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Report On

FCC and ISED Testing of the Ericsson Radio 4426 B66, KRC 161 472/3 NR (2100 MHz) Base Station in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 27, Industry Canada RSS-GEN Industry Canada RSS-139 and Industry Canada RSS-170

COMMERCIAL-IN-CONFIDENCE

FCC: TA8AKRC161472-3
IC: 287AB-AS1614723

PREPARED BY	APPROVED BY	DATED
Maggie Whiting Key Account Manager	Steve Scarfe Authorised Signatory	14 February 2022

Steve Scarfe Digitally signed by Steve Scarfe Date: 2022.02.14 16:40:57 Z

Document 75953954 Report 05 Issue 1 **February 2022**

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Section **Page No**

SECTION 1

REPORT INFORMATION

1.1 REPORT DETAILS

Manufacturer	Ericsson
Address	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Product Name & Product Number	Radio 4426 B66 - KRC 161 472/3
IC Model Name	AS1614723
Serial Number(s)	CF85825155
Software Version	CXP9013268/15 Revision R89AJ
Hardware Version	R2B
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2014 FCC CFR 47 Part 27: 2014 Industry Canada RSS-GEN: Issue 4: 2014 Industry Canada RSS-139: Issue 2: 2009 Industry Canada RSS-170: Issue 3: 2015 + Amendment:2020
Test Plan	Q1 2022 FCC_IC test plan for MR7602-1 NR-IoT V 1.1
Start of Test	8-December-2021
Finish of Test	15-December-2021
Name of Engineer(s)	Neil Rousell, Paul Dickson, 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: 2014, FCC CFR 47 Part 27: 2014, Industry Canada RSS-GEN: Issue 4: 2014, Industry Canada RSS-139: Issue 2: 2009, Industry Canada RSS-170: Issue 3: 2015 + Amendment:2020 The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

Neil Rousell, Paul Dickson,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 27, Industry Canada RSS-GEN, Indusrty Canada RSS-170 and Industry Canada RSS-139 is shown below.

Section	Specification Clause					Test Description	Result
	FCC CFR 47 Part 2	FCC CFR 47 Part 27	RSS-GEN	RSS-139	RSS-170		
2.1	2.1046	27.50	-	6.5	5.3	Maximum Peak Output Power and Peak to Average Ratio - Conducted	Pass
2.2	2.1049	27.53	6.6	-	-	Occupied Bandwidth	Pass
2.3	2.1051	27.53	-	6.5	-	Band Edge	Pass
2.4	2.1051	27.53	-	6.6	5.4	Transmitter Spurious Emissions	Pass
2.5	2.1053	27.53	6.13	6.6	5.4	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

RATs	Carriers	Pout (W)	NR Main carrier				Comment
			Position	BW	Freq	NR-ARFCN	
NR in NR/ESS Setup (NB IoT IB) QPSK	1	60	B	10	2115	423000	with 15 kHz SCS, QPSK
			M	10	2155	431000	with 15 kHz SCS, QPSK
			T	10	2195	439000	with 15 kHz SCS, QPSK
			B	15	2117.5	423500	with 15 kHz SCS, QPSK
			M	15	2155	431000	with 15 kHz SCS, QPSK
			T	15	2192.5	438500	with 15 kHz SCS, QPSK
			B	20	2120	424000	with 15 kHz SCS, QPSK
			M	20	2155	431000	with 15 kHz SCS, QPSK
			T	20	2190	438000	with 15 kHz SCS, QPSK
			T	10	2195	439000	with 15 kHz SCS, QPSK

1.5 DECLARATION OF BUILD STATUS

Equipment Description		
Technical Description: (Please provide a brief description of the intended use of the equipment including the technologies the product supports)		Multi-standard remote radio unit Radio 4426 B66, 4Tx and 4Rx
Manufacturer:		Ericsson AB
Model:		Radio 4426 B66
Part Number:		KRC 161 472/3
Hardware Version:		R2B
Software Version:		CXP9013268/15 Revision R89AJ
FCC ID of the product under test		TA8AKRC161472-3
IC ID of the product under test		287AB-AS1614723
Intentional Radiators		
Frequency Range (MHz to MHz) B66 :LTE ,NR	TX (DL): 2110 - 2200 MHz RX (UL): 1710 - 1780 MHz	BW: 90MHz BW: 70MHz
Frequency Range (MHz to MHz) B66 :WCDMA	TX (DL): 2110 - 2155 MHz	RX (UL): 1710 - 1755 MHz
Conducted Declared Output Power (dBm)	47.8 Max output power per port 60 W	
Rat SC carrier Power (Max) :NR	BW	PWR/Carrier(Max)
	10MHz	60 W
	15MHz	60W
	20MHz	60W
Radio Configuration:	4 RX / 4TX	
Duplex mode:	FDD	
Radio Access Technology, RAT(s):	Single RAT :WCDMA, LTE, NR, NB-IoT (IB, GB, SA) Multi RAT : WCDMA,+LTE ; WCDMA,+ NR: LTE+ NR; LTE+ NB-IoT LTE+ NR + WCDMA; LTE+ NR + NB-IoT SA; LTE+ WCDMA+ NB-IoT SA;	
Supported Bandwidth(s) (MHz)	NR: 5MHz, 10MHz, 15MHz, 20MHz LTE: 5MHz, 10MHz, 15MHz, 20MHz WCDMA : 5 MHz NB-IoT(SA): 200 kHz	
Antenna Gain (dBi)	17,9 (B66)	
Antenna Impedance(Ω)	50	
Supported modulation scheme, LTE:	QPSK, 16QAM, 64QAM, 256QAM	
Supported modulation scheme, NR:	QPSK, 16QAM, 64QAM, 256QAM	
Supported modulation scheme, WCDMA:	QPSK, 16QAM, 64QAM	
Supported modulation scheme, NB-IoT :	QPSK	
NR SCS	15kHz	
RF power Tolerance:	.+0.6/-2.5 dB	
Frequency Tolerance:	±0.05 ppm	
Carrier Aggregation, CA	Supported	

Maximum supported number of DL NR carrier per port	6/Band		
Maximum supported number of DL LTE carrier per port	6/Band		
Nominal output power per Antenna Port / Band	SRO / MRO: Single / Multi Carrier: 60W (47,8 dBm)		
Supported transmission modes:	4X4 MIMO		
Unintentional Radiators			
Highest frequency generated or used in the device or on which the device operates or tunes			Up to 10.1 Gbit/s
Lowest frequency generated or used in the device or on which the device operates or tunes if <30MHz			.-
Class A Digital Device (Use in commercial, industrial or business environment)			.-
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:	30A		
Temperature			
Minimum temperature:	-40°C		
Maximum temperature:	55°C		
Ancillaries			
Manufacturer:	X	Part Number:	X
Model:	X	Model:	X
I hereby declare that I am entitled to sign on behalf of the manufacturer and that the information supplied is correct and complete.			
Name:	Afrah Ali sadiq		
Position held:	Regulatory Approval Engineer		
Email address:	Afrah.ali.sadiq@ericsson.com		
Telephone number:	.+46724650796		
Date:	11/02/2022		

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

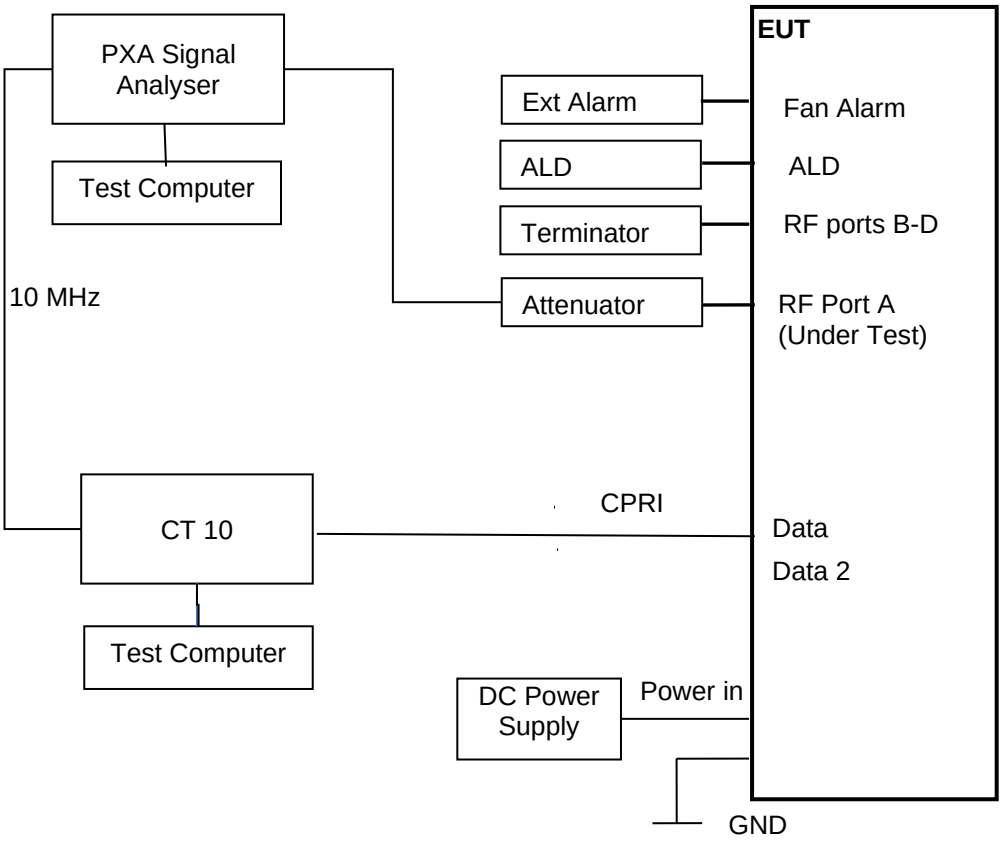
The Equipment Under Test (EUT) Radio 4426 B66 - KRC 161 472/3 is an Ericsson AB Radio Unit working in the public mobile service Band 66 band which provides communication connections to Band 66 network. The EUT operates from a -48V DC supply.

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

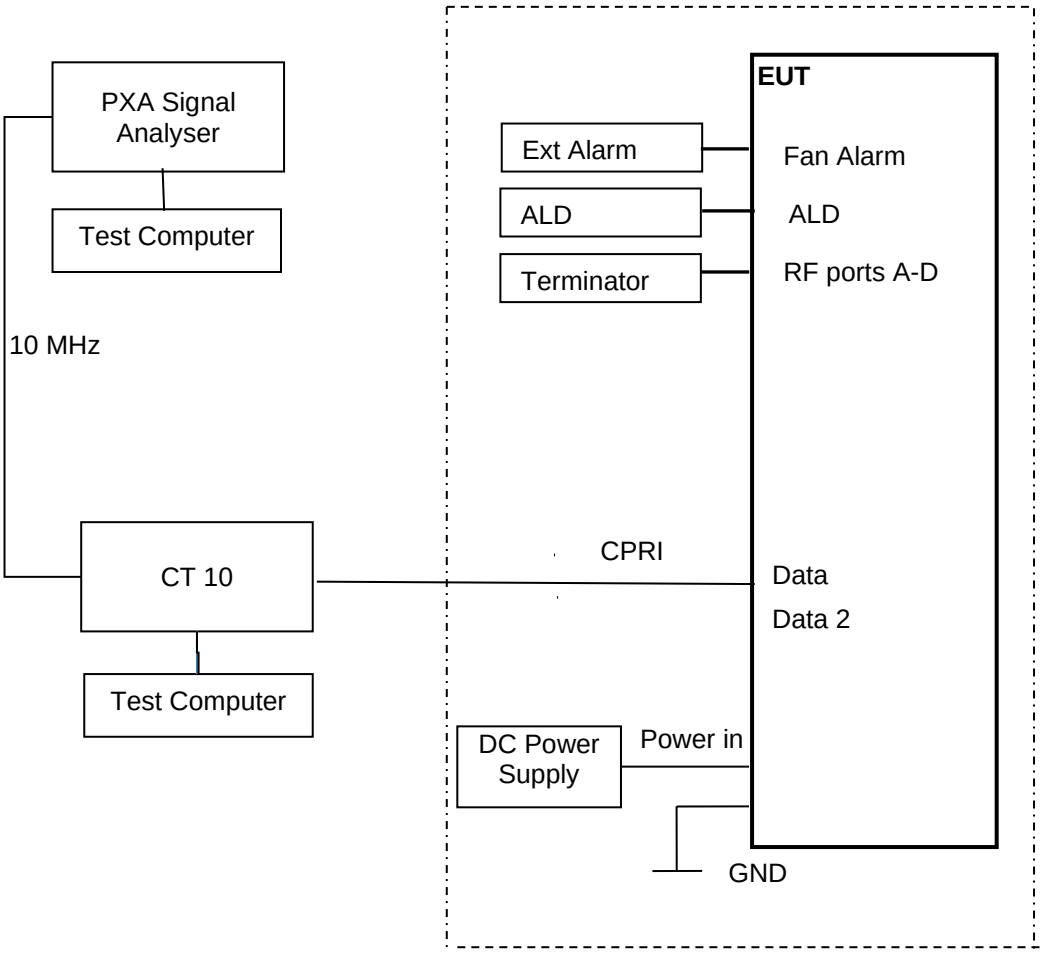
Equipment Under Test

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

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	Paul Dickinson/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 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 27, Clause 27.50
Industry Canada RSS-139, Clause 6.5
Industry Canada RSS-170: Clause 5.3
FCC CFR 47 Part 2, Clause 2.1046

2.1.2 Date of Test and Modification State

08-December-2021 - 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 Temperature	21.7°C
Relative Humidity	35.1%

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

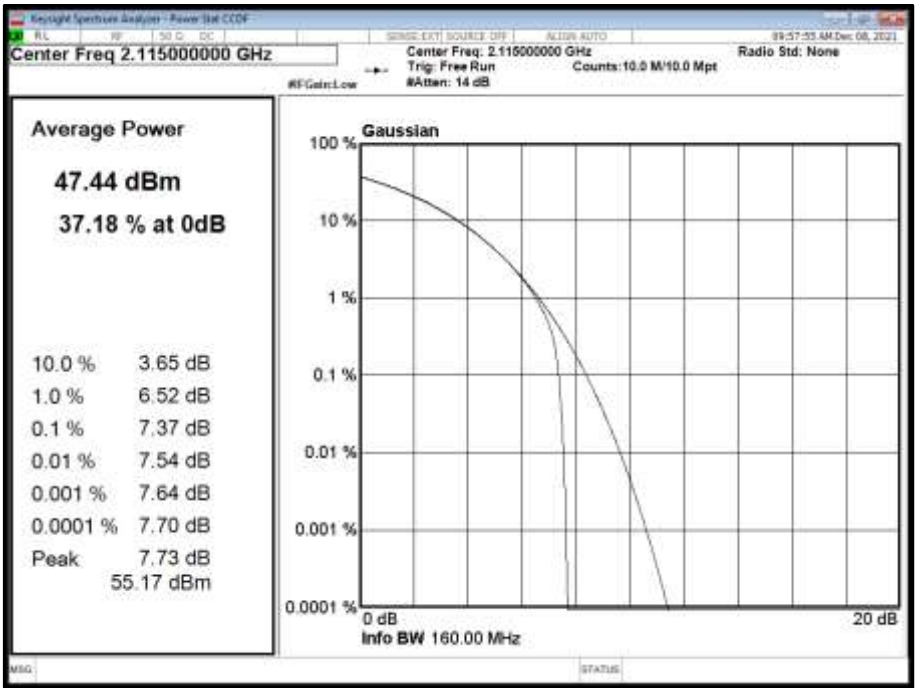
Maximum Output Power 47.78 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power / PSD				
			Channel Position B				
			PAR (dB)	Average Power/PSD		Total Power Port A + B + C + D	Total Power Port A + B + C + D
				dBm	dBm/MHz	dBm	dBm/MHz
A	QPSK	10.0 MHz 15 kHz SCS	7.37	47.48	38.61	53.50	44.63
A	QPSK	15.0 MHz 15 kHz SCS	7.32	47.60	38.34	53.62	44.36
A	QPSK	20.0 MHz 15 kHz SCS	7.32	47.44	38.12	53.46	44.14

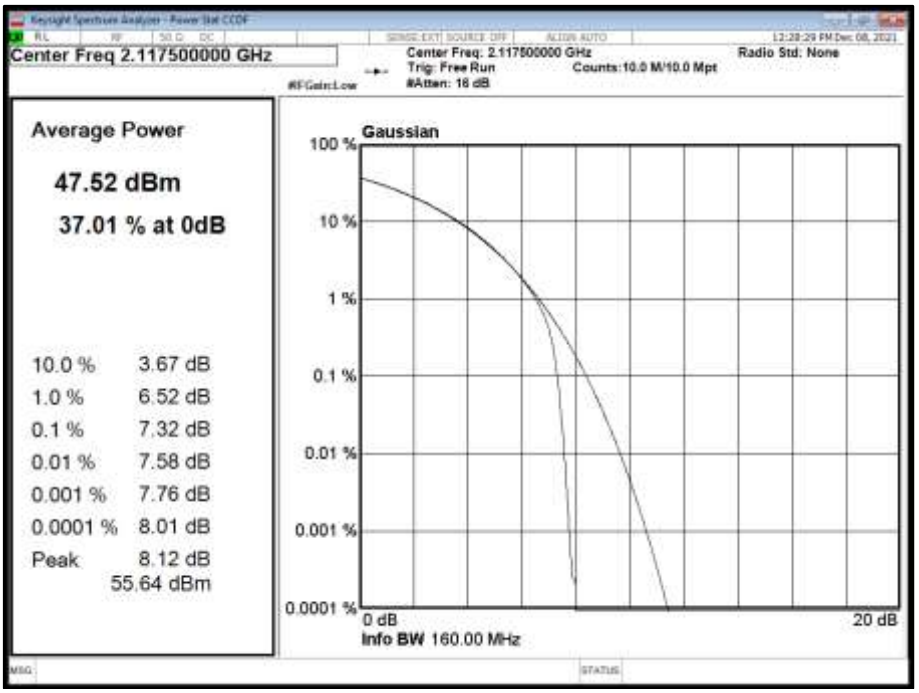
Remarks

Calculations: Total Power = Measured Output Power (port A, worst case) + 10log (NANT)
Where NANT refers to the number of Ports. In this product = 4.

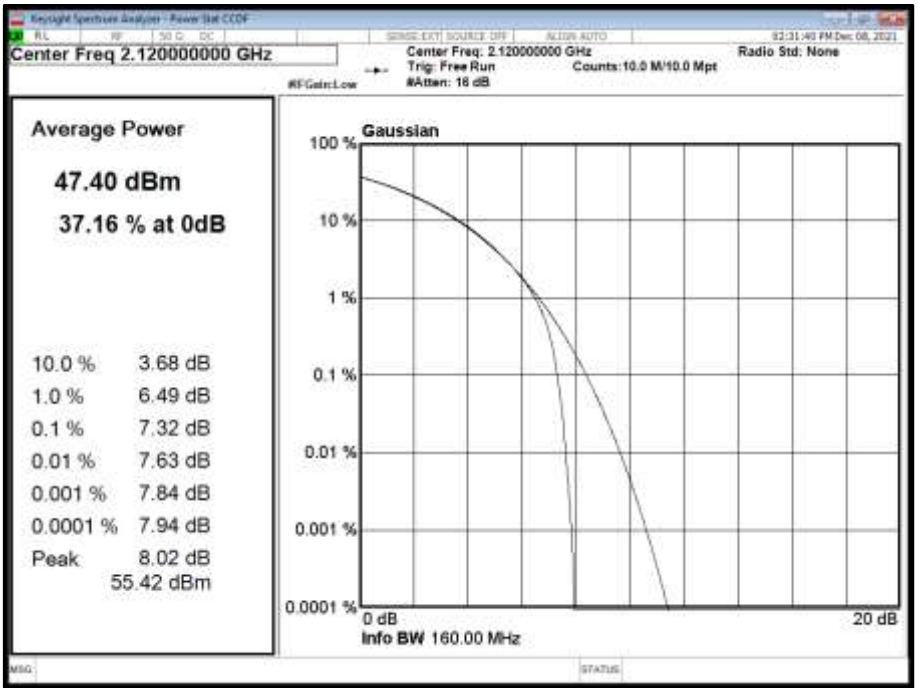
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 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

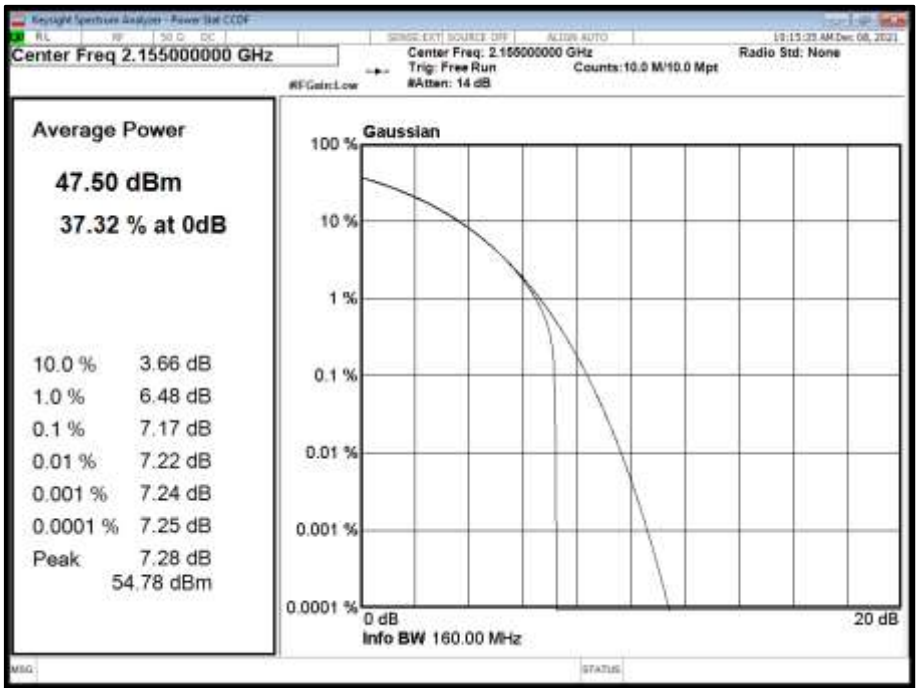
Maximum Output Power 47.78 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power / PSD				
			Channel Position M				
			PAR (dB)	Average Power/PSD		Total Power Port A + B + C + D	Total Power Port A + B + C + D
				dBm	dBm/MHz	dBm	dBm/MHz
A	QPSK	10.0 MHz 15 kHz SCS	7.17	47.55	38.66	53.57	44.68
A	QPSK	15.0 MHz 15 kHz SCS	7.25	47.46	38.16	53.48	44.18
A	QPSK	20.0 MHz 15 kHz SCS	7.21	47.45	38.03	53.47	44.05

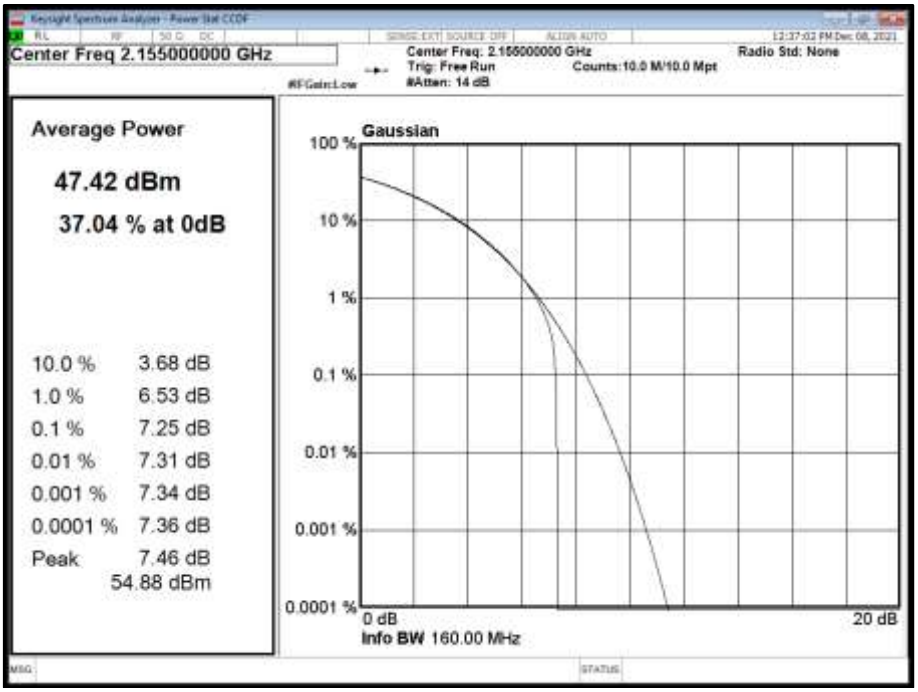
Remarks

Calculations: Total Power = Measured Output Power (port A, worst case) + 10log (NANT)
Where NANT refers to the number of Ports. In this product = 4.

