

FCC PART 15.249
MEASUREMENT AND TEST REPORT
FOR

EXCELLENT MEDIA GROUP CO., LTD.

7F., NO. 124-6. SEC.1, NANJHU RD., LUJHU TOWNSHIP, TAOYUAN

COUNTY 338, TAIWAN

FCC ID: VSTE071107WL

Report Concerns: Original Report	Equipment Type: Wireless Video eyewear
Model:	<u>iTheater-WL</u>
Report No.:	<u>STR07118017I</u>
Test/Witness Engineer:	<u>Lahm Peng</u>
Test Date:	<u>2007-11-01 to 2007-11-07</u>
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Approved & Authorized By:	 _____ Jandy So / PSQ Manager

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Excellent Media Group Co., Ltd.
Address of applicant: 7F., No. 124-6. Sec.1, Nanjhu Rd., Lujhu Township,
Taoyuan County 338, Taiwan

Manufacturer1: AQUAWAYS
Address of manufacturer1: NO. 1-1, Lane 28, Gaocing Rd., Yangmei Townshio,
Taoyuan County 326, Taiwan(R.O.C)
Manufacturer2: Excellent Media Group Co., Ltd.
Address of manufacturer2: 7F., No. 124-6. Sec.1, Nanjhu Rd., Lujhu Township,
Taoyuan County 338, Taiwan

General Description of E.U.T

Items	Description
EUT Description:	Wireless Video eyewear
Trade Name:	EMG, ITHEATER
Model No.:	iTheater-WL
Rated Voltage:	DC 6V Adaptor
Output Power:	<10dBm
Frequency Range:	920MHz
Antenna Type:	Fixed antenna
Size:	11.0x8.0x4.8 cm
For more information refer to the circuit diagram form and the user's manual.	

The test data is gathered from a production sample, provided by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of Excellent Media Group Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 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 15.249 of the Federal Communication Commissions rules.

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

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 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 according to the Operating Instructions and let the EUT keep transmitting.

1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

United States of American Federal Communications Commission (**FCC**), and the registration number is **556682**
Certification and Engineering Bureau of Industry Canada for radio equipment testing with the registration number is **6002**.

All measurement required was performed at laboratory of SGS-CSTC Standards Technical Services Co., Ltd., No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China.

1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software is started while the whole system is on.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
DC Cable	1.2	Unshielded	Without Core

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.207(a)	Conducted Emission	Compliant
§15.209	Radiated Emission	Compliant
§15.249(a)	Field Strength	Compliant
§15.249(d)	Out of Band 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 fixed antenna, fulfill the requirement of this section.

4. §15.207(a) - CONDUCTED EMISSION

4.1 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 $\pm 1.5\text{dB}$.

4.2 Test Equipment List and Details

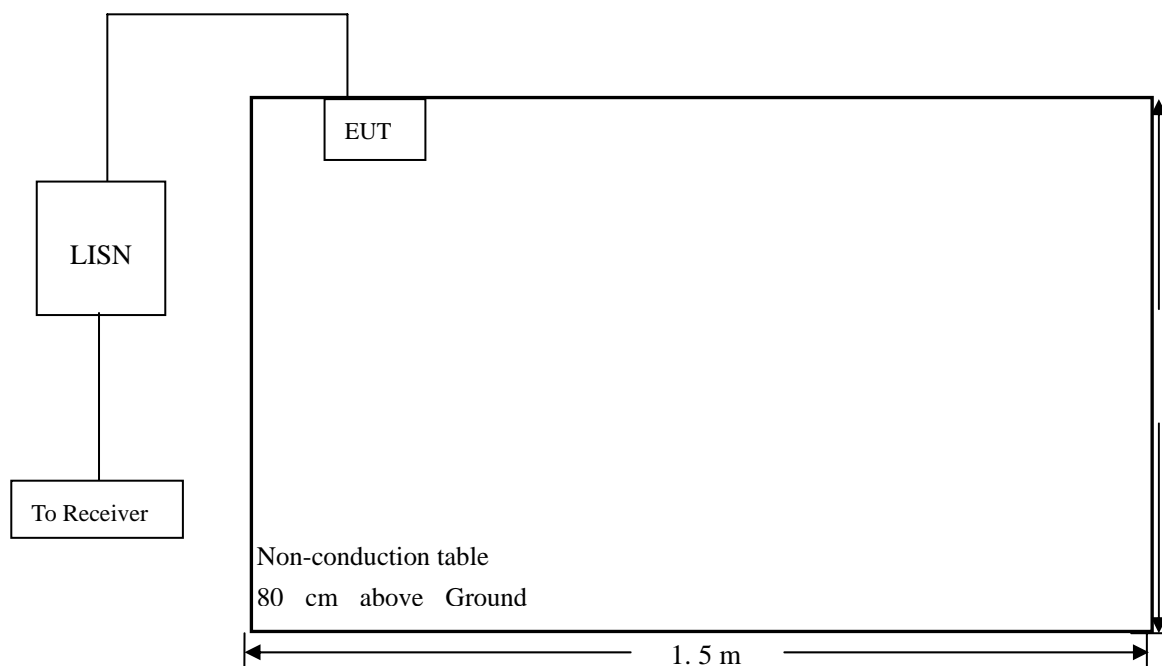
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	830245/009	2007-1-26	2008-1-25
Artificial Mains	Schwarz beck	NSLK8126	8126-224	2007-1-26	2008-1-25
Limiter	Rohde & Schwarz	ESH3-Z2	357.8810.52	2007-1-26	2008-1-25
AMN	Rohde & Schwarz	ESH3-Z5	828304/014	2007-1-26	2008-1-25
Spectrum Analyzer	Agilent	E4402B-ESA	US41192821	2007-1-26	2008-1-25

