

FCC CERTIFICATION TEST REPORT

For

FCC ID: 2AAIN-BTW249

Report Reference No. : 14FAB12020 21

Date of issue : 2015-01-28

Testing Laboratory : ATT Product Service Co., Ltd.

Address : No. 3, ChangLianShan Industrial Park, ChangAn Town,
DongGuan City, GuangDong, China.

Applicant's name : ACOUSTMAX INTERNATIONAL CO., LTD

Address : Unit D16/F Cheuk Nang Plaza 250 Hennessy Road Wanchai
Hong Kong China.

Manufacturer : Musilab Electronic (DongGuan) CO., Ltd

Test specification:


Test item description : Wireless Speakers with EZ-Play Technology

Trade Mark : 

Model/Type reference : BTW249

Ratings : I/P:100-240Vac, 50-60Hz, 0.6A

Responsible Engineer


(Rock Huang/Engineer)

Approved by

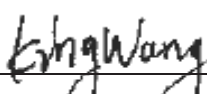

(King Wang /EMC Manger)

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TEST REPORT DECLARE

Applicant	:	ACOUSTMAX INTERNATIONAL CO., LTD
Address	:	Unit D16/F Cheuk Nang Plaza 250 Hennessy Road Wanchai Hong Kong China.
Equipment under Test	:	Wireless Speakers with EZ-Play Technology
Model No	:	BTW249
FCC ID	:	2AAIN-BTW249
Manufacturer	:	Musilab Electronic (DongGuan) CO., Ltd
Address	:	A2, LinDong 3 Road, LinCun, TangXia, DongGuan City, Guangdong Province, China

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C: 2013

Test procedure used: ANSI C63.4: 2009, KDB558074 D01 DTS Meas Guidance V03r02.

We Declare:

The equipment described above is tested by ATT Product Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and ATT Product Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	14FAB12020 21		
Date of Test:	2015/01/12-2015/01/26	Data of report:	2015/01/28

Note: This report applies to above tested sample only. This report shall not be reproduced in parts written approval of ATT Product Service Co., Ltd.

1. SUMMARY OF TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	Standard	Results
6dB Bandwidth	FCC Part 15: 15.247 KDB558074	PASS
Peak Output Power	FCC Part 15: 15.247 KDB558074	PASS
Power Spectral Density	FCC Part 15: 15.247 KDB558074	PASS
Band Edge	FCC Part 15: 15.247	PASS
Spurious Emission	FCC Part 15.205/15.209	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
Conducted Emission	FCC Part 15.207	PASS

2. GENERAL TEST INFORMATION

2.1. DESCRIPTION OF EUT

EUT* Name	:	Wireless Speakers with EZ-Play Technology
Model Number	:	BTW249
EUT function description	:	Please reference user manual of this device
Power supply	:	11.1Vdc or 120Vac, 60 Hz
Radio Technology	:	5.8GHz wireless audio processor
Operation frequency	:	5736MHz, 5762MHz, 5814MHz
Modulation	:	QPSK
MIMO	:	NO
Antenna Type	:	built-in antenna, maximum PK gain:3dBi
Date of Receipt	:	2015/01/12
Sample Type	:	Single production

Note1: EUT is the ab.of equipment under test.

Channle information					
CH	Frequency	CH	Frequency	CH	Frequency
0	5736	1	5762	2	5814

2.2. ACCESSORIES OF EUT

Description of Accessories	Manufacturer	Model number or Type	Output.
/	/	/	/

2.3. ASSISTANT EQUIPMENT USED FOR TEST

Description of Assistant equipment	Manufacturer	Model number or Type	EMC Compliance	SN
--	--	--	--	--

2.4. BLOCK DIAGRAM OF EUT CONFIGURATION FOR TEST



Note: The EUT have two antenna(A and B), They can not transmit simultaneously, The EUT select a antenna to transmit according to signal strength automatically, One Antenna of EUT does not work when Another antenna is transmitting.

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
QPSK	Low :CH0	5736
	Middle: CH1	5762
	High: CH2	5814
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.		

2.5. TEST ENVIRONMENT CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

2.6. MEASUREMENT UNCERTAINTY

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (9KHz-30MHz)	3.21dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	3.42 dB (Polarize: V)
	3.52 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	3.52 dB (Polarize: V)
	3.54 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	4.20 dB (Polarize: V)
	4.20 dB (Polarize: H)
Uncertainty for radio frequency	1×10-9
Uncertainty for conducted RF Power	0.65dB

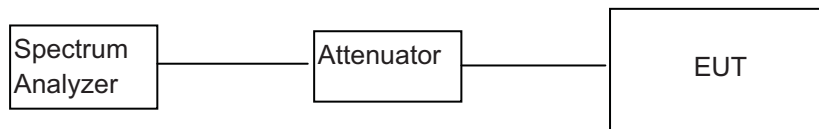
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. 6dB BANDWIDTH

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2015/12/25	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2015/12/26	1 Year

3.2. BLOCK DIAGRAM OF TEST SETUP



3.3. LIMITS

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 KHz

3.4. TEST PROCEDURE

- (1) Configure EUT and assistant system according clause 2.4 and 3.2
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (3) Configure EUT work in test mode as stated in clause 2.4.
- (4) Set the spectrum analyzer as follows:

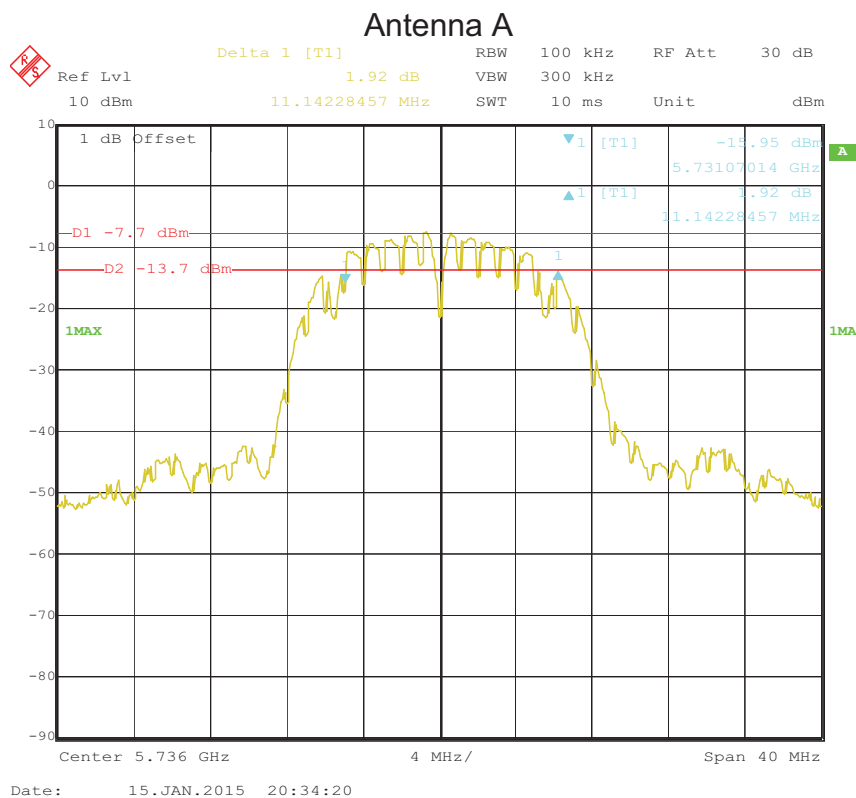
RBW:	100KHz
VBW:	300KHz
Detector Mode:	Peak
Sweep time:	auto
Trace mode:	Max hold

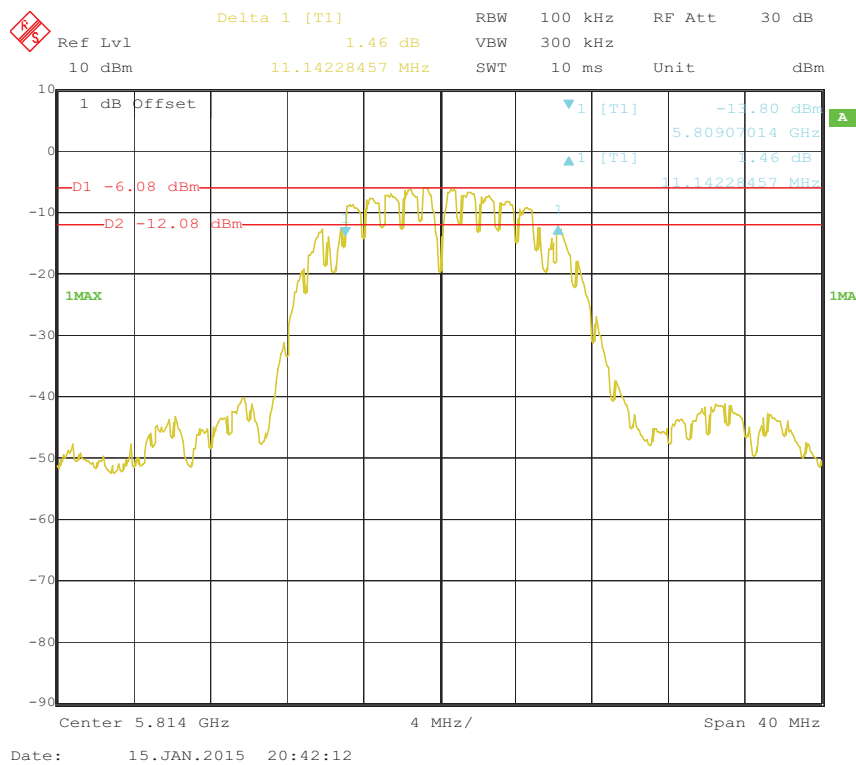
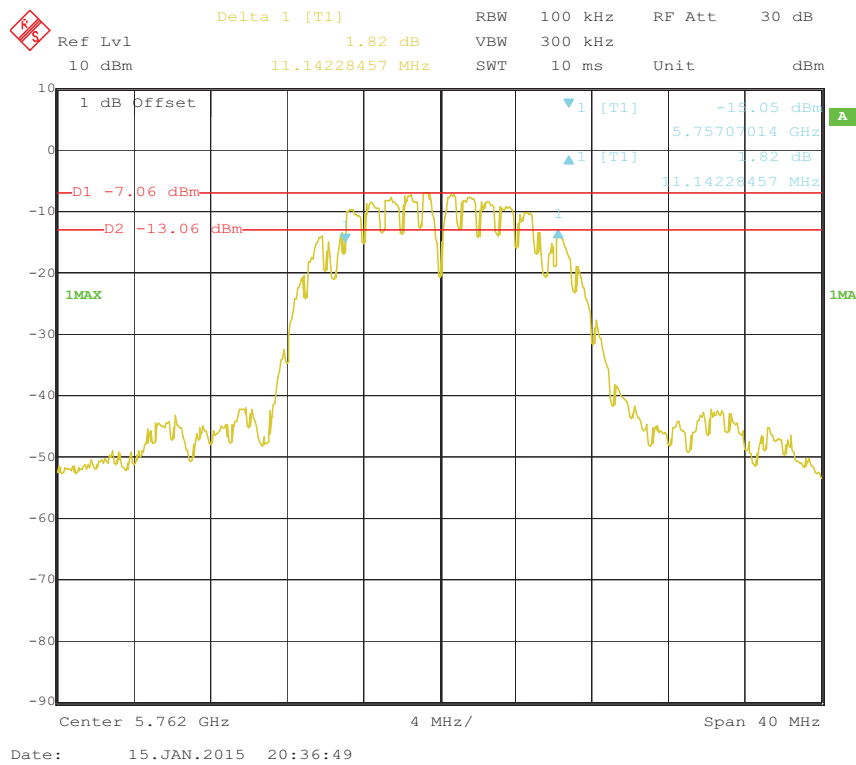
- (5) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.5. TEST RESULT

