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Report On

FCC and IC Testing of the
Ericsson KRC 161 752/1 (Radio 4449 B5 B12A) NR (850 MHz) Base
Station in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 22,
Industry Canada RSS-GEN and Industry Canada RSS-132

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC161752-1

IC ID: 287AB-AS16167521

PREPARED BY

A handwritten signature in black ink, appearing to read "Maggie Whiting".

Maggie Whiting
Key Account Manager

APPROVED BY

A handwritten signature in black ink, appearing to read "Steve Scarfe".

Steve Scarfe
Authorised Signatory

DATED

15 July 2019

Document 75946096 Report 04 Issue 2

July 2019



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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 4449 B5 B12A & KRC 161 752/1
IC Model Name	AS1617521
Serial Number(s)	B442513008
Software Version	CXP9013268%15 Rev R79BT
Hardware Version	R1D
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2016 FCC CFR 47 Part 22: 2016 Industry Canada RSS-GEN: Issue 4: 2014 Industry Canada RSS-132: Issue 3: 2015
Start of Test	27 June 2019
Finish of Test	27 June 2019
Name of Engineer(s)	Brian Scarfe
Related Document(s)	KDB 971168 D01 v02r02 KDB 662911 D01 v02r01

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 22. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

A handwritten signature in black ink, appearing to read 'Brian Scarfe', positioned above a horizontal line.

Brian Scarfe

This Report has been up issued to Issue 2 and should be read in place of Issue 1. This Report has been up issued to Issue 2 to correct some typographical errors.



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, Industry Canada RSS-GEN and Industry Canada RSS-132 is shown below.

Section	Specification Clause				Test Description	Result
	FCC CFR 47 Part 2	FCC CFR 47 Part 22	RSS-GEN	RSS-132		
2.1	2.1046	22.913 (a)	-	5.4	Maximum Peak Output Power and Peak to Average Ratio - Conducted	Pass
2.2	2.1049	22.917 (b)	6.6	-	Occupied Bandwidth	Pass
2.3	2.1051	22.905	-	5.5	Band Edge	Pass
2.4	2.1051	22.905	-	5.5	Transmitter Spurious Emissions	Pass

The testing in this report was performed on B5 only.

Measurement Uncertainty Decision Statement

Determination of conformity with the specification limits is based on the results of the compliance measurement and does not take into account measurement instrumentation uncertainty as defined in ANSI C63.26:2015 Clause 1.3.



1.3 CONFIGURATION DESCRIPTION

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
A	NR	1	5 MHz – SCS 15kHz	871.5	-	891.5
	NR	1	10 MHz – SCS 15kHz	874.0	-	889.0
	NR	1	10 MHz – SCS 30kHz	874.0	-	889.0



1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Unit
MANUFACTURER	Ericsson AB
PRODUCT NAME	Radio 4449 B5 B12A
PART NUMBER	KRC 161 752/1
IC Model Name	AS1617521
SERIAL NUMBER	B442513008
HARDWARE VERSION	R1D
SOFTWARE VERSION	CXP9013268/15-R79BT
TRANSMITTER OPERATING RANGE	B5: 869 - 894 MHz B12A: 729 - 745 MHz
MODULATIONS	LTE & NR: QPSK, 16QAM, 64QAM, 256QAM NB IoT ³ : QPSK
ITU DESIGNATION OF EMISSION	B12A LTE 5 MHz BW channel: 5M00W7D ¹
	B12A LTE 5 MHz BW channel: 5M00W7D ²
	B12A LTE 10 MHz BW channel: 10M0W7D ¹
	B12A LTE 10 MHz BW channel: 10M0W7D ²
	B5 LTE 5 MHz BW channel: 5M00W7D ¹
	B5 LTE 5 MHz BW channel: 5M00W7D ²
	B5 LTE 10 MHz BW channel: 10M0W7D ¹
	B5 LTE 10 MHz BW channel: 10M0W7D ²
	B5 NR 5 MHz BW channel: 4M47W7D ¹
	B5 NR 5 MHz BW channel: 4M47W7D ²
	B5 NR 10 MHz BW channel: 9M29W7D ¹
	B5 NR 10 MHz BW channel: 9M29W7D ²
OUTPUT POWER (RMS) (W or dBm)	40 W per port on 4 ports, or 60 W per port on 2 ports only
FCC ID	TA8AKRC161752-1
IC ID	287AB-AS1617521
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Base station radio

¹40W

²60W

³ NB IoT IB & GB on B12A

Signature

Audun B Helle
Audun Helle

Date

2019-07-04

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

1.5 PRODUCT INFORMATION

1.5.1 Technical Description

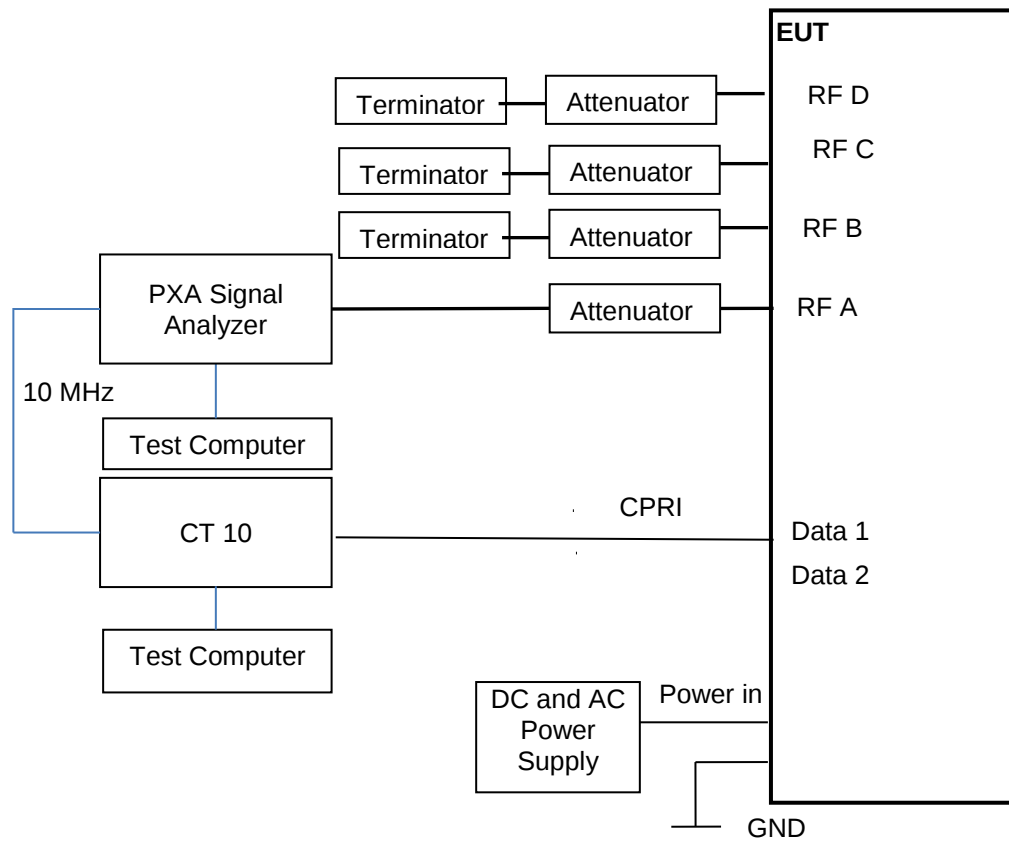
The Equipment Under Test (EUT) Radio 4449 B5 B12A is an Ericsson AB Radio Unit working in the public mobile service 850 MHz band which provides communication connections to 850 MHz network. The Radio 4449 B5 B12A operates from a 240V AC and -48V DC supply.