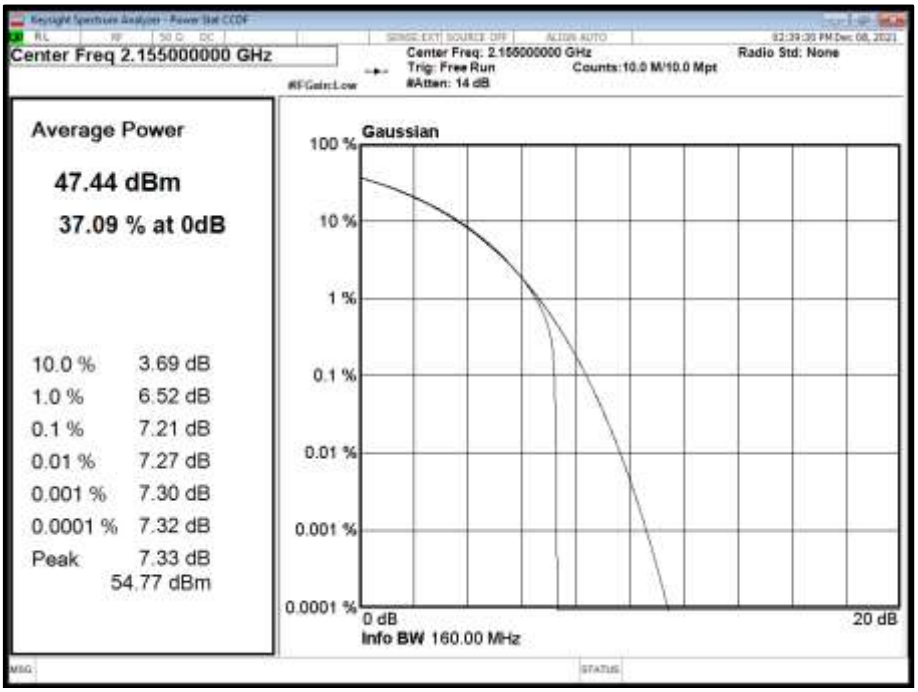
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 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

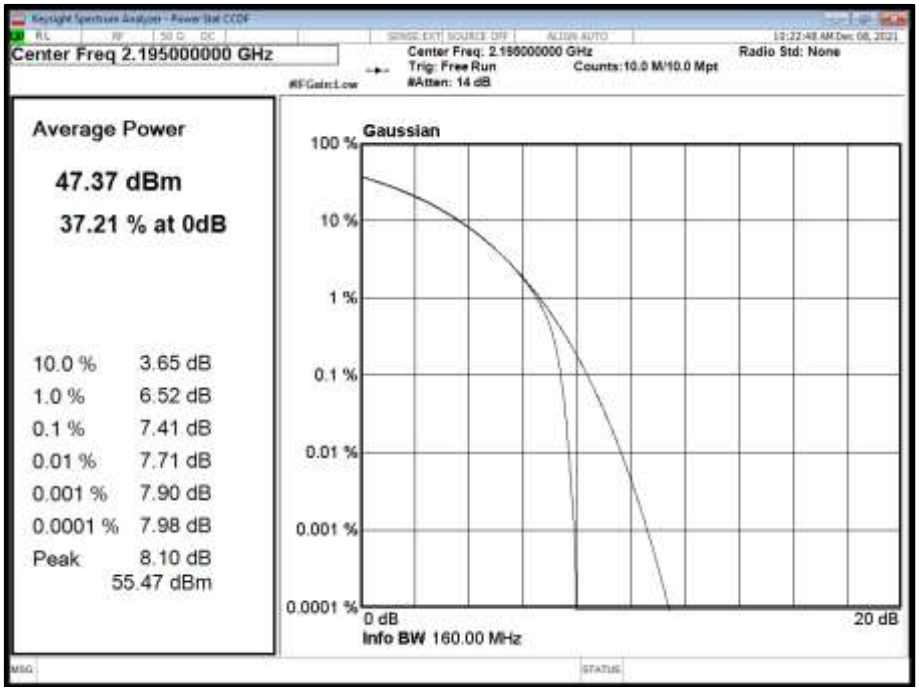
Maximum Output Power 47.78 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power / PSD				
			Channel Position T				
			PAR (dB)	Average Power/PSD		Total Power Port A + B + C + D	Total Power Port A + B + C + D
				dBm	dBm/MHz	dBm	dBm/MHz
A	QPSK	10.0 MHz 15 kHz SCS	7.41	47.35	38.55	53.37	44.57
A	QPSK	15.0 MHz 15 kHz SCS	7.44	47.44	38.37	53.46	44.39
A	QPSK	20.0 MHz 15 kHz SCS	7.52	47.56	38.50	53.58	44.52

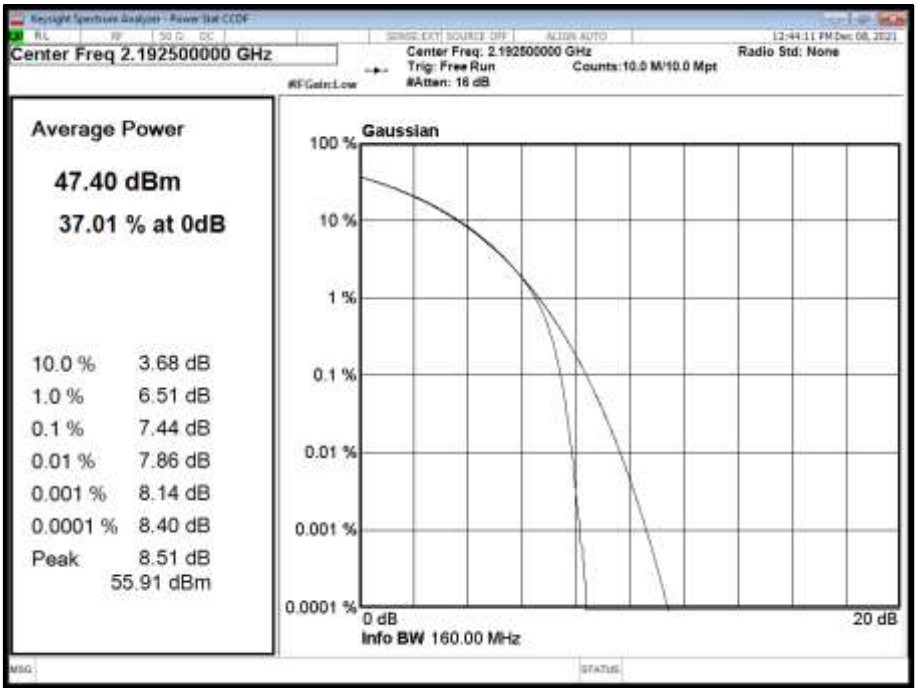
Remarks

Calculations: Total Power = Measured Output Power (port A, worst case) + 10log (NANT)
Where NANT refers to the number of Ports. In this product = 4.

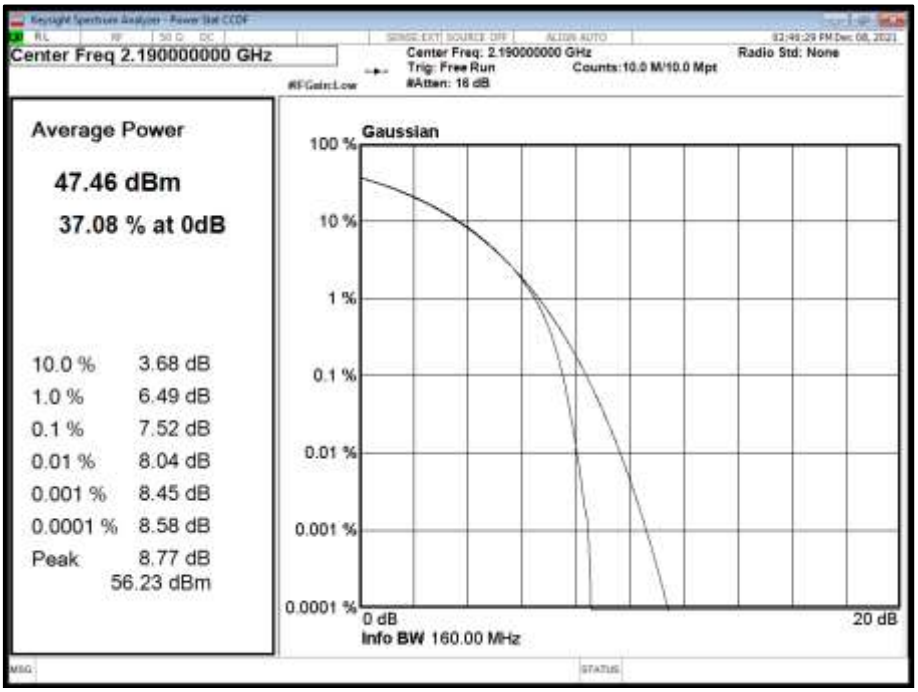
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 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 27.50 Clauses (d)

Base and Fixed Stations in the following Bands	Description	EIRP (watts/MHz)
995-2000 MHz, 2110-2155 MHz, 2155-2180 MHz or 2180-2200 MHz	Non-Urban	3280
	Urban	1640

RSS-139 Clause 6.4

Limit	
EIRP	≤ 1 W (1710-1780 MHz)
Peak to Average Ratio	13 dB

SRSP-513 Power and Antenna Height Limitations Clause 5.1.1 & 5.1.2

Limit	
Maximum EIRP (Non-Urban)	≤ 3280 W/MHz or ≤+65.15 dBm ≤ 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)
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 27, Clause 27.53
ISED RSS-GEN, Clause 6.6
FCC CFR 47 Part 2, Clause 2.1049

2.2.2 Date of Test and Modification State

08-December-2021 - 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 Temperature	21.7°C
Relative Humidity	35.1%

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).

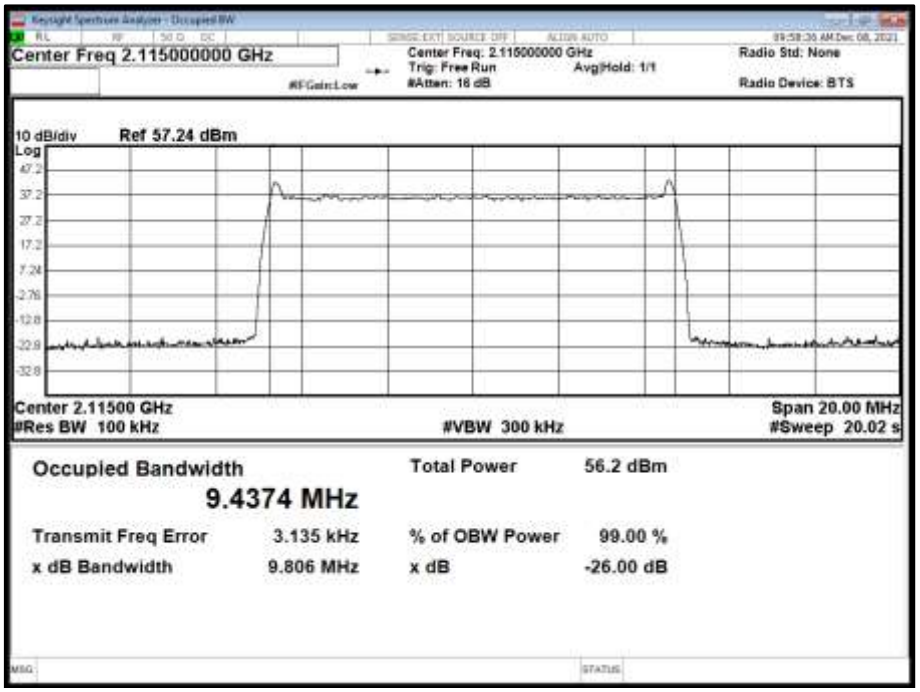
2.2.6 Test Results

Configuration 1

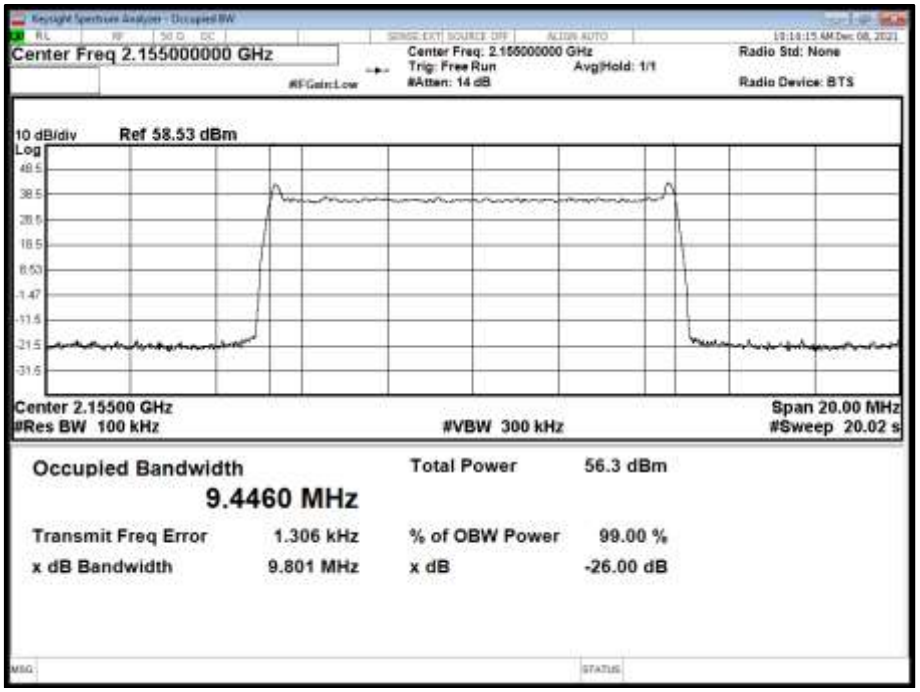
Maximum Output Power 47.78 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Result (kHz)					
			Channel Position B		Channel Position M		Channel Position T	
			Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
A	QPSK	10.0 MHz 15 kHz SCS	9437.41	9805.55	9446.01	9800.63	9445.33	9801.97
A	QPSK	15.0 MHz 15 kHz SCS	14370.13	14810.62	14362.41	14805.64	14372.39	14816.61
A	QPSK	20.0 MHz 15 kHz SCS	19187.75	19755.79	19187.19	19744.51	19183.37	19757.46

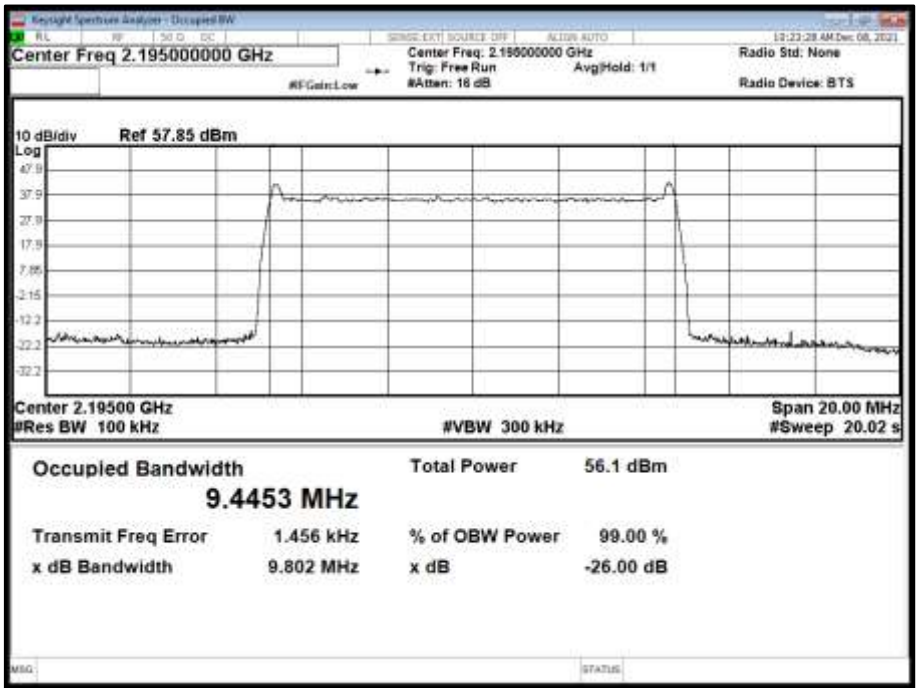
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B



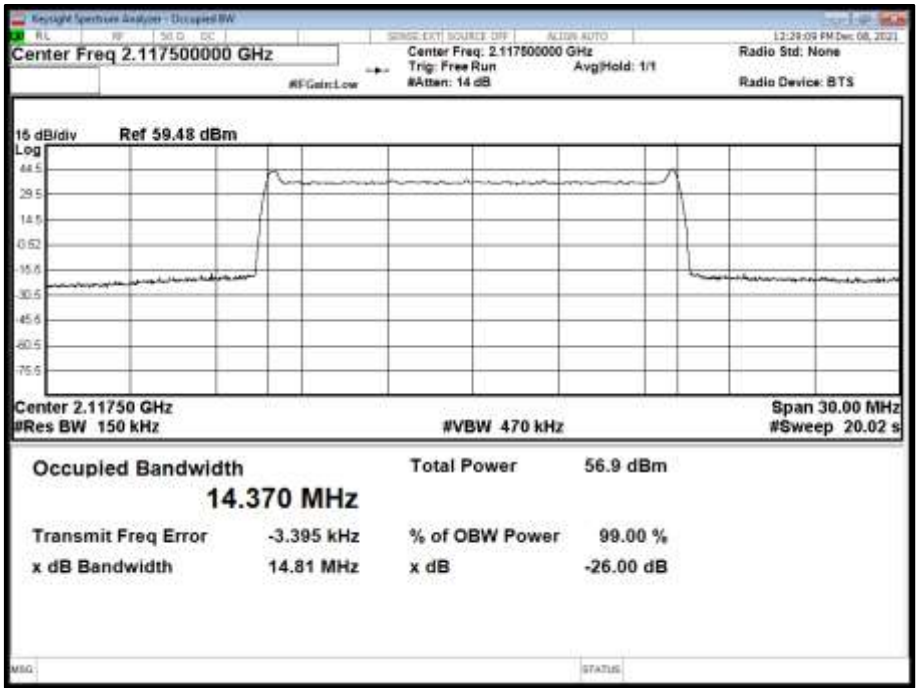
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M



