Test Report

Product Name	2020 Tablet
Model No.	2020
FCC ID.	SEJ-2020

Applicant	Zonar Systems, Inc.
Address	18200 Cascade Ave South, Suite 200, Seattle, WA 98188

Date of Receipt	Sep. 21, 2012
Issued Date	Nov. 01, 2012
Report No.	129412R-RFUSP39V01
Report Version	V1.0

Testing Laboratory
0914

The Test Results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date: Nov. 01, 2012
Report No.: 129412R-RFUSP39V01

Product Name	2020 Tablet
Applicant	Zonar Systems, Inc.
Address	18200 Cascade Ave South, Suite 200, Seattle, WA 98188
Manufacturer	MICRO-STAR INT'L Co., LTD.
Model No.	2020
FCC ID.	SEJ-2020
EUT Rated Voltage	DC 3.7V
EUT Test Voltage	AC 120V/60Hz
Trade Name	Zonar
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2010 ANSI C63.4: 2003
Test Result	Complied

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(Senior Adm. Specialist / Genie Chang)

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(Assistant Engineer / Alan Chen)

Approved By :
(Manager / Vincent Lin)

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	2020 Tablet
Trade Name	Zonar
Model No.	2020
FCC ID.	SEJ-2020
Frequency Range	125kHz
Type of Modulation	N/A
Type of antenna	Coil Antenna
Number of Channel	1
Power Adapter	MFR: TPT, M/N: MII050180-U Input: AC 100-240V~, 50-60Hz, 0.3A Output: DC 5V, 1.8A Cable Out: Shielded, 1.2m

Frequency of Each Channel:

Channel	Frequency
1	125kHz

Note:
1. The EUT is a 2020 Tablet with a built-in 125kHz transmitter.
2. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit

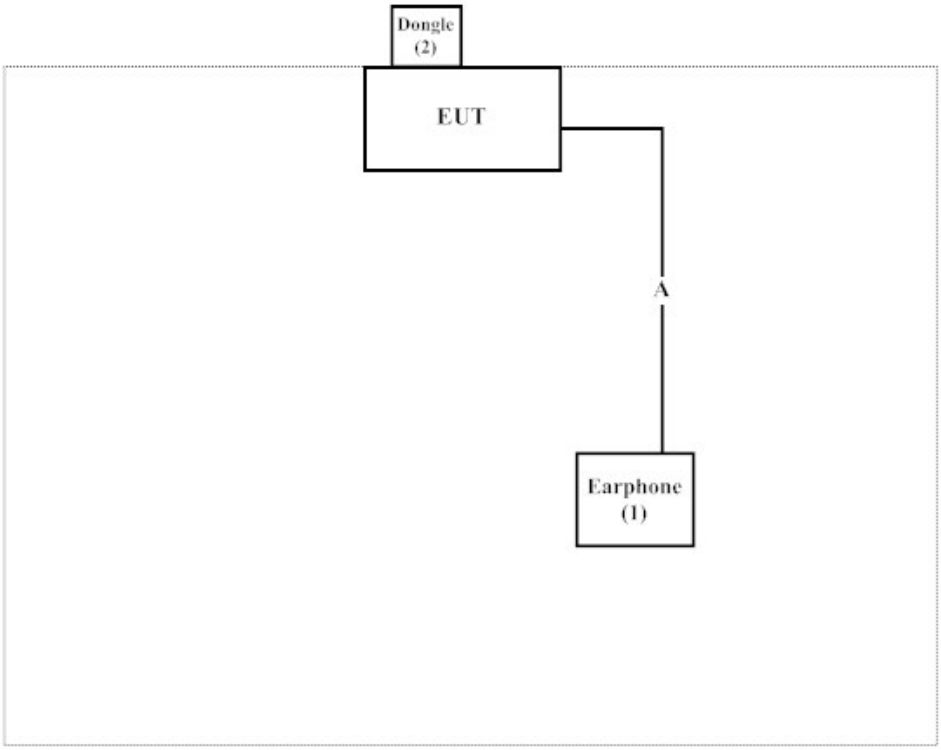
1.3. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Earphone	Dr.AV	CD-806B	N/A	N/A
2	Dongle	Transcend	N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A	Microphone & Earphone Cable	Non-Shielded, 0.2m

1.4. Configuration of Test System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in section 1.4.

(2) Execute program on the EUT.