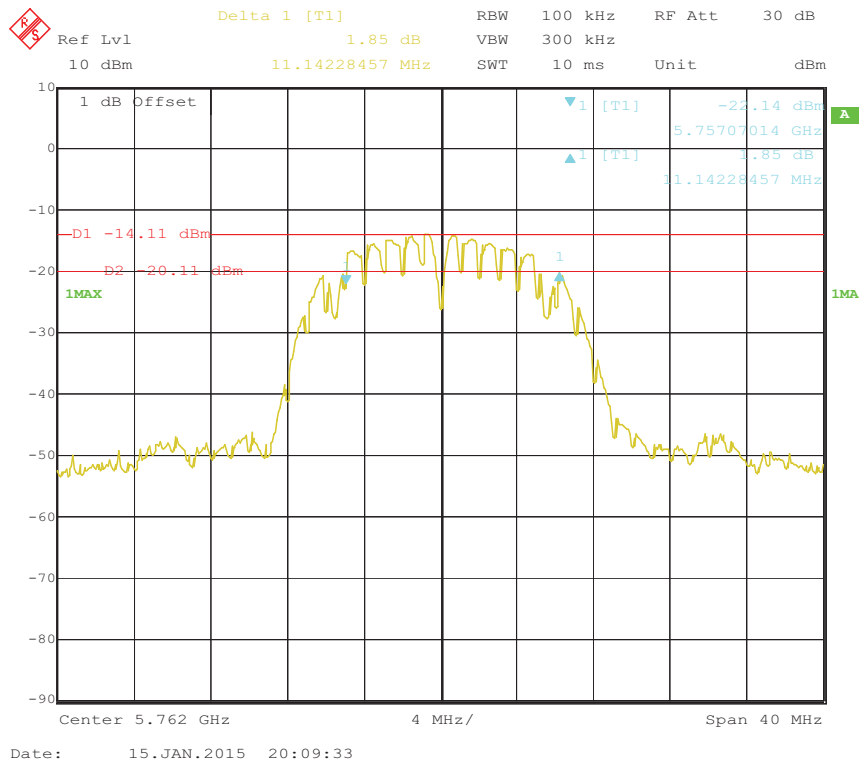
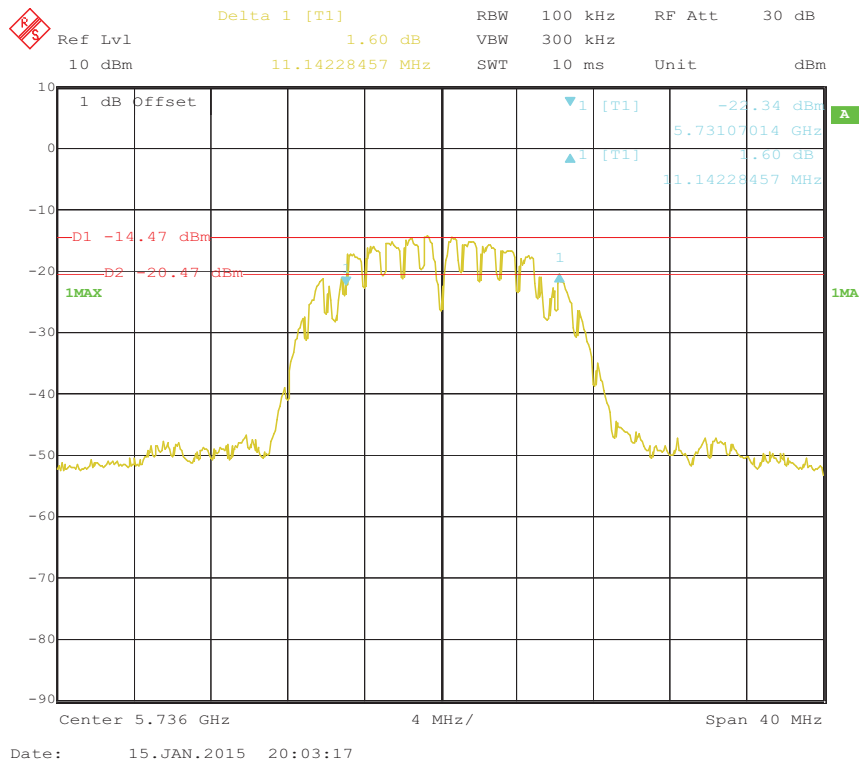
EUT Set Mode	Frequency	Antenna A	Antenna B
		Result (MHz)	Result (MHz)
QPSK	5736	11.142	11.142
	5762	11.142	11.142
	5814	11.142	11.142
Limit: >500KHz			Conclusion: PASS

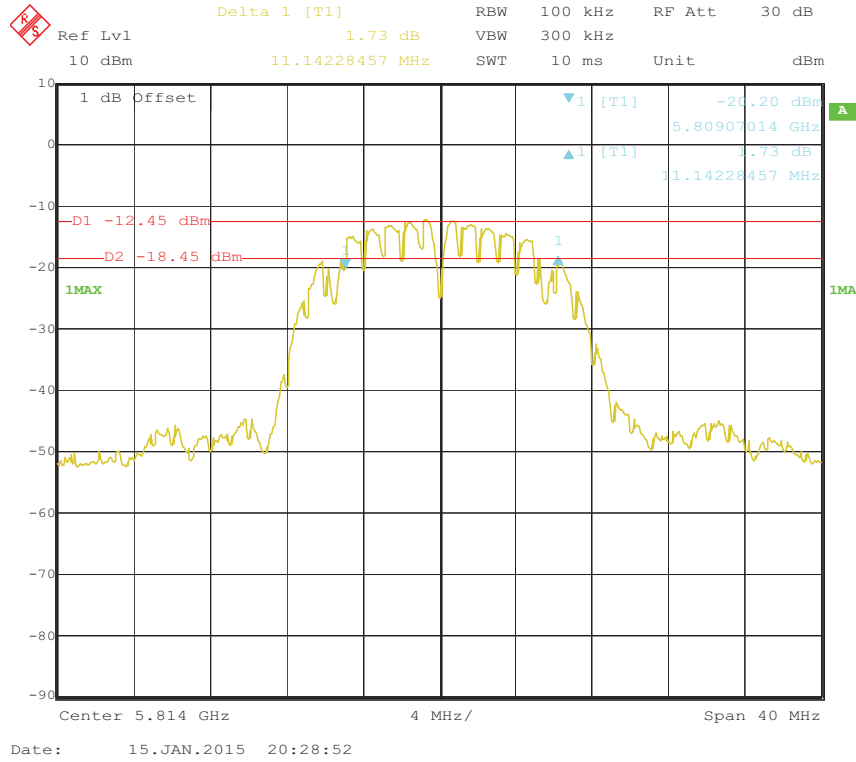
3.6. ORIGINAL TEST DATA





Antenna B





4. MAXIMUM OUTPUT POWER

4.1. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Power meter	R&S	NRVD	102051	2015/12/25	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1 Year
3	Power sensor	Agilent	E9300A	100594	2015/12/26	1 Year

4.2. BLOCK DIAGRAM OF TEST SETUP

Same with 3.2

4.3. LIMITS

Section 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

4.4. TEST PROCEDURE

- (1) Configure EUT and assistant system according clause 2.4 and 3.2
- (2) Connect EUT's antenna output to power meter by RF cable.
- (3) Configure EUT work in test mode as stated in clause 2.4.

4.5. TEST RESULT

EUT Set Mode	Frequency(MHz)	Antenna A Result(dBm)	Antenna B Result(dBm)
		AV	AV
QPSK	5736	4.60	1.39
	5762	5.00	1.26
	5814	7.10	3.44
Limit: 30dBm	Conclusion: PASS		

5. POWER SPECTRAL DENSITY

5.1 TEST EQUIPMENT

Same with 3.1

5.2 BLOCK DIAGRAM OF TEST SETUP

Same with 3.2

5.3 LIMITS

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.4 TEST PROCEDURE

- (1) Configure EUT and assistant system according clause 2.4 and 5.2
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (3) Configure EUT work in test mode as stated in clause 2.4.
- (4) Set the spectrum analyzer as follows:

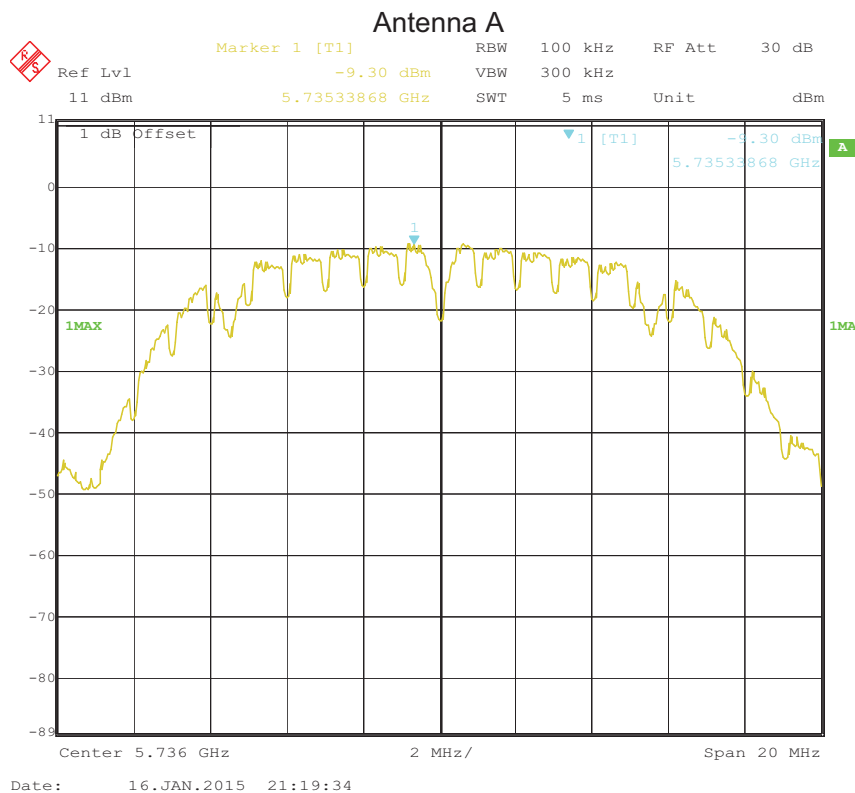
Center frequency	Channel center frequency
RBW:	3 kHz
VBW:	10kHz
Span	1.5times the DTS bandwidth
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

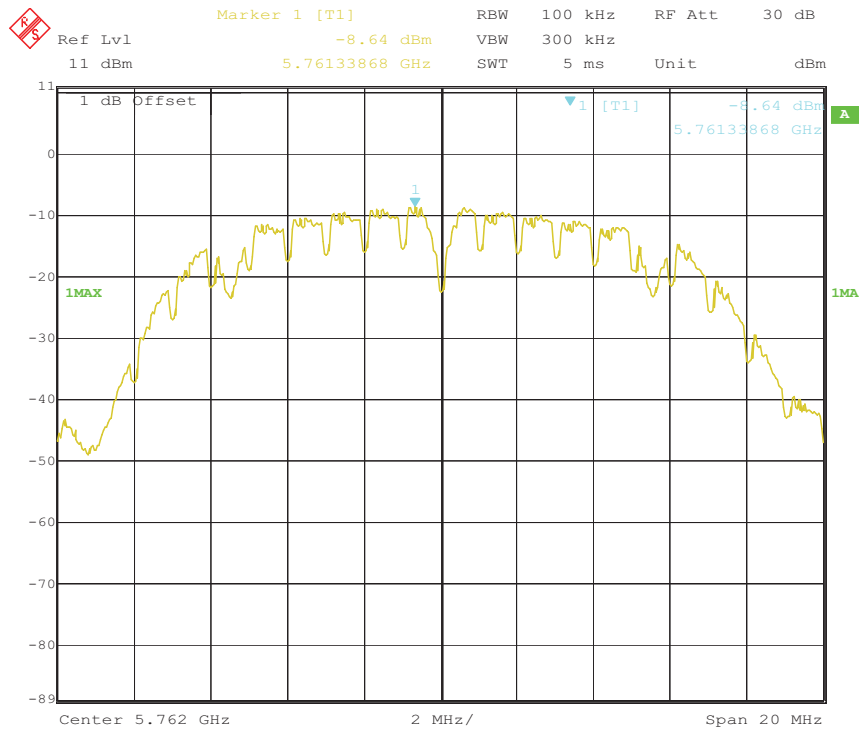
- (5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
- (6) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.5 TEST RESULT

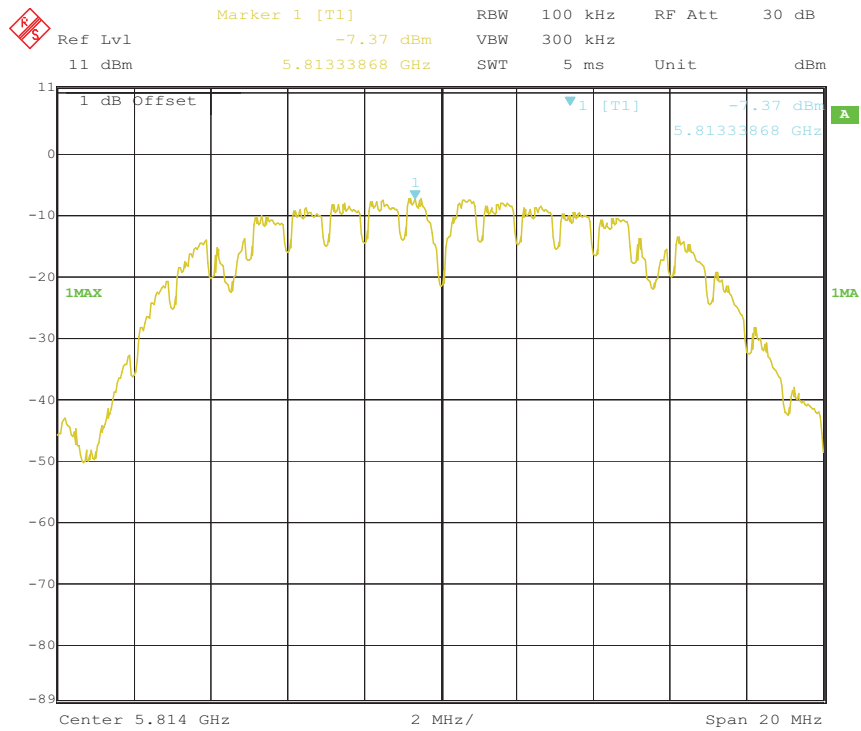
EUT Set Mode	Frequency (MHz)	Antenna A Result	Antenna B Result
QPSK	5736	-9.30	-13.83
	5762	-8.64	-8.33
	5814	-7.37	-11.94
Limit: <8dBm/3KHz		Conclusion: PASS	

