

RF-EXPOSURE ASSESSMENT REPORT

FCC 47 CFR Part 2.1091
Industry Canada RSS-102

RF-Exposure evaluation of mobile equipment

Report Reference No.: G0M-1408-4061-TFC091ME-V01

Testing Laboratory: Eurofins Product Service GmbH

Address: Storkower Str. 38c
15526 Reichenwalde
Germany

Accreditation:



A2LA Accredited Testing Laboratory, Certificate No.: 1983.01
FCC Filed Test Laboratory, Reg.-No.: 96970
IC OATS Filing assigned code: 3470A

Applicant's name: Sonetics Corporation

Address: 7340 SW Durham Road
OR 97224 Portland
USA

Test specification:

Standard: 47 CFR 1.1310 / 47 CFR 2.1091 / 47 CFR 2.1093
OET Bulletin 65:1997
RSS-102, Issue 4:2010
Safety Code 6:2009

Equipment under test (EUT):

Product description	DECT 6.0 Base Station	
Model No.	SON150	
Additional Model(s)	None	
Brand Name(s)	Sonetics Corporation	
Hardware version	SON150 Rev A (See Addition Information)	
Firmware / Software version	Rev A (See Addition Information)	
	FCC-ID: V9N950325700V1	IC: 7895A-950325700
Test result	Passed	

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Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Possible test case verdicts:

- neither assessed nor tested: N/N
- required by standard but not appl. to test object.....: N/A
- required by standard but not tested.....: N/T
- not required by standard for the test object: N/R
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

Testing:

Test Lab Temperature: 20 – 23 °C

Test Lab Humidity: 32 – 38 %

Date of receipt of test item: 2014-09-22

Date (s) of assessment: 2014-12-15

Compiled by: Matthias Handrik

Assessed by (+ signature): Matthias Handrik
(Responsible for Assessment)



Approved by (+ signature): Christian Weber



Date of issue: 2014-12-15

Total number of pages: 13

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

Additional comments:

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Subject: Software/Firmware Declaration
Date: December 01, 2014
Model Number: SON150 DECT Base Station, Revision A

Sonetics Corporation hereby declares that the above referenced model, submitted to Eurofins for FCC and IC testing have the following firmware installed.

SON150 DECT Basestation Revision A (950-3257-02 Revision B)					
Item Reference	Part Number	Description	Qty	BOM Version Revision	Firmware Radio Related?
15	490-0200-00	Firmware, SON150, BASE STATION, S-US	1	A	Yes
20	490-4012-00	Firmware, RTX1040 RADIO RTX Release Ver 7.0	1	A	Yes
35	121-4040-H1	PCBA, SON150, WB, WIRELESS BASE	1	H	Hardware

The above is declared as accurate and true as of 12/01/2014.

Sincerely,



Michael Heade
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Sonetics Quality Policy:

"We practice continuous quality improvement of our processes to achieve customer satisfaction through customer-focused solutions, sales, service, and innovation"



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Version History

Version	Issue Date	Remarks	Revised by
01	2014-12-15	Initial Release	

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1 Equipment (Test item) Description

Description	DECT 6.0 Base Station
Model	SON150
Additional Model(s)	None
Brand Name(s)	Sonetech Corporation
Serial number	None
Hardware version	SON150 Rev A (See Additional Information)
Software / Firmware version	Rev A (See Additional Information)
FCC-ID	V9N950325700V1
IC	7895A-950325700
Equipment type	End product

1.1 Reference Documents

Document type	Document No.	Issued by	Date
Test Report	G0M-1408-4061-TFC15DFP-V01	Eurofins Product Service GmbH	2014-12-15

1.2 Radiation Sources

Mode #	Description	
UPCS	Frequency range [MHz]	1921.536 – 1928.448 MHz
	Channels	5
	Modulations	GFSK
	Maximum conducted power [dBm]	17.95
	Maximum transmission duty cycle [%]	21
	Antenna gain [dBi]	3.0
	Antenna diameter [cm]	13.3

2 Result Summary

FCC 47 CFR Part 2.1091, IC RSS-102			
Product Specific Standard Section	Requirement	Result	Remarks
47 CFR 2.1091	Maximum permissible exposure @ 20cm below limit	PASS	
RSS-102 2.5.2	Maximum permissible exposure @ 20cm below limit	PASS	
Remarks:			

3 RF-Exposure Classifications

Device Types	
Fixed	A fixed device is defined as a device physically secured at one fixed location and cannot be easily re-located.
Mobile	A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. (47 CFR 2.1091)
Portable	A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user. (47 CFR 2.1093)

Exposure Categories	
Occupational / Controlled	Limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
General population / uncontrolled	Exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

