

Port 2, LTE, Band 71, 617 MHz - 652 MHz, 200 kHz Bandwidth, Standalone NB-IoT Modulation, High Ch. 651.8 MHz

Value

99% (MHz)

26dB (MHz)

Limit

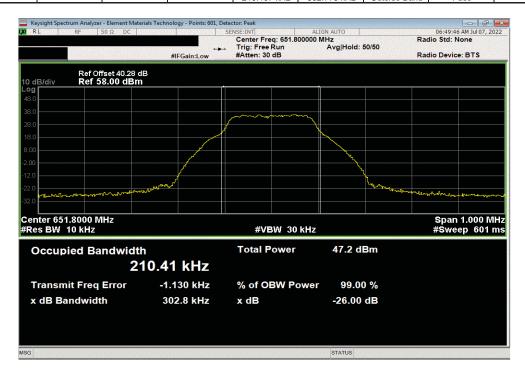
Result

210.407 kHz

302.775 kHz

Outside Band

Pass





XMit 2022.02.07.0

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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

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

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

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHLOB) as the original certification test. The AHLOB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

The occupied bandwidth was measured with the EUT configured in the modes called out in the data sheets. FCC 27.53 defines the 26dB emission bandwidth requirement.

RSS GEN Section 6.7 defines the 99% emission bandwidth requirement.

	FCC and ISED Emission Designators for Band 85 (728MHz to 746MHz) Narrow-Band IoT Stand Alone								
Ch	Radio	4G-	4G-LTE: N-TM						
BW	Channel	FCC	ISED						
	Low	291KG7D	203KG7D						
200kHz	Mid	291KG7D	204KG7D						
	High	290KG7D	204KG7D						
Note: FCC emi	Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.								



			TbtTx 2022.05.02.0	XMit 2022.02.07.0						
EUT: AHLOB		Work Order:	NOKI0043							
Serial Number: YK220900029			13-Jul-22							
Customer: Nokia Solutions and Networks		Temperature:	20.6 °C							
Attendees: Mitchell Hill, John Rattanavong		Humidity:	53.5% RH							
Project: None		Barometric Pres.:	1017 mbar							
Tested by: Marty Martin Power: 54 VDC		Job Site:	TX07							
TEST SPECIFICATIONS Test Method										
RSS-130 Issue 2 ANSI C63.26:2015										
FCC 27:2022 ANSI C63.26:2015										
COMMENTS										
DEVIATIONS FROM TEST STANDARD  None  Configuration # 2										
Signature	Value 99% (MHz)	Value 26dB (MHz)	Limit	Result						
Port 2, LTE, Band 85, 728 MHz - 746 MHz										
200 kHz Bandwidth										
Standalone NB-IoT										
Low Ch. 728.2 MHz	203.449 kHz	290.513 kHz	Outside Band	Pass						
Mid Ch. 737 MHz	203.509 kHz	290.892 kHz	Outside Band	Pass						
High Ch. 745.8 MHz	203.806 kHz	289.943 kHz	Outside Band	Pass						



Port 2, LTE, Band 85, 728 MHz - 746 MHz, 200 kHz Bandwidth, Standalone NB-IoT Modulation, Low Ch. 728.2 MHz

Value

99% (MHz)

26dB (MHz)

Limit

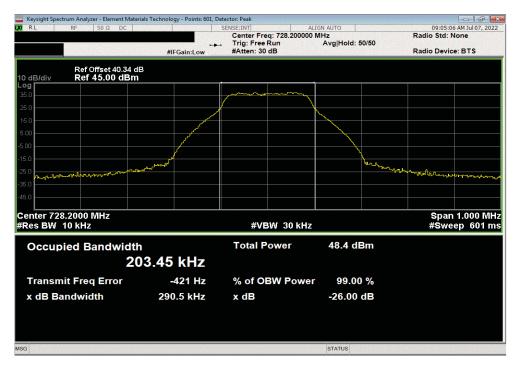
Result

203.449 kHz

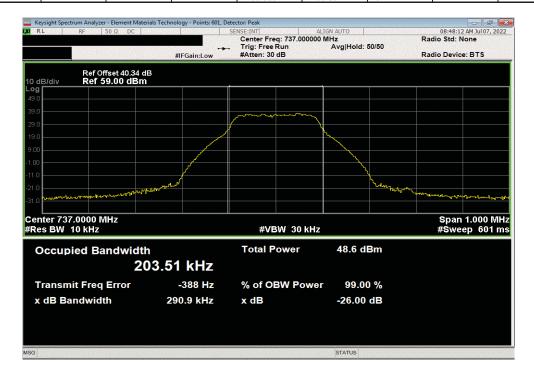
209.513 kHz

Outside Band

Pass



	Port 2, LTE, Band 85, 728 MHz - 746 MHz, 200 kHz Bandwidth, Standalone NB-IoT Modulation, Mid Ch. 737 MHz								
				Value	Value				
_				99% (MHz)	26dB (MHz)	Limit	Result		
l				203.509 kHz	290.892 kHz	Outside Band	Pass		



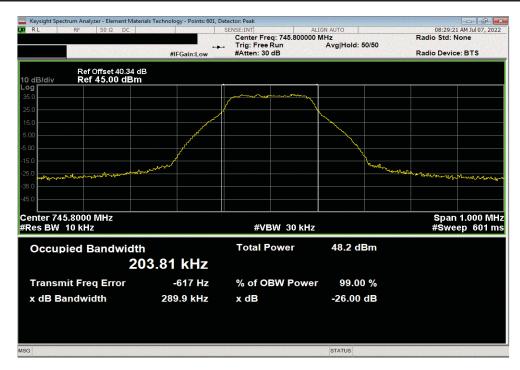


Port 2, LTE, Band 85, 728 MHz - 746 MHz, 200 kHz Bandwidth, Standalone NB-IoT Modulation, High Ch. 745.8 MHz

Value Value

99% (MHz) 26dB (MHz) Limit Result

203.806 kHz 289.943 kHz Outside Band Pass





XMit 2022.02.07.0

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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

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

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

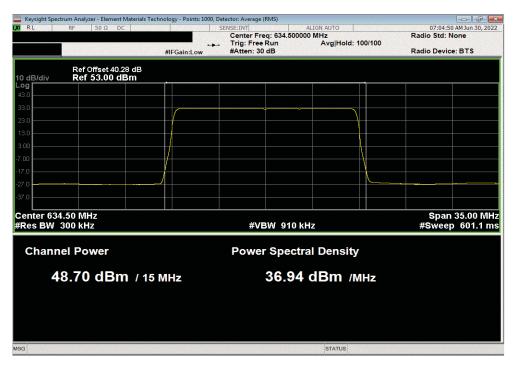
RF conducted emissions testing was performed on all ports at 15 MHz middle channel in order to prove the AHLOB antenna ports are essentially electrically identical. Antenna port 2 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.



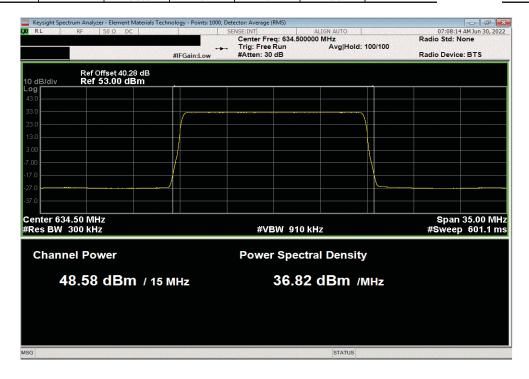
								TbtTx 2022.06.03.0	XMit 2022.02
	AHLOB						Work Order:		
Serial Number:								11-Jul-22	
Customer:	Nokia Solutions and Ne	tworks					Temperature:	20.8 °C	
Attendees:	Mitchell Hill, John Ratta	navong				Humidity: 59.1% RH			
Project:	None					Barometric Pres.: 1016 mbar			
Tested by:	Marty Martin		Pow	er: 54 VDC			Job Site:	TX07	
EST SPECIFICAT	TONS			Test Method					
CC 27:2022				ANSI C63.26:2015					
SS-130 Issue 2:20	019			ANSI C63.26:2015					
OMMENTS				•					
	·	ccounted for: attenuators, cables, DC	Block and filter w	/hen in use.					
EVIATIONS FROM	M TEST STANDARD								
lone									
Configuration #	2	Signature	Verty	Marti					
				Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	All Ports Value (dBm)	Value (dBm)	Limit	Results
TE, Band 71, 617 N	MHz - 652 MHz				· ·	· · · ·			
	Port 1								
	15 MHz Bar	ndwidth							
		256-QAM Modulation							
		Mid Ch. 634.5 MHz		48.697	0	N/A	48.7	Within Tolerance	N/A
	Port 2								
	15 MHz Bar	ndwidth							
		256-QAM Modulation							
		Mid Ch. 634.5 MHz		48.583	0	N/A	48.6	Within Tolerance	N/A
	Port 3								
	15 MHz Bar	ndwidth							
		256-QAM Modulation							
		Mid Ch. 634.5 MHz		48.61	0	N/A	48.6	Within Tolerance	N/A
	Port 4								
	15 MHz Bar	ndwidth							
		256-QAM Modulation							
		Mid Ch. 634.5 MHz		48.758	0	N/A	48.8	Within Tolerance	N/A
	Radio Power All Ports								
	Tudio I Offici All I Olis								
	15 MHz BW	/ 256QAM							



LTE, Band 71, 617 MHz - 652 MHz, Port 1, 15 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 634.5 MHz Avg Cond **Duty Cycle** All Ports Value Limit Pwr (dBm) Factor (dB) Value (dBm) (dBm) Results Within Tolerance 48.697 N/A 48.7 NAA



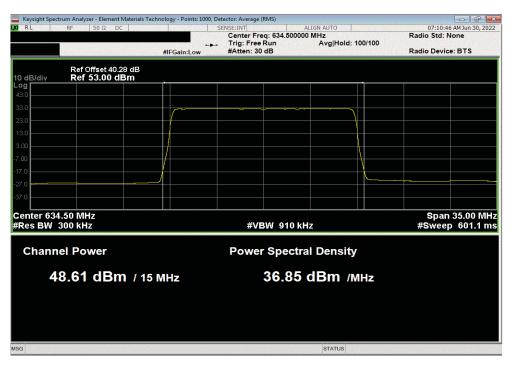
LTE, Band 71, 617 MHz - 652 MHz, Port 2, 15 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 634.5 MHz								
Avg Cond Duty Cycle All Ports Value Limit								
	Pwr (dBm)	Factor (dB)	Value (dBm)	(dBm)		Results		
	48.583	0	N/A	48.6	Within Tolerance	N/A		



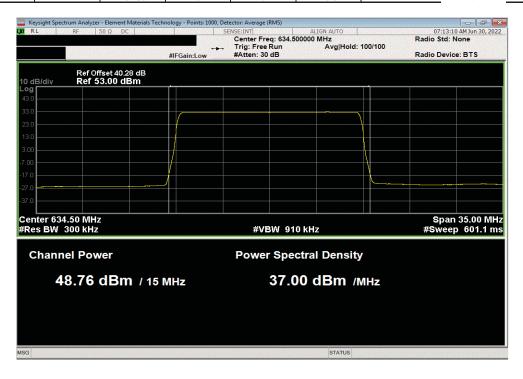


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LTE, Band 71, 617 MHz - 652 MHz, Port 3, 15 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 634.5 MHz								
	Avg Cond	Duty Cycle	All Ports	Value	Limit			
<u></u>	Pwr (dBm)	Factor (dB)	Value (dBm)	(dBm)		Results		
	48.61	0	N/A	48.6	Within Tolerance	N/A		



LTE, Band 71, 617 MHz - 652 MHz, Port 4, 15 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 634.5 MHz								
Avg Cond Duty Cycle All Ports Value Limit								
	Pwr (dBm)	Factor (dB)	Value (dBm)	(dBm)		Results		
	48.758	0	N/A	48.8	Within Tolerance	N/A		





TbtTx 2022.06.03.0 XMit 2022.02.07.0

5G NR, Band n71, 617 MHz - 652 MHz, All Ports, 15 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 634.5 MHz								
	Avg Cond Duty Cycle Value All Ports							
	Pwr (dBm)	Factor (dB)	(dBm)	Value (dBm)	Limit	Results		
	N/A	0	N/A	54.7	N/A	N/A		

AVERAGE POWER PORT SUMMING										
PORT 1 PORT 2 PORT 3 PORT 4 SUM TOTAL										
INITIAL VALUE (dBm)	48.7	48.6	48.6	48.8	N/A					
INITIAL VALUE (Watts)	74.1	72.4	72.4	75.9	294.9					
TOTAL VALUE (dBm)	N/A	N/A	N/A	N/A	54.7					



XMit 2022.02.07.0

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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

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

RF conducted emissions testing performed on all ports at 15 MHz middle channel in order to prove the AHLOB antenna ports are essentially electrically identical. Antenna port 2 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.



