NCC RADIO TEST REPORT

Product name	Headphones
Applicant	Kingstate Electronics (Dongguan) Co., Ltd.
Manufacture	Kingstate Electronics (Dongguan) Co., Ltd.
Rating(s)	DC5V from adapter or DC3.7V from battery
Trademark	YAMAHA
Model and/or type reference	YH-E500A
Standard	LP0002:2018
Test Result	**Pass**

Date of receipt：06-23-2020 Signature：

Date of Issue： 07-02-2020

NCC RADIO TEST REPORT

Report Reference No..... M200629N3-01

Compiled by (+ signature) ..... Kevin Bothmann

Approved by (+ signature)..... Jay Gandhi

Date of issue..... 2020-07-02

Applicant's name	Kingstate Electronics (Dongguan) Co., Ltd.
Address	Shichong Industrial Park, Shichong Avenue, Xiangxi Village, Shipai Town, Dongguan City, Guangdong Province, China
Manufacture's Name	Kingstate Electronics (Dongguan) Co., Ltd.
Address	Shichong Industrial Park, Shichong Avenue, Xiangxi Village, Shipai Town, Dongguan City, Guangdong Province, China

Test specification:

Standard	LP0002: 2018
Test procedure	EIA 603、ANSI、FCC/47 CFR/2.1046、2.1047、2.1049、2.1051、2.1053 and 2.1055
Non-standard test method…	N/A

Test item description

Product name ..... :	Headphones
Trademark ..... :	YAMAHA
Model and/or type reference ..... :	YH-E500A
Rating(s) ..... :	DC5V from adapter or DC3.7V from battery

Testing Laboratory information

Testing Laboratory Name ..... :	Electro Magnetic Test, Inc.
Address ..... :	1547 Plymouth Street, Mountain View, CA 94043
CAB Identifier Number ..... :	US0036
Tel ..... :	(650) 965-4000
Fax ..... :	(650) 965-3000
E-mail ..... :	jgandhi@emtlabs.com

Testing.....

Date of receipt of test item.....	Jun. 23, 2020
Date (s) of performance of tests.....	Jun. 23~ Jul. 01 , 2020
Date of Issue	Jul. 02, 2020
Test Result	**Pass**

GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Electro Magnetic Test, Inc., which is an independent testing and consulting firm. The test report is based on testing performed Electro Magnetic Test, Inc. personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government.

Electro Magnetic Test, Inc. is recognized by the following agencies for performing EMI/EMC testing:

COUNTRY	AGENCY	IDENTIFYING #
USA	Federal Communications Commission (FCC) (EMT's test site is recognized by the FCC)	Registration Number: 90576
USA, Canada, Taiwan, Australia/New Zealand, European Community	National Voluntary Lab Accreditation Program (NVLAP) (EMT is accredited by NVLAP. A copy of the NVLAP Scope Of Accreditation is available upon request.)	Lab Code: 200147-0
Canada	Industry Canada	File No.: IC 2804
Japan	Voluntary Control Council For Interference (VCCI)	See Below
	Open Field Test Site "A"	R-589
	Mains Conducted Emissions Test Site "A"	C-604
	Telecom Conducted Emissions Test Site "A"	T-1655
	3 Meter Semi-Anechoic Chamber Site "E"	R-3227
	3 Meter Semi-Anechoic Chamber Site "E" (1GHz – 6GHz)	G-219
	Mains Conducted Emissions Test Site "E"	C-35793
	Telecom Conducted Emissions Test Site "E"	T-1715
Korea	Ministry of Information and Communication's Radio Research Laboratory (RRL) under the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (A copy of the Scope Of Accreditation is available upon request)	US0036
Taiwan	Bureau Of Standards, Metrology and Inspection (BSMI)	Reference Number: SL2-IN-E-1024
Australia / New Zealand	Australian Communications Authority (AUSTEL)	*

***THESE AGENCIES DO NOT ISSUE AN IDENTIFYING NUMBER TO TEST LABS.**

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

LP0002 : 2018			
Standard Section	Test Item	Judgment	Remark
2.3	Conducted Emission	PASS	None
3.10.1.5/2.8	Radiated Spurious Emission	PASS	None
3.10.1.2	Peak Output Power	PASS	None
3.10.1.6	Occupied Bandwith	PASS	None
3.10.1.6	Hopping Channel Separation	PASS	None
3.10.1.6	Number of Hopping Frequency	PASS	None
3.10.1.6	Dwell Time	PASS	None
3.10.1.5/2.8	Restricted Bands	PASS	None
3.10.1.3	Antenna Requirement	PASS	None

NOTE:

(1)” N/A” denotes test is not applicable in this Test Report.

1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	Conducted Emission Test	1.38dB
2	Radiated Emission Test	3.17dB
3	RF power,conducted	0.16dB
4	Spurious emissions,conducted	0.21dB
5	All emissions,radiated(<1G)	4.68dB
6	All emissions,radiated(>1G)	4.89dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Headphones
Trade Name	YAMAHA
Model Name	YH-E500A
Serial Model Name	N/A
Model Difference	N/A
Product Description	The EUT is a Headphones. Operation Frequency: 2402~2480 MHz Modulation Type: GFSK(1Mbps) / Π/4 DQPSK(2Mbps) / 8QPSKA(3Mbps) Bluetooth version: 5.0 Number Of Channel: 79 CH Antenna Designation: Please see Note 3. Antenna Gain(Peak): 2.45 dBi Output Power: 1Mbps Mode: 7.543dBm (Max.) / 3Mbps Mode: 4.321 dBm(Max.)
Channel List	Please refer to the Note 2.
Power Rating	DC5V from adapter or DC3.7V from battery
Connecting I/O Port(s)	Please refer to the User's Manual
Products Covered	N/A
EUT Modification(s)	N/A
Model difference	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3.

Table for Filed Antenna

	Manuf.acturer	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	YAMAHA	HP-E500A	PIFA Antenna	N/A	2.45 dBi	Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	1Mbps
Mode 2	2Mbps
Mode 3	3Mbps
Mode 4	RX
Mode 5	CHARGE

For Conducted Emission	
Final Test Mode	Description
Mode 1	CH00 /CH39 /CH78
Mode 3	CH00 /CH39 /CH78
Mode 5	CHARGE

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH00 /CH39 /CH78
Mode 3	CH00 /CH39 /CH78
Mode 4	RX
Mode 5	CHARGE

Note:

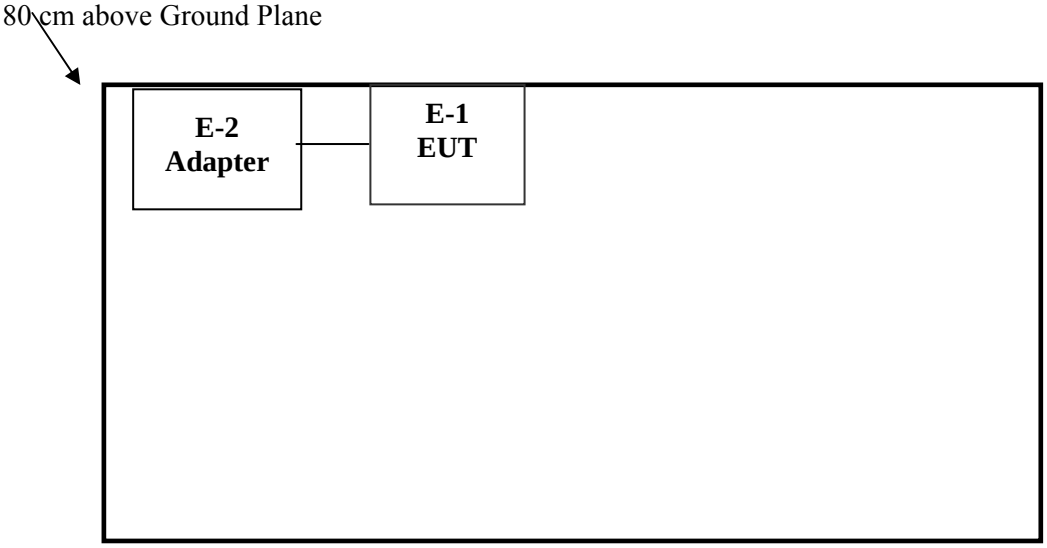
(1) The measurements are performed at the highest, middle, lowest available channels.

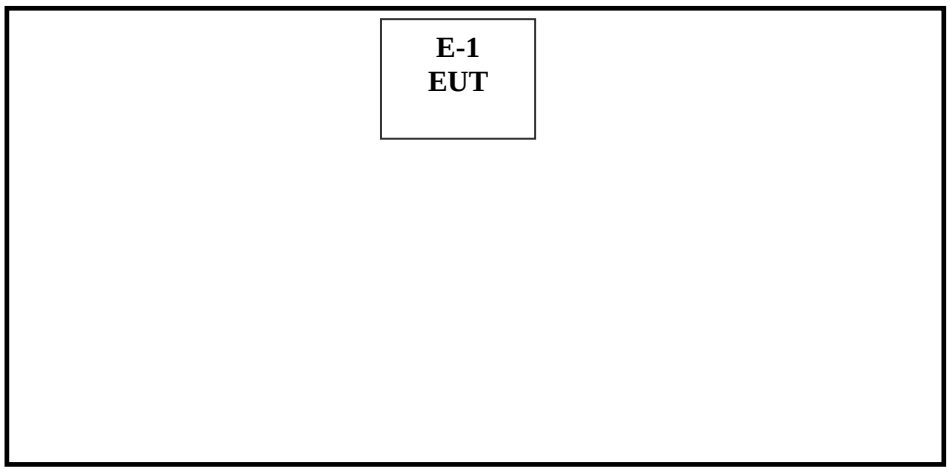
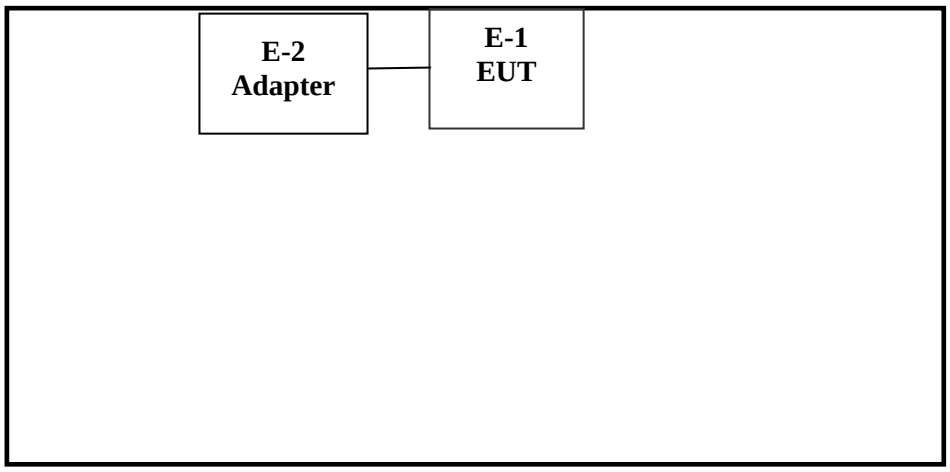
2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test software Version	Test program: Bluetest3		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps)	Default	Default	Default
Parameters(3Mbps)	Default	Default	Default

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Block diagram of EUT configuration
CONDUCTED EMISSION
Test mode: mode 1, 2, 3, 5 Non-Conductive Table 80 cm above Ground Plane 

Block diagram of EUT configuration
RADIATED EMISSION
Test mode: mode 1, 2, 3 ,4 Non-Conductive Table 80 cm above Ground Plane 
Test mode: mode 5 Non-Conductive Table 80 cm above Ground Plane 

2.5 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	Headphones	YAMAHA	YH-E500A	N/A	N/A	EUT
E-2	Adapter	NOKIA	F0302	N/A	N/A	Test Accessory

1	USB Cable	YAMAHA	YH-E500A	EUT
2	Audio Cable	YAMAHA	YH-E500A	EUT

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.
(3) "YES" means "shielded" or "with ferrite core";"NO" means "unshielded" or"without ferrite core"

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3013A07296	April 29, 2020	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	April 29, 2020	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650	2521A00584	April 29, 2020	1 Year
Preamplifier	Com Power	PA-102	1482	April 29, 2020	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 8, 2019	1 Year
LISN	Com Power	LI-200	12012	September 10, 2019	1 Year
LISN	Com Power	LI-200	12214	September 10, 2019	1 Year
LISN	Com Power	LI-200	1767	September 10, 2019	1 Year
LISN	Com Power	LI-200	1768	September 10, 2019	1 Year
Biconical Antenna	Com Power	AB-100	01557	December 29, 2019	1 Year
Log Periodic Antenna	Com Power	AL-100	16037	December 22, 2019	1 Year
Horn Antenna	Com Power	AHA-118	711054	December 22, 2019	1 Year
Antenna Mast	Com Power	AM-400	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Dell, Inc.	DHS	DNSV641	N/A	N/A
Printer	Hewlett Packard	C8124A	CN39B2234T	N/A	N/A
Plotter	Hewlett Packard	7470A	2308A96499	N/A	N/A

EMI Test Equipment (Continued)

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
EMI Receiver	Rohde & Schwarz	ESU40	100127	June 12, 2020	1 Year
BiConiLog Antenna	ETS-Lindgren	3142D	00102183	August 14, 2019	1 Year
Horn Antenna	ETS-Lindgren	3117	00109294	May 6, 2020	1 Year
Preamplifier	Rohde & Schwarz	TS-PR18	100056	June 12, 2020	1 Year
Antenna Mast	ETS-Lindgren	2175	00095727	N/A	N/A
Turntable	ETS-Lindgren	2187-3.0	00118231	N/A	N/A
Computer	Acer	Aspire 8930	85100050123	N/A	N/A
Multi-Function Controller	ETS-Lindgren	2090	00102270	N/A	N/A
Loop Antenna	ARA	PLA-1030/B	1029	May 19, 2020	1 Year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

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

0.15 -0.5			66 - 56 *	56 - 46 *	LP0002
0.50 -5.0			56.00	46.00	LP0002
5.0 -30.0			60.00	50.00	LP0002

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

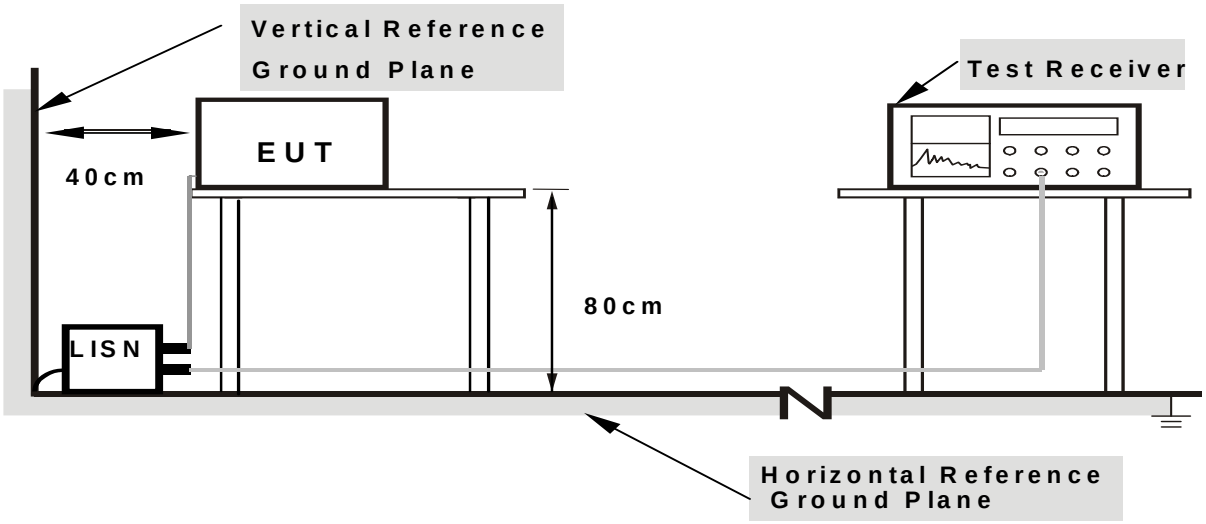
3.1.2 TEST PROCEDURE

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

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

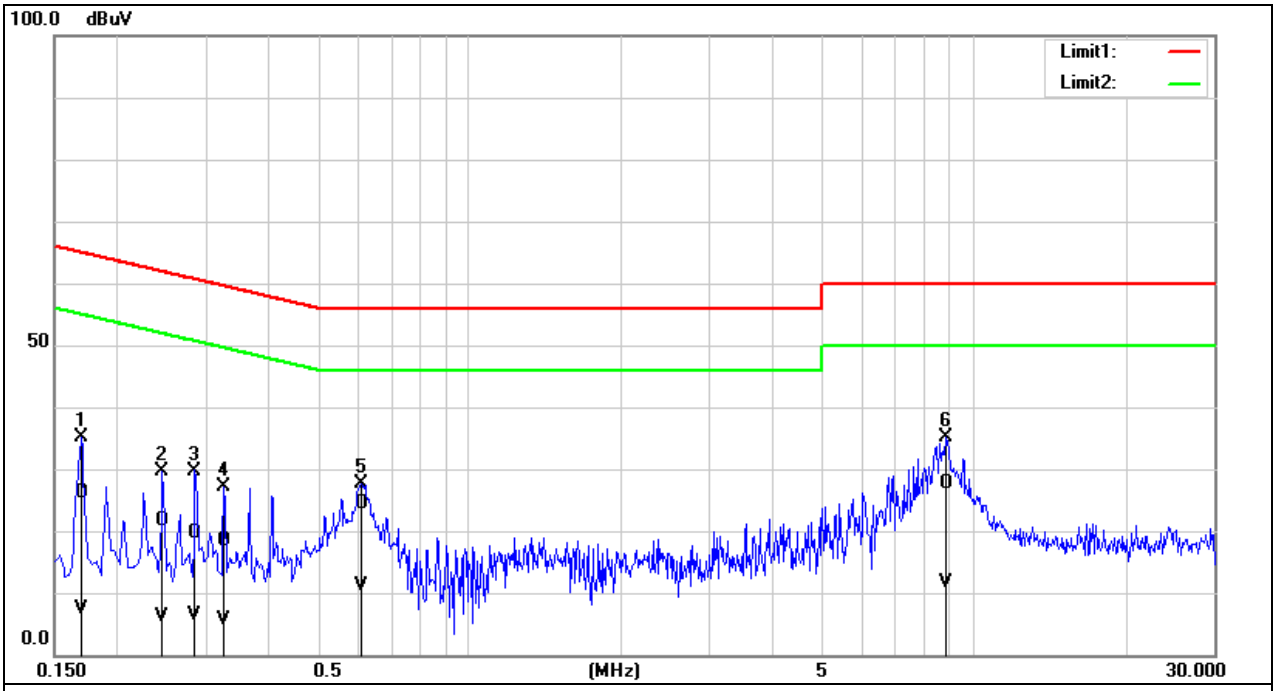
3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 TEST RESULTS

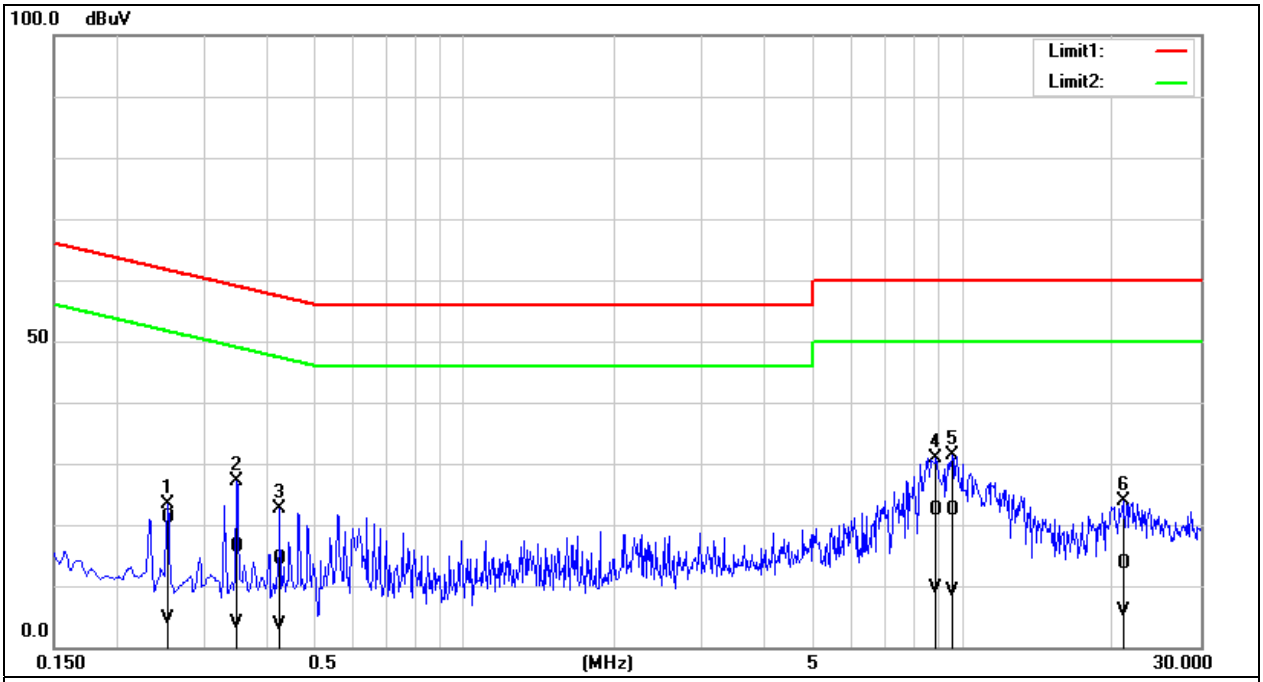
EUT：	Headphones	Model Name. ：	YH-E500A
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Test Date :	2020-06-25
Test Mode：	TX 2402MHz (1Mbps-worst case)	Phase :	L
Test Voltage ：	AC 110V/60Hz for Adapter		



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss + Pulse limit.
3. '*' means the worst case

No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)
1	0.1700	15.64	-3.08	10.38	26.02	7.30	64.96	54.96	-38.94	-47.66
2	0.2460	11.84	-3.74	9.91	21.75	6.17	61.89	51.89	-40.14	-45.72
3	0.2860	9.73	-3.52	9.89	19.62	6.37	60.64	50.64	-41.02	-44.27
4	0.3260	8.48	-4.33	9.89	18.37	5.56	59.55	49.55	-41.18	-43.99
5	0.6100	14.44	1.24	9.82	24.26	11.06	56.00	46.00	-31.74	-34.94
6	8.7980	17.44	1.34	10.22	27.66	11.56	60.00	50.00	-32.34	-38.44

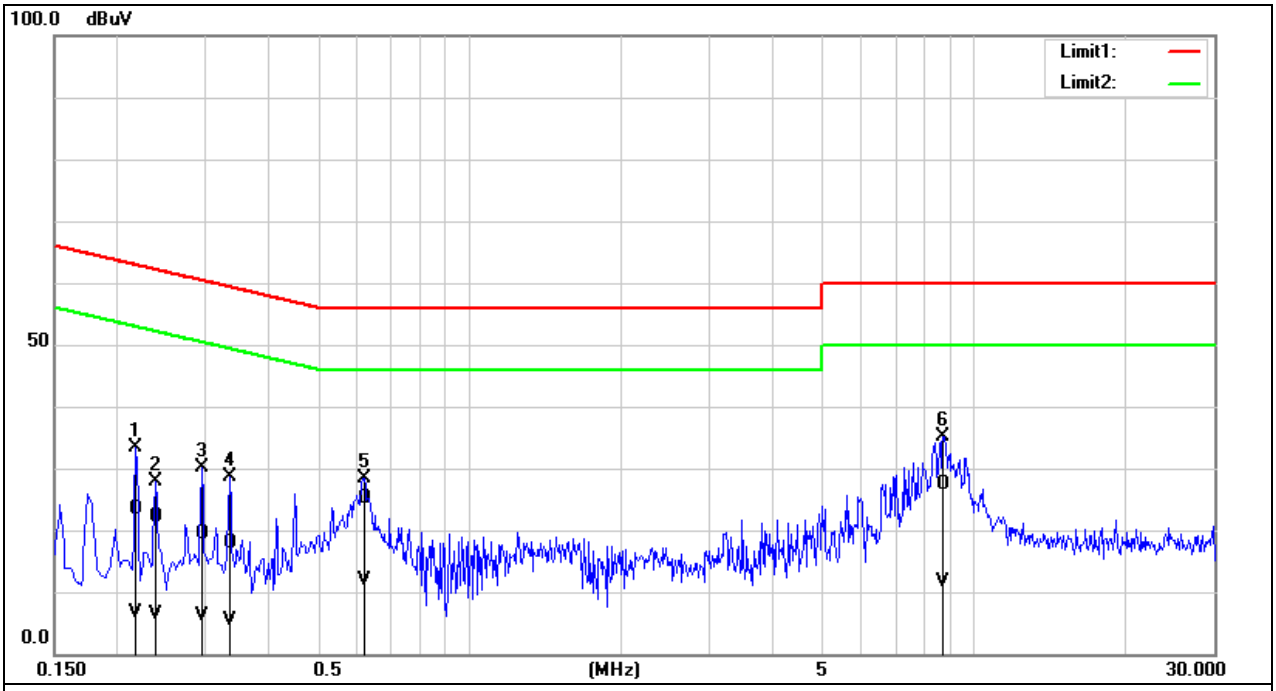
EUT：	Headphones	Model Name. ：	YH-E500A
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Test Date :	2020-06-25
Test Mode：	TX 2402MHz (1Mbps-worst case)	Phase :	N
Test Voltage ：	AC 110V/60Hz for Adapter		



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss + Pulse limit.
3. '*' means the worst case

No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)
1	0.2540	11.28	-5.20	9.90	21.18	4.70	61.63	51.63	-40.45	-46.93
2	0.3500	6.42	-6.11	9.93	16.35	3.82	58.96	48.96	-42.61	-45.14
3	0.4260	4.46	-6.38	9.89	14.35	3.51	57.33	47.33	-42.98	-43.82
4	8.8340	12.14	-0.66	10.22	22.36	9.56	60.00	50.00	-37.64	-40.44
5	9.5500	12.12	-1.09	10.23	22.35	9.14	60.00	50.00	-37.65	-40.86
6	20.9700	3.22	-4.44	10.44	13.66	6.00	60.00	50.00	-46.34	-44.00

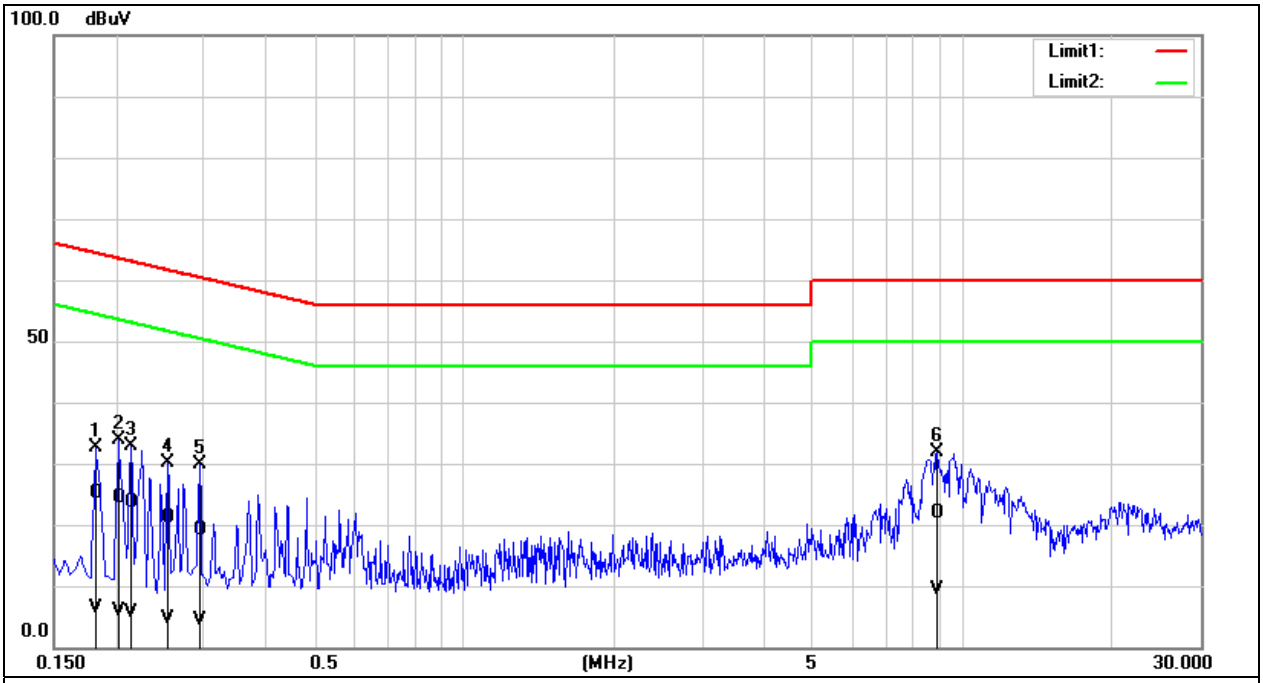
EUT：	Headphones	Model Name. ：	YH-E500A
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Test Date :	2020-06-25
Test Mode：	Mode 5	Phase :	L
Test Voltage ：	AC 110V/60Hz for Adapter		



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss + Pulse limit.
3. '*' means the worst case

No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)
1	0.2180	13.11	-3.48	10.19	23.30	6.71	62.89	52.89	-39.59	-46.18
2	0.2380	12.21	-3.62	9.99	22.20	6.37	62.17	52.17	-39.97	-45.80
3	0.2940	9.40	-3.79	9.90	19.30	6.11	60.41	50.41	-41.11	-44.30
4	0.3340	7.89	-4.52	9.89	17.78	5.37	59.35	49.35	-41.57	-43.98
5	0.6180	15.31	1.94	9.82	25.13	11.76	56.00	46.00	-30.87	-34.24
6	8.7100	17.19	1.32	10.22	27.41	11.54	60.00	50.00	-32.59	-38.46

EUT：	Headphones	Model Name. ：	YH-E500A
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Test Date :	2020-06-25
Test Mode：	Mode 5	Phase :	N
Test Voltage ：	AC 110V/60Hz for Adapter		



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss + Pulse limit.
3. '*' means the worst case

No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)
1	0.1820	14.73	-3.79	10.29	25.02	6.50	64.39	54.39	-39.37	-47.89
2	0.2020	14.07	-4.26	10.26	24.33	6.00	63.53	53.53	-39.20	-47.53
3	0.2140	13.56	-4.53	10.17	23.73	5.64	63.05	53.05	-39.32	-47.41
4	0.2540	11.22	-5.25	9.90	21.12	4.65	61.63	51.63	-40.51	-46.98
5	0.2940	9.35	-5.44	9.88	19.23	4.44	60.41	50.41	-41.18	-45.97
6	8.8820	11.73	-0.78	10.22	21.95	9.44	60.00	50.00	-38.05	-40.56

Test result: The unit does meet the NCC requirements.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 2.7, then the 2.8 limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

(1) The limit for radiated test was performed according to LP0002.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5^{th} harmonic of the highest frequency or 40 GHz, whichever is lower

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

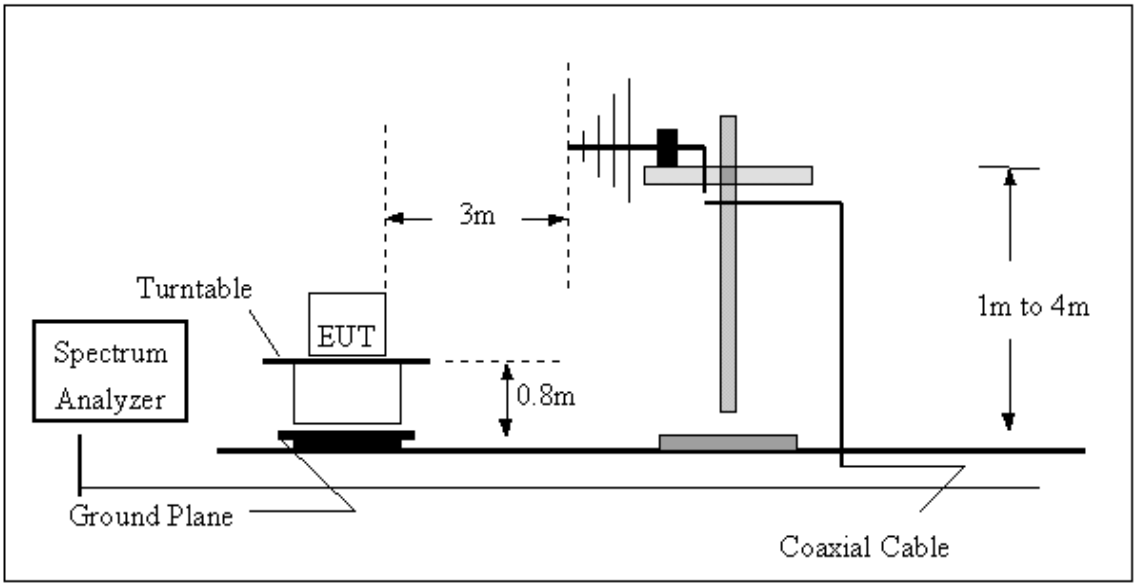
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

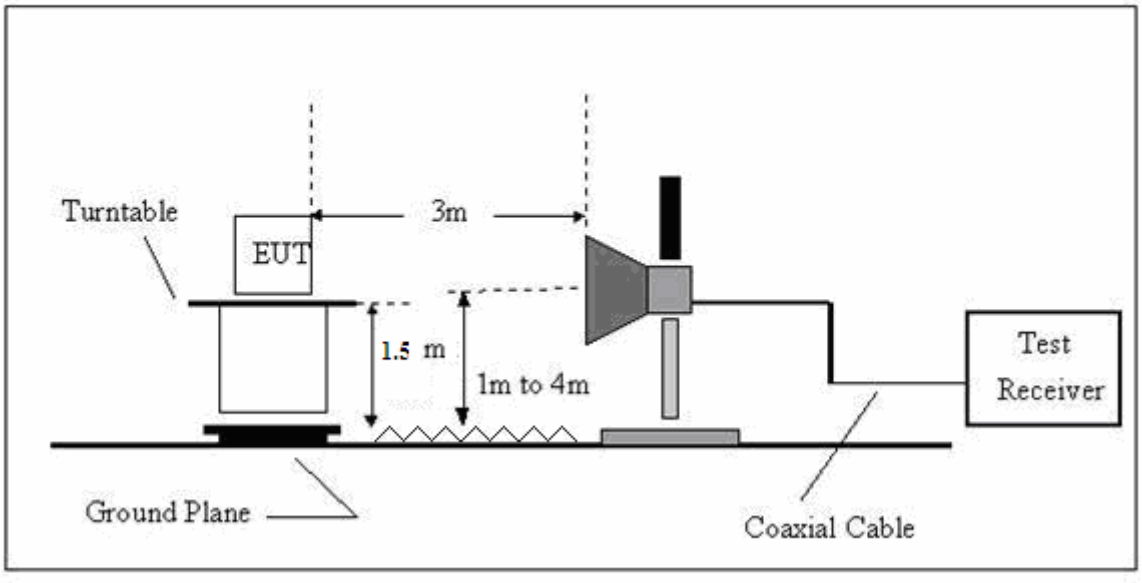
a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters (For frequencies above 1GHz, table 1.5 meters) above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 TEST SETUP

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



3.2.4 EUT OPERATING CONDITIONS

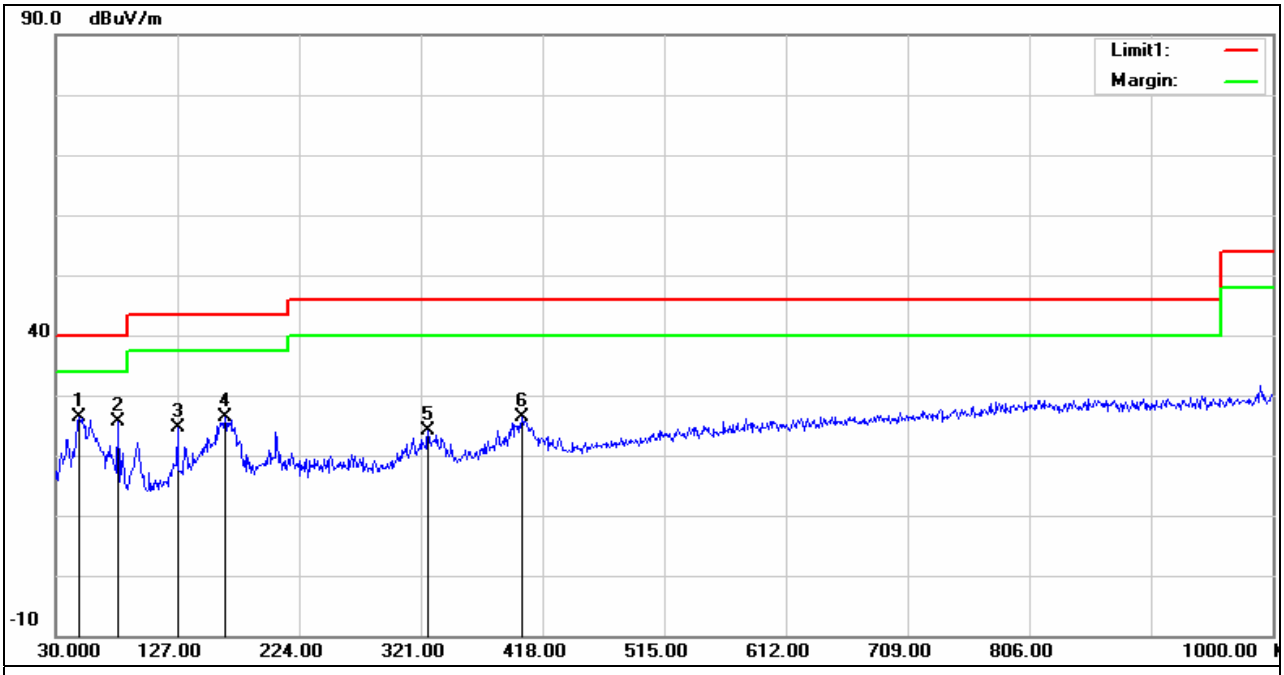
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 TEST RESULTS (BLOW 30 MHZ)

There is no detected blow 30MHz

3.2.6 TEST RESULTS (BETWEEN30 – 1000 MHZ)

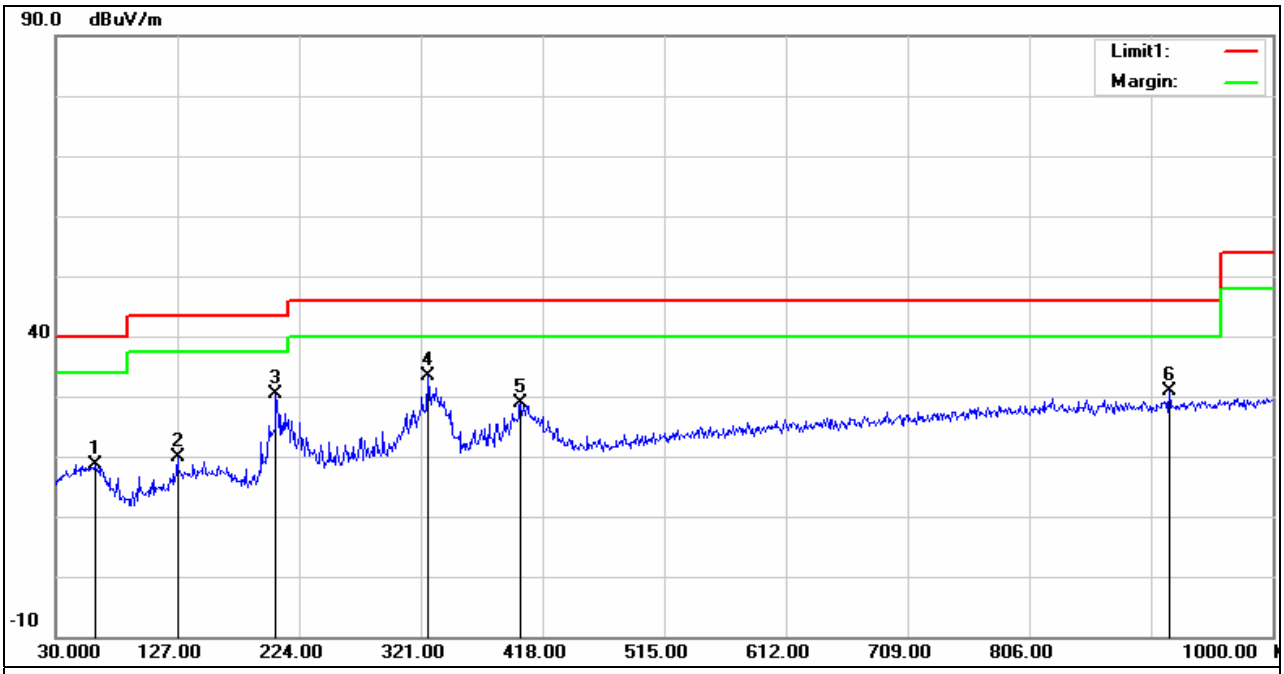
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2402MHz (1Mbps-worst case)	Polarization :	Vertical
Test Power ：	DC3.7V from battery		



Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	48.4300	37.39	-11.11	26.28	40.00	-13.72			QP
2	79.4700	40.80	-15.28	25.52	40.00	-14.48			QP
3	127.0000	37.01	-12.42	24.59	43.50	-18.91			QP
4	164.8300	37.49	-11.05	26.44	43.50	-17.06			QP
5	326.8200	33.81	-9.70	24.11	46.00	-21.89			QP
6	401.5100	34.35	-7.90	26.45	46.00	-19.55			QP

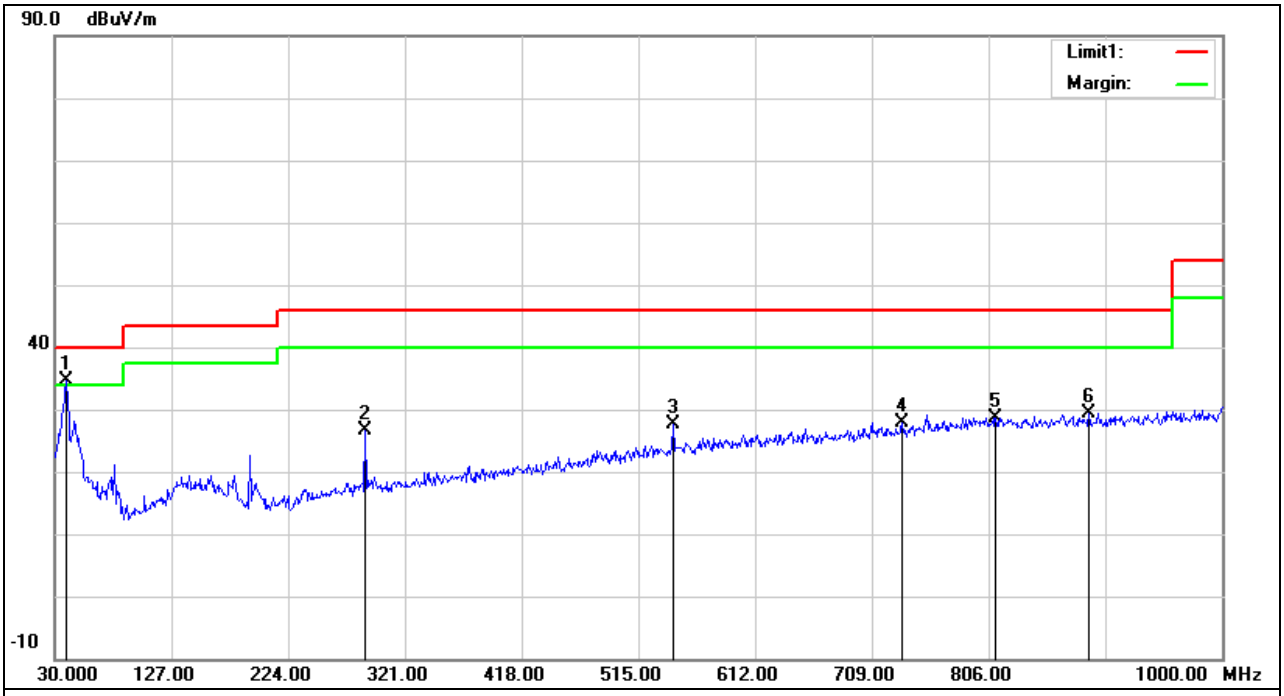
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2402MHz (1Mbps-worst case)	Polarization :	Horizontal
Test Power ：	DC3.7V from battery		



Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	62.0100	30.42	-11.68	18.74	40.00	-21.26			QP
2	127.0000	32.25	-12.42	19.83	43.50	-23.67			QP
3	205.5700	44.95	-14.61	30.34	43.50	-13.16			QP
4	326.8200	43.06	-9.70	33.36	46.00	-12.64			QP
5	400.5400	36.82	-7.94	28.88	46.00	-17.12			QP
6	917.5500	29.71	1.19	30.90	46.00	-15.10			QP

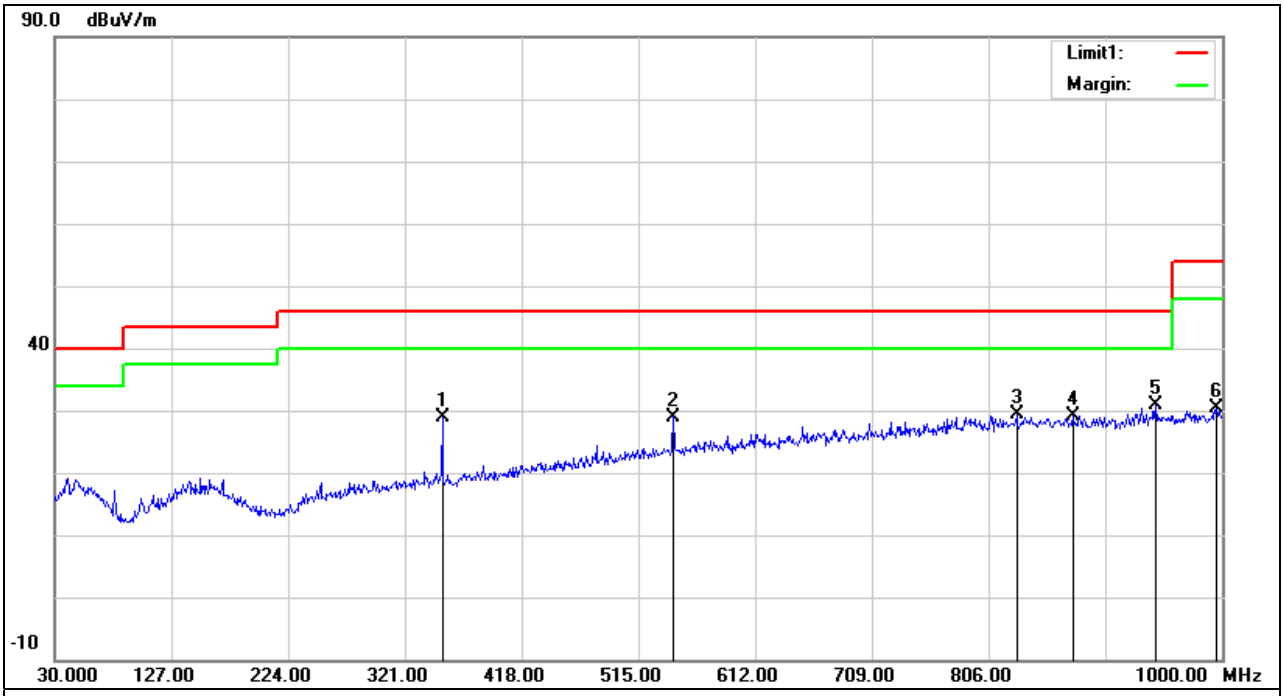
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	RX	Polarization :	Vertical
Test Power ：	DC3.7V from battery		



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (◦)	Height (cm)	Remark
1	39.7000	46.51	-11.78	34.73	40.00	-5.27			QP
2	288.0200	37.18	-10.48	26.70	46.00	-19.30			QP
3	544.1000	31.80	-4.13	27.67	46.00	-18.33			QP
4	734.2200	28.70	-0.86	27.84	46.00	-18.16			QP
5	811.8200	28.32	0.40	28.72	46.00	-17.28			QP
6	889.4200	28.41	0.95	29.36	46.00	-16.64			QP

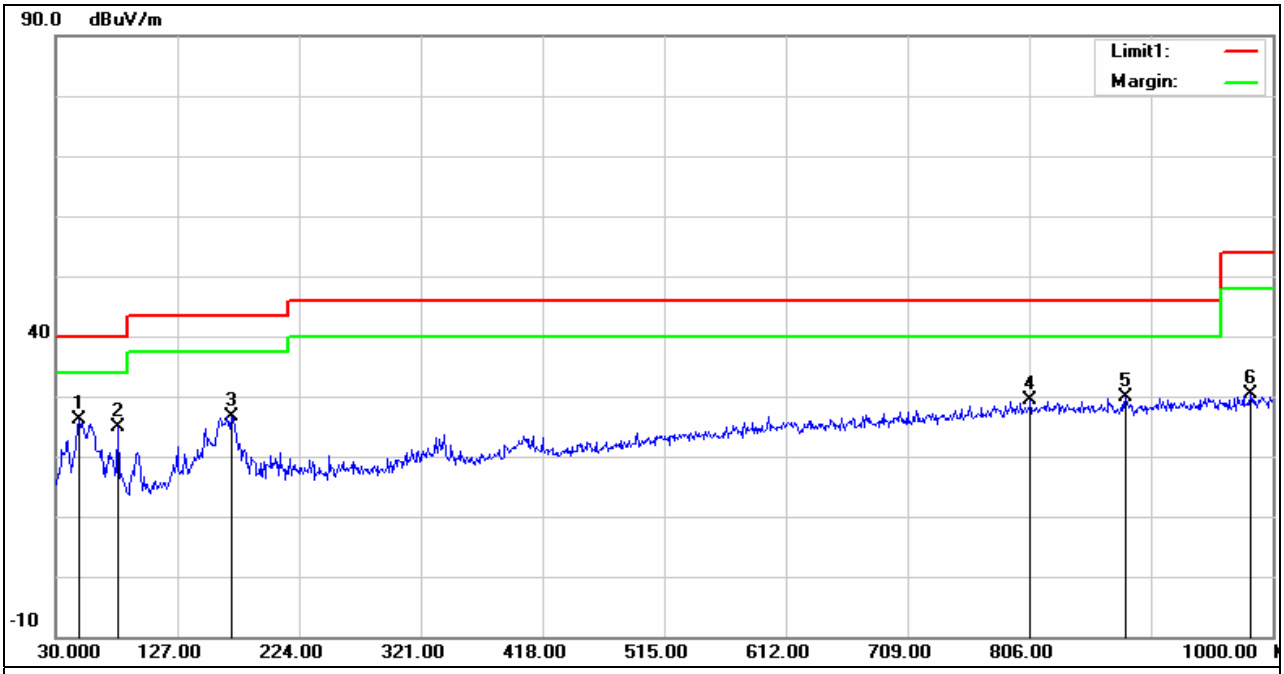
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	RX	Polarization :	Horizontal
Test Power ：	DC3.7V from battery		



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (◦)	Height (cm)	Remark
1	352.0400	37.91	-9.14	28.77	46.00	-17.23			QP
2	544.1000	33.13	-4.13	29.00	46.00	-17.00			QP
3	829.2800	28.86	0.53	29.39	46.00	-16.61			QP
4	875.8400	28.23	0.86	29.09	46.00	-16.91			QP
5	944.7100	29.45	1.43	30.88	46.00	-15.12			QP
6	995.1500	28.36	1.91	30.27	54.00	-23.73			QP

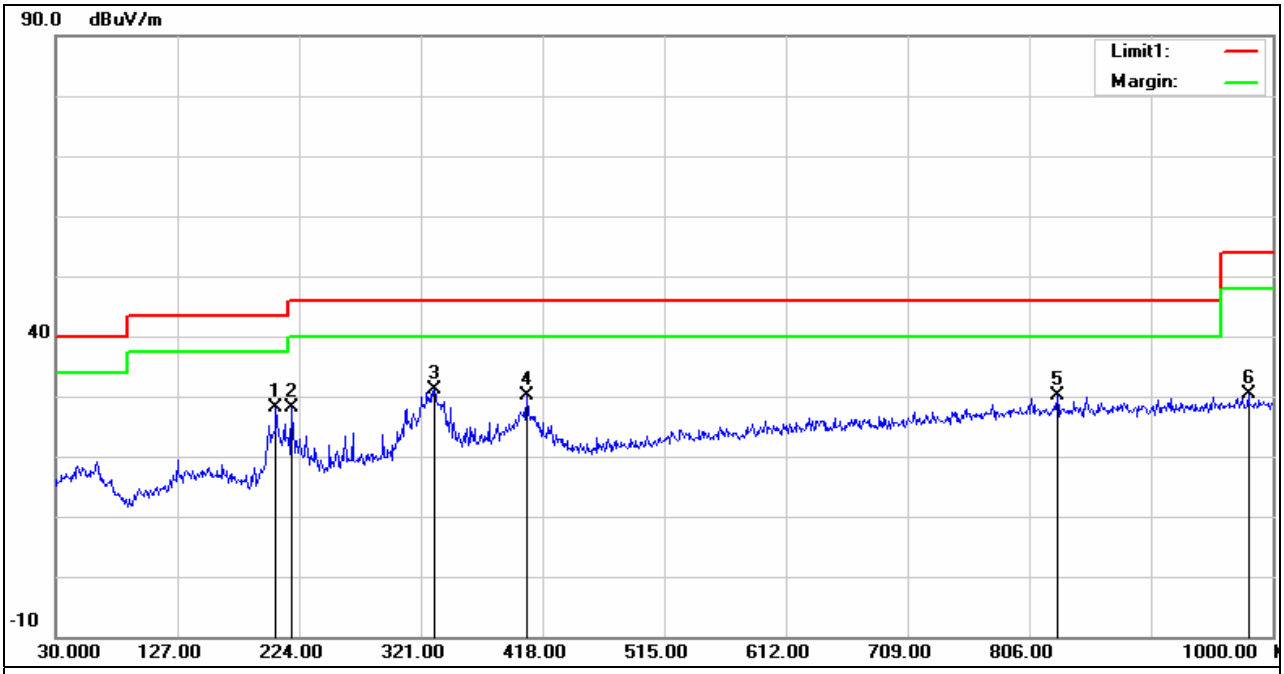
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	Mode5	Polarization :	Vertical
Test Power ：	DC5V from adapter		



Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	48.4300	37.34	-11.11	26.23	40.00	-13.77			QP
2	79.4700	40.06	-15.28	24.78	40.00	-15.22			QP
3	170.6500	38.35	-11.61	26.74	43.50	-16.76			QP
4	806.9700	28.93	0.37	29.30	46.00	-16.70			QP
5	882.6300	28.89	0.90	29.79	46.00	-16.21			QP
6	982.5400	28.54	1.78	30.32	54.00	-23.68			QP

EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	Mode5	Polarization :	Horizontal
Test Power ：	DC5V from adapter		



Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	205.5700	42.86	-14.61	28.25	43.50	-15.25			QP
2	218.1800	42.82	-14.65	28.17	46.00	-17.83			QP
3	331.6700	40.69	-9.58	31.11	46.00	-14.89			QP
4	405.3900	37.92	-7.80	30.12	46.00	-15.88			QP
5	828.3100	29.54	0.52	30.06	46.00	-15.94			QP
6	980.6000	28.61	1.77	30.38	54.00	-23.62			QP

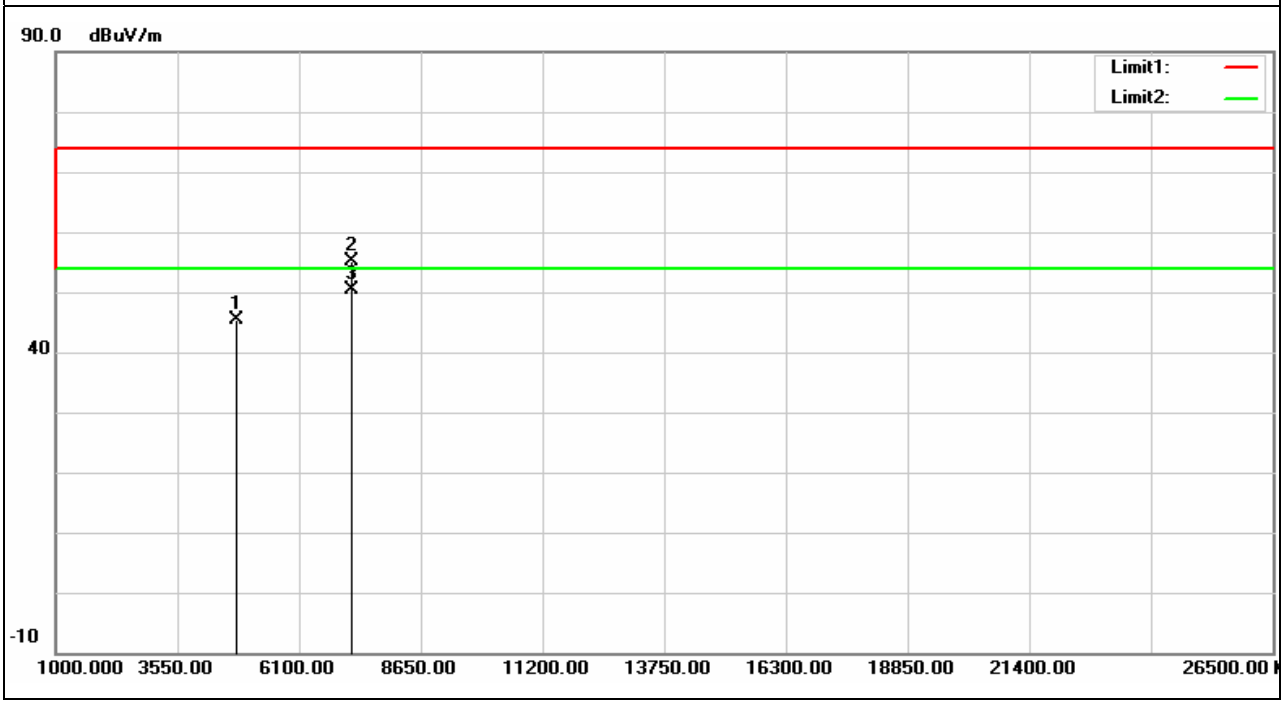
Test result: The unit does meet the NCC requirements.

3.2.7 TEST RESULTS (FRENQUCY RANGE 1000-25000 MHZ)

EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2402MHz (1Mbps-worst case)	Polarization :	Horizontal
Test Power ：	DC3.7V from battery		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4804.000	51.06	-5.57	45.49	74.00	-28.51	peak
7206.000	56.57	-1.37	55.20	74.00	-18.80	peak
7206.000	51.66	-1.37	50.29	54.00	-3.71	AVG

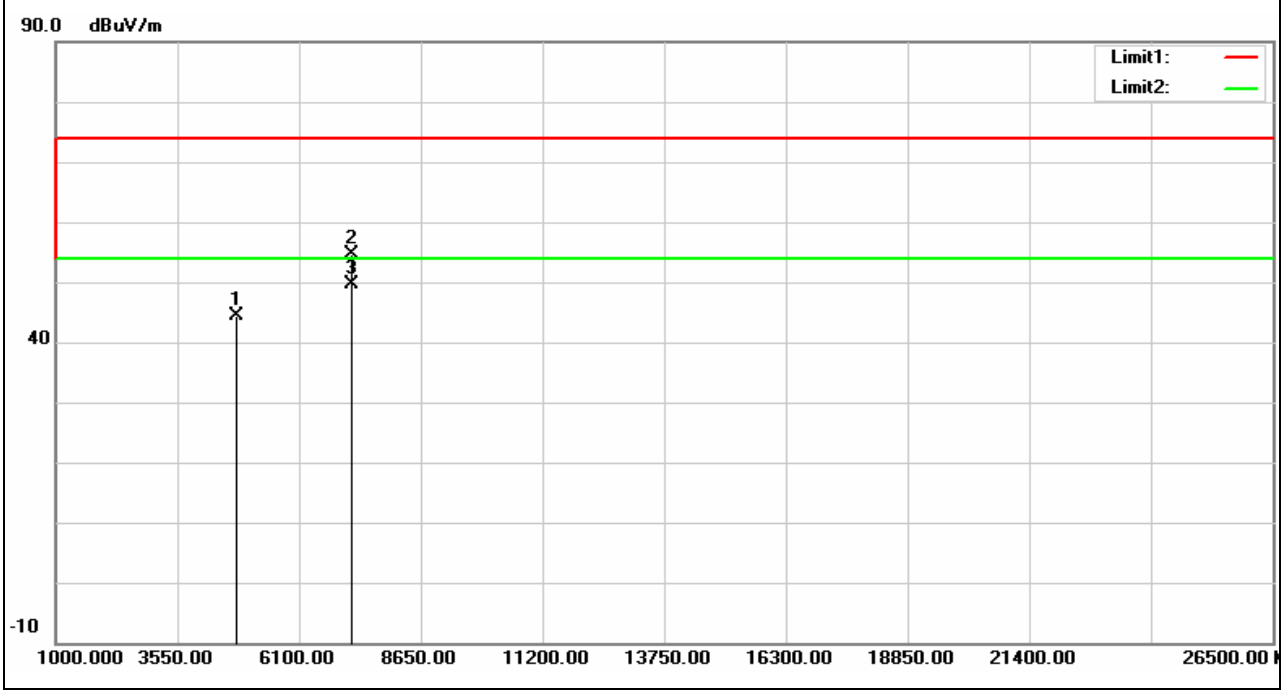
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2402MHz (1Mbps-worst case)	Polarization :	Vertical
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.000	49.90	-5.57	44.33	74.00	-29.67	peak
7206.000	55.92	-1.37	54.55	74.00	-19.45	peak
7206.000	51.02	-1.37	49.65	54.00	-4.35	AVG

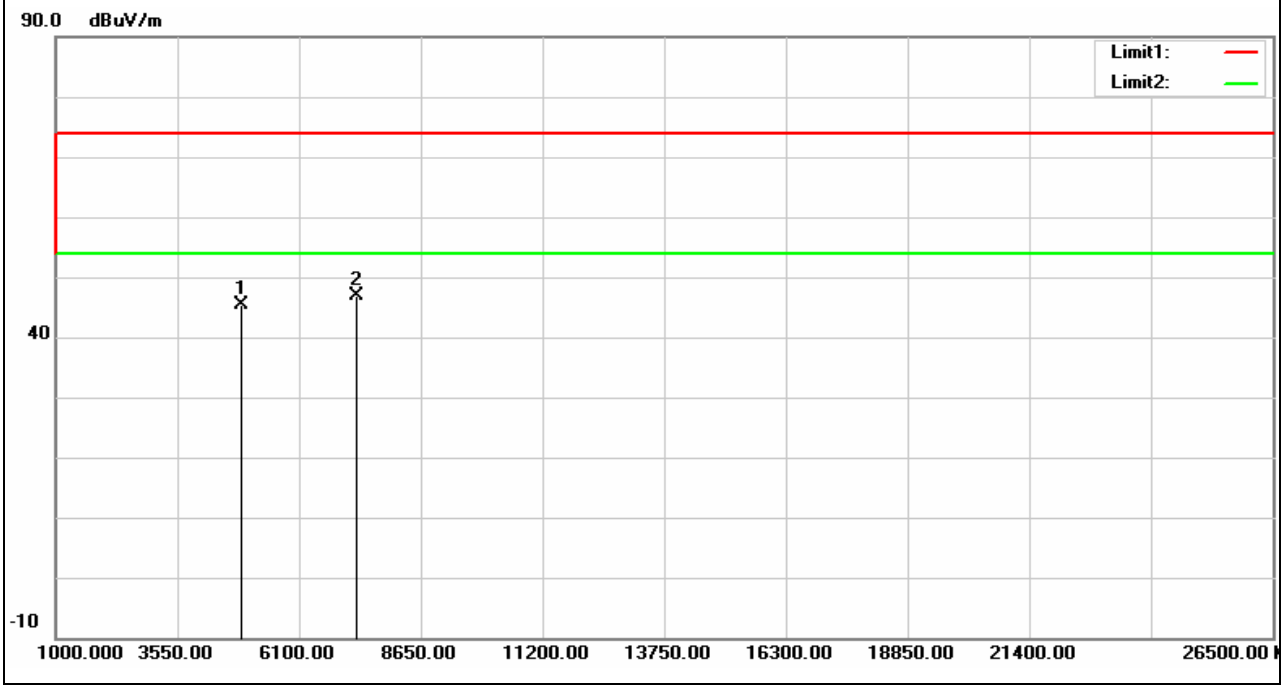
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2441MHz (1Mbps-worst case)	Polarization :	Horizontal
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4882.000	50.86	-5.45	45.41	74.00	-28.59	peak
7323.000	48.01	-1.18	46.83	74.00	-27.17	peak

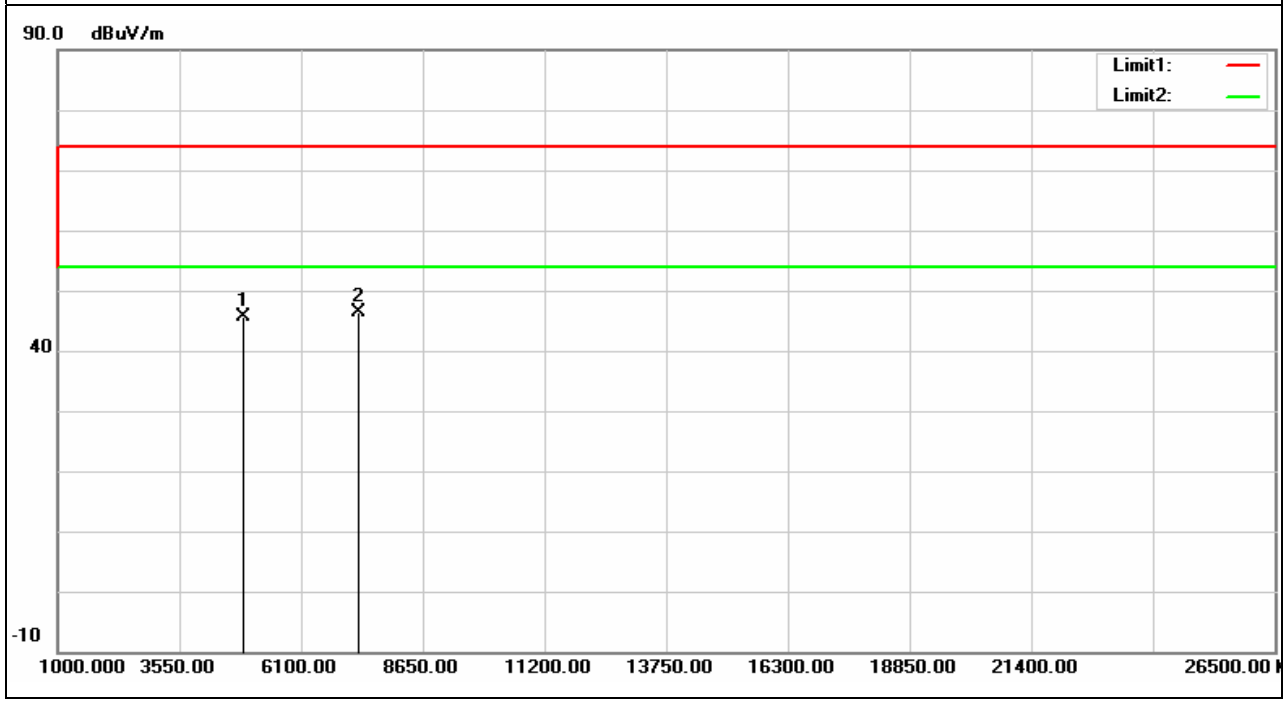
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2441MHz (1Mbps-worst case)	Polarization :	Vertical
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4882.000	51.17	-5.45	45.72	74.00	-28.28	peak
7323.000	47.64	-1.18	46.46	74.00	-27.54	peak

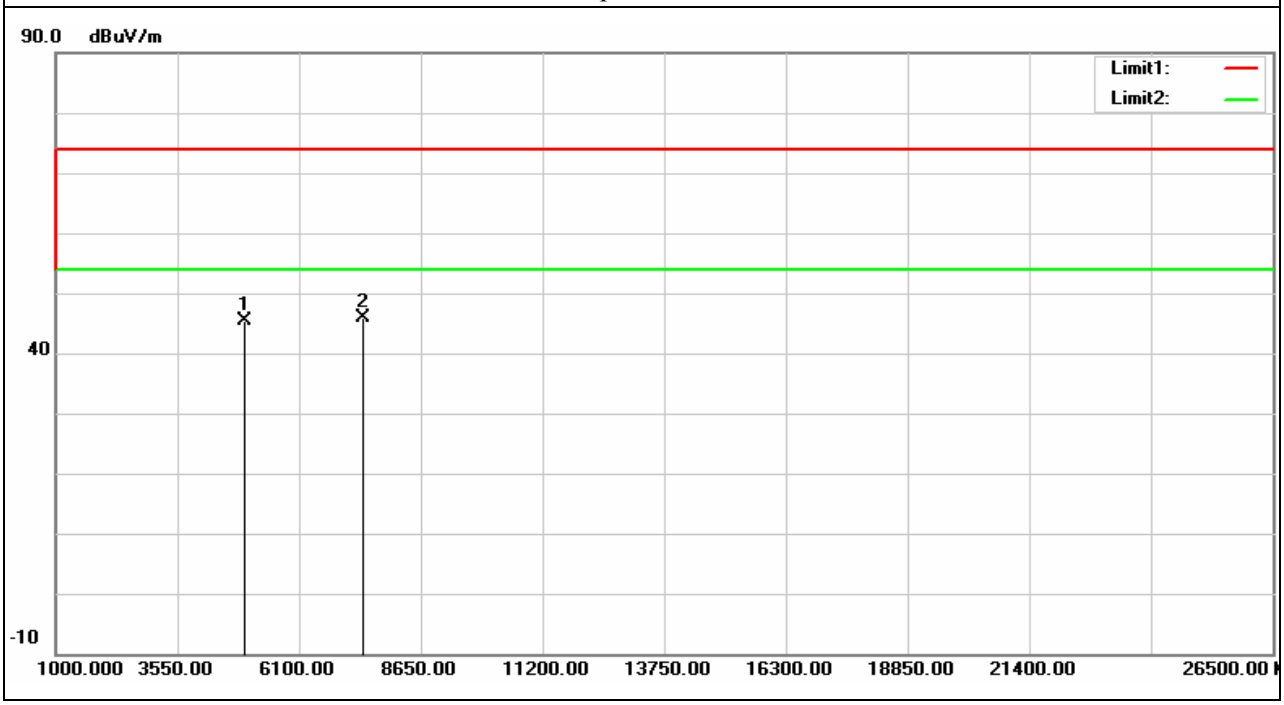
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2480MHz (1Mbps-worst case)	Polarization :	Horizontal
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.000	50.66	-5.33	45.33	74.00	-28.67	peak
7440.000	46.98	-1.00	45.98	74.00	-28.02	peak

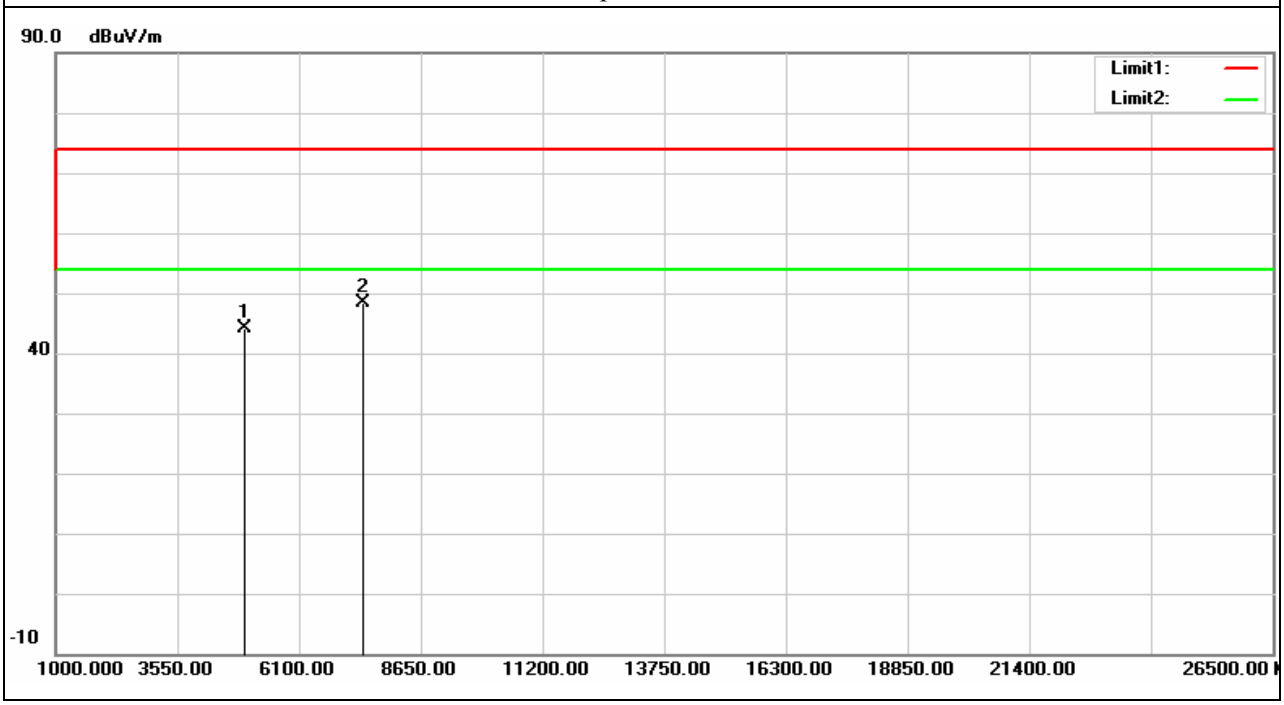
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2480MHz (1Mbps-worst case)	Polarization :	Vertical
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.000	49.34	-5.33	44.01	74.00	-29.99	peak
7440.000	49.49	-1.00	48.49	74.00	-25.51	peak

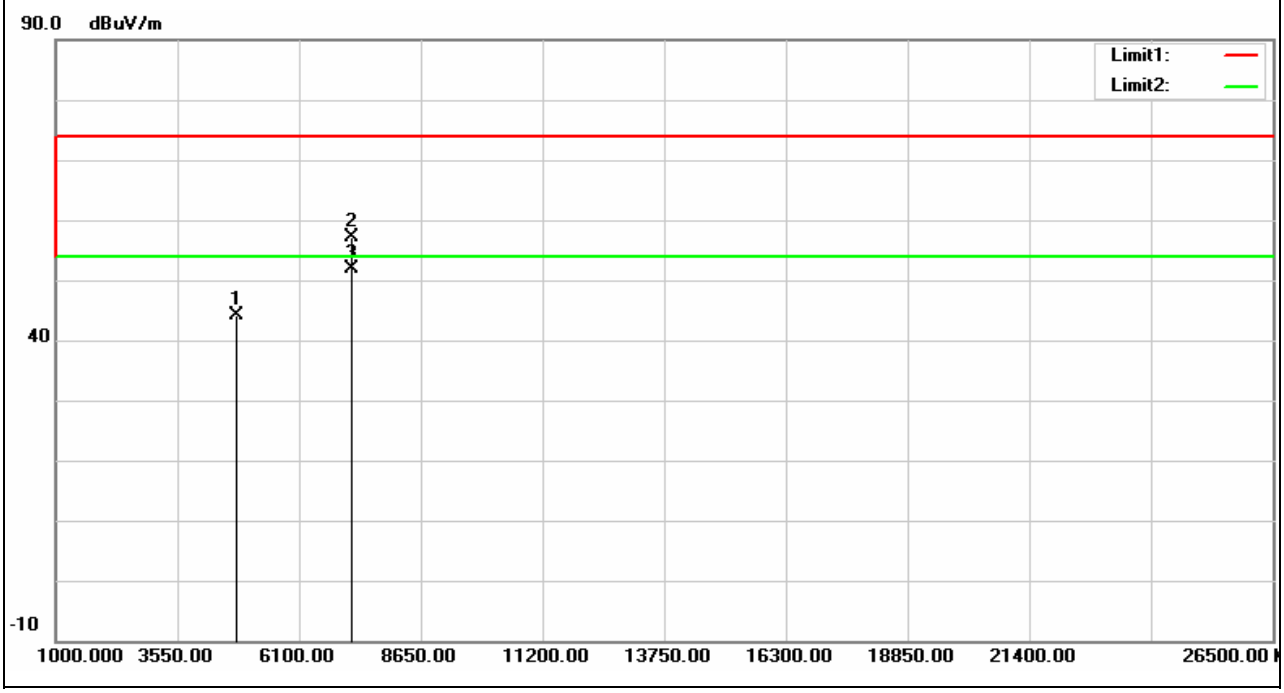
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2402MHz (3Mbps-worst case)	Polarization :	Horizontal
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.000	49.65	-5.57	44.08	74.00	-29.92	peak
7206.000	58.40	-1.37	57.03	74.00	-16.97	peak
7206.000	53.23	-1.37	51.86	54.00	-2.14	AVG

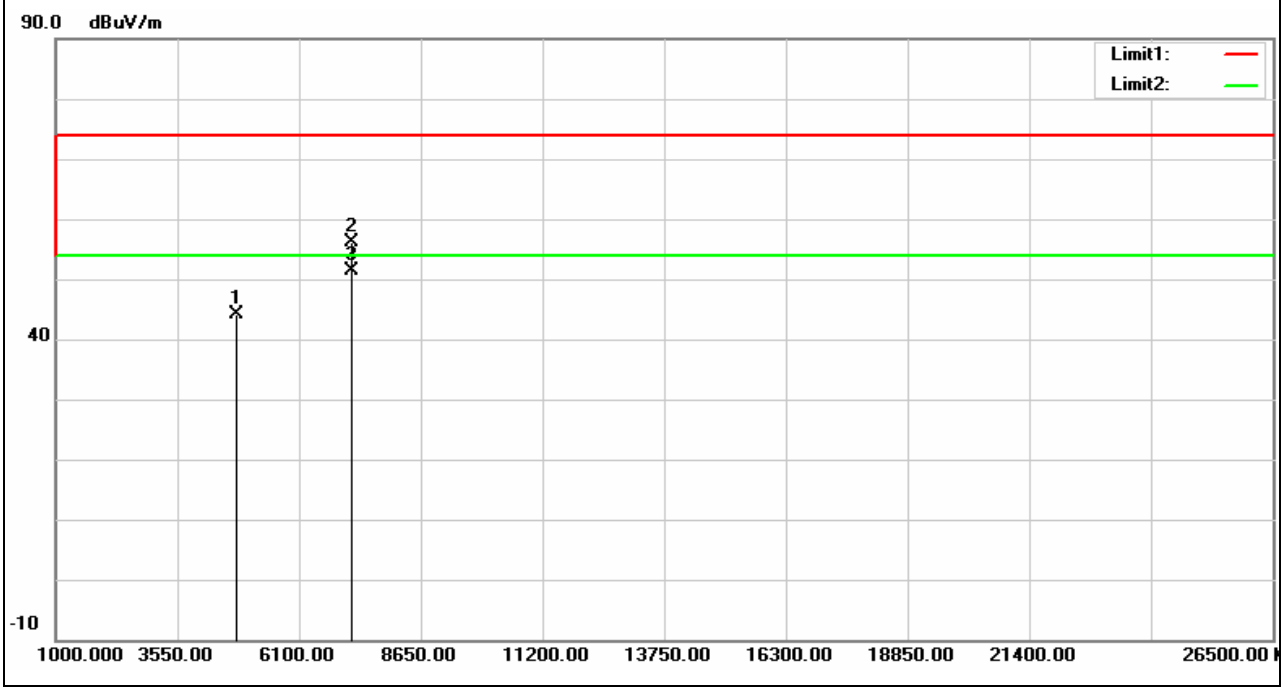
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2402MHz (3Mbps-worst case)	Polarization :	Vertical
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.000	49.81	-5.57	44.24	74.00	-29.76	peak
7206.000	57.59	-1.37	56.22	74.00	-17.78	peak
7206.000	52.77	-1.37	51.40	54.00	-2.60	AVG

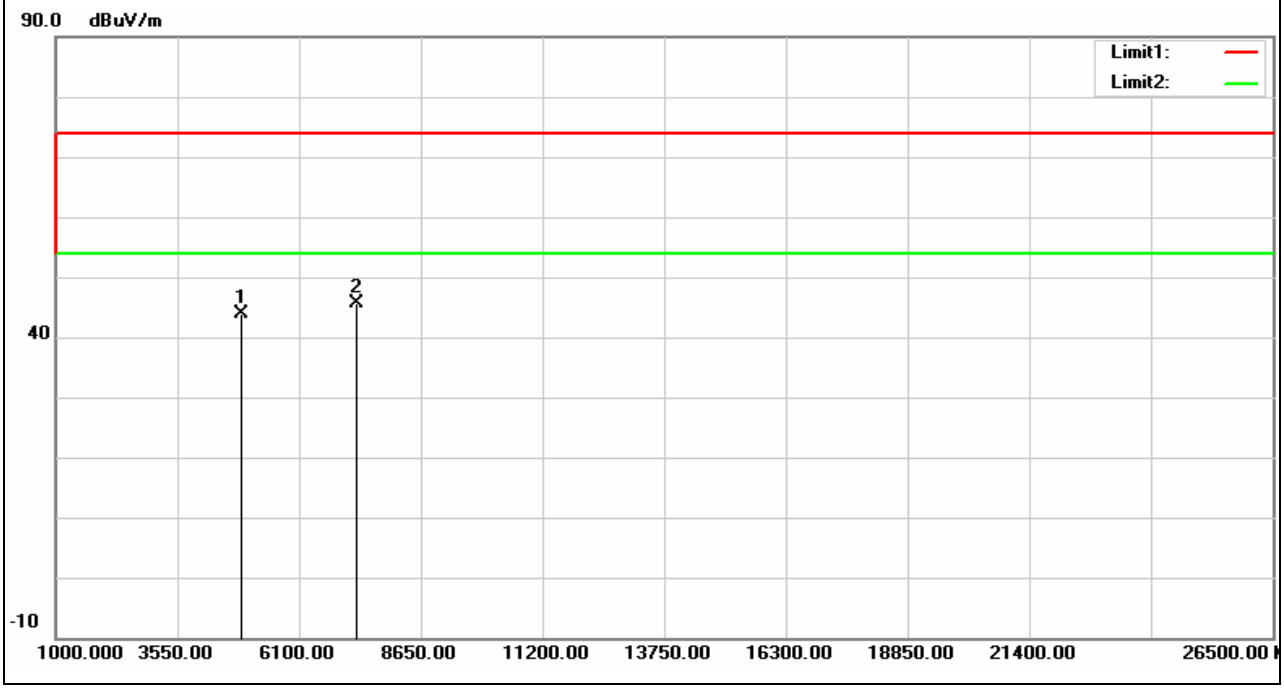
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2441MHz (3Mbps-worst case)	Polarization :	Horizontal
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4882.000	49.26	-5.45	43.81	74.00	-30.19	peak
7323.000	46.85	-1.18	45.67	74.00	-28.33	peak

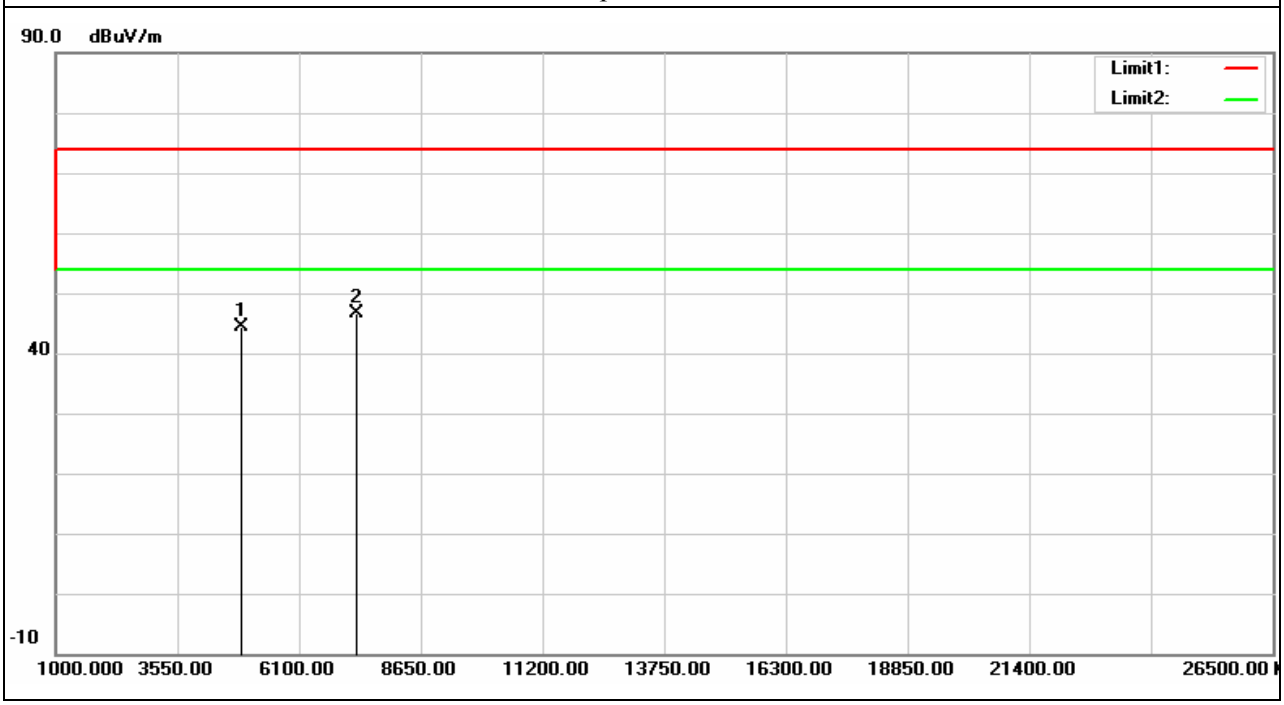
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2441MHz (3Mbps-worst case)	Polarization :	Vertical
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4882.000	49.74	-5.45	44.29	74.00	-29.71	peak
7323.000	47.84	-1.18	46.66	74.00	-27.34	peak

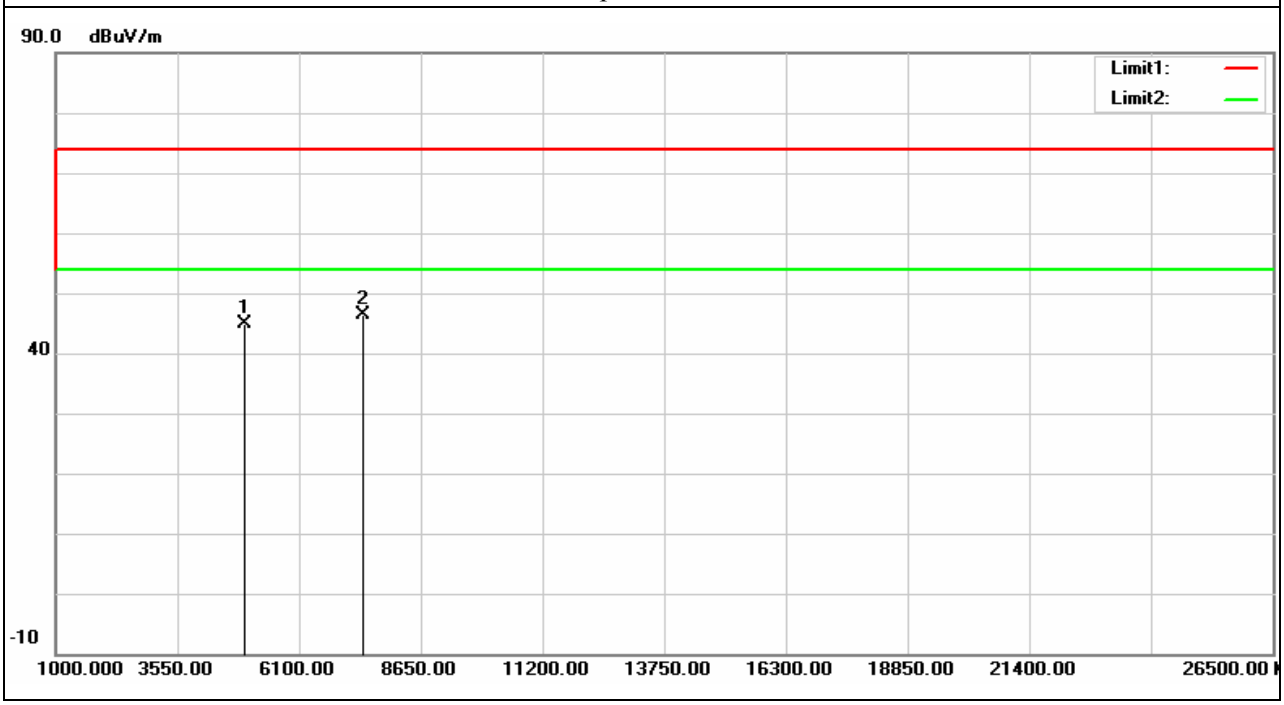
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2480MHz (3Mbps-worst case)	Polarization :	Horizontal
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.000	50.20	-5.33	44.87	74.00	-29.13	peak
7440.000	47.42	-1.00	46.42	74.00	-27.58	peak

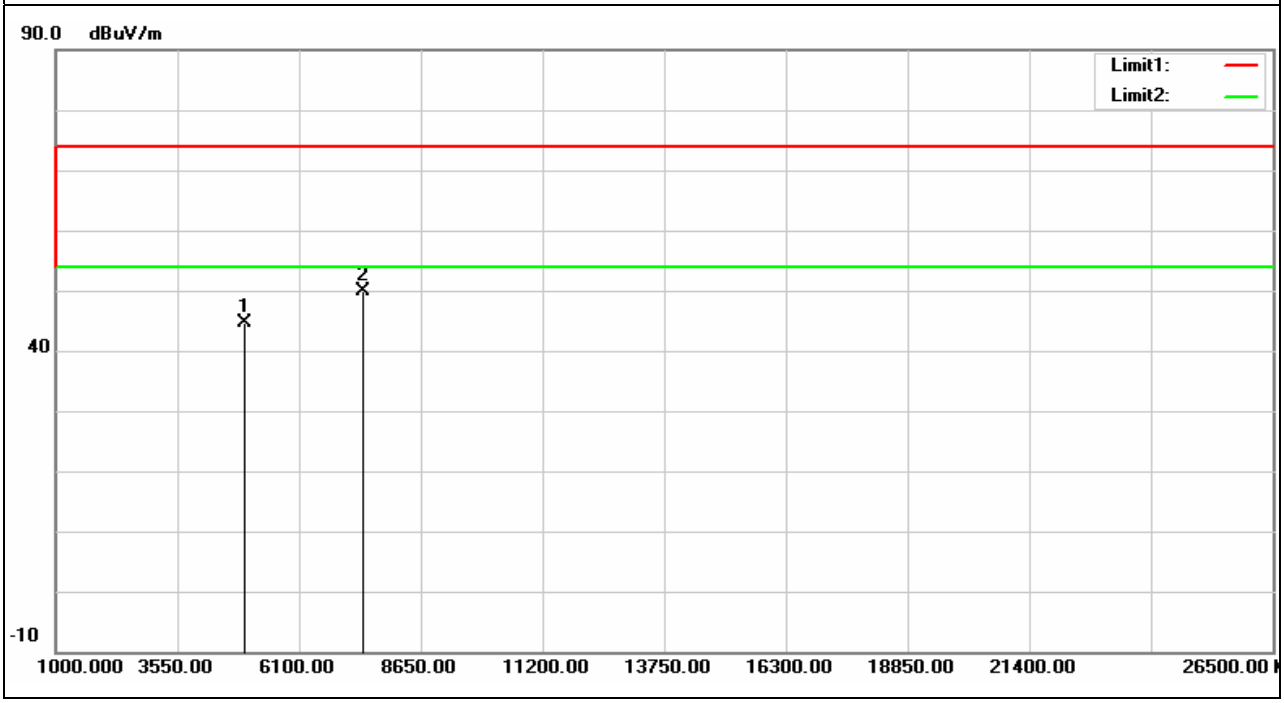
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	TX 2480MHz (3Mbps-worst case)	Polarization :	Vertical
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.000	50.00	-5.33	44.67	74.00	-29.33	peak
7440.000	50.86	-1.00	49.86	74.00	-24.14	peak

Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Remark:

All the modes had been tested, but only the worst data recorded in the report.

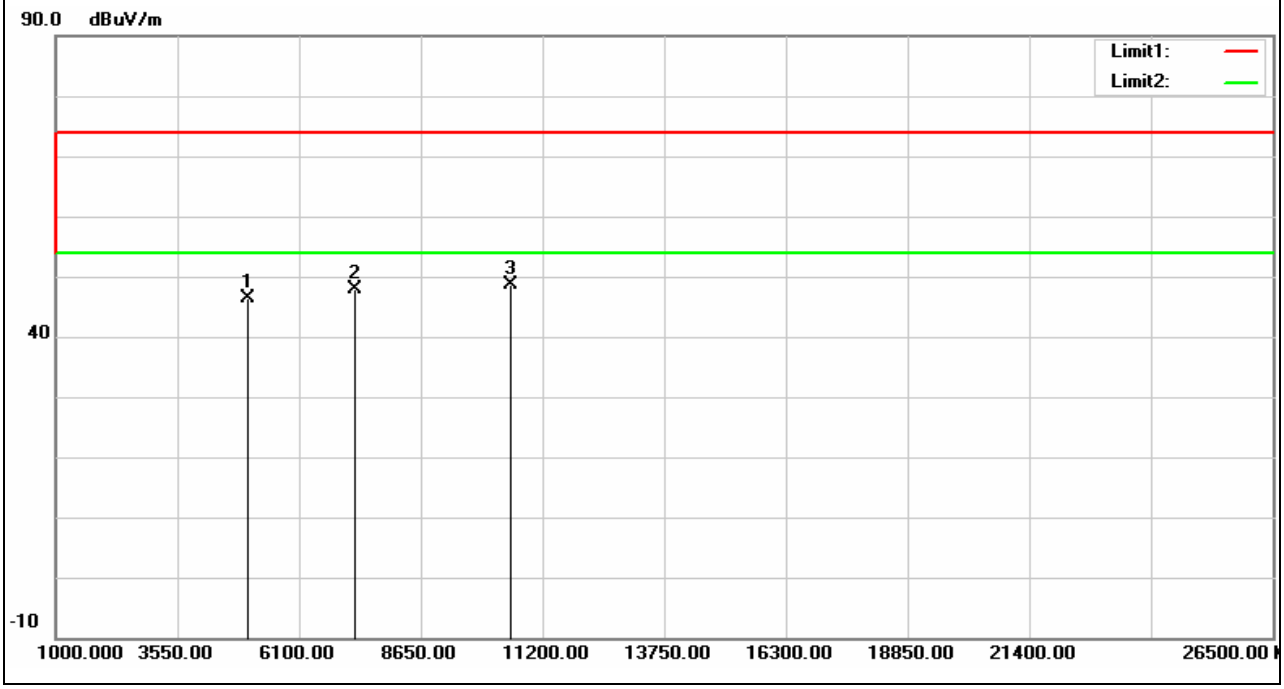
In frequency ranges 1~25GHz no any other harmonic emissions detected which are tested to compliance with the limit. No recording in the test report.

Test result: The unit does meet the NCC requirements.

EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	RX (worst case)	Polarization :	Horizontal
Measurement Distance	3 m	Frenqucy Range	1GHz to 18GHz
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5029.000	51.67	-5.20	46.47	74.00	-27.53	peak
7273.000	49.24	-1.26	47.98	74.00	-26.02	peak
10537.000	45.15	3.57	48.72	74.00	-25.28	peak

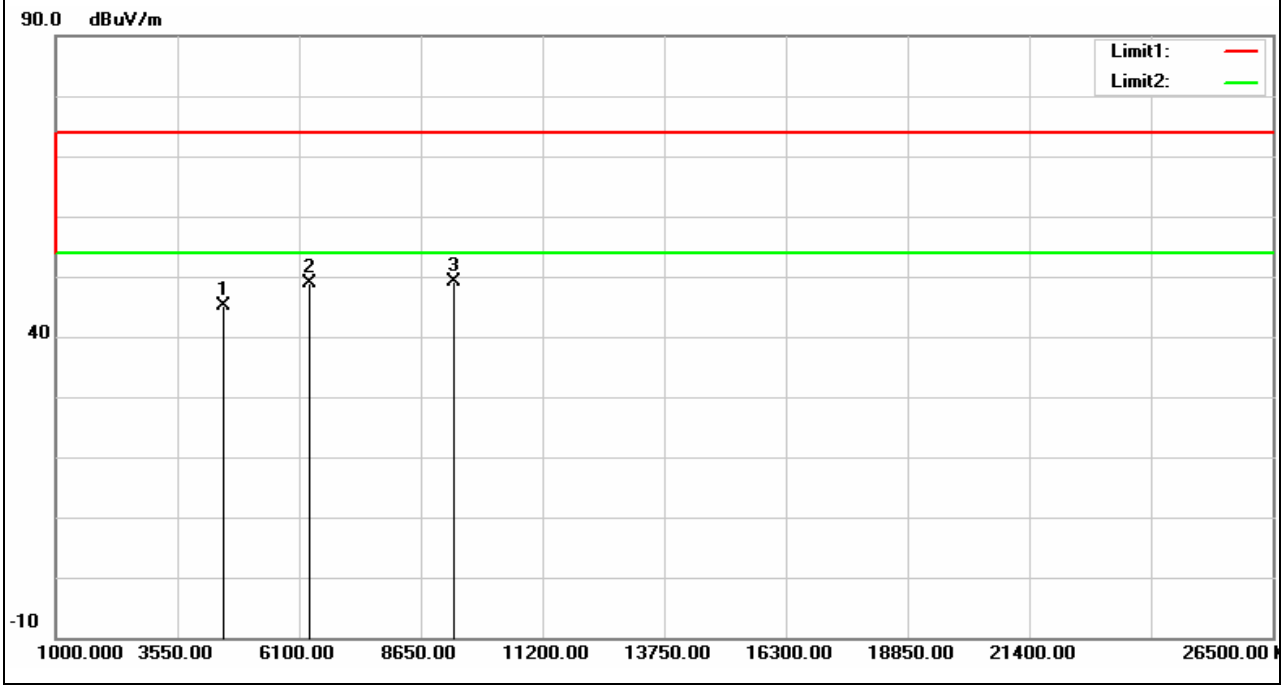
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2020-06-25
Test Mode ：	RX (worst case)	Polarization :	Vertical
Measurement Distance	3 m	Frenqucy Range	1GHz to 18GHz
Test Power ：	DC3.7V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4519.000	51.16	-6.01	45.15	74.00	-28.85	peak
6304.000	51.18	-2.31	48.87	74.00	-25.13	peak
9338.500	47.57	1.60	49.17	74.00	-24.83	peak

Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Remark:

All the modes had been tested, but only the worst data recorded in the report.

No any other emissions detected which are tested to compliance with the limit. No recording in the test report.

Test result: The unit does meet the NCC requirements.

3.2.8 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	TX 2402MHz/2480MHz (1Mbps)		
Test Date :	2020-06-25		
Note：	1. The transmitter was setup to transmit at the lowest channel (CH00). Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was setup to transmit at the highest channel (CH78). Then the field strength was measured at 2483.5-2500 MHz. 3. The data of 2390MHz and 2483.5MHz was the worst.		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant/CF CF(dB)	Act		Limit		Note
		Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)	
2390.00	H	55.66	--	-10.85	44.81	--	74.00	54.00	CH00
2390.00	V	58.54	--	-10.85	47.69	--	74.00	54.00	CH00
2483.50	H	55.53	--	-10.65	44.88	--	74.00	54.00	CH78
2483.50	V	56.87	--	10.65	46.22	--	74.00	54.00	CH78

Remark：

(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode

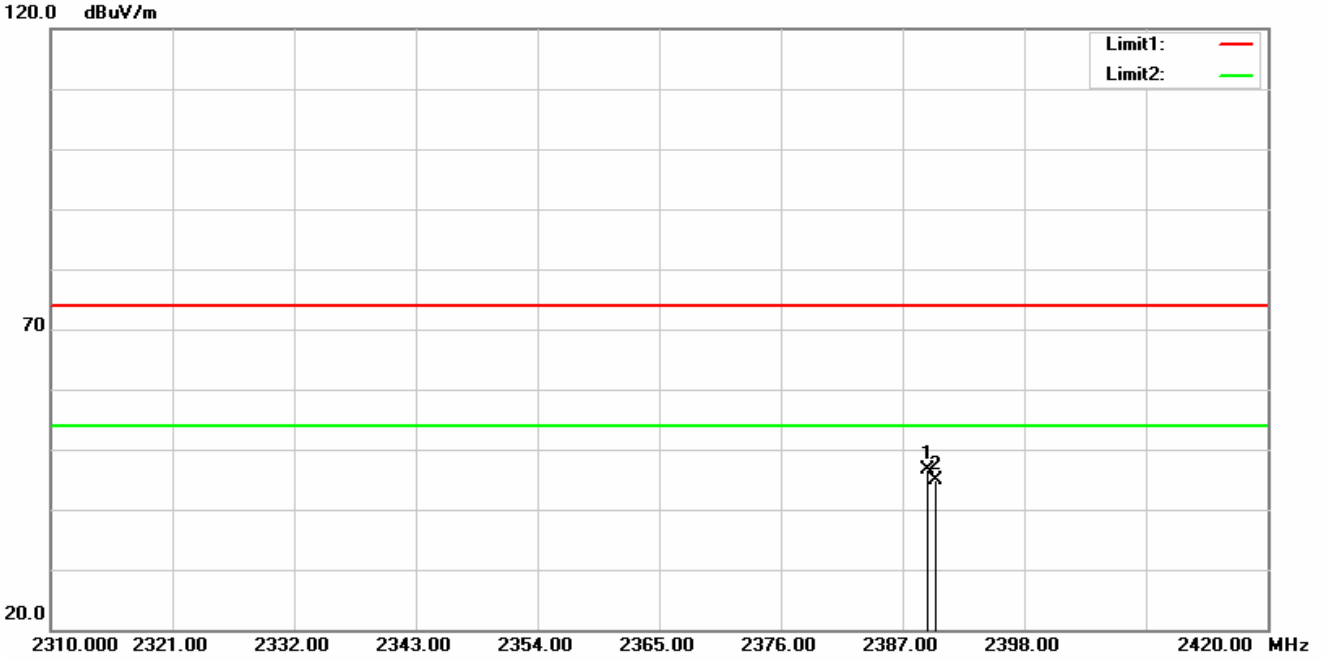
(2) EUT Orthogonal Axis：

"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

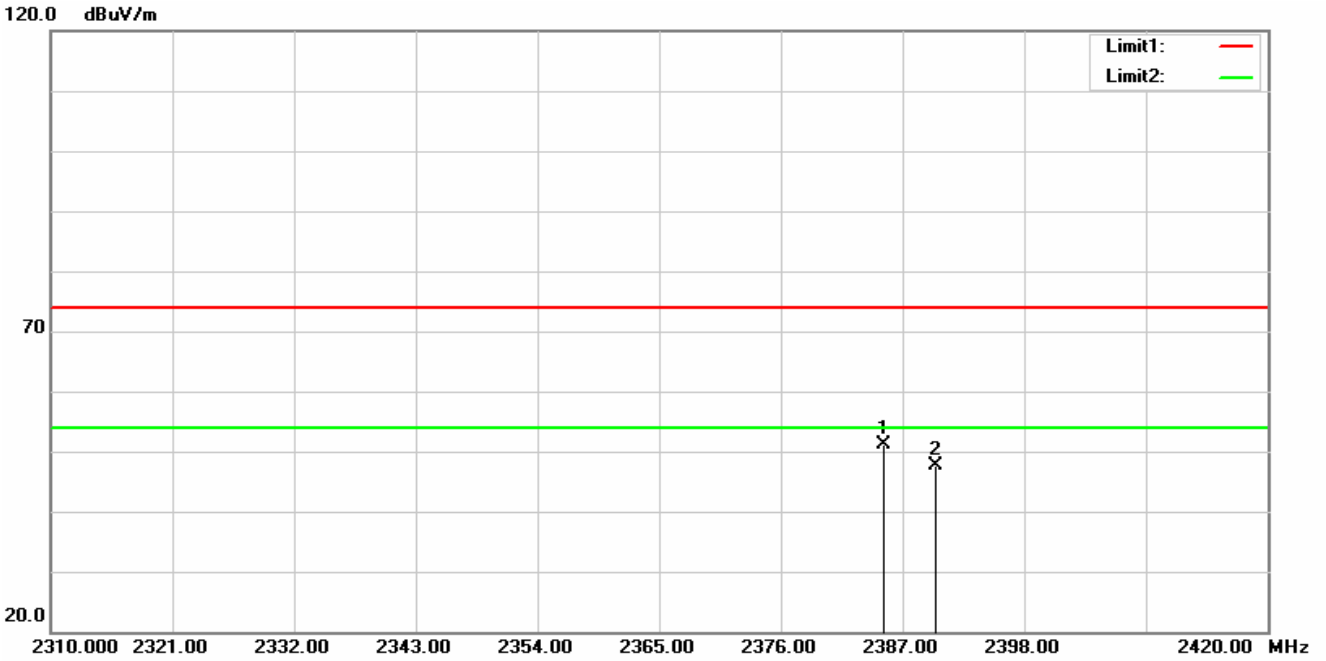
(3) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(4) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

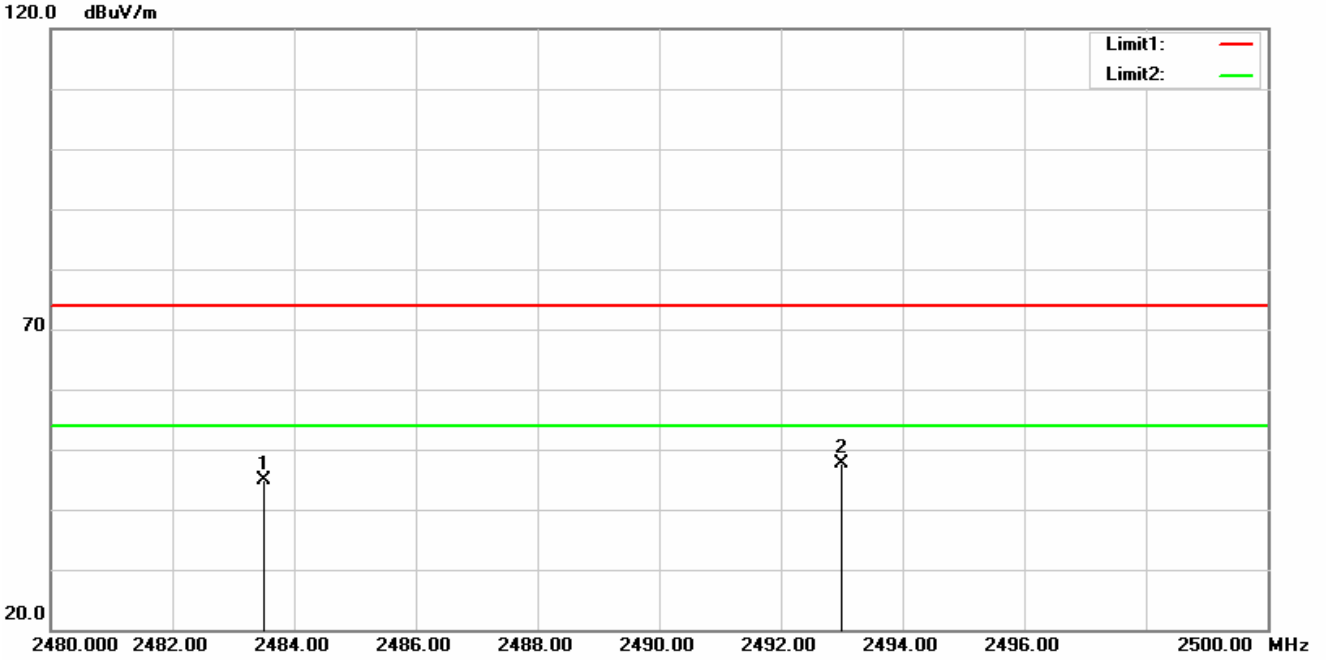
Horizontal



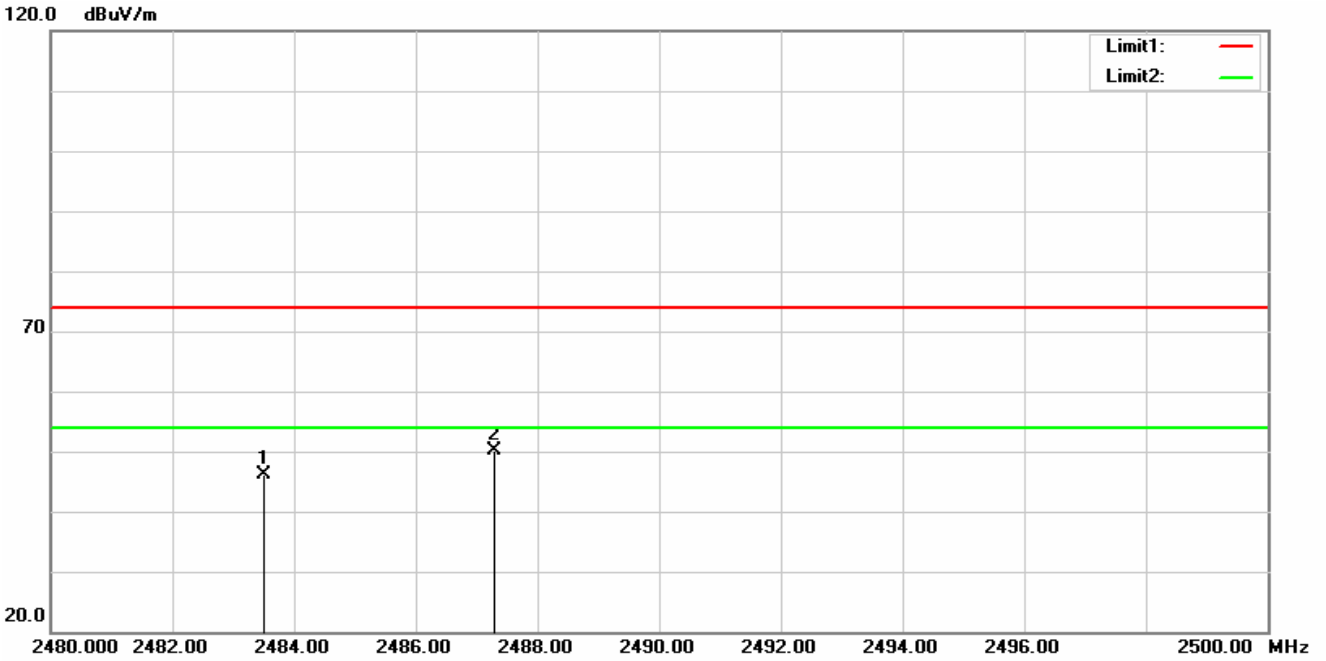
Vertical



Horizontal



Vertical



EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	24℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	TX 2402MHz/2480MHz (3Mbps)		
Test Date :	2020-06-25		
Note：	1. The transmitter was setup to transmit at the lowest channel (CH00). Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was setup to transmit at the highest channel (CH78). Then the field strength was measured at 2483.5-2500 MHz. 3. The data of 2390MHz and 2483.5MHz was the worst.		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant/CF CF(dB)	Act		Limit		Note
		Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)	
2390.00	H	55.90	--	-10.85	45.05	--	74.00	54.00	CH00
2390.00	V	58.48	--	-10.85	47.63	--	74.00	54.00	CH00
2483.50	H	56.15	--	-10.65	45.50	--	74.00	54.00	CH78
2483.50	V	61.31	--	-10.65	50.66	--	74.00	54.00	CH78

Remark：

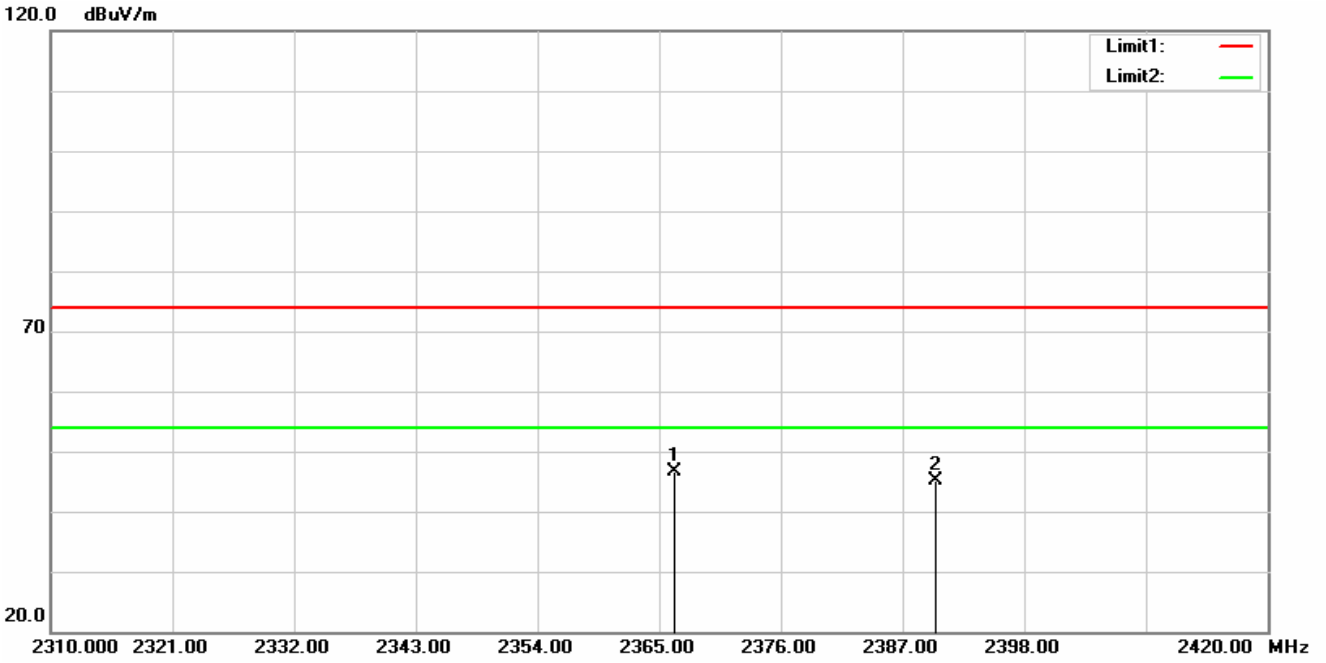
(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode

(2) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

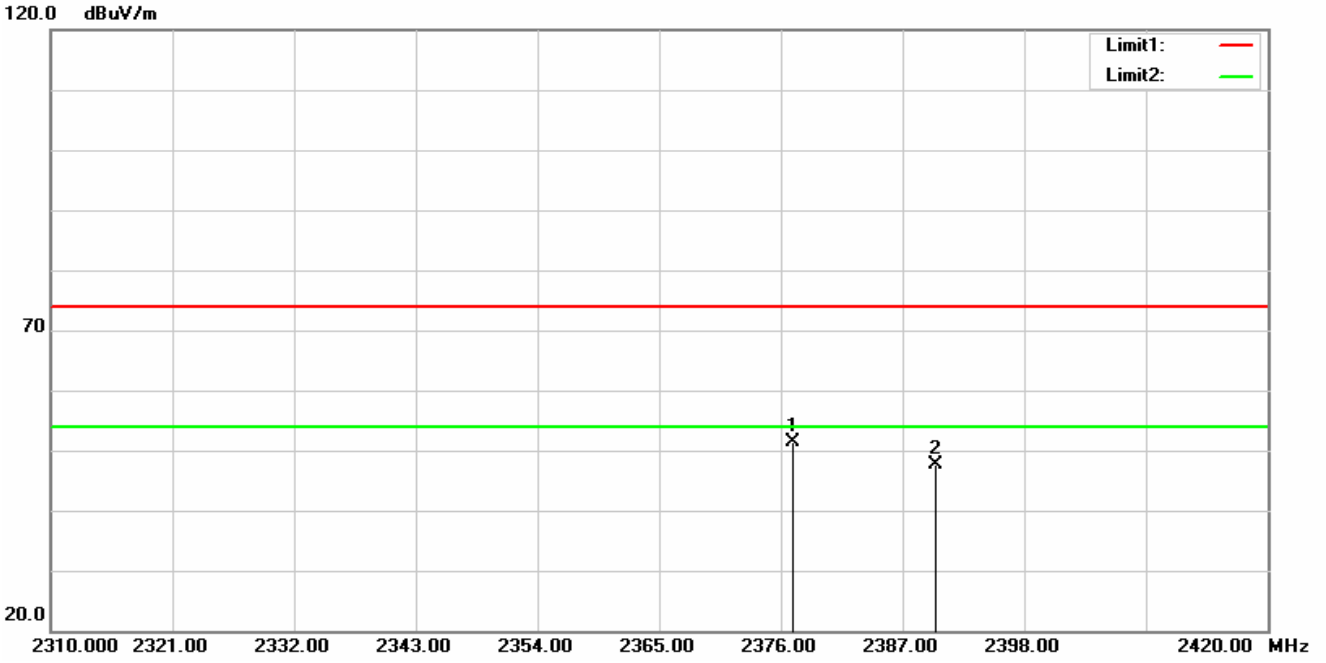
(3) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(4) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

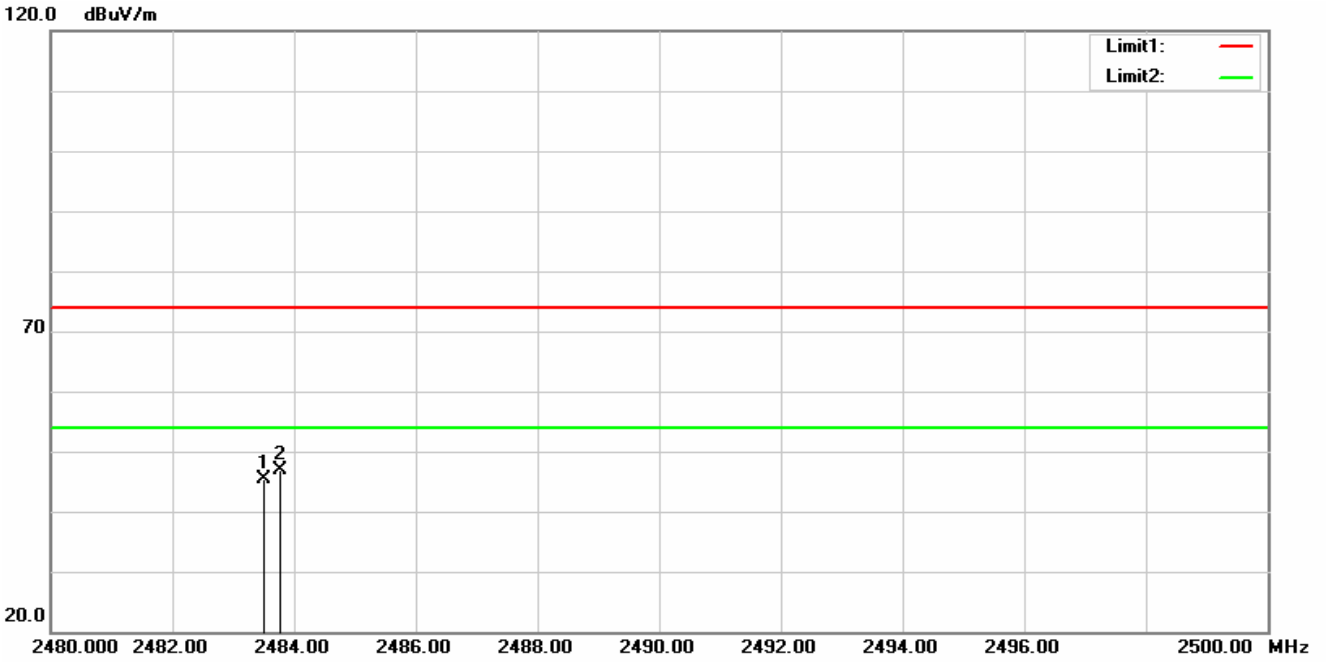
Horizontal



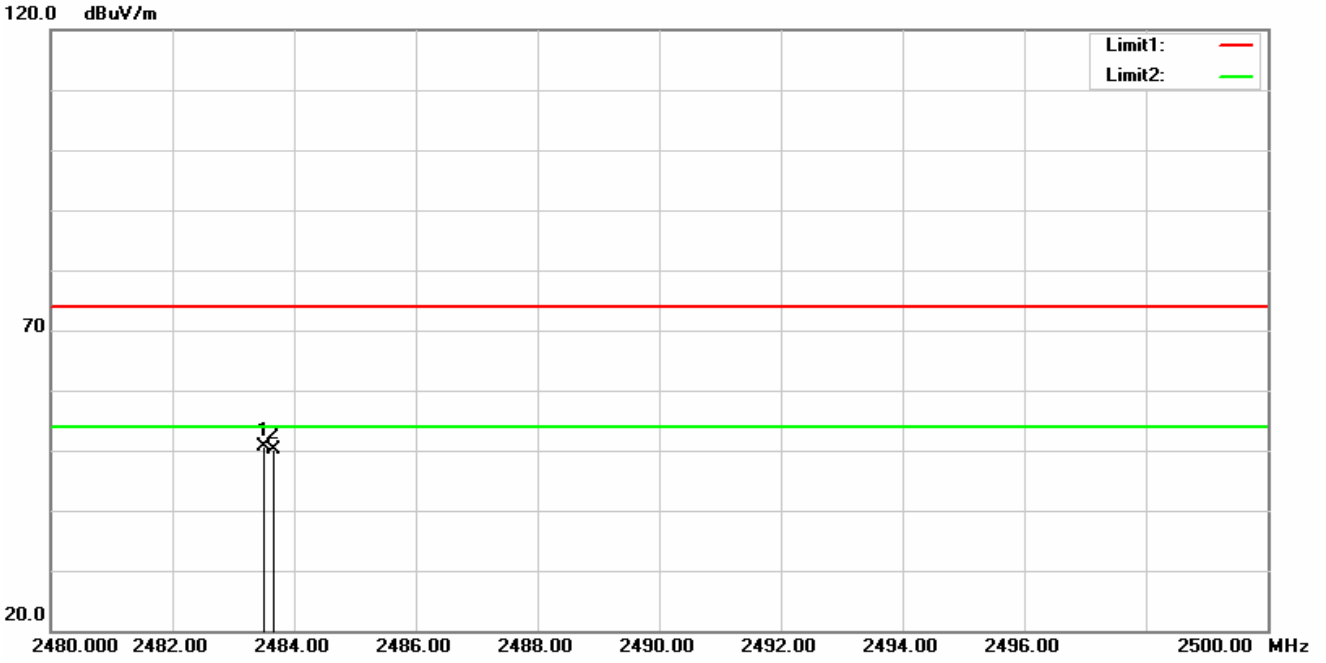
Vertical



Horizontal



Vertical



Test result: The unit does meet the NCC requirements.

4. OCCUPIED BANDWIDTH TEST

4.1 APPLIED PROCEDURES / LIMIT

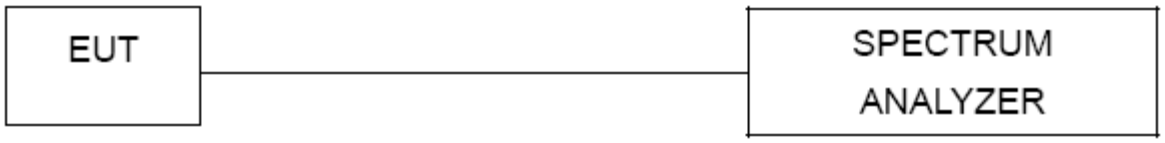
LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
3.10.1(6.1.1)	Bandwidth	N/A	2402-2480	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

4.1.2 TEST SETUP



4.1.3 EUT OPERATION CONDITIONS

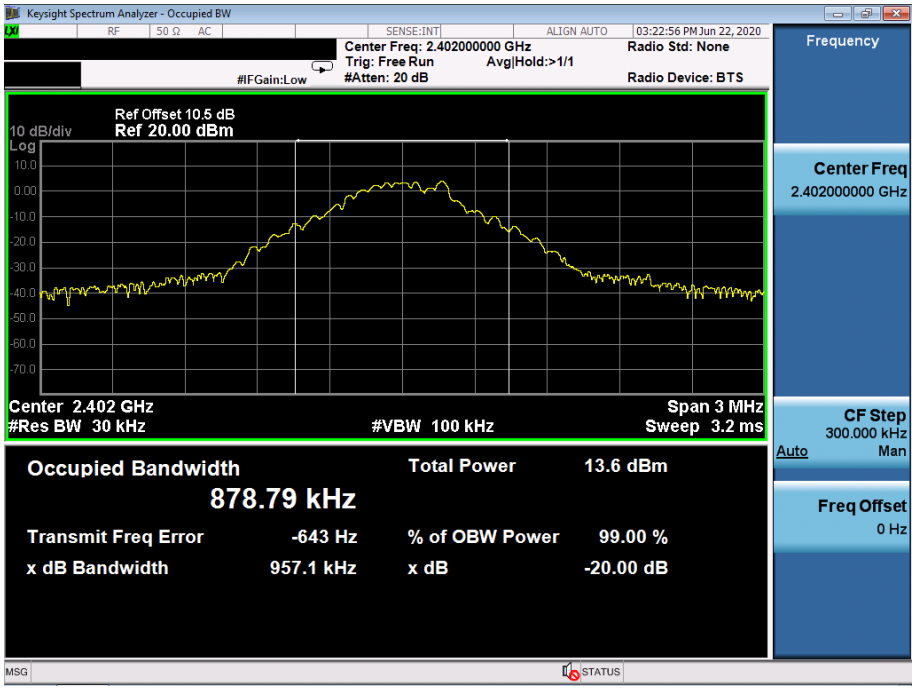
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.4 TEST RESULTS

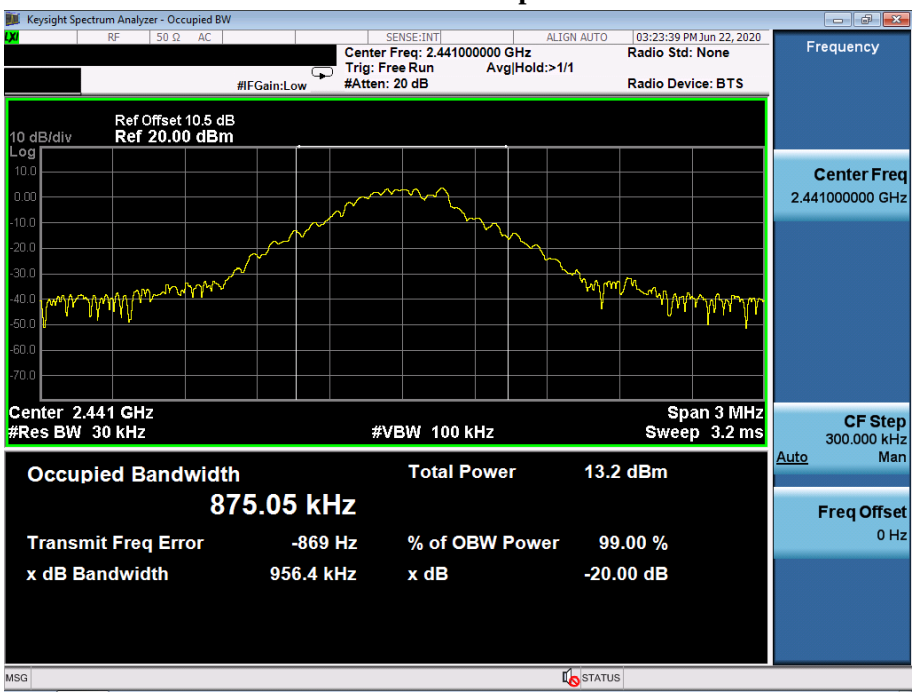
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00 / CH39 /CH78 (1Mbps Mode)		
Test Date :	2020-06-25		

Frequency	20dB Bandwidth (kHz)	Result
2402 MHz	957.1	Pass
2441 MHz	956.4	Pass
2480 MHz	956.7	Pass

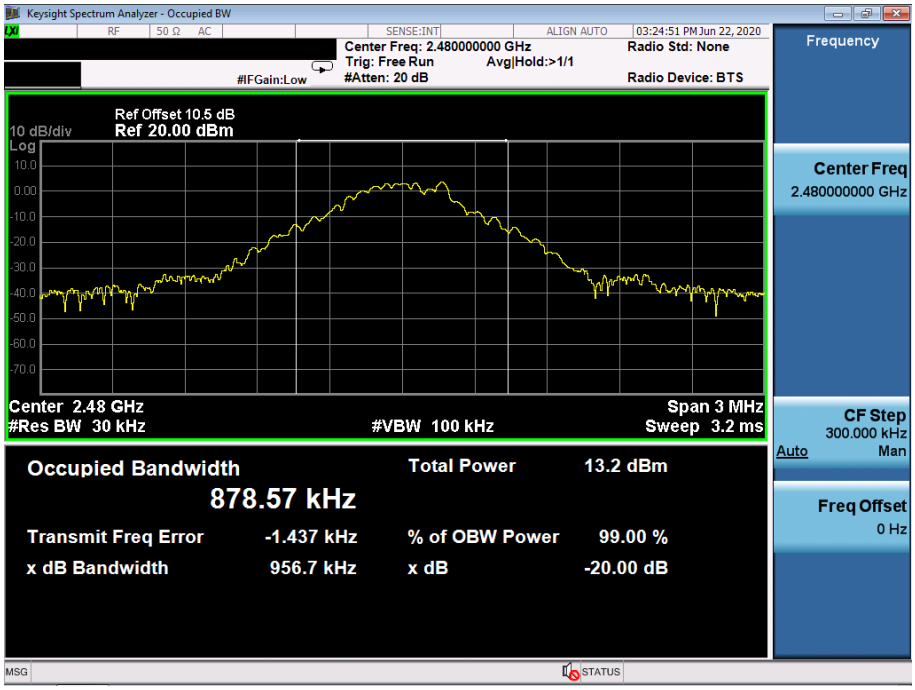
CH00-1Mbps



CH 39-1Mbps



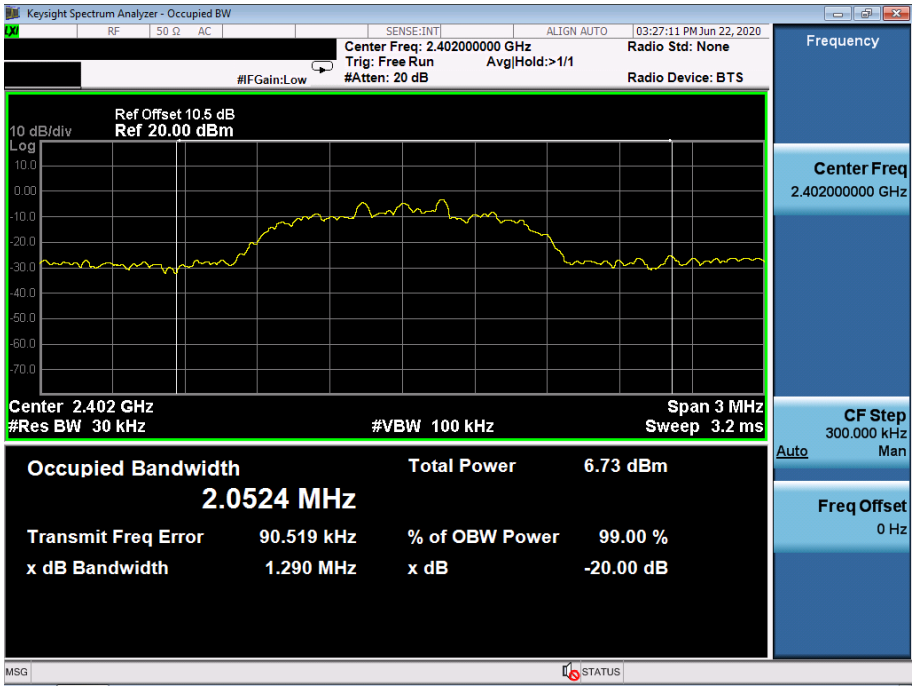
CH 78-1Mbps


Keysight Spectrum Analyzer - Occupied BW
RF
50 Ω
AC
SENSE:INT
ALIGN AUTO
03:24:51 PM Jun 22, 2020
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>1/1
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 10.5 dB
10 dB/div
Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
878.57 kHz
Total Power
13.2 dBm
Transmit Freq Error
-1.437 kHz
% of OBW Power
99.00 %
x dB Bandwidth
956.7 kHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00 / CH39 /CH78 (3Mbps Mode)		
Test Date :	2020-06-25		

Frequency	20dB Bandwidth (kHz)	Result
2402 MHz	1290	Pass
2441 MHz	1290	Pass
2480 MHz	1287	Pass

CH 00-3Mbps



CH 39-3Mbps

CH 78-3Mbps

5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

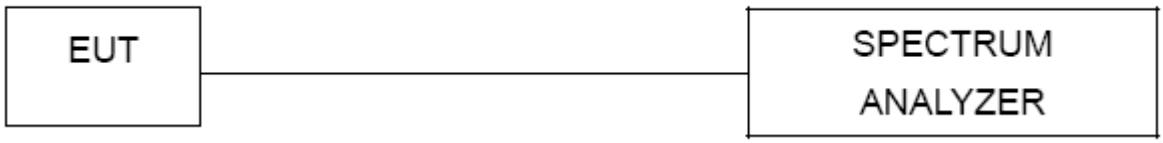
LP0002			
Section	Test Item	Frequency Range (MHz)	Result
3.10.1(6.1.1)	Number of Hopping Channel	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	1 MHz
VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 1 MHz, VBW=1 MHz, Sweep time = Auto.

5.1.2 TEST SETUP



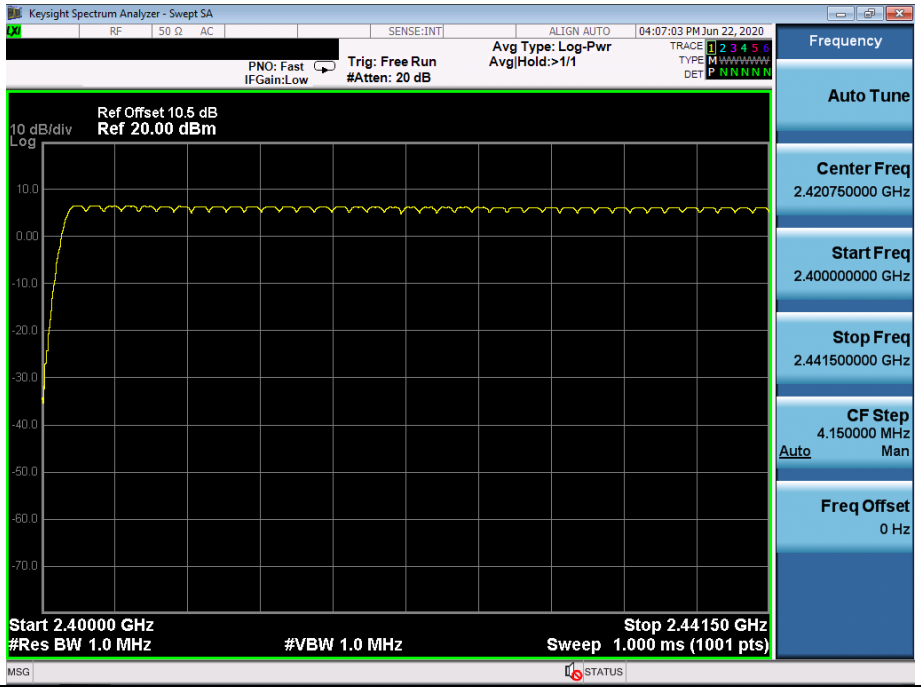
5.1.3 EUT OPERATION CONDITIONS

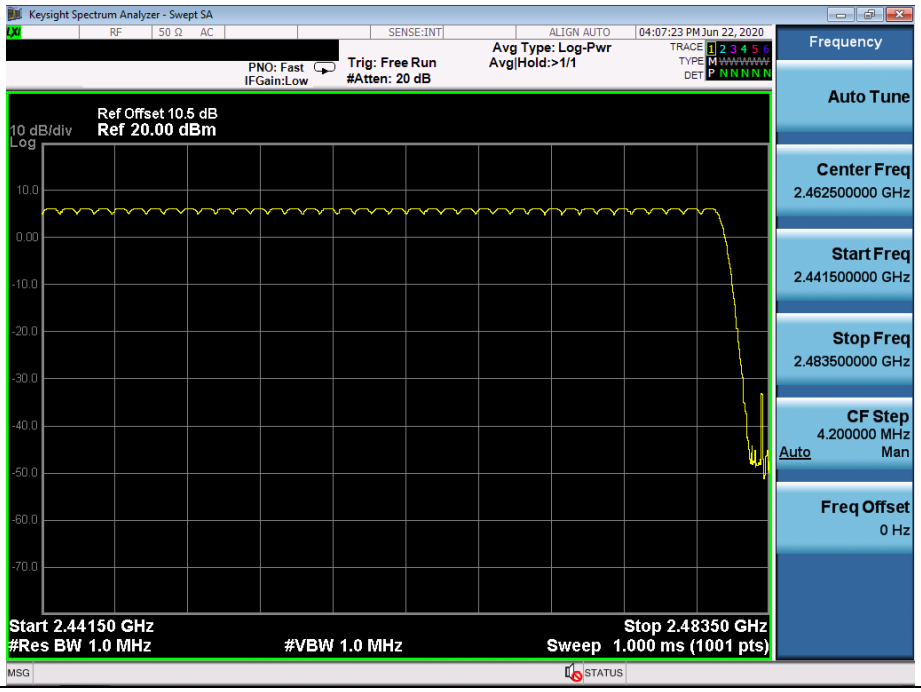
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.4 TEST RESULTS

EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	Hopping Mode –1Mbps mode		
Test Date :	2020-06-25		

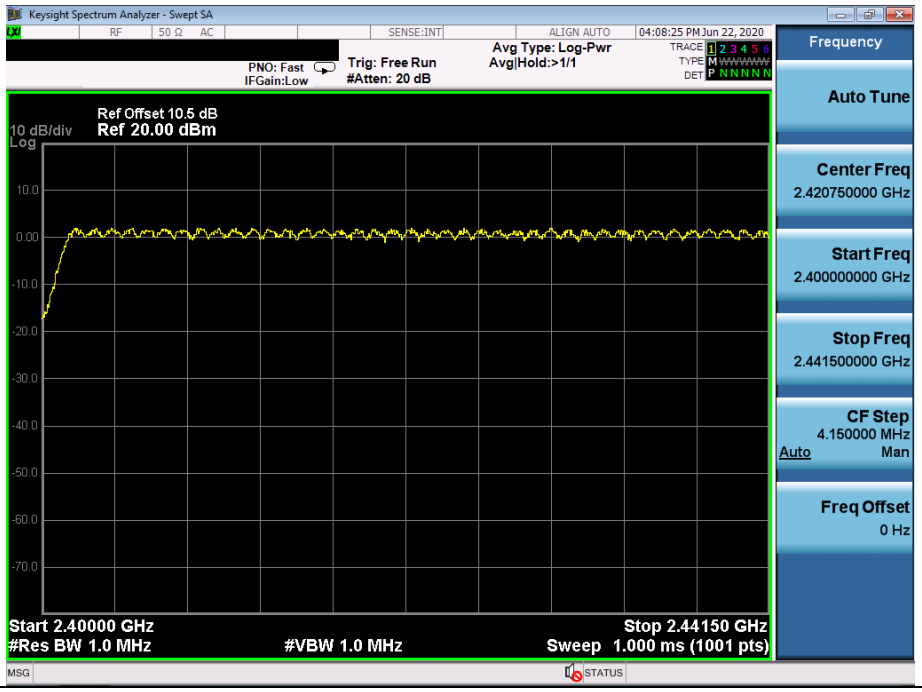
Number of Hopping Channel	79

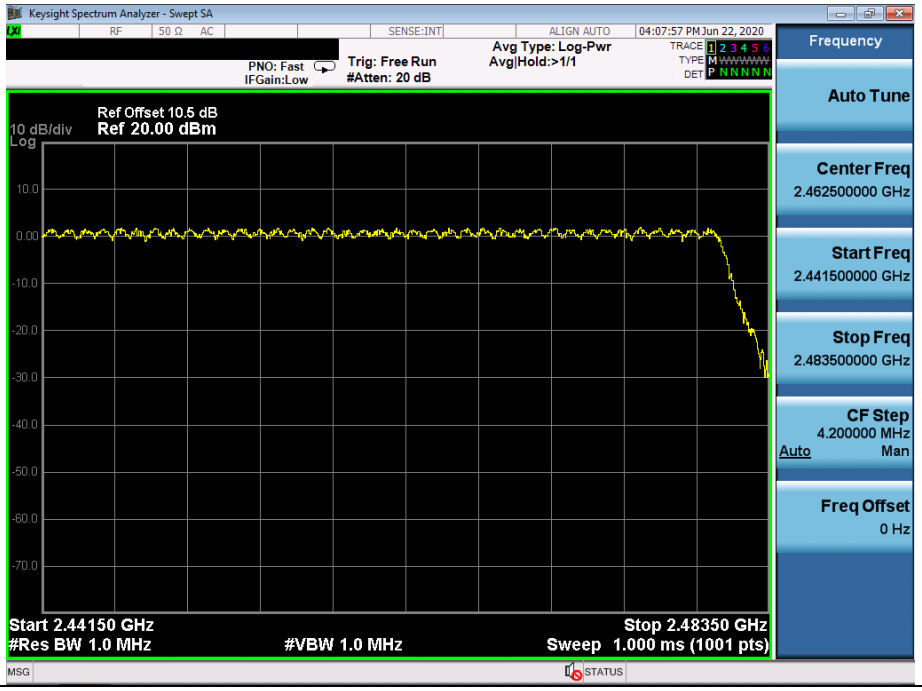




EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	Hopping Mode –3Mbps mode		
Test Date :	2020-06-25		

Number of Hopping Channel	79





6. AVERAGE TIME OF OCCUPANCY

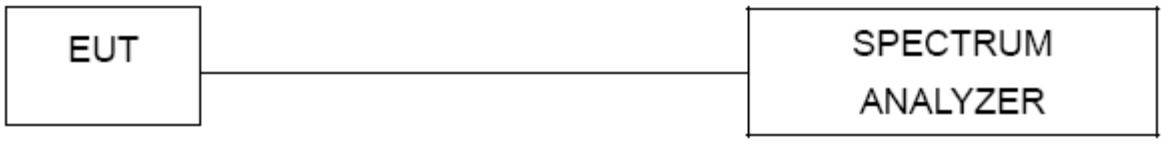
6.1 APPLIED PROCEDURES / LIMIT

LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
3.10.1(6.1.2)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.1.1 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
h. Measure the maximum time duration of one single pulse.
i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds.
j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 5.06 x 31.6 = 160 within 31.6 seconds.
k. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds.

6.1.2 TEST SETUP



6.1.3 EUT OPERATION CONDITIONS

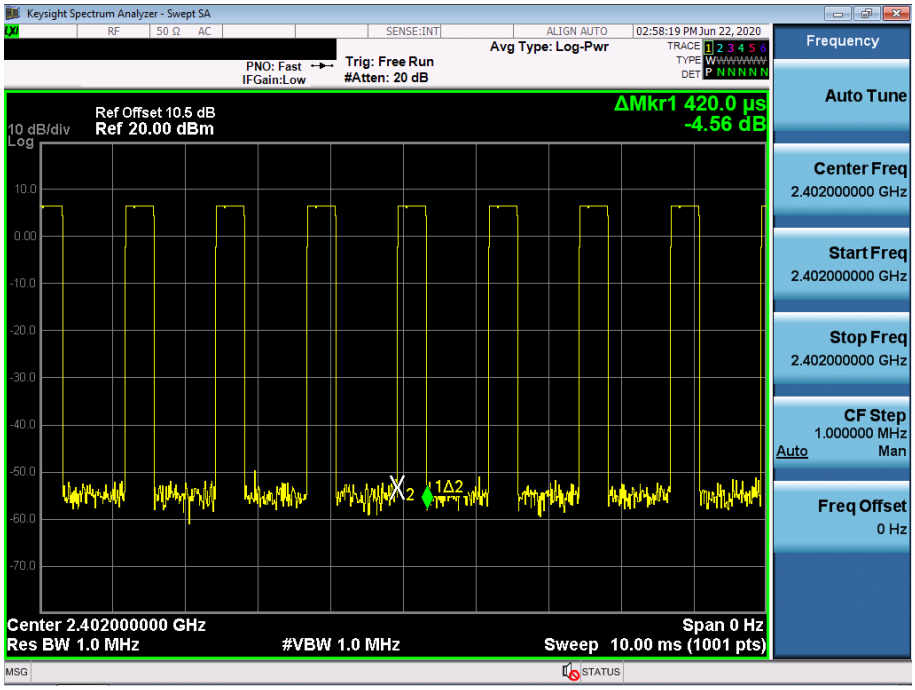
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.4 TEST RESULTS

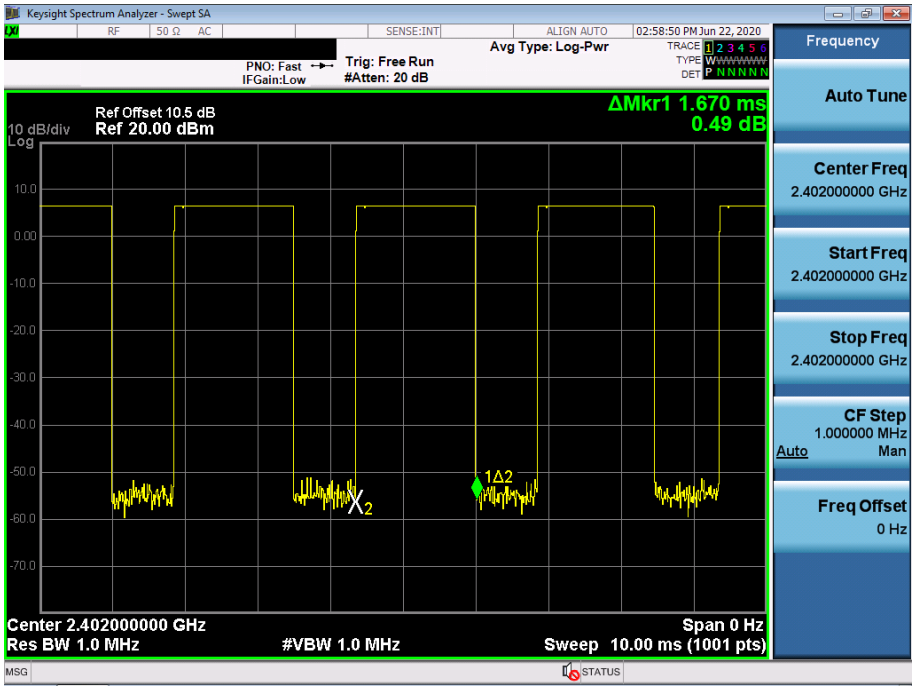
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00-DH1/DH3/DH5 (1Mbps Mode)		
Test Date :	2020-06-25		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (ms)	Limits (s)
DH1	2402 MHz	0.420	134.445	0.4000
DH3	2402 MHz	1.670	267.026	0.4000
DH5	2402 MHz	2.920	311.879	0.4000

CH 00- DH1



CH 00- DH3

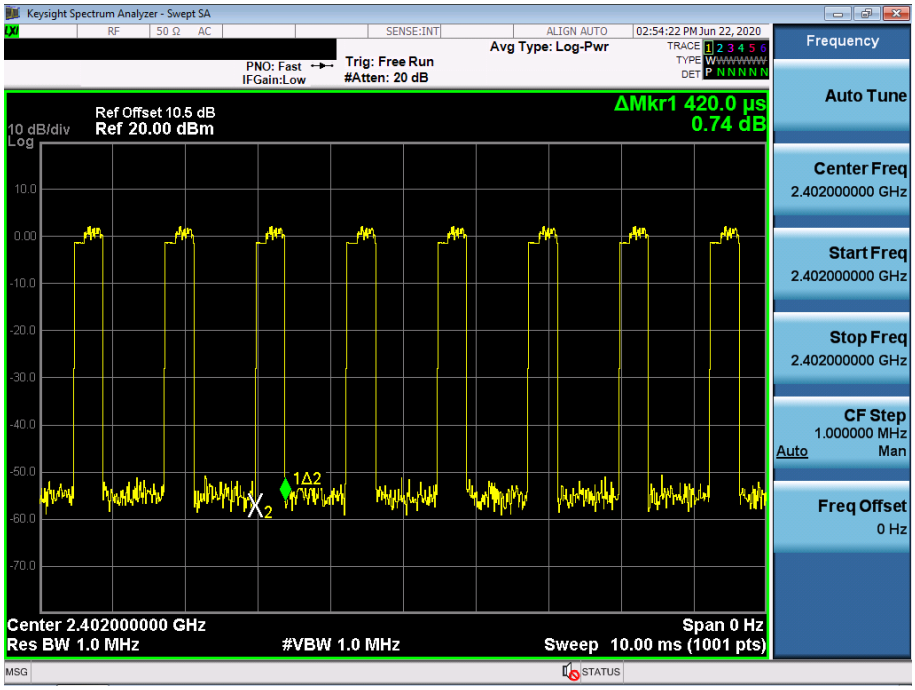


CH 00- DH5

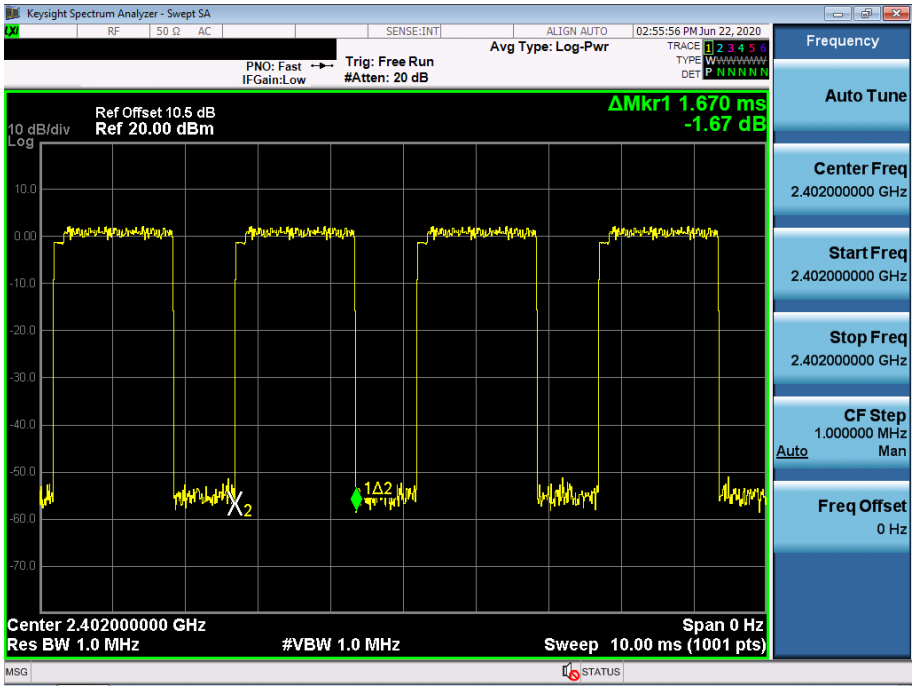
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00-DH1/DH3/DH5 (3Mbps Mode)		
Test Date :	2020-06-25		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH1	2402 MHz	0.420	134.445	0.4000
DH3	2402 MHz	1.670	267.026	0.4000
DH5	2402 MHz	2.920	311.879	0.4000

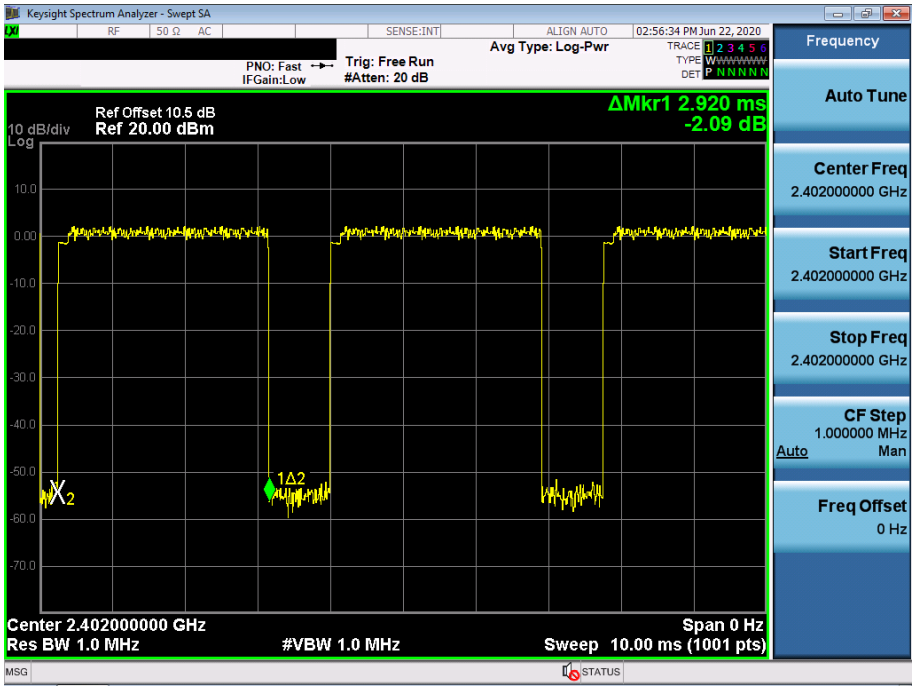
CH 00- DH1



CH 00- DH3



CH 00- DH5



7. HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 APPLIED PROCEDURES / LIMIT

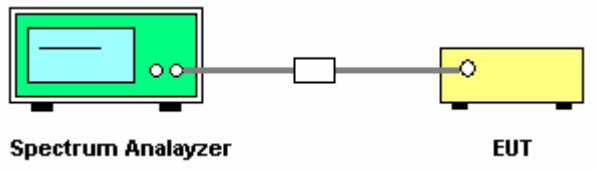
Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.1.1 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
c. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

7.1.2 TEST SETUP



7.1.3 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

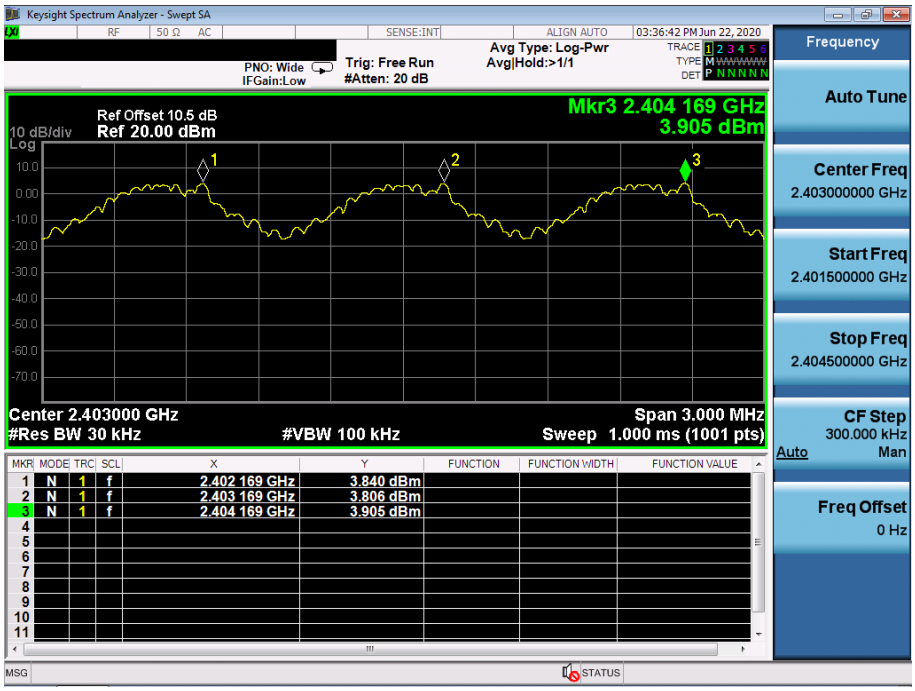
7.1.4 TEST RESULTS

EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00 / CH39 /CH78 (1Mbps Mode)		
Test Date :	2020-06-25		

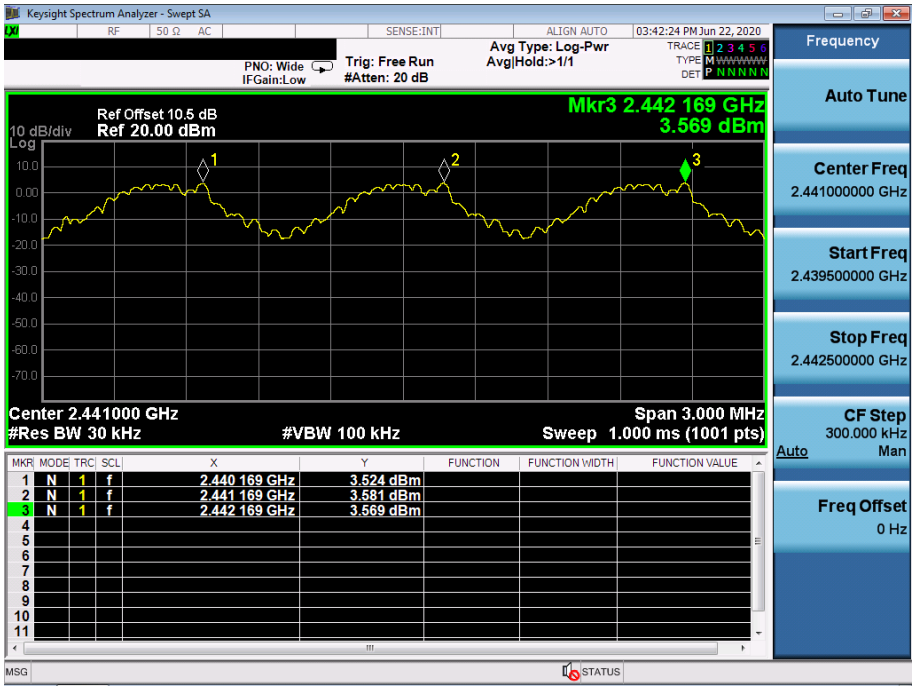
Frequency	Ch. Separation (KHz)	Limit 2/3(20dB bandwidth) (kHz)	Result
2402 MHz	1000	638	PASS
2441 MHz	1000	638	PASS
2480 MHz	1000	638	PASS

Ch. Separation >2/3(20dB bandwidth)

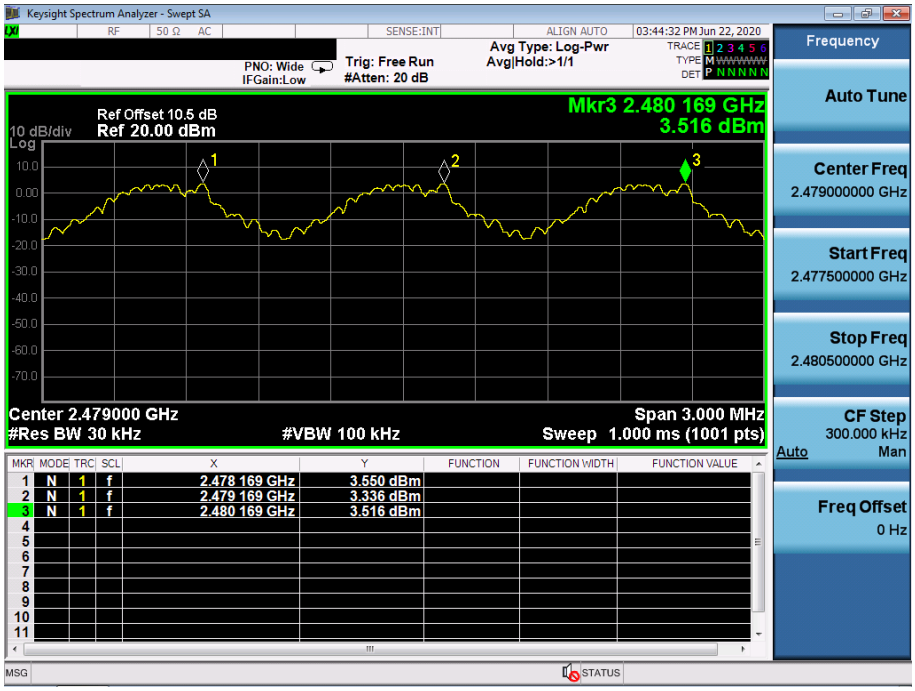
CH 00-1Mbps



CH 39-1Mbps



CH 78-1Mbps

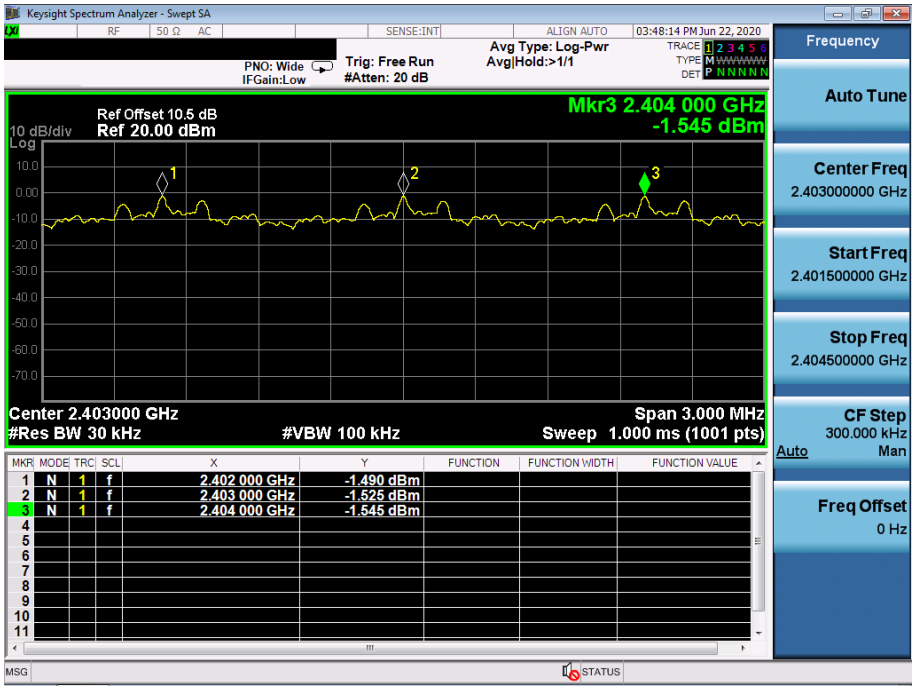


EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00 / CH39 /CH78 (3Mbps Mode)		
Test Date :	2020-06-25		

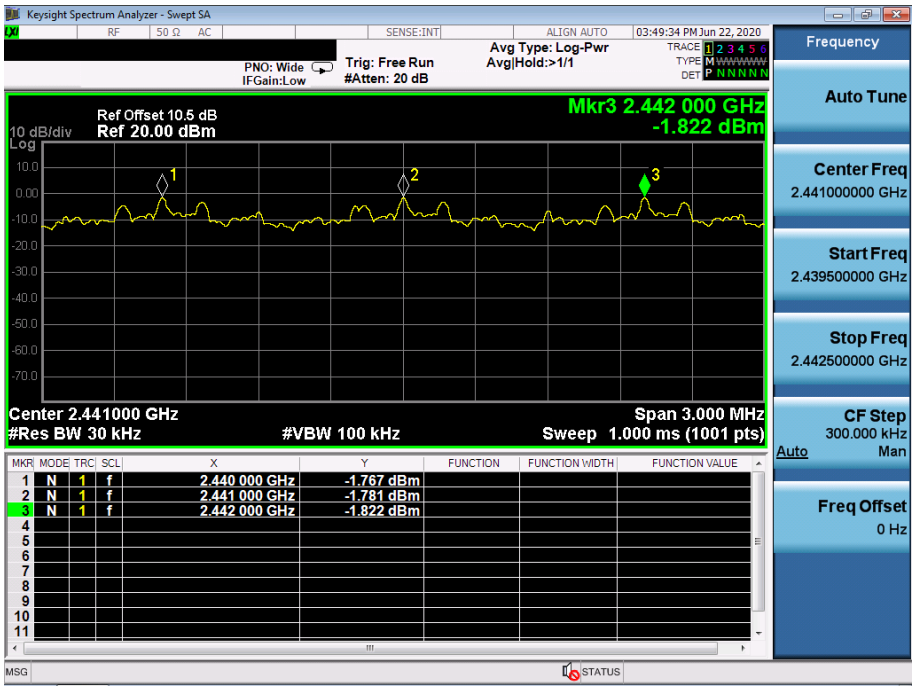
Frequency	Ch. Separation (KHz)	Limit 2/3(20dB bandwidth) (KHz)	Result
2402 MHz	1000	860	PASS
2441 MHz	1000	860	PASS
2480 MHz	1000	858	PASS

Ch. Separation >2/3(20dB bandwidth)

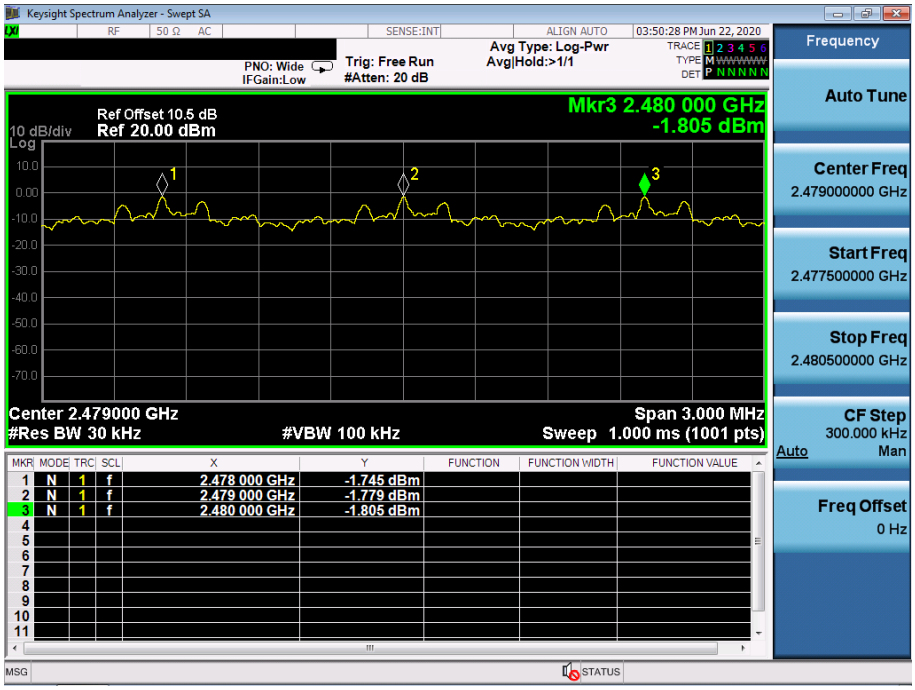
CH 00-3Mbps



CH 39-3Mbps



CH 78-3Mbps



8. PEAK OUTPUT POWER TEST

8.1 APPLIED PROCEDURES / LIMIT

LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
3.10.1(2)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS

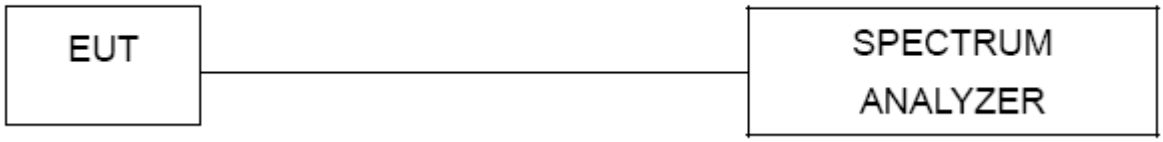
8.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : (1Mbps)RBW= 1MHz, VBW= 3MHz, Sweep time = Auto.
(3Mbps)RBW= 3MHz, VBW= 10MHz, Sweep time = Auto.

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

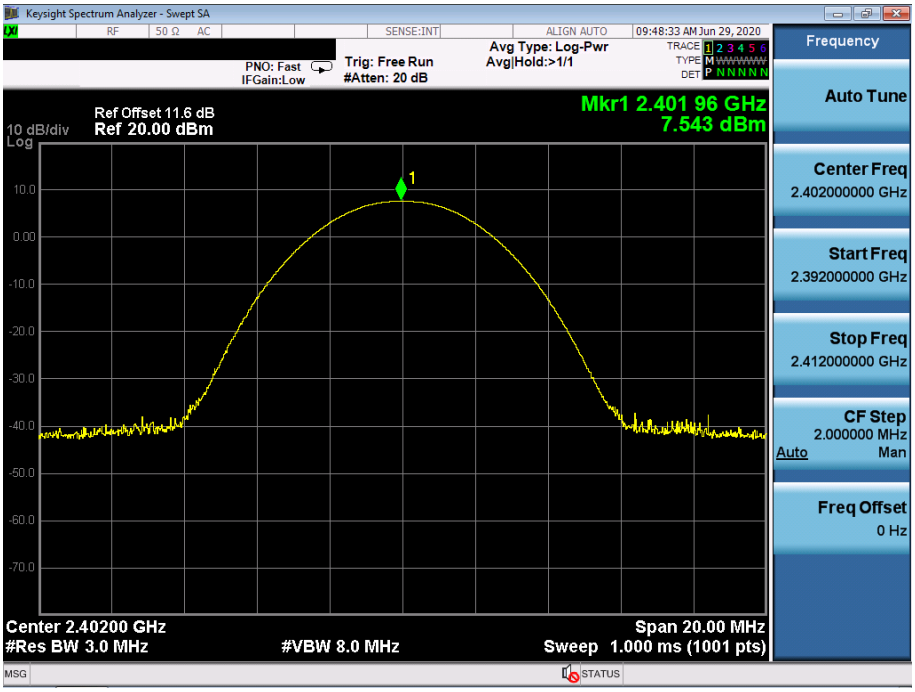
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 TEST RESULTS

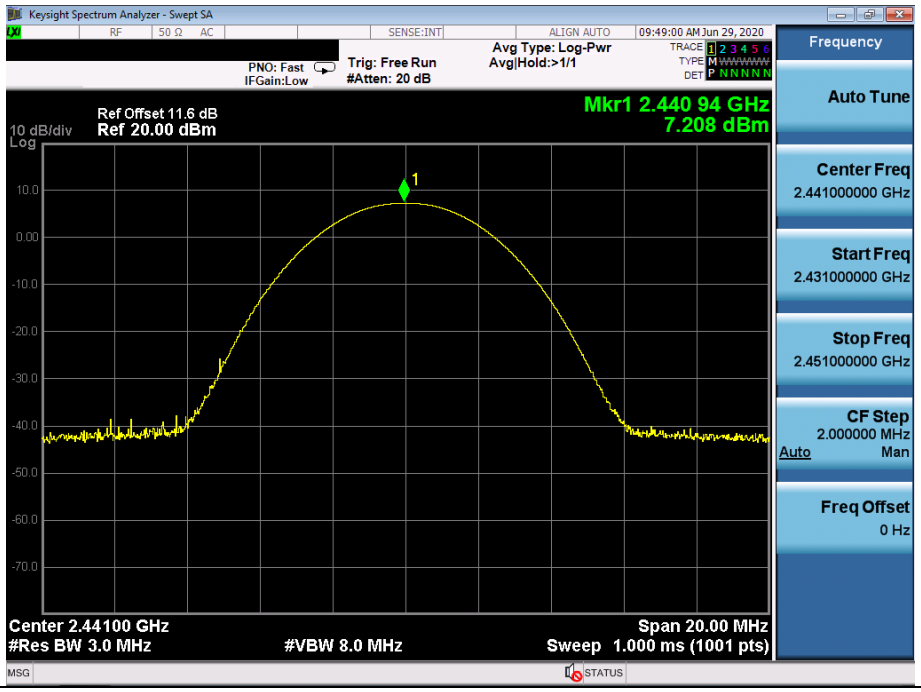
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00/ CH39 /CH78 (1Mbps Mode)		
Test Date :	2020-06-25		

Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
2402	7.543	21	0.125
2441	7.208	21	0.125
2480	7.163	21	0.125

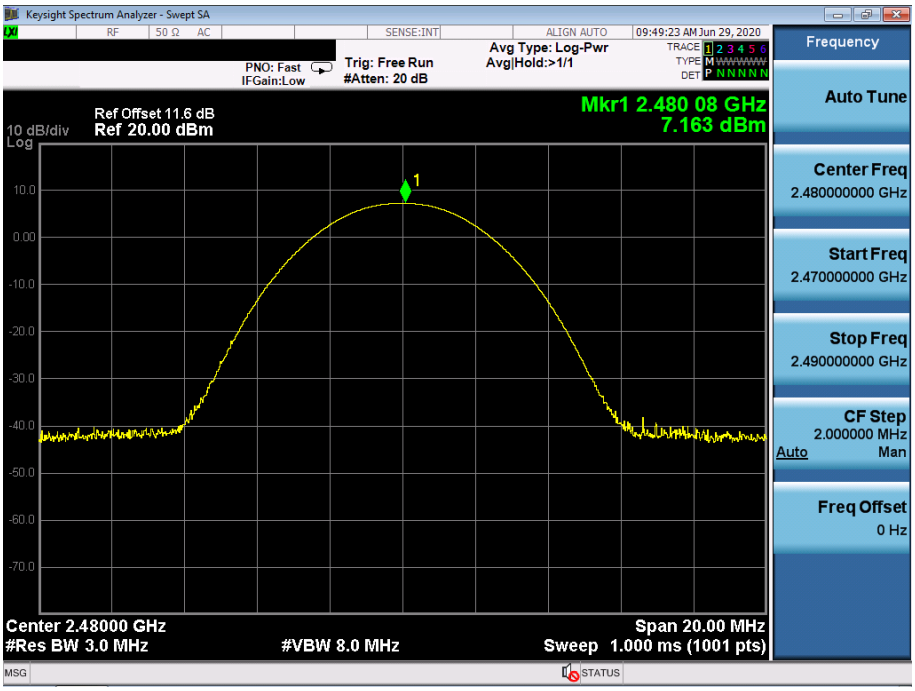
CH00 -1Mbps



CH39 -1Mbps



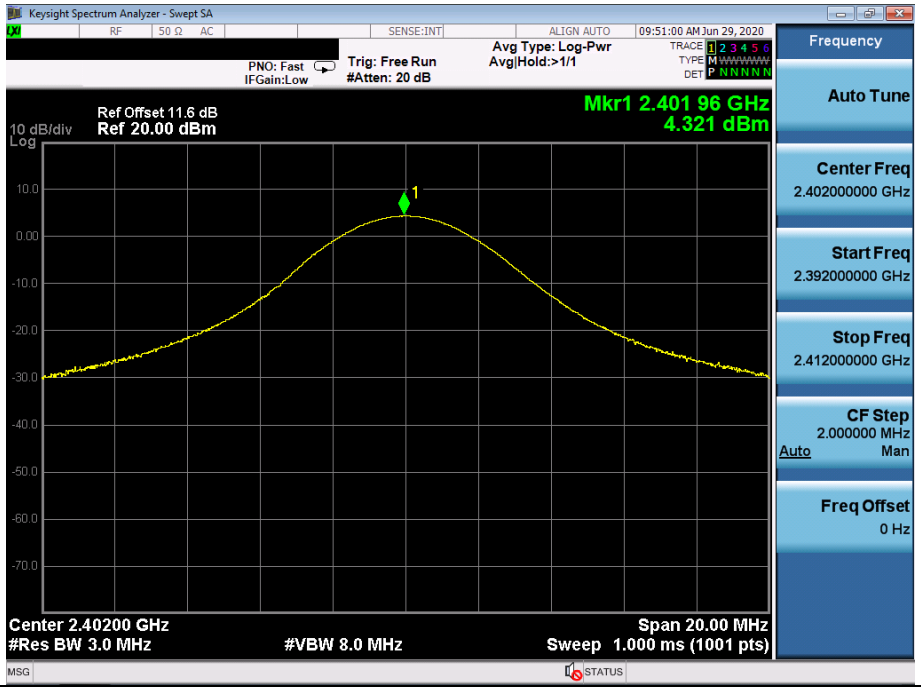
CH78 -1Mbps



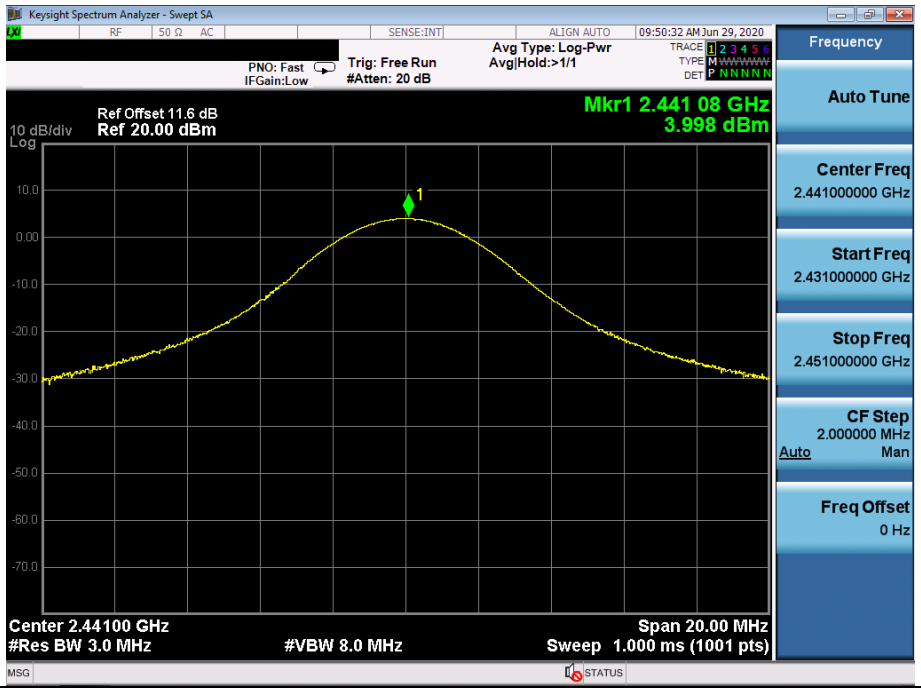
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00/ CH39 /CH78 (3Mbps Mode)		
Test Date :	2020-06-25		

Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
2402	4.321	21	0.125
2441	3.998	21	0.125
2480	4.009	21	0.125

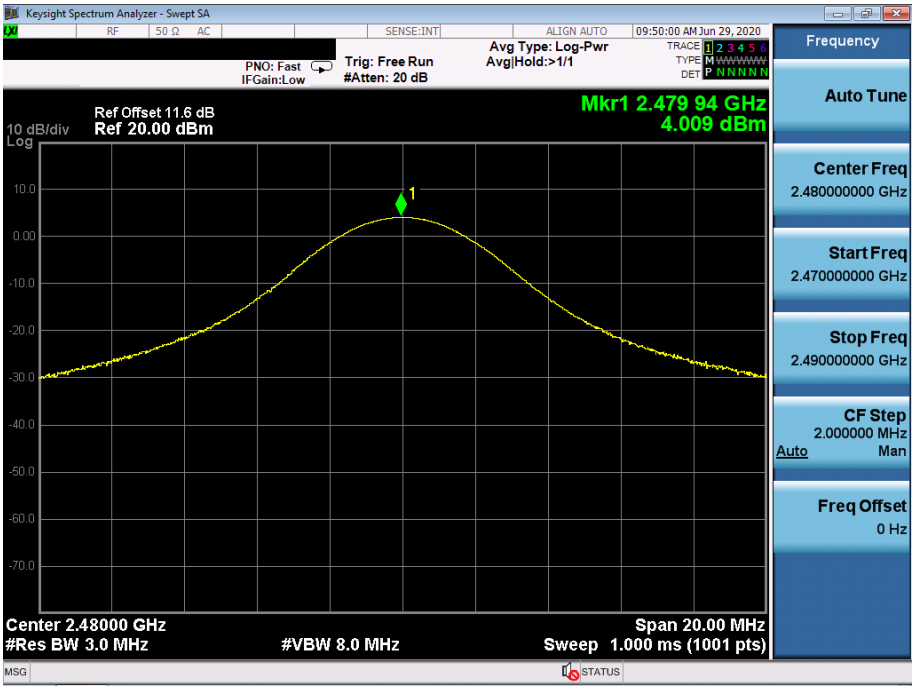
CH00 -3Mbps



CH39 -3Mbps



CH78 -3Mbps



9. ANTENNA CONDUCTED SPURIOUS EMISSION

9.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency 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 or shall not exceed the general levels specified in Section 2.8.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

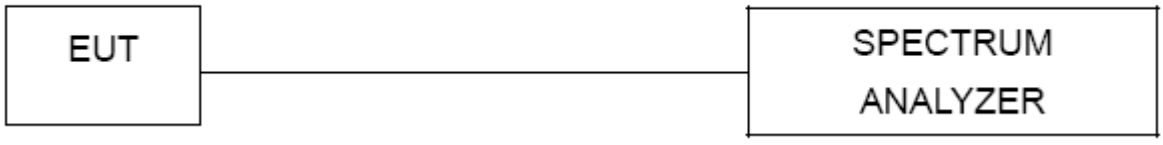
The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (other emission)	100 KHz /100 KHz for Peak

9.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

9.1.2 TEST SETUP



9.1.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

9.1.4 TEST RESULTS

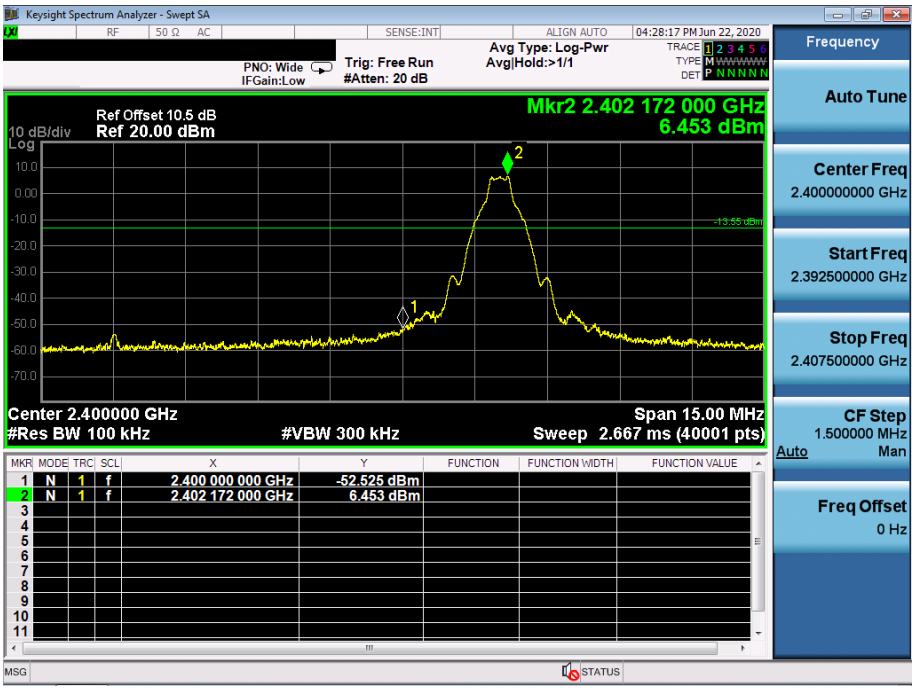
EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00 / CH78 (1Mbps)		
Test Date :	2020-06-25		

in any 100kHz bandwidth outside the low frequency band	in any 100 kHz bandwidth outside the high frequency band
Pass	Pass
Result	
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.	

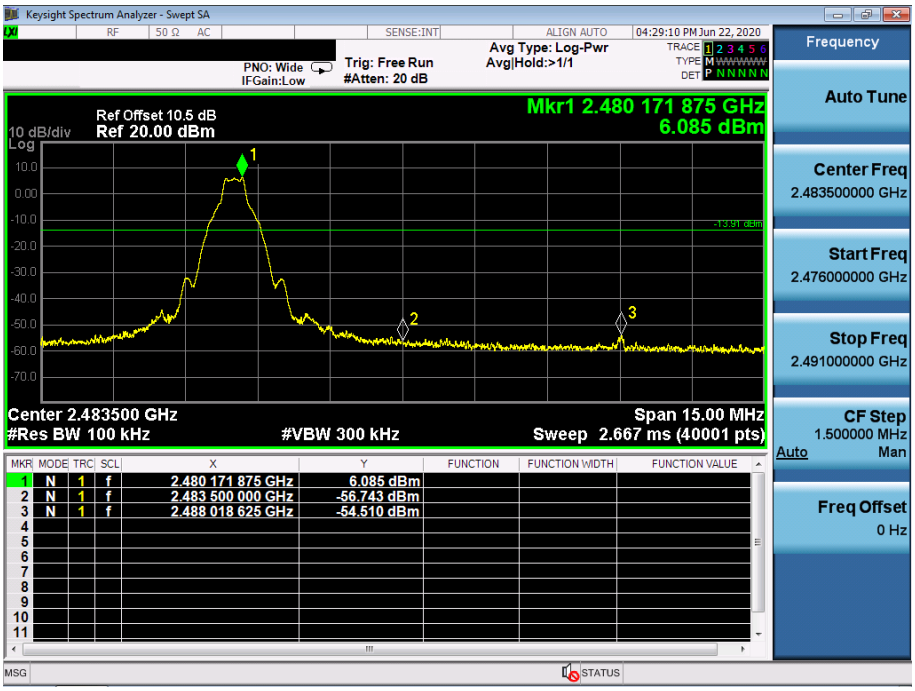
Remark：

(1) Hopping enabled and disabled have evaluated,and the worrest data was reported

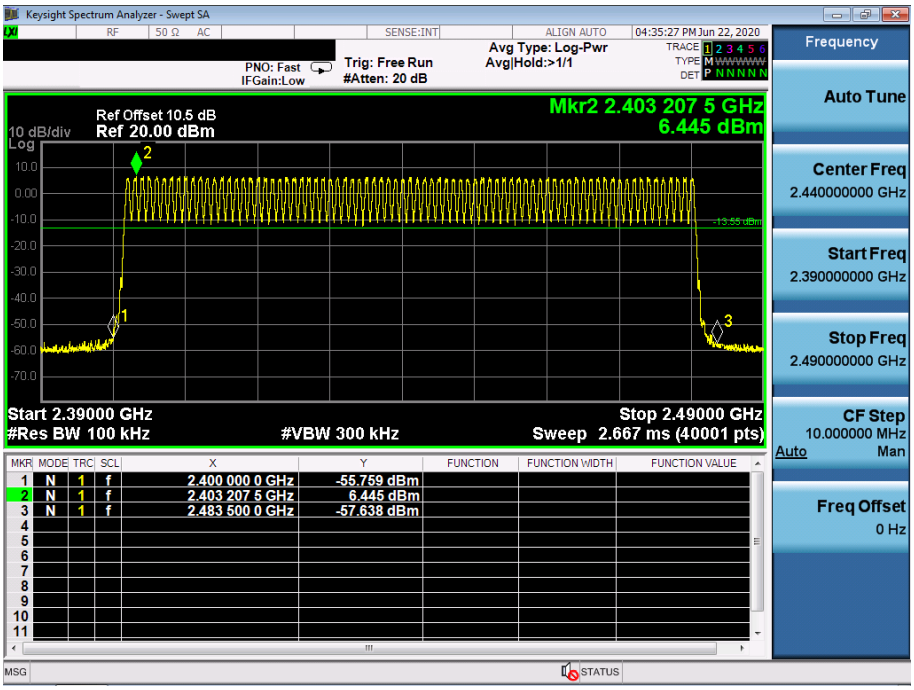
CH00 (Lower) Data rate 1Mbps



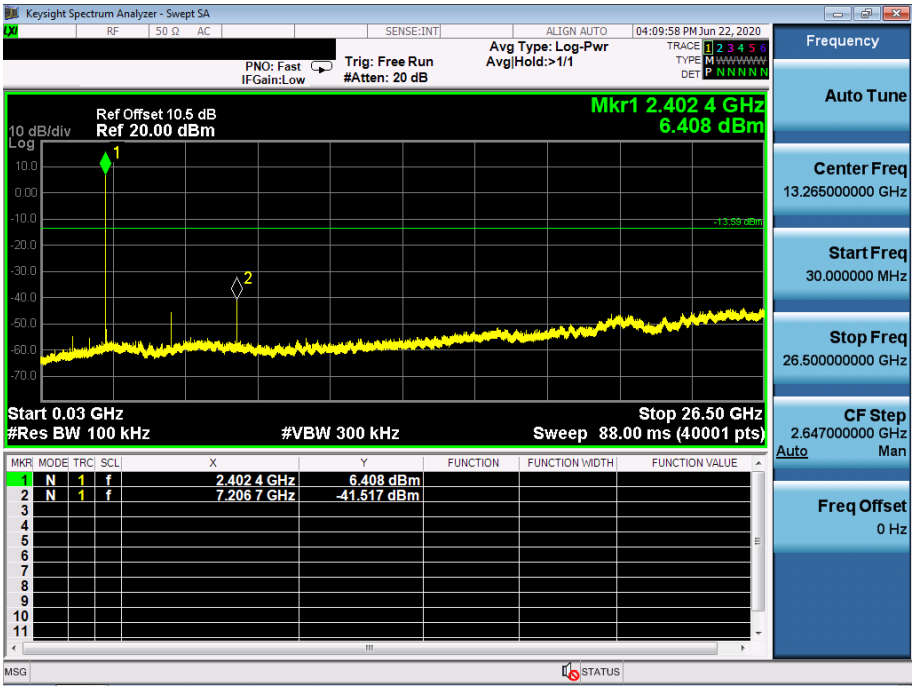
CH 78 (Upper) Data rate 1Mbps



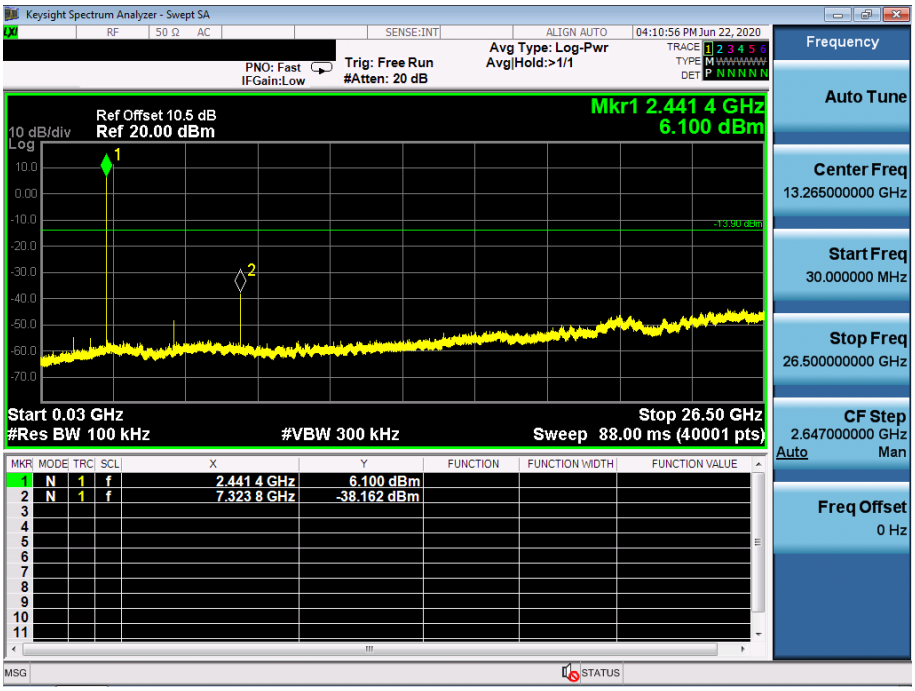
Data rate 1Mbps



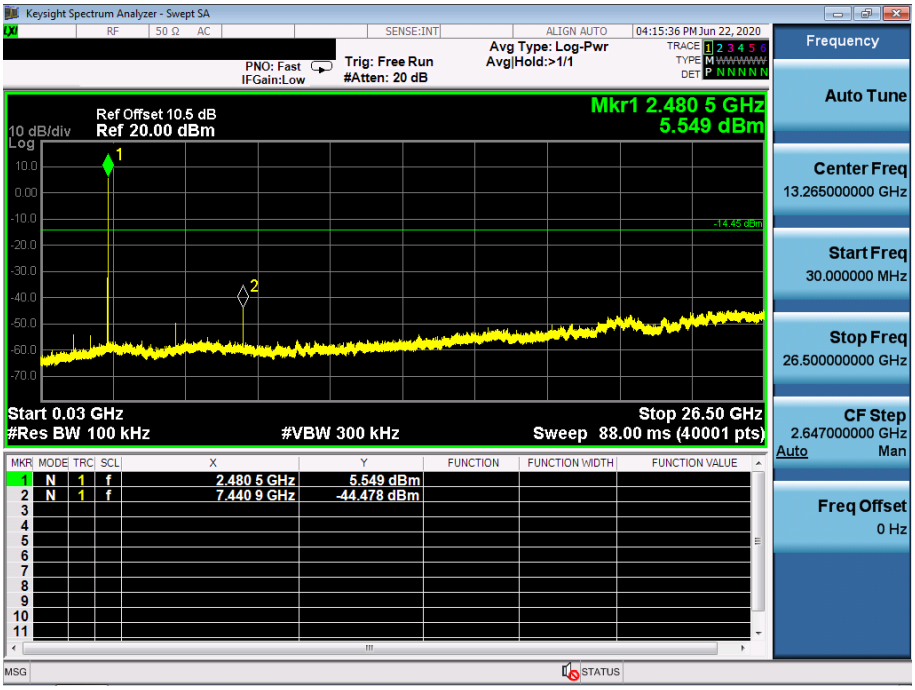
CH01


Keysight Spectrum Analyzer - Swept SA
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
04:09:58 PM Jun 22, 2020
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
Ref Offset 10.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.402 4 GHz
6.408 dBm
Start 0.03 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 88.00 ms (40001 pts)
1 N 1 f 2.402 4 GHz 6.408 dBm
2 N 1 f 7.206 7 GHz -41.517 dBm
Frequency
Auto Tune
Center Freq
13.265000000 GHz
Start Freq
30.000000 MHz
Stop Freq
26.500000000 GHz
CF Step
2.647000000 GHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

CH39


Keysight Spectrum Analyzer - Swept SA
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
04:10:56 PM Jun 22, 2020
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
Ref Offset 10.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.441 4 GHz
6.100 dBm
Start 0.03 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 88.00 ms (40001 pts)
1 N 1 f 2.441 4 GHz 6.100 dBm
2 N 1 f 7.323 8 GHz -38.162 dBm
Frequency
Auto Tune
Center Freq
13.265000000 GHz
Start Freq
30.000000 MHz
Stop Freq
26.500000000 GHz
CF Step
2.647000000 GHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

CH78


Keysight Spectrum Analyzer - Swept SA
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
04:15:36 PM Jun 22, 2020
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
Ref Offset 10.5 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.480 5 GHz
5.549 dBm
-14.45 dBm
Start 0.03 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 88.00 ms (40001 pts)
1 N 1 f 2.480 5 GHz 5.549 dBm
2 N 1 f 7.440 9 GHz -44.478 dBm
Frequency
Auto Tune
Center Freq
13.265000000 GHz
Start Freq
30.000000 MHz
Stop Freq
26.500000000 GHz
CF Step
2.647000000 GHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

EUT：	Headphones	Model Name ：	YH-E500A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC3.7V from battery
Test Mode ：	CH00 / CH78 (3Mbps)		
Test Date :	2020-06-25		

in any 100kHz bandwidth outside the low frequency band	in any 100 kHz bandwidth outside the high frequency band
Pass	Pass
Result	
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.	

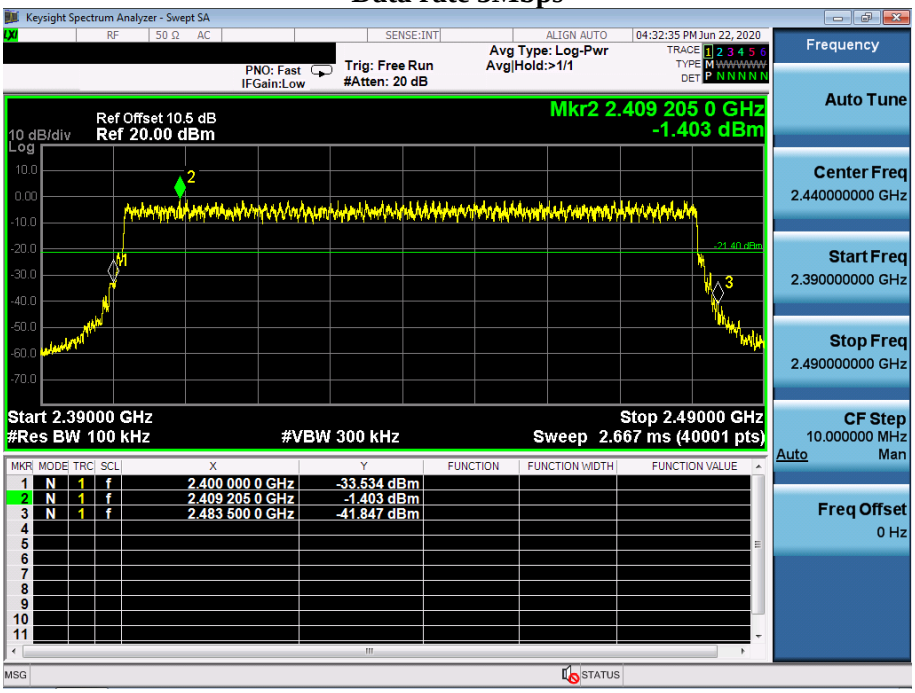
Remark：

(1) Hopping enabled and disabled have evaluated,and the worrest data was reported

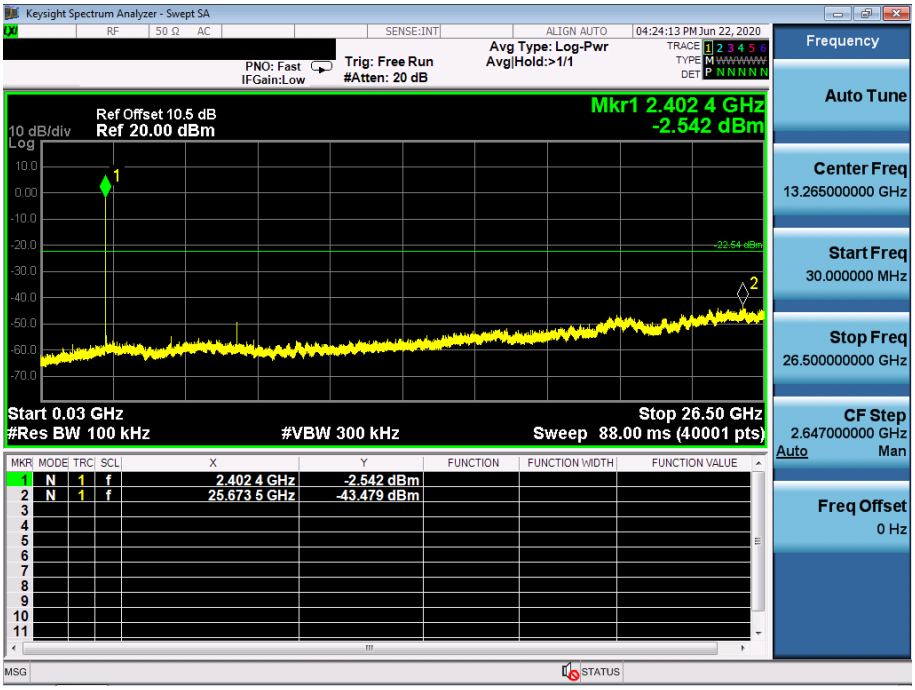
CH00 (Lower) Data rate 3Mbps

CH 78 (Upper) Data rate 3Mbps

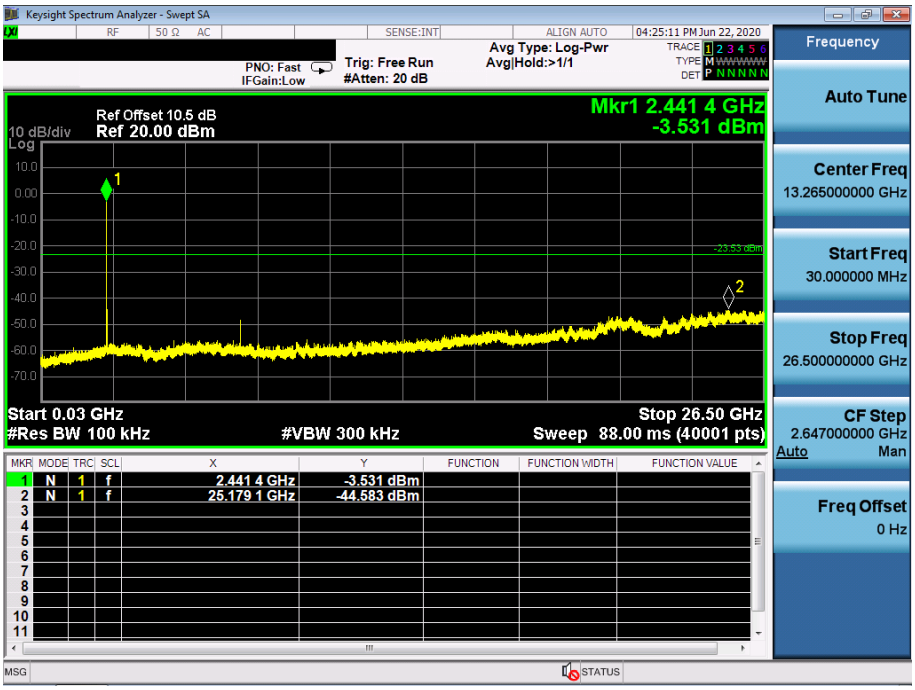
Data rate 3Mbps



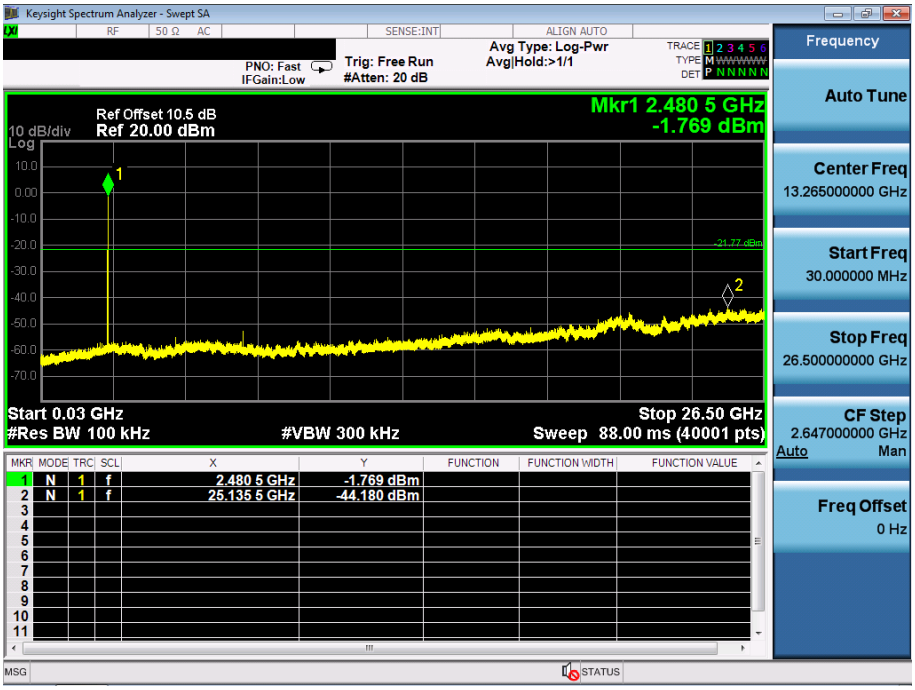
CH01


Keysight Spectrum Analyzer - Swept SA
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
04:24:13 PM Jun 22, 2020
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
Ref Offset 10.5 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.402 4 GHz
-2.542 dBm
-23.54 dBm
Start 0.03 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 88.00 ms (40001 pts)
1 N 1 f 2.402 4 GHz -2.542 dBm
2 N 1 f 25.673 5 GHz -43.479 dBm
Frequency
Auto Tune
Center Freq
13.265000000 GHz
Start Freq
30.000000 MHz
Stop Freq
26.500000000 GHz
CF Step
2.647000000 GHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

CH39


Keysight Spectrum Analyzer - Swept SA
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
04:25:11 PM Jun 22, 2020
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
Ref Offset 10.5 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.441 4 GHz
-3.531 dBm
-23.53 dBm
Start 0.03 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 88.00 ms (40001 pts)
1 N 1 f 2.441 4 GHz -3.531 dBm
2 N 1 f 25.179 1 GHz -44.583 dBm
Frequency
Auto Tune
Center Freq
13.265000000 GHz
Start Freq
30.000000 MHz
Stop Freq
26.500000000 GHz
CF Step
2.647000000 GHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

CH78


Keysight Spectrum Analyzer - Swept SA
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Ref Offset 10.5 dB
10 dB/div Ref 20.00 dBm
Log
Mkr1 2.480 5 GHz
-1.769 dBm
-21.77 dBm
Start 0.03 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 88.00 ms (40001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.480 5 GHz -1.769 dBm
2 N 1 f 25.135 5 GHz -44.180 dBm
Frequency
Auto Tune
Center Freq
13.265000000 GHz
Start Freq
30.000000 MHz
Stop Freq
26.500000000 GHz
CF Step
2.647000000 GHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

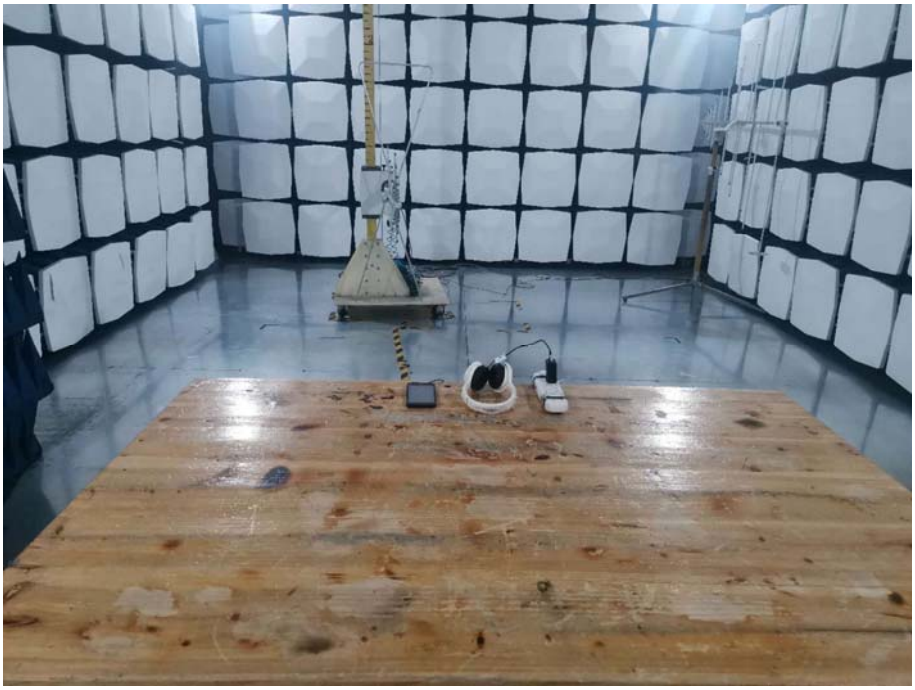
3.10.3.1.1 requirement: Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

10.2 EUT ANTENNA

The antenna is a PCB Antenna and no consideration of replacement. Antenna max gain is 2.45 dBi from 2.4GHz to 2.5GHz.

11. EUT TEST PHOTO

Radiated Measurement Photos
30MHz-1GHz



Radiated Measurement Photos
Above 1GHz

Conducted Measurement Photos