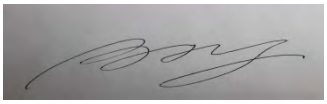
RF TEST REPORT

Report No.: CE_SL18040201-RIO-001_5GHz
Supersede Report No.:

Applicant	Resin.io
Product Name	Raspberry Compute Module 3 Lite
Model No.	Balena Fin
Test Standard	EN 301 893 V2.1.1 (2017-05)
Test Method	EN 301 893 V2.1.1 (2017-05)
Date of test	04/15/2018 - 06/14/2018
Issue Date	06/15/2018
Test Result	Pass Fail

Equipment complied with the specification	[x]
Equipment did not comply with the specification	[ ]

	
Benjamin Jing	Chen Ge
Test Engineer	Engineer Reviewer

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Test result presented in this test report is applicable to the tested sample only

ACCREDITED
TESTING CERT # 2742-01

Issued By:
SIEMIC Laboratories
775 Montague Expressway, Milpitas, 95035 CA

Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC, RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & RED
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
CE_SL18040201-RIO-001_5GHz	None	Original	06/15/2018

2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: Resin.io
Product: Raspberry Compute Module 3 Lite
Model: Balena Fin

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1st page.

3 Customer information

Applicant Name	Resin.io
Applicant Address	One London Wall 6th floor London EC2Y 5EB United Kingdom
Manufacturer Name	Resin.io
Manufacturer Address	One London Wall 6th floor London EC2Y 5EB United Kingdom

4 Test site information

Lab performing tests	SIEMIC Laboratories
Lab Address	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	881796
IC Test Site No.	4842D-2
VCCI Test Site No.	A0133

5 Modification

Index	Item	Description	Note
-	-	-	-

6 EUT Information

6.1 EUT Description

Product Name	Raspberry Compute Module 3 Lite
Model No.	Balena Fin
Trade Name	Resin.io
Serial No.	N/A
Input Power	220VAC/50Hz
Power Adapter Manu/Model	VEL36US120-US-JA
Power Adapter SN	E317867
Date of EUT received	04/15/2018
Equipment Class/ Category	DTS; UNII
Port/Connectors	1 X RJ45 Ethernet , 2 X USB, 1 X mini USB, 1 X HDMI
Remark	NONE

6.2 Radio Description

Spec. for WLAN

Radio Type	802.11a	802.11n-20M	802.11n-40M	802.11ac-80M
Operating Frequency	5180-5320MHz 5500-5700MHz	5180-5320MHz 5500-5700MHz	5190-5310MHz 5510-5670MHz	5210MHz 5290MHz 5530MHz 5610MHz
Modulation	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	20MHz	5MHz(2.4GHz), 20MHz (5GHz)	40MHz	80MHz
Number of Channels	19	19 (5GHz)	11 (5GHz)	4
Antenna Type	External antenna : ¼ Dipole Omni Embedded antenna : SMT			
Antenna Gain (Peak)	External antenna : 2 dBi Embedded antenna : 1 dBi			
Antenna Connector Type	U.FL			

EUT Power level / TPC setting

Freq Band	Mode	Frequency (MHz)	Power setting
5150-5350MHz	802.11a	5320	14
	802.11n-20MHz	5320	12
	802.11n-40MHz	5310	12
	802.11ac-80MHz	5290	12
5470-5725MHz	802.11a	5500	16
		5700	16
	802.11n-20MHz	5500	15
		5700	15
	802.11n-40MHz	5510	16
		5670	16
	802.11ac-80MHz	5530	16
		5610	15

6.3 EUT Operational Condition

Item	Range		
Battery Voltage	N/A		
AC Adapter Voltage	100VAC – 240VAC		
Environmental Condition	Tnom = 25 °C	Tmax = 50 °C	Tmin = 0 °C

6.4 Adaptive Equipment

Adaptive Equipment			
☒	Adaptive Equipment without the possibility to switch to a non-adaptive mode:		
	☒	The equipment has implemented an LBT based DAA mechanism	
		☐	The equipment is Frame Based equipment
		☒	The equipment is Load Based equipment
		☐	The equipment can switch dynamically between Frame Based and Load Based equipment
	☐	The equipment has implemented and non-LBT based DAA mechanism	
	☐	The equipment can operate in more than one adaptive mode	
	☐	Adaptive Frequency Hopping using other forms of DAA (non-LBT based) / without Short Control Signaling Transmissions	
☐	Adaptive Equipment which can also operate in a non-adaptive mode		

6.5 EUT test modes/configuration Description

Test mode

Test Mode		Note
Pre_test_mode_1	Continuous Transmit	-
Pre_test_mode_2	Normal Operation Mode (duty cycle transmit power)	-

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	LATITUDE 3550	N/A	Dell	-
2	Router	WNR2000	N/A	Netgear	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
Ethernet	RJ-45	EUT	RJ-45	Laptop	Ethernet 1 m	no	Unshielded

7.3 Test Software Description

Test Item	Software	Description
RF testing	Dut Labtool	Enable EUT continuous TX mode and change to different channel

8 Test Summary

Test Item	Test standard	Test Method/Procedure	Pass / Fail
Centre Frequencies	EN 301 893 V2.1.1 (2017-05)	EN 301 893 V2.1.1 (2017-05)	Pass
Nominal and Occupied Channel Bandwidth	EN 301 893 V2.1.1 (2017-05)	EN 301 893 V2.1.1 (2017-05)	Pass
RF Output Power, Transmit Power Control (TPC) and Power density	EN 301 893 V2.1.1 (2017-05)	EN 301 893 V2.1.1 (2017-05)	Pass
TX unwanted emission outside the 5GHz RLAN Bands	EN 301 893 V2.1.1 (2017-05)	EN 301 893 V2.1.1 (2017-05)	Pass
TX unwanted emission Within the 5GHz RLAN Bands	EN 301 893 V2.1.1 (2017-05)	EN 301 893 V2.1.1 (2017-05)	Pass
RX Spurious Emission	EN 301 893 V2.1.1 (2017-05)	EN 301 893 V2.1.1 (2017-05)	Pass
Adaptivity	EN 301 893 V2.1.1 (2017-05)	EN 301 893 V2.1.1 (2017-05)	Pass*
Receiver Blocking	EN 301 893 V2.1.1 (2017-05)	EN 301 893 V2.1.1 (2017-05)	Pass
DFS	EN 301 893 V2.1.1 (2017-05)	EN 301 893 V2.1.1 (2017-05)	Pass
Remark	1. All measurement uncertainties do not take into consideration for all presented test results. 2. The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual. 3. Pass*: Testing was done by Marvell for 88W8887 radio module approval.		

9 Measurement Uncertainty

9.1 Radiated Emissions (30MHz to 1GHz)

The test is to measure the radiated emissions of the EUT.
Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
Antenna Factor	0.65	Normal	2	1	0.325
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
NSA Calibration	4.0	U-Shape	1.414	1	2.8288543
Combined Standard Uncertainty					3.0059131
Expanded Uncertainty (K=2)					6.0118262

The total derived measurement uncertainty is +/- 6.00 dB.

