

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. Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Power Ratio (PAPR) was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed 13 dB. The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4.

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

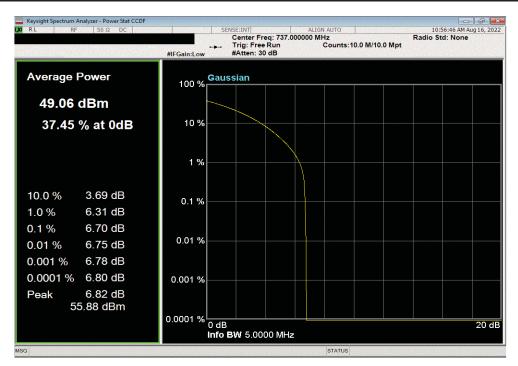
RF conducted emissions testing was performed only on one port. The AHLBA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed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



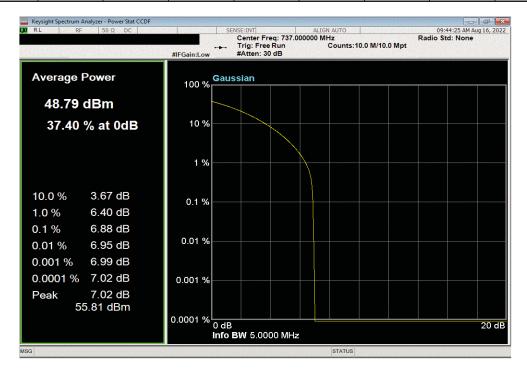
EUT: AHLBA
Serial Number: K9180844519
Customer: Nokia Solutions and Networks
Attendees: David Le Work Order: NOKI0046
Date: 17-Aug-22
Temperature: 21.1 °C Humidity: 54.1% RH Barometric Pres.: 1016 mbar Project: None
Tested by: Marty Martin
TEST SPECIFICATIONS Power: 54 VDC Test Method Job Site: TX07 FCC 27:2022 FCC 90R:2022 COMMENTS All measurement path losses accounted for the reference level offset including and attenuators, filters, and DC blocks. Carriers enabled at maximum power. DEVIATIONS FROM TEST STANDARD Morty Marti Configuration # 2 Signature PAPR PAPR Limit (dB) Results Value (dB) Band n12, 729 - 745 Mhz 5 MHz Bandwidth **QPSK Modulation** Mid Channel, 737.0 MHz 6.7 13 Pass 16QAM Modulation Mid Channel, 737.0 MHz 6.88 13 Pass 64QAM Modulation Mid Channel, 737.0 MHz 13 256QAM Modulation Low Channel, 731.5 MHz 13 Pass Mid Channel, 737.0 MHz High Channel, 742.5 MHz 6.71 13 13 Pass Pass 10 MHz Bandwidth 256QAM Modulation Low Channel, 734 MHz Mid Channel, 737.0 MHz 6.8 13 13 Pass 6.92 Pass High Channel, 740 MHz 6.75 Pass 15 MHz Bandwidth 256QAM Modulation Low Channel, 736.5 MHz 13 Pass Mid Channel, 737.0 MHz High Channel, 737.5 MHz 13 13 7.02 Pass 6.98 Pass



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 737.0 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
6.7 13 Pass

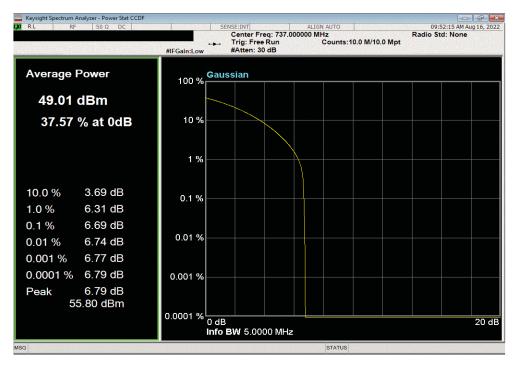


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 737.0 MHz								
				PAPR	PAPR			
				Value (dB)	Limit (dB)	Results		
				6.88	13	Pass		

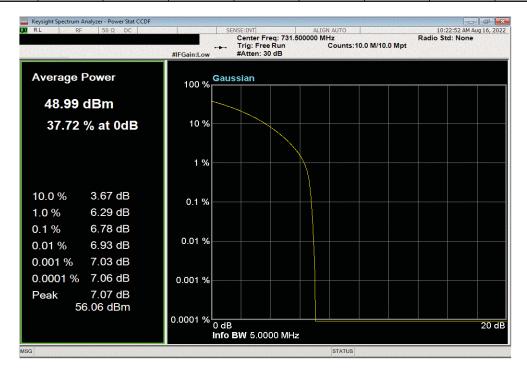




Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 737.0 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
6.69 13 Pass

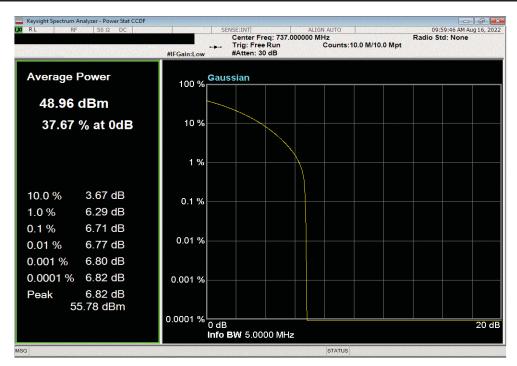


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 731.5 MHz								
				PAPR	PAPR			
Value (dB) Limit (dB) Results								
				6.78	13	Pass		

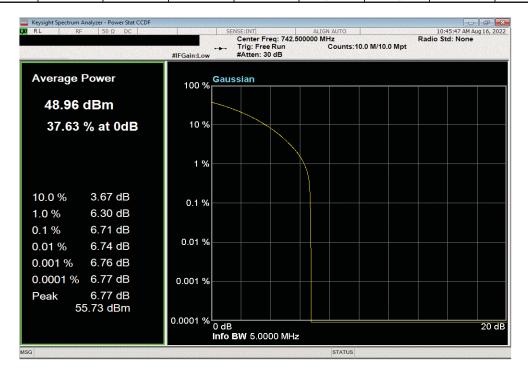




Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
6.71 13 Pass

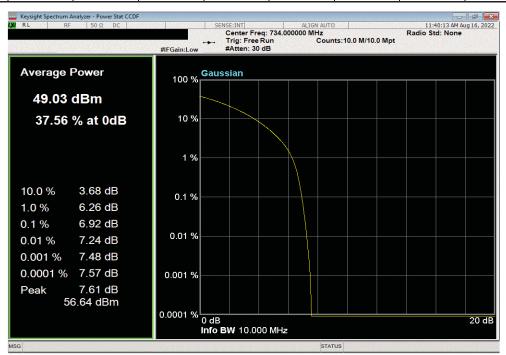


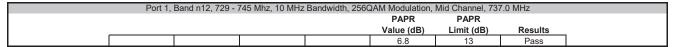
	Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 742.5 MHz								
					PAPR	PAPR			
	Value (dB) Limit (dB) Results								
1					6.71	13	Pass		

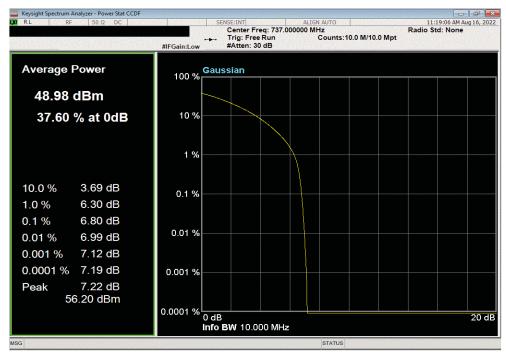




Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Low Channel, 734 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
6.92 13 Pass

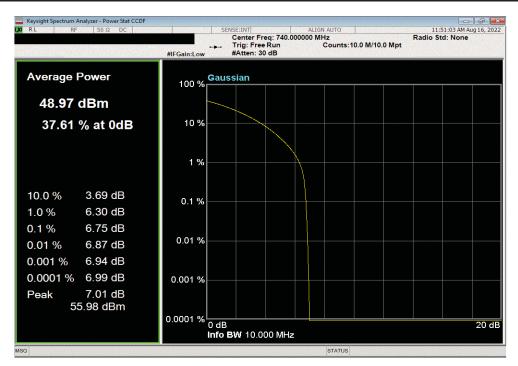




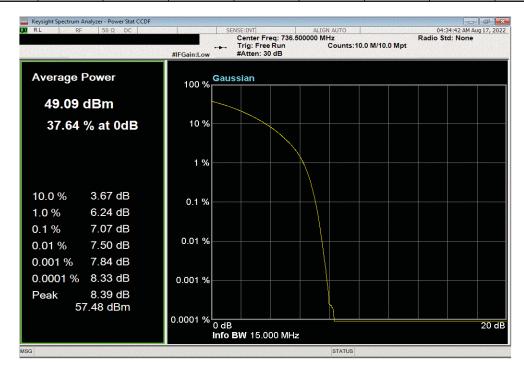




Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 740 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
6.75 13 Pass

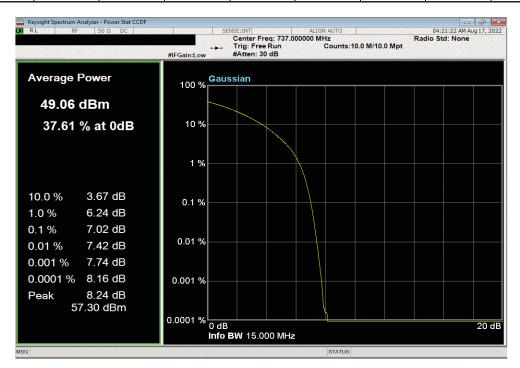


Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, Low Channel, 736.5 MHz								
				PAPR	PAPR			
Value (dB) Limit (dB) Results								
				7.07	13	Pass		

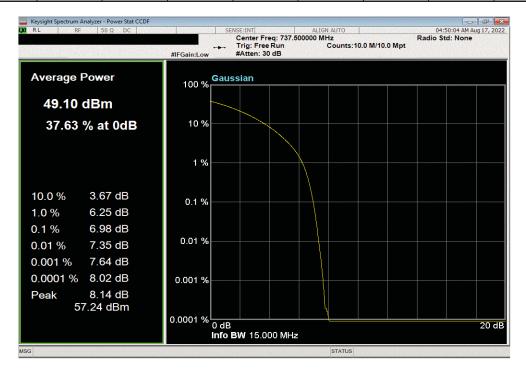




Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
7.02 13 Pass



Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, High Channel, 737.5 MHz								
					PAPR	PAPR		
					Value (dB)	Limit (dB)	Results	
					6.98	13	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
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. Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Power Ratio (PAPR) was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed 13 dB.

