OUTPUT POWER - GUARD BAND

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
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Block - DC	Fairview Microwave	SD3379	AMT	2021-09-14	2022-09-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

TEST DESCRIPTION

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

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

RF conducted emissions testing was performed only on one port. All four AHFII antenna ports are essentially electrically identical and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

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

OUTPUT POWER - GUARD BAND

TbtTx 2021.12.14.1 XMit 2022.02.07.0

EUT:	AHFII Remote Radio Head			**Work Order:**	NOKI0037
Serial Number:	YK214000036			**Date:**	28-Feb-22
Customer:	Nokia Solutions and Networks			**Temperature:**	22.6 °C
Attendees:	David Le, John Rattanavong			**Humidity:**	23.7% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Mark Baytan	**Power:**	54 VDC	**Job Site:**	TX09

TEST SPECIFICATIONS	**Test Method**
FCC 24E:2022	ANSI C63.26:2015
RSS-133 Issue 6:2013+A1:2018	RSS-133 Issue 6:2013+A1:2018

COMMENTS

All measurement path loses accounted for in the reference level offest including any attenuators, filters, and DC blocks. Band 25 carriers enabled at maximum power is 80 watts/carrier. The following is the output power measurements at the radio output ports. The output power was measured for a single carrier over the carrier channel bandwidth on port 1. The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port power + 6dB [i.e. 10log(4)].

DEVIATIONS FROM TEST STANDARD

None

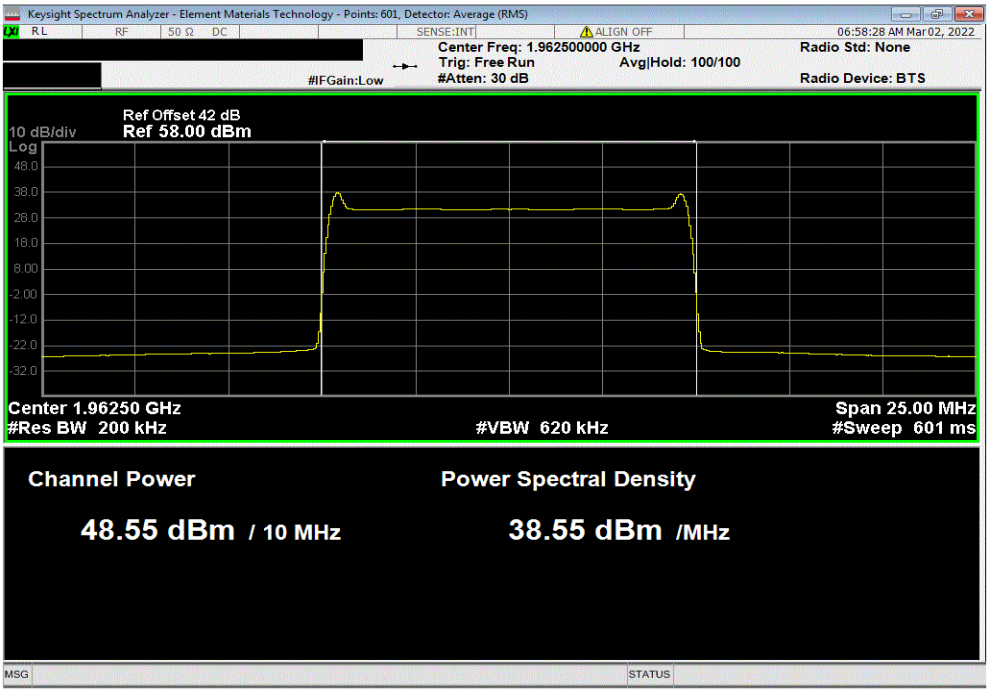
Configuration #	**2**	*Signature*

	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW
Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band					
Port 1					
10 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 1935 MHz	48.803	0	48.8	51.8	54.8
Mid Channel, 1962.5 MHz	48.553	0	48.6	51.6	54.6
High Channel, 1990 MHz	48.942	0	48.9	51.9	54.9
15 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 1937.5 MHz	48.883	0	48.9	51.9	54.9
Mid Channel, 1962.5 MHz.	48.897	0	48.9	51.9	54.9
High Channel, 1987.5 MHz	49.165	0	49.2	52.2	55.2
20 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 1940 MHz	48.706	0	48.7	51.7	54.7
Mid Channel, 1962.5 MHz.	48.57	0	48.6	51.6	54.6
High Channel, 1985 MHz	49.045	0	49.0	52.0	55.0

OUTPUT POWER - GUARD BAND

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 1935 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.803	0	48.8	51.8	54.8	

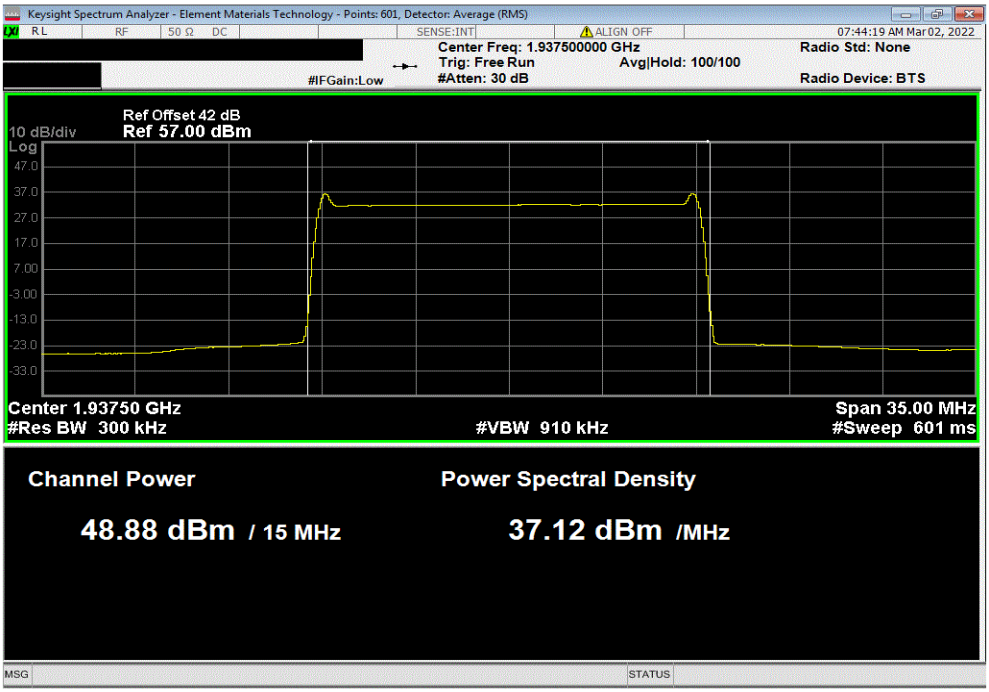
Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.553	0	48.6	51.6	54.6	



OUTPUT POWER - GUARD BAND

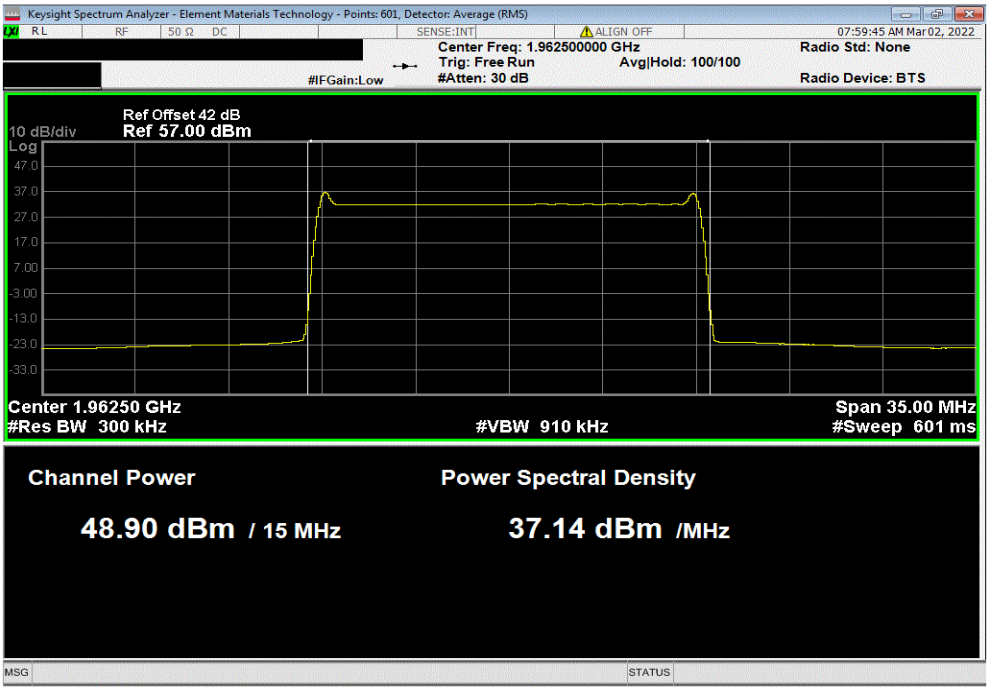
Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 1990 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.942	0	48.9	51.9	54.9	

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 1937.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.883	0	48.9	51.9	54.9	



OUTPUT POWER - GUARD BAND

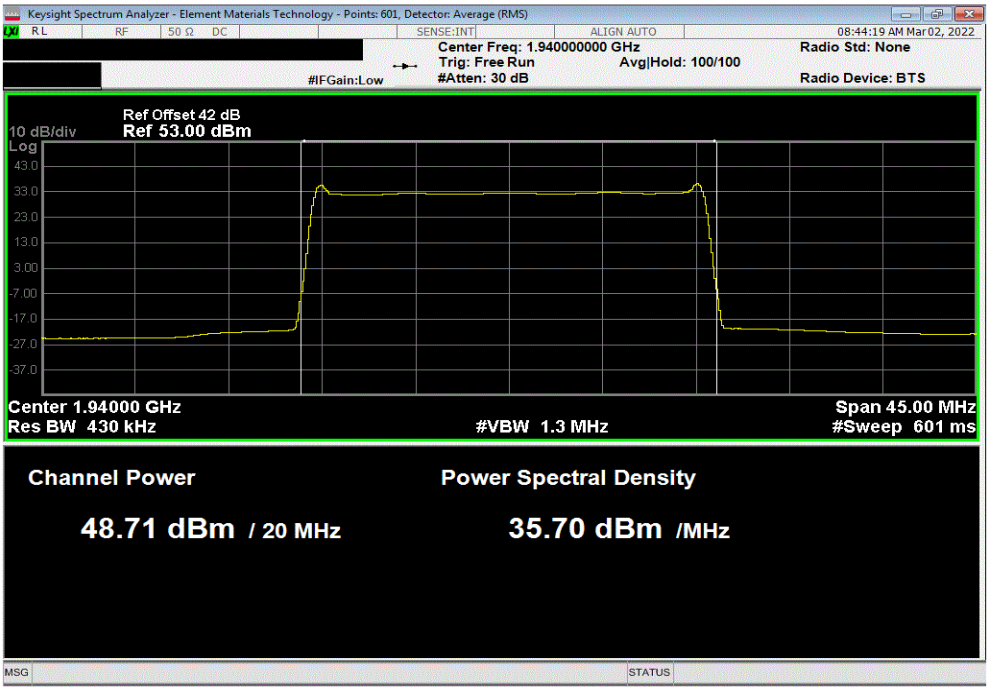
Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz.						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.897	0	48.9	51.9	54.9	



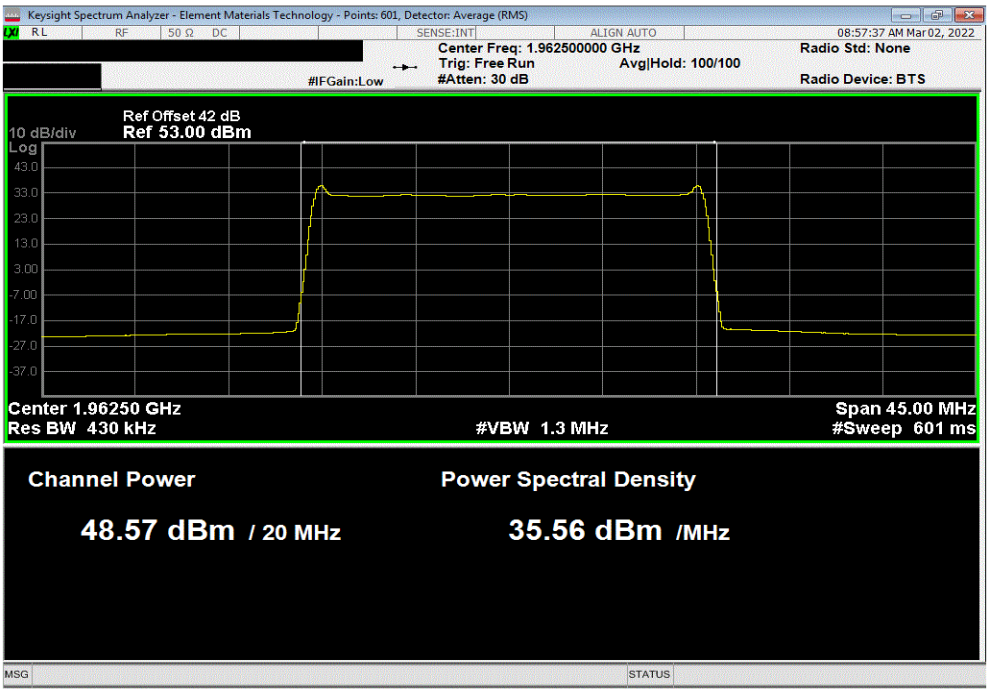
Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 1987.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.165	0	49.2	52.2	55.2	

OUTPUT POWER - GUARD BAND

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 1940 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.706	0	48.7	51.7	54.7	