9.2 Radiated Emissions (1GHz to 40GHz)

The test is to measure the radiated emissions of the EUT.
Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- VSWR Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.0692840
Cable Insertion Loss	0.21	Normal	2	1	0.1050000
Filter Insertion Loss	0.25	Normal	2	1	0.1250000
Antenna Factor	0.65	Normal	2	1	0.3250000
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.8660508
PRF Response	1.5	Rectangular	1.732	1	0.8660508
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
VSWR Calibration	2.0	U-Shape	1.414	1	1.4144272
Combined Standard Uncertainty					4.2363
Expanded Uncertainty (K=2)					8.4726

The total derived measurement uncertainty is +/- 8.47 dB.

9.3 RF conducted measurement

The test is to measure the RF output power from the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the Reference Level Uncertainty
- Uncertainty of variable attenuators
- Uncertainty of cables
- Uncertainty due to the mismatches

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Reference Level	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Attenuator	0.25	Normal	2	1	0.125
Mismatch	0.25	U-Shape	1.414	1	0.1768033
Combined Standard Uncertainty					0.476087
Expanded Uncertainty (K=2)					0.952174

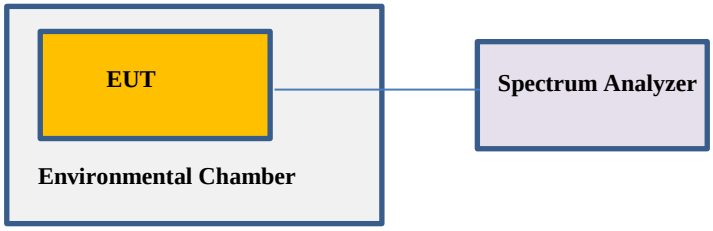
The total derived measurement uncertainty is +/- 0.95 dB.

10 Measurements, Examination and Derived Results

10.1 Centre Frequencies

Spec	Item	Requirement	Applicable
EN 301 893 V2.1.1 (2017-05)	4.2	The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range fc ± 20 ppm.	☒

Test Setup



Procedure

For EUT capable of no-modulation mode

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The bandwidth of the measuring receiver was set to 300Hz.
3. To measure conducted, a SMA Cable was used to replace the EUT antenna.
4. Have EUT transmit in No-modulated mode.
5. Enable Frequency counter on Spectrum Analyser to measure the carrier centre frequency.

For EUT tested with modulation

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The bandwidth of the measuring receiver was set to 300Hz.
3. To measure conducted, a SMA Cable was used to replace the EUT antenna.
4. Have EUT transmit in modulated mode and connect to spectrum analyser.
5. Max hold the trace on spectrum analyser and record the -10 dBC points.
6. The centre frequency is calculated as (f1 + f2) / 2.

Test Date	06/10/2018	Environmental condition	Temperature	23 °C
			Relative Humidity	41 %
			Atmospheric Pressure	1017 mbar
Remark	NONE			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

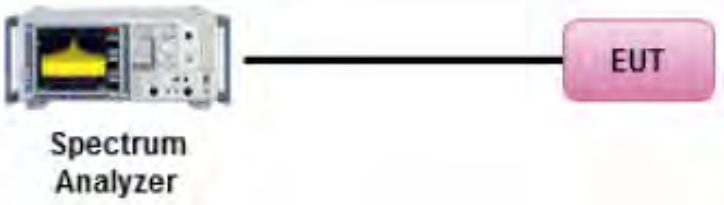
Test was done by Benjamin Jing at RF test site.

Test Results:

Type	Condition	Mode	Nominal Frequency (MHz)	Measured Frequency (MHz)	Measured frequency Error (PPM)	Max Allowed (PPM)
Center Frequency	Norm Temp (25°C)	802.11a	5180.000	5179.992	1.54	20
	Low Temp (-20 °C)	802.11a	5180.000	5179.995	0.97	20
	High Temp (55°C)	802.11a	5180.000	5179.991	1.74	20
	Norm Temp (25°C)	802.11n40	5190.000	5189.998	0.39	20
	Low Temp (-20 °C)	802.11n40	5190.000	5189.995	0.96	20
	High Temp (55°C)	802.11n40	5190.000	5189.990	1.93	20
	Norm Temp (25°C)	802.11ac	5210.000	5209.986	2.69	20
	Low Temp (-20 °C)	802.11ac	5210.000	5209.989	2.11	20
	High Temp (55°C)	802.11ac	5210.000	5209.993	1.34	20
	Norm Temp (25°C)	802.11a	5500.000	5500.002	0.36	20
	Low Temp (-20 °C)	802.11a	5500.000	5500.005	0.91	20
	High Temp (55°C)	802.11a	5500.000	5500.010	1.82	20
	Norm Temp (25°C)	802.11n40	5510.000	5509.995	0.91	20
	Low Temp (-20 °C)	802.11n40	5510.000	5509.991	1.63	20
	High Temp (55°C)	802.11n40	5510.000	5509.992	1.45	20
	Norm Temp (25°C)	802.11ac	5530.000	5530.001	0.18	20
	Low Temp (-20 °C)	802.11ac	5530.000	5530.006	1.08	20
	High Temp (55°C)	802.11ac	5530.000	5530.009	1.63	20

10.2 Nominal and Occupied Channel Bandwidth

Spec	Item	Requirement	Applicable
EN 301 893 V2.1.1 (2017-05)	4.3	The Nominal Channel Bandwidth shall be at least 5 MHz at all times. The Occupied Channel Bandwidth shall be between 80 % and 100 % of the declared Nominal Channel Bandwidth. In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement.	☒

Test Setup				
Procedure	1. Connect the UUT to the spectrum analyser and use the following settings: - Centre Frequency: The centre frequency of the channel under test - RBW: 100KHz - VBW: 300KHz - Frequency Span: 2 × Norminal Channel Bandwidth (e.g. 40 MHz for a 20 MHz channel) - Detector Mode: Peak - Trace Mode: Max Hold 2. Wait until the trace is completed, "View" the trace on spectrum analyzer. Find the peak value of the trace and place the analyser marker on this peak. 3. Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.			
Test Date	06/03/2018	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	24.9 °C 31.5 % 1019 mbar
Remark	None			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes ☐ N/A

Test was done by Benjamin Jing at RF test site.

