FCC Part 15C

Measurement and Test Report

For

GUANGDONG TAKSTAR ELECTRONIC CO., LTD

XIALIAO LONGXI BOLUO HUIZHOU GUANGDONG CHINA

FCC ID: WRAML70DWRX

Report Concerns: Original Report	**Equipment Type:** WIRELESS HEADPHONE
Model:	ML 70DW
Report No.:	STR11118136I
Test Date:	2011-11-22 to 2011-12-05
Issue Date:	2012-01-09
Tested By:	Seven Song / Engineer
Reviewed By:	Lahm Peng / EMC Manager
Approved & Authorized By:	Jandy so / PSQ Manager

Prepared By:

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	GUANGDONG TAKSTAR ELECTRONIC CO., LTD
Address of applicant:	XIALIAO LONGXI BOLUO HUIZHOU GUANGDONG CHINA
Manufacturer:	GUANGDONG TAKSTAR ELECTRONIC CO., LTD
Address of manufacturer:	XIALIAO LONGXI BOLUO HUIZHOU GUANGDONG CHINA

General Description of E.U.T

Items	Description
EUT Description:	WIRELESS HEADPHONE
Trade Name:	TAKSTAR
Model Tested:	ML 70DW
Adding Models:	ML 80DW, ML 90DW
Rated Voltage:	DC 3.7V
Max RF Output Power	0.5957mW
Frequency range:	2403-2477MHz
Number of channels:	38
Channel Separation:	2MHz
Antenna Gain:	0dBi
Type of Antenna:	Integral Antenna

Note: The test data is gathered from a production sample, provided by the manufacture. The others models listed in the report have different appearance only of ML 70DW without circuit and electronic construction changed, declared by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the GUANGDONG TAKSTAR ELECTRONIC CO., LTD in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted with Low Channel, Middle Channel and High Channel, accordingly in reference to the Operating Instructions.

1.4 Test Facility

- **FCC – Registration No.: 994117**
  SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**
  The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

- **CNAS Registration No.: L4062**
  Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

1.5 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components.

1.6 Accessories Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	SAMSUNG	NP-R20	124V93FP30082V
/	/	/	/

1.7 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	1.0	Unshielded	Without Core
Audio Cable	1.0	Unshielded	Without Core

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.247(a)(1)(iii)	Quantity of Hopping Channel	Compliant
§ 15.247(a)(1)	Channel Separation	Compliant
§ 15.247(a)(1)(iii)	Time of Occupancy (Dwell time)	Compliant
§ 15.247(a)	20dB Bandwidth	Compliant
§ 15.247(b)(1)	Power Output	Compliant
§ 15.209(a)(f)	Radiated Emission	Compliant
§ 15.247(d)	Band edge	Compliant
§ 15.207(a)	Conducted Emission	Compliant

3. §15.203 - ANTENNA REQUIREMENT

3.1 Standard Applicable

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Test Result

This product has a PCB integral antenna, the gain is 0 dBi, which in accordance to section 15.203, please refer to the internal photos.

4. NUMBER OF HOPPING CHANNELS AND CHANNEL SPACING

4.1 Standard Applicable

According to FCC 15.247(a)(1), frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, and frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-12-20	2011-12-19
Attenuator	ATTEN	ATS100-4-20	/	2010-12-20	2011-12-19

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.3 Test Procedure

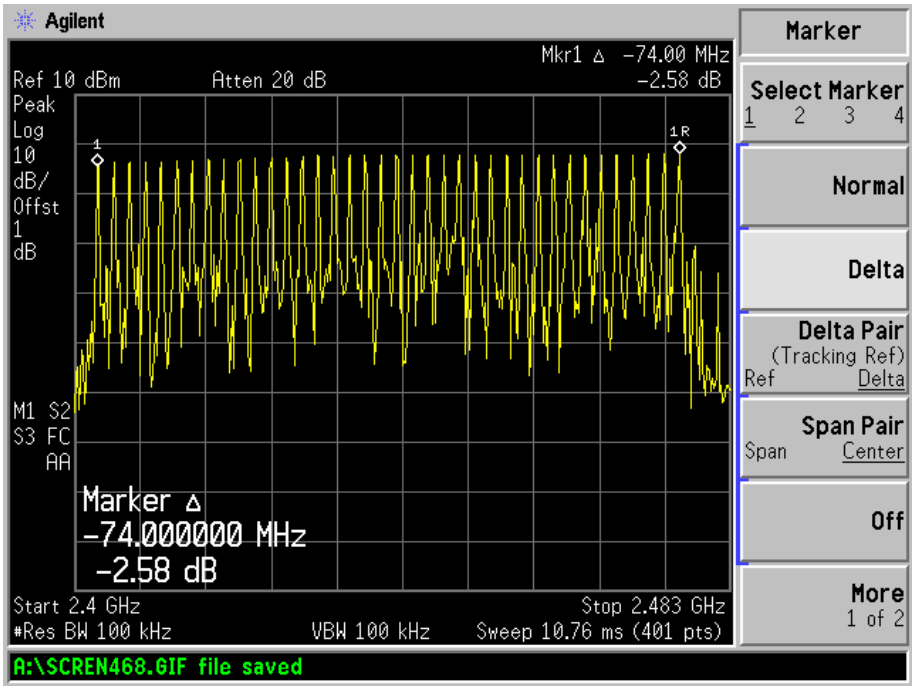
Set the Lowest channel to the Highest Channel, observed the band of 2400MHz to 2483.5MHz, than count it out the number of channels for comparing with the FCC rules. Adjust channel spacing can be read by adjusting the Analyzer SPAN.

4.4 Environmental Conditions

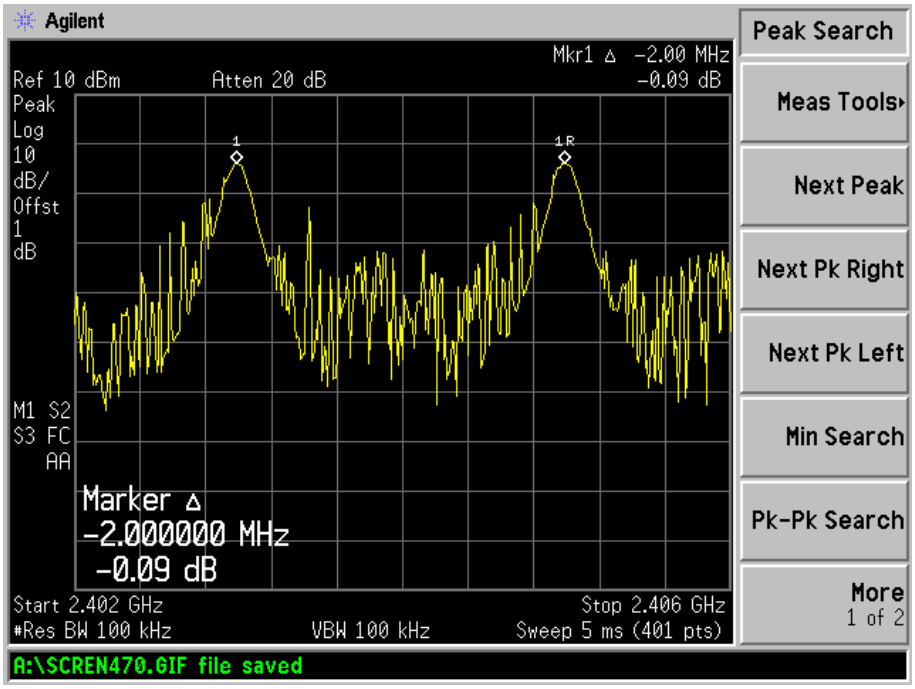
Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.5 Summary of Test Results/Plots

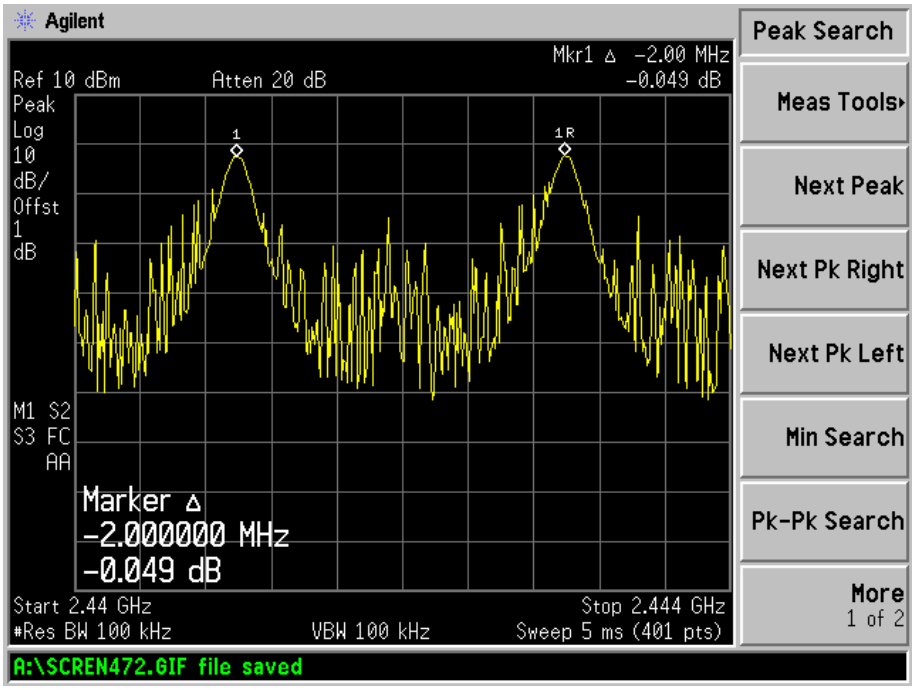
No. of Channel = 38



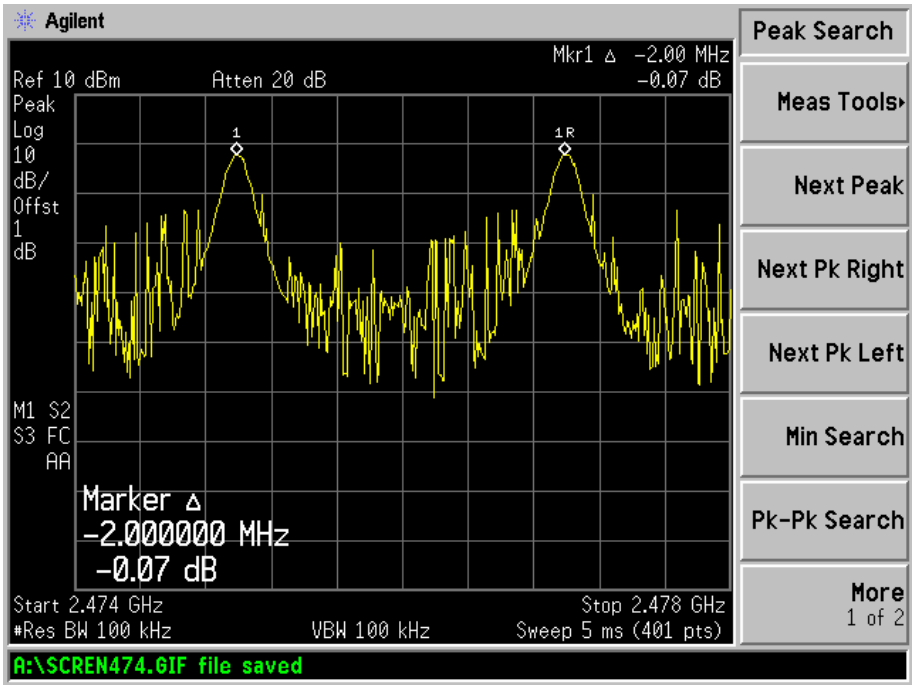
Channel Spacing (Low CH=2MHz)



Channel Spacing (Middle CH=2MHz)



Channel Spacing (High CH=2MHz)



5. DWELL TIME OF A HOPPING CHANNEL

5.1 Standard Applicable

According to 15.247(a)(1)(iii), Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-12-20	2011-12-19
Attenuator	ATTEN	ATS100-4-20	/	2010-12-20	2011-12-19

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW, VBW=100KHz, Span = 0Hz.
4. Repeat above procedures until all frequency measured was complete.