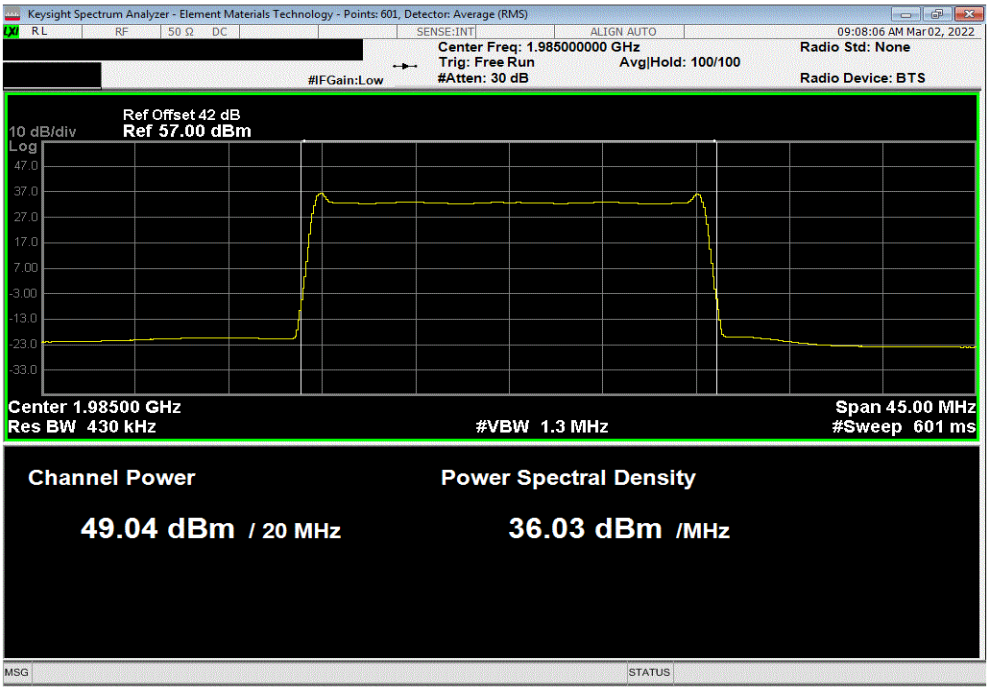


Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz..						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.57	0	48.6	51.6	54.6	



OUTPUT POWER - GUARD BAND

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 1985 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.045	0	49.0	52.0	55.0	



OUTPUT POWER - GUARD BAND

TbtTx 2021.12.14.1 XMit 2022.02.07.0

EUT:	**AHFII Remote Radio Head**			**Work Order:**	**NOKI0037**
Serial Number:	**YK214000036**			**Date:**	**28-Feb-22**
Customer:	**Nokia Solutions and Networks**			**Temperature:**	**22.6 °C**
Attendees:	**David Le, John Rattanavong**			**Humidity:**	**23.7% RH**
Project:	**None**			**Barometric Pres.:**	**1026 mbar**
Tested by:	**Mark Baytan**	**Power:**	**54 VDC**	**Job Site:**	**TX09**

TEST SPECIFICATIONS	**Test Method**
FCC 27:2022	ANSI C63.26:2015
RSS-139 Issue 3:2015	RSS-139 Issue 3:2015
RSS-170 Issue 3:2015	RSS-170 Issue 3:2015

COMMENTS

All measurement path loses accounted for in the reference level offest including any attenuators, filters, and DC blocks. Band 66 carriers enabled at maximum power is 80 watts/carrier. The following is the output power measurements at the radio output ports. The output power was measured for a single carrier over the carrier channel bandwidth on port 1. The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port power + 6dB [i.e. 10log(4)].

DEVIATIONS FROM TEST STANDARD

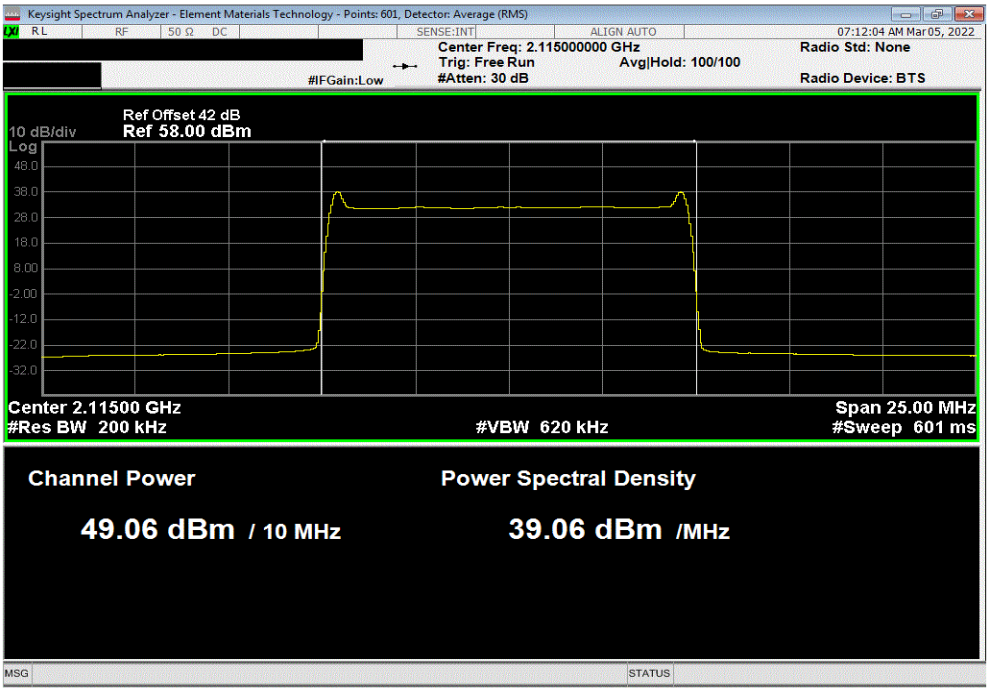
None

Configuration #	**2**	*Signature*

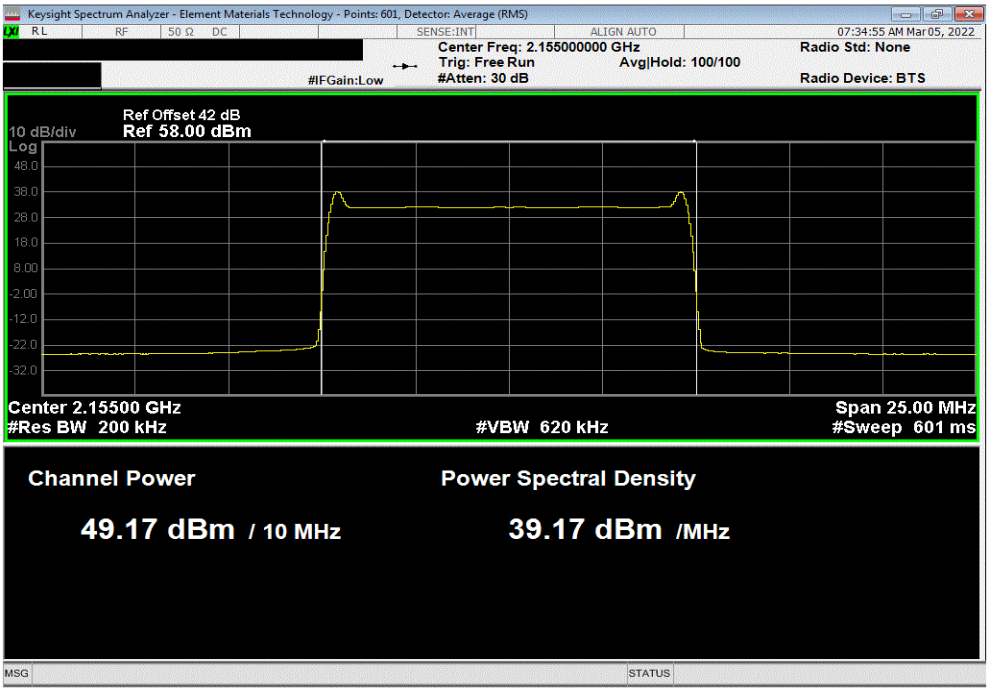
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW
Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band					
Port 1					
10 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 2115 MHz	49.057	0	49.1	52.1	55.2
Mid Channel, 2155 MHz	49.174	0	49.2	52.2	55.2
High Channel, 2195 MHz	49.308	0	49.3	52.3	55.3
15 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 2117.5 MHz	49.306	0	49.3	52.3	55.3
Mid Channel, 2155 MHz.	49.234	0	49.2	52.2	55.2
High Channel, 2192.5 MHz	49.473	0	49.5	52.5	55.5
20 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 2120 MHz	49.259	0	49.3	52.3	55.3
Mid Channel, 2155 MHz..	49.032	0	49.0	52.0	55.0
High Channel, 2190 MHz	49.319	0	49.3	52.3	55.3

OUTPUT POWER - GUARD BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 2115 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.057	0	49.1	52.1	55.2	

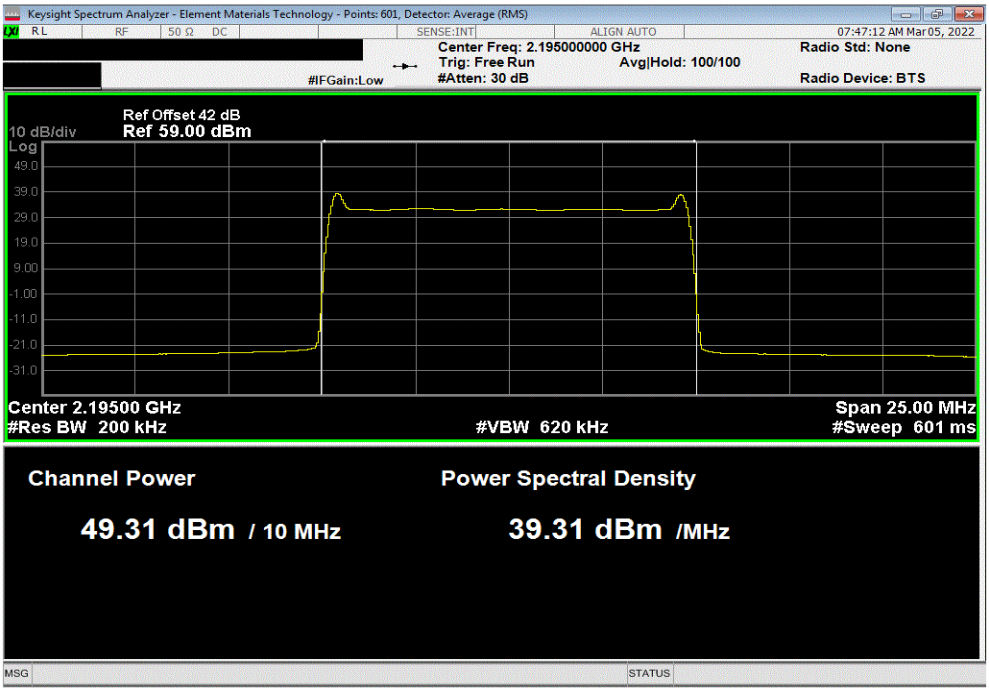


Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 2155 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.174	0	49.2	52.2	55.2	

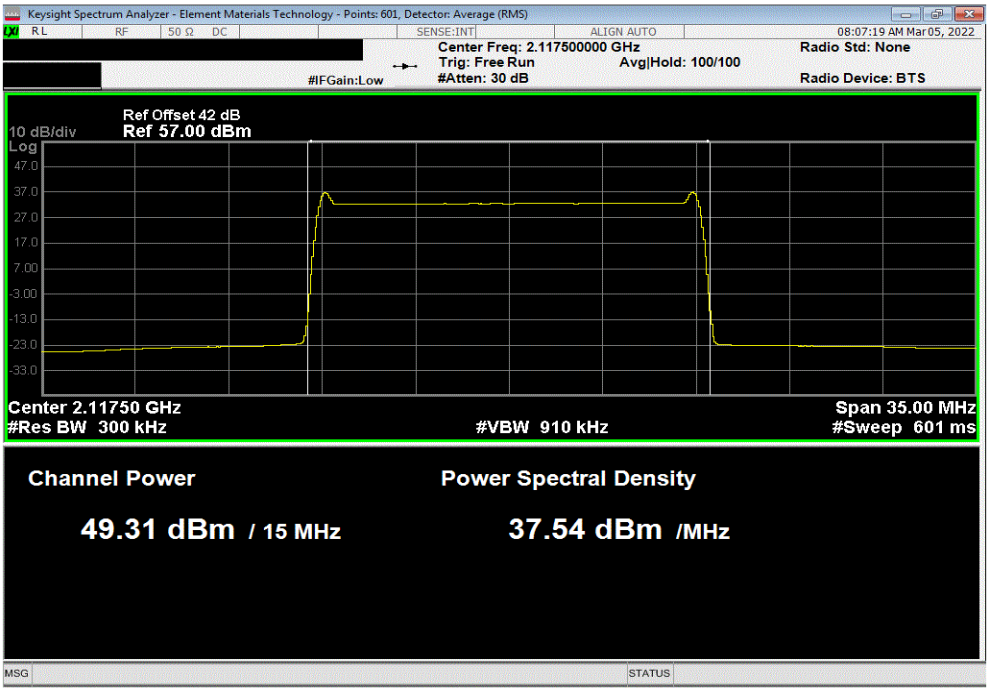


OUTPUT POWER - GUARD BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 2195 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.308	0	49.3	52.3	55.3	

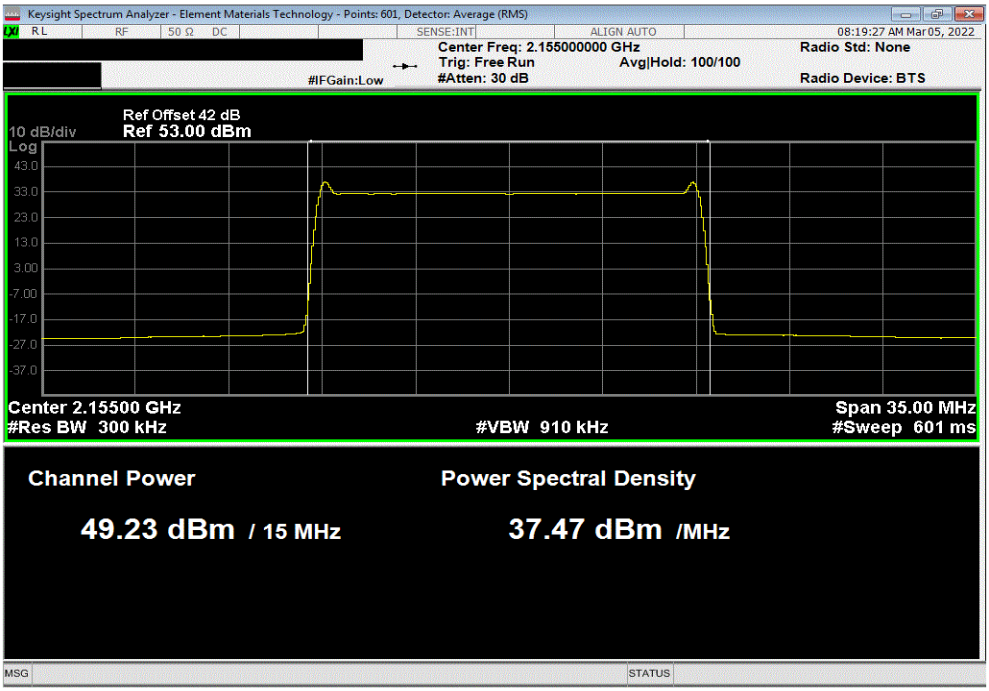


Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 2117.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.306	0	49.3	52.3	55.3	

