

# OUTPUT POWER - GUARD BAND



element

XMR 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



Tel: 2021.12.14.1 XMI: 2022.02.07.0

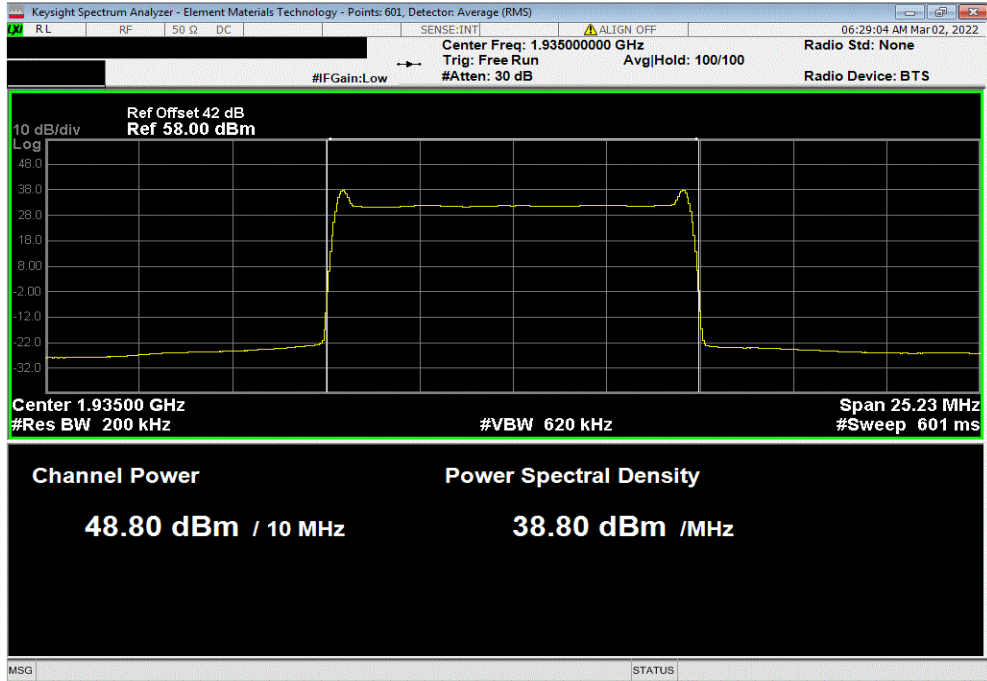
EUT: AHFII Remote Radio Head		Work Order: NOKI0037	
Serial Number: YK214000036		Date: 28-Feb-22	
Customer: Nokia Solutions and Networks		Temperature: 22.6 °C	
Attendees: David Le, John Rattanavong		Humidity: 23.7% RH	
Project: None		Barometric Pres.: 1026 mbar	
Tested by: Mark Baytan	Power: 54 VDC	Job Site: TX09	
TEST SPECIFICATIONS			
FCC 24E:2022		Test Method	
RSS-133 Issue 6:2013+A1:2018		ANSI C63.26:2015	
		RSS-133 Issue 6:2013+A1:2018	
COMMENTS			
All measurement path losses accounted for in the reference level offset 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 multipoint (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	
		Initial Value	Duty Cycle
		dBm/Carrier BW	Factor (dB)
		Single Port	Two Port
		dBm/Carrier BW	dBm/Carrier BW
		Four Port	
		dBm/Carrier BW	
Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band			
Port 1			
10 MHz Bandwidth			
E-TM1.1 with N-TM			
	Low Channel, 1935 MHz	48.803	0
	Mid Channel, 1962.5 MHz	48.553	0
	High Channel, 1990 MHz	48.942	0
		48.8	51.8
		48.6	51.6
		48.9	51.9
		54.8	54.6
		54.9	54.9
15 MHz Bandwidth			
E-TM1.1 with N-TM			
	Low Channel, 1937.5 MHz	48.883	0
	Mid Channel, 1962.5 MHz	48.897	0
	High Channel, 1987.5 MHz	49.165	0
		48.9	51.9
		48.9	51.9
		49.2	52.2
		54.9	54.9
		55.2	55.2
20 MHz Bandwidth			
E-TM1.1 with N-TM			
	Low Channel, 1940 MHz	48.706	0
	Mid Channel, 1962.5 MHz	48.57	0
	High Channel, 1985 MHz	49.045	0
		48.7	51.7
		48.6	51.6
		49.0	52.0
		54.7	54.6
		55.0	55.0

# OUTPUT POWER - GUARD BAND

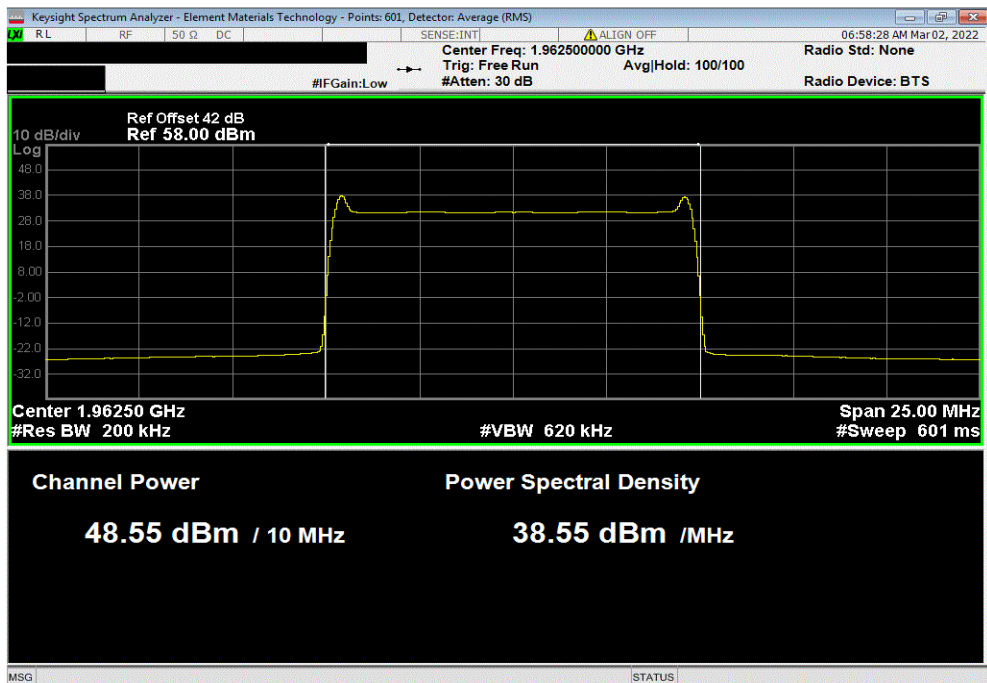


TuTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwidth, E-TM1.1 with N-TM, Low Channel, 1935 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
48.553	0	48.6	51.6	54.6		

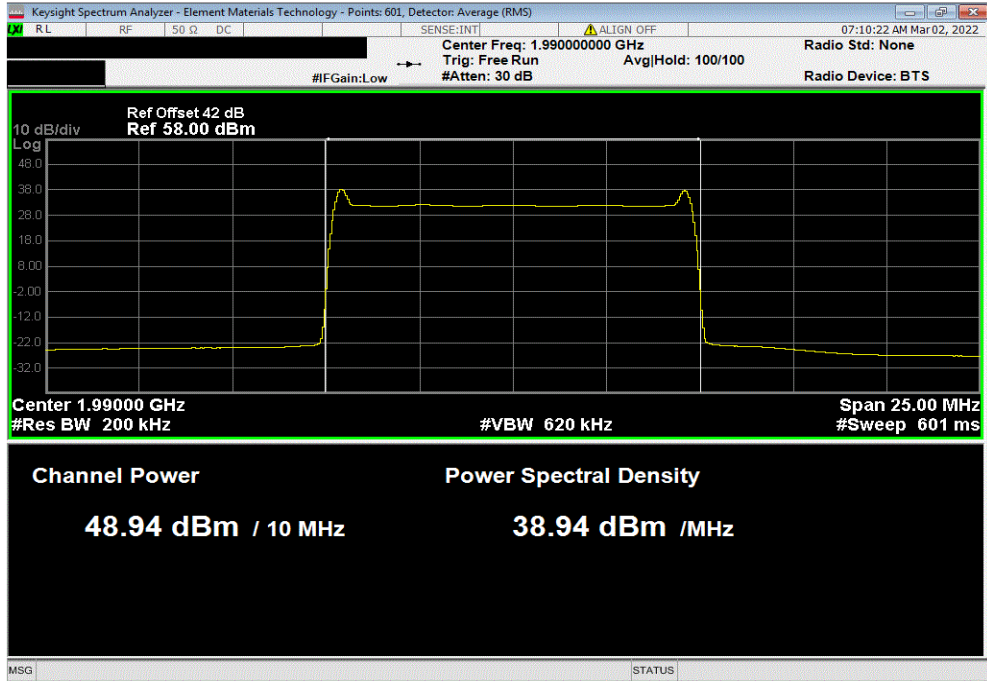


# OUTPUT POWER - GUARD BAND



Tel: 2021.12.14.1 XMI: 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwidth, E-TM1.1 with N-TM, High Channel, 1990 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Low Channel, 1937.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
48.883	0	48.9	51.9	54.9		



# OUTPUT POWER - GUARD BAND

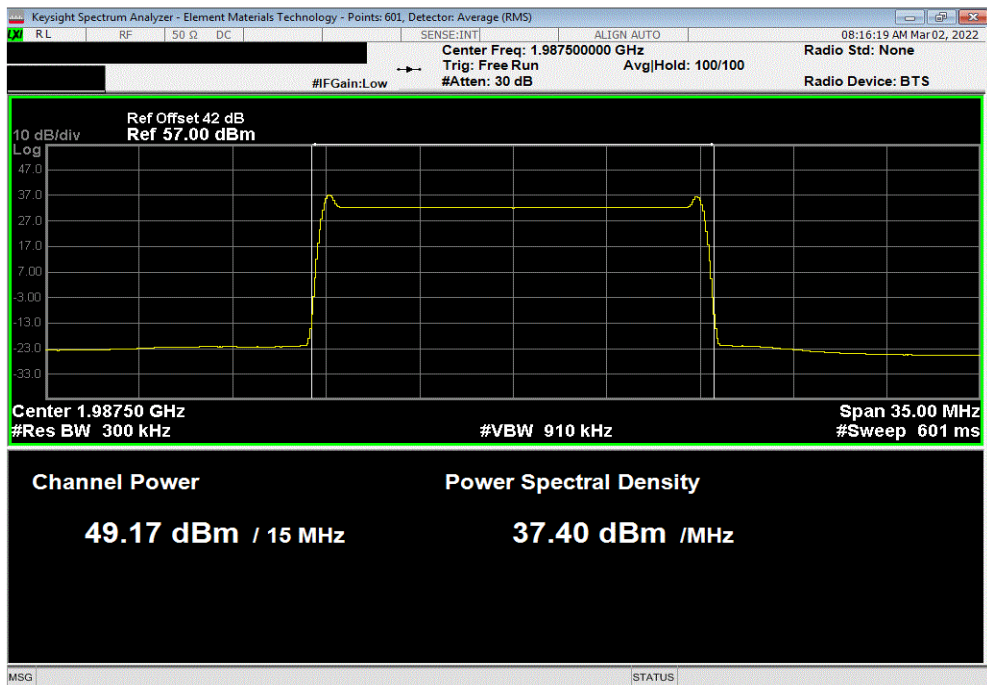


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Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 15 MHz Bandwidth, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz.						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, High Channel, 1987.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
49.165	0	49.2	52.2	55.2		

