OUTPUT POWER - ALL PORTS

XMit 2020.12.30.0

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
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2021-03-11	2022-03-11
Block - DC	Fairview Microwave	SD3379	AMM	2020-09-21	2021-09-21

TEST DESCRIPTION

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

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

RF conducted emissions testing was performed on all sixteen ports at NR5 middle channel to demonstrate that the AAIB antenna ports are essentially electrically identical. AAIB antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

OUTPUT POWER - ALL PORTS

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	**AAIB (FCC/ISED C2PC)**			**Work Order:**	**NOKI0030**
Serial Number:	**BL2032123Y0**			**Date:**	**19-Jul-21**
Customer:	**Nokia Solutions and Networks**			**Temperature:**	**21.3 °C**
Attendees:	**David Le, Mitchell Hill**			**Humidity:**	**58.6% RH**
Project:	**None**			**Barometric Pres.:**	**1020 mbar**
Tested by:	**Brandon Hobbs**	**Power:**	**54 VDC**	**Job Site:**	**TX09**

TEST SPECIFICATIONS	**Test Method**
FCC 27:2021	ANSI C63.26:2015
RSS-139 Issue 3:2015, RSS-170 Issue 3:2015	RSS-139 Issue 3:2015, RSS-170 Issue 3:2015

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. The output power was measured for a single carrier over the carrier channel bandwidth on all ports. Band n66 NR5 carriers are enabled at maximum power (6.25 watts/carrier).

DEVIATIONS FROM TEST STANDARD

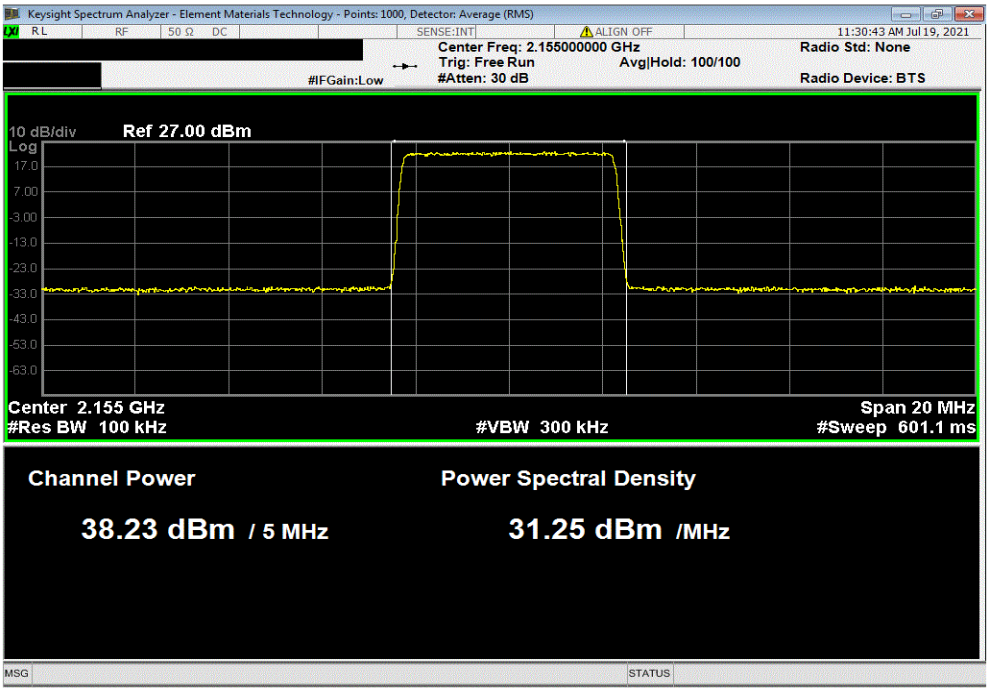
None

Configuration #	**2**	*Signature*

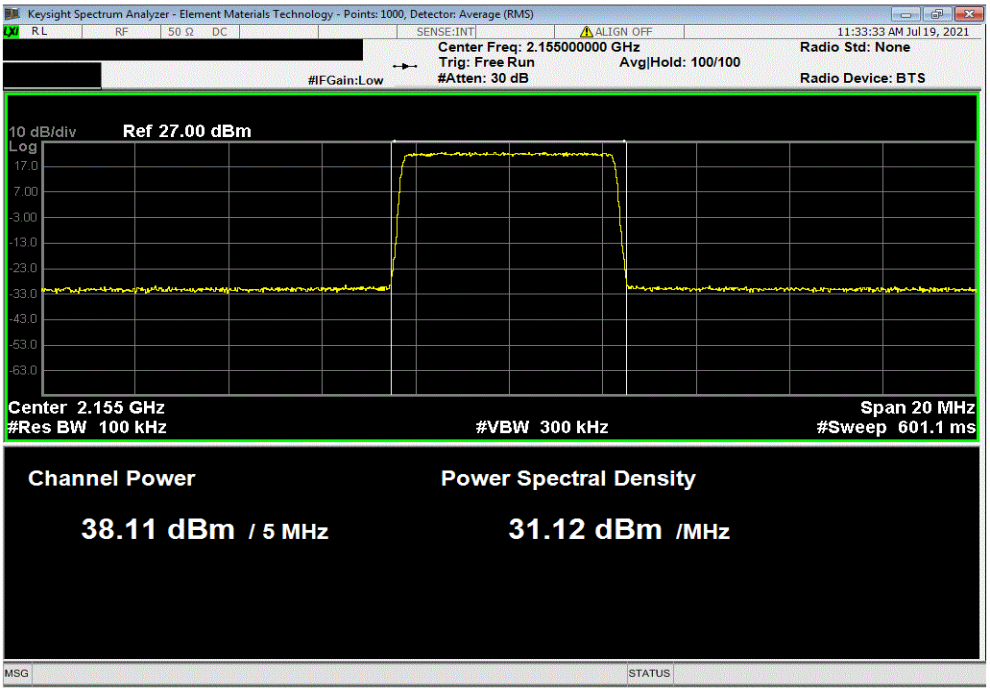
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Limit (dBm)	Results
Band n66, 2110 MHz - 2200 MHz					
5 MHz Bandwidth					
256-QAM Modulation					
Mid Channel 2155 MHz					
Port 1	38.235	0	38.2	Inside Tolerance	N/A
Port 2	38.114	0	38.1	Inside Tolerance	N/A
Port 3	38.013	0	38.0	Inside Tolerance	N/A
Port 4	37.995	0	38.0	Inside Tolerance	N/A
Port 5	38.020	0	38.0	Inside Tolerance	N/A
Port 6	37.922	0	37.9	Inside Tolerance	N/A
Port 7	38.036	0	38.0	Inside Tolerance	N/A
Port 8	37.942	0	37.9	Inside Tolerance	N/A
Port 9	37.879	0	37.9	Inside Tolerance	N/A
Port 10	37.767	0	37.8	Inside Tolerance	N/A
Port 11	37.808	0	37.8	Inside Tolerance	N/A
Port 12	37.867	0	37.9	Inside Tolerance	N/A
Port 13	37.979	0	38.0	Inside Tolerance	N/A
Port 14	37.965	0	38.0	Inside Tolerance	N/A
Port 15	37.891	0	37.9	Inside Tolerance	N/A
Port 16	37.873	0	37.9	Inside Tolerance	N/A

OUTPUT POWER - ALL PORTS

Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 1						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	38.235	0		38.2	Inside Tolerance	N/A

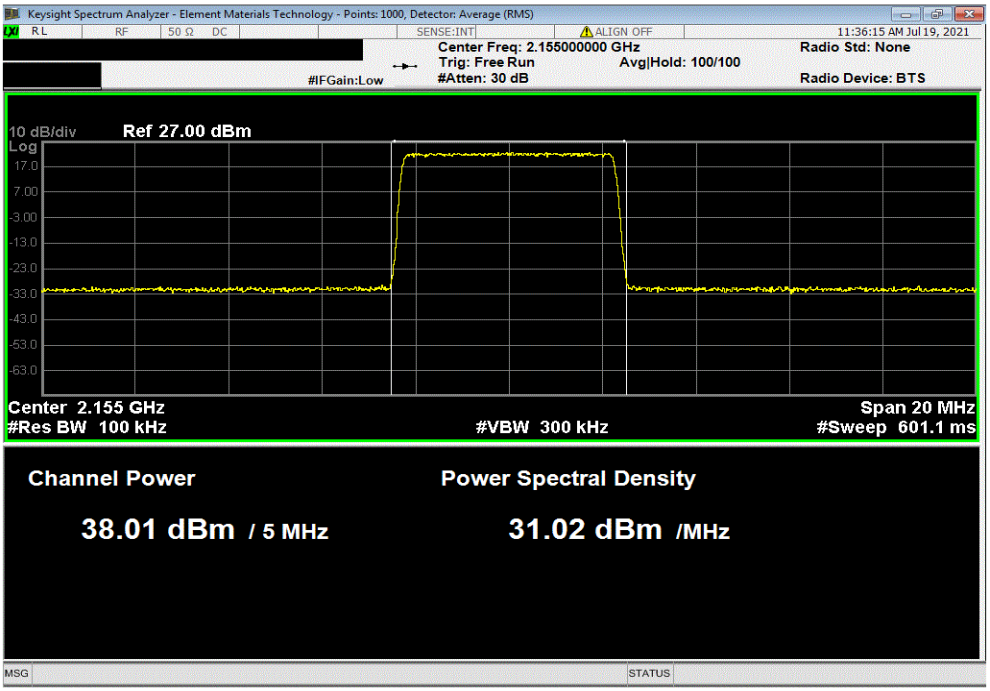


Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 2						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	38.114	0		38.1	Inside Tolerance	N/A

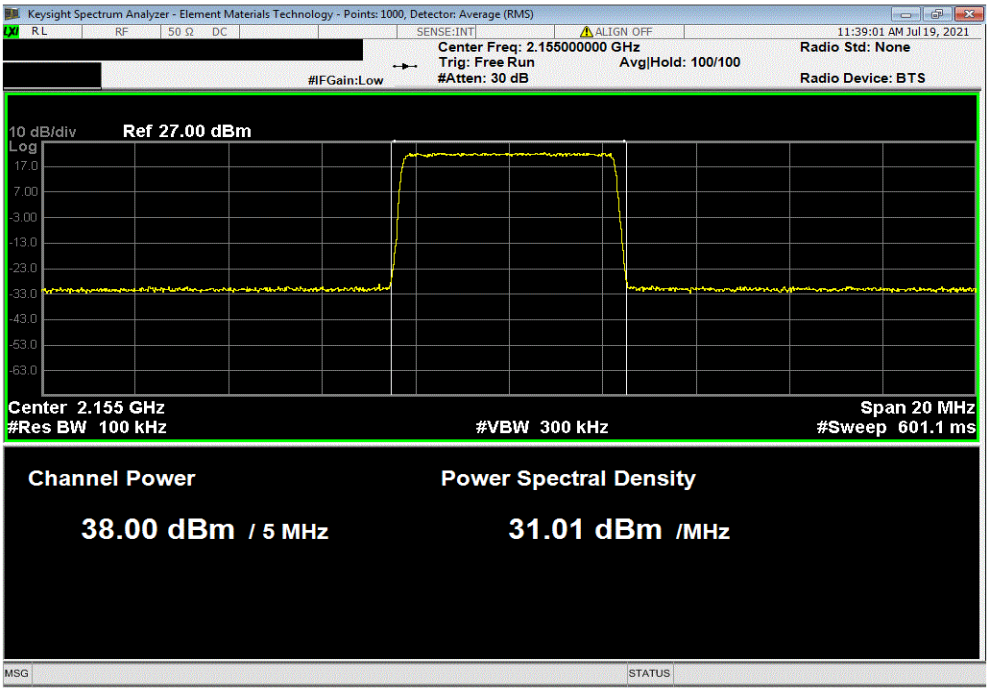


OUTPUT POWER - ALL PORTS

Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 3						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	38.013	0		38	Inside Tolerance	N/A

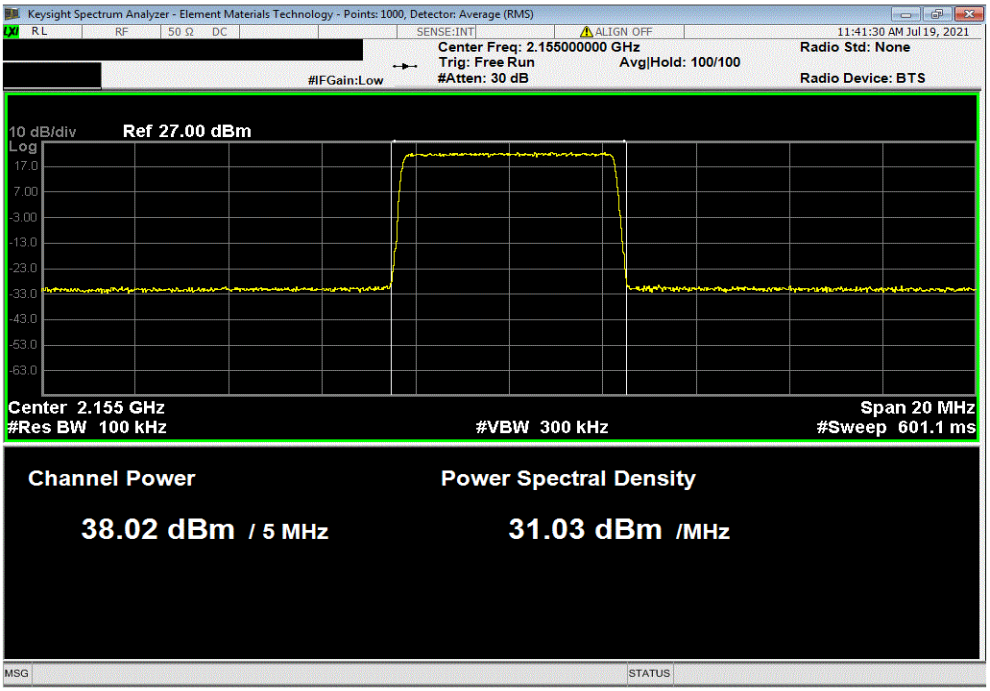


Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 4						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.995	0		38	Inside Tolerance	N/A

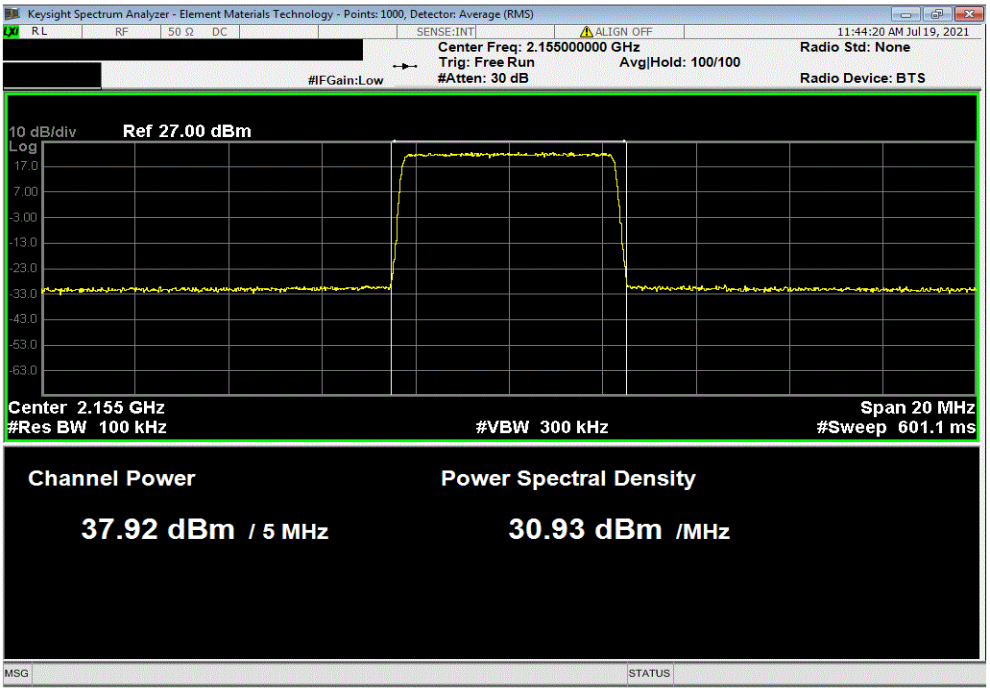


OUTPUT POWER - ALL PORTS

Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 5						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	38.02	0		38	Inside Tolerance	N/A

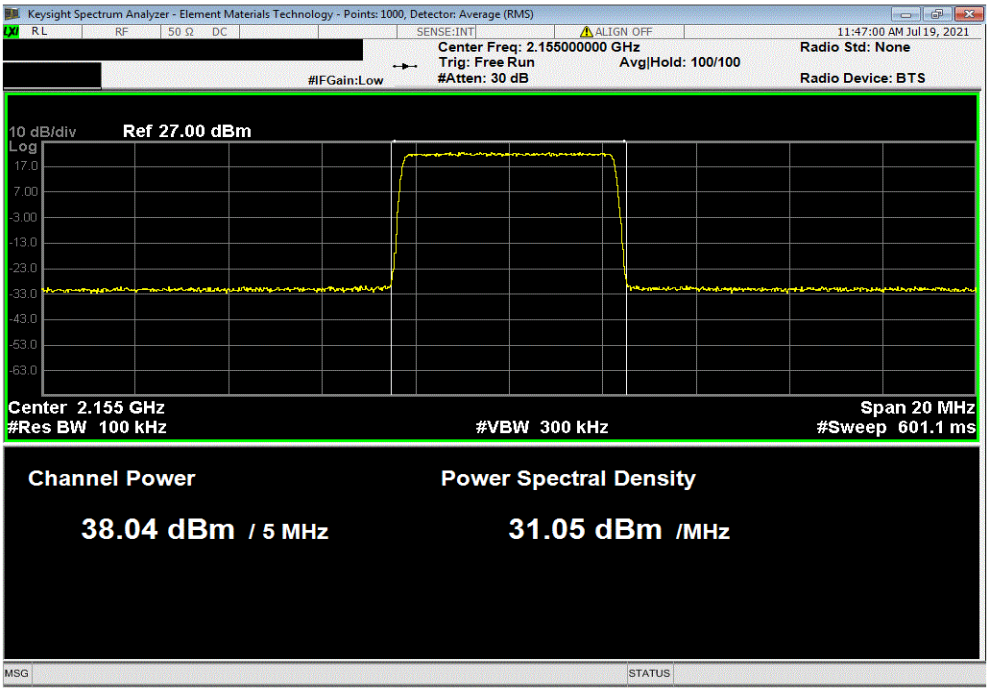


Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 6						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.922	0		37.9	Inside Tolerance	N/A

