Starkey Laboratories, Inc.

Edge AI RIC RT Hearing Aid

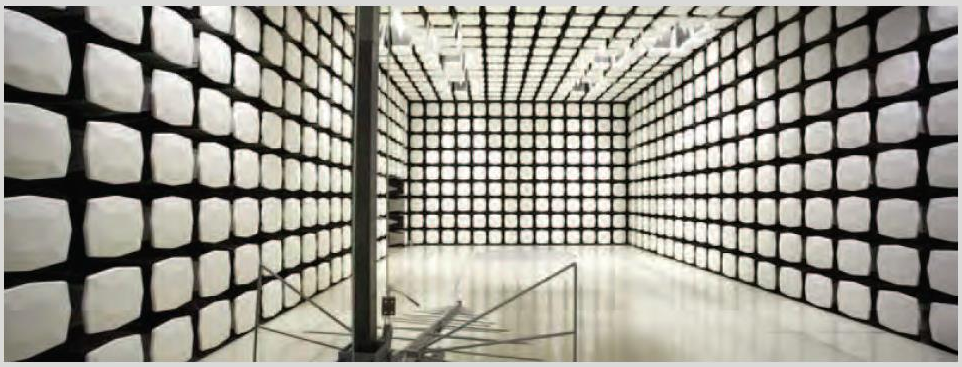
FCC 15.209:2024

RSS-210 Issue 10:2019+A1:2020

RSS-Gen Issue 5:2018+A1:2019+A2:2021

Inductive Radio

Report: STAK0329.1 Rev. 1, Issue Date: July 25, 2024



CERT #3310.05

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element
2023.04.17

Section	Page Number

CERTIFICATE OF TEST

Last Date of Test: March 25, 2024
Starkey Laboratories, Inc.
EUT: Edge AI RIC RT Hearing Aid

Radio Equipment Testing

Standards

Specification	Method
FCC 15.209:2024	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020	
RSS-Gen Issue 5:2018+A1:2019+A2:2021	

Guidance

Notice 2020 - DRS0023

Results

Test Description	Result	FCC Section(s)	RSS Section(s)	ANSI C63.10 Section(s)	Comments
Powerline Conducted Emissions	N/A	15.207	RSS-Gen 8.8	6.2	Not required for a battery powered EUT.
Field Strength of Fundamental	Pass	15.209	RSS-210 7.2, RSS-Gen 6.12	6.4	
Spurious Radiated Emissions	Pass	15.209	RSS-210 7.2, RSS-Gen 6.13	6.4, 6.5	
Occupied Bandwidth	Pass	N/A	RSS-Gen 6.7	6.9.3	

Deviations From Test Standards

None

Approved By:

Jeff Alcoke, Senior EMC Test Engineer
Signed for and on behalf of Element

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
01	Corrected antenna coil details	2024-07-25	12

ACCREDITATIONS AND AUTHORIZATIONS

element
2021.09.01

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

SCOPE

For details on the Scopes of our Accreditations, please visit:

California Minnesota Oregon Texas Washington

FACILITIES

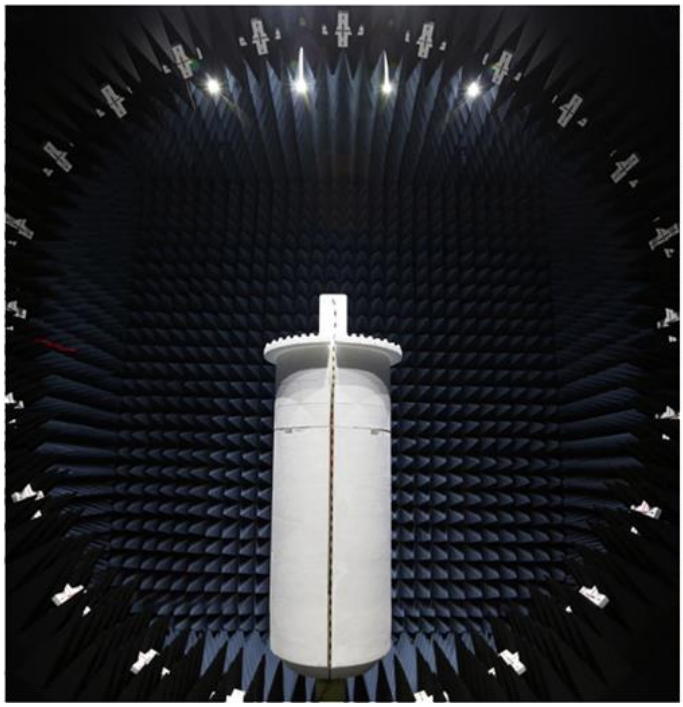
element
2023.09.21

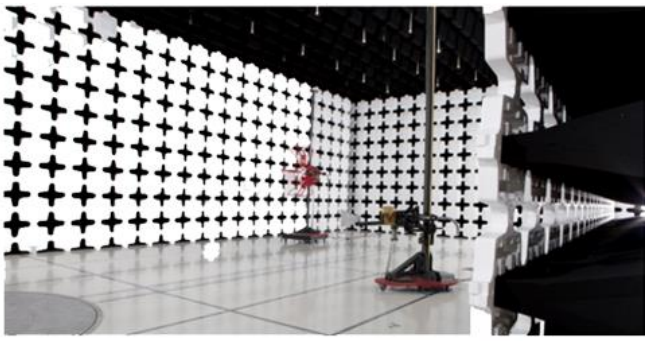
Testing was performed at the following location(s)

