

ISED CABid: ES1909

Test report No:
NIE: 70437RRF.004

Partial Test Report

Reference Standard:
USA FCC Part 22 & Part 90
CANADA RSS-132, RSS-Gen

(*) Identification of item tested	AirCurve 11
(*) Trademark	ResMed
(*) Model and /or type reference	39428
(*) Derived test models not tested	For USA: 39491, 39492, 39493, 39494, 51400. For Canada: 39495, 39496, 39497, 39498, 51400.
Other identification of the product	HW version: 1.0 SW version: SW04600 FCC ID: 2ACHL-AIR11M1B IC: 9103A-AIR11M1B
(*) Features	LTE Cat-M1, BLE
Applicant	ResMed Pty Ltd. 1 Elizabeth Macarthur Drive Bella Vista, NSW 2153 Australia
Test method requested, standard	USA FCC Part 22 (10-1-20 Edition): Public Mobile Services. USA FCC Part 90 (10-1-20 Edition): Private Land Mobile Radio Services. CANADA IC RSS-132 Issue 3, Jan. 2013. CANADA IC RSS-Gen Issue 5 (March 2019). ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager  2022.05.06 10:21:16 +02'00'
Date of issue	2022-05-06
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 5

Test sample description 6

Identification of the client.....7

Testing period and place 7

Document history 7

Environmental conditions 7

Remarks and comments 8

Testing verdicts.....9

Summary 9

Appendix A: Test results for FCC Part 22 & 90 / IC RSS-132. 10

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 S.A.U. is an FCC-recognized accredited testing laboratory with the appropriate scope of accreditation that covers the performed test in this report.

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, 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 of the model 39428 is a bilevel device with integrated cellular and Bluetooth connectivity.
3. Derived models of 39428 are not tested: 39491, 39492, 39493, 39494, 39495, 39496, 39497, 39498 and 51400.



Date: 01 Dec 2021

DECLARATION OF EQUIVALENCE

This document declares that the following designated products are equivalent to the unit under test **39428**.

For USA:

Model Name / Product Code	Marketing Name
39491	AIRCURVE 11 ASV USA
39492	AIRCURVE 11 S USA
39493	AIRCURVE 11 ST USA
39494	AIRCURVE 11 VAUTO USA

For Canada:

Model Name / Product Code	Marketing Name
39495	AIRCURVE 11 VAUTO CAN
39496	AIRCURVE 11 S CAN
39497	AIRCURVE 11 ST CAN
39498	AIRCURVE 11 ASV CAN

For USA & Canada:

Model Name / Product Code	Marketing Name
51400	AIRCURVE 11 ST NORTH AMERICA

All the above stated products have the same hardware, cellular firmware and Bluetooth firmware.

Applicant:

Company Name: ResMed Pty Ltd
Address: 1 Elizabeth Macarthur Drive,
Bella Vista NSW 2153
Australia

By,



Christopher Jenkins

Title: Associate Manager – Systems Engineering
Company: ResMed Pty Ltd
Telephone: +61 2 8884 1517
e-mail: Christopher.jenkins@resmed.com.au

Usage of samples

Samples undergoing test have been selected by: the client.

Sample S/01 is composed of the following elements:

Control No.	Description	Model	Serial No.	Date of reception
68649/005	Continuous Positive Airway Pressure (CPAP) Device	39001	22201142551	2021/07/29
68649/009	AC/DC Adapter	--	00003D00	2021/07/29

Sample S/01 has undergone the following test(s): All tests indicated in Appendix A.

Test sample description

Ports..... :	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	Power			☒	☐	☐	
Supplementary information to the ports..... :	---						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☒	AC: 100-240V~50-60 Hz 1.0-1.5A	☒	☐	☐	☒	☐
☒	AC: 115V~400Hz 1.5A	☒	☐	☐	☒	☐	
Rated Power	24 VDC, 3.75A						
Clock frequencies..... :	N/A						
Other parameters	390001 (PSU Model Number)						
Software version	SW04600 (DUT)						
Hardware version	1.0 (DUT)						
Dimensions in cm (W x H x D)	13.85 cm x 25.94 cm x 9.45 cm						
Mounting position	☒	Table top equipment					
Modules/parts..... :	Module/parts of test item			Type		Manufacturer	
	Wireless Module			EXS62-W		Thales	
	Bluetooth LE			EFR32BG1		SiLabs	
Accessories (not part of the test item)	Description			Type		Manufacturer	
	Power Supply Unit 390001			N/A		ResMed	
Documents as provided by the applicant	Description			File name		Issue date	

⁽³⁾ Only for Medical Equipment

Identification of the client

ResMed Pty Ltd.
1 Elizabeth Macarthur Drive
Bella Vista, NSW 2153
Australia

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2021-10-22
Date (finish)	2021-10-26

Document history

Report number	Date	Description
70437RRF.004	2022-03-16	First release.

