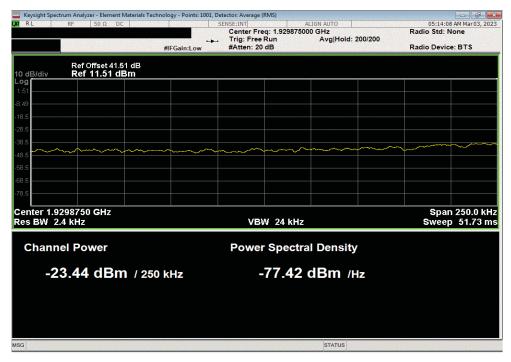
Report No. NOKI0054.0 106/197



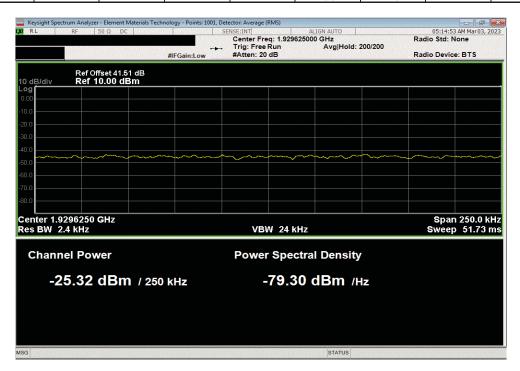
Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 1942.5 MHz

Frequency
Max Value
Limit
(dBm) < (dBm)
Result

1 -23.44 -19 Pass



	Band n25 1930 N	MHz - 1995 MHz,	5G NR, Port 1, 2	25 MHz Bandwidt	h, 256-QAM Mod	ulation, Low Cha	nnel 1942.5 MHz	
		Frequency			Max Value	Limit		
_		Range			(dBm)	< (dBm)	Result	
		2			-25.32	-19	Pass	



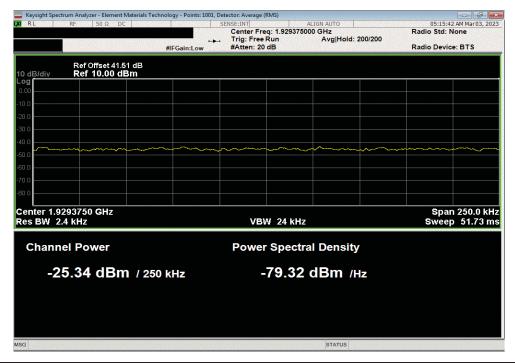
Report No. NOKI0054.0 107/197



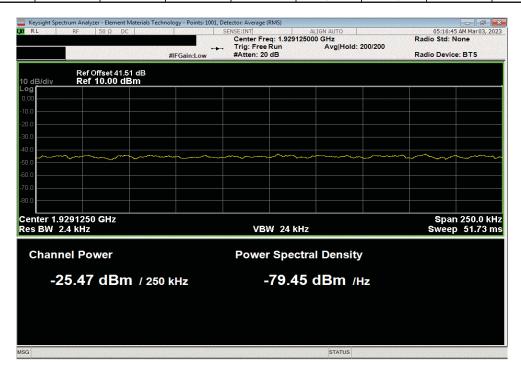
Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 1942.5 MHz

Frequency
Max Value
Limit
(dBm) < (dBm)
Result

3 -25.34 -19 Pass



Band n25 1930 N	Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 1942.5 MHz							
	Frequency			Max Value	Limit			
	Range			(dBm)	< (dBm)	Result		
	4			-25.47	-19	Pass		



Report No. NOKI0054.0 108/197

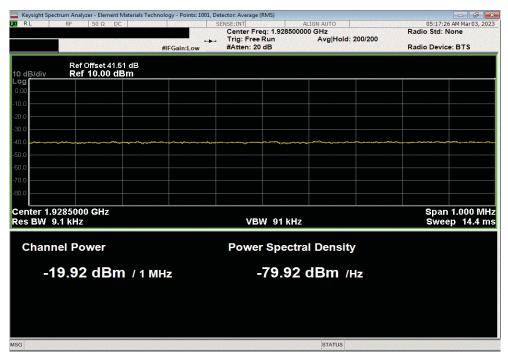


 Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 1942.5 MHz

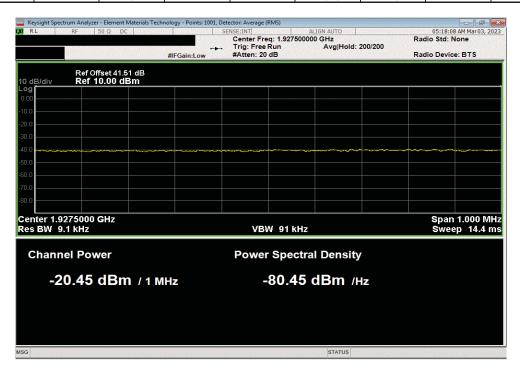
 Frequency
 Max Value
 Limit

 Range
 (dBm)
 < (dBm)</td>
 Result

 5
 -19.92
 -19
 Pass

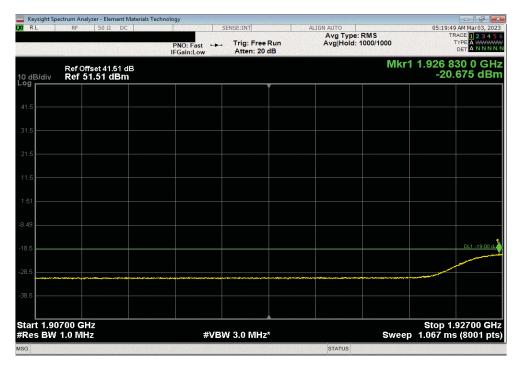


Band n25 1930	Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 1942.5 MHz							
	Frequency			Max Value	Limit			
<u></u>	Range			(dBm)	< (dBm)	Result		
1	6			-20.45	-19	Pass		

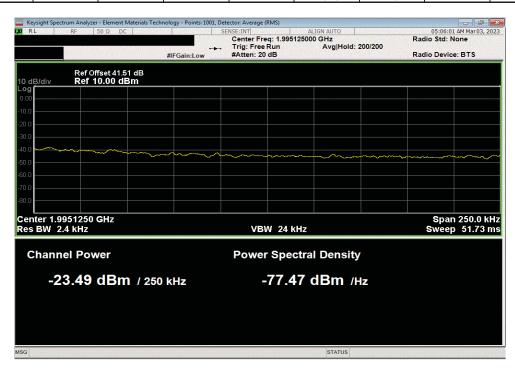


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E	3and n25 1930 N	ИНz - 1995 МНz,	5G NR , Port 1, 2	5 MHz Bandwidt	h, 256-QAM Modi	ulation, High Cha	nnel 1982.5 MHz	
		Frequency			Max Value	Limit		
_		Range			(dBm)	< (dBm)	Result	
Ι		1			-23.49	-19	Pass	



