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Report On

FCC and ISED Testing of the Ericsson Radio 2217 B2, KRC 161 563-1 NR (1900 MHz) Base Station in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 24, ISED RSS-GEN and Industry Canada RSS-133

COMMERCIAL-IN-CONFIDENCE

FCC: TA8AKRC161563-1 IC: 287AB-AS1615631

PREPARED BY

APPROVED BY

DATED

M44Anto

Maggie Whiting Key Account Manager

Steve Scarfe Authorised Signatory

22 April 2022

Document 75954487 Report 04 Issue 1

11-April-2022



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SECTION 1

REPORT INFORMATION



1.1 REPORT DETAILS

Manufacturer	Ericsson
Address	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Product Name & Product Number	Radio 2217 B2 - KRC 161 563-1
IC Model Name	AS1615631
Serial Number(s)	CF85078531
Software Version	CXP9013268/9-R84JD
Hardware Version	R1A
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2020 FCC CFR 47 Part 24: 2020 ISED RSS-GEN: Issue 5: March 2019 Amendment 1, 2021 Amendment 2 Industry Canada RSS-133: Issue 6: January 2018 Amendment 1
Test Plan	MR7602LTE-NR_FDD_Spectrum_Sharing_with_NB-IoT 9 Radios FCC and ISED V 1.0
Start of Test	4-March-2022
Finish of Test	3-April-2022
Name of Engineer(s)	Neil Rousell, Graeme Lawler
Related Document(s)	KDB 971168 D01 v02r02 KDB 662911 D01 v02r01 ICES-003:Issue 7 (2020-10) ANSI C63.26-2015

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate compliance with and FCC CFR 47 Part 2: 2020, FCC CFR 47 Part 24: 2020, ISED RSS-GEN: Issue 5: March 2019 Amendment 1, 2021 Amendment 2, Industry Canada RSS-133: Issue 6: January 2018 Amendment 1 The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

Alawlar.

Neil Rousell, Graeme Lawler



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 24, ISED RSS-GEN and Industry Canada RSS-133 is shown below.

	Specificati	on Clause				
Section	FCC CFR 47 Part 2	FCC CFR 47 Part 24	RSS- GEN	RSS-133	Test Description	Result
2.1	2.1046	24.232	-	6.4	Maximum Peak Output Power and Peak to Average Ratio - Conducted	Pass
2.2	2.1049	24.238 (b)	6.7		Occupied Bandwidth	Pass
2.3	2.1051	24.238 (b)	-	6.5	Band Edge	Pass
2.4	2.1051	24.238 (a)	6.13	6.5	Transmitter Spurious Emissions	Pass
2.5	2.1053	-	6.13	6.5	Radiated Emissions	Pass



1.3 TEST RATIONALE

The tests that have been selected are detailed in the customer Test Plan as defined in section 1.1 of this report. The Test Plan is based on the TÜV SÜD FCC Test Plan Rationale, available on request.



1.4 CONFIGURATION DESCRIPTION

Config	Carrier configurations		Corriero	Pout NF			R Main carrier		
Number	Band	RATs	Carriers	(W)	Position	BW	Freq	NR-ARFCN	
1	B2	NR in NR/ESS Setup (NB IoT IB) QPSK	1	40	В	10	1935	387000	
	B2	NR in NR/ESS Setup (NB IoT IB) QPSK	1	40	М	10	1960	392000	
	B2	NR in NR/ESS Setup (NB IoT IB) QPSK	1	40	Т	10	1985	397000	
	B2	NR in NR/ESS Setup (NB IoT IB) QPSK	1	40	в	15	1937.5	387500	
	B2	NR in NR/ESS Setup (NB IoT IB) QPSK	1	40	М	15	1960	392000	
	B2	NR in NR/ESS Setup (NB IoT IB) QPSK	1	40	Т	15	1982.5	396500	
	B2	NR in NR/ESS Setup (NB IoT IB) QPSK	1	40	в	20	1940	388000	
	B2	NR in NR/ESS Setup (NB IoT IB) QPSK	1	40	М	20	1960	392000	
	B2	NR in NR/ESS Setup (NB IoT IB) QPSK	1	40	Т	20	1980	396000	



1.5 DECLARATION OF BUILD STATUS

Equipment Description					
Technical Description: (Please provide a brief description of the inter equipment including the technologies the proc	Multi-standard remote radio unit Radio 2217 B2 (G1), 2 RX/ 2 TX				
Manufacturer:		Ericsson AB			
Model:		Radio 2217 B2			
Part Number:		KRC 161 563/1			
Hardware Version:		R1A			
Software Version:		CXP9013268/9-R84JD			
FCC ID of the product under test		TA8AKRC161563-1			
IC ID of the product under test		287AB-AS1615631			
Intentional Radiators		1			
Frequency Range (MHz to MHz) B2	TX (DL): 1930 - 1990 MHz RX (UL): 1850 -	BW: 60MHz BW: 60MHz			
	1910 MHz				
Conducted Declared Output Power (dBm)	46.0 Max output power pe	or port 40 W			
	BW	PWR/Carrier(Max)			
	5MHz	40 W			
Rat SC carrier Power (Max) :NR, LTE	10MHz	40 W			
	15MHz	40 W			
	20MHz	40 W			
Rat SC carrier Power (Max) :WCDMA	5MHz	40W			
Rat SC carrier Power (Max) :LTE	1,4 MHz, 3MHz	20W			
Radio Configuration:	2 RX / 2 TX				
Duplex mode:	FDD				
	Single RAT :WCDMA	A, LTE, NR, NB-IoT (IB, GB, SA)			
Radio Access Technology, RAT(s):	Multi RAT : WCDMA,+LTE ; WCDMA,+ NR: LTE+ NR; LTE+ NB-IoT LTE+ NR + WCDMA; LTE+ NR + NB-IoT SA; LTE+ WCDMA+ NB- IoT SA				
	NR: 5MHz, 10MHz, 1	5MHz, 20MHz			
Supported Bandwidth(s) (MHz)	LTE: 1.4MHz, 3MHz,	5MHz, 10MHz, 15MHz, 20MHz			
Supported Bandwidth(S) (Min2)	WCDMA : 5 MHz				
	NB-IoT(SA): 200 kHz	NB-IoT(SA): 200 kHz			
Antenna Gain (dBi)	the tested configurati	Maximum antenna system gain (including cable loss), GANT (dBi) for the tested configurations to comply with maximum radiated output power in SRSP -510 calculated using measured and summed PSD from all 2 Ports			
Antenna Impedance(Ω)	50				
Supported modulation scheme, LTE:	QPSK, 16QAM, 64Q	AM, 256QAM			
Supported modulation scheme, NR:	QPSK, 16QAM, 64Q	AM, 256QAM			
Supported modulation scheme, WCDMA:	QPSK, 16QAM, 64Q	AM			
Supported modulation scheme, NB-IoT :	QPSK				
NR SCS	15kHz				
RF power Tolerance:	.+0.6/-2.0 dB				



Frequency Tolerance:	±0.1 ppm						
Carrier Aggregation, CA	Supported						
Maximum supported number of DL NR carrier per port	3/Band]/Band					
Maximum supported number of DL LTE carrier per port	3/Band						
Maximum supported number of DL WCDMA carrier per port	8/Band						
Maximum supported number of DL NB-IoT SA carrier per port	2/Band						
Nominal output power per Antenna Port / Band	SRO / MRO: Single /	Multi Carrier: 80W (4	9,0 dBm)				
Supported transmission modes:	2X2 MIMO						
Unintentional Radiators							
Highest frequency generated or used in the de tunes		•	Up to 9.8 Gbit/s				
Lowest frequency generated or used in the dev tunes if <30MHz	vice or on which the dev	ice operates or					
Class A Digital Device (Use in commercial, ind	ustrial or business envir	onment)					
Class B Digital Device (Use in residential environment) Class B							
DC Power Supply (Delete if Not Applicable)							
Nominal voltage:		-48V					
Extreme upper voltage:		-36V					
Extreme lower voltage:		-58.5V					
Max current:		25A					
Temperature	·						
Minimum temperature:		-40°C					
Maximum temperature:		55°C					
Ancillaries	·						
Manufacturer:	Х	Part Number:	Х				
Model:	Х	Model:	Х				
I hereby declare that I am entitled to sign on be and complete.	ehalf of the manufacture	r and that the informa	ation supplied is correct				
Name:		Afrah Ali sadiq					
Position held:	Regulatory Approval Engineer						
Email address:	Afrah.ali.sadiq@ericsson.com						
Telephone number:		.+46724650796	3				
Date:	14-Apr-2022						

No responsibility will be accepted by TÜV SÜD UK Limited as to the accuracy of the information declared in this document by the manufacturer.

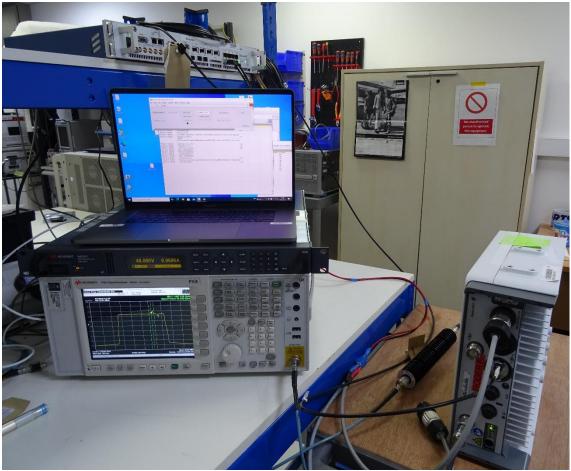


1.6 **PRODUCT INFORMATION**

1.6.1 Technical Description

The Equipment Under Test (EUT) Radio 2217 B2 - KRC 161 563-1 is an Ericsson AB Radio Unit working in the public mobile service Band 2 band which provides communication connections to Band 2 network. The EUT operates from a -48V DC supply.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.

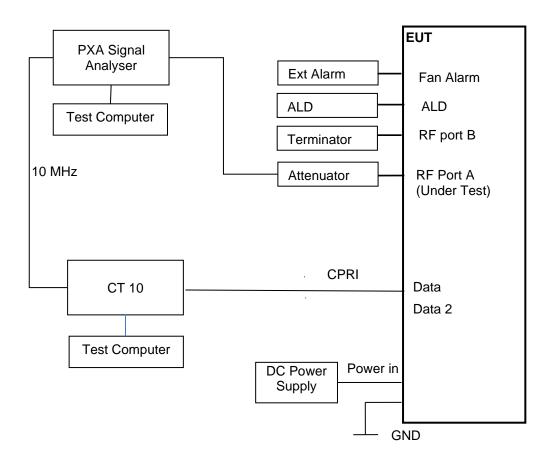


Equipment Under Test



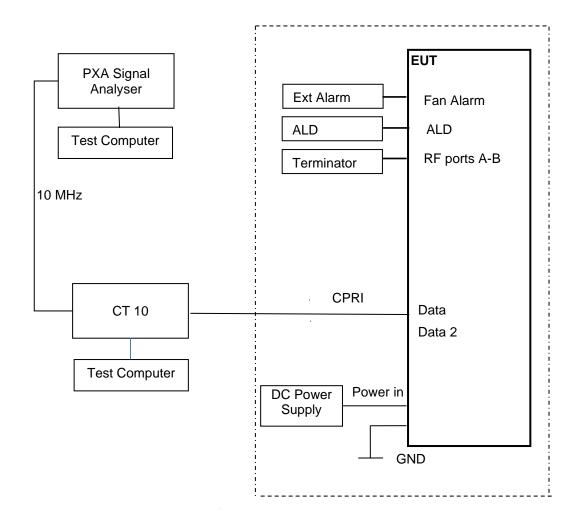
1.7 TEST SETUP

Conducted Test Set Up





Radiated Test Set Up – Dashed line indicates equipment inside the Chamber for Radiated testing.