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 in a shielded enclosure, test laboratories or a chamber as appropriate.

The EUT was powered from a 240V AC and -48V DC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC2932B-1 Octagon House, Fareham Test Laboratory

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 ALTERNATIVE TEST SITE

Under our group UKAS Accreditation, TÜV SÜD conducted the following tests at Ericsson in Fareham, UK.

Test Name	Name of Engineer(s)
Maximum Peak Output Power and Peak to Average Ratio - Conducted	Brian Scarfe
Occupied Bandwidth	Brian Scarfe
Band Edge	Brian Scarfe
Transmitter Spurious Emissions	Brian Scarfe



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 22, Clause 27.50
Industry Canada RSS-132, Clause 5.4

2.1.2 Date of Test and Modification State

27 June 2019 - 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 24.3°C
Relative Humidity 40%

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

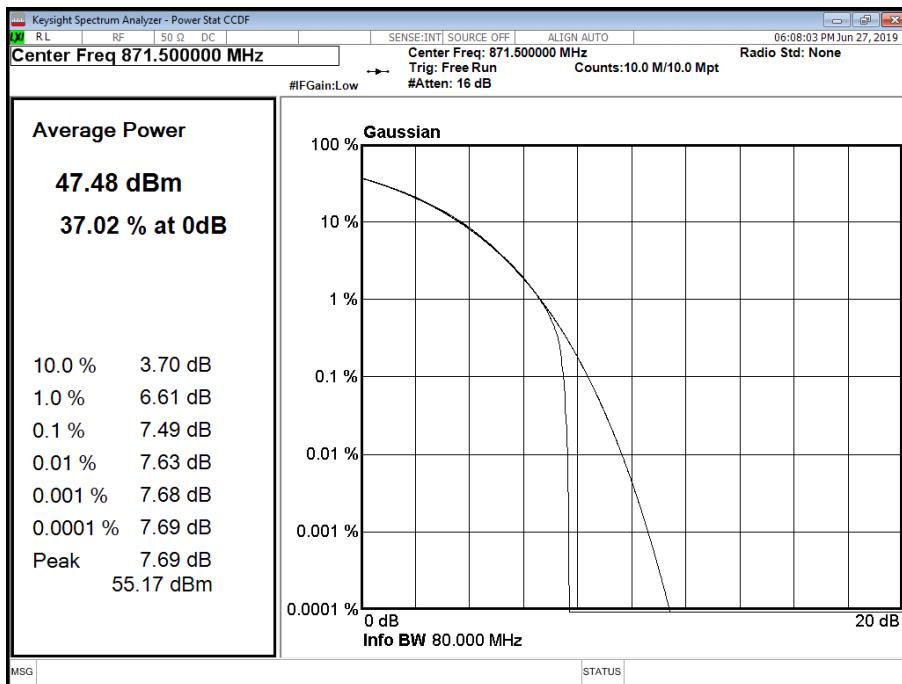
Configuration 1

Maximum Output Power 47.8 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	QPSK	5.0 MHz 15 kHz SCS	7.49	47.51	41.61
A	QPSK	10.0 MHz 15 kHz SCS	-	47.59	-
A	QPSK	10.0 MHz 30 kHz SCS	-	47.53	-



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B



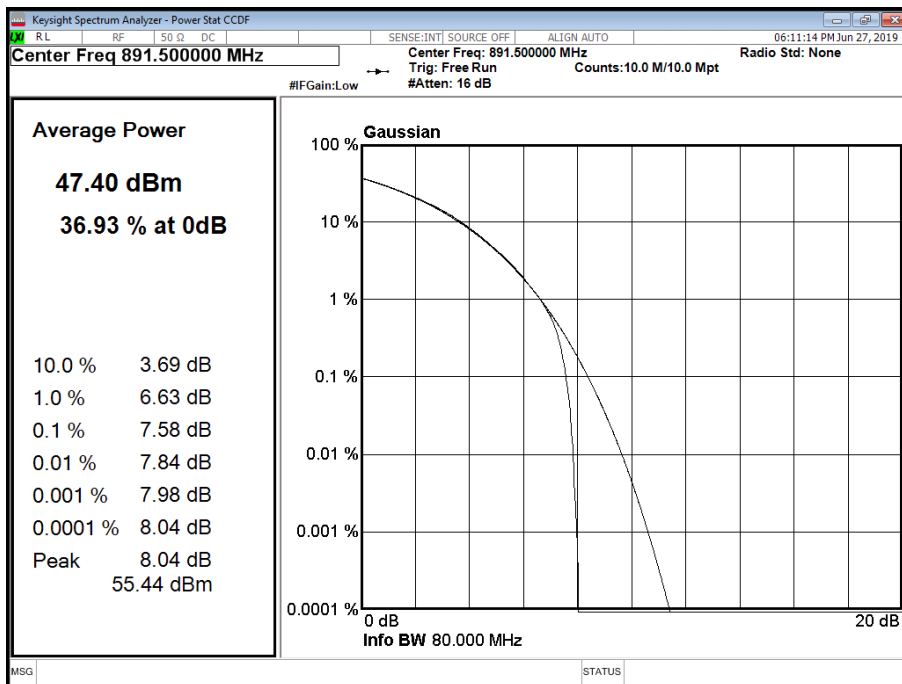
Configuration 1

Maximum Output Power 47.8 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			PAR (dB)	Channel Position T	
				Average Power	
				dBm	dBm/MHz
A	QPSK	5.0 MHz 15 kHz SCS	7.58	47.48	41.53
A	QPSK	10.0 MHz 15 kHz SCS	-	47.47	-
A	QPSK	10.0 MHz 30 kHz SCS	-	47.50	-