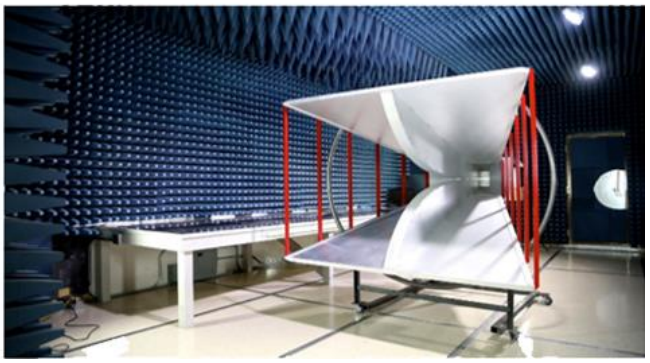
	Location	Labs (1)	Address	A2LA (2)	ISED (3)	BSMI (4)	VCCI (5)	CAB (6)	FDA (7)
☐	California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
☒	Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	US0175	TL-57
☐	Oregon	EV01-12	6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	3310.02	2834D	SL2-IN-E-1017	A-0108	US0017	TL-56
☐	Texas	TX01-09	3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	3310.03	2834G	SL2-IN-E-1158R	A-0201	US0191	TL-54
☐	Washington	NC01-05	19201 120th Ave NE Bothell, WA 98011 (425) 984-6600	3310.06	2834F	SL2-IN-E-1153R	A-0110	US0157	TL-67
☐	Offsite	N/A	See Product Description	N/A	N/A	N/A	N/A	N/A	N/A

See data sheets for specific labs

(1) The lab designations denote individual rooms within each location. (OC01, OC02, OC03, etc.)
(2) A2LA Certificate No.
(3) ISED Company No.
(4) BSMI No.
(5) VCCI Site Filing No.
(6) CAB Identifier. Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA
(7) FDA ASCA No.







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	3.2 dB	-3.2 dB

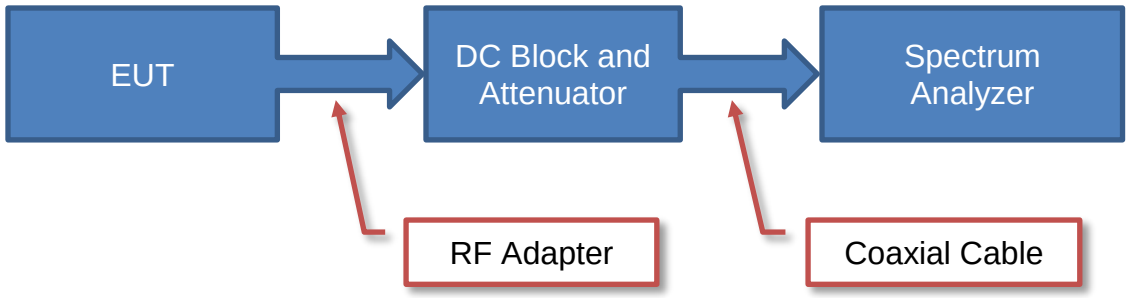
TEST SETUP BLOCK DIAGRAMS

Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

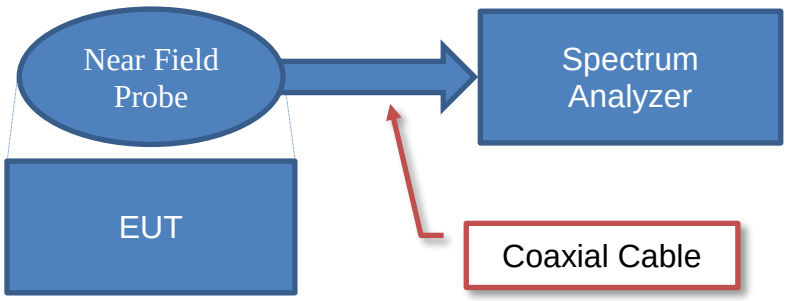
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

Near Field Test Fixture Measurements

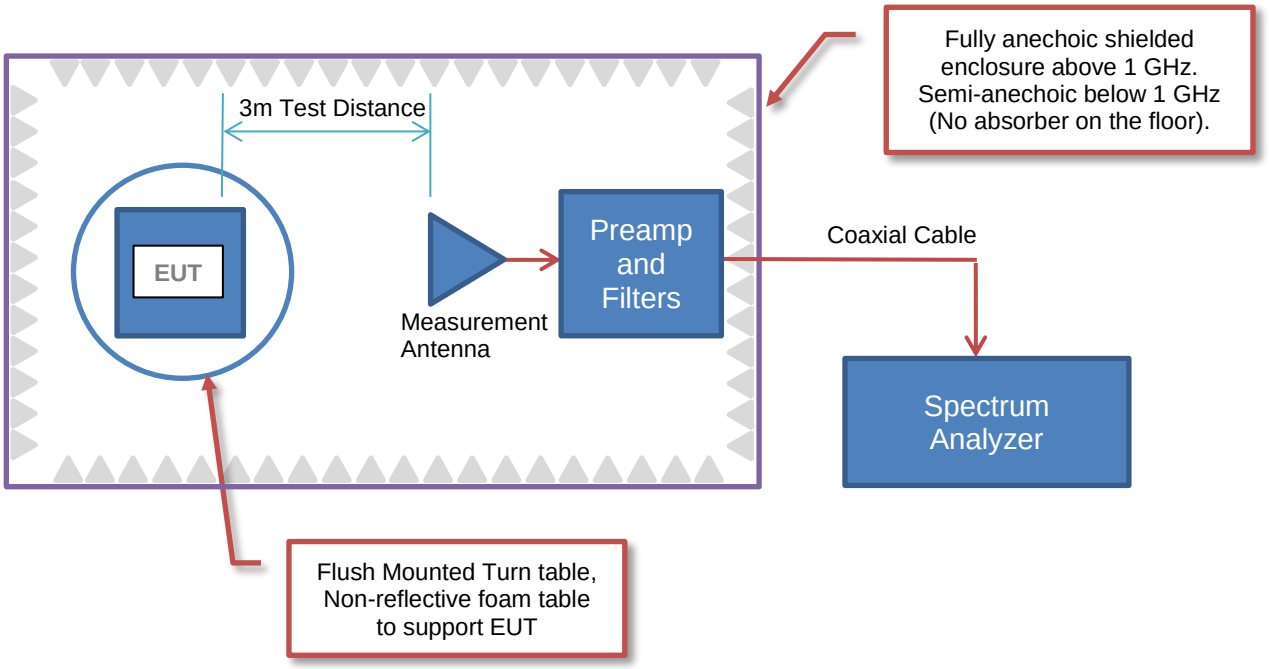


Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

Measured Level (Amplitude)		Factor: Antenna Factor		Factor: Cable Factor		Factor: Amplifier Gain		Distance Adjustment Factor		External Attenuation		Field Strength
42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0	=	**33.5**

