

No attempt has been made to rank the information contained in this report in order of importance, since BPA Worldwide believes this is a judgment which must be made by the user of the report.

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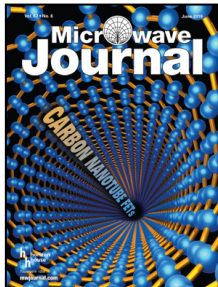
Since 1958, **MICROWAVE JOURNAL** has been a leading source for information about RF and Microwave technology, design techniques, news, events and educational information.

BRAND REPORT PURPOSE

The Brand Report provides a deeper understanding and identification of all audited touch points with customers that have interest in the brand. It is designed to present analysis of all communication channels, including a brand's unique users within each channel of, but not across, multiple media platforms. This non-integrated report contains data for each separate media channel as indicated in the Executive Summary. No attempt has been made to identify or eliminate duplication that may exist across media channels.

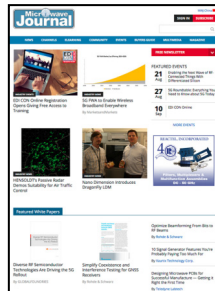
CHANNELS

MICROWAVE JOURNAL



6 issues in the period
50,000 average circulation

MICROWAVE JOURNAL WEBSITE



124,145 average users

EXECUTIVE SUMMARY

Below are the average contacts per occurrence, including frequency per period reported.

	Non-Paid	Paid	Average
MICROWAVE JOURNAL (6 issues in the period)	50,000	-	50,000
a. Print	28,990	-	28,990
b. Digital	21,010	-	21,010
1. Requested	21,010	-	21,010
2. Non-Requested	-	-	-
MICROWAVE JOURNAL WEBSITE (Monthly Users with 236,828 average Pageviews)	124,145	-	124,145

3b. QUALIFICATION SOURCE BREAKOUT OF QUALIFIED CIRCULATION FOR ISSUE OF NOVEMBER 2019

Qualification Source	Qualified Within			Print	Digital	Total Qualified	Percent
	1 Year	2 Years	3 Years				
I. Direct Request:	38,619	11,381	-	28,688	21,312	50,000	100.0
II. Request from recipient's company:	-	-	-	-	-	-	-
III. Membership Benefit:	-	-	-	-	-	-	-
IV. Communication from recipient or recipient's company (other than request):	-	-	-	-	-	-	-
V. Sources other than above, including: Association rosters and directories; Business directories; Manufacturer's, distributor's and wholesaler's lists; and Other sources:	-	-	-	-	-	-	-
VI. Single Copy Sales:	-	-	-	-	-	-	-
TOTAL QUALIFIED CIRCULATION	38,619	11,381	-	28,688	21,312	50,000	100.0
PERCENT	77.2	22.8	-	57.4	42.6	100.0	

QUALIFICATION SOURCE BREAKOUT OF QUALIFIED CIRCULATION FOR ISSUE OF NOVEMBER 2019*

State	Print	Digital	Total Qualified	Percent	State	Print	Digital	Total Qualified	Percent
Maine	66	26	92		Kentucky	178	74	252	
New Hampshire	262	138	400		Tennessee	329	133	462	
Vermont	52	33	85		Alabama	242	147	389	
Massachusetts	928	617	1,545		Mississippi	126	42	168	
Rhode Island	89	45	134		EAST SO. CENTRAL	875	396	1,271	2.5
Connecticut	308	140	448		Arkansas	97	46	143	
NEW ENGLAND	1,705	999	2,704	5.4	Louisiana	123	61	184	
New York	1,299	635	1,934		Oklahoma	166	98	264	
New Jersey	746	418	1,164		Texas	1,355	937	2,292	
Pennsylvania	916	469	1,385		WEST SO. CENTRAL	1,741	1,142	2,883	5.8
MIDDLE ATLANTIC	2,961	1,522	4,483	9.0	Montana	76	34	110	
Ohio	928	423	1,351		Idaho	120	64	184	
Indiana	445	238	683		Wyoming	50	20	70	
Illinois	940	482	1,422		Colorado	420	330	750	
Michigan	671	362	1,033		New Mexico	192	116	308	
Wisconsin	460	182	642		Arizona	497	420	917	
EAST NO. CENTRAL	3,444	1,687	5,131	10.3	Utah	247	146	393	
Minnesota	449	216	665		Nevada	118	70	188	
Iowa	206	116	322		MOUNTAIN	1,720	1,200	2,920	5.8
Missouri	336	173	509		Alaska	40	32	72	
North Dakota	49	28	77		Washington	462	300	762	
South Dakota	80	25	105		Oregon	273	207	480	
Nebraska	136	52	188		California	3,577	2,502	6,079	
Kansas	207	133	340		Hawaii	53	28	81	
WEST NO. CENTRAL	1,463	743	2,206	4.4	PACIFIC	4,405	3,069	7,474	15.0
Delaware	58	28	86		UNITED STATES	22,385	12,946	35,331	70.7
Maryland	665	397	1,062		U.S. Territories	30	24	54	
Washington, DC	106	59	165		Canada	208	373	581	
Virginia	601	379	980		Mexico	27	67	94	
West Virginia	80	36	116		Other International	6,035	7,899	13,934	
North Carolina	575	290	865		APO/FPO	3	3	6	
South Carolina	253	117	370						
Georgia	548	256	804						
Florida	1,185	626	1,811						
SOUTH ATLANTIC	4,071	2,188	6,259	12.5					
					TOTAL QUALIFIED CIRCULATION	28,688	21,312	50,000	100.0

