

Targus International LLC

TEST REPORT

SCOPE OF WORK
FCC TESTING-AMP38R

REPORT NUMBER
190522035SZN-003

ISSUE DATE [REVISED DATE]
Jun 17, 2019 [-----]

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Targus International LLC

Application
For
Certification

FCC ID: OXM000106**Wireless Receiver****Model: AMP38R**

2.4GHz Transceiver

Report No.: 190522035SZN-003

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-17]

Prepared and Checked by:

Leo Li
Project Engineer

Approved by:

Peter Kang
Senior Technical Supervisor
Date: Jun 17, 2019

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LIST OF EXHIBITS

INTRODUCTION

<i>EXHIBIT 1:</i>	General Description
<i>EXHIBIT 2:</i>	System Test Configuration
<i>EXHIBIT 3:</i>	Emission Results
<i>EXHIBIT 4:</i>	Equipment Photographs
<i>EXHIBIT 5:</i>	Product Labelling
<i>EXHIBIT 6:</i>	Technical Specifications
<i>EXHIBIT 7:</i>	Instruction Manual
<i>EXHIBIT 8:</i>	Miscellaneous Information
<i>EXHIBIT 9:</i>	Confidentiality Request
<i>EXHIBIT 10:</i>	Test Equipment List

MEASUREMENT/TECHNICAL REPORT

Applicant: Targus International LLC
Applicant Address: 1211 North Miller Street Anaheim, CA 92806 USA

MODEL: AMP38R

FCC ID: OXM000106

This report concerns (check one): Original Grant Class II Change

Equipment Type: DXX - Part 15 Low Power Communication Device Transmitter

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes No

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes No

If no, assumed Part 15, Subpart C for intentional radiator – the new 47 CFR [10-1-17 Edition] provision.

Report prepared by:

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Table of Contents

1.0 General Description	7
1.1 Product Description	7
1.2 Related Submittal(s) Grants	7
1.3 Test Methodology	7
1.4 Test Facility	7
2.0 System Test Configuration	9
2.1 Justification	9
2.2 EUT Exercising Software	9
2.3 Special Accessories	9
2.4 Equipment Modification	9
2.5 Measurement Uncertainty	9
2.6 Support Equipment List and Description	10
3.0 Emission Results	12
3.1 Radiated Test Results	13
3.1.1 Field Strength Calculation	13
3.1.2 Radiated Emission Configuration Photograph	14
3.1.3 Radiated Emissions	14
3.1.4 Transmitter Spurious Emissions	16
3.2 Conducted Emission Configuration Photograph	20
3.2.1 Conducted Emission	20
4.0 Equipment Photographs	24
5.0 Product Labelling	26
6.0 Technical Specifications	28
7.0 Instruction Manual	30
8.0 Miscellaneous Information	32
8.1 Bandedge Plot	33
8.2 Discussion of Pulse Desensitization	36
8.3 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)	36
8.4 Emissions Test Procedures	37
9.0 Confidentiality Request	40
10.0 Test Equipment List	42

List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
Test Report	Bandedge Plot	bandedge.pdf
Test Report	20dB BW Plot	bw.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf



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Test Report

Intertek Report No.: 190522035SZN-003

EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The equipment under test (EUT) is a Wireless Receiver with 2.4G SRD function operated at 2.4GHz band. The EUT is powered by DC 5V by USB port. For more detail information pls. refer to the user manual.

Antenna Type: Integral antenna

Antenna Gain: -1dBi Max

Modulation Type: GFSK

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is an application for certification of a transceiver for the Wireless Receiver 2.4G SRD function.

For other functions were reported in the SDOC report: 190522027SZN-001.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in Semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

1.4 Test Facility

The Semi-Anechoic chamber and shield room used to collect the radiated data and conducted data are Intertek **Testing Services Shenzhen Ltd. Longhua Branch** and located at 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen. This test facility and site measurement data have been fully placed on file with File Number: CN1188.

EXHIBIT 2

SYSTEM TEST CONFIGURATION

2.0 System Test Configuration

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The EUT was powered by DC 5V by USB port through Laptop which powered by AC 120V/60Hz during the test. Only the worst case data was reported.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on a turn table, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

The EUT exercise program (provided by client) used during testing was designed to exercise the various system components in a manner similar to a typical use.

2.3 Special Accessories

N/A

2.4 Equipment Modification

Any modifications installed previous to testing by Targus International LLC will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd Longhua Branch.

