TEST REPORT

KCTL Inc.
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KCTL
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1. Applicant

Name:	E-TECH Co., Ltd.
Address:	#403-901, 655, Pyeongcheon-ro, Wonmi-gu, Bucheon-si, Gyeonggi-do, Korea

2. Sample Description:

FCC ID:	R72NEP400
Type of equipment:	FM Handheld Transceiver (UHF)
Basic Model:	NEP400

3. Date of Test:	October 22 ~ October 30, 2015 April 5 ~ April 15, 2016
4. Test method used:	FCC Part 2 Subpart J, FCC Part 90 Subpart I

5. Test Results

Test Item:	Refer to page 8
Result:	Refer to page 9 ~ page 118
Measurement Uncertainty:	Refer to page 8

This result shown in this report refer only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by Name: MYEONG HWA, JANG	Technical Manager Name: MIN GI, SON

2016. 04. 18

KCTL Inc. Testing Laboratory

History of Issued Test Report

Issued date:.	Report Number	History
November 30, 2015	KCTL15-FR0076	Issued the original test teport
April 18, 2016	KCTL15-FR0076(1)	Added and tested more test mode

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6. Test equipment used for test 119

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1. Client information

Applicant:	E-TECH Co., Ltd.
Address:	#403-901, 655, Pyeongcheon-ro, Wonmi-gu, Bucheon-si, Gyeonggi-do, Korea
Telephone number:	+82-32-328-3184
Facsimile number:	+82-32-328-3186
Contact person:	Jae-Hyun Kim / pico76@etech2004.co.kr

Manufacturer:	E-TECH Co., Ltd.
Address:	#403-901, 655, Pyeongcheon-ro, Wonmi-gu, Bucheon-si, Gyeonggi-do, Korea

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2. Laboratory information

Address

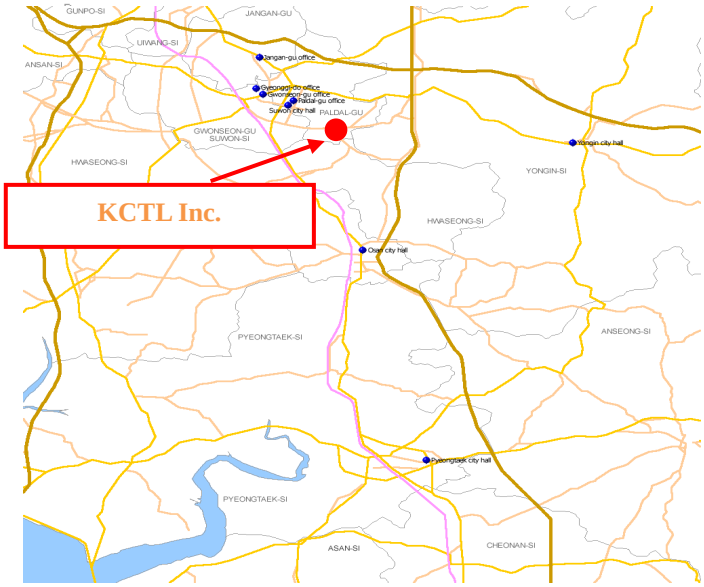
KCTL Inc.
65 Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea
Telephone Number: 82-70-5008-1016 Facsimile Number: 82-505-299-8311

Certificate

KOLAS No.: KT231
FCC Site Designation No.: KR0040
FCC Site Registration No.: 687132
VCCI Site Registration No.: R-3327, G-198, C-3706, T-1849
IC Site Registration No.:8035A-2

SITE MAP





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3. Description of E.U.T.

3.1 Basic description

Applicant:	E-TECH Co., Ltd.
Address of Applicant	#403-901, 655, Pyeongcheon-ro, Wonmi-gu, Bucheon-si, Gyeonggi-do, Korea
Manufacturer	E-TECH Co., Ltd.
Address of Manufacturer	#403-901, 655, Pyeongcheon-ro, Wonmi-gu, Bucheon-si, Gyeonggi-do, Korea
Type of equipment	FM Handheld Transceiver (UHF)
Basic Model	NEP400
Serial number	N/A

3.2 General description

Frequency Range	406.10 ㎒ ~ 512.00 ㎒
Type of Modulation	12.5BW, 6.25BW
Emission Designators	9K6F3E for 12.5BW 4K7F3E for 6.25BW
Number of Channels	32 ch
Type of Antenna	Helical Antenna
Transmit Power	1 W / 4 W
Power supply	DC 7.4 Ⅴ
H/W Version	1.0
S/W version	1.0
Test SW Version	N/A
RF power setting in TEST SW	N/A

Note : The above EUT information was declared by the manufacturer.

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3.3 Test frequency

	Frequency
Low frequency	406.10 ㎒
Middle frequency	459.00 ㎒
High frequency	512.00 ㎒

3.4 Test Voltage

Mode	Voltage
Norminal voltage	DC 7.4 Ⅴ

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4. Summary of test results

4.1 Standards & results

FCC Rule Reference	Parameter	Report Section	Test Result
2.1046(a), 90.205	Output Power Conducted	5.1	C
90.213, 2.1055	Frequency Stability	5.2	C
2.1047(b)	Modulation Limiting	5.3	C
2.1047(a)	Audio Frequency Response	5.4	C
2.1047(a)	Audio Low Pass Filter Frequency Response	5.5	C
2.1049, 90.209, 90.210	Occupied Bandwidth and Emission Mask	5.6	C
90.214	Transient Frequency Behaviour of the Transmitter	5.7	C
2.1051, 90.210	Conducted Spurious Emission	5.8	C
2.1053(a), 90.210	Radiated Spurious Emission	5.9	C

Note: C = complies
NC = Not complies
NT = Not tested
NA = Not Applicable

* The general test methods used to test this device is TIA-603-D.

4.2 Uncertainty

Measurement Item	Expanded Uncertainty U = *k*Uc (*k* = 2)	
Conducted RF power	1.30 dB	
Conducted Spurious Emissions	1.52 dB	
Radiated Spurious Emissions	30 MHz ~ 300 MHz:	+ 4.94 dB, - 5.06 dB
		+ 4.93 dB, - 5.05 dB
	300 MHz ~ 1 000 MHz:	+ 4.97 dB, - 5.08 dB
		+ 4.84 dB, - 4.96 dB
	1 GHz ~ 25 GHz:	+ 6.03 dB, - 6.05 dB
Conducted Emissions	9 kHz ~ 150 kHz:	3.75 dB
	150 kHz ~ 30 MHz:	3.36 dB

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5. Test results

5.1 Output Power Conducted

5.1.1 Regulation

According to §90.205, (r) All other frequency bands. Requested transmitter power will be considered and authorized on a case by case basis.

(s) The output power shall not exceed by more than 20 percent either the output power shown in the Radio Equipment List [available in accordance with §90.203(a)(1)] for transmitters included in this list or when not so listed, the manufacturer's rated output power for the particular transmitter specifically listed on the authorization.

5.1.2 Measurement Procedure

1. The conducted RF output power is the available power at the output terminals of the transmitter when the output terminals are corrected to the standard transmitter load.
2. The test sample is feeding a 50 ohm coaxial attenuator which is connected to a spectrum analyzer.
3. The power output at the transmitter antenna port is determined by adding the value of the attenuator to the spectrum analyzer reading.
4. The test are performed at the frequencies(low, middle, high channels of the EUT operating band) and full rated power levels of the transmitter.

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5.1.3 Test Result

- Complied

* 12.5BW

-Target Power_1W

Channel	Frequency [㎒]	Result [dBm]	Result [W]	Limit [W]	Margin [W]	Current [A]
Lowest	406.10	30.29	1.07	1.20	0.13	0.77
Middle	459.00	30.72	1.18	1.20	0.02	0.59
Highest	512.00	30.42	1.10	1.20	0.10	0.61

-Target Power_4W

Channel	Frequency [㎒]	Result [dBm]	Result [W]	Limit [W]	Margin [W]	Current [A]
Lowest	406.10	36.05	4.02	4.80	0.78	1.45
Middle	459.00	36.39	4.35	4.80	0.45	1.20
Highest	512.00	36.16	4.13	4.80	0.67	1.50

* 6.25BW

-Target Power_1W

Channel	Frequency [㎒]	Result [dBm]	Result [W]	Limit [W]	Margin [W]	Current [A]
Lowest	406.10	30.59	1.15	1.20	0.05	0.77
Middle	459.00	30.52	1.13	1.20	0.07	0.59
Highest	512.00	30.46	1.11	1.20	0.09	0.61

-Target Power_4W

Channel	Frequency [㎒]	Result [dBm]	Result [W]	Limit [W]	Margin [W]	Current [A]
Lowest	406.10	36.00	3.98	4.80	0.82	1.40
Middle	459.00	35.79	3.79	4.80	1.01	1.13
Highest	512.00	35.57	3.61	4.80	1.19	1.34

-NOTE:

1. We took the insertion loss of the cable loss into consideration within the measuring instrument.

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5.2 Frequency Stability

5.2.1 Regulation

According to §90.213, in the 150-174 ㎒ band, fixed and base stations with a 12.5 ㎑ channel bandwidth must have a frequency stability of 2.5 ppm. Fixed and base stations with a 6.25 ㎑ channel bandwidth must have a frequency stability of 1.0 ppm.

In the 150-174 ㎒ band, mobile stations designed to operate with a 12.5 ㎑ channel bandwidth or designed to operate on a frequency specifically designated for itinerant use or designed for low-power operation of two watts or less, must have a frequency stability of 5.0 ppm. Mobile stations designed to operate with a 6.25 ㎑ channel bandwidth must have a frequency stability of 2.0 ppm.

In the 421-512 ㎒ band, fixed and base stations with a 12.5 ㎑ channel bandwidth must have a frequency stability of 1.5 ppm. Fixed and base stations with a 6.25 ㎑ channel bandwidth must have a frequency stability of 0.5 ppm.

In the 421-512 ㎒ band, mobile stations designed to operate with a 12.5 ㎑ channel bandwidth must have a frequency stability of 2.5 ppm. Mobile stations designed to operate with a 6.25 ㎑ channel bandwidth must have a frequency stability of 1.0 ppm.

5.2.2 Measurement Procedure

1. The carrier frequency is the stability of the transmitter to maintain an assigned carrier frequency.
2. The frequency stability is measured with variation of ambient temperature from -30℃ to +60℃.

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5.2.3 Test Result

- Complied

* 12.5BW

-Target Power_1W_406.10 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	406 099 845	-155	-0.382
		-20	406 099 839	-161	-0.396
		-10	406 099 872	-128	-0.315
		0	406 099 920	-80	-0.197
		10	406 099 980	-20	-0.049
		20	406 100 100	100	0.246
		30	406 100 070	70	0.172
		40	406 100 009	9	0.022
		50	406 099 969	-31	-0.076
		60	406 099 945	-55	-0.135
		Normal	406 100 043	43	0.106
85	6.29	Normal	406 100 042	42	0.103
115	8.51	Normal	406 100 042	42	0.103

-Target Power_1W_459.00 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	458 999 827	-173	-0.377
		-20	458 999 809	-191	-0.416
		-10	458 999 859	-141	-0.307
		0	458 999 909	-91	-0.198
		10	458 999 986	-14	-0.031
		20	459 000 112	112	0.244
		30	459 000 080	80	0.174
		40	459 000 011	11	0.024
		50	458 999 964	-36	-0.078
		60	458 999 940	-60	-0.131
		Normal	459 000 051	51	0.111
85	6.29	Normal	459 000 050	50	0.109
115	8.51	Normal	459 000 049	49	0.107

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-Target Power_1W_512.00 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	511 999 799	-201	-0.393
		-20	511 999 770	-230	-0.449
		-10	511 999 846	-154	-0.301
		0	511 999 894	-106	-0.207
		10	511 999 995	-5	-0.010
		20	512 000 123	123	0.240
		30	512 000 090	90	0.176
		40	512 000 013	13	0.025
		50	511 999 960	-40	-0.078
		60	511 999 931	-69	-0.135
		Normal	512 000 065	65	0.127
85	6.29	Normal	512 000 062	62	0.121
115	8.51	Normal	512 000 062	62	0.121

-Target Power_4W_406.10 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	406 099 796	-204	-0.502
		-20	406 099 792	-208	-0.512
		-10	406 099 883	-117	-0.288
		0	406 099 902	-98	-0.241
		10	406 100 027	27	0.066
		20	406 100 079	79	0.195
		30	406 100 070	70	0.172
		40	406 100 031	31	0.076
		50	406 099 962	-38	-0.094
		60	406 099 940	-60	-0.148
		Normal	406 100 038	38	0.094
85	6.29	Normal	406 100 045	45	0.111
115	8.51	Normal	406 100 050	50	0.123

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-Target Power_4W_459.00 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	458 999 786	-214	-0.466
		-20	458 999 771	-229	-0.499
		-10	458 999 866	-134	-0.292
		0	458 999 895	-105	-0.229
		10	459 000 019	19	0.041
		20	459 000 099	99	0.216
		30	459 000 080	80	0.174
		40	459 000 034	34	0.074
		50	458 999 959	-41	-0.089
		60	458 999 934	-66	-0.144
		Normal	459 000 065	65	0.142
85	6.29	Normal	459 000 065	65	0.142
115	8.51	Normal	459 000 067	67	0.146

-Target Power_4W_512.00 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	511 999 778	-222	-0.434
		-20	511 999 755	-245	-0.479
		-10	511 999 847	-153	-0.299
		0	511 999 888	-112	-0.219
		10	512 000 004	4	0.008
		20	512 000 117	117	0.229
		30	512 000 089	89	0.174
		40	512 000 033	33	0.064
		50	511 999 958	-42	-0.082
		60	511 999 929	-71	-0.139
		Normal	512 000 073	73	0.143
85	6.29	Normal	512 000 071	71	0.139
115	8.51	Normal	512 000 070	70	0.137

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* 6.25BW

-Target Power_1W_406.10 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	406 099 609	-391	-0.963
		-20	406 099 714	-286	-0.704
		-10	406 099 665	-335	-0.825
		0	406 099 858	-142	-0.350
		10	406 099 875	-125	-0.308
		20	406 099 927	-73	-0.180
		30	406 099 906	-94	-0.231
		40	406 099 844	-156	-0.384
		50	406 099 787	-213	-0.525
		60	406 099 855	-145	-0.357
		Normal	406 099 858	-142	-0.350
85	6.29	Normal	406 099 858	-142	-0.350
115	8.51	Normal	406 099 860	-140	-0.345

-Target Power_1W_459.00 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	458 999 618	-382	-0.832
		-20	458 999 644	-356	-0.776
		-10	458 999 654	-346	-0.754
		0	458 999 808	-192	-0.418
		10	458 999 879	-121	-0.264
		20	458 999 916	-84	-0.183
		30	458 999 894	-106	-0.231
		40	458 999 853	-147	-0.320
		50	458 999 764	-236	-0.514
		60	458 999 789	-211	-0.460
		Normal	458 999 825	-175	-0.381
85	6.29	Normal	458 999 825	-175	-0.381
115	8.51	Normal	458 999 828	-172	-0.375

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-Target Power_1W_512.00 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	511 999 477	-523	-1.021
		-20	511 999 546	-454	-0.887
		-10	511 999 749	-251	-0.490
		0	511 999 739	-261	-0.510
		10	511 999 889	-111	-0.217
		20	511 999 886	-114	-0.223
		30	511 999 872	-128	-0.250
		40	511 999 849	-151	-0.295
		50	511 999 732	-268	-0.523
		60	511 999 718	-282	-0.551
		Normal	511 999 815	-185	-0.361
85	6.29	Normal	511 999 813	-187	-0.365
115	8.51	Normal	511 999 814	-186	-0.363

-Target Power_4W_406.10 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	406 099 626	-374	-0.921
		-20	406 099 703	-297	-0.731
		-10	406 099 682	-318	-0.783
		0	406 099 843	-157	-0.387
		10	406 099 881	-119	-0.293
		20	406 099 927	-73	-0.180
		30	406 099 909	-91	-0.224
		40	406 099 844	-156	-0.384
		50	406 099 790	-210	-0.517
		60	406 099 830	-170	-0.419
		Normal	406 099 860	-140	-0.345
85	6.29	Normal	406 099 860	-140	-0.345
115	8.51	Normal	406 099 860	-140	-0.345

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-Target Power_4W_459.00 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	458 999 633	-367	-0.800
		-20	458 999 623	-377	-0.821
		-10	458 999 670	-330	-0.719
		0	458 999 791	-209	-0.455
		10	458 999 879	-121	-0.264
		20	458 999 910	-90	-0.196
		30	458 999 890	-110	-0.240
		40	458 999 859	-141	-0.307
		50	458 999 763	-237	-0.516
		60	458 999 770	-230	-0.501
		Normal	458 999 833	-167	-0.364
85	6.29	Normal	458 999 833	-167	-0.364
115	8.51	Normal	458 999 833	-167	-0.364

-Target Power_4W_512.00 ㎒

Voltage [%]	Power [V_{DC}]	Temp. [°C]	Reading Frequency [㎐]	Frequency Error [㎐]	Frequency Error [ppm]
100	7.4	-30	511 999 495	-505	-0.986
		-20	511 999 529	-471	-0.920
		-10	511 999 788	-212	-0.414
		0	511 999 708	-292	-0.570
		10	511 999 896	-104	-0.203
		20	511 999 868	-132	-0.258
		30	511 999 867	-133	-0.260
		40	511 999 849	-151	-0.295
		50	511 999 729	-271	-0.529
		60	511 999 691	-309	-0.604
		Normal	511 999 812	-188	-0.367
85	6.29	Normal	511 999 809	-191	-0.373
115	8.51	Normal	511 999 806	-194	-0.379

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5.3 Modulation Limiting

5.3.1 Regulation

According to TIA-603-D, the instantaneous peak and steady state deviations shall not exceed rated system deviation at any audio frequency or change in level, as specified in the method of measurement.

5.3.2 Measurement Procedure

1. Modulation limiting is the transmitter circuit's ability to limit the transmitter from producing deviations in excess of rated system deviation.
2. The modulation response is measured at certain modulation frequencies, related to 1000 ㎐ reference signal.
3. The basic setting is 60% of full rated deviation which will be increased the audio generator level from –20 ㏈ to 20 ㏈ in nine steps.
4. Tests are performed for positive and negative modulation.

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5.3.3 Test Result

- Complied

* 12.5BW

-Target Power_1W_406.10 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.090	0.221	0.343	0.085	0.217	0.344	2.5
-15	0.109	0.328	0.565	0.108	0.332	0.557	
-10	0.144	0.539	0.946	0.141	0.530	0.944	
-5	0.207	0.897	1.610	0.207	0.898	1.606	
0	0.318	1.558	1.632	0.320	1.560	1.621	
5	0.511	2.003	1.626	0.507	2.004	1.621	
10	0.861	1.913	1.617	0.856	1.916	1.611	
15	1.485	1.887	1.617	1.469	1.902	1.607	
20	2.321	1.887	1.619	2.330	1.885	1.614	

-Target Power_1W_459.00 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.079	0.207	0.329	0.079	0.206	0.335	2.5
-15	0.094	0.314	0.554	0.101	0.319	0.551	
-10	0.134	0.528	0.935	0.127	0.524	0.930	
-5	0.189	0.895	1.614	0.186	0.903	1.611	
0	0.286	1.541	1.621	0.293	1.541	1.613	
5	0.475	1.990	1.613	0.471	1.980	1.608	
10	0.804	1.901	1.621	0.805	1.901	1.609	
15	1.395	1.874	1.622	1.389	1.883	1.610	
20	2.239	1.886	1.616	2.251	1.883	1.609	

-Target Power_1W_512.00 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.080	0.208	0.341	0.077	0.201	0.338	2.5
-15	0.095	0.325	0.567	0.105	0.331	0.559	
-10	0.127	0.533	0.947	0.125	0.524	0.948	
-5	0.181	0.897	1.633	0.182	0.896	1.631	
0	0.274	1.559	1.637	0.274	1.553	1.633	
5	0.442	2.004	1.641	0.449	2.005	1.636	
10	0.751	1.925	1.635	0.745	1.928	1.622	
15	1.292	1.899	1.644	1.291	1.908	1.630	
20	2.104	1.898	1.637	2.112	1.905	1.629	

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-Target Power_4W_406.10 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.092	0.215	0.344	0.105	0.214	0.344	2.5
-15	0.106	0.325	0.558	0.111	0.323	0.555	
-10	0.145	0.527	0.950	0.147	0.526	0.933	
-5	0.205	0.893	1.616	0.201	0.897	1.604	
0	0.314	1.543	1.619	0.311	1.541	1.610	
5	0.500	1.995	1.607	0.517	1.995	1.604	
10	0.844	1.906	1.610	0.840	1.910	1.598	
15	1.460	1.878	1.616	1.457	1.888	1.605	
20	2.309	1.888	1.612	2.333	1.887	1.604	

-Target Power_4W_459.00 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.083	0.213	0.332	0.085	0.202	0.337	2.5
-15	0.099	0.314	0.549	0.094	0.319	0.550	
-10	0.139	0.529	0.935	0.127	0.513	0.929	
-5	0.189	0.892	1.616	0.185	0.885	1.607	
0	0.294	1.550	1.620	0.288	1.548	1.609	
5	0.472	1.985	1.615	0.468	1.994	1.603	
10	0.809	1.909	1.615	0.801	1.908	1.605	
15	1.401	1.878	1.618	1.397	1.888	1.610	
20	2.238	1.879	1.608	2.255	1.883	1.609	

-Target Power_4W_512.00 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.083	0.206	0.344	0.078	0.205	0.336	2.5
-15	0.092	0.323	0.559	0.094	0.326	0.562	
-10	0.125	0.535	0.942	0.123	0.536	0.937	
-5	0.180	0.887	1.632	0.178	0.903	1.626	
0	0.276	1.550	1.636	0.271	1.549	1.629	
5	0.447	1.995	1.634	0.441	2.003	1.630	
10	0.746	1.922	1.628	0.734	1.921	1.623	
15	1.277	1.895	1.631	1.278	1.902	1.620	
20	2.096	1.891	1.624	2.108	1.900	1.618	

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* 6.25BW

-Target Power_1W_406.10 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.083	0.144	0.204	0.078	0.138	0.194	1.25
-15	0.100	0.200	0.301	0.094	0.190	0.299	
-10	0.120	0.299	0.483	0.103	0.287	0.480	
-5	0.130	0.453	0.735	0.129	0.449	0.735	
0	0.182	0.757	0.743	0.174	0.756	0.737	
5	0.272	0.914	0.751	0.273	0.914	0.740	
10	0.432	0.881	0.743	0.431	0.881	0.748	
15	0.718	0.863	0.744	0.724	0.870	0.741	
20	1.052	0.868	0.739	1.063	0.866	0.741	

-Target Power_1W_459.00 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.073	0.119	0.185	0.070	0.118	0.181	1.25
-15	0.093	0.279	0.471	0.093	0.274	0.472	
-10	0.094	0.272	0.468	0.088	0.271	0.467	
-5	0.114	0.446	0.734	0.112	0.442	0.732	
0	0.166	0.746	0.733	0.164	0.745	0.735	
5	0.246	0.902	0.731	0.236	0.903	0.733	
10	0.401	0.865	0.738	0.399	0.866	0.738	
15	0.670	0.857	0.736	0.670	0.859	0.736	
20	1.009	0.862	0.738	1.013	0.855	0.730	

-Target Power_1W_512.00 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.071	0.135	0.185	0.068	0.121	0.187	1.25
-15	0.082	0.185	0.290	0.077	0.179	0.289	
-10	0.093	0.288	0.474	0.092	0.277	0.479	
-5	0.116	0.453	0.749	0.112	0.446	0.755	
0	0.165	0.752	0.753	0.158	0.750	0.743	
5	0.244	0.910	0.756	0.235	0.909	0.744	
10	0.377	0.879	0.746	0.375	0.879	0.743	
15	0.631	0.869	0.748	0.621	0.872	0.744	
20	0.956	0.870	0.750	0.972	0.869	0.744	

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-Target Power_4W_406.10 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.097	0.131	0.198	0.084	0.126	0.187	1.25
-15	0.103	0.187	0.296	0.086	0.187	0.287	
-10	0.111	0.287	0.466	0.108	0.273	0.461	
-5	0.138	0.452	0.739	0.126	0.440	0.733	
0	0.180	0.751	0.741	0.183	0.748	0.739	
5	0.275	0.915	0.742	0.268	0.913	0.741	
10	0.425	0.870	0.743	0.429	0.872	0.743	
15	0.706	0.866	0.813	0.701	0.873	0.738	
20	1.050	0.862	0.740	1.056	0.862	0.736	

-Target Power_4W_459.00 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.068	0.127	0.185	0.064	0.122	0.185	1.25
-15	0.081	0.187	0.284	0.073	0.175	0.278	
-10	0.092	0.266	0.465	0.094	0.268	0.459	
-5	0.119	0.446	0.732	0.113	0.438	0.484	
0	0.164	0.756	0.740	0.162	0.742	0.736	
5	0.243	0.904	0.736	0.237	0.907	0.730	
10	0.393	0.868	0.735	0.403	0.867	0.731	
15	0.671	0.858	0.737	0.670	0.852	0.733	
20	1.008	0.855	0.730	1.019	0.857	0.734	

-Target Power_4W_512.00 ㎒

Audio input level relative [dB]	Positive peak deviation [㎑]			Negative peak deviation [㎑]			Limit [㎑]
	300 [㎐]	1 000 [㎐]	3 000 [㎐]	300 [㎐]	1 000 [㎐]	3 000 [㎐]	
-20	0.072	0.128	0.193	0.066	0.126	0.187	1.25
-15	0.075	0.181	0.290	0.078	0.178	0.284	
-10	0.112	0.290	0.475	0.092	0.274	0.480	
-5	0.112	0.453	0.745	0.115	0.442	0.737	
0	0.165	0.756	0.745	0.164	0.750	0.744	
5	0.238	0.910	0.747	0.234	0.904	0.737	
10	0.385	0.875	0.748	0.389	0.877	0.749	
15	0.634	0.872	0.749	0.634	0.866	0.747	
20	0.958	0.872	0.742	0.965	0.870	0.743	

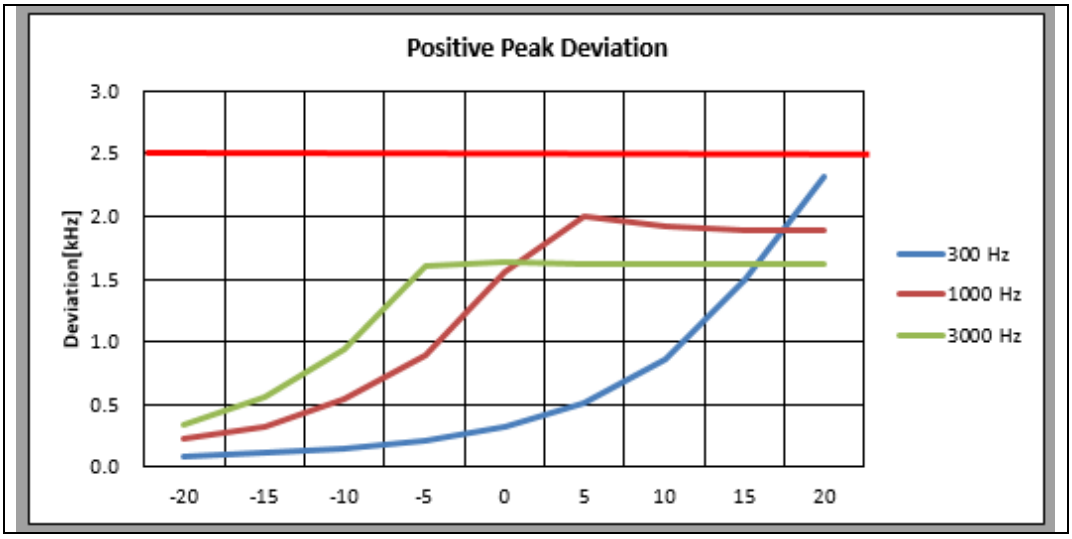
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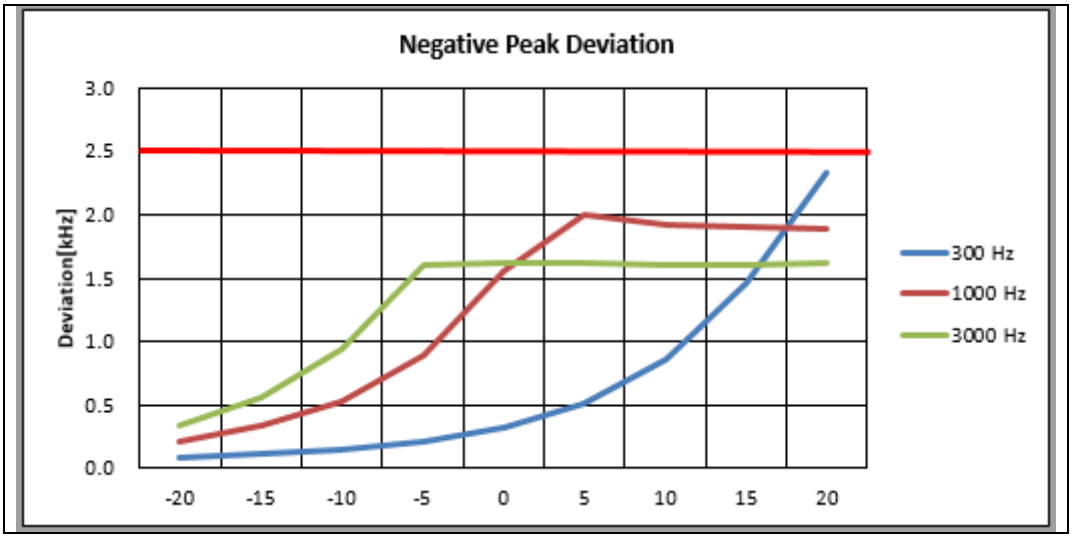
5.3.4 Test Plot

Figure 1. Plot of the Modulation Limiting

* 12.5BW

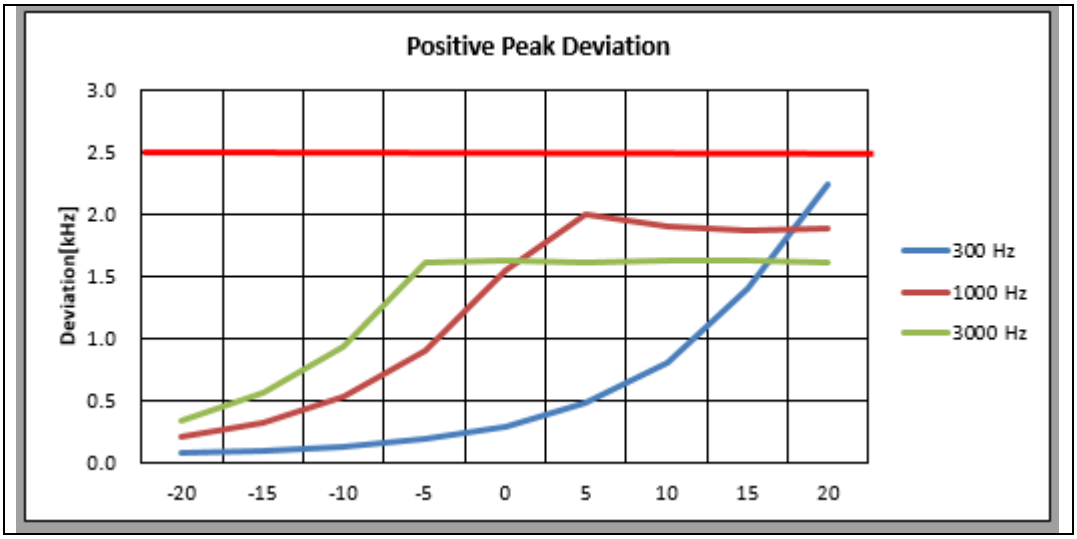
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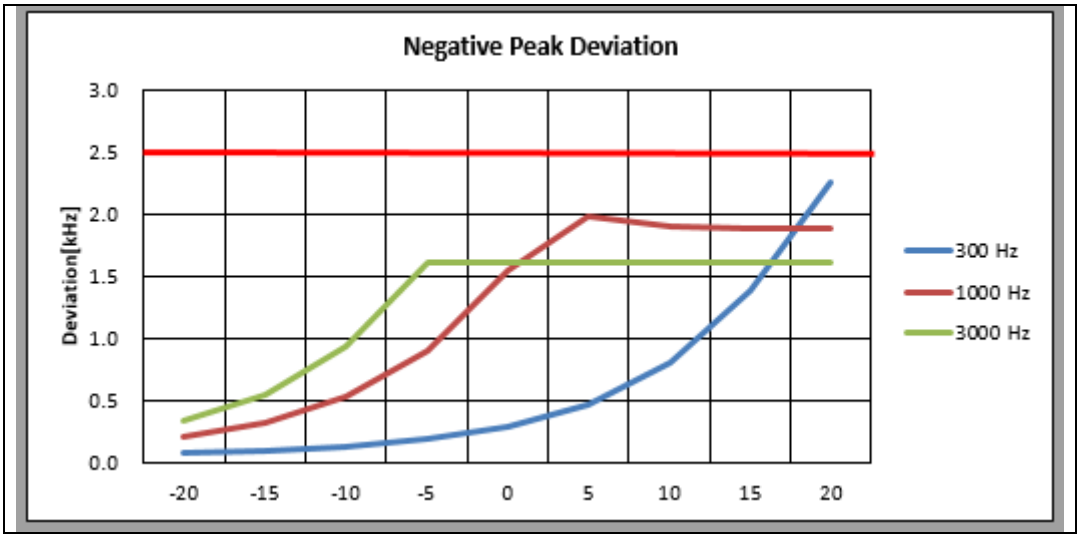




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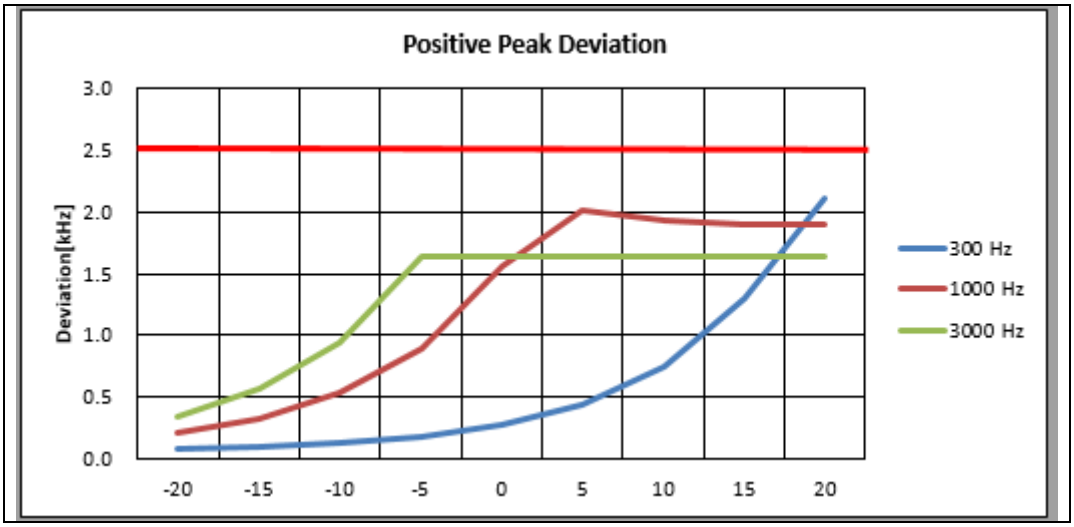
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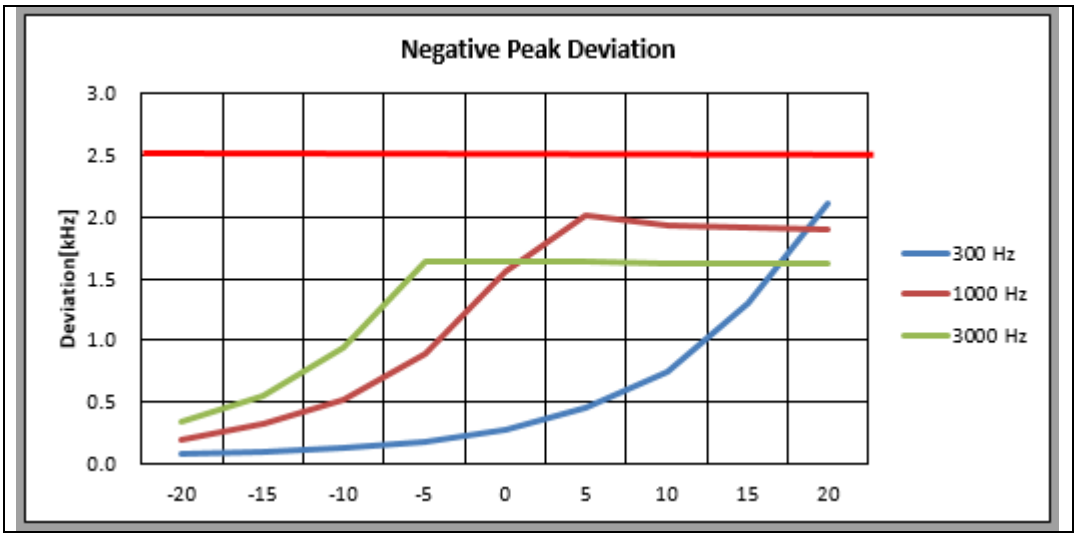




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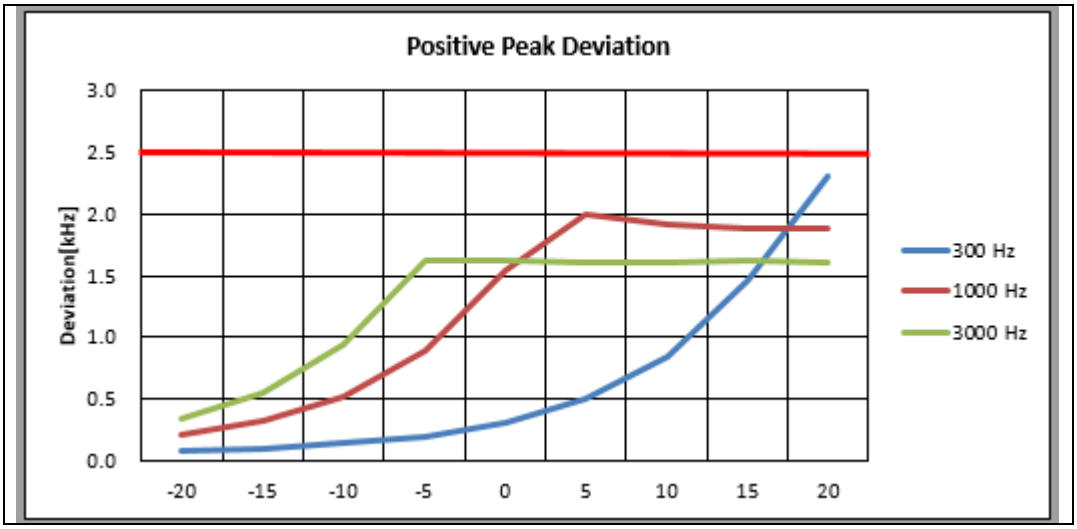
-Target Power_1W_512.00 ㎒

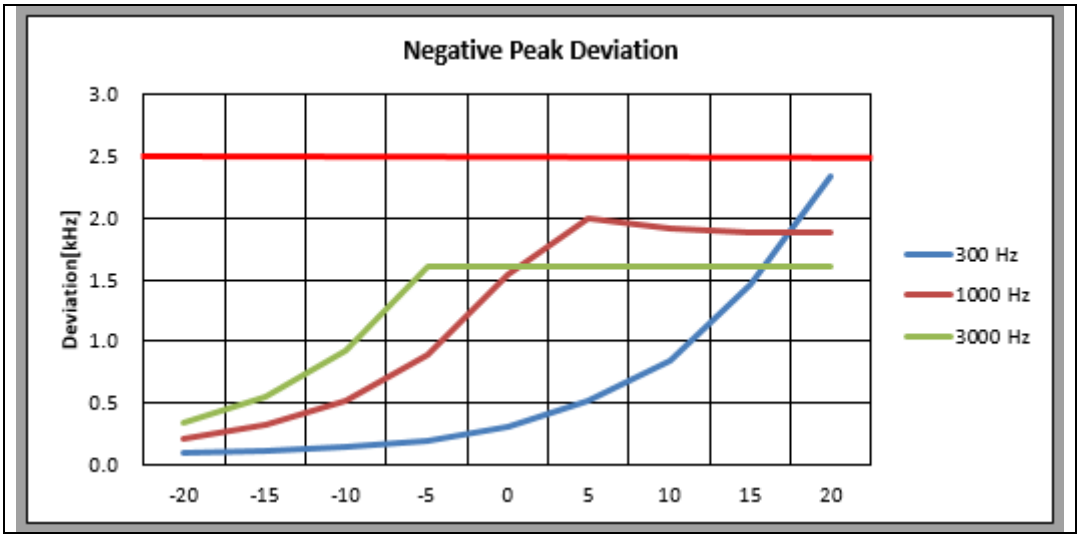




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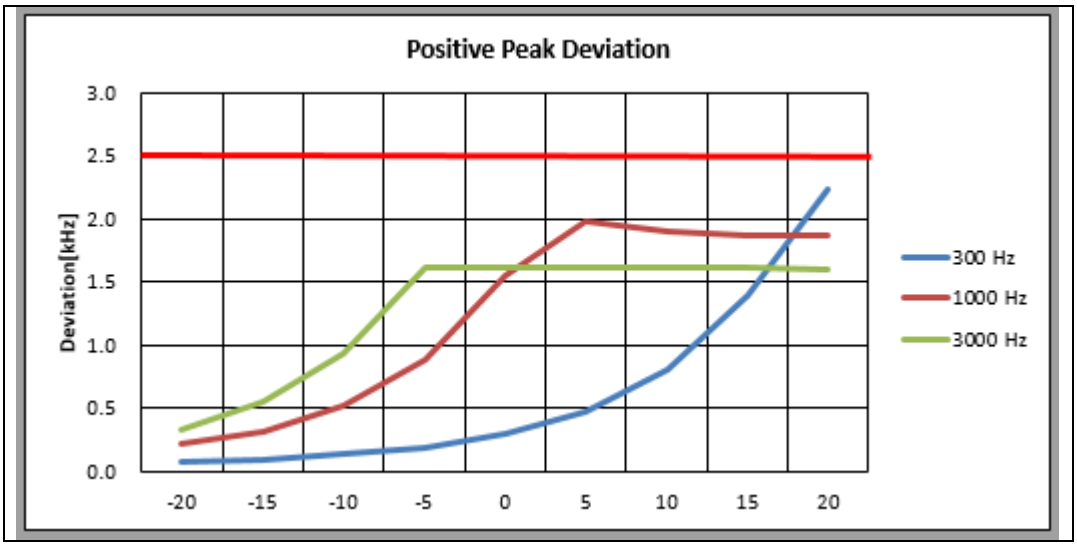
-Target Power_4W_406.10 ㎒

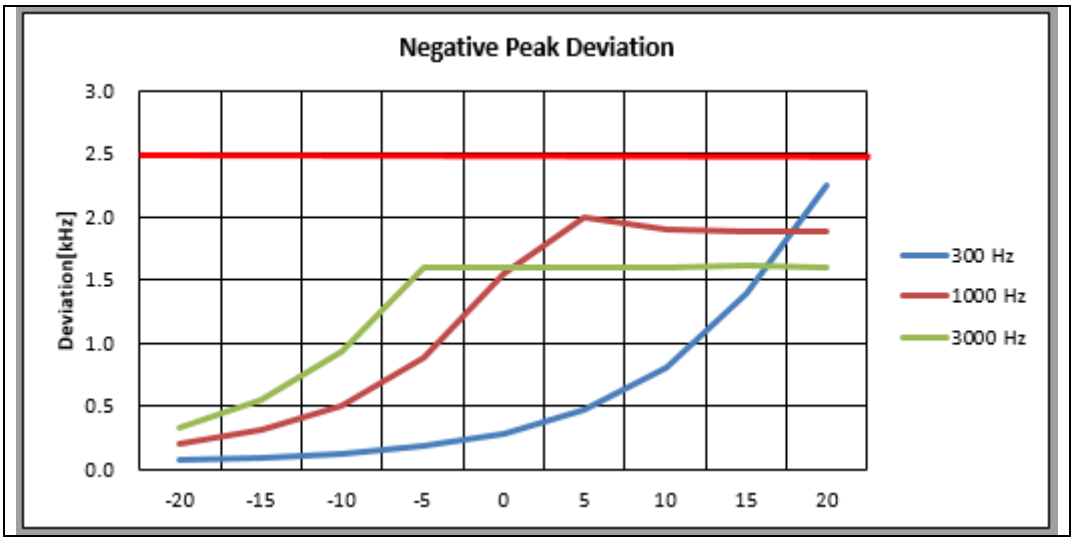




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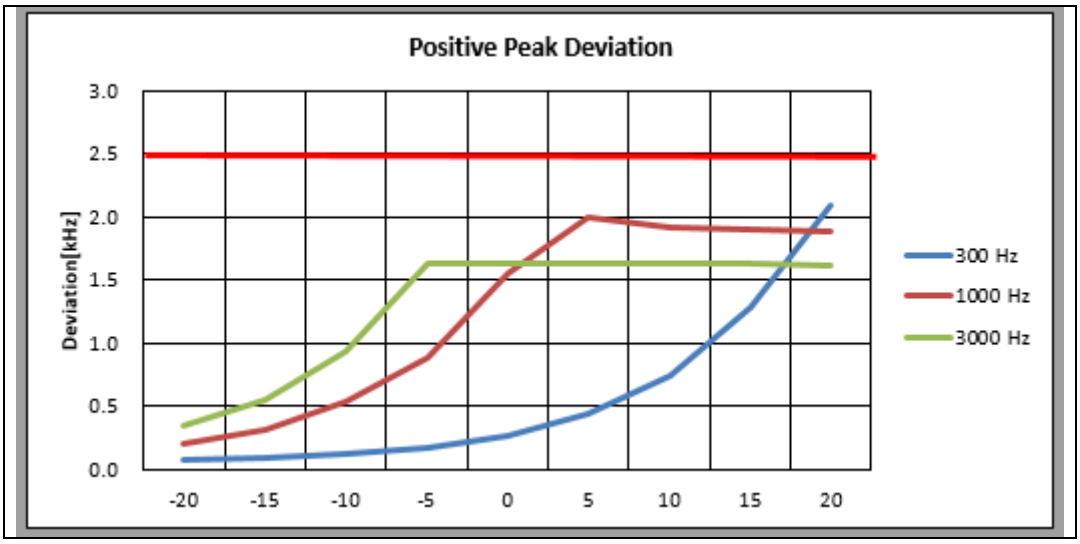
-Target Power_4W_459.00 ㎒

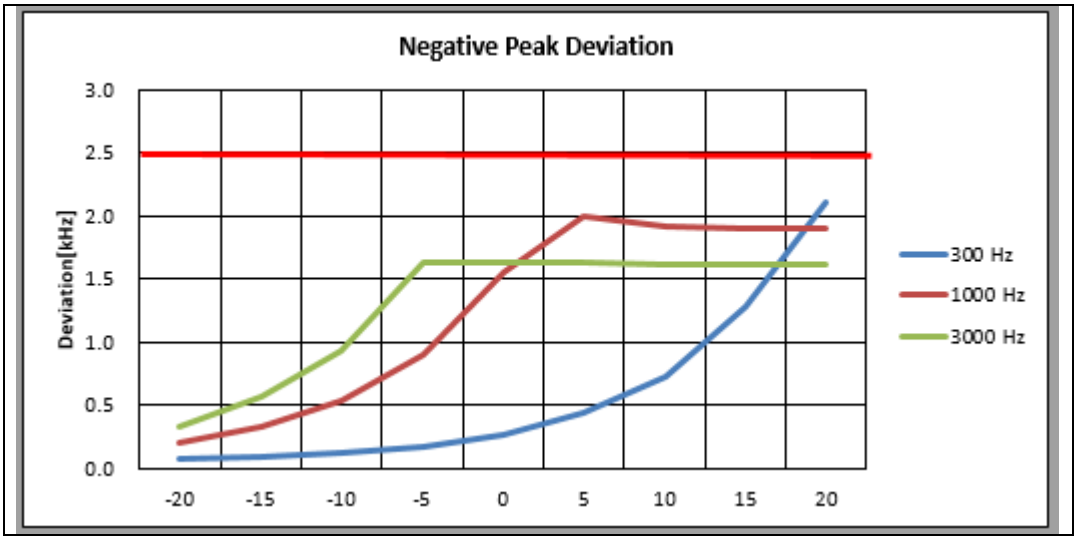




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-Target Power_4W_512.00 ㎒

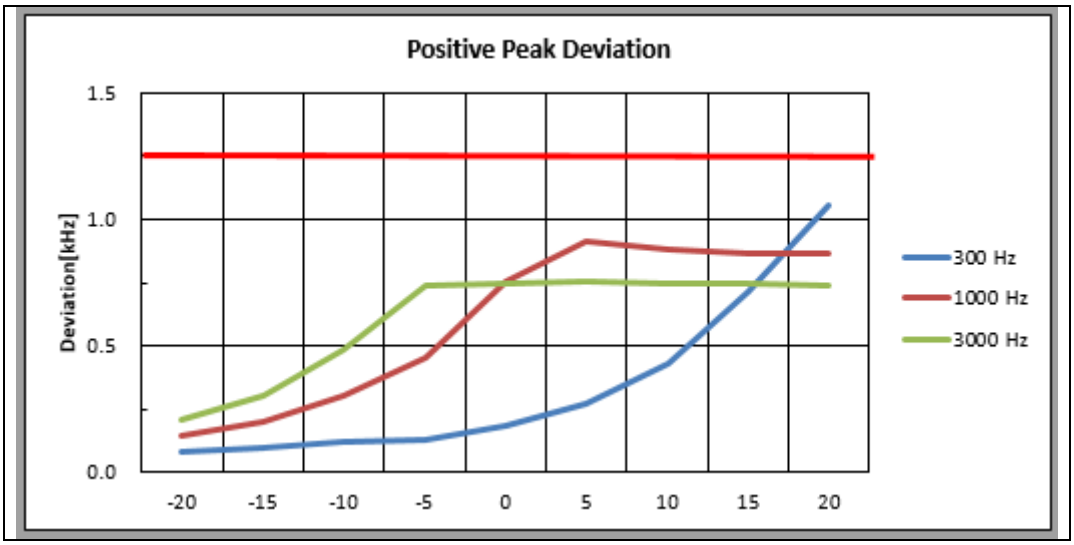


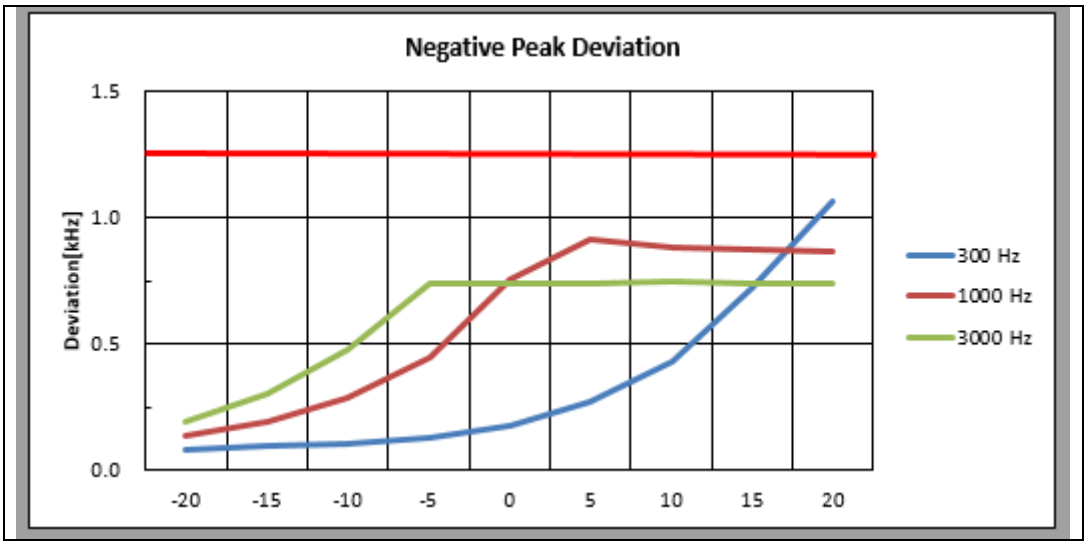


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* 6.25BW

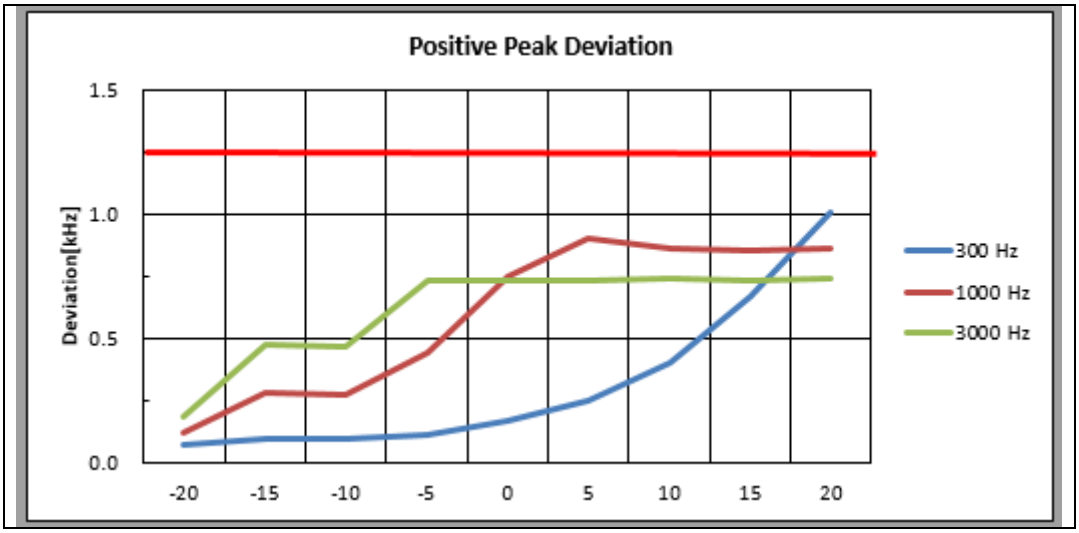
-Target Power_1W_406.10 ㎒

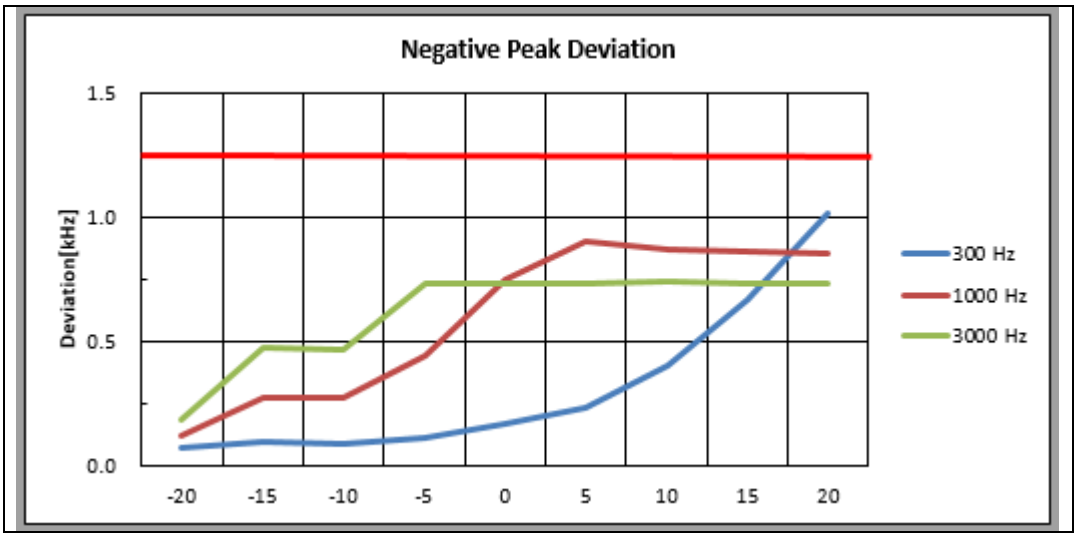




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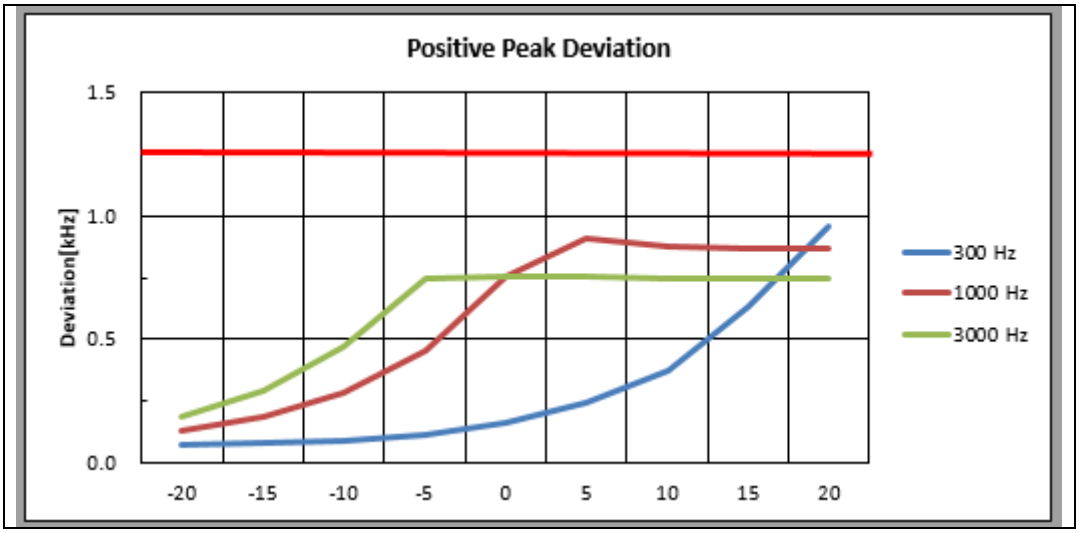
-Target Power_1W_459.00 ㎒

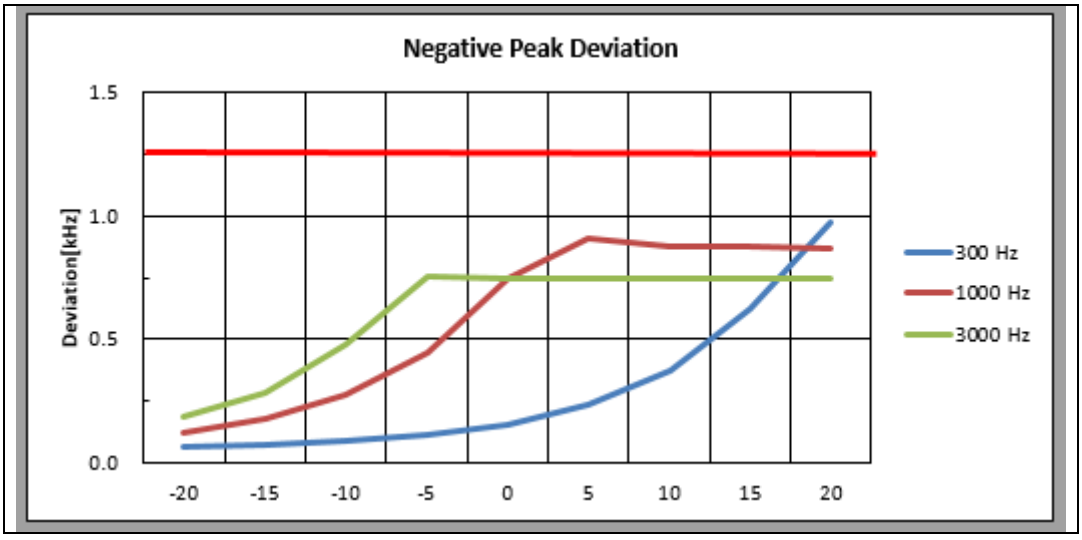




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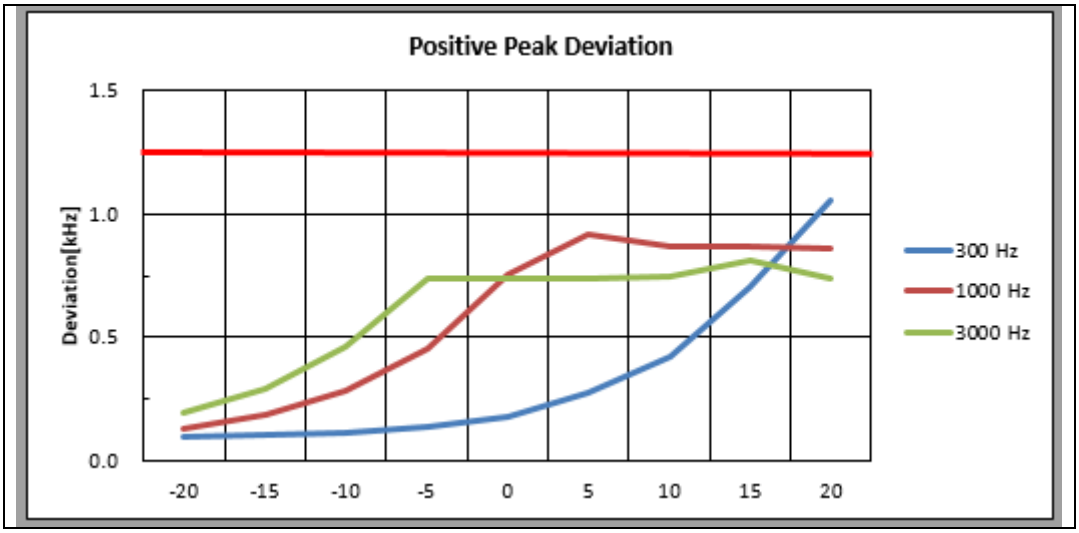
-Target Power_1W_512.00 ㎒

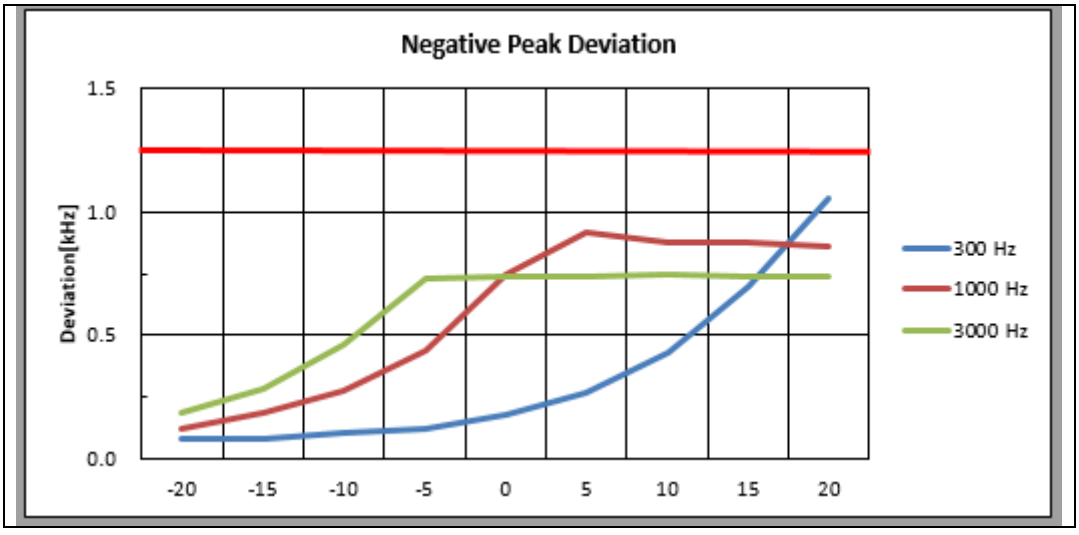




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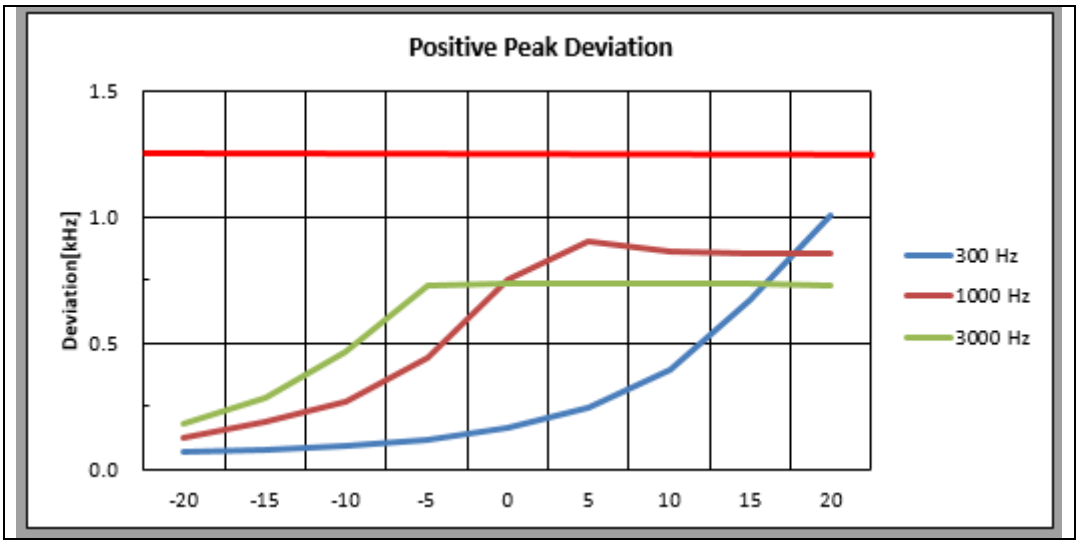
-Target Power_4W_406.10 ㎒

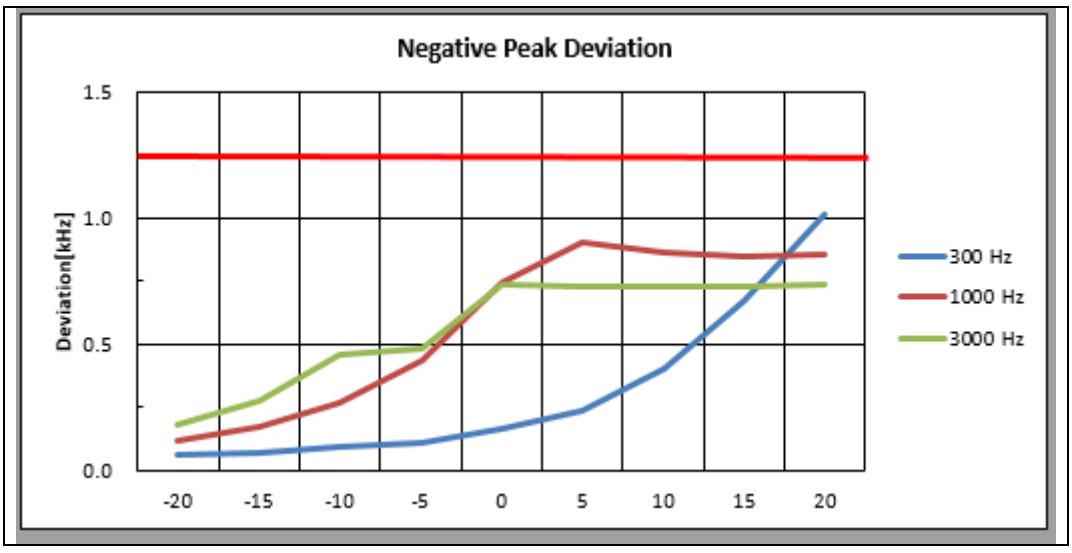




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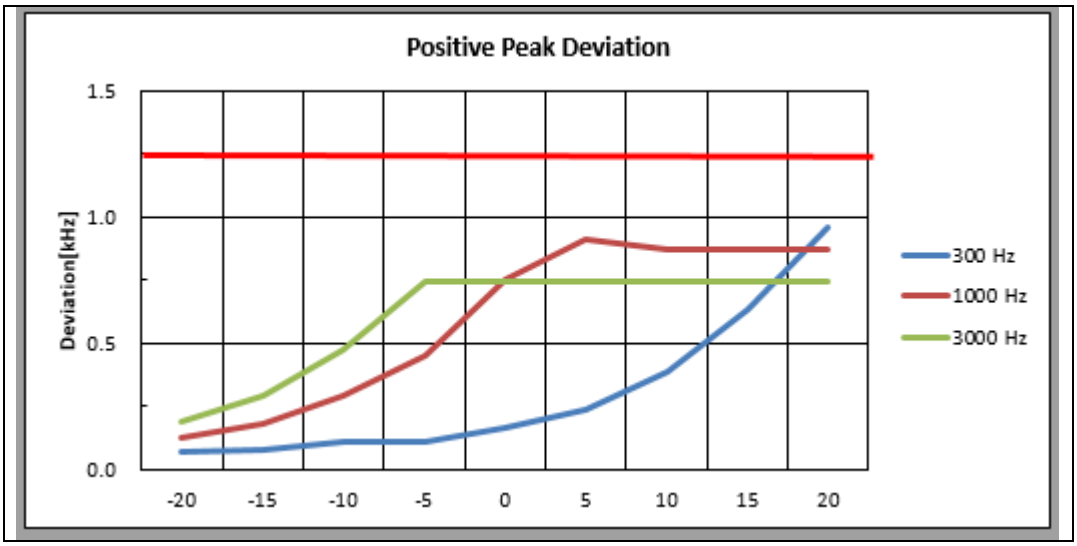
-Target Power_4W_459.00 ㎒

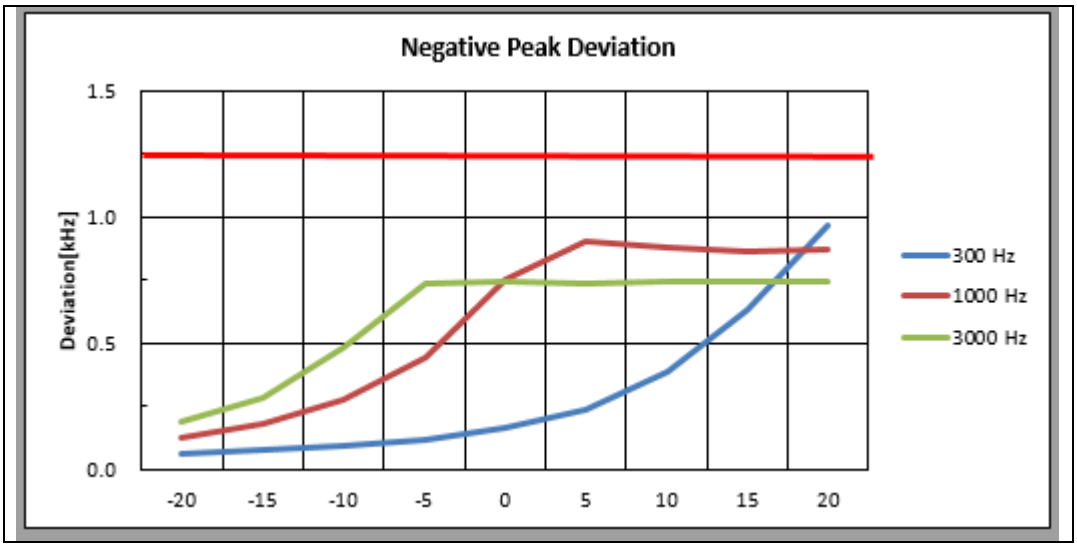




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-Target Power_4W_512.00 ㎒





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5.4 Audio Frequency Response

5.4.1 Regulation

According to TIA-603-D, the audio frequency response from 300 Hz to 3000 Hz shall not vary more than +1 dB or -3 dB from a true 6 dB per octave pre-emphasis characteristics as referenced to the 1000 Hz level. The exception is from 500 Hz to 300 Hz, where additional 6 dB per octave rolloff is allowed.

5.4.2 Measurement Procedure

1. The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.
2. The frequency response of the audio modulation part is adjusted to get 20% of the rated system deviation.
3. The deviations obtained over the frequency range from 100 Hz to 5000 Hz are recorded and compared with the reference deviation as follows:

$$\text{Audio Frequency Response} = 20\log [DEV_{Freq} / DEV_{ref}]$$

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5.4.3 Test Result

- Complied

* 12.5BW

-Target Power_1W_406.10 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.07	-17.19
200	0.07	-16.83
300	0.14	-11.05
400	0.18	-8.92
500	0.24	-6.62
600	0.29	-5.12
700	0.34	-3.54
800	0.39	-2.33
900	0.45	-1.12
1 000	**0.51**	**0.00**
1 500	0.80	3.80
2 000	1.07	6.34
2 500	1.21	7.41
3 000	0.89	4.76
4 000	0.08	-15.94
5 000	0.08	-16.72

-Target Power_1W_459.00 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.07	-17.60
200	0.07	-17.34
300	0.13	-11.97
400	0.18	-9.21
500	0.23	-6.85
600	0.28	-5.11
700	0.33	-3.88
800	0.39	-2.32
900	0.45	-1.11
1 000	**0.51**	**0.00**
1 500	0.80	3.89
2 000	1.08	6.57
2 500	1.21	7.55
3 000	0.90	5.00
4 000	0.07	-17.86
5 000	0.06	-18.27

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-Target Power_1W_512.00 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.07	-16.87
200	0.06	-18.01
300	0.13	-12.20
400	0.17	-9.42
500	0.23	-7.05
600	0.28	-5.13
700	0.33	-3.71
800	0.39	-2.36
900	0.45	-1.03
1 000	**0.51**	**0.00**
1 500	0.81	3.99
2 000	1.09	6.63
2 500	1.22	7.62
3 000	0.91	5.08
4 000	0.08	-16.18
5 000	0.06	-18.15

-Target Power_4W_406.10 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.08	-16.26
200	0.08	-16.37
300	0.14	-11.30
400	0.19	-8.43
500	0.24	-6.46
600	0.29	-4.88
700	0.36	-3.07
800	0.41	-1.95
900	0.45	-1.06
1 000	**0.51**	**0.00**
1 500	0.78	3.79
2 000	1.06	6.43
2 500	1.19	7.40
3 000	0.89	4.84
4 000	0.08	-15.72
5 000	0.07	-16.95

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-Target Power_4W_459.00 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.07	-17.45
200	0.07	-17.84
300	0.13	-11.62
400	0.19	-8.76
500	0.23	-6.83
600	0.28	-5.06
700	0.34	-3.50
800	0.39	-2.37
900	0.44	-1.19
1 000	**0.51**	**0.00**
1 500	0.79	3.85
2 000	1.09	6.61
2 500	1.21	7.56
3 000	0.90	4.95
4 000	0.07	-16.95
5 000	0.07	-17.07

-Target Power_4W_512.00 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.07	-17.27
200	0.06	-18.49
300	0.13	-11.77
400	0.18	-9.04
500	0.22	-7.08
600	0.28	-5.26
700	0.34	-3.52
800	0.39	-2.18
900	0.45	-0.97
1 000	**0.50**	**0.00**
1 500	0.80	4.03
2 000	1.10	6.79
2 500	1.23	7.71
3 000	0.91	5.11
4 000	0.06	-17.93
5 000	0.06	-18.20

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* 6.25BW

-Target Power_1W_406.10 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.07	-11.27
200	0.07	-10.78
300	0.08	-9.97
400	0.10	-7.67
500	0.13	-5.45
600	0.15	-4.40
700	0.18	-3.06
800	0.19	-2.26
900	0.22	-1.28
1 000	**0.25**	**0.00**
1 500	0.36	3.30
2 000	0.50	5.97
2 500	0.54	6.69
3 000	0.41	4.29
4 000	0.07	-11.15
5 000	0.07	-11.53

-Target Power_1W_459.00 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.06	-12.51
200	0.06	-11.80
300	0.08	-9.72
400	0.10	-7.44
500	0.12	-6.06
600	0.14	-4.74
700	0.16	-3.76
800	0.19	-2.03
900	0.21	-1.26
1 000	**0.25**	**0.00**
1 500	0.36	3.39
2 000	0.49	5.93
2 500	0.54	6.82
3 000	0.40	4.28
4 000	0.07	-11.39
5 000	0.06	-12.82

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-Target Power_1W_512.00 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.06	-12.89
200	0.06	-11.87
300	0.08	-10.12
400	0.11	-7.35
500	0.12	-6.20
600	0.14	-4.69
700	0.17	-3.45
800	0.20	-1.92
900	0.22	-0.97
1 000	**0.25**	**0.00**
1 500	0.37	3.42
2 000	0.50	6.09
2 500	0.55	6.89
3 000	0.42	4.65
4 000	0.07	-10.83
5 000	0.06	-12.01

-Target Power_4W_406.10 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.08	-10.46
200	0.07	-10.81
300	0.08	-10.23
400	0.11	-7.29
500	0.13	-5.55
600	0.15	-4.44
700	0.17	-3.35
800	0.20	-1.81
900	0.22	-0.99
1 000	**0.25**	**0.00**
1 500	0.36	3.22
2 000	0.48	5.70
2 500	0.54	6.67
3 000	0.41	4.30
4 000	0.07	-10.69
5 000	0.07	-11.70

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-Target Power_4W_459.00 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.06	-12.91
200	0.06	-11.90
300	0.08	-10.53
400	0.11	-7.60
500	0.12	-6.23
600	0.15	-4.45
700	0.17	-3.22
800	0.19	-2.50
900	0.21	-1.54
1 000	**0.25**	**0.00**
1 500	0.36	3.15
2 000	0.49	5.72
2 500	0.55	6.73
3 000	0.41	4.25
4 000	0.06	-12.61
5 000	0.06	-12.91

-Target Power_4W_512.00 ㎒

Audio Frequency [㎐]	Measured Deviation [㎑]	Calculated Response [dB]
100	0.06	-12.01
200	0.07	-11.61
300	0.08	-10.51
400	0.10	-7.79
500	0.12	-6.55
600	0.15	-4.73
700	0.17	-3.32
800	0.20	-2.29
900	0.22	-1.44
1 000	**0.26**	**0.00**
1 500	0.37	3.33
2 000	0.50	5.83
2 500	0.56	6.79
3 000	0.42	4.25
4 000	0.07	-11.11
5 000	0.07	-11.74

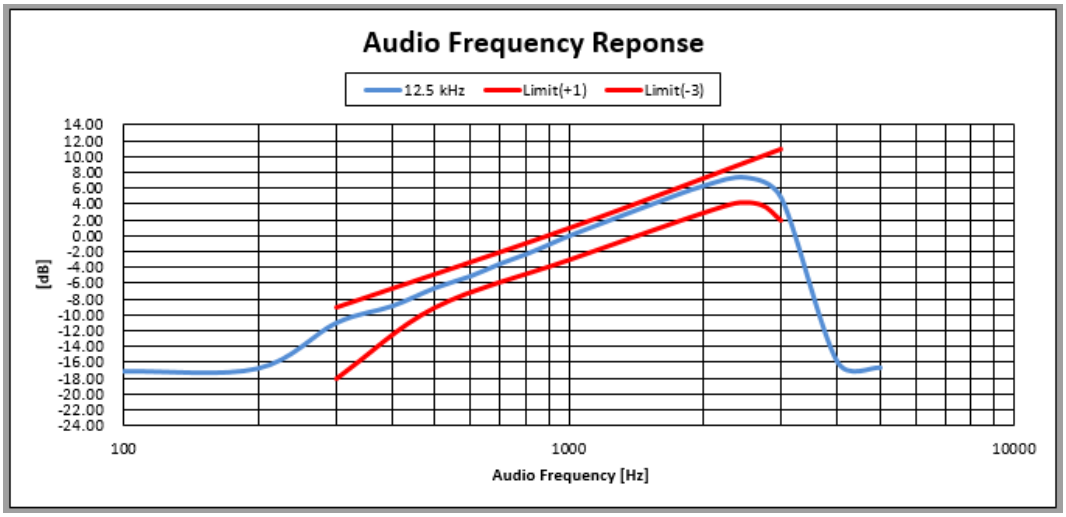
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5.4.4 Test Plot

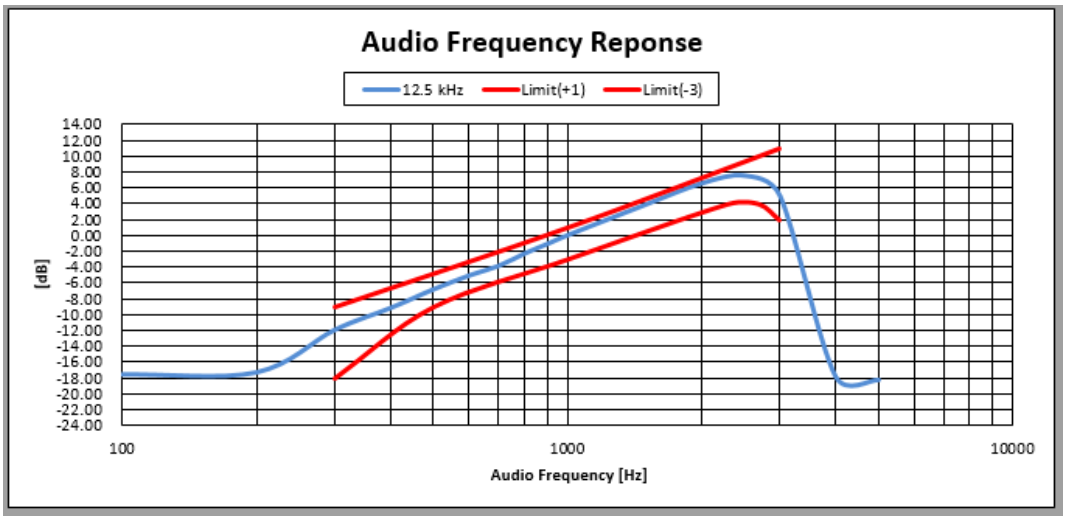
- Complied

* 12.5BW

-Target Power_1W_406.10 ㎒

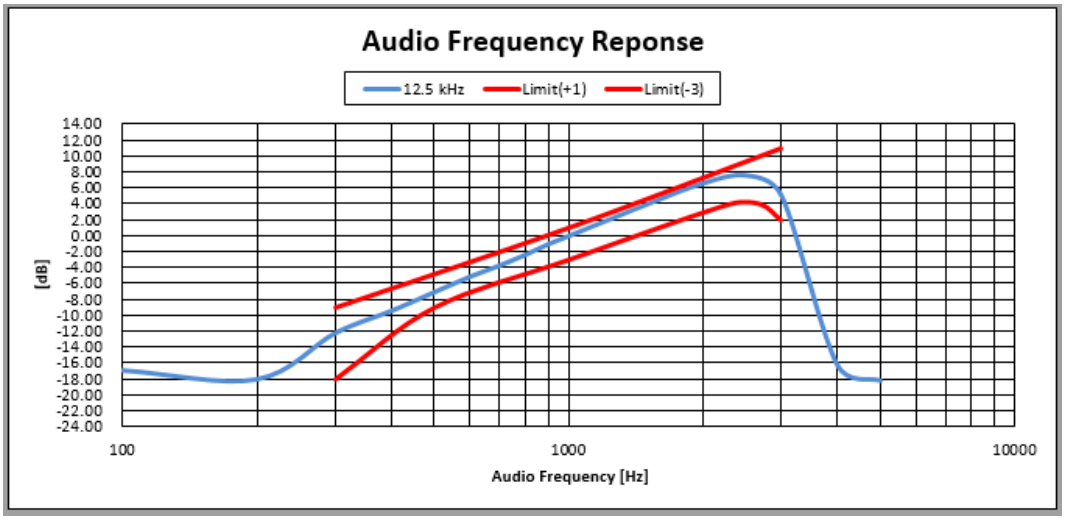


-Target Power_1W_459.00 ㎒

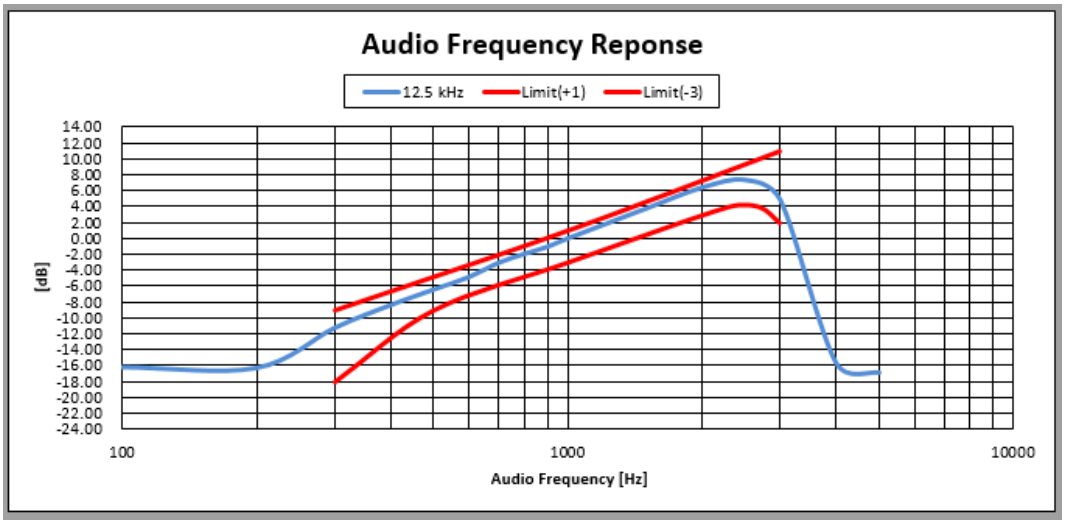


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-Target Power_1W_512.00 ㎒

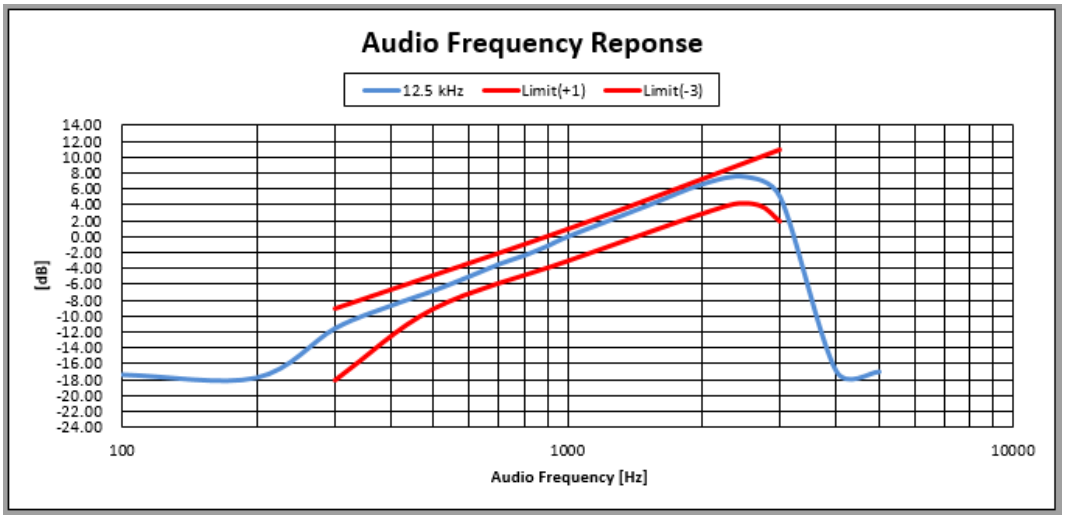


-Target Power_4W_406.10 ㎒

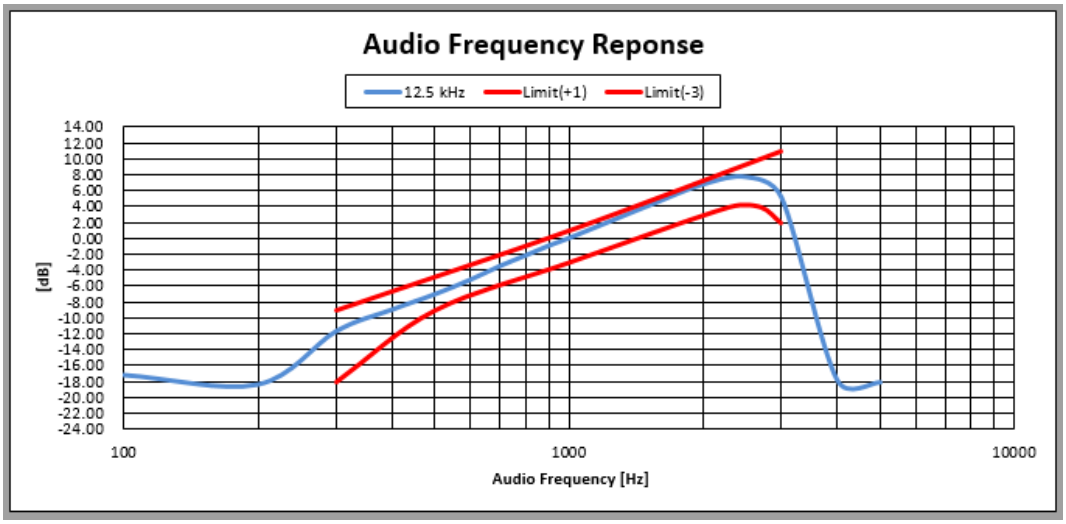


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-Target Power_4W_459.00 ㎒



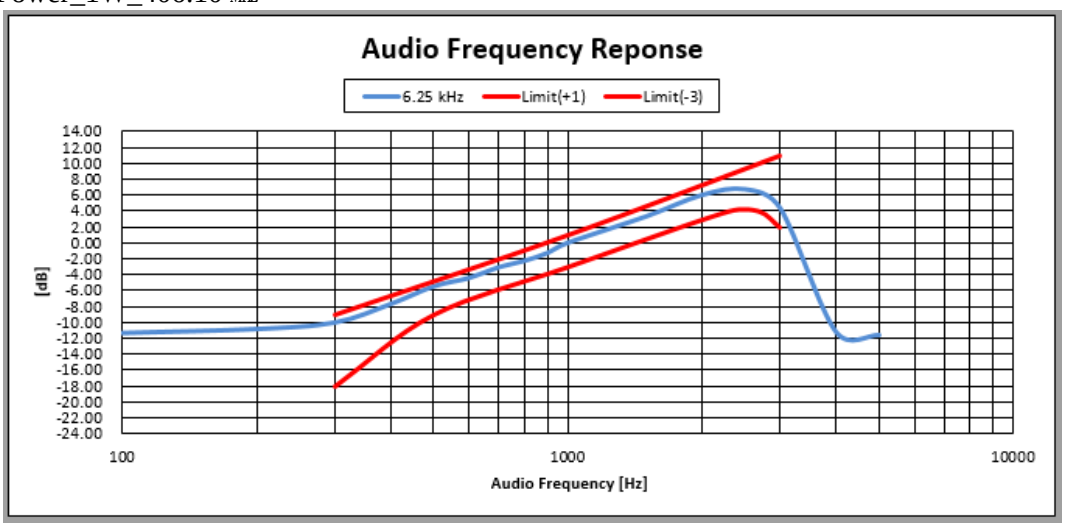
-Target Power_4W_512.00 ㎒



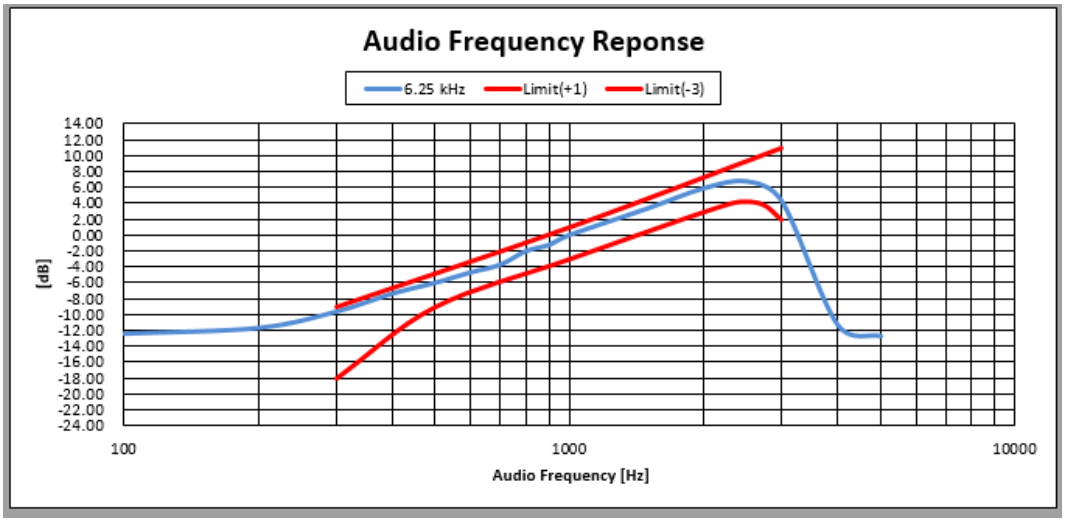
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* 6.25BW

-Target Power_1W_406.10 ㎒

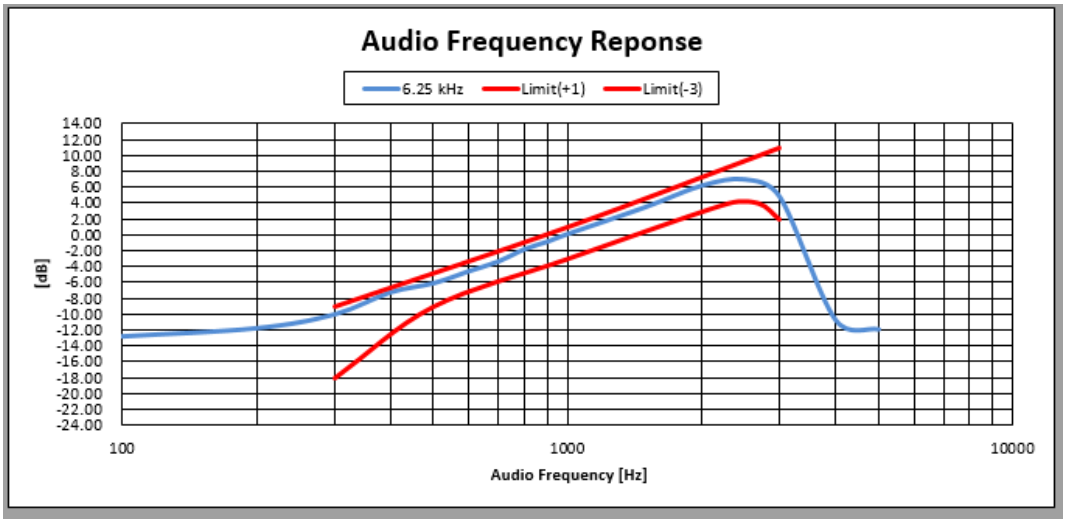


-Target Power_1W_459.00 ㎒

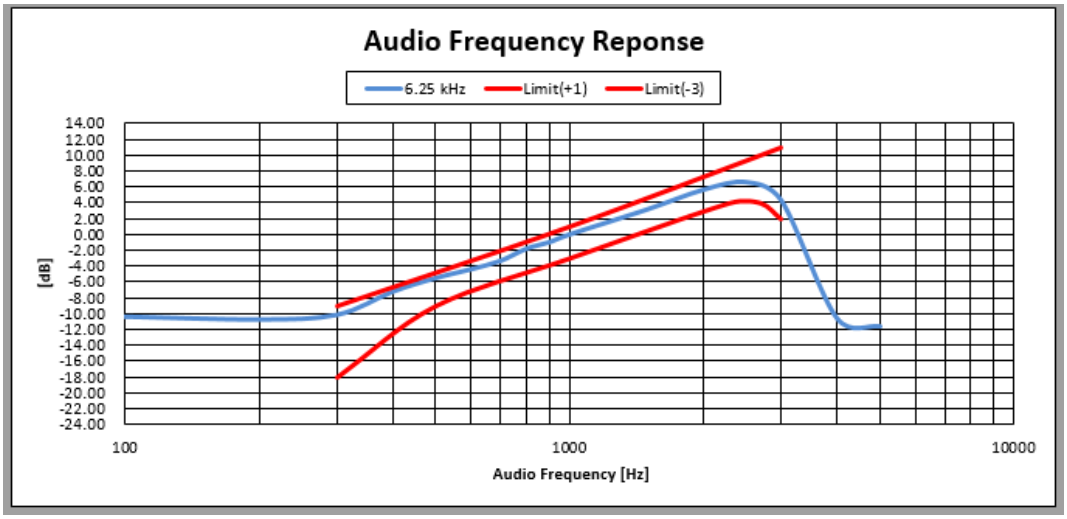


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-Target Power_1W_512.00 ㎒

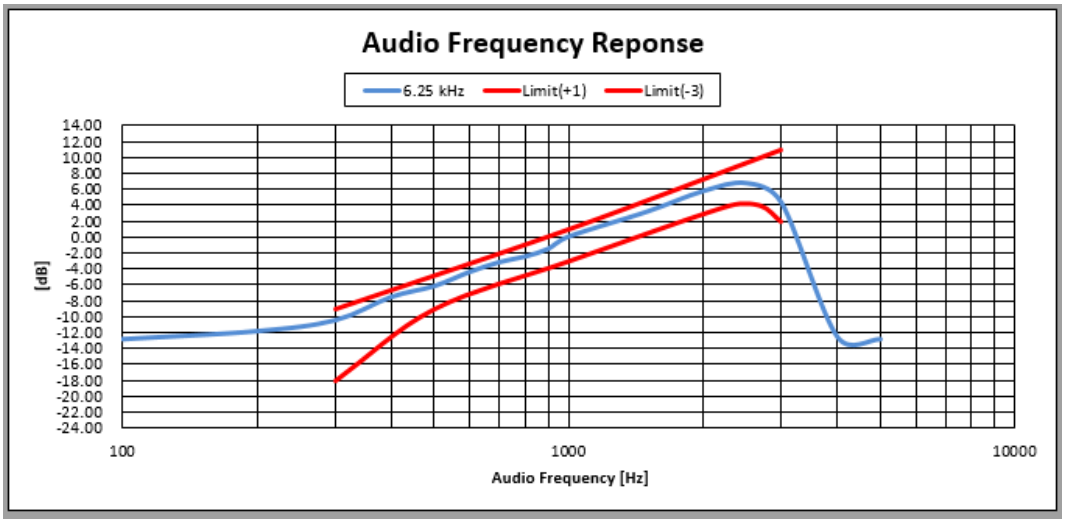


-Target Power_4W_406.10 ㎒

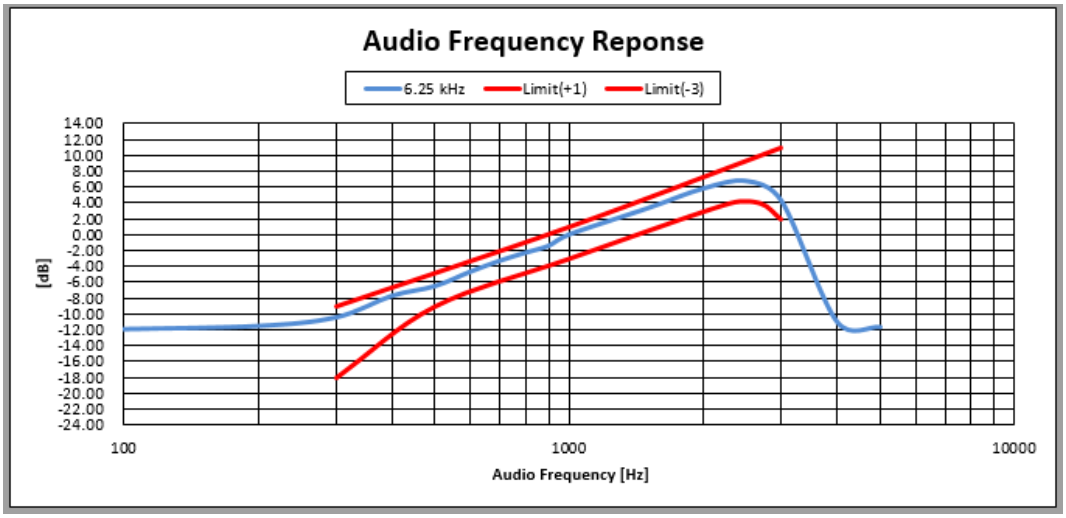


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-Target Power_4W_459.00 ㎒



-Target Power_4W_512.00 ㎒



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5.5 Audio Low Pass Filter Frequency Response

5.5.1 Regulation

According to TIA-603-D, for equipment operating on channels between 896 ㎒ through 901 ㎒, between 935 ㎒ through 940 ㎒, and 12.5 or 15 ㎑ spaced channels in the frequency range 138-174 ㎒ and 406-512 ㎒.

5.5.2 Measurement Procedure

1. Connect the audio frequency generator as close as possible the input of the post limiter low pass filter within the transmitter under test.
2. Connect the audio spectrum analyzer to the output of the post limiter low pass filter within the transmitter under test.
3. Apply a 1000 ㎐ tone from the audio frequency generator and adjust the level per manufacturer's specifications.
4. Record the ㏈ level of the 1000 ㎐ spectral line on the audio spectrum analyzer as LEV_{REF} .
5. Set the audio frequency generator to the desired test frequency between 3000 ㎐ and the upper low pass filter limit.
6. Record audio spectrum analyzer levels, at the test frequency in step 5).
7. Record the ㏈ level on the audio spectrum analyzer as LEV_{FREQ}
8. Calculate the audio frequency response at the test frequency as: low pass frequency response $=LEV_{FREQ} - LEV_{REF}$
9. Repeat steps 7) through 8) for all the desired test frequencies.

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5.5.3 Test Result

- Complied

* 12.5BW

-Target Power_1W_406.10 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-3.3	0.0
3	-5.9	0.0
4	-15.7	-12.5
5	-33.9	-22.2
6	-39.9	-30.1
7	-41.0	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

-Target Power_1W_459.00 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-3.2	0.0
3	-5.9	0.0
4	-15.4	-12.5
5	-33.8	-22.2
6	-40.2	-30.1
7	-40.8	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

-Target Power_1W_512.00 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-3.2	0.0
3	-5.9	0.0
4	-15.6	-12.5
5	-33.8	-22.2
6	-39.7	-30.1
7	-39.9	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

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-Target Power_4W_406.10 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-3.3	0.0
3	-6.0	0.0
4	-15.8	-12.5
5	-33.7	-22.2
6	-44.4	-30.1
7	-46.3	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

-Target Power_4W_459.00 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-3.2	0.0
3	-5.9	0.0
4	-15.3	-12.5
5	-34.3	-22.2
6	-43.8	-30.1
7	-46.0	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

-Target Power_4W_512.00 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-3.3	0.0
3	-5.9	0.0
4	-15.7	-12.5
5	-33.5	-22.2
6	-44.5	-30.1
7	-46.8	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

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* 6.25BW

-Target Power_1W_406.10 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-2.5	0.0
3	-5.9	0.0
4	-16.0	-12.5
5	-34.4	-22.2
6	-41.2	-30.1
7	-41.9	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

-Target Power_1W_459.00 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-2.4	0.0
3	-5.8	0.0
4	-15.7	-12.5
5	-34.2	-22.2
6	-41.4	-30.1
7	-42.1	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

-Target Power_1W_512.00 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-2.5	0.0
3	-5.8	0.0
4	-15.8	-12.5
5	-34.2	-22.2
6	-40.8	-30.1
7	-41.9	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

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-Target Power_4W_406.10 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-2.6	0.0
3	-6.0	0.0
4	-16.8	-12.5
5	-35.5	-22.2
6	-44.3	-30.1
7	-46.1	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

-Target Power_4W_459.00 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-2.5	0.0
3	-5.8	0.0
4	-15.8	-12.5
5	-34.7	-22.2
6	-45.1	-30.1
7	-47.4	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

-Target Power_4W_512.00 ㎒

Audio Frequency [㎑]	Calculated Response [dB]	Limit [dB]
1	0.0	0.0
2	-2.5	0.0
3	-5.8	0.0
4	-15.8	-12.5
5	-33.8	-22.2
6	-45.5	-30.1
7	-47.2	-36.8
8	<-50	-42.6
9	<-50	-47.7
10	<-55	-52.3
20	<-85	-82.4

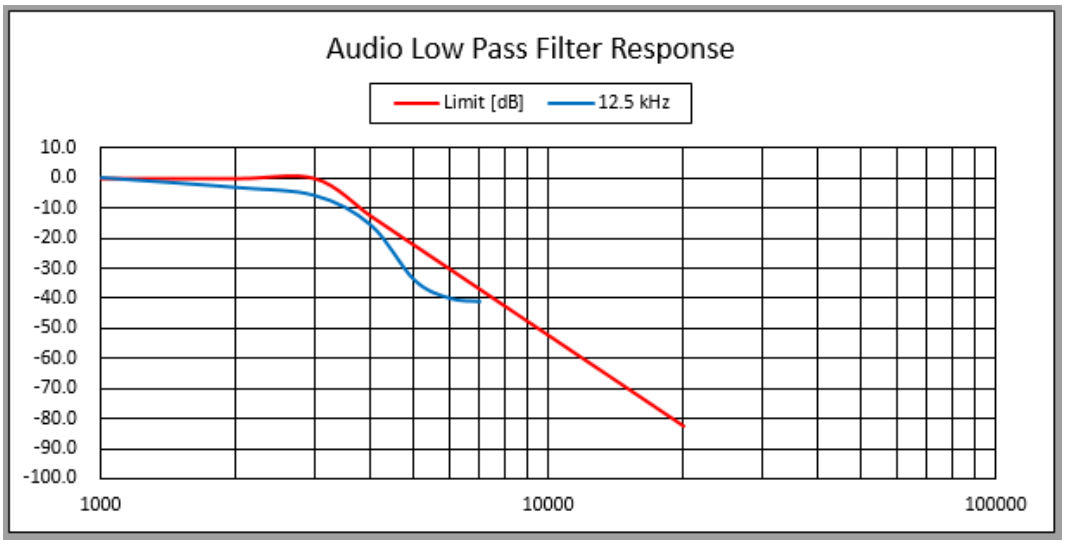
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5.5.4 Test Plots

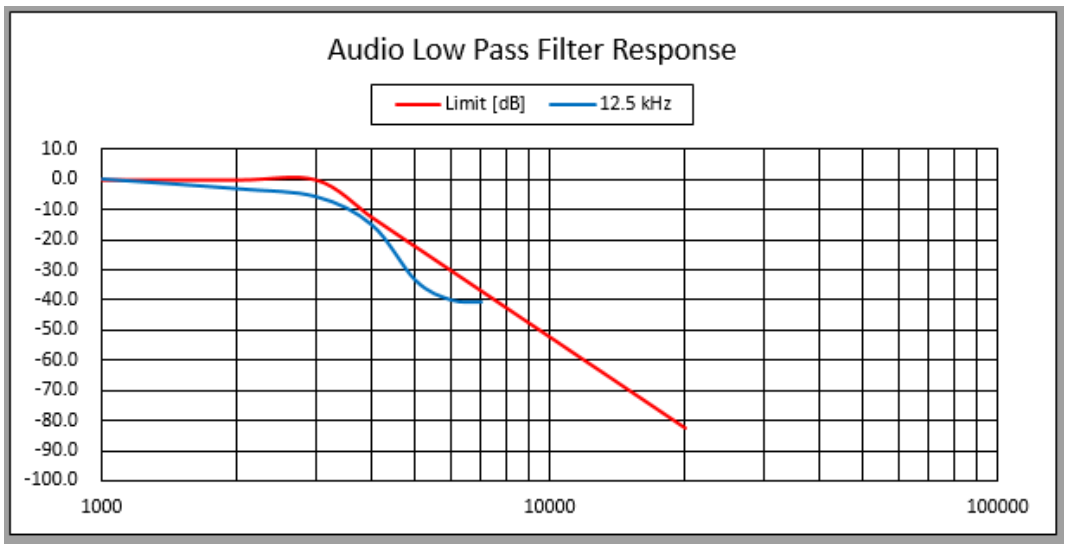
- Complied

* 12.5BW

-Target Power_1W_406.10 ㎒

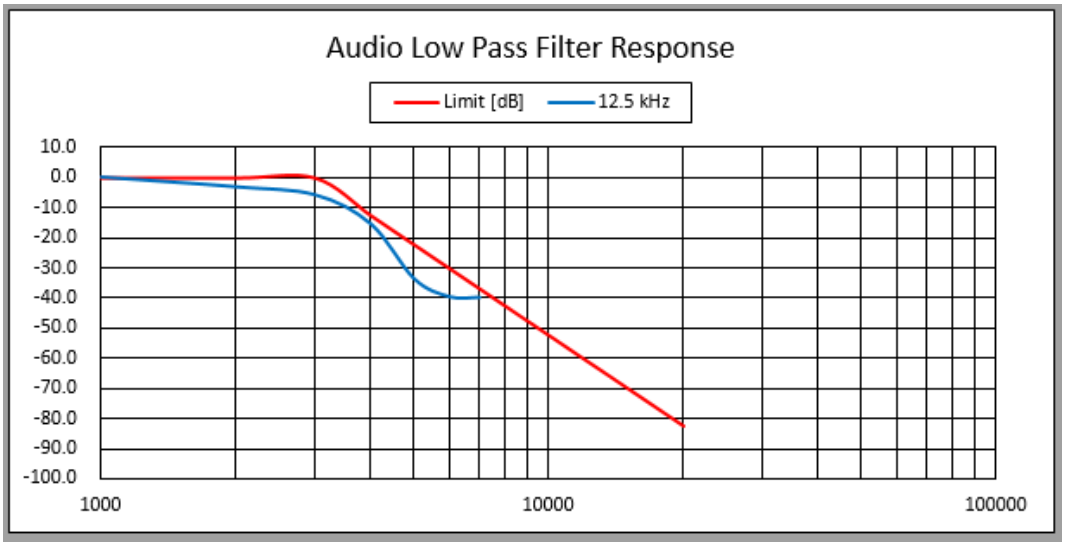


-Target Power_1W_459.00 ㎒

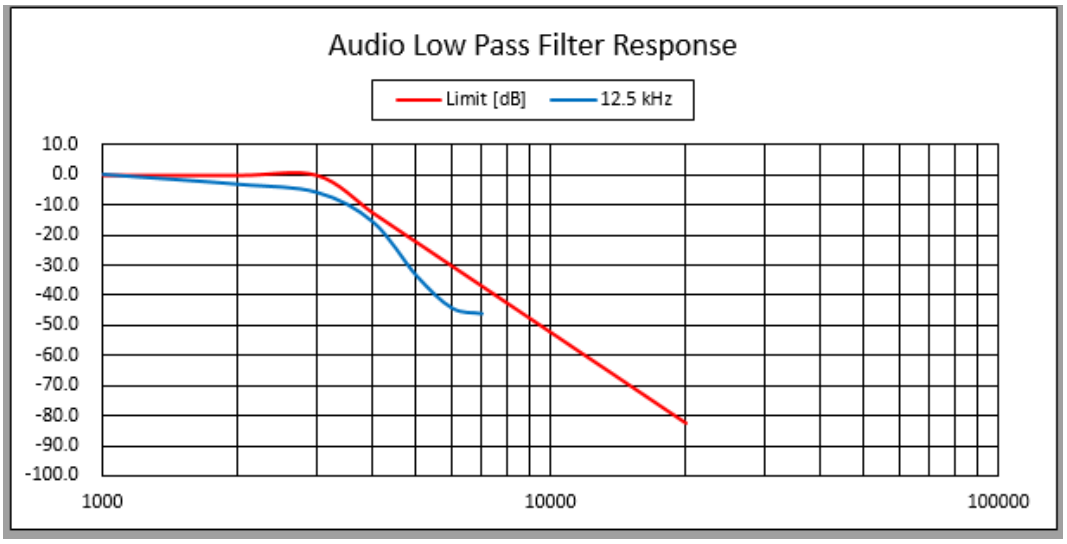


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-Target Power_1W_512.00 ㎒

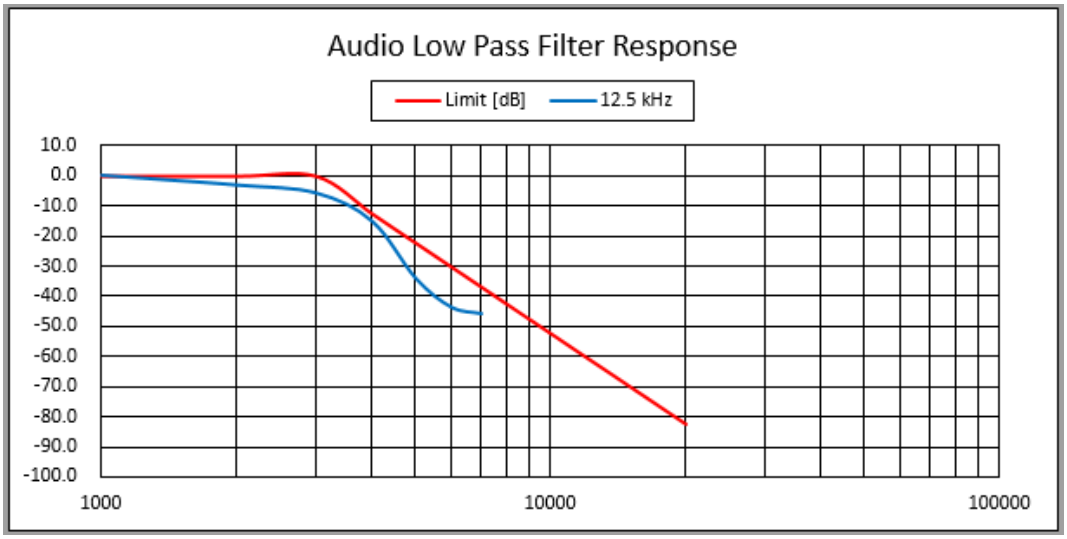


-Target Power_4W_406.10 ㎒

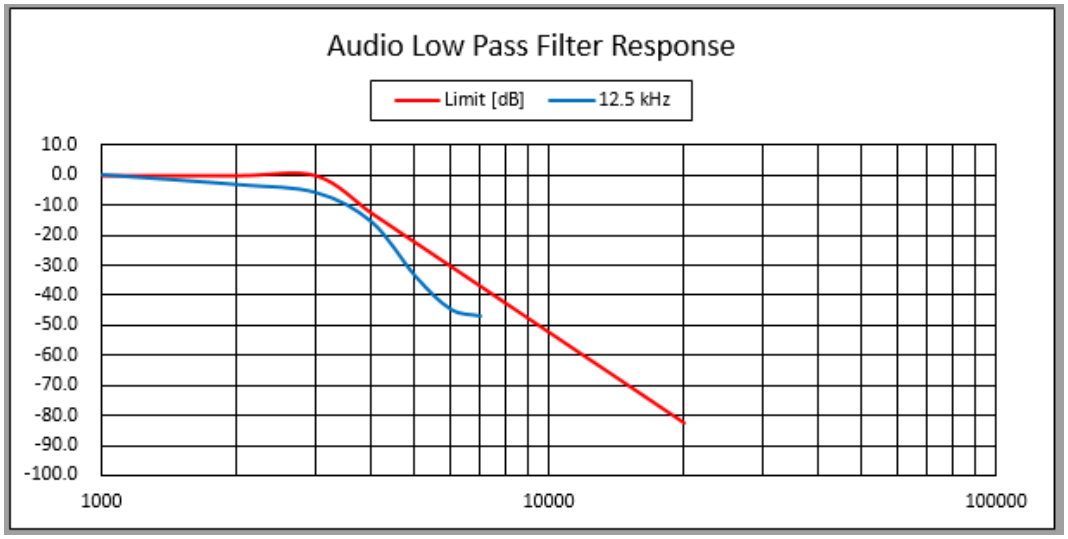


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-Target Power_4W_459.00 ㎒



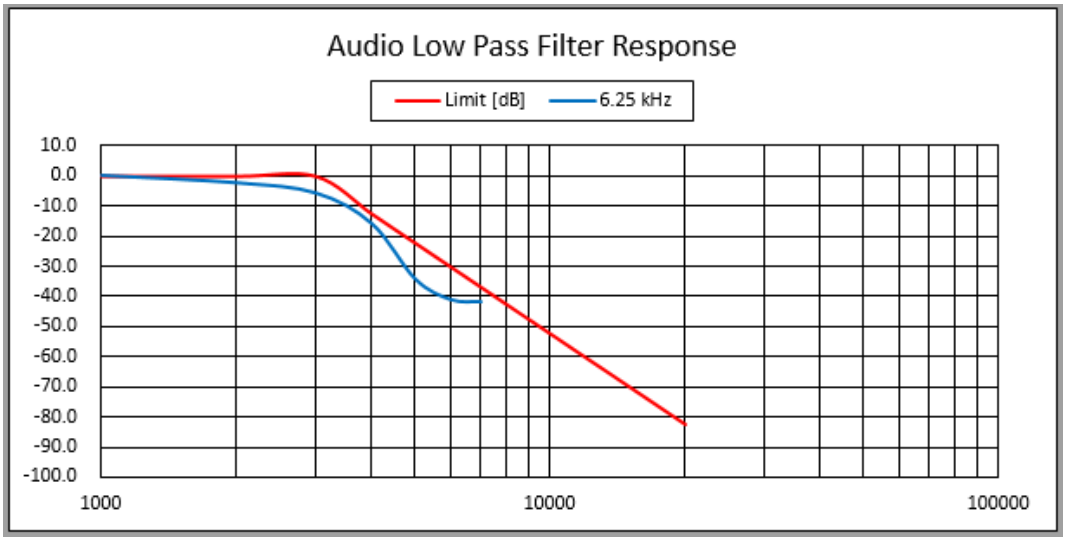
-Target Power_4W_512.00 ㎒



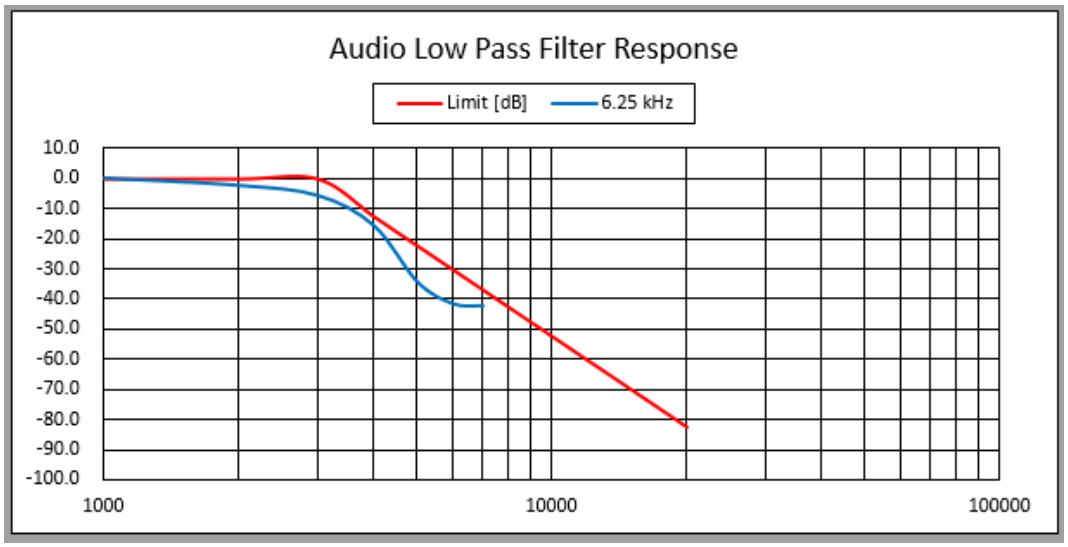
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* 6.25BW

-Target Power_1W_406.10 ㎒

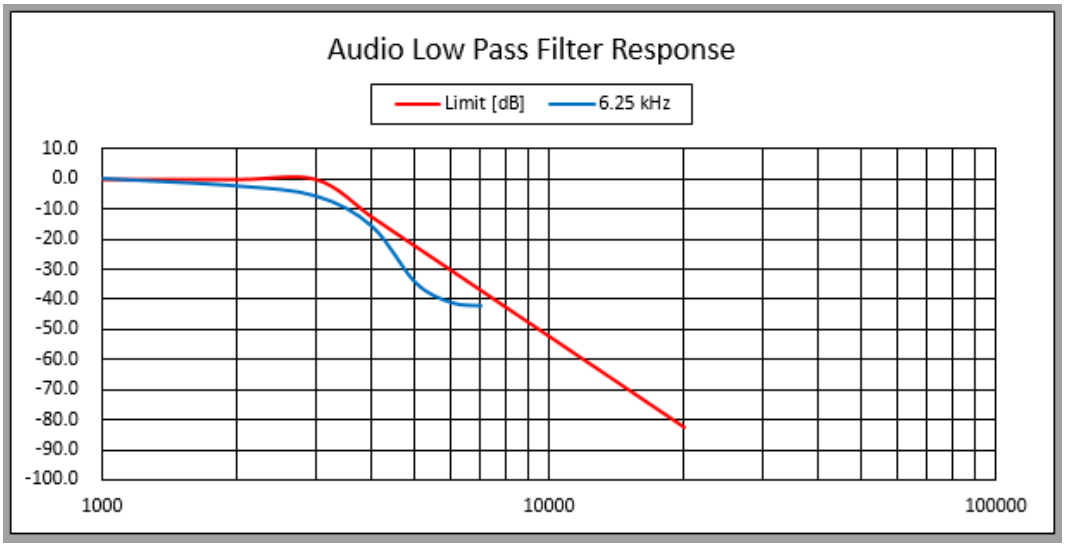


-Target Power_1W_459.00 ㎒

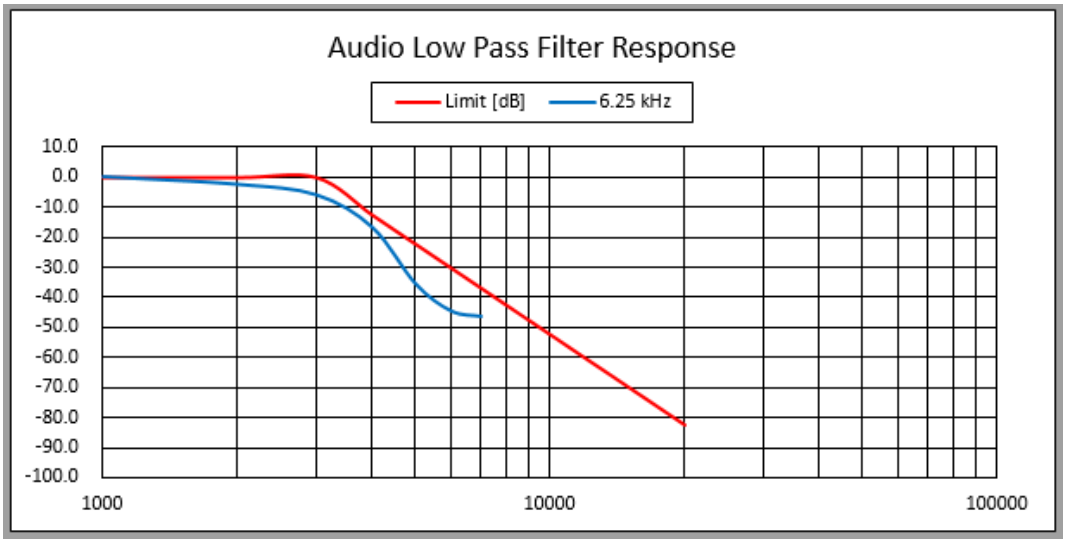


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-Target Power_1W_512.00 ㎒

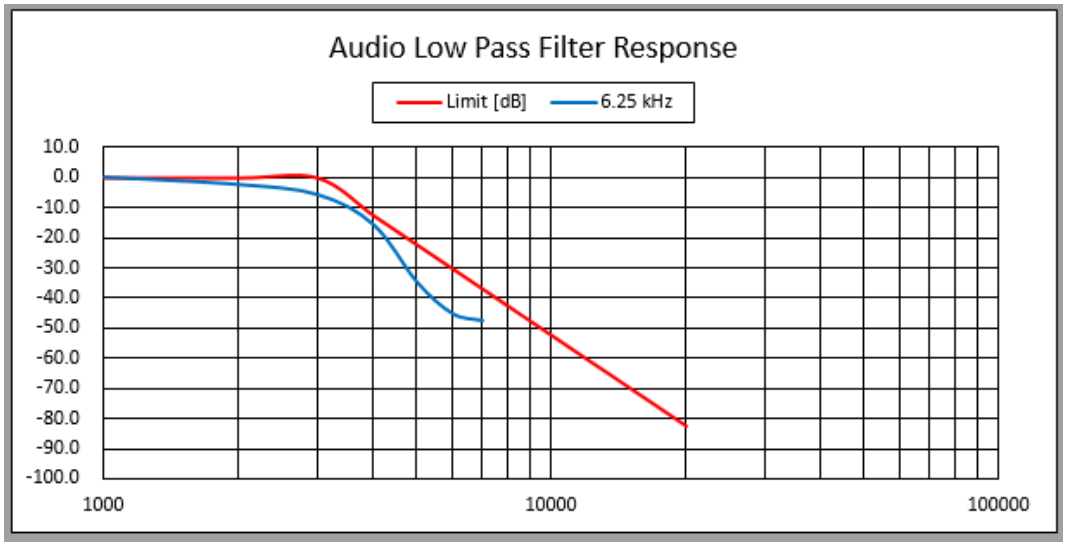


-Target Power_4W_406.10 ㎒

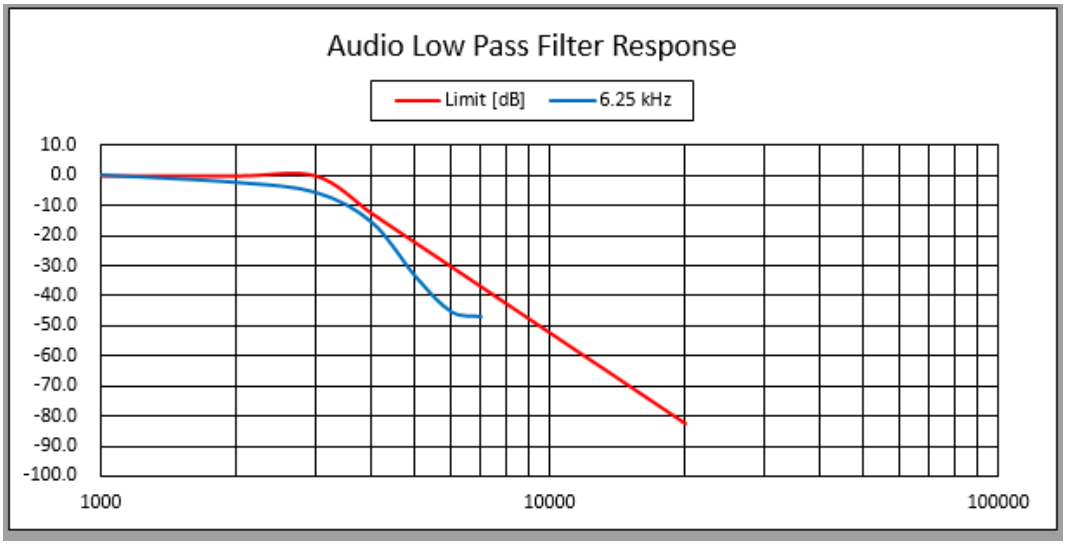


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-Target Power_4W_459.00 ㎒



-Target Power_4W_512.00 ㎒



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5.6 Occupied Bandwidth and Emission Mask

5.6.1 Regulation

According to §90.210(d), Emission Mask D—12.5 ㎑ channel bandwidth equipment. For transmitters designed to operate with a 12.5 ㎑ channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f0 to 5.625 ㎑ removed from f0: Zero ㏈.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in ㎑) of more than 5.625 ㎑ but no more than 12.5 ㎑: At least 7.27(fd−2.88 ㎑) ㏈.

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in ㎑) of more than 12.5 ㎑: At least 50 + 10 log (P) ㏈ or 70 ㏈, whichever is the lesser attenuation.

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 ㎑ removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 ㎐ with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 ㎑ from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

Emission Mask E—6.25 ㎑ channel bandwidth equipment. For transmitters designed to operate with a 6.25 ㎑ or less bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f0 to 3.0 ㎑ removed from f0: Zero ㏈.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in ㎑) of more than 3.0 ㎑ but no more than 4.6 ㎑: At least 30 + 16.67(fd−3 ㎑) ㏈ or 55 + 10 log (P) or 65 ㏈, whichever is the lesser attenuation.

(3) On any frequency removed from the center of the authorized bandwidth by more than 4.6 ㎑: At least 55 + 10 log (P) ㏈ or 65 ㏈, whichever is the lesser attenuation.

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(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 ㎑ removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 ㎐ with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 ㎑ from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

5.6.2 Measurement Procedure

1. The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.
2. The transmitter is modulated by a 2500 ㎐ tone at an input level 16 ㏈ greater than that necessary to produce 50 percent modulation.
3. The input level shall be established at the frequency of maximum response of the audio modulating circuit.

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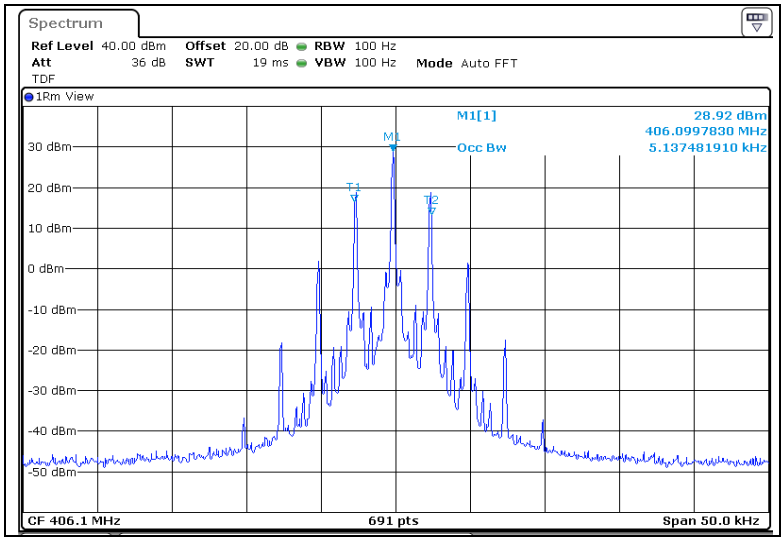
5.6.3 Test Result

- Complied

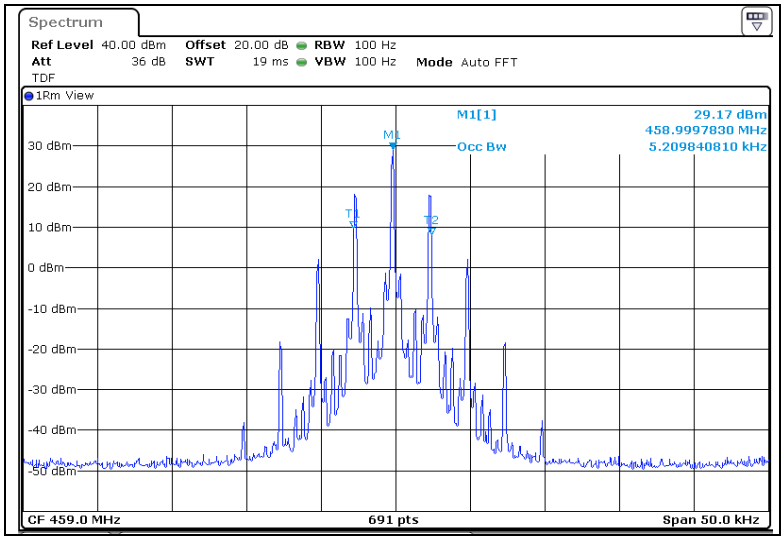
Figure 4. plot of Occupied Bandwidth and Emission Mask

* 99% Bandwidth_12.5BW

-Target Power_1W_406.10 ㎒

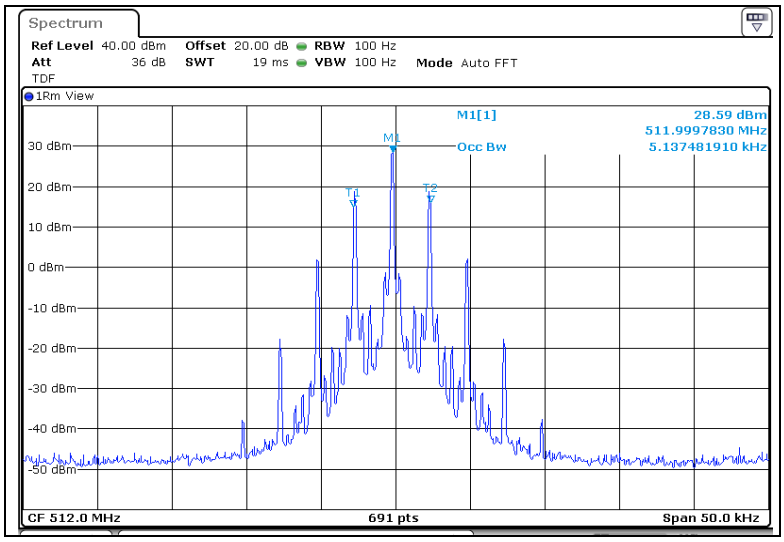


-Target Power_1W_459.00 ㎒

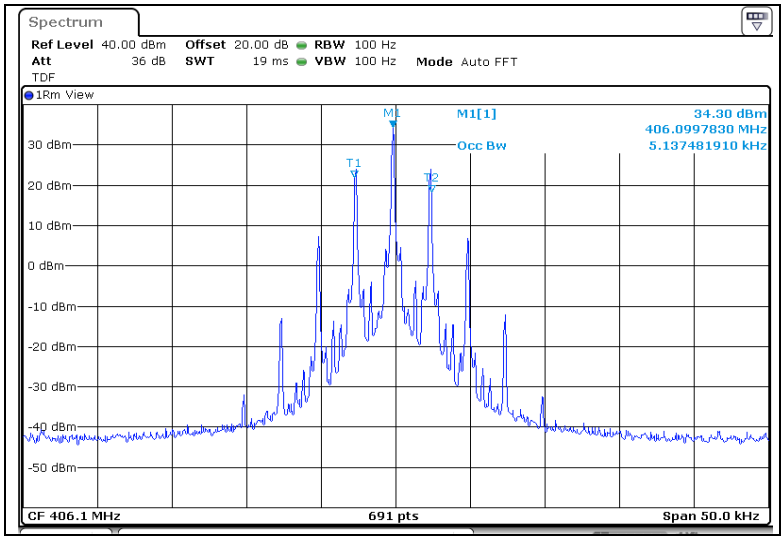


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-Target Power_1W_512.00 ㎒

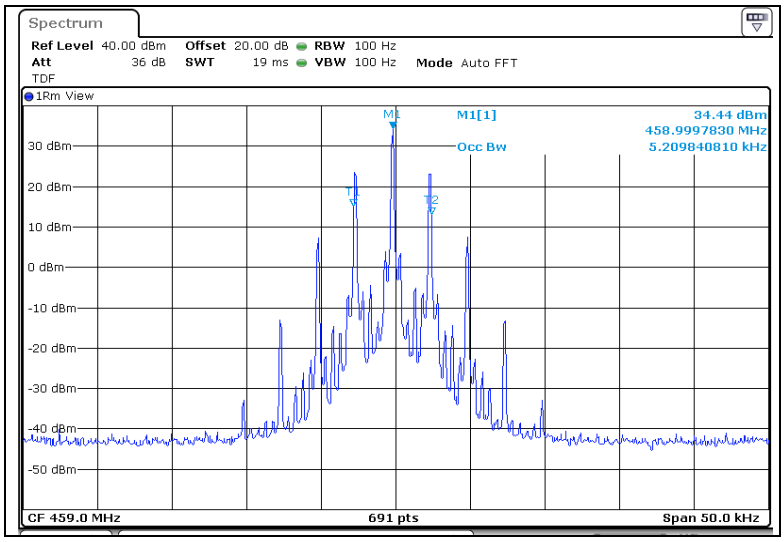


-Target Power_4W_406.10 ㎒

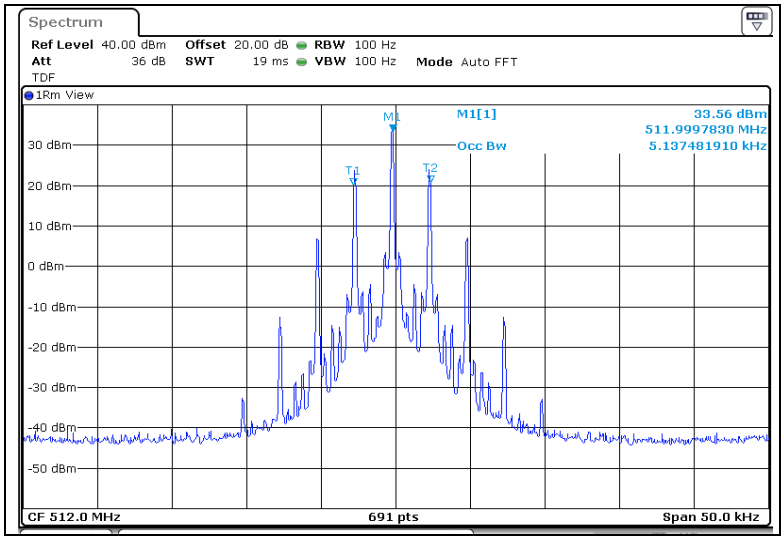


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-Target Power_4W_459.00 ㎒



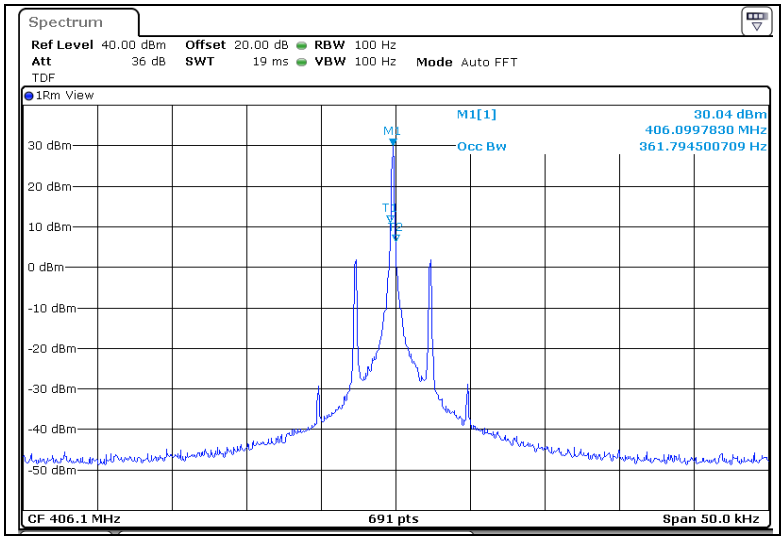
-Target Power_4W_512.00 ㎒



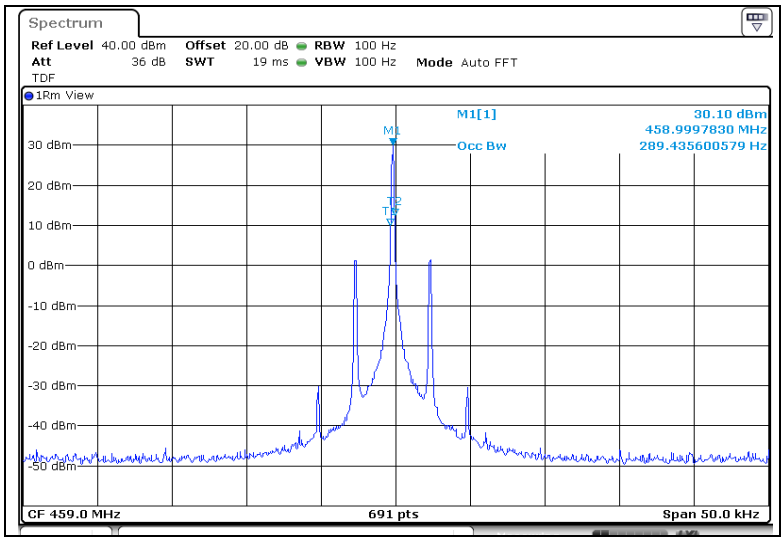
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* 99% Bandwidth_6.25BW

-Target Power_1W_406.10 ㎒

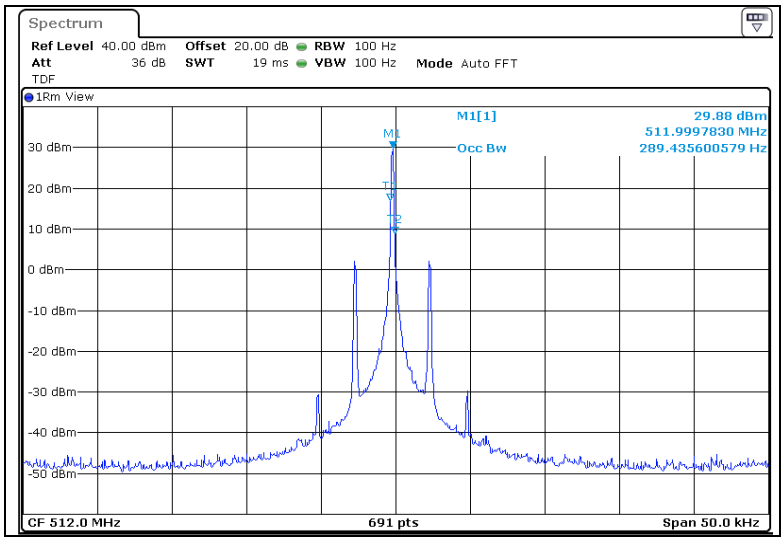


-Target Power_1W_459.00 ㎒

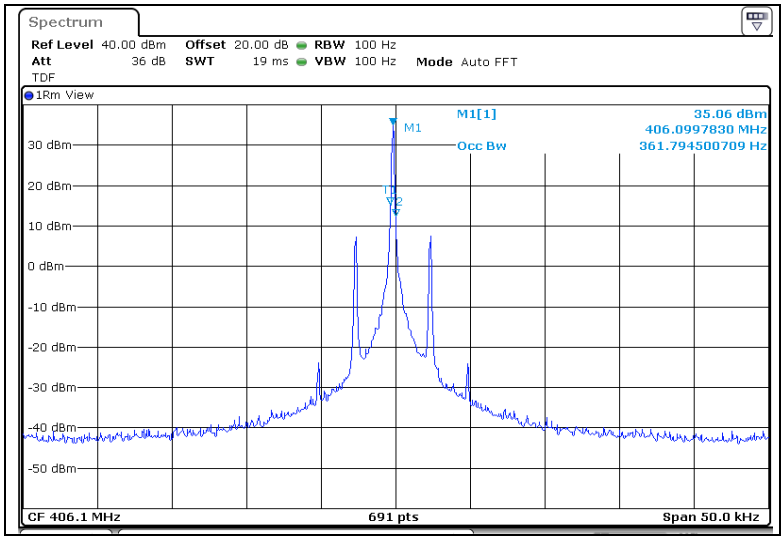


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-Target Power_1W_512.00 ㎒

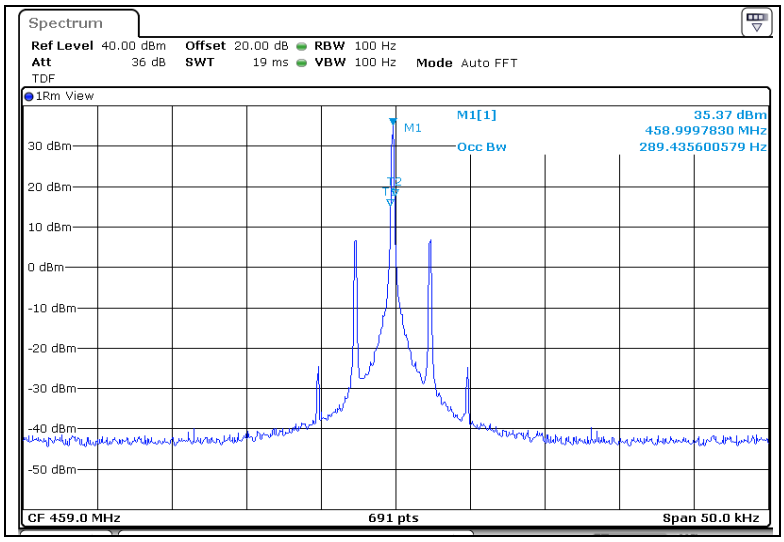


-Target Power_4W_406.10 ㎒

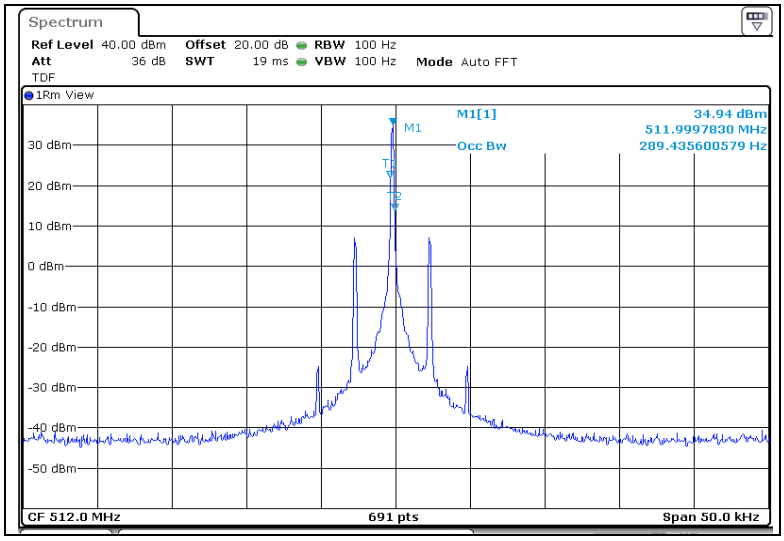


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-Target Power_4W_459.00 ㎒



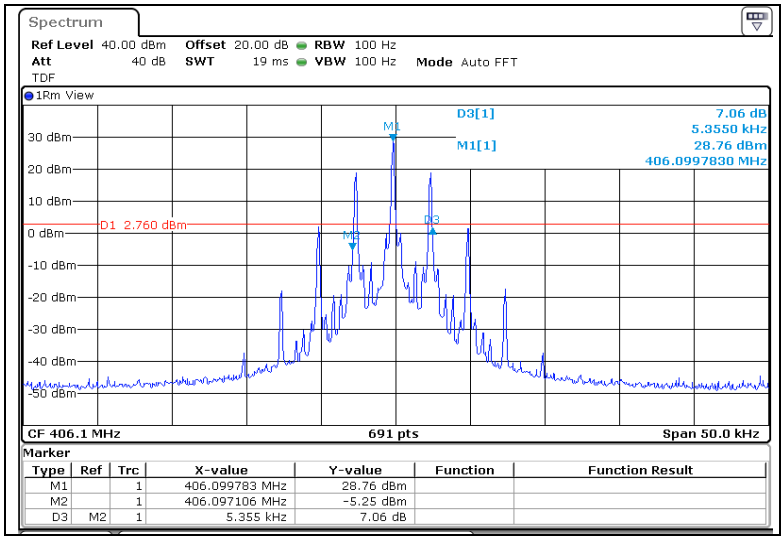
-Target Power_4W_512.00 ㎒



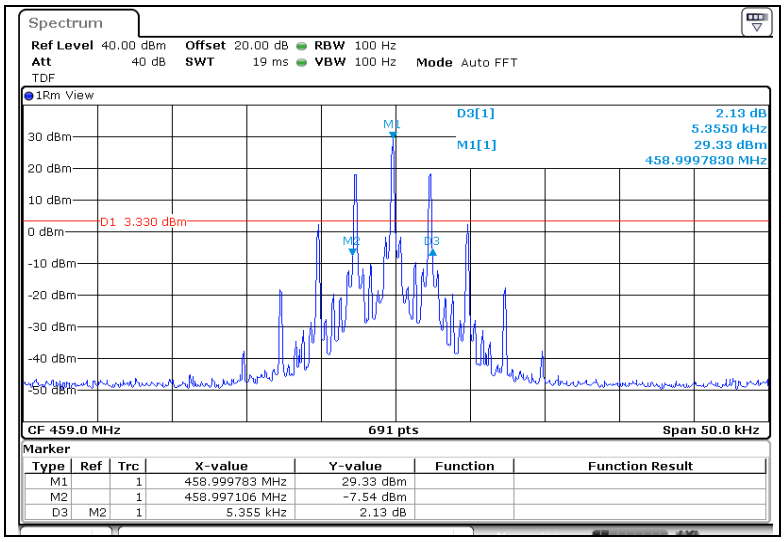
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* 26dB Bandwidth_12.5BW

-Target Power_1W_406.10 ㎒

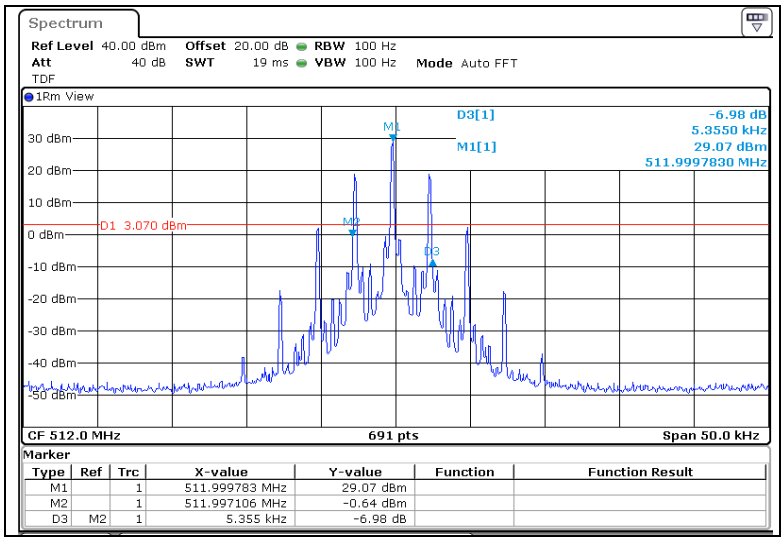


-Target Power_1W_459.00 ㎒

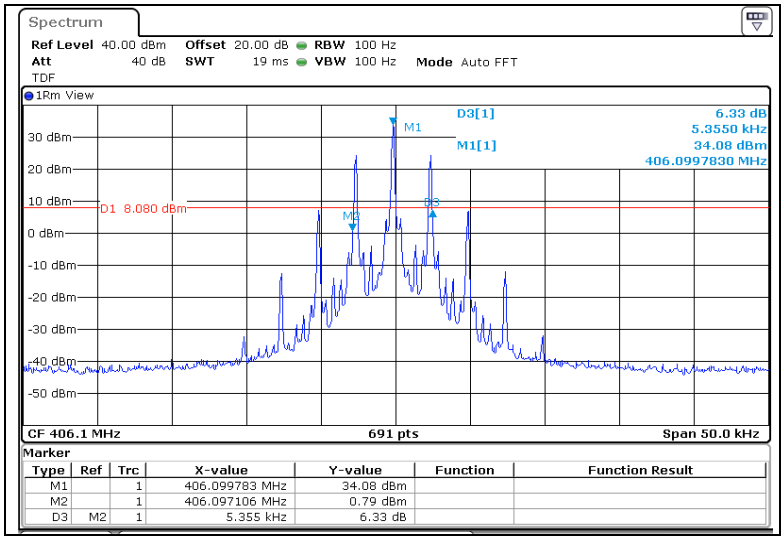


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-Target Power_1W_512.00 ㎒

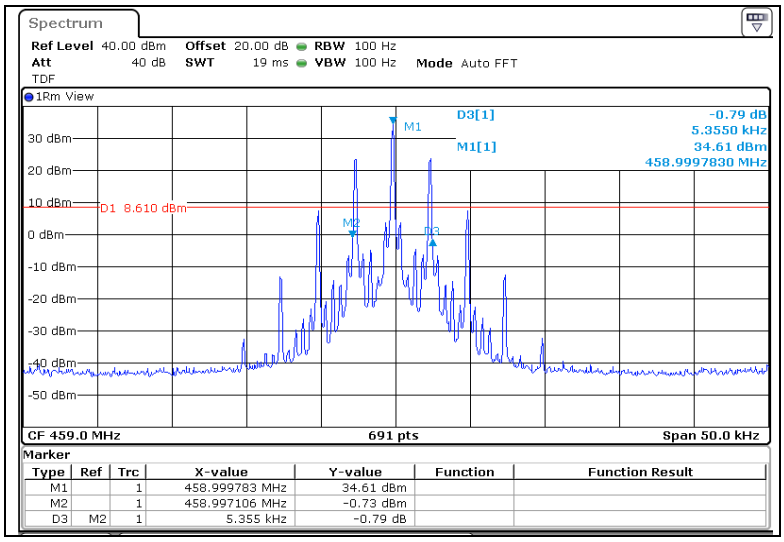


-Target Power_4W_406.10 ㎒

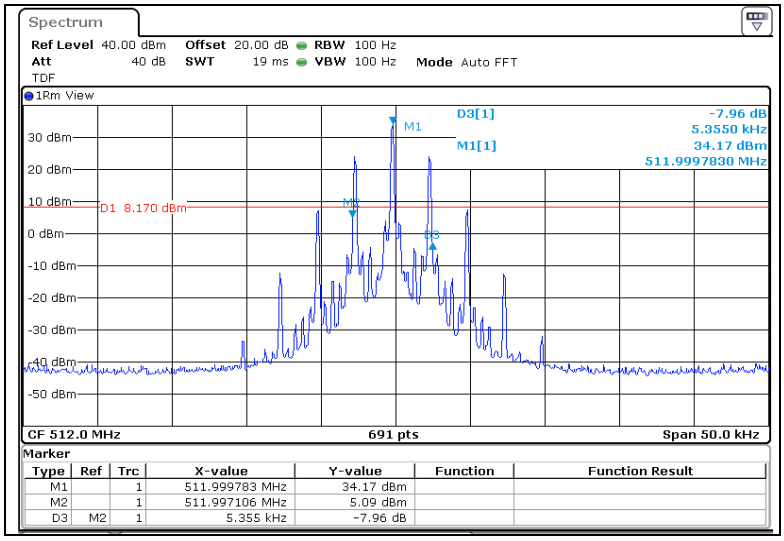


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-Target Power_4W_459.00 ㎒



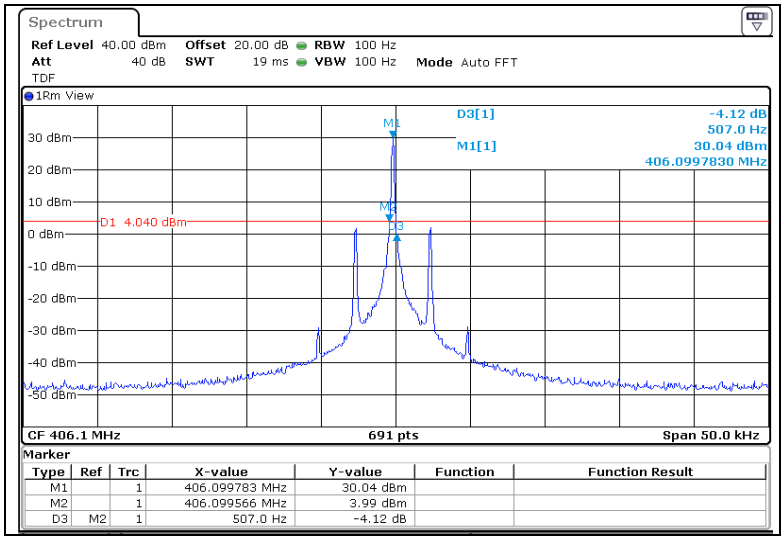
-Target Power_4W_512.00 ㎒



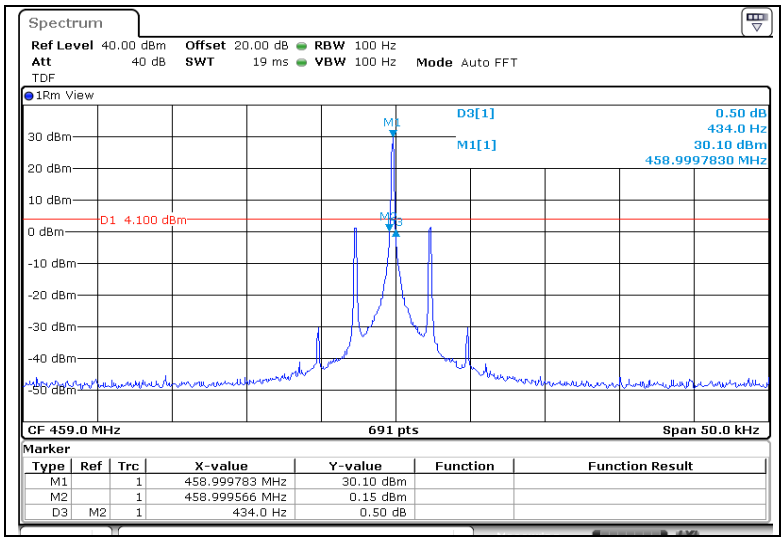
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* 26dB Bandwidth_6.25BW

-Target Power_1W_406.10 ㎒

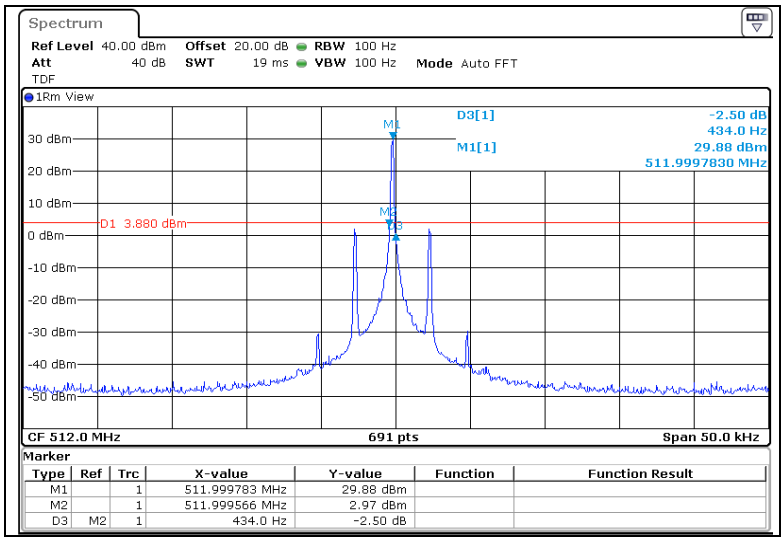


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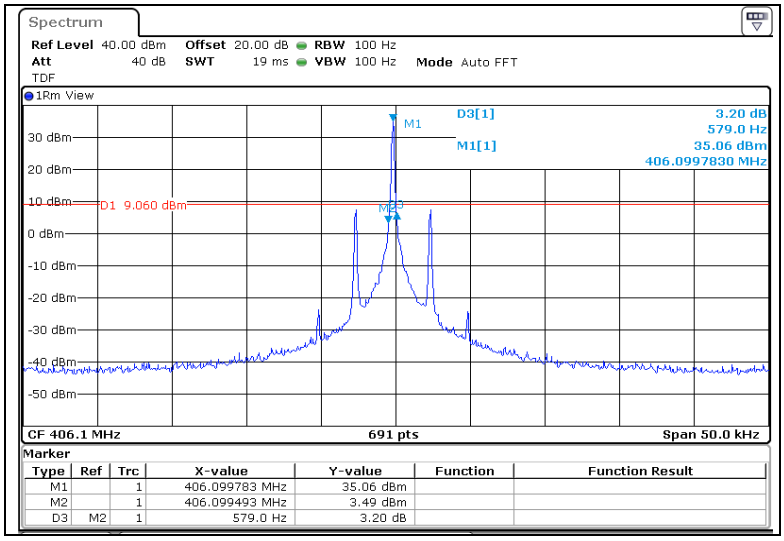


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-Target Power_1W_512.00 ㎒

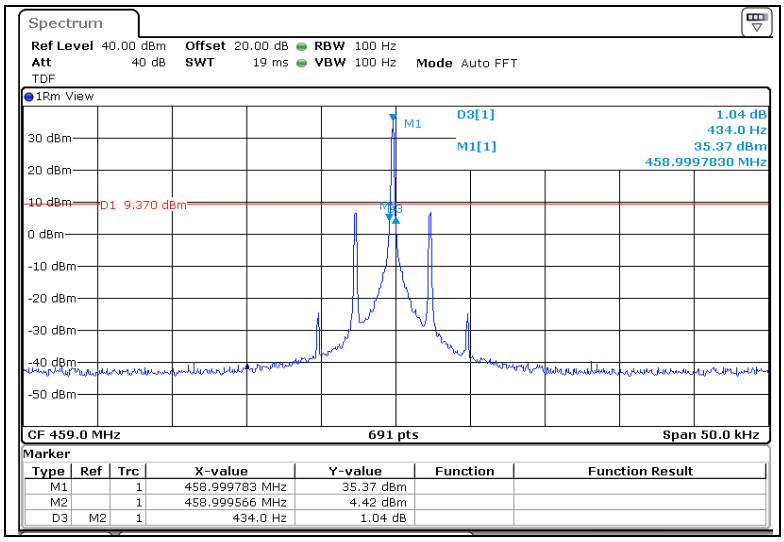


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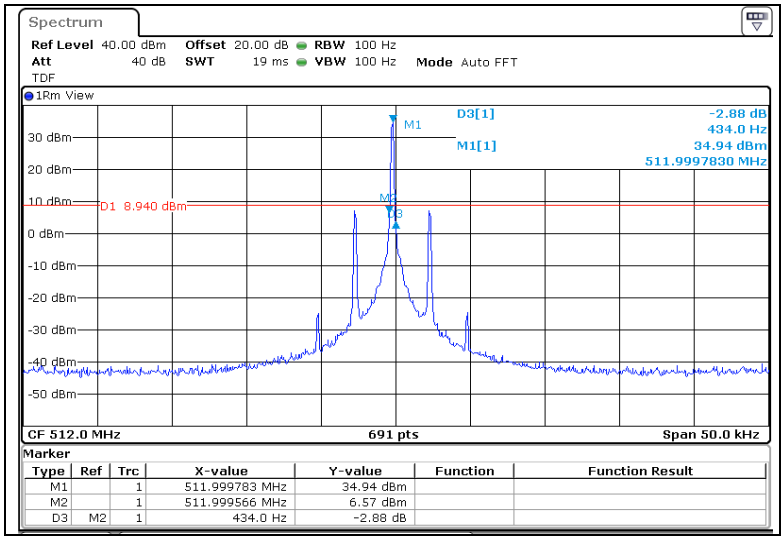


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-Target Power_4W_459.00 ㎒



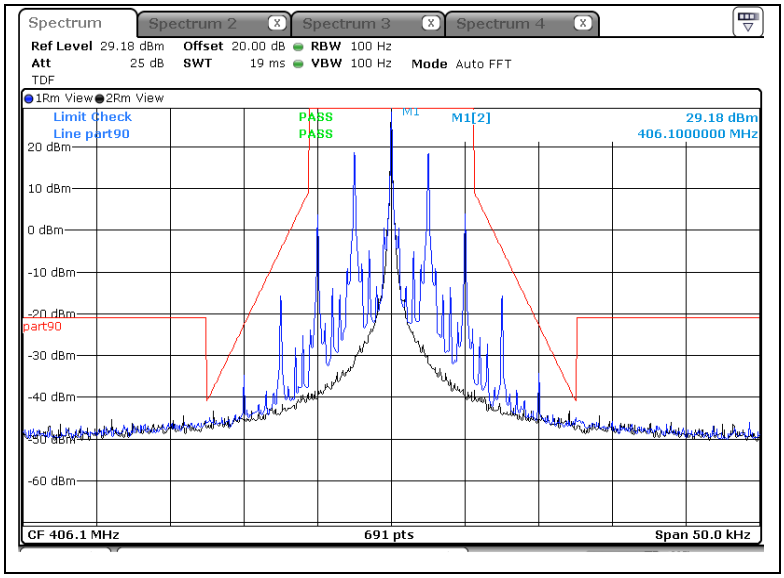
-Target Power_4W_512.00 ㎒



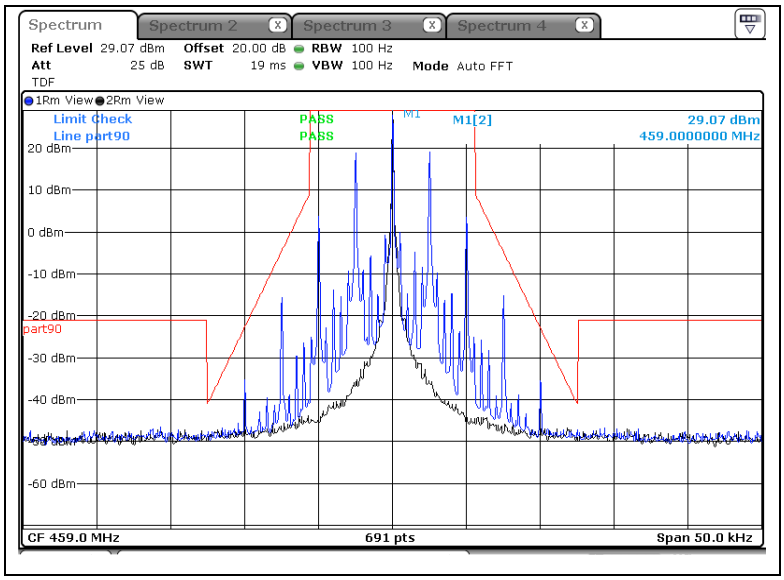
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* Emission Mask_12.5BW

-Target Power_1W_406.10 ㎒

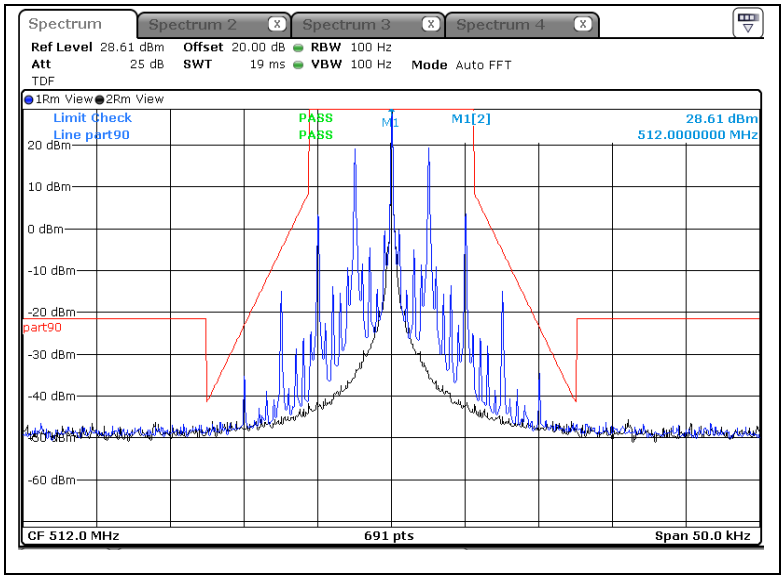


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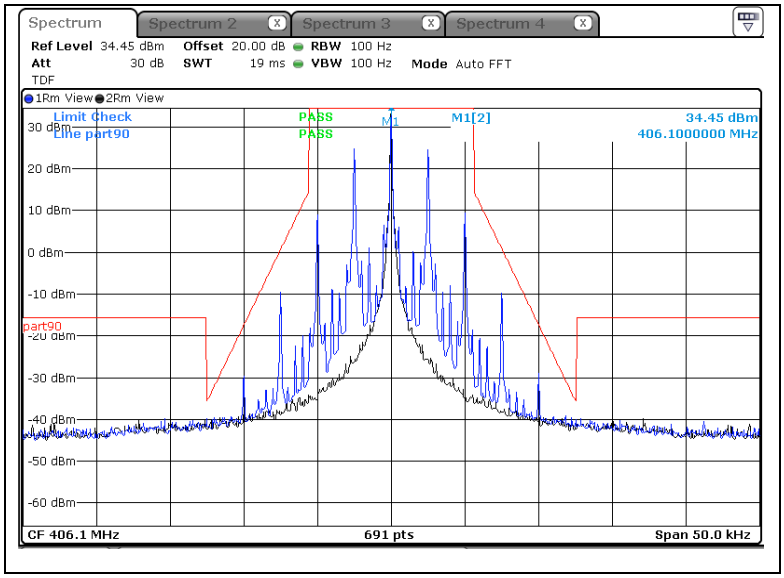


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-Target Power_1W_512.00 ㎒

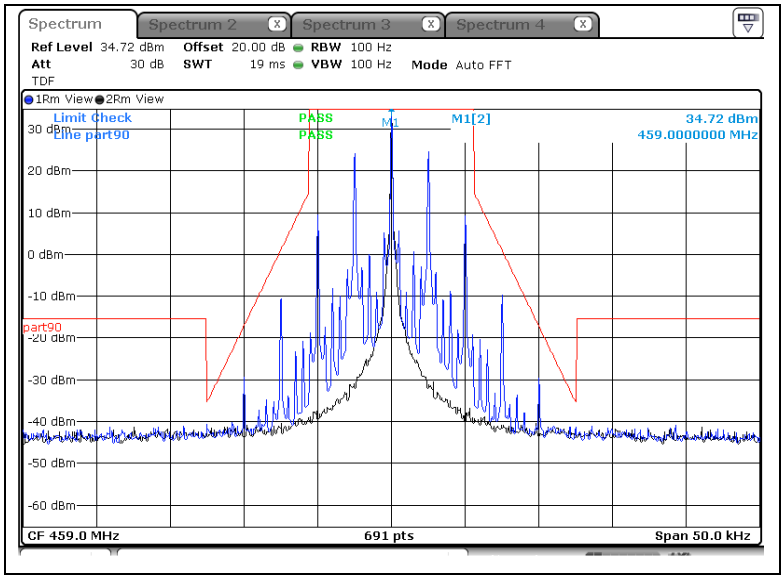


-Target Power_4W_406.10 ㎒

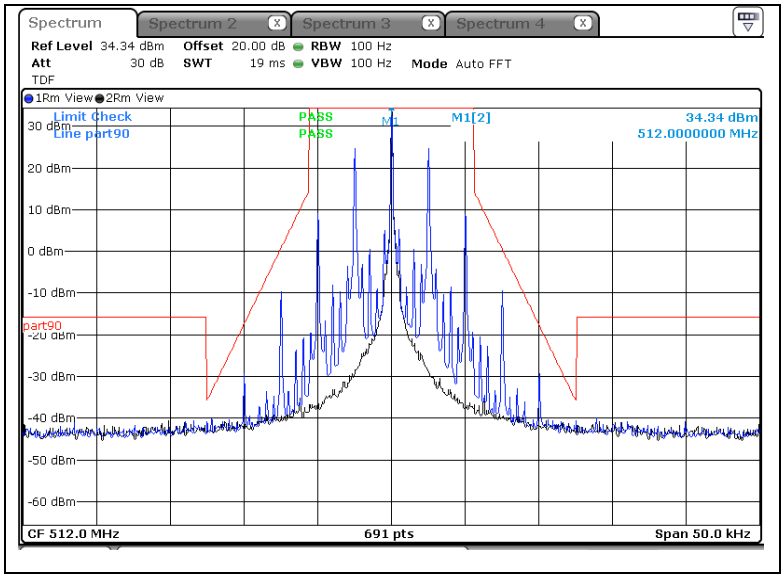


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-Target Power_4W_459.00 ㎒



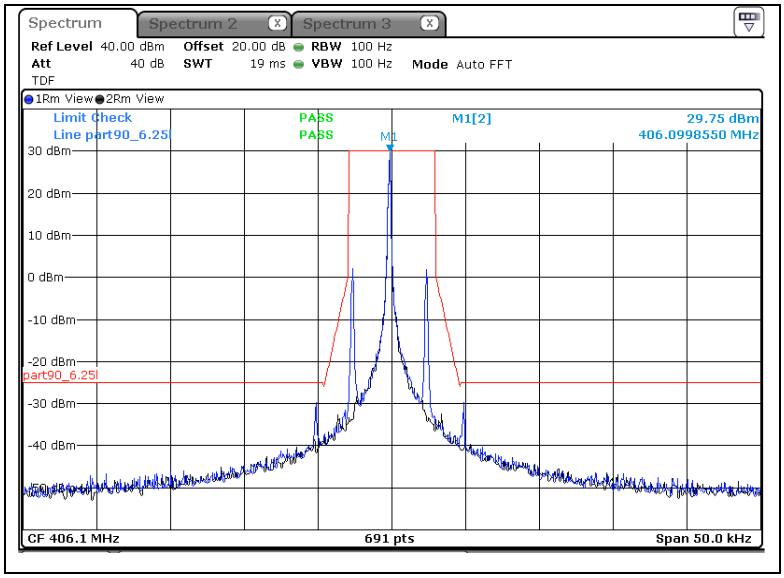
-Target Power_4W_512.00 ㎒



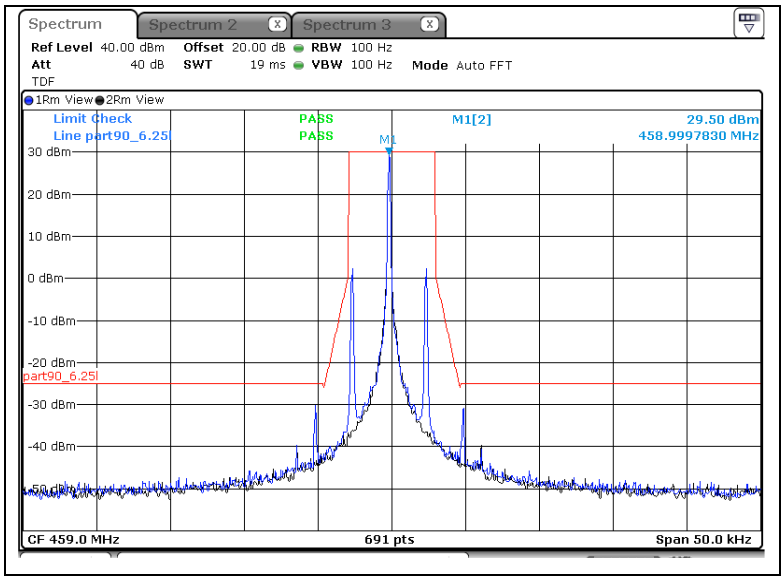
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* Emission Mask_6.25BW

-Target Power_1W_406.10 ㎒

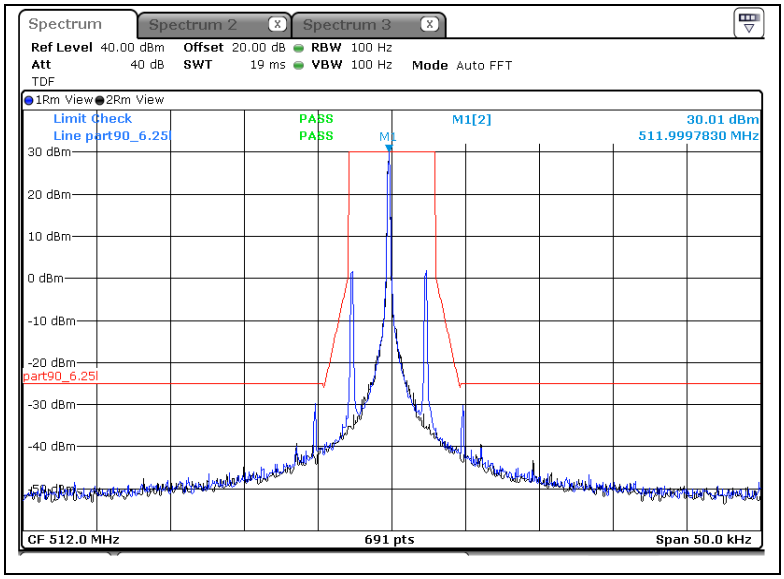


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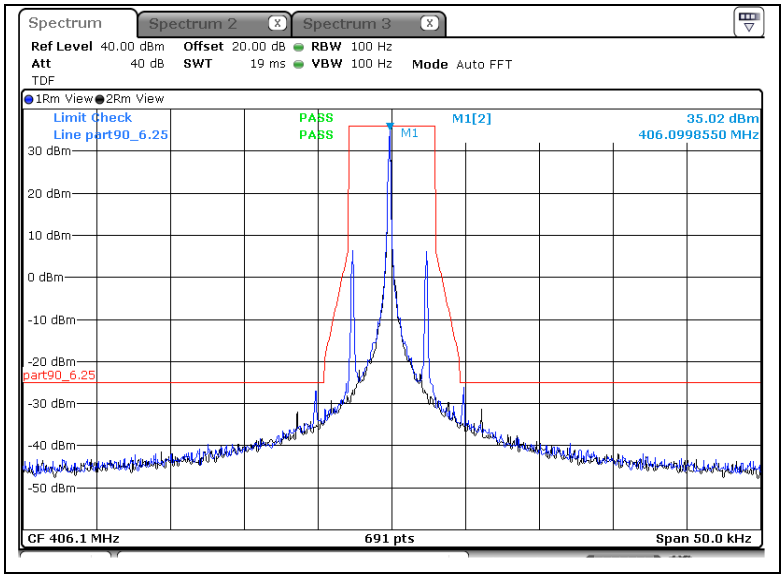


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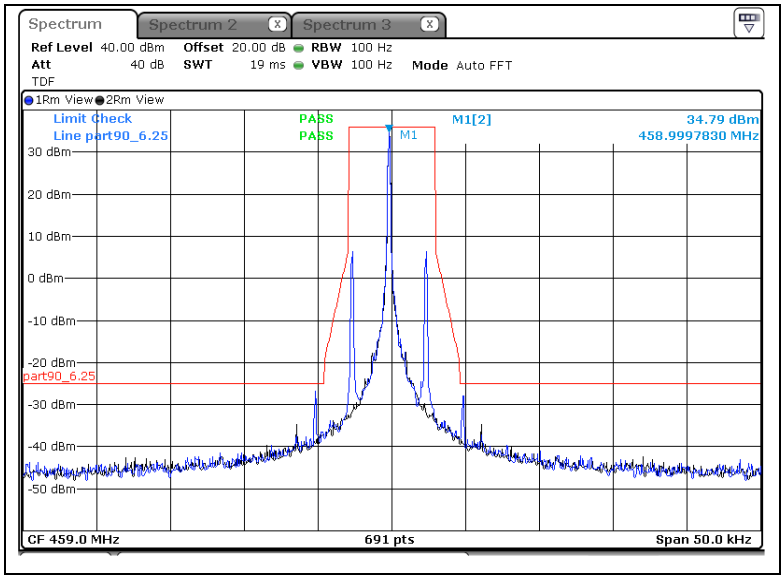


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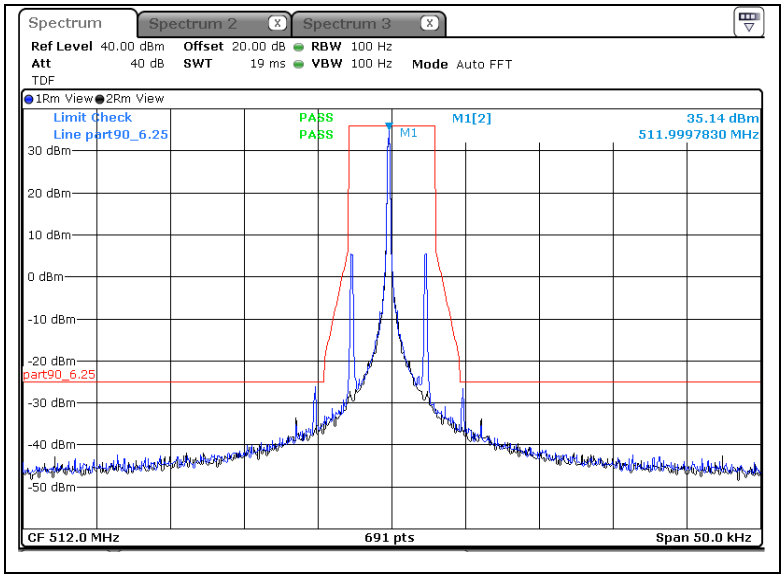


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-Target Power_4W_459.00 ㎒



-Target Power_4W_512.00 ㎒



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5.7 Transient Frequency Behaviour of the Transmitter

5.7.1 Regulation

According to §90.214, Transmitters designed to operate in the 150-174 ㎒ and 421-512 ㎒ frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time intervals[1] [2]	Maximum frequency difference[3]	All equipment	
		150 to 174 MHz	421 to 512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels			
t_1[4]	±25.0 kHz	5.0 ms	10.0 ms
t_2	±12.5 kHz	20.0 ms	25.0 ms
t_3[4]	±25.0 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels			
t_1[4]	±12.5 kHz	5.0 ms	10.0 ms
t_2	±6.25 kHz	20.0 ms	25.0 ms
t_3[4]	±12.5 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels			
t_1[4]	±6.25 kHz	5.0 ms	10.0 ms
t_2	±3.125 kHz	20.0 ms	25.0 ms
t_3[4]	±6.25 kHz	5.0 ms	10.0 ms

[1] t_{on} is the instant when a 1 kHz test signal is completely suppressed, including any capture time due to phasing.
t_1 is the time period immediately following t_{on}.
t_2 is the time period immediately following t_1.
t_3 is the time period from the instant when the transmitter is turned off until t_{off}.
t_{off} is the instant when the 1 kHz test signal starts to rise.
[2] During the time from the end of t_2 to the beginning of t_3, the frequency difference must not exceed the limits specified in §90.213.
[3] Difference between the actual transmitter frequency and the assigned transmitter frequency.
[4] If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

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5.7.2 Measurement Procedure

1. Set the test receiver to measure FM deviation with the audio bandwidth set at ≤50 ㎐ to ≥15,000 ㎐, and tune the RF frequency to the transmitter assigned frequency.
2. Set the signal generator to the assigned transmitter frequency and modulate it with a 1 ㎑ tone at ±25㎑ deviation and set its output level to -100㏈m.
3. Key the transmitter.
4. Supply sufficient attenuation via the RF attenuator to provide an input level to the test receiver that is 40 ㏈ below the test receiver maximum allowed input power when the transmitter is operating at its rated power level.
5. Unkey the transmitter.
6. Adjust the RF level of the signal generator to provide RF power into the RF power meter equal to the level This signal generator RF level shall be maintained throughout the rest of the measurement.
7. Connect the output of the RF combiner network to the input of the Modulation analyzer.
8. Set the horizontal sweep rate on the storage oscilloscope to 10 milliseconds per division and adjust the display to continuously view the 1000 ㎐ tone. Adjust the vertical amplitude control of the oscilloscope to display the 1000 ㎐ at ±4 divisions vertically centered on the display.
9. Key the transmitter and observe the stored display. once the modulation Analyzer demodulator has been captured by the transmitter power, the display will show the frequency difference from the assigned frequency to the actual transmitter frequency versus time. The instant when the 1 ㎑ test signal is completely suppressed (including any capture time due to phasing) is considered to be ton . The trace should be maintained within the allowed divisions during the period t1 and t2 . See the figure in the appropriate standards section.
10. During the time from the end of t2 to the beginning of t3 the frequency difference should not exceed the limits set by the FCC in 47 CFR 90.214 and outlined in 3.2.2. The allowed limit is equal to the transmitter frequency times its FCC frequency tolerance times ±4 display divisions divided by 25 ㎑.
11. Key the transmitter and observe the stored display. The trace should be maintained within the allowed divisions after the end of t2 and remain within it until the end of the trace. See the figure in the appropriate standards sections.
12. To test the transient frequency behavior during the period t3 the transmitter shall be keyed.
13. Adjust the oscilloscope trigger controls so it will trigger on a decreasing magnitude from the Modulation analyzer, at 1 division from the right side of the display, when the transmitter is turned off. Set the controls to store the display. The moment when the 1 ㎑ test signal starts to rise is considered to provide to toff .
14. The transmitter shall be unkeyed.
15. Observe the display. The trace should remain within the allowed divisions during period t3. See the figures in the appropriate standards section.

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5.7.3 Test Result

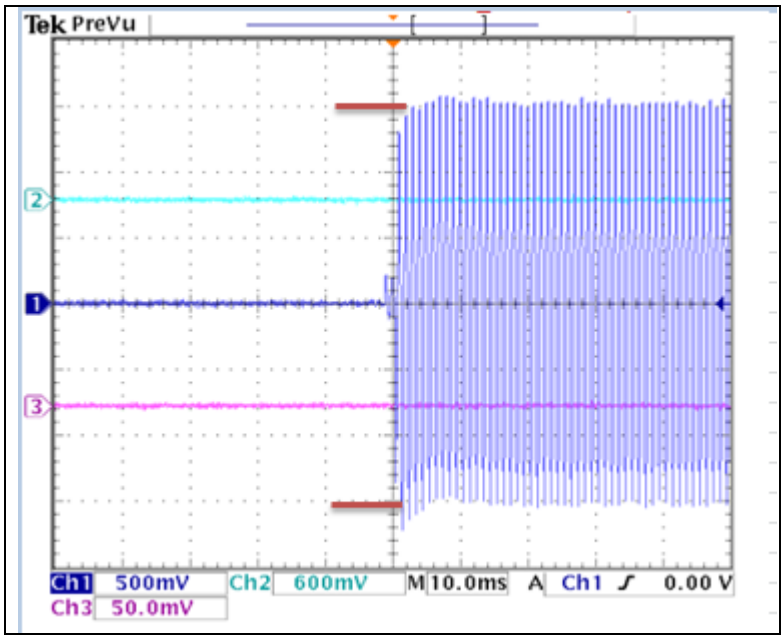
- Complied

Figure 4. plot of Transient Frequency Behaviour of the Transmitter

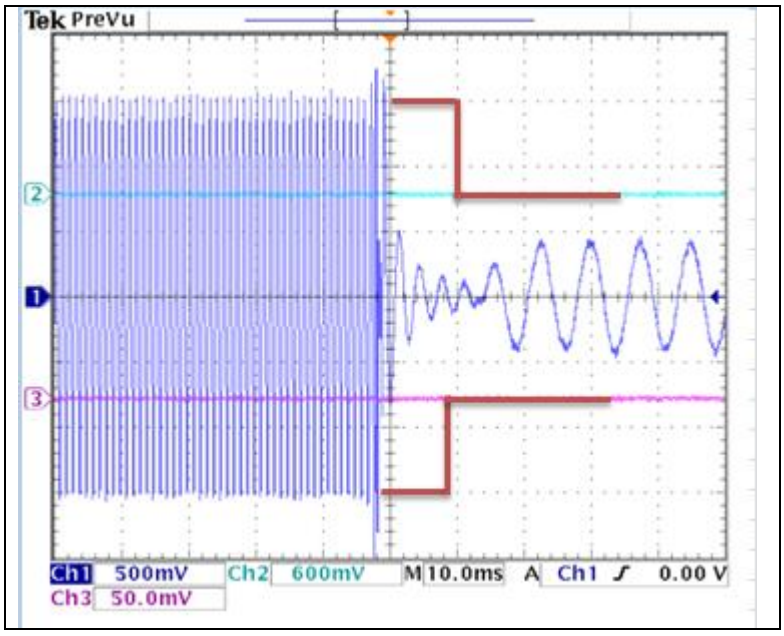
* 12.5BW

-Target Power_1W_406.10 ㎒

-On to Off



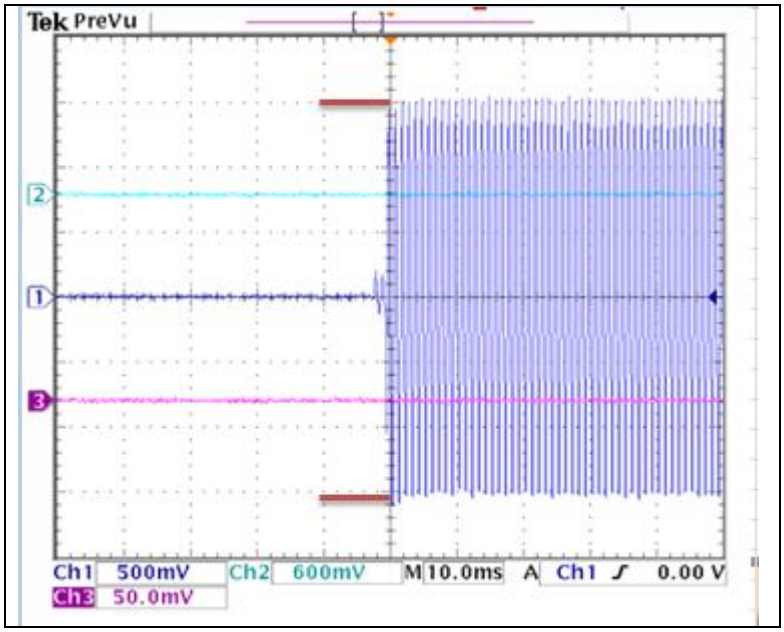
-Off to On



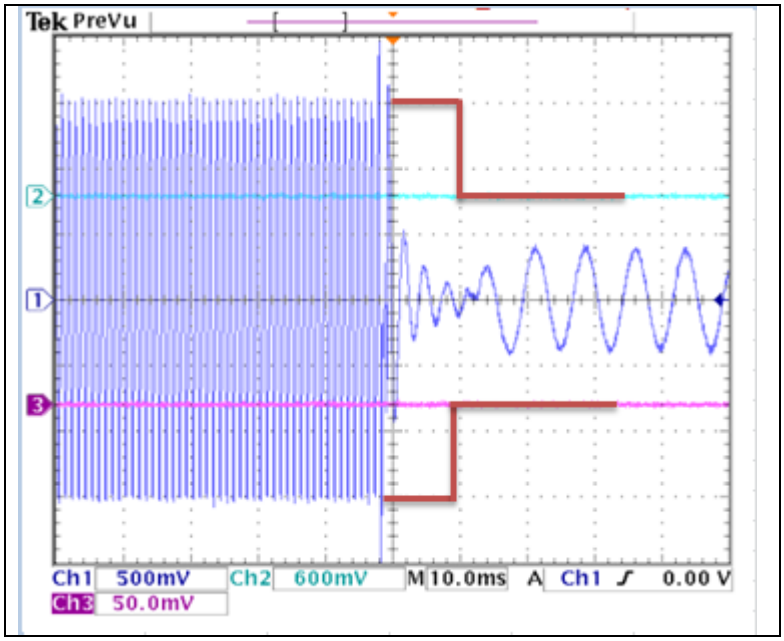
This test report shall not be reproduced, except in full, without the written approval

-Target Power_1W_459.00 ㎒

-On to Off



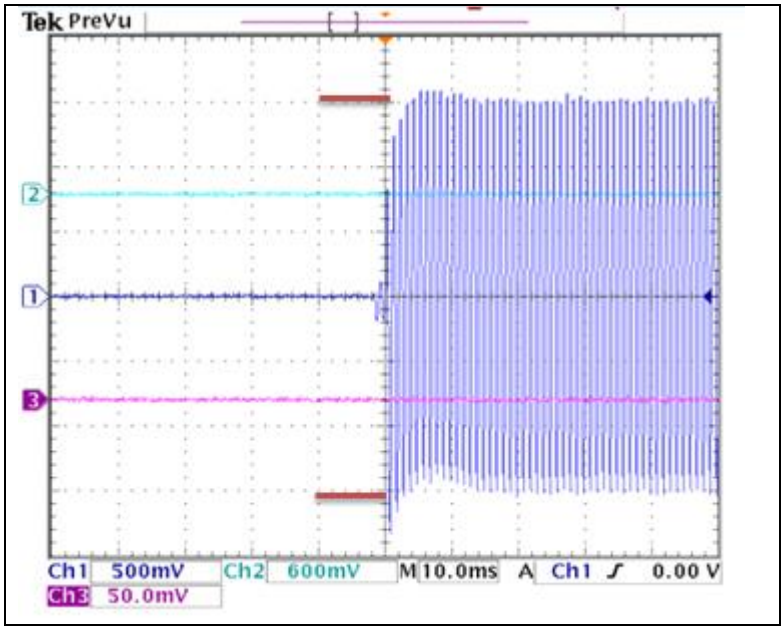
-Off to On



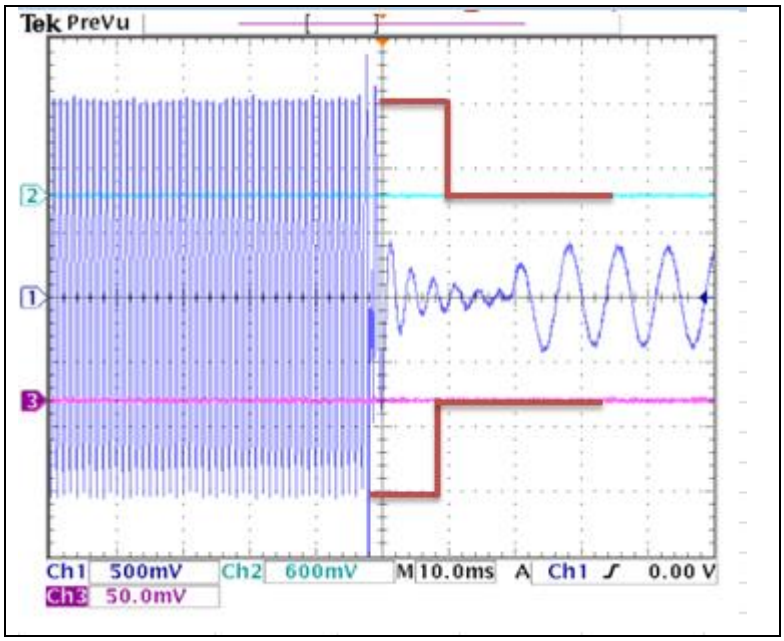
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-Target Power_1W_512.00 ㎒

-On to Off



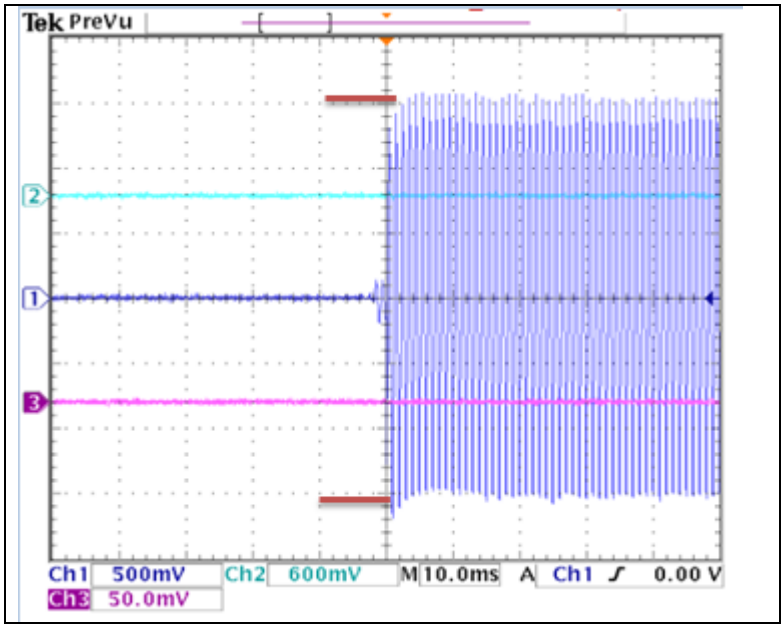
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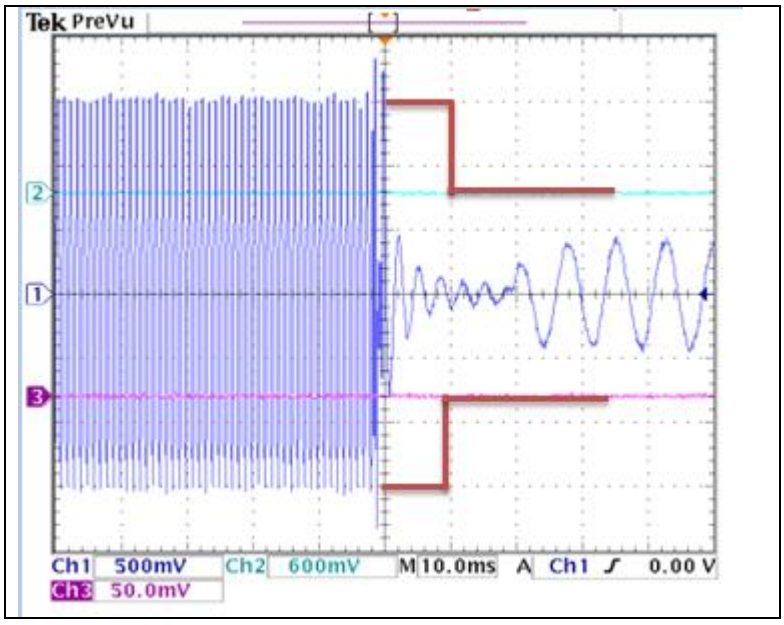
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-Target Power_4W_406.10 ㎒

-On to Off



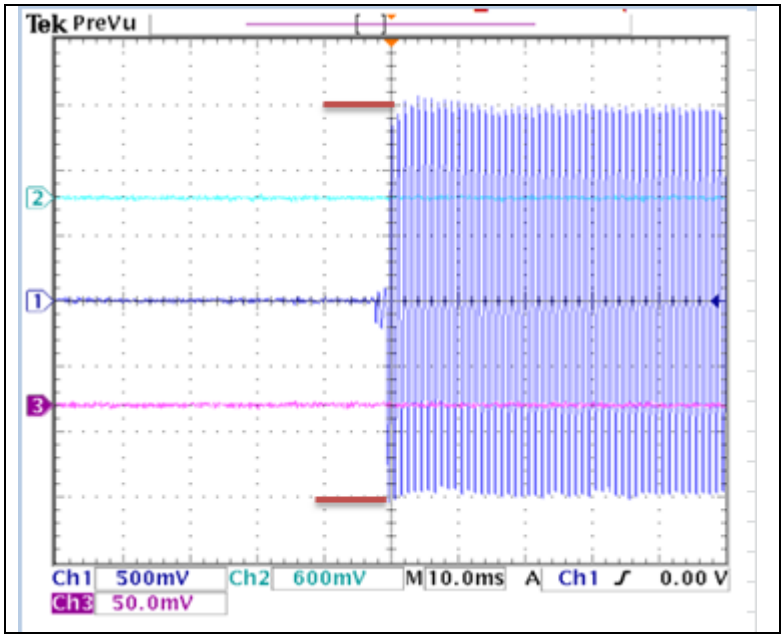
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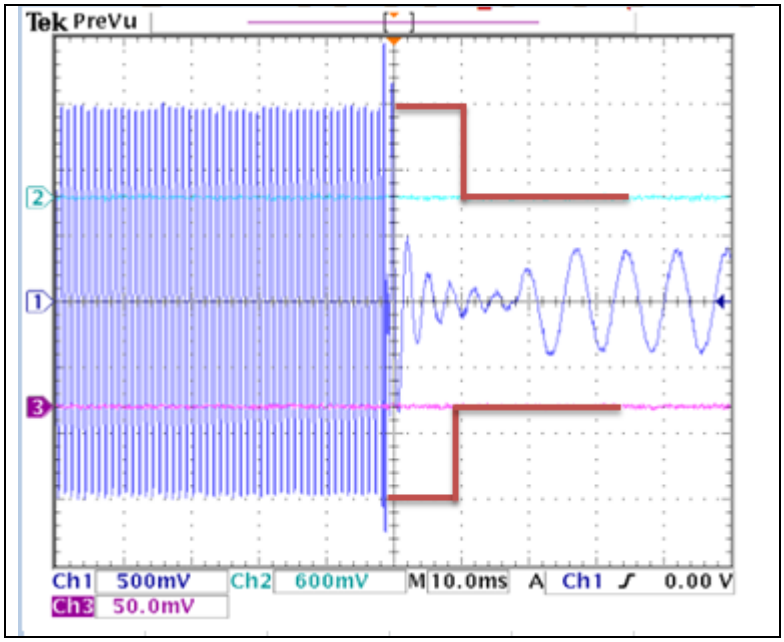
This test report shall not be reproduced, except in full, without the written approval

-Target Power_4W_459.00 ㎒

-On to Off



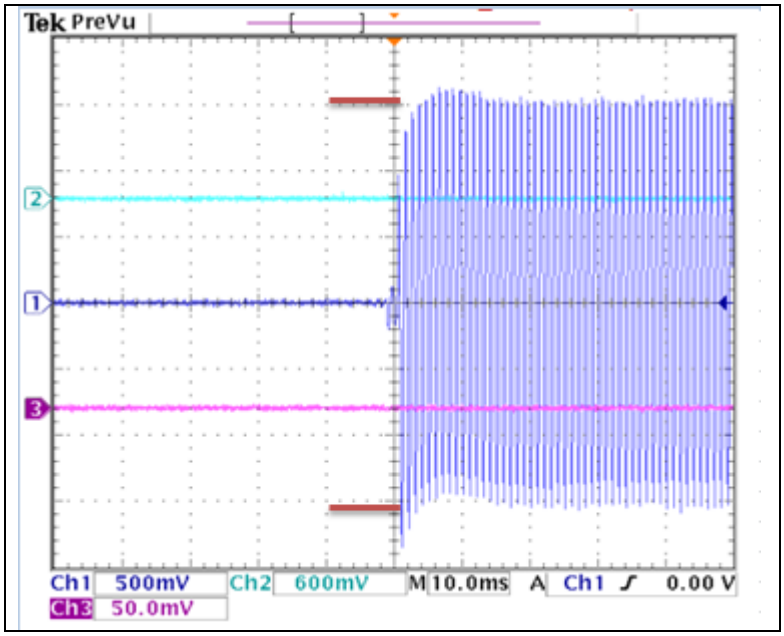
-Off to On



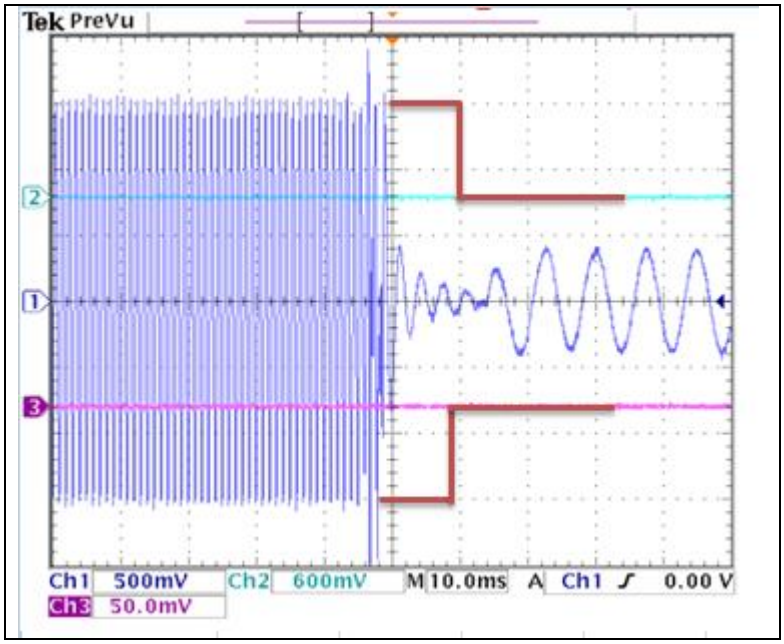
This test report shall not be reproduced, except in full, without the written approval

-Target Power_4W_512.00 ㎒

-On to Off



-Off to On

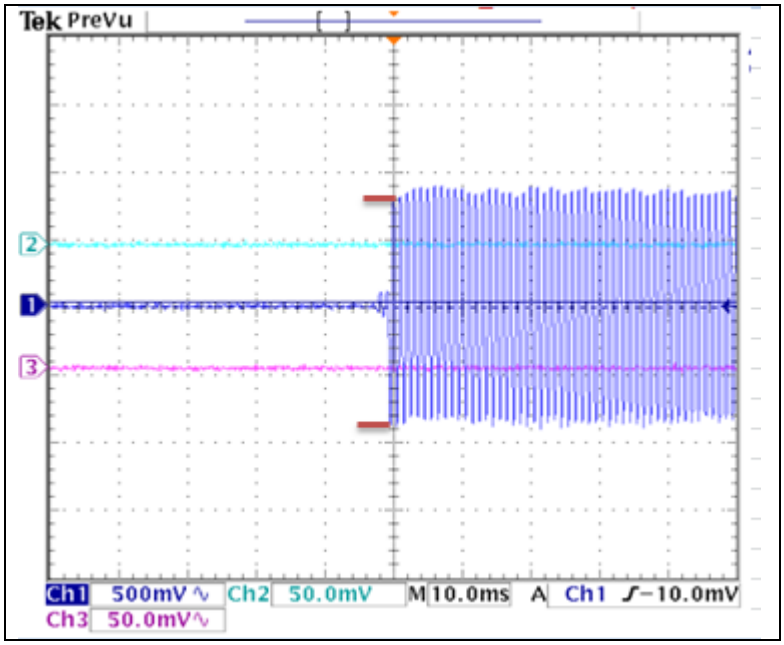


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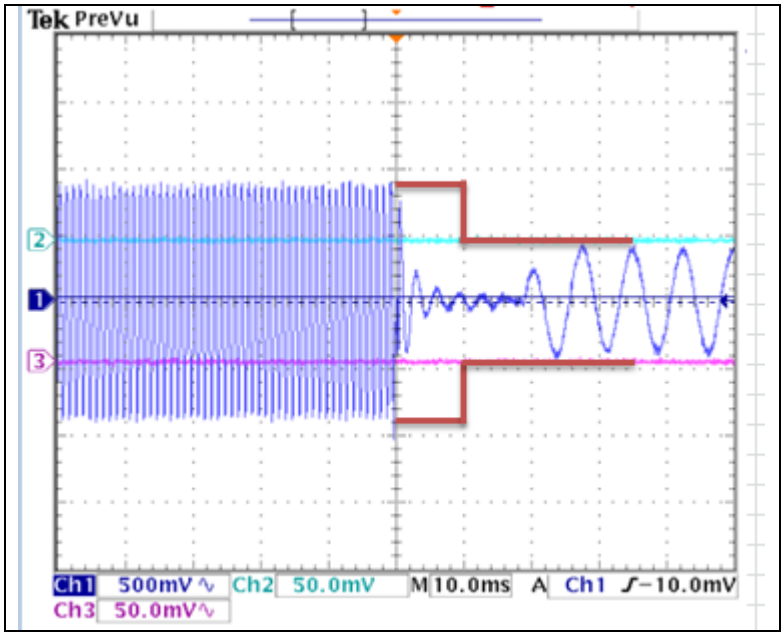
* 6.25BW

-Target Power_1W_406.10 ㎒

-On to Off



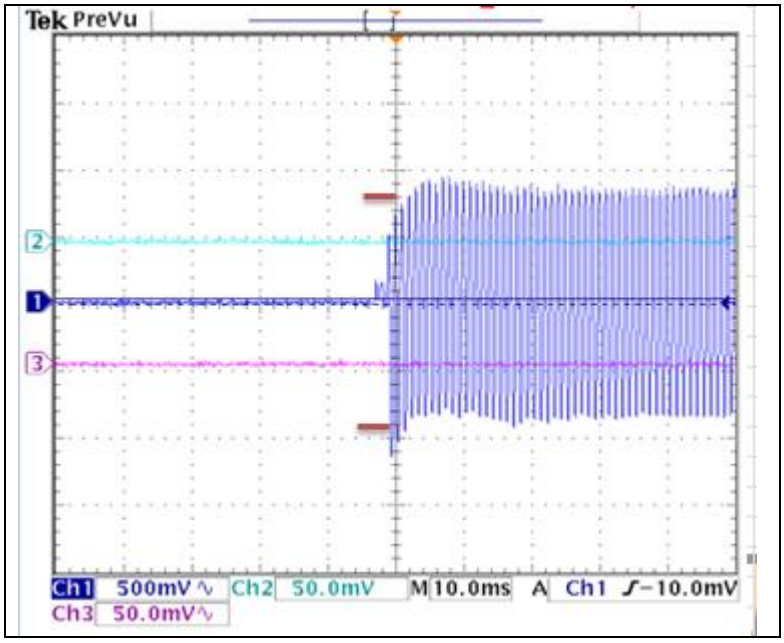
-Off to On



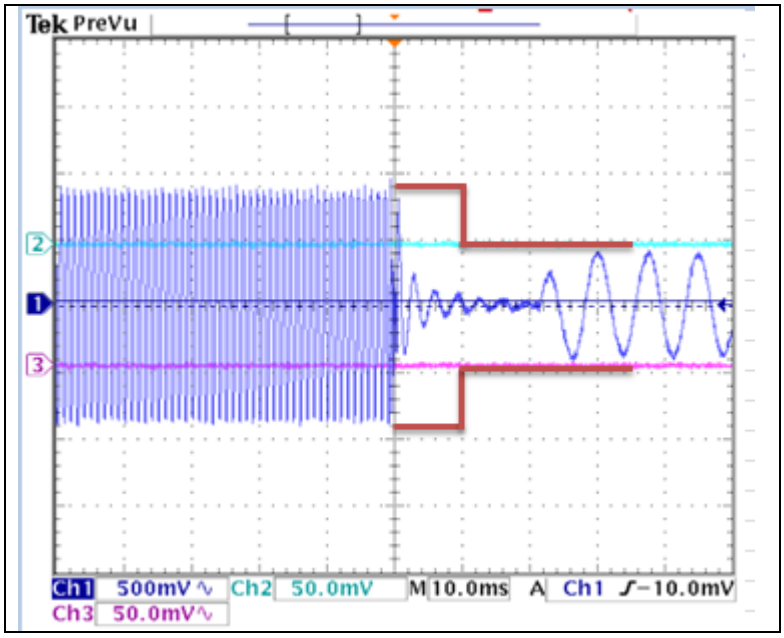
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-Target Power_1W_459.00 ㎒

-On to Off



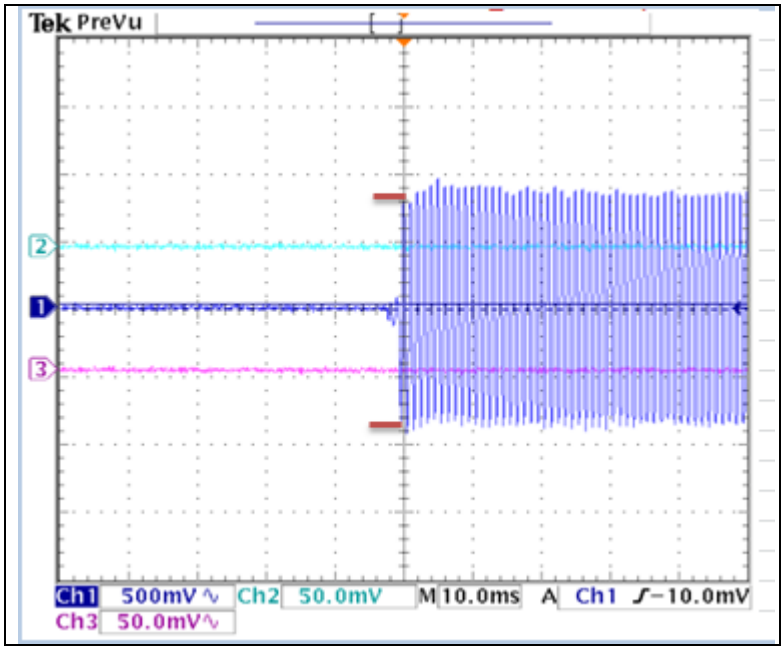
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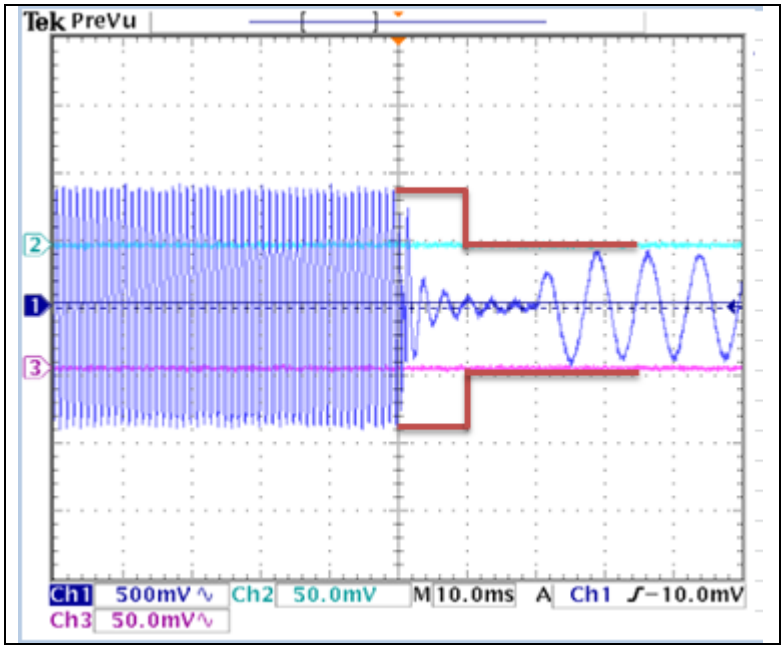
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-Target Power_1W_512.00 ㎒

-On to Off



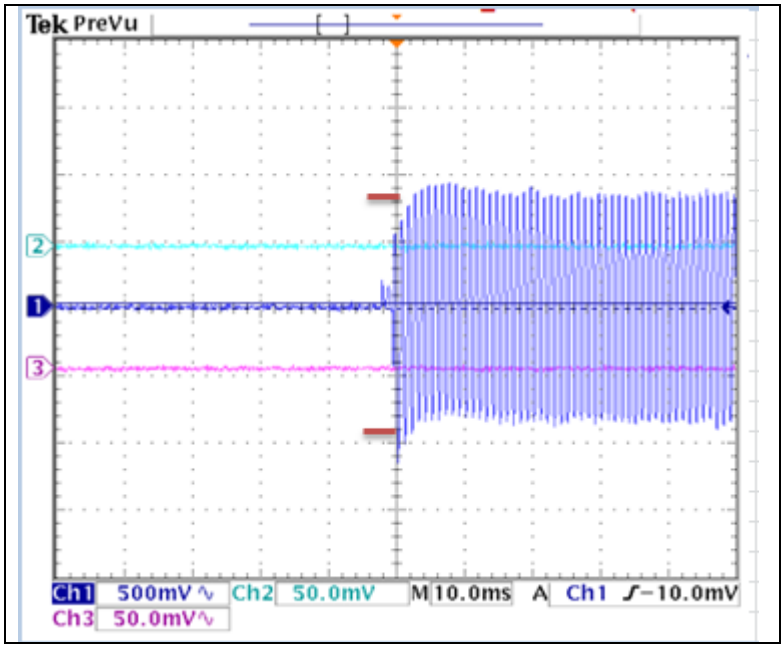
-Off to On



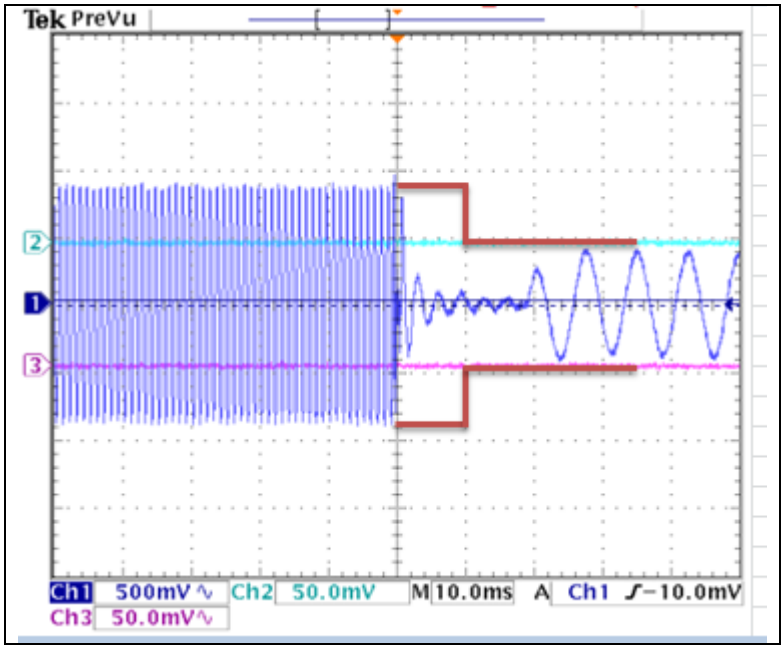
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-Target Power_4W_406.10 ㎒

-On to Off



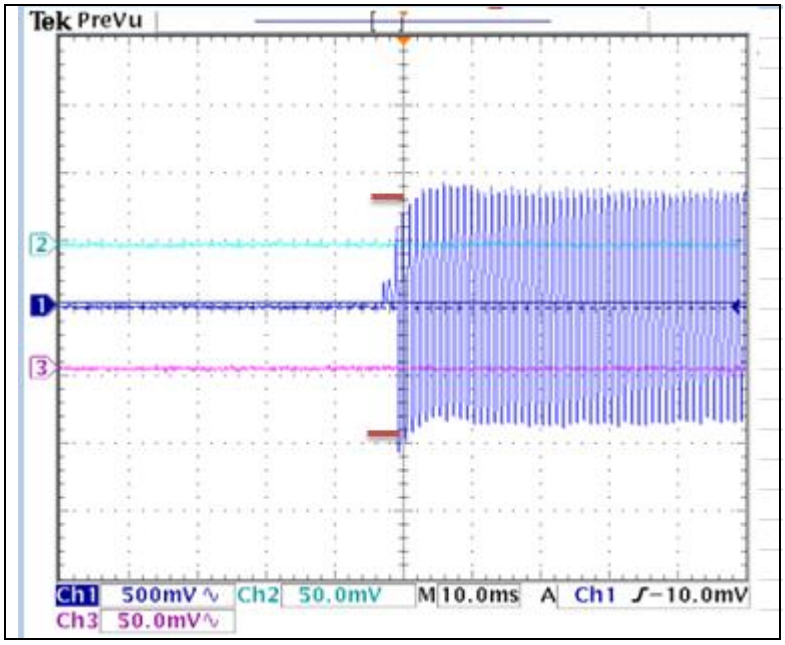
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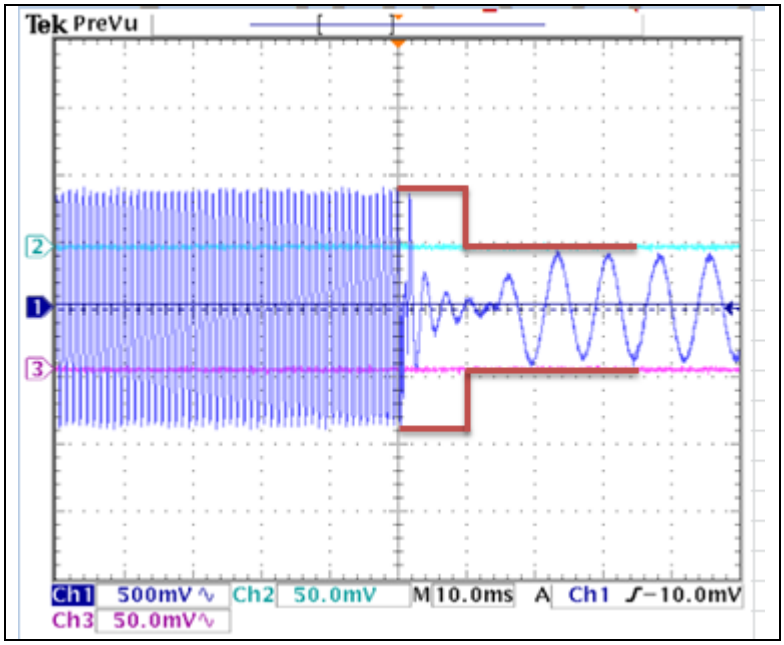
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-Target Power_4W_459.00 ㎒

-On to Off



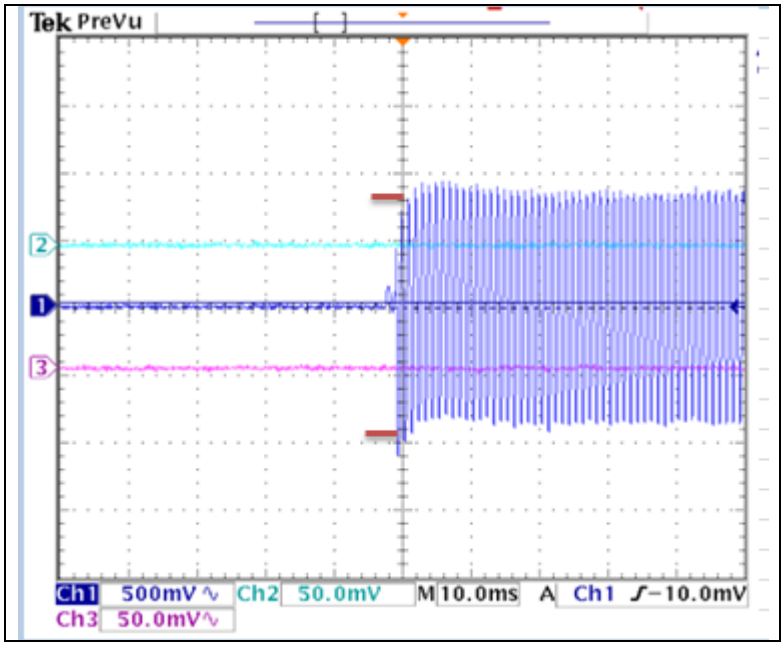
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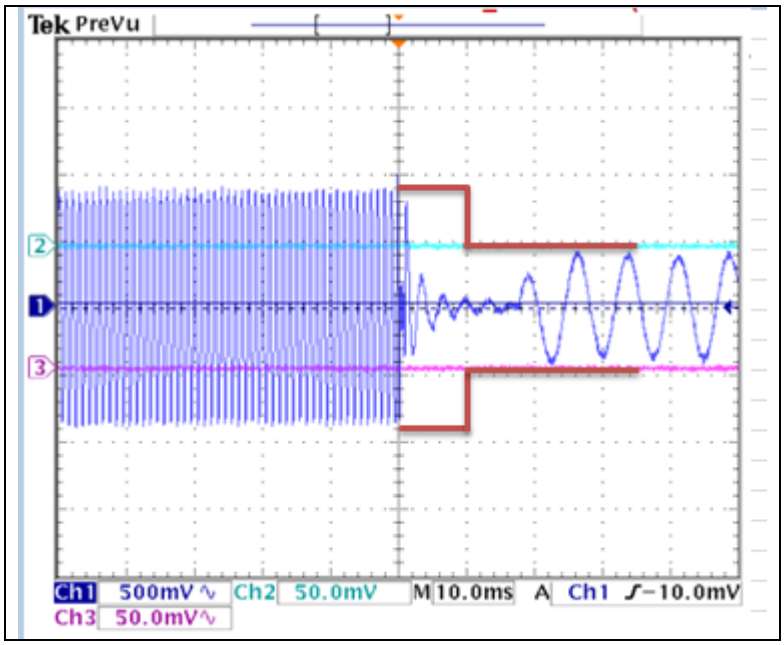
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-Target Power_4W_512.00 ㎒

-On to Off



-Off to On



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5.8 Conducted Spurious Emission

5.8.1 Regulation

According to §90.210, For 12.5 ㎑ channel : Spurious attenuated in ㏈= 50+ 10log(Power output in watts) Alternatively, an equivalent absolute level of -20 ㏈m is taken.

5.7.2 Measurement Procedure

1. Conducted spurious emissions are emissions at the antenna terminal on frequencies outside the operating band. The test is performed according the principle below using a computer controlled test set-up.
2. The transmitter is modulated with 2500 ㎐ sine wave at an input level 16 ㏈ greater than that necessary to produce 50% of rated system deviation.

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5.8.3 Test Result

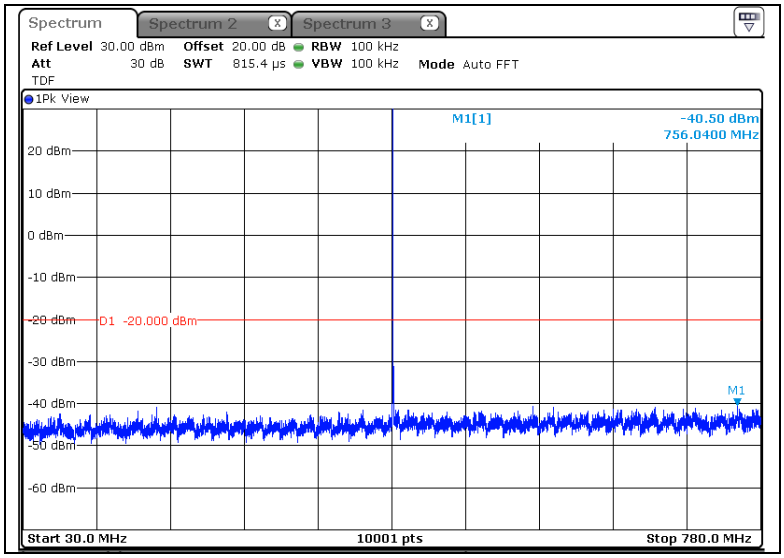
- Complied

Figure 4. plot of Conducted Spurious Emission

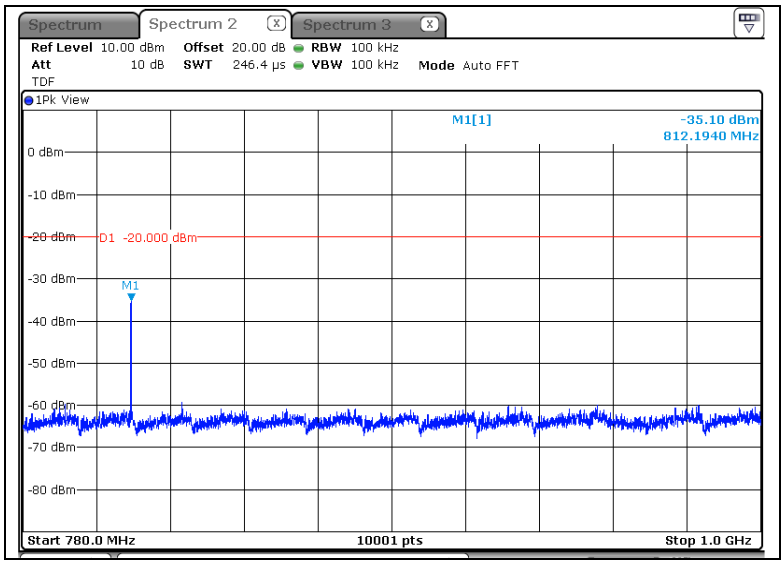
* 12.5BW

-Target Power_1W_406.10 ㎒

-30 ㎒ ~ 780 ㎒

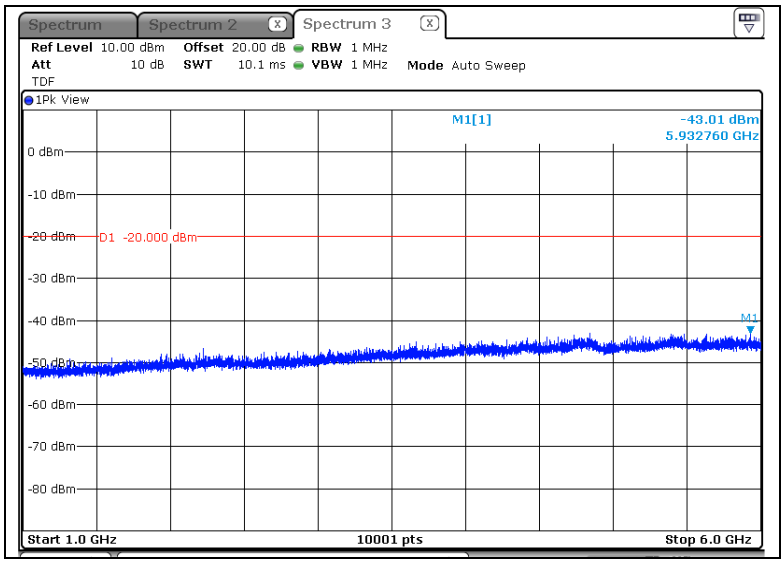


-780 ㎒ ~ 1 ㎓



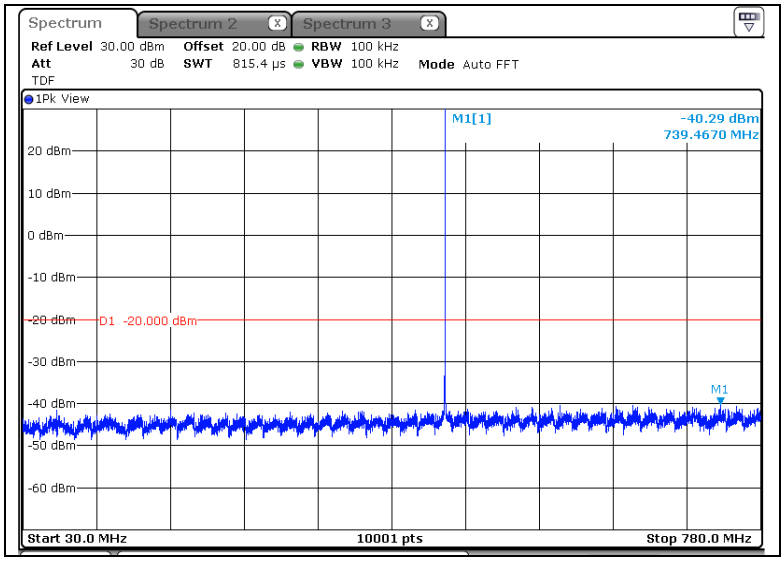
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-1 ㎓ ~ 6 ㎓



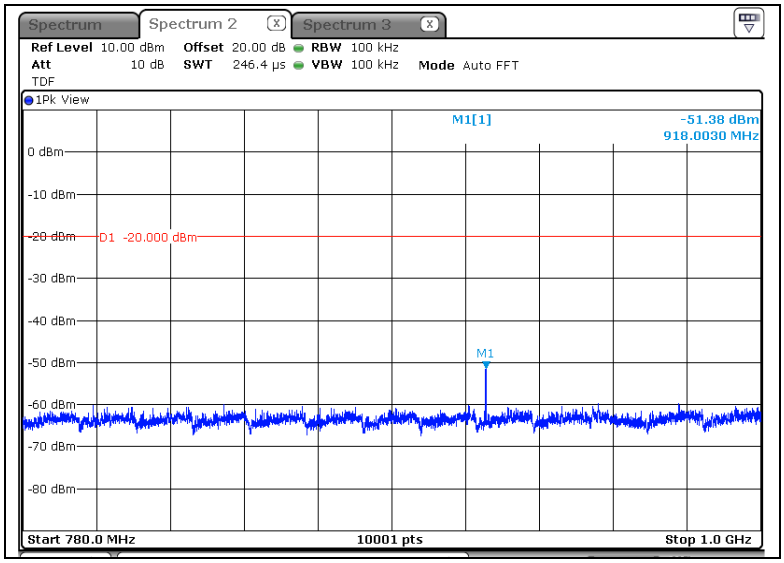
-Target Power_1W_459.00 ㎒

-30 ㎒ ~ 780 ㎒

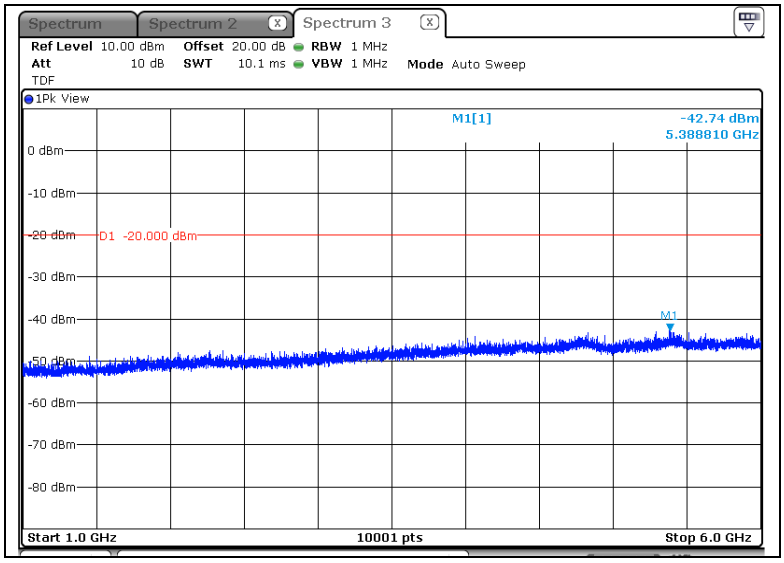


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-780 ㎒ ~ 1 ㎓



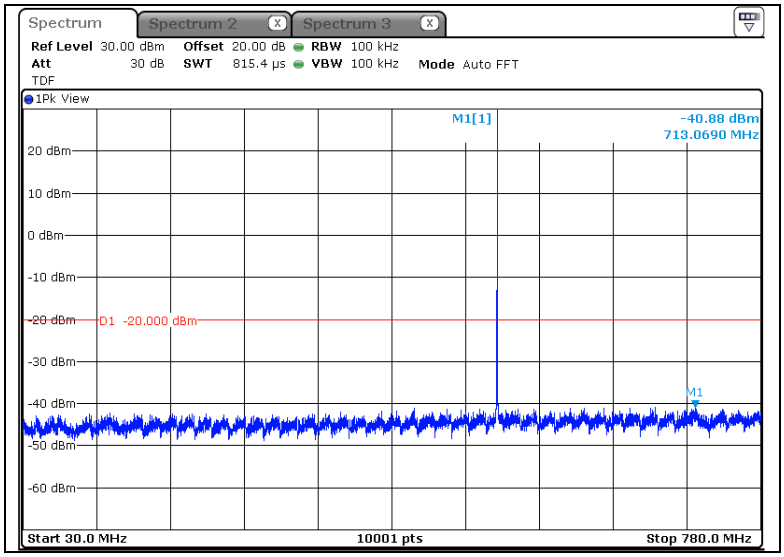
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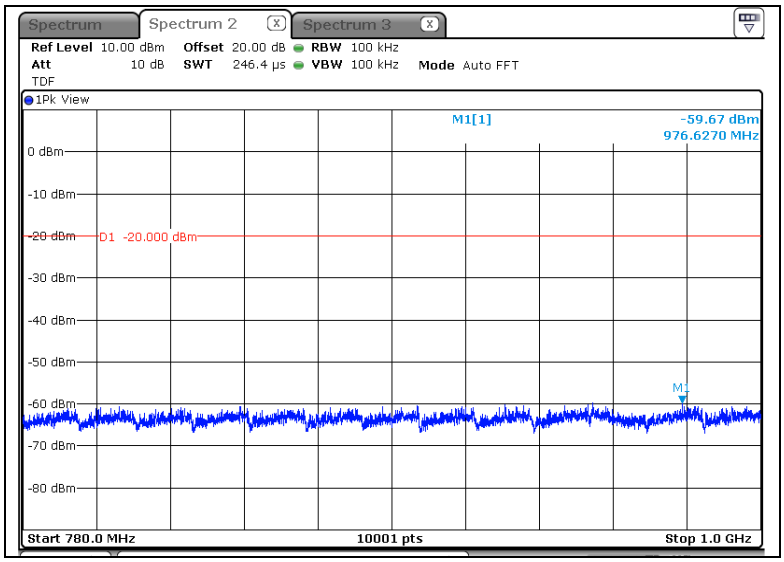
This test report shall not be reproduced, except in full, without the written approval

-Target Power_1W_512.00 ㎒

-30 ㎒ ~ 780 ㎒

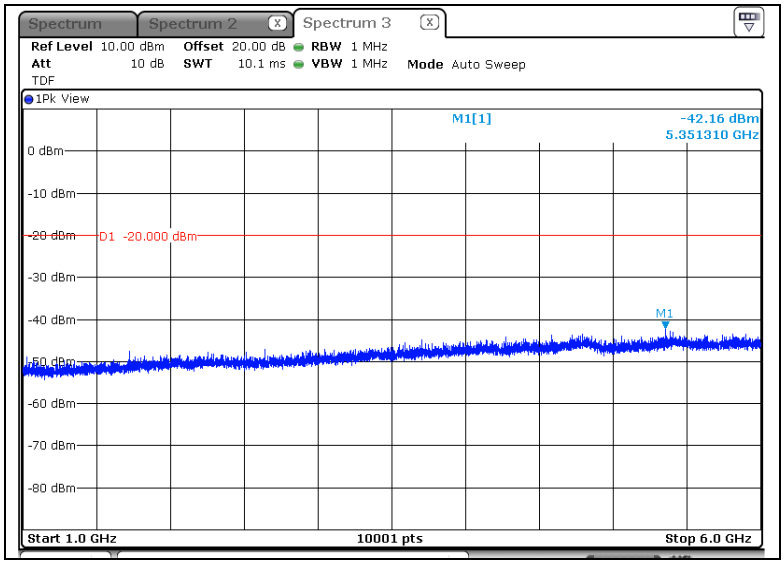


-780 ㎒ ~ 1 ㎓



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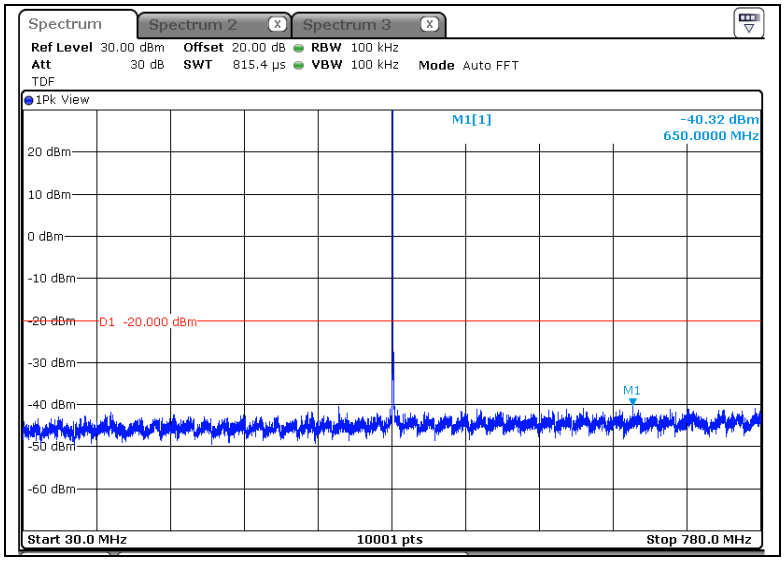
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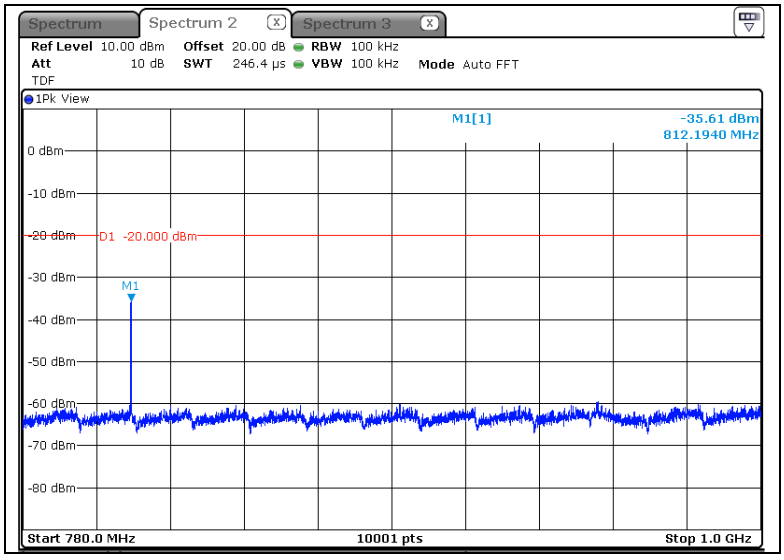
This test report shall not be reproduced, except in full, without the written approval

-Target Power_4W_406.10 ㎒

-30 ㎒ ~ 780 ㎒

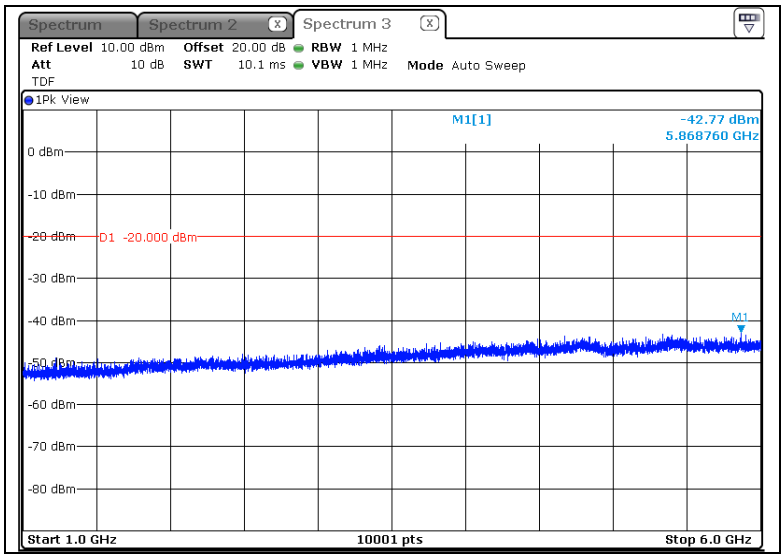


-780 ㎒ ~ 1 ㎓



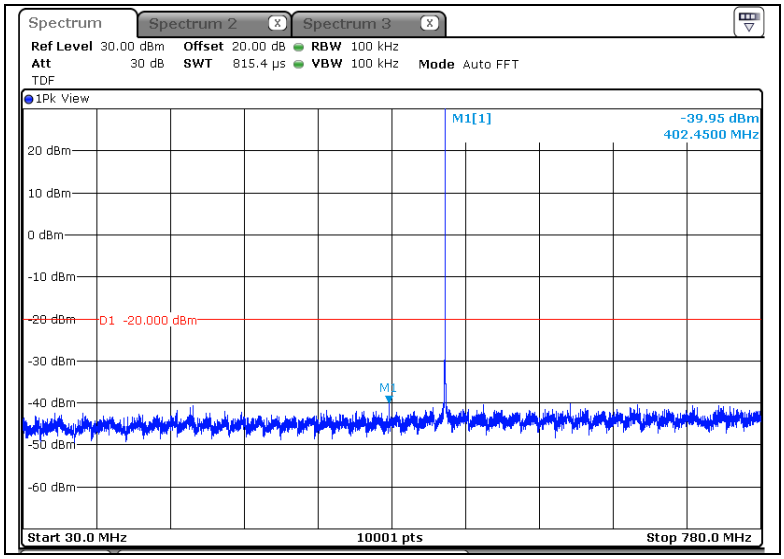
This test report shall not be reproduced, except in full, without the written approval

-1 ㎓ ~ 6 ㎓



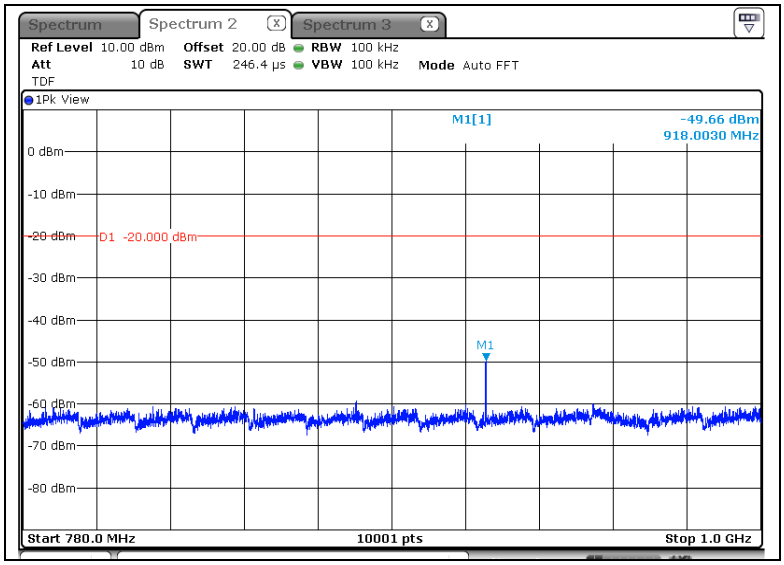
-Target Power_4W_459.00 ㎒

-30 ㎒ ~ 780 ㎒

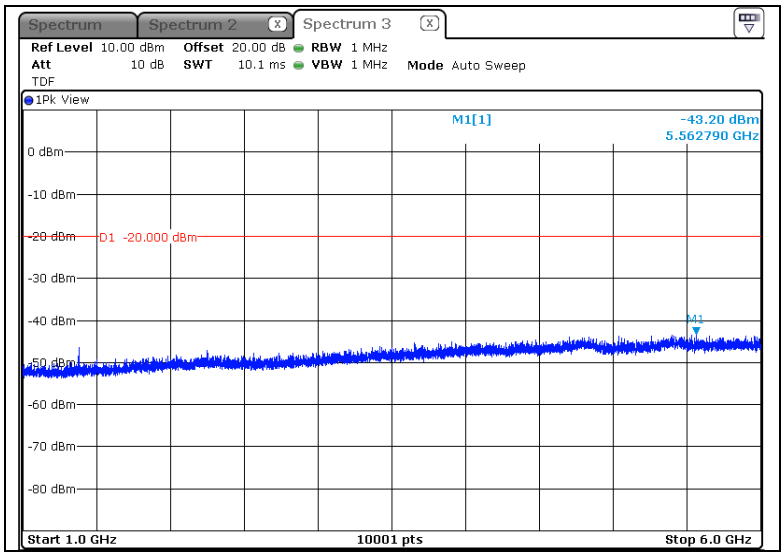


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-780 ㎒ ~ 1 ㎓



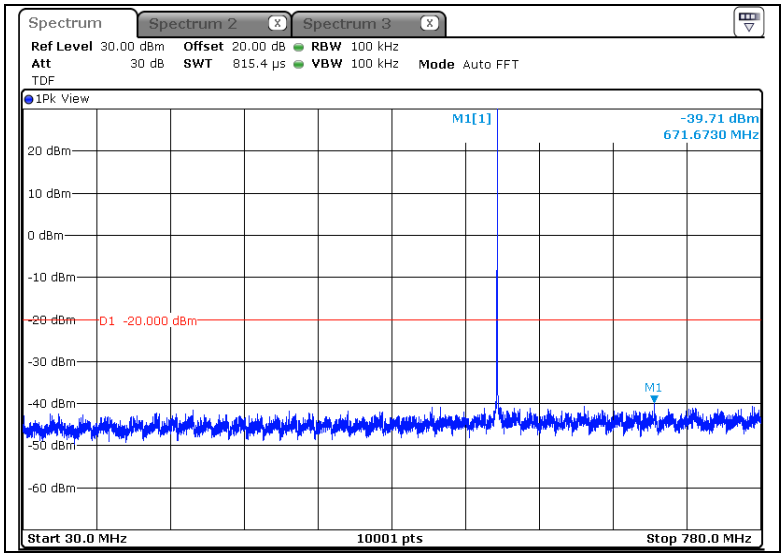
-1 ㎓ ~ 6 ㎓



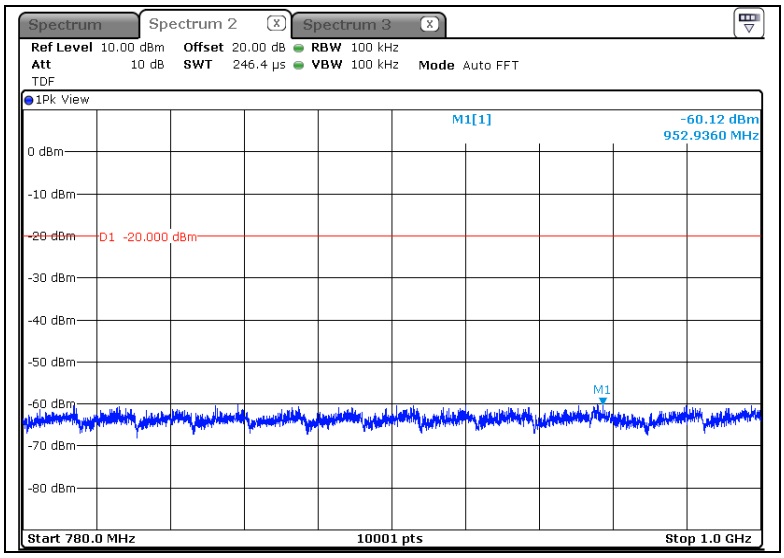
This test report shall not be reproduced, except in full, without the written approval

-Target Power_4W_512.00 ㎒

-30 ㎒ ~ 780 ㎒

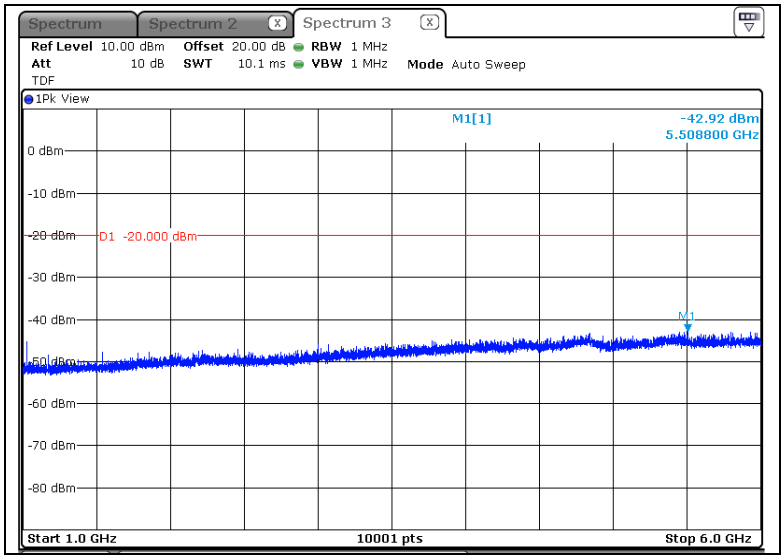


-780 ㎒ ~ 1 ㎓



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-1 ㎓ ~ 6 ㎓

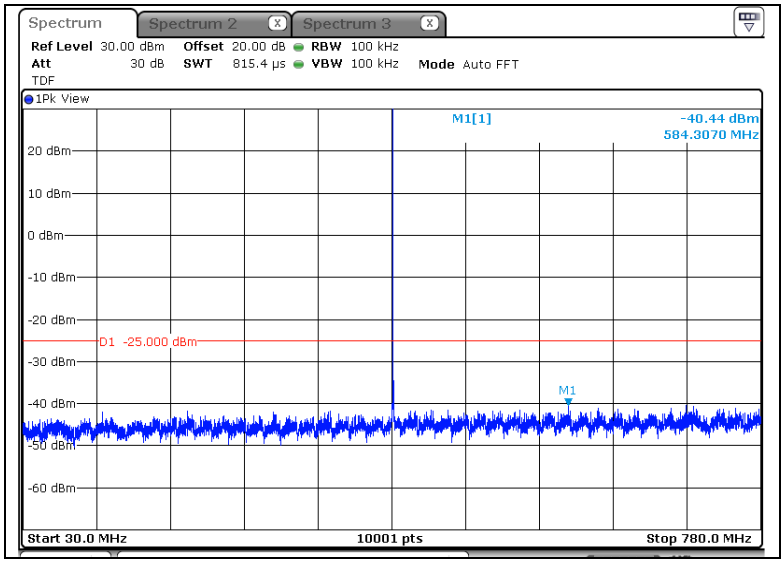


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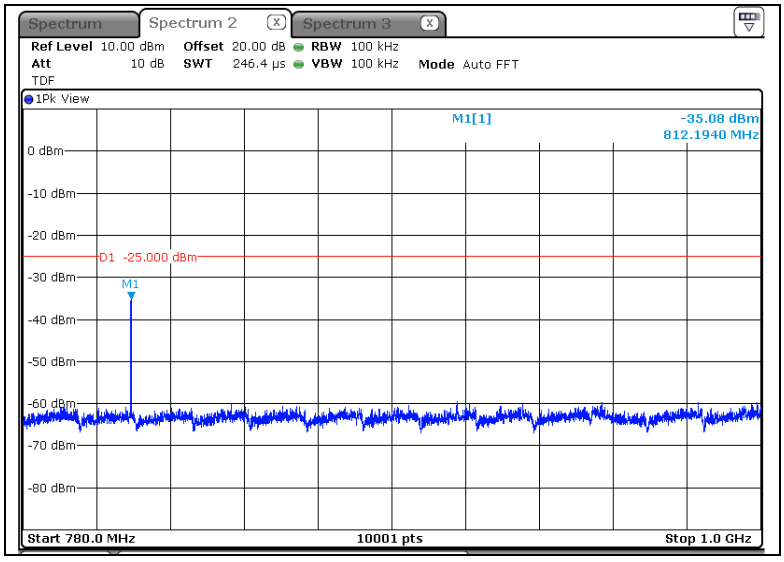
* 6.25BW

-Target Power_1W_406.10 ㎒

-30 ㎒ ~ 780 ㎒

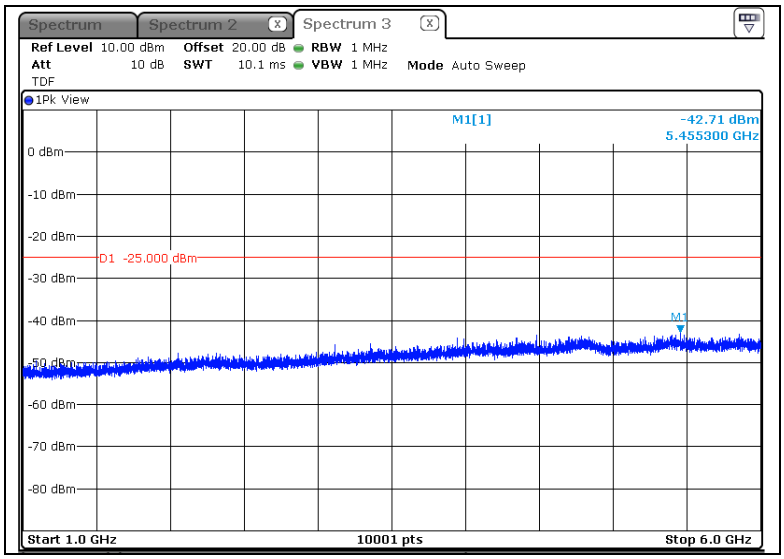


-780 ㎒ ~ 1 ㎓



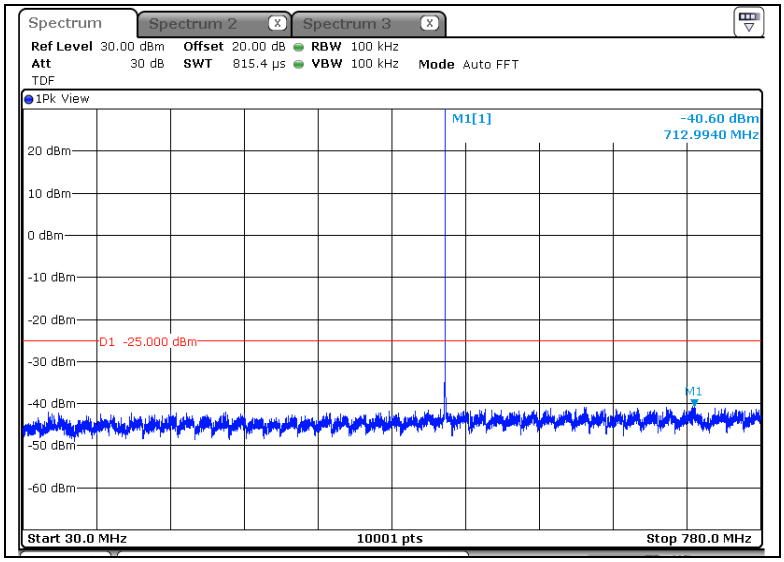
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-1 ㎓ ~ 6 ㎓



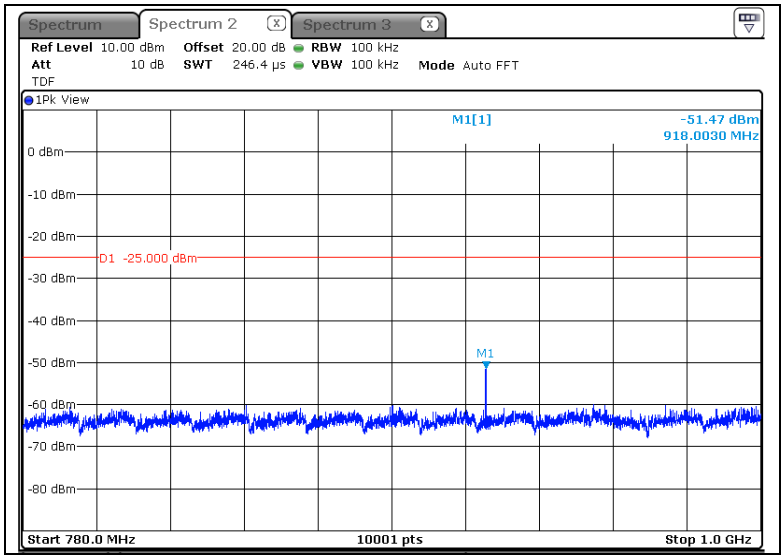
-Target Power_1W_459.00 ㎒

-30 ㎒ ~ 780 ㎒

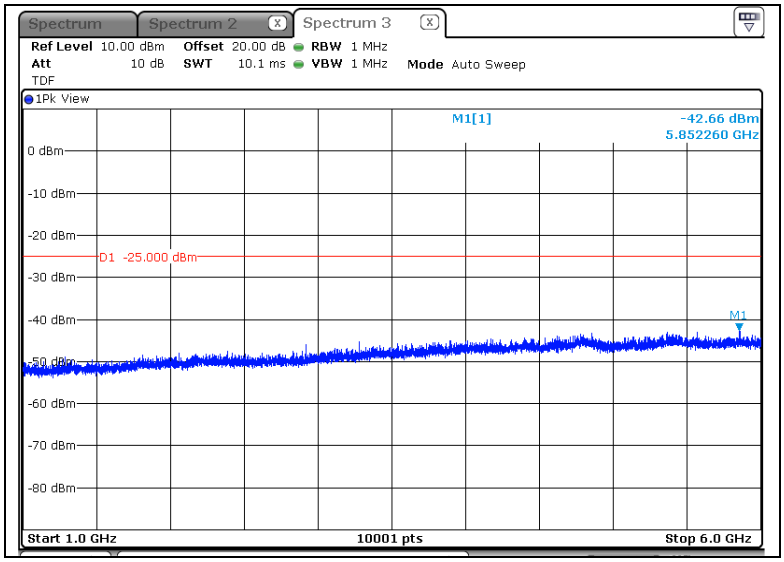


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-780 ㎒ ~ 1 ㎓



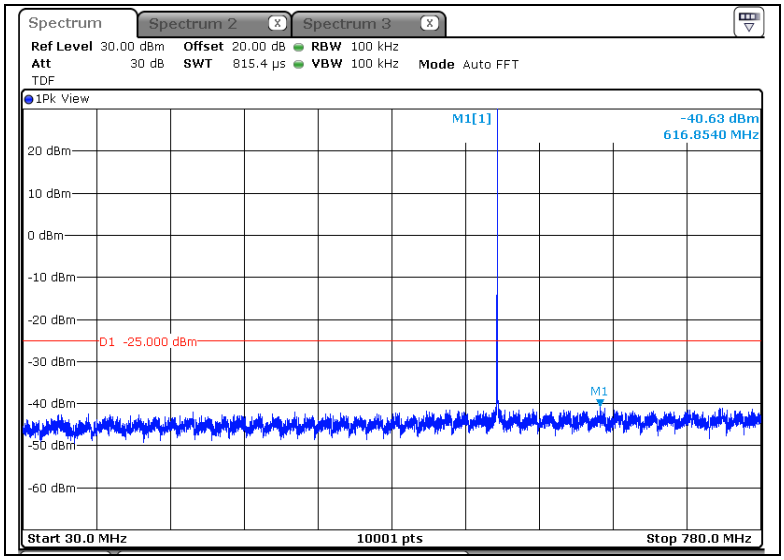
-1 ㎓ ~ 6 ㎓



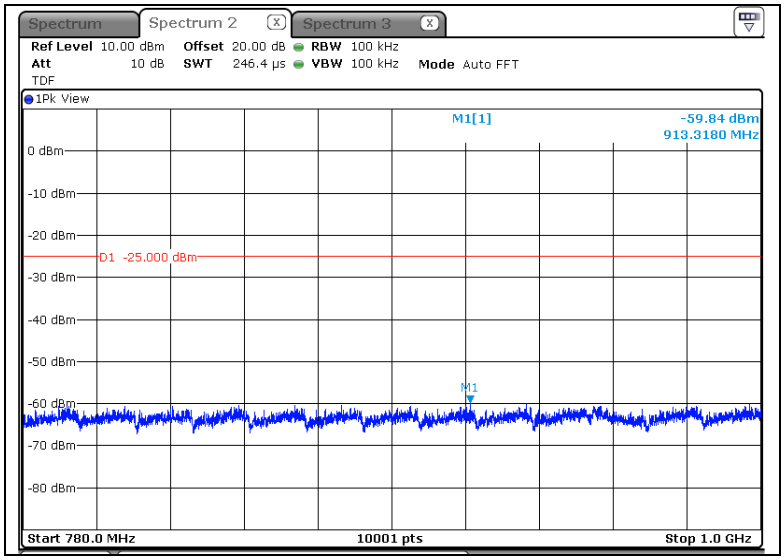
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-Target Power_1W_512.00 ㎒

-30 ㎒ ~ 780 ㎒

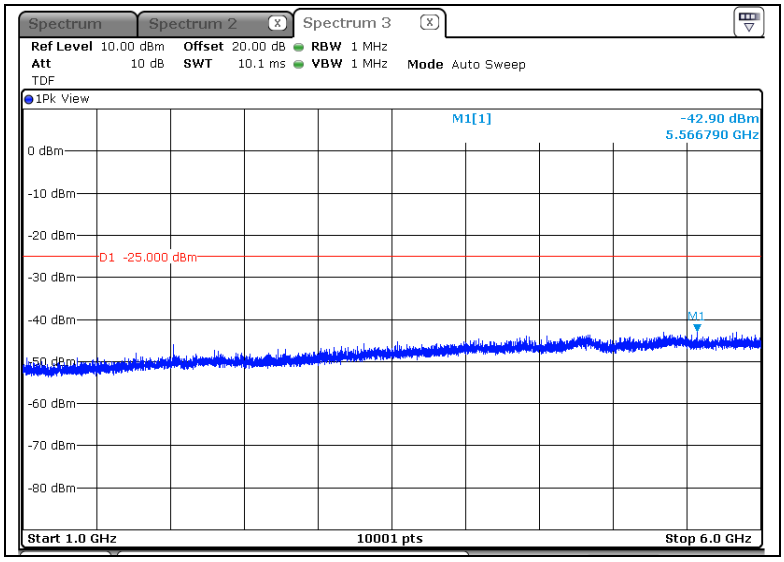


-780 ㎒ ~ 1 ㎓



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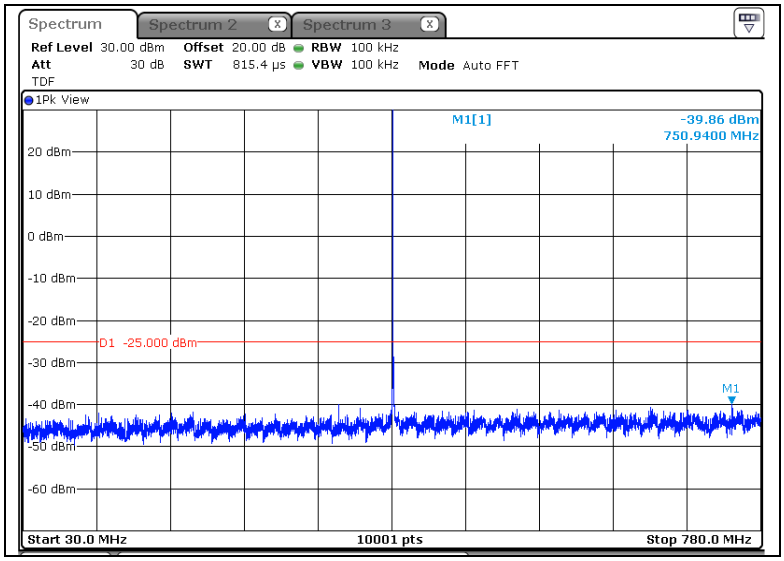
-1 ㎓ ~ 6 ㎓



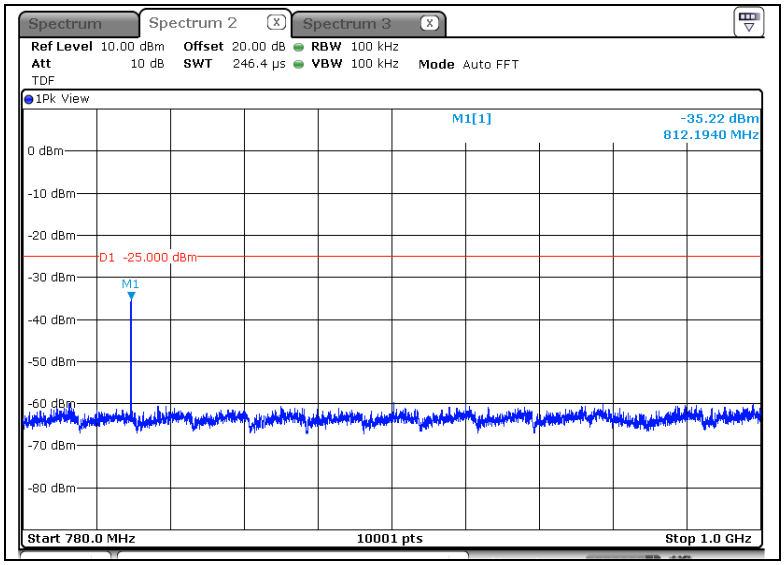
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-Target Power_4W_406.10 ㎒

-30 ㎒ ~ 780㎒

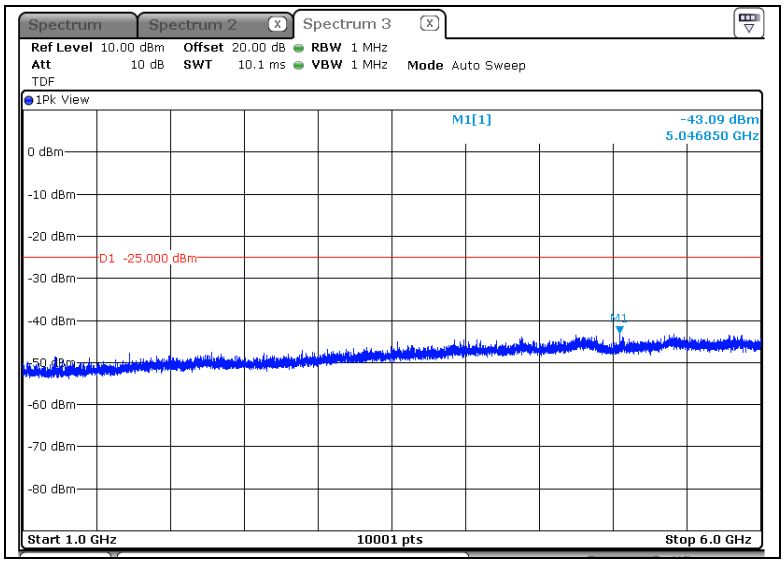


-780 ~ 1 ㎓



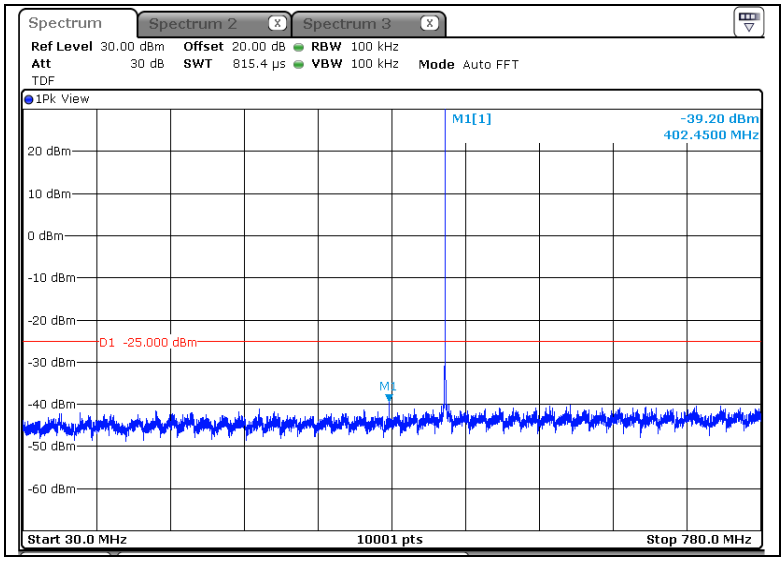
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-1 ㎓ ~ 6 ㎓



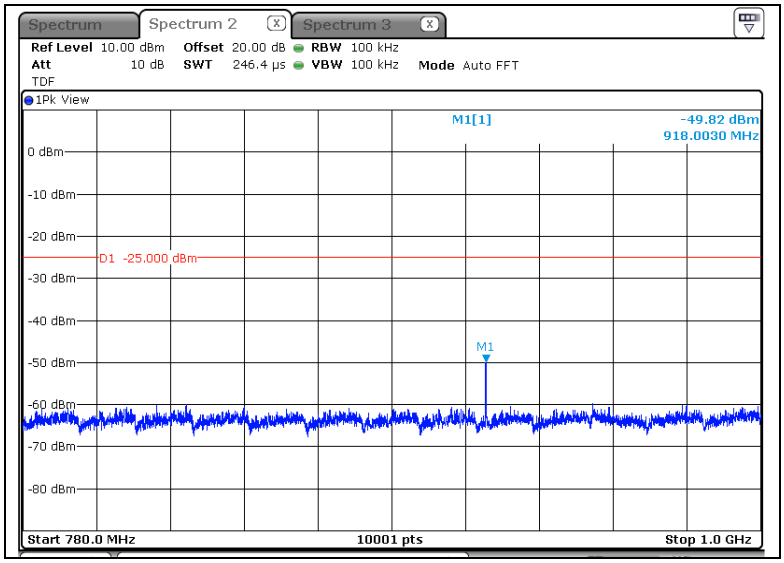
-Target Power_4W_459.00 ㎒

-30 ㎒ ~ 780 ㎒

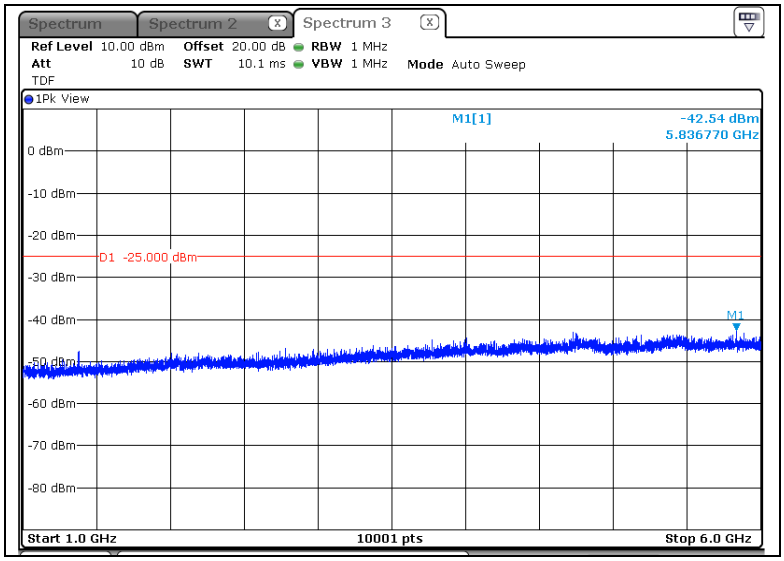


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-780 ㎒ ~ 1 ㎓



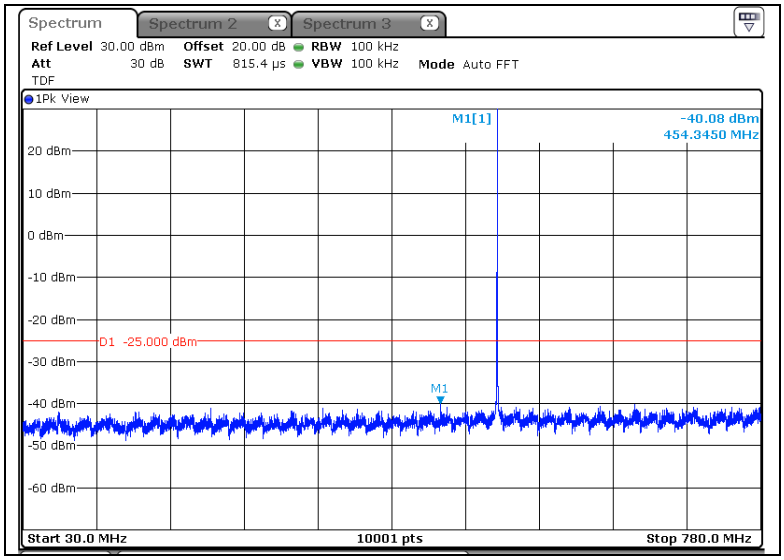
-1 ㎓ ~ 6 ㎓



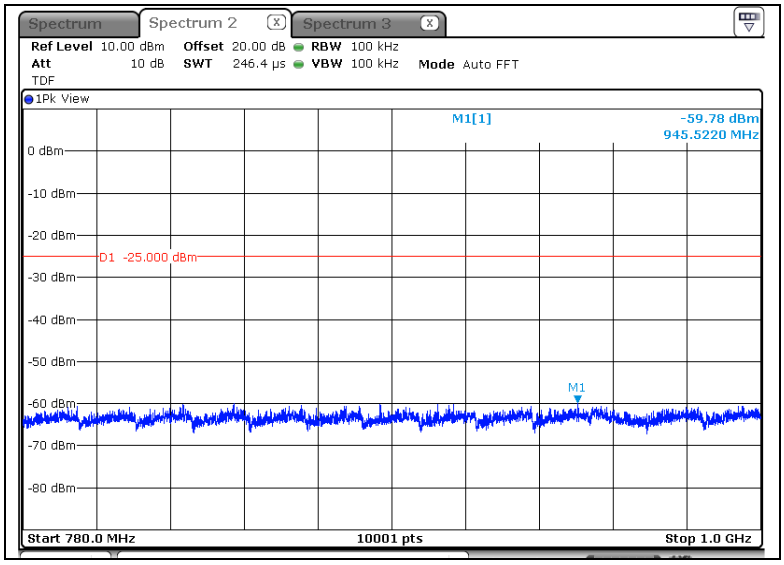
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-Target Power_4W_512.00 ㎒

-30 ㎒ ~ 780 ㎒

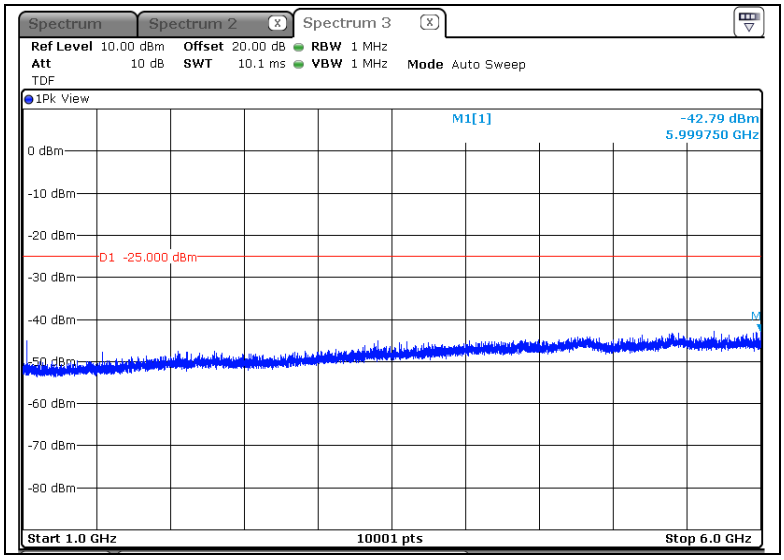


-780 ㎒ ~ 1 ㎓



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-1 ㎓ ~ 6 ㎓



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5.9 Radiated Spurious Emission

5.9.1 Regulation

According to §90.210, For 12.5 ㎑ channel : Spurious attenuated in ㏈= 50+ 10log(Power output in watts) Alternatively, an equivalent absolute level of -20 ㏈m is taken.

5.9.2 Measurement Procedure

1. Radiated spurious emissions are emissions from the EUT when transmitting in non-radiating load on frequencies outside the operating band.
2. In order to suppress inter-modulation products in the spectrum analyzer a notch filter is used, if applicable.
3. The preliminary and final rdiated measurements were performed to determine the frequency producing the maximum emissions in at a 3 m anechoic chamber. The EUT was tested at a distance 3 meters.
4. The EUT was placed on the top of the 1.5-meter height. To find the maximum emission levels, the EUT was tested x,y and z – 3 axis each and the turntable was rotated 360 ˚.
5. The testing procedure is repeated for both horizontal and vertical polarization of the receiving antenna.
6. It mentioned only worst case data at this report.

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5.9.3 Test Result

- Complied

* 12.5BW

-Target Power_1W_406.10 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
812.20	H	-55.20	8.20	-47.00	-20.00	27.00
1 218.53	V	-65.40	6.70	-58.70	-20.00	38.70
1 624.47	V	-64.80	7.10	-57.70	-20.00	37.70
2 436.94	H	-63.90	13.10	-50.80	-20.00	30.80
2 842.88	H	-63.00	13.40	-49.60	-20.00	29.60

-Target Power_1W_459.00 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
918.00	H	-62.10	10.40	-51.70	-20.00	31.70
1 377.24	H	-65.80	9.40	-56.40	-20.00	36.40
1 836.28	V	-61.00	7.90	-53.10	-20.00	33.10
2 295.32	V	-60.90	12.40	-48.50	-20.00	28.50
2 753.75	V	-70.00	13.70	-56.30	-20.00	36.30
3 671.84	H	-68.60	16.70	-51.90	-20.00	31.90

-Target Power_1W_512.00 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
962.05	H	-71.60	11.50	-60.10	-20.00	40.10
1 023.81	V	-56.60	4.90	-51.70	-20.00	31.70
1 535.95	H	-67.00	7.70	-59.30	-20.00	39.30
2 048.10	H	-61.80	12.30	-49.50	-20.00	29.50
2 559.64	H	-58.10	12.70	-45.40	-20.00	25.40
3 071.79	H	-61.90	14.40	-47.50	-20.00	27.50

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-Target Power_4W_406.10 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
812.20	H	-52.60	8.20	-44.40	-20.00	24.40
1 218.53	H	-58.60	6.60	-52.00	-20.00	32.00
1 624.47	H	-63.70	7.10	-56.60	-20.00	36.60
2 030.40	H	-67.80	11.80	-56.00	-20.00	36.00
2 436.33	H	-64.80	13.10	-51.70	-20.00	31.70
2 842.88	H	-63.50	13.40	-50.10	-20.00	30.10

-Target Power_4W_459.00 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
918.00	V	-54.70	9.70	-45.00	-20.00	25.00
1 377.24	H	-49.80	9.40	-40.40	-20.00	20.40
1 836.28	V	-60.80	7.90	-52.90	-20.00	32.90
2 294.71	V	-62.10	12.40	-49.70	-20.00	29.70

-Target Power_4W_512.00 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
954.45	V	-71.50	11.70	-59.80	-20.00	39.80
1 023.81	V	-49.80	4.90	-44.90	-20.00	24.90
1 535.95	V	-59.90	7.70	-52.20	-20.00	32.20
2 048.10	H	-54.50	12.30	-42.20	-20.00	22.20
2 560.25	H	-59.40	12.70	-46.70	-20.00	26.70
3 072.40	H	-62.60	14.40	-48.20	-20.00	28.20
4 096.08	H	-69.30	18.50	-50.80	-20.00	30.80
4 608.23	H	-70.40	21.50	-48.90	-20.00	28.90
5 119.77	H	-67.60	20.20	-47.40	-20.00	27.40
5 631.91	H	-71.30	22.30	-49.00	-20.00	29.00

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* 6.25BW

-Target Power_1W_406.10 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
812.20	V	-53.00	8.30	-44.70	-25.00	19.70
1 217.92	H	-57.60	6.60	-51.00	-25.00	26.00
1 624.47	V	-65.60	7.10	-58.50	-25.00	33.50
2 436.33	H	-64.00	13.10	-50.90	-25.00	25.90
2 842.88	H	-62.70	13.40	-49.30	-25.00	24.30

-Target Power_1W_459.00 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
918.00	H	-62.30	10.40	-51.90	-25.00	26.90
1 377.24	H	-55.10	9.40	-45.70	-25.00	20.70
1 836.28	V	-61.60	7.90	-53.70	-25.00	28.70
2 295.32	V	-60.50	12.40	-48.10	-25.00	23.10
2 754.37	V	-69.70	13.70	-56.00	-25.00	31.00
3 671.84	H	-69.80	16.70	-53.10	-25.00	28.10

-Target Power_1W_512.00 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
976.04	H	-71.50	11.10	-60.40	-25.00	35.40
1 023.81	V	-56.50	4.90	-51.60	-25.00	26.60
2 048.10	H	-63.50	12.30	-51.20	-25.00	26.20
2 559.64	H	-59.80	12.70	-47.10	-25.00	22.10
3 071.79	H	-61.50	14.40	-47.10	-25.00	22.10

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-Target Power_4W_406.10 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
812.20	V	-49.80	8.30	-41.50	-25.00	16.50
1 217.92	H	-58.90	6.60	-52.30	-25.00	27.30
1 624.47	H	-63.90	7.10	-56.80	-25.00	31.80
2 436.33	H	-62.20	13.10	-49.10	-25.00	24.10
2 842.88	H	-61.70	13.40	-48.30	-25.00	23.30

-Target Power_4W_459.00 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
918.00	V	-54.60	9.70	-44.90	-25.00	19.90
1 377.24	V	-62.10	9.00	-53.10	-25.00	28.10
1 835.67	V	-61.60	7.90	-53.70	-25.00	28.70
2 294.71	V	-61.10	12.40	-48.70	-25.00	23.70
2 754.37	V	-69.20	13.70	-55.50	-25.00	30.50

-Target Power_4W_512.00 ㎒

Frequency [㎒]	Pol [H/V]	Reading [dB(㎽)]	Space Loss [dB]	Level [dB(㎽)]	Limit [dB(㎽)]	Margin [dB]
955.93	H	-71.10	11.60	-59.50	-25.00	34.50
1 023.81	V	-49.70	4.90	-44.80	-25.00	19.80
1 535.95	V	-56.70	7.70	-49.00	-25.00	24.00
2 048.10	H	-54.60	12.30	-42.30	-25.00	17.30
2 560.25	H	-60.80	12.70	-48.10	-25.00	23.10
3 071.79	H	-63.10	14.40	-48.70	-25.00	23.70
4 096.08	H	-70.10	18.50	-51.60	-25.00	26.60
4 608.23	H	-70.90	21.50	-49.40	-25.00	24.40
5 119.77	H	-70.20	20.20	-50.00	-25.00	25.00
5 631.91	V	-71.20	22.10	-49.10	-25.00	24.10

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6. Test equipment used for test

	Description	Manufacturer	Model No.	Serial No.	Next Cal Date.
■	DC power supply	AGILENT	E3632A	MY40004791	16.07.15
■	Constant temp & Humid chamber	ESPEC CORP.	SH-641	92004765	16.07.17
■	Attenuator	BIRD	50-A-MFN-20	403002	16.10.08
■	Signal generator	R&S	SMR40	100007	16.06.15
■	Spectrum Analyzer	R&S	FSV30	100732	16.07.21
■	Highpass Filter	Mini-Circuits	NHP-800+	v uu16801113	16.07.15
■	Audio analyzer	HP	8903B	3729A18248	16.10.13
■	Modulation analyzer	HP	8901B	3538A05527	16.10.13
■	Wideband power sensor	R&S	NRP-Z81	102398	17.02.11
■	DIGITAL PHOSPHOR OSCILLOSCOPE	Tektronix	TDS3012	B027160	16.01.06
■	Bilog Antenna	Teseq GmbH	CBL 6143A	35039	16.07.10
■	Horn antenna	ETS.lindgren	3115	62589	16.11.12
■	Amplifier	SONOMA INSTRUMENT	317	321041	17.03.05
■	Broadband Preamplifier	SCHWARZBECK	BBV9718	216	16.11.11
■	Attenuator	Weinschel ENGINEERING	10	AJ1239	16.07.15
■	RF Selector	TOYO Corporation	NS5800	1003-010	-
■	Band Selector	TOYO Corporation	NS5800	1003-135	-
■	Band Selector	TOYO Corporation	NS5800	1003-320	-
■	Antenna Master	MATURO	EAS 1.5	042/8941211	-
■	Antenna Master	MATURO	EAS 1.5	043/8941211	-
■	Turn Table	MATURO	TT 0.8 PF	041/8941211	-
■	Turn Devices	MATURO	TD 1.5-2 kg	039/8941211	-

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