4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 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.

4.4 Basic Test Setup Block Diagram



4.5 Environmental Conditions

Temperature:	25° C
Relative Humidity:	58%
ATM Pressure:	1011 mbar

4.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 150 kHz
 Stop Frequency..... 30 MHz
 Sweep Speed Auto
 IF Bandwidth..... 10 kHz
 Quasi-Peak Adapter Bandwidth 9 kHz
 Quasi-Peak Adapter Mode Normal

4.7 Summary of Test Results/Plots

According to the data in section 4.8, the EUT complied with the FCC 15C Conducted margin for a Subpart C device, with the *worst* margin reading of:

-28.3 dB μ V at 10.65 MHz in the Line mode, 0.15-30MHz

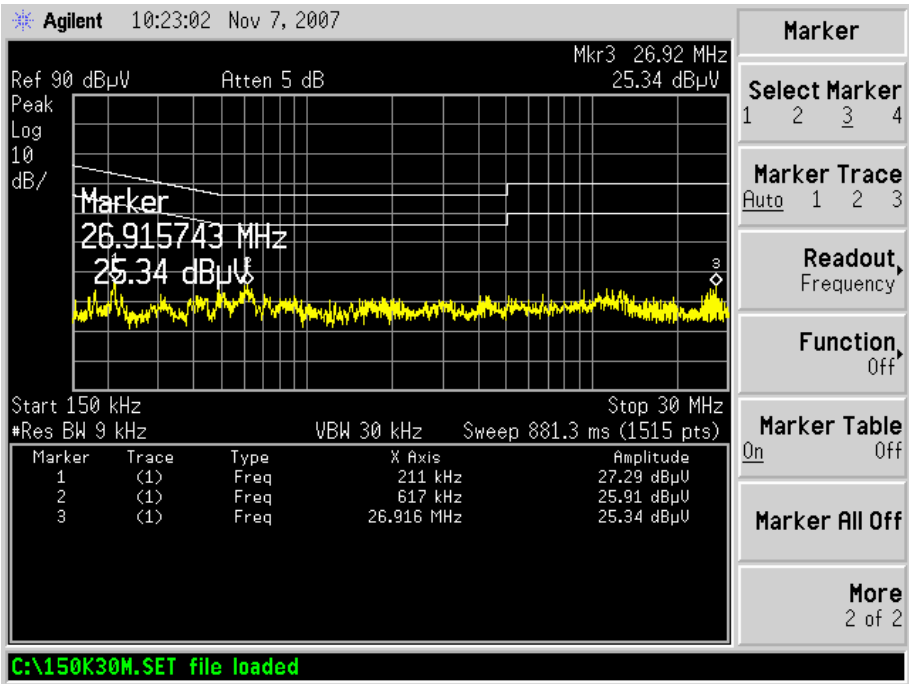
4.8 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC 15.207	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB μ V	QP/Ave/Pk	Line/Neutral	dB μ V	dB
10.65	31.67	PK	Line	60.00	-28.3
4.380	26.83	PK	Line	56.00	-29.2
0.617	25.91	PK	Neutral	56.00	-30.1
0.57	25.14	PK	Line	56.00	-30.9
26.91	25.34	PK	Neutral	60.00	-34.7
0.211	27.29	PK	Neutral	63.17	-35.9

Since the 31.67 peak reading is below the AV Limit, the AV reading can be omitted.