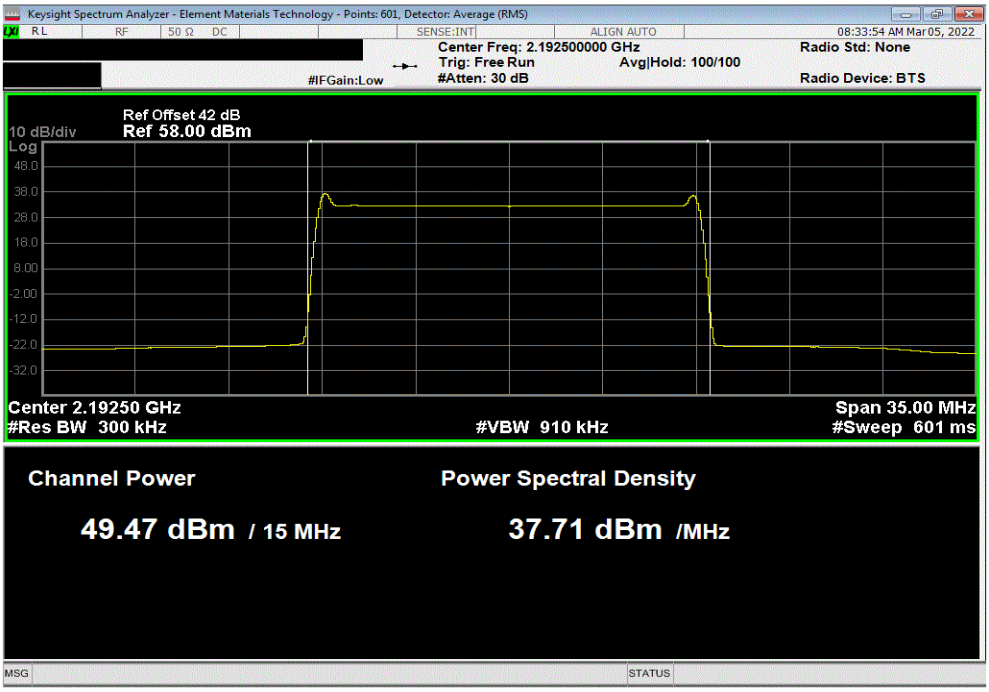


OUTPUT POWER - GUARD BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 2155 MHz.						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.234	0	49.2	52.2	55.2	

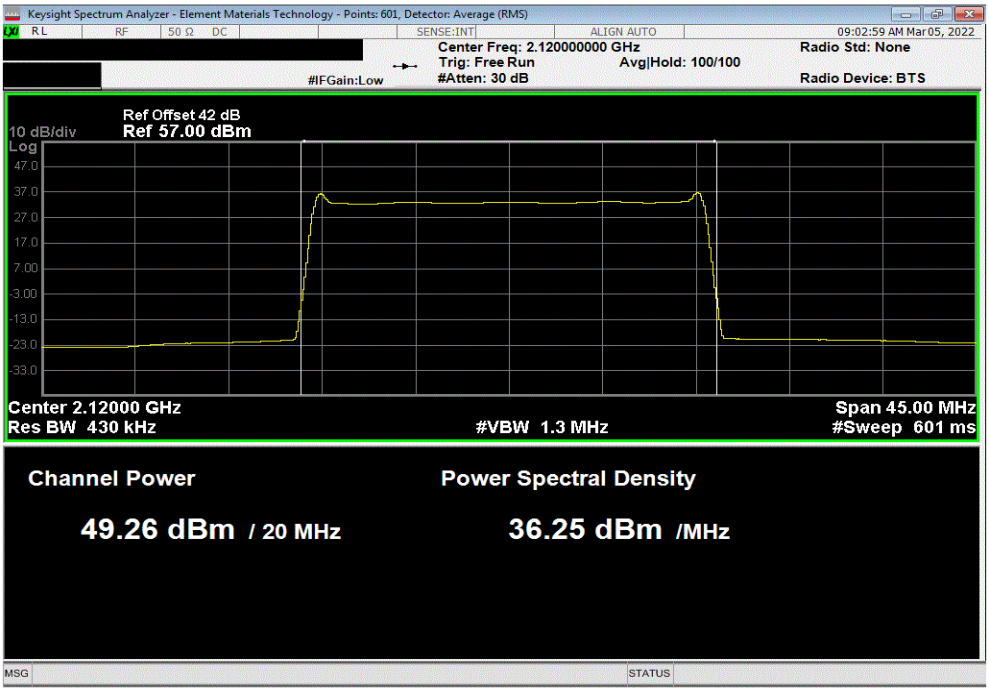


Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 2192.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.473	0	49.5	52.5	55.5	

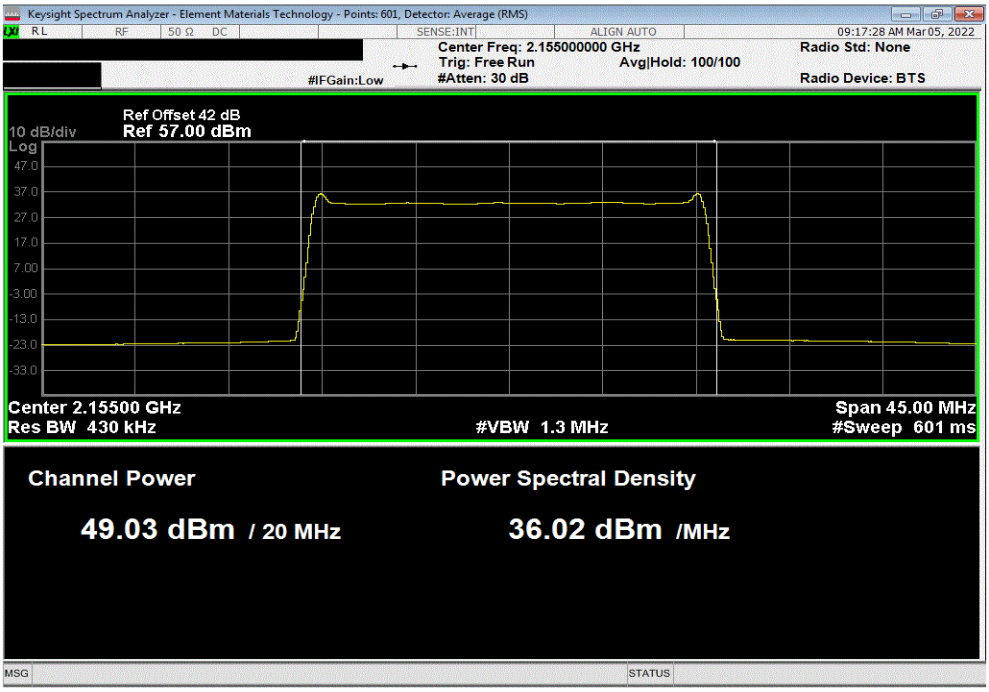


OUTPUT POWER - GUARD BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 2120 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.259	0	49.3	52.3	55.3	

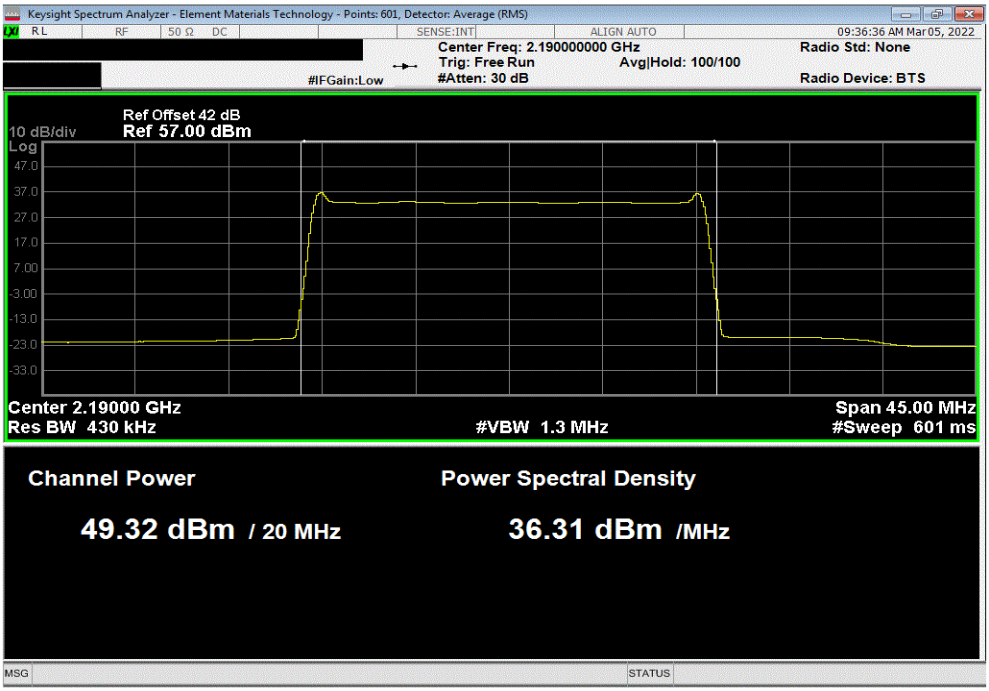


Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 2155 MHz..						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.032	0	49.0	52.0	55.0	



OUTPUT POWER - GUARD BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 2190 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.319	0	49.3	52.3	55.3	



OUTPUT POWER - IN-BAND

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
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Block - DC	Fairview Microwave	SD3379	AMT	2021-09-14	2022-09-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

TEST DESCRIPTION

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

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

RF conducted emissions testing was performed only on one port. All four AHFII antenna ports are essentially electrically identical and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

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

OUTPUT POWER - IN-BAND

element

TbiTx 2021.12.14.1 XMit 2022.02.07.0

EUT:	**AHFII Remote Radio Head**			**Work Order:**	**NOKI0037**
Serial Number:	**YK214000036**			**Date:**	**28-Feb-22**
Customer:	**Nokia Solutions and Networks**			**Temperature:**	**22.6 °C**
Attendees:	**David Le, John Rattanavong**			**Humidity:**	**23.7% RH**
Project:	**None**			**Barometric Pres.:**	**1026 mbar**
Tested by:	**Mark Baytan**	**Power:**	**54 VDC**	**Job Site:**	**TX09**

TEST SPECIFICATIONS	**Test Method**
FCC 24E:2022	ANSI C63.26:2015
RSS-133 Issue 6:2013+A1:2018	RSS-133 Issue 6:2013+A1:2018

COMMENTS

All measurement path loses accounted for in the reference level offest including any attenuators, filters, and DC blocks. Band 25 carriers enabled at maximum power is 80 watts/carrier. The following is the output power measurements at the radio output ports. The output power was measured for a single carrier over the carrier channel bandwidth on port 1. The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port power + 6dB [i.e. 10log(4)].

DEVIATIONS FROM TEST STANDARD

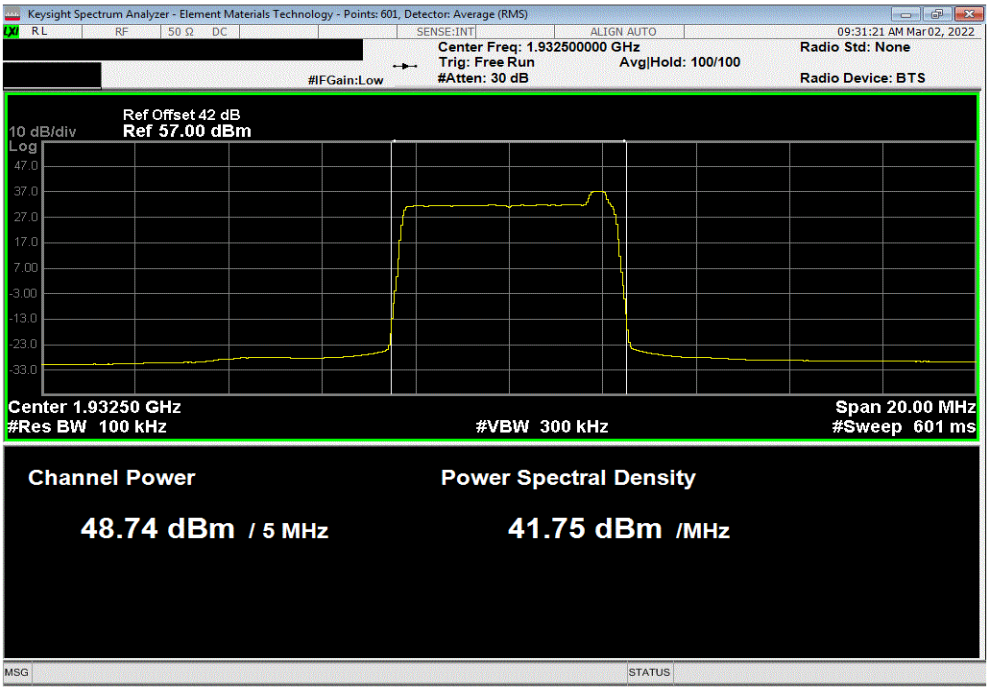
None

Configuration #	**2**	*Signature*

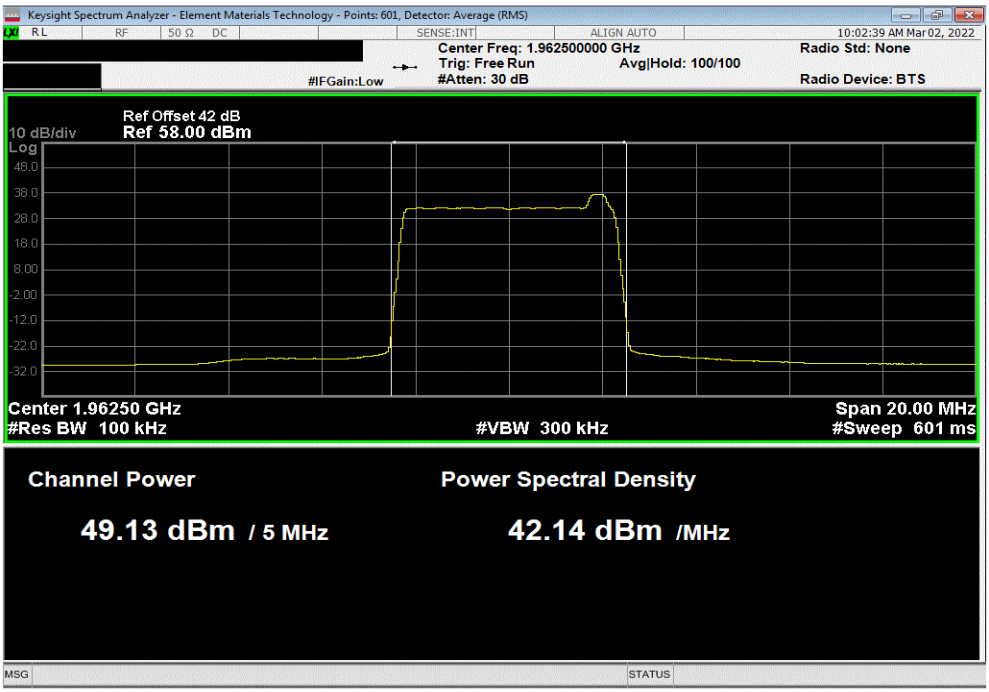
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW
Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band					
Port 1					
5 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 1932.5 MHz	48.742	0	48.7	51.7	54.7
Mid Channel, 1962.5 MHz	49.126	0	49.1	52.1	55.1
High Channel, 1992.5 MHz	48.985	0	49.0	52.0	55.0
10 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 1935 MHz	48.906	0	48.9	52.9	55.9
Mid Channel, 1962.5 MHz	48.755	0	48.8	51.8	54.8
High Channel, 1990 MHz	49.028	0	49.0	52.0	55.0
15 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 1937.5 MHz	48.754	0	48.8	51.8	54.8
Mid Channel, 1962.5 MHz	48.663	0	48.7	51.7	54.7
High Channel, 1987.5 MHz	48.961	0	49.0	52.0	55.0
20 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 1940 MHz	48.81	0	48.8	51.8	54.8
Mid Channel, 1962.5 MHz	48.582	0	48.6	51.6	54.6
High Channel, 1985 MHz	49.108	0	49.1	52.1	55.1

