

Test Report No:
NIE: 72146RRF.004A1

Partial Test Report

USA FCC Part 90

(*) Identification of item tested	CPAP Device
(*) Trademark	ResMed
(*) Model and /or type reference	37089
(*) Derived model not tested	37158, 37159, 37160, 37161, 37162, 37163, 37164, 37165
Other identification of the product	HW version: R379-7135 SW version: SX558 FCC ID: 2ACHL-AIR104GU IC: 9103A-AIR104GU
(*) Features	4G, 3G, 2G
Applicant	ResMed Pty Ltd 1 Elizabeth Macarthur Drive, Bella Vista, NSW, 2153, Australia
Test method requested, standard	USA FCC Part 90 (10-1-20 Edition). ANSI C63.26-2015. ANSI/TIA-603-E: 2016.
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager
Date of issue	2022-10-17
Report template No	FDT08_24 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Testing and Certification 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 a FCC-recognized accredited testing laboratory with 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 has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification 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 at the time of performance of the test.

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The results presented in this Test Report apply only to the particular item under test established in this document.

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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.
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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 37089 is a CPAP device with integrated cellular 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.



Date: 13-May-2022

DECLARATION OF EQUIVALENCE

This document declares that the following designated products are equivalent to the unit under test 37089.

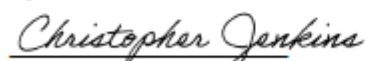
Model Name / Product Code	Marketing Name
37158	AirSense 10 CPAP
37159	AirSense 10 Elite
37160	AirSense 10 AutoSet
37161	AirSense 10 AutoSet FH
37162	AirCurve 10 ASV
37163	AirCurve 10 S
37164	AirCurve 10 VAuto
37165	AirCurve 10 ST

All the above stated products 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: Associate 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.

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

Control N°	Description	Model	Serial N°	Date of reception
72146/001	CPAP Device	37089 AirSense 10	22221362833	2022/05/09
72146/008	Water tub	--	--	2022/05/09
72146/009	Air tube	--	--	2022/05/09
72146/010	AC/DC Adapter	370006	--	2022/05/09
72146/011	Power Cord	--	--	2022/05/09

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

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

Control N°	Description	Model	Serial N°	Date of reception
72146/007	CPAP Device	37089 AirSense 10	22221362874	2022/05/09
72146/008	Water tub	--	--	2022/05/09
72146/009	Air tube	--	--	2022/05/09
72146/010	AC/DC Adapter	370006	--	2022/05/09
72146/011	Power Cord	--	--	2022/05/09

Sample S/02 has undergone the following test(s): The Conducted 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, 50–60Hz 1.0–1.5A	☐	☐	☐	☐	☐
	☒	AC: 115V, 400Hz 1.5A, (aircraft)	☐	☐	☐	☐	☐
	☒	DC: 24V, 90W (DC-DC Converter)					
☐	DC:						
Rated Power.....:	53W (57VA) - Typical, 104W (108VA) – Peak						

Clock frequencies..... :	N/A		
Other parameters	-		
Software version..... :	SX558		
Hardware version	R379-7135		
Dimensions in cm (W x H x D) ... :	255 mm X 116 mm X 150 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
	Cellular Module (4G, 3G, 2G)		LARA-R6001
Accessories (not part of the test item)	Description		Type
	-		-
Documents as provided by the applicant	Description		File name
	-		-
	-		-

⁽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)	2022-05-27
Date (finish)	2022-10-13

Document history

Report number	Date	Description
72146RRF.004	2022-08-26	First release.
72146RRF.004A1	2022-10-17	First modification: update of typos. This modification test report cancels and replaces the test report 72146RRF.004s.

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 semianechoic 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: Rafael Fernández, Alfonso Gutiérrez.

Used instrumentation:

Conducted Measurements

		Last Calibration	Due Calibration
1.	Shielded Room ETS LINDGREN S101	N/A	N/A
2.	Wideband Radio Communication Tester ROHDE AND SCHWARZ CMW500	2021/09	2023/09
3.	Wideband Radio Communication Tester ROHDE AND SCHWARZ CMW500	2022/05	2023/05

Radiated Measurements

		Last Calibration	Due Calibration
1.	Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N/A	N/A
2.	Shielded Room ETS LINDGREN S101	N/A	N/A
3.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2020/10	2023/10
4.	Horn Antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2020/08	2023/08
5.	RF Preamplicifier G>30dB, 1-18GHz BONN ELEKTRONIK BLMA 0118-3A	2021/12	2022/12
6.	EMI Test Receiver 2Hz-44GHz, ROHDE AND SCHWARZ ESW44	2021/12	2023/12
7.	Wideband Radio Communication Tester ROHDE AND SCHWARZ CMW500	2021/09	2023/09
8.	EMC/RF Testing SW ROHDE AND SCHWARZ EMC32	N/A	N/A

Testing verdicts

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

Summary

FCC PART 90 PARAGRAPH		
Requirement – Test case	Verdict	Remark
Clause 90.542 (a) (7): RF Output Power	P	
Clause 2.1047: Modulation Characteristics	N/M	(1)
Clause 90.539: Frequency Stability	N/M	(1)
Clause 2.1049: Occupied Bandwidth	N/M	(1)
Clause 90.543 (e) (2) (3) & (5): Spurious Emissions at Antenna Terminals	P	
Clause 90.543 (e) (2) (3) & (f): Radiated Emissions	P	
<u>Supplementary information and remarks:</u>		
(1) Test not requested.		