*See Additional Data

GEOGRAPHICAL BREAKOUT OF QUALIFIED CIRCULATION FOR ISSUE OF NOVEMBER 2019*

Region/Country	Print	Digital	Total Qualified	Percent	Region/Country	Print	Digital	Total Qualified	Percent
ASIA					Spain	173	261	434	
Afghanistan	-	4	4		Sweden	107	180	287	
Armenia	2	6	8		Switzerland	108	112	220	
Azerbaijan	1	-	1		Turkey	127	158	285	
Bangladesh	68	14	82		Ukraine	16	38	54	
Brunei Darussalam	-	1	1		United Kingdom	2,007	1,354	3,361	
Cambodia	-	3	3		unspecified Europe	1	5	6	
China	69	327	396		Subtotal	4,636	5,048	9,684	19.4
Georgia	1	1	2		AFRICA				
Hong Kong - SAR	14	58	72		Algeria	6	12	18	
India	396	516	912		Angola	-	1	1	
Indonesia	9	25	34		Benin	-	1	1	
Japan	157	302	459		Botswana	3	1	4	
Kazakhstan	-	1	1		Cameroon	-	1	1	
Korea, Republic Of	99	161	260		Chad	-	4	4	
Macao	-	2	2		Egypt	11	37	48	
Malaysia	40	75	115		Ethiopia	-	5	5	
Myanmar	-	2	2		Ghana	-	1	1	
Nepal	2	1	3		Kenya	1	6	7	
Pakistan	19	55	74		Liberia	-	1	1	
Philippines	21	13	34		Libyan Arab Jamahiriya	-	4	4	
Singapore	60	110	170		Mauritius	-	1	1	
Sri Lanka	7	5	12		Morocco	14	11	25	
Taiwan	57	222	279		Namibia	-	1	1	
Thailand	10	12	22		Niger	-	1	1	
Uzbekistan	-	1	1		Nigeria	7	15	22	
Vietnam	3	31	34		Rwanda	-	1	1	
Subtotal	1,035	1,948	2,983	6.0	South Africa	15	61	76	
MIDDLE EAST					Sudan	-	6	6	
Bahrain	-	1	1		Swaziland	-	1	1	
Iran	19	46	65		Tanzania	-	2	2	
Iraq	5	8	13		Tunisia	8	10	18	
Israel	85	126	211		Uganda	-	2	2	
Jordan	-	2	2		Western Sahara	-	1	1	
Kuwait	-	1	1		Zambia	-	1	1	
Lebanon	2	4	6		Zimbabwe	-	4	4	
Oman	1	1	2		Subtotal	65	192	257	0.5
Qatar	-	1	1		NORTH AMERICA				
Saudi Arabia	4	23	27		Canada	208	374	582	
Syrian Arab Republic	-	5	5		Mexico	27	67	94	
United Arab Emirates	4	17	21		United States	22,419	12,974	35,393	
unspecified Middle East	-	3	3		Subtotal	22,654	13,415	36,069	72.1
Subtotal	120	238	358	0.7	CARIBBEAN				
EUROPE					Antigua and Barbuda	-	1	1	
Albania	1	-	1		Aruba	-	1	1	
Austria	36	53	89		Cayman Islands	-	1	1	
Azores	3	3	6		Cuba	2	4	6	
Balearic Islands	1	-	1		Dominican Republic	-	2	2	
Belarus	8	11	19		Haiti	-	1	1	
Belgium	124	120	244		Netherlands Antilles	-	1	1	
Bosnia and Herzegovina	-	3	3		Trinidad and Tobago	-	1	1	
Bulgaria	33	38	71		unspecified Caribbean	1	1	2	
Croatia	11	12	23		Subtotal	3	13	16	-
Cyprus	13	8	21		CENTRAL AMERICA				
Czech Republic	36	69	105		Costa Rica	-	1	1	
Denmark	54	67	121		El Salvador	-	1	1	
Estonia	8	12	20		Guatemala	-	2	2	
Faroe Islands	-	2	2		Nicaragua	-	1	1	
Finland	54	84	138		Panama	-	1	1	
France	301	470	771		Subtotal	-	6	6	-
Germany	488	627	1,115		SOUTH AMERICA				
Greece	40	67	107		Argentina	22	42	64	
Holy See (Vatican City State)	-	1	1		Bolivia	-	3	3	
Hungary	25	36	61		Brazil	63	130	193	
Iceland	3	4	7		Chile	8	25	33	
Ireland	122	112	234		Colombia	1	30	31	
Italy	274	378	652		Ecuador	3	10	13	
Latvia	3	12	15		Paraguay	-	1	1	
Lithuania	18	11	29		Peru	3	20	23	
Luxembourg	8	12	20		Uruguay	2	1	3	
Macedonia	-	3	3		Venezuela	2	8	10	
Malta	2	2	4		Subtotal	104	270	374	0.8
Moldova	-	1	1		ASIA PACIFIC				
Montenegro	-	2	2		American Samoa	-	1	1	
Netherlands	139	186	325		Australia	55	152	207	
Norway	30	40	70		Fiji	-	2	2	
Poland	65	90	155		French Polynesia	-	1	1	
Portugal	25	44	69		New Zealand	16	26	42	
Romania	30	41	71		Subtotal	71	182	253	0.5
Russian Federation	102	266	368		TOTAL QUALIFIED CIRCULATION	28,688	21,312	50,000	100.0
Serbia	14	24	38						
Slovakia	5	13	18						
Slovenia	21	16	37						

