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Report On

FCC Testing of the Ericsson Radio 2212 B8, KRC 161 650/1 LTE and NB-IoT Stand Alone and NB-IoT In Band (936.5-939.5 MHz), Remote Radio Unit, with compatible Main Unit in a Base Station configuration in accordance with FCC CFR 47 Part 2 and FCC CFR Part 27

COMMERCIAL-IN-CONFIDENCE

FCC: TA8AKRC161650

PREPARED BY

144 Junto

Maggie Whiting Key Account Manager APPROVED BY

DATED

Steve Scarfe Authorised Signatory

13 April 2021

Document 75950445 Report 02 Issue 2

April 2021



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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 2212 B8 – KRC 161 650/1
IC Model Name	AS161650
Serial Number(s)	E238996984
Software Version	CXP9013268/15 Rev R85BS
Hardware Version	R5H
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2019 FCC CFR 47 Part 27: 2019
Test Plan	Radio 2212 B8 for MANA FCC test plan V 0.5
Start of Test	01 December 2020
Finish of Test	08 December 2020
Name of Engineer(s)	Neil Rousell Graeme Lawler
Related Document(s)	KDB 971168 D01 v03r01 ANSI C63.26:2015 FCC -20-67A1: May 2020

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, and FCC CFR Part 27. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

Neil Rousell

Graeme Lawler

ander

This report has been revised to Issue 2 and should be read in place of Issue 1. This report has been revised to issue 2 to make minor corrections in the Manufacturers Declaration of Build Status.



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2 and FCC CFR Part 27 is shown below.

		Specifica	tion Clause		
Section	FCC CFR 47 Part 2	FCC CFR Part 27	FCC CFR Part 27, Subpart P (FCC-20-67A1)	Test Description	Result
-	2.1046	-	27.1507	Effective radiated power limits for 900 MHz Broadband systems	N/A ¹
-	2.1046	-	27.1508	Field Strength	N/A ¹
-	-	-	-	Receiver Emission Limits	N/A ²
2.1	2.1051	27.53 (h)	27.1506	Band Edge	Pass
2.2	2.1049	27.53	27.1506	Occupied Bandwidth	Pass
2.3	2.1046	27.50	27.1507	Maximum Peak Output Power and Peak to Average Ratio - Conducted	Pass
2.4	2.1051	27.53 (h)	27.1509	Transmitter Spurious Emissions	Pass
2.5	2.1053	27.53 (h)	27.1509	Radiated Emissions	Pass
2.6	2.1055	27.54	-	Frequency Stability	Pass

N/A¹ – Not Applicable, due to no integral antenna

 N/A^2 – Not Applicable, due to no stand alone receive mode. Testing has been performed to FCC Part 15B and is recorded in the TUV SUD Document 75950445 Report 01. N/A – Not Applicable

This unit was tested without an antenna. ERP/EIRP compliance is addressed at the time of licensing, as required by the responsible IC Bureau(s). Licensees are required to take into account the maximum allowed antenna gain used in combination with the power settings to prevent the radiated output power exceeding the limits.



1.3 CONFIGURATION DESCRIPTION

Configuration	DAT	No. Of corriero	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
Configuration		NO. OF CATHERS		Bottom	Middle	Тор
A1	NB-IoT IB	1	3MHz (+NB-loT IB PRB)	-	938.00	-
A2	LTE	1	1.4 MHz	937.20	938.00	938.80
A3	LTE	2	1.4 MHz + 1.4 MHz	-	937.20+938.80	-
A4	NB-IoT SA	1	400 kHz	936.70	938.0	939.30



1.4 DECLARATION OF BUILD STATUS

Equipment Description

Technical Description: (Please provide a brief description of the intended use of the equipment)	Multi Standard Remote Radio
Manufacturer:	Ericsson AB
Model:	Radio 2212 B8
Part Number:	KRC 161 650/1
Hardware Version:	R5H
Software Version:	CXP9013268/15-R85BS
FCC ID (if applicable)	TA8AKRC161650

