



Test Report

**Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8
FCC Part15 Subpart E**

Product Name : DWAM83 Wireless Audio Module
Model No. : 1492549
FCC ID : AK81492549
IC : 409B-1492549

Applicant : Sony Corporation
Address : 1-7-1 Konan, Minato-ku, Tokyo 108-0075 Japan

Date of Receipt : 17/06/2013
Test Date : 17/06/2013~25/06/2013
Issued Date : 12/07/2013
Report No. : 136S028R-RF-US-P09V01
Report Version : V1.2

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF, CNAS or any agency of the Government.

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Test Report Certification

Issued Date : 12/07/2013

Report No. : 136S028R-RF-US-P09V01



Product Name : DWAM83 Wireless Audio Module
 Applicant : Sony Corporation
 Address : 1-7-1 Konan, Minato-ku, Tokyo 108-0075 Japan
 Manufacturer : Weifang GoerTek Electronics Co., Ltd
 Address : Gaoxin 2 Road, Free Trade Zone, Weifang, Shandong,
 261205, P.R. China
 Model No. : 1492549
 FCC ID : AK81492549
 IC : 409B-1492549
 EUT Voltage : DC 3.5V
 Brand Name : Sony
 Applicable Standard : FCC CFR Title 47 Part 15 Subpart E: 2012
 ANSI C63.4: 2009; KDB789033
 Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8
 Test Result : Complied
 Performed Location : Suzhou EMC Laboratory
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 FCC Registration Number: 800392; IC Lab Code: 4075B

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Laboratory Information

We, **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

Taiwan R.O.C.	:	BSMI, NCC, TAF
Germany	:	TUV Rheinland
Norway	:	Nemko, DNV
USA	:	FCC
Japan	:	VCCI
China	:	CNAS

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site :<http://www.quietek.com/tw/ctg/cts/accreditations.htm>

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TABLE OF CONTENTS

Description	Page
1. General Information	7
1.1. EUT Description	7
1.2. Mode of Operation	8
1.3. Tested System Details.....	9
1.4. Configuration of Tested System	10
1.5. EUT Exercise Software	11
2. Technical Test.....	12
2.1. Summary of Test Result	12
2.2. Test Environment	14
3. Conducted Emission	15
3.1. Test Equipment	15
3.2. Test Setup	15
3.3. Limit.....	16
3.4. Test Procedure	16
3.5. Uncertainty	16
3.6. Test Result	17
4. Radiated Emission	19
4.1. Test Equipment	19
4.2. Test Setup	20
4.3. Limit.....	21
4.4. Test Procedure	21
4.5. Uncertainty	22
4.6. Test Result	23
5. Operation Frequency Range of 20dB Bandwidth.....	27
5.1. Test Equipment	27
5.2. Test Setup	27
5.3. Limit.....	27
5.4. Test Procedure	27
5.5. Uncertainty	27
5.6. Test Result	28
6. Occupied Bandwidth	30
6.1. Test Equipment	30
6.2. Test Setup	30
6.3. Limit.....	30
6.4. Test Procedure	31
6.5. Uncertainty	31
6.6. Test Result	32

7.	Power Output	36
7.1.	Test Equipment	36
7.2.	Test Setup	36
7.3.	Limit.....	36
7.4.	Test Procedure	37
7.5.	Uncertainty	37
7.6.	Test Result	38
8.	Peak Power Spectral Density.....	39
8.1.	Test Equipment	39
8.2.	Test Setup	39
8.3.	Limit.....	39
8.4.	Test Procedure	40
8.5.	Uncertainty	40
8.6.	Test Result	41
9.	Peak Excursion	45
9.1.	Test Equipment	45
9.2.	Test Setup	45
9.3.	Limit.....	45
9.4.	Test Procedure	46
9.5.	Uncertainty	46
9.6.	Test Result	47
10.	Radiated Emission Band Edge	51
10.1.	Test Equipment	51
10.2.	Test Setup	51
10.3.	Limit.....	51
10.4.	Test Procedure	53
10.5.	Uncertainty	53
10.6.	Test Result	54
11.	Frequency Stability.....	70
11.1.	Test Equipment	70
11.2.	Test Setup	70
11.3.	Limit.....	70
11.4.	Test Procedure	71
11.5.	Uncertainty	71
11.6.	Test Result	72
12.	Receiver Spurious Emission for Industry Canada RSS-Gen Requirement.....	73
12.1.	Test Equipment	73
12.2.	Test Setup	74
12.3.	Limit.....	75

12.4. Test Procedure 76

12.5. Uncertainty 76

12.6. Test Result 77

1. General Information

1.1. EUT Description

Product Name	DWAM83 Wireless Audio Module
Brand Name	Sony
Model No.	1492549
EUT Voltage	DC 3.5V
Frequency Range	2412 ~ 2464 MHz, 5180 ~ 5240 MHz, 5736 ~ 5814 MHz
Channel Number	9
Type of Modulation	QPSK
Channel Control	Auto
Antenna Delivery	1*Tx + 1*Rx
Antenna Type	Reference to Antenna List
Peak Antenna Gain	Reference to Antenna List

Antenna List

RF Port	Antenna	Manufacturer	Peak Gain
A#	Printed Antenna	Goertek	1.57dBi for 2.4GHz, 2.82dBi for 5.2GHz, 3dBi for 5.8GHz
B#	Printed Antenna	Goertek	0.82dBi for 2.4GHz, 0.67dBi for 5.2GHz, 2.8dBi for 5.8GHz

Note: The EUT just transmit in A or B antenna port alone.

Channel List

2.4GHz Band Center Frequency			
Channel	2412MHz	2438MHz	2464MHz
5.2GHz Band Center Frequency			
Channel	5180MHz	5210MHz	5240MHz
5.8GHz Band Center Frequency			
Channel	5736MHz	5762MHz	5814MHz

1.2. Mode of Operation

Quietek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode	Mode 1: Transmit
	Mode 2: Receive

Note:

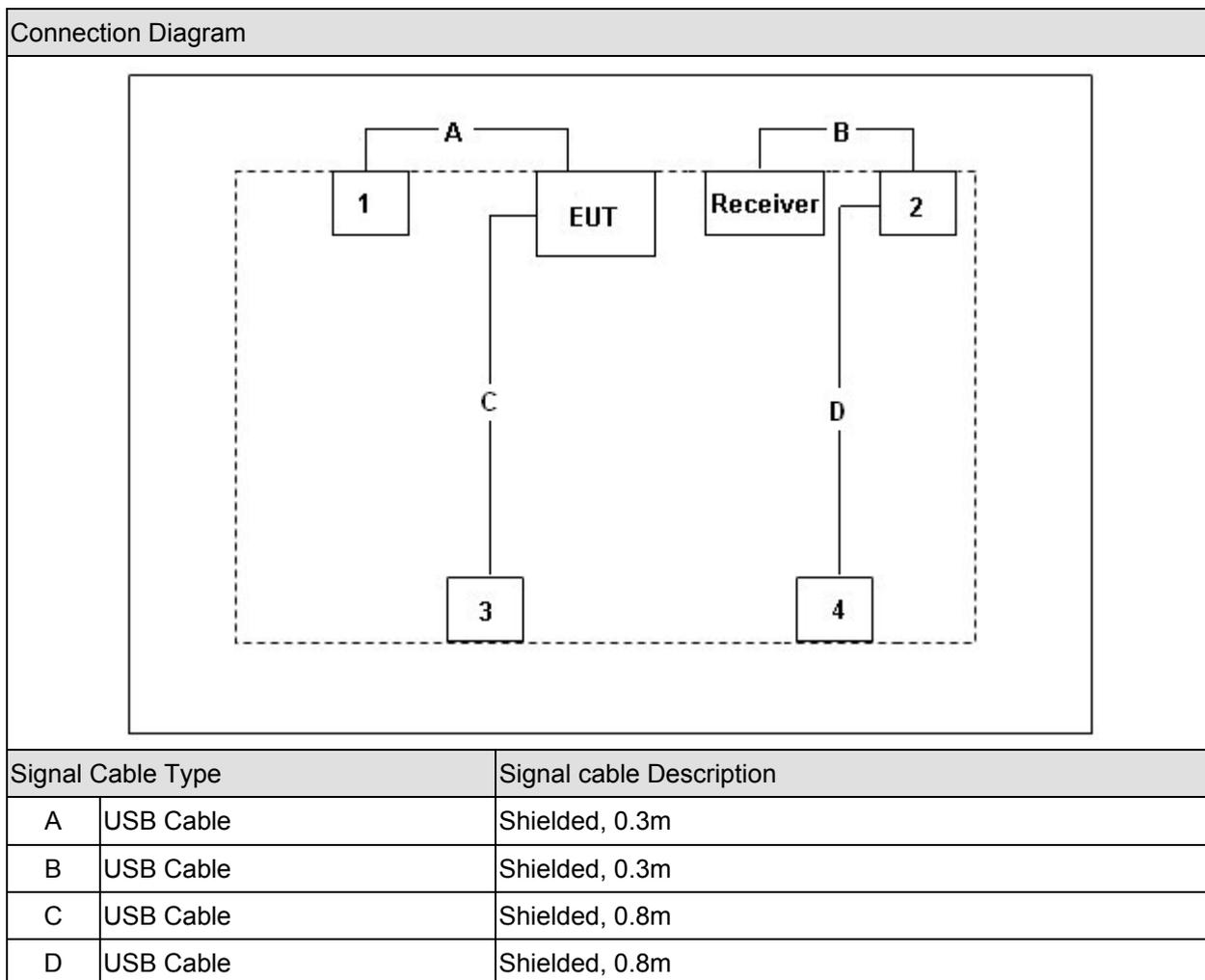
1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. This device is a composite device in accordance with Part 15 Subpart B regulations. The function for the receiver was measured and made a test report that the report number is 136S028R-RF-US-P01V02.

1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Asus	N80V	8BN0AS226971468	N/A
2	Notebook	Dell	PP19L	JH097A01	N/A
3	USB Mouse	DELL	MOC5UO	10D00JL	N/A
4	USB Mouse	DELL	MOC5UO	10D00JL	N/A

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Execute some commands on the PC provided by applicant.
4	Setup the test channel and the test mode press "Write" to start continue transmit or receive.

2. Technical Test

2.1. Summary of Test Result

- No deviations from the test standards
- Deviations from the test standards as below description:

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.207	Yes	No
Radiated Emission	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.209	Yes	No
Operation Frequency Range of 20dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2012 15.215(c)	Yes	No
26dB Occupied Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.407(a)	Yes	No
Power Output	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.407(a)	Yes	No
Peak Power Spectral Density	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.407(a)	Yes	No
Peak Excursion	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.407(a)(6)	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.205, 15.407(b)	Yes	No
Frequency Stability	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.407(g)	Yes	No

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	RSS-Gen Issue 3 December 2010 Table 2	Yes	No
Radiated Emission	RSS-210 Issue 8 December 2010 Section 2.7 Table 2 and Table 3	Yes	No
99% Occupied Bandwidth	RSS-Gen Issue 3 December 2010 Section 4.6.1 and 4.6.2	Yes	No
Power Output	RSS-210 Issue 8 December 2010 A9.2	Yes	No
Peak Power Spectral Density	RSS-210 Issue 8 December 2010 A9.2/A9.5	Yes	No
Radiated Emission Band Edge	RSS-210 Issue 8 December 2010 A9.3	Yes	No
Frequency Stability	RSS-210 Issue 8 December 2010 A9.5(5)	Yes	No

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

3. Conducted Emission

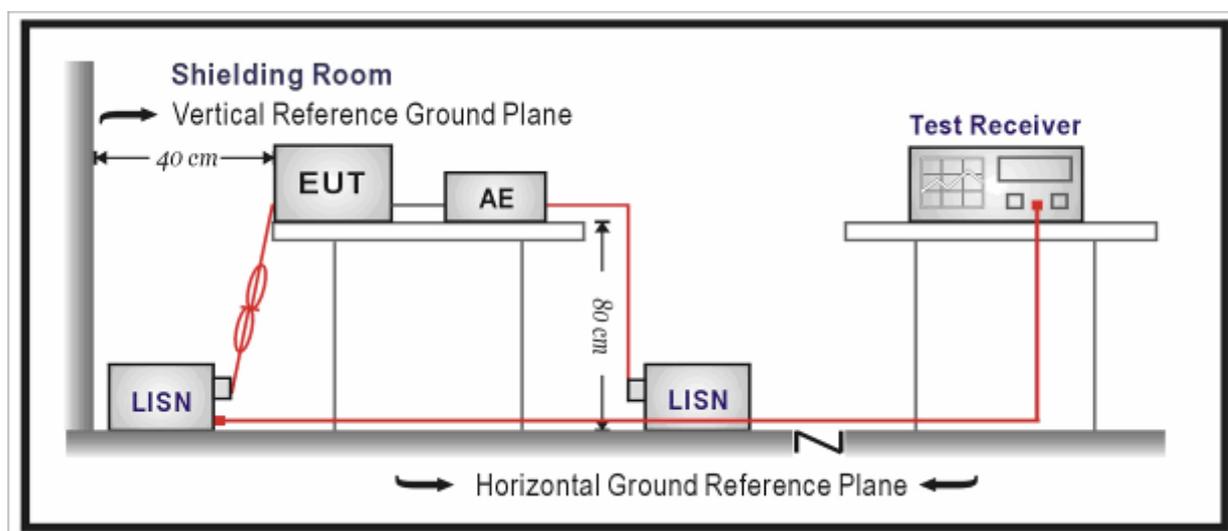
3.1. Test Equipment

Conducted Emission / TR-1

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
EMI Test Receiver	R&S	ESCI	100906	2014.01.07
Two-Line V-Network	R&S	ENV216	101043	2014.03.30
Two-Line V-Network	R&S	ENV216	101044	2013.09.17
50ohm Termination	SHX	TF2	07081401	2013.09.17
50ohm Termination	SHX	TF2	07081402	2013.09.17
Temperature/Humidity Meter	zhicheng	ZC1-2	TR1-TH	2014.01.10

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

3.2. Test Setup



3.3. Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

3.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 & KDB789033.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

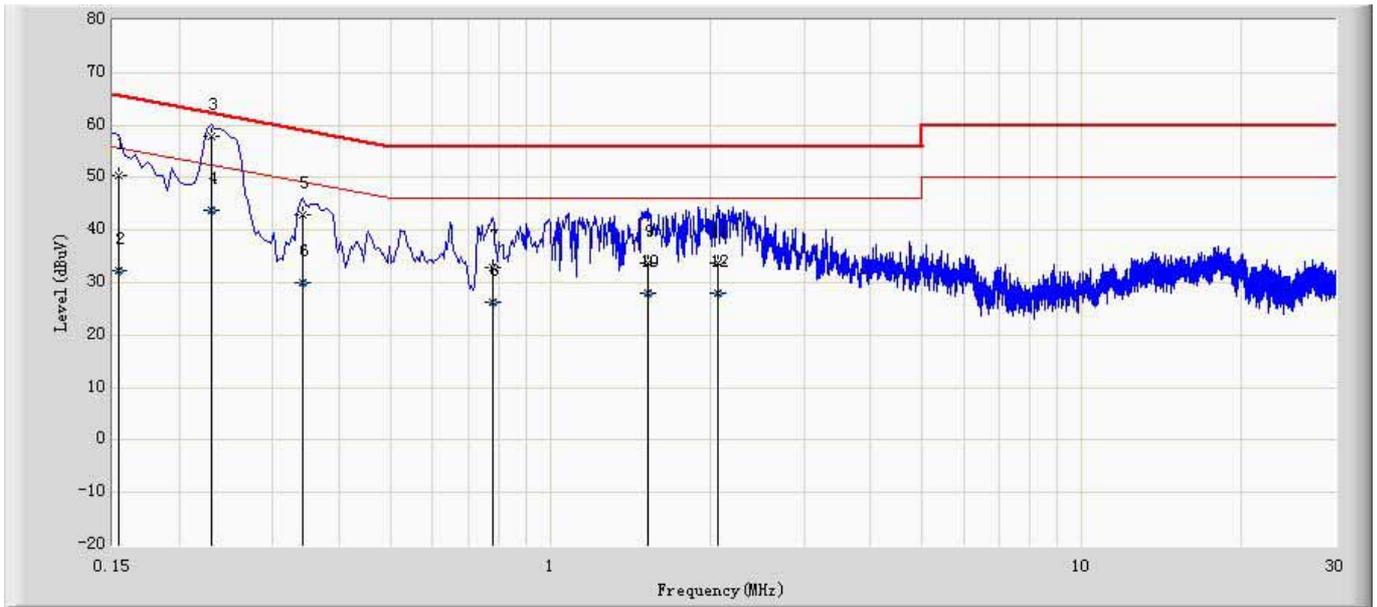
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

3.5. Uncertainty

The measurement uncertainty is defined as ± 2.02 dB

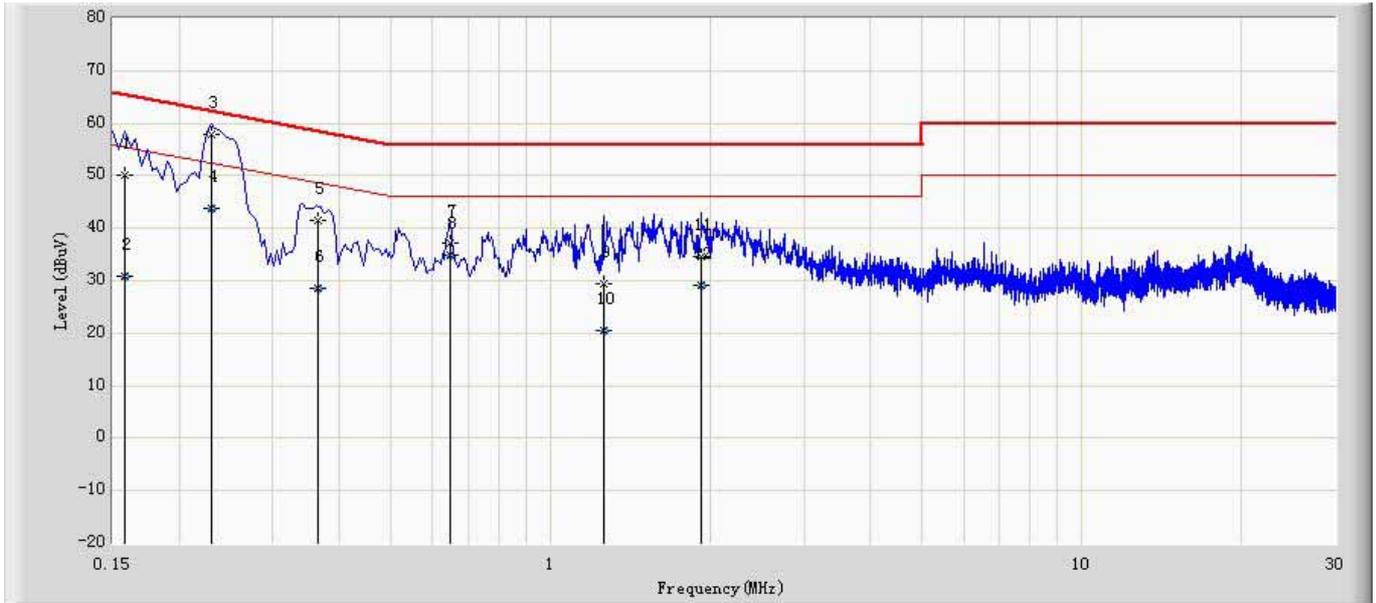
3.6. Test Result

Engineer: Brgant	
Site: TR1	Time: 2013/06/17 - 09:19
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Neutral
EUT: DWAM83 Wireless Audio Module	Power: AC 120V/60Hz
Note: Mde1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.154	50.282	40.435	-15.500	65.781	9.846	QP
2		0.154	32.306	22.460	-23.475	55.781	9.846	AV
3	*	0.230	57.775	47.910	-4.675	62.450	9.864	QP
4		0.230	43.867	34.003	-8.582	52.450	9.864	AV
5		0.342	42.962	33.082	-16.193	59.155	9.879	QP
6		0.342	30.077	20.198	-19.078	49.155	9.879	AV
7		0.778	32.778	22.949	-23.222	56.000	9.829	QP
8		0.778	26.276	16.446	-19.724	46.000	9.829	AV
9		1.526	33.726	23.928	-22.274	56.000	9.799	QP
10		1.526	27.912	18.113	-18.088	46.000	9.799	AV
11		2.070	33.791	24.001	-22.209	56.000	9.790	QP
12		2.070	28.081	18.291	-17.919	46.000	9.790	AV

