

FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

DEI Sales, Inc., dba Polk Audio

Universal TV Sound Bar and Wireless Subwoofer System

Model Number: SIGNA S1 SUBWOOFER

FCC ID : WLQAM9217RX

Prepared for : DEI Sales, Inc., dba Polk Audio
1 Viper Way Vista, California 92801, USA

Prepared By : EST Technology Co., Ltd.
San Tun Management Zone, Houjie Town, Dongguan,
Guangdong, China

Tel: 86-769-83081888-808

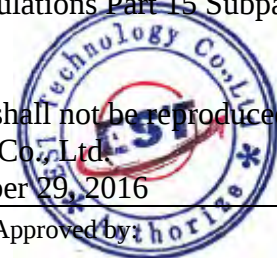
Report Number: ESTE-R1612067
Date of Test : December 01 ~ 27, 2016
Date of Report : December 29, 2016

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Test Report Verification

Applicant:	DEI Sales, Inc., dba Polk Audio		
Address:	1 Viper Way Vista, California 92801, USA		
Manufacturer	DEI Sales, Inc., dba Polk Audio		
Address:	1 Viper Way Vista, California 92801, USA		
E.U.T:	Universal TV Sound Bar and Wireless Subwoofer System		
Model Number:	SIGNA S1 SUBWOOFER		
Power Supply:	AC 100-240V ~ 50-60Hz		
Test Voltage:	AC 120V/60Hz AC 240V/60Hz		
Trade Name:	Polk	Serial No.:	-----
Date of Receipt:	December 01, 2016	Date of Test:	December 01 ~ 27, 2016
Test Specification:	FCC Rules and Regulations Part 15 Subpart C:2016 ANSI C63.10:2013		
Test Result:	The device described above is tested by EST Technology Co., Ltd.. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd. Date: December 29, 2016		
Prepared by:	Tested by:	Approved by:	
			
Ada / Assistant	Tony.Tang/ Engineer	IcemanHu / Manager	
Other Aspects:	None.		
Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested			
This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.			



1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	:	Universal TV Sound Bar and Wireless Subwoofer System
FCC ID	:	WLQAM9217RX
Model Number	:	SIGNA S1 SUBWOOFER
Operation frequency	:	2404-2478 MHz
Number of channel	:	38
Antenna	:	Internal antenna, 2dBi gain
Modulation	:	GFSK
Sample Type	:	Prototype production

2. SUMMARY OF TEST

2.1. Summary of test result

Description of Test Item	Standard	Results
Power Line Conducted Emissions	FCC Part 15C: 15.207 ANSI C63.10-2013	PASS
Radiated Emission Test	FCC Part 15C: 15.209 FCC Part 15C: 15.249 ANSI C63.10-2013	PASS
20 dB Bandwidth Test	FCC Part 15: 15.249 ANSI C63.10-2013	PASS
Band Edge Compliance Test	FCC Part 15: 15.215 ANSI C63.10-2013	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
N/A is an abbreviation for Not Applicable.		

2.2. Test Facilities

EMC Lab : Certified by CNAL, CHINA
Registration No.: L5288
Date of registration: December 07, 2015

Certificated by FCC, USA
Registration No.: 989591
Date of registration: November 15, 2016

Certificated by Industry Canada
Registration No.: 9405A-1
Date of registration: December 30, 2015

Certificated by VCCI, Japan
Registration No.: R-3663 & C-4103
Date of registration: July 25, 2011

Certificated by TUV Rheinland, Germany
Registration No.: UA 50195514 0001
Date of registration: January 07, 2011

Certificated by TUV/PS, Shenzhen
Registration No.: SCN1017
Date of registration: January 27, 2011

Certificated by Intertek ETL SEMKO
Registration No.: 2011-RTL-L1-18
Date of registration: April 28, 2011

Certificated by Siemic, Inc.
Registration No.: SLCN021
Date of registration: November 8, 2011

Certificated by Nemko, Hong Kong
Registration No.: 175193
Date of registration: May 4, 2011

Name of Firm : EST Technology Co., Ltd.

Site Location : San Tun Management Zone, Houjie District, Dongguan, Guangdong, China

2.3. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.54dB
Uncertainty for Radiation Emission test (30MHz-1GHz)	3.62
Uncertainty for Radiation Emission test (1GHz to 18GHz)	4.86
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	0.20dB
Uncertainty for Power density test	0.26dB

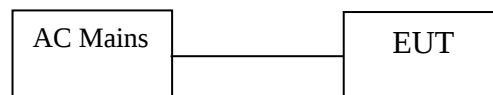
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.4. Assistant equipment used for test

2.4.1. N/A

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 or 1.5 meter high above ground. EUT was be set into TX test mode by software before test.



(EUT: Universal TV Sound Bar and Wireless Subwoofer System)

2.6. Test mode

The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode

Mode	Channel	Frequency
TX	Low	2404MHz
	Middle	2442MHz
	High	2478MHz

2.7. Channel List for GFSK

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2404	2	2406
3	2408	4	2410
5	2412	6	2414
7	2416	8	2418
9	2420	10	2422
11	2424	12	2426
13	2428	14	2430
15	2432	16	2434
17	2436	18	2438
19	2440	20	2442
21	2444	22	2446
23	2448	24	2450
25	2452	26	2454
27	2456	28	2458
29	2460	30	2462
31	2464	32	2466
33	2468	34	2470
35	2472	36	2474
37	2476	38	2478

2.8. Test Equipment

2.8.1. For conducted emissions test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	832354	June,25,16	1 Year
Artificial Mains Networ	Rohde & Schwarz	ENV216	101260	June,25,16	1 Year
Pulse Limiter	Rohde & Schwarz	ESDS6-Z2	101100	June,25,16	1 Year

2.8.2. For radiated emission test(9 kHz-30MHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI	100435	June,25,16	1 Year
Loop Antenna	ETS-LINDGREN	6502	00071730	June,25,16	1 Year

2.8.3. For radiated emissions test (30-1000MHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESVS10	100004	June,25,16	1 Year
Spectrum Analyzer	Agilent	E4411B	MY50140697	June,25,16	1 Year
Bilog Antenna	Teseq	CBL 6111D	27090	June,28,15	3 Year
Signal Amplifier	Agilent	310N	187037	June,25,16	1 Year

2.8.4. For radio & radiated emissions test (above 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	SCHWARZB ECK	BBHA 9120 D	BBHA9120D1 002	June,28,15	3 Year
Board-Band Horn Antenna	SCHWARZB ECK	BBHA 9170	9170-497	June,28,15	3 Year
Signal Amplifier	SCHWARZB ECK	BBV9718	9718-212	June,25,16	1 Year
Spectrum Analyzer	Agilent	E4408B	MY44211139	June,25,16	1 Year
Spectrum Analyzer	Rohde &Schwarz	FSV	103173	June,25,16	1 Year
RF Cable	Hubersuhner	RG 214/U	513423	June,25,16	1 Year

3. CONDUCTED EMISSION TEST

3.1. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

3.2. Test Procedure

The EUT was placed on a non-metallic table, 80 cm above the ground plane. The EUT was charged from PC's USB port which connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#).. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.

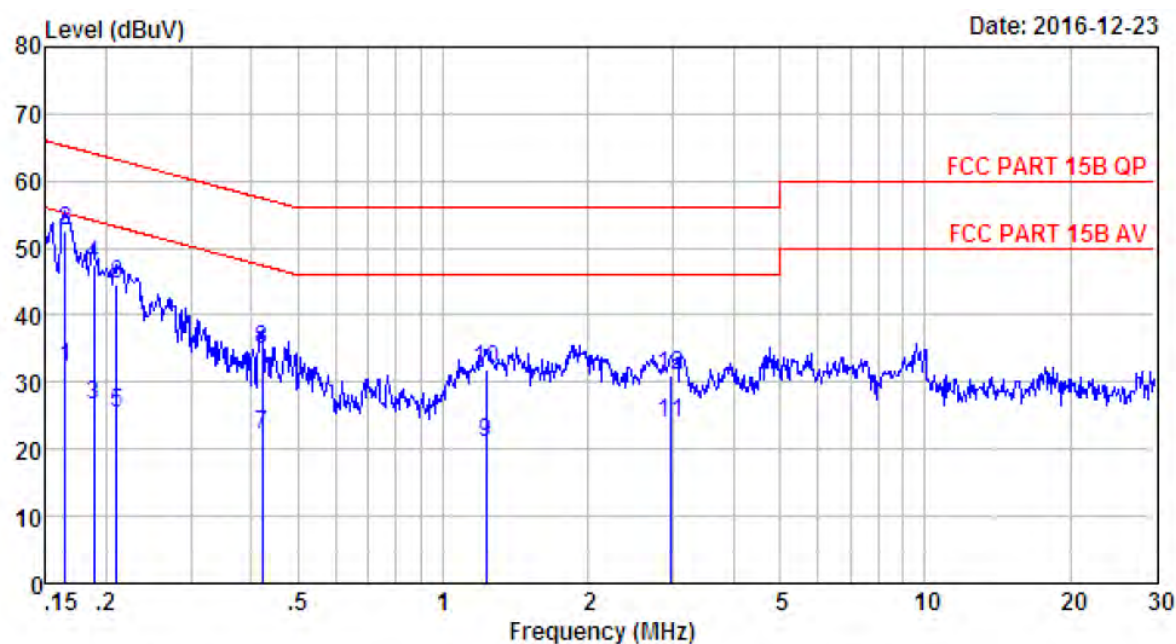
The bandwidth of test receiver (R & S ESHS30) is set at 10kHz.

The frequency range from 150kHz to 30MHz is checked.

3.3. Test Result

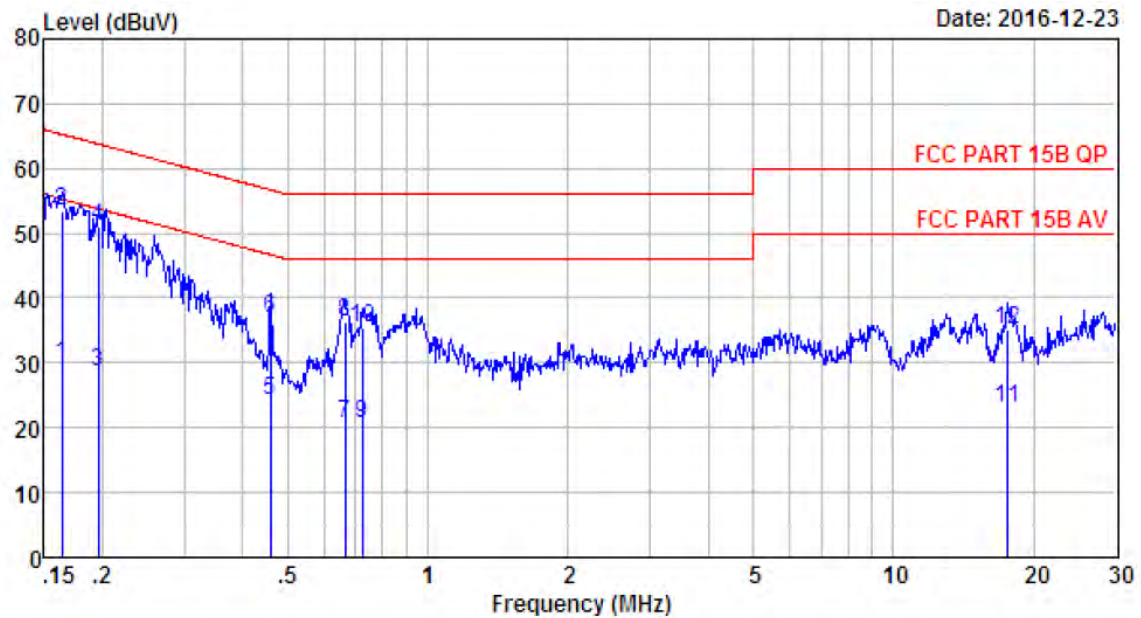
PASS. (All emissions not reported below are too low against the prescribed limits.)

