



CE Radio Partial Report

Equipment : RouterBOARD wAP G-60ad
Brand Name : RouterBOARD
Model No. : RBwAPG-60ad
Standard : EN 302 567 V2.1.1 (2017-07)
Frequency Range : 57 GHz – 66 GHz
Applicant : Mikrotiks SIA
Pernavas 46, Riga, LV-1009 Latvia
Manufacturer : Mikrotiks SIA
Pernavas 46, Riga, LV-1009 Latvia

The product sample received on Jun. 29, 2017 and completely tested on Jul. 26, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in EN 302 567 V2.1.1 (2017-07) and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.


Cliff Chang
SPORTON INTERNATIONAL INC.

TABLE OF CONTENTS

TABLE OF CONTENTS	2
SUMMARY OF TEST RESULT	3
REVISION HISTORY	4
1 GENERAL DESCRIPTION	5
1.1 Information.....	5
1.2 Additional Information Provided by the Submitter	6
1.3 Accessories	6
1.4 Support Equipment.....	7
1.5 EUT Setups	7
1.6 Testing Applied Standards	7
1.7 Testing Location	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 Test Channel Frequencies	8
2.2 Conformance Tests and Related Test Frequencies	8
3 RECEIVER ADJACENT CHANNEL REJECTION TEST RESULT	9
3.1 Receiver Adjacent Channel Rejection.....	9
4 TEST EQUIPMENT AND CALIBRATION DATA	11
5 MEASUREMENT UNCERTAINTY	12
PHOTOGRAPHS OF EUT V01	

SUMMARY OF TEST RESULT

Harmonized Standard Requirements and Conformance Test Specifications				
Report Clause	Ref. Std. Clause	Description	Result	Remark
3.1	4.2.7	Receiver Adjacent Channel Rejection	Complied	-
1.1.6	4.2.9	Geo-location capability	N/A	-

REVISION HISTORY

[illegible]

1 General Description

1.1 Information

1.1.1 The Channel Plan(s)

The Channel Plan(s)
Channel 1: 58.32 GHz
Channel 2: 60.48 GHz
Channel 3: 62.64 GHz

1.1.2 Transmit Operating Modes

The Different Transmit Operating Modes
<input checked="" type="checkbox"/> Operating mode 1: Smart Antenna Systems - with beam forming
<input type="checkbox"/> Operating mode 2: Smart Antenna Systems - without beam forming
<input type="checkbox"/> Operating mode 3: Single Antenna Equipment

1.1.3 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		
					58.32 GHz	60.48 GHz	62.64 GHz
1	Mikrotik	60G-phased-array	Integral phased-array	Soldered	12.13	13.48	10.56

1.1.4 User Condition

Intended Operation
<input checked="" type="checkbox"/> Indoor only
<input type="checkbox"/> Indoor & Outdoor

1.1.5 Power Type

Power Type	
EUT Power Type	From Power Adapter or PoE
Supply Voltage	<input checked="" type="checkbox"/> AC State AC voltage 230 V
Supply Voltage	<input type="checkbox"/> DC State DC voltage V

1.1.6 Geo-location capability supported by the equipment

Geo-location capability supported by the equipment	
<input type="checkbox"/>	Yes
<input type="checkbox"/>	The geographical location determined by the equipment as defined in clause 4.2.9.2 shall not be accessible to the user.
<input checked="" type="checkbox"/>	No

1.2 Additional Information Provided by the Submitter

1.2.1 Modulation

IEEE 802.11ad Modulation Scheme

MCS Index	Modulation	Code rate	Data rate (Mbit/s)
0	π /-2BPSK	1/2	27.5
1	π /-2BPSK	1/2	385
2	π /-2BPSK	1/2	770
3	π /-2BPSK	5/8	962.5
4	π /-2BPSK	3/4	1155
5	π /-2BPSK	13/16	1251.25
6	π /-2QPSK	1/2	1540
7	π /-2QPSK	5/8	1925
8	π /-2QPSK	3/4	2310
9	π /-2QPSK	13/16	2502.5
10	π /2-16QAM	1/2	3080
11	π /2-16QAM	5/8	3850
12	π /2-16QAM	3/4	4620