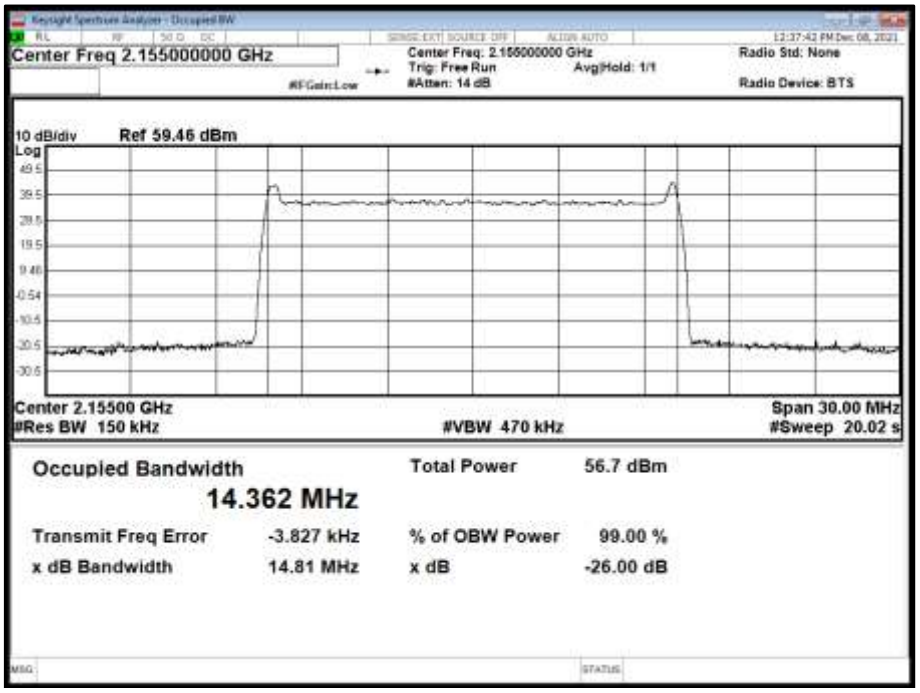
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T



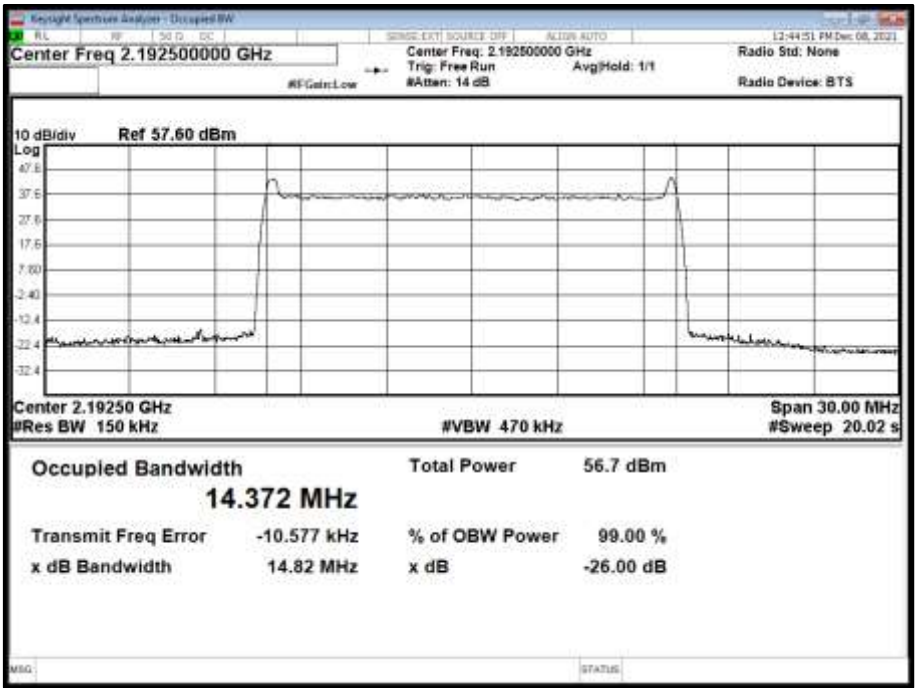
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B



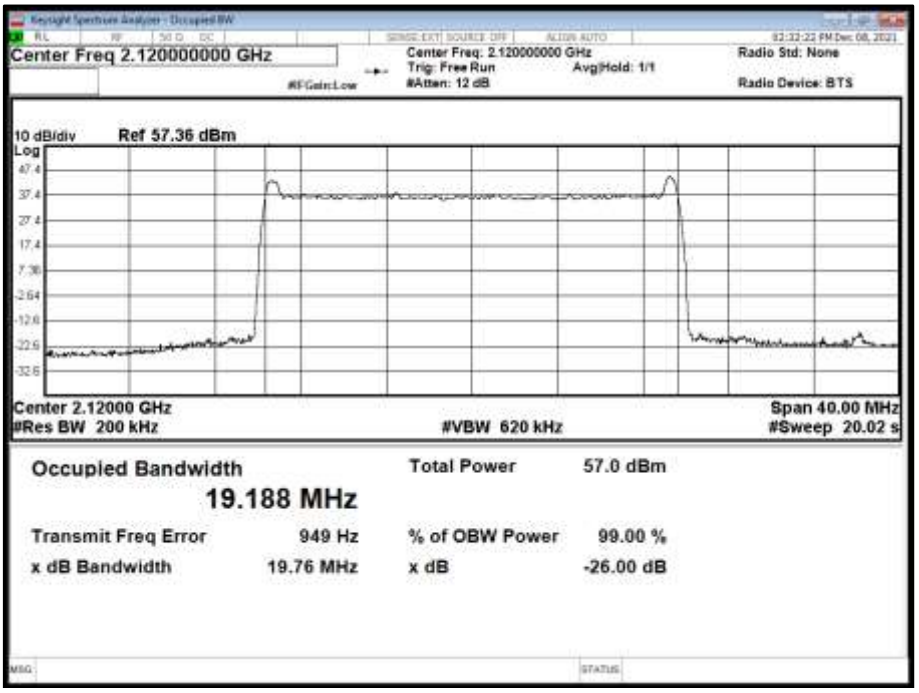
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M



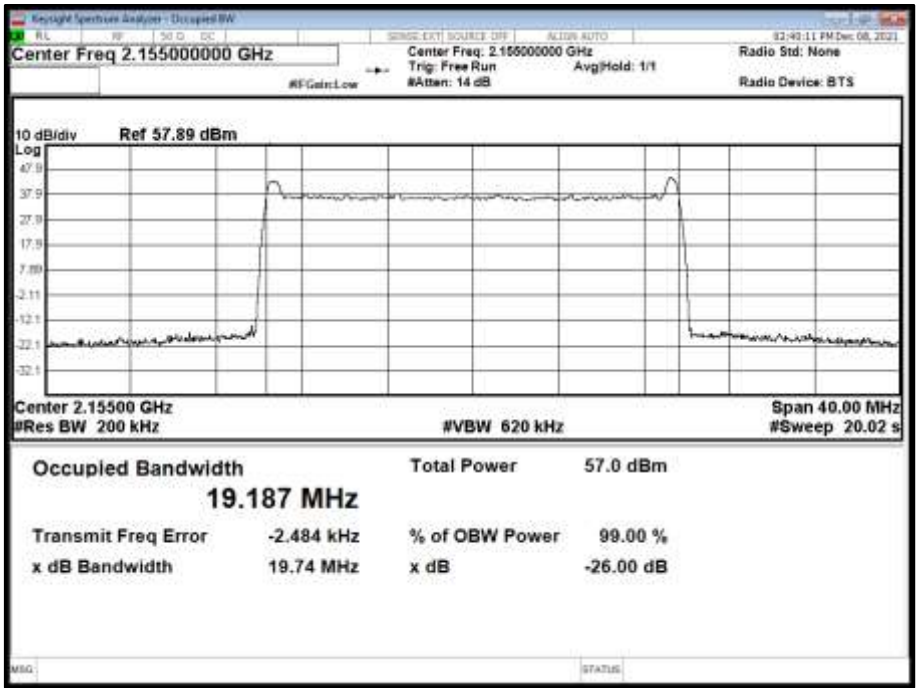
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T



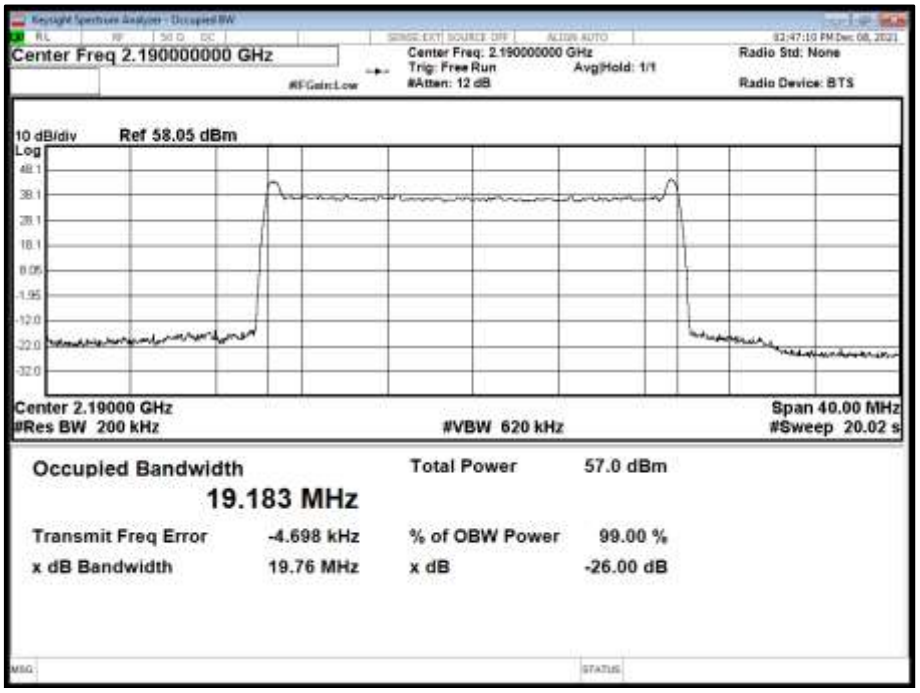
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B



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



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



2.3 BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 27, Clause 27.53
Industry Canada RSS-139, Clause 6.5
FCC CFR 47 Part 2, Clause 2.1051

2.3.2 Date of Test and Modification State

08-December-2021 - 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 Temperature	21.7°C
Relative Humidity	35.1%

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 (4) = -19 dBm.

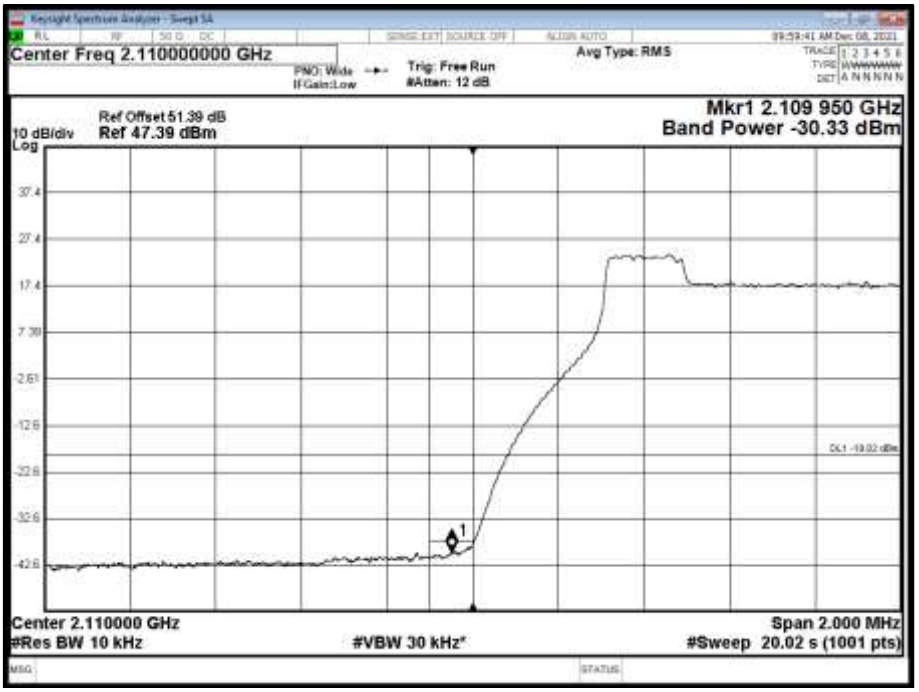
2.3.6 Test Results

Configuration 1

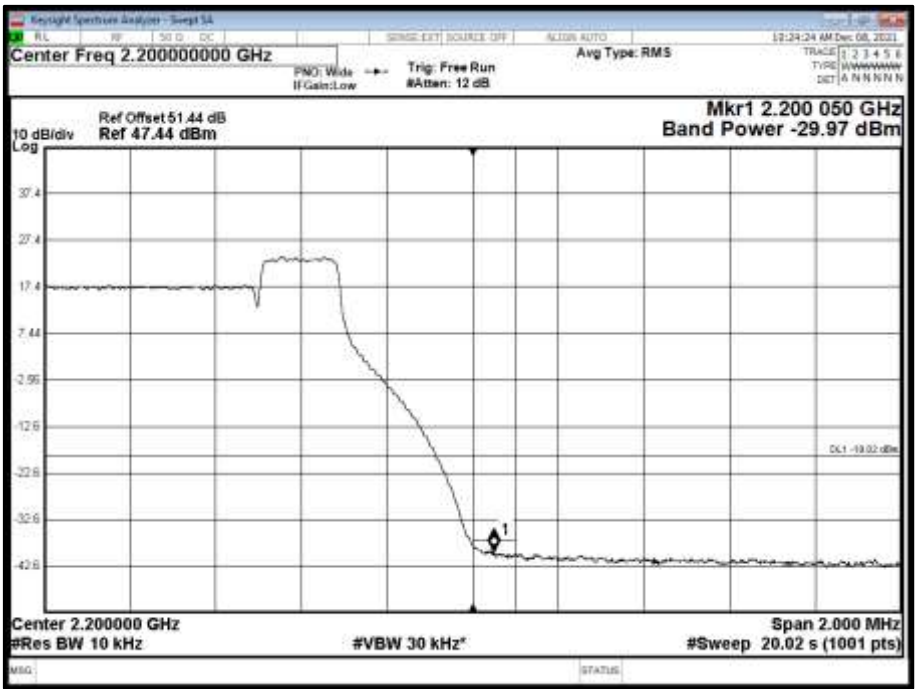
Maximum Output Power 47.78 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Band Edge (MHz)	
			Channel Position B	Channel Position T
A	QPSK	10.0 MHz 15 kHz SCS	2,115.0	2,195.0
A	QPSK	15.0 MHz 15 kHz SCS	2,117.5	2,192.5
A	QPSK	20.0 MHz 15 kHz SCS	2,120.0	2,190.0

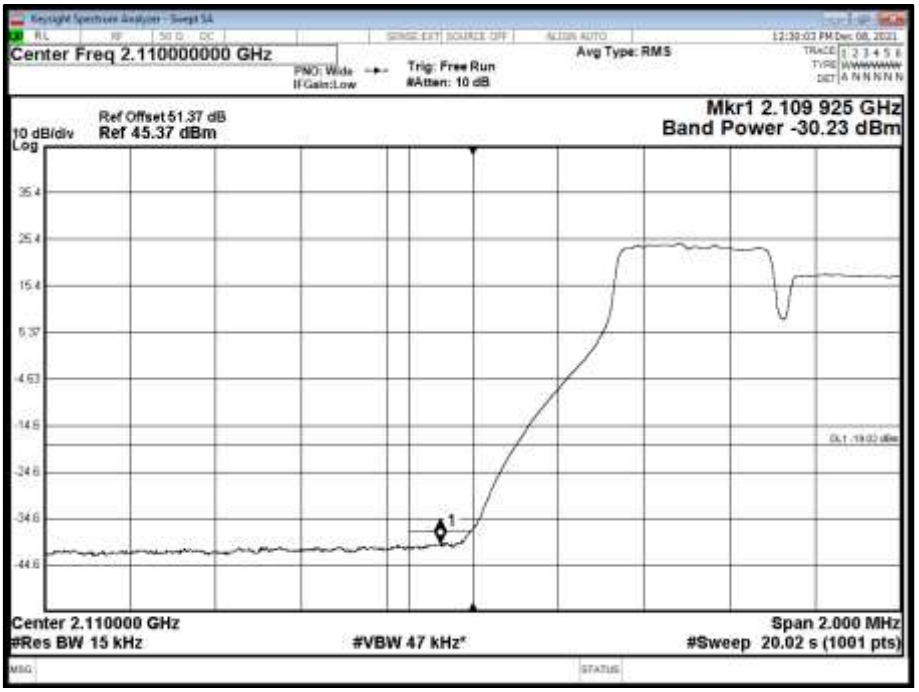
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B



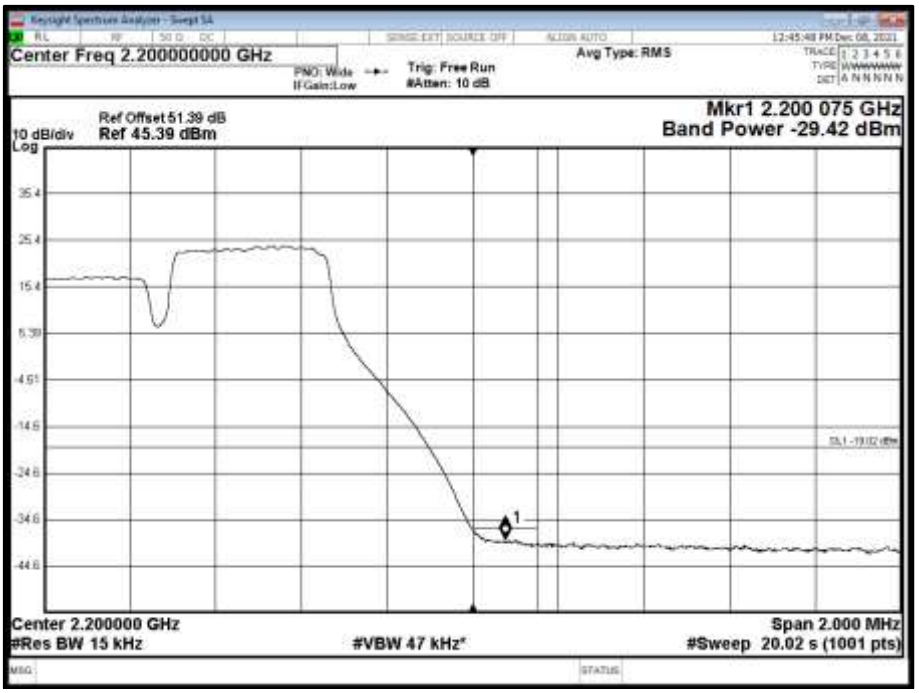
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T



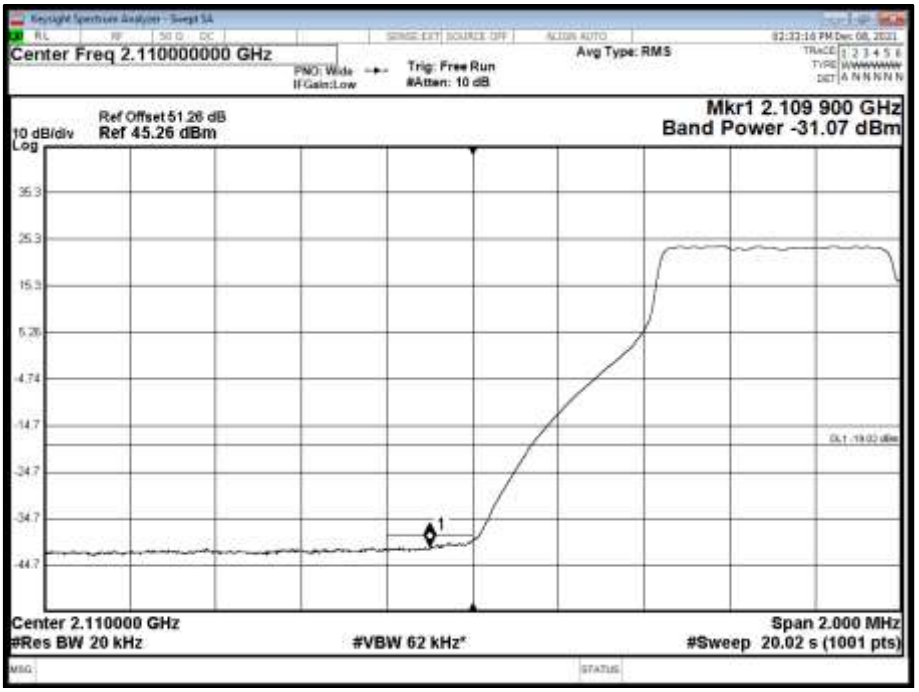
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B



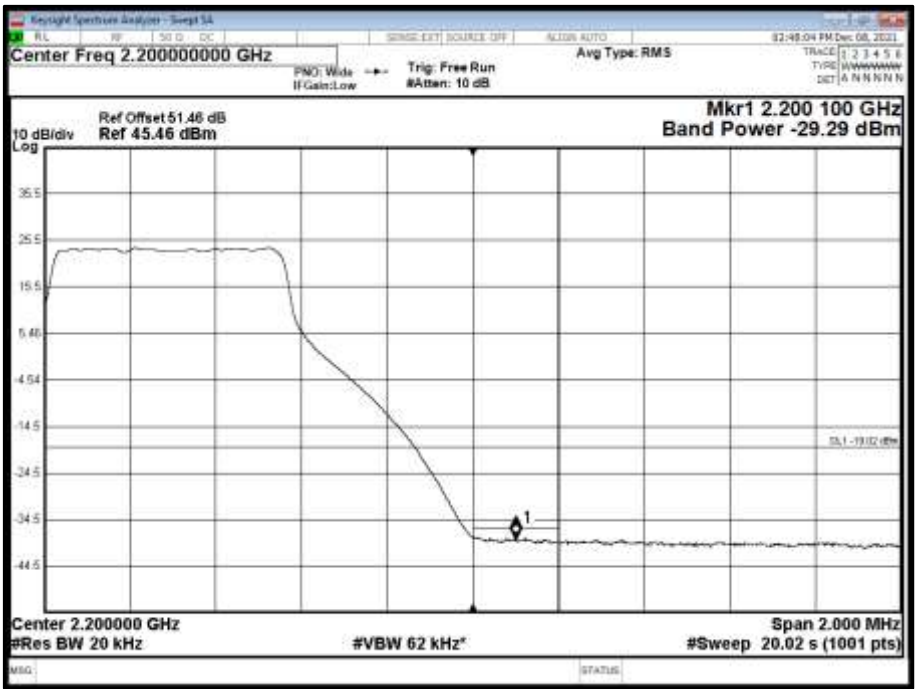
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T



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



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



Limit	-19 dBm

2.4 TRANSMITTER SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 27, Clause 27.53
Industry Canada RSS-139, Clause 6.6
Industry Canada RSS-170, Clause 5.4
FCC CFR 47 Part 2, Clause 2.1051

2.4.2 Date of Test and Modification State

08-December-2021 - 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 Temperature	21.7°C
Relative Humidity	35.1%

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.