Engineer: Brgant	
Site: TR1	Time: 2013/06/22 - 21:20
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Line
EUT: DWAM83 Wireless Audio Module	Power: AC 120V/60Hz
Note: Mde1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.158	50.020	40.175	-15.548	65.568	9.846	QP
2		0.158	30.804	20.958	-24.765	55.568	9.846	AV
3	*	0.230	58.000	48.136	-4.449	62.450	9.864	QP
4		0.230	43.799	33.935	-8.650	52.450	9.864	AV
5		0.366	41.565	31.683	-17.026	58.591	9.883	QP
6		0.366	28.529	18.646	-20.063	48.591	9.883	AV
7		0.646	37.132	27.274	-18.868	56.000	9.859	QP
8		0.646	34.795	24.937	-11.205	46.000	9.859	AV
9		1.258	29.385	19.586	-26.615	56.000	9.799	QP
10		1.258	20.505	10.706	-25.495	46.000	9.799	AV
11		1.922	34.638	24.844	-21.362	56.000	9.793	QP
12		1.922	29.088	19.295	-16.912	46.000	9.793	AV

4. Radiated Emission

4.1. Test Equipment

Radiated Emission / AC-2

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
EMI Test Receiver	R&S	ESCI	100573	2014.03.30
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2013.10.15
Coaxial Cable	Huber+Suhner	RG 214	AC2-C	2014.03.01
Temperature/Humidity Meter	zhicheng	ZC1-2	AC2-TH	2014.01.09
EMI Test Receiver	R&S	ESCI	100573	2014.03.30

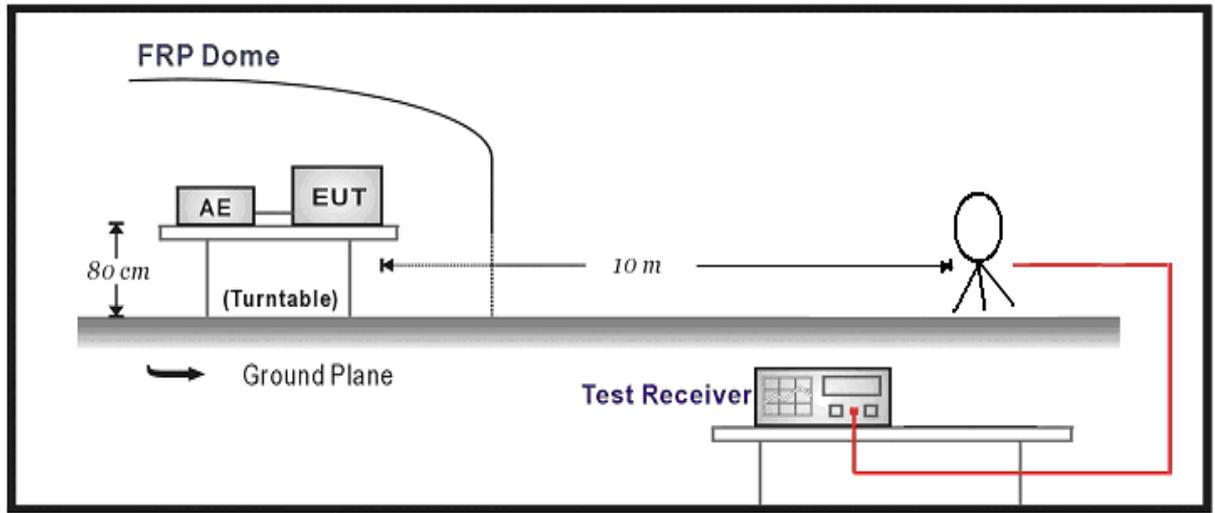
Radiated Emission / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2014.03.30
Preamplifier	Miteq	NSP1800-25	1364185	2014.05.03
DRG Horn	ETS-Lindgren	3117	00123988	2014.01.21
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2014.03.01
Temperature/Humidity Meter	zhicheng	ZC1-2	AC5-TH	2014.01.11
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2013.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2014.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2014.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2014.03.01
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2014.01.11

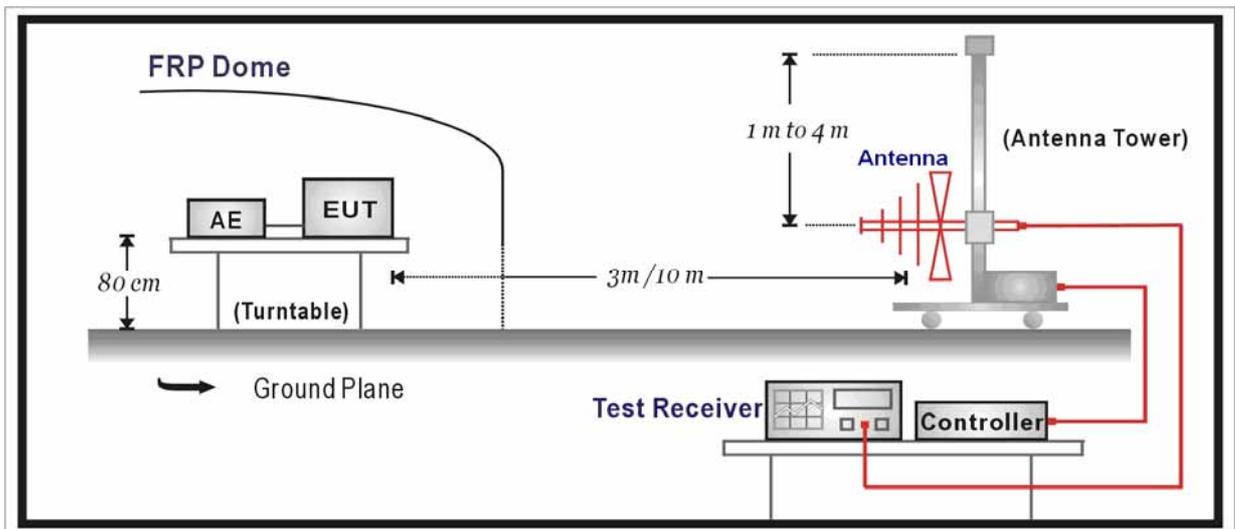
Note 1: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

4.2. Test Setup

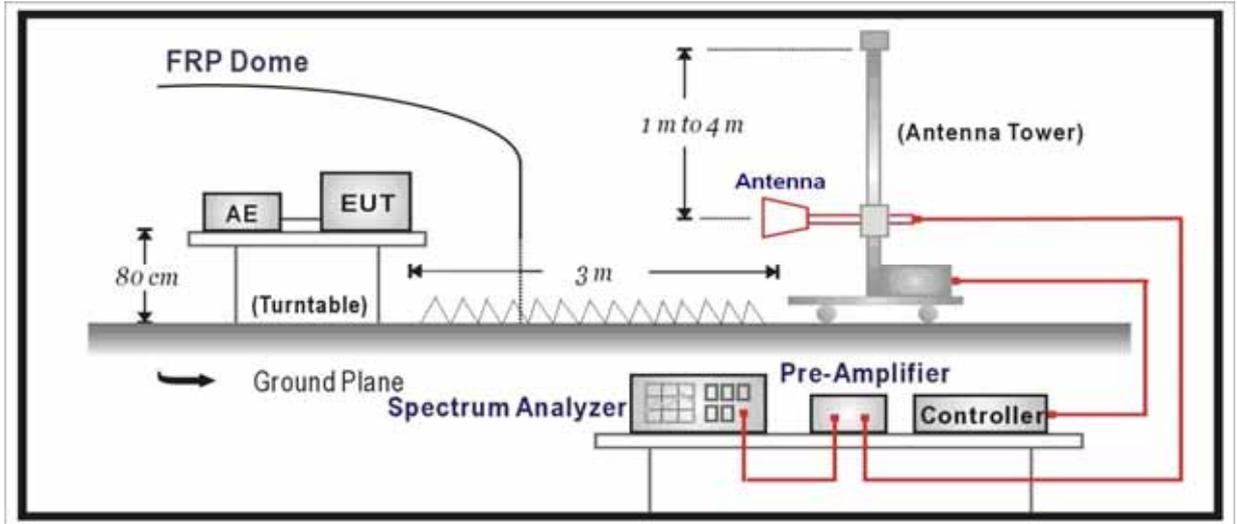
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 & KDB789033 & KDB 789033.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the

maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the "cone of radiation" of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

4.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB
below 1G is defined as ± 3.8 dB

4.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant A	5180	V	5178.9	101.3	-8.0	93.3	Fundamental	/	PK
		H	10360.0	36.4	4.0	40.4	54(Note3)	-13.6	PK
		V	10360.0	37.0	4.0	41.0	54(Note3)	-13.0	PK
		H	15540.0	35.0	6.9	42.0	54(Note3)	-12.0	PK
		V	15540.0	34.7	6.7	41.4	54(Note3)	-12.6	PK
	5210	V	5209.9	100.8	-8.2	92.6	Fundamental	/	PK
		H	10420.0	34.7	4.0	38.6	54(Note3)	-15.4	PK
		V	10420.0	33.8	4.0	37.8	54(Note3)	-16.2	PK
		H	15630.0	33.9	7.0	40.9	54(Note3)	-13.1	PK
		V	15630.0	33.7	6.8	40.5	54(Note3)	-13.5	PK
	5240	V	5238.4	101.0	-8.0	93.0	Fundamental	/	PK
		H	10480.0	34.2	4.0	38.3	54(Note3)	-15.7	PK
		V	10480.0	34.2	4.0	38.3	54(Note3)	-15.7	PK
		H	15720.0	34.6	7.1	41.7	54(Note3)	-12.3	PK
		V	15720.0	33.4	7.1	40.5	54(Note3)	-13.5	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant B	5180	V	5176.4	100.1	-8.0	92.0	Fundamental	/	PK
		H	10360.0	36.7	4.0	40.7	54(Note3)	-13.3	PK
		V	10360.0	36.9	4.0	40.9	54(Note3)	-13.1	PK
		H	15540.0	34.6	6.9	41.6	54(Note3)	-12.4	PK
		V	15540.0	34.6	6.7	41.3	54(Note3)	-12.7	PK
	5210	V	5210.4	99.3	-8.2	91.1	Fundamental	/	PK
		H	10420.0	34.3	4.0	38.3	54(Note3)	-15.7	PK
		V	10420.0	34.9	4.0	38.8	54(Note3)	-15.2	PK
		H	15630.0	33.1	7.0	40.1	54(Note3)	-13.9	PK
		V	15630.0	34.1	6.8	40.9	54(Note3)	-13.1	PK
	5240	V	5243.5	98.8	-8.0	90.8	Fundamental	/	PK
		H	10480.0	34.0	4.0	38.0	54(Note3)	-16.0	PK
		V	10480.0	34.1	4.0	38.2	54(Note3)	-15.8	PK
		H	15720.0	34.0	7.1	41.1	54(Note3)	-12.9	PK
		V	15720.0	34.2	7.1	41.3	54(Note3)	-12.7	PK

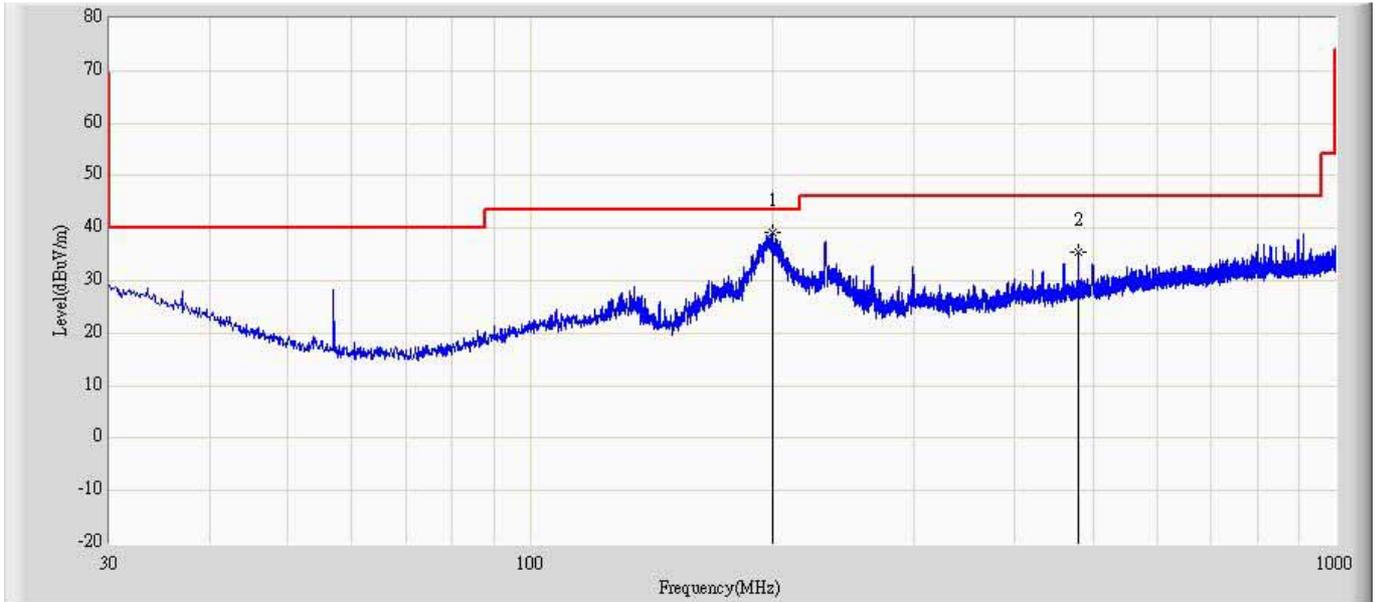
Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

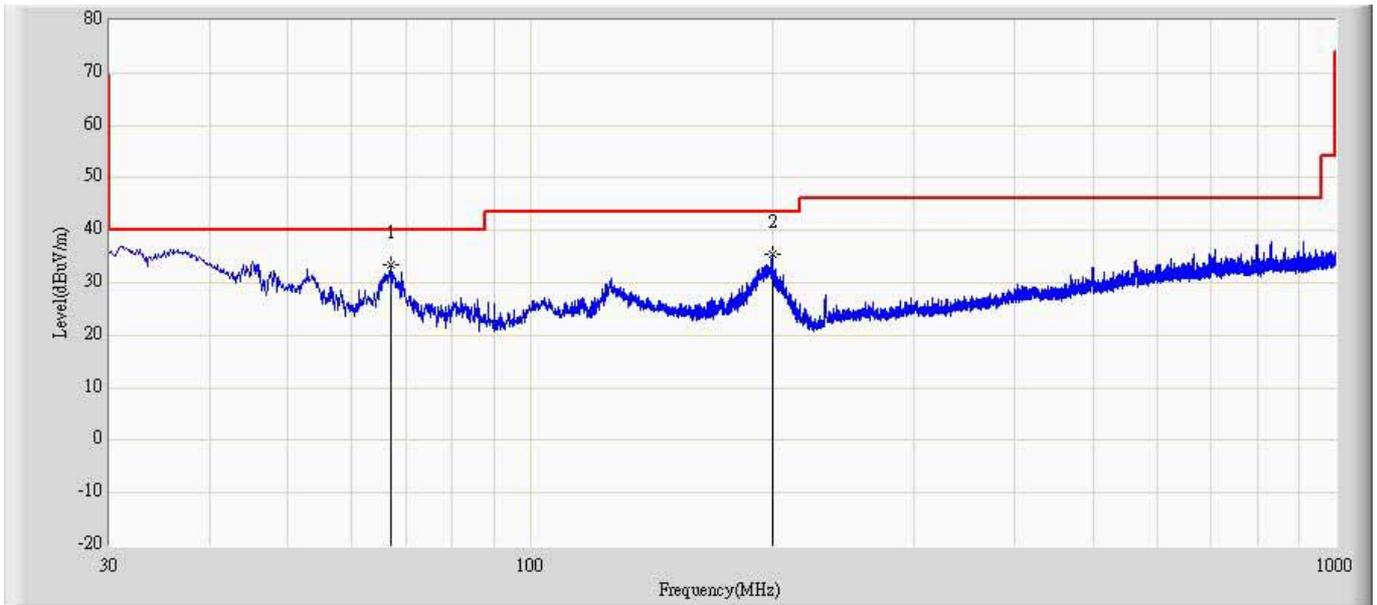
The worst case of Radiated Emission below 1GHz:

Site: AC2	Time: 2013/06/17 - 10:20
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: CBL6112D_27611(30-1000MHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: AC120V/60Hz
Note: Mode1: Transmit by 5180MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	199.750	39.162	23.051	-4.338	43.500	16.111	QP
2		480.080	35.551	10.355	-10.449	46.000	25.196	QP

Site: AC2	Time: 2013/06/17 - 10:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: CBL6112D_27611(30-1000MHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: AC120V/60Hz
Note: Mode1: Transmit by 5180MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	66.981	33.380	21.664	-6.620	40.000	11.716	QP
2		199.871	35.358	19.250	-8.142	43.500	16.109	QP

5. Operation Frequency Range of 20dB Bandwidth

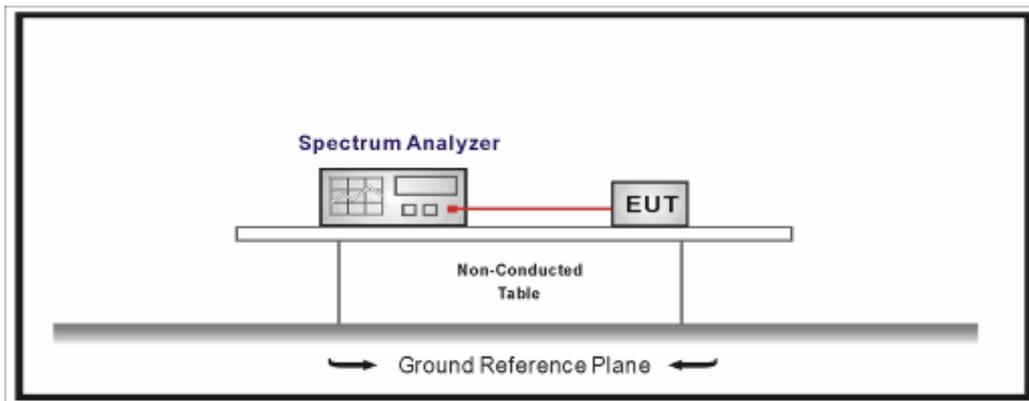
5.1. Test Equipment

Operation Frequency Range of 20dB Bandwidth /TR8

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2014.01.21
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2014.05.08

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

5.2. Test Setup



5.3. Limit

20 dB bandwidth of the emission is contained within the operation frequency band. FCC Part15.215(c).