2.5 Measurement Uncertainty

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

2.6 Support Equipment List and Description

Description	Manufacturer	Model No.
Wireless Presenter	Provided by applicant	AMP38
Laptop	HP	Compaq 2510p
Hard Disk	Smart.drive	HD-003
USB Cable	Smart.drive	Unshielded, Length 155cm
USB extension cable	Provided by Intertek	Unshielded, Length 50cm



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Test Report

Intertek Report No.: 190522035SZN-003

EXHIBIT 3

EMISSION RESULTS

3.0 Emission Results

Data is included worst-case configuration (the configuration which resulted in the highest emission levels).

3.1 Radiated Test Results

A sample calculation, configuration photographs and data tables of the emissions are included.

3.1.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG$$

Where

FS = Field Strength in $\text{dB}\mu\text{V}/\text{m}$

RA = Receiver Amplitude (including preamplifier) in $\text{dB}\mu\text{V}$

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG$$

Assume a receiver reading of 62.0 $\text{dB}\mu\text{V}$ is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The net field strength for comparison to the appropriate emission limit is 42 $\text{dB}\mu\text{V}/\text{m}$. This value in $\text{dB}\mu\text{V}/\text{m}$ was converted to its corresponding level in $\mu\text{V}/\text{m}$.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 \text{ dB}\mu\text{V}/\text{m}$$

$$\text{Level in } \mu\text{V}/\text{m} = \text{Common Antilogarithm } [(42 \text{ dB}\mu\text{V}/\text{m})/20] = 125.9 \mu\text{V}/\text{m}$$

3.1.2 Radiated Emission Configuration Photograph

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos. pdf.

3.1.3 Radiated Emissions

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Worst Case Radiated Emission
at
531.361 MHz

Judgement: Passed by 14.3 dB

TEST PERSONNEL:

Sign on file

Leo Li, Project Engineer
Typed/Printed Name

Jun 5, 2019
Date

Applicant: Targus International LLC

Date of Test: Jun 5, 2019

Worst Case Operating Mode:

Model: AMP38R

2.4G SRD Link

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	170.941	37.8	20.0	9.6	27.4	43.5	-16.1
Horizontal	232.083	34.0	20.0	11.8	25.8	46.0	-20.2
Horizontal	488.357	26.0	20.0	18.5	24.5	46.0	-21.5
Vertical	39.571	29.7	20.0	12.3	22.0	40.0	-18.0
Vertical	167.126	30.6	20.0	9.8	20.4	43.5	-23.1
Vertical	531.361	31.8	20.0	19.9	31.7	46.0	-14.3

NOTES: 1. Quasi-Peak detector is used except for others stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. All emissions are below the QP limit.

3.1.4 Transmitter Spurious Emissions (Radiated)

Worst Case Radiated Emission
at
2400.000 MHz

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos. pdf.

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 7.3 dB

TEST PERSONNEL:

Sign on file

Leo Li, Project Engineer
Typed/Printed Name

Jun 10, 2019
Date

Applicant: Targus International LLC

Date of Test: Jun 10, 2019

Worst Case Operating Mode:

Model: AMP38R

Transmitting

Table 2

Radiated Emissions

(2404MHz)

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2404.000	94.2	36.7	28.1	85.6	114.0	-28.4
Horizontal	4808.000	47.4	36.7	35.5	46.2	74.0	-27.8
Horizontal	7212.000	51.8	36.1	36.5	52.2	74.0	-21.8
Horizontal	9616.000	51.1	36.2	37.0	51.9	74.0	-22.1

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2404.000	93.9	36.7	28.1	85.3	94.0	-8.7
Horizontal	4808.000	38.8	36.7	35.5	37.6	54.0	-16.4
Horizontal	7212.000	43.5	36.1	36.5	43.9	54.0	-10.1
Horizontal	9616.000	45.0	36.2	37.0	45.8	54.0	-8.2

NOTES: 1. Peak detector is used for the emission measurement (RBW=1MHz / VBW=3MHz for Peak value, and RBW=1MHz / VBW=10Hz for Average value; RBW=3MHz is used for fundamental emission measurement).

2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Leo Li

Applicant: Targus International LLC

Date of Test: Jun 10, 2019

Worst Case Operating Mode:

Model: AMP38R

Transmitting

Table 3

Radiated Emissions

(2440MHz)

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2440.000	92.9	36.7	28.1	84.3	114.0	-29.7
Horizontal	4880.000	44.4	36.7	35.5	43.2	74.0	-30.8
Horizontal	7320.000	50.6	36.1	37.2	51.7	74.0	-22.3
Horizontal	9760.000	51.0	36.2	37.0	51.8	74.0	-22.2

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2440.000	92.5	36.7	28.1	83.9	94.0	-10.1
Horizontal	4880.000	37.8	36.7	35.5	36.6	54.0	-17.4
Horizontal	7320.000	42.6	36.1	37.2	43.7	54.0	-10.3
Horizontal	9760.000	44.6	36.2	37.0	45.4	54.0	-8.6

NOTES: 1. Peak detector is used for the emission measurement (RBW=1MHz / VBW=3MHz for Peak value, and RBW=1MHz / VBW=10Hz for Average value; RBW=3MHz is used for fundamental emission measurement).