Appendix A: Test results for FCC 22, 90

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TEST CONDITIONS

POWER SUPPLY (*):

Vnormal: 24 Vdc

Type of Power Supply: AC-DC Adapter.

ANTENNA (*):

Band	Gain (dBi)	Type
LTE 26	1.71	Ceramic SMT Antenna

(*): Declared by the Applicant.

TEST FREQUENCIES:

LTE Band 26 sub-band 814-824 MHz. QPSK and 16QAM modulations:

	Channel (Frequency, MHz)				
	BW=1.4 MHz	BW=3 MHz	BW=5 MHz	BW=10 MHz	BW=15 MHz
Low	26697 (814.7)	26705 (815.5)	26715 (816.5)	N/A	N/A
Middle	26740 (819)	26740 (819)	26740 (819)	26740 (819)	N/A
High	26783 (823.3)	26775 (822.5)	26765 (821.5)	N/A	N/A

LTE Band 26 Cross-rule Channel (824 MHz). QPSK and 16QAM modulations:

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 §90.635 (b): 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 CMW500, selecting maximum transmission power of the EUT and different modes of modulation.

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:

1. CONDUCTED AVERAGE POWER:



RESULTS:

1. CONDUCTED AVERAGE POWER.

LTE Band 26 sub-band 814-824 MHz:

LTE Band 26 sub-band 814-824 MHz. QPSK modulation. BW=1.4 MHz.

Channel	Low	High
Maximum declared antenna gain (dBi)	1.71	1.71
Measured maximum average power (dBm) at antenna port	23.99	23.96
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.70	25.67
Maximum effective radiated power E.R.P. (dBm)	23.55	23.52
Measurement uncertainty (dB)	<±0.94	

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 6. RB Offset: 0.

LTE Band 26 sub-band 814-824 MHz. 16QAM modulation. BW=1.4 MHz.

Channel	Low	High
Maximum declared antenna gain (dBi)	1.71	1.71
Measured maximum average power (dBm) at antenna port	22.47	22.74
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	24.18	24.45
Maximum effective radiated power E.R.P. (dBm)	22.03	22.3
Measurement uncertainty (dB)	<±0.94	

Worst case AVERAGE POWER: Modulation 16QAM. RB Size: 1. RB Offset: 0.

LTE Band 26 sub-band 814-824 MHz. QPSK modulation. BW=3 MHz.

Channel	Low	High
Maximum declared antenna gain (dBi)	1.71	1.71
Measured maximum average power (dBm) at antenna port	24.12	23.98
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.83	25.69
Maximum effective radiated power E.R.P. (dBm)	23.68	23.54
Measurement uncertainty (dB)	<±0.94	

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 15. RB Offset: 0.

LTE Band 26 sub-band 814-824 MHz. 16QAM modulation. BW=3 MHz.

Channel	Low	High
Maximum declared antenna gain (dBi)	1.71	1.71
Measured maximum average power (dBm) at antenna port	22.44	22.75
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	24.15	24.46
Maximum effective radiated power E.R.P. (dBm)	22	22.31
Measurement uncertainty (dB)	<±0.94	

Worst case AVERAGE POWER: Modulation 16QAM. RB Size: 1. RB Offset: 14.

LTE Band 26 sub-band 814-824 MHz. QPSK modulation. BW=5 MHz.

Channel	Low	High
Maximum declared antenna gain (dBi)	1.71	1.71
Measured maximum average power (dBm) at antenna port	24.53	24.60
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	26.24	26.31
Maximum effective radiated power E.R.P. (dBm)	24.09	24.16
Measurement uncertainty (dB)	<±0.94	

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 25. RB Offset: 0.

LTE Band 26 sub-band 814-824 MHz. 16QAM modulation. BW=5 MHz.

Channel	Low	High
Maximum declared antenna gain (dBi)	1.71	1.71
Measured maximum average power (dBm) at antenna port	22.53	22.79
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	24.24	24.5
Maximum effective radiated power E.R.P. (dBm)	22.09	22.35
Measurement uncertainty (dB)	<±0.94	

Worst case AVERAGE POWER: Modulation 16QAM. RB Size: 1. RB Offset: 24.

LTE Band 26 sub-band 814-824 MHz. QPSK modulation. BW=10 MHz.

Channel	Middle
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	24.62
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	26.33
Maximum effective radiated power E.R.P. (dBm)	24.18
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 1. RB Offset: 24.

LTE Band 26 sub-band 814-824 MHz. 16QAM modulation. BW=10 MHz.

Channel	Middle
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	24.01
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.72
Maximum effective radiated power E.R.P. (dBm)	23.57
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation 16QAM. RB Size: 1. RB Offset: 24.

LTE Band 26 Cross-rule Channel 824 MHz:

LTE Band 26 Cross-rule Channel 824 MHz. QPSK modulation. BW=1.4 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	24.04
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.75
Maximum effective radiated power E.R.P. (dBm)	23.60
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 1. RB Offset: 0.

