DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29507456

ISED CABid: ES1909
Lab. Company Number: 4621A

Test Report No:
NIE: 72943RRF.006A1

Partial Test Report

USA FCC 15.31(h), 15.209, 15.247, 27
CANADA RSS-130, RSS-139, RSS-247, RSS-Gen

(*) Identification of item tested	Continuous Positive Airway Pressure (CPAP) Device
(*) Trademark	ResMed
(*) Model and /or type reference	39485
(*) Derived model not tested	39517, 39518, 39519, 39520, 39521, 39522
Other identification of the product	FCC ID: 2ACHL-AIR11M1G22 IC: 9103A-AIR11M1G22
(*) Features	LTE Cat-M1, BLE HW version: R390-7654 SW version: SW04600
Applicant	ResMed Pty Ltd 1 Elizabeth Macarthur Drive Bella Vista, NSW, 2153, Australia
Test method requested, standard	USA FCC Part 15.31(h) (10-1-20 Edition). USA FCC Part 15.247 (10-1-21 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-21 Edition): Radiated emission limits; general requirements. USA FCC Part 27 (10-1-21 Edition). CANADA RSS-247 Issue 2 (Feb. 2017). CANADA RSS-Gen Issue 5 Amendment 1 (Mar. 2019) + Amendment 2 (Feb. 2021). CANADA RSS-130 Issue 2, Feb. 2019. CANADA RSS-139 Issue 3, Jul. 2015. Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018. ANSI C63.10-2013. ANSI C63.26-2015.
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager  2022.12.23 10:30:00 +01'00'
Date of issue	2022-12-23
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 4
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 7
Testing verdicts 9
Summary 9
Appendix A: Test results FCC 27 / RSS-130, RSS-139 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 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.

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.

The total uncertainty of the measurement system for the radiated emissions of EUT from 30 MHz to 1 GHz is: Measurement uncertainty ≤ ±5.35 dB with factor (k = 2).

The total uncertainty of the measurement system for the radiated emissions of EUT from 1 GHz to 17 GHz is: Measurement uncertainty ≤ ±4.32 dB with factor (k = 2).

The total uncertainty of the measurement system for the radiated emissions of EUT from 17 GHz to 26 GHz is: Measurement uncertainty ≤ ±5.51 dB with factor (k = 2).

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 39485 is a Continuous Positive Airway Pressure (CPAP) device with integrated cellular and Bluetooth connectivity.
3. Derived models not tested. These models have been declared by the supplier of the sample as being the same as the model under test.

ResMed
Changing lives with every breath

Date: 25-Oct-2022

DECLARATION OF EQUIVALENCE

This document declares that the following designated products are equivalent to the unit under test **39485**.

Model Name / Product Code	Marketing Name
39517	AirSense 11 AutoSet USA
39518	AirSense 11 CPAP USA
39519	AirSense 11 Elite USA
39520	AirSense 11 AutoSet CAN
39521	AirSense 11 CPAP CAN
39522	AirSense 11 Elite CAN

All the above stated products and the unit under test - 39485 have the same cellular hardware and firmware.

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

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

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.

Id	Control Number	Description	Model	Serial No.	Date of Reception	Application
S/01	72943_46.1	Continuous Positive Airway Pressure Device	39485	22221830061	2022-09-19	Equipment Under Test
S/01	66427_6.1	Climate line	AIR11		2020-12-29	Equipment Under Test
S/01	72943_10.1	Water tank	HumidAir11	--	2022-08-02	Equipment Under Test
S/01	72943_18.1	AC/DC adapter	390000	0001RP02	2022-08-02	Equipment Under Test
S/01	72943_25.1	Power cord1	--	--	2022-08-02	Equipment Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Sample for radiated test

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 2.0A	☒	☐	☐	☒	☐
	☒	AC: 115V~400Hz 1.5A	☒	☐	☐	☒	☐
	☐	DC: 12V (DC-DC for Vehicle Use)					
	☐	DC: 24V (DC-DC for Vehicle Use)					
Rated Power..... :	--						
Clock frequencies..... :	N/A						
Other parameters ..... :	390000 (PSU Model Number)						
Software version..... :	SW04600 (DUT)						
Hardware version ..... :	R390-7654 (DUT)						
Dimensions in cm (W x H x D) ... :	138.5 mm x 259.4 mm x 94.5 mm						
Mounting position ..... :	☒	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☐	Other:					
Modules/parts..... :	Module/parts of test item		Type		Manufacturer		
	Wireless Module		EXS62-W		Thales		
	Bluetooth LE		EFR32BG22		SiLabs		
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