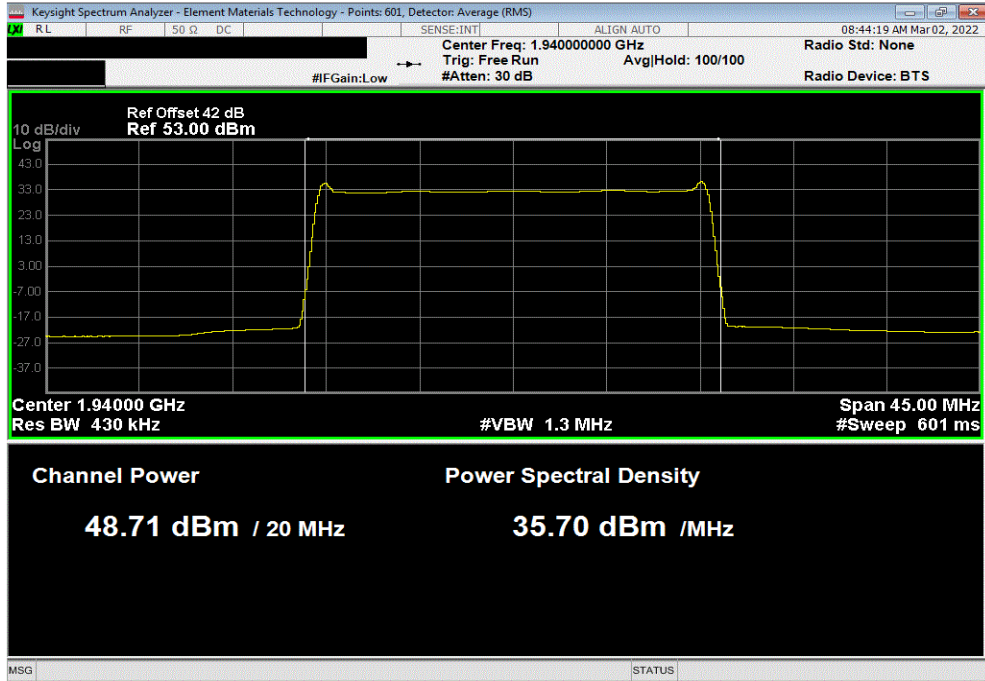


# OUTPUT POWER - GUARD BAND

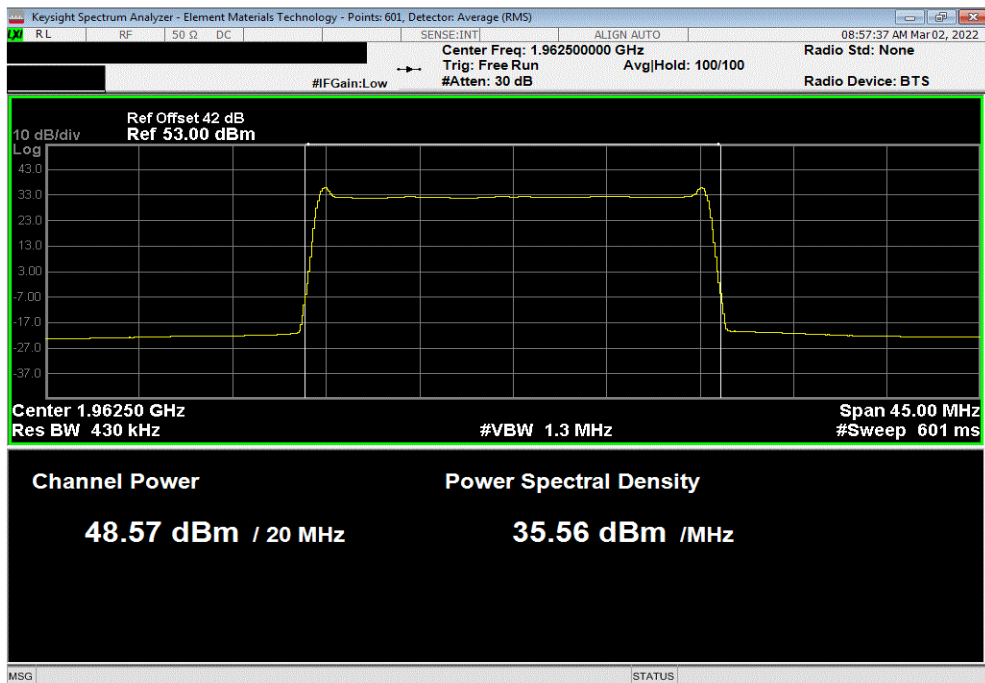


TuTx 2021.12.14.1 XMi 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Guard Band, Port 1, 20 MHz Bandwidth, E-TM1.1 with N-TM, Low Channel, 1940 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz..						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
48.57	0	48.6	51.6	54.6		

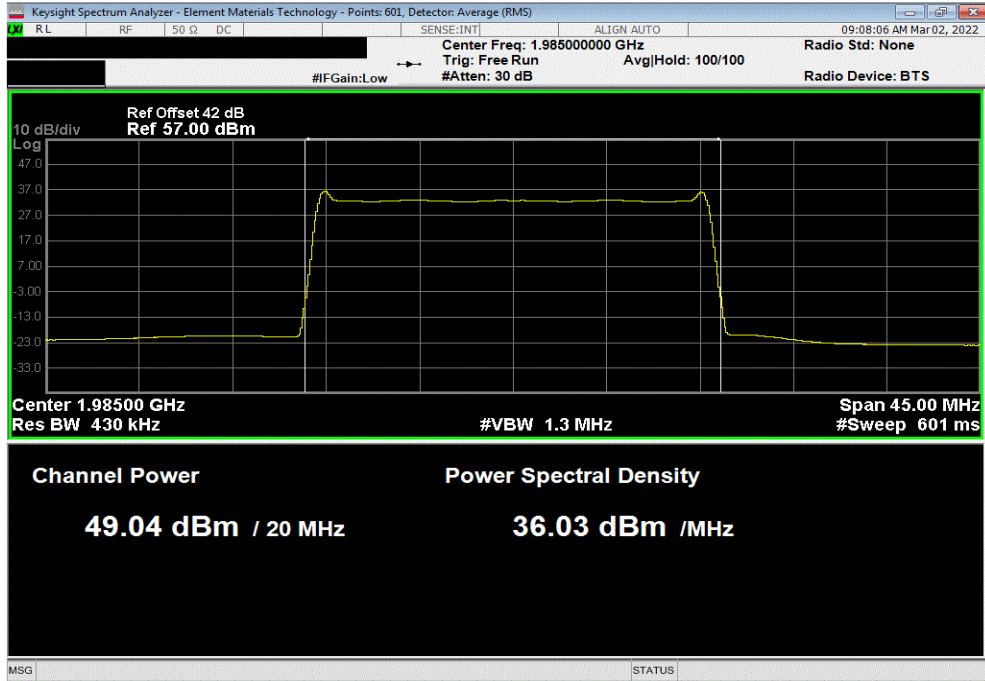


# OUTPUT POWER - GUARD BAND



TbTx 2021.12.14.1 XMI 2022.02.07.0

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



# OUTPUT POWER - GUARD BAND



TelTx 2021.12.14.1 XMI 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	
<b>TEST SPECIFICATIONS</b>			
FCC 27:2022		Test Method	
RSS-139 Issue 3:2015		ANSI C63.26:2015	
RSS-170 Issue 3:2015		RSS-139 Issue 3:2015	
RSS-170 Issue 3:2015		RSS-170 Issue 3:2015	
<b>COMMENTS</b>			
All measurement path losses accounted for in the reference level offset 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)].			
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			
Configuration #	2	Signature	
		Initial 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 Bandwidth

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 Bandwidth

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 Bandwidth

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

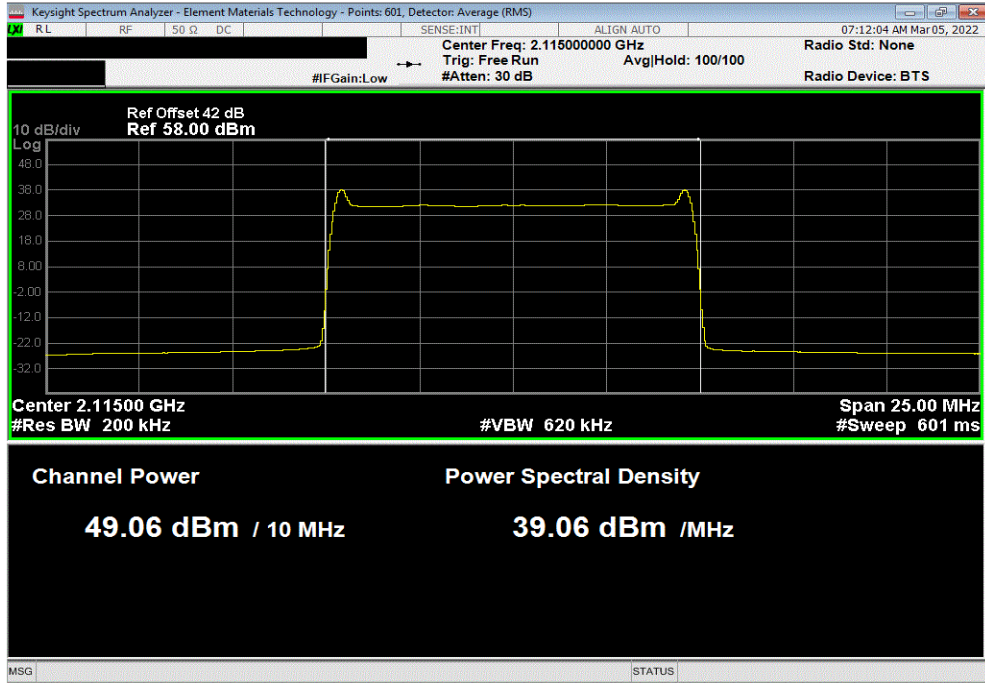


# OUTPUT POWER - GUARD BAND

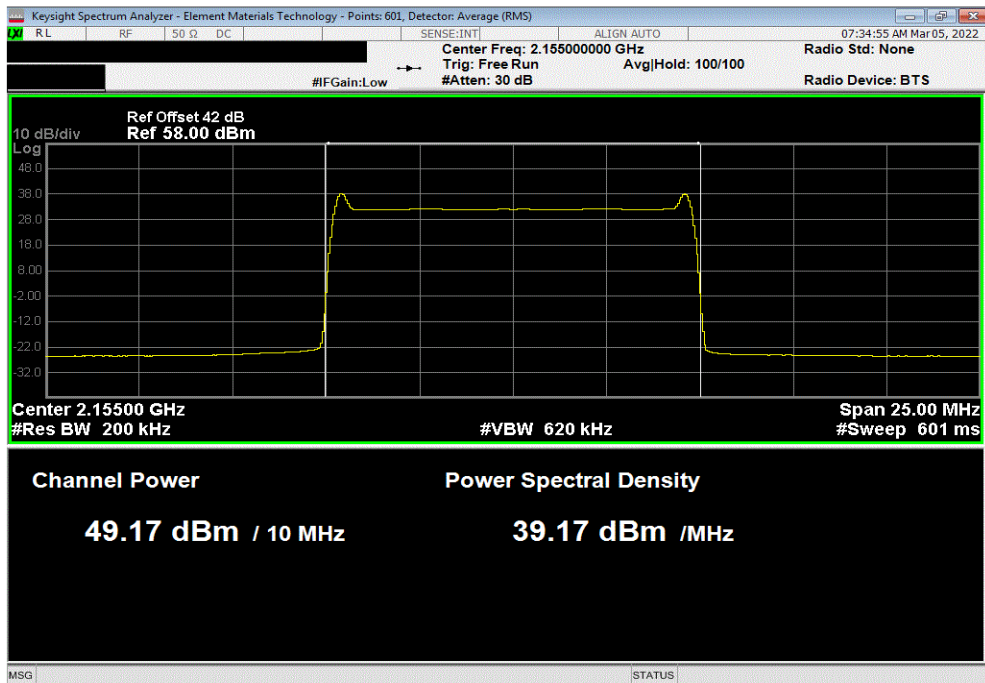


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwidth, E-TM1.1 with N-TM, Low Channel, 2115 MHz					
Initial Value	Duty Cycle	Single Port	Two Port	Four Port	
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Mid Channel, 2155 MHz					
Initial Value	Duty Cycle	Single Port	Two Port	Four Port	
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
49.174	0	49.2	52.2	55.2	

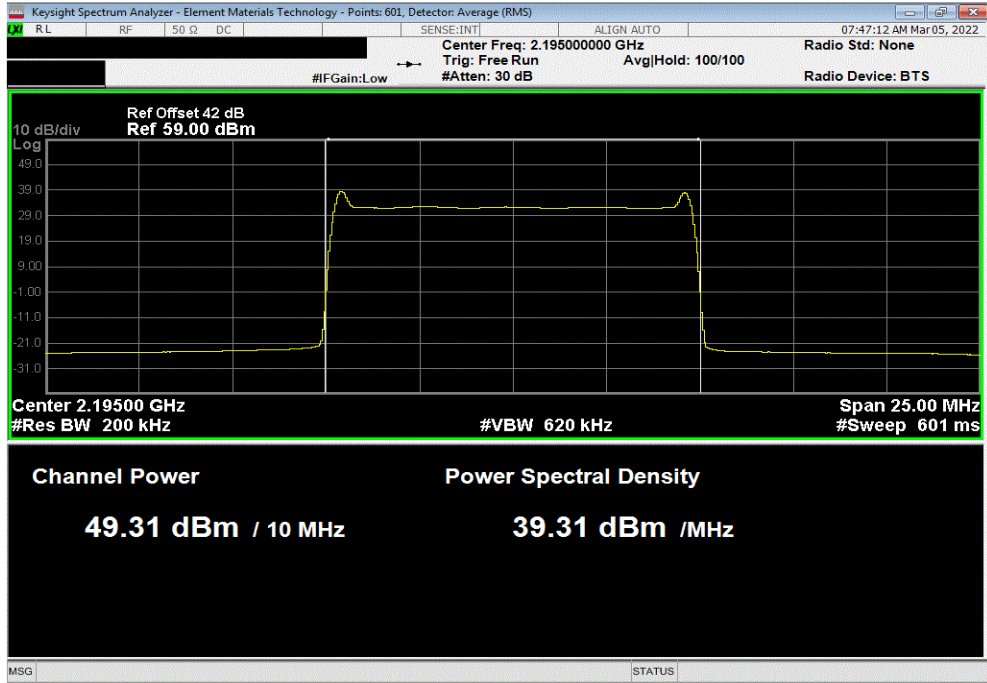


# OUTPUT POWER - GUARD BAND



Tel: 2021.12.14.1 XMI: 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 10 MHz Bandwidth, E-TM1.1 with N-TM, High Channel, 2195 MHz					
Initial Value	Duty Cycle	Single Port	Two Port	Four Port	
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Low Channel, 2117.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port	Four Port	
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
49.306	0	49.3	52.3	55.3	

