

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

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

Per section 90.543(e)(3) and RSS 140 4.4 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 for Band n14.

FCC 90.543(e)(5) and RSS 140 4.4b requires a >100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range. FCC 90.543(e)(5) and RSS 140 4.4b requires a >30 kHz measurement bandwidth for emissions between 100 kHz outside of the RRH operating frequency range and band edge of the operating frequency range.

FCC 90.543(e) (1) and RSS 140 4.4a requires an emission limit of -46dBm for any 6.25 kHz bandwidth between frequency bands 769-775 MHz and 799-806 MHz (Note that the upper frequency for Part 90 is 805MHz and RSS 140 is 806MHz). The limit is adjusted to -52 dBm per 6.25 kHz bandwidth [-46 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Spectrum analyzer reference level offset corrections were applied for the Band n14 band edge measurements from 769MHz-775MHz and 799MHz to 808MHz.

AHLBBA antenna ports 1&4 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: AHLBBA (C2PC/C3PC FCC/ISED)
Serial Number: K9193514835 Work Order: NOKI0047 Date: 3-Aug-22 Customer: Nokia Solutions and Networks Temperature: 22.2 °C Attendees: Mitchell Hill Humidity: 53.8% RH Barometric Pres.: 1021 mbar Project: None Tested by: Marty Martin
TEST SPECIFICATIONS Power: 54VDC Test Method Job Site: TX07 FCC 90R:2022 RSS 140 Issue 1: 2018 COMMENTS All measurement path losses were accounted for in the reference level offset including attenuators, cables, DC block and filter when in use. The carriers were enabled at maximum power **DEVIATIONS FROM TEST STANDARD** Morty 2, 4 Configuration # Marta Frequency Measured Max Value Limit Range Freq (MHz) (dBm) < (dBm) Result 5G NR Band n14, 758 - 768 Mhz 5 MHz Bandwidth **QPSK Modulation** Low Channel, 760.5 MHz 758 -25.8 -19 Pass 757.9 768 -21.2 -25.8 Low Channel, 760.5 MHz -19 Pass High Channel, 765.5 MHz -19 Pass High Channel, 765.5 MHz High Channel, 765.5 MHz Pass Pass 768.1 -22.9 -19 769.04 -52 -55.8 High Channel, 765.5 MHz 806.76 -72.7 -52 Pass 16QAM Modulation Low Channel, 760.5 MHz 758 -26.0 -19 Pass 757.9 Low Channel, 760.5 MHz -21.0 -19 Pass High Channel, 765.5 MHz 768 -26.1 -19 Pass -23.2 768.15 High Channel, 765.5 MHz -19 Pass -52 -52 High Channel, 765.5 MHz 769 -56.9 High Channel, 765.5 MHz 804.66 -72.9 Pass 64QAM Modulation Low Channel, 760.5 MHz -25.9 -19 758 Pass Low Channel, 760.5 MHz High Channel, 765.5 MHz -19 -19 757.9 -20.5 Pass -25.8 Pass 768 High Channel, 765.5 MHz 768.1 -22.5 -19 Pass High Channel, 765.5 MHz 769.01 -55.7 -52 Pass High Channel, 765.5 MHz 805.89 -72.9 -52 Pass 256QAM Modulation Low Channel, 760.5 MHz Low Channel, 760.5 MHz -25.7 -20.7 -19 -19 758 Pass 757.9 Pass High Channel, 765.5 MHz High Channel, 765.5 MHz 768 768.16 -19 -19 Pass Pass -25.7 -23.1 High Channel, 765.5 MHz 769.01 -56.0 -52 Pass High Channel, 765.5 MHz 803.61 -72.9-52 Pass 10 MHz Bandwidth, 256 QAM Modulation Low Channel, 763.0 MHz 758 -28.1-19 Pass Low Channel, 763.0 MHz 757.65 -22.9 -19 Pass -31.3 High Channel, 763.0 MHz 768 -19 Pass High Channel, 763.0 MHz High Channel, 763.0 MHz 768.1 -28.3 -19 Pass -59.5 -52 Pass 769 High Channel, 763.0 MHz 805.67 -72.7 Pass Port 2 5G NR Band n14, 758 - 768 Mhz 5 MHz Bandwidth QPSK Modulation Low Channel, 760.5 MHz 758 -26.0 -19 Pass -21.9 -27.0 Low Channel, 760.5 MHz 757.9 -19 Pass High Channel, 765.5 MHz Pass 768 -19 High Channel, 765.5 MHz 768.15 -25.1 -19 Pass High Channel, 765.5 MHz -60.0 769.07 -52 Pass High Channel, 765.5 MHz 805.08 -72.8 -52 Pass 16QAM Modulation Low Channel, 760.5 MHz 758 -26.4 -19 Pass Low Channel, 760.5 MHz 757.9 -21.9 -19 Pass High Channel, 765.5 MHz High Channel, 765.5 MHz 768 -27.2 -19 Pass 768.1 Pass -25.3-19 High Channel, 765.5 MHz 769.19 -59.8 -52 Pass High Channel, 765.5 MHz 807.49 -72.8 -52 Pass 64QAM Modulation Low Channel, 760.5 MHz 758 -26.0 -19 Pass Low Channel, 760.5 MHz High Channel, 765.5 MHz Pass 757.87 -21.9 -19 768 -26.9 -19 Pass High Channel, 765.5 MHz 768.1 -24.4 -19 Pass High Channel, 765.5 MHz 769.11 -59.8 -52 Pass Pass High Channel, 765.5 MHz 803.97 -72.9 -52 256QAM Modulation Low Channel, 760.5 MHz Low Channel, 760.5 MHz 758 -26.2 -19 Pass 757.9 -21.4 Pass -19 768 768.13 High Channel, 765.5 MHz -26.6 -19 Pass High Channel, 765.5 MHz -24.2 -19 Pass -52 -52 High Channel, 765.5 MHz 769.1 -59.5 High Channel, 765.5 MHz 804.03 -72.8 Pass 10 MHz Bandwidth 256QAM Modulation Low Channel, 763.0 MHz Low Channel, 763.0 MHz 758 757.71 -27.1 -21.5 -19 Pass -19 Pass -30.0 -26.3 High Channel, 763.0 MHz 768 -19 Pass 768.16 High Channel, 763.0 MHz -19 Pass High Channel, 763.0 MHz 769.29 -59.5 High Channel, 763.0 MHz 802.9 -72.8 -52 Pass

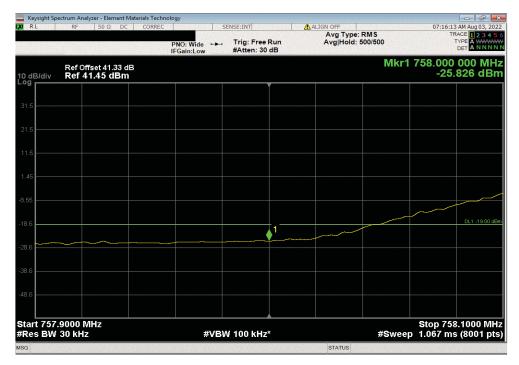


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 760.5 MHz

Frequency Measured Max Value Limit

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

1 758 -25.83 -19 Pass



	Port 1	, Band n14, 758	- 768 Mhz, 5 MHz	Bandwidth, QPS	SK Modulation, Lo	w Channel, 760.	5 MHz
		Frequency		Measured	Max Value	Limit	
		Range		Freq (MHz)	(dBm)	< (dBm)	Result
i		2		757.9	-21.23	-19	Pass



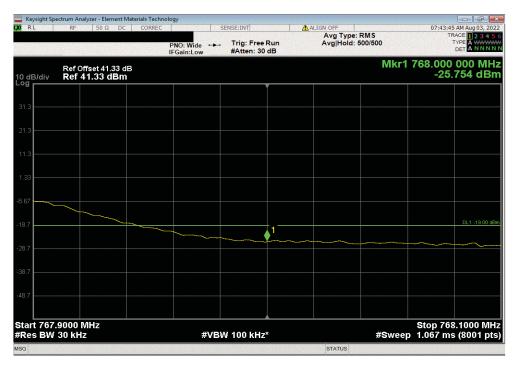


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz

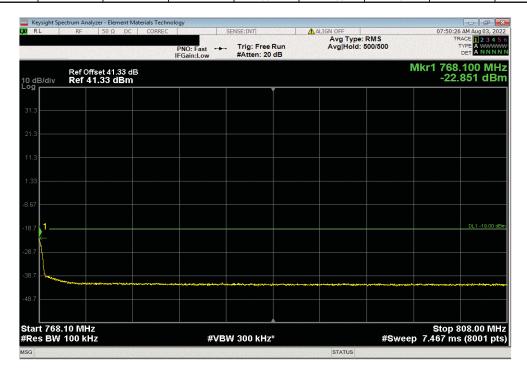
Frequency Measured Max Value Limit

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

1 768 -25.75 -19 Pass



	Port 1	, Band n14, 758 -	- 768 Mhz, 5 MHz	Bandwidth, QPS	K Modulation, Hi	gh Channel, 765.	5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
l í		2		768.1	-22.85	-19	Pass