LTE Band 26 Cross-rule Channel 824 MHz. 16QAM modulation. BW=1.4 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	23.72
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.43
Maximum effective radiated power E.R.P. (dBm)	23.28
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation 16QAM. RB Size: 1. RB Offset: 0.

LTE Band 26 Cross-rule Channel 824 MHz. QPSK modulation. BW=3 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	23,80
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.51
Maximum effective radiated power E.R.P. (dBm)	23.36
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 1. RB Offset: 0.

LTE Band 26 Cross-rule Channel 824 MHz. 16QAM modulation. BW=3 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	23.38
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.09
Maximum effective radiated power E.R.P. (dBm)	22.94
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation 16QAM. RB Size: 1. RB Offset: 0.

LTE Band 26 Cross-rule Channel 824 MHz. QPSK modulation. BW=5 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	24.01
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.72
Maximum effective radiated power E.R.P. (dBm)	23.57
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 1. RB Offset: 12.

LTE Band 26 Cross-rule Channel 824 MHz. 16QAM modulation. BW=5 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	22.54
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	24.25
Maximum effective radiated power E.R.P. (dBm)	22.10
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation 16QAM. RB Size: 1. RB Offset: 0.

LTE Band 26 Cross-rule Channel 824 MHz. QPSK modulation. BW=10 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	23.89
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.60
Maximum effective radiated power E.R.P. (dBm)	23.45
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 1. RB Offset: 0.

LTE Band 26 Cross-rule Channel 824 MHz. 16QAM modulation. BW=10 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	23.58
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.29
Maximum effective radiated power E.R.P. (dBm)	23.14
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation 16QAM. RB Size: 1. RB Offset: 0.

LTE Band 26 Cross-rule Channel 824 MHz. QPSK modulation. BW=15 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	23.97
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.68
Maximum effective radiated power E.R.P. (dBm)	23.53
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 1. RB Offset: 0.

LTE Band 26 Cross-rule Channel 824 MHz. 16QAM modulation. BW=15 MHz.

Channel	824 MHz
Maximum declared antenna gain (dBi)	1.71
Measured maximum average power (dBm) at antenna port	23.39
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	25.10
Maximum effective radiated power E.R.P. (dBm)	22.95
Measurement uncertainty (dB)	<±0.94

Worst case AVERAGE POWER: Modulation QPSK. RB Size: 1. RB Offset: 0.

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.

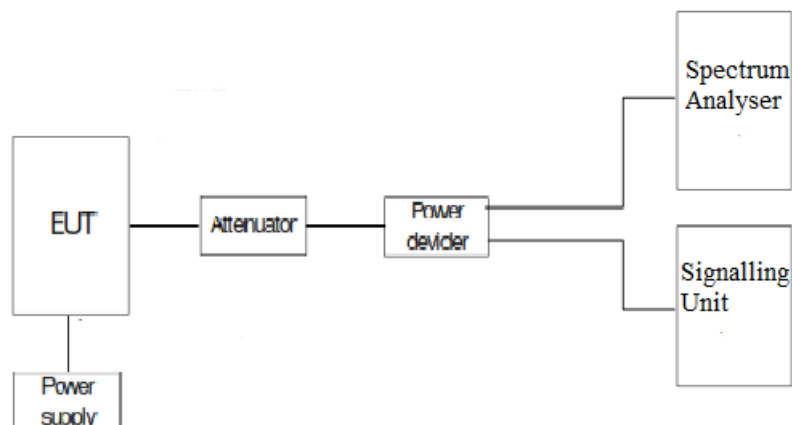
Measurement Limit:

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

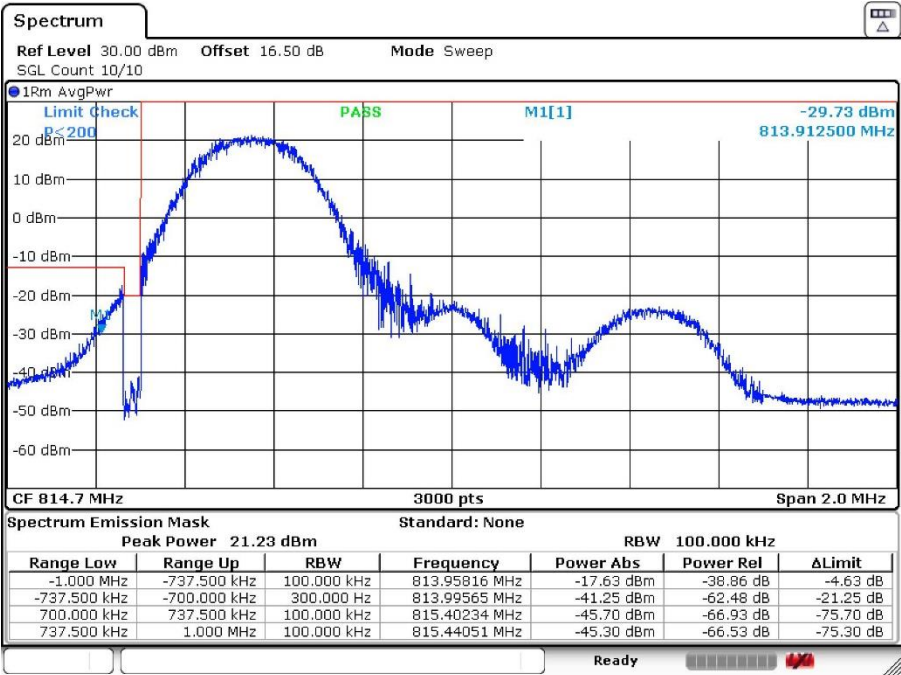


RESULTS (see plots in next pages)