The Channel Bandwidth is 2.16GHz

Can the transmitter operate un-modulated: ☒ Yes ☐ No

1.2.2 Duty Cycle

Duty Cycle	Duty Cycle Factor
The transmitter is intended for 100%	0.00

1.3 Accessories

Accessories				
No.	Equipment Name	Brand Name	Model Name	Rating
1	Adapter	MLF	MLF-A00122400380FE0141	Input: 100-240V ~ 50/60Hz, 0.4Amax Output: 24V, 0.38A
2	PoE	MikroTik	RBGPOE	Input: 9-48V

1.4 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E4300	DoC
2	TX Device	Mikrotiks SIA	wAP G 60ad	DoC
3	Notebook	lenovo	80J2	DoC

1.5 EUT Setups

During the test, executed the test program to control the EUT continuously transmit/receive RF signal.

1.6 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- EN 302 567 V2.1.1 (2017-07)

1.7 Testing Location

Testing Location		
<input type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085
Test Condition		Test Site No.
Radiated Emission		05CH01-CB

2 Test Configuration of Equipment under Test

2.1 Test Channel Frequencies

Test Channel Frequencies Configuration (GHz)	
Low Channel	58.32
Middle Channel	60.48
High Channel	62.64

2.2 Conformance Tests and Related Test Frequencies

Test Item	Test Frequencies (GHz)		
	Low Channel	Middle Channel	High Channel
Receiver Adjacent Channel Rejection	58.32	60.48	62.64

3 Receiver Adjacent Channel Rejection Test Result

3.1 Receiver Adjacent Channel Rejection

3.1.1 Receiver Adjacent Channel Rejection Limit

The equipment shall meet the performance criteria as declared by the manufacturer.

Wanted signal mean power from companion device (dBm) at the input of UUT	Unwanted signal frequency (GHz)	Unwanted signal power (dBm) at the input of UUT	Type of unwanted signal
Pmin + 6 dB	Operating Channel Centre Frequency - Nominal Channel BW	-65	CW
Pmin + 6 dB	Operating Channel Centre Frequency + Nominal Channel BW	-65	CW
NOTE: Pmin is the minimum level of the wanted signal required to meet the minimum performance criteria in the absence of any interference signal.			

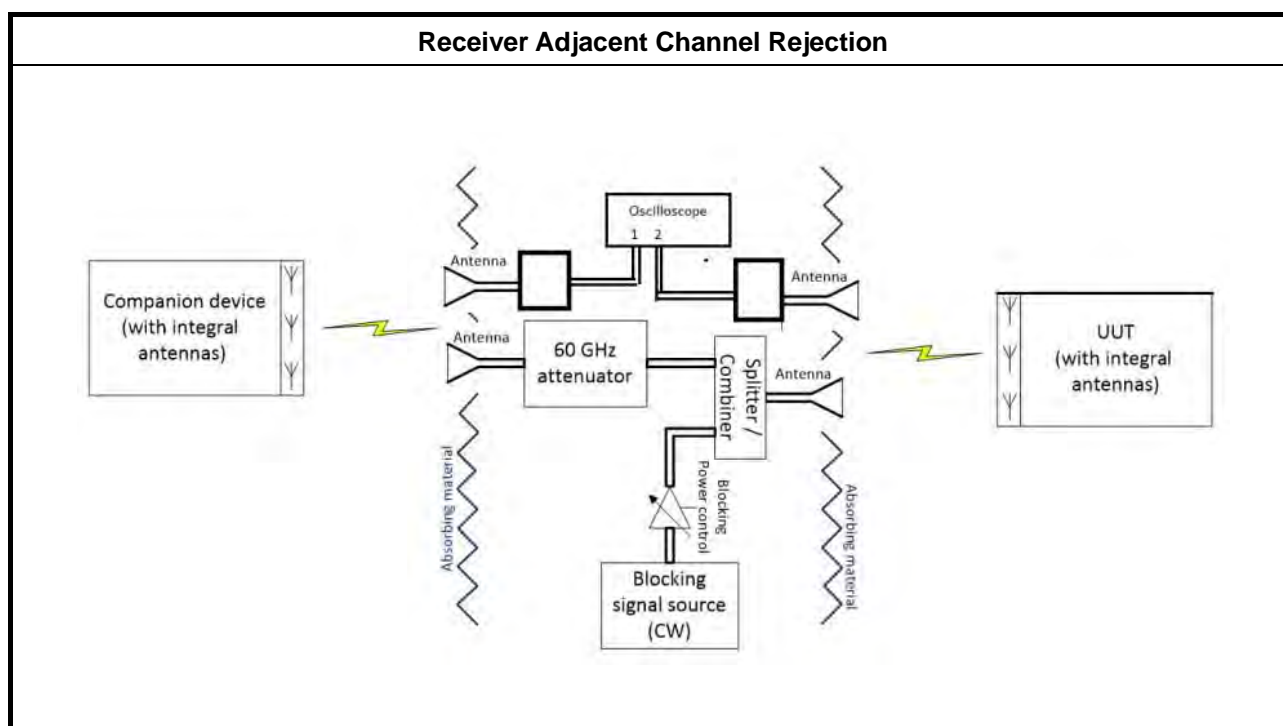
3.1.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.1.3 Test Procedures