3.4. Test Data



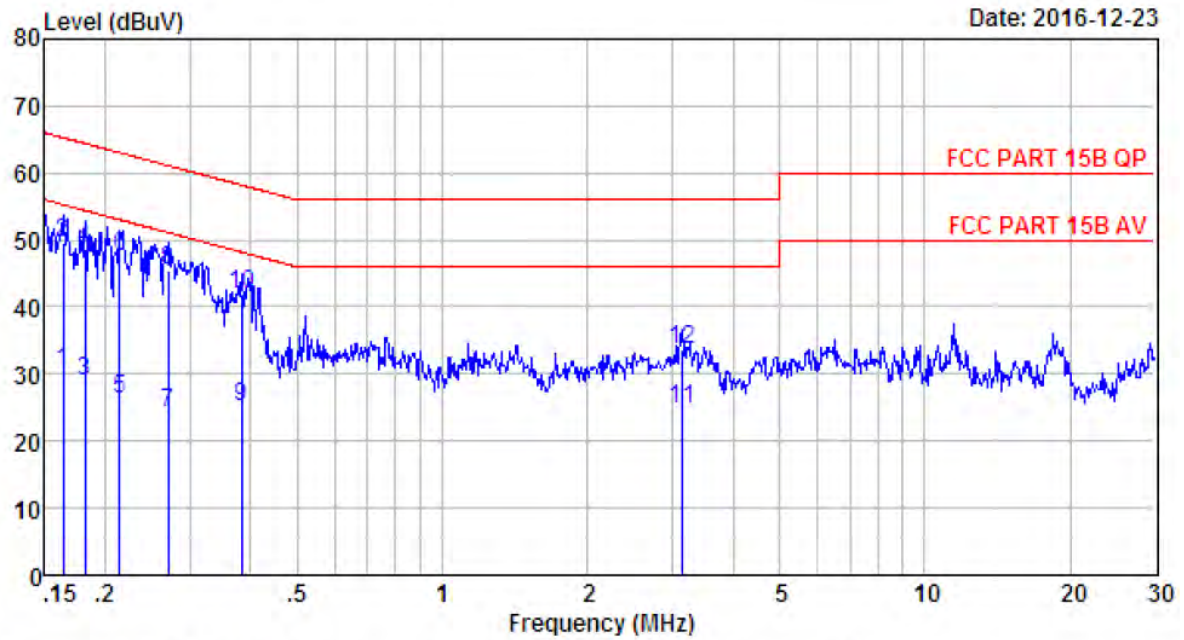
Site no : 844 Shield Room Data no. : 325
 Env. / Ins. : Temp:25.3'C Humi:58% Press:101.50kPa LINE Phase : LINE
 Limit : FCC PART 15B QP
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.16	9.61	9.81	12.79	32.21	55.25	23.04	Average
2	0.16	9.61	9.81	33.00	52.42	65.25	12.83	QP
3	0.19	9.61	9.80	7.02	26.43	54.11	27.68	Average
4	0.19	9.61	9.80	28.26	47.67	64.11	16.44	QP
5	0.21	9.61	9.80	5.89	25.30	53.18	27.88	Average
6	0.21	9.61	9.80	25.05	44.46	63.18	18.72	QP
7	0.42	9.61	9.81	2.82	22.24	47.42	25.18	Average
8	0.42	9.61	9.81	15.43	34.85	57.42	22.57	QP
9	1.23	9.63	9.82	1.56	21.01	46.00	24.99	Average
10	1.23	9.63	9.82	12.39	31.84	56.00	24.16	QP
11	2.98	9.63	9.85	4.30	23.78	46.00	22.22	Average
12	2.98	9.63	9.85	11.52	31.00	56.00	25.00	QP



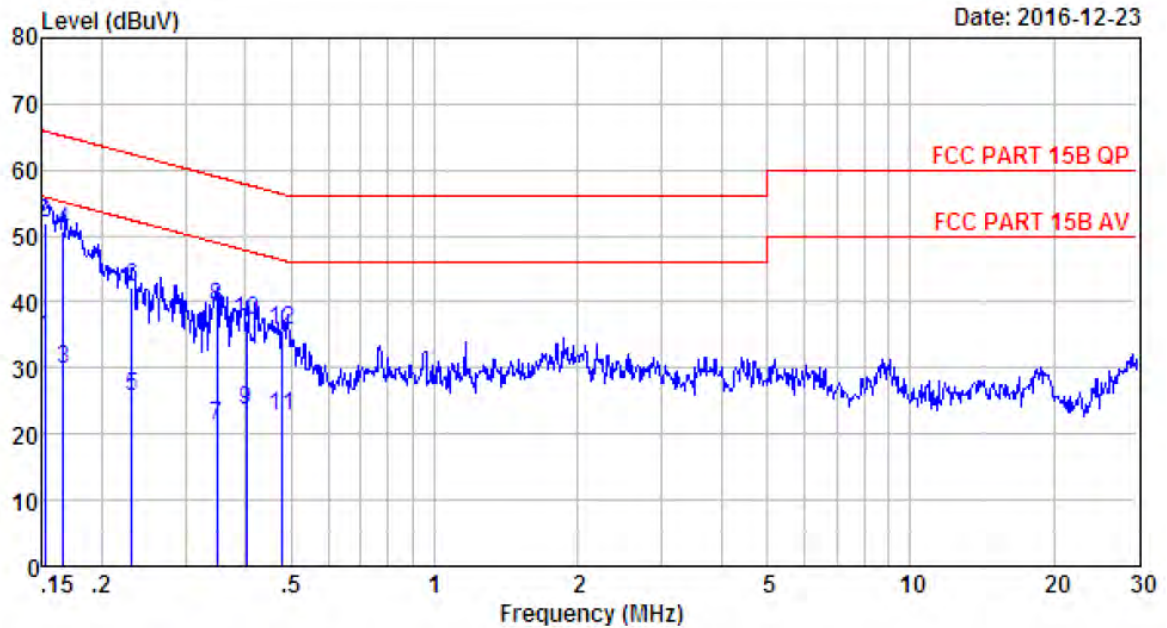
Site no : 844 Shield Room Data no. : 327
 Env. / Ins. : Temp:25.3'C Humi:58% Press:101.50kPa LINE Phase : NEUTRAL
 Limit : FCC PART 15B QP
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.16	9.50	9.81	10.49	29.80	55.30	25.50	Average
2	0.16	9.50	9.81	34.00	53.31	65.30	11.99	QP
3	0.20	9.59	9.80	9.14	28.53	53.80	25.27	Average
4	0.20	9.59	9.80	31.70	51.09	63.80	12.71	QP
5	0.46	9.59	9.81	4.85	24.25	46.71	22.46	Average
6	0.46	9.59	9.81	17.47	36.87	56.71	19.84	QP
7	0.66	9.62	9.81	1.23	20.66	46.00	25.34	Average
8	0.66	9.62	9.81	16.99	36.42	56.00	19.58	QP
9	0.72	9.63	9.81	1.15	20.59	46.00	25.41	Average
10	0.72	9.63	9.81	16.07	35.51	56.00	20.49	QP
11	17.57	9.78	9.93	3.41	23.12	50.00	26.88	Average
12	17.57	9.78	9.93	15.53	35.24	60.00	24.76	QP



Site no : 844 Shield Room Data no. : 329
 Env. / Ins. : Temp:25.3'C Humi:58% Press:101.50kPa LINE Phase : LINE
 Limit : FCC PART 15B QP
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 240V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.16	9.61	9.81	11.10	30.52	55.30	24.78	Average
2	0.16	9.61	9.81	30.21	49.63	65.30	15.67	QP
3	0.18	9.61	9.80	9.52	28.93	54.42	25.49	Average
4	0.18	9.61	9.80	29.32	48.73	64.42	15.69	QP
5	0.21	9.61	9.80	7.01	26.42	53.05	26.63	Average
6	0.21	9.61	9.80	27.99	47.40	63.05	15.65	QP
7	0.27	9.61	9.83	4.82	24.26	51.12	26.86	Average
8	0.27	9.61	9.83	26.05	45.49	61.12	15.63	QP
9	0.38	9.61	9.82	5.77	25.20	48.21	23.01	Average
10	0.38	9.61	9.82	22.55	41.98	58.21	16.23	QP
11	3.16	9.63	9.84	5.35	24.82	46.00	21.18	Average
12	3.16	9.63	9.84	14.23	33.70	56.00	22.30	QP



Site no : 844 Shield Room Data no. : 331
 Env. / Ins. : Temp:25.3'C Humi:58% Press:101.50kPa LINE Phase : NEUTRAL
 Limit : FCC PART 15B QP
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 240V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15	9.46	9.81	15.26	34.53	55.91	21.38	Average
2	0.15	9.46	9.81	32.80	52.07	65.91	13.84	QP
3	0.17	9.51	9.81	10.52	29.84	55.16	25.32	Average
4	0.17	9.51	9.81	31.35	50.67	65.16	14.49	QP
5	0.23	9.60	9.80	6.16	25.56	52.39	26.83	Average
6	0.23	9.60	9.80	22.80	42.20	62.39	20.19	QP
7	0.35	9.59	9.83	1.98	21.40	49.00	27.60	Average
8	0.35	9.59	9.83	19.72	39.14	59.00	19.86	QP
9	0.40	9.59	9.82	4.11	23.52	47.81	24.29	Average
10	0.40	9.59	9.82	17.69	37.10	57.81	20.71	QP
11	0.48	9.59	9.81	3.19	22.59	46.41	23.82	Average
12	0.48	9.59	9.81	16.24	35.64	56.41	20.77	QP

4. RADIATED EMISSIONS

4.1. Limit

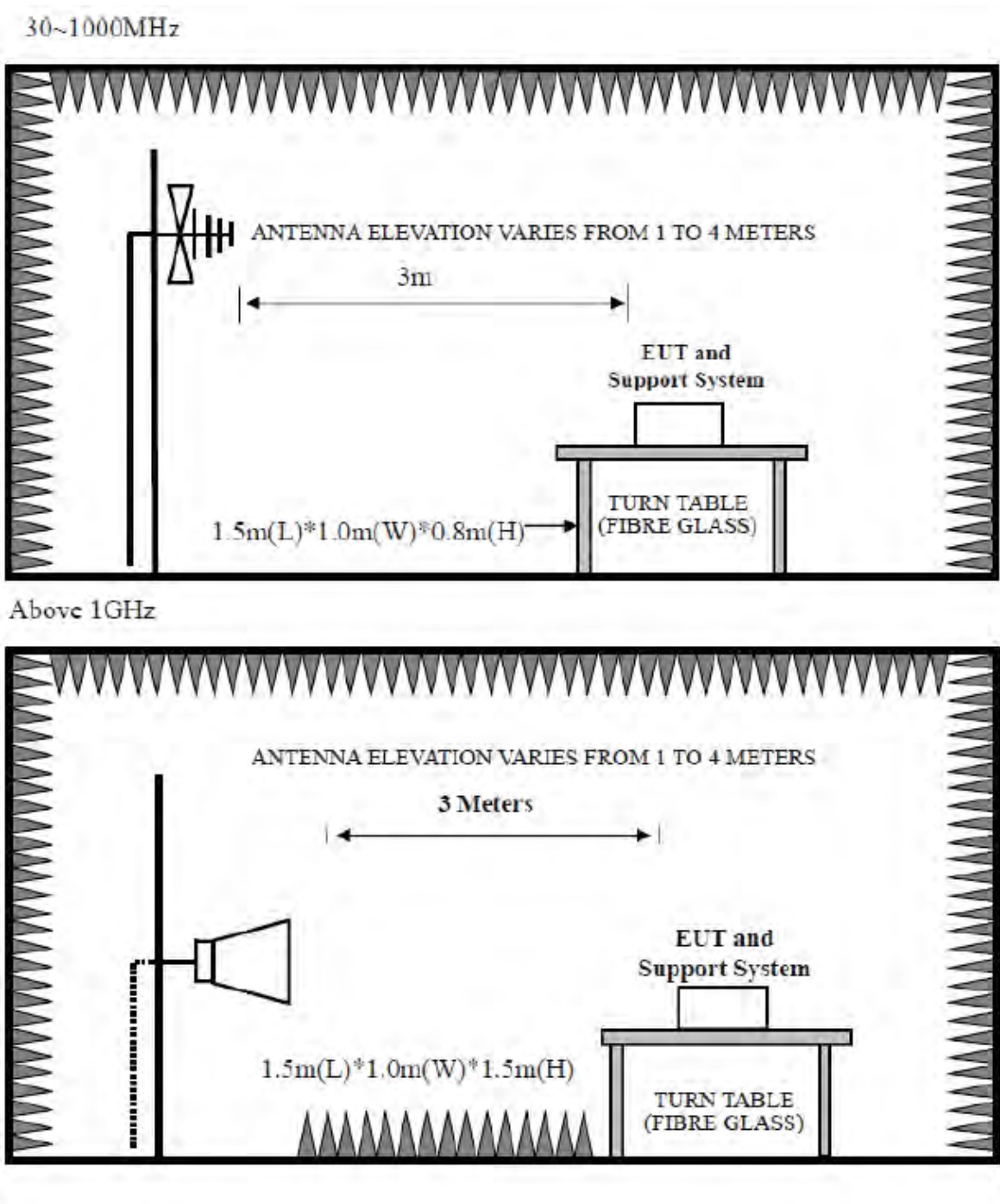
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Remark : (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system