5.4. Test Procedure

The EUT was tested according to UNII test procedure of KDB789033 and KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

Set RBW = 100 kHz, Span greater than RBW.

5.5. Uncertainty

The measurement uncertainty is defined as ± 1 kHz

5.6. Test Result

Product	:	DWAM83 Wireless Audio Module
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by Ant A

5180MHz



5240MHz



Product	:	DWAM83 Wireless Audio Module
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by Ant B

5180MHz



5240MHz



6. Occupied Bandwidth

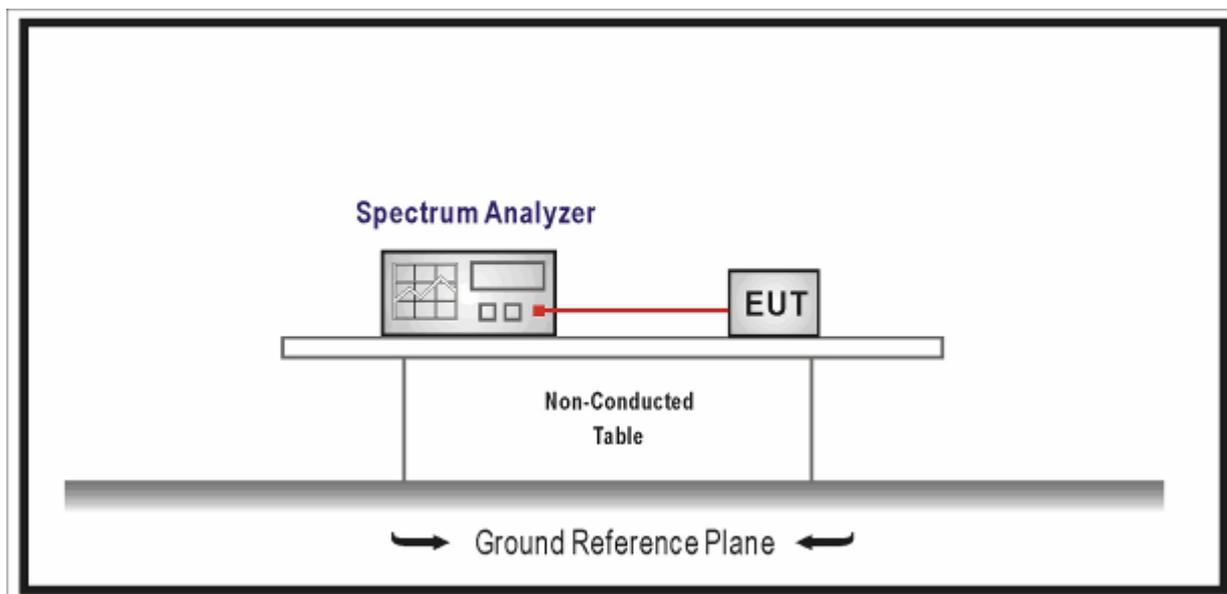
6.1. Test Equipment

Occupied Bandwidth / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2014.01.21
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2014.05.08

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

6.2. Test Setup



6.3. Limit

N/A

6.4. Test Procedure

The EUT was tested according to KDB789033 and KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

Emission bandwidth "B" MHz.

- Use a RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW
- Use a peak detector.
- Do not use the Max Hold function. Rather, use the view button to capture the emission.
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

6.5. Uncertainty

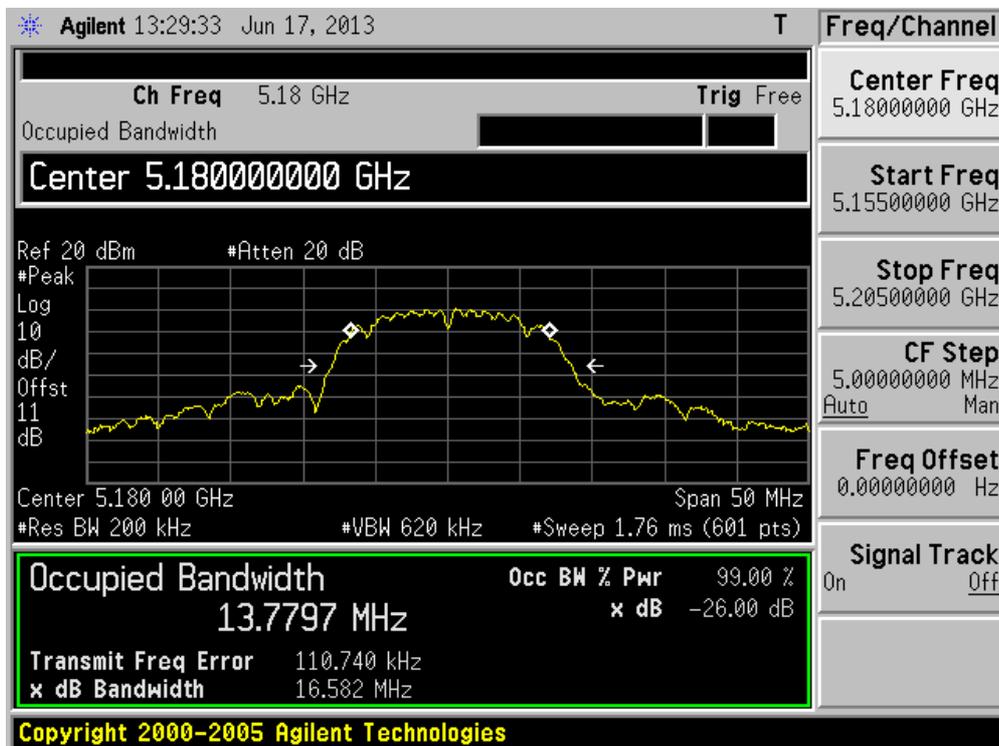
The measurement uncertainty is defined as ± 1 kHz

6.6. Test Result

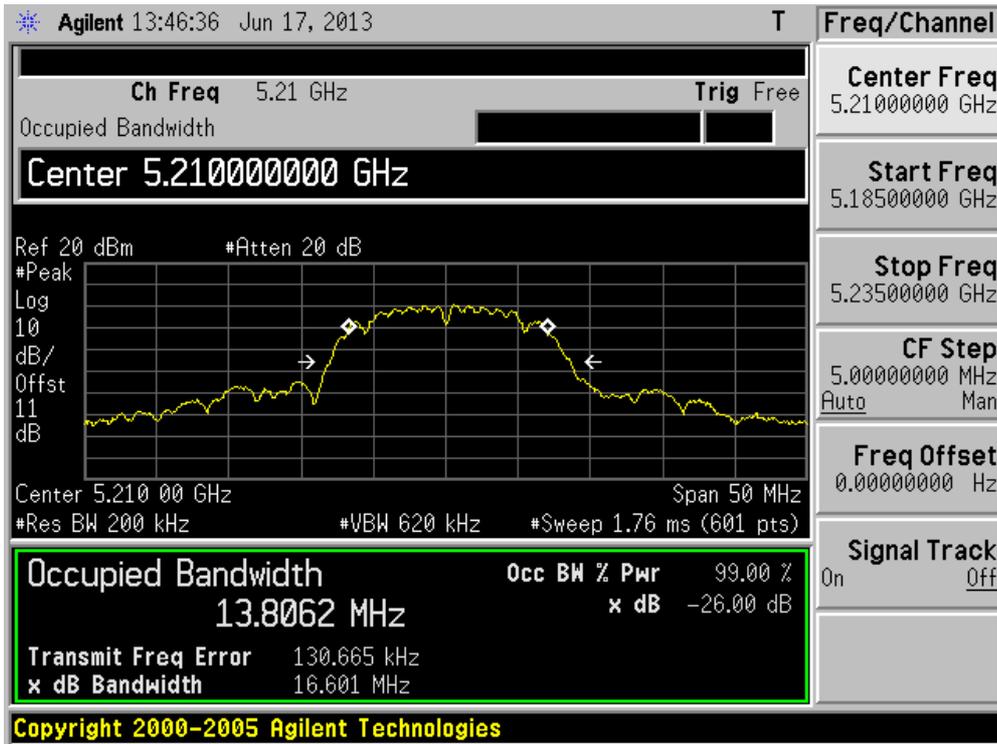
Product	:	DWAM83 Wireless Audio Module
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by Ant A

Channel No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
1	5180	16.582	13.7797
2	5210	16.601	13.8062
3	5240	16.583	13.7951

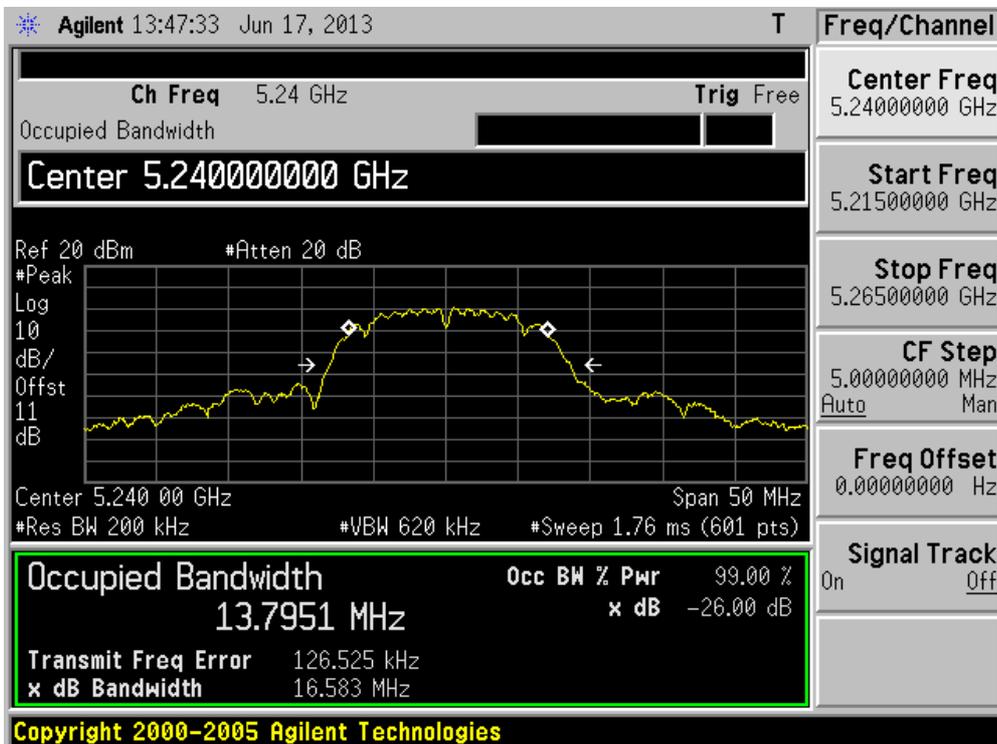
5180MHz



5210MHz



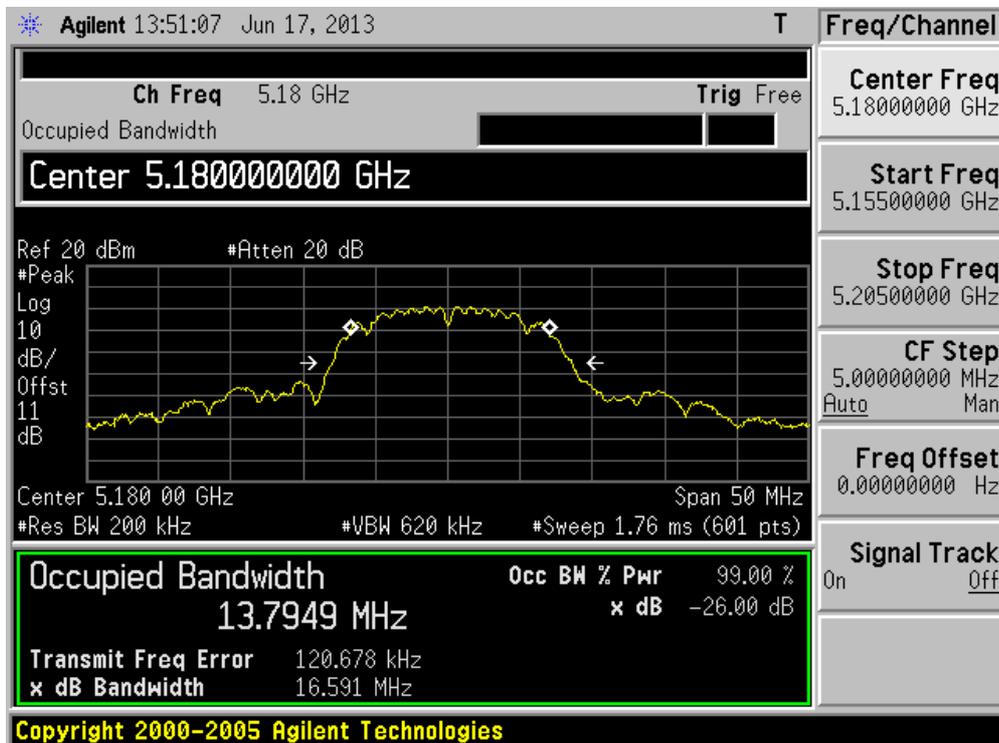
5240MHz



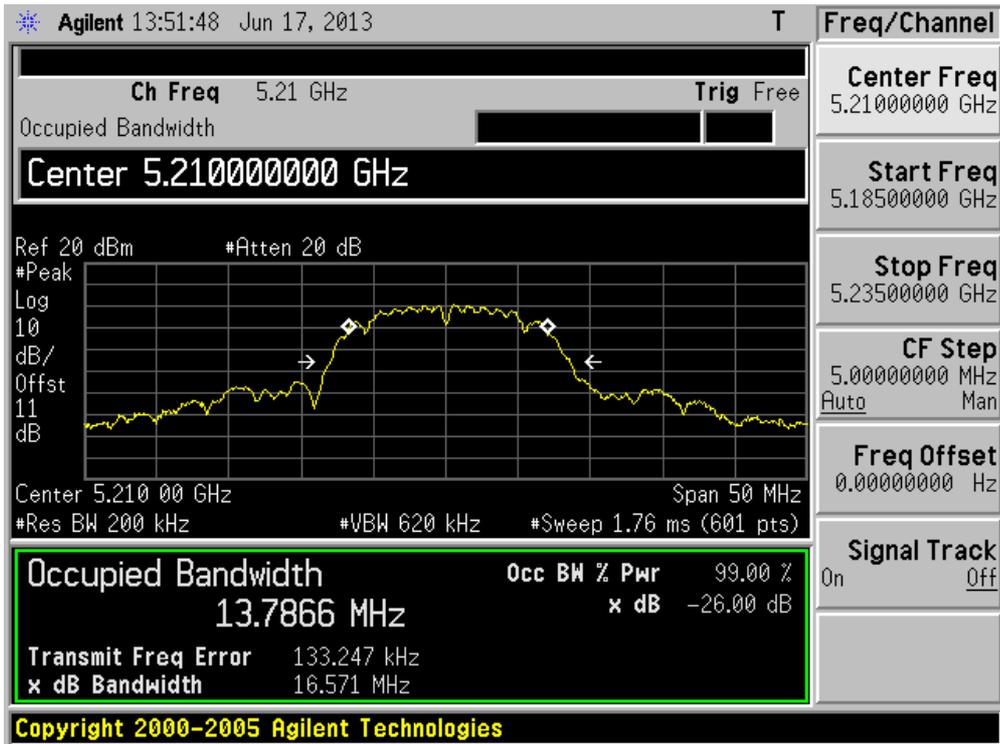
Product	:	DWAM83 Wireless Audio Module
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by Ant B

Channel No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
1	5180	16.591	13.7949
2	5210	16.571	13.7866
3	5240	16.586	13.8078

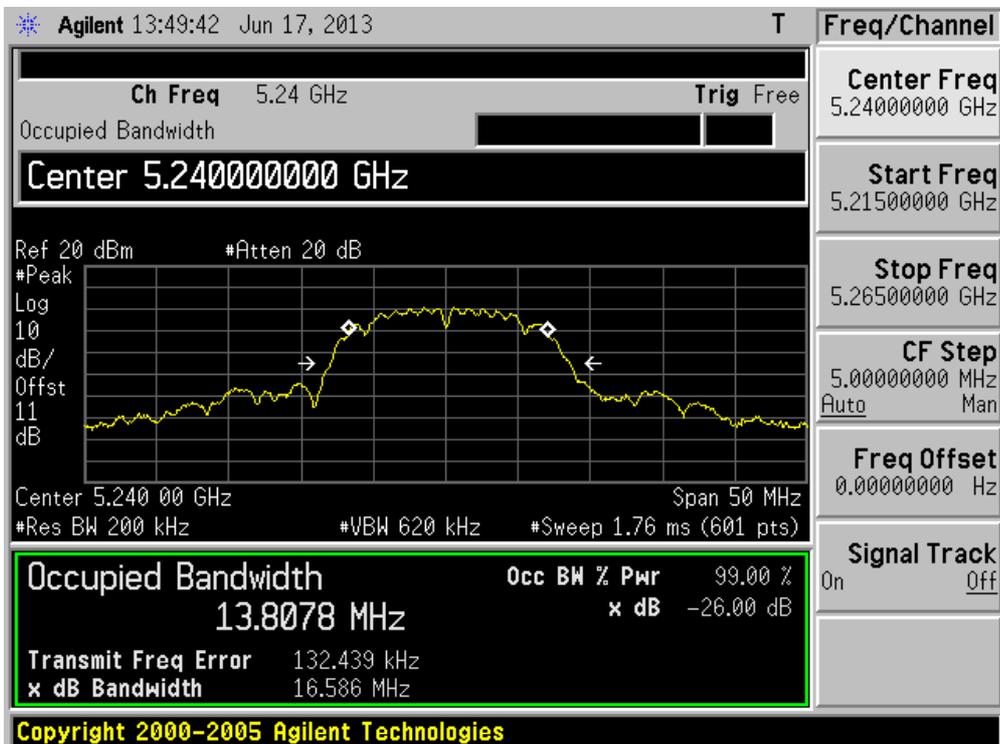
5180MHz



5210MHz



5240MHz



7. Power Output

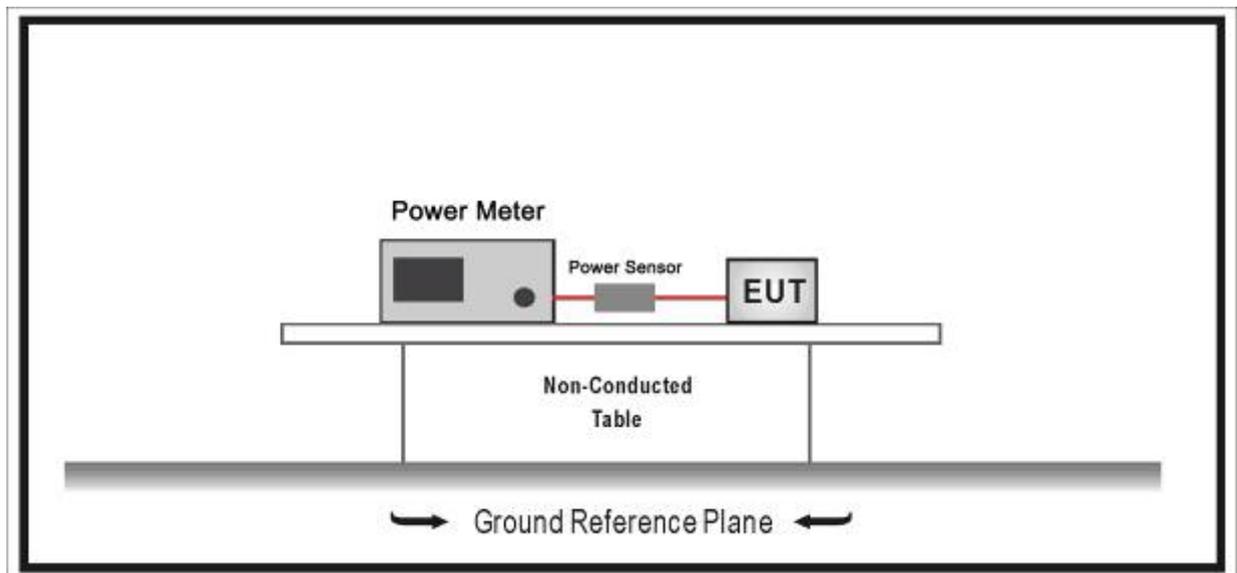
7.1. Test Equipment

Power Output / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2014.01.21
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2014.05.08

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

7.2. Test Setup



7.3. Limit

- For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- For the band 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. If transmitting antenna of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6

dBi.

