

ISED CABid: ES1909
 Lab. Company Number: 4621A

Test Report No:
 75755RRF.004A1

Test Report

USA FCC Part 27

CANADA RSS-130, RSS-139

(*) Identification of item tested	nRF91
(*) Trademark	nRF91
(*) Model and /or type reference	nRF9161
Other identification of the product	FCC ID: 2ANPO00nRF9161 IC: 24529-NRF9161
(*) Features	LTE Cat-M1, LTE NB1&NB2 HW version: nRF9161 LACA A0A SW version: mfw_nrf91x1_2.0.0-77.beta
Applicant	NORDIC SEMICONDUCTOR ASA Otto Niensens Veg 12, 7052 Trondheim, Norway
Test method requested, standard	USA FCC Part 27 (10-1-21 Edition). CANADA RSS-130 Issue 2, Feb. 2019. CANADA RSS-139 Issue 4 September 2022, Amendment October 2022. ANSI C63.26-2015. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager
Date of issue	2023-11-30
Report template No.	FDT08_24 (*) "Data provided by the client"

Index

Competences and guarantees	3
General conditions	3
Uncertainty	3
Data provided by the client.....	3
Usage of samples	4
Test sample description	4
Identification of the client.....	5
Testing period and place.....	5
Document history	5
Environmental conditions	5
Remarks and comments	7
Testing verdicts.....	8
Summary	8
Appendix A: Test results for FCC 27 / RSS-130, RSS-139: LTE Cat-M1 Bands 4, 8, 12, 13, 66, 71, 85.....	9
Appendix B: Test results for FCC 27 / RSS-130, RSS-139: LTE Cat NB1 Bands 4, 8, 12, 13, 66, 71, 85.....	131

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is an FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory, CABid: ES1909, Company Number: 4621A, with the appropriate scope of accreditation that covers the performed tests in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document. **IMPORTANT:** No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Testing and Certification S.A.U.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample model nRF9161 is a Development Kit that has nRF9161 IOT Module and GPS. The nRF9161 is capable of LTE Cat-M1, Cat-NB1&NB2 and GPS. The Development kit contains antennas for cellular and GPS.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
75755B/005	nRF91	nRF9161	359746166778998	11-05-2023
75755B/007	USB Cable	-	-	11-05-2023

Sample S/01 has undergone the following test(s): The radiated tests indicated in Appendix A and B.

- Sample S/02 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
75755B/003	nRF91	nRF9161	359746166783618	11-05-2023
75755B/007	USB Cable	-	-	11-05-2023
75755B/011	Antenna Cable SMA	-	-	11-05-2023

Sample S/02 has undergone the following test(s): The conducted tests indicated in Appendix A and B.

Test sample description

Ports.....:	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	LTE RF	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	GPS	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Supplementary information to the ports.....:	-						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: 3.0-5.5V					
	<input type="checkbox"/>	DC:					
Rated Power.....:	1W						
Clock frequencies.....:	32kHz, 32MHz						
Other parameters	-						
Software version.....:	mfw_nrf91x1_2.0.0-77.beta						
Hardware version	nRF9161 LACA A0A						
Dimensions in cm (W x H x D) ...:	155x64x9mm						
Mounting position	<input checked="" type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					
	<input type="checkbox"/>	Other:					
Modules/parts.....:	Module/parts of test item		Type		Manufacturer		
	-		-		-		

Accessories (not part of the test item)	Description	Type	Manufacturer
	-	-	-
Documents as provided by the applicant	Description	File name	Issue date
	-	-	-

⁽³⁾ Only for Medical Equipment

Identification of the client

NORDIC SEMICONDUCTOR ASA
 Otto Niensens Veg 12, 7052 Trondheim, Norway

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2023-05-15
Date (finish)	2023-06-16

Document history

Report number	Date	Description
75755RRF.004	2023-09-21	First release.
75755RRF.004A1	2023-11-30	Second release. Minor typos corrected. Corrections in RBW used for block edges measurement. This release cancel and replace 75755RRF.002