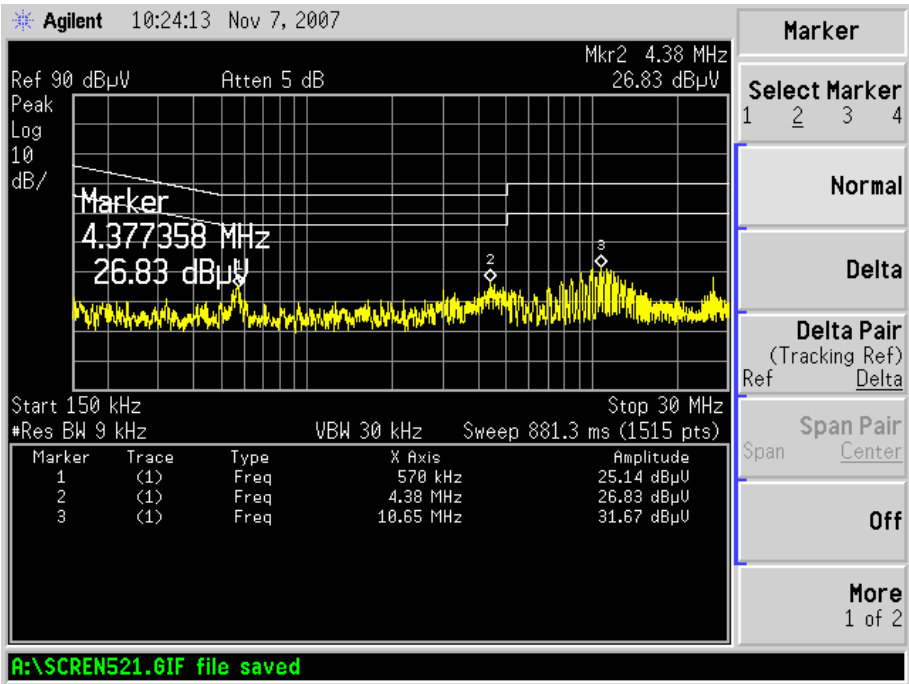
Plot of Conducted Emissions Test Data/Plots

Conducted Disturbance
EUT: Wireless Video eyewear
M/N: iTheater-WL
Operating Condition: Charging
Test Specification: N
Comment: 120V/60Hz Adaptor



Plot of Conducted Emissions Test Data

Conducted Disturbance
EUT: Wireless Video eyewear
M/N: iTheater-WL
Operating Condition: Charging
Test Specification: L
Comment: 120V/60Hz Adaptor



5. §15.205, §15.209, §15.249 (a)- RADIATED EMISSION

5.1 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 ± 3.0 dB.

5.2 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of harmonics (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

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.

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209,WHICHEVER IS THE LESSER ATTENUATION.

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.

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Rohde & Schwarz	EMI Test Receiver	ESIB26	830245/009	2007-01-26	2008-01-25
ETS	Multi Controller	2090	57230	2007-01-26	2008-01-25
ETS	Receiver Antenna	2175	57337	2007-01-26	2008-01-25
ETS	50 ohm Coaxial Cable	SUCOFLEX 104	25498514	2007-01-26	2008-01-25
Schwarz beck	Horn Antenna	BBHX	BBHX9120-00 2	2007-01-26	2008-01-25

