Radio Test Report
Application for a Class II Permissive Change of Equipment Authorization
FCC Part 24 and IC RSS-133
[1930MHz – 1990MHz]

FCC ID: VBNFXFC-01
IC ID: 661W-FXFC

Nokia Solutions and Networks
Flexi MultiRadio Base Transceiver Station Radio Frequency Module
Model: FXFC

Report: NOKI0029, Issue Date: May 12, 2021

NVLAP LAB CODE: 201049-0

CERTIFICATE OF TEST

Last Date of Test: April 28, 2021
Nokia Solutions and Networks
EUT: FXFC (FCC/ISED C2PC)

Radio Equipment Testing

Standards

Specification	Method
Code of Federal Regulations (CFR) Title 47 Part 2 (Radio Standards Specification) RSS-Gen Issue 5 CFR Title 47 Part 24 Subpart E – Broadband PCS RSS-133 Issue 6 - January 18, 2018 – 2GHz Personal Communications Services	ANSI C63.26-2015 with FCC KDB 971168 D01 v03r01 FCC KDB 662911D01 v02r01 FCC KDB 662911D02 v01

Results

Test Description	Applied	Results	Comments
Occupied Bandwidth	Yes	Pass	
Frequency Stability	No	N/A	Not requested.
Output Power	Yes	Pass	
Peak to Average Power (PAPR)CCDF	Yes	Pass	
Band Edge Compliance	Yes	Pass	
Spurious Conducted Emissions	Yes	Pass	
Spurious Radiated Emissions	No	N/A	Not requested.
Power Spectral Density and EIRP Calculation	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Adam Bruno, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

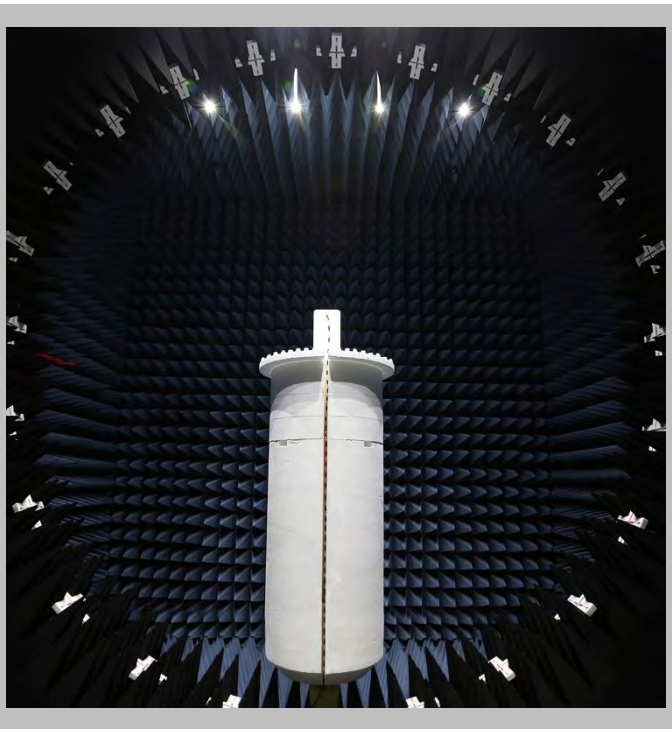
SCOPE

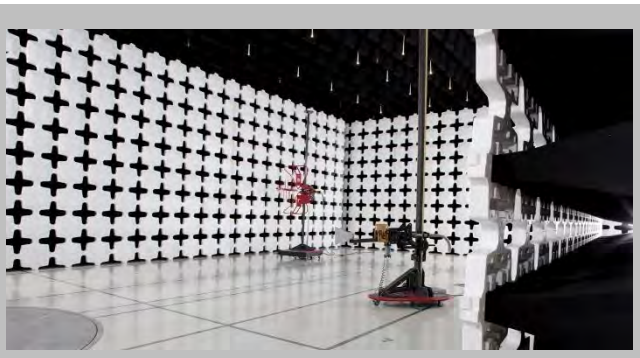
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

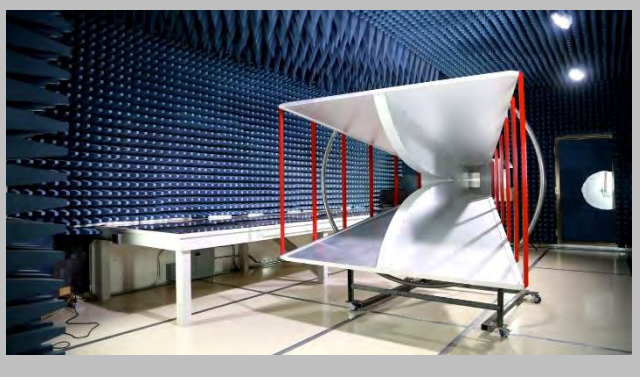
FACILITIES

element
2020.12.15

California	Minnesota	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP				
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

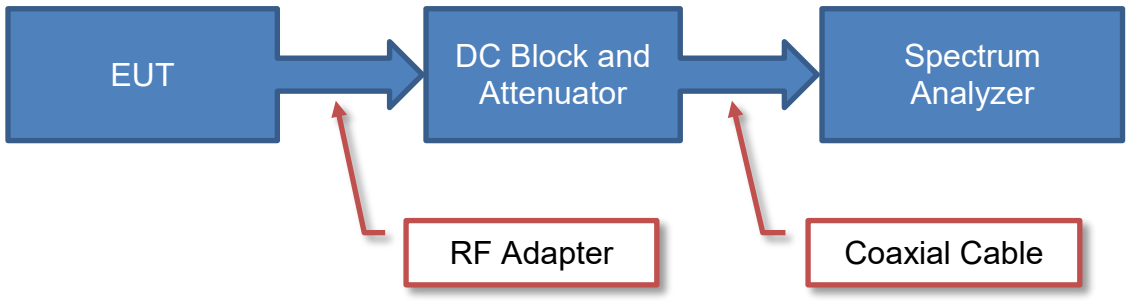
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

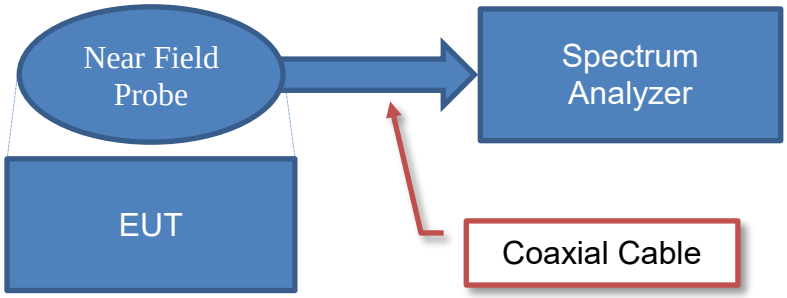
Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.1 dB	-5.1 dB
AC Powerline Conducted Emissions (dB)	2.6 dB	-2.6 dB

Test Setup Block Diagrams

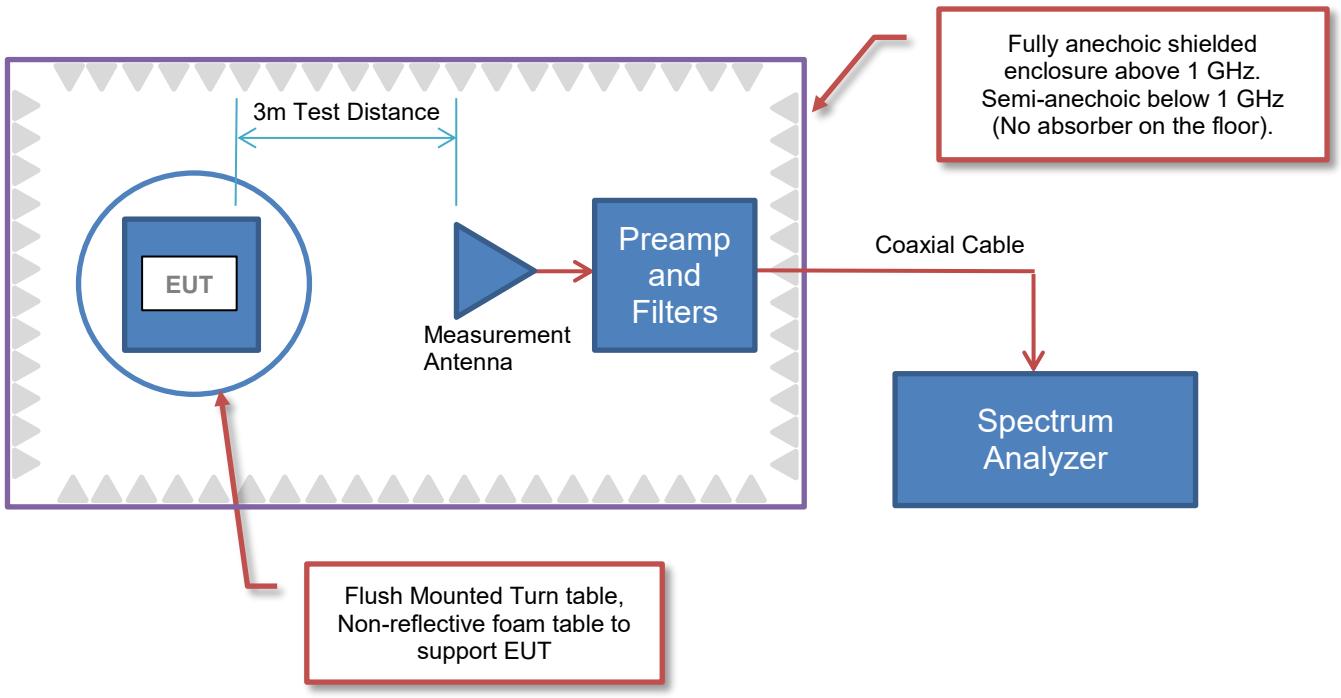
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



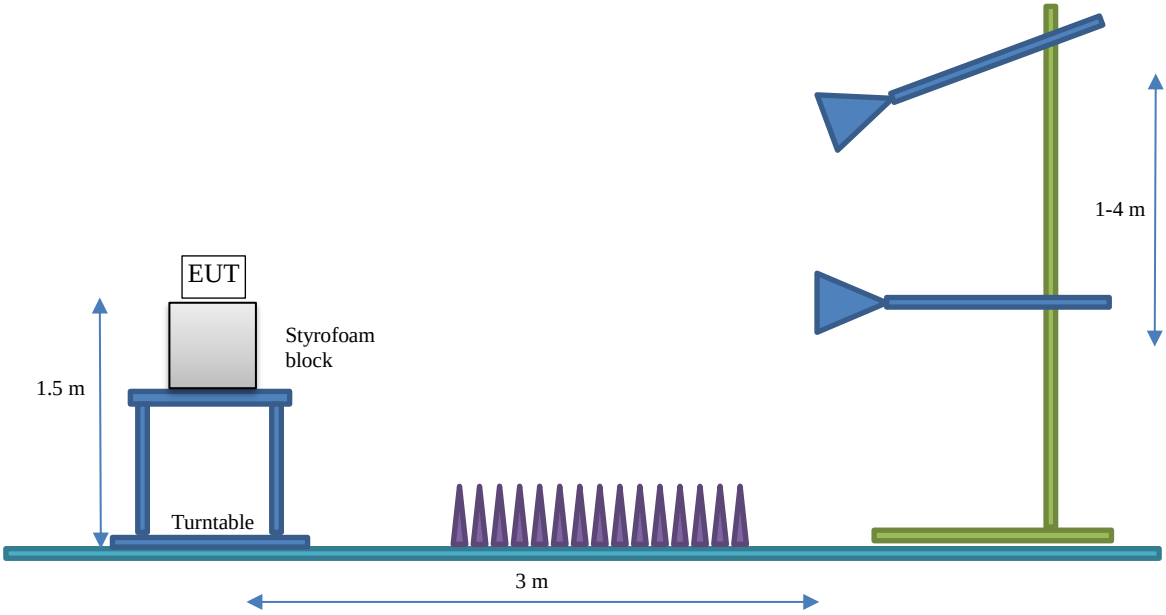
Spurious Radiated Emissions



Test Setup Block Diagrams

Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Nokia Solutions and Networks
Address:	3201 Olympus Blvd
City, State, Zip:	Dallas, TX 75019
Test Requested By:	Steve Mitchell
EUT:	Flexi MultiRadio Base Transceiver Station Radio Frequency Module Model FXFC
First Date of Test:	April 27, 2021
Last Date of Test:	April 28, 2021
Receipt Date of Samples:	April 27, 2021
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

A class II permissive change on the original filing is being pursued to add 5G NR (new radio) carriers to the Flexi MultiRadio Base Transceiver Station Radio Frequency Module Model FXFC FCC_ISED radio certifications.