Report No. NOKI0054.0 110/197

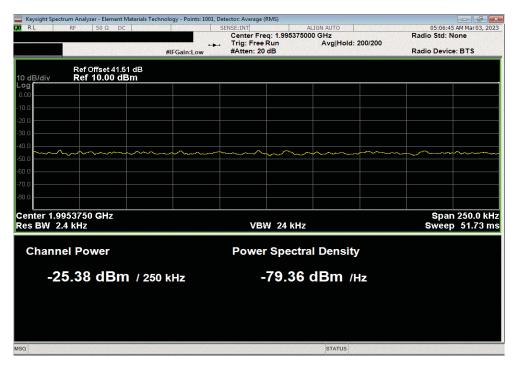


 Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, High Channel 1982.5 MHz

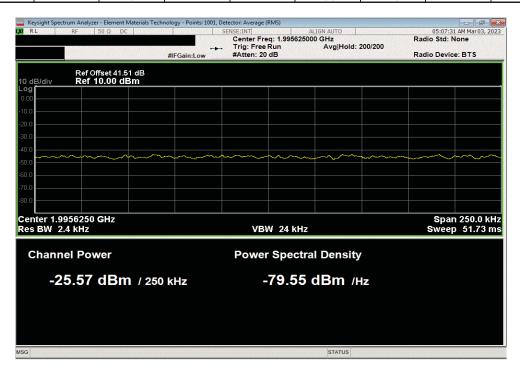
 Frequency
 Max Value
 Limit

 Range
 (dBm)
 < (dBm)</th>
 Result

 2
 -25.38
 -19
 Pass



Band n25 1930 M	Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, High Channel 1982.5 MHz						
	Frequency			Max Value	Limit		
	Range			(dBm)	< (dBm)	Result	
	3			-25.57	-19	Pass	



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Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, High Channel 1982.5 MHz

Frequency

Range

(dBm)

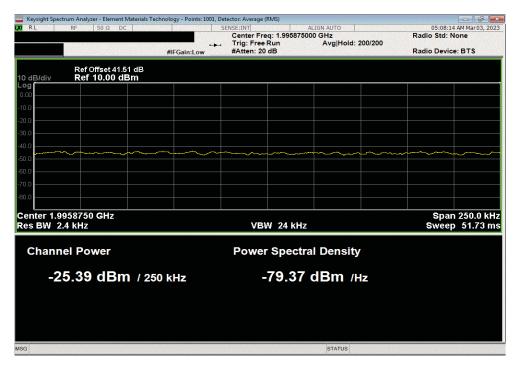
(dBm)

Result

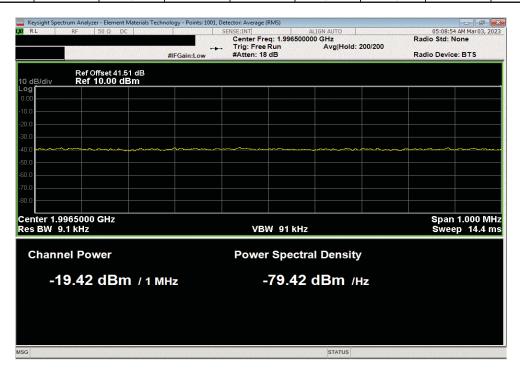
-25.39

-19

Pass



Band n25 1930	Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, High Channel 1982.5 MHz						
	Frequency			Max Value	Limit		
	Range			(dBm)	< (dBm)	Result	
	5			-19.42	-19	Pass	



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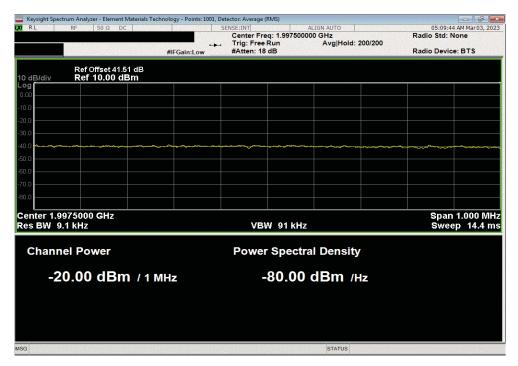


 Band n25 1930 MHz - 1995 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, High Channel 1982.5 MHz

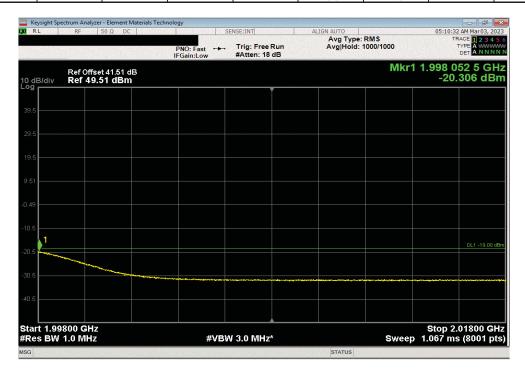
 Frequency
 Max Value
 Limit

 Range
 (dBm)
 < (dBm)</th>
 Result

 6
 -20.00
 -19
 Pass



	Band n25 1930 N	ИНz - 1995 МНz,	5G NR , Port 1, 2	25 MHz Bandwidt	h, 256-QAM Modi	ulation, High Cha	innel 1982.5 MHz	
		Frequency			Max Value	Limit		
		Range			(dBm)	< (dBm)	Result	
l í		7			-20.31	-19	Pass	



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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

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

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

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

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

Per FCC 24.238(a) and RSS 133 6.5.1 (i). the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Per FCC 24.238(b) and RSS 133 6.5.1 (i). emissions seen up to 1 MHz outside of authorized operating frequency range band edges shell be measured with a RBW of 1% of the measured emission bandwidth. Any emission seen to be > 1 MHz further outside the band edges shall be measured with a RBW of 1 MHz. However, a narrower RBW of at least 1% of the emission bandwidth is still allowed provided that the measured power is integrated over the full reference bandwidth of 1 MHz.

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

The band edge testing was performed using only one modulation type because the Occupied Bandwidth variation between modulation types is small, the average output power variation between modulation types is small, there is significant/good passing margin, and previous compliance testing was successfully performed using a high average power level. The highest rate modulation type (256QAM) was used. (See ANSI C63.26. clause 5.7.2e).

