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Report On

FCC and ISED Testing of the Ericsson KRY 901 428/2 (Dot 2282 B5 B12A) LTE (NB-IoT GB), NR, LTE+NR B12A (700 MHz) Base Station in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 27, ISED RSS-GEN and ISED RSS-130

COMMERCIAL-IN-CONFIDENCE

FCC: TA8AKRY901428-1 & TA8AKRY901428-2
IC: 287AB-AS9014281 & 287AB-AS9014282

PREPARED BY	APPROVED BY	DATED
Glen Westwell	Scott Drysdale Authorised Signatory	June 14th 2021

Document 7169009740 Report 02 Issue 1 **June 2021**

CONTENTS

SECTION 1

REPORT INFORMATION

1.1 REPORT DETAILS

Manufacturer	Ericsson
Address	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Product Name & Product Number	Dot 2282 B5B12A & KRY 901 428/2
IC Model Name	AS9014281 & AS9014282
Serial Number(s)	TD3WD72731
Software Version	CXP9013268%17 Revision R82GS
Hardware Version	R1C
Non-Tested Variant (See Section 1.10 Additional Information)	Dot 2272 B5B12A & KRY 901 428/1
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2019 FCC CFR 47 Part 27: 2021 ISED RSS-GEN: Issue 5: March 2019 Amendment 1 ISED RSS-130: Issue 2: 2019
Test Plan	Dot 2282 B5B12A_RA_testplan_NR_LTE_NBIoT
Start of Test	27 March 2021
Finish of Test	28 March 2021
Name of Engineer(s)	Glen Westwell
Related Document(s)	KDB 971168 D01 v03r01 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 FCC CFR 47 Part 2: 2019, FCC CFR 47 Part 22: 2019, ISED RSS-GEN: Issue 5: March 2019 Amendment 1, ISED RSS-132: Issue 3: 2013. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

Glen Westwell

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 22, ISED RSS-GEN and ISED RSS-132 is shown below.

Section	Specification Clause				Test Description	Result
	FCC CFR 47 Part 2	FCC CFR 47 Part 27	RSS-GEN	ISED RSS-130		
2.1	2.1046	27.50(b)	-	4.6	Maximum Peak Output Power and Peak to Average Ratio - Conducted	Pass
2.2	2.1049	27.53 (c)	-	4.2	Occupied Bandwidth	Pass
2.3	2.1051	27.53 (c)	-	4.7	Band edge	Pass
2.4	2.1051	27.53 (c)	6.13	4.7	Transmitter Spurious Emissions	Pass
2.5	2.1051	-	7.4	4.7	Receiver Spurious Emissions	Pass
2.6	2.1055	27.54	6.11	4.5	Frequency Stability	Pass

This test report only covers testing for B12A, test results for B5 can be found in TUV SUD Document 7169009740 Report 01.

1.3 CONFIGURATION DESCRIPTION

Configuration A					
RAT	N0. Of Carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE	1	5 MHz	731.5	737.0	742.5
		10 MHz	734.0	737.0	740.0
NR	1	5 MHz	731.5	737.0	742.5
		10 MHz	734.0	737.0	740.0
		15 MHz	736.5	737.0	737.5

Configuration B					
RAT	No. of Carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE +NR	2	10+5 MHz	734.0 + 741.5	--	735.0 + 742.5

Configuration C					
RAT	No. of Carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE NR LTE +NR	3	5 MHz	731.5 +736.5 +741.5	732.0 + 737.0 + 742.0	732.5 + 737.5 + 742.5

Note: The 10MHz LTE Carrier includes an NB-IoT GB signal.

1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Dot 2272 B5B12A and Dot 2282 B5B12A
MANUFACTURER	Ericsson
TYPE	Remote Radio Base Station
TESTED UNIT PART NUMBER	KRY 901 428/2
SERIAL NUMBER	TD3WD72731
HARDWARE VERSION	R1C
SOFTWARE VERSION	CXP9013268%17_R82GS
NON-TESTED VARIANT PART NUMBER	KRY 901 428/1
TRANSMITTER OPERATING RANGE	B5: 869-894 MHz, B12A: 729-745MHz
RECEIVER OPERATING RANGE	B5: 824-849 MHz, B12A: 699-715MHz
COUNTRY OF ORIGIN	China
INTERMEDIATE FREQUENCIES	None
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	B5 and B12A LTE: 5M00W7D, 10M0W7D B5 and B12A NBIoT Guardband: 10M0W7D B5 NR: 5M00F9W, 10M0F9W, 15M0F9W, 20M0F9W B12A NR: 5M00F9W, 10M0F9W, 15M0F9W
MODULATION TYPES: (i.e. GMSK, QPSK)	LTE: QPSK, 16QAM, 64QAM, 256QAM NR: QPSK, 16QAM, 64QAM, 256QAM
HIGHEST INTERNALLY GENERATED FREQUENCY	0.894 GHz
OUTPUT POWER (W or dBm)	B5: 2 x 0.05W (17dBm) B12A: 2 x 0.05W (17dBm)
ANTENNA GAIN (dBi)	B5 Peak gain: 1.4dBi B12A Peak gain: 1.8dBi
FCC ID	TA8AKRY901428-2 and TA8AKRY901428-1
INDUSTRY CANADA ID	287AB-AS9014282 and 287AB-AS9014281
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Dot 2282 B5B12A (KRY 901 428/2) is a dual band Remote Radio Unit forming part of the Ericsson Radio Base Station (RBS) equipment. The RD provides radio access for mobile and fixed devices and is intended for the indoor environment. The radio operates over 4 Transmit ports in MRO;Single, Multi-Carrier, and MIMO transmission with a maximum rated RF Output of 0.05W per port over an operational temperature of 5°C to +40°C. The unit is designed to be ceiling or wall mounted. Dot 2272 B5B12A (KRY 901 428/1) is identical to Dot 2282 B5B12A (KRY 901 428/2) except that it is built with internal antennas instead of external antenna RF ports.

Signature:

.....

Denis Lalonde

Date: 1 June 2021

Declaration of Build Status Serial Number: TD3WD72731

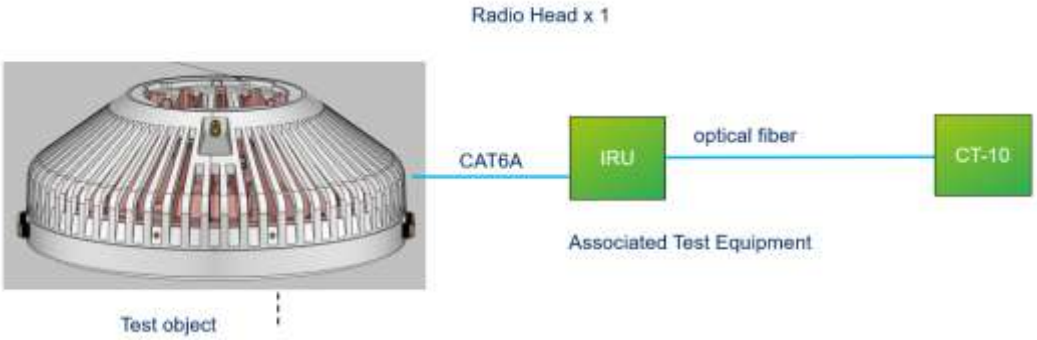
1.5 PRODUCT INFORMATION

1.5.1 Technical Description

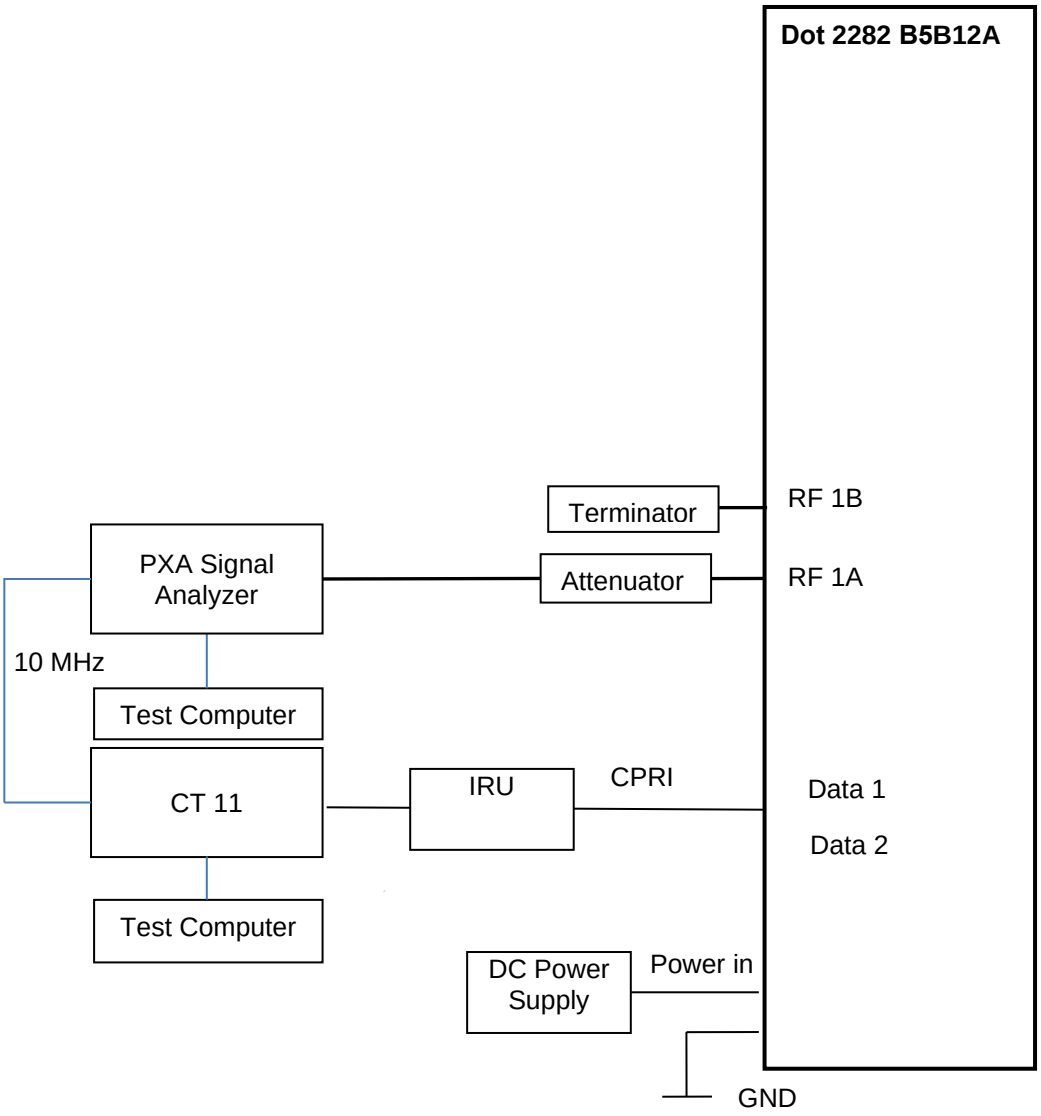
The Equipment Under Test (EUT) Dot 2282 B5 B12A is an Ericsson AB Radio Unit working in the public mobile service 746-756 MHz band which provides communication connections to 746-756 MHz network. The Dot 2282 B5 B12A operates from a -48V DC supply.