4.2. Block Diagram of Test setup



4.3. Test Procedure

EUT was placed on a turn table, which is 0.8 meter high above ground for 30~1000MHz test, and which is 1.5 meter high above ground for above 1GHz test. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 1MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

PEAK detector, 1MHz/1MHz for PAEK measurement,

PEAK detector, 1MHz/10Hz for Average measurement

The frequency range from 30MHz to 10th harmonic (25GHz) are checked.

4.4. Test Result

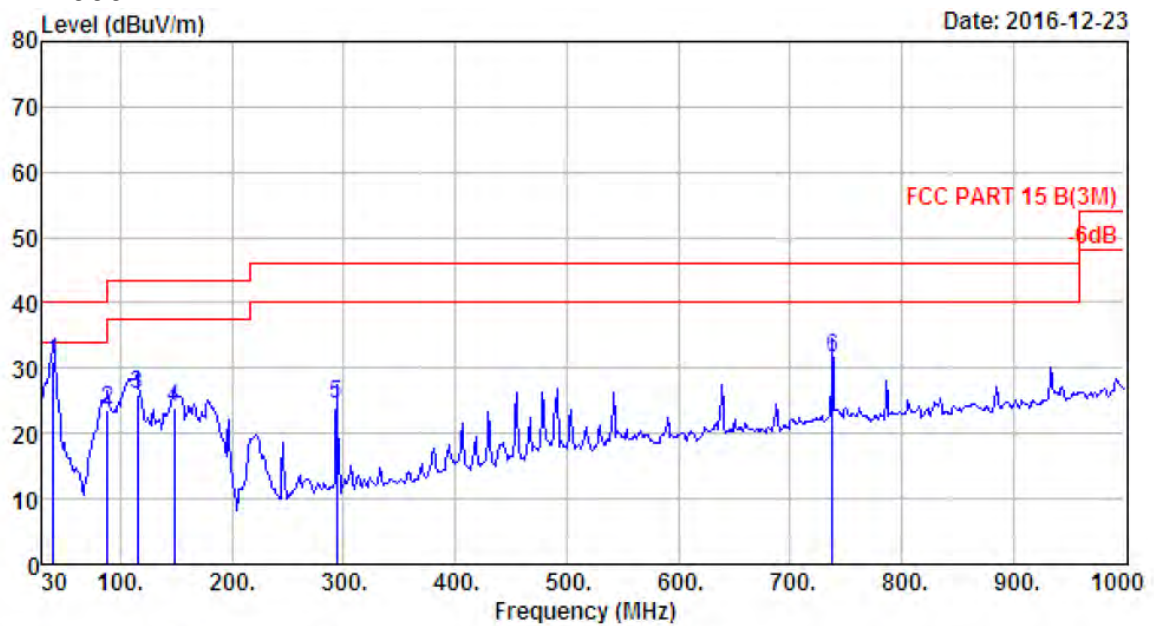
Pass

Note: 1、 For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

2、 The frequency 2404MHz 、2442MHz and 2478MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

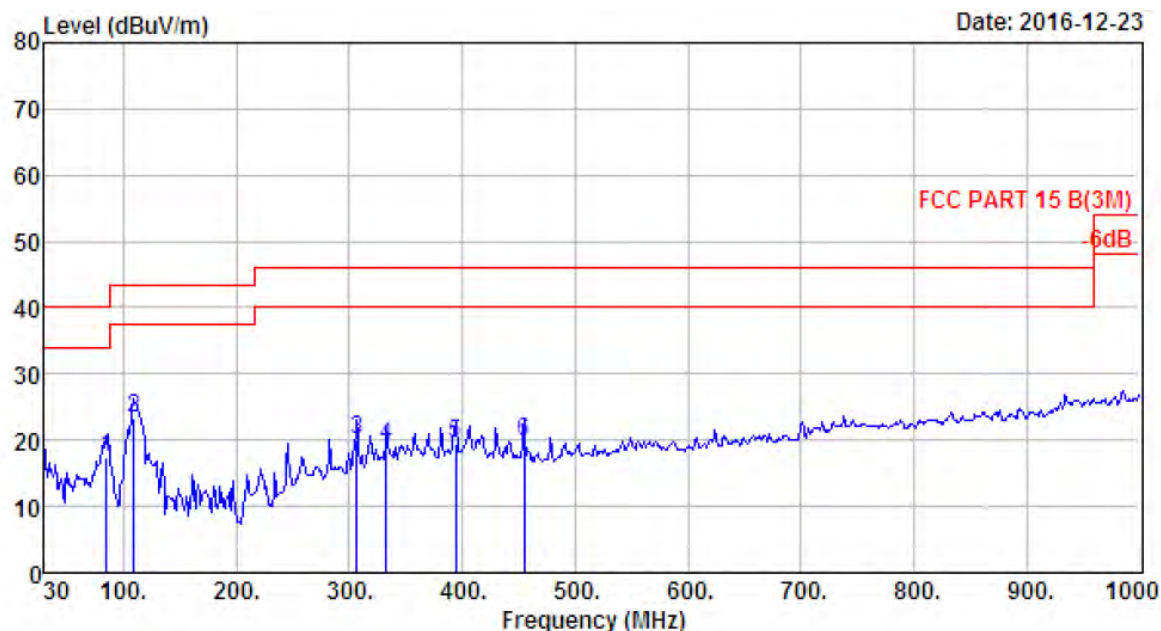
4.5. Test Data

30 MHz – 1000 MHz



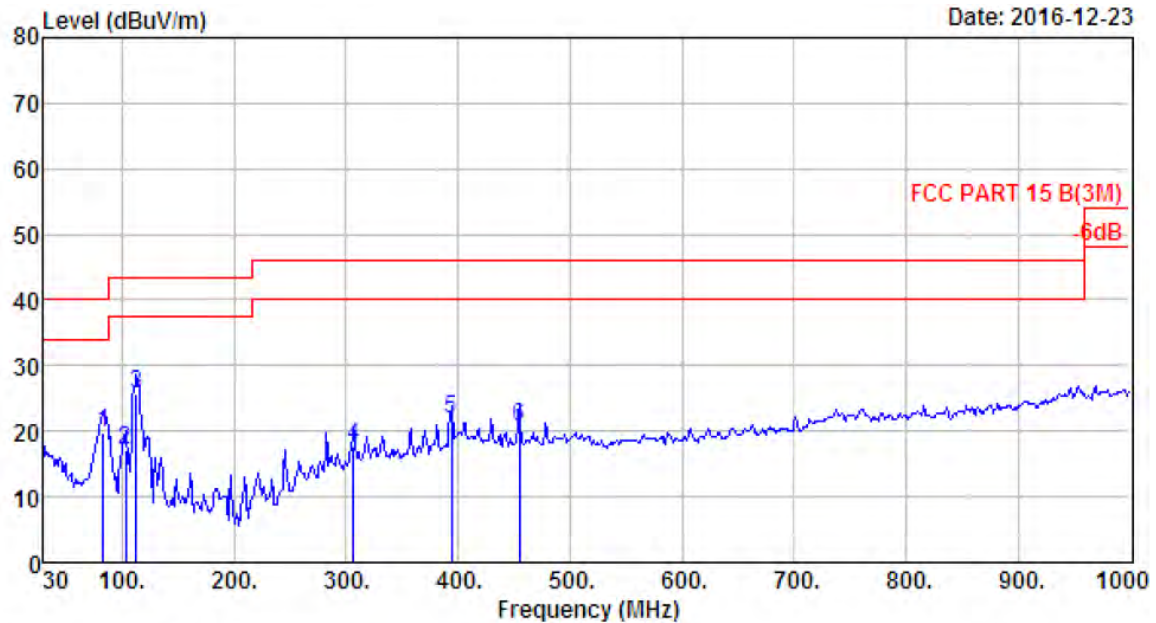
Site no. : 966 1# chamber Data no. : 867
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH1 TX 2404MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Remark
1	39.70	12.90	0.81	17.17	30.88	40.00	9.12	QP
2	88.20	8.11	1.31	14.27	23.69	43.50	19.81	QP
3	115.36	10.93	1.46	13.69	26.08	43.50	17.42	QP
4	148.34	11.00	1.69	11.11	23.80	43.50	19.70	QP
5	293.84	12.92	2.33	9.22	24.47	46.00	21.53	QP
6	738.10	22.32	3.79	5.52	31.63	46.00	14.37	QP



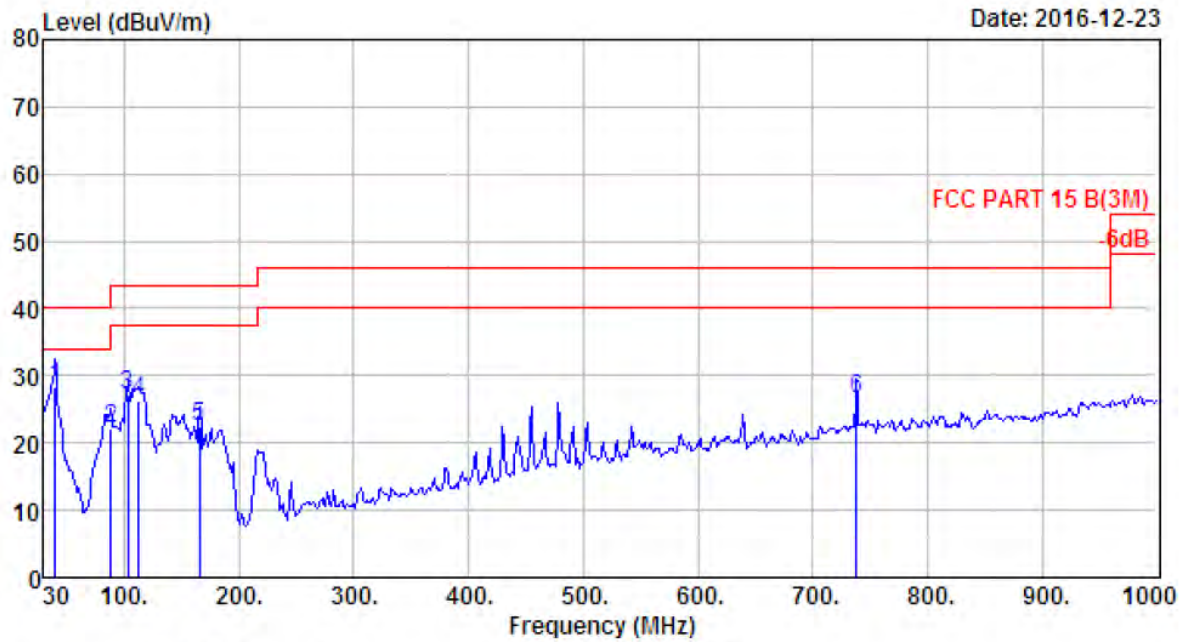
Site no. : 966 1# chamber Data no. : 868
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGMA S1 SUBWOOFER
 Test Mode : CH1 TX 2404MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	85.29	7.72	1.18	8.55	17.45	40.00	22.55	QP
2	109.54	10.44	1.40	11.49	23.33	43.50	20.17	QP
3	306.45	13.13	2.35	4.67	20.15	46.00	25.85	QP
4	332.64	13.93	2.48	2.76	19.17	46.00	26.83	QP
5	393.75	15.78	2.58	1.24	19.60	46.00	26.40	QP
6	454.86	16.65	2.94	0.32	19.91	46.00	26.09	QP



