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Report On

FCC Testing of the
Ericsson KRC 161 838/1 Radio 2203 B14 (700 MHz) NR Base Station
in accordance with FCC CFR 47 Part 2: 2019 & FCC CFR 47 Part 90: 2019

COMMERCIAL-IN-CONFIDENCE
FCC: TA8AKRC161838-1

PREPARED BY	APPROVED BY	DATED
Daria Fiedorowicz Senior Administrator (Technical)	Steve Scarfe Authorised Signatory	25 June 2020

Document 75949116 Report 08 Issue 1 **June 2020**

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Section **Page No**

SECTION 1

REPORT INFORMATION

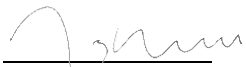
1.1 REPORT DETAILS

Manufacturer	Ericsson
Address	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Product Name & Product Number	Radio 2203 B14 & KRC 161 838/1
Serial Number(s)	TD3R174227
Software Version	CXP9017316/2 Rev R78JT
Hardware Version	R1B
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2019 & FCC CFR 47 Part 90: 2019
Test Plan	Test Plan FCC&IC NR legacy 20Q2
Start of Test	11 June 2020
Finish of Test	19 June 2020
Name of Engineer(s)	Neil Rousell
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 90. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);



Neil Rousell

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 90, and is shown below.

Section	Specification Clause		Test Decription	Result
	FCC CFR 47 Part 2	FCC CFR 47 Part 90		
2.1	2.1046	90.542	Broadband Transmitting Power Limits	Pass
2.2	2.1049	-	Occupied Bandwidth	Pass
2.3	2.1051	-	Band Edge	Pass
2.4	2.1051	90.543	Transmitter Spurious Emissions	Pass

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.

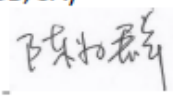
1.3 CONFIGURATION DESCRIPTION

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
1	NR	1	5 MHz – SCS 15kHz	760.5	-	765.5
	NR	1	10 MHz – SCS 15kHz	-	763.0	-

1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Unit
MANUFACTURER	Ericsson AB
PRODUCT NAME	Radio 2203 B14
PART NUMBER	KRC 161 838/1
IC Model Name	N/A
SERIAL NUMBER	TD3R174227
HARDWARE VERSION	R1B
SOFTWARE VERSION	CXP9017316/2 Rev R78JT
TRANSMITTER OPERATING RANGE	UL: 788~798MHz DL: 758~768MHz
MODULATIONS	LTE & NR: QPSK, 16QAM, 64QAM, 256QAM
ITU DESIGNATION OF EMISSION	LTE 5 MHz BW channel: 5M00F9W
	LTE 10 MHz BW channel: 10M0F9W
	NB IoT IB&GB channel: 230KF9W
	NR 5 MHz BW channel: 5M00W7D
	NR 10 MHz BW channel: 10M0W7D
OUTPUT POWER (RMS) (W or dBm)	2 ports, 5W per port
FCC ID	TA8AKRC161838-1
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Base station radio

Supports NB IoT for LTE (IB, GB, SA)

Signature 

Weiqun Chen

Date 2020-05-25

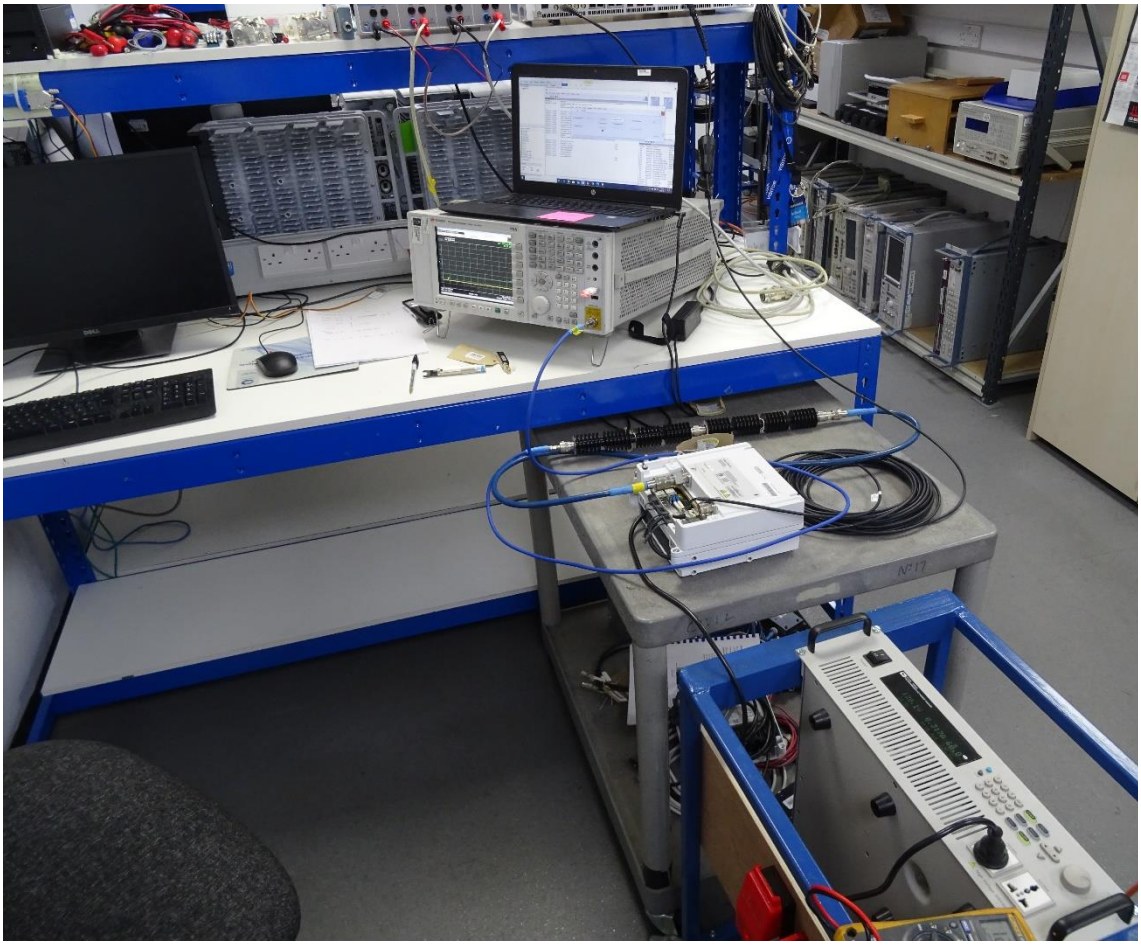
No responsibility will be accepted by TÜV SÜD Product Service UK Limited as to the accuracy of the information declared in this document by the manufacturer.