1.8 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated as described in the Test Method for each Test.

The EUT was powered from a -48V DC supply.

FCC Measurement Facility Registration Number 90987 Octagon House, Fareham Test Laboratory Postal Address: Octagon House, Concorde Way, Fareham, Hampshire, UK, PO15 5RL

ISED Accreditation IC#12669A Octagon House, Fareham Test Laboratory Postal Address: Octagon House, Concorde Way, Fareham, Hampshire, UK, PO15 5RL

Under our UKAS Accreditation, TÜV SÜD conducted the following tests Octagon House, Fareham Laboratory.

Test Name	Name of Engineer(s)
Maximum Peak Output Power and Peak to Average Ratio - Conducted	Neil Rousell
Occupied Bandwidth	Neil Rousell
Band Edge	Neil Rousell
Transmitter Spurious Emissions	Neil Rousell
Radiated Emissions	Graeme Lawler

1.9 DEVIATION FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.10 MODIFICATION RECORD

No modifications were made to the EUT during testing.



1.11 ADDITIONAL INFORMATION

This filing is for a Class II permissive change procedure for FCC and the class III permissive change procedure for ISED of the added NB-IoT functionality to NR to a previously certified Radio for use in the USA and Canada under the following ID's:

FCC ID: TA8AKRC161563-1 ISED ID: 287AB-AS1615631

Hardware Version R1A

This device is electrically identical as originally certified as no hardware changes have been made

This EUT uses the same port for Tx and Rx and therefore RX Spurious Emisisons has not been performed. Rx Spurious Emissions have been covered by testing to FCC Part 15B, which are covered by a seprate test report.

Frequency Stability was verified at the time of the original certification and is covered by a seperate report.



SECTION 2

TEST DETAILS



2.1 MAXIMUM PEAK OUTPUT POWER AND PEAK TO AVERAGE RATIO - CONDUCTED

2.1.1 Specification Reference

FCC CFR 47 Part 24, Clause 24.232 Industry Canada RSS-133, Clause 6.4 FCC CFR 47 Part 2, Clause 2.1046

2.1.2 Date of Test and Modification State

04-March-2022 - Modification State 0

2.1.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.4 Environmental Conditions

Ambient Temperature23.8°CRelative Humidity39.0%

2.1.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, clause 5.2.1 and summed in accordance with FCC KDB 662911 D01.

2.1.6 Test Results

Configuration 1

Maximum Output Power 46.00 dBm

				Peak to Average Ratio (PAR) / Output Power / PSD							
				Channel Position B							
Antenna	NR Modulation	NR Carrier Bandwidth	PAR (dB)		verage wer/PSD	Total Power Port A + B	Total Power Port A + B	GANT* Limit 62.15dB	GANT* Limit 65.15dB		
				dBm	dBm/MHz	dBm	dBm/MHz	dBi	dBi		
А	QPSK	10.0 MHz 15 kHz SCS	7.23	45.94	37.10	48.95	40.11	22.04	25.04		
А	QPSK	15.0 MHz 15 kHz SCS	7.40	45.96	36.72	48.97	39.73	22.42	25.42		
А	QPSK	20.0 MHz 15 kHz SCS	7.44	45.99	36.66	49.00	39.67	22.48	25.48		

Remarks

Calculations:

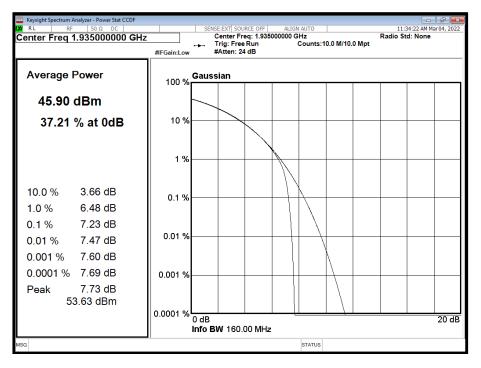
Total Power = Measured Output Power (port A) + 10log (NANT)

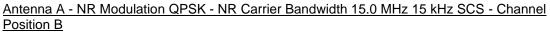
Where NANT refers to the number of Ports.

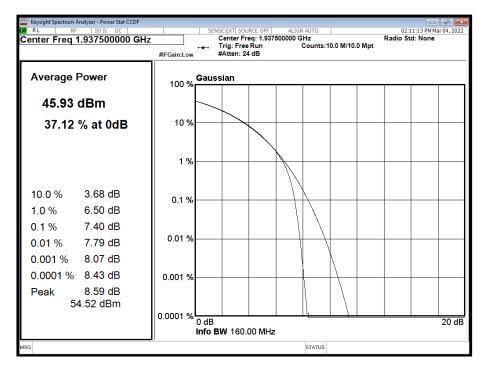


* Maximum antenna system gain (including cable loss), GANT (dBi) 50 ohm, for the tested configurations, to comply with Maximum radiated output power in ISED SRSP-510, calculated using measured and summed PSD from both ports.

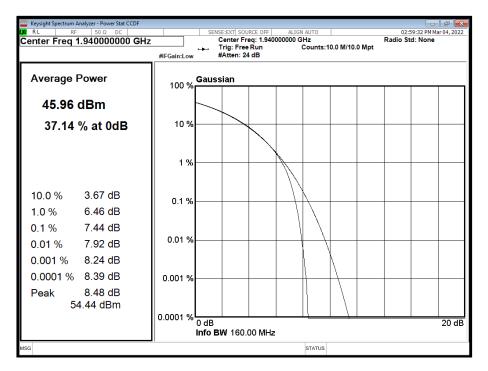
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B











Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B

Configuration 1

Maximum Output Power 46.00 dBm

				Peak to Average Ratio (PAR) / Output Power / PSD							
				Channel Position M							
Antenna	NR Modulation	NR Carrier Bandwidth	PAR (dB)		verage ver/PSD	Total Power Port A + B	Total Power Port A + B	GANT* Limit 62.15dB	GANT* Limit 65.15dB		
				dBm	dBm/MHz	dBm	dBm/MHz	dBi	dBi		
А	QPSK	10.0 MHz 15 kHz SCS	7.18	46.02	36.97	49.03	39.98	22.17	25.17		
А	QPSK	15.0 MHz 15 kHz SCS	7.25	45.91	36.61	48.92	39.62	22.53	25.53		
А	QPSK	20.0 MHz 15 kHz SCS	7.24	46.07	36.94	49.08	39.95	22.20	25.20		

Remarks

Calculations:

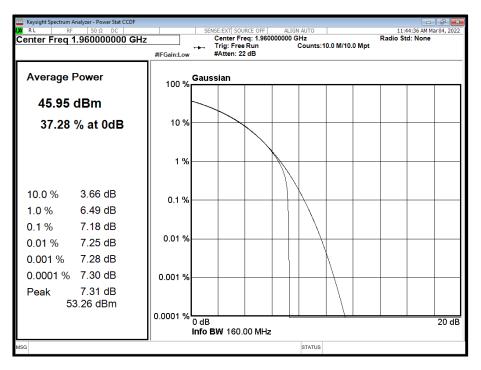
Total Power = Measured Output Power (port A) + 10log (NANT)

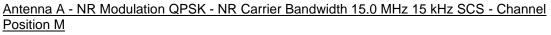
Where NANT refers to the number of Ports.

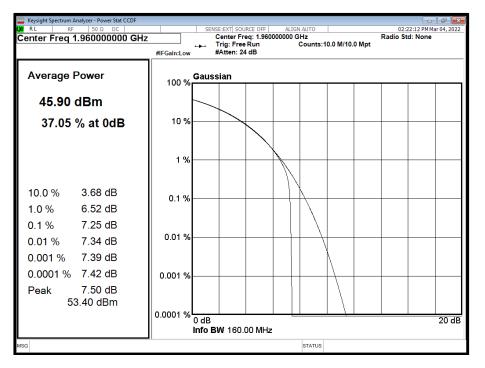
* Maximum antenna system gain (including cable loss), GANT (dBi) 50 ohm, for the tested configurations, to comply with Maximum radiated output power in ISED SRSP-510, calculated using measured and summed PSD from all both ports.



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M

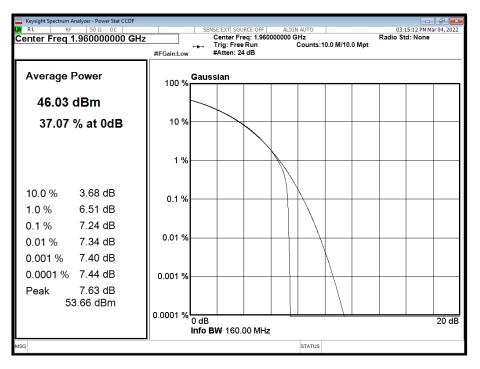








Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M



Configuration 1

Maximum Output Power 46.00 dBm

				Peak to Average Ratio (PAR) / Output Power / PSD							
				Channel Position T							
Antenna	NR Modulation	NR Carrier Bandwidth	PAR (dB)		verage ver/PSD	Total Power Port A + B	Total Power Port A + B	GANT* Limit 62.15dB	GANT* Limit 65.15dB		
				dBm	dBm/MHz	dBm	dBm/MHz	dBi	dBi		
А	QPSK	10.0 MHz 15 kHz SCS	7.21	45.88	37.08	48.89	40.09	22.06	25.06		
А	QPSK	15.0 MHz 15 kHz SCS	7.32	45.87	36.52	48.88	39.53	22.62	25.62		
А	QPSK	20.0 MHz 15 kHz SCS	7.33	45.91	36.57	48.92	39.58	22.57	25.57		

<u>Remarks</u>

Calculations:

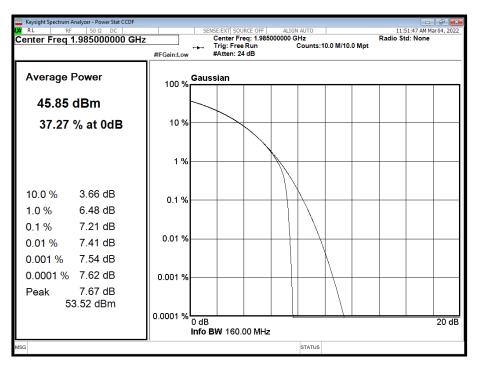
Total Power = Measured Output Power (port A) + 10log (NANT)

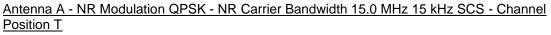
Where NANT refers to the number of Ports.