5.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

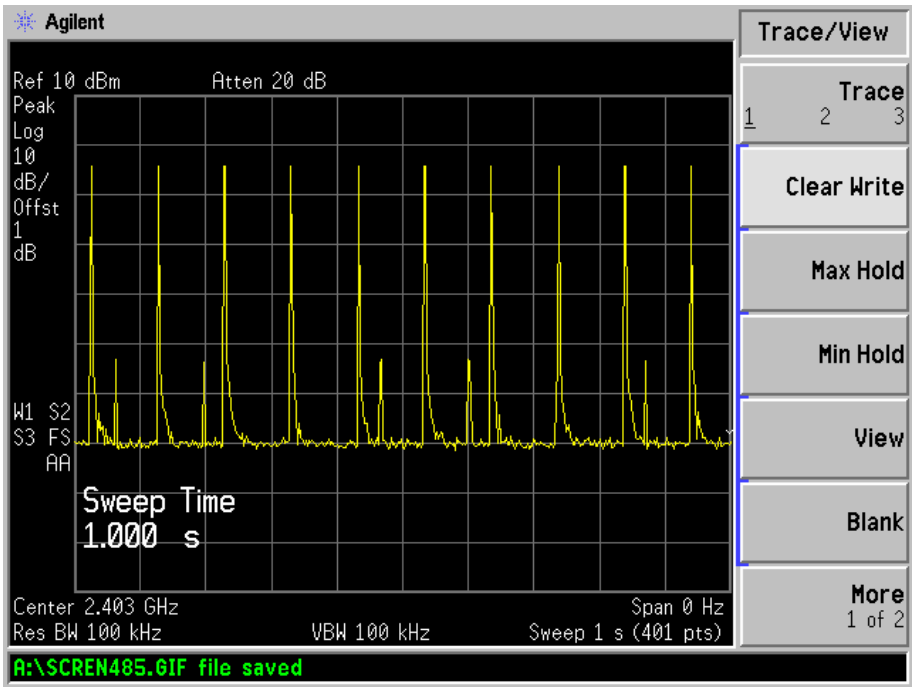
5.5 Summary of Test Results/Plots

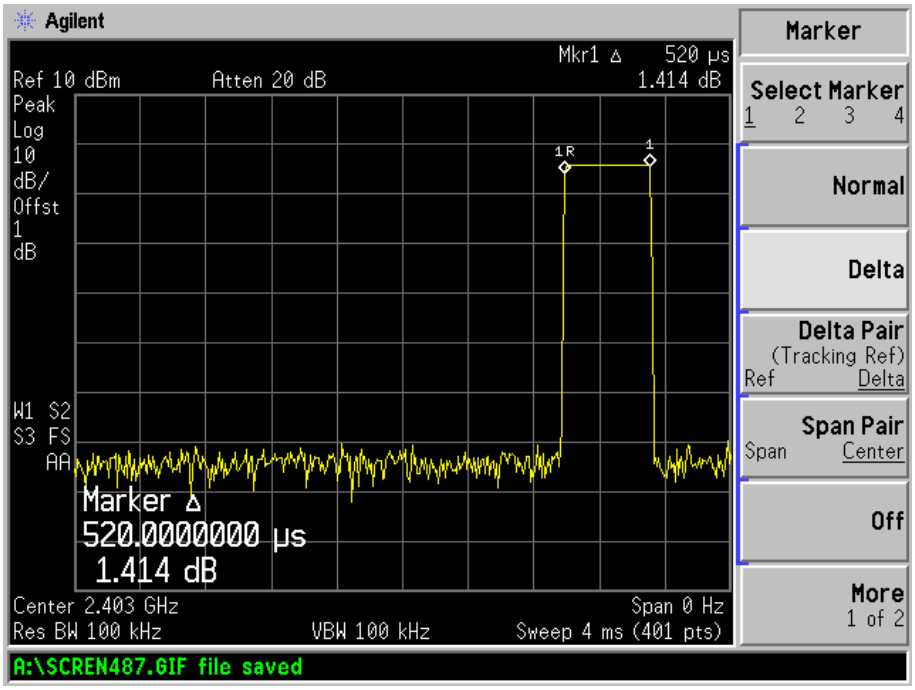
The dwell time within a 15.2 second period in data mode is independent from the packet type (packet length). The calculation for a 15.2 second period is a follows:

Dwell time = time slot length * hop rate / number of hopping channels *15.2s

Test data is corrected with the worse case.

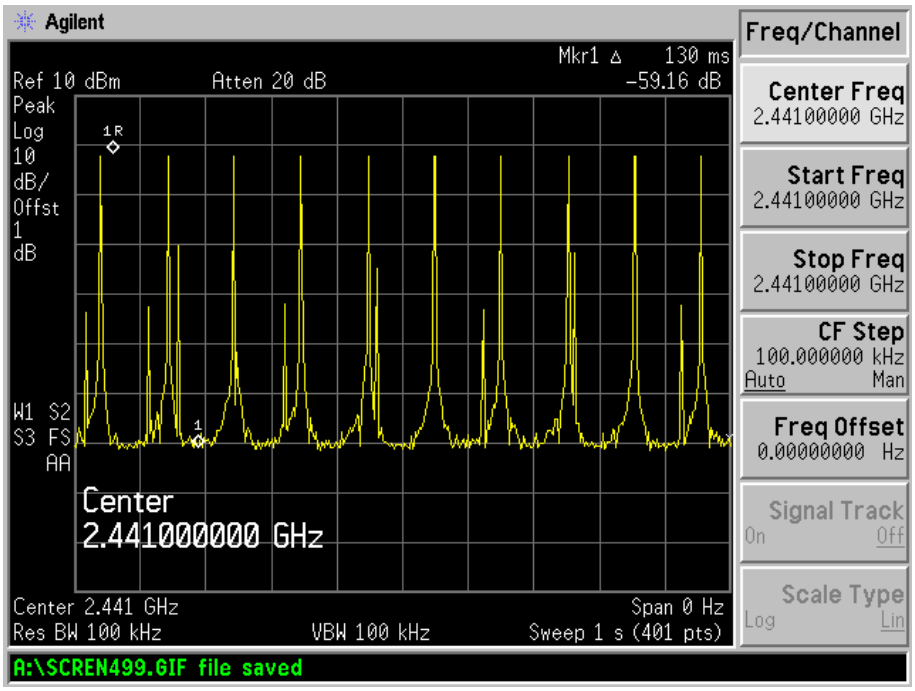
CH Low:

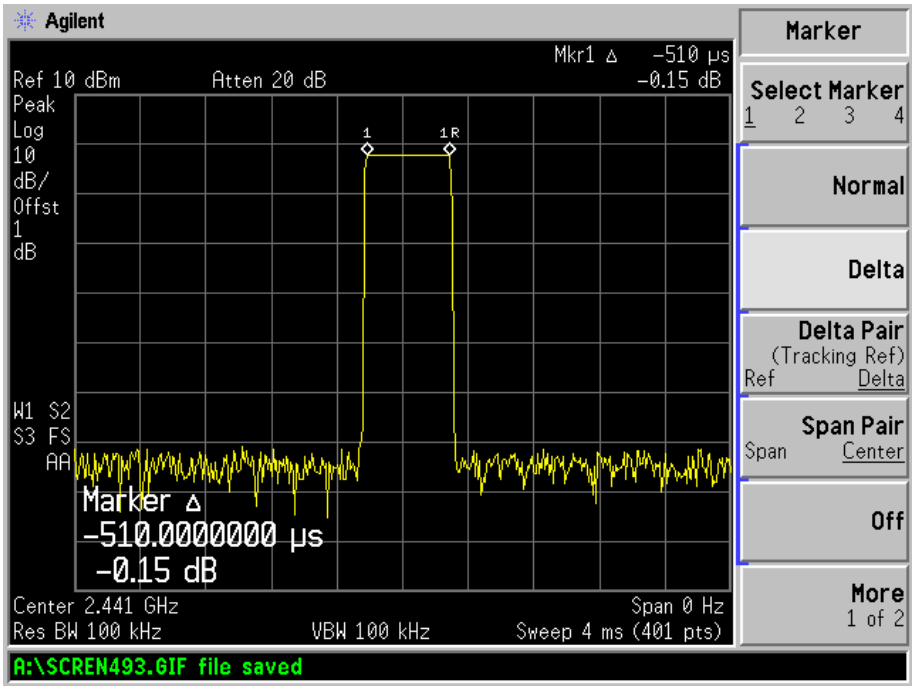




Time slot = 0.52*10*15.2 = 79.04 (ms) < 400 (ms)

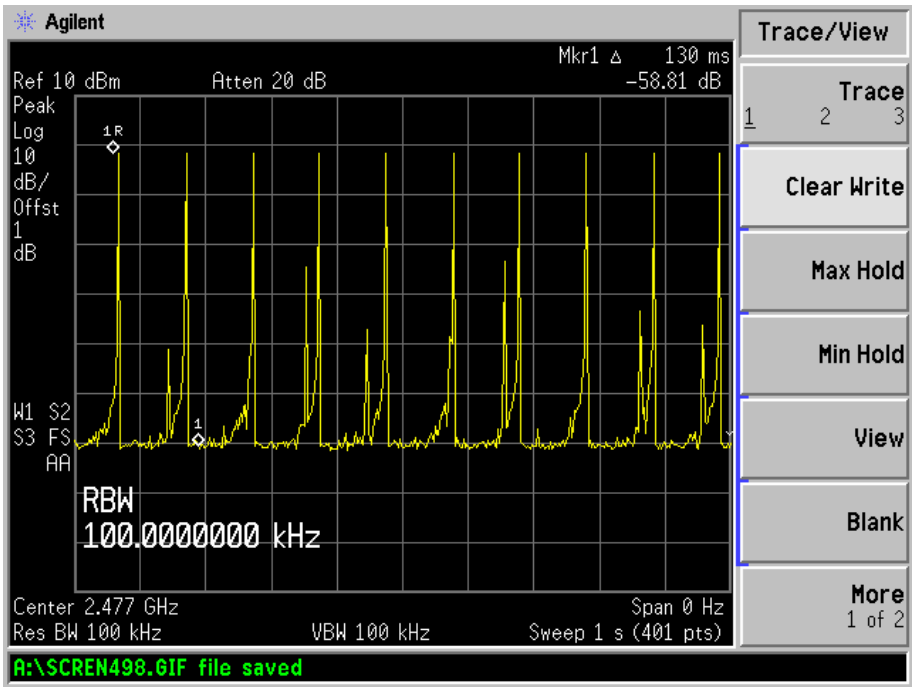
CH Mid:

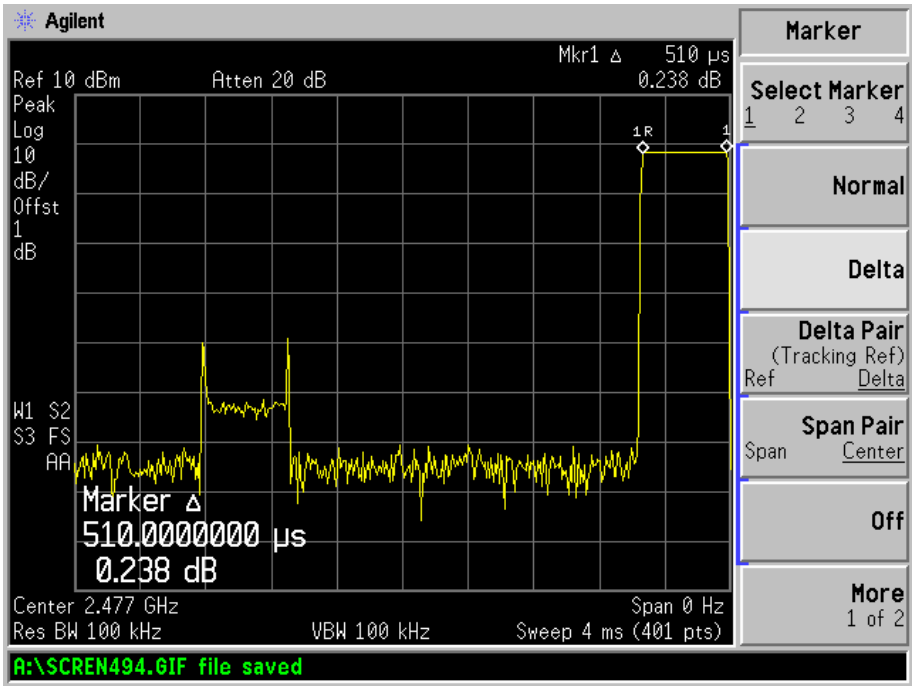




Time slot = 0.51*10*15.2 = 77.52 (ms) < 400 (ms)

CH High:





Time slot = 0.51*10*15.2 = 77.52 (ms) < 400 (ms)

6. 20-dB BANDWIDTH

6.1 Standard Applicable

According to 15.247(a)(1)(iii). For frequency hopping systems operating in the 2400MHz-2483.5 MHz no limit for 20dB bandwidth.