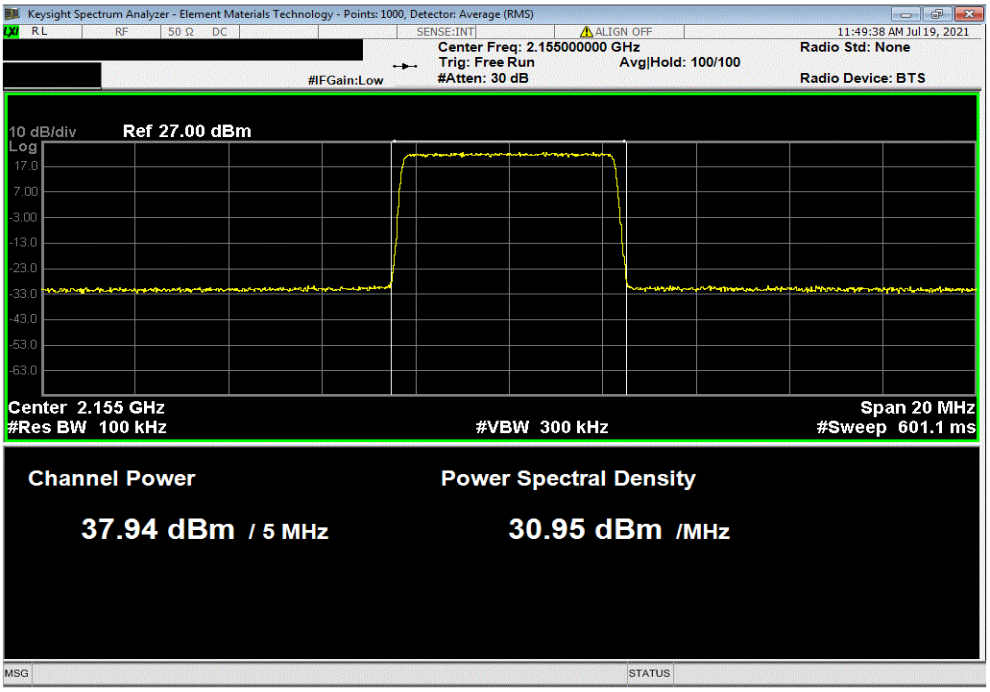


OUTPUT POWER - ALL PORTS

Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 7						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	38.036	0		38	Inside Tolerance	N/A

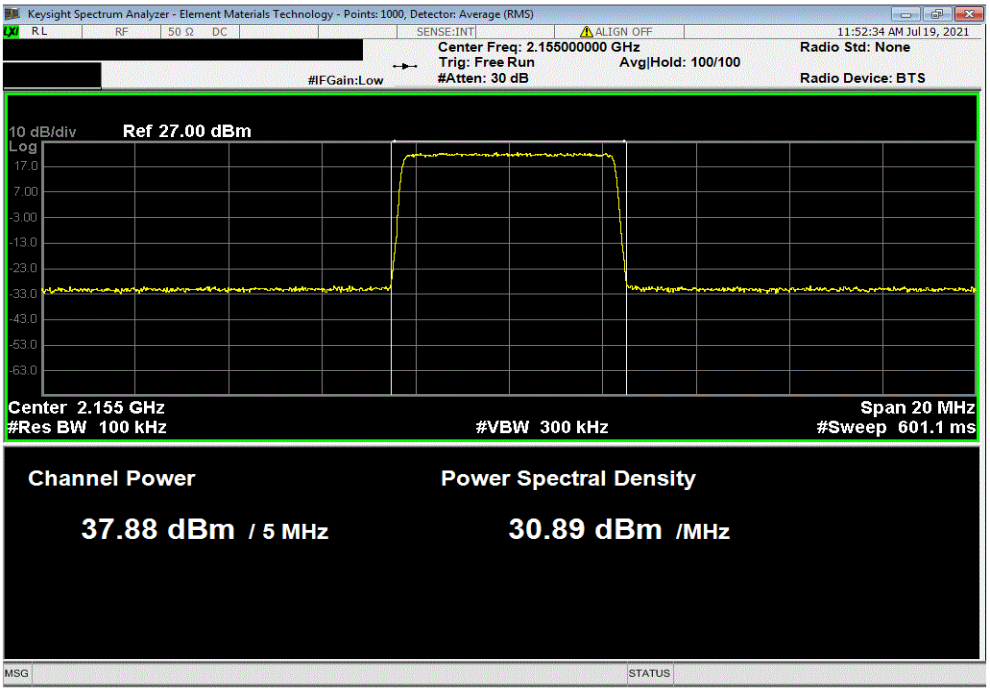


Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 8						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.942	0		37.9	Inside Tolerance	N/A

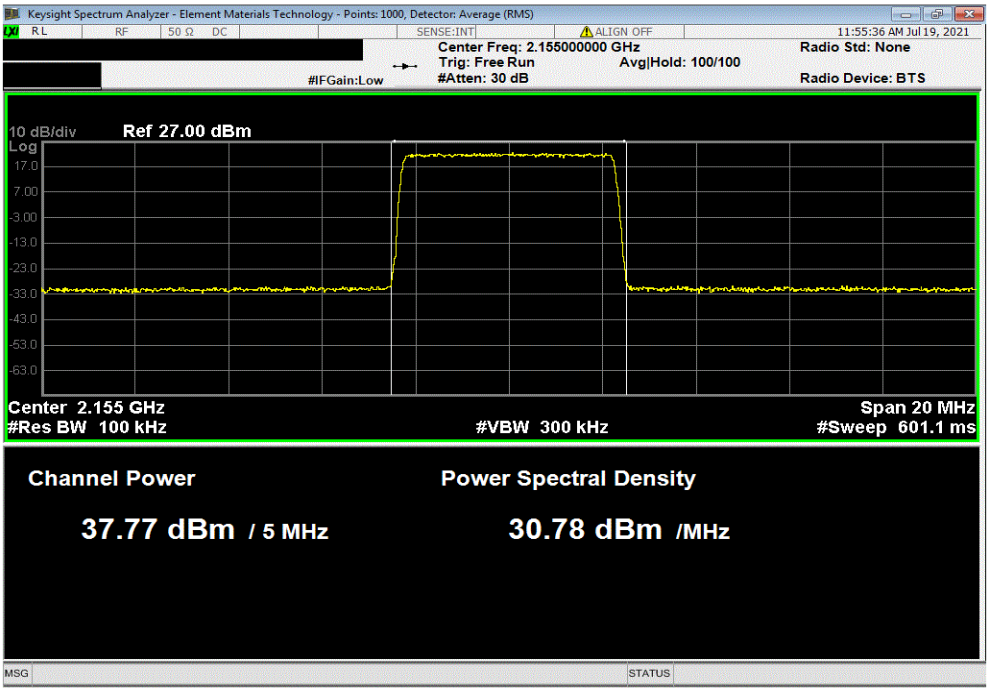


OUTPUT POWER - ALL PORTS

Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 9						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.879	0		37.9	Inside Tolerance	N/A

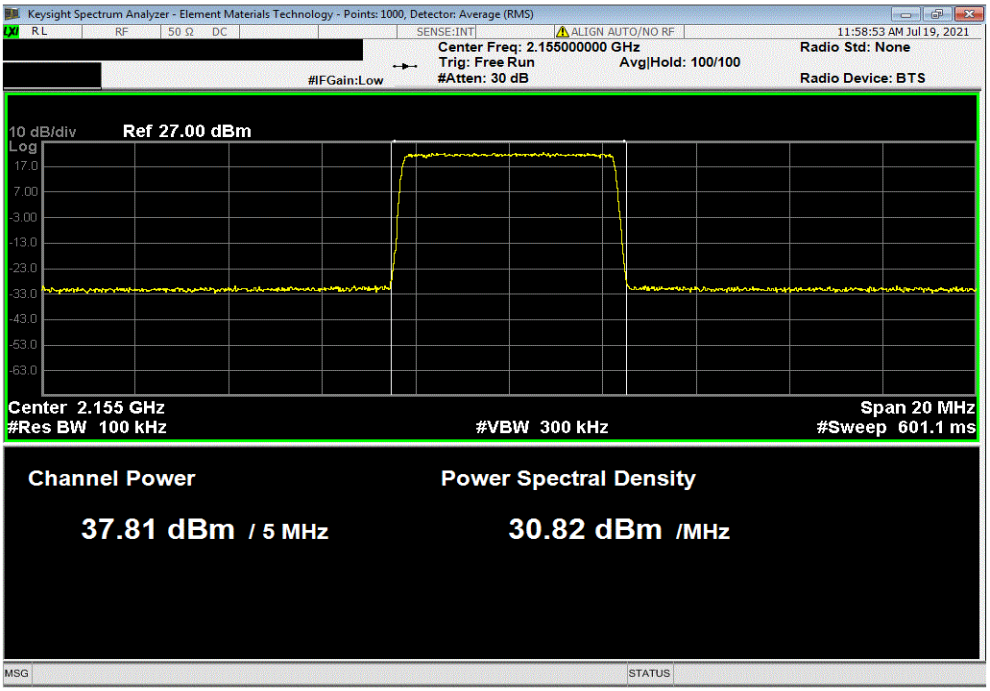


Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 10						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.767	0		37.8	Inside Tolerance	N/A

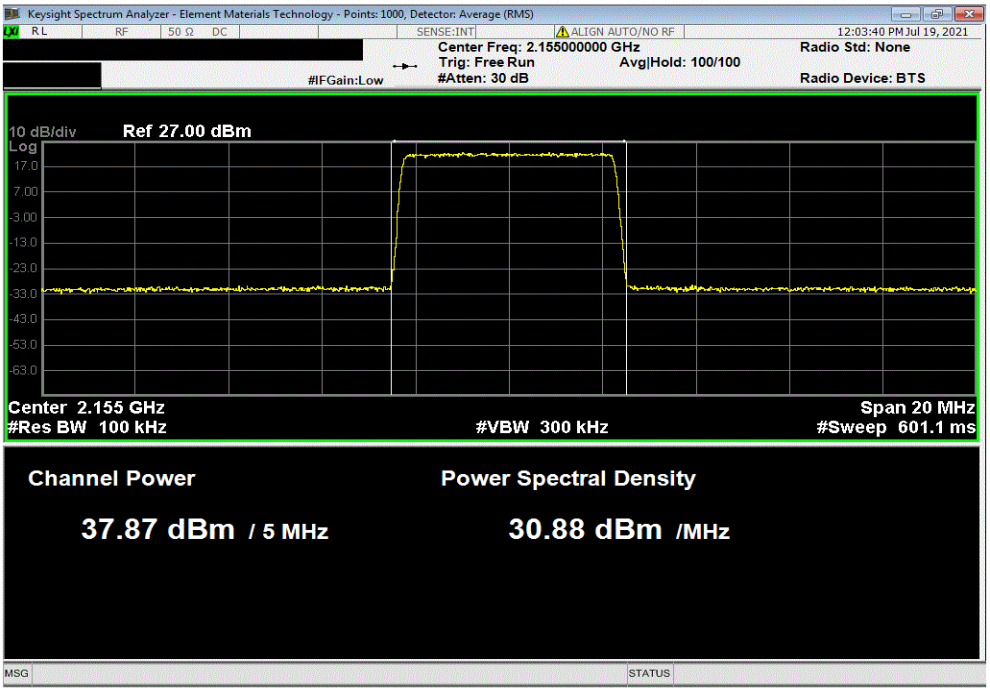


OUTPUT POWER - ALL PORTS

Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 11						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.808	0		37.8	Inside Tolerance	N/A

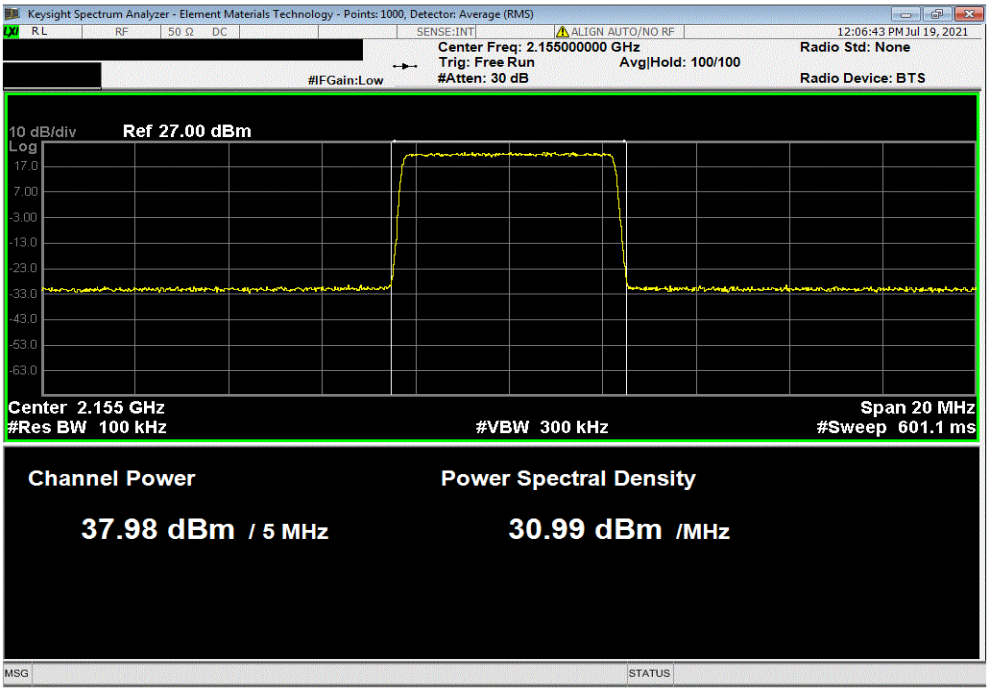


Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 12						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.867	0		37.9	Inside Tolerance	N/A

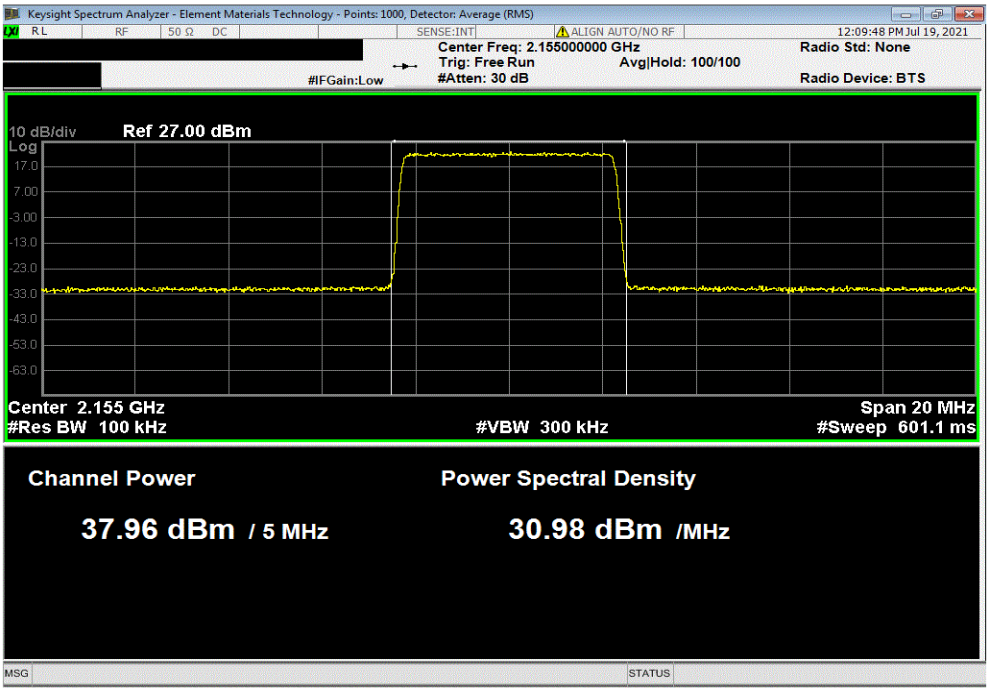


OUTPUT POWER - ALL PORTS

Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 13						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.979	0		38	Inside Tolerance	N/A

