

TEST REPORT

FCC HAC T-COIL Test for SM-A376U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-SR-2512-FC003

DATE OF ISSUE
December 15, 2025

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TEST REPORT

HAC T-COIL Test
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FCC ID
A3LSMA376U

Applicant SAMSUNG Electronics Co., Ltd
129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677, Korea

Product Name	Mobile Phone
Model Name	SM-A376U
Additional Model Name	SM-A376U1, SM-S376V

Date of Test	Nov. 10, 2025~ Dec. 01,2025
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Location of Test	☒ Permanent Testing Lab ☐ On Site Testing Lab (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
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FCC Rule Part(s)	FCC 47 CFR § 20.19 , ANSI C63.19-2019
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C63.19-2019HACResult:	PASS
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REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	Dec. 15, 2025	Initial Release

Notice

Content

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

The laboratory is not accredited for the test results marked *.

Information provided by the applicant is marked **.

Test results provided by external providers are marked ***.

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

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1. Test Regulations

The tests were performed according to the following regulations:

Test Standard	FCC 47 CFR § 20.19, ANSI C63.19-2019
Test Method	• FCC CFR47 Part 20.19 • ANSI C63.19 2019-version • FCC KDB 285076 D01 HAC Guidance v06r04 • FCC KDB 285076 D02 T Coil testing v04 • FCC KDB 285076 D03 HAC FAQ v01r07 • TCB workshop updates

2. Test Location

2.1 Test Laboratory

Company Name	HCT Co., Ltd.
Address	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea
Telephone	031-645-6300
Fax.	031-645-6401

2.2 Test Facilities

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Korea	National Radio Research Agency (Designation No. KR0032)
	KOLAS (Testing No. KT197)

3. DEVICE UNDER TEST DESCRIPTION

3.1 General Information of the EUT

Model Name	SM-A376U
Additional Model Name	SM-A376U1,SM-S376V
Equipment Type	Mobile Phone
FCC ID	A3LSMA376U
Application Type	Certification
Applicant	SAMSUNG Electronics Co., Ltd.

3.2 DUT specification

Device Wireless specification overview		
Band & Mode	Operating Mode	Tx Frequency
GSM850	Voice / Data	824.2 MHz ~ 848.8 MHz
GSM1900	Voice / Data	1 850.2 MHz ~ 1 909.8 MHz
UMTS Band 2	Voice / Data	1 852.4 MHz ~ 1 907.6 MHz
UMTS Band 4	Voice / Data	1 712.4 MHz ~ 1 752.6 MHz
UMTS Band 5	Voice / Data	826.4 MHz ~ 846.6 MHz
LTE FDD Band 2 (PCS)	Voice / Data	1 850.7 MHz ~ 1 909.3 MHz
LTE FDD Band 4 (AWS)	Voice / Data	1 710.7 MHz ~ 1 754.3 MHz
LTE FDD Band 5 (Cell)	Voice / Data	824.7 MHz ~ 848.3 MHz
LTE FDD Band 7	Voice / Data	2 502.5 MHz ~ 2 567.5 MHz
LTE FDD Band 12	Voice / Data	699.7 MHz ~ 715.3 MHz
LTE FDD Band 13	Voice / Data	779.5 MHz ~ 784.5 MHz
LTE FDD Band 14	Voice / Data	790.5 MHz ~ 795.5 MHz
LTE FDD Band 25	Voice / Data	1 850.7 MHz ~ 1 914.3 MHz
LTE FDD Band 26	Voice / Data	814.7 MHz ~ 848.3 MHz
LTE FDD Band 30	Voice / Data	2 307.5 MHz ~ 2 312.5 MHz
LTE TDD Band 38	Voice / Data	2 572.5 MHz ~ 2 617.5 MHz
LTE TDD Band 41	Voice / Data	2 498.5 MHz ~ 2 687.5 MHz
LTE TDD Band 48	Voice / Data	3 552.5 MHz ~ 3 697.5 MHz
LTE FDD Band 66 (AWS)	Voice / Data	1 710.7 MHz ~ 1 779.3 MHz
LTE FDD Band 71	Voice / Data	665.5 MHz ~ 695.5 MHz
NR FDD Band n2 (PCS)	Voice / Data	1 852.5 MHz ~ 1 907.5 MHz
NR FDD Band n5	Voice / Data	826.5 MHz ~ 846.5 MHz
NR FDD Band n25 (PCS)	Voice / Data	1 852.5 MHz ~ 1 912.5 MHz
NR FDD Band n30	Voice / Data	2 307.5 MHz ~ 2 312.5 MHz
NR TDD Band n41	Voice / Data	2 501.01 MHz ~ 2 685 MHz
NR TDD Band n48	Voice / Data	3 555 MHz ~ 3 695.01 MHz
NR FDD Band n66	Voice / Data	1 712.5 MHz ~ 1 777.5 MHz
NR FDD Band n70	Voice / Data	1 697.5 MHz ~ 1 707.5 MHz
NR FDD Band n71	Voice / Data	665.5 MHz ~ 695.5 MHz
NR TDD Band n77	Voice / Data	3 705 MHz ~ 3 975 MHz
NR TDD Band n77 DoD	Voice / Data	3 445.01 MHz ~ 3 544.98 MHz
NR TDD Band n78	Voice / Data	3 705 MHz ~ 3 795 MHz
NR TDD Band n78 DoD	Voice / Data	3 455.01 MHz ~ 3 544.98 MHz
U-NII-1	Voice / Data	5 180 MHz ~ 5 240 MHz
U-NII-2A	Voice / Data	5 260 MHz ~ 5 320 MHz
U-NII-2C	Voice / Data	5 500 MHz ~ 5 720 MHz
U-NII-3	Voice / Data	5 745 MHz ~ 5 825 MHz
U-NII-4	Voice / Data	5 845 MHz ~ 5 885 MHz
2.4 GHz WLAN	Voice / Data	2 412 MHz ~ 2 462 MHz
Bluetooth / LE	Data	2 402 MHz ~ 2 480 MHz
NFC	Data	13.56 MHz

4. Measuring Instrument Calibration

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
ABM Probe	SPEAG	AM1DV3	3153	10/10/2026
ABM Probe	SPEAG	AM1DV3	3050	05/22/2026
Data Acquisition Electronics	SPEAG	DAE4	869	09/16/2026
Data Acquisition Electronics	SPEAG	DAE4	1417	02/18/2026
DAC	Sound Devices	USBPre 2	HB1318341009	N/A
Radio Communication Tester	R & S	CMW 500	127521	04/21/2026
Radio Communication Tester	R & S	CMW 500	167918	03/18/2026
USB Audio Module	KEYSIGHT	U8903B-UAM	101006	N/A
UXM 5G Wireless Test Set	KEYSIGHT	E7515B	MY60102101	04/28/2026

5. Measurement Uncertainty

Measurement Uncertainty for Audio Band Magnetic Measurement

Error Description	Uncertainty ± %	Probability distribution	Div.	c/ ABM _d	c/ ABM _u	Std. Unc. ABM _d	Std. Unc. ABM _u
Probe Sensitivity							
Reference Level	3.0	N	1	1	1	3.0	3.0
AMCC Geometry	0.4	R	1.73	1	1	0.2	0.2
AMCC Current	1.0	R	1.73	1	1	0.6	0.6
Probe Positioning during Calibr.	0.1	R	1.73	1	1	0.1	0.1
Noise Contribution	0.7	R	1.73	0.0143	1	0.0	0.4
Frequency Slope	5.9	R	1.73	0.1	1.0	0.3	3.5
Probe System							
Repeatability / Drift	1.0	R	1.73	1	1	0.6	0.6
Linearity / Dynamic Range	0.6	R	1.73	1	1	0.4	0.4
Acoustic Noise	1.0	R	1.73	0.1	1	0.1	0.6
Probe Angle	1.0	R	1.73	1	1	0.6	0.6
Spectral Processing	0.9	R	1.73	1	1	0.5	0.5
Integration Time	0.6	N	1.00	1	5	0.6	3.0
Field Distribution	0.2	R	1.73	1	1	0.1	0.1
Test Signal							
Ref. Signal Spectral Response	0.6	R	1.73	0	1	0.00	0.4
Positioning							
Probe Positioning	1.9	R	1.73	1	1	1.1	1.1
Phantom Thickness	0.9	R	1.73	1	1	0.5	0.5
DUT Positioning	1.9	R	1.73	1	1	1.1	1.1
External Contributions							
RF Interference	0.0	R	1.73	1	0.3	0.0	0.0
Test Signal Variation	2.0	R	1.73	1	1	1.2	1.2
Combined Uncertainty							
Combined Std. Uncertainty	(k=1)					3.9	6.0
Expanded uncertainty	(Coverage factor for 95%, k=2)					7.8	12.0
Notes for table : N –Normal, R –Rectangular, Div. - Divisor used to obtain standard uncertainty							

6. Test Procedures for all Technologies

6.1 General Procedures C63.19-2019, Section 6

ANSI C63.19-2019, Section 6

This document describes the measurement of the baseband (audio frequency) magnetic T-Coil signal from a WD. The goal is to evaluate the size of the area where a user could position their WD relative to their hearing aid's telecoil and receive an acceptable magnetically coupled signal. Three quantities are measured and evaluated. The first is the field strength of the desired signal at the center of the audio band (desired ABM signal).³¹ The second is the frequency response of the desired signal measured across the audio band.

This subclause describes the procedures used to measure the ABM (T-Coil) performance of the WD. Measurements shall be performed over a measurement area 50 mm square, in the measurement plane, as specified in A.3. The measurement area shall be scanned with a uniform measurement point spacing of $2.0 \text{ mm} \pm 0.5 \text{ mm}$ in each X-Y axis of the plane, yielding 676 measurement points with approximately even spacing throughout the area. In addition to measuring the desired ABM signal levels, the weighted magnitude of the unintended signal shall also be determined. Weighting of the unintended and undesired ABM field shall be by the spectral and temporal weighting described in D.4 through D.6. Measurements shall not include undesired properties from the WD's RF field; therefore, use of a coaxial connection to a base station simulator or non-radiating load may be necessary. However, even then with a coaxial connection to a base station simulator or non-radiating load there may still be RF leakage from the WD, which may interfere with the desired measurement.

Measurements shall be performed with the probe coil oriented in the transverse direction, as illustrated in A.3, that is, aligned in the plane of the measurement area and perpendicular to the long dimension of the WD. A multi-stage sequence consists of first measuring the field strength of the desired T-Coil signal (desired ABM signal) that is useful to a hearing aid T-Coil at each specified measurement point. The undesired magnetic component (undesired ABM field) is then measured in the same transverse orientation at each of the same measurement points. At a single location only, taken at or near the highest desired ABM signal reading, the desired ABM signal frequency response shall be determined in a third measurement stage.

Test flow for T-Coil signal test

The following steps summarize the basic test flow for determining desired ABM signal and undesired ABM field. These steps assume that a sine wave or narrowband 1/3 octave signal can be used for the measurement of desired ABM signal level. An alternative procedure, yielding equivalent results, using a broadband excitation is described in 6.5.

- a) A validation of the test setup and instrumentation shall be performed. This may be done using a TMFS or Helmholtz Coil. Measure the emissions and confirm that they are within tolerance of the expected values.
- b) Confirm that equipment that requires calibration has been calibrated, and that the noise level meets the requirements given in 6.3.2.
- c) Position the WD in the test setup and connect the WD RF connector to a base station simulator or a non-radiating load (if necessary to control RF interference in the measurement equipment) as shown in Figure 6.1 or Figure 6.2.
- d) The drive level to the WD is set such that the reference input level specified in Table 6.1 is input to the base station simulator (or manufacturer's test mode equivalent) in the 1 kHz, 1/3 octave band. This drive level shall be used for the T-Coil signal test (desired ABM signal) at $f = 1 \text{ kHz}$.
Either a sine wave at 1025 Hz, or a voice-like signal, band-limited to the 1 kHz 1/3 octave, as specified in 6.4.3, shall be used for the reference audio signal. If interference is found at 1025 Hz an alternative nearby reference audio signal frequency may be used.³⁵ The same drive

level will be used for the desired ABM signal frequency response measurements at each 1/3 octave band center frequency. The WD volume control may be set at any level up to maximum, provided that a signal at any frequency at maximum modulation would not result in clipping or signal overload.

e) At each measurement location over the measurement area and in the transverse orientation, measure and record the desired 1 kHz T-Coil magnetic signal (desired ABM signal) as described in Step c).

f) At or near a location representing a maximum in the just-measured desired ABM signal, measure and record the desired T-Coil magnetic signals (desired ABM signal at f_i) as described in 6.4.5.2 in each individual ISO 266:1975 R10 standard 1/3 octave band. The desired audio band input frequency (f_i) shall be centered in each 1/3 octave band maintaining the same drive level as determined in Step c), and the reading taken for that band. Equivalent methods of determining the frequency response may also be employed, such as fast Fourier transform (FFT) analysis using noise excitation or input-output comparison using simulated speech. The full-band integrated or half-band integrated probe output, as described in D.9, may be used, as long as the appropriate calibration curve is applied to the measured result, so as to yield an accurate measurement of the field magnitude. (The resulting measurement shall be an accurate measurement in dB(A/m).) Compare the frequency response found to the requirements of 6.6.3.

g) At the same locations measured in Step d), measure and record the undesired broadband audio magnetic signal (undesired ABM field) with no audio signal applied (or digital zero applied, if appropriate) using the specified spectral weighting, the half-band integrator followed by the temporal weighting.

h) Calculate and record the location and number of the measurement points that satisfy both the minimum desired ABM signal level and the maximum undesired ABM field level specified in 6.6.2. Compare this to the requirements in 6.6.4 and record the result.

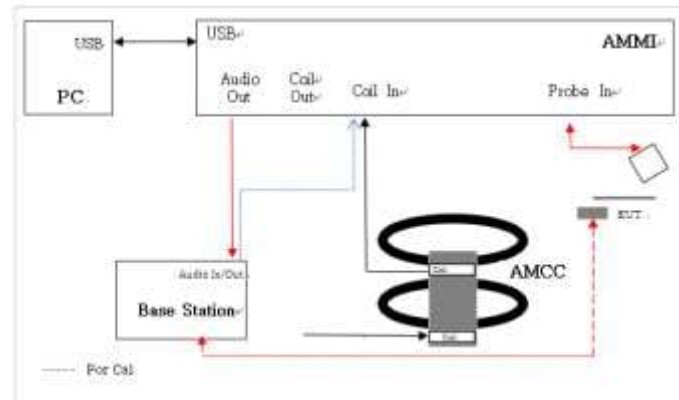
i) Calculate and record the location and number of the measurement points that satisfy the maximum undesired ABM field level and distribution requirements specified in 6.6.4.

All measurements of the desired signal shall be shown to be of the desired signal and not of an undesired signal. This may be shown by turning the desired signal ON and OFF with the probe measuring the scanned locations.

At the measurement location for each orientation, measure and record the undesired broadband audio magnetic signal (ABM2) as specified in 6.4.2 g) with no audio signal applied (or digital zero applied, if appropriate) using A-weighting and the half-band integrator. Calculate the ratio of the desired to undesired signal strength (i.e., signal quality).

Obtain the data from the postprocessor, SEMCAD, and determine the primary group, secondary group that properly the signal quality based on Table 8.

Test Setup Diagram



6.2 VoWiFi

This device supports Wi-Fi calling (aka Voice over Wi-Fi or VoWiFi) which is an extended feature of the carriers CMRS service to offload VoLTE calls onto local area networks over WI-FI via the internet and subject to HAC assessment for phones with a HAC rating.

The set up for VoWiFi uses the Base station as described in section 7.1 with the exception that the reference audio level is set at -16dBm0. The reference level is calibrated using the standard call box calibration procedures with the exception of the -16dBm0 reference level being used.

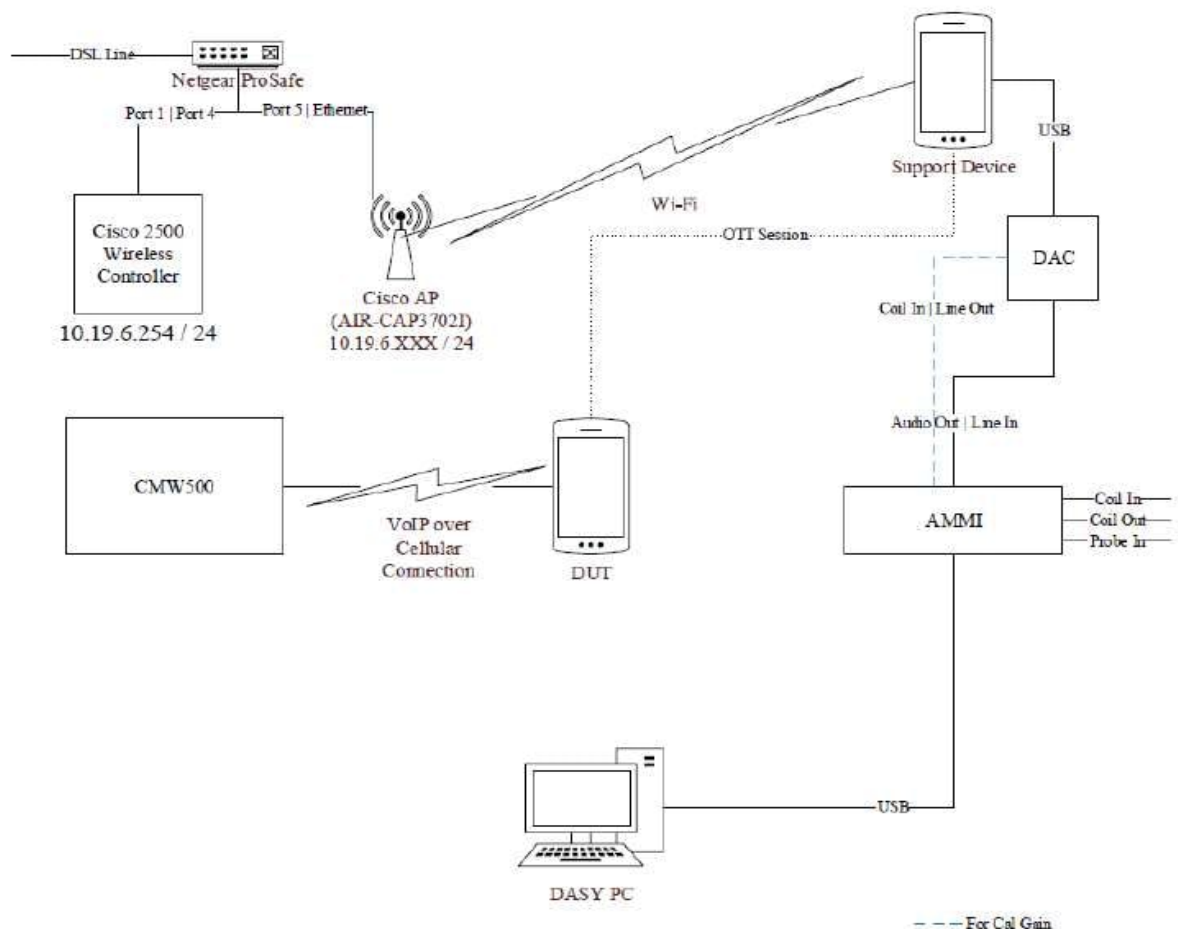
An investigation was performed to determine worst case codec, bit rate and air interface configuration (refer to sections 11.3, 11.4 and 11.5).

6.3 Over the Top(OTT) Voice over IP(VoIP)

This device supports VoIP via a preinstalled application that uses the Google Meet service, using OPUS as its only codec (refer to § 10 for air interface details and § 11.6 for codec bit rates). VoIP capabilities require HAC assessment when voice calls are supported over the cellular data connection via pre-installed VoIP applications.

The equipment is set up as shown below with a support device used to originate the call using the IP transport. The support device connects to the cloud-based Google Meet service via Wi-Fi access point and router, or RJ45. The DUT connects to the VoIP service via a cellular/unlicensed air interface to the call box and an Ethernet connection from call box to Internet. The various codec bit rate and air interface configurations are evaluated to determine the worst-case configuration (refer to § 11.6).

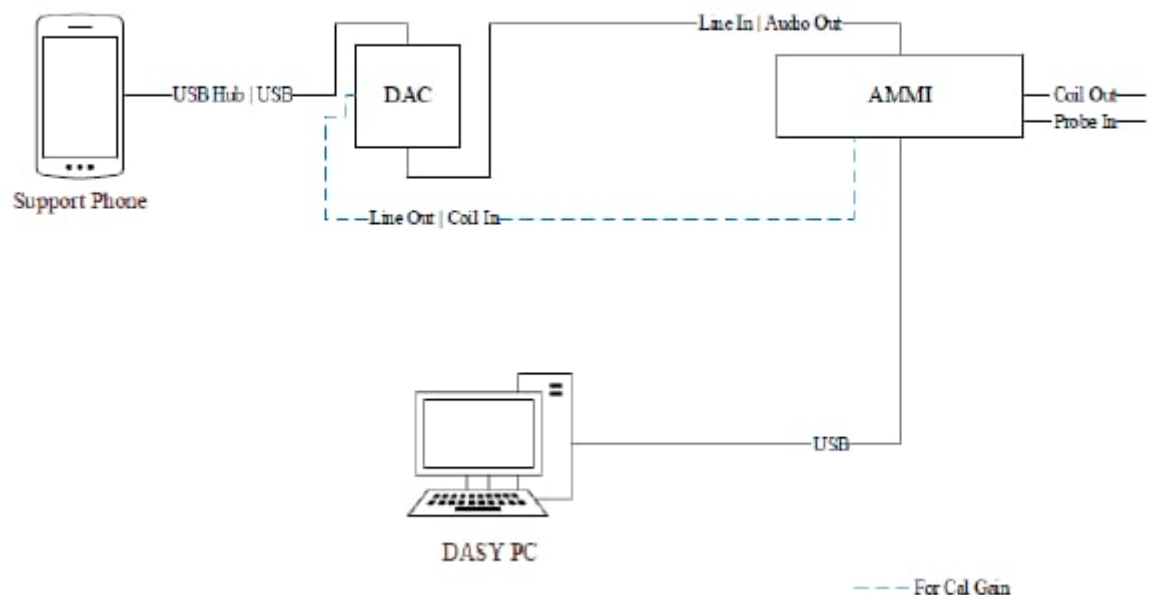
Test Setup configuration for OTT calls



For the OTT call, the calibrated audio card within the CMW500 cannot be used so the AMMI is connected to an external Digital-Analog Converter (DAC) and the DAC is connected to the Support

Device via USB. The test signal is sent from the DASY PC to the AMMI, from the AMMI to the DAC, from the DAC to the Support Device, and, via the VoIP call, to the DUT.

As this test set up uses an external DAC between the AMMI's audio output and support device, the appropriate gain factor for the OTT call needs be determined. This is done by connecting the DAC between the AMMI Audio output and Coil input as shown below.



Using the metering function on the DAC, the DAC gain is adjusted until the volume reaches 0dBFS (3.14 dBm0 based on TIA/EIA 810-A).

7. Audio Level and Gain Measurements

The following reference input levels (table 6.1—Normal speech input level of ANSI C63.19-2019) that correlate to a normal speech input level shall be used for the standard transmission protocols.

Normal speech input level -16 dBm0 is used for all testing: GSM, WCDMA, VOLTE, VONR, VoWiFi.

According to FCC KDB 285076 D02 T Coil testing v04 Sec.3, Other services not defined by note 2 shall use -20dBm0 or the level defined in an attestation by the manufacture.

Input level -20dBm0 is Over The Top (OTT) Voice over IP (VOIP) Testing (Codec : OPUS).

Table 6.1—Normal speech input levels

Standard	Protocol	Input (dBm0)
TLA-2000	CDMA	-18
TLA/EIA-136	TDMA (50 Hz)	-18
J-STD-007	GSM (217 Hz)	-16
T1-T1P1/3GPP ^a (See Note 1)	UMTS (WCDMA)	-16
iDEN ^a	TDMA (22 Hz and 11 Hz)	-18
VoIP ^a (See Note 2)	Voice over Internet Protocol	-16

^a The manufacturer shall establish that -16 dBm0 is the normal acoustic level in order to place it in this category.

For protocols not listed in Table 6.1, use the normal speech input level per the relevant specifications for that air interface.

7.1 GSM, UMTS, VoLTE, VoNR, VoWifi

Refer to the below table for the gains used to measure.

GSM, UMTS, VoLTE, VoWifi 2.4GHz,5GHz

Signal Type	Audio Level [dBm]	Peak to Full Scale [dB]	Peak to RMS Scale [dB]	BWC [dB]	Scaling [Gain]
Voice 1 kHz	-16	-0.37	15.74	0.07	-12.44 to -12.20
Normal Voice	-16	0	21.57	10.81	-6.60 to -6.37

VoNR

Signal Type	Audio Level [dBm]	Peak to Full Scale [dB]	Peak to RMS Scale [dB]	BWC [dB]	Scaling [Gain]
Voice 1 kHz	-16	-0.37	15.74	0.07	-7.44 to -7.14
Normal Voice	-16	0	21.57	10.81	-1.61 to -1.31

Refer to the below table for the gains used to measure VoLTE.(CMW500)

The following software/firmware was used to simulate the VoLTE server for testing:

Firmware	License Keys	Software Name
V4.0.24 for LTE	KS500	LTE FDD R8 SIG BASIC
	KS550	LTE TDD R8 SIG BASIC
V4.0.56 for Audio	KA100	IP APPL ENABLING IPv4
	KA150	IP APPL ENABLING IPv6
	KAA20	IP APPL IMS BASIC
	KM050	DATA APPL MEAS
	KS104	EVS SPEECH CODEC

Refer to the below table for the gains used to measure VoWifi.(CMW500)

Firmware	License Keys	Software Name
V4.0.23 for WLAN	KS650	WLAN a/b/g SIG BASIC
	KS651	WLAN n SIG BASIC
	KS656	WLAN IEEE 802.11ac
	KS657	WLAN IEEE 802.11ax
V4.0.56for Audio	KA100	IP APPL ENABLING IPv4
	KA150	IP APPL ENABLING IPv4
	KAA20	IP APPL IMS BASIC
	KM050	DATA APPL MEAS
	KS104	EVS SPEECH CODEC

Refer to the below table for the gains used to measure VoWifi.(CMX500)

Firmware	License Keys	Software Name
V8.0.0.164 for WLAN	KM350	WLAN IEEE a/b/g/n/ac SIG BASIC
	KM351	WLAN IEEE SIG 802.11ax
	KM351	WLAN IEEE 802.11ax
	KM360	WLAN IEEE 802.11 MIMO
	KS350B	WLAN IEEE a/b/g/n/ac APs
	KS355B	WLAN IEEE ax
V8.0.0.164 for Audio	KA110	IP APPL ENABLING IPv4, DATA APPL MEAS
	KA180	Audio Enabler

Refer to the below table for the gains used to measure VoNR of Call Box(E7515B)

The following software/firmware was used to simulate the VoNR server for testing:

Firmware	License Model	Software Name
5G NR	C8700200A	Test Application Framework
Audio	C8700201A	IMS-SIP Emulation
	C87300P1A	LTE IP data
	C87350P1A	5G NR IP data

7.2 Over the Top(OTT) Voice over IP(VoIP)

For EDGE, HSPA, LTE, NR and Wi-Fi the linear gain levels listed below were used. The results below were based on a reference input level of -20 dBm.

To calibrate the DAC (refer § 6.3), three. Way audio files (sine wave, 1 kHz voice, and 300 to 3 kHz voice) are sent from the DASY PC to the AMMI, then to the DAC. The Helmholtz resonator measures the field strength, which represents the AMMI to DAC input sensitivity. After determining the input sensitivity, the adjusted linear gain values can then be calculated.

OTT GSM, UMTS, Wifi, LTE, NR

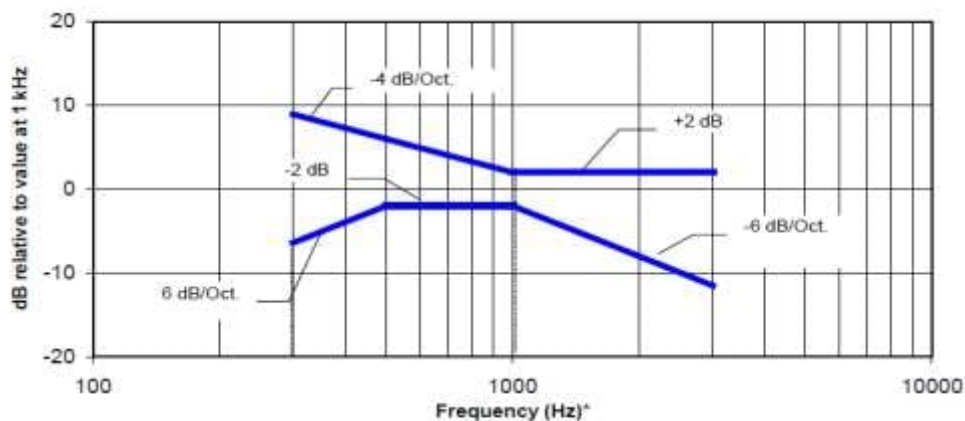
Signal Type	Audio Level [dBm]	Peak to Full Scale [dB]	Peak to RMS Scale [dB]	BWC [dB]	Scaling [Gain]
Voice 1 kHz	-20	-0.37	15.74	0.07	-12.95 to -12.78
Normal Voice	-20	0	21.57	10.81	-7.12 to -6.95

8. T-coil Measurement Criteria

8.1 Frequency Response

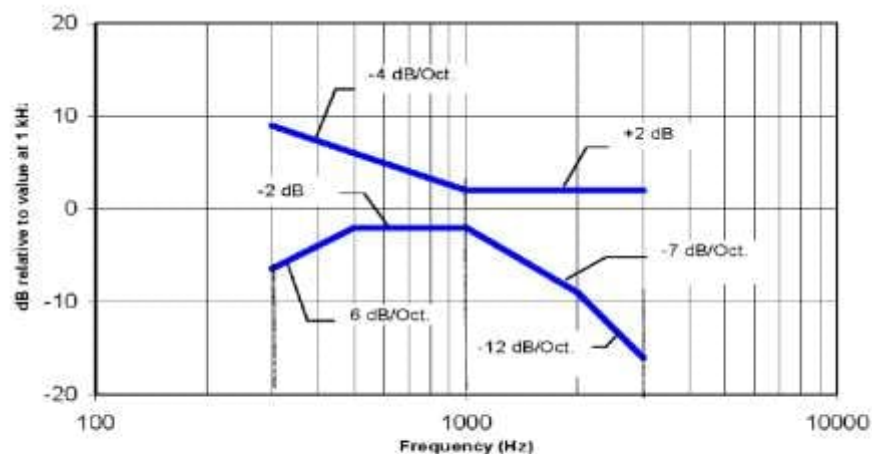
The frequency response of the axial component of the magnetic field, measured in 1/3 octave bands, shall follow the response curve, over the frequency range 300 Hz to 3000Hz.

Figure 6.4 and Figure 6.5 provide the boundaries for the specified frequency. These response curves are for true field strength measurements of the T-Coil signal. Thus the 6 dB/octave probe response has been corrected from the raw readings.



NOTE—Frequency response is between 300 Hz and 3 kHz.

Figure 6.4—Magnetic field frequency response for WDs with a maximum field ≤ -15 dB(A/m) at 1 kHz



NOTE—Frequency response is between 300 Hz and 3000 Hz.

Figure 6.5—Magnetic field frequency response for WDs with a maximum field that exceeds -15 dB(A/m) at 1 kHz

8.2 Desired ABM Signal, Undesired ABM Field qualification requirements

ANSI C63.19-2019, Section 6.6.4.1

For a WD that is expected to operate primarily in radio access technologies that include 2G GSM for legacy support, the WD shall be qualified for telecoil compatibility one of two ways:

- a) The WD shall be rated for telecoil use for all other voice operating modes, exclusive of 2G GSM, according to the criteria of 6.6.4.2.
- b) If the WD is to be rated for telecoil use in its 2G GSM operating modes, these modes shall be qualified according to the criteria of 6.6.4.3.

ANSI C63.19-2019, 6.6.4.2 Non-2G GSM operating modes

The goal of this requirement is to ensure an adequate area where desired ABM signal is sufficiently strong to be heard clearly and a larger area where undesired ABM field is sufficiently low as to avoid undue annoyance. Qualifying measurement points shall fulfill the requirements of 6.6.2; both the primary and secondary group requirements shall be met:

- The primary group shall include at least 75 measurement points.
- The secondary group shall include at least 300 contiguous measurement points.

Additionally, to avoid an oddly shaped area of low noise, the secondary group shall include at least one longitudinal column of at least 10 contiguous qualifying points and at least one transverse row containing at least 15 contiguous qualifying points.

ANSI C63.19-2019, 6.6.4.3 2G GSM operating modes

If the 2G GSM operating mode(s) are selected for qualification, the qualifying measurement points shall fulfill the requirements of 6.6.2; both the primary and secondary group requirements shall be met:

- The primary group shall include at least 25 measurement points.
- The secondary group shall include at least 125 contiguous measurement points.

9. Device Under Test

Normal operation	Held to head	
Back Cover	The Back Cover is not removable	
Test sample information	S/N	Notes
	YJN1695M	T-coil Test
	YJN1693M	

Note: T-Coil Measurements in this report were performed by Maximum Power (Pmax) in static power condition.

10. Air Interfaces and Operating Mode

Air Interface	Bands (MHz)	Type	C63.19 Tested	Simultaneous Transmitter	Name of voice service	Audio Codecs Evaluated
GSM	850	VO	Yes	Wi-Fi, BT	CMRS Voice ¹	EFR
	1900					
	GPRS/EDGE	VD	Yes	Wi-Fi, BT	Google Meet ¹	OPUS
UMTS	850	VO	Yes	Wi-Fi, BT	CMRS Voice ¹	AMR-NB&AMR-WB
	1700					
	1900					
	HSPA	VD	Yes	Wi-Fi, BT	Google Meet ¹	OPUS
LTE - FDD	680 (B71)	VD	Yes	NR, Wi-Fi, BT	VoLTE ¹ Google Meet ¹	VoLTE: AMR-NB, AMR-WB, EVS-NB, EVS-WB Google Meet :OPUS
	700 (B12/13/14)					
	850 (B5/26)					
	1700 (B4/66)					
	1900 (B2/25)					
	2300 (B30)					
	2500 (B7)					
LTE – TDD	2600 (B38/41)	VD	Yes	NR, Wi-Fi, BT	VoLTE ¹ Google Meet ¹	VoLTE: AMR-NB, AMR-WB, EVS-NB, EVS-WB Google Meet :OPUS
	3600 (B48)					
NR -FDD	680(B71)	VD	Yes	LTE, Wi-Fi, BT	VoNR ^{1,2} Google Meet ¹	VoNR: AMR-NB, AMR-WB, EVS-NB, EVS-WB. Google Meet :OPUS
	850(B5)					
	1700(B66,B70)					
	1900(B2/25)					
	2300(B30)					
NR -TDD	2600(B38,B41)	VD	Yes	LTE, Wi-Fi, BT	VoNR ¹ Google Meet ¹	VoNR: AMR-NB, AMR-WB, EVS-NB, EVS-WB Google Meet :OPUS
	3600 (B48)		Yes			
	3800(B77, B78)		Yes			
Wi-Fi	2450	VD	Yes	WWAN	VoWiFi ¹ Google Meet ¹	VoWiFi: AMR-NB, AMR-WB, EVS-NB, EVS-WB Google Meet :OPUS
	5200 (U-NII-1)		Yes	WWAN and BT		
	5300 (U-NII-2A)					
	5500 (U-NII-2C)					
	5800 (U-NII-3)					
	5900 (U-NII-4)					
BT	2450	DT	N/A	WWAN and Wi-Fi 5	N/A	N/A
Type: VO: Legacy Cellular Voice Service DT: Digital Transport only(no voice) CMRS: Commercial Mobile Radio Service VD: IP Voice service over Digital Transport				Note: 1. Ref Lev in accordance with the ANSI 63.19-2019 Table 6.1		

11. HAC (T-coil) Test Resultsation

11.1 Codec Investigation

An investigation between the various codec configurations (Low/High bit rates for Narrowband, Wideband) and specific parameters are documented (Primary Group, Secondary Group, longitudinal contiguous points, transverse row contiguous points, frequency response) to determine the worst-case bit rates for each voice service type. The table below compares the varying codec configurations. A codec investigation was performed on one band of each GSM, UMTS, LTE FDD/TDD, NR FDD/TDD.

The highlighted results below were determined to be the worst case codec configuration(s) for GSM, UMTS and LTE, NR.

GSM

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
GSM 850 190ch	A	FR V1	99	261	17	26	2.00
		HR V1	94	269	16	26	2.00

UMTS

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
UMTS 2 9400ch	B	AMR-NB 4.75	501	671	26	26	2.00
		AMR-NB 7.4	505	674	26	26	2.00
		AMR-NB 12.2	507	676	26	26	2.00
		AMR-WB 6.6	499	676	26	26	2.00
		AMR-WB 15.85	494	670	26	26	2.00
		AMR-WB 23.85	492	668	26	26	2.00

LTE FDD

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
LTE 25 QPSK 20MHz 1RB 0offset	F	AMR-NB 4.75	423	596	26	26	2.00
		AMR-NB 7.4	422	600	26	26	2.00
		AMR-NB 12.2	425	603	26	26	2.00
		AMR-WB 6.6	412	604	26	26	2.00
		AMR-WB 15.85	414	605	26	26	2.00
		AMR-WB 23.85	410	602	26	26	2.00
		EVS-NB 5.9	394	602	26	26	2.00
		EVS-NB 13.2	503	676	26	26	2.00
		EVS-NB 24.4	491	664	26	26	2.00
		EVS-WB 5.9	414	600	26	26	2.00
		EVS-WB 13.2	409	597	26	26	2.00
		EVS-WB 24.4	415	600	26	26	2.00
		EVS-SWB 9.6	418	598	26	26	2.00
		EVS-SWB 16.4	418	597	26	26	2.00
		EVS-SWB 24.4	416	596	26	26	2.00

LTE TDD

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
LTE Band 41 CH.40620 20 MHz QPSK 1RB 0offset	B	AMR-NB 4.75	190	364	20	26	2.00
		AMR-NB 7.4	189	363	20	26	2.00
		AMR-NB 12.2	190	363	20	26	2.00
		AMR-WB 6.6	154	342	17	26	2.00
		AMR-WB 15.85	156	338	17	26	2.00
		AMR-WB 23.85	152	335	17	26	2.00
		EVS-NB 5.9	165	350	20	26	2.00
		EVS-NB 13.2	177	349	20	26	2.00
		EVS-NB 24.4	176	349	20	26	2.00
		EVS-WB 5.9	193	412	20	26	1.93
		EVS-WB 13.2	213	394	19	26	2.00
		EVS-WB 24.4	210	392	19	26	2.00
		EVS-SWB 9.6	207	385	19	26	2.00
		EVS-SWB 16.4	213	390	19	26	2.00
		EVS-SWB 24.4	212	390	19	26	2.00

NR FDD

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
NR Band n25 CH.376500 DFT-s OFDM QPSK 40 Mhz 1RB 1offset	F	AMR-NB 4.75	465	621	26	26	2.00
		AMR-NB 7.4	460	618	26	26	2.00
		AMR-NB 12.2	460	616	26	26	2.00
		AMR-WB 6.6	454	618	26	26	2.00
		AMR-WB 15.85	454	618	26	26	2.00
		AMR-WB 23.85	457	620	26	26	2.00
		EVS-NB 5.9	441	605	26	26	2.00
		EVS-NB 13.2	435	612	26	26	2.00
		EVS-NB 24.4	434	613	26	26	2.00
		EVS-WB 5.9	432	612	26	26	2.00
		EVS-WB 13.2	428	609	26	26	2.00
		EVS-WB 24.4	433	612	26	26	2.00
		EVS-SWB 9.6	434	614	26	26	2.00
		EVS-SWB 16.4	431	614	26	26	2.00
		EVS-SWB 24.4	431	614	26	26	2.00

NR TDD

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
NR Band n41 CH.518598 DFT-s OFDM QPSK 100 MHz 1 RB 1 offset PC2	B	AMR-NB 4.75	200	354	21	26	2.00
		AMR-NB 7.4	201	354	21	26	2.00
		AMR-NB 12.2	167	340	20	26	2.00
		AMR-WB 6.6	177	346	19	26	2.00
		AMR-WB 15.85	152	335	20	26	2.00
		AMR-WB 23.85	149	332	20	26	2.00
		EVS-NB 5.9	143	327	20	26	2.00
		EVS-NB 13.2	134	321	20	26	2.00
		EVS-NB 24.4	163	331	20	26	2.00
		EVS-WB 5.9	163	331	20	26	2.00
		EVS-WB 13.2	144	329	17	26	2.00
		EVS-WB 24.4	159	344	20	26	2.00
		EVS-SWB 9.6	151	336	20	26	2.00
		EVS-SWB 16.4	151	334	20	26	2.00
		EVS-SWB 24.4	148	332	20	26	2.00

11.2 Air Interface Investigation

Use the worst-case codec test and document a limited set of bands/modulations/channels/bandwidth. Observe the effect of changing the band and bandwidth to ensure that there are no unexpected variations.

11.2.1 GSM

Band	Ant	Codec (kbit/s)	Ch.	Freq(MHz)	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)	Hmax dB(A/m)	Plot No.
GSM 850	A	HRV1	190	836.6	-56.42	94	269	16	26	2.00	14.51	1
GSM 1900	B		661	1 880	-56.42	141	307	19	26	2.00	14.63	
GSM 850	A		128	824.2	-56.42	87	240	16	26	2.00	14.60	2
			251	848.8	-56.42	90	245	17	26	2.00	14.66	3

11.2.2 UMTS

Band	Ant	Codec (kbit/s)	Ch.	Freq(MHz)	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)	Hmax dB(A/m)	Plot No.
UMTS 2	B	AMR-WB 23.85	9400	1 880	-56.46	492	668	26	26	2.00	13.89	4
UMTS 4	B		1412	1 732.4	-56.46	497	670	26	26	2.00	13.83	
UMTS 5	A		4183	836.6	-56.46	501	675	26	26	2.00	13.71	
UMTS 2	B		9262	1 852.4	-56.46	498	672	26	26	2.00	13.75	5
			9538	1 907.6	-56.46	484	659	26	26	2.00	13.81	6

11.2.3 LTE-FDD

RB/ Modulation configuration

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Mod.	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
LTE 25	F	EVS- NB 5.9	26365	1 882.5	20	QPSK	1/0	-56.62	394	602	26	26	2.00	12.03	
							1/49	-56.62	436	624	26	26	2.00	13.59	
							1/99	-56.62	442	630	26	26	2.00	12.15	
							50/0	-56.62	485	674	26	26	2.00	13.25	
							50/25	-56.62	487	676	26	26	2.00	13.11	
							50/49	-56.62	481	675	26	26	2.00	12.72	
							100/0	-56.62	481	675	26	26	2.00	13.21	
						16QAM	1/0	-56.62	296	485	26	26	2.00	13.09	7
						64QAM	1/0	-56.62	312	508	26	26	2.00	12.69	
						256QAM	1/0	-56.62	311	506	26	26	2.00	12.37	
					15	16QAM	1/0	-56.62	297	485	25	26	2.00	12.43	
					10		1/0	-56.62	329	528	26	26	2.00	13.03	
					5		1/0	-56.62	346	544	26	26	2.00	12.70	
					3		1/0	-56.62	344	547	26	26	2.00	12.65	
					1.4		1/0	-56.62	338	431	26	26	2.00	12.31	

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Mod.	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
LTE 25	B	EVS- NB 5.9	26365	1 882.5	20	16QAM	1/0	-56.62	444	642	26	26	2.00	12.54	
LTE 7	B		21100	2 535	20	16QAM	1/0	-56.62	388	584	25	26	2.00	12.09	
LTE 7	F		21100	2 535	20	16QAM	1/0	-56.62	327	532	26	26	2.00	12.60	
LTE 12	A		23095	707.5	10	16QAM	1/0	-56.62	319	510	26	26	2.00	12.47	
LTE 13	A		23230	782	10	16QAM	1/0	-56.62	323	514	26	26	2.00	12.82	
LTE 14	A		23330	793	10	16QAM	1/0	-56.62	356	550	26	26	2.00	12.83	
LTE 26	A		26865	831.5	15	16QAM	1/0	-56.62	353	544	26	26	2.00	12.78	
LTE 30	B		27710	2 310	10	16QAM	1/0	-56.62	428	619	26	26	2.00	12.58	
LTE 30	F		27710	2 310	10	16QAM	1/0	-56.62	337	542	26	26	2.00	12.80	
LTE 66	B		132322	1 745	20	16QAM	1/0	-56.62	413	609	26	26	2.00	12.43	
LTE 66	F		132322	1 745	20	16QAM	1/0	-56.62	369	568	26	26	2.00	12.80	
LTE 71	A		133297	680.5	20	16QAM	1/0	-56.62	335	527	26	26	2.00	12.56	
LTE 25	F		26140	1 860	20	16QAM	1/0	-56.62	379	572	26	26	2.00	12.35	8
LTE 25			26590	1 905	20	16QAM	1/0	-56.62	323	523	26	26	2.00	12.72	9

11.2.4 LTE-TDD

RB/ Modulation configuration

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Mod.	RB Config.	Ambient Noise dB(A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
LTE 41	B	AMR- WB 23.85	40620	2 593	20	QPSK	1/0	-52.37	152	335	17	26	2.00	15.04	10
							1/49	-52.37	225	408	20	26	2.00	15.01	
							1/99	-52.37	235	418	20	26	2.00	15.03	
							50/0	-52.37	198	380	16	26	2.00	15.12	
							50/25	-52.37	189	372	17	26	2.00	15.08	
							50/49	-52.37	222	405	22	26	2.00	15.09	
							100/0	-52.37	217	398	22	26	2.00	15.10	
					15	16QAM	1/0	-52.37	195	378	21	26	2.00	15.14	
						64QAM	1/0	-52.37	189	372	21	26	2.00	15.10	
						256QAM	1/0	-52.37	181	353	17	26	2.00	15.27	
					10	QPSK	1/0	-52.37	193	368	17	26	2.00	15.23	
					5		1/0	-52.37	191	369	20	26	2.00	15.27	
							1/0	-52.37	198	370	21	26	2.00	15.28	

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Mod.	RB Config.	Ambient Noise dB A/m	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
LTE 48	G	AMR- WB 23.85	55990	3 625	20	QPSK	1/0	-52.37	190	361	17	26	2.00	15.45	
LTE 41	B		39750	2 506	20	QPSK	1/0	-52.37	160	335	17	26	2.00	15.34	11
			40185	2 549.5	20	QPSK	1/0	-52.37	152	327	17	26	2.00	15.27	12
			41055	2 636.5	20	QPSK	1/0	-52.37	192	370	21	26	2.00	15.13	13
			41490	2 680	20	QPSK	1/0	-52.37	193	370	21	26	2.00	15.22	14

11.2.4 NR-FDD

RB/ Modulation configuration

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
NR n25	F	EVS- WB 13.2	376500	1882.5	40	CP QPSK	1/1	-51.56	294	479	26	26	2.00	15.63	15
							1/108	-51.56	350	535	26	26	2.00	15.68	
							1/214	-51.56	294	480	26	26	2.00	15.62	
							108/0	-51.56	385	562	26	26	1.97	15.92	
							108/54	-51.56	386	564	26	26	2.00	15.93	
							108/108	-51.56	389	554	26	26	2.00	16.25	
							216/0	-51.56	453	617	26	26	2.00	16.19	
						CP 16QAM	1/1	-51.56	297	469	24	26	2.00	15.33	
						CP 64QAM	1/1	-51.56	306	479	24	26	2.00	15.38	
						CP 256QAM	1/1	-51.56	355	526	26	26	2.00	15.53	

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	RB Config.	Ambient Noise dB A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
NR n25	F	EVS- WB 13.2	376500	1882.5	40	DFT-S QPSK	1/1	-51.56	428	609	26	26	2.00	18.62	
							1/108	-51.56	443	624	26	26	2.00	15.77	
							1/214	-51.56	420	605	26	26	1.99	15.75	
							108/0	-51.56	383	569	26	26	2.00	15.61	
							108/54	-51.56	383	568	26	26	2.00	15.67	
							108/108	-51.56	337	522	26	26	2.00	15.67	
							216/0	-51.56	337	522	26	26	2.00	15.68	
						DFT-S BPSK	216/0	-51.56	376	561	26	26	2.00	15.62	
						DFT-S 16QAM	216/0	-51.56	378	563	26	26	2.00	15.63	
						DFT-S 64QAM	216/0	-51.56	329	514	26	26	2.00	15.67	
						DFT-S 256QAM	216/0	-51.56	331	514	26	26	2.00	15.73	

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
NR n25	F	EVS- WB 13.2	376500	1882.5	35	CP QPSK	1/1	-51.56	338	513	26	26	2.00	15.45	
					30		1/1	-51.56	376	546	26	26	2.00	15.67	
					25		1/1	-51.56	368	538	26	26	2.00	15.63	
					20		1/1	-51.56	341	509	26	26	2.00	15.80	
					15		1/1	-51.56	335	503	26	26	2.00	15.44	
					10		1/1	-51.56	392	560	26	26	2.00	15.62	
					5		1/1	-51.56	351	517	26	26	2.00	15.57	

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
NR n25	B	EVS- WB 13.2	376000	1 880	40	CP QPSK	1/1	-51.56	447	619	26	26	2.00	15.50	
NR n5	A		167300	836.5	20	CP QPSK	1/1	-51.56	315	487	25	26	2.00	15.53	
NR n30	B		462000	2 310	10	CP QPSK	1/1	-51.56	361	533	26	26	2.00	15.54	
NR n30	F		462000	2 310	10	CP QPSK	1/1	-51.56	324	492	26	26	2.00	15.57	
NR n66	B		349000	1 745	40	CP QPSK	1/1	-51.56	361	533	26	26	2.00	16.05	
NR n66	F		349000	1 745	40	CP QPSK	1/1	-51.56	362	527	26	26	2.00	15.61	
NR n70	B		340500	1 702.5	15	CP QPSK	1/1	-51.56	502	666	26	26	2.00	15.12	
NR n70	F		340500	1 702.5	15	CP QPSK	1/1	-51.56	406	577	26	26	2.00	15.81	
NR n71	A		136100	680.5	40	CP QPSK	1/1	-51.56	379	551	26	26	2.00	15.45	

11.2.5 NR-TDD

RB/ Modulation configuration

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
NR n41	B	EVS-NB 13.2	518598	2 593	100	CP QPSK	1/1	-52.48	185	345	20	26	2.00	16.94	
							1/137	-52.48	217	377	21	26	2.00	16.92	
							1/271	-52.48	190	350	20	26	2.00	16.98	
							137/0	-52.48	219	375	21	26	2.00	16.93	
							137/68	-52.48	211	367	21	26	2.00	16.87	
							137/136	-52.48	246	410	22	26	2.00	16.84	
							273/0	-52.48	230	394	21	26	2.00	16.81	
						CP 16QAM	1/1	-52.48	211	375	21	26	2.00	16.76	
						CP 64QAM	1/1	-52.48	230	394	21	26	2.00	16.82	
						CP 256QAM	1/1	-52.48	277	440	220	26	2.00	16.88	

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
NR n41	B	EVS-NB 13.2	518598	2 593	100	DFT-s QPSK	1/1	-52.48	134	321	20	26	2.00	16.19	16
							1/137	-52.48	170	330	20	26	2.00	16.91	
							1/271	-52.48	171	331	20	26	2.00	16.89	
							135/0	-52.48	182	342	20	26	2.00	16.90	
							135/67	-52.48	189	349	20	26	2.00	16.98	
							135/138	-52.48	208	368	21	26	2.00	16.97	
							270/0	-52.48	190	350	20	26	2.00	16.94	
						DFT-s BPSK	1/1	-52.48	174	329	20	26	2.00	16.87	
						DFT-s 16QAM	1/1	-52.75	201	356	20	26	2.00	16.84	
						DFT-s 64QAM	1/1	-52.75	216	372	221	26	2.00	16.91	
						DFT-s 256QAM	1/1	-52.75	243	401	21	26	2.00	16.99	

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
NR n41	B	EVS-NB 13.2	518598	2 593	90	DFT-s QPSK	1/1	-52.75	153	316	19	26	2.00	16.81	
					80		1/1	-52.75	155	316	19	26	2.00	16.93	
					70		1/1	-52.75	151	313	19	26	2.00	16.90	
					60		1/1	-52.75	148	311	19	26	2.00	15.76	
					50		1/1	-52.75	150	312	19	26	2.00	16.15	
					40		1/1	-52.75	178	340	20	26	2.00	16.24	
					30		1/1	-52.75	157	320	19	26	2.00	16.29	
					25		1/1	-52.75	163	326	19	26	2.00	16.30	
					20		1/1	-52.75	163	325	19	26	2.00	16.27	
					15		1/1	-52.75	178	340	20	26	2.00	16.27	
					10		1/1	-52.75	188	350	20	26	2.00	16.26	

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
NR n48	G	EVS- NB 13.2	641666	3 624.99	40	DFT-s QPSK	1/1	-52.75	245	407	22	26	2.00	16.70	
NR n77 PC2	G		650000	3 750	100	DFT-s QPSK	1/1	-52.75	170	326	21	26	2.00	16.55	
NR n77 PC2 DoD	G		633334	3 500.01	100	DFT-s QPSK	1/1	-52.75	177	331	21	26	2.00	16.37	

11.3 VoWi-Fi Codec Investigation

An investigation between the various codec configurations (Low/High bit rates for Narrowband, Wideband) and specific parameters are documented (Primary Group, Secondary Group, longitudinal contiguous points, transverse row contiguous points, frequency response) to determine the worst-case bit rates for each voice service type. The table below compares the varying codec configurations. A codec investigation was performed for each Wi-Fi 2.4 GHz and 5 GHz.

The highlighted results below were determined to be the worst case codec configuration(s) for Wi-Fi 2.4 GHz and 5 GHz.

Wi-Fi 2.4 GHz

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
802.11b CH.6 2437 MHz DSSS 1Mbps	MIMO	AMR-NB 4.75	165	333	26	26	2.00
		AMR-NB 7.4	169	335	26	26	2.00
		AMR-NB 12.2	168	329	26	26	2.00
		AMR-WB 6.6	159	325	26	26	2.00
		AMR-WB 15.85	167	336	26	26	1.95
		AMR-WB 23.85	165	332	25	26	2.00
		EVS-NB 5.9	152	332	26	26	2.00
		EVS-NB 13.2	175	335	26	26	2.00
		EVS-NB 24.4	172	332	25	26	2.00
		EVS-WB 5.9	154	330	26	26	2.00
		EVS-WB 13.2	168	334	26	26	2.00
		EVS-WB 24.4	172	335	25	26	2.00
		EVS-SWB 9.6	175	335	25	26	2.00
		EVS-SWB 16.4	183	336	26	26	2.00
		EVS-SWB 24.4	181	333	25	26	2.00

Wi-Fi 5 GHz

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
802.11a CH.40 5200 MHz BPSK 6Mbps	MIMO	AMR-NB 4.75	310	473	26	26	2.00
		AMR-NB 7.4	292	451	26	26	2.00
		AMR-NB 12.2	297	456	26	26	2.00
		AMR-WB 6.6	273	445	26	26	2.00
		AMR-WB 15.85	260	423	26	26	2.00
		AMR-WB 23.85	268	432	26	26	2.00
		EVS-NB 5.9	267	439	26	26	2.00
		EVS-NB 13.2	271	417	26	26	2.00
		EVS-NB 24.4	281	432	26	26	2.00
		EVS-WB 5.9	252	438	26	26	2.00
		EVS-WB 13.2	265	429	26	26	2.00
		EVS-WB 24.4	269	430	26	26	2.00
		EVS-SWB 9.6	272	429	26	26	2.00
		EVS-SWB 16.4	343	521	26	26	2.00
		EVS-SWB 24.4	348	525	26	26	2.00

11.4 VoWi-Fi Antennas Investigation

EVS-NB 5.9 kbit/s was the worst case bit-rates for 2.4 GHz 802.11b, EVS-WB 5.9 kbit/s was the worst case bit-rates for 5GHz 802.11a. The secondary antenna was investigated to determine which antennas yields a worse Primary Group.

The worst case codec and bit-rate from 802.11b 2.4 GHz, 802.11a 5 GHz Antenna MIMO was used to determine Antenna 1 exclusions.

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
802.11b CH.6 2437 MHz DSSS 1Mbps	H	EVS-NB 5.9	179	330	24	26	2.00
	MIMO		152	332	26	26	2.00

Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
802.11a CH.40 5200 MHz BPSK 6Mbps	G	EVS-WB 5.9	345	523	26	26	2.00
	MIMO		252	438	26	26	2.00

11.5 VoWi-Fi Air Interface Investigation

Using the data from §11.4, further testing was performed on the remaining 802.11 modes. The objective of these measurements is to ensure that changing the modulation, bandwidth, and data rate, whilst using the worst case codec configuration measured in §11.3, §11.4, yields no unexpected variations.

VoWi-Fi Air Interface Investigation (Continued)

Wi-Fi 2.4 GHz

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
802.11b	MIMO	EVS-NB 5.9	CH.6	2 437	20	1 Mbps	-56.47	152	332	26	26	2.00	11.55	
						5.5 Mbps	-56.47	146	310	26	26	2.00	12.61	17
						11 Mbps	-56.47	162	325	25	26	2.00	13.55	
802.11g			CH.6	2 437	20	6 Mbps	-56.47	198	396	26	26	2.00	13.59	
802.11n20			CH.6	2 437	20	MCS 0	-56.47	220	414	26	26	2.00	12.16	
802.11ax20			CH.6	2 437	20	MCS 0	-56.47	219	408	26	26	2.00	11.95	
802.11b			CH.1	2 412	20	5.5 Mbps	-56.47	160	323	26	26	2.00	12.83	18
			CH.11	2 462			-56.47	147	314	26	26	2.00	12.70	19

Wi-Fi 5 GHz

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
802.11a	MIMO	EVS- WB 5.9	40	5 200	20	6 Mbps	-56.51	252	438	26	26	2.00	13.33	
						18 Mbps	-56.51	295	493	26	26	2.00	12.78	
						54 Mbps	-56.51	326	524	26	26	2.00	13.21	
802.11n20			40	5 200	20	MCS 0	-56.51	262	459	26	26	2.00	13.18	
						MCS 3	-56.51	284	487	26	26	2.00	13.48	
						MCS 7	-56.51	308	512	26	26	2.00	12.57	
802.11n40			38	5 190	40	MCS 0	-56.51	308	512	26	26	2.00	12.98	
						MCS 3	-56.51	294	492	26	26	2.00	12.81	
						MCS 7	-56.51	315	512	26	26	2.00	13.24	
802.11ac20			40	5 200	20	MCS 0	-56.51	237	437	26	26	2.00	13.53	20
						MCS 4	-56.51	295	496	26	26	2.00	12.75	
						MCS 8	-56.51	307	503	26	26	2.00	12.85	
802.11ac40			38	5 190	40	MCS 0	-56.51	286	482	26	26	2.00	12.65	
						MCS 4	-56.51	310	506	26	26	2.00	12.52	
						MCS 9	-56.51	285	484	26	26	2.00	13.33	
802.11ac80			42	5 210	80	MCS 0	-56.51	291	489	26	26	2.00	13.33	
						MCS 4	-56.51	307	506	26	26	2.00	12.63	
						MCS 9	-56.51	305	500	26	26	2.00	11.86	
802.11ax20			40	5 200	20	MCS 0	-56.51	258	453	26	26	2.00	12.74	
						MCS 4	-56.51	287	483	26	26	2.00	13.56	
						MCS 8	-56.51	281	480	26	26	2.00	12.73	
802.11ax40	38	5 190	40	MCS 0	-56.51	285	483	26	26	2.00	12.90			
				MCS 4	-56.51	291	491	26	26	2.00	12.26			
				MCS 9	-56.51	304	497	26	26	2.00	12.74			
802.11ax80	42	5 210	80	MCS 0	-56.51	288	482	26	26	2.00	12.33			
				MCS 4	-56.51	300	496	26	26	2.00	13.50			
				MCS 9	-56.51	304	493	26	26	2.00	12.03			
802.11ac20	56	5 280	20	MCS 0	-56.51	272	457	26	26	1.77	12.66			
	120	5 600		MCS 0	-56.51	270	462	26	26	2.00	12.13			
	165	5 825		MCS 0	-56.51	257	442	26	26	2.00	12.87			
	173	5 865		MCS 0	-56.51	255	444	26	26	1.20	12.97			
802.11ac20	149	5745	20	MCS 0	-56.51	269	460	26	26	2.00	12.78	21		
	157	5785	20	MCS 0	-56.51	263	456	26	26	2.00	12.62	22		

11.6 OTT Codec Investigation

The DUT's nested OTT application supports range of codec bit rate 6 – 75 kbit/s, thus an investigation between the various codec configurations (6/75 as Low/High bit rates) and specific parameters are documented (Primary Group, Secondary Group, longitudinal contiguous points, transverse row contiguous points, Frequency Response) to determine the worst-case bit rates for each service type.

The table below compares the varying codec configurations.

Codec Investigation							
Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
GSM 850 EDGE 2 slot CH.128 824.2 MHz	A	6	156	347	19	26	1.42
		40	170	355	19	26	2.00
		75	220	413	21	26	2.00
UMTS Band 2 HSUPA subtest 1 CH.9538 1 907.6 MHz	B	6	452	649	26	26	1.79
		40	450	645	26	26	2.00
		75	450	643	26	26	2.00
LTE Band 25 20 MHz 16QAM 1RB 0offset CH.26365 1 882.5 MHz	F	6	297	485	26	26	2.00
		40	298	482	25	26	2.00
		75	288	475	25	26	2.00
LTE Band 41 PC3 20 MHz QPSK 1RB 0offset CH.40185 2 549.5 MHz	B	6	163	336	19	26	1.71
		40	159	337	19	26	2.00
		75	161	338	20	26	1.63
NR Band n25 40 MHz CP QPSK 1RB 0offset CH.376500 1 882.5 MHz	F	6	364	541	26	26	2.00
		40	357	535	26	26	2.00
		75	358	536	25	26	2.00
NR Band n41 PC2 100 MHz DFT-s-OFDM QPSK 1RB 1offset CH.518598 2 593 MHz	B	6	227	408	19	26	2.00
		40	233	412	20	26	2.00
		75	235	416	20	26	2.00

Codec Investigation							
Band	Ant	Codec (kbit/s)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response(dB)
2.4 GHz 802.11b 5.5Mbps CH.6 2.437 MHz	MIMO	6	160	311	24	26	1.44
		40	171	318	24	26	1.43
		75	165	313	25	26	1.46
5 GHz 802.11ac20 MCS0 CH.40 5.200 MHz	MIMO	6	275	449	25	26	2.00
		40	265	442	25	26	2.00
		75	270	445	25	26	2.00

11.7 OTT Air Interface Investigation

GSM/UMTS

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
GSM850	A	6	128	824.2	-52.55	156	347	19	26	1.42	14.13	23
GSM1900	B		661	1 880	-52.55	200	393	21	26	1.64	13.62	
GSM850	A		190	836.6	-52.55	181	366	20	26	2.00	13.59	24
GSM850	A		251	848.8	-52.55	177	367	20	26	2.00	13.40	25
UMTS 2	B	75	9538	1 907.6	-52.55	450	643	26	26	2.00	13.77	26
UMTS 4	B		1412	1 732.4	-52.55	486	665	26	26	2.00	14.35	
UMTS 5	A		4183	836.6	-52.55	481	653	26	26	2.00	14.43	

LTE FDD/TDD

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Mod.	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
LTE 7	B	75	21100	2 535	20	16QAM	1/0	-52.74	419	607	26	26	2.00	14.86	
LTE 7	F		21100	2 535	20	16QAM	1/0	-52.74	335	522	26	26	2.00	14.75	
LTE 12	A		23095	707.5	10	16QAM	1/0	-52.74	348	525	26	26	2.00	14.81	
LTE 13	A		23230	782	10	16QAM	1/0	-52.74	315	499	26	26	2.00	14.83	
LTE 14	A		23330	793	10	16QAM	1/0	-52.74	304	485	24	26	2.00	14.73	
LTE 25	B		26365	1 882.5	20	16QAM	1/0	-52.74	434	612	26	26	2.00	14.97	
LTE 25	F		26365	1 882.5	20	16QAM	1/0	-52.74	288	475	25	26	2.00	14.74	27
LTE 26	A		26865	831.5	15	16QAM	1/0	-52.74	435	615	26	26	2.00	14.69	
LTE 30	B		27710	2 310	10	16QAM	1/0	-52.74	399	575	26	26	2.00	14.92	
LTE 30	F		27710	2 310	10	16QAM	1/0	-52.74	344	528	26	26	2.00	14.57	
LTE 66	B		132322	1 745	20	16QAM	1/0	-52.74	390	568	24	26	2.00	14.93	
LTE 66	F		132322	1 745	20	16QAM	1/0	-52.74	350	534	26	26	2.00	14.59	
LTE 71	A		133297	680.5	20	16QAM	1/0	-52.74	420	601	26	26	2.00	14.66	
LTE 41	B	40	40185	2 549.5	20	QPSK	1/0	-52.74	159	337	19	26	2.00	15.39	28
LTE 48	G		55990	3 625	20	QPSK	1/0	-52.74	216	397	22	26	1.70	15.24	

NR FDD/TDD

Mode	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Mod.	RB Config.	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB(A/m)	Plot No.
NR n5	A	40	167300	836.5	20	CP QPSK	1/1	-52.77	360	547	26	26	2.00	13.63	
NR n25	B		376500	1 882.5	40	CP QPSK	1/1	-52.77	407	589	26	26	2.00	14.82	
NR n25	F		376500	1 882.5	40	CP QPSK	1/1	-52.77	357	535	26	26	2.00	14.85	29
NR n30	B		462000	2 310	10	CP QPSK	1/1	-52.77	411	594	26	26	2.00	15.01	
NR n30	F		462000	2 310	10	CP QPSK	1/1	-52.77	370	548	26	26	2.00	14.81	
NR n66	B		349000	1 745	40	CP QPSK	1/1	-52.77	405	586	26	26	2.00	14.84	
NR n70	B		340500	1 702.5	15	CP QPSK	1/1	-52.77	436	611	26	26	1.31	14.89	
NR n70	F		340500	1 702.5	15	CP QPSK	1/1	-52.77	413	600	26	26	1.13	14.31	
NR n66	F		349000	1 745	40	CP QPSK	1/1	-52.77	370	549	26	26	2.00	14.73	
NR n71	A		136100	680.5	20	CP QPSK	1/1	-52.77	369	549	26	26	2.00	14.71	
NR n41 PC2	B	6	518598	2 593	100	DFT-s QPSK	1/1	-52.77	227	408	19	26	2	2.00	
NR n48	G		641666	3 624.99	40	DFT-s QPSK	1/1	-52.77	209	388	19	26	2	2.00	
NR n77 PC2	G		650000	3 750	100	DFT-s QPSK	1/1	-52.77	144	318	19	26	2	2.00	30
NR n77 PC2 DoD	G		633334	3 500.01	100	DFT-s QPSK	1/1	-52.77	146	321	21	26	2.00	14.76	

Wi-Fi 2.4 GHz /5 GHz

Band	Ant	Codec (kbit/s)	Ch.	Freq (MHz)	BW (MHz)	Modulation	Ambient Noise dB (A/m)	Primary	Secondary	Contiguous longitudinal	Contiguous Transverse	Freq. Response (dB)	Hmax dB (A/m)	Plot No.
Wi-Fi 2.4 GHz 802.11b	MIMO	6	6	2 437	20	5.5 Mbps	-52.36	160	311	24	26	1.44	15.33	31
U-NII 5.2 GHz 802.11ac20		40	40	5 200	20	MCS 0	-52.36	265	442	25	26	2.00	15.45	
U-NII 5.3 GHz 802.11ac20			64	5 300	20	MCS 0	-52.36	235	409	25	26	2.00	15.30	
U-NII 5.6 GHz 802.11ac20			120	5 600	20	MCS 0	-52.36	229	402	23	26	1.84	15.40	32
U-NII 5.8 GHz 802.11ac20			165	5 825	20	MCS 0	-52.36	280	453	25	26	1.54	15.51	
U-NII 5.8 GHz 802.11ac20			173	5865	80	MCS 0	-52.36	276	450	25	26	1.59	15.62	

Appendix A. TEST SETUP PHOTO

Please refer to test Setup Photo file no. as follows;

Rev. No.	File No.
0	HCT-SR-2512-FC003-P

Appendix B. HAC T-COIL Test Plots

Plot 1 GSM 850 CH.190 Voice Codec Speech Codec: HR V1 ANT A T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

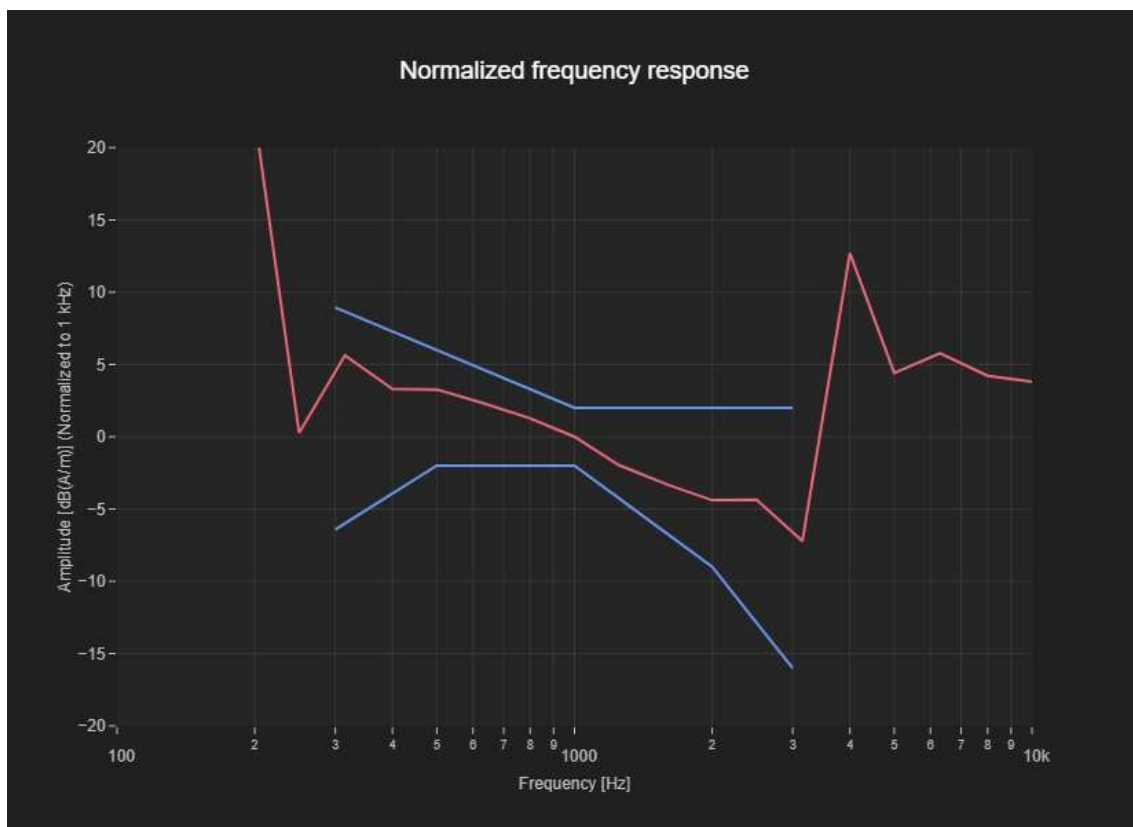
Band Name	Communication Systems Name	Channel	Frequency [MHz]
GSM 850	GSM-FDD (TDMA, GMSK)	190	836.6

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

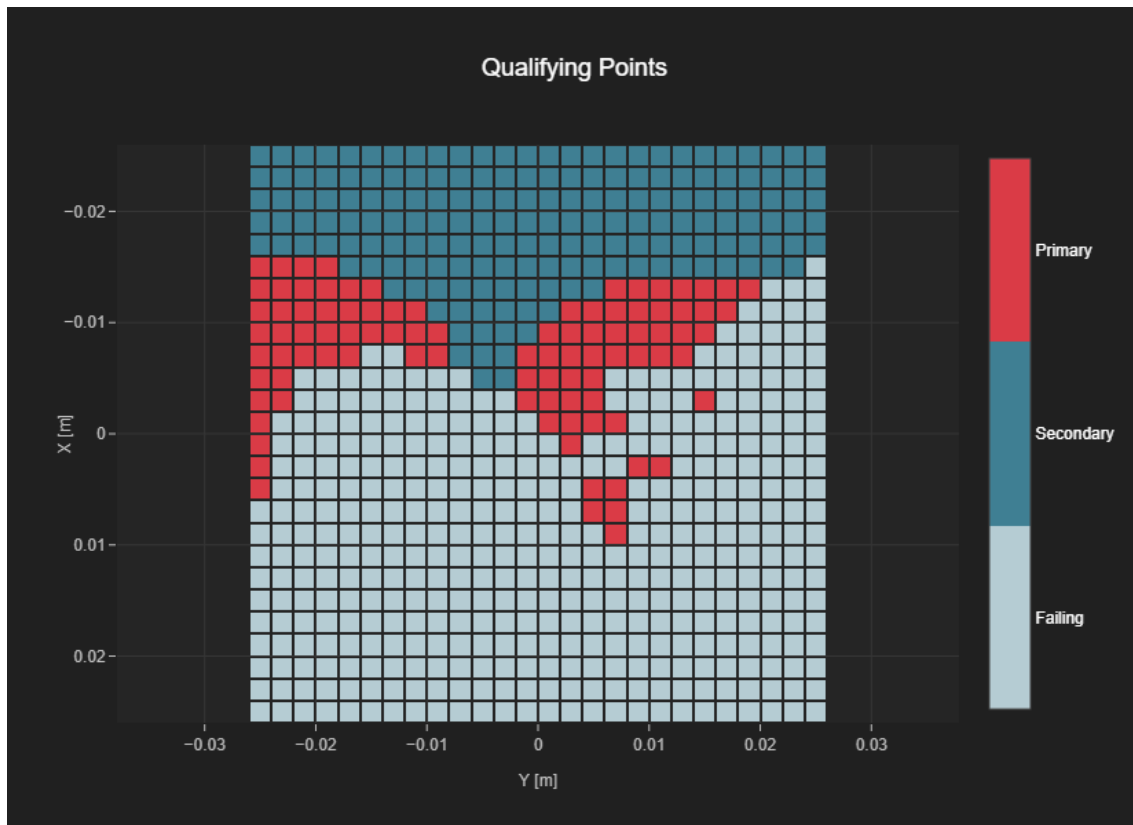
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
94	269	16	26



Plot 2 GSM 850 CH.128 Voice Codec Speech Codec: HR V1 ANT A T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

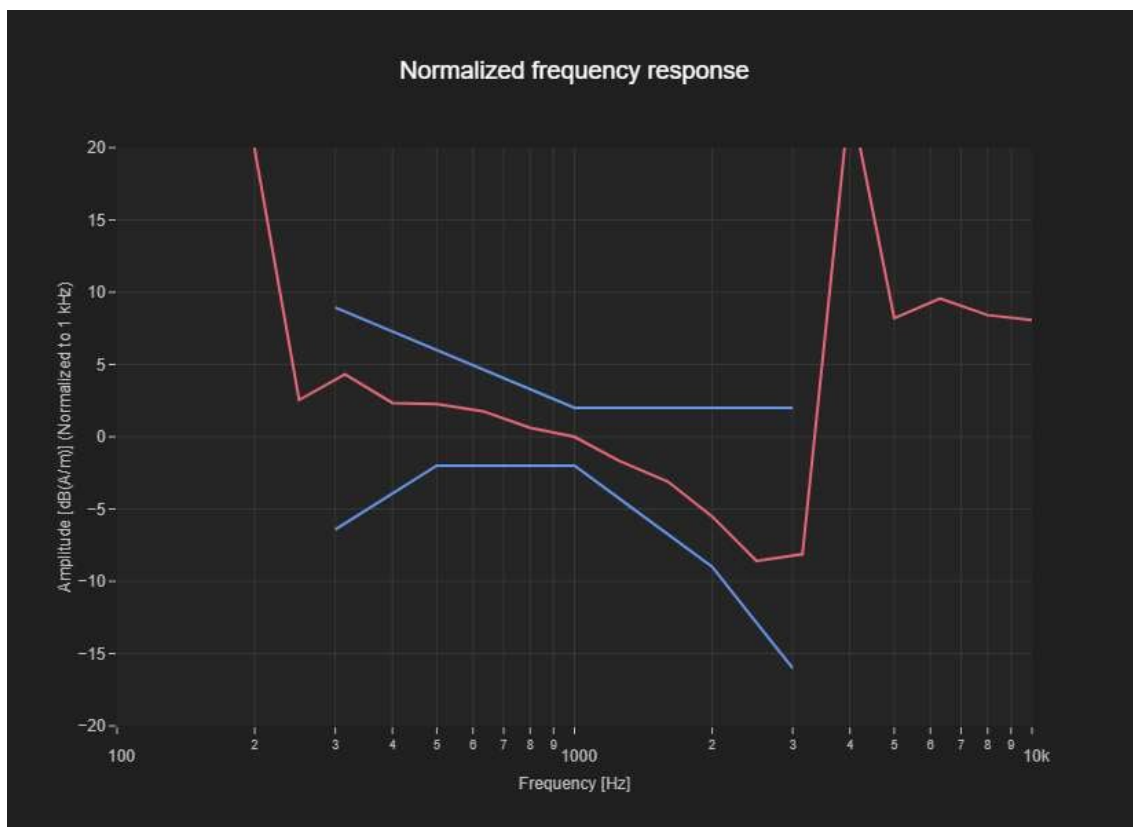
Band Name	Communication Systems Name	Channel	Frequency [MHz]
GSM 850	GSM-FDD (TDMA, GMSK)	128	824.2

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

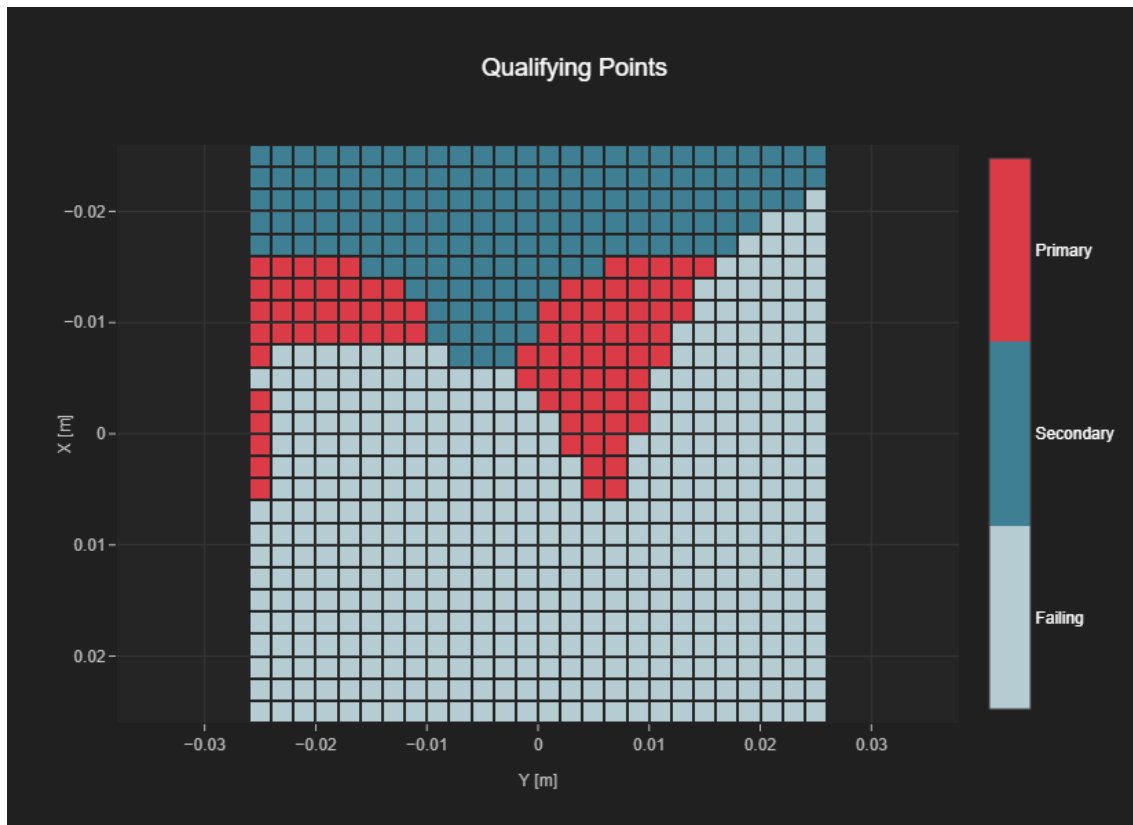
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
87	240	16	26



Plot 3 GSM 850 CH.251 Voice Codec Speech Codec: HR V1 ANT A T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

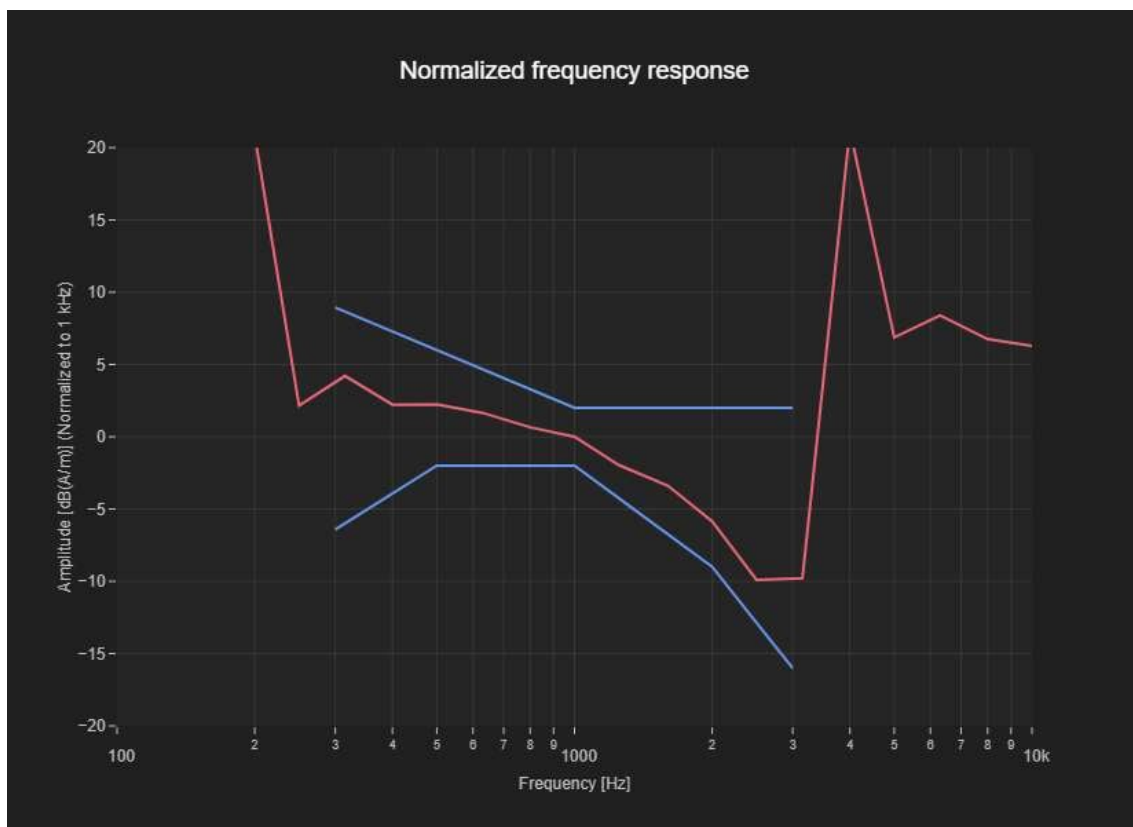
Band Name	Communication Systems Name	Channel	Frequency [MHz]
GSM 850	GSM-FDD (TDMA, GMSK)	251	848.8

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

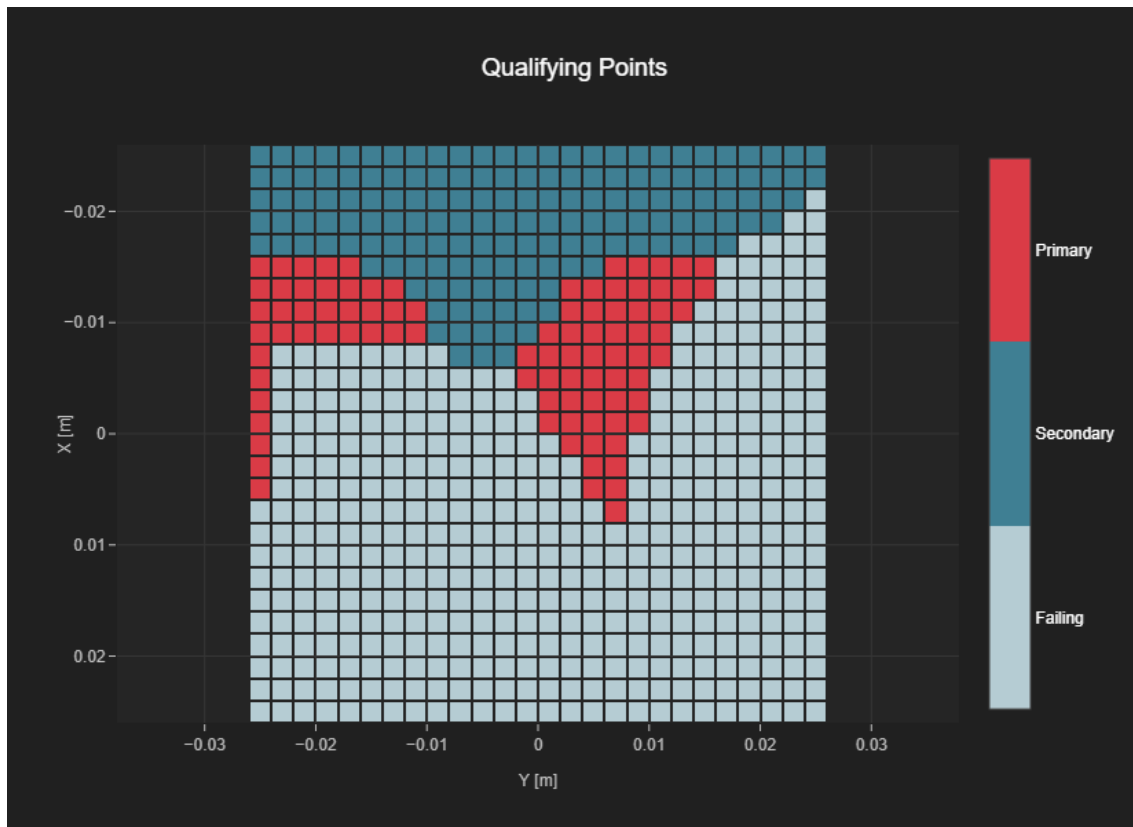
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
90	245	17	26



Plot 4 UMTS Band 2 CH.9400 Voice AMR-WB Codec: 23.85kbit/s ANT B T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

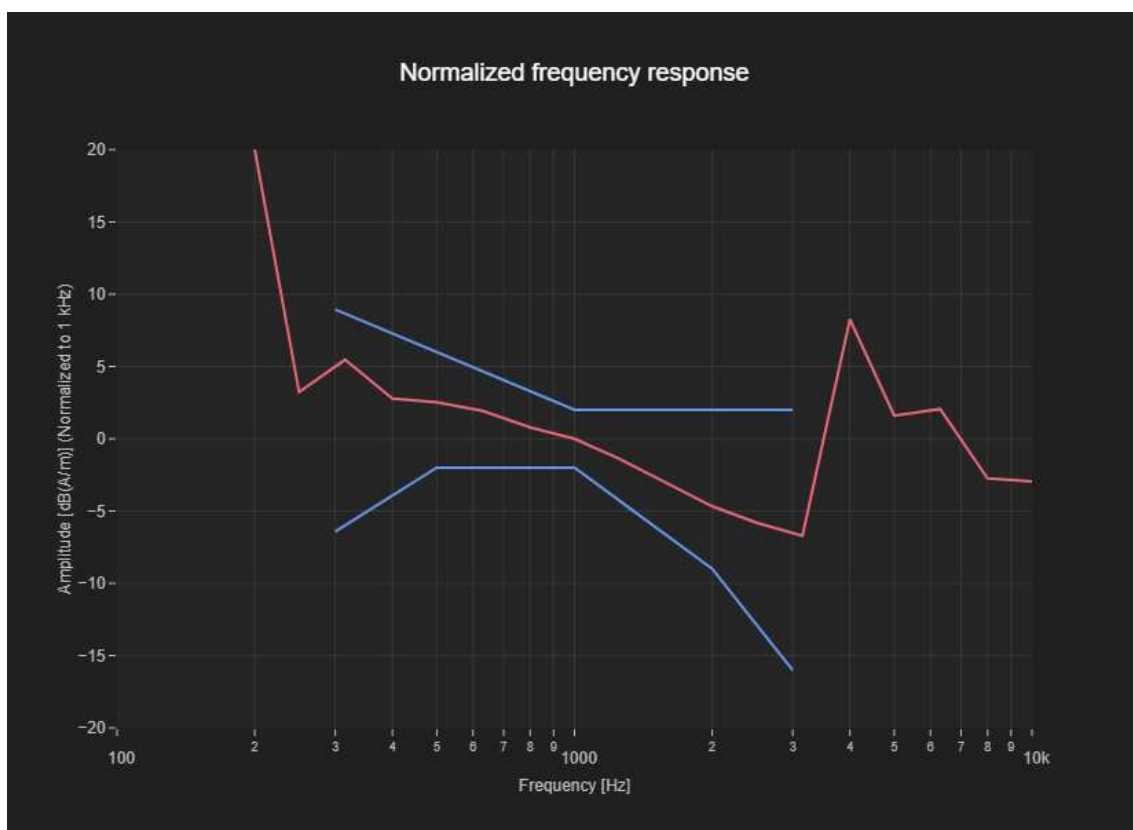
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 2	UMTS-FDD (WCDMA, AMR)	9400	1880.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

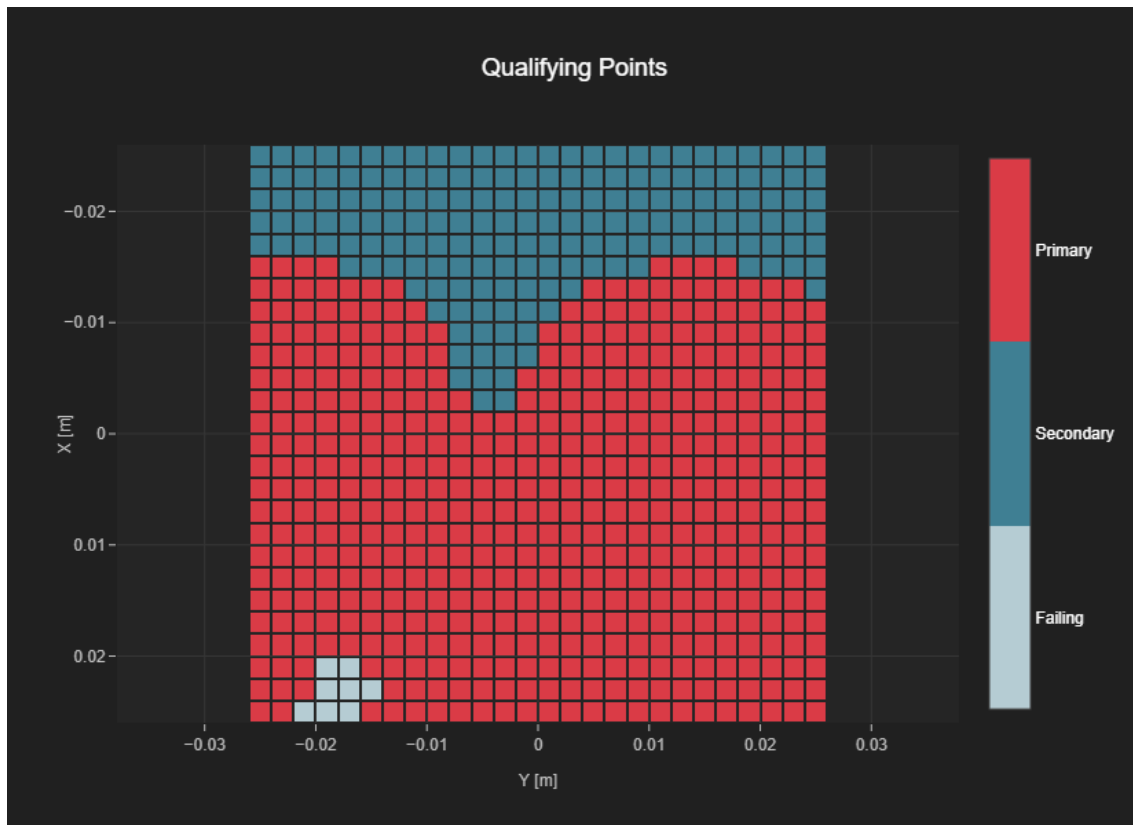
Results

Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
492	668	26	26



Plot 5 UMTS Band 2 CH.9262 Voice AMR-WB Codec: 23.85kbit/s ANT B T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

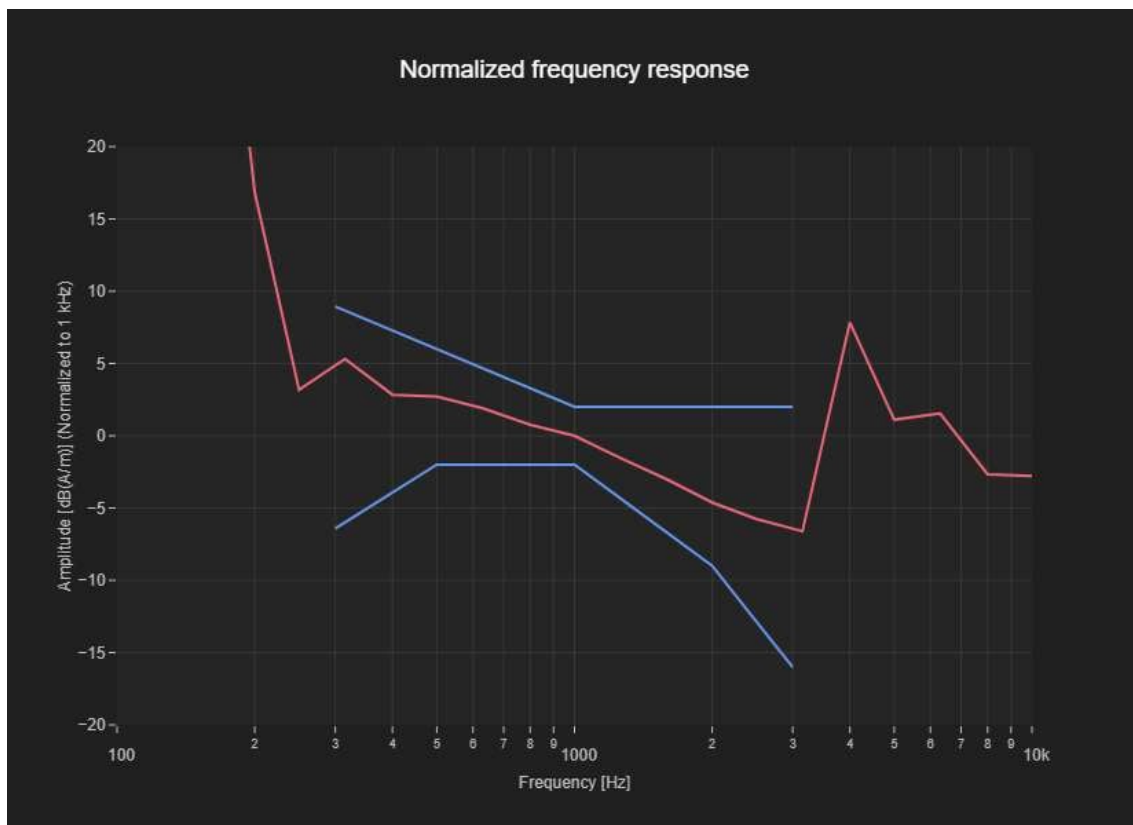
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 2	UMTS-FDD (WCDMA, AMR)	9262	1852.4

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

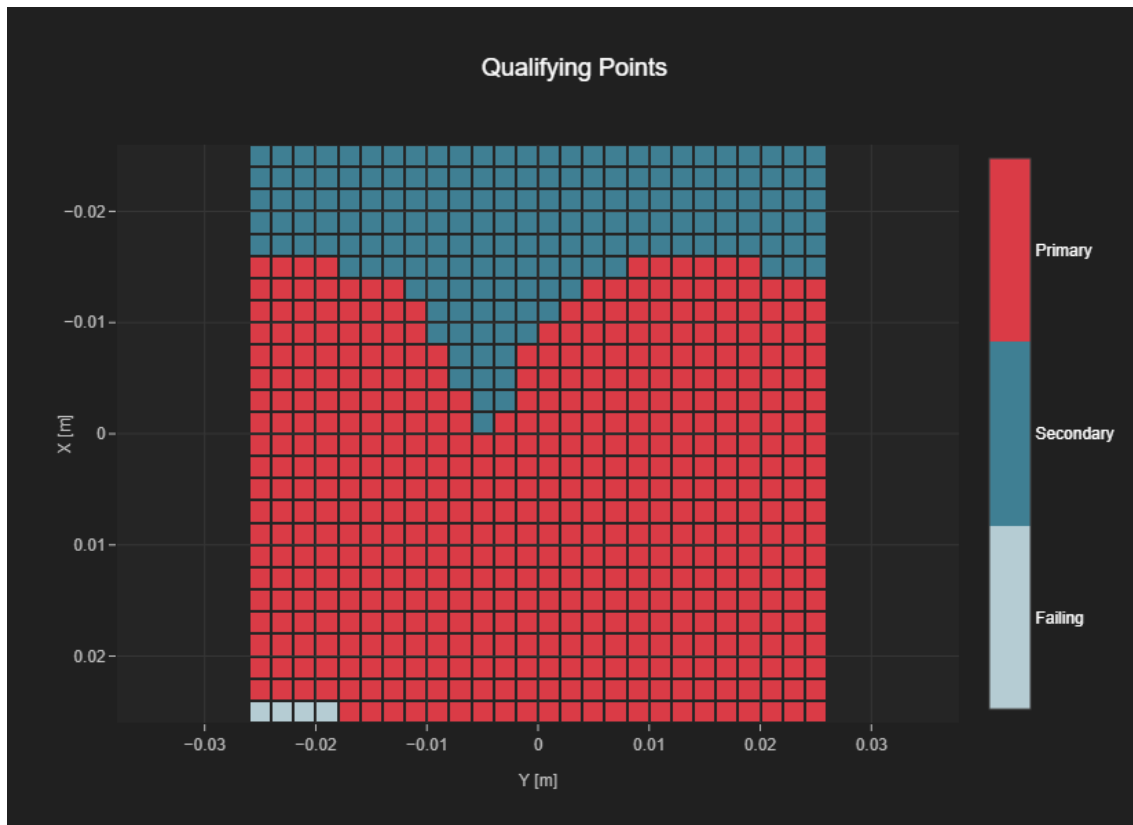
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
498	672	26	26



Plot 6 UMTS Band 2 CH.9538 Voice AMR-WB Codec: 23.85kbit/s ANT B T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

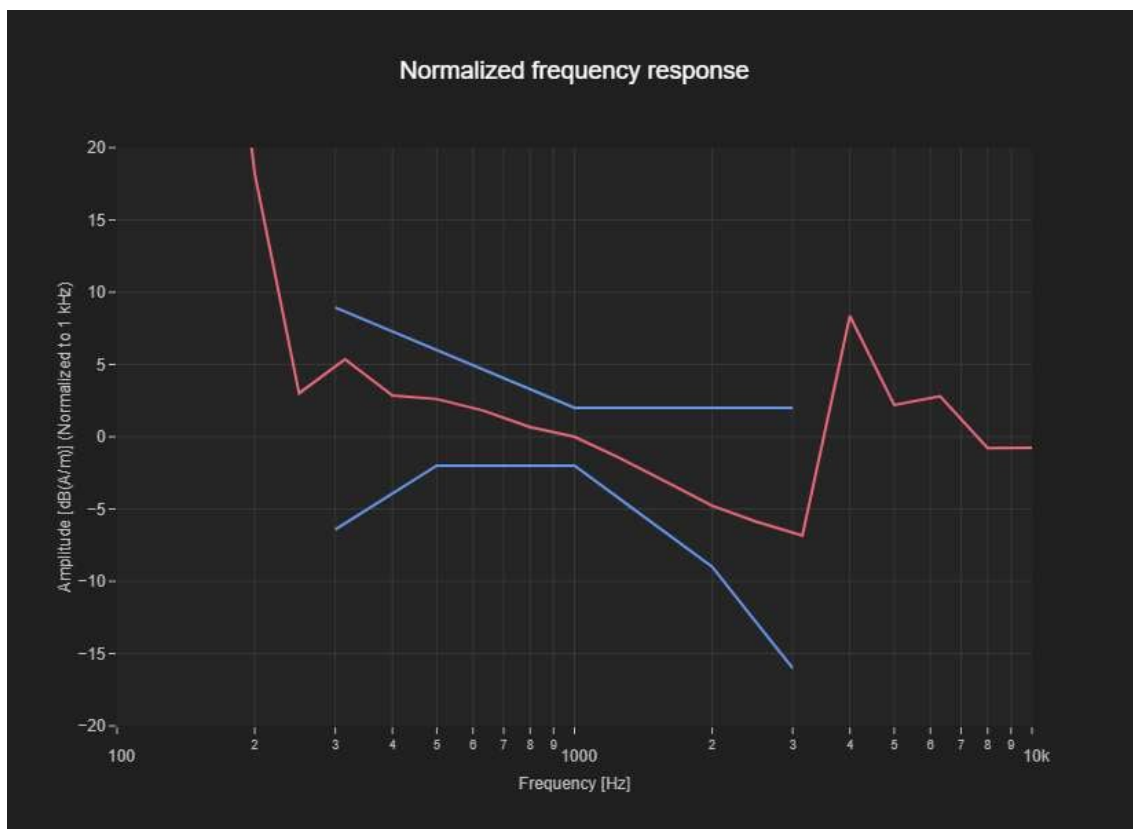
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 2	UMTS-FDD (WCDMA, AMR)	9538	1907.6

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

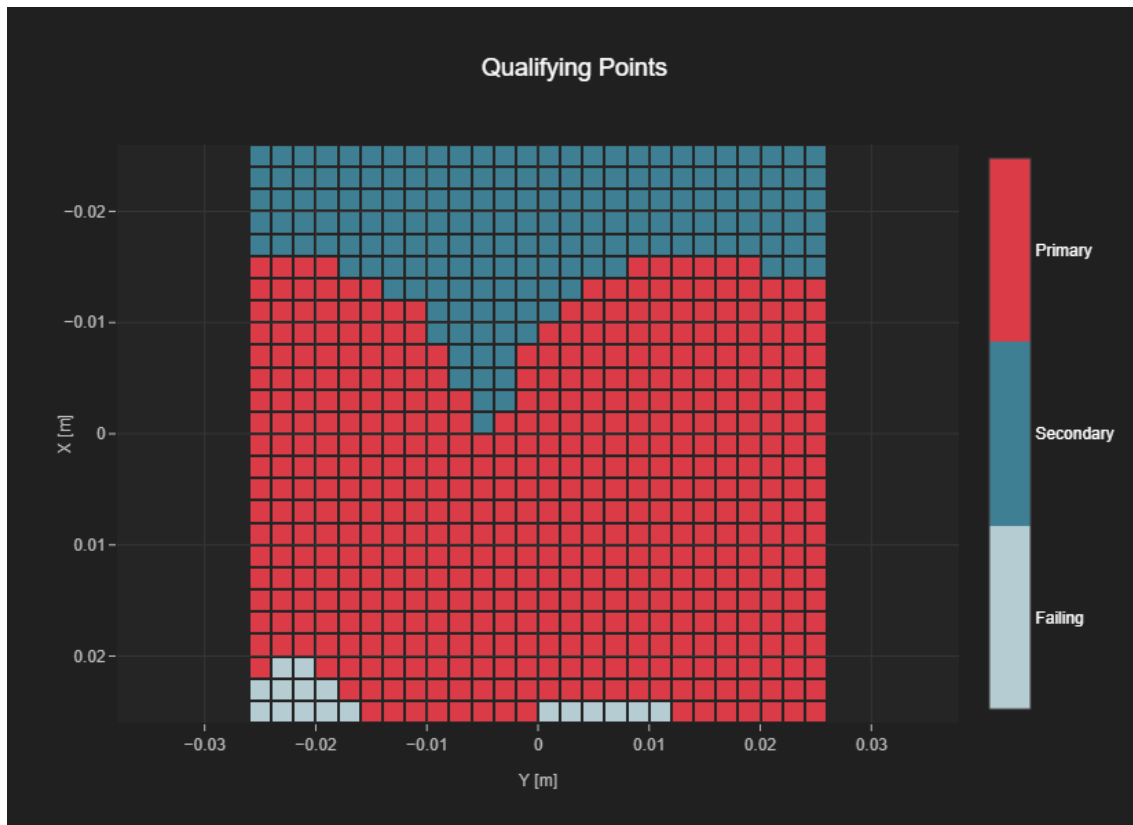
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
484	659	26	26



Plot 7 LTE Band 25 20MHz 16QAM 1RB 0offset CH.26365 Voice EVS-NB Codec 5.9kbit/s
ANT F

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

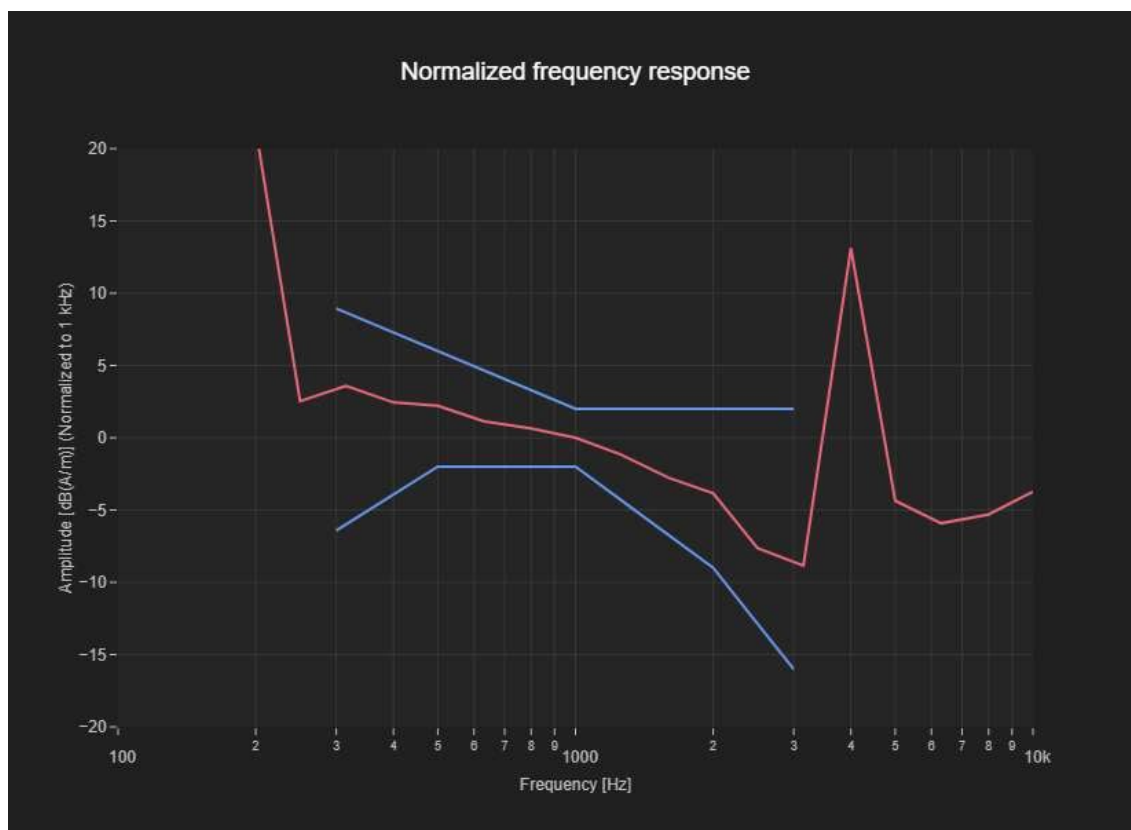
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 25	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	26365	1882.5

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

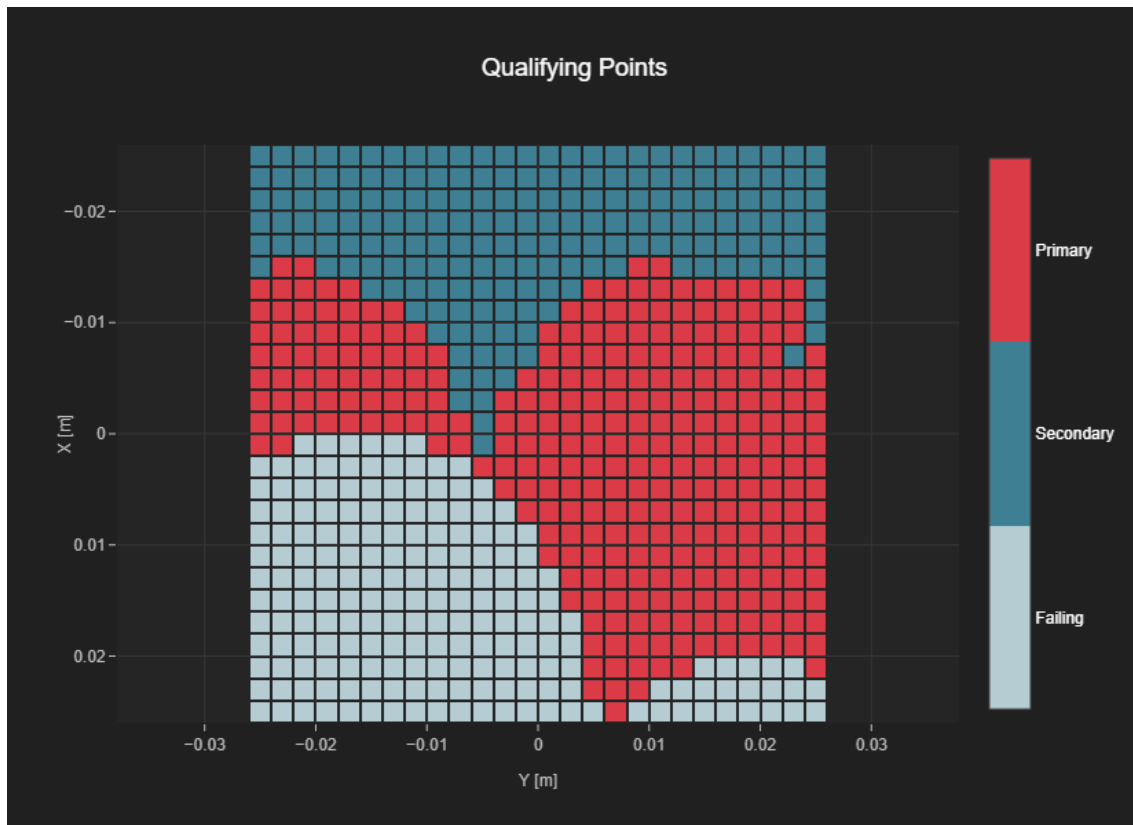
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
296	485	26	26



Plot 8 LTE Band 25 20MHz 16QAM 1RB 0offset CH.26140 Voice EVS-NB Codec: 5.9kbit/s
ANT F

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

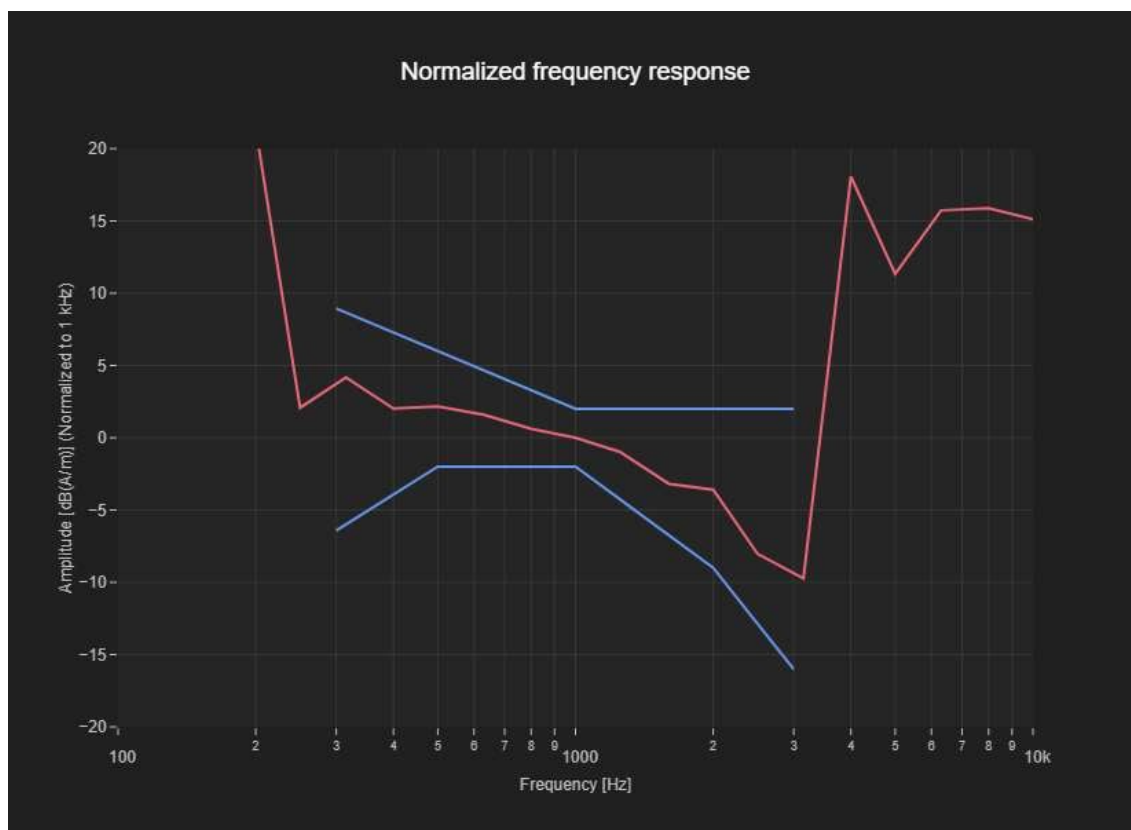
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 25	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	26140	1860.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

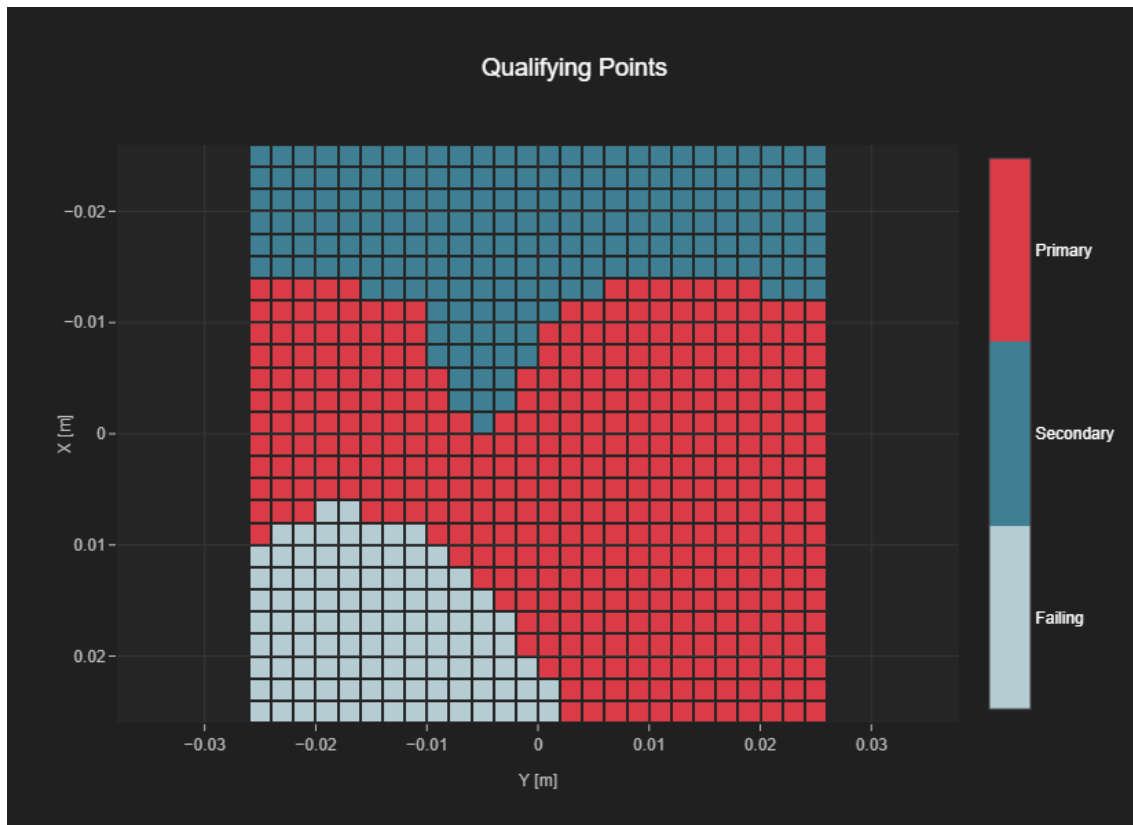
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
379	572	26	26



Plot 9 LTE Band 25 20MHz 16QAM 1RB 0offset CH.26590 Voice EVS-NB Codec: 5.9kbit/s
ANT F

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

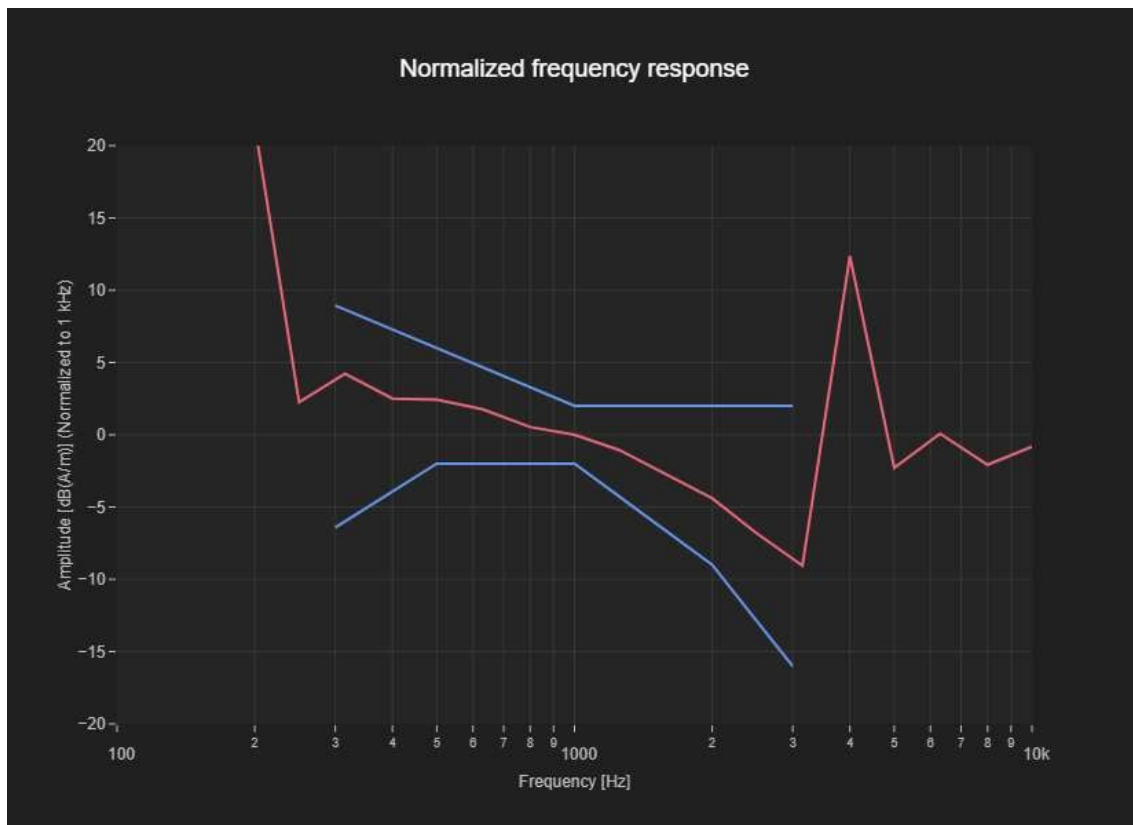
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 25	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	26590	1905.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

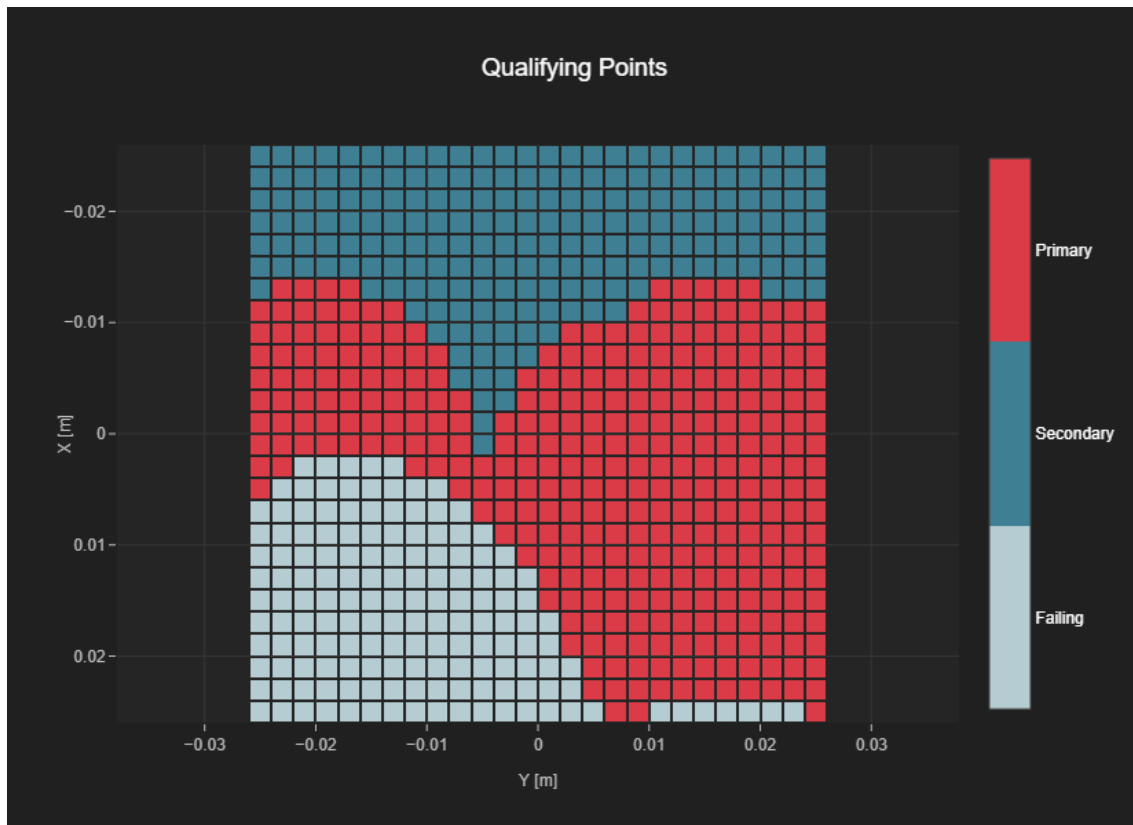
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
323	523	26	26



Plot 10 LTE Band 41 20MHz QPSK 1RB 0offset CH.40620 Voice AMR-WB Codec:
23.85kbit/s ANT.B
T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

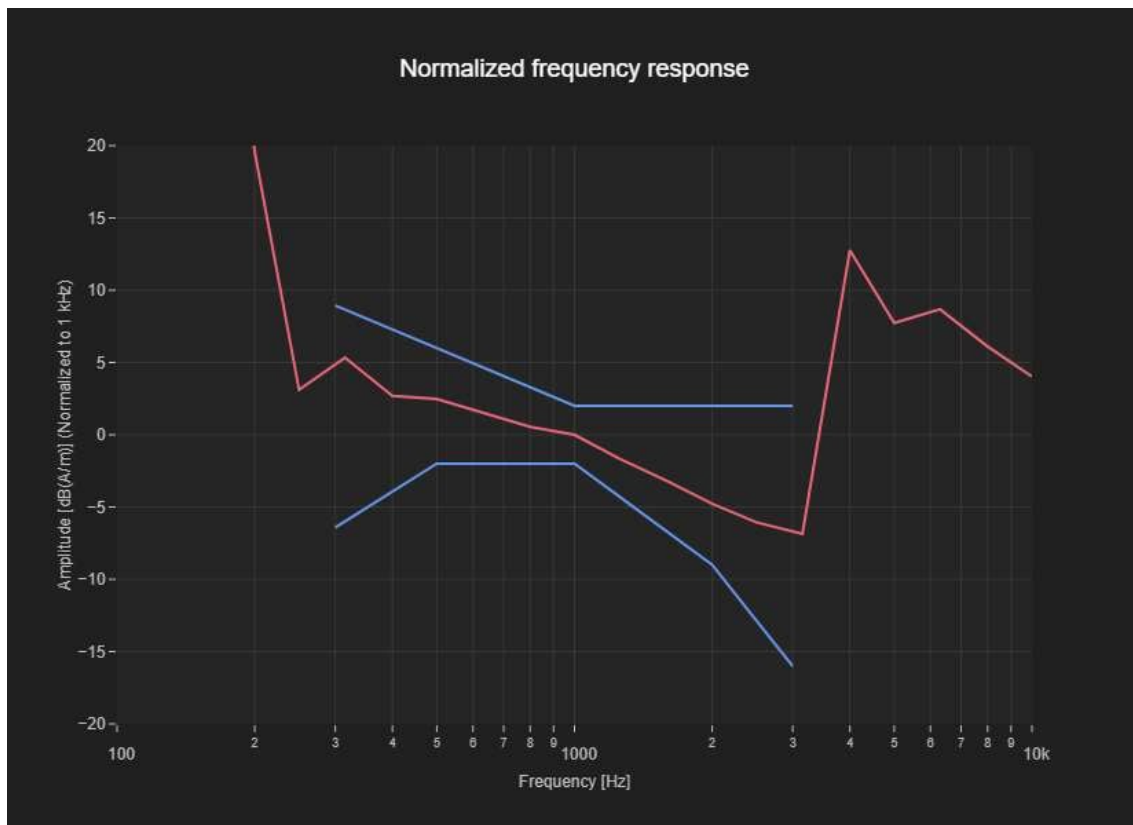
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	40620	2593.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

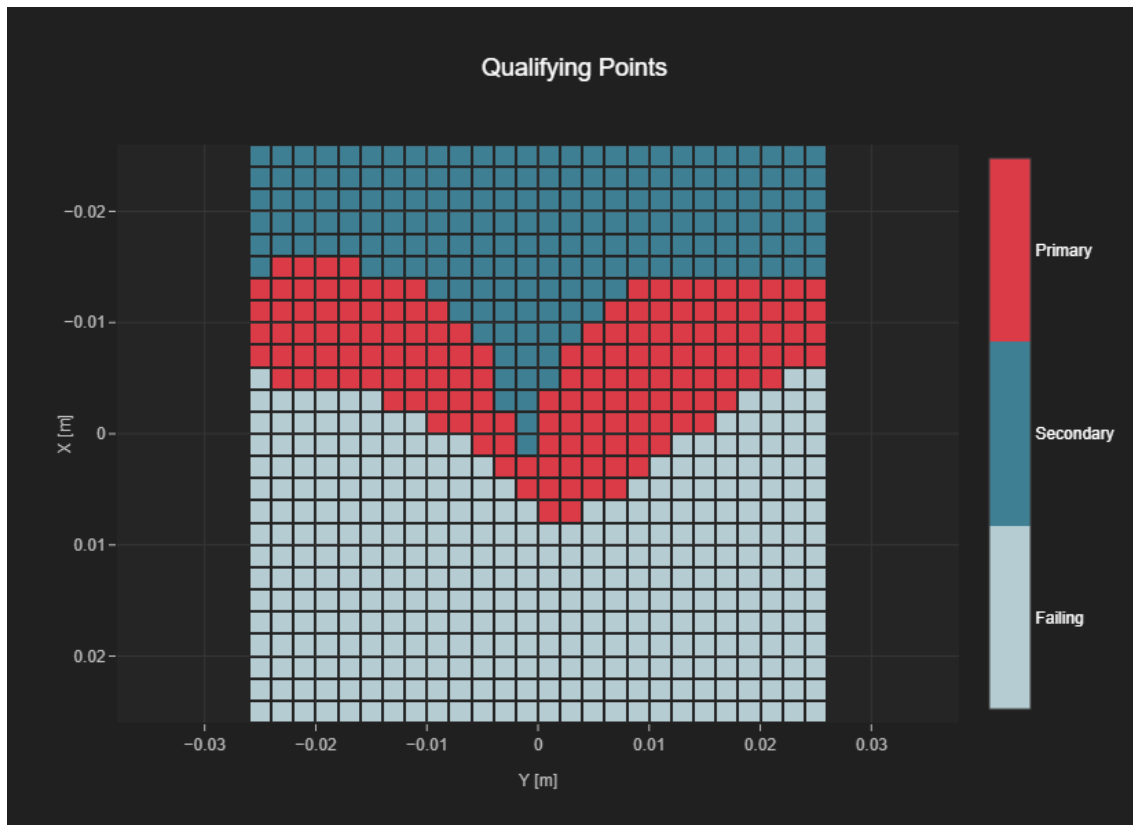
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
152	335	17	26



Plot 11 LTE Band 41 20MHz QPSK 1RB 0offset CH.39750 Voice AMR-WB Codec:
23.85kbit/s ANT B
T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

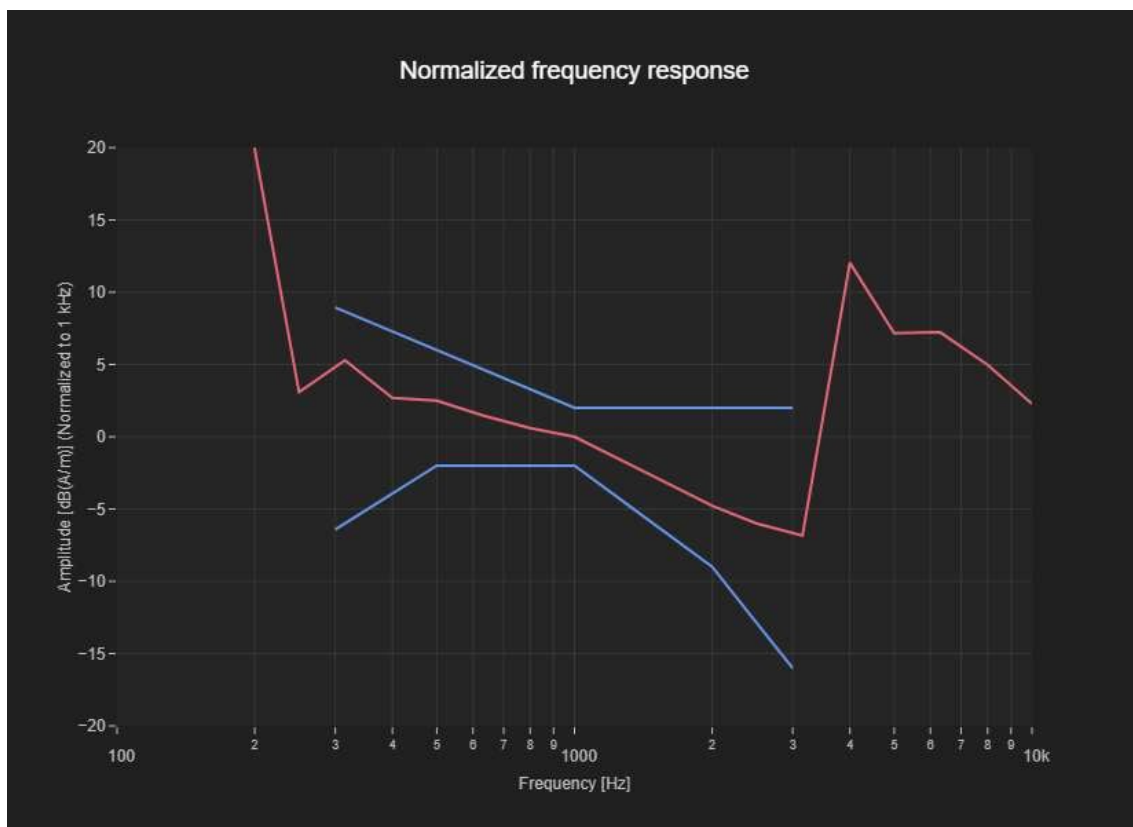
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	39750	2506.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

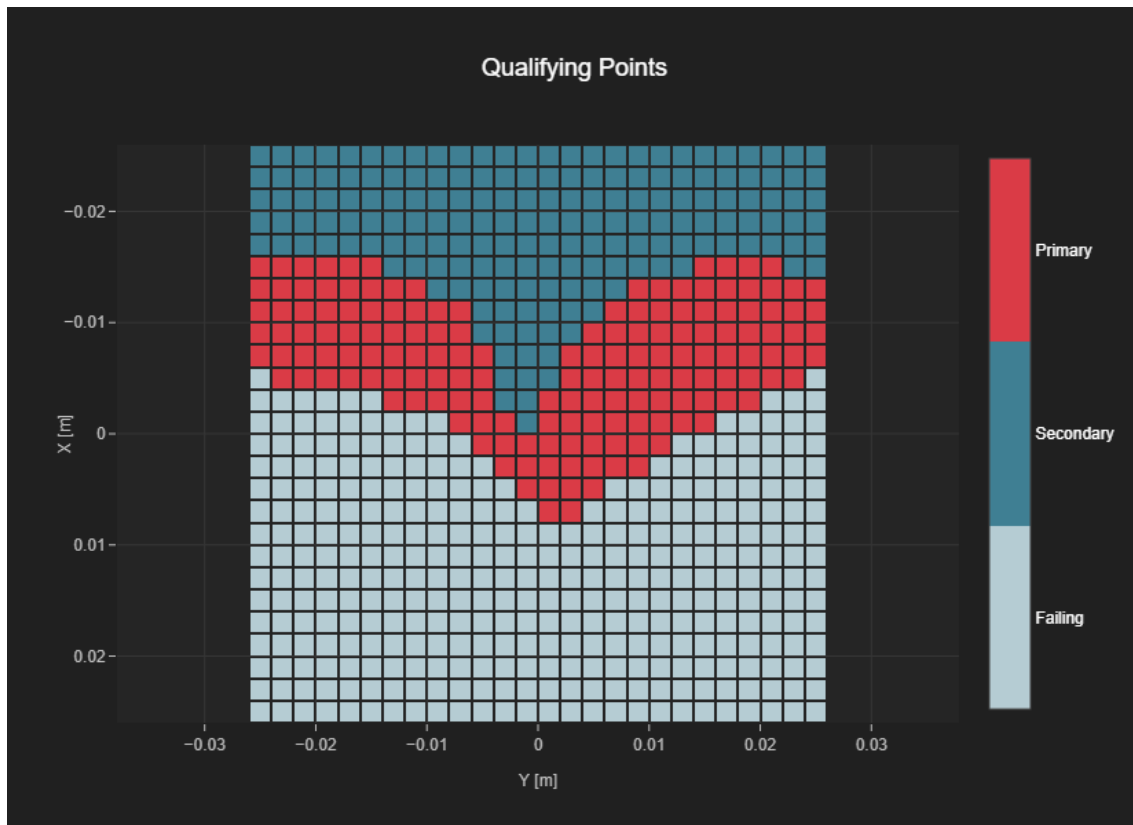
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
160	335	17	26



Plot 12 LTE Band 41 20MHz QPSK 1RB 0offset CH.40185 Voice AMR-WB Codec:
23.85kbit/s ANT B
T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

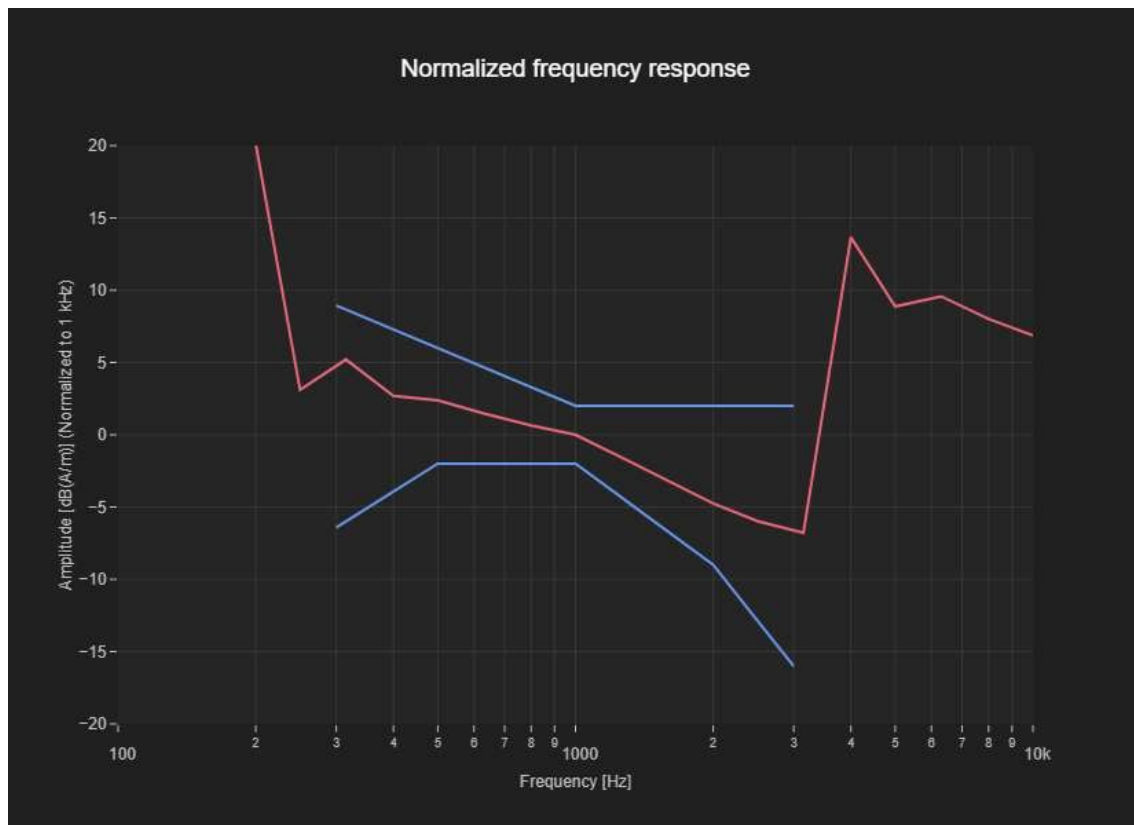
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	40185	2549.5

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

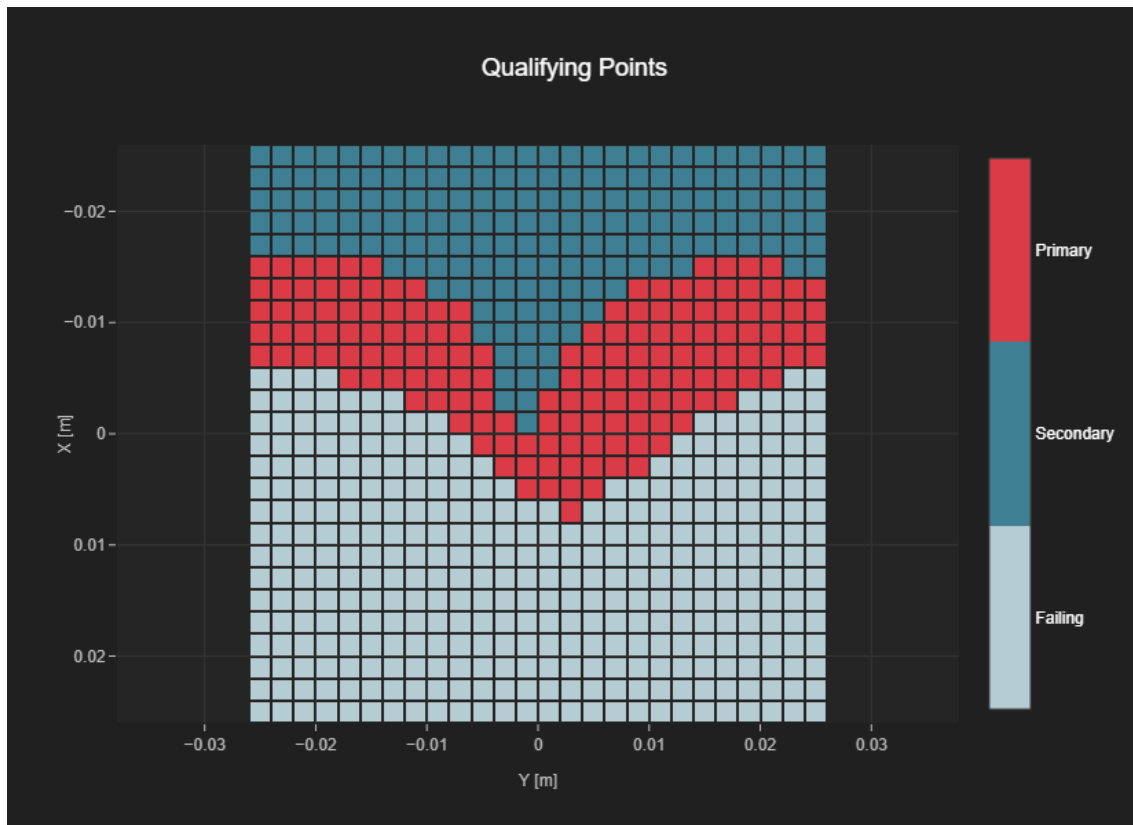
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
152	327	17	26



Plot 13 LTE Band 41 20MHz QPSK 1RB 0offset CH.41055 Voice AMR-WB Codec:
23.85kbit/s ANT B
T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

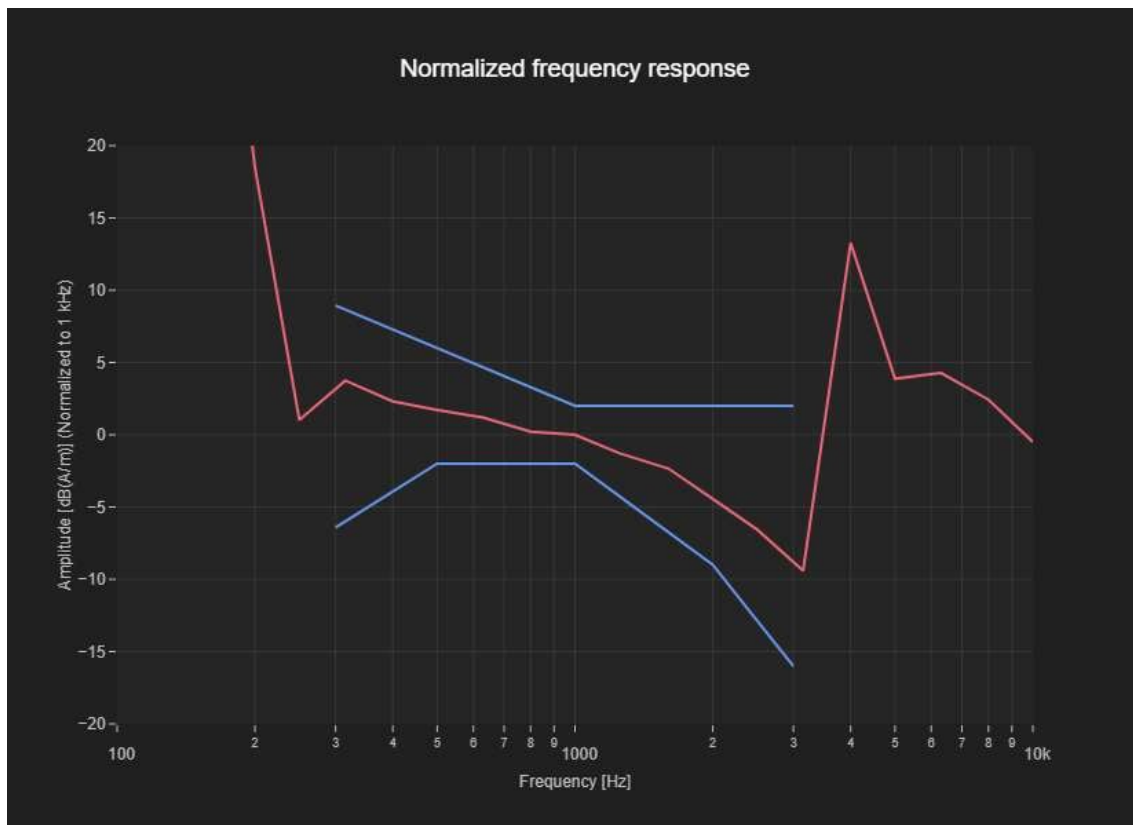
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	41055	2636.5

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

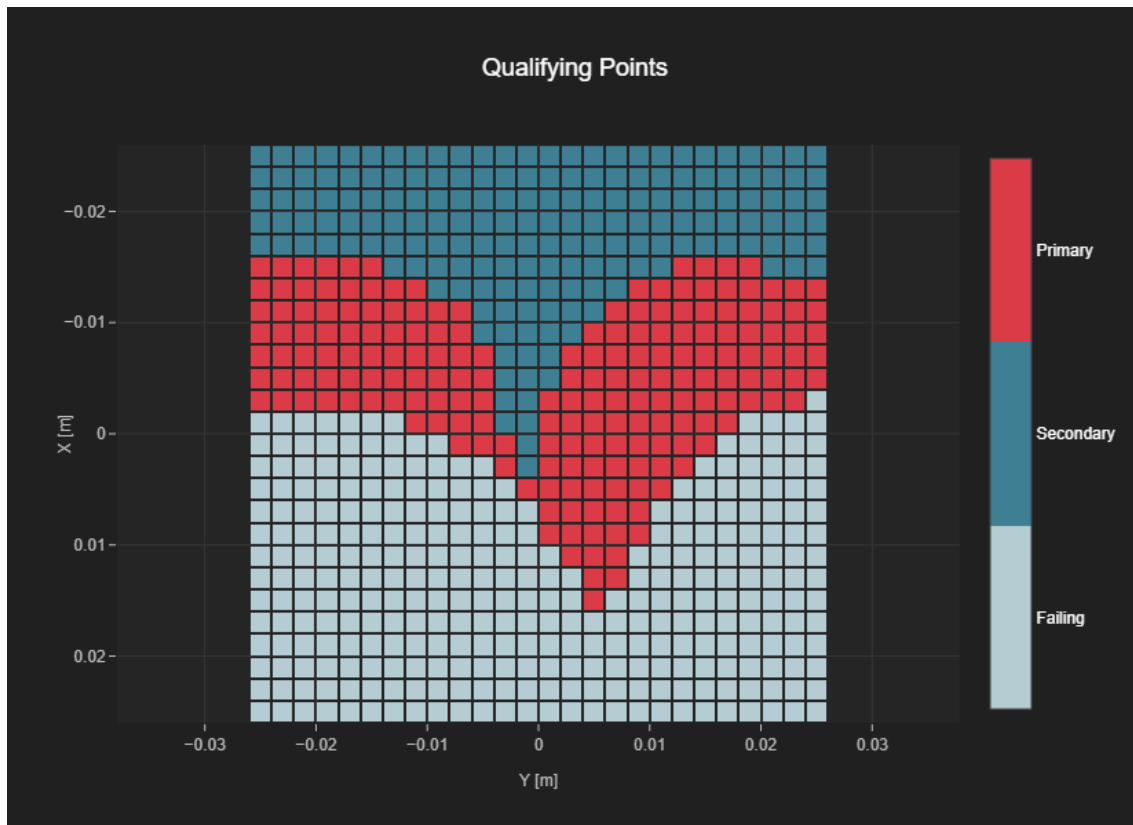
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
192	370	21	26



Plot 14 LTE Band 41 20MHz QPSK 1RB 0offset CH.41490 Voice AMR-WB Codec:
23.85kbit/s ANT B
T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

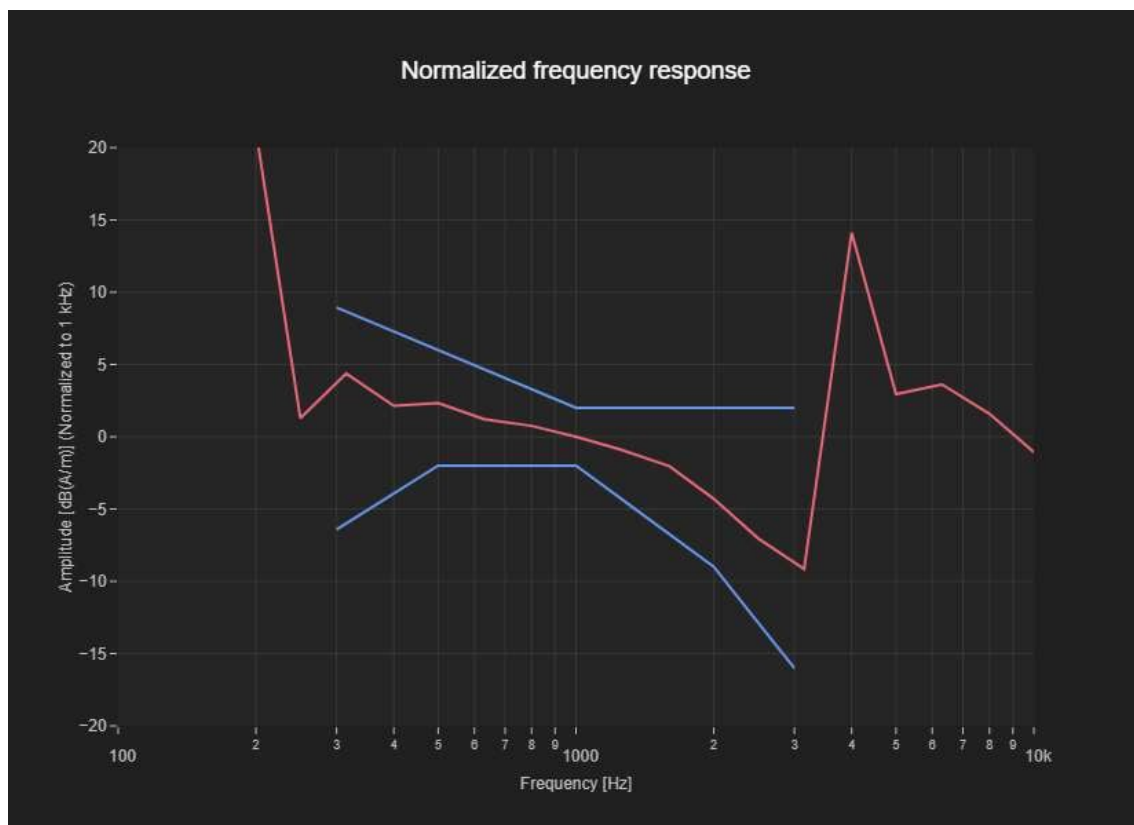
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	41490	2680.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

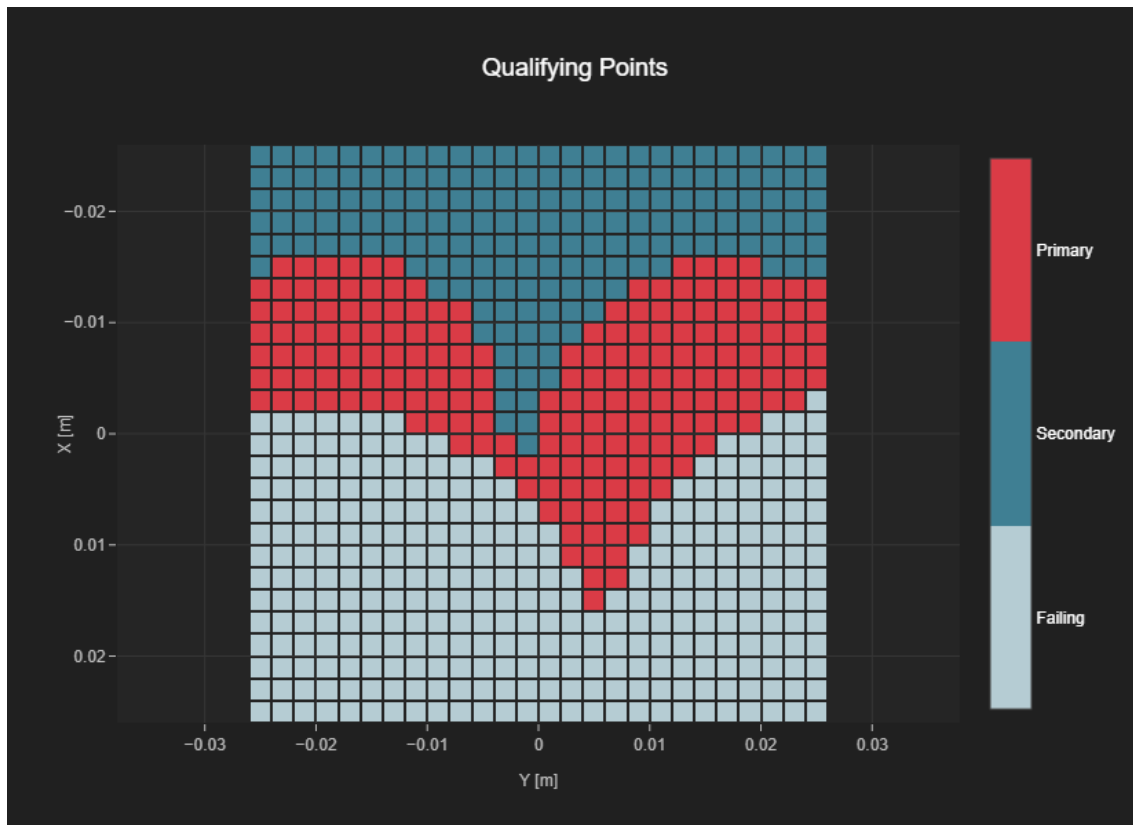
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
193	370	21	26



Plot 15 NR Band n25 40MHz CP OFDM 1RB 1offset CH.376500 Voice EVS-WB Codec:
13.2kbit/s ANT F
T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

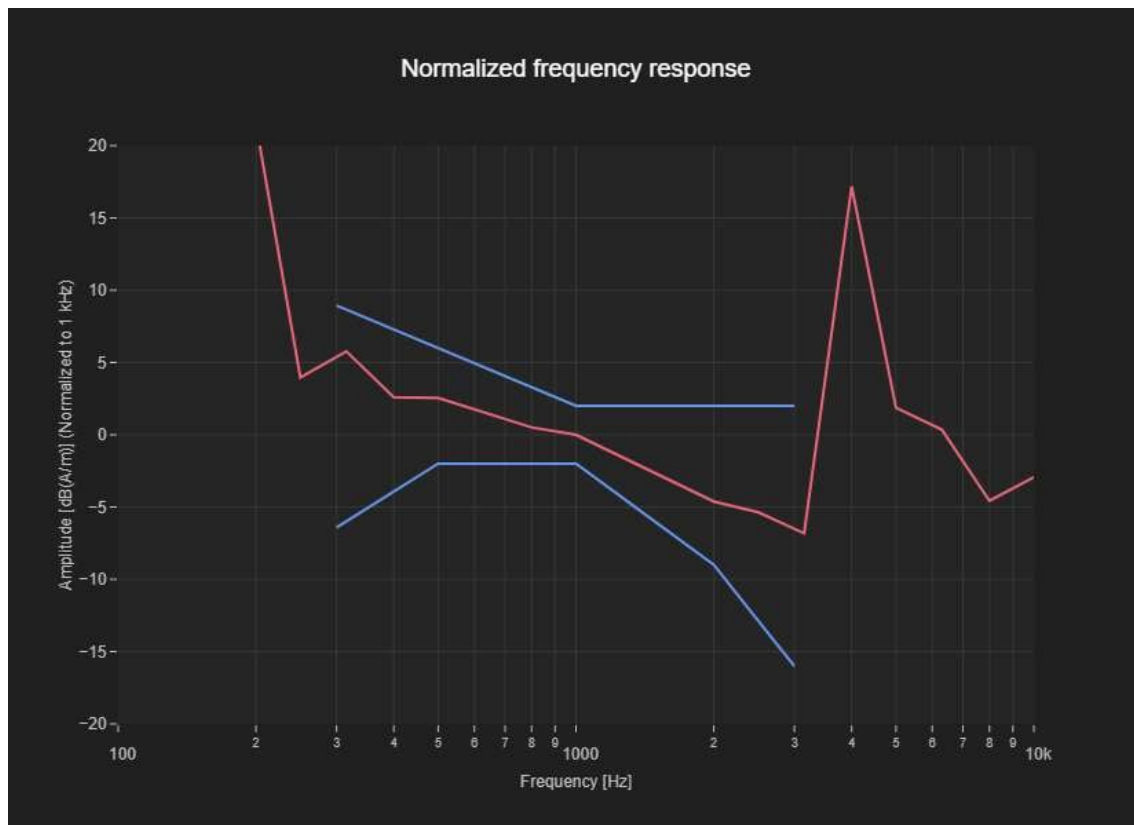
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n25	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	376500	1882.5

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

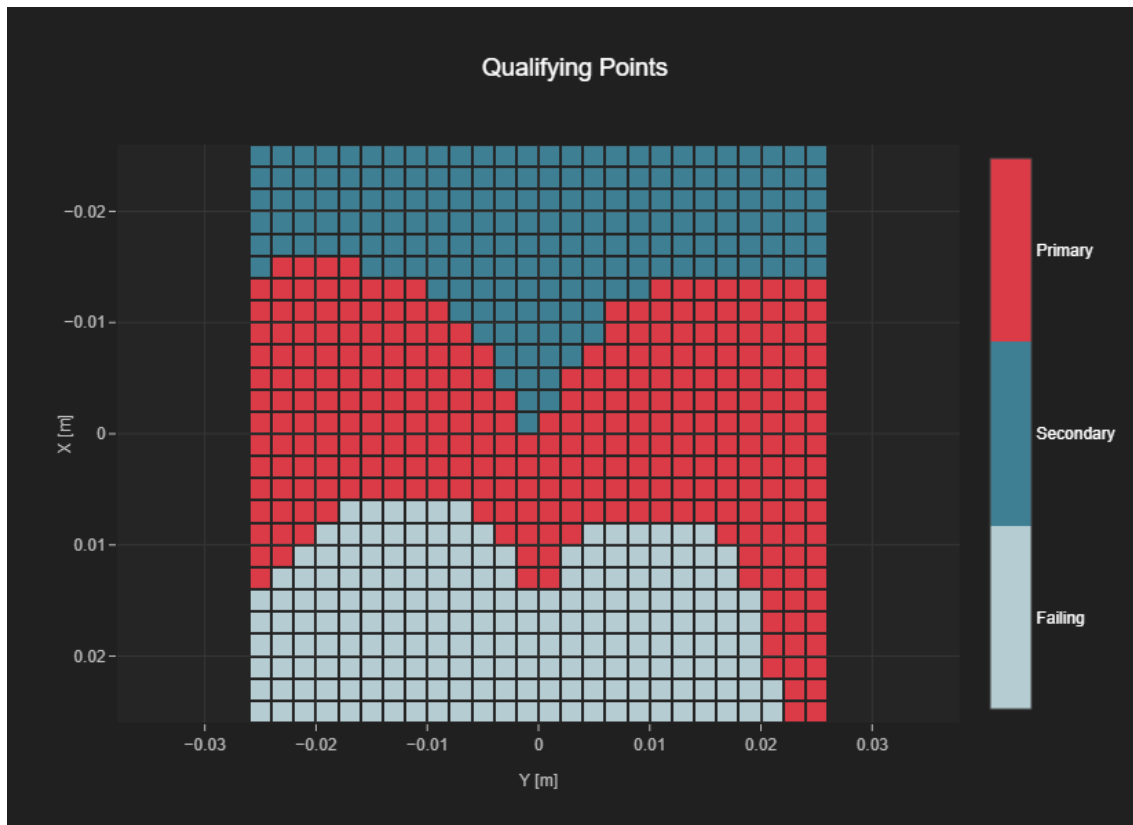
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
294	479	26	26



Plot 16 NR Band n41 100MHz DFT-s OFDM 1RB 1offset CH.518598 Voice EVS-NB Codec:
13.2kbit/s ANT B
T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

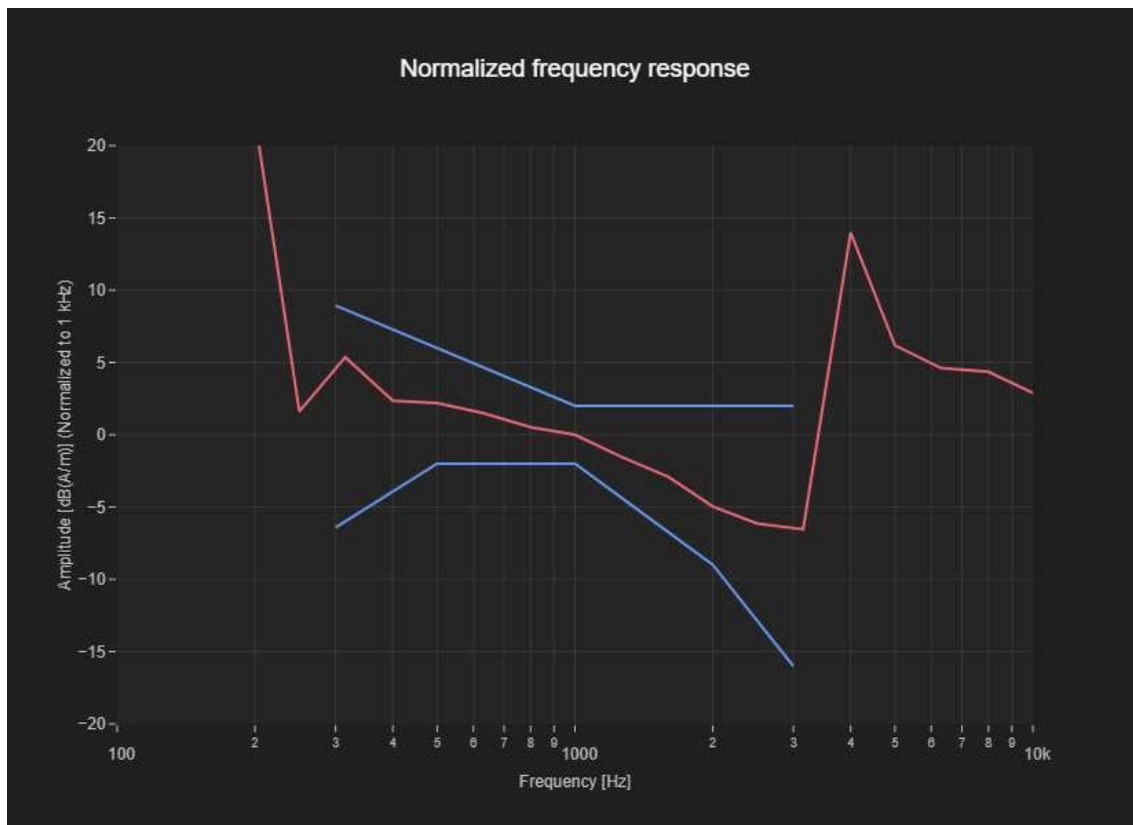
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n41	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	518598	2592.99

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

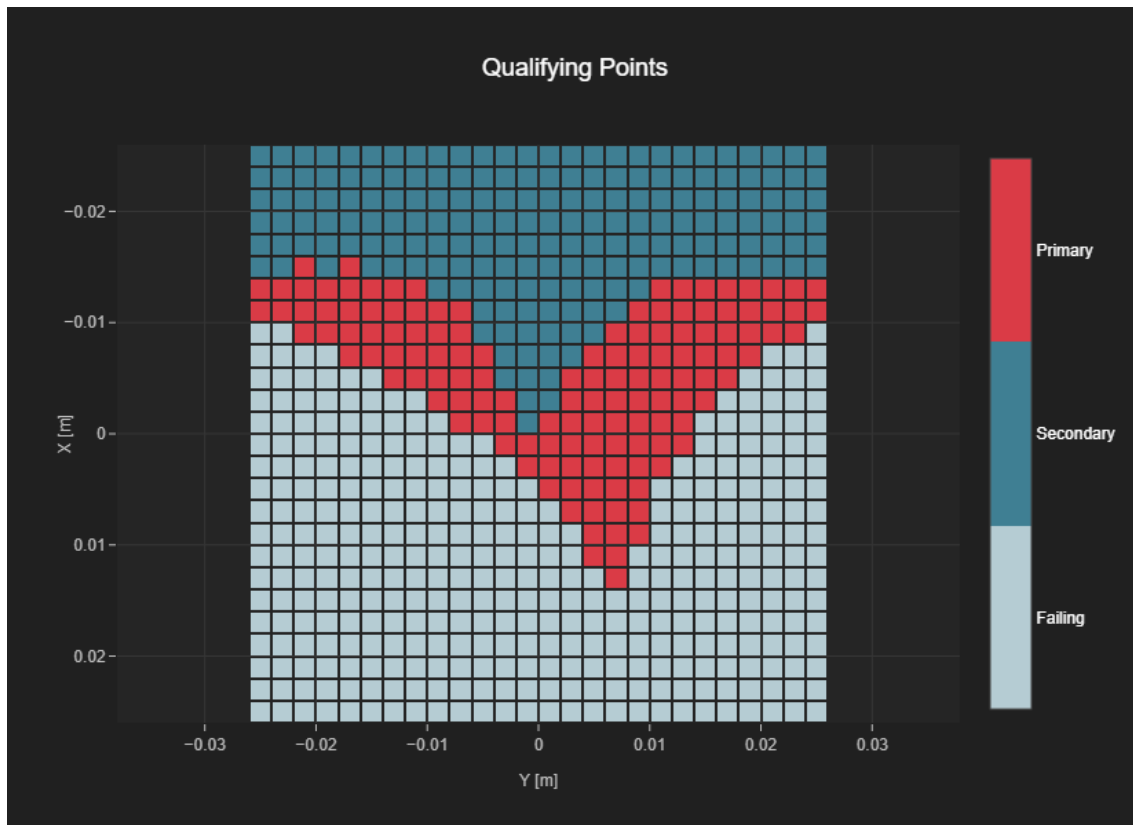
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
134	321	20	26



Plot 17 802.11b CH.6 5.5Mbps Voice EVS-NB Codec: 5.9 kbit/s

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

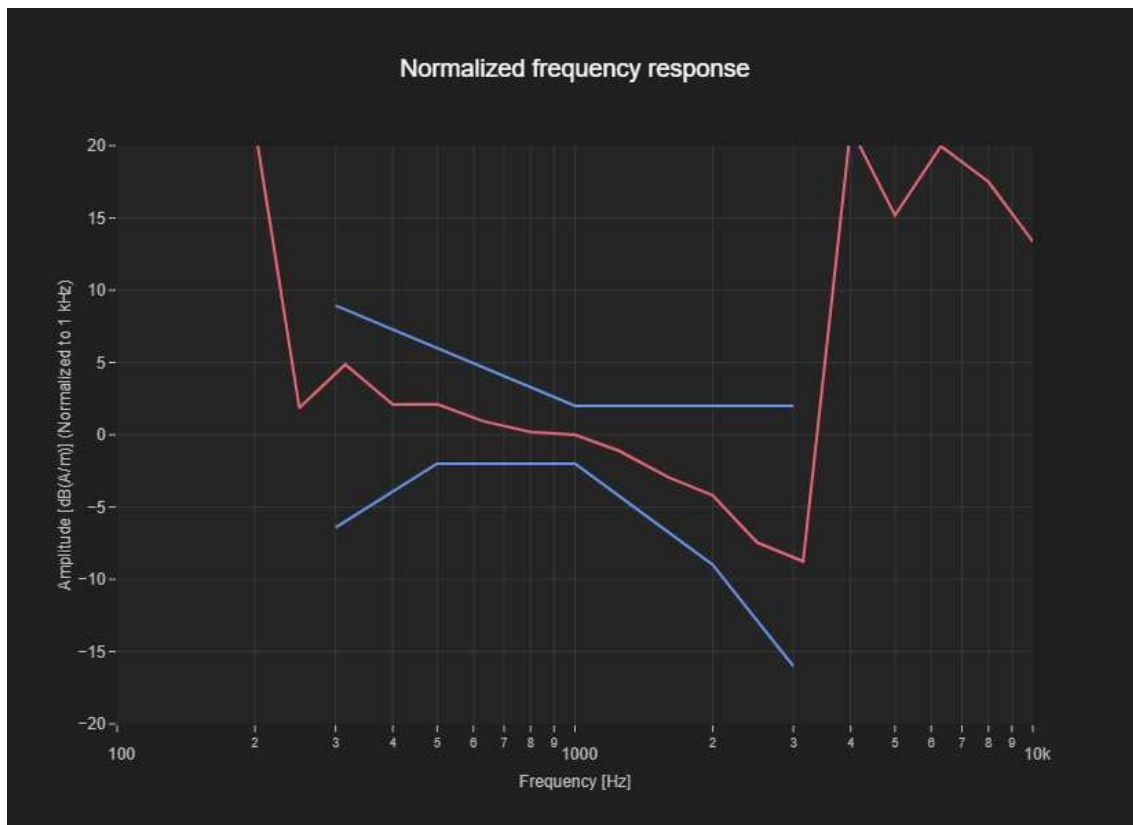
Band Name	Communication Systems Name	Channel	Frequency [MHz]
WLAN 2.4GHz	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	6	2437.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