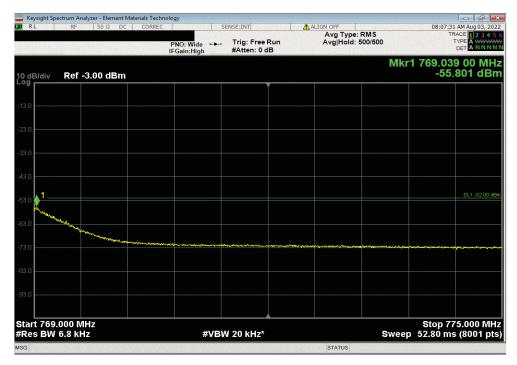


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz

Frequency Measured Max Value Limit

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

3 769.04 -55.8 -52 Pass



	Port 1	, Band n14, 758 -	- 768 Mhz, 5 MHz	Bandwidth, QPS	K Modulation, Hi	gh Channel, 765.	5 MHz
		Frequency		Measured	Max Value	Limit	
		Range		Freq (MHz)	(dBm)	< (dBm)	Result
ĺ		4		806.76	-72.72	-52	Pass





Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 760.5 MHz

Frequency Measured Max Value Limit

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

1 758 -26.03 -19 Pass



Port 1,	Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 16QA	AM Modulation, Lo	ow Channel, 760.	.5 MHz
	Frequency		Measured	Max Value	Limit	
	Range		Freq (MHz)	(dBm)	< (dBm)	Result
	2		757.9	-20.95	-19	Pass



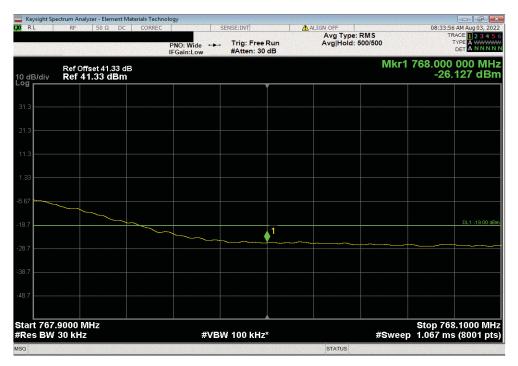


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 765.5 MHz

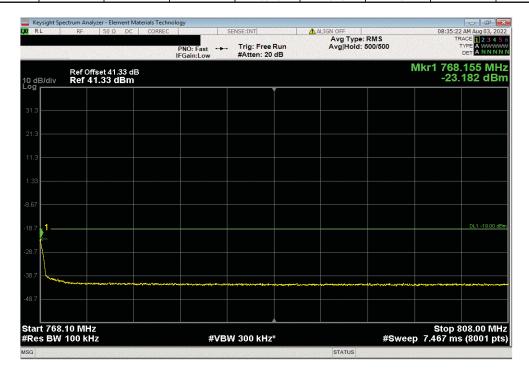
Frequency Measured Max Value Limit

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

1 768 -26.13 -19 Pass

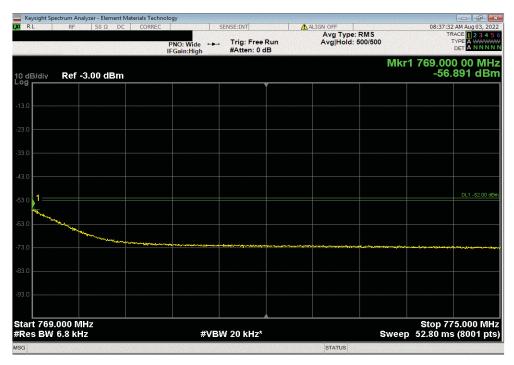


Po	rt 1, Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 16QA	AM Modulation, H	igh Channel, 765	.5 MHz
	Frequency		Measured	Max Value	Limit	
	Range		Freq (MHz)	(dBm)	< (dBm)	Result
	2		768.15	-23.18	-19	Pass

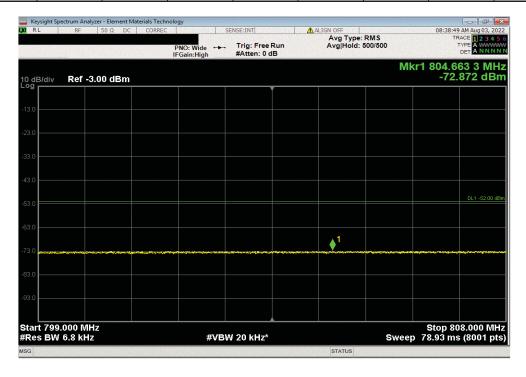




| Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 765.5 MHz
Frequency	Measured	Max Value	Limit	
Range	Freq (MHz)	(dBm)	< (dBm)	Result
3	769	-56.89	-52	Pass



	Port 1,	Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 16QA	AM Modulation, H	igh Channel, 765	.5 MHz
		Frequency		Measured	Max Value	Limit	
		Range		Freq (MHz)	(dBm)	< (dBm)	Result
1		4		804.66	-72.87	-52	Pass



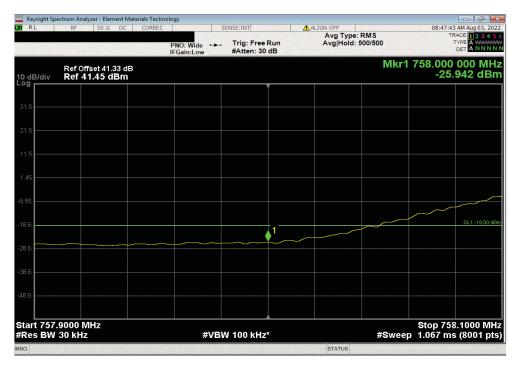


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 760.5 MHz

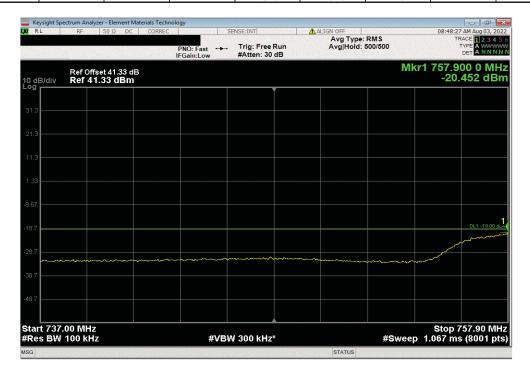
Frequency Measured Max Value Limit

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

1 758 -25.94 -19 Pass



	Port 1	Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 64QA	AM Modulation, L	ow Channel, 760	.5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
i		2		757.9	-20.45	-19	Pass



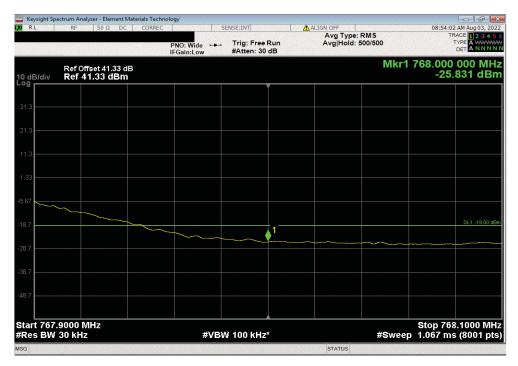


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 765.5 MHz

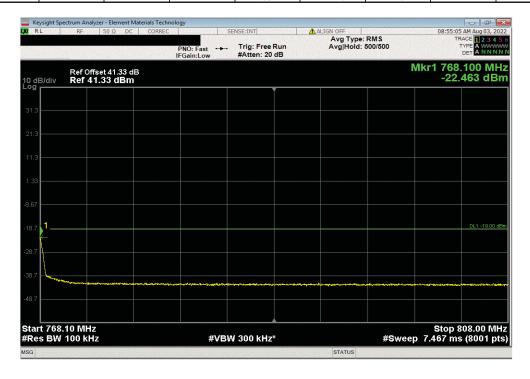
Frequency Measured Max Value Limit

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

1 768 -25.83 -19 Pass



	Port 1,	Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 64QA	M Modulation, H	igh Channel, 765	.5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
i í		2		768.1	-22.46	-19	Pass