(3) Start transmits continually.

(4) Verify that the EUT works correctly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : http://tw.quietek.com/tw/emc/accreditations/accreditations.htm
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/

Site Description: Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Accreditation on NVLAP
NVLAP Lab Code: 200533-0

Site Name: Quietek Corporation
Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

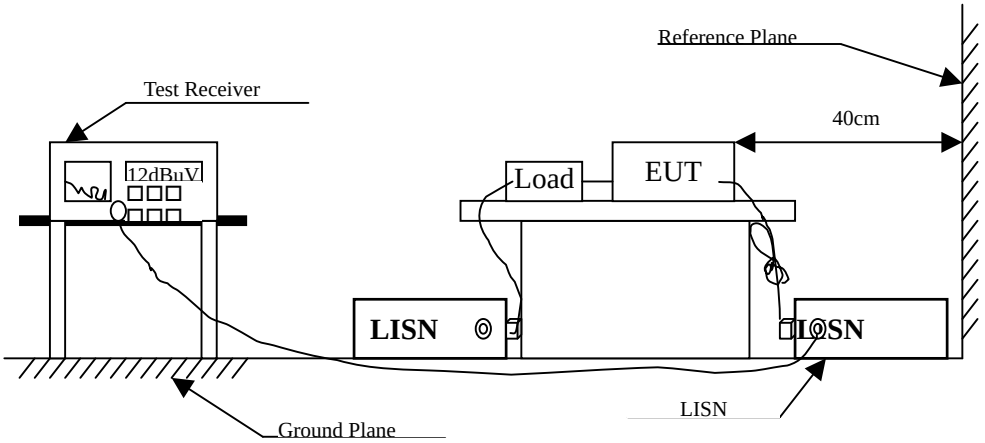
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2012	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2012	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2012	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2012	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2012	
	No.1 Shielded Room				

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : 2020 Tablet
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Transmit

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.189	9.830	33.740	43.570	-21.316	64.886
0.255	9.830	29.170	39.000	-24.000	63.000
0.431	9.830	30.080	39.910	-18.061	57.971
0.513	9.830	32.770	42.600	-13.400	56.000
2.369	9.840	25.640	35.480	-20.520	56.000
8.732	9.958	25.790	35.748	-24.252	60.000
Average					
0.189	9.830	25.300	35.130	-19.756	54.886
0.255	9.830	19.850	29.680	-23.320	53.000
0.431	9.830	20.550	30.380	-17.591	47.971
0.513	9.830	20.570	30.400	-15.600	46.000
2.369	9.840	13.960	23.800	-22.200	46.000
8.732	9.958	14.020	23.978	-26.022	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : 2020 Tablet
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Transmit

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	**dBuV**
LINE 2					
Quasi-Peak					
0.197	9.830	32.950	42.780	-21.877	64.657
0.244	9.830	28.370	38.200	-25.114	63.314
0.638	9.840	26.520	36.360	-19.640	56.000
0.857	9.850	28.320	38.170	-17.830	56.000
4.162	9.870	25.670	35.540	-20.460	56.000
8.615	10.006	27.610	37.616	-22.384	60.000
Average					
0.197	9.830	19.710	29.540	-25.117	54.657
0.244	9.830	15.660	25.490	-27.824	53.314
0.638	9.840	12.200	22.040	-23.960	46.000
0.857	9.850	11.970	21.820	-24.180	46.000
4.162	9.870	12.620	22.490	-23.510	46.000
8.615	10.006	22.260	32.266	-17.734	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Radiated Emission