6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-12-20	2011-12-19
Attenuator	ATTEN	ATS100-4-20	/	2010-12-20	2011-12-19

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. The spectrum analyzer as RBW=100KHz (1 %-5% of Bandwidth.), Sweep=auto
4. Mark the peak frequency and –20dB (upper and lower) frequency.

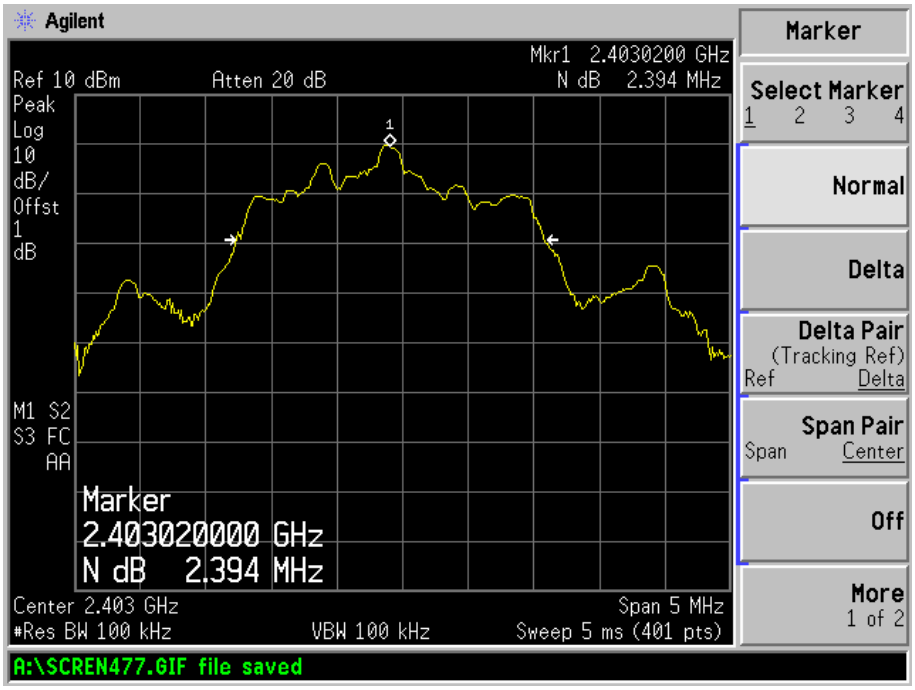
6.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

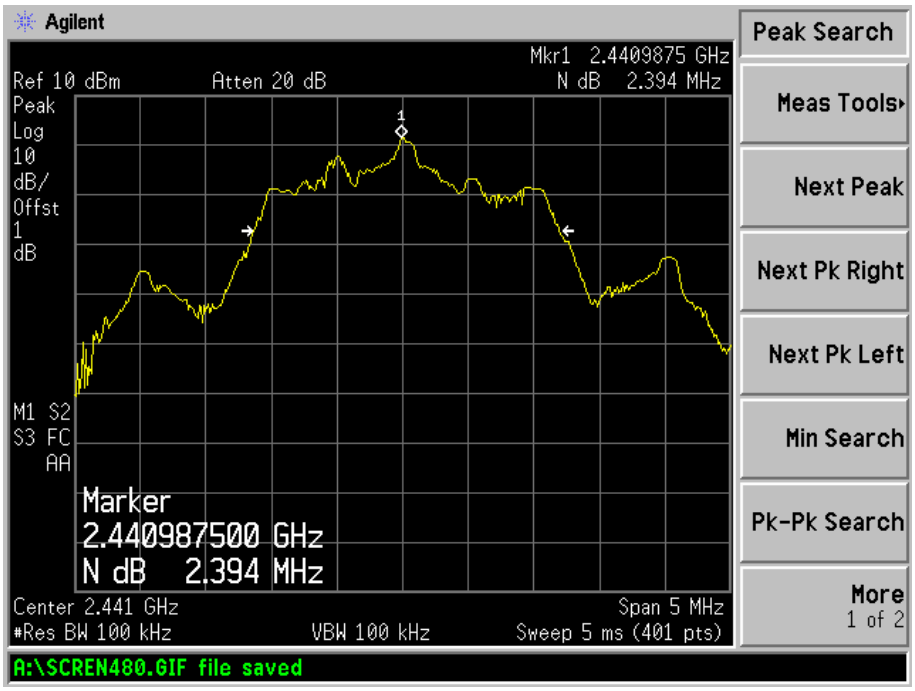
6.5 Summary of Test Results/Plots

Frequency MHz	20 dB Bandwidth (PCB Antenna) kHz	Limit dB
2403	2394.00	/
2441	2394.00	/
2477	2419.00	/

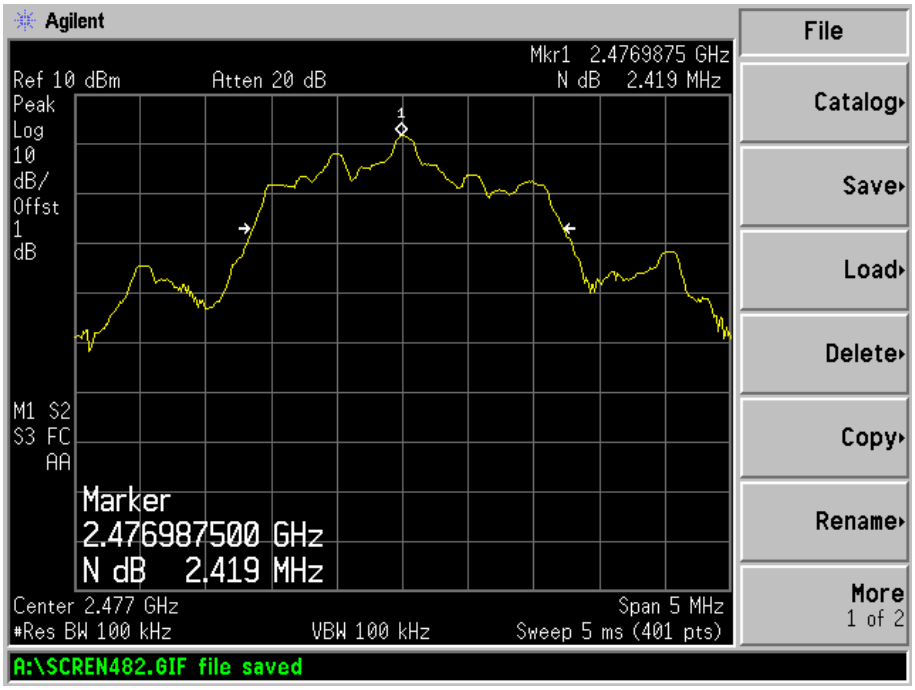
Channel Bandwidth (CH Low):



Channel Bandwidth (CH Mid):



Channel Bandwidth (CH High):



7. POWER OUTPUT

7.1 Standard Applicable

According to 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. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-12-20	2011-12-19
Attenuator	ATTEN	ATS100-4-20	/	2010-12-20	2011-12-19

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

7.3 Test Procedure

The device under test has an integral antenna and the power was measured on a conducted basis.

7.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

7.5 Summary of Test Results/Plots

Conducted Power:

Channel	Frequency MHz	Measured Value dBm	Output Power mW	Limit mW
Low Channel	2403	-0.276	0.5297	125
Middle Channel	2441	-0.254	0.5572	125
High Channel	2477	-0.225	0.5957	125

8. FIELD STRENGTH OF SPURIOUS EMISSIONS

8.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±5.10 dB.

8.2 Standard Applicable

According to §15.247(c), 15.205 15.209(b) &15.35 (b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Section 15.209:
30 - 88 MHz 40 dBuV/m @3M
88 -216 MHz 43.5 dBuV/m @3M
216 -960 MHz 46 dBuV/m @3M
Above 960 MHz 54dBuV/m @3M

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

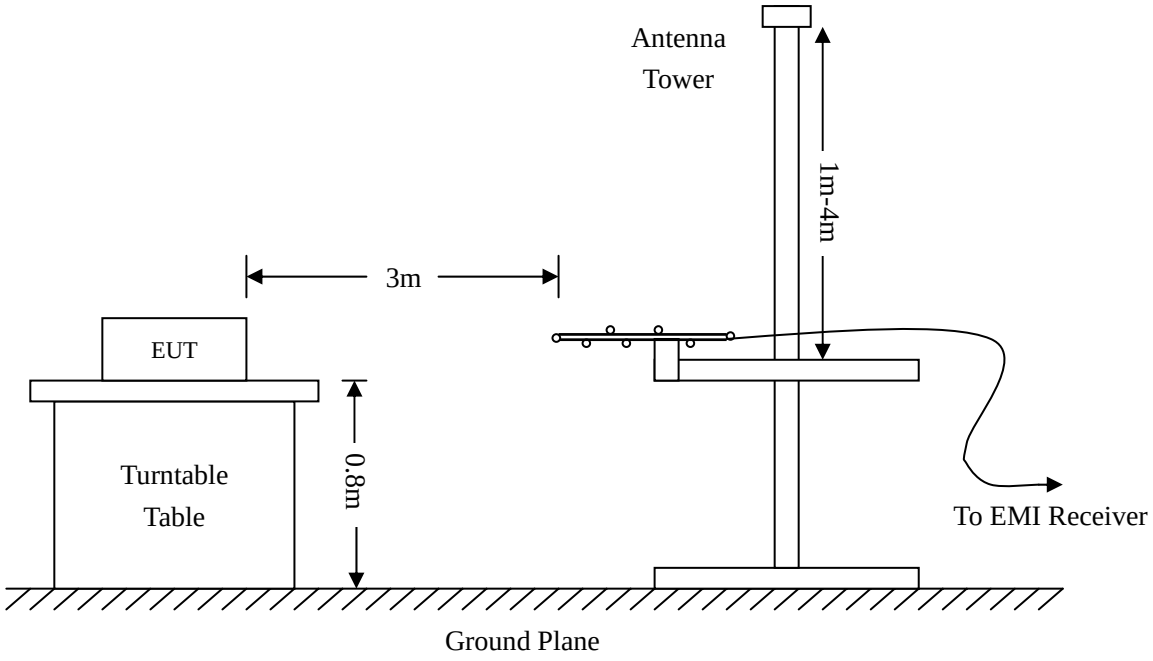
8.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-12-20	2011-12-19
EMI Test Receiver	R&S	ESVB	825471/005	2010-12-20	2011-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2010-12-20	2011-12-19
RF Switch	EM	EMSW18	SW060023	2010-12-20	2011-12-19
Pre-amplifier	Agilent	8447F	3113A06717	2010-12-20	2011-12-19
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-12-20	2011-12-19
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2011-01-09	2012-01-08
Horn Antenna	ETS	3117	00086197	2011-01-09	2012-01-08
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2011-01-09	2012-01-08

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

8.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.