- For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10\log B$, where B is the 26 dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power for each 1 dB of antenna gain in excess of 23 dBi would be required.

7.4. Test Procedure

The EUT was tested according to KDB789033 and KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

Use the wideband power meter to test peak power and record the result.

7.5. Uncertainty

The measurement uncertainty is defined as $\pm 1.27 \text{ dB}$

7.6. Test Result

Product	:	DWAM83 Wireless Audio Module
Test Item	:	Power Output
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit (Ant A)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Total Power (dBm)	Limit (dBm)	Result
1	5180	15.56	15.56	17.00	Pass
2	5210	15.09	15.09	17.00	Pass
3	5240	15.36	15.36	17.00	Pass

Product	:	DWAM83 Wireless Audio Module
Test Item	:	Power Output
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit (Ant B)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Total Power (dBm)	Limit (dBm)	Result
1	5180	15.43	15.43	17.00	Pass
2	5210	14.98	14.98	17.00	Pass
3	5240	15.02	15.02	17.00	Pass

8. Peak Power Spectral Density

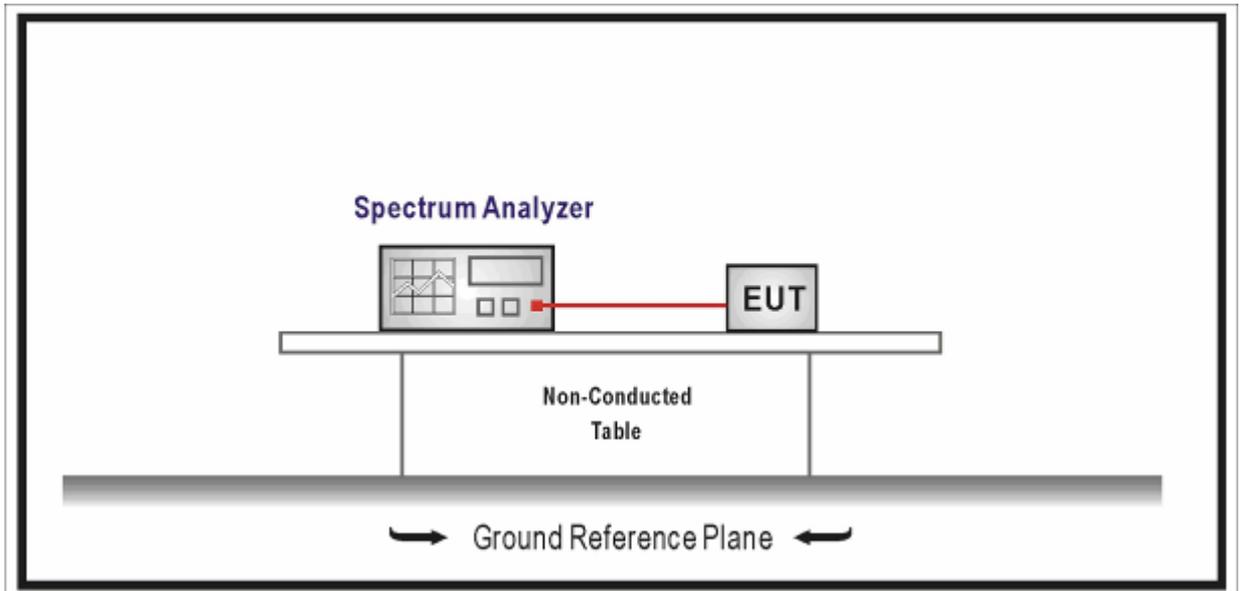
8.1. Test Equipment

Peak Power Spectral Density / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2014.01.21
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2014.05.08

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

8.2. Test Setup



8.3. Limit

- For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- For the band 5.25-5.35 GHz and 5.47-5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- For the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm

in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required.

8.4. Test Procedure

The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW \geq 3 MHz.
- Number of points in sweep \geq 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- The trigger shall be set to “free run”.
- Trace average at least 100 traces in power averaging (i.e., RMS) mode.

8.5. Uncertainty

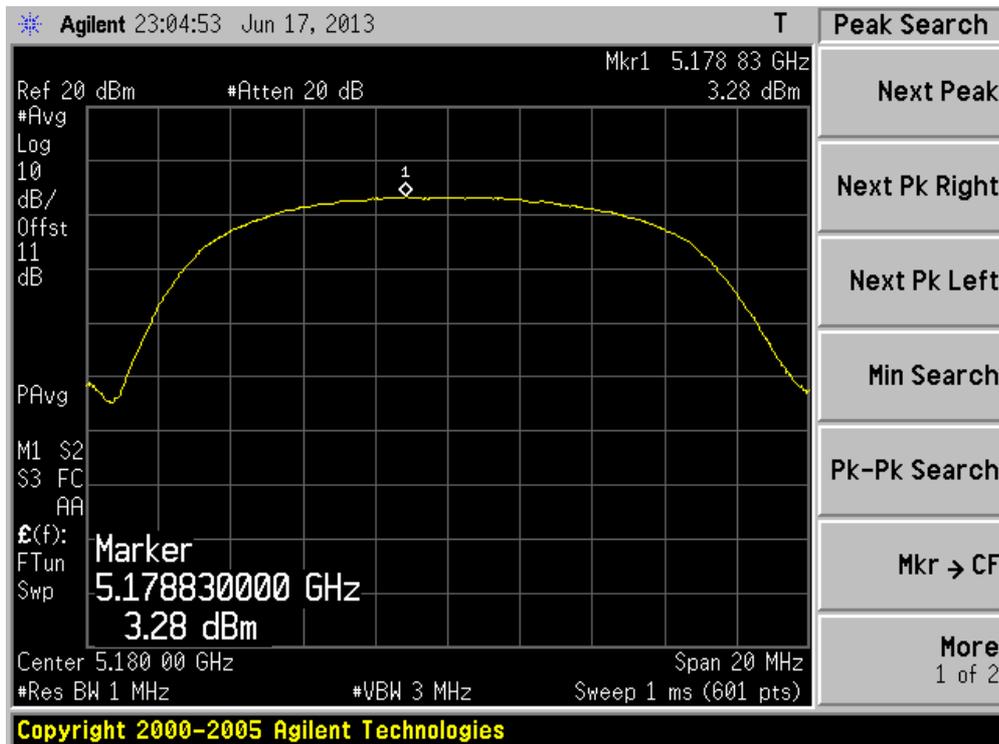
The measurement uncertainty is defined as ± 1.27 dB

8.6. Test Result

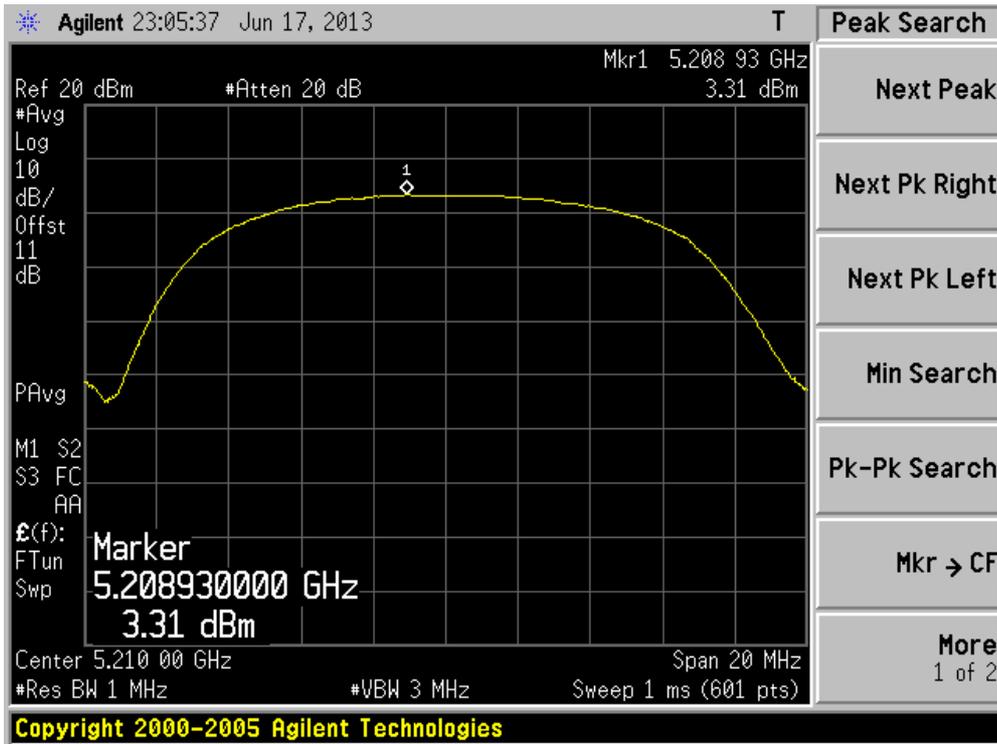
Product	:	DWAM83 Wireless Audio Module
Test Item	:	Peak Power Spectral Density
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/MHz)	Total PPSD (dBm/MHz)	Limit (dBm/MHz)	Result
1	5180	3.28	3.28	4.0	Pass
2	5210	3.31	3.31	4.0	Pass
3	5240	3.47	3.47	4.0	Pass

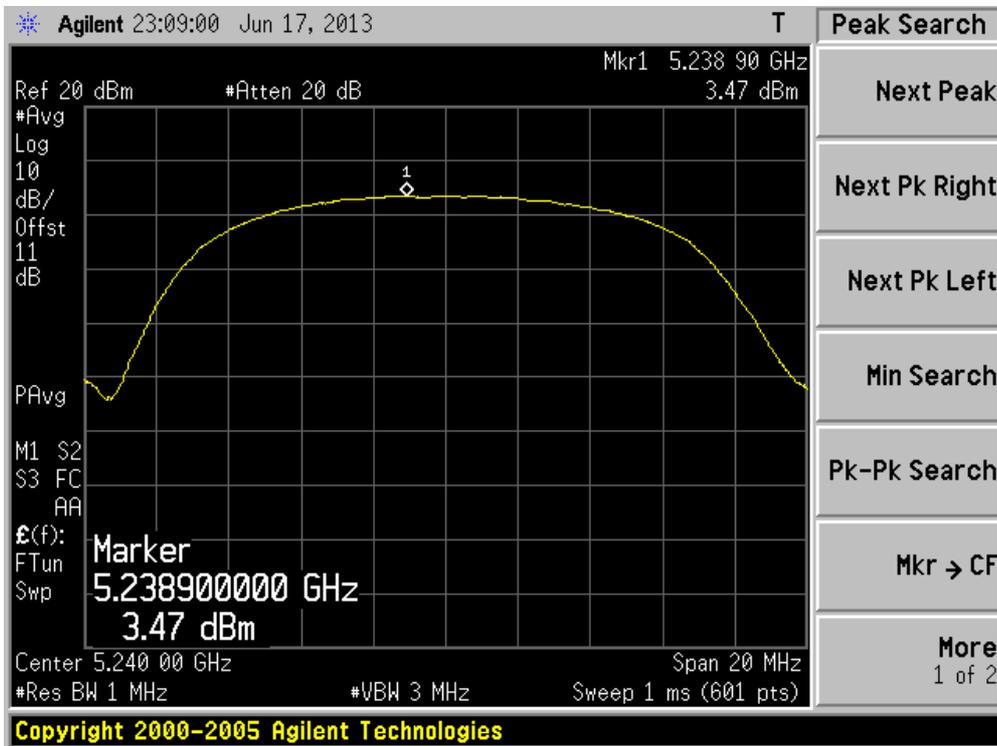
5180MHz



5210MHz



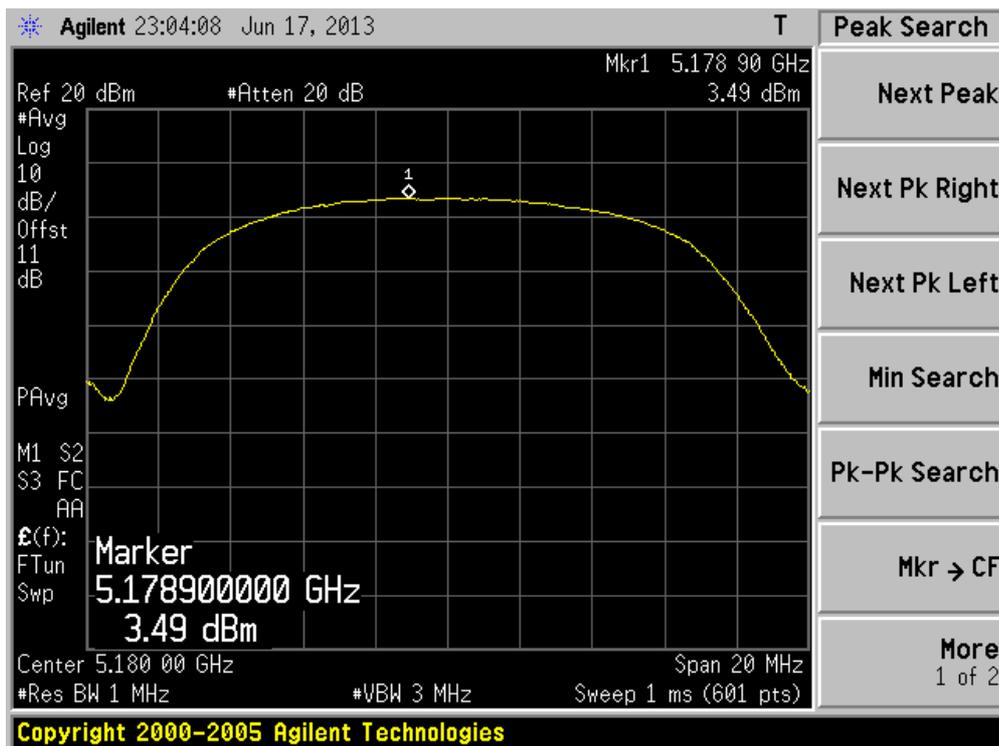
5240MHz



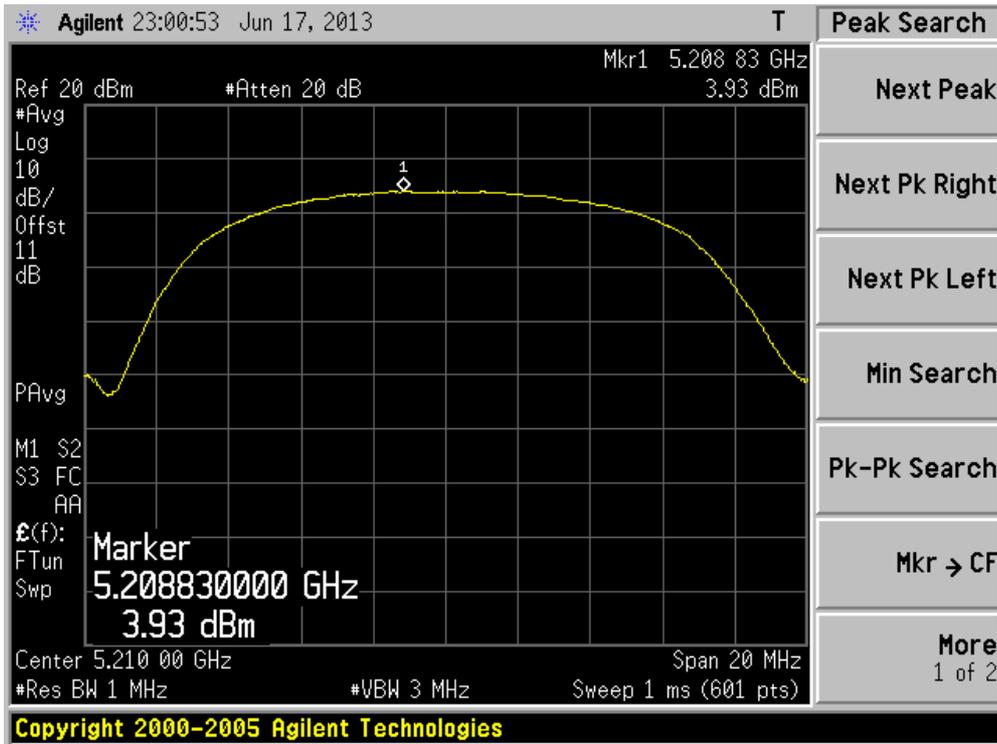
Product	:	DWAM83 Wireless Audio Module
Test Item	:	Peak Power Spectral Density
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/MHz)	Total PPSD (dBm/MHz)	Limit (dBm/MHz)	Result
1	5180	3.49	3.49	4.0	Pass
2	5210	3.93	3.93	4.0	Pass
3	5240	3.21	3.21	4.0	Pass