5.6 ORIGINAL TEST DATA



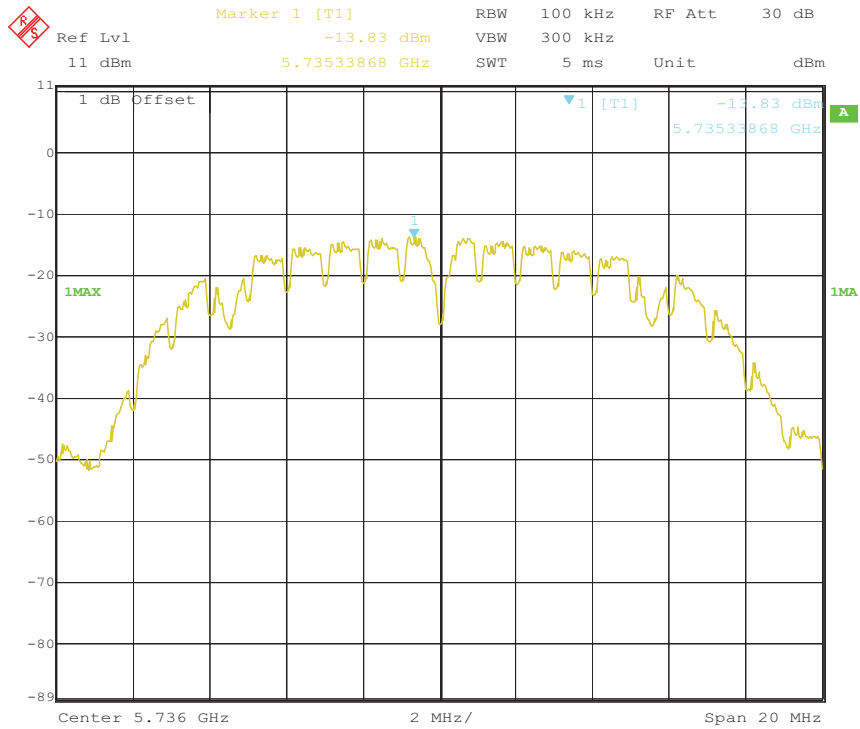


Date: 16.JAN.2015 21:24:20

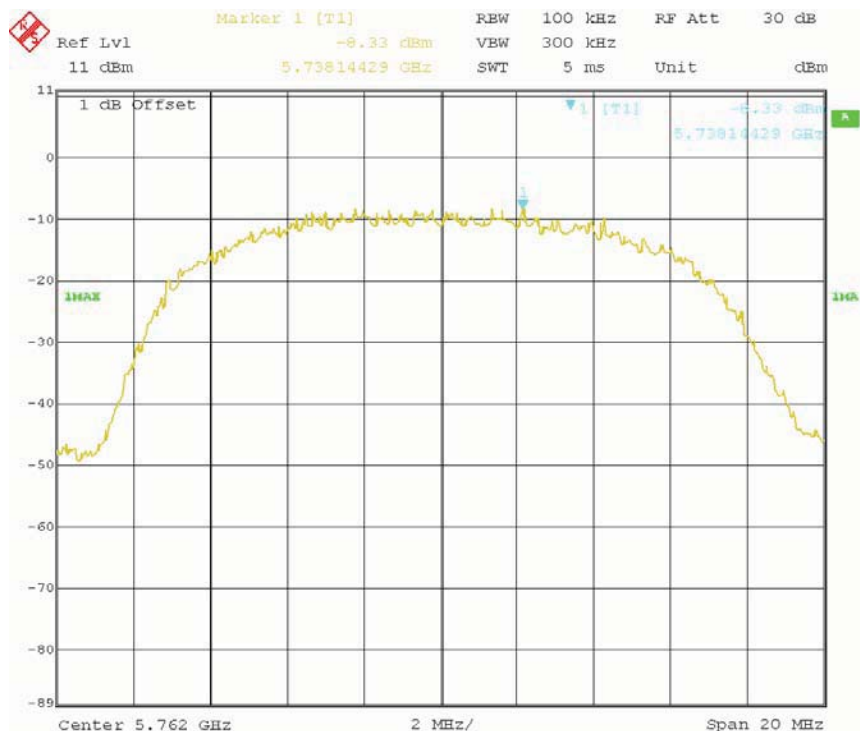


Date: 16.JAN.2015 21:25:30

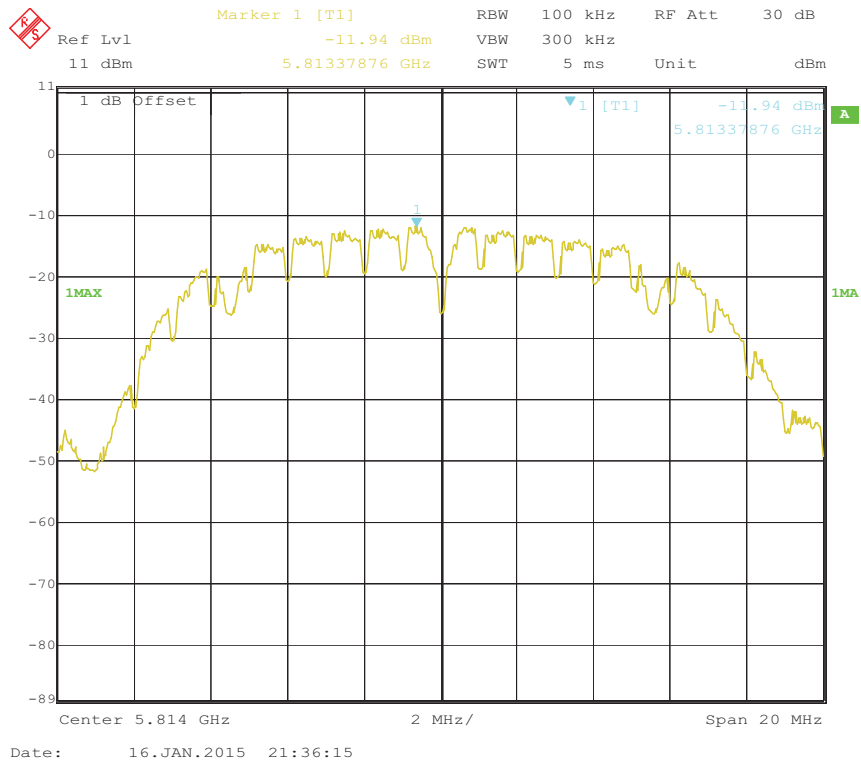
Antenna B



Date: 16.JAN.2015 21:37:14



Date: 16.JAN.2015 21:43:00



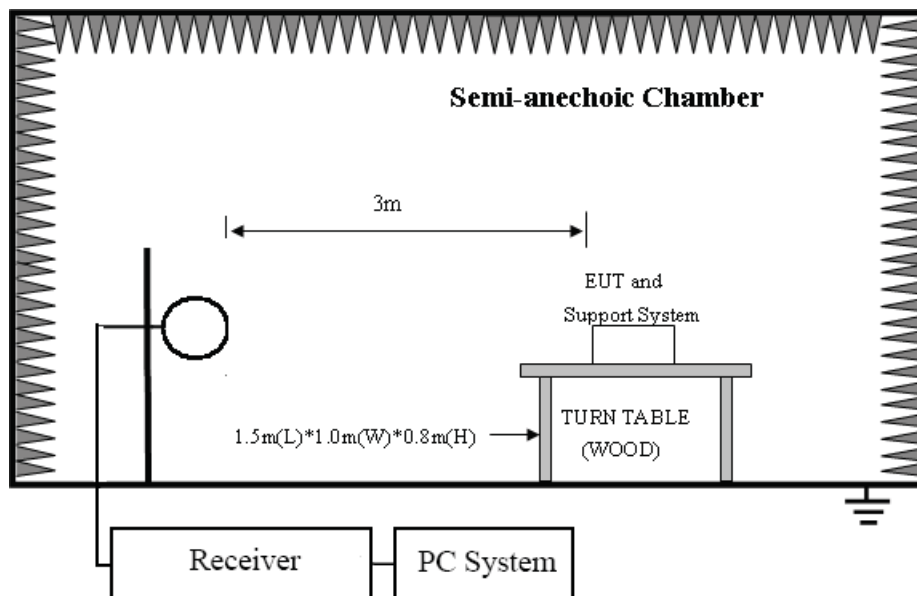
6 SPURIOUS EMISSION

6.1 TEST EQUIPMENT

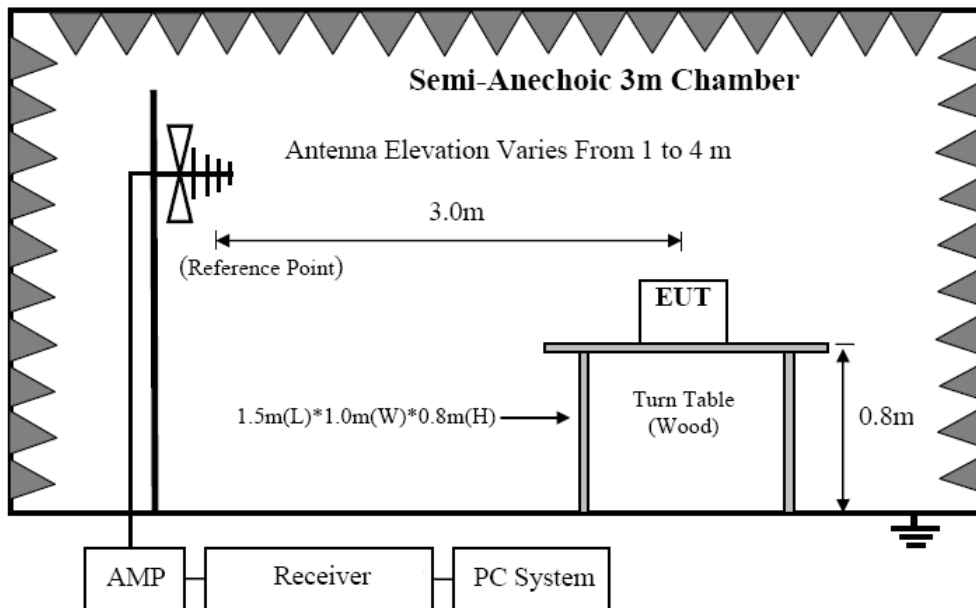
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2015/12/25	1 Year
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2015/07/13	1 Year
3	Loop antenna	TESEQ	HLA6120	20129	2015/12/26	1 Year
4	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2015/12/26	1 Year
5	Double Ridged Horn Antenna	R&S	HF907	100276	2015/12/26	1 Year
6	Horn Antenna	EMCO	3116	00060095	2015/12/26	1 Year
7	Pre-amplifier	A.H.	PAM-1840VH	562	2015/12/26	1 Year
8	Pre-amplifier	R&S	AFS33-18002 650-30-8P-44	SEL0080	2015/12/26	1 Year
9	RF Cable	R&S	R01	10403	2015/12/26	1 Year
10	RF Cable	R&S	R02	10512	2015/12/26	1 Year

6.2 BLOCK DIAGRAM OF TEST SETUP

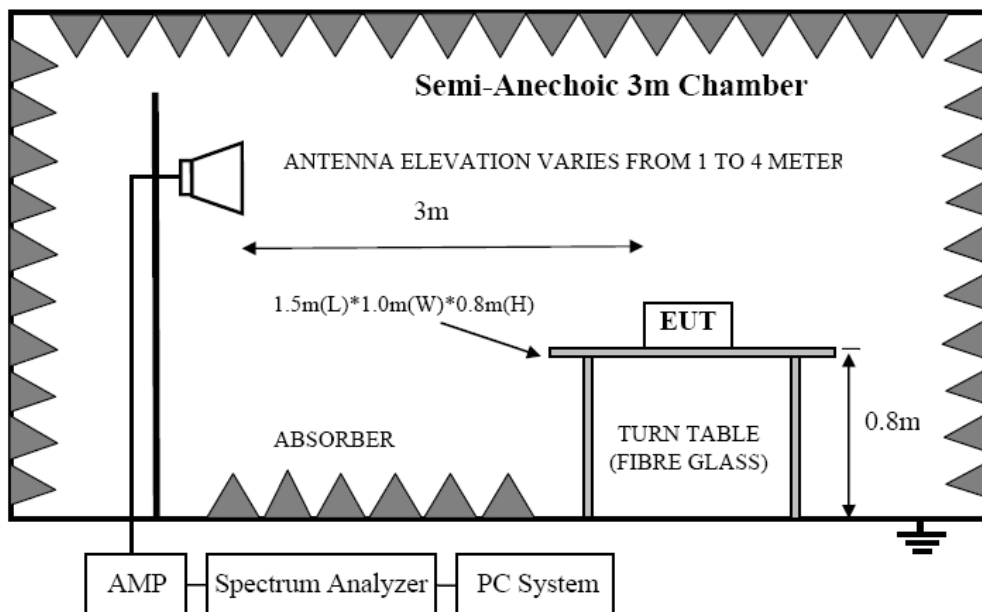
In 3m Anechoic Chamber Test Setup Diagram for 9KHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for 30MHz-1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

6.3 LIMIT

6.3.1 FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

6.3.2 FCC 15.209 Limit.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(KHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(KHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
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 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3m}(\text{dB}\mu\text{V}/\text{m}) = \text{Limit}_{30m}(\text{dB}\mu\text{V}/\text{m}) + 40\text{Log}(30\text{m}/3\text{m})$$

6.3.3 Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 30dB below the fundamental emissions, or comply with 15.209 limits.

6.4 TEST PROCEDURE

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 7.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
9KHz-30MHz	Active Loop antenna
30MHz-1GHz	Trilog Broadband Antenna
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)
18GHz-40GHz	Horn Antenna(18GHz-40GHz)

According ANSI C63.10:2009 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

- (4) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9KHz to 25GHz:
 - (a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m(Except loop antenna, it's fixed 1m above ground.)
 - (b) Change work frequency or channel of device if practicable.
 - (c) Change modulation type of device if practicable.
 - (d) Change power supply range from 85% to 115% of the rated supply voltage
 - (e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18GHz to 25GHz, so below final test was performed with frequency range from 9KHz to 18GHz.

- (5) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2009 on Radiated Emission test.
- (6) The emissions from 9KHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz, for emissions from 9KHz-90KHz,110KHz-490KHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.
- (7) The emissions from 9KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

- (8) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, And the RBW is set at 1MHz, VBW is set at 3MHz peak detector for Peak measure and RMS detector for Average measure.