1.5 PRODUCT INFORMATION

1.5.1 Technical Description

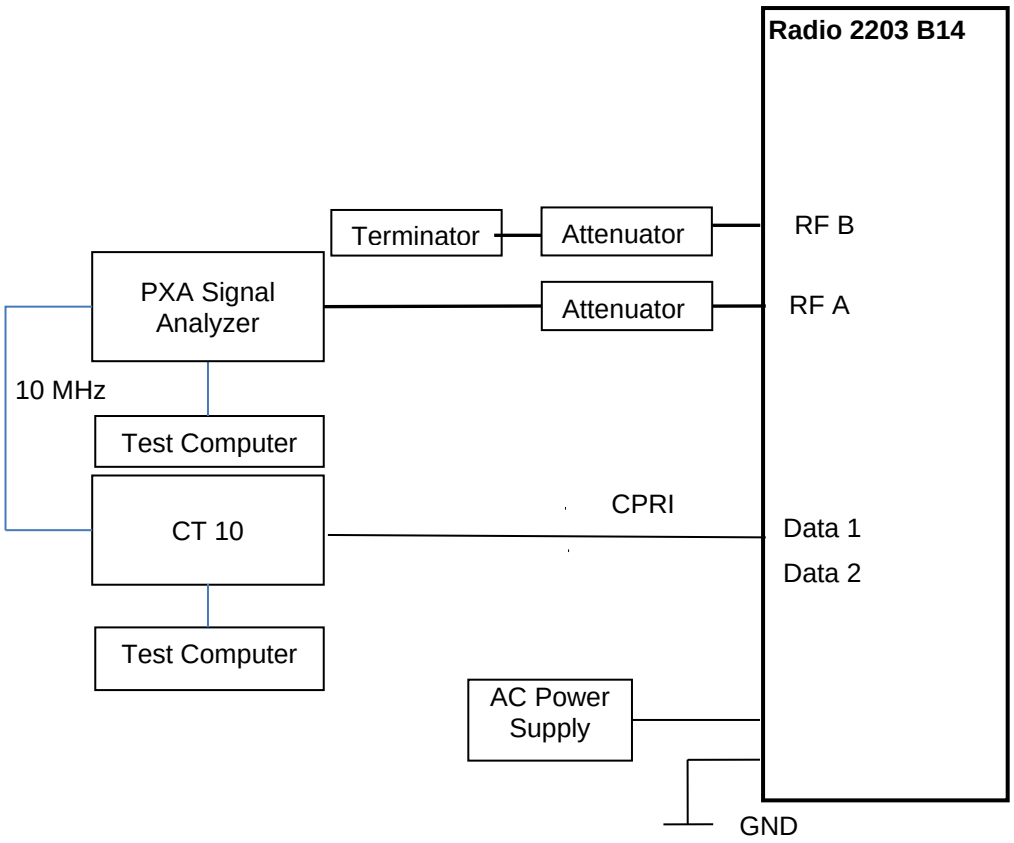
The Equipment Under Test (EUT) Radio 2203 B14 is an Ericsson AB Radio Unit working in the public mobile service 700 MHz band which provides communication connections to 700MHz network. The 2203 B14 is powered by one AC to DC 36V power supply.

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 -120V AC supply.

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

Test Name	Name of Engineer(s)
Broadband Transmitting Power Limits	Neil Rousell
Occupied Bandwidth	Neil Rousell
Band Edge	Neil Rousell
Transmitter Spurious Emissions	Neil Rousell

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.

SECTION 2

TEST DETAILS

2.1 BROADBAND TRANSMITTING POWER LIMITS

2.1.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.542
FCC CFR 47 Part 2, Clause 2.1046

2.1.2 Date of Test and Modification State

11 June 2020 - 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	22.3°C
Relative Humidity	47.2%

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.

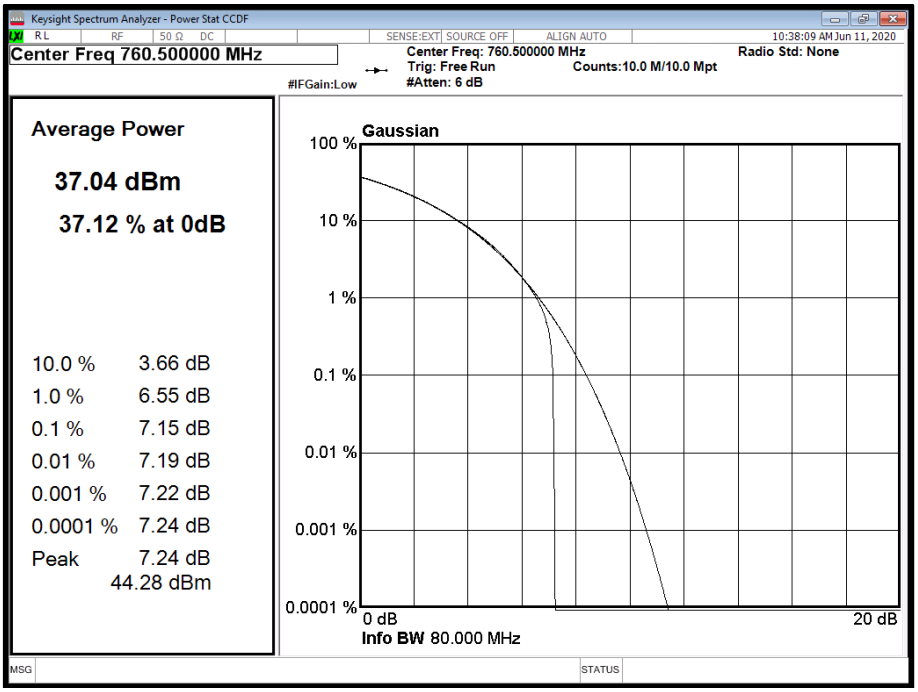
2.1.6 Test Results

Configuration 1

Maximum Output Power 37.00 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	7.15	37.06	31.19

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



Configuration 1

Maximum Output Power 37.00 dBm

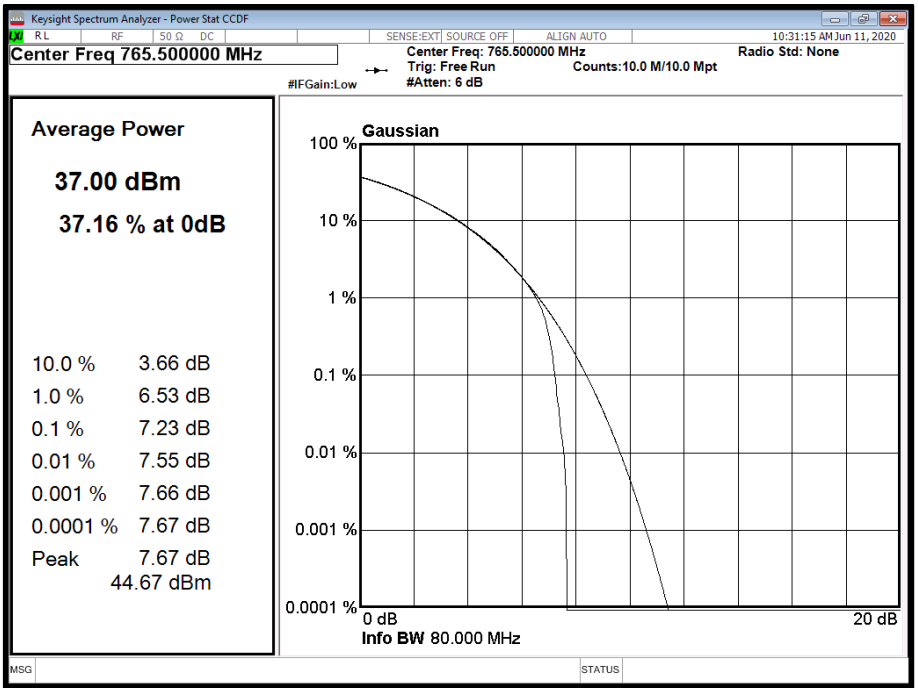
Antenna	NR Modulation	NR Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position M		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	QPSK	10.0 MHz 15 kHz SCS	-	36.92	-