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T



Limit	
Peak Power	≤500 W or ≤+57 dBm
Peak to Average Ratio	13 dB



2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049
FCC CFR 47 Part 22, Clause 27.53
Industry Canada RSS-GEN, Clause 5.6

2.2.2 Date of Test and Modification State

27 June 2019 - 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 24.3°C
Relative Humidity 40%

2.2.5 Test Method

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

2.2.6 Test Results

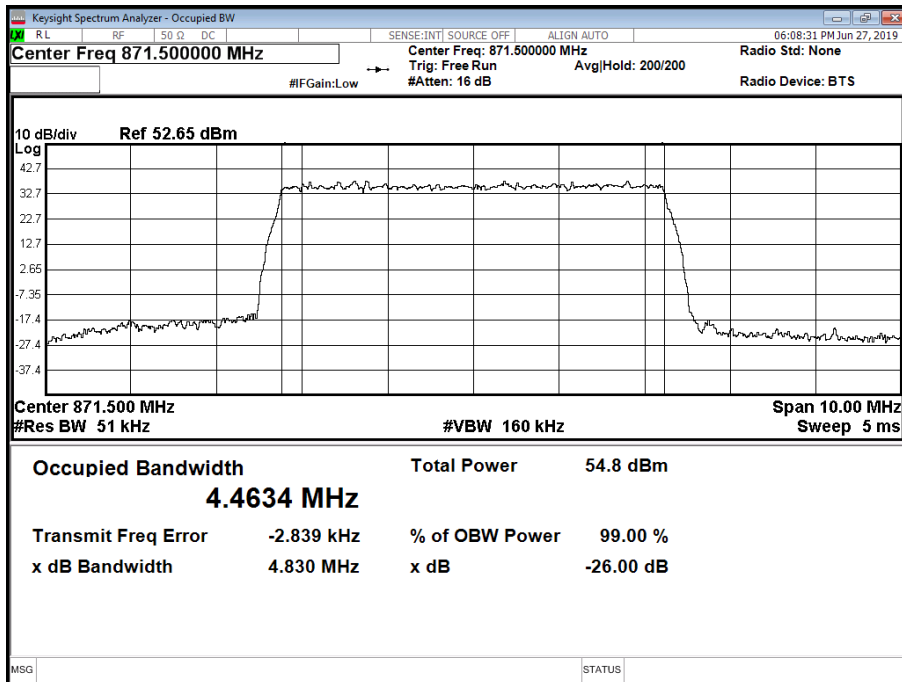
Configuration 1

Maximum Output Power 47.8 dBm

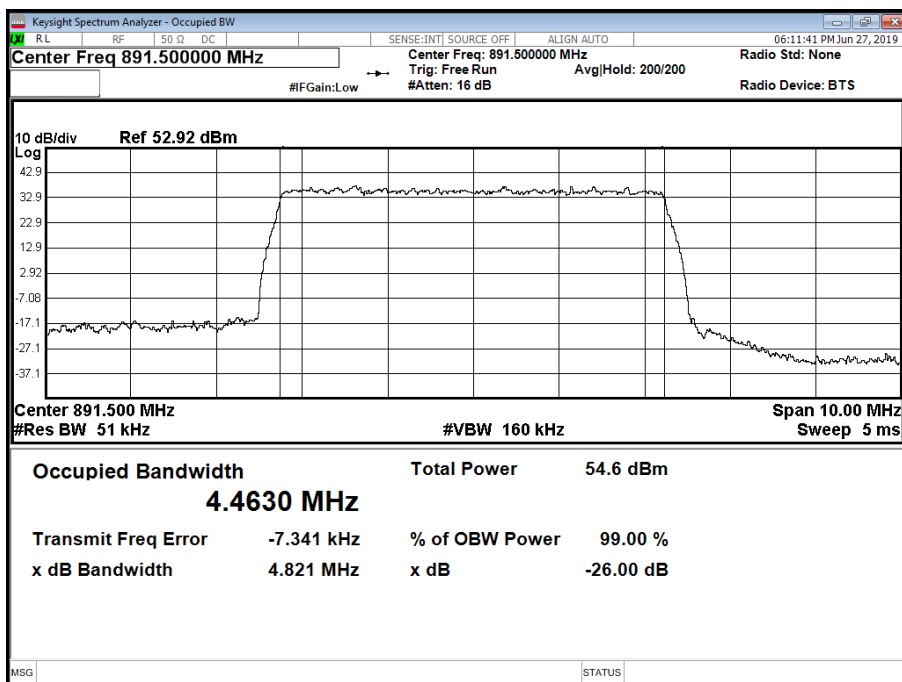
Antenna	NR Modulation	NR Carrier Bandwidth	Result (KHz)					
			Channel Position B		Channel Position M		Channel Position T	
			Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
A	QPSK	5.0 MHz 15 kHz SCS	4,463.36	4,829.54	-	-	4,462.98	4,820.87
A	QPSK	10.0 MHz 15 kHz SCS	9,287.01	9,786.83	-	-	9,272.11	9,760.31
A	QPSK	10.0 MHz 30 kHz SCS	8,617.09	9,693.13	-	-	8,603.69	9,641.36