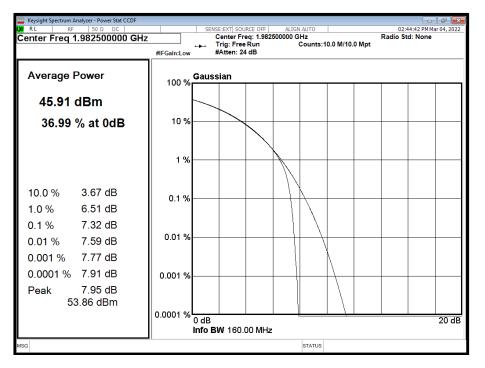
* Maximum antenna system gain (including cable loss), GANT (dBi) 50 ohm, for the tested configurations, to comply with Maximum radiated output power in ISED SRSP-510, calculated using measured and summed PSD from all both ports.



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T

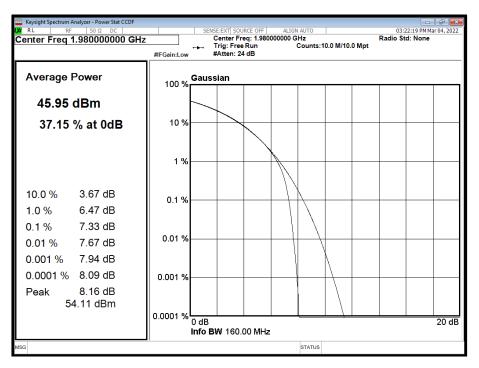








Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T



FCC Part 24.232 Clauses (a) & (b)

Limit	
Maximum ERP (Urban)	 ≤ 1640 W or ≤+62.15 dBm (antenna height ≤300m) ≤ 1070 W or ≤+60.30 dBm (antenna height ≤500m) ≤ 490 W or ≤+56.90 dBm (antenna height ≤1000m) ≤ 270 W or ≤+54.31 dBm (antenna height ≤1500m) ≤ 160 W or ≤+52.04 dBm (antenna height ≤2000m)
Maximum ERP (Non-Urban)	 ≤ 3280 W or ≤+65.15 dBm (antenna height ≤300m) ≤ 2140 W or ≤+63.30 dBm (antenna height ≤500m) ≤ 980 W or ≤+59.91 dBm (antenna height ≤1000m) ≤ 540 W or ≤+57.32 dBm (antenna height ≤1500m) ≤ 320 W or ≤+55.05 dBm (antenna height ≤2000m)

RSS-133 Clause 6.4

Limit	
Peak to Average Ratio	13 dB



SRSP-510 Power and Antenna Height Limitations Clause 5.1.1 & 5.1.2

Limit	
Maximum EIRP (Non-Urban)	≤ 3280 W/MHz or ≤+65.15 dBm
Maximum EIRP (Urban)	 ≤ 1640 W/MHz or ≤+62.15 dBm (antenna height ≤300m) ≤ 1070 W/MHz or ≤+60.30 dBm (antenna height ≤500m) ≤ 490 W/MHz or ≤+56.90 dBm (antenna height ≤1000m) ≤ 270 W/MHz or ≤+54.31 dBm (antenna height ≤1500m) ≤ 160 W/MHz or ≤+52.04 dBm (antenna height ≤2000m)



2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 24, Clause 24.238 (b) ISED RSS-GEN, Clause 6.7 FCC CFR 47 Part 2, Clause 2.1049

2.2.2 Date of Test and Modification State

04-March-2022 - Modification State 0

2.2.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.4 Environmental Conditions

Ambient Temperature23.8°CRelative Humidity39.0%

2.2.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, Clause 4.2 and 4.3. The Spectrum Analyser RBW was configured to be at least 1% of the channel bandwidth of the carrier to be measured.

For 26 dB Bandwidth, in accordance with KDB 971168 D01, a peak detector and a trace setting of Max Hold were used. The trace was allowed to stabilise. Using the Spectrum Analyser function, the 26dB measurement result was obtained.

4.2 Occupied bandwidth – relative measurement procedure
The reference value is the highest level of the spectral envelope of the modulated signal, unless otherwise specified in an applicable rule section.
Subclause 5.4.3 of ANSI C63.26-2015 is applicable.

4.3 Occupied bandwidth – power bandwidth (99 %) measurement procedure Subclause 5.4.4 of ANSI C63.26-2015 is applicable (wherein the recommendation is to use the 99 % power bandwidth function of a spectrum analyzer).

2.2.6 Test Results



Configuration 1

Maximum Output Power 46.00 dBm

			Result (kHz)						
Antenna	NR	NR Carrier	Channel F	Position B	Channel F	Position M	Channel F	Position T	
Antenna	Modulation	Bandwidth	Occupied	-26 dB	Occupied	-26 dB	Occupied	-26 dB	
			Bandwidth	Bandwidth	Bandwidth	Bandwidth	Bandwidth	Bandwidth	
А	QPSK	10.0 MHz 15 kHz SCS	9444.05	9796.94	9441.85	9807.01	9445.98	9802.78	
A	QPSK	15.0 MHz 15 kHz SCS	14350.71	14802.87	14352.75	14795.58	14351.27	14807.06	
A	QPSK	20.0 MHz 15 kHz SCS	19175.72	19739.55	19178.24	19746.29	19174.65	19749.16	

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B

	vsight Spectrum Analyzer - Occupie								
Cen	L RF 50Ω D ter Freq 1.9350000			SENSE:EXT SOUR Center Fre	CE OFF ALI q: 1.935000000	GN AUTO		11:35:2 Radio Std: I	3 AM Mar 04, 2022 None
			⊷ IFGain:Low	 Trig: Free I #Atten: 24 	Run	Avg Hold: 1/	'1	Radio Devid	e: BTS
10 dE	B/div Ref 55.88 d	IBm							
Log 45.9									
35.9		- M		mumm	~~~~~	~~~~~~			
25.9								_	
15.9									
5.88							<u> </u> }		
-4.12									
-14.1									
-24.1	within the second se	mound					~~~	white methodal and the	
-34.1									
	ter 1.93500 GHz s BW 100 kHz			<i>#</i> 1/D	W 300 kHz				20.00 MHz
#Re				#VD	W JUU KHZ			#5W6	ep 20.02 s
0	ccupied Bandwi	idth		Total P	ower	54.7 dB	m		
		9.4440	MHz						
Т	ransmit Freq Error	4.6	699 kHz	% of OE	BW Power	99.00	%		
x	dB Bandwidth	9.7	97 MHz	x dB		-26.00 c	B		
MSG						STATUS			



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M

Keysight Spectrum Analyzer - Occupied BW				
RL RF 50 Ω DC Center Freq 1.960000000 1.960000000 1.96000000000000000000000000000000000000	GHZ	SENSE:EXT SOURCE OFF ALIG	IN AUTO	11:45:34 AM Mar 04, 202 Radio Std: None
	#IFGain:Low		Avg Hold: 1/1	Radio Device: BTS
0 dB/div Ref 56.31 dBm				
og 6.3				
6.3				
6.3	/ mm			
5.3			1	
31				
69				
3.7				
3.7 more unit by work of the	and a		hours hours	when the states the share he down
3.7				
enter 1.96000 GHz Res BW 100 kHz		#VBW 300 kHz		Span 20.00 Mi #Sweep 20.02
Occupied Bandwidth	1	Total Power	54.7 dBm	
9.4	419 MHz			
Transmit Freq Error	2.586 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	9.807 MHz	x dB	-26.00 dB	
G			STATUS	

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T

Keysight Spectrum Analyzer - O										- 6 -
RL RF 50 G Center Freq 1.9850	DC 00000 GH	7		SENSE:EXT SOUR Center Fre	RCE OFF ALI eq: 1.985000000				11:52:4 Radio Std: I	7 AM Mar 04, 2022 None
			Gain:Low	Trig: Free #Atten: 24		Avg Hold: 1	1/1		Radio Devid	e: BTS
10 d <u>B/div Ref 55.</u> 2	22 dBm									
45.2										
35.2		h.		~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Λ			
25.2										
15.2	/							1		
5.22								1		
4.78								1		
14.8										
24.8 marther water how we	and a stand and							- Myrkowie	Hallow Alansy row has	www.
34.8										
Center 1.98500 GHz									Oner	00.00 MIL-
#Res BW 100 kHz				#VE	300 kHz					20.00 MHz ep 20.02 s
Occupied Ban	dwidth			Total P	ower	54.6 dE	Зm			
	9.440	60	MHz							
Transmit Freq Er	rror	2.8	56 kHz	% of O	BW Power	99.00	%			
x dB Bandwidth		9.80	3 MHz	x dB		-26.00	dB			
sg						STATUS				
						314103				



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B

Keysight Spectrum Analyzer - Occupied BW KXI RL RF 50 Ω DC	v	SENSE:EXT SOURCE OFF ALIC	SN AUTO	02:12:14 PM Mar 04, 2022
Center Freq 1.937500000		Center Freq: 1.937500000	GHz	Radio Std: None
	#IFGain:Low	. Trig: Free Run #Atten: 24 dB	Avg Hold: 1/1	Radio Device: BTS
10 dB/div Ref 55.36 dBn Log	n			
45.4	^			
35.4	- Contraction	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
25.4				
15.4				
-4.64				
-14.6				
-24.6 manual Anthenana anthenana	and		had	mar and and the second and and and and and and and and and a
-34.6				
Center 1.93750 GHz				0
#Res BW 150 kHz		#VBW 470 kHz		Span 30.00 MH #Sweep 20.02
Occupied Bandwidt	'n	Total Power	55.2 dBm	
•	.351 MHz			
Transmit Freq Error	-551 Hz	% of OBW Power	99.00 %	
x dB Bandwidth	14.80 MHz	x dB	-26.00 dB	
ISG			STATUS	

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M

Keysight Spect	rum Analyzer - Occupied I	BW			05.055					
	RF 50 Ω DC	0 GHz			q: 1.96000000				Radio Std:	0 PM Mar 04, 2022 None
			⊷ Gain:Low	Trig: Free #Atten: 22		Avg Hold: 1	/1		Radio Devi	e: BTS
10 dB/div Log 47.9 37.9 27.9 7.89 -2.11	Ref 57.89 dB		~~~				_			
-12.1	here and a state of the second state	hand						water	wanting.or matters	and the second second
-32.1										
Center 1.9 #Res BW				#VE	3W 470 kHz	!				n 30.00 MHz ep 20.02 s
Occup	ied Bandwid	lth		Total P	ower	55.2 di	3m			
		4.353 N	ΛHz							
Transm	it Freq Error	-2.01	6 kHz	% of O	BW Power	99.00	%			
x dB Ba	ndwidth	14.80) MHz	x dB		-26.00	dB			
ISG						STATUS				