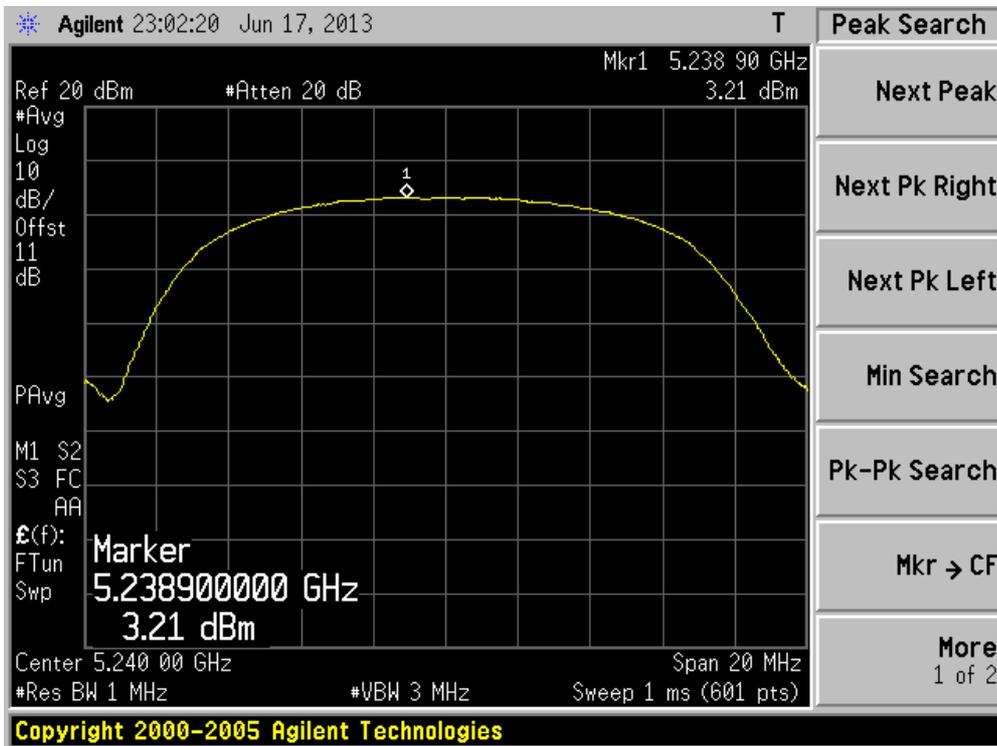
5180MHz



5210MHz



5240MHz



9. Peak Excursion

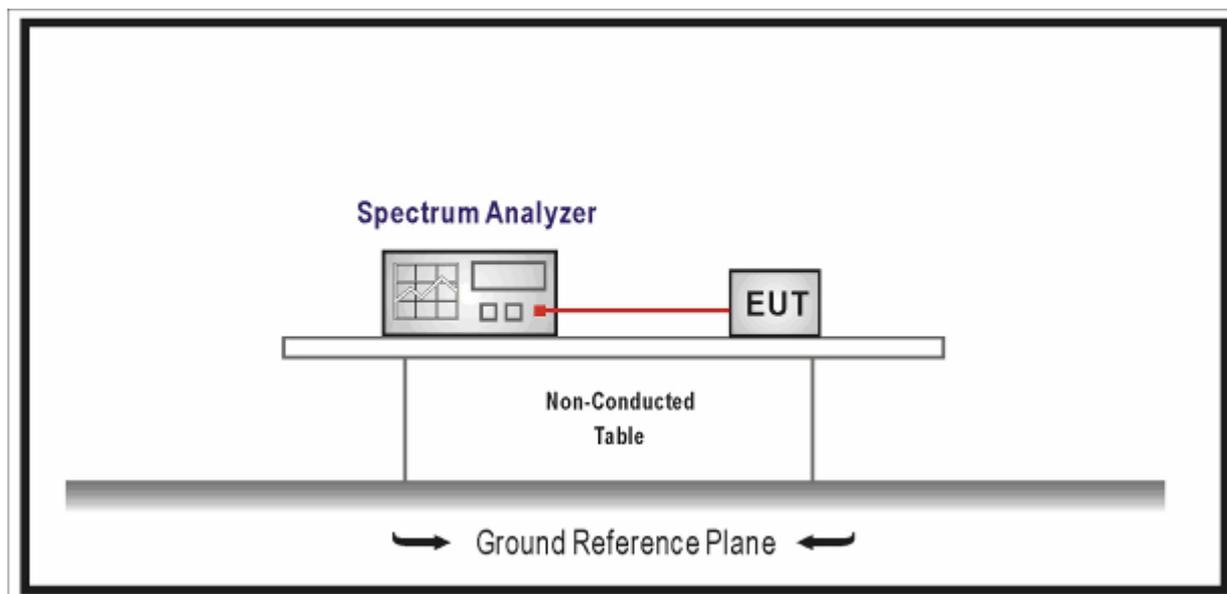
9.1. Test Equipment

Peak Excursion / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2014.01.21
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2014.05.08

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

9.2. Test Setup



9.3. Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

9.4. Test Procedure

The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be ≤ 13 dB for all frequencies across the emission bandwidth.

- (1) 1st Trace: Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and max-hold settings.
- (2) 2nd Trace: The result is the peak value of the PPSD.

9.5. Uncertainty

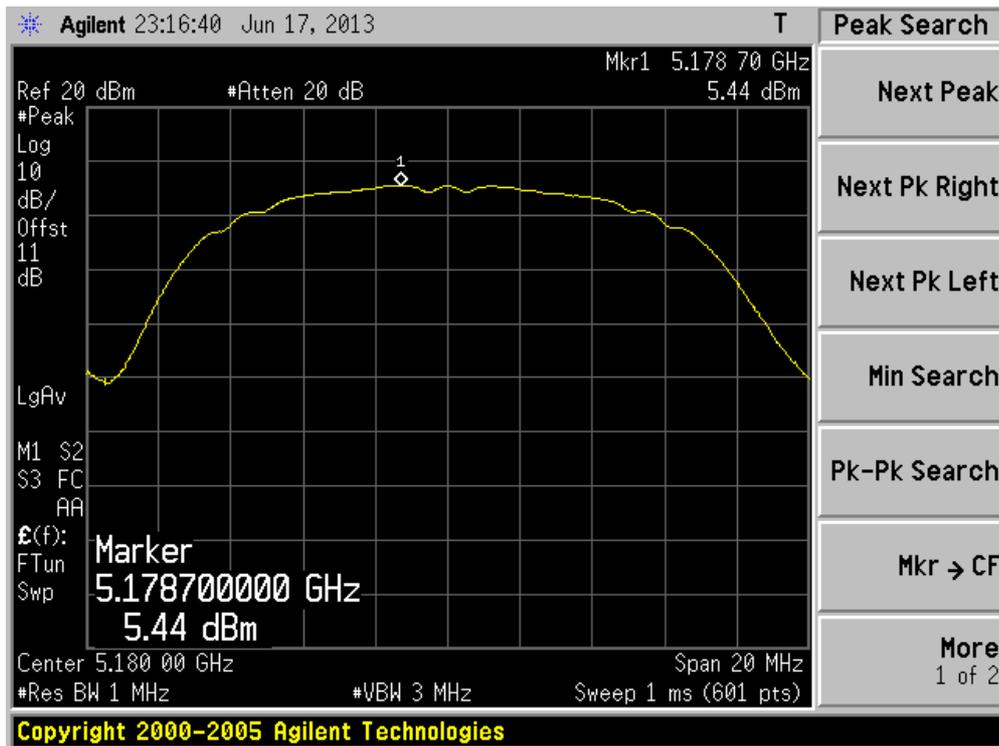
The measurement uncertainty is defined as ± 1.27 dB

9.6. Test Result

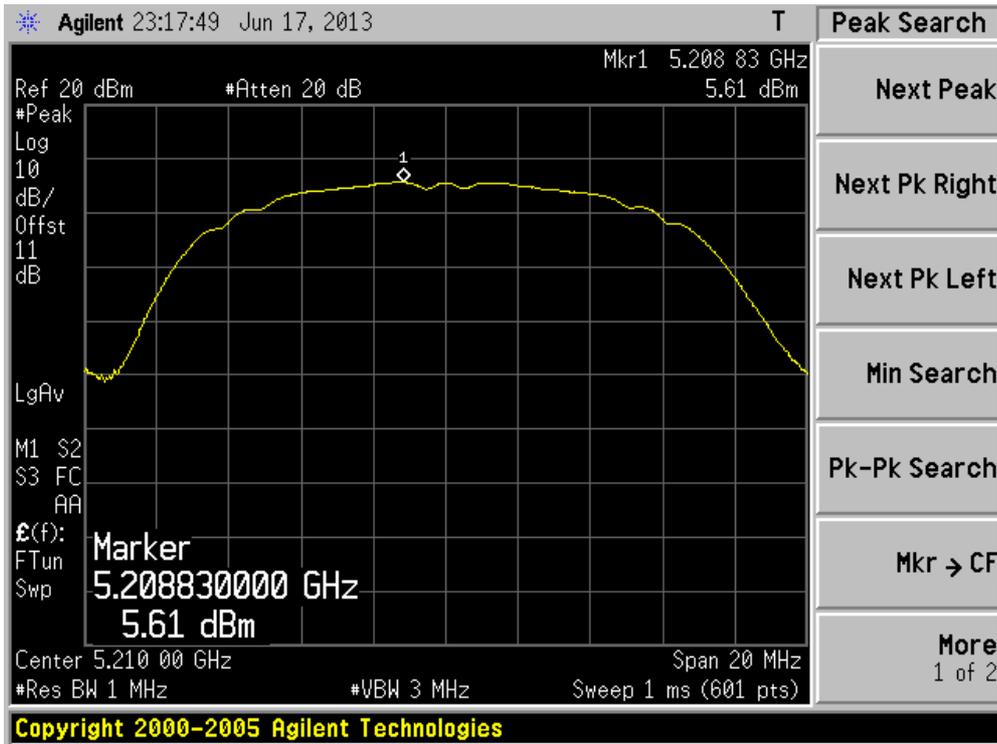
Product	:	DWAM83 Wireless Audio Module
Test Item	:	Peak Excursion
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by Ant A

Frequency (MHz)	Peak Level (dB)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Result
5180	5.44	3.28	1.92	0.24	13	Pass
5210	5.61	3.31	1.92	0.38	13	Pass
5240	5.83	3.47	1.92	0.44	13	Pass

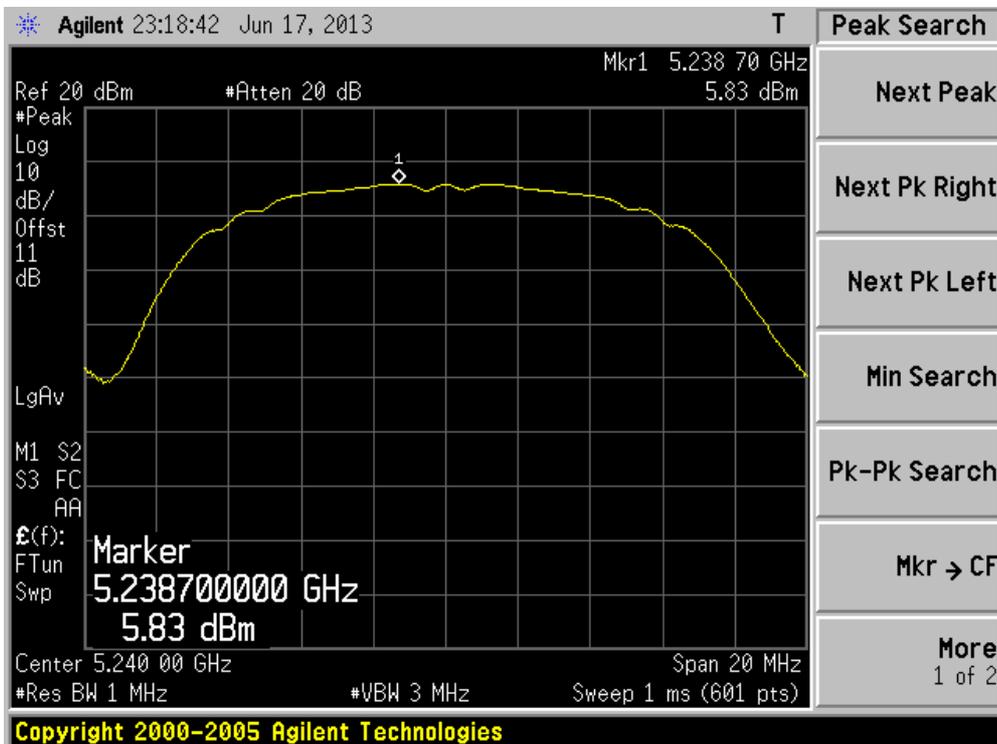
5180MHz



5210MHz



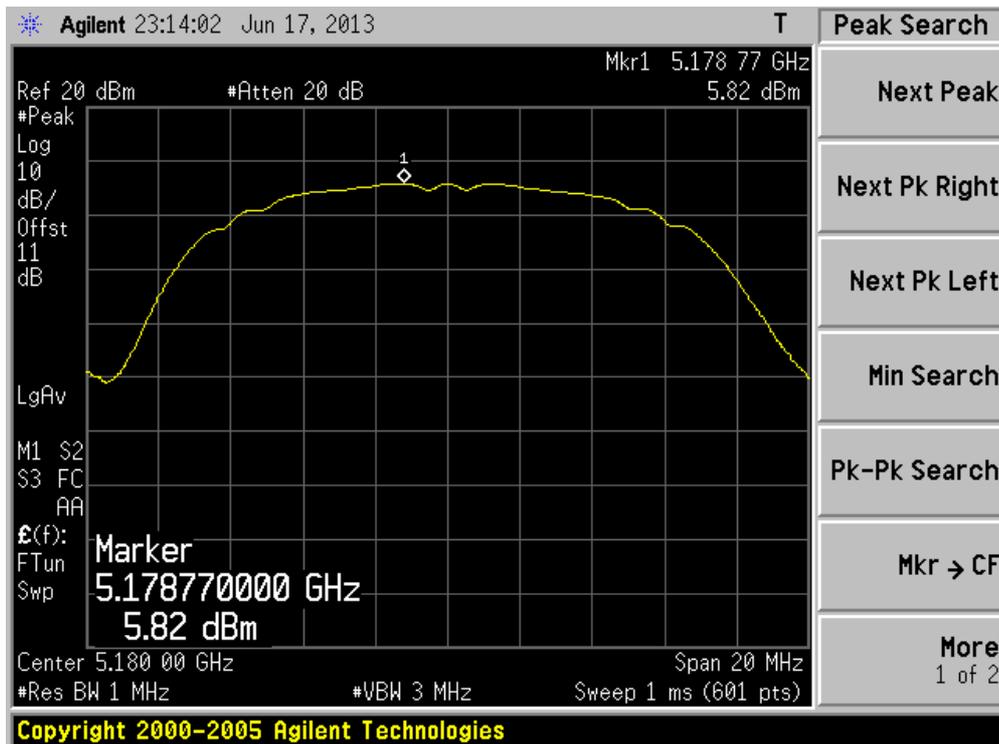
5240MHz



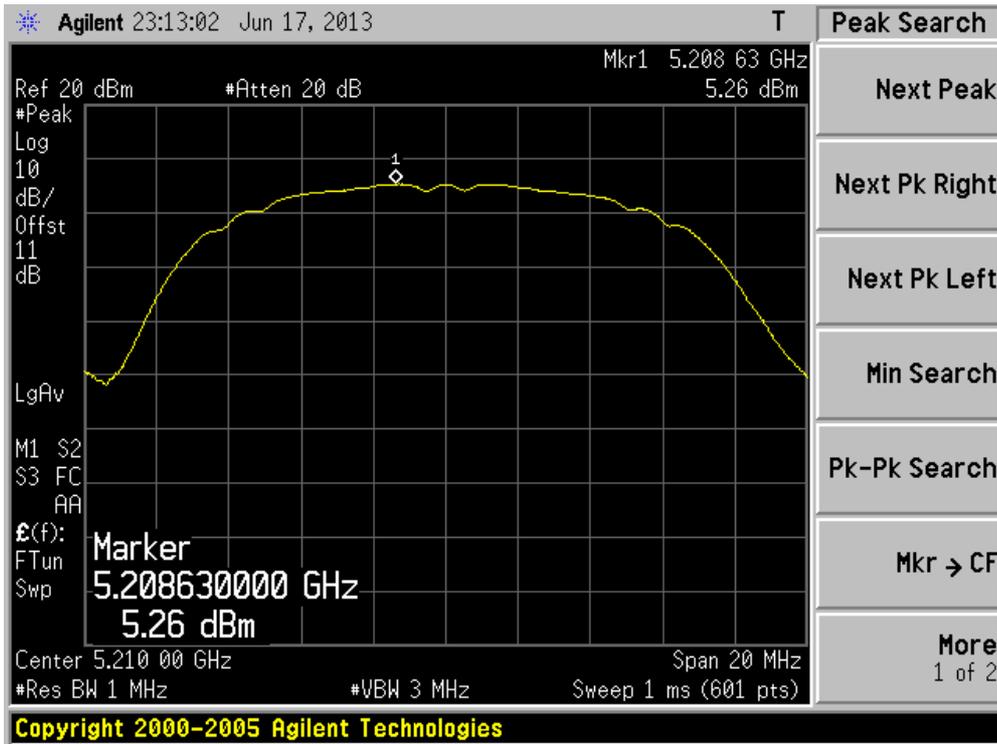
Product	:	DWAM83 Wireless Audio Module
Test Item	:	Peak Excursion
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit by Ant B

Frequency (MHz)	Peak Level (dB)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Result
5180	5.82	3.49	1.92	0.41	13	Pass
5210	5.26	3.93	1.92	-0.59	13	Pass
5240	5.53	3.21	1.92	0.40	13	Pass

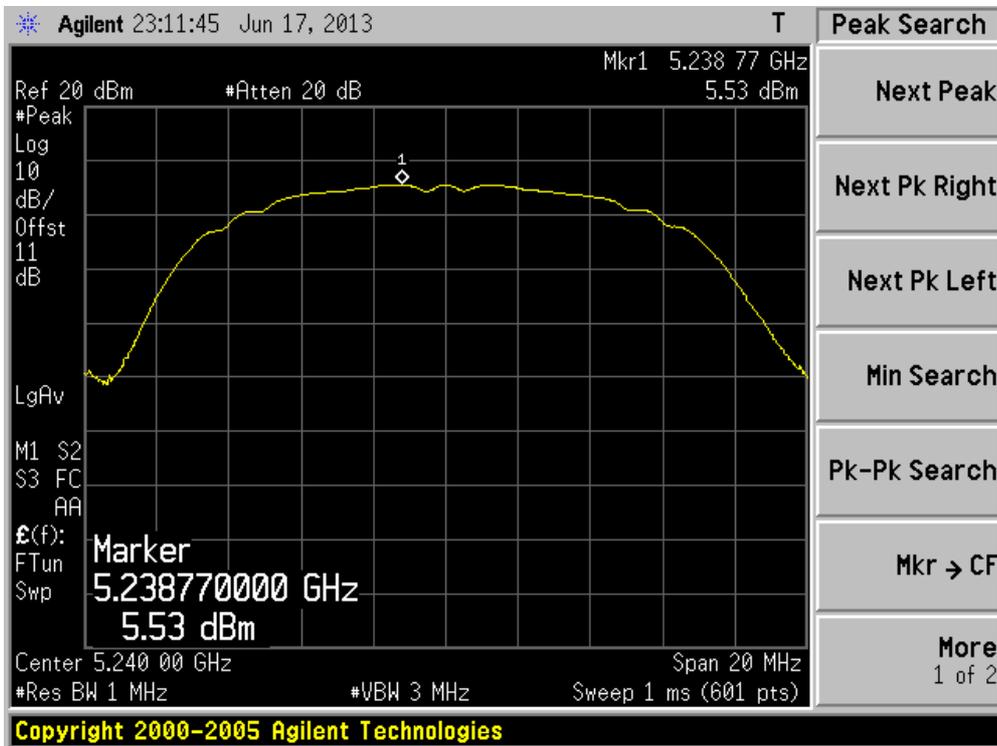
5180MHz



5210MHz



5240MHz



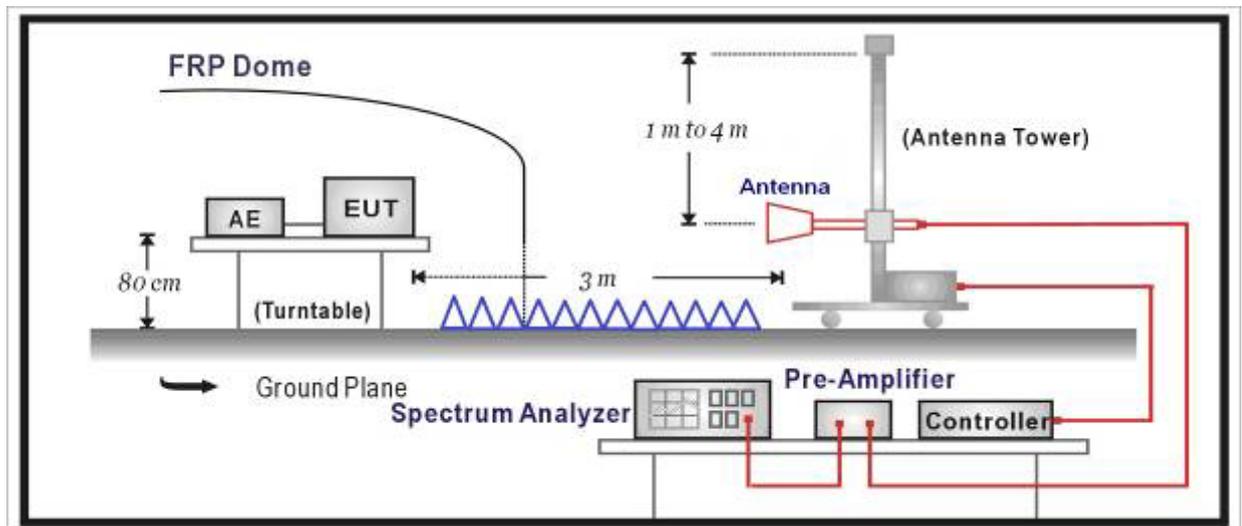
10. Radiated Emission Band Edge

10.1. Test Equipment

☒ Radiated Emission Band Edge / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2014.03.30
Preamplifier	Miteq	NSP1800-25	1364185	2014.05.03
Preamplifier	Quietek	AP-040G	CHM-0906001	2014.05.03
Bilog Type Antenna	Schaffner	CBL6112B	2932	2013.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2014.06.08
Temperature/Humidity Meter	zhicheng	ZC1-2	AC5-TH	2014.01.11

10.2. Test Setup



10.3. Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

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)

For 15.407(b) requirement:

- For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.
- For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27dBm/MHz in the 5.15-5.25 GHz band.
- For transmitters operating in the 5.47-5.725 GHz band: all emission outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.
- For transmitters operating in the 5.725-5.825 GHz band: all emission within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.