The previous radio certifications can be found under FCC ID: VBNFXFC-01 and IC ID: 661W-FXFC. The previous test effort includes testing for GSM/EDGE, WCDMA and LTE technologies. Please refer to the previous certification test reports for details on all required testing.

All conducted RF testing performed for the original certification testing has been repeated using 5G NR carriers for this class II permissive change per correspondence/guidance from Nemko TCB. The same test methodology used in the original certification testing was used in this class II permissive change test effort. 5G NR carrier bandwidths of 5MHz, 10MHz, 15MHz and 20MHz with QPSK, 16QAM, 64QAM and 256QAM modulation types were verified under this effort. Tests performed under the class II change effort include RF power, CCDF, PSD, emission bandwidth (99% and 26 dB down), band edge spurious emissions, and conducted spurious emissions. The 5G NR carriers/modulation types for this testing are setup according to 3GPP TS 38.141-1 Test Models and are NR-FR1-TM 1.1 (QPSK modulation type), NR-FR1-TM 3.2 (16QAM modulation type), NR-FR1-TM 3.1 (64QAM modulation type), and NR-FR1-TM 3.1a (256QAM modulation type).

The testing was performed on the same hardware version (FXFC) as the previous certification testing. The base station and remote radio head software for this testing is an updated release that includes 5G NR carrier support.

The radiated emissions and frequency stability measurements performed in the original certification were not repeated under this effort per TCB guidance. The radiated emission and frequency stability/accuracy results from the original certification had enough margin to preclude requiring additional testing. The same frequency stability/accuracy radio design is the same for all radio technologies/modulation types.
The equipment under test (EUT) is a Nokia Solutions and Networks Flexi MultiRadio Base Transceiver Station Radio Frequency Module Model FXFC. The FXFC radio frequency module (RFM) is a multi-standard multi-carrier radio module designed to support GSM/EDGE, WCDMA, LTE and 5G NR FDD operations. **The scope of testing in this effort is for 5G NR FDD Single Carrier operations.** Multicarrier operations will be performed under a separate effort.

The FXFC RFM has three transmit/six receive antenna ports (3Tx/6Rx). Each transmit antenna port (1, 3, 5) has a maximum power output of 80 watts. The FXFC (using multiple FXFCs) can be operated as a 4x4 MIMO, 2x2 MIMO or as non-MIMO. The FXFC operates over 3GPP frequency band n2 (BTS Rx: 1850 to 1910 MHz/BTS Tx: 1930 to 1990 MHz). The TX and RX instantaneous bandwidth cover the full operational RRH bandwidth. The RRH supports 5, 10, 15 and 20MHz 5G NR bandwidths. The RRH supports four 5G NR downlink

modulation types (QPSK, 16QAM, 64QAM and 256QAM).

The RRH has external interfaces including DC power (DC In), ground, transmit/receive (ANT), external alarm (EAC), optical (OPT), receive monitor (RXO) and remote electrical tilt (RET). The RRH with applicable installation kit may be pole, wall, cabinet or stack mounted.

The FXFC 5G NR channel bandwidths are 5, 10, 15 and 20MHz. The downlink channel numbers and frequencies are provided below.

	Downlink 5G NR NR-ARFCN	Downlink Frequency (MHz)	5G NR Channel Bandwidth			
			5 MHz	10 MHz	15 MHz	20 MHz
FXFC Band n2 (Ant 1, 3, 5)	386000	1930.0	Lower Band Edge			
	386500	1932.5	Bottom Ch			
	387000	1935.0		Bottom Ch		
	387500	1937.5			Bottom Ch	
	388000	1940.0				Bottom Ch
	392000	1960.0	Middle Ch	Middle Ch	Middle Ch	Middle Ch
	396000	1980.0				Top Channel
	396500	1982.5			Top Channel	
	397000	1985.0		Top Channel		
	397500	1987.5	Top Channel			
	398000	1990.0	Upper Band Edge			

FXFC Downlink Band Edge 5G NR Band n2 Frequency Channels

PRODUCT DESCRIPTION

FXFC Connector Layout

EUT External Interfaces

Name	Qty	Connector Type	Purpose (and Description)
DC In	1	Screw Terminal	Power Input -48 VDC
GND	1	Screw lug (2xM5)	Ground
ANT	6	7/16	RF signal for three Transmitter/Receiver (50 Ohm) and three Receive Only (50 Ohm)
RXO	6	QMA	RX output for monitoring
EAC	1	RJ45	External Alarm Interface (4 alarms)
RET	1	8-pin circular	AISG 2.0 to external devices
OPT	3	SFP+ cage	Optical OBSAI Interface (3 Gbps)

Testing Objective:

A class II permissive change on the original filing is being pursued to add 5G NR (new radio) carriers to the Flexi MultiRadio Base Transceiver Station Radio Frequency Module Model FXFC FCC and ISED radio certifications.

CONFIGURATIONS

Configuration NOKI0029- 1

Software/Firmware Running during test	
Description	**Version**
5G BTS Software Version	5G21B_GNB_0000_000800_003950
RF_SW	VEG21.03.R02

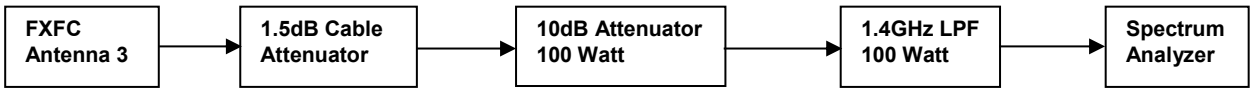
Equipment being tested (include Peripherals)			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AMIA (BTS System Module)	Nokia Solutions and Networks	473098A.102	J8173107703
MDEA (Mobile Fronthaul Switch)	Nokia Solutions and Networks	473922A.102	6Q202306254
ASIK (5G BTS System Module)	Nokia Solutions and Networks	474021A.102	EA194259377
ABIL (5G BTS Baseband Module)	Nokia Solutions and Networks	474020A.102	L1183300437
FXFC (Radio Frequency Module Model)	Nokia Solutions and Networks	472679A.101	1M152245671
Low Pass Filter 1.4GHz/100W	Microwave Circuits,Inc.	L13502G1	SN2454-01
Attenuator 100W/10dB	Weinschel Corp	48-10-43-LIM	BJ1771
SFP28 + 9.8G,70M,850NM (RADIO)	Nokia	474900A.101	VF20180016Z
SFP28 + 9.8G,70M,850NM (MDEA)	Nokia	474900A.101	VF2023004CF
SFP28 + 9.8G,70M,850NM (MDEA)	Nokia	474900A.101	VF2023003TA
SFP28 + 9.8G,70M,850NM (BS)	Nokia	474900A.101	VF20180015T
ThinkPad T490 (WebEM- PC)	Lenovo	20N3S88012	PF26RVZ0
HP- DC System power supply (Radio)	HP	6032A	3440A-10308
FPAC (DC-PWR supply-BS)	Nokia	472805A.X21	A9124600282
APAF (DC-PWR supply-MDEA)	Nokia	474676A.X21	A9183050057
2 Meter RF cable (Load)	Huber + Suhner, Inc.	HS-SUCOFLEX_106	SN297385
2 Meter RF cable (Load)	Huber + Suhner, Inc.	HS-SUCOFLEX_106	SN297389
250W -50ohm -Terminating Load	API Weinschel inc	1433-3-LIM	TV066
250W -50ohm -Terminating Load	API Weinschel inc	1433-3-LIM	TC870
Fiber Optic cable 2m	RG	994807D	270410
Fiber Optic cable 2m	Amphenol Fiber Optic	VZ1701	995741A
GPS Receiver Cable	Nokia	995426C	CA2029
Cat-5e cable	CSA	E151955	LL79189
6 Meter RF cable (3x2 Meter RF cable)	Huber + Suhner, Inc.	HS-SUCOFLEX_106	SN297372 SN297373 SN297374
1 Meter RF cable	Huber + Suhner, Inc.	HS-SUCOFLEX_104	SN551432/4

CONFIGURATIONS

Cables (Peripheral)					
Description	**Shield (Y/N)**	**Length (m)**	**Ferrite (Y/N)**	**Connection 1**	**Connection 2**
Fiber Optic cable	N	2 meters	N	ABIL	MDEA
Fiber Optic cable	N	2 meters	N	MDEA	FXFC
GPS Receiver Cable	Y	100 meters	N	ASIK	FYGB GPS receiver
Cat-5e cable	Y	7 meters	N	ASIK	WebEM- PC
RD Microwave Systems – RF CABLES	Y	2 meters	N	EUT [FXFC] Ant ports 1, 5	250W -50ohm - Load

Cables					
Description	**Shield (Y/N)**	**Length (m)**	**Ferrite (Y/N)**	**Connection 1**	**Connection 2**
HS-SUCOFLEX_106 1.5dB cable attenuator	Y	6 meters	N	EUT [FXFC] Ant port #3	Attenuator 100W/10dB
Attenuator 100W/10dB	N	NA	N	RF cable HS-SUCOFLEX_106	Low Pass filter 1.4G/100W
Low Pass Filter 1.4G/100W	N	NA	N	Attenuator 100W/10dB	RF cable HS-SUCOFLEX_104
HS-SUCOFLEX_104	Y	1 meter	N	Low Pass Filter 1.4G/100W	Analyzer

RF Test Setup Diagram:



CONFIGURATIONS

Configuration NOKI0029- 2

Software/Firmware Running during test	
Description	**Version**
5G BTS Software Version	5G21B_GNB_0000_000800_003950
RF_SW	VEG21.03.R02