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)	2022-10-07
Date (finish)	2022-10-07

Document history

Report number	Date	Description
72943RRF.006	2022-11-25	First release.
72943RRF.006A1	2022-12-23	Second release. This report is modified due to minor typos. This modification test report cancels and replaces the test report 72943RRF006

Environmental conditions

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

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

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

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

Remarks and comments

The tests have been performed by the technical personnel: Miguel Manuel López.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
6791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	2024-06-07
6793	SHIELDED ROOM	S101	ETS LINDGREN	N/A
7817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2023-12-30
6496	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK	2023-08-24
4657	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2023-05-05
6143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2023-10-29
8856	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2023-11-02
3783	PRE-AMPLIFIER G>30dB 1GHz-18GHz	BLMA 0118-3A	BONN ELEKTRONIK	2022-12-01
6142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2023-06-16
4609	AC POWER SUPPLY	6490	CHROMA	2022-12-11
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

FCC 15, FCC 27 / RSS-130, RSS-139, RSS-247, RSS-Gen			
Requirement – Test case		**Verdict**	**Remark**
FCC 15.31 (h) FCC 15.247 (d), FCC 15.209 (a) FCC 27.53 RSS-247 5.5, RSS-Gen 8.9 RSS-130 4.7, RSS-139 6.6	Transmitter out of band radiated emissions with simultaneous transmissions	P	(1)
Supplementary information and remarks: (1) Only Simultaneous Transmission radiated spurious emissions test was requested.			

Appendix A: Test results. FCC 27 / RSS-130, RSS-139

INDEX

TEST CONDITIONS 12
Transmitter out of band radiated emissions with simultaneous transmissions 13

TEST CONDITIONS

(*): Declared by the Applicant.

POWER SUPPLY (*):

Vnormal: Preliminary scan determined 115Vac / 60Hz as worst case of power supply.

Type of Power Supply: Mains Supply.

ANTENNA (*):

Type of Bluetooth LE Antenna: Internal.

Type of Cellular Antenna: Internal (ceramic).

TEST FREQUENCIES (*):

	Cellular LTE Cat-M1	
Band:	LTE Band 12	
Frequency Range:	699 – 716 MHz	
Transmit Channel:	Channel	Channel Frequency
	High: 23155	713.5 MHz (BW 5 MHz, RB Size 1, RB Offset 0, Narrow Band=0, QPSK)
Band:	LTE Band 66	
Frequency Range:	1710 – 1780 MHz	
Transmit Channel:	Channel	Channel Frequency (MHz)
	Middle: 132322	1745 MHz (BW 20 MHz, RB Size 1, RB Offset 0, Narrow Band=0, 16QAM)

	Bluetooth LE	
Mode:	GFSK	
Channel Spacing:	1 MHz	
Frequency Range:	2400 MHz to 2483.5 MHz	
Transmit Channel:	Channel	Channel Frequency (MHz)
	Low	2402

The test set-up was made in accordance to the general provisions of FCC DTS Measurement 558074 D01 DTS Meas Guidance v05r02 dated April 2, 2019.

During transmitter test the EUT was being controlled by the SW tool to operate in a continuous transmit mode on the Bluetooth LE test channel as required. An auxiliary signalling unit was used to establish a cellular link and control the EUT to operate in a continuous transmission mode on the channel and configuration as required.

Selected Transmission Modes for each Radio:

The next configurations were selected based on preliminary testing that identified these settings as the worst cases:

* Cellular LTE Cat-M1:

Transmitter radiated spurious emissions tests were performed with the EUT transmitting in
Cellular LTE Cat-M1 Band 12, BW 5 MHz, RB Size 1, RB Offset 0, Narrow Band=0, QPSK, High Channel configuration, and
Cellular LTE Cat-M1 Band 66, BW 20 MHz, RB Size 1, RB Offset 0, Narrow Band=0, 16QAM, Middle Channel configuration

These channels and configurations were found to transmit higher EIRP than all the other LTE Cat-M1 channels.

* Bluetooth Low Energy:

Transmitter radiated spurious emissions tests were performed with the EUT transmitting in Bluetooth Low Energy, GFSK 1Mbps, Low Channel configuration.

Tested Simultaneous Transmission Modes:

*** Cellular LTE Cat-M1 Band 12, Bluetooth Low Energy**, with the EUT configured to simultaneously transmit the following signals at maximum output power: Cellular LTE Cat-M1 Band 12 QPSK / High Channel and Bluetooth Low Energy GFSK 1 Mbps / Low Channel.