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B

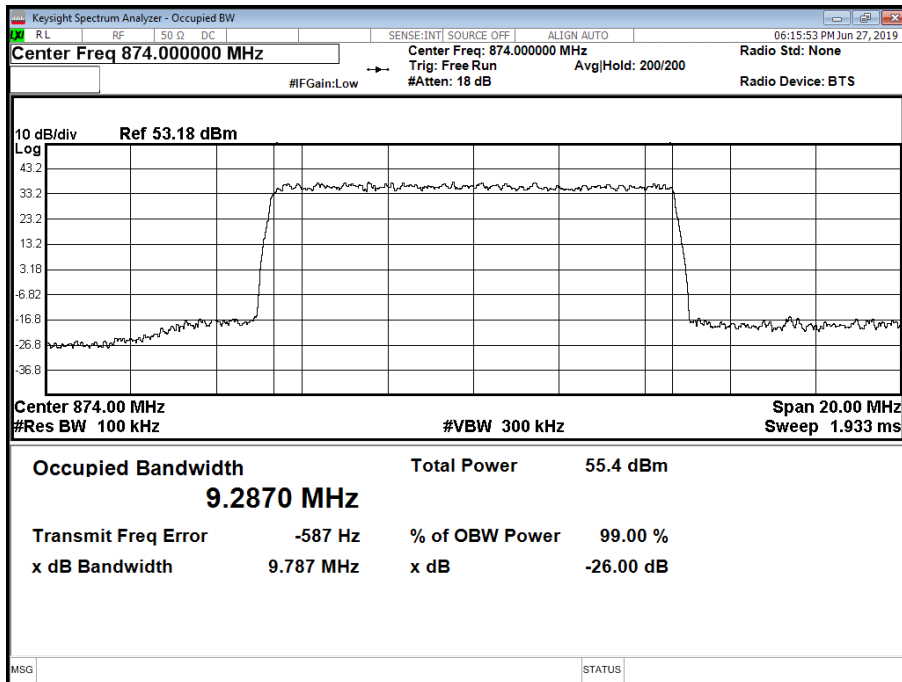


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T

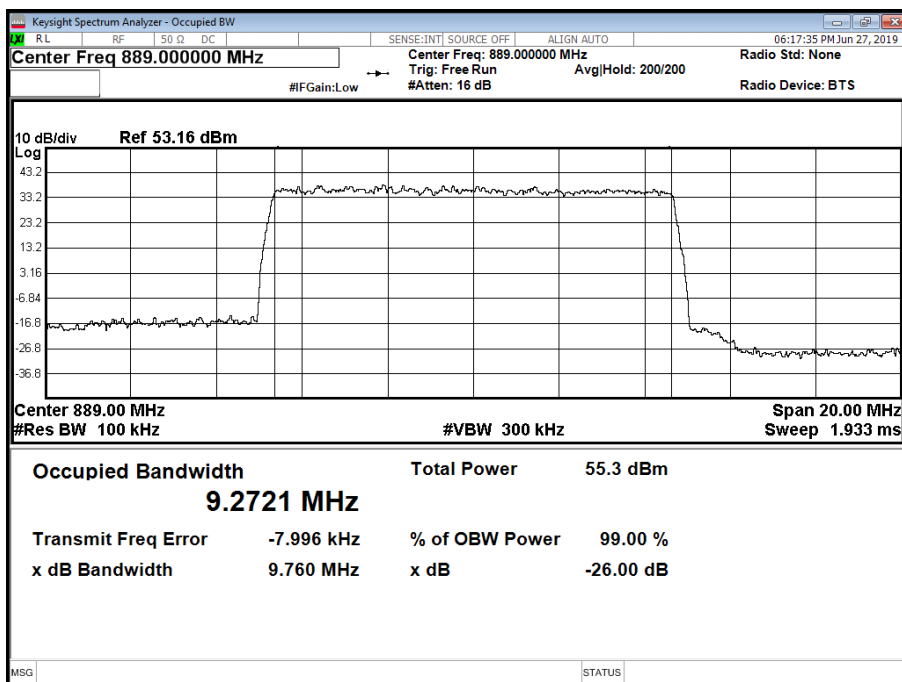




Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B

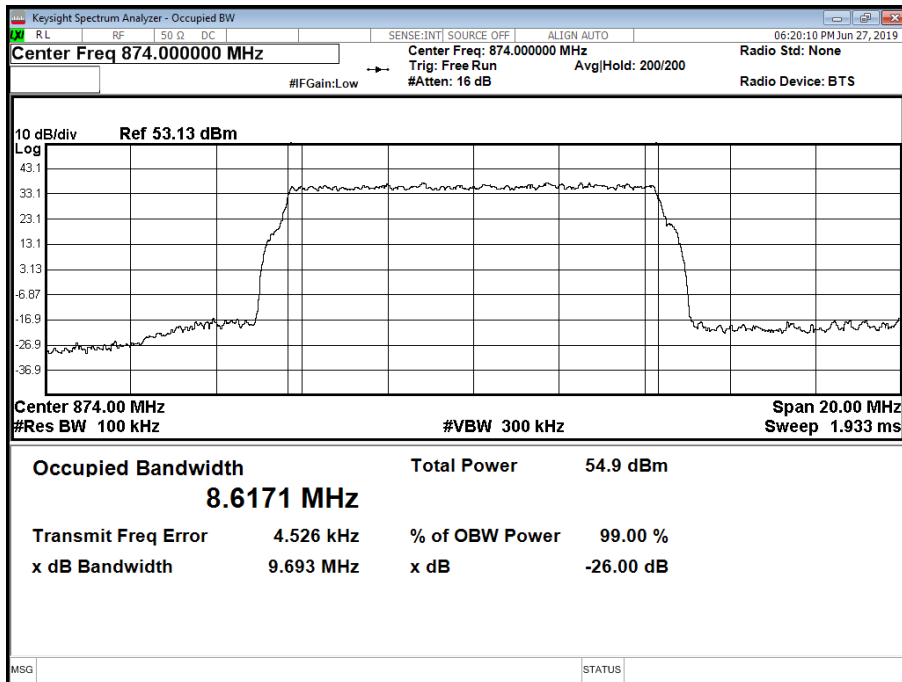


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T

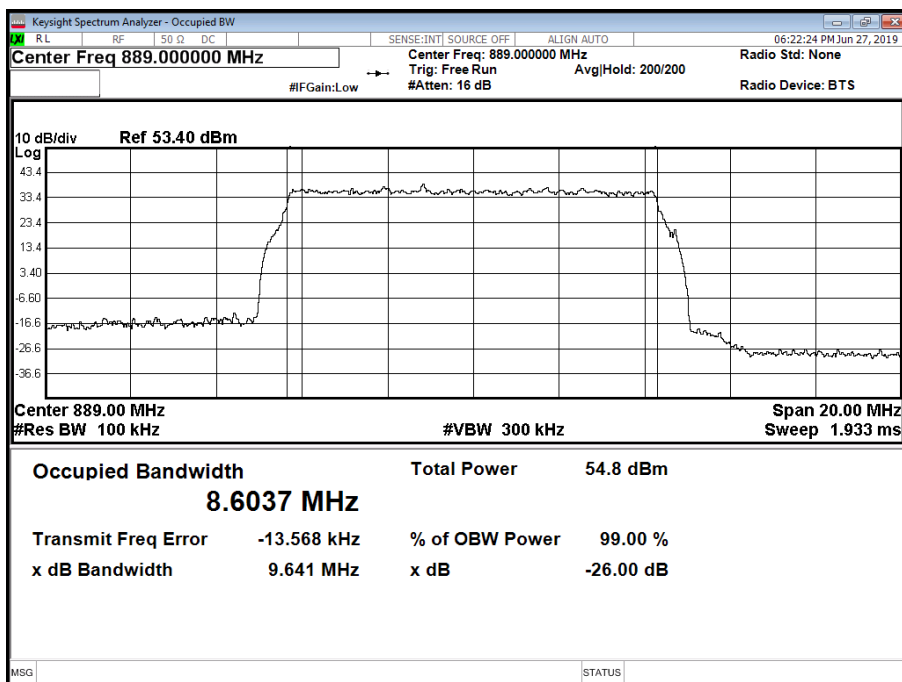




Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 30 kHz SCS - Channel Position B