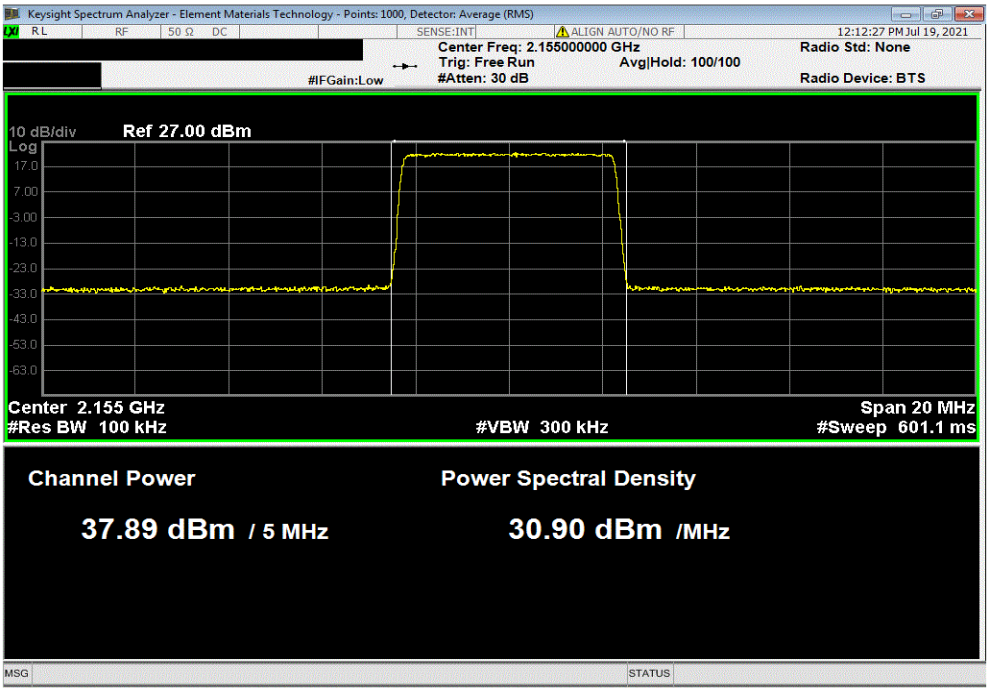


Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 14						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.965	0		38	Inside Tolerance	N/A

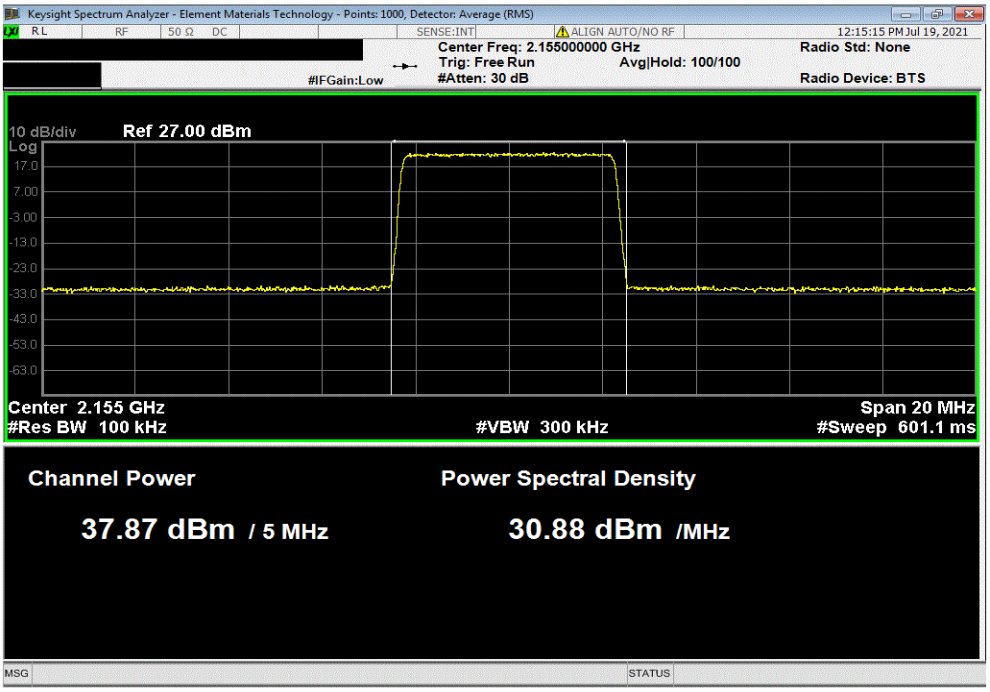


OUTPUT POWER - ALL PORTS

Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 15						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.891	0		37.9	Inside Tolerance	N/A



Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz, Port 16						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW	Limit (dBm)	Results
	37.873	0		37.9	Inside Tolerance	N/A



OUTPUT POWER - LOWERED POWER

XMit 2020.12.30.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMM	2020-09-21	2021-09-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2021-03-11	2022-03-11
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

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

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

RF conducted emissions testing was performed on one port. The AAIB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification report) and port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4. The total average transmit power of all antenna ports was determined per ANSI C63.26-2015 paragraph 6.4.3.1.

As shown in the EIRP calculation table in the "PSD and EIRP Calculations" report section, the highest AAIB antenna port 1 PSD level that will not cause the calculated EIRP to exceed the EIRP limit is 29.1 dBm/MHz. The NR5 and NR10 maximum carrier power levels were reduced by 3.0dB and 1.0 dB respectively by changing the carrier power parameters in the configuration file for the base station to comply with the EIRP limit (62.15 dBm/MHz).

The AAIB base station configuration file parameters set for maximum carrier output power (37.9dBm) gives a measured maximum NR5 PSD/port result of 32.1dBm/MHz and a worst case calculated EIRP that is 2.95dB over the EIRP limit (62.15dBm/MHz). To show compliance with the EIRP limit (62.15dBm/MHz), the AAIB base station configuration file parameters setting for NR5 carrier output power was set to 34.9dBm (reduced 3.0 dB from maximum) that gives a measured maximum NR5 PSD/port result of 29.0dBm/MHz and a worst case calculated EIRP that is 0.1dB below the EIRP limit (62.15dBm/MHz).

The AAIB base station configuration file parameters set for maximum carrier output power (37.9dBm) gives a measured maximum NR10 PSD/port result of 29.6dBm/MHz and a worst case calculated EIRP that is 0.45dB over the EIRP limit (62.15dBm/MHz). To show compliance with the EIRP limit (62.15dBm/MHz), the AAIB base station configuration file parameters setting for NR10 carrier output power was set to 36.9dBm (reduced 1.0 dB from maximum) that gives a measured maximum NR10 PSD/port result of 28.4dBm/MHz and a worst case calculated EIRP that is 0.7dB below the EIRP limit (62.15dBm/MHz).

OUTPUT POWER - LOWERED POWER

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	AAIB (FCC/ISED C2PC)			Work Order:	NOKI0030
Serial Number:	BL2032123Y0			Date:	21-Jul-21
Customer:	Nokia Solutions and Networks			Temperature:	21.1 °C
Attendees:	David Le, Mitchell Hill			Humidity:	52.1% RH
Project:	None			Barometric Pres.:	1021 mbar
Tested by:	Brandon Hobbs	Power:	54 VDC	Job Site:	TX09

TEST SPECIFICATIONS	Test Method
FCC 27:2021	ANSI C63.26:2015
RSS-139 Issue 3:2015, RSS-170 Issue 3:2015	RSS-139 Issue 3:2015, RSS-170 Issue 3:2015

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. The output power was measured for a single carrier over the carrier channel bandwidth on port 1. The NR5 and NR10 carrier power levels were reduced to demonstrate compliance with EIRP limits shown elsewhere in this report.

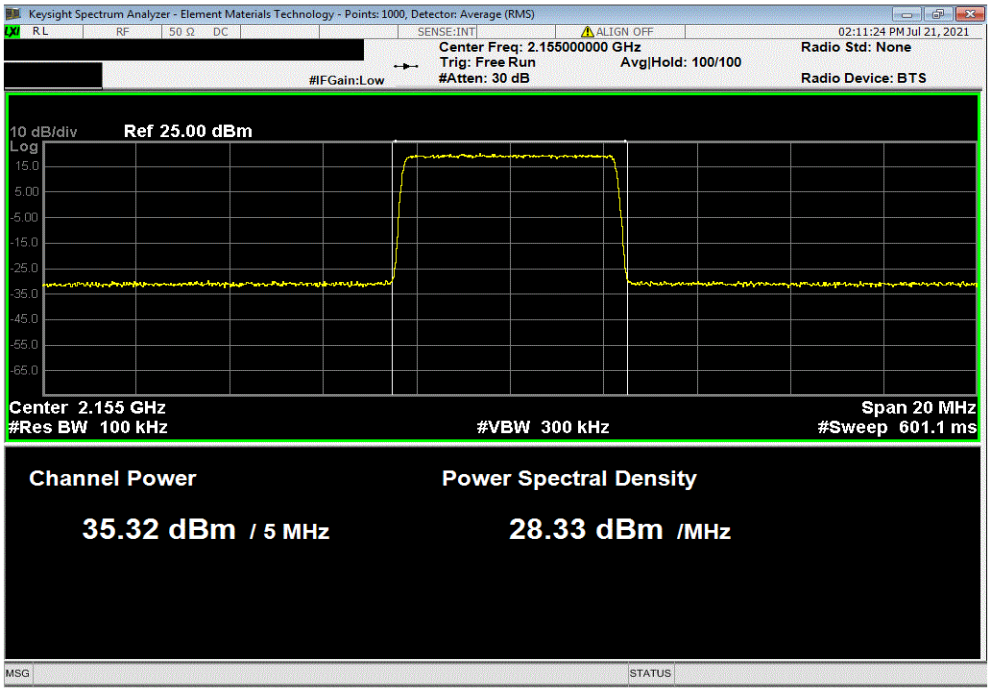
DEVIATIONS FROM TEST STANDARD

None

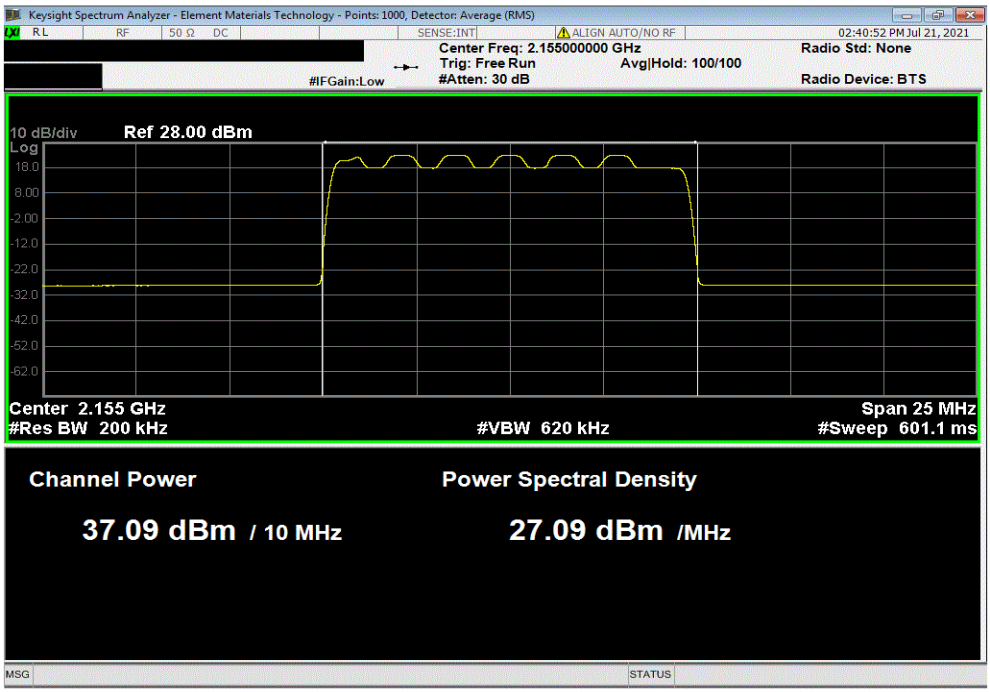
Configuration #	2	Signature

	Initial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW
Port 1, Band n66, 2110 MHz - 2200 MHz			
5 MHz Bandwidth			
256-QAM Modulation			
Mid Channel 2155 MHz	35.318	0	35.3
10 MHz Bandwidth			
16-QAM Modulation			
Mid Channel 2155 MHz	37.095	0	37.1

Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
	Initial Value dBm/Carrier BW	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW		
	35.318	0		35.3		



Port 1, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 16-QAM Modulation, Mid Channel 2155 MHz						
	Initial Value dBm/Carrier BW	Duty Cycle Factor (dB)		Single Port dBm/Carrier BW		
	37.095	0		37.1		



POWER SPECTRAL DENSITY AND EIRP CALCULATIONS

XMit 2020.12.30.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2021-03-11	2022-03-11
Block - DC	Fairview Microwave	SD3379	AMM	2020-09-21	2021-09-21
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The fundamental emission power spectral density was measured using the channels and modes as called out on the following data sheets.

The method of ANSI C63.26-2015 section 5.2.4.5 was used to make this measurement.

The RF conducted emission testing was performed on one port. The AAIB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the “Output Power - All Ports” report section) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

The total PSD for all antenna ports (at the radio output) were determined per ANSI C63.26-2015 paragraph 6.4.3.2.4. The EIRP calculations are based upon ANSI C63.26-2015 paragraphs 6.4 and 6.4.6.3.

The applicable FCC and ISED regulatory requirements for EIRP are as follows.

FCC Requirements:
27.50(d) The following power and antenna height requirements apply to stations transmitting in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz and 2180-2200 MHz bands:
(1) The power of each fixed or base station transmitting in the 1995-2000 MHz, 2110-2155 MHz, 2155-2180 MHz or 2180-2200 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to:
(ii) An EIRP of 3280 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.
(2) The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:
(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

ISED Requirements RSS-139 Section 6.5/SRSP-513 Section 5.1.1
SRSP-513 5.1 Radiated Power and Antenna Height Limits
5.1.1 Fixed and Base Stations
5.1.1.2 For fixed and base stations operating within the frequency range 2110-2180 MHz with a channel bandwidth greater than 1 MHz, the maximum permissible e.i.r.p. is 1640 watts/MHz e.i.r.p. (i.e. no more than 1640 watts e.i.r.p. in any 1 MHz band segment) with an antenna height above average terrain (HAAT) up to 300 metres.
5.1.1.3 Fixed and base stations located in geographic areas at a distance greater than 26 km from large or medium population centres and transmitting within the frequency range 2110-2180 MHz, may increase their e.i.r.p. up to a maximum of 3280 watts/MHz (i.e. no more than 3280 watts e.i.r.p. in any 1 MHz band segment), with an antenna HAAT up to 300 metres. …….
5.1.1.4 Fixed and base station antenna heights above average terrain may exceed 300 metres with a reduction in e.i.r.p. The maximum permissible e.i.r.p. for installations with antenna HAAT in excess of 300 metres is given in the following table: …….

ISED Requirements RSS-170 Section 5.3.1/SRSP-519 Section 5.1
SRSP-519 5.1 Radiated Power and Antenna Height Limits for Base Stations

POWER SPECTRAL DENSITY AND EIRP CALCULATIONS

element

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	AAIB (FCC/ISED C2PC)			**Work Order:**	NOKI0030
Serial Number:	BL2032123Y0			**Date:**	21-Jul-21
Customer:	Nokia Solutions and Networks			**Temperature:**	20.7 °C
Attendees:	David Le, Mitchell Hill			**Humidity:**	52.9% RH
Project:	None			**Barometric Pres.:**	1021 mbar
Tested by:	Brandon Hobbs	**Power:**	54 VDC	**Job Site:**	TX09

TEST SPECIFICATIONS	Test Method
FCC 27:2021	ANSI C63.26:2015
RSS-139 Issue 3:2015, RSS-170 Issue 3:2015	RSS-139 Issue 3:2015, RSS-170 Issue 3:2015

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. The PSD was measured while transmitting one carrier on Port 1. The total PSD for multiport (2x2 MIMO, 4x4 MIMO, 8x8 MIMO & 16x16 MIMO) operation was determinded based upon ANSI 63.26 clause 6.4.3.2.4 (10 Log Nout). The total PSD for two port operation is single port PSD +3dB [i.e. 10 Log(2)]. The total PSD for four port operation is single port PSD +6dB [i.e. 10 Log(4)]. The total PSD for eight port operation is single port PSD +9dB [i.e. 10 Log(8)]. The total PSD for sixteen port operation is single port PSD +12dB [i.e. 10 Log(16)]. The carrier power was set to maximum for all testing.