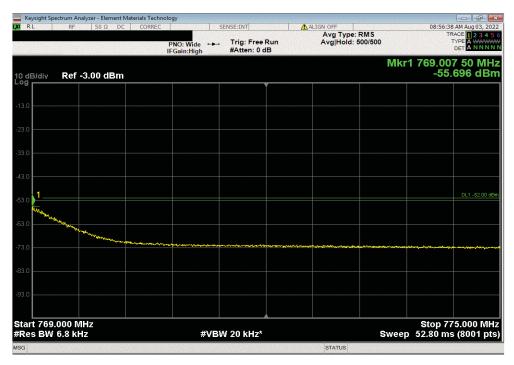


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 765.5 MHz

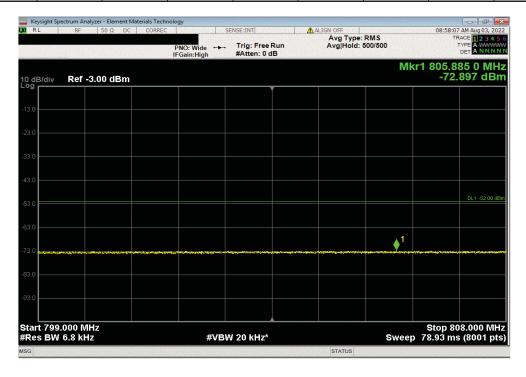
Frequency Measured Max Value Limit

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

3 769.01 -55.7 -52 Pass



	Port 1,	Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 64QA	AM Modulation, H	igh Channel, 765	.5 MHz
		Frequency		Measured	Max Value	Limit	
		Range		Freq (MHz)	(dBm)	< (dBm)	Result
i		4		805.89	-72.9	-52	Pass



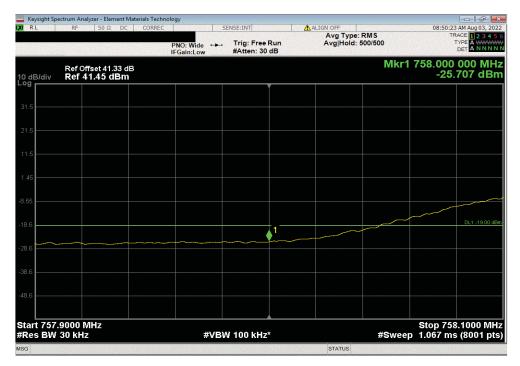


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 760.5 MHz

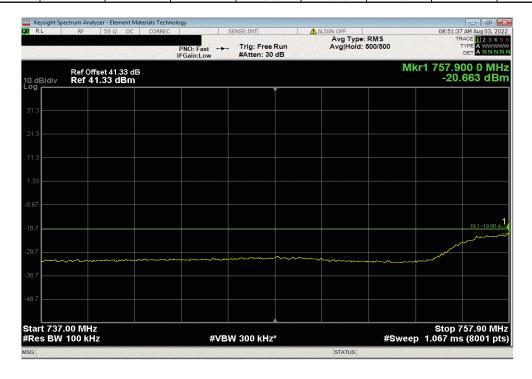
Frequency Measured Max Value Limit

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

1 758 -25.71 -19 Pass



	Port 1,	Band n14, 758 -	768 Mhz, 5 MHz I	Bandwidth, 256Q	AM Modulation, L	ow Channel, 760	).5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
l í		2		757.9	-20.66	-19	Pass



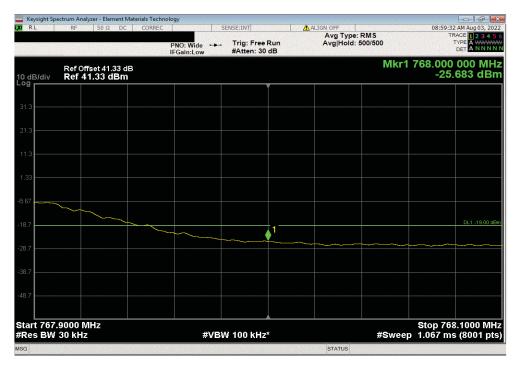


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz

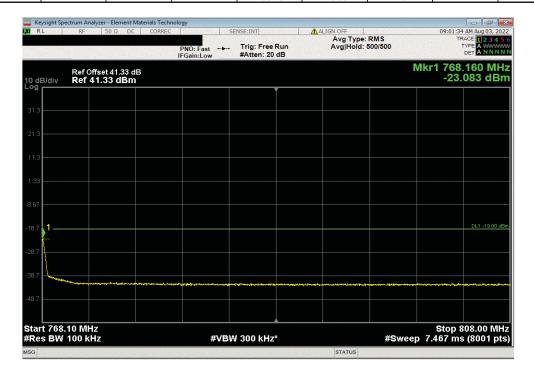
Frequency Measured Max Value Limit

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

1 768 -25.68 -19 Pass



	Port 1,	Band n14, 758 - 7	768 Mhz, 5 MHz E	Bandwidth, 256Q	AM Modulation, F	ligh Channel, 765	5.5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
1 [		2		768.16	-23.08	-19	Pass



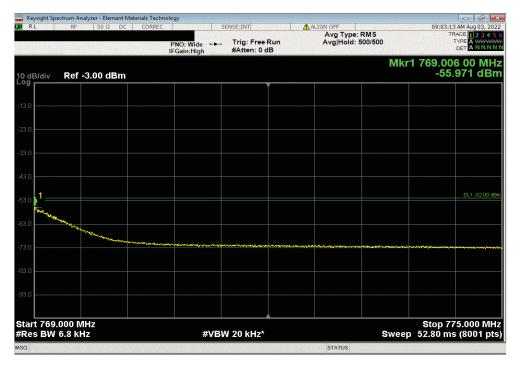


Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz

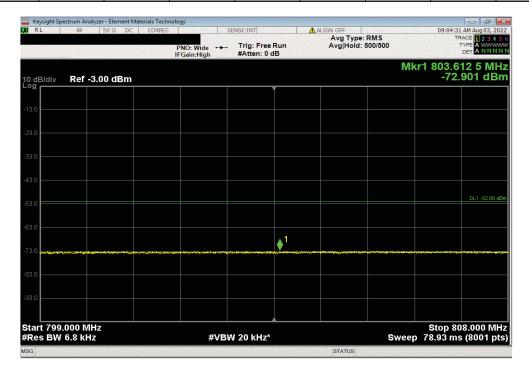
Frequency Measured Max Value Limit

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

3 769.01 -55.97 -52 Pass



Port 1, 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		
	4		803.61	-72.9	-52	Pass		



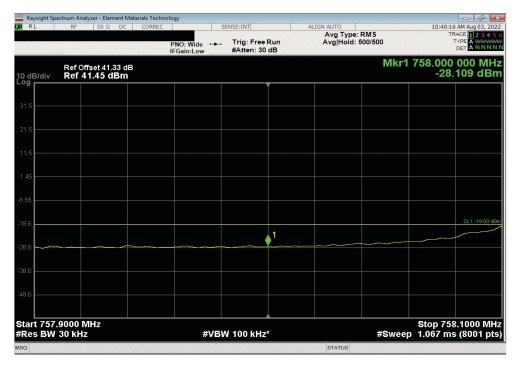


Port 1, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Low Channel, 760.5 MHz

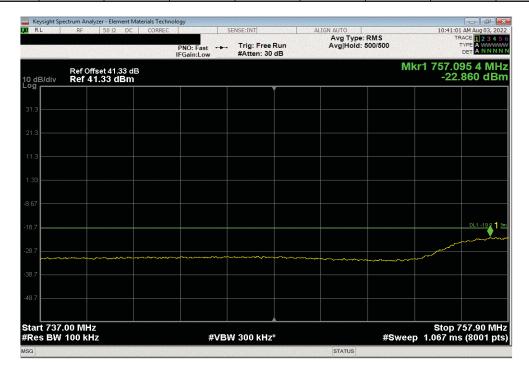
Frequency Measured Max Value Limit

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

1 758 -28.11 -19 Pass



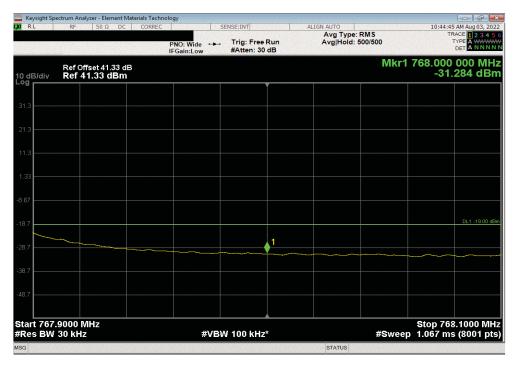
Port 1,	Band n14, 758 - 7	768 Mhz, 10 MHz	Bandwidth, 2560	QAM Modulation, I	Low Channel, 76	0.5 MHz
	Frequency		Measured	Max Value	Limit	
	Range		Freq (MHz)	(dBm)	< (dBm)	Result
	2		757.1	-22.86	-19	Pass