8.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

8.6 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

8.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst margin of:

-10.39 dBµV at **37.0248 MHz** in the **Vertical** polarization for **Charging Mode**, **9kHz to 1 GHz, 3 Meters**

-6.94 dBµV at **734.4913 MHz** in the **Vertical** polarization for **Audio Input Mode**, **9kHz to 1 GHz, 3 Meters**

-4.4 dBµV at **4806.0 MHz** in the **Horizontal** polarization for **Low Channel Transmitting**, **9kHz to 25 GHz, 3 Meters**

Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

Plot of Radiation Emissions Test

Radiated Disturbance

EUT: WIRELESS HEADPHONE

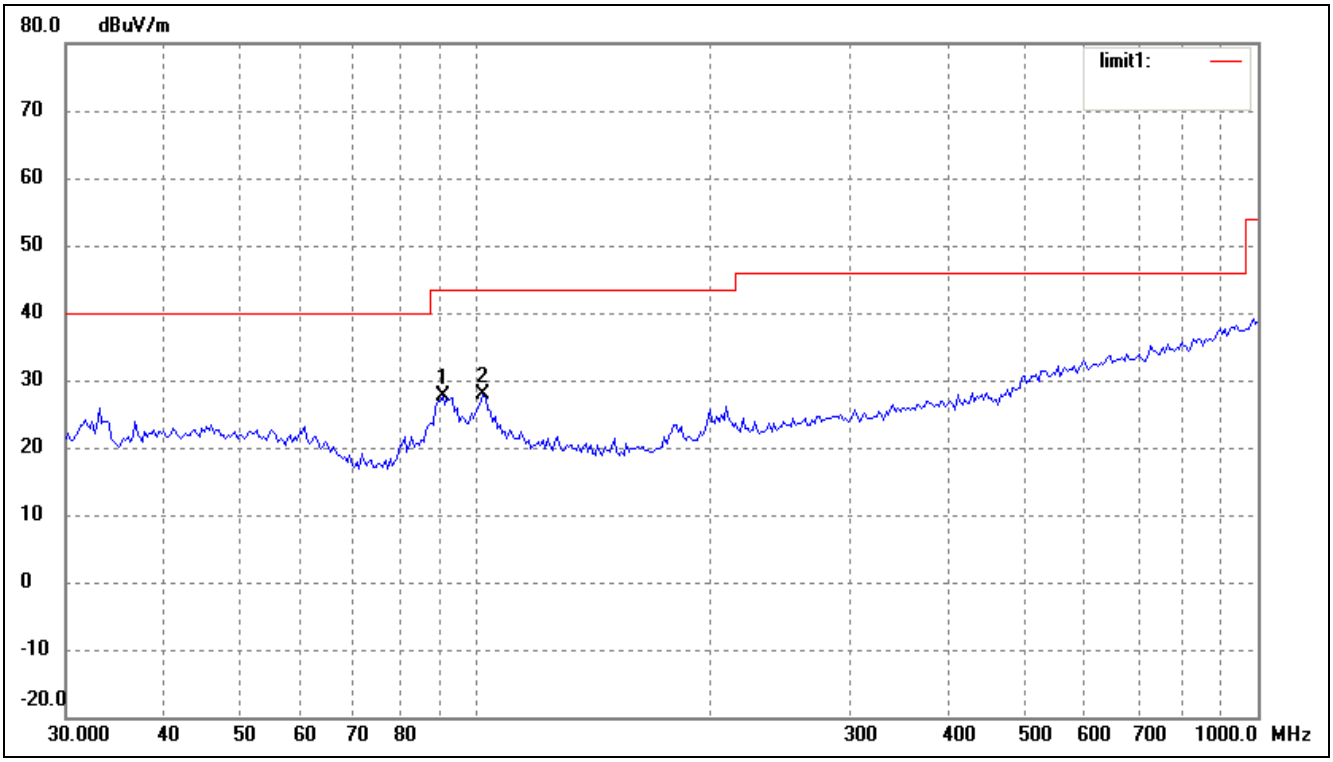
M/N: ML 70DW

Operating Condition: Charging

Test Specification: Horizontal & Vertical

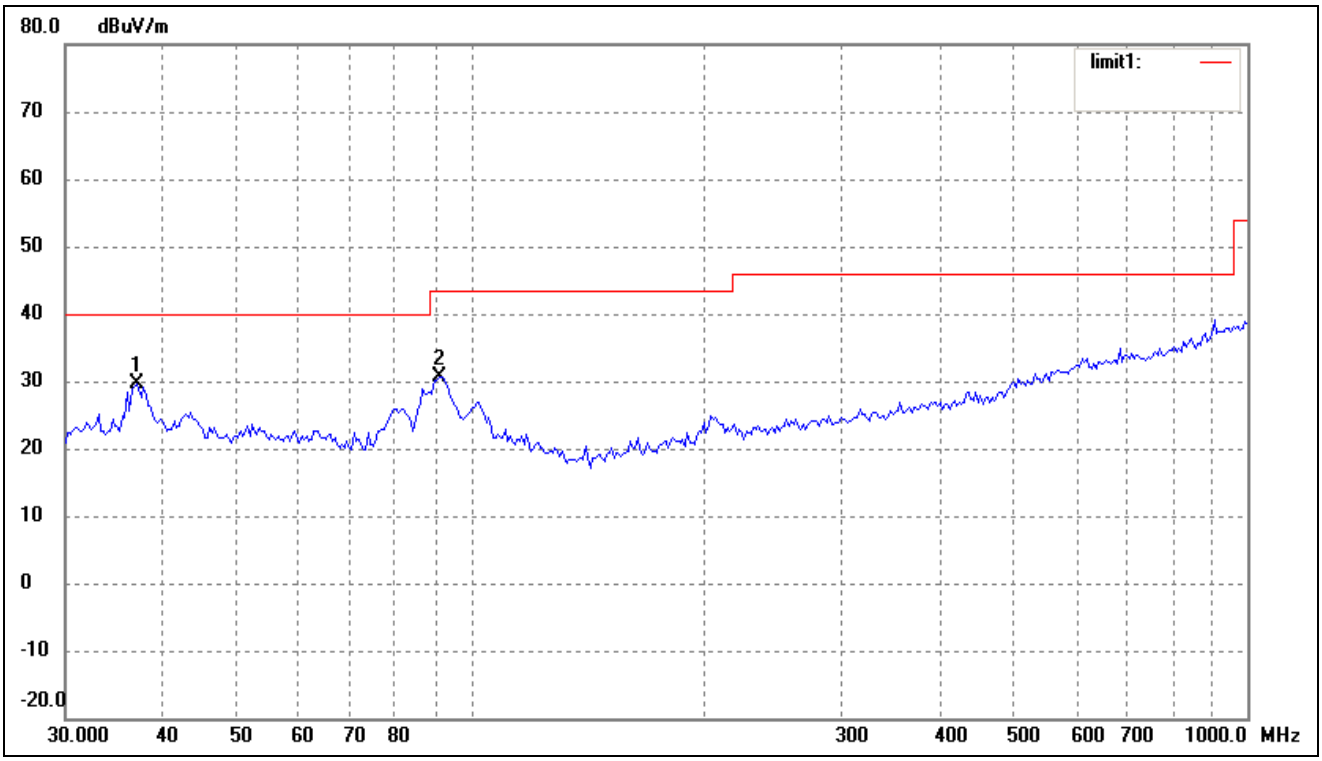
Comment: 120V/60Hz; DC 5V

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	90.8554	20.38	7.25	27.63	43.50	-15.87	160	100	QP
2	102.3597	19.65	8.23	27.88	43.50	-15.62	290	100	QP

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	37.0248	22.28	7.33	29.61	40.00	-10.39	331	100	peak
2	90.8554	23.50	7.25	30.75	43.50	-12.75	205	100	peak

Plot of Radiation Emissions Test

Radiated Disturbance

EUT: WIRELESS HEADPHONE

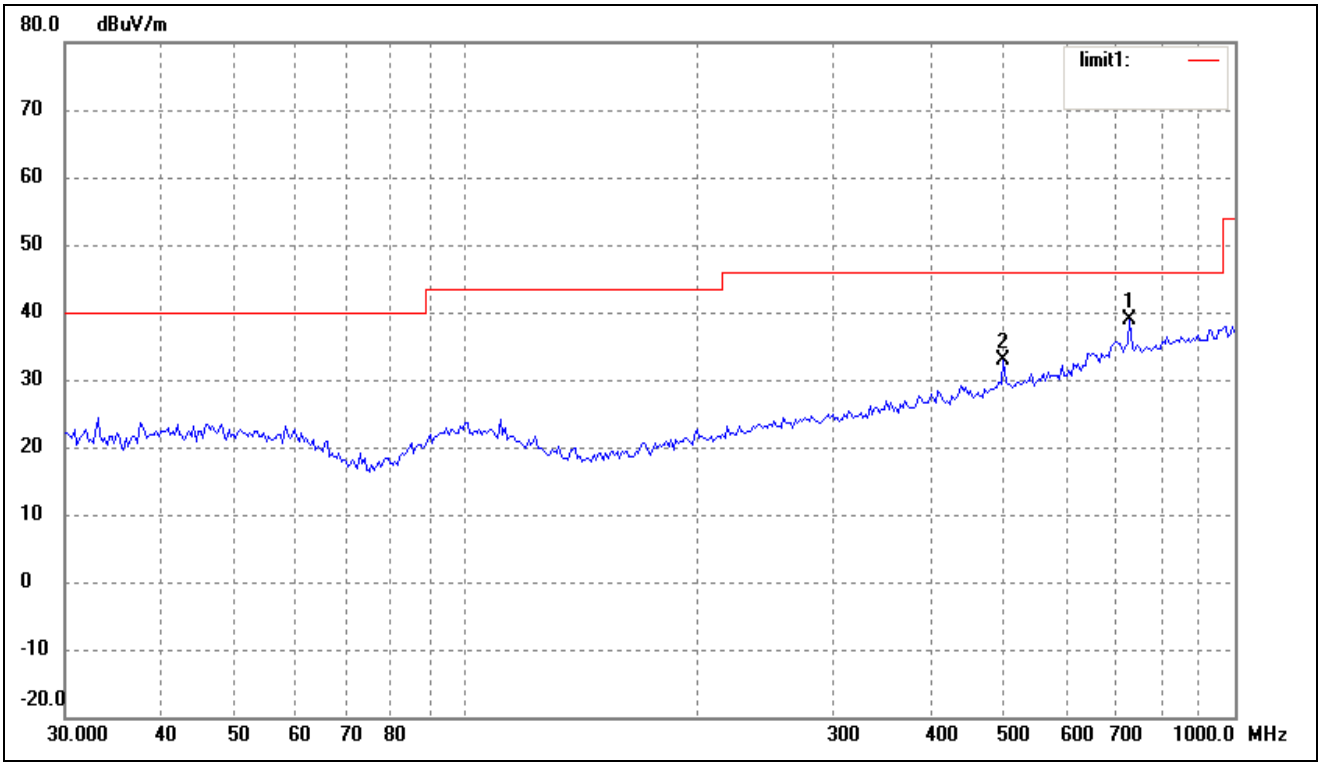
M/N: ML 70DW

Operating Condition: Audio Input

Test Specification: Horizontal & Vertical

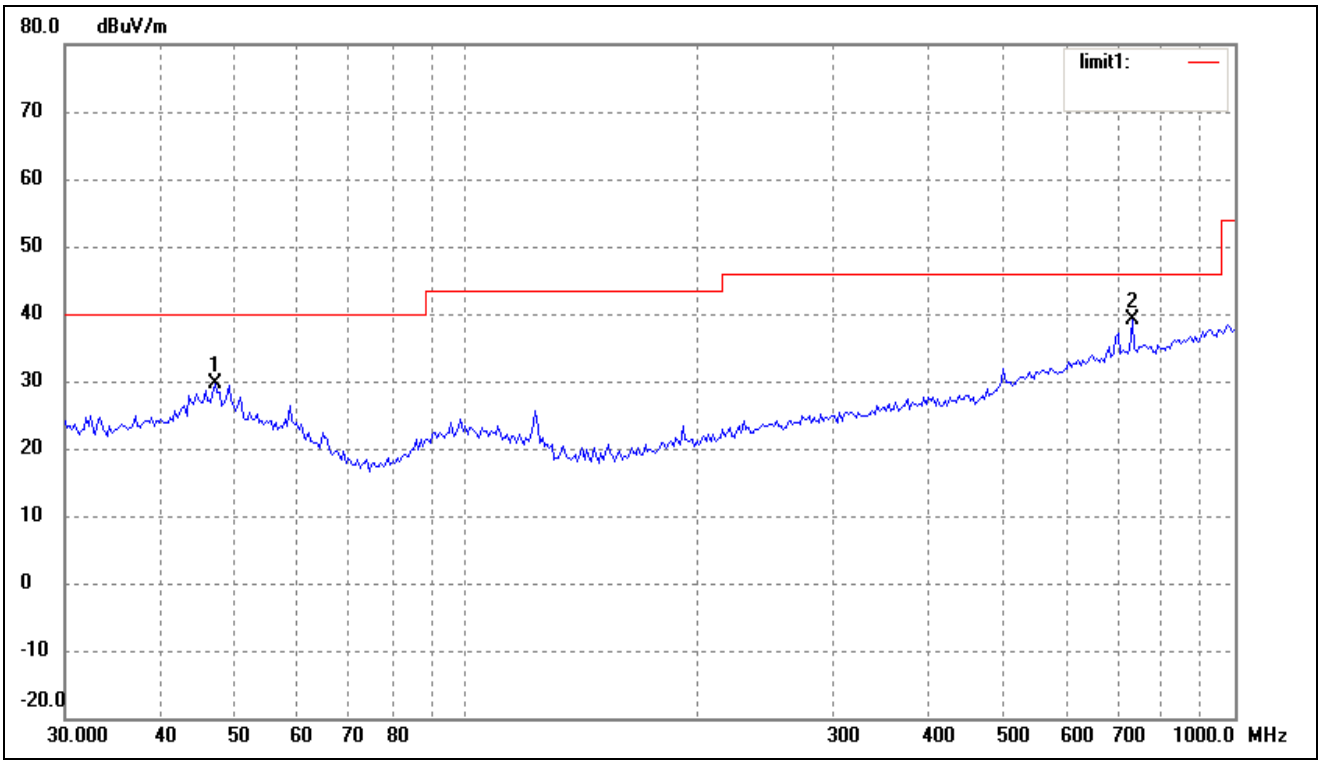
Comment:

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	729.3583	21.00	17.94	38.94	46.00	-7.06	251	100	peak
2	499.4247	18.58	14.36	32.94	46.00	-13.06	134	100	peak

Vertical

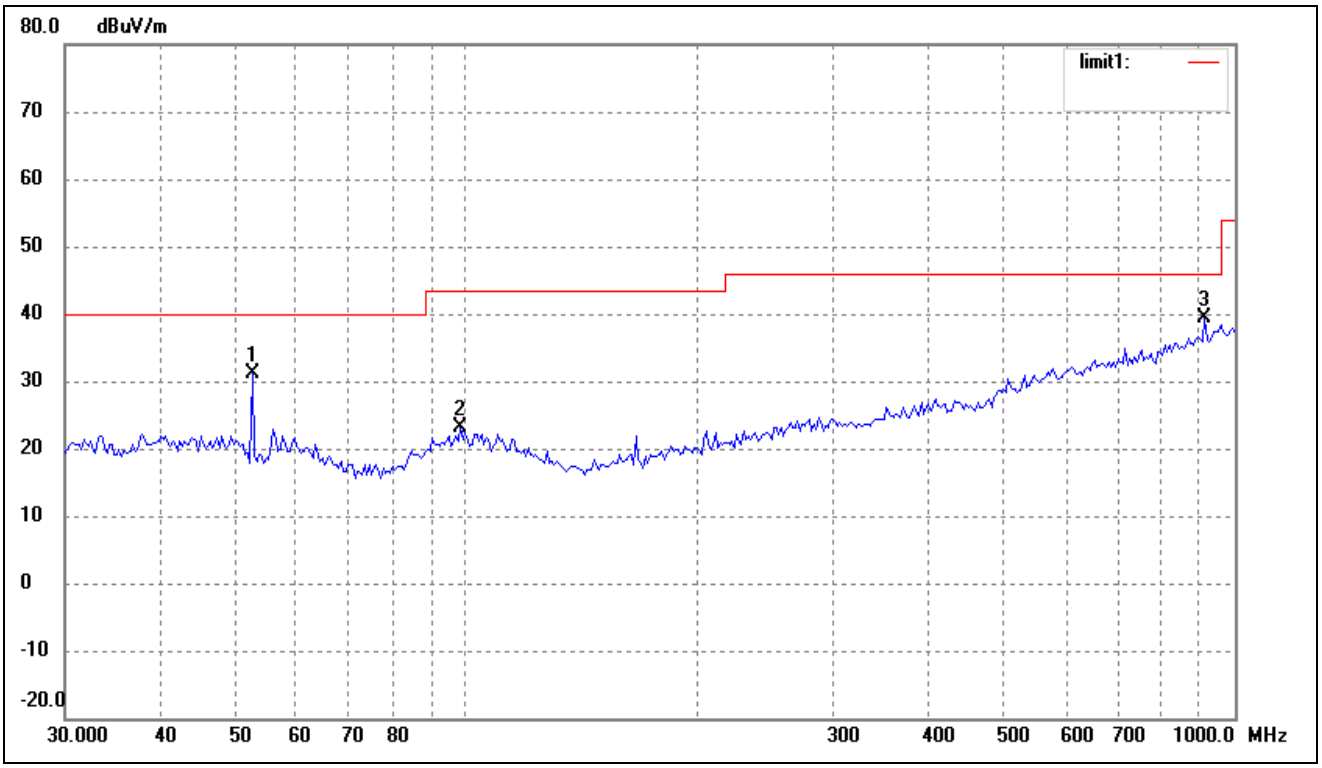


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	46.9947	21.61	8.13	29.74	40.00	-10.26	340	100	peak
2	734.4913	21.04	18.02	39.06	46.00	-6.94	180	100	peak

From 30 MHz to 1 GHz

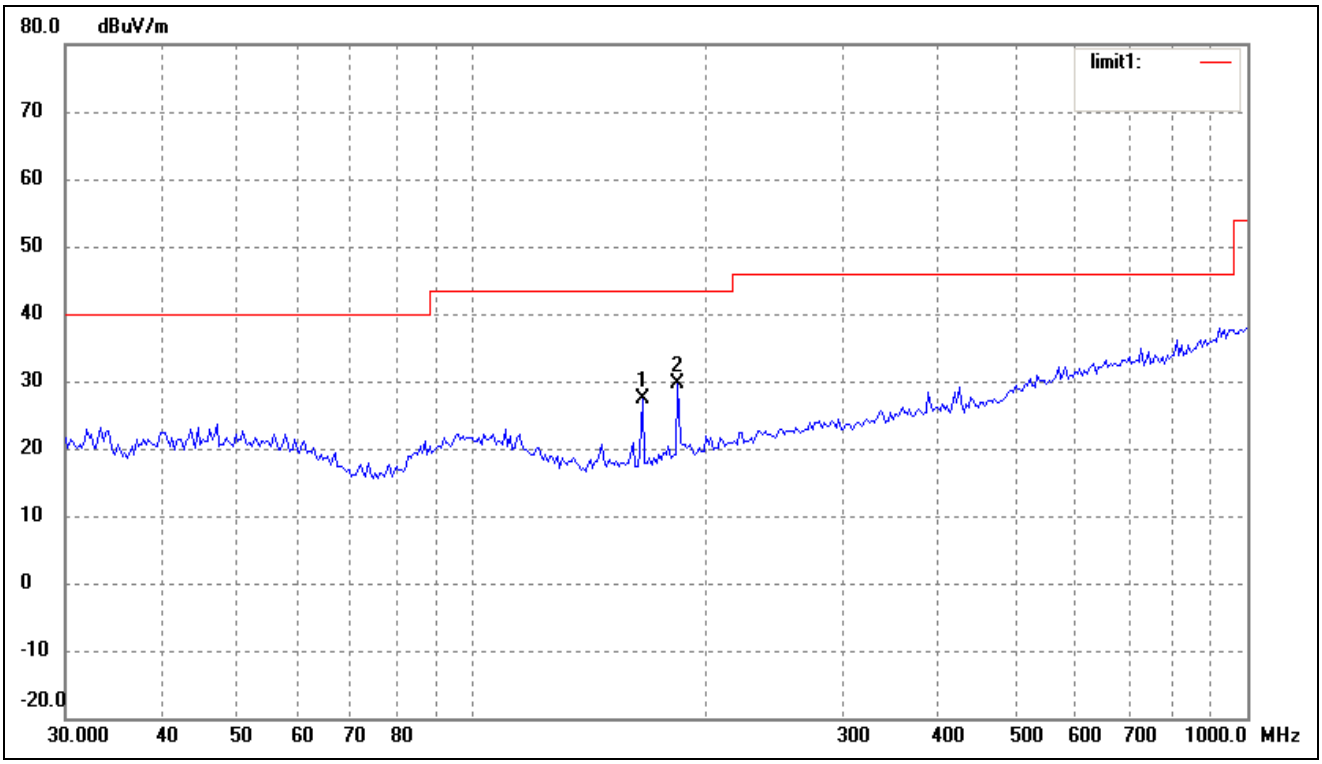
Test Mode: Transmitting-Low channel 2403MHz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	52.5753	23.32	7.87	31.19	40.00	-8.81	312	100	peak
2	98.1419	14.79	8.30	23.09	43.50	-20.41	100	100	peak
3	912.8620	18.34	21.14	39.48	46.00	-6.52	200	100	peak

Vertical

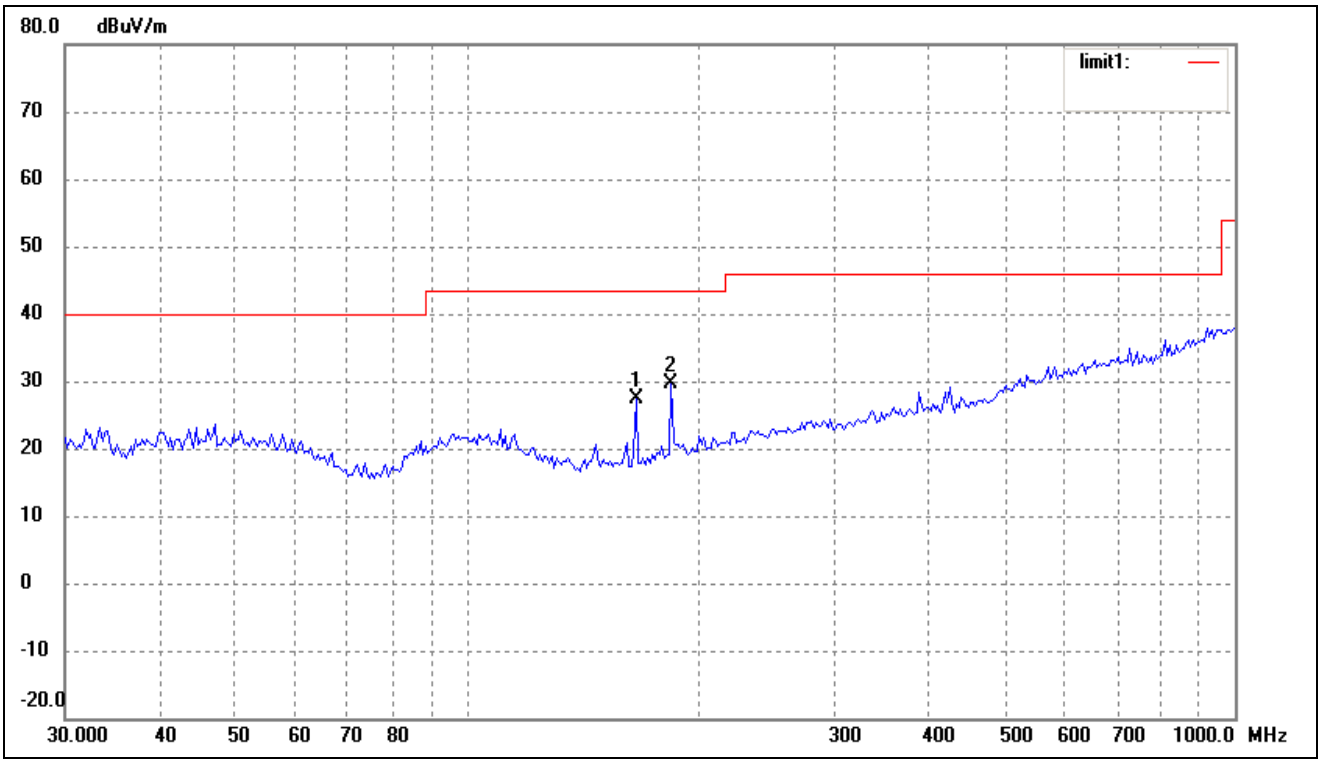


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	166.0680	22.68	4.75	27.43	43.50	-16.07	174	100	peak
2	184.4898	23.60	6.05	29.65	43.50	-13.85	210	100	peak