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

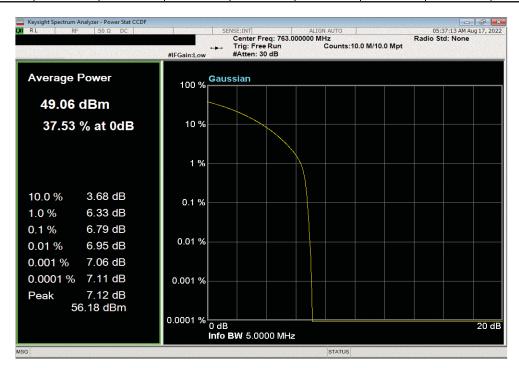
RF conducted emissions testing was performed only on one port. The AHLBA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed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



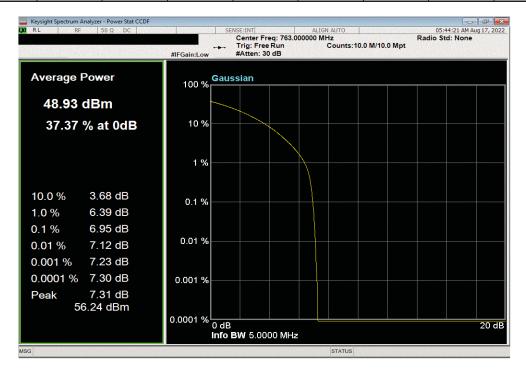
ANSI C63.26:2015  COMMENTS  All measurement path loses accounted for in the reference level offest including any attenuators, filters, and DC blocks. Carriers enabled at maximum power.  DEVIATIONS FROM TEST STANDARD  None  Configuration # 2 Signature  PAPR PAPR Value (dB) Limit (dB) Results								TbtTx 2022.05.02.0	XMit 2022.02.07.0
Customer, Notic Solutions and Networks   Temperature; 21.5 °C						Wo	ork Order:	NOKI0046	
Attendess: David Le   Barometric Press; 1918 mbar   Tested by: Marty Martin   Power; 54 VDC   Job Site:   TX07   Tested by: Marty Martin   Power; 54 VDC   Job Site:   TX07   Tested by: Marty Martin   Power; 54 VDC   Job Site:   TX07   Test SPECIFICATIONS   Test Method   Test SPECIFICATIONS   Test SPECIFICATION   Test S	Serial Number:	K9180844519							
Project:   None	Customer:	Nokia Solutions and Net	works						
Tested by   Marty Martin   Power.   54 VDC   Job Site:   TX07									
TEST SPECIFICATIONS						Barome			
ANSI C63.26.2015				Powe			Job Site:	TX07	
ANSI C63.26.2015   COMMENTS		IONS							
COMMENTS	FCC 27:2022								
All measurement path loses accounted for in the reference level offest including any attenuators, filters, and DC blocks. Carriers enabled at maximum power.    DEVIATIONS FROM TEST STANDARD	FCC 90R:2022				ANSI C63.26:2015				
DEVIATIONS FROM TEST STANDARD   None   Signature   Deviation # 2   Signature   Deviation   D	COMMENTS								
None   Paper   Paper			in the renerence level offest including a	any attenuators,	inters, and DC biocks. Carriers enable	u at maximum power.			
Pape		M TEST STANDARD							
PAPR   PAPR   Value (dB)   Results	None								
PAPR   Value (dB)   Limit (dB)   Results	Configuration #	2	Signature	lorly	Marti				
5G NR, Band n14, 758 - 768 Mhz 5 MHz Bandwidth  QPSK Modulation  Mid Channel, 763 MHz 6,79 13 Pass 16QAM Modulation  Mid Channel, 763 MHz 6,95 13 Pass 64QAM Modulation  Mid Channel, 763 MHz 6,76 13 Pass 256QAM Modulation  Low Channel, 760 MHz 6,72 13 Pass Mid Channel, 763 MHz 6,77 13 Pass High Channel, 763 MHz 10 MHz Bandwidth 10 MHz Bandwidth									
5 MHz Bandwidth         QPSK Modulation         Mid Channel, 763 MHz       6.79       13       Pass         16QAM Modulation         Mid Channel, 763 MHz       6.95       13       Pass         64QAM Modulation         Mid Channel, 763 MHz       6.76       13       Pass         Low Channel, 760.5 MHz       6.72       13       Pass         Mid Channel, 763 MHz       6.77       13       Pass         High Channel, 765.5 MHz       7.06       13       Pass         10 MHz Bandwidth         256QAM Modulation					10				Results
QPSK Modulation         Mid Channel, 763 MHz       6.79       13       Pass         16CAM Modulation       6.95       13       Pass         64QAM Modulation       6.76       13       Pass         256QAM Modulation       6.72       13       Pass         Low Channel, 760.5 MHz       6.72       13       Pass         Mid Channel, 763 MHz       6.77       13       Pass         High Channel, 765.5 MHz       7.06       13       Pass         10 MHz Bandwidth       256QAM Modulation	Port 1	50 ND D 1 44 750 7							Results
Mid Channel, 763 MHz     6.79     13     Pass       16QAM Modulation     6.95     13     Pass       64QAM Modulation     64QAM Modulation       Mid Channel, 763 MHz     6.76     13     Pass       256QAM Modulation     6.72     13     Pass       Low Channel, 760.5 MHz     6.72     13     Pass       Mid Channel, 763 MHz     6.77     13     Pass       High Channel, 765.5 MHz     7.06     13     Pass       10 MHz Bandwidth       256QAM Modulation	Port 1		68 Mhz						Results
16QAM Modulation     6.95     13     Pass       64QAM Modulation     6.76     13     Pass       Mid Channel, 763 MHz     6.76     13     Pass       256QAM Modulation       Low Channel, 760.5 MHz     6.72     13     Pass       Mid Channel, 763 MHz     6.77     13     Pass       High Channel, 765.5 MHz     7.06     13     Pass       10 MHz Bandwidth       256QAM Modulation	Port 1	5 MHz Bandy	68 Mhz width						Results
Mid Channel, 763 MHz	Port 1	5 MHz Bandy	66 Mhz width QPSK Modulation			Valu	ie (dB)	Limit (dB)	
64QAM Modulation Mid Channel, 763 MHz Mid Channel, 765 MHz 256QAM Modulation Low Channel, 760.5 MHz Mid Channel, 763 MHz High Channel, 765.5 MHz 10 MHz Bandwidth 256QAM Modulation	Port 1	5 MHz Bandy	68 Mhz width QPSK Modulation Mid Channel, 763 MHz			Valu	ie (dB)	Limit (dB)	
Mid Channel, 763 MHz     6.76     13     Pass       256QAM Modulation	Port 1	5 MHz Bandy	68 Mhz width QPSK Modulation Mid Channel, 763 MHz 16QAM Modulation			Valu	i.79	Limit (dB)	Pass
256QAM Modulation	Port 1	5 MHz Bandv	68 Mhz width (OPSK Modulation Mid Channel, 763 MHz 16QAM Modulation Mid Channel, 763 MHz			Valu	i.79	Limit (dB)	Pass
Low Channel, 760.5 MHz 6.72 13 Pass Mid Channel, 763 MHz High Channel, 765.5 MHz 7.06 13 Pass 10 MHz Bandwidth 256QAM Modulation	Port 1	5 MHz Bandv	68 Mhz width QPSK Modulation Mid Channel, 763 MHz 16QAM Modulation Mid Channel, 763 MHz 64QAM Modulation			<b>Val</b> . 6	i.79	Limit (dB)  13  13	Pass Pass
Mid Channel, 763 MHz     6.77     13     Pass       High Channel, 765.5 MHz     7.06     13     Pass       10 MHz Bandwidth       256QAM Modulation	Port 1	5 MHz Bandv	68 Mhz width QPSK Modulation Mid Channel, 763 MHz 16QAM Modulation Mid Channel, 763 MHz 64QAM Modulation Mid Channel, 763 MHz			<b>Val</b> . 6	i.79	Limit (dB)  13  13	Pass Pass
High Channel, 765.5 MHz 7.06 13 Pass  10 MHz Bandwidth  256QAM Modulation	Port 1	5 MHz Bandv	68 Mhz Width OPSK Modulation Mid Channel, 763 MHz 16QAM Modulation Mid Channel, 763 MHz 64QAM Modulation Mid Channel, 763 MHz 256QAM Modulation 256QAM Modulation			<b>Val.</b> 6	i.79 i.95	13 13 13	Pass Pass Pass
10 MHz Bandwidth 256QAM Modulation	Port 1	5 MHz Bandv	68 Mhz width QPSK Modulation Mid Channel, 763 MHz 16QAM Modulation Mid Channel, 763 MHz 64QAM Modulation Mid Channel, 763 MHz 256QAM Modulation Low Channel, 760.5 MHz			<b>Valu</b> 6 6 6	i.79 i.79 i.76	13 13 13 13 13	Pass Pass Pass Pass
256QAM Modulation	Port 1	5 MHz Bandv	68 Mhz width QPSK Modulation Mid Channel, 763 MHz 16QAM Modulation Mid Channel, 763 MHz 64QAM Modulation Mid Channel, 763 MHz 256QAM Modulation Low Channel, 760.5 MHz Mid Channel, 763 MHz			<b>Val.</b> 6 6 6 6 6		13 13 13 13 13 13	Pass Pass Pass Pass Pass
	Port 1	5 MHz Bandv	68 Mhz  (OPSK Modulation  Mid Channel, 763 MHz  16QAM Modulation  Mid Channel, 763 MHz  64QAM Modulation  Mid Channel, 763 MHz  256QAM Modulation  Low Channel, 760.5 MHz  Mid Channel, 763 MHz  High Channel, 765.5 MHz			<b>Val.</b> 6 6 6 6 6		13 13 13 13 13 13	Pass Pass Pass Pass Pass
	Port 1	5 MHz Bandv	68 Mhz width QPSK Modulation Mid Channel, 763 MHz 16QAM Modulation Mid Channel, 763 MHz 64QAM Modulation Mid Channel, 763 MHz 256QAM Modulation Low Channel, 760.5 MHz Mid Channel, 765.5 MHz High Channel, 765.5 MHz dwidth			<b>Val.</b> 6 6 6 6 6		13 13 13 13 13 13	Pass Pass Pass Pass Pass



Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 763 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
6.79 13 Pass

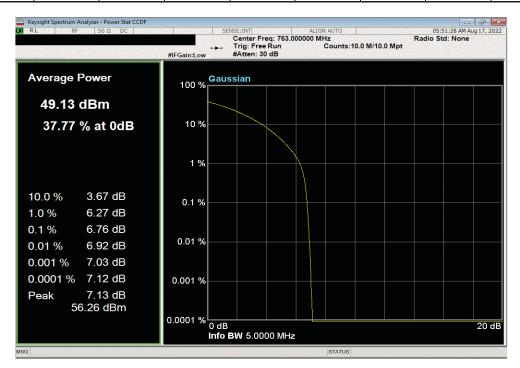


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 763 MHz								
					PAPR	PAPR		
					Value (dB)	Limit (dB)	Results	
ı					6.95	13	Pass	

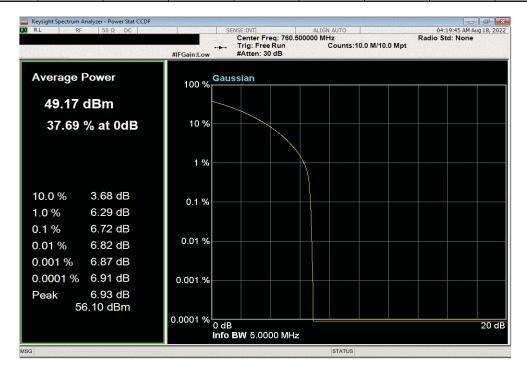




Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 763 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
6.76 13 Pass

