FCC - TEST REPORT

Report Number	:	**68.930.15.027.01**	Date of Issue:	September 18, 2015

Model	:	**COM-DEX**
Product Type	:	Wireless headset for hearing aid
Applicant	:	Widex A/S
Address	:	Nymoellevej 6, DK-3540 Lynge, Denmark
Production Facility	:	Widex A/S
Address	:	Nymoellevej 6, DK-3540 Lynge, Denmark

Test Result	:	■ **Positive** ☐ **Negative**
Total pages including Appendices	:	19

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1 Table of Contents

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2 Details about the Test Laboratory

Details about the Test Laboratory
Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China
FCC Registration No.:	502708
IC Registration No:	10320A-1
Telephone:	86 755 8828 6998
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3 Description of the Equipment Under Test

Product:	Wireless headset for hearing aid
Model no.:	COM-DEX
FCC ID:	TTY-CMDEX
Options and accessories:	NIL
Rating:	DC 3.0V by Li-ion Battery
RF Transmission Frequency:	10.6MHz
Modulation:	FSK
Antenna Type:	Integral Antenna
Antenna Gain:	0dBi
Description of the EUT:	The Equipment Under Test (EUT) is a hearing aid operated at 10.6MHz

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2014 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

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5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C				
Test Condition		Pages	Test Site	Test Result
§15.207	Conducted emission AC power port	---	---	N/A
§15.209	Field strength of fundamental	11	Site 1	Pass
§15.215	20dB&99% bandwidth	13	Site 1	Pass
§15.209(a)	Filed strength of harmonics and spurious	16	Site 1	Pass
§15.203	Antenna requirement	See note 1		Pass

Note 1: N/A=Not Applicable.
Note 2: The EUT uses a integral antenna, which gain is 0dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: TTY-CMDEX complies with Section 15.207, 15.209, 15.231 of the FCC Part 15, Subpart C Rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: August 3, 2015

Testing Start Date: August 4, 2015

Testing End Date: September 17, 2015

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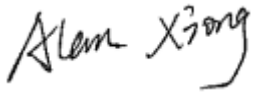
Reviewed by:

_____
John Zhi
EMC Project Manager

Prepared by:



_____
Alan Xiong
EMC Project Engineer

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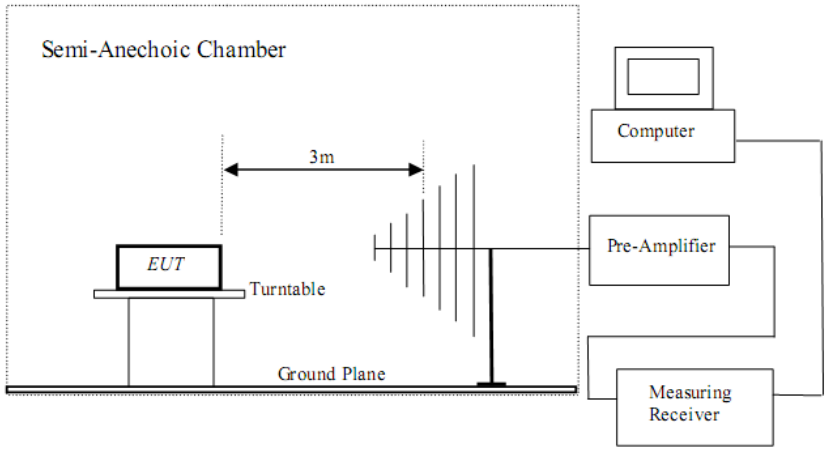
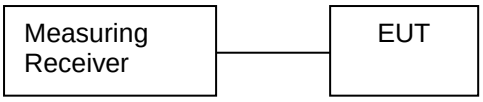
7 Test Setups

7.1 Radiated test setups



7.2 Conducted RF test setups



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8 Test Methodology

8.1 Radiated Emission

The sample was placed 0.8m above the ground plane on a standard emission test site *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

*On a standard emission test site with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules.

