

XMit 2020.03.25.0

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	27-Feb-20	27-Feb-21
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21

#### **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

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

All limits were adjusted by a factor of [-10\*log(4)] dB to account for the device operation as a 4 port MIMO transmitter, as per FCC KDB 622911.

Per FCC 24.238(a) and RSS 133 6.5.1 (i). the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Per FCC 24.238(b) and RSS 133 6.5.1 (i). emissions seen up to 1 MHz outside of authorized operating frequency range band edges shall be measured with a RBW of 1% of the measured emission bandwidth. Any emission seen to be > 1 MHz further outside the band edges shall be measured with a RBW of 1 MHz. However, a narrower RBW of at least 1% of the emission bandwidth is still allowed provided that the measured power is integrated over the full reference bandwidth of 1 MHz.

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (FHFB) as the original certification test. The FHFB antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the original certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2i.



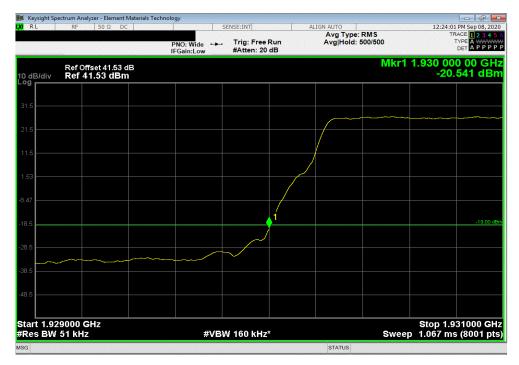
					TbtTx 2020.09.08.0 BETA	XMit 2020.03.25.0
EUT:	FHFB (FCC C2PC)			Work Order:	NOKI0021	
Serial Number:	L9144200604			Date:	10-Sep-20	
Customer:	Nokia Solutions and Networks			Temperature:	22.7 °C	
Attendees:	Mitchell Hill, John Rattanavong			Humidity:	48.1% RH	
Project:	None			Barometric Pres.:	1023 mbar	
Tested by:	Brandon Hobbs	Power:	54 VDC	Job Site:	TX05	
TEST SPECIFICATI	IONS		Test Method			
FCC 24E:2020			ANSI C63.26:2015			
RSS-133:2018			RSS-133:2018			
COMMENTS						
All measurement p	ath losses were accounted for in the reference level offest including	any attenuators, f	ilters and DC blocks. The carrier power	er was set to maximum except for the	15MHz channel bandwi	idth. The