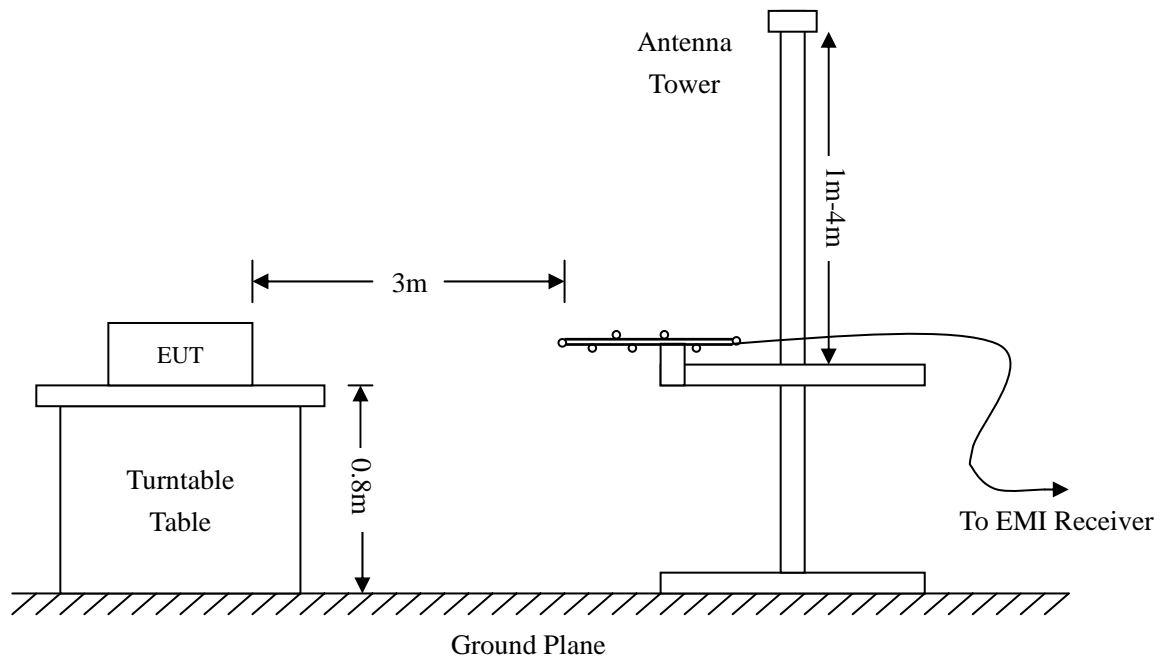
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.4 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 15.249(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.



5.5 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:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

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:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

5.6 Environmental Conditions

Temperature:	26° C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

5.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.249 standards, and had the worst margin of:

-1.2 dBμV at 233.80 MHz in the Horizontal polarization, 30 MHz to 25 GHz, 3Meters