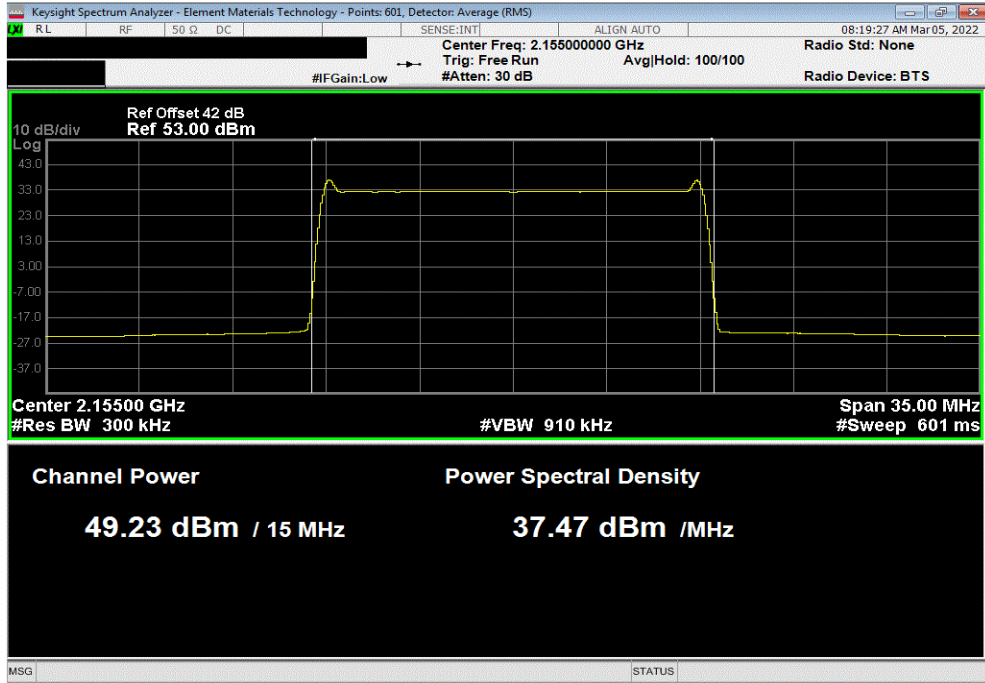


# OUTPUT POWER - GUARD BAND

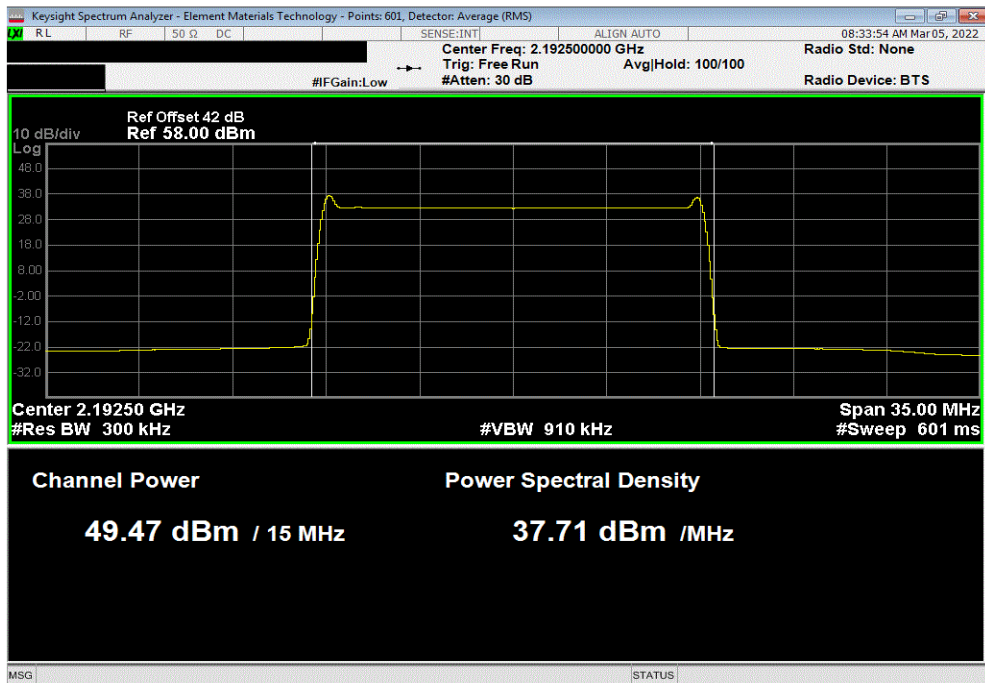


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 15 MHz Bandwidth, E-TM1.1 with N-TM, Mid Channel, 2155 MHz.						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, High Channel, 2192.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
49.473	0	49.5	52.5	55.5		

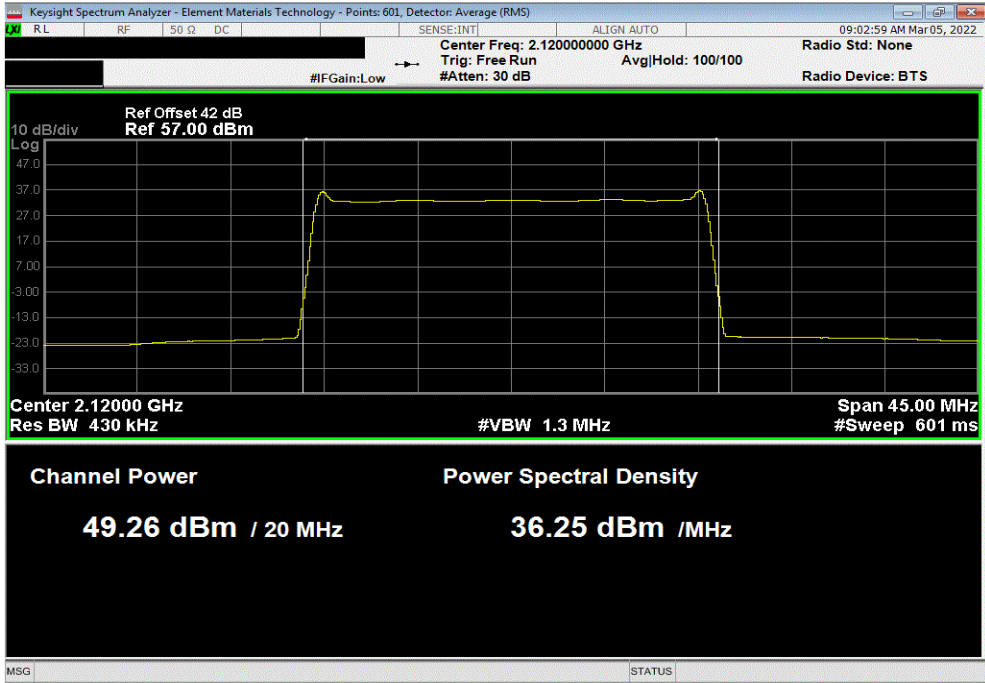


# OUTPUT POWER - GUARD BAND

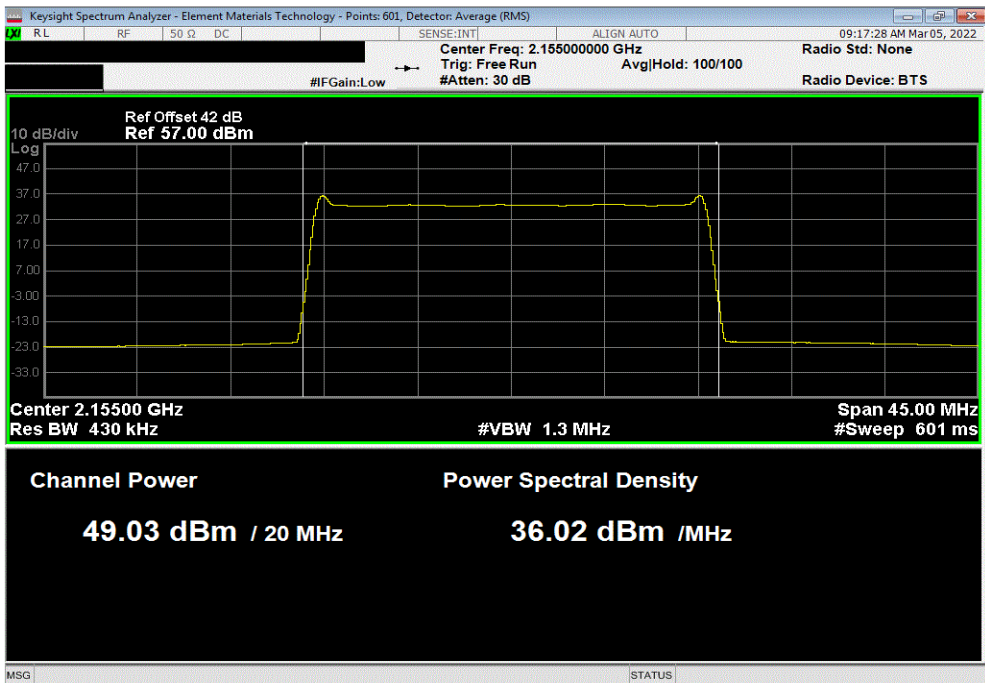


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Guard Band, Port 1, 20 MHz Bandwidth, E-TM1.1 with N-TM, Low Channel, 2120 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Mid Channel, 2155 MHz..						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
49.032	0	49.0	52.0	55.0		

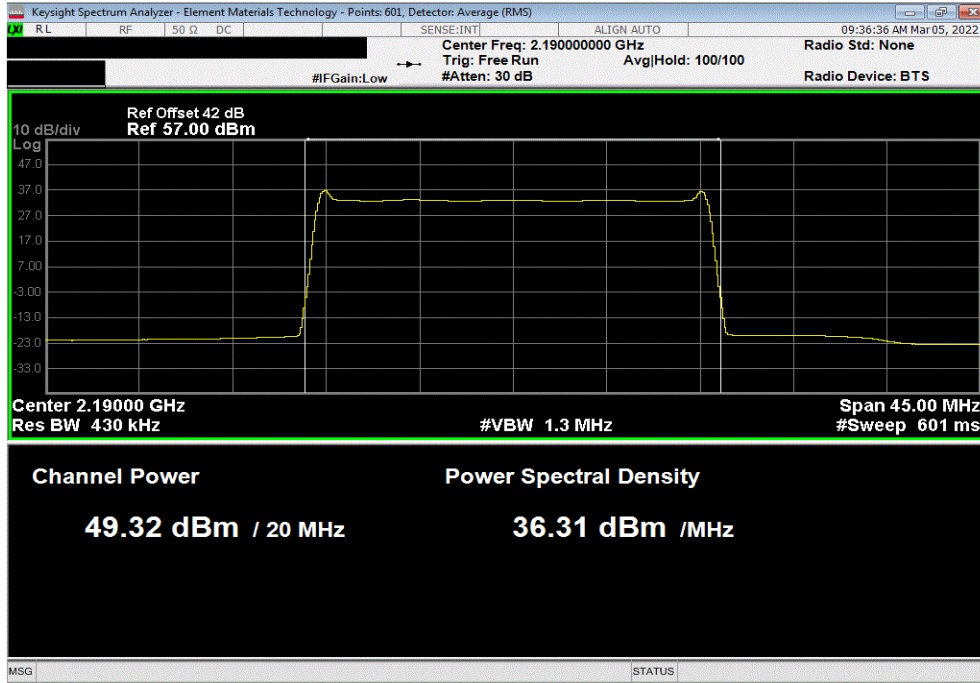


# OUTPUT POWER - GUARD BAND



TbTx 2021.12.14.1 XMI 2022.02.07.0

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

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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