Report No. NOKI0054.0



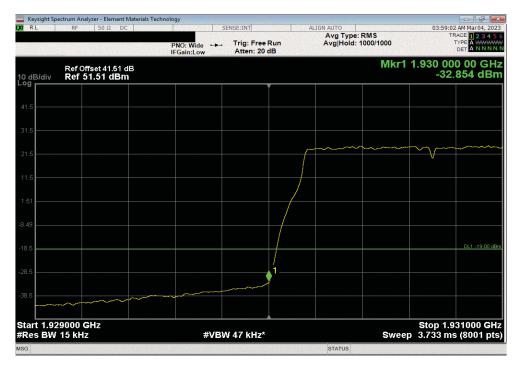
					TbtTx 2022.05.02.0	XMit 2022.12.2
EUT:	Airscale Base Transceiver	Station Remote Radio Head Model AH	IFII	Work Order: N	IOKI0054	
Serial Number:	BL2235N41PG			Date: 0	3/03/2023	
Customer:	Nokia of America Corporat	ion		Temperature: 2	23.8°C	
	John Rattanavong, David I	_e		Humidity: 3		
Project:				Barometric Pres.: 9		
	Brandon Hobbs and Jarroo	d Brenden	Power: 54 VDC	Job Site: T	X07	
TEST SPECIFICATION	ONS		Test Method			
FCC 24E:2022			ANSI C63.26:2015			
RSS-133 Issue 6:20	)13+A1:2018		ANSI C63.26:2015			
COMMENTS						
II measurment pat	th losses were accounted t	for in the reference level offset including	ng any attenuators, filters, and DC block	s. The LTE 1.4 MHz carriers are e	nabled at 20 watt	s/carrier.
	I TEST STANDARD					
None						
			_			
Configuration #			1 / 1			
	NOKI0054-2		11			
	NOK10054-2	Signature	Jan.			
	NOKI0054-2	Signature	Frequency	Max Value	Limit	Dogulf.
		Signature	Frequency Range	Max Value (dBm)	Limit (dBm)	Result
and 25 1930 MHz -	- 1995 MHz, LTE	Signature				Result
3and 25 1930 MHz -	- 1995 MHz, LTE Port 1					Result
3and 25 1930 MHz -	- 1995 MHz, LTE Port 1 1.4 MHz Bandv	vidth				Result
Band 25 1930 MHz -	- 1995 MHz, LTE Port 1 1.4 MHz Bandv	vidth i6-QAM Modulation		(dBm)	(dBm)	
Band 25 1930 MHz -	- 1995 MHz, LTE Port 1 1.4 MHz Bandv	vidth 16-QAM Modulation Low Channel 1930.7 MHz		(dBm) -32.9	(dBm) -19	Pass
Band 25 1930 MHz -	- 1995 MHz, LTE Port 1 1.4 MHz Bandv	vidth 16-QAM Modulation Low Channel 1930.7 MHz Low Channel 1930.7 MHz		(dBm) -32.9 -26.4	-19 -19	Pass Pass
3and 25 1930 MHz -	- 1995 MHz, LTE Port 1 1.4 MHz Bandv	vidth 16-QAM Modulation Low Channel 1930.7 MHz Low Channel 1930.7 MHz Low Channel 1930.7 MHz		-32.9 -26.4 -26.5	-19 -19 -19 -19	Pass Pass Pass
Band 25 1930 MHz -	- 1995 MHz, LTE Port 1 1.4 MHz Bandv	width 16-QAM Modulation Low Channel 1930.7 MHz Low Channel 1930.7 MHz Low Channel 1989.3 MH		-32.9 -26.4 -26.5 -31.6	-19 -19 -19 -19 -19	Pass Pass Pass Pass
Band 25 1930 MHz -	- 1995 MHz, LTE Port 1 1.4 MHz Bandv	vidth 16-QAM Modulation Low Channel 1930.7 MHz Low Channel 1930.7 MHz Low Channel 1930.7 MHz		-32.9 -26.4 -26.5	-19 -19 -19 -19	Pass Pass Pass

Report No. NOKI0054.0 115/197

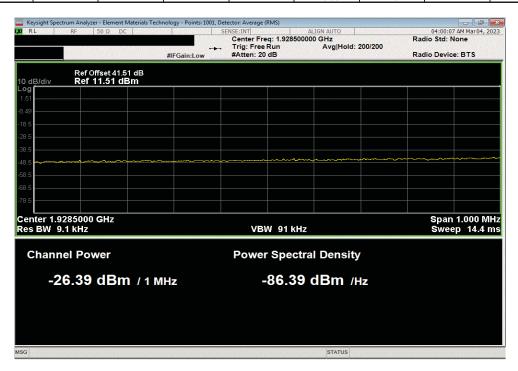


Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Low Channel 1930.7 MHz

Frequency
Max Value
Limit
Range
(dBm)
(dBm)
Result
1
-32.85
-19
Pass



	Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Low Channel 1930.7 MHz							
		Frequency			Max Value	Limit		
		Range			(dBm)	(dBm)	Result	
1		2			-26.39	-19	Pass	



Report No. NOKI0054.0 116/197

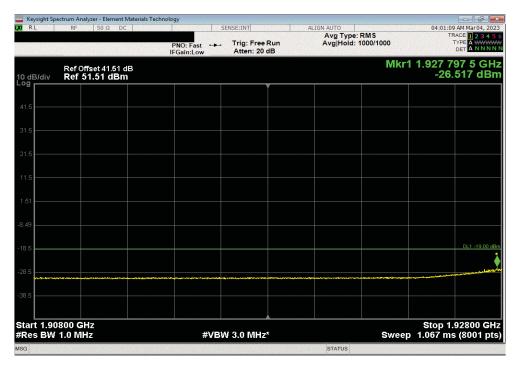


 Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Low Channel 1930.7 MHz

 Frequency
 Max Value
 Limit

 Range
 (dBm)
 (dBm)
 Result

 3
 -26.52
 -19
 Pass



	Band 25 1930	Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, High Channel 1989.3 MHz					
		Frequency			Max Value	Limit	
		Range			(dBm)	(dBm)	Result
1		1			-31.56	-19	Pass

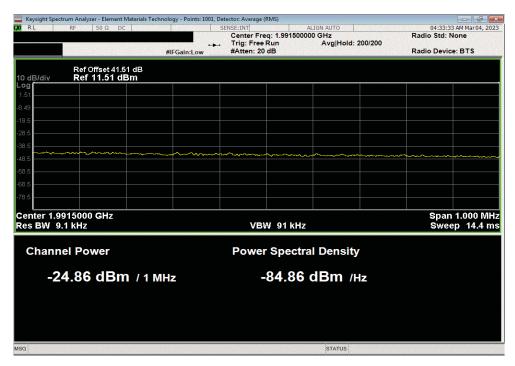


Report No. NOKI0054.0 117/197

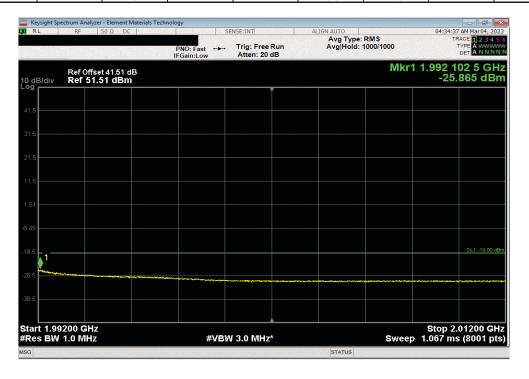


Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, High Channel 1989.3 MHz

Frequency
Max Value
Limit
Range
(dBm)
(dBm)
Result
2
-24.86
-19
Pass



	Band 25 1930 MHz - 1995 MHz, LTE, Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, High Channel 1989.3 MHz						
		Frequency			Max Value	Limit	
		Range			(dBm)	(dBm)	Result
1		3			-25.87	-19	Pass



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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
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Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

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

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

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

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

Per FCC 24.238(a) and RSS 133 6.5.1 (i). the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Per FCC 24.238(b) and RSS 133 6.5.1 (i). emissions seen up to 1 MHz outside of authorized operating frequency range band edges shell be measured with a RBW of 1% of the measured emission bandwidth. Any emission seen to be > 1 MHz further outside the band edges shall be measured with a RBW of 1 MHz. However, a narrower RBW of at least 1% of the emission bandwidth is still allowed provided that the measured power is integrated over the full reference bandwidth of 1 MHz.