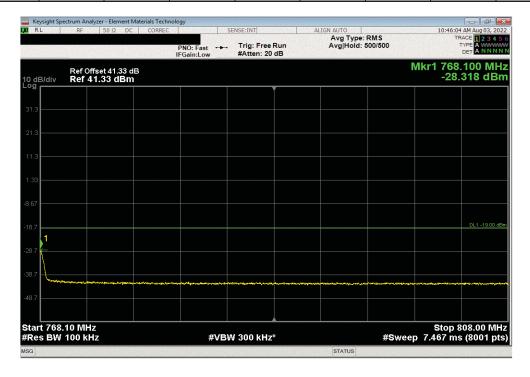


Port 1, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz

Frequency Measured Max Value Limit
Range Freq (MHz) (dBm) < (dBm) Result
1 768 -31.28 -19 Pass



Port 1, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz							
	Frequency		Measured	Max Value	Limit		
	Range		Freq (MHz)	(dBm)	< (dBm)	Result	
	2		768.1	-28.32	-19	Pass	



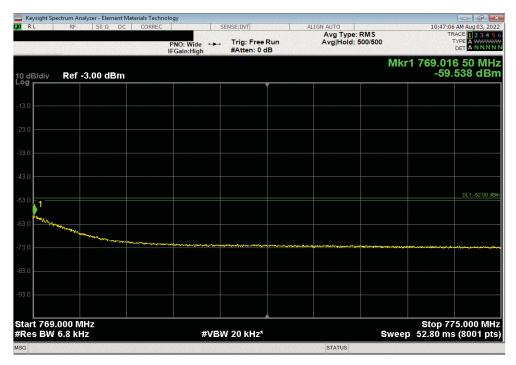


Port 1, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz

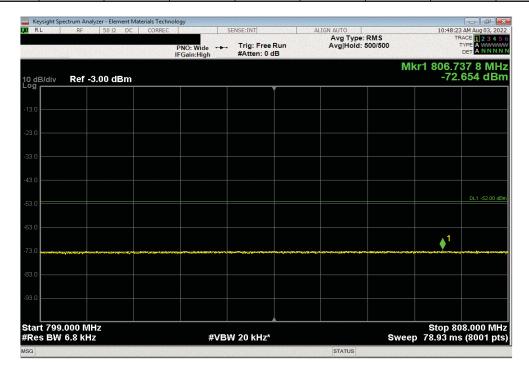
Frequency Measured Max Value Limit

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

3 769.02 -59.54 -52 Pass



Port 1, I	Band n14, 758 - 7	68 Mhz, 10 MHz	Bandwidth, 256C	AM Modulation, I	High Channel, 76	5.5 MHz
	Frequency		Measured	Max Value	Limit	
	Range		Freq (MHz)	(dBm)	< (dBm)	Result
	4		806.74	-72.65	-52	Pass



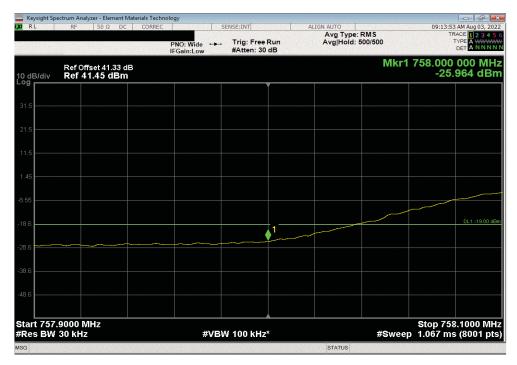


Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 760.5 MHz

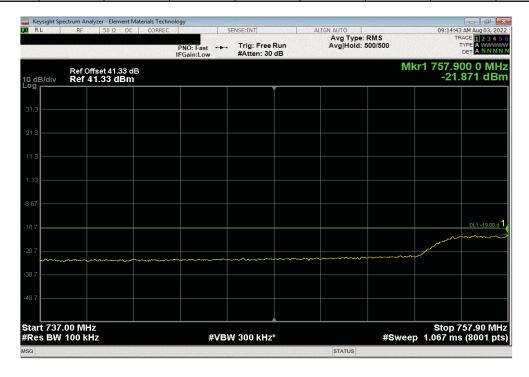
Frequency Measured Max Value Limit

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

1 758 -25.96 -19 Pass



	Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 760.5 MHz								
		Frequency		Measured	Max Value	Limit			
		Range		Freq (MHz)	(dBm)	< (dBm)	Result		
1		2		757.9	-21.87	-19	Pass		





Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz

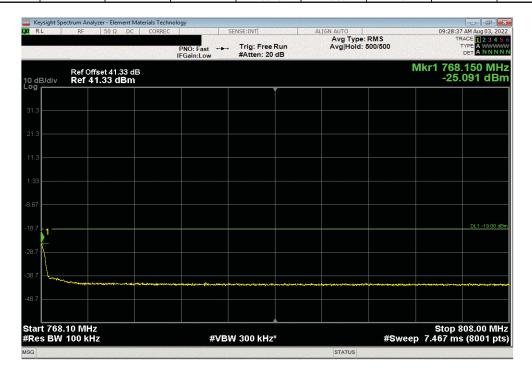
Frequency Measured Max Value Limit

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

1 768 -27.01 -19 Pass



	Port 2, Band n14, 758 -	768 Mhz, 5 MHz Bandwidth, QPS	SK Modulation, Hi	gh Channel, 765.	5 MHz
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBm)	< (dBm)	Result
	2	768.15	-25.09	-19	Pass



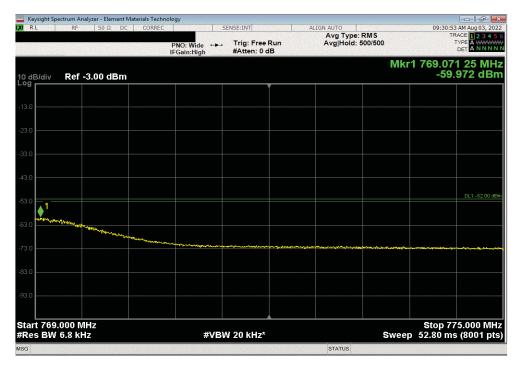


Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz

Frequency Measured Max Value Limit

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

3 769.07 -59.97 -52 Pass



	Port 2, Band n14, 758 -	768 Mhz, 5 MHz Bandwidth, QPS	SK Modulation, Hi	igh Channel, 765.	5 MHz
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBm)	< (dBm)	Result
1	4	805.08	-72.84	-52	Pass



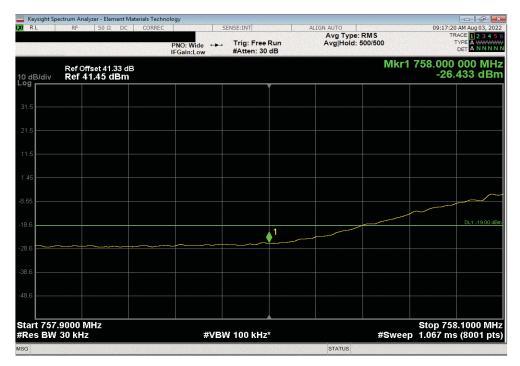


Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 760.5 MHz

Frequency Measured Max Value Limit

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

1 758 -26.43 -19 Pass



Port 2, Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 16Q/	AM Modulation, L	ow Channel, 760	.5 MHz
Frequency		Measured	Max Value	Limit	
 Range		Freq (MHz)	(dBm)	< (dBm)	Result
2		757.9	-21.87	-19	Pass



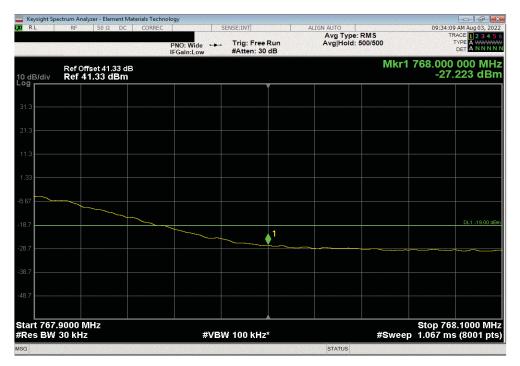


Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 765.5 MHz

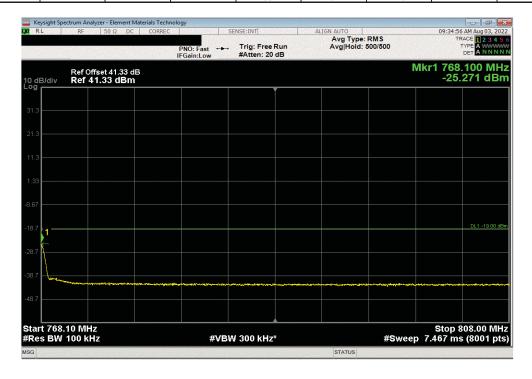
Frequency Measured Max Value Limit

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

1 768 -27.22 -19 Pass



	Port 2,	Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 16QA	M Modulation, H	igh Channel, 765	.5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
i [		2		768.1	-25.27	-19	Pass