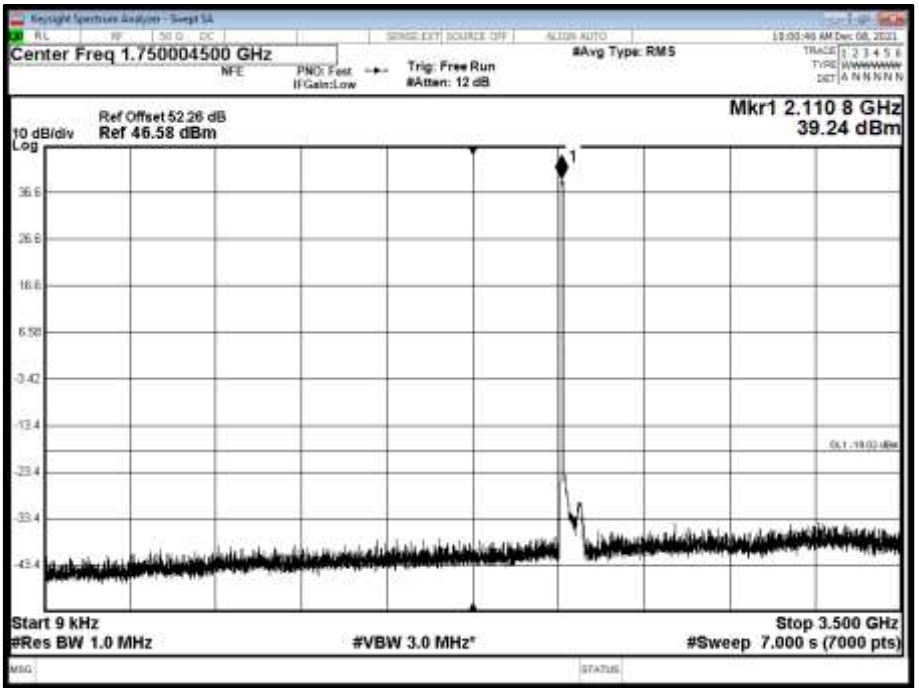
For single port, the limit was calculated as being -13 dBm - 10 * Log (4) = -19 dBm.

2.4.6 Test Results

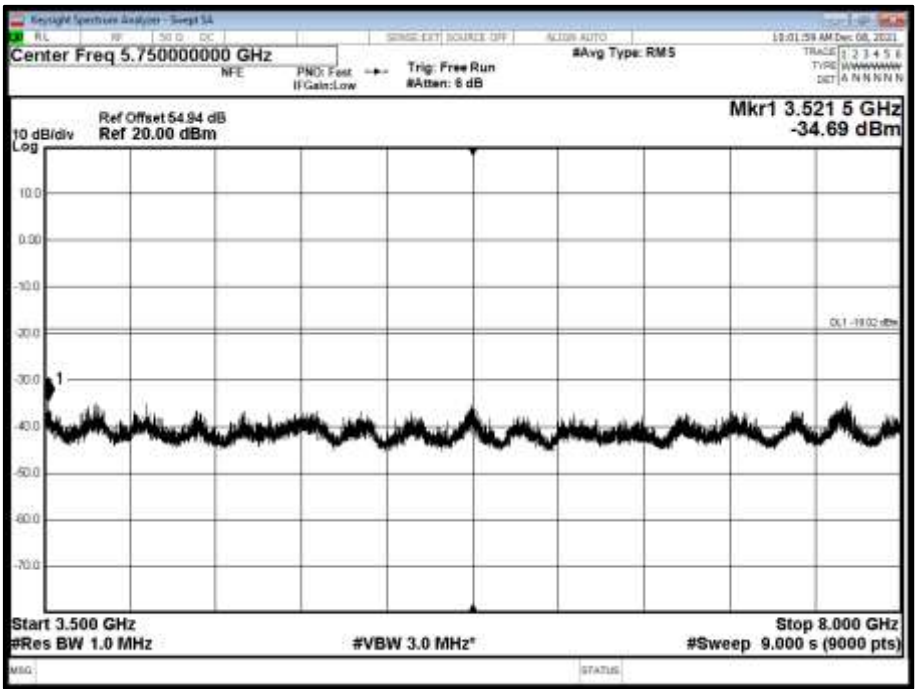
Configuration 1

Maximum Output Power 47.78 dBm

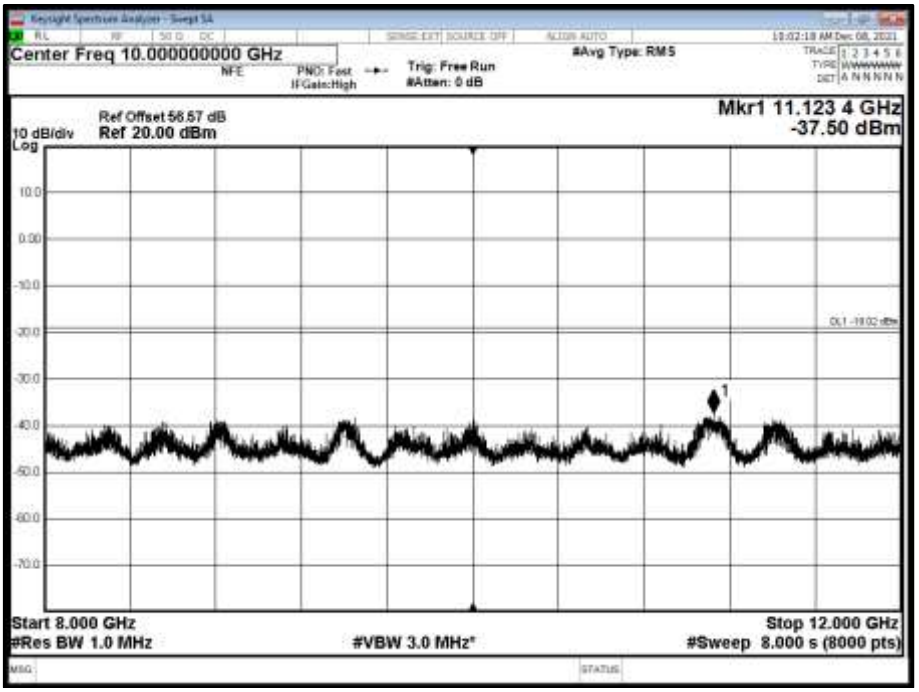
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B - Band 1.00 - Range 0.009 to 3500 MHz



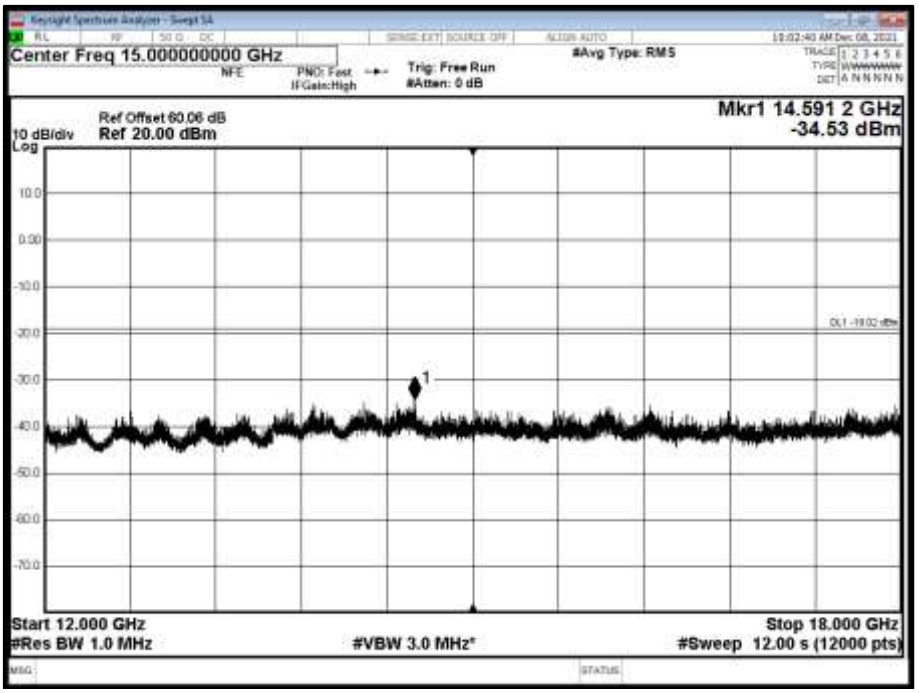
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B - Band 2 - Range 3500 to 8000 MHz



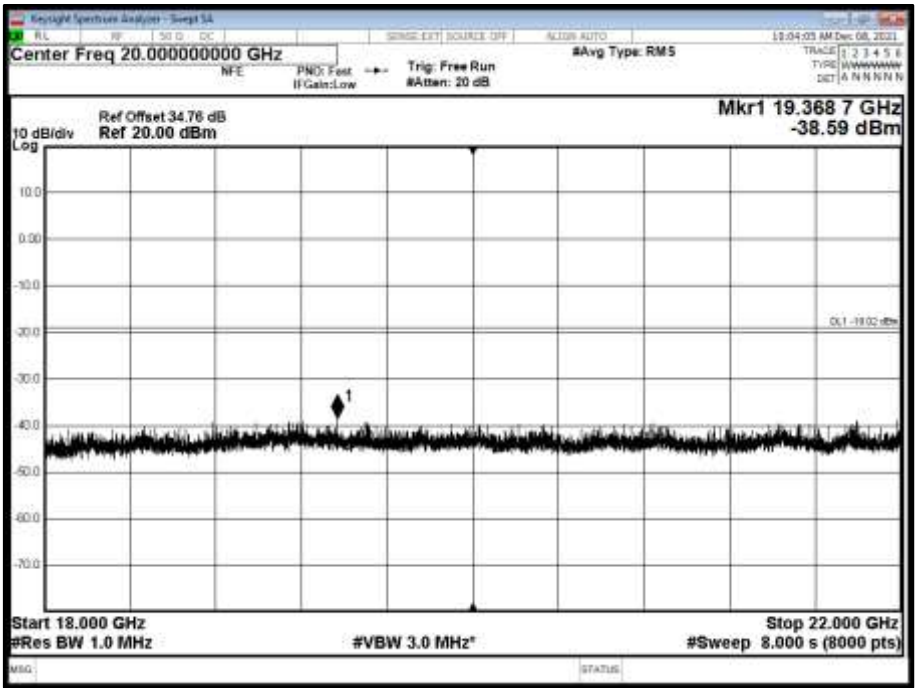
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B - Band 3 - Range 8000 to 12000 MHz



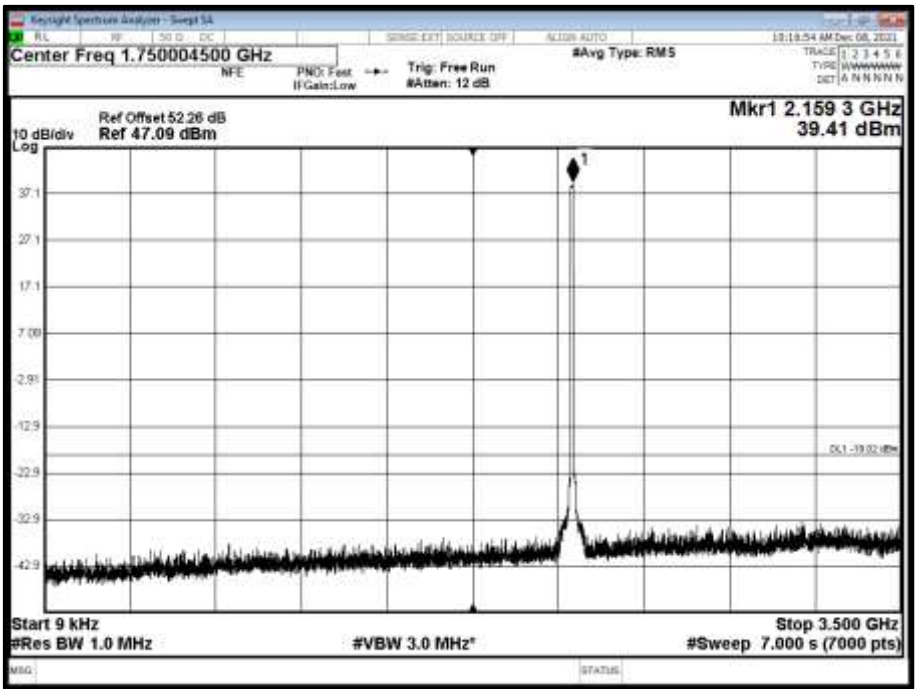
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B - Band 4 - Range 12000 to 18000 MHz



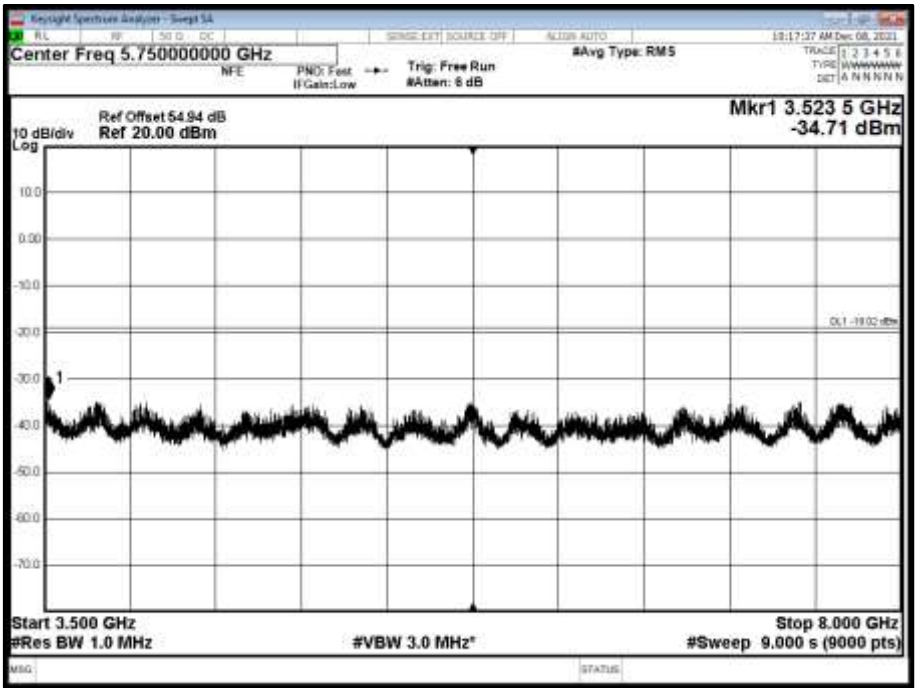
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B - Band 5 - Range 18000 to 22000 MHz



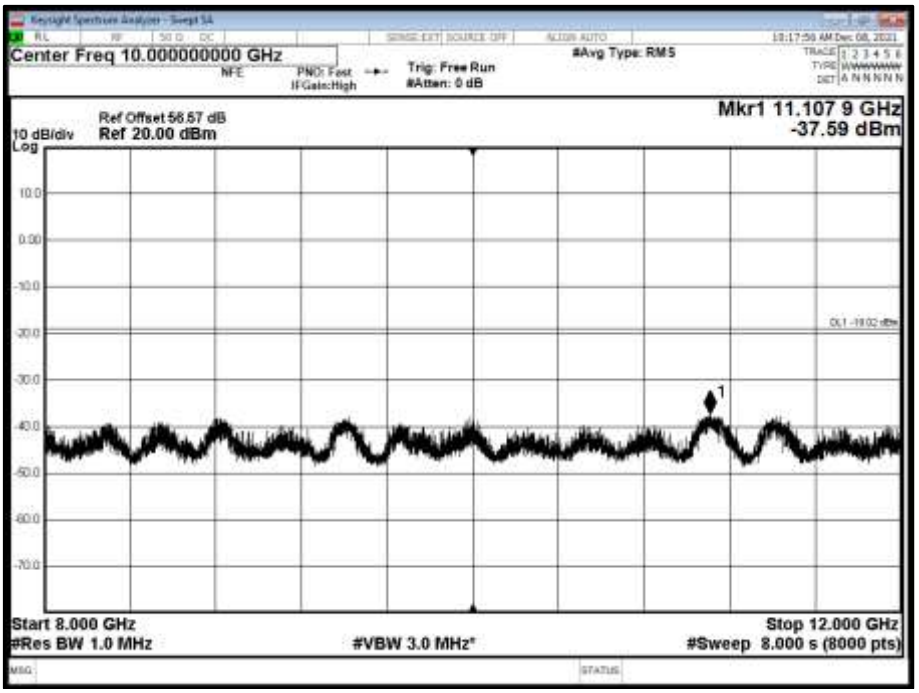
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M - Band 1.00 - Range 0.009 to 3500 MHz



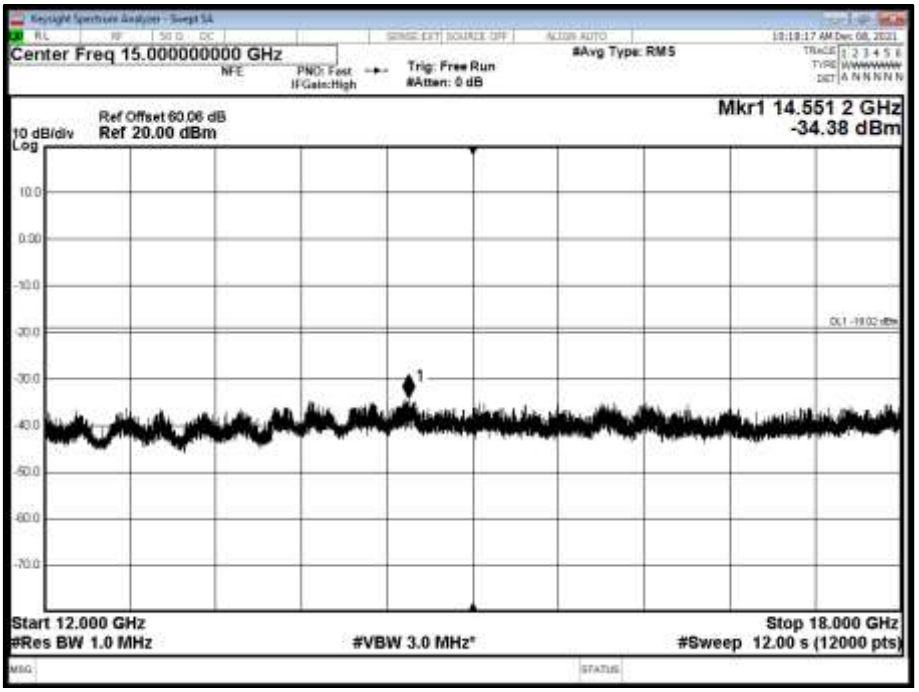
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M - Band 2 - Range 3500 to 8000 MHz



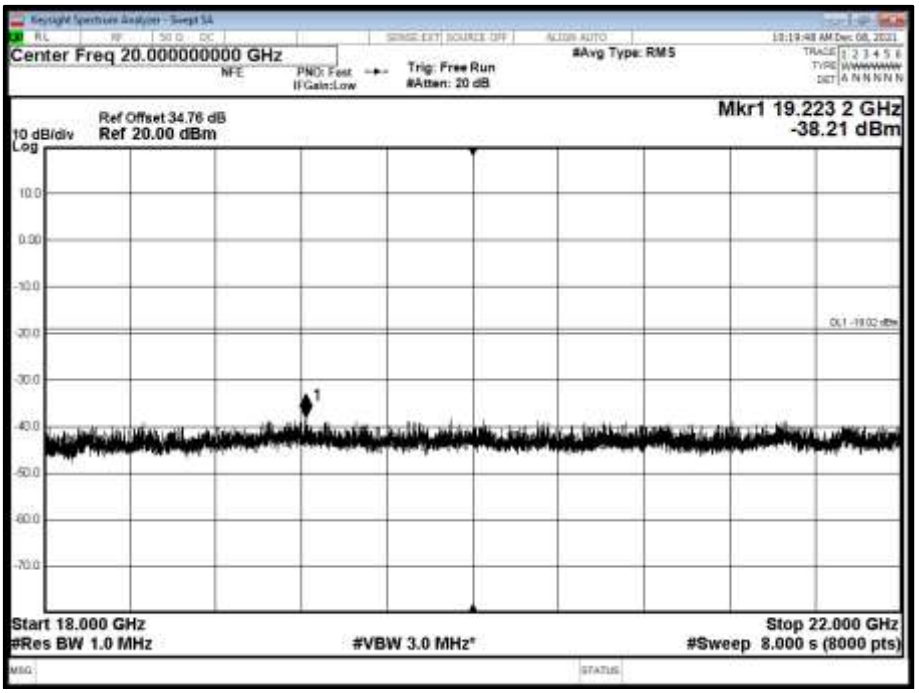
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M - Band 3 - Range 8000 to 12000 MHz