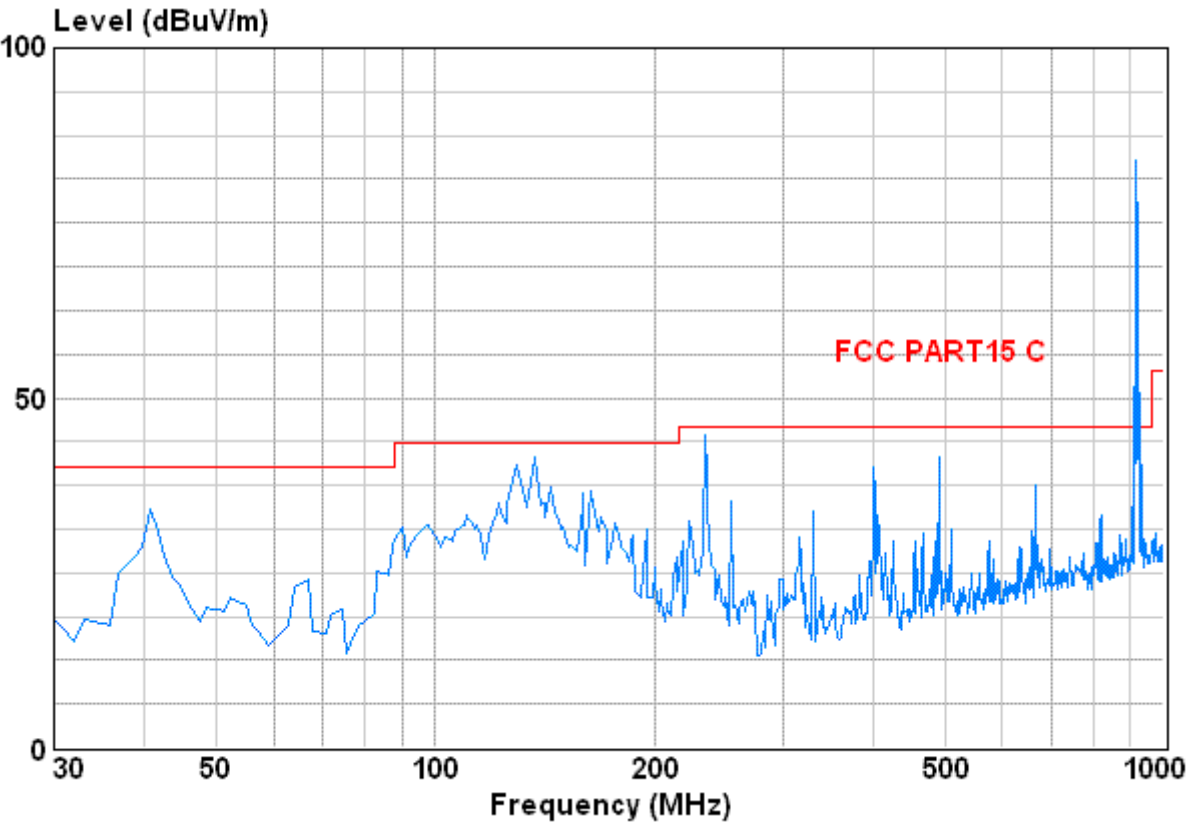
Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier Gain	Corr. Ampl.	FCC Part 15.249 & 15.209	
MHz	dBuV	PK/ QP/AV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB
Transmitting below 1GHz											
233.8	56.9	QP	90	1.5	H	11.7	1.3	25.05	44.8	46	-1.2
140.5	52.3	QP	185	1.2	H	13.8	1.1	25.58	41.6	43.5	-1.9
233.8	55.7	QP	56	1.4	V	11.7	1.3	25.05	43.6	46	-2.4
489.5	47.1	QP	60	2	H	17.9	2.3	25.82	41.5	46	-4.5
400.1	47.9	QP	45	1.2	V	16.1	2.1	25.29	40.8	46	-5.2
400.1	47.8	QP	266	1	H	16.1	2.1	25.29	40.7	46	-5.3
140.5	48.5	QP	43	1	V	13.8	1.1	25.58	37.8	43.5	-5.7
41.0	45.6	QP	135	1.2	H	14.3	0.6	26.25	34.2	40	-5.8
306.2	47.1	QP	45	1	V	13.9	1.6	24.70	37.9	46	-8.1
661.0	40.1	QP	98	1.2	H	20.3	2.9	25.63	37.7	46	-8.3
489.5	42.6	QP	66	1	V	17.9	2.3	25.82	37.0	46	-9.0
223.1	47.2	QP	60	1.3	V	11.5	1.3	25.08	34.9	46	-11.1

Transmitting (Fundamental)											
920	85.5	AV(Fund.)	45	1.0	V	22.8	3.6	24.35	87.5	94.0	-6.5
920	81.2	AV(Fund.)	180.	1.2	H	22.8	3.6	24.35	83.2	94.0	-10.8
920	86.1	PK(Fund.)	45	1.0	V	22.8	3.6	24.35	88.1	114.0	-25.9
920	82.0	PK(Fund.)	180	1.2	H	22.8	3.6	24.35	84.0	114.0	-30.0
Transmitting above 1GHz											
2760	43.4	AV	180	1.2	H	32.8	2.1	25.15	53.1	54.0	-0.9
