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ENSAYOS Nº 51/LE147

Informe de ensayo nº:
Test report No:

NIE: 43932REM.002

Test report

FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & American National standard for Testing Unlicensed Wireless Devices

Identificación del objeto ensayado.....: Identification of item tested	RESOUND
Marca .....: Trade	Resound
Modelo y/o referencia tipo .....: Model and /or type reference	BRIE
Other identification of the product .....:	S/N: 1500800114 FCC ID: X26BRIE IC ID: 6941C-BRIE
Final HW version .....:	BRIE
Final SW version .....:	4.1.1.0
Características .....: Features	BTLE, Proximity
Peticionario .....: Applicant	GN HEARING A/S Lautrupbjerg 7, 2750 Ballerup, Denmark CVR: 55082715 Lars Hagander +45 4575 2100 lhagander@gnresound.dk
Método de ensayo solicitado, norma.....: Test method requested, standard	FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009: American National Standard for Methods of Measurement of RadioNoise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Resultado.....: Summary	IN COMPLIANCE
Aprobado por (nombre / cargo y firma) .....: Approved by (name / position & signature)	Rafael López EMC LAB Manager Firmado digitalmente por Rafael López Martín Fecha: 2014.12.17 19:01:56 +01'00'
Fecha de realización .....: Date of issue	2014-12-17
Formato de informe No. .....: Report template No	FDT08_15

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Competences and guarantees

AT4 wireless is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

This certificate of conformity was issued in accordance with the decision Nº 3/2000 of the Joint Committee established under the Agreement on Mutual Recognition between the European Community and the United States of America. By this decision, AT4 wireless can act as Conformity Assessment Body (CAB) on Electromagnetic Compatibility. This Certificate applies to the samples listed at technical reports.

This laboratory is designed by the Federal Communications Commission (ES0004)

AT4 wireless is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance program for its measurement equipment.

AT4 wireless guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at AT4 wireless at the time of performance of the test.

AT4 wireless is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of AT4 wireless.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the AT4 wireless internal document PODT000.

Usage of samples

Samples under test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
43932/95	Hearing Aid (EMC Emission)	BRIE	1500800114	2014-11-06

Test sample description

The test sample consists of a wireless hearing instrument.

Test samples supplier

GN HEARING A/S

Lautrupbjerg 7, 2750 Ballerup, Denmark

CVR: 55082715

Lars Hagander

+45 4575 2100

lhagander@gnresound.dk

Testing period

The performed test started on 2014-11-10 and finished on the same day.

The tests have been performed at AT4 wireless.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 30 ºC
Relative humidity	Min. = 45 % Max. = 60 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 30 ºC
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m & 3m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Site VSWR	< ±6 dB at 3m distance between item under test and receiver antenna, (1 GHz to 18 GHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 18 GHz).

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 30 ºC
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

Remarks and comments

The tests have been realized by the technical personnel: Pedro Manuel Valenzuela.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 150 kHz to 30 MHz is I = ± 3,60 dB for quasi-peak measurements, I = ± 3,48 dB for peak measurements (k = 2).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1 GHz is I = ± 4,57 dB for quasi-peak measurements, I = ± 4,48 dB for peak measurements (k = 2) and from 1 to 12,75 GHz is I = ± 3,43 dB for average and peak measurements.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 12,75 GHz to 26 GHz is I = ± 4,09 dB for average and peak measurements.

Testing verdicts (Legend)

Not applicable ..... :	N/A
Pass ..... :	P
Fail ..... :	F
Not measured ..... :	N/M

List of equipment used during the test					
CONTROL NUMBER	**DESCRIPTION**	**MANUFACTURER**	**MODEL**	**LAST CALIBRATION**	**NEXT CALIBRATION**
1999	EMI Receptor	ROHDE & SCHWARZ	ESIB 26	2013-05-30	2015-05-30
1935	EMI Receptor	ROHDE & SCHWARZ	ESPI 3	2013-12-11	2015-12-11
2932	Bilog Hybrid Antenna	SUNOL	JB6	2014-05-11	2017-05-11
0246	Horn Antenna	HP	11966E	2012-04-27	2015-04-27
1920	Horn Antenna	AGILENT	11966J	2014-09-29	2017-09-29
1658	RF Amplifier	SCHAFFNER	CPA9231A	2013-06-11	2015-06-11
1975	RF Amplifier	MITEQ	JS4	2014-05-22	2016-05-22
3783	RF Amplifier	BONN ELEKTRONIK	BLMA 0118-3A	2013-04-23	2015-05-19
0258	Transient Limiter	HP	119471A	2014-10-02	2016-10-02
1650	Artificial Network	SCHWARZBECK	NNLK - 8121	2013-06-25	2015-06-25
3545	Temperature & Humidity probe	PICO TECHNOLOGY	HUMIDIPROBE	2014-01-21	2015-01-21
3548	Temperature & Humidity probe	PICO TECHNOLOGY	HUMIDIPROBE	2014-01-21	2015-01-21
3556	Temperature & Humidity probe	T & D	TR-72W	2014-01-21	2015-01-21

Appendix A – Test result

APPENDIX A CONTENT:

DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. In the following table appears the operation modes used by the samples tested to that it refers the present test report.

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. Power supply: Internal battery. Microphone mode.

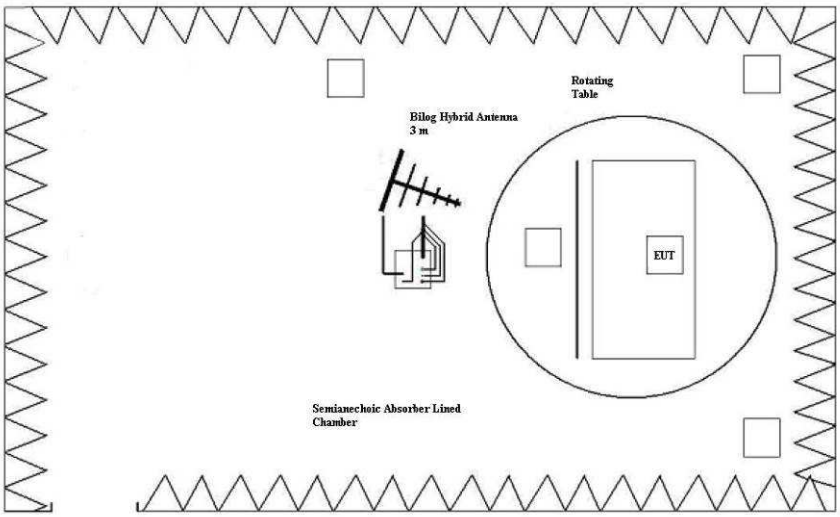
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE.

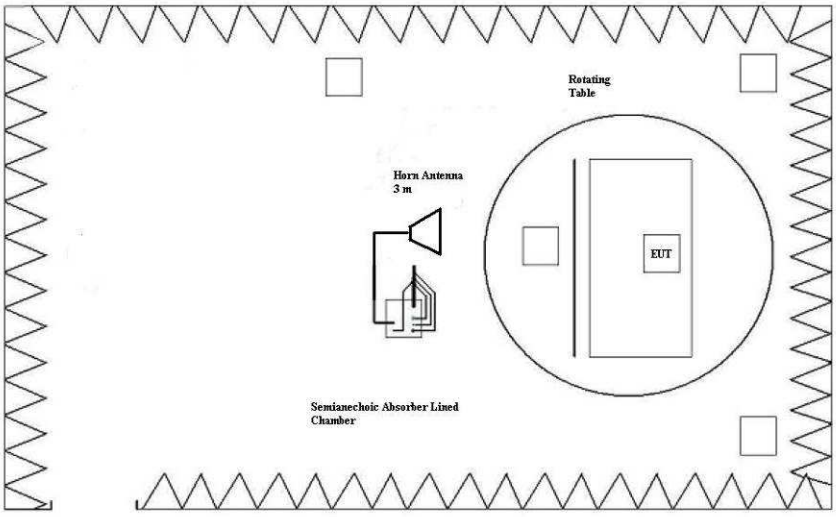
LIMITS:	Product standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009
	Test standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009

LIMITS OF INTERFERENCE CLASS B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15.109, Subpart B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009 in the frequency range 30 MHz to 26 GHz, for Class B equipment, which is a transmitter in a band over 500 MHz, was:

Frequency range (MHz)	Limit for 3 m (µV/m)	Limit for 3 m (dBµV/m)
30 to 88	100	40
88 to 216	150	43,52
216 to 960	200	46,02
Above 960	500	53,98
Above 1000	Limit for 3m AVG	Limit for 3m PK
	53.98	73.98





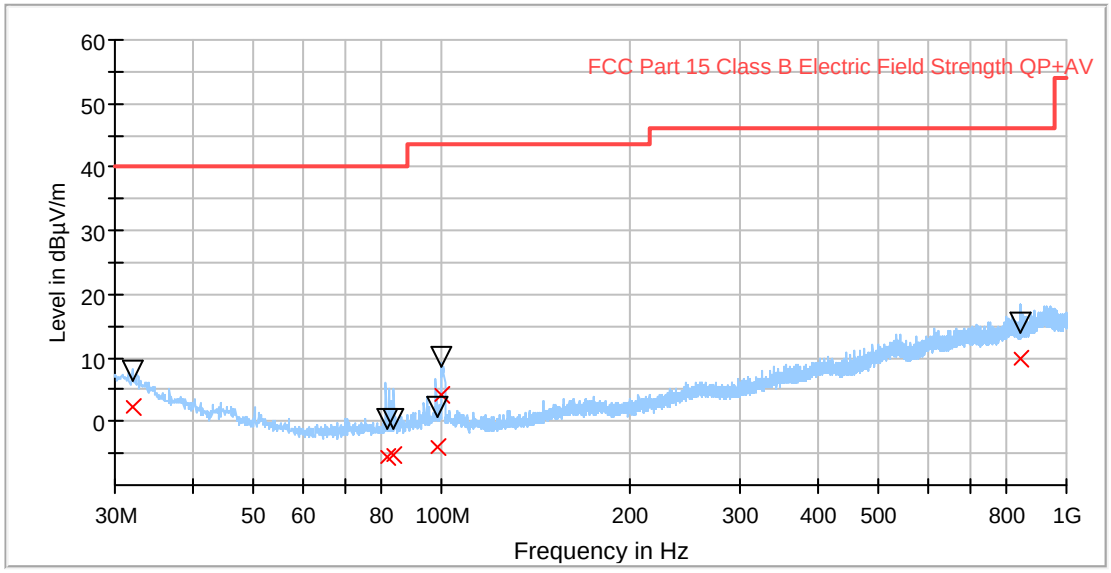
TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS :	CRmmnn: CR, Radiation Condition; mm: Sample number; nn: Operation mode, xx: Polarisation.

CRmmnn	Description	Result
CR0101	EUT ON. Power supply: Internal battery. Microphone mode. Range 30-1000 MHz.	P
CR0101_RA1_PH	EUT ON. Power supply: Internal battery. Microphone mode. Range 1-18 GHz. Horizontal pol.	P
CR0101_RA1_PV	EUT ON. Power supply: Internal battery. Microphone mode. Range 1-18 GHz. Vertical pol.	P
CR0101_RA2_PH	EUT ON. Power supply: Internal battery. Microphone mode. Range 18-26 GHz. Horizontal pol.	P
CR0101_RA2_PV	EUT ON. Power supply: Internal battery. Microphone mode. Range 18-26 GHz. Vertical pol.	P

Radiated Emission: CR0101 (30MHz to 1GHz)

Project:	43932rem002
Company:	GN RESOUND
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Hearing aid. Power supply: Internal battery. Microphone mode.

Full Spectrum



Peak Preview
FCC Part 15 Class B Electric Field Strength QP+AV
QuasiPeak
MaxPeak

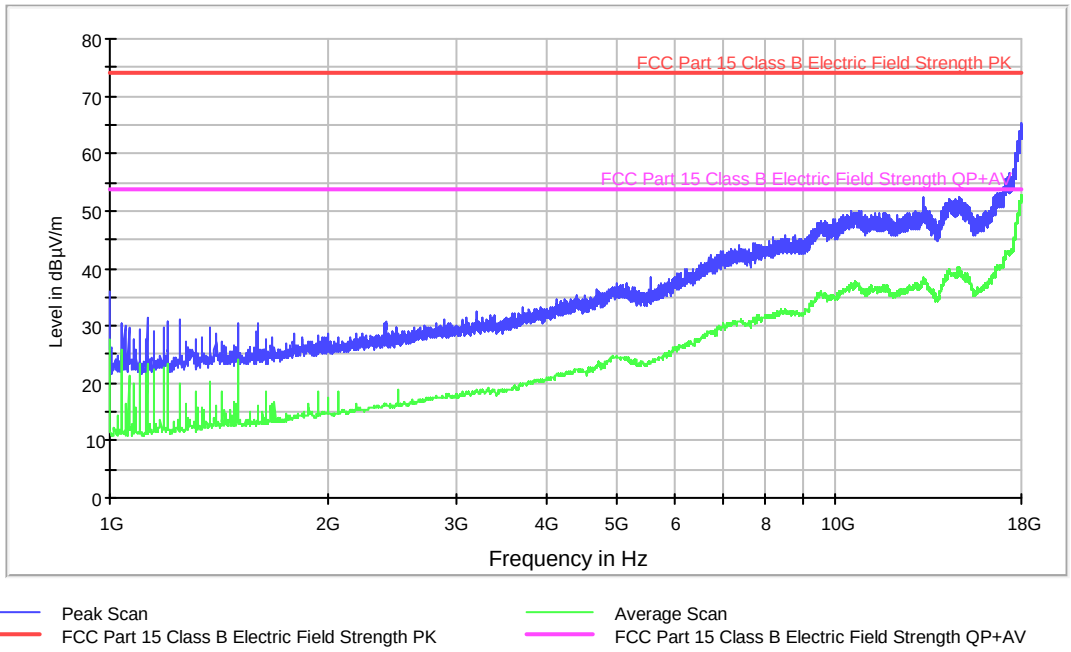
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Height (cm)	Pol	Azimuth (deg)
32.064935	2.16	8.10	371.0	V	261.0
81.701299	-5.55	0.43	157.0	H	221.0
83.993506	-5.37	0.30	268.0	H	219.0
98.483117	-3.98	2.45	400.0	H	171.0
99.902597	4.28	10.26	243.0	H	83.0
844.589610	9.79	15.45	345.0	V	331.0

Radiated Emission: CR0101_RA1_PH (1 – 18 GHz)

Project:	43932rem002
Company:	GN RESOUND
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Hearing aid. Power supply: Internal battery. Microphone mode. Horizontal polarization.

ER EMI FCC 15 Class B AMP_4659 (1-18GHz) 1m



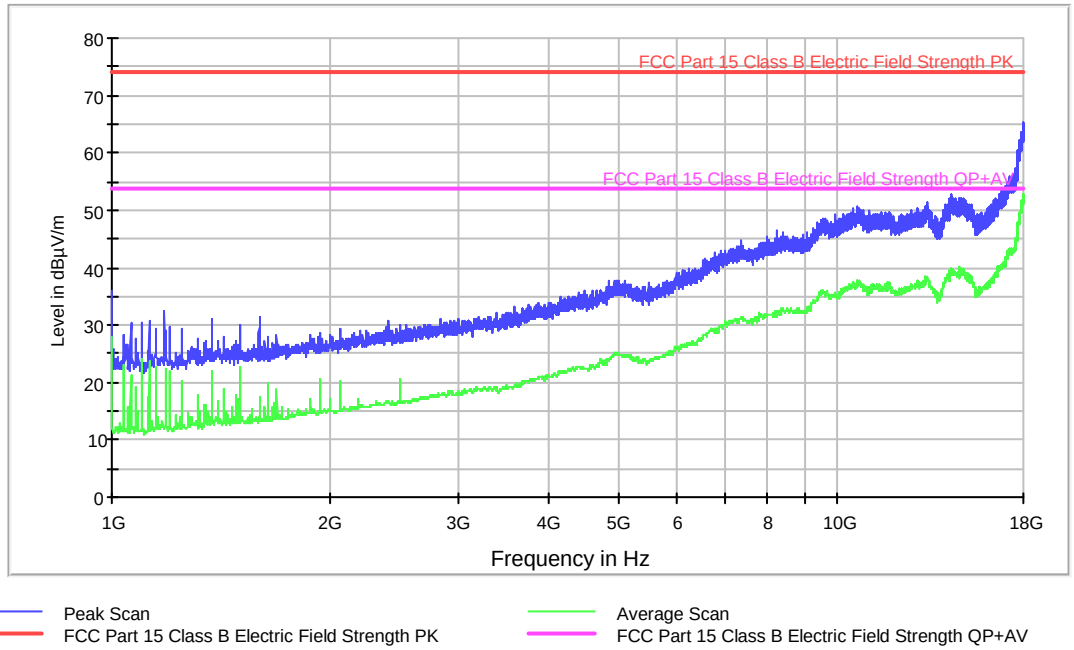
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
1000.000000	35.9	27.5
1500.000000	30.4	24.1
1792.000000	28.8	14.2
3098.000000	31.3	18.2
4131.000000	34.6	21.6
5545.000000	38.4	23.4
7336.000000	44.0	30.8
9922.000000	48.5	35.1
13203.000000	52.3	38.1
17992.000000	65.2	52.8

Radiated Emission: CR0101_RA1_PV (1 – 18 GHz)

Project:	43932rem002
Company:	GN RESOUND
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Hearing aid. Power supply: Internal battery. Microphone mode. Vertical polarization.

ER EMI FCC 15 Class B AMP_4659 (1-18GHz) 1m



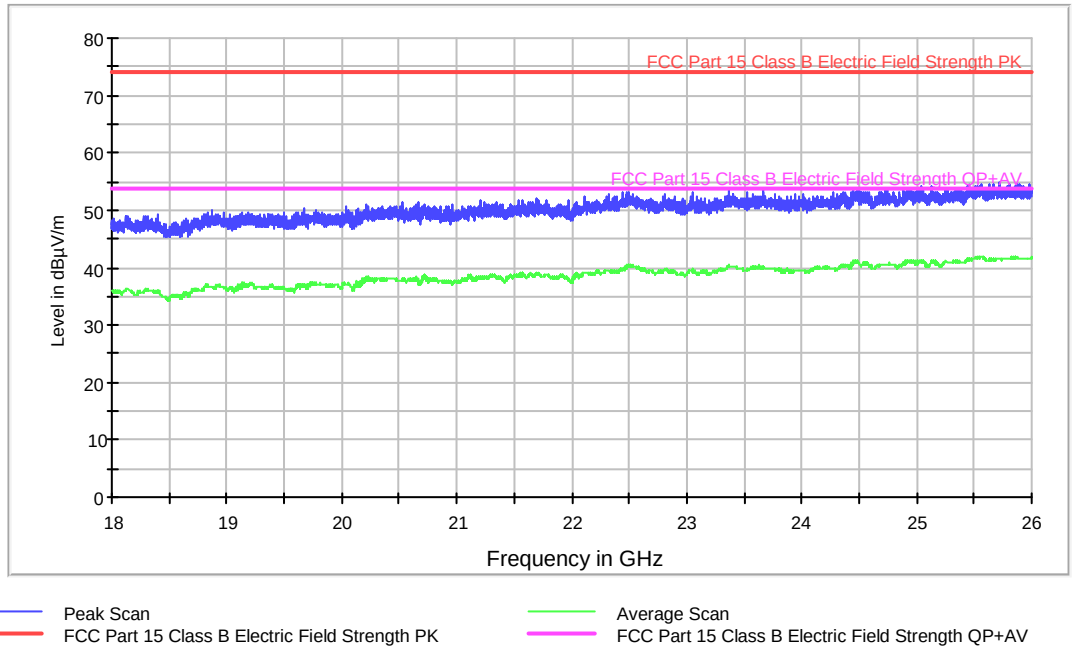
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
1000.000000	35.9	28.1
1599.000000	31.5	14.5
2063.000000	29.2	20.3
3167.000000	31.1	18.7
4156.000000	34.8	21.5
4969.000000	37.9	24.9
7366.000000	44.6	31.2
9924.000000	49.3	35.4
13309.000000	51.2	37.7
17995.000000	65.3	52.7

Radiated Emission: CR0101_RA2_PH (18 – 26 GHz)

Project:	43932rem002
Company:	GN RESOUND
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Hearing aid. Power supply: Internal battery. Microphone mode. Horizontal polarization.

ER EMI FCC 15 Class B AMP_4729 (18-26GHz) 1m



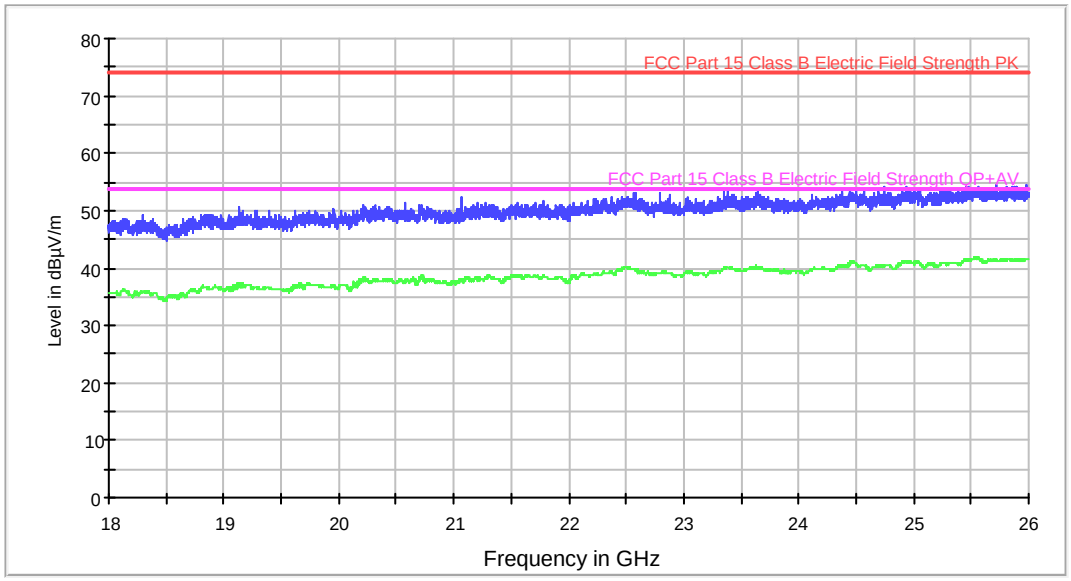
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
18394.000000	49.3	35.8
18872.000000	49.8	36.7
20042.000000	50.6	37.1
20528.000000	51.4	38.0
21542.000000	51.7	38.5
22330.000000	52.6	39.4
22499.000000	53.3	40.4
23657.000000	53.9	40.1
25042.000000	54.1	41.2
25717.000000	54.7	41.6

Radiated Emission: CR0101_RA2_PV (18 -26 GHz)

Project:	43932rem002
Company:	GN RESOUND
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Hearing aid. Power supply: Internal battery. Microphone mode. Vertical polarization.

ER EMI FCC 15 Class B AMP_4729 (18-26GHz) 1m

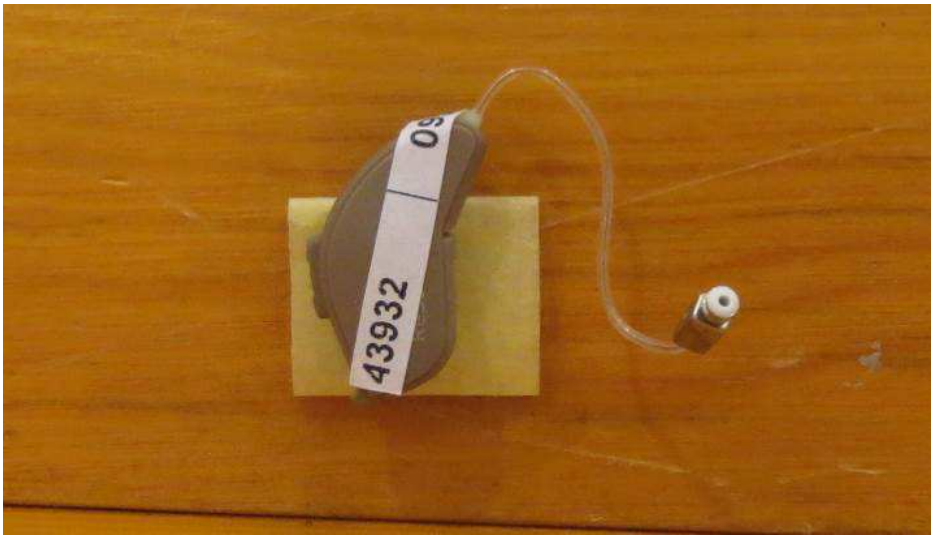


Peak Scan
FCC Part 15 Class B Electric Field Strength PK
Average Scan
FCC Part 15 Class B Electric Field Strength QP+AV

Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
18300.000000	49.1	36.1
19135.000000	50.7	37.0
19960.000000	50.4	36.9
20579.000000	51.2	37.8
21062.000000	52.6	37.8
22372.000000	52.3	39.2
22561.000000	53.3	39.9
23393.000000	53.8	40.1
24931.000000	54.2	41.2
25977.000000	54.4	41.5

Appendix B - Photographs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