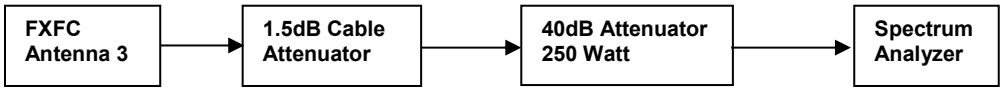
Equipment being tested (include Peripherals)			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AMIA (BTS System Module)	Nokia Solutions and Networks	473098A.102	J8173107703
MDEA (Mobile Fronthaul Switch)	Nokia Solutions and Networks	473922A.102	6Q202306254
ASIK (5G BTS System Module)	Nokia Solutions and Networks	474021A.102	EA194259377
ABIL (5G BTS Baseband Module)	Nokia Solutions and Networks	474020A.102	L1183300437
FXFC (Radio Frequency Module Model)	Nokia Solutions and Networks	472679A.101	1M152245671
Attenuator 250W/40dB	API Weinschel	58-40-43-LIM	TC909
SFP28 + 9.8G,70M,850NM (RADIO)	Nokia	474900A.101	VF20180016Z
SFP28 + 9.8G,70M,850NM (MDEA)	Nokia	474900A.101	VF2023004CF
SFP28 + 9.8G,70M,850NM (MDEA)	Nokia	474900A.101	VF2023003TA
SFP28 + 9.8G,70M,850NM (BS)	Nokia	474900A.101	VF20180015T
ThinkPad T490 (WebEM- PC)	Lenovo	20N3S88012	PF26RVZ0
HP- DC System power supply (Radio)	HP	6032A	3440A-10308
FPAC (DC-PWR supply-BS)	Nokia	472805A.X21	A9124600282
APAF (DC-PWR supply-MDEA)	Nokia	474676A.X21	A9183050057
2 Meter RF cable (Load Cable)	Huber + Suhner, Inc.	HS-SUCOFLEX_106	SN297385
2 Meter RF cable (Load Cable)	Huber + Suhner, Inc.	HS-SUCOFLEX_106	SN297389
250W -50ohm -Terminating Load	API Weinschel inc	1433-3-LIM	TV066
250W -50ohm -Terminating Load	API Weinschel inc	1433-3-LIM	TC870
Fiber Optic cable 2m	RG	994807D	270410
Fiber Optic cable 2m	Amphenol Fiber Optic	VZ1701	995741A
GPS Receiver Cable	Nokia	995426C	CA2029
Cat-5e cable	CSA	E151955	LL79189
6 Meter RF cable (3x2 Meter RF cable)	Huber + Suhner, Inc.	HS-SUCOFLEX_106	SN297372 SN297373 SN297374
1 Meter RF cable	Huber + Suhner, Inc.	HS-SUCOFLEX_104	SN551432/4

CONFIGURATIONS

Cables (Peripheral)					
Description	**Shield (Y/N)**	**Length (m)**	**Ferrite (Y/N)**	**Connection 1**	**Connection 2**
Fiber Optic cable	N	2 meters	N	ABIL	MDEA
Fiber Optic cable	N	2 meters	N	MDEA	FXFC
GPS Receiver Cable	Y	100 meters	N	ASIK	FYGB GPS receiver
Cat-5e cable	Y	7 meters	N	ASIK	WebEM- PC
RD Microwave Systems – RF CABLES	Y	2 meters	N	EUT [FXFC] Ant ports 1, 5	250W -50ohm - Load

Cables					
Description	**Shield (Y/N)**	**Length (m)**	**Ferrite (Y/N)**	**Connection 1**	**Connection 2**
HS-SUCOFLEX_106 1.5dB cable attenuator	Y	6 meters	N	EUT [FXFC] Ant port #3	Attenuator 250W/40dB
Attenuator 250W/40dB	N	NA	N	RF cable HS-SUCOFLEX_106	RF cable HS-SUCOFLEX_104
HS-SUCOFLEX_104	Y	1 meter	N	Attenuator 250W/40dB	Analyzer

RF Test Setup Diagram:



CONFIGURATIONS

Configuration NOKI0029- 3

Software/Firmware Running during test	
Description	**Version**
5G BTS Software Version	5G21B_GNB_0000_000800_003950
RF_SW	VEG21.03.R02

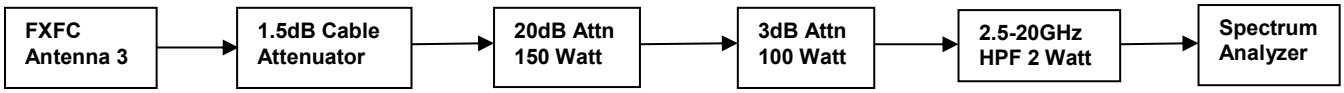
Equipment being tested (include Peripherals)			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AMIA (BTS System Module)	Nokia Solutions and Networks	473098A.102	J8173107703
MDEA (Mobile Fronthaul Switch)	Nokia Solutions and Networks	473922A.102	6Q202306254
ASIK (5G BTS System Module)	Nokia Solutions and Networks	474021A.102	EA194259377
ABIL (5G BTS Baseband Module)	Nokia Solutions and Networks	474020A.102	L1183300437
FXFC (Radio Frequency Module Model)	Nokia Solutions and Networks	472679A.101	1M152245671
High Pass Filter 2.5-20GHz/2W	RLC Electronics	F-100-3000-5-R	0028
Attenuator 150W/20dB	Aeroflex Weinschel	66-20-33	BZ2075
Attenuator 100W/3dB	Aeroflex Weinschel	47-3-33	CG5493
SFP28 + 9.8G,70M,850NM (RADIO)	Nokia	474900A.101	VF20180016Z
SFP28 + 9.8G,70M,850NM (MDEA)	Nokia	474900A.101	VF2023004CF
SFP28 + 9.8G,70M,850NM (MDEA)	Nokia	474900A.101	VF2023003TA
SFP28 + 9.8G,70M,850NM (BS)	Nokia	474900A.101	VF20180015T
ThinkPad T490 (WebEM- PC)	Lenovo	20N3S88012	PF26RVZ0
HP- DC System power supply (Radio)	HP	6032A	3440A-10308
FPAC (DC-PWR supply-BS)	Nokia	472805A.X21	A9124600282
APAF (DC-PWR supply-MDEA)	Nokia	474676A.X21	A9183050057
2 Meter RF cable (Load Cable)	Huber + Suhner, Inc.	HS-SUCOFLEX_106	SN297385
2 Meter RF cable (Load Cable)	Huber + Suhner, Inc.	HS-SUCOFLEX_106	SN297389
250W -50ohm -Terminating Load	API Weinschel inc	1433-3-LIM	TV066
250W -50ohm -Terminating Load	API Weinschel inc	1433-3-LIM	TC870
Fiber Optic cable 2m	RG	994807D	270410
Fiber Optic cable 2m	Amphenol Fiber Optic	VZ1701	995741A
GPS Receiver Cable	Nokia	995426C	CA2029
Cat-5e cable	CSA	E151955	LL79189
6 Meter RF cable (3x2 Meter RF cable)	Huber + Suhner, Inc.	HS-SUCOFLEX_106	SN297372 SN297373 SN297374
1 Meter RF cable	Huber + Suhner, Inc.	HS-SUCOFLEX_104	SN551432/4

CONFIGURATIONS

Cables (Peripheral)					
Description	**Shield (Y/N)**	**Length (m)**	**Ferrite (Y/N)**	**Connection 1**	**Connection 2**
Fiber Optic cable	N	2 meters	N	ABIL	MDEA
Fiber Optic cable	N	2 meters	N	MDEA	FXFC
GPS Receiver Cable	Y	100 meters	N	ASIK	FYGB GPS receiver
Cat-5e cable	Y	7 meters	N	ASIK	WebEM- PC
RD Microwave Systems – RF CABLES	Y	2 meters	N	EUT [FXFC] Ant ports 1, 5	250W -50ohm - Load

Cables					
Description	**Shield (Y/N)**	**Length (m)**	**Ferrite (Y/N)**	**Connection 1**	**Connection 2**
HS-SUCOFLEX_106 1.5dB cable attenuator	Y	6 meters	N	EUT [FXFC] RF port #3	Attenuator 150W/20dB
Attenuator 150W/20dB	N	NA	N	RF cable HS-SUCOFLEX_106	Attenuator 100W/3dB
Attenuator 100W/3dB	N	NA	N	Attenuator 150W/20dB	High Pass Filter 2.5-20GHz
High Pass Filter 2.5GHz/2W	N	NA	N	Attenuator 100W/3dB	RF cable HS-SUCOFLEX_104
HS-SUCOFLEX_104	Y	1 meter	N	High Pass Filter 2.5-20GHz/2W	Analyzer

RF Test Setup Diagram:



MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-04-27	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2021-04-27	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2021-04-27	Peak to Average Power (PAPR)CCDF	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2021-04-27	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2021-04-27	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2021-04-28	Power Spectral Density and EIRP Calculation	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

OCCUPIED BANDWIDTH

XMit 2020.12.30.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMM	2020-09-21	2021-09-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The method in section 5.4 of ANSI C63.26 was used to make this measurement. The spectrum analyzer settings were as follows:

- RBW is 1% - 5% of the occupied bandwidth
- VBW is ≥ 3x the RBW
- Peak Detector was used
- Trace max hold was used

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (FXFC) as the original certification test. The FXFC 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 3 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2i.

The occupied bandwidth was measured with the EUT configured in the modes called out in the data sheets.
FCC 24.238(b) defines he 26dB emission bandwidth requirement.
RSS GEN Section 6.7 defines the 99% emission bandwidth requirement.

FCC and ISED Emission Designators for Band n2 (1930MHz to 1990MHz)									
Ch BW	Radio Channel	5G-NR: QPSK		5G-NR: 16QAM		5G-NR: 64QAM		5G-NR: 256QAM	
		FCC	ISED	FCC	ISED	FCC	ISED	FCC	ISED
5MHz	Low							4M89G7W	4M51G7W
	Mid	4M86G7W	4M48G7W	4M84G7W	4M50G7W	4M86G7W	4M49G7W	4M84G7W	4M48G7W
	High							4M86G7W	4M49G7W
10MHz	Low							9M91G7W	9M31G7W
	Mid	9M89G7W	9M31G7W	9M82G7W	9M23G7W	9M96G7W	9M35G7W	9M94G7W	9M33G7W
	High							9M94G7W	9M31G7W
15MHz	Low							14M9G7W	14M1G7W
	Mid	14M9G7W	14M1G7W	14M9G7W	14M2G7W	15M0G7W	14M1G7W	14M8G7W	14M1G7W
	High							14M9G7W	14M1G7W
20MHz	Low							20M0G7W	19M0G7W
	Mid	20M0G7W	19M0G7W	19M9G7W	19M0G7W	20M0G7W	18M9G7W	20M0G7W	19M0G7W
	High							20M0G7W	19M0G7W

Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.