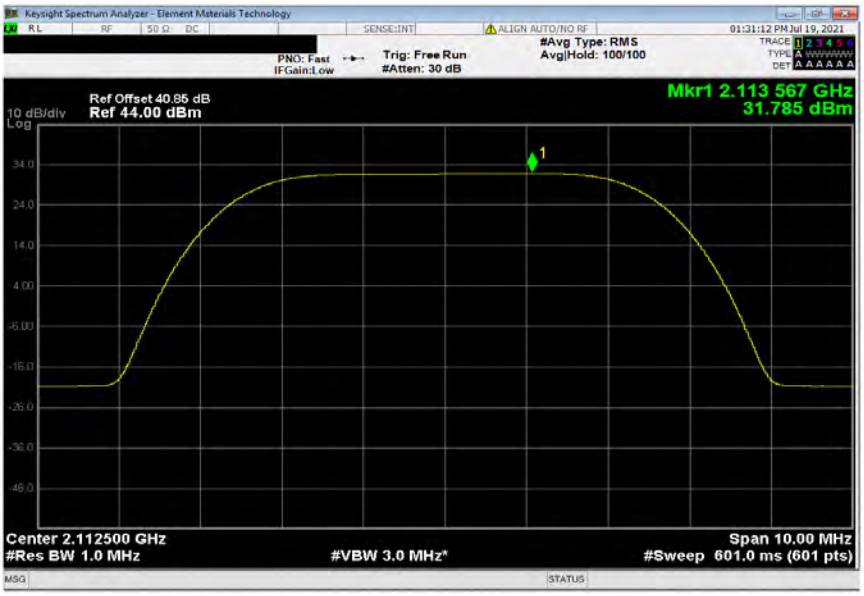
DEVIATIONS FROM TEST STANDARD

None

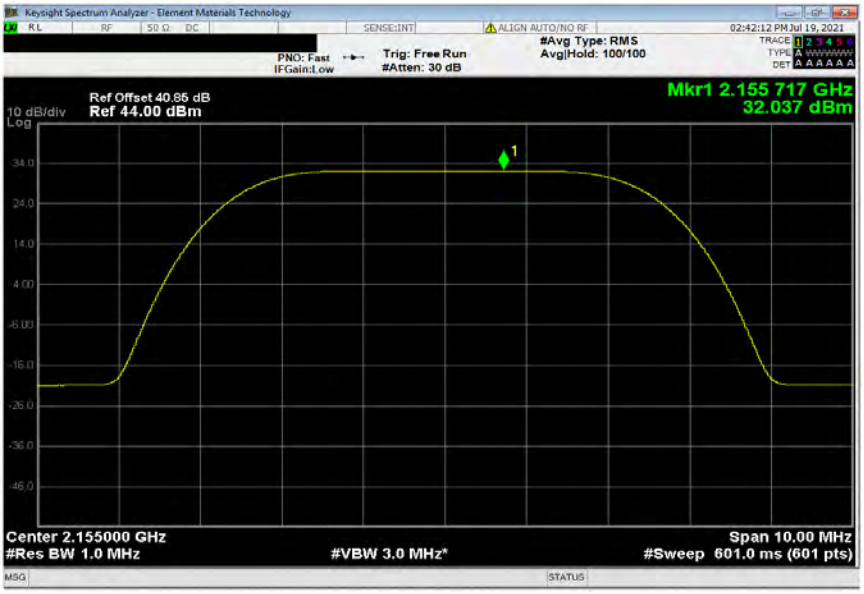
Configuration #	2	Signature

	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
Port 1, Band n66, 2110 MHz - 2200 MHz							
5 MHz Bandwidth							
QPSK Modulation							
Low Channel 2112.5 MHz	31.785	0	31.8	34.8	37.8	40.8	43.8
Mid Channel 2155 MHz	32.037	0	32.0	35.0	38.0	41.0	44.0
High Channel 2197.5 MHz	31.825	0	31.8	34.8	37.8	40.8	43.8
16-QAM Modulation							
Low Channel 2112.5 MHz	31.693	0	31.7	34.7	37.7	40.7	43.7
Mid Channel 2155 MHz	32.046	0	32.0	35.0	38.0	41.0	44.0
High Channel 2197.5 MHz	31.912	0	31.9	34.9	37.9	40.9	43.9
64-QAM Modulation							
Low Channel 2112.5 MHz	31.789	0	31.8	34.8	37.8	40.8	43.8
Mid Channel 2155 MHz	32.04	0	32.0	35.0	38.0	41.0	44.0
High Channel 2197.5 MHz	31.909	0	31.9	34.9	37.9	40.9	43.9
256-QAM Modulation							
Low Channel 2112.5 MHz	31.808	0	31.8	34.8	37.8	40.8	43.8
Mid Channel 2155 MHz	32.086	0	32.1	35.1	38.1	41.1	44.1
High Channel 2197.5 MHz	31.925	0	31.9	34.9	37.9	40.9	43.9
10 MHz Bandwidth							
QPSK Modulation							
Mid Channel 2155 MHz	28.984	0	29.0	32.0	35.0	38.0	41.0
16-QAM Modulation							
Mid Channel 2155 MHz	29.643	0	29.6	32.6	35.6	38.6	41.6
64-QAM Modulation							
Mid Channel 2155 MHz	28.952	0	29.0	32.0	35.0	38.0	41.0
256-QAM Modulation							
Mid Channel 2155 MHz	28.999	0	29.0	32.0	35.0	38.0	41.0
15 MHz Bandwidth							
QPSK Modulation							
Mid Channel 2155 MHz	27.114	0	27.1	30.1	33.1	36.1	39.1
16-QAM Modulation							
Mid Channel 2155 MHz	28.119	0	28.1	31.1	34.1	37.1	40.1
64-QAM Modulation							
Mid Channel 2155 MHz	27.112	0	27.1	30.1	33.1	36.1	39.1
256-QAM Modulation							
Mid Channel 2155 MHz	27.163	0	27.2	30.2	33.2	36.2	39.2
20 MHz Bandwidth							
QPSK Modulation							
Mid Channel 2155 MHz	25.853	0	25.9	28.9	31.9	34.9	37.9
16-QAM Modulation							
Mid Channel 2155 MHz	27.476	0	27.5	30.5	33.5	36.5	39.5
64-QAM Modulation							
Mid Channel 2155 MHz	25.878	0	25.9	28.9	31.9	34.9	37.9
256-QAM Modulation							
Mid Channel 2155 MHz	25.839	0	25.8	28.8	31.8	34.8	37.8

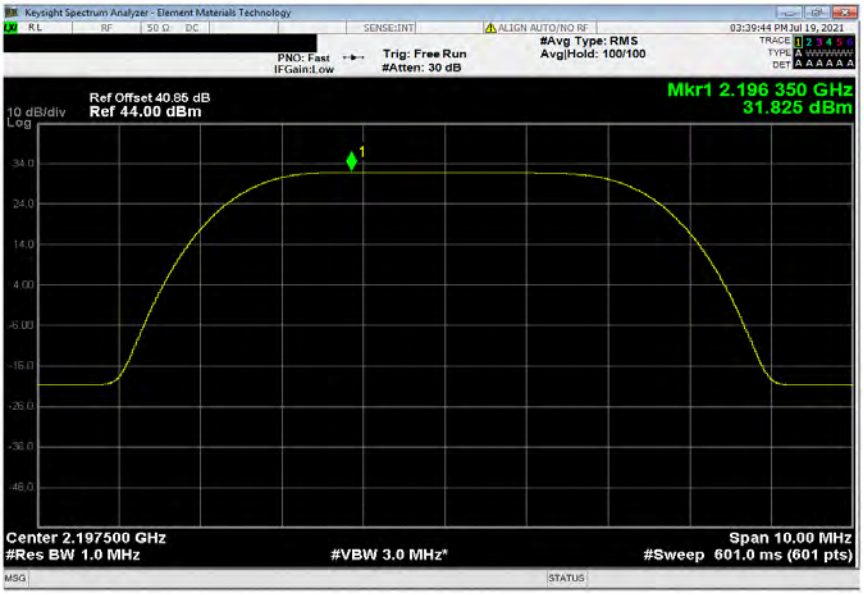
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , QPSK Modulation, Low Channel 2112.5 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
31.785	0	31.785	34.785	37.785	40.785	43.785



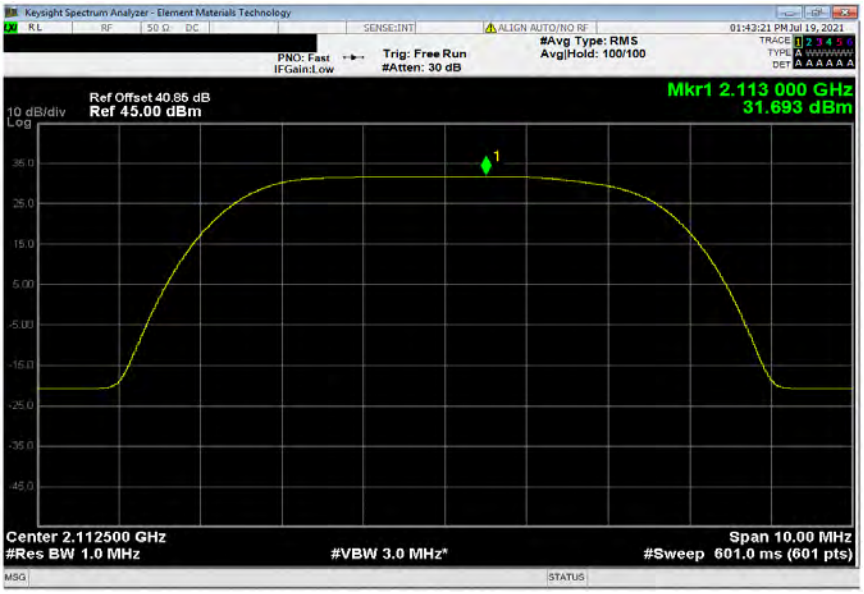
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , QPSK Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
32.037	0	32.037	35.037	38.037	41.037	44.037



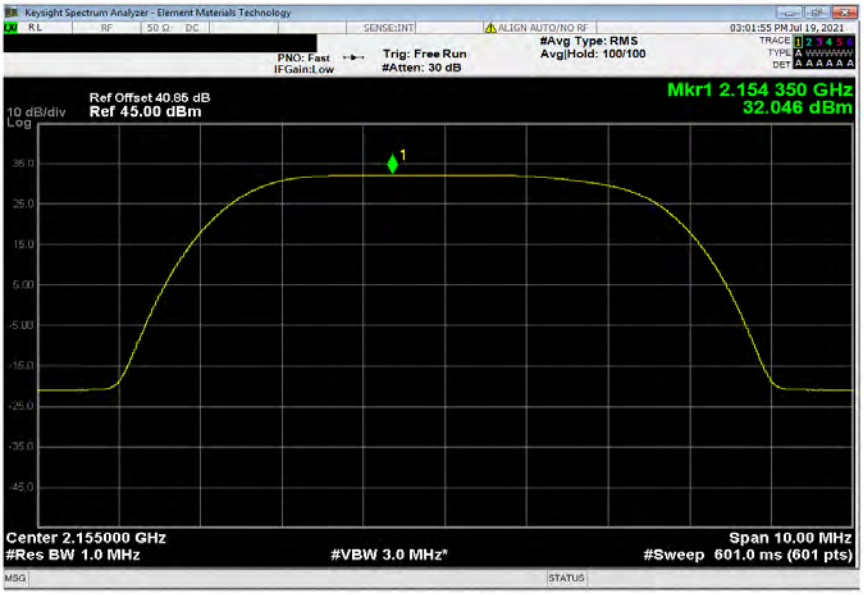
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , QPSK Modulation, High Channel 2197.5 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
31.825	0	31.825	34.825	37.825	40.825	43.825



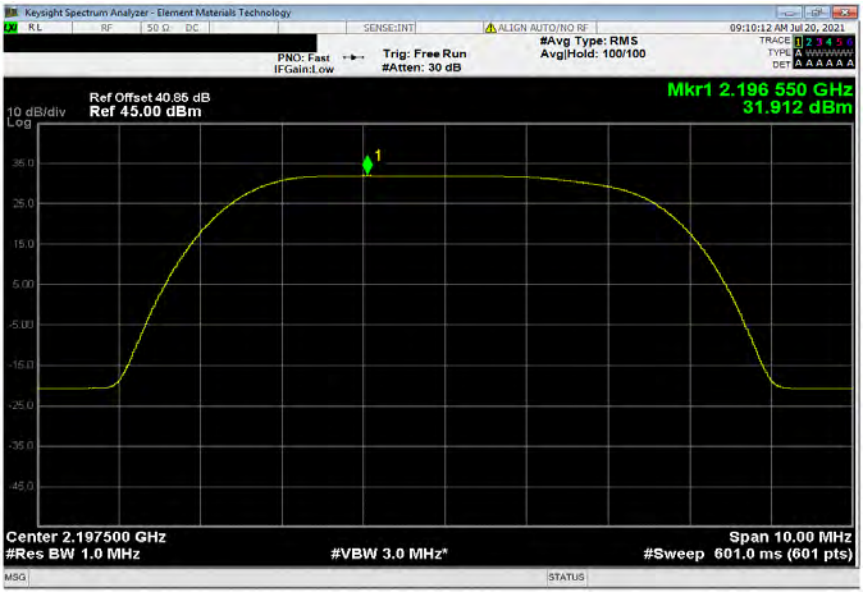
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 16-QAM Modulation, Low Channel 2112.5 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
31.693	0	31.693	34.693	37.693	40.693	43.693



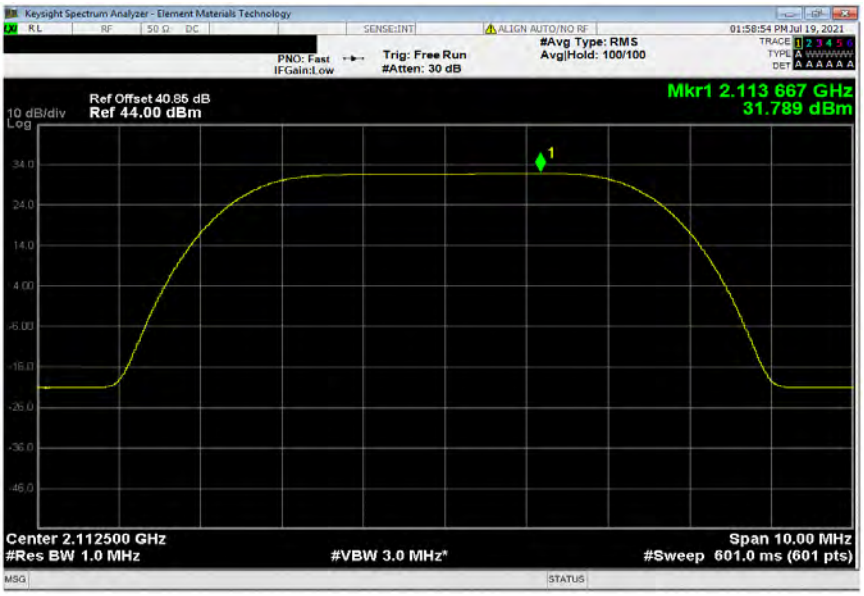
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 16-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
32.046	0	32.046	35.046	38.046	41.046	44.046



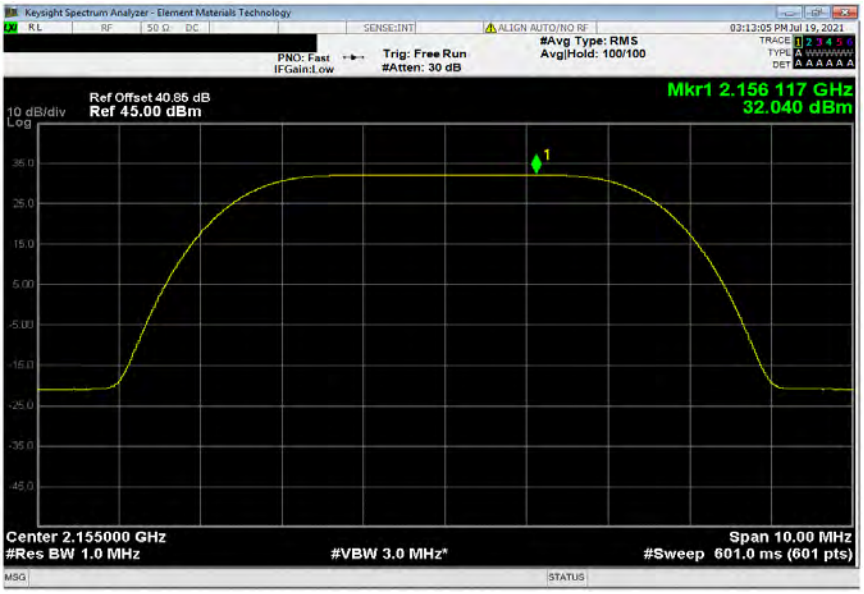
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 16-QAM Modulation, High Channel 2197.5 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
31.912	0	31.912	34.912	37.912	40.912	43.912



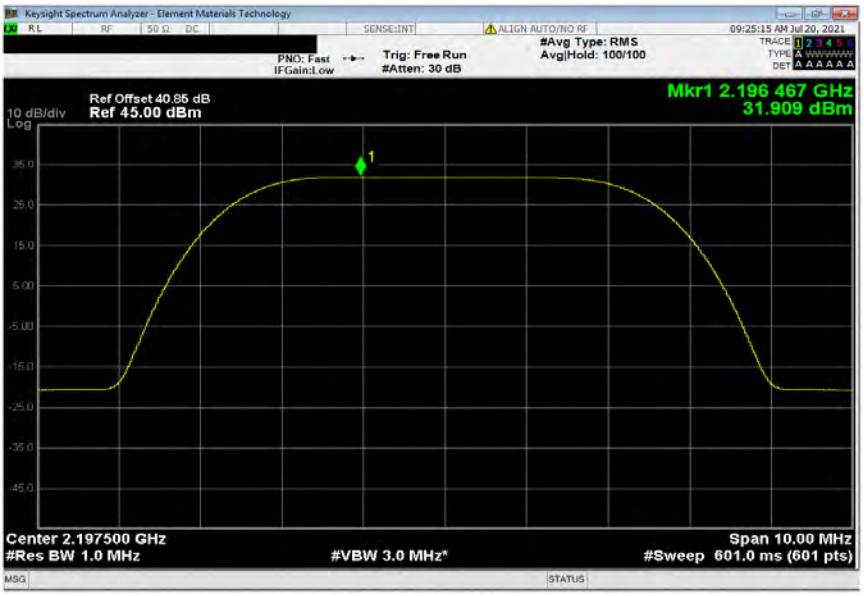
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 64-QAM Modulation, Low Channel 2112.5 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
31.789	0	31.789	34.789	37.789	40.789	43.789