Intentional Radiators

Technology	NB IoT	LTE
Frequency Band (MHz)	897,5 – 900,5 Mhz (UL) 936,5-939,5 Mhz (DL)	897,5 – 900,5 Mhz (UL) 936,5-939,5 Mhz (DL)
Output Power (W or dBm)	2 ports, 40 W per port, total max 80 W, (49dBm)	2 ports, 40 W per port, total max 80 W, (49dBm)
Antenna Gain (dBi)	15,2 dBi	15,2 dBi
Supported Bandwidth(s) (MHz)	200 kHz	1,4, 3 MHz
Modulation Scheme(s)	QPSK, 16QAM, 64QAM, 256QAM	QPSK, 16QAM, 64QAM, 256QAM
ITU Emission Designator	205KW7D	1M10W7D 2M68W7D
Bottom Frequency (MHz)	936,70 MHz	937,20 MHz
Middle Frequency (MHz)	938,00 MHz	938,00 MHz
Top Frequency (MHz)	939,30 MHz	938,80 MHz

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	CPRI 10,1 Gbit/s	
Lowest frequency generated or used in the device or on which the device operates or tunes	-	
Class A Digital Device (Use in commercial, industrial or business environment) 🗆		
Class B Digital Device (Use in residential environment only)		



DC Power Source

Nominal voltage:	-48	V
Extreme upper voltage:	-36	V
Extreme lower voltage:	-58,5	V
Max current:	32	Α

Temperature

Minimum temperature:	-40	°C
Maximum temperature:	+55	°C

Antenna Characteristics

Antenna connector			State impedance		Ohm
Temporary antenna connector			State impedance	50	Ohm
Integral antenna 🗆	Type:		Gain		dBi
External antenna 🛛	Type:	Macro cell, directional, 2 ports (single column, X- polarized)	Gain	15,2	dBi
For external antenna only:					
Standard Antenna Jack 🗆 If yes, describe how user is prohibited from changing antenna (if not professional installed):					
Equipment is only ever professionally installed					
Non-standard Antenna Jack					

Ancillaries (if applicable)

Manufacturer:	CT10	Part Number:	T01F265031
Model:	LPC 102487/1	Country of Origin:	-

Manufacturer:	Delta PSU AC 02	Part Number:	BW96903167
Model:	BML 901 250/1	Country of Origin:	

I hereby declare that the information supplied is correct and complete.

Faysal Pirmohamed

Name: Faysal Pirmohamed Position held: Regulatory Engineer Date: 2021-04-13

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



1.5 **PRODUCT INFORMATION**

1.5.1 Technical Description

The Equipment Under Test (EUT) Radio 2212 B8 is an Ericsson AB Radio Unit working in the public mobile service 936.5-939.5 MHz band which provides communication connections to (Band) network. The Radio 2212 B8 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

Conducted Testing





Radiated Emissions Testing





1.7 TEST CONDITIONS

Testing was performed to establish the worst case modulation scheme and carrier bandwidth before any other measurements were carried out. It was established that 16QAM modulation and 3MHz bandwidth for LTE gave the highest output power and therefore deemed to be worst case operating modes.

QPSK modulation is the only supported modulation for NB-IoT.

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

Test Name	Name of Engineer(s)
Radiated Emissions	Graeme Lawler
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
Frequency Stability	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.

1.10 ADDITIONAL INFORMATION

Ericsson will limit this product through the software from operating across the whole of Band 8, it will be limited to 936.5-939.5 MHz.

Some plots for Conducted Spurious Emissions have an Asterisk in the top right corner of the display. This indicates that settings have been changed on the Spectrum Analyser post sweep which may alter the measurement result/displayed trace data. In the cases displayed in this report, a setting was changed post sweep which was the display line. This did not result in any impact on the measurement results.