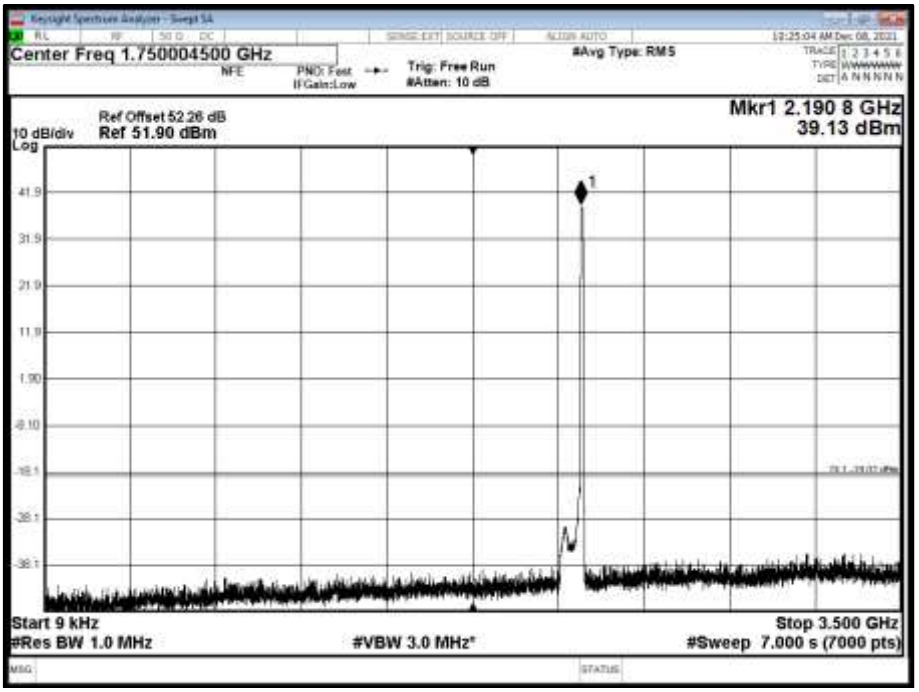
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M - Band 4 - Range 12000 to 18000 MHz



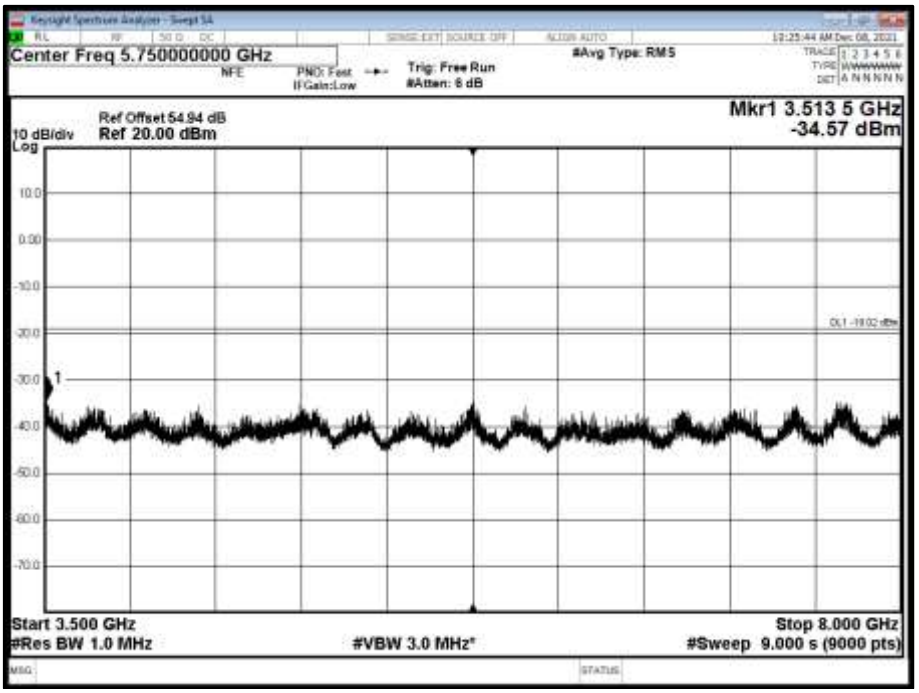
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position M - Band 5 - Range 18000 to 22000 MHz



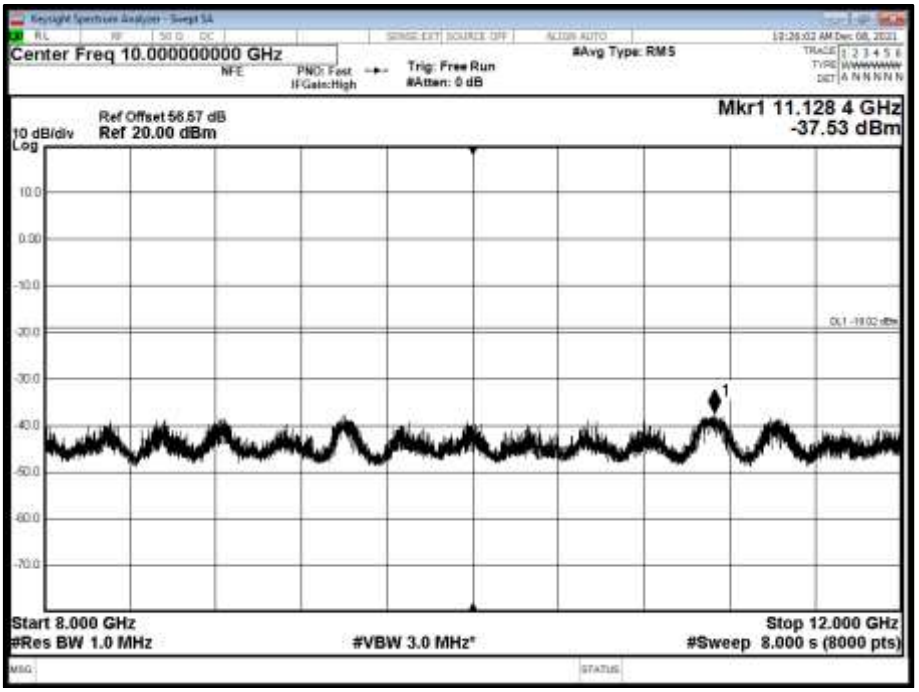
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T - Band 1.00 - Range 0.009 to 3500 MHz



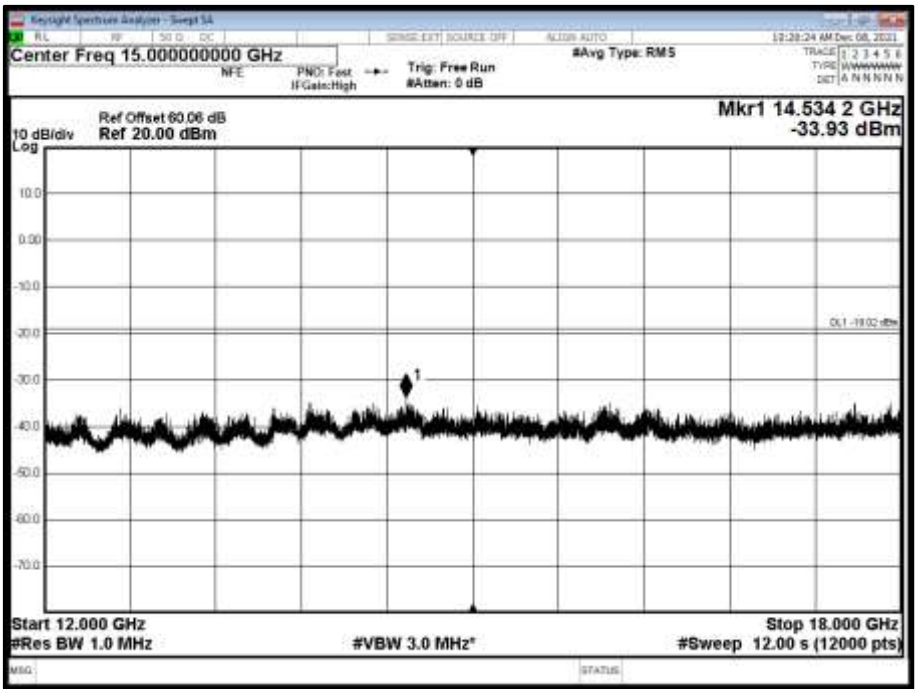
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T - Band 2 - Range 3500 to 8000 MHz



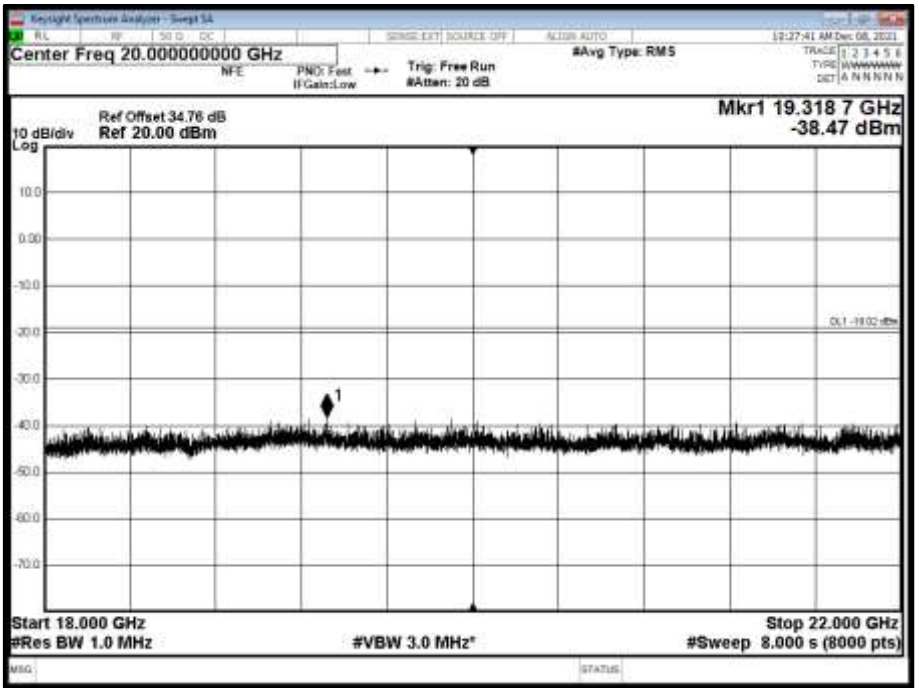
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T - Band 3 - Range 8000 to 12000 MHz



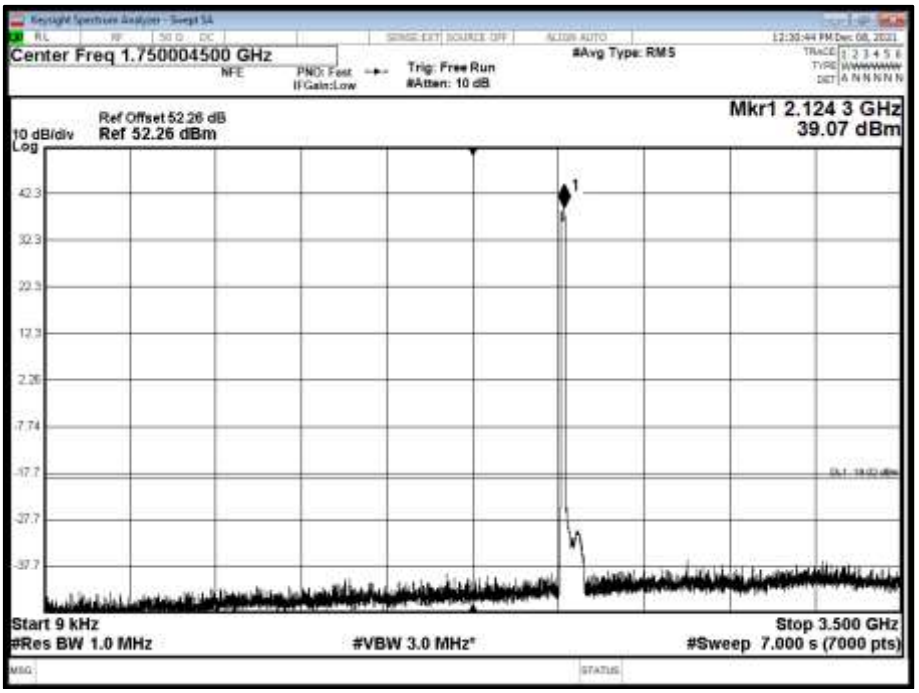
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T - Band 4 - Range 12000 to 18000 MHz



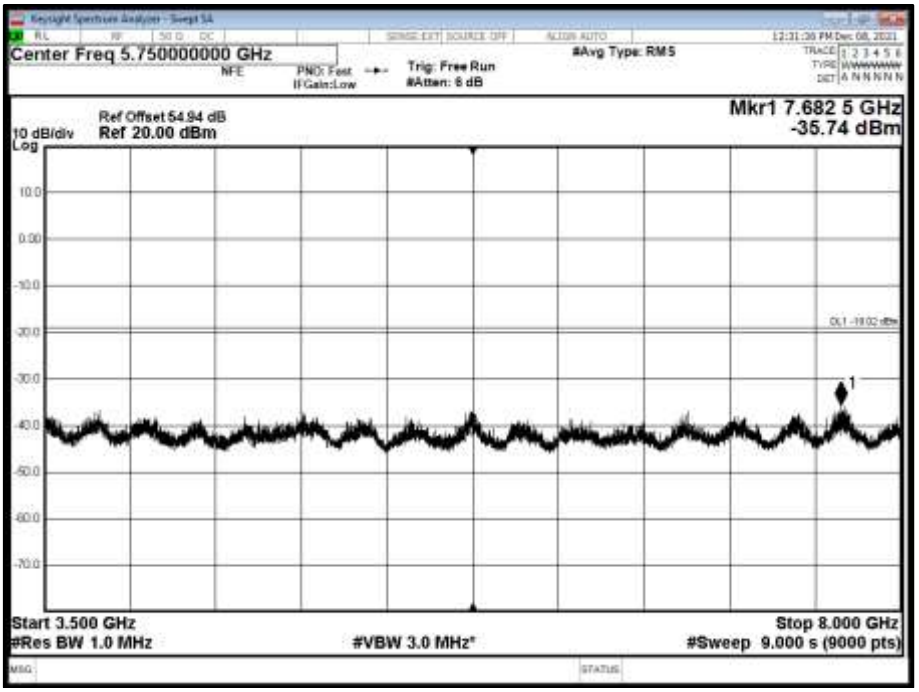
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T - Band 5 - Range 18000 to 22000 MHz



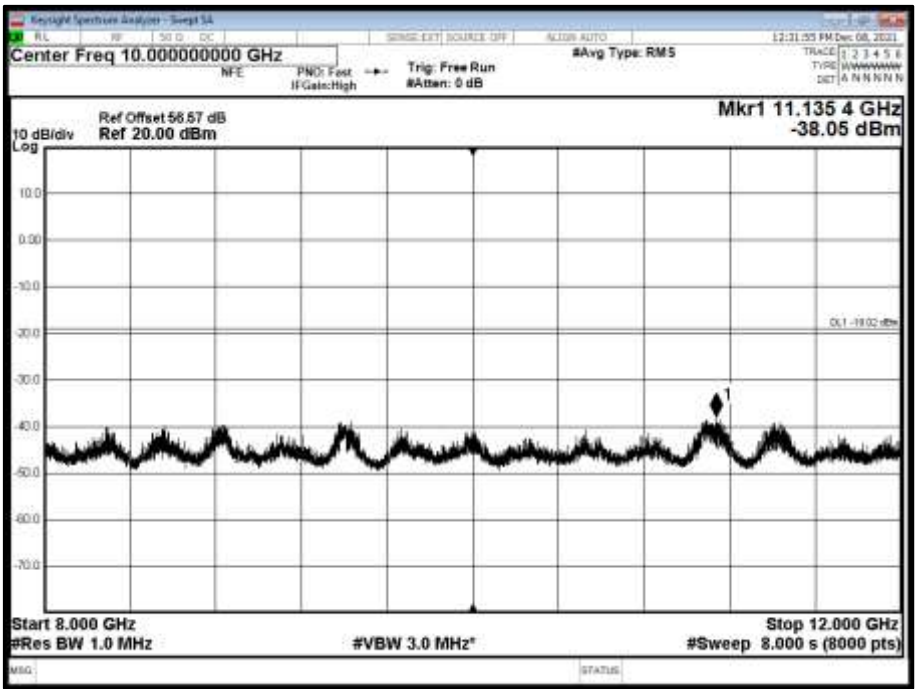
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B - Band 1.00 - Range 0.009 to 3500 MHz



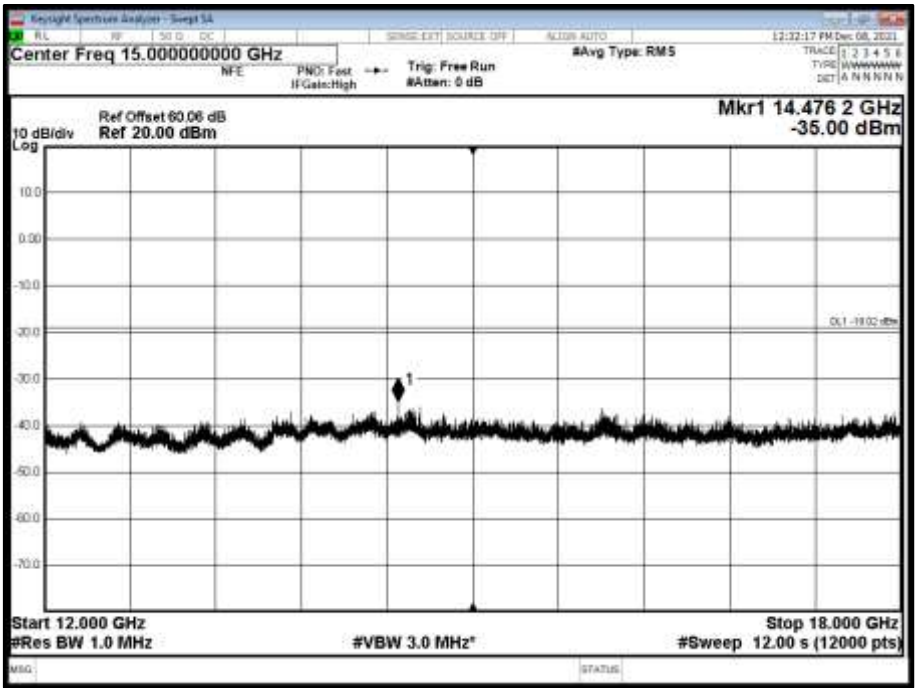
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B - Band 2 - Range 3500 to 8000 MHz



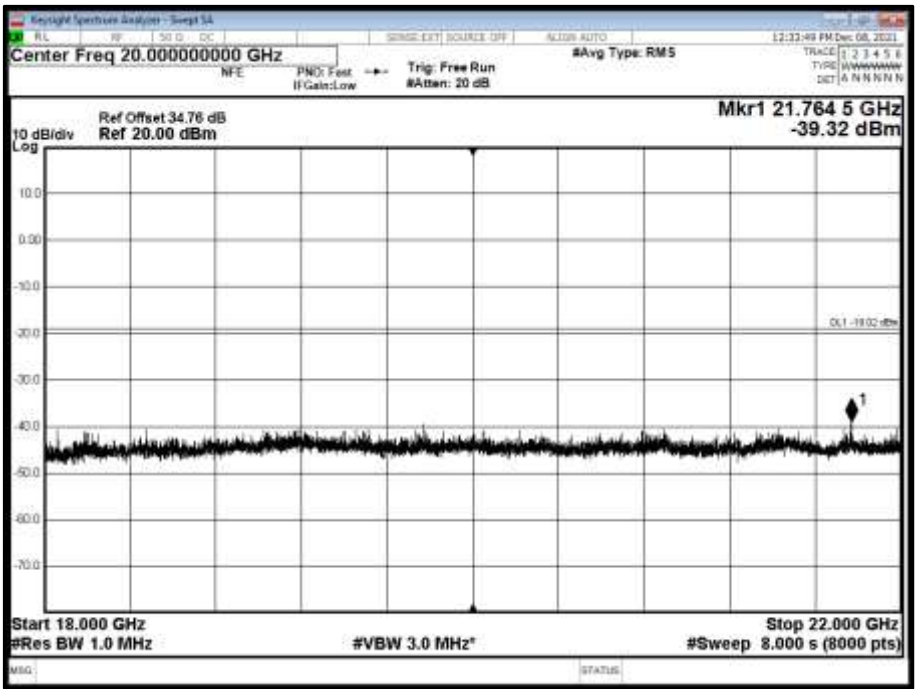
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B - Band 3 - Range 8000 to 12000 MHz



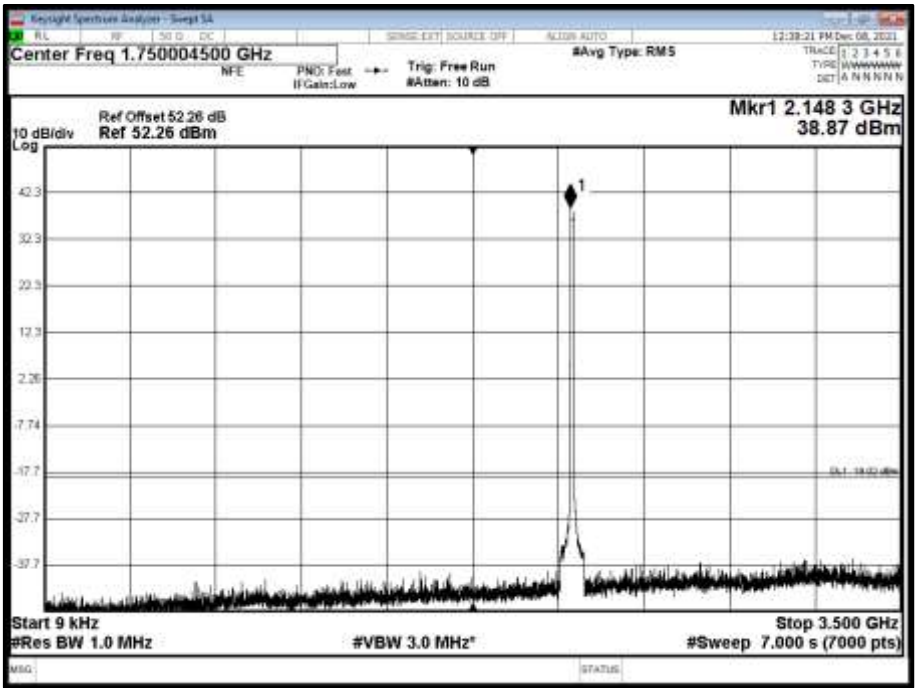
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B - Band 4 - Range 12000 to 18000 MHz