Operating Frequency Band (MHz)	EIRP Limit (dBm/MHz)	Equivalent Field Strength at 3m (dBuV/m)
5150 - 5250	-27	68.3
5250 - 5350	-27	68.3
5470 - 5725	-27	68.3
5725 - 5825	-27 [Note(1)]	68.3
	-17 [Note(2)]	78.3
<p>Note(1): Outside the frequency range 5715 - 5835MHz.</p> <p>Note(2): Within the frequency range from the band edge to 10MHz below or above the band edge, 5715 – 5725MHz and 5825 - 5835MHz.</p>		

10.4. Test Procedure

The EUT was tested according to KDB 789033 and KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 on radiated measurement.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 10~60 degrees for H-plane and 10~90 degrees for E-plane.

10.5. Uncertainty

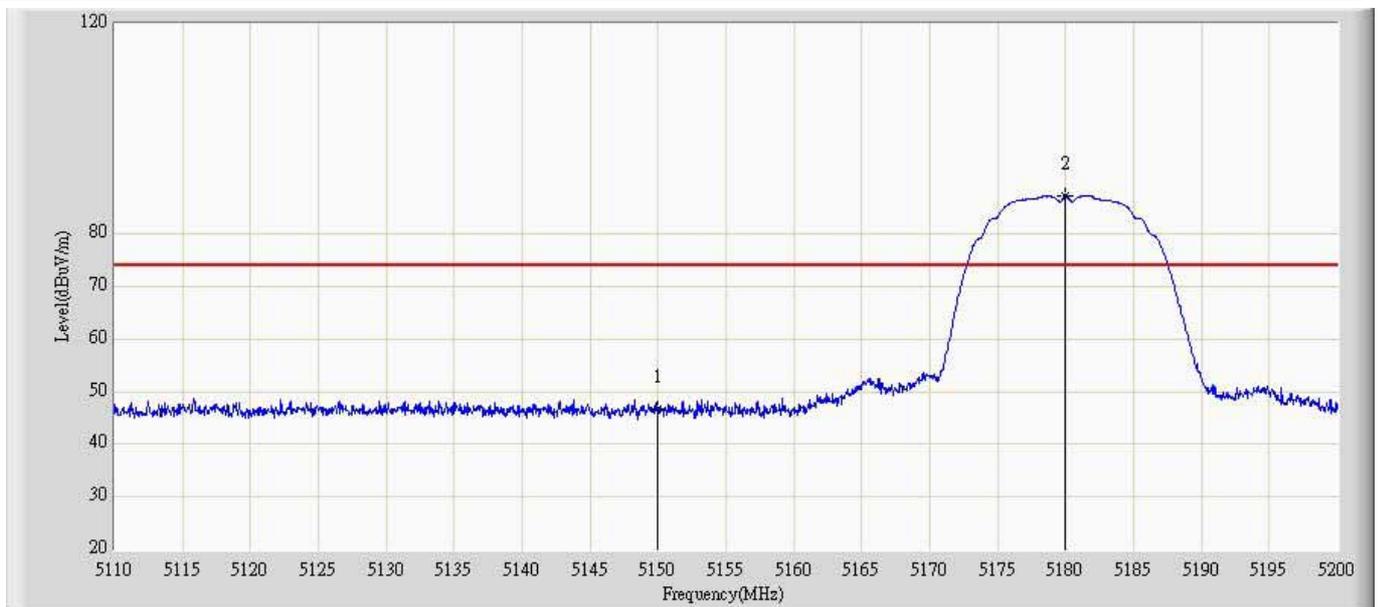
The measurement uncertainty above 1GHz is defined as ± 3.9 dB

10.6. Test Result

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5180MHz Ant A	



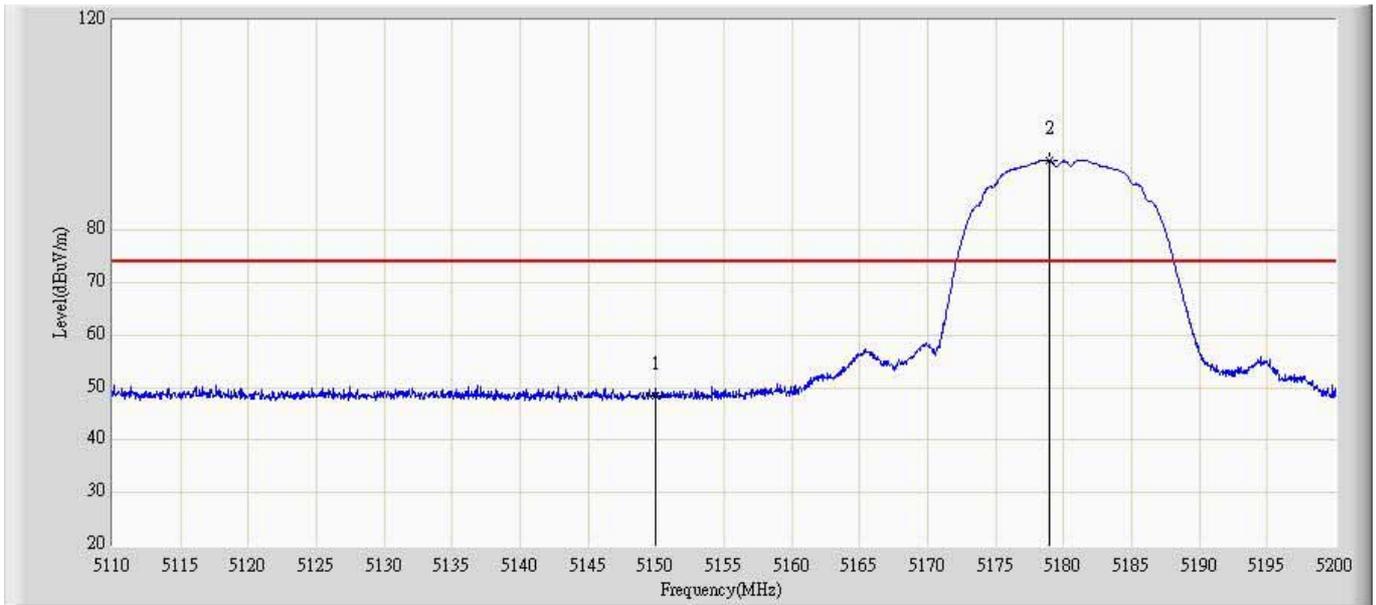
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			5150.000	46.747	54.791	-27.253	74.000	-8.044	PK
2		*	5179.930	87.324	95.259	N/A	N/A	-7.934	PK

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5180MHz Ant A	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			5150.000	34.874	42.918	-19.126	54.000	-8.044	AV
2		*	5179.165	82.988	90.925	N/A	N/A	-7.938	AV

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5180MHz Ant A	



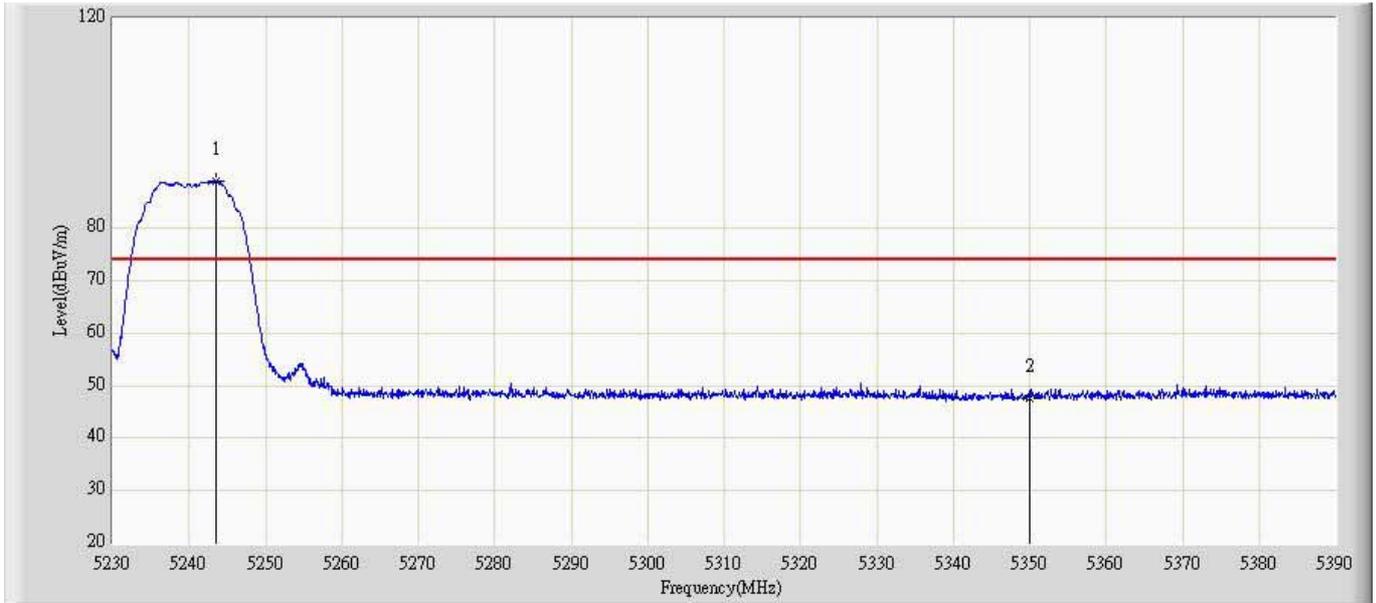
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			5150.000	48.430	56.514	-25.570	74.000	-8.084	PK
2		*	5178.940	93.271	101.295	N/A	N/A	-8.024	PK

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:07
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5180MHz Ant A	



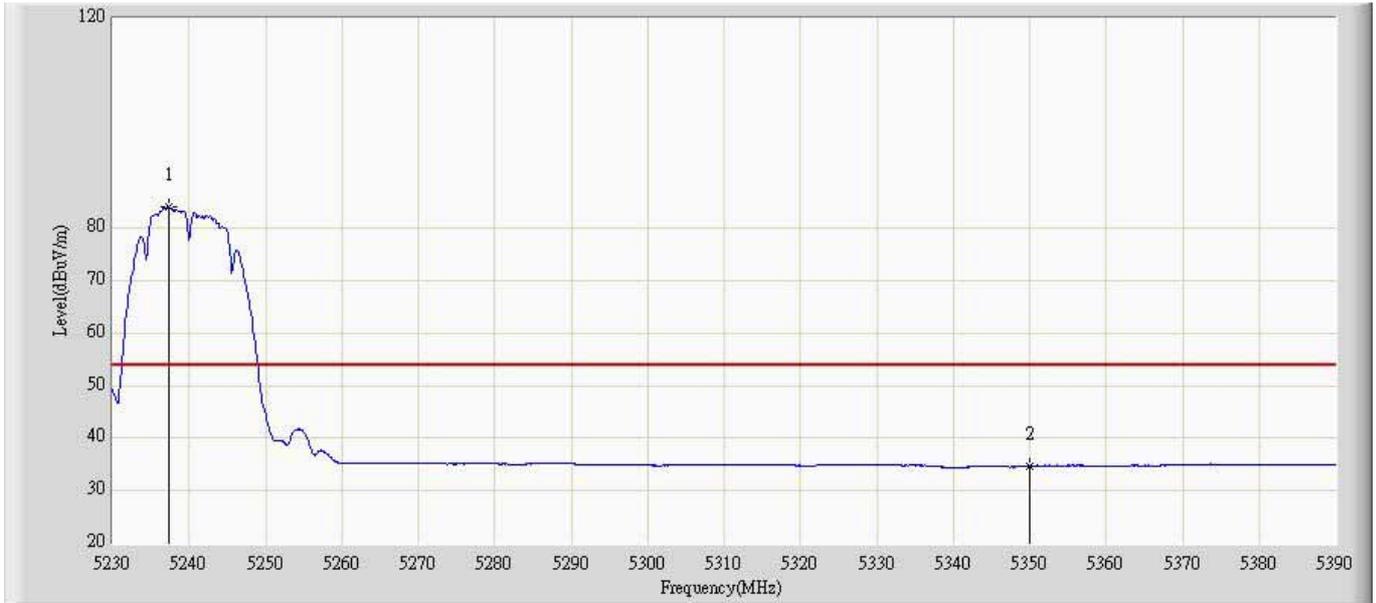
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			5150.000	35.403	43.487	-18.597	54.000	-8.084	AV
2		*	5179.255	87.897	95.920	N/A	N/A	-8.024	AV

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5240MHz Ant A	



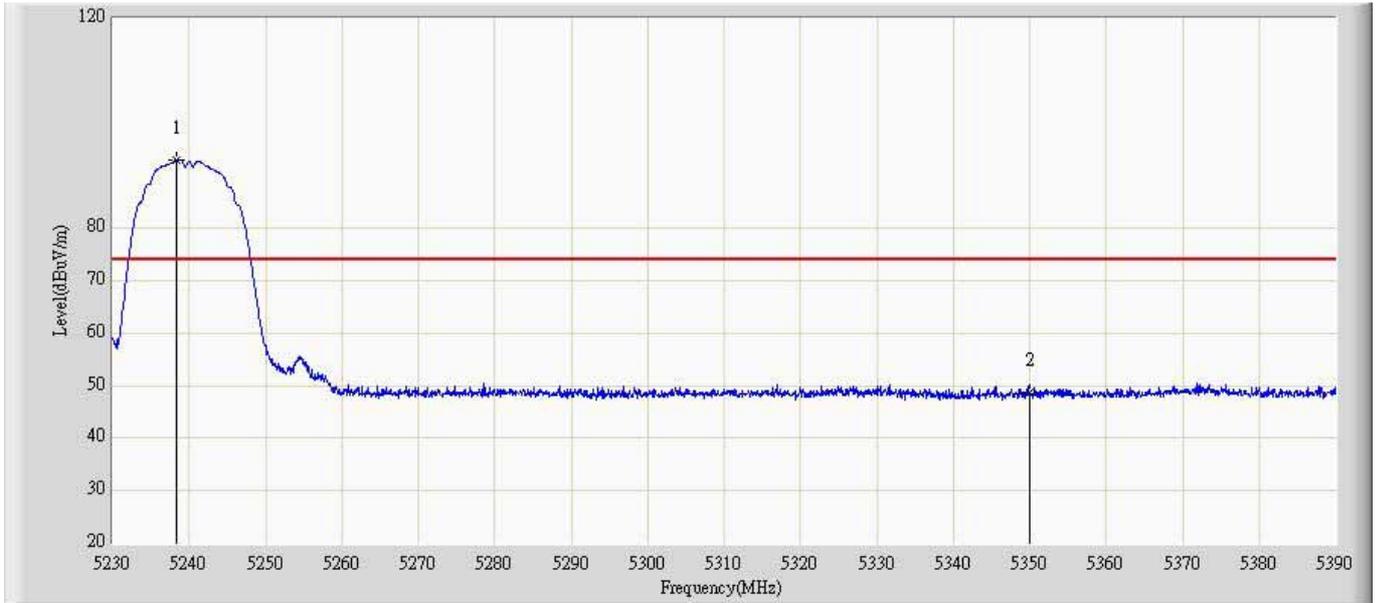
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	5243.600	89.001	96.789	N/A	N/A	-7.788	PK
2			5350.000	47.639	55.262	-26.361	74.000	-7.623	PK

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:12
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5240MHz Ant A	



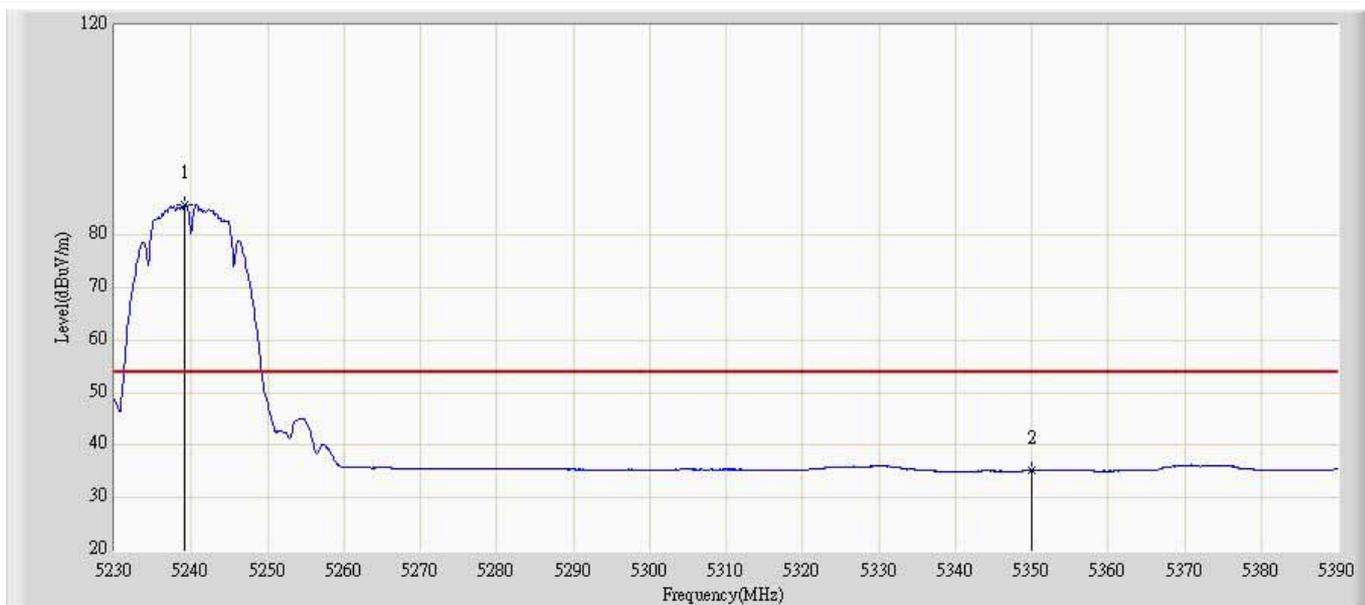
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	5237.360	84.058	91.863	N/A	N/A	-7.805	AV
2			5350.000	34.758	42.381	-19.242	54.000	-7.623	AV