								TbtTx 2022.05.02.0	XMit 2022.02
	AHLOB						Work Order:		
Serial Number:	YK220900029						Date:	11-Jul-22	
Customer:	Nokia Solutions and Net	works					Temperature:	21 °C	
	Mitchell Hill, John Rattar	navong					Humidity:		
Project:						В	arometric Pres.:		
	Marty Martin		Pov	wer: 54 VDC			Job Site:	TX07	
EST SPECIFICATI	IONS			Test Method					
CC 27:2022				ANSI C63.26:2015					
RSS-130 Issue 2:20	119			ANSI C63.26:2015					
OMMENTS									
All loses in the mea	asurment path were accor	unted for: attenuators, cables, DC b	lock and filter wh	nen in use.					
DEVIATIONS FROM	// TEST STANDARD								
lone									
Configuration #	2	Signature	Morty	Merti					
		•		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	All Ports Value (dBm)	Value (dBm)	Limit (dBm)	Results
TE, Band 85, 728 N	ИНz - 746 MHz								
	Port 1								
	15 MHz Band	dwidth 256-QAM Modulation							
		Mid Ch. 737 MHz		48.703	0	N/A	48.7	Within Tolerance	N/A
	Port 2								
	15 MHz Band	dwidth 256-QAM Modulation							
		Mid Ch. 737 MHz		48.626	0	N/A	48.6	Within Tolerance	N/A
	Port 3 15 MHz Band								
		256-QAM Modulation Mid Ch. 737 MHz		48.538	0	N/A	48.5	Within Tolerance	N/A
	Port 4	IVIIU CII. 131 IVIHZ		40.000	U	IN/A	40.0	vviuliti rolerance	IN/A
	15 MHz Band	dwidth 256-QAM Modulation							
		Mid Ch. 737 MHz		48.768	0	N/A	48.8	Within Tolerance	N/A
	Radio Power All Ports 15 MHz BW	256QAM							77.
		Mid Ch. 737 Mhz		N/A	0	54.7	N/A	N/A	N/A

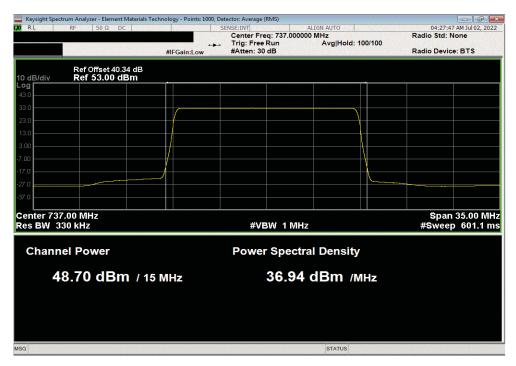


LTE, Band 85, 728 MHz - 746 MHz, Port 1, 15 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 737 MHz

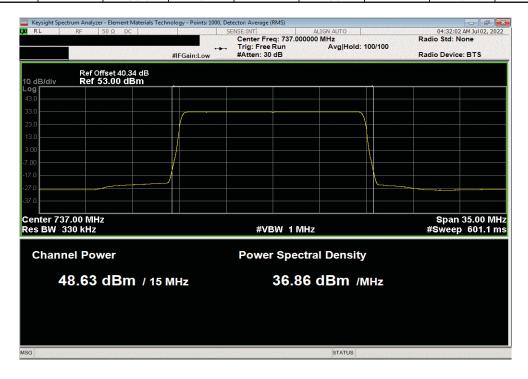
Avg Cond Duty Cycle Ports Value (dE Value Limit

Pwr (dBm) Factor (dB) (dBm) (dBm) Results

48.703 0 48.7 Within Tolerance N/A



LTE, Bar	nd 85, 728 MHz -	746 MHz, Port 2,	15 MHz Bandwid	th, 256-QAM N	Modulation, Mid Ch. 7	37 MHz
	Avg Cond	<b>Duty Cycle</b>	Ports Value (dE	Value	Limit	
	Pwr (dBm)	Factor (dB)		(dBm)	(dBm)	Results
	48.626	0		48.6	Within Tolerance	N/A

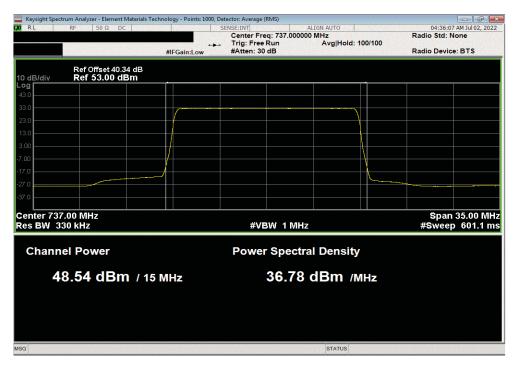




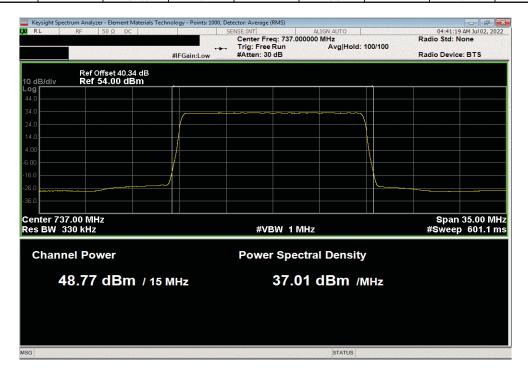
LTE, Band 85, 728 MHz - 746 MHz, Port 3, 15 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 737 MHz

Avg Cond Duty Cycle Ports Value (dE Value Limit
Pwr (dBm) Factor (dB) (dBm) (dBm) Results

48.538 0 48.5 Within Tolerance N/A



LTE, Bar	nd 85, 728 MHz -	746 MHz, Port 4,	15 MHz Bandwid	th, 256-QAM N	Modulation, Mid Ch. 7	37 MHz
	Avg Cond	<b>Duty Cycle</b>	Ports Value (dE	Value	Limit	
	Pwr (dBm)	Factor (dB)		(dBm)	(dBm)	Results
	48.768	0		48.8	Within Tolerance	N/A





TbtTx 2022.06.03.0 XMit 2022.02.07.0

L	TE, Band n85, 728 MH	z - 746 MHz, 15 N	ИНz Bandwidth, 2	256-QAM Modula	tion, Mid Ch. 737 MH	Z	
	Avg Cond	<b>Duty Cycle</b>	Value	All Ports			
	Pwr (dBm)	Factor (dB)	(dBm)	Value (dBm)	Limit	Results	
	N/A	0	N/A	54.7	N/A	N/A	1

		AVERAGE POWER	PORT SUMMING		
	PORT 1	PORT 2	PORT 3	PORT 4	SUM TOTAL
INITIAL VALUE (dBm)	48.7	48.6	48.5	48.8	N/A
INITIAL VALUE (Watts)	74.1	72.4	70.8	75.9	293.2
TOTAL VALUE (dBm)	N/A	N/A	N/A	N/A	54.7



XMit 2022.02.07.0

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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

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

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

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHLOB) as the original certification test. The AHLOB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 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



EUT: AHLOB Work Order: NOKI0043 Serial Number: YK220900029 Date: 11-Jul-22 Temperature: 21.3 °C
Humidity: 58% RH
Barometric Pres.: 1015 mba Customer: Nokia Solutions and Networks
Attendees: Mitchell Hill, John Rattanavong Project: None Tested by: Marty Martin Power: 54 VDC Test Method Job Site: TX07 FCC 27:2022 RSS-130 Issue 2:2019 ANSI C63.26:2015 COMMENTS All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. 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 bandwidth on port 2. The total output power for multiport (2x2, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 [10 log(Nout)]. The total output power for two port operation is single port power + 6dB [i.e. 10log(2)] and the total output power for a four port operation is single port power + 6dB [i.e. 10log(4)]. DEVIATIONS FROM TEST STANDARD None Monty Marti Configuration # 2 Signature Intial Value Two Port (2x2 MIMO) Four Port (4x4 MIMO) dBm/Carrier BW dBm/Carrier BW Duty Cycle Factor (dB) Single Port dBm/Carrier BW Port 2, LTE, Band 71, 617 MHz - 652 MHz 5 MHz Bandwidth 256-QAM Modulation Low Ch. 619.5 MHz Mid Ch. 634.5 MHz 51.4 51.7 51.7 45.401 45.748 45.654 45.7 45.7 48.7 High Ch. 649.5 MHz 48.7 10 MHz Bandwidth 256-QAM Modulation Low Ch. 622 MHz Mid Ch. 634.5 MHz 47.587 47.32 47.6 47.3 50.6 50.3 53.6 53.3 High Ch. 647 MHz 47.531 47.5 50.5 53.5 15 MHz Bandwidth

QPSK Modulation Mid Ch. 634.5 MHz 48.313 0 48.3 51.3 54.3 16-QAM Modulation Mid Ch. 634.5 MHz 48.387 48.4 51.4 54.3 64-QAM Modulation Mid Ch. 634.5 MHz 51.4 54.3 256-QAM Modulation 51.8 51.4 51.4 Low Ch. 624.5 MHz Mid Ch. 634.5 MHz 48.795 48.8 48.4 54.8 48.399 54.4 High Ch. 644.5 MHz 48.412 48.4 54.4 20 MHz Bandwidth 256-QAM Modulation Low Ch. 627 MHz Mid Ch. 634.5 MHz High Ch. 642 MHz 48.5 48.3 48.5 51.5 51.3 51.5 48.52 0 54.5 48.331 48.523 54.3 54.5

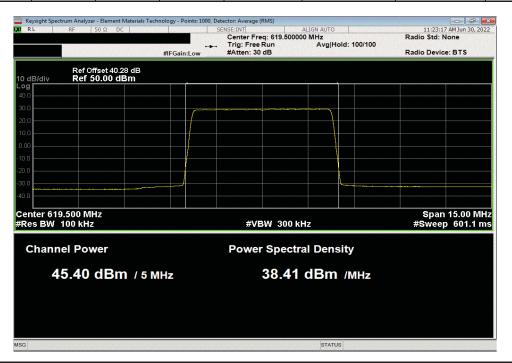


Port 2, LTE, Band n71, 617 MHz - 652 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Low Ch. 619.5 MHz

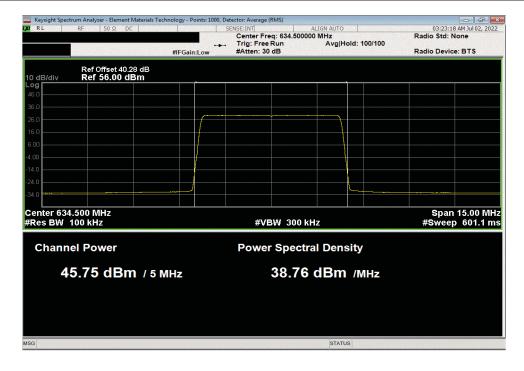
Intial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