814-824MHz Band “EA MASK”:

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

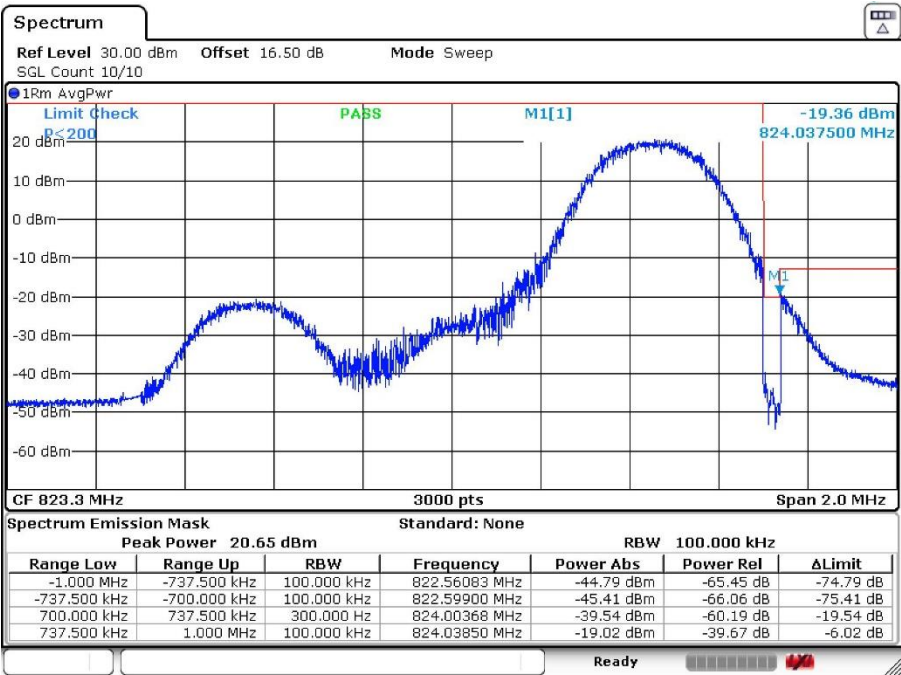
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

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

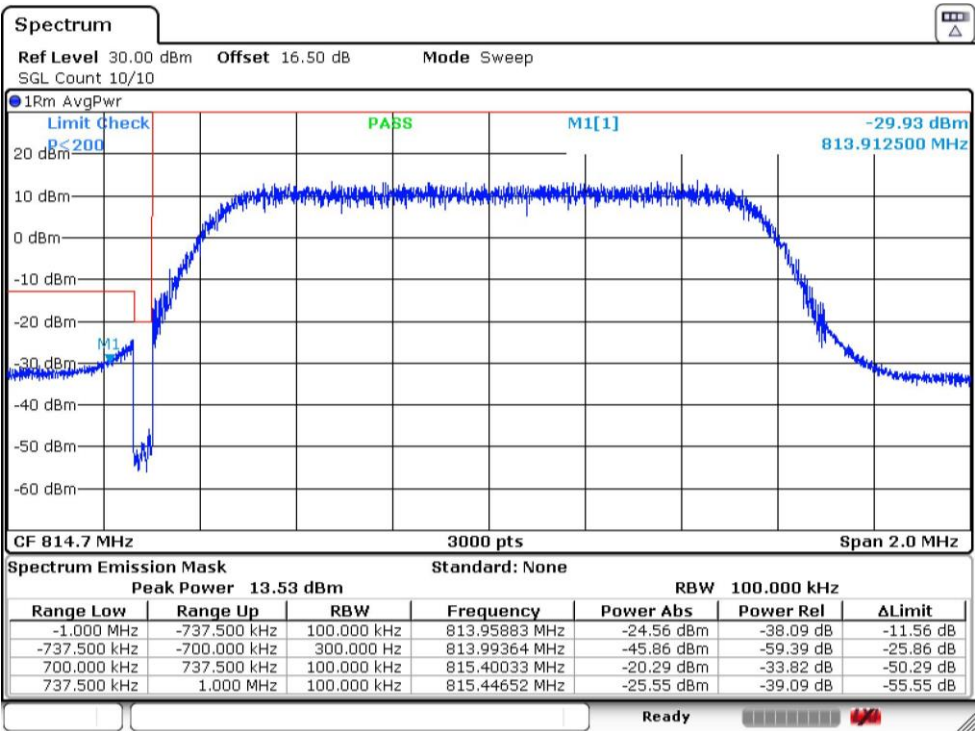
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