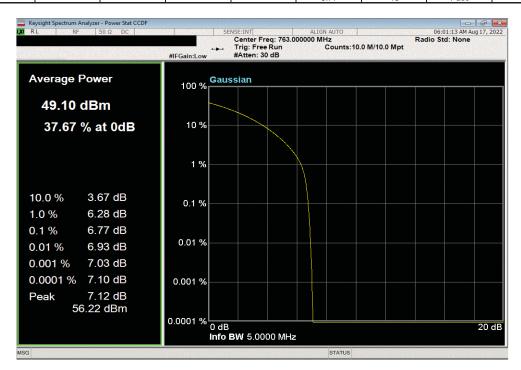


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 760.5 MHz								
				PAPR	PAPR			
Value (dB) Limit (dB) Results								
				6.72	13	Pass		

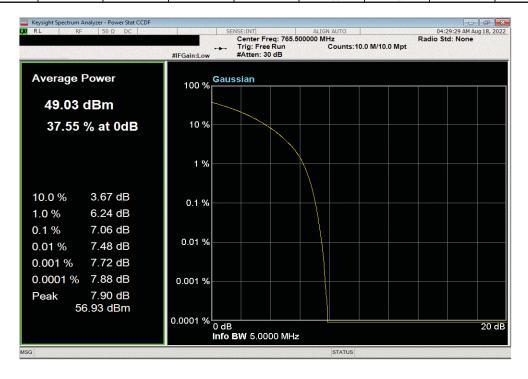




Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
6.77 13 Pass

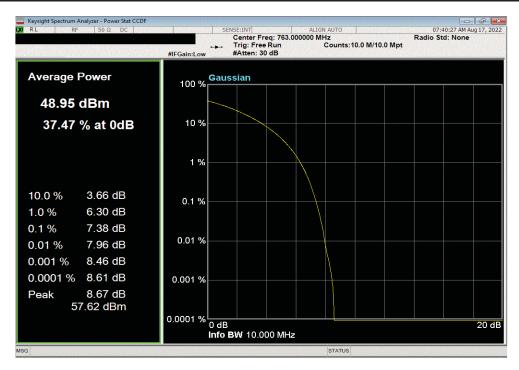


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz								
				PAPR	PAPR			
Value (dB) Limit (dB) Results								
				7.06	13	Pass		





Port 1, 5G NR, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763 MHz
PAPR PAPR
Value (dB) Limit (dB) Results
7.38 13 Pass



# SPURIOUS CONDUCTED EMISSIONS - MULTIBAND MULTICARRIER



KMit 2022.02.07.0

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#### **TEST EQUIPMENT**

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Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

#### **TEST DESCRIPTION**

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 3 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 8 GHz. The conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.

The measurement methods are detailed in KDB 971168 D01v03 section 6 and ANSI C63.26-2015. Per FCC 2.1057(a)(1), the upper level of measurement is the 10th harmonic of the highest fundamental frequency. These measurements are for the frequency band after the first 100kHz bands immediately outside and adjacent to the frequency block.

Per FCC sections 27.53(g) and 90.543(e)(3), the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

FCC 27.53(g), and FCC 90.543(e)(5) requires a >100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range.

Per section 90.543(f), for the frequency range 1559-1610 MHz the EIRP limit is -70dBW/MHz for wideband signals and -80dBW for discrete emissions of bandwidths less than 700Hz. This equates to an EIRP of -40dBm/MHz for wideband emissions and -50dBm/MHz for discrete emissions. The limit is adjusted to -46 dBm [-40 dBm -10 log (4)] for wideband signals and -56dBm [-50 dBm -10 log (4)] for discrete emissions per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

The limit for the 9kHz to 150kHz frequency range was adjusted to –39dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 100kHz [i.e.: -39dBm = -19dBm -10log(100kHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to –29dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 100kHz [i.e.: -29dBm = -19dBm -10log(100kHz/10kHz)]. The required limit of -19dBm with a RBW of > 100kHz was used for all other frequency ranges. (See ANSI C63.26-2015 paragraph 5.7.2a for details on the Limit/RBW scaling method)

#### Multicarrier Test Cases

Multi-Carrier Test Case 1 (3GPP Band n12 Multicarrier): Three NR5 carriers using two carriers (with minimum spacing between carrier frequencies) at the lower band (731.5MHz & 736.5MHz) and a third carrier with maximum spacing between the other two carrier frequencies (742.5MHz) at the upper band edge. The NR 5MHz 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 n12 carriers).

Multi-Carrier Test Case 2 (3GPP Band n12 and Band n14 Multicarrier/Multiband): In the Band n12 \_ Two NR5 carriers at the lower band edge (731.5 & 736.5MHz). In Band n14 one NR5 carrier at the upper band edge (765.5MHz). The NR 5MHz 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 n12/n14 carriers).

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

# SPURIOUS CONDUCTED EMISSIONS - MULTIBAND MULTICARRIER



						TbtTx 2022.05.02.0	XMit 2022.02.07
EUT:	AHLBA				Work Order:	NOKI0046	
Serial Number:	K9180844519				Date:	19-Aug-22	
Customer:	Nokia Solutions and Net	vorks			Temperature:		
Attendees: I	David Le				Humidity:		
Project:	None				Barometric Pres.:		
	Marty Martin	Powe	er: 54 VDC		Job Site:	TX07	
TEST SPECIFICATION	ONS		Test Method				
FCC 27:2022			ANSI C63.26:2015				
FCC 90R:2022			ANSI C63.26:2015				
COMMENTS							
All measurement pa	th losses were accounted	ed for in the reference level offset including	attenuators, cables, DC block	and filter when in us	se. Band n12 and B	and n14 carriers w	ere operating a
maximum power in	each applicable test cas	e to achieve a total port power of 80 watts.					
DEVIATIONS FROM	TEST STANDARD						
None							
		27	2.4				
Configuration #	1, 2, 3	Signature	y Marti				
		Signature	y music				
			Frequency	Measured	Max Value	Limit	
			Range	Freq (MHz)	(dBm)	< (dBm)	Result
Port 1, Multi-Carrier T	Test Case 1						
5	5G NR, Band n12, 729 - 7-	45 MHz					
	5 MHz Bandy	vidth					
		QPSK Modulation					
		731.5, 736.5 and 742.5 MHz	9 kHz - 150 kHz	0.01	-55.19	-39	Pass
		731.5, 736.5 and 742.5 MHz	150 kHz - 20 MHz	0.15	-52.01	-29	Pass
		731.5, 736.5 and 742.5 MHz	20 MHz - 1.2 GHz	909.41	-40.78	-19	Pass
		731.5, 736.5 and 742.5 MHz	1.2 GHz - 8 GHz	4022	-37.65	-19	Pass
Port 1, Multi-Carrier T	Test Case 2						
		45 MHz, Band n14 758 - 768 MHz					
	5 MHz Bandy						
		QPSK Modulation					
		731.5, 736.5 and 765.5 MHz	9 kHz - 150 kHz	0.01	-55.09	-39	Pass
		731.5, 736.5 and 765.5 MHz	150 kHz - 20 MHz	0.15	-51.59	-29	Pass
		731.5, 736.5 and 765.5 MHz	20 MHz - 1.2 GHz	910.19	-40.45	-19	Pass
		731.5, 736.5 and 765.5 MHz	1.2 GHz - 8 GHz	4021.55	-38.14	-19	Pass
Port 1, Multi-Carrier T							
5		45 MHz, 1559 - 1610 MHz					
	5 MHz Bandy						
		QPSK Modulation					_
		731.5, 736.5 and 742.5 MHz	1.559 GHz - 1.61 GHz	1607.56	-61.95	-46	Pass
Port 1, Multi-Carrier T							
		45 MHz, Band n14 758 - 768 MHz, 1559 - 161	0 MHz				
	5 MHz Bandy						
		QPSK Modulation	4.550.011 4.04.011	4504.00	24.27	40	
		731.5, 736.5 and 765.5 MHz	1.559 GHz - 1.61 GHz	1591.93	-61.87	-46	Pass

#### SPURIOUS CONDUCTED EMISSIONS



Port 1, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 MHz, 5 MHz Bandwidth, QPSK Modulation, 731.5, 736.5 and 742.5 MHz

Frequency

Range
Freq (MHz)

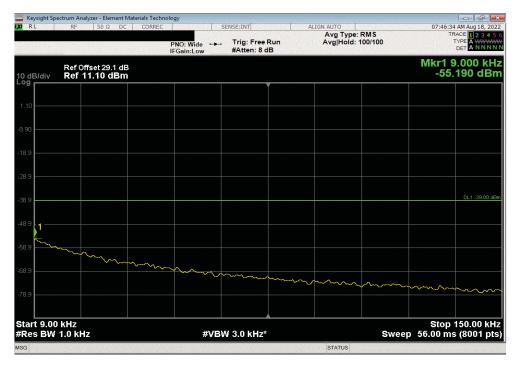
9 kHz - 150 kHz

0.01

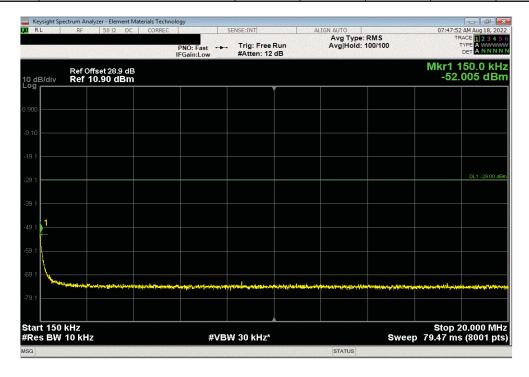
-55.19

-39

Pass



Port 1, 50	G NR, Multi-Carrier Test Case 1, Band n12, 729	- 745 MHz, 5 MHz	Bandwidth, QPSI	K Modulation, 731	l.5, 736.5 and 74	2.5 MHz
	Frequency	Measured	Max Value	Limit		
_	Range	Freq (MHz)	(dBm)	< (dBm)	Result	
Г	150 kHz - 20 MHz	0.15	-52.01	-29	Pass	



#### SPURIOUS CONDUCTED EMISSIONS

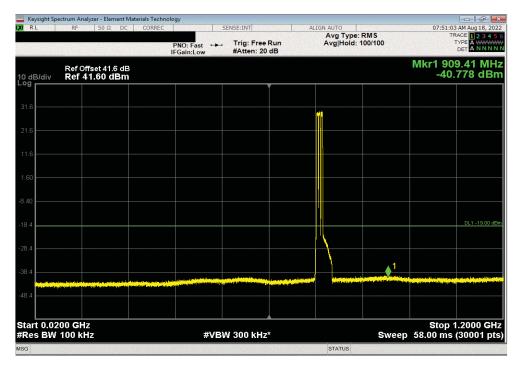


Port 1, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 MHz, 5 MHz Bandwidth, QPSK Modulation, 731.5, 736.5 and 742.5 MHz

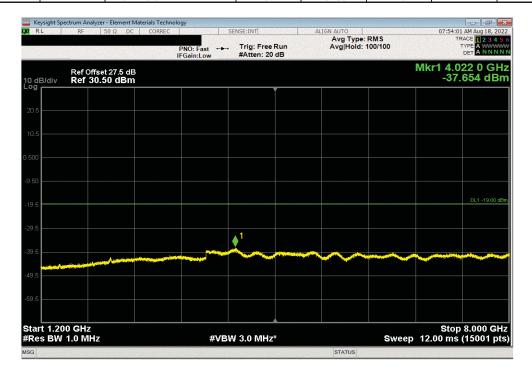
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 909.41 -40.78 -19 Pass



Port 1, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 -	745 MHz, 5 MHz	Bandwidth, QPSł	K Modulation, 731	l.5, 736.5 and 74	2.5 MHz
Frequency	Measured	Max Value	Limit		
Range	Freq (MHz)	(dBm)	< (dBm)	Result	
1.2 GHz - 8 GHz	4022	-37.65	-19	Pass	