8.2 Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

FS = R + System Factor
System Factor = AF + CF + FA – PA

Where FS = Net Field Strength in dBuV/m at 3 meters.
R = Reading of Spectrum Analyzer / Test Receiver in dBuV.
AF = Antenna Factor in dB.
CF = Cable Attenuation Factor in dB.
FA = Filter Attenuation Factor in dB.
PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

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9 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
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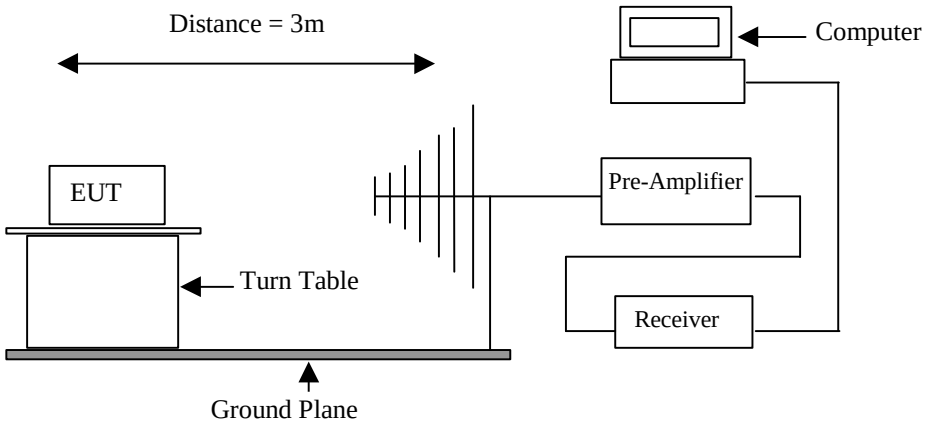
10 Technical Requirement

10.1 Radiated Emission of Fundamental Frequency

Test Requirement:	FCC part 15 section 15.209(a)
Test Method:	ANSI C63.4:2003
Test Date:	2015-09-14
Mode of Operation:	Transmitting mode.
Detector Function	Quasi Peak(CISPR)
Measurement BW	RBW 10KHz ; VBW 30KHz
Trace mode:	Max hold

Test Setup:



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Results: PASS

Test conditions		Maximum power (dBµV/m)	
Frequency		10.6MHz	10.6MHz
Mode		At 10 m distance	At 30 m distance
T_{nom}	V_{nom}	26.49	6.49

Limits for Fundamental Frequency: [Section 15.209(a)]:

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30(29.5dBµV/m)	30
30-88	100(40dBµV/m)	3
88-216	150(43.5dBµV/m)	3
216-960	200(46dBµV/m)	3
Above 960	500(54dBµV/m)	3

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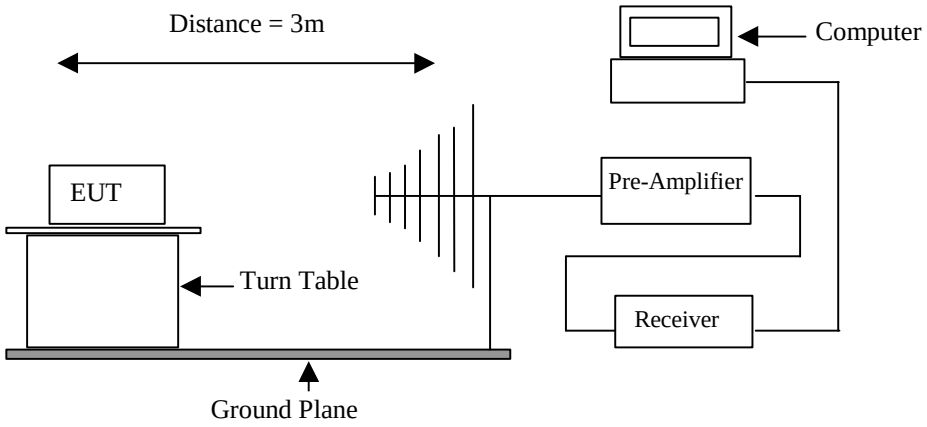
10.2 Field strength of the harmonics and spurious

Test Requirement:	FCC part 15 section 15.209
Test Method:	ANSI C63.4:2003
Test Date:	2015-09-14
Mode of Operation:	Transmitting mode.
Detector Function	Quasi Peak(CISPR)
Measurement BW	RBW 120KHz ; VBW 300KHz
Trace mode:	Max hold

Test Setup:



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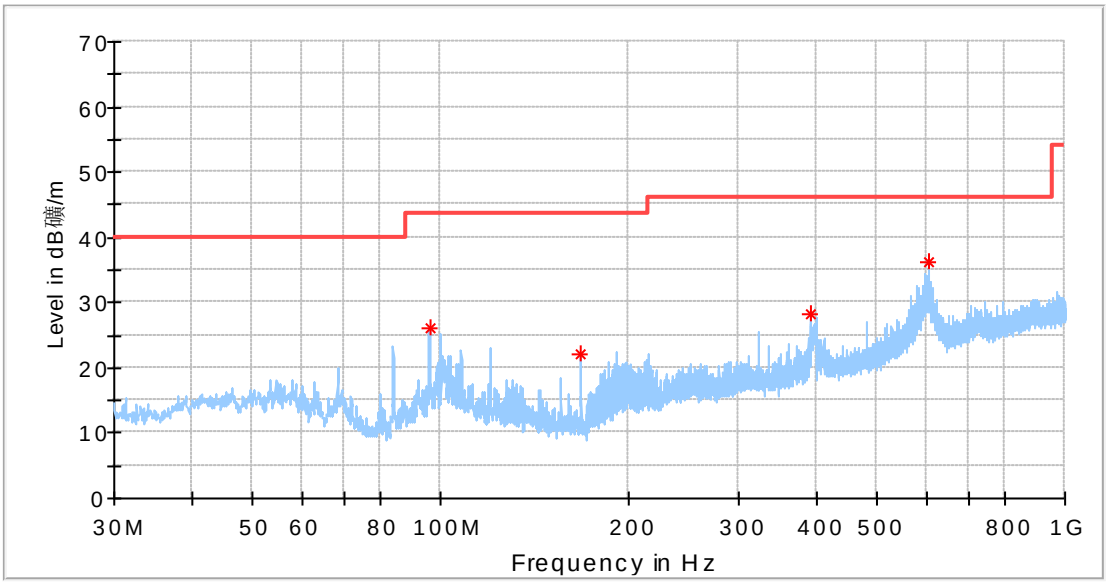
Results: PASS

EUT: Wireless headset for hearing aid
M/N: COM-DEX
Operating Condition: TC1
Test Specification: Horizontal



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
95.960000	26.22	43.50	17.28	200.0	H	0.0
167.982500	22.16	43.50	21.34	200.0	H	0.0
391.082500	28.23	46.00	17.77	100.0	H	94.0
603.997500	36.14	46.00	9.86	200.0	H	148.0

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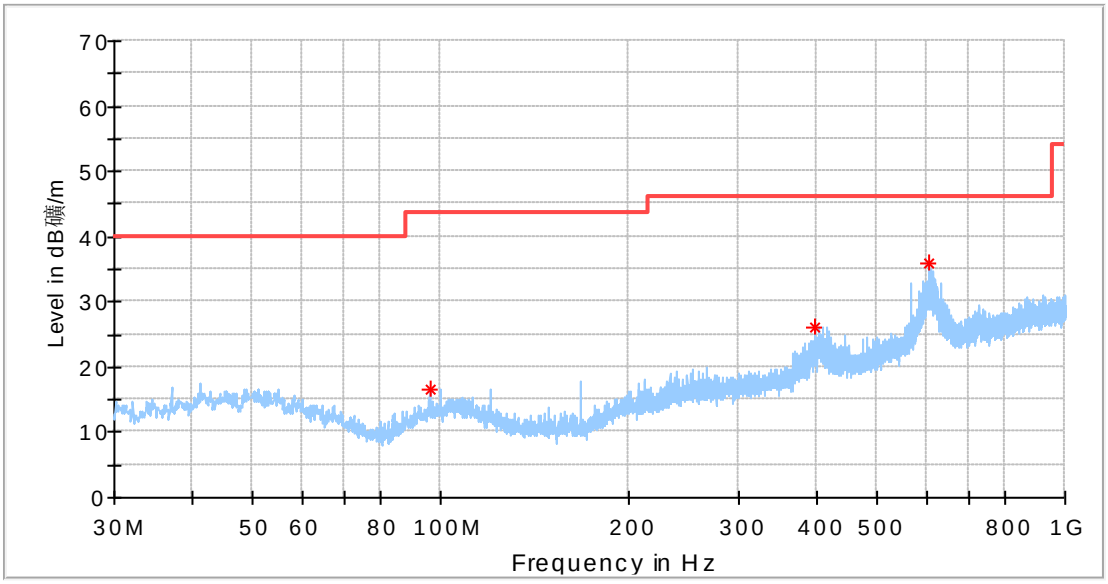
EUT: Wireless headset for hearing aid
M/N: COM-DEX
Operating Condition: TC1
Test Specification: Vertical



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
96.020625	16.67	43.50	26.83	200.0	V	329.0
397.023750	26.22	46.00	19.78	100.0	V	0.0
603.997500	35.77	46.00	10.23	100.0	V	86.0

Note: No further spurious emissions found between 30 MHz and lowest internal used/generated frequency.

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Limits for Radiated Emission [Section 15.209)]:

Frequency (MHz)	Field strength (μV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30(29.5dBμV/m)	30
30-88	100(40dBμV/m)	3
88-216	150(43.5dBμV/m)	3
216-960	200(46dBμV/m)	3
Above 960	500(54dBμV/m)	3

Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in section 15.209, whichever permits a higher field strength.

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209.

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

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10.3 Bandwidth Measurement

Test Requirement:	FCC part 15 section 15.215
Test Method:	ANSI C63.4:2003
Test Date:	2015-9-17
Mode of Operation:	Transmitting continuously mode
Detector Function:	Peak
Trace mode:	Max hold

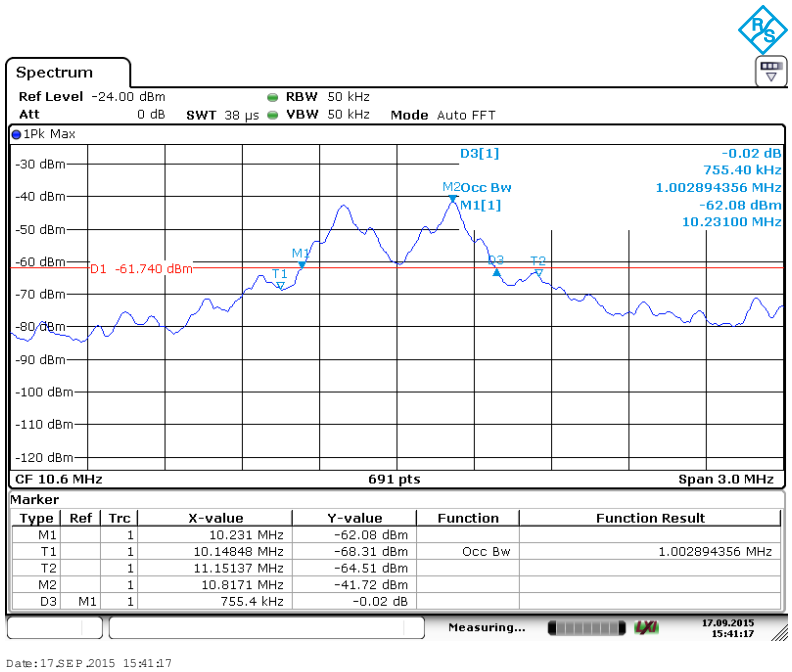
Test setup:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Result: Pass

Result data graph is shown in the following for reference.

	Occupied Bandwidth(KHz)
20dB	755.4
99%	1002.9



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11 Test Equipment List

List of Test Instruments

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
C	Signal Analyzer	Rohde & Schwarz	FSV40	101030	2016-7-24
RE	EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2016-7-24
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2016-8-14
	Horn Antenna	Rohde & Schwarz	HF907	102294	2016-7-24
	Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2016-7-24
	3m Semi-anechoic chamber	TDK	9X6X6	----	2019-5-29

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12 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.54dB
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.83dB; Vertical: 4.91dB;
Uncertainty for Conducted RF test with TS 8997	Power level test involved: 2.04dB Frequency test involved:1.1×10^{-7}

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