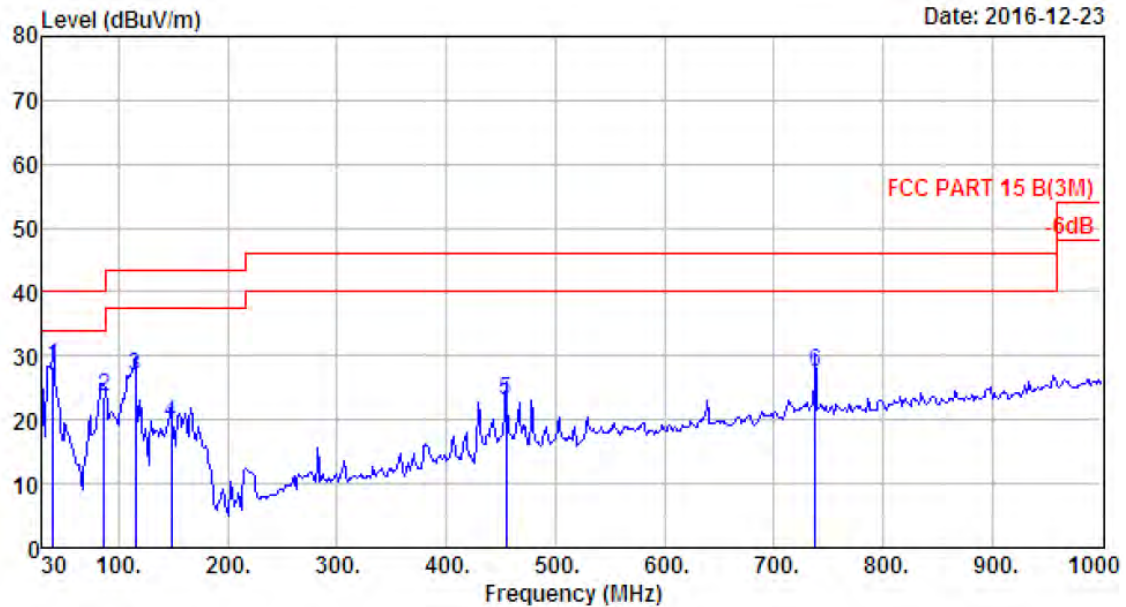
Site no. : 966 1# chamber Data no. : 869
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH20 TX 2442MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	83.35	7.47	1.23	11.14	19.84	40.00	20.16	QP
2	102.75	9.75	1.35	6.05	17.15	43.50	26.35	QP
3	112.45	10.68	1.43	13.64	25.75	43.50	17.75	QP
4	306.45	13.13	2.35	2.31	17.79	46.00	28.21	QP
5	393.75	15.78	2.58	3.41	21.77	46.00	24.23	QP
6	454.86	16.65	2.94	1.18	20.77	46.00	25.23	QP



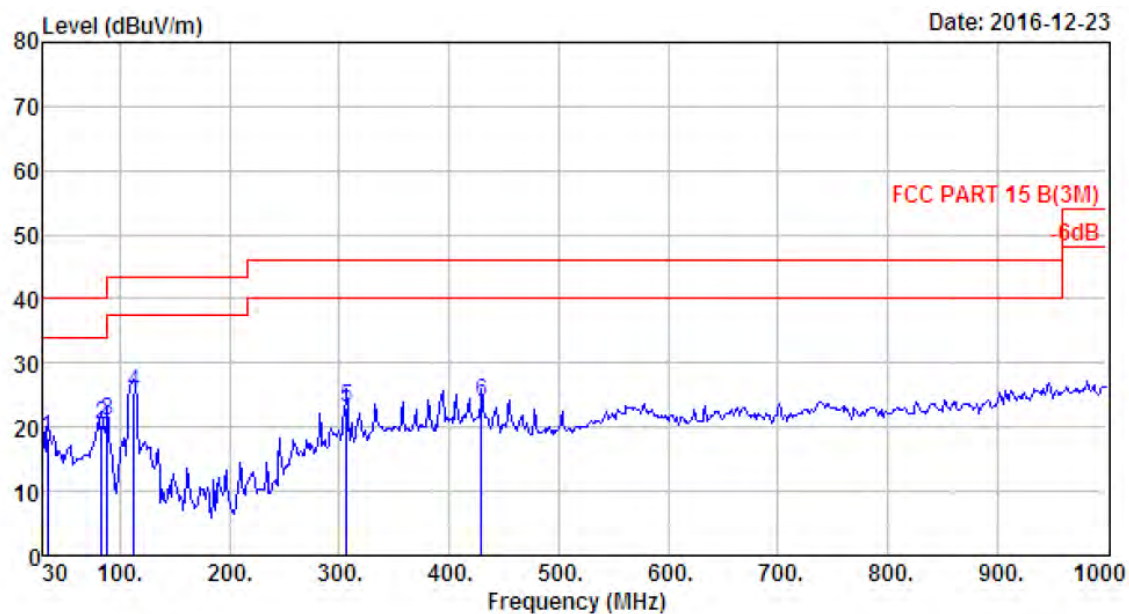
Site no. : 966 1# chamber Data no. : 870
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH20 TX 2442MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	39.70	12.90	0.81	14.75	28.46	40.00	11.54	QP
2	88.20	8.11	1.31	12.72	22.14	43.50	21.36	QP
3	102.75	9.75	1.35	16.02	27.12	43.50	16.38	QP
4	112.45	10.68	1.43	14.29	26.40	43.50	17.10	QP
5	165.80	9.66	1.68	11.09	22.43	43.50	21.07	QP
6	738.10	22.32	3.79	0.43	26.54	46.00	19.46	QP



Site no. : 966 1# chamber Data no. : 871
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGMA S1 SUBWOOFER
 Test Mode : CH38 TX 2478MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	39.70	12.90	0.81	14.75	28.46	40.00	11.54	QP
2	86.26	7.84	1.24	14.55	23.63	40.00	16.37	QP
3	115.36	10.93	1.46	14.57	26.96	43.50	16.54	QP
4	148.34	11.00	1.69	6.66	19.35	43.50	24.15	QP
5	454.86	16.65	2.94	3.43	23.02	46.00	22.98	QP
6	738.10	22.32	3.79	1.37	27.48	46.00	18.52	QP



Site no. : 966 1# chamber Data no. : 872
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH38 TX 2478MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	33.88	16.11	0.70	1.43	18.24	40.00	21.76	QP
2	83.35	7.47	1.23	11.68	20.38	40.00	19.62	QP
3	88.20	8.11	1.31	11.62	21.04	43.50	22.46	QP
4	112.45	10.68	1.43	13.39	25.50	43.50	18.00	QP
5	306.45	13.13	2.35	7.46	22.94	46.00	23.06	QP
6	429.64	16.06	2.86	5.09	24.01	46.00	21.99	QP

Above 1GHz

Site no. : 966 1# chamber Data no. : 853
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH1 TX 2404MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2404.00	27.61	6.64	34.64	76.42	76.03	94.00	17.97	Average
2	2404.00	27.61	6.64	34.64	90.34	89.95	114.00	24.05	Peak
3	4808.00	31.25	11.77	35.64	40.55	47.93	74.00	26.07	Peak
4	7212.00	36.52	11.54	33.95	31.88	45.99	74.00	28.01	Peak
5	11404.00	39.25	10.99	33.57	29.84	46.51	74.00	27.49	Peak
6	14787.00	40.95	10.89	33.81	28.50	46.53	74.00	27.47	Peak
7	18000.00	46.45	11.38	32.12	25.12	50.83	74.00	23.17	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.

Site no. : 966 1# chamber Data no. : 854
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH1 TX 2404MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2404.00	27.61	6.64	34.64	79.52	79.13	94.00	14.87	Average
2	2404.00	27.61	6.64	34.64	93.45	93.06	114.00	20.94	Peak
3	4808.00	31.25	11.77	35.64	40.42	47.80	74.00	26.20	Peak
4	7212.00	36.52	11.54	33.95	31.93	46.04	74.00	27.96	Peak
5	10945.00	39.46	11.29	34.13	31.39	48.01	74.00	25.99	Peak
6	14651.00	41.42	10.91	33.89	29.60	48.04	74.00	25.96	Peak
7	17201.00	40.52	10.91	32.15	28.66	47.94	74.00	26.06	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.

Site no. : 966 1# chamber Data no. : 855
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH20 TX 2442MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2442.00	27.60	6.67	34.85	79.03	78.45	94.00	15.55	Average
2	2442.00	27.60	6.67	34.85	94.55	93.97	114.00	20.03	Peak
3	4884.00	31.37	12.07	35.82	40.04	47.66	74.00	26.34	Peak
4	7326.00	36.55	11.57	34.14	32.24	46.22	74.00	27.78	Peak
5	8650.00	37.27	11.45	33.68	32.31	47.35	74.00	26.65	Peak
6	14855.00	40.71	10.88	33.68	29.32	47.23	74.00	26.77	Peak
7	17898.00	45.45	11.26	30.94	25.85	51.62	74.00	22.38	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.

Site no. : 966 1# chamber Data no. : 856
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH20 TX 2442MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2442.00	27.60	6.67	34.85	79.03	78.45	94.00	15.55	Average
2	2442.00	27.60	6.67	34.85	91.82	91.24	114.00	22.76	Peak
3	4884.00	31.37	12.07	35.82	40.69	48.31	74.00	25.69	Peak
4	7326.00	36.55	11.57	34.14	32.69	46.67	74.00	27.33	Peak
5	11285.00	39.33	11.08	33.32	28.11	45.20	74.00	28.80	Peak
6	15314.00	38.74	11.01	33.37	28.63	45.01	74.00	28.99	Peak
7	18000.00	46.45	11.38	32.12	23.01	48.72	74.00	25.28	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.

Site no. : 966 1# chamber Data no. : 857
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH38 TX 2478MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2478.00	27.58	6.71	35.11	78.65	77.83	94.00	16.17	Average
2	2478.00	27.58	6.71	35.11	91.46	90.64	114.00	23.36	Peak
3	4956.00	31.49	12.44	36.01	39.94	47.86	74.00	26.14	Peak
4	7434.00	36.54	11.60	34.22	35.45	49.37	74.00	24.63	Peak
5	9058.00	37.50	11.49	34.25	32.46	47.20	74.00	26.80	Peak
6	15025.00	40.10	10.87	33.61	29.96	47.32	74.00	26.68	Peak
7	17864.00	45.12	11.22	30.66	24.47	50.15	74.00	23.85	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.