TstTx 2021.12.14.1 XMI 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 losses accounted for in the reference level offset 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
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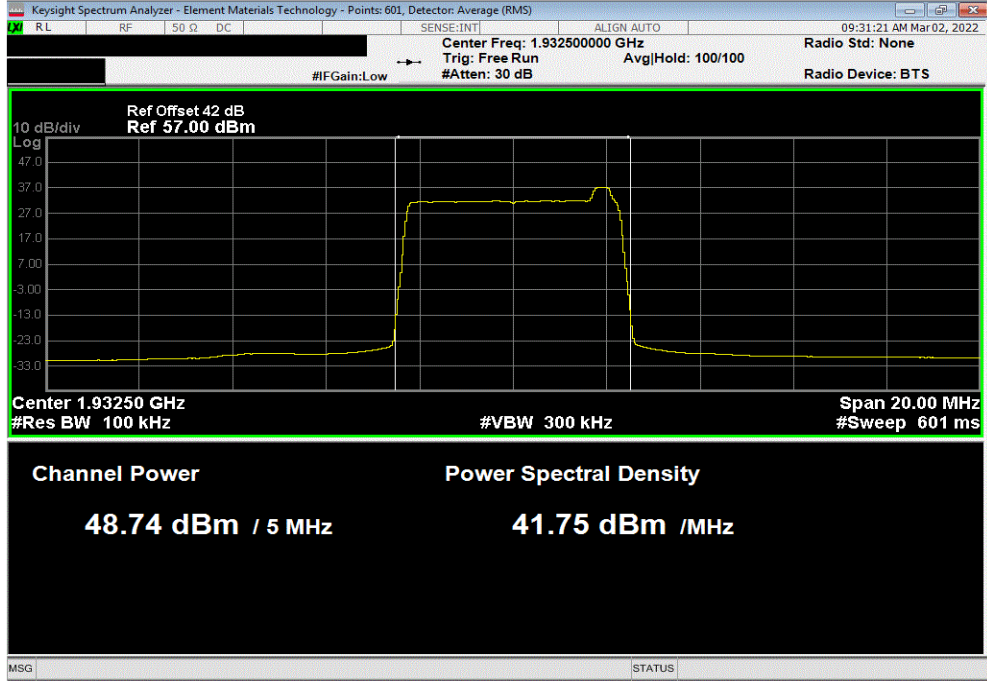
		Initial Value dBm/Carrier BW	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Two Port dBm/Carrier BW	Four Port dBm/Carrier BW
Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band						
Port 1						
5 MHz Bandwidth						
E-TM1.1 with N-TM						
	Low Channel, 1932.5 MHz	48.742	0	48.7	51.7	54.7
	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 Bandwidth						
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 Bandwidth						
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 Bandwidth						
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

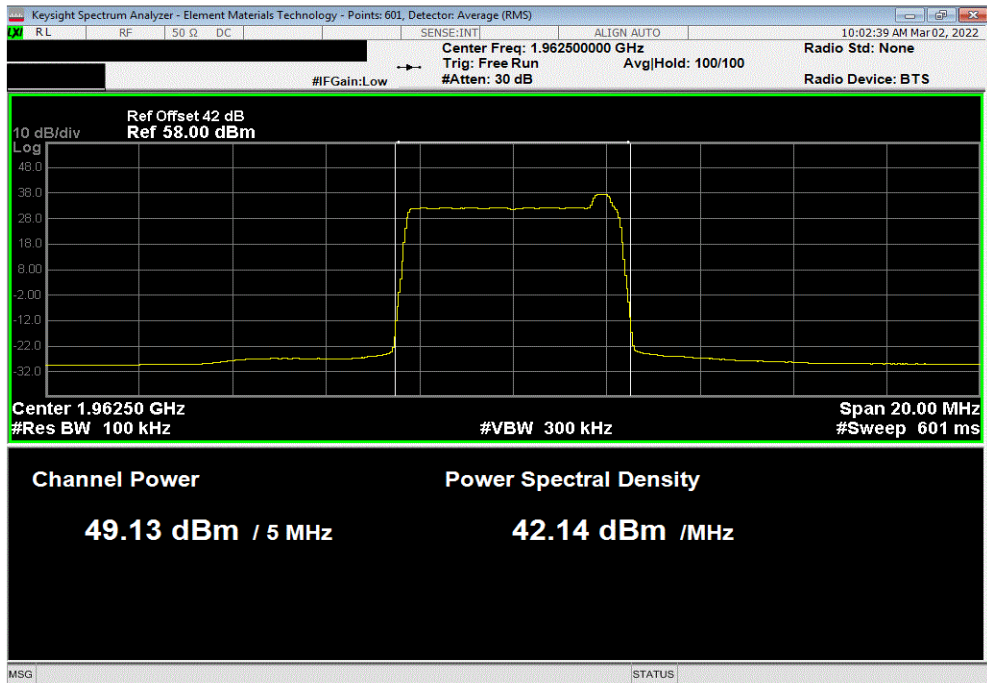


TuTx 2021.12.14.1 XMt 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 5 MHz Bandwidth, E-TM1.1 with N-TM, Low Channel, 1932.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
49.126	0	49.1	52.1	55.1		



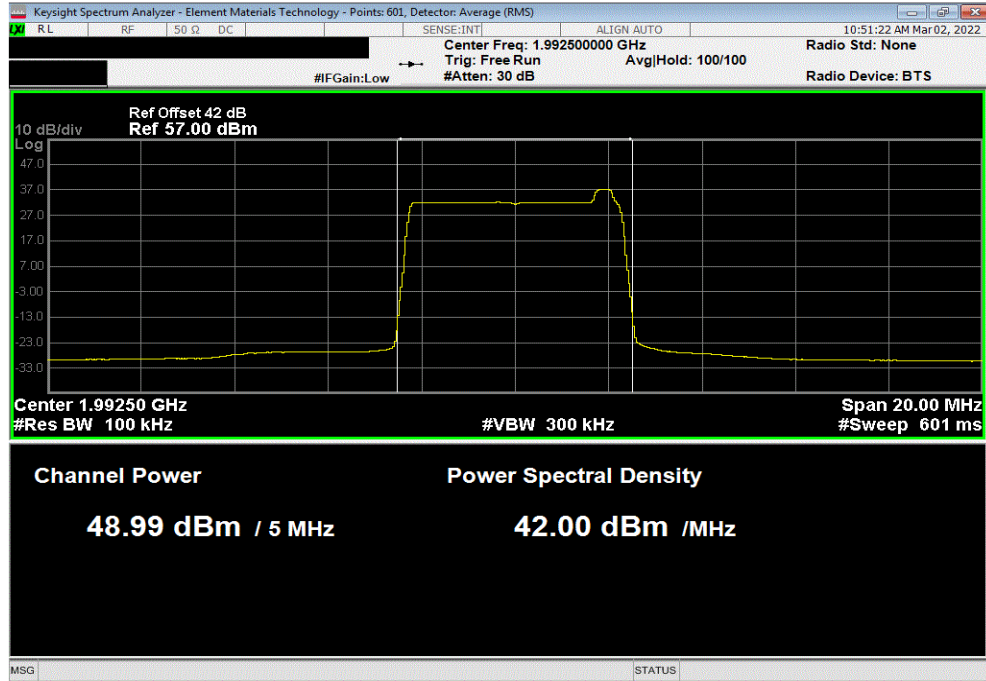


# OUTPUT POWER - IN-BAND

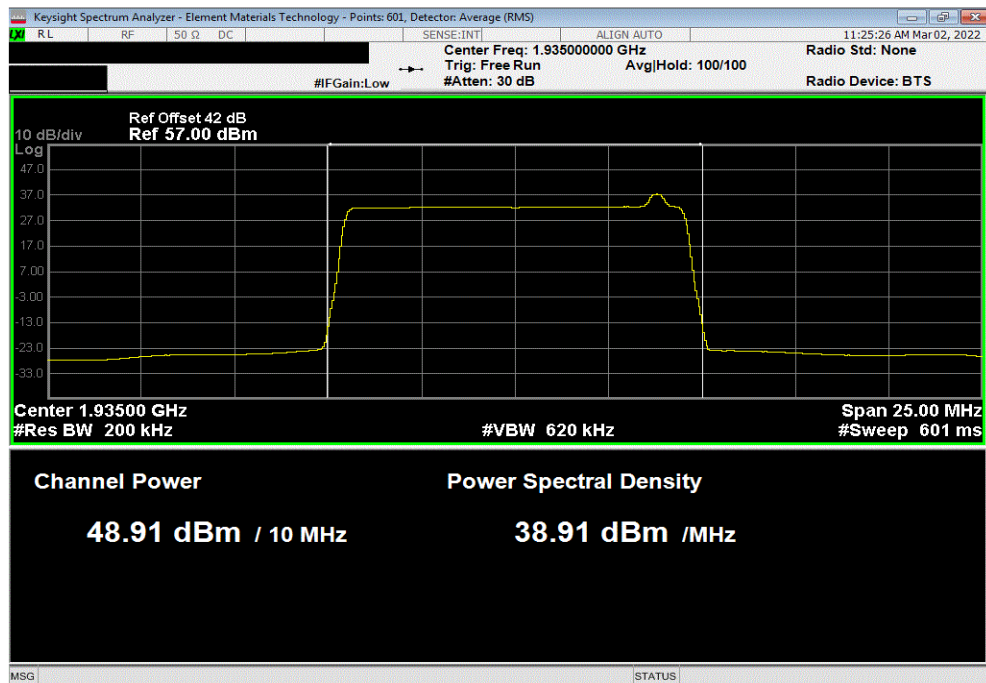


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 5 MHz Bandwidth, E-TM1.1 with N-TM, High Channel, 1992.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Low Channel, 1935 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
48.906	0	48.9	52.9	55.9		

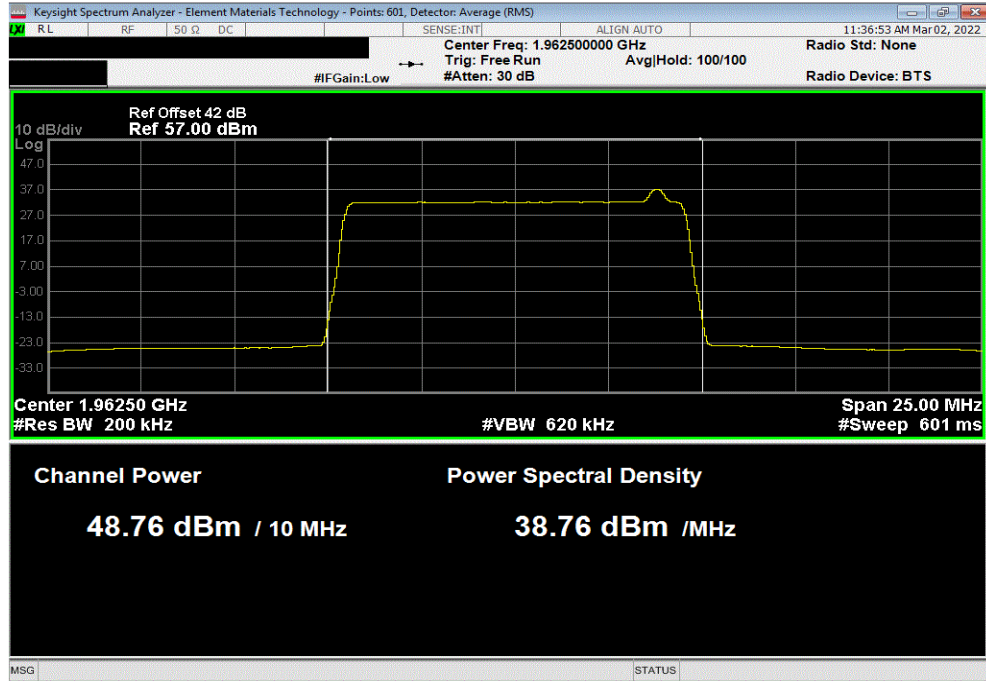


# OUTPUT POWER - IN-BAND

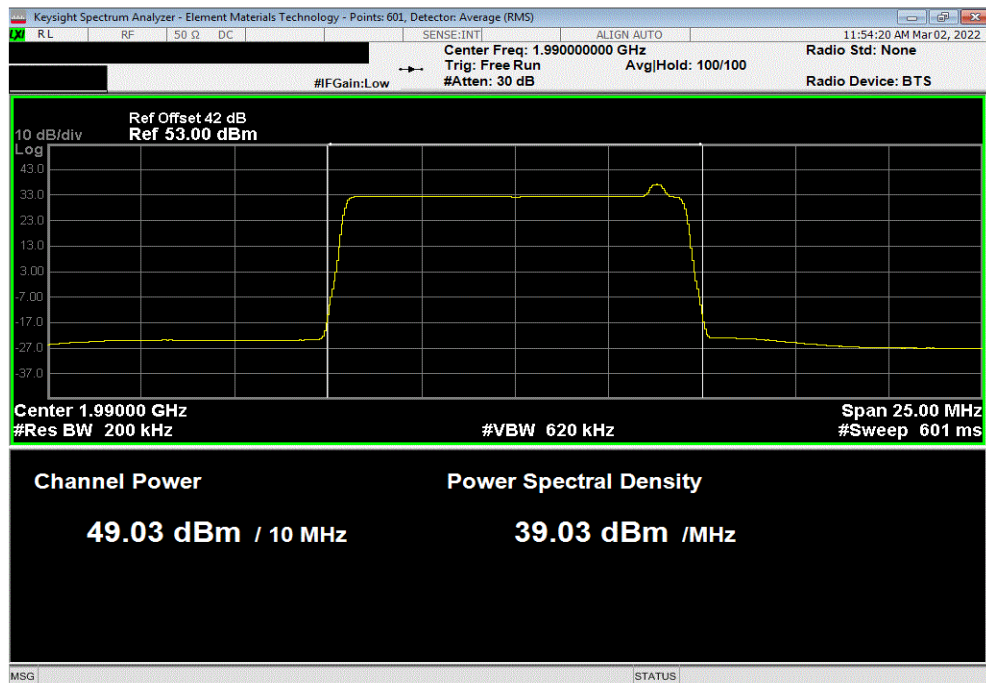


TuTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 10 MHz Bandwidth, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, High Channel, 1990 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
49.028	0	49.0	52.0	55.0		