6.5 TEST RESULT

PASS. (See below detailed test result)

All the emissions except fundamental emission from 9KHz to 40GHz were comply with 15.209 limit.

Note 1: According exploratory test no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 40GHz, so the final test was performed with frequency range from 30MHz to 18GHz and recorded in below.

Note 2: For below test data, when the limit tabular marked “/” means this frequency point is the fundamental emission and no need comply with this limit.

Test Result

Test Site : DDT 3m Chamber
EUT : Wireless Speakers with EZ-Play Technology
Power Supply : 11.1Vdc
Condition : Temp:24.5°C,Humi:55%, Press:100.1kPa
Memo : Antenna A

Tested By : Vito
Model Number : BTW249
Test Mode : keeping TX mode
Antenna/Distance : VULB 9163 / 3m

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
	Reading (dBμV)	(PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel (5736)									
5350.0	48.26	PK	H	33.86	6.45	31.59	56.98	74.00	-17.02
5350.0	34.52	AV	H	33.86	6.45	31.59	43.24	54.00	-10.76
5350.0	46.25	PK	V	33.86	6.45	31.59	54.97	74.00	-19.03
5350.0	33.48	AV	V	33.86	6.45	31.59	42.20	54.00	-11.80
5460.0	49.56	PK	H	34.05	6.49	31.42	58.68	74.00	-15.32
5460.0	36.18	AV	H	34.05	6.49	31.42	45.30	54.00	-8.70
5460.0	47.24	PK	V	34.05	6.49	31.42	56.36	74.00	-17.64
5460.0	34.10	AV	V	34.05	6.49	31.42	43.22	54.00	-10.78
11472.0	32.48	PK	H	40.00	10.10	32.40	50.18	74.00	-23.82
11472.0	26.65	AV	H	40.00	10.10	32.40	44.35	54.00	-9.65
11472.0	33.89	PK	V	40.00	10.10	32.40	51.59	74.00	-22.41
11472.0	26.59	AV	V	40.00	10.10	32.40	44.29	54.00	-9.71
17208.0	32.19	PK	H	40.82	13.40	33.20	53.21	74.00	-20.79
17208.0	24.56	AV	H	40.82	13.40	33.20	45.58	54.00	-8.42
17208.0	33.67	PK	V	40.82	13.40	33.20	54.69	74.00	-19.31
17208.0	25.78	AV	V	40.82	13.40	33.20	46.80	54.00	-7.20
457.0	37.36	QP	H	12.80	2.63	27.20	25.59	46.00	-20.41
457.3	36.87	QP	V	12.80	2.63	27.20	25.10	46.00	-20.90
Middle Channel (5762)									
11524.0	32.16	PK	H	40.10	10.20	32.40	50.06	74.00	-23.94
11524.0	27.45	AV	H	40.10	10.20	32.40	45.35	54.00	-8.65
11524.0	31.62	PK	V	40.10	10.20	32.40	49.52	74.00	-24.48
11524.0	20.18	AV	V	40.10	10.20	32.40	38.08	54.00	-15.92
17286.0	32.41	PK	H	40.88	13.46	33.20	53.55	74.00	-20.45
17286.0	21.54	AV	H	40.88	13.46	33.20	42.68	54.00	-11.32

17286.0	33.87	PK	V	40.88	13.46	33.20	55.01	74.00	-18.99
17286.0	24.62	AV	V	40.88	13.46	33.20	45.76	54.00	-8.24
455.8	38.96	QP	H	12.80	2.63	27.20	27.19	46.00	-18.81
456.0	37.58	QP	V	12.80	2.63	27.20	25.81	46.00	-20.19
High Channel (5814)									
7250.0	35.12	PK	H	36.30	6.64	30.85	47.21	74.00	-26.79
7250.0	23.46	AV	H	36.30	6.64	30.85	35.55	54.00	-18.45
7250.0	33.94	PK	V	36.30	6.64	30.85	46.03	74.00	-27.97
7250.0	18.69	AV	V	36.30	6.64	30.85	30.78	54.00	-23.22
11628.0	34.64	PK	H	40.10	10.20	32.40	52.54	74.00	-21.46
11628.0	24.59	AV	H	40.10	10.20	32.40	42.49	54.00	-11.51
11628.0	34.24	PK	V	40.10	10.20	32.40	52.14	74.00	-21.86
11628.0	23.57	AV	V	40.10	10.20	32.40	41.47	54.00	-12.53
17442.0	33.18	PK	H	40.91	13.50	33.30	54.29	74.00	-19.71
17442.0	26.32	AV	H	40.91	13.50	33.30	47.43	54.00	-6.57
17442.0	36.49	PK	V	40.91	13.50	33.30	57.60	74.00	-16.40
17442.0	25.67	AV	V	40.91	13.50	33.30	46.78	54.00	-7.22
456.6	37.54	QP	H	12.80	2.63	27.20	25.77	46.00	-20.23
456.4	38.47	QP	V	12.80	2.63	27.20	26.70	46.00	-19.30

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss-Amp Gain

Test Site : DDT 3m Chamber
EUT : Wireless Speakers with EZ-Play Technology
Power Supply : 11.1Vdc
Condition : Temp:24.5'C,Humi:55%, Press:100.1kPa
Memo : Antenna B

Tested By : Vito
Model Number : BTW249
Test Mode : keeping TX mode
Antenna/Distance : VULB 9163 / 3m

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
	Reading (dBμV)	(PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel (5736)									
5350.0	45.13	PK	H	33.86	6.45	31.59	53.85	74.00	-20.15
5350.0	33.34	AV	H	33.86	6.45	31.59	42.06	54.00	-11.94
5350.0	42.95	PK	V	33.86	6.45	31.59	51.67	74.00	-22.33
5350.0	31.24	AV	V	33.86	6.45	31.59	39.96	54.00	-14.04
5460.0	47.28	PK	H	34.05	6.49	31.42	56.40	74.00	-17.60
5460.0	34.56	AV	H	34.05	6.49	31.42	43.68	54.00	-10.32
5460.0	49.85	PK	V	34.05	6.49	31.42	58.97	74.00	-15.03
5460.0	35.64	AV	V	34.05	6.49	31.42	44.76	54.00	-9.24
11472.0	28.15	PK	H	40.00	10.10	32.40	45.85	74.00	-28.15
11472.0	19.54	AV	H	40.00	10.10	32.40	37.24	54.00	-16.76
11472.0	30.48	PK	V	40.00	10.10	32.40	48.18	74.00	-25.82
11472.0	18.64	AV	V	40.00	10.10	32.40	36.34	54.00	-17.66
17208.0	31.28	PK	H	40.82	13.40	33.20	52.30	74.00	-21.70
17208.0	22.48	AV	H	40.82	13.40	33.20	43.50	54.00	-10.50
17208.0	29.48	PK	V	40.82	13.40	33.20	50.50	74.00	-23.50
17208.0	18.42	AV	V	40.82	13.40	33.20	39.44	54.00	-14.56
457.6	42.58	QP	H	12.80	2.63	27.20	30.81	46.00	-15.19
457.2	37.49	QP	V	12.80	2.63	27.20	25.72	46.00	-20.28
Middle Channel (5762)									
11524.0	29.48	PK	H	40.10	10.20	32.40	47.38	74.00	-26.62
11524.0	18.23	AV	H	40.10	10.20	32.40	36.13	54.00	-17.87
11524.0	30.26	PK	V	40.10	10.20	32.40	48.16	74.00	-25.84
11524.0	19.66	AV	V	40.10	10.20	32.40	37.56	54.00	-16.44
17286.0	33.85	PK	H	40.88	13.46	33.20	54.99	74.00	-19.01
17286.0	20.76	AV	H	40.88	13.46	33.20	41.90	54.00	-12.10
17286.0	35.49	PK	V	40.88	13.46	33.20	56.63	74.00	-17.37
17286.0	23.85	AV	V	40.88	13.46	33.20	44.99	54.00	-9.01

455.6	45.62	QP	H	12.80	2.63	27.20	33.85	46.00	-12.15
456.1	41.85	QP	V	12.80	2.63	27.20	30.08	46.00	-15.92
High Channel (5814)									
7250.0	39.52	PK	H	36.30	6.64	30.85	51.61	74.00	-22.39
7250.0	26.74	AV	H	36.30	6.64	30.85	38.83	54.00	-15.17
7250.0	36.44	PK	V	36.30	6.64	30.85	48.53	74.00	-25.47
7250.0	24.86	AV	V	36.30	6.64	30.85	36.95	54.00	-17.05
11628.0	32.36	PK	H	40.10	10.20	32.40	50.26	74.00	-23.74
11628.0	21.88	AV	H	40.10	10.20	32.40	39.78	54.00	-14.22
11628.0	35.86	PK	V	40.10	10.20	32.40	53.76	74.00	-20.24
11628.0	26.74	AV	V	40.10	10.20	32.40	44.64	54.00	-9.36
17442.0	29.75	PK	H	40.91	13.50	33.30	50.86	74.00	-23.14
17442.0	20.56	AV	H	40.91	13.50	33.30	41.67	54.00	-12.33
17442.0	33.89	PK	V	40.91	13.50	33.30	55.00	74.00	-19.00
17442.0	23.41	AV	V	40.91	13.50	33.30	44.52	54.00	-9.48
456.7	45.05	QP	H	12.80	2.63	27.20	33.28	46.00	-12.72
456.3	39.80	QP	V	12.80	2.63	27.20	28.03	46.00	-17.97

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss-Amp Gain

7 CONDUCTED EMISSION MEASUREMENT

7.1 POWER LINE CONDUCTED EMISSION

(Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

7.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-010-0024	12/20/2015
2	EMI Test Receiver	R&S	ESCI	101308	12/20/2015
3	LISN	AFJ	LS16	16011103219	12/20/2015
4	LISN	SCHWARZBECK	NSLK 8127	8127-432	12/21/2015

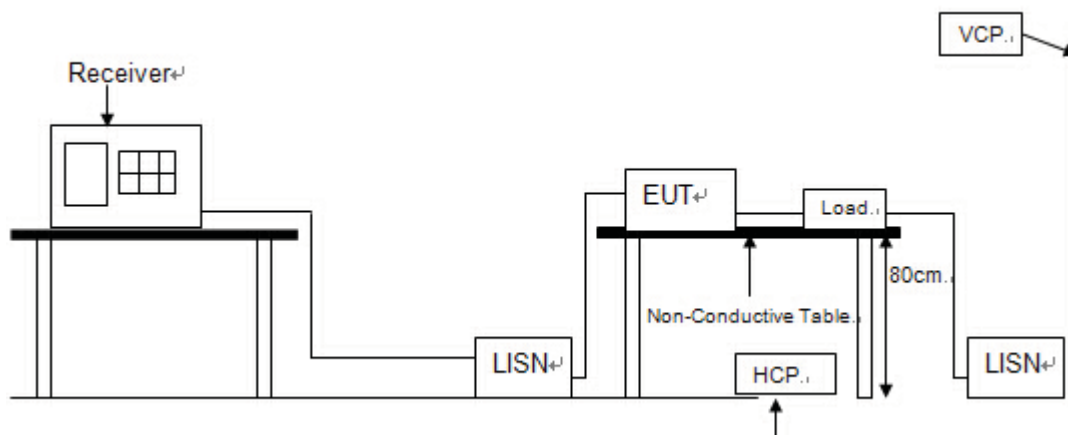
7.3 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal reference ground plane and 0.4 meters from vertical reference ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

7.4 DEVIATION FROM TEST STANDARD

No deviation

7.5 TEST SETUP



7.6 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use.

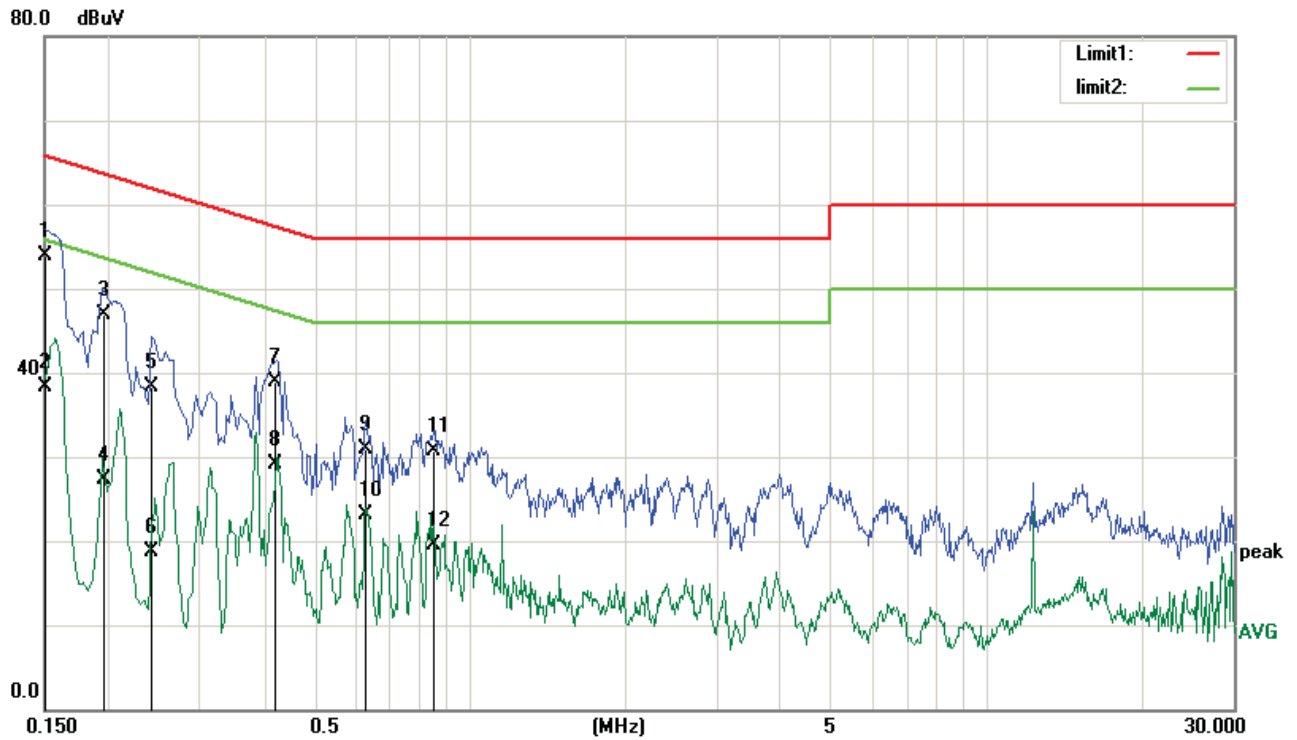
7.7 TEST RESULT

EUT :	Wireless Speakers with EZ-Play Technology	Model No. :	BTW249
Temperature :	24°C	Relative Humidity :	55%
Pressure :	1008 hPa	Test Power :	AC 120V/60Hz
Test Mode :	keeping TX mode		