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T

Keysight Spectrum Analyzer - Occupied BW K RL RF 50 Ω DC		SENSE:EXT SOURCE OFF ALIG	N AUTO	02:45:42 PM Mar 04, 202 Radio Std: None
Center Freq 1.982500000	GHZ #IFGain:Low	→ Trig: Free Run #Atten: 24 dB	Avg Hold: 1/1	Radio Std: None
10 dB/div Ref 56.34 dBm			;;	
46.3				
6.3	- Communities	-	mmm	
6.3				
34				
66				
3.7	[
3.7 warman mar million the harmonite	لسه			Manney Maring and Market
3.7				
enter 1.98250 GHz Res BW 150 kHz		#VBW 470 kHz		Span 30.00 MI #Sweep 20.02
Occupied Bandwidth	1	Total Power	55.2 dBm	
14	.351 MHz			
Transmit Freq Error	-8.690 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	14.81 MHz	x dB	-26.00 dB	
			STATUS	

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B

	ctrum Analyzer - Occupier RF 50 Ω DO				orwar rygl og		GN 41/70			00.00	
enter Fr	RF 50 Ω DC eq 1.9400000		z –			req: 1.94000000	GN AUTO GHz			Radio Std:	:33 PM Mar 04, 2022 None
]			Gain:Low	Trig: Fre #Atten: 2		Avg Hold:	1/1		Radio Dev	ice: BTS
			#11	Gam.Low							
0 dB/div	Ref 56.18 d	Bm									
og											
46.2			~								
6.2			(\m		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		مەرىمىر يەرىمىم				
6.2									1		
6.2									1		
i.18											
.82		1									
3.8									1. A		
3.8									-14 W. M.M.	*****	~ April pre v Marage M.
33.8											
enter 1.9	4000 GHz									Spa	n 40.00 MH:
Res BW					#\	/BW 620 kHz					eep 20.02
Occur	ied Bandwi	dth			Total	Power	55.5 d	Bm			
			76	MHz							
Transn	nit Freq Error		4.69	96 kHz	% of (DBW Power	99.0	0 %			
x dB B	andwidth		19.7	4 MHz	x dB		-26.00	dB			



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M

Keysight Spectrum Analyzer - Occupie				
XIRL RF 50Ω D		SENSE:EXT SOURCE OFF ALIC Center Freq: 1.960000000	GN AUTO	03:16:11 PM Mar 04, 2022 Radio Std: None
Center Freq 1.960000		💷 Trig: Free Run	Avg Hold: 1/1	
	#IFGain:Low	#Atten: 22 dB		Radio Device: BTS
10 dB/div Ref 56.25 d	IBm			
46.3				
	n		Λ	
36.3		www.www.www.www.www.www.	Constraint (
26.3				
16.3				
6.25				
3.75				
13.8				
23.8 mar mar water and	Nertrained			- annuly strated and an angle of the second
33.8				
Center 1.96000 GHz #Res BW 200 kHz		#VBW 620 kHz		Span 40.00 MH #Sweep 20.02
FRES DW ZOU KHZ		#VDVV 020 KHZ		#3weep 20.02
Occupied Bandwi	idth	Total Power	55.6 dBm	
	19.178 MHz			
	13.170 WI12			
Transmit Freq Error	3.652 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	19.75 MHz	x dB	-26.00 dB	
20			074710	
SG			STATUS	

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T

							03:23: Radio Std:	20 PM Mar 04, 2022 None
		+ #IFGain:Low			Avg Hold: 1/	1	Radio Devi	ce: BTS
iv Ref 56.05 dE	3m							
	ń					Δ		
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	v	www.www.ww	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~		
	1					l		
	1					1		
an an here and the date of the side of the	man					hun	Autoren .	
								where and the second
1.98000 GHz W 200 kHz			#VB	W 620 kHz				n 40.00 MHz eep 20.02 s
	dth		Total P	ower	55.4 dB	m		•
-		5 MHz						
nsmit Freq Error	-1	.623 kHz	% of OE	W Power	99.00	%		
Bandwidth	19	.75 MHz	x dB		-26.00 c	IB		
					STATUS			
	v Ref 56.05 dE	v         Ref 56.05 dBm           v         Ref 56.05 dBm           v         1.98000 GHz           W         200 KHz           upled Bandwidth         19.175           usmit Freq Error         -1	Ref 56.05 dBm           v         Image: State of the st	Preq 1.980000000 GHz         SENSECT SOUR           v         Ref 56.05 dBm           v         Ref 56.05 dBm           v         Image: Sense extra source of the source of	Ref         S0 0 oc         SERSE-EXT SOURCE OFF         ALL           "Ref 1.98000000 GHz         Center Freq: 1.98000000         Trig: Freq Run         #Atten: 22 dB           "Ref 56.05 dBm         "Atten: 22 dB         "Atten: 22 dB         "Atten: 22 dB           "Ref 56.05 dBm         "Atten: 22 dB         "Atten: 22 dB         "Atten: 22 dB           "Image: Series and the series of the	Preq 190 DC         SENSE BAT SOURCE OFF         ALIGN AUTO           Freq 1.980000000 GHz         Center Freg: 1.98000000 GHz         Avg Hold: 1/           #FGain:Low         #FGain:Low         Avg Hold: 1/           v         Ref 56.05 dBm         Avg Hold: 1/           1.98000 GHz         #VBW 620 kHz         Avg Hold: 1/           supjed Bandwidth         Total Power         55.4 dB           19.175 MHz         % of OBW Power         99.00           Bandwidth         19.75 MHz         x dB	Prod         SNG OC         SENSE CFT         ALIGN ATO           Freq 1.980000000 GHz         Center Freq 1.980000000 GHz         Center Freq 1.980000000 GHz         Avg Hold: 1/1           #IFGain:Low         Trig: Free Run         Avg Hold: 1/1           w         Ref 56.05 dBm         Avg Hold: 1/1           v         Ref 56.05 dBm         Avg Hold: 1/1           1.98000 GHz         #VBW 620 kHz         Avg Hold: 1/1           w         200 kHz         #VBW 620 kHz         W           supjed Bandwidth         19.175 MHz         X dB         -26.00 dB           Bandwidth         19.75 MHz         X dB	Preq 1.98000000 GHz       SENSEE(1) SOURCOFF       AUGMAND       00223:         Preq 1.98000000 GHz       Center Freq: 1.98000000 GHz       Radio Std:         v       Ref 56.05 dBm       Radio Devi         v       Ref 56.05 dBm       Image: Sense Series (Source OFF)       Augmand         v       Ref 56.05 dBm       Image: Sense Series (Source OFF)       Augmand       Avg Hold: 1/1       Radio Devi         v       Ref 56.05 dBm       Image: Sense Series (Source OFF)       Augmand       Avg Hold: 1/1       Radio Devi         v       Ref 56.05 dBm       Image: Sense Series (Source OFF)       Augmand       Avg Hold: 1/1       Radio Devi         v       Ref 56.05 dBm       Image: Sense Series (Source OFF)       Augmand       Avg Hold: 1/1       Radio Devi         v       Ref 56.05 dBm       Image: Sense Series (Source OFF)       Augmand       Avg Hold: 1/1       Radio Devi         v       Ref 56.05 dBm       Image: Sense Series (Source OFF)       Image: Sense Series (Source OFF)       Augmand       Avg Hold: 1/1       Radio Series (Source OFF)         1.98000 GHz       W 200 kHz       #VBW 620 kHz       Spain       Spain       Spain       Spain         uplied Bandwidth       19.175 MHz       Yeb of OBW Power       99.00 %       Spain       Spain<



# 2.3 BAND EDGE

#### 2.3.1 Specification Reference

FCC CFR 47 Part 24, Clause 24.238 (b) Industry Canada RSS-133, Clause 6.5 FCC CFR 47 Part 2, Clause 2.1051

#### 2.3.2 Date of Test and Modification State

04-March-2022 - Modification State 0

#### 2.3.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

#### 2.3.4 Environmental Conditions

Ambient Temperature23.8°CRelative Humidity39.0%

#### 2.3.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, Clause 6.0.

Band Edge measurements were used an Integration Bandwidth of at least 1% of the measured 26dB Bandwidth.

Each antenna port has been declared as being equivalent, therefore measurements were made on one antenna port only. To account for this, the limit was tightened by 10 * Log(N), where N is equal to the number of MIMO antenna ports.

For single port, the limit was calculated as being -13 dBm - 10 * Log (2) = -16 dBm.

# 2.3.6 Test Results

**Configuration 1** 

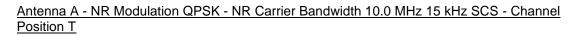
Maximum Output Power 46.00 dBm

Antonno	ntenna NR Modulation		Band Edge (MHz)			
Antenna			Channel Position B	Channel Position T		
A	QPSK	10.0 MHz 15 kHz SCS	1,935.0	1,985.0		
A	QPSK	15.0 MHz 15 kHz SCS	1,937.5	1,982.5		
A	QPSK	20.0 MHz 15 kHz SCS	1,940.0	1,980.0		



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B

🚾 Keysight Spectrum Analyzer - Swept SA						
<b>LX RL RF 50 Ω DC</b>	SENSE:EXT SOU	RCE OFF ALI	GN AUTO			AM Mar 04, 2022
Center Freq 1.930000000 GHz	PNO: Wide Trig: Free IFGain:Low #Atten: 20	Run ) dB	Avg Type: F	an s		ACE 1 2 3 4 5 6 TYPE WWWWW DET A NNNN
Ref Offset 41.34 dB 10 dB/div Ref 45.34 dBm				MI Band F	(r1 1.929 Power -33	950 GHz 3.51 dBm
		Ĭ				
35.3						
25.3			~~~~			
15.3				L	~~~~~~	
5.34						
-4.66			,			
-14.7						DL1 16.01 dB
-14.7						DE1 16.01 (db)
-24.7		-/				
-34.7		/				
		1				
-44.7 marganetus marganetus marganetus marganetus marganetus and the	hand the contraction of the cont					
Center 1.930000 GHz #Res BW 10 kHz	#VBW 30 kHz*			#Swe	Span ep 20.02 s	2.000 MH; ; (1001 pts
MSG			STATUS		•	• •