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 30 kHz SCS - Channel Position T





2.3 BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 22, Clause 27.53 (h)
Industry Canada RSS-132, Clause 5.5

2.3.2 Date of Test and Modification State

27 June 2019 - 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 24.3°C
Relative Humidity 40%

2.3.5 Test Method

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

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 carrier, the limit was calculated as being $-13 \text{ dBm} - 10 * \log(4) = -19 \text{ dBm}$.

For dual carrier, the limit was calculated as being $-13 \text{ dBm} - 10 * \log(2) = -16 \text{ dBm}$.

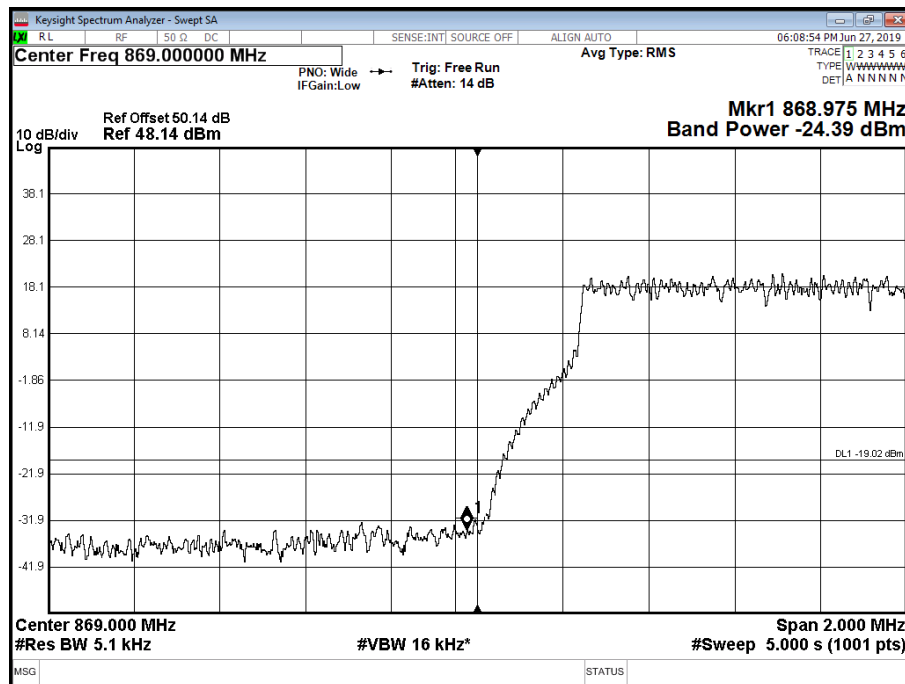
2.3.6 Test Results

Configuration 1

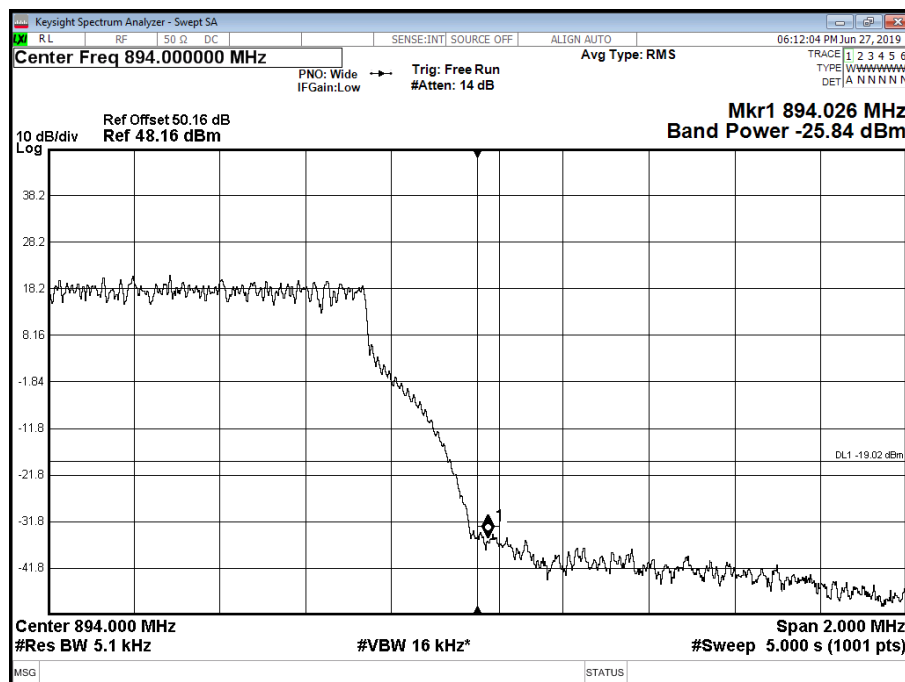
Maximum Output Power 47.8 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Band Edge (MHz)	
			Channel Position B	Channel Position T
A	QPSK	5.0 MHz 15 kHz SCS	871.5	891.5
A	QPSK	10.0 MHz 15 kHz SCS	874.0	889.0
A	QPSK	10.0 MHz 30 kHz SCS	874.0	889.0