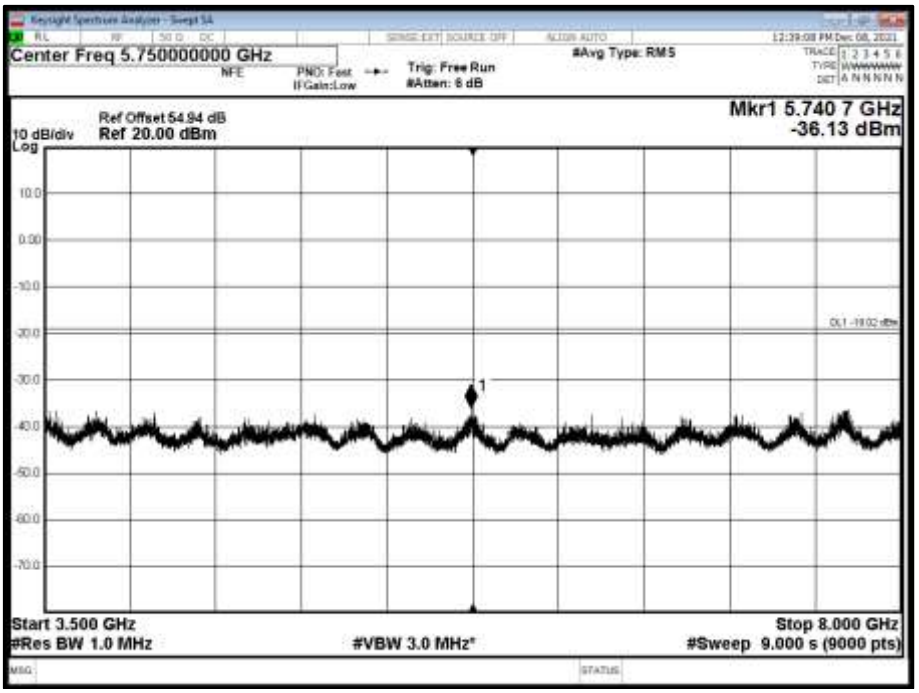
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position B - Band 5 - Range 18000 to 22000 MHz



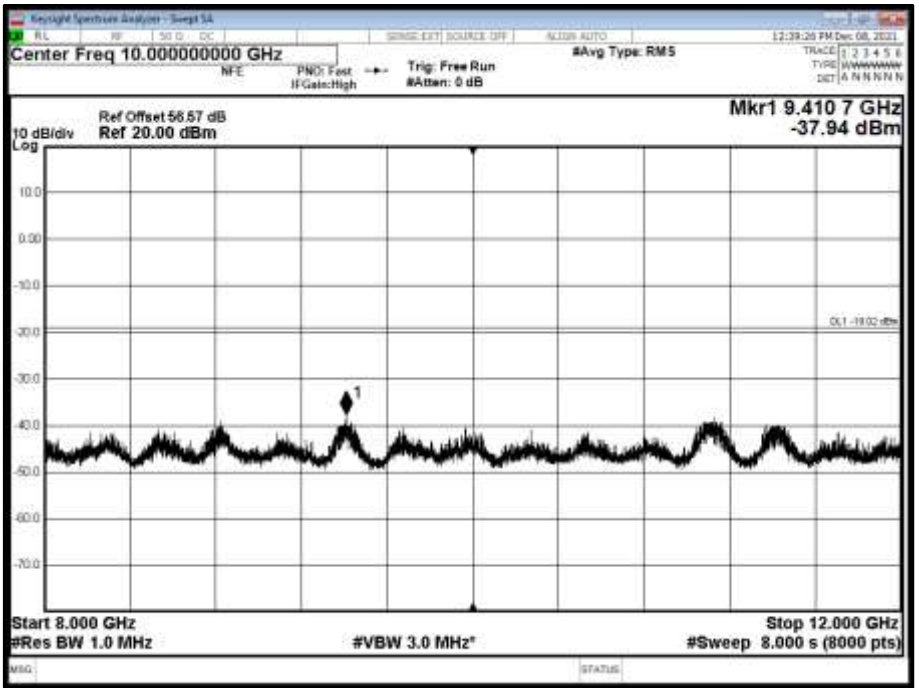
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M - Band 1.00 - Range 0.009 to 3500 MHz



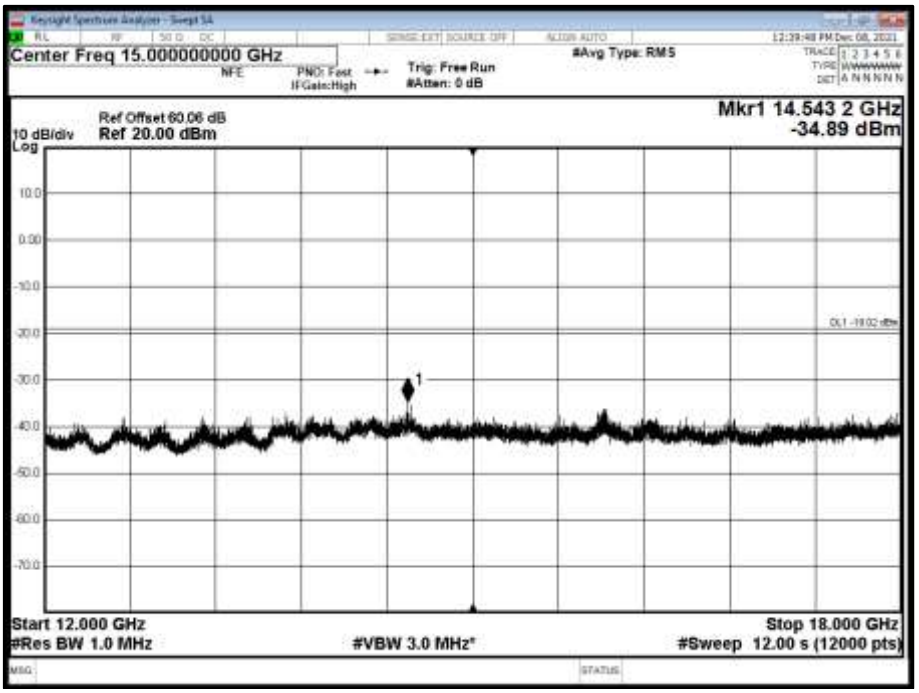
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M - Band 2 - Range 3500 to 8000 MHz



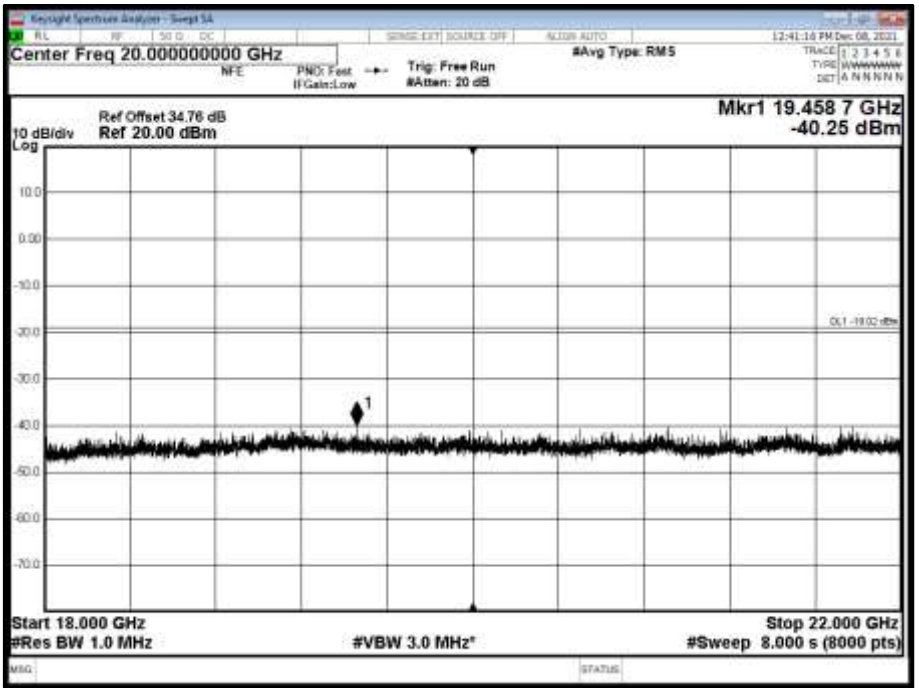
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M - Band 3 - Range 8000 to 12000 MHz



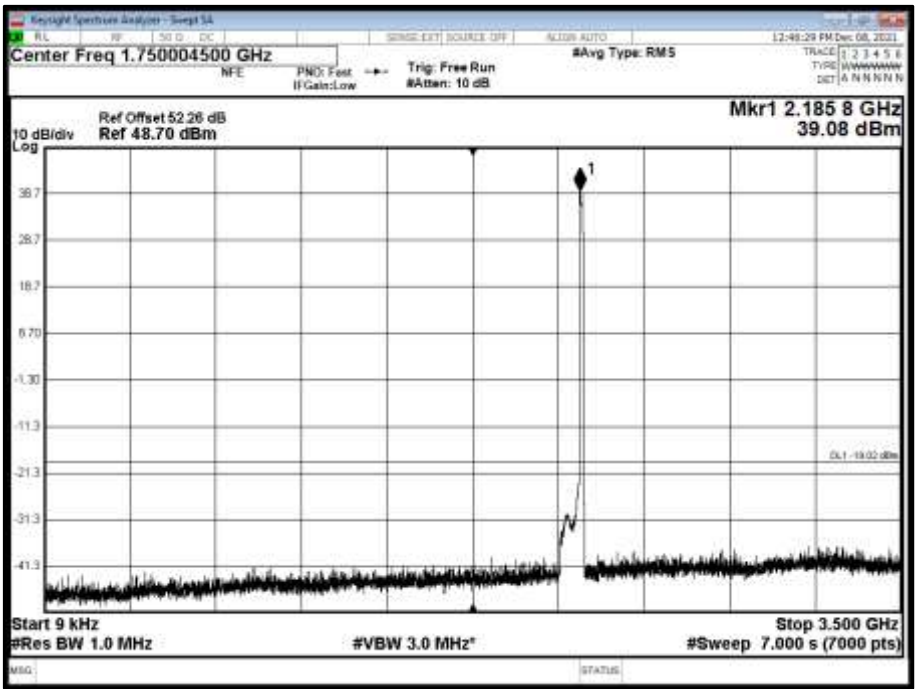
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M - Band 4 - Range 12000 to 18000 MHz



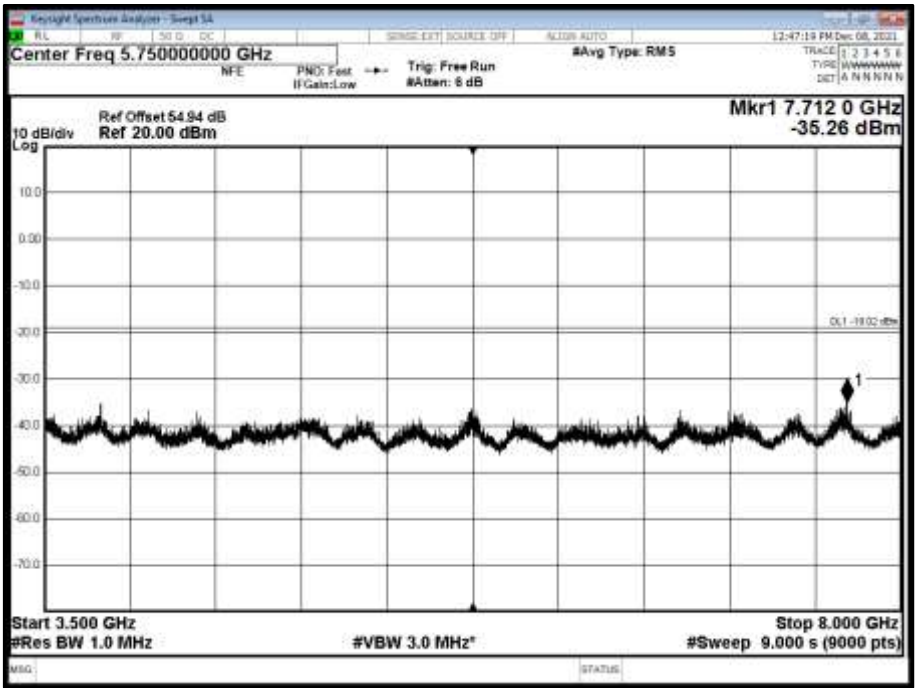
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position M - Band 5 - Range 18000 to 22000 MHz



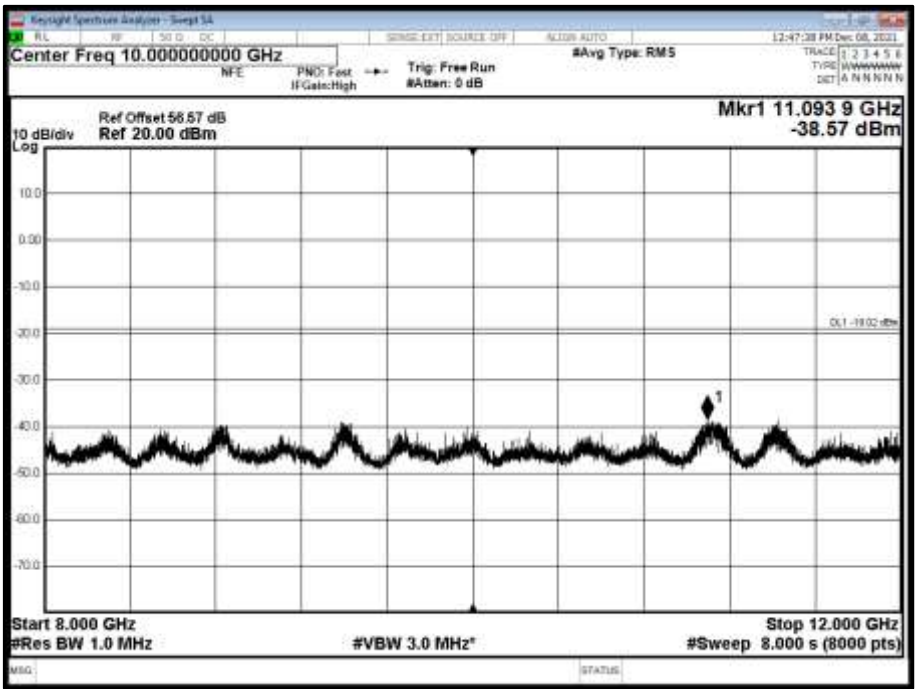
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T - Band 1.00 - Range 0.009 to 3500 MHz



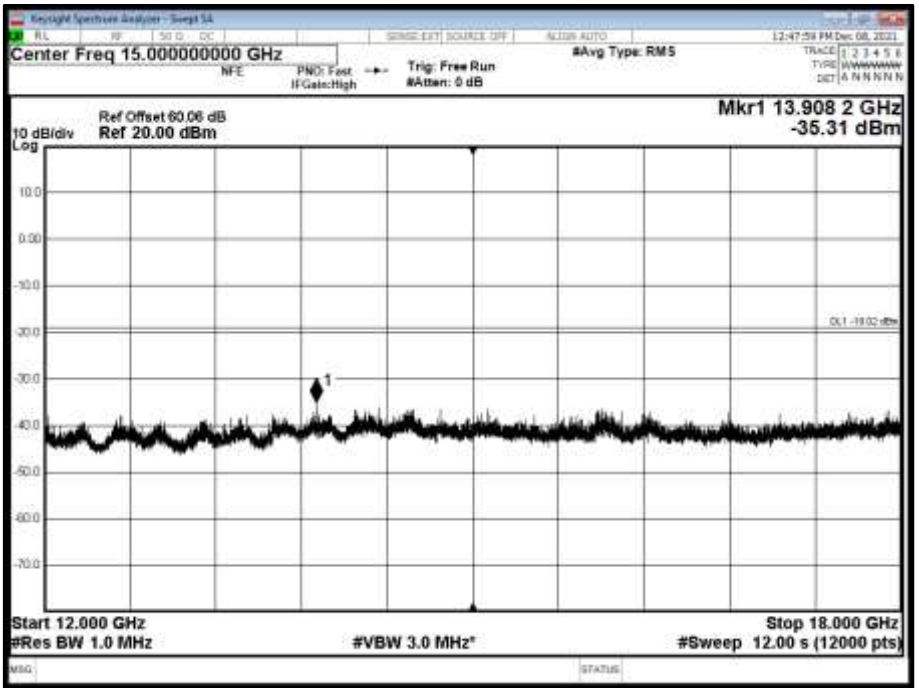
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T - Band 2 - Range 3500 to 8000 MHz



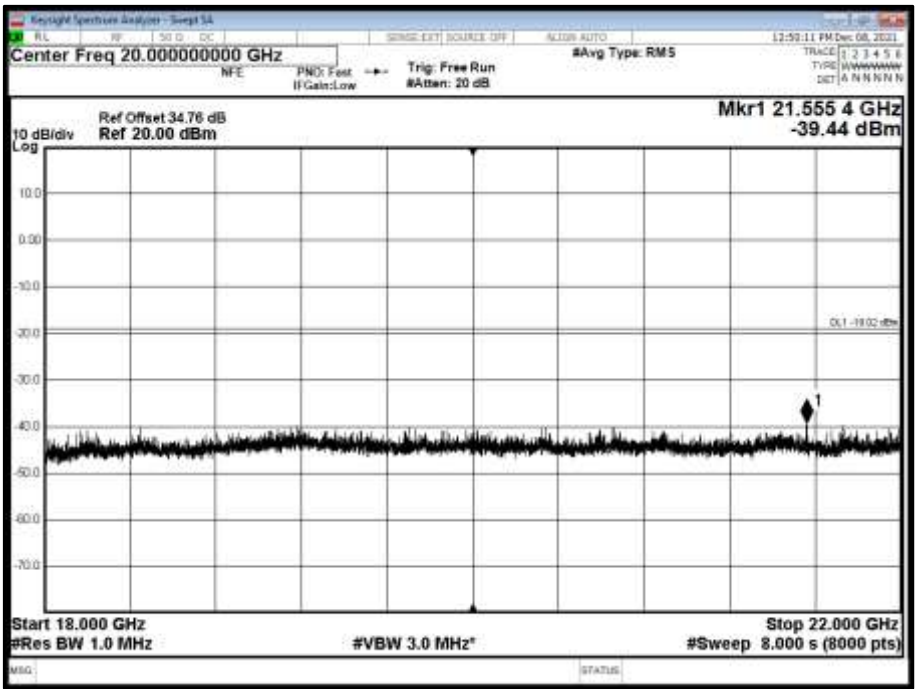
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T - Band 3 - Range 8000 to 12000 MHz



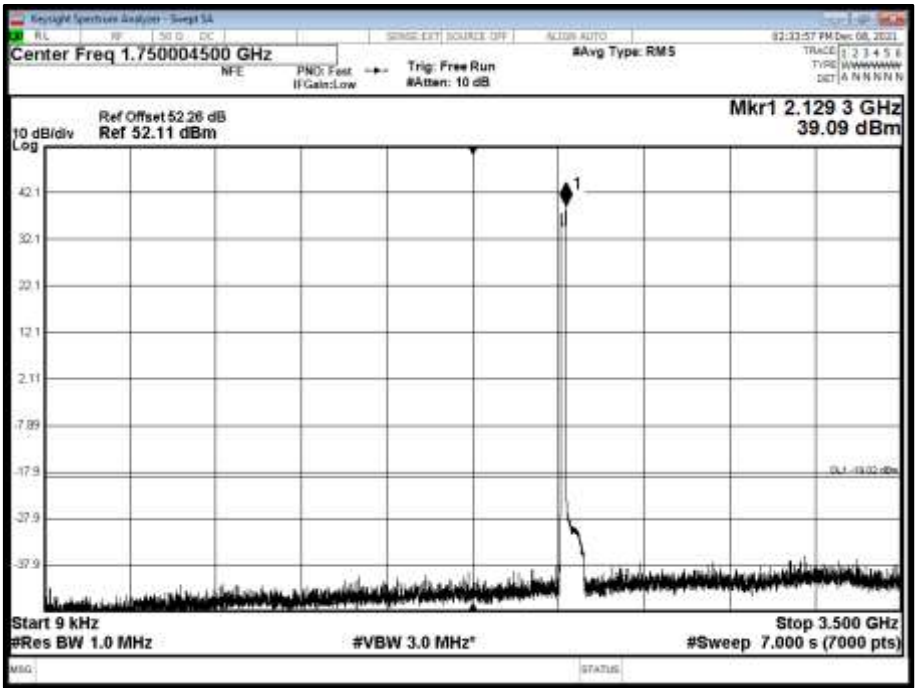
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T - Band 4 - Range 12000 to 18000 MHz



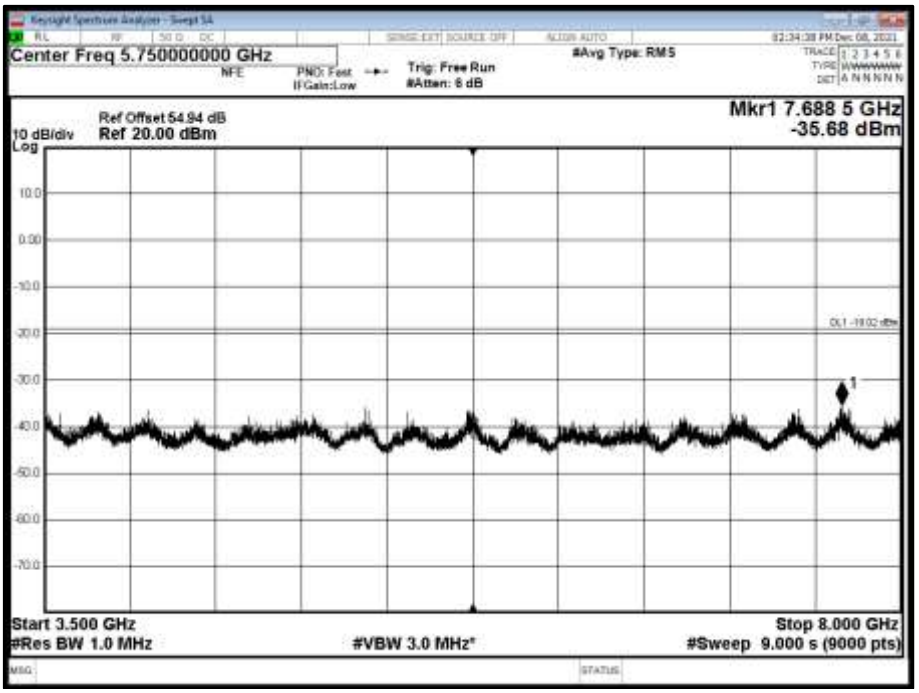
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 15.0 MHz 15 kHz SCS - Channel Position T - Band 5 - Range 18000 to 22000 MHz