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

In the semi-anechoic chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Pablo Redondo, Valentín Andarias, Francisco López, Sergio Carrasco, Ireneo Bibang, Fernando Chito, Carmen Vázquez, Álvaro Gutiérrez, Alberto Agüera, Rafael Fernández.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
6791	SEMIANECHOIC ABSORBER LINED	FACT 3 200 STP	ETS LINDGREN	N/A
6792	SHIELDED ROOM	S101	ETS LINDGREN	N/A
6143	Biconical/Log Antenna 30 MHz - 6 GHz	3142E	ETS LINDGREN	2023-10
4657	Horn Antenna 18-40 GHz	BBHA 9170	SCHWARZBECK MESS-ELEKTRONIK	2023-05
6496	HORN ANTENNA 1-18 GHz	BBHA 9120 D	SCHWARZBECK	2023-08
3783	PRE-AMPLIFIER G>30dB 1GHz-18GHz	BLMA 0118-3A	BONN ELEKTRONIK	2023-12
6142	RF Preamplifier, G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2023-06
8856	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2023-11
7817	EMI TEST RECEIVER 2 Hz-44 GHz	ESW44	ROHDE AND SCHWARZ	2023-12
9229	Wideband Radio Communication Tester	CMW500	ROHDE AND SCHWARZ	2024-06
5880	DC POWER SUPPLY 30V/5A	U8002A	KEYSIGHT TECHNOLOGY	N/A
7760	Digital Multimeter	175	FLUKE	2023-11
7794	Signal and Spectrum Analyzer 10 Hz - 40 GHz	FSV40	ROHDE AND SCHWARZ	2025-04
9229	Wideband Radio Communication Tester	CMW500	ROHDE AND SCHWARZ	2024-06
8912	Wideband Radio Communication Tester	CMW500	ROHDE AND SCHWARZ	2023-09
2215	Power Divider DC-25 GHz	5333-104	PICOSECOND PULSE LABS	2024-07
8002	TEMPERATURE CHAMBER MK56 BINDER	MK 56	BINDER	2024-04
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A

Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

Summary

Appendix A: LTE Cat-M1 Bands 4, 8, 12, 13, 66, 71, 85.

FCC PART 27 / RSS-130, RSS-139		
Requirement – Test case	Verdict	Remark
FCC 27.50 / RSS-130 4.6, RSS-139 6.5: RF Output Power	P	
FCC 2.1047 / RSS-130 4.2, RSS-139 5.3: Modulation Characteristics	P	
FCC 27.54 / RSS-130 4.5, RSS-139 5.4: Frequency Stability	P	
FCC 2.1049 / RSS-130 4.5, RSS-139 6.4: Occupied Bandwidth	P	
FCC 27.53 / RSS-130 4.7, RSS-139 5.6: Spurious Emissions at Antenna Terminals	P	
FCC 27.53 / RSS-130 4.7, RSS-139 5.6: Spurious Emissions at Antenna Terminals at Block Edges	P	
FCC 27.53 / RSS-130 4.7, RSS-139 5.6: Radiated Emissions	P	
<u>Supplementary information and remarks:</u> None.		

Appendix B: LTE Cat NB1 Bands 4, 8, 12, 13, 66, 71, 85.

FCC PART 27 / RSS-130, RSS-139		
Requirement – Test case	Verdict	Remark
FCC 27.50 / RSS-130 4.6, RSS-139 6.5: RF Output Power	P	
FCC 2.1047 / RSS-130 4.2, RSS-139 5.3: Modulation Characteristics	P	
FCC 27.54 / RSS-130 4.5, RSS-139 5.4: Frequency Stability	P	
FCC 2.1049 / RSS-130 4.5, RSS-139 6.4: Occupied Bandwidth	P	
FCC 27.53 / RSS-130 4.7, RSS-139 5.6: Spurious Emissions at Antenna Terminals	P	
FCC 27.53 / RSS-130 4.7, RSS-139 5.6: Spurious Emissions at Antenna Terminals at Block Edges	P	
FCC 27.53 / RSS-130 4.7, RSS-139 5.6: Radiated Emissions	P	
<u>Supplementary information and remarks:</u> None.		

Appendix A: Test results for FCC 27 / RSS-130, RSS-139: LTE Cat-M1 Bands 4, 8, 12, 13, 66, 71, 85

INDEX

TEST CONDITIONS	11
RF Output Power	14
Frequency Stability	35
Modulation Characteristics	44
Occupied Bandwidth	50
Spurious Emissions at Antenna Terminals	65
Spurious Emissions at Antenna Terminals at Block Edges	81
Radiated Emissions	98

TEST CONDITIONS

(*): Declared by the Applicant.