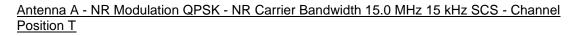


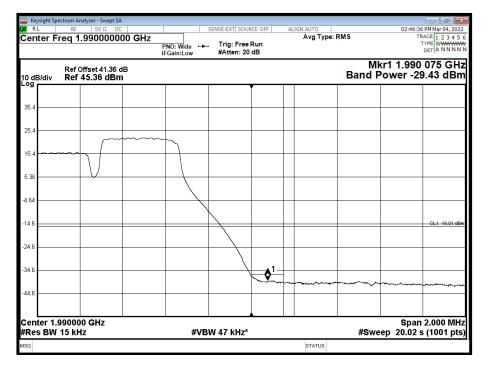
Senter F	req 1.9900000		PNO: Wide ++	. Trig: Free #Atten: 20		Avg Type:	RMS	Т	ACE 1 2 3 4 5 YPE WWWWW DET A NNNN
0 dB/div	Ref Offset 41.36 Ref 45.36 dBr	dB	FGain:Low	#Atten: 20			Mk Band P	(r1 1.990 Power -28	050 GH: 3.51 dBm
35.4									
25.4			h						
15.4									
5.36			h h						
14.6				N N N N N N N N N N N N N N N N N N N					DL1 16.01 dBr
24.6									
34.6					<b>♦</b> 1				
44.6					winner w	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	hand	~~~~~	مرمعمومهم
Center 1. Res BW	990000 GHz 10 kHz		#VB	W 30 kHz*			#Swe	Span ep 20.02 s	2.000 MHz



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B

X RL	ectrum Analyzer - Swept SA RF 50 Ω DC		ENSE:EXT SOUR	RCE OFF AL	IGN AUTO Avg Type: F	MS	02:13:05	PM Mar 04, 2022
Senter F	req 1.930000000 GHz	PNO: Wide	Trig: Free #Atten: 20		Avg Type. P	CIVI 3		DET A NNNN
10 dB/div	Ref Offset 41.34 dB Ref 45.34 dBm						r1 1.929 ower -33	
35.3								
25.3					~		~	
15.3							$\neg$	<u> </u>
5.34							V	
4.66								
14.7								DL1 16.01 dB
24.7				-/				
34.7				/				
44.7		**************************************		(				
	930000 GHz						0	2 000 0411
Res BW		#VBV	N 47 kHz*			#Swe	ep 20.02 s	2.000 MH s (1001 pts
SG					STATUS			







Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B

LXI RL	ctrum Analyzer - Swept SA RF 50 Ω DC req 1.930000000 GHz		SENSE:EXT SOUR		IGN AUTO Avg Type: I	RMS	TF	5 PM Mar 04, 2022 RACE 1 2 3 4 5 6 TYPE WWWWWW
10 dB/div	Ref Offset 41.34 dB Ref 45.34 dBm	IFGain:Low	#Atten: 20			MI Band F	kr1 1.929 Power -3:	900 GHz 3.42 dBm
35.3								
25.3								
15.3						$\int$		
5.34					/	/		
-4.66								
-14.7				-/				DL1 16.01 dBr
-24.7								
-34.7	- up han we want to the group of the the second		<b>0</b> ¹					
								2 000 521
#Res BW	930000 GHz 20 kHz	#VB	W 62 kHz*			#Swe	span ep 20.02 s	2.000 MH s (1001 pts
ISG					STATUS			

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T

			PNO: Wide 🔸 FGain:Low	<ul> <li>Trig: Free #Atten: 20</li> </ul>				
0 dB/div	Ref Offset 41.36 Ref 45.36 dBn					 MI Band F	kr1 1.990 Power -3	100 GH: 0.18 dBn
35.4								
25.4								
15.4								
Y								
5.36		,						
.64								
4.6								DL1 16.01 dB
4.6								
4.6						 		
4.6								
	990000 GHz 20 kHz			W 62 kHz*	1		Spar	2.000 MH s (1001 pts



# 2.4 TRANSMITTER SPURIOUS EMISSIONS

#### 2.4.1 Specification Reference

FCC CFR 47 Part 24, Clause 24.238 (a) ISED RSS-GEN, Clause 6.13 Industry Canada RSS-133, Clause 6.5 FCC CFR 47 Part 2, Clause 2.1051

# 2.4.2 Date of Test and Modification State

04-March-2022 - Modification State 0

#### 2.4.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.4.4 Environmental Conditions

Ambient Temperature23.8°CRelative Humidity39.0%

#### 2.4.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, Clause 6.1.

Each antenna port has been declared as being equivalent, therefore measurements were made on one antenna port only. To account for this, the limit was tightened by 10 * Log(N), where N is equal to the number of MIMO antenna ports.

For single port, the limit was calculated as being -13 dBm - 10 * Log (2) = -16 dBm.

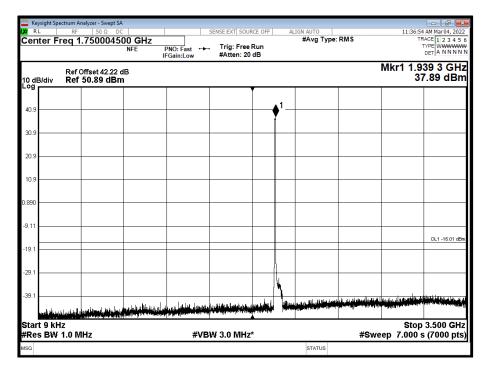
#### 2.4.6 Test Results

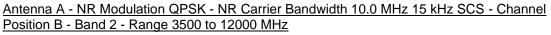
**Configuration 1** 

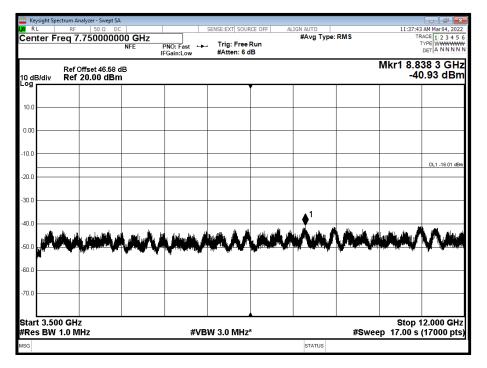
Maximum Output Power 46.00 dBm



### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B - Band 1 - Range 0.009 to 3500 MHz

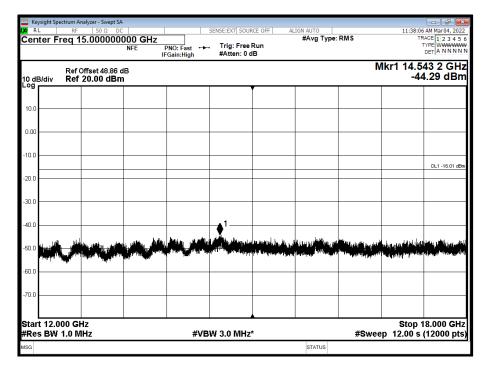








## Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B - Band 3 - Range 12000 to 18000 MHz

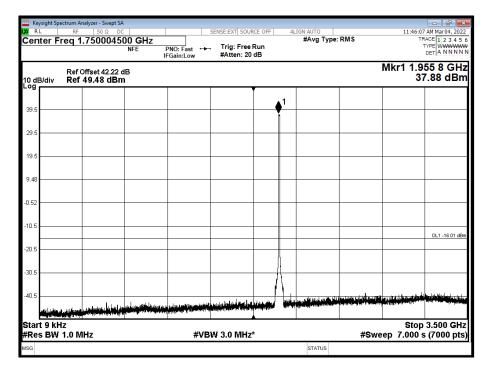


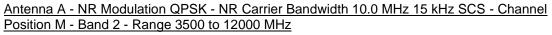
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B - Band 4 - Range 18000 to 20000 MHz

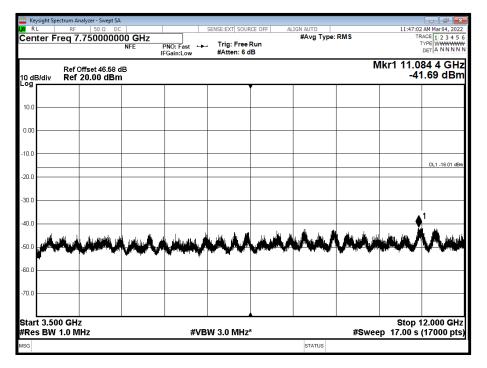
enter F	RF 50 Ω D req 19.000000	000 GHz		Trig: Free	Run	#Avg Type:	RMS		ACE 1 2 3 4 5
			PNO: Fast 🔸 FGain:Low	#Atten: 10					DETANNNN
) dB/div	Ref Offset 32.13 Ref 20.00 dBr						N	1kr1 19.3 -49	578 GH 9.76 dBn
Ĭ									
0.0									
.00									
D.O									DL1 -16.01 dE
0.0									
0.0									
0.0						. 1			
0.0				1 1 2 2		<b>♦</b> '			
	h in the state of the		lla parte a parte de la parte	, itiliy filisida ya		en hadde for block of		i din di panjan di ka	hili ani na kati ili akati
0.0									
0.0									
L tart 18.0	00 GHz	1	1					Stop 2 ep 4.000 s	0.000 GH



#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M - Band 1 - Range 0.009 to 3500 MHz

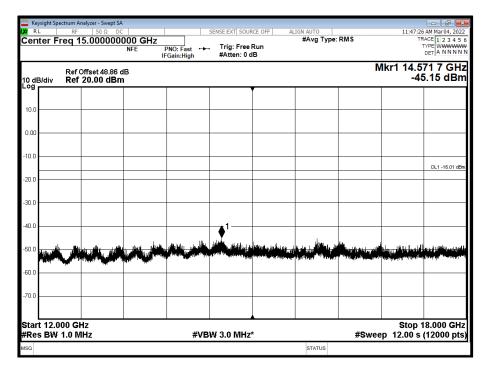




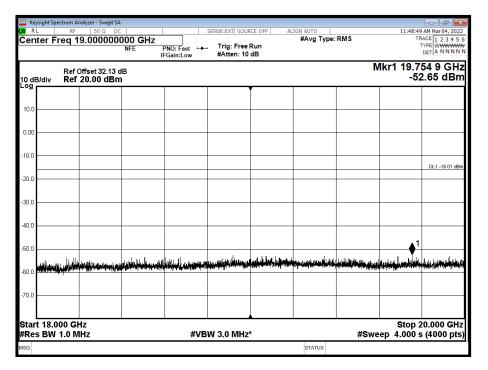




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M - Band 3 - Range 12000 to 18000 MHz

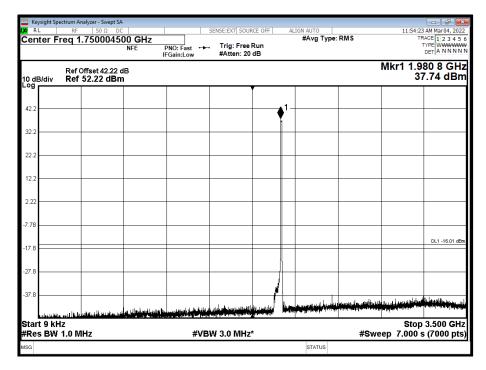


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M - Band 4 - Range 18000 to 20000 MHz