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5240MHz Ant A	



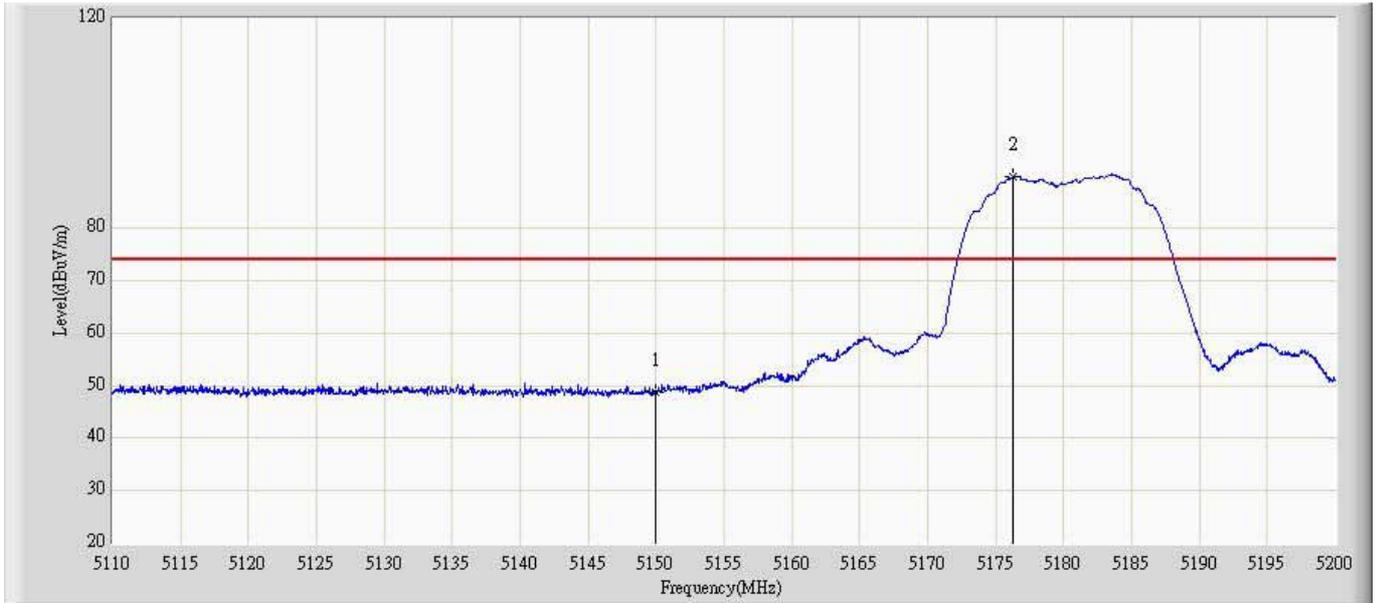
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	5238.400	93.043	101.027	N/A	N/A	-7.984	PK
2			5350.000	48.685	56.468	-25.315	74.000	-7.783	PK

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:15
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5240MHz Ant A	



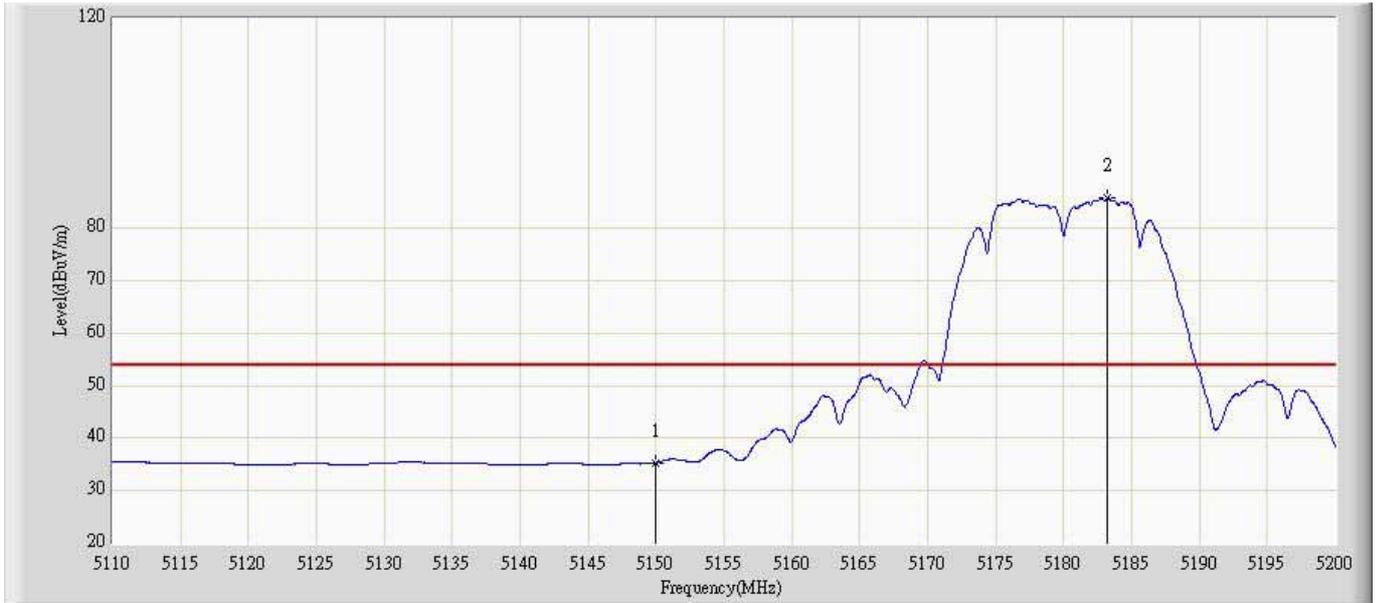
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	5239.200	85.818	93.801	N/A	N/A	-7.983	AV
2			5350.000	35.153	42.936	-18.847	54.000	-7.783	AV

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5180MHz Ant B	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			5150.000	48.864	56.908	-25.136	74.000	-8.044	PK
2		*	5176.240	89.733	97.678	N/A	N/A	-7.944	PK

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:35
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5180MHz Ant B	



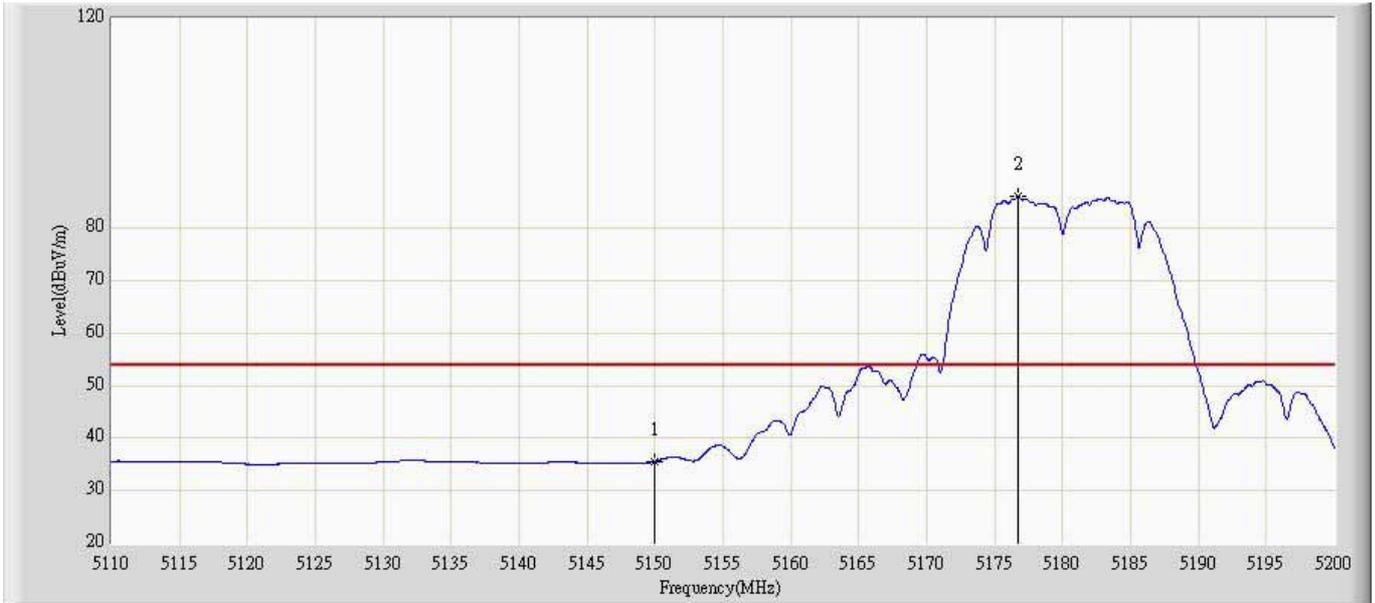
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			5150.000	35.341	43.385	-18.659	54.000	-8.044	AV
2		*	5183.260	85.684	93.608	N/A	N/A	-7.925	AV

Profile: 2013.6.10	Page No.: 133
Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5180MHz Ant B	



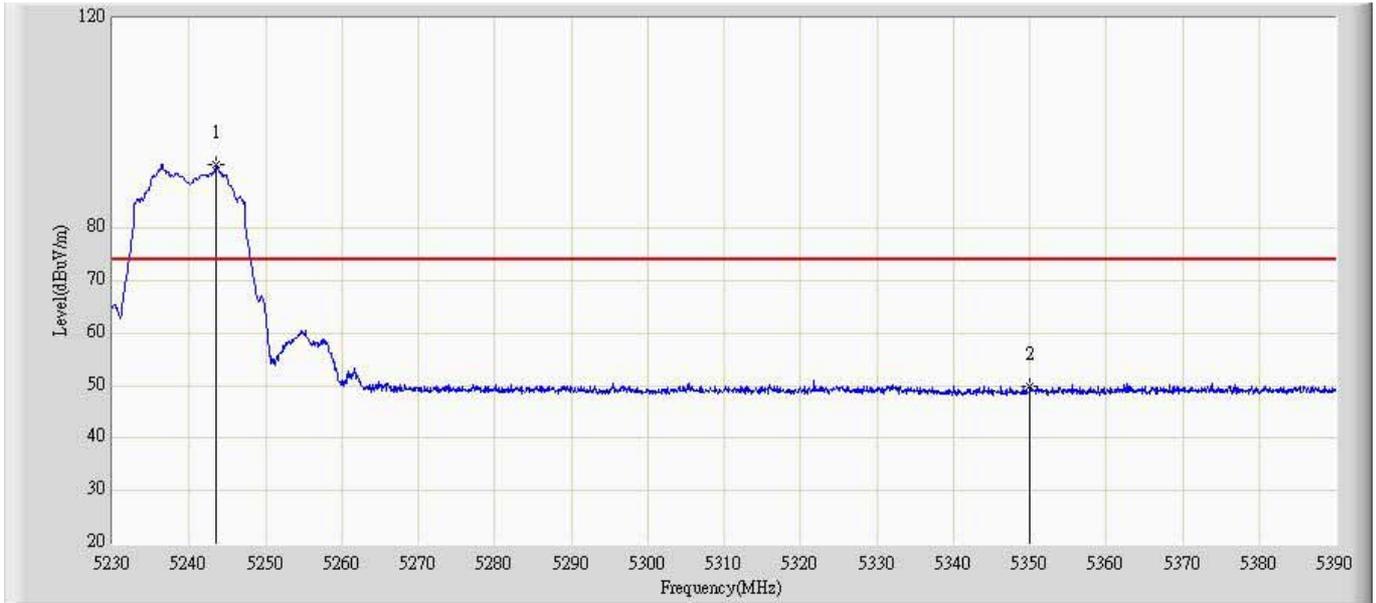
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			5150.000	47.909	55.993	-26.091	74.000	-8.084	PK
2		*	5176.420	92.038	100.065	N/A	N/A	-8.026	PK

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5180MHz Ant B	



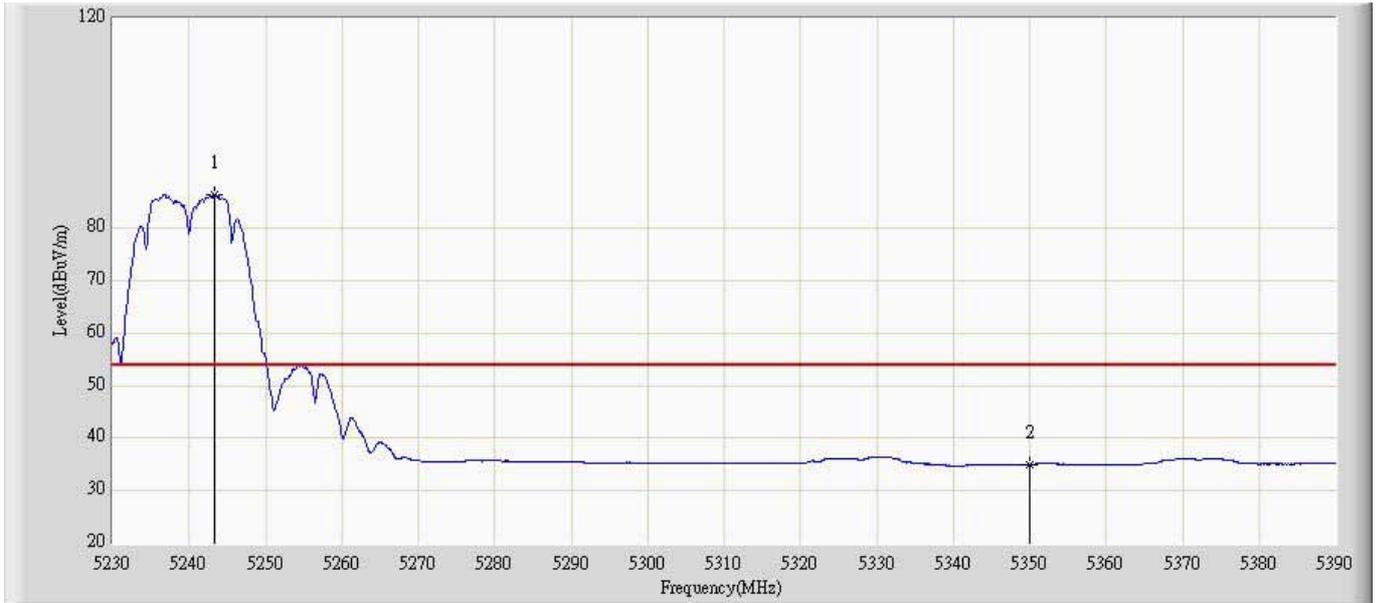
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			5150.000	35.538	43.622	-18.462	54.000	-8.084	AV
2		*	5176.735	85.999	94.025	N/A	N/A	-8.026	AV

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 15:53
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5240MHz Ant B	



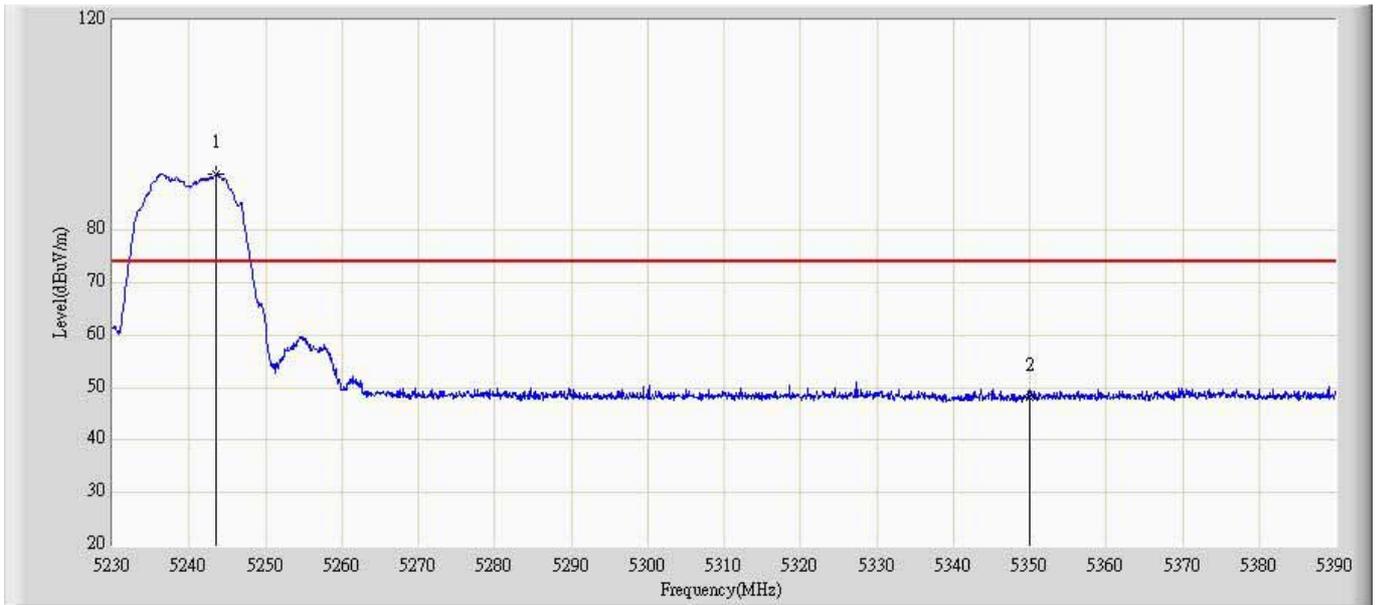
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	5243.600	91.994	99.782	N/A	N/A	-7.788	PK
2			5350.000	49.843	57.466	-24.157	74.000	-7.623	PK

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 16:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5240MHz Ant B	



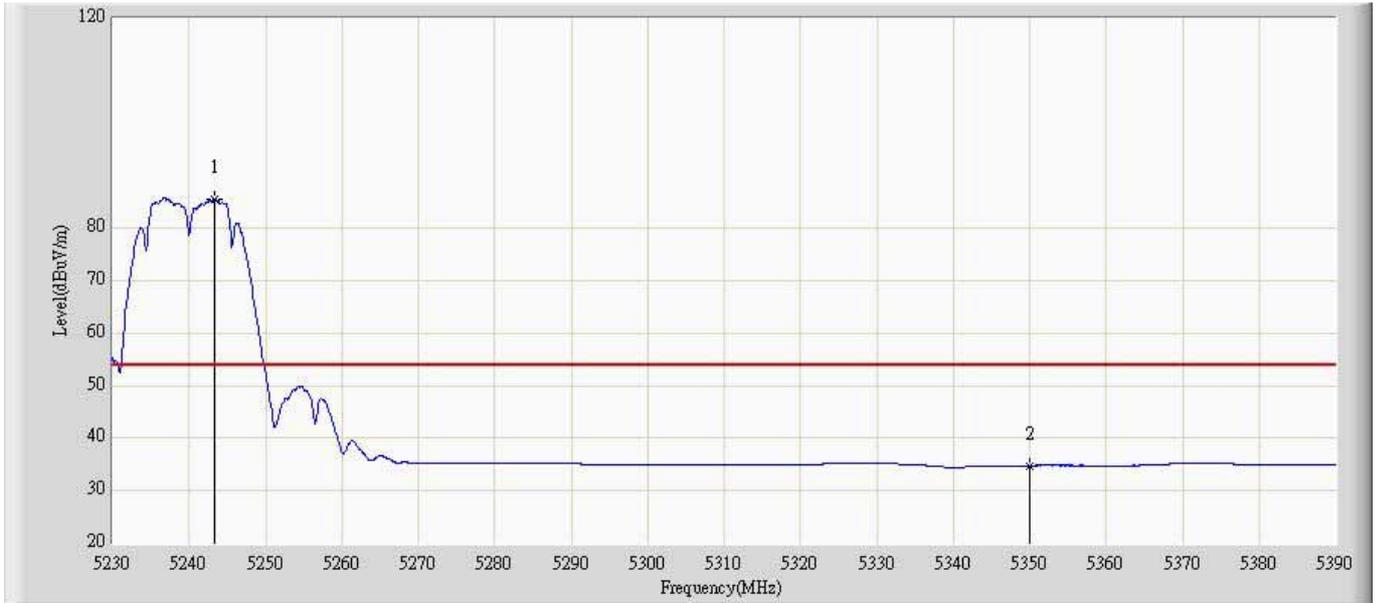
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	5243.360	86.468	94.256	N/A	N/A	-7.789	AV
2			5350.000	35.069	42.692	-18.931	54.000	-7.623	AV