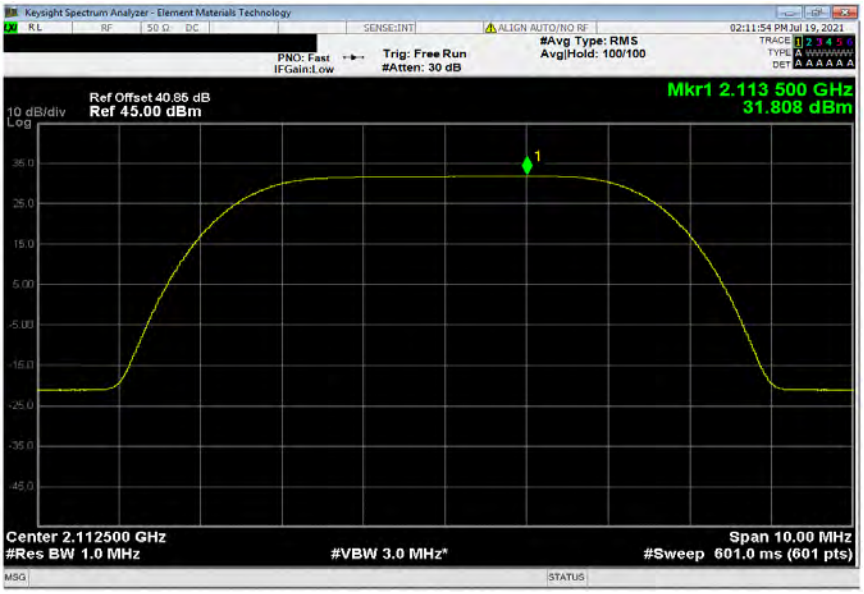
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 64-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
32.04	0	32.04	35.04	38.04	41.04	44.04



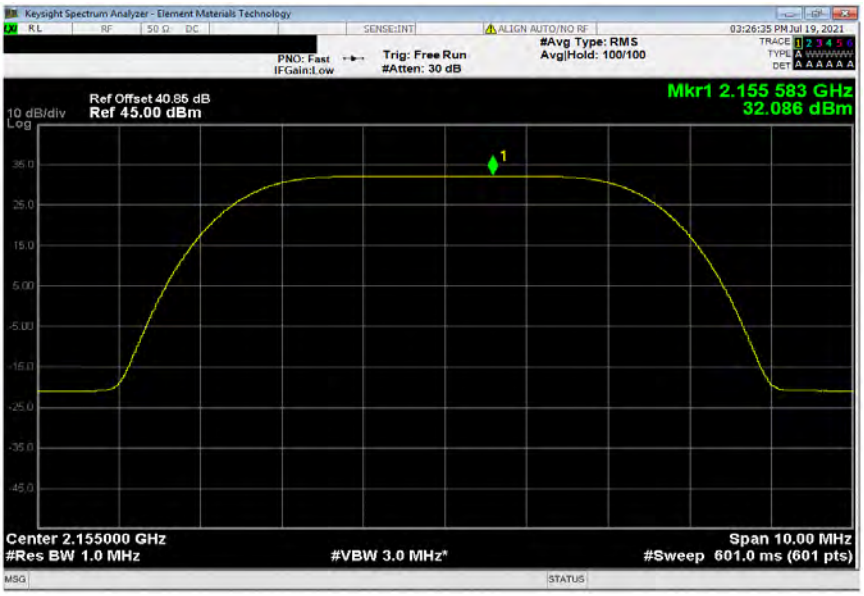
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 64-QAM Modulation, High Channel 2197.5 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
31.909	0	31.909	34.909	37.909	40.909	43.909



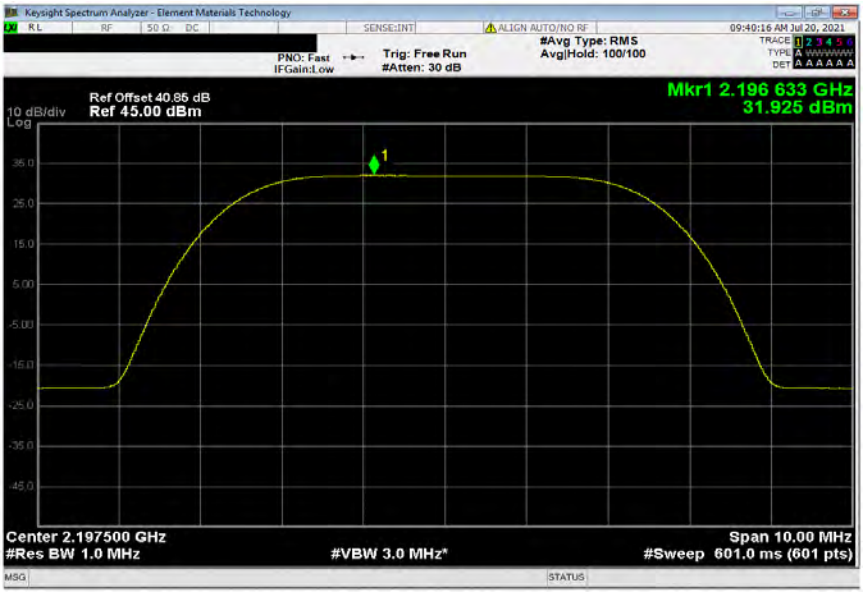
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, Low Channel 2112.5 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
31.808	0	31.808	34.808	37.808	40.808	43.808



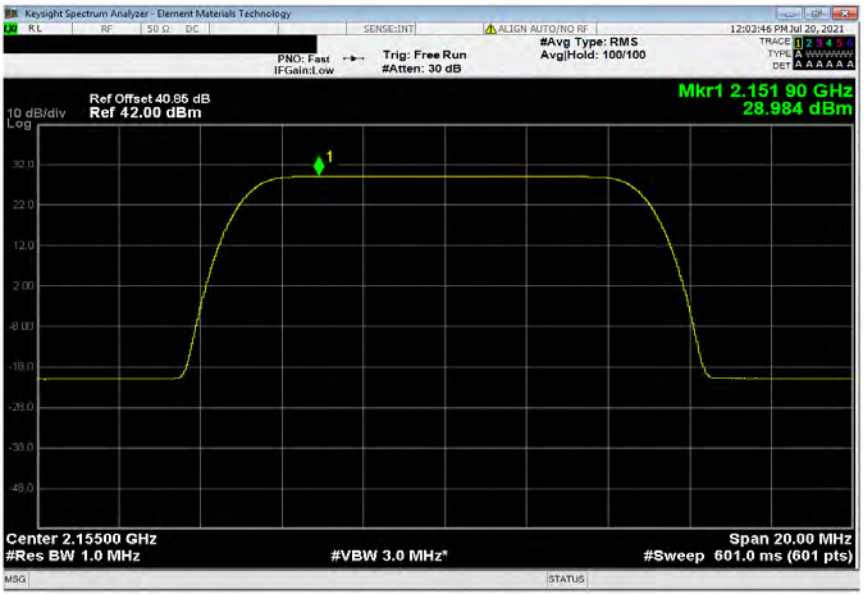
Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
32.086	0	32.086	35.086	38.086	41.086	44.086



Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, High Channel 2197.5 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
31.925	0	31.925	34.925	37.925	40.925	43.925

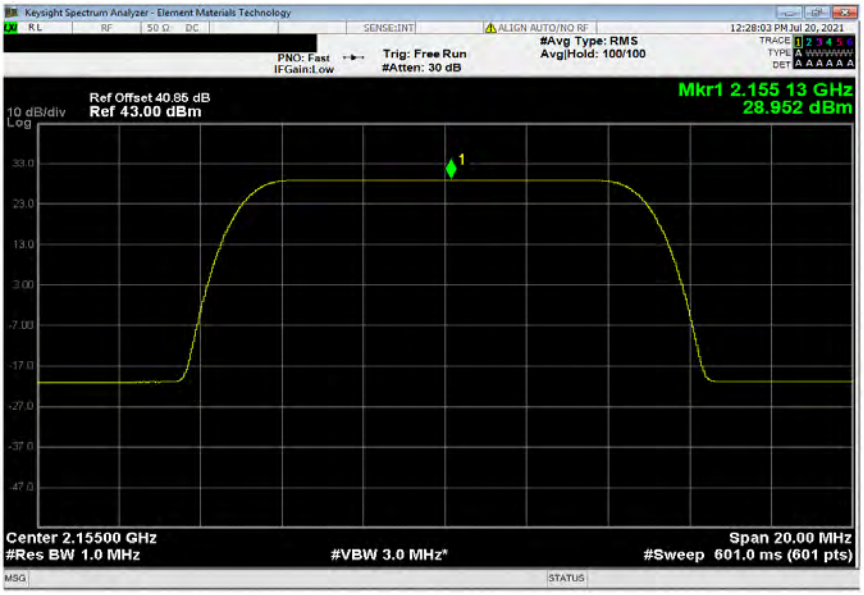


Port 1, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , QPSK Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
28.984	0	28.984	31.984	34.984	37.984	40.984

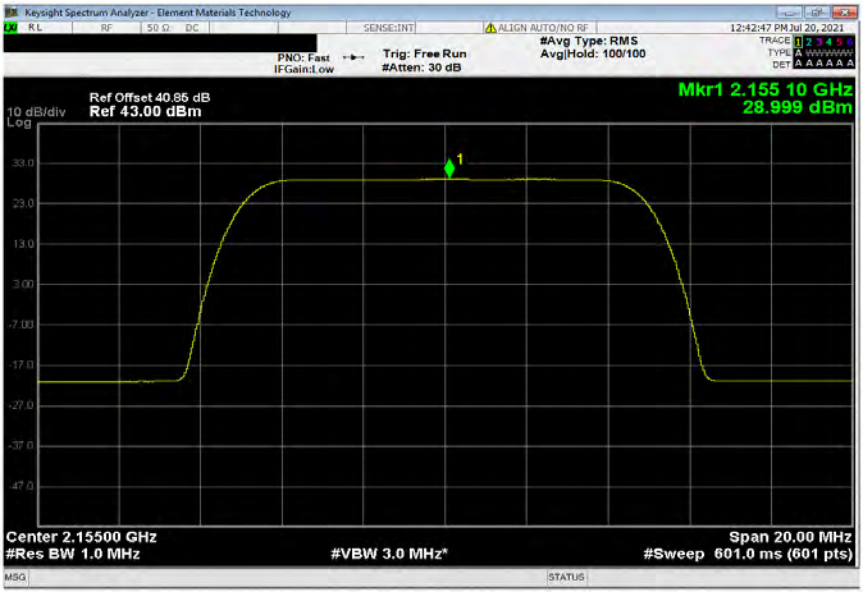


Port 1, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 16-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
29.643	0	29.643	32.643	35.643	38.643	41.643

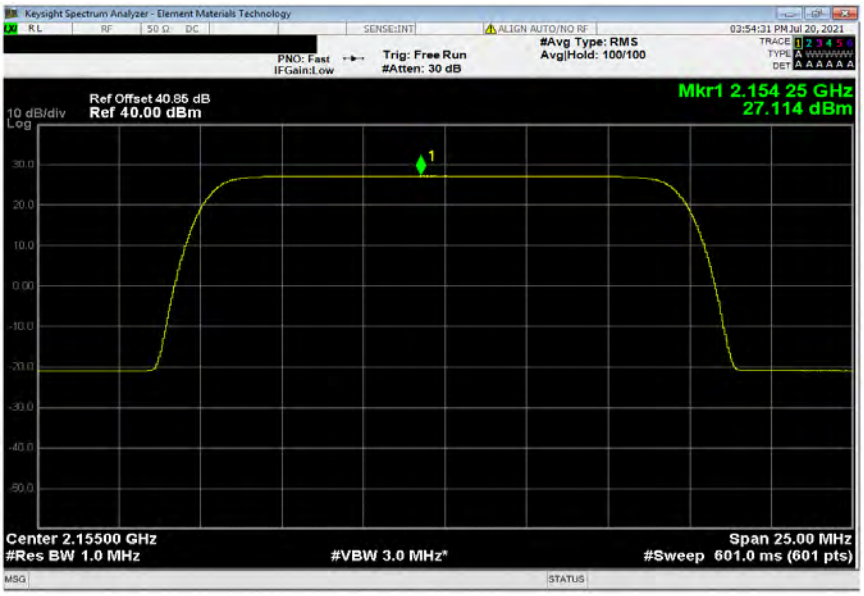
Port 1, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 64-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
28.952	0	28.952	31.952	34.952	37.952	40.952



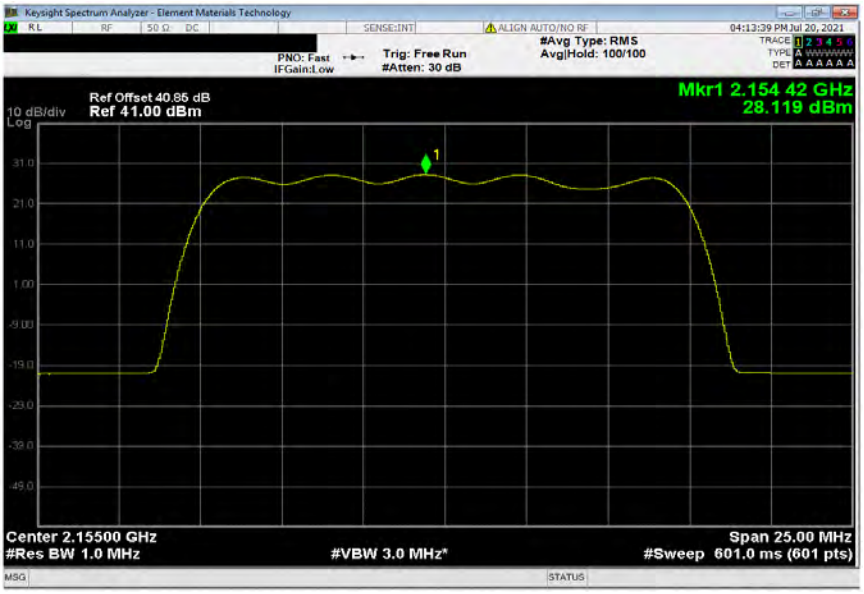
Port 1, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
28.999	0	28.999	31.999	34.999	37.999	40.999



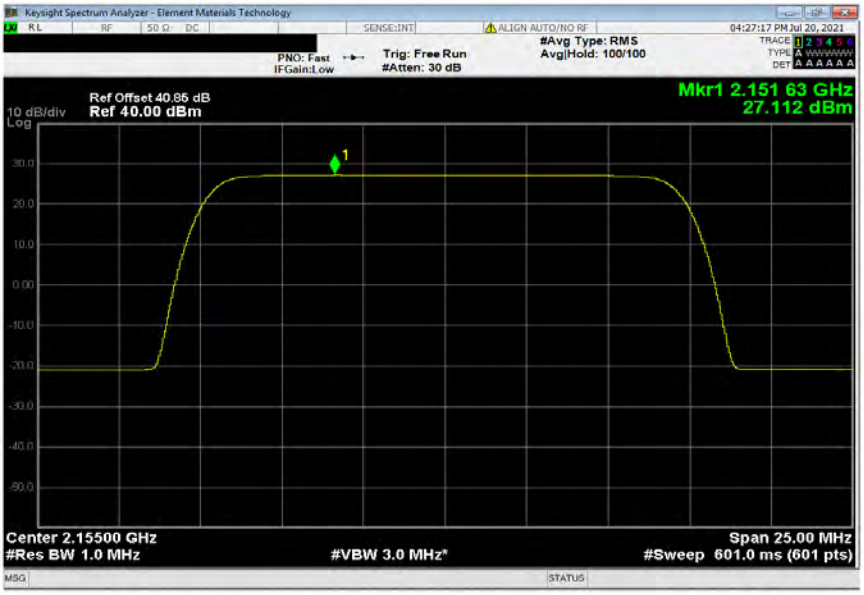
Port 1, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , QPSK Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
27.114	0	27.114	30.114	33.114	36.114	39.114



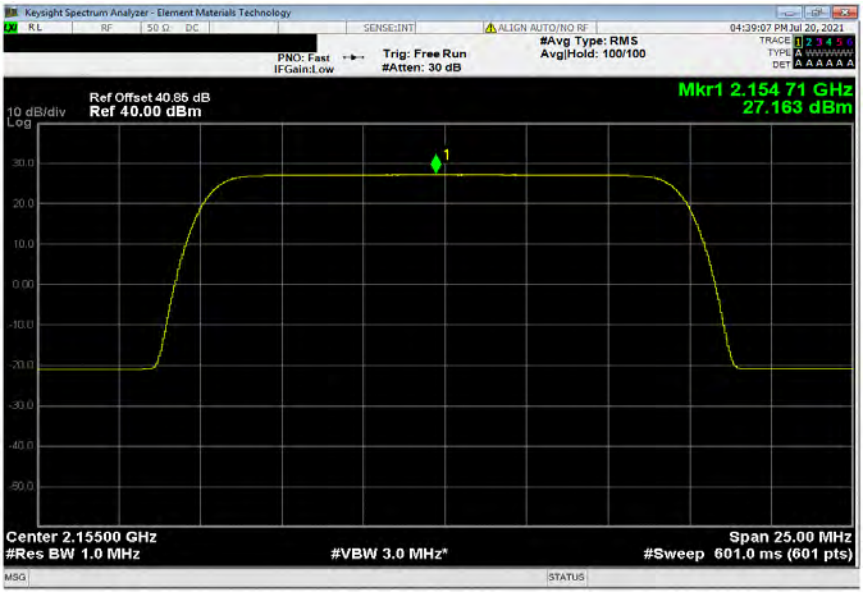
Port 1, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 16-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
28.119	0	28.119	31.119	34.119	37.119	40.119