*** Cellular LTE Cat-M1 Band 66, Bluetooth Low Energy**, with the EUT configured to simultaneously transmit the following signals at maximum output power: Cellular LTE Cat-M1 Band 66 16QAM / Middle Channel and Bluetooth Low Energy GFSK 1 Mbps / Low Channel.

Transmitter out of band radiated emissions with simultaneous transmissions

Limits

Bluetooth Low Energy

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table, specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required.

LTE Band 12

FCC §27.53 (g):

> For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

RSS-130 Clause 4.7.1:

> The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB.

LTE Band 66

FCC §27.53 (h). RSS-139, Clause 6.6:

> For operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater.

Method

The measurement was performed with the EUT inside an anechoic chamber.

The spectrum was scanned from 9 kHz to at least the 10th harmonic of the highest frequency of radios configured to transmit simultaneously.

The EUT was placed on a non-conductive stand at 3-meter distance from the measuring antenna for the frequency range 30 MHz to 17 GHz. Measurement distance is reduced to 1.5 meters for frequencies above 17 GHz.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded.

The field strength is calculated by adding a correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

For radiated emissions measurements above 17 GHz performed at a distance closer than the distance specified in the standard, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

These measurements have been performed in order to check the impact of the simultaneous transmission of all radio interfaces (that can transmit simultaneously).

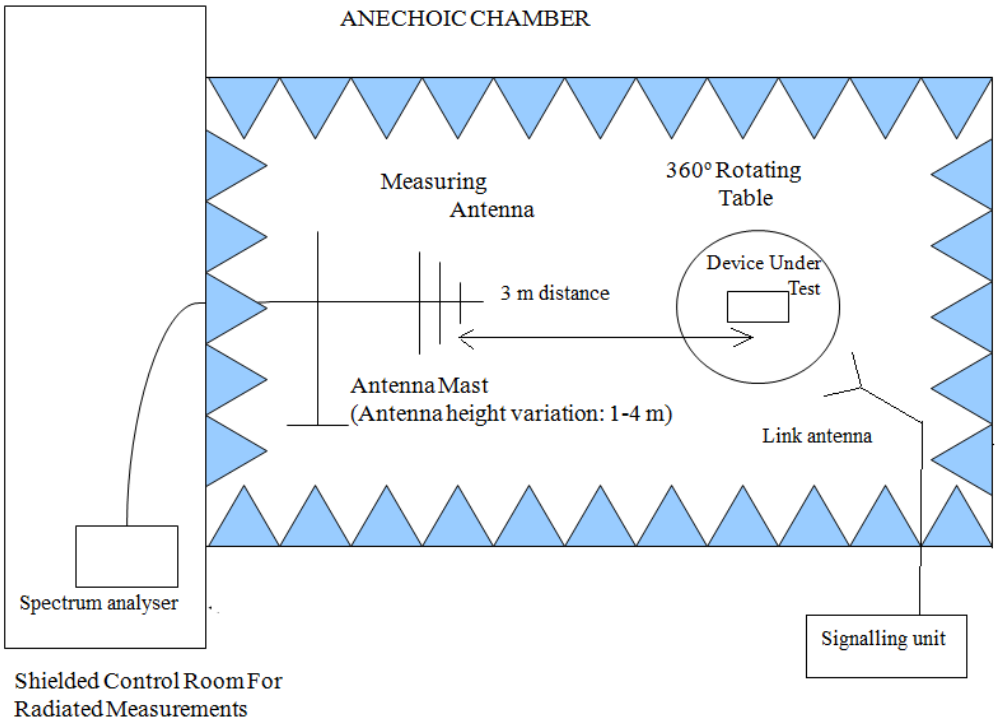
Cellular Measurement Limit:

At Po transmitting power, the specified minimum attenuation becomes 43+10 log (Po), and the level in dBm relative Po becomes:

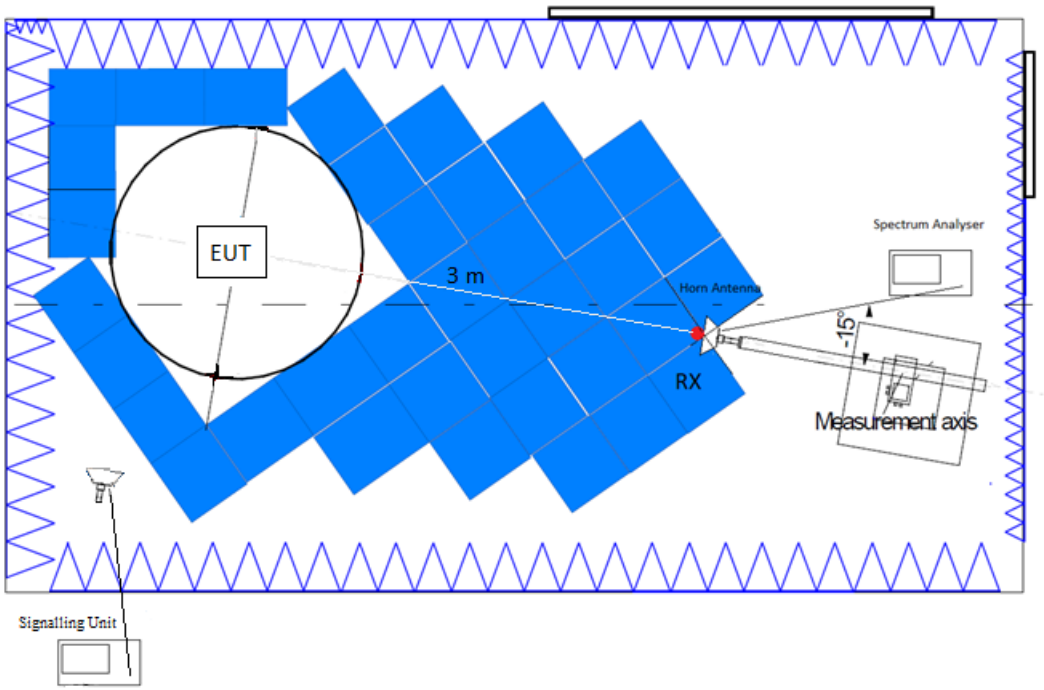
$$Po\ (dBm) – [43 + 10 \log (Po\ in\ mwatts) - 30] = -13\ dBm$$

Test setup

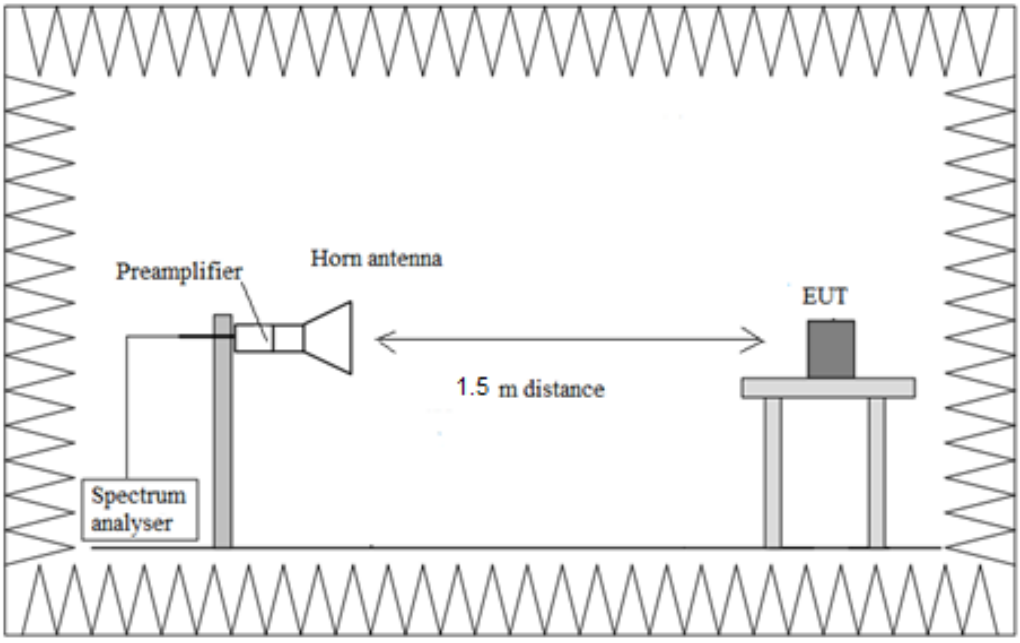
Radiated measurements below 1 GHz:



Radiated measurements between 1 GHz and 17 GHz:



Radiated measurements above 17 GHz:



Results

Simultaneous Transmission mode Cellular LTE Cat-M1 Band 12, Bluetooth Low Energy.