*See Additional Data

WEBSITE CHANNEL

WWW.MWJOURNAL.COM

2019	Pageviews	Sessions	Users	Average Session Duration
July	167,149	111,927	83,706	1:12
August	216,750	143,056	100,277	1:09
September	240,384	169,848	120,244	1:02
October	290,650	212,867	157,699	0:54
November	285,439	212,743	156,924	0:52
December	220,599	163,662	126,023	0:53
AVERAGE:	236,828	169,017	124,145	1:00

July – December 2019 data was provided by Google Analytics. All website activity is audited by BPA Worldwide.

WEBSITE GLOSSARY

Pageviews: A Pageview is recorded each time a page implanted with the JavaScript code (tag) is displayed in a browser window. This will occur whether the page is served directly from the web server, from a proxy, or from the browser's cache.

Sessions: A single continuous set of activity attributable to a cookie browser resulting in one or more pulled text and/or graphics downloads from a site. A period of 30 minutes of inactivity will terminate the session.

Users: An identified and unduplicated Cookie Browser that accesses Internet content or advertising during a measurement period.

Average Session Duration: The time visitors remain on a site per session.

ADDITIONAL DATA

METHOD OF DISTRIBUTION:

All qualified circulation conforms to the field served and definition of recipient qualification, as reported. Print copies are distributed via postal services or other carriers. Recipients of the digital version are notified via email when the version is available.

STATEMENT OF CONTENT PLATFORM:

Editorial Replica – If a print edition exists, editorial and design are unchanged from the original print edition. Each issue's content and design are identical to the original edition. Apart from minor updates, the content cannot change once the issue is made available.

GEOGRAPHIC DISTRIBUTION:

Geographic data for Website is not reported at the media owner's option.

PUBLISHER'S AFFIDAVIT

We hereby make oath and say that all data set forth in this statement are true.

Ivar Bazzy, President

Carl Sheffres, Publisher

(At least one of the above signatures must be that of an officer of the publishing company or its authorized representative.)

IMPORTANT NOTE:

This unaudited brand report has been checked against the previous audit report.

It will be included in the annual audit made by BPA Worldwide.

Date signed January 16, 2020

State Massachusetts

County Norfolk

Received by BPA Worldwide January 16, 2020

Type BJ

ID Number M069B0D9

About BPA Worldwide

A not-for-profit organization since 1931 and headquartered in Shelton, Connecticut, USA, BPA has a global membership, spanning more than 20 countries. The organization conducts 2,500+ audits for media brands in print, online/digital and live events. In addition, the BPA-iCompli division verifies compliance to defined industry standards, provides technology assurance, and certifies organization's sustainability practices and reporting. BPA is supported by 4,000+ advertiser and agency members. The latest innovation to move the industry forward is the BPA Media Exchange, a brand-safe and audited cooperative marketplace which offers automated solutions for the buying and selling of digital advertising.