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

Report No. NOKI0054.0



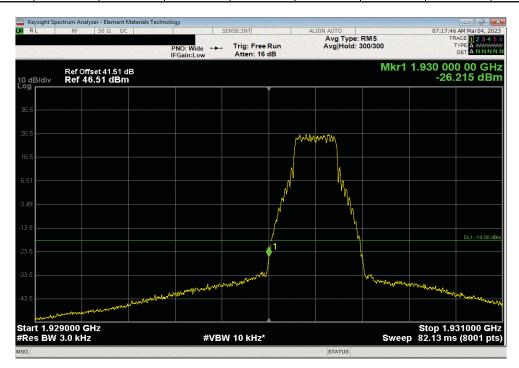
		ver Station Remote Radio Head Mode	el AHFII	Work Order:		
	BL2235N41PG				03/03/2023	
	Nokia of America Corpo			Temperature:		
	John Rattanavong, Davi	d Le		Humidity:		
Project:				Barometric Pres.:		
	Brandon Hobbs and Jar	rod Brenden	Power: 54 VDC	Job Site:	TX07	
EST SPECIFICAT	TIONS		Test Method			
CC 24E:2022			ANSI C63.26:2015			
RSS-133 Issue 6:2	2013+A1:2018		ANSI C63.26:2015			
COMMENTS						
II measurment pa	ath losses were accounted	d for in the reference level offset inc	cluding any attenuators, filters, and DC block	s.The NB IoT SA carriers are enable	ed at maximum po	wer (20
atts/carrier).			3. 7,,			
DEVIATIONS FRO	M TEST STANDARD					
DEVIATIONS FRO	M TEST STANDARD					
	NOKI0054-2	Signature	J. J.			
None	I	Signature	Frequency	Max Value	Limit	
None	I	Signature	Frequency Range	Max Value (dBm)	Limit (dBm)	Result
None Configuration #	I	Signature				Result
None Configuration #	NOKI0054-2	Signature				Result
None Configuration #	NOKI0054-2 - 1995 MHz, NB-IoT					Result
lone Configuration #	NOKI0054-2  - 1995 MHz, NB-IoT Port 1 200 KHz Bai					Result
lone configuration #	NOKI0054-2  - 1995 MHz, NB-IoT Port 1 200 KHz Bai	ndwidth	Range			Result
lone Configuration #	NOKI0054-2  - 1995 MHz, NB-IoT Port 1 200 KHz Bai	ndwidth NTM Modulation	Range 1	(dBm)	(dBm)	
lone configuration #	NOKI0054-2  - 1995 MHz, NB-IoT Port 1 200 KHz Bai	ndwidth NTM Modulation Low Channel 1930.2 MHz	Range 1  1 1 2 2	(dBm) -26.2	(dBm) -19	Pass
lone configuration #	NOKI0054-2  - 1995 MHz, NB-IoT Port 1 200 KHz Bai	ndwidth NTM Modulation Low Channel 1930.2 MH: Low Channel 1930.2 MH:	Range 1 2 1 2 2 2 3	(dBm) -26.2 -27.5	-19 -19	Pass Pass
None Configuration #	NOKI0054-2  - 1995 MHz, NB-IoT Port 1 200 KHz Bai	ndwidth NTM Modulation Low Channel 1930.2 MH: Low Channel 1930.2 MH: Low Channel 1930.2 MH:	Range 1 2 2 2 3 1 1	-26.2 -27.5 -27.5	-19 -19 -19 -19	Pass Pass Pass

Report No. NOKI0054.0 120/197

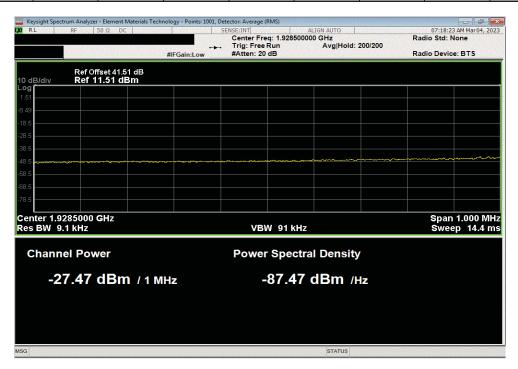


Band 25 1930 MHz - 1995 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, Low Channel 1930.2 MHz

Frequency
Max Value
Limit
Range
(dBm)
(dBm)
Result
1
-26.22
-19
Pass

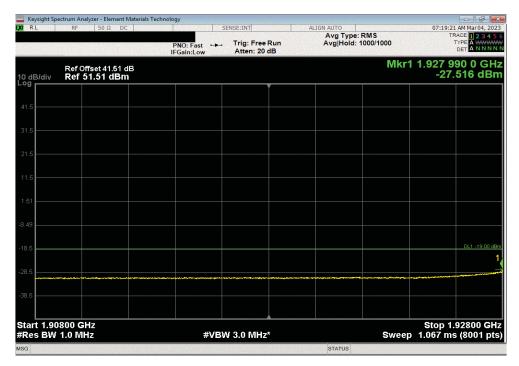


	Band 25 1930 MHz - 1995 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, Low Channel 1930.2 MHz						
		Frequency			Max Value	Limit	
_		Range			(dBm)	(dBm)	Result
. [		2	•		-27.47	-19	Pass

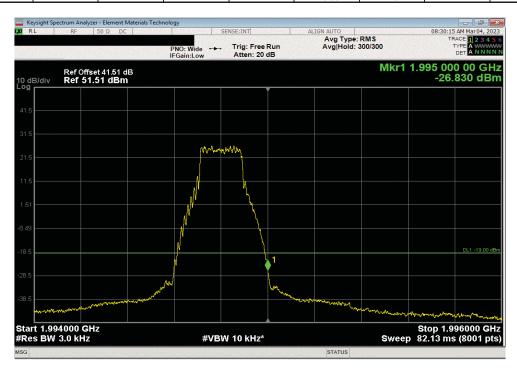


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	Band 25 1930 MHz - 1995 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, High Channel 1994.8 MHz						
		Frequency			Max Value	Limit	
		Range			(dBm)	(dBm)	Result
i		1			-26.83	-19	Pass

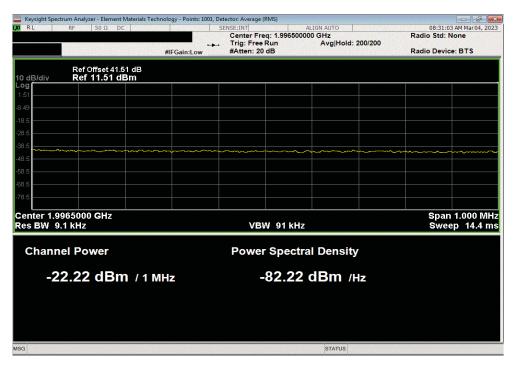


Report No. NOKI0054.0 122/197

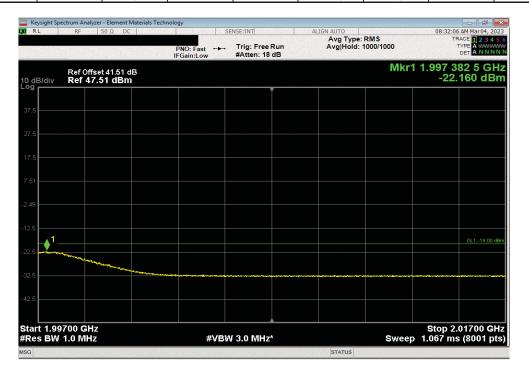


Band 25 1930 MHz - 1995 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, High Channel 1994.8 MHz