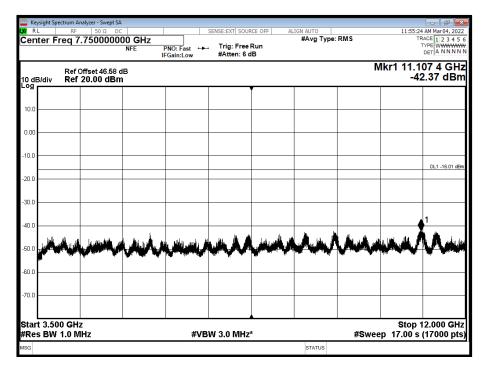




### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T - Band 1 - Range 0.009 to 3500 MHz

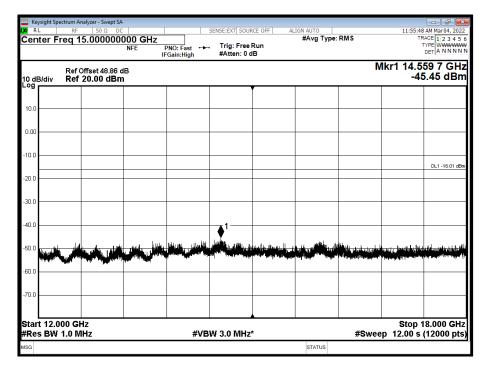


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T - Band 2 - Range 3500 to 12000 MHz

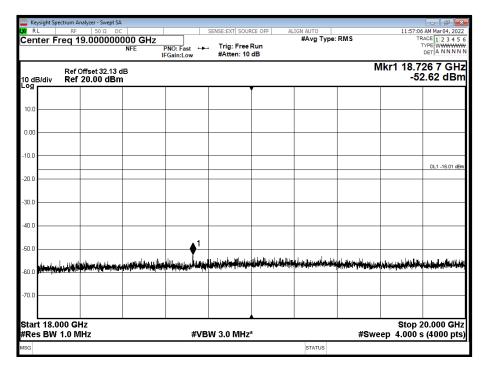




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T - Band 3 - Range 12000 to 18000 MHz

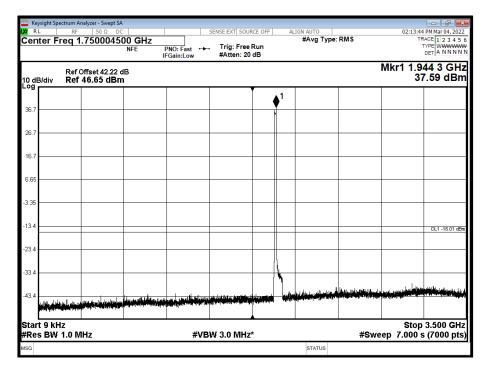


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T - Band 4 - Range 18000 to 20000 MHz

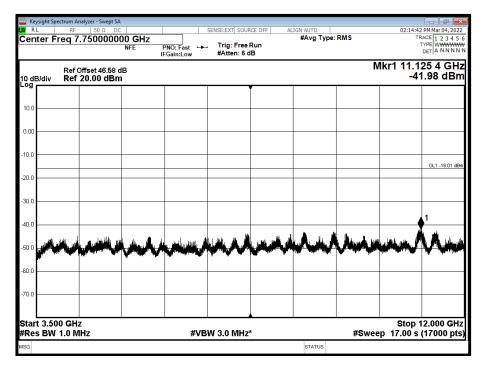




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B - Band 1 - Range 0.009 to 3500 MHz

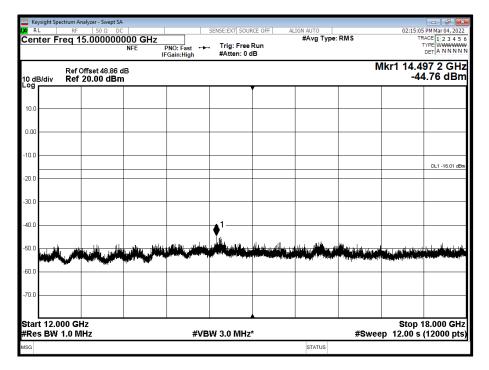


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B - Band 2 - Range 3500 to 12000 MHz

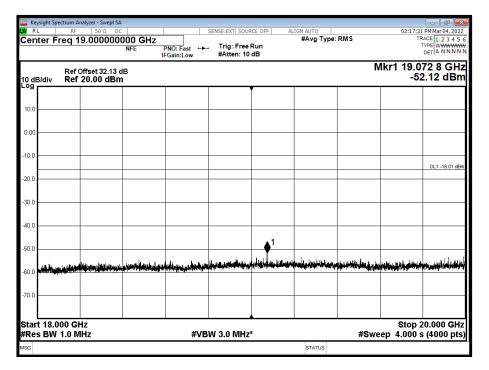




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B - Band 3 - Range 12000 to 18000 MHz



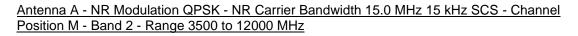
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B - Band 4 - Range 18000 to 20000 MHz

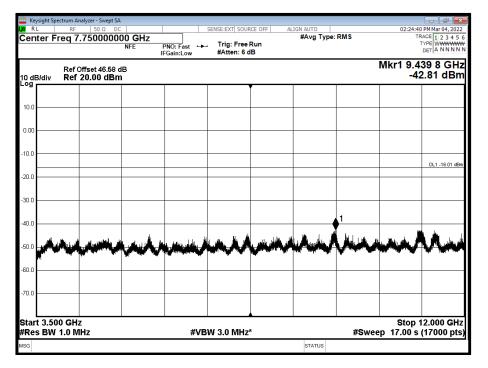




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M - Band 1 - Range 0.009 to 3500 MHz

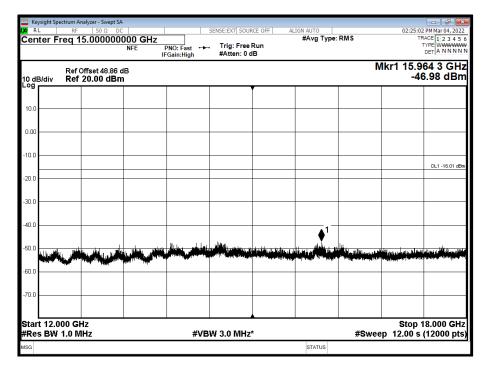
🛄 Keysig LXI R L		m Analyzer - Swep RF 50 Ω	SA DC		SENSE:EXT SOUR			IGN AUTO		02.22.41	PM Mar 04, 2022
		1.750004					AL	#Avg Type:	RMS	TR	ACE 1 2 3 4 5
••••••			NFE F	NO: Fast 🔸	. Trig: Free #Atten: 20						
10 dB/c		ef Offset 42.2 ef 48.82 dE								Mkr1 1.9 37	66 8 GH: 7.46 dBn
							<b>▲</b> 1				
38.8							Ĭ				
28.8 —											
18.8		_									
8.82											
-1.18											
-11.2											
-21.2											DL1 -16.01 dE
31.2							1				
							1				later a second
-41.2				la, yi quyi kasi ka a	ad billing to the strength of the same						
Start 9 #Res I	9 kHz BW 1.0	MHz	1	#VB	W 3.0 MHz	*		1	#Swe	Stop ep 7.000 s	3.500 GHz 6 (7000 pts
MSG								STATUS			



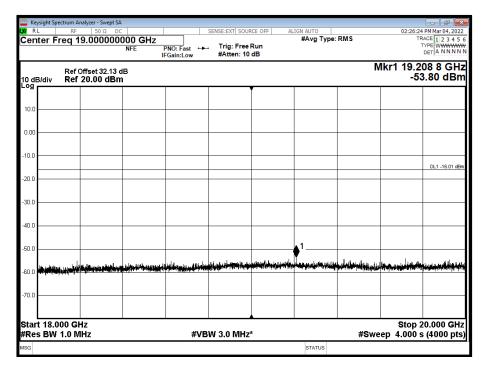




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M - Band 3 - Range 12000 to 18000 MHz

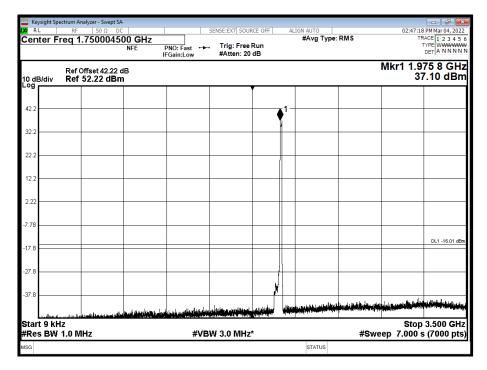


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M - Band 4 - Range 18000 to 20000 MHz

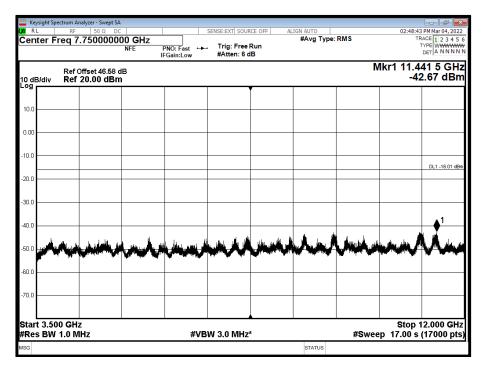




### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T - Band 1 - Range 0.009 to 3500 MHz

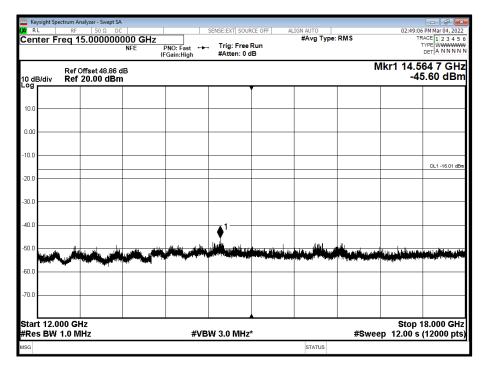


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T - Band 2 - Range 3500 to 12000 MHz

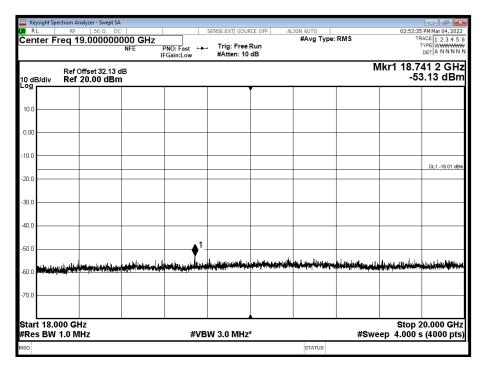




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T - Band 3 - Range 12000 to 18000 MHz