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

45.401 0 45.4 48.4 51.4



	1	Port 2, LTE, Band	d n71, 617 MHz -	652 MHz, 5 MHz Bar	ndwidth, 256-QAM Modula	ation, Mid Ch. 634.5 MHz	Z	
		Intial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
		dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		_
1		45.748	0	45.7	48.7	51.7		



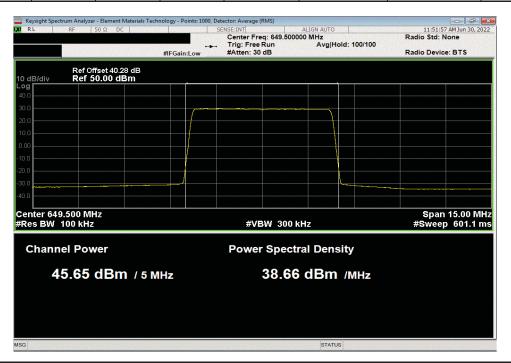


Port 2, LTE, Band n71, 617 MHz - 652 MHz, 5 MHz Bandwidth, 256-QAM Modulation, High Ch. 649.5 MHz

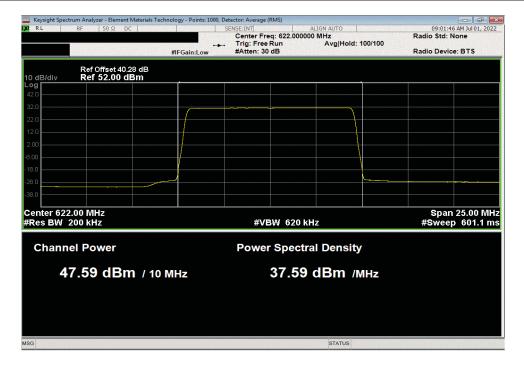
Intial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

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

45.654 0 45.7 48.7 51.7



ı		F	Port 2, LTE, Band	n71, 617 MHz -	652 MHz, 10 MHz B	andwidth, 256-QAM Mod	lulation, Low Ch. 622 MH	Z	
-			Intial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
١			dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		_
١	ĺ	_	47.587	0	47.6	50.6	53.6		

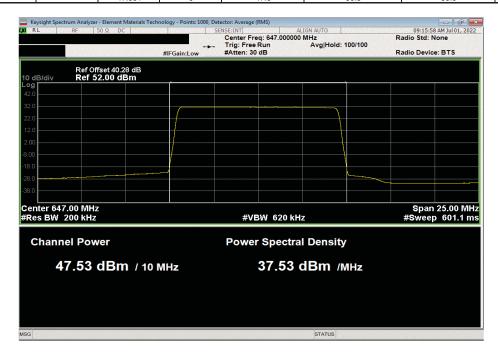




Port 2, LTE, Band n71, 617 MHz - 652 MHz, 10 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 634.5 MHz
Intial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)
dBm/MHz Factor (dB) dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW
47.32 0 47.3 50.3 53.3

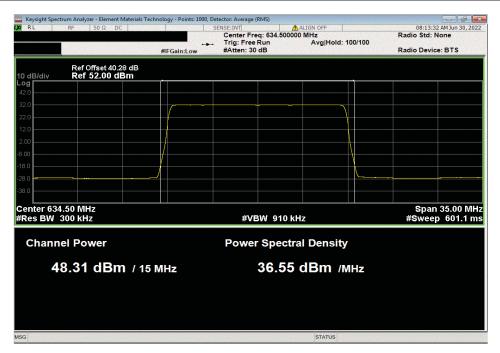


Port 2, LTE, B	and n71, 617 MH:	z - 652 MHz, 10 MHz B	andwidth, 256-QAM Modula	ation, High Ch. 647 MHz	
Intial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
47.531	0	47.5	50.5	53.5	

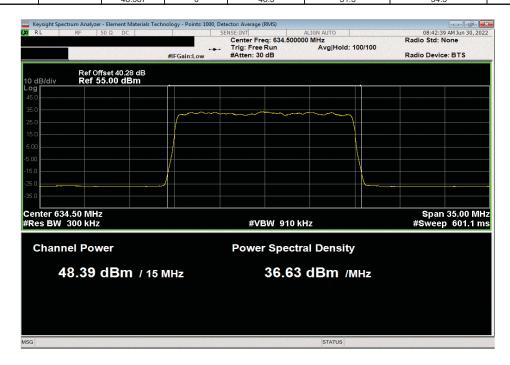




Ì		Port 2, LTE, Bar	nd n71, 617 MHz	- 652 MHz, 15 MHz E	Bandwidth, QPSK Modula	ation, Mid Ch. 634.5 MHz	
I		Intial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	(	Four Port (4x4 MIMO) dBm/Carrier BW	
l		48.313	0	48.3	51.3	54.3	]

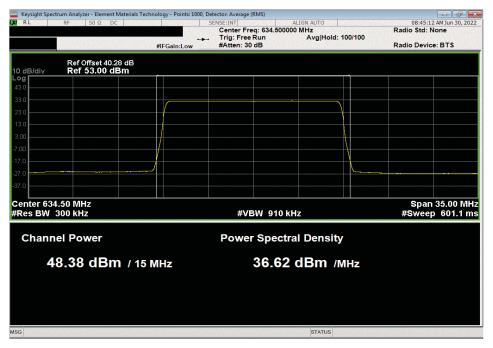


	Port 2, LTE, Band	d n71, 617 MHz -	652 MHz, 15 MHz Ba	andwidth, 16-QAM Modu	lation, Mid Ch. 634.5 MHz	
	Intial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	48 387	n	48.3	51.3	54.3	

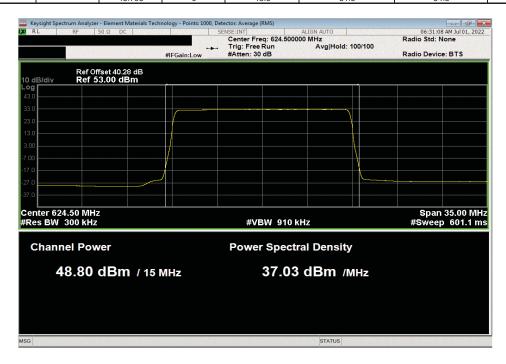




	Port 2, LTE, Ban	d n71, 617 MHz -	652 MHz, 15 MHz B	andwidth, 64-QAM Modula	ation, Mid Ch. 634.5 MHz	
	Intial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	48.382	0	48.4	51.4	54.4	



	Port 2, LTE, Band	n71, 617 MHz -	652 MHz, 15 MHz Ba	andwidth, 256-QAM Modul	ation, Low Ch. 624.5 MH	Z
	Intial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	48 795	0	48.8	51.8	54.8	



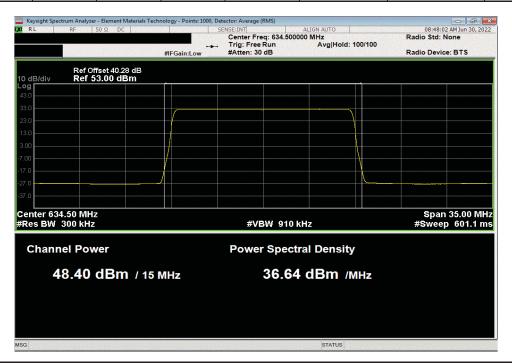


Port 2, LTE, Band n71, 617 MHz - 652 MHz, 15 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 634.5 MHz

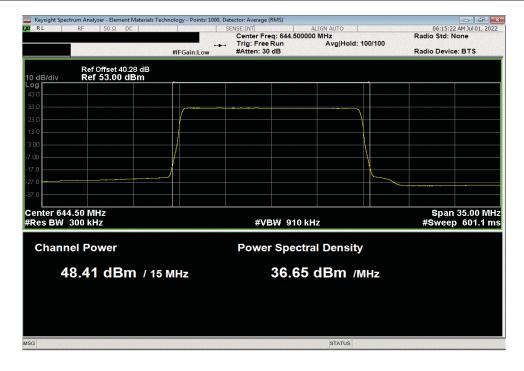
Intial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

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

48.399 0 48.4 51.4 54.4



Po	ort 2, LTE, Band r	n71, 617 MHz - 6	52 MHz, 15 MHz Ba	ndwidth, 256-QAM Modu	ulation, High Ch. 644.5 Mb	Ηz	
	Intial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
	48.412	0	48.4	51.4	54.4		

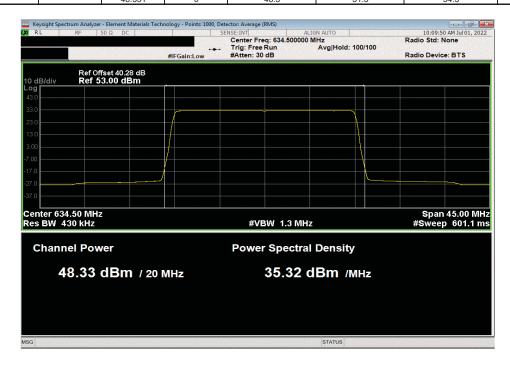




	Port 2, LTE, Bar	nd n71, 617 MHz	- 652 MHz, 20 MHz Bar	ndwidth, 256-QAM Modul	ation, Low Ch. 627 MHz	
	Intial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW	
	UDIII/WII IZ	ractor (ub)	ubili/Calliel DVV	ubili/carrier byv	ubili/Carrier byv	-
	48.52	0	48.5	51.5	54.5	



	Port 2, LTE, Ban	d n71, 617 MHz -	- 652 MHz, 20 MHz Ban	dwidth, 256-QAM Modula	ation, Mid Ch. 634.5 MHz	
	Intial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	AR 331	0	48.3	51.3	54.3	



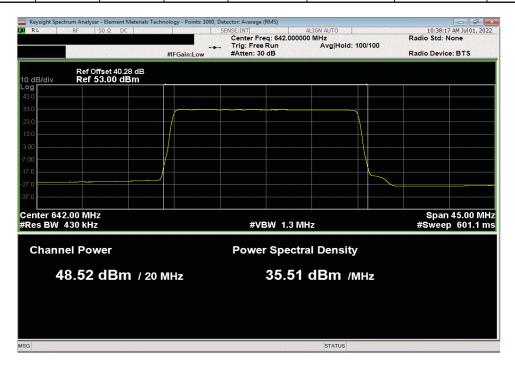


Port 2, LTE, Band n71, 617 MHz - 652 MHz, 20 MHz Bandwidth, 256-QAM Modulation, High Ch. 642 MHz

Intial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

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

48.523 0 48.5 51.5 54.5





XMit 2022.02.07.0

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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

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

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

RF conducted emissions testing was performed only on one port. The AHLOB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 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