	: Nokia Solutions and Netwo				Temperature: 22.7 °C Humidity: 48.1% RH				
Attendees: Project:		vong			Barometric Pres.: 1023 mbar				
	: Brandon Hobbs			Power: 54 VDC	Job Site:				
TEST SPECIFICAT				Test Method	000 01101	77.00			
FCC 24E:2020				ANSI C63.26:2015					
RSS-133:2018				RSS-133:2018					
COMMENTS									
				g any attenuators, filters and DC blocks. The carrier power					
				fHz) and "Low Channel" (1937.5MHz) and the measurement			cy as allowed by		
C63.26 clause 5.7.	2.g. The 15MHz channel ban	idwidth at full power was	re-measured at	t "High Channel - 100kHz" (1987.4MHz) and "Low Channe	el + 100kHz" (1937.6MHz) at the band e	edge frequencies.			
	M TEST STANDARD								
None									
Configuration #	2			2 1 1					
_		Signature	7	7					
				Frequency					
				Range	Value (dBm)	Limit (dBm)	Result		
3and 25, 1930 MHz									
	Port 1	Jish.							
	5 MHz Bandwd	QPSK Modulation							
	· ·	Low Channel,	1932.5 MHz	1	-20.54	-19	Pass		
		Low Channel,		2	-19.53	-19	Pass		
		Low Channel,		3	-22.11	-19	Pass		
		High Channel,		1	-20.55	-19	Pass		
		High Channel,		2	-20.97	-19	Pass		
	To the state of th	High Channel, 6-QAM Modulation	1992.5 MHz	3	-25.2	-19	Pass		
	10	Low Channel,	1932 5 MH <del>-</del>	1	-22.78	-19	Pass		
		Low Channel,		2	-22.78 -22.5	-19	Pass		
		Low Channel,		3	-22.78	-19	Pass		
		High Channel,	1992.5 MHz	1	-20.32	-19	Pass		
		High Channel,	1992.5 MHz	2	-22.62	-19	Pass		
	-	High Channel,	1992.5 MHz	3	-25.59	-19	Pass		
	6	64-QAM Modulation Low Channel,	1032 F ML!-	1	-21.23	-19	Poor		
		Low Channel,		2	-21.23 -22.2	-19	Pass Pass		
		Low Channel,		3	-21.47	-19	Pass		
		High Channel,		1	-21.44	-19	Pass		
		High Channel,		2	-22.54	-19	Pass		
	_	High Channel,	1992.5 MHz	3	-24.49	-19	Pass		
	29	256-QAM Modulation		<u>.</u>		40			
		Low Channel,		1 2	-22.85 -22.91	-19 10	Pass		
		Low Channel, Low Channel,		3	-22.91	-19 -19	Pass Pass		
		High Channel,		1	-19.72	-19	Pass		
		High Channel,		2	-22.61	-19	Pass		
		High Channel,		3	-24.46	-19	Pass		
	10 MHz Bandw								
	0	QPSK Modulation		<u>.</u>					
		Low Channel, Low Channel,		1 2	-21.27 -25.07	-19 -19	Pass Pass		
		Low Channel,		3	-25.07 -25.1	-19	Pass		
		High Channel,		1	-22.88	-19	Pass		
		High Channel,		2	-24.52	-19	Pass		
	_	High Channel,	1990 MHz	3	-25.44	-19	Pass		
	1	6-QAM Modulation					_		
		Low Channel, Low Channel,		1 2	-20.82 -24.53	-19 -19	Pass Pass		
		Low Channel, Low Channel,		3	-24.53 -24.44	-19 -19	Pass		
		High Channel,		1	-22.08	-19	Pass		
		High Channel,		2	-24.95	-19	Pass		
		High Channel,		3	-25.56	-19	Pass		
	6	64-QAM Modulation					_		
		Low Channel,		1	-21.18	-19	Pass		
		Low Channel, Low Channel,		2 3	-24.61 -24.25	-19 -19	Pass Pass		
		High Channel,		3 1	-24.25 -20.52	-19 -19	Pass Pass		
		High Channel,		2	-20.52 -24.67	-19	Pass		
		High Channel,		3	-25.68	-19	Pass		
	2	256-QAM Modulation							
		Low Channel,		1	-20.22	-19	Pass		
		Low Channel,		2	-24.79	-19	Pass		
		Low Channel, High Channel,		3 1	-24.63 -20.39	-19 -19	Pass Pass		
		High Channel, High Channel,		2	-20.39 -24.94	-19 -19	Pass Pass		
		High Channel,		3	-25.56	-19	Pass		
		wdith, 1dB Reduced Power							
		QPSK Modulation							
		Low Channel,		1	-21.7	-19	Pass		
		Low Channel,		2	-26.47	-19	Pass		
		Low Channel, High Channel,		3 1	-25.86 -21.21	-19 -19	Pass Pass		
		High Channel, High Channel,		2	-21.21 -25.6	-19 -19	Pass Pass		
		High Channel,		3	-26.16	-19	Pass		
	1	6-QAM Modulation		<u>.</u>	200				
		Low Channel,		1	-20.6	-19	Pass		
		Low Channel,		2	-26.04	-19	Pass		
		Low Channel,		3	-25.82	-19	Pass		
		High Channel, High Channel,		1 2	-20.67 -25.51	-19 -19	Pass Pass		
		High Channel,		3	-25.51 -26.16	-19	Pass		
	6	64-QAM Modulation	. JOT TO IVII IE		20.10		. 200		
		Low Channel,	1937.5 MHz	1	-24.683	-19	Pass		

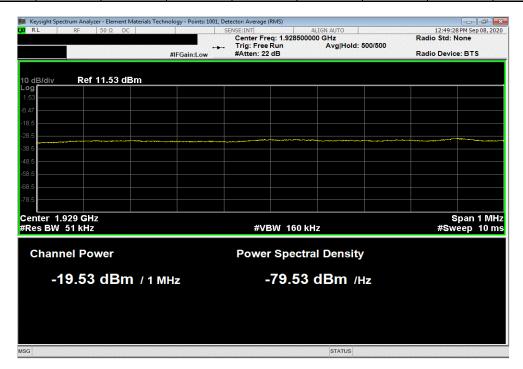
Low Channel, 1937.5 MHz	2	-26.75	-19	Pass
Low Channel, 1937.5 MHz	3	-26.319	-19	Pass
High Channel, 1987.5 MHz	1	-21.332	-19	Pass
High Channel, 1987.5 MHz	2	-25.36	-19	Pass
High Channel, 1987.5 MHz	3	-25.975	-19	Pass
256-QAM Modulation				
Low Channel, 1937.5 MHz	1	-22.38	-19	Pass
Low Channel, 1937.5 MHz	2	-26.47	-19	Pass
Low Channel, 1937.5 MHz	3	-26.44	-19	Pass
High Channel, 1987.5 MHz	1	-24.7	-19	Pass
High Channel, 1987.5 MHz	2	-25.9	-19	Pass
High Channel, 1987.5 MHz	3	-26.31	-19	Pass
20 MHz Bandwdith				
QPSK Modulation				
Low Channel, 1940 MHz	1	-22.4	-19	Pass
Low Channel, 1940 MHz	2	-25.13	-19	Pass
Low Channel, 1940 MHz	3	-24.77	-19	Pass
High Channel, 1985 MHz	1	-21.44	-19	Pass
High Channel, 1985 MHz	2	-25.48	-19	Pass
High Channel, 1985 MHz	3	-26.03	-19	Pass
16-QAM Modulation				
Low Channel, 1940 MHz	1	-22.46	-19	Pass
Low Channel, 1940 MHz	2	-25.39	-19	Pass
Low Channel, 1940 MHz	3	-25.51	-19	Pass
High Channel, 1985 MHz	1	-21.08	-19	Pass
High Channel, 1985 MHz	2	-25.59	-19	Pass
High Channel, 1985 MHz	3	-26.29	-19	Pass
64-QAM Modulation				
Low Channel, 1940 MHz	1	-21.56	-19	Pass
Low Channel, 1940 MHz	2	-25.08	-19	Pass
Low Channel, 1940 MHz	3	-24.67	-19	Pass
High Channel, 1985 MHz	1	-21.18	-19	Pass
High Channel, 1985 MHz	2	-25.57	-19	Pass
High Channel, 1985 MHz	3	-26.18	-19	Pass
256-QAM Modulation				
Low Channel, 1940 MHz	1	-20.72	-19	Pass
Low Channel, 1940 MHz	2	-24.93	-19	Pass
Low Channel, 1940 MHz	3	-24.83	-19	Pass
High Channel, 1985 MHz	1	-19.71	-19	Pass
High Channel, 1985 MHz	2	-25.54	-19	Pass
High Channel, 1985 MHz	3	-26.2	-19	Pass



Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, QPSK Modulation , Low Channel, 1932.5 MHz
Frequency
Range
Value (dBm) Limit (dBm) Result
-20.54 -19 Pass



Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, QPSK Modulation , Low Channel, 1932.5 MHz										
	Frequency									
	Range			Value (dBm)	Limit (dBm)	Result				
	2			-19.53	-19	Pass				





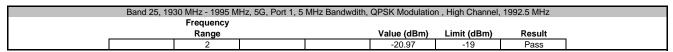
Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, QPSK Modulation , Low Channel, 1932.5 MHz
Frequency
Range Value (dBm) Limit (dBm) Result
3 -22.11 -19 Pass

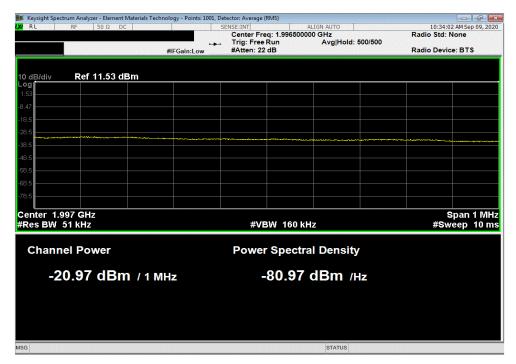


	Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, QPSK Modulation , High Channel, 1992.5 MHz										
		Frequency									
_		Range			Value (dBm)	Limit (dBm)	Result				
i í		1			-20.55	-19	Pass				

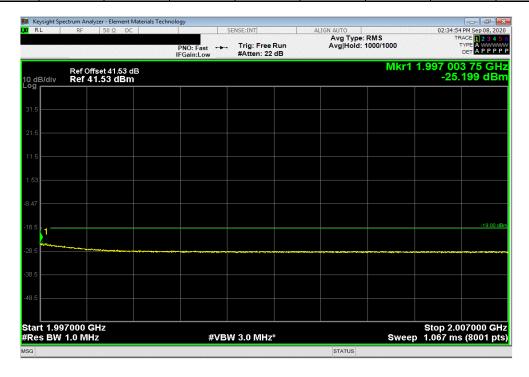








Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, QPSK Modulation , High Channel, 1992.5 MHz										
	Frequency									
	Range			Value (dBm)	Limit (dBm)	Result				
	3			-25.2	-19	Pass				



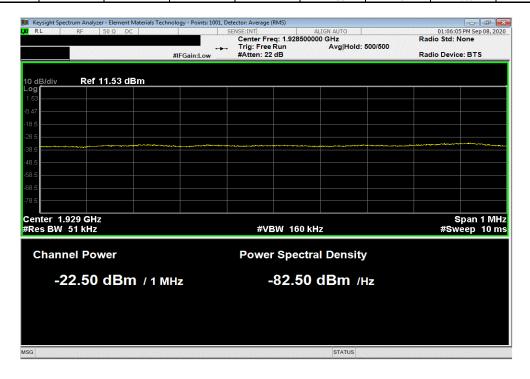


Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, 16-QAM Modulation, Low Channel, 1932.5 MHz



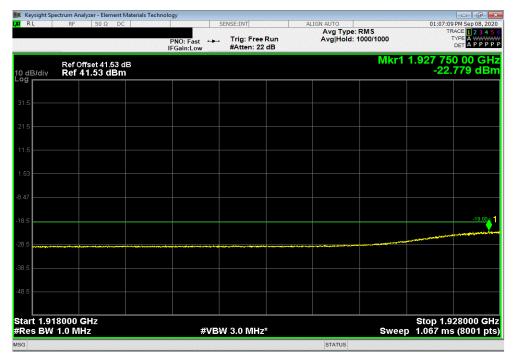


	Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, 16-QAM Modulation, Low Channel, 1932.5 MHz									
		Frequency								
_		Range			Value (dBm)	Limit (dBm)	Result			
I		2			-22.50	-19	Pass			





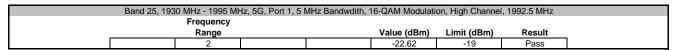
	Band 25, 193	80 MHz - 1995 MF	Hz, 5G, Port 1, 5	MHz Bandwdith,	16-QAM Modulati	on, Low Channel	, 1932.5 MHz	
		Frequency						
_		Range			Value (dBm)	Limit (dBm)	Result	
ĺ		3			-22.78	-19	Pass	



	Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, 16-QAM Modulation, High Channel, 1992.5 MHz										
		Frequency									
_		Range			Value (dBm)	Limit (dBm)	Result				
l		1			-20.32	-19	Pass				

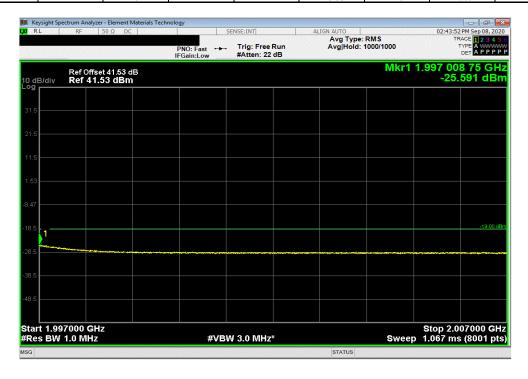








	Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, 16-QAM Modulation, High Channel, 1992.5 MHz										
		Frequency									
_		Range			Value (dBm)	Limit (dBm)	Result				
l		3			-25.59	-19	Pass				



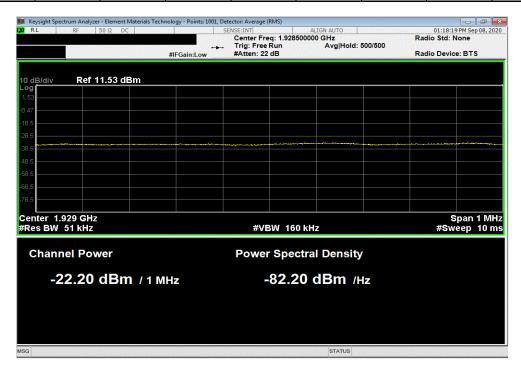


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	Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, 64-QAM Modulation, Low Channel, 1932.5 MHz											
Frequency												
		Range			Value (dBm)	Limit (dBm)	Result					
		1			-21.23	-19	Pass					

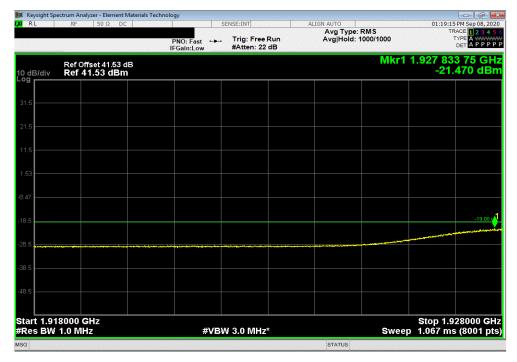


Band 25, 193	30 MHz - 1995 MH	Hz, 5G, Port 1, 5	MHz Bandwdith,	64-QAM Modulati	on, Low Channel	, 1932.5 MHz			
Frequency									
Range Value (dBm) Limit (dBm) Result									
	2			-22.20	-19	Pass			





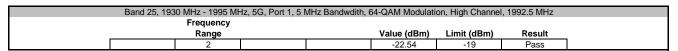
	Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, 64-QAM Modulation, Low Channel, 1932.5 MHz										
	Frequency										
_	Value (dBm)	Limit (dBm)	Result								
1		3			-21.47	-19	Pass				

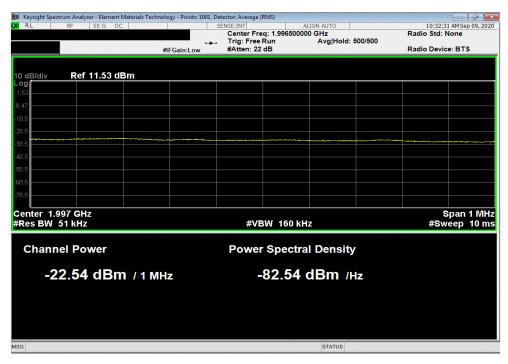


	Band 25, 193	30 MHz - 1995 MH	lz, 5G, Port 1, 5 I	MHz Bandwdith, 6	64-QAM Modulati	on, High Channel	l, 1992.5 MHz			
Frequency										
	Range Value (dBm) Limit (dBm) Result									
		1			-21.44	-19	Pass			

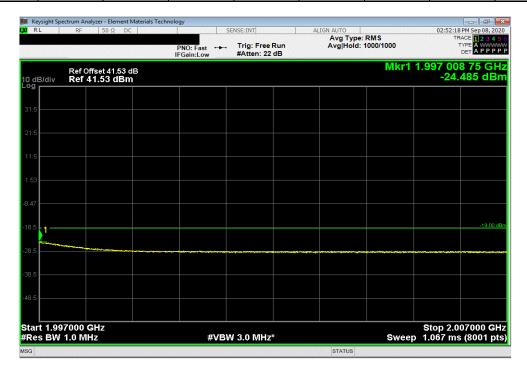






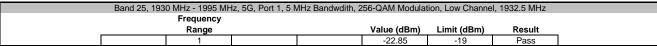


	Band 25, 193	0 MHz - 1995 MF	lz, 5G, Port 1, 5 I	MHz Bandwdith, 6	64-QAM Modulati	on, High Channel	, 1992.5 MHz			
	Frequency									
_	Range Value (dBm) Limit (dBm) Result									
ĺ		3	•		-24.49	-19	Pass			



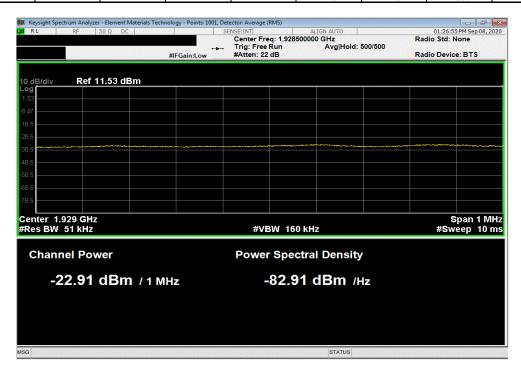


Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1932.5 MHz Frequency





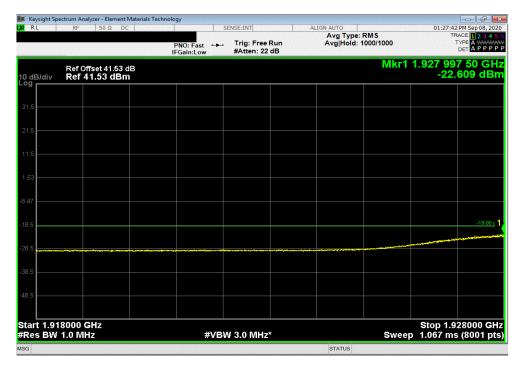
	Band 25, 193	0 MHz - 1995 MH	lz, 5G, Port 1, 5 N	/IHz Bandwdith, 2	256-QAM Modulat	tion, Low Channe	l, 1932.5 MHz			
Frequency										
Range Value (dBm) Limit (dBm) Result										
		2			-22.91	-19	Pass			





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	Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1932.5 MHz									
Frequency										
	Range					Limit (dBm)	Result			
		3			-22.61	-19	Pass			

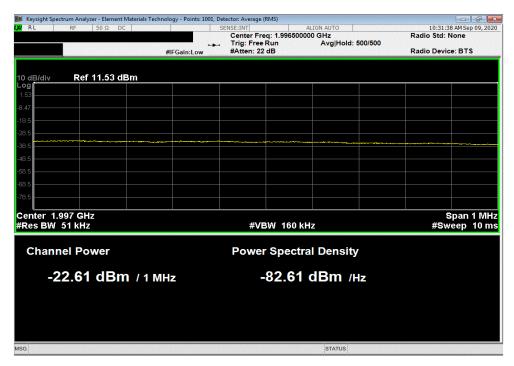


	Band 25, 1930	0 MHz - 1995 MH	z, 5G, Port 1, 5 N	1Hz Bandwdith, 2	56-QAM Modulat	ion, High Channe	el, 1992.5 MHz			
	Frequency									
_		Range			Value (dBm)	Limit (dBm)	Result			
l		1			-19.72	-19	Pass			





Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 5 MHz Bandwdith, 256-QAM Modulation, High Channel, 1992.5 MHz
Frequency
Range
Value (dBm) Limit (dBm) Result
2 -22.61 -19 Pass



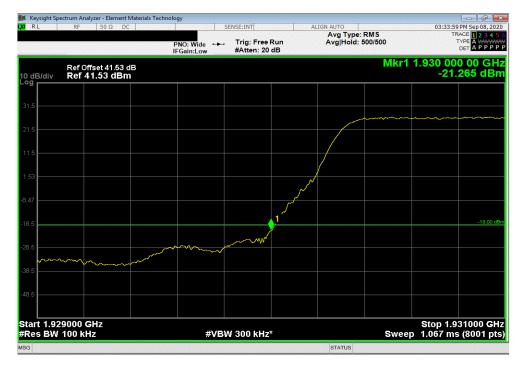
	Band 25, 1930	0 MHz - 1995 MH	z, 5G, Port 1, 5 N	1Hz Bandwdith, 2	56-QAM Modulat	ion, High Channe	el, 1992.5 MHz			
	Frequency									
_		Range			Value (dBm)	Limit (dBm)	Result			
ſ		3			-24.46	-19	Pass			



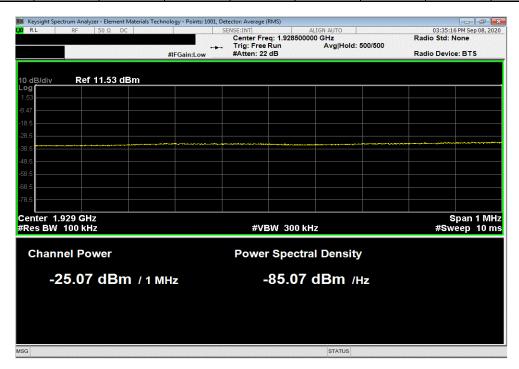


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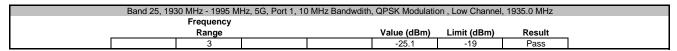
	Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 10 MHz Bandwdith, QPSK Modulation , Low Channel, 1935.0 MHz										
Frequency											
	Range						Result				
		1			-21.27	-19	Pass				

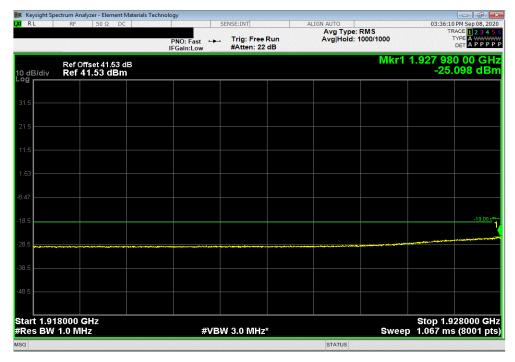


Band 25, 193	30 MHz - 1995 MI	Hz, 5G, Port 1, 10	) MHz Bandwdith	, QPSK Modulation	on, Low Channel	, 1935.0 MHz
	Frequency					
	Range			Value (dBm)	Limit (dBm)	Result
	2			-25.07	-19	Pass







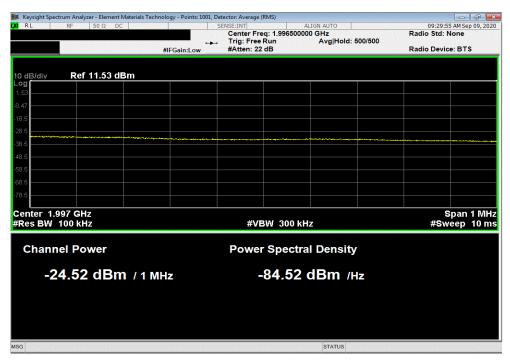


	Band 25, 19	30 MHz - 1995 M	Hz, 5G, Port 1, 1	0 MHz Bandwdith	n, QPSK Modulati	on, High Channe	el, 1990 MHz				
	Frequency										
_	Range Value (dBm) Limit (dBm) Result										
[		1			-22.88	-19	Pass				

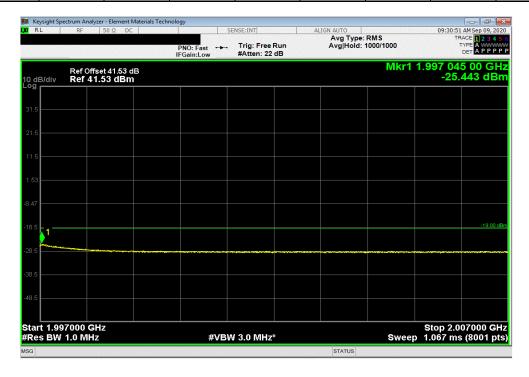




	Band 25, 19	30 MHz - 1995 M	Hz, 5G, Port 1, 1	0 MHz Bandwdith	, QPSK Modulati	on , High Channe	l, 1990 MHz	
_		Range			Value (dBm)	Limit (dBm)	Result	
l		2			-24.52	-19	Pass	



Band 25, 19	30 MHz - 1995 M	Hz, 5G, Port 1, 1	0 MHz Bandwdith	n, QPSK Modulati	ion, High Channe	el, 1990 MHz
	Frequency					
	Range			Value (dBm)	Limit (dBm)	Result
	3			-25.44	-19	Pass





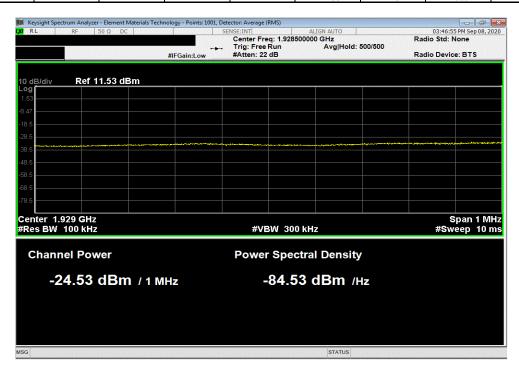
Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 10 MHz Bandwdith, 16-QAM Modulation, Low Channel, 1935.0 MHz

Frequency
Range
Value (dBm) Limit (dBm) Result

1 -20.82 -19 Pass



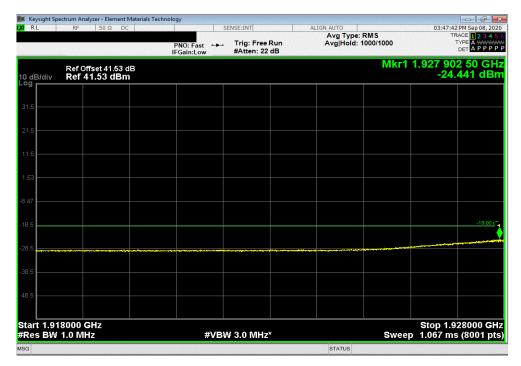
	Band 25, 193	0 MHz - 1995 MH	z, 5G, Port 1, 10	MHz Bandwdith,	16-QAM Modulat	ion, Low Channe	l, 1935.0 MHz
		Frequency					
_		Range			Value (dBm)	Limit (dBm)	Result
		2			-24.53	-19	Pass





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Band 25, 193	0 MHz - 1995 MH	z, 5G, Port 1, 10	MHz Bandwdith,	16-QAM Modulat	ion, Low Channe	l, 1935.0 MHz
	Frequency					
	Range			Value (dBm)	Limit (dBm)	Result
	3			-24.44	-19	Pass

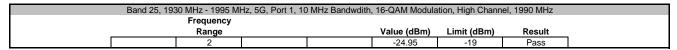


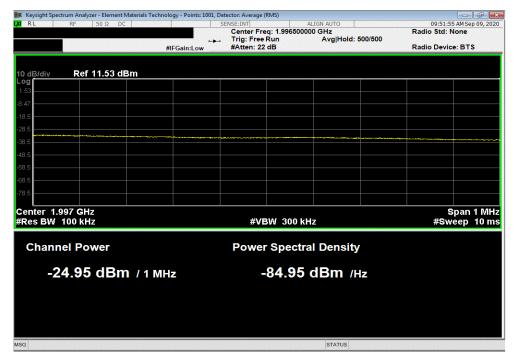
Band 25, 193	30 MHz - 1995 MH	Hz, 5G, Port 1, 10	) MHz Bandwdith	, 16-QAM Modula	ition, High Chann	el, 1990 MHz	
	Frequency						
	Range			Value (dBm)	Limit (dBm)	Result	
	1			-22.08	-19	Pass	



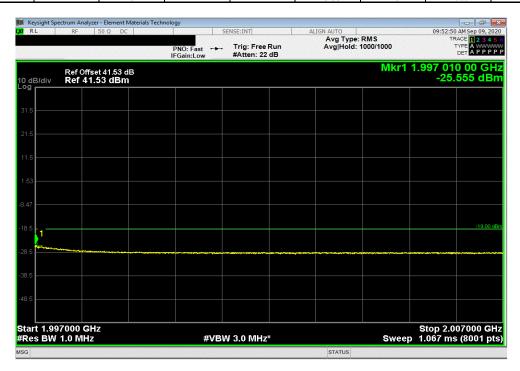


TbtTx 2020.09 08.0 BETA XMI: 2020.09.25.0





	Band 25, 193	30 MHz - 1995 MH	Hz, 5G, Port 1, 10	) MHz Bandwdith	, 16-QAM Modula	ition, High Chann	el, 1990 MHz	
		Frequency						
_		Range			Value (dBm)	Limit (dBm)	Result	
l		3			-25.56	-19	Pass	1





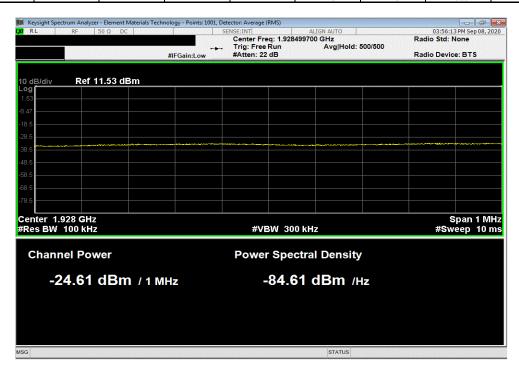
Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 10 MHz Bandwdith, 64-QAM Modulation, Low Channel, 1935.0 MHz

Frequency
Range
Value (dBm) Limit (dBm) Result

1 -21.18 -19 Pass



	Band 25, 193	0 MHz - 1995 MH	lz, 5G, Port 1, 10	MHz Bandwdith,	64-QAM Modulat	tion, Low Channe	l, 1935.0 MHz	
		Frequency						
		Range			Value (dBm)	Limit (dBm)	Result	
l		2			-24.61	-19	Pass	

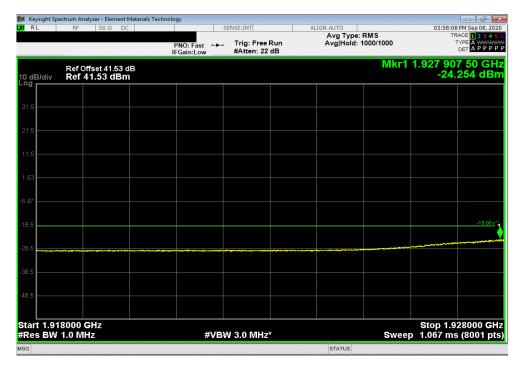




Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 10 MHz Bandwdith, 64-QAM Modulation, Low Channel, 1935.0 MHz

Frequency
Range
Value (dBm) Limit (dBm) Result

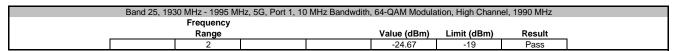
3 -24.25 -19 Pass

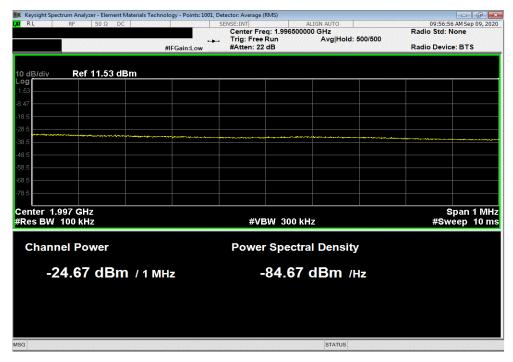


	Band 25, 193	30 MHz - 1995 MH	Hz, 5G, Port 1, 10	MHz Bandwdith	, 64-QAM Modula	ition, High Chann	el, 1990 MHz	
		Frequency						
		Range			Value (dBm)	Limit (dBm)	Result	
i		1			-20.52	-19	Pass	

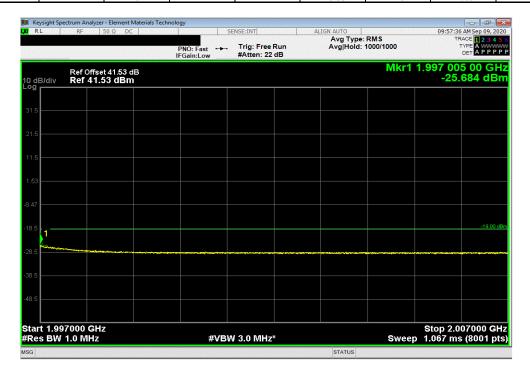








	Band 25, 193	30 MHz - 1995 MH	dz, 5G, Port 1, 10	) MHz Bandwdith	, 64-QAM Modula	ition, High Chann	el, 1990 MHz	
		Frequency						
_		Range			Value (dBm)	Limit (dBm)	Result	
[		3	<u> </u>		-25.68	-19	Pass	

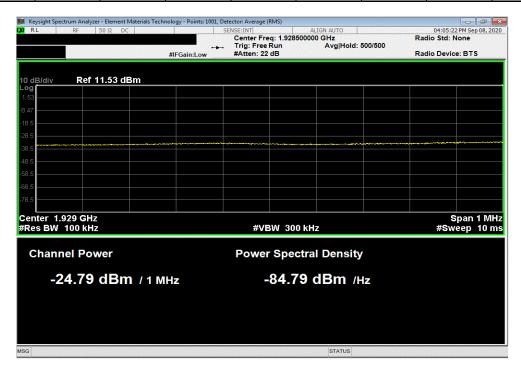




Band 25, 1930	MHz - 1995 MH:	z, 5G, Port 1, 10	MHz Bandwdith,	256-QAM Modula	tion, Low Channe	el, 1935.0 MHz	
	Frequency						
	Range			Value (dBm)	Limit (dBm)	Result	
	1			-20.22	-19	Pass	

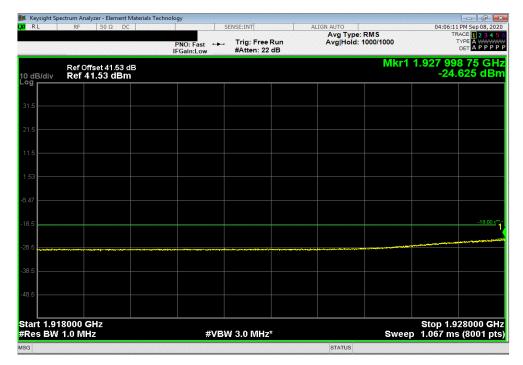


Band 25, 1930	) MHz - 1995 MH:	z, 5G, Port 1, 10	MHz Bandwdith, 2	256-QAM Modula	tion, Low Channe	el, 1935.0 MHz
	Frequency					
	Range			Value (dBm)	Limit (dBm)	Result
	2			-24.79	-19	Pass





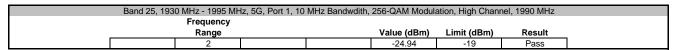
Band 25, 1930	) MHz - 1995 MH:	z, 5G, Port 1, 10	MHz Bandwdith, 2	256-QAM Modula	tion, Low Channe	el, 1935.0 MHz	
	Frequency						
	Range			Value (dBm)	Limit (dBm)	Result	
	3			-24.63	-19	Pass	

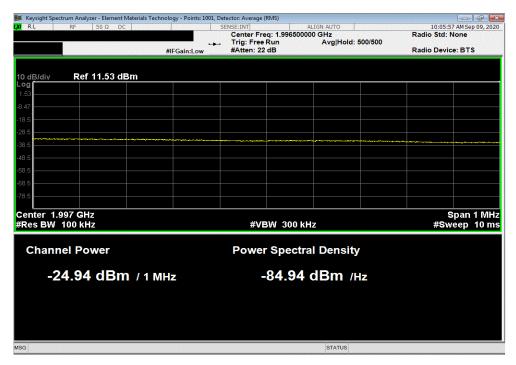


Band 25, 193	0 MHz - 1995 MH	lz, 5G, Port 1, 10	MHz Bandwdith,	256-QAM Modula	ation, High Chanr	nel, 1990 MHz
	Frequency					
	Range			Value (dBm)	Limit (dBm)	Result
	1			-20.39	-19	Pass









Band 25, 1930 MHz - 1995 MHz, 5G, Port 1, 10 MHz Bandwdith, 256-QAM Modulation, High Channel, 1990 MHz							
		Frequency					
Range					Value (dBm)	Limit (dBm)	Result
		3			-25.56	-19	Pass