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



1.6 TEST SETUP



1.7 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
CA4810 TUV SUD Ottawa, Canada

ISED Accreditation
IC#24015 TUV SUD Ottawa, Canada

Under our A2LA Accreditation, TÜV SÜD Canada conducted the following tests Ericsson, Ottawa Laboratory.

Test Name	Name of Engineer(s)
Maximum Peak Output Power and Peak to Average Ratio - Conducted	Glen Westwell
Occupied Bandwidth	Glen Westwell
Band Edge	Glen Westwell
Transceiver Spurious Emissions	Glen Westwell

1.8 DEVIATION FROM THE STANDARD

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

1.9 MODIFICATION RECORD

No modifications were made to the EUT during testing.

1.10 ADDITIONAL INFORMATION

Dot 2272 B5B12A (KRY 901 428/1) is identical to Dot 2282 B5B12A (KRY 901 428/2) except that it is built with internal antennas instead of external antenna RF ports.

Ericsson will limit this product through the software from operating across the whole of Band 12, it will be limited to746-756 MHz

1. This filing is for a Radio Certification for use in the USA and Canada under the following ID's:

FCC ID: TA8AKRY901428-2 and TA8AKRY901428-1
ISED ID: 287AB-AS9014282 and 287AB-AS9014281

2. Transmitter performance was measured for top, mid & bottom channels, where applicable, across all antenna ports as presented in the average power measurement tables. Typical performance is presented.

3. The LTE 10MHz RAT also contains the NB-IoT Carrier.

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 2, Clause 2.1046
FCC CFR 47 Part 27, Clause 27.50(b)
ISED RSS-130, Clause 4.6

2.1.2 Date of Test and Modification State

27 March 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	24.9°C
Relative Humidity	29.8%

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 A

Maximum Output Power 17 dBm / Port

Antenna Gain (dBd)	Modulation	Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power				
-0.35			Channel Position B				
Antenna Port			PAR (dB)	Average Power			
				dBm	ERP (dBm)	dBm/MHz	ERP dBm/MHz
A	LTE: QPSK	5.0 MHz	9.37	16.79	16.44	11.88	11.53
B	LTE: QPSK	5.0 MHz	-	17.26	16.91	11.88	11.53
Total			-	20.04	19.69	14.89	14.54
A	LTE: QPSK	10.0 MHz	9.89	16.66	16.31	8.66	8.31
B	LTE: QPSK	10.0 MHz	-	16.59	16.24	8.66	8.31
Total			-	19.64	19.29	11.67	11.32
A	NR: QPSK	5.0 MHz	9.27	17.04	16.69	11.82	11.47
B	NR: QPSK	5.0 MHz	-	16.77	16.42	11.82	11.47
Total			-	19.92	19.57	14.83	14.48
A	NR: QPSK	10.0 MHz	9.41	16.83	16.48	8.78	8.43
B	NR: QPSK	10.0 MHz	-	17.99	17.64	8.78	8.43
Total			-	20.46	20.11	11.79	11.44
A	NR: QPSK	15.0 MHz	9.92	17.09	16.74	6.99	6.64
B	NR: QPSK	15.0 MHz	-	16.82	16.47	6.99	6.64
Total			-	19.97	19.62	10.00	9.65

Antenna Gain (dBd)	Modulation	Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power				
-0.35			Channel Position M				
Antenna Port			PAR (dB)	Average Power			
				dBm	ERP (dBm)	dBm/MHz	ERP dBm/MHz
A	LTE: QPSK	5.0 MHz	9.26	17.10	16.75	11.88	11.53
B	LTE: QPSK	5.0 MHz	-	17.29	16.94	11.88	11.53
Total			-	20.21	19.86	14.89	14.54
A	LTE: QPSK	10.0 MHz	9.48	17.57	17.22	8.42	8.07
B	LTE: QPSK	10.0 MHz	-	17.76	17.41	8.42	8.07
Total			-	20.68	20.33	11.43	11.08
A	NR: QPSK	5.0 MHz	9.27	17.29	16.94	11.98	11.63
B	NR: QPSK	5.0 MHz	-	16.77	16.42	11.98	11.63
Total			-	20.05	19.70	14.99	14.64
A	NR: QPSK	10.0 MHz	9.32	16.95	16.60	8.89	8.54
B	NR: QPSK	10.0 MHz	-	17.97	17.62	8.89	8.54
Total			-	20.50	20.15	11.90	11.55
A	NR: QPSK	15.0 MHz	9.78	17.82	17.47	7.17	6.82
B	NR: QPSK	15.0 MHz	-	18.33	17.98	7.17	6.82
Total			-	21.09	20.74	10.18	9.83

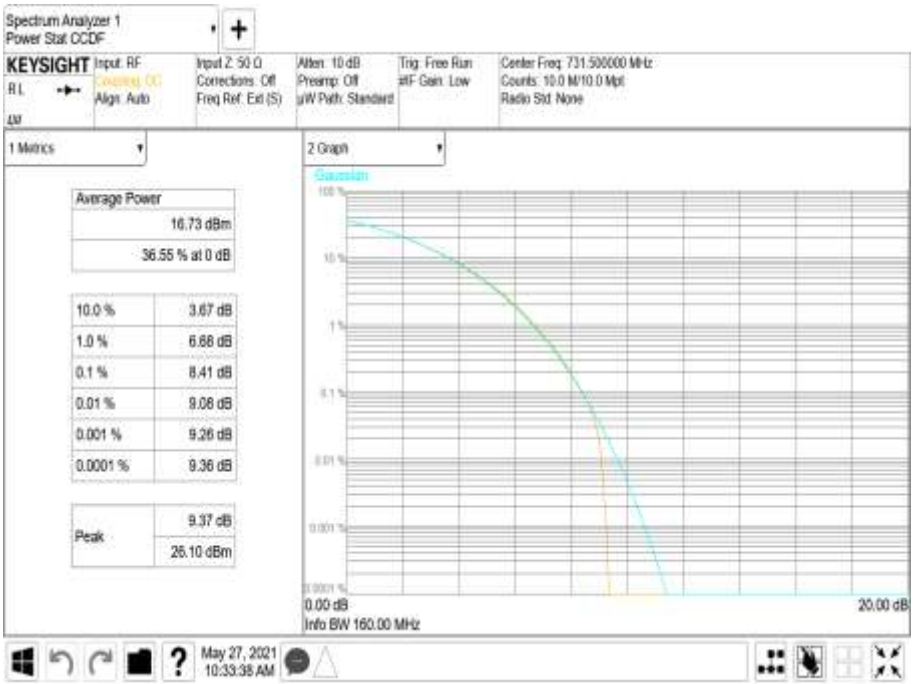
Antenna Gain (dBd)	Modulation	Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power				
-0.35			Channel Position T				
Antenna Port			PAR (dB)	Average Power			
				dBm	ERP (dBm)	dBm/MHz	ERP dBm/MHz
A	LTE: QPSK	5.0 MHz	9.41	16.92	16.57	11.78	11.43
B	LTE: QPSK	5.0 MHz	-	16.74	16.39	11.78	11.43
Total			-	19.84	19.49	14.79	14.44
A	LTE: QPSK	10.0 MHz	9.61	16.80	16.45	8.20	7.85
B	LTE: QPSK	10.0 MHz	-	17.54	17.19	8.20	7.85
Total			-	20.20	19.85	11.21	10.86
A	NR: QPSK	5.0 MHz	9.33	17.15	16.80	12.09	11.74
B	NR: QPSK	5.0 MHz	-	16.95	16.60	12.09	11.74
Total			-	20.06	19.71	15.10	14.75
A	NR: QPSK	10.0 MHz	9.35	17.49	17.14	8.93	8.58
B	NR: QPSK	10.0 MHz	-	17.78	17.43	8.93	8.58
Total			-	20.65	20.30	11.94	11.59
A	NR: QPSK	15.0 MHz	9.69	17.11	16.76	6.96	6.61
B	NR: QPSK	15.0 MHz	-	18.33	17.98	6.96	6.61
Total			-	20.77	20.42	9.97	9.62

Remarks

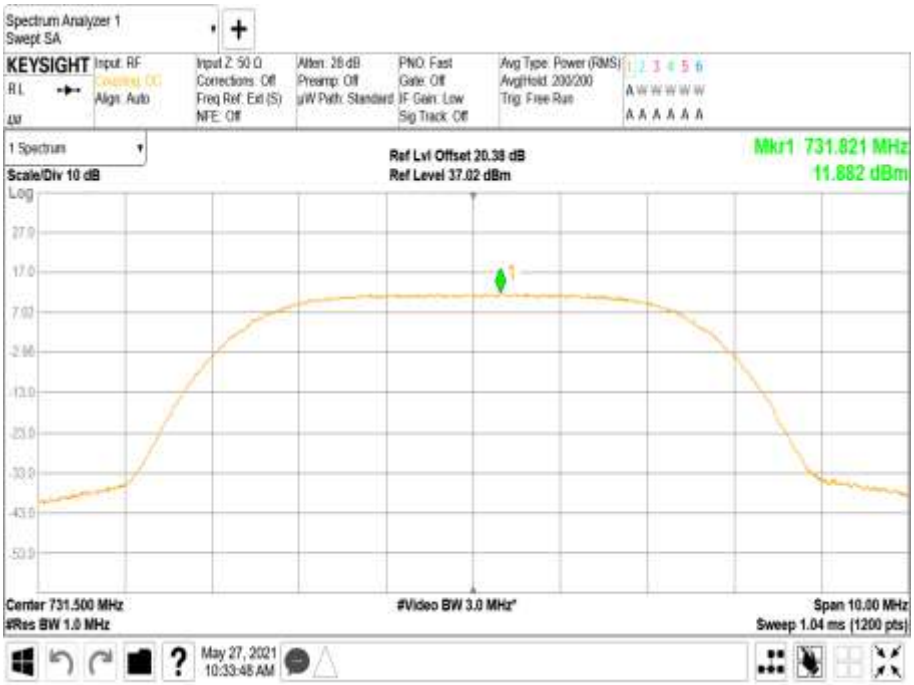
1. Transmitter performance has been presented for top, mid, bottom channels across all antenna ports as represented in the following tables.
2.Typical performance and measurement plot data has been presented for reference.
3. All plot data is on file and available upon request.