High Ch. 738.5 MHz

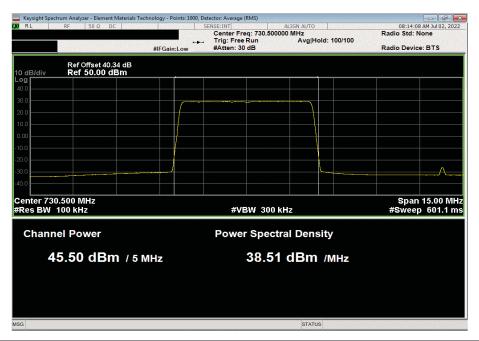


EUT: | AHLOB
Serial Number: | YK220900029
Customer: | Nokia Solutions and Networks
Attendees: | Mitchell Hill, John Rattanavong
Project: | None
Tested by: | Marty Martin
TEST SPECIFICATIONS
FCC 27:2020 Work Order: NOKI0043
Date: 13-Jul-22
Temperature: 21.5 °C
Humidity: 53.6 °K RH
Barometric Pres.: 1018 mbar
Job Site: TX07 FCC 27:2022 RSS-130 Issue 2:2019 COMMENTS All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. 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 bandwidth on port 2. The total output power for multiport (2x2, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port two port operation is single port power + 3dB [i.e. 10log(2)] and the total output power for a four port operation is single port power + 6dB [i.e. 10log(4)]. DEVIATIONS FROM TEST STANDARD None Monty Configuration # 2 Marta Initial Value Single Port dBm/Carrier BW Two Port (2x2 MIMO) dBm/Carrier BW Duty Cycle Factor (dB) dBm/Carrier BW Port 2, LTE, Band 85, 728 MHz - 746 MHz 5 MHz Bandwidth 256-QAM Modulation Low Ch. 730.5 MHz Mid Ch. 737.0 MHz High Ch. 743.5 MHz 45.5 45.7 45.5 51.5 51.7 51.5 45.5 48.5 45.653 45.47 48.7 48.5 10 MHz Bandwidth 256-QAM Modulation Low Ch. 733 MHz Mid Ch. 737.0 MHz 47.352 47.163 47.339 47.4 47.2 47.3 50.4 50.2 50.3 53.4 53.2 15 MHz Bandwidth QPSK Modulation Mid Ch. 737.0 MHz 53.3 Mid Cn. 737.0 MHz
16-QAM Modulation
Mid Ch. 737.0 MHz
64-QAM Modulation
Mid Ch. 737.0 MHz 48.296 48.3 51.3 54.3 48.319 48.3 48.381 48.4 51.4 54.4 256-QAM Modulation Low Ch. 735.5 MHz Mid Ch. 737.0 MHz 48.3 48.5 48.4 51.3 51.5 51.4 54.3 54.5 54.4 48.281 48.503

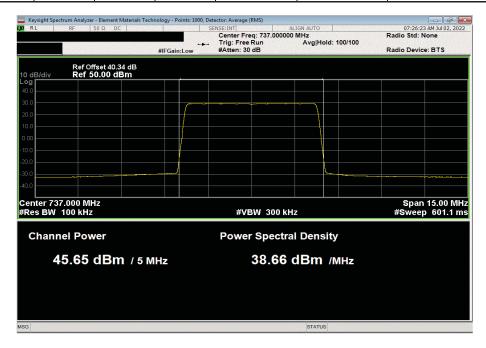
48,423



Port 2, LTE, Band n85, 728 MHz - 746 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Low Ch. 730.5 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)
dBm/MHz Factor (dB) dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW
45.5 0 45.5 48.5 51.5



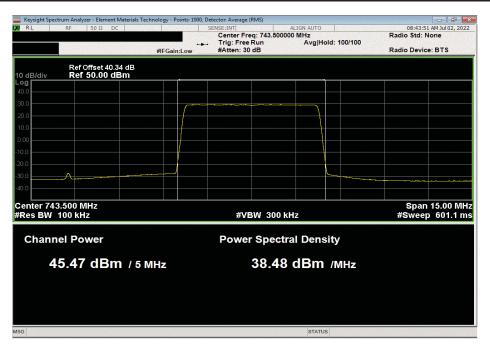
	Port 2, LTE, B	and n85, 728 MF	łz - 746 MHz, 5 MHz B	andwidth, 256-QAM Modu	lation, Mid Ch. 737.0 MHz	
	Initial Value	<b>Duty Cycle</b>	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	45.653	0	45.7	48.7	51.7	



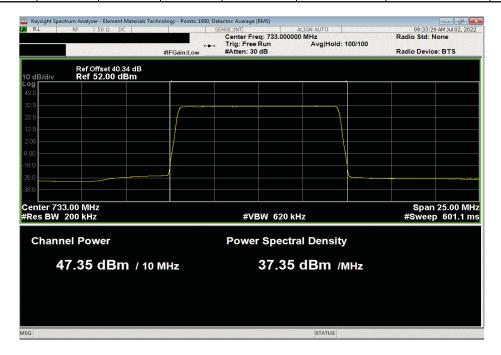


Port 2, LTE, Band n85, 728 MHz - 746 MHz, 5 MHz Bandwidth, 256-QAM Modulation, High Ch. 743.5 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)
dBm/MHz Factor (dB) dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW

45.47 0 45.5 48.5 51.5



	Port 2, LTE, Ba	nd n85, 728 MHz	- 746 MHz, 10 MHz	Bandwidth, 256-QAM Mo	dulation, Low Ch. 733 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	
	47.352	0	47.4	50.4	53.4	



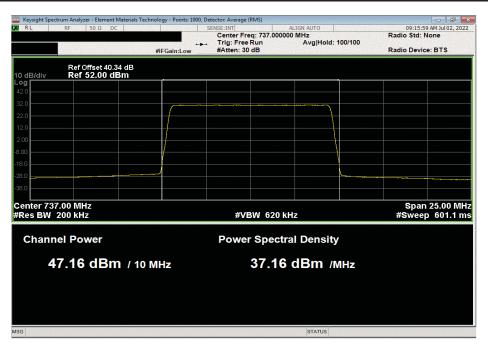


Port 2, LTE, Band n85,, 728 MHz - 746 MHz, 10 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 737.0 MHz

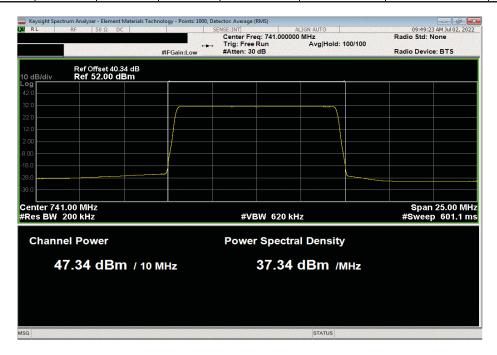
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

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

47.163 0 47.2 50.2 53.2

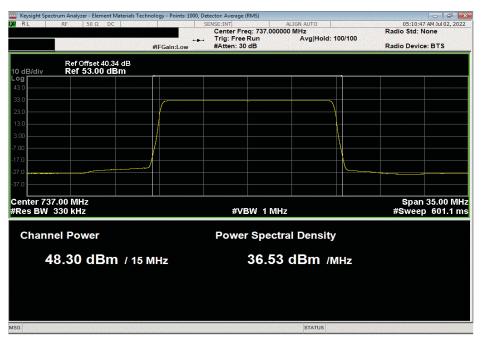


	Port 2, LTE, Ba	nd n85, 728 MHz	- 746 MHz, 10 MHz B	andwidth, 256-QAM Mod	ulation, High Ch. 741 MHz	
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	47.339	0	47.3	50.3	53.3	

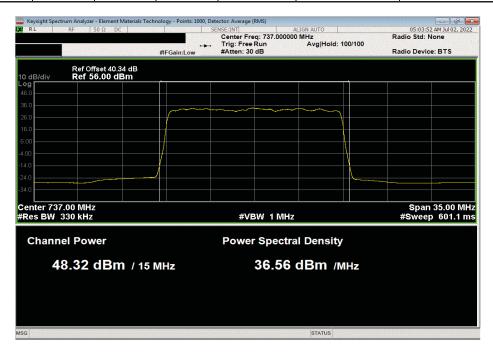




	Port 2, LTE, I	Band n85, 728 M	Hz - 746 MHz, 15 MHz	z Bandwidth, QPSK Modulati	on, Mid Ch. 737.0 MHz	
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	48.296	0	48.3	51.3	54.3	

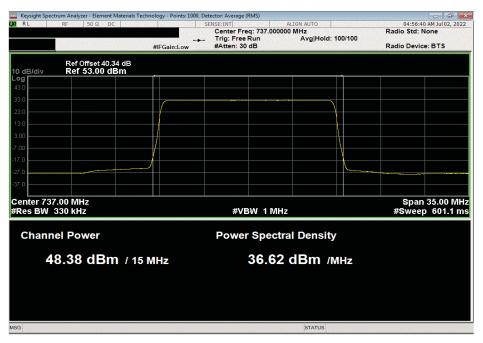


	Port 2, LTE, B	and n85, 728 MF	z - 746 MHz, 15 MHz	Bandwidth, 16-QAM Modula	tion, Mid Ch. 737.0 MHz	
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	48.319	0	48.3	51.3	54.3	

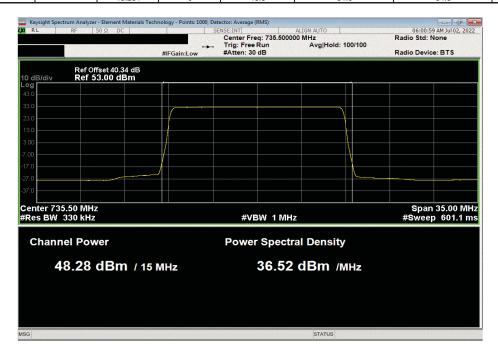




Port 2, LTE, Band n85, 728 MHz - 746 MHz, 15 MHz Bandwidth, 64-QAM Modulation, Mid Ch. 737.0 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)
dBm/MHz Factor (dB) dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW
48.381 0 48.4 51.4 54.4

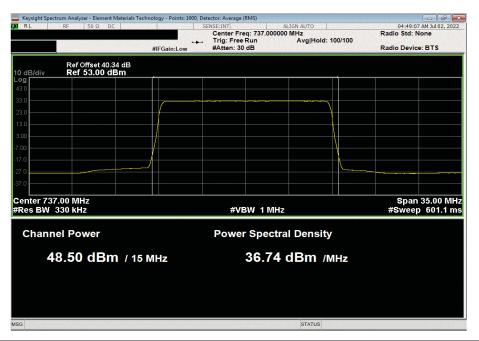


	Port 2, LTE, Bar	nd n85, 728 MHz	- 746 MHz, 15 MHz E	Bandwidth, 256-QAM Modu	lation, Low Ch. 735.5 MHz	
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	48.281	0	48.3	51.3	54.3	

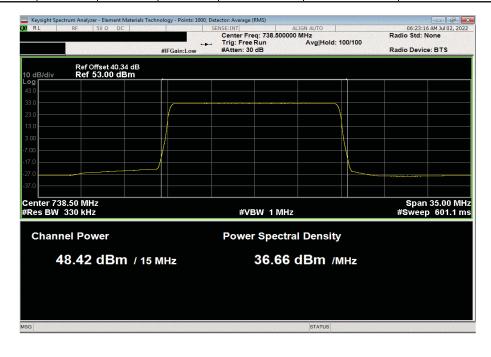




Port 2, LTE, Band n85, 728 MHz - 746 MHz, 15 MHz Bandwidth, 256-QAM Modulation, Mid Ch. 737.0 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)
dBm/MHz Factor (dB) dBm/Carrier BW dBm/Carrier BW
dBm/Carrier BW
48.503 0 48.5 51.5 54.5



Port 2, LTE, Ba	and n85, 728 MH	z - 746 MHz, 15 MHz Ba	andwidth, 256-QAM Modula	tion, High Ch. 738.5 MHz	
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
48.423	0	48.4	51.4	54.4	



## **OUTPUT POWER - Band 71 NB IoT GB**



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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

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

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

RF conducted emissions testing was performed only on one port. The AHLOB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 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