SECTION 2

TEST DETAILS



2.1 BAND EDGE

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051 FCC CFR Part 27, Clause 27.53 FCC-20-67A1, FCC CFR Part 27, Subpart P, Clause 27.1506

2.1.2 Date of Test and Modification State

01 and 07 December 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	20.7 - 22.2°C
Relative Humidity	35.6 - 36.0%

2.1.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01 Clause 6. The measurements were performed using resolution bandwidths <1 % of the 26dB bandwidth and then integrated over at least 1 % of the 26 dB 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 this EUT with 2 antenna ports, the limit was calculated as being -20 dBm - 10 * Log (2) = - 23 dBm.

2.1.6 Test Results

Configuration A1

Maximum Output Power 46 dBm

Antonno	LTE + NB-IoT IB	LTE + NB-IoT IB	Band Edge (MHz)			
Antenna	Modulation	Carrier Bandwidth	Channel Position B	Channel Position T		
В	QPSK	3.0 MHz + NB-IoT IB	938.0	938.0		



Antenna B - LTE +NB-IoT IB Modulation QPSK - LTE +NB-IoT IB Carrier Bandwidth 3.0 MHz + NB-IoT IB - Channel Position B

🔤 Ke	eysight Sp	ectrum A	nalyzer - Swept SA									
XI R	IL	RF	50 Ω DC			SENSE:EXT SO	JRCE OFF	AL	IGN AUTO		11:18:25	AM Dec 07, 2020
Cer	nter F	req 9	36.50000	<u>0 MHz ף</u> וו	PNO: Wide ↔ FGain:Low	. Trig: Fre #Atten: 2	e Run 0 dB		Avg Type:	RMS	TH T	ACE 1 2 3 4 5 6 TYPE WWWWW DET A NNNNN
10 d	B/div	Ref Ref	Offset 39.7 dE 43.70 dBm	3						l Band F	Mkr1 936. Power -27	.485 MHz 7.58 dBm
Log												
33.7												
23.7										n di dan	961/161	
13.7								ми	lutraharah	*****	r ir rei Wywydylydd	What Alphantan
3.70									μ _{ωμ} η	W		
-6.30								.NI				
-16 3							M	ľ				
-10.5							- p					DL1 -23.00 dBm
-20.3												
-36.3	W.Loffer	alwyb ^{yby} a	nunnunu	manu	4hhhtml/4/4/	wanay porter	Ĭ					
-46.3						1 10	1					
Cen #Re	ter 93 s BW	36.500 3.0 k) MHz Hz		#VB	W 9.1 kHz	*			#Swe	Span 9 5.000 s	2.000 MHz (1001 pts)
MSG									STATUS			,







Maximum Output Power 43 dBm

Antonna			Band Edge (MHz)			
Antenna	LIE-MODULATION	LIE Carrier Bandwidth	Channel Position B	Channel Position T		
В	16QAM	1.4 MHz	937.2	938.8		

Antenna B - LTE-Modulation 16QAM - LTE Carrier Bandwidth 1.4 MHz - Channel Position B

🔤 Key	sight Spectru	m Analyzer - Swept SA								
	tor Frod	RF 50 Ω DC			SENSE:EXT SOUR	RCE OFF AL		RMS	12:20:42 TE	2 PM Dec 01, 2020
Cen		1930.500000	7 IVIFIZ F 11	NO: Wide	Trig: Free #Atten: 16	Run dB	Alg type.			TYPE WWWWW DET A NNNNN
10 dE	R Maiv R	ef Offset 39.7 dB ef 39.70 dBm	•					Band F	Mkr1 936 Power -29	.494 MHz 9.89 dBm
Log						Ĭ				
29.7										
19.7										
0.70						M	hold the second second	ally programming	hilling phillin	k MANAMANA MANA
9.70								- I		
-0.30						H			1	
-10.3						NA M				
						1 par				
-20.3		_				1				DL1 -23.00 dBm
-30.3						ŗ				
-40.3					4) ¹				
					. A					
-50.3	ur, andril a	WALKING WHILE	ANN MARKAN	MANAN	, Antrophysics					
Cent #Res	er 936.5 BW 1.3	00 MHz kHz		#VB	W 3.9 kHz*			#Swe	Span ep 5.000 s	2.000 MHz s (1001 pts)
MSG							STATUS		-	