3680	42.0	AV	60	1.0	H	33.3	2.4	25.25	52.4	54.0	-1.6
2760	42.2	AV	45	1.0	V	32.8	2.1	25.15	51.9	54.0	-2.1
5520	38.5	AV	60	1.0	H	34.7	2.9	25.30	50.8	54.0	-3.2
3680	39.7	AV	45	1.0	V	33.3	2.4	25.25	50.1	54.0	-3.9
6440	33.7	AV	180	1.2	H	35.8	3.0	25.26	47.2	54.0	-6.8
4600	35.5	AV	45	1.0	V	34.1	2.7	25.32	47.0	54.0	-7.0
4600	35.4	AV	180	1.2	H	34.1	2.7	25.32	46.9	54.0	-7.1
5520	32.3	AV	45	1.0	V	34.7	2.9	25.30	44.6	54.0	-9.4
6440	31.1	AV	45	1.0	V	35.8	3.0	25.26	44.6	54.0	-9.4
1840	37.2	AV	60	1.0	H	30.6	1.6	25.20	44.2	54.0	-9.8
1840	37.1	AV	45	1.0	V	30.6	1.6	25.20	44.1	54.0	-9.9
2760	44.6	PK	45	1.2	H	32.8	2.1	25.15	54.3	74.0	-19.7
3680	43.5	PK	60	1.0	H	33.3	2.4	25.25	53.9	74.0	-20.1
2760	43.5	PK	45	1.0	V	32.8	2.1	25.15	53.2	74.0	-20.8
3680	42.2	PK	45	1.0	V	33.3	2.4	25.25	52.6	74.0	-21.4
5520	39.8	PK	60	1.0	H	34.7	2.9	25.30	52.1	74.0	-21.9
6440	35.8	PK	45	1.2	H	35.8	3.0	25.26	49.3	74.0	-24.7
4600	37.7	PK	45	1.0	V	34.1	2.7	25.32	49.2	74.0	-24.8
4600	37.0	PK	45	1.2	H	34.1	2.7	25.32	48.5	74.0	-25.5
5520	34.2	PK	45	1.0	V	34.7	2.9	25.30	46.5	74.0	-27.5
6440	32.8	PK	45	1.0	V	35.8	3.0	25.26	46.3	74.0	-27.7
1840	38.8	PK	45	1.0	V	30.6	1.6	25.20	45.8	74.0	-28.2
1840	38.7	PK	60	1.0	H	30.6	1.6	25.20	45.7	74.0	-28.3

Note: Testing is carried out with frequency rang 30MHz 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. Emissions 20dB lower than the limit are not reported.

Plot of Radiation Emissions Test

Radiated Disturbance
EUT: Wireless Video eyewear
M/N: iTheater-WL
Operating Condition: Transmitting below 1GHz
Test Specification: Vertical
Comment: DC 6V/Adapter



Radiated Disturbance

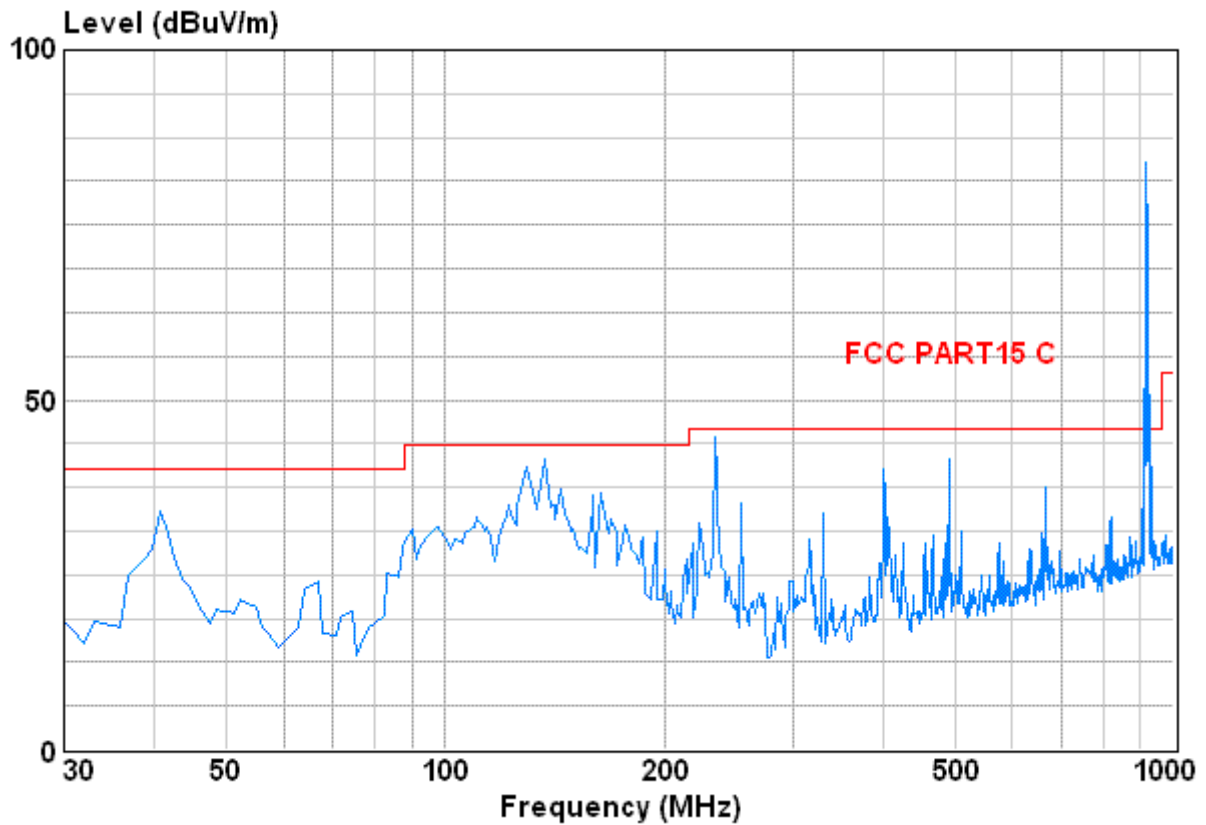
EUT: Wireless Video eyewear

M/N: iTheater-WL

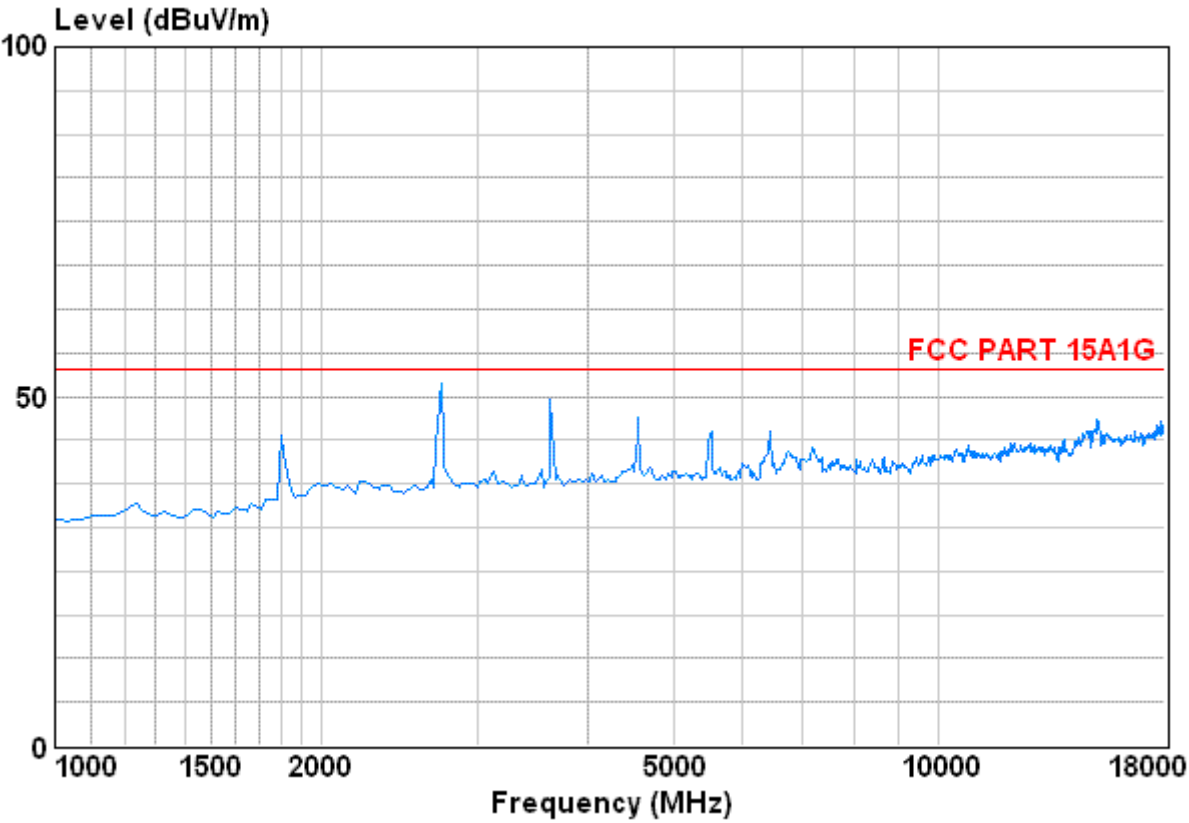
Operating Condition: Transmitting below 1GHz