OUTPUT POWER - IN-BAND

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 5 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 1932.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.742	0	48.7	51.7	54.7	

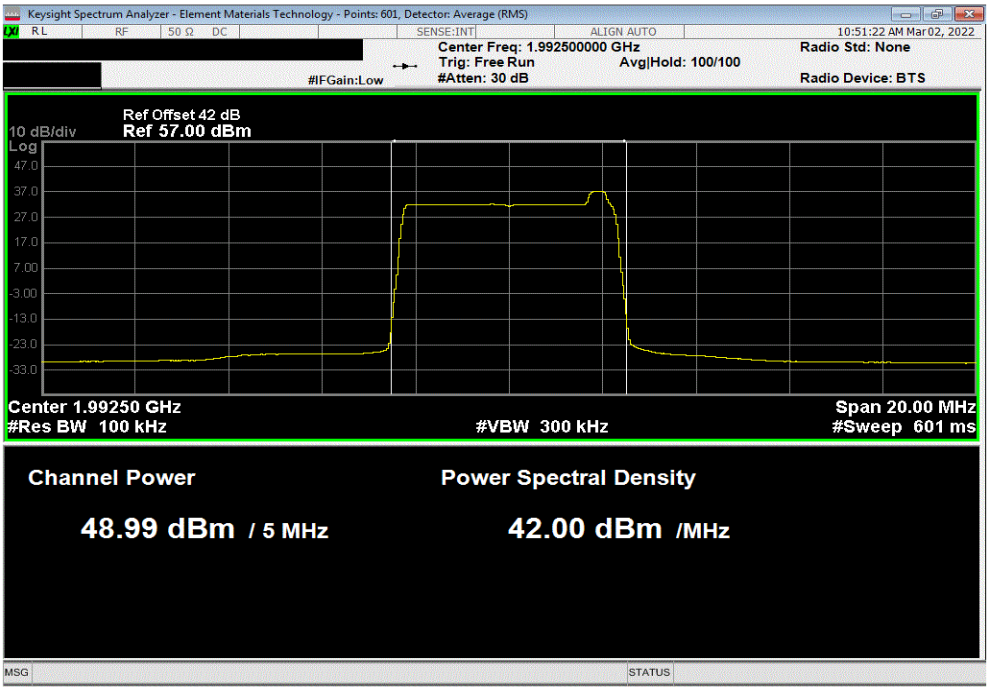


Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 5 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.126	0	49.1	52.1	55.1	

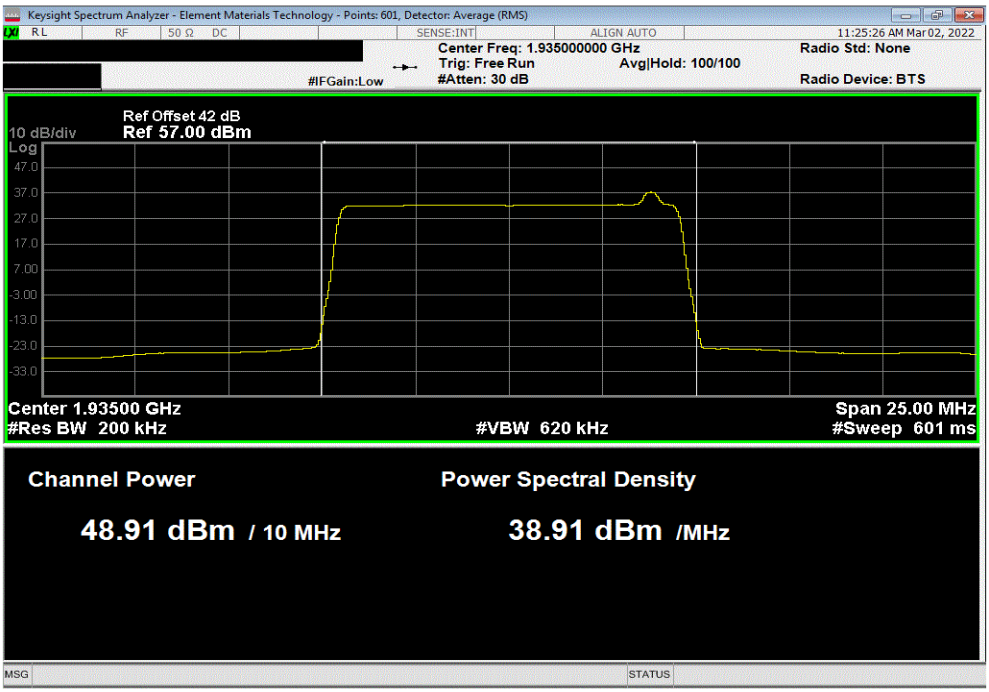


OUTPUT POWER - IN-BAND

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 5 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 1992.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.985	0	49.0	52.0	55.0	

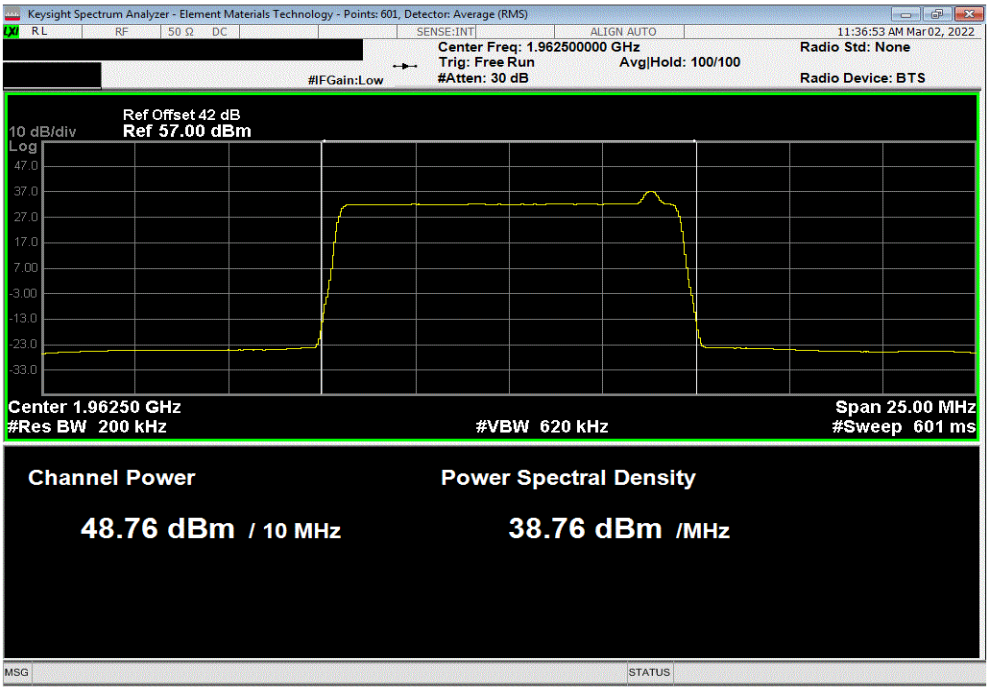


Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 1935 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.906	0	48.9	52.9	55.9	

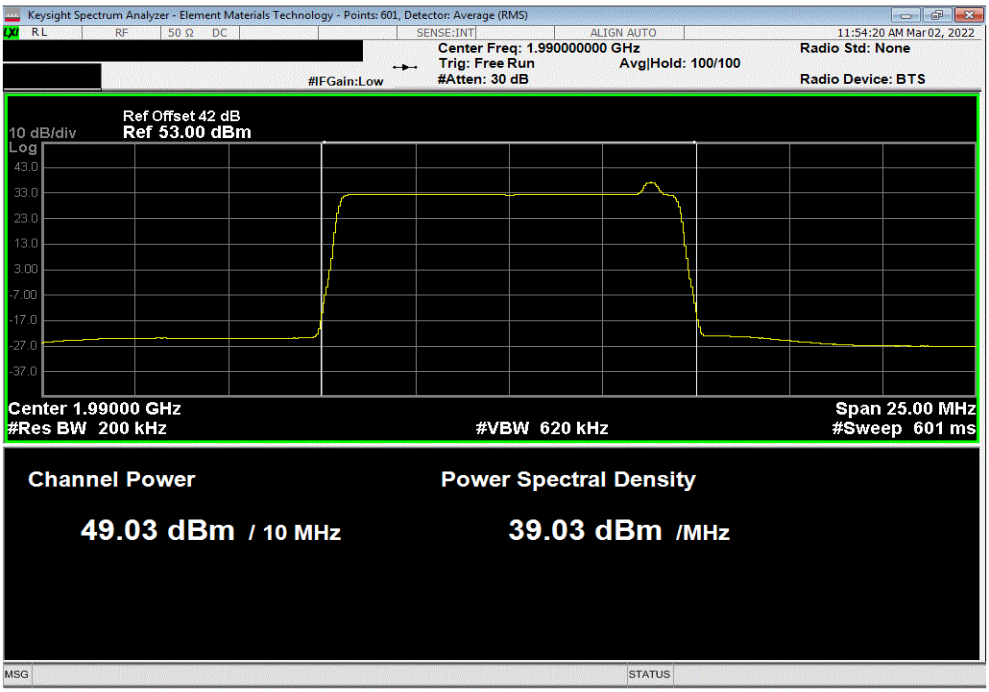


OUTPUT POWER - IN-BAND

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.755	0	48.8	51.8	54.8	

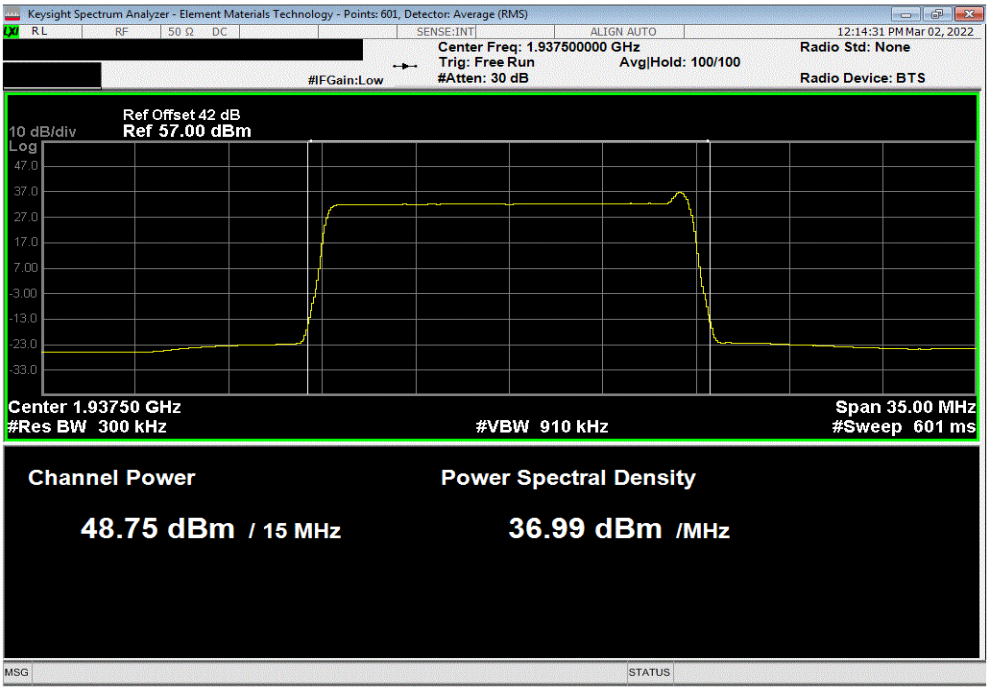


Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 1990 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.028	0	49.0	52.0	55.0	

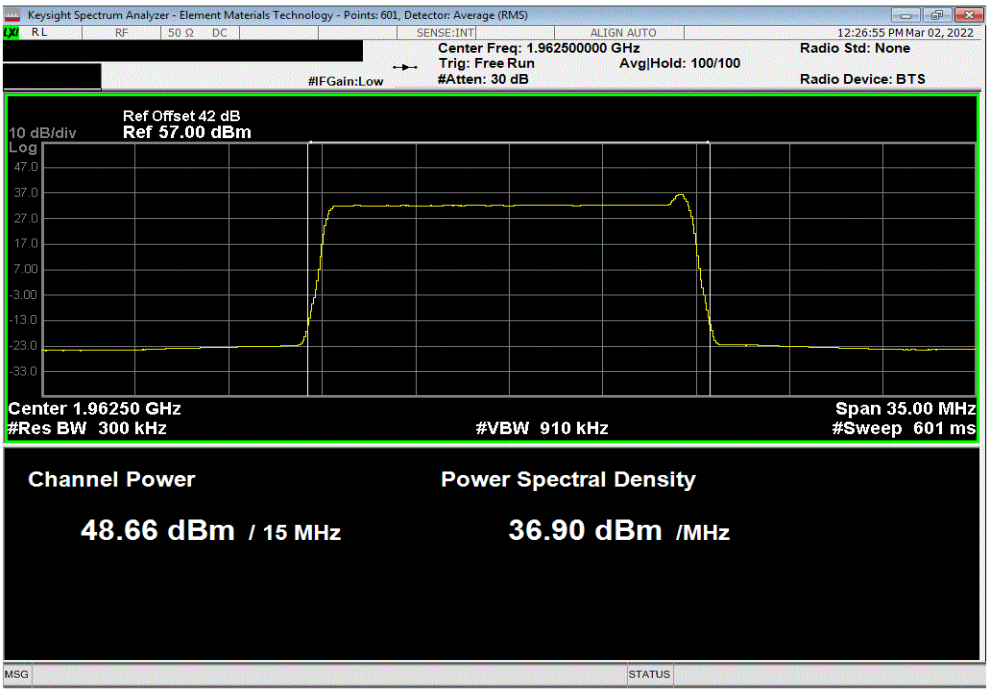


OUTPUT POWER - IN-BAND

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 1937.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.754	0	48.8	51.8	54.8	