Antenna B - LTE-Modulation 16QAM - LTE Carrier Bandwidth 1.4 MHz - Channel Position T

🔤 Keysight Sp	ectrum Analyzer - Swept	SA							
X/RL	RF 50 Ω	DC		SENSE:EXT SOUR	CE OFF AL	IGN AUTO		12:28:50	PM Dec 01, 2020
Center F	req 939.5000	00 MHz	PNO: Wide ++-	Trig: Free F #Atten: 24	Run dB	Avg Type:	RMS	T	DET A N N N N
10 dB/div	Ref Offset 39.7 Ref 37.32 dE	dB im					l Band F	Mkr1 939. Power -29	507 MHz 0.76 dBm
27.3									
^{17.3} М¹М У	www.manilyyyun where		Th ^{at} in Wath Ala	414					
7.32	Í			.					
-2.68				"NI NI					
-12.7				NI.					DI 1 22.00 dBm
-22.7									DE1 -23.00 (DB)
-32.7				Ĭ	3 ¹				
-42.7					MANANA	Nadamantadaa			Mu.
-52.7					1 - 1 - 1 - 1	<u>կտերգություն</u>	e had hand faith of the faith o	www.linitiana	
Center 93 #Res BW	39.500 MHz 1.3 kHz		#VB	W 3.9 kHz*			#Swe	Span ep 5.000 s	2.000 MHz (1001 pts)
MSG						STATUS			

Configuration A3

Maximum Output Power 46 dBm

Antenna			Band Edge (MHz)		
	LIE-MODULATION	LIE Carrier Bandwidth	Channel Position B	Channel Position T	
В	16QAM	1.4 MHz +1.4 MHz	937.2 + 938.8	937.2 + 938.8	



Antenna B - LTE-Modulation 16QAM - LTE Carrier Bandwidth 1.4 MHz +1.4 MHz - Channel Position B

🛄 Ke	ysight	t Spectrum A	nalyzer - Swept SA								
Cer	ter	Frea 9	36.50000) MHz		SENSE:EXT SOU	RCE OFF AL	Avg Type:	RMS	02:51:02 TR	ACE 1 2 3 4 5 6
				P	NO: Wide	Trig: Free	Run			1	DET A N N N N N
				11	-Gain:Low	#Atten. 20				Mkr1 936	
10 d	B/div	Ref Ref	Offset 39.7 dE 43.70 dBm	3					Band F	Power -30).48 dBm
Log			40.10 UBI				Y				
33.7											
22.7											
23.7											
13.7							իլ		Last markers and	Halfaha Anathalan	1.1.11/14/14/14/14
							l jr	ווי אייייין	իւնը, հերևեվո	, .	י יין איי
3.70	⊢										
							l JM				
-b.JU							l M.				
-16.3							L M.				
											DL1 -23.00 dBm
-26.3	<u> </u>						₩				
-36.3							P '				
-46.3	haji	the the second	An Alaman Market	uhahlada A.dau			1				
	րլ	1.1.1.1	a the s	1997 - 1999 - 1999 1997 - 1999 1997 - 1999	hha Na Chille Allevel	no providente de la constante d					
Con	L	036 50) MU7							Snan	2 000 MHz
#Re	s B	W 1.3 k	Hz		#VB	W 3.9 kHz	*		#Swe	ep 5.000 s	(1001 pts)
MSG								STATUS			

Antenna B - LTE-Modulation 16QAM - LTE Carrier Bandwidth 1.4 MHz +1.4 MHz - Channel Position T

🔤 Kej	ysight Sp	ectrum Ar	nalyzer -	Swept SA										
Con	tor F	RF	30 50					SENSE:EXT SC	UR	CE OFF AL	IGN AUTO	RMS	02:52:16 TR	PM Dec 01, 2020
Cell		req 5	39.5	00000		PN	IO: Wide 🔸	. Trig: Fre	e F	Run			T	
						IFC	Gain:Low	#Atten: :	24 (dB			41	
		Ref	Offset	39.7 dE	3							Band B	VIKr1 939. 20wer -20	507 MHZ
10 de Log	Bídiv	Ref	37.30) aBM					_			Danur		.00 0.011
27.3	-								-					
17.3	J. J. J	un klud		6 Ju		thrung	wiki i	lita i	-					
	i way	hindinvils.	n hau	l southern		r - r 1	արդերեր	WH						
7.30	-		-											
0.70				I				1 141						
-2.70														
-12.7								1						
-12.7								1 N.						
-22.7								1						DL1 -23.00 dBm
									կ					
-32.7									1	1				
									4) '				
-42.7	<u> </u>								-	ч 1.144-г.				14.1.
										1 March 14	han the second	W MANA WIND	n huthur hute	ahttimerationa
-52.7									-	1 1 1 1		1 .1	AT . 401 14 0	1 1 1
Cen	ter 93	9.500	MHz										Span	2.000 MHz
#Re	s BW	1.3 kl	Hz				#VB	W 3.9 kH	z*			#Swe	ep 5.000 s	(1001 pts)
MSG											STATUS			



Maximum Output Power 43 dBm

Antonno		NB-IoT SA Carrier	Band Edge (MHz)		
Antenna	ND-101 SA MODULATION	Bandwidth	Channel Position B	Channel Position T	
В	QPSK	400 kHz	936.7	939.3	

Antenna B - NB-IoT SA Modulation QPSK - NB-IoT SA Carrier Bandwidth 400 kHz - Channel Position B





Antenna B - NB-IoT SA Modulation QPSK - NB-IoT SA Carrier Bandwidth 400 kHz - Channel Position T



900 MHz broadband operations in the 936.5-939.5 MHz band, by at least 50 + 10 log (P) dB	Limit
	-23dBm



2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 FCC CFR 47 Part 27, Clause 27.53 FCC-20-67A1, FCC CFR Part 27, Subpart P, Clause 27.1506

2.2.2 Date of Test and Modification State

01 and 07 December 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	20.7-22.2°C
Relative Humidity	35.6 - 36.0%

2.2.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, Clause 5.4.3.

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 26 dB measurement result was obtained.

2.2.6 Test Results



Maximum Output Power 46 dBm

	LTE +NB-	LTE +NB-	Result (kHz)								
Antenna	LTE +NB-	IoT IB	Channel F	Position B	Channel F	Position M	Channel I	Position T			
	Modulation	Carrier Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth			
В	QPSK	3.0 MHz + NB-IoT IB	-	-	2,682.71	2,838.68	-	-			

Antenna B - LTE +NB-IoT IB Modulation QPSK - LTE +NB-IoT IB Carrier Bandwidth 3.0 MHz + NB-IoT IB - Channel Position M

🔤 Keysight Spe	ctrum Analyzer - Occupied E	3W								
IXI RL	RF 50 Ω DC			SENSE:EXT SOUR	CE OFF AL	IGN AUTO	_		10:55:0	AM Dec 07, 2020
Center Fi	req 938.000000	MHz		Center Fre	q: 938.000000 Run		200/2	00	Radio Std: N	lone
		#IFG	ain:Low	#Atten: 26	dB	Arghiola	200/2		Radio Devic	e: BTS
	Ref 55.40 dB	m , , , , , , , , , , , , , , , , , , ,					. ``			
45.4							\square			
25.4						m				
33.4		mer	\sim	monuna	mm	~~ ~~	have			
25.4							tħ	(
15.4		4					++			
5.40							++	+		
-4.60							\square	\rightarrow		
-14.6										
and the fact	Mar mar mar	www.						have		
-24.6							\square	.41.6	WWWW.JR.JWW.JWW	- manufall and a fight
-34.6							++			
Center 03	8 000 MHz								Snan	6 000 MHz
#Res BW	30 kHz			#VE	W 91 kHz				Swe	ep 6.4 ms
Occur	oied Bandwid	th		Total P	ower	52.8 d	Bm			
	0	6007 N								
	2	.6827 IV	INZ							
Transr	nit Freg Error	-94	55 Hz	% of O	3W Power	99.00	0 %			
X dB B	andwidth	2.839	MHz	x dB		-26.00	dB			
						071710				
MSG						STATUS				



