

Prüfbericht - Nr.: Test Report No.	14007648 001		Seite 1 von 13 Page 1 of 13	
Auftraggeber: Applicant	IEA Electro-Acoustic Co., Ltd. Unit 2301-02, 23/F. Millennium City 3 370 Kwun Tong Road, Kwun Tong Kowloon, Hong Kong			
Gegenstand der Prüfung: Test item	Bluetooth Mini Headset			
Bezeichnung: Identification	BTH-318A	Serien-Nr.: Serial No.	Engineering sample	
Wareneingangs-Nr.: Receipt No.	041104014 - 019	Eingangsdatum: Date of receipt	04.11.2004	
Prüfört: Testing location	TÜV Rheinland Hong Kong Ltd. Room 8, 25th Floor, Skyline Tower, 39 Wang Kwong Road, Kowloon Bay Kowloon, Hong Kong Hong Kong Productivity Council HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong			
Prüfgrundlage: Test specification	FCC Part 15 Subpart C ANSI C63.4-2003 CISPR 22:1997			
Prüfergebnis: Test Result	Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage. The above mentioned product was tested and passed.			
geprüft / tested by:		kontrolliert / reviewed by:		
21.12.2004	Hugo Wan	21.12.2004	Thomas Berns	
Datum Date	Name Name	Unterschrift Signature	Datum Date	Name Name
				Unterschrift Signature
Sonstiges: Other Aspects	FCCID: SFYBTH-318IEA			
Abkürzungen:	OK, Pass, P Fail, F N/A NT	= entspricht Prüfgrundlage = entspricht nicht Prüfgrundlage = nicht anwendbar = nicht getestet	Abbreviations:	OK, Pass, P Fail, F N/A NT = passed = failed = not applicable = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicate in extracts. This test report does not entitle to carry any safety mark on this or similar products.				

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Product information

Manufacturers declarations

	Transmitter	Receiver
Operating frequency range	2402 - 2480 MHz	2402 - 2480 MHz
Type of modulation	FHSS modulation	FHSS modulation
Number of channels	79	79
Channel separation	1 MHz	1 MHz
Type of antenna	Integral Antenna	Integral Antenna
Antenna gain (dBi)	2.0	
Power level	fix	
Type of equipment	stand alone	stand alone
Connection to public utility power line	Yes	
Nominal voltage	V _{nom} : 3.7 V	V _{nom} : 3.7 V
Independent Operation Modes	Page scan Inquiry scan Connection state - ACL Link Connection state - SCO Link	

Product function and intended use

The test item is a Wireless Headset based on the Bluetooth technology.

Bluetooth is a short-range radio link intended to be a cable replacement between portable and/or fixed electronic devices.

Bluetooth operates in the unlicensed ISM Band at 2.4 GHz. In the US a band of 83.5 MHz width is available. In this band, 79 RF channels spaced 1 MHz apart are defined.

The channel is represented by a pseudo-random hopping sequence through the 79 channels. The channel is divided into time slots, with a nominal slot length of 625 µs, where each slot corresponds to different RF hop frequencies. The nominal hop rate is 1600 hops/s. The symbol rate on the channel is 1 Ms/s.

Submitted documents

Circuit Diagram
PCB Layout
Block Diagram
Bill of material
User manual

Special accessories and auxiliary equipment

The product has been tested together with the following additional accessory:

- Standard Charger CST-13
Manufacturer: Ericsson
Model number: GSAC-MN/3
Serial number: 0688A0019460
Input: 100-240VAC, 150mA, 50-60Hz
Output: 5.1V, 450mA

List of Test and Measurement Instruments

	Kind of Equipment	Manufacturer	Type	S/N
☒	Test Receiver	Rohde & Schwarz	ESH-3	890173/033
☒	L/I/S/N	Rohde & Schwarz	ESH 3-Z5	849876/026
☐	Oscilloscope	HP	54713B	US34510455
☐	Test Receiver	Rohde & Schwarz	ESVP	882402/033
☐	Absorbing Clamp	Rohde & Schwarz	MDS-21	979 3/4
☒	Test Receiver	Rohde & Schwarz	ESVS30	842807/009
☒	Biconical Antenna	Rohde & Schwarz	HK116	841489/015
☒	Log.-Periodic Antenna	Rohde & Schwarz	HL223	841516/017
☐	Universal Power Analyzer	Voltech	PM3000A	9915
☐	Reference Impedance Network	Voltech	IEC 555 Standard	9946
☐	AC Power Source	California Instr.	4500L	HK51895
☐	Trip-Loop Antenna	Chase	LLA6142	1019
☒	Double Ridge Horn Antenna	EMCO	3115	9002-3351
☒	Double Ridge Horn Antenna	EMCO	3115	9002-3347
☐	RF Comms Test Set	HP	8920B	US36492628
☐	Spectrum Analyser + Tracking G.	HP	8596E	3639A00758
☐	Signal Generator	Rohde & Schwarz	SMY 01	844146/024
☐	Signal Generator	Rohde & Schwarz	SMY 01	844146/023
☐	BiLog Antenna	EMCO	3143	9607-1287
☐	Isotropic Field Probe	Holladay	HI-4422	90956
☐	Power Amplifier	Kalmus	757-LC	7620-1
☐	Power Amplifier	Kalmus	122-FC	7620-2
☐	Coupling Clamp	Schaffner	CDN 126	312
☐	Couple Device Network	Fischer	CDN-M2	9604
☒	Spectrum Analyzer	Rohde & Schwarz	FSP30	1093.4495K30
☐	Temperature Chamber	Binder	MK 240	9020-0028
☐	EFT,ESD,SURGE, DIPS tester	Schaffner	Best 96	IN3796-011
☐	Surge Generator	Schaffner	NSG650	280

Result FCC Part 15 – Subpart C

Subclause 15.203 – Antenna Information		Pass
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device	
Result:	Permanent attached antenna	
Verdict:	Pass	

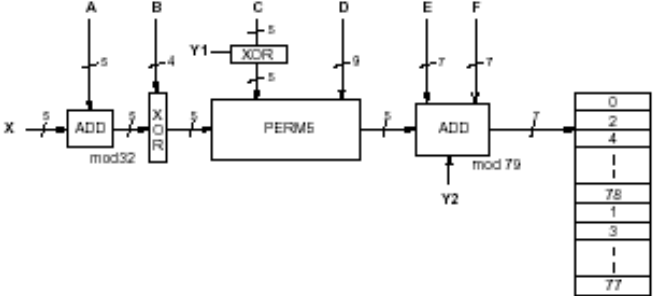
Subclause 15.204 – Antenna Information		Pass
Requirement:	Provide information for every antenna proposed for the use with the EUT	
Result:	a) Antenna type: Inverted F type antenna soldered to the circuit board b) Manufacturer and model no: N.A. c) Gain with reference to an isotropic radiator: 2.0 dBi	
Verdict:	Pass	

Subclause 15.207 – Disturbance Voltage on AC Mains						Pass
Test Port: Standard Charger CST-13 Applied voltage: 100VAC Applicable only to equipment designed to be connected to the public utility power line.						
Live measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV/m	Average dBµV/m	Limit QP (dBµV/m)	Limit AV (dBµV/m)	Verdict
0,15 – 0,5	0.204	50.1	33.5	66 - 56	56 - 46	Pass
> 0,5 - 5	-	-	-	56	46	Pass
> 5 - 30	-	-	-	60	50	Pass
Neutral measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV/m	Average dBµV/m	Limit QP (dBµV/m)	Limit AV (dBµV/m)	Verdict
0,15 – 0,5	0.204	50.9	39.3	66 - 56	56 - 46	Pass
> 0,5 - 5	-	-	-	56	46	Pass
> 5 - 30	-	-	-	60	50	Pass
Result: The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz does not exceed the limits. For test results plots refer to Appendix 1, page 55-57.						

Subclause 15.247 (a) – Carrier Frequency Separation		Pass
Requirement:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.	
Test Specification	: FCC Part 15 Subpart A – Subclause 15.31	
Mode of operation	: Tx mode (hopping on), DH1 packet	
Port of testing	: Temporary antenna port	
Detector	: Peak	
RBW/VBW	: 100 kHz / 300 kHz	
Supply voltage	: 3.7VDC from rechargeable battery	
Temperature	: 23°C	
Humidity	: 50%	
Result:	The centre frequencies of the hopping channels are separated by more than the 20dB bandwidth. For test results plots refer to Appendix 1, page 2.	
Verdict:	Pass	

Subclause 15.247 (a) – Time of Occupancy (Dwell Time)		Pass
Requirement:	Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping 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.	
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode (hopping on), DH5 packet Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 1 MHz / 3 MHz Supply voltage : 3.7VDC from rechargeable battery Temperature : 23°C Humidity : 50%		
Result:	The screenshot in Appendix 1 page 4 shows the occurrence of a channel in a 12.8 s time period. In inquiry and page scan mode Bluetooth is using 32 hopping channels only. The frequency was used 26 times. The dwell time for the longest supported packet type is about 3 ms. As a result the average time of occupancy will not be greater than 400 ms.	
i.e.	Time period calculation: $0.4 \times 32 = 12.8\text{s}$ Limit calculation: $26 \times 2.936 \times 10^{-3} = 76.34 \times 10^{-3}\text{s}$ $\leq 400 \times 10^{-3}\text{s}$	
For test protocols please refer to Appendix 1, page 3-4.		
Verdict: Pass		

Subclause 15.247 (a) – 20 dB Bandwidth			
Requirement: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.			
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz), DH5 packet Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 30 kHz / 100 kHz Supply voltage : 3.7VDC from rechargeable battery Temperature : 23°C Humidity : 50%			
Results			
For test protocols refer to Appendix 1, page 5-6.			
Frequency (MHz)	20 dB left (MHz)	20 dB right (MHz)	20dB bandwidth (MHz)
2402	0.492	0.464	0.956
2441	0.448	0.496	0.944
2480	0.452	0.500	0.952

Subclause 15.247 (a) – Hopping Sequence	Pass
Requirement: The hopping sequence is generated and provided with an example.	
Hopping sequence The channel is represented by a pseudo-random hopping sequence hopping through the 79 RF channels. The hopping sequence is unique for the piconet and is determined by the Bluetooth device address of the master. The X input determines the phase in the 32-hop segment, whereas Y1 and Y2 selects between master-to-slave and slave-to-master transmission. The inputs A to D determine the ordering within the segment, the inputs E and F determine the mapping onto the hop frequencies.	
	

Example data:

Hop sequence {k} for CONNECTION STATE:

CLK start: 0x0000010

ULAP: 0x00000000

#ticks: 00 02 | 04 06 | 08 0a | 0c 0e | 10 12 | 14 16 | 18 1a | 1c 1e |

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0x0000010: 08 66 | 10 70 | 12 19 | 14 23 | 16 01 | 18 05 | 20 33 | 22 37 |
0x0000030: 24 03 | 26 07 | 28 35 | 30 39 | 32 72 | 34 76 | 36 25 | 38 29 |
0x0000050: 40 74 | 42 78 | 44 27 | 46 31 | 48 09 | 50 13 | 52 41 | 54 45 |
0x0000070: 56 11 | 58 15 | 60 43 | 62 47 | 32 17 | 36 19 | 34 49 | 38 51 |
0x0000090: 40 21 | 44 23 | 42 53 | 46 55 | 48 33 | 52 35 | 50 65 | 54 67 |
0x00000b0: 56 37 | 60 39 | 58 69 | 62 71 | 64 25 | 68 27 | 66 57 | 70 59 |
0x00000d0: 72 29 | 76 31 | 74 61 | 78 63 | 01 41 | 05 43 | 03 73 | 07 75 |
0x00000f0: 09 45 | 13 47 | 11 77 | 15 00 | 64 49 | 66 53 | 68 02 | 70 06 |
0x0000110: 01 51 | 03 55 | 05 04 | 07 08 | 72 57 | 74 61 | 76 10 | 78 14 |
0x0000130: 09 59 | 11 63 | 13 12 | 15 16 | 17 65 | 19 69 | 21 18 | 23 22 |
0x0000150: 33 67 | 35 71 | 37 20 | 39 24 | 25 73 | 27 77 | 29 26 | 31 30 |
0x0000170: 41 75 | 43 00 | 45 28 | 47 32 | 17 02 | 21 04 | 19 34 | 23 36 |
0x0000190: 33 06 | 37 08 | 35 38 | 39 40 | 25 10 | 29 12 | 27 42 | 31 44 |
0x00001b0: 41 14 | 45 16 | 43 46 | 47 48 | 49 18 | 53 20 | 51 50 | 55 52 |
0x00001d0: 65 22 | 69 24 | 67 54 | 71 56 | 57 26 | 61 28 | 59 58 | 63 60 |
0x00001f0: 73 30 | 77 32 | 75 62 | 00 64 | 49 34 | 51 42 | 57 66 | 59 74 |
0x0000210: 53 36 | 55 44 | 61 68 | 63 76 | 65 50 | 67 58 | 73 03 | 75 11 |
0x0000230: 69 52 | 71 60 | 77 05 | 00 13 | 02 38 | 04 46 | 10 70 | 12 78 |
0x0000250: 06 40 | 08 48 | 14 72 | 16 01 | 18 54 | 20 62 | 26 07 | 28 15 |
0x0000270: 22 56 | 24 64 | 30 09 | 32 17 | 02 66 | 06 74 | 10 19 | 14 27 |
0x0000290: 04 70 | 08 78 | 12 23 | 16 31 | 18 03 | 22 11 | 26 35 | 30 43 |
0x00002b0: 20 07 | 24 15 | 28 39 | 32 47 | 34 68 | 38 76 | 42 21 | 46 29 |
0x00002d0: 36 72 | 40 01 | 44 25 | 48 33 | 50 05 | 54 13 | 58 37 | 62 45 |
0x00002f0: 52 09 | 56 17 | 60 41 | 64 49 | 34 19 | 36 35 | 50 51 | 52 67 |
0x0000310: 38 21 | 40 37 | 54 53 | 56 69 | 42 27 | 44 43 | 58 59 | 60 75 |
0x0000330: 46 29 | 48 45 | 62 61 | 64 77 | 66 23 | 68 39 | 03 55 | 05 71 |
0x0000350: 70 25 | 72 41 | 07 57 | 09 73 | 74 31 | 76 47 | 11 63 | 13 00 |
0x0000370: 78 33 | 01 49 | 15 65 | 17 02 | 66 51 | 70 67 | 03 04 | 07 20 |
0x0000390: 68 55 | 72 71 | 05 08 | 09 24 | 74 59 | 78 75 | 11 12 | 15 28 |
0x00003b0: 76 63 | 01 00 | 13 16 | 17 32 | 19 53 | 23 69 | 35 06 | 39 22 |
0x00003d0: 21 57 | 25 73 | 37 10 | 41 26 | 27 61 | 31 77 | 43 14 | 47 30 |
0x00003f0: 29 65 | 33 02 | 45 18 | 49 34 | 19 04 | 21 08 | 23 20 | 25 24 |

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Subclause 15.247 (a) – Equal Hopping Frequency Use**Pass**

Requirement: Each of the transmitter's hopping channels is used equally on average.

Equal hopping frequency use

The EUT complies with the Bluetooth RF specifications. For details refer to the Bluetooth standard.

Subclause 15.247 (a) – Receiver Input Bandwidth**Pass**

Requirement: The associated receiver(s) complies with the requirement that its input bandwidth matches the bandwidth of the transmitted signal.

Receiver input bandwidth

The receiver bandwidth is equal to the receiver bandwidth in the 79 hopping channel mode, which is 1 MHz. The receiver bandwidth was verified during Bluetooth RF conformance testing.

Subclause 15.247 (a) – Receiver Hopping Capability		Pass
Requirement:	The associated receiver has the ability to shift frequencies in synchronisation with the transmitted signals.	
Receiver hopping Capability		
The EUT complies with the Bluetooth RF specifications. For details refer to the Bluetooth standard.		

Subclause 15.247 (b) – Peak Output Power		Pass			
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz), DH1 packet Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 1 MHz / 3 MHz Supply voltage : 3.7VDC from rechargeable battery Temperature : 23°C Humidity : 50%					
Requirement:	For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 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.				
Result All three transmit frequency modes comply with the maximum peak output power limit. For test protocols please refer to Appendix 1, page 7-8.					
Frequency (MHz)	Maximum peak output power (dBm)	Cable attenuation (dB)	Output power (dBm)	Limit (W/dBm)	Verdict
2402	0.680	3.52	4.20	1 / 30.0	Pass
2441	0.440	3.65	4.09	1 / 30.0	Pass
2480	0.280	3.60	3.88	1 / 30.0	Pass

Subclause 15.247 (b) – Band edge compliance		Pass
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz), DH1 packet Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 300 kHz / 1 MHz Supply voltage : 3.7VDC from rechargeable battery Temperature : 23°C Humidity : 50%		
Requirement: 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.		
Result There is no peak found outside any 100 kHz bandwidth of the operating frequency band in the three transmit frequency. All three transmit frequency modes comply with the limit stated in subclause 15.247(c). For test protocols refer to Appendix 1, page 9-10.		

Subclause 15.247 (c) – Spurious Conducted Emissions					Pass
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz), DH1 packet Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 100 kHz / 300 kHz Supply voltage : 3.7VDC from rechargeable battery Temperature : 23 °C Humidity : 50 %					
Requirement: 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.					
Result There is no peak found outside any 100kHz bandwidth of the operating frequency band in the three transmit frequency. All three transmit frequency modes comply with the limit stated in subclause 15.247(c). For test protocols refer to Appendix 1, page 11-17.					
Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	No peak found	-	-	-	Pass
2441	No peak found	-	-	-	Pass
2480	No peak found	-	-	-	Pass

Subclause 15.247 (c) – Spurious Radiated Emissions							Pass
Test Specification : ANSI C63.4 - 1992 Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz), DH1 packet Port of testing : Enclosure Detector : Peak RBW/VBW : 100 kHz / 300 kHz for $f < 1$ GHz 1 MHz / 3 MHz for $f > 1$ GHz Supply voltage : 3.7VDC from rechargeable battery Temperature : 23°C Humidity : 50%							
Requirement: 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.							
Result All three transmit frequency modes comply with the field strength within the restricted bands. For test protocols refer to Appendix 1, page 18-54							
Tx frequency 2402MHz				Vertical Polarization			
Freq MHz	Reading dBuV	AF dB(1/m)	Cable att. dB	Pre-amp dB	Filter att. dB	Level dBuV/m	Limit/ Detector dBuV/m
1200.600	46.97	24.40	1.52	37.10	1.87	37.66	74.0 / P
1200.560	44.09	24.40	1.52	37.10	1.87	34.78	54.0 / A
Tx frequency 2402MHz				Horizontal Polarization			
Freq MHz	Reading dBuV	AF dB(1/m)	Cable att. dB	Pre-amp dB	Filter att. dB	Level dBuV/m	Limit/ Detector dBuV/m
no peak found	-	-	-	-	-	-	-
Tx frequency 2441MHz				Vertical Polarization			
Freq MHz	Reading dBuV	AF dB(1/m)	Cable att. dB	Pre-amp dB	Filter att. dB	Level dBuV/m	Limit/ Detector dBuV/m
1220.000	48.00	24.40	1.52	37.10	1.87	38.69	74.0 / P
1220.000	46.12	24.40	1.52	37.10	1.87	36.81	54.0 / A
Tx frequency 2441MHz				Horizontal Polarization			
Freq MHz	Reading dBuV	AF dB(1/m)	Cable att. dB	Pre-amp dB	Filter att. dB	Level dBuV/m	Limit/ Detector dBuV/m
no peak found	-	-	-	-	-	-	-

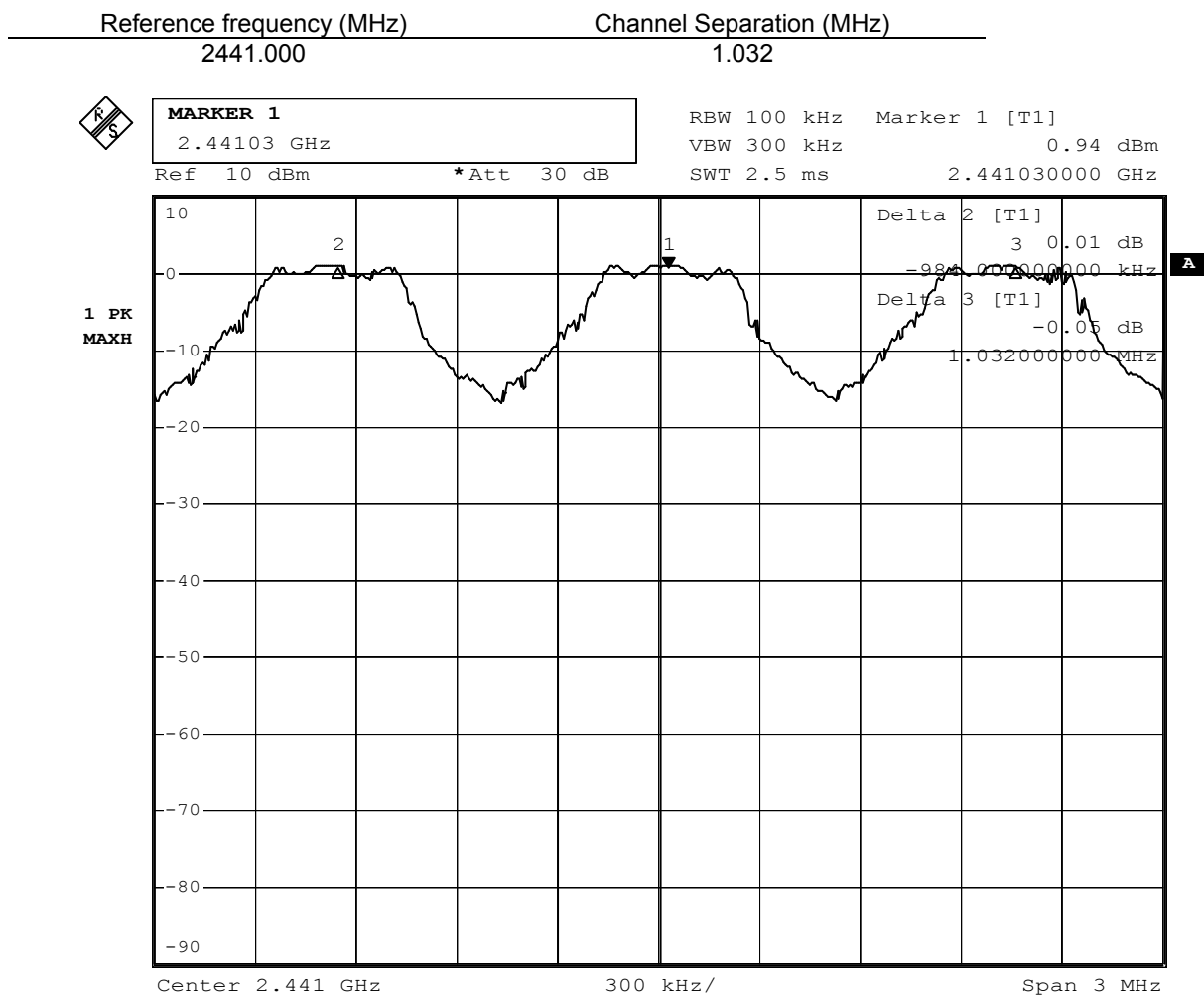
Tx frequency 2480MHz				Vertical Polarization			
Freq MHz	Reading dBuV	AF dB(1/m)	Cable att. dB	Pre-amp dB	Filter att. dB	Level dBuV/m	Limit/ Detector dBuV/m
1239.540	49.65	24.40	1.52	37.10	1.87	40.34	74.0 / P
1239.500	47.94	24.40	1.52	37.10	1.87	38.63	54.0 / A
Tx frequency 2480MHz				Horizontal Polarization			
Freq MHz	Reading dBuV	AF dB(1/m)	Cable att. dB	Pre-amp dB	Filter att. dB	Level dBuV/m	Limit/ Detector dBuV/m
no peak found	-	-	-	-	-	-	-

Appendix 1

Test results

Carrier Frequency Separation

Date: 6 Dec 2004
 EUT: BTH-318A
 Company: IEA Electro-Acoustic Co., Ltd.
 Humidity: 50%
 Temperature: 23°C
 Voltage supply: 3.7VDC from rechargeable battery
 Test by: Hugo Wan
 Op. mode: Hopping on



Date: 6.DEC.2004 09:49:33

Dwell Time

Date: 6 Dec 2004
 EUT: BTH-318A
 Company: IEA Electro-Acoustic Co., Ltd.
 Humidity: 50%
 Temperature: 23°C
 Voltage supply: 3.7VDC from rechargeable battery
 Test by: Hugo Wan
 Op. mode: Hopping on

Burst Duration (ms)	Number of hopping	Time of occupancy (s)	Results
2.936	26	$0.002936 \times 26 = 0.07634$	Pass


DELTA MARKER 2

2.936 ms

Ref 10 dBm

*Att 30 dB

RBW 1 MHz

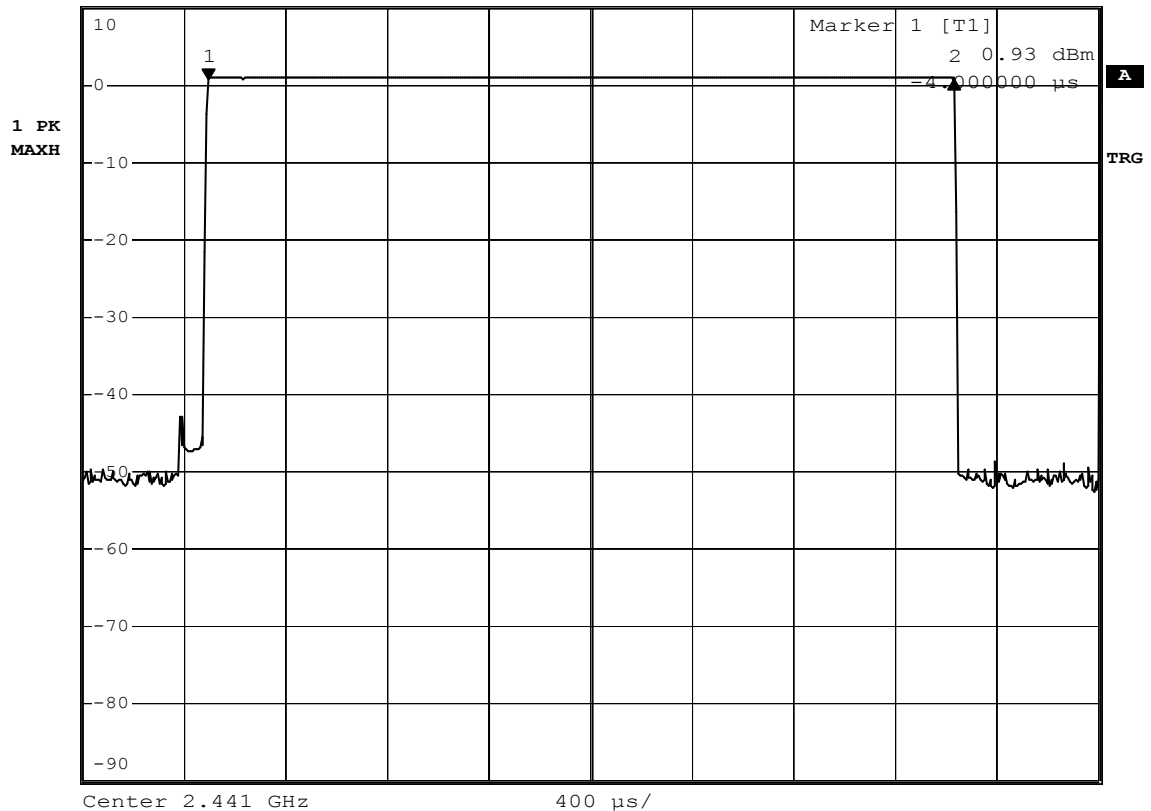
Delta 2 [T1]

VBW 3 MHz

-0.01 dB

SWT 4 ms

2.936000 ms



Date: 6.DEC.2004 09:52:22



SWEEP TIME

12.8 s

RBW 1 MHz

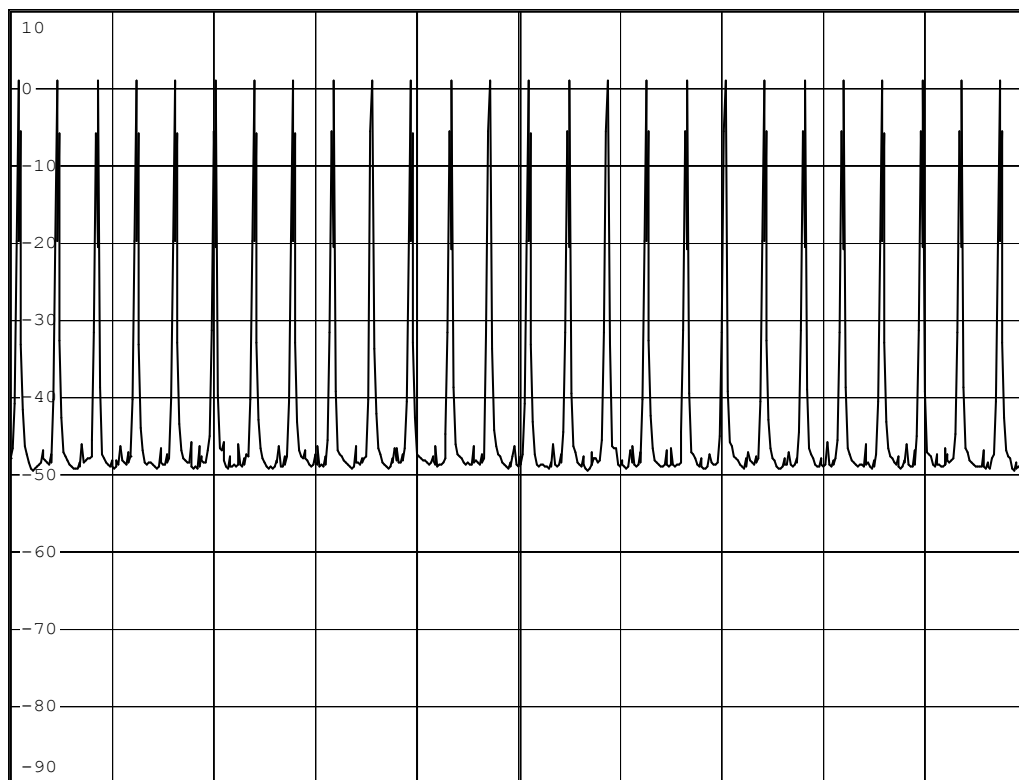
VBW 3 MHz

SWT 12.8 s

Ref 10 dBm

*Att 30 dB

1 PK
MAXH



A
SGL

Center 2.441 GHz

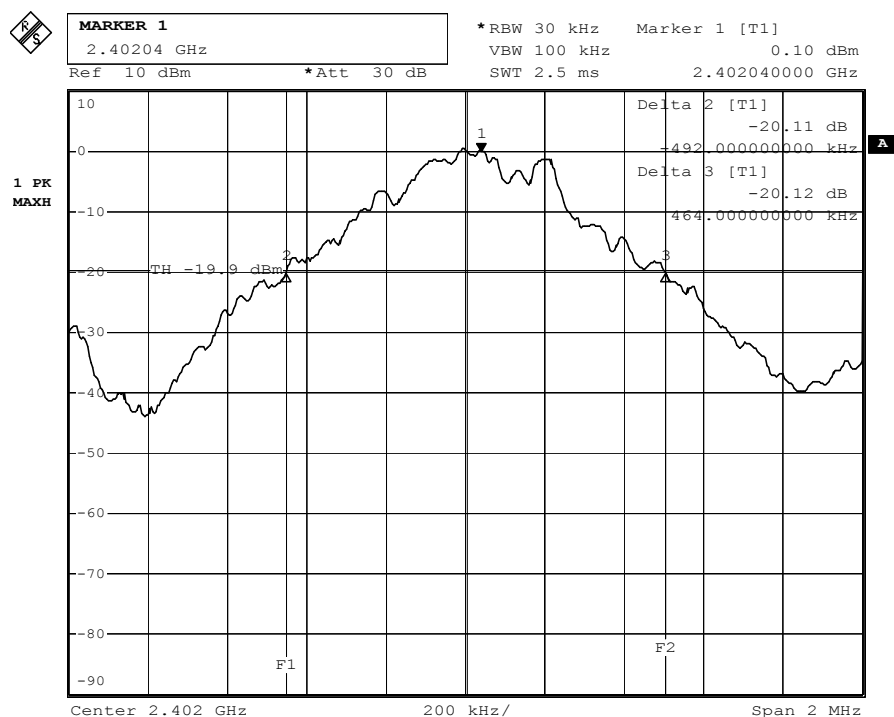
1.28 s/

Date: 6.DEC.2004 09:53:09

20dB Bandwidth

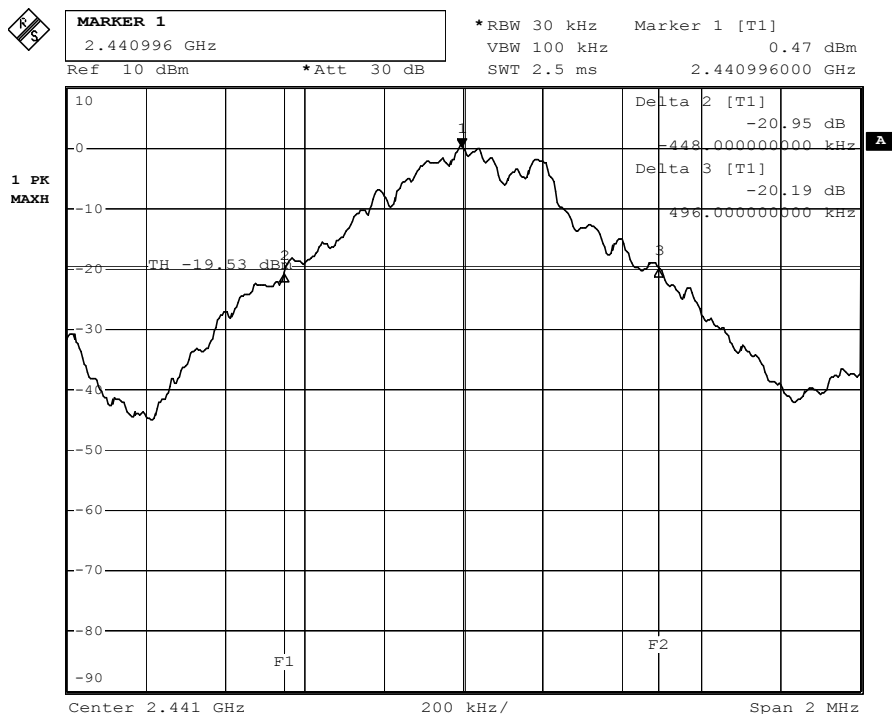
Date: 6 Dec 2004
 EUT: BTH-318A
 Company: IEA Electro-Acoustic Co., Ltd.
 Humidity: 50%
 Temperature: 23°C
 Voltage supply: 3.7VDC from rechargeable battery
 Test by: Hugo Wan
 Op. mode: TX mode, DH5 with PRBS9 payload

Tx frequency (MHz)	Δf_L (MHz)	Δf_H (MHz)	$ \Delta f_H + \Delta f_L $ (MHz)	Results
2402	0.492	0.464	0.956	Pass
2441	0.448	0.496	0.944	Pass
2480	0.452	0.500	0.952	Pass



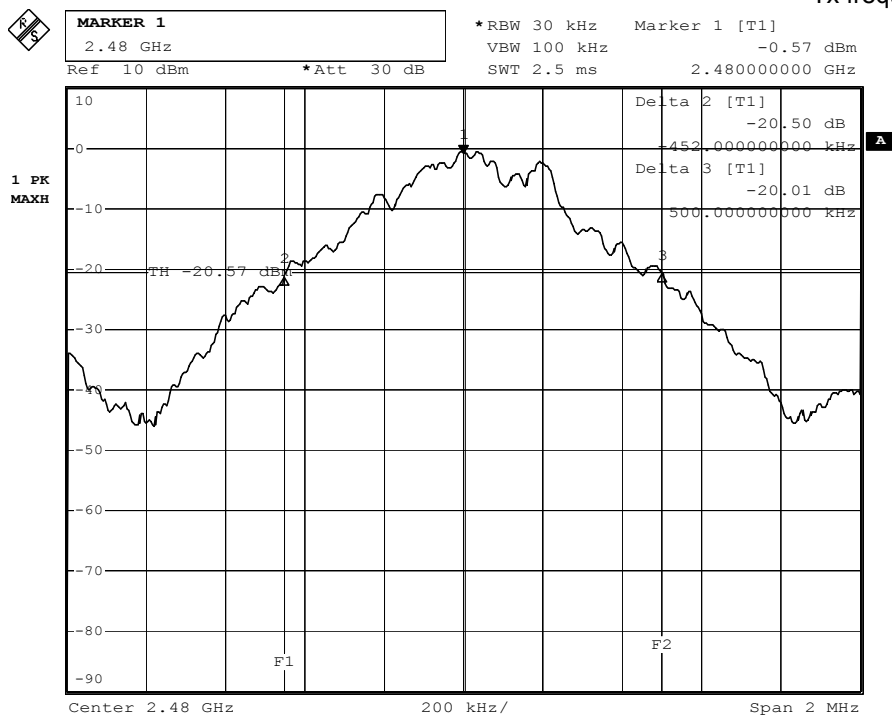
Date: 6.DEC.2004 09:59:18

Tx frequency: 2402MHz



Date: 6.DEC.2004 10:05:06

Tx frequency: 2441MHz



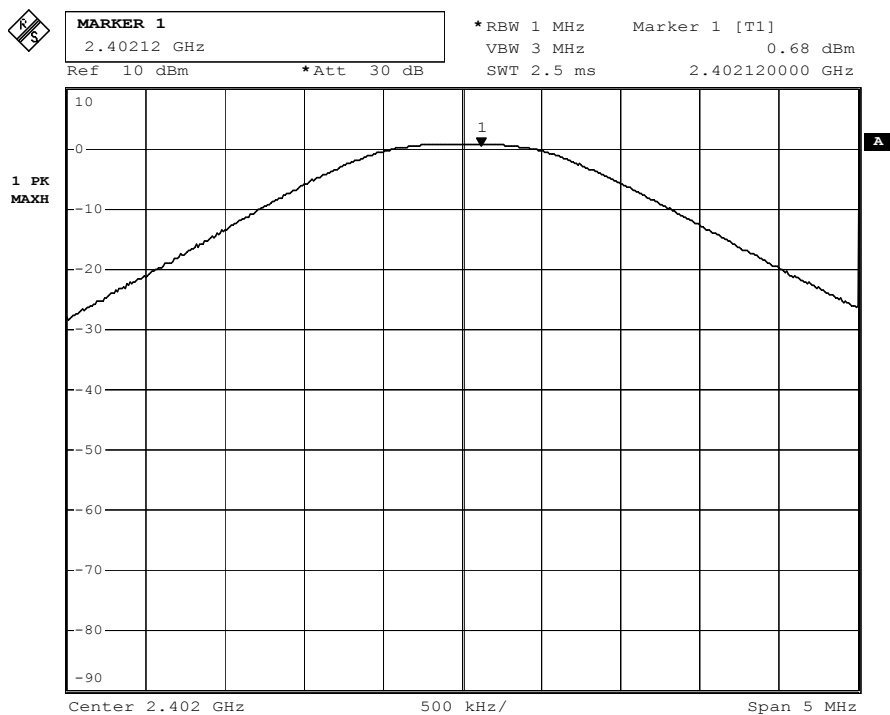
Date: 6.DEC.2004 10:06:39

Tx frequency: 2480MHz

Peak Output Power

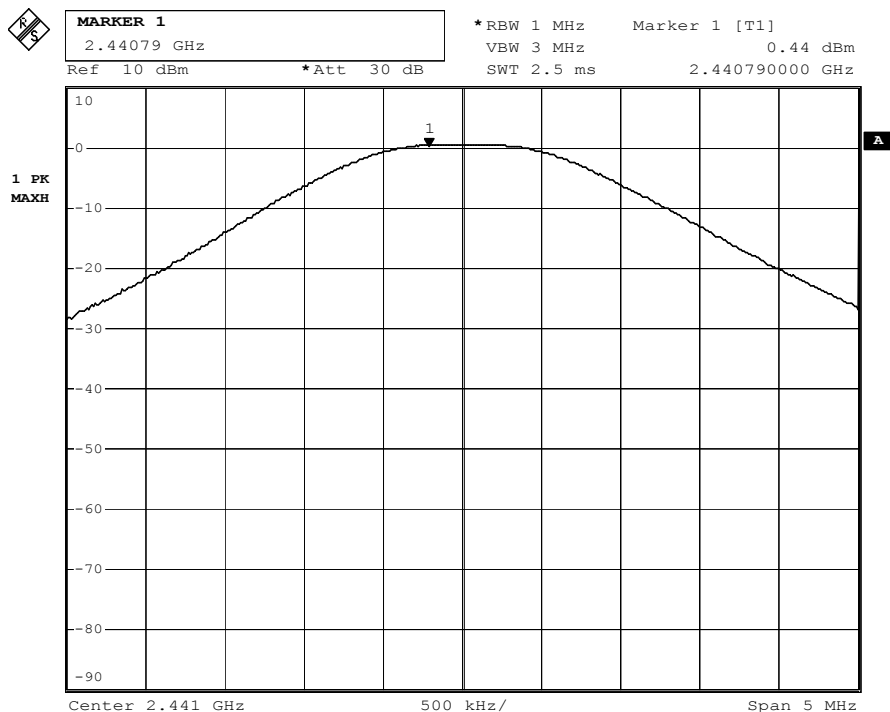
Date: 6 Dec 2004
 EUT: BTH-318A
 Company: IEA Electro-Acoustic Co., Ltd.
 Humidity: 50%
 Temperature: 23°C
 Voltage supply: 3.7VDC from rechargeable battery
 Test by: Hugo Wan
 Op. mode: TX mode, DH1 with PRBS9 payload

Tx Frequency (MHz)	Power P _{PK} (dBm)	Cable Attenuation (dB)	Actual Peak Power (dBm)	Results
2402	0.680	3.52	4.20	Pass
2441	0.440	3.65	4.09	Pass
2480	0.280	3.60	3.88	Pass



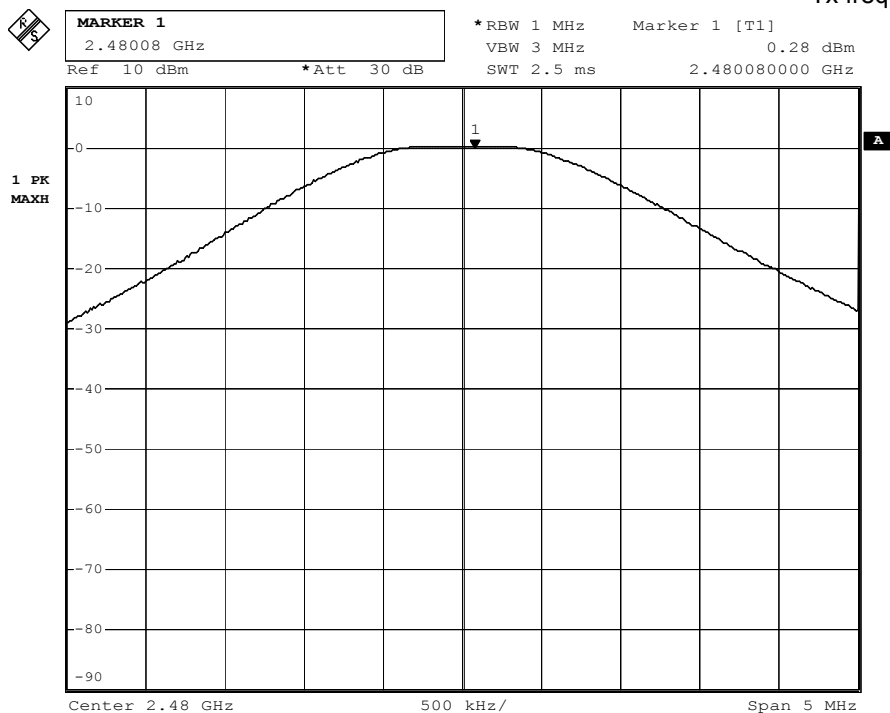
Date: 6.DEC.2004 10:08:51

Tx frequency: 2402MHz



Date: 6.DEC.2004 10:08:16

Tx frequency: 2441MHz



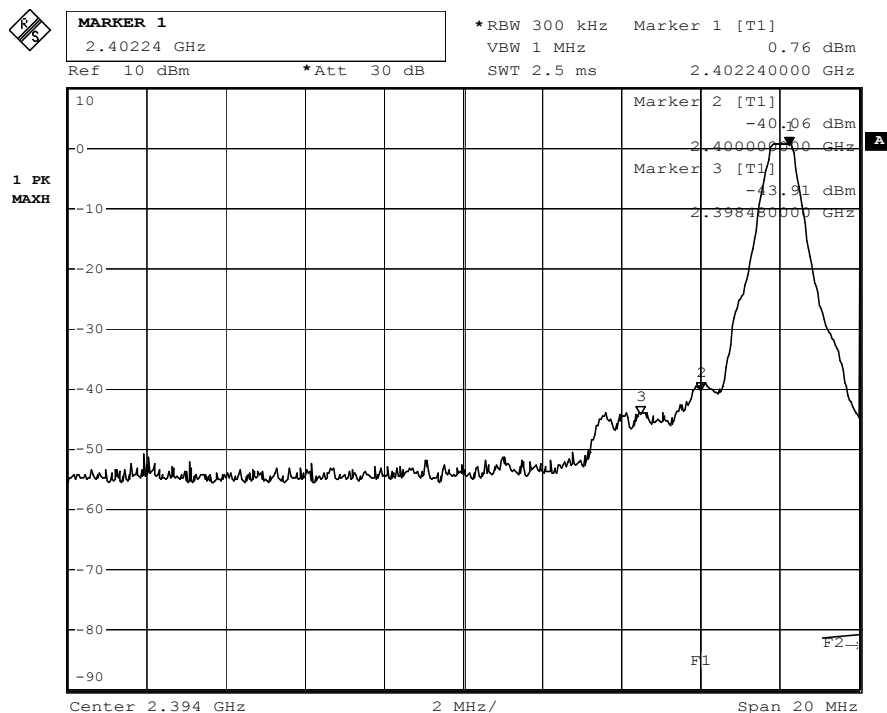
Date: 6.DEC.2004 10:07:40

Tx frequency: 2480MHz

Band Edge Compliance

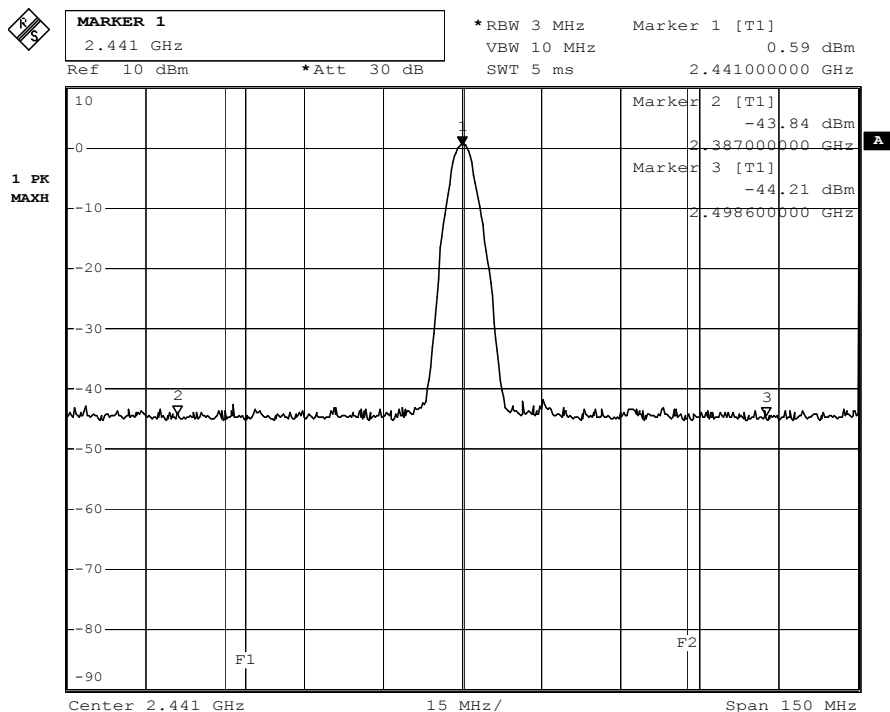
Date: 6 Dec 2004
 EUT: BTH-318A
 Company: IEA Electro-Acoustic Co., Ltd.
 Humidity: 50%
 Temperature: 23°C
 Voltage supply: 3.7VDC from rechargeable battery
 Test by: Hugo Wan
 Op. mode: TX mode, DH1 with PRBS9 payload

Tx Frequency (MHz)	Peak in band Power level (dBm)	RF power outside 100kHz BW (MHz)	RF power difference outside 100kHz BW (dB)	Results
2402	0.760	No Peak	-	Pass
2480	0.360	No Peak	-	Pass



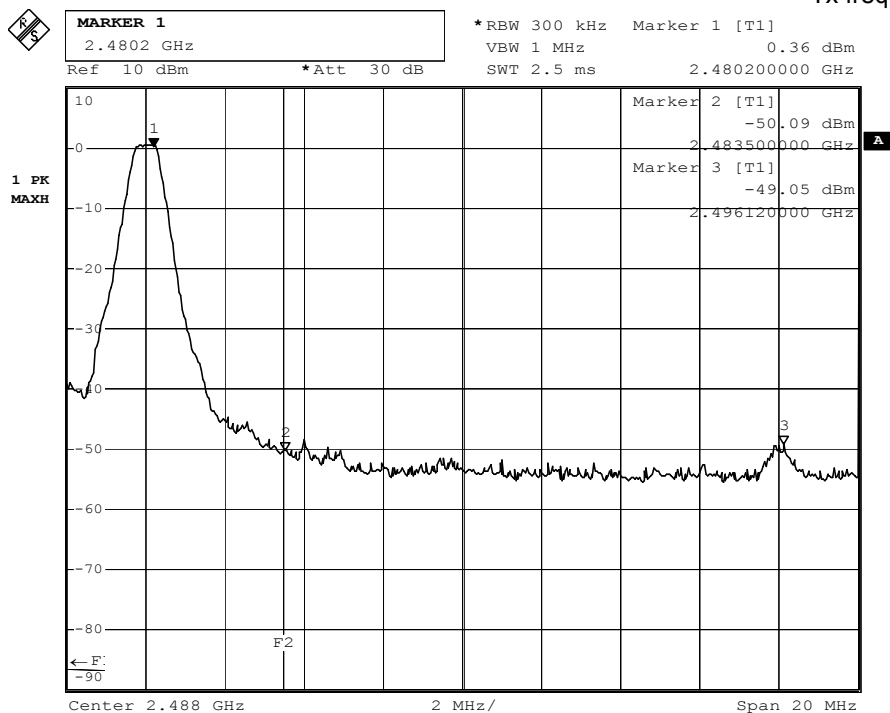
Date: 6.DEC.2004 10:09:51

Tx frequency: 2402MHz



Date: 6.DEC.2004 10:10:52

Tx frequency: 2441MHz



Date: 6.DEC.2004 10:13:49

Tx frequency: 2480MHz

Spurious Emissions - Conducted

Date: 6 Dec 2004
EUT: BTH-318A
Company: IEA Electro-Acoustic Co., Ltd.
Humidity: 50%
Temperature: 23°C
Voltage supply: 3.7VDC from rechargeable battery
Test by: Hugo Wan
Op. mode: TX mode, DH1 with PRBS9 payload

Tx frequency : 2402MHz

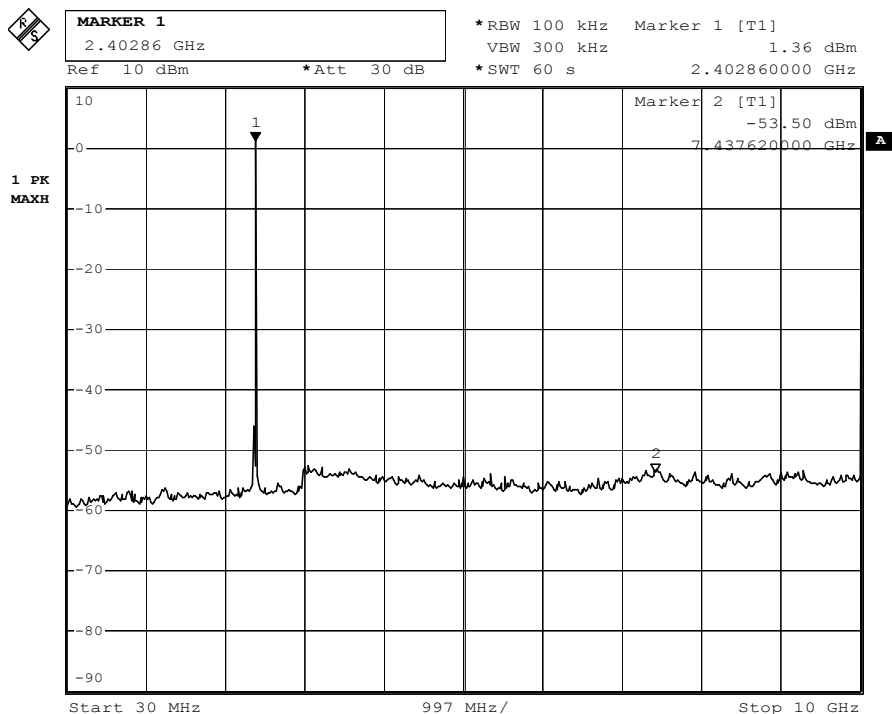
Spurious Frequency (MHz)	Power level (dBm)	Reference value (dBm)	Delta to reference level (dB)	Results
No peak found	-	-	-	Pass

Tx frequency : 2441MHz

Spurious Frequency (MHz)	Power level (dBm)	Reference value (dBm)	Delta to reference level (dB)	Results
No peak found	-	-	-	Pass

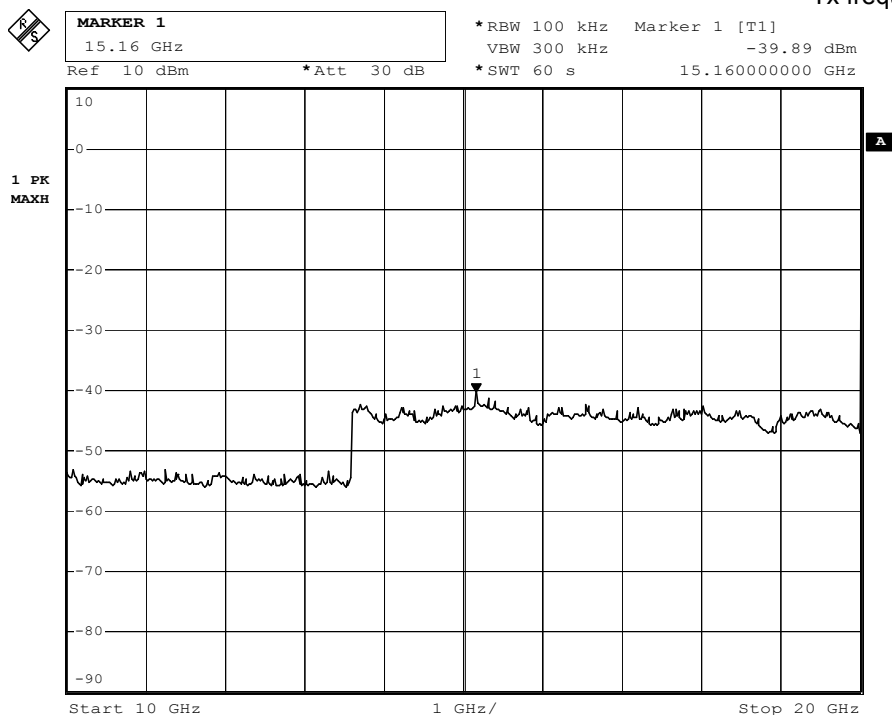
Tx frequency : 2480MHz

Spurious Frequency (MHz)	Power level (dBm)	Reference value (dBm)	Delta to reference level (dB)	Results
No peak found	-	-	-	Pass



Date: 6.DEC.2004 10:43:45

Tx frequency: 2402MHz



Date: 6.DEC.2004 10:39:41

Tx frequency: 2402MHz



MARKER 1

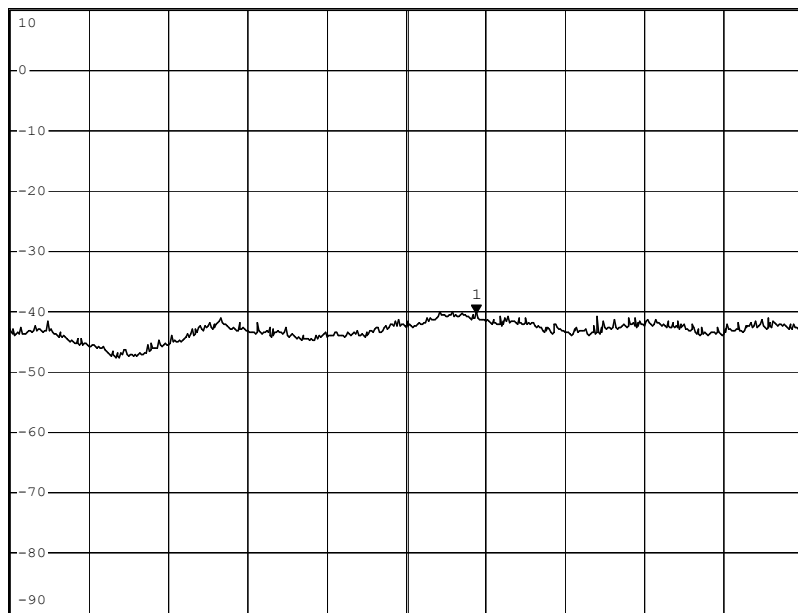
22.94 GHz

*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz -39.89 dBm
 *SWT 60 s 22.94000000 GHz

Ref 10 dBm

*Att 30 dB

1 PK
MAXH



Start 20 GHz

500 MHz/

Stop 25 GHz

Date: 6.DEC.2004 10:36:54

Tx frequency: 2402MHz

**MARKER 1**

2.44274 GHz

Ref 10 dBm

*Att 30 dB

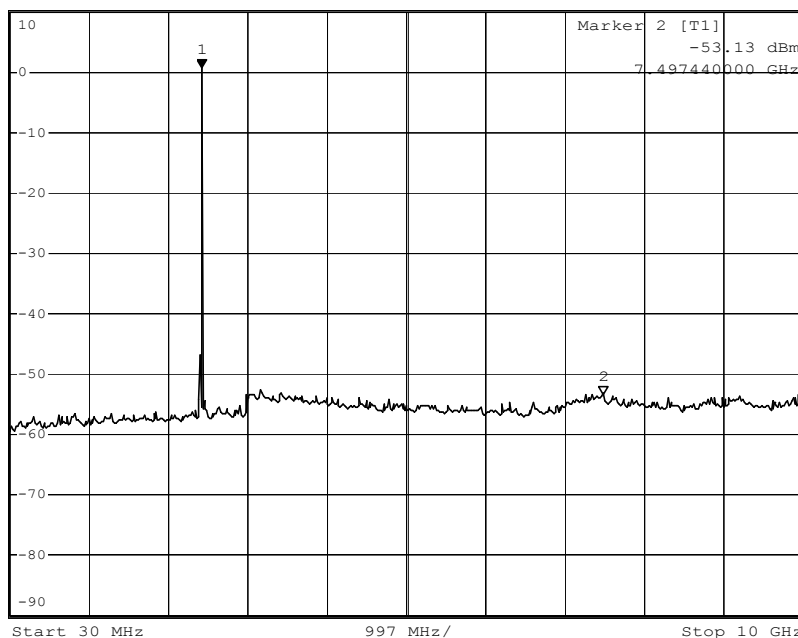
*RBW 100 kHz Marker 1 [T1]

VBW 300 kHz

*SWT 60 s

0.98 dBm

2.442740000 GHz

1 PK
MAXH

Date: 6.DEC.2004 10:28:01

Tx frequency: 2441MHz

**MARKER 1**

19.44 GHz

Ref 10 dBm

*Att 30 dB

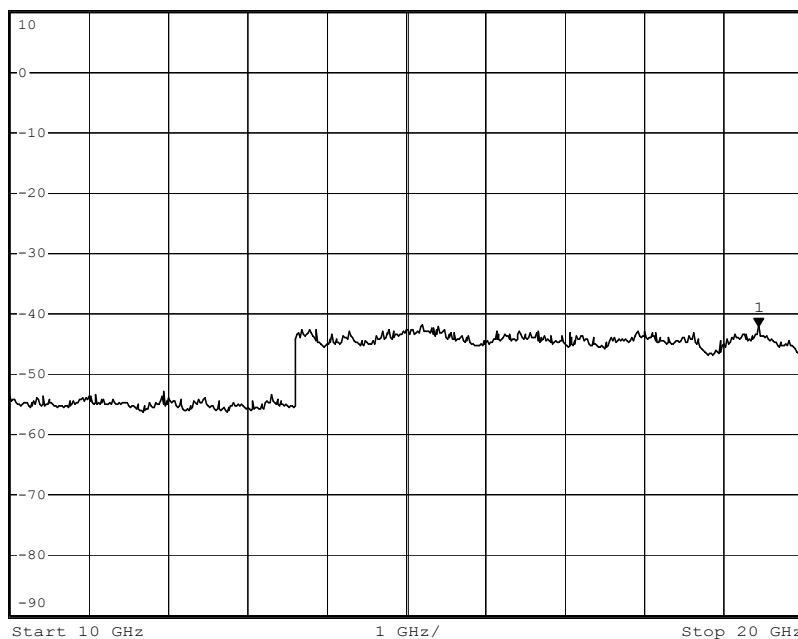
*RBW 100 kHz Marker 1 [T1]

VBW 300 kHz

*SWT 60 s

-41.85 dBm

19.440000000 GHz

1 PK
MAXH

Date: 6.DEC.2004 10:30:33

Tx frequency: 2441MHz



MARKER 1

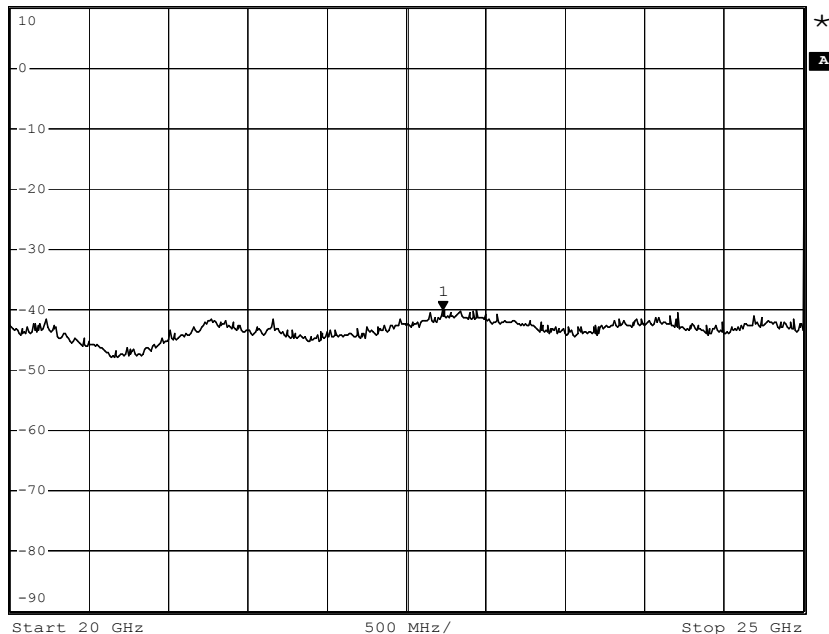
22.73 GHz

*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz -39.76 dBm
 *SWT 60 s 22.73000000 GHz

Ref 10 dBm

*Att 30 dB

1 PK
MAXH



Date: 6.DEC.2004 10:34:06

Tx frequency: 2441MHz

**MARKER 1**

2.483192 GHz

Ref 10 dBm

*Att 30 dB

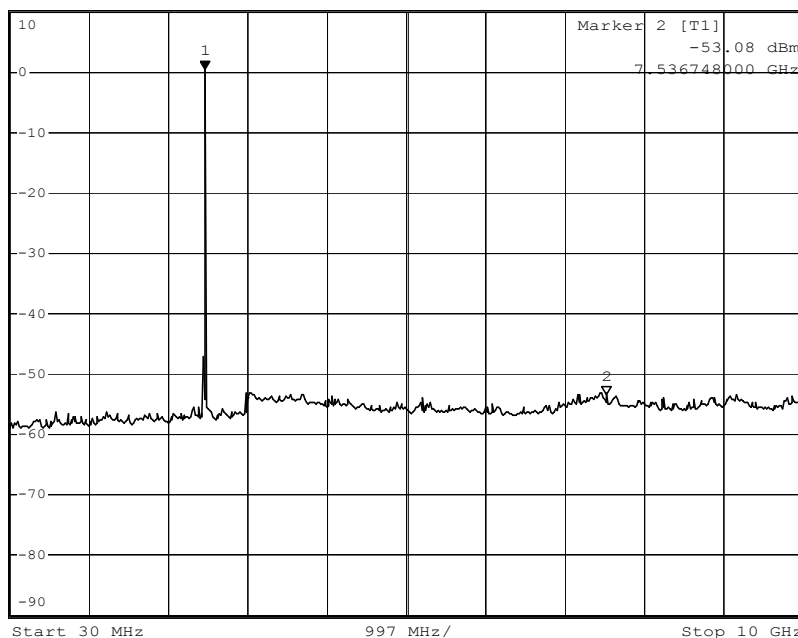
*RBW 100 kHz Marker 1 [T1]

VBW 300 kHz

0.71 dBm

*SWT 60 s

2.483192000 GHz

1 PK
MAXH

Date: 6.DEC.2004 10:18:32

Tx frequency: 2480MHz

**MARKER 1**

15.08 GHz

Ref 10 dBm

*Att 30 dB

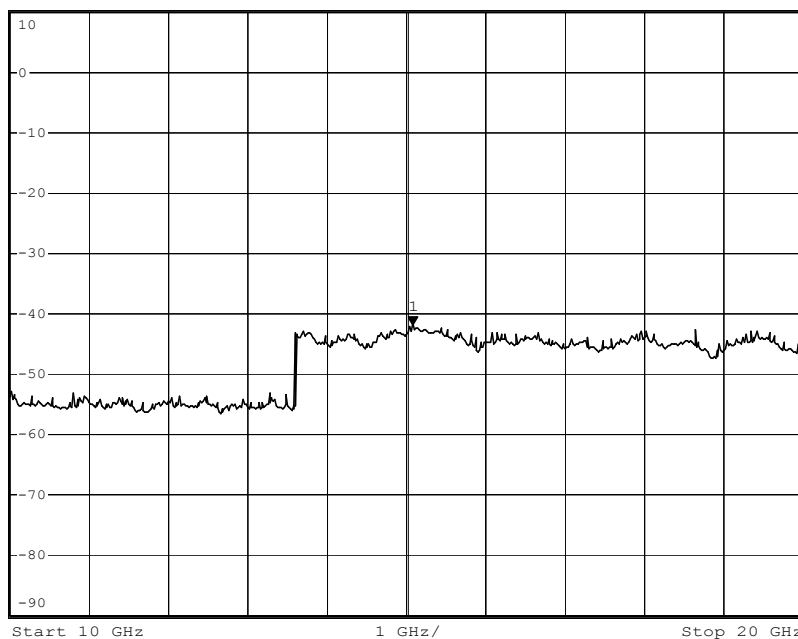
*RBW 100 kHz Marker 1 [T1]

VBW 300 kHz

-41.57 dBm

*SWT 60 s

15.080000000 GHz

1 PK
MAXH

Date: 6.DEC.2004 10:20:33

Tx frequency: 2480MHz



MARKER 1

22.77 GHz

Ref 10 dBm

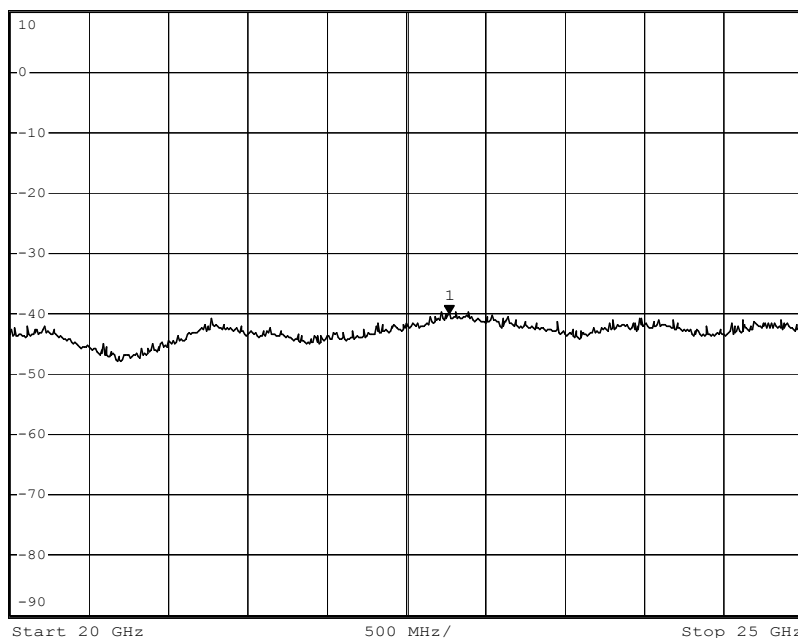
*Att 30 dB

*RBW 100 kHz Marker 1 [T1]

VBW 300 kHz -39.79 dBm

*SWT 60 s 22.77000000 GHz

1 PK
MAXH



Date: 6.DEC.2004 10:23:35

Tx frequency: 2480MHz

Spurious Emissions - Radiated

Date: 19 Nov 2004

EUT: BTH-318A

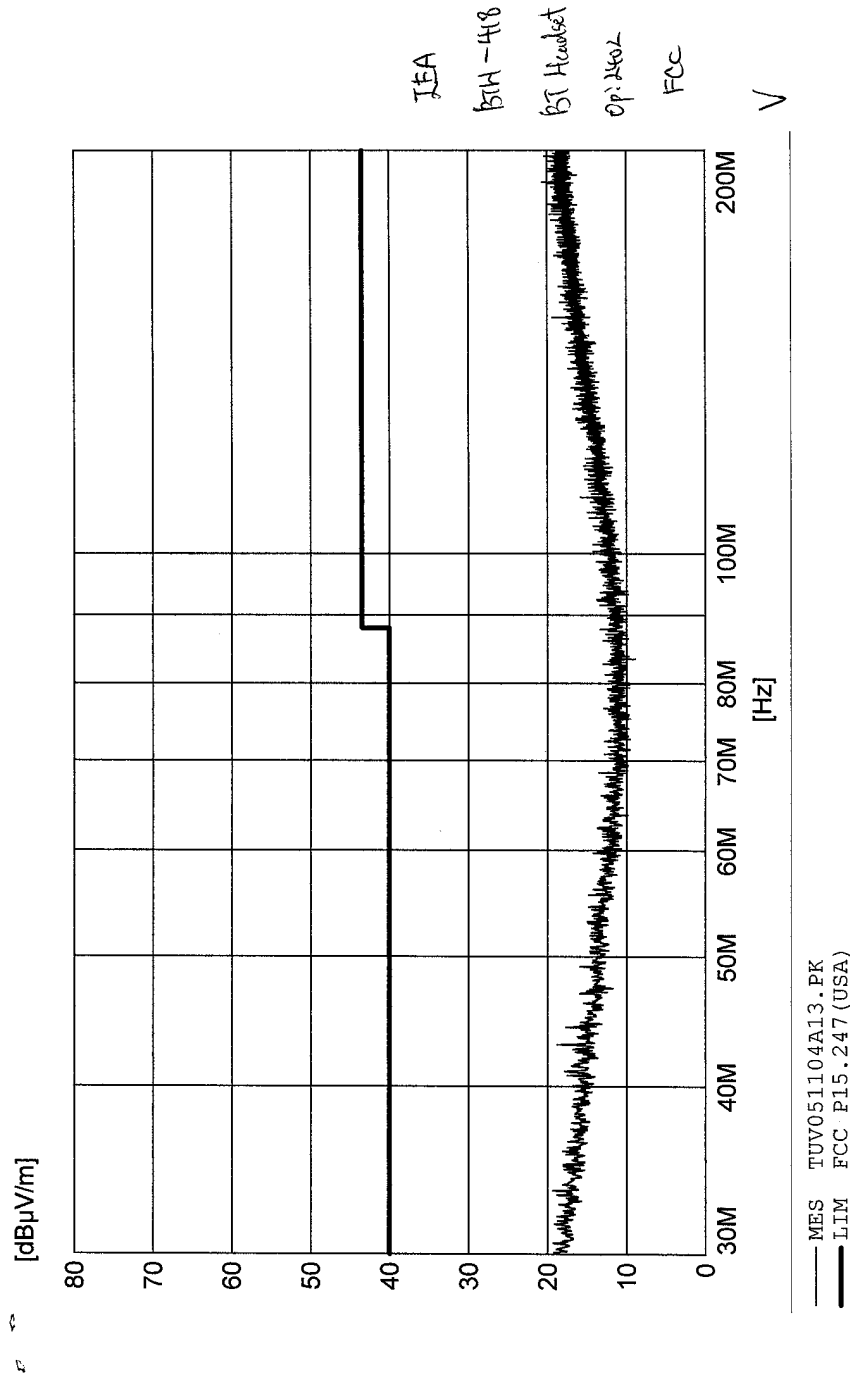
Company: IEA Electro-Acoustic Co., Ltd.

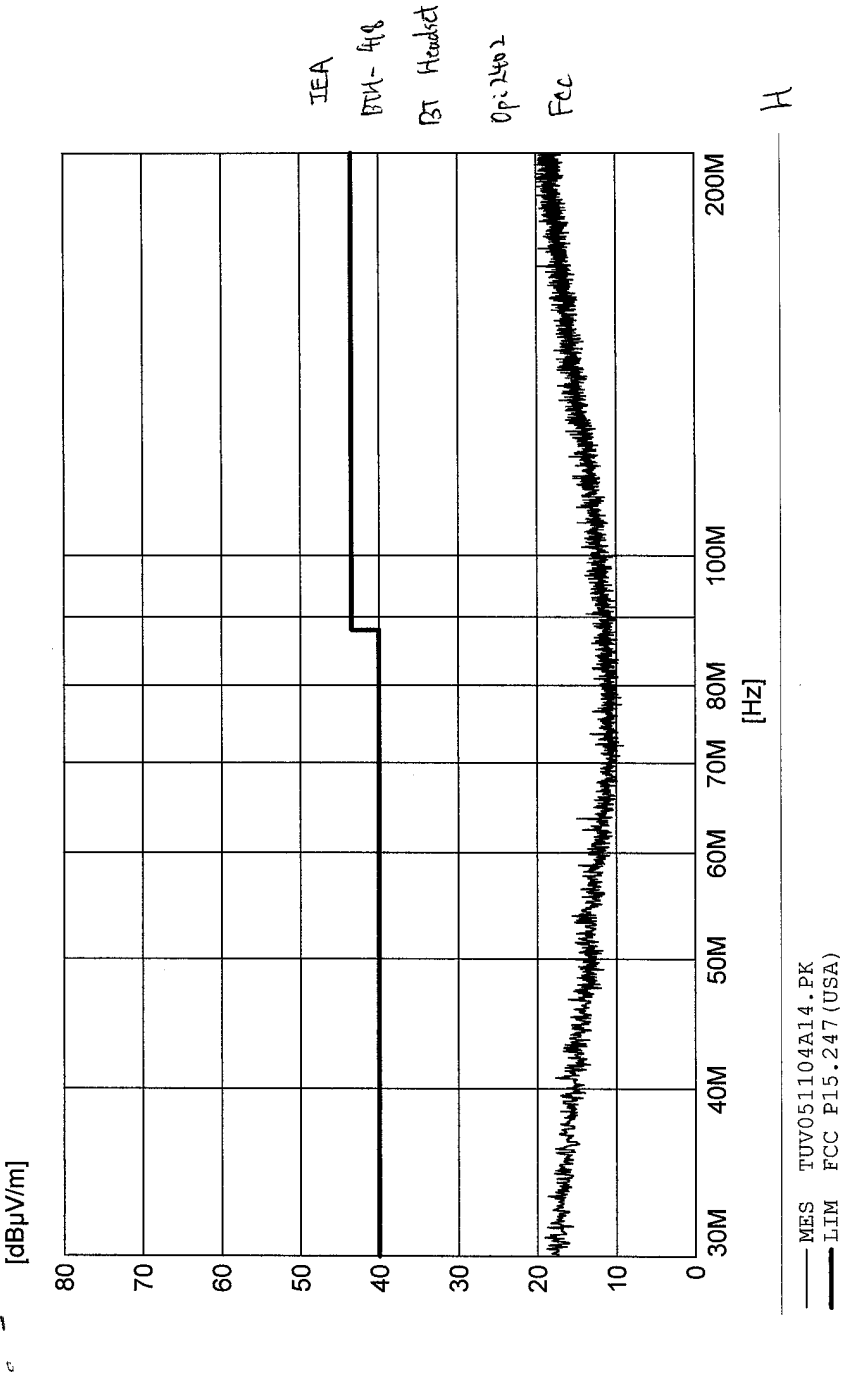
Voltage supply: 3.7VDC from rechargeable battery

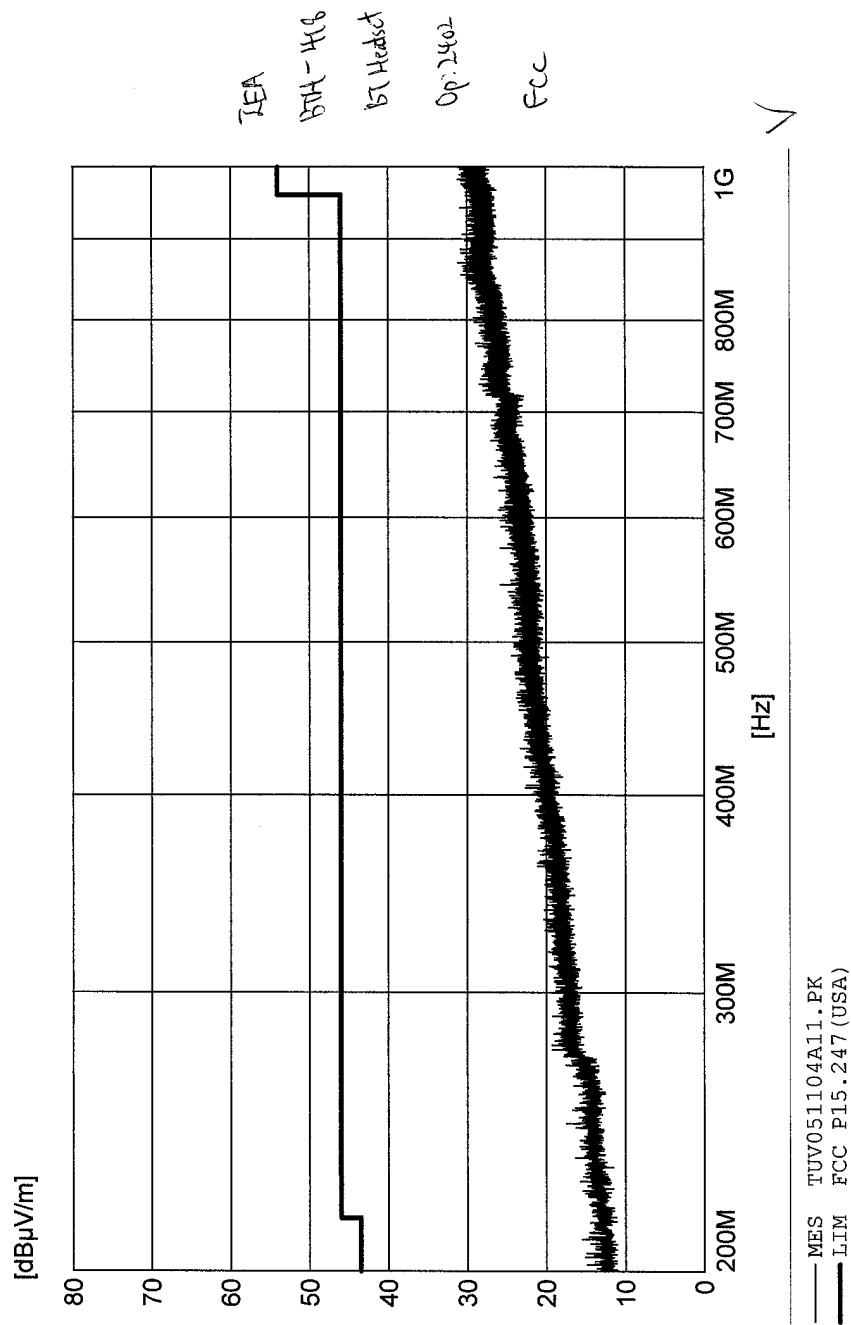
Test by: Hugo Wan

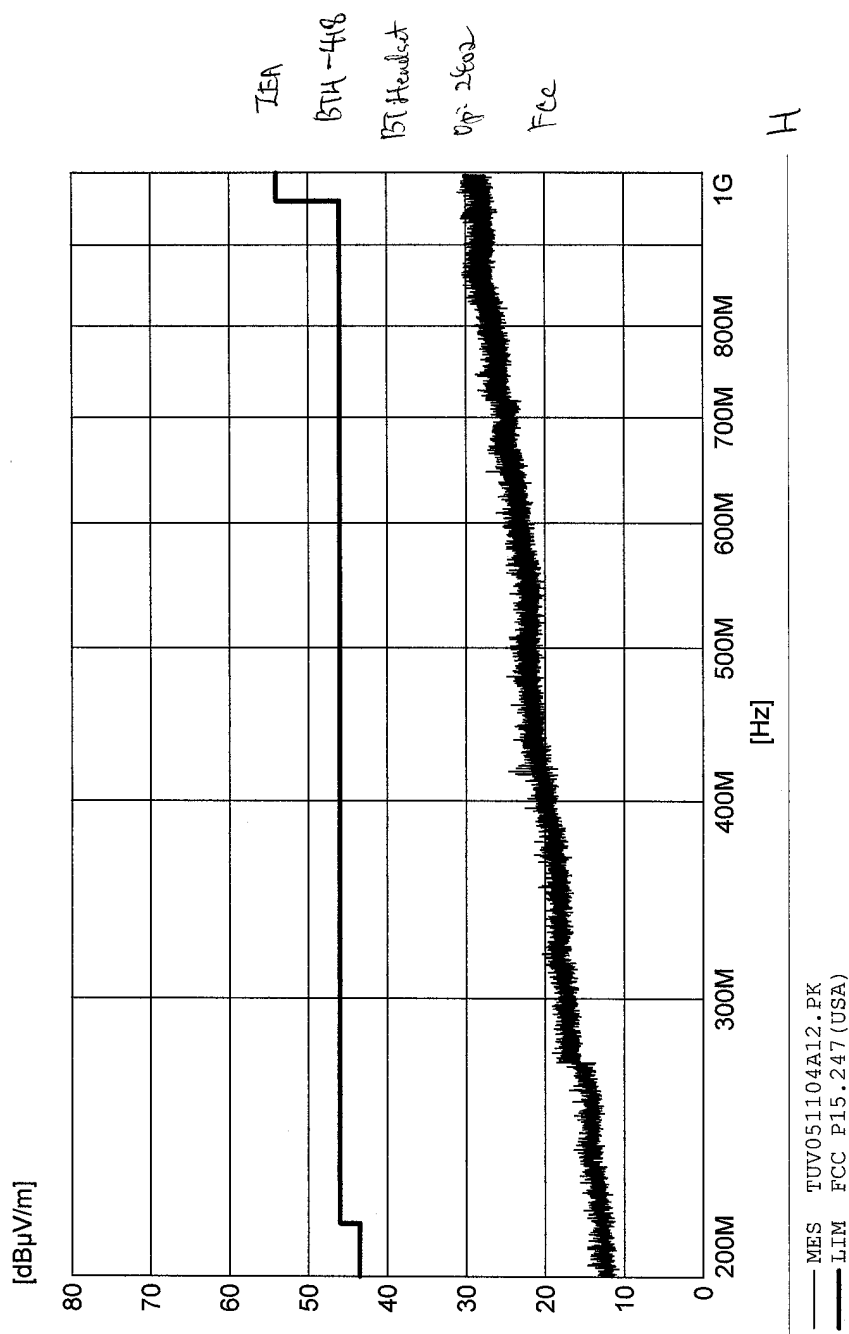
Op. mode: TX mode, DH1 with PRBS9 payload

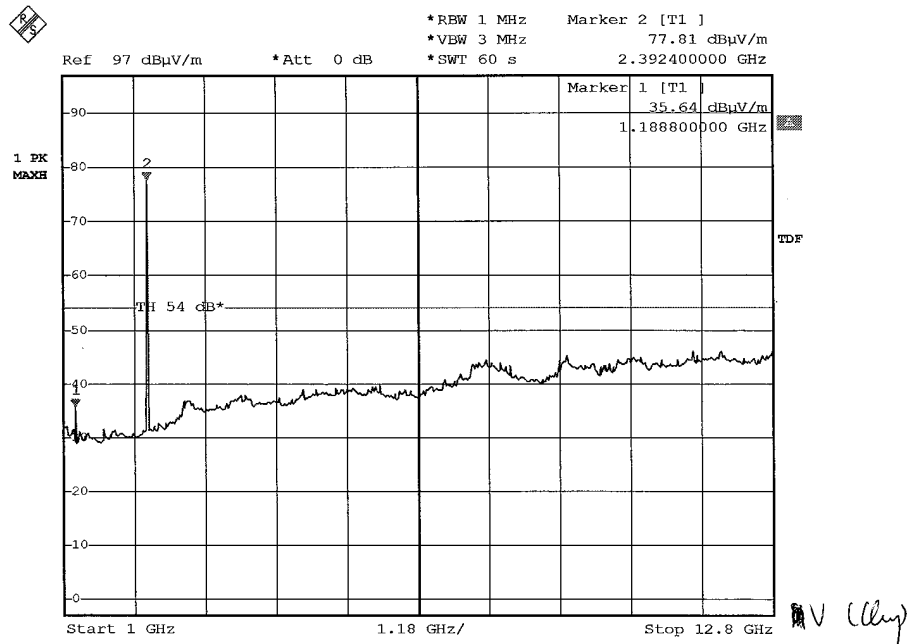
Tx frequency (MHz)	Polarization	Spurious Frequency (MHz)	Power Level (dBuV/m)	Detector (P/QP/A)
2402	V	1200.600	37.66	P
2402	V	1200.560	34.78	A
Tx frequency (MHz)	Polarization	Spurious Frequency (MHz)	Power Level (dBuV/m)	Detector (P/QP/A)
2441	V	1220.000	38.69	P
2441	V	1220.000	36.81	A
Tx frequency (MHz)	Polarization	Spurious Frequency (MHz)	Power Level (dBuV/m)	Detector (P/QP/A)
2480	V	1239.540	40.34	P
2480	V	1239.500	38.63	A











Date: 19.NOV.2004 20:36:05

IEA

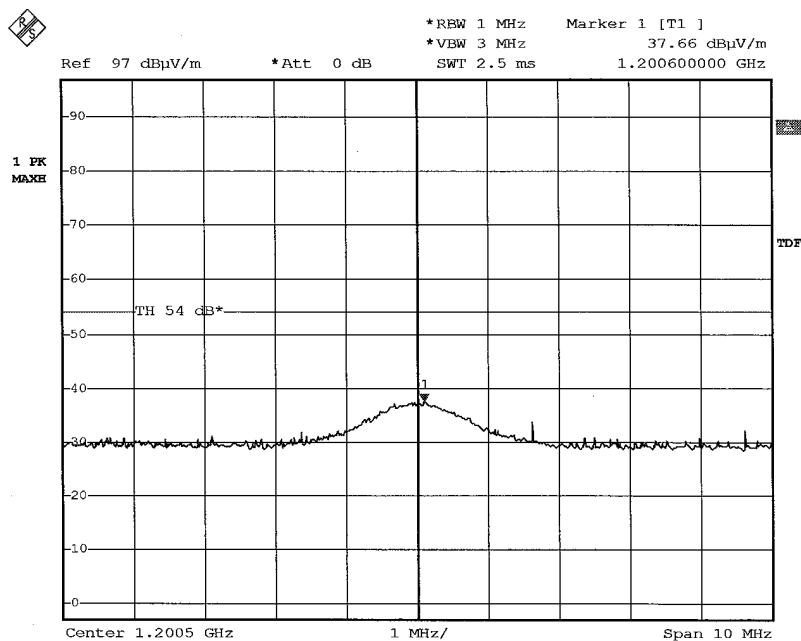
BT Headset

BTH-49

041011017

Op. 2502

Fcc



Date: 19.NOV.2004 20:42:30

IEA

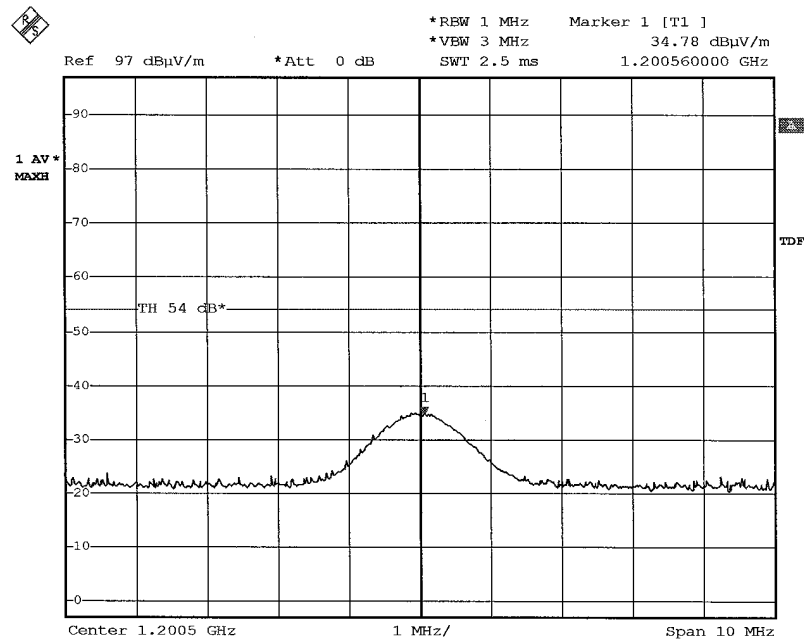
BT Headset

BT4-HB

041011017

Op: 2402

FCC



Date: 19.NOV.2004 20:43:36

IEA

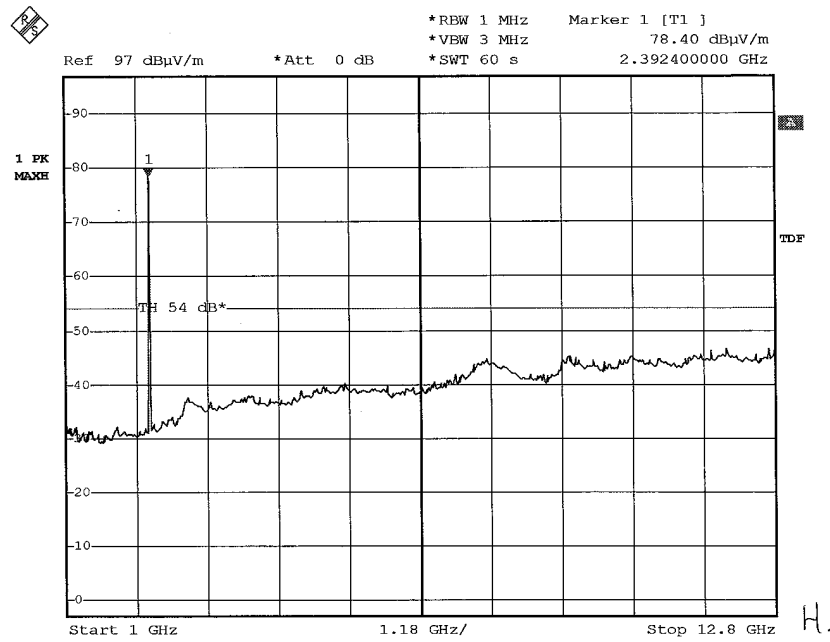
BT Headset

BT4-418

041011017

Op:2402

FCC



Date: 19.NOV.2004 20:33:30

IEA

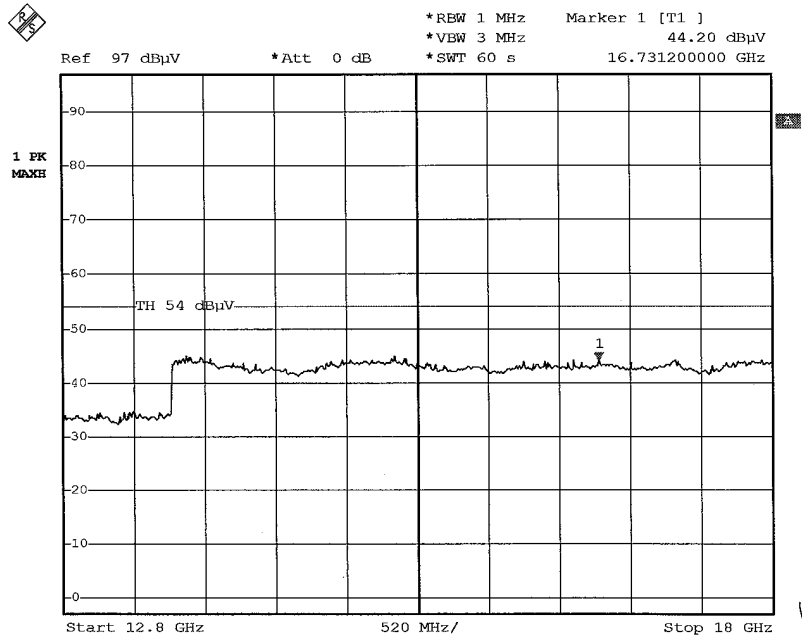
BT Headset

15TH-418

041011017

Op: 2402

FCC



Date: 19.NOV.2004 21:23:02

IEA

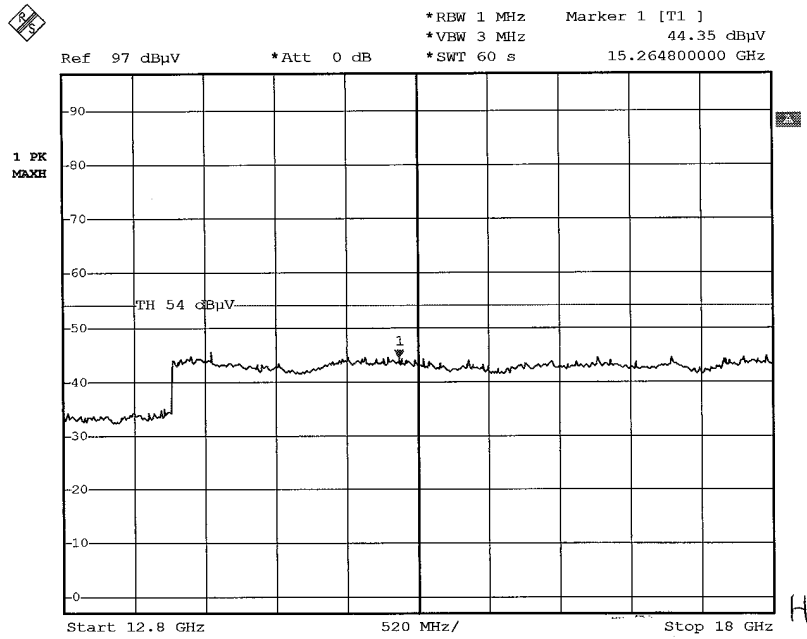
BT Headset

BSH-418

041011017

Op: 2402

Fcc



Date: 19.NOV.2004 21:30:44

IEA

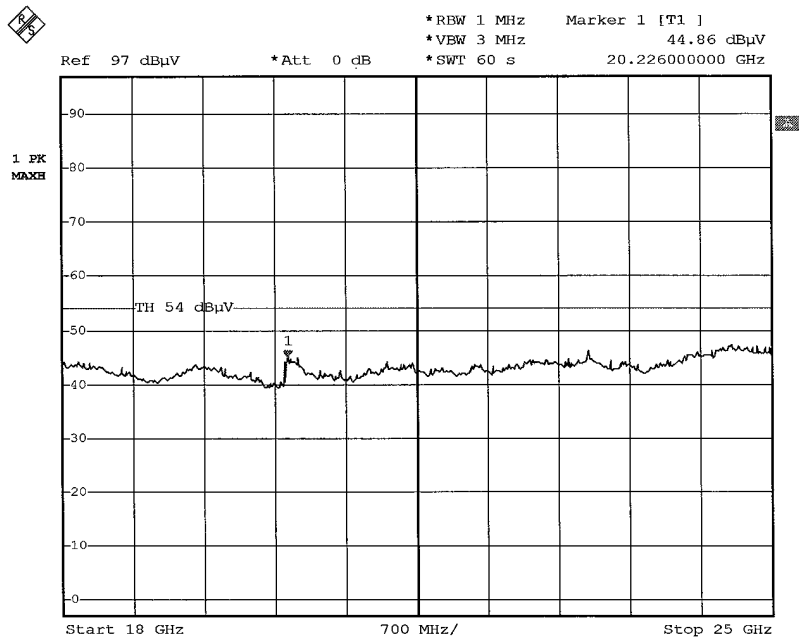
BT Headset

BTM-418

041011017

Op: 2402

FCC



Date: 19.NOV.2004 21:41:04

IEA

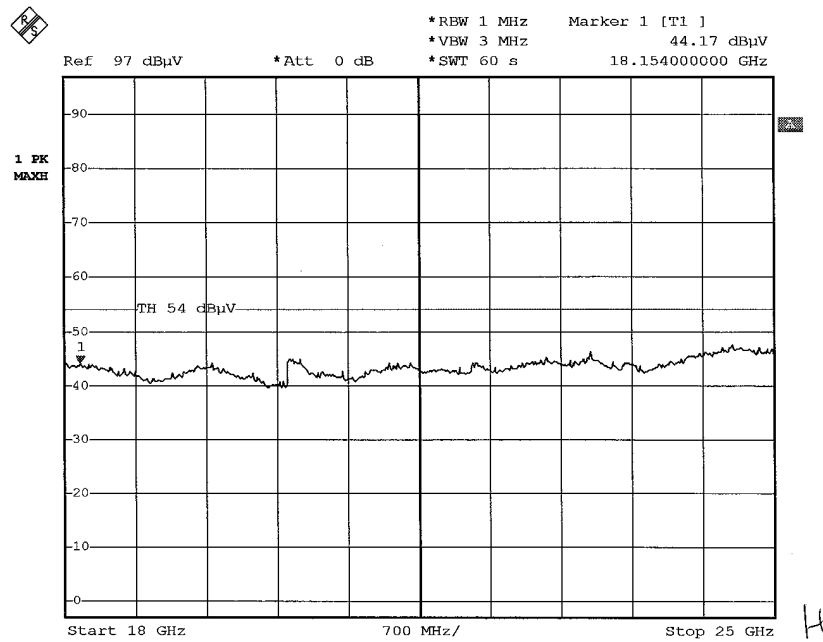
B7 Headset

B14 - 418

041011017

Op: 2402

FCC



Date: 19.NOV.2004 21:45:35

IEA

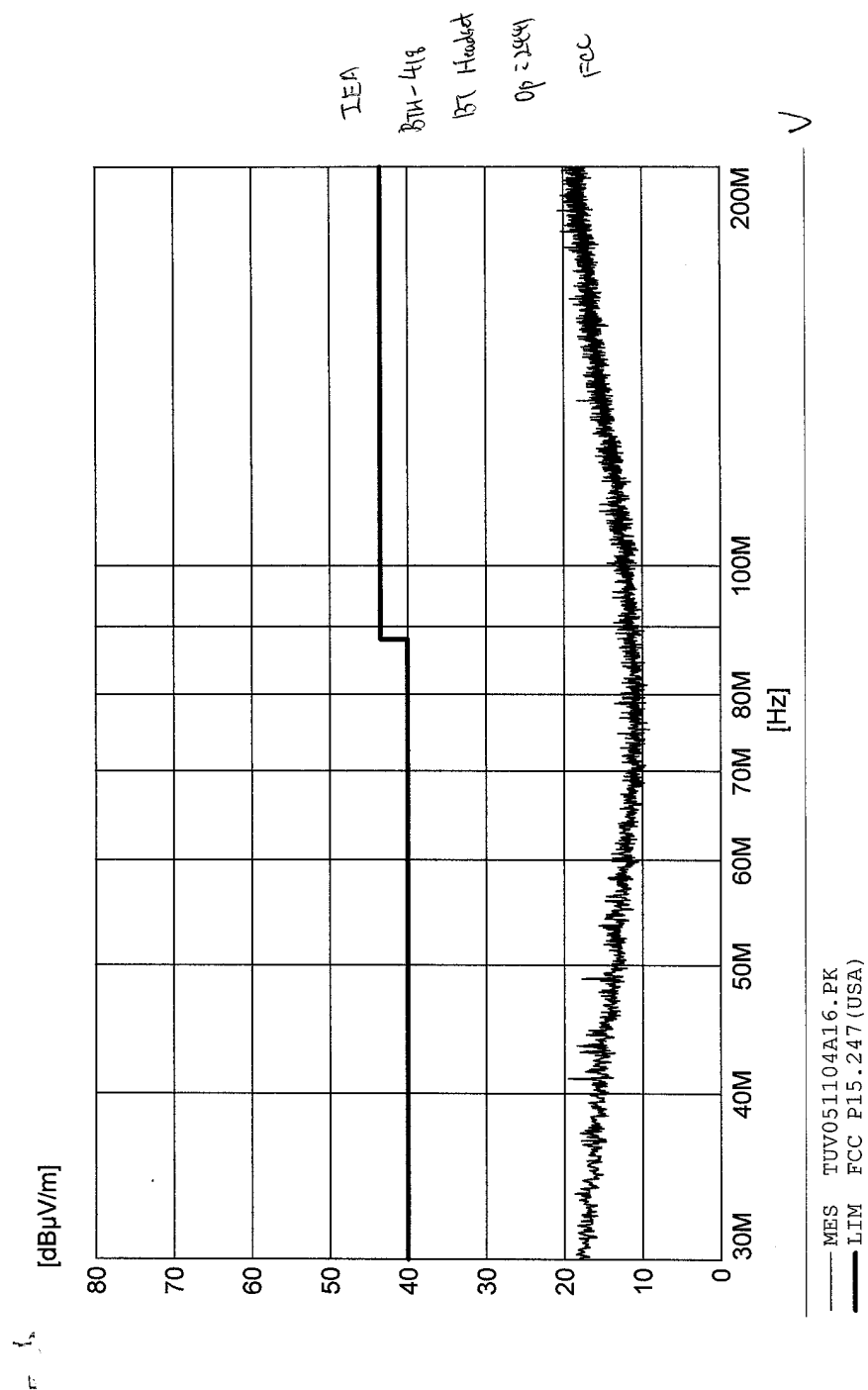
BT Headset

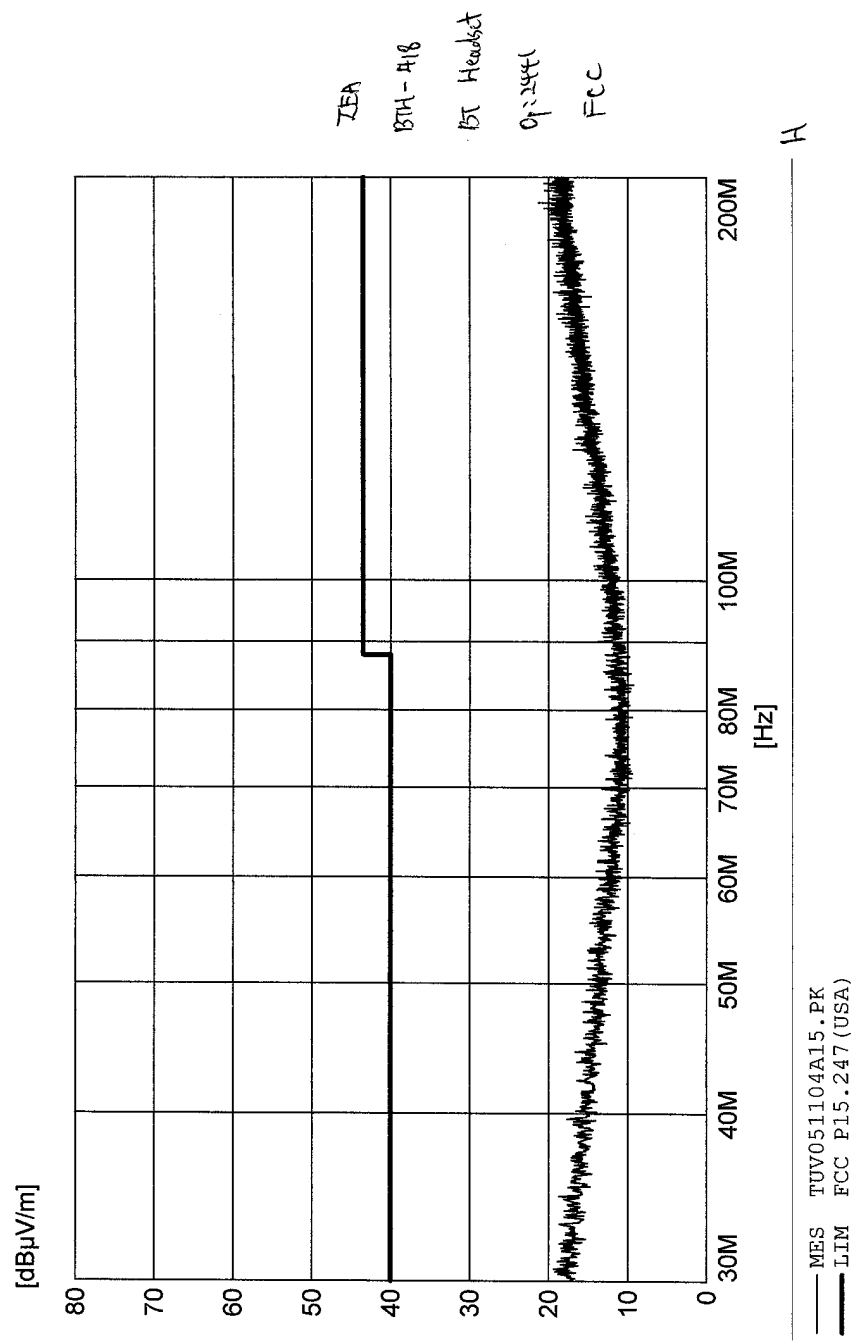
BT4-418

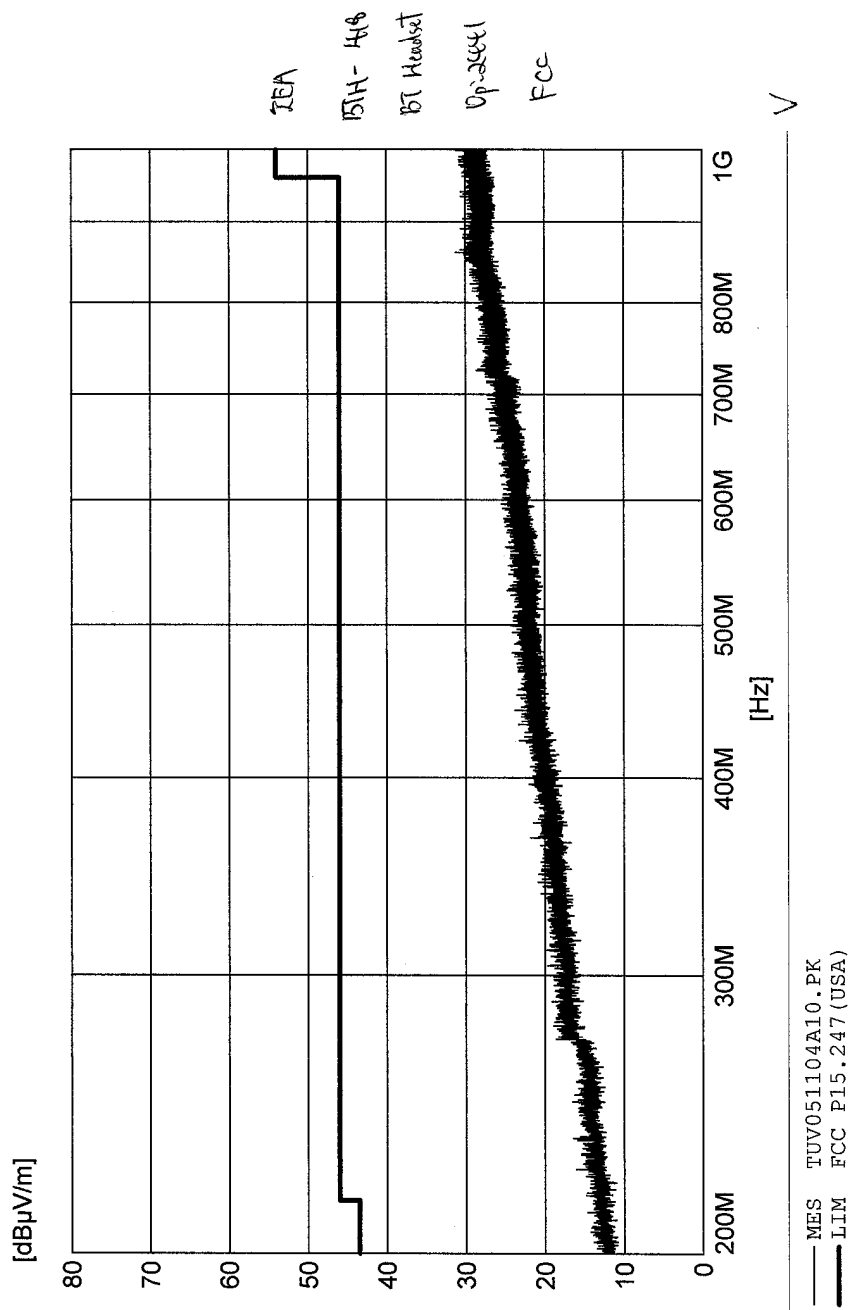
041011017

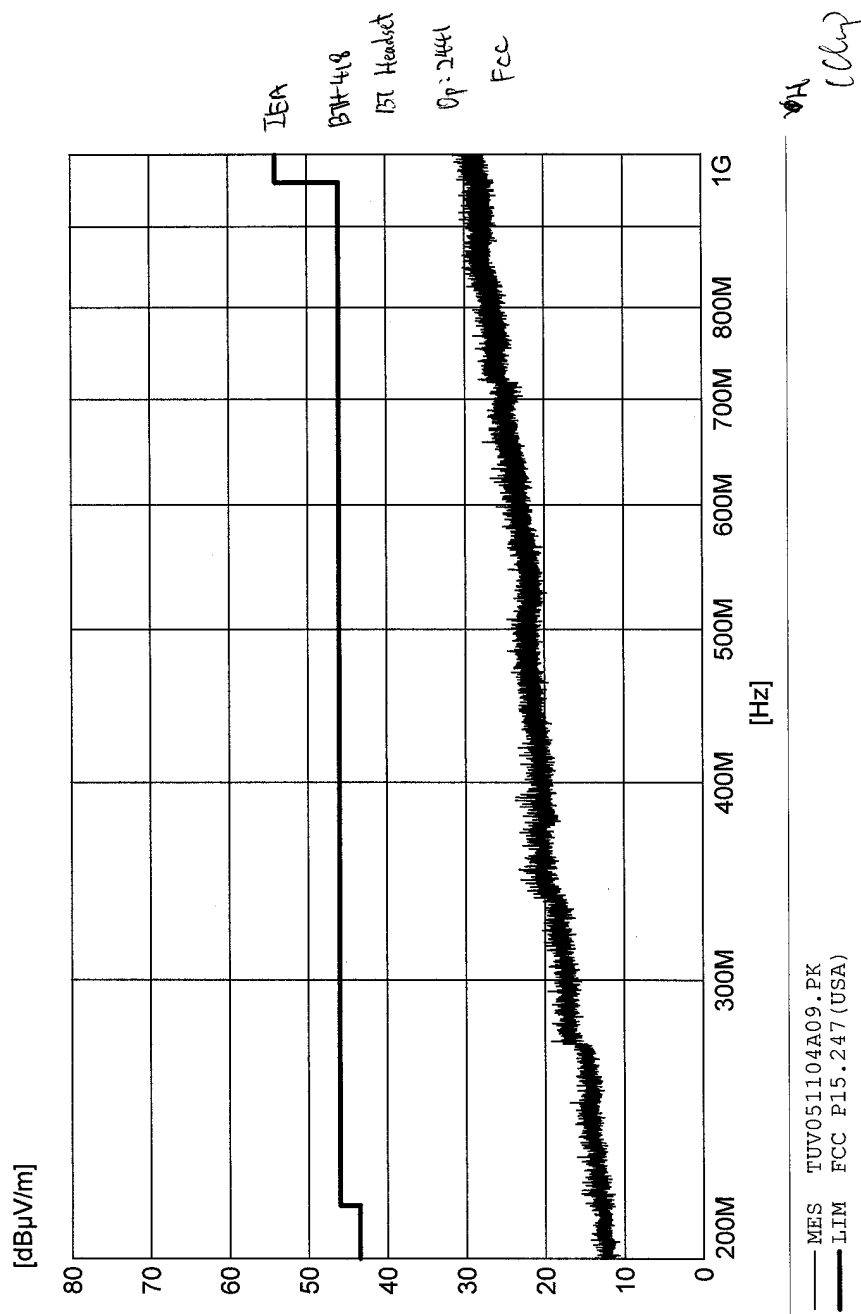
Op: 2402

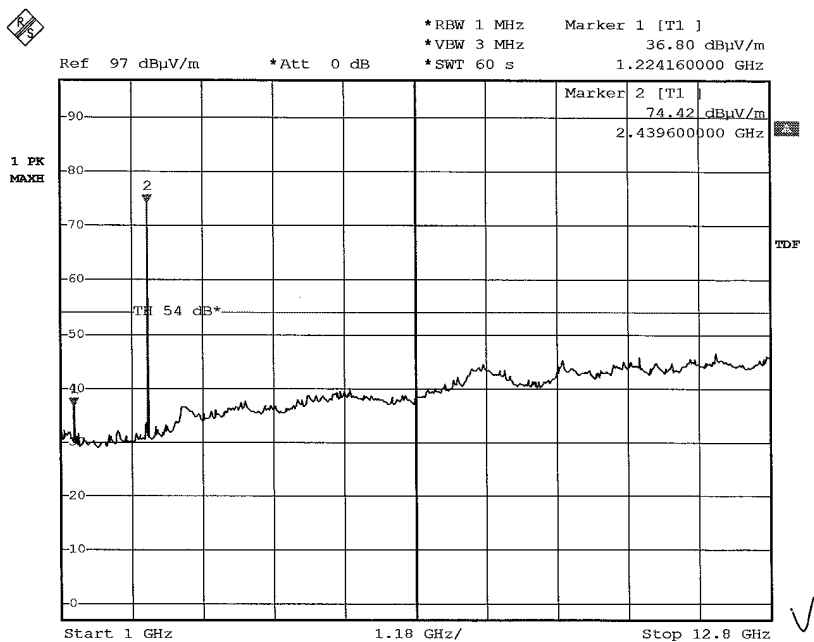
FCC











Date: 19.NOV.2004 20:52:02

IEA

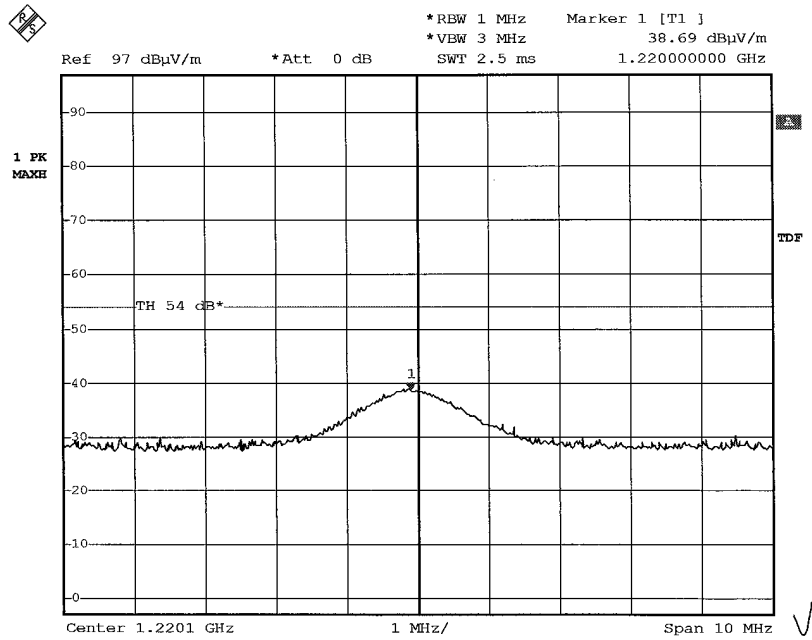
BT Headset

BTM-418

041011017

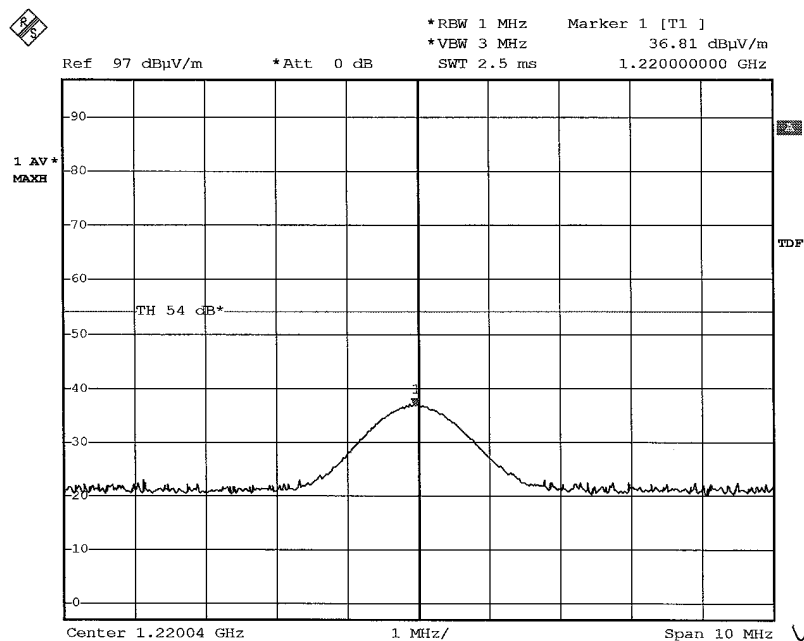
Op: 2441.

FCC



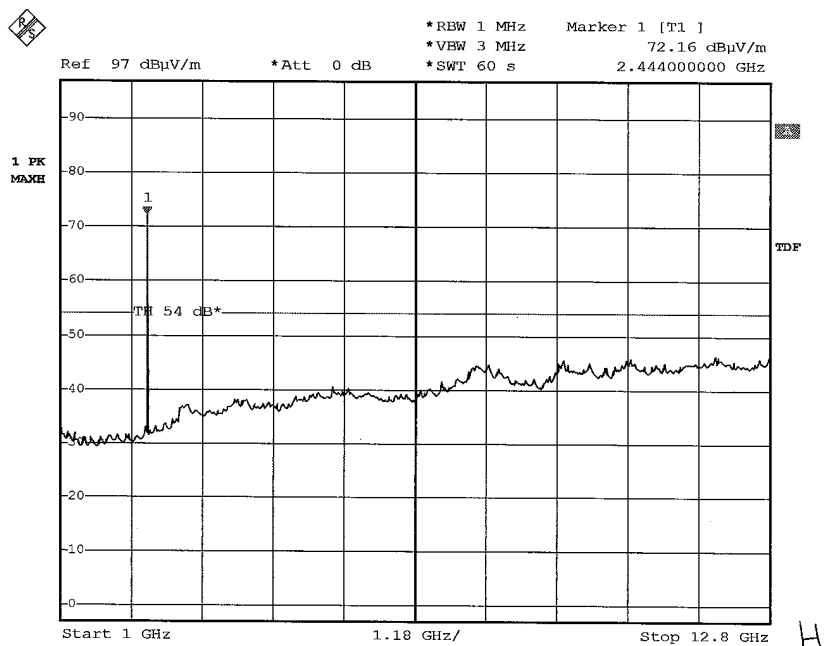
Date: 19.NOV.2004 20:56:03

IEA
 BT Headset
 BTH - 418
 041011017
 Op:2441
 FCC



Date: 19.NOV.2004 20:57:30

IEA
 BT Headset
 BTU-416
 041011017
 Op: 2441
 FCC



Date: 19.NOV.2004 21:04:45

IEA

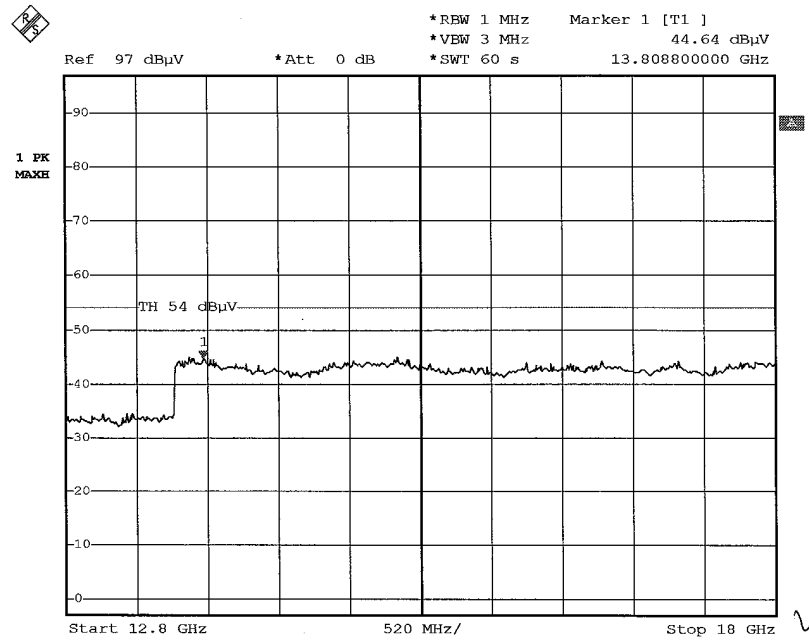
BT Headset

BTW-418

041011017

Op: 2441.

FCC



Date: 19.NOV.2004 21:21:41

IEA

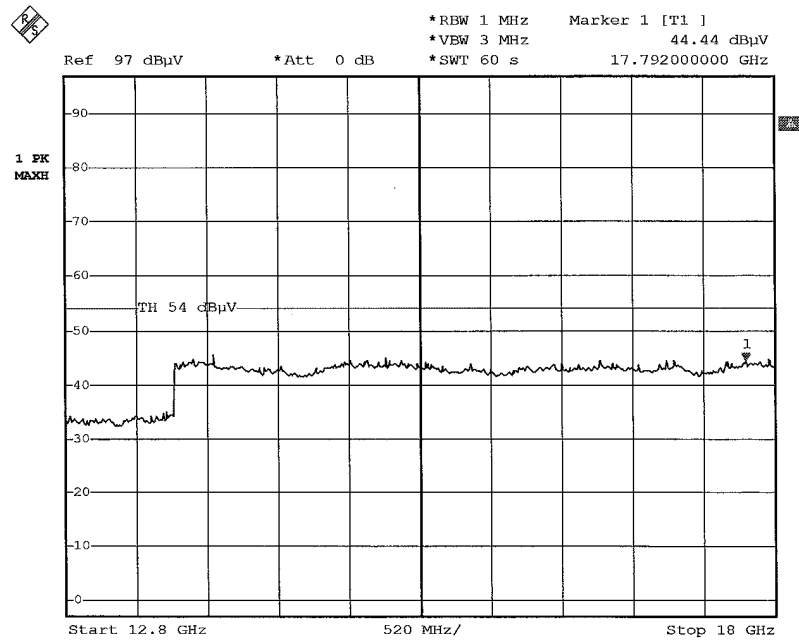
BT Headset

BT4-418

041011017

Op: 2441

FCC



Date: 19.NOV.2004 21:31:25

IEA

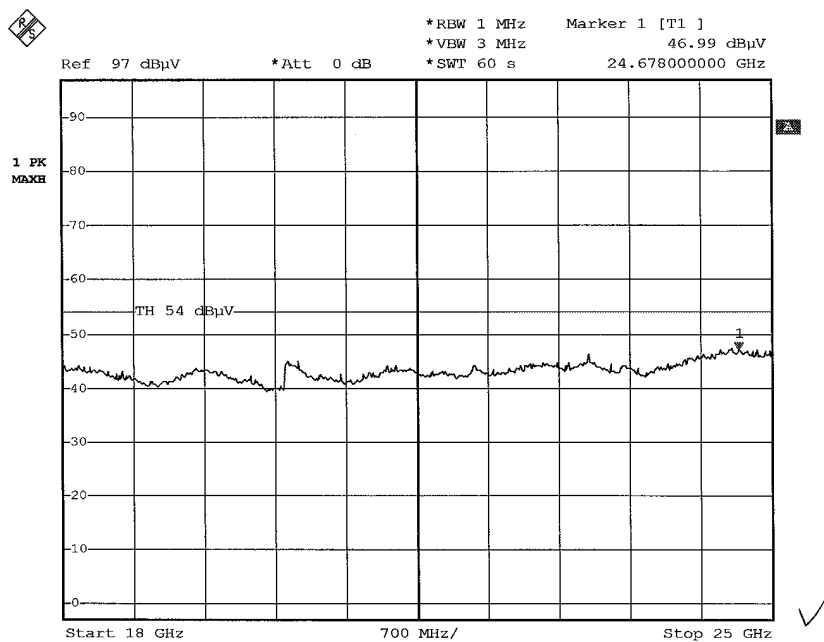
BT Headset

BT4-418

641011017

Op: 2441.

FCC



Date: 19.NOV.2004 21:42:29

IEA

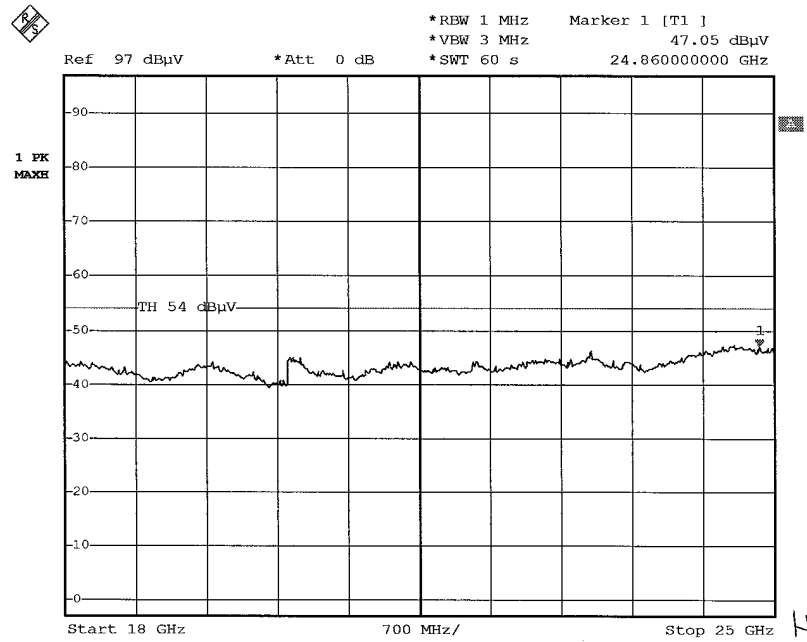
BT Headset

BT4-18

041011017

Opi241

Fcc



Date: 19.NOV.2004 21:44:16

IEA

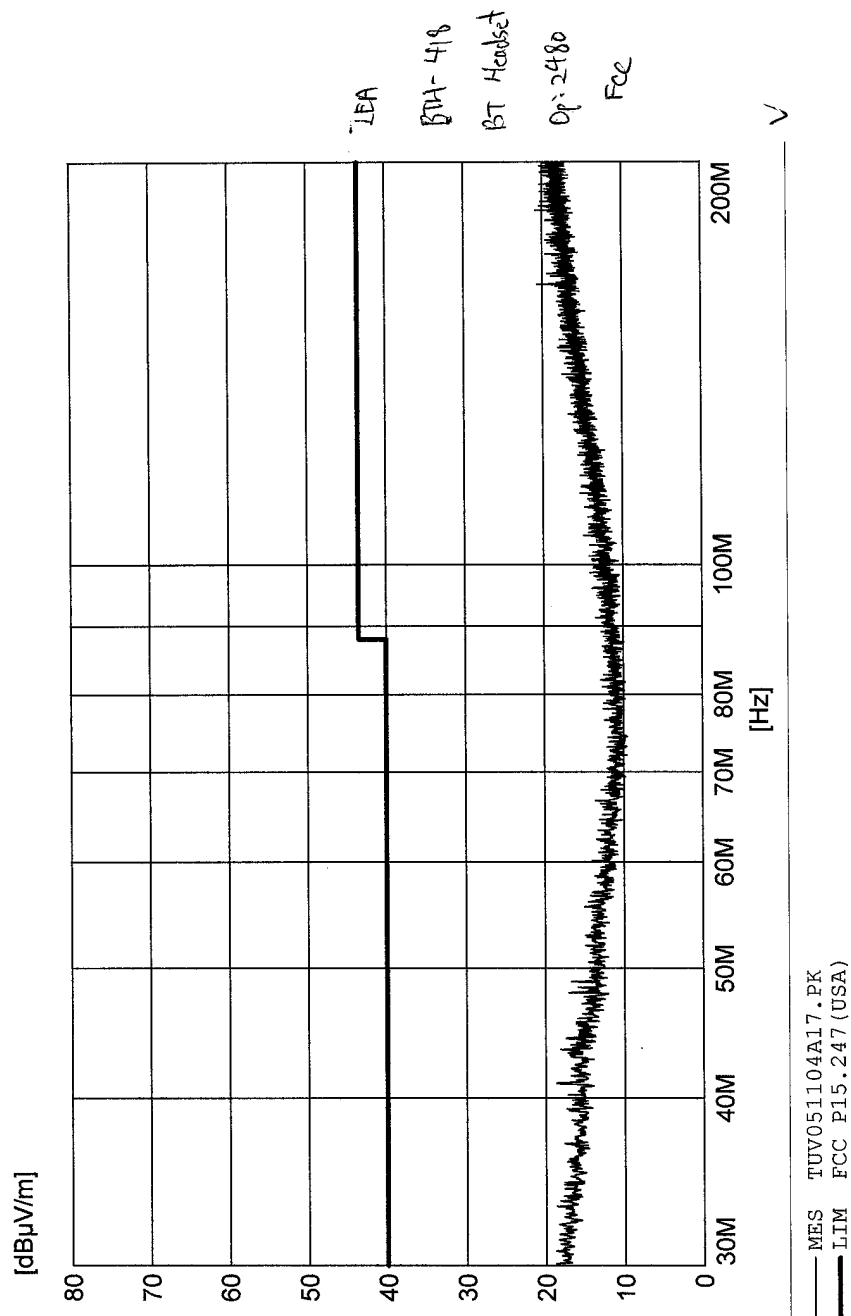
Bt Headset

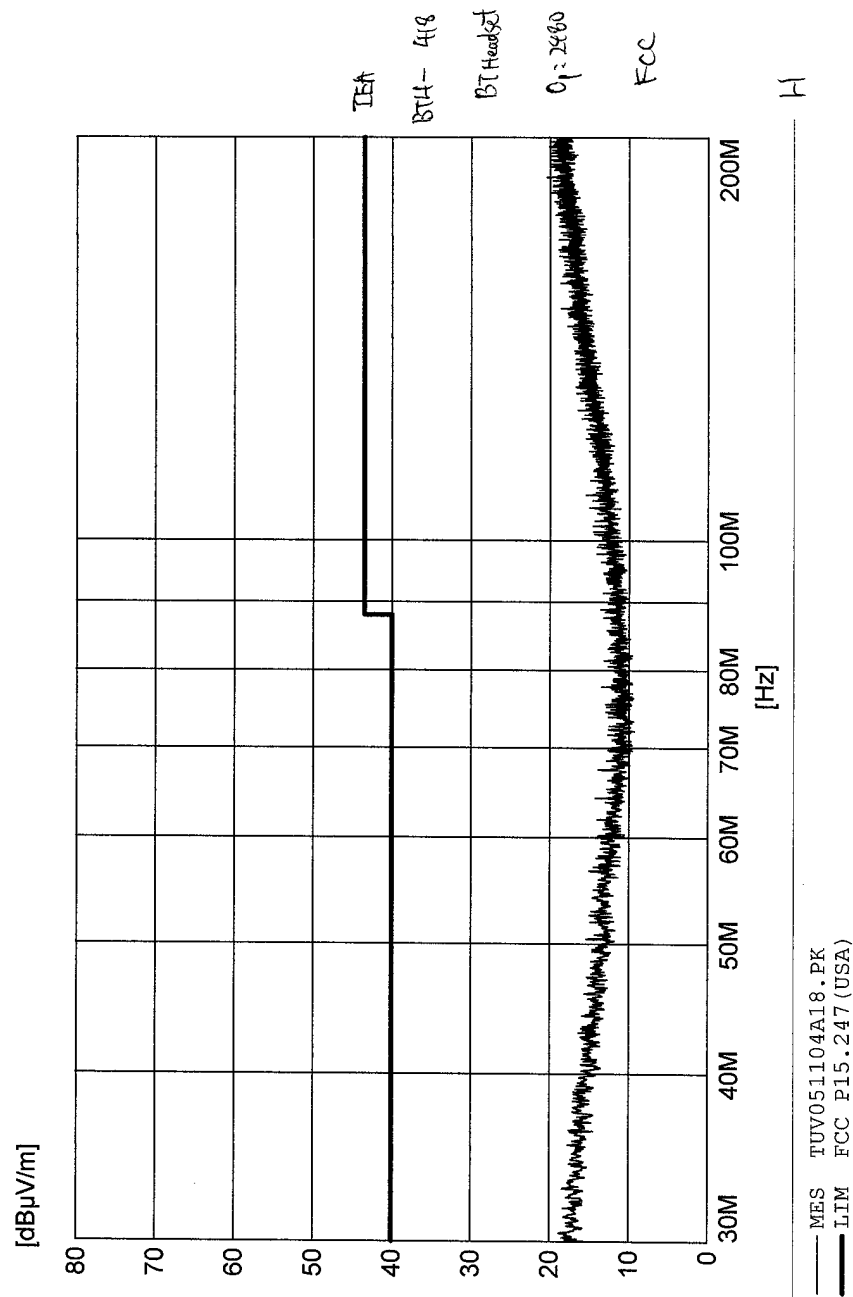
BTH-419

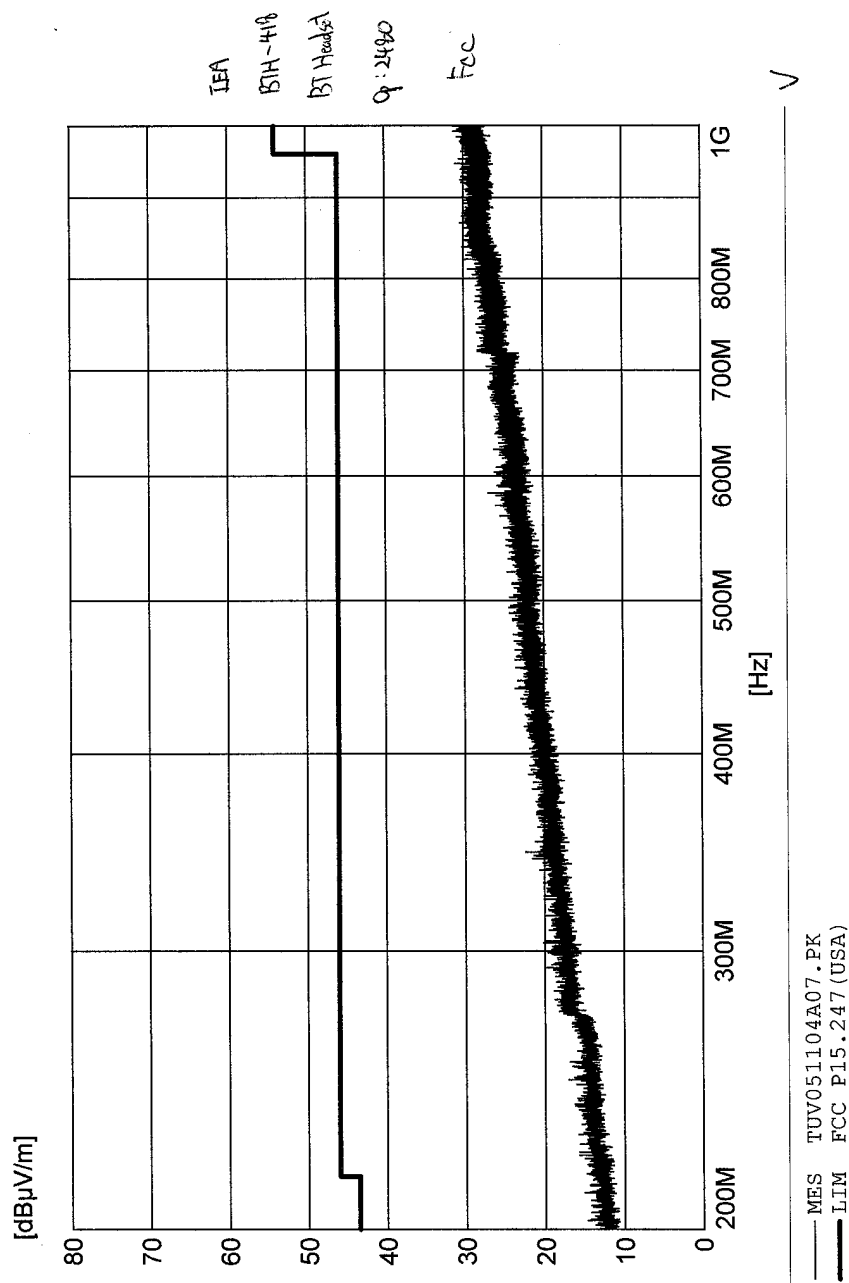
041011017

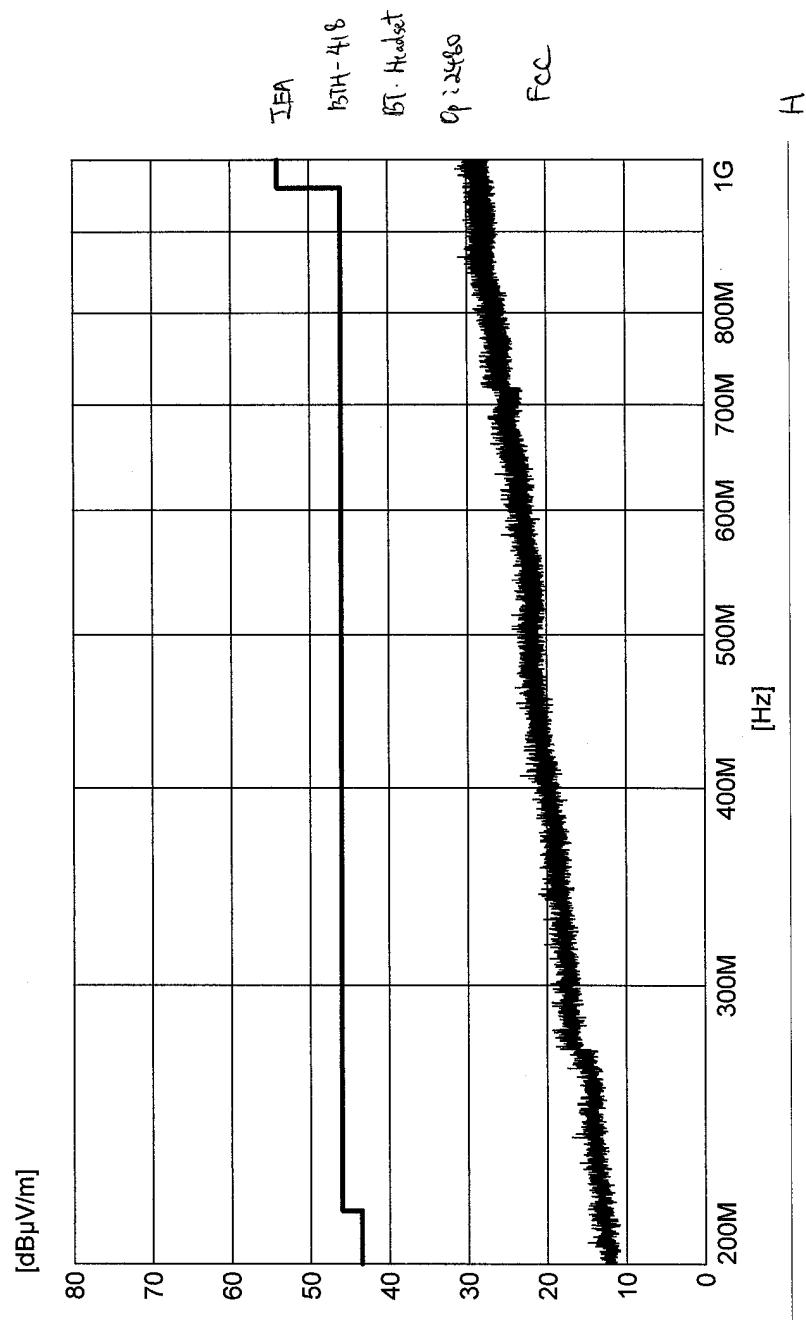
Op: 2441

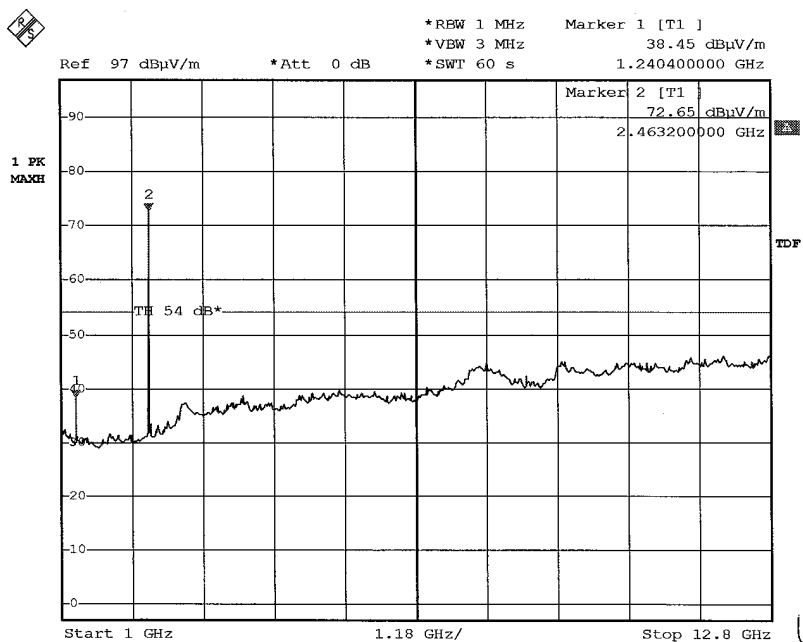
Fcc











Date: 19.NOV.2004 21:13:52

IEA

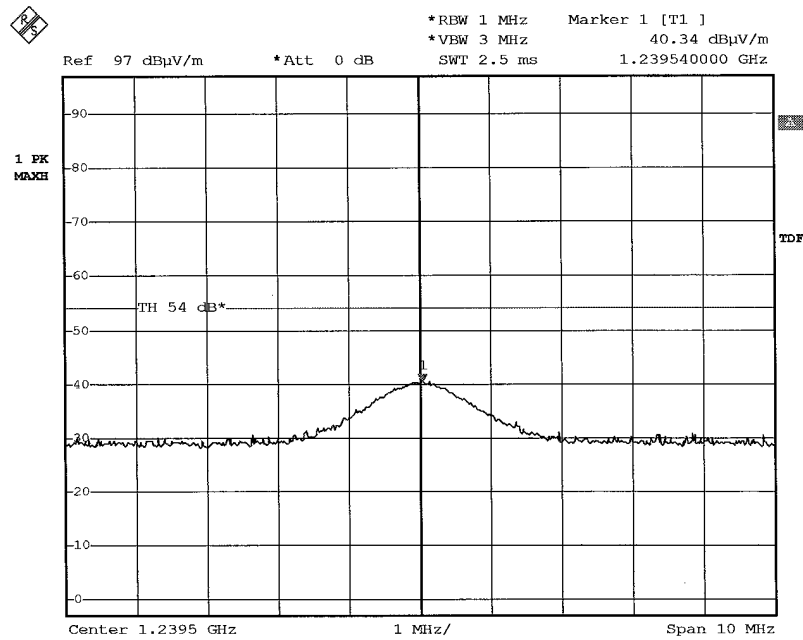
BT Headset

BT4-418

041011017

Op: 2460

FCC



Date: 19.NOV.2004 21:17:10

IEA

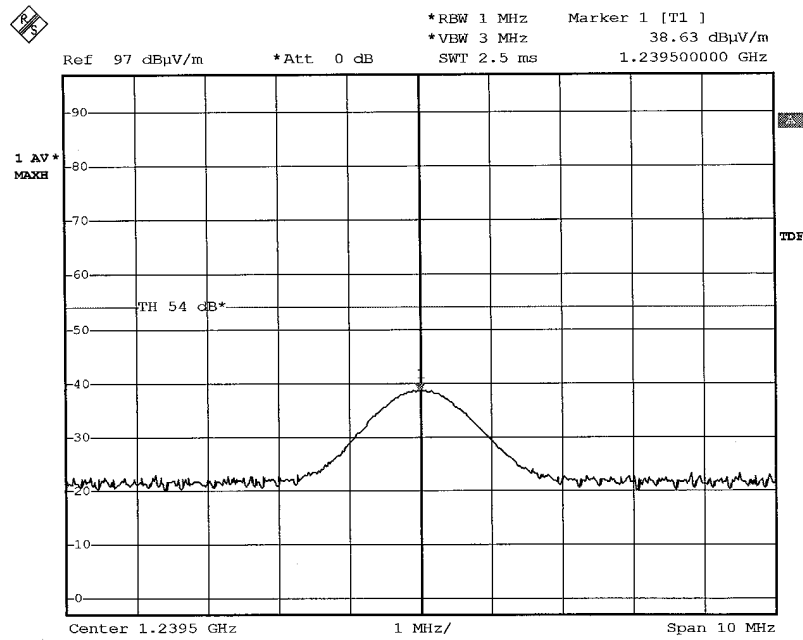
BT Headset

BTH-418

041011017

Op:2480

FCC



Date: 19.NOV.2004 21:17:54

IEA

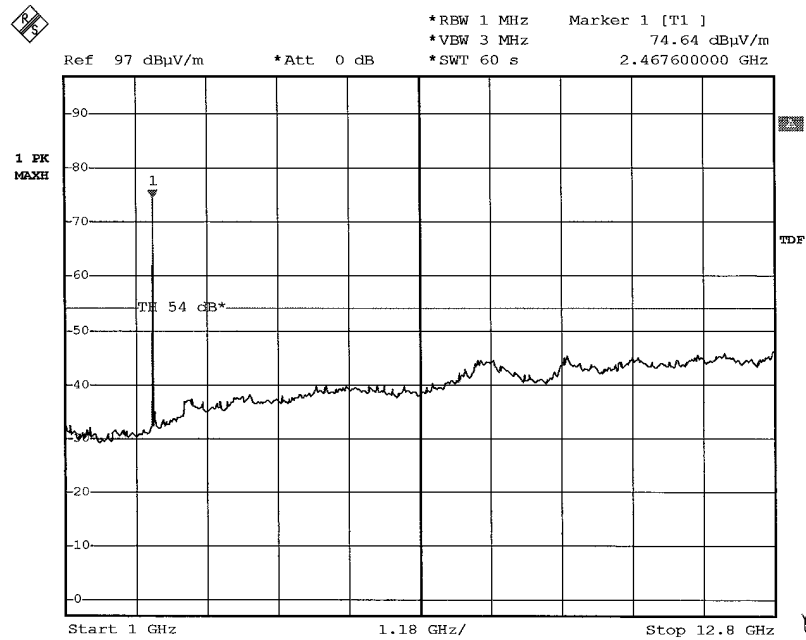
B7 Headset

BTH-418

041011017

Op: 2480

FCC



Date: 19.NOV.2004 21:10:37

BH
(clip)

IEA

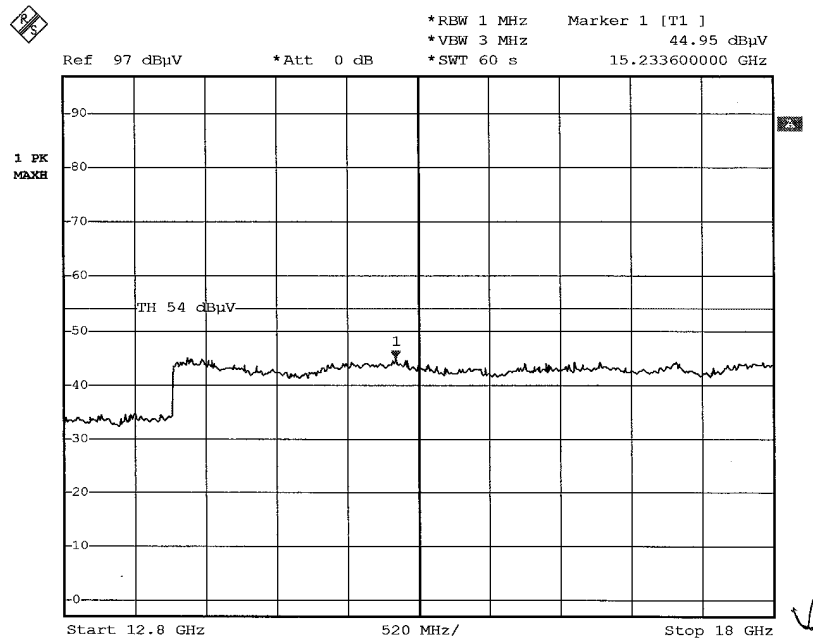
BT Headset

BTU-418

041011017

Op:2480

FCC



Date: 19.NOV.2004 21:22:20

IEA

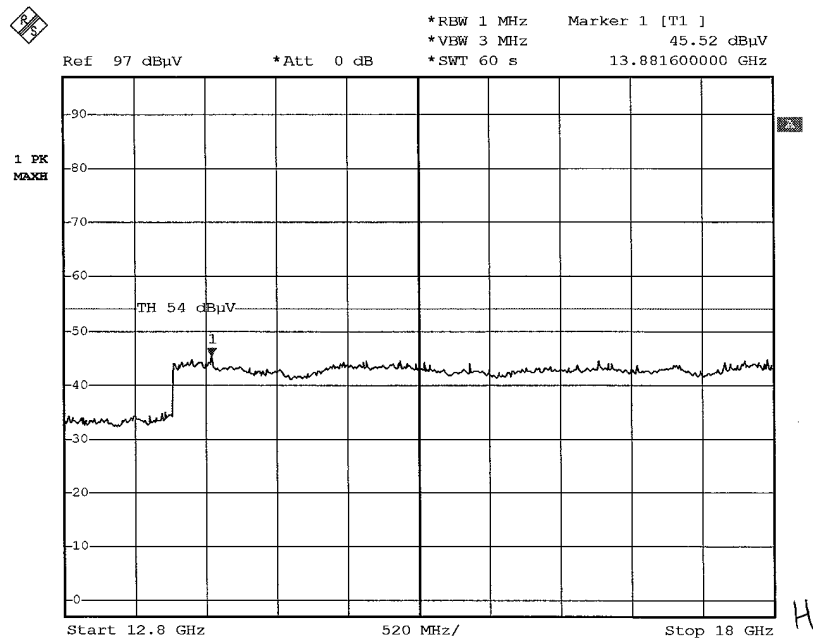
BT Headset

BT4-418

041011017

Op: 2480.

FCC



Date: 19.NOV.2004 21:29:38

IEA

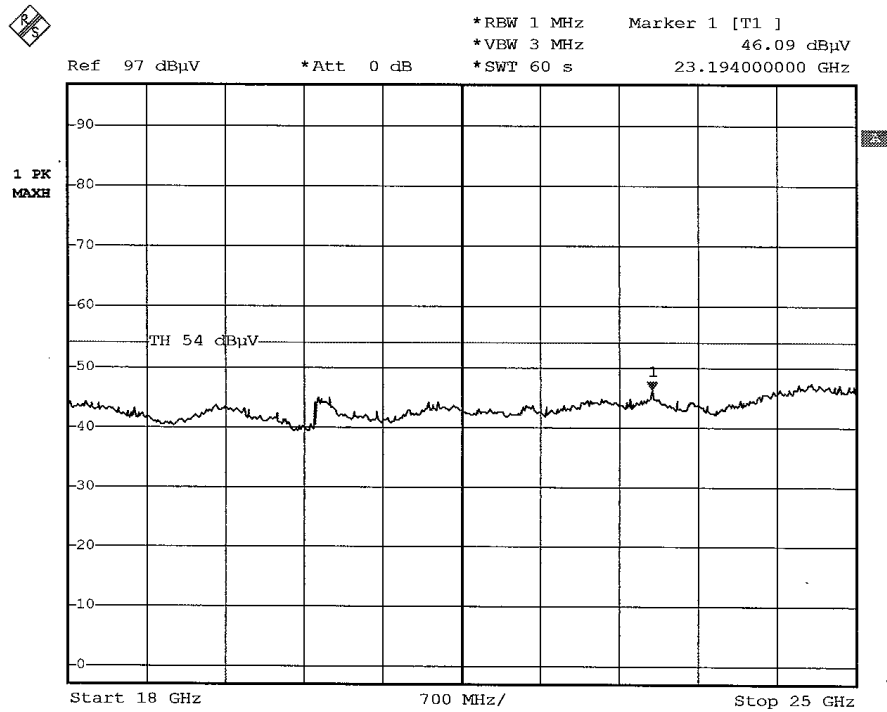
BT Headset

B14 - 418

041011017

Op: 2480

FCC



Date: 19.NOV.2004 21:41:51

IEA

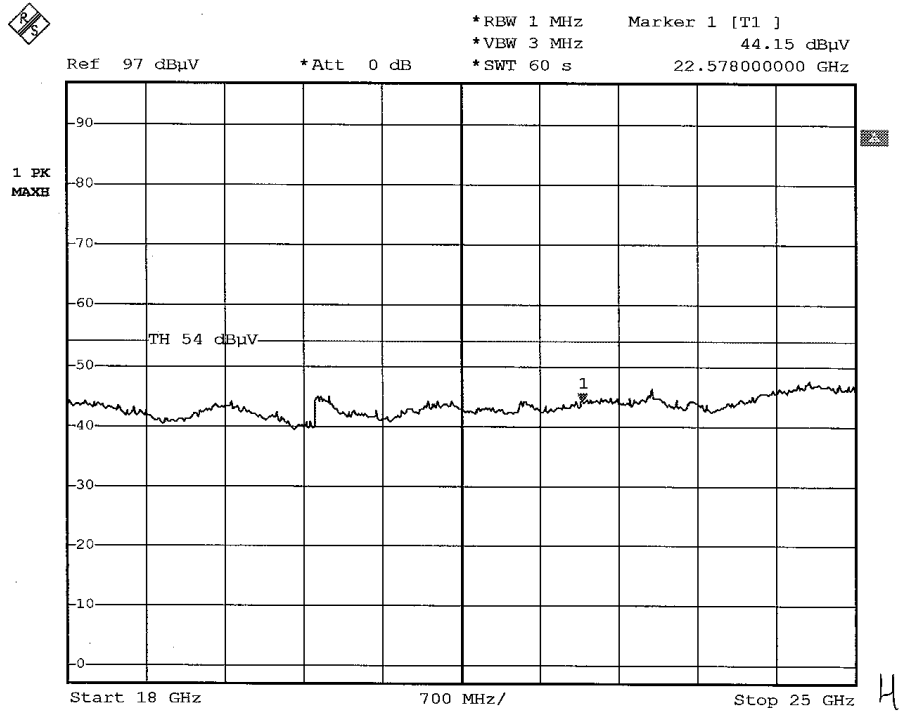
Bt Headset

BTH-418

041011017

Op: ~~248~~ 248b

Fcc



Date: 19.NOV.2004 21:44:53

TEA

BT Headset

BTM-418

041011017

Op: ~~2480~~ 2480

Fcc

Disturbance Voltage on AC Mains

Date: 13 Jan 2005

EUT: BTH-318A

Company: IEA Electro-Acoustic Co., Ltd.

Voltage supply: 3.7VDC from rechargeable battery

Test by: Hugo Wan

Op. mode: Charging

Live measurement

Frequency (MHz)	QP reading (dB μ V)	Av reading (dB μ V)	Results
0.204	50.1	33.5	Pass

Neutral measurement

Frequency (MHz)	QP reading (dB μ V)	Av reading (dB μ V)	Results
0.204	50.9	39.3	Pass