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B

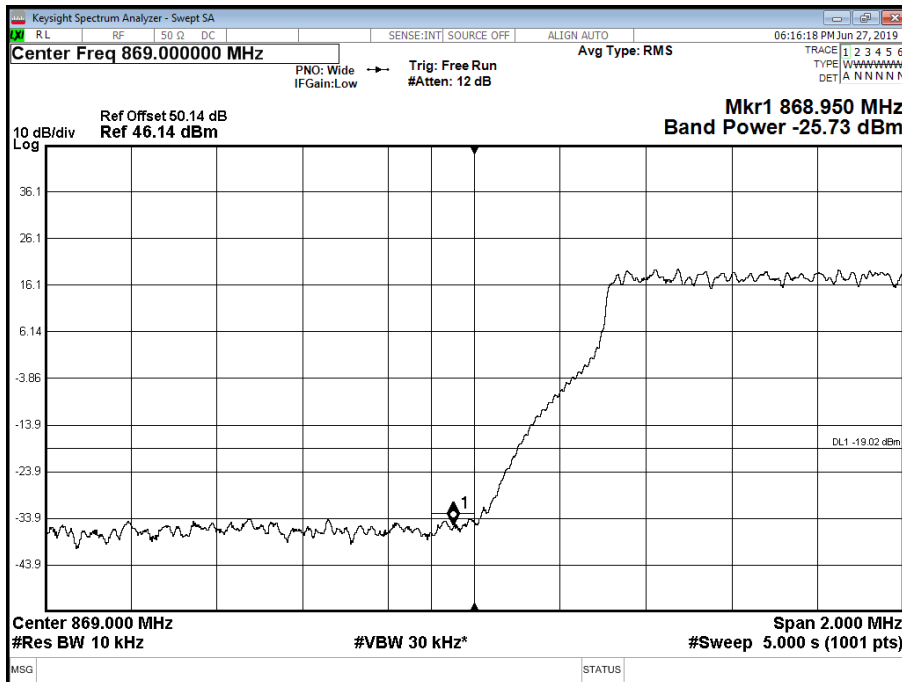


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T

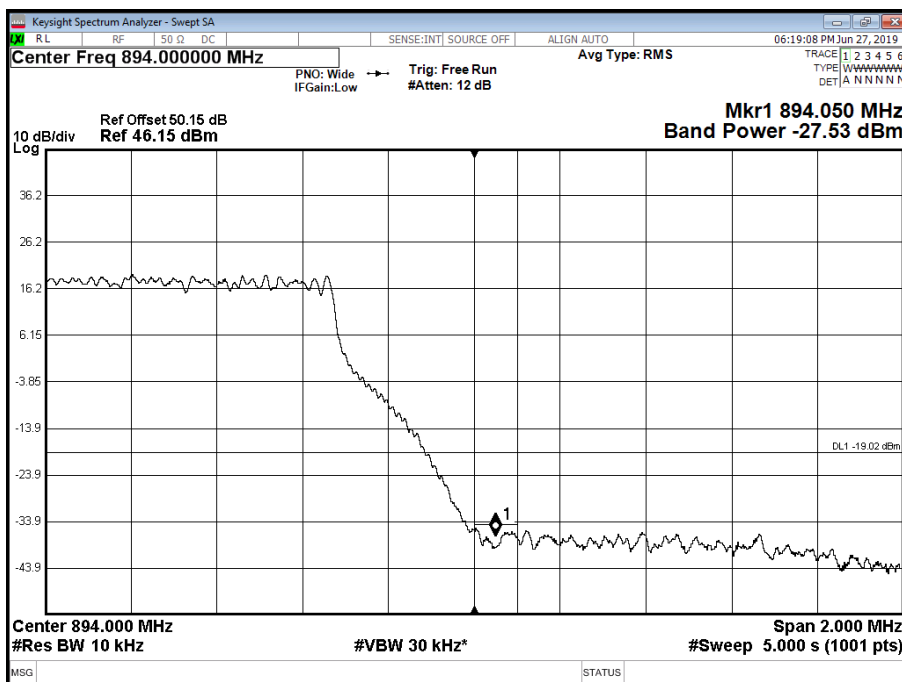




Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position B

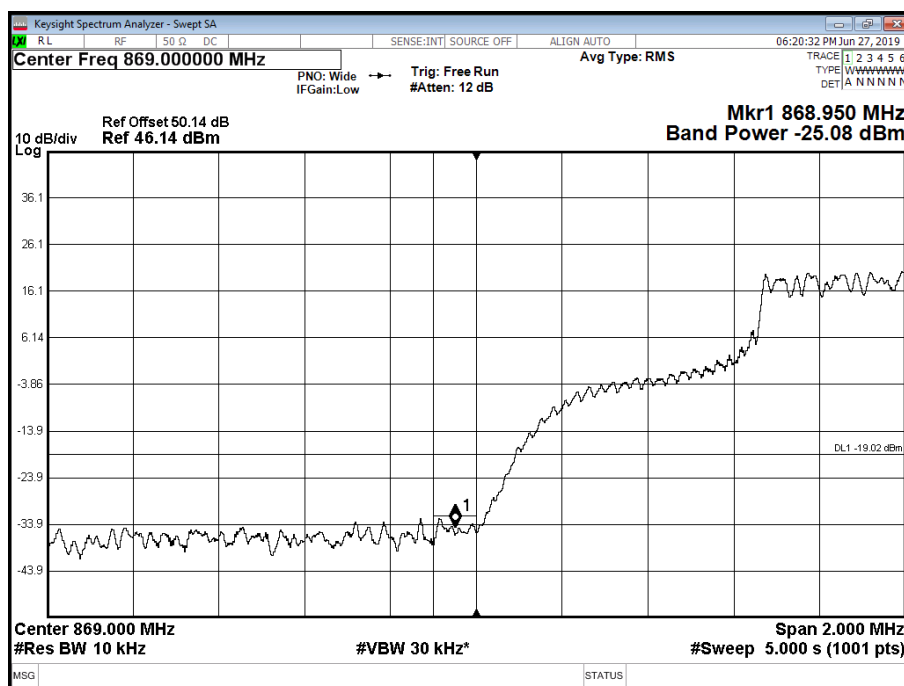


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 15 kHz SCS - Channel Position T