Configuration 1

Maximum Output Power 37.00 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	QPSK	5.0 MHz 15 kHz SCS	7.23	36.99	31.16

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



Limit	
Peak Power	≤ 1640 W/MHz or ≤+62.15 dBm
Peak to Average Ratio	13 dB

2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049

2.2.2 Date of Test and Modification State

11 June 2020 - 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	22.3°C
Relative Humidity	47.2%

2.2.5 Test Method

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

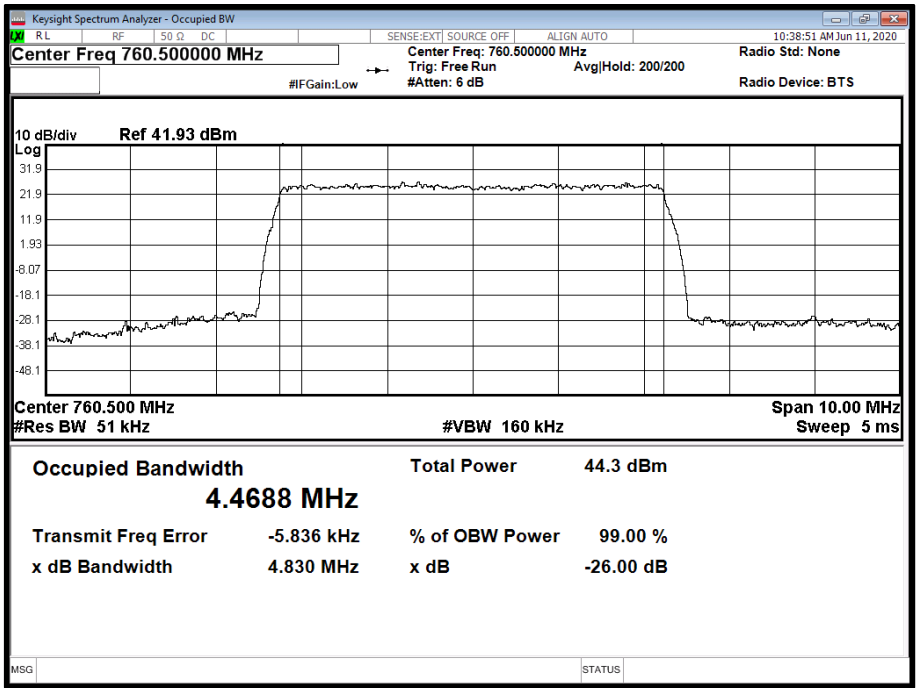
2.2.6 Test Results

Configuration 1

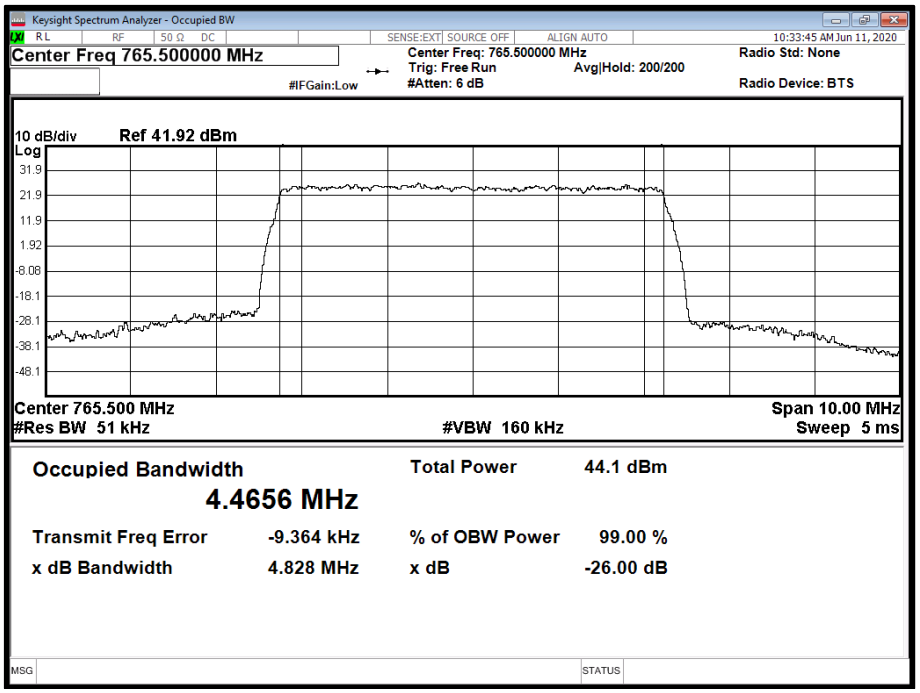
Maximum Output Power 37.00 dBm

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	4468.83	4830.43	-	-	4465.58	4827.60
A	QPSK	10.0 MHz 15 kHz SCS	-	-	9277.81	9762.58	-	-

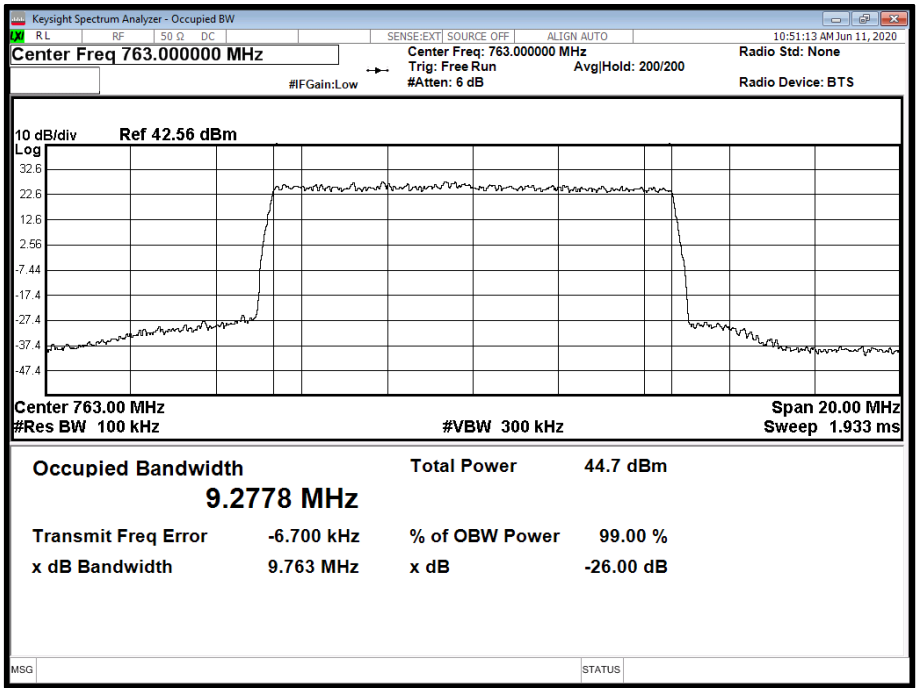
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B



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 M



2.3 BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051

2.3.2 Date of Test and Modification State

11 June 2020 - 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	22.3°C
Relative Humidity	47.2%

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 port, the limit was calculated as being -13 dBm - 10 * Log (1) = -13 dBm.