FIELD SERVED
MICROWAVE JOURNAL serves the field of Communications/Cellular/Broadcast/Networks, Test & Measurement Equipment, Semiconductors & IC's, Components, Military/Radar/Weapons/EW, Software/EDA Tools, Materials/Substrates/Packaging, R & D Labs/Consultants/Educators, Industrial/Processing Equipment, Medical/Scientific Equipment, Consumer Electronics, Automotive/Telematics, Laser/Electro-Optical Systems/Equipment, Aerospace, Avionics, Government and All Others Allied to the Field.

DEFINITION OF RECIPIENT QUALIFICATION
 Qualified recipients are personnel of design and development, engineering services/support, research and development and manufacturing and production. Also qualified are executive or operating management, purchasing and procurement, applications engineering, sales and marketing personnel, academia and other personnel.

AVERAGE NON-QUALIFIED CIRCULATION

Non-Qualified Not Included Elsewhere	Copies
Other Paid Circulation	94
Advertiser and Agency	752
Allocated for Trade Shows and Conventions	633
All Other	1,487
TOTAL	2,966

1. AVERAGE QUALIFIED CIRCULATION BREAKOUT FOR THE PERIOD

Qualified Circulation	Total Qualified		Qualified Non-Paid		Qualified Paid	
	Copies	Percent	Copies	Percent	Copies	Percent
Individual	50,000	100.0	50,000	100.0	-	-
Sponsored Individually Addressed	-	-	-	-	-	-
Membership Benefit	-	-	-	-	-	-
Multi-Copy Same Addressee	-	-	-	-	-	-
Single Copy Sales	-	-	-	-	-	-
TOTAL QUALIFIED CIRCULATION	50,000	100.0	50,000	100.0	-	-

2. QUALIFIED CIRCULATION BY ISSUES FOR PERIOD

2019 Issue	Print	Digital	Total Qualified
July	29,361	20,639	50,000
August	29,149	20,851	50,000
September	29,246	20,754	50,000
October	28,889	21,111	50,000
November	28,688	21,312	50,000
December	28,609	21,391	50,000

3a. BUSINESS/OCCUPATION BREAKOUT OF QUALIFIED CIRCULATION FOR ISSUE OF NOVEMBER 2019
 This issue is equal to the average of the other 5 issues reported in Paragraph 2.

Business and Industry	Total Qualified	Percent of Total	Print	Digital	Design & Development	Engineering Services/Support	Executive or Operating Management	Research & Development	Manufacturing & Production	Purchasing & Procurement	Applications Engineering, Sales & Marketing	Academia	Other	None of the Above
Communications/Cellular/Broadcast/Networks	12,718	25.4	7,191	5,527	4,031	2,302	3,527	1,217	256	132	784	371	98	-
Test & Measurement Equipment	4,370	8.7	2,475	1,895	1,317	895	766	498	162	40	540	113	39	-
Semiconductors & ICs	2,749	5.5	1,219	1,530	1,067	276	342	448	88	23	360	110	35	-
Components	2,279	4.6	1,367	912	602	297	603	188	124	40	344	61	20	-
Military/Radar/Weapons/EW	4,007	8.0	2,133	1,874	1,904	499	405	691	126	38	218	105	21	-
Software/EDA Tools	973	1.9	536	437	255	142	269	106	16	14	136	29	6	-
Materials/Substrates/Packaging	1,333	2.7	865	468	201	202	414	160	152	35	130	24	15	-
R & D Labs/Consultants/Educators	4,469	8.9	2,368	2,101	961	556	640	1,270	41	22	102	858	19	-
Industrial/Processing Equipment	4,776	9.6	3,167	1,609	1,224	1,009	1,487	228	412	84	296	25	11	-
Medical/Scientific Equipment	1,548	3.1	898	650	457	254	358	243	111	28	52	41	4	-
Consumer Electronics	2,267	4.5	1,360	907	713	345	684	213	99	34	148	27	4	-
Automotive/Telematics	1,857	3.7	1,135	722	608	326	447	217	128	30	75	13	13	-
Laser/Electro-Optical Systems, Equipment	420	0.8	242	178	108	43	96	73	30	11	41	16	2	-
Other	531	1.1	298	233	124	71	103	31	48	6	36	54	58	-
Aerospace	2,825	5.7	1,632	1,193	1,070	516	498	339	183	46	119	33	21	-
Avionics	583	1.2	346	237	222	128	126	34	17	7	31	16	2	-
Government	2,295	4.6	1,456	839	504	624	563	313	40	55	69	98	29	-
None of the Above	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL QUALIFIED CIRCULATION	50,000	100.0	28,688	21,312	15,368	8,485	11,328	6,269	2,033	645	3,481	1,994	397	-
PERCENT	100.0		57.4	42.6	30.7	17.0	22.6	12.5	4.1	1.3	7.0	4.0	0.8	-