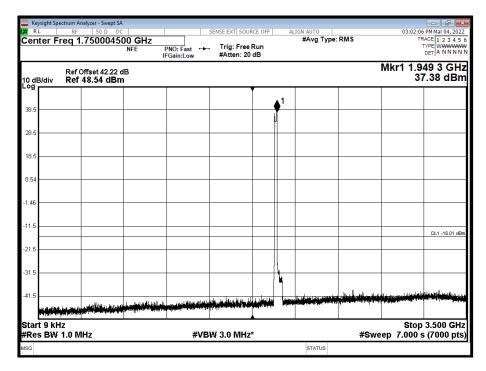


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T - Band 4 - Range 18000 to 20000 MHz

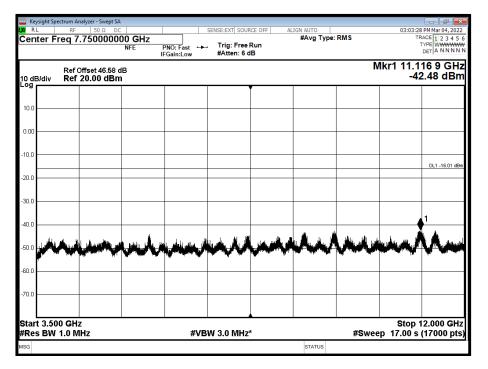




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B - Band 1 - Range 0.009 to 3500 MHz

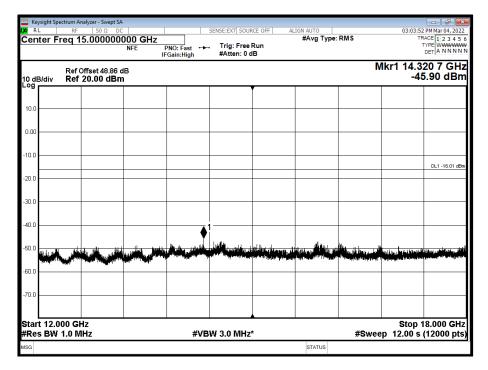


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B - Band 2 - Range 3500 to 12000 MHz

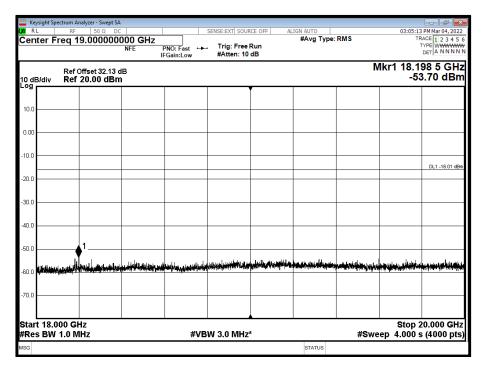




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B - Band 3 - Range 12000 to 18000 MHz



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B - Band 4 - Range 18000 to 20000 MHz

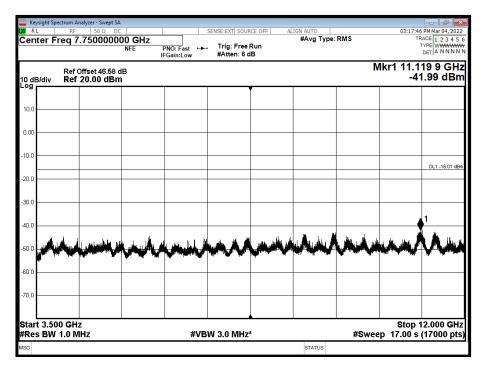




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M - Band 1 - Range 0.009 to 3500 MHz

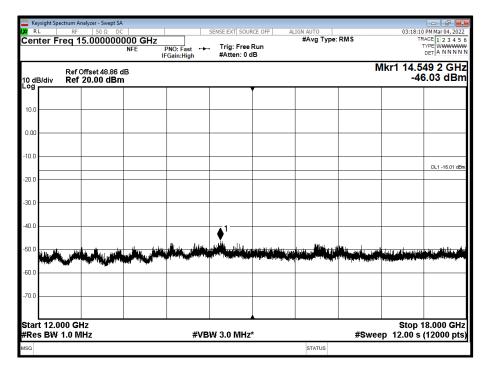
XI RL	ectrum Analyzer - Swep RF 50 Ω	DC		SENSE:EXT SOUR	RCE OFF AL	IGN AUTO	03:1	5:50 PM Mar 04, 2022
Center F	req 1.750004	500 GHz NFE	PNO: Fast ↔ IFGain:Low	. Trig: Free #Atten: 20	Run dB	#Avg Type: RMS		TRACE 1 2 3 4 5 TYPE WWWWW DET A NNNN
10 dB/div	Ref Offset 42.2 Ref 48.69 dE	2 dB 3m					Mkr1 1	.969 3 GH 37.47 dBn
38.7					1			
28.7					Í			
18.7			_					
8.69								
1.31								_
11.3								
21.3								DL1 -16.01 dE
31.3					/\			
41.3								
Start 9 kH	Iz 1.0 MHz		#\/P	W 3.0 MHz	*		Ste #Sweep 7.00	op 3.500 GH
ISG			#VE	W 3.0 WHZ		STATUS	#aweep 7.00	o 5 (7000 pts

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M - Band 2 - Range 3500 to 12000 MHz

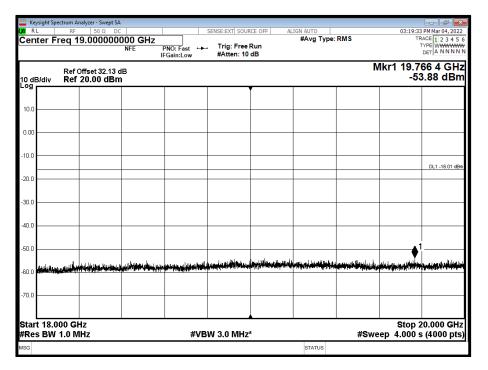




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M - Band 3 - Range 12000 to 18000 MHz



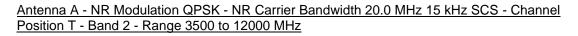
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M - Band 4 - Range 18000 to 20000 MHz

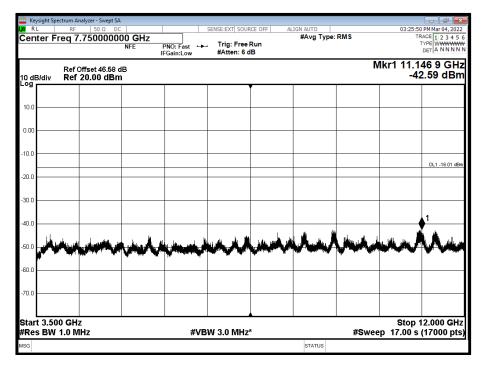




#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T - Band 1 - Range 0.009 to 3500 MHz

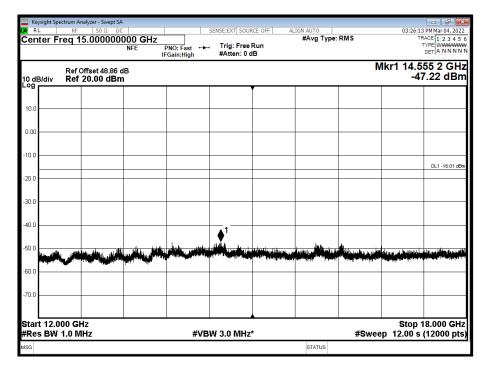
			alyzer - Swept S									
IXI RI		RF	50 Ω D			SENSE:EXT SOUR	RCE OFF	A	LIGN AUTO #Avg Type	DMC		PM Mar 04, 2022
Cen	iter Fr	eq 1	.7500045	NFE F	NO: Fast ++	. Trig: Free #Atten: 18			#Avg Type	. RIVIS	1	TYPE WWWWWW
				IF	Gain:Low	#Atten. 10	ub					,
10 dE			)ffset 42.22 46.81 dBn								Mkr1 1.9 37	70 8 GHz 7.32 dBm
Log							Ĭ	<b>▲</b> 1				
36.8								Ţ.				
26.8												
16.8												
6.81												
-3.19												
-13.2												DL1 -16.01 dBr
-23.2												
20.2								Π.				
-33.2							l r	⊬				
-43.2										and the second second	والمراجع والمراجع والمراجع	<u>اير ين د الماندانية</u>
				a and the second states	د مانستانا، متناور بالرسيم. و مارسور خار میرمود و		lahan kili 1	digi		و خاط و و من ماله به دار و ما	a de la constitución de la constitu La constitución de la constitución d	and the second states of the second
	t9 kHz sBW 1	2			#\/B	W 3.0 MHz	*					3.500 GHz
_	2 0 4 4 1	.0 1	Π <b>2</b>		#VB	WW J.U IVIHZ				#5W6	ep 7.000 s	5 (7 000 pts
ISG									STATUS			

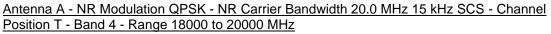






#### Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T - Band 3 - Range 12000 to 18000 MHz





enterr	164 19.00	00000000 NFE	PNO: Fas IFGain:Lo		ree Run 10 dB	#Avg Type:			TYPE WWWWW DET A NNNN
) dB/div	Ref Offset Ref 20.0						N	lkr1 19.1 -5	77 8 GH 3.37 dBn
10.0									
1.00									
D.0									DL1 -16.01 dB
0.0									
0.0									
D.0						 			
0.0 <b>#</b> ####	Nices desired	ALE STATES	ing, and digulate		li ili a la firi da alla si a l			i i je na stali	in designer, in the state
0.0									
	000 GHz ( 1.0 MHz			#VBW 3.0 M			#Swa	Stop 2	20.000 GH2 s (4000 pts

Limit -16dBm



#### 2.5 RADIATED EMISSIONS

#### 2.5.1 Specification Reference

ISED RSS-GEN, Clause 6.13 Industry Canada RSS-133, Clause 6.5 FCC CFR 47 Part 2, Clause 2.1053

#### 2.5.2 Date of Test and Modification State

03-April-2022 - Modification State 0

#### 2.5.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

#### 2.5.4 Environmental Conditions

Ambient Temperature22.0°CRelative Humidity30.1%

#### 2.5.5 Test Method

The test was performed in accordance with ANSI C63.26 Clause 5. The EUT was configured as defined in ANSI C63.26, clause 5.5.2.3.2.

As a result of the conducted measurements that were performed on the EUT, it was established that 10 MHz was the bandwidth configuration which gave the highest output power and therefore deemed to be worst case operating mode. Testing was performed on the Top, Middle and Bottom channels.

The EUT was set up on a support replicating typical installation conditions at a height of 0.8 m above the reference ground plane for measurements below 1GHz, (see setup photos) within a semi-anechoic chamber on a remotely controlled turntable. Above 1 GHz, the height was increased to 1.5 m above the reference ground plane.