Conducted Emissions:

Measured Level (Amplitude)		Factor: Transducer Factor		Factor: Cable Factor		External Attenuation		Adjusted Level
26.7	+	0.3	+	0.1	+	20.0	=	**47.1**

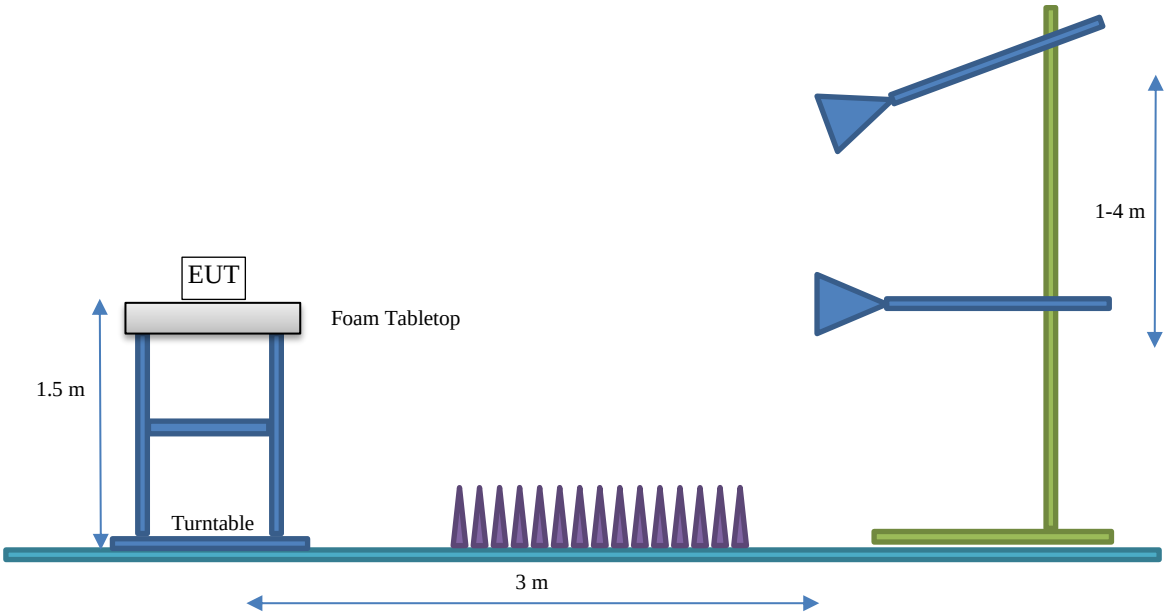
Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)		Substitution Antenna Factor (dBi)		EIRP to ERP (if applicable)		Measured power (dBm ERP/EIRP)
10.0	+	6.0	-	2.15	=	**13.9/16.0**

TEST SETUP BLOCK DIAGRAMS

Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



PRODUCT DESCRIPTION

Client and Equipment under Test (EUT) Information

Company Name:	Starkey Laboratories, Inc.
Address:	6600 Washington Ave S
City, State, Zip:	Eden Prairie, MN 55344-3404
Test Requested By:	Bill Mitchell
EUT:	Edge AI RIC RT Hearing Aid
First Date of Test:	March 21, 2024
Last Date of Test:	March 25, 2024
Receipt Date of Samples:	March 21, 2024
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Hearing aid with near field magnetic induction and Bluetooth LE.

Testing Objective:
To demonstrate compliance of the inductive portion of the device to FCC Part 15.209 specifications and the General Field Strength (<30MHz) Inductive radio to ISED specifications per RSS-210 section 7.3

POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)
Coil	Starkey Laboratories, Inc	10.281

The NFMI antenna coil is an SMD cubical prism of nominal length 5.1 mm and width 1.9 mm. The max height is 1.915 mm. There are 41 turns going from one end of the coil to the other.

The EUT was tested using the power settings provided by the manufacturer which were based upon:

☐ Test software settings
☒ Rated power settings

FW Version: 10.0.0.14.342

SW Version Monaco 7.0.2.0

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types	Frequency Range (MHz)	Power Setting *
Single Data Rate / Modulation Data Rate - 894 kbps, Modulation - 8-DPSK	10.281 MHz	3.4 mW

* power value was obtained from the NXH2281 (NFMI Radio) datasheet.

CONFIGURATIONS

Configuration STAK0329-2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Edge AI RIC R	Starkey	P00002179	240583884

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Edge AI RIC R	Starkey	P00002179	240583876

Configuration STAK0329-3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Edge AI RIC R (Conducted Unit)	Starkey	P00002179	240583877

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2024-03-21	Occupied Bandwidth	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2024-03-25	Spurious Radiated Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2024-03-25	Field Strength of Fundamental	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

The fundamental carrier of the EUT was maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna polarization (per ANSI C63.10). A calibrated active loop antenna was used for this test in order to provide sufficient measurement sensitivity. The reference point of the loop antenna was maintained at 1m above the ground plane during the testing.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = CISPR Average Detector

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.5, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

The limits in CFR 47, Part 15C 15.209(a) are identical to those is RSS-Gen section 8.9 Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, an E-Field measurement in dBuV/m can be converted to dBuA/m via the following formula: dBuV/m - 51.5 dB = dBuA/m. E-Field measurements have the same margin in dB to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limits

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	ETS Lindgren	6502	AOB	2023-06-12	2025-06-12
Cable	ESM Cable Corp.	Antenna Loop Cable	MNE	2024-01-28	2025-01-28
Receiver	Rohde & Schwarz	ESR26	ARP	2023-05-10	2024-05-10

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

10 MHz TO 11 MHz

POWER INVESTIGATED

Lithium Battery

CONFIGURATIONS INVESTIGATED

STAK0329-3

MODES INVESTIGATED

Transmitting NFMI 10.281 MHz Modulated.

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	Edge AI RIC RT Hearing Aid	Work Order:	STAK0329
Serial Number:	240583884	Date:	2024-03-25
Customer:	Starkey Laboratories, Inc.	Temperature:	22.2°C
Attendees:	John Quach	Relative Humidity:	26.8%
Customer Project:	None	Bar. Pressure (PMSL):	1001 mb
Tested By:	Christopher Heintzelman	Job Site:	MN04
Power:	Lithium Battery	Configuration:	STAK0329-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.209:2024	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020 RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	3	Test Distance (m):	1	Ant. Height(s) (m):	1(m)

COMMENTS

40dB/decade distance correction factor applied. Fundamental was not visible at 10 or 3 meters, therefore testing was done at a 1 meter distance.

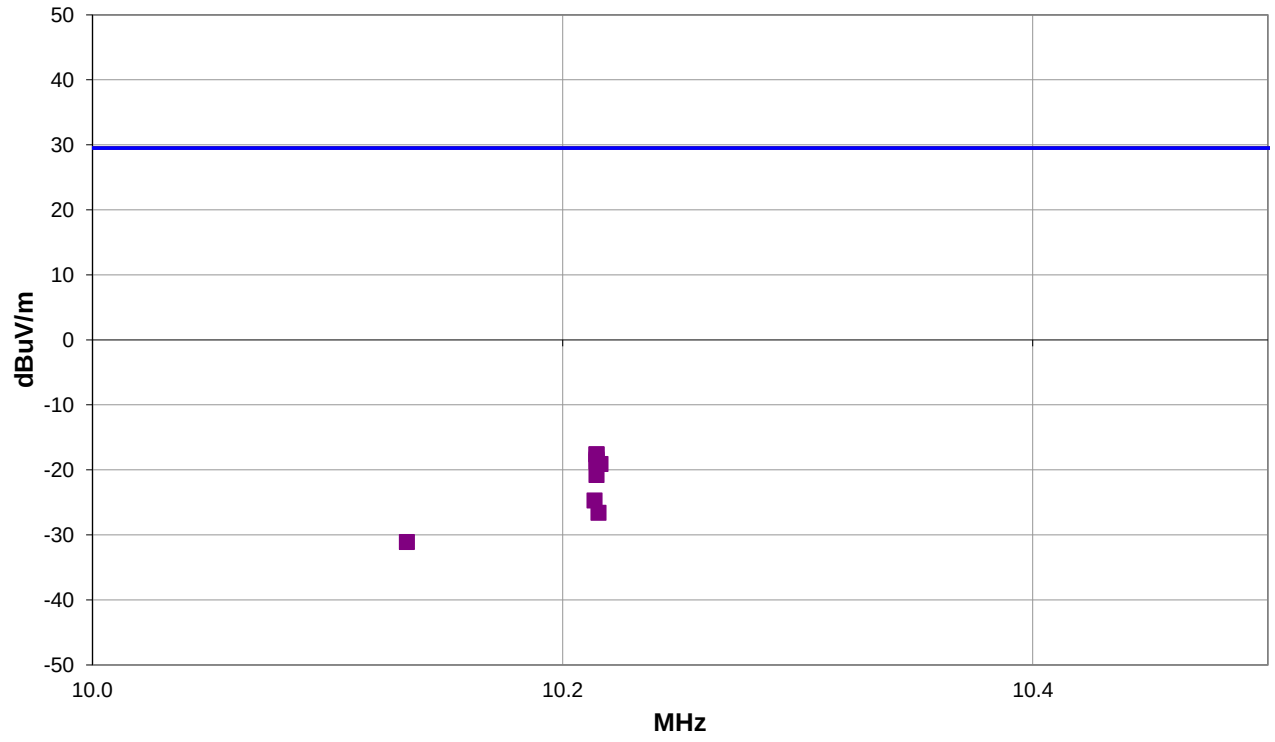
A PK detector was used to show compliance, which is considered worst case as compared to a QP detector.

EUT OPERATING MODES

Transmitting NFMI 10.281 MHz Modulated.

DEVIATIONS FROM TEST STANDARD

None



FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

Run #: 3

■ PK ◆ AV ● QP

RESULTS - Run #3

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
10.214	30.4	11.1	1.0	81.0	1.0	0.0	Para to EUT	PK	-59.1	-17.6	29.5	-47.1	EUT Vert
10.214	30.4	11.1	1.0	309.0	1.0	0.0	Para to GND	PK	-59.1	-17.6	29.5	-47.1	EUT On Side
10.214	29.6	11.1	1.0	118.0	1.0	0.0	Para to EUT	PK	-59.1	-18.4	29.5	-47.9	EUT Horz
10.214	29.3	11.1	1.0	360.0	1.0	0.0	Perp to EUT	PK	-59.1	-18.7	29.5	-48.2	EUT Vert
10.216	28.9	11.1	0.0	357.0	1.0	0.0	Perp to EUT	PK	-59.1	-19.1	29.5	-48.6	EUT Horz
10.214	27.2	11.1	1.0	304.0	1.0	0.0	Para to EUT	PK	-59.1	-20.8	29.5	-50.3	EUT On Side
10.214	23.3	11.1	1.0	248.0	1.0	0.0	Para to GND	PK	-59.1	-24.7	29.5	-54.2	EUT Vert
10.215	21.4	11.1	1.0	194.0	1.0	0.0	Para to GND	PK	-59.1	-26.6	29.5	-56.1	EUT Horz
10.134	16.9	11.1	1.0	191.0	1.0	0.0	Perp to EUT	PK	-59.1	-31.1	29.5	-60.6	EUT On Side

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. A reference preview scan (pre-scan) is included in the report. Final measurements on individual emissions were then made and included in this test report. The BLE transmitter cannot be disabled - emissions from the BLE radio were present in the data but ignored for this test. Please note the pre-scan data.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height (where applicable) and polarization (per ANSI C63.10). A calibrated active loop antenna was used for this test in order to provide sufficient measurement sensitivity. The reference point of the loop antenna was maintained at 1m above the ground plane during the testing.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = CISPR Average Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.5, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

The limits in CFR 47, Part 15C 15.209(a) are identical to those is RSS-Gen section 8.9 Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, an E-Field measurement in dBuV/m can be converted to dBuA/m via the following formula: dBuV/m - 51.5 dB = dBuA/m. E-Field measurements have the same margin in dB to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limits

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	ESM Cable Corp.	Antenna Loop Cable	MNE	2024-01-28	2025-01-28
Antenna - Loop	ETS Lindgren	6502	AOB	2023-06-12	2025-06-12
Receiver	Rohde & Schwarz	ESR26	ARP	2023-05-10	2024-05-10
Antenna - Double Ridge	ETS Lindgren	3115	AIB	2022-09-01	2024-09-01
Cable	Element	Double Ridge Guide Horn Cables	MNV	2024-01-30	2025-01-30
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	2024-01-30	2025-01-30
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2023-05-01	2024-05-01
Antenna - Standard Gain	ETS-Lindgren	3160-07	AJJ	NCR	NCR
Cable	Element	Standard Gain Cable	MNW	2024-01-30	2025-01-30
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2024-01-30	2025-01-30
Antenna - Standard Gain	ETS-Lindgren	3160-08	AJP	NCR	NCR
Amplifier - Pre-Amplifier	L-3 Narda-Miteq	AMF-6F-12001800-30-10P	PAP	2024-01-30	2025-01-30
Antenna - Biconilog	Ametek	CBL 6141B	AYS	2023-03-28	2025-03-28
Cable	Element	Biconilog Cable	MNX	2024-01-30	2025-01-30
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	2024-01-30	2025-01-30
Filter - Low Pass	Micro-Tronics	LPM50004	HGG	2023-09-10	2024-09-10

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

9 kHz TO 12400 MHz

POWER INVESTIGATED

Lithium Battery

CONFIGURATIONS INVESTIGATED

STAK0329-3

MODES INVESTIGATED

Transmitting NFMI 10.281 MHz Modulated.

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	Edge AI RIC RT Hearing Aid	Work Order:	STAK0329
Serial Number:	240583884	Date:	2024-03-25
Customer:	Starkey Laboratories, Inc.	Temperature:	21.9°C
Attendees:	John Quach	Relative Humidity:	27.7%
Customer Project:	None	Bar. Pressure (PMSL):	996 mb
Tested By:	Christopher Heintzelman	Job Site:	MN04
Power:	Lithium Battery	Configuration:	STAK0329-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.209:2024	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020 RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	5	Test Distance (m):	1	Ant. Height(s) (m):	1(m)

COMMENTS

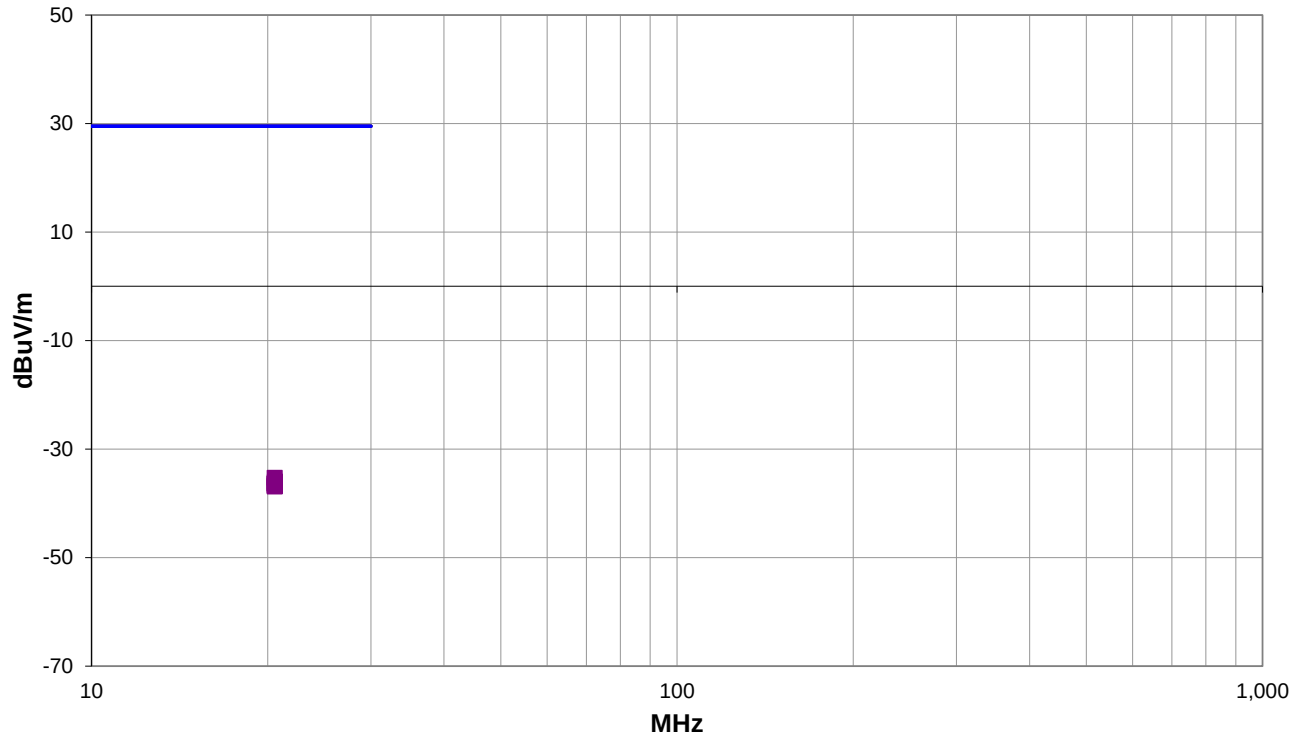
None

EUT OPERATING MODES

Transmitting NFMI 10.281 MHz Modulated.
A PK detector was used to show compliance, which is considered worst case as compared to a QP detector.

DEVIATIONS FROM TEST STANDARD

None



Run #: 5

PK AV QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #5

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
20.561	13.3	10.5	1.0	231.0	1.0	0.0	Para to EUT	PK	-59.1	-35.3	29.5	-64.8	EUT Vert
20.563	12.6	10.5	1.0	279.0	1.0	0.0	Perp to EUT	PK	-59.1	-36.0	29.5	-65.5	EUT On Side
20.563	12.3	10.5	1.0	184.0	1.0	0.0	Para to GND	PK	-59.1	-36.3	29.5	-65.8	EUT Vert
20.557	12.3	10.5	1.0	145.0	1.0	0.0	Para to GND	PK	-59.1	-36.3	29.5	-65.8	EUT Horz
20.560	12.2	10.5	1.0	0.0	1.0	0.0	Perp to EUT	PK	-59.1	-36.4	29.5	-65.9	EUT Horz
20.566	12.2	10.5	1.0	291.0	1.0	0.0	Para to EUT	PK	-59.1	-36.4	29.5	-65.9	EUT Horz
20.559	11.9	10.5	1.0	98.0	1.0	0.0	Perp to EUT	PK	-59.1	-36.7	29.5	-66.2	EUT Vert
20.567	11.8	10.5	1.0	303.0	1.0	0.0	Para to EUT	PK	-59.1	-36.8	29.5	-66.3	EUT On Side
20.559	11.7	10.5	1.0	54.0	1.0	0.0	Para to GND	PK	-59.1	-36.9	29.5	-66.4	EUT On Side

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

EUT:	Edge AI RIC RT Hearing Aid	Work Order:	STAK0329
Serial Number:	240583884	Date:	2024-03-25
Customer:	Starkey Laboratories, Inc.	Temperature:	21.9°C
Attendees:	John Quach	Relative Humidity:	27.6%
Customer Project:	None	Bar. Pressure (PMSL):	1001 mb
Tested By:	Christopher Heintzelman	Job Site:	MN09
Power:	Lithium Battery	Configuration:	STAK0329-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.209:2024	ANSI C63.10:2013
RSS-210 Issue 10:2019+A1:2020 RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	4	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

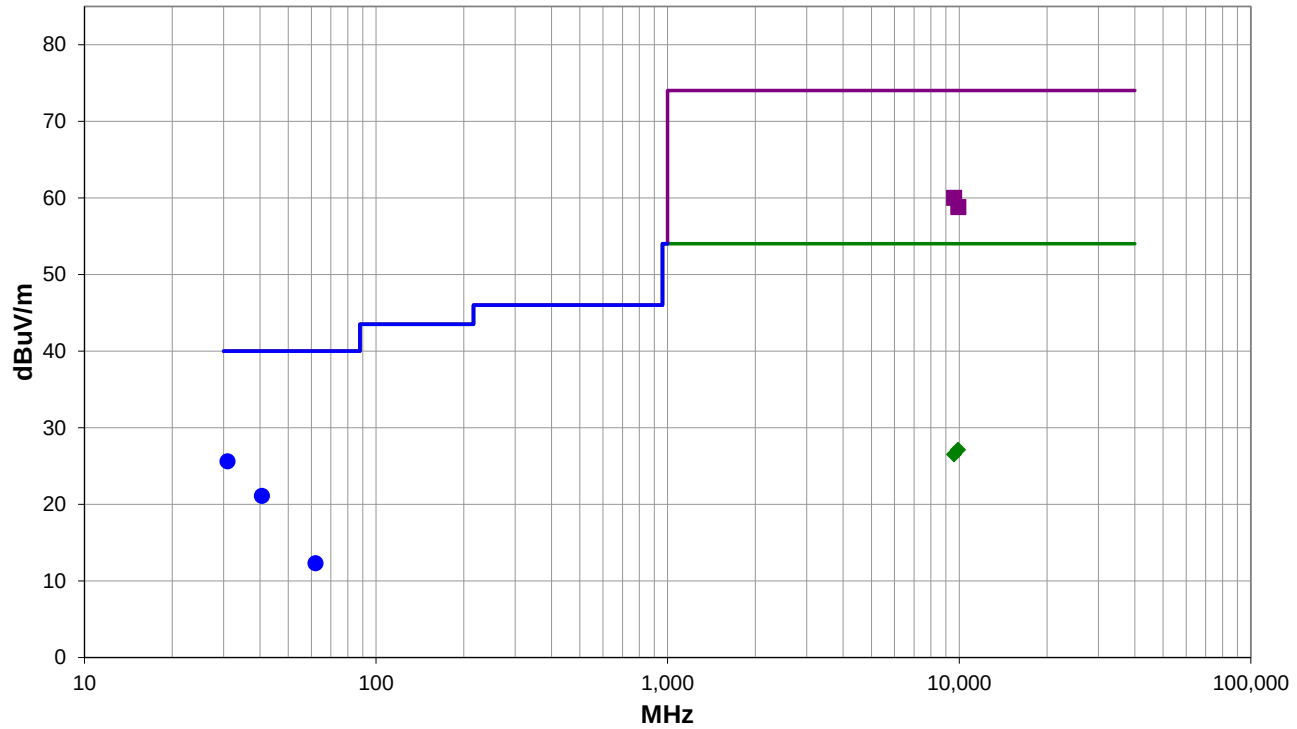
None

EUT OPERATING MODES

Transmitting NFMI 10.281 MHz Modulated.

DEVIATIONS FROM TEST STANDARD

None



Run #: 4 ■ PK ◆ AV ● QP

RESULTS - Run #4

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
9607.600	69.0	-9.0	1.5	36.0	3.0	0.0	Vert	PK	0.0	60.0	74.0	-14.0	EUT Horz
30.942	20.6	5.0	1.0	312.0	3.0	0.0	Horz	QP	0.0	25.6	40.0	-14.4	EUT Horz
9919.942	68.2	-9.4	1.5	6.0	3.0	0.0	Vert	PK	0.0	58.8	74.0	-15.2	EUT Horz
40.592	20.6	0.5	1.0	250.0	3.0	0.0	Horz	QP	0.0	21.1	40.0	-18.9	EUT Horz
9919.300	36.5	-9.4	1.5	6.0	3.0	0.0	Vert	AV	0.0	27.1	54.0	-26.9	EUT Horz
9607.242	35.5	-9.0	1.5	36.0	3.0	0.0	Vert	AV	0.0	26.5	54.0	-27.5	EUT Horz
61.974	20.6	-8.3	2.4	95.0	3.0	0.0	Horz	QP	0.0	12.3	40.0	-27.7	EUT Horz

CONCLUSION

Evaluation

Tested By

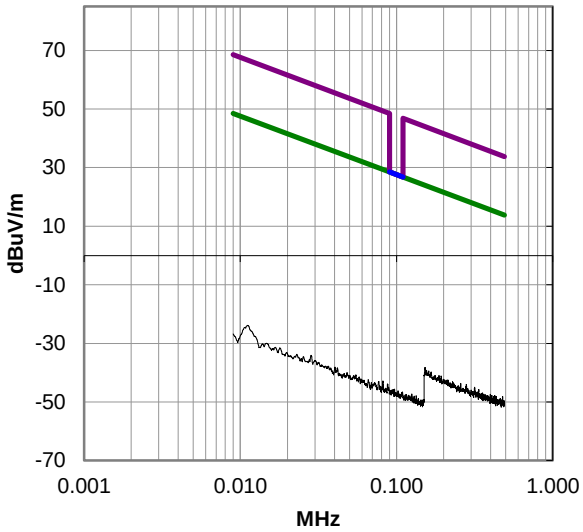
SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

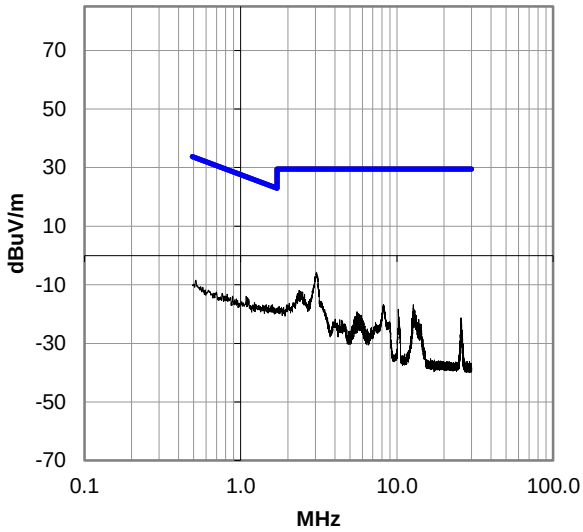
PRESCAN DATA

Radiated spurious emissions from the EUT are initially reviewed with Pre-scans (Preview scans). Pre-scans are performed, with the EUT transmitting on the lowest applicable data rate, for both vertical and horizontal polarizations. The Pre-scan plots below are shown with a peak detector and RBW for the following frequency ranges: 9 kHz RBW (< 30 MHz); 120 kHz RBW (30 - 1000 MHz); 1 MHz RBW (> 1 GHz). In the case where unintentional emissions are observed, an ambient or idle pre-scan with the radio off, will be shown for comparison.

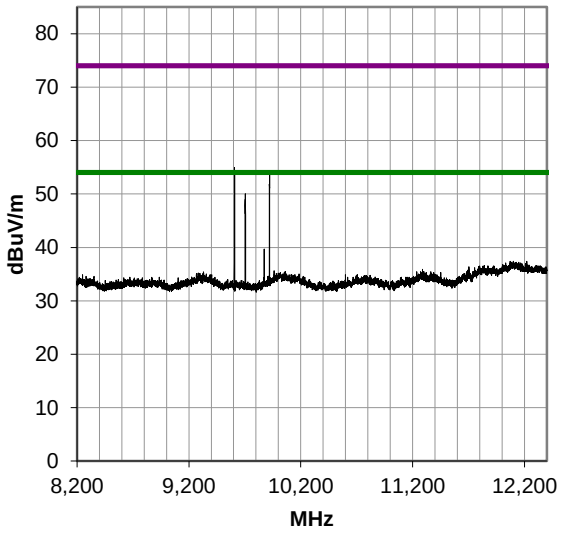
0.009-0.49 MHz, Run 4



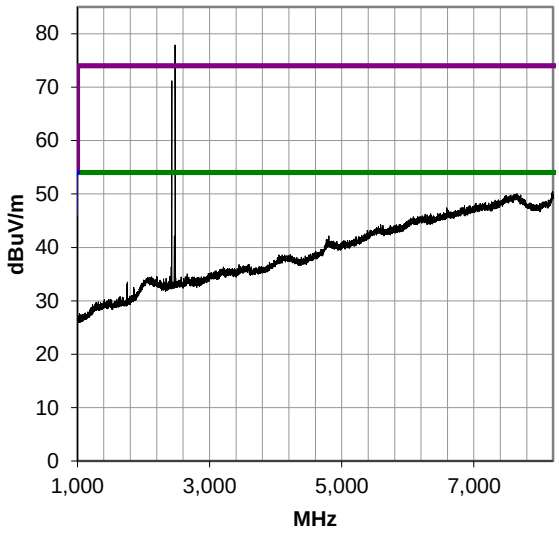
0.49-30 MHz, Run 5



8200-12400 MHz, Run 3



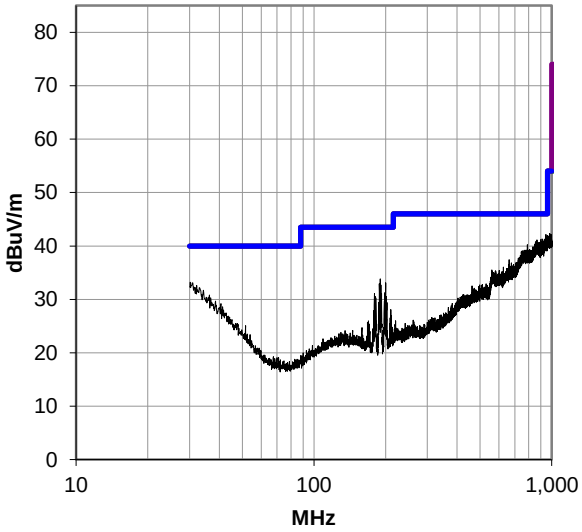
1000-8200 MHz, Run 2



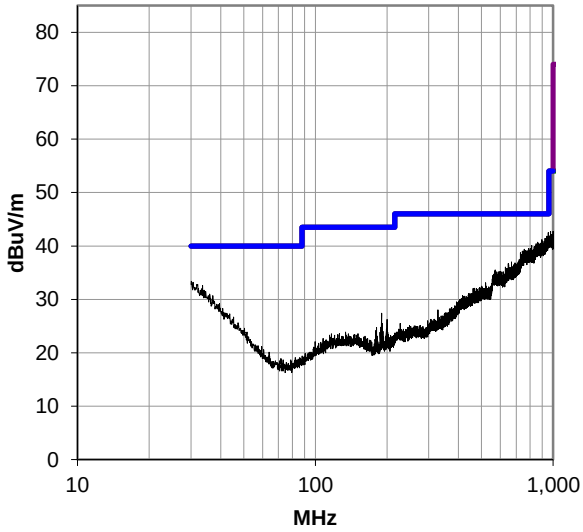
SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.04.25.0

30-1000 MHz, Run 8, Horizontal



30-1000 MHz, Run 7, Vertical



OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer.

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth as defined in RSS-Gen.

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Probe - Near Field Set	ETS Lindgren	7405	IPO	NCR	NCR
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2023-05-01	2024-05-01
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2023.12.06.3
WTD.2023.11.13.0

EUT:	Edge AI RIC RT Hearing Aid	Work Order:	STAK0329
Serial Number:	240583884	Date:	2024-03-21
Customer:	Starkey Laboratories, Inc.	Temperature:	22.5°C
Attendees:	John Quach	Relative Humidity:	19.8%
Customer Project:	None	Bar. Pressure (PMSL):	1026 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Lithium Battery	Configuration:	STAK0329-2

TEST SPECIFICATIONS

Specification:	Method:
RSS-210 Issue 10:2019+A1:2020 RSS-Gen Issue 5:2018+A1 2019+A2:2021	ANSI C63.10:2013

COMMENTS

No reference level offset applied because this is a frequency measurement only.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

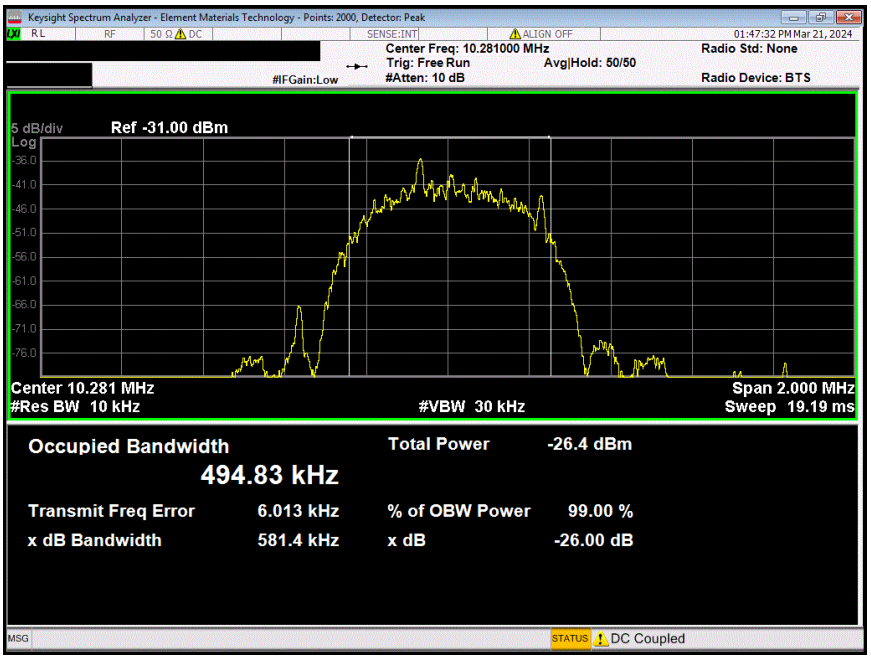
Pass

Tested By

TEST RESULTS

	Value	Limit	Result
10.281 MHz Inductive Radio (Modulated)	494.832 kHz	N/A	N/A

OCCUPIED BANDWIDTH (99%)



10.281 MHz Inductive Radio (Modulated)

End of Test Report