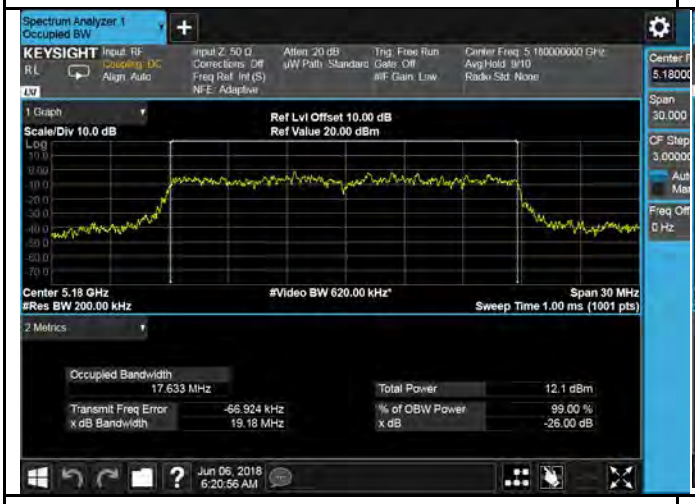
Test Result:

Freq Band (MHz)	Mode	Frequency (MHz)	Nominal Frequency BW (MHz)	Measured Channel BW (MHz)	Variation from Nominal BW (%)	Min Requirement. (%)
5150-5350	802.11a	5180	20	17.61	88.1	>80
	802.11n-HT20	5180	20	17.63	88.2	>80
	802.11n-HT40	5190	40	36.07	90.1	>80
	802.11ac	5210	80	75.84	94.8	>80
5470-5725	802.11a	5500	20	17.63	88.2	>80
	802.11n-HT20	5500	20	17.66	88.3	>80
	802.11n-HT40	5510	40	36.07	90.1	>80
	802.11ac	5530	80	75.83	88.2	>80

Test Plots

OBW-802.11a-5180MHz

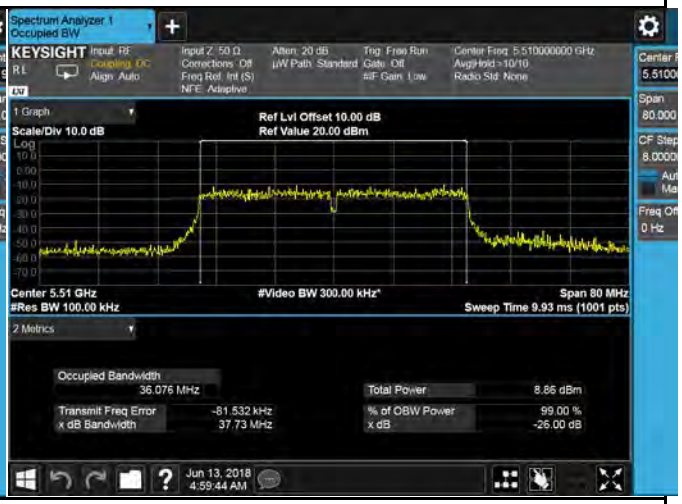
OBW-802.11a-5500MHz



OBW-11n-HT20-5180MHz

OBW-11n-HT20-5500MHz

OBW-11n-HT40-5190MHz



OBW-11n-HT40-5510MHz

OBW-802.11ac-5210MHz

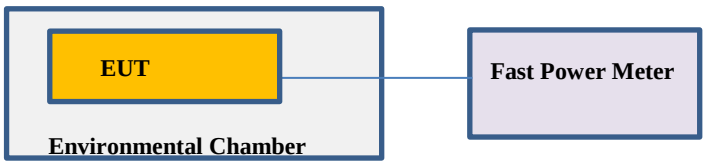
OBW-802.11ac-5530MHz

10.3 RF output power, Transmit Power Control (TPC) and power density

Requirement(s):

Spec	Item	Requirement			Applicable
EN 301 893 V2.1.1 (2017-05)	4.4	Highest power level – 5150-5250	TPC	23 dBm (Mean e.i.r.p.)	☒
			Non-TPC	23 dBm (Mean e.i.r.p.)	☐
		Highest power level – 5250-5350	TPC	23 dBm (Mean e.i.r.p.)	☒
			Non-TPC	20 dBm (Mean e.i.r.p.)	☐
		Highest power level – 5470-5725	TPC	30 dBm (Mean e.i.r.p.) (23 dBm for DFS slave devices)	☒
			Non-TPC	27 dBm (Mean e.i.r.p.)	☐
EN 301 893 V2.1.1 (2017-05)	4.4	Highest power level – 5150-5250	TPC	10 dBm/MHz (Mean e.i.r.p. density)	☒
			Non-TPC	10 dBm/MHz (Mean e.i.r.p. density)	☐
		Highest power level – 5250-5350	TPC	10 dBm/MHz (Mean e.i.r.p. density)	☒
			Non-TPC	7 dBm/MHz (Mean e.i.r.p. density)	☐
		Highest power level – 5470-5725	TPC	17 dBm/MHz (Mean e.i.r.p. density)	☒
			Non-TPC	14 dBm/MHz (Mean e.i.r.p. density)	☐
EN 301 893 V2.1.1 (2017-05)	4.4	Lowest power level – 5250-5350	TPC	17 dBm (Mean e.i.r.p.)	☒
			Non-TPC	N/A	☐
		Lowest power level – 5470-5725	TPC	24 dBm (Mean e.i.r.p.) (17 dBm for DFS slave devices)	☒
			Non-TPC	N/A	☐

Test Setup



Test Procedure

Step 1:
For equipment configured into a continuous transmit mode (x = 1), proceed immediately with step 2.
- The output power of the transmitter shall be coupled to a matched diode detector or equivalent thereof. The output of the diode detector shall be connected to the vertical channel of an oscilloscope.
- The combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the duty cycle of the transmitter output signal.
- The observed duty cycle of the transmitter (Tx on / (Tx on + Tx off)) shall be noted as x ($0 < x \leqslant 1$), and recorded in the test report.

Step 2:
- The RF output power shall be determined using a wideband RF power meter with a thermocouple detector or an equivalent thereof and with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be noted as "A" (in dBm).
- In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the output power of each transmit chain shall be measured separately to calculate the total power (value "A" in dBm) for the UUT.

Step 3:
- The RF output power at the highest power level PH (e.i.r.p.) shall be calculated from the above measured power output A (in dBm), the observed duty cycle x, the stated antenna gain "G" in dBi and if applicable the beamforming gain "Y" in dB, according to the formula below. This value shall be recorded in the test report.
  If more than one antenna assembly is intended for this power setting or TPC range, the gain of the antenna assembly with the highest gain shall be used.

$$PH = A + G + Y + 10 \log (1/x) \text{ (dBm)}$$

Test Date	06/03/2018	Environmental condition	Temperature 24 °C Relative Humidity 31 % Atmospheric Pressure 1015 mbar
Remark	Test at the highest output power level of the TPC range .		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Benjamin Jing at RF test site.