LTE Cat-M1 Band 12: High Channel (713.5 MHz). QPSK, BW 5 MHz, RB Size 1, RB Offset 0, Narrow Band=0

Bluetooth Low Energy: Low Channel (2402 MHz). GFSK 1 Mbps.

The limit of the test is determined by:

Frequency Range	Detector	Limit at 3m (dBµV/m)
30 MHz to 8 GHz	Peak	43 + 10 log (P) dB = -13 dBm → 82.23 dBµV/m
8 GHz to 26 GHz	Peak	74 dBµV/m
8 GHz to 26 GHz	Average	54 dBµV/m (*)

(*) Radiated emissions which fall in the restricted bands, as defined in §15.205(a).

Frequency range 30 MHz - 1 GHz:

No spurious frequencies at less than 20 dB below the limit.

Frequency range 1 - 26 GHz:

Spurious frequencies at less than 20 dB below the limit:

Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[17,26]	21615.50000	56.26	H	Peak

Verdict

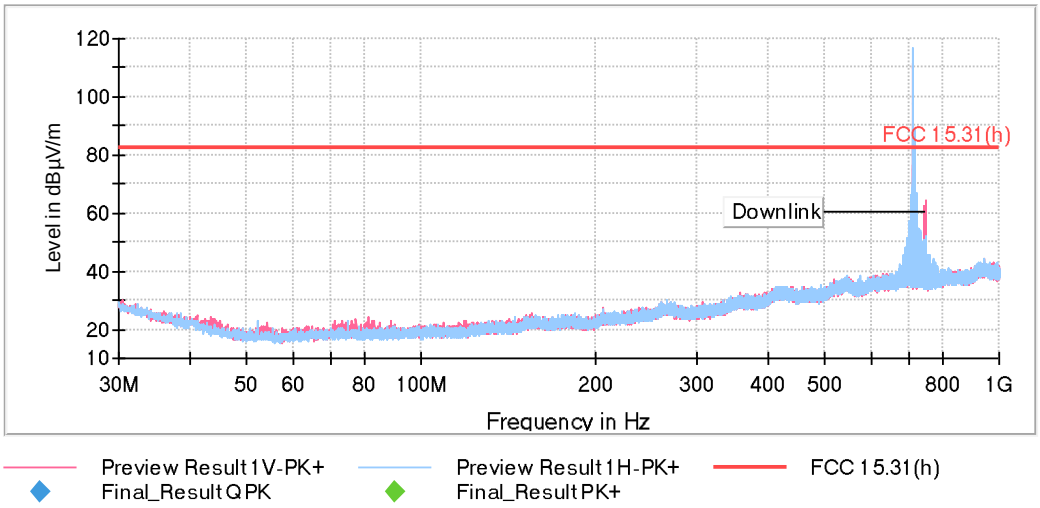
Pass

Attachments

Measurement settings:

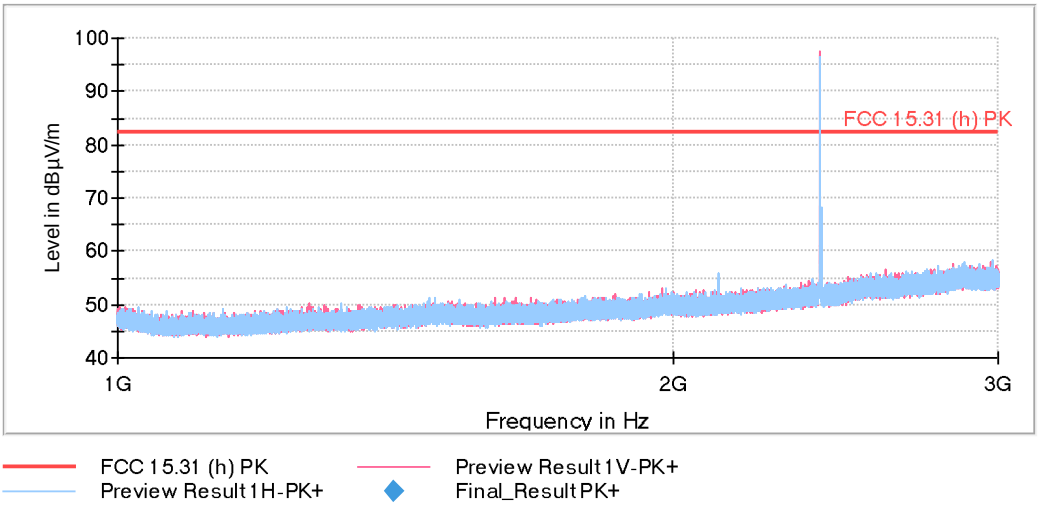
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44]					
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB
Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [ESW 44]					
1 GHz - 3 GHz	30,769 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [ESW 44]					
3 GHz - 17 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	30 dB
Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [ESW 44]					
17 GHz - 26 GHz	300 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