## SPURIOUS CONDUCTED EMISSIONS - MULTIBAND MULTICARRIER



Port 1, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 MHz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, 731.5, 736.5 and 765.5 MHz

Frequency

Range
Freq (MHz)

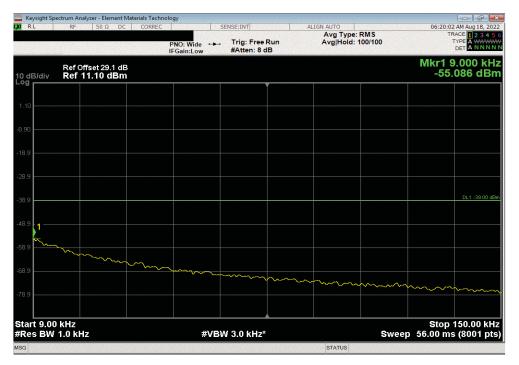
9 kHz - 150 kHz

0.01

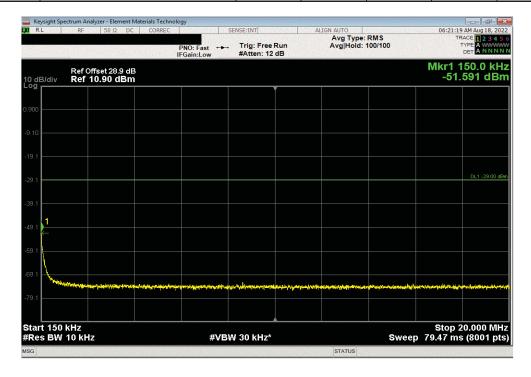
-55.09

-39

Pass



Port 1, 5G NR, Multi-Carrier Test Case 2	, Band n12, 729 - 745 MHz, Ba	nd n14 758 - 768	MHz, 5 MHz Ban	dwidth, QPSK Mo	odulation, 731.5,	736.5 and 765.5 MHz
	Frequency	Measured	Max Value	Limit		
	Range	Freq (MHz)	(dBm)	< (dBm)	Result	_
150	0 kHz - 20 MHz	0.15	-51.59	-29	Pass	



## SPURIOUS CONDUCTED EMISSIONS - MULTIBAND MULTICARRIER



Port 1, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 MHz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, 731.5, 736.5 and 765.5 MHz

Frequency

Range
Freq (MHz)

(dBm)

(dBm)

Result

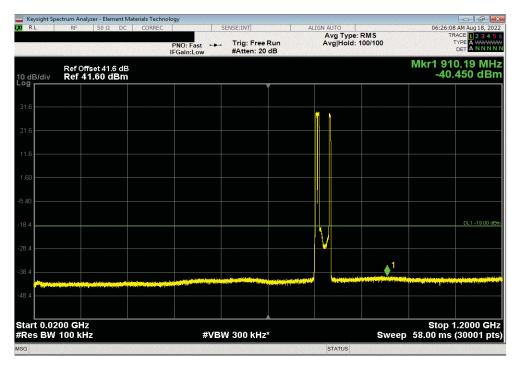
20 MHz - 1.2 GHz

910.19

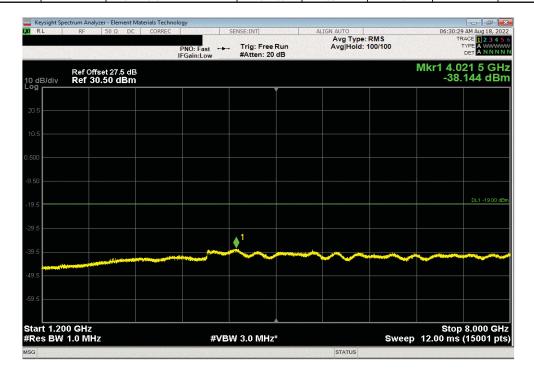
-40.45

-19

Pass



ſ	Port 1, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 MHz, Bar	nd n14 758 - 768	MHz, 5 MHz Ban	dwidth, QPSK Me	odulation, 731.5,	736.5 and 765.5 MHz
ı	Frequency	Measured	Max Value	Limit		
ı	Range	Freq (MHz)	(dBm)	< (dBm)	Result	
ı	1.2 GHz - 8 GHz	4021.55	-38.14	-19	Pass	]



#### SPURIOUS CONDUCTED EMISSIONS



Port 1, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 MHz, 5 MHz Bandwidth, QPSK Modulation, 731.5, 736.5 and 742.5 MHz

Frequency

Measured

Max Value

Limit

Range

Freq (MHz)

(dBm)

< (dBm)

Result

1.559 GHz - 1.61 GHz

1607.56

-61.95

-46

Pass



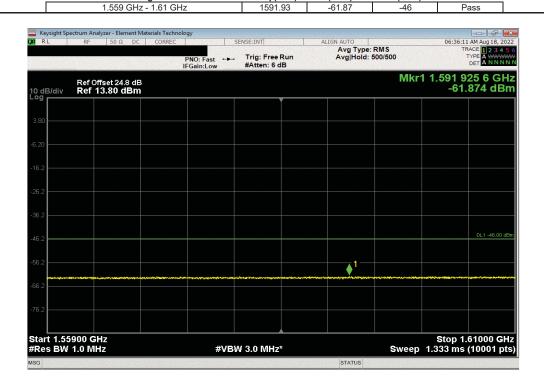
#### SPURIOUS CONDUCTED EMISSIONS



Port 1, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 MHz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz

Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result





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 antenna port spurious emissions were measured at the RF output terminal of the EUT through 3 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 8 GHz. The conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.

The measurement methods are detailed in KDB 971168 D01v03 section 6 and ANSI C63.26-2015. Per FCC 2.1057(a)(1), the upper level of measurement is the 10th harmonic of the highest fundamental frequency. These measurements are for the frequency band after the first 100 kHz bands immediately outside and adjacent to the frequency block.

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

FCC 27.53(g) requires a >100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range.

The limit for the 9kHz to 150kHz frequency range was adjusted to –39dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 100kHz [i.e.: -39dBm = -19dBm -10log(100kHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to -29dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 100kHz [i.e.: -29dBm = -19dBm -10log(100kHz/10kHz)]. The required limit of -19dBm with a RBW of > 100kHz was used for all other frequency ranges. (See ANSI C63.26-2015 paragraph 5.7.2a for details on the Limit/RBW scaling method)

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



	ALILDA				Monte Outland	NOKIOO4C	XMit 20
	AHLBA KO488844548				Work Order:		
	K9180844519	d.				19-Aug-22	
	Nokia Solutions and Nety	WORKS				22.1 °C	
Attendees:						53.7% RH	
Project:						1018 mbar	
	Marty Martin		Power: 54 VDC		Job Site:	1 X 0 /	
SPECIFICATION	JNS		Test Method				
27:2022			ANSI C63.26:2015				
90R:2022			ANSI C63.26:2015				
		d for in the reference level offest including any at	tenuators, filters and DC blocks. The car	rier was enabled at maximu	ım power (80 watts	carrier).	
ATIONS FROM	TEST STANDARD						
figuration #	1, 2, 3	Signature	Morti				
		•	Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Resul
			range	1109 (2)	(4.2)	(0.2)	
	5G NR, Band n12, 729 - 74 5 MHz Bandv						
		QPSK Modulation					
		Mid Channel, 737.0 MHz	9 kHz - 150 kHz	0.01	-54.55	-39	Pass
		Mid Channel, 737.0 MHz	150 kHz - 20 MHz	0.15	-51.84	-29	Pass
		Mid Channel, 737.0 MHz	20 MHz - 1.2 GHz	909.6	-40.56	-19	Pass
		Mid Channel, 737.0 MHz	1.2 GHz - 8 GHz	3956.72	-37.83	-19	Pass
		16QAM Modulation					
		Mid Channel, 737.0 MHz	9 kHz - 150 kHz	0.01	-55.34	-39	Pass
		Mid Channel, 737.0 MHz	150 kHz - 20 MHz	0.15	-51.1	-29	Pass
		Mid Channel, 737.0 MHz	20 MHz - 1.2 GHz	909.21	-40.5	-19	Pass
		Mid Channel, 737.0 MHz	1.2 GHz - 8 GHz	3992.99	-37.54	-19	Pass
		64QAM Modulation					
		Mid Channel, 737.0 MHz	9 kHz - 150 kHz	0.01	-54.49	-39	Pass
		Mid Channel, 737.0 MHz	150 kHz - 20 MHz	0.15	-51.82	-29	Pass
		Mid Channel, 737.0 MHz	20 MHz - 1.2 GHz	909.25	-40.09	-19	Pass
		Mid Channel, 737.0 MHz	1.2 GHz - 8 GHz	4000.69	-37.84	-19	Pass
		256QAM Modulation	1.2 0112 - 0 0112	4000.00	-01.04	-10	1 030
		Mid Channel, 737.0 MHz	9 kHz - 150 kHz	0.01	-54.79	-39	Pass
		Mid Channel, 737.0 MHz	150 kHz - 20 MHz	0.01	-51.53	-29	Pass
		Mid Channel, 737.0 MHz	20 MHz - 1.2 GHz	910.03	-40.69	-19	Pass
		Mid Channel, 737.0 MHz	1.2 GHz - 1.2 GHz	4018.83	-37.78	-19	Pass
	10 MHz Band		1.2 GHZ - 0 GHZ	4010.03	-31.10	-18	ras
		256QAM Modulation					
		Mid Channel, 737.0 MHz	9 kHz - 150 kHz	0.01	-55.01	-39	Pass
		Mid Channel, 737.0 MHz	150 kHz - 20 MHz	0.15	-51.54	-29	Pass
		Mid Channel, 737.0 MHz	20 MHz - 1.2 GHz	909.6	-40.13	-19	Pass
		Mid Channel, 737.0 MHz	1.2 GHz - 8 GHz	4000.69	-37.85	-19	Pass
	15 MHz Band		1.2 0112 - 0 0112	4000.00	-01.00	-10	1 033
		256QAM Modulation					
	'	Mid Channel, 737.0 MHz	9 kHz - 150 kHz	0.01	-54.7	-39	Pass
		Mid Channel, 737.0 MHz	150 kHz - 20 MHz	0.15	-51.34	-29	Pass
		Mid Channel, 737.0 MHz	20 MHz - 1.2 GHz	910.35	-39.99	-19	Pass
		Mid Channel, 737.0 MHz	1.2 GHz - 8 GHz	4019.73	-37.87	-19	Pass
1	Band n12, 729 - 745 Mhz,		1.2 31.2 3 31.2	10.10.10	07.07		. 455
	5 MHz Bandy	vidth					
		256QAM Modulation					
		Low Channel, 731.5 MHz	1.559 GHz - 1.61 GHz	1609.43	-61.86	-46	Pass
		Mid Channel, 737.0 MHz	1.559 GHz - 1.61 GHz	1600.17	-61.86	-46	Pass
		High Channel, 742.5 MHz	1.559 GHz - 1.61 GHz	1594.93	-61.94	-46	Pass
		nigii Chainei, 742.5 Mnz					
	10 MHz Band		1.003 6112 - 1.01 6112	1001.00			
			1.505 GHZ - 1.61 GHZ	100 1.50			