RF Output Power

Test at the highest level of the TPC setting

Normal Temperature _ 25 ^{0} C

Freq Band (MHz)	Mode	Frequency (MHz)	Total Mean EIRP (dBm)	Mean EIRP Limit (dBm)
5150-5350	802.11a	5180	12.9	23.0
		5320	12.4	
	802.11n-20	5180	11.2	
		5320	11.5	
	802.11n-40	5190	10.8	
		5310	10.3	
	802.11ac-80	5210	9.75	
		5290	9.62	
5470-5725	802.11a	5500	11.2	23.0
		5700	10.7	
	802.11n-20	5500	9.83	
		5700	9.22	
	802.11n-40	5510	9.59	
		5670	9.32	
	802.11ac-80	5530	9.23	
		5610	9.17	

Low Temperature _ --20 ^{0} C

Freq Band (MHz)	Mode	Frequency (MHz)	Total Mean EIRP (dBm)	Mean EIRP Limit (dBm)
5150-5350	802.11a	5180	12.1	23.0
		5320	11.7	
	802.11n-20	5180	10.5	
		5320	11.2	
	802.11n-40	5190	10.1	
		5310	9.83	
	802.11ac-80	5210	9.15	
		5290	9.03	
5470-5725	802.11a	5500	11.2	23.0
		5700	10.4	
	802.11n-20	5500	9.26	
		5700	8.77	
	802.11n-40	5510	9.12	
		5670	8.56	
	802.11ac-80	5530	8.63	
		5610	8.84	

High Temperature _ 55 0 C

Freq Band (MHz)	Mode	Frequency (MHz)	Total Mean EIRP (dBm)	Mean EIRP Limit (dBm)
5150-5350	802.11a	5180	13.4	23.0
		5320	12.9	
	802.11n-20	5180	11.8	
		5320	12.3	
	802.11n-40	5190	11.7	
		5310	11.6	
	802.11ac-80	5210	10.7	
		5290	10.6	
5470-5725	802.11a	5500	11.8	23.0
		5700	11.4	
	802.11n-20	5500	10.3	
		5700	9.98	
	802.11n-40	5510	10..2	
		5670	9.75	
	802.11ac-80	5530	9.84	
		5610	9.63	

Test at the lowest level of the TPC setting

Normal Temperature _ 25 0 C

Freq Band (MHz)	Mode	Frequency (MHz)	Total Mean EIRP (dBm)	Mean EIRP Limit (dBm)
5250-5350	802.11a	5280	5.37	17.0
		5320	5.85	
	802.11n-20	5280	5.24	
		5320	4.27	
	802.11n-40	5310	4.32	
	802.11ac-80	5290	4.07	
5470-5725	802.11a	5500	5.18	17.0
		5700	4.46	
	802.11n-20	5500	4.27	
		5700	4.19	
	802.11n-40	5510	4.54	
		5670	3.97	
	802.11ac-80	5530	3.54	
		5610	3.66	

Low Temperature _ --20 0 C

Freq Band (MHz)	Mode	Frequency (MHz)	Total Mean EIRP (dBm)	Mean EIRP Limit (dBm)
5250-5350	802.11a	5280	5.14	17.0
		5320	5.26	
	802.11n-20	5280	4.98	
		5320	4.03	
	802.11n-40	5310	3.85	
	802.11ac-80	5290	3.76	
5470-5725	802.11a	5500	4.92	17.0
		5700	4.04	
	802.11n-20	5500	3.87	
		5700	4.01	
	802.11n-40	5510	4.33	
		5670	3.84	
	802.11ac-80	5530	3.17	
		5610	3.36	

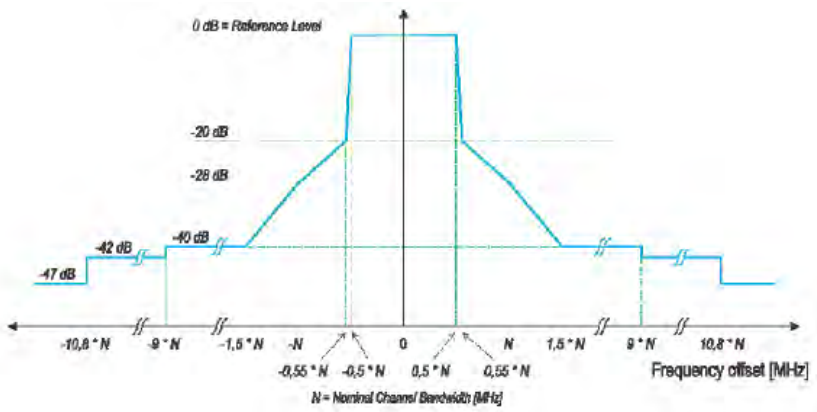
High Temperature _ 55 0 C

Freq Band (MHz)	Mode	Frequency (MHz)	Total Mean EIRP (dBm)	Mean EIRP Limit (dBm)
5250-5350	802.11a	5280	5.56	17.0
		5320	5.97	
	802.11n-20	5280	5.64	
		5320	4.93	
	802.11n-40	5310	4.88	
	802.11ac-80	5290	4.62	
5470-5725	802.11a	5500	5.95	17.0
		5700	5.13	
	802.11n-20	5500	5.06	
		5700	4.92	
	802.11n-40	5510	5.11	
		5670	4.37	
	802.11ac-80	5530	4.14	
		5610	4.05	

PSD

Freq Band (MHz)	Mode	Frequency (MHz)	Total Mean EIRP Density (dBm/MHz)	Mean EIRP Density Limit (dBm/MHz)
5150 -5350	802.11a	5180	8.15	10.0
		5320	7.62	
	802.11n-20MHz	5180	7.23	
		5320	6.37	
	802.11n-40MHz	5190	7.05	
		5310	6.52	
	802.11ac-80MHz	5210	5.29	
		5290	6.17	
5470 -5725	802.11a	5500	6.94	17.0
		5700	6.47	
	802.11n-20MHz	5500	6.82	
		5700	6.19	
	802.11n-40MHz	5510	6.53	
		5670	6.87	
	802.11ac-80MHz	5530	5.94	
		5610	5.67	

10.4 TX Unwanted Emissions within the 5 GHz RLAN Band

Spec	Item	Requirement	Applicable
EN 301 893 V2.1.1 (2017-05)	4.5.2	The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in figure at below, 	☒
Test Setup			
Procedure	Step 1 :The EUT was switched on and allowed to warm up to its normal operating condition. Step 2: To measure conducted, a SMA cable was used to replace the EUT antenna. Step 3: Determination of the reference average power level Spectrum analyser settings: o Resolution bandwidth: 1 MHz o Video bandwidth: 30 kHz o Detector mode: Peak o Trace mode: Video Average o Sweep Time: Coupled o Centre Frequency: Centre frequency of the channel being tested. o Span: 2 times the Nominal Channel Bandwidth Use the marker to find the highest average power level of the power envelope of the UUT. This level shall be used as the reference level for the relative measurements. Step 4: Determination of the relative average power levels Adjust the frequency range of the spectrum analyser to allow the measurement to be performed within the sub-bands 5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz. No other parameter of the spectrum analyser should be changed. Compare the relative power envelope of the UUT with the spectrum mask given in above emission mask.		
Test Date	05/10/2018	Environmental condition	Temperature 24.9 °C Relative Humidity 31.5 % Atmospheric Pressure 1019 mbar
Remark	None.		
Result	☒ Pass ☐ Fail		

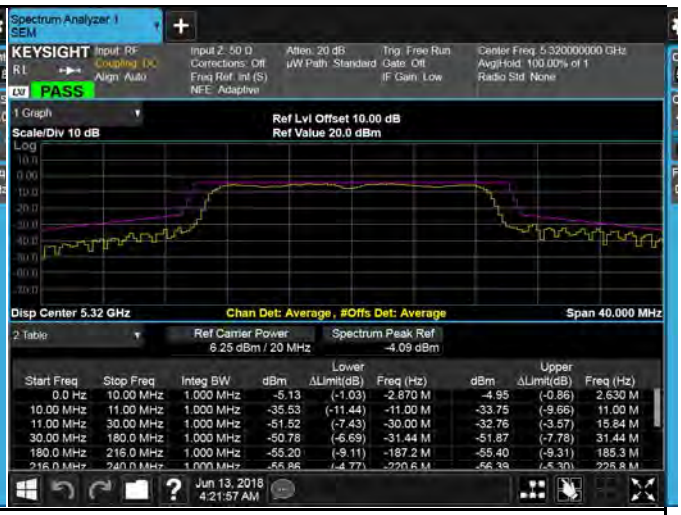
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Benjamin Jing at RF test site.