POWER SUPPLY (*):

Vnormal: 5 Vdc.
 Vmin 3 Vdc
 Vmax 5.5 Vdc
 Type of Power Supply: Internal DC.

ANTENNA (*):

Low Bands	Gain (dBi)	Type
LTE 8	+2.70	SMD
LTE 12	+1.56	SMD
LTE 13	+1.56	SMD
LTE 71	+1.56	SMD
LTE 85	+1.56	SMD
High Bands	Gain (dBi)	Type
LTE 4	+3.0	SMD
LTE 66	+3.0	SMD

TEST FREQUENCIES:

LTE Cat-M1 Band 4. QPSK and 16QAM modulations:

	Channel per BW=(Frequency, MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Low	19957 (1710.7)	19965 (1711.5)	19975 (1712.5)	20000 (1715.0)	20025 (1717.5)	20050 (1720.0)
Middle	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)
High	20393 (1754.3)	20385 (1753.5)	20375 (1752.5)	20350 (1750.0)	20325 (1747.5)	20300 (1745.0)

NOTE: LTE Cat-M1 Band 4 is completely included in LTE Cat-M1 Band 66, so the channels of LTE Cat-M1 Band 66 were tested to give conformity to the assigned block.

LTE Cat-M1 Band 8. QPSK and 16QAM modulations:

	Channel (Frequency, MHz)	
	BW = 1.4 MHz	BW = 3 MHz
Low	21632 (898.2)	
Middle		21640 (899)
High	21648 (899.8)	

LTE Cat-M1 Band 12. QPSK and 16QAM modulations:

	Channel (Frequency, MHz)			
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz
Low	23017 (699.7)	23025 (700.5)	23035 (701.5)	23060 (704.0)
Middle	23095 (707.5)	23095 (707.5)	23095 (707.5)	23095 (707.5)
High	23173 (715.3)	23165 (714.5)	23155 (713.5)	23130 (711.0)

NOTE: LTE Cat-M1 Band 12 is completely included in LTE Cat-M1 Band 85, so the channels of LTE Cat-M1 Band 85 were tested to give conformity to the assigned block.

LTE Cat-M1 Band 13. QPSK and 16QAM modulations:

	Channel (Frequency, MHz)	
	BW = 5 MHz	BW = 10 MHz
Low	23205 (779.5)	
Middle	23230 (782.0)	23230 (782.0)
High	23255 (784.5)	

LTE Cat-M1 Band 17. QPSK and 16QAM modulations:

	Channel per BW=(Frequency, MHz)	
	BW = 5 MHz	BW = 10 MHz
Low	23755 (706.5)	23780 (709.0)
Middle	23790 (710.0)	23790 (710.0)
High	23825 (713.5)	23800 (711.0)

NOTE: LTE Cat-M1 Band 17 is completely included in LTE Cat-M1 Band 85, so the channels of LTE Cat-M1 Band 85 were tested to give conformity to the assigned block.

LTE Cat-M1 Band 66. QPSK and 16QAM modulations:

	Channel per BW=(Frequency, MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Low	131979 (1710.7)	131987 (1711.5)	131997 (1712.5)	132022 (1715.0)	132047 (1717.5)	132072 (1720.0)
Middle	132322 (1745)	132322 (1745)	132322 (1745)	132322 (1745)	132322 (1745)	132322 (1745)
High	132665 (1779.3)	132657 (1778.5)	132647 (1777.5)	132622 (1775)	132597 (1772.5)	132572 (1770)

LTE Cat-M1 Band 71. QPSK and 16QAM modulations:

	Channel (Frequency)			
	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Low	133147 (665.50 MHz)	133172 (668.00 MHz)	133197 (670.50 MHz)	133222 (673.00 MHz)
Middle	133297 (680.50 MHz)	133297 (680.50 MHz)	133297 (680.50 MHz)	133297 (680.50 MHz)
High	133447 (695.50 MHz)	133422 (693.00 MHz)	133397 (690.50 MHz)	133372 (688.00 MHz)