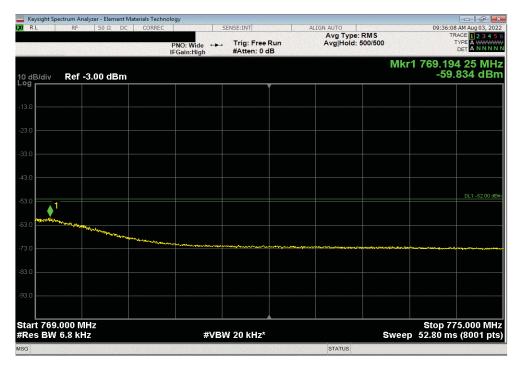


Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 765.5 MHz

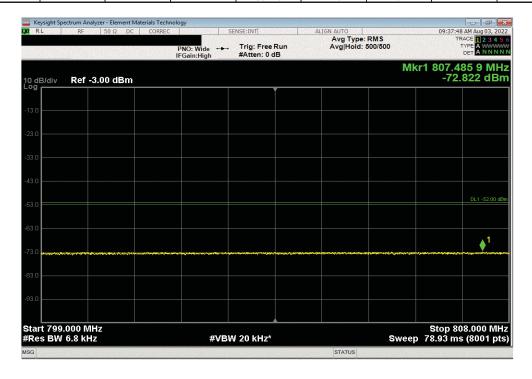
Frequency Measured Max Value Limit

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

3 769.19 -59.83 -52 Pass



	Port 2,	Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 16QA	AM Modulation, H	igh Channel, 765	.5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
ĺ		4		807.49	-72.82	-52	Pass



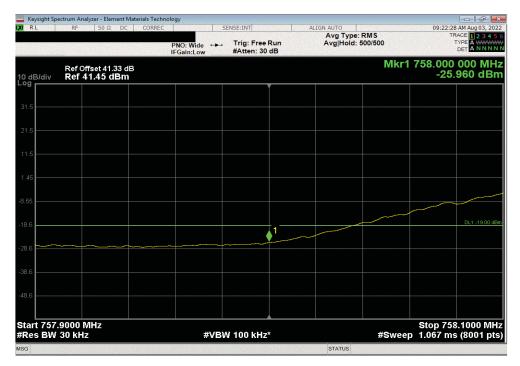


Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 760.5 MHz

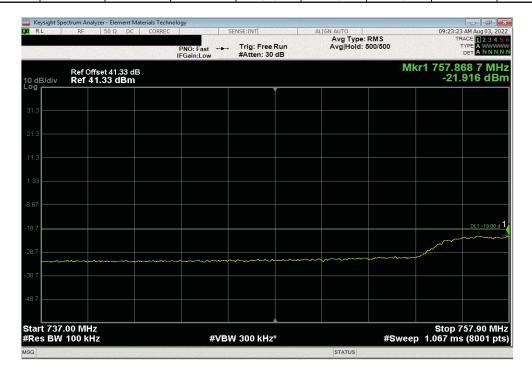
Frequency Measured Max Value Limit

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

1 758 -25.96 -19 Pass



	Port 2	, Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 64Q/	AM Modulation, L	ow Channel, 760	.5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
1 [		2		757.87	-21.92	-19	Pass



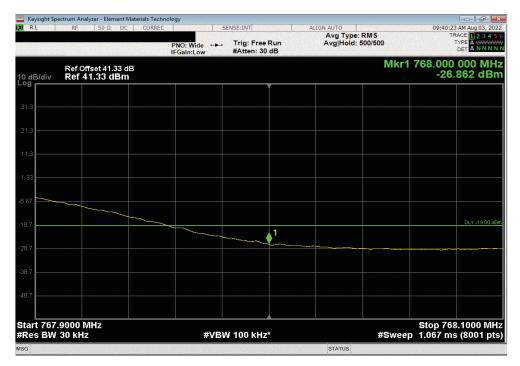


Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 765.5 MHz

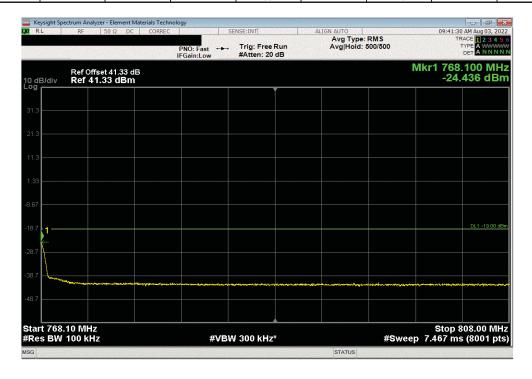
Frequency Measured Max Value Limit

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

1 768 -26.86 -19 Pass



	Port 2,	Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 64QA	M Modulation, H	igh Channel, 765	.5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
i [		2		768.1	-24.44	-19	Pass



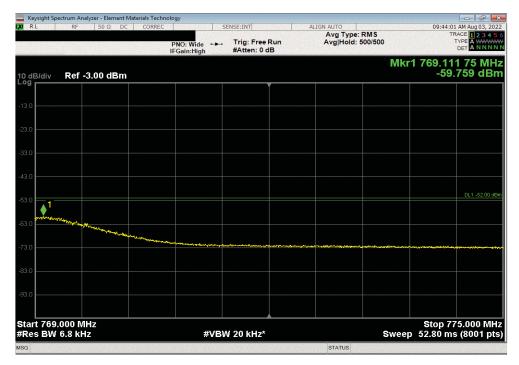


Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 765.5 MHz

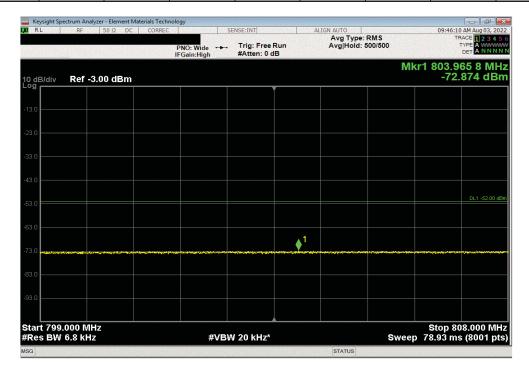
Frequency Measured Max Value Limit

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

3 769.11 -59.76 -52 Pass



Port 2,	Band n14, 758 -	768 Mhz, 5 MHz	Bandwidth, 64QA	M Modulation, H	igh Channel, 765	.5 MHz
	Frequency		Measured	Max Value	Limit	
	Range		Freq (MHz)	(dBm)	< (dBm)	Result
	4		803.97	-72.87	-52	Pass





Port 2, 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

1 758 -26.22 -19 Pass



	Port 2,	Band n14, 758 -	768 Mhz, 5 MHz I	Bandwidth, 256Q	AM Modulation, L	ow Channel, 760	).5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
1		2		757.9	-21.36	-19	Pass





Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz

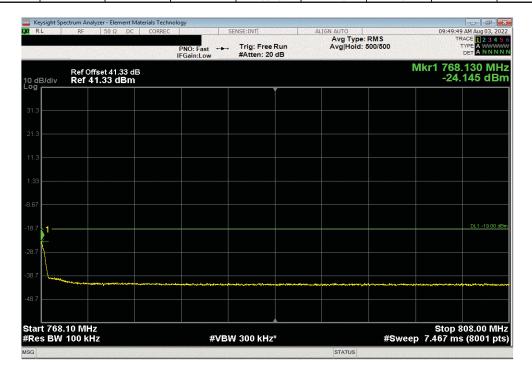
Frequency Measured Max Value Limit

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

1 768 -26.64 -19 Pass



	Port 2,	Band n14, 758 - 7	768 Mhz, 5 MHz E	Bandwidth, 256Q	AM Modulation, F	ligh Channel, 765	5.5 MHz
		Frequency		Measured	Max Value	Limit	
_		Range		Freq (MHz)	(dBm)	< (dBm)	Result
i ſ		2		768.13	-24.15	-19	Pass