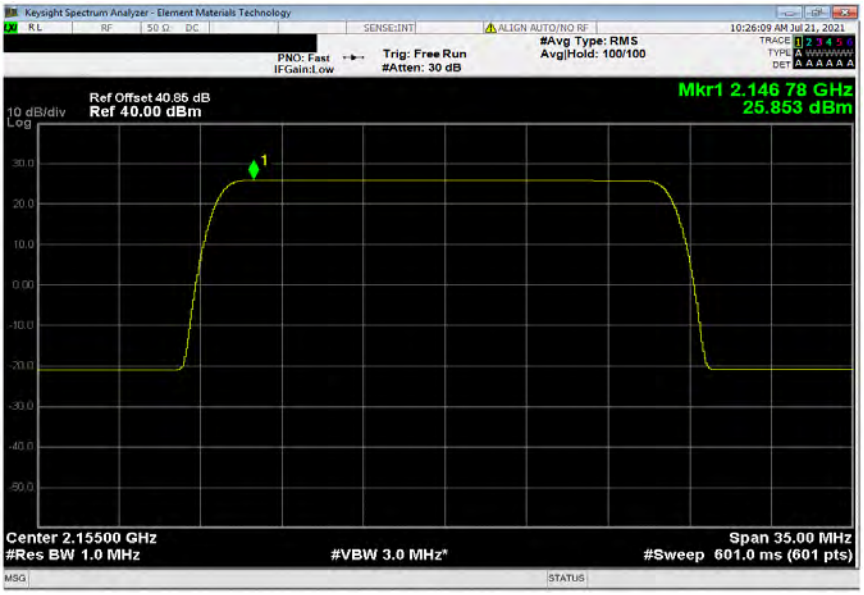
Port 1, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 64-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
27.112	0	27.112	30.112	33.112	36.112	39.112



Port 1, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
27.163	0	27.163	30.163	33.163	36.163	39.163

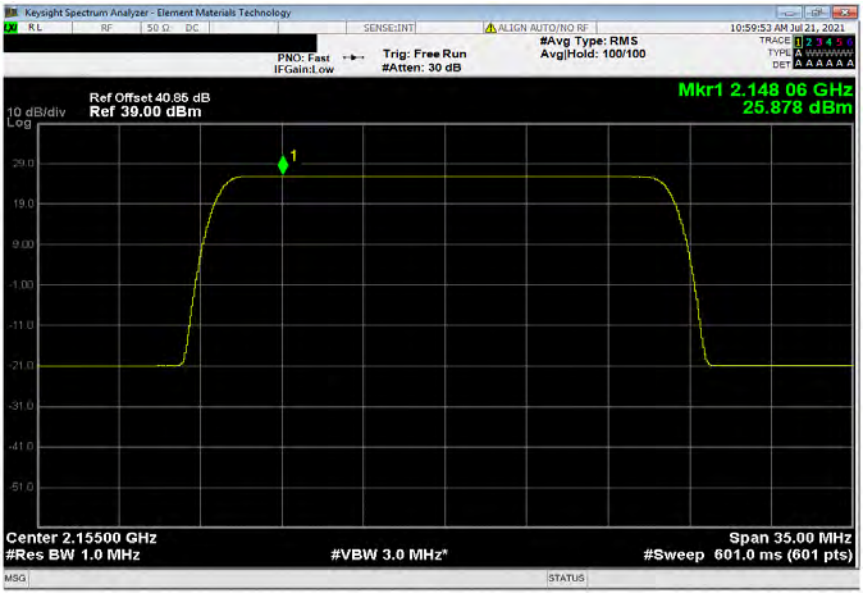


Port 1, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, QPSK Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
25.853	0	25.853	28.853	31.853	34.853	37.853

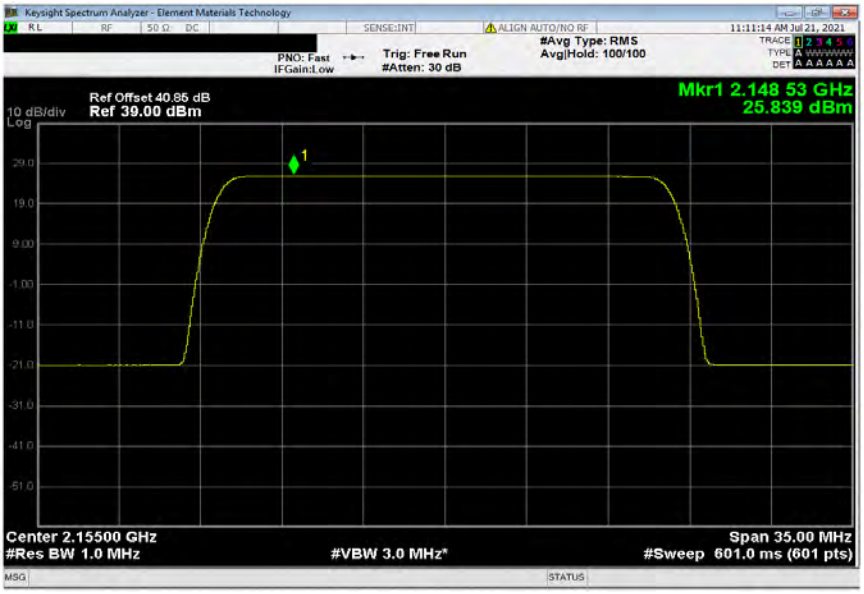


Port 1, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 16-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
27.476	0	27.476	30.476	33.476	36.476	39.476

Port 1, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 64-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
25.878	0	25.878	28.878	31.878	34.878	37.878



Port 1, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz						
Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	Eight Port (8x8 MIMO) dBm/MHz == PSD	Sixteen Port (16x16 MIMO) dBm/MHz == PSD
25.839	0	25.839	28.839	31.839	34.839	37.839



5G NR EIRP Calculations for Sixteen Port MIMO Operations

EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements. Each cell site installation needs to consider the power measurements in the radio certification report as well as site specific regulatory requirements (such as antenna height, population density, etc.), site installation parameters (line loss between antenna and radio, antenna parameters, etc.) and base station operational parameters (MIMO operational setup, carrier power level, channel bandwidth, modulation type, etc.) to optimize performance. Transmitter output power may be reduced (from maximum) by base station setup parameters.

The AAIB radio module connects to an 8-column antenna assembly with a maximum beamforming gain of 24 dBi. The columns within the antenna have ±45° cross-polarized (orthogonal) radiators. The sixteen AAIB transmitter outputs are connected to the columns (eight are connected to +45° radiators/antennas and eight are connected to the -45° radiators/antennas). The AAIB radio module provides transmitter outputs for one 8-column antenna assembly.

Equivalent Isotropically Radiated Power (EIRP) is calculated (as specified in ANSI C63.26-2015 section 6.4 for a system of correlated output signals) from the results of the power measurements (highest measured PSD for each channel bandwidth type). The maximum antenna assembly beamforming gain (8-column antenna maximum beamforming gain is 24 dBi) was used for this calculation. The cable loss between the antenna and transmitter is assumed to be 0dB for this worst case EIRP calculation. Calculations of worst-case EIRP for sixteen port MIMO are as follows:

Parameter	5 MHz Ch BW	10 MHz Ch BW	15 MHz Ch BW	20 MHz Ch BW
Worst Case PSD/Antenna Port	1.62 W/MHz or 32.1 dBm/MHz	0.91 W/MHz or 29.6 dBm/MHz	0.65 W/MHz or 28.1 dBm/MHz	0.56 W/MHz or 27.5 dBm/MHz
Cable Loss	0 dB	0 dB	0 dB	0 dB
Number of Ant Ports per Polarization	8	8	8	8
Total PSD per Polarization	13.0 W/MHz or 41.1 dBm/MHz	7.28 W/MHz or 38.6 dBm/MHz	5.2 W/MHz or 37.2 dBm/MHz	4.48 W/MHz or 36.5 dBm/MHz
Maximum Antenna Beamforming Gain per Polarization	24.0 dBi	24.0 dBi	24.0 dBi	24.0 dBi
EIRP per Polarization	65.1 dBm/MHz or 3236 W/MHz	62.6 dBm/MHz or 1820 W/MHz	61.2 dBm/MHz or 1318 W/MHz	60.5 dBm/MHz or 1122 W/MHz
Number of Polarizations	2	2	2	2
EIRP Total (See Note 1)	65.1 dBm/MHz or 3236 W/MHz	62.6 dBm/MHz or 1820 W/MHz	61.2 dBm/MHz or 1318 W/MHz	60.5 dBm/MHz or 1122 W/MHz

Note 1: The EIRP per antenna polarization is required to be below the regulatory limit as described in ANSI C63.26 -2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the two transmitter outputs to each antenna are 90 degree -phase shifted relative to each other (cross-polarized radiators).

Calculation Summary

The worst case AAIB sixteen port MIMO EIRP levels using the 8-column antenna assembly are:
(1) Less than the FCC and ISED (3280 W/MHz or 65.16 dBm/MHz) EIRP Regulatory Limits for all (5, 10, 15 & 20MHz) channel bandwidths.
(2) Less than the FCC and ISED (1640 W/MHz or 62.15 dBm/MHz) EIRP Regulatory Limits for 15 & 20MHz channel bandwidths
(3) Over the FCC and ISED (1640 W/MHz or 62.15 dBm/MHz) EIRP Regulatory Limits by 2.95 dB for the 5MHz channel bandwidth and by 0 .45 dB for the 10MHz channel bandwidth. EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements as noted above.
(4) The AAIB antenna port NR5 maximum carrier power level was reduced 3.0 dB by changing the BTS configuration file output power parameter definition to show compliance with the 62.15 dBm/MHz EIRP regulatory limit. See "Output Power Lowered Power" and "Power Spectral Density Lowered Power" sections of this report for details.
(5) The AAIB antenna port NR10 maximum carrier power level was reduced 1.0 dB by changing the BTS configuration file output power parameter definition to show compliance with the 62.15 dBm/MHz EIRP regulatory limit. See "Output Power Lowered Power" and "Power Spectral Density Lowered Power" sections of this report for details.

POWER SPECTRAL DENSITY - LOWERED POWER

XMit 2020.12.30.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2021-03-11	2022-03-11
Block - DC	Fairview Microwave	SD3379	AMM	2020-09-21	2021-09-21
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The fundamental emission power spectral density was measured using the channels and modes as called out on the following data sheets. The transmit power was set to levels seen in the datasheet.

The method of section 5.2.4.5 of ANSI C63.26 was used to make the measurement. The method uses trace averaging across ON and OFF times of EUT transmissions using the spectrum analyzer's RMS detector. Following the measurement a duty cycle correction was applied by adding [10log(1/D)], where D is the duty cycle, to the measured power to compute the PSD during the transmit times.

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

The total PSD of all antenna ports (at the radio output) was determined per ANSI C63.26-2015 paragraph 6.4.3.2.4.

The EIRP calculations were based upon ANSI C63.26-2015 sections 6.4.3.2.4, section 6.4.6.3, section 6.4.5.3 and section 6.4.5.2

Compliance check for EIRP Limit of 1640W/MHz or 62.15 dBm/MHz:

As shown in the EIRP calculation table of the "PSD and EIRP Calculations" report section, the highest AAIB antenna port 1 PSD level that will not cause the calculated EIRP to exceed the EIRP limit is 29.1 dBm/MHz. The NR5 and NR10 maximum carrier power levels were reduced by 3.0dB and 1.0 dB respectively by changing the carrier power parameters in the configuration file for the base station to comply with the EIRP limit (62.15 dBm/MHz).

The AAIB base station configuration file parameters set for maximum carrier output power (37.9dBm) gives a measured maximum NR5 PSD/port result of 32.1dBm/MHz and a worst case calculated EIRP that is 2.95dB over the EIRP limit (62.15dBm/MHz). To show compliance with the EIRP limit (62.15dBm/MHz), the AAIB base station configuration file parameters setting for NR5 carrier output power was set to 34.9dBm (reduced 3.0 dB from maximum) that gives a measured maximum NR5 PSD/port result of 29.0dBm/MHz and a worst case calculated EIRP that is 0.1dB below the EIRP limit (62.15dBm/MHz).

The AAIB base station configuration file parameters set for maximum carrier output power (37.9dBm) gives a measured maximum NR10 PSD/port result of 29.6dBm/MHz and a worst case calculated EIRP that is 0.45dB over the EIRP limit (62.15dBm/MHz). To show compliance with the EIRP limit (62.15dBm/MHz), the AAIB base station configuration file parameters setting for NR10 carrier output power was set to 36.9dBm (reduced 1.0 dB from maximum) that gives a measured maximum NR10 PSD/port result of 28.4dBm/MHz and a worst case calculated EIRP that is 0.7dB below the EIRP limit (62.15dBm/MHz).

POWER SPECTRAL DENSITY - LOWERED POWER

element

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	AAIB (FCC/ISED C2PC)			**Work Order:**	NOKI0030
Serial Number:	BL2032123Y0			**Date:**	21-Jul-21
Customer:	Nokia Solutions and Networks			**Temperature:**	20.9 °C
Attendees:	David Le, Mitchell Hill			**Humidity:**	52.5% RH
Project:	None			**Barometric Pres.:**	1021 mbar
Tested by:	Brandon Hobbs	**Power:**	54 VDC	**Job Site:**	TX09

TEST SPECIFICATIONS	Test Method
FCC 27:2021	ANSI C63.26:2015
RSS-139 Issue 3:2015, RSS-170 Issue 3:2015	RSS-139 Issue 3:2015, RSS-170 Issue 3:2015

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. The NR5 and NR10 carrier power levels were reduced to demonstrate compliance with EIRP limits. The maximum port 1 PSD level is 29.1 dBm/MHz for the base station calculated EIRP level not to exceed the EIRP limit (62.15 dBm/MHz).

DEVIATIONS FROM TEST STANDARD

None

Configuration #	2	Signature

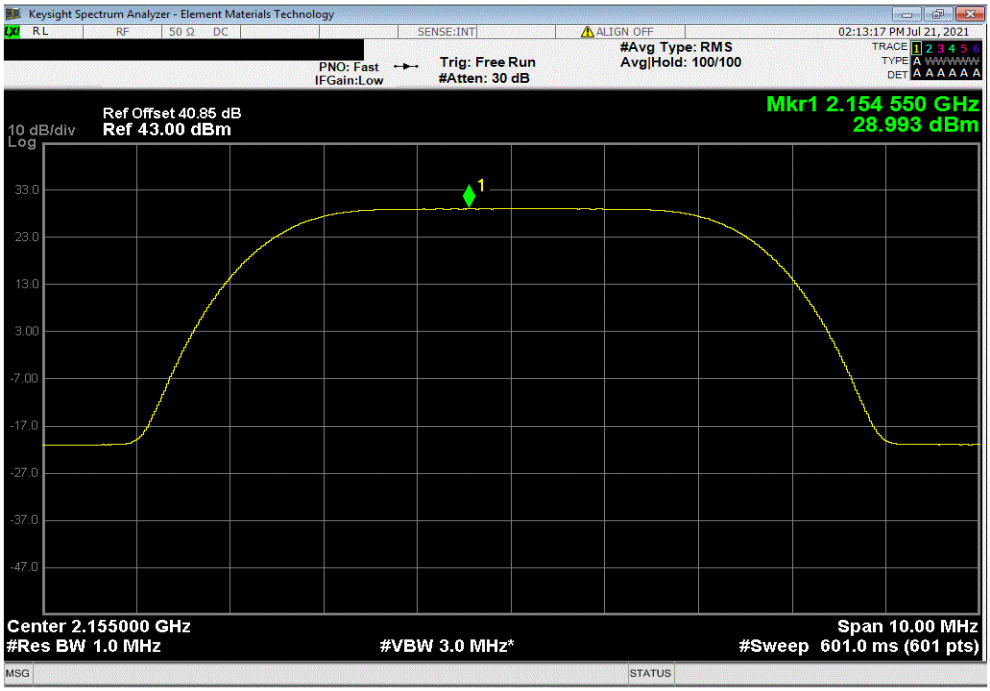
	Initial Value dBm/MHz == PSD	Duty Cycle	Single Port dBm/MHz == PSD	Limit (dBm/MHz)	Results
Port 1, Band n66, 2110 MHz - 2200 MHz					
5 MHz Bandwidth					
256-QAM Modulation					
Mid Channel 2155 MHz	28.993	0	28.993	29.1	Pass
10 MHz Bandwidth					
16-QAM Modulation					
Mid Channel 2155 MHz	28.427	0	28.427	29.1	Pass

POWER SPECTRAL DENSITY - LOWERED POWER

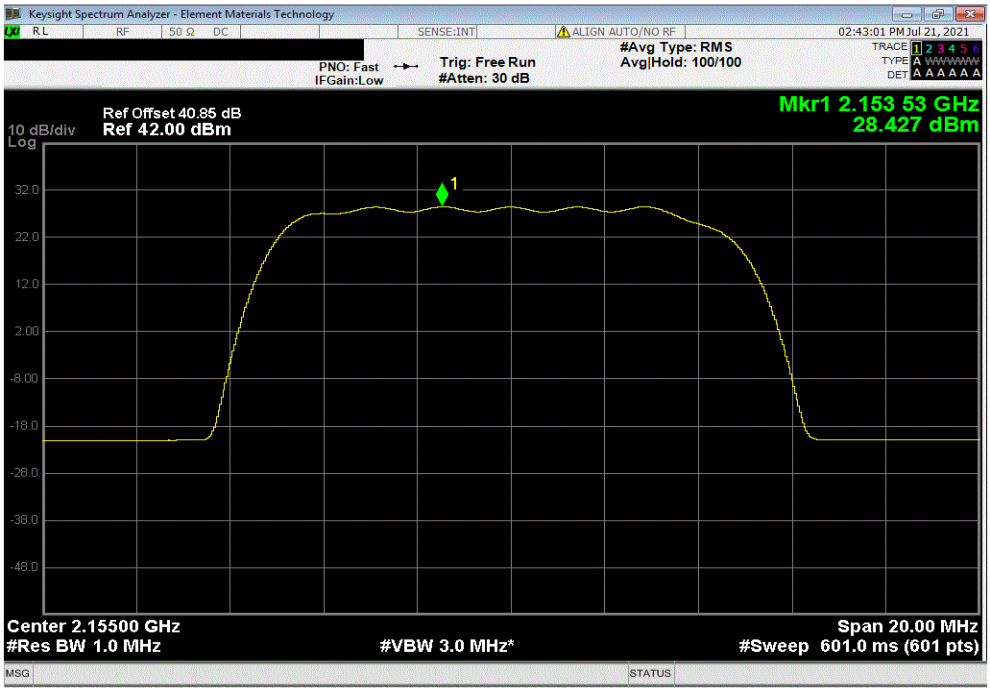
element

TbtTx 2021.03.19.1 XMit 2020.12.30.0

Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
	Initial Value dBm/MHz == PSD	Duty Cycle		Single Port dBm/MHz == PSD	Limit (dBm/MHz)	Results
	28.993	0		29.0	29.1	Pass



Port 1, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 16-QAM Modulation, Mid Channel 2155 MHz						
	Initial Value dBm/MHz == PSD	Duty Cycle		Single Port dBm/MHz == PSD	Limit (dBm/MHz)	Results
	28.427	0		28.4	29.1	Pass



PEAK TO AVERAGE (PAPR) CCDF

XMit 2020.12.30.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMM	2020-09-21	2021-09-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	2021-03-11	2022-03-11
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

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

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

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

Per 27.50(d)(2), RSS-139 section 6.5, and RSS-170 section 5.3.1, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

RF conducted emissions testing was performed on one port. The AAIB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small) and 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.