Antenna Port A Carrier Power - Modulation LTE: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B

Antenna Port A Pk-Av Ratio - Modulation LTE: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B

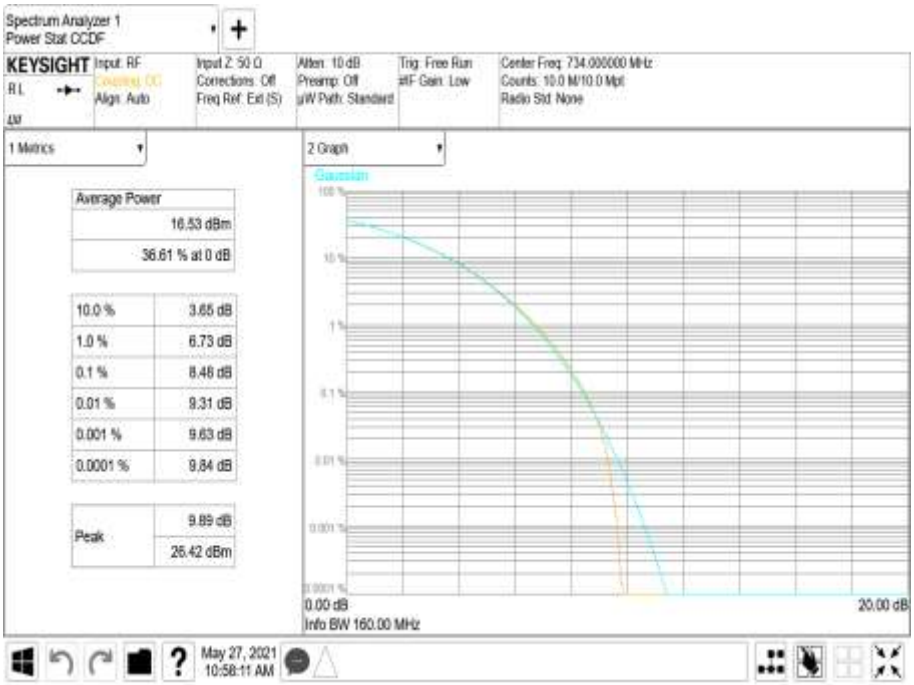


Antenna Port A PSD - Modulation LTE: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B



Antenna Port A Carrier Power - Modulation LTE: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B

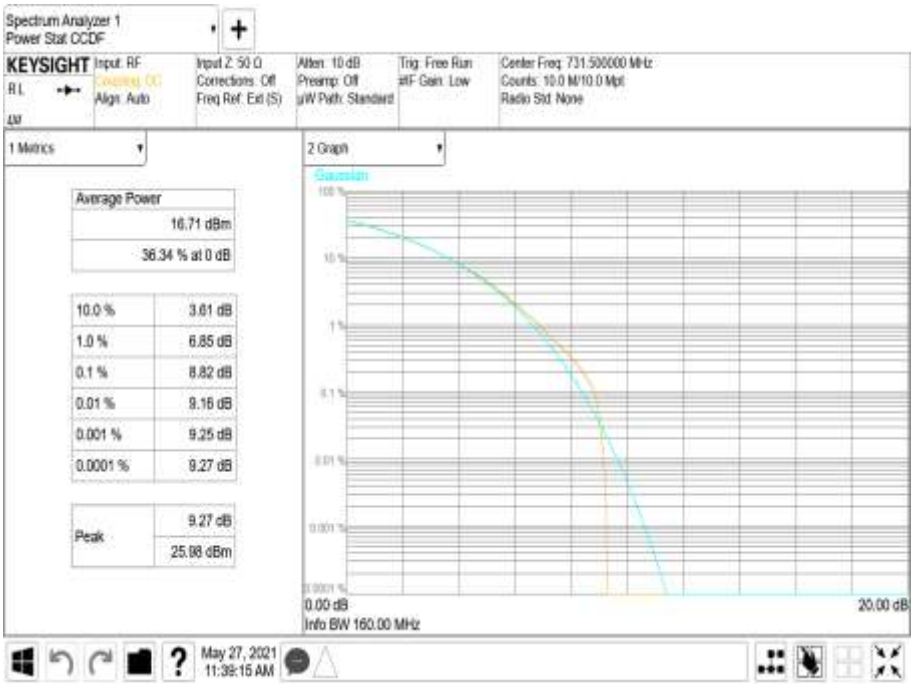
Antenna Port A Pk-Av Ratio - Modulation LTE: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B



Antenna Port A PSD - Modulation LTE: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B

Antenna Port A Carrier Power - Modulation NR: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B

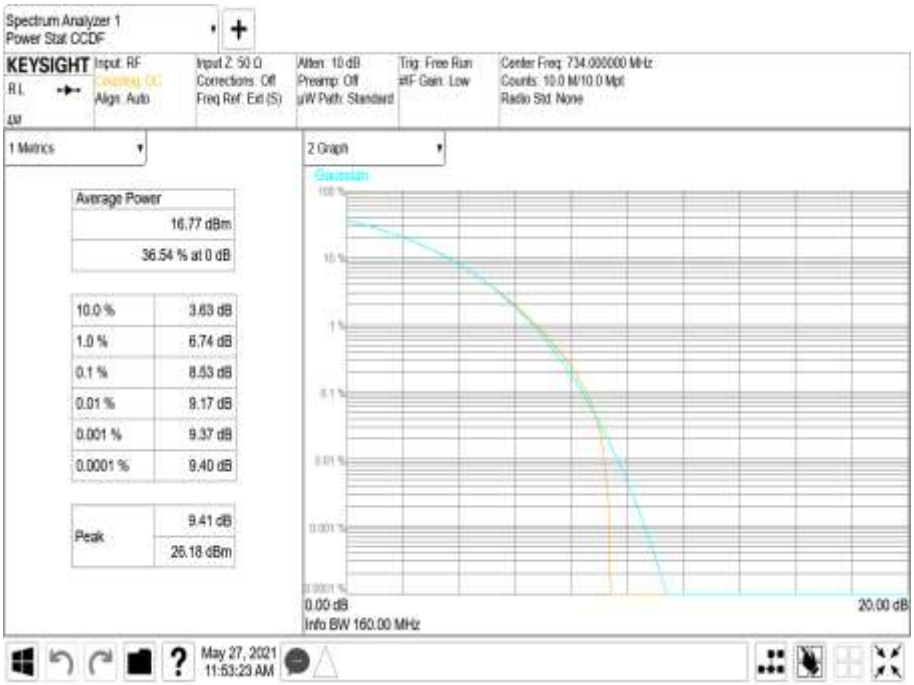
Antenna Port A Pk-Av Ratio - Modulation NR: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B



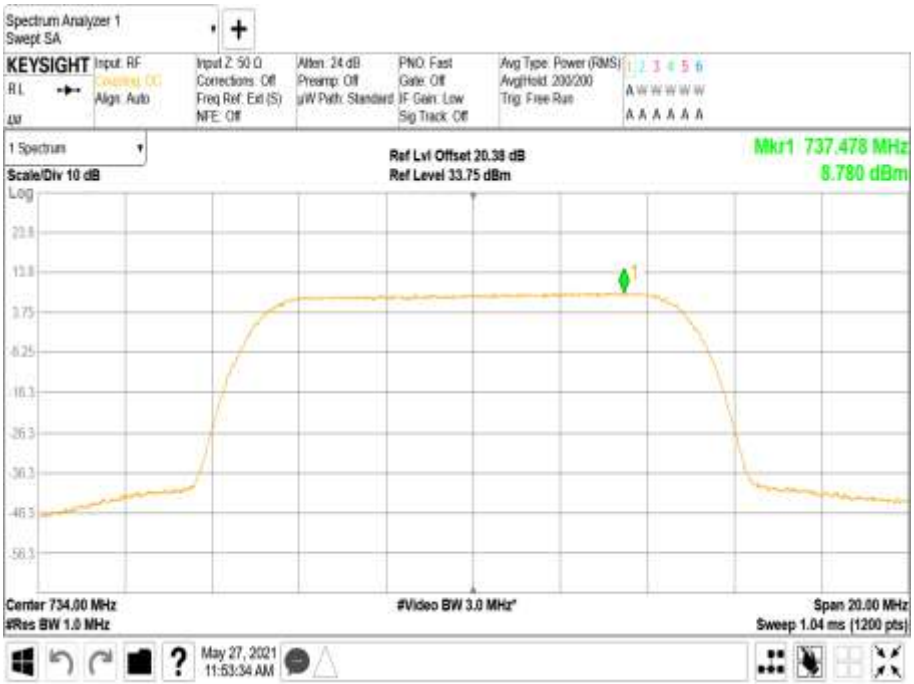
Antenna Port A PSD - Modulation NR: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B

Antenna Port A Carrier Power - Modulation NR: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B

Antenna Port A Pk-Av Ratio - Modulation NR: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B

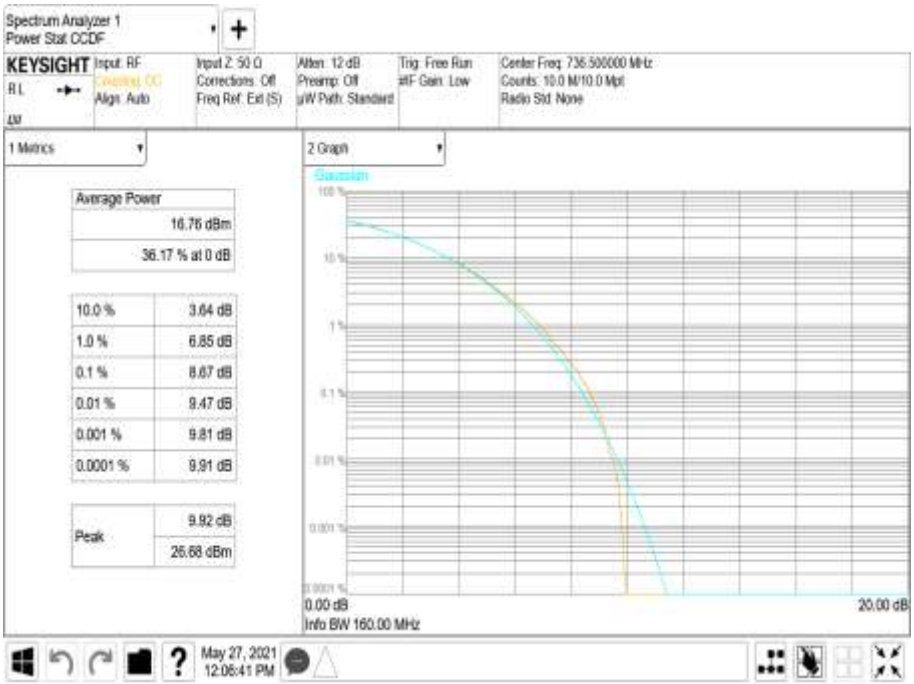


Antenna Port A PSD - Modulation NR: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B