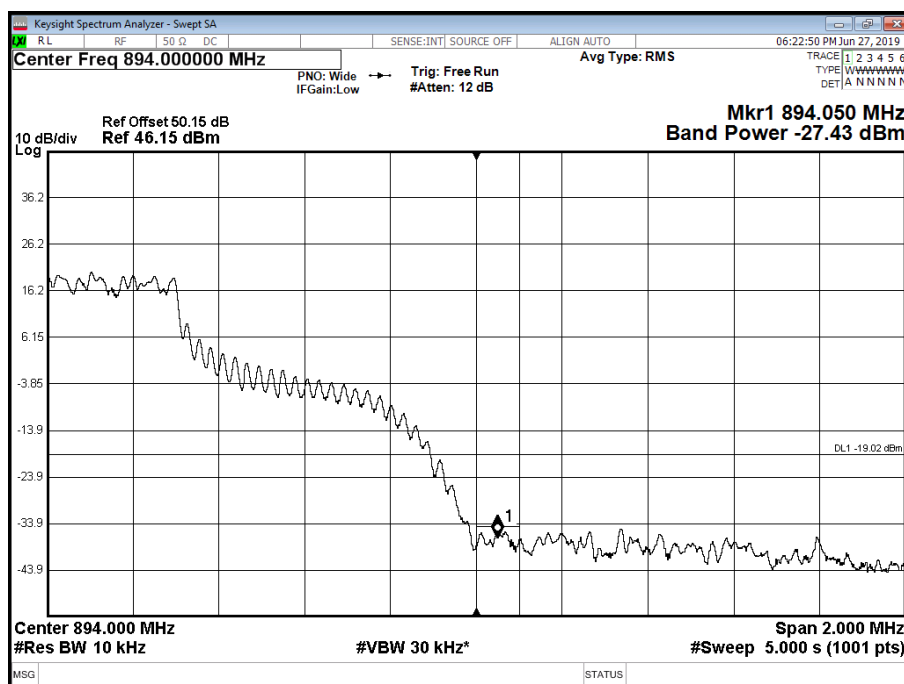




Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 30 kHz SCS - Channel Position B



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 10.0 MHz 30 kHz SCS - Channel Position T



Limit	-19 dBm
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2.4 TRANSMITTER SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 22, Clause 27.53 (h)
Industry Canada RSS-132, Clause 5.5

2.4.2 Date of Test and Modification State

27 June 2019 - 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	24.3°C
Relative Humidity	40%

2.4.5 Test Method

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

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 carrier, the limit was calculated as being $-13 \text{ dBm} - 10 * \log(4) = -19 \text{ dBm}$.

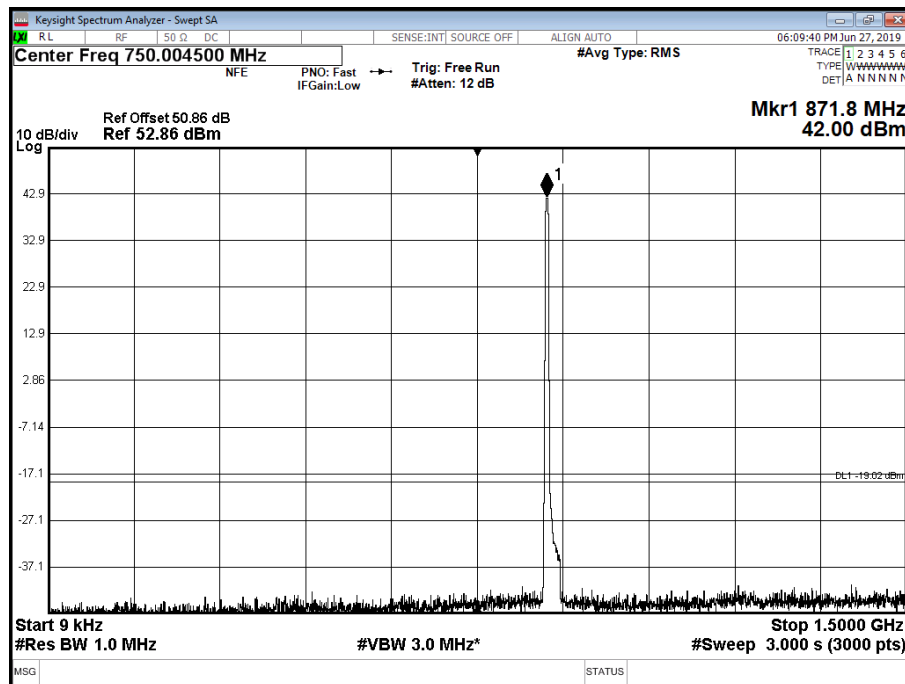
For dual carrier, the limit was calculated as being $-13 \text{ dBm} - 10 * \log(2) = -16 \text{ dBm}$.

2.4.6 Test Results

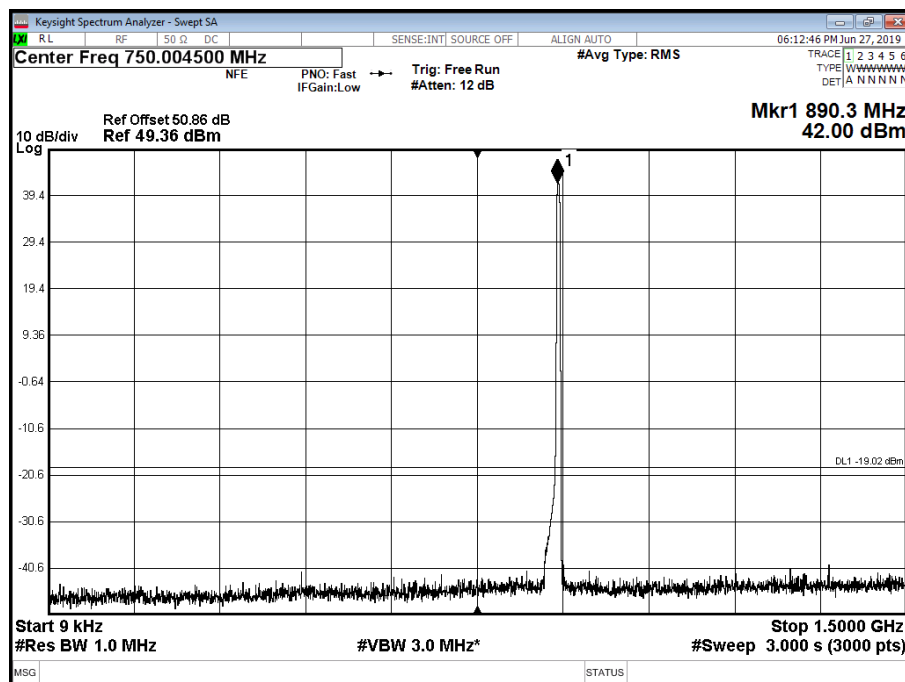
Configuration 1

Maximum Output Power 47.8 dBm

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B - Band 1 - Range 0.009 to 1500 MHz