Pre-scan and final measurements were made using a Field Strength method in accordance with ANSI C63.26 Clause 5.5.4. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification. Final results were then converted to eirp and are displayed in the plots below. The correction for field strength measurements to eirp at 3 m was 95.2 dB. An RBW of 1 MHz and VBW of 3 MHz was used for all measurements with a Peak detector and trace set to Max Hold. In all cases below where the limit line is exceeded – this is the intentional transmit frequency.

#### 2.5.6 Test Results

**Configuration 1** 

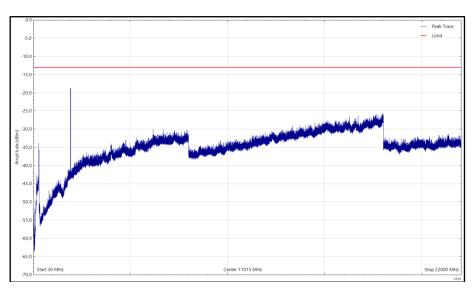
Maximum Output Power 46.00 dBm



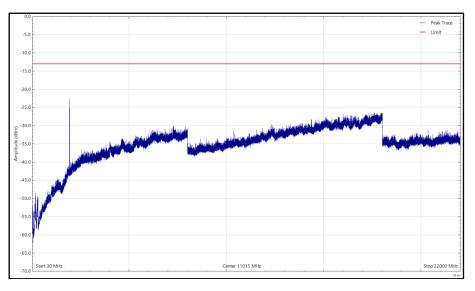
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Bot - NR&NB-IoT - B2, 1935MHz, 30 MHz to 22 GHz

*No emissions found within 6 dB of the limit.



Bot - NR&NB-IoT - B2, 1935MHz, 30 MHz to 22 GHz, Horizontal (Peak)



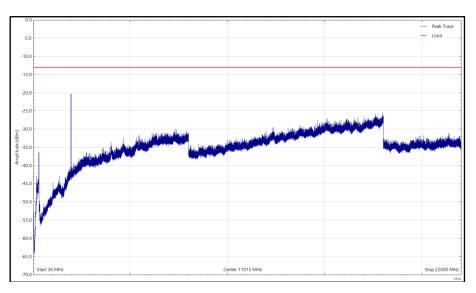
Bot - NR&NB-IoT - B2, 1935MHz, 30 MHz to 22 GHz, Vertical (Peak)



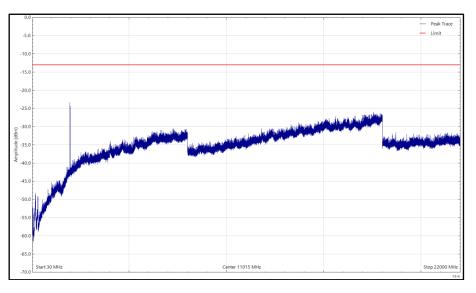
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Mid - NR&NB-IoT - B2, 1960MHz, 30 MHz to 22 GHz

*No emissions found within 6 dB of the limit.



Mid - NR&NB-IoT - B2, 1960MHz, 30 MHz to 22 GHz, Horizontal (Peak)



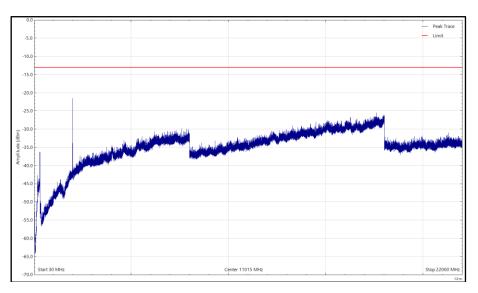
Mid - NR&NB-IoT - B2, 1960MHz, 30 MHz to 22 GHz, Vertical (Peak)



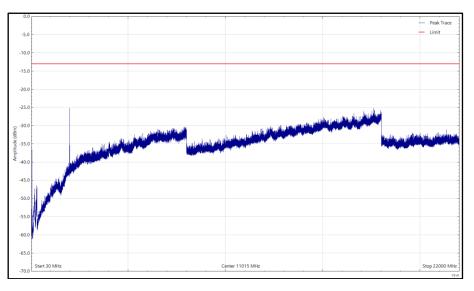
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Top - NR&NB-IoT - B2, 1985MHz, 30 MHz to 22 GHz

*No emissions found within 6 dB of the limit.



Top - NR&NB-IoT - B2, 1985MHz, 30 MHz to 22 GHz, Horizontal (Peak)



Top - NR&NB-IoT - B2, 1985MHz, 30 MHz to 22 GHz, Vertical (Peak)



No emissions were detected within 6dB of the limits however the highest emissions for each Band has been recorded below.

	Channel Frequency		Angle	Height	Frequency	Level
Channel/Band	(MHz)	Polarisation	(°)	(cm)	(MHz)	(dBm)
Bot - NR&NB-IoT - B2	1935MHz	Horizontal	0	155	17994.499	-25.65
Mid - NR&NB-IoT - B2	1960MHz	Vertical	0	155	1956.159	-23.34
Top - NR&NB-IoT - B2	1985MHz	Vertical	0	155	17586.931	-25.12

Limit	-13dBm



**SECTION 3** 

TEST EQUIPMENT USED



## 3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Maximum Peak Output					
Hygrometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022
Frequency Standard	Spectracom	SecureSync 1200- 0408-0601	4393	6	30-Jun-2022
Analyser	Keysight	N9030A	4654	12	24-Nov-2022
PSU Module	Keysight	N6754A	5836	-	OP-MON
Power System	Keysight	N6701C	5835	-	OP-MON
Multimeter	Iso-tech	IDM93N	4435	12	07-Mar-2023
Attenuator	Weinschel	48-40-43-LIM	5134	12	05-Jan-2023
Network Analyser	Keysight	N5235B	5361	12	29-Jun-2022
Occupied Bandwidth			•		
Hygrometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022
Frequency Standard	Spectracom	SecureSync 1200- 0408-0601	4393	6	30-Jun-2022
Analyser	Keysight	N9030A	4654	12	24-Nov-2022
PSU Module	Keysight	N6754A	5836	-	OP-MON
Power System	Keysight	N6701C	5835	-	OP-MON
Multimeter	Iso-tech	IDM93N	4435	12	07-Mar-2023
Attenuator	Weinschel	48-40-43-LIM	5134	12	05-Jan-2023
Network Analyser	Keysight	N5235B	5361	12	29-Jun-2022
Band Edge					
Hygrometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022
Frequency Standard	Spectracom	SecureSync 1200- 0408-0601	4393	6	30-Jun-2022
Analyser	Keysight	N9030A	4654	12	24-Nov-2022
PSU Module	Keysight	N6754A	5836	-	OP-MON
Power System	Keysight	N6701C	5835	-	OP-MON
Multimeter	Iso-tech	IDM93N	4435	12	07-Mar-2023
Attenuator	Weinschel	48-40-43-LIM	5134	12	05-Jan-2023
Network Analyser	Keysight	N5235B	5361	12	29-Jun-2022
Transmitter Spurious Er	missions		•		
Hygrometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022
Frequency Standard	Spectracom	SecureSync 1200- 0408-0601	4393	6	30-Jun-2022
Analyser	Keysight	N9030A	4654	12	24-Nov-2022
PSU Module	Keysight	N6754A	5836	-	OP-MON
Power System	Keysight	N6701C	5835	-	OP-MON
Multimeter	lso-tech	IDM93N	4435	12	07-Mar-2023



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Attenuator	Weinschel	48-40-43-LIM	5134	12	05-Jan-2023
Network Analyser	Keysight	N5235B	5361	12	29-Jun-2022
HPF	Advance Power Components	11SH10- 3000/X18000-O/O	4411	12	02-Jul-2022
Waveguide filter	Quasar	QWS20SB-UBR- UBR-50	5789	12	04-May-2022
WG20 Coaxial Adapter	Quasar	QWC20SB-UBR-K-F	5785	-	OP-MON
WG20 Coaxial Adapter	Quasar	QWC20SB-UBR-K-F	5786	-	OP-MON
Cable attenuator	Aralab	CSF6767C-C2S6500	5175	-	OP-MON
Radiated Emissions					
Antenna (DRG, 18 GHz to 40 GHz)	Link Microtek Ltd	AM180HA-K-TU2	230	24	27-Jul-2022
Antenna with attenuator (Bilog, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	14-Oct-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
Emissions Software	TUV SUD	EmX V2.1.11 V.2.1.11	5125	-	Software
Cable (N-Type to N- Type, 8 m)	Teledyne	PR90-088-8MTR	5450	6	01-Apr-2022
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5610	12	15-Oct-2022
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023
EMI Test Receiver	Rohde & Schwarz	ESW44	5912	12	17-Feb-2023
Thermo-Hygro Barometer	PCE Instruments	PCE-THB-40	5605	12	23-Sep-2022
Antenna DRG 1-18 GHz	ETS-Lindgren	3117	4722	12	11-Mar-2023
Power Source	PDS Instruments	31020-00071	4133	TU	O/P Mon
Multimeter	Fluke	177	3832	12	08-Jul-2022
Power Supply	Farnell	H 60/50	1095	TU	O/P Mon

N/A – Not Applicable O/P Mon – Output Monitored with Calibrated Equipment



### 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU		
Conducted Maximum Peak Output Power	9 kHz to 40 GHz Amplitude	± 1.0 dB		
Conducted Emissions	9 kHz to 40 GHz Amplitude	± 3.5 dB		
	10 MHz Bandwidth			
Occupied Bandwidth	15 MHz Bandwidth	± 16.7 kHz		
	20 MHz Bandwidth			
Band Edge	< 3.6 GHz Amplitude	± 0.6 dB		
Dedicted Sourieus Emissions	30 MHz to 1 GHz	± 5.2 dB		
Radiated Spurious Emissions	1 GHz to 40 GHz	± 6.3 dB		

#### Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2007, Clause 4.4.3 and 4.5.1. (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8



## 3.3 MEASUREMENT SOFTWARE USED

List of measurement software versions used for testing.

Instrument	Manufacturer	Type No.	TE No.	Software Version
Network Analyser	Keysight	N5235B	5361	A.22.08
HP-VEE Software	TUV SUD	HP_VEE	N/A	V3.29
Emissions Software	TUV SUD	EmX	5125	V.2.1.11



**SECTION 5** 

# ACCREDITATION, DISCLAIMERS AND COPYRIGHT



### 4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



### This report relates only to the actual item/items tested.

Our Swedac Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our Swedac Accreditation.

Results of tests not covered by our Swedac Accreditation Schedule are marked NSA (Not Swedac Accredited).

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Postal Address: Djäknegatan 31, 211 35, Malmo, Sweden Postal Address :Octagon House, Concorde Way, Fareham, Hampshire, UK, PO15 5RL

# ANNEX A

# MODULE LIST

Configuration A				
Product	Product No	R-State	Serial No	
Radio 2217 B2	KRC 161 563/1	R1A	CF85078531	
Software Version:	CXP9013268/9	Revision:	R84JD	