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

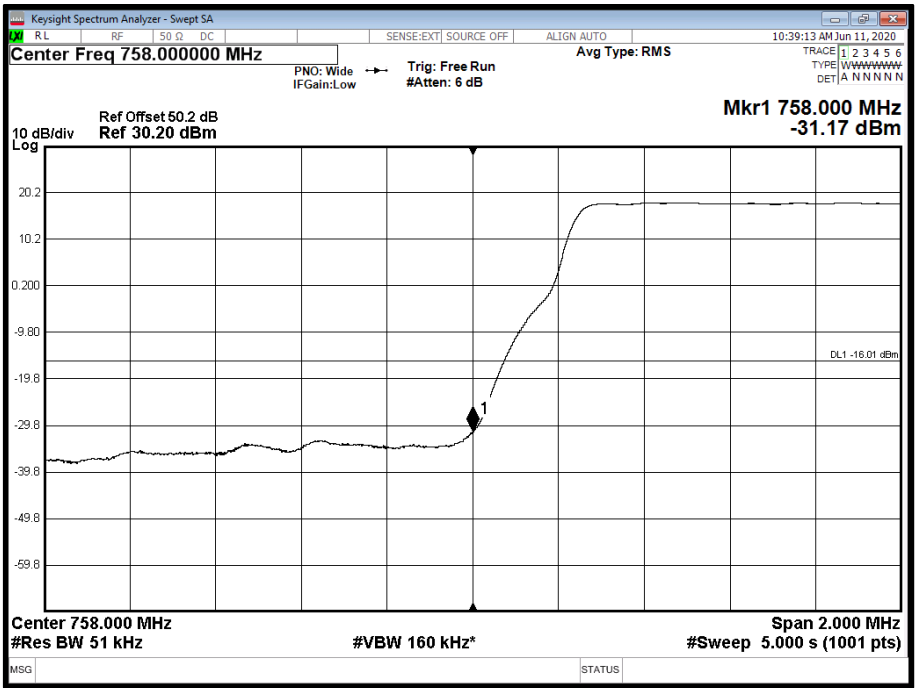
2.3.6 Test Results

Configuration 1

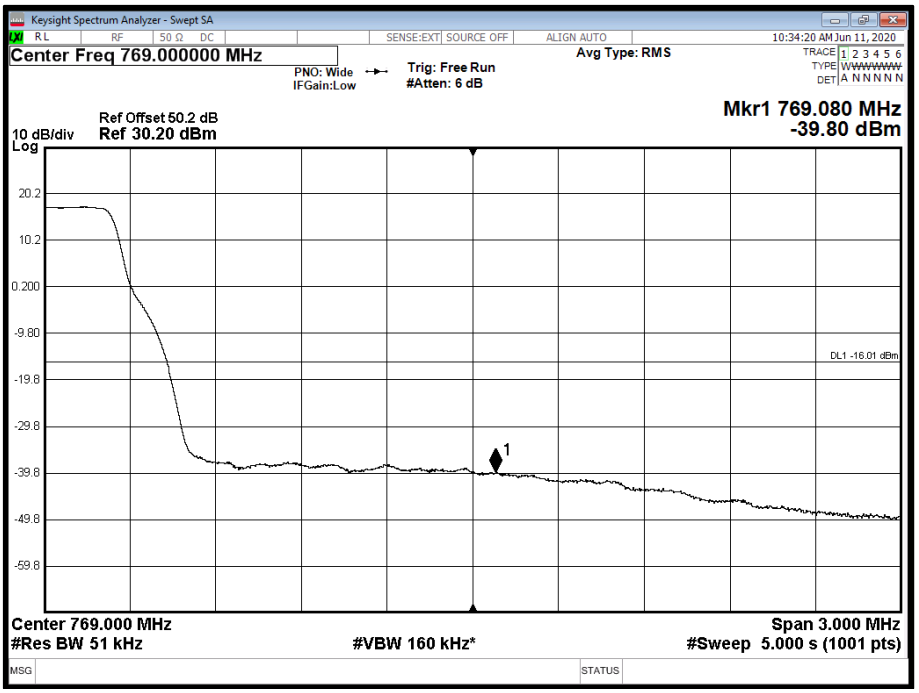
Maximum Output Power 37.00 dBm

Antenna	NR Modulation	NR Carrier Bandwidth	Band Edge (MHz)	
			Channel Position B	Channel Position T
A	QPSK	5.0 MHz 15 kHz SCS	760.5	765.5
A	QPSK	10.0 MHz 15 kHz SCS	763.0	763.0

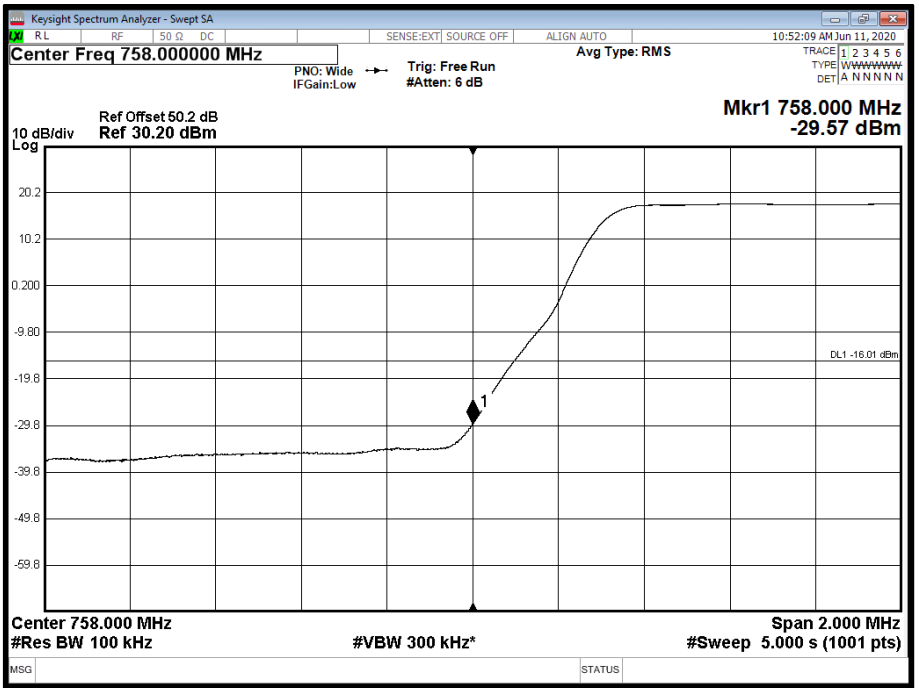
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B