Frequency
Max Value
Limit
Range
(dBm)
(dBm)
Result
2
-22.22
-19
Pass



Band 25 1930 MHz - 1995 MHz, NB-IoT, Port 1, 200 KHz Bandwidth, NTM Modulation, High Channel 1994.8 MHz						
	Frequency			Max Value	Limit	
	Range			(dBm)	(dBm)	Result
	3			-22.16	-19	Pass



Report No. NOKI0054.0 123/197



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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

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

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

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

Per FCC 27.53(h) and RSS-139 6.6 the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Per FCC 27.53(h) and RSS-139 6.6 emissions seen up to 1 MHz outside of authorized operating frequency range band edges shell be measured with a RBW of 1% of the measured emission bandwidth. Any emission seen to be > 1 MHz further outside the band edges shall be measured with a RBW of 1 MHz. However, a narrower RBW of at least 1% of the emission bandwidth is still allowed provided that the measured power is integrated over the full reference bandwidth of 1 MHz.

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

The band edge testing was performed using only one modulation type because the Occupied Bandwidth variation between modulation types is small, the average output power variation between modulation types is small, and there was small variation in band edge measurements over modulation types from previous certification testing for other channel bandwidths. The highest rate modulation type (256QAM) was used. (See ANSI C63.26. clause 5.7.2e).

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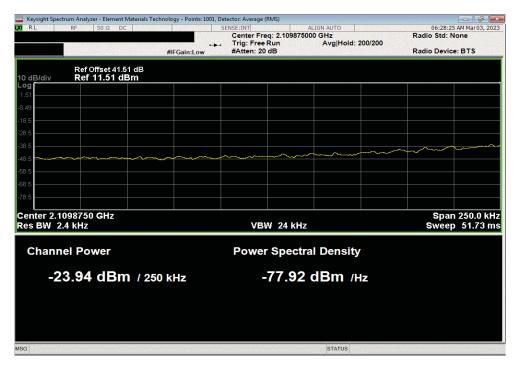
					TbtTx 2022.05.02.0	XMit 2022.1
	Airscale Base Transceiver Station Remote Radio	Head Model AHFII		Work Order:	NOKI0054	
Serial Number:	BL2235N41PG			Date:	03/02/2023	
Customer:	Nokia of America Corporation			Temperature:	23.4°C	
Attendees:	John Rattanavong, David Le			Humidity:	42.5%	
Project:	None		Ba	rometric Pres.:	997.4 mbar	
Tested by:	Brandon Hobbs and Jarrod Brenden	Power: 54 VDC		Job Site:	TX07	
ST SPECIFICATION	ONS	Test Metho	d			
C 27:2023		ANSI C63.2	5:2015			
SS-139 Issue 4:202	22	ANSI C63.2	3:2015			
OMMENTS						
one	TEST STANDARD					
onfiguration #	NOKI0054-2 Signature	1 to the	1-1			
		Frequer	icv	Max Value	Limit	
		Frequer Rang		Max Value (dBm)	Limit < (dBm)	Result
nd n66 2110 MHz	- 2200 MHz, 5G NR					Result
	- 2200 MHz, 5G NR Port 1					Result
	Port 1 25 MHz Bandwidth					Result
	Port 1  25 MHz Bandwidth  256-QAM Modulation	Rang				Result
	Port 1 25 MHz Bandwidth 256-QAM Modulation Low Channe	Range 2122.5 MHz 1		(dBm) -23.9	< (dBm)	Result
	Port 1  25 MHz Bandwidth 256-QAM Modulation Low Channe Low Channe	2122.5 MHz 1 2122.5 MHz 2		-23.9 -28.3	< (dBm)	
	Port 1  25 MHz Bandwidth 256-QAM Modulation Low Channe Low Channe	Range 2122.5 MHz 1		(dBm) -23.9	< (dBm)	Pass
	Port 1  25 MHz Bandwidth 256-QAM Modulation Low Channe Low Channe	2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 3		-23.9 -28.3	< (dBm) -19 -19	Pass Pass
	Port 1  25 MHz Bandwidth 256-QAM Modulation Low Channe Low Channe Low Channe	2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 2 2122.5 MHz 3 2122.5 MHz 3 2122.5 MHz 4		-23.9 -28.3 -28.2	-19 -19 -19 -19	Pass Pass Pass
	Port 1  25 MHz Bandwidth 256-QAM Modulation Low Channe Low Channe Low Channe Low Channe	2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 2 2122.5 MHz 3 2122.5 MHz 4 2122.5 MHz 5		-23.9 -28.3 -28.2 -28.6	-19 -19 -19 -19	Pass Pass Pass Pass
	25 MHz Bandwidth 256-QAM Modulation Low Channe Low Channe Low Channe Low Channe Low Channe	2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 3 2122.5 MHz 3 2122.5 MHz 4 2122.5 MHz 5 2122.5 MHz 5		-23.9 -28.3 -28.2 -28.6 -22.9	-19 -19 -19 -19 -19	Pass Pass Pass Pass Pass
	25 MHz Bandwidth 256-QAM Modulation Low Channe	2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 3 2122.5 MHz 3 2122.5 MHz 4 2122.5 MHz 5 2122.5 MHz 5		-23.9 -28.3 -28.2 -28.6 -22.9 -23.3	-19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass
	25 MHz Bandwidth 256-QAM Modulation Low Channe High Channe	2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 3 2122.5 MHz 3 2122.5 MHz 4 2122.5 MHz 5 2122.5 MHz 5 2122.5 MHz 7		-23.9 -28.3 -28.2 -28.6 -22.9 -23.3 -23.1	-19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass
	25 MHz Bandwidth 256-QAM Modulation Low Channe High Channe High Channe	Range 2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 2 2122.5 MHz 3 2122.5 MHz 4 2122.5 MHz 5 2122.5 MHz 6 2122.5 MHz 6 2122.5 MHz 7 4 2187.5 MH: 1		-23.9 -28.3 -28.2 -28.6 -22.9 -23.3 -23.1 -23.8	-19 -19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass Pass
	25 MHz Bandwidth 256-QAM Modulation Low Channe High Channe High Channe High Channe	Range 2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 3 2122.5 MHz 3 2122.5 MHz 4 2122.5 MHz 5 2122.5 MHz 5 2122.5 MHz 7 12187.5 MHz 7 12187.5 MH: 1 12187.5 MH: 2 12187.5 MH: 3		-23.9 -28.3 -28.2 -28.6 -22.9 -23.3 -23.1 -23.8 -27.6	-19 -19 -19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass Pass
	25 MHz Bandwidth 256-QAM Modulation Low Channe High Channe High Channe High Channe High Channe	Range 2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 3 2122.5 MHz 3 2122.5 MHz 4 2122.5 MHz 5 2122.5 MHz 5 2122.5 MHz 6 2122.5 MHz 7 12187.5 MHz 1 12187.5 MH; 1 12187.5 MH; 2 12187.5 MH; 3 12187.5 MH; 3		-23.9 -28.3 -28.2 -28.6 -22.9 -23.3 -23.1 -23.8 -27.6 -27.8	-19 -19 -19 -19 -19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass Pass Pass
	25 MHz Bandwidth  256-QAM Modulation  Low Channe  High Channe	Range 2122.5 MHz 1 2122.5 MHz 2 2122.5 MHz 3 2122.5 MHz 3 2122.5 MHz 4 2122.5 MHz 5 2122.5 MHz 5 2122.5 MHz 7 12187.5 MHz 7 12187.5 MH: 1 12187.5 MH: 2 12187.5 MH: 3		-23.9 -28.3 -28.2 -28.6 -22.9 -23.3 -23.1 -23.8 -27.6 -27.8	-19 -19 -19 -19 -19 -19 -19 -19 -19 -19	Pass Pass Pass Pass Pass Pass Pass Pass