Test Result:

Low Channel (802.11a-5180MHz)

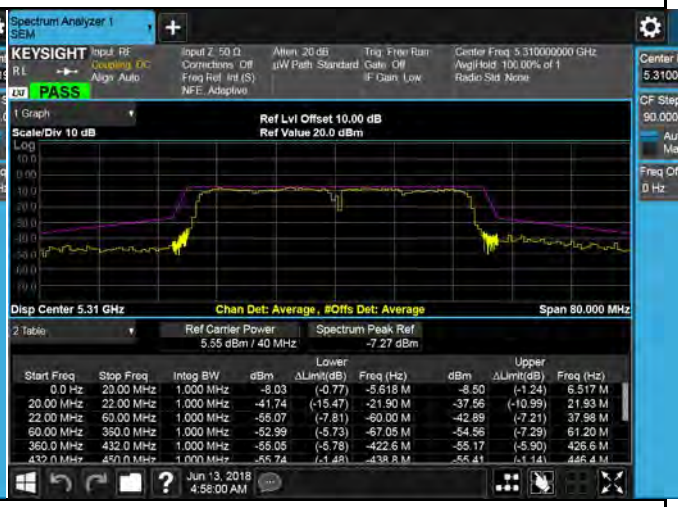


High Channel (802.11a-5320MHz)

Low Channel (802.11n20-5180MHz)

High Channel (802.11n20-5320MHz)

Low Channel (802.11n40-5190MHz)



High Channel (802.11n40-5310MHz)

Low Channel (802.11ac-5210MHz)

High Channel (802.11ac-5290MHz)

Low Channel (802.11a-5500MHz)

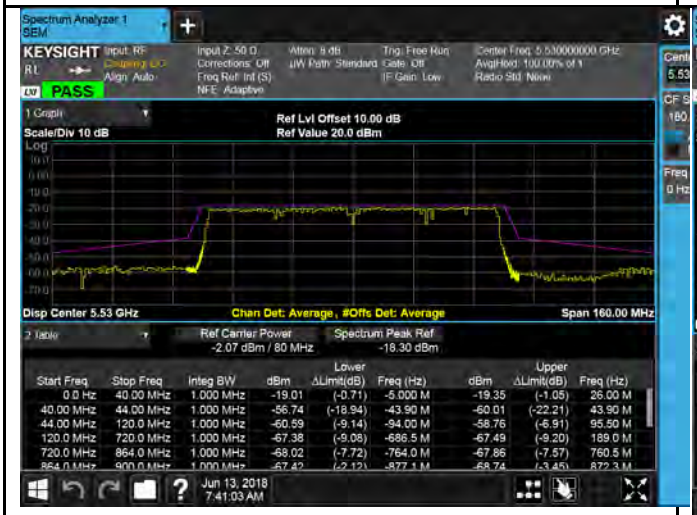
High Channel (802.11a-5700MHz)

Low Channel (802.11n20-5500MHz)

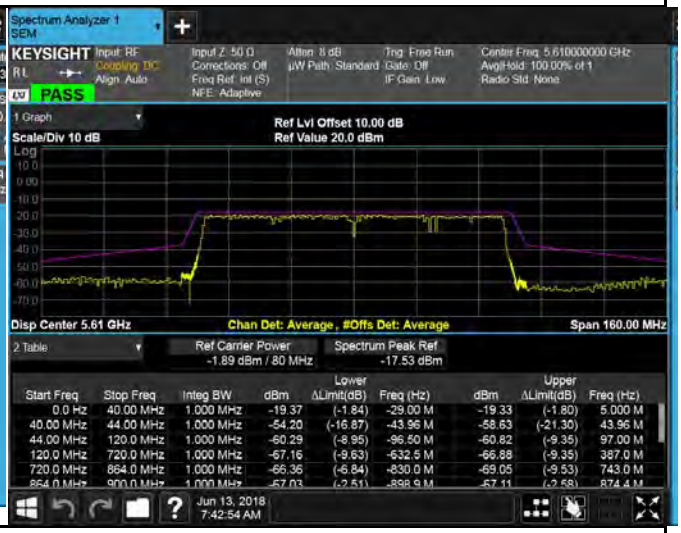
High Channel (802.11n20-5700MHz)

Low Channel (802.11n40-5510MHz)

Hgh Channel (802.11n40-5670MHz)

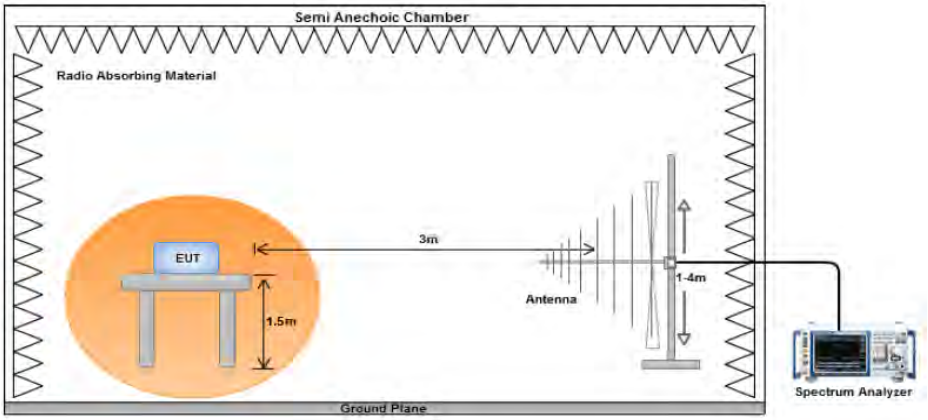
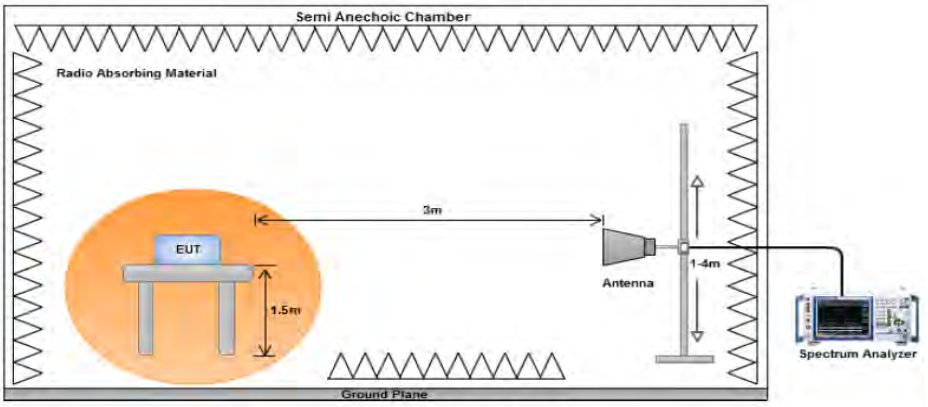