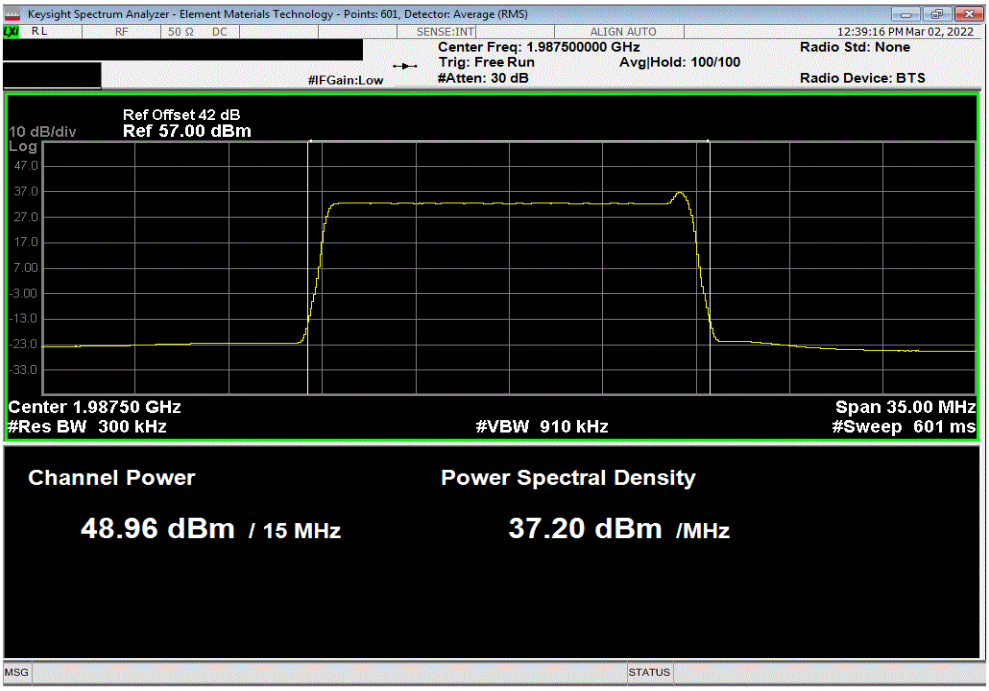


Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.663	0	48.7	51.7	54.7	

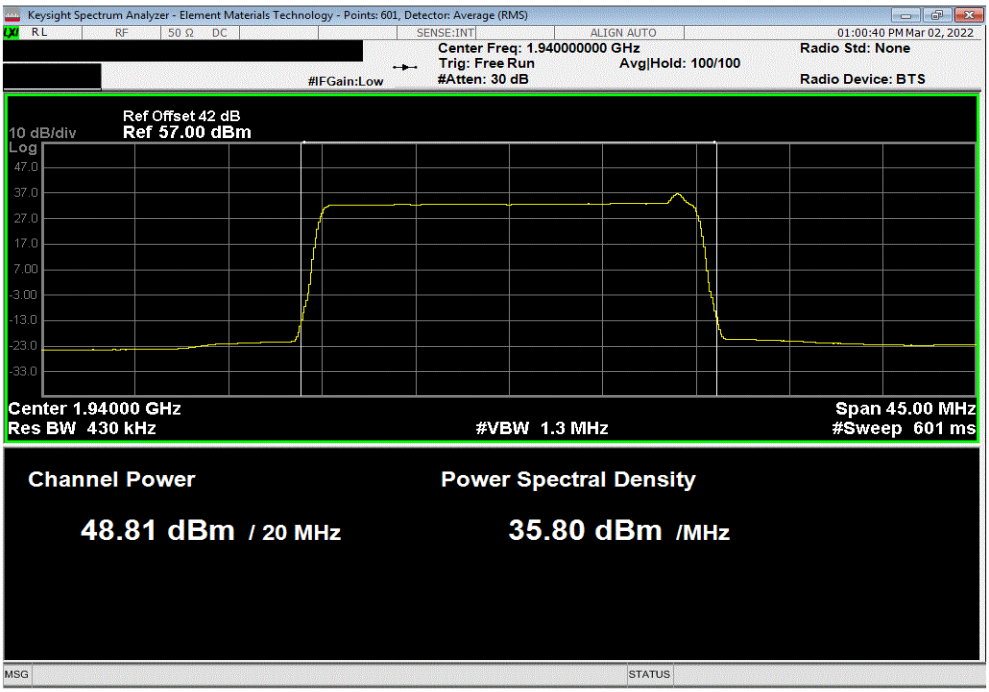


OUTPUT POWER - IN-BAND

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 1987.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.961	0	49.0	52.0	55.0	

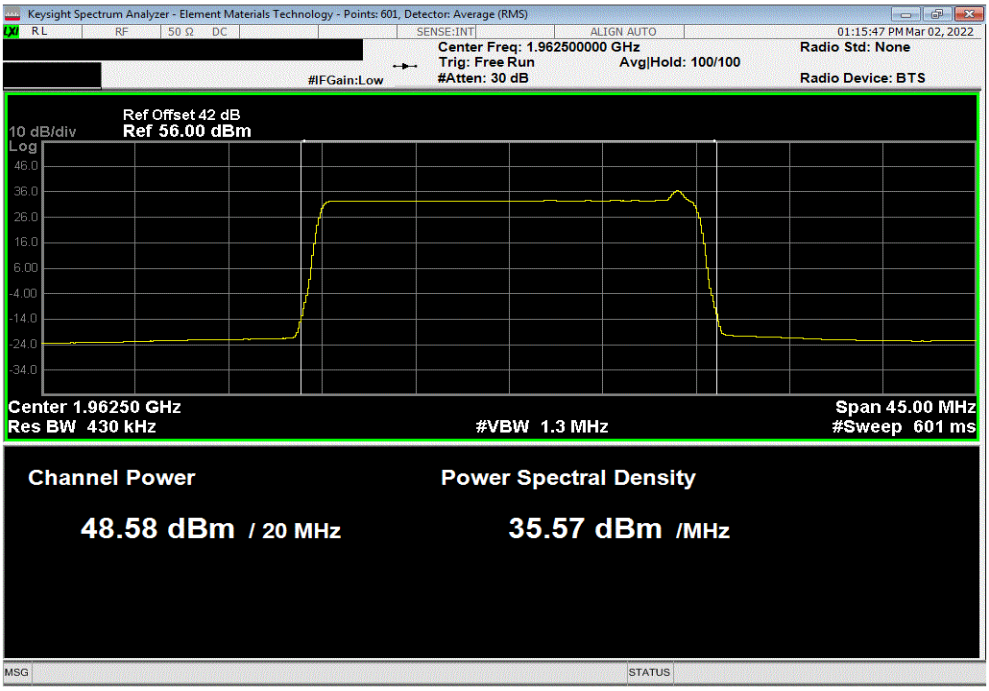


Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 1940 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.81	0	48.8	51.8	54.8	

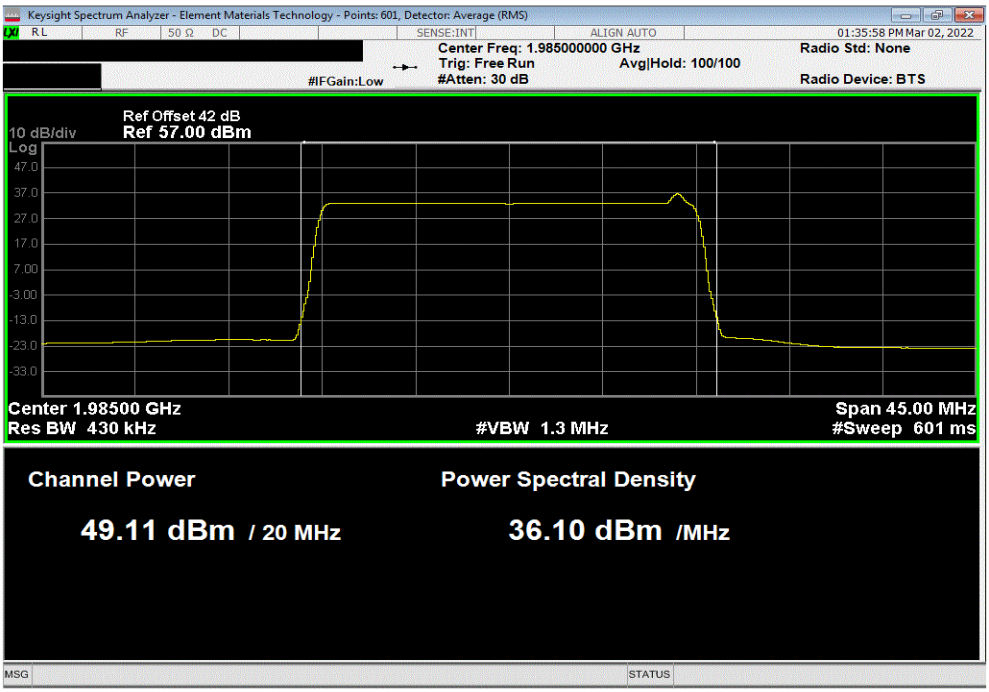


OUTPUT POWER - IN-BAND

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.582	0	48.6	51.6	54.6	



Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 1985 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.108	0	49.1	52.1	55.1	



OUTPUT POWER - IN-BAND

TbtTx 2021.12.14.1 XMit 2022.02.07.0

EUT:	AHFII Remote Radio Head			**Work Order:**	NOKI0037
Serial Number:	YK214000036			**Date:**	28-Feb-22
Customer:	Nokia Solutions and Networks			**Temperature:**	22.6 °C
Attendees:	David Le, John Rattanavong			**Humidity:**	23.7% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Mark Baytan	**Power:**	54 VDC	**Job Site:**	TX09

TEST SPECIFICATIONS	**Test Method**
FCC 27:2022	ANSI C63.26:2015
RSS-139 Issue 3:2015	RSS-139 Issue 3:2015
RSS-170 Issue 3:2015	RSS-170 Issue 3:2015

COMMENTS

All measurement path loses accounted for in the reference level offest including any attenuators, filters, and DC blocks. Band 66 carriers enabled at maximum power is 80 watts/carrier. The following is the output power measurements at the radio output ports. The output power was measured for a single carrier over the carrier channel bandwidth on port 1. The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port power + 6dB [i.e. 10log(4)].

DEVIATIONS FROM TEST STANDARD

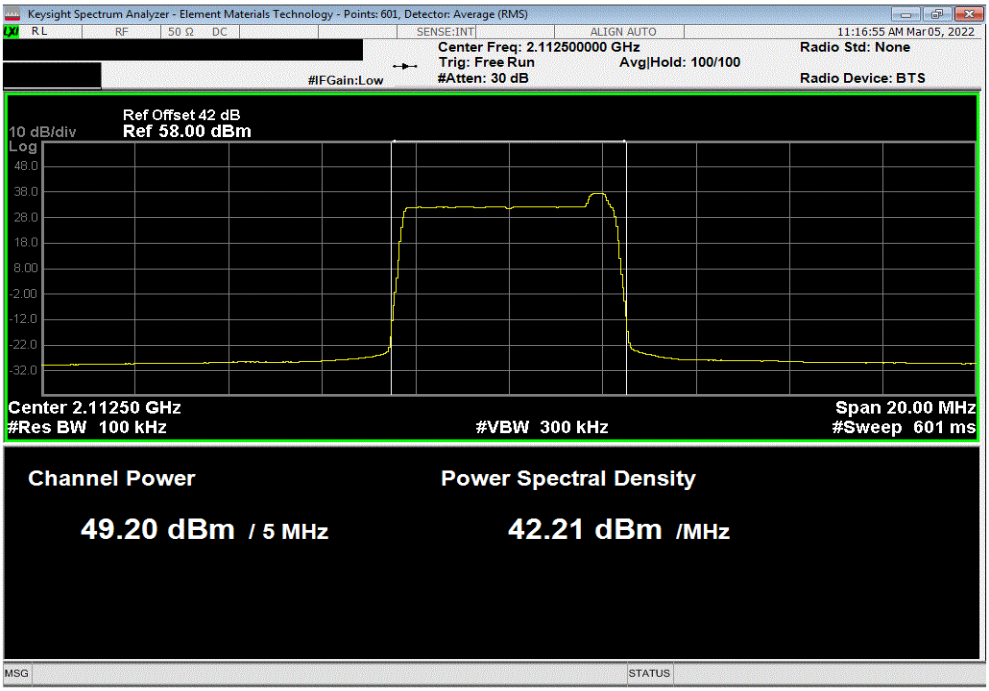
None

Configuration #	**2**	*Signature*

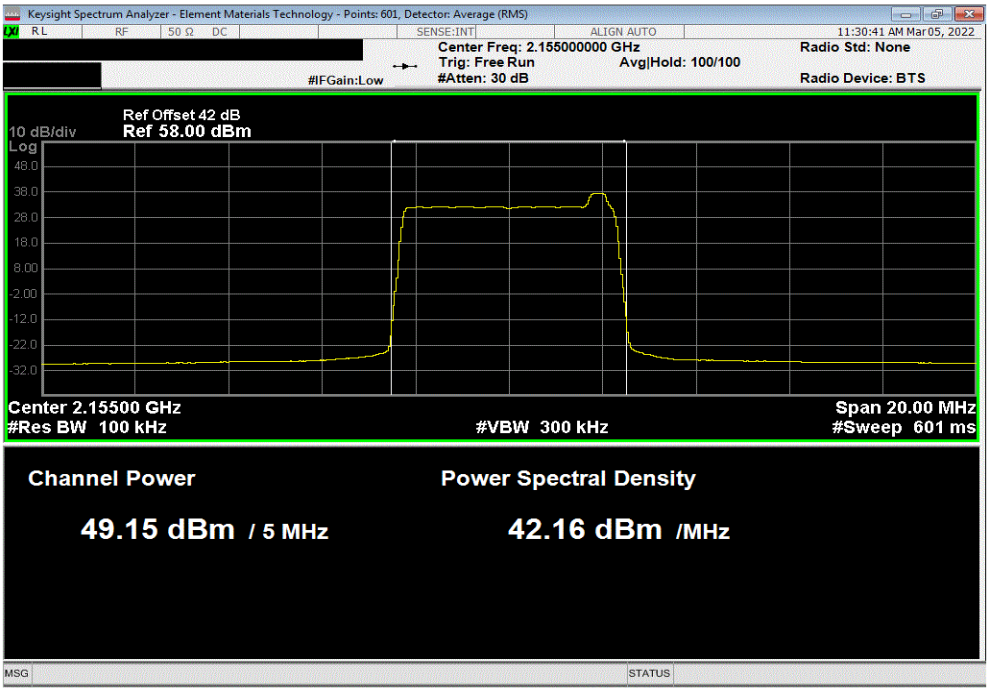
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW
Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band					
Port 1					
5 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 2112.5 MHz	49.196	0	49.2	52.2	55.2
Mid Channel, 2155 MHz	49.151	0	49.2	52.2	55.2
High Channel, 2197.5 MH:	49.174	0	49.2	52.2	55.2
10 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 2115 MHz	49.154	0	49.2	52.2	55.2
Mid Channel, 2155 MHz.	48.941	0	48.9	52.9	55.9
High Channel, 2195 MHz	49.288	0	49.3	52.4	55.3
15 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 2117.5 MHz	49.161	0	49.2	52.2	55.2
Mid Channel, 2155 MHz..	49.033	0	49.0	52.0	55.0
High Channel, 2192.5 MH:	49.272	0	49.3	52.3	55.3
20 MHz Bandwdith					
E-TM1.1 with N-TM					
Low Channel, 2120 MHz	49.262	0	49.3	52.3	55.3
Mid Channel, 2155 MHz...	49.172	0	49.2	52.2	55.2
High Channel, 2190 MHz	49.131	0	49.1	52.1	55.1