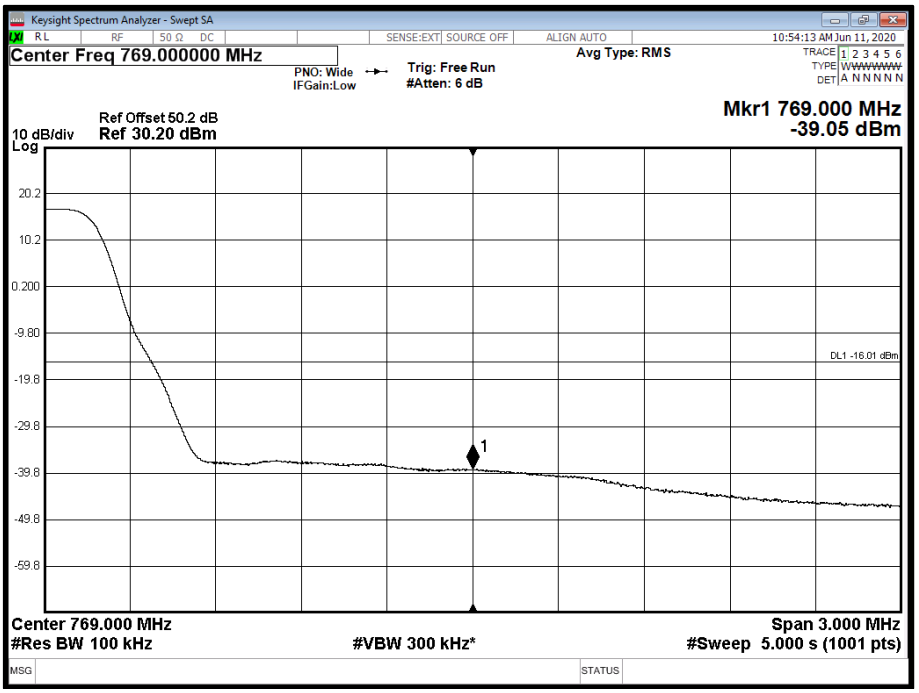
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T



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



Limit	-16 dBm

2.4 TRANSMITTER SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 90, Clause 90.543
FCC CFR 47 Part 2, Clause 2.1051

2.4.2 Date of Test and Modification State

11 June to 19 June 2020 - 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	21.1 - 22.3°C
Relative Humidity	47.2 – 59.0%

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 port, the limit was calculated as being -13 dBm - 10 * Log (1) = -13 dBm.

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

2.4.6 Test Results

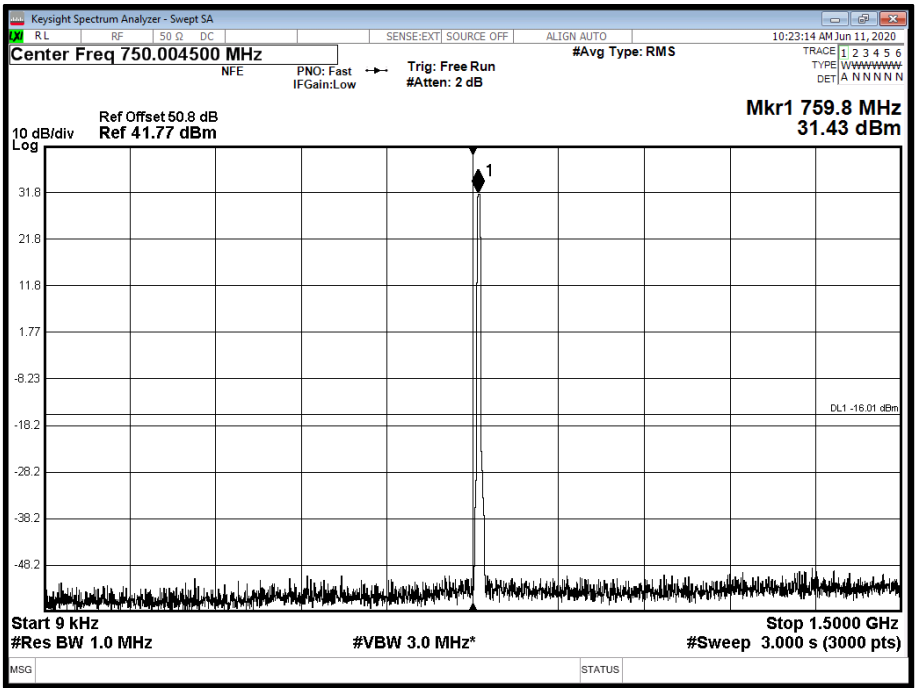
Configuration 1

Maximum Output Power 37.00 dBm

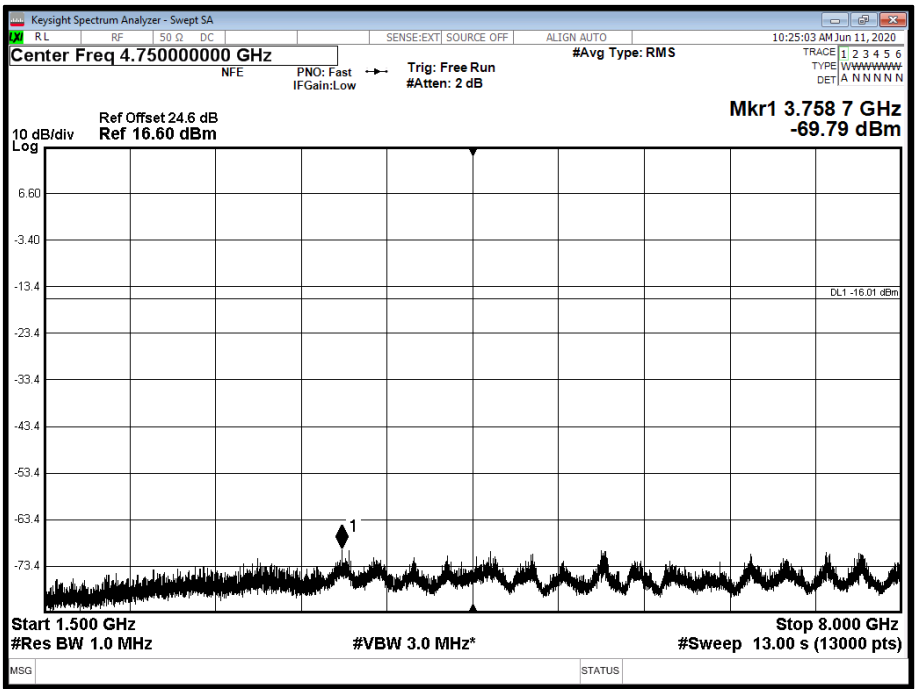
Remarks

Reduced measurement BW compensated for measurement ranges 769-775 and 799-805 MHz