Site no. : 966 1# chamber Data no. : 858
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH38 TX 2478MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2478.00	27.58	6.71	35.11	78.65	77.83	94.00	16.17	Average
2	2478.00	27.58	6.71	35.11	93.37	92.55	114.00	21.45	Peak
3	4956.00	31.49	12.44	36.01	39.31	47.23	74.00	26.77	Peak
4	7434.00	36.54	11.60	34.22	33.20	47.12	74.00	26.88	Peak
5	11625.00	39.06	11.04	33.19	28.51	45.42	74.00	28.58	Peak
6	14651.00	41.42	10.91	33.89	28.60	47.04	74.00	26.96	Peak
7	17983.00	46.28	11.36	31.94	25.72	51.42	74.00	22.58	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.

5. 20 DB BANDWIDTH

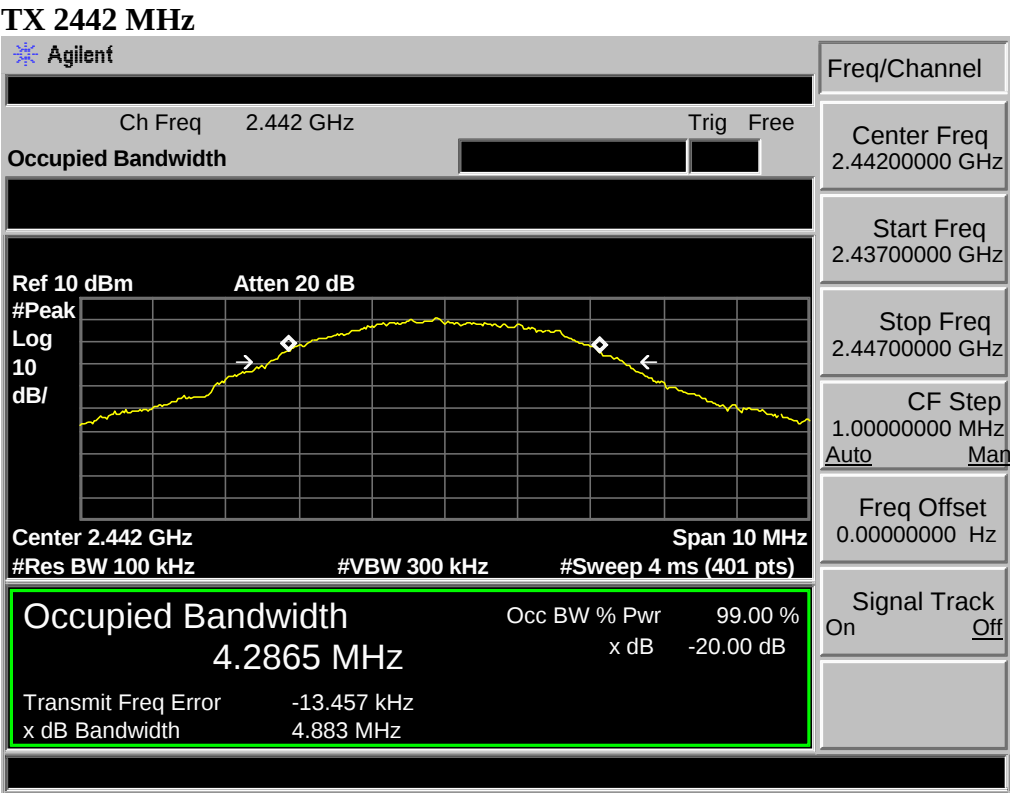
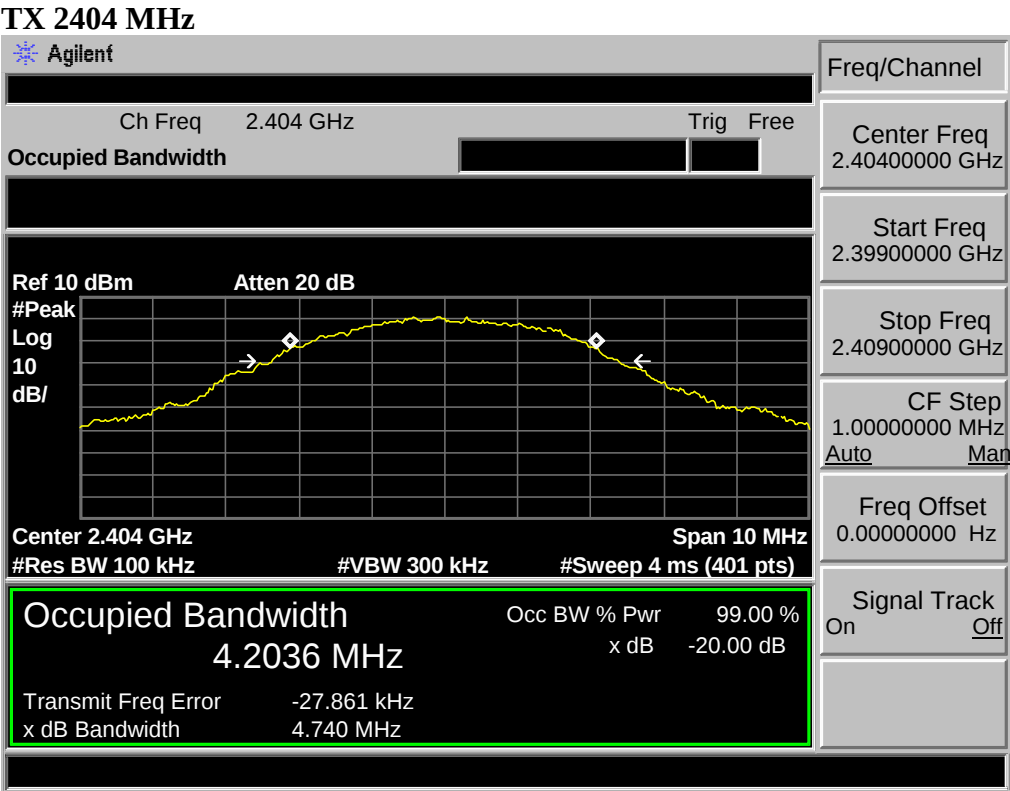
5.1. Test Procedure

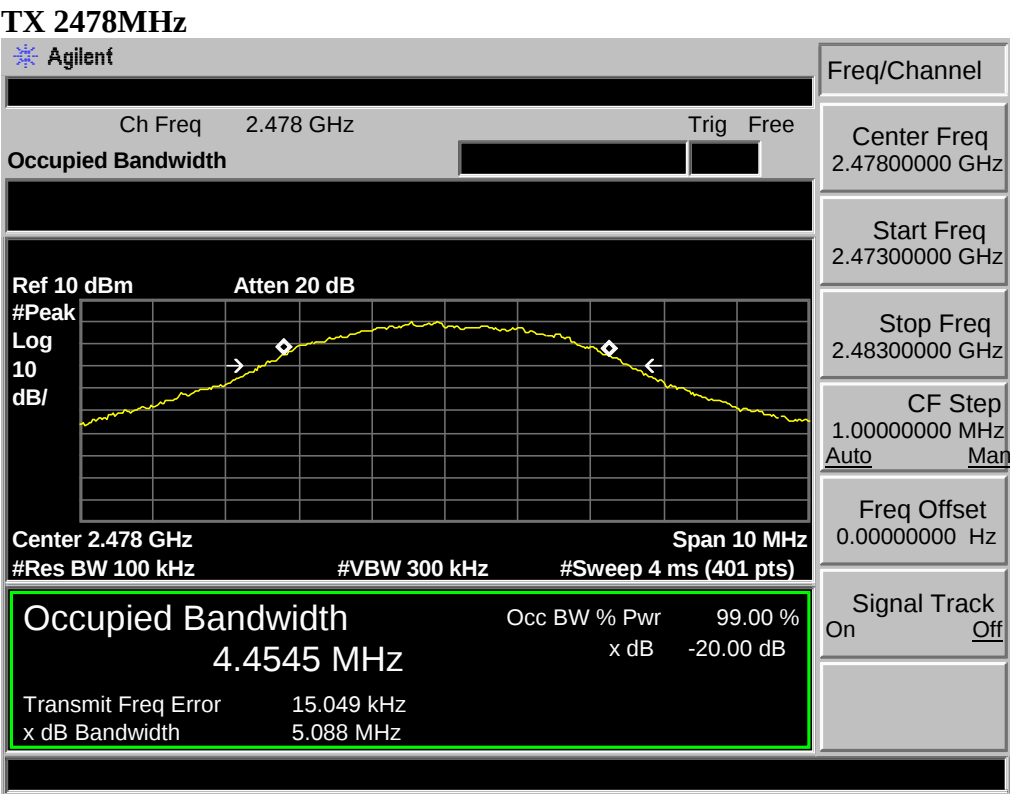
The transmitter output (antenna port) was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

5.2. Test Result

EUT: Universal TV Sound Bar and Wireless Subwoofer System				
M/N: SIGNA S1 SUBWOOFER				
Test date: 2016-12-16		Test site: RF site		Tested by: Tony Tang
Mode	Freq (MHz)	20dB Bandwidth (MHz)	Limit (kHz)	Conclusion
TX	2404	4.740	/	PASS
	2442	4.883	/	PASS
	2478	5.088	/	PASS

5.3. Test Data



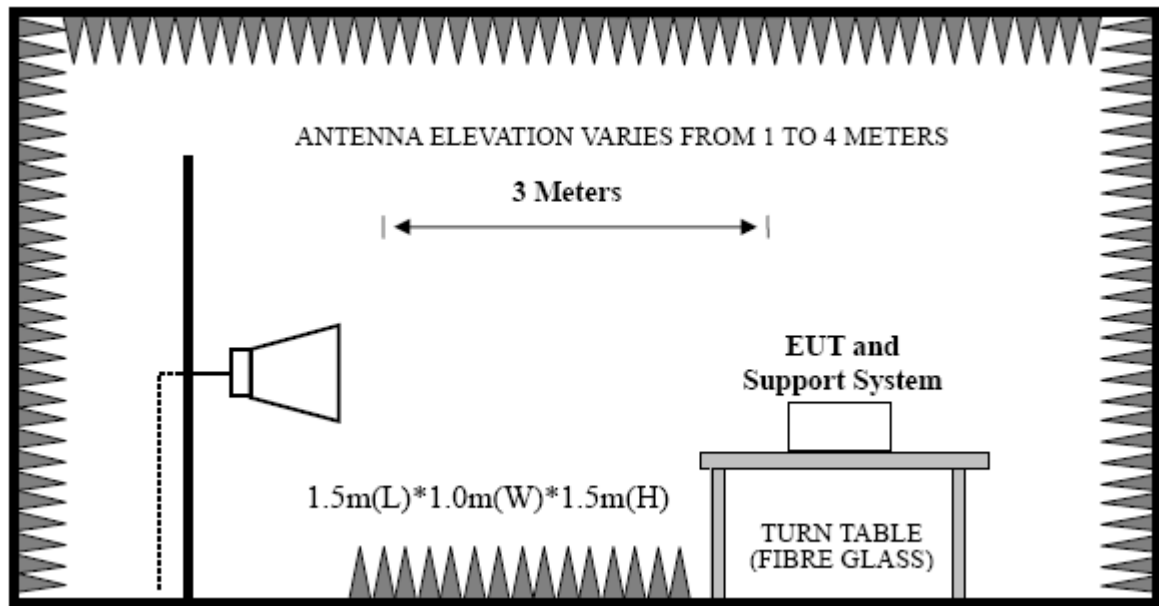


6. BAND EDGE COMPLIANCE

6.1. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

6.2. Block Diagram of Test setup



6.3. Test Procedure

EUT was placed on a turn table, which is 1.5 m high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of emissions

Peak : RBW = 1MHz, VBW = 1MHz, Detector=PEAK detector, Sweep time = auto.

AV : RBW = 1MHz, VBW = 10Hz, Detector=PEAK detector, Sweep time = auto.