Remark

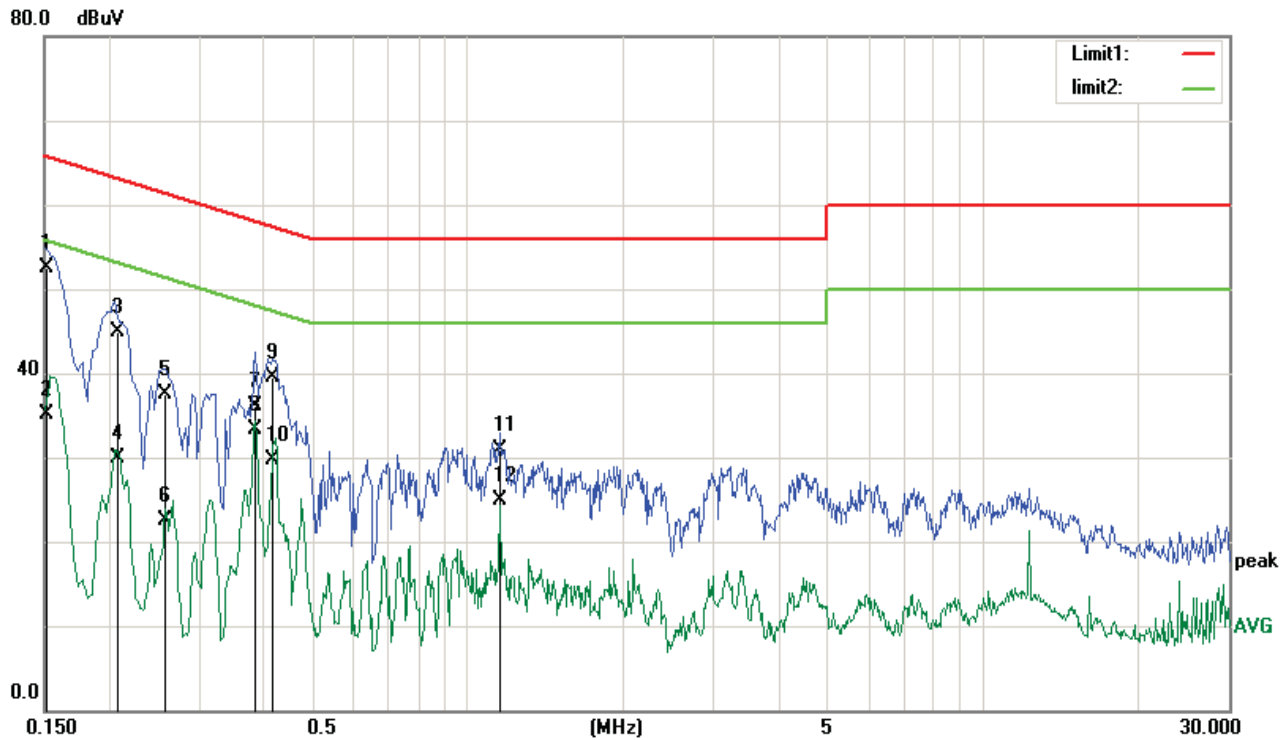
- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Sweep. Time = 0.3 sec./MHz. Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Sweep. Time =0.3 sec./MHz.
- (2) All readings are QP Mode value unless otherwise stated AVG in column of 『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “ * ” marked in AVG Mode column of Interference Voltage Measured.
- (3) Measuring frequency range from 150KHz to 30MHz.
- (4) Measurement result=Reading + Correct.

EUT:	Wireless Speakers with EZ-Play Technology	Model No.:	BTW249
Temperature:	24°C	Relative Humidity:	55%
Probe:	L1	Test Power:	AC 120V/60Hz
Standard:	(CE)FCC PART 15 class B_QP	Test Result:	Pass
Test Mode:	keeping TX mode	Test By:	vito
Note:	Antenna A		



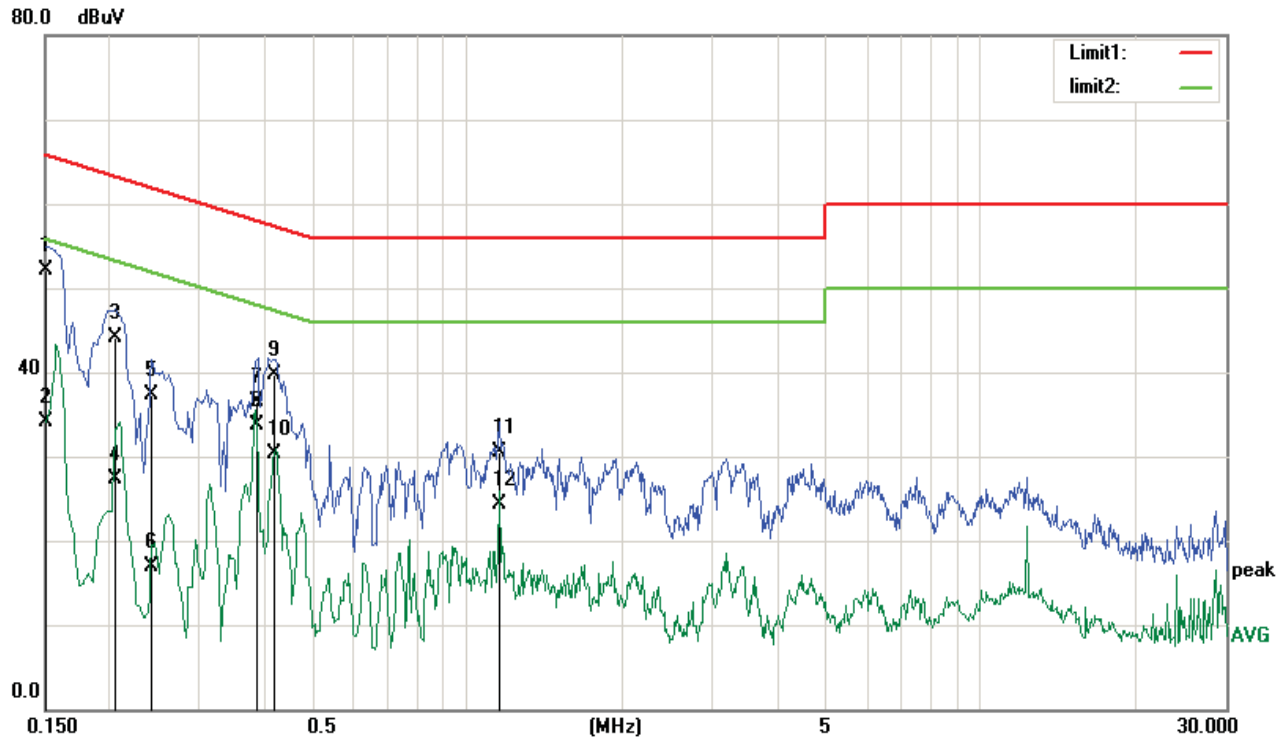
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1508	42.51	11.46	53.97	65.95	-11.98	QP
2	0.1508	26.94	11.46	38.40	55.95	-17.55	AVG
3	0.1960	35.80	11.15	46.95	63.77	-16.82	QP
4	0.1960	16.24	11.15	27.39	53.77	-26.38	AVG
5	0.2407	27.47	10.85	38.32	62.07	-23.75	QP
6	0.2407	7.85	10.85	18.70	52.07	-33.37	AVG
7	0.4193	28.71	10.28	38.99	57.46	-18.47	QP
8	0.4193	18.74	10.28	29.02	47.46	-18.44	AVG
9	0.6278	20.69	10.14	30.83	56.00	-25.17	QP
10	0.6278	12.98	10.14	23.12	46.00	-22.88	AVG
11	0.8493	20.63	10.10	30.73	56.00	-25.27	QP
12	0.8493	9.42	10.10	19.52	46.00	-26.48	AVG

EUT:	Wireless Speakers with EZ-Play Technology	Model No.:	BTW249
Temperature:	24°C	Relative Humidity:	55%
Probe:	N	Test Power:	AC 120V/60Hz
Standard:	(CE)FCC PART 15 class B QP	Test Result:	Pass
Test Mode:	keeping TX mode	Test By:	vito
Note:	Antenna A		



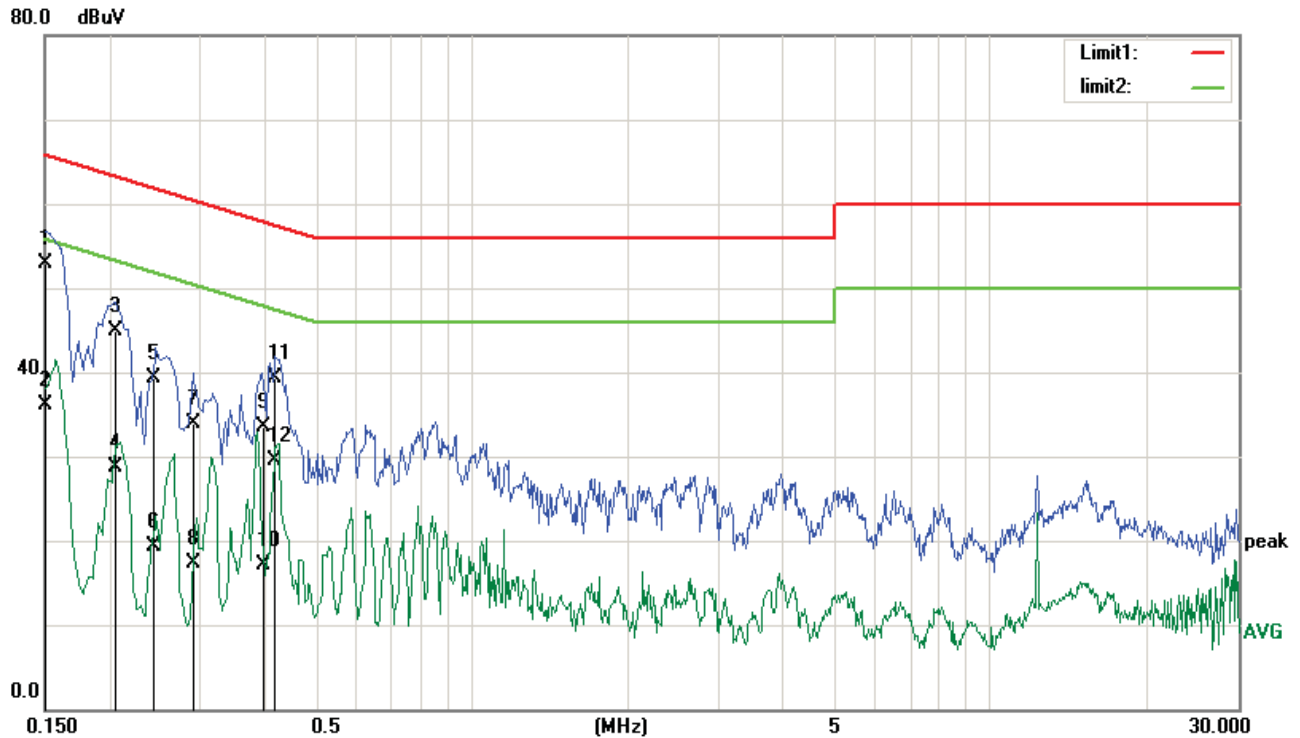
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1516	41.05	11.46	52.51	65.91	-13.40	QP
2	0.1516	23.67	11.46	35.13	55.91	-20.78	AVG
3	0.2084	33.85	11.07	44.92	63.26	-18.34	QP
4	0.2084	18.92	11.07	29.99	53.26	-23.27	AVG
5	0.2581	26.76	10.73	37.49	61.49	-24.00	QP
6	0.2581	11.83	10.73	22.56	51.49	-28.93	AVG
7	0.3868	25.70	10.33	36.03	58.13	-22.10	QP
8	0.3868	22.93	10.33	33.26	48.13	-14.87	AVG
9	0.4173	29.13	10.29	39.42	57.50	-18.08	QP
10	0.4173	19.32	10.29	29.61	47.50	-17.89	AVG
11	1.1517	20.77	10.10	30.87	56.00	-25.13	QP
12	1.1517	14.85	10.10	24.95	46.00	-21.05	AVG