4 Assessment

4.1 MPE Assessment – 47 CFR 2.1091 / RSS-102

MPE Assessment acc. to 47 CFR 2.1091 / IC RSS-102			Verdict: PASS			
Assessment according to reference		Reference Method				
		FCC OET Bulletin 65 / RSS-102 & Safety Code 6				
Device type		mobile				
Exposure category		General public				
IC Limits – Occupational / Controlled Exposure						
Frequency range [MHz]	Electric field strength [V/M]	Magnetic field strength [A/M]	Power density [W/m ²]	Averaging time [min]		
0.003 – 1.0	600	4.9	N/A	6		
1 – 10	600·f	4.9·f	N/A	6		
10 – 30	60	4.9·f	N/A	6		
30 – 300	60	0.163	10.0*	6		
300 – 1500	3.54·f ^{0.5}	0.0094·f ^{0.5}	f/30	6		
1500 - 15000	137	0.364	50	6		
15000 - 150000	137	0.364	50	616000/f ^{0.5}		
150000 - 300000	0.354·f ^{0.5}	9.4·10 ⁻⁴ ·f ^{0.5}	3.33·10 ⁻⁴ ·f	616000/f ^{0.5}		
IC Limits – General Population / Uncontrolled Exposure						
Frequency range [MHz]	Electric field strength [V/M]	Magnetic field strength [A/M]	Power density [W/m ²]	Averaging time [min]		
0.003 – 1.0	280	2.19	N/A	6		
1 – 10	280·f	2.19·f	N/A	6		
10 – 30	28	2.19·f	N/A	6		
30 – 300	28	0.073	2.0*	6		
300 – 1500	1.585·f ^{0.5}	0.0042·f ^{0.5}	f/150	6		
1500 - 15000	61.4	0.163	10	6		
15000 - 150000	61.4	0.163	10	616000/f ^{0.5}		
150000 - 300000	0.158·f ^{0.5}	4.21·10 ⁻⁴ ·f ^{0.5}	6.67·10 ⁻⁵ ·f	616000/f ^{0.5}		

* = Power density is applicable at frequencies greater than 100 MHz; f in MHz

FCC Limits – Occupational / Controlled Exposure				
Frequency range [MHz]	Electric field strength [V/M]	Magnetic field strength [A/M]	Power density [mW/cm ²]	Averaging time [min]
0.3 – 3.0	614	1.63	(100)*	6
3.0 - 30	1842/f	4.89/f	(900/f ²)*	6
30 - 300	61.4	0.163	1.0	6
300 - 1500	N/A	N/A	f/300	6
1500 - 100000	N/A	N/A	5.0	6
FCC Limits – General Population / Uncontrolled Exposure				
Frequency range [MHz]	Electric field strength [V/M]	Magnetic field strength [A/M]	Power density [mW/cm ²]	Averaging time [min]
0.3 – 1.34	614	1.63	(100)*	30
1.34 - 30	842/f	2.19/f	(180/f ²)*	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	N/A	N/A	f/1500	30
1500 - 100000	N/A	N/A	1.0	30

* = Plane wave equivalent power density; f in MHz

Assessment Relations				
$\lambda[m] = \frac{c \left[\frac{m}{s} \right]}{f[Hz]} ; R_{FF}[m] \geq \frac{2 \cdot D[m]^2}{\lambda[m]}$				
$S[mW/cm^2] = \frac{P_{E.I.R.P.}[mW]}{4\pi R[cm]^2} ; R[cm] = \sqrt{\frac{P_{E.I.R.P.}[mW]}{4\pi S[mW/cm^2]}}$				
$P_R[mW] = P_C[mW] \cdot G ; P_R[dBm] = P_C[dBm] + G[dBi]$				
$DCC [dB] = 10 \cdot \log_{10} \left(\frac{DC[\%]}{100} \right)$				

Assessment procedure				
<p>For each radio and frequency band the worst case transmission mode with the highest peak conducted or radiated power is evaluated at the frequency that results in the most restrictive rf-exposure limit. From the peak power values, antenna gains and duty cycles taken from the reference documents, the source average radiated power values are calculated. From the average radiated power the power densities at antenna far-field distance, at 20cm separation distance from the radiation source is calculated. Compliance with the RF-Exposure limit is determined at 20cm separation distance.</p>				

Assessment results		
Transmission mode		
Operating mode frequency range [MHz]	1921.536 – 1928.448	
Assessment frequency (f) [MHz]	1921.536	
Transmission duty cycle (DC) [%]	21	
Peak conducted power (P _c) [dBm]	17.95	
Peak radiated power (P _R) [dBm e.i.r.p.]	20.95	
Peak Antenna gain (G) [dBi]	3.0	
Maximum Antenna Diameter D [cm]	13.3	
Antenna far-field distance		
Transmission frequency wavelength (λ)	0.156m	15.61cm
Antenna far-field distance (R _{FF})	0.227m	22.66cm
Power evaluation		
Peak conducted power (P _c)	62.37mW	17.95dBm
Peak Antenna Gain (G)	2.00	3.00dBi
Calculated peak radiated power (P _{R-Calc})	124.45mW	20.95dBm
Measured peak radiated power (P _R)	124.45mW	20.95dBm
Source average Power		
Maximum transmission duty cycle (DC)	21.0%	
Duty cycle correction (DCC)	0.21	-6.78dB
Measured peak radiated power (P _R)	124.45mW	20.95dBm
Averaged peak radiated power (P _{RAVG})	26.13mW	14.17dBm
Power density		
Compliance power density limit	1.000mW/cm ²	10.00W/m ²
Power density @ Antenna far-field distance	0.004mW/cm ²	0.041W/m ²
Power density @ 20cm	0.005mW/cm ²	0.052W/m ²
Distance for compliance power density	0.014m	1.44cm
Verdict		
The power density of the EUT at 20cm is below the FCC/IC MPE limit!		
Comments:		