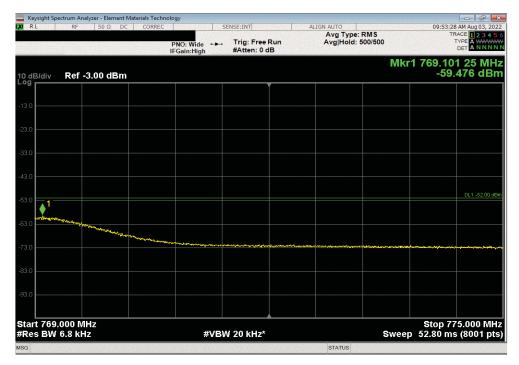


Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz

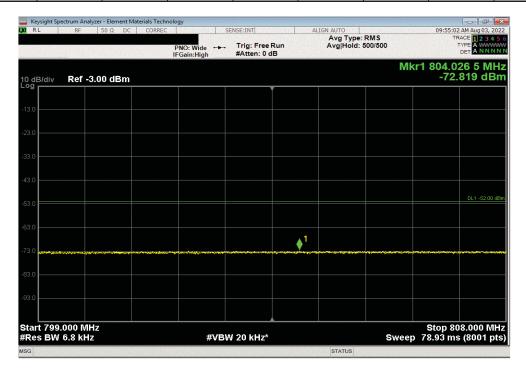
Frequency Measured Max Value Limit

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

3 769.1 -59.48 -52 Pass



Port 2,	Band n14, 758 -	768 Mhz, 5 MHz E	Bandwidth, 256Q	AM Modulation, F	ligh Channel, 765	5.5 MHz
	Frequency		Measured	Max Value	Limit	
	Range		Freq (MHz)	(dBm)	< (dBm)	Result
	4		804.03	-72.82	-52	Pass





Port 2, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Low Channel, 760.5 MHz

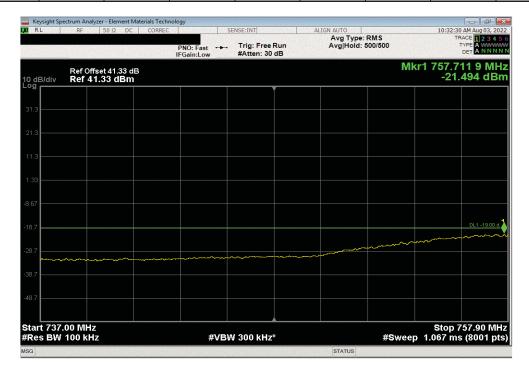
Frequency Measured Max Value Limit

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

1 758 -27.08 -19 Pass



Port 2,	Band n14, 758 - 7	768 Mhz, 10 MHz	Bandwidth, 2560	QAM Modulation,	Low Channel, 76	0.5 MHz
	Frequency		Measured	Max Value	Limit	
	Range		Freq (MHz)	(dBm)	< (dBm)	Result
	2		757.71	-21.49	-19	Pass



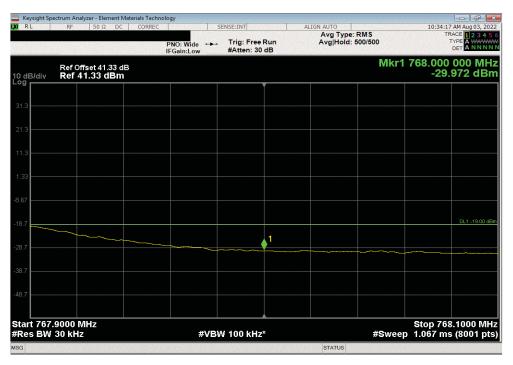


Port 2, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz

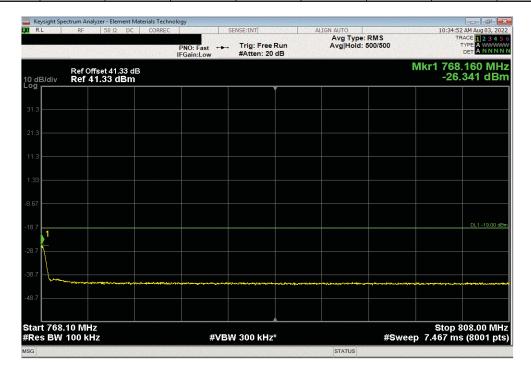
Frequency Measured Max Value Limit

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

1 768 -29.97 -19 Pass



Port 2, I	Band n14, 758 - 7	68 Mhz, 10 MHz	Bandwidth, 256C	AM Modulation, I	High Channel, 76	5.5 MHz
	Frequency		Measured	Max Value	Limit	
	Range		Freq (MHz)	(dBm)	< (dBm)	Result
	2		768.16	-26.34	-19	Pass



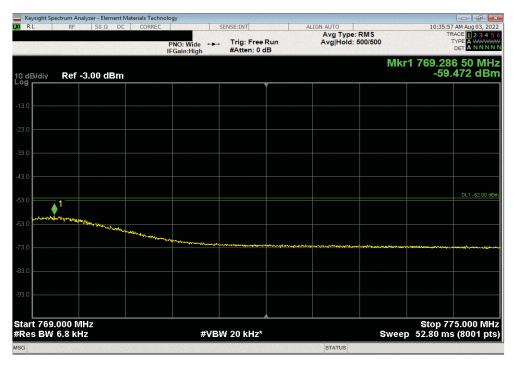


Port 2, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz

Frequency Measured Max Value Limit

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

3 769.29 -59.47 -52 Pass



	Port 2, E	Band n14, 758 - 7	68 Mhz, 10 MHz	Bandwidth, 256C	AM Modulation, I	Port 2, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz								
		Frequency		Measured	Max Value	Limit								
		Range		Freq (MHz)	(dBm)	< (dBm)	Result							
i		4		802.9	-72.79	-52	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 spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet. For Multiband operation, measurements were taken at the lower band edge of the lower band and the upper band edge of the upper band.

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

Per FCC section 27.53(g) and RSS 130 4.7.1, FCC section 90.543(e)(3) and RSS 140 4.4 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 for 5G NR Band n12.

FCC section 27.53(g) and RSS 130 4.7.1, FCC section 90.543(e)(3) and RSS 140 4.4 requires a >100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range. FCC section 27.53(g) and RSS 130 4.7.1, FCC section 90.543(e)(3) and RSS 140 4.4 requires a >30 kHz measurement bandwidth for emissions between 100 kHz outside of the RRH operating frequency range and band edge of the operating frequency range.

FCC 90.543(e)(1) and RSS 140 4.4a requires an emission limit of -46dBm for any 6.25 kHz bandwidth between frequency bands 769-775 MHz and 799-806 MHz (Note that the upper frequency for Part 90 is 805MHz and RSS 140 is 806MHz). The limit is adjusted to -52 dBm per 6.25kHz bandwidth [-46 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Spectrum analyzer reference level offset corrections were applied for the Band n14 band edge measurements from 769MHz-775MHz and 799MHz to 808MHz.

AHLBBA antenna port s 1&4 are essentially electrically identical (the RF power variation between antenna ports is small as shown in the 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.

AHLBBA antenna ports 2&3 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.

#### Multicarrier/Multiband 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 NR 5MHz carriers at the lower band edge (731.5 & 736.5MHz). In Band n14 one NR 5MHz carrier at the upper band edge 765.5MHz. The carriers are operated at maximum power for a total port power of 80 watts (~26.6W/Band n12/n14 carriers).