## **OUTPUT POWER - Band 71 NB IoT GB**



							TbtTx 2022.05.02.0	XMit 2022.02.07
EUT: AHLOB						Work Order:		
Serial Number: YK220900029							13-Jul-22	
Customer: Nokia Solutions and Ne						Temperature:		
Attendees: Mitchell Hill, John Ratta	anavong					Humidity:		
Project: None						Barometric Pres.:		
Tested by: Marty Martin		Pow	er: 54 VDC			Job Site:	TX07	
TEST SPECIFICATIONS			Test Method					
FCC 27:2022			ANSI C63.26:2015					
RSS-130 Issue 2:2019			ANSI C63.26:2015					
COMMENTS  All measurement path losses were account								
was measured for a single carrier over the Nout). The total output power for two port DEVIATIONS FROM TEST STANDARD None								2.4 (10 log
Configuration # 2	Signature	Monty	Marta					
	Olgridia	U						
	Oignature		Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Two Port (4x4 MIMO) dBm/Carrier BW	
	Oignature	<u> </u>						
10 MHz Bandwidth	Gyndare							
		0.	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
10 MHz Bandwidth	Low Ch. 622 MHz	0	dBm/MHz 47.604	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
10 MHz Bandwidth	Low Ch. 622 MHz Mid Ch. 634.5 MHz		47.604 47.562	Factor (dB)  0 0	47.6 47.6	50.6 50.6	53.6 53.6	
10 MHz Bandwidth NB IoT GB	Low Ch. 622 MHz	o,	dBm/MHz 47.604	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
10 MHz Bandwidth NB IoT GB  15 MHz Bandwidth	Low Ch. 622 MHz Mid Ch. 634.5 MHz	0	47.604 47.562	Factor (dB)  0 0	47.6 47.6	50.6 50.6	53.6 53.6	
10 MHz Bandwidth NB IoT GB	Low Ch. 622 MHz Mid Ch. 634.5 MHz High Ch. 647 MHz	0	47.604 47.562 47.493	0 0 0	47.6 47.6 47.5	50.6 50.6 50.5	53.6 53.6 53.5	
10 MHz Bandwidth NB IoT GB  15 MHz Bandwidth	Low Ch. 622 MHz Mid Ch. 634.5 MHz High Ch. 647 MHz Low Ch. 624.5 MHz		47.604 47.562 47.493 48.971	0 0 0	47.6 47.6 47.5	50.6 50.6 50.5	dBm/Carrier BW 53.6 53.6 53.5	
10 MHz Bandwidth NB IoT GB  15 MHz Bandwidth	Low Ch. 622 MHz Mid Ch. 634.5 MHz High Ch. 647 MHz Low Ch. 624.5 MHz Mid Ch. 634.5 MHz		47.604 47.562 47.493 48.971 48.849	0 0 0 0	47.6 47.6 47.5 49 48.8	50.6 50.6 50.5 52 51.8	53.6 53.6 53.5 55 54.8	
10 MHz Bandwidth NB IoT GB 15 MHz Bandwidth	Low Ch. 622 MHz Mid Ch. 634.5 MHz High Ch. 647 MHz Low Ch. 624.5 MHz		47.604 47.562 47.493 48.971	0 0 0	47.6 47.6 47.5	50.6 50.6 50.5	dBm/Carrier BW 53.6 53.6 53.5	
NB IoT GB  15 MHz Bandwidth  NB IoT GB  20 MHz Bandwidth	Low Ch. 622 MHz Mid Ch. 634.5 MHz High Ch. 647 MHz Low Ch. 624.5 MHz Mid Ch. 634.5 MHz		47.604 47.562 47.493 48.971 48.849	0 0 0 0	47.6 47.6 47.5 49 48.8	50.6 50.6 50.5 52 51.8	53.6 53.6 53.5 55 54.8	
10 MHz Bandwidth NB IoT GB  15 MHz Bandwidth NB IoT GB  20 MHz Bandwidth	Low Ch. 622 MHz Mid Ch. 634.5 MHz High Ch. 647 MHz Low Ch. 624.5 MHz Mid Ch. 634.5 MHz High Ch. 644.5 MHz		47.604 47.562 47.493 48.971 48.849 48.921	0 0 0 0	47.6 47.6 47.5 49 48.8 48.9	50.6 50.6 50.5 52 51.8 51.9	53.6 53.6 53.5 55 54.8 54.9	

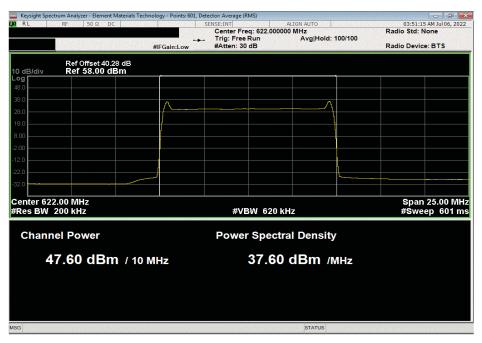
## **OUTPUT POWER - Band 71 NB IoT GB**



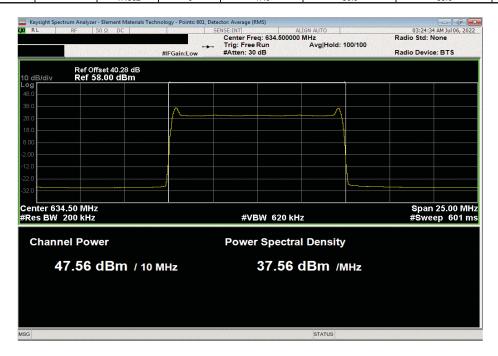
Port 2, LTE, Band 71, 617 MHz - 652 MHz, 10 MHz Bandwidth, NB IoT GB Modulation, Low Ch. 622 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Two Port (4x4 MIMO)

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

47.604 0 47.6 50.6 53.6

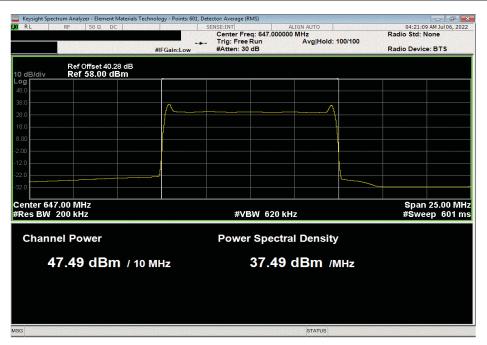


	Port 2, LTE, Band 71, 617 MHz - 652 MHz, 10 MHz Bandwidth, NB IoT GB Modulation, Mid Ch. 634.5 MHz						
Initial Value		Value Duty Cycle Single Port Two Port (2x2 MIMO) Two Port		Two Port (4x4 MIMO)			
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
	47.562	0	47.6	50.6	53.6		

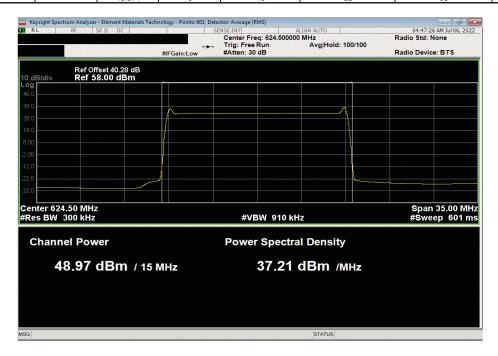




Port 2, LTE, Band 71, 617 MHz - 652 MHz, 10 MHz Bandwidth, NB IoT GB Modulation, High Ch. 647 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Two Port (4x4 MIMO)
dBm/MHz Factor (dB) dBm/Carrier BW dBm/Carrier BW
dBm/Carrier BW
47.493 0 47.5 50.5 53.5

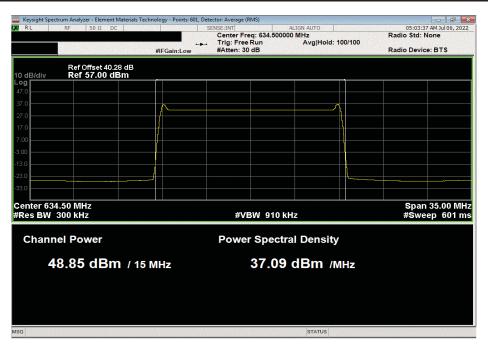


	Port 2, LTE, Bar	nd 71, 617 MHz -	652 MHz, 15 MHz Ba	ndwidth, NB IoT GB Modul	ation, Low Ch. 624.5 MHz	
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Two Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	48.971	0	49	52	55	

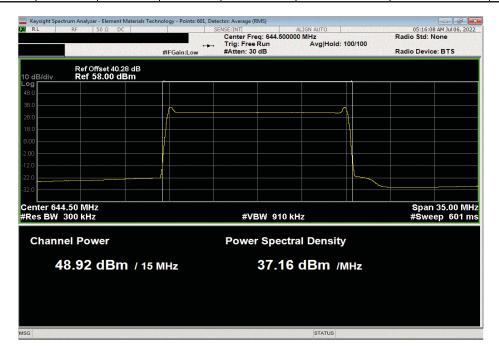




ſ		Port 2, LTE, Bar	nd 71, 617 MHz -	652 MHz, 15 MHz Ba	andwidth, NB IoT GB Modu	lation, Mid Ch. 634.5 MHz	
ı		Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Two Port (4x4 MIMO)	
ı	_	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	_
1		48.849	0	48.8	51.8	54.8	



	Port 2, LTE, Ban	d 71, 617 MHz -	652 MHz, 15 MHz Ba	andwidth, NB IoT GB Modu	lation, High Ch. 644.5 MHz	
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Two Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	48.921	0	49	52	55	



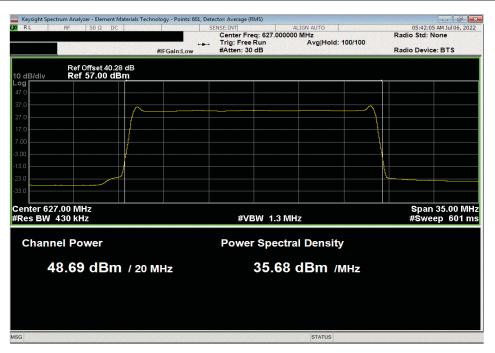


Port 2, LTE, Band 71, 617 MHz - 652 MHz, 20 MHz Bandwidth, NB IoT GB Modulation, Low Ch. 627 MHz

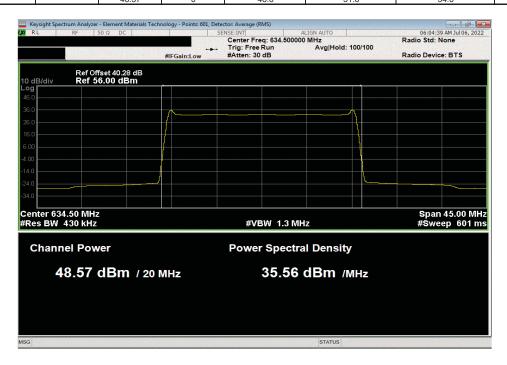
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Two Port (4x4 MIMO)

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

48.691 0 48.7 51.7 54.7

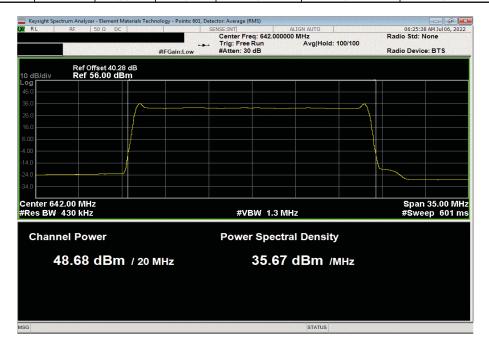


	Port 2, LTE, Ban	d 71, 617 MHz - 0	652 MHz, 20 MHz Bar	ndwidth, NB IoT GB Modu	lation, Mid Ch. 634.5 MHz	
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Two Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
1	48 57	0	48.6	51.6	54.6	





Port 2, LTE, Band 71, 617 MHz - 652 MHz, 20 MHz Bandwidth, NB IoT GB Modulation, High Ch. 642 MHz
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Two Port (4x4 MIMO)
dBm/MHz Factor (dB) dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW
48.677 0 48.7 51.7 54.7





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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

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

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

RF conducted emissions testing was performed only on one port. The AHLOB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 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