LTE Cat-M1 Band 85. QPSK and 16QAM modulations:

	Channel (Frequency)	
	BW = 5 MHz	BW = 10 MHz
Low	134027 (700.5)	134052 (703.0)
Middle	134092 (707)	134092 (707)
High	134157 (713.5)	134132 (711.0)

RF Output Power

Limits

1. LTE Cat-M1 Band 8. FCC §27.1507 (a) & (d).

FCC §27.1507 (a) & (d):

(a) *Maximum ERP*. The power limits specified in this section are applicable to operations in areas more than 110 km (68.4 miles) from the U.S./Mexico border and 140 km (87 miles) from the U.S./Canada border.

(3) *Mobile, control and auxiliary test stations*. Mobile, control and auxiliary test stations must not exceed 10 watts ERP.

(4) *Portable stations*. Portable stations must not exceed 3 watts ERP.

(d) *PAR limit*. The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

2. LTE Cat-M1 Band 13. FCC §27.50 (b) (10) / RSS-130 Clause 4.6.

FCC §27.50 (b) (10):

Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

RSS-130 Clause 4.6:

4.6.1 General

The transmitter output power shall be measured in terms of average power. In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the High PAPR during periods of continuous transmission.

4.6.3 Frequency bands 698-756 MHz and 777-787 MHz

The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.

3. LTE Cat-M1 Band 66. FCC §27.50 (d) / RSS-139 Clause 6.5.

FCC §27.50 (d):

(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(5) In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

RSS-139 Clause 6.5:

The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

In addition, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the High PAPR during periods of continuous transmission.

4. LTE Cat-M1 Band 71 & LTE Cat-M1 Band 85. FCC §27.50 (c) (10) / RSS-130 Clause 4.6.

FCC §27.50 (c) (10):

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

RSS-130 Clause 4.6:

4.6.1 General

The transmitter output power shall be measured in terms of average power. In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the High PAPR during periods of continuous transmission.

4.6.3 Frequency bands 698-756 MHz and 777-787 MHz

The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.

Method

The conducted RF output power measurements were made at the RF output terminals of the EUT using the power meter of the Universal Radio Communication tester CMW500, selecting maximum transmission power of the EUT and different modes of modulation.

The peak-to-average power ratio (PAPR) is measured using an attenuator, power splitter and spectrum analyser with a Complementary Cumulative Distribution Function implemented.

The maximum equivalent isotropically radiated power (e.i.r.p.) is calculated by adding the declared maximum antenna gain (dBi).

The maximum effective radiated power e.r.p. is calculated from the maximum equivalent isotropically radiated power (e.i.r.p.) by subtracting 2.15 dB:

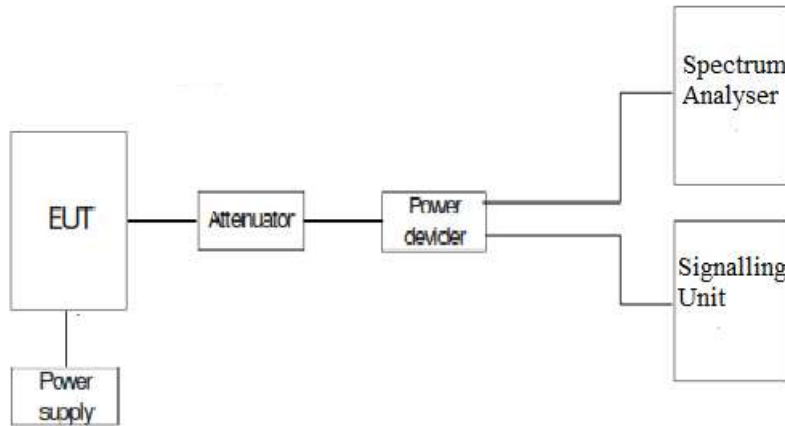
$$E.R.P. = E.I.R.P. - 2.15 \text{ dB}$$

Test Setup

1. CONDUCTED AVERAGE POWER:



2. PEAK-TO-AVERAGE POWER RATIO (PAPR) and Conducted Average power:



Results

1. CONDUCTED AVERAGE POWER:

LTE Cat-M1 Band 8:

Worst-case of RF Power is BW=1.4 MHz, Low Channel, QPSK, RB Size=1, RB Offset=2, Narrow Band=0.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
1.4	Low 21632	898.2	QPSK	1	0	22.89
				1	2	22.95
				1	5	22.89
				3	0	21.89
				3	1	21.97
				3	3	21.89
			6	0	20.92	
			16-QAM	1	0	21.67
				1	2	21.84
				1	5	21.68
	3	0		20.93		
	High 21648	899.8	QPSK	3	1	20.96
				3	3	20.98
				5	0	20.87
				1	0	22.78
				1	2	22.93
				1	5	22.78
			16-QAM	3	0	21.89
				3	1	21.97
				3	3	21.89
6				0	21.01	
1	0	21.72				
1	2	21.82				
1	5	21.72				
3	0	21				
3	1	20.95				
3	3	21.01				
5	0	20.76				

BW=1.4 MHz. QPSK:

MAX POWER	QPSK COND. POWER AVG (dBm)	ANTENNA GAIN (dBi)	RAD. POWER AVG EIRP(dBm)
LOW	22.95	2.7	25.65
MIDDLE			
HIGH	22.93	2.7	25.63
MAX:	22.95		25.65

BW=1.4 MHz. 16QAM:

MAX POWER	16QAM COND. POWER AVG (dBm)	ANTENNA GAIN (dBi)	RAD. POWER AVG EIRP(dBm)
LOW	21.84	2.7	24.54
MIDDLE			
HIGH	21.82	2.7	24.52
MAX:	21.84		24.54

LTE Cat-M1 Band 13:

Worst-case of RF Power is BW=5 MHz, Low Channel, QPSK, RB Size=1, RB Offset=0, Narrow Band=1.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
5	Low 23205	779.5	QPSK	1	0	22.87
				1	2	22.81
				1	5	21.45
				3	0	22.8
				3	1	22.8
				3	3	21.45
			16-QAM	6	0	22.8
				1	0	22.8
				1	2	22.79
				1	5	22.79
	High 23255	784.5	QPSK	3	0	21.44
				3	1	22.8
				3	3	22.79
				5	0	21.44
				1	0	22.82
				1	2	22.82
			16-QAM	1	5	21.52
				3	0	22.81
				3	1	21.52
				3	3	22.82
16-QAM	6	0	21.52			
	1	0	21.52			
	1	2	21.52			
	1	5	22.81			
	3	0	22.81			
	3	1	22.81			
	3	3	22.81			
	5	0	22.74			

BW=5 MHz. QPSK:

MAX POWER	QPSK COND. POWER AVG (dBm)	ANTENNA GAIN (dBi)	RAD. POWER AVG EIRP(dBm)
LOW	22.87	1.56	24.43
MIDDLE			
HIGH	22.82	1.56	24.38
MAX:	22.87		24.43

BW=5 MHz. 16QAM:

MAX POWER	16QAM COND. POWER AVG (dBm)	ANTENNA GAIN (dBi)	RAD. POWER AVG EIRP(dBm)
LOW	22.8	1.56	24.36
MIDDLE			
HIGH	22.81	1.56	24.37
MAX:	22.81		24.37

LTE Cat-M1 Band 66:

Worst-case of RF Power is BW=10 MHz, High Channel, 16QAM, RB Size=1, RB Offset=2, Narrow Band=0.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
10	Low 132022	1715	QPSK	1	0	22.49
				1	2	22.53
				1	5	22.52
				3	0	22.48
				3	1	22.51
				3	3	22.51
			16-QAM	6	0	21.56
				1	0	22.41
				1	2	22.36
				1	5	22.36
				3	0	22.75
				3	1	22.63
				3	3	22.63
				5	0	21.56
	Middle 132322	1745	QPSK	1	0	22.42
				1	2	22.48
				1	5	22.42
				3	0	22.45
				3	1	22.48
				3	3	22.48
			16-QAM	6	0	21.5
				1	0	22.56
				1	2	22.61
				1	5	22.61
				3	0	22.55
				3	1	22.59
				3	3	22.46
				5	0	21.36
	High 132622	1775	QPSK	1	0	22.24
				1	2	22.31
1				5	22.31	
3				0	22.38	
3				1	22.4	
3				3	22.41	
16-QAM			6	0	21.37	
			1	0	23.03	
			1	2	23.06	
			1	5	22.96	
			3	0	22.19	
			3	1	22.21	
			3	3	22.21	
			5	0	21.37	