Method of measurement: Refer as Refer as ETSI EN 302 567, clause 5.3.7.

3.1.4 Test Setup



3.1.5 Test Result of Receiver Adjacent Channel Rejection

Test Conditions: These measurements shall only be performed at normal test conditions

Temp	22°C	Humidity	54%
Test Engineer	Ekko Hsieh	Test Date	Jul. 15, 2017 ~ Jul. 26, 2017

Receiver Adjacent Channel Rejection Result										
Freq. (GHz)	NCB (GHz)	Pmin	Wanted Signal Power Pmin + 6 (dBm)	Unwanted Signal Frequency		Unwanted Signal Level (dBm)	Type of Unwanted Signal	Min. Performance Pmin -1 without Unwanted Signal	Min. Performance Pmin + 6 with Unwanted Signal	Test Result
				Centre Freq. - NCB (GHz)	Centre Freq. + NCB (GHz)					
58.32	2.16	-77	-71	56.16	60.48	-65	CW	disconnection	Stable Connection	Complied
60.48	2.16	-76	-70	58.32	62.64	-65	CW	disconnection	Stable Connection	Complied
62.64	2.16	-78	-72	60.48	64.80	-65	CW	disconnection	Stable Connection	Complied
Note: 1. Test shall be performed lowest data rate & smallest channel bandwidth. 2. Test shall be performed on all operating channels. 3. Min Performance criteria declared by the manufacturer.										

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum analyzer	R&S	FSV40	100979	9kHz ~ 40GHz	Dec. 26, 2016	Radiated (05CH01-CB)
Mixer	OML	M15HW/A	V91113-1	50 ~ 75 GHz	Sep. 14, 2015*	Radiated (05CH01-CB)
Horn Antenna	Custom Microwave	M15RH	V91113-A	50 ~ 75 GHz	N.C.R.	Radiated (05CH01-CB)
Horn Antenna	Custom Microwave	M15RH	V91113-A	50 ~ 75 GHz	N.C.R.	Radiated (05CH01-CB)
RF Cable-high	Woken	RG402	High Cable-53	1GHz ~ 18GHz	Oct. 24, 2016	Radiated (05CH01-CB)
Signal Generator	R&S	SMR40	100302	10MHz ~ 40GHz	Dec. 21, 2016	Radiated (05CH01-CB)
Millimeter Wave Source	OML	S15MS	9113-1	50 ~ 75 GHz	Nov. 03, 2016	Radiated (05CH01-CB)

Note: Calibration Interval of instruments listed above is one year.

*Calibration Interval of instruments listed above is two year.

N.C.R means Non-Calibration required.

5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Radiated Emission (40GHz ~ 220GHz)	4.7 dB	Confidence levels of 95%

Parameter	Uncertainty
Radio Frequency	±9.5 ppm
Time	±9.3 %