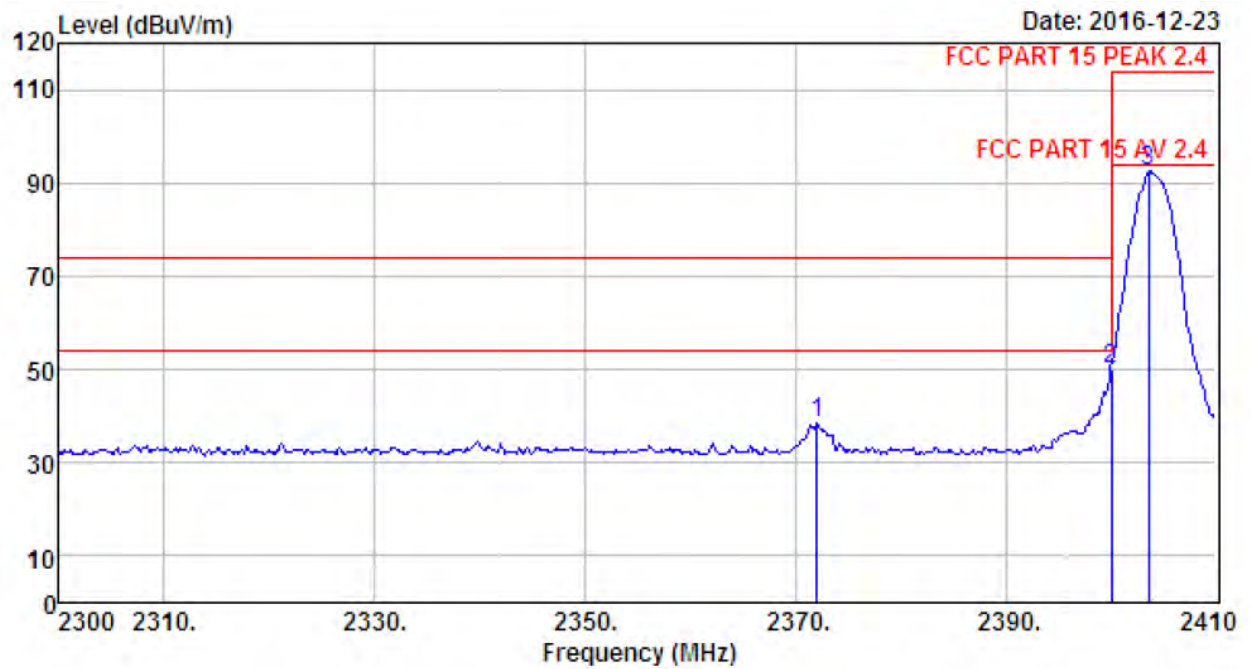
6.4. Test Result

Pass (The testing data was attached in the next pages.)

Note: 1、 For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

2、 The frequency 2404MHz 、2442MHz and 2478MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

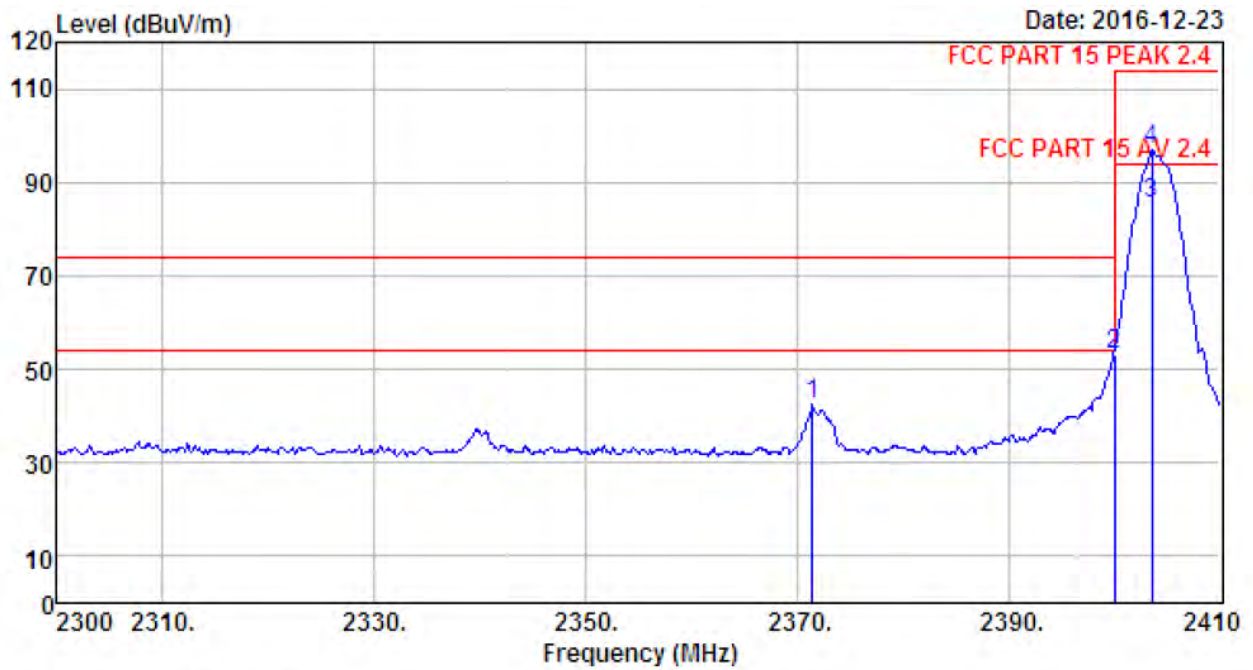
6.5. Test Data



Site no. : 966 1# chamber Data no. : 859
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGMA S1 SUBWOOFER
 Test Mode : CH1 TX 2404MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2372.05	27.67	6.60	34.59	38.67	38.35	74.00	35.65	Peak
2	2400.00	27.61	6.62	34.64	50.30	49.89	74.00	24.11	Peak
3	2403.62	27.61	6.64	34.64	93.15	92.76	114.00	21.24	Peak

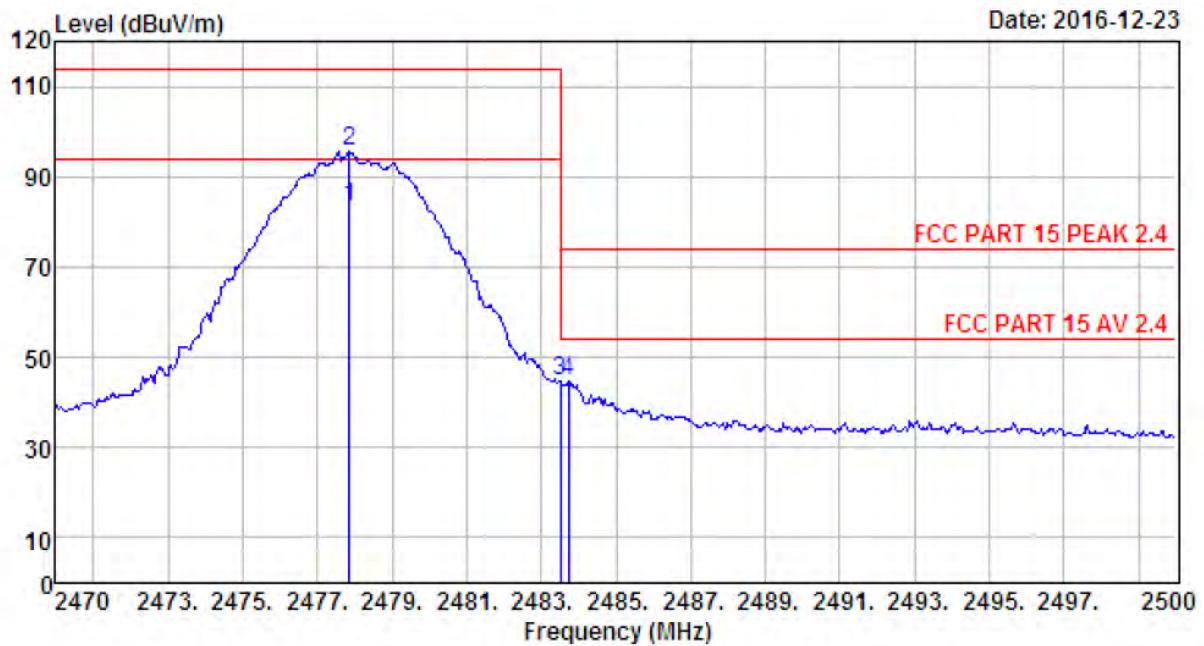
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.



Site no. : 966 1# chamber Data no. : 860
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH1 TX 2404MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2371.50	27.67	6.60	34.59	43.04	42.72	74.00	31.28	Peak
2	2400.00	27.61	6.62	34.64	53.70	53.29	74.00	20.71	Peak
3	2403.62	27.61	6.64	34.64	85.83	85.44	94.00	8.56	Average
4	2403.62	27.61	6.64	34.64	97.33	96.94	114.00	17.06	Peak

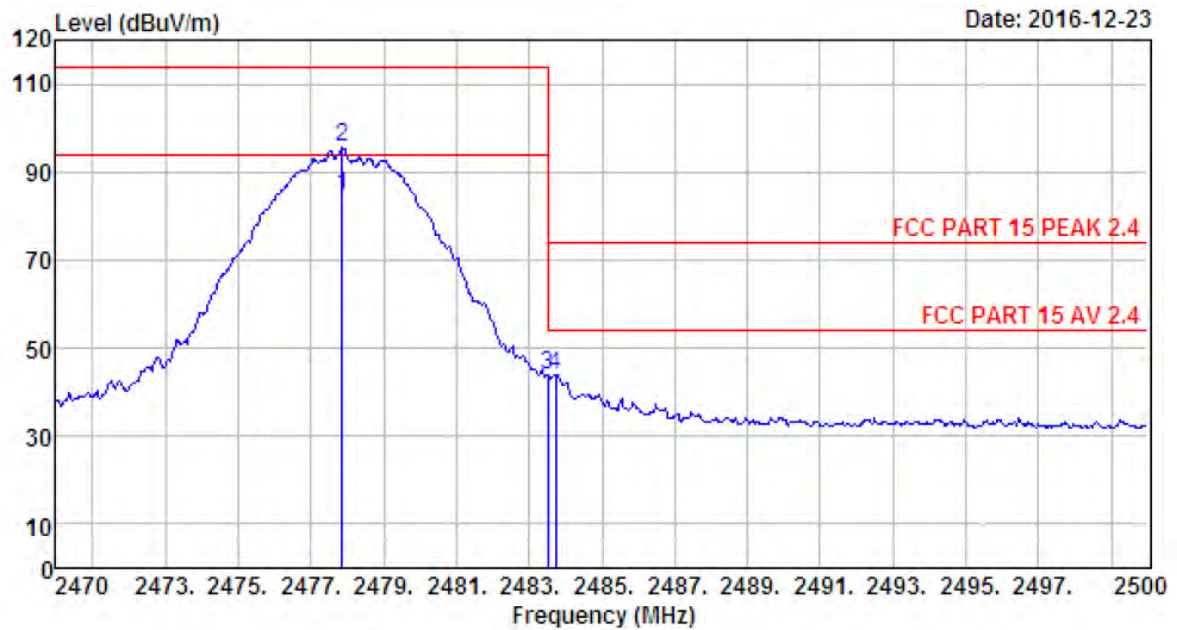
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.



Site no. : 966 1# chamber Data no. : 861
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH38 TX 2478MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2477.86	27.58	6.71	35.11	84.02	83.20	94.00	10.80	Average
2	2477.86	27.58	6.71	35.11	96.28	95.46	114.00	18.54	Peak
3	2483.50	27.58	6.71	35.11	45.74	44.92	74.00	29.08	Peak
4	2483.74	27.58	6.71	35.11	45.41	44.59	74.00	29.41	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.



Site no. : 966 1# chamber Data no. : 862
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 PEAK 2.4
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Universal TV Sound Bar and
 Wireless Subwoofer System
 Power : AC 120V/60Hz
 M/N : SIGNA S1 SUBWOOFER
 Test Mode : CH38 TX 2478MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2477.86	27.58	6.71	35.11	85.50	84.68	94.00	9.32	Average
2	2477.86	27.58	6.71	35.11	96.44	95.62	114.00	18.38	Peak
3	2483.50	27.58	6.71	35.11	44.85	44.03	74.00	29.97	Peak
4	2483.74	27.58	6.71	35.11	44.72	43.90	74.00	30.10	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official
 limit are not reported.

7. ANTENNA REQUIREMENTS

7.1. Limit

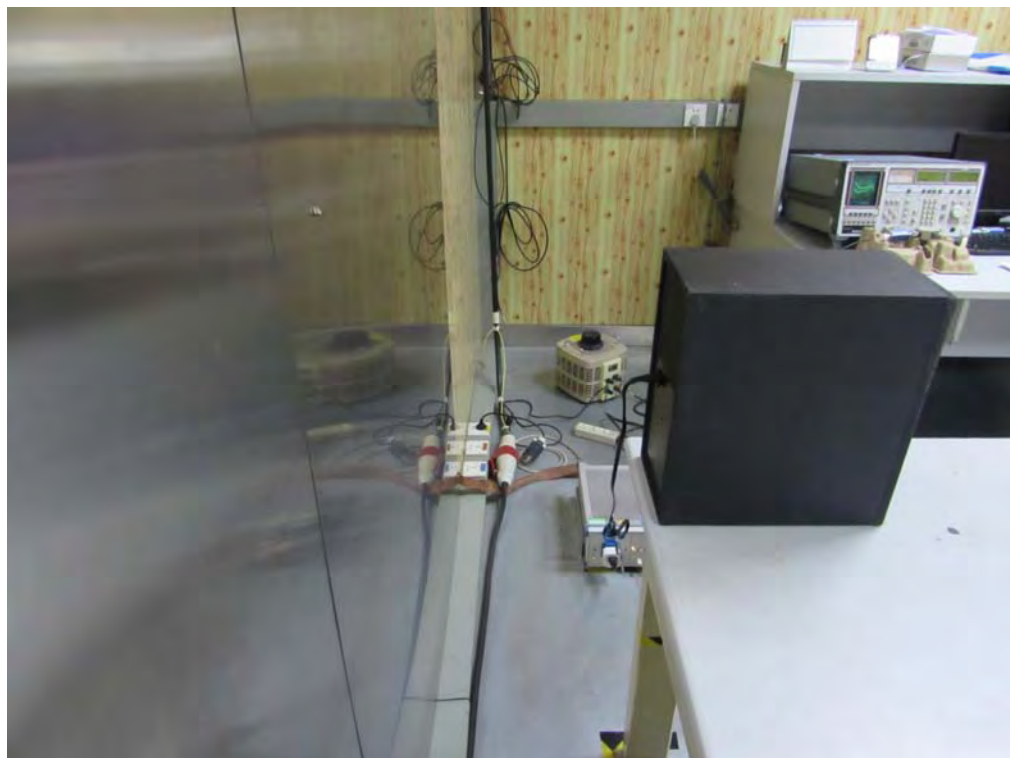
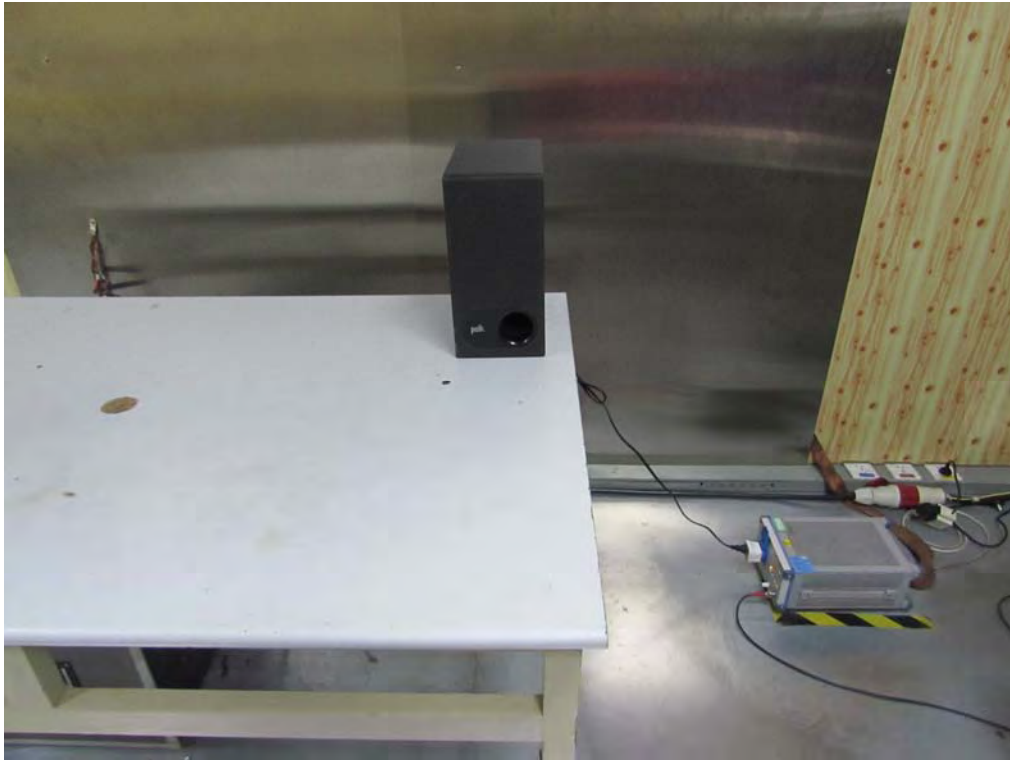
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.249 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

7.2. Result

The antennas used for this product are internal antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2.00dBi.

8. TESTSETUP PHOTO

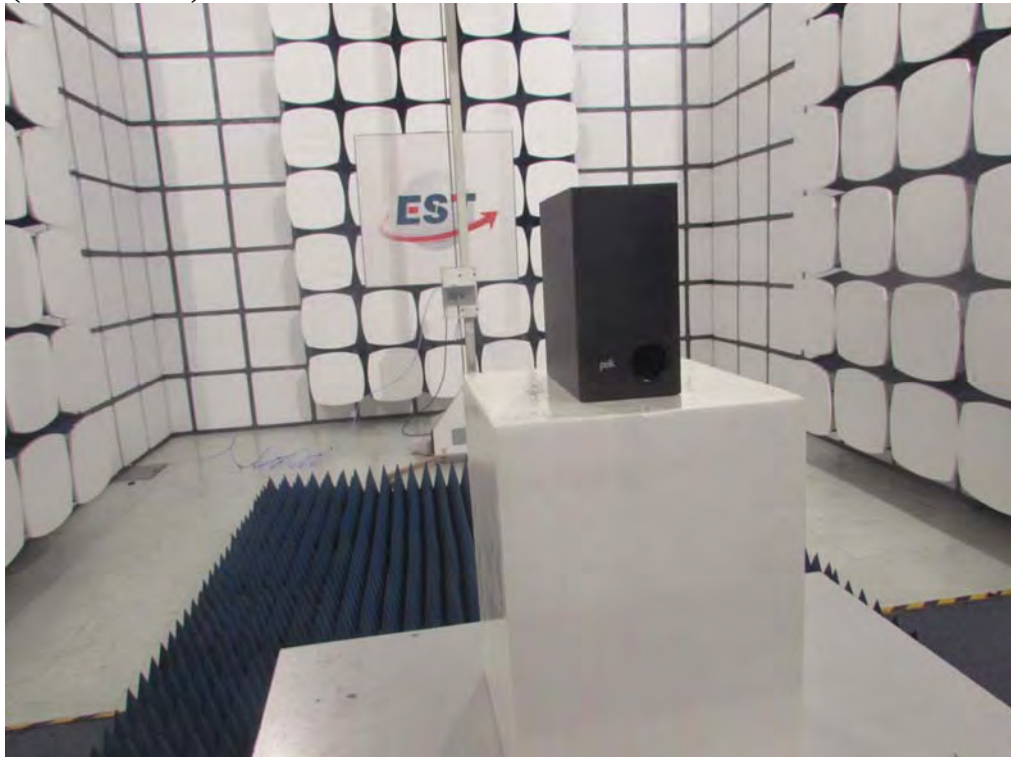
Conducted Test



Radiated Test (30-1000 MHz)

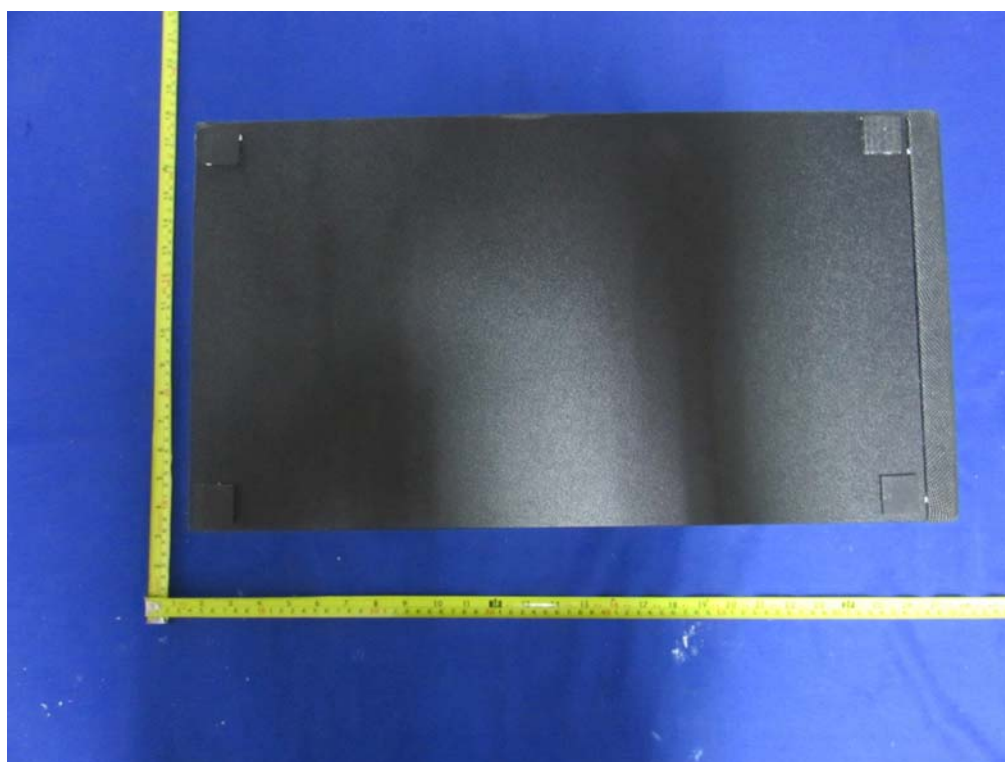
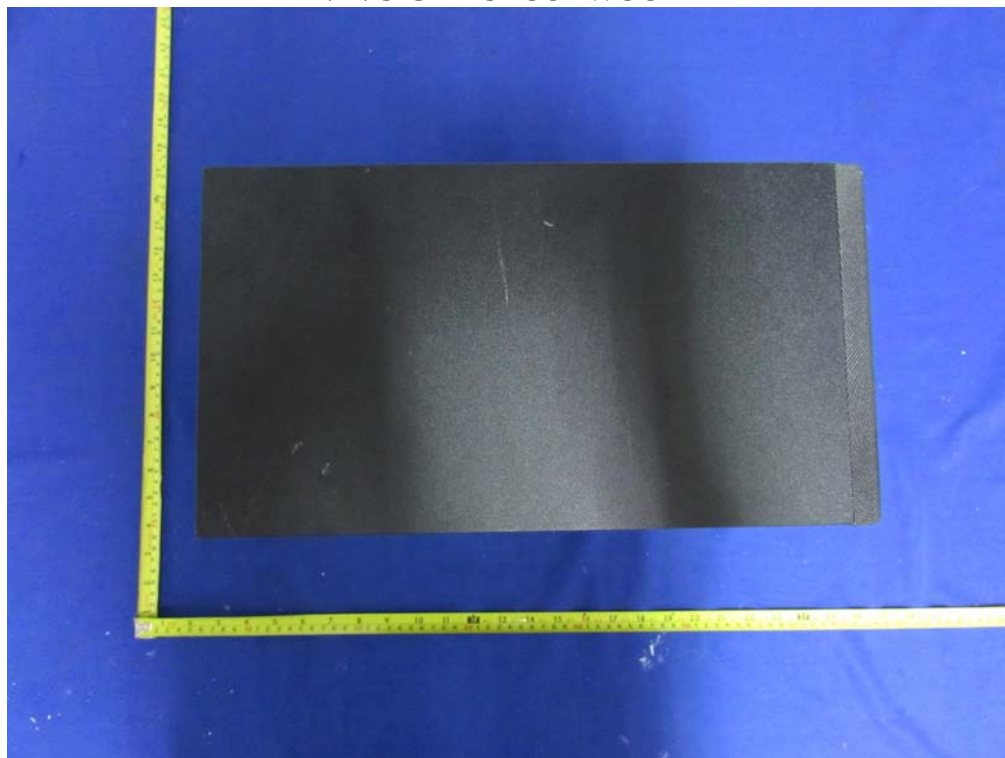