Maximum Output Power 43 dBm

				Result	t (kHz)			
Antenna	LTE-	LTE Carrier	Channel I	Position B	Channel F	Position M	Channel I	Position T
	Modulation	Bandwidth	Occupied	-26 dB	Occupied	-26 dB	Occupied	-26 dB
			Bandwidth	Bandwidth	Bandwidth	Bandwidth	Bandwidth	Bandwidth
В	16QAM	1.4 MHz	1,095.06	1,244.89	1,094.49	1,260.12	1,095.72	1,255.36

Antenna B - LTE-Modulation 16QAM - LTE Carrier Bandwidth 1.4 MHz - Channel Position B

🔤 Kej	/sight Spectrum /	Analyzer - Occupied	BW							
IXI R	L RF	50 Ω DC			SENSE:EXT SOUR	CE OFF AL	IGN AUTO		12:19:5	4 PM Dec 01, 2020
Cen	ter Freq	937.200000) MHz		Trig: Free	q: 937.200000 Run	MHz AvalHold: 2	200/200	Radio Std: N	None
			#16	Gain:Low	#Atten: 24	dB			Radio Devic	e: BTS
10 di	B/div I	Ref 50.71 dE	3m							
Log										
40.7										
30.7				mon	mon m	man	mon why			
20.7								h		
10.7			{					2		
n 710			(N 1		
0.00			ſ					1		
-9.29										
-19.3			~					6		
-29.3	almanan and	๖๛๛๛๛๛๛	- 'Yan						- Walter and the for the	monter
-39.3										
Con	tor 027 20								Enan	2 200 MHz
#Re	s BW 15 I	kHz			#VE	3W 43 kHz			Sw	eep 12 ms
0	ccupied	d Bandwid	dth		Total P	ower	51.4 dl	Bm		
		1	.0951	MHz						
т	ransmit F	req Error	-1.6	51 kHz	% of O	BW Power	99.00) %		
x	dB Band	width	1.24	5 MHz	x dB		-26.00	dB		
MSG							STATUS			



Keysight Spectrum Ana	lyzer - Occupied I	BW							- 6 ×
Center Freq 93	38.000000	MHz		Center Fre	rce OFF AL	IGN AUTO		Radio Std: N	l PM Dec 01, 2020
		#IF	Gain:Low	 Trig: Free #Atten: 24 	Run dB	Avg Hold:	200/200	Radio Devic	e: BTS
10 dB/div Re	f 50.42 dB	m							
Log									
40.4			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mama	man	man na			
30.4		/			V		N		
10.4		Å					h.		
D.420		^م					<u></u>		
-9.58							<u> </u>		
-19.6									
-29.6 mm - Martin	manna	~~ ^N N					hours -	mannow	Marchinen a
-39.6									
Center 938.000	MHz						11	Span	2.800 MHz
#Res BW 15 KH	Z			#VE	SW 43 KHZ			SW	eep 12 ms
Occupied I	Bandwid	lth		Total P	ower	51.2 d	Bm		
	1	.0945	MHz						
Transmit Fre	eq Error	-{	387 Hz	% of O	BW Power	99.0	0 %		
x dB Bandw	idth	1.26	0 MHz	x dB		-26.00	dB		
MSG						STATUS			

Antenna B - LTE-Modulation 16QAM - LTE Carrier Bandwidth 1.4 MHz - Channel Position M

Antenna B - LTE-Modulation 16QAM - LTE Carrier Bandwidth 1.4 MHz - Channel Position T

Keysight Spectrum Analy	zer - Occupied E	BW							
RL RF	50 Ω DC 8 800000	MHz		SENSE:EXT SOU	RCE OFF AL	IGN AUTO		12:27:2 Radio Std: 1	8 PM Dec 01, 2020 None
		#IF	Gain:Low ↔	Trig: Free #Atten: 24	Run dB	Avg Hold:	200/200	Radio Devic	e: BTS
10 dB/div Ref	50.73 dB	m							
Log									
40.7			mm	La ma	man	man m			
30.7		1							
20.7		كمر					1		
1730		للم ك					<u>\</u>		
-9.27		/							
-19.3									
-29.3		why					1 Vm	A MAGA R	
-39.3	64							- manada	- mar and a second
								-	0.000 8411
#Res BW 15 kHz	INZ			#VE	SW 43 kHz			Span Sw	eep 12 ms
Occupied B	andwid	lth		Total P	ower	51.4 d	Bm		
	1	.0957	MHz						
Transmit Free	q Error	-1.34	48 kHz	% of O	BW Power	99.0	0 %		
x dB Bandwid	lth	1.25	5 MHz	x dB		-26.00	dB		
MSG						STATUS			



Maximum Output Power 46 dBm

					Result	(kHz)		
Antenna	LTE-	LTE Carrier	Channel I	Position B	Channel F	Position M	Channel I	Position T
	Modulation	Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
В	16QAM	1.4 MHz +1.4 MHz	-	-	2,682.48	2,852.71	-	-

Antenna B - LTE-Modulation 16QAM - LTE Carrier Bandwidth 1.4 MHz +1.4 MHz - Channel Position M

🔤 Ke	ysight Spectru	m Analyzer - Occupied	BW							- 6 🔀
LXI R	L	RF 50 Ω DC			SENSE:EXT SOUR	RCE OFF AL	IGN AUTO		02:49:0	8 PM Dec 01, 2020
Cer	iter Fred	4 938.00000	0 MHz		Trig: Free	q: 938.000000 Run	Avg Hold	: 200/200	Radio Std: I	None
			#16	Gain:Low	#Atten: 26	dB			Radio Devid	e: BTS
10 d	Bidiy	Ref 50 78 di	Rm							
Log										
40.8										
30.8				himaha	Aproxim	maria	mon			
20.8				_		1				
10.8				/				\		
0 790				/				{		
0.700						1		1		
-9.22					1	1				
-19.2	1. A. M	Murthburnde	AT ANA ANA ANA			N		h.		
-29.2		,	- Ale Arth Marcar					- Marshann	in the second states	to mark with the
-39.2	———				+			_		
									-	7.500 841
Cer #Po	iter 938.0	JUU IVIMZ 5 kH-7			#\/E	NA 43 647			Span	17.500 WHZ
#1	5 0 44 1.	5 KHZ			#**	999 4J KHZ			3₩	eep Jz IIIs
)ccupie	d Bandwi	dth		Total P	ower	54.5	dBm		
`	ooupn									
		4	2.6825	WHZ						
Ιт	ransmit	Freg Error	-2.1	99 kHz	% of O	BW Power	99.0	00 %		
I .					,,					
×	dB Ban	dwidth	2.85	3 MHZ	x dB		-26.0	0 dB		
MSG							STATUS			



Maximum Output Power 43 dBm

					Result	: (kHz)		
Antenna	NB-IoT SA	NB-IoT SA Carrier	Channel I	Position B	Channel F	Position M	Channel I	Position T
	Modulation	Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
В	QPSK	400 kHz	202.11	290.07	203.20	290.18	204.51	293.29

Antenna B - NB-IoT SA Modulation QPSK - NB-IoT SA Carrier Bandwidth 400 kHz - Channel Position B

Keysight Spectrum Analyzer - Occupied B	N			
X RL RF 50 Ω DC	MHz	SENSE:EXT SOURCE OFF A Center Freq: 936.700000	MHz	03:17:06 PM Dec 01, 2020 Radio Std: None
	#IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold: 200/200	Radio Device: BTS
15 dB/div Ref 53.48 dBr	n			
Log				
38.5				
8.48	ممسممس		manne	
-6.52				
-21.5			han	
-36.5				monolom
-51.5				
-66.5				
-81.5				
Center 936.7000 MHz				Span 1.000 MHz
#Res BW 10 kHz		#VBW 30 kHz		Sweep 9.6 ms
Occupied Bandwid	th	Total Power	49.3 dBm	
2	02.11 kHz			
Transmit Freq Error	-912 Hz	% of OBW Powe	r 99.00 %	
x dB Bandwidth	290.1 kHz	x dB	-26.00 dB	
MSG			STATUS	