3.1. Test Equipment

The following test equipment are used during the radiated emission test:

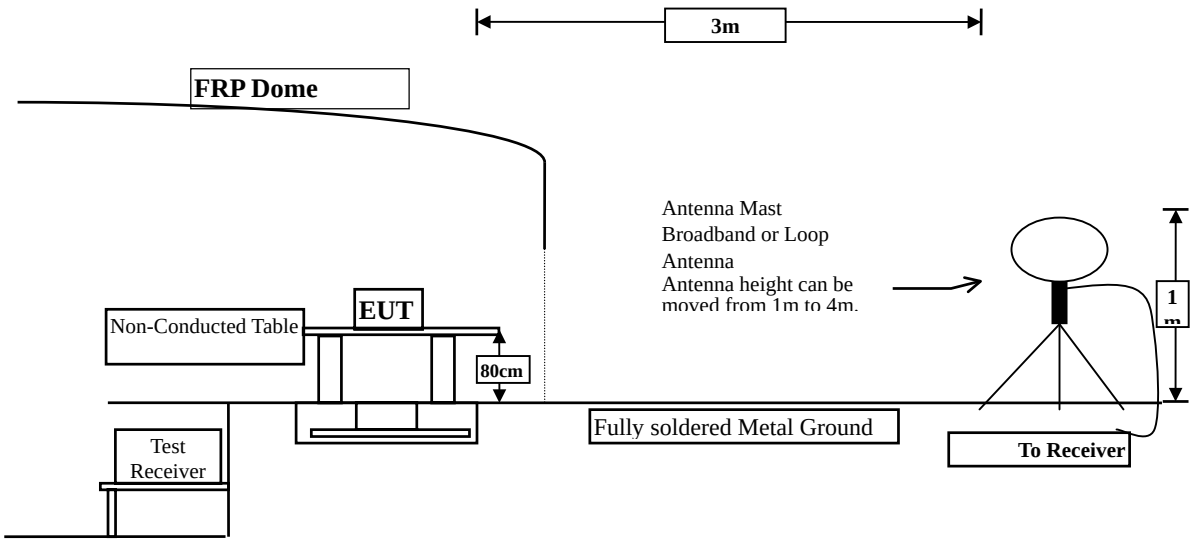
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2012
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2012
		Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2012
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2012
		Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2012
		Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2012
		Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2012
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2012
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2012
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All equipments are calibrated every one year.

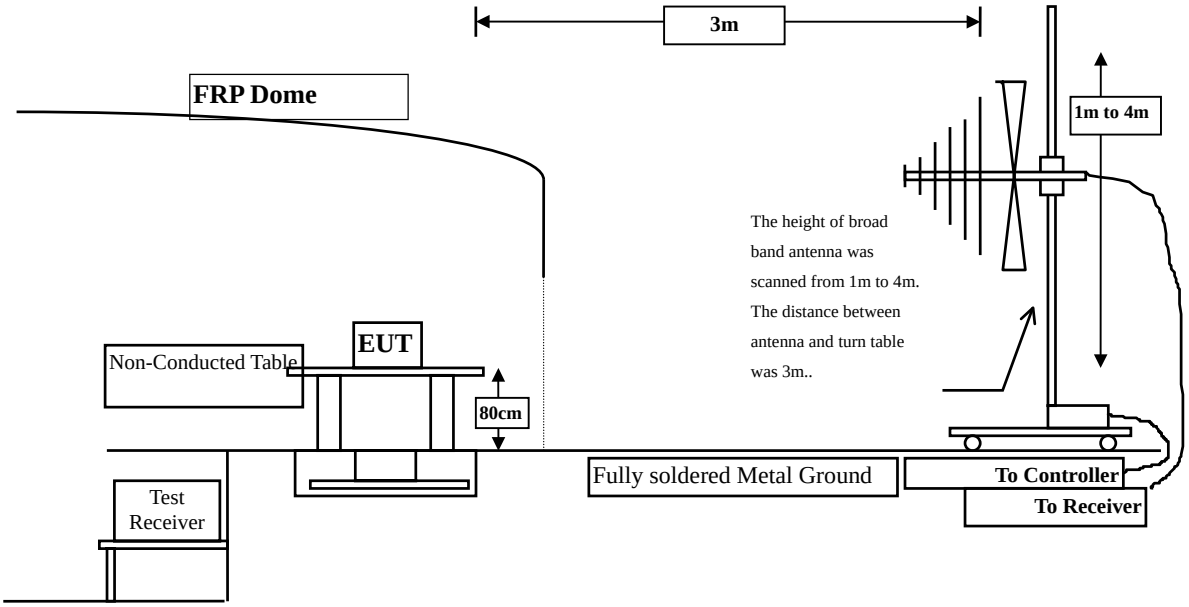
2. The test equipments marked by “X” are used to measure the final test results.