BW=10 MHz. QPSK:

MAX POWER	QPSK COND. POWER AVG (dBm)	ANTENNA GAIN (dBi)	RAD. POWER AVG EIRP(dBm)
LOW	22.53	3	25.53
MIDDLE	22.48	3	25.48
HIGH	22.41	3	25.41
MAX:	22.53		25.53

BW=10 MHz. 16QAM:

MAX POWER	16QAM COND. POWER AVG (dBm)	ANTENNA GAIN (dBi)	RAD. POWER AVG EIRP(dBm)
LOW	22.75	3	25.75
MIDDLE	22.61	3	25.61
HIGH	23.06	3	26.06
MAX:	23.06		26.06

LTE Cat-M1 Band 71:

Worst-case of RF Power is BW=10 MHz, High Channel, 16QAM, RB Size=1, RB Offset=2, Narrow Band=3.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
10	Low 133172	668	QPSK	1	0	22.43
				1	2	22.51
				1	5	22.5
				3	0	22.58
				3	1	22.49
				3	3	22.48
			16-QAM	6	0	21.56
				1	0	22.54
				1	2	22.36
				1	5	22.36
				3	0	22.74
				3	1	22.65
	Middle 133297	680.5	QPSK	3	3	22.65
				5	0	21.56
				1	0	22.5
				1	2	22.5
				1	5	22.51
				3	0	22.65
			16-QAM	3	1	22.69
				3	3	22.69
				6	0	21.49
				1	0	22.72
				1	2	22.81
				1	5	22.8
	High 133422	693	QPSK	3	0	22.6
				3	1	22.73
				3	3	22.74
				5	0	21.47
				1	0	22.5
				1	2	22.6
16-QAM			1	5	22.59	
			3	0	22.53	
			3	1	22.68	
			3	3	22.68	
			6	0	21.65	
			1	0	23.18	
				1	2	23.2
				1	5	23.2
				3	0	22.45
				3	1	22.47
				3	3	22.47
				5	0	21.64

BW=10 MHz. QPSK:

MAX POWER	QPSK COND. POWER AVG (dBm)	ANTENNA GAIN (dBi)	RAD. POWER AVG EIRP(dBm)
LOW	22.58	1.56	24.14
MIDDLE	22.69	1.56	24.25
HIGH	22.68	1.56	24.24
MAX:	22.69		24.25

BW=10 MHz. 16QAM:

MAX POWER	16QAM COND. POWER AVG (dBm)	ANTENNA GAIN (dBi)	RAD. POWER AVG EIRP(dBm)
LOW	22.74	1.56	24.3
MIDDLE	22.81	1.56	24.37
HIGH	23.2	1.56	24.76
MAX:	23.2		24.76

LTE Cat-M1 Band 85:

Worst-case of RF Power is BW=10 MHz, High Channel, 16QAM, RB Size=1, RB Offset=2, Narrow Band=0.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
10	Low 134052	703	QPSK	1	0	22.4
				1	2	22.44
				1	5	22.45
				3	0	22.55
				3	1	22.57
				3	3	22.56
			16-QAM	6	0	21.54
				1	0	22.46
				1	2	22.49
				1	5	22.43
				3	0	22.78
				3	1	22.65
				3	3	22.65
				5	0	21.54
	Middle 134092	707	QPSK	1	0	22.51
				1	2	22.5
				1	5	22.5
				3	0	22.65
				3	1	22.7
				3	3	22.7
			16-QAM	6	0	21.75
				1	0	22.82
				1	2	22.86
				1	5	22.86
				3	0	22.92
				3	1	22.97
				3	3	22.96
				5	0	21.61
	High 134132	711	QPSK	1	0	22.59
				1	2	22.67
1				5	22.67	
3				0	22.74	
3				1	22.76	
3				3	22.77	
16-QAM			6	0	21.75	
			1	0	23.4	
			1	2	23.41	
			1	5	23.41	
			3	0	22.48	
			3	1	22.57	
			3	3	22.57	
			5	0	21.74	