Low Channel (802.11ac-5530MHz)



High Channel (802.11ac-5610MHz)

10.5 TX Unwanted Emissions outside the 5 GHz RLAN Band

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>EN 301 893
V2.1.1
(2017-05)</td><td>4.5.1</td><td>The spurious emissions of the transmitter shall not exceed the values in the tables below in the indicated bands.
Transmitter limits for narrowband spurious emissions
<table>
<tr><th>Frequency range</th><th>Maximum power</th><th>Bandwidth</th></tr>
<tr><td>30 MHz to 47 MHz</td><td>-36 dBm</td><td>100 KHz</td></tr>
<tr><td>47 MHz to 74 MHz</td><td>-54 dBm</td><td>100 KHz</td></tr>
<tr><td>74 MHz to 87.5 MHz</td><td>-36 dBm</td><td>100 KHz</td></tr>
<tr><td>87.5 MHz to 118 MHz</td><td>-54 dBm</td><td>100 KHz</td></tr>
<tr><td>118 MHz to 174 MHz</td><td>-36 dBm</td><td>100 KHz</td></tr>
<tr><td>174 MHz to 230 MHz</td><td>-54 dBm</td><td>100 KHz</td></tr>
<tr><td>230 MHz to 470 MHz</td><td>-36 dBm</td><td>100 KHz</td></tr>
<tr><td>470 MHz to 862 MHz</td><td>-54 dBm</td><td>100 KHz</td></tr>
<tr><td>862 MHz to 1 GHz</td><td>-36 dBm</td><td>100 KHz</td></tr>
<tr><td>1 GHz to 5.15 GHz</td><td>-30 dBm</td><td>1 MHz</td></tr>
<tr><td>5.35 GHz to 5.47 GHz</td><td>-30 dBm</td><td>1 MHz</td></tr>
<tr><td>5.725 GHz to 26 GHz</td><td>-30 dBm</td><td>1 MHz</td></tr>
</table></td><td>☒</td></tr>
<tr><td>Test Setup
Below 1GHz</td><td colspan="3"> 
</td></tr>
<tr><td>Test Setup
Above 1GHz</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">Refer to Clause 5.3.5 of ETSI EN 301 893 V2.1.1 (2017-05)</td></tr>
<tr><td>Remark</td><td colspan="3">Only worst case was presented.</td></tr>
<tr><td>Result</td><td colspan="3">☒ Pass ☐ Fail</td></tr>
</table>

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Benjamin Jing at 10m chamber.

External Antenna _

TX - 5150 – 5350 MHz Band

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
189.63	-48.27	275	110	V	189.63	-73.45	0	1.28	-72.17	-54	-18.17
189.63	-44.46	96	229	H	189.63	-65.41	0	1.28	-64.13	-54	-10.13
1882.34	-50.92	112	163	V	1882.34	-51.92	11.30	0.72	-41.34	-30	-11.34
1882.34	-51.04	165	201	H	1882.34	-51.04	11.30	0.72	-40.46	-30	-10.46
10360.15	-55.45	218	199	V	10360.15	-43.45	11.41	2.37	-34.41	-30	-4.41
10360.15	-58.27	334	178	H	10360.15	-45.27	11.41	2.37	-36.23	-30	-6.23

- TX - 5470 – 5725 MHz Band

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
206.12	-46.52	70	130	V	206.12	-67.17	0	1.31	-65.86	-54	-11.86
206.12	-40.48	142	220	H	206.12	-64.56	0	1.31	-63.25	-54	-9.25
1885.46	-49.87	315	148	V	1885.46	-50.87	11.30	0.72	-40.29	-30	-10.29
1885.46	-50.22	100	155	H	1885.46	-50.22	11.30	0.72	-39.64	-30	-9.64
11000.03	-55.17	217	150	V	11000.03	-43.15	11.45	2.39	-34.14	-30	-4.14
11000.03	-57.66	265	182	H	11000.03	-44.66	11.45	2.39	-35.63	-30	-5.63

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

Embedded Antenna _

TX - 5150 – 5350 MHz Band

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
225.44	-41.59	351	138	V	225.44	-65.29	0	1.35	-63.94	-54	-9.94
225.44	-35.63	124	147	H	225.44	-59.34	0	1.35	-57.99	-54	-3.99
1882.34	-50.92	112	163	V	1882.34	-51.92	11.30	0.72	-41.34	-30	-11.34
1882.34	-51.04	165	201	H	1882.34	-51.04	11.30	0.72	-40.46	-30	-10.46
10360.15	-55.45	218	199	V	10360.15	-43.45	11.41	2.37	-34.41	-30	-4.41
10360.15	-58.27	334	178	H	10360.15	-45.27	11.41	2.37	-36.23	-30	-6.23

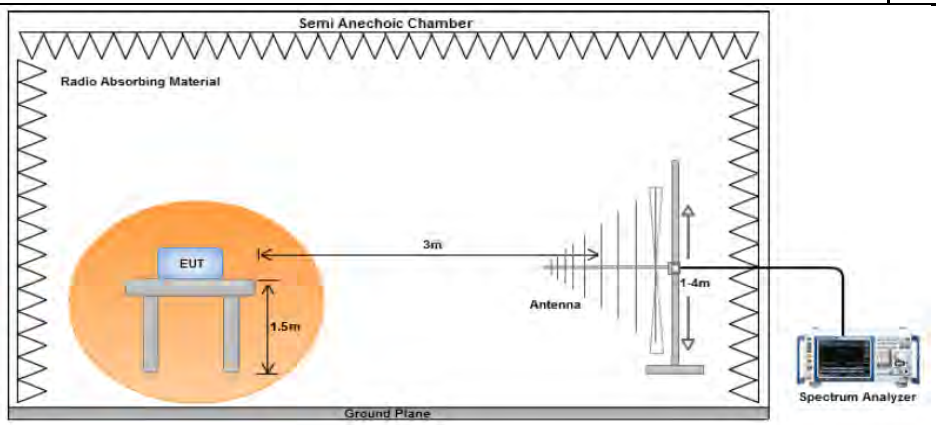
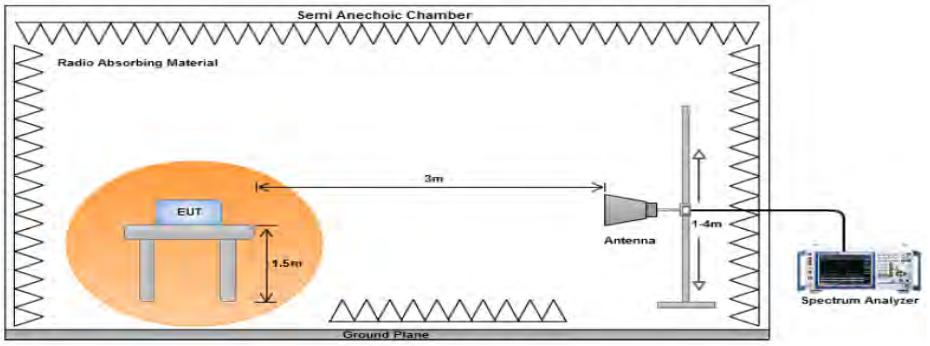
TX - 5470 5725 MHz Band