Antenna Port A Carrier Power - Modulation NR: QPSK - Carrier Bandwidth 15.0 MHz - Channel Position B

Antenna Port A Pk-Av Ratio - Modulation NR: QPSK - Carrier Bandwidth 15.0 MHz - Channel Position B



Antenna Port A PSD - Modulation NR: QPSK - Carrier Bandwidth 15.0 MHz - Channel Position B

Configuration A

Maximum Output Power 17 dBm

Configuration B

Maximum Output Power 17 dBm / Port

Antenna	Modulation	Carrier Bandwidth	Output Power		
			Channel Position B		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	LTE + NR: QPSK	10.0+5 MHz	-	16.74	-
B	LTE + NR: QPSK	10.0+5 MHz	-	18.43	-
Total			-	20.68	-

Antenna	Modulation	Carrier Bandwidth	Output Power		
			Channel Position T		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	LTE + NR: QPSK	10.0+5 MHz	-	17.27	-
B	LTE + NR: QPSK	10.0+5 MHz	-	16.62	-
Total			-	20.68	-

Remarks

1. No Mid band measurements were presented as the authorized BW for this variant is 16MHz.

Antenna A - Modulation LTE + NR: QPSK - Carrier Bandwidth 10.0+5 MHz - Channel Position T

Antenna B - Modulation LTE + NR: QPSK - Carrier Bandwidth 10.0+5 MHz - Channel Position B

Configuration C

Maximum Output Power 17 dBm / Port

Antenna	Modulation	Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position M		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	LTE: QPSK	5.0+5.0+5.0 MHz	-	17.78	-
B	LTE: QPSK	5.0+5.0+5.0 MHz	-	16.72	-
Total			-	20.29	-
A	NR: QPSK	5.0+5.0+5.0 MHz	-	17.74	-
B	NR: QPSK	5.0+5.0+5.0 MHz	-	16.91	-
Total			-	20.36	-
A	LTE + NR + NR: QPSK	5.0+5.0+5.0 MHz	-	17.71	-
B	LTE + NR + NR: QPSK	5.0+5.0+5.0 MHz	-	16.81	-
Total			-	20.29	-

Remarks

1. The plot results represent typical radio performance across the transmit pass band. 2. The highest power transmitter configuration is presented for compliance.

Antenna A - Modulation LTE: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position M

Antenna A - Modulation NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position M

Antenna A - Modulation LTE + NR + NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position M

FCC Part 27.50(b)(4)

Limit	
Maximum ERP (Urban)	≤ 1000 W/MHz
Peak to Average Ratio	13 dB

RSS-130 Clause 4.6.1

Limit	
Peak to Average Ratio	13 dB

SRSP-518 Power and Antenna Height Limitations Clause 5.1, 5.2

Limit	
Maximum EIRP (Non-Urban)	≤ 1640 W/MHz or ≤+62.15 dBm
Maximum EIRP (Urban)	≤ 820 W/MHz or ≤+59.15 dBm

2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 27, Clause 27.53 (c)
ISED RSS-130, Clause 4.2
FCC CFR 47 Part 2, Clause 2.1049

2.2.2 Date of Test and Modification State

27 March 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	24.9°C
Relative Humidity	29.8%

2.2.5 Test Method

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

2.2.6 Test Results

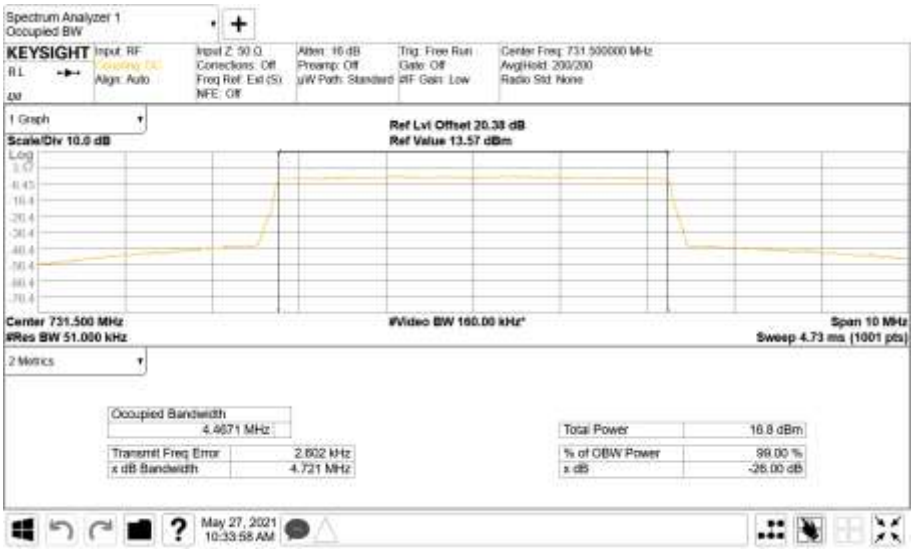
Configuration A

Maximum Output Power 17.00 dBm / Port

Modulation	Carrier Bandwidth	Result (MHz)	
		Channel Bandwidth	
		Occupied Bandwidth	-26 dB Bandwidth
NR: QPSK	LTE: 5.0 MHz	4.47	4.72
NR: QPSK	LTE: 10.0 MHz	9.39	9.63
NR: QPSK	NR: 5.0 MHz	4.45	4.75
NR: QPSK	NR: 10.0 MHz	9.26	9.64
NR: QPSK	NR: 15.0 MHz	14.08	14.60

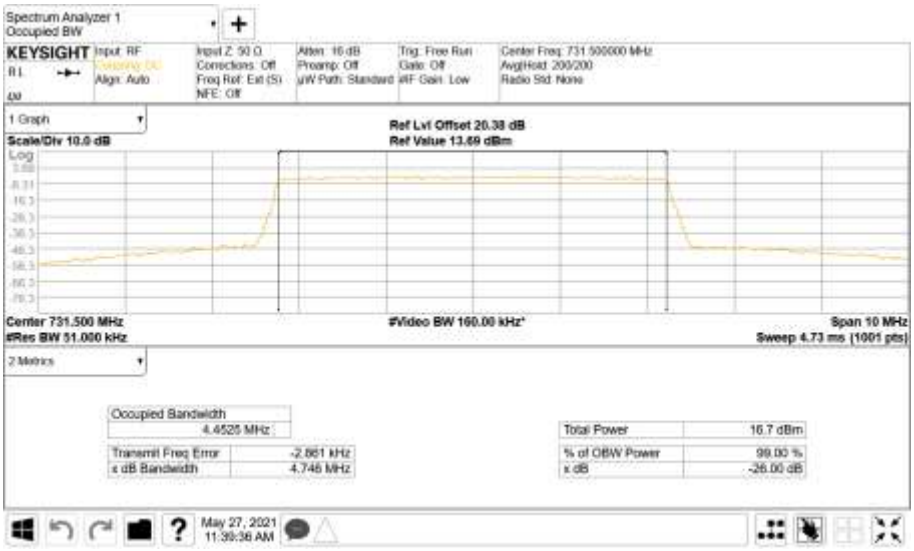
Remarks
Representative occupied bandwidth performance results presented. Plot data performance for all transmitter ports and channel positions are on file and available on request.

Modulation LTE: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B



Modulation LTE: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B

Modulation NR: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B



Modulation NR: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B

Modulation NR: QPSK - Carrier Bandwidth 15.0 MHz - Channel Position B

2.3 BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 27.53(c)
ISED RSS-130, Clause 4.7
FCC CFR 47 Part 2, Clause 2.1051

2.3.2 Date of Test and Modification State

27 March 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	24.9 °C
Relative Humidity	29.8%

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

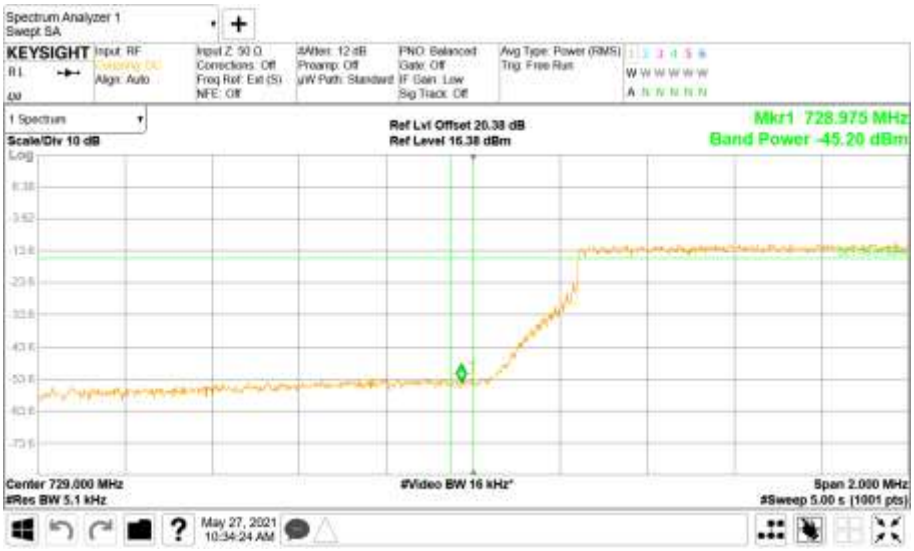
2.3.6 Test Results

Configuration A

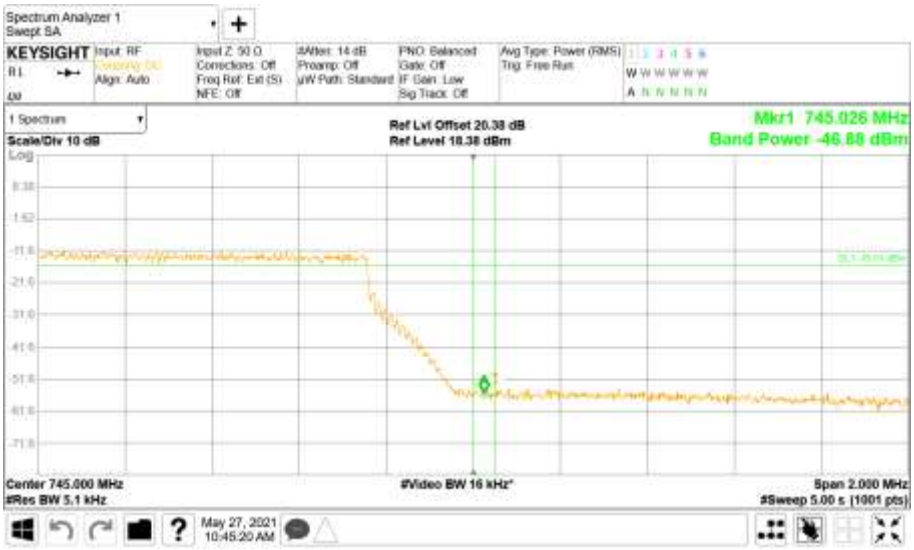
Maximum Output Power 17.00 dBm / Port

Modulation	Carrier Bandwidth	Band Edge (MHz)	
		Channel Position B	Channel Position T
NR: QPSK	LTE: 5.0 MHz	731.5	742.5
NR: QPSK	LTE: 10.0 MHz	734.0	740.0
NR: QPSK	NR: 5.0 MHz	731.5	742.5
NR: QPSK	NR: 10.0 MHz	734.0	740.0
NR: QPSK	NR: 15.0 MHz	736.5	737.5