2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Leo Li

Applicant: Targus International LLC

Date of Test: Jun 10, 2019

Worst Case Operating Mode:

Model: AMP38R

Transmitting

Table 4

Radiated Emissions

(2478MHz)

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2478.000	92.6	36.7	28.1	84.0	114.0	-30.0
Horizontal	4956.000	44.3	36.7	35.5	43.1	74.0	-30.9
Horizontal	7434.000	51.0	36.1	37.2	52.1	74.0	-21.9
Horizontal	9912.000	48.6	36.3	38.9	51.2	74.0	-22.8

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2478.000	92.1	36.7	28.1	83.5	94.0	-10.5
Horizontal	4956.000	36.5	36.7	35.5	35.3	54.0	-18.7
Horizontal	7434.000	42.6	36.1	37.2	43.7	54.0	-10.3
Horizontal	9912.000	42.7	36.3	38.9	45.3	54.0	-8.7

NOTES: 1. Peak detector is used for the emission measurement (RBW=1MHz / VBW=3MHz for Peak value, and RBW=1MHz / VBW=10Hz for Average value; RBW=3MHz is used for fundamental emission measurement).

2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Leo Li

3.2 Conducted Emission Configuration Photograph

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: conducted photos.pdf.

3.2.1 Conducted Emission

Worst Case Conducted Configuration
at
0.186MHz

Judgement: Passed by 11.0dB margin

TEST PERSONNEL:

Sign on file

Leo Li, Project Engineer
Typed/Printed Name

Jun 10, 2019
Date

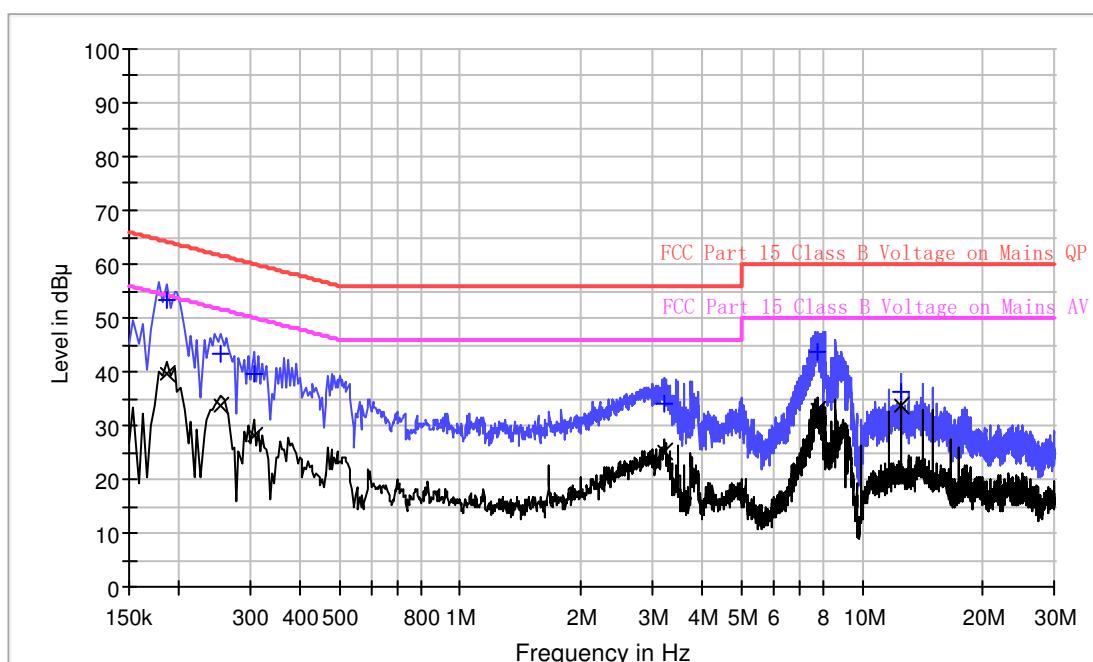
Applicant: Targus International LLC

Date of Test: Jun 10, 2019

Model: AMP38R

Worst Case Operating Mode: 2.4G SRD Link

Phase: Live

Graphic / Data Table**Conducted Emissions
Pursuant to FCC 15.207: Emissions Requirement****Limit and Margin QP**