ANSI C63.26:2015  COMMENTS  AND										
Customer.   Notia Solutions and Networks   Humidity: \$4.2% RH										
Attendees:   Mitchell Hill, John Rattanavong   Humidity:   54,2% RH     Project: None   Barometric Press:   1018 mbar     Tested by:   Marty Martin   Power   54 VDC   Job Site:   TX07     Tested by:   Marty Martin   Power   54 VDC   Job Site:   TX07     Test Method   Job Site:   TX07     TS07   Job Site:   TX07     TS08   Job Site:   TX08     TS08   Job Site:										
Project   None   Barometric Press.   1018 mbar										
Tested by   Marty Martin   Power:   54 VDC			inavong							
Test Method										
ANSI C63.26:2015   ANSI C63.26:2015   ANSI C63.26:2015	Tested by:	Marty Martin		Pow	er: 54 VDC			Job Site:	TX07	
ANSI C63.26:2015	TEST SPECIFICATI	TONS			Test Method					
All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. The following is the output power measurements at the radio output ports. The output power measurements at the radio output ports. The output power measurements at the radio output ports. The output power for multiport (2x2, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 [10 log(Nout)]. The total output power for two port operation is single port power + 3dB [i.e. 10log(2)] and the total output power for a four port operation is single port power + 6dB [i.e. 10log(4)].  DEVIATIONS FROM TEST STANDARD  Vone  Intial value dBm/MHz  Signature  Intial value dBm/MHz  Pactor (dB)  Intial value dBm/MHz  Intial value dBm/MHz  Factor (dB)  Intial value dBm/Carrier BW  Intial value dBm/Carrier	FCC 27:2022				ANSI C63.26:2015					
All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. 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 bandwidth on port 1. The total output power for multiport (2x2, 4x4 MIMO) operation was determined based upon ANSi 63.26 clauses 6.4.3.1 and 6.4.3.2.4 [10 log(Nout)]. The total output power for two port operation is single port power + 6dB [i.e. 10log(4)].  DetVIATIONS FROM TEST STANDARD  None  Configuration # 2	RSS-130 Issue 2:20	019			ANSI C63.26:2015					
Configuration # 2   Signature   Intial value   Bam/MHz   Factor (dB)   Duty Cycle   dBm/Carrier BW   Two Port (2x2 MIMO)   dBm/Carrier BW	COMMENTS									
Configuration # 2   Signature   Intial value   Bam/MHz   Factor (dB)   Duty Cycle   dBm/Carrier BW   Two Port (2x2 MIMO)   dBm/Carrier BW	All measurement p	oath losses were accoun	ted for in the reference level	offest including any atte	nuators, filters and DC	blocks. The follo	owing is the output	power measurement	s at the radio output ports. Th	e output
Section   From Test Standard   Signature										
None   Signature   Markly   Markly   Signature   Single Port   Two Port (2x2 MIMO   dBm/Carrier BW   dBm/C										
Signature   Sign				3 1 1 1 1						
Configuration # 2   National Points   National										
Initial value   Butty Cycle   Amy   Butty Cycle   Butty	DEVIATIONS FROM	M TEST STANDARD								
Port 2, LTE, Band 85, 728 MHz - 746 MHz	DEVIATIONS FROM None	M TEST STANDARD								
Manual   M	None	I	Signature	Monty	Marti					
10 MHz Bandwidth NB IoT GB  Low Ch. 733 MHz Air		I	Signature	Morty		Duty Cycle	Single Port	Two Port (2x2 MIMO	Four Port (4x4 MIMO)	
10 MHz Bandwidth NB IoT GB  Low Ch. 733 MHz Air	None	I	Signature	Mosty	Intial value					
Mid Ch. 737 MHz 47.628 0 47.6 50.6 53.6 High Ch. 741 MHz 47.589 0 47.6 50.6 53.6 S3.6 S3.6 S3.6 S3.6 S3.6 S3.6 S3.6 S	None Configuration #	2	Signature	Morty	Intial value					
High Ch. 741 MHz 47.589 0 47.6 50.6 53.6  Port 2, LTE, Band 85, 728 MHz - 746 MHz  15 MHz Bandwidth    NB IoT GB	None Configuration # Port 2, LTE, Band 8	2 55, 728 MHz - 746 MHz 10 MHz Bandwidth	Signature	Morty	Intial value					
Port 2, LTE, Band 85, 728 MHz - 746 MHz  15 MHz Bandwidth  NB IoT GB  Low Ch. 735.5 MHz 48.82 0 48.8 51.8 54.8  Mid Ch. 737 MHz 48.731 0 48.7 51.7 54.7	None Configuration # Port 2, LTE, Band 8	2 55, 728 MHz - 746 MHz 10 MHz Bandwidth		Morty	Intial value dBm/MHz	Factor (dB)	dBm/carrier BW	dBm/Carrier BW	dBm/Carrier BW	
Port 2, LTE, Band 85, 728 MHz - 746 MHz  15 MHz Bandwidth  NB IoT GB  Low Ch. 735.5 MHz 48.82 0 48.8 51.8 54.8  Mid Ch. 737 MHz 48.731 0 48.7 51.7 54.7	None Configuration # Port 2, LTE, Band 8	2 55, 728 MHz - 746 MHz 10 MHz Bandwidth	Low Ch. 733 MHz	Marty	Intial value dBm/MHz	Factor (dB)	dBm/carrier BW	dBm/Carrier BW	dBm/Carrier BW	
Mid Ch. 737 MHz 48.731 0 48.7 51.7 54.7	None Configuration # Port 2, LTE, Band 8	2 55, 728 MHz - 746 MHz 10 MHz Bandwidth	Low Ch. 733 MHz Mid Ch. 737 MHz	Marty	Intial value dBm/MHz 47.249 47.628	Factor (dB)  0 0	47.2 47.6	50.2 50.6	53.2 53.6	
	None  Configuration #  Port 2, LTE, Band 8:	2 35, 728 MHz - 746 MHz 10 MHz Bandwidth NB IoT GB 15, 728 MHz - 746 MHz 15 MHz Bandwidth	Low Ch. 733 MHz Mid Ch. 737 MHz	Morty	Intial value dBm/MHz 47.249 47.628	Factor (dB)  0 0	47.2 47.6	50.2 50.6	53.2 53.6	
	None  Configuration #  Port 2, LTE, Band 8:  Port 2, LTE, Band 8:	2 35, 728 MHz - 746 MHz 10 MHz Bandwidth NB IoT GB 15, 728 MHz - 746 MHz 15 MHz Bandwidth	Low Ch. 733 MHz Mid Ch. 737 MHz High Ch. 741 MHz	Morty	Intial value dBm/MHz 47.249 47.628 47.589	0 0 0	47.2 47.6 47.6	50.2 50.6 50.6	dBm/Carrier BW 53.2 53.6 53.6	
	None  Configuration #  Port 2, LTE, Band 8:  Port 2, LTE, Band 8:	2 35, 728 MHz - 746 MHz 10 MHz Bandwidth NB IoT GB 15, 728 MHz - 746 MHz 15 MHz Bandwidth	Low Ch. 733 MHz Mid Ch. 737 MHz High Ch. 741 MHz Low Ch. 735.5 MHz	Marty	Intial value dBm/MHz 47.249 47.628 47.589	0 0 0	47.2 47.6 47.6	50.2 50.6 50.6	dBm/Carrier BW  53.2 53.6 53.6 53.6	

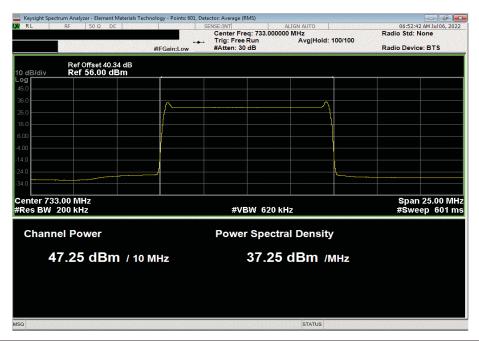


Port 2, LTE, Band 85, 728 MHz - 746 MHz, 10 MHz Bandwidth, NB IoT GB, Low Ch. 733 MHz

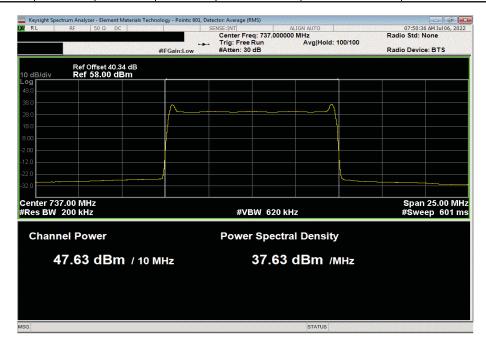
Intial value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

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

47.249 0 47.2 50.2 53.2



Port 2,	LTE, Band 85, 72	28 MHz - 746 MHz, 10MI	Hz Bandwidth, NB IoT GB, N	/lid Ch. 737 MHz	
Intial value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/carrier BW	dBm/Carrier BW	dBm/Carrier BW	
47.628	0	47.6	50.6	53.6	



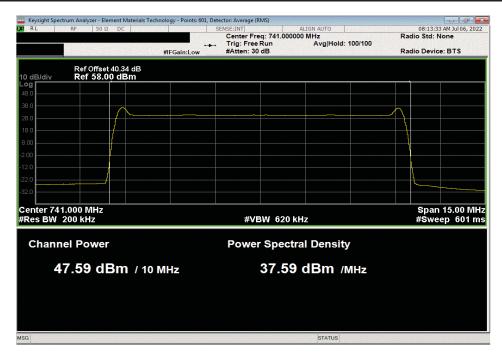


Port 2, LTE, Band 85, 728 MHz - 746 MHz, 10MHz Bandwidth, NB IoT GB, High Ch. 741 MHz

Intial value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

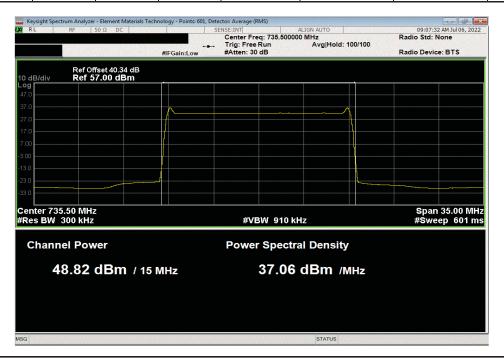
dBm/MHz Factor (dB) dBm/carrier BW dBm/Carrier BW

47.589 0 47.6 50.6 53.6

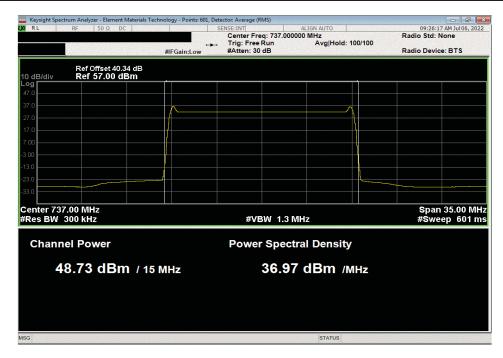




Port 2, LTE, Band 85, 728 MHz - 746 MHz, 15MHz Bandwidth, NB IoT GB, Low Ch. 735.5 MHz
Intial value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)
dBm/MHz Factor (dB) dBm/carrier BW dBm/Carrier BW
dBm/Carrier BW
48.82 0 48.8 51.8 54.8



	Port 2, LT	E, Band 85, 728	MHz - 746 MHz, 15MI	Hz Bandwidth, NB IoT GB	, Mid Ch. 737 MHz	
	Intial value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	48.731	0	48.7	51.7	54.7	



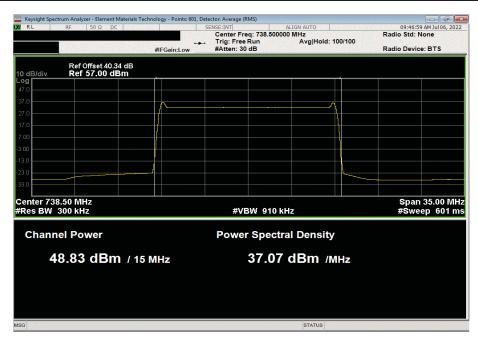


Port 2, LTE, Band 85, 728 MHz - 746 MHz, 15MHz Bandwidth, NB IoT GB, High Ch. 738.5 MHz

Intial value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

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

48.833 0 48.8 51.8 54.8





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

#### **TEST DESCRIPTION**

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

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

RF conducted emissions testing was performed only on one port. The AHLOB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 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



EUT: AHLOB
Serial Number: YK220900029
Customer: Nokia Solutions and Networks
Attendees: Mitchell Hill, John Rattanavong Work Order: NOKI0043 Date: 19-Aug-22
Temperature: 20.9 °C
Humidity: 54.5% RH
Barometric Pres.: 1013 mbar
Job Site: TX07 Project: None
Tested by: Marty Martin
TEST SPECIFICATIONS Power: 54 VDC Test Method ANSI C63.26:2015 FCC 27:2022 RSS-130 Issue 2:2019 COMMENTS All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. 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 bandwidth on port 2. The total output power for multiport (2x2, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)] and the total output power for a four port operation is single port power + 6dB [i.e. 10log(4)]. DEVIATIONS FROM TEST STANDARD None Menty Marti Configuration # Signature Initial Value Two Port (2x2 MIMO) Four Port (4x4 MIMO) Duty Cycle Factor (dB) Single Port dBm/MHz dBm/Carrier BW dBm/Carrier BW dBm/Carrier BW Port 2, LTE, Band 71, 617 MHz - 652 MHz 200 kHz Bandwidth Standalone NB-IoT 42.3 42.9 42.3 Low Ch. 617.2 MHz Mid Ch. 634.5 MHz 42.309 42.882 45.3 45.9 48.3 48.9 0 0 0 High Ch. 651.8 MHz 42.312 48.3

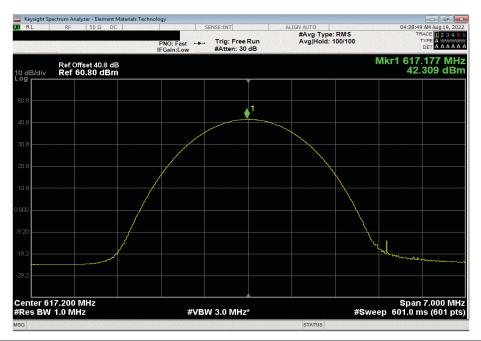


Port 2, LTE, Band 71, 617 MHz - 652 MHz, 200 kHz Bandwidth, Standalone NB-IoT, Low Ch. 617.2 MHz

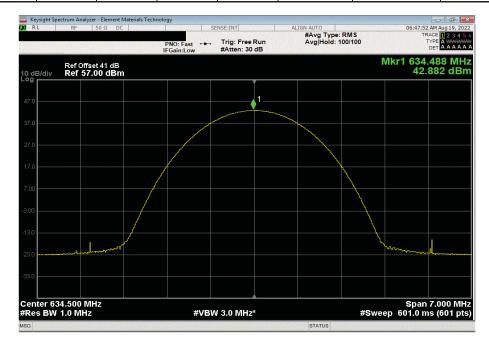
Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

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

42.309 0 42.3 45.3 48.3



	Port 2, LTE	, Band 71, 617 N	IHz - 652 MHz, 200 kHz Ban	dwidth, St	tandalone NB-IoT, Mid Ch	n. 634.5 MHz
	Initial Value	Duty Cycle	Single	Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)
	dBm/MHz	Factor (dB)	dBm/Car	rier BW	dBm/Carrier BW	dBm/Carrier BW
i	42.882	0	42	9	45.9	48.9



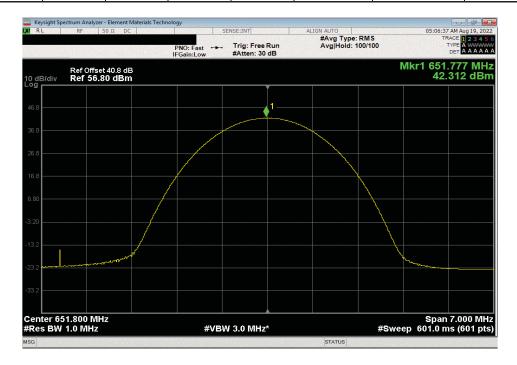


Port 2, LTE, Band 71, 617 MHz - 652 MHz, 200 kHz Bandwidth, Standalone NB-IoT, High Ch. 651.8 MHz

Initial Value Duty Cycle Single Port Two Port (2x2 MIMO) Four Port (4x4 MIMO)

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

42.312 0 42.3 45.3 48.3





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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

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

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

RF conducted emissions testing was performed only on one port. The AHLOB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 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.

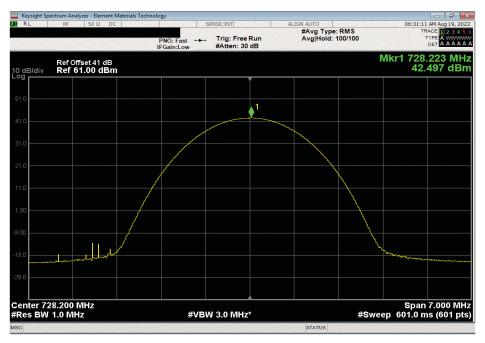
The total average transmit power of all antenna ports was determined per ANSI C63.26-2105 paragraph 6.4.3.1



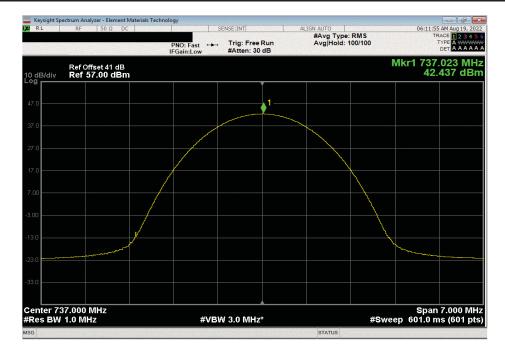
	AHLOB						Work Order:	NOKI0043	
Serial Number:								19-Aug-22	
Customer:	Nokia Solutions and Ne	tworks					Temperature:	20.6 °C	
Attendees:	Mitchell Hill, John Ratta	anavong					Humidity:	53.2% RH	
Project:	None						Barometric Pres.:	1016 mbar	
Tested by:	Marty Martin		Pow	er: 54 VDC			Job Site:	TX07	
TEST SPECIFICAT	IONS			Test Method					
FCC 27:2022				ANSI C63.26:2015					
RSS-130 Issue 2:20	019			ANSI C63.26:2015					
COMMENTS				-					
All measurement p	ath losses were account	ted for in the reference level of	fest including any atte	nuators, filters and DC I	blocks. The follo	owing is the output	power measurements at	t the radio output ports. The	output power
		carrier channel bandwidth on							
Nout) The total our	itnut nower for two nort		+ 3dB [i e 10log(2)] an						, ,
	Itput power for two port	operation is single port power	+ 3dB (i.e. 10log(2)) an						, ,
			+ 3dB [i.e. 10log(2)] an						
DEVIATIONS FROM				d the total output powe					
DEVIATIONS FROM				d the total output powe					
None									
None		operation is single port power		d the total output powe					
None		operation is single port power		Marta	er for a four port	operation is single	port power + 6dB (i.e. 1	0log(4)].	
DEVIATIONS FROM None Configuration #	M TEST STANDARD	operation is single port power		Martia Initial value	er for a four port	operation is single Single Port	port power + 6dB (i.e. 1	Olog(4)].  Four Port (4x4 MIMO)	
DEVIATIONS FROM None Configuration #		operation is single port power		Martia Initial value	er for a four port	operation is single Single Port	port power + 6dB (i.e. 1	Olog(4)].  Four Port (4x4 MIMO)	
DEVIATIONS FROM None Configuration #	2 2 5, 728 MHz - 746 MHz	operation is single port power  Signature		Martia Initial value	er for a four port	operation is single Single Port	port power + 6dB (i.e. 1	Olog(4)].  Four Port (4x4 MIMO)	
DEVIATIONS FROM None Configuration #	2 2,5, 728 MHz - 746 MHz 200 KHz Bandwidth	operation is single port power  Signature		Martia Initial value	er for a four port	operation is single Single Port	port power + 6dB (i.e. 1	Olog(4)].  Four Port (4x4 MIMO)	
DEVIATIONS FROM None Configuration #	2 2,5, 728 MHz - 746 MHz 200 KHz Bandwidth	operation is single port power  Signature		d the total output power  Mortic  Initial value  dBm/MHz	er for a four port	Operation is single Single Port dBm/Carrier BW	Dort power + 6dB (i.e. 1  Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW	
DEVIATIONS FROM None Configuration #	2 2,5, 728 MHz - 746 MHz 200 KHz Bandwidth	Signature  NB-IoT Low Ch. 728.2 MHz		Initial value dBm/MHz	er for a four port	operation is single Single Port dBm/Carrier BW	Two Port (2x2 MIMO) dBm/Carrier BW	Four Port (4x4 MIMO) dBm/Carrier BW	



Port 2, LTE, Band 85, 728 MHz - 746 MHz, 200 kHz Bandwidth, Standalone NB-IoT, Low Ch. 728.2 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
42.497 0 42.5 45.5 48.5

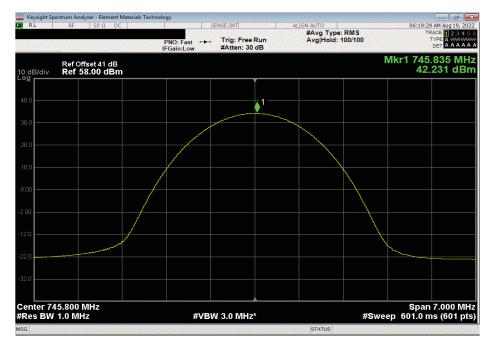


	Port 2, LTE, E	Band 85, 728 MH	z - 746 MHz, 200 kHz	Bandwidth, Standalone NB-	loT, Mid Ch. 737 MHz	
	Initial value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
	42.437	0	42.4	45.4	48.4	





	Port 2, LTE, B	Port 2, LTE, Band 85, 728 MHz - 746 MHz, 200 kHz Bandwidth, Standalone NB-IoT, High Ch. 745.8 MHz						
	Initial value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)			
<u>.</u>	dBm/MHz	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW			
	42.231	0	42.2	45.2	48.2			





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

#### **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANE	2022-03-02	2023-03-02
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

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

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

RF conducted emissions testing was performed only on one port. The AHLOB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown during 4 port output power testing) and antenna port 2 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

Multicarrier test cases have been developed as shown below:

Multi-Carrier Test Case 1: 3GPP Band 71 Multicarriers \_Three LTE5 carriers using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (619.5 & 624.5MHz) and a third carrier with maximum spacing between the other two carrier frequencies (649.5MHz) at the upper band edge. The LTE5 channel bandwidth was selected to maximize carrier power spectral density. The carriers are operated at maximum power for a total port power of 80 watts (~26.6W/Band 71 carriers). 3GPP Band 85 carrier is not enabled.

Multi-Carrier Test Case 2: 3GPP Band 71 Multicarriers\_ One LTE 20MHz carrier (627.0 MHz) and one LTE 15MHz carrier (644.5MHz) cover all of the Band 71 bandwidth. The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power for a total port power of 80 watts (~40W/Band 71 carriers). 3GPP Band 85 carrier is not enabled.

Multi-Carrier Test Case 3: 3GPP Band 85 Multicarrier\_Two LTE5 carriers using two carriers (with maximum spacing between carrier frequencies) at the lower band edge (730.5MHz) and at the upper band edge (743.5MHz). The LTE5 channel bandwidth was selected to maximize carrier power spectral density. The carriers are operated at maximum power for a total port power of 80 watts (~40W/Band 85 carrier). 3GPP Band 71 carrier is not enabled.

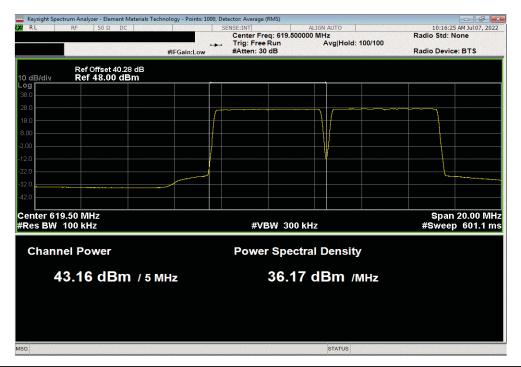
Multi-Carrier Test Case 4: 3GPP Band 71 and Band 85 Multicarrier Multiband: Three LTE 5MHz carriers using two carriers (with minimum spacing between carrier frequencies) at the Band 71 lower band edge (619.5 & 624.5MHz) and a third carrier with maximum spacing between the other two carrier frequencies (743.5MHz) at the Band 85 upper band edge. The smallest channel bandwidth was selected to maximize carrier power spectral density. The carriers were operated at maximum power (~26.6W/ Band 71 carrier and ~26.6W/ Band 85 carrier) for a total port power of 80 watts.



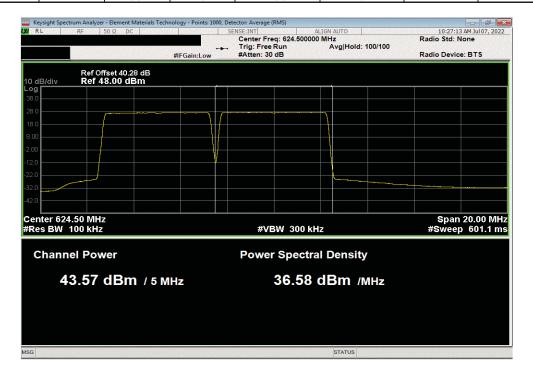
EUT: AHLOB Work Order: NOK Serial Number: YK220900029 Date: 11-Ju	V10042
Customer: Nokia Solutions and Networks Temperature: 20.8	
Attendees: Mitchell Hill, John Rattanavong Humidity: 53.9	9% RH
Project: None Barometric Pres.:   1013	
Tested by: Marty Martin Power: 54 VDC Job Site: TX07	)7
EST SPECIFICATIONS Test Method	
CC 27:2022 ANSI C63.26:2015	
<b>SS-130 Issue 2:2019</b> ANSI C63.26:2015	
OMMENTS	
EVIATIONS FROM TEST STANDARD	
None	
configuration# 2 Marty Martin	
onfiguration# 2 Marty Marti	Limit (dBm) Result
Signature  Signature  Norty Nortic  Avg Cond Pwr (dBm)  Factor (dB)  Duty Cycle Avg Cond Avg Cond Avg Cond Carrier Pwr (dBm) Band Pwr (dBm)	
Signature    Avg Cond   Duty Cycle   Avg Cond   Band Pwr (dBm)	
Signature Multicarrier Multiband Port 2  QPSK Modulation  ANG Cond Pwr (dBm)  Avg Cond Pwr (dBm)  Avg Cond Factor (dB)  Avg Cond Carrier Pwr (dBm)  Avg Cond Carrier Pwr (dBm)  Band Pwr (dBm)	(dBm) Result
Signature  Norty Norts  Avg Cond Pwr (dBm)  Port 2  QPSK Modulation  Test Case 1, LTE5 Carrier 1, 619.5 MHz  Norty Norts  Avg Cond Pwr (dBm)  Avg Cond Carrier Pwr (dBm)  Port 2  QPSK Modulation  Test Case 1, LTE5 Carrier 1, 619.5 MHz  Avg Cond Carrier Pwr (dBm)	(dBm) Result thin Tolerance Pass
Nortiguration #   2   Nortiguration #   2   Nortiguration #   2   Nortiguration #   Signature	(dBm) Result thin Tolerance Pass thin Tolerance Pass
Signature   Sign	thin Tolerance Pass thin Tolerance Pass thin Tolerance Pass
Avg Cond   Pwr (dBm)   Pactor (dB)   Pwr (dBm)   Pactor (dB)   Pwr (dBm)   P	thin Tolerance Pass thin Tolerance Pass thin Tolerance Pass
Avg Cond   Port 2   Signature   Multicarrier Multicarri	(dBm)         Result           thin Tolerance         Pass           thin Tolerance         Pass           thin Tolerance         Pass           thin Tolerance         Pass
Signature   Sign	thin Tolerance Pass
Avg Cond   Pwr (dBm)   Pactor (dB)   Avg Cond   Carrier Pwr (dBm)   Carrier Pw	thin Tolerance Pass
Avg Cond   Pwr (dBm)   Pwr (	thin Tolerance Pass



LTE Multicarrier Multiband, Port 2, QPSK Modulation, Test Case 1, LTE5 Carrier 1, 619.5 MHz Avg Cond **Duty Cycle** Avg Cond Avg Cond Limit Pwr (dBm) Factor (dB) Carrier Pwr (dBm) Band Pwr (dBm) (dBm) Results 43.162 0 43.2 N/A Within Tolerance Pass

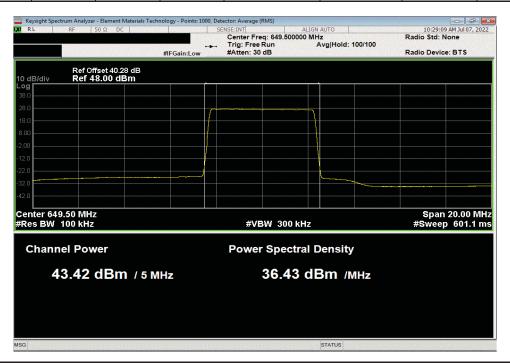


	LTE Multicarrie	r Multiband, Port	2, QPSK Modulation, T	est Case 1, LTE5 Ca	rrier 2, 624.5 MHz	
	Avg Cond	<b>Duty Cycle</b>	Avg Cond	Avg Cond	Limit	
	Pwr (dBm)	Factor (dB)	Carrier Pwr (dBm)	Band Pwr (dBm)	(dBm)	Results
	43.574	0	43.6	N/A	Within Tolerance	Pass

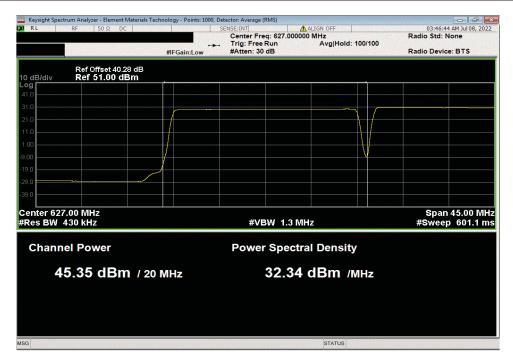




LTE Multicarrier Multiband, Port 2, QPSK Modulation, Test Case 1, LTE5 Carrier 3, 649.5 MHz Avg Cond **Duty Cycle** Avg Cond Avg Cond Limit Pwr (dBm) Factor (dB) Carrier Pwr (dBm) Band Pwr (dBm) (dBm) Results 43.424 43.4 N/A Within Tolerance Pass

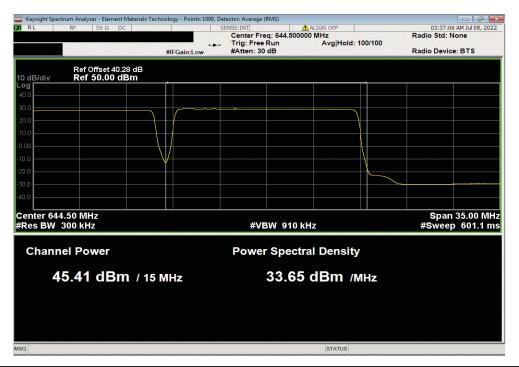


	LTE Multicari	rier Multiband, Po	rt 2, QPSK Modulation, Te	est Case 2, LTE20 Car	rrier 1, 627 MHz		
	Avg Cond	Duty Cycle	Avg Cond	Avg Cond	Limit		
	Pwr (dBm)	Factor (dB)	Carrier Pwr (dBm)	Band Pwr (dBm)	(dBm)	Results	
	45.346		45.3	N/A	Within Tolerance	Pass	

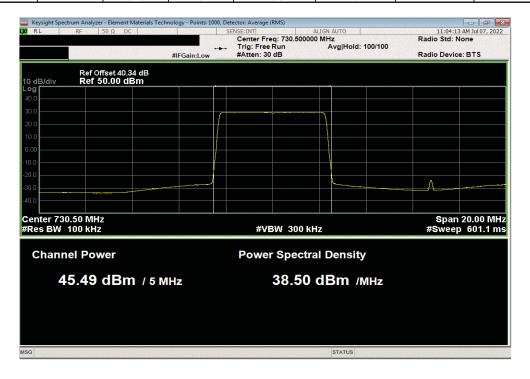




LTE Multicarrier Multiband, Port 2, QPSK Modulation, Test Case 2, LTE15 Carrier 2, 644.5 MHz Avg Cond **Duty Cycle** Avg Cond Avg Cond Limit Carrier Pwr (dBm) Pwr (dBm) Factor (dB) Band Pwr (dBm) (dBm) Results 45.406 0 45.4 N/A Within Tolerance

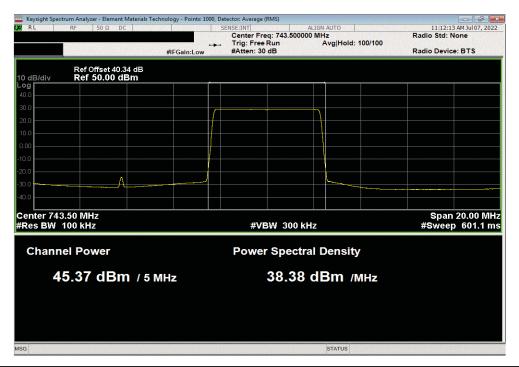


	LTE Multicarrier	Multiband, Port 2	2, QPSK Modulation,	Test Case 3, LTE5 C	arrier 1, 730.5 MHz	
	Avg Cond	<b>Duty Cycle</b>	Avg Cond	Avg Cond	Limit	
	Pwr (dBm)	Factor (dB)	Carrier Pwr (dBm)	Band Pwr (dBm)	(dBm)	Results
	45.492	0	45.5	N/A	Within Tolerance	Pass





LTE Multicarrier Multiband, Port 2, QPSK Modulation, Test Case 3, LTE5 Carrier 2, 743.5 MHz Avg Cond **Duty Cycle** Avg Cond Avg Cond Limit Carrier Pwr (dBm) Pwr (dBm) Factor (dB) Band Pwr (dBm) (dBm) Results 45.372 45.4 N/A Within Tolerance Pass



	LTE Multicarrier	Multiband, Port 2	, QPSK Modulation, T	Test Case 4, LTE5 n8	35 Carrier 1, 743.5 MHz	
	Avg Cond	Duty Cycle	Avg Cond	Avg Cond	Limit	
	Pwr (dBm)	Factor (dB)	Carrier Pwr (dBm)	Band Pwr (dBm)	(dBm)	Results
	43.663	0	43.7	N/A	Within Tolerance	Pass