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B - Band 1.00 - Range 0.009 to 1500 MHz

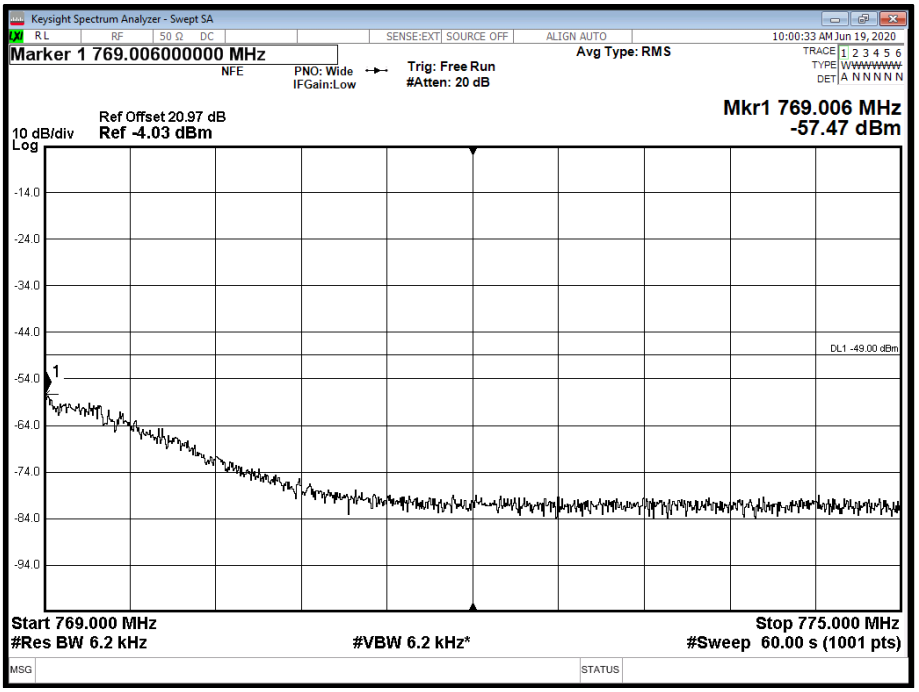


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B - Band 2.00 - Range 1500 to 8000 MHz

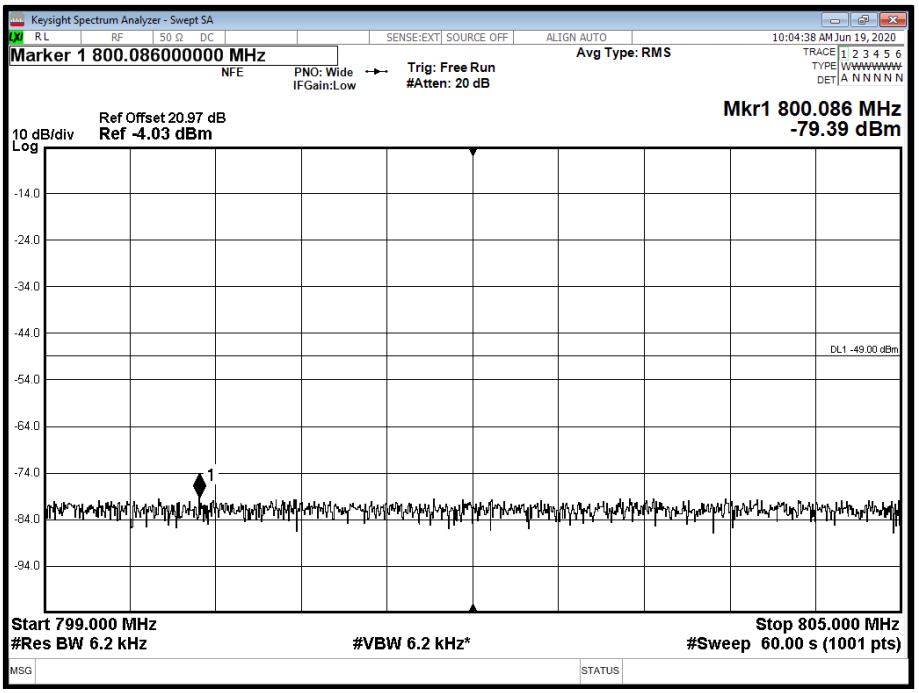


Limit	-16dBm

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B - Band 3 - Range 769 to 775 MHz

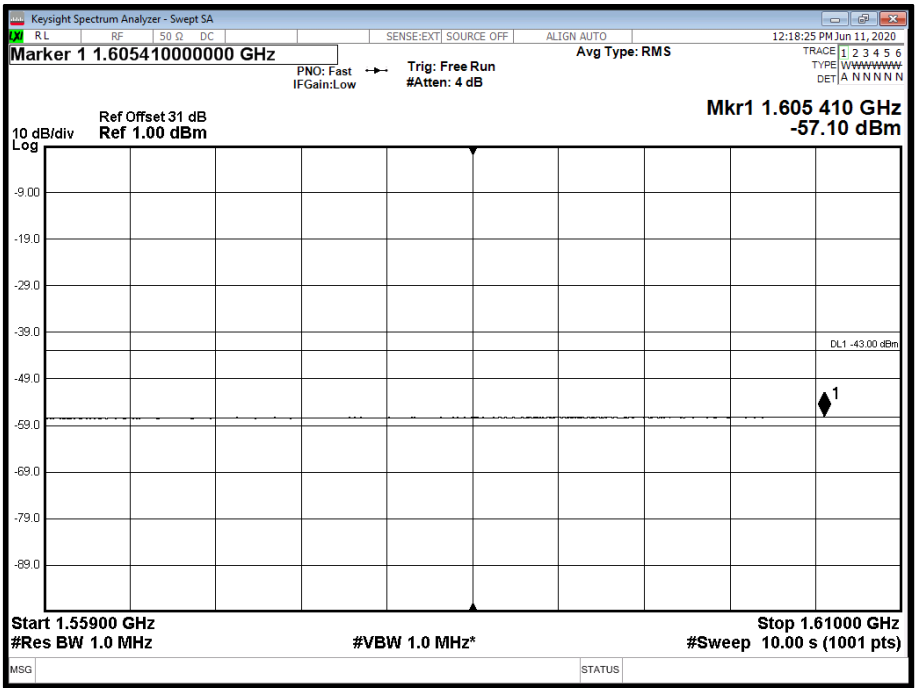


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B - Band 4 - Range 799 to 805 MHz