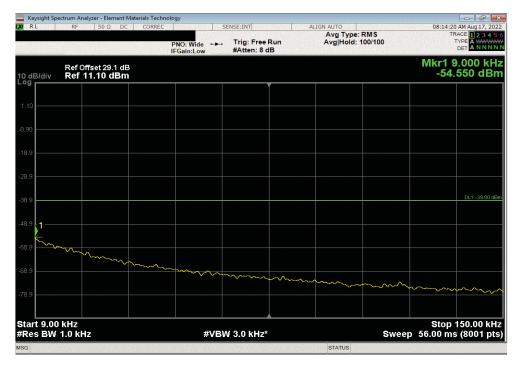


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 737.0 MHz

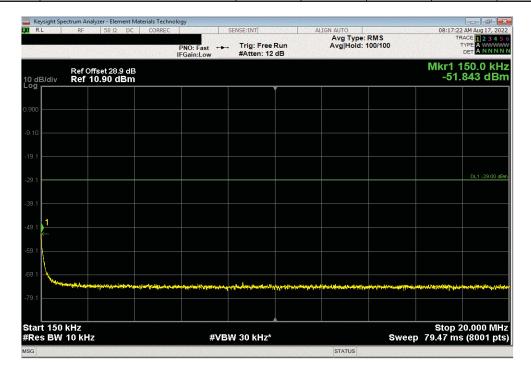
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

9 kHz - 150 kHz 0.01 -54.55 -39 Pass



	Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 737.0 MHz					
	Frequency	Frequency Measured Max Value Limit				
_	Range	Freq (MHz)	(dBm)	< (dBm)	Result	
i [	150 kHz - 20 MHz	0.15	-51.84	-29	Pass	



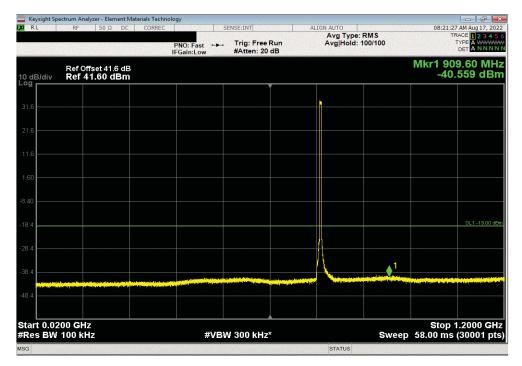


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 737.0 MHz

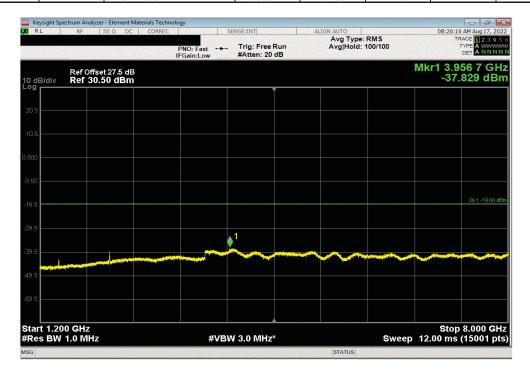
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 909.6 -40.56 -19 Pass



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 737.0 MHz					
Frequency	Measured	Max Value	Limit		
 Range	Freq (MHz)	(dBm)	< (dBm)	Result	
1.2 GHz - 8 GHz	3956.72	-37.83	-19	Pass	



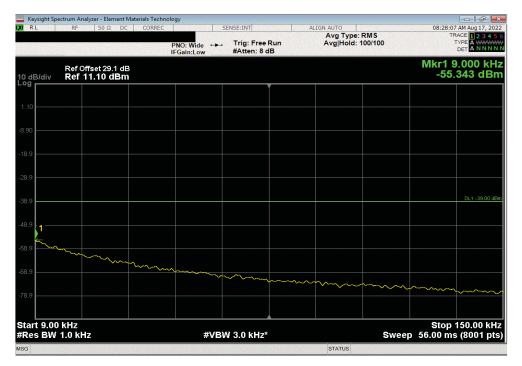


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 737.0 MHz

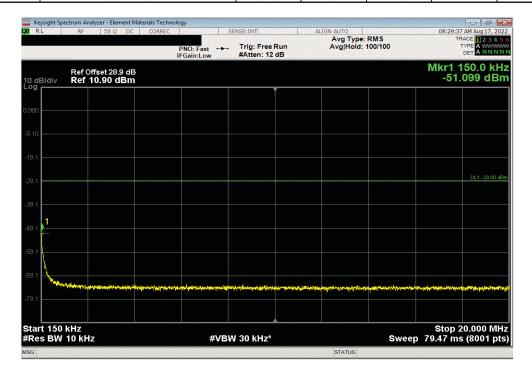
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

9 kHz - 150 kHz 0.01 -55.34 -39 Pass



Port 1, Band n12, 729	Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 737.0 MHz					
Frequency	Measured	Max Value	Limit			
Range	Freq (MHz)	(dBm)	< (dBm)	Result		
150 kHz - 20 MH	z 0.15	-51.1	-29	Pass		



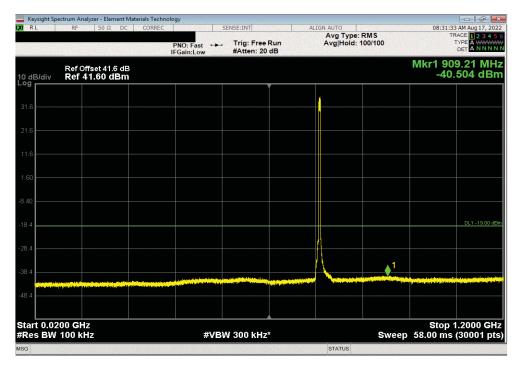


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 737.0 MHz

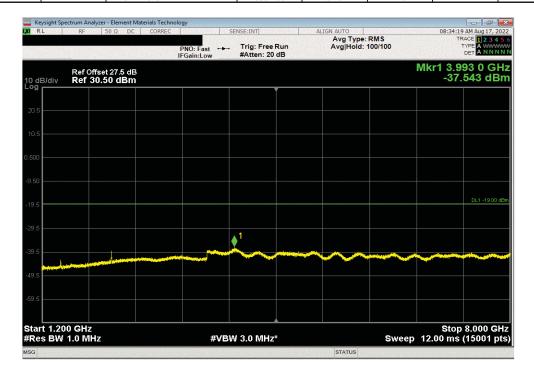
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 909.21 -40.5 -19 Pass



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 737.0 MHz					
Frequency	Measured	Max Value	Limit		
 Range	Freq (MHz)	(dBm)	< (dBm)	Result	
1.2 GHz - 8 GHz	3992.99	-37.54	-19	Pass	



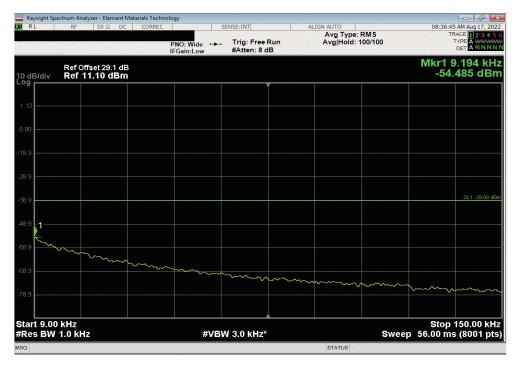


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 737.0 MHz

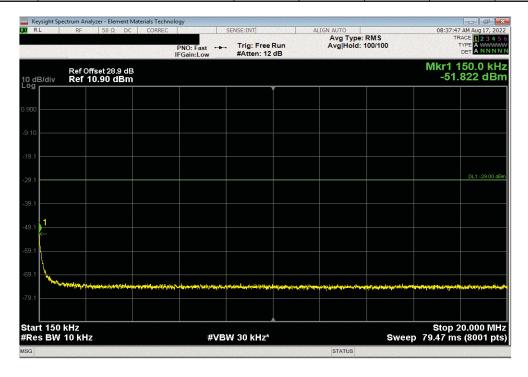
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

9 kHz - 150 kHz 0.01 -54.49 -39 Pass



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 737.0 MHz					
Frequency	Measured	Max Value	Limit		
Range	Freq (MHz)	(dBm)	< (dBm)	Result	
150 kHz - 20 MHz	0.15	-51.82	-29	Pass	



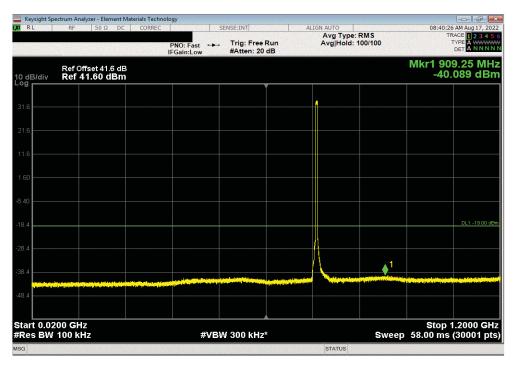


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 737.0 MHz

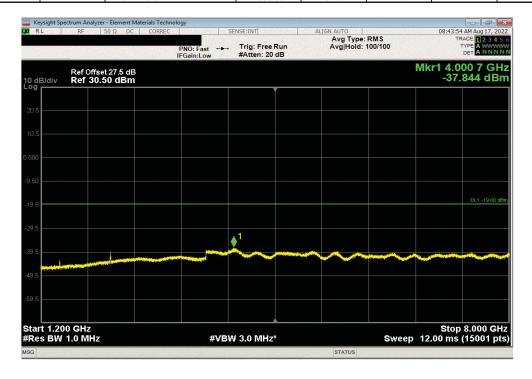
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 909.25 -40.09 -19 Pass



Port 1, Band n12, 729 - 745 Mhz, 5	MHz Bandwidth, 64Q/	AM Modulation, N	lid Channel, 737.	0 MHz
Frequency	Measured	Max Value	Limit	
 Range	Freq (MHz)	(dBm)	< (dBm)	Result
1.2 GHz - 8 GHz	4000.69	-37.84	-19	Pass



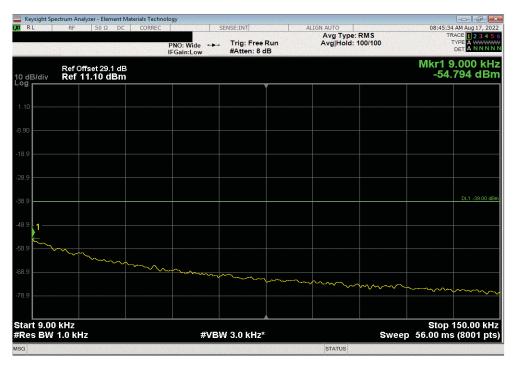


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz

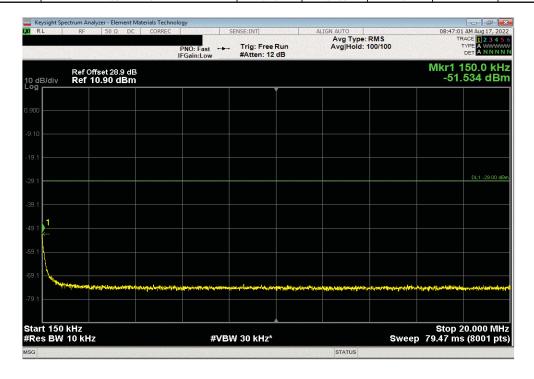
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

9 kHz - 150 kHz 0.01 -54.79 -39 Pass



Port 1, Band	d n12, 729 - 745 Mhz, 5 MHz	Bandwidth, 256Q	AM Modulation, N	∕lid Channel, 737	.0 MHz
Fi	requency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBm)	< (dBm)	Result
150 k	Hz - 20 MHz	0.15	-51.53	-29	Pass