Modulation LTE: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B



Modulation LTE: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position T

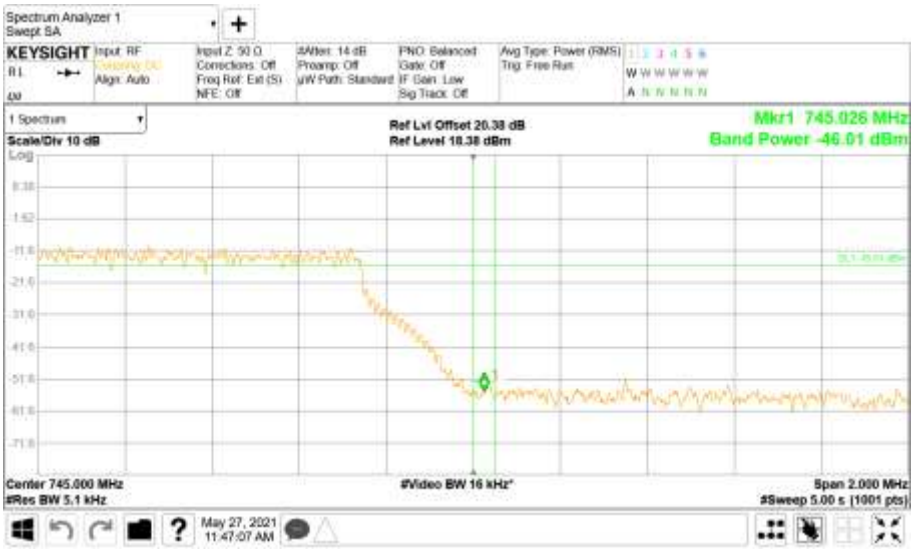


Modulation LTE: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B

Modulation LTE: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position T

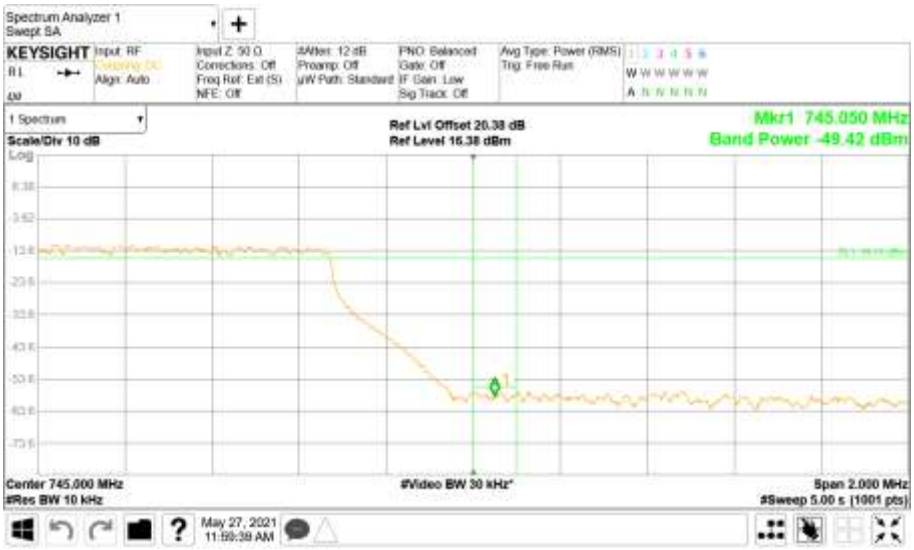
Modulation NR: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B

Modulation NR: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position T



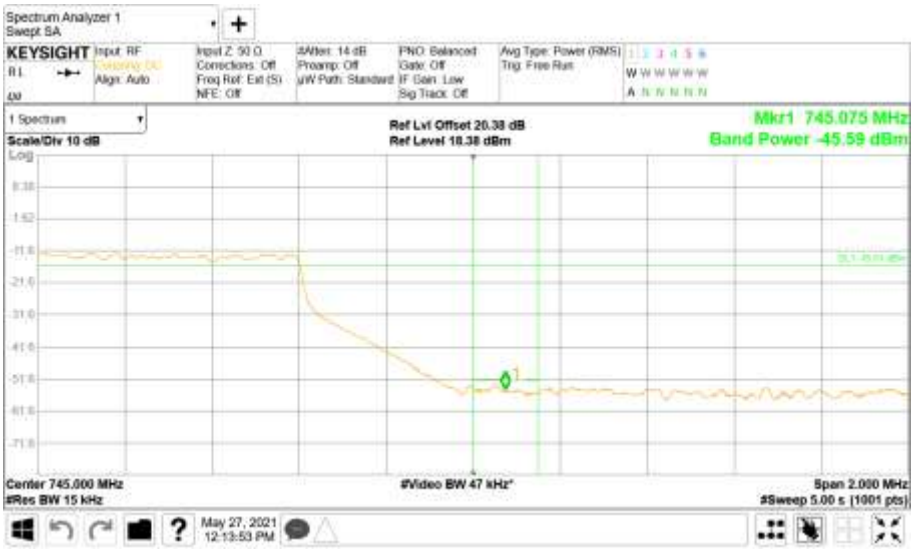
Modulation NR: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position B

Modulation NR: QPSK - Carrier Bandwidth 10.0 MHz - Channel Position T



Modulation NR: QPSK - Carrier Bandwidth 15.0 MHz - Channel Position B

Modulation NR: QPSK - Carrier Bandwidth 15.0 MHz - Channel Position T



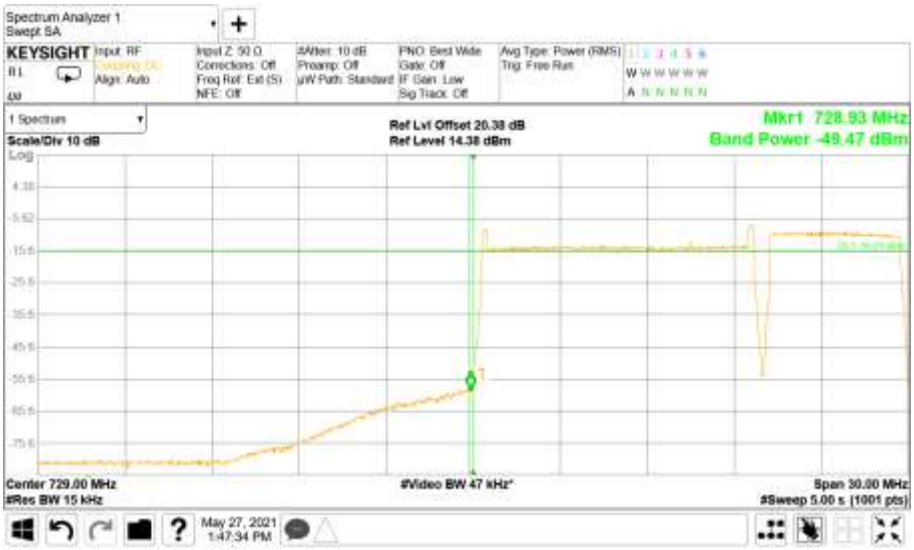
Configuration B

Maximum Output Power 17.00 dBm / Port

Modulation	Carrier Bandwidth	Band Edge (MHz)	
		Channel Position B	Channel Position T
LTE + NR: QPSK	10.0+5 MHz	734.0 + 741.5	735.0 + 742.5

Remarks
The plot results represent typical radio performance.

Modulation LTE+NR: QPSK - Carrier Bandwidth 10.0+5.0 MHz - Channel Position B



Modulation LTE+NR: QPSK - Carrier Bandwidth 10.0+5.0 MHz - Channel Position B

Configuration C

Maximum Output Power 17.00 dBm / Port

Modulation	Carrier Bandwidth	Band Edge (MHz)	
		Channel Position B	Channel Position T
LTE: QPSK	5.0+5.0+5.0 MHz	731.5 +736.5 +741.5	732.5 + 737.5 + 742.5
NR: QPSK	5.0+5.0+5.0 MHz	731.5 +736.5 +741.5	732.5 + 737.5 + 742.5
LTE + NR + NR: QPSK	5.0+5.0+5.0 MHz	731.5 +736.5 +741.5	732.5 + 737.5 + 742.5

Modulation LTE: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position B

Modulation LTE: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position T

Modulation NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position B

Modulation NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position T

Modulation LTE+NR+NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position B

Modulation LTE+NR+NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position T

Limit	-16dBm

2.4 TRANCEIVER SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 27.53(c)
ISED RSS-GEN, Clause 6.13
ISED RSS-130, Clause 4.7