OCCUPIED BANDWIDTH

element

TbiTx 2019.08.30.0 XMit 2020.12.30.0

EUT:	FXFC (FCC/ISED C2PC)			Work Order:	NOKI0029
Serial Number:	1M152245671			Date:	27-Apr-21
Customer:	Nokia Solutions and Networks			Temperature:	22 °C
Attendees:	David Le, John Rattanavong			Humidity:	50.6% RH
Project:	None			Barometric Pres.:	1014 mbar
Tested by:	Brandon Hobbs	Power:	54 VDC	Job Site:	TX05

TEST SPECIFICATIONS	Test Method
FCC 24E:2021	ANSI C63.26:2015
RSS-133 Issue 6:2013+A1:2018	RSS-133 Issue 6:2013+A1:2018

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n2 carriers are enabled at maximum power (80 watts/carrier).

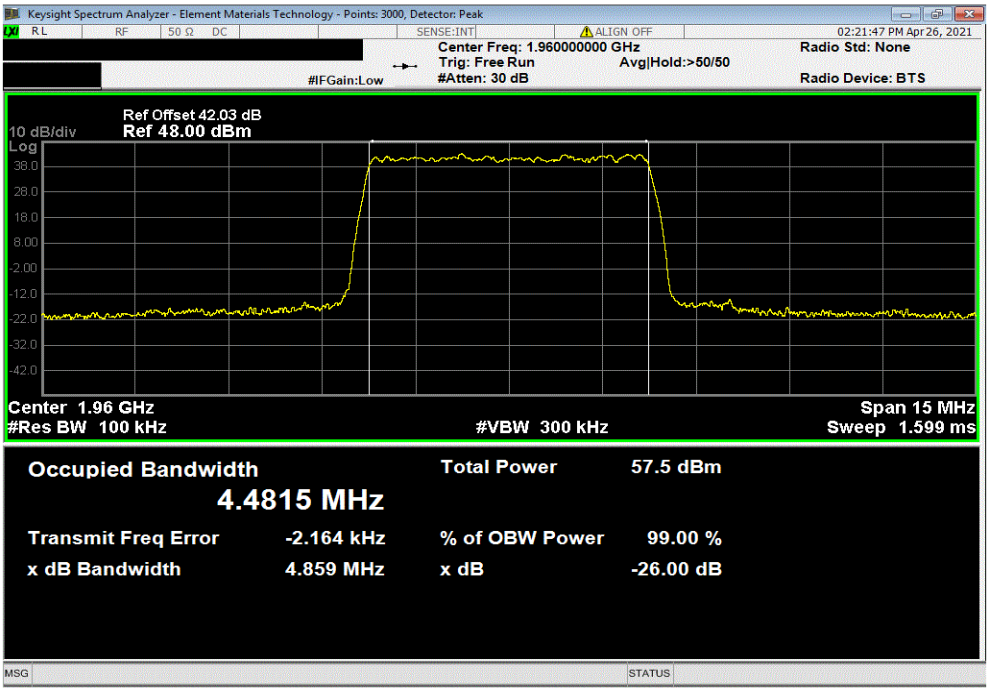
DEVIATIONS FROM TEST STANDARD

None

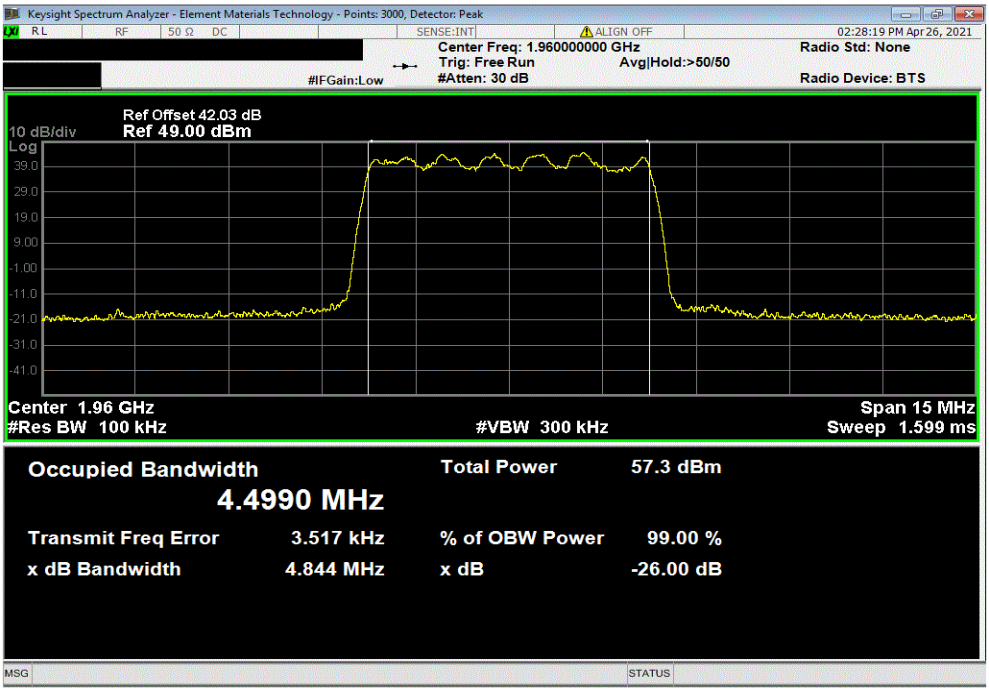
Configuration #	2	Signature

	Value 99% (MHz)	Value 26dB (MHz	Limit	Result
Band n2, 1930 MHz - 1990 MHz, 5G NR				
Port 3				
5 MHz Bandwdith				
QPSK Modulation				
Mid Channel, 1960 MHz	4.48	4.86	Within Band	Pass
16-QAM Modulation				
Mid Channel, 1960 MHz	4.50	4.84	Within Band	Pass
64-QAM Modulation				
Mid Channel, 1960 MHz	4.49	4.86	Within Band	Pass
256-QAM Modulation				
Low Channel, 1932.5 MHz	4.51	4.89	Within Band	Pass
Mid Channel, 1960 MHz	4.48	4.84	Within Band	Pass
High Channel, 1987.5 MHz	4.49	4.86	Within Band	Pass
10 MHz Bandwdith				
QPSK Modulation				
Mid Channel, 1960 MHz	9.31	9.89	Within Band	Pass
16-QAM Modulation				
Mid Channel, 1960 MHz	9.23	9.82	Within Band	Pass
64-QAM Modulation				
Mid Channel, 1960 MHz	9.35	9.96	Within Band	Pass
256-QAM Modulation				
Low Channel, 1935 MHz	9.31	9.91	Within Band	Pass
Mid Channel, 1960 MHz	9.33	9.94	Within Band	Pass
High Channel, 1985 MHz	9.31	9.94	Within Band	Pass
15 MHz Bandwdith				
QPSK Modulation				
Mid Channel, 1960 MHz	14.1	14.9	Within Band	Pass
16-QAM Modulation				
Mid Channel, 1960 MHz	14.2	14.9	Within Band	Pass
64-QAM Modulation				
Mid Channel, 1960 MHz	14.1	15.0	Within Band	Pass
256-QAM Modulation				
Low Channel, 1937.5 MHz	14.1	14.9	Within Band	Pass
Mid Channel, 1960 MHz	14.1	14.8	Within Band	Pass
High Channel, 1982.5 MHz	14.1	14.9	Within Band	Pass
20 MHz Bandwdith				
QPSK Modulation				
Mid Channel, 1960 MHz	19.0	20.0	Within Band	Pass
16-QAM Modulation				
Mid Channel, 1960 MHz	19.0	19.9	Within Band	Pass
64-QAM Modulation				
Mid Channel, 1960 MHz	18.9	20.0	Within Band	Pass
256-QAM Modulation				
Low Channel, 1940 MHz	19.0	20.0	Within Band	Pass
Mid Channel, 1960 MHz	19.0	20.0	Within Band	Pass
High Channel, 1980 MHz	19.0	20.0	Within Band	Pass

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			4.481	4.859	Within Band	Pass

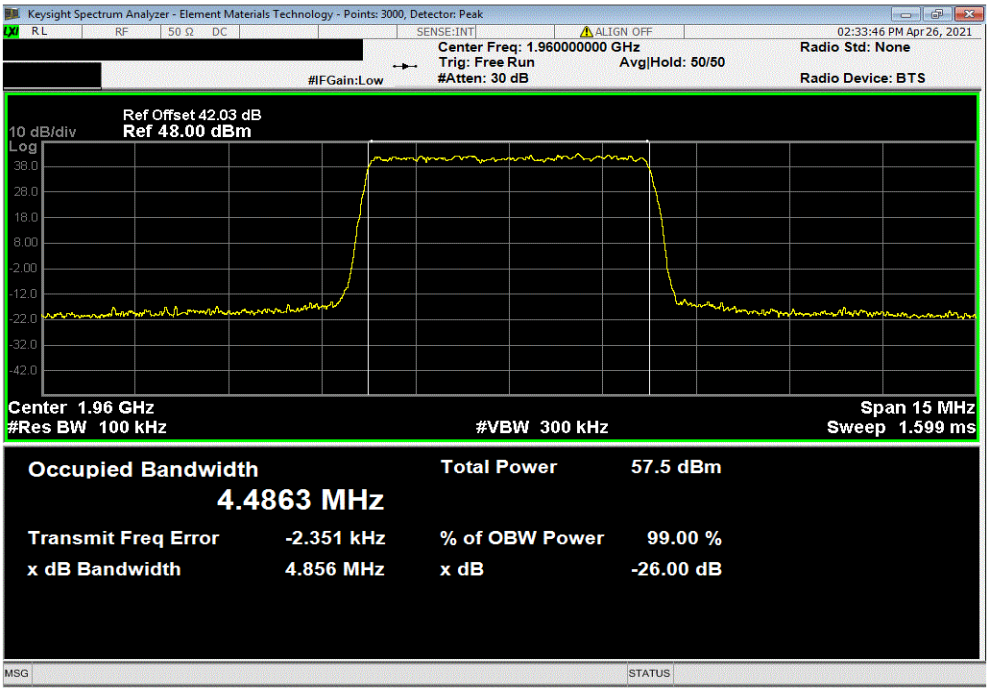


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			4.499	4.844	Within Band	Pass

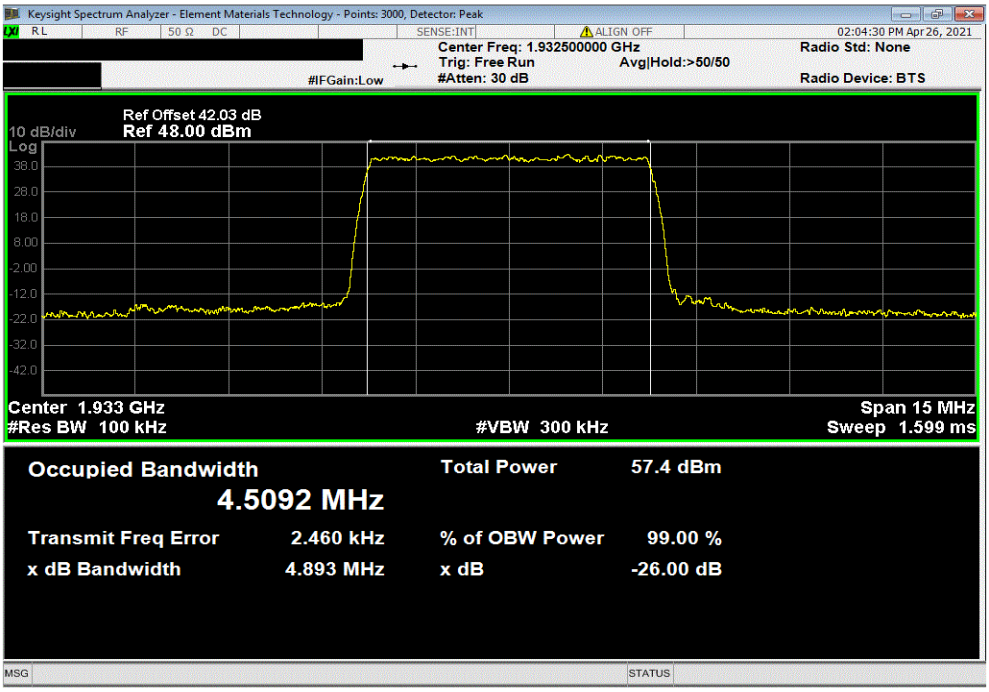


OCCUPIED BANDWIDTH

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			4.486	4.856	Within Band	Pass