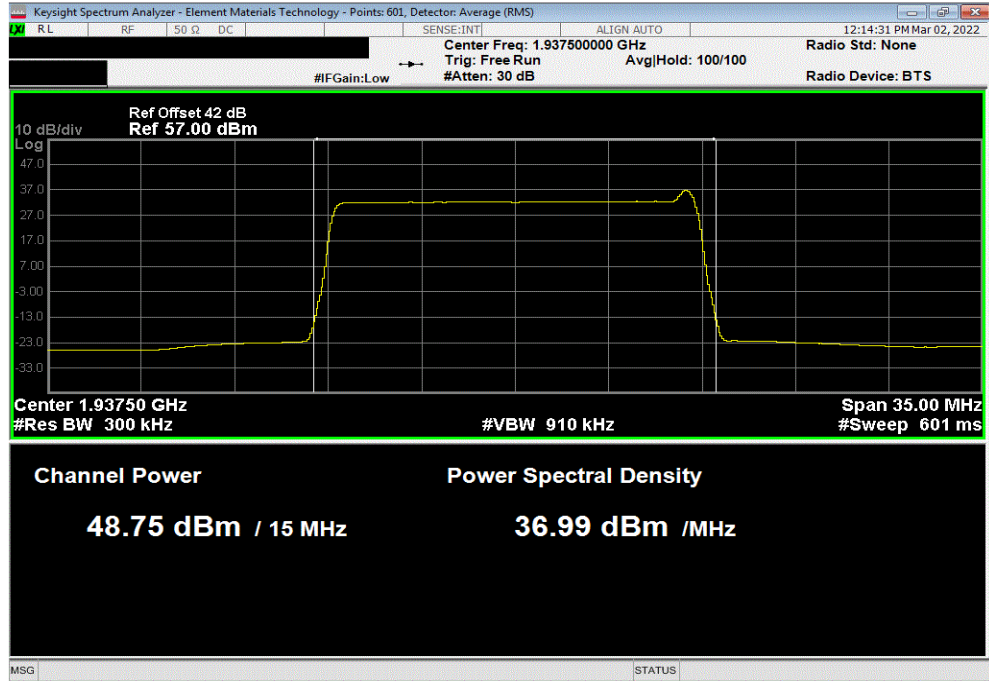


# OUTPUT POWER - IN-BAND

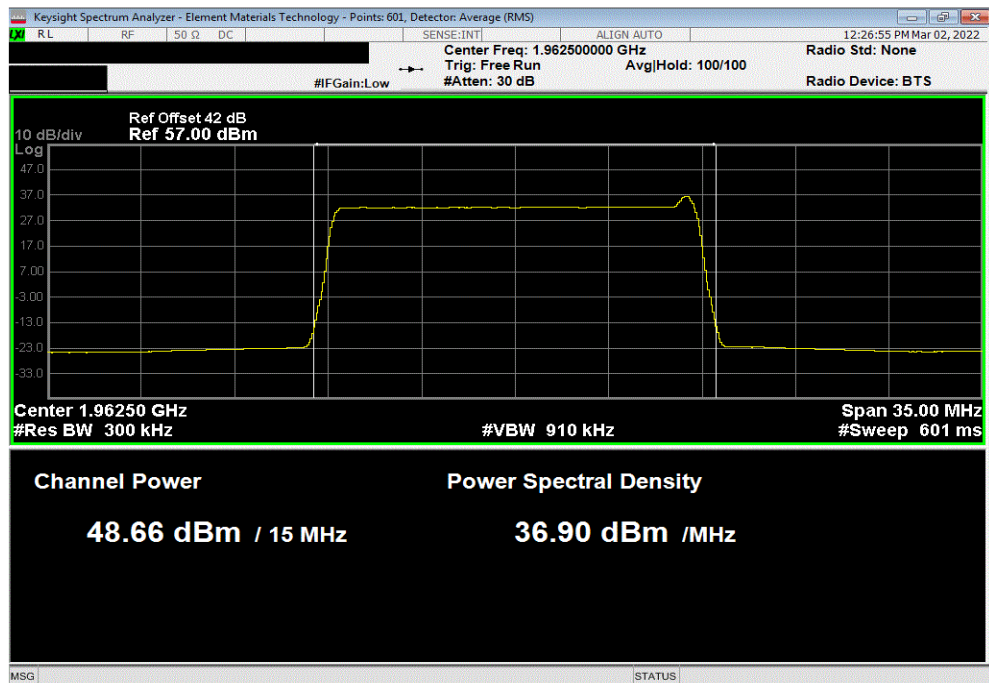


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 15 MHz Bandwidth, E-TM1.1 with N-TM, Low Channel, 1937.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
48.663	0	48.7	51.7	54.7		



# OUTPUT POWER - IN-BAND

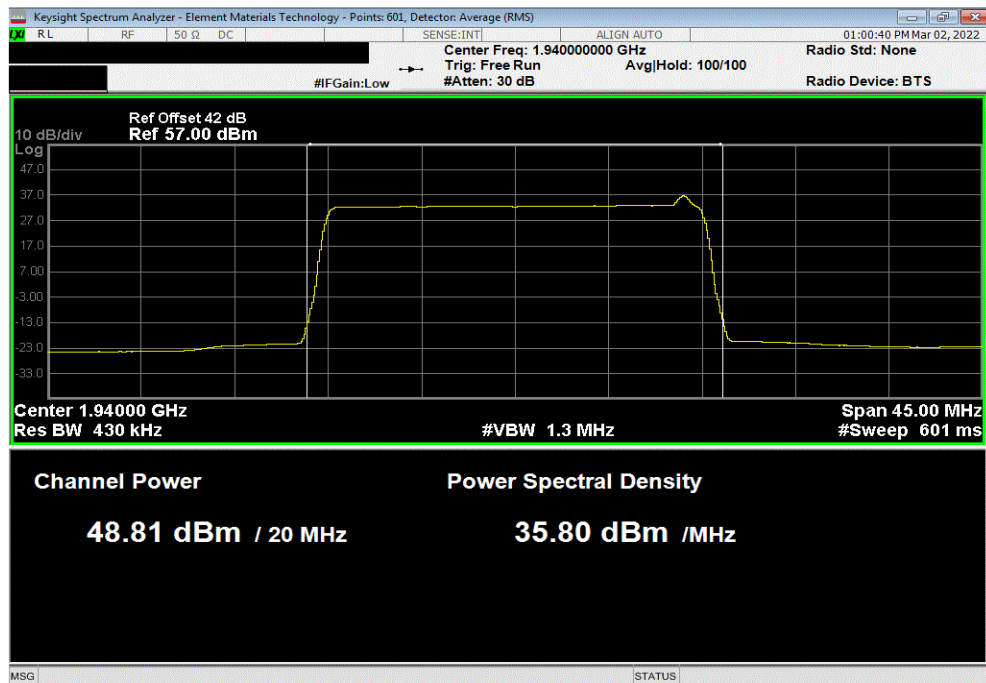


TuTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 15 MHz Bandwidth, E-TM1.1 with N-TM, High Channel, 1987.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Low Channel, 1940 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
48.81	0	48.8	51.8	54.8		

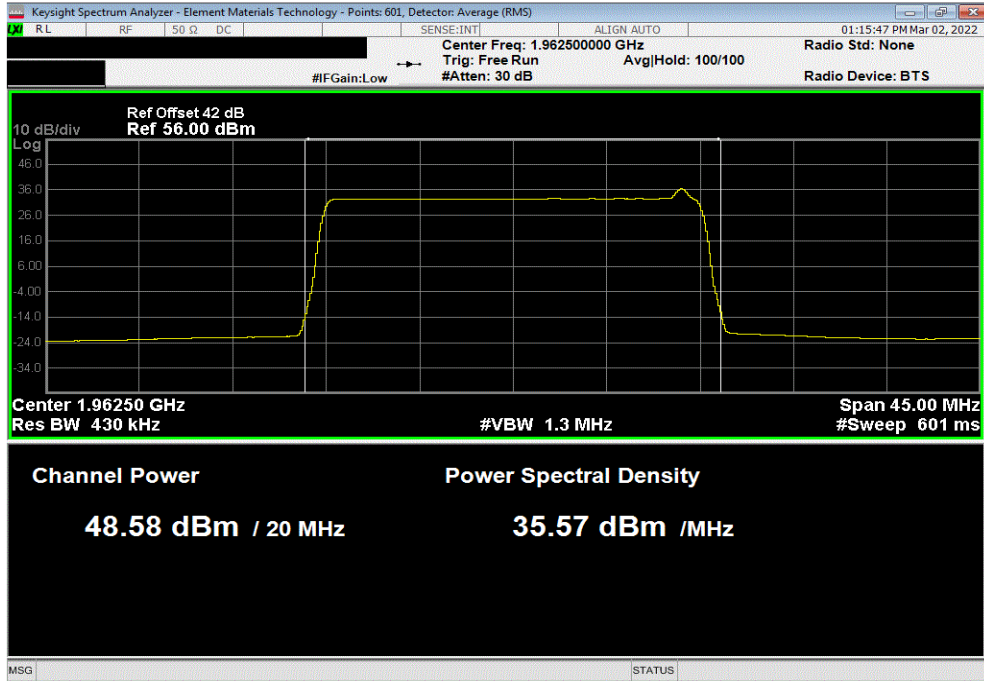


# OUTPUT POWER - IN-BAND

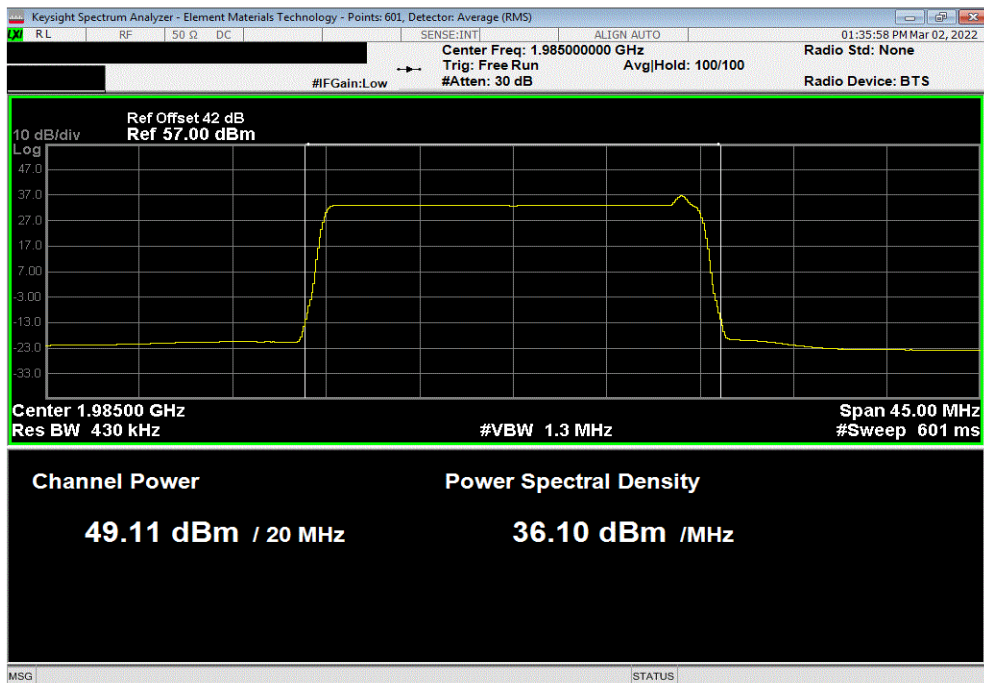


TuTx 2021.12.14.1 XMt 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT In-Band, Port 1, 20 MHz Bandwidth, E-TM1.1 with N-TM, Mid Channel, 1962.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, High Channel, 1985 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
49.108	0	49.1	52.1	55.1		



