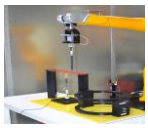
Element
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
https://www.element.com



HEARING AID COMPATIBILITY

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro, Maetan dong,
Yeongtong-gu, Suwon-si
Gyeonggi-do 16677, Korea

Date of Testing:
5/21/2026
Test Site/Location:
Element Washington DC LLC,
Columbia, MD, USA
Test Report Serial No.:
1M2605130037-01.A3L
Date of Issue:
5/27/2026

FCC ID:	**A3LSMA576U**
APPLICANT:	**SAMSUNG ELECTRONICS CO., LTD.**

Scope of Test:	RF Emissions Testing
Application Type:	Class II Permissive Change
FCC Rule Part(s):	CFR §20.19(b)
HAC Standard:	ANSI C63.19-2019 285076 D01 HAC Guidance v06r02 285076 D02 T-Coil testing for CMRS IP v04
DUT Type:	Portable Handset
Model:	SM-A576U1
Additional Model:	SM-A576U
Test Device Serial No.:	*Pre-Production Sample* [S/N: 3686M]

HAC Compliance:	**PASS**

This report only pertains to LTE Band 71 and NR Band n71 on antenna E of this wireless portable device. This wireless portable device has been shown to be hearing-aid compatible as specified in ANSI/IEEE Std. C63.19-2019 and has been tested in accordance with the specified measurement procedures. Test results reported herein relate only to the item(s) tested. Hearing-Aid Compatibility is based on the assumption that all production units will be designed electrically identical to the device tested in this report. North American Bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RJ Ortanez
Executive Vice President

ACCREDITED
CERT #2041.01

TEST REPORT REVISION HISTORY

Rev. No.	Report S/N	Description	Issue Date
A	1M2605130037-01.A3L	Initial Release	5/26/2026
B	1M2605130037-01.A3L	Editorial Changes	5/29/2026
C	1M2605130037-01.A3L	Editorial Changes	6/1/2026

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1. INTRODUCTION

On July 10, 2003, the Federal Communications Commission (FCC) adopted new rules requiring wireless manufacturers and service providers to provide digital wireless phones that are compatible with hearing aids. The FCC has modified the exemption for wireless phones under the Hearing Aid Compatibility Act of 1998 (HAC Act) in WT Docket 01-309 RM-8658[1] to extend the benefits of wireless telecommunications to individuals with hearing disabilities. These benefits encompass business, social and emergency communications, which increase the value of the wireless network for everyone. An estimated more than 10% of the population in the United States show signs of hearing impairment and of that fraction, almost 80% use hearing aids. Approximately 500 million people worldwide and 30 million people in the United States suffer from hearing loss.

Compatibility Tests Involved:

The standard calls for wireless communications devices to be measured for:

- RF Electric-field emissions
- T-coil mode, magnetic-signal strength in the audio band
- T-coil mode, magnetic-signal frequency response through the audio band
- T-coil mode, magnetic-signal and noise articulation index
- Volume Control, receive volume control performance
- Volume Control, receive distortion and noise performance
- Volume Control, receive acoustic frequency response performance

The hearing aid may be measured for:

- RF immunity in microphone mode
- RF immunity in T-coil mode

In the following tests and results, this report includes the evaluation for a wireless communications device.

Figure 1-1 Hearing Aid *in-vitu*

[1] FCC Rule & Order, WT Docket 01-309 RM-8658

2. DUT DESCRIPTION

FCC ID:	A3LSMA576U
Manufacturer:	Samsung Electronics Co., Ltd. 129, Samsung-ro, Maetan dong, Yeongtong-gu, Suwon-si Gyeonggi-do 16677, Korea
Model:	SM-A576U1
Additional Model:	SM-A576U
Serial Number:	3686M
Antenna Configurations:	Internal Antenna
DUT Type:	Portable Handset

I. LTE/NR Band Selection

This device supports LTE/NR capabilities with overlapping transmission frequency ranges. When the supported frequency range of a band falls completely within a band with a larger transmission frequency range, both bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both bands share the same transmission path and signal characteristics, hearing-aid compatibility compliance was only assessed for the band with the larger transmission frequency range. However, overlapping LTE bands which are anchor bands for dual connectivity (EN-DC) scenarios between LTE and NR were evaluated as independent LTE bands.

Table 2-1
HAC Air Interfaces

Air-Interface	Band (MHz)	Type Transport	HAC Tested	Simultaneous But Not Tested	Name of Voice Service
GSM	850	VO	No[1]	Yes: WIFI or BT	CMRS Voice
	1900				
	GPRS/EDGE	VD	No[1]	Yes: WIFI or BT	Google Meet
UMTS	850	VD	No[1]	Yes: WIFI or BT	CMRS Voice
	1700				
	1900				
	HSPA	VD	No[1]	Yes: WIFI or BT	Google Meet
LTE (FDD)	680 (B71)	VD	No[1]	Yes: NR, WIFI or BT	VoLTE, Google Meet
	700 (B12)				
	780 (B13)				
	790 (B14)				
	850 (B5)				
	850 (B26)				
	1700 (B4)				
	1700 (B66)				
	1900 (B2)				
	1900 (B25)				
	2300 (B30)				
	2500 (B7)				
LTE (TDD)	2600 (B38)	VD	No[1]	Yes: NR, WIFI or BT	VoLTE, Google Meet
	2600 (B41)				
	3600 (B48)				
NR (FDD)	680 (n71)	VD	No[1]	Yes: LTE, WIFI or BT	VoNR, Google Meet
	850 (n5)				
	1700 (n70)				
	1700 (n66)				
	1900 (n2)				
	1900 (n25)				
	2300 (n30)				
NR (TDD)	2600 (n41)	VD	No[1]	Yes: LTE, WIFI or BT	VoNR, Google Meet
	3500 (n77, DoD)				
	3500 (n78, DoD)				
	3600 (n48)				
	3750 (n78)				
	3800 (n77)				
WIFI	2450	VD	No[1]	Yes: GSM, UMTS, LTE, or NR	VoWIFI, Google Meet
	5200 (U-NII 1)				
	5300 (U-NII 2A)				
	5500 (U-NII 2C)				
	5800 (U-NII 3)				
	5900 (U-NII 4)				
	6175 (U-NII 5)		No[1,3]		
	6475 (U-NII 6)		No[4]		
	6700 (U-NII 7)				
	7000 (U-NII 8)				
BT	2450	DT	No	Yes: GSM, UMTS, LTE, or NR	N/A

Type Transport
VO = Voice Only
DT = Digital Data - Not intended for Voice Services
VD = CMRS and/or IP Voice over Data Transport

Notes:
1. Evaluated for WD RF peak power level requirements.
2. NR FR2 bands are currently outside the scope of ANSI C63.19 and FCC HAC regulations therefore they were not evaluated.
3. WIFI U-NII band 5 was evaluated for operations which are entirely below 6GHz. Operations partially or entirely above 6GHz were not evaluated due to equipment limitations and being outside of the current scope of ANSI C63.19 and FCC HAC regulations.
4. WIFI U-NII bands 6 through 8 were not evaluated due to being outside of the current scope of ANSI C63.19 and FCC HAC regulations.
5. This report only pertains to LTE Band 71 and NR Band n71 on antenna E of this wireless portable device. For full data, please refer to the original certification test report.

3. ANSI/IEEE C63.19-2019 PERFORMANCE REQUIRMENTS

I. WD EMISSIONS Requirements

The ANSI Standard provides guidance on measuring the potential for wireless device (WD) RF emissions to cause audio frequency interference in a hearing aid. When the performance requirements of the Standard below are met, the WD demonstrates compliance to emission requirements for operation in close proximity with a hearing aid. The WD may demonstrate compliance by meeting any of the four requirements listed below for each of its operating bands.

Frequency Range (MHz)	RF_{AIPL} (dBm)
<960	29
960-2000	26
>2000	25

Table 3-1
WD RF audio interference power level requirements

Frequency Range (MHz)	$RF_{Peak\ Power}$ (dBm)
<960	35
960-2000	32
>2000	31

Table 3-2
WD RF peak power level requirements

Frequency Range (MHz)	RF_{AIL} (dB(V/m))
<960	39
960-2000	36
>2000	35

Table 3-3
WD RF audio interference level requirements

Frequency Range (MHz)	RF_{Peak} (dB(V/m))
<960	29
960-2000	26
>2000	25

Table 3-4
WD RF peak near-field level requirements

4. RF SYSTEM SPECIFICATIONS

Description of test system for measurement of near-field RF audio interference level

EF3DV3 E-Field Probe Description

Construction:	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges
Calibration:	In air from 30 MHz to 6.0 GHz (absolute accuracy ±5.1%, k=2)
Frequency:	30 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)
Dynamic Range	2 V/m to > 1000 V/m (M3 or better device readings fall well below diode compression point)
Linearity:	± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 4.0 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.5 mm

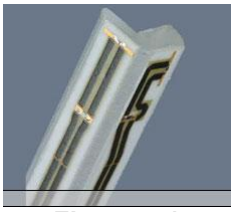
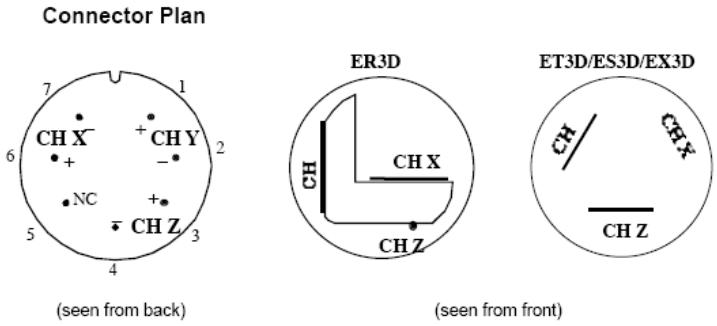


Figure 4-1
E-field Free-space Probe

Probe Tip Description

HAC field measurements take place in the close near field with high gradients. Increasing the measuring distance from the source will generally decrease the measured field values (in case of the validation dipole approx. 10% per mm).

The electric field probes have an irregular internal geometry because it is physically not possible to have the 3 orthogonal sensors situated with the same center. The effect of the different sensor centers is accounted for in the HAC uncertainty budget ("sensor displacement").



The antistatic shielding inside the probe is connected to the probe connector case.

Instrumentation Chain

Equation 1

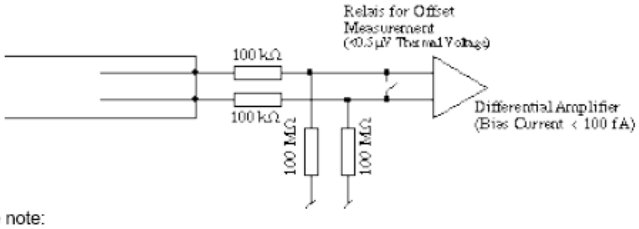
Conversion of Connector Voltage u_i to E-Field E_i

$$E_i = \sqrt{\frac{u_i + (u_i^2 \cdot CF)/(DCP)}{Norm_i \cdot ConvF}}$$

whereby

E_i:	electric field in V/m
u_i:	voltage of channel i at the connector in µV
$Norm_i$:	sensitivity of channel i in µV/(V/m)^2
$ConvF$:	enhancement factor in liquid (ConvF=1 for Air)
DCP:	diode compression point in µV
CF:	signal crest factor (peak power/average power)

Conditions of Calibration



Please note:

- a lower input impedance of the amplifier will result in different sensitivity factors $Norm_i$ and DCP
- larger bias currents will cause higher offset

Probe Response to Frequency

The E-field sensors have inherently a very flat frequency response. They are calibrated with a number of frequencies resulting in a common calibration factor, with the frequency behavior documented in the calibration certificate (See also below).

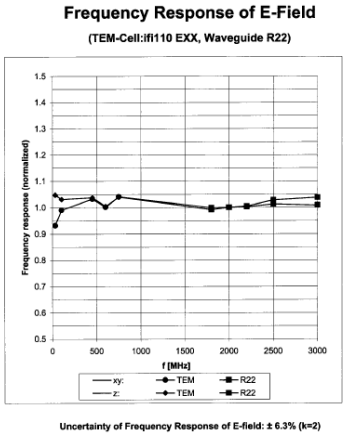


Figure 4-2 E-Field Probe Frequency Response

SPEAG Robotic System

E-field measurements are performed using the DASY6 automated dosimetric assessment system. The DASY6 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Staubli), robot controller, Intel CORE i7 computer, near-field probe, probe alignment sensor, and the HAC phantom. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF).

Figure 4-3
SPEAG Robotic System

System Hardware

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of the computer with operating system and RF Measurement Software DASY6 v1.2.4 (with HAC Extension), A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

System Electronics

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

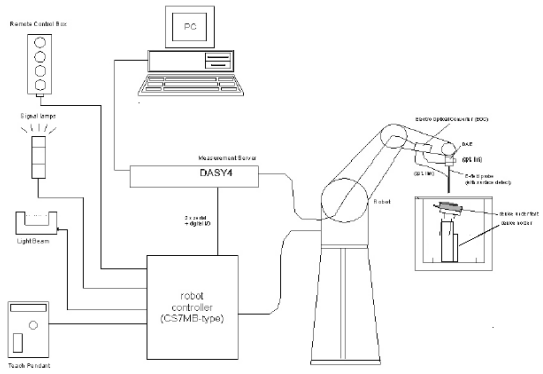


Figure 4-4
SPEAG Robotic System Diagram

DASY6 Instrumentation Chain

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with	V_i	= compensated signal of channel i	(i = x, y, z)
	U_i	= input signal of channel i	(i = x, y, z)
	cf	= crest factor of exciting field	(DASY parameter)
	dcp_i	= diode compression point	(DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

$$\text{E} - \text{fieldprobes}: \qquad E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

with V_i = compensated signal of channel i (i = x, y, z)
$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
$\mu\text{V}/(\text{V/m})^2$ for E-field Probes
$ConvF$ = sensitivity enhancement in solution
E_i = electric field strength of channel i in V/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

The measurement/integration time per point, as specified by the system manufacturer is >500ms.

The signal response time is evaluated as the time required by the system to reach 90% of the expected final value after an on/off switch of the power source with an integration time of 500ms and a probe response time of <5 ms. In the current implementation, DASY6 waits longer than 100ms after having reached the grid point before starting a measurement, i.e., the response time uncertainty is negligible.

If the device under test does not emit a CW signal, the integration time applied to measure the electric field at a specific point may introduce additional uncertainties due to the discretization.
The tolerances for the different systems had the worst-case of 2.6%.

Environmental Conditions

Environmental conditions such as temperature and relative humidity are monitored to ensure there are no impacts on system specifications. Proper voltage and power line frequency conditions are maintained with three phase power sources. Environmental noise and reflections are monitored through system checks.

5. TEST PROCEDURE

I. PEAK POWER LEVEL EVALUATION

To demonstrate hearing aid compliance with the ANSI standard C63.19-2019, an evaluation was performed using the peak power level requirements detailed in Table 3-2. Conducted power measurements were performed to verify maximum target power levels for all relevant operating bands/modes. An evaluation of each applicable air interface was performed to ensure compliance for each band.

6. CONDUCTED POWER CONFIGURATIONS AND TARGETS

I. Procedures Used to Establish RF Signal for HAC Testing

The handset was configured to transmit the required air interface in a shielded chamber. Measurements were taken with a fully charged battery.

II. HAC Target Powers

All applicable modes supported by the device have their held-to-ear conducted power targets listed below and were used for the individual mode evaluations in Section 7. All conducted power targets have a tolerance of +1.0dB and -1.5dB unless otherwise noted. For WIFI modes, the overall maximum power amongst all bands per IEEE standards is listed.

III. RF Conducted Power Measurement Setup and Conditions

Output Power Verification
Maximum output power is verified for all applicable test channels for all air interfaces which require HAC compliance. See Table 6-1 for air interface specific settings of transmit power parameters.

Table 6-1
Power Control Parameters and Settings by Air Interface

Air Interface:	Parameter Name:	Parameter Set To:
GSM	PCL	GSM850: “5”; GSM1900: “0”
UMTS	TPC	“All 1’s”
LTE	TPC	“Max Power”
NR	PLS	“Max Power”
WIFI	PLS	Mfr Specified

The general setup for conducted powers included in Tables 6-11 to 6-77 is shown in Figure 6-1 below. The power measurement equipment could be a base station simulator, signal analyzer, or power meter depending on the applicable air interface.

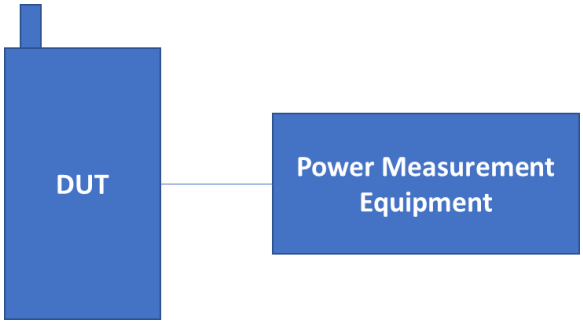


Figure 6-1
Power Measurement Setup

IV. LTE FDD Target Powers

Table 6-1
LTE FDD Conducted Power Targets

Band	Modulated Average Output Power (in dBm)
LTE Band 71	24.0

V. NR FDD Target Powers

Table 6-2
NR FDD Conducted Power Targets

Band	Modulated Average Output Power (in dBm)
NR Band n71	24.0

VI. Conducted Power Measurements

Table 6-3
LTE Band 71 Conducted Powers – Ant E

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	133222	673.0	1 / 99	23.28
		133297	680.5	1 / 99	23.49
		133372	688.0	1 / 99	23.60
	16-QAM	133222	673.0	1 / 99	22.58
15 MHz	QPSK	133197	670.5	1 / 74	23.37
		133297	680.5	1 / 74	23.50
		133397	690.5	1 / 0	23.43
	16-QAM	133197	670.5	1 / 37	22.68
10 MHz	QPSK	133172	668.0	1 / 49	23.45
		133297	680.5	1 / 49	23.38
		133422	693.0	1 / 0	23.50
	16-QAM	133172	668.0	1 / 49	22.43
5 MHz	QPSK	133147	665.5	1 / 12	23.23
		133297	680.5	1 / 24	23.18
		133447	695.5	1 / 24	23.57
	16-QAM	133147	665.5	1 / 0	22.42

Table 6-4
NR Band 71 Conducted Powers – Ant E

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	π/2 BPSK	134600	673.0	1 / 53	23.78
		136100	680.5	1 / 1	23.64
		137600	688.0	1 / 53	23.55
	QPSK	134600	673.0	1 / 53	23.69
		136100	680.5	1 / 1	23.63
		137600	688.0	1 / 1	23.41
	16-QAM	137600	688.0	1 / 53	22.45
15 MHz	π/2 BPSK	134100	670.5	1 / 39	23.89
		136100	680.5	1 / 1	23.58
		138100	690.5	1 / 39	23.45
	QPSK	134100	670.5	1 / 39	23.88
		136100	680.5	1 / 1	23.57
		138100	690.5	1 / 39	23.46
	16-QAM	138100	690.5	1 / 1	22.38
10 MHz	π/2 BPSK	133600	668.0	1 / 26	24.04
		136100	680.5	1 / 26	23.57
		138600	693.0	1 / 26	23.35
	QPSK	133600	668.0	1 / 26	23.95
		136100	680.5	1 / 1	23.54
		138600	693.0	1 / 26	23.36
	16-QAM	138600	693.0	1 / 1	22.34
5 MHz	π/2 BPSK	133100	665.5	1 / 1	23.99
		136100	680.5	1 / 12	23.59
		139100	695.5	1 / 12	23.36
	QPSK	133100	665.5	1 / 23	23.92
		136100	680.5	1 / 12	23.48
		139100	695.5	1 / 12	23.42
	16-QAM	139100	695.5	1 / 12	22.33

7. JUSTIFICATION OF HELD TO EAR MODES TESTED

I. Analysis of RF Air Interface Technologies

An analysis was performed, following the guidance of §4.7 of the ANSI standard, of the RF air interface technologies being evaluated. For this analysis, the stated peak power levels were verified to be within the requirements detailed in Table 3-2.

II. Individual Mode Evaluations

Table 7-1
Peak power levels of individual air interfaces evaluated for emission compliance

Air Interface	Peak Power** [dBm]	Peak Power Level Margin [dB]	Emission Compliance
LTE FDD	25.00	10.00	PASS
NR FDD	25.00	10.00	PASS

III. WD RF Peak power level conclusions

Per ANSI C63.19-2019, all applicable air interfaces demonstrate compliance to the peak power requirements shown in Table 3-2 of this report.

8. EQUIPMENT LIST

Table 8-1
Equipment List

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Amplifier Research	15S1G6	Amplifier	N/A	CBT*	N/A	433978
Anritsu	MA24106A	USB Power Sensor	5/29/2025	Annual	6/29/2026	1349511
Control Company	4040	Digital Thermometer	10/15/2024	Biennial	10/15/2026	240763496
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	N/A	CBT*	N/A	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	N/A	CBT*	N/A	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	N/A	CBT*	N/A	1226
Pasternack	PE2237-20	Bidirectional Coupler	N/A	CBT*	N/A	N/A
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	7/9/2025	Annual	7/9/2026	166462
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	8/14/2025	Biennial	8/14/2026	164948
Anritsu	MT8000A	Radio Communication Test Station	6/4/2025	Annual	6/4/2026	6261914237
Seekonk	NC-100	Torque Wrench (8" lb)	5/29/2025	Biennial	5/29/2027	N/A

Calibration traceable to the National Institute of Standards and Technology (NIST).

***Note: CBT (Calibrated Before Testing).** Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

9. MEASUREMENT UNCERTAINTY

Table 9-1
Uncertainty Estimation Table

Wireless Communications Device Near-Field Measurement Uncertainty Estimation							
Uncertainty Component	Data (dB)	Data Type	Prob. Dist.	Divisor	Ci (E)	Unc. (dB)	Notes/Comments
Measurement System							
RF System Reflections	0.50	Tolerance	N	1.00	1	0.50	* Refl. < -20 dB
Field Probe Calibration	0.21	Tolerance	N	1.00	1	0.21	
Field Probe Isotropy	0.01	Tolerance	N	1.00	1	0.01	
Field Probe Frequency Response	0.135	Tolerance	N	1.00	1	0.14	
Field Probe Linearity	0.013	Tolerance	N	1.00	1	0.01	
Modulation Interference Factor	0.20	Tolerance	R	1.73	1	0.12	Applicable for M-rating testing
Boundary Effects	0.105	Accuracy	R	1.73	1	0.06	*
Probe Positioning Accuracy	0.20	Accuracy	R	1.73	1	0.12	*
Probe Positioner	0.050	Accuracy	R	1.73	1	0.03	*
Extrapolation/Interpolation	0.045	Tolerance	R	1.73	1	0.03	*
Resolution to 2mm error	0.21	Tolerance	N	1.00	1	0.21	
System Detection Limit	0.05	Tolerance	R	1.73	1	0.03	*
Readout Electronics	0.015	Tolerance	N	1.00	1	0.02	*
Integration Time	0.11	Tolerance	R	1.73	1	0.06	*
Response Time	0.033	Tolerance	R	1.73	1	0.02	*
Phantom Thickness	0.10	Tolerance	R	1.73	1	0.06	*
System Repeatability (Field x 2=power)	0.17	Tolerance	N	1.00	1	0.17	*
Test Sample Related							
Device Positioning Vertical	0.2	Tolerance	R	1.73	1	0.12	*
Device Positioning Lateral	0.045	Tolerance	R	1.73	1	0.03	*
Device Holder and Phantom	0.1	Tolerance	R	1.73	1	0.06	*
Power Drift	0.21	Tolerance	R	1.73	1	0.12	
Combined Standard Uncertainty (k=1)						0.66	16.3%
Expanded Uncertainty [95% confidence]						1.31	32.6%
Expanded Uncertainty [95% confidence] on Field						0.66	16.3%

Notes:
1. Test equipments are calibrated according to techniques outlined in NIS81, NIS3003 and NIST Tech Note 1297. All equipments have traceability according to NIST. Measurement Uncertainties are defined in further detail in NIS 81 and NIST Tech Note 1297 and UKAS M3003.
2. * Uncertainty specifications from Schmidt & Partner Engineering AG (not site specific)

Measurement uncertainty reflects the quality and accuracy of a measured result as compared to the true value. Such statements are generally required when stating results of measurements so that it is clear to the intended audience that the results may differ when reproduced by different facilities. Measurement results vary due to the measurement uncertainty of the instrumentation, measurement technique, and test engineer. Most uncertainties are calculated using the tolerances of the instrumentation used in the measurement, the measurement setup variability, and the technique used in performing the test. While not generally included, the variability of the equipment under test also figures into the overall measurement uncertainty. Another component of the overall uncertainty is based on the variability of repeated measurements (so-called Type A uncertainty). This may mean that the Hearing Aid immunity tests may have to be repeated by taking down the test setup and resetting it up so that there are a statistically significant number of repeat measurements to identify the measurement uncertainty. By combining the repeat measurement results with that of the instrumentation chain using the technique contained in NIS 81 and NIS 3003, the overall measurement uncertainty was estimated.

10. CONCLUSION

The measurements indicate that the referenced wireless communications device complies with the HAC limits specified in accordance with the ANSI C63.19-2019 Standard and FCC WT Docket No. 01-309 RM-8658. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters specific to the test. The test results and statements relate only to the item(s) tested.

11. REFERENCES

1. ANSI C63.19-2019, American National Standard for Methods of Measurement of Compatibility between Wireless communication devices and Hearing Aids.", New York, NY, IEEE, August 2019

2. FCC Office of Engineering and Technology KDB, "285076 D01 HAC Guidance v06r02," September 19, 2022

3. FCC Office of Engineering and Technology KDB, "285076 D02 T-Coil Testing for CMRS IP v04," February 23, 2022

4. FCC Public Notice DA 06-1215, *Wireless Telecommunications Bureau and Office of Engineering and Technology Clarify Use of Revised Wireless Phone Hearing Aid Compatibility Standard*, June 6, 2006

5. FCC 3G Review Guidance, Laboratory Division OET FCC, May/June 2006

6. Berger, H. S., "Compatibility Between Hearing Aids and Wireless Devices," Electronic Industries Forum, Boston, MA, May, 1997

7. Berger, H. S., "Hearing Aid and Cellular Phone Compatibility: Working Toward Solutions," Wireless Telephones and Hearing Aids: New Challenges for Audiology, Gallaudet University, Washington, D.C., May, 1997 (To be reprinted in the American Journal of Audiology).

8. Berger, H. S., "Hearing Aid Compatibility with Wireless Communications Devices, " IEEE International Symposium on Electromagnetic Compatibility, Austin, TX, August, 1997.

9. Bronaugh, E. L., "Simplifying EMI Immunity (Susceptibility) Tests in TEM Cells," in the 1990 IEEE International Symposium on Electromagnetic Compatibility Symposium Record, Washington, D.C., August 1990, pp. 488-491

10. Byme, D. and Dillon, H., The National Acoustics Laboratory (NAL) New Procedure for Selecting the Gain and Frequency Response of a Hearing Aid, Ear and Hearing 7:257-265, 1986.

11. Crawford, M. L., "Measurement of Electromagnetic Radiation from Electronic Equipment using TEM Transmission Cells, " U.S. Department of Commerce, National Bureau of Standards, NBSIR 73-306, Feb. 1973.

12. Crawford, M. L., and Workman, J. L., "Using a TEM Cell for EMC Measurements of Electronic Equipment," U.S. Department of Commerce, National Bureau of Standards. Technical Note 1013, July 1981.

13. Decker, W. F., Crawford, M. L., and Wilson, W. A., "Construction of a Large Transverse Electromagnetic Cell", U.S. Department of Commerce, National Bureau of Standards, Technical Note 1011, Feb. 1979.

14. EHIMA GSM Project, Development phase, Project Report (1st part) Revision A. Technical-Audiological Laboratory and Telecom Denmark, October 1993.

15. EHIMA GSM Project, Development phase, Part II Project Report. Technical-Audiological Laboratory and Telecom Denmark, June 1994.

16. EHIMA GSM Project Final Report, Hearing Aids and GSM Mobile Telephones: Interference Problems, Methods of Measurement and Levels of Immunity. Technical-Audiological Laboratory and Telecom Denmark, 1995.

17. HAMPIS Report, Comparison of Mobile phone electromagnetic near field with an upscaled electromagnetic far field, using hearing aid as reference, 21 October 1999.

18. Hearing Aids/GSM, Report from OTWIDAM, Technical-Audiological Laboratory and Telecom Denmark, April 1993.

19. IEEE 100, The Authoritative Dictionary of IEEE Standards Terms, Seventh Edition.

20. Joyner, K. H, et. al., Interference to Hearing Aids by the New Digital Mobile Telephone System, Global System for Mobile (GSM) Communication Standard, National Acoustic Laboratory, Australian Hearing Series, Sydney 1993.

21. Joyner, K. H., et. al., Interference to Hearing Aids by the Digital Mobile Telephone System, Global System for Mobile Communications (GSM), NAL Report #131, National Acoustic Laboratory, Australian Hearing Series, Sydney, 1995.

22. Konigstein, D., and Hansen, D., “A New Family of TEM Cells with enlarged bandwidth and Optimized working Volume,” in the Proceedings of the 7th International Symposium on EMC, Zurich, Switzerland, March 1987; 50:9, pp. 127-132.

23. Kuk, F., and Hjorstgaard, N. K., “Factors affecting interference from digital cellular telephones,” Hearing Journal, 1997; 50:9, pp 32-34.

24. Ma, M. A., and Kanda, M., ”Electromagnetic Compatibility and Interference Metrology,” U.S. Department of Commerce, National Bureau of Standards, Technical Note 1099, July 1986, pp. 17-43.

25. Ma, M. A., Sreenivashiah, I. , and Chang, D. C., “A Method of Determining the Emission and Susceptibility Levels of Electrically Small Objects Using a TEM Cell,” U.S. Department of Commerce, National Bureau of Standards, Technial Note 1040, July 1981.

26. McCandless, G. A., and Lyregaard, P. E., Prescription of Gain/Output (POGO) for Hearing Aids, Hearing Instruments 1:16-21, 1983

27. Skopec, M., “Hearing Aid Electromagnetic Interference from Digital Wireless Telephones, “IEEE Transactions on Rehabilitation Engineering, vol. 6, no. 2, pp. 235-239, June 1998.

28. Technical Report, GSM 05.90, GSM EMC Considerations, European Telecommunications Standards Institute, January 1993.

29. Victorian, T. A., “Digital Cellular Telephone Interference and Hearing Aid Compatibility—an Update,” Hearing Journal 1998; 51:10, pp. 53-60

30. Wong, G. S. K., and Embleton, T. F. W., eds., AIP Handbook of Condenser Microphones: Theory, Calibration and Measurements, AIP Press.