Test Specification: Horizontal

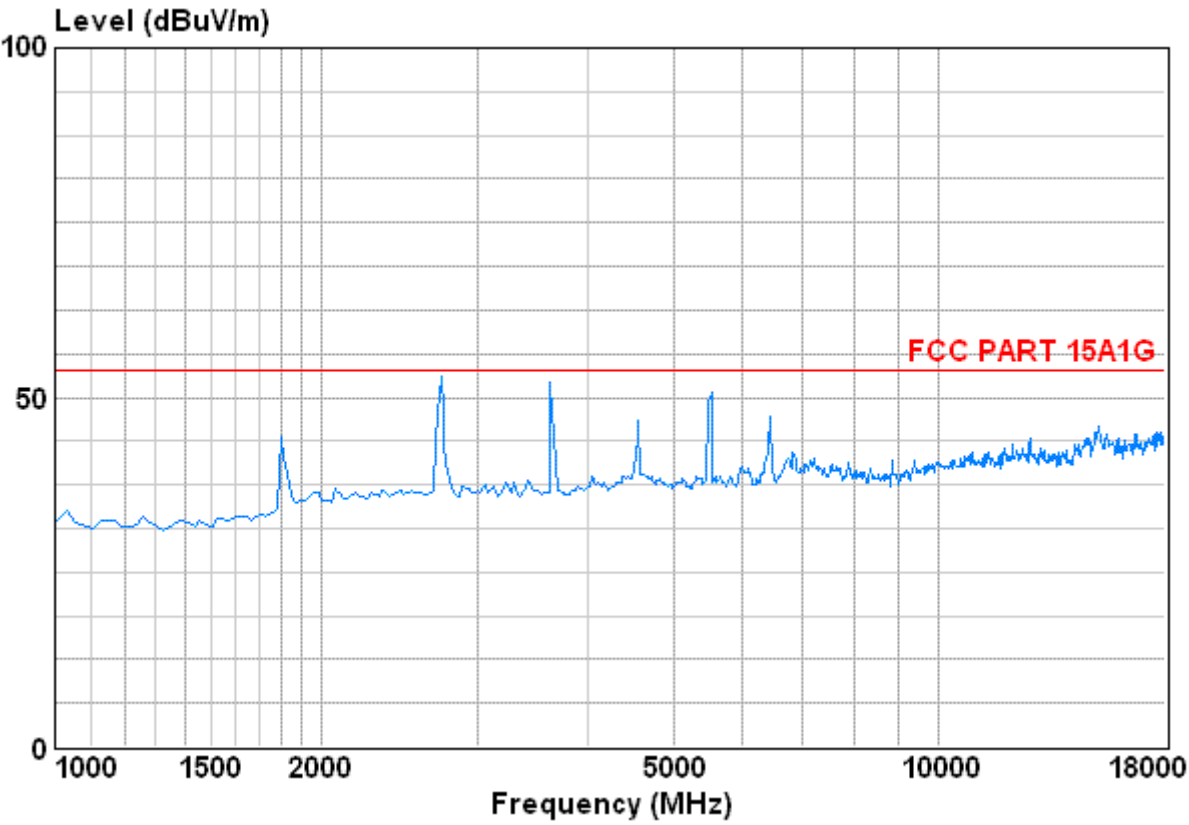
Comment: DC 6V/ Adapter



Radiated Disturbance
EUT: Wireless Video eyewear
M/N: iTheater-WL
Operating Condition: Transmitting above 1GHz
Test Specification: Vertical
Comment: DC 6V/Adapter



Radiated Disturbance
EUT: Wireless Video eyewear
M/N: iTheater-WL
Operating Condition: Transmitting above 1GHz
Test Specification: Horizontal
Comment: DC 6V/Adapter



6. §15.249(b) OUT OF BAND EMISSIONS

6.1 Standard Applicable

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

6.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2007-06-30	2008-06-29
ETS.LINDGR EN	Receiver Antenna	2175	57337	2007-01-26	2008-01-25
ETS.LINDGR EN	50 ohm Coaxial Cable	SUCOFLEX 104	25498514	2007-01-26	2008-01-25
Schwarz beck	Horn Antenna	BBHX	BBHX9120-00 2	2007-01-26	2008-01-25

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

6.3 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 902MHz to 928MHz, than mark the higher-level emission for comparing with the FCC rules.

6.4 Environmental Conditions

Temperature:	22° C
Relative Humidity:	54%
ATM Pressure:	1012 mbar

6.5 Summary of Test Results/Plots

Frequency MHz	Emission dB μ V/m	Limit dB μ V/m
902.0	13.21	46
928.0	16.22	46

Test Result Pass

Refer to the attached plots.
Bandedge