2.4.2 Date of Test and Modification State

27 March 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	24.9°C
Relative Humidity	29.8%

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

2.4.6 Test Results

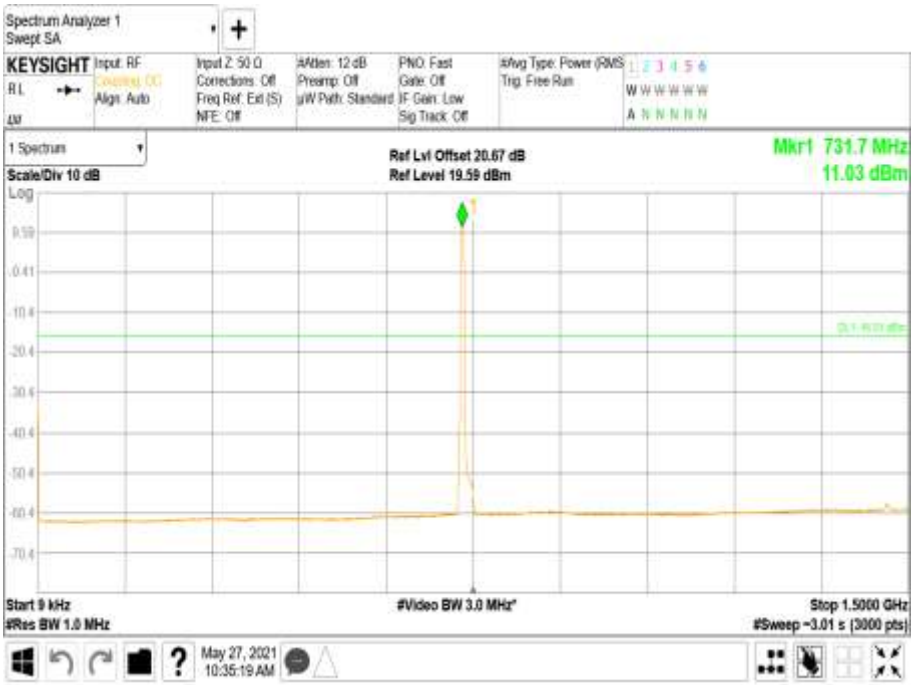
Configuration A

Maximum Output Power 17 dBm / Port

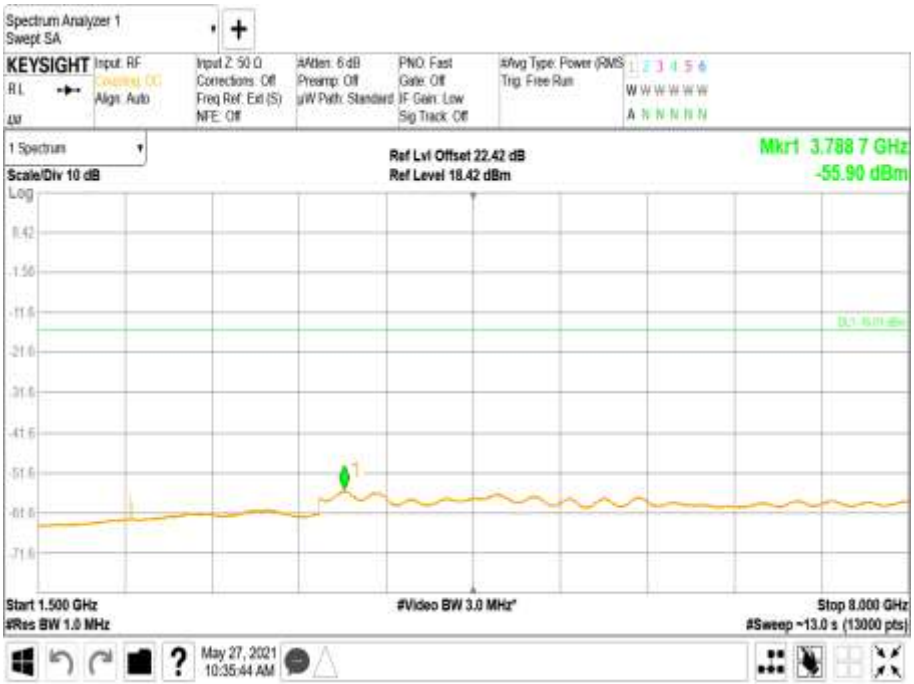
Remarks

1. Transceiver spurious emissions have been searched for all channel bandwidths and antenna ports.
2. Representative spurious emissions performance has been presented for all modulations.
3. Plot data performance for all transmitter ports, channel bandwidths, and channel positions are on file and available on request.

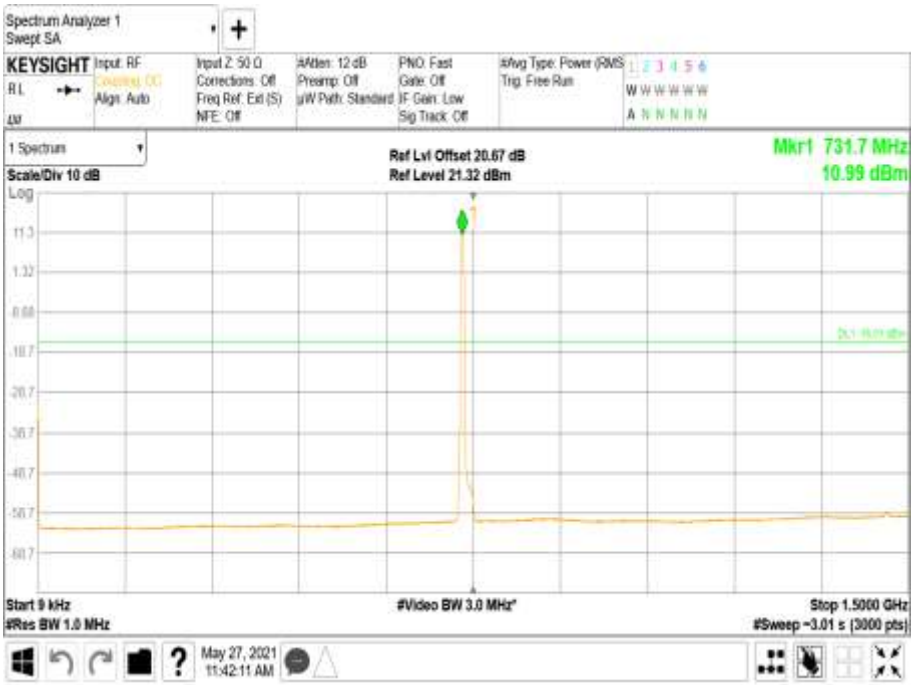
Antenna A - Modulation LTE: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B - Band 1 - Range 0.009 to 1500 MHz



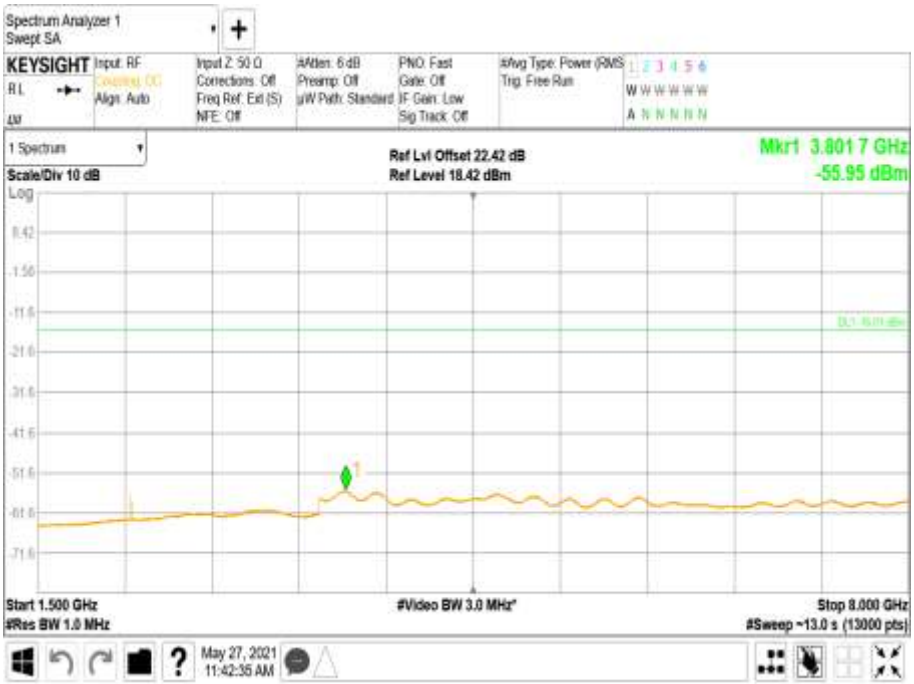
Antenna A - Modulation LTE: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B - Band 2 - Range 1500 to 8000 MHz



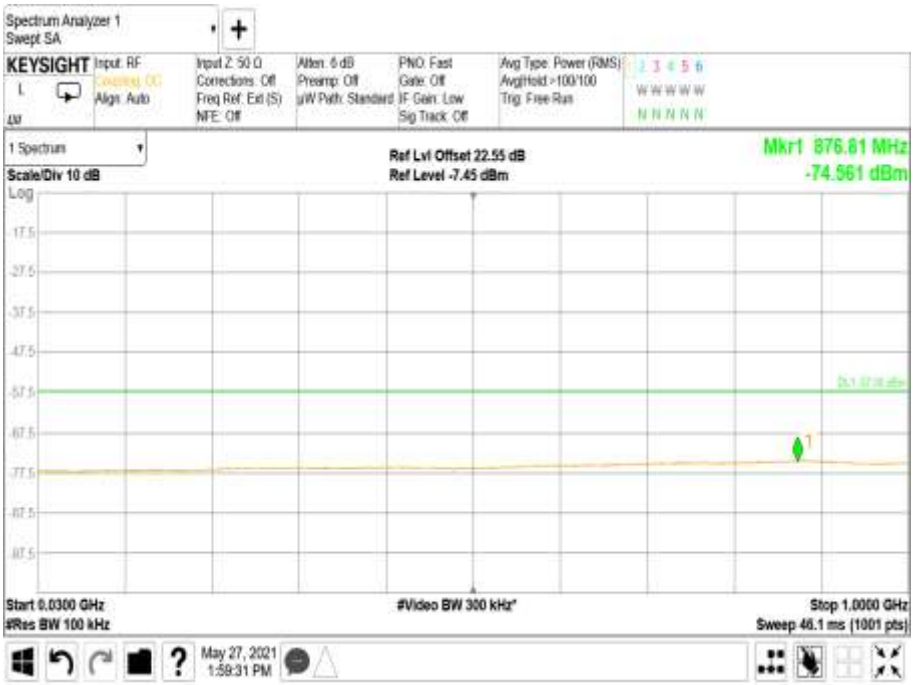
Antenna A - Modulation NR: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B - Band 1 - Range 0.009 to 1500 MHz