PEAK TO AVERAGE (PAPR) CCDF

element

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	**AAIB (FCC/ISED C2PC)**			**Work Order:**	**NOKI0030**
Serial Number:	**BL2032123Y0**			**Date:**	**21-Jul-21**
Customer:	**Nokia Solutions and Networks**			**Temperature:**	**21.1 °C**
Attendees:	**David Le, Mitchell Hill**			**Humidity:**	**583% RH**
Project:	**None**			**Barometric Pres.:**	**1021 mbar**
Tested by:	**Brandon Hobbs**	**Power:**	**54 VDC**	**Job Site:**	**TX09**

TEST SPECIFICATIONS	**Test Method**
FCC 27:2021	ANSI C63.26:2015
RSS-139 Issue 3:2015, RSS-170 Issue 3:2015	RSS-139 Issue 3:2015, RSS-170 Issue 3:2015

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n66 carriers are enabled at maximum power (6.25 watts/carrier).

DEVIATIONS FROM TEST STANDARD

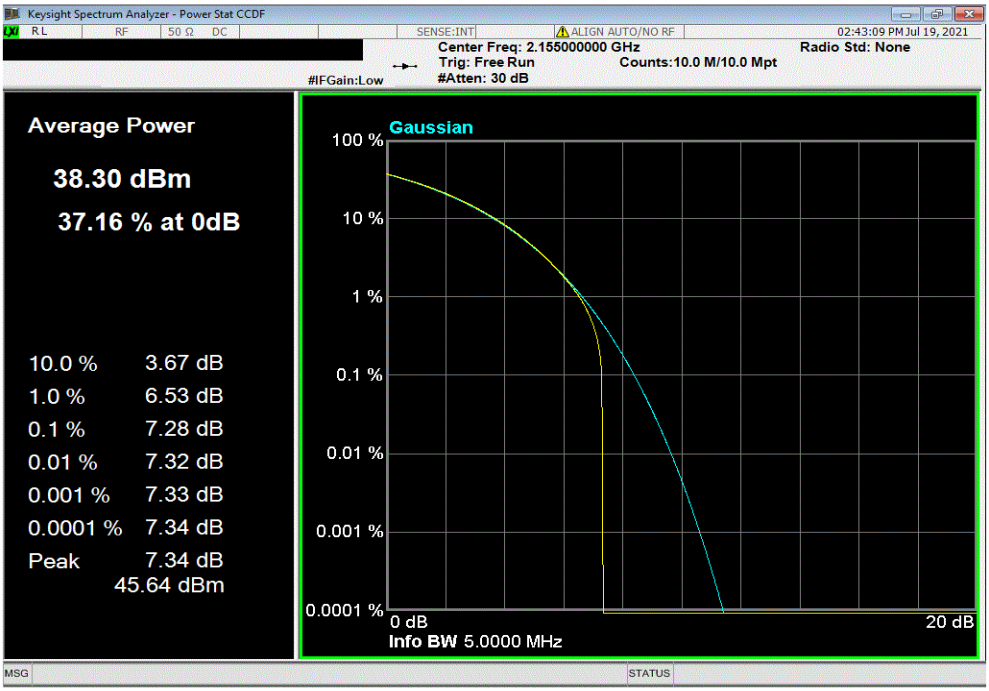
None

Configuration #	**2**	*Signature*

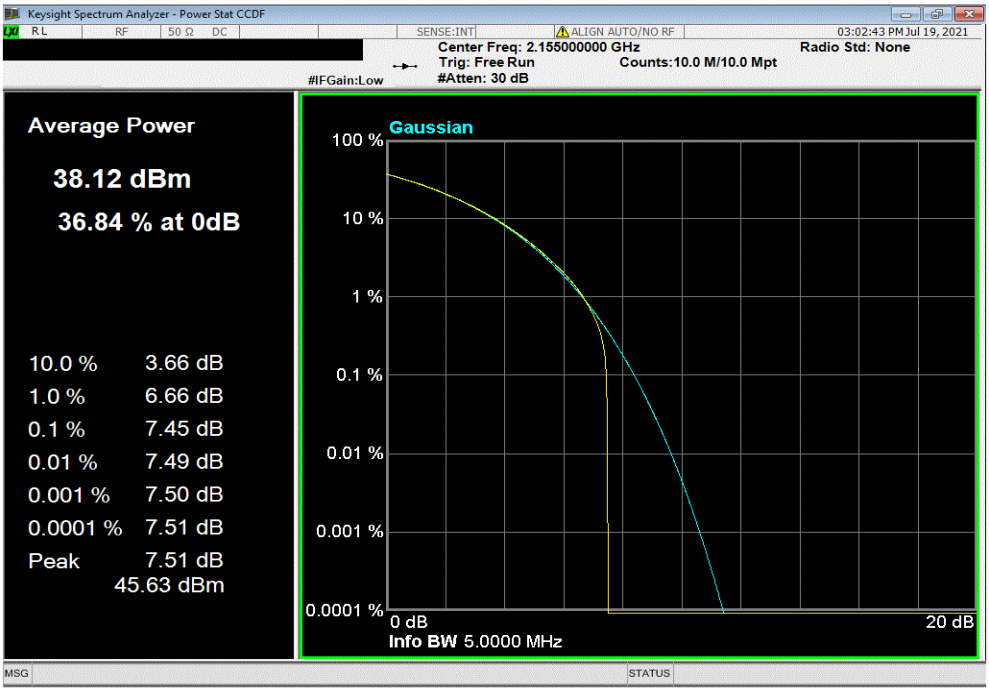
	PAPR Value (dB)	PAPR Limit (dB)	Results
Port 1, Band n66, 2110 MHz - 2200 MHz			
5 MHz Bandwidth			
QPSK Modulation			
Mid Channel 2155 MHz	7.28	13	Pass
16-QAM Modulation			
Mid Channel 2155 MHz	7.45	13	Pass
64-QAM Modulation			
Mid Channel 2155 MHz	7.27	13	Pass
256-QAM Modulation			
Low Channel 2112.5 MHz	7.28	13	Pass
Mid Channel 2155 MHz	7.29	13	Pass
High Channel 2197.5 MHz	7.30	13	Pass
10 MHz Bandwidth			
256-QAM Modulation			
Low Channel 2115 MHz	7.30	13	Pass
Mid Channel 2155 MHz	7.29	13	Pass
High Channel 2195 MHz	7.31	13	Pass
15 MHz Bandwidth			
256-QAM Modulation			
Low Channel 2117.5 MHz	7.47	13	Pass
Mid Channel 2155 MHz	7.44	13	Pass
High Channel 2192.5 MHz	7.48	13	Pass
20 MHz Bandwidth			
256-QAM Modulation			
Low Channel 2120 MHz	7.26	13	Pass
Mid Channel 2155 MHz	7.17	13	Pass
High Channel 2190 MHz	7.27	13	Pass

PEAK TO AVERAGE (PAPR) CCDF

Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , QPSK Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.28	13	Pass

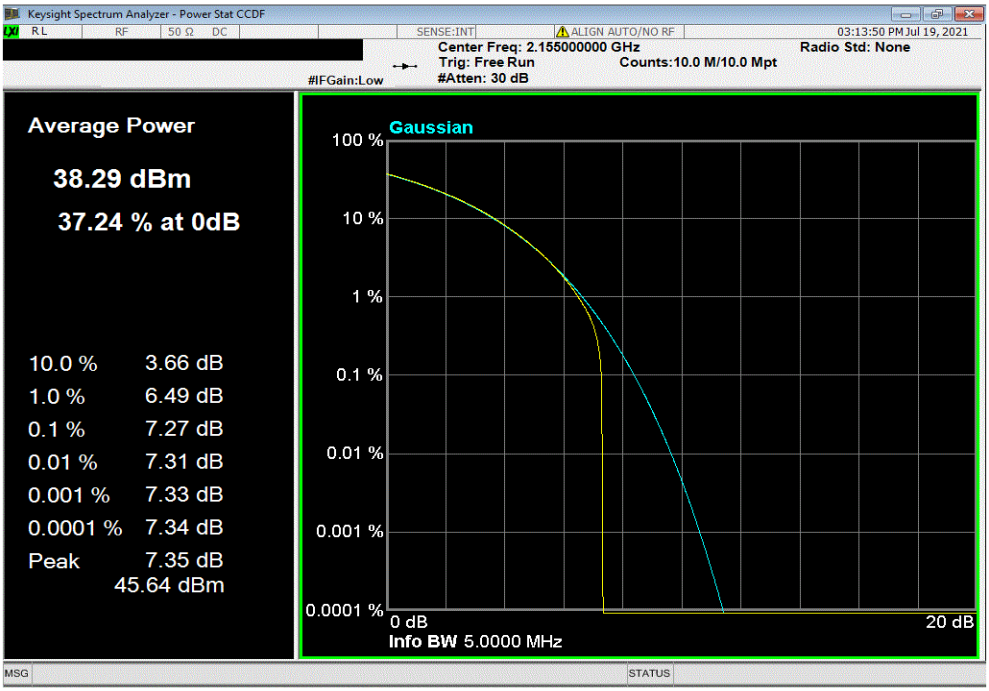


Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 16-QAM Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.45	13	Pass

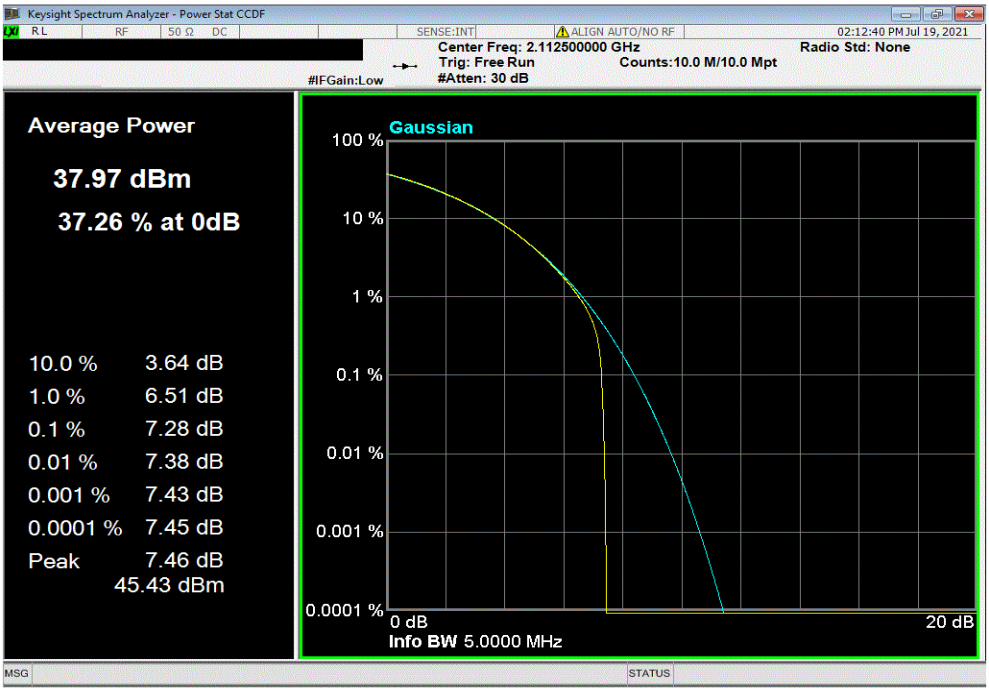


PEAK TO AVERAGE (PAPR) CCDF

Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 64-QAM Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.27	13	Pass



Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, Low Channel 2112.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.28	13	Pass

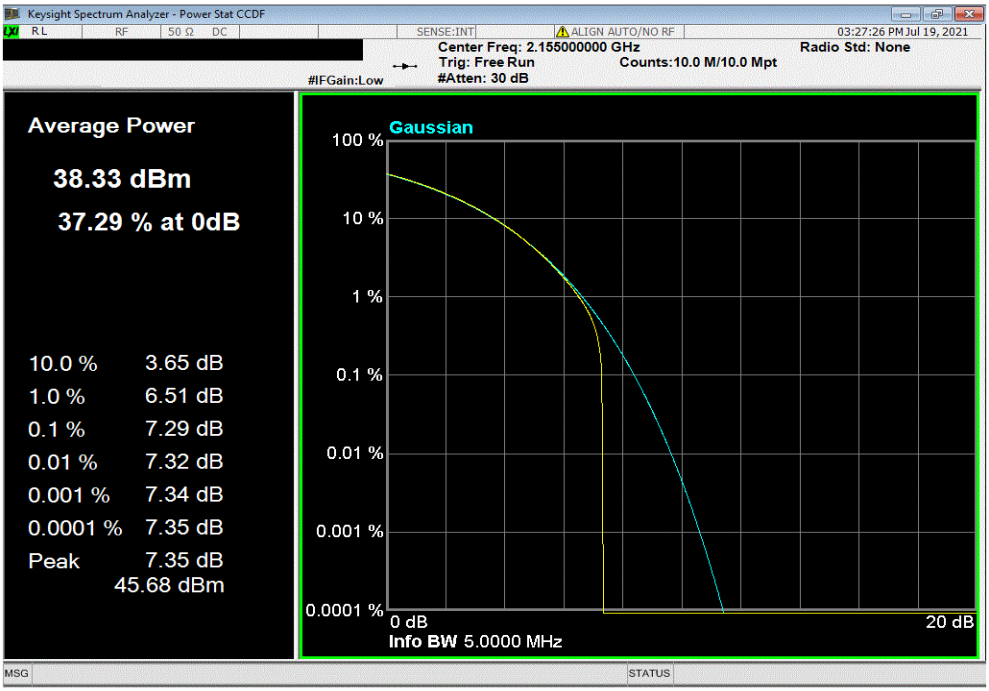


PEAK TO AVERAGE (PAPR) CCDF

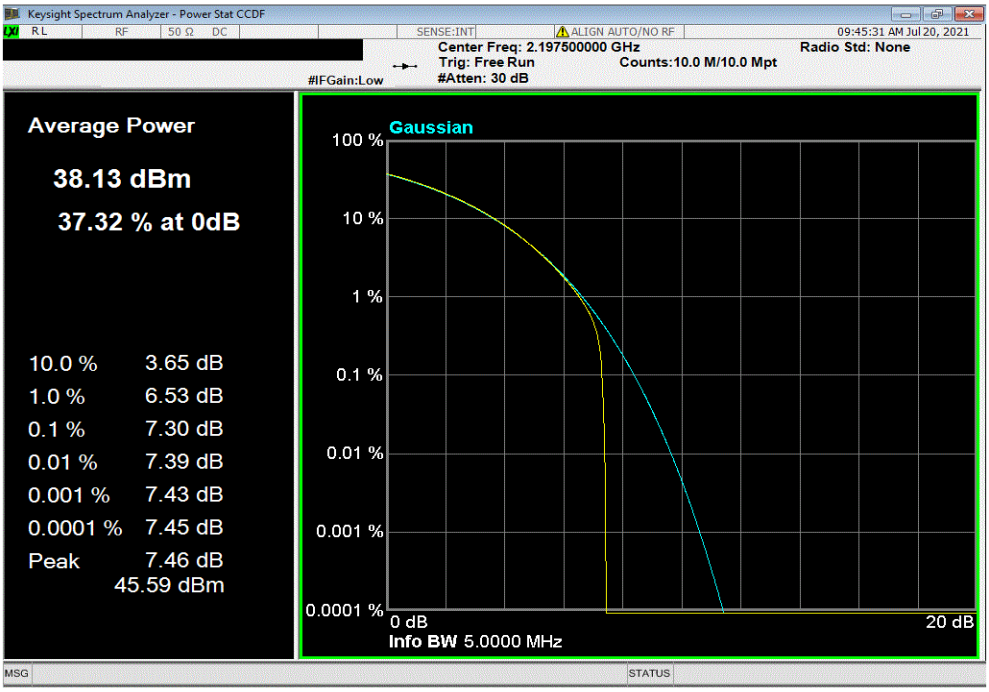
element

TbtTx 2021.03.19.1 XMit 2020.12.30.0

Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.29	13	Pass

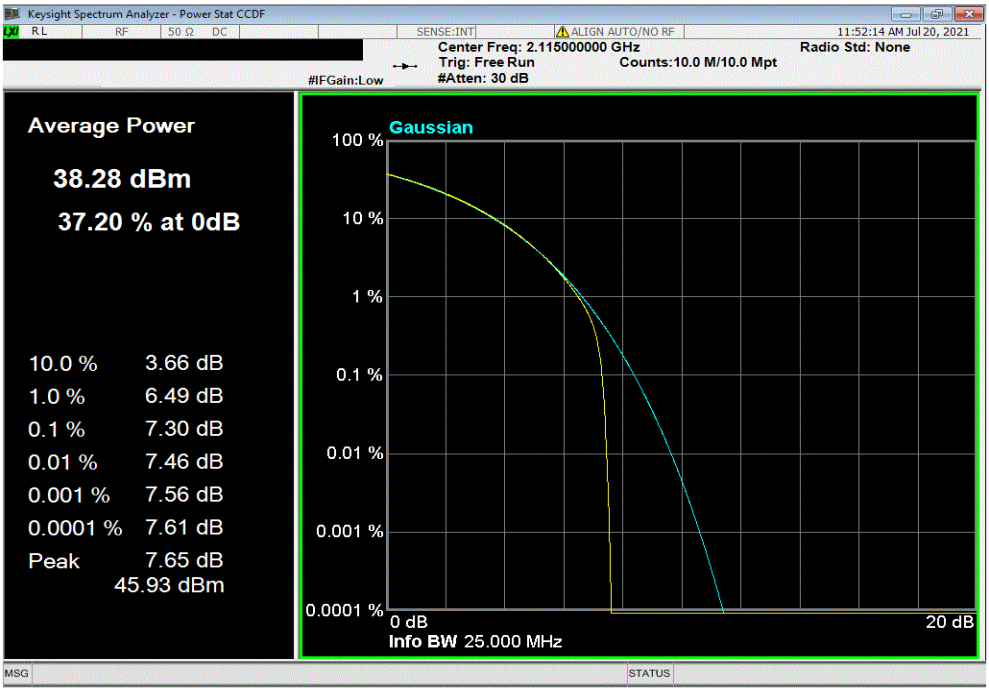


Port 1, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, High Channel 2197.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.3	13	Pass