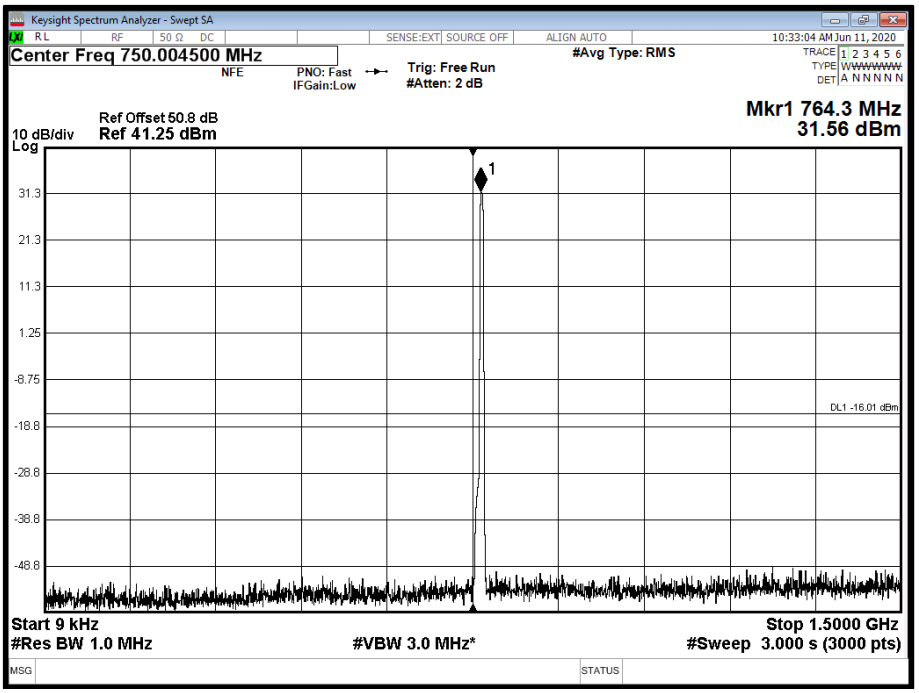


Limit	-49dBm

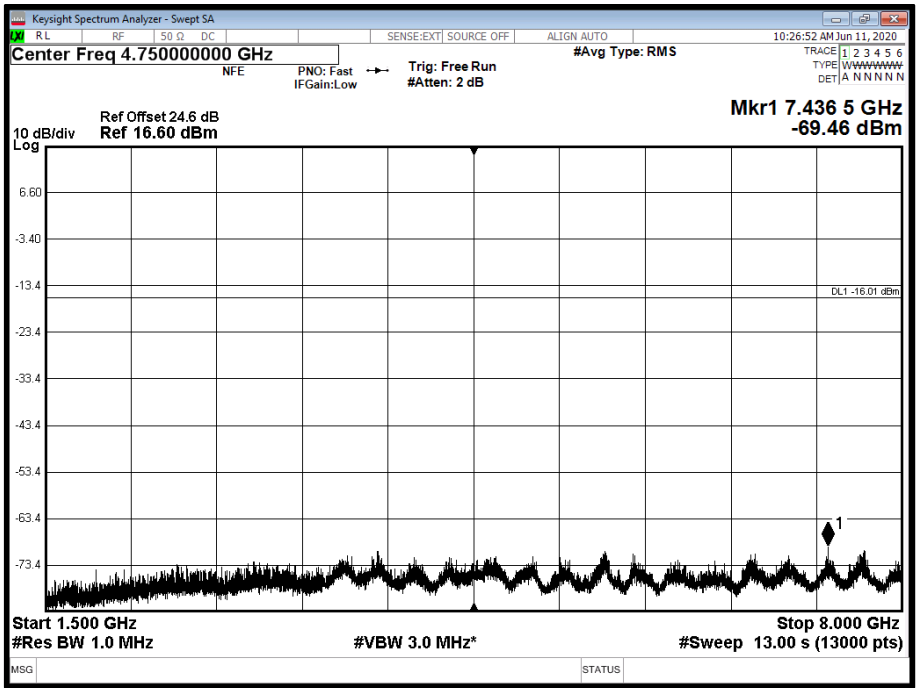
Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position B - Band 5 - Range 1559 to 1610 MHz



Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T - Band 1.00 - Range 0.009 to 1500 MHz

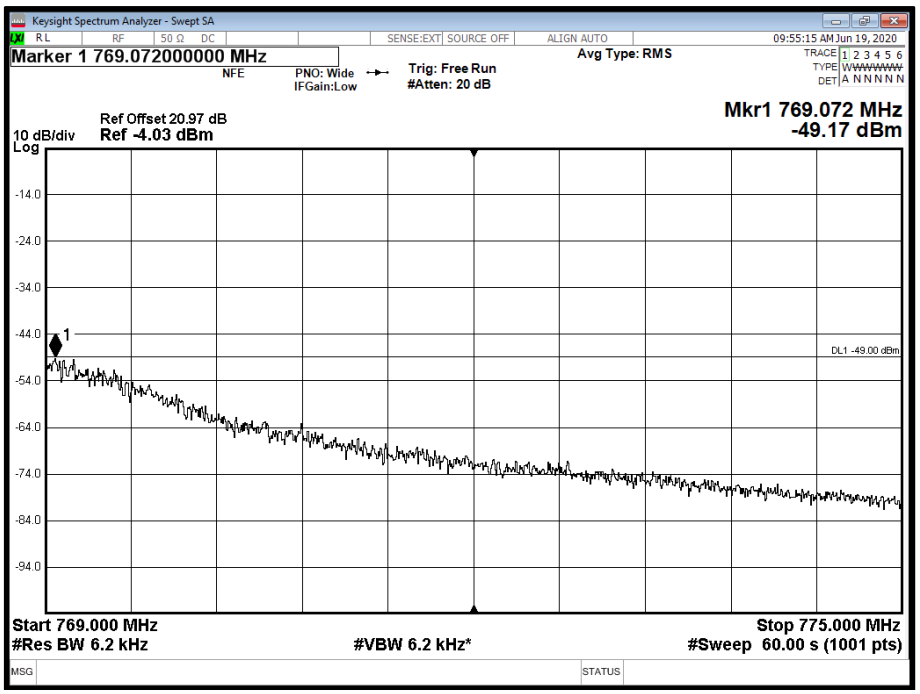


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T - Band 2.00 - Range 1500 to 8000 MHz