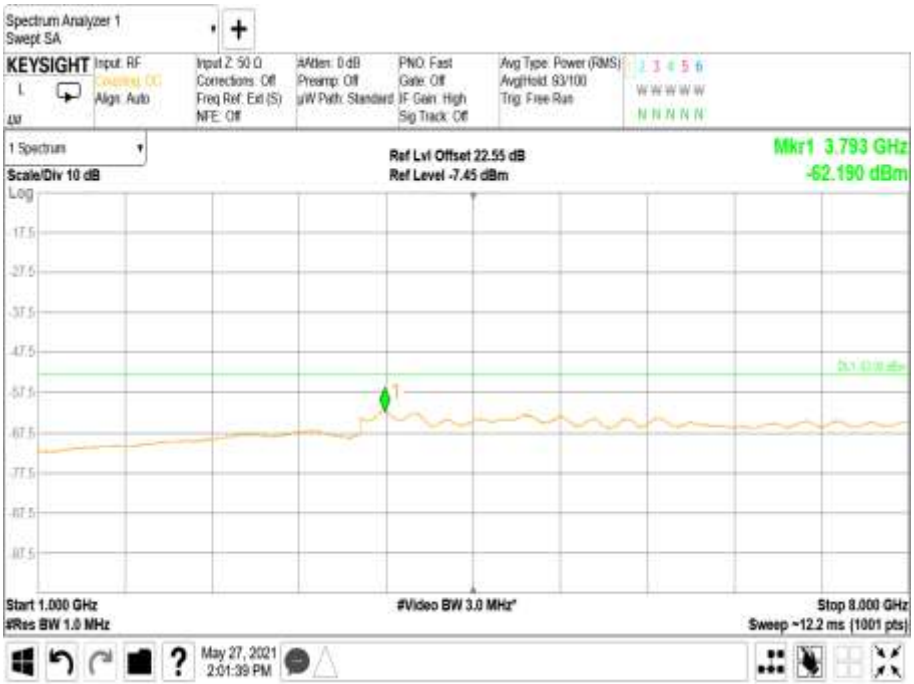
Antenna A - Modulation NR: QPSK - Carrier Bandwidth 5.0 MHz - Channel Position B - Band 2 - Range 1500 to 8000 MHz



Antenna A - Modulation RX Spur - Carrier Bandwidth 5.0 MHz - Channel Position M - Band 1 - Range 30.0 to 1000 MHz



Antenna A - Modulation RX Spur - Carrier Bandwidth 5.0 MHz - Channel Position M - Band 2 - Range 1000 to 8000 MHz



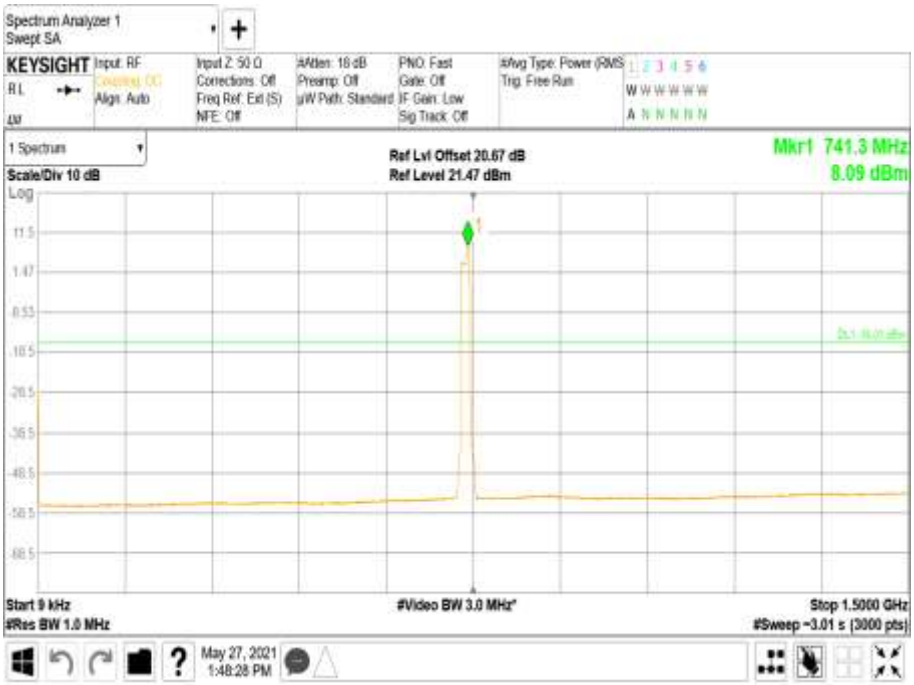
Configuration B

Maximum Output Power 17 dBm / Port

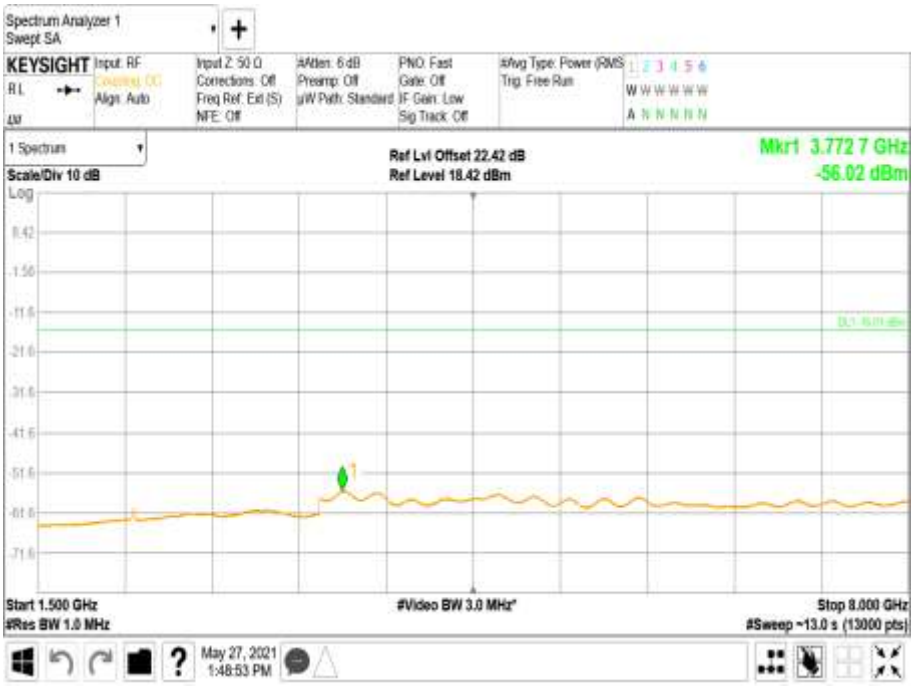
Remarks

1. Representative spurious emissions performance has been presented for all modulations.
2. Typical worst-case performance presented.

Antenna A - Modulation LTE + NR: QPSK - Carrier Bandwidth 10.0+5.0 MHz - Channel Position B - Band 1 - Range 0.009 to 1500 MHz



Antenna A - Modulation LTE + NR + NR: QPSK - Carrier Bandwidth 10.0+5.0 MHz - Channel Position B - Band 2 - Range 1500 t0 8000 MHz



Configuration C

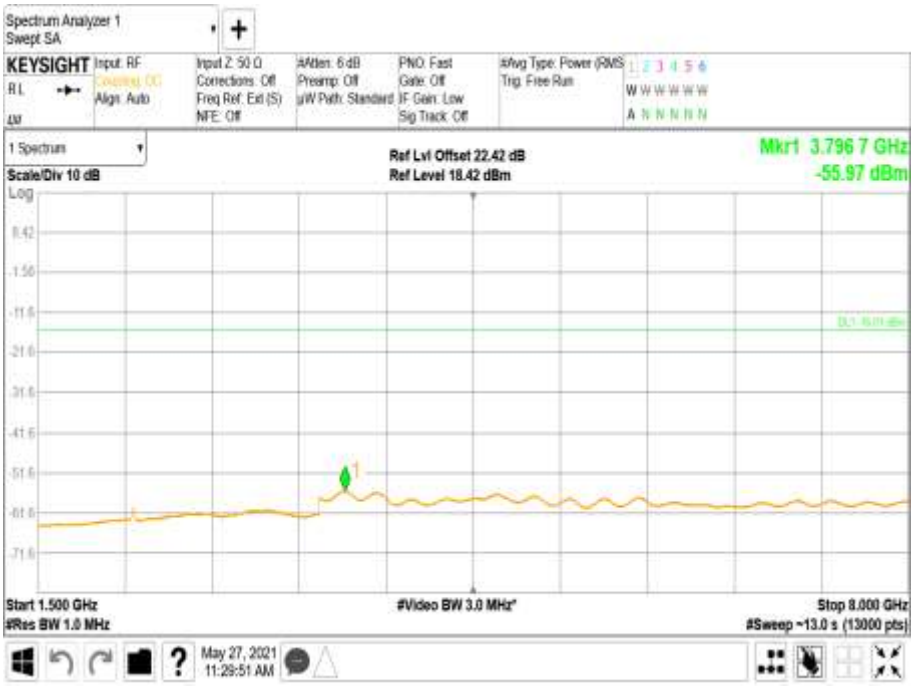
Maximum Output Power 17 dBm / Port

Remarks

1. Transceiver spurious emissions have been searched for all channel bandwidths and antenna ports.
2. Representative spurious emissions performance has been presented for all modulations.
3. Plot data performance for all transmitter ports, channel bandwidths, and channel positions are on file and available on request.

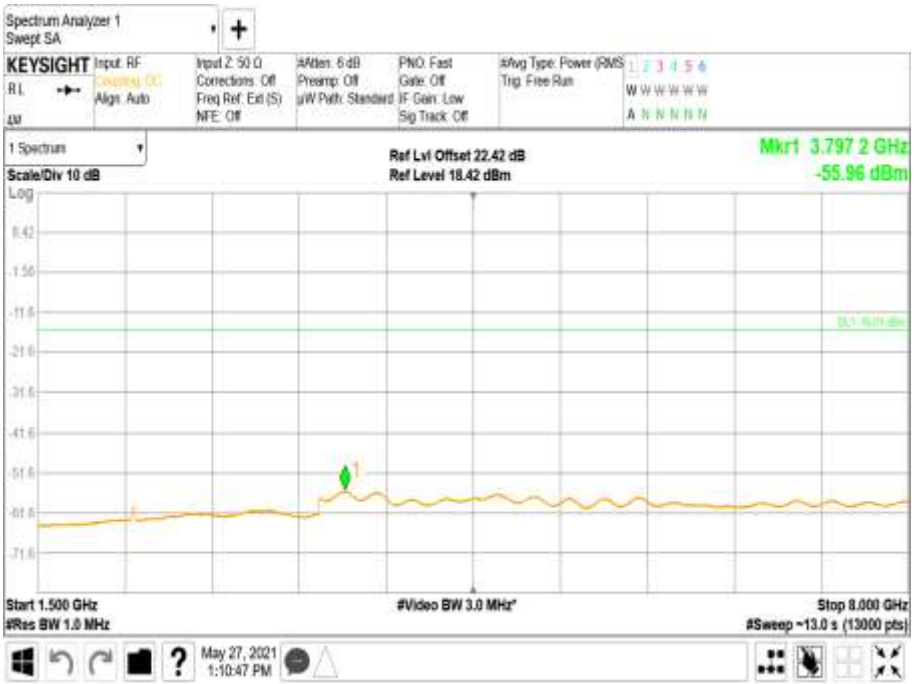
Antenna A - Modulation LTE: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position M - Band 1 - Range 0.009 to 1500 MHz

Antenna A - Modulation LTE: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position M - Band 2 - Range 1500 to 8000 MHz



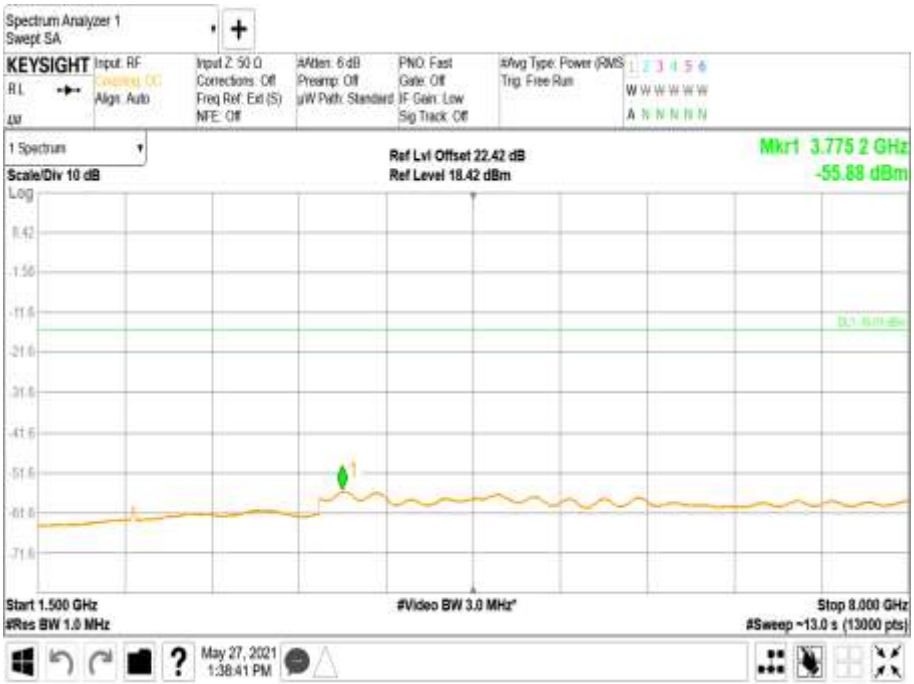
Antenna A - Modulation NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position M - Band 1 - Range 0.009 to 1500 MHz

Antenna A - Modulation NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position M - Band 2 - Range 1500 to 8000 MHz



Antenna A - Modulation LTE + NR + NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position M - Band 1 - Range 0.009 to 1500 MHz

Antenna A - Modulation LTE + NR + NR: QPSK - Carrier Bandwidth 5.0+5.0+5.0 MHz - Channel Position M - Band 2 - Range 1500 to 8000 MHz



Limit	-16dBm

2.5 RECEIVER SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
ISED RSS-GEN, Clause 7.4

Date of Test and Modification State
27 March 2021 - Modification State 0

2.5.2 Test Equipment Used

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

2.5.3 Environmental Conditions

Ambient Temperature	24.9°C
Relative Humidity	29.8%

2.5.4 Test Method

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

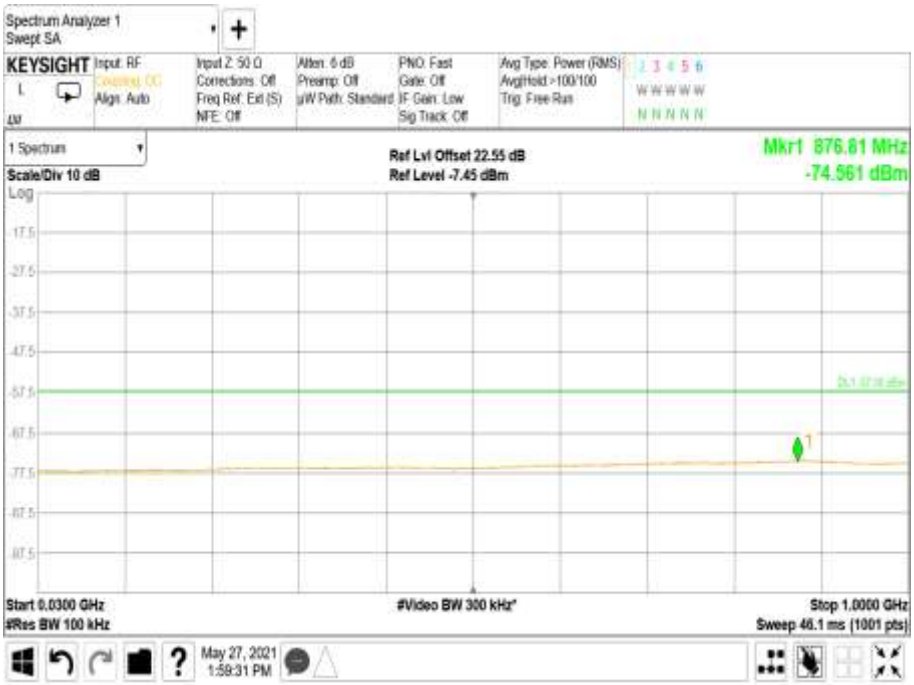
2.5.5 Test Results

Configuration A

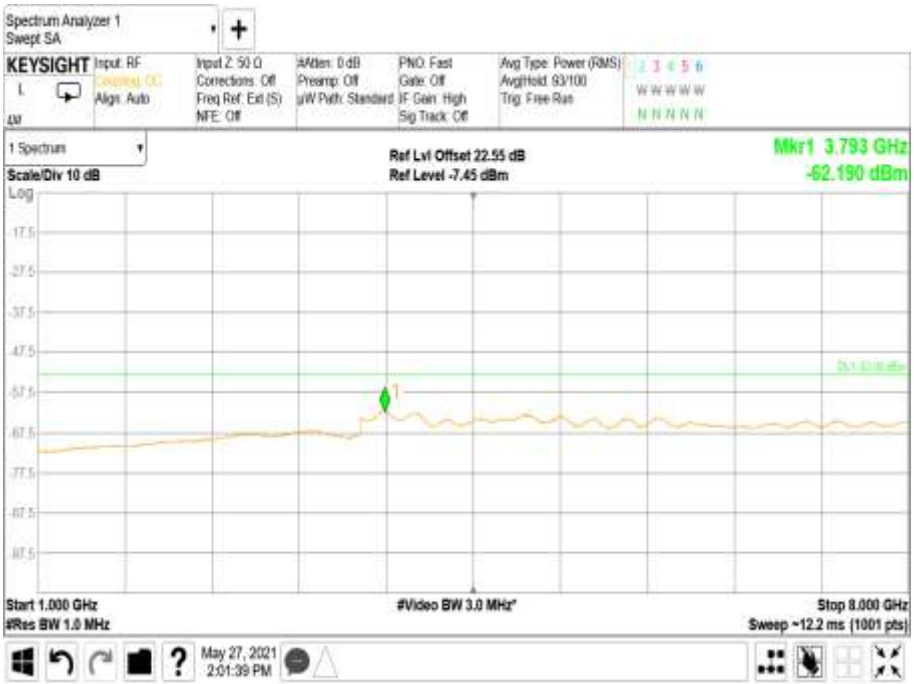
Remarks

1. Typical receiver spurious performance presented. No emissions detected.

Antenna A - Modulation RX Spur - Carrier Bandwidth 5.0 MHz - Channel Position M - Band 1 - Range 30.0 to 1000 MHz



Antenna A - Modulation RX Spur - Carrier Bandwidth 5.0 MHz - Channel Position M - Band 2 - Range 1000 to 8000 MHz



Limit	-57dBm ,<1GHz -53 dBm >1GHz

2.6 FREQUENCY STABILITY

2.6.1 Specification Reference

FCC CFR 47 Part 27.54
ISED RSS-GEN, Clause 6.11
ISED RSS-130, Clause 4.5
FCC CFR 47 Part 2, Clause 2.1055

2.6.2 Date of Test and Modification State

28 March 2021 - Modification State 0

2.6.3 Test Equipment Used

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

2.6.4 Environmental Conditions

Ambient Temperature	25.3°C
Relative Humidity	30.1%

2.6.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, Clause 9 and ANSI C63.26 Clause 5.6

2.6.6 Test Results

Configuration A

Maximum Output Power 17.00 dBm / Port

Temperature	Voltage	Frequency Error (Hz)
		Channel Position B: 731.5 MHz
-30°C	-48.0 V DC	N/A (Radio shuts down)
-20°C	-48.0 V DC	N/A (Radio shuts down)
-10°C	-48.0 V DC	1.2609
0°C	-48.0 V DC	1.2424
+10°C	-48.0 V DC	0.9333
+20°C	-40.5 V DC	0.8786
+20°C	-48.0 V DC	0.5519
+20°C	-57.5 V DC	-0.7823
+30°C	-48.0 V DC	0.9441
+40°C	-48.0 V DC	0.7947
+50°C	-48.0 V DC	0.6821

Remarks
Worst case = 0.00172 ppm

RSS-132 Limit 5.3

Limit	±1.5 ppm or ±1.097 kHz

Frequency Tolerance FCC Part 27.54

Frequency range (MHz)	Limit (ppm)
25 to 50	20.0
50 to 450	5.0
450 to 512	2.5
821 to 896	1.5
928 to 929	5.0
929 to 960	1.5
2110 to 2220	10.0

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
Spectrum Analyzer	Keysight	PXA N9030B	MY57144347	24	24/04/2022
Thermometer	VWR	61161-364	192595396	24	25-10-2021
PSU	Xantrex	XKW60-50	E00109862	-	O/P Mon
Attenuator (20dB)	Mini-Circuits	BW-K10-2W44+	-	-	O/P Mon
Climate Chamber	Burnsco	RTC-37P-3-3	-07-07	-	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	30 MHz to 20 GHz Amplitude		± 0.7 dB
Conducted Emissions	30 MHz to 20 GHz Amplitude		± 2.1 dB
Frequency Stability	30 MHz to 2 GHz		± 5.0 Hz
Occupied Bandwidth	Up to 20 MHz Bandwidth	5 MHz Bandwidth	± 11547 Hz
		10 MHz Bandwidth	± 23094 Hz
		15 MHz Bandwidth	± 34641 Hz
		20 MHz Bandwidth	± 46188 Hz
Band Edge	30 MHz to 20 GHz Amplitude		±0.8 dB
Radiated Spurious Emissions	30 MHz to 1 GHz		± 5.2 dB
	1 GHz to 40GHz		± 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.

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Testing Laboratory
Certificate #2955.19

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

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc. accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc., unless otherwise stated.

This report relates only to the actual item/items tested

ANNEX A

MODULE LIST

Product	Product No	R-State	Serial No
CT11	LPC 102 494/1	R2A	T01G495060
IRU 8844	KRC 161 754/3	R1D	D828666185
DOT 2282 B5 B12A (EUT)	KRY 901 428/2	R1C	TD3WD72731
Software Version:	CXP9013268%17	Revision:	R82GS