Radiated Test (Above 1GHz)

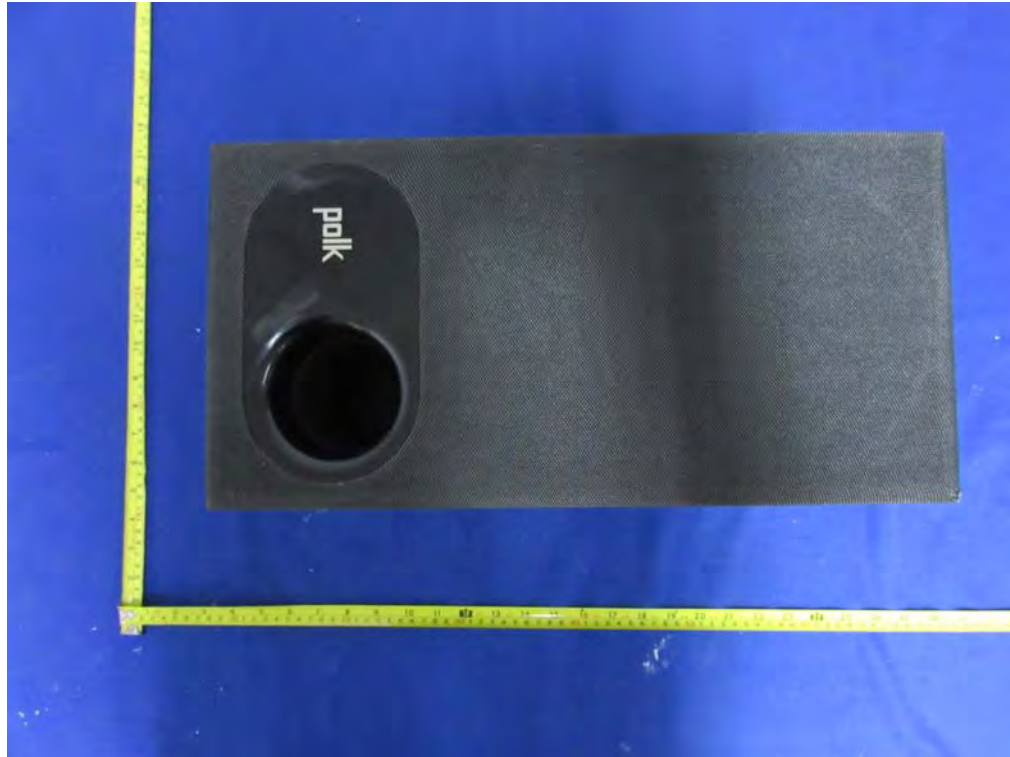


9. PHOTO OF EUT

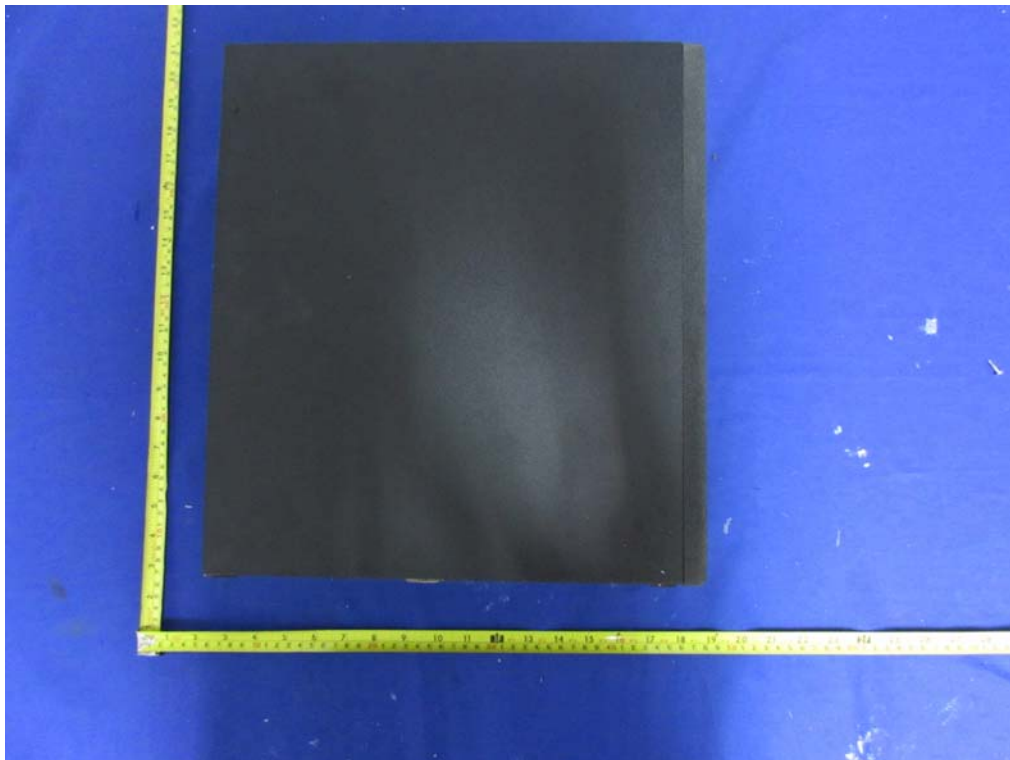
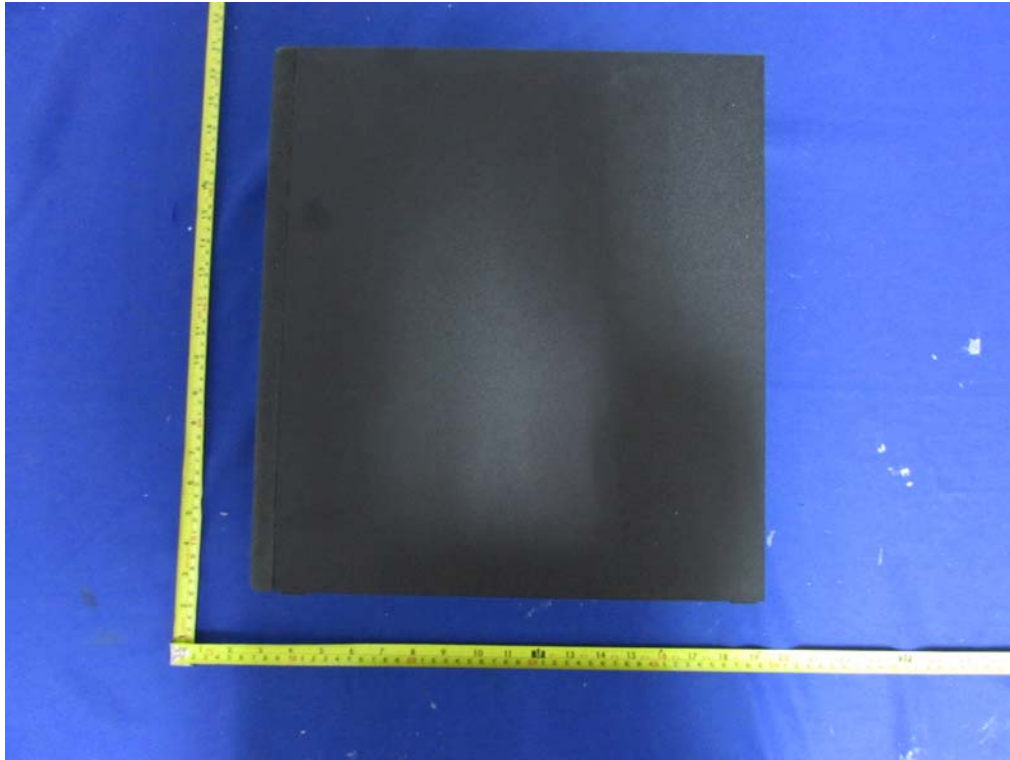
External Photos
M/N: SIGNA S1 SUBWOOFER



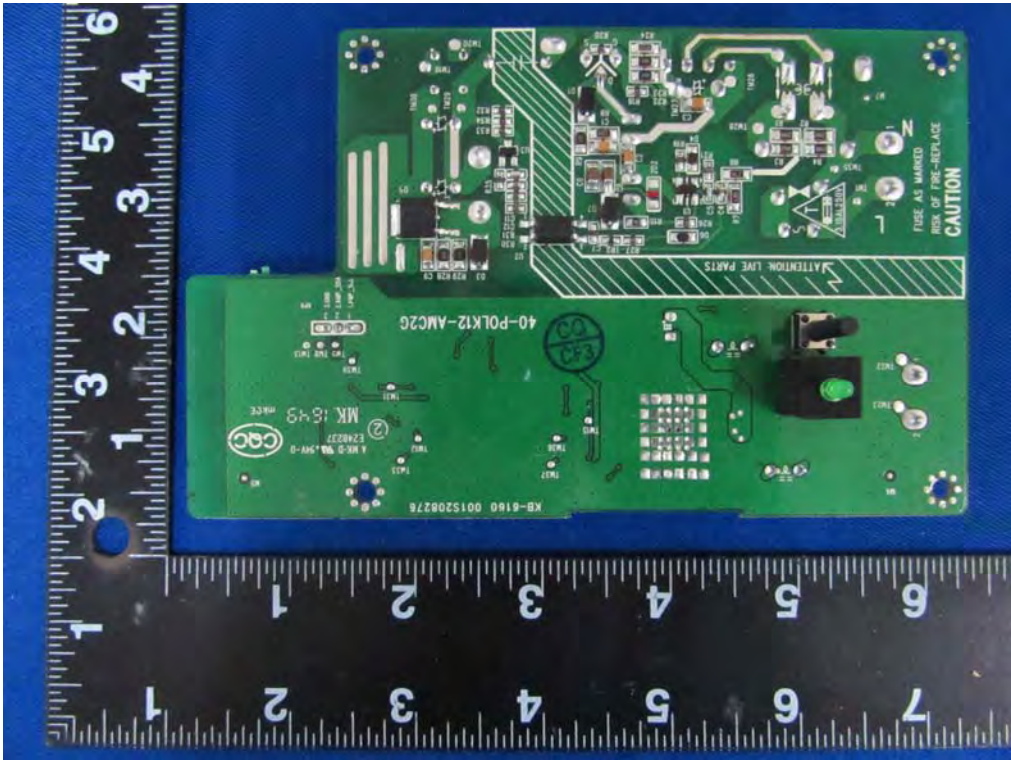
External Photos
M/N: SIGNA S1 SUBWOOFER



External Photos
M/N: SIGNA S1 SUBWOOFER



Internal Photos
M/N: SIGNA S1 SUBWOOFER



Internal Photos
M/N: SIGNA S1 SUBWOOFER