FREQUENCY RANGE 30 MHz - 1 GHz:



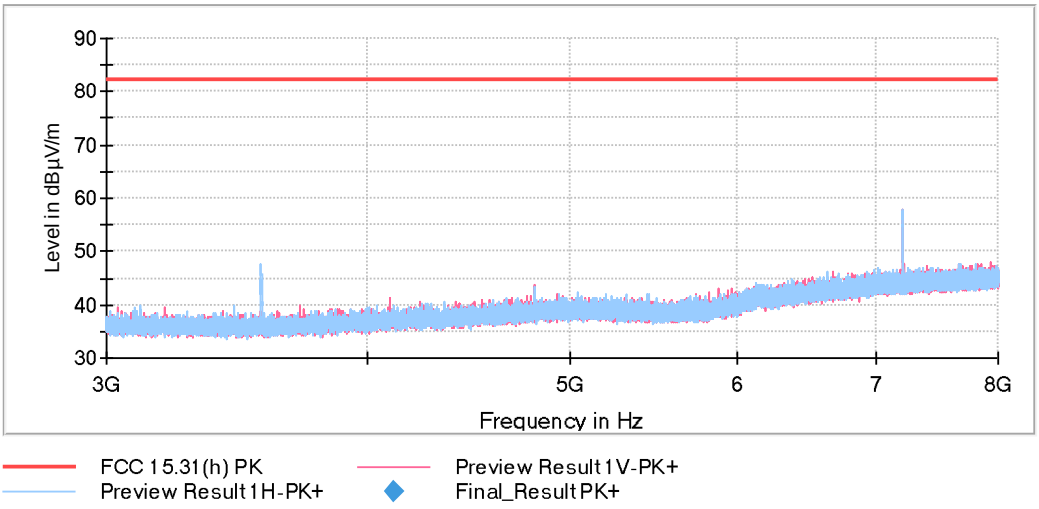
The peak above the limit is the carrier frequency LTE Cat-M1 Band 12 (713.5 MHz).

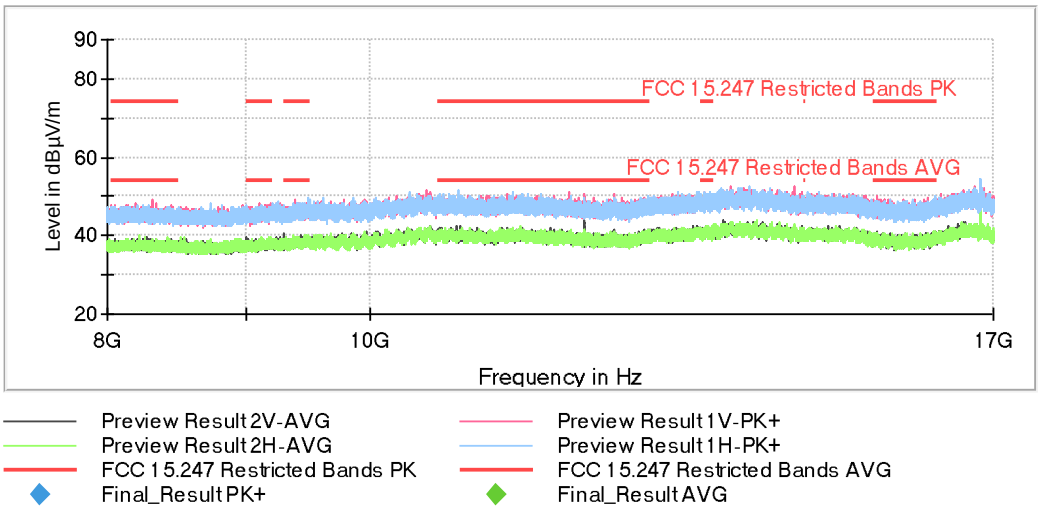
FREQUENCY RANGE 1 - 3 GHz:



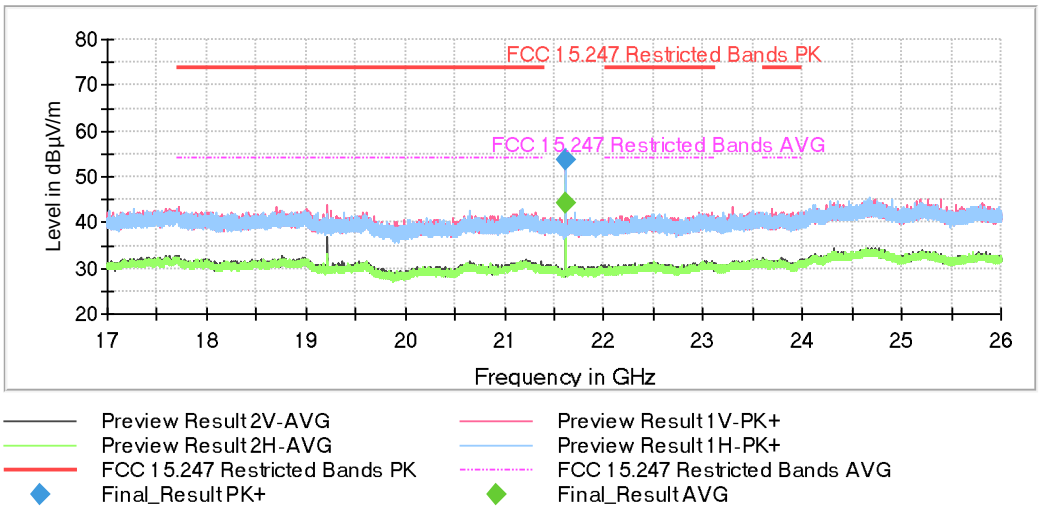
The peak above the limit is the carrier frequency Bluetooth Low Energy (2402 MHz).

FREQUENCY RANGE 3 - 17 GHz:





FREQUENCY RANGE 17 - 26 GHz:



Simultaneous Transmission mode Cellular LTE Cat-M1 Band 66, Bluetooth Low Energy.

LTE Cat-M1 Band 12: Middle Channel (1745 MHz). 16QAM, BW 20 MHz, RB Size 1, RB Offset 0, Narrow Band=0

Bluetooth Low Energy: Low Channel (2402 MHz). GFSK 1 Mbps.

The limit of the test is determined by:

Frequency Range	Detector	Limit at 3m (dBµV/m)
30 MHz to 18 GHz	Peak	43 + 10 log (P) dB = -13 dBm → 82.23 dBµV/m
18 GHz to 26 GHz	Peak	74 dBµV/m
18 GHz to 26 GHz	Average	54 dBµV/m (*)

(*) Radiated emissions which fall in the restricted bands, as defined in §15.205(a).

Frequency range 30 MHz - 1 GHz:

No spurious frequencies at less than 20 dB below the limit.

Frequency range 1 - 26 GHz:

Spurious frequencies at less than 20 dB below the limit:

Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[17, 26]	21620.00000	56.59	H	Peak