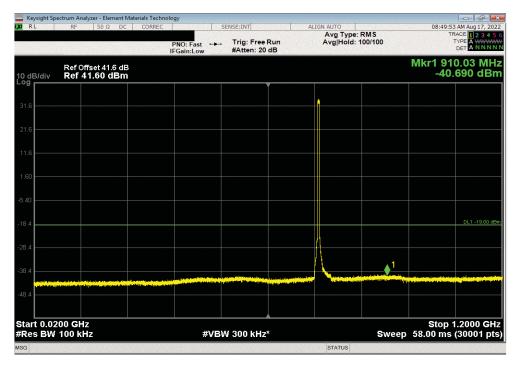


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz

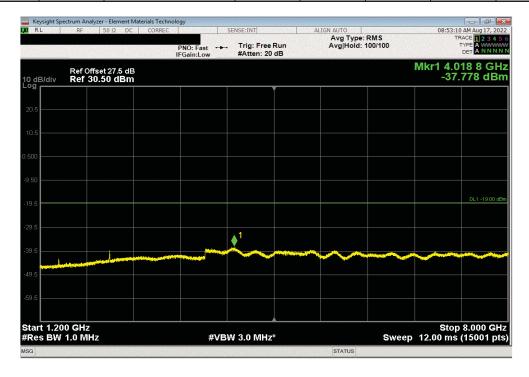
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 910.03 -40.69 -19 Pass



	Port 1, Band n12, 729 - 745 Mhz, 5 M	1Hz Bandwidth, 256C	AM Modulation, I	Mid Channel, 737	.0 MHz
	Frequency	Measured	Max Value	Limit	
_	Range	Freq (MHz)	(dBm)	< (dBm)	Result
ĺ	1.2 GHz - 8 GHz	4018.83	-37.78	-19	Pass



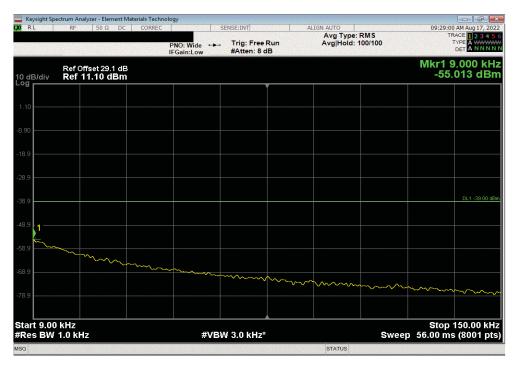


Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz

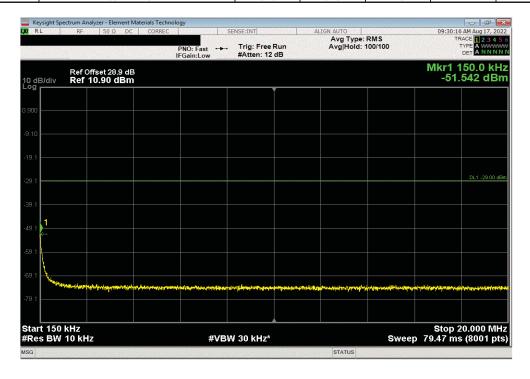
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

9 kHz - 150 kHz 0.01 -55.01 -39 Pass



	Port 1, Band n12, 729 - 745 Mhz, 10	MHz Bandwidth, 2560	QAM Modulation,	Mid Channel, 737	7.0 MHz
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBm)	< (dBm)	Result
i	150 kHz - 20 MHz	0.15	-51.54	-29	Pass



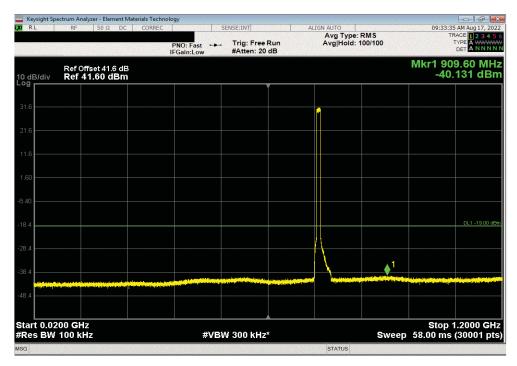


Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz

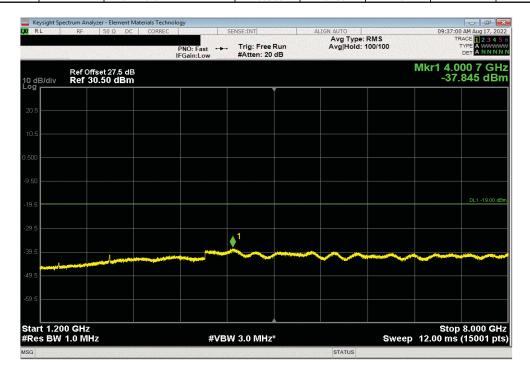
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 909.6 -40.13 -19 Pass



	Port 1, Band n12, 729 - 745 Mhz, 10	MHz Bandwidth, 2560	QAM Modulation,	Mid Channel, 73	7.0 MHz
	Frequency	Measured	Max Value	Limit	
_	Range	Freq (MHz)	(dBm)	< (dBm)	Result
l í	1.2 GHz - 8 GHz	4000.69	-37.85	-19	Pass



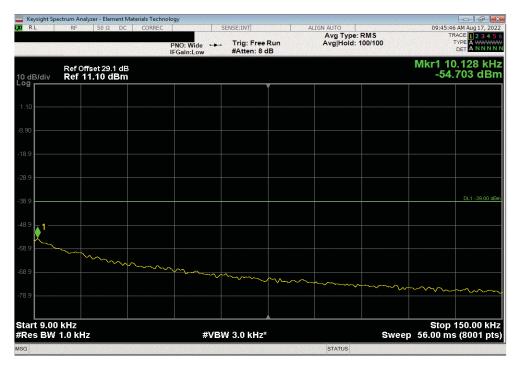


Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz

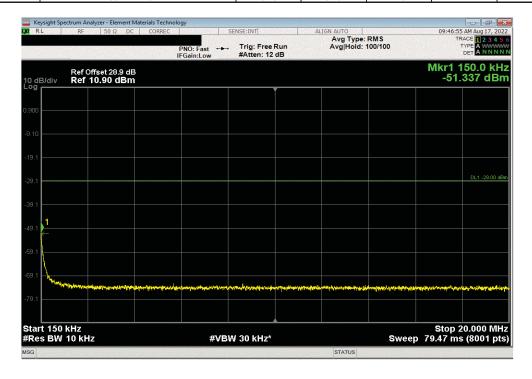
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

9 kHz - 150 kHz 0.01 -54.7 -39 Pass



	Port 1, Band n12, 729 - 745 Mhz, 15	MHz Bandwidth, 2560	QAM Modulation,	Mid Channel, 737	7.0 MHz
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBm)	< (dBm)	Result
i	150 kHz - 20 MHz	0.15	-51.34	-29	Pass



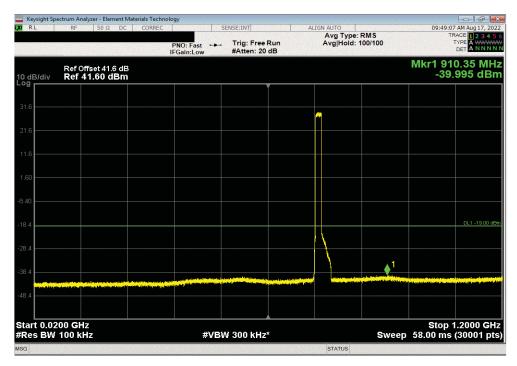


Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz

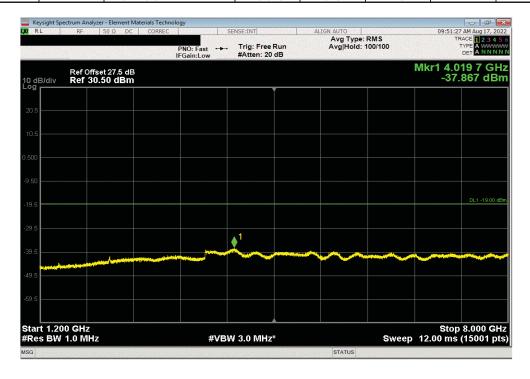
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 910.35 -39.99 -19 Pass



Port 1, Band n12, 729 - 745 Mhz, 15	MHz Bandwidth, 2560	QAM Modulation,	Mid Channel, 737	7.0 MHz
Frequency	Measured	Max Value	Limit	
Range	Freq (MHz)	(dBm)	< (dBm)	Result
1.2 GHz - 8 GHz	4019.73	-37.87	-19	Pass



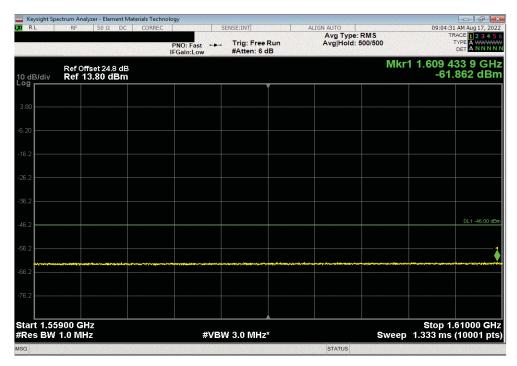


Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 731.5 MHz

Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

1.559 GHz - 1.61 GHz 1609.43 -61.86 -46 Pass

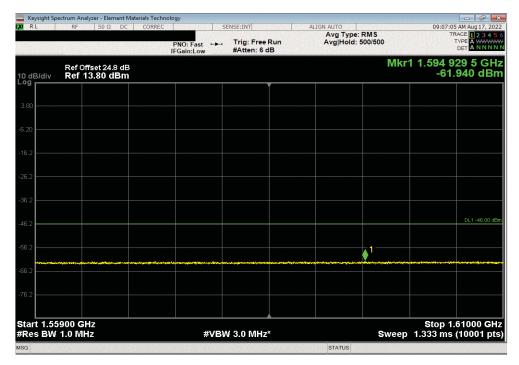


Port 1	Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz						
	Frequency	Measured	Max Value	Limit			
	Range	Freq (MHz)	(dBm)	< (dBm)	Result		
1	.559 GHz - 1.61 GHz	1600.17	-61.86	-46	Pass		





Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 742.5 MHz
Frequency Measured Max Value Limit
Range Freq (MHz) (dBm) < (dBm) Result
1.559 GHz - 1.61 GHz 1594.93 -61.94 -46 Pass



Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz						
Frequency Measured Max Value Limit						
Range	Freq (MHz)	(dBm)	< (dBm)	Result		
1.559 GHz - 1.61 GHz	1596.22	-61.9	-46	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 antenna port spurious emissions were measured at the RF output terminal of the EUT through 3 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 8 GHz. The conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.

The measurement methods are detailed in KDB 971168 D01v03 section 6 and ANSI C63.26-2015. Per FCC 2.1057(a)(1), the upper level of measurement is the 10th harmonic of the highest fundamental frequency. These measurements are for the frequency band after the first 100 kHz bands immediately outside and adjacent to the frequency block.

Per FCC section 90.543(e)(3), the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

FCC 90.543(e)(5) requires a >100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range.

Per section 90.543(f), for the frequency range 1559-1610 MHz the EIRP limit is -70dBW/MHz for wideband signals and -80dBW for discrete emissions of bandwidths less than 700Hz. This equates to an EIRP of -40dBm/MHz for wideband emissions and -50dBm/MHz for discrete emissions. The limit is adjusted to -46 dBm [-40 dBm -10 log (4)] for wideband signals and -56dBm [-50 dBm -10 log (4)] for discrete emissions per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

The limit for the 9kHz to 150kHz frequency range was adjusted to –39dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 100kHz [i.e.: -39dBm = -19dBm -10log(100kHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to -29dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 100kHz [i.e.: -29dBm = -19dBm -10log(100kHz/10kHz)]. The required limit of -19dBm with a RBW of > 100kHz was used for all other frequency ranges. (See ANSI C63.26-2015 paragraph 5.7.2a for details on the Limit/RBW scaling method)

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



					TbtTx 2022.05.02.0	XMit 202
EUT: AHLBA				Work Order:		
Serial Number: K918084					19-Aug-22	
	olutions and Networks			Temperature:		
Attendees: David Le				Humidity:		
Project: None				Barometric Pres.:		
Tested by: Marty M	artin	Power: 54 VDC		Job Site:	TX07	
EST SPECIFICATIONS		Test Method				
CC 27:2022		ANSI C63.26:2015				
CC 90R:2022		ANSI C63.26:2015				
OMMENTS						
	s were accounted for in the reference level offest in	ncluding any attenuators, filters and DC blocks. T	he carrier was enabled at maximum	power (80 watts/ca	rrier).	
EVIATIONS FROM TEST Sone	TANDARD					
		m + m +				
onfiguration #	1, 2, 3 Signature	Morty Marti				
	- J.g.	Frequency	Measured	Max Value	Limit	
		Range	Freq (MHz)	(dBm)	< (dBm)	Result
rt 1 5G NR, I	Band n14, 758 - 768 Mhz					
	5 MHz Bandwidth  QPSK Modulation					
	Mid Channel, 763.0 MH	Hz 9 kHz - 150 kHz	0.01	-55.36	-39	Pass
	Mid Channel, 763.0 MH		0.15	-52.2	-29	Pass
	Mid Channel, 763.0 Mi		909.44	-40.29	-19	Pass
	Mid Channel, 763.0 MH		3631.68	-37.72	-19	Pass
	16QAM Modulation	1.2 0112 - 0 0112	3031.00	-51.12	-15	1 033
	Mid Channel, 763.0 MH	Hz 9 kHz - 150 kHz	0.01	-54.66	-39	Pass
	Mid Channel, 763.0 Mi		0.15	-52.55	-29	Pass
	Mid Channel, 763.0 Mi		909.52	-40.55	-19	Pass
	Mid Channel, 763.0 Mi		4026.53	-37.89	-19	Pass
	64QAM Modulation	1.2 0112 - 0 0112	4020.00	-01.00	-10	1 433
	Mid Channel, 763.0 MH	Hz 9 kHz - 150 kHz	0.01	-54.58	-39	Pass
	Mid Channel, 763.0 Mi		0.01	-51.39	-29	Pass
	Mid Channel, 763.0 Mi		909.64	-40.44	-19	Pass
	Mid Channel, 763.0 Mi		4025.63	-37.81	-19	Pass
	256QAM Modulation	1.2 Of 12 - 0 Of 12	4020.00	-07.01	-10	1 433
	Mid Channel, 763.0 MH	Hz 9 kHz - 150 kHz	0.01	-54.77	-39	Pass
	Mid Channel, 763.0 Mi		0.01	-51.81	-29	Pass
	Mid Channel, 763.0 Mi		908.97	-40.68	-19	Pass
	Mid Channel, 763.0 Mi		4028.8	-37.74	-19	Pass
	10 MHz Bandwidth	1.2 OF 12 - 0 OF 12	4020.0	-01.14	-10	1 433
	256QAM Modulation					
	Mid Channel, 763.0 MH	Hz 9 kHz - 150 kHz	0.01	-55.11	-39	Pass
	Mid Channel, 763.0 Mi		0.15	-51.66	-29	Pass
	Mid Channel, 763.0 Mi		910.03	-40.67	-19	Pass
	Mid Channel, 763.0 Mh		4029.71	-37.9	-19	Pass
5G NR F	Band n14, 758 - 768 Mhz, 1559 - 1610 MHz	1.2 OF 12 - 0 OF 12	7023.71	-01.0	-10	1 033
05 MI, 1	5 MHz Bandwidth					
	256QAM Modulation					
	Low Channel, 760.5 MI	Hz 1.559 GHz - 1.61 GHz	1609.43	-61.95	-46	Pass
	Mid Channel, 763.0 MH		1597.15	-61.99	-46	Pass
	High Channel, 765.5 M		1590.25	-61.94	-46	Pass
	10 MHz Bandwidth		.550.20			. 200
	256QAM Modulation					
	Mid Channel, 763.0 MH	Hz 1.559 GHz - 1.61 GHz	1605.76	-61.94	-46	Pass

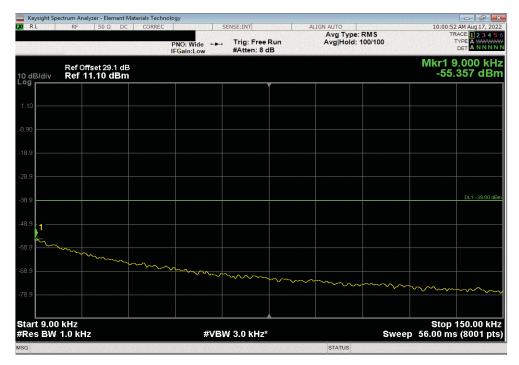


 Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 763.0 MHz

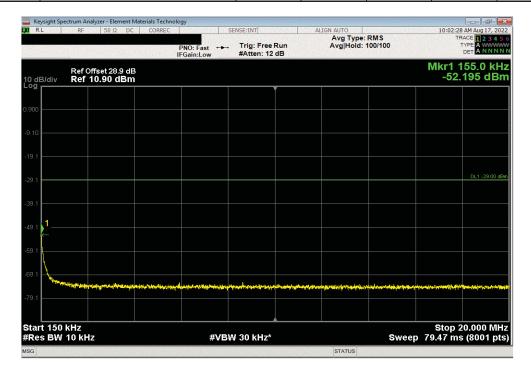
 Frequency
 Measured
 Max Value
 Limit

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

 9 kHz - 150 kHz
 0.01
 -55.36
 -39
 Pass



Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 763.0 MHz					
Frequency	Measured	Max Value	Limit		
Range	Freq (MHz)	(dBm)	< (dBm)	Result	
150 kHz - 20 MHz	0.15	-52.2	-29	Pass	



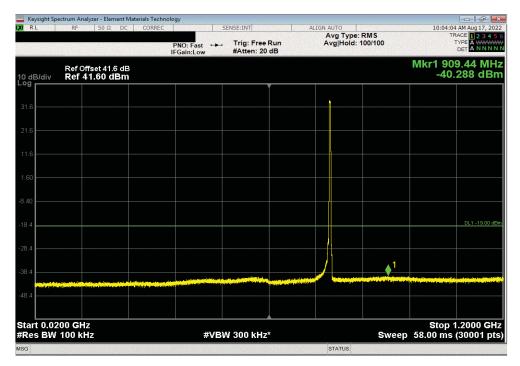


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 763.0 MHz

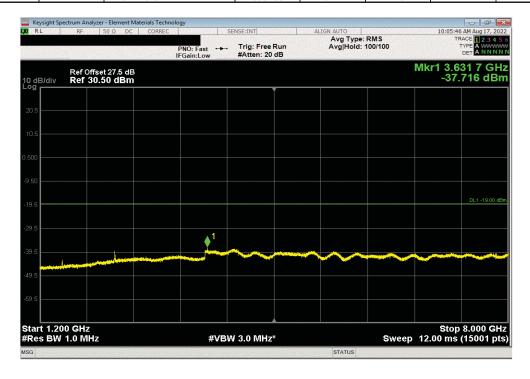
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 909.44 -40.29 -19 Pass



Port 1, 5G NR, Band n14, 758 - 768 N	Mhz, 5 MHz Bandwidth,	QPSK Modulation	n, Mid Channel, 7	763.0 MHz
Frequency	Measured	Max Value	Limit	
Range	Freq (MHz)	(dBm)	< (dBm)	Result
1.2 GHz - 8 GHz	3631.68	-37.72	-19	Pass



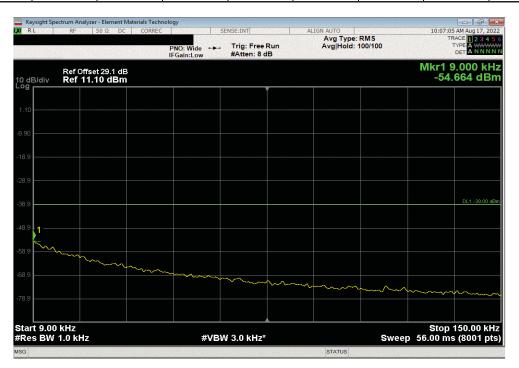


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 763.0 MHz

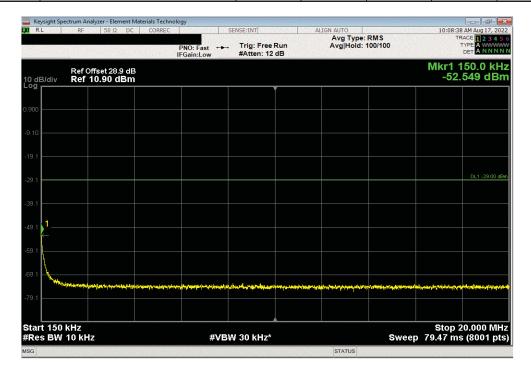
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

9 kHz - 150 kHz 0.01 -54.66 -39 Pass



	Port 1, 5G NR, Band n14, 758 - 768 Mhz,	5 MHz Bandwidth,	16QAM Modulation	on, Mid Channel,	763.0 MHz
	Frequency	Measured	Max Value	Limit	
_	Range	Freq (MHz)	(dBm)	< (dBm)	Result
i [	150 kHz - 20 MHz	0.15	-52.55	-29	Pass



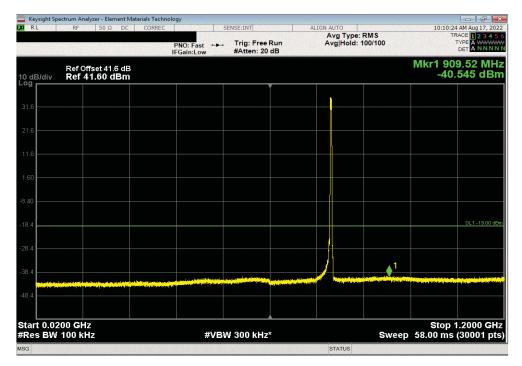


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 763.0 MHz

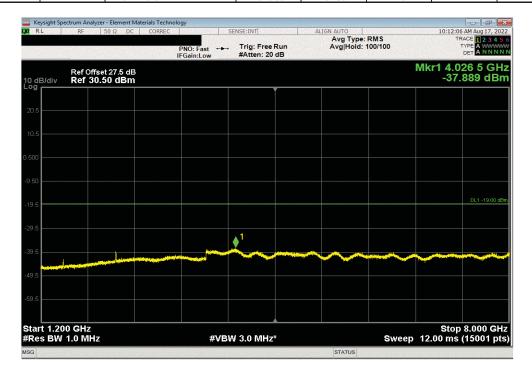
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 909.52 -40.55 -19 Pass



Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5	MHz Bandwidth,	16QAM Modulation	n, Mid Channel,	763.0 MHz
Frequency	Measured	Max Value	Limit	
 Range	Freq (MHz)	(dBm)	< (dBm)	Result
1.2 GHz - 8 GHz	4026.53	-37.89	-19	Pass



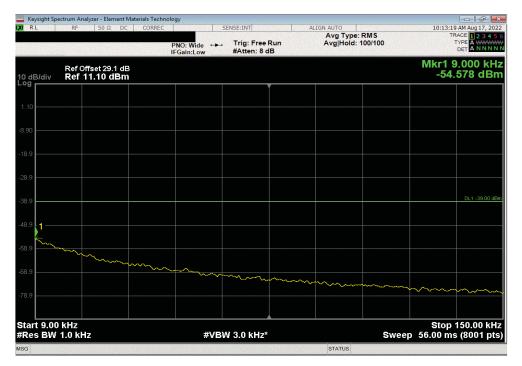


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 763.0 MHz

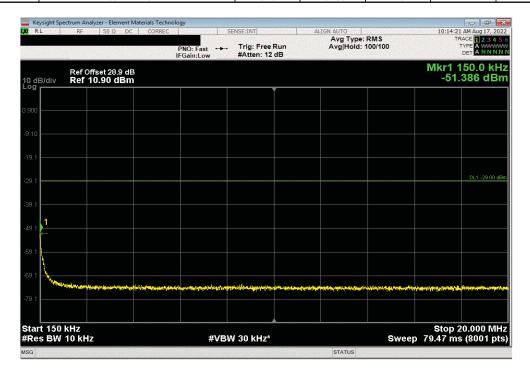
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

9 kHz - 150 kHz 0.01 -54.58 -39 Pass



	Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 763.0 MHz					
	Frequency	Measured	Max Value	Limit		
	Range	Freq (MHz)	(dBm)	< (dBm)	Result	
i	150 kHz - 20 MHz	0.15	-51.39	-29	Pass	



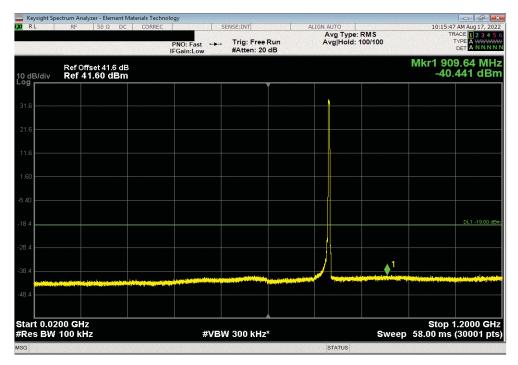


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 763.0 MHz

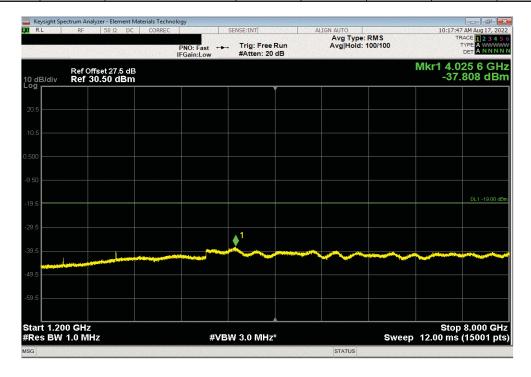
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 909.64 -40.44 -19 Pass



	Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 763.0 MHz					
	Frequency	Measured	Max Value	Limit		
_	Range	Freq (MHz)	(dBm)	< (dBm)	Result	
ĺ	1.2 GHz - 8 GHz	4025.63	-37.81	-19	Pass	



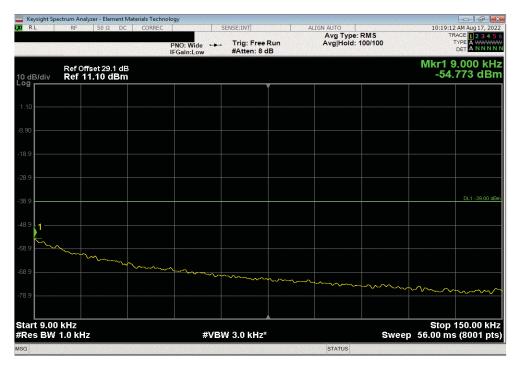


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763.0 MHz

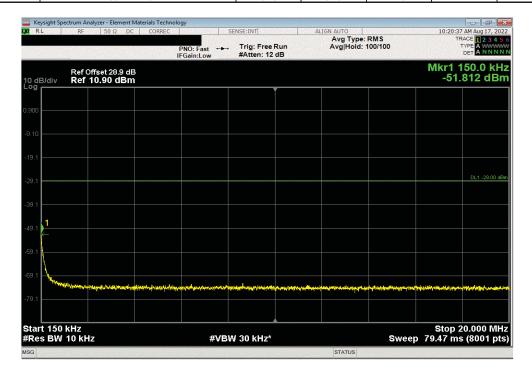
Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

9 kHz - 150 kHz 0.01 -54.77 -39 Pass



Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763.0 MHz					
Frequency	Measured	Max Value	Limit		
Range	Freq (MHz)	(dBm)	< (dBm)	Result	
150 kHz - 20 MHz	0.15	-51.81	-29	Pass	



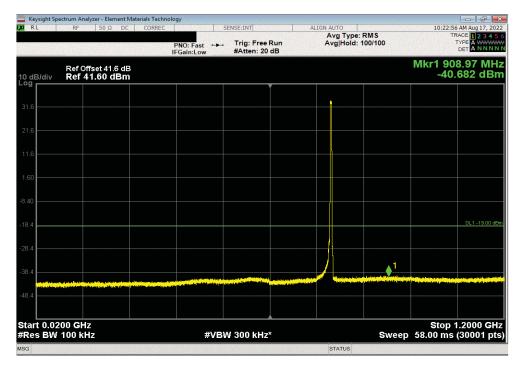


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763.0 MHz

Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 908.97 -40.68 -19 Pass



Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763.0 MHz						
Frequency	Measured	Max Value	Limit			
Range	Freq (MHz)	(dBm)	< (dBm)	Result		
1.2 GHz - 8 GHz	4028.8	-37.74	-19	Pass		



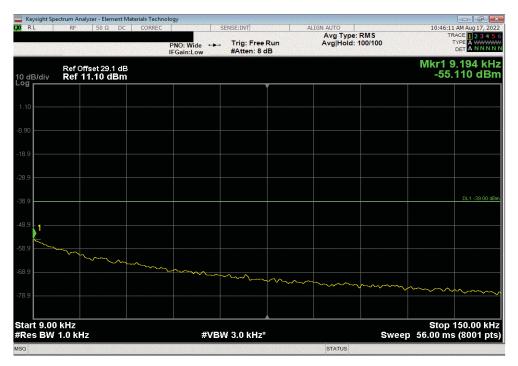


 Port 1, 5G NR, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763.0 MHz

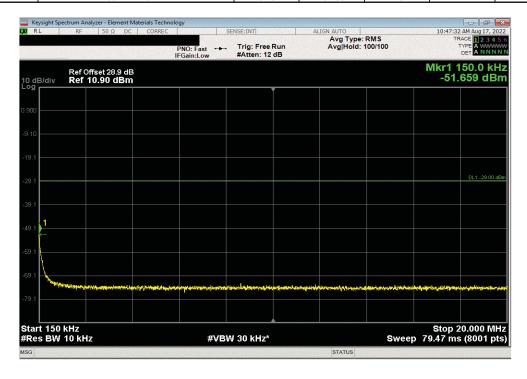
 Frequency
 Measured
 Max Value
 Limit

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

 9 kHz - 150 kHz
 0.01
 -55.11
 -39
 Pass



Port 1, 5G NR, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763.0 MHz				763.0 MHz
Frequency	Measured	Max Value	Limit	
 Range	Freq (MHz)	(dBm)	< (dBm)	Result
150 kHz - 20 MHz	0.15	-51.66	-29	Pass



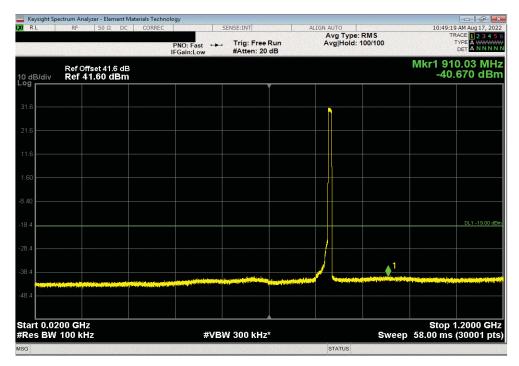


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763.0 MHz

Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

20 MHz - 1.2 GHz 910.03 -40.67 -19 Pass



F	Port 1, 5G NR, Band n14, 758 - 768 Mhz, 10	MHz Bandwidth, 2	256QAM Modulati	ion, Mid Channel,	, 763.0 MHz
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBm)	< (dBm)	Result
	1.2 GHz - 8 GHz	4029.71	-37.9	-19	Pass



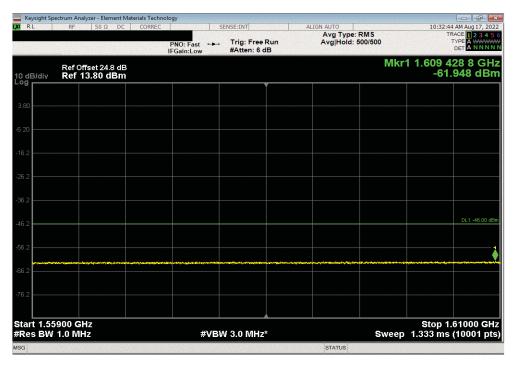


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 760.5 MHz

Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

1.559 GHz - 1.61 GHz 1609.43 -61.95 -46 Pass



Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763.0 MHz				
Frequency Measured Max Value Limit				
Range	Freq (MHz)	(dBm)	< (dBm)	Result
1.559 GHz - 1.61 GHz	1597.15	-61.99	-46	N/A



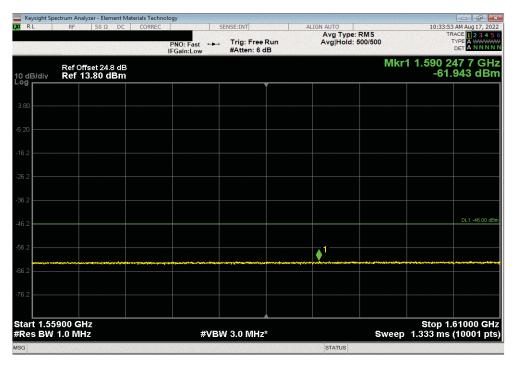


Port 1, 5G NR, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz

Frequency Measured Max Value Limit

Range Freq (MHz) (dBm) < (dBm) Result

1.559 GHz - 1.61 GHz 1590.25 -61.94 -46 Pass



	Port 1, 5G NR, Band n14, 758 - 768 Mhz, 10	MHz Bandwidth, 2	256QAM Modulati	ion, Mid Channel,	, 763.0 MHz
	Frequency	Measured	Max Value	Limit	
_	Range	Freq (MHz)	(dBm)	< (dBm)	Result
l [	1.559 GHz - 1.61 GHz	1605.76	-61.94	-46	Pass





End of Test Report