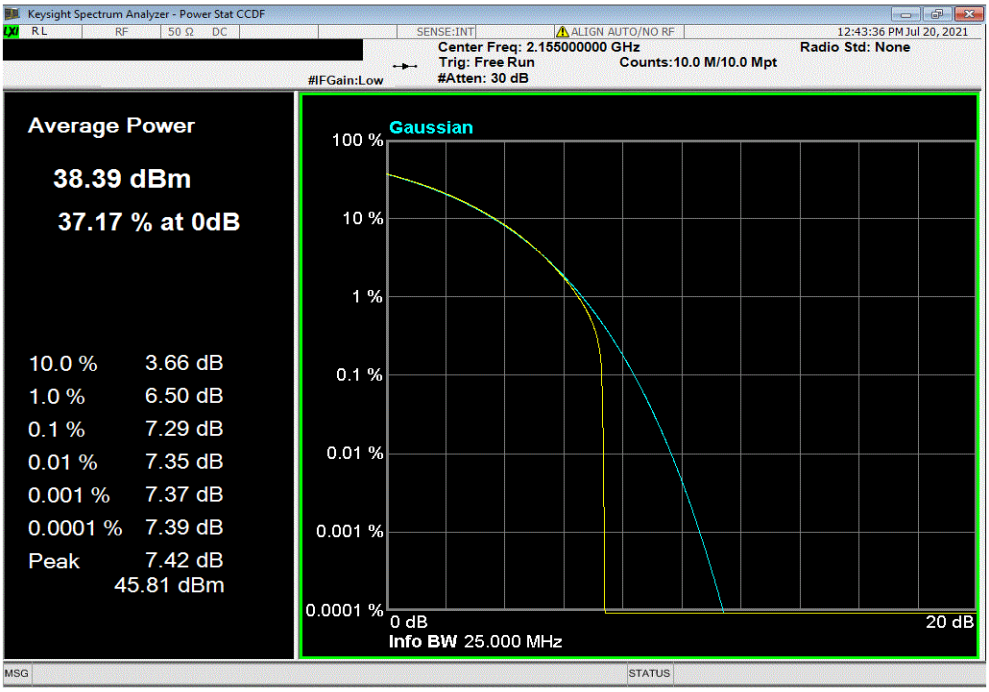


PEAK TO AVERAGE (PAPR) CCDF

Port 1, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 256-QAM Modulation, Low Channel 2115 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.3	13	Pass

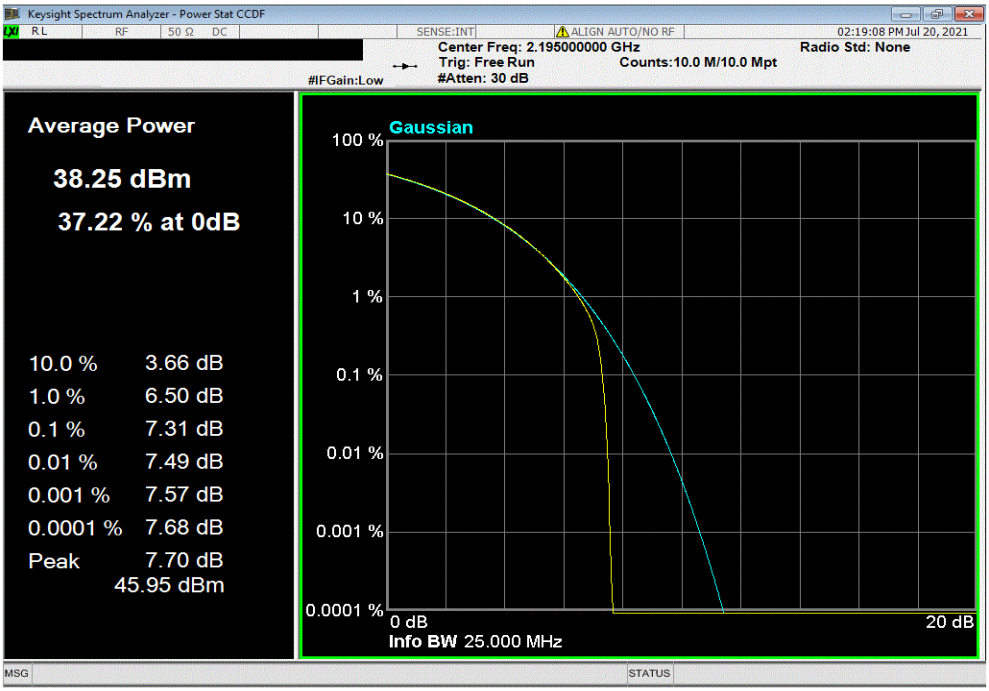


Port 1, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.29	13	Pass

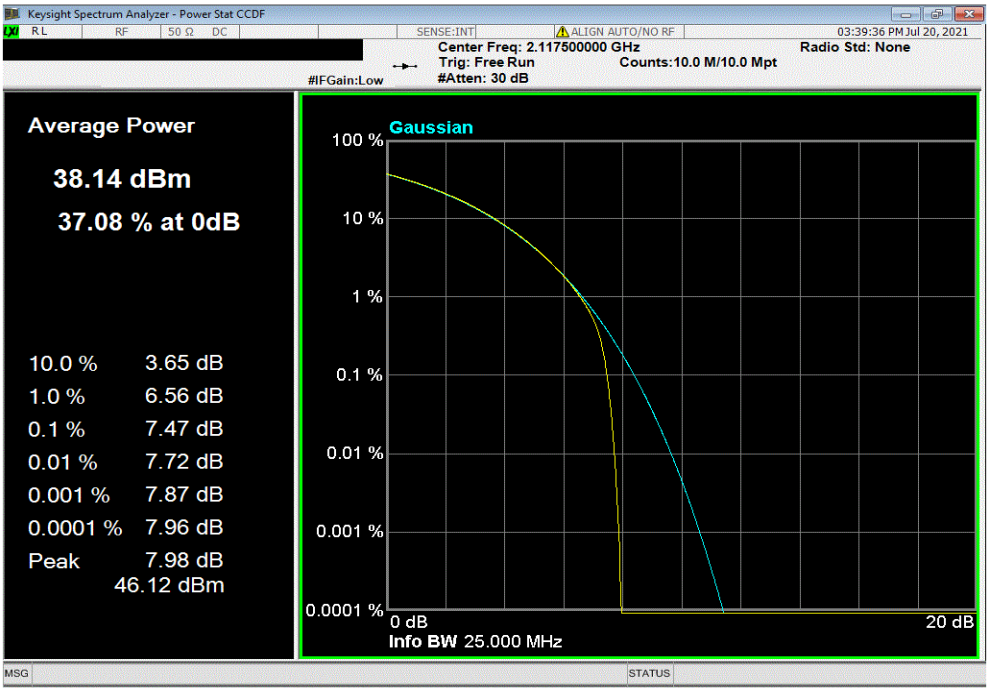


PEAK TO AVERAGE (PAPR) CCDF

Port 1, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 256-QAM Modulation, High Channel 2195 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.31	13	Pass

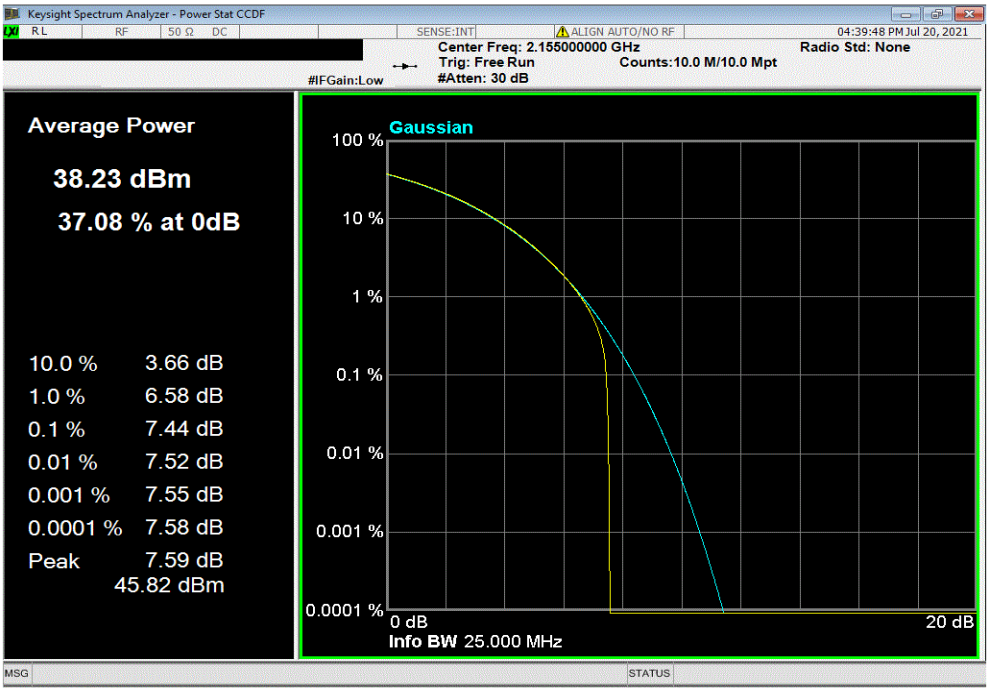


Port 1, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 256-QAM Modulation, Low Channel 2117.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.47	13	Pass

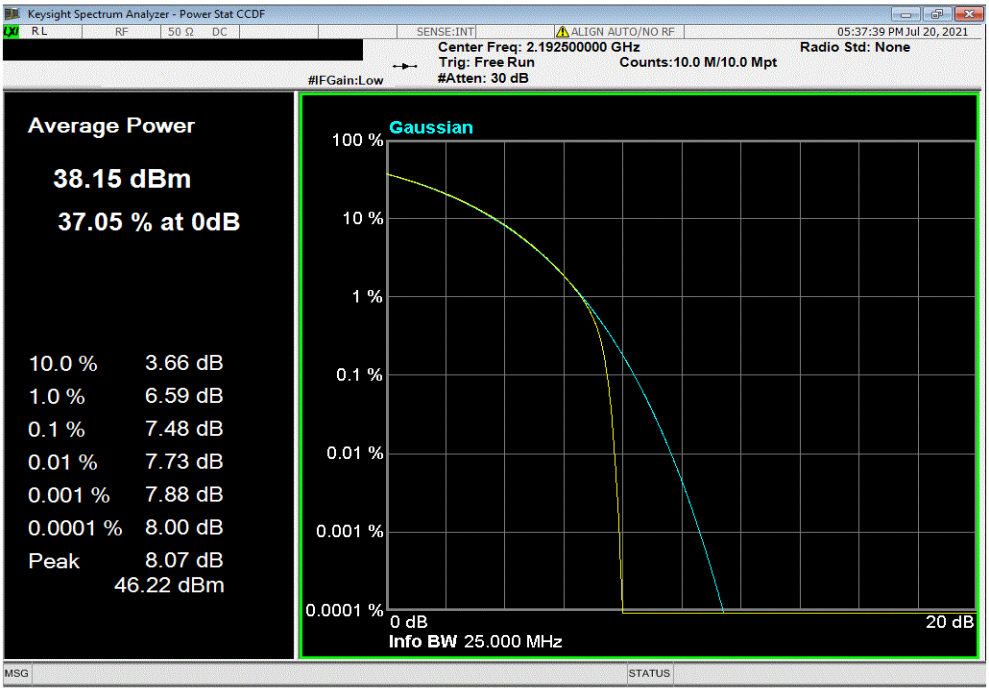


PEAK TO AVERAGE (PAPR) CCDF

Port 1, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.44	13	Pass

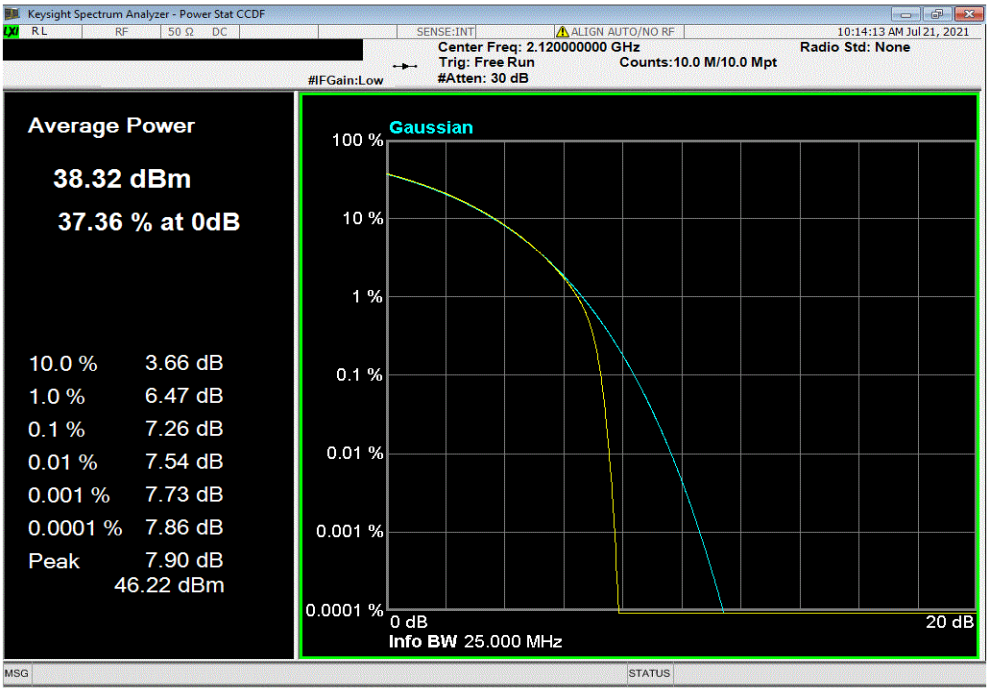


Port 1, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 256-QAM Modulation, High Channel 2192.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.48	13	Pass

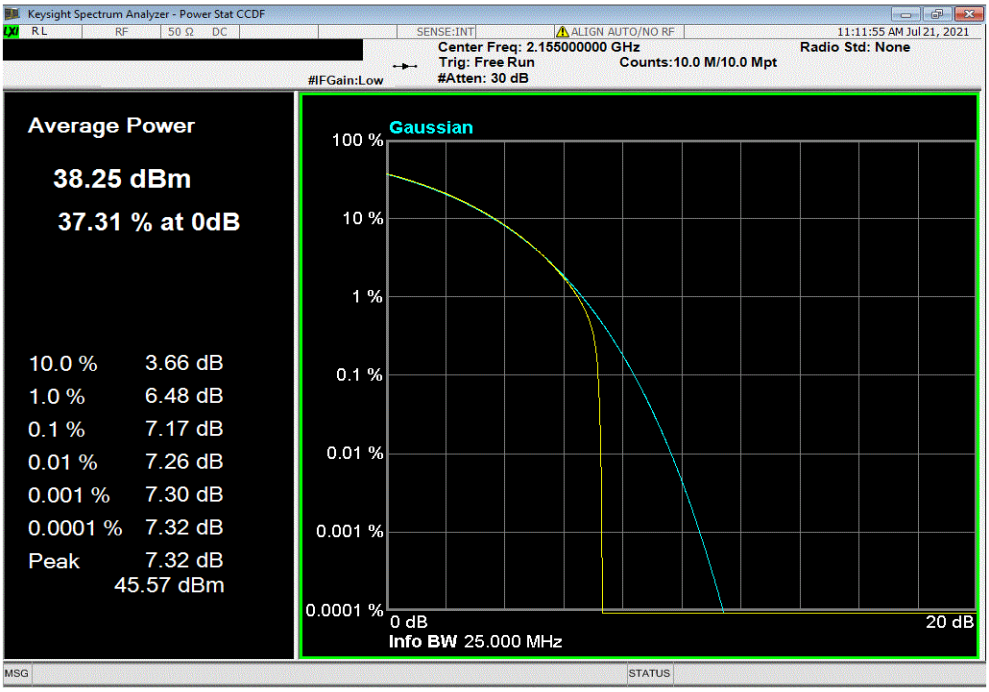


PEAK TO AVERAGE (PAPR) CCDF

Port 1, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 256-QAM Modulation, Low Channel 2120 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.26	13	Pass



Port 1, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.17	13	Pass



PEAK TO AVERAGE (PAPR) CCDF

Port 1, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 256-QAM Modulation, High Channel 2190 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.27	13	Pass