3.2. Test Setup

Under 30MHz Test Setup



Radiated Emission Below 1GHz



3.3. Limits

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark[1]	300
0.490-1.705	24000/F(kHz)	See Remark[1]	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.
The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.
The measurement is divided into the Preliminary Measurement and the Final Measurement.
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.
The worst radiated emission is measured on the Final Measurement.
The measurement frequency range form 9KHz to 10th harminics of fundamental was investigated.

3.5. Uncertainty

± 3.9 dB above 1GHz
± 3.8 dB below 1GHz

3.6. Test Result of Radiated Emission

Product : 2020 Tablet
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

9kHz~30MHz

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Quasi-Peak					
Horizontal					
0.125	19.650	67.100	86.750	-18.916	105.666
0.250	19.600	46.800	66.400	-33.245	99.645
0.375	19.600	42.900	62.500	-33.624	96.124
0.500	19.597	41.300	60.897	-12.728	73.625
0.625	19.540	37.300	56.840	-15.757	71.687
0.750	19.500	39.200	58.700	-12.782	70.103
0.875	19.500	35.500	55.000	-15.368	68.764
1.000	19.500	30.300	49.800	-19.454	67.604
2.510	19.604	34.500	54.104	-15.436	69.540
3.740	19.700	28.180	47.880	-21.660	69.540
14.510	20.080	28.180	48.260	-21.280	69.540
Quasi-Peak					
Vertical					
0.125	19.650	61.700	81.350	-24.316	105.666
0.250	19.600	49.600	69.200	-30.445	99.645
0.375	19.600	47.000	66.600	-29.524	96.124
0.500	19.597	45.400	64.997	-8.628	73.625
0.625	19.540	42.100	61.640	-10.047	71.687
0.750	19.500	44.300	63.800	-6.303	70.103
0.875	19.500	41.000	60.500	-8.264	68.764
1.000	19.500	35.700	55.200	-12.404	67.604
2.410	19.600	38.100	57.700	-11.840	69.540
3.610	19.700	36.900	56.600	-12.940	69.540
15.010	20.100	20.120	40.220	-29.320	69.540

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

Product : 2020 Tablet
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

30MHz~1GHz

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
QP Detector					
37.772	1.318	32.924	34.242	-5.758	40.000
149.696	-14.246	39.701	25.455	-18.045	43.500
350.224	-4.472	32.938	28.466	-17.534	46.000
532.099	1.271	31.158	32.429	-13.571	46.000
715.529	3.794	25.940	29.735	-16.265	46.000
836.779	5.503	27.061	32.564	-13.436	46.000
Vertical					
QP Detector					
50.208	-12.810	46.649	33.839	-6.161	40.000
208.766	-11.256	37.865	26.609	-16.891	43.500
404.631	-1.076	29.949	28.873	-17.127	46.000
532.099	1.271	32.166	33.437	-12.563	46.000
748.173	4.462	27.167	31.629	-14.371	46.000
903.622	5.506	25.571	31.077	-14.923	46.000

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.