EUT:	Wireless Speakers with EZ-Play Technology	Model No.:	BTW249
Temperature:	24°C	Relative Humidity:	55%
Probe:	N	Test Power:	AC 120V/60Hz
Standard:	(CE)FCC PART 15 class B QP	Test Result:	Pass
Test Mode:	keeping TX mode	Test By:	vito
Note:	Antenna B		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1504	40.73	11.47	52.20	65.97	-13.77	QP
2	0.1504	22.55	11.47	34.02	55.97	-21.95	AVG
3	0.2047	33.06	11.09	44.15	63.41	-19.26	QP
4	0.2047	16.16	11.09	27.25	53.41	-26.16	AVG
5	0.2415	26.39	10.84	37.23	62.04	-24.81	QP
6	0.2415	6.07	10.84	16.91	52.04	-35.13	AVG
7	0.3863	26.08	10.33	36.41	58.14	-21.73	QP
8	0.3863	23.43	10.33	33.76	48.14	-14.38	AVG
9	0.4181	29.36	10.29	39.65	57.48	-17.83	QP
10	0.4181	20.01	10.29	30.30	47.48	-17.18	AVG
11	1.1532	20.41	10.10	30.51	56.00	-25.49	QP
12	1.1532	14.29	10.10	24.39	46.00	-21.61	AVG

EUT:	Wireless Speakers with EZ-Play Technology	Model No.:	BTW249
Temperature:	24°C	Relative Humidity:	55%
Probe:	L1	Test Power:	AC 120V/60Hz
Standard:	(CE)FCC PART 15 class B QP	Test Result:	Pass
Test Mode:	keeping TX mode	Test By:	vito
Note:	Antenna B		



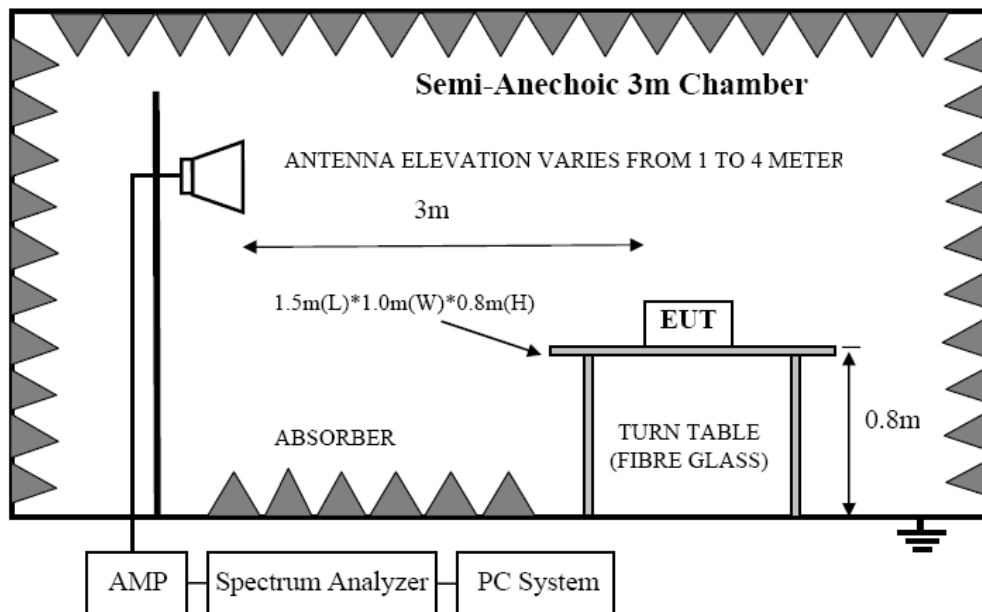
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	41.42	11.47	52.89	65.99	-13.10	QP
2	0.1500	24.72	11.47	36.19	55.99	-19.80	AVG
3	0.2042	33.89	11.10	44.99	63.43	-18.44	QP
4	0.2042	17.57	11.10	28.67	53.43	-24.76	AVG
5	0.2429	28.50	10.83	39.33	61.99	-22.66	QP
6	0.2429	8.57	10.83	19.40	51.99	-32.59	AVG
7	0.2909	23.36	10.50	33.86	60.50	-26.64	QP
8	0.2909	6.82	10.50	17.32	50.50	-33.18	AVG
9	0.3957	23.16	10.32	33.48	57.94	-24.46	QP
10	0.3957	6.78	10.32	17.10	47.94	-30.84	AVG
11	0.4160	29.08	10.29	39.37	57.53	-18.16	QP
12	0.4160	19.16	10.29	29.45	47.53	-18.08	AVG

8 BAND EDGE

8.1 TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2015/12/25	1 Year
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2015/07/13	1 Year
3	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2015/12/26	1 Year
4	Double Ridged Horn Antenna	R&S	HF907	100276	2015/12/26	1 Year
5	Pre-amplifier	A.H.	PAM0-0118	360	2015/12/26	1 Year
6	RF Cable	R&S	R01	10403	2015/12/26	1 Year
7	RF Cable	R&S	R02	10512	2015/12/26	1 Year

8.2 BLOCK DIAGRAM OF TEST SETUP



8.3 LIMIT

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

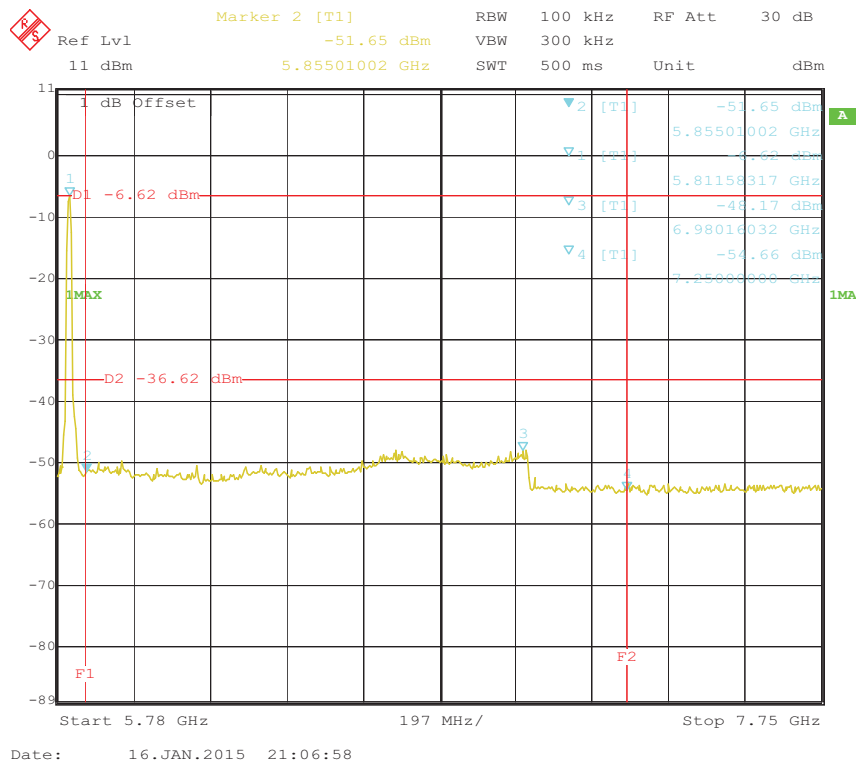
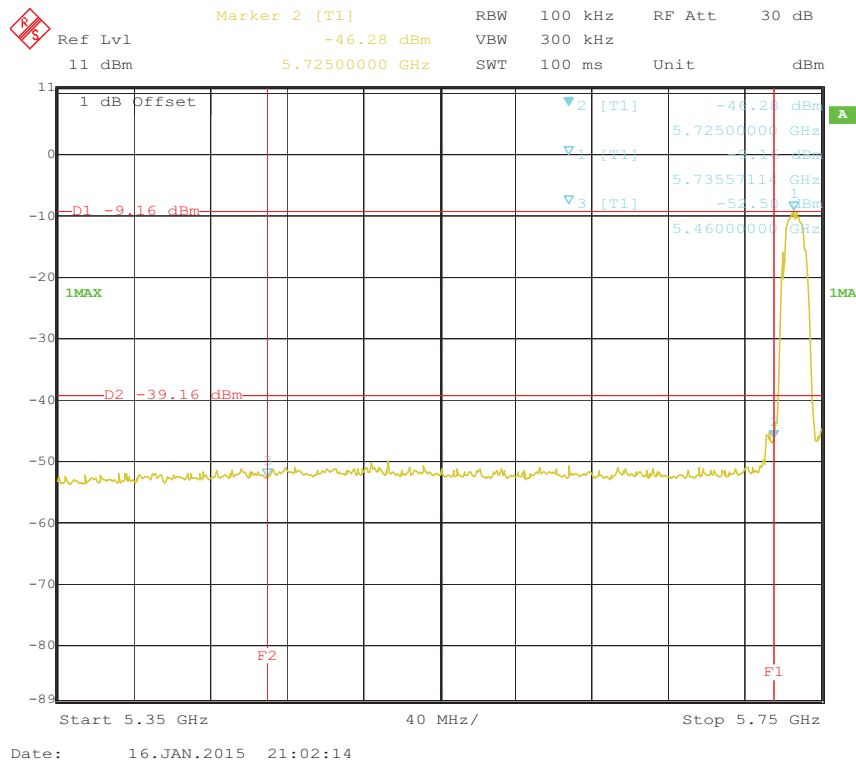
8.4 TEST PROCEDURE

- 7.4.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.
- 7.4.2. Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz. Radiate Band Edge:
- 7.4.3. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
- 7.4.4. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
- 7.4.5. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 7.4.6. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
- 7.4.7. RBW=1MHz, VBW=1MHz

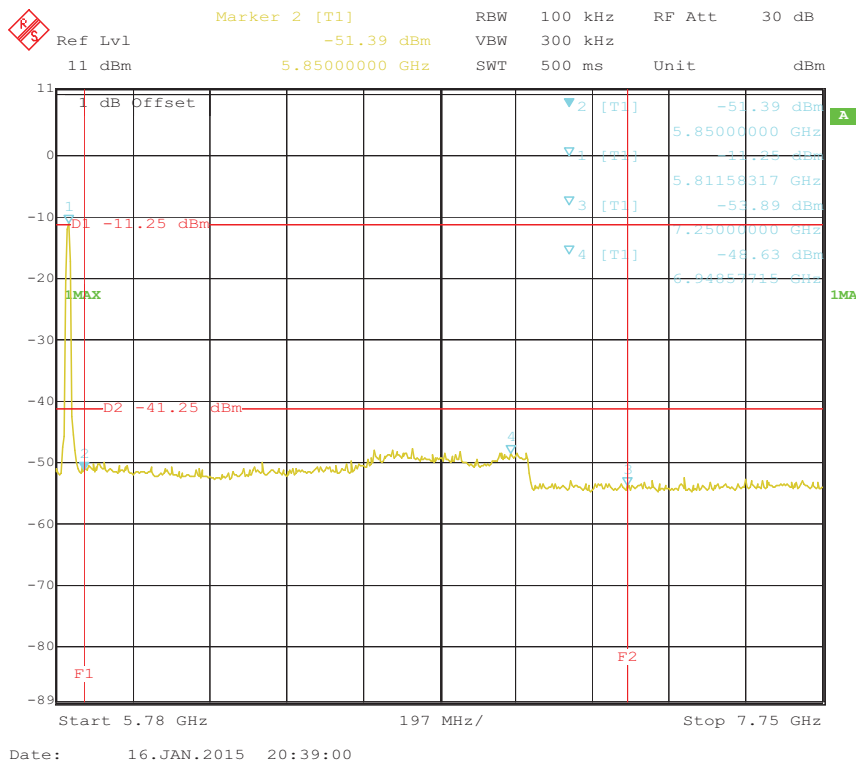
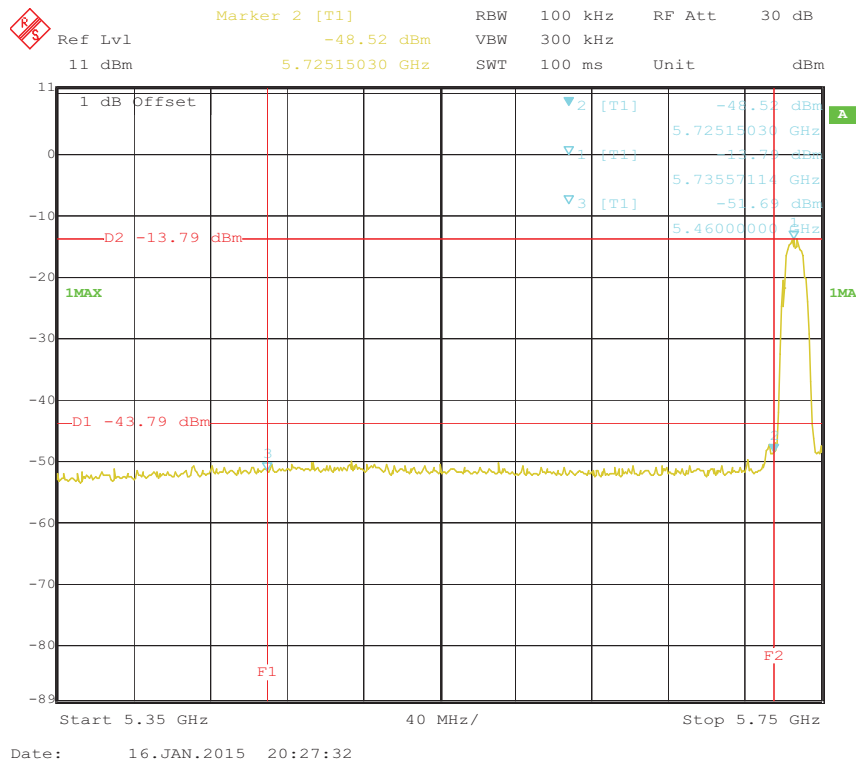
8.5 THE BAND EDGES WAS MEASURED AND RECORDED. TEST RESULT

PASS. (See below detailed test result)

Antenna A



Antenna B



9 ANTENNA REQUIREMENTS

9.1 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 15.247 (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.

9.2 RESULT

The antennas used for this product are dipole antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 3 dBi.

9 TEST SETUP PHOTOGRAPH

Conducted Measurement Photos



Radiated Measurement Photos (Below 1GHz)

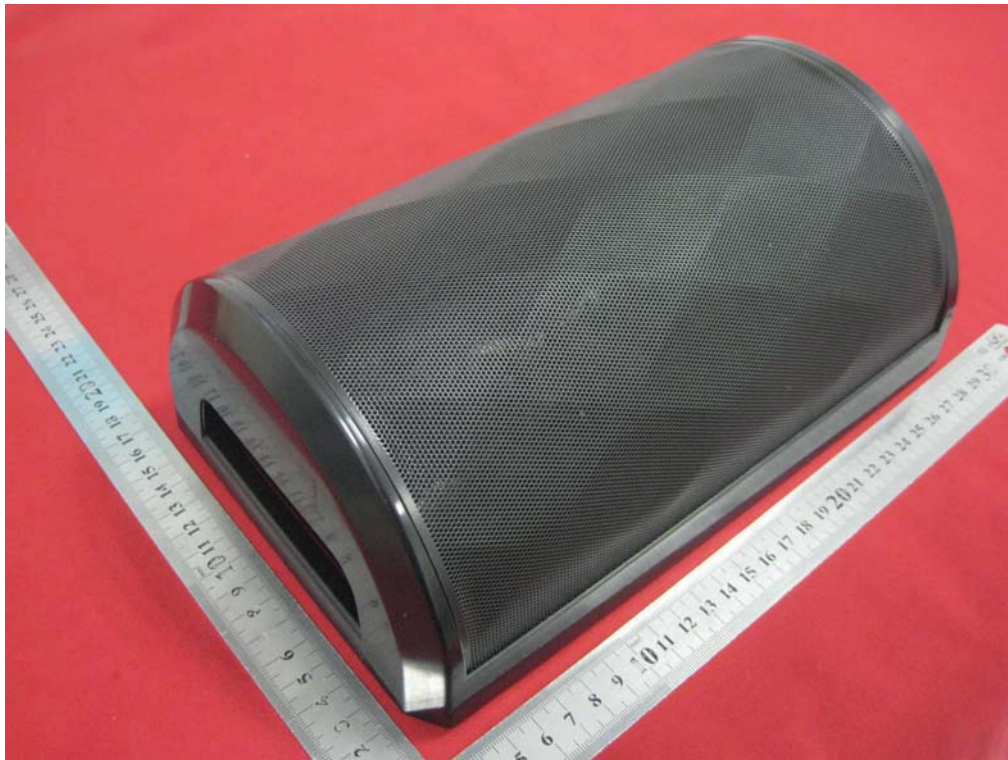


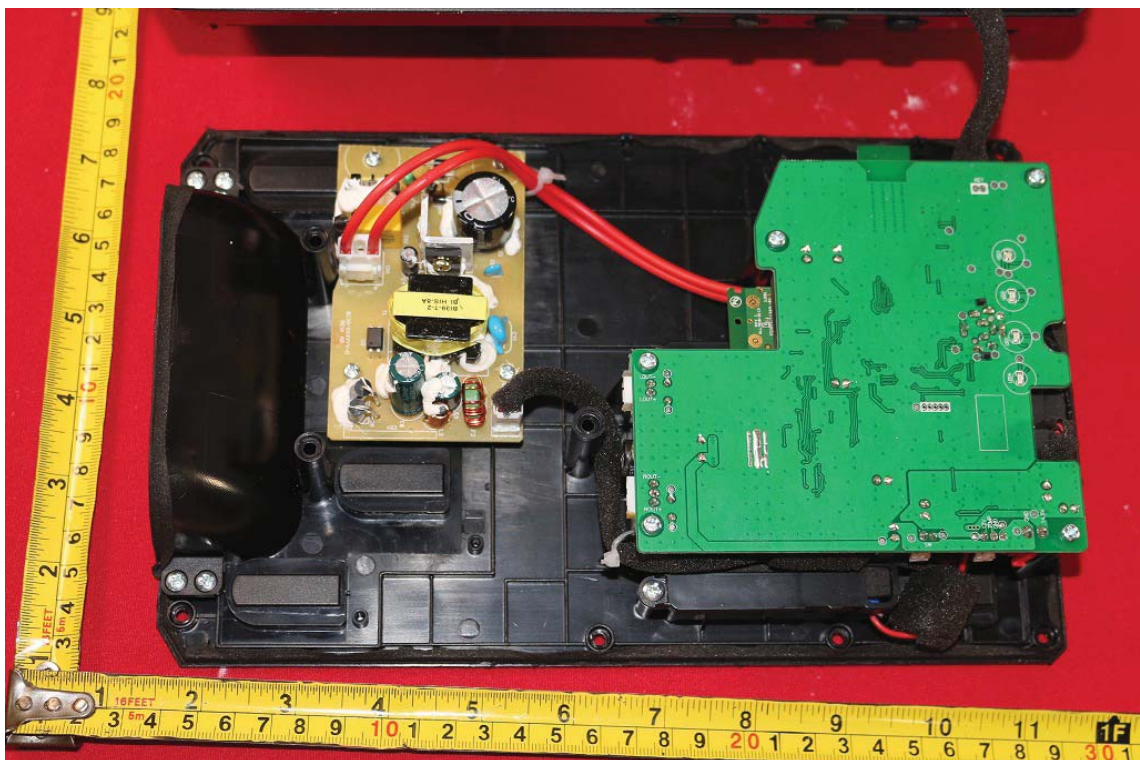
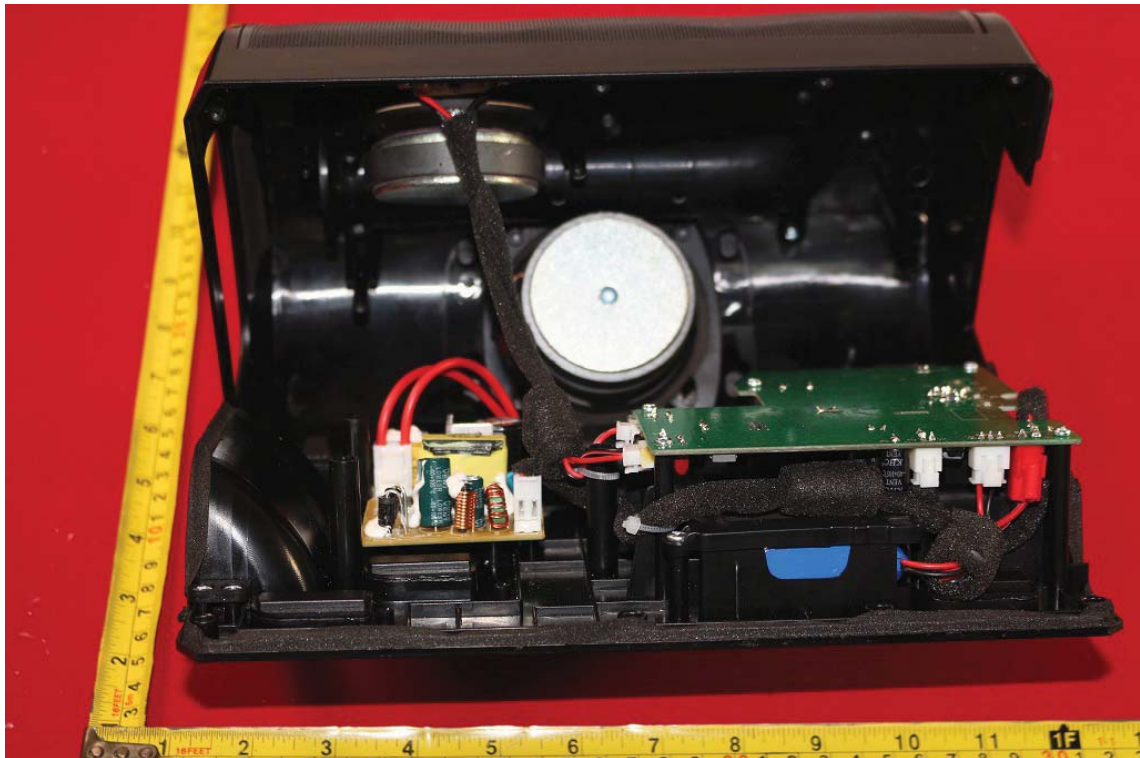
Radiated Measurement Photos (Above 1GHz)

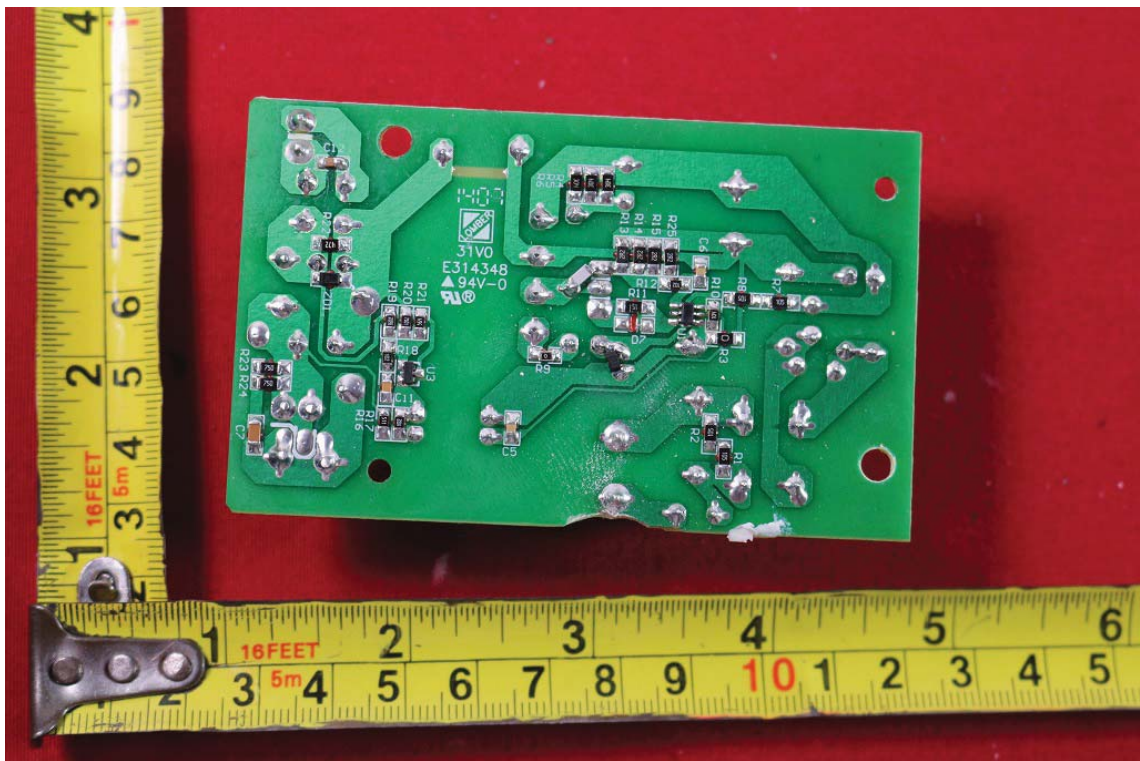
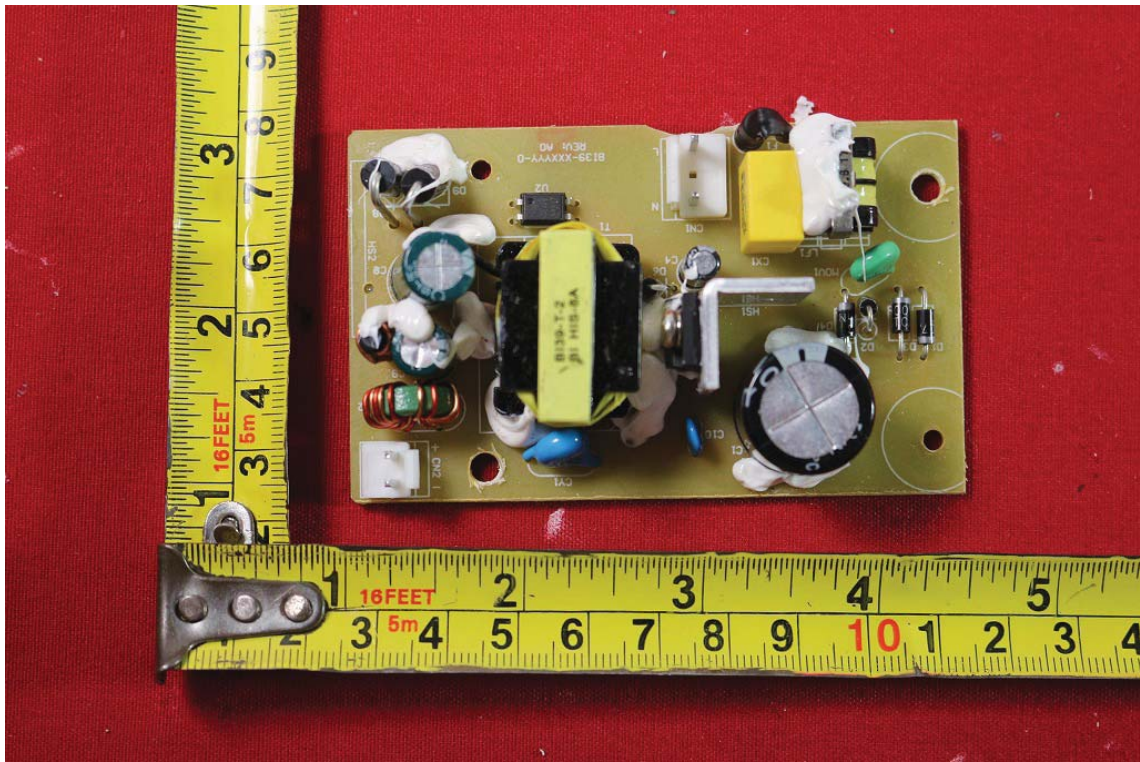


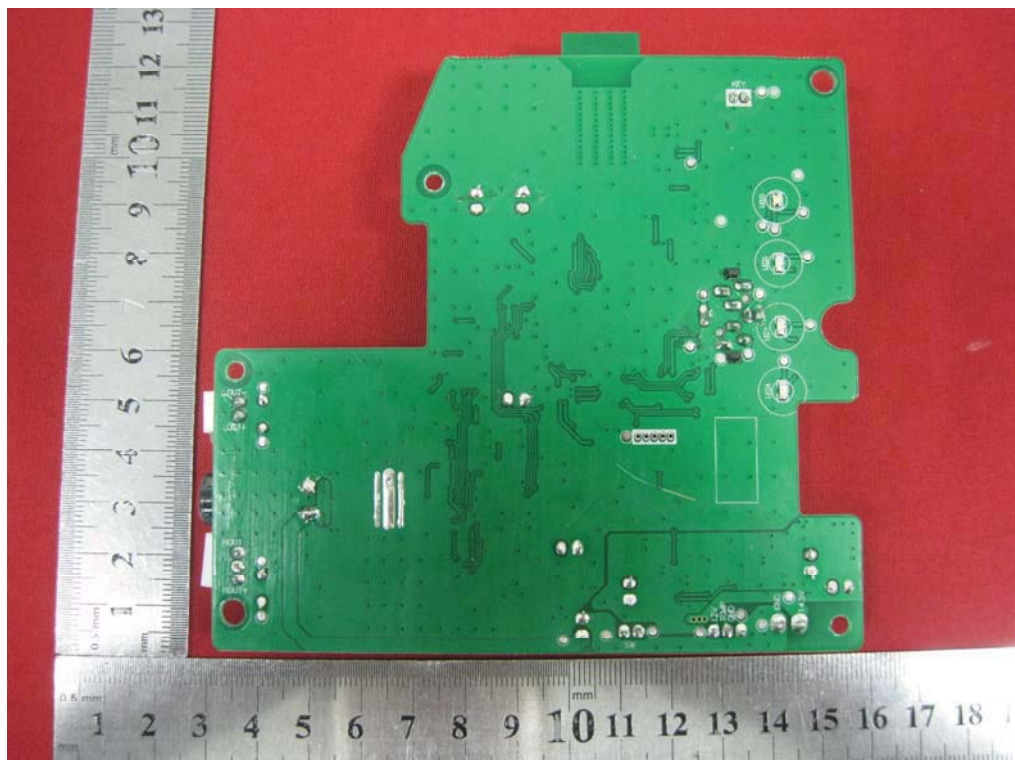
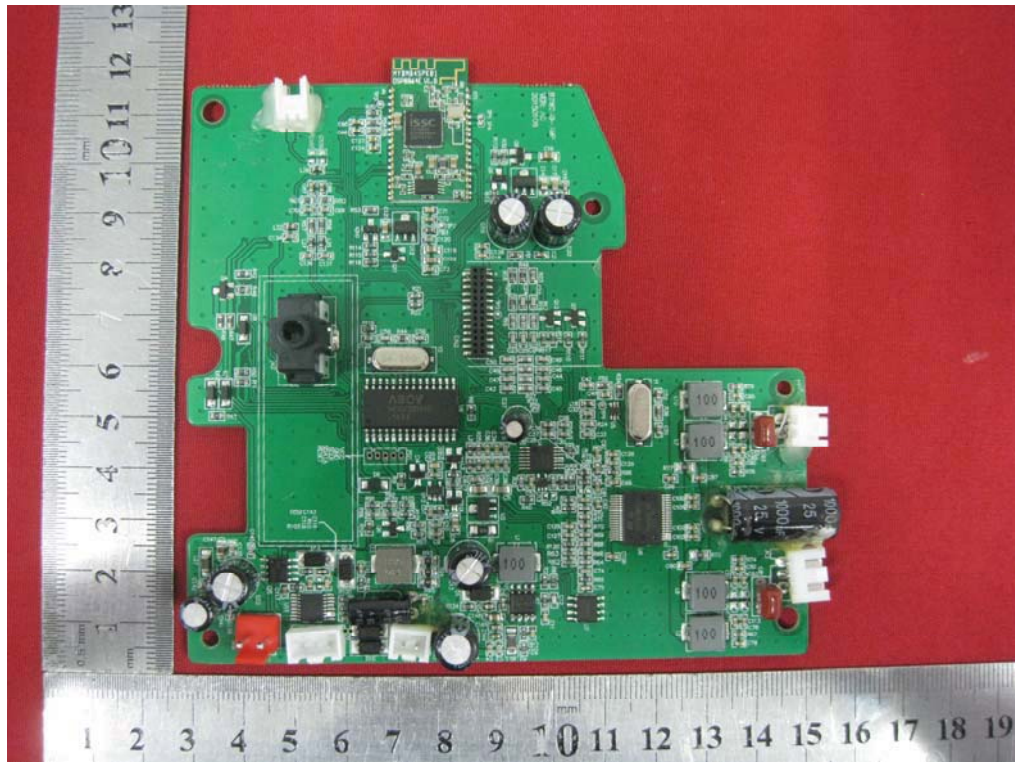
10 Photos of the EUT

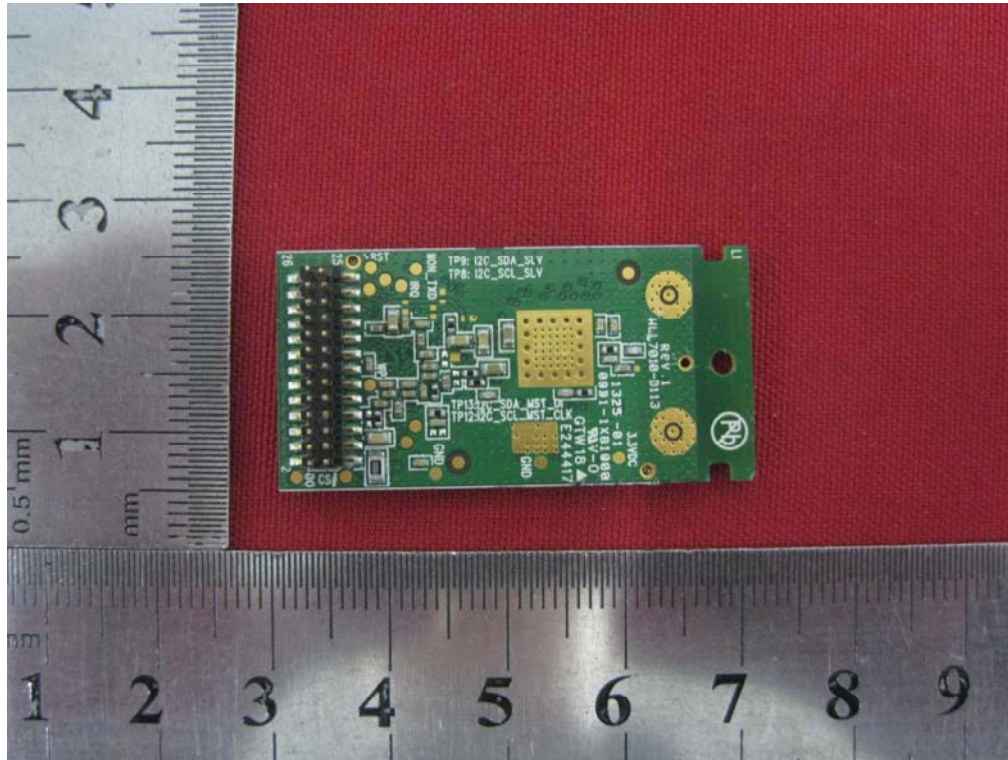


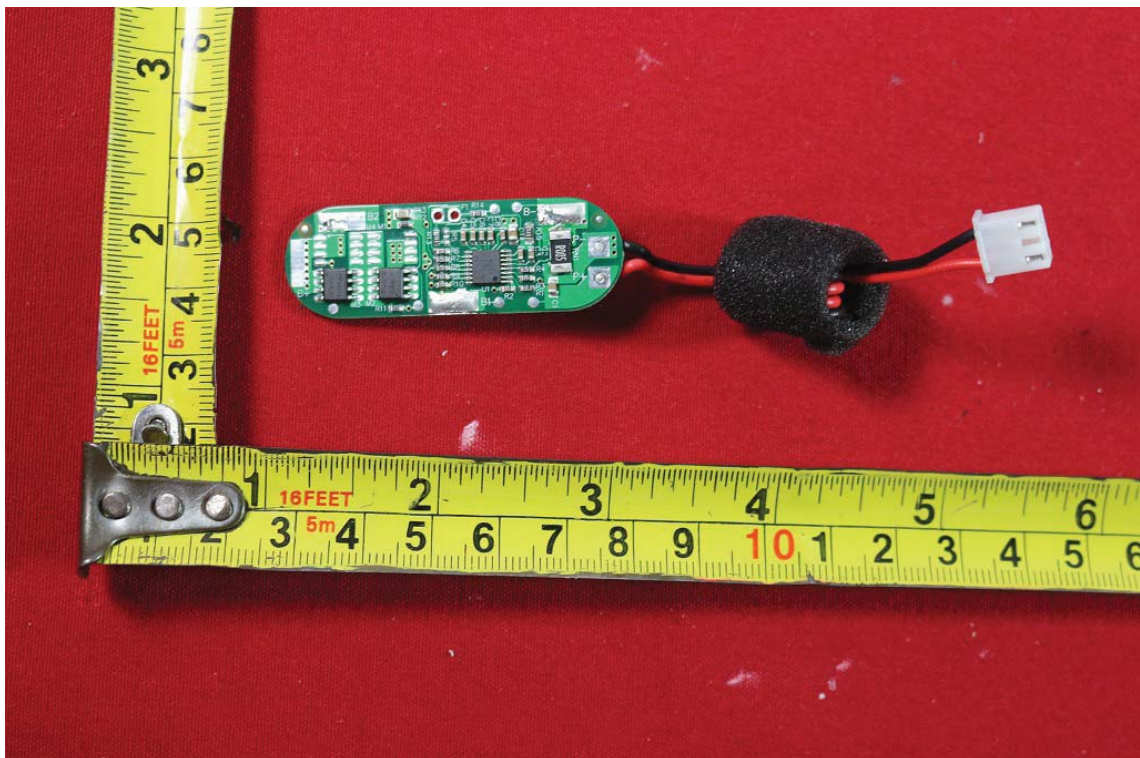
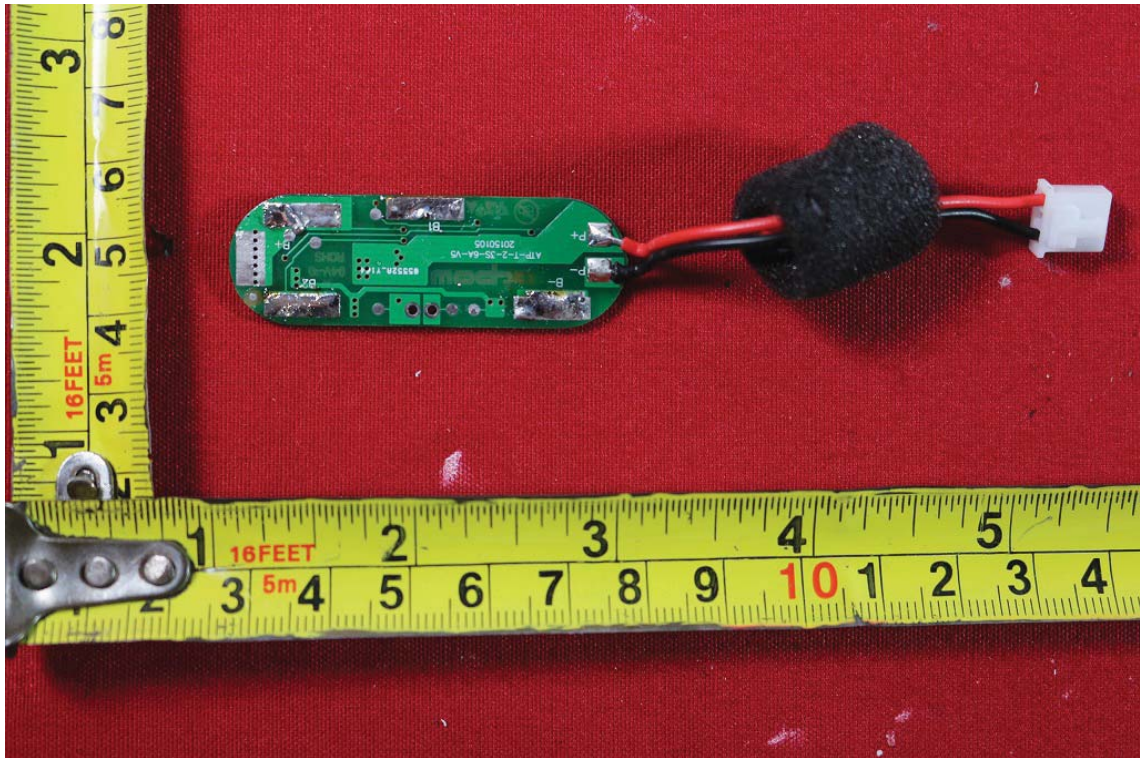












END OF REPORT