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 16:06
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5240MHz Ant B	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	5243.520	90.788	98.766	N/A	N/A	-7.978	PK
2			5350.000	48.255	56.038	-25.745	74.000	-7.783	PK

Engineer: Jack	
Site: AC5	Time: 2013/06/17 - 16:11
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: DC 5V
Note: Mode 1: Transmit at channel 5240MHz Ant B	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	5243.360	85.620	93.598	N/A	N/A	-7.978	AV
2			5350.000	34.711	42.494	-19.289	54.000	-7.783	AV

11. Frequency Stability

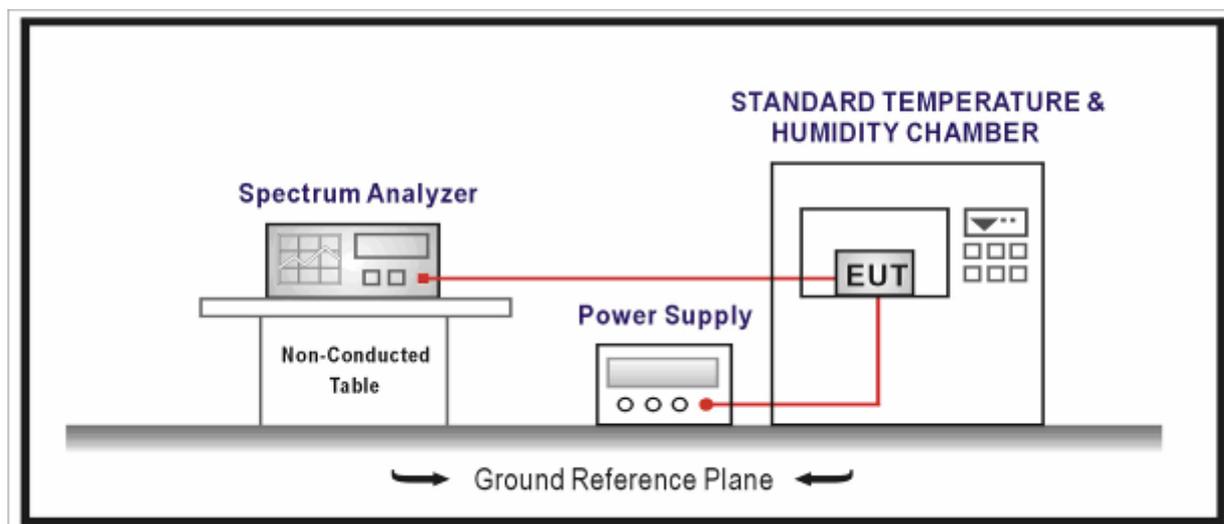
11.1. Test Equipment

Frequency Stability / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2014.01.21
AC Power Supply	IDRC	CF-500TP	979422	2013.09.17
DC Power Supply	IDRC	CD-035-020PR	977272	2013.09.17
Programmable Temperature & Humidity Chamber	Gaoyu	TH-1P-B	WIT-05121302	2014.01.10
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2014.05.08

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

11.2. Test Setup



11.3. Limit

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

11.4. Test Procedure

Frequency Stability Under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

11.5. Uncertainty

The measurement uncertainty is defined as ± 100 Hz

11.6. Test Result

Product	:	DWAM83 Wireless Audio Module
Test Item	:	Frequency Stability
Test Site	:	TR-8
Test Mode	:	Carrier Transmit

Operating Frequency: 5180MHz					
Temp (°C)	Voltage (AC)	Frequency Tolerance (ppm)			
		0 minutes	2 minutes	5 minutes	10 minutes
-10	102	2.44	2.45	2.48	2.47
	120	2.15	2.14	2.11	2.12
	138	2.34	2.32	2.31	2.37
25	102	2.45	2.45	2.49	2.48
	120	2.12	2.12	2.11	2.10
	138	2.33	2.31	2.31	2.38
60	102	2.48	2.47	2.47	2.46
	120	2.13	2.12	2.11	2.10
	138	2.38	2.35	2.35	2.33

12. Receiver Spurious Emission for Industry Canada RSS-Gen Requirement

12.1. Test Equipment

Radiated Emission / AC-2

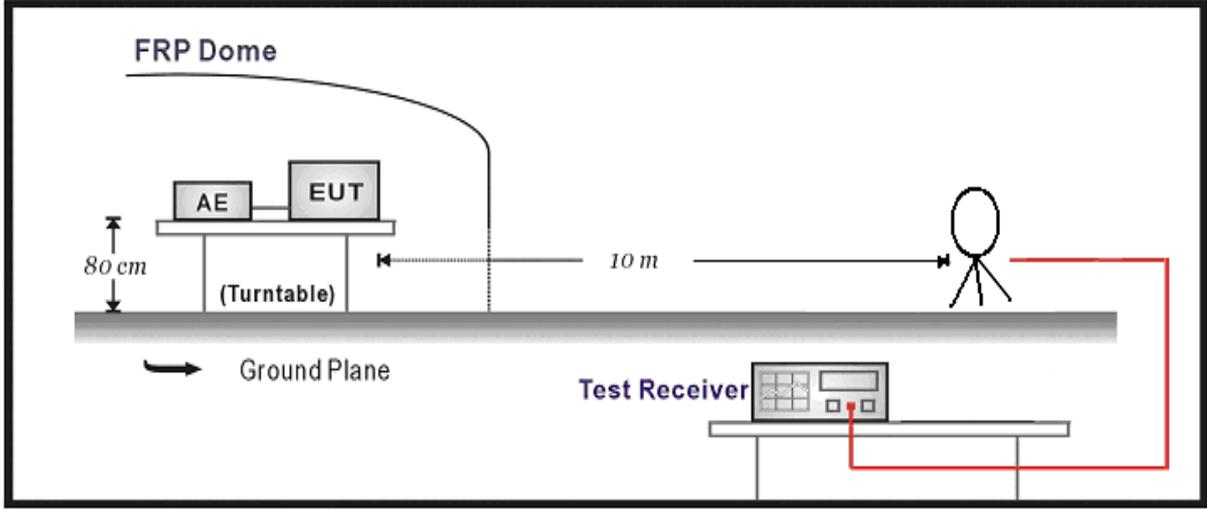
Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
EMI Test Receiver	R&S	ESCI	100573	2014.03.30
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2013.10.15
Coaxial Cable	Huber+Suhner	RG 214	AC2-C	2014.03.01
Temperature/Humidity Meter	zhicheng	ZC1-2	AC2-TH	2014.01.10
EMI Test Receiver	R&S	ESCI	100573	2014.03.30

Radiated Emission / AC-5

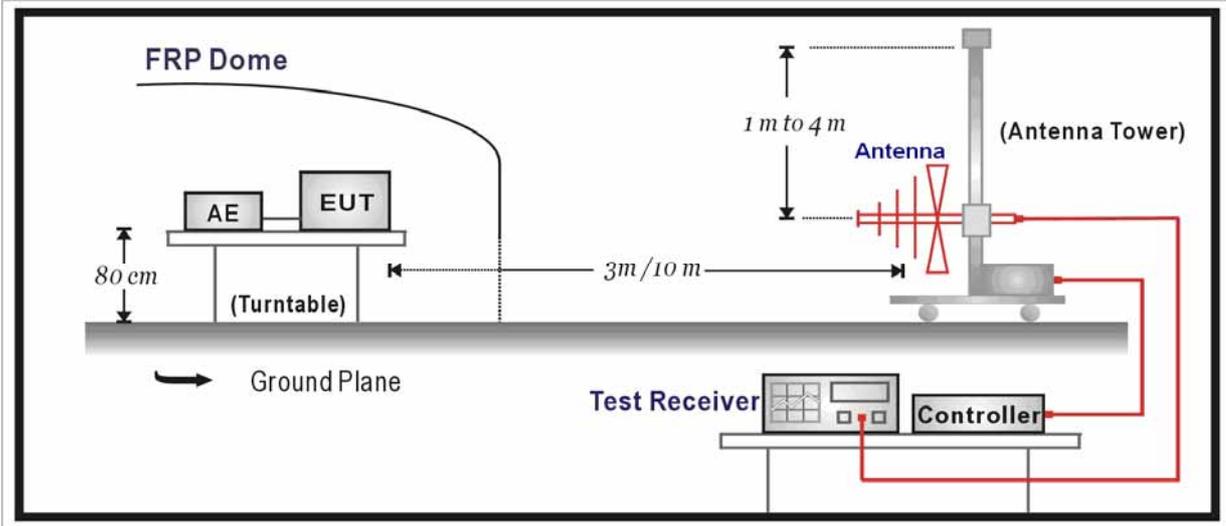
Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2014.03.30
Preamplifier	Miteq	NSP1800-25	1364185	2014.05.03
DRG Horn	ETS-Lindgren	3117	00123988	2014.01.21
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2014.03.01
Temperature/Humidity Meter	zhicheng	ZC1-2	AC5-TH	2014.01.11
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2013.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2014.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2014.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2014.03.01
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2014.01.11

12.2. Test Setup

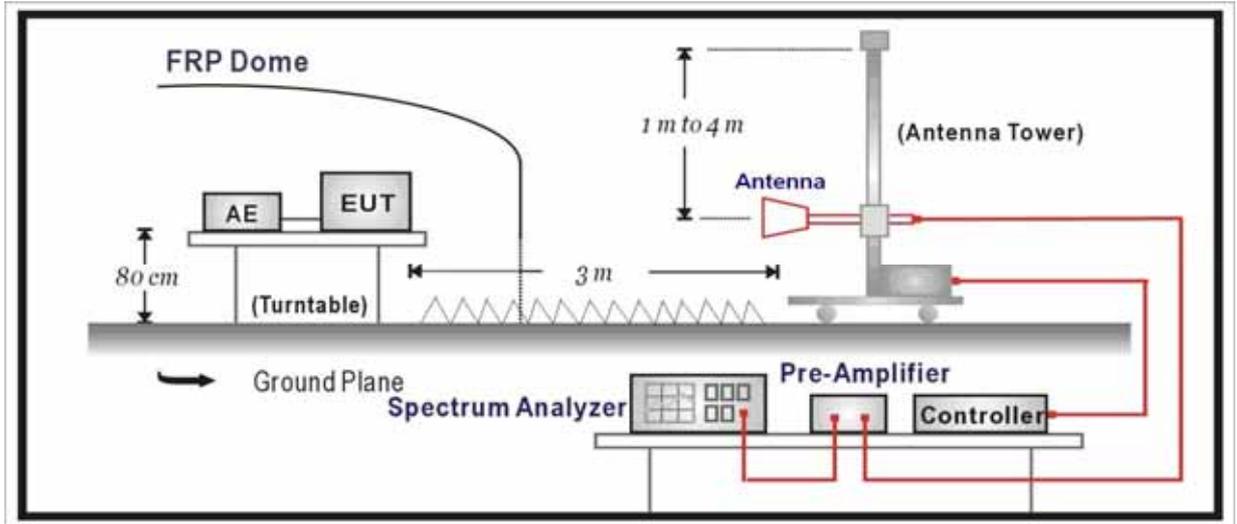
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



12.3. Limit

FCC Part 15 Subpart B Paragraph 15.109		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

12.4. Test Procedure

According to KDB 789033.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 9kHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the "cone of radiation" of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

12.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB
below 1G is defined as ± 3.8 dB

12.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor - Preamp Gain

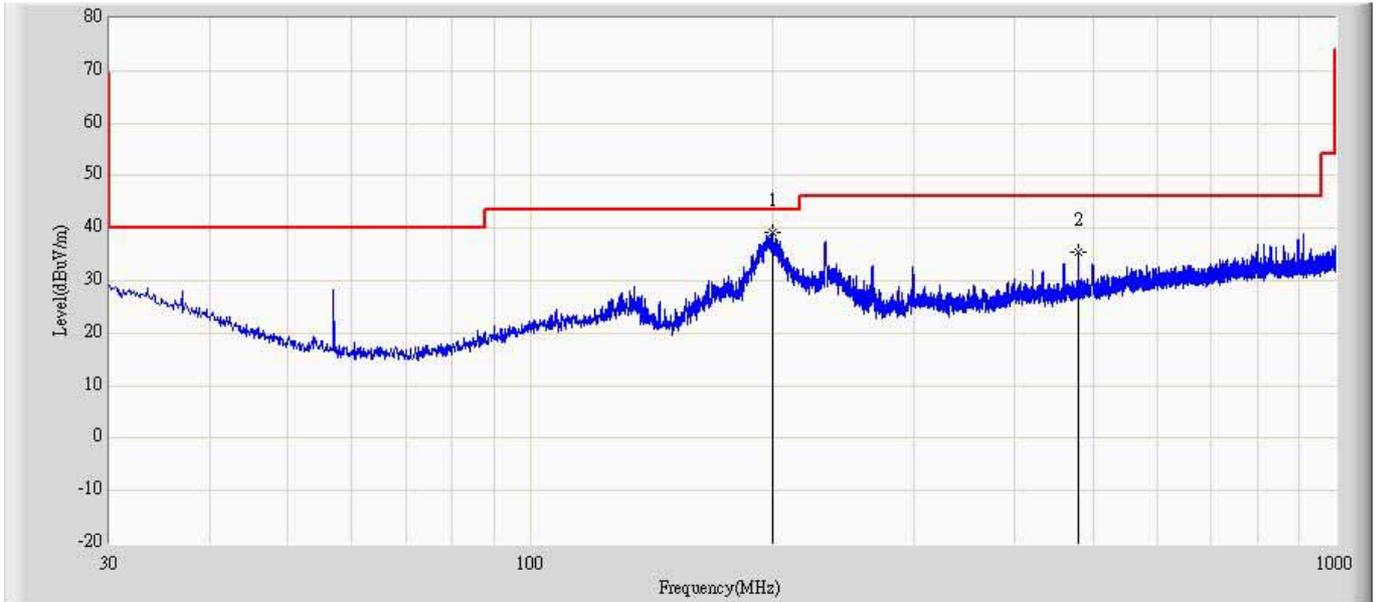
Mode 2: Receive

Ant	CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Ant A	5180	H	1501.5	55.5	-19.4	36.1	54(Note1)	-17.9	PK
		V	2003.0	55.1	-17.9	37.2	54(Note1)	-16.8	PK
	5210	H	2215.5	56.9	-16.9	40.0	54(Note1)	-14.0	PK
		V	2215.5	55.5	-16.9	38.6	54(Note1)	-15.4	PK
	5240	H	1671.5	56.2	-19.3	37.0	54(Note1)	-17.0	PK
		V	2003.0	55.3	-17.9	37.3	54(Note1)	-16.7	PK
Ant B	5180	H	1501.5	55.0	-19.4	35.6	54(Note1)	-18.4	PK
		V	2003.0	55.9	-17.9	37.9	54(Note1)	-16.1	PK
	5210	H	1501.5	54.9	-19.4	35.5	54(Note1)	-18.5	PK
		V	2003.0	56.2	-17.9	38.3	54(Note1)	-15.7	PK
	5240	H	1501.5	58.5	-19.4	39.1	54(Note1)	-14.9	PK
		V	2003.0	56.7	-17.9	38.7	54(Note1)	-15.3	PK

Note1: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

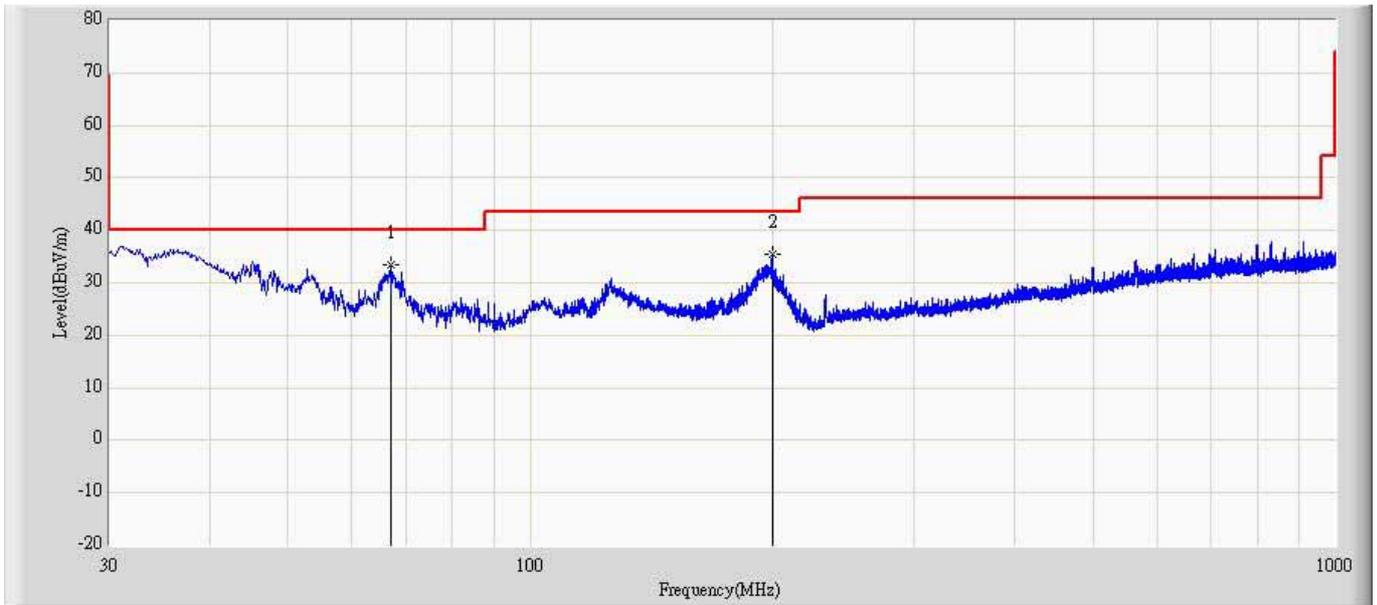
The worst case of Radiated Emission below 1GHz:

Site: AC2	Time: 2013/06/17 - 10:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: CBL6112D_27611(30-1000MHz)	Polarity: Horizontal
EUT: DWAM83 Wireless Audio Module	Power: AC 120V/60Hz
Note: Mode2: Receive at channel 5180MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	199.750	39.162	23.051	-4.338	43.500	16.111	QP
2		480.080	35.551	10.355	-10.449	46.000	25.196	QP

Site: AC2	Time: 2013/06/17 - 10:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: CBL6112D_27611(30-1000MHz)	Polarity: Vertical
EUT: DWAM83 Wireless Audio Module	Power: AC 120V/60Hz
Note: Mode2: Receive at channel 5180MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	66.981	33.380	21.664	-6.620	40.000	11.716	QP
2		199.871	35.358	19.250	-8.142	43.500	16.109	QP

_____ The End _____