OUTPUT POWER - IN-BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 5 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 2112.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.196	0	49.2	52.2	55.2	

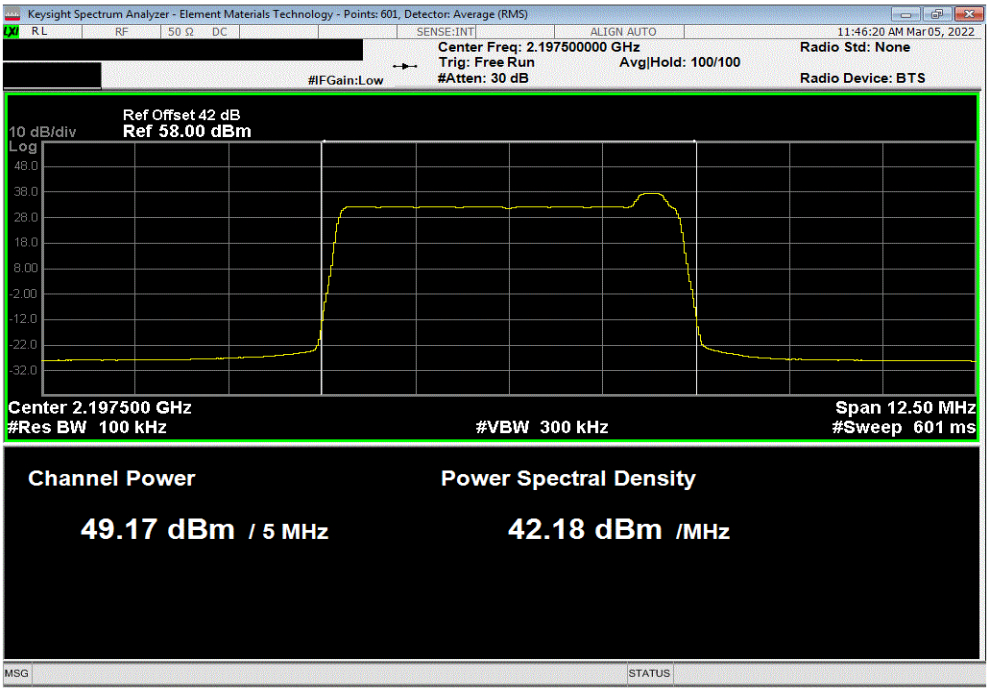


Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 5 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 2155 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.151	0	49.2	52.2	55.2	

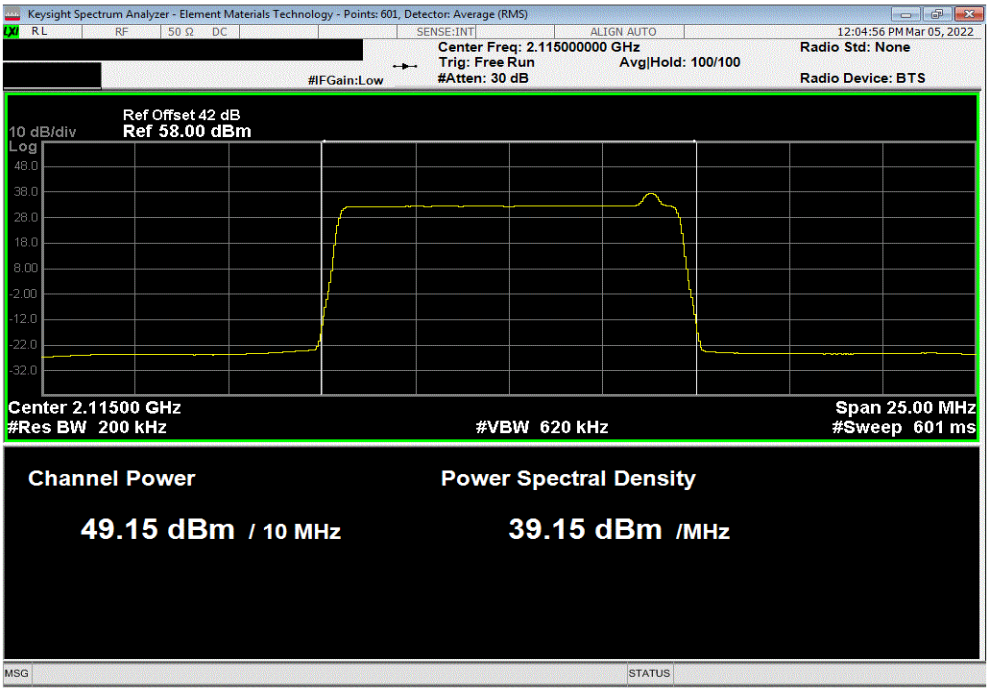


OUTPUT POWER - IN-BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 5 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 2197.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.174	0	49.2	52.2	55.2	

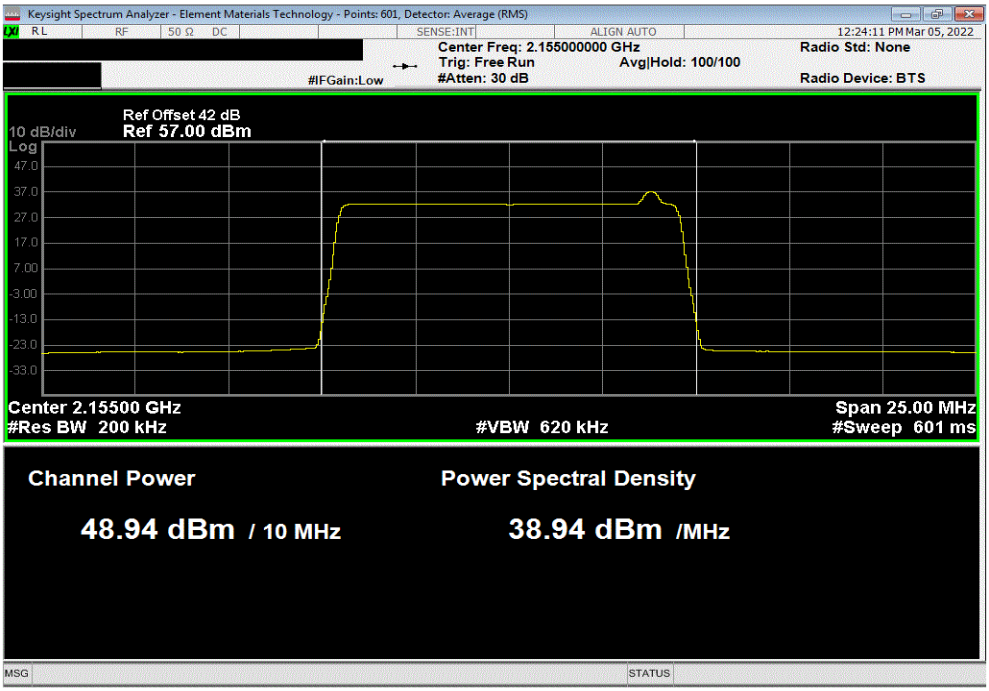


Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 2115 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.154	0	49.2	52.2	55.2	

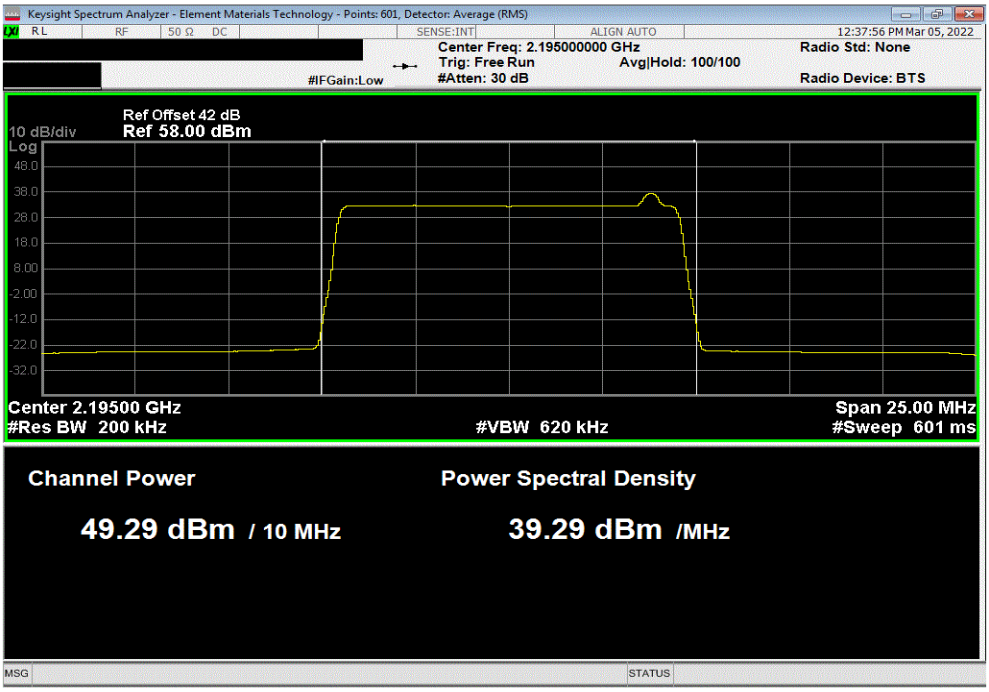


OUTPUT POWER - IN-BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 2155 MHz.						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	48.941	0	48.9	52.9	55.9	

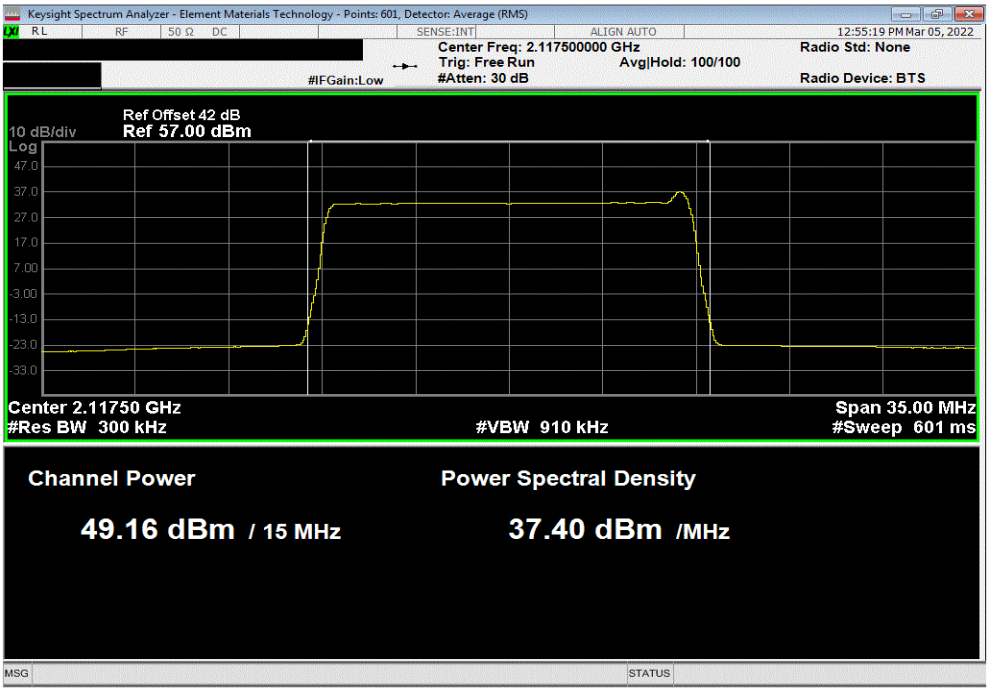


Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 10 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 2195 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.288	0	49.3	52.4	55.3	

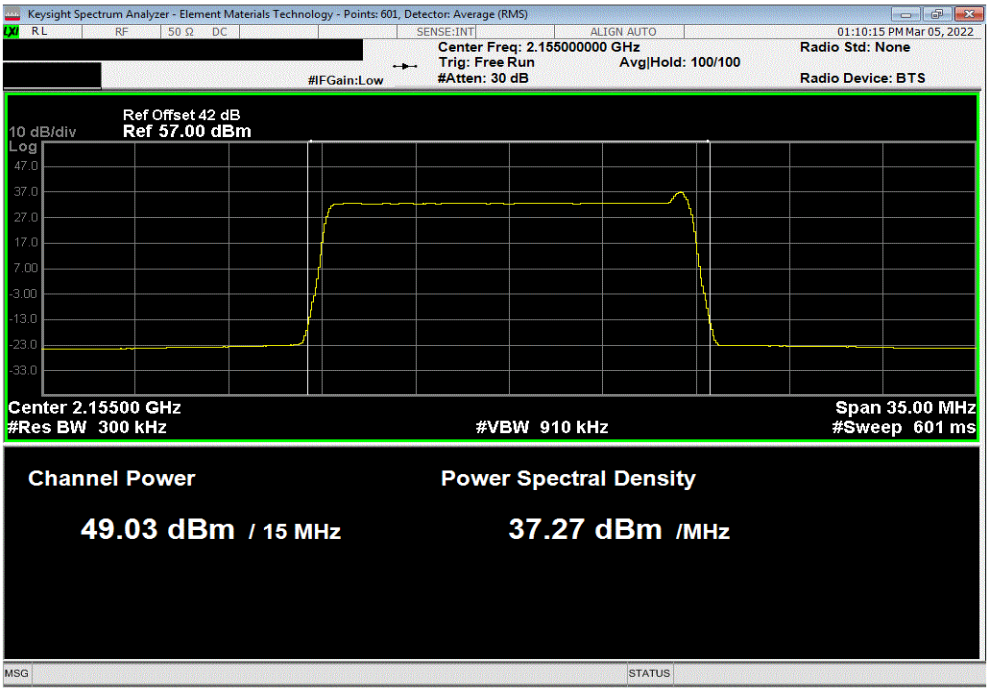


OUTPUT POWER - IN-BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 2117.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.161	0	49.2	52.2	55.2	