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
206.12	-46.52	70	130	V	206.12	-67.17	0	1.31	-65.86	-54	-11.86
206.12	-40.48	142	220	H	206.12	-64.56	0	1.31	-63.25	-54	-9.25
1885.46	-49.87	315	148	V	1885.46	-50.87	11.30	0.72	-40.29	-30	-10.29
1885.46	-50.22	100	155	H	1885.46	-50.22	11.30	0.72	-39.64	-30	-9.64
11000.03	-55.17	217	150	V	11000.03	-43.15	11.45	2.39	-34.14	-30	-4.14
11000.03	-57.66	265	182	H	11000.03	-44.66	11.45	2.39	-35.63	-30	-5.63

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

10.6 Receiver Spurious Emissions –

Requirement

Spec	Item	Requirement	Applicable
EN 301 893 V1.8.1 (2015-03)	5.3.7	Receiver spurious emissions are emissions at any frequency when the equipment is in received mode. The spurious emissions of the receiver shall not exceed the values in the tables below in the indicated bands. Frequency range / Maximum power / Bandwidth 30 MHz to 1GHz / -57 dBm / 100 KHz 1 GHz to 26 GHz / -47 dBm / 1 MHz	☒
Test Setup Below 1GHz			
Test Setup Above 1GHz			
Procedure	Refer to Clause 5.3.7 of ETSI EN 301 893 V2.2.1 (2017-05)		
Remark	Both horizontal and vertical polarities were investigated. The results show only the worst case		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Benjamin Jing at 10m chamber

External Antenna

RX - 5150 – 5350 MHz Band

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
207.5	-46.55	66	100	V	207.025	-68.42	0	1.31	-67.11	-57	-10.11
207.5	-40.47	138	229	H	207.025	-62.58	0	1.31	-61.27	-57	-4.27
1952	-79.43	236	150	V	1952	-66.65	10.25	2.08	-74.82	-47	-27.82
1952	-79.76	167	150	H	1952	-66.98	10.25	2.08	-75.15	-47	-28.15
1632	-79.27	264	150	V	1632	-68.53	10.08	1.78	-76.83	-47	-29.83
1632	-79.38	252	150	H	1632	-68.64	10.08	1.78	-76.94	-47	-29.94

RX - 5470 – 5725 MHz Band

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
227.3	-41.18	353	143	V	227.031	-63.27	0	1.35	-61.92	-57	-4.92
227.3	-38.29	116	159	H	227.031	-61.31	0	1.35	-59.96	-57	-2.96
1952	-79.43	236	150	V	1952	-66.65	10.25	2.08	-74.82	-47	-27.82
1952	-79.76	167	150	H	1952	-66.98	10.25	2.08	-75.15	-47	-28.15
1632	-79.27	264	150	V	1632	-68.53	10.08	1.78	-76.83	-47	-29.83
1632	-79.38	252	150	H	1632	-68.64	10.08	1.78	-76.94	-47	-29.94

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

Embedded Antenna

RX - 5150 – 5350 MHz Band

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
207.5	-46.55	66	100	V	207.025	-68.42	0	1.31	-67.11	-57	-10.11
207.5	-40.47	138	229	H	207.025	-62.58	0	1.31	-61.27	-57	-4.27
1952	-79.43	236	150	V	1952	-66.65	10.25	2.08	-74.82	-47	-27.82
1952	-79.76	167	150	H	1952	-66.98	10.25	2.08	-75.15	-47	-28.15
1632	-79.27	264	150	V	1632	-68.53	10.08	1.78	-76.83	-47	-29.83
1632	-79.38	252	150	H	1632	-68.64	10.08	1.78	-76.94	-47	-29.94

RX - 5470 – 5725 MHz Band

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
227.3	-41.18	353	143	V	227.031	-63.27	0	1.35	-61.92	-57	-4.92
227.3	-38.29	116	159	H	227.031	-61.31	0	1.35	-59.96	-57	-2.96
1952	-79.43	236	150	V	1952	-66.65	10.25	2.08	-74.82	-47	-27.82
1952	-79.76	167	150	H	1952	-66.98	10.25	2.08	-75.15	-47	-28.15
1632	-79.27	264	150	V	1632	-68.53	10.08	1.78	-76.83	-47	-29.83
1632	-79.38	252	150	H	1632	-68.64	10.08	1.78	-76.94	-47	-29.94

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

10.7 Receiver Blocking

Requirement(s):

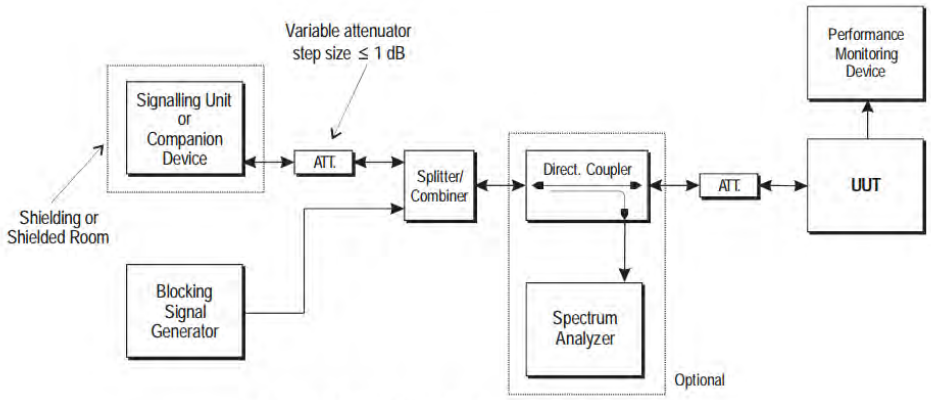
<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>EN 301 893 V2.1.1 (2017-05)</td><td>4.2.8</td><td>
Table 7: Receiver Blocking parameters
<table>
<tr><th rowspan="2">Wanted signal mean power from companion device (dBm)</th><th rowspan="2">Blocking signal frequency (MHz)</th><th colspan="2">Blocking signal power (dBm) (see note 2)</th><th rowspan="2">Type of blocking signal</th></tr>
<tr><th>Master or Slave with radar detection (see table D.2, note 2)</th><th>Slave without radar detection (see table D.2, note 2)</th></tr>
<tr><td>Pmin + 6 dB</td><td>5 100</td><td>-53</td><td>-59</td><td>Continuous Wave</td></tr>
<tr><td>Pmin + 6 dB</td><td>4 900
5 000
5 975</td><td>-47</td><td>-53</td><td>Continuous Wave</td></tr>
<tr><td colspan="5">NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal.
NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.</td></tr>
</table>
</td><td>☒</td></tr>
<tr><td>Test Setup</td><td colspan="3">


Figure 14: Test Set-up for receiver blocking
</td></tr>
<tr><td>Procedure</td><td colspan="3">Refer to Clause 5.4.10 of ETSI EN 301 893 V2.1.1 (2016-11)</td></tr>
<tr><td>Result</td><td colspan="3">☒ Pass ☐ Fail</td></tr>
</table>

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by Rachana Khanduri at RF test site.