Environmental conditions

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. = 35 %

Remarks and comments

The tests have been performed by the technical personnel: José Manuel Jiménez and Javier Nadales.

Used instrumentation:

	Last Cal. date	Cal. due date
1. EMI Test Receiver 9kHz-7GHz ROHDE AND SCHWARZ ESR7	2019/10	2021/10
2. Signal and spectrum analyzer 10Hz-40GHz Rhode and Schwarz FSV40	2021/02	2023/02
3. Wideband Radio Communication Tester CMW500 ROHDE AND SCHWARZ	2021/06	2022/06
4. Wideband Radio Communication Tester CMW500 ROHDE AND SCHWARZ	2021/08	2023/08
5. AC Power Supply 135/270 V, 5/10/20/40 A ELGAR CS-AC35(351SL)	2019/09	2022/09
6. Digital Multimeter FLUKE 175	2020/11	2021/11

Testing verdicts

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

Summary

LTE Cat M1 Band FDD 26

FCC PART 90 PARAGRAPH		
Requirement – Test case	Verdict	Remark
FCC 90.635 (b): RF output power	P	(2)
FCC 2.1047: Modulation characteristics	N/M	(1)
FCC 90.213: Frequency stability	N/M	(1)
FCC 2.1049: Occupied Bandwidth	N/M	(1)
FCC 90.691: Spurious emissions at antenna terminals	P	(2)
FCC 90.691: Radiated emissions	N/M	(1)
<u>Supplementary information and remarks:</u> (1) Test not requested. (2) Conducted measurement performed at Cross-rule channel (824MHz) inherited from 39001 model due to Cellular module is the same for 39001 and 39428 models.		

Appendix A: Test results for FCC Part 22 & 90 / IC RSS-132.

INDEX

TEST CONDITIONS.....12

RF Output Power 13

Spurious emissions at antenna terminals.....15

Spurious emissions at antenna terminals at Block Edges.....17

TEST CONDITIONS

POWER SUPPLY (V):

Vn: 115 Vac

Type of Power Supply: AC Voltage mains.

The subscript 'n' indicates nominal voltage test conditions.

ANTENNA:

Declared Gain for antennas:

Band	Gain (dBi)	Antenna type
LTE Band 26	+2.2	External

TEST FREQUENCIES:

LTE Band 26. QPSK AND 16QAM MODULATIONS:

- 814-824 MHz

	Channel per Nominal Bandwidth (Frequency, MHz)			
	BW = 1.4 MHz	BW = 3 MHz	BW=5 MHz	BW=10 MHz
Lowest	26697 (814.7)	26705 (815.5)	26715 (816.5)	N/A
Middle	26740 (819.0)	26740 (819.0)	26740 (819.0)	26740 (819.0)
Highest	26783 (823.3)	26775 (822.5)	26765 (821.5)	N/A

- Cross-rule channel (824MHz):

Channel (Frequency, MHz)				
BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz
26790 (824)	26790 (824)	26790 (824)	26790 (824)	26790 (824)

RF Output Power

SPECIFICATION

FCC §2.1046 and §22.913. The Effective Radiated Power (E.R.P.) of mobile transmitter and auxiliary test transmitter must not exceed 7 Watts (38.45 dBm E.R.P.).

RSS-132. Clause 5.4. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts (38.45 dBm E.R.P.).

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 using a signal corresponding to the highest PAPR during periods of continuous transmission.