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.186000	53.2	9.000	L1	9.7	11.0	64.2
0.254000	43.5	9.000	L1	9.7	18.1	61.6
0.306000	39.6	9.000	L1	9.8	20.5	60.1
3.214000	34.2	9.000	L1	9.8	21.8	56.0
7.734000	43.7	9.000	L1	9.9	16.3	60.0
12.442000	36.3	9.000	L1	10.1	23.7	60.0

Limit and Margin AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.186000	39.8	9.000	L1	9.7	14.4	54.2
0.254000	33.5	9.000	L1	9.7	18.1	51.6
0.306000	28.3	9.000	L1	9.8	21.8	50.1
3.214000	25.1	9.000	L1	9.8	20.9	46.0
7.734000	33.0	9.000	L1	9.9	17.0	50.0
12.442000	33.7	9.000	L1	10.1	16.3	50.0

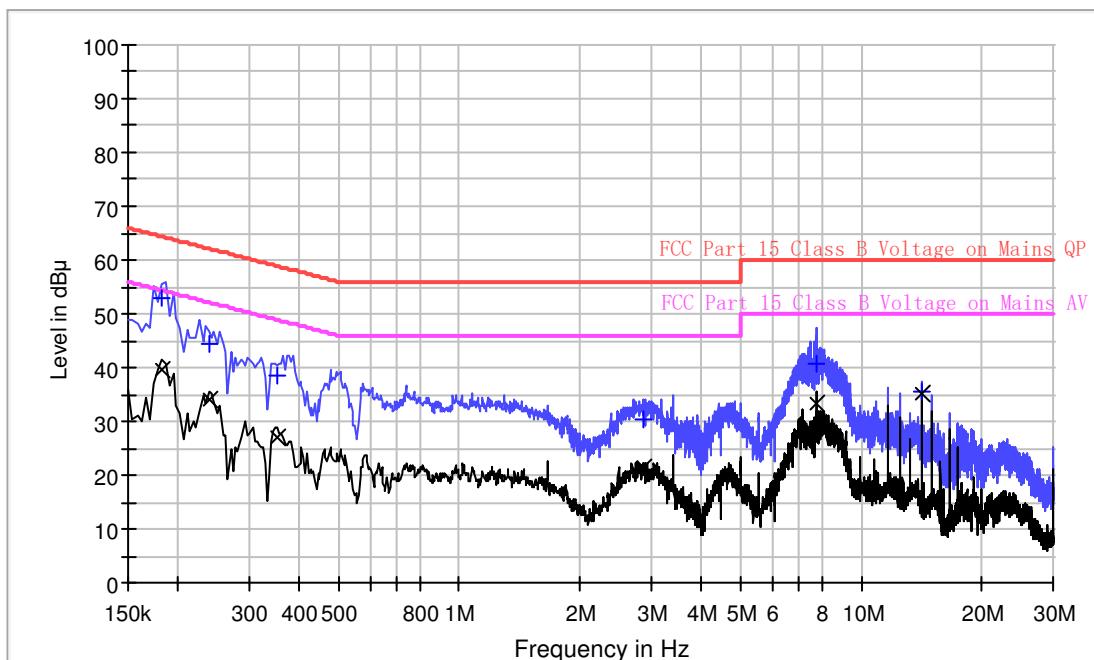
Applicant: Targus International LLC

Date of Test: Jun 10, 2019

Model: AMP38R

Worst Case Operating Mode: 2.4G SRD Link

Phase: Neutral

Graphic / Data Table**Conducted Emissions
Pursuant to FCC 15.107: Emissions Requirement****Limit and Margin QP**

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.182000	52.9	9.000	N	9.7	11.5	64.4
0.238000	44.4	9.000	N	9.7	17.8	62.2
0.354000	38.3	9.000	N	9.8	20.6	58.9
2.862000	30.5	9.000	N	9.8	25.5	56.0
7.706000	40.9	9.000	N	9.9	19.1	60.0
14.098000	35.7	9.000	N	10.2	24.3	60.0

Limit and Margin AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.182000	39.7	9.000	N	9.7	14.7	54.4
0.238000	34.2	9.000	N	9.7	18.0	52.2
0.354000	26.9	9.000	N	9.8	22.0	48.9
2.862000	21.6	9.000	N	9.8	24.4	46.0
7.706000	33.4	9.000	N	9.9	16.6	50.0
14.098000	35.3	9.000	N	10.2	14.7	50.0

EXHIBIT 4**EQUIPMENT PHOTOGRAPHS**

4.0 Equipment Photographs

For electronic filing, the photographs of the tested EUT are saved with filename: external photos.pdf & internal photos.pdf.