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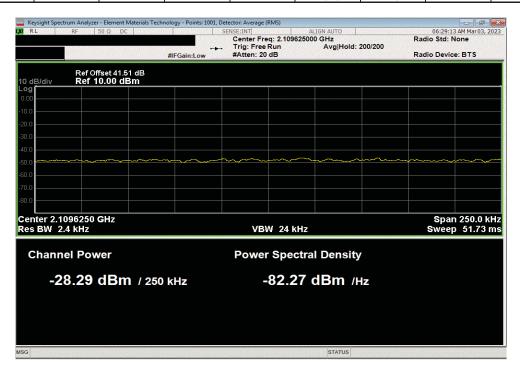


Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 2122.5 MHz

Frequency
Max Value
Limit
(dBm) < (dBm)
Result
1 -23.94 -19 Pass



	Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 2122.5 MHz						
		Frequency			Max Value	Limit	
_		Range			(dBm)	< (dBm)	Result
		2			-28.29	-19	Pass

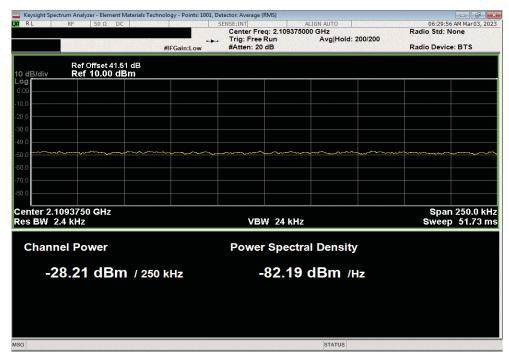


Report No. NOKI0054.0 126/197

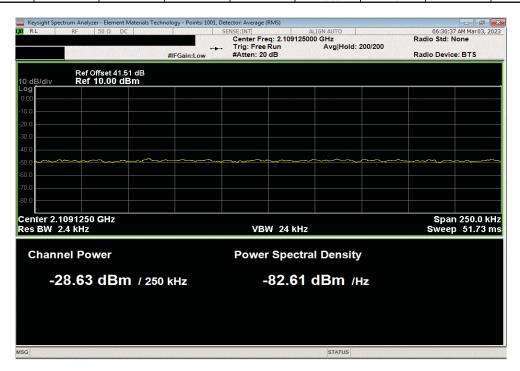


Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 2122.5 MHz

Frequency
Max Value
Limit
Range
(dBm) < (dBm)
Result
3 -28.21 -19 Pass



Band n66 2110 N	Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 2122.5 MHz					
	Frequency			Max Value	Limit	
	Range			(dBm)	< (dBm)	Result
	4			-28.63	-19	Pass

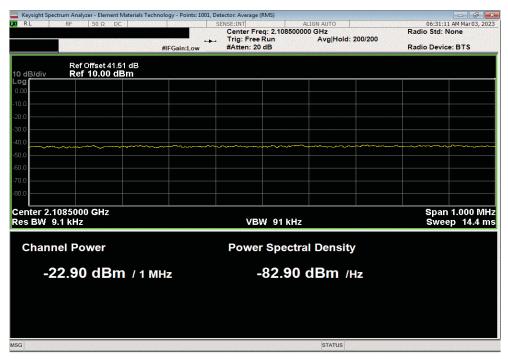


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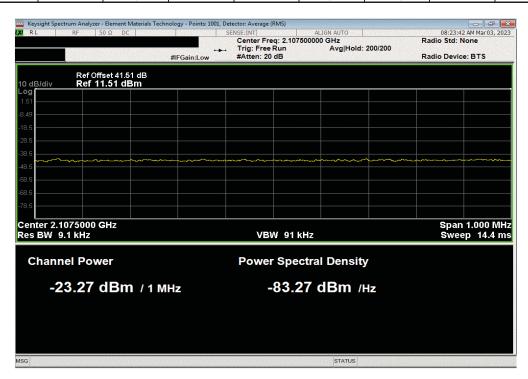


Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 2122.5 MHz

Frequency
Max Value
Limit
Range
(dBm) < (dBm)
Result
5 -22.90 -19 Pass



Band n66 21	Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 2122.5 MHz					
	Frequency			Max Value	Limit	
	Range			(dBm)	< (dBm)	Result
	6			-23.27	-19	Pass

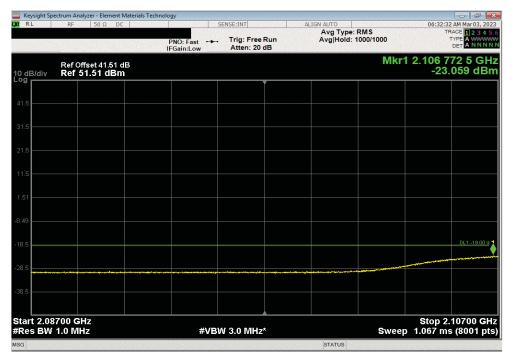


Report No. NOKI0054.0 128/197

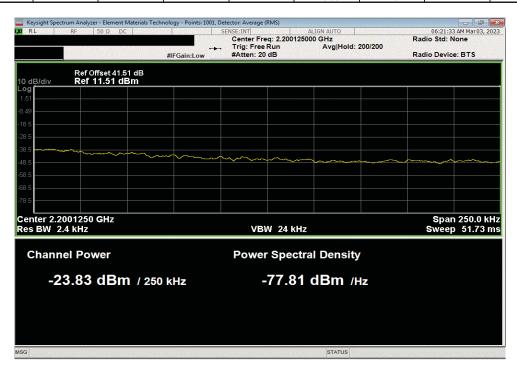


Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, Low Channel 2122.5 MHz

Frequency
Max Value
Limit
Range
(dBm) < (dBm)
Result
7 -23.06 -19 Pass



Band n66 2110 N	MHz - 2200 MHz, 5G	NR , Port 1, 2	5 MHz Bandwidth	n, 256-QAM Modu	ulation, High Cha	nnel 2187.5 MHz
	Frequency			Max Value	Limit	
	Range			(dBm)	< (dBm)	Result
	1			-23.83	-19	Pass



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Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, High Channel 2187.5 MHz

Frequency

Range

(dBm)

(dBm)

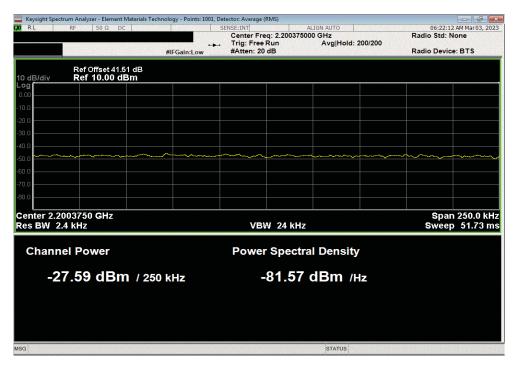
Result

2

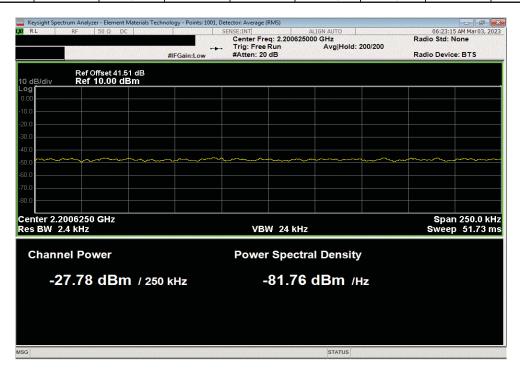
-27.59

-19

Pass



Band n66 2110	MHz - 2200 MHz,	5G NR , Port 1, 2	5 MHz Bandwidt	n, 256-QAM Modi	ulation, High Cha	nnel 2187.5 MHz
	Frequency			Max Value	Limit	
	Range			(dBm)	< (dBm)	Result
	3			-27.78	-19	Pass

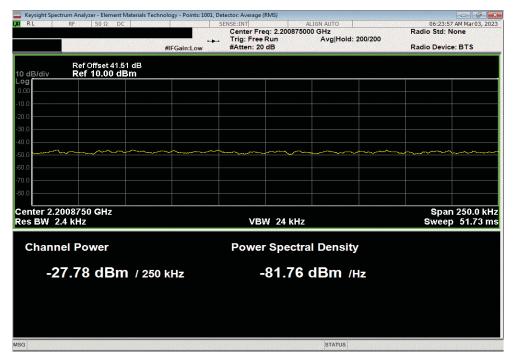


Report No. NOKI0054.0 130/197

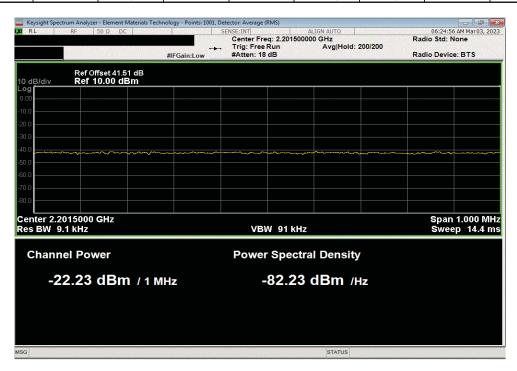


Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, High Channel 2187.5 MHz

Frequency
Range
(dBm) < (dBm)
Result
-27.78 -19
Pass



Band n66 21	10 MHz - 2200 MHz,	5G NR , Port 1, 2	5 MHz Bandwidt	n, 256-QAM Mod	ulation, High Cha	nnel 2187.5 MHz
	Frequency			Max Value	Limit	
	Range			(dBm)	< (dBm)	Result
	5			-22.23	-19	Pass

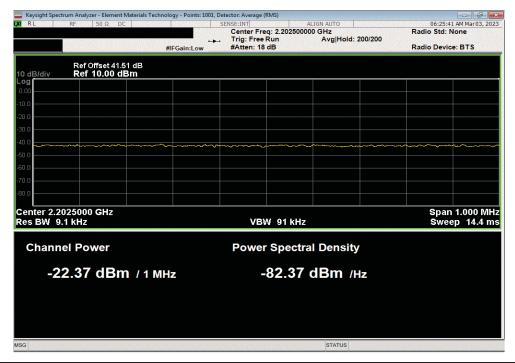


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Band n66 2110 MHz - 2200 MHz, 5G NR , Port 1, 25 MHz Bandwidth, 256-QAM Modulation, High Channel 2187.5 MHz

Frequency
Max Value
Limit
Range
(dBm) < (dBm)
Result
6 -22.37 -19 Pass



Band n66 2110 M	IHz - 2200 MHz, 5	G NR , Port 1, 2	5 MHz Bandwidtl	n, 256-QAM Modi	ulation, High Cha	nnel 2187.5 MHz
	Frequency			Max Value	Limit	
	Range			(dBm)	< (dBm)	Result
	7	_		-22.10	-19	Pass



Report No. NOKI0054.0 132/197



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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2023-02-09	2024-02-09
Block - DC	Fairview Microwave	SD3239	ANE	2023-02-16	2024-02-16
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

#### **TEST DESCRIPTION**

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

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

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

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

Per section 27.53(h)(1) and RSS-139 6.6, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Per 27.53(h)(3) and RSS-139 6.6. emissions seen up to 1 MHz outside of authorized operating frequency range band edges shell be measured with a RBW of 1% of the measured emission. Any emission seen to be > 1 MHz further outside the band edges shall be measured with a RBW of 1 MHz. However, a narrower RBW of at least 1% of the emission bandwidth is still allowed provided that the measured power is integrated over the full reference bandwidth of 1 MHz.

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

The band edge testing was performed using only one modulation type because the Occupied Bandwidth variation between modulation types is small, the average output power variation between modulation types is small, there is significant/good passing margin, and previous compliance testing was successfully performed using a higher average power level. The highest rate modulation type (256QAM) was used. (See ANSI C63.26. clause 5.7.2e).

Report No. NOKI0054.0



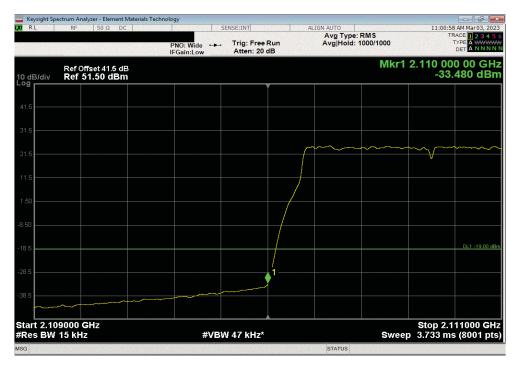
					TbtTx 2022.05.02.0	
		er Station Remote Radio Head Model AHFI	I	Work Order:		
Serial Number:					03/03/2023	
	Nokia of America Corpo			Temperature:		
	John Rattanavong, Davi	d Le		Humidity:		
Project:				Barometric Pres.:		
	Brandon Hobbs and Jar	rod Brenden Pov	ver: 54 VDC	Job Site:	TX07	
TEST SPECIFICATION	ONS		Test Method			
FCC 27:2023			ANSI C63.26:2015			
RSS-139 Issue 4:202	22		ANSI C63.26:2015			
COMMENTS						
All measurment pati	h losses were accounted	d for in the reference level offset including	any attenuators, filters, and DC bloc	ks. The LTE 1.4 MHz carrieris a	re enabled at 20 w	atts/carrier.
DEVIATIONS FROM	TEST STANDARD					
None			2 /			
None Configuration #	NOKI0054-2	Signature	Jal			
	NOKI0054-2	Signature	Frequency	Max Value	Limit	
Configuration #		Signature	Frequency Range	Max Value (dBm)	Limit (dBm)	Result
Configuration #	2200 MHz, LTE	Signature				Result
Configuration #	2200 MHz, LTE Port 1					Result
Configuration #	2200 MHz, LTE Port 1 1.4 MHz Bar	ndwidth				Result
Configuration #	2200 MHz, LTE Port 1 1.4 MHz Bar	ndwidth 256-QAM Modulation		(dBm)	(dBm)	
Configuration #	2200 MHz, LTE Port 1 1.4 MHz Bar	ndwidth 256-QAM Modulation Low Channel 2110.7 MHz		(dBm) -33.5	( <b>dBm</b> )	Pass
Configuration #	2200 MHz, LTE Port 1 1.4 MHz Bar	ndwidth 256-QAM Modulation Low Channel 2110.7 MHz Low Channel 2110.7 MHz		(dBm) -33.5 -26.3	-19 -19	Pass Pass
Configuration #	2200 MHz, LTE Port 1 1.4 MHz Bar	ndwidth 256-QAM Modulation Low Channel 2110.7 MHz Low Channel 2110.7 MHz Low Channel 2110.7 MHz		-33.5 -26.3 -27.3	-19 -19 -19	Pass Pass Pass
Configuration #	2200 MHz, LTE Port 1 1.4 MHz Bar	ndwidth 256-QAM Modulation Low Channel 2110.7 MHz Low Channel 2110.7 MHz Low Channel 2110.7 MHz High Channel 2199.3 MHz		-33.5 -26.3 -27.3 -32.6	-19 -19 -19 -19	Pass Pass Pass Pass
Configuration #	2200 MHz, LTE Port 1 1.4 MHz Bar	ndwidth  256-QAM Modulation  Low Channel 2110.7 MHz  Low Channel 2110.7 MHz  Low Channel 2110.7 MHz  High Channel 2199.3 MHz  High Channel 2199.3 MHz	Range 1 1 2 3 1 2 2	-33.5 -26.3 -27.3 -32.6 -27.2	-19 -19 -19 -19 -19	Pass Pass Pass Pass Pass
Configuration #	2200 MHz, LTE Port 1 1.4 MHz Bar	ndwidth 256-QAM Modulation Low Channel 2110.7 MHz Low Channel 2110.7 MHz Low Channel 2110.7 MHz High Channel 2199.3 MHz		-33.5 -26.3 -27.3 -32.6	-19 -19 -19 -19	Pass Pass Pass Pass

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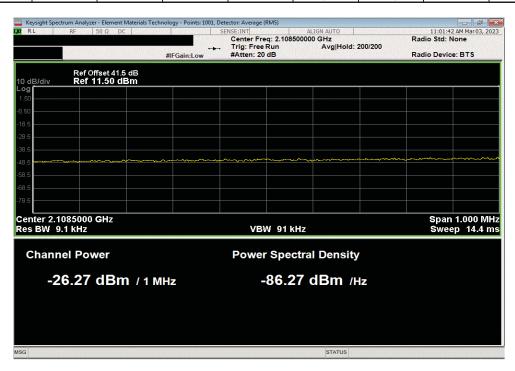


Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Low Channel 2110.7 MHz

Frequency
Range
(dBm)
(dBm)
Result
1
-33.48
-19
Pass



Band 66	Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Low Channel 2110.7 MHz					
	Frequency		Max Va	alue Limit		
	Range		(dBr	n) (dBm)	Result	
	2		-26.2	27 -19	Pass	



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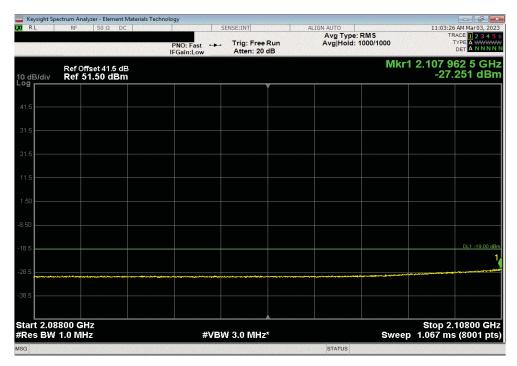


 Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, Low Channel 2110.7 MHz

 Frequency
 Max Value
 Limit

 Range
 (dBm)
 (dBm)
 Result

 3
 -27.25
 -19
 Pass



	Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, High Channel 2199.3 MHz						
		Frequency			Max Value	Limit	
		Range			(dBm)	(dBm)	Result
1		1			-32.56	-19	Pass

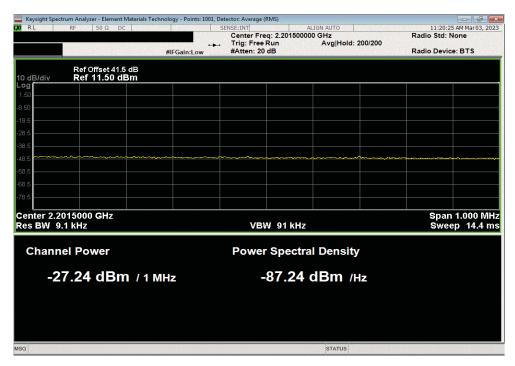


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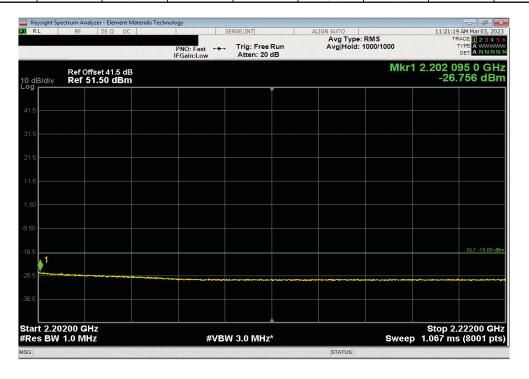


Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, High Channel 2199.3 MHz

Frequency
Max Value
Limit
Range
(dBm)
(dBm)
Result
2
-27.24
-19
Pass



Band 66 2110	Band 66 2110 MHz - 2200 MHz, LTE , Port 1, 1.4 MHz Bandwidth, 256-QAM Modulation, High Channel 2199.3 MHz					
	Frequency			Max Value	Limit	
<u></u>	Range			(dBm)	(dBm)	Result
	3			-26.76	-19	Pass



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