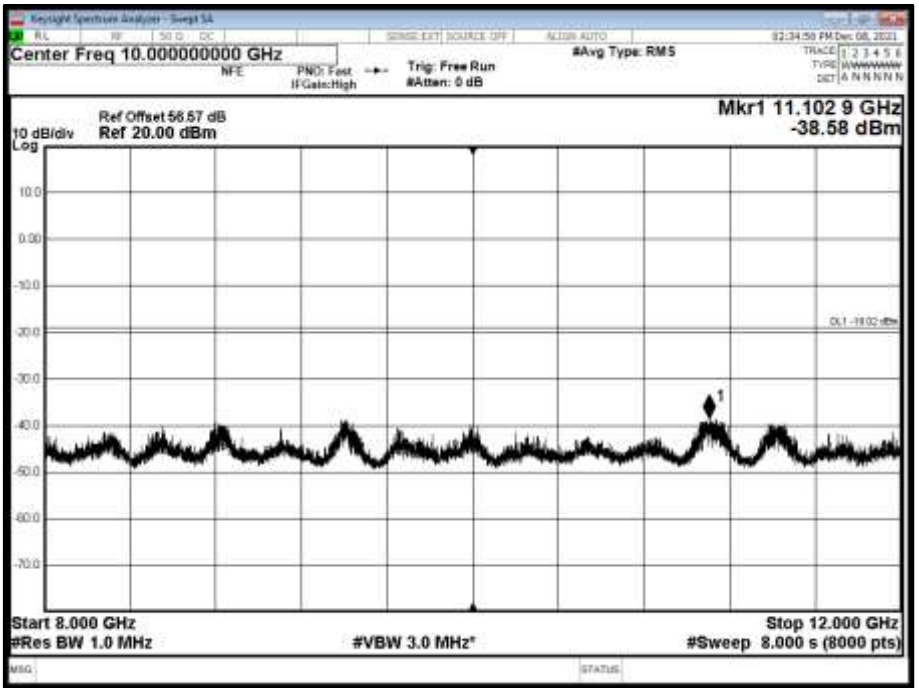
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B - Band 1.00 - Range 0.009 to 3500 MHz



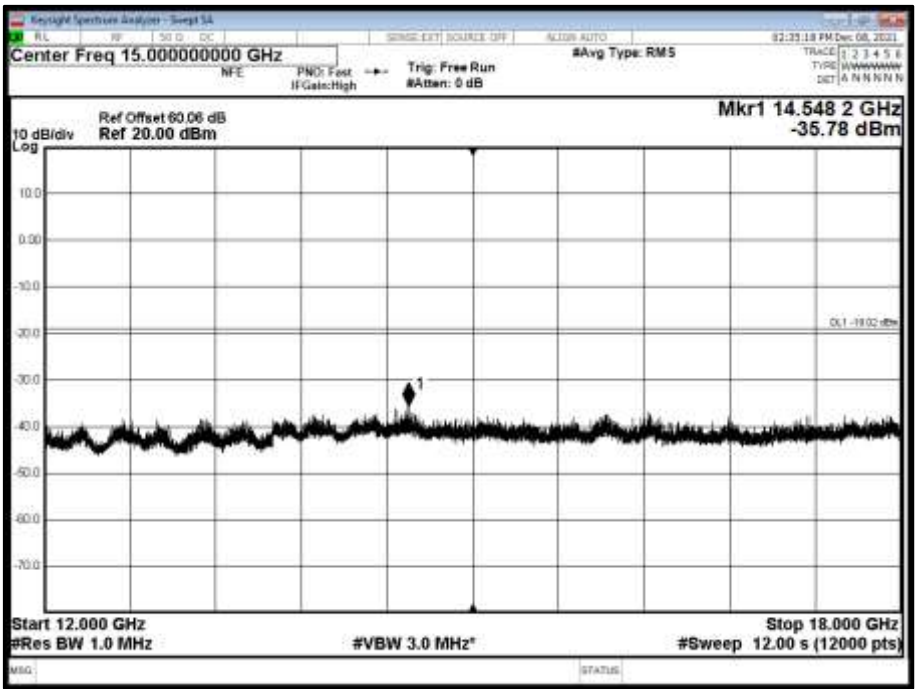
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B - Band 2 - Range 3500 to 8000 MHz



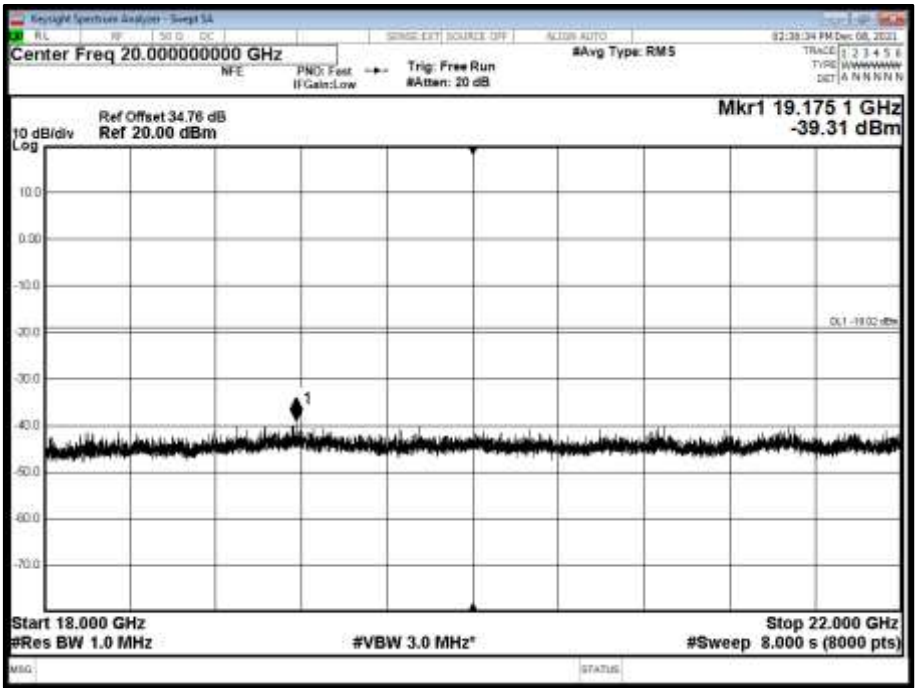
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B - Band 3 - Range 8000 to 12000 MHz



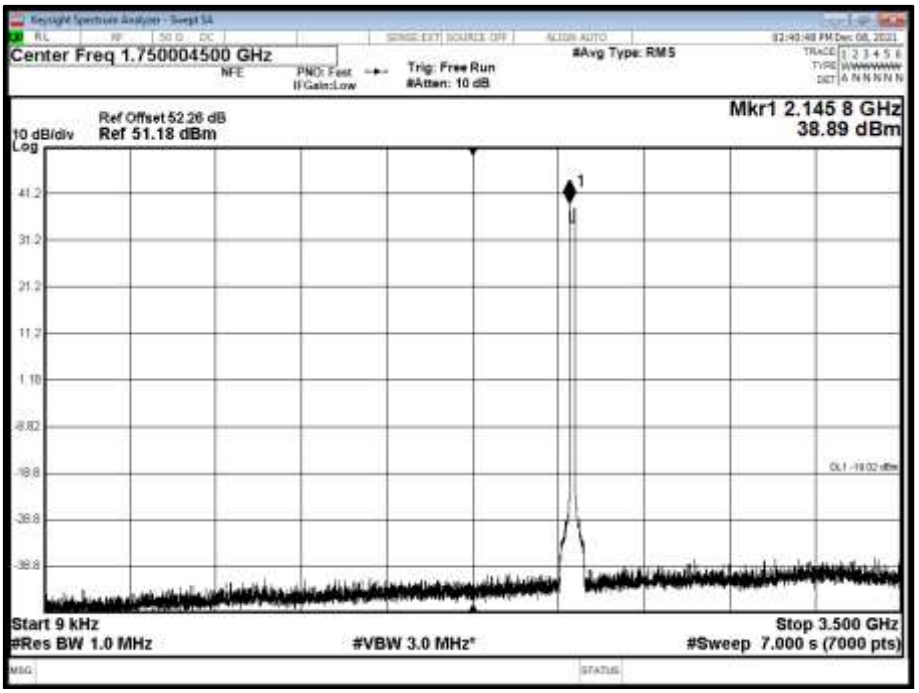
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B - Band 4 - Range 12000 to 18000 MHz



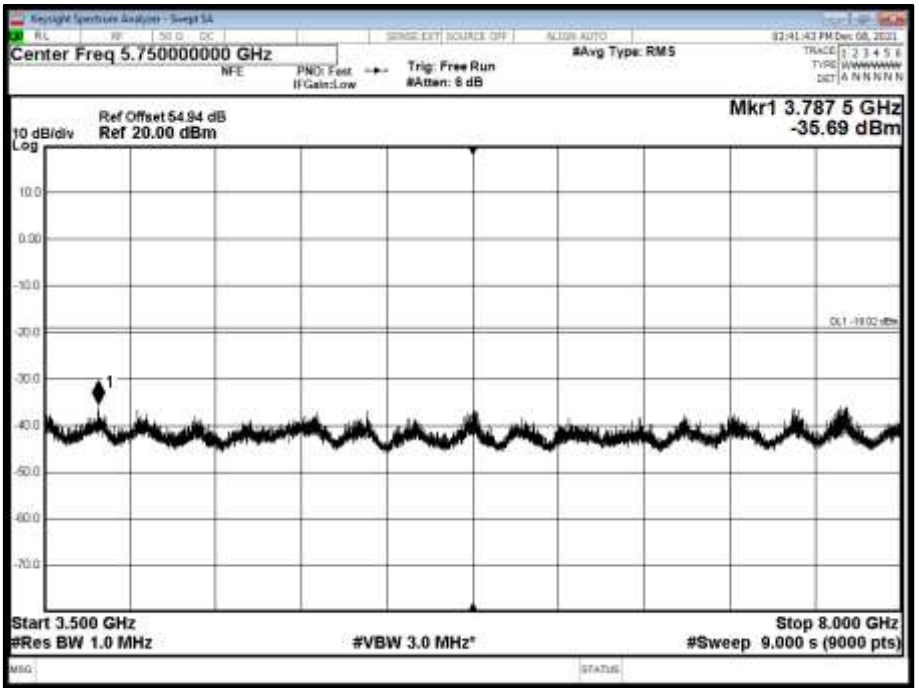
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position B - Band 5 - Range 18000 to 22000 MHz



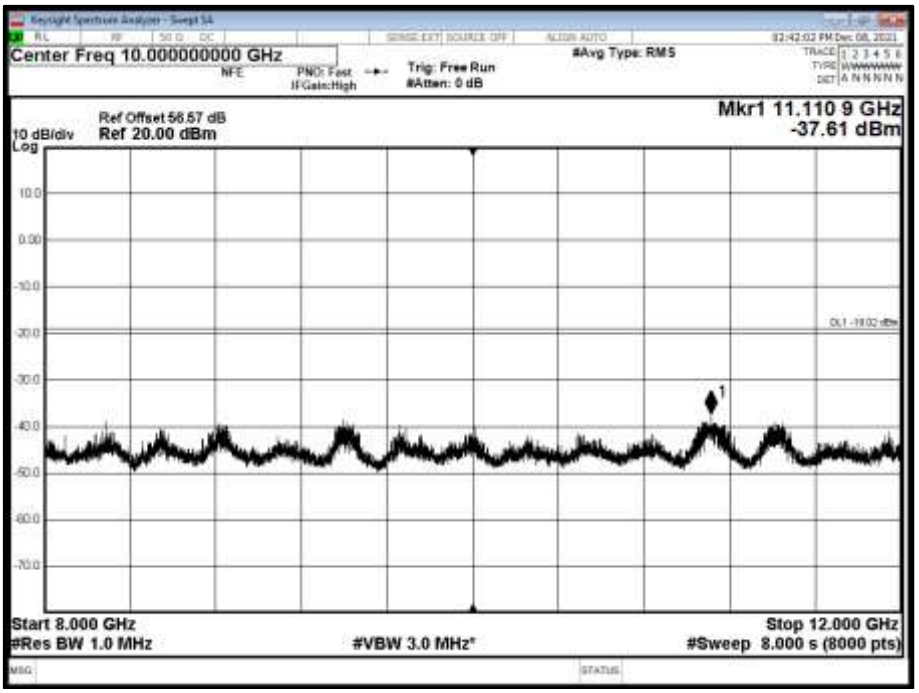
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M - Band 1.00 - Range 0.009 to 3500 MHz



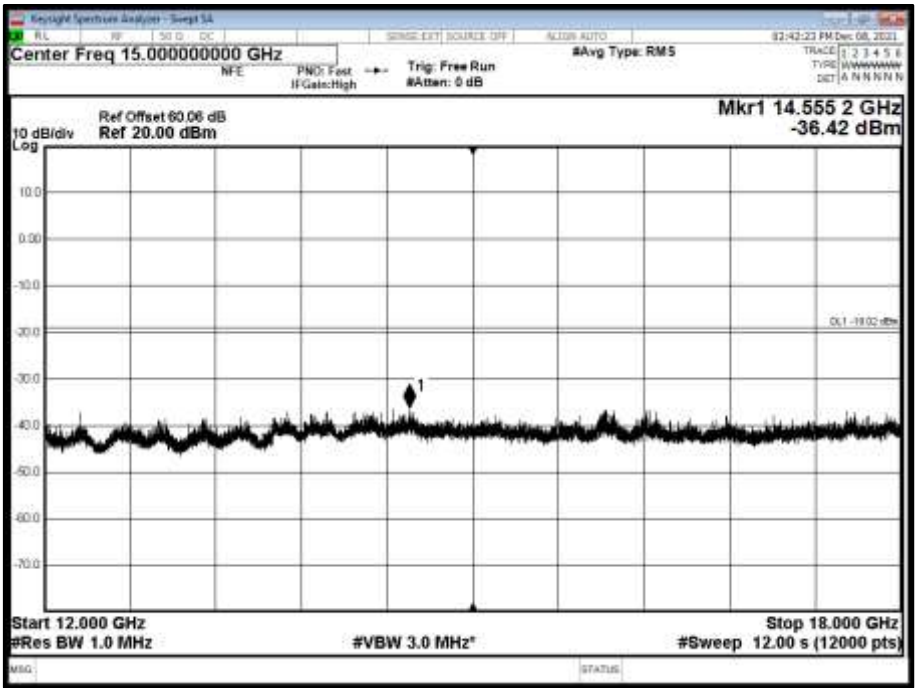
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M - Band 2 - Range 3500 to 8000 MHz



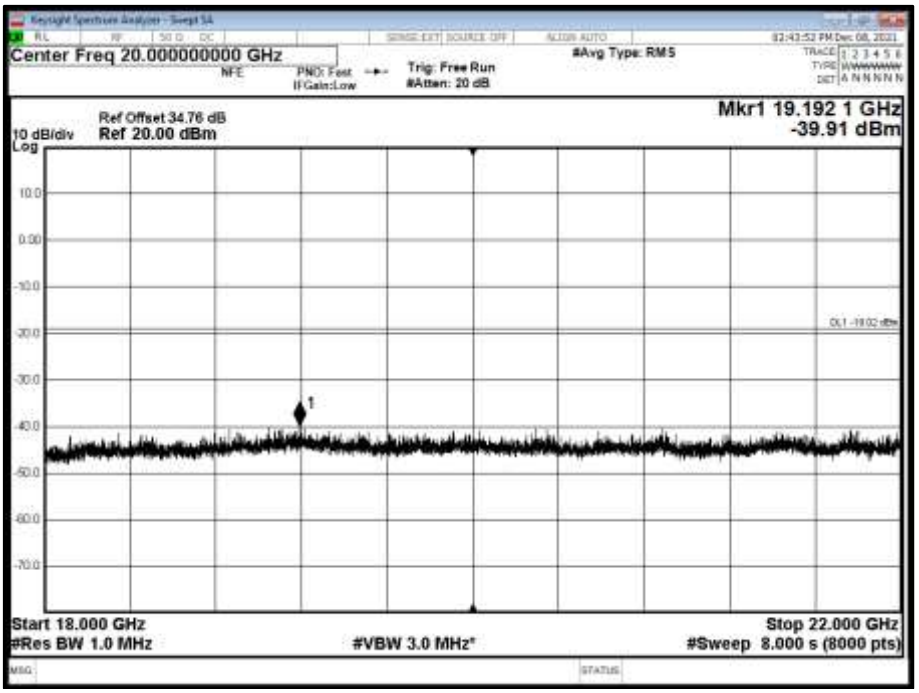
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M - Band 3 - Range 8000 to 12000 MHz



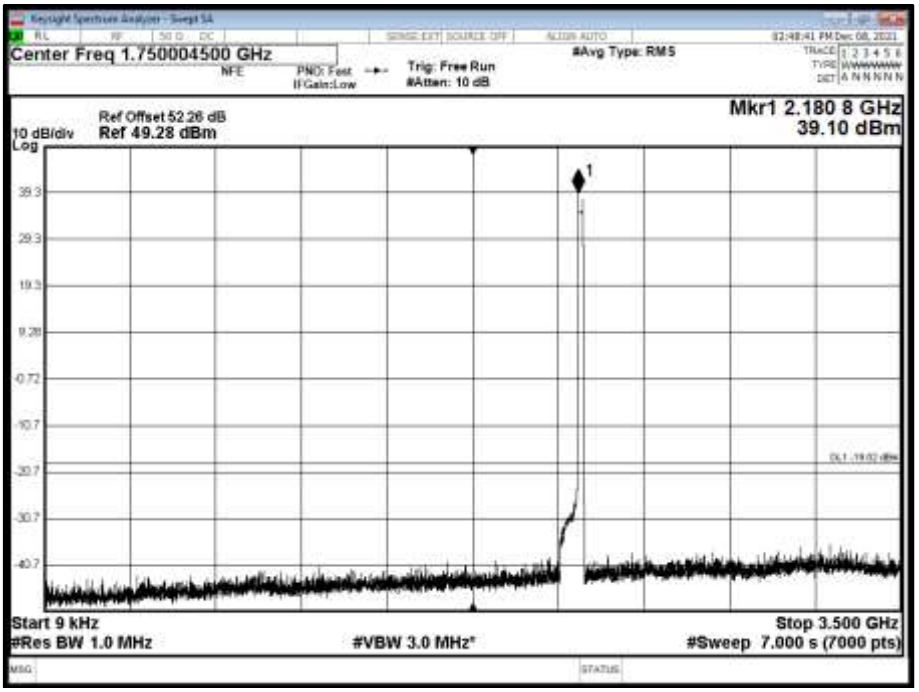
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M - Band 4 - Range 12000 to 18000 MHz



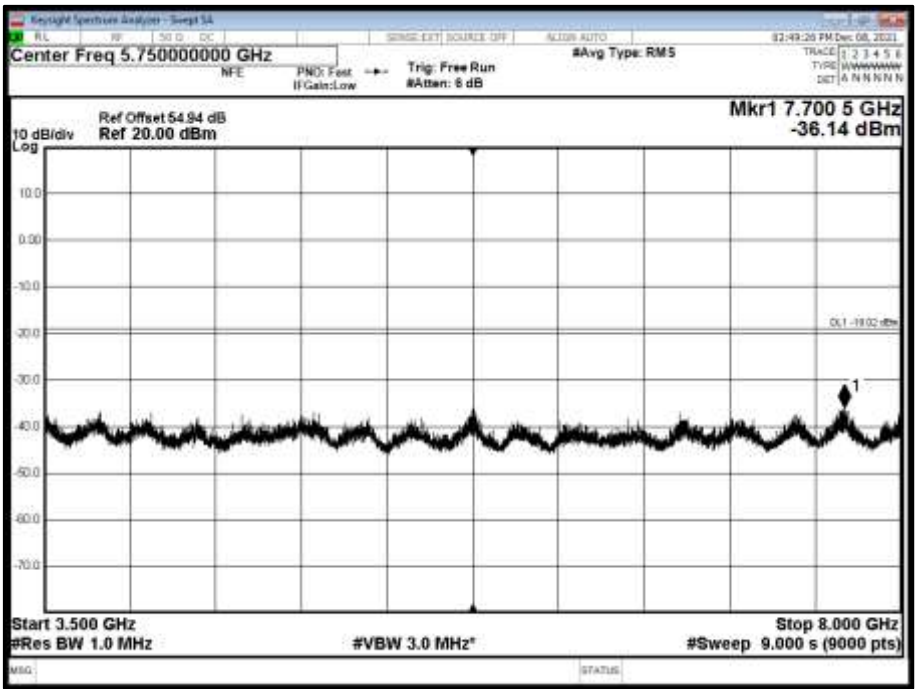
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position M - Band 5 - Range 18000 to 22000 MHz