Antenna B - NB-IoT SA Modulation QPSK - NB-IoT SA Carrier Bandwidth 400 kHz - Channel Position M

Keysight Spectrum Analyzer - Occupied BW				- @ *
RL RF 50 Ω DC Center Freg 938.000000 N	/Hz	SENSE:EXT SOURCE OFF ALL Center Freq: 938.000000	IGN AUTO	03:26:15 PM Dec 01, 2020 Radio Std: None
	#IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold: 200/200	Radio Device: BTS
15 dB/div Ref 53.53 dBm	1			
.og 38.5				
23.5			m	
8.53				
3.47	/ ·		$ \longrightarrow $	+
21.5 Mr Marine	m		mm	mmmmm
6.5				
1.5				+ +
36.5				
1.5				
enter 938.0000 MHz Res BW 10 kHz		#VBW 30 kHz		Span 1.000 MH Sweep 9.6 m
Occupied Bandwidth	n	Total Power	49.2 dBm	
20)3.20 kHz			
Transmit Freq Error	-1.212 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	290.2 kHz	x dB	-26.00 dB	
G			STATUS	

Antenna B - NB-IoT SA Modulation QPSK - NB-IoT SA Carrier Bandwidth 400 kHz - Channel Position T

Keysight Spec	Keysight Spectrum Analyzer - Occupied BW 👝 🗗 📧									
	RF 50 Ω DC		SENSE:EXT SOURCE OFF ALL	GN AUTO	03:37:47 PM Dec 01, 2020					
Center Fr	eq 939.300000 N	IHZ	Trig: Free Run	Radio Sta: None						
		#IFGain:Low	#Atten: 20 dB	Radio Device: BTS						
15 dB/div	Ref 53.09 dBm									
Log										
38.1										
23.1			f 1	~						
8.09				<u> </u>						
-6.91										
-21.9	1 1000			- March	man man					
-36.9	1 Maker Currad				and more and					
-51.9										
-66.9										
01.0										
-01.9										
Center 939	9.3000 MHz				Span 1.000 MHz					
#Res BW	10 kHz		#VBW 30 kHz		Sweep 9.6 ms					
Occur	ind Randwidth	•	Total Power	49 3 dBm						
				40.0 0811						
	20)4.51 kHz								
Transm	it Freq Error	-1.424 kHz	% of OBW Power	99.00 %						
x dB Ba	andwidth	293.3 kHz	x dB	-26.00 dB						
MSG				STATUS						



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

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046 FCC CFR Part 27, Clause 27.50 FCC-20-67A1, FCC CFR Part 27, Subpart P, Clause 27.1507

2.3.2 Date of Test and Modification State

01 and 07 December 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 Temperature20.7-22.2°CRelative Humidity35.6 - 36.0%

2.3.5 Test Method

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

2.3.6 Test Results



Maximum Output Power 46 dBm

	LTE + NB-IoT IB Modulation	LTE + NB-loT IB Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
Antonno			Channel Position M			
Antenna			PAR (dB)	Average Power		
				dBm	dBm/MHz	
B QPSK		3.0 MHz + NB- loT IB	8.43	45.53	42.62	

Antenna B - LTE + NB-IoT IB Modulation QPSK - LTE + NB-IoT IB Carrier Bandwidth 3.0 MHz + NB-IoT IB - Channel Position M





Maximum Output Power 43 dBm

Antenna	LTE-Modulation	LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position B			
			PAR (dB)	Average Power		
				dBm	dBm/MHz	
В	16QAM	1.4 MHz	8.33	43.08	42.68	

Antenna B - LTE-Modulation 16QAM - LTE Carrier Bandwidth 1.4 MHz - Channel Position B