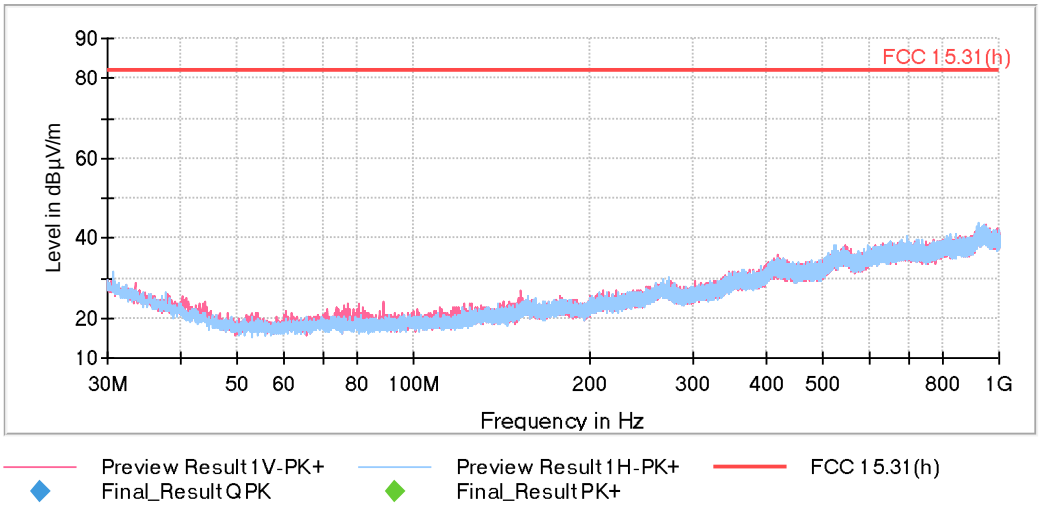
Verdict
Pass

Attachments

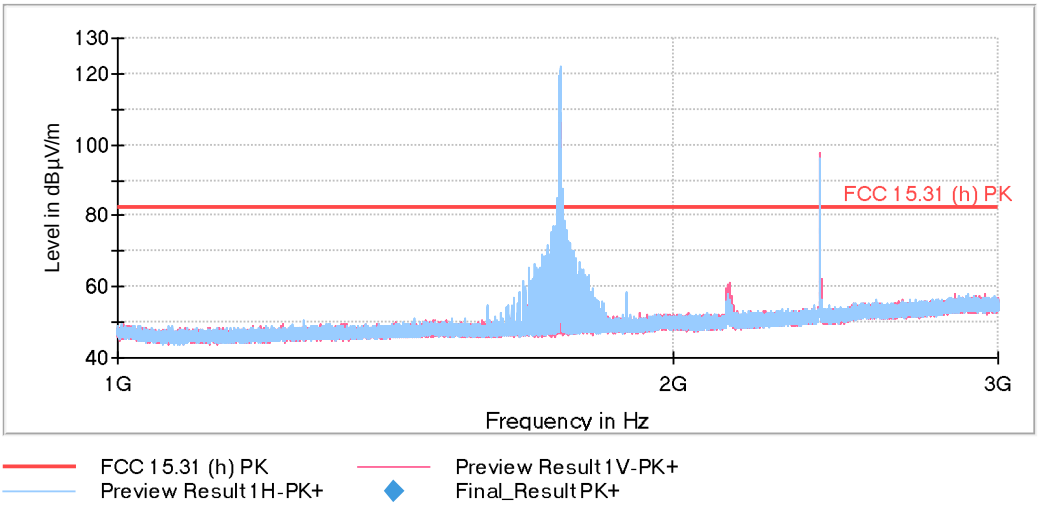
Measurement settings:

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44]					
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB
Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [ESW 44]					
1 GHz - 3 GHz	30,769 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [ESW 44]					
3 GHz - 17 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	30 dB
Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [ESW 44]					
17 GHz - 26 GHz	300 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

FREQUENCY RANGE 30 MHz - 1 GHz:



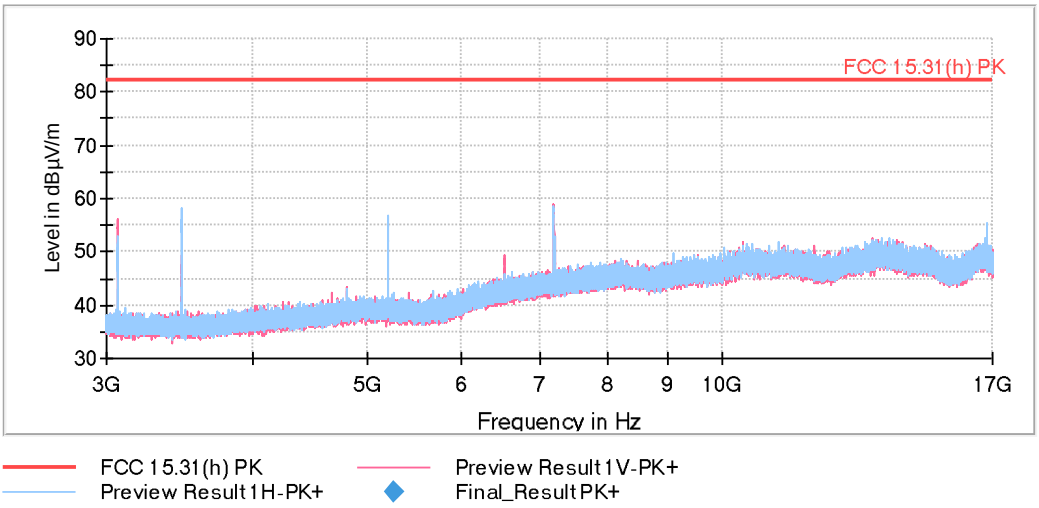
FREQUENCY RANGE 1 - 3 GHz:



The peak on the left above the limit is the carrier frequency LTE Cat-M1 Band 66 (1745 MHz).

The peak on the right above the limit is the carrier frequency Bluetooth Low Energy (2402 MHz).

FREQUENCY RANGE 3 - 17 GHz:



FREQUENCY RANGE 17 - 26 GHz: