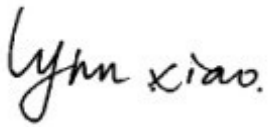
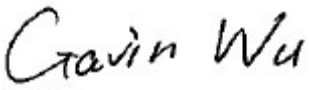
TEST REPORT

Report No.:	**EM201300550-2**	**Application No.:**	**ZJ00032797**
Applicant:	Harman International Industries, Incorporated		
Applicant Address:	8500 Balboa Blvd, Northridge, CA 91329, United States		
Sample Description:	Wireless Stereo Speaker With Bluetooth and Airplay		
Model:	HARMAN KARDON AURA		
Adding Model:	/		
FCC ID:	APIHKAURA		
Test Specification:	FCC Part 15,Subpart C(Section 15.247)		
Test Date:	2013-08-08 to 2013-09-11		
Issue Date:	2013-09-11		
Test Result:	*PASS*		

Prepared By:	**Reviewed By:**	**Approved By:**
Lynn Xiao/ Test Engineer	Jane Cao / Technical Assistance	Gavin Wu / Manager
		
Date:2013-09-11	Date:2013-09-11	Date:2013-09-11

Other Aspects:
/
Abbreviations: *ok / P = passed; fail / F = failed; n.a. / N = not applicable*
The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.

GRG Metrology and Test Co., Ltd. Address: 163, Pingyun Road, West of Huangpu Avenue, Guangzhou, Guangdong, P.R. China

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DIRECTIONS OF TEST

1. This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.

2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.

Table of Contents

1. TEST RESULT SUMMARY

Section B of FCC Part 15.247:2012			
Standard	**Item**	**Limit / Severity**	**Result**
FCC Part 15,Subpart C (15.247)	Antenna Requirement	§15.203	PASS
	Conducted Emissions	§15.207 (a)	PASS
	Radiated Electromagnetic Disturbance	§15.247(d)	PASS
	6 Db Bandwidth	§15.247 (a)(2)	PASS
	Maximum Peak Output Power	§15.247(b)(3)	PASS
	Power Spectral Density	§15.247(e)	PASS
	Emissions In Non-Restricted Frequency Bands	§15.247(d)	PASS
	Emissions In Restricted Frequency Bands	§15.205	PASS
	Band-Edge Measurements	§15.247(d)	PASS

2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name:	Harman International Industries, Incorporated
Address:	8500 Balboa Blvd, Northridge, CA 91329, UNITED STATES

2.2 MANUFACTURER

Name:	Harman International Industries, Incorporated
Address:	8500 Balboa Blvd, Northridge, CA 91329, UNITED STATES

2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	Wireless Stereo Speaker With Bluetooth and Airplay
Model No.:	HARMAN KARDON AURA
Adding Model	/
Trade Name:	HARMAN/KARDON
Power supply	
AC Adapter:	Adaptor input 100-240V~50/60Hz 1.5A Max output DC19V,3A with LPS Speaker input: DC 19V,3A
Frequency Range	2412MHZ~ 2462MHz
Max Antenna gain:	4.80dBi
Type of emission	WIFI
Modulation type	DSSS（802.11b）OFDM（802.11g）
Note:	Pretest the two antenna port (con1 and con2). Found that con2 is worst and the antenna of this port is 4.8dBi. So we record con1 port data.

3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests and measurements refer to this report were performed by Guangzhou GRG Metrology and Test CO., LTD.

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3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC Listed Lab (No. 688188)
China	CNAS （No.L0446）
China	DILAC (No.DL175)
Canada	Registration No.:8355A-1

3.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		**Frequency**	**Uncertainty**
Radiated Emission	Horizontal	30MHz～1000MHz	4.2dB
		1GHz～26.5GHz	4.2dB
	Vertical	30MHz～1000MHz	4.4dB
		1GHz～26.5GHz	4.4dB
Conducted Emission		9kHz～30MHz	3.1 dB

This uncertainty represents an expanded uncertainty factor of *k*=2.

3.4 LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Conducted Emissions				
EMI Receiver	R&S	ESU40	100529	2014-01-24
L.I.S.N	SCHWARZBECK	NSLK 8127	8127450	2014-08-06
Spurious Emissions at Antenna Port				
Receiver	R&S	ESU40	100106	2014-01-24
Restricted Bands				
Receiver	R&S	ESU40	100106	2014-01-24
Spurious Emissions				
Receiver	R&S	ESU40	100106	2014-01-24
Signal Generator	R&S	SML03	103002	2013-11-14
Biconical Log-periodic Antenna	ETS.LINDGREN	3142C	00075971	2014-05-26
Horn antenna	SCHWARZBECK	BBHA9120D	D752	2014-10-14
6 dB Bandwidth				
Receiver	R&S	ESU40	100106	2014-01-24
Maximum Peak Output Power				
Receiver	R&S	ESU40	100106	2014-01-24
100kHz Bandwidth of Frequency Band Edge				
Receiver	R&S	ESU40	100106	2014-01-24
Power Spectral Density				
Receiver	R&S	ESU40	100106	2014-01-24

NOTE: The calibration interval of the above test instruments is 12 months.

4. ANTENNA REQUIREMENT

The EUT has two antennas. The antennas are PCB antennas.
The max gain of antenna 1 is 3.04dBi and the max gain of antenna 2 is 4.8dBi .which accordance 15.203.is considered sufficient to comply with the provisions of this section

5. CONDUCTED EMISSION MEASUREMENT

5.1 LIMITS

Frequency range	Limits (dBμV)	
	Quasi-peak	Average
150kHz ～ 0.5MHz	66～56	56～46
0.5 MHz ～ 5 MHz	56	46
5 MHz ～ 30 MHz	60	50

NOTE: (1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 150 kHz to 0.5MHz.

5.2 TEST PROCEDURES

Procedure of Preliminary Test

Test procedures follow ANSI C63.4:2009.
For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

– Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

– All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

– The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

– Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

– I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

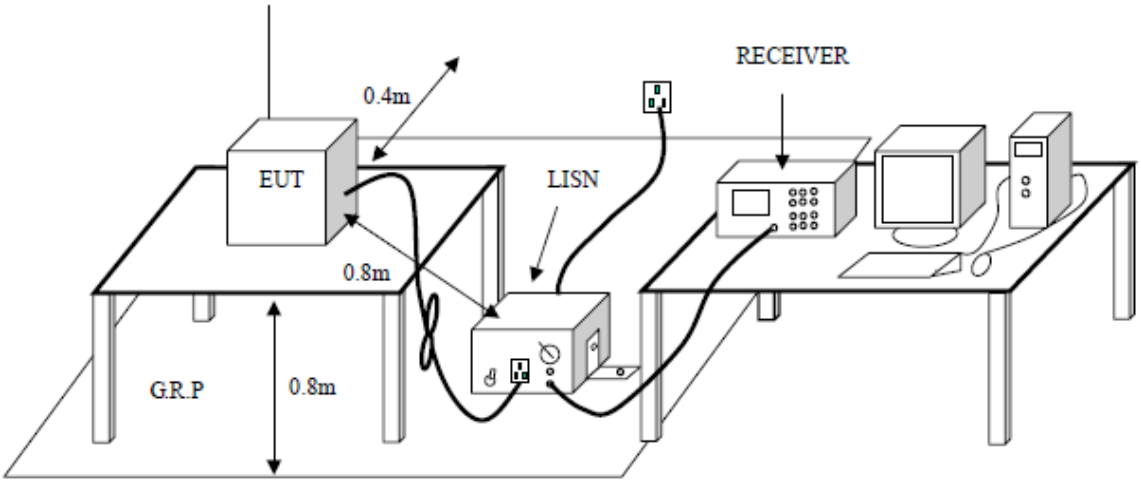
The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines,

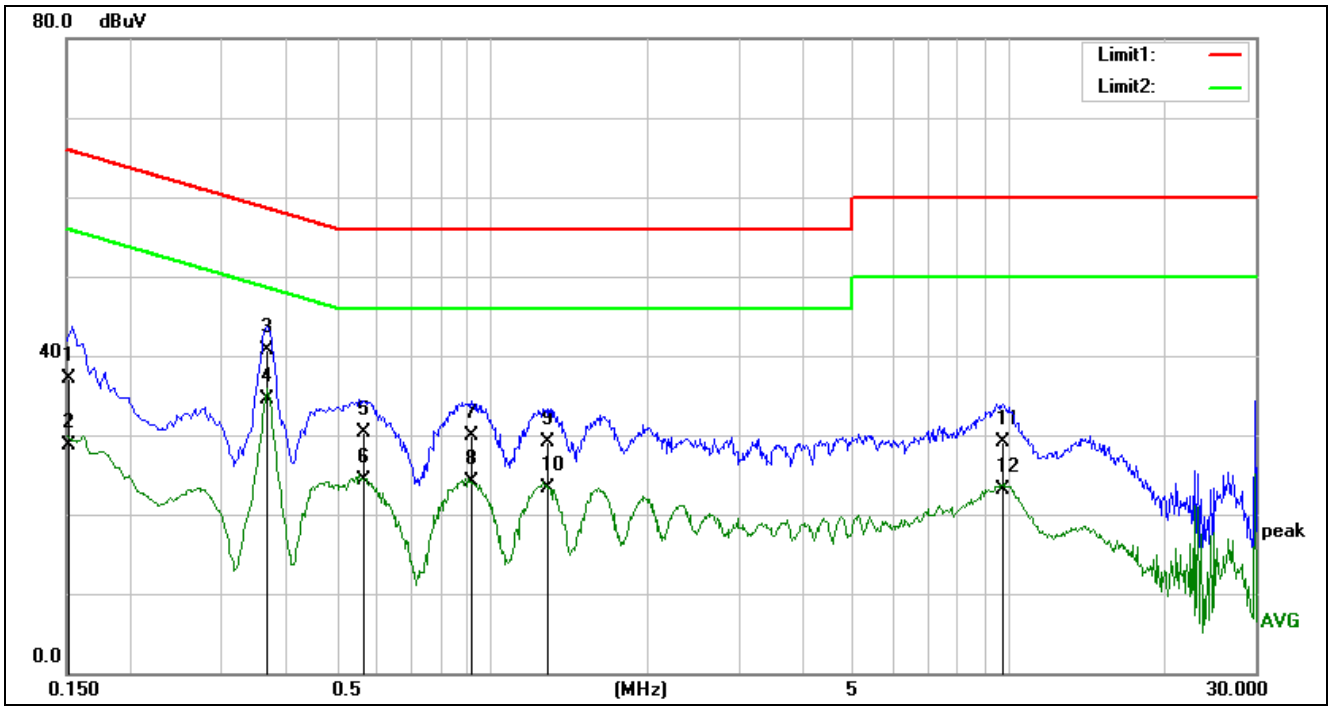
recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

5.3 TEST SETUP



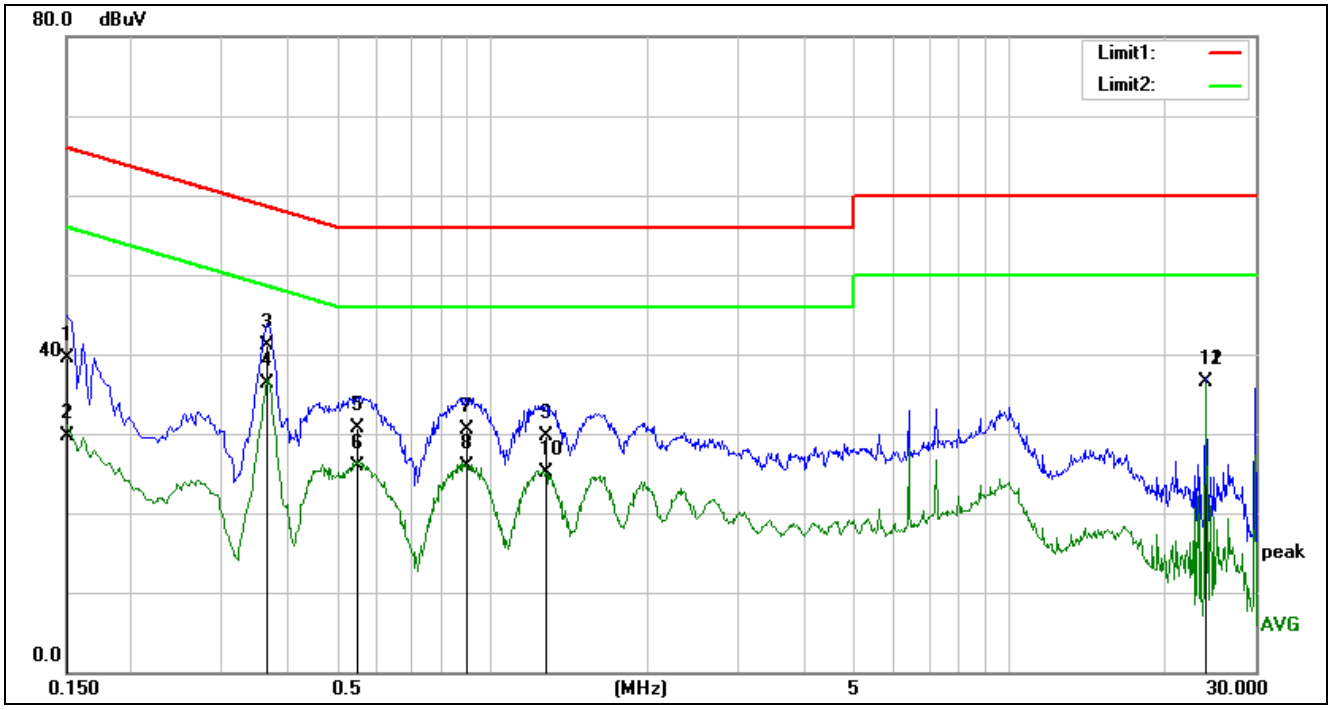
5.4 TEST RESULTS

Project No.:	**ZJ00032797**	**Probe:**	**L1**
Standard:	**(CE)FCC PART 15 class B _QP**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Conduction Test**	**Date:**	**2013-8-20**
Temp./Hum.(%RH):	**25/57%RH**	**Time:**	**8:19:23**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**		
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1513	36.70	0.47	37.17	65.92	-28.75	QP
2	0.1513	28.29	0.47	28.76	55.92	-27.16	AVG
3	0.3664	40.24	0.51	40.75	58.58	-17.83	QP
4	0.3664	34.05	0.51	34.56	48.58	-14.02	AVG
5	0.5627	29.73	0.50	30.23	56.00	-25.77	QP
6	0.5627	23.81	0.50	24.31	46.00	-21.69	AVG
7	0.9086	29.42	0.46	29.88	56.00	-26.12	QP
8	0.9086	23.69	0.46	24.15	46.00	-21.85	AVG
9	1.2751	28.44	0.57	29.01	56.00	-26.99	QP
10	1.2751	22.71	0.57	23.28	46.00	-22.72	AVG
11	9.7195	28.39	0.76	29.15	60.00	-30.85	QP
12	9.7195	22.37	0.76	23.13	50.00	-26.87	AVG

Project No.:	**ZJ00032797**	**Probe:**	**N**
Standard:	**(CE)FCC PART 15 class B _QP**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Conduction Test**	**Date:**	**2013-8-20**
Temp./Hum.(%RH):	**25/57%RH**	**Time:**	**8:19:23**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**		
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1502	38.94	0.47	39.41	65.98	-26.57	QP
2	0.1502	29.28	0.47	29.75	55.98	-26.23	AVG
3	0.3678	40.51	0.51	41.02	58.55	-17.53	QP
4	0.3678	35.71	0.51	36.22	48.55	-12.33	AVG
5	0.5497	30.29	0.51	30.80	56.00	-25.20	QP
6	0.5497	25.31	0.51	25.82	46.00	-20.18	AVG
7	0.8901	30.06	0.46	30.52	56.00	-25.48	QP
8	0.8901	25.35	0.46	25.81	46.00	-20.19	AVG
9	1.2672	29.11	0.57	29.68	56.00	-26.32	QP
10	1.2672	24.45	0.57	25.02	46.00	-20.98	AVG
11	24.0413	35.61	0.93	36.54	60.00	-23.46	QP
12	24.0413	35.57	0.93	36.50	50.00	-13.50	AVG

6. RADIATED ELECTROMAGNETIC DISTURBANCE

6.1 LIMITS

Frequency (MHz)	Quasi-peak(dBμV/m)
30 ~ 88	40
88~216	43.5
216 ~ 960	46
Above 960	54

NOTE: (1) The lower limit shall apply at the transition frequencies.

Frequency (GHz)	Quasi-peak(dBμV/m)
1 ~ 26.5	74
1~ 26.5	54

6.2 TEST PROCEDURES

Test procedures follow ANSI C63.10:2009,

Procedure of Preliminary Test

Radiated emission tests shall be made with the receive or transmit antenna located at a horizontal distance of 3 m plus half of the maximum width of the EUT being tested, measured from the centre of the EUT. The tests shall be performed with the equipment configured as closely as possible to its typical, practical operation. Unless stated otherwise, cables and wiring shall be as specified by the manufacturer and the equipment shall be in its housing (or cabinet) with all covers and access panels in place. Any deviation from normal EUT operating conditions shall be included in the test report.

The EUT (on a non-conductive support structure, where applicable) shall be placed on a remotely operated turntable, to allow the EUT to be rotated. The height of the EUT above the ground plane shall be according to the following requirements.

• Table-top equipment is placed on a non-conductive set-up table with height 0,8 m ± 0,01 m, ANSI C63.10:2009, specifies the method to determine the impact of the non-conductive set-up table on test results.

• Floor-standing equipment is placed on a non-conductive support, as specified in the applicable product standard. If there are no EUT height placement requirements in the product standard, the EUT shall be placed on a non-conductive support at a height of 5 cm to 15 cm above the ground plane.

Interface cables, loads, and devices should be connected to at least one of each type of the interface ports of the EUT and, where practical, each cable shall be terminated in a device typical for its actual use. Where there are multiple interface ports of the same type, a typical number of these devices shall be connected to devices or loads. It is sufficient to connect only one of the loads, provided that it can be shown, for example by preliminary testing, that the connection of further ports would not significantly increase the level of disturbance (that is, more than 2 dB) or significantly degrade the immunity level.

The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test. The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level. Record at least six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only QP reading is presented. The test data of the worst-case condition(s) was recorded.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

6.3 TEST SETUP

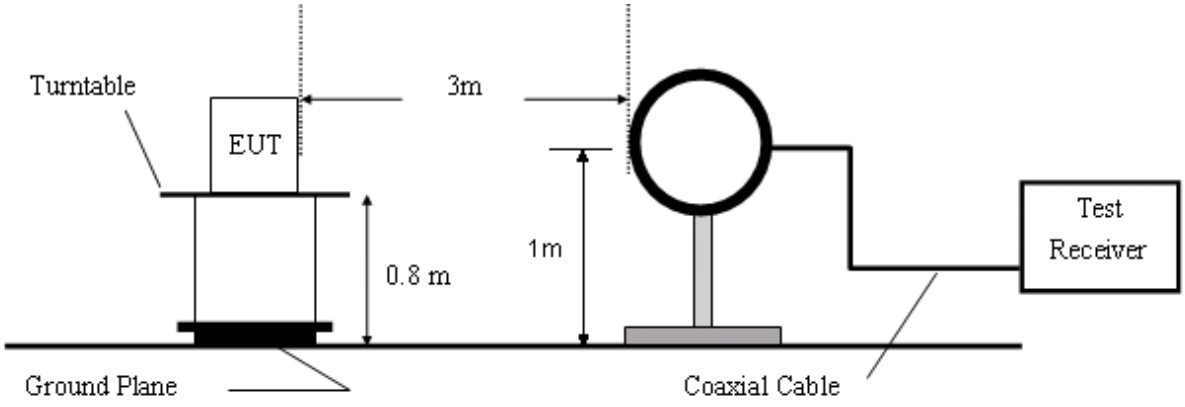


Figure 1. 9KHz to 30MHz radiated emissions test configuration

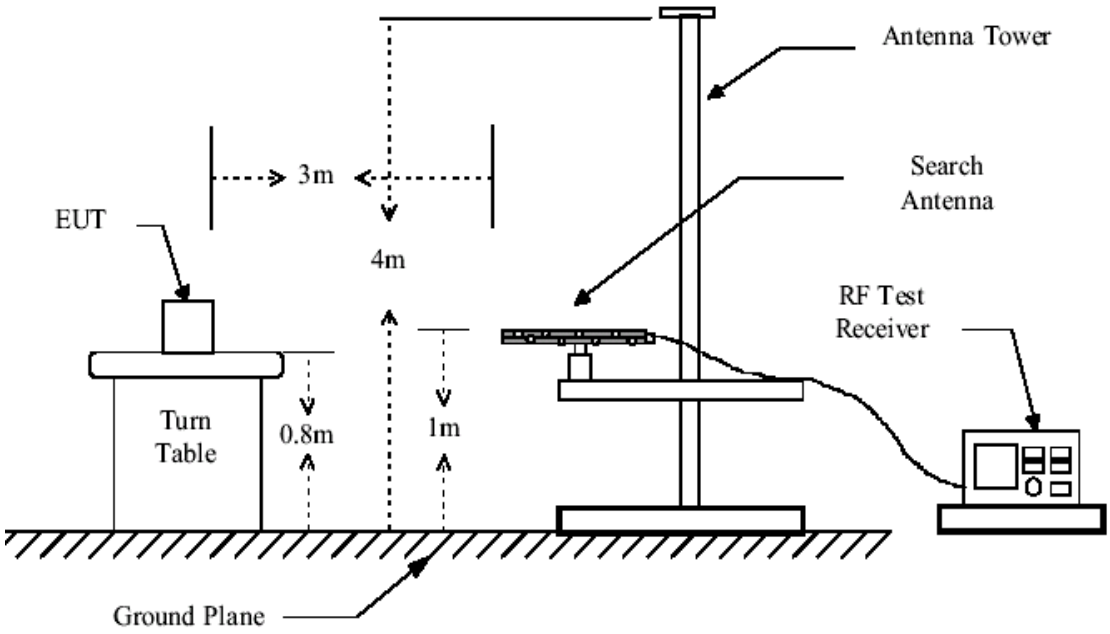


Figure 2. 30MHz to 1GHz radiated emissions test configuration

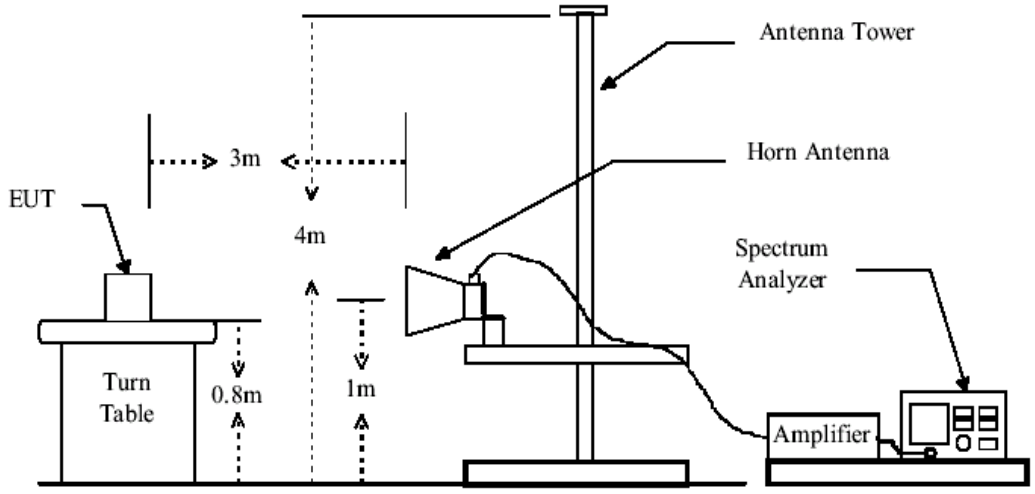
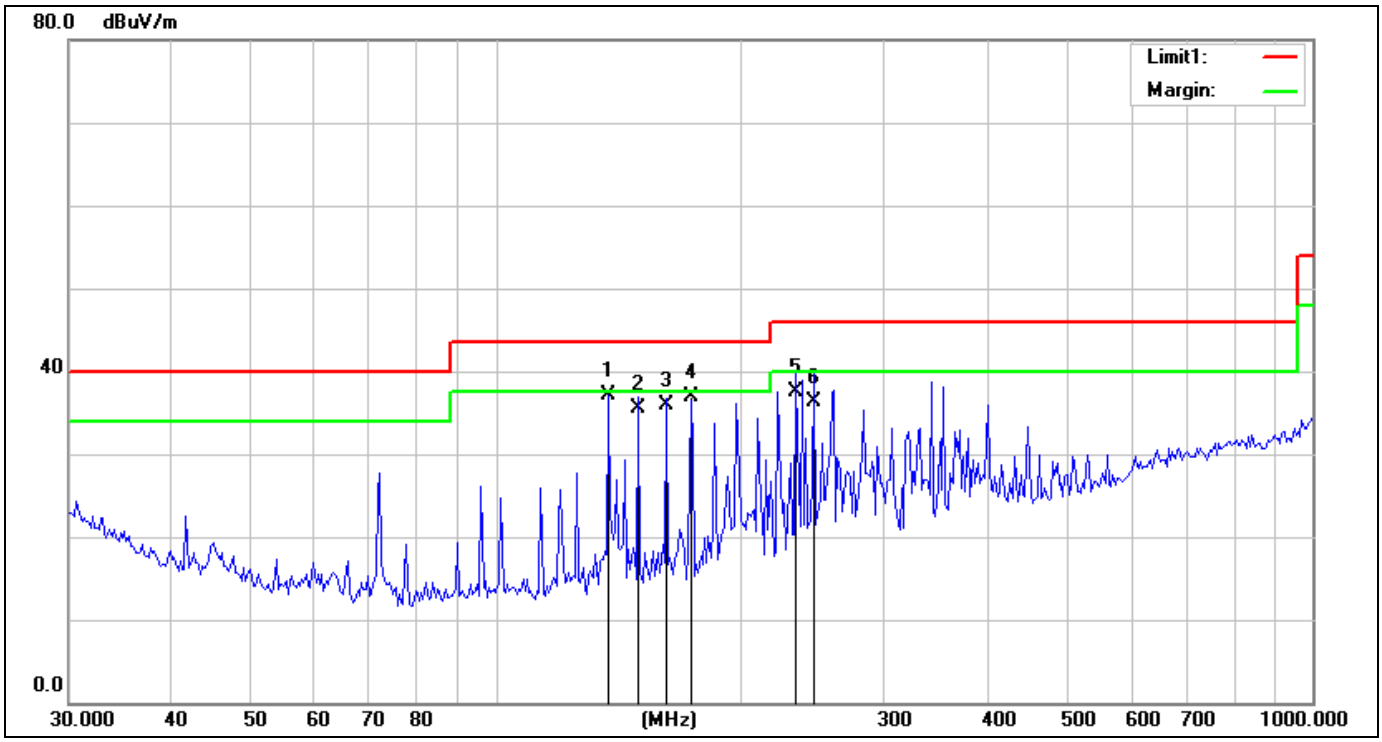


Figure 3. Above 1GHz radiated emissions test configuration

6.4 TEST RESULTS

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**9:14:57**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11B 2412**		

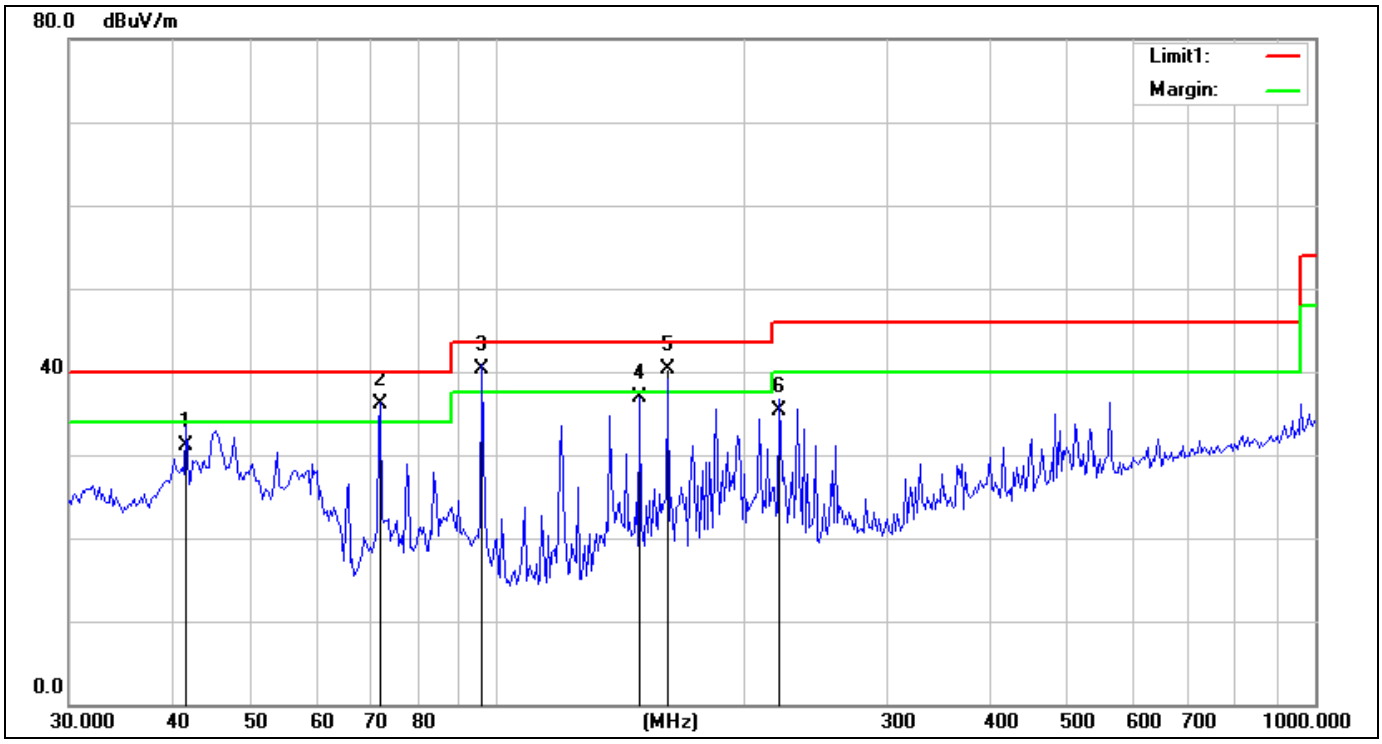


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	137.5624	28.04	9.06	37.10	43.50	-6.40	QP
2	149.6606	25.40	10.10	35.50	43.50	-8.00	QP
3	161.9103	25.24	10.66	35.90	43.50	-7.60	QP
4	173.2051	26.32	10.68	37.00	43.50	-6.50	QP
5	233.2962	24.46	13.04	37.50	46.00	-8.50	QP
6	245.3987	22.90	13.50	36.40	46.00	-9.60	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1911.522	36.09	13.74	49.83	74.00	-24.17	peak
2	1911.522	16.76	13.74	30.50	54.00	-23.50	AVG
3	2911.540	28.38	22.58	50.96	74.00	-23.04	peak
4	2911.540	14.62	22.58	37.20	54.00	-16.80	AVG
5	8055.965	26.37	23.37	49.74	74.00	-24.26	peak
6	8055.965	14.73	23.37	38.10	54.00	-15.90	AVG
7	10665.190	28.04	24.71	52.75	74.00	-21.25	peak
8	10665.190	15.39	24.71	40.10	54.00	-13.90	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**9:14:57**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11B 2412**		

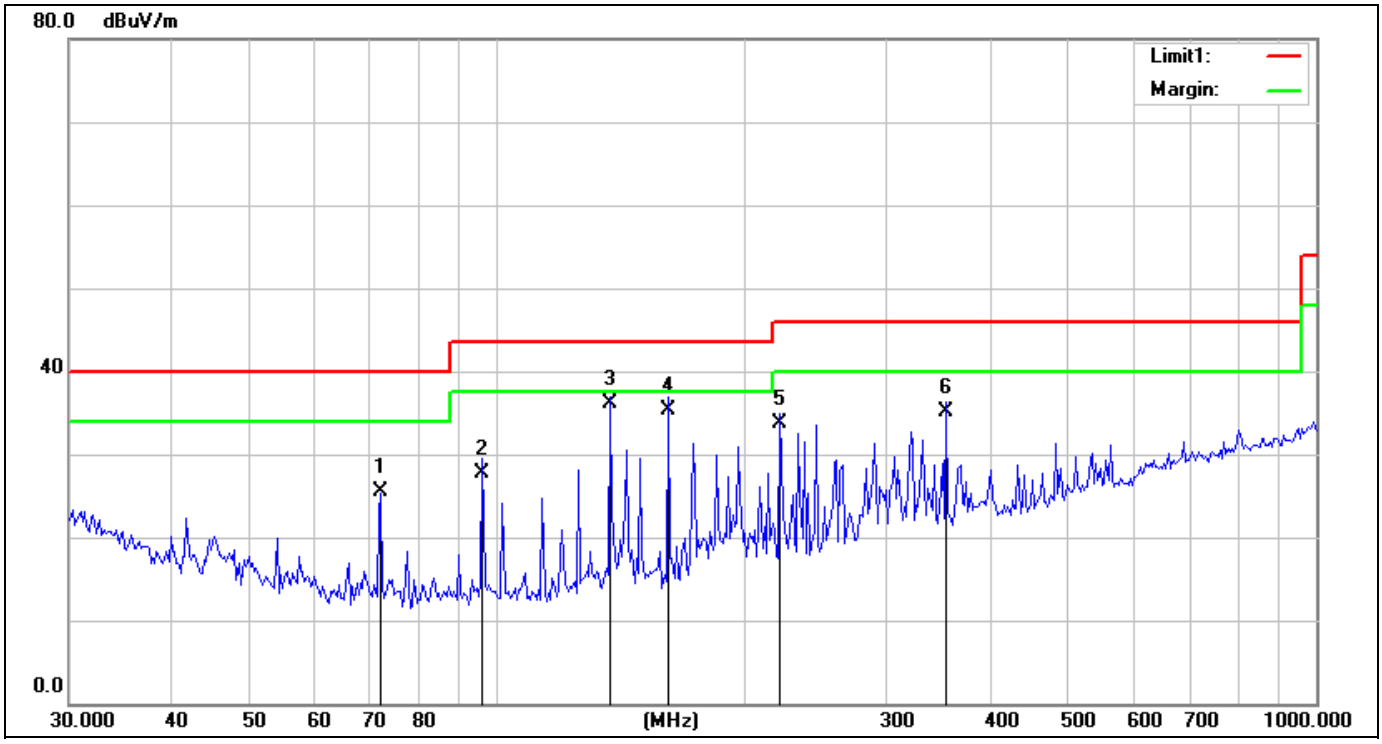


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	41.7938	18.40	12.70	31.10	40.00	-8.90	QP
2	72.0843	28.27	7.83	36.10	40.00	-3.90	QP
3	96.0079	30.44	9.86	40.30	43.50	-3.20	QP
4	149.6606	26.90	10.10	37.00	43.50	-6.50	QP
5	161.9103	29.74	10.66	40.40	43.50	-3.10	QP
6	221.7906	22.82	12.58	35.40	46.00	-10.60	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1813.179	38.77	13.39	52.16	74.00	-21.84	peak
2	1813.179	17.61	13.39	31.00	54.00	-23.00	AVG
3	1911.522	40.00	13.74	53.74	74.00	-20.26	peak
4	1911.522	17.06	13.74	30.80	54.00	-23.20	AVG
5	10252.954	27.76	25.15	52.91	74.00	-21.09	peak
6	10252.954	15.95	25.15	41.10	54.00	-12.90	AVG
7	12544.719	28.60	26.57	55.17	74.00	-18.83	peak
8	12544.719	15.73	26.57	42.30	54.00	-11.70	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**8:42:02**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11B 2437**		

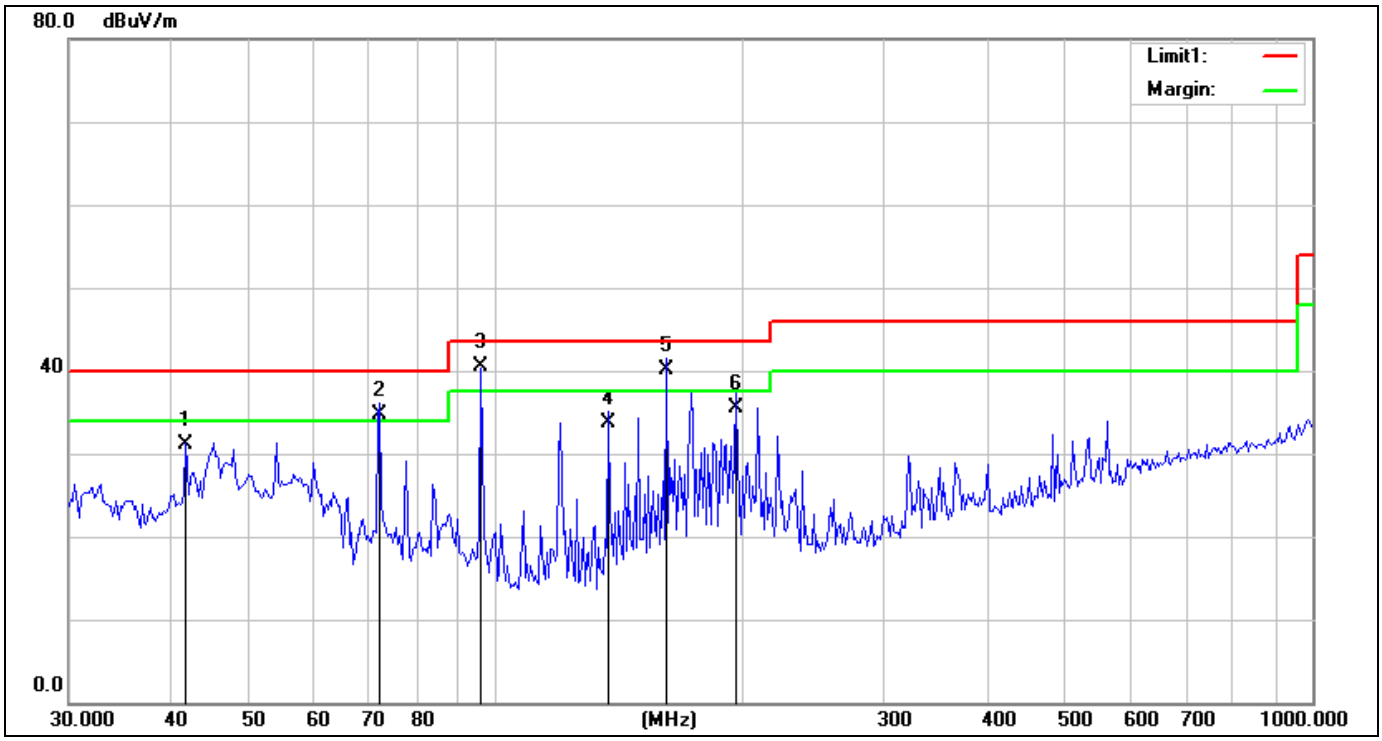


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	72.0841	17.77	7.83	25.60	40.00	-14.40	QP
2	96.0079	17.94	9.86	27.80	43.50	-15.70	QP
3	137.5622	27.14	9.06	36.20	43.50	-7.30	QP
4	161.9103	24.74	10.66	35.40	43.50	-8.10	QP
5	221.7906	21.12	12.58	33.70	46.00	-12.30	QP
6	353.5944	17.85	17.35	35.20	46.00	-10.80	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2208.401	28.50	15.26	43.76	74.00	-30.24	peak
2	2208.401	14.84	15.26	30.10	54.00	-23.90	AVG
3	2906.418	28.73	22.51	51.24	74.00	-22.76	peak
4	2906.418	15.09	22.51	37.60	54.00	-16.40	AVG
5	8341.095	26.57	23.92	50.49	74.00	-23.51	peak
6	8341.095	14.38	23.92	38.30	54.00	-15.70	AVG
7	9630.728	27.11	25.08	52.19	74.00	-21.81	peak
8	9630.728	15.12	25.08	40.20	54.00	-13.80	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**22/51%RH**	**Time:**	**8:52:12**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11B 2437**		

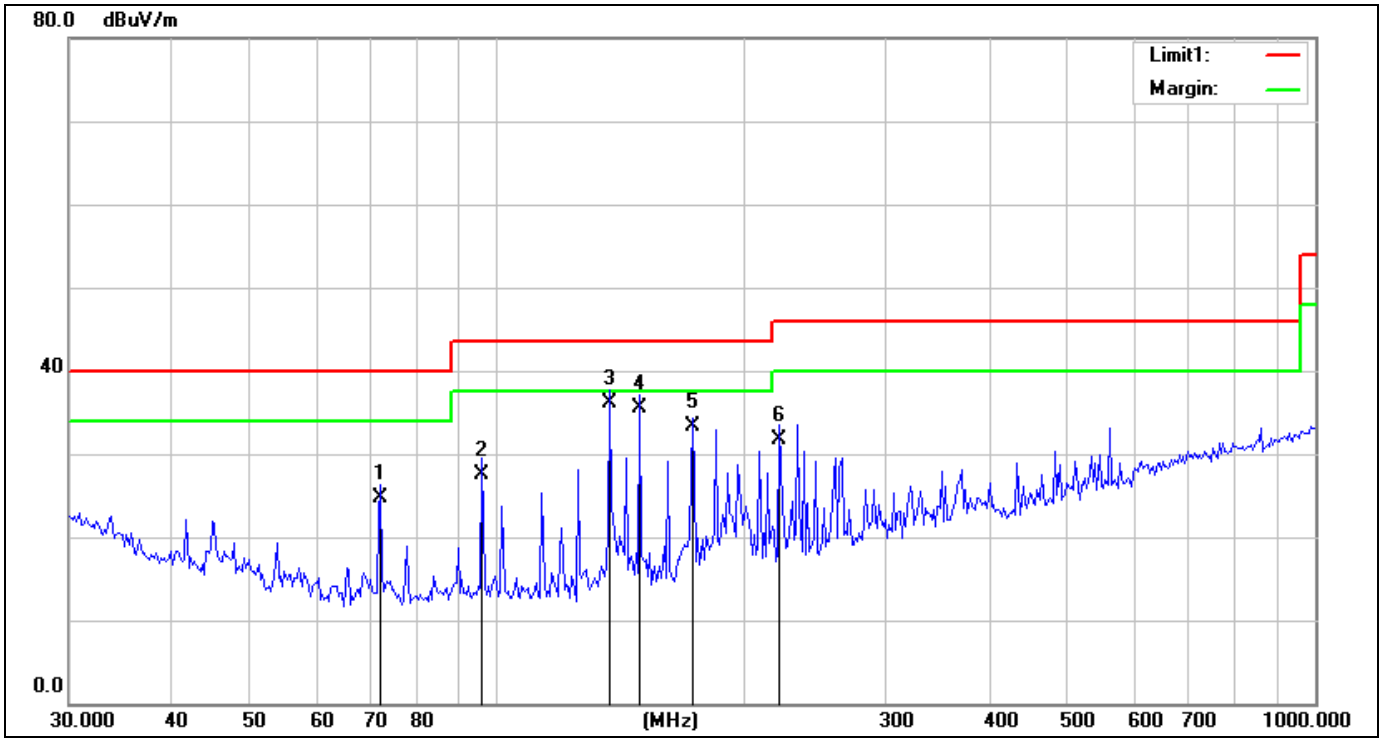


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	41.7937	18.50	12.70	31.20	40.00	-8.80	QP
2	72.0841	26.97	7.83	34.80	40.00	-5.20	QP
3	96.0079	30.64	9.86	40.50	43.50	-3.00	QP
4	137.5622	24.74	9.06	33.80	43.50	-9.70	QP
5	161.9103	29.44	10.66	40.10	43.50	-3.40	QP
6	197.1024	24.20	11.40	35.60	43.50	-7.90	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1750.444	37.68	13.05	50.73	74.00	-23.27	peak
2	1750.444	17.15	13.05	30.20	54.00	-23.80	AVG
3	1911.522	39.07	13.74	52.81	74.00	-21.19	peak
4	1911.522	17.36	13.74	31.10	54.00	-22.90	AVG
5	8302.502	27.05	23.85	50.90	74.00	-23.10	peak
6	8302.502	14.55	23.85	38.40	54.00	-15.60	AVG
7	12314.157	27.20	25.98	53.18	74.00	-20.82	peak
8	12314.157	16.12	25.98	42.10	54.00	-11.90	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**22/51%RH**	**Time:**	**9:16:41**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11B 2462**		

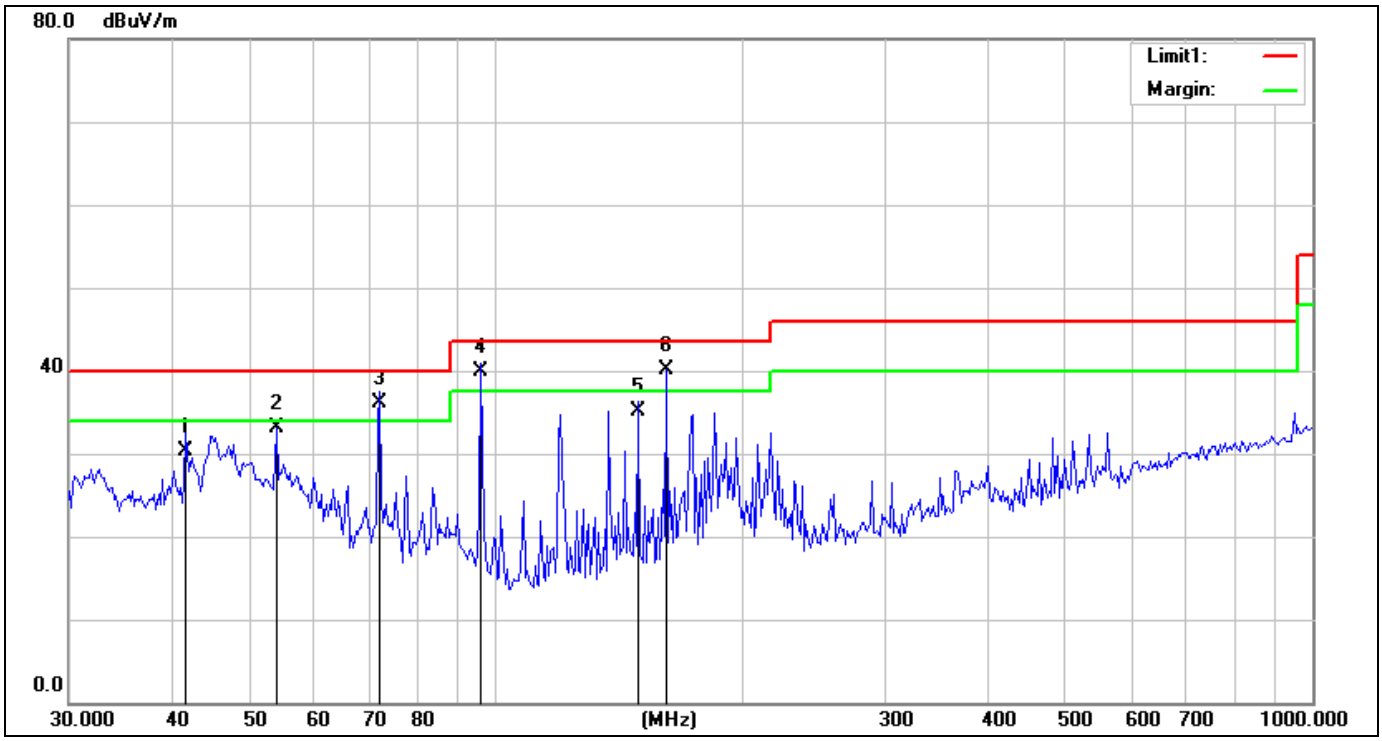


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	72.0841	16.97	7.83	24.80	40.00	-15.20	QP
2	96.0079	17.64	9.86	27.50	43.50	-16.00	QP
3	137.5622	27.14	9.06	36.20	43.50	-7.30	QP
4	149.6605	25.40	10.10	35.50	43.50	-8.00	QP
5	173.2050	22.72	10.68	33.40	43.50	-10.10	QP
6	221.7906	19.22	12.58	31.80	46.00	-14.20	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1806.806	35.31	13.36	48.67	74.00	-25.33	peak
2	1806.806	17.14	13.36	30.50	54.00	-23.50	AVG
3	1914.890	35.76	13.76	49.52	74.00	-24.48	peak
4	1914.890	16.34	13.76	30.10	54.00	-23.90	AVG
5	9902.470	26.08	25.53	51.61	74.00	-22.39	peak
6	9902.470	14.57	25.53	40.10	54.00	-13.90	AVG
7	12257.181	28.04	25.84	53.88	74.00	-20.12	peak
8	12257.181	16.66	25.84	42.50	54.00	-11.50	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**8:57:14**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11b 2462**		

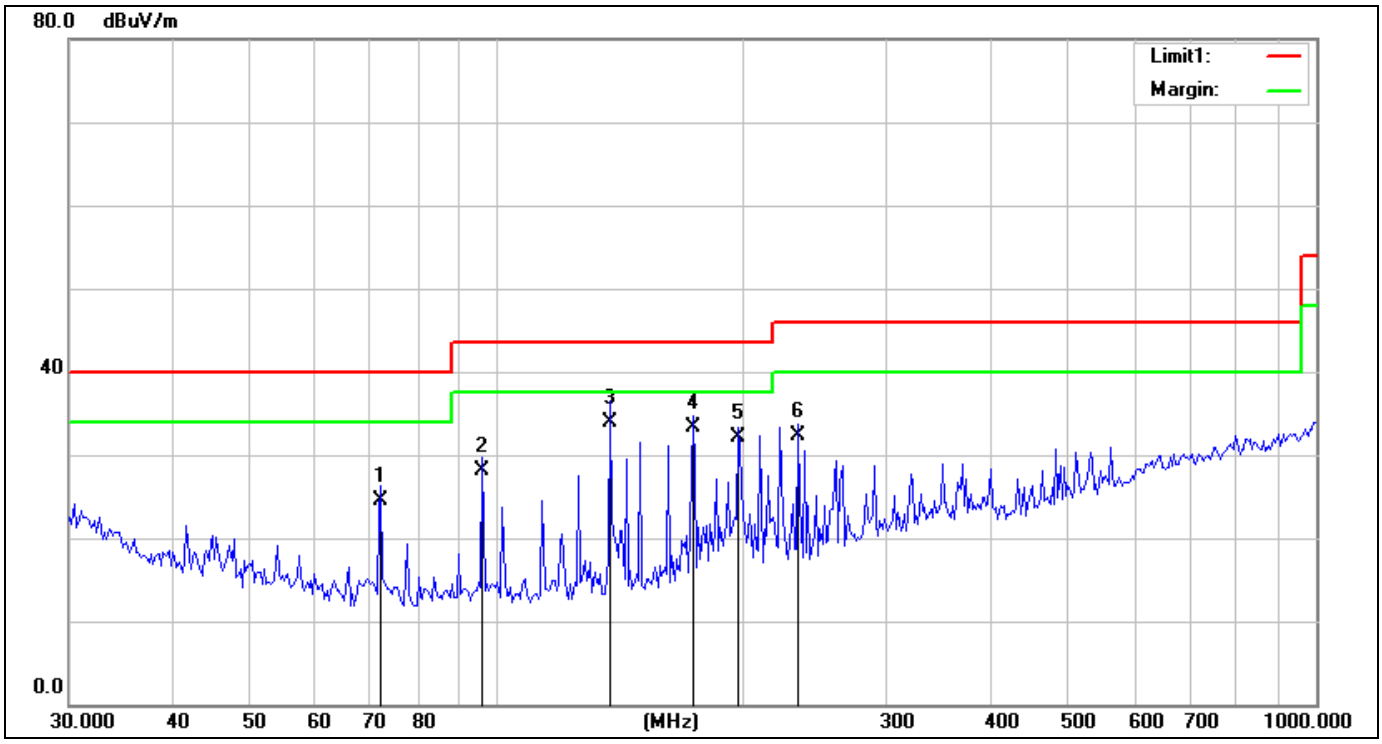


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	41.7937	17.70	12.70	30.40	40.00	-9.60	QP
2	53.8188	24.01	9.09	33.10	40.00	-6.90	QP
3	72.0841	28.27	7.83	36.10	40.00	-3.90	QP
4	96.0079	30.04	9.86	39.90	43.50	-3.60	QP
5	149.6605	25.10	10.10	35.20	43.50	-8.30	QP
6	161.9103	29.44	10.66	40.10	43.50	-3.40	QP

Emission above 1GHz:

o.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1806.806	38.42	13.36	51.78	74.00	-22.22	peak
2	1806.806	17.04	13.36	30.40	54.00	-23.60	AVG
3	1911.522	38.71	13.74	52.45	74.00	-21.55	peak
4	1911.522	16.46	13.74	30.20	54.00	-23.80	AVG
5	9788.325	27.18	25.34	52.52	74.00	-21.48	peak
6	9788.325	14.96	25.34	40.30	54.00	-13.70	AVG
7	12603.031	26.82	26.79	53.61	74.00	-20.39	peak
8	12603.031	16.41	26.79	43.20	54.00	-10.80	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**9:14:40**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2412**		

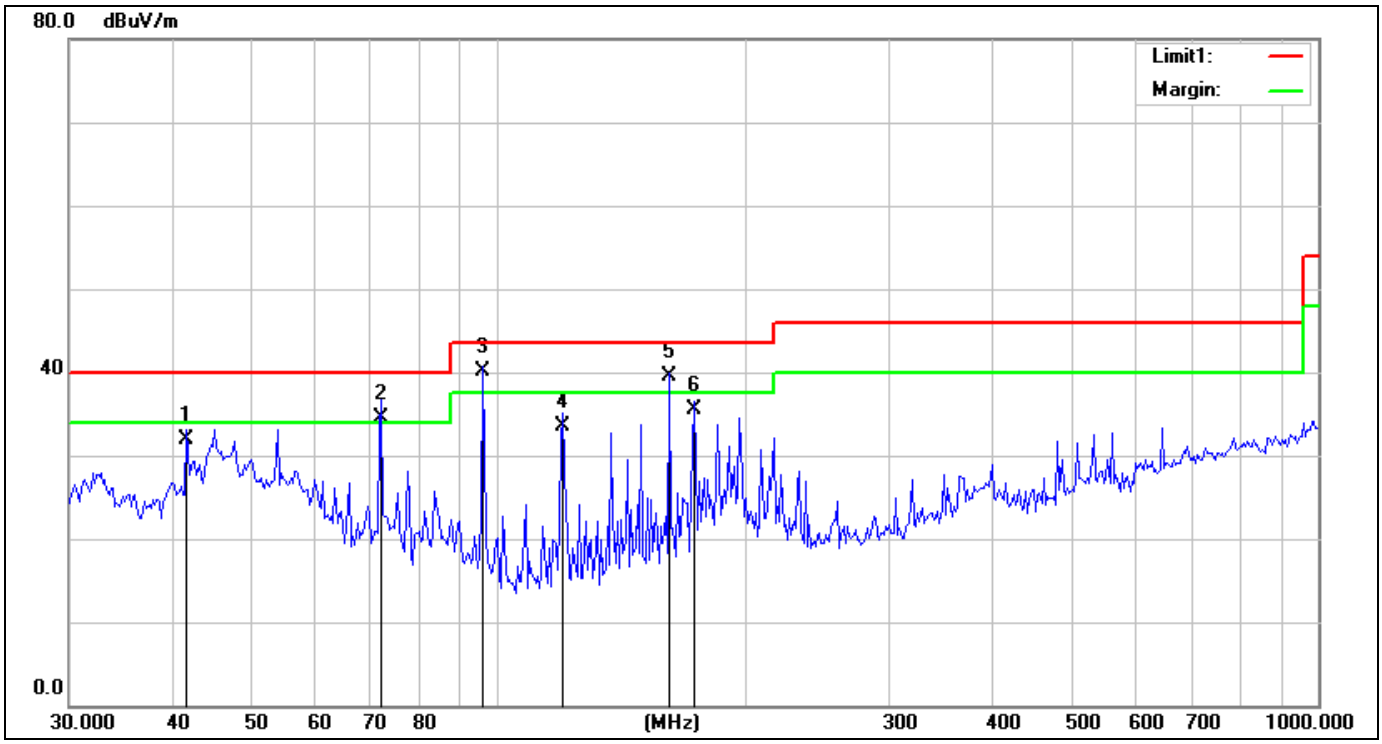


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	72.0841	16.67	7.83	24.50	40.00	-15.50	QP
2	96.0079	18.34	9.86	28.20	43.50	-15.30	QP
3	137.5622	24.84	9.06	33.90	43.50	-9.60	QP
4	173.2050	22.62	10.68	33.30	43.50	-10.20	QP
5	197.1024	20.70	11.40	32.10	43.50	-11.40	QP
6	233.2961	19.36	13.04	32.40	46.00	-13.60	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1617.114	35.41	12.29	47.70	74.00	-26.30	peak
2	1617.114	21.51	12.29	33.80	54.00	-20.20	AVG
3	1911.522	36.91	13.74	50.65	74.00	-23.35	peak
4	1911.522	16.46	13.74	30.20	54.00	-23.80	AVG
5	9994.744	26.02	25.69	51.71	74.00	-22.29	peak
6	9994.744	14.41	25.69	40.10	54.00	-13.90	AVG
7	12228.793	27.09	25.79	52.88	74.00	-21.12	peak
8	12228.793	16.01	25.79	41.80	54.00	-12.20	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**8:59:42**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2412**		

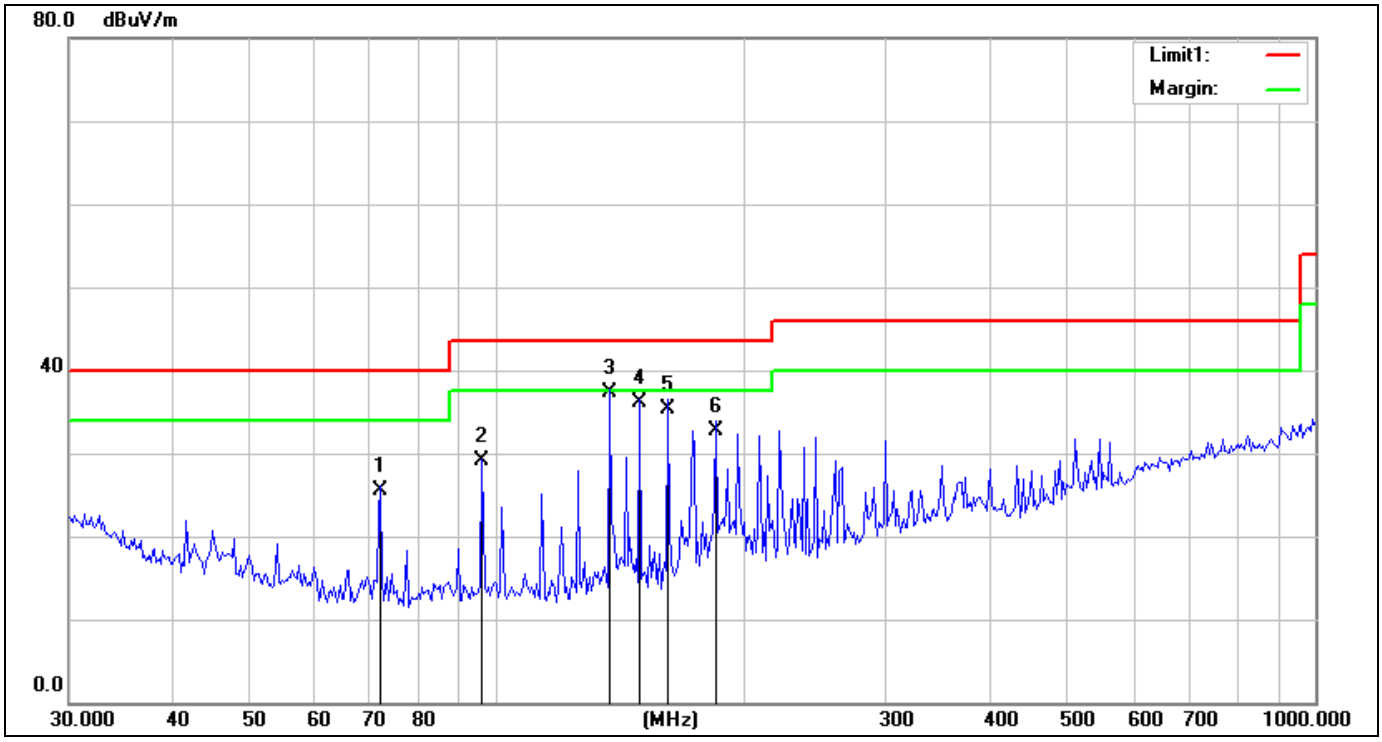


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	41.7937	19.20	12.70	31.90	40.00	-8.10	QP
2	72.0841	26.67	7.83	34.50	40.00	-5.50	QP
3	96.0079	30.34	9.86	40.20	43.50	-3.30	QP
4	120.2064	24.73	8.87	33.60	43.50	-9.90	QP
5	161.9103	28.84	10.66	39.50	43.50	-4.00	QP
6	173.2050	24.82	10.68	35.50	43.50	-8.00	peak

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1809.989	37.62	13.37	50.99	74.00	-23.01	peak
2	1809.989	17.73	13.37	31.10	54.00	-22.90	AVG
3	1914.890	38.64	13.76	52.40	74.00	-21.60	peak
4	1914.890	16.44	13.76	30.20	54.00	-23.80	AVG
5	9173.001	26.60	24.43	51.03	74.00	-22.97	peak
6	9173.001	14.07	24.43	38.50	54.00	-15.50	AVG
7	11893.212	27.54	25.11	52.65	74.00	-21.35	peak
8	11893.212	15.19	25.11	40.30	54.00	-13.70	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**9:13:53**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2437**		

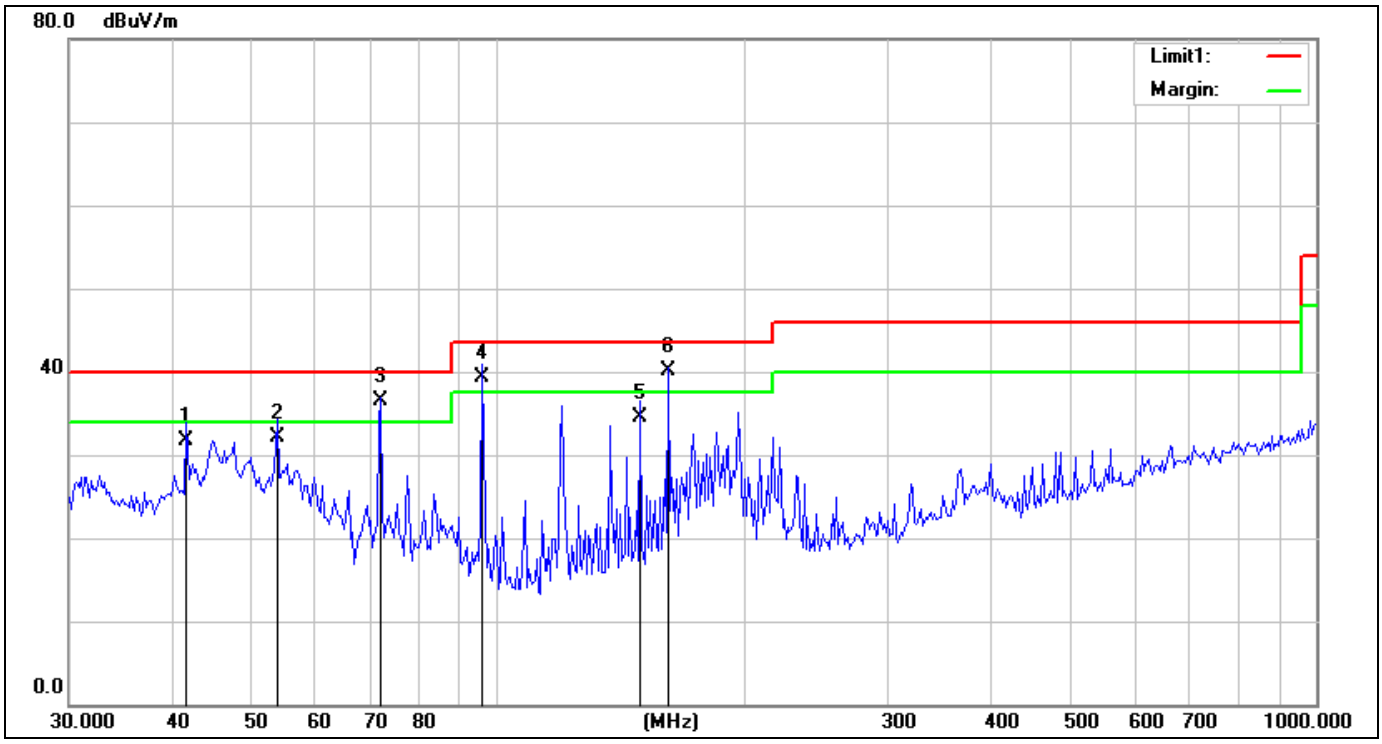


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	72.0841	17.77	7.83	25.60	40.00	-14.40	QP
2	96.0079	19.24	9.86	29.10	43.50	-14.40	QP
3	137.5622	28.34	9.06	37.40	43.50	-6.10	QP
4	149.6605	26.10	10.10	36.20	43.50	-7.30	QP
5	161.9103	24.74	10.66	35.40	43.50	-8.10	QP
6	185.2878	21.41	11.29	32.70	43.50	-10.80	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2147.059	27.66	14.91	42.57	74.00	-31.43	peak
2	2147.059	16.79	14.91	31.70	54.00	-22.30	AVG
3	2926.959	26.79	22.79	49.58	74.00	-24.42	peak
4	2926.959	14.01	22.79	36.80	54.00	-17.20	AVG
5	10420.733	27.43	24.77	52.20	74.00	-21.80	peak
6	10420.733	15.03	24.77	39.80	54.00	-14.20	AVG
7	12314.157	27.07	25.98	53.05	74.00	-20.95	peak
8	12314.157	15.82	25.98	41.80	54.00	-12.20	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**9:00:39**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2437**		

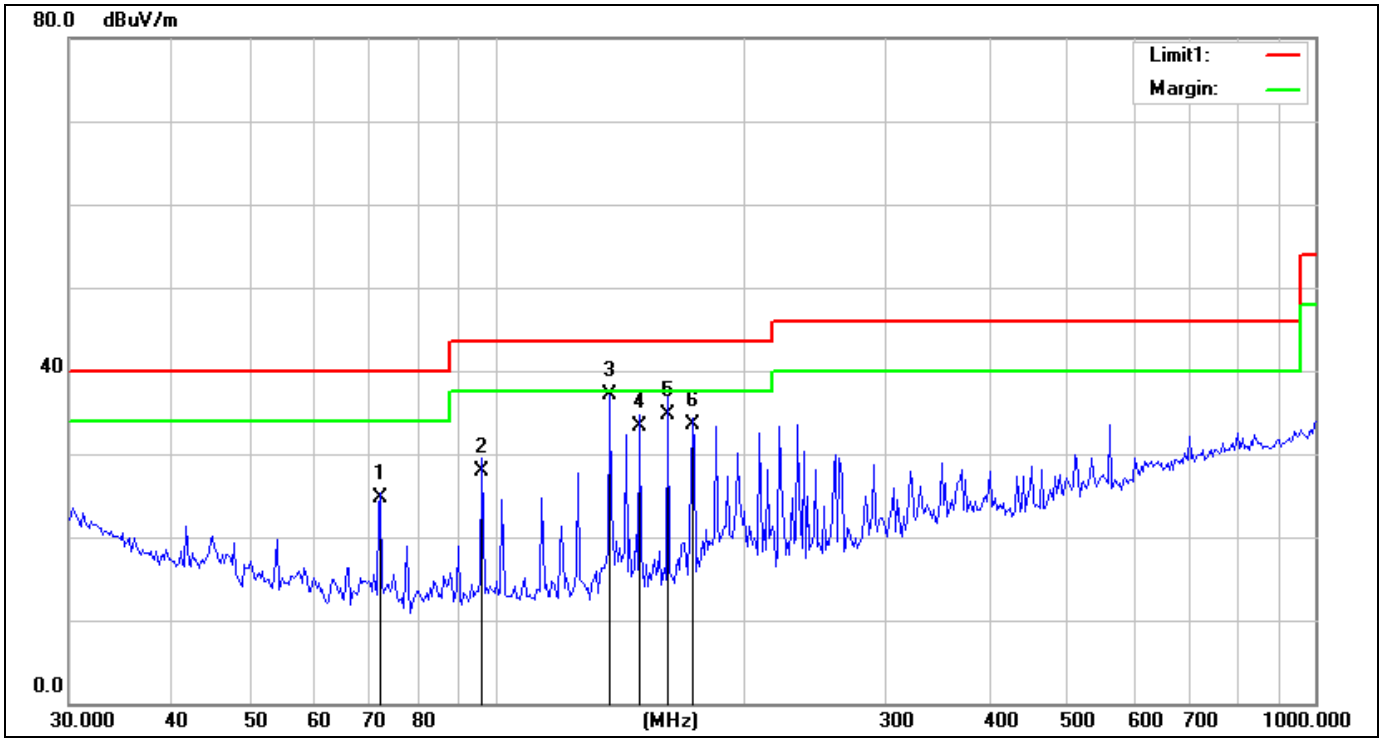


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	41.7937	19.00	12.70	31.70	40.00	-8.30	QP
2	53.8188	23.11	9.09	32.20	40.00	-7.80	QP
3	72.0841	28.67	7.83	36.50	40.00	-3.50	QP
4	96.0079	29.54	9.86	39.40	43.50	-4.10	QP
5	149.6605	24.40	10.10	34.50	43.50	-9.00	QP
6	161.9103	29.54	10.66	40.20	43.50	-3.30	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1611.429	39.03	12.26	51.29	74.00	-22.71	peak
2	1611.429	24.64	12.26	36.90	54.00	-17.10	AVG
3	1914.890	37.97	13.76	51.73	74.00	-22.27	peak
4	1914.890	16.74	13.76	30.50	54.00	-23.50	AVG
5	11094.000	27.18	24.85	52.03	74.00	-21.97	peak
6	11094.000	15.15	24.85	40.00	54.00	-14.00	AVG
7	12573.842	27.82	26.67	54.49	74.00	-19.51	peak
8	12573.842	15.53	26.67	42.20	54.00	-11.80	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**9:13:03**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11 g 2462**		

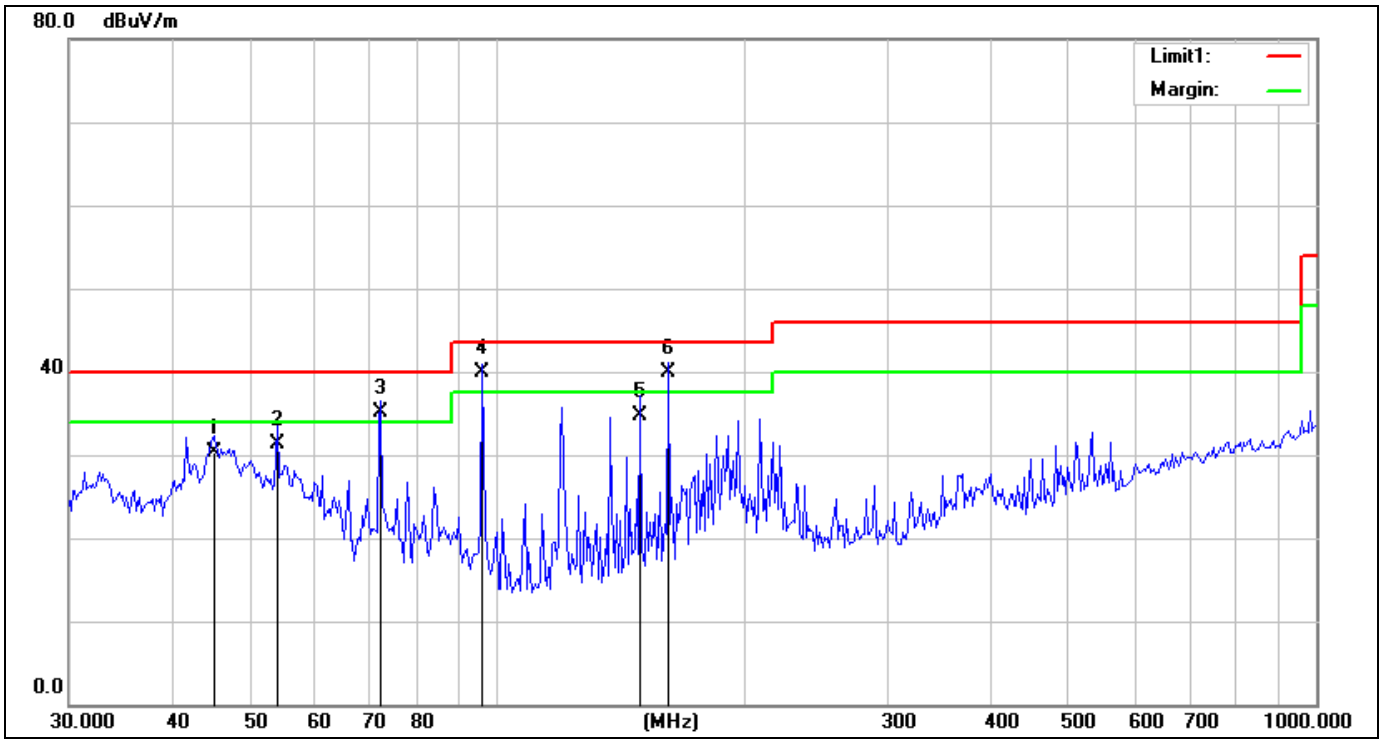


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	72.0841	16.97	7.83	24.80	40.00	-15.20	QP
2	96.0079	18.04	9.86	27.90	43.50	-15.60	QP
3	137.5622	28.04	9.06	37.10	43.50	-6.40	QP
4	149.6605	23.30	10.10	33.40	43.50	-10.10	QP
5	161.9103	24.14	10.66	34.80	43.50	-8.70	QP
6	173.2050	22.92	10.68	33.60	43.50	-9.90	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1803.627	34.66	13.35	48.01	74.00	-25.99	peak
2	1803.627	16.95	13.35	30.30	54.00	-23.70	AVG
3	1908.159	36.21	13.73	49.94	74.00	-24.06	peak
4	1908.159	16.37	13.73	30.10	54.00	-23.90	AVG
5	9608.423	26.82	25.05	51.87	74.00	-22.13	peak
6	9608.423	14.65	25.05	39.70	54.00	-14.30	AVG
7	12285.636	27.23	25.92	53.15	74.00	-20.85	peak
8	12285.636	15.58	25.92	41.50	54.00	-12.50	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15 class B 3m**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-22**
Temp./Hum.(%RH):	**23/55%RH**	**Time:**	**8:58:10**
EUT:	**Wireless Stereo Speaker With Bluetooth and Airplay**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11 g 2462**		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	45.2145	18.83	11.47	30.30	40.00	-9.70	QP
2	53.8188	22.31	9.09	31.40	40.00	-8.60	QP
3	72.0841	27.37	7.83	35.20	40.00	-4.80	QP
4	96.0079	30.14	9.86	40.00	43.50	-3.50	QP
5	149.6605	24.70	10.10	34.80	43.50	-8.70	QP
6	161.9103	29.24	10.66	39.90	43.50	-3.60	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1803.627	38.01	13.35	51.36	74.00	-22.64	peak
2	1803.627	17.15	13.35	30.50	54.00	-23.50	AVG
3	1914.890	37.04	13.76	50.80	74.00	-23.20	peak
4	1914.890	16.54	13.76	30.30	54.00	-23.70	AVG
5	8516.994	27.95	24.24	52.19	74.00	-21.81	peak
6	8516.994	13.26	24.24	37.50	54.00	-16.50	AVG
7	12285.636	27.25	25.92	53.17	74.00	-20.83	peak
8	12285.636	16.18	25.92	42.10	54.00	-11.90	AVG

Note: Below 30MHz, since the radiated emission of the EUT is too weak to be detected.

7. 6dB BANDWIDTH TESTING

7.1 LIMITS

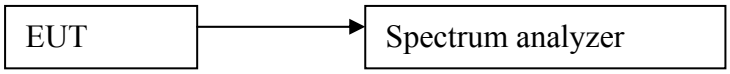
Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.2 TEST PROCEDURES

Test procedures follow ANSI C63.4:2009 and KDB 558074 D01 DTS Measurement Guidance v03r01.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Set resolution bandwidth (RBW) = 100kHz.Set the video bandwidth (VBW) ≥ 3 x RBW. Detector = Peak. Trace mode = max hold. Sweep = auto couple. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer.
5. Repeat above procedures until all frequencies measured were complete.

7.3 TEST SETUP

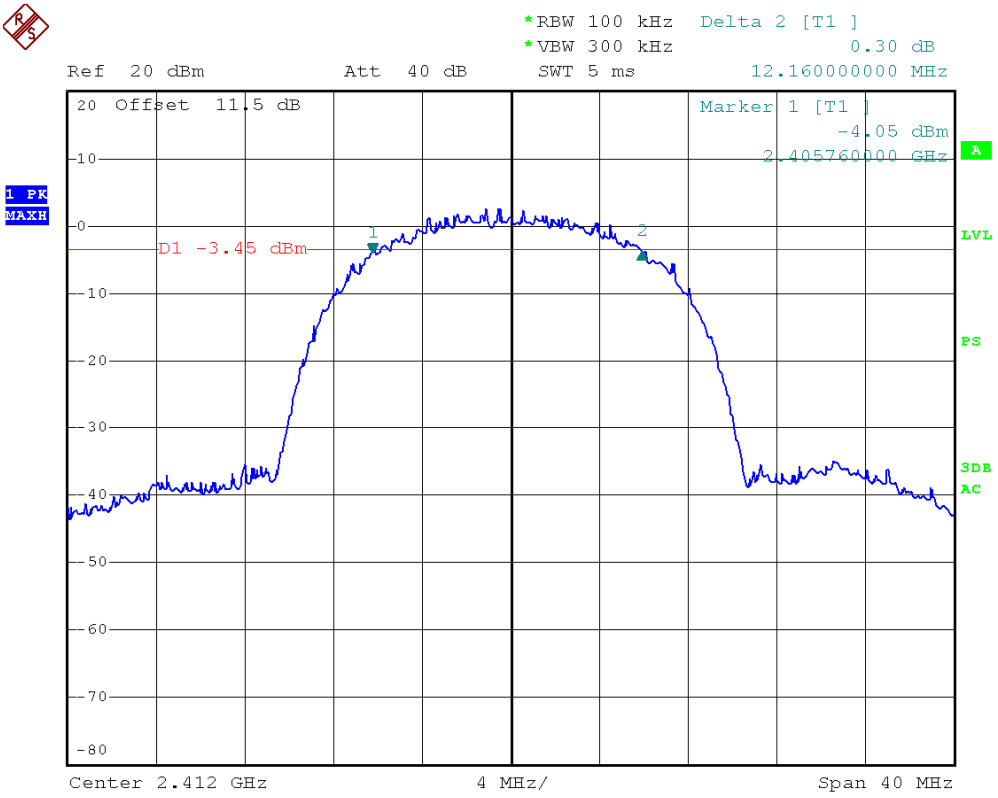


7.4 TEST RESULTS

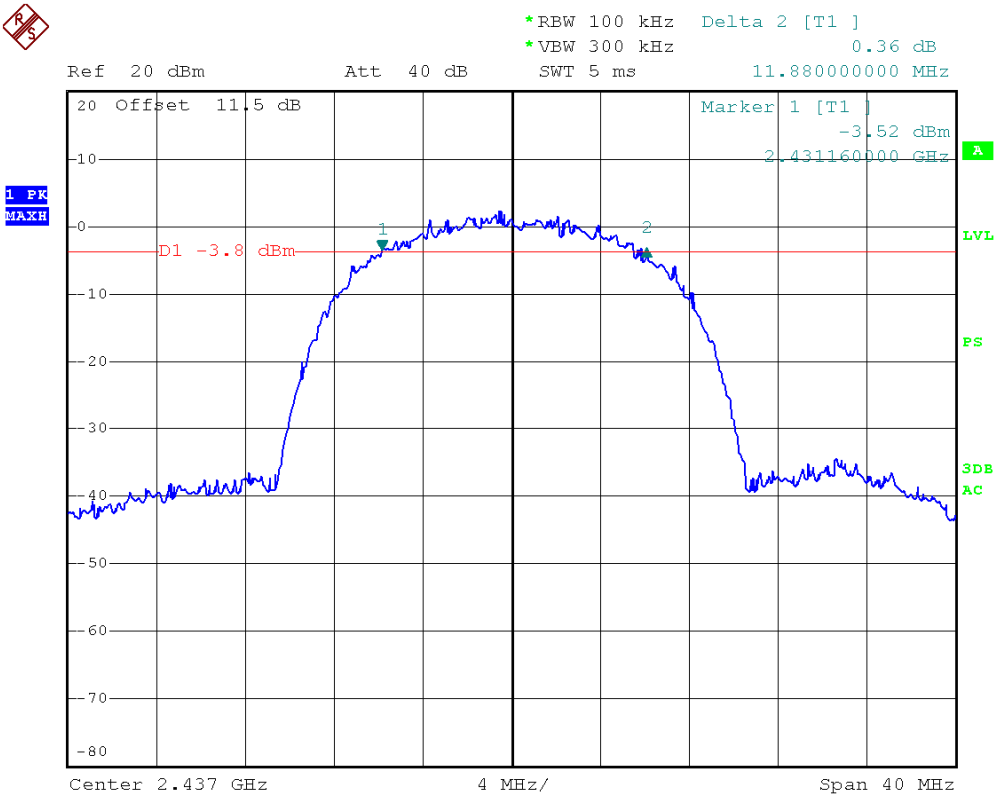
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (MHz)	Limit (kHz)
802.11b Mode				
Low Channel	2412	11	12.16	＞500
Middle Channel	2437	11	11.88	＞500
High Channel	2462	11	11.84	＞500

802.11b mode:

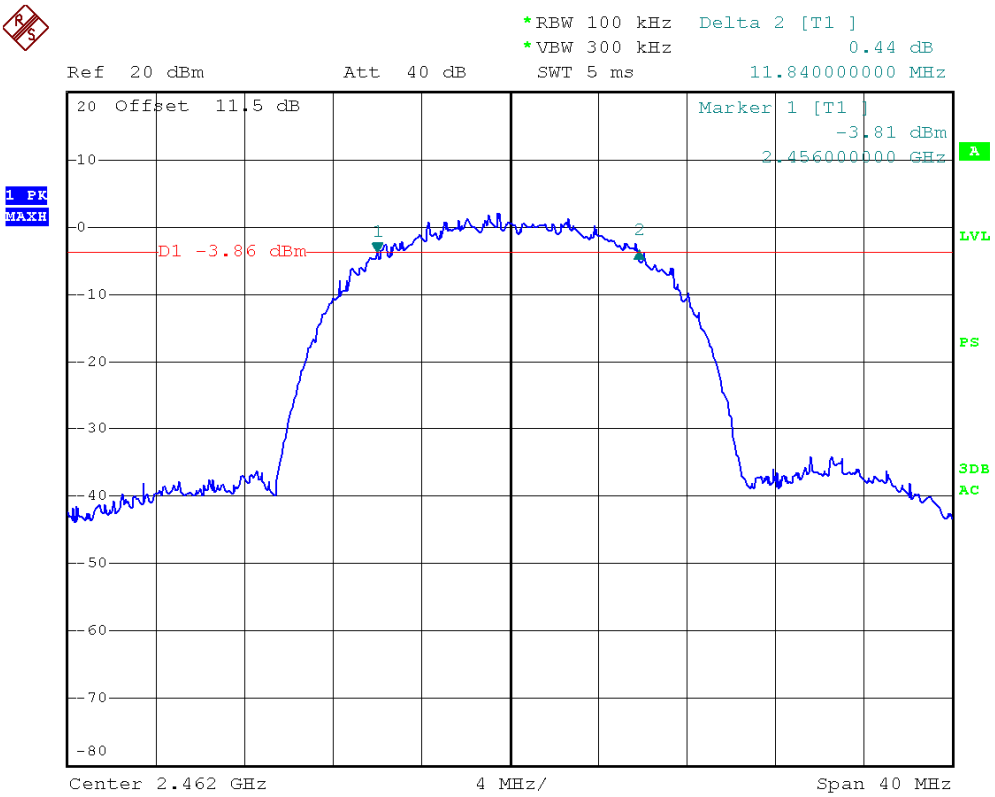
Channel 2412MHz



Channel 2437MHz



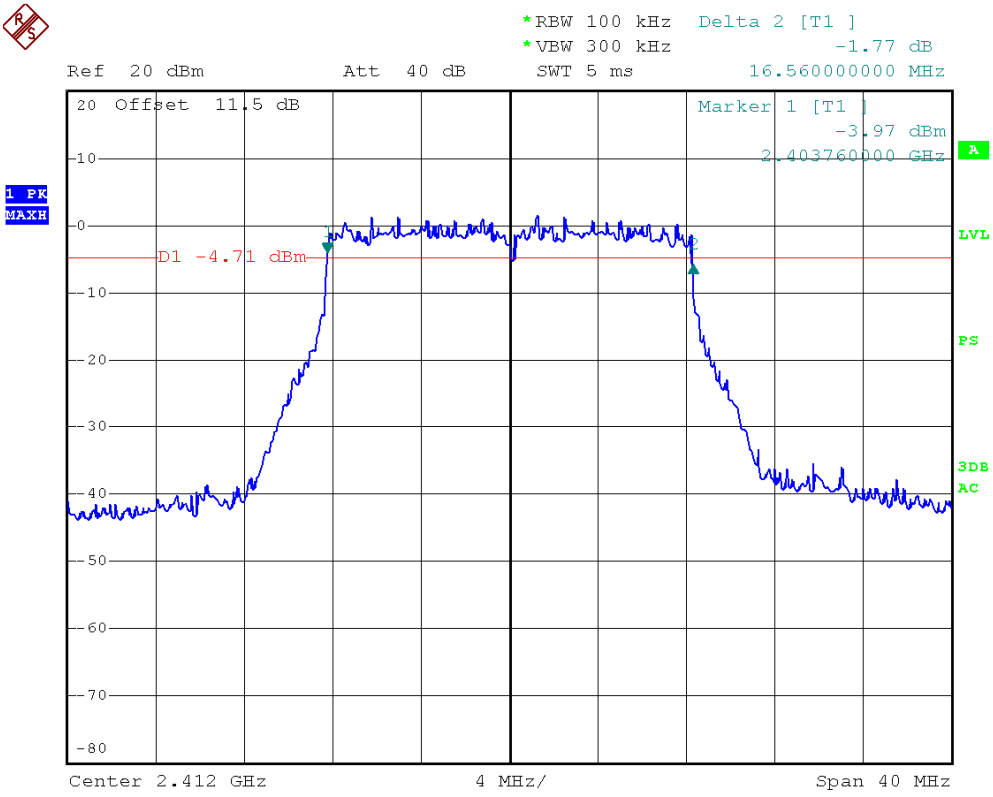
Channel 2462MHz



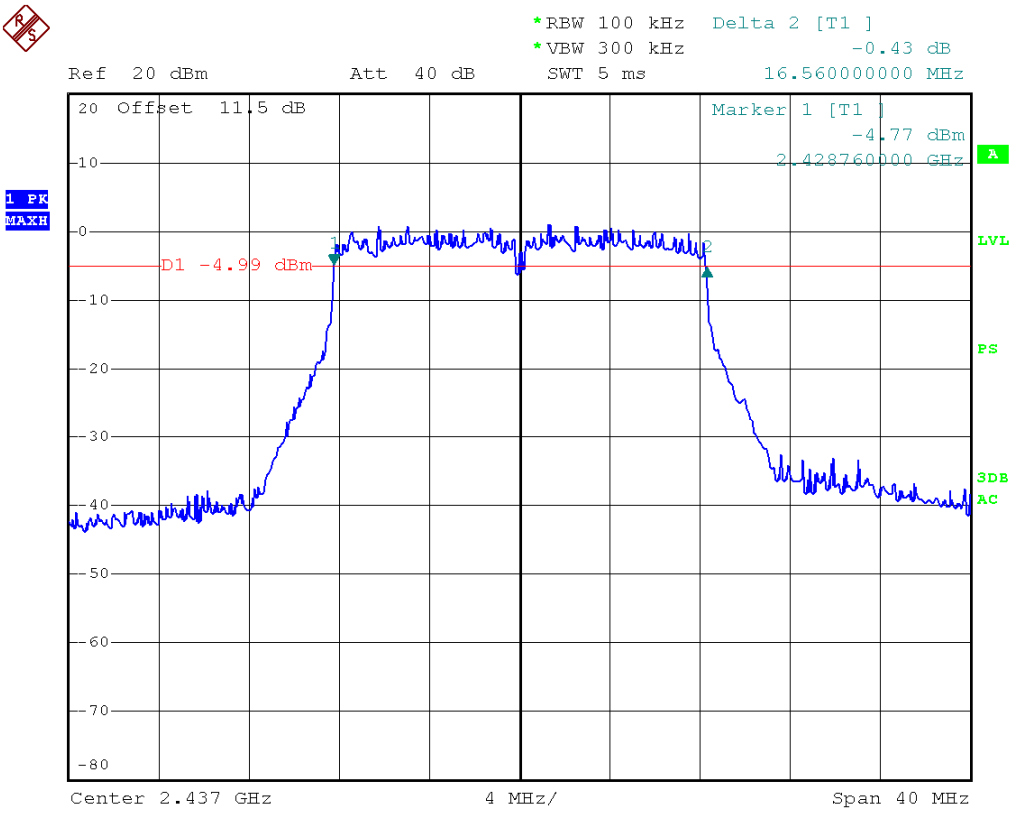
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (MHz)	Limit (kHz)
802.11g Mode				
Low Channel	2412	54	16.56	＞500
Middle Channel	2437	54	16.56	＞500
High Channel	2462	54	16.64	＞500

802.11g mode:

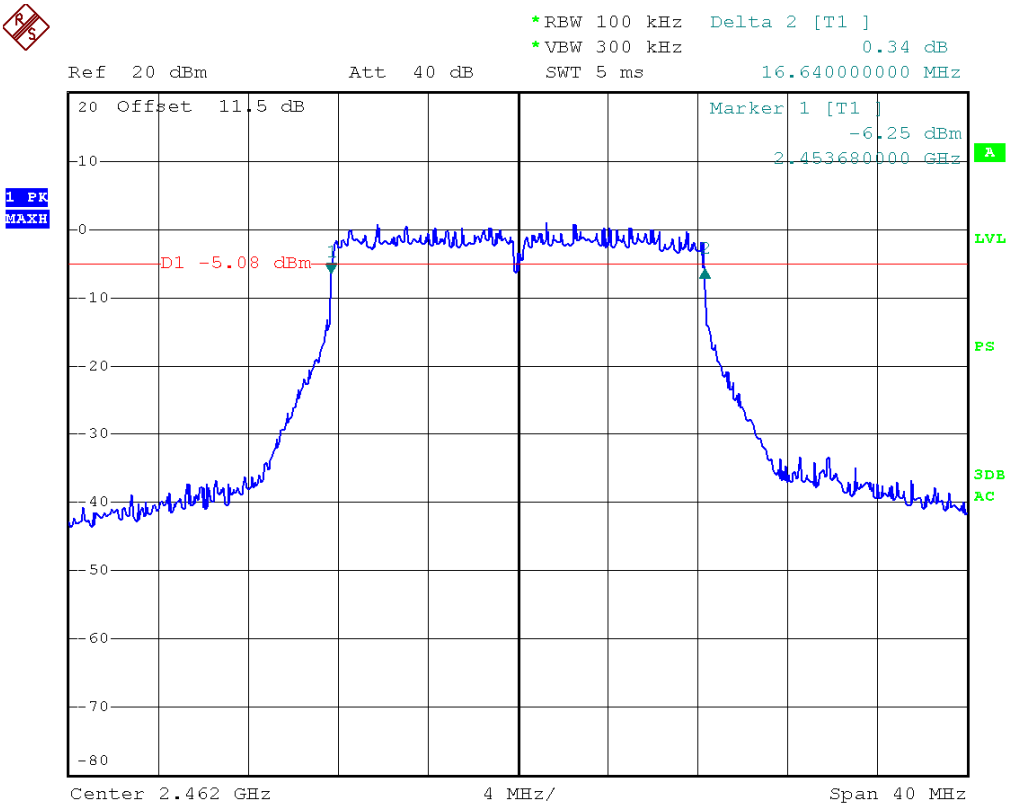
Channel 2412MHz



Channel 2437MHz



Channel 2462MHz



8. MAXIMUM PEAK OUTPUT POWER

8.1 LIMITS

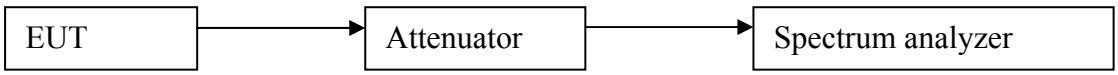
The maximum Peak output power measurement is 1W

8.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v03r01.

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. The spectrum analyzer resolution bandwidth that is ≤EBW. So we test the Maximum Conducted Output Power ——Integrated band power method.
4. Set the analyzer span≥ 1.5 x DTS bandwidth. Set the RBW = 1 MHz. Set the VBW ≥ 3 MHz. Sweep time = auto couple. Detector = peak. Allow trace to fully stabilize.

8.3 TEST SETUP



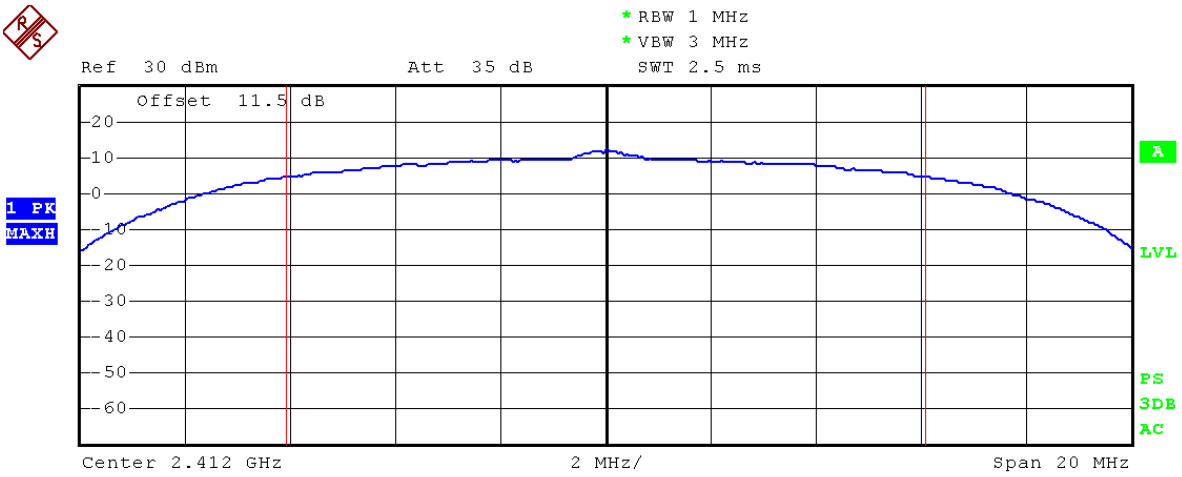
8.4 TEST RESULTS

802.11b Mode:

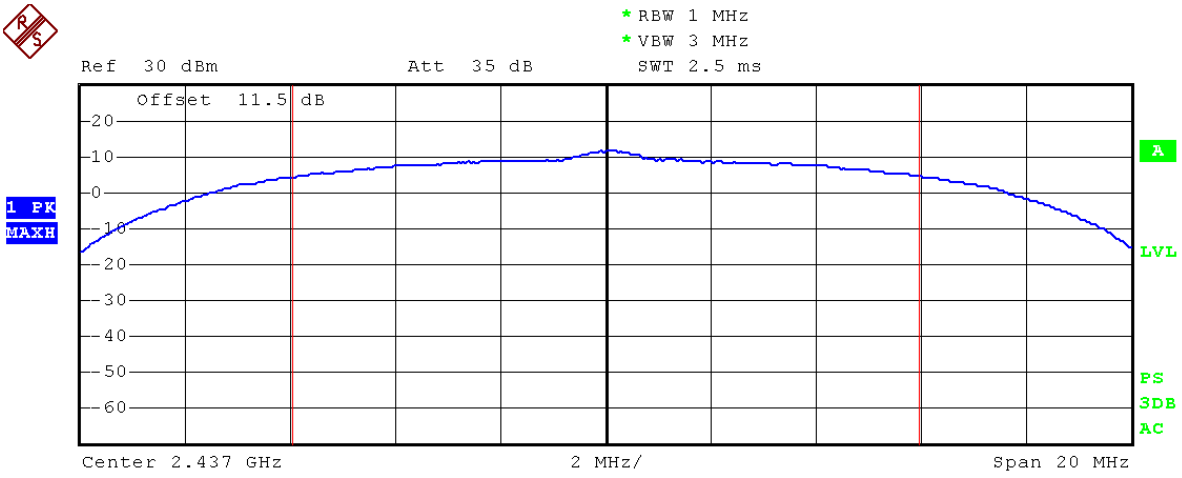
Channel No.	Frequency (MHz)	Mode	Data Rate	Measured Channel Power (dBm)	Limit	Result
1	2412	802.11b	1Mbps	18.65	1W (30dBm)	Pass
6	2437			18.16		Pass
11	2462			18.14		Pass
1	2412		2Mps	18.68		Pass
6	2437			18.21		Pass
11	2462			18.15		Pass
1	2412		5.5Mbps	18.56		Pass
6	2437			18.34		Pass
11	2462			18.12		Pass
1	2412		11Mbps	18.71		Pass
6	2437			18.38		Pass
11	2462			18.22		Pass

802.11b mode: 11Mbps

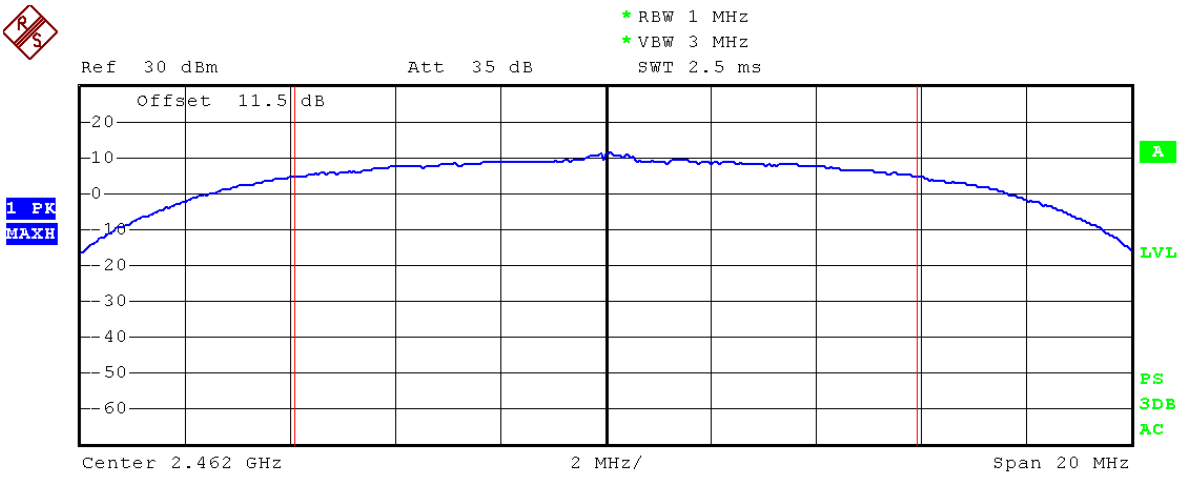
Channel 2412MHz



Channel 2437MHz



Channel 2462MHz

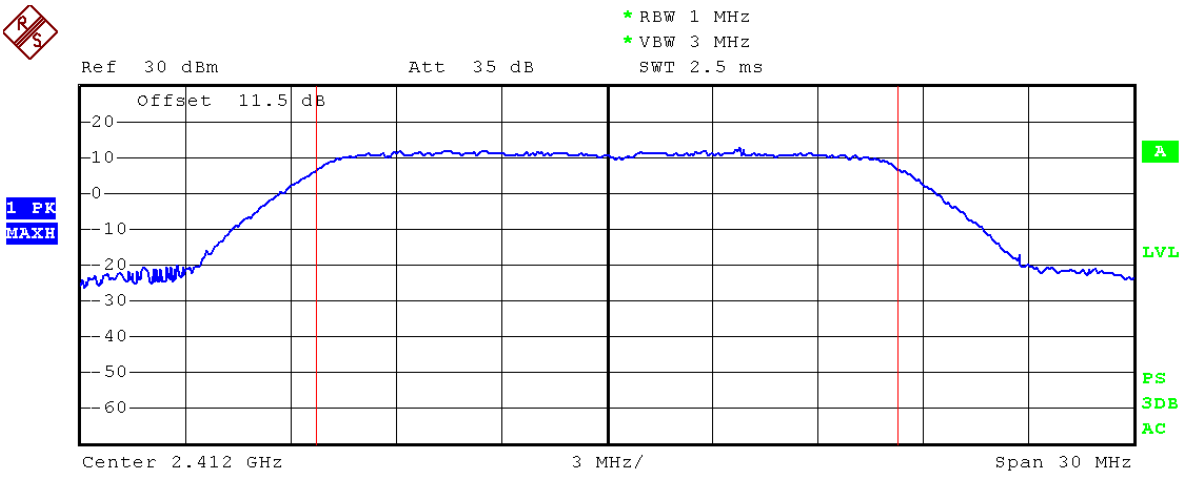


802.11g Mode:

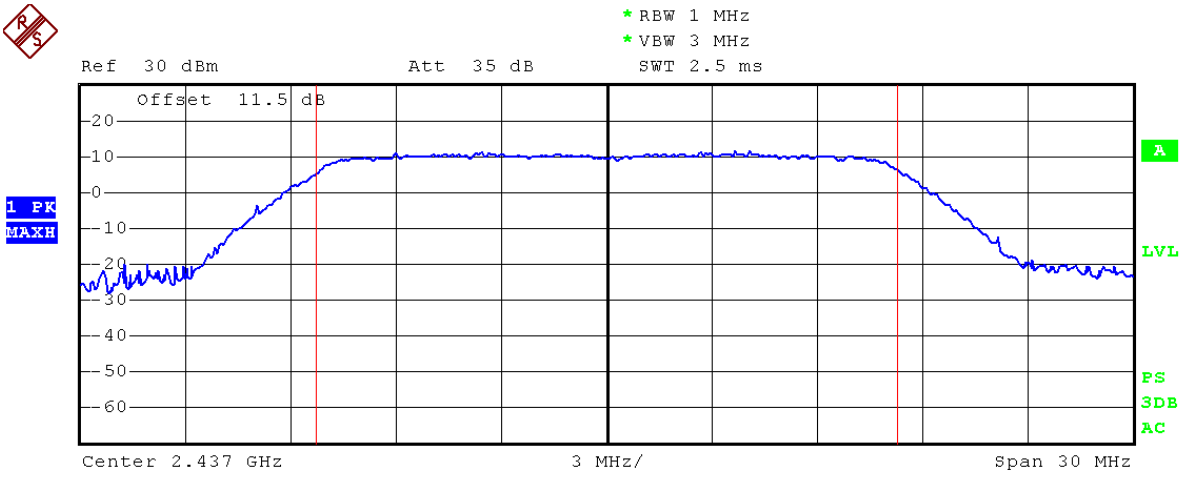
Channel No.	Frequency (MHz)	Mode	Data Rate	Measured Channel Power (dBm)	Limit	Result
1	2412	802.11g	6Mbps	22.12	1W (30dBm)	Pass
6	2437			21.35		Pass
11	2462			21.39		Pass
1	2412		9Mbps	22.13		Pass
6	2437			21.31		Pass
11	2462			21.51		Pass
1	2412		12Mbps	22.18		Pass
6	2437			21.37		Pass
11	2462			21.45		Pass
1	2412		18Mbps	22.21		Pass
6	2437			21.41		Pass
11	2462			21.47		Pass
1	2412		24Mbps	22.19		Pass
6	2437			21.35		Pass
11	2462			21.44		Pass
1	2412		36Mbps	22.13		Pass
6	2437			21.43		Pass
11	2462			21.31		Pass
1	2412		48Mbps	22.16		Pass
6	2437			21.34		Pass
11	2462			21.49		Pass
1	2412		54Mbps	22.22		Pass
6	2437			21.45		Pass
11	2462			21.55		Pass

802.11g mode: 54Mbps

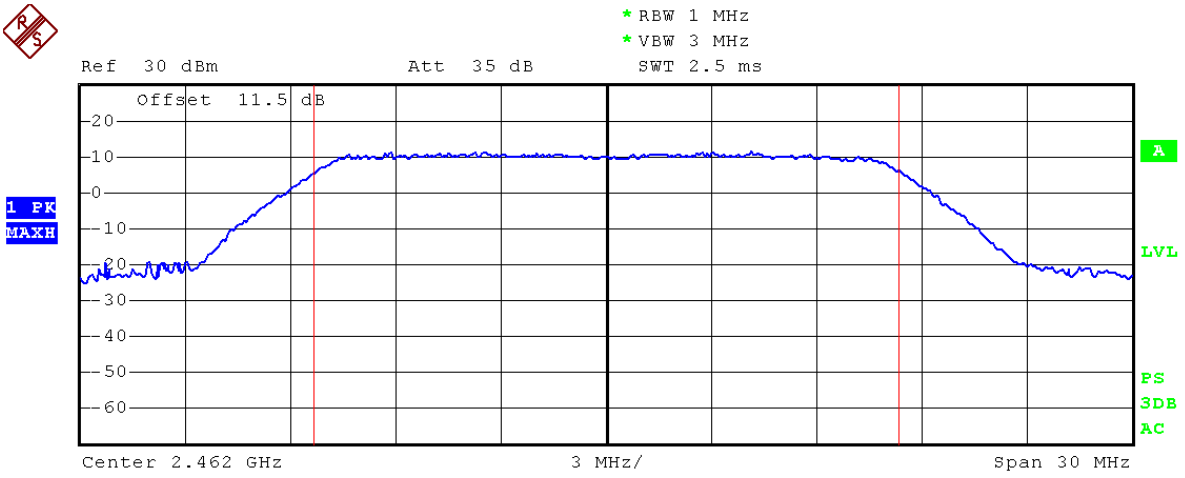
Channel 2412MHz



Channel 2437MHz



Channel 2462MHz



9. POWER SPECTRAL DENSITY

9.1 LIMITS

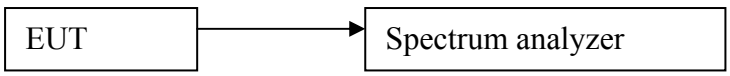
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

9.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v03r01.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the analyzer span to 1.5 times the DTS bandwidth. Set the RBW = 3 kHz. Set the VBW ≥3 RBW. Detector = peak. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
4. Repeat above procedures until all frequencies measured were complete.

9.3 TEST SETUP

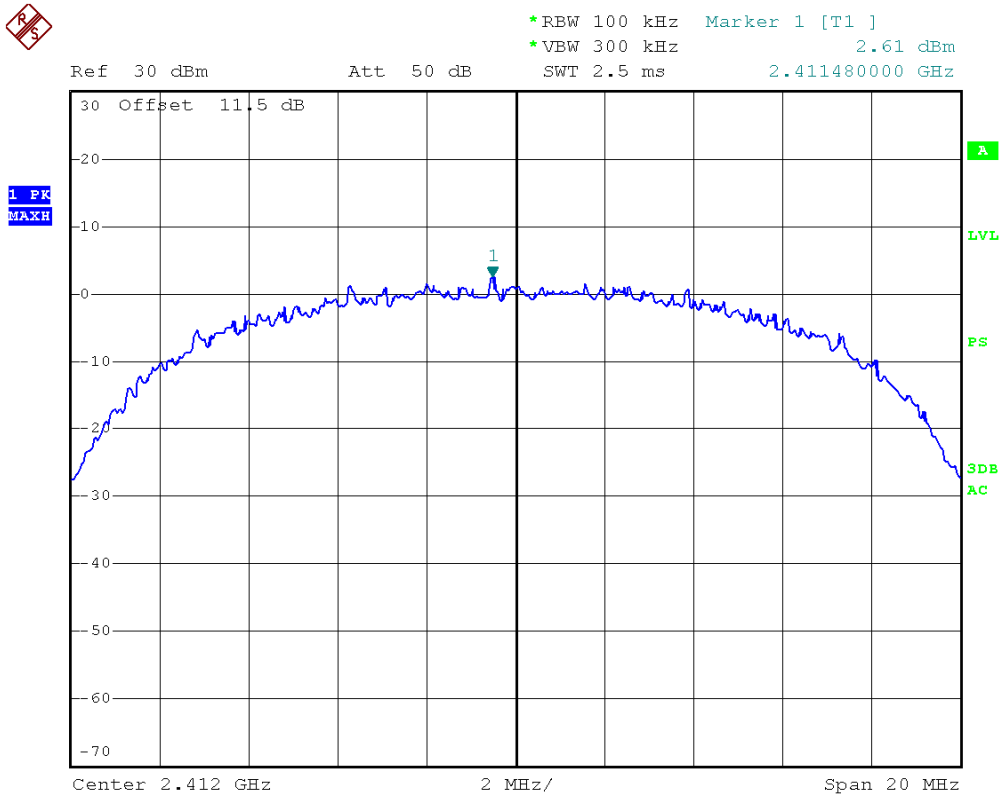


9.4 TEST RESULTS

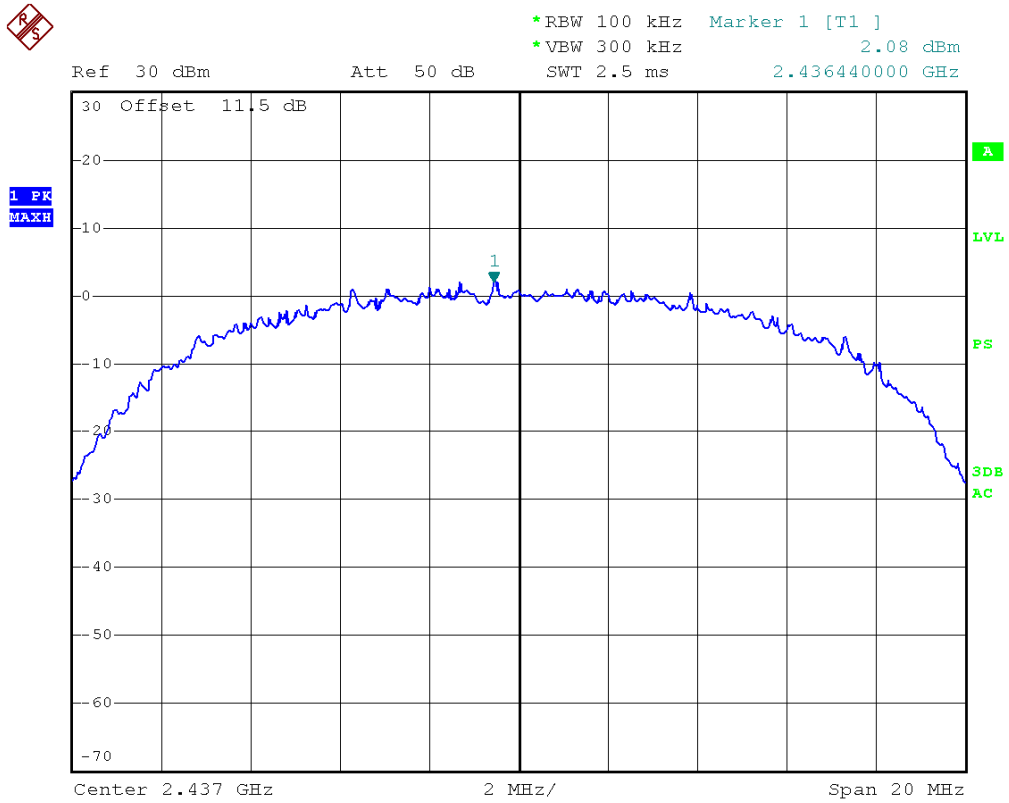
802.11b mode:

Channel No.	Frequency (MHz)	Mode	Data Rate	PSD (dBm/3KHz)	Factor （100kHz/3kHz）(dB)	PSD (dBm/3KHz)	Limit	Result
1	2412	802.11b	11Mbps	2.61	-15.2	-12.59	8dBm/3KHz	Pass
6	2437			2.08	-15.2	-13.12		Pass
11	2462			2.30	-15.2	-12.90		Pass

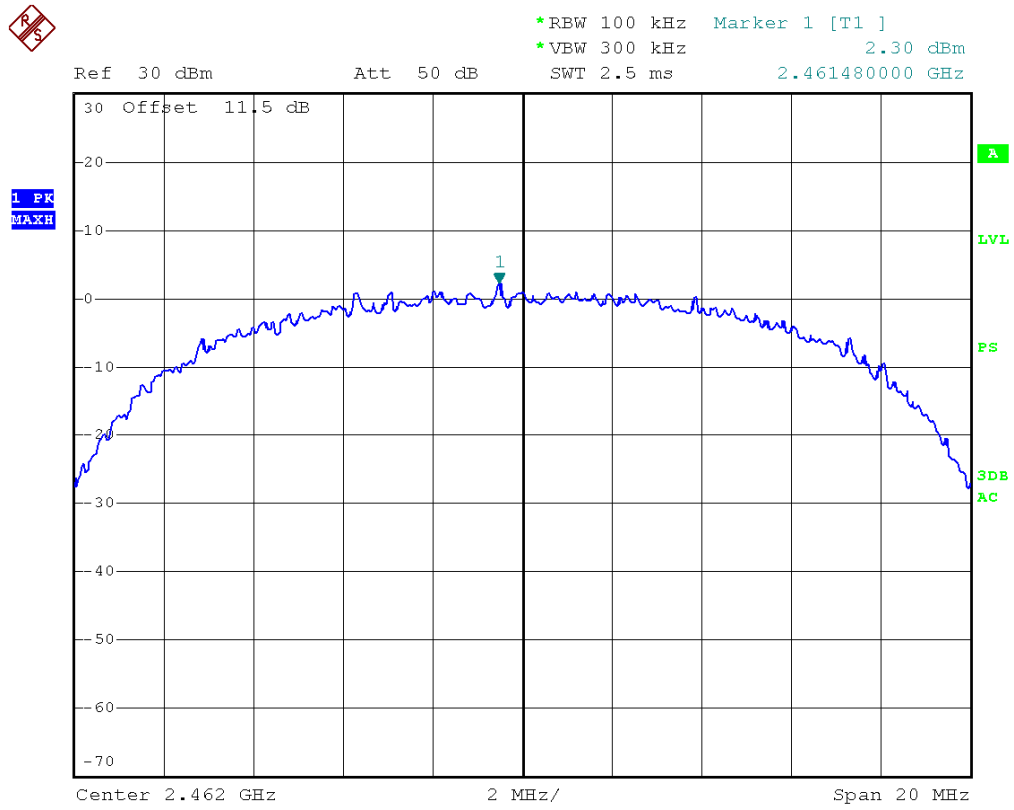
802.11b mode:
Channel 2412MHz



Channel 2437MHz



Channel 2462MHz

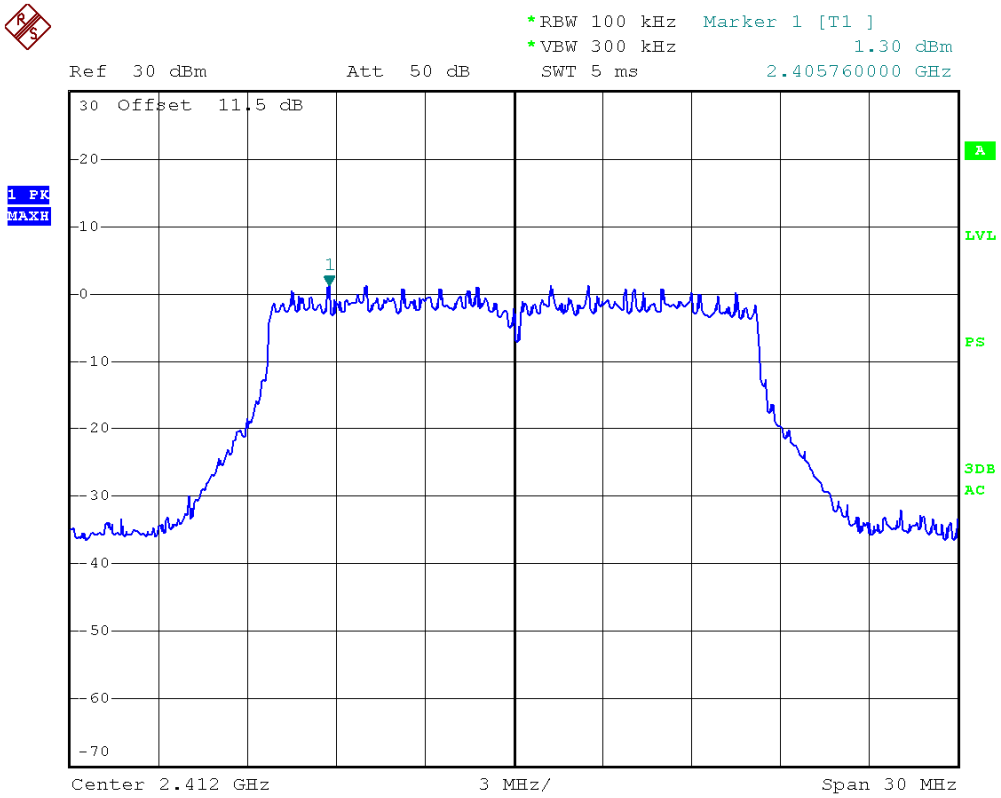


802.11g mode:

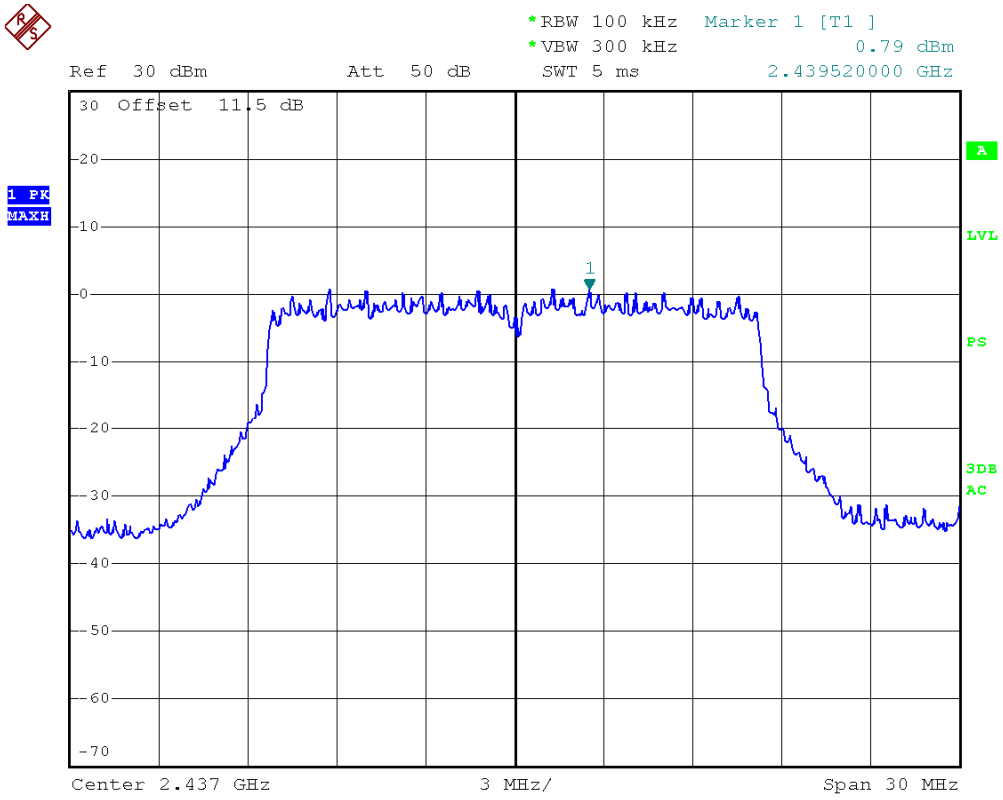
Channel No.	Frequency (MHz)	Mode	Data Rate	PSD (dBm/3KHz)	Factor （100kHz/3kHz）(dB)	PSD (dBm/3KHz)	Limit	Result
1	2412	802.11g	54Mbps	1.30	-15.2	-13.90	8dBm/3KHz	Pass
6	2437			0.79	-15.2	-14.41		Pass
11	2462			0.87	-15.2	-14.33		Pass

802.11g mode:

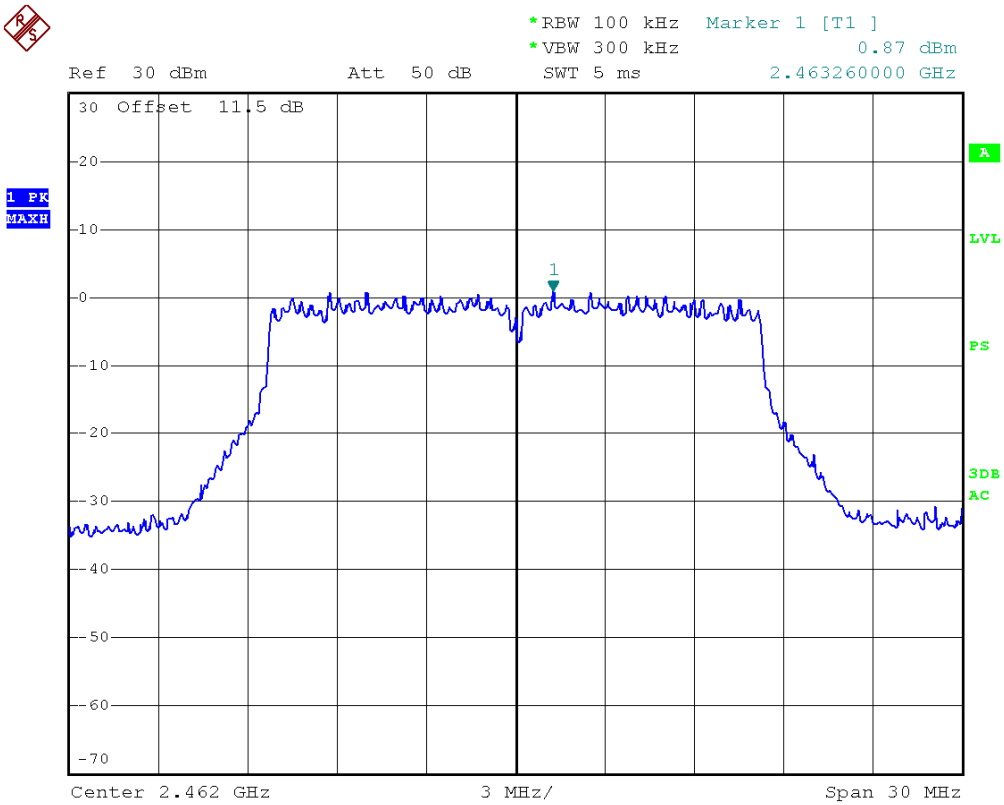
Channel 2412MHz



Channel 2437MHz



Channel 2462MHz



10. EMISSIONS IN NON-REST RICTED FREQUENCY BANDS

10.1 LIMITS

FCC 15.247(d) & 15.209

10.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v03r01.

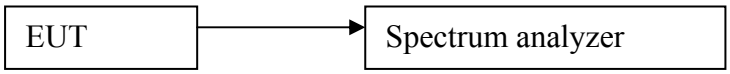
Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.

1. Reference level measurement

Below 1GHz Set the spectrum analyzer: RBW =100KHz VBW >= 3*RBW, Set the span to ⩾ 1.5 times the DTS bandwidth. Sweep = auto; Detector Function = peak. Trace = Max-hold. Allow the trace to stabilize.

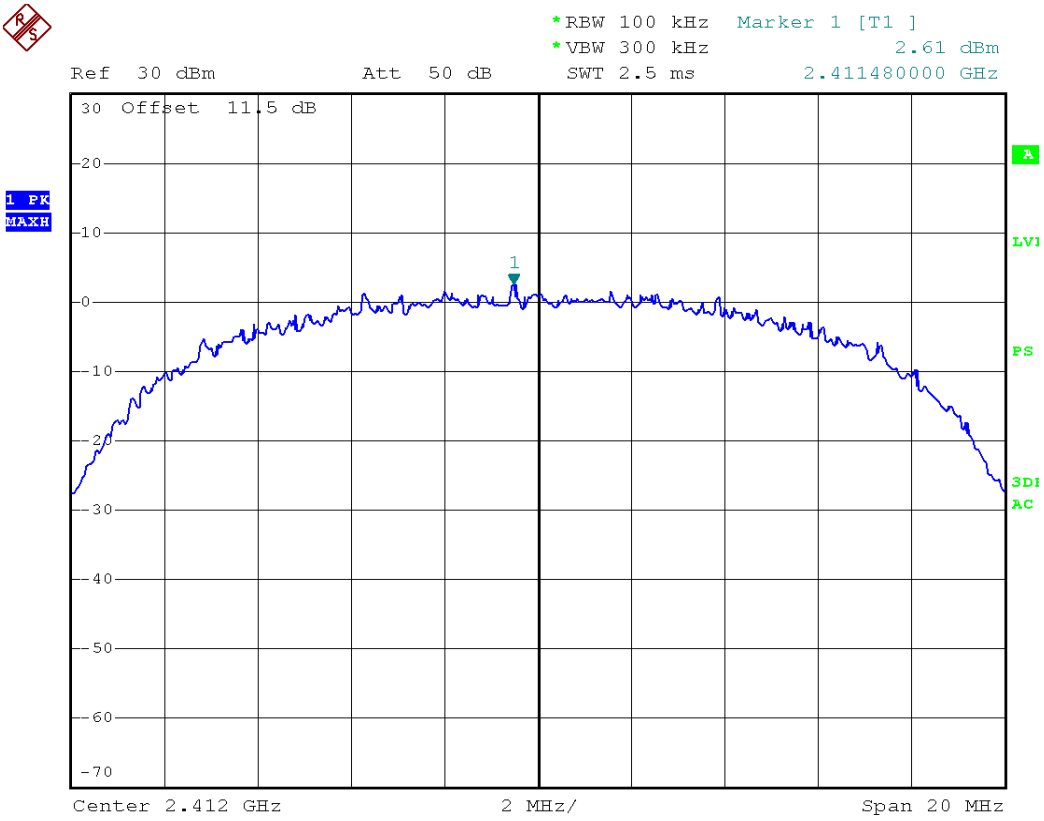
2. Set the spectrum analyzer: RBW =100KHz VBW >= 3*RBW, Set the span to ⩾ 1.5 times the DTS bandwidth. Sweep = auto; Detector Function = peak. Trace = Max-hold. Allow the trace to stabilize.

10.3 TEST SETUP

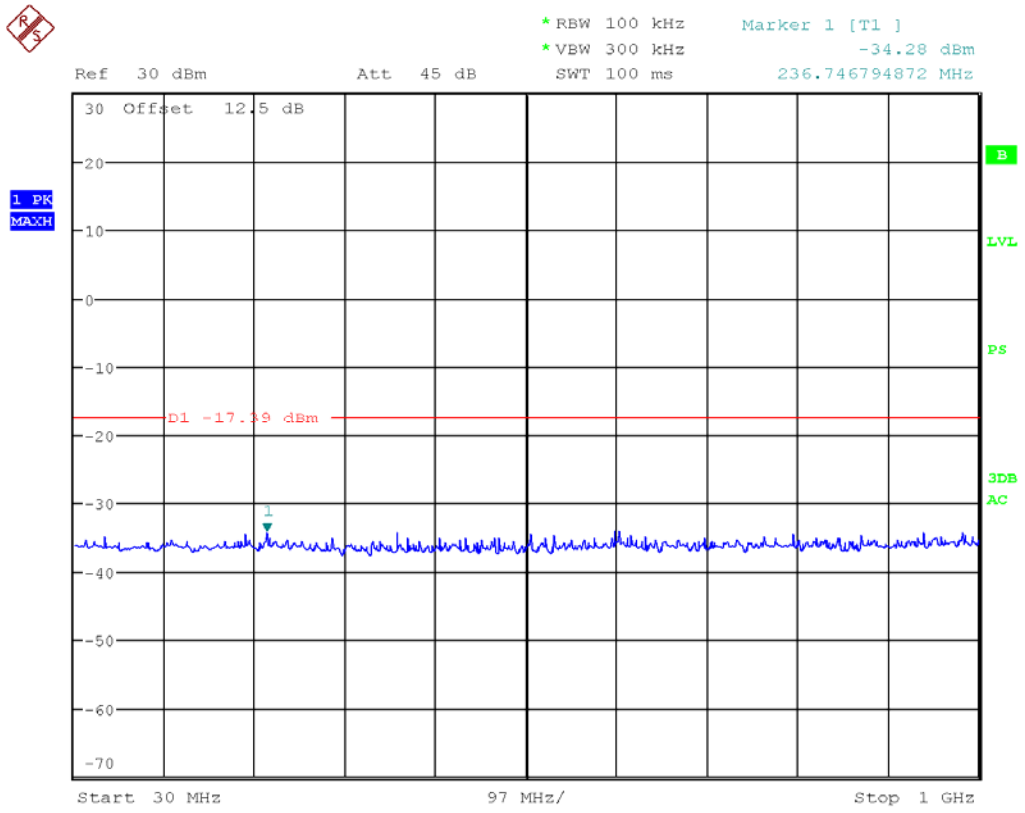


10.4 TEST RESULTS

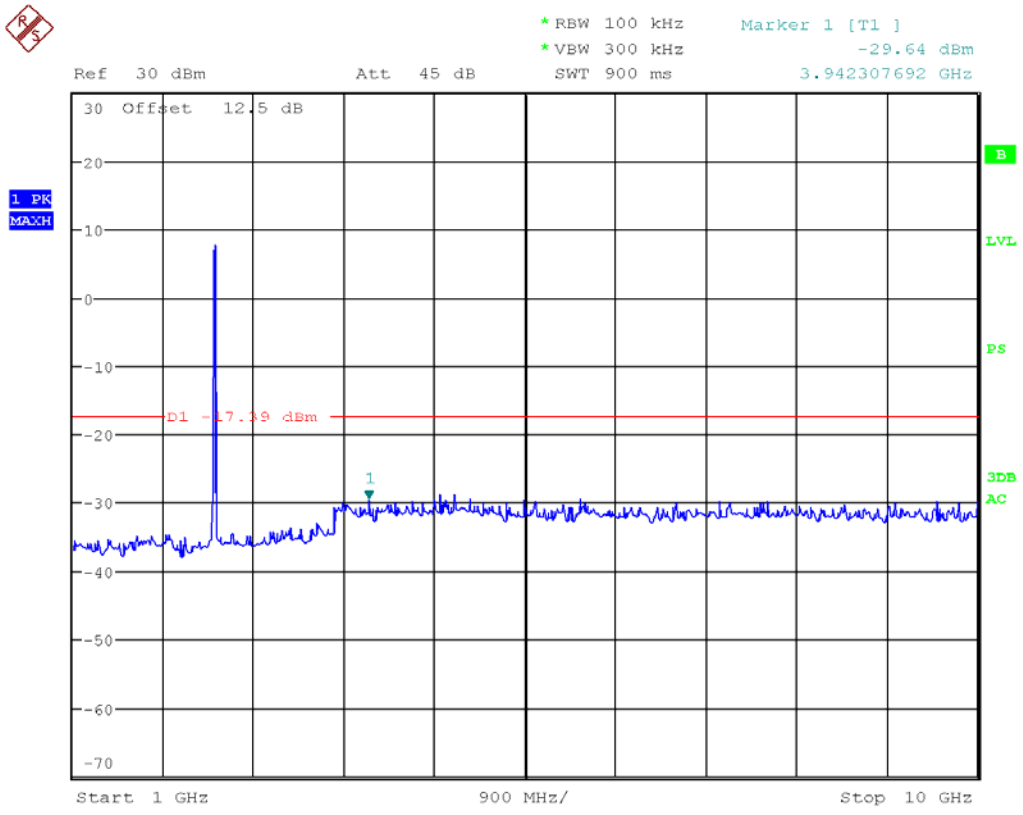
802.11b mode:
Channel 2412MHz
reference level：



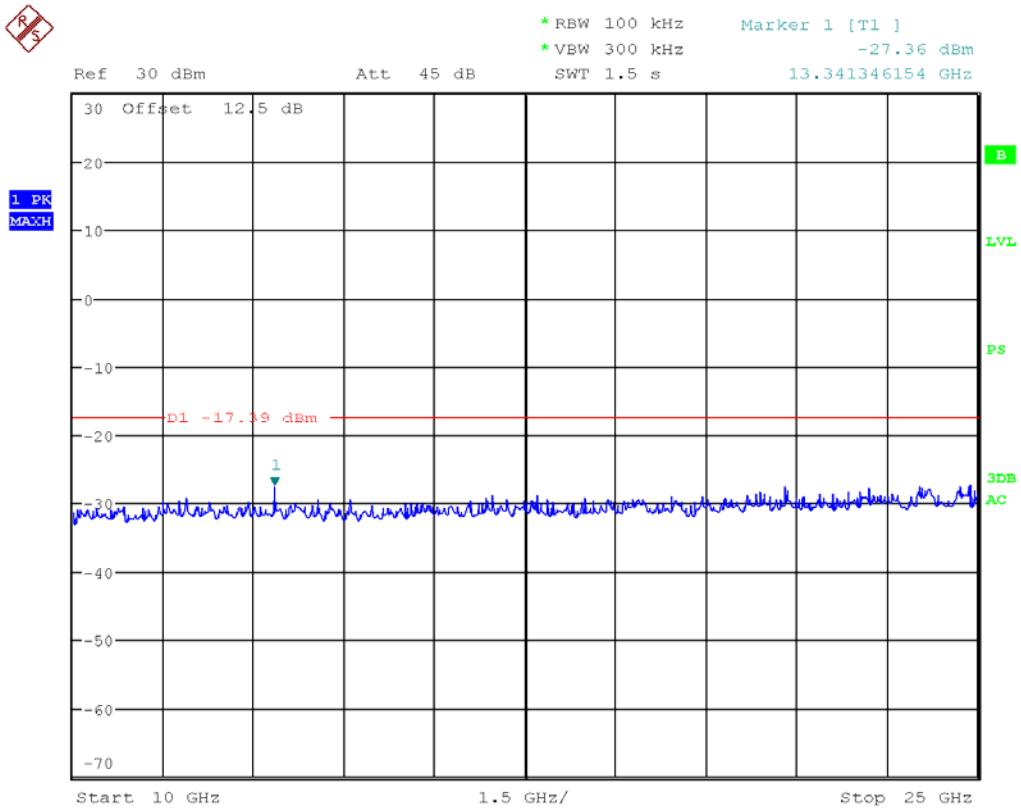
30M-1G


RBW 100 kHz
VBW 300 kHz
SWT 100 ms
Marker 1 [T1]
-34.28 dBm
236.746794872 MHz
Ref 30 dBm
Att 45 dB
Offset 12.5 dB
1 PK
MAXH
D1 -17.39 dBm
B
LVL
PS
3DB
AC
Start 30 MHz
97 MHz/
Stop 1 GHz

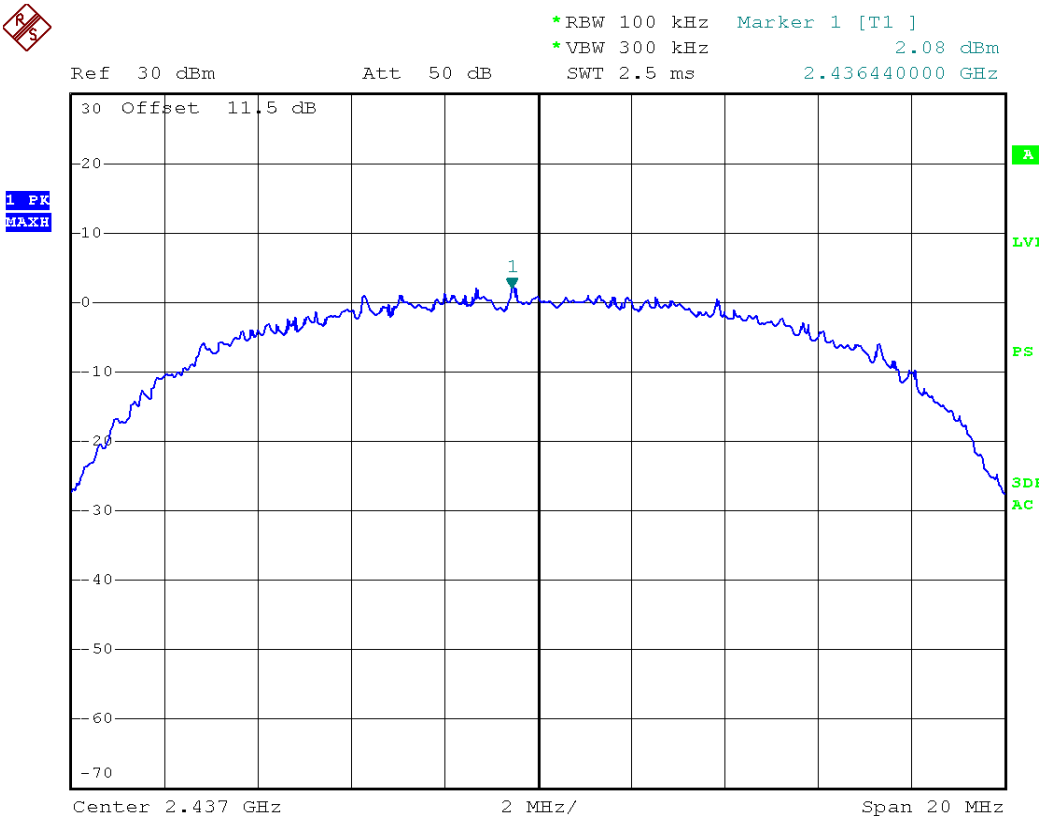
1G-10G


RBW 100 kHz
VBW 300 kHz
SWT 900 ms
Marker 1 [T1]
-29.64 dBm
3.942307692 GHz
Ref 30 dBm
Att 45 dB
Offset 12.5 dB
1 PK
MAXH
D1 -17.39 dBm
B
LVL
PS
3DB
AC
Start 1 GHz
900 MHz/
Stop 10 GHz

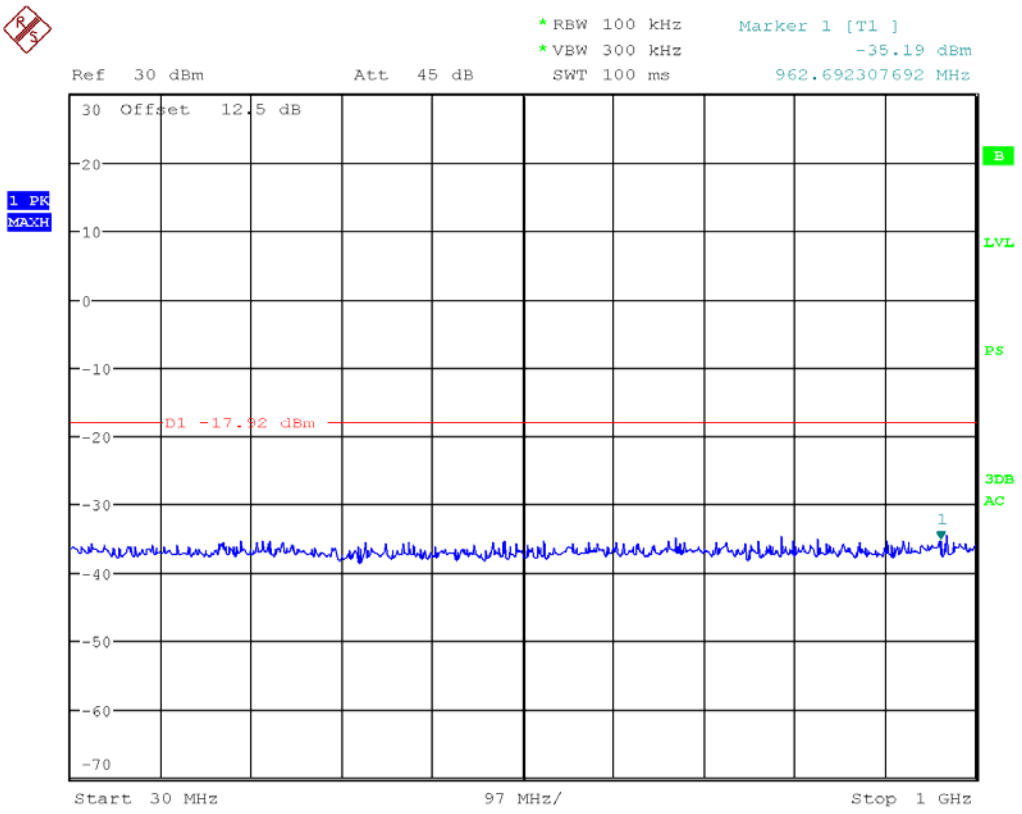
10G-25G



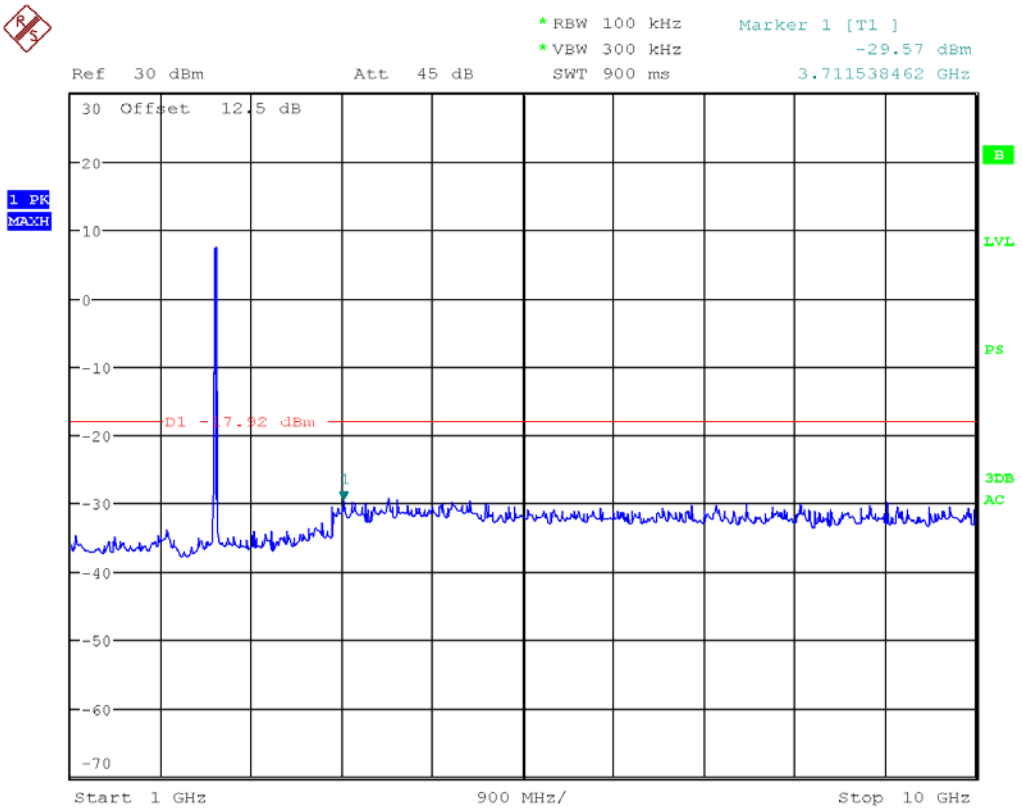
802.11b mode:
Channel 2437MHz
Reference level



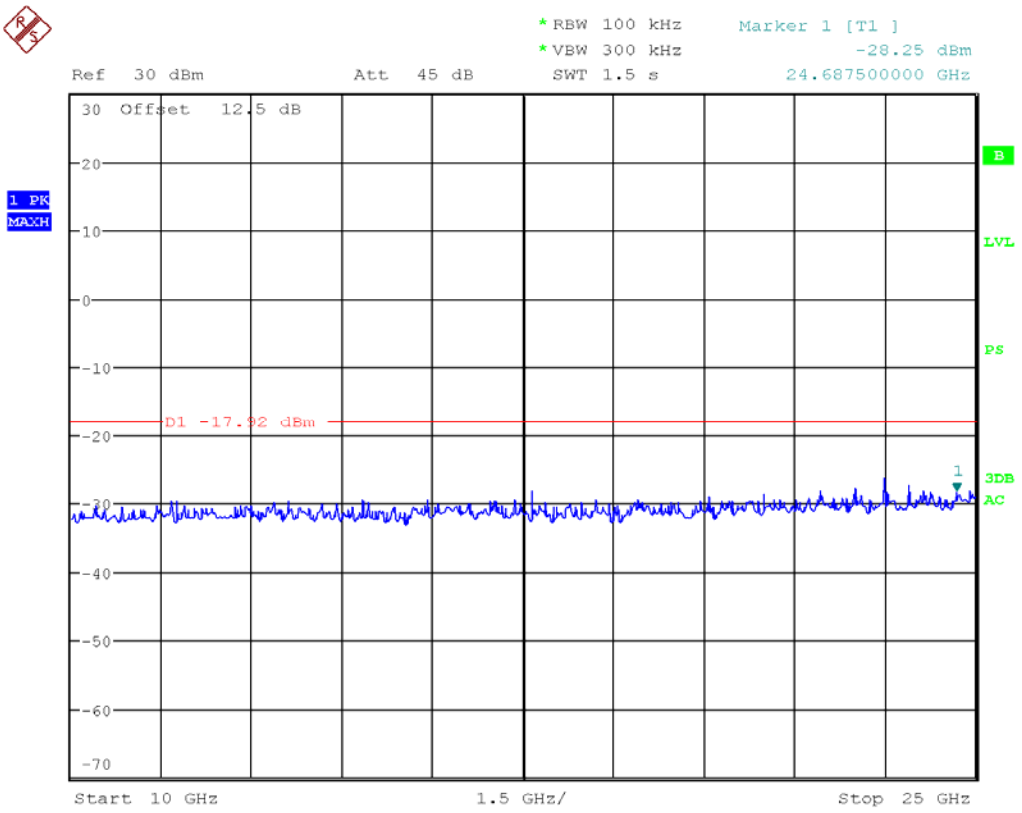
30M-1G


RBW 100 kHz
VBW 300 kHz
SWT 100 ms
Marker 1 [T1]
-35.19 dBm
962.692307692 MHz
Ref 30 dBm
Att 45 dB
30 Offset 12.5 dB
1 PK
MAXH
D1 -17.92 dBm
B
LVL
PS
3DB
AC
Start 30 MHz
97 MHz/
Stop 1 GHz

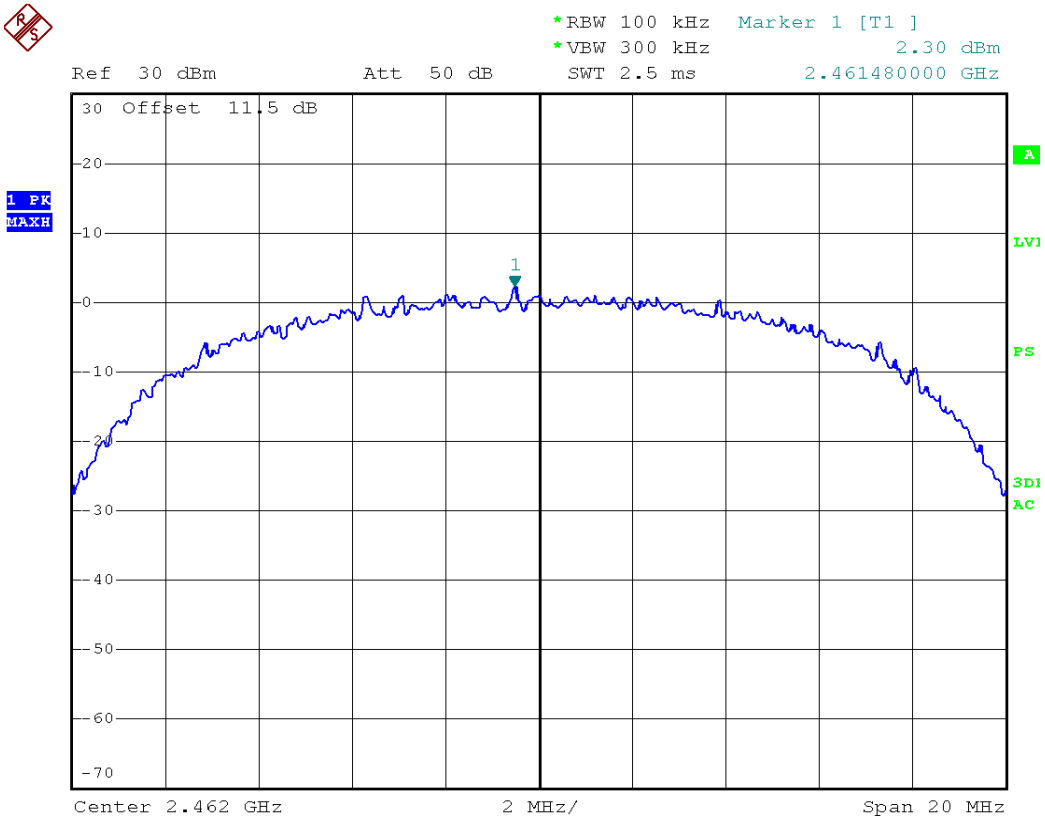
1G-10G


RBW 100 kHz
VBW 300 kHz
SWT 900 ms
Marker 1 [T1]
-29.57 dBm
3.711538462 GHz
Ref 30 dBm
Att 45 dB
30 Offset 12.5 dB
1 PK
MAXH
D1 -17.92 dBm
B
LVL
PS
3DB
AC
Start 1 GHz
900 MHz/
Stop 10 GHz

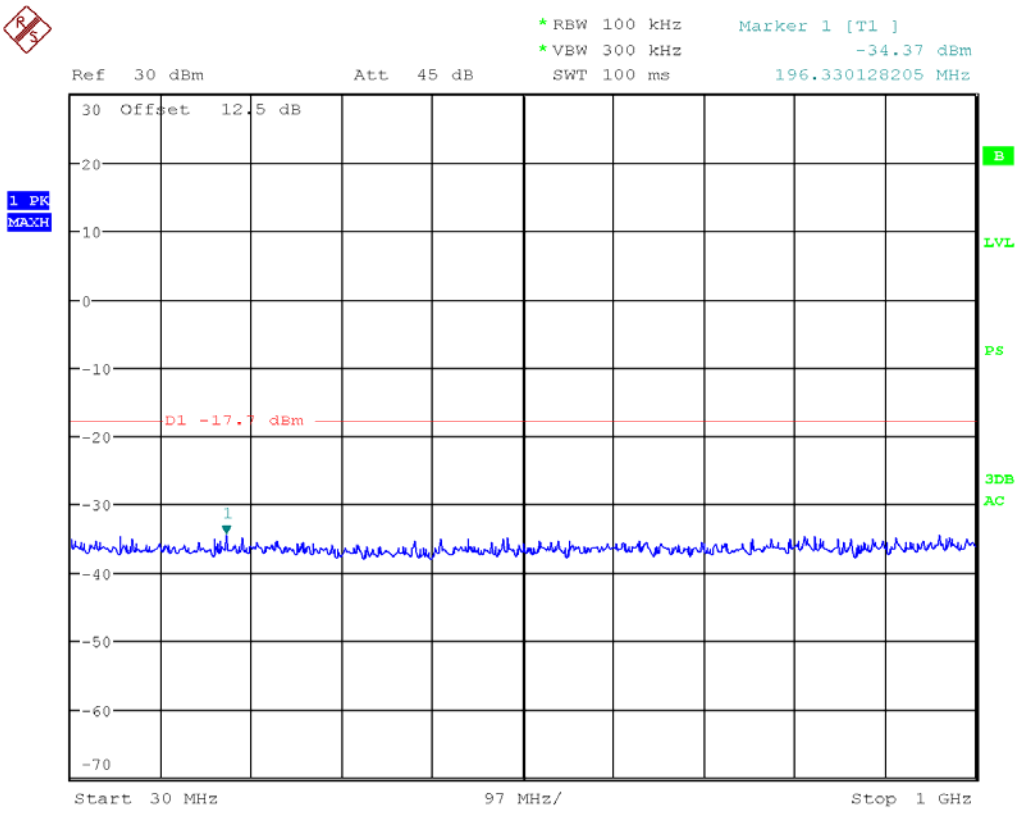
10G-25G



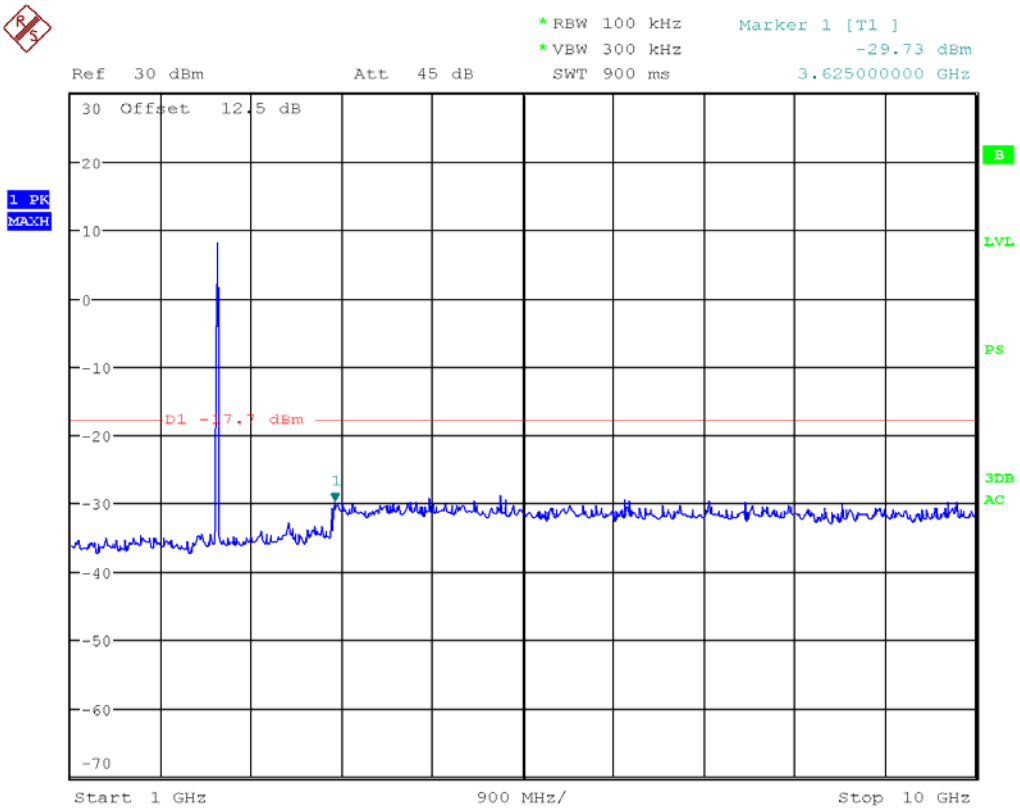
802.11b mode:
Channel 2462MHz
Reference level



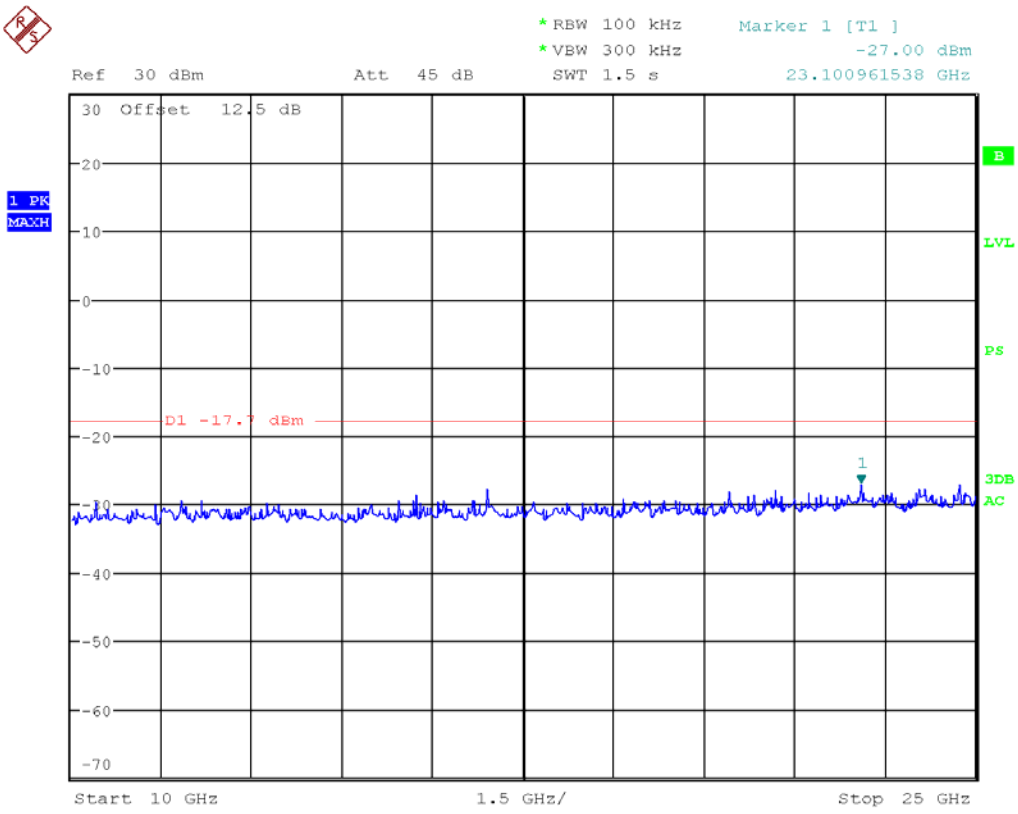
30M-1G



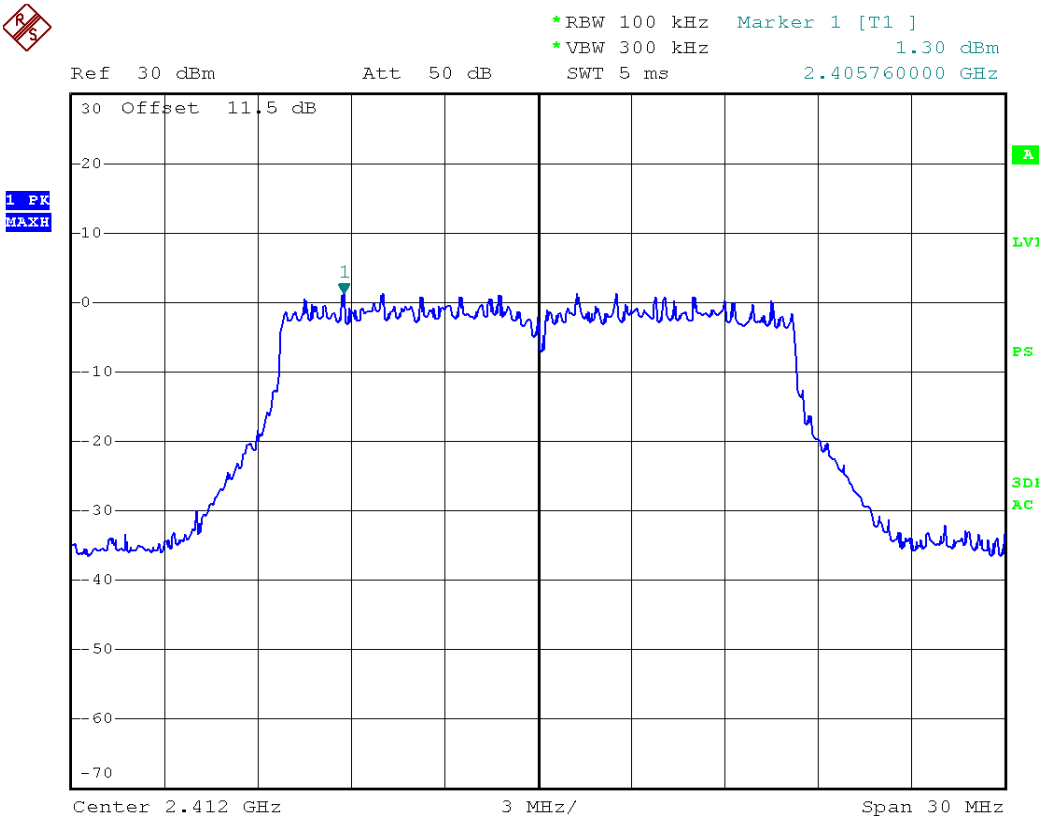
1G-10G



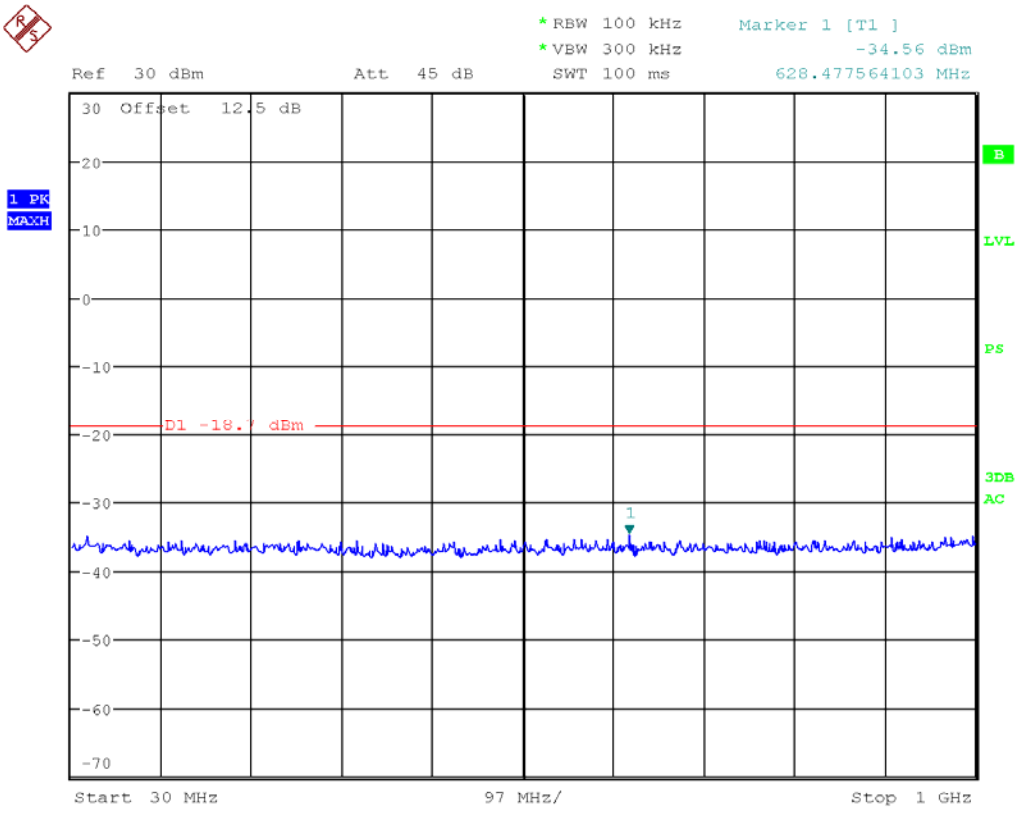
10-25GHz


* RBW 100 kHz
* VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-27.00 dBm
23.100961538 GHz
Ref 30 dBm
Att 45 dB
30 Offset 12.5 dB
1 PK
MAXH
B
LVL
PS
3DB
AC
D1 -17.7 dBm
1
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 10 GHz
1.5 GHz/
Stop 25 GHz

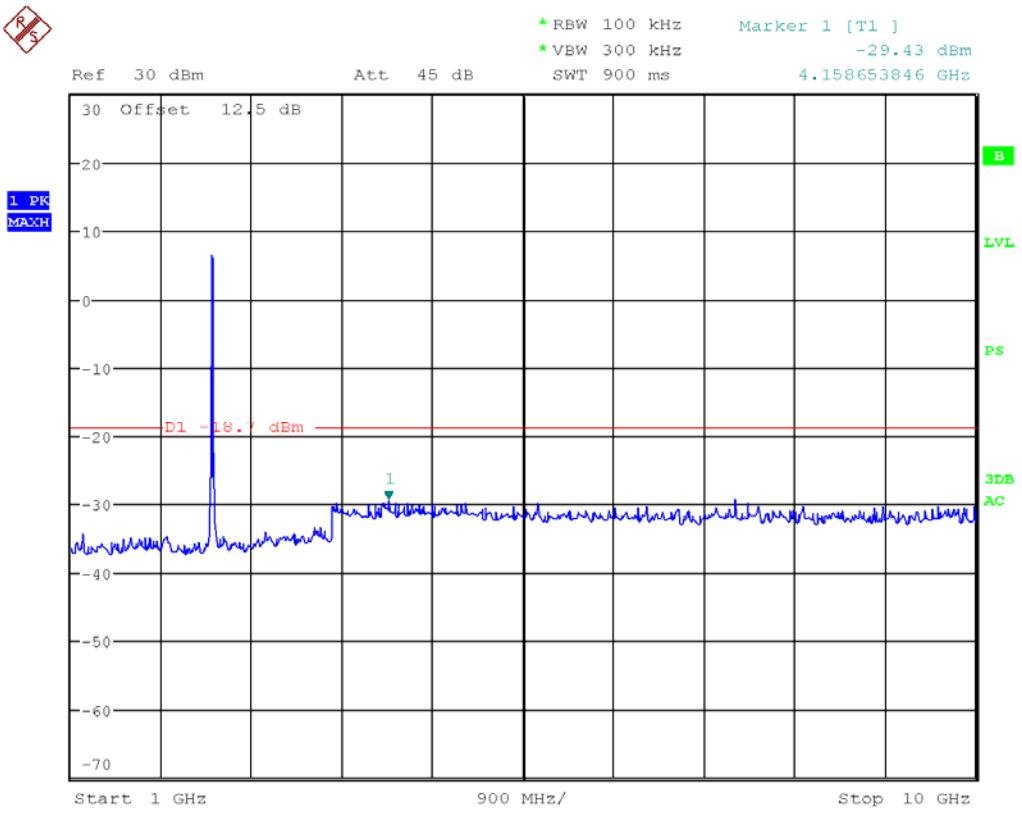
802.11G mode:
Channel 2412MHz
Reference level



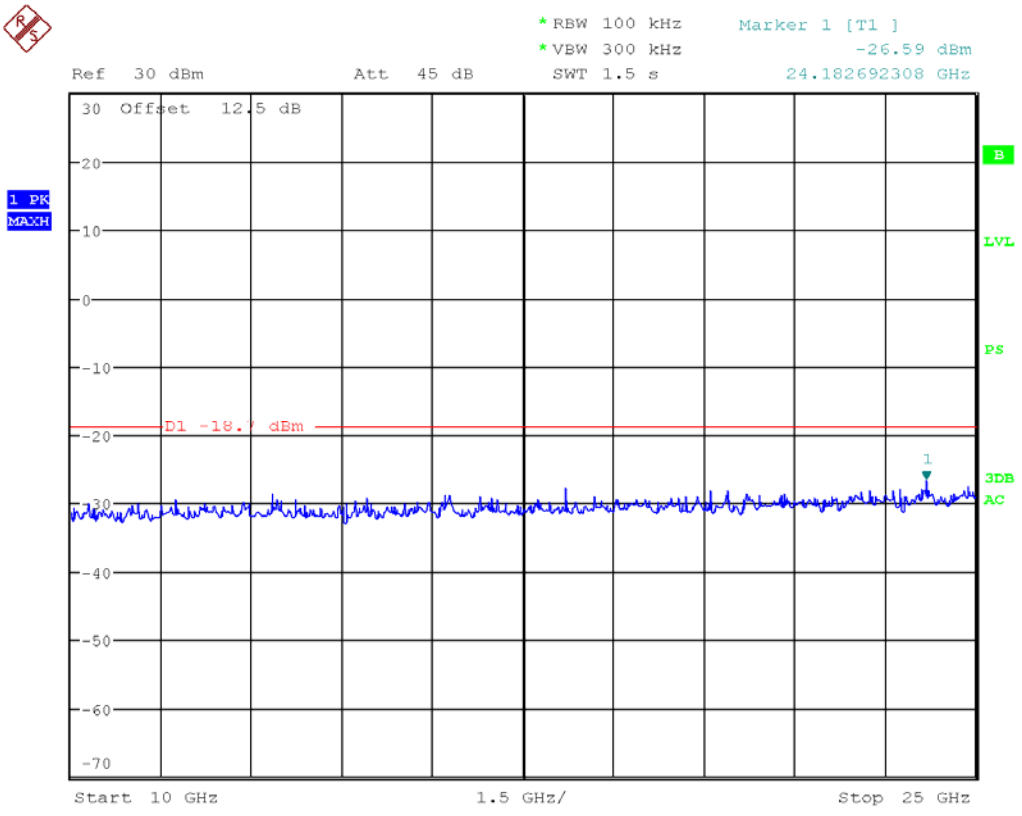
30M-1G



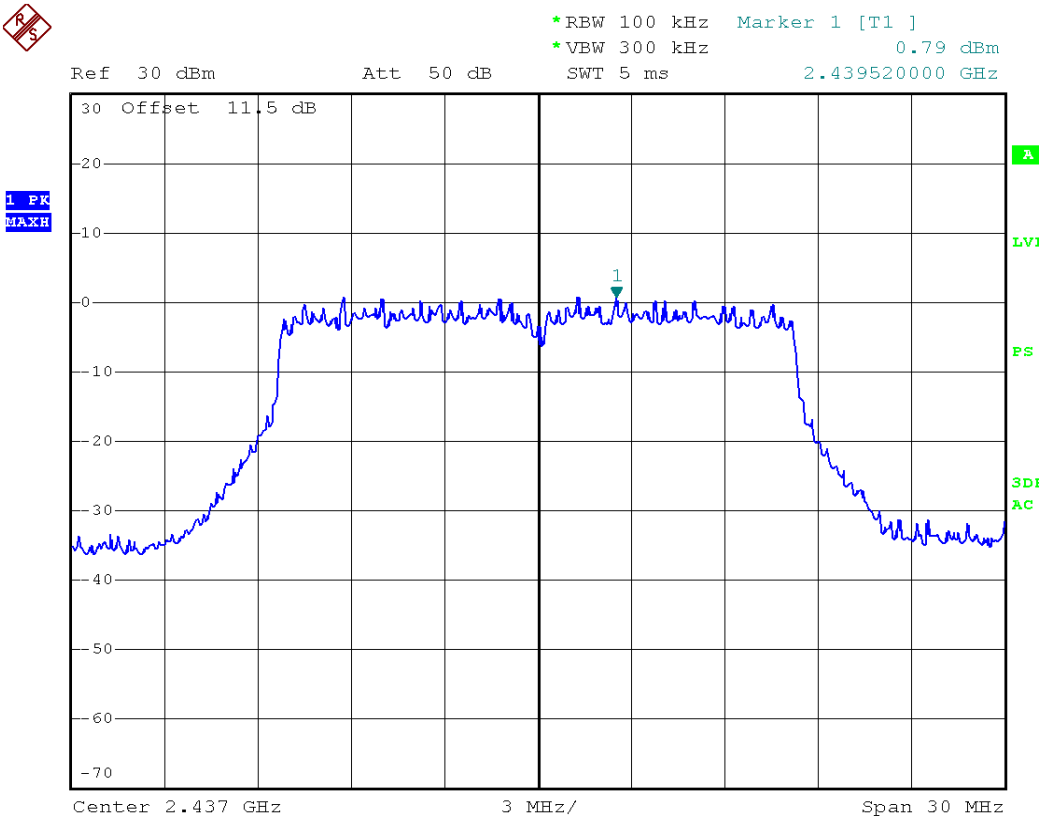
1G-10G


RBW 100 kHz
VBW 300 kHz
SWT 900 ms
Marker 1 [T1]
-29.43 dBm
4.158653846 GHz
Ref 30 dBm
Att 45 dB
30 Offset 12.5 dB
1 PK
MAXH
D1 -18.7 dBm
B
LVL
PS
3DB
AC
Start 1 GHz
900 MHz/
Stop 10 GHz

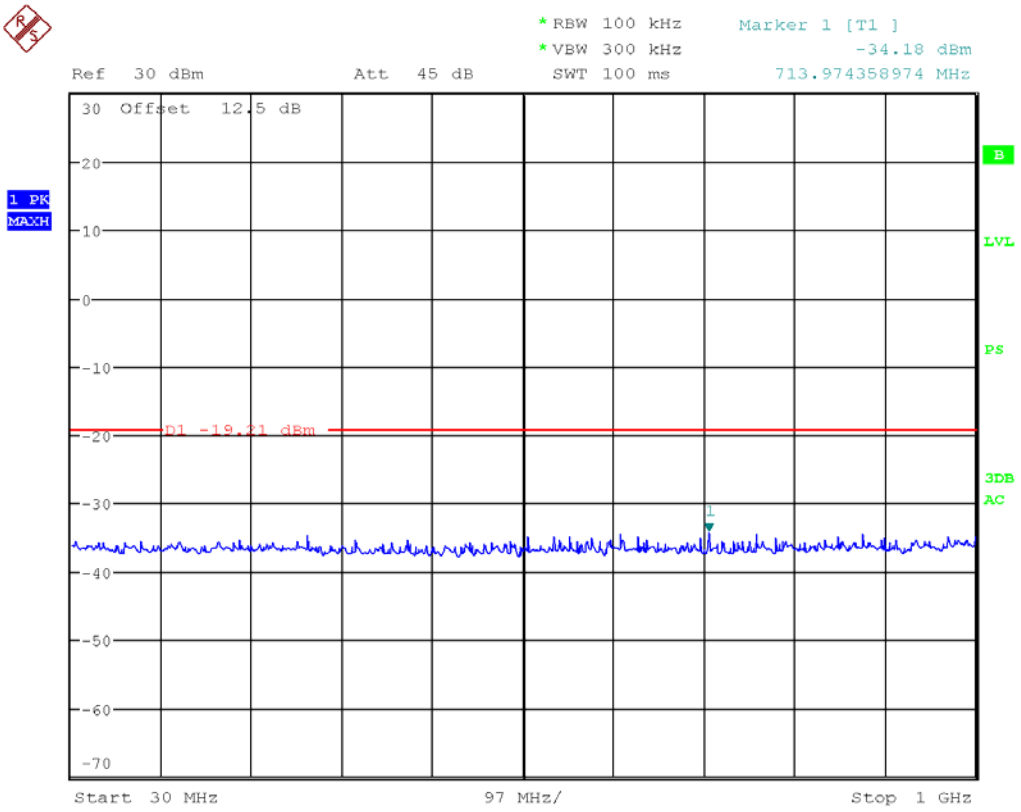
10G-25G


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-26.59 dBm
24.182692308 GHz
Ref 30 dBm
Att 45 dB
30 Offset 12.5 dB
1 PK
MAXH
D1 -18.7 dBm
B
LVL
PS
3DB
AC
Start 10 GHz
1.5 GHz/
Stop 25 GHz

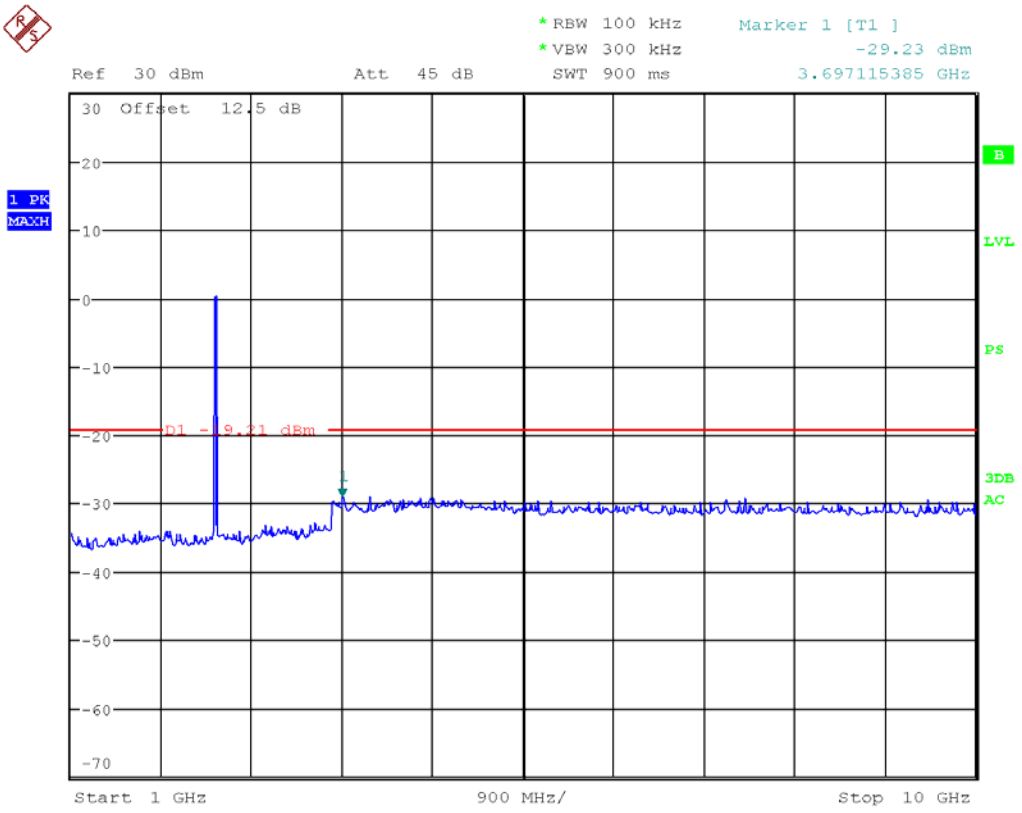
802.11G mode:
Channel 2437MHz
Reference level



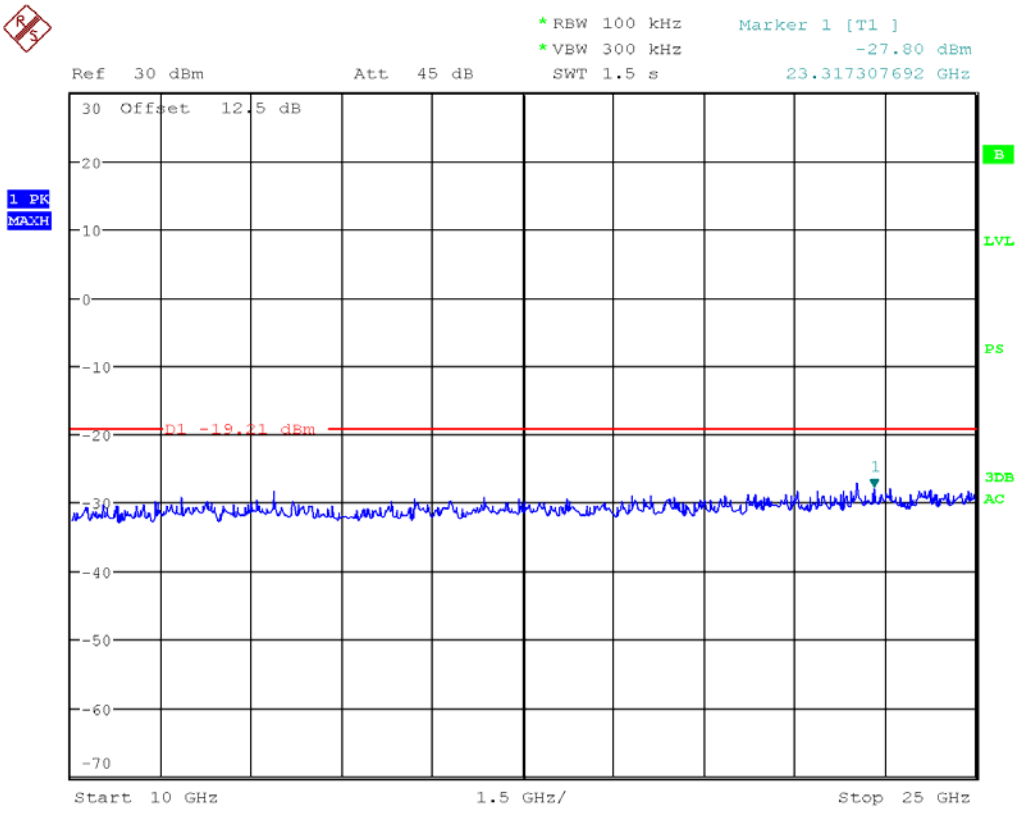
30M-1G



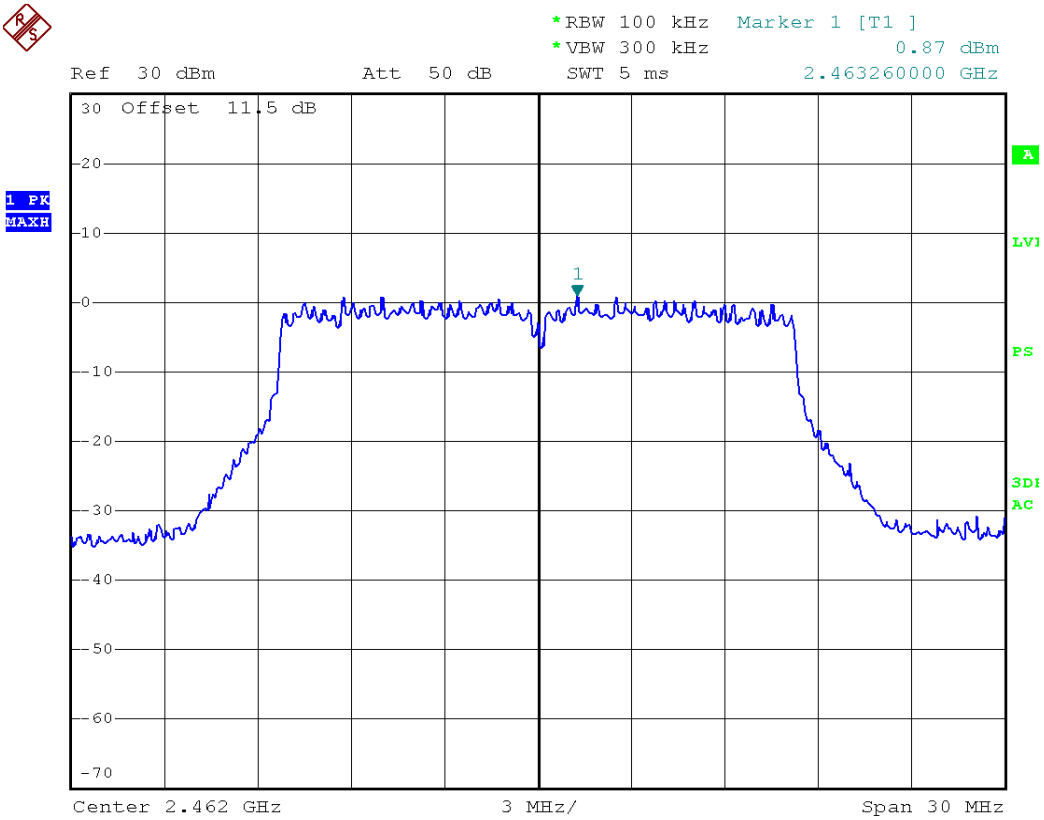
1G-10G



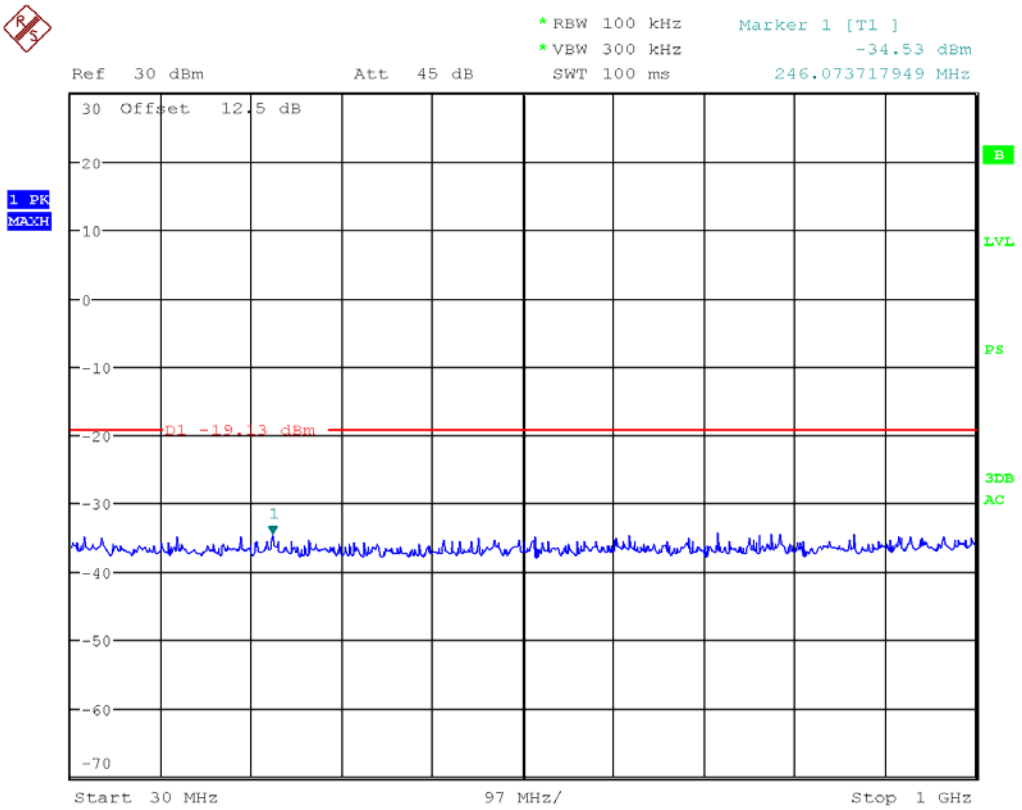
10G-25G



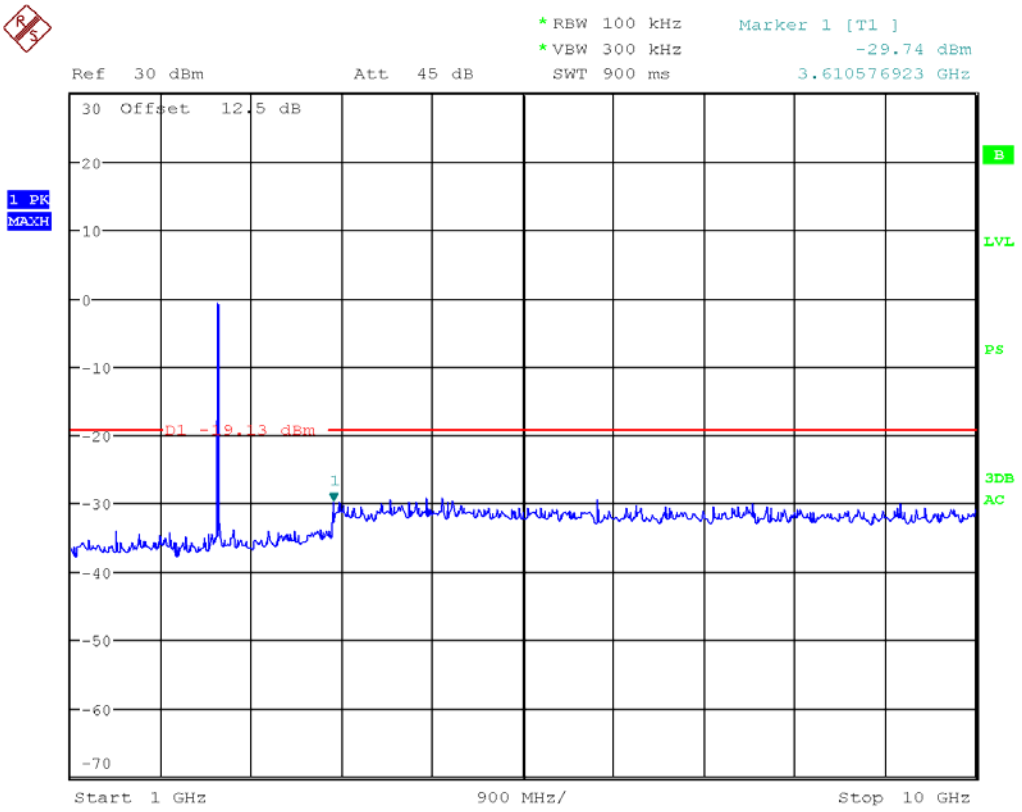
802.11G mode:
Channel 2462MHz
Reference level



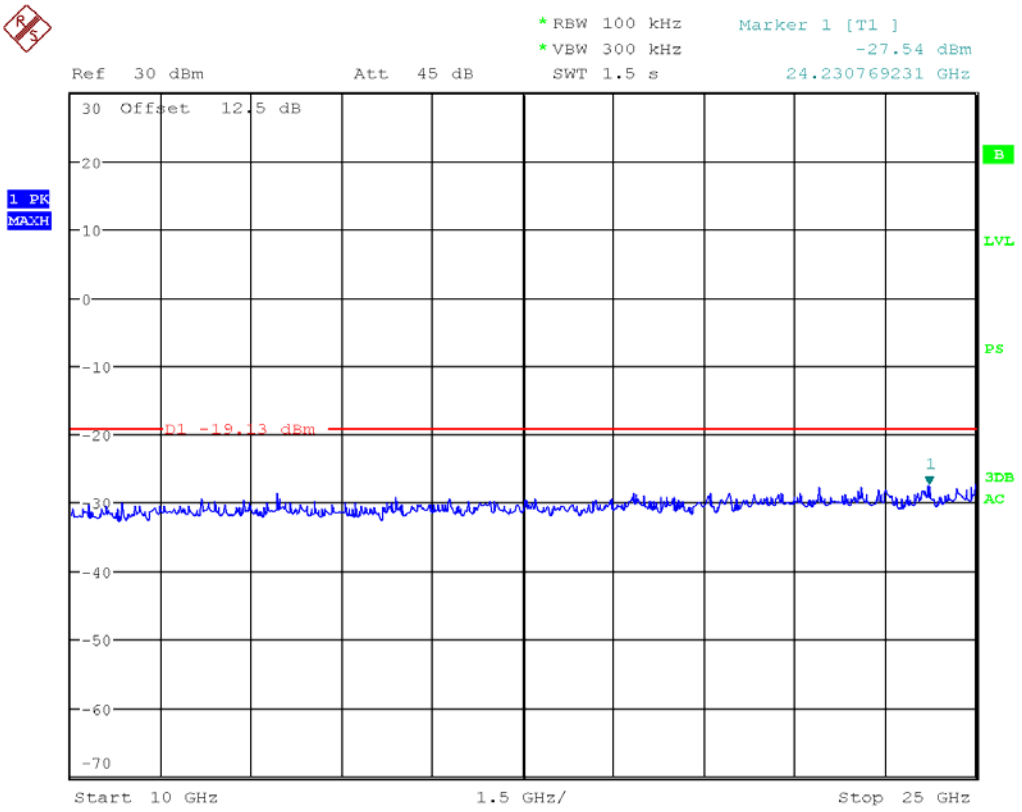
So the limit is -18.48dBm
Channel 2462MHz
30M-1G



1G-10G



10G-25G



11. EMISSIONS IN RESTRICTED FREQUENCY BANDS

11.1 LIMITS

The DTS rules specify that emissions which fall into restricted frequency bands shall comply with the general radiated emission limits..

11.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Meas Guidance v03r01.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the analyzer span to encompass the entire unwanted emission bandwidth above the measurement system noise level.
4. When Detector = peak, Set the RBW = 1 MHz. Set the VBW ≥ 3 MHz. Ensure that the number of measurement points in the sweep ≥ 2 x (span/RBW). Set sweep time = auto couple.
5. When Detector = average. Set the RBW = 1 MHz. Set the VBW =10Hz. Ensure that the number of measurement points in the sweep ≥ 2 x (span/RBW). Set sweep time = auto couple.
6. Use the peak marker function to determine the maximum average power level in any 1 MHz of the unwanted emission.
7. Repeat above procedures until all measured frequencies were complete.

11.3 TEST SETUP

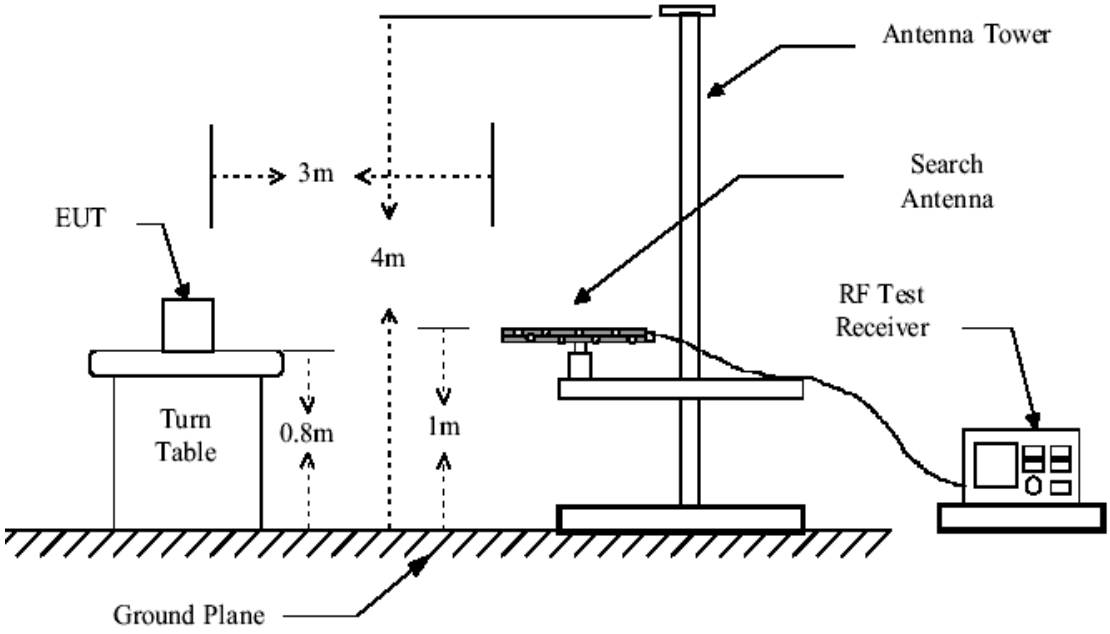


Figure 1. 30MHz to 1GHz radiated emissions test configuration

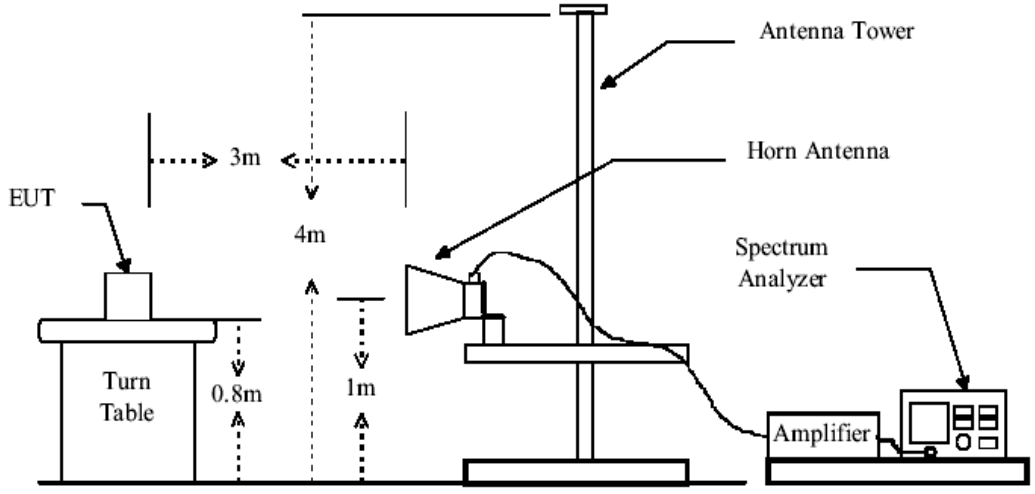
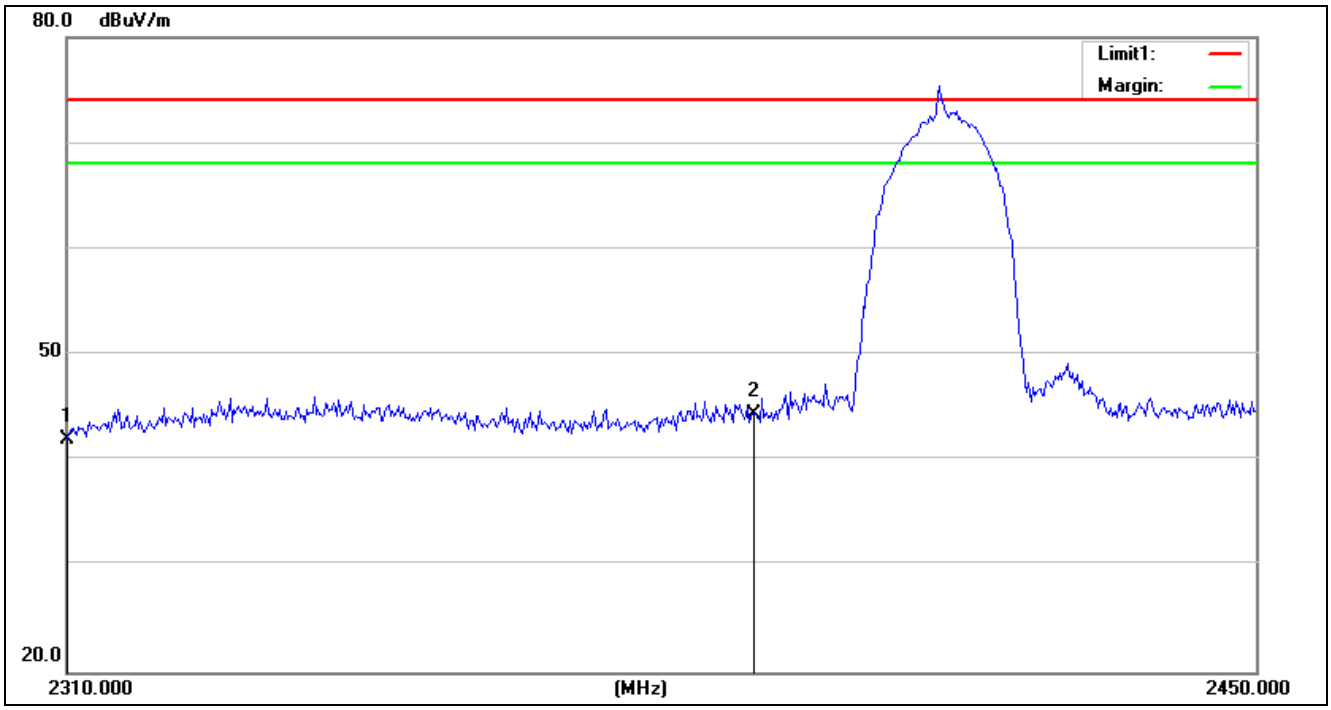


Figure 2. Above 1GHz radiated emissions test configuration

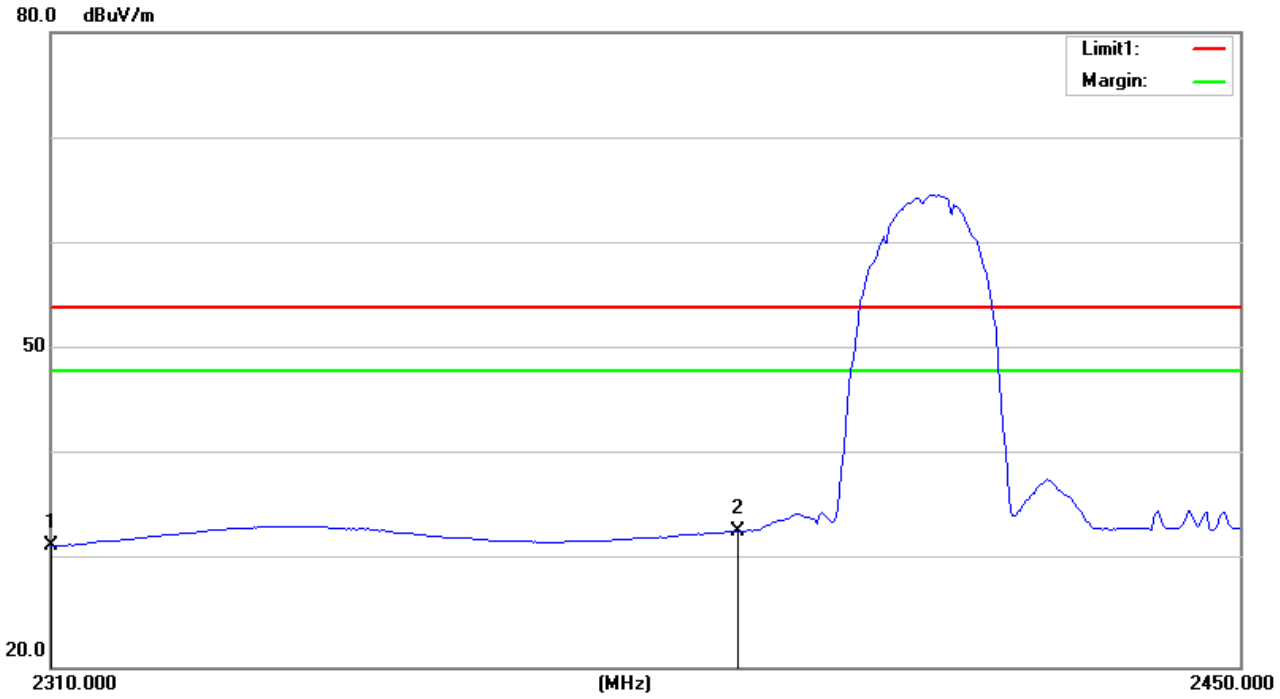
11.4 TEST RESULTS

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15.247_PEAK**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**9:52:50**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11b 2412**		



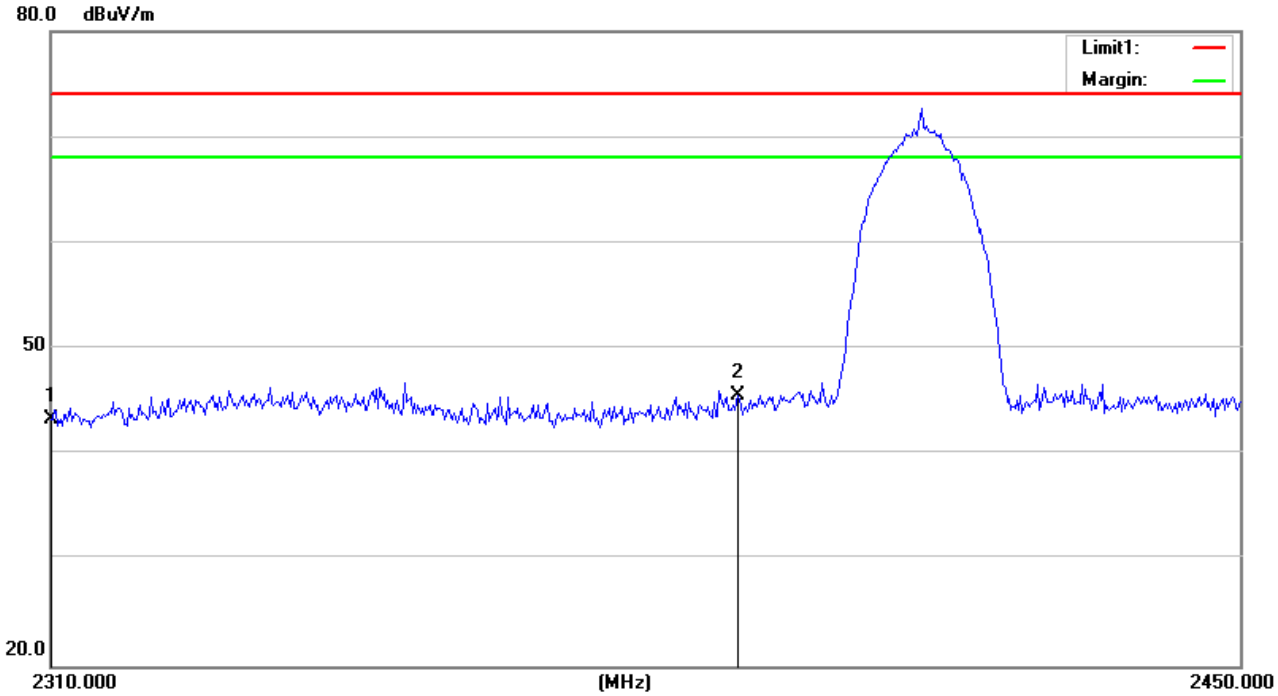
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	26.19	15.85	42.04	74.00	-31.96	peak
2	2390.000	28.12	16.32	44.44	74.00	-29.56	peak

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15.247_AVG**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**19:27:36**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11b 2412**		



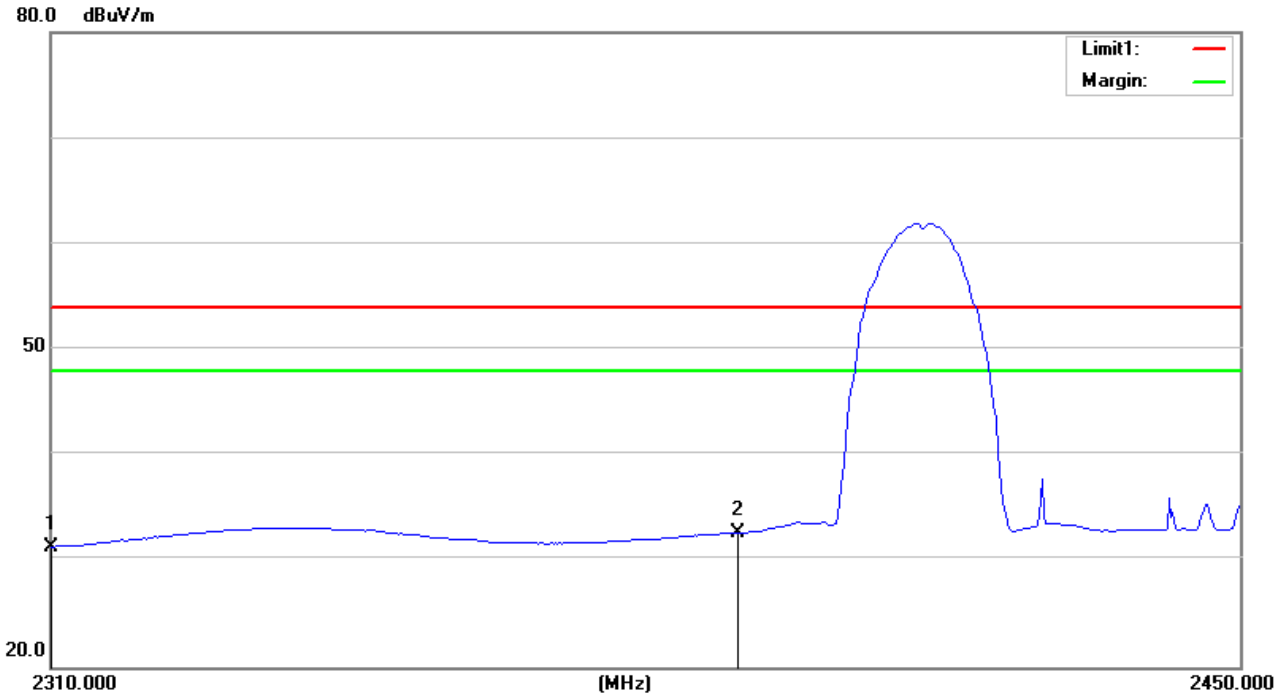
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	15.58	15.85	31.43	54.00	-22.57	AVG
2	2390.000	16.55	16.32	32.87	54.00	-21.13	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15.247_PEAK**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**9:45:02**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11b 2412**		



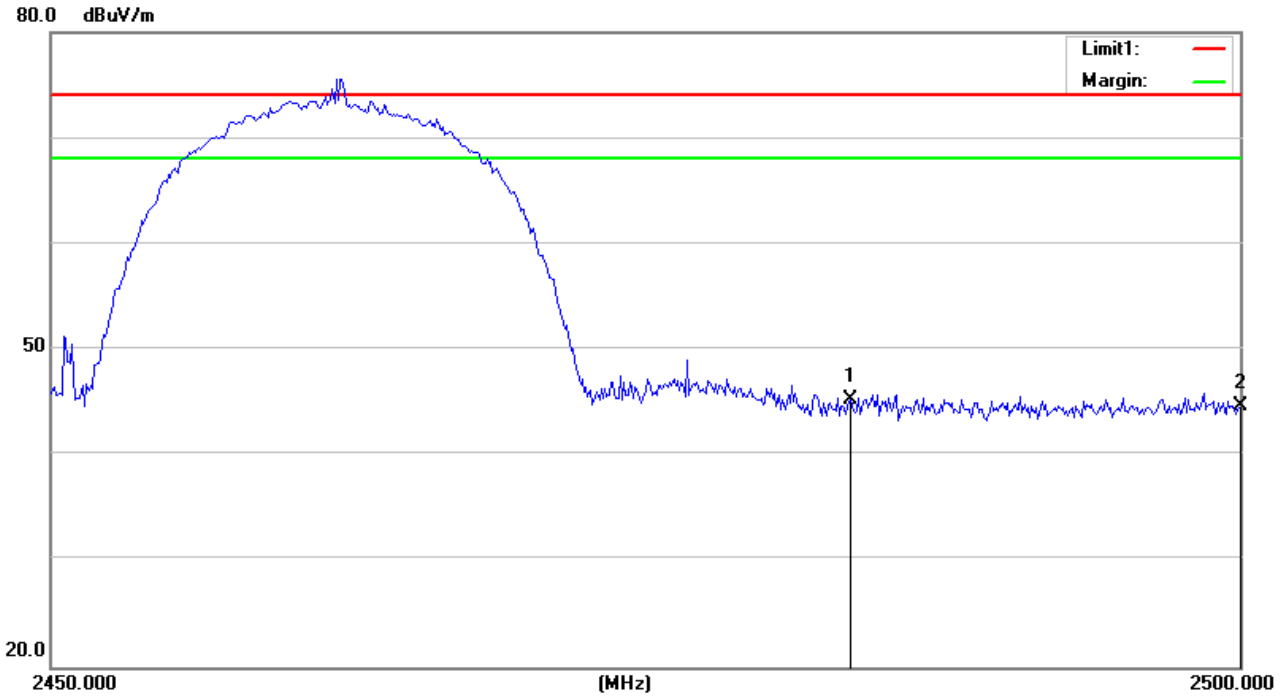
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	27.46	15.85	43.31	74.00	-30.69	peak
2	2390.000	29.24	16.32	45.56	74.00	-28.44	peak

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15.247_AVG**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**9:49:28**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11b 2412**		



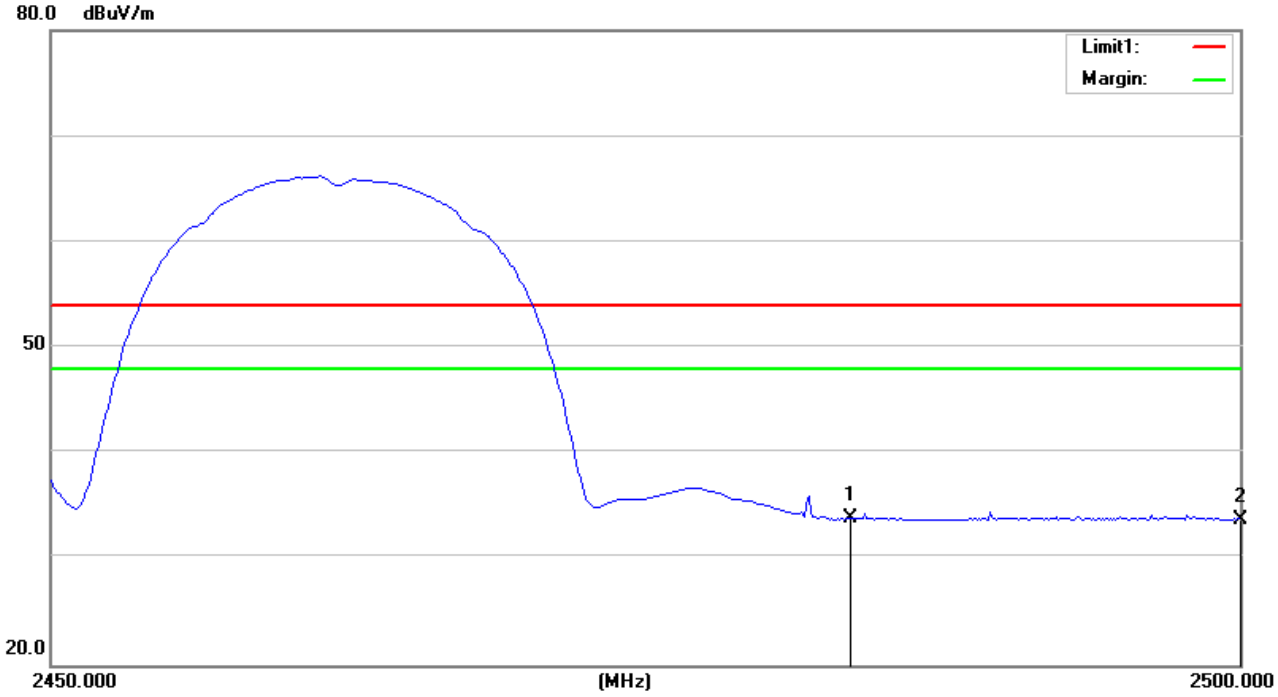
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	15.49	15.85	31.34	54.00	-22.66	AVG
2	2390.000	16.40	16.32	32.72	54.00	-21.28	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15.247_PEAK**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**9:56:29**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11b 2462**		



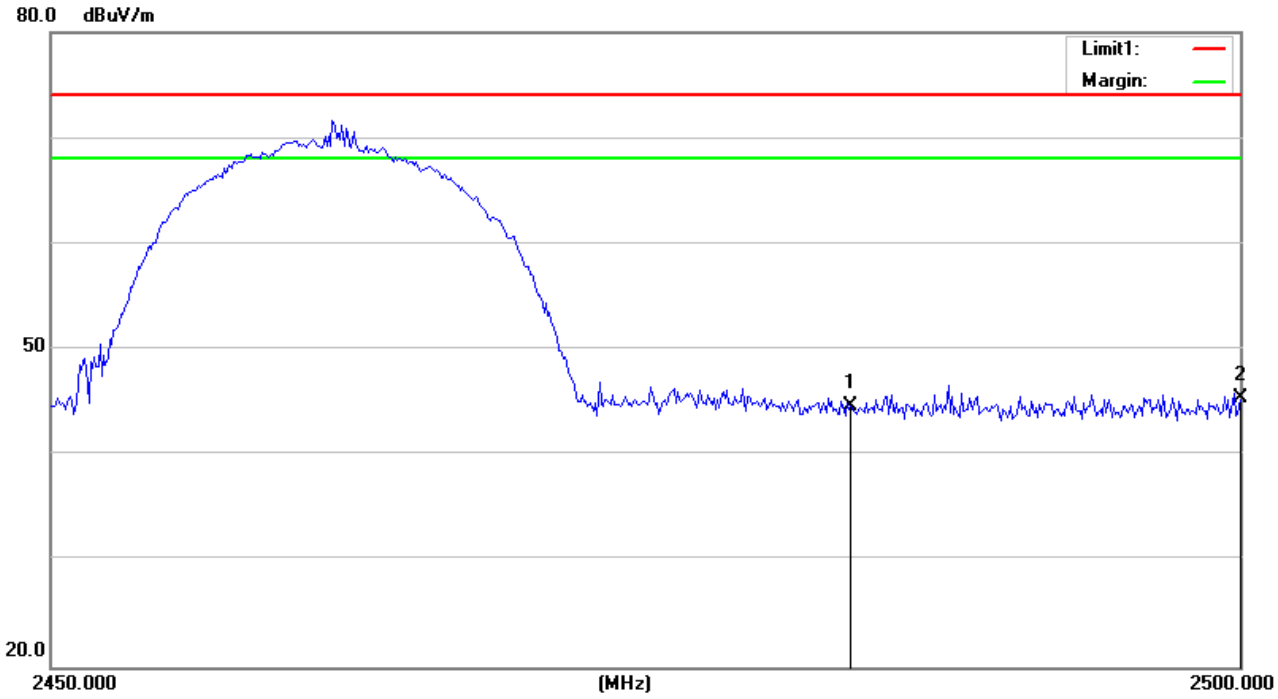
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	28.41	16.87	45.28	74.00	-28.72	peak
2	2500.000	27.70	16.97	44.67	74.00	-29.33	peak

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15.247_ AVG**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**9:58:18**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11b 2462**		



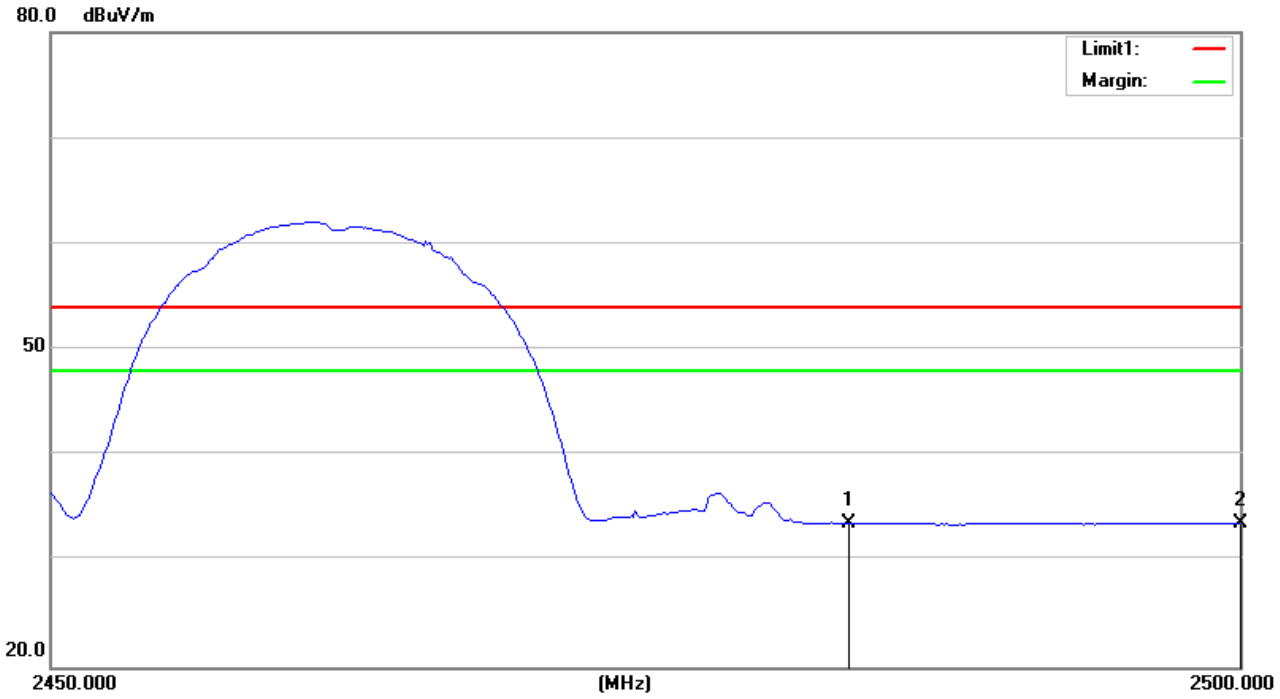
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	16.97	16.87	33.84	54.00	-20.16	AVG
2	2500.000	16.82	16.97	33.79	54.00	-20.21	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15.247_PEAK**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**10:00:15**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11b 2462**		



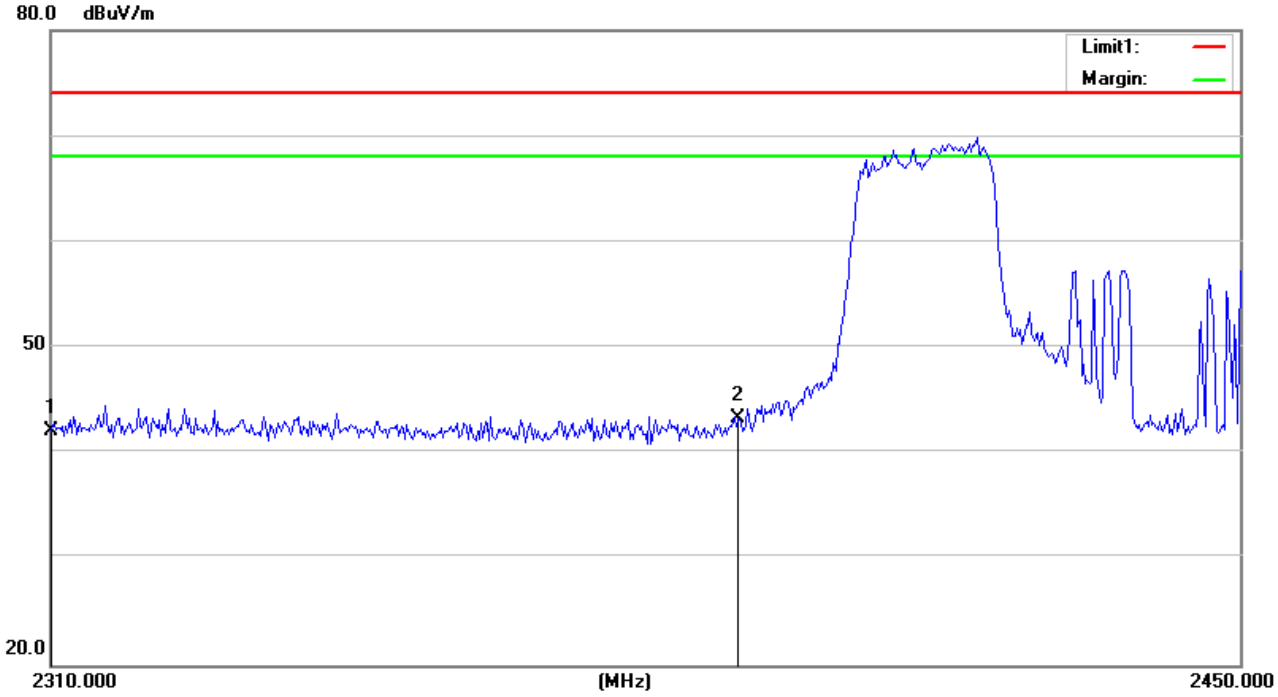
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	27.76	16.87	44.63	74.00	-29.37	peak
2	2500.000	28.41	16.97	45.38	74.00	-28.62	peak

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15.247_ AVG**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**9:59:40**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11b 2462**		



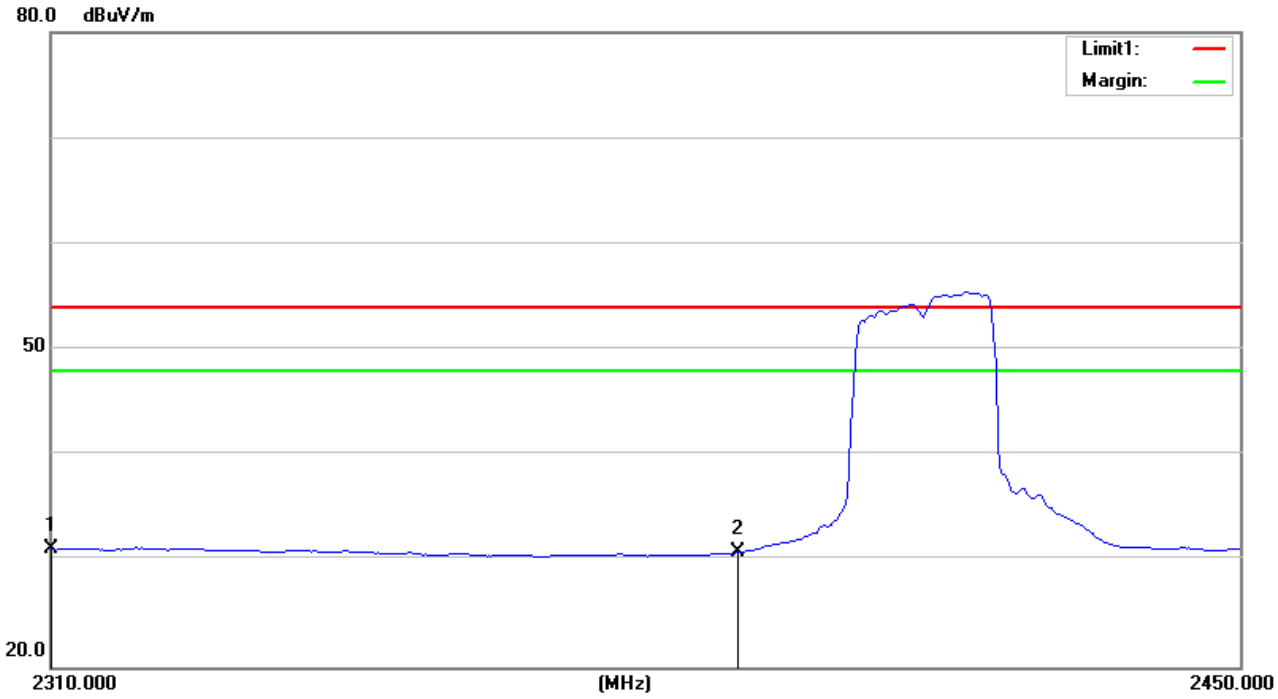
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	16.70	16.87	33.57	54.00	-20.43	AVG
2	2500.000	16.62	16.97	33.59	54.00	-20.41	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15.247_PEAK**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**10:10:09**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2412**		



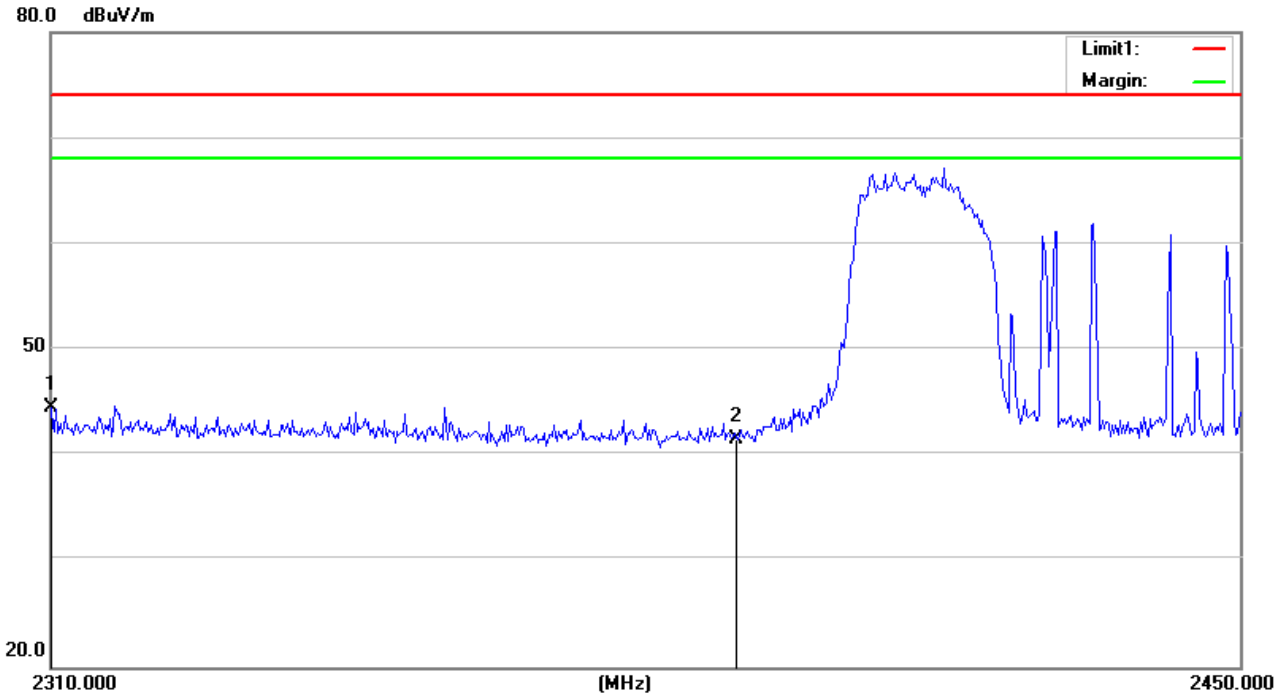
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	26.21	15.85	42.06	74.00	-31.94	peak
2	2390.000	26.98	16.32	43.30	74.00	-30.70	peak

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15.247_AVG**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**10:11:45**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2412**		



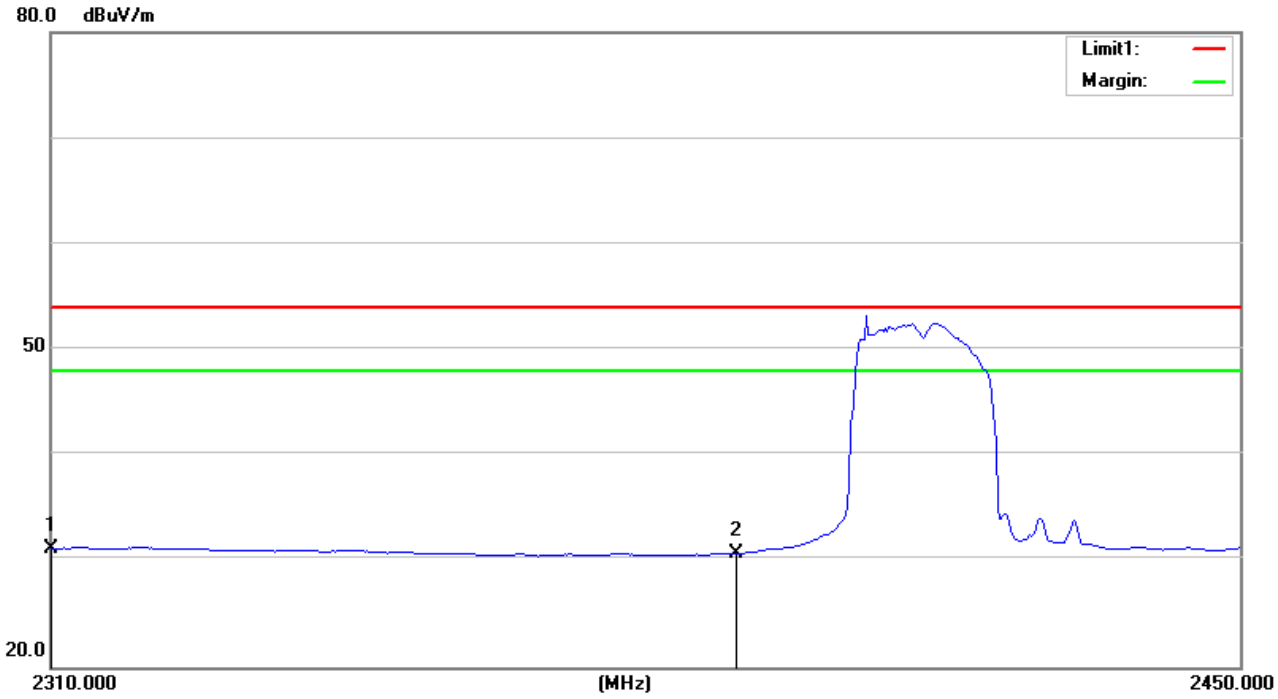
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	15.27	15.85	31.12	54.00	-22.88	AVG
2	2390.000	14.52	16.32	30.84	54.00	-23.16	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15.247_PEAK**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**10:13:42**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2412**		



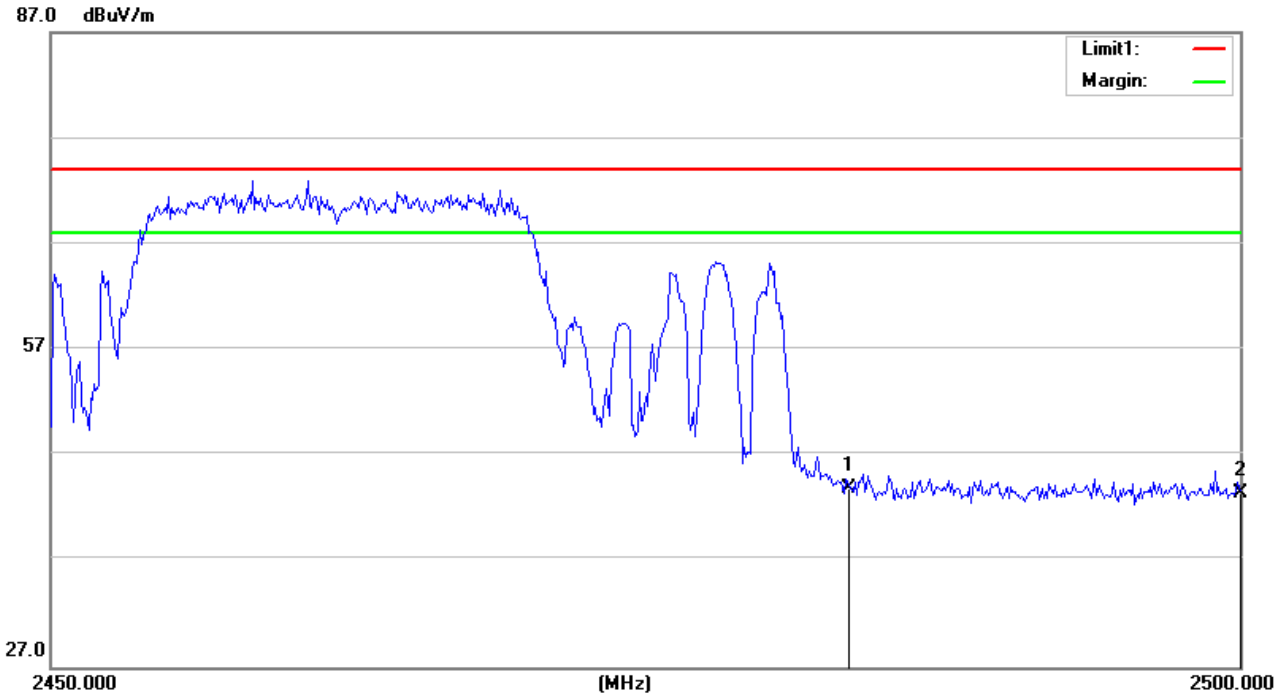
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	28.65	15.85	44.50	74.00	-29.50	peak
2	2390.000	25.13	16.32	41.45	74.00	-32.55	peak

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15.247_ AVG**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**10:13:09**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2412**		



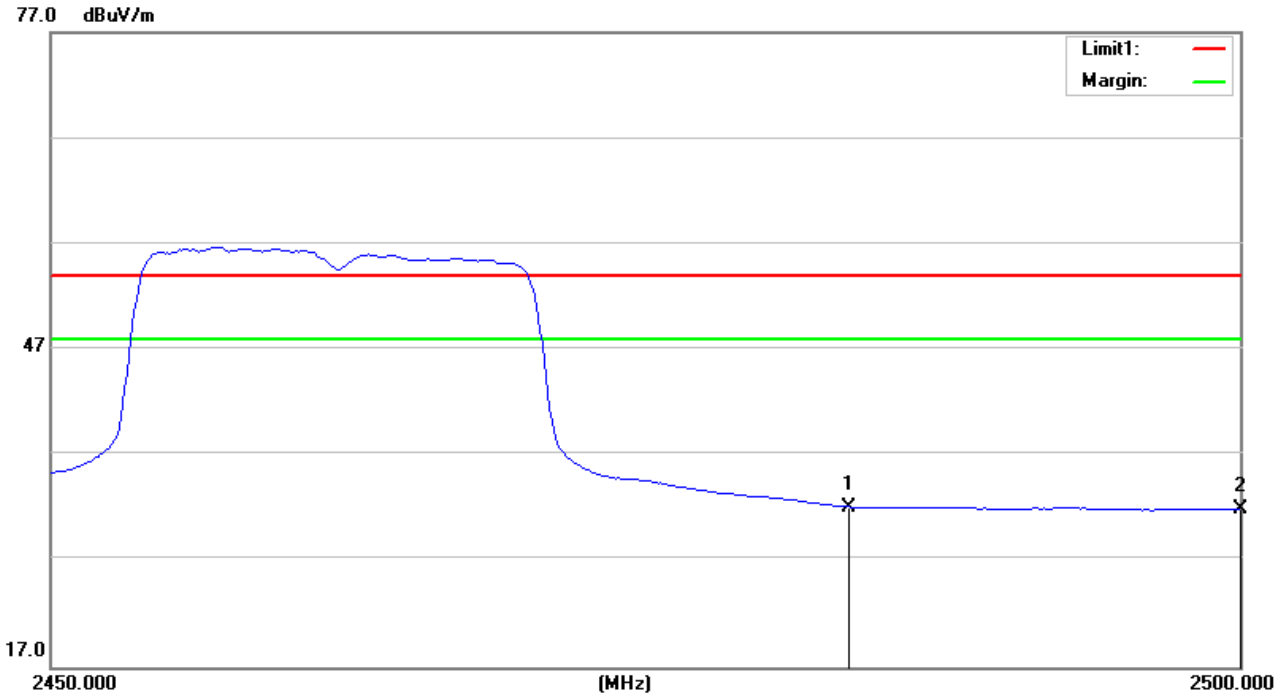
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	15.36	15.85	31.21	54.00	-22.79	AVG
2	2390.000	14.42	16.32	30.74	54.00	-23.26	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15.247_PEAK**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**10:07:36**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2462**		



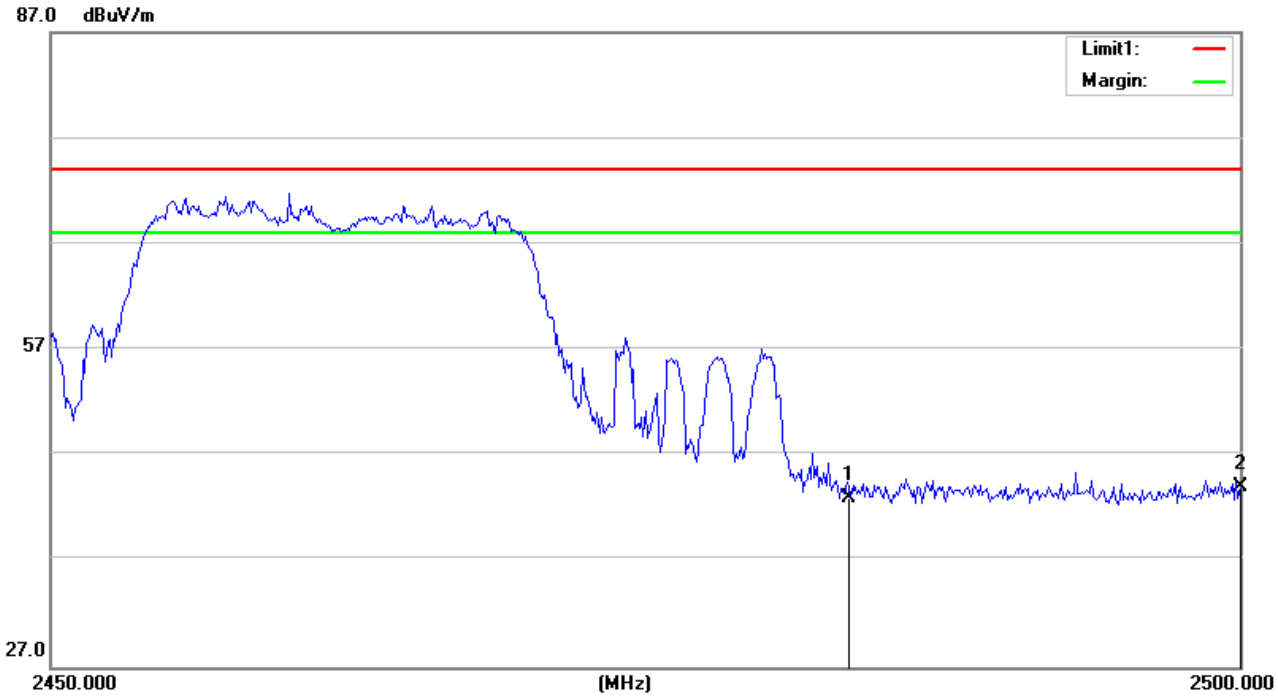
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	27.05	16.87	43.92	74.00	-30.08	peak
2	2500.000	26.53	16.97	43.50	74.00	-30.50	peak

Project No.:	**ZJ00032797**	**Polarization:**	**Vertical**
Standard:	**(RE)FCC PART 15.247_ AVG**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**10:04:47**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2462**		



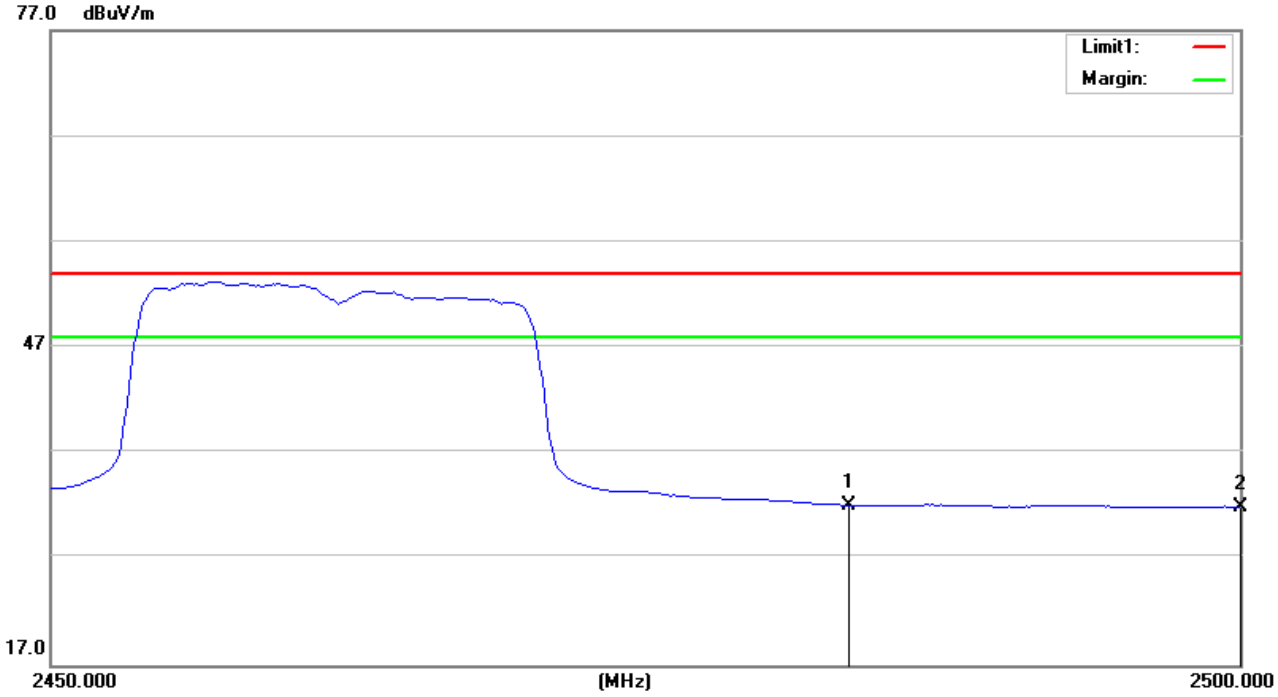
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	15.25	16.87	32.12	54.00	-21.88	AVG
2	2500.000	15.00	16.97	31.97	54.00	-22.03	AVG

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15.247_PEAK**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**10:02:05**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2462**		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	26.10	16.87	42.97	74.00	-31.03	peak
2	2500.000	26.99	16.97	43.96	74.00	-30.04	peak

Project No.:	**ZJ00032797**	**Polarization:**	**Horizontal**
Standard:	**(RE)FCC PART 15.247_ AVG**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Radiation Test**	**Date:**	**2013-8-23**
Temp./Hum.(%RH):	**22/46%RH**	**Time:**	**10:03:37**
EUT:	**WIRELESS STEREO SPEAKER WITH BLUETOOTH AND AIRPLAY**	**Distance:**	**3m**
Model:	**HARMAN KARDON AURA**	**Test Result:**	**Pass**
Note:	**802.11g 2462**		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	15.19	16.87	32.06	54.00	-21.94	AVG
2	2500.000	15.01	16.97	31.98	54.00	-22.02	AVG

Note: factor =Cable loss+ Space loss-Antenna factor-Amplifier

12. BAND-EDGE MEASUREMENTS

12.1 LIMITS

FCC 15.247(d) & 15.209

12.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v03r01.

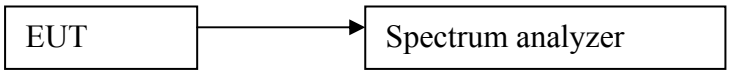
Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.

1. Reference level measurement

Below 1GHz Set the spectrum analyzer: RBW =100KHz VBW >= 3*RBW, Set the span to ≥ 1.5 times the DTS bandwidth. Sweep = auto; Detector Function = peak. Trace = Max-hold. Allow the trace to stabilize.

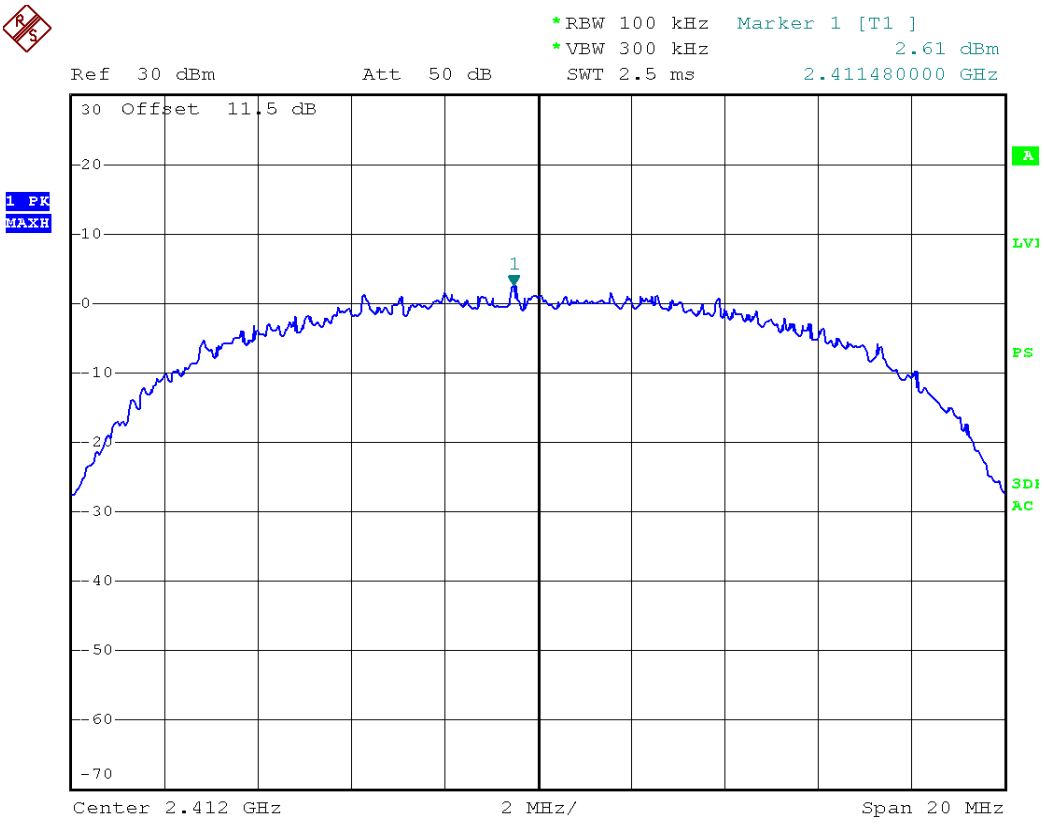
2. Set the spectrum analyzer: RBW =100KHz VBW >= 3*RBW, Set the span to ≥ 1.5 times the DTS bandwidth. Sweep = auto; Detector Function = peak. Trace = Max-hold. Allow the trace to stabilize.

12.3 TEST SETUP

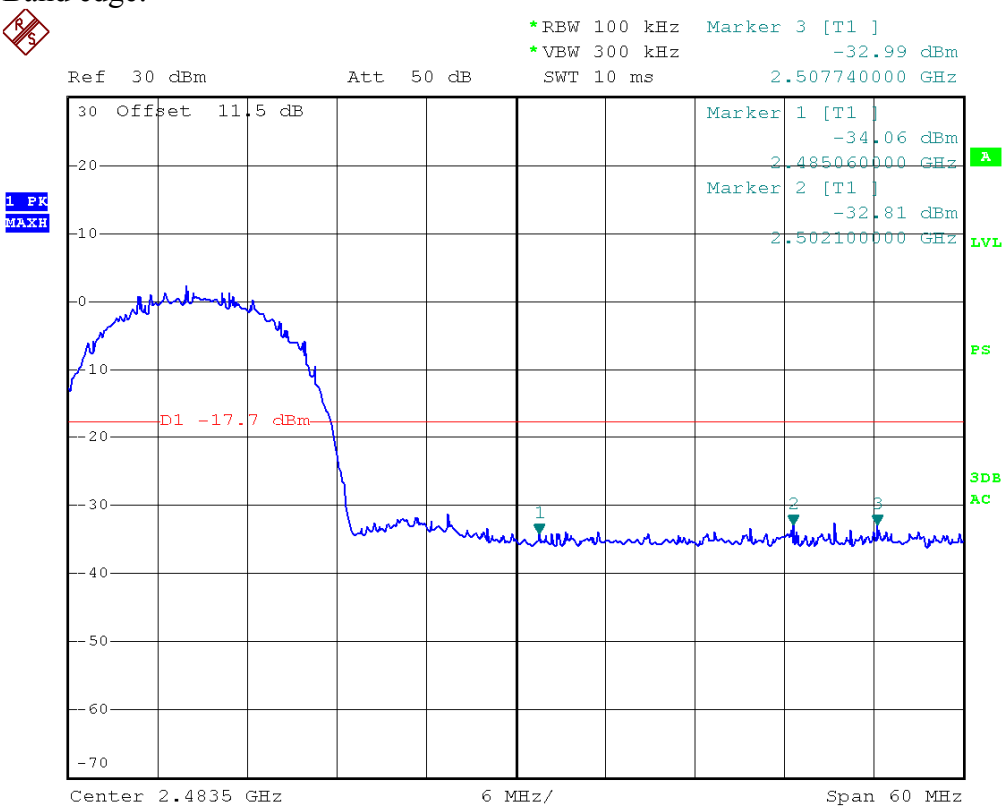


12.4 TEST RESULTS

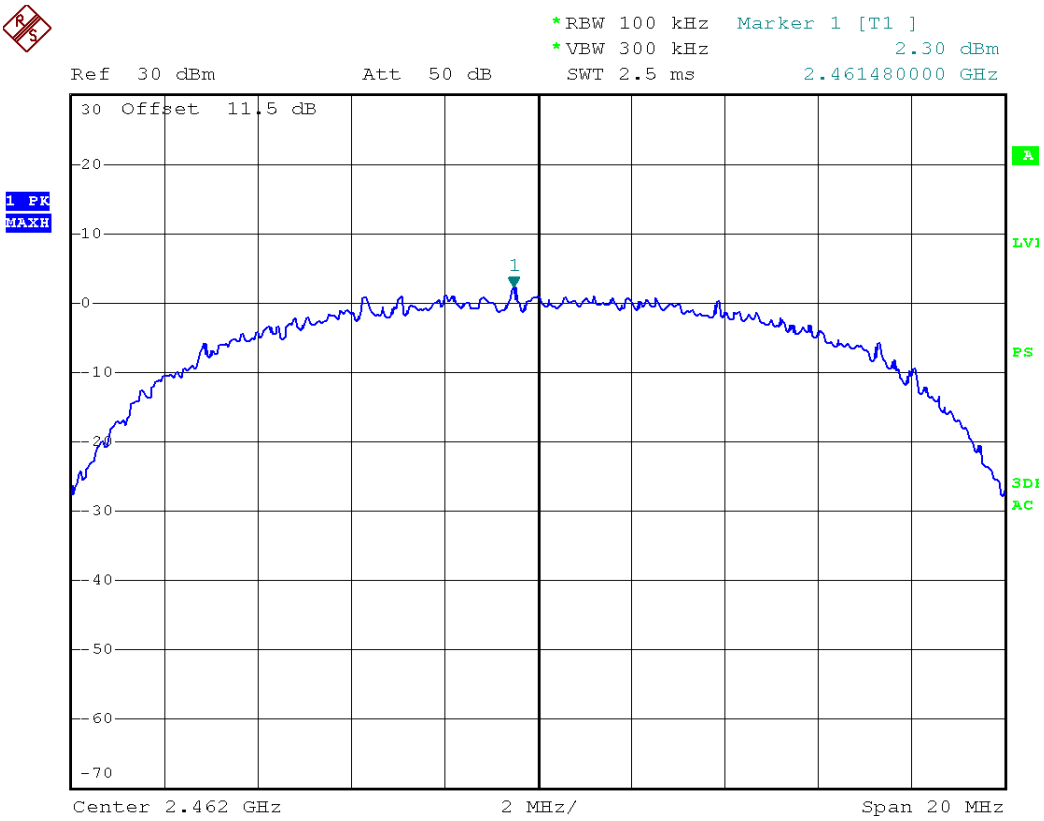
802.11b mode:
Channel 2412MHz
reference level：



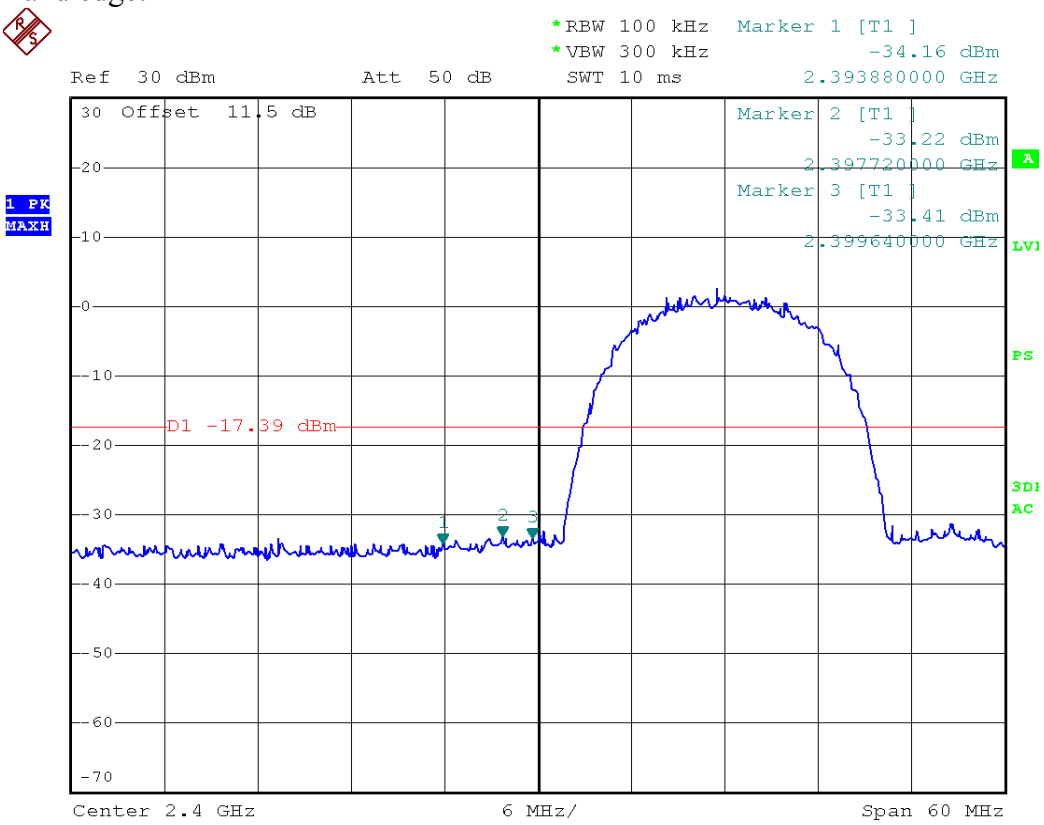
Band edge:



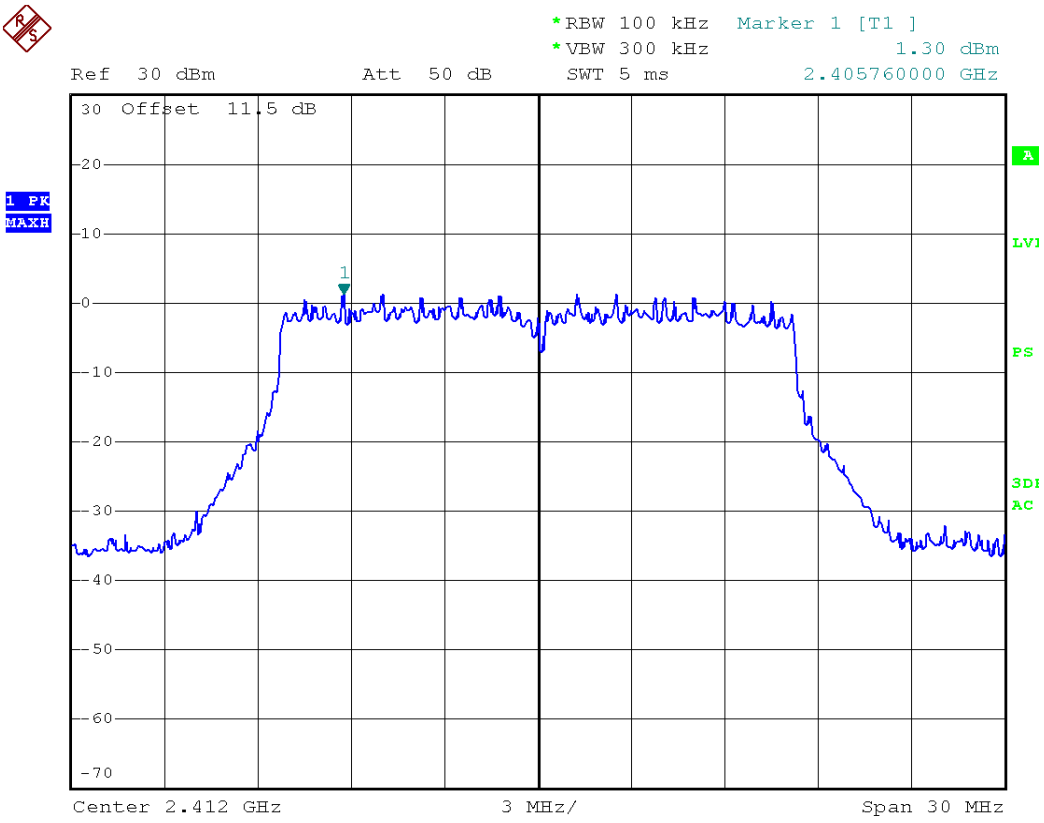
802.11b mode:
Channel 2462MHz
reference level：



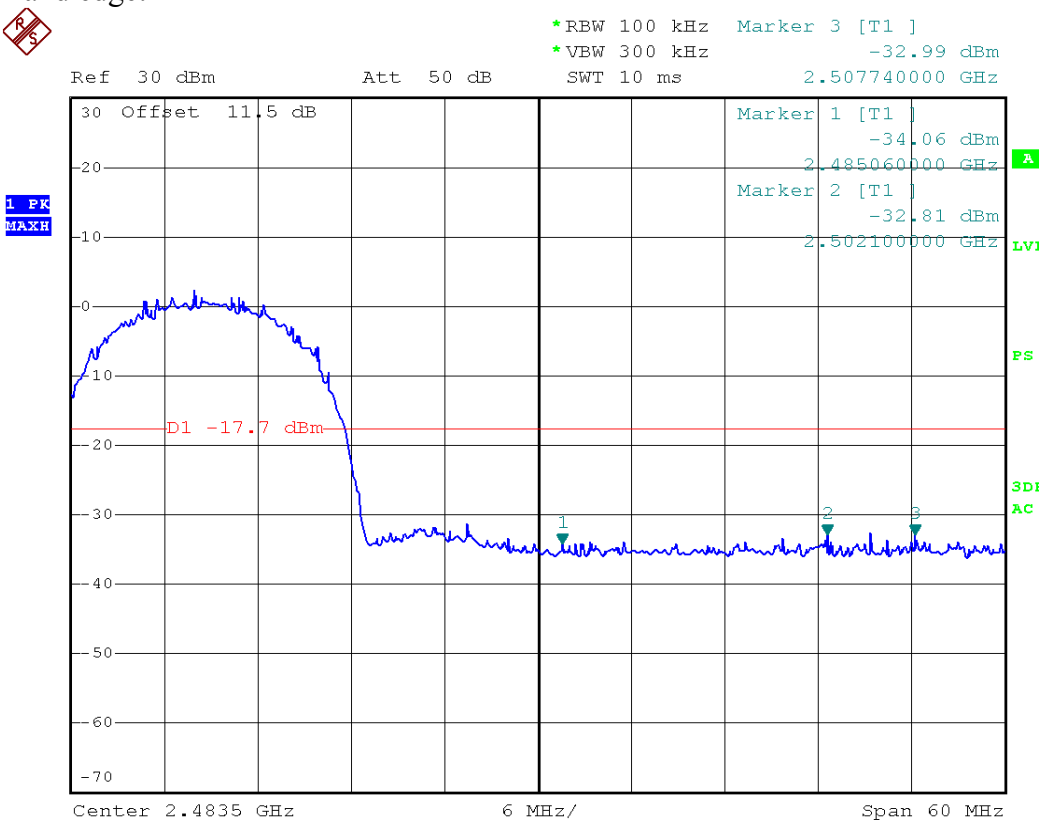
Band edge:



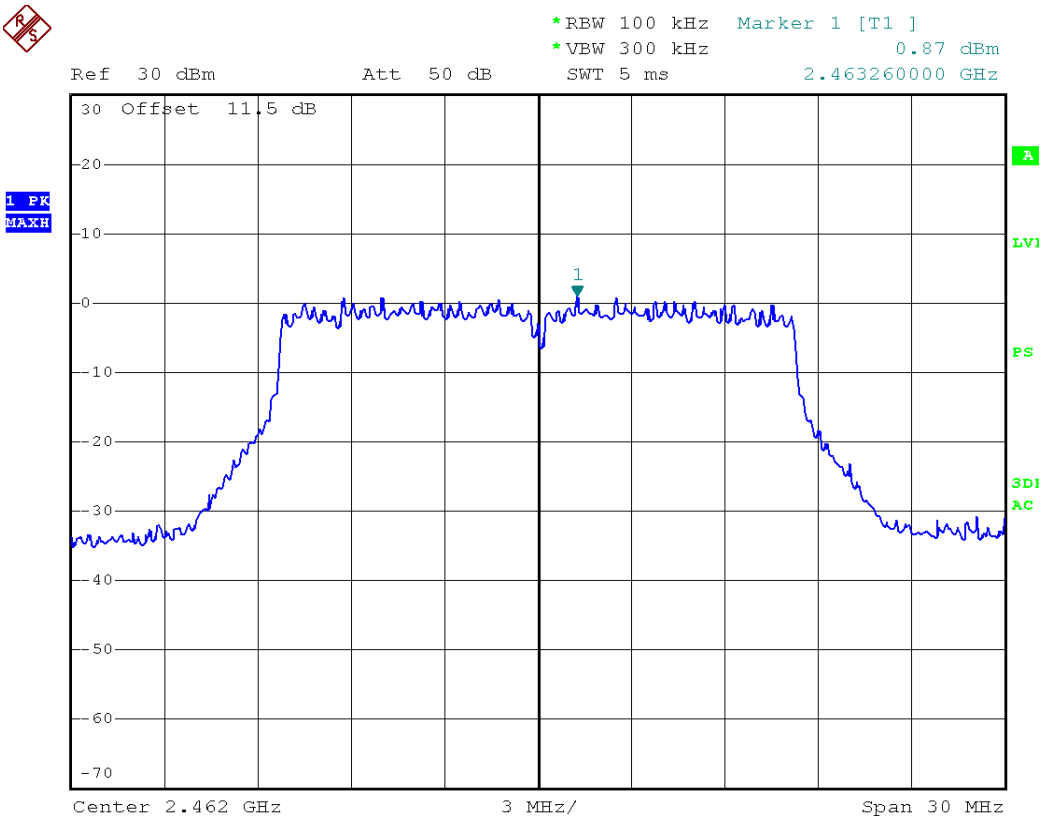
802.11g mode:
Channel 2412MHz
reference level：



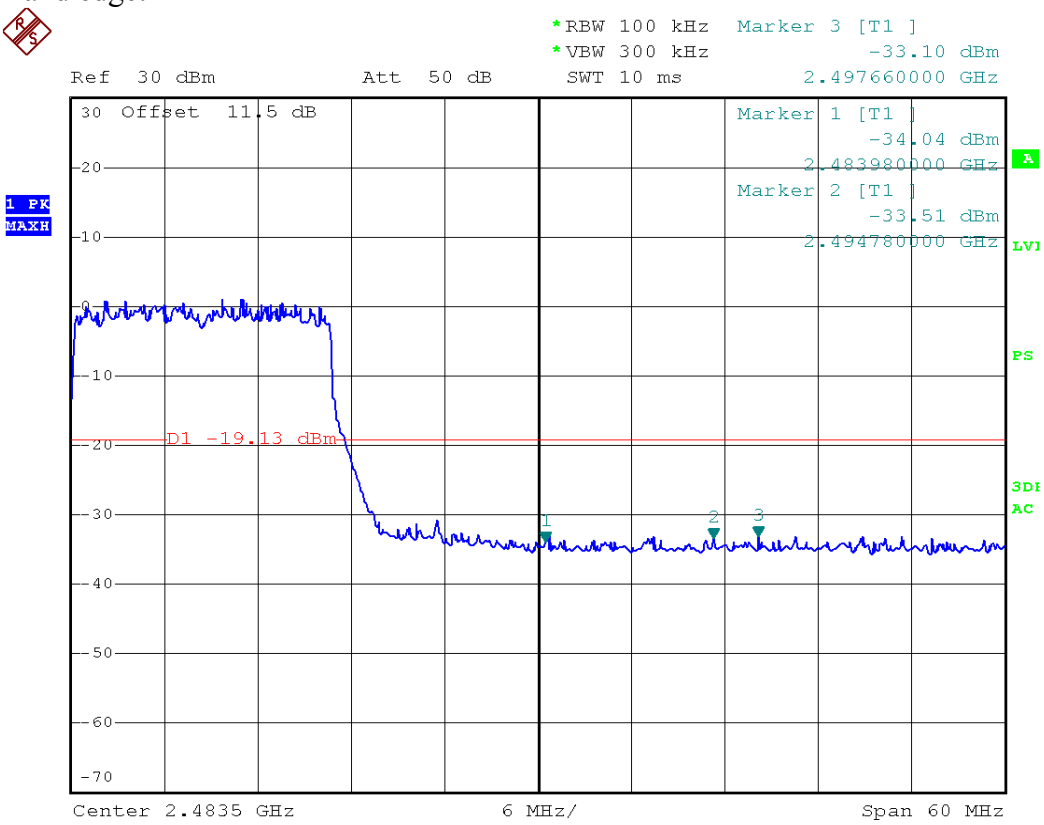
Band edge:



802.11g mode:
Channel 2462MHz
reference level：



Band edge:



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