# OUTPUT POWER - IN-BAND



TelTx 2021.12.14.1 XMI 2022.02.07.0

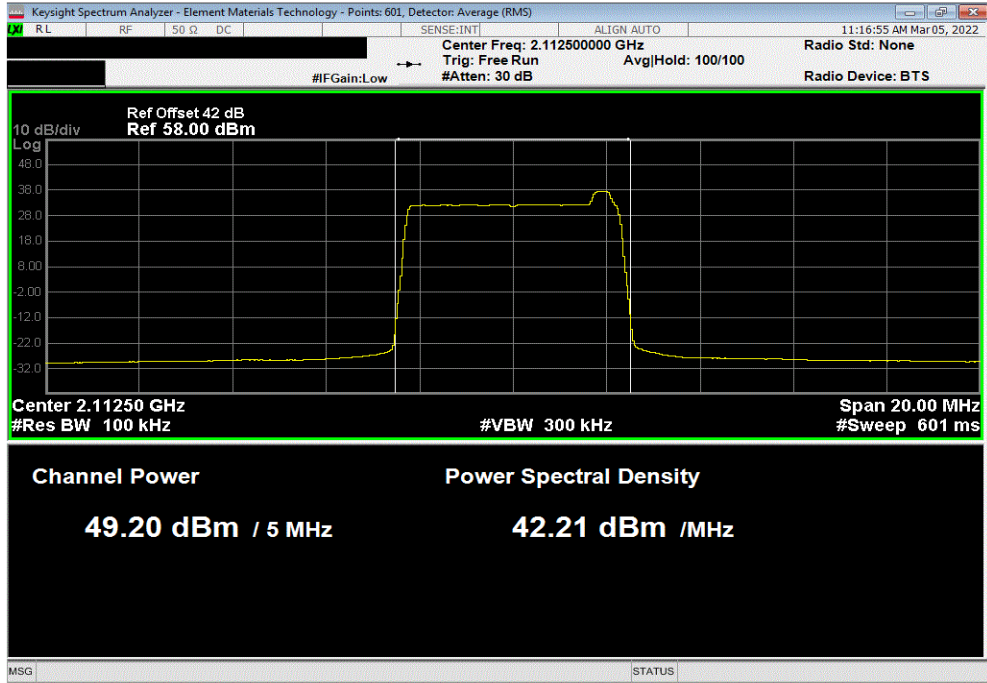
EUT: AHFII Remote Radio Head		Work Order: NOKI0037	
Serial Number: YK214000036		Date: 28-Feb-22	
Customer: Nokia Solutions and Networks		Temperature: 22.6 °C	
Attendees: David Le, John Rattanavong		Humidity: 23.7% RH	
Project: None		Barometric Pres.: 1026 mbar	
Tested by: Mark Baytan		Power: 54 VDC	
TEST SPECIFICATIONS		Job Site: TX09	
FCC 27:2022		Test Method	
RSS-139 Issue 3:2015		ANSI C63.26:2015	
RSS-170 Issue 3:2015		RSS-139 Issue 3:2015	
RSS-170 Issue 3:2015		RSS-170 Issue 3:2015	
COMMENTS			
All measurement path losses accounted for in the reference level offset 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	
		Initial 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 Bandwidth			
E-TM1.1 with N-TM			
	Low Channel, 2112.5 MHz	49.196	0
	Mid Channel, 2155 MHz	49.151	0
	High Channel, 2197.5 MHz	49.174	0
		49.2	52.2
		49.2	52.2
		49.2	55.2
10 MHz Bandwidth			
E-TM1.1 with N-TM			
	Low Channel, 2115 MHz	49.154	0
	Mid Channel, 2155 MHz	48.941	0
	High Channel, 2195 MHz	49.288	0
		49.2	52.2
		48.9	52.9
		49.3	55.3
15 MHz Bandwidth			
E-TM1.1 with N-TM			
	Low Channel, 2117.5 MHz	49.161	0
	Mid Channel, 2155 MHz	49.033	0
	High Channel, 2192.5 MHz	49.272	0
		49.2	52.2
		49.0	52.0
		49.3	52.3
		55.2	55.0
		55.3	55.3
20 MHz Bandwidth			
E-TM1.1 with N-TM			
	Low Channel, 2120 MHz	49.262	0
	Mid Channel, 2155 MHz	49.172	0
	High Channel, 2190 MHz	49.131	0
		49.3	52.3
		49.2	52.2
		49.1	52.1
		55.3	55.2
		55.2	55.1

# OUTPUT POWER - IN-BAND

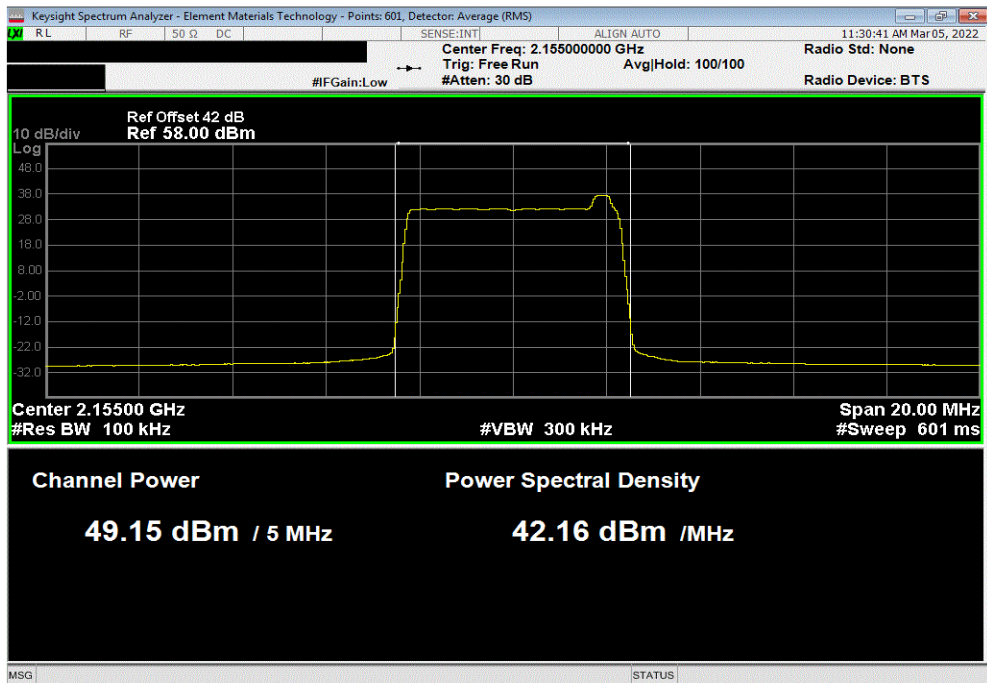


TuTx 2021.12.14.1 XMt 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 5 MHz Bandwidth, E-TM1.1 with N-TM, Low Channel, 2112.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Mid Channel, 2155 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
49.151	0	49.2	52.2	55.2		

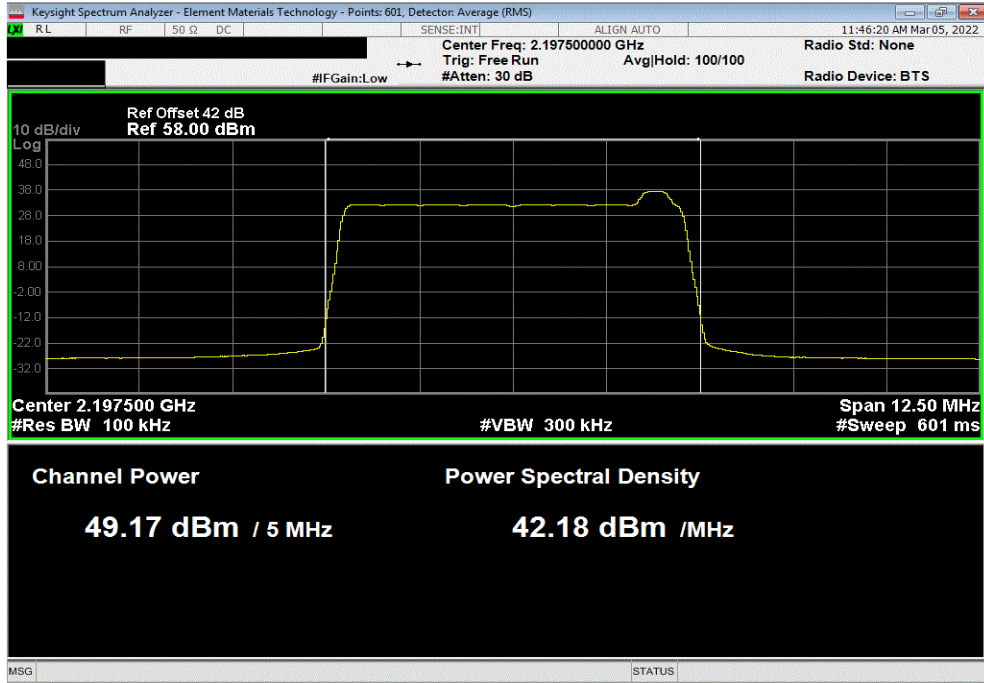


# OUTPUT POWER - IN-BAND

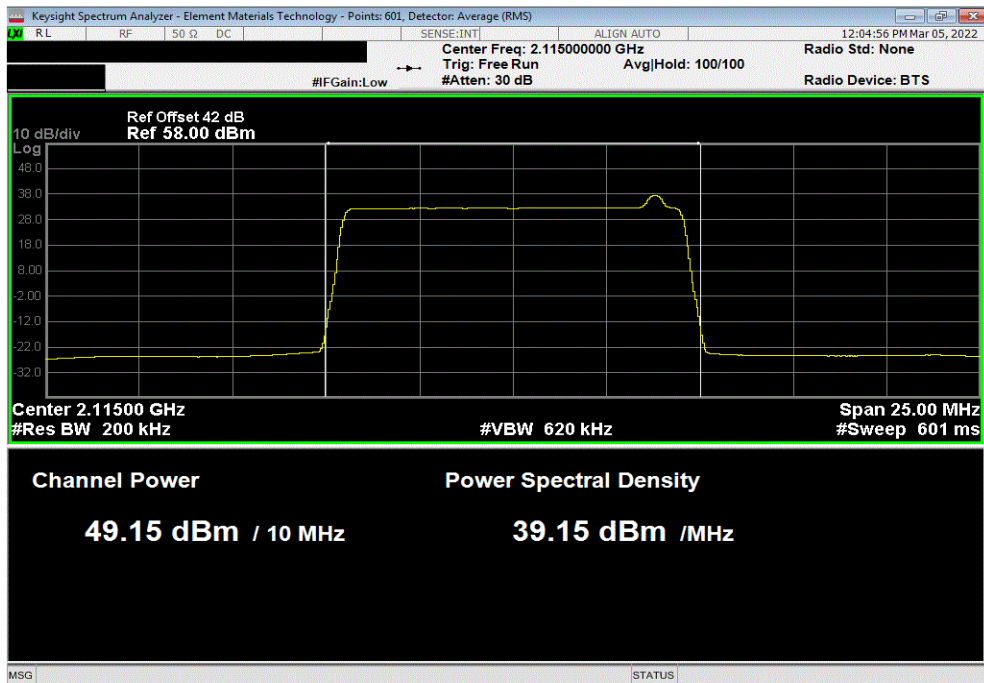


TuTx 2021.12.14.1 XMt 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 5 MHz Bandwidth, E-TM1.1 with N-TM, High Channel, 2197.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port	Four Port	
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Low Channel, 2115 MHz					
Initial Value	Duty Cycle	Single Port	Two Port	Four Port	
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
49.154	0	49.2	52.2	55.2	



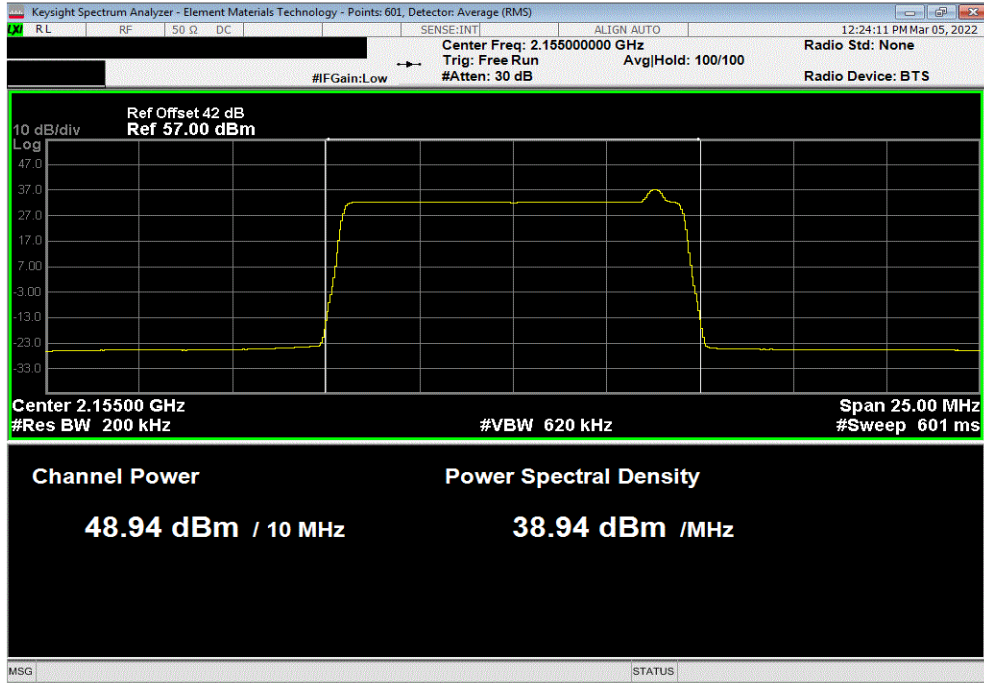


# OUTPUT POWER - IN-BAND

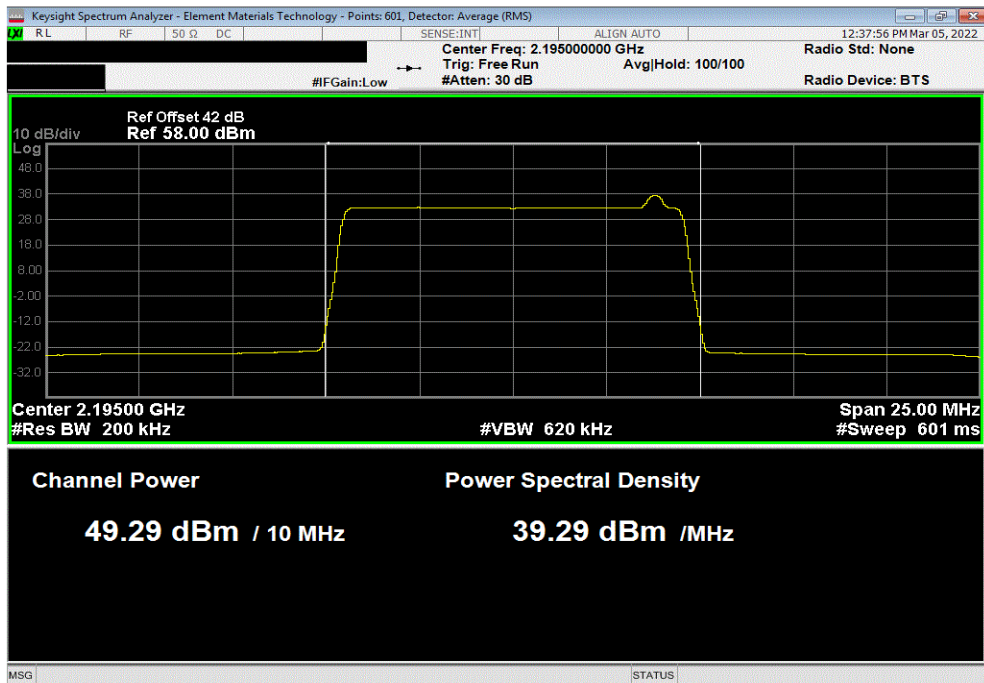


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 10 MHz Bandwidth, E-TM1.1 with N-TM, Mid Channel, 2155 MHz.						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, High Channel, 2195 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
49.288	0	49.3	52.4	55.3		