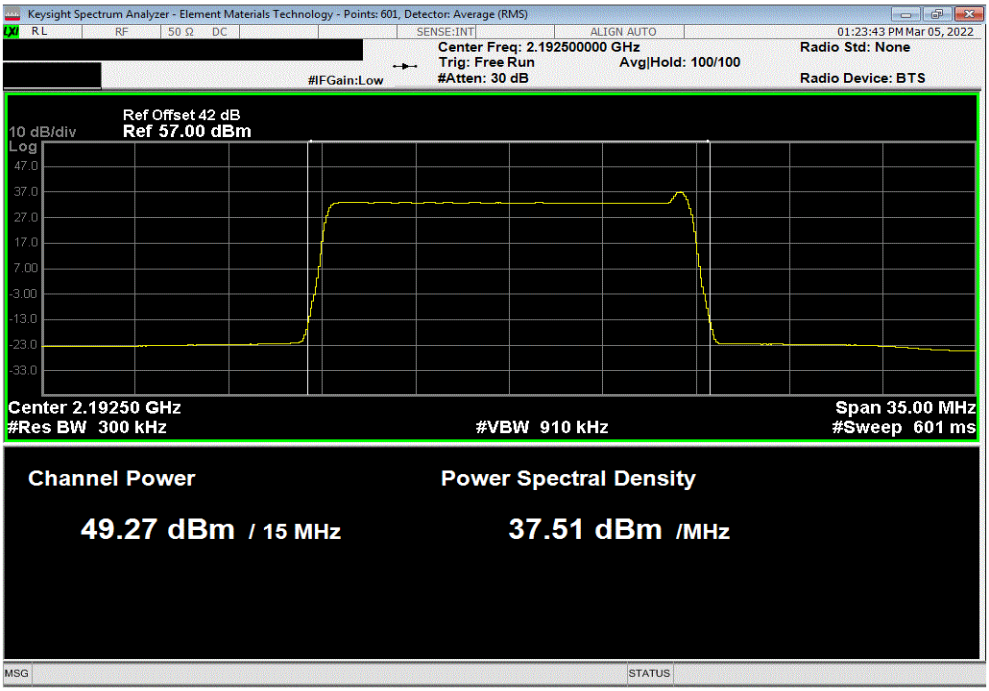


Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 2155 MHz..						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.033	0	49.0	52.0	55.0	

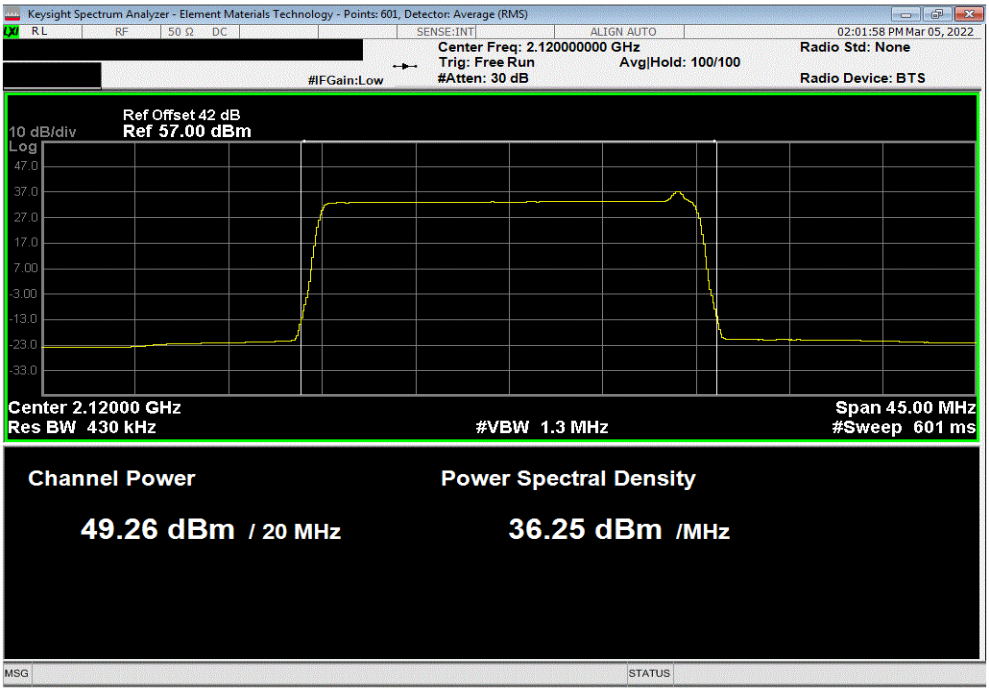


OUTPUT POWER - IN-BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 15 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 2192.5 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.272	0	49.3	52.3	55.3	

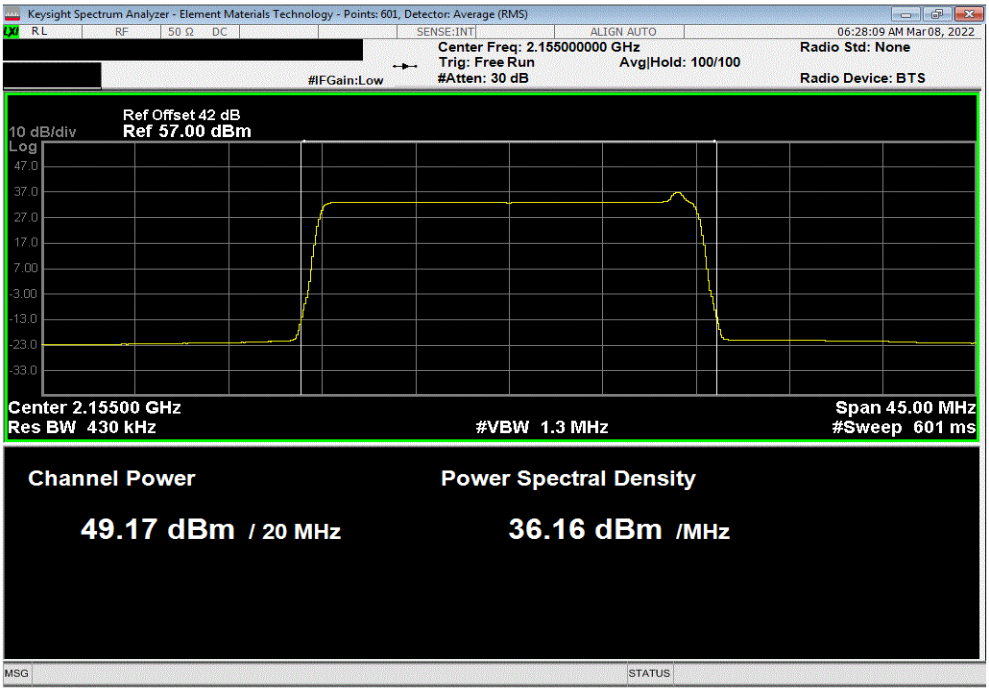


Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, Low Channel, 2120 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.262	0	49.3	52.3	55.3	

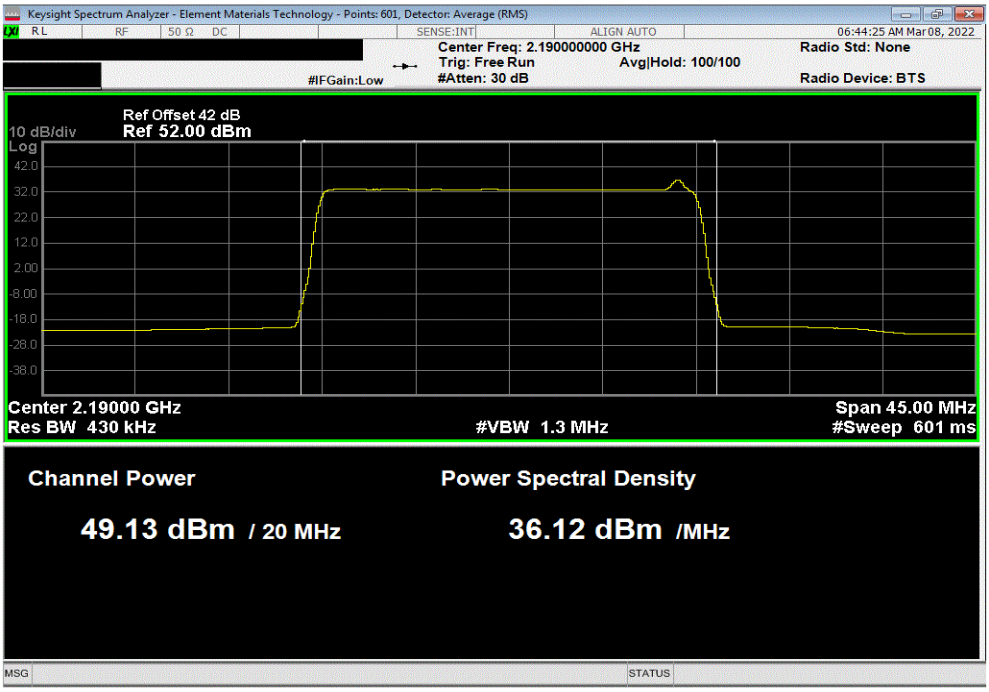


OUTPUT POWER - IN-BAND

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, Mid Channel, 2155 MHz...						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.172	0	49.2	52.2	55.2	



Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 20 MHz Bandwdith, E-TM1.1 with N-TM, High Channel, 2190 MHz						
	Intial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW	
	49.131	0	49.1	52.1	55.1	



OUTPUT POWER - STAND ALONE

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
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Block - DC	Fairview Microwave	SD3379	AMT	2021-09-14	2022-09-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17

TEST DESCRIPTION

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

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

RF conducted emissions testing was performed only on one port. All four AHFII antenna ports are essentially electrically identical and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

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

OUTPUT POWER - STAND ALONE

TbtTx 2021.12.14.1 XMit 2022.02.07.0

EUT:	**AHFII Remote Radio Head**			**Work Order:**	**NOKI0037**
Serial Number:	**YK214000036**			**Date:**	**28-Feb-22**
Customer:	**Nokia Solutions and Networks**			**Temperature:**	**22.6 °C**
Attendees:	**David Le, John Rattanavong**			**Humidity:**	**23.7% RH**
Project:	**None**			**Barometric Pres.:**	**1026 mbar**
Tested by:	**Mark Baytan**	**Power:**	**54 VDC**	**Job Site:**	**TX09**

TEST SPECIFICATIONS	**Test Method**
FCC 24E:2022	ANSI C63.26:2015
RSS-133 Issue 6:2013+A1:2018	RSS-133 Issue 6:2013+A1:2018

COMMENTS

All measurement path loses accounted for in the reference level offest including any attenuators, filters, and DC blocks. The Band 25 NB IoT Standalone carrier was enabled at maximum power of 20 watts/carrier. The following is the output power measurements at the radio output ports. The output power was measured for a single carrier over the carrier channel bandwidth on port 1. The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port power + 6dB [i.e. 10log(4)].

DEVIATIONS FROM TEST STANDARD

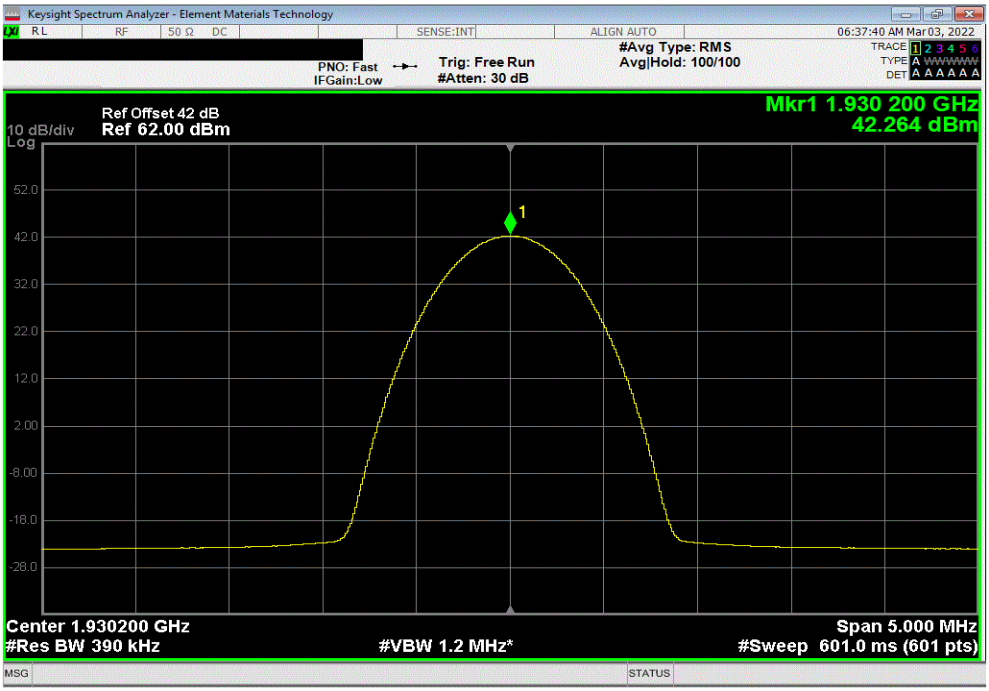
None

Configuration #	**2**	*Signature*

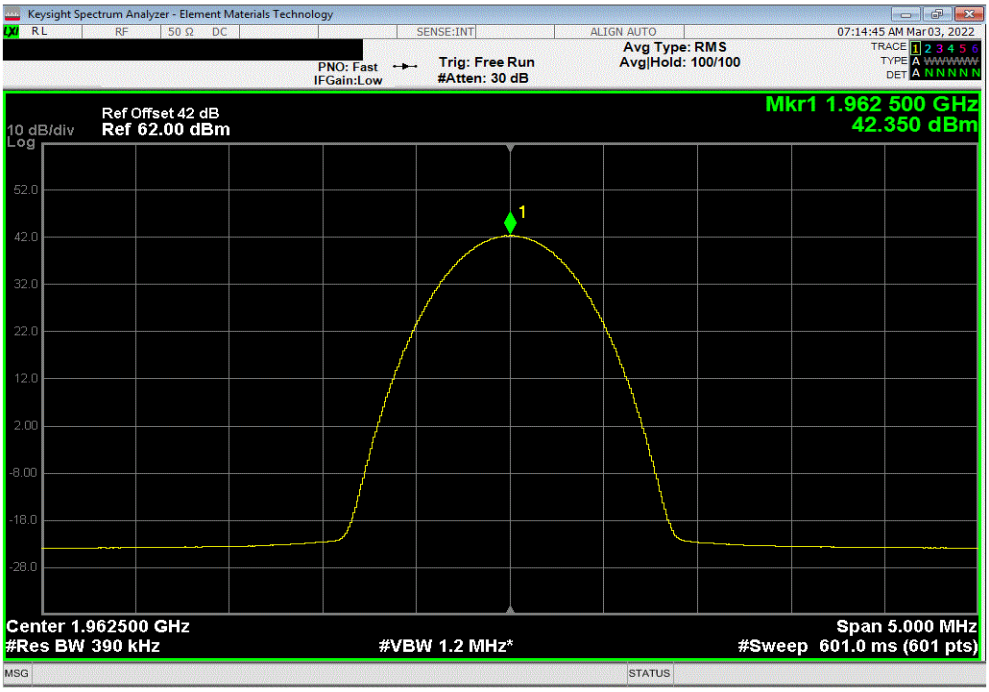
		Intial Value (dBm)	Duty Cycle Factor (dB)	Single Port (dBm)	Two Port (dBm)	Four Port (dBm)
Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Stand Alone						
Port 1						
200 kHz Bandwidth						
N-TM						
	Low Channel, 1930.2 MHz	42.264	0	42.3	45.3	48.3
	Mid Channel, 1962.5 MHz	42.35	0	42.4	45.4	48.4
	High Channel, 1994.8 MH:	42.436	0	42.4	45.4	48.4