From 30 MHz to 1 GHz

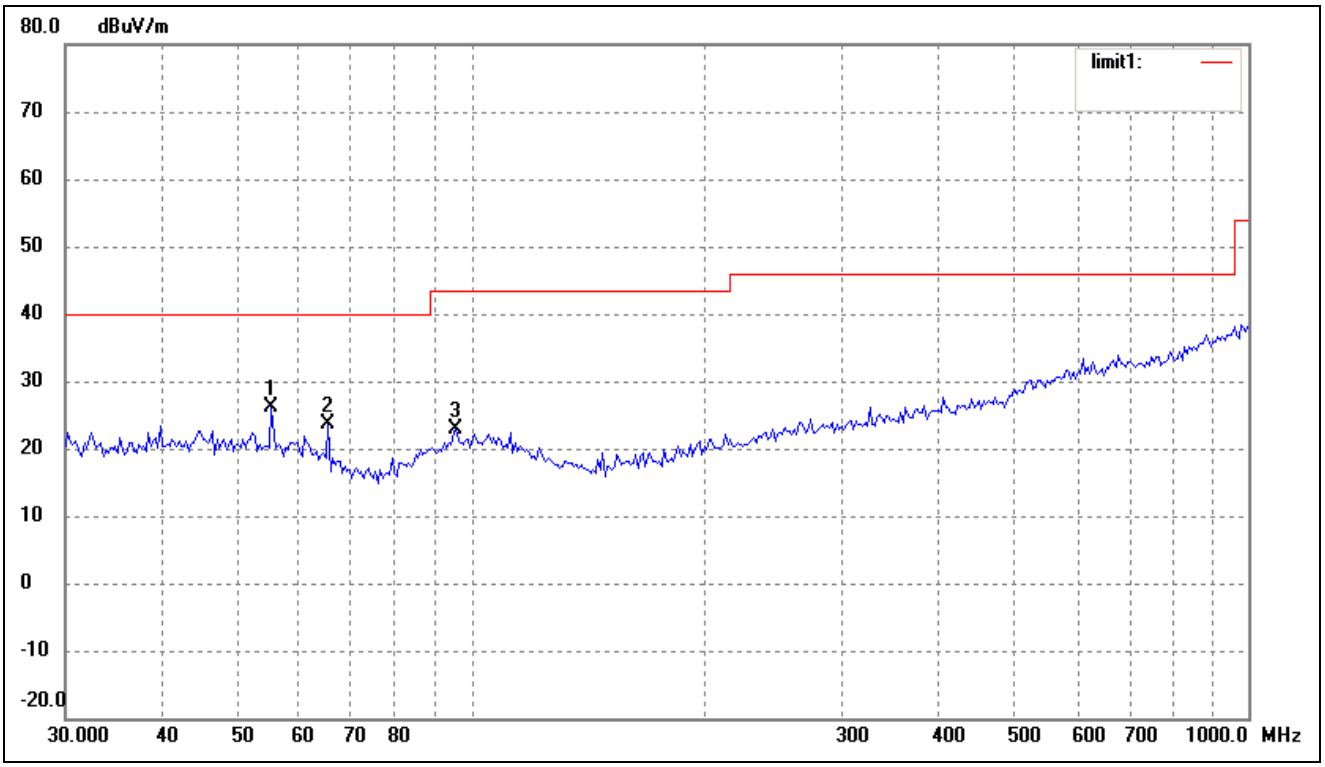
Test Mode: Transmitting-Middle channel 2441MHz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	166.0680	22.68	4.75	27.43	43.50	-16.07	284	100	peak
2	184.4898	23.60	6.05	29.65	43.50	-13.85	64	200	peak

Vertical

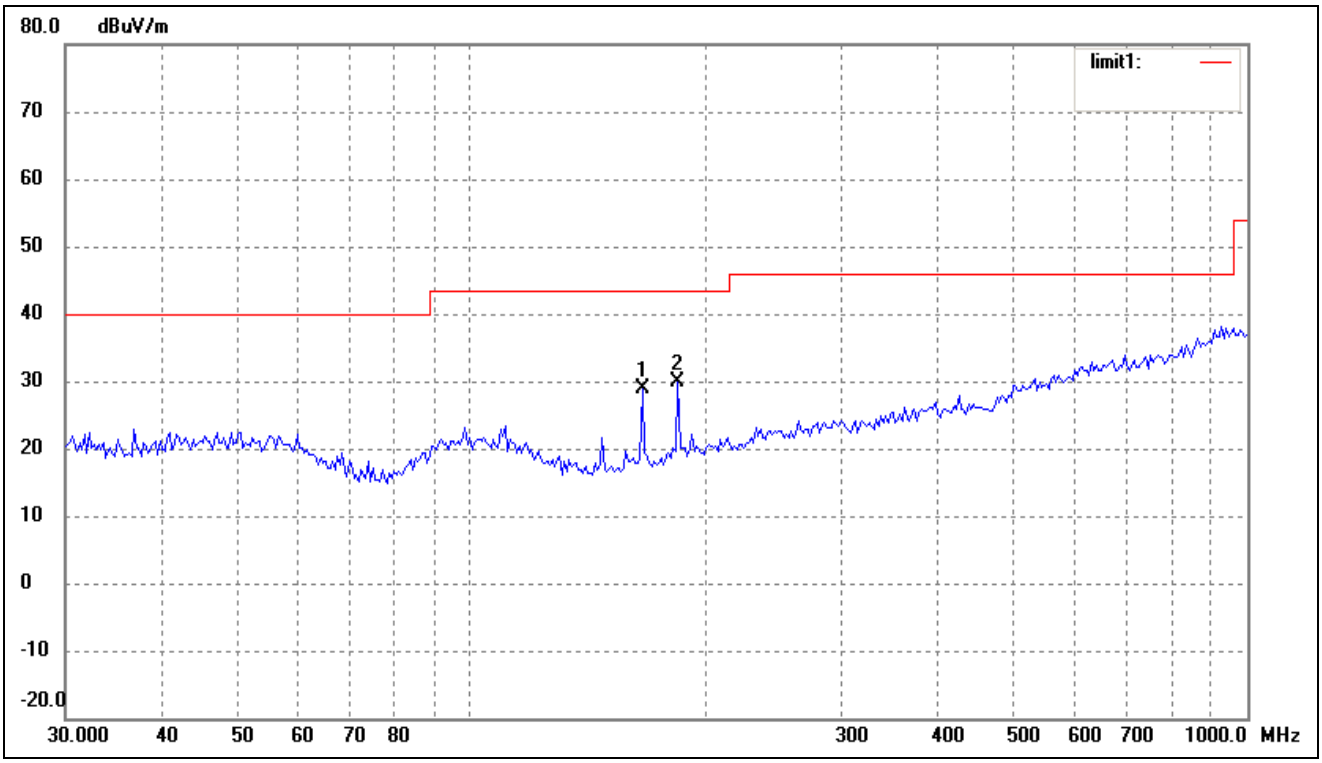


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	55.2207	18.45	7.76	26.21	40.00	-13.79	76	100	peak
2	65.3432	18.18	5.44	23.62	40.00	-16.38	175	100	peak
3	95.4270	14.81	8.09	22.90	43.50	-20.60	268	100	peak

From 30 MHz to 1 GHz

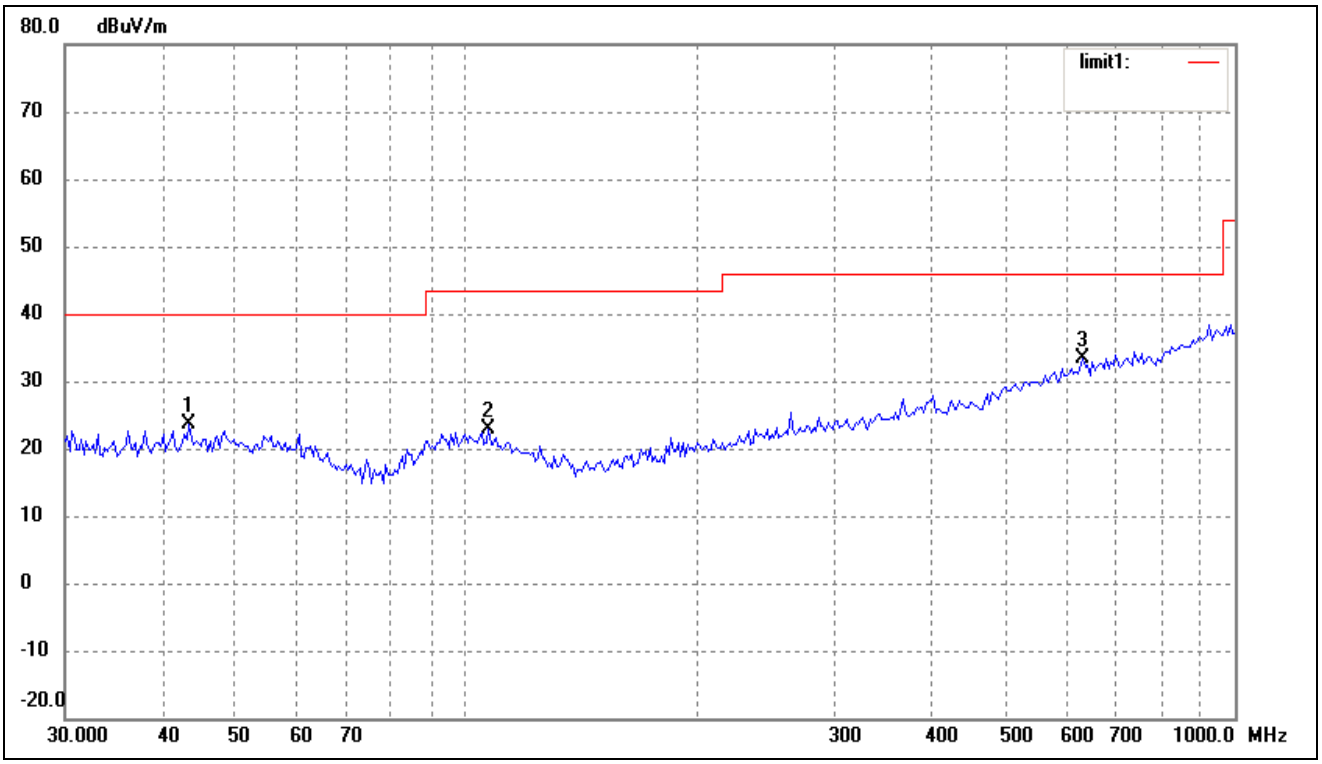
Test Mode: Transmitting-High channel 2477MHz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	166.0680	24.16	4.75	28.91	43.50	-14.59	132	100	peak
2	184.4898	23.86	6.05	29.91	43.50	-13.59	201	100	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	43.5057	15.49	8.20	23.69	40.00	-16.31	124	100	peak
2	106.7587	14.90	7.86	22.76	43.50	-20.74	100	100	peak
3	633.9073	16.47	16.95	33.42	46.00	-12.58	265	100	peak

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (2403MHz)										
4806.0	AV	43.3	57	H	34.1	5.2	33.0	49.6	54	-4.4
4806.0	AV	40.9	35	V	34.1	5.2	33.0	47.2	54	-6.8
7209.0	AV	36.3	60	H	37.4	6.1	33.5	46.3	54	-7.7
7209.0	AV	35.3	79	V	37.4	6.1	33.5	45.3	54	-8.7
2403.0	AV	87.1	45	H	29.1	3.7	34.0	85.9		(Fund.)
2403.0	AV	84.4	359	V	29.1	3.7	34.0	83.2		(Fund.)
4806.0	PK	48.0	65	H	34.1	5.2	33.0	54.3	74	-19.7
4806.0	PK	44.7	98	V	34.1	5.2	33.0	51.0	74	-23.0
7209.0	PK	41.1	256	H	37.4	6.1	33.5	51.1	74	-22.9
7209.0	PK	39.5	185	V	37.4	6.1	33.5	49.5	74	-24.5
2403.0	PK	94.3	78	H	29.1	3.7	34.0	93.1		(Fund.)
2403.0	PK	90.9	44	V	29.1	3.7	34.0	89.7		(Fund.)
Middle Channel (2441MHz)										
4882.0	AV	42.3	21	H	34.1	5.2	33.0	48.6	54	-5.4
4882.0	AV	39.2	34	V	34.1	5.2	33.0	45.5	54	-8.5
7323.0	AV	36.0	342	H	37.4	6.1	33.5	46.0	54	-8.0
7323.0	AV	33.3	30	V	37.4	6.1	33.5	43.3	54	-10.7
2441.0	AV	87.9	98	H	29.1	3.7	34.0	86.7		(Fund.)
2441.0	AV	85.0	72	V	29.1	3.7	34.0	83.8		(Fund.)
4882.0	PK	45.8	237	H	34.1	5.2	33.0	52.1	74	-21.9
4882.0	PK	43.4	354	V	34.1	5.2	33.0	49.7	74	-24.3
7323.0	PK	41.4	264	H	37.4	6.1	33.5	51.4	74	-22.6
7323.0	PK	38.8	187	V	37.4	6.1	33.5	48.8	74	-25.2
2441.0	PK	94.8	55	H	29.1	3.7	34.0	93.6		(Fund.)
2441.0	PK	92.5	49	V	29.1	3.7	34.0	91.3		(Fund.)