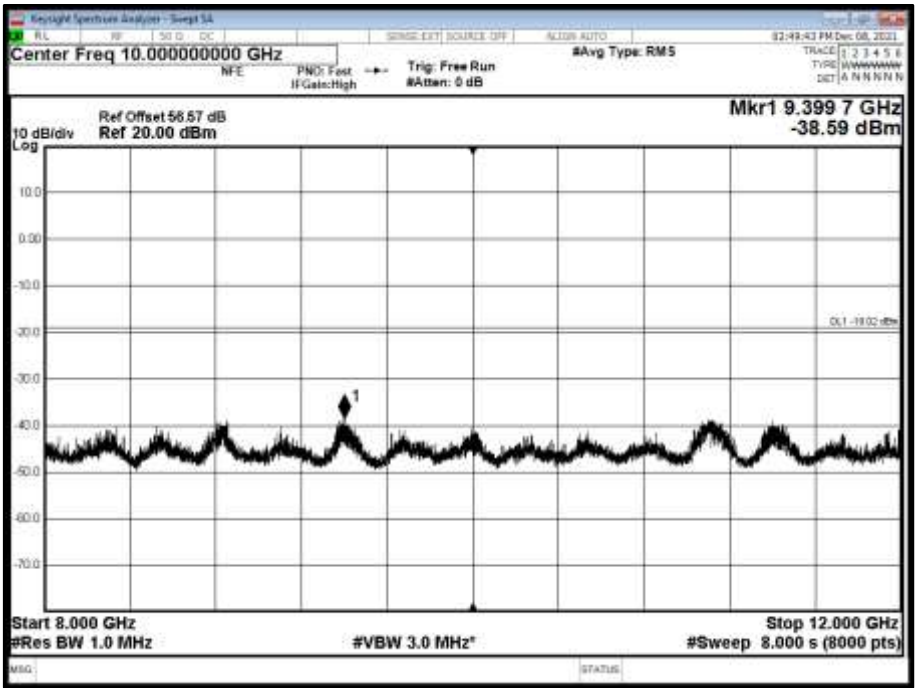
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T - Band 1.00 - Range 0.009 to 3500 MHz



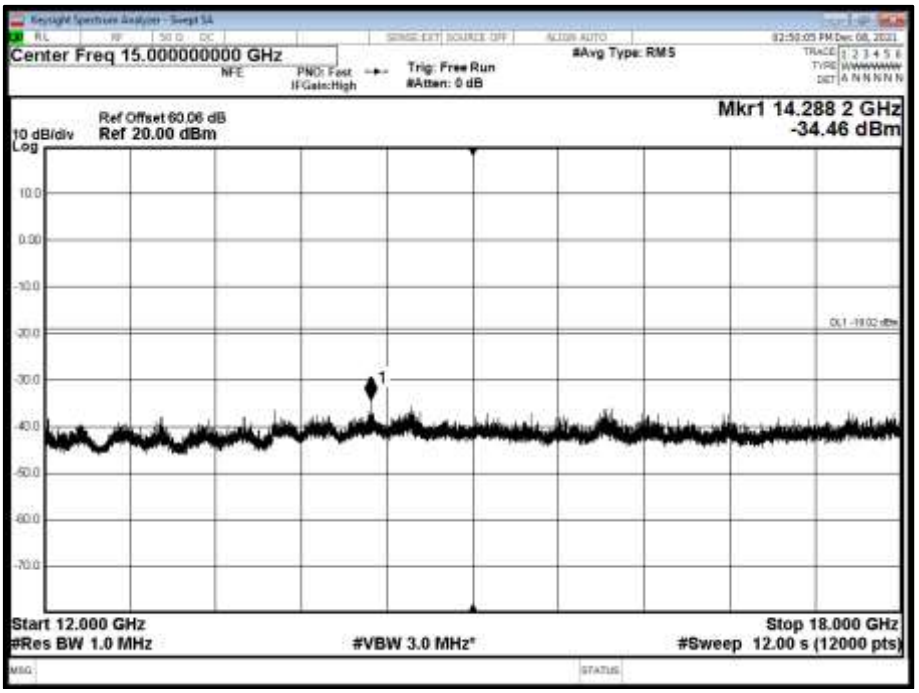
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T - Band 2 - Range 3500 to 8000 MHz



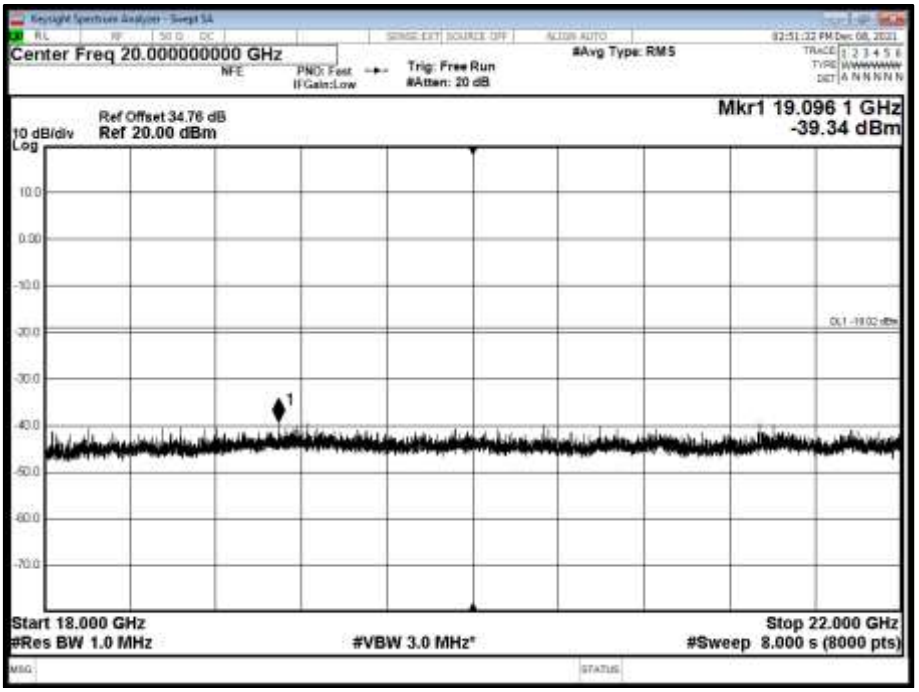
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T - Band 3 - Range 8000 to 12000 MHz



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T - Band 4 - Range 12000 to 18000 MHz



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 20.0 MHz 15 kHz SCS - Channel Position T - Band 5 - Range 18000 to 22000 MHz



Limit	-19dBm

2.5 RADIATED EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 27, Clause 27.53
Industry Canada RSS-139, Clause 6.6
Industry Canada RSS-170, Clause 5.4
Industry Canada RSS-GEN, Clause 6.13

2.5.2 Date of Test and Modification State

15-December-2021 - 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 Temperature	21.9°C
Relative Humidity	50.0%

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 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 for single carrier.

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.

2.5.6 Test Results

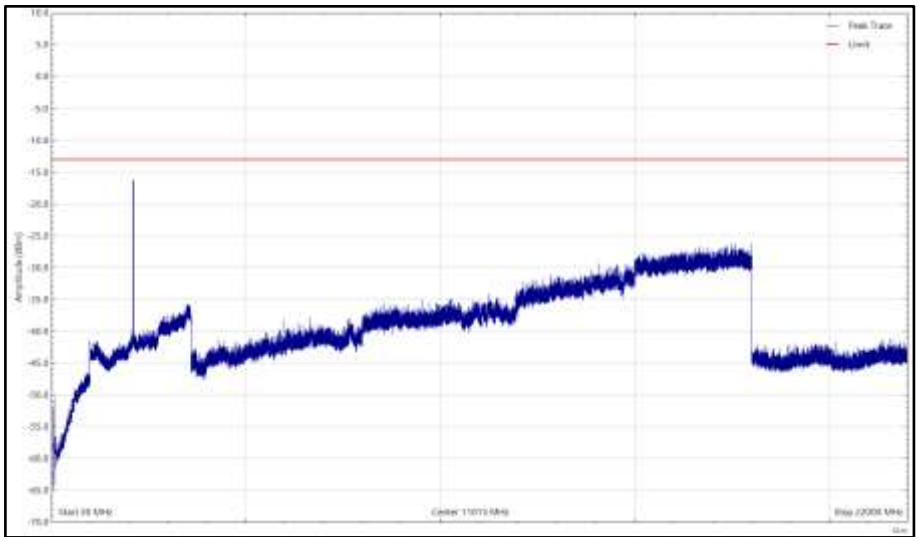
Configuration 1

Maximum Output Power 47.78 dBm

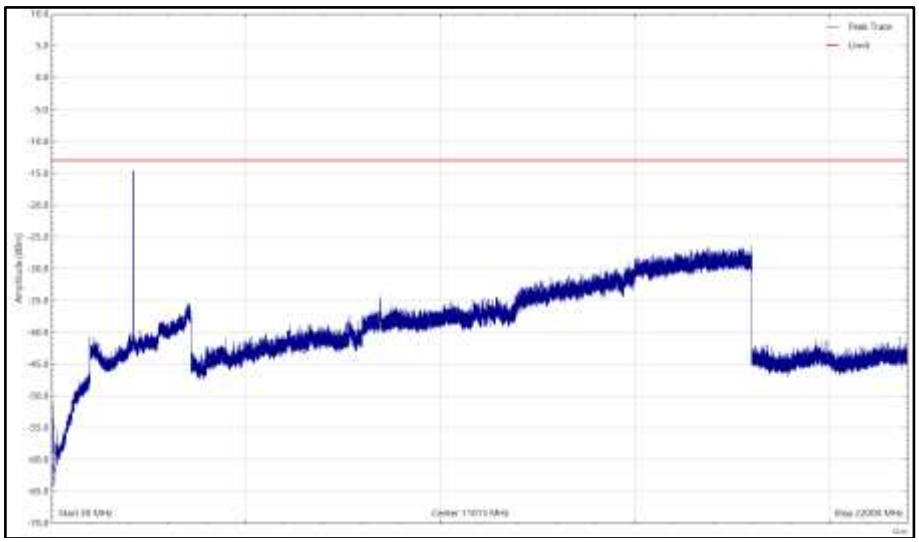
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Bot - NR&NB-IoT - B66, 2115MHz, 30 MHz to 22 GHz

*No emissions found within 6 dB of the limit.



Bot - NR&NB-IoT - B66, 2115MHz, 30 MHz to 22 GHz, Horizontal (Peak)

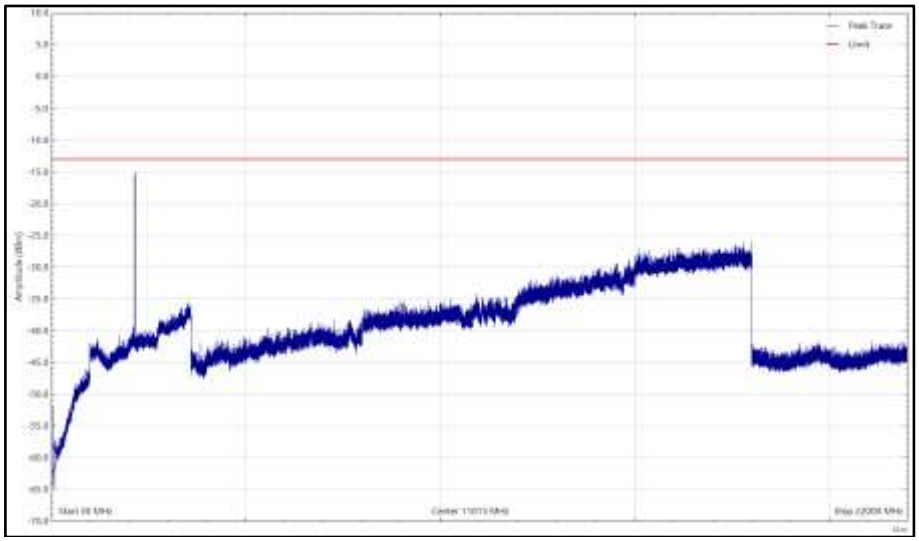


Bot - NR&NB-IoT - B66, 2115MHz, 30 MHz to 22 GHz, Vertical (Peak)

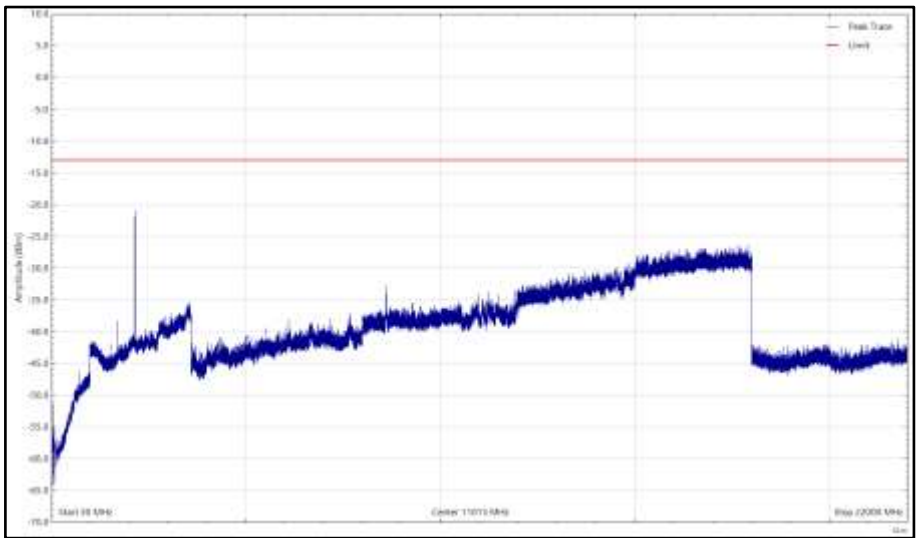
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Mid - NR&NB-IoT - B66, 2155MHz, 30 MHz to 22 GHz

*No emissions found within 6 dB of the limit.



Mid - NR&NB-IoT - B66, 2155MHz, 30 MHz to 22 GHz, Horizontal (Peak)

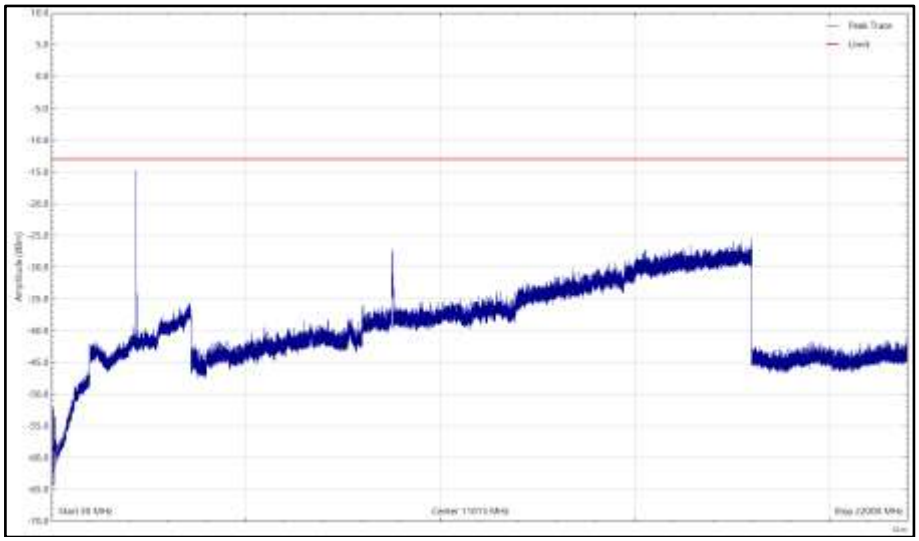


Mid - NR&NB-IoT - B66, 2155MHz, 30 MHz to 22 GHz, Vertical (Peak)

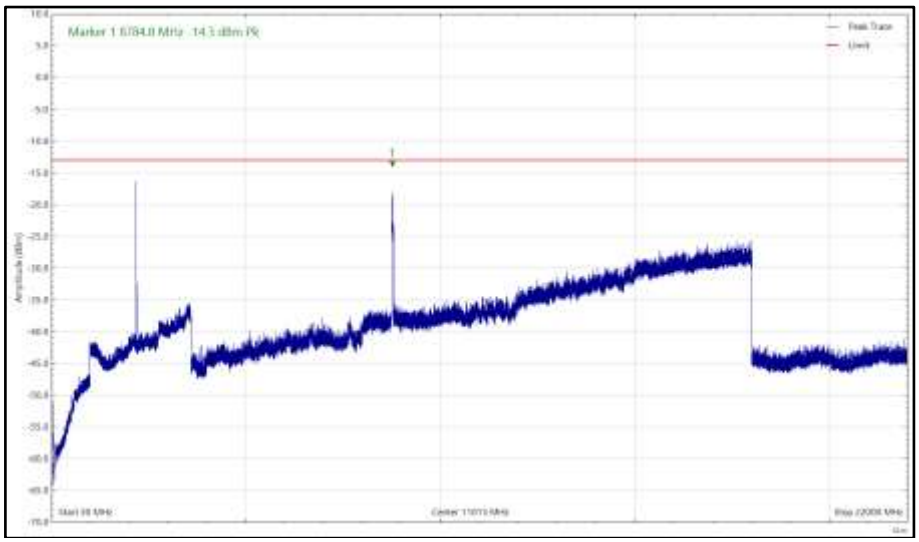
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
8784.847	-14.3	-13.0	-1.3	Peak	360	107	Vertical

Top - NR&NB-IoT - B66, 2195MHz, 30 MHz to 22 GHz

No other emissions found within 6 dB of the limit.



Top - NR&NB-IoT - B66, 2195MHz, 30 MHz to 22 GHz, Horizontal (Peak)



Top - NR&NB-IoT - B66, 2195MHz, 30 MHz to 22 GHz, Vertical (Peak)

Limit FCC Part 27.53 (a – j) and RSS-139 Clause 6.6

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) db.	46-(43+10 Log 46) = -13.6 dBm

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 Power and Peak to Average Ratio - Conducted					
Hygrometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Jan-2022
Analyser	Keysight	N9030A	4654	12	24-Nov-2022
Power Supply	Farnell	H60-25	1092	-	OP-MON
Multimeter	Fluke	79 Series II	3057	12	23-Aug-2022
Attenuator	Weinschel	48-40-43-LIM	5134	12	03-Jan-2022
Attenuator	Aeroflex / Weinschel	47-10-34	3166	12	13-Sep-2022
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	29-Jan-2022
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	30-Dec-2021
Occupied Bandwidth					
Hygrometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Jan-2022
Analyser	Keysight	N9030A	4654	12	24-Nov-2022
Power Supply	Farnell	H60-25	1092	-	OP-MON
Multimeter	Fluke	79 Series II	3057	12	23-Aug-2022
Attenuator	Weinschel	48-40-43-LIM	5134	12	03-Jan-2022
Attenuator	Aeroflex / Weinschel	47-10-34	3166	12	13-Sep-2022
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	29-Jan-2022
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	30-Dec-2021
Band Edge					
Hygrometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Jan-2022
Analyser	Keysight	N9030A	4654	12	24-Nov-2022
Power Supply	Farnell	H60-25	1092	-	OP-MON
Multimeter	Fluke	79 Series II	3057	12	23-Aug-2022
Attenuator	Weinschel	48-40-43-LIM	5134	12	03-Jan-2022
Attenuator	Aeroflex / Weinschel	47-10-34	3166	12	13-Sep-2022
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	29-Jan-2022
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	30-Dec-2021
Transmitter Spurious Emissions					
Hygrometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Jan-2022
Analyser	Keysight	N9030A	4654	12	24-Nov-2022

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Power Supply	Farnell	H60-25	1092	-	OP-MON
Multimeter	Fluke	79 Series II	3057	12	23-Aug-2022
Attenuator	Weinschel	48-40-43-LIM	5134	12	03-Jan-2022
Attenuator	Aeroflex / Weinschel	47-10-34	3166	12	13-Sep-2022
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	29-Jan-2022
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	30-Dec-2021
HPF	Advance Power Components	11SH10-3000/X18000-O/O	4411	12	02-Jul-2022
Cable	Junkosha	MWX241-01000KMS	5414	12	23/06/2022
Cable	Rosenberger	LU1-001-2000	5020	12	07-Jan-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
Pre-Amplifier (8 GHz to 18 GHz)	Phase One	PS04-0086	1533	12	05-Feb-2022
Pre-Amplifier (18 GHz to 40 GHz)	Phase One	PSO4-0087	1534	12	02-Aug-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
Multimeter	Fluke	79 Series II	3057	12	23-Aug-2022
Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	18-Nov-2022
Cable (K-Type to K-Type, 2 m)	Scott Cables	KPS-1501-2000-KPS	4526	6	06-Mar-2022
Cable (N-Type to N-Type, 1 m)	Rosenberger	LU7-036-1000	5031	12	23-Jul-2022
Emissions Software	TUV SUD	EmX V2.1.11 V.2.1.11	5125	-	Software
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5216	12	01-Apr-2022
Digital Multimeter	Keysight Technologies	U1282A	5320	12	25-Aug-2022
Cable (sma-sma, 2 m)	Junkosha	MWX221-02000DMS	5428	12	20-Oct-2022
Cable (N-Type to N-Type, 8 m)	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5511	12	09-Apr-2022
1m K-Type Cable	Junkosha	MWX241-01000KMSKMS/A	5512	12	09-Apr-2022
2m K Type Cable	Junkosha	MWX241-02000KMSKMS/A	5524	12	24-Mar-2022
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5610	12	15-Oct-2022
Antenna (DRG, 1 GHz to 10 GHz)	Schwarzbeck	BBHA 9120 B	5611	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
Antenna (Bi-Log, 30 MHz to 1 GHz)	Teseq	CBL6111D	5615	24	16-Oct-2022
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023

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
Occupied Bandwidth	10 MHz Bandwidth	± 16.7 kHz
	15 MHz Bandwidth	
	20 MHz Bandwidth	
Band Edge	< 3.6 GHz Amplitude	± 0.6 dB
Radiated Spurious Emissions	30 MHz to 1 GHz	± 5.2 dB
	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
PXA Signal Analyser	Keysight	N9030B	4654	A22.08
HP-VEE Software	TUV SUD	HP_VEE	N/A	V3.28

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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

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

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

TÜV SÜD
Postal Address :Octagon House, Concorde Way, Fareham, Hampshire, UK, PO15 5RL

ANNEX A

MODULE LIST

Configuration 1			
Product	Product No	R-State	Serial No
Radio 4426 B66	KRC 161 472/3	R2B	CF85825155
Software Version:	CXP9013268/15	Revision:	R89AJ