# OUTPUT POWER - IN-BAND

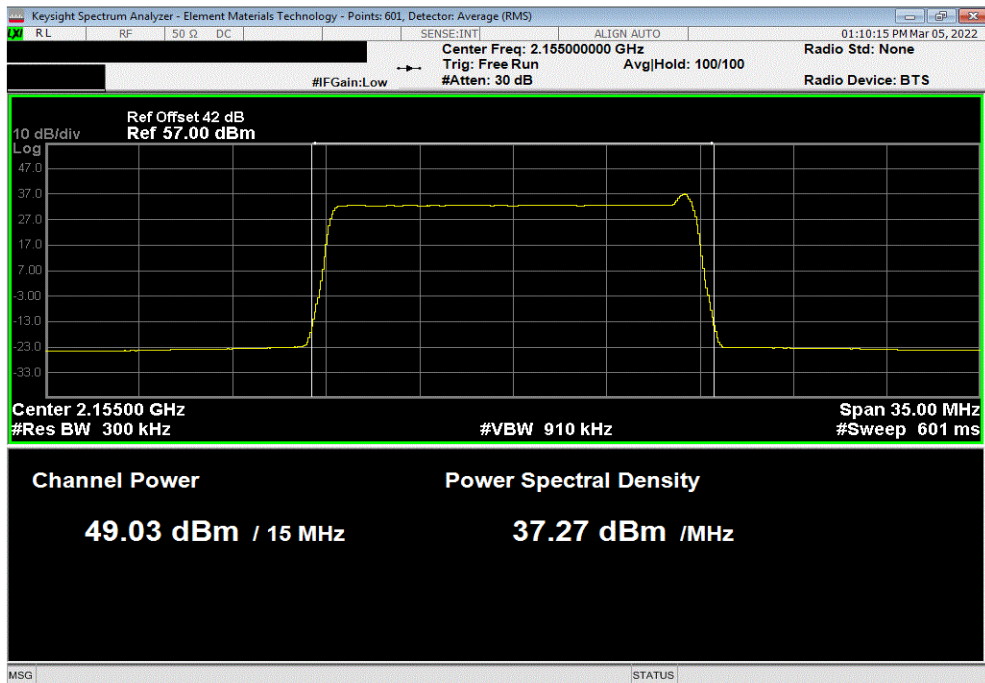


Tel: 2021.12.14.1 XMI: 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 15 MHz Bandwidth, E-TM1.1 with N-TM, Low Channel, 2117.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port	Four Port	
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Mid Channel, 2155 MHz..					
Initial Value	Duty Cycle	Single Port	Two Port	Four Port	
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW	
49.033	0	49.0	52.0	55.0	



# OUTPUT POWER - IN-BAND

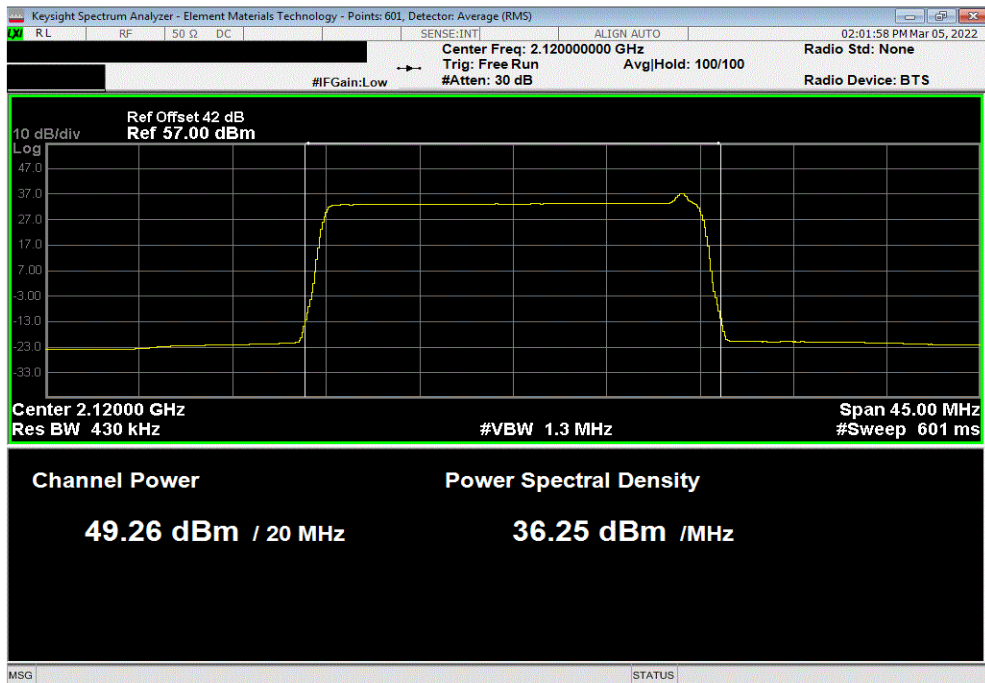


TuTx 2021.12.14.1 XMI 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 15 MHz Bandwidth, E-TM1.1 with N-TM, High Channel, 2192.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, Low Channel, 2120 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	dBm/Carrier BW		
49.262	0	49.3	52.3	55.3		

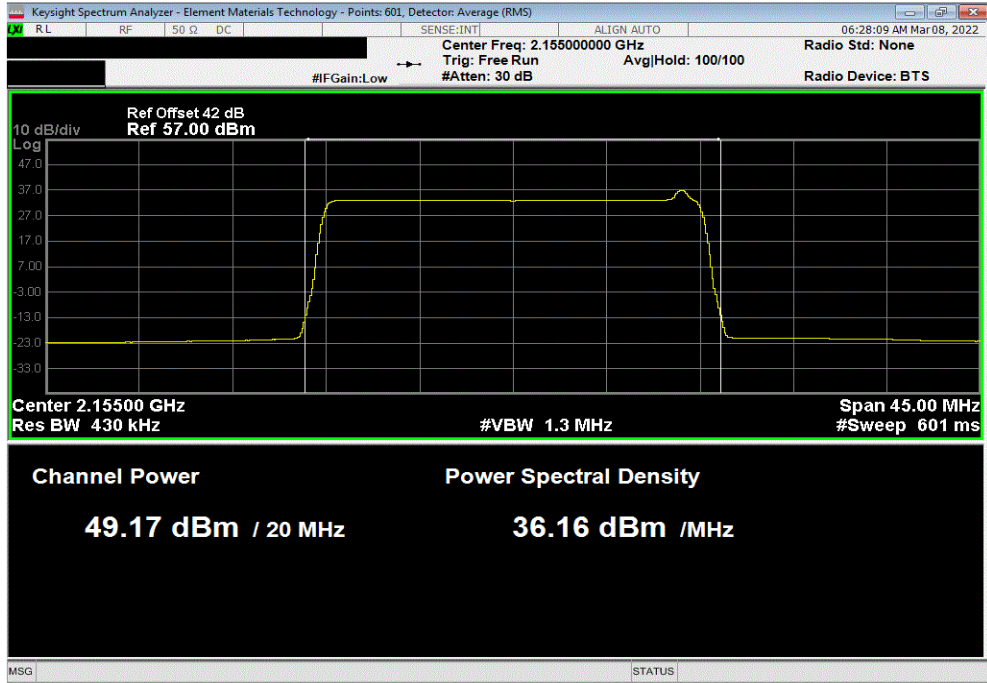


# OUTPUT POWER - IN-BAND

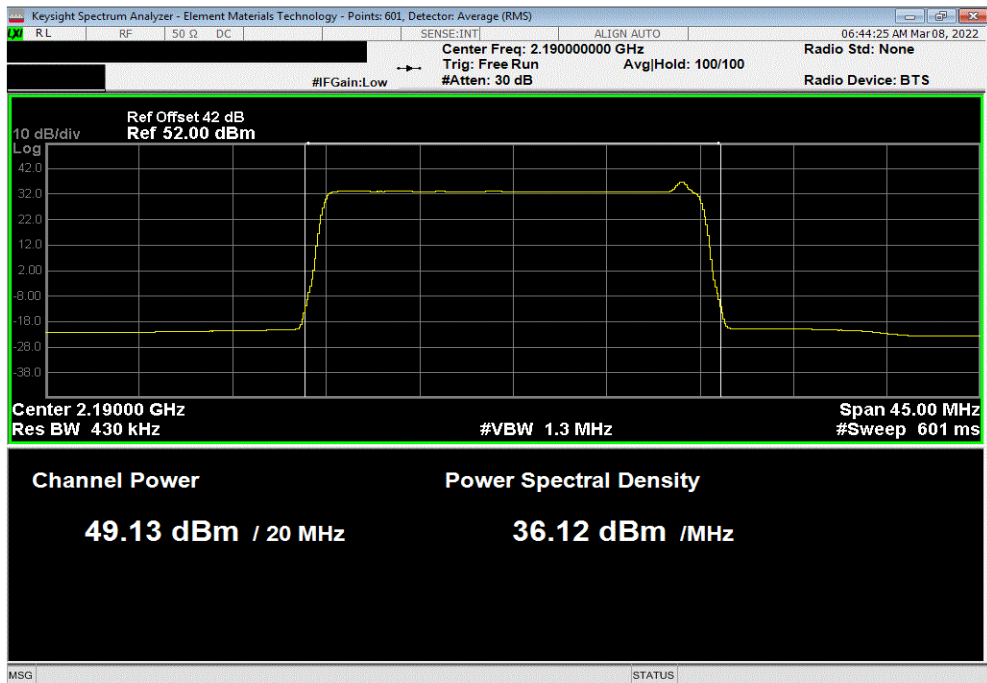


Tel: 2021.12.14.1 XMI: 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT In Band, Port 1, 20 MHz Bandwidth, E-TM1.1 with N-TM, Mid Channel, 2155 MHz...						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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 Bandwidth, E-TM1.1 with N-TM, High Channel, 2190 MHz						
Initial Value	Duty Cycle	Single Port	Two Port	Four Port		
dBm/Carrier BW	Factor (dB)	dBm/Carrier BW	dBm/Carrier BW	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