F	ALII DD A (00D0/00D0 =00"00	·D.			W	TbtTx 2022.05.02.0	XMit 2023
	AHLBBA (C2PC/C3PC FCC/ISE	ED)			Work Order:		
Serial Number:					Date:		
	Nokia Solutions and Networks				Temperature:		
	Mitchell Hill					58.3% RH	
Project:					Barometric Pres.:		
	Marty Martin		Power: 54VDC		Job Site:	TX07	
ST SPECIFICATI	ONS		Test Method				
CC 27:2022			ANSI C63.26:2015				
CC 90R:2022			ANSI C63.26:2015				
SS-130 Issue 2: 20	119 and RSS 140 Issue 1: 2018		ANSI C63.26:2015				
OMMENTS							
measurement path lo	sses were accounted for in the reference	e level offset including attenuators, cables, DC bloc	k and filter when in use. Band n12 and Band n14 c	arriers were operating at maximu	n power in each applic	able test case to achieve	a total port pow
watts.		• • • • • • • • • • • • • • • • • • • •					
EVIATIONS FROM	TEST STANDARD						
one							
		22					
onfiguration #	2, 4	11/201	Marti				
	, i	Signature	rooms				
			Frequency	Measured	Max Value	Limit	
			Range	Freg (MHz)	(dBm)	< (dBm)	Result
ort 1 5G NR Multi-	Carrier Test Case 1		g-	1104 ()	(==/	(==/	
	Band n12, 729 - 745 Mhz						
	5 MHz Bandwidth						
		Modulation					
	લા ઝા	Low Channel, 731.5 MHz	1	729	-31.6	-19	Pass
		Low Channel, 731.5 MHz	2	728.78	-27.2	-19	Pass
			1	745	-31.8	-19	Pass
		High Channel, 742.5 MHz High Channel, 742.5 MHz	2	745.39	-26.9	-19	Pass
aut 1 EC ND Multi	Carrier Test Case 2	riigii Channei, 742.5 MHZ		745.59	-20.9	-18	газэ
	Band n12, 729 - 745 Mhz, Band i	14 750 760 MU=					
	5 MHz Bandwidth	114 736 - 700 WITZ					
		C B A - strategations					
	QPSr	( Modulation Low Channel, 731.5 MHz	1	729	-28.8	-19	Pass
			2	728.87			
		Low Channel, 731.5 MHz	2		-24.4	-19	Pass
		High Channel, 765.5 MHz	1	768	-29.1	-19	Pass
		High Channel, 765.5 MHz	2	768.1	-25.3	-19	Pass
		High Channel, 765.5 MHz	3	769.03	-54.5	-52	Pass
		High Channel, 765.5 MHz	4	805.99	-73.0	-52	Pass
	Carrier Test Case 1						
	Band n12, 729 - 745 Mhz						
	5 MHz Bandwidth						
	QPSk	Modulation					
		Low Channel, 731.5 MHz	1	729	-28.9	-19	Pass
		Low Channel, 731.5 MHz	2	728.9	-24.0	-19	Pass
		High Channel, 742.5 MHz	1	745	-27.3	-19	Pass
		High Channel, 742.5 MHz	2	745.11	-22.8	-19	Pass
	Carrier Test Case 2						
	Band n12, 729 - 745 Mhz, Band I	n14 758 - 768 MHz					
	5 MHz Bandwidth						
	QPSk	Modulation					
	-	Low Channel, 731.5 MHz	1	729	-26.5	-19	Pass
		Low Channel, 731.5 MHz	2	728.72	-21.4	-19	Pass
		High Channel, 765.5 MHz	1	768	-25.3	-19	Pass
		High Channel, 765.5 MHz	2	768.11	-21.3	-19	Pass
							Pass
		High Channel 765 5 MHz	3				
		High Channel, 765.5 MHz High Channel, 765.5 MHz	3 4	769.37 806.33	-54.9 -72.9	-52 -52	Pass



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

Frequency

Range
Freq (MHz)

(dBm)

(dBm)

Result

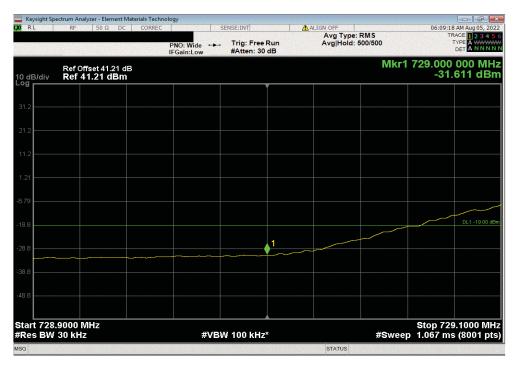
1

729

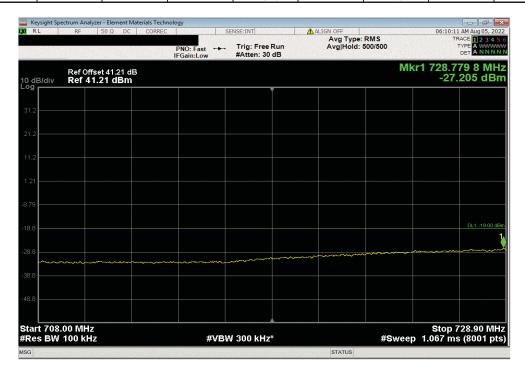
-31.61

-19

Pass



Port '	Port 1, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz									
	Frequency					Limit				
	Range					< (dBm)	Result			
		2		728.78	-27.21	-19	Pass			



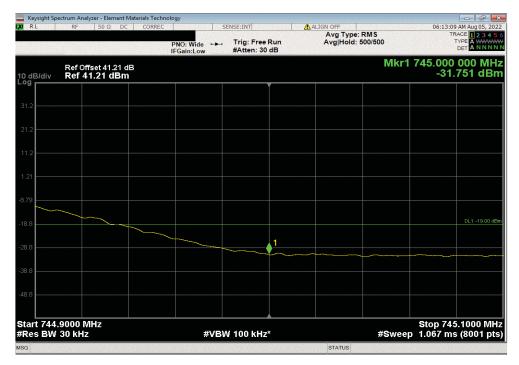


Port 1, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz

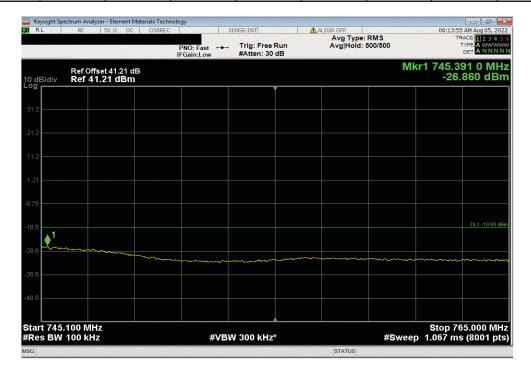
Frequency Measured Max Value Limit

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

1 745 -31.75 -19 Pass



Port 1,	Port 1, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz									
	Frequency					Limit				
	Range					< (dBm)	Result			
	2			745.39	-26.86	-19	Pass			



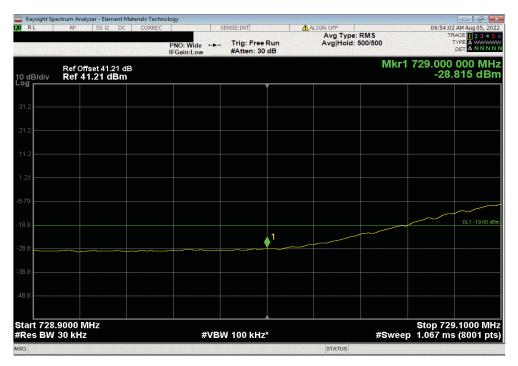


Port 1, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 Mhz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz

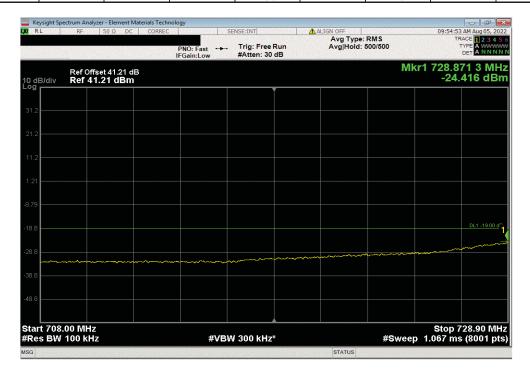
Frequency Measured Max Value Limit

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

1 729 -28.82 -19 Pass



Γ	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										
I		Frequency		Measured	Max Value	Limit					
ı		Range		Freq (MHz)	(dBm)	< (dBm)	Result	_			
ı		2		728.87	-24.42	-19	Pass	1			





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

Frequency

Range

Freq (MHz)

(dBm)

(dBm)

Result

1

768

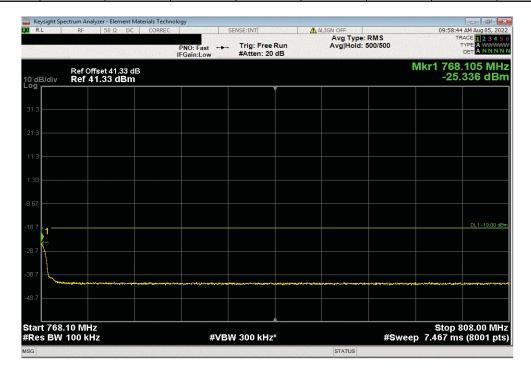
-29.1

-19

Pass



Port 1, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 Mhz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz									
		Frequency		Measured	Max Value	Limit			
	Range			Freq (MHz)	(dBm)	< (dBm)	Result	_	
l		2		768.1	-25.34	-19	Pass		

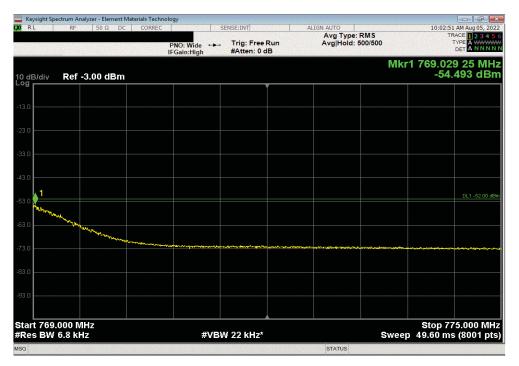




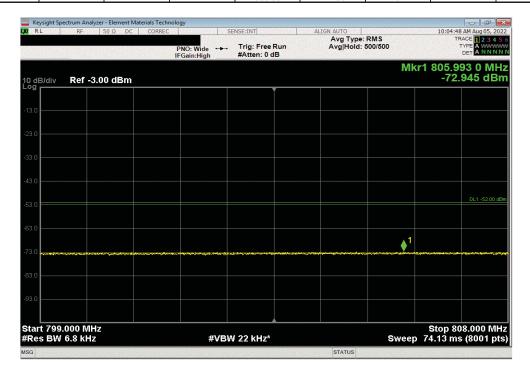
Port 1, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 Mhz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz

Frequency
Range
Freq (MHz)
(dBm)
(dBm)
Result

3
769.03
-54.49
-52
Pass



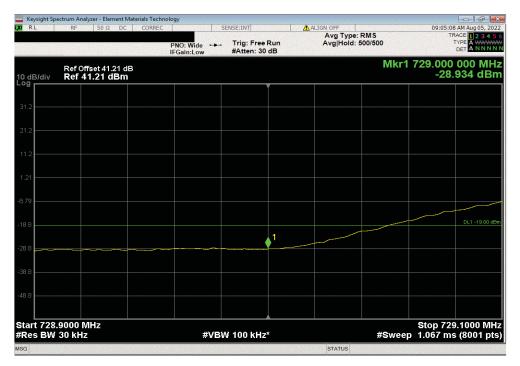
Port 1, 5G NR, Mult	Port 1, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 Mhz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz									
		Frequency		Measured	Max Value	Limit				
1	Range			Freq (MHz)	(dBm)	< (dBm)	Result	_		
l		4		805.99	-72.95	-52	Pass			



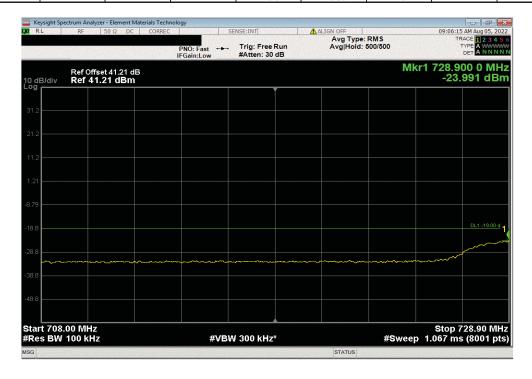


Port 2, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz

Frequency
Range
Freq (MHz)
(dBm)
(dBm)
Result
1
729
-28.93
-19
Pass



Port 2, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz									
Frequency			Measured	Max Value	Limit				
Range			Freq (MHz)	(dBm)	< (dBm)	Result			
		2		728.9	-23.99	-19	Pass		



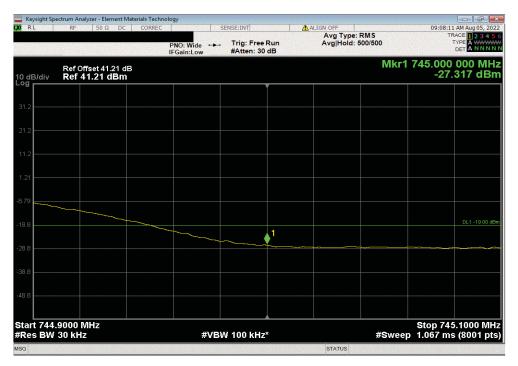


Port 2, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz

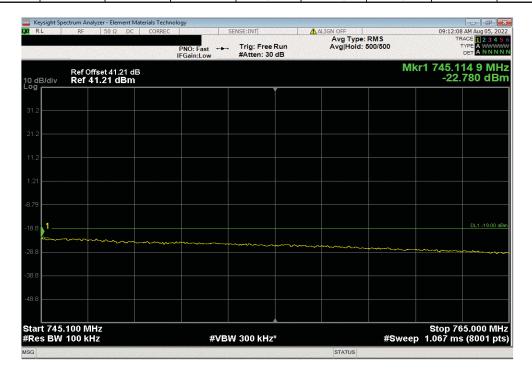
Frequency Measured Max Value Limit

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

3 745 -27.32 -19 Pass



	Port 2, 5G NR, Multi-Carrier Test Case 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz										
Frequency				Measured	Max Value	Limit					
	Range			Freq (MHz)	(dBm)	< (dBm)	Result				
		4		745.11	-22.78	-19	Pass				





Port 2, 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

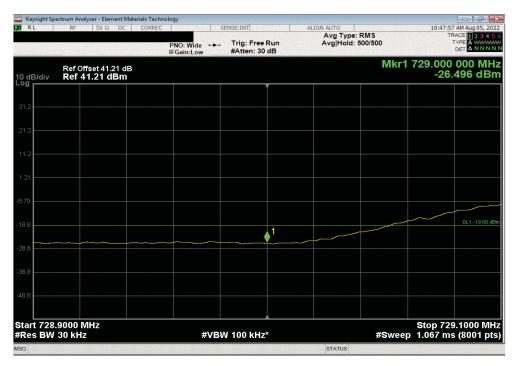
1

729

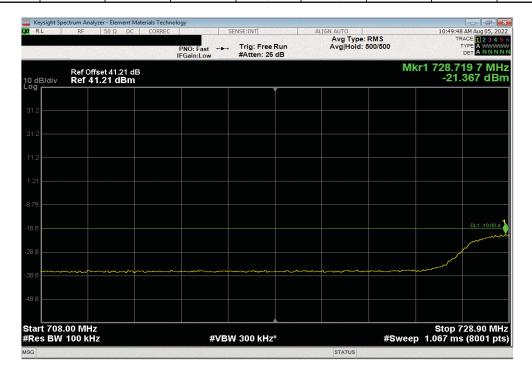
-26.5

-19

Pass



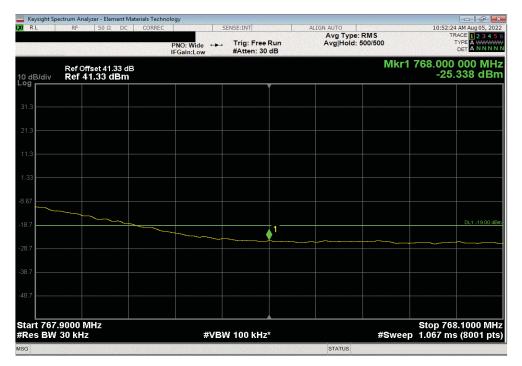
Port 2, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 Mhz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz									
		Frequency		Measured	Max Value	Limit			
	Range				(dBm)	< (dBm)	Result		
		2		728.72	-21.37	-19	Pass		



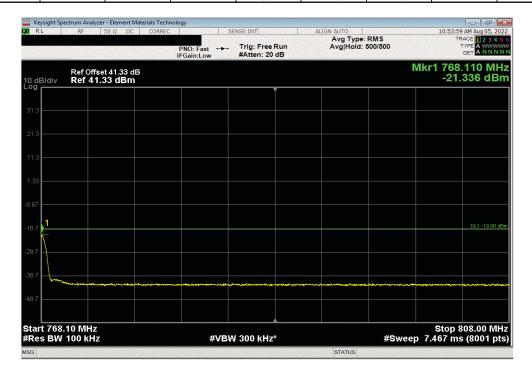


Port 2, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 Mhz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz

Frequency
Range
Freq (MHz)
(dBm)
(dBm)
Result
1
768
-25.34
-19
Pass



Γ	Port 2, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 Mhz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz										
I		Frequency		Measured	Max Value	Limit					
ı		Freq (MHz)	(dBm)	< (dBm)	Result						
ı		2		768.11	-21.34	-19	Pass	]			





Port 2, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 Mhz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz

Frequency

Measured

Max Value

Limit

Range

Freq (MHz)

(dBm)

< (dBm)

Result

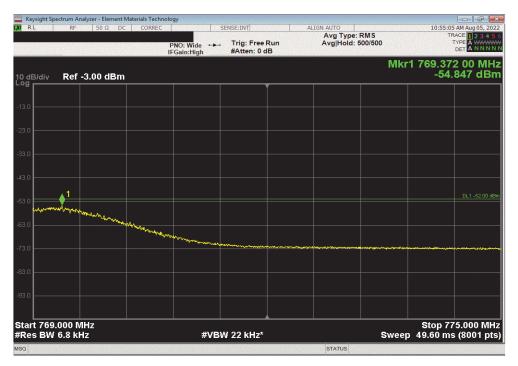
3

769.37

-54.85

-52

Pass



Port 2, 5G NR, Mult	Port 2, 5G NR, Multi-Carrier Test Case 2, Band n12, 729 - 745 Mhz, Band n14 758 - 768 MHz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz									
		Frequency		Measured	Max Value	Limit				
	Range			Freq (MHz)	(dBm)	< (dBm)	Result			
1		4		806.33	-72.93	-52	Pass	]		