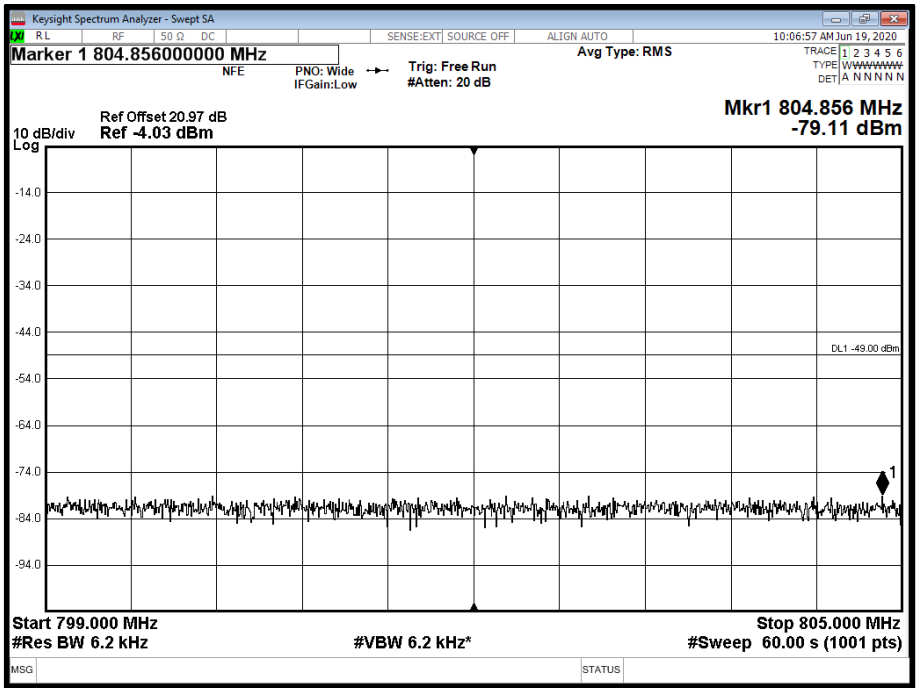


Limit	-16dBm

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T - Band 3 - Range 769 to 775 MHz

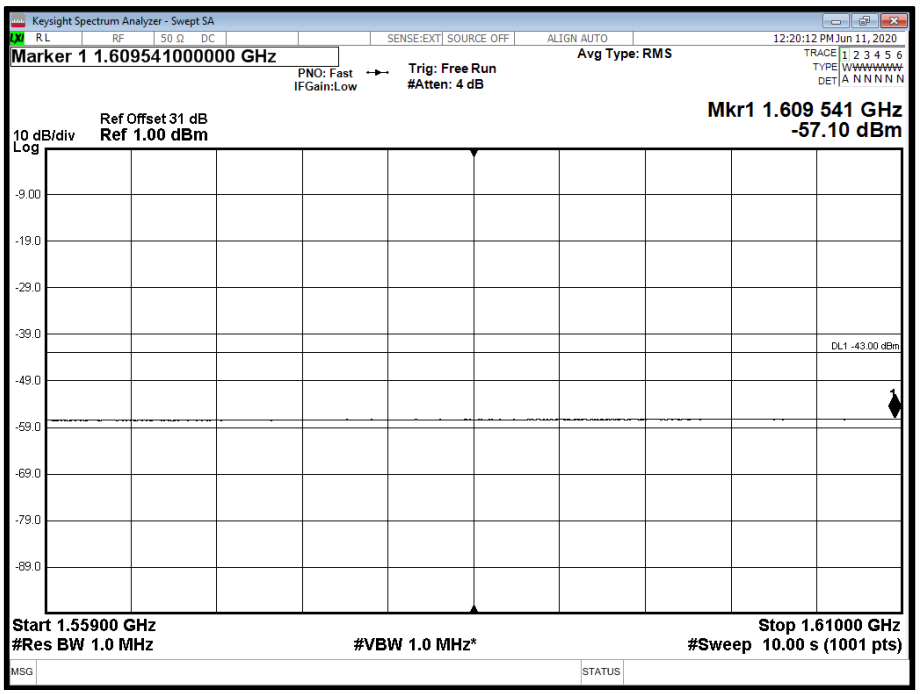


Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T - Band 4 - Range 799 to 805 MHz



Limit	-49dBm

Antenna A - NR Modulation QPSK - NR Carrier Bandwidth 5.0 MHz 15 kHz SCS - Channel Position T - Band 5 - Range 1559 to 1610 MHz



Limit	-43dBm

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
Broadband Transmitting Power Limits					
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5480	12	18-Mar-2021
Power Supply	iTech	IT7324	5226	-	O/P MON
Multimeter	Fluke	177	3813	12	09-Oct-2020
Attenuator 20dB 100W	Weinschel	48-20-43-LIM	5133	12	29-Nov-2020
Attenuator 30dB 100W	Weinschel	48-30-43-LIM	5135	-	O/P MON
PXA Signal Analyser	Keysight	N9030A	4654	12	21-Oct-2020
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	08-Nov-2020
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	08-Nov-2020
Analyser	Rohde & Schwarz	ZVA 40	3548	12	11-Dec-2020
Calibration Kit	Rohde & Schwarz	ZV-Z54	4368	12	28-Nov-2020
Occupied Bandwidth					
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5480	12	18-Mar-2021
Power Supply	iTech	IT7324	5226	-	O/P MON
Multimeter	Fluke	177	3813	12	09-Oct-2020
Attenuator 20dB 100W	Weinschel	48-20-43-LIM	5133	12	29-Nov-2020
Attenuator 30dB 100W	Weinschel	48-30-43-LIM	5135	-	O/P MON
PXA Signal Analyser	Keysight	N9030A	4654	12	21-Oct-2020
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	08-Nov-2020
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	08-Nov-2020
Analyser	Rohde & Schwarz	ZVA 40	3548	12	11-Dec-2020
Calibration Kit	Rohde & Schwarz	ZV-Z54	4368	12	28-Nov-2020
Band Edge					
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5480	12	18-Mar-2021
Power Supply	iTech	IT7324	5226	-	O/P MON
Multimeter	Fluke	177	3813	12	09-Oct-2020
Attenuator 20dB 100W	Weinschel	48-20-43-LIM	5133	12	44164
Attenuator 30dB 100W	Weinschel	48-30-43-LIM	5135	-	O/P MON
PXA Signal Analyser	Keysight	N9030A	4654	12	21-Oct-2020
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	08-Nov-2020
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	08-Nov-2020
Analyser	Rohde & Schwarz	ZVA 40	3548	12	11-Dec-2020
Calibration Kit	Rohde & Schwarz	ZV-Z54	4368	12	28-Nov-2020
Transmitter Spurious Emissions					
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5480	12	18-Mar-2021
Power Supply	iTech	IT7324	5226	-	O/P MON
Multimeter	Fluke	177	3813	12	09-Oct-2020
Attenuator 20dB 100W	Weinschel	48-20-43-LIM	5133	12	29-Nov-2020
Attenuator 30dB 100W	Weinschel	48-30-43-LIM	5135	-	O/P MON
PXA Signal Analyser	Keysight	N9030A	4654	12	21-Oct-2020
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	08-Nov-2020
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	08-Nov-2020
Analyser	Rohde & Schwarz	ZVA 40	3548	12	11-Dec-2020
Calibration Kit	Rohde & Schwarz	ZV-Z54	4368	12	28-Nov-2020
HPF	Wainwright	WHKX12-1290-1500-18000-80SS	4961	12	25-Mar-2021

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		± 0.95 dB
Occupied Bandwidth	Up to 20 MHz Bandwidth	5 MHz Bandwidth	± 33.321 kHz
		10 MHz Bandwidth	± 67.172 kHz
Band Edge	30 MHz to 20 GHz Amplitude		±0.95 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

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).

ANNEX A

MODULE LIST

Configuration 1			
Product	Product No	R-State	Serial No
Radio 2203 B14	KRC 161 838/1	R1B	TD3R174227
Software Version:	CXP9017316/2	Revision:	R78JT