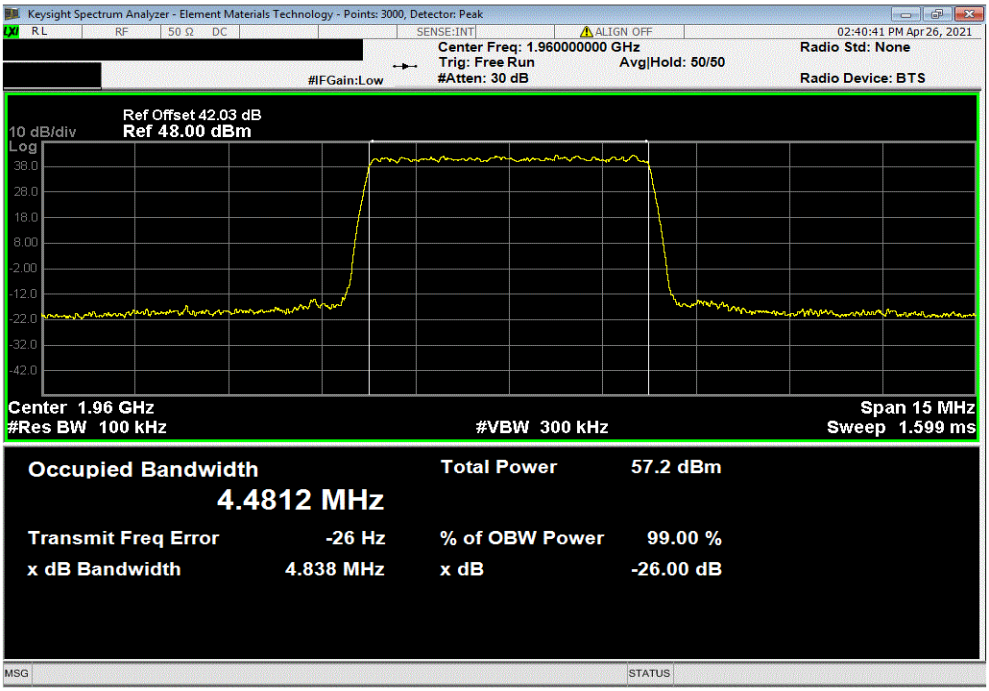


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1932.5 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			4.509	4.893	Within Band	Pass

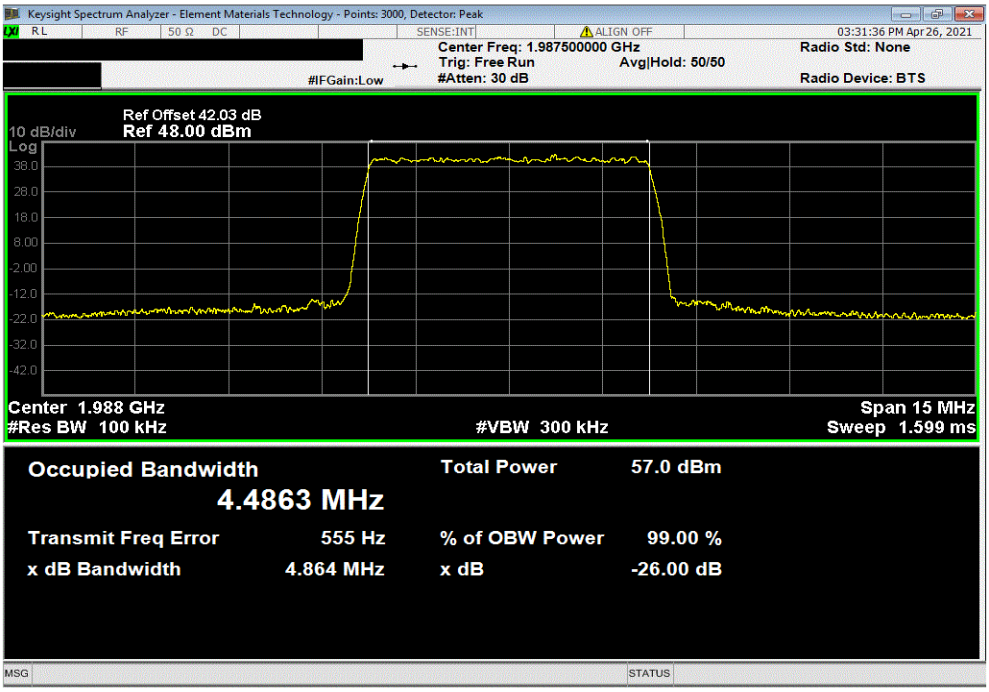


OCCUPIED BANDWIDTH

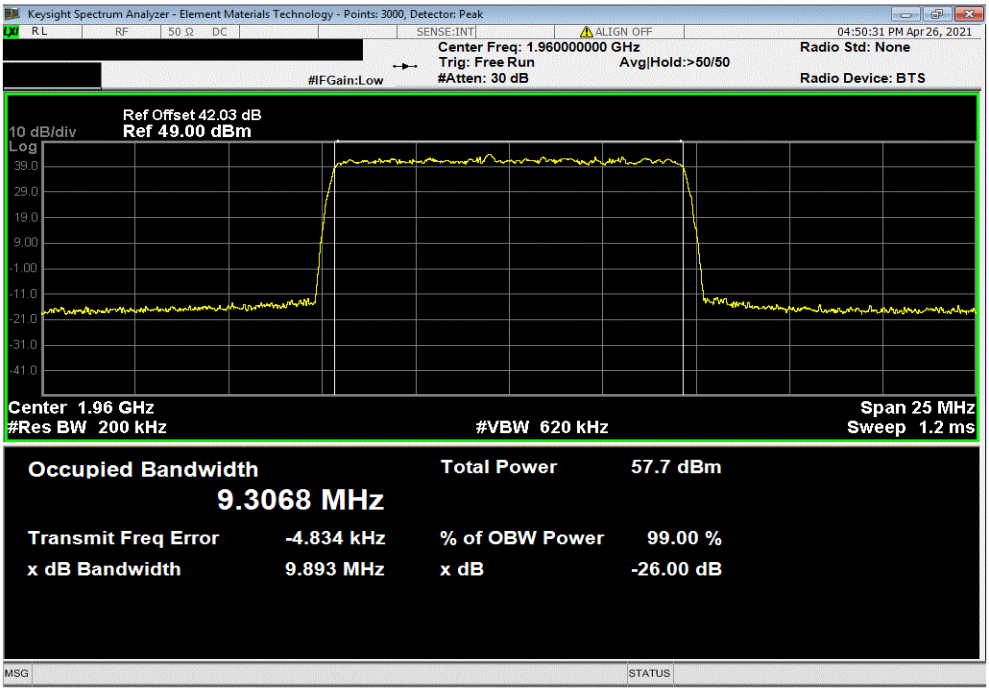
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			4.481	4.838	Within Band	Pass



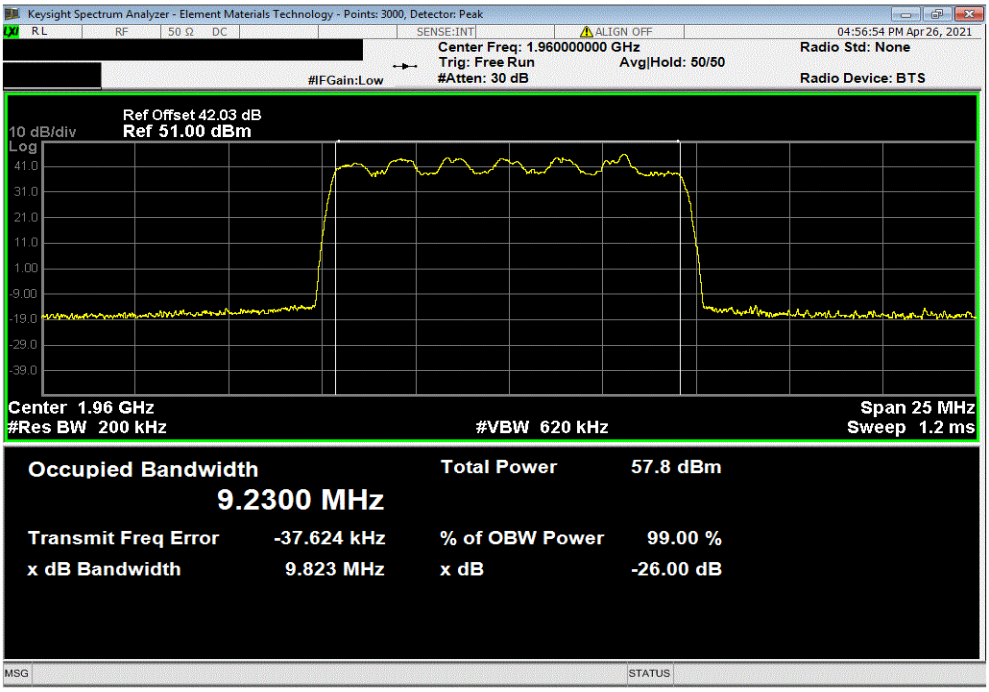
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, High Channel, 1987.5 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			4.486	4.864	Within Band	Pass