OUTPUT POWER - STAND ALONE

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Stand Alone, Port 1, 200 kHz Bandwidth, N-TM, Low Channel, 1930.2 MHz						
	Intial Value (dBm)	Duty Cycle Factor (dB)	Single Port (dBm)	Two Port (dBm)	Four Port (dBm)	
	42.264	0	42.3	45.3	48.3	

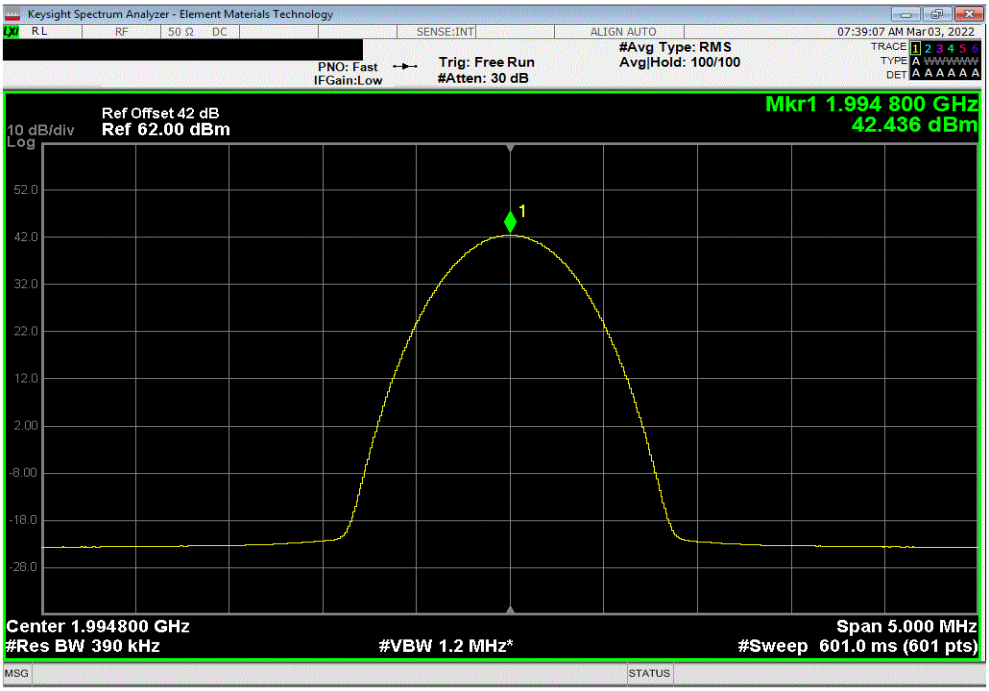


Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Stand Alone, Port 1, 200 kHz Bandwidth, N-TM, Mid Channel, 1962.5 MHz						
	Intial Value (dBm)	Duty Cycle Factor (dB)	Single Port (dBm)	Two Port (dBm)	Four Port (dBm)	
	42.35	0	42.4	45.4	48.4	



OUTPUT POWER - STAND ALONE

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Stand Alone, Port 1, 200 kHz Bandwidth, N-TM, High Channel, 1994.8 MHz						
	Intial Value (dBm)	Duty Cycle Factor (dB)	Single Port (dBm)	Two Port (dBm)	Four Port (dBm)	
	42.436	0	42.4	45.4	48.4	



OUTPUT POWER - STAND ALONE

TbtTx 2021.12.14.1 XMit 2022.02.07.0

EUT:	**AHFII Remote Radio Head**			**Work Order:**	**NOKI0037**
Serial Number:	**YK214000036**			**Date:**	**28-Feb-22**
Customer:	**Nokia Solutions and Networks**			**Temperature:**	**22.6 °C**
Attendees:	**David Le, John Rattanavong**			**Humidity:**	**23.7% RH**
Project:	**None**			**Barometric Pres.:**	**1026 mbar**
Tested by:	**Mark Baytan**	**Power:**	**54 VDC**	**Job Site:**	**TX09**

TEST SPECIFICATIONS	**Test Method**
FCC 27:2022	ANSI C63.26:2015
RSS-139 Issue 3:2015	RSS-139 Issue 3:2015
RSS-170 Issue 3:2015	RSS-170 Issue 3:2015

COMMENTS

All measurement path loses accounted for in the reference level offest including any attenuators, filters, and DC blocks. The Band 66 NB IoT Standalone carrier was enabled at maximum power of 20 watts/carrier. The following is the output power measurements at the radio output ports. The output power was measured for a single carrier over the carrier channel bandwidth on port 1. The total output power for multiport (2x2 MIMO, 4x4 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for two port operation is single port power + 3dB [i.e. 10log(2)]. The total output power for four port operation is single port power + 6dB [i.e. 10log(4)].

DEVIATIONS FROM TEST STANDARD

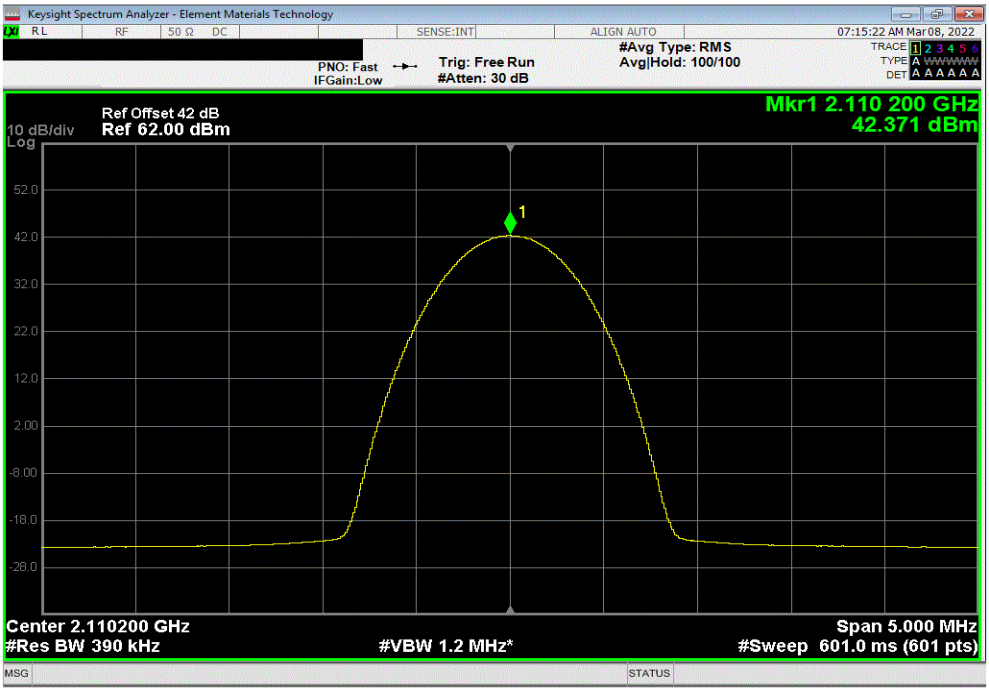
None

Configuration #	**2**	*Signature*

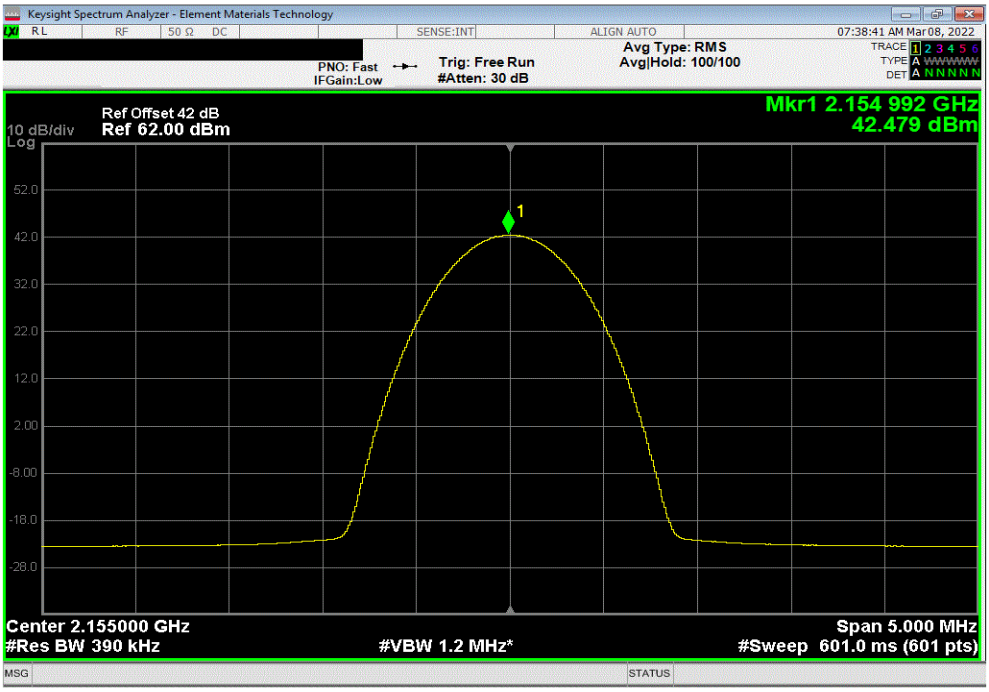
	Intial Value (dBm)	Duty Cycle Factor (dB)	Single Port (dBm)	Two Port (dBm)	Four Port (dBm)
Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Stand Alone					
Port 1					
200 kHz Bandwdith					
N-TM					
Low Channel, 2110.2 MHz	42.371	0	42.4	45.4	48.4
Mid Channel, 2155 MHz	42.479	0	42.5	45.5	48.5
High Channel, 2199.8 MH:	42.49	0	42.5	45.5	48.5

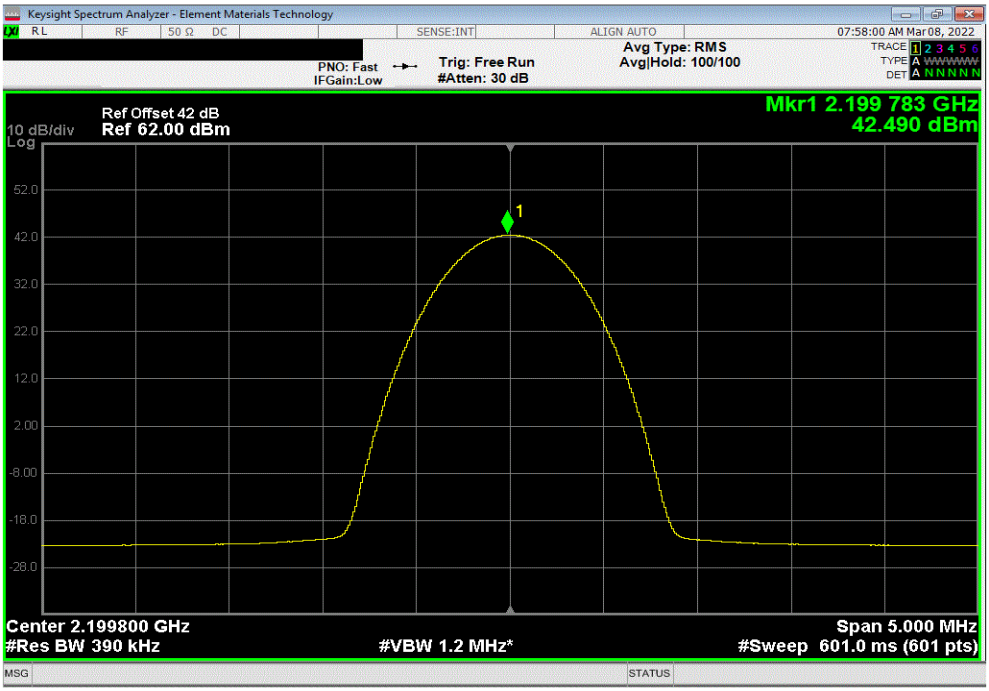
OUTPUT POWER - STAND ALONE

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Stand Alone, Port 1, 200 kHz Bandwdith, N-TM, Low Channel, 2110.2 MHz						
	Intial Value (dBm)	Duty Cycle Factor (dB)	Single Port (dBm)	Two Port (dBm)	Four Port (dBm)	
	42.371	0	42.4	45.4	48.4	



Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Stand Alone, Port 1, 200 kHz Bandwdith, N-TM, Mid Channel, 2155 MHz						
	Intial Value (dBm)	Duty Cycle Factor (dB)	Single Port (dBm)	Two Port (dBm)	Four Port (dBm)	
	42.479	0	42.5	45.5	48.5	



OUTPUT POWER - STAND ALONE

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Stand Alone, Port 1, 200 kHz Bandwdith, N-TM, High Channel, 2199.8 MHz						
	Intial Value (dBm)	Duty Cycle Factor (dB)	Single Port (dBm)	Two Port (dBm)	Four Port (dBm)	
	42.49	0	42.5	45.5	48.5