EXHIBIT 5

PRODUCT LABELLING

5.0 Product Labelling

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

EXHIBIT 6**TECHNICAL SPECIFICATIONS**

6.0 Technical Specifications

For electronic filing, the block diagram and schematics of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.



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Test Report

Intertek Report No.: 190522035SZN-003

EXHIBIT 7

INSTRUCTION MANUAL

7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

EXHIBIT 8

MISCELLANEOUS INFORMATION

8.0 Miscellaneous Information

This miscellaneous information includes details of the measured bandedge, the test procedure and calculation of factor such as pulse desensitization.

8.1 Bandedge Plot

For electronic filing, the plot shows the fundamental emission when modulated is saved with filename: bandedge.pdf. From the plot, the field strength of any emissions outside of the specified frequency band are attenuated to the general radiated emission limits in section 15.209. It fulfills the requirement of 15.249(d).

Peak Measurement

Restricted-band band-edge tests shall be performed as radiated measurements, i.e (Band-edge Plot).

Fixed frequency mode:

(i) Lower channel 2404MHz:

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2400.000	66.8	36.7	28.1	58.2	74.0	-15.8

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2400.000	55.3	36.7	28.1	46.7	54.0	-7.3

(ii) Upper channel 2478MHz:

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2483.500	65.4	36.8	29.1	57.7	74.0	-16.3

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2483.500	54.2	36.8	29.1	46.5	54.0	-7.5

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dB μ V/m (Peak Limit) and 54dB μ V/m (Average Limit).

FHSS mode:

(i) Lower channel 2404MHz:

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2400.000	67.2	36.7	28.1	58.6	74.0	-15.4

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2400.000	55.3	36.7	28.1	46.7	54.0	-7.3

(ii) Upper channel 2478MHz:

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2483.500	66.2	36.8	29.1	58.5	74.0	-15.5

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	2483.500	54.3	36.8	29.1	46.6	54.0	-7.4

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dB μ V/m (Peak Limit) and 54dB μ V/m (Average Limit).

8.1 Bandedge Plot (cont'd)

Pursuant to FCC part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

Figure 8.1 Bandwidth

8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

8.3 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
x	Not applicable, duty cycle was not used.

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.10 – 2013.

The transmitting equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter and approximately 0.8 meter up to 1GHz and 1.5 meter above 1GHz in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Detector function for radiated emissions is in peak mode. Average Measurements were made with measurement instrumentation employing an average detector function using a minimum resolution bandwidth of 1 MHz.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

Detector function for conducted emissions is in QP & AV mode and IFBW setting is 9 kHz from the frequency band 150 kHz to 30MHz.

8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.10 - 2013.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. Above 1000 MHz, a resolution bandwidth of 1 MHz (RBW 3MHz for fundamental emission) is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

EXHIBIT 9**CONFIDENTIALITY REQUEST**

9.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.



Total Quality. Assured.

Test Report

Intertek Report No.: 190522035SZN-003

EXHIBIT 10

TEST EQUIPMENT LIST

10.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	Biconilog Antenna	ETS	3142E	00166158	14-Sep-2018	14-Sep-2019
SZ061-08	Horn Antenna	ETS	3115	00092346	24-May-2019	24-May-2020
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	14-Sep-2018	14-Sep-2019
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	10-Mar-2019	10-Mar-2020
SZ056-03	Spectrum Analyzer	R&S	FSP30	101148	28-May-2019	28-May-2020
SZ185-01	EMI Receiver	R & S	ESCI	100547	4-Jan-2019	4-Jan-2020
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	15-Jan-2019	15-Jan-2020
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	15-Dec-2018	15-Dec-2020
SZ062-02	RF Cable	RADIALL	RG 213U	--	25-Dec-2018	25-Jun-2019
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	23-Feb-2019	23-Aug-2019
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	23-Feb-2019	23-Aug-2019
SZ067-04	Notch Filter	Micro-Tronics	BRM5070 2-02	--	28-May-2019	28-May-2020
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	26-Oct-2018	26-Oct-2019
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	04-Jul-2018	04-Jul-2019
SZ188-03	Shielding Room	ETS	RFD-100	4100	16-Jan-2017	16-Jan-2020
SZ062-16	RF Cable	HUBER+SUHNER	CBL2-BN-1m	110127-2231000	29-Oct-2018	29-Oct-2019

***** End of Report *****