FCC §90.635. The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

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 R&S CMU200 and 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:

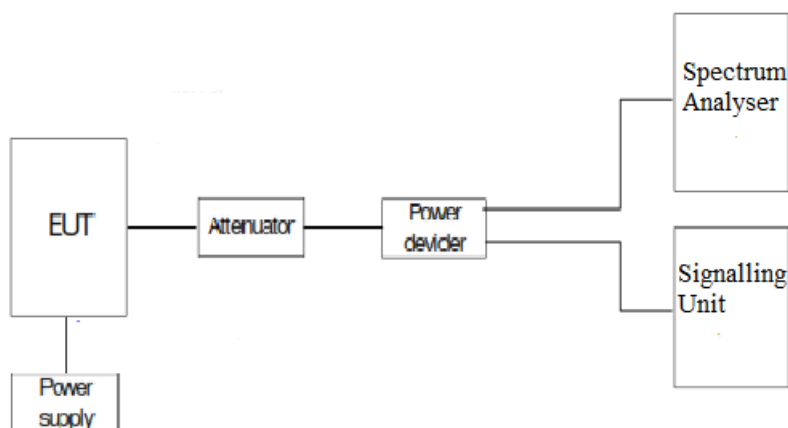
$$\text{E.R.P.} = \text{E.I.R.P.} - 2.15 \text{ dB}$$

TEST SETUP

Conducted average power.



Peak-to-average power ratio (PAPR)



RESULTS

MAXIMUM OUTPUT POWER (CONDUCTED).

Cross-rule channel (824MHz):

Preliminary measurements determined the narrow band = 1 and nominal bandwidth of 3 MHz as the worst case. The results in the next tables shows the results for this configuration.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
3	26790	824	QPSK	1	0	19.92
				6	0	19.33
			16-QAM	1	0	19.35
				5	0	19.29

Channel	Measured maximum average power (dBm) at antenna port	Maximum declared antenna gain (dBi)	Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	Maximum effective radiated power E.R.P. (dBm)
26790 (824)	19.92	+2.2	22.12	19.97
Measurement uncertainty (dB)	<±1.11			

Verdict: PASS

Spurious emissions at antenna terminals

SPECIFICATION

FCC §2.1051 and §22.917

RSS-132. Clause 5.5.

The power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log(P)$ dB. P in watts.

METHOD

The EUT RF output connector was connected to a spectrum analyser and to the Universal Radio Communication tester R&S CMW500 (selecting maximum transmission power of the EUT and different modes of modulation) using a 50 ohm attenuator and a power divider.

The spectrum was investigated from 9 kHz to 10th harmonic for LTE Band 5 and 26.

The reading of the spectrum analyser is corrected with the attenuation loss of connection between output terminal of EUT and input of the spectrum analyser.

The configuration of Resource Blocks and modulation which is the worst case for conducted power was used.

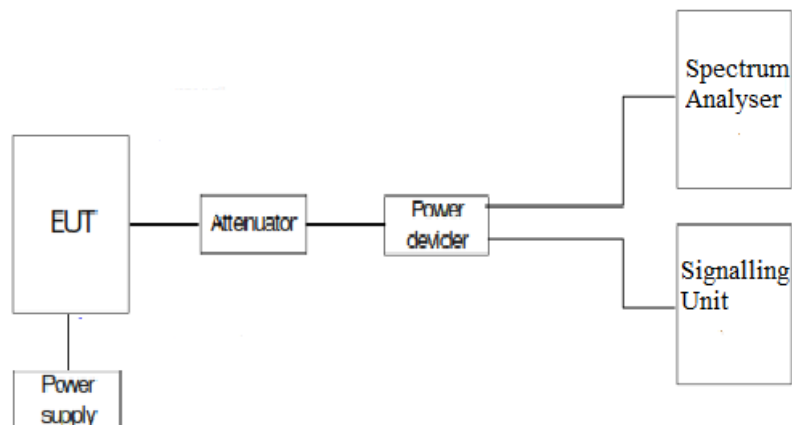
Measurement Limit:

According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log(P)$ dB. P in watts.

At P_o transmitting power. the specified minimum attenuation becomes $43 + 10 \log(P_o)$. and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log(P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

TEST SETUP



RESULTS (see plots in next pages)

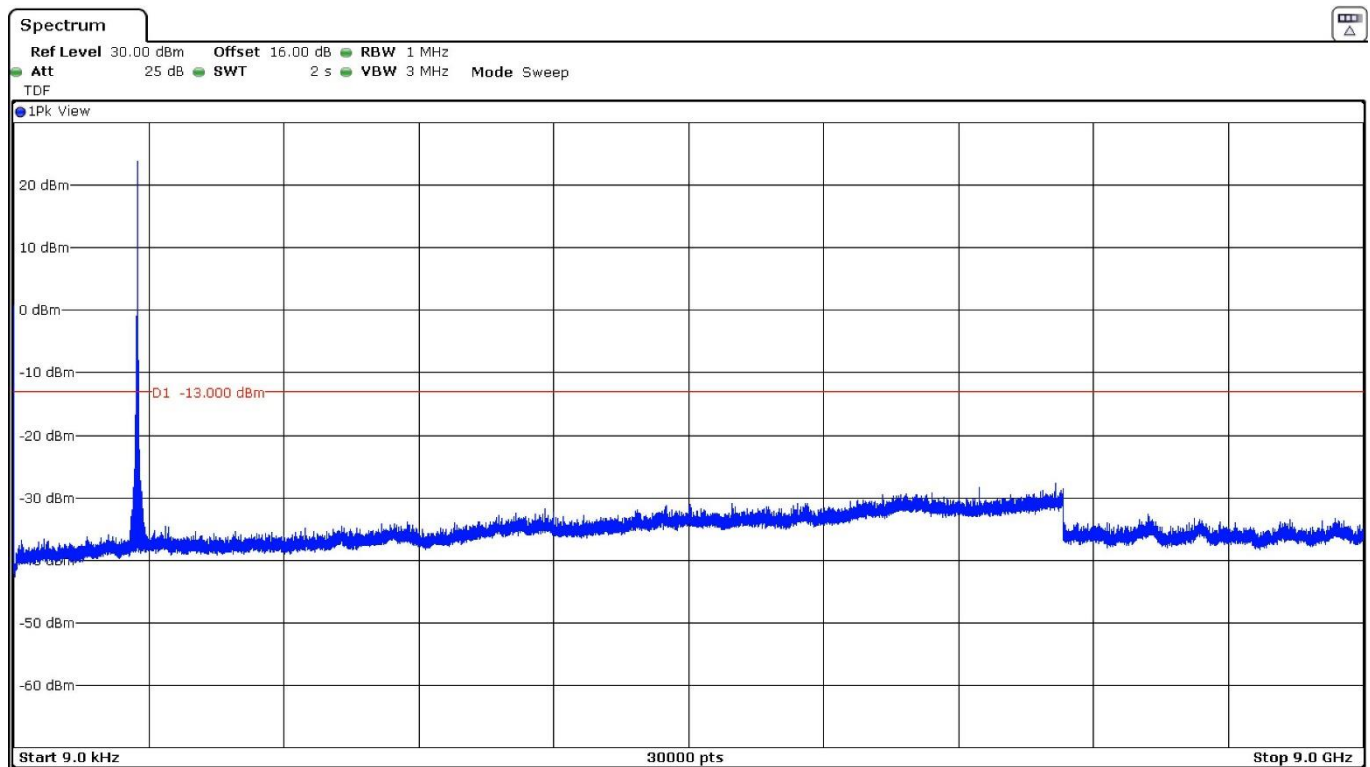
Cross-rule channel (824MHz):

LTE Band 26 (QPSK MODULATION. BW = 3 MHz)

1. CHANNEL (26790) 824MHz:

No spurious signals were found at less than 20dB respect to the limit in all the range.

Frequency Range 9 kHz – 9 GHz



Note: The peak above the limit is the carrier frequency.

Verdict: PASS

Spurious emissions at antenna terminals at Block Edges

SPECIFICATION

FCC §2.1051 and §22.917
RSS-132. Clause 5.5.

The power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

FCC §90.691. Emission mask requirements for EA-based systems. Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

METHOD

The EUT RF output connector was connected to a spectrum analyser and to the Universal Radio Communication tester R&S CMW500 (selecting maximum transmission power of the EUT and different modes of modulation) using a 50 ohm attenuator and a power splitter.

The reading of the spectrum analyser is corrected with the attenuation loss of connection between output terminal of EUT and input of the spectrum analyser.

The configuration of modulation which is the worst case for conducted power was used.

As indicated in FCC part 22, in the 1 MHz bands immediately outside and adjacent to the frequency block or band a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

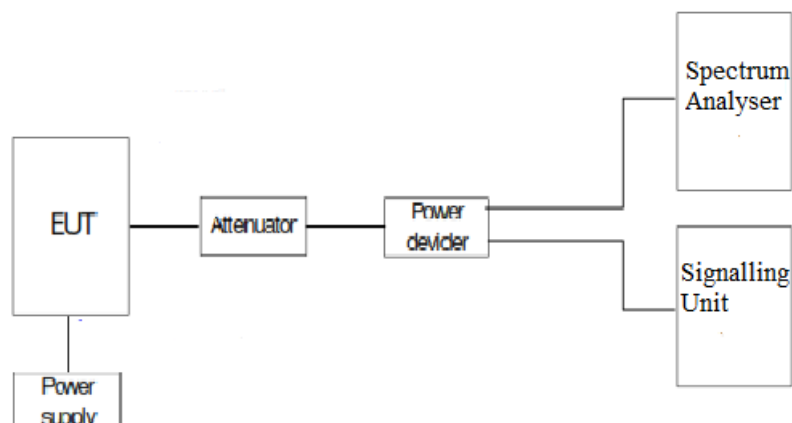
Measurement Limit:

According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

At P_o transmitting power. the specified minimum attenuation becomes $43 + 10 \log (P_o)$. and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

TEST SETUP

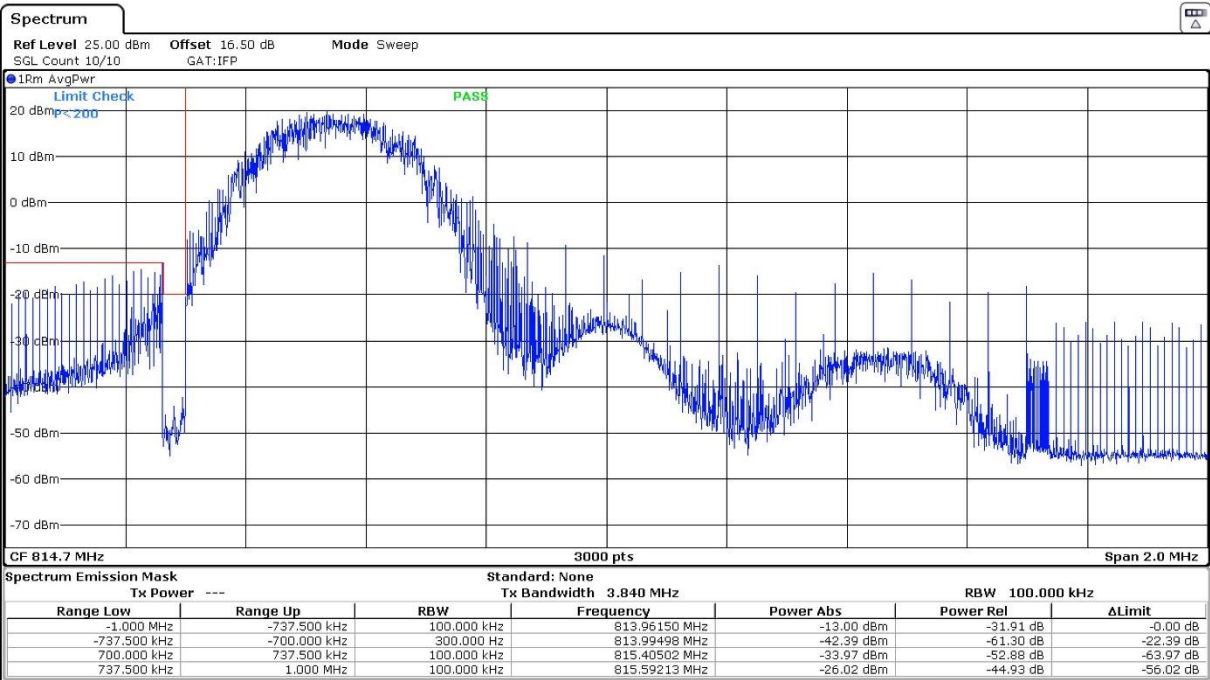


RESULTS (see plots in next pages)

814-824MHz Band “EA MASK”:

Narrow band = 1. RB = 1. Offset = 0. BW = 1.4 MHz

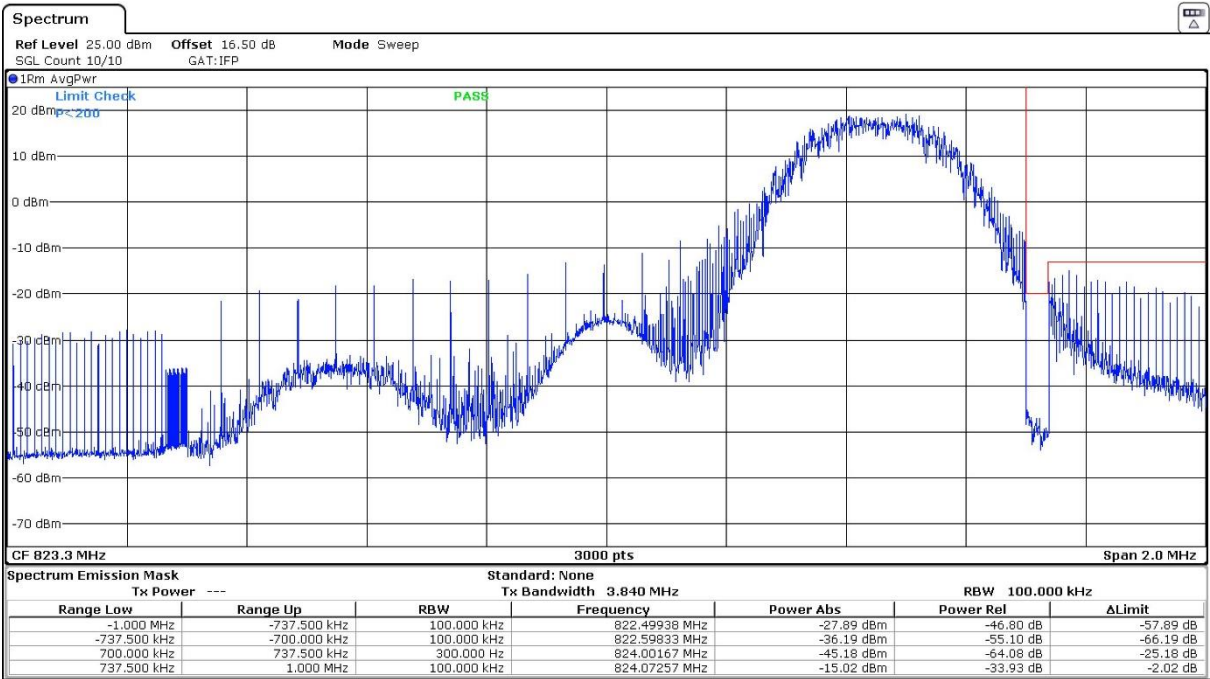
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

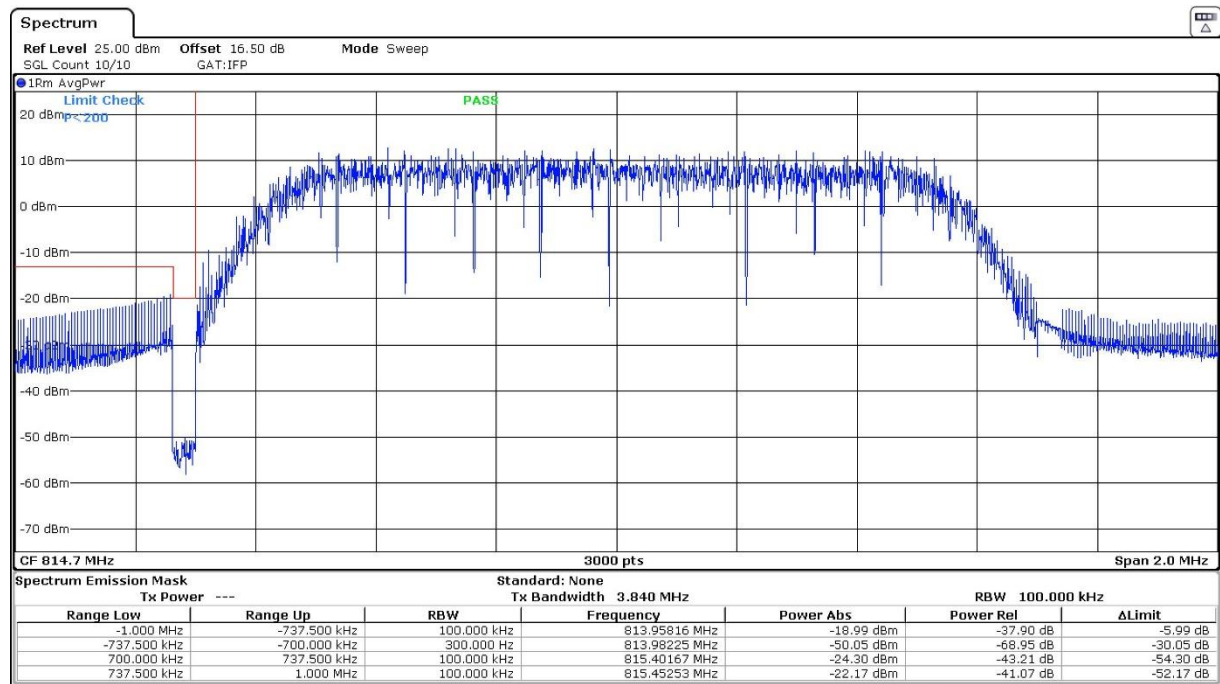
Narrow band = 1. RB = 1. Offset = Max. BW = 1.4 MHz

CHANNEL HIGHEST



Narrow band = 1. RB = All. Offset = 0. BW = 1.4 MHz

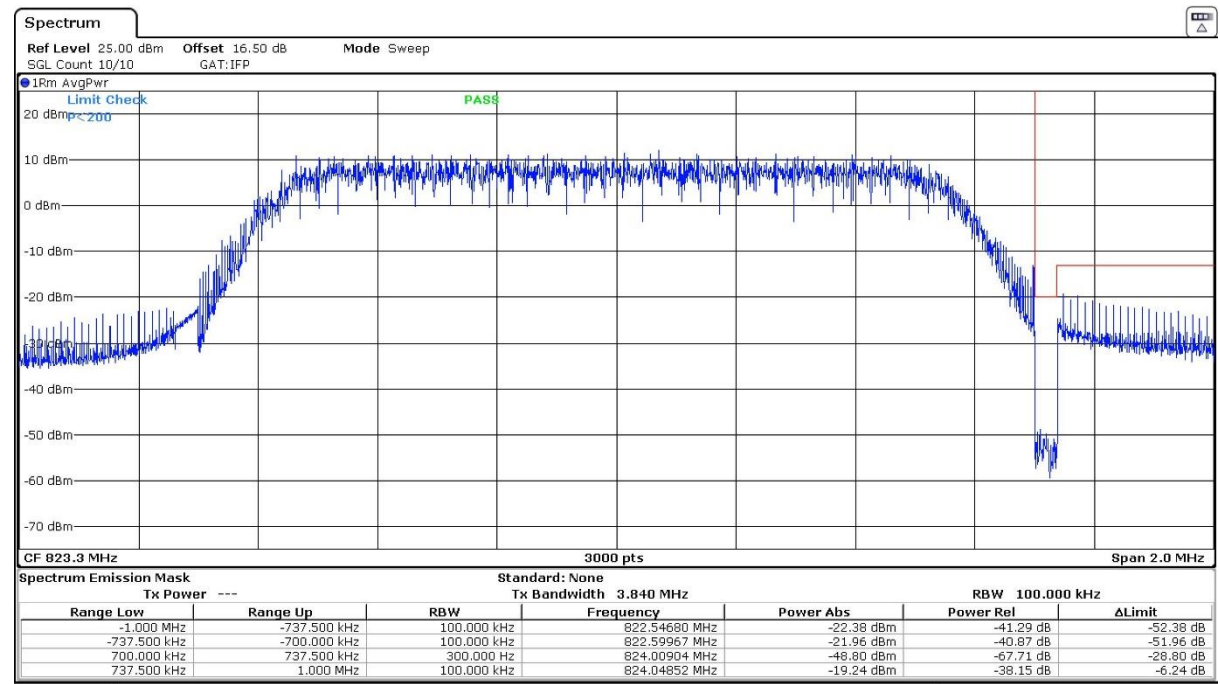
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

Narrow band = 1. RB = All. Offset = 0. BW = 1.4 MHz

CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power
Verdict: PASS