High Channel (2477Hz)										
4954.0	AV	41.0	17	H	34.1	5.2	33.0	47.3	54	-6.7
4954.0	AV	39.2	13	V	34.1	5.2	33.0	45.5	54	-8.5
7431.0	AV	34.3	355	H	37.4	6.1	33.5	44.3	54	-9.7
7431.0	AV	34.1	66	V	37.4	6.1	33.5	44.1	54	-9.9
2477.0	AV	85.7	63	H	29.1	3.7	34.0	84.5		(Fund.)
2477.0	AV	83.4	85	V	29.1	3.7	34.0	82.2		(Fund.)
4954.0	PK	46.9	50	H	34.1	5.2	33.0	53.2	74	-20.8
4954.0	PK	44.8	59	V	34.1	5.2	33.0	51.1	74	-22.9
7431.0	PK	40.2	269	H	37.4	6.1	33.5	50.2	74	-23.8
7431.0	PK	39.3	64	V	37.4	6.1	33.5	49.3	74	-24.7
2477.0	PK	95.4	85	H	29.1	3.7	34.0	94.2		(Fund.)
2477.0	PK	93.3	55	V	29.1	3.7	34.0	92.1		(Fund.)

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.
The measurements greater than 20dB below the limit from 9kHz to 30MHz..

9. OUT OF BAND EMISSIONS

9.1 Standard Applicable

According to §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.

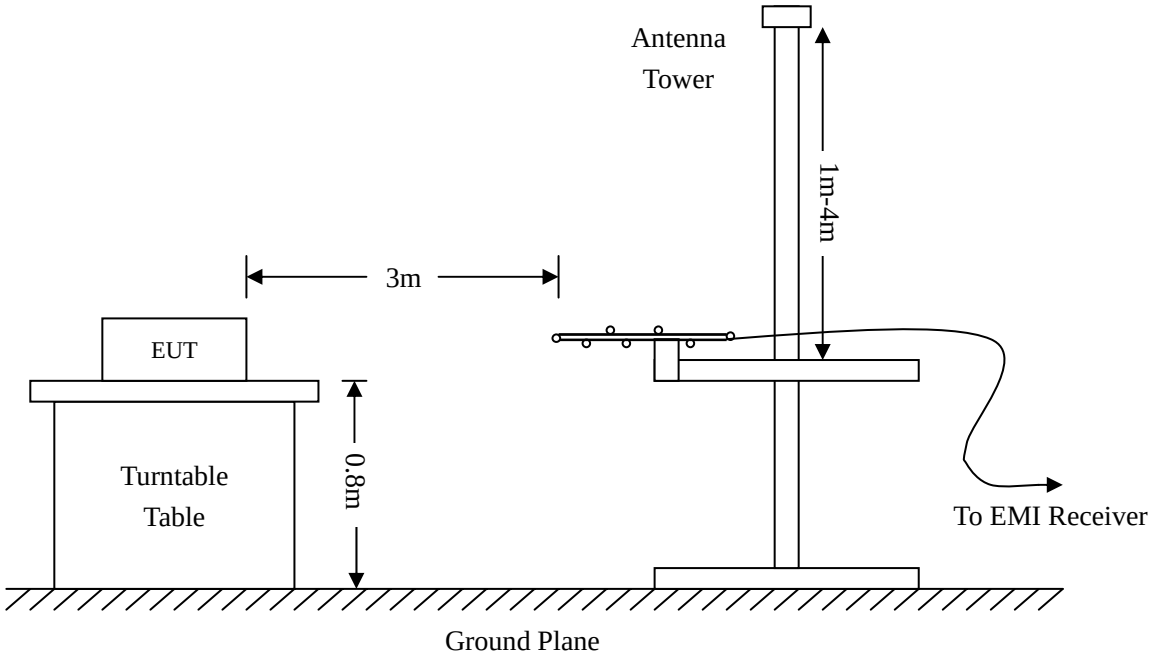
9.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-12-20	2011-12-19
EMI Test Receiver	R&S	ESVB	825471/005	2010-12-20	2011-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2010-12-20	2011-12-19
RF Switch	EM	EMSW18	SW060023	2010-12-20	2011-12-19
Pre-amplifier	Agilent	8447F	3113A06717	2010-12-20	2011-12-19
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-12-20	2011-12-19
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2011-01-09	2012-01-08
Horn Antenna	ETS	3117	00086197	2011-01-09	2012-01-08

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

9.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.



The setup of spectrum analyzer:
Peak detector: RBW = 100kHz, VBW = 100kHz
Sweep time = Auto
Average detector: RBW = 100kHz, VBW = 10Hz
Sweep time = Auto

Star frequency = 2310MHz for lowest bandedge testing, 2450MHz for highest bandedge testing
Stop frequency = 2410MHz for lowest bandedge testing, or 2500MHz for hightest bandedge testing

Mark the higher-level emission for compliance with the FCC rules.

9.4 Environmental Conditions

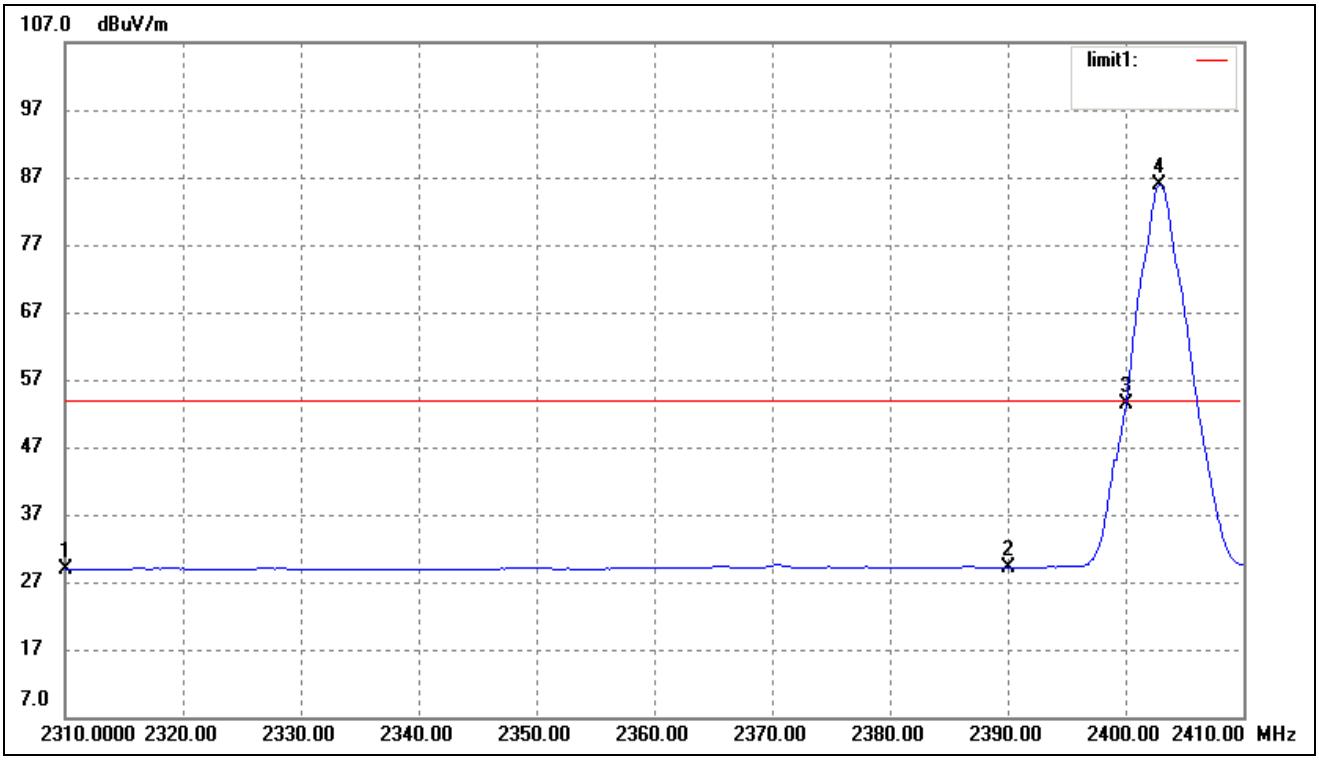
Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.5 Summary of Test Results/Plots

Test mode	Frequency MHz	Limit dBuV /dB	Result
Lowest	2310.00	<54dBuv	Pass
	2390.00	<54dBuv	Pass
	2400.00	>20dB	Pass
Highest	2483.50	<54dBuv	Pass
	2500.00	<54dBuv	Pass

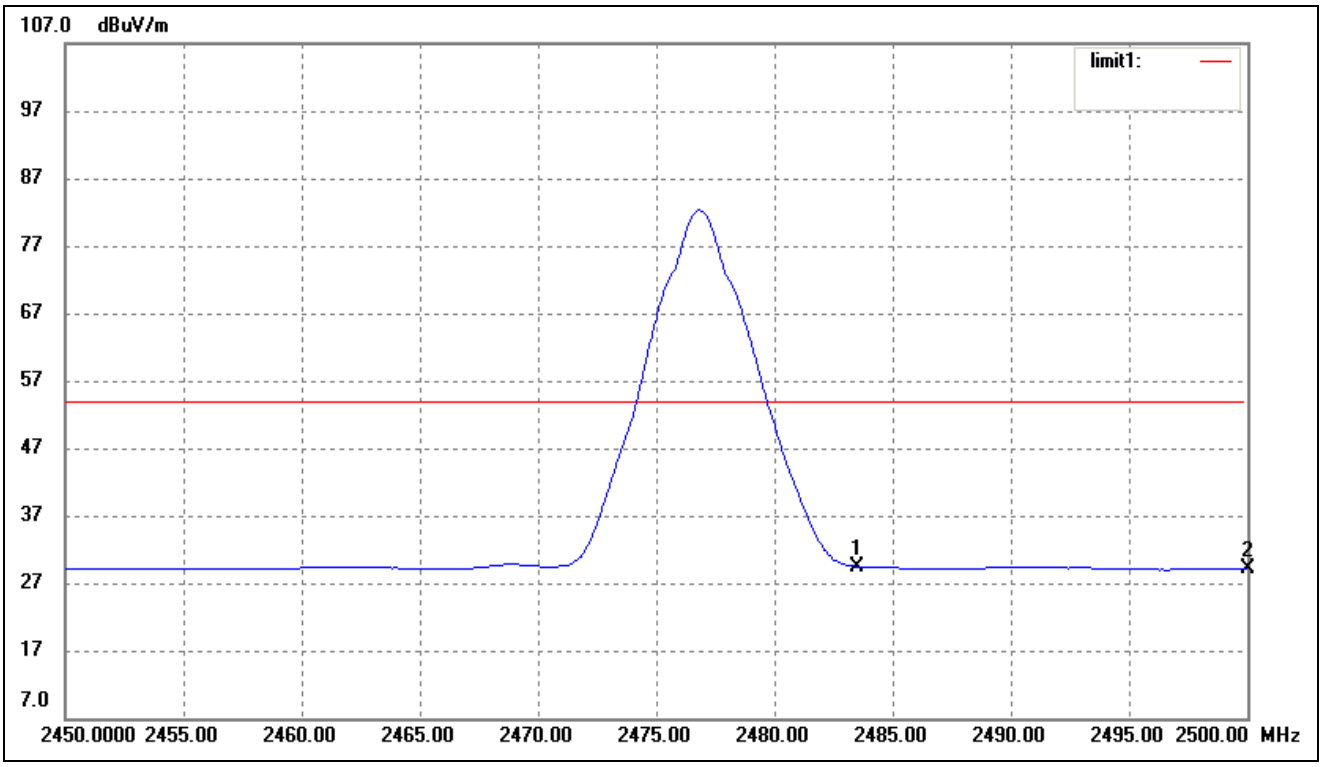
The edge emissions are below the FCC 15.209 Limits. Please refer to the test plots below.