TelTx 2021.12.14.1 XMI: 2022.02.07.0

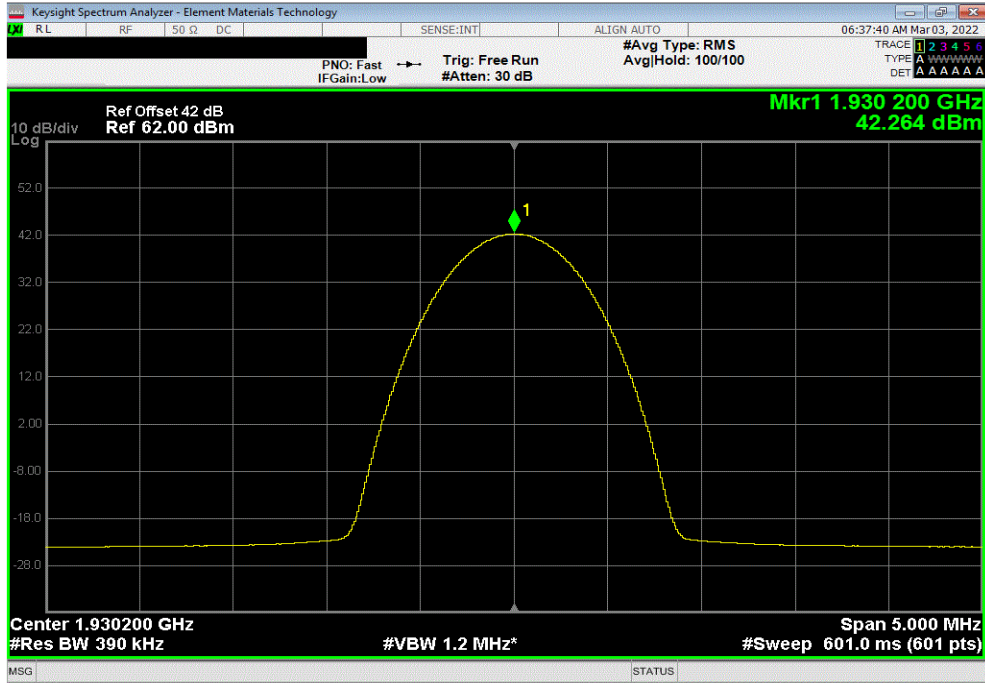
EUT: AHFII Remote Radio Head		Work Order: NOKI0037	
Serial Number: YK214000036		Date: 28-Feb-22	
Customer: Nokia Solutions and Networks		Temperature: 22.6 °C	
Attendees: David Le, John Rattanaovong		Humidity: 23.7% RH	
Project: None		Barometric Pres.: 1026 mbar	
Tested by: Mark Baytan	Power: 54 VDC	Job Site: TX09	
<b>TEST SPECIFICATIONS</b>			
FCC 24E:2022		Test Method	
RSS-133 Issue 6:2013+A1:2018		ANSI C63.26:2015	
		RSS-133 Issue 6:2013+A1:2018	
<b>COMMENTS</b>			
All measurement path losses accounted for in the reference level offset 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)].			
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			
Configuration #	2	Signature	
		Initial 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
	Mid Channel, 1962.5 MHz	42.35	0
	High Channel, 1994.8 MHz	42.436	0
			42.3
			45.3
			48.3
			42.4
			45.4
			48.4

# OUTPUT POWER - STAND ALONE

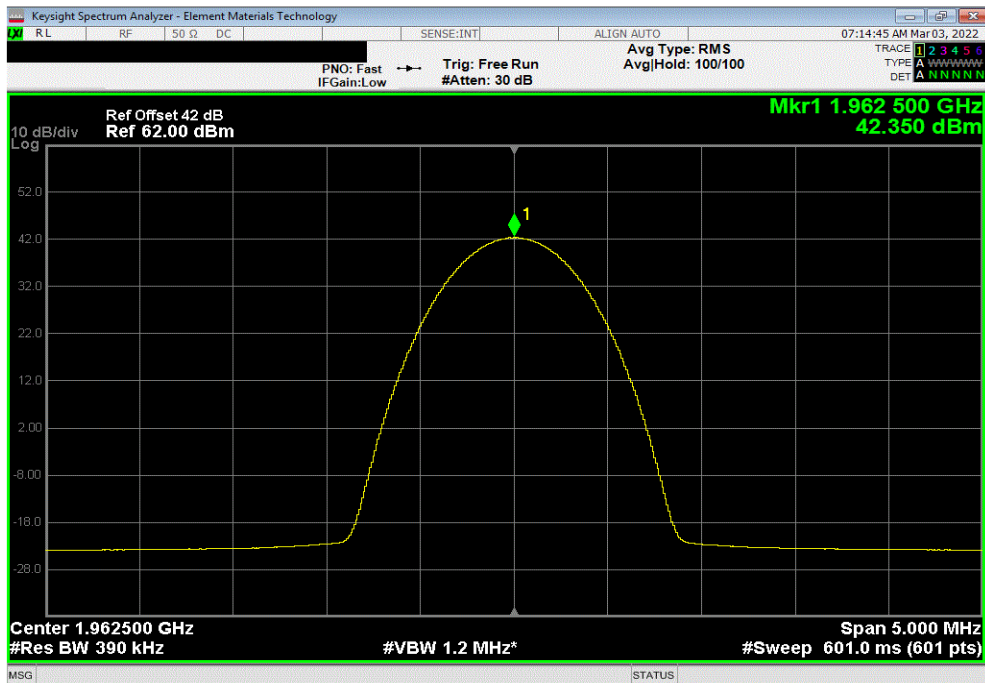


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Stand Alone, Port 1, 200 kHz Bandwidth, N-TM, Low Channel, 1930.2 MHz						
Initial 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						
Initial Value (dBm)	Duty Cycle Factor (dB)	Single Port (dBm)	Two Port (dBm)	Four Port (dBm)		
42.35	0	42.4	45.4	48.4		

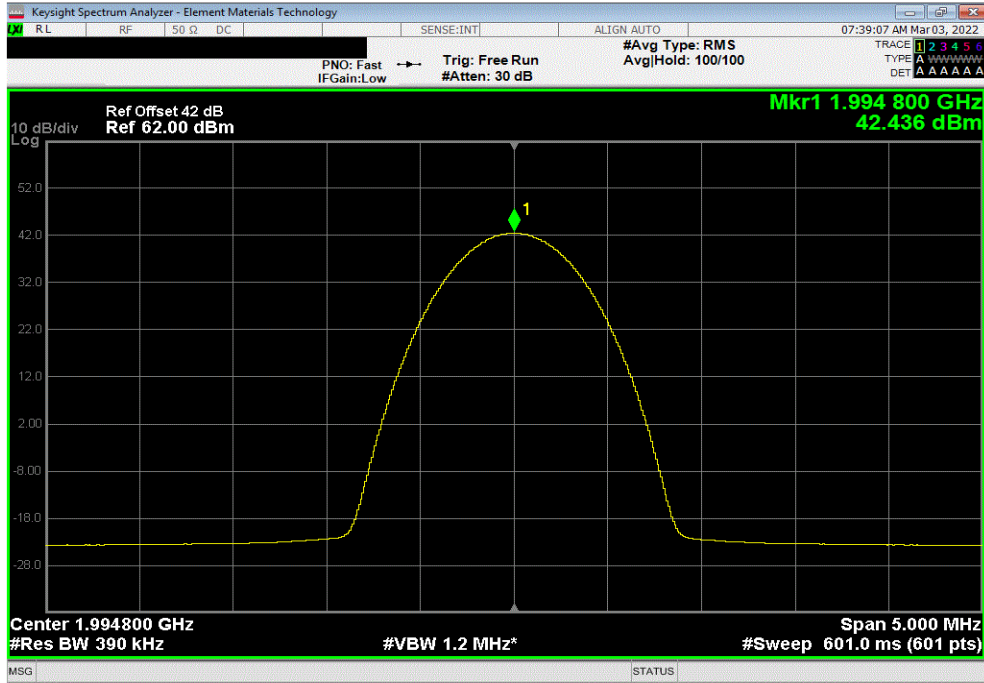


# OUTPUT POWER - STAND ALONE



TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 25, 1930 MHz - 1995 MHz, LTE Narrow Band IoT Stand Alone, Port 1, 200 kHz Bandwidth, N-TM, High Channel, 1994.8 MHz						
Initial 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



TelTx 2021.12.14.1 XMI 2022.02.07.0

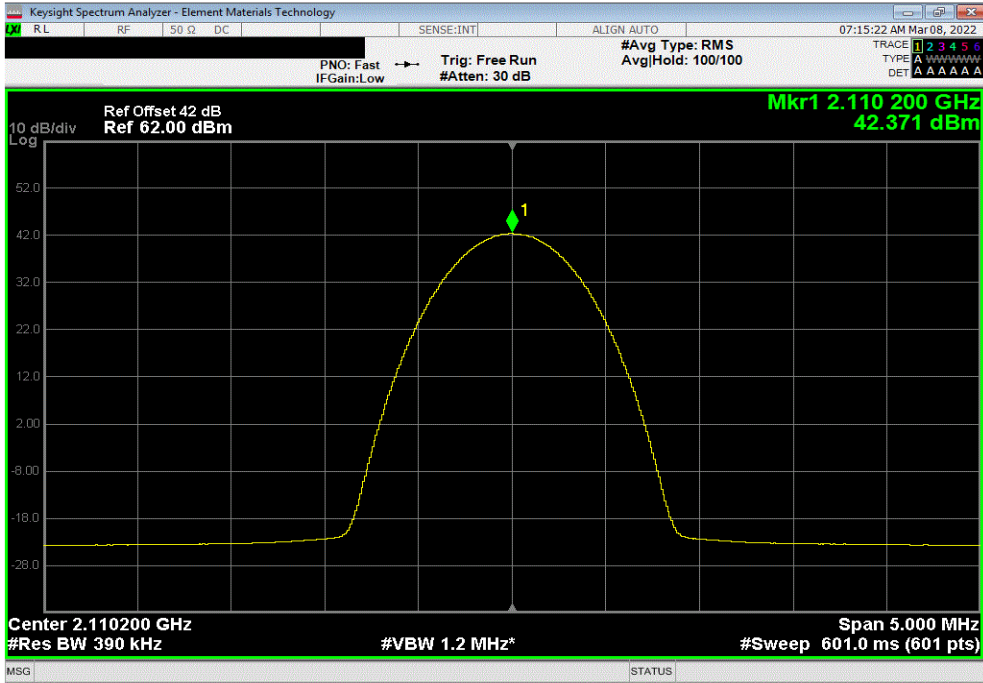
EUT: AHFII Remote Radio Head		Work Order: NOKI0037	
Serial Number: YK214000036		Date: 28-Feb-22	
Customer: Nokia Solutions and Networks		Temperature: 22.6 °C	
Attendees: David Le, John Rattanavong		Humidity: 23.7% RH	
Project: None		Barometric Pres.: 1026 mbar	
Tested by: Mark Baytan		Power: 54 VDC	
Job Site: TX09			
<b>TEST SPECIFICATIONS</b>			
FCC 27:2022		Test Method	
RSS-139 Issue 3:2015		ANSI C63.26:2015	
RSS-170 Issue 3:2015		RSS-139 Issue 3:2015	
		RSS-170 Issue 3:2015	
<b>COMMENTS</b>			
All measurement path losses accounted for in the reference level offset 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 multipoint (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)].			
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			
Configuration #	2	Signature	
		Initial 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 Bandwidth			
N-TM			
	Low Channel, 2110.2 MHz	42.371	0
	Mid Channel, 2155 MHz	42.479	0
	High Channel, 2199.8 MHz	42.49	0
		42.4	45.4
		42.5	45.5
		42.5	45.5
		48.4	48.5
		48.5	48.5

# OUTPUT POWER - STAND ALONE

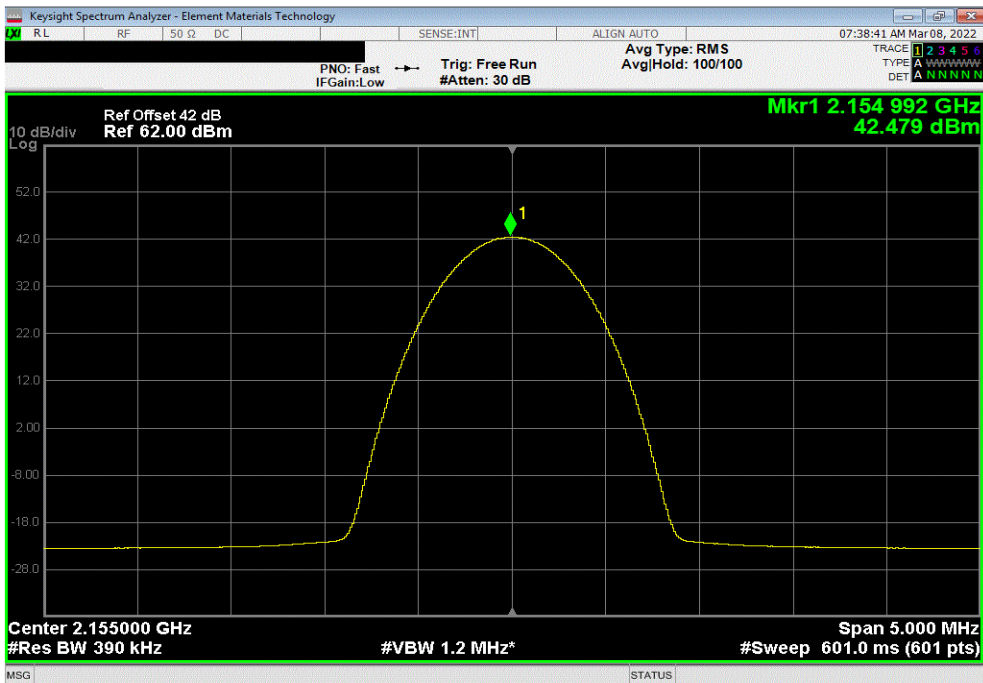


TbTx 2021.12.14.1 XMI 2022.02.07.0

Band 66, 2110 MHz - 2200 MHz, LTE Narrow Band IoT Stand Alone, Port 1, 200 kHz Bandwidth, N-TM, Low Channel, 2110.2 MHz						
Initial 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 Bandwidth, N-TM, Mid Channel, 2155 MHz						
Initial 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



TbTx 2021.12.14.1 XMt 2022.02.07.0

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