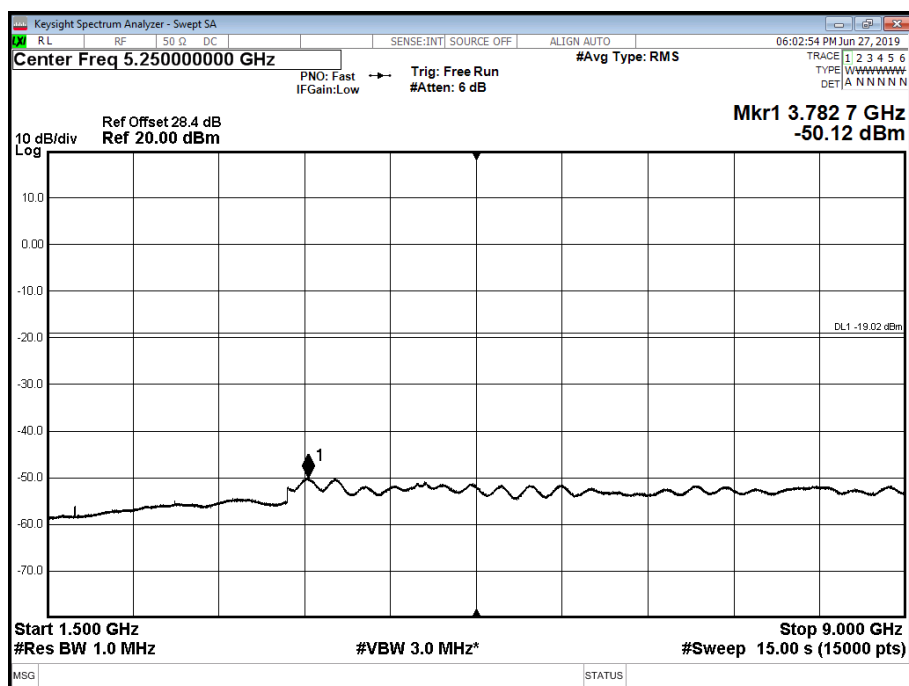


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T - Band 1 - Range 0.009 to 1500 MHz

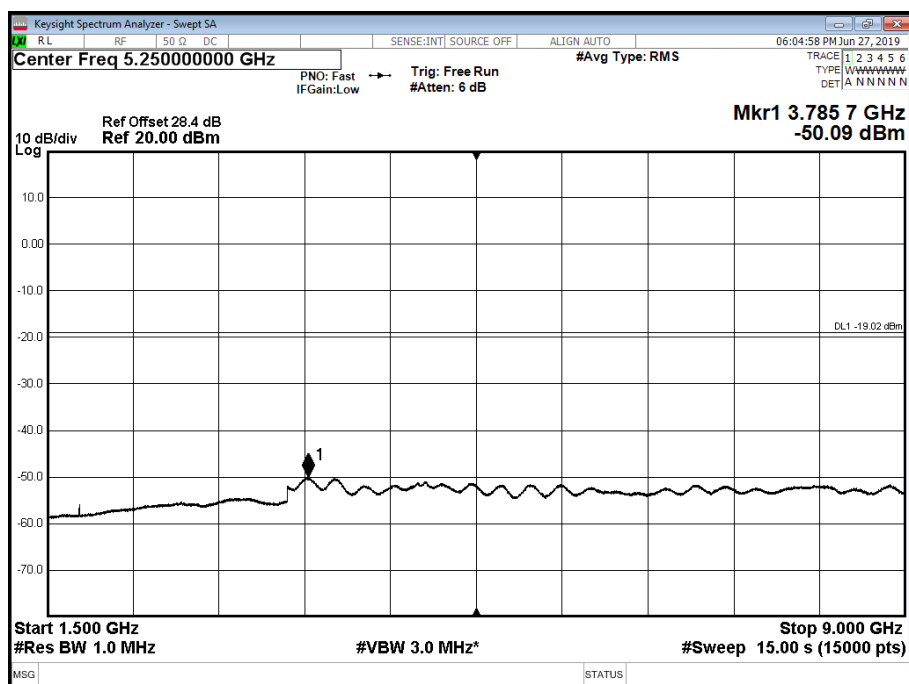




Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B - Band 2 - Range 1500 to 9000 MHz



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T - Band 2 - Range 1500 to 9000 MHz



Limit	-19dBm
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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					
PXA Signal Analyser	Keysight	N9030A	TE 004654	12	08-Oct-2019
Attenuator	API weinschel inc.	30dB	TE 005135	12	07-Nov-2019
Attenuator	API weinschel inc.	20dB	TE 005133	12	07-Nov-2019
Hydrometer	Rotronic	Hygropalm	TE 005264	12	02-May-2020
Occupied Bandwidth					
PXA Signal Analyser	Keysight	N9030A	TE 004654	12	08-Oct-2019
Attenuator	API weinschel inc.	30dB	TE 005135	12	07-Nov-2019
Attenuator	API weinschel inc.	20dB	TE 005133	12	07-Nov-2019
Hydrometer	Rotronic	Hygropalm	TE 005264	12	02-May-2020
Band Edge					
PXA Signal Analyser	Keysight	N9030A	TE 004654	12	08-Oct-2019
Attenuator	API weinschel inc.	30dB	TE 005135	12	07-Nov-2019
Attenuator	API weinschel inc.	20dB	TE 005133	12	07-Nov-2019
Hydrometer	Rotronic	Hygropalm	TE 005264	12	02-May-2020
Transmitter Spurious Emissions					
PXA Signal Analyser	Keysight	N9030A	TE 004654	12	08-Oct-2019
Attenuator	API weinschel inc.	30dB	TE 005135	12	07-Nov-2019
Attenuator	API weinschel inc.	20dB	TE 005133	12	07-Nov-2019
Highpass Filter	Wainwright	1500-18000Mhz	TE 004961	12	11-Oct-2019
Hydrometer	Rotronic	Hygropalm	TE 005264	12	02-May-2020



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	± 0.1 dB
Conducted Emissions	30 MHz to 20 GHz Amplitude	± 2.3 dB
Frequency Stability	30 MHz to 2 GHz	± 5.0 Hz
Occupied Bandwidth	Up to 20 MHz Bandwidth	± 1.1 Hz
Band Edge	30 MHz to 20 GHz Amplitude	± 2.3 dB



SECTION 4

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).

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ANNEX A

MODULE LIST



Configuration A			
Product	Product No	R-State	Serial No
Radio 4449 B5 B12A	KRC161752/1	R1D	B442513008
CT10	LPC102487/1	R1C	T01F375047
Software Version:	CXP9013268%15	Revision:	R79BT