Lowest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	36.46	-7.51	28.95	54.00	-25.05	Average Detector
	2310.000	50.14	-7.51	42.63	74.00	-31.37	Peak Detector
2	2390.000	36.48	-7.34	29.14	54.00	-24.86	Average Detector
	2390.000	60.98	-7.34	53.64	74.00	-20.36	Peak Detector
3	2400.000	60.63	-7.31	53.32	/	/	Average Detector
4	2402.861	93.23	-7.31	85.92	/	/	Average Detector

Highest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	36.58	-7.13	29.45	54.00	-24.55	Average Detector
	2483.500	63.30	-7.13	56.17	74.00	-17.83	Peak Detector
2	2500.000	36.28	-7.08	29.20	54.00	-24.80	Average Detector
	2500.000	58.98	-7.08	51.90	74.00	-22.10	Peak Detector

10. §15.207 (a) CONDUCTED EMISSIONS

10.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

10.2 Test Equipment List and Details

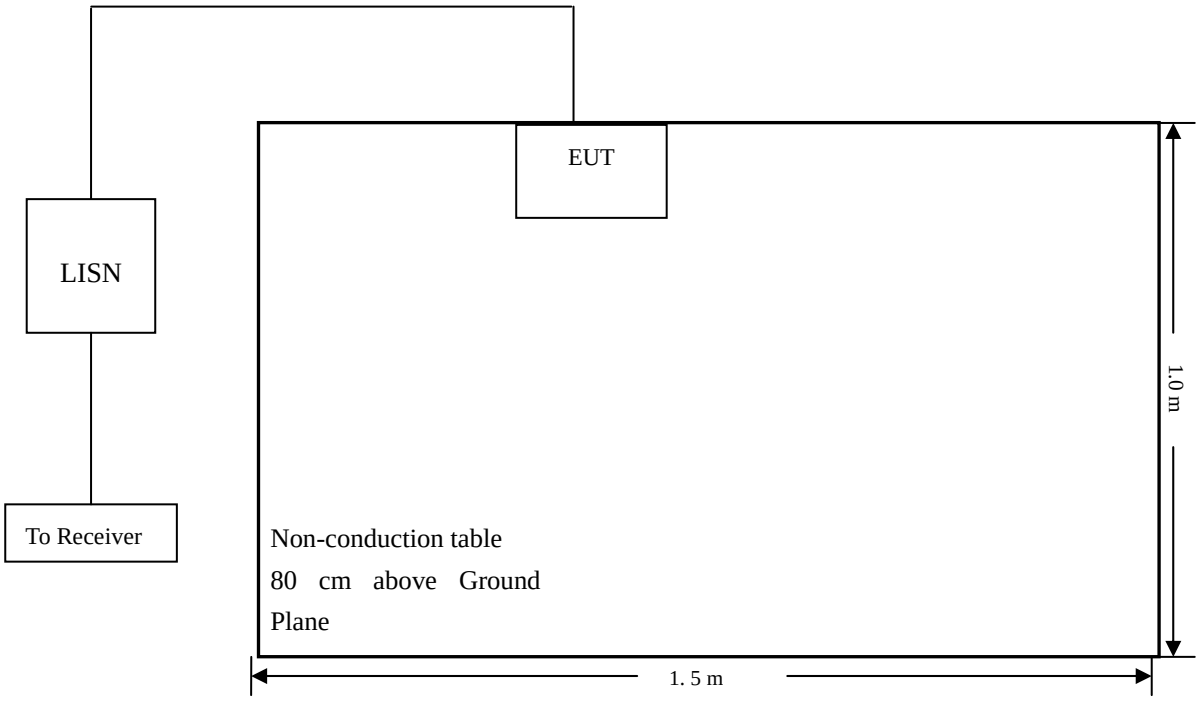
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2010-12-20	2011-12-19
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2010-12-20	2011-12-19
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2010-12-20	2011-12-19

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

10.3 Test Procedure

Test is conducting under the description of ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

10.4 Basic Test Setup Block Diagram



10.5 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

10.6 Summary of Test Results/Plots

According to the data in section 10.7, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

-7.64 dBμV at **0.386 MHz** in the **Line**, **Average** detector, 0.15-30MHz

10.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

Conducted Disturbance

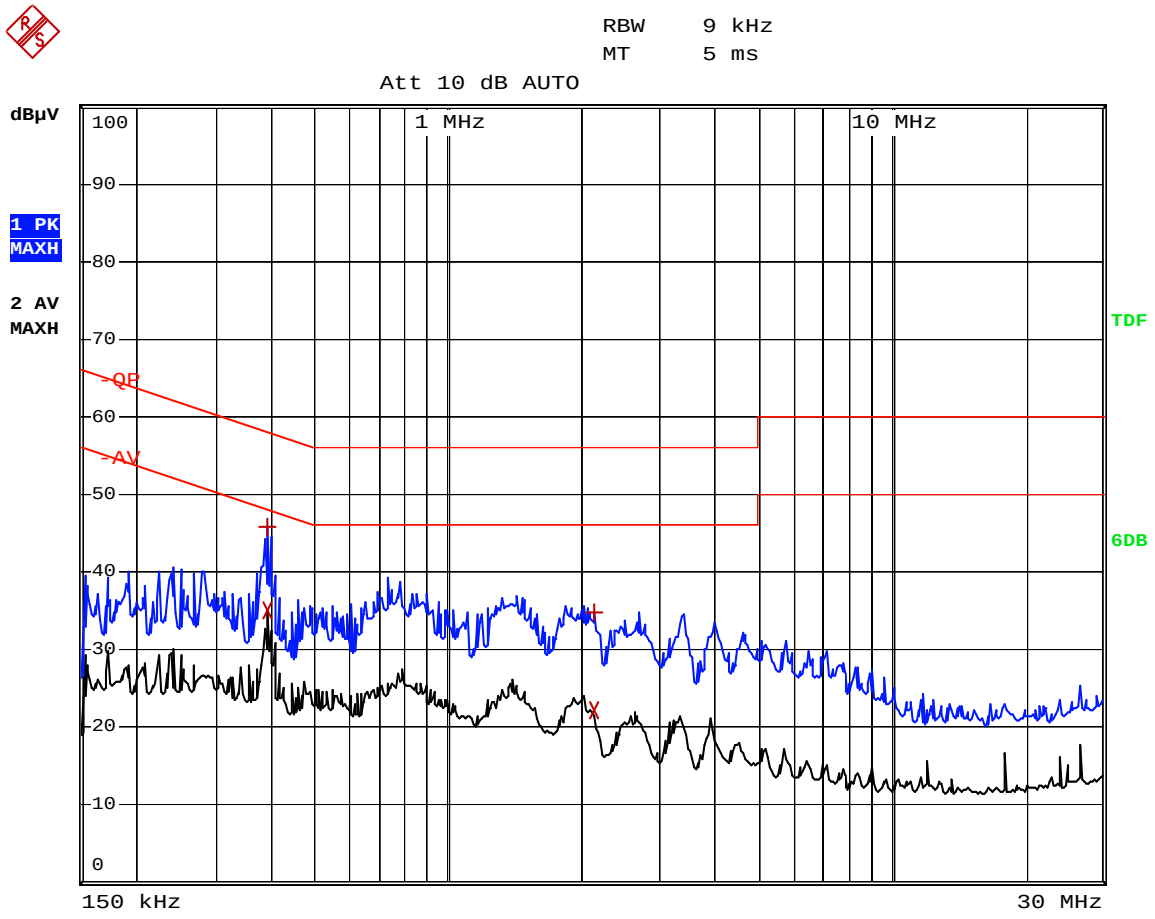
EUT: WIRELESS HEADPHONE

M/N: ML 70DW

Operating Condition: Charging

Test Specification: N

Comment: 120V/60Hz;



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	390 kHz	45.72	-12.34
2 Average	390 kHz	35.14	-12.91
1 Max Peak	2.138 MHz	34.71	-21.28
2 Average	2.138 MHz	22.09	-23.90

Plot of Conducted Emissions Test Data

Conducted Disturbance

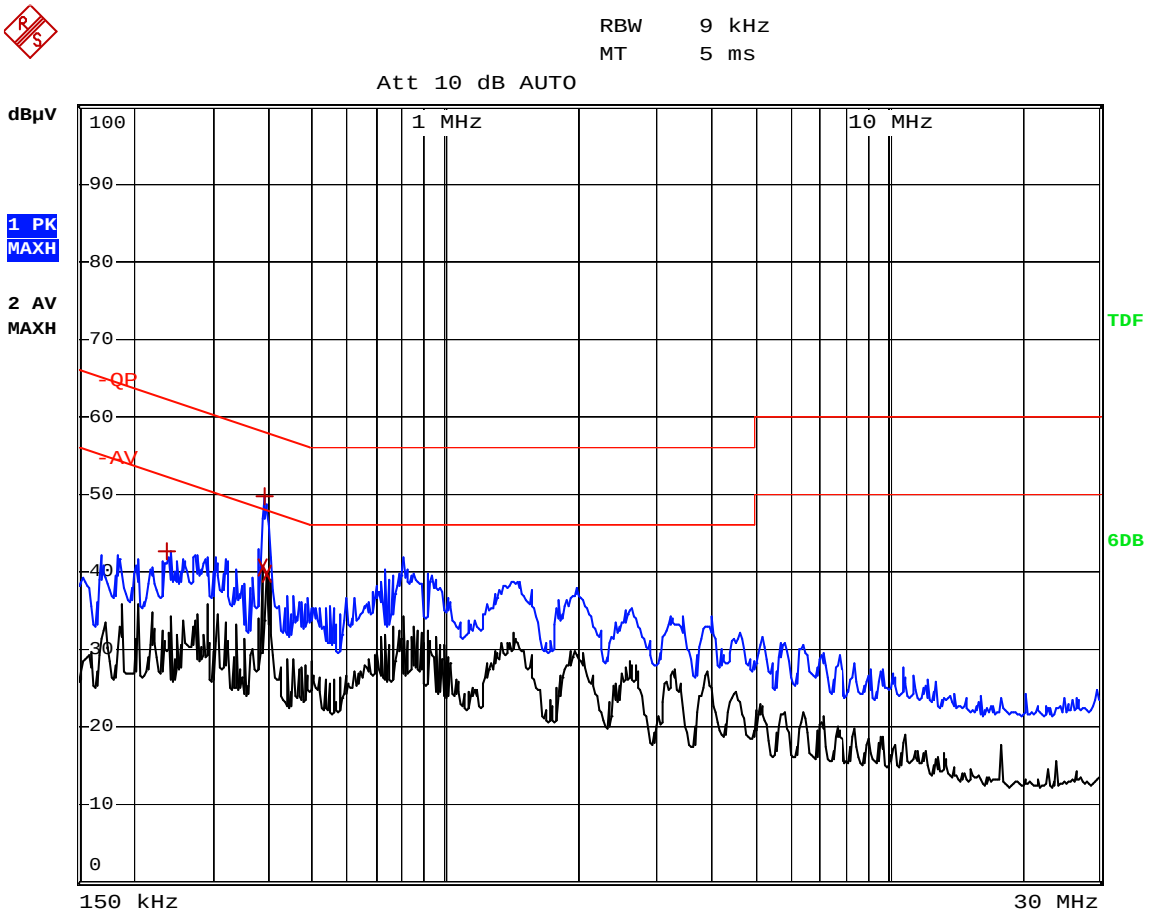
EUT: WIRELESS HEADPHONE

M/N: ML 70DW

Operating Condition: Charging

Test Specification: L

Comment: 120V/60Hz;



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	238 kHz	42.55	-19.60
2 Average	386 kHz	40.50	-7.64
1 Max Peak	390 kHz	49.71	-8.34
2 Average	394 kHz	39.73	-8.24

******* END OF REPORT *******