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

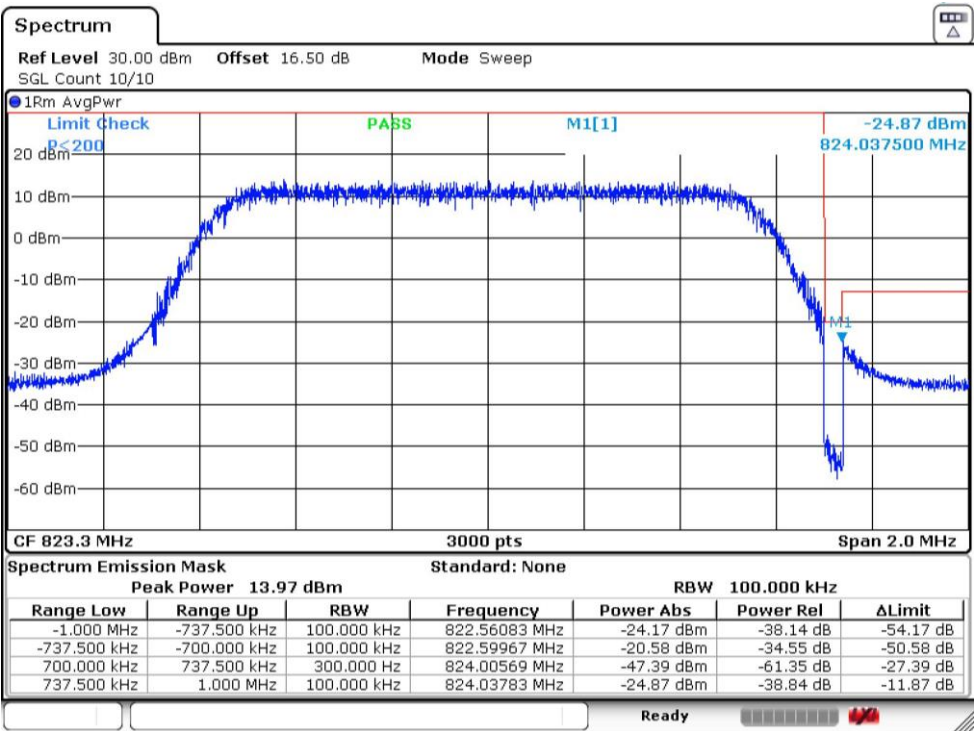
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

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

CHANNEL HIGHEST



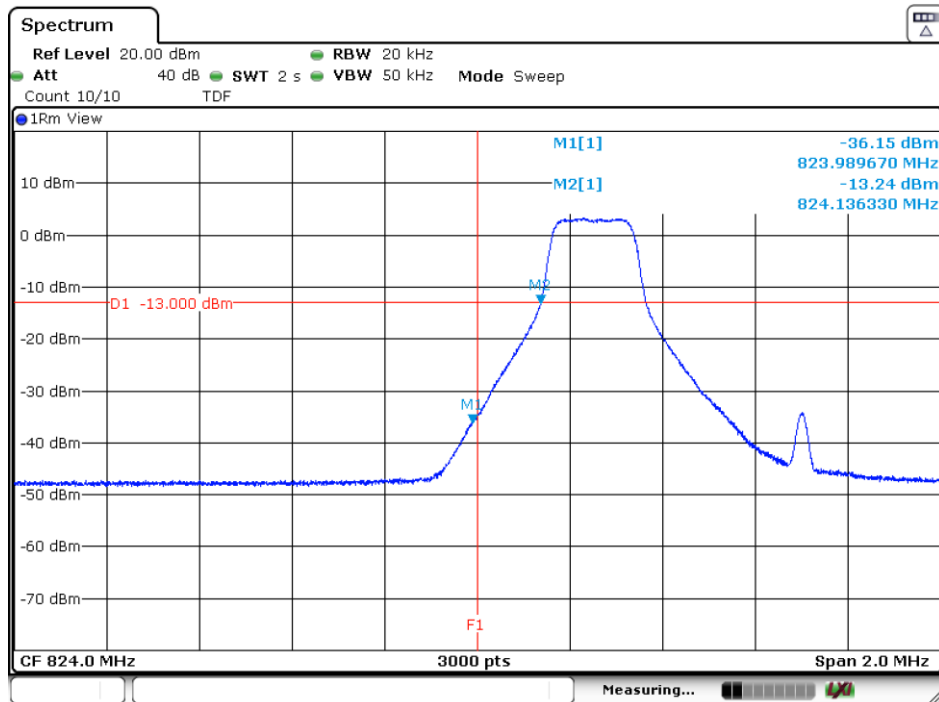
NOTE: The equipment transmits at the maximum output power

Verdict: PASS

824-849MHz Band “EA MASK”:

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

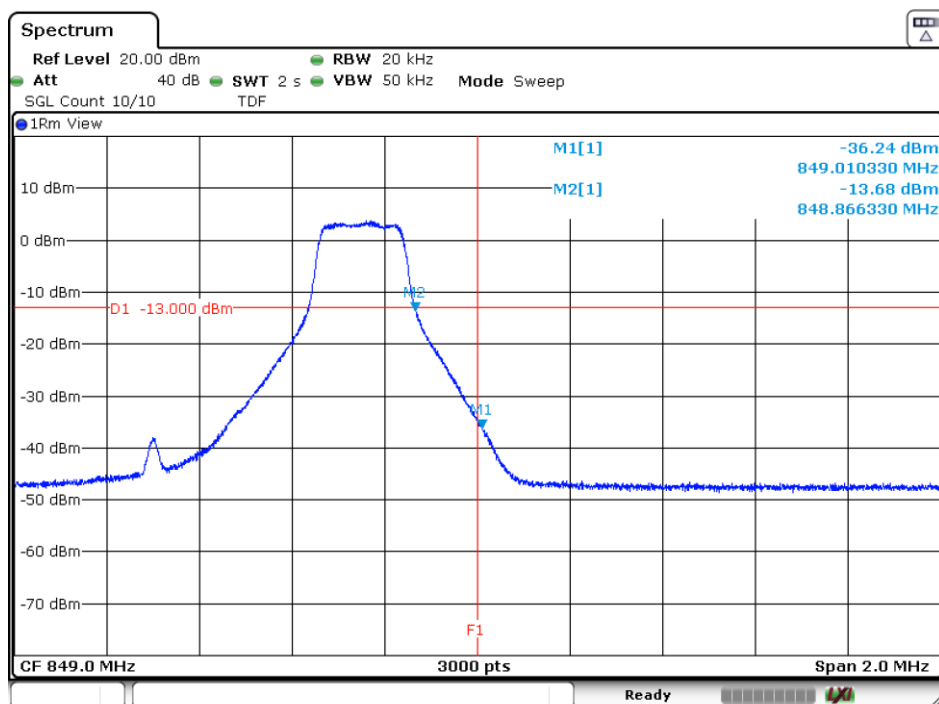
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

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

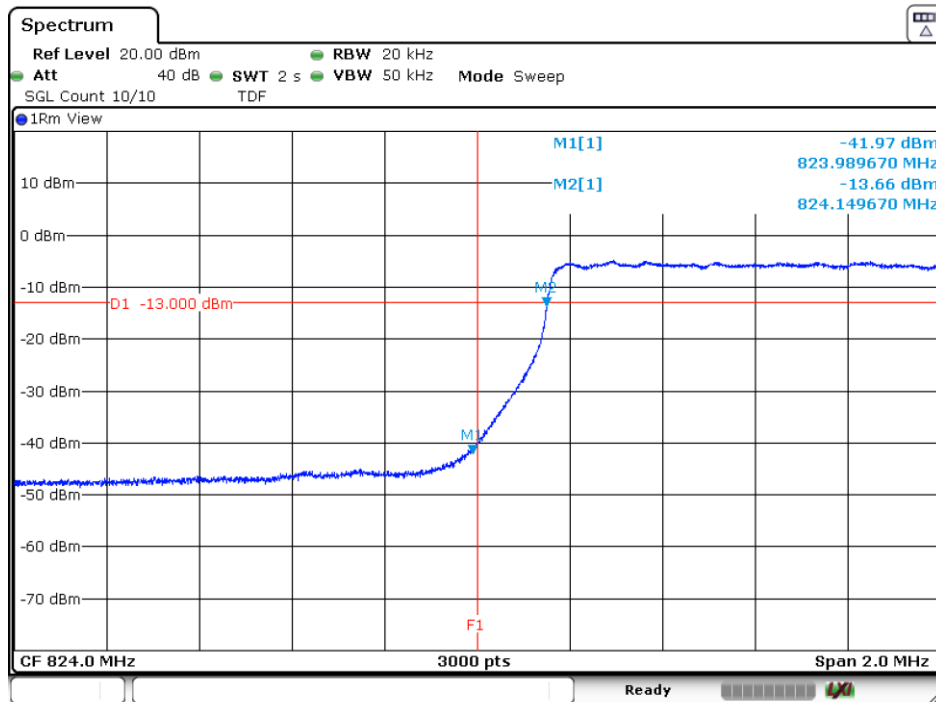
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

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

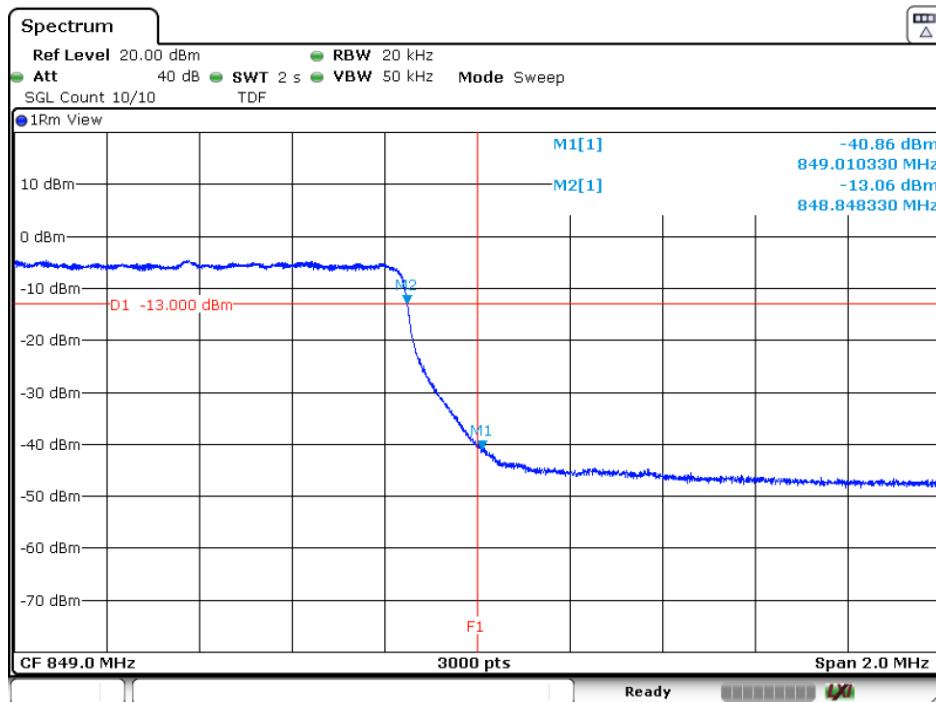
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