Test Result for Receiver Blocking

802.11a Low CH: 5180 MHz

Type	Frequency (MHz)	Level (dBm)	Type	Result
Receiver Blocking	5100	-53	CW	Pass
	4900	-47		Pass
	5000			Pass
	5975			Pass

802.11a High CH: 5500 MHz

Type	Frequency (MHz)	Level (dBm)	Type	Result
Receiver Blocking	5100	-53	CW	Pass
	4900	-47		Pass
	5000			Pass
	5975			Pass

10.8 DFS

Spec	Item	Requirement	Applicable
EN 301 893 V2.1.1 (2017-05)	5.3.8.2.1.5	To verify the Channel Shutdown process and to determine the Channel Closing Transmission Time, the Channel Move Time and the Non-Occupancy Period.	☒
Result	☒ Pass ☐ Fail		

DFS requirement values

Parameter	Value
Channel Availability Check Time	60 s (see note 1)
Minimum Off-Channel CAC Time	6 minutes (see note 2)
Maximum Off-Channel CAC Time	4 hours (see note 2)
Channel Move Time	10 s
Channel Closing Transmission Time	1 s
Non-Occupancy Period	30 minutes
NOTE 1: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the *Channel Availability Check Time* shall be 10 minutes. NOTE 2: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the *Off-Channel CAC Time* shall be within the range 1 to 24 hours.	

Channel Closing Transmission Time, Channel Move Time, Non-occupancy Period

The UUT operating as a Client Device will associate with a UNII master device at Mid Channel.
Observe the transmissions of the UUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). Compare the Channel Move Time and Channel Closing Transmission Time results to the limits defined in the DFS Response requirement values table

Test Data ☒ Yes (See below) ☐ N/A

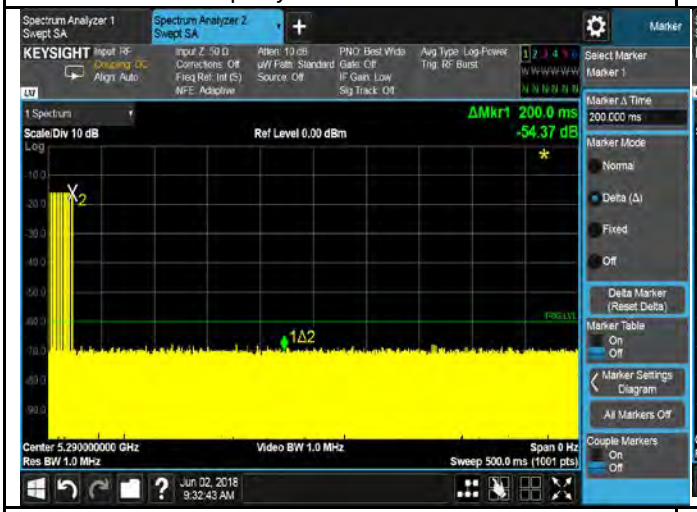
Test Plot ☒ Yes (See below) ☐ N/A

Test was done by Benjamin Jing at RF test site.

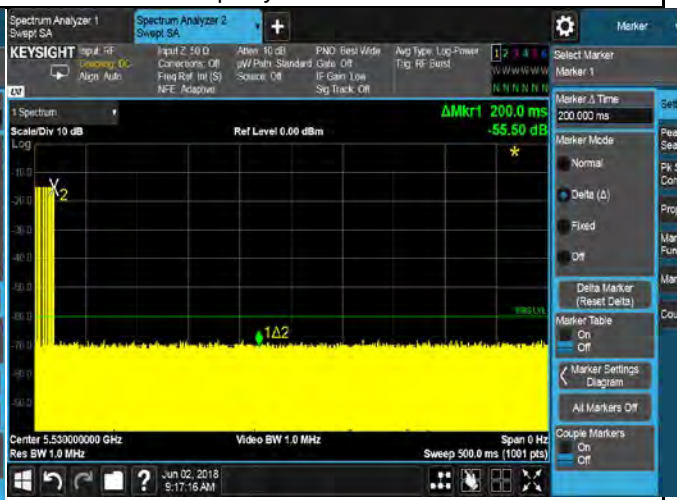
DFS Test Result

Non-Occupancy Period - 802.11ac-5290MHz

Non-Occupancy Period - 802.11ac-5530MHz



Channel Move Time & Closing Time - 802.11ac-5290MHz (Type 0)



Channel Move Time & Closing Time - 802.11ac-5530MHz (Type 0)

Channel Move Time & Closing Time - 802.11ac-5290MHz (Type 0)

Channel Move Time & Closing Time - 802.11ac-5530MHz (Type 0)

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Radiated Emissions						
Keysight EXA 44GHz Spectrum Analyzer	N9030B(PXA)	MY57140374	09/06/2017	1 Year	09/06/2018	☑
Keysight Signal Generator	MXG N5182A	MY47071065	07/12/2017	1 Year	07/12/2018	☑
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	08/16/2017	1 Year	08/16/2018	☑
RF Preamplifier (100KHz-7GHz)	LPA-6-30	11170601	07/21/2017	1 Year	07/21/2018	☑
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	03/09/2018	2 Year	03/09/2020	☑
Horn Antenna (1GHz~26GHz)	3115	100059	11/09/2017	1 Year	11/09/2018	☑
Horn Antenna (700MHz-18GHz)	SAS-571	411	08/13/2017	1 Year	08/13/2018	☑
Tuned Dipole Antenna 30 - 1000 MHz (4pcs set)	AD-100	40133	10/02/2017	1 Year	10/02/2018	☑
RF Conducted Measurement						
Agilent Spectrum Analyzer	N9010A	10SL0219	11/16/2017	1 Year	11/16/2018	☑
MXG Agilent Signal Generator	N5182A	MY47071065	06/28/2017	1 Year	06/28/2018	☑
Test Equity Environment Chamber	1007H	61201	11/08/2017	1 Year	11/08/2018	☑
ETS-Lingren USB RF Power Sensor	7002-006	159860	11/15/2017	1 Year	11/15/2018	☑

Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1, A2, A3, A4, B1, B2, B3, B4, C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		Radio Equipment: EN45011: EN ISO/IEC 17065
		Electromagnetic Compatibility: EN45011 – EN ISO/IEC 17065
Singapore iDA CB(Certification Body)		Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		(Phase II) OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		Radio: Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		Radio: A1. Terminal equipment for purpose of calling Telecom: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI EMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS
		Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68
		Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measuremet
Australia CAB Recognition		EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4
		Radiocommunications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771
		Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016,AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2