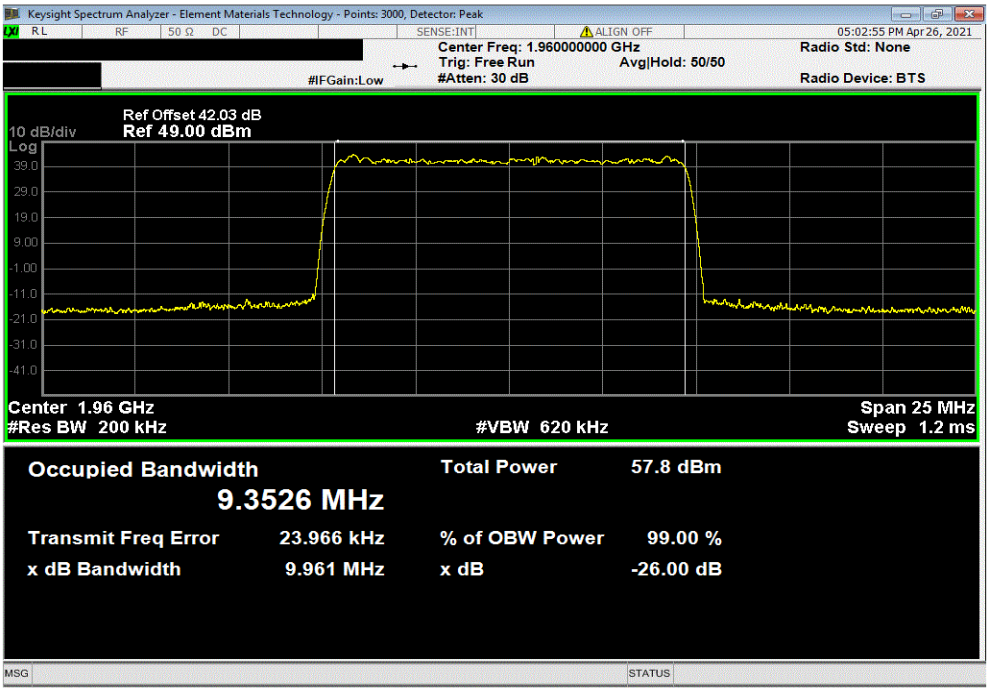
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			9.307	9.893	Within Band	Pass



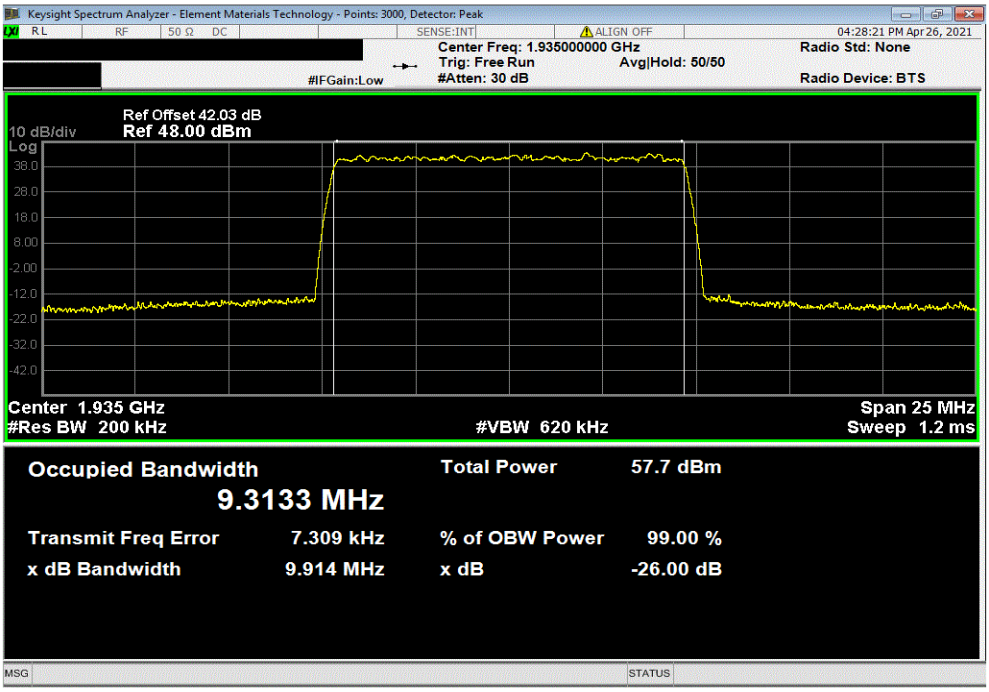
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			9.23	9.823	Within Band	Pass



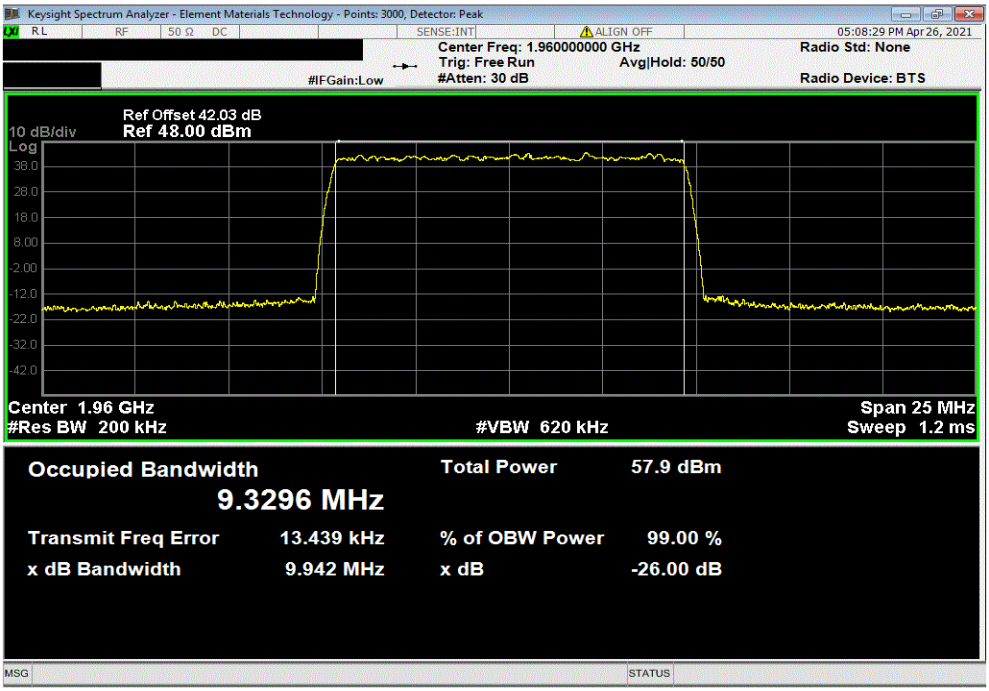
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			9.353	9.961	Within Band	Pass



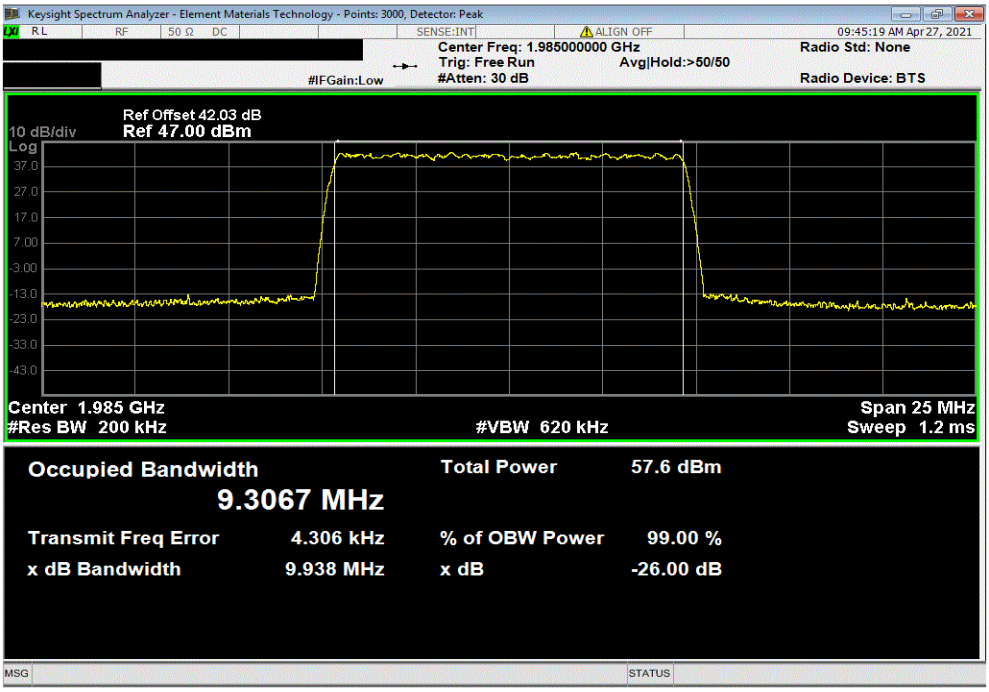
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1935 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			9.313	9.914	Within Band	Pass



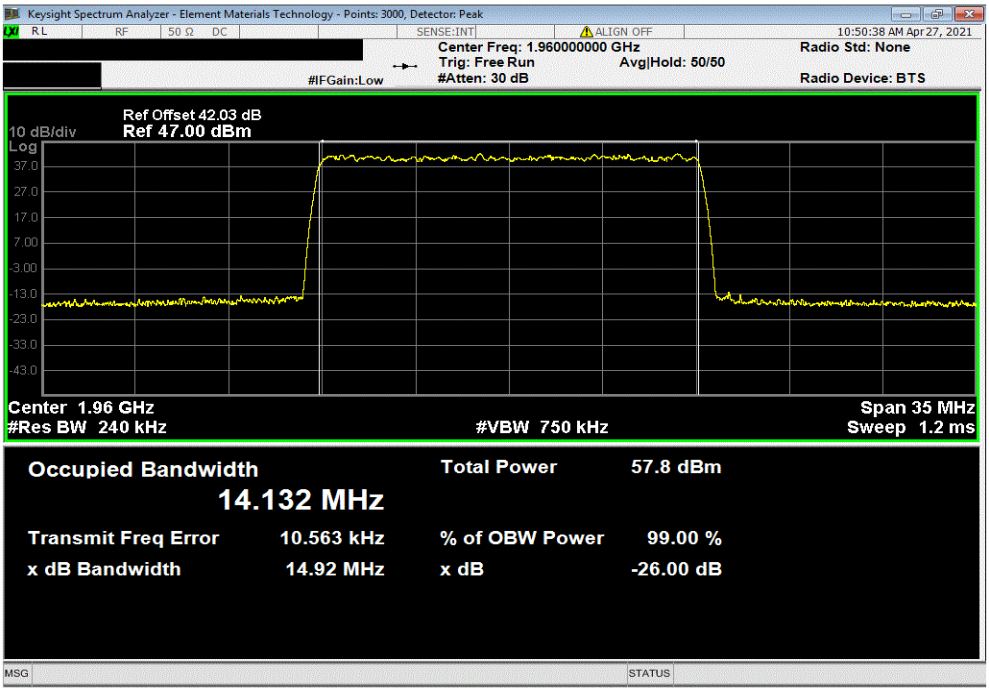
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			9.33	9.942	Within Band	Pass



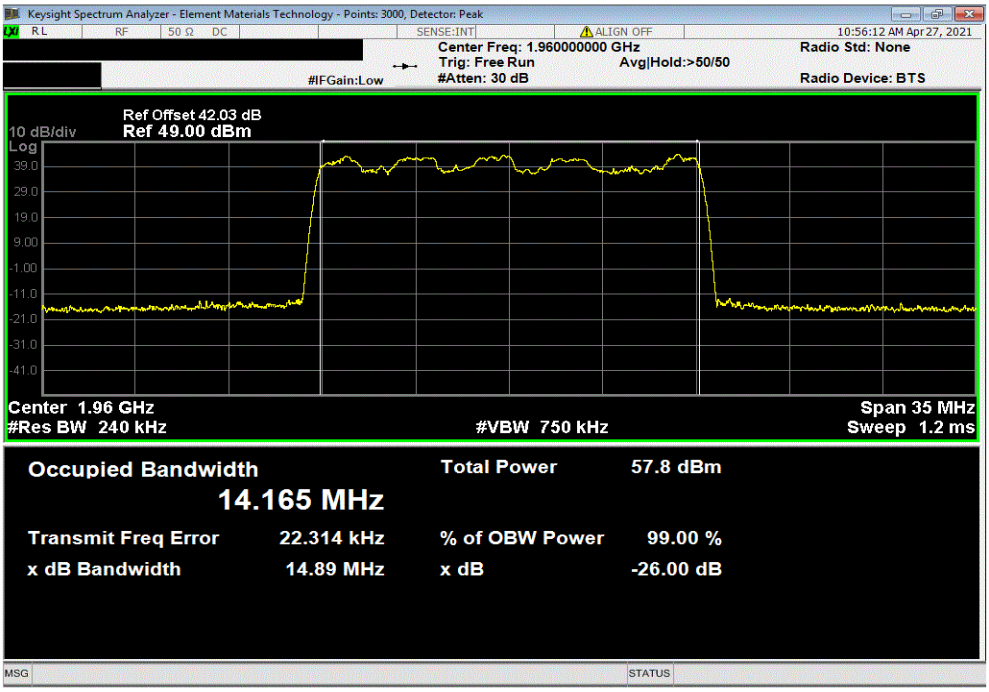
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, High Channel, 1985 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			9.307	9.938	Within Band	Pass



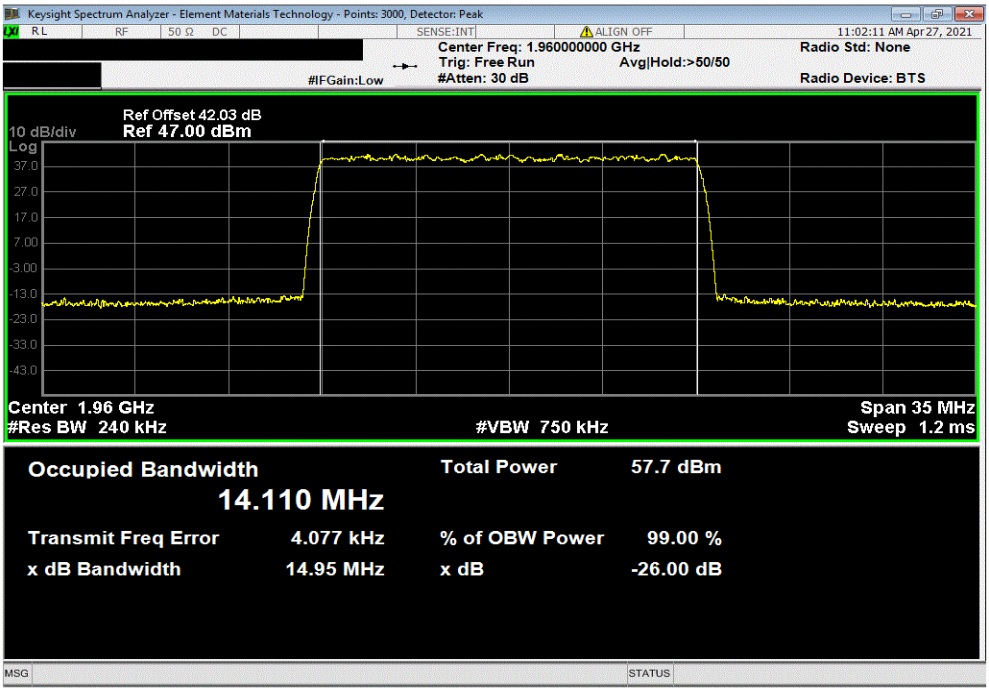
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			14.132	14.92	Within Band	Pass



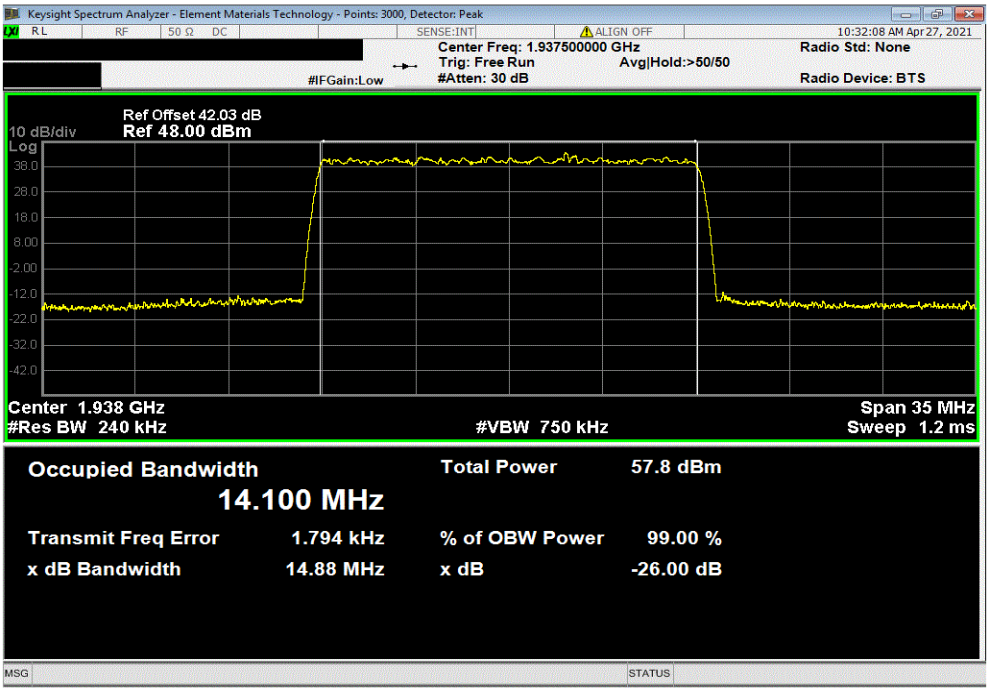
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			14.165	14.894	Within Band	Pass



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			14.11	14.955	Within Band	Pass

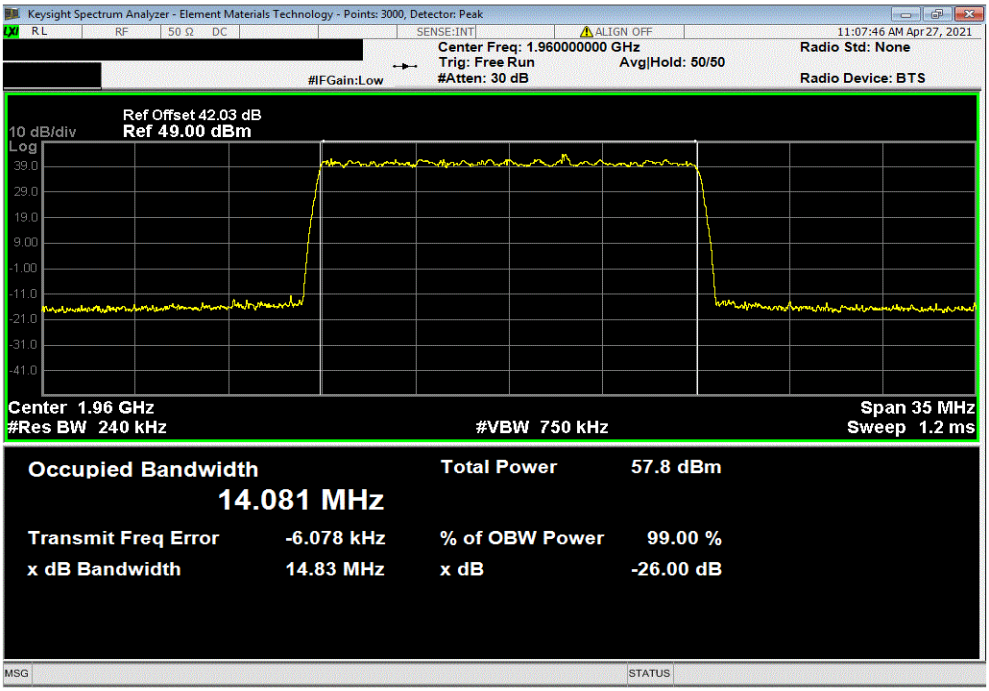


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1937.5 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			14.1	14.88	Within Band	Pass

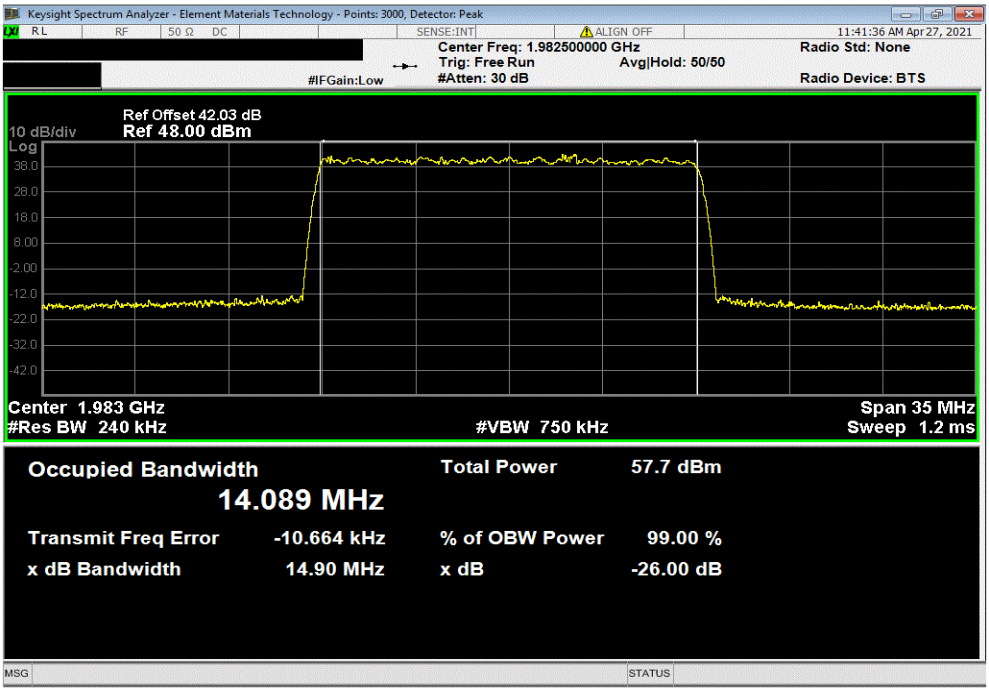


OCCUPIED BANDWIDTH

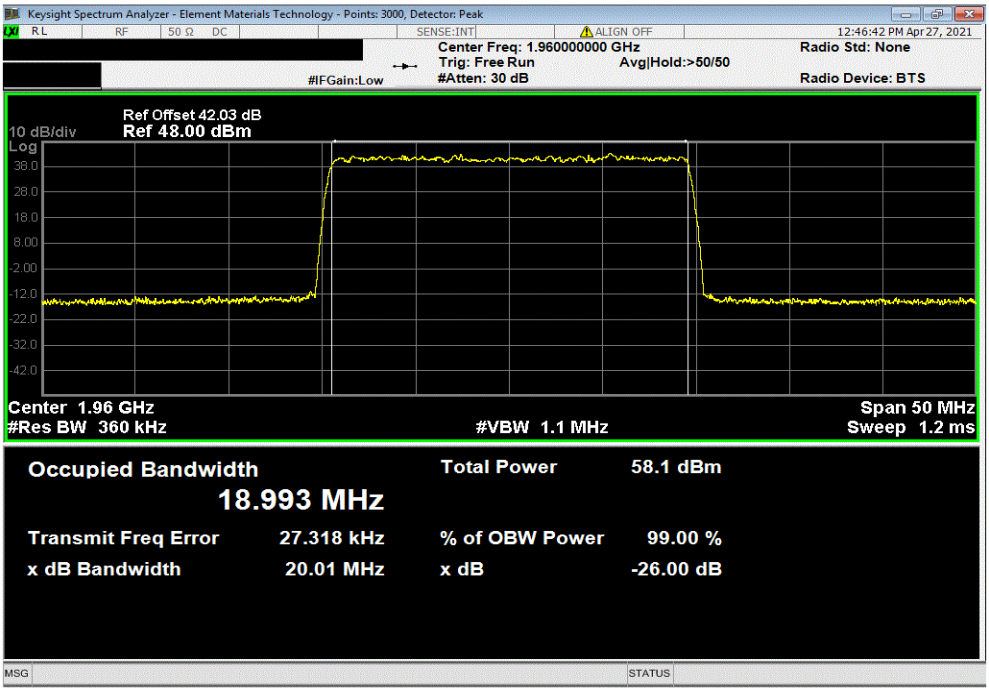
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			14.081	14.835	Within Band	Pass



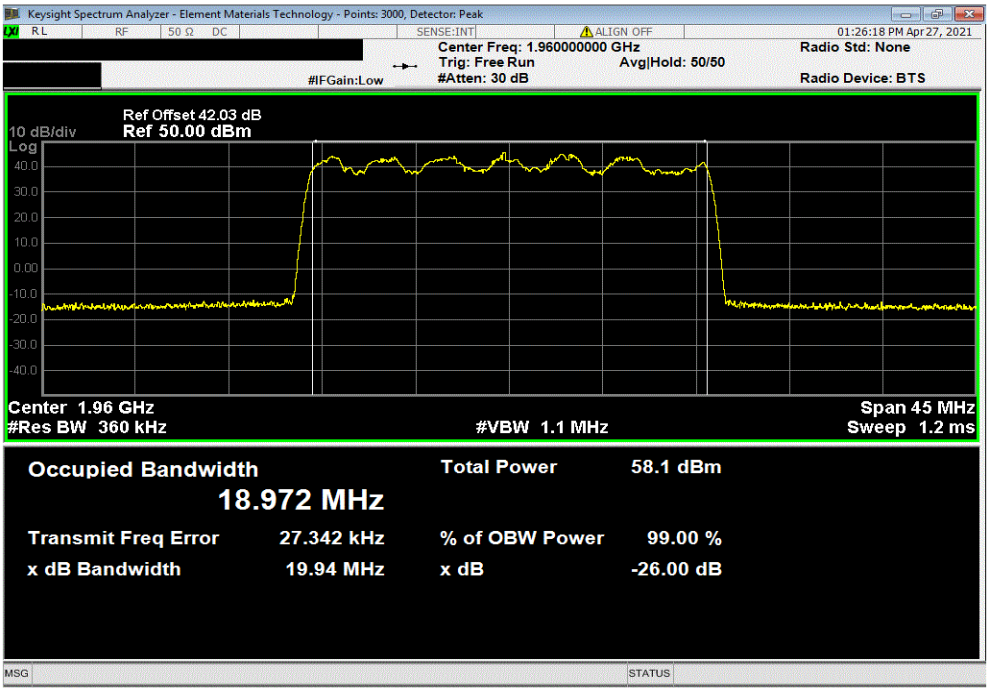
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, High Channel, 1982.5 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			14.089	14.902	Within Band	Pass



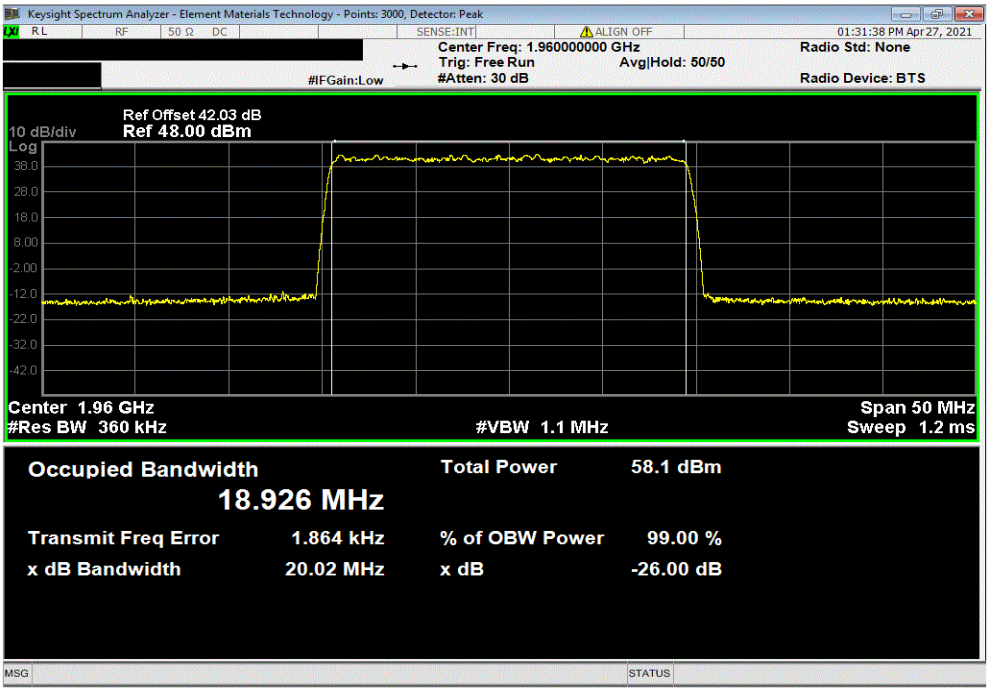
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			18.993	20.005	Within Band	Pass



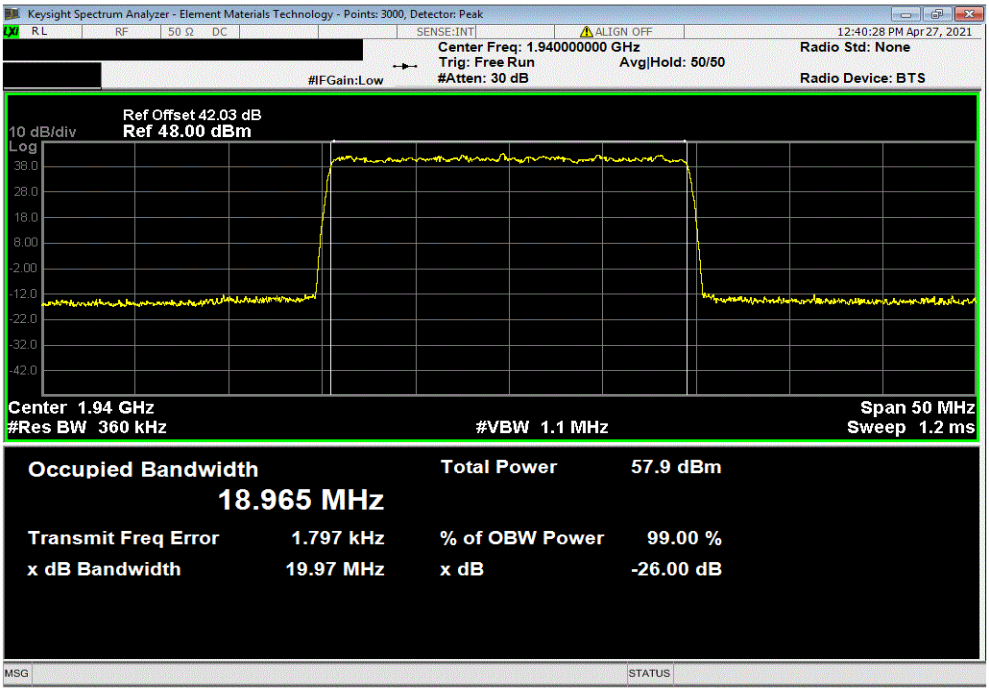
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			18.972	19.943	Within Band	Pass



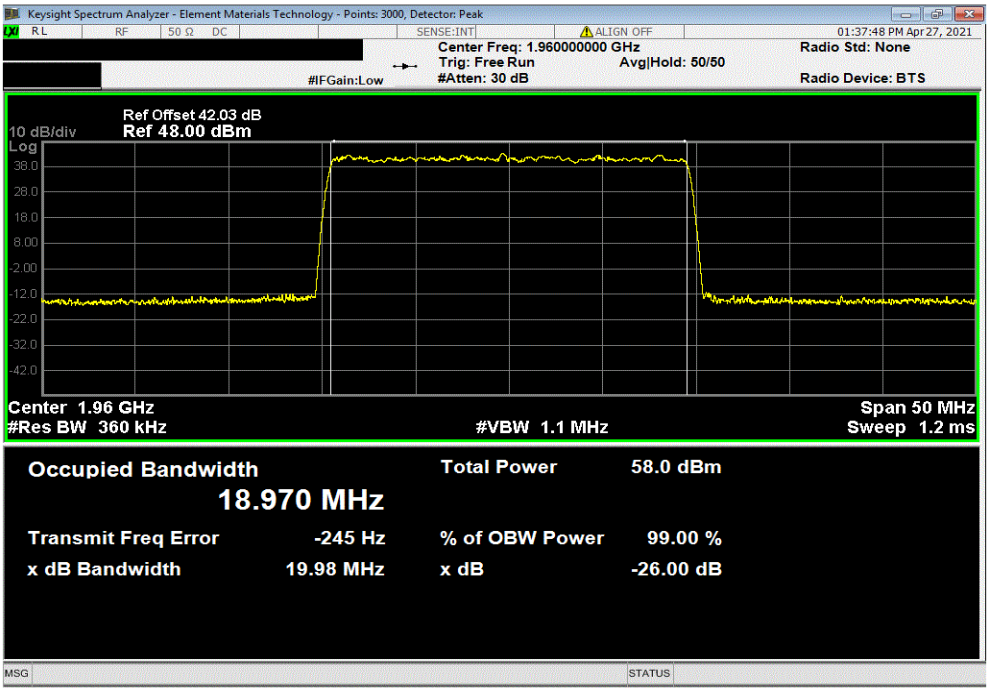
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			18.926	20.021	Within Band	Pass



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1940 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			18.965	19.969	Within Band	Pass



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			18.97	19.977	Within Band	Pass



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, High Channel, 1980 MHz						
			Value 99% (MHz)	Value 26dB (MHz	Limit	Result
			18.961	19.971	Within Band	Pass