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

CHANNEL HIGHEST



Date: 13.OCT.2022 12:57:30

NOTE: The equipment transmits at the maximum output power

Verdict: PASS

Radiated emissions

SPECIFICATION:

FCC §90.691:

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 measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.

The EUT was placed on a 1 meter high non-conductive stand at a 3 meter distance from the measuring antenna. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the height and polarization of the measuring antenna. The maximum meter reading was recorded.

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:

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

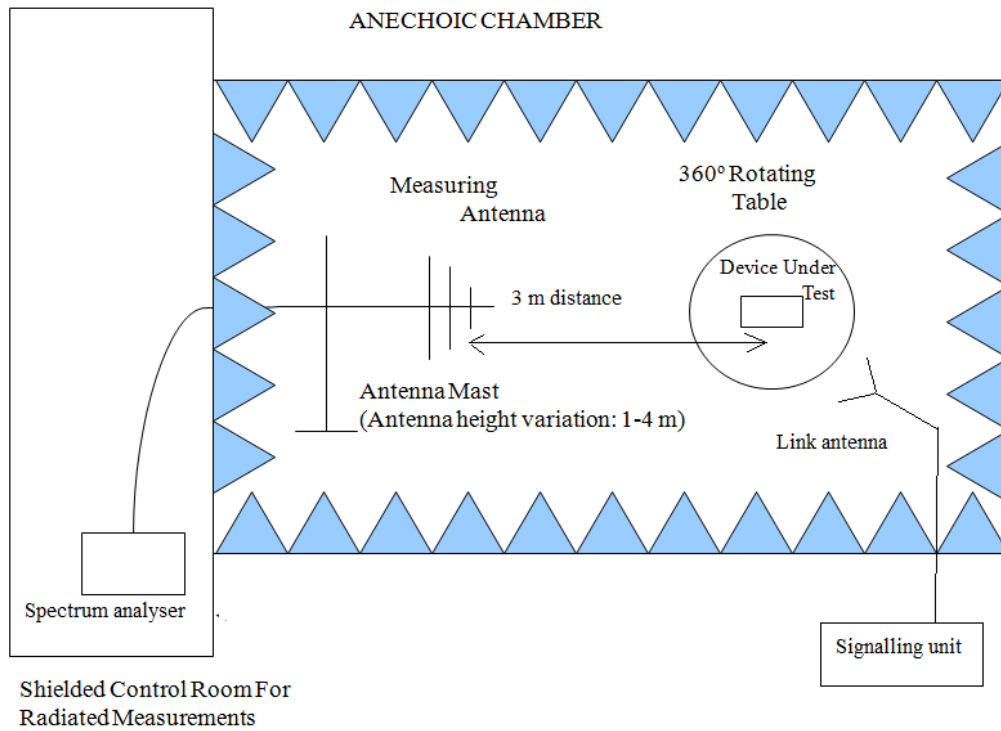
The maximum field strength (dBμV/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

$$\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \log(D) - 104.8; \text{ where } D \text{ is the measurement distance (in the far field region) in m. } D = 3 \text{ m}$$

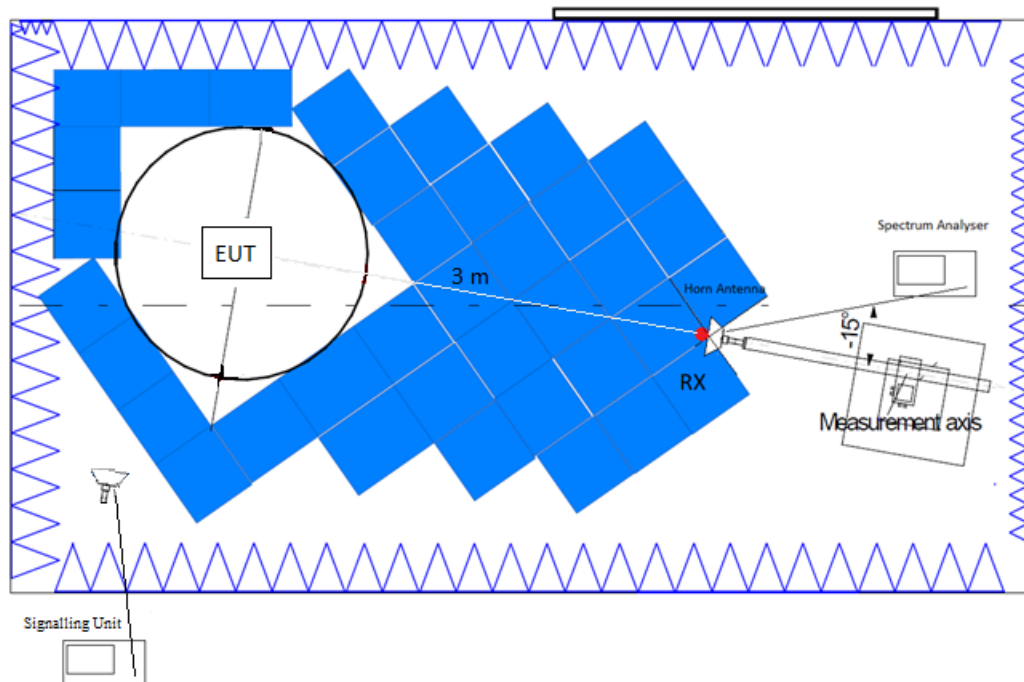
A resolution bandwidth / video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

TEST SETUP:

Radiated measurements below 1 GHz:



Radiated measurements above 1 GHz:



RESULTS:

LTE Band 26 sub-band 814-824 MHz:

QPSK and 16QAM modulations:

A preliminary scan determined the 16QAM modulation, BW=10 MHz, RB Size=1, RB Offset=24, Narrowband=0 as the worst case. The following tables and plots show the results for the worst case modulation.

- MIDDLE CHANNEL:

Frequency range 30 MHz - 1 GHz:

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

Frequency range 1 - 8.5 GHz:

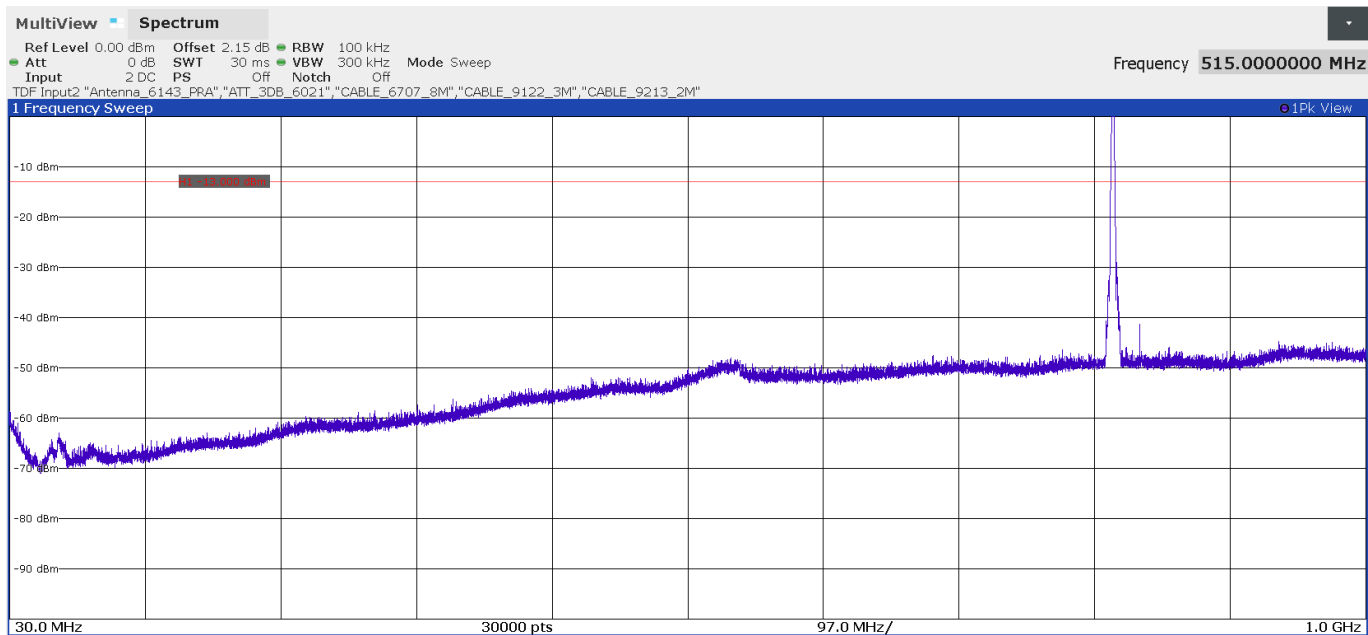
No spurious frequencies at less than 20 dB below the limit.

Measurement uncertainty (dB): $<\pm 5.35$ for $f \geq 30$ MHz up to 1 GHz
 $<\pm 4.32$ for $f \geq 1$ GHz up to 10 GHz

Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz:

- Middle Channel:



The peak above the limit is the carrier frequency:
LTE Band 26, range 814-824 MHz (819 MHz).

FREQUENCY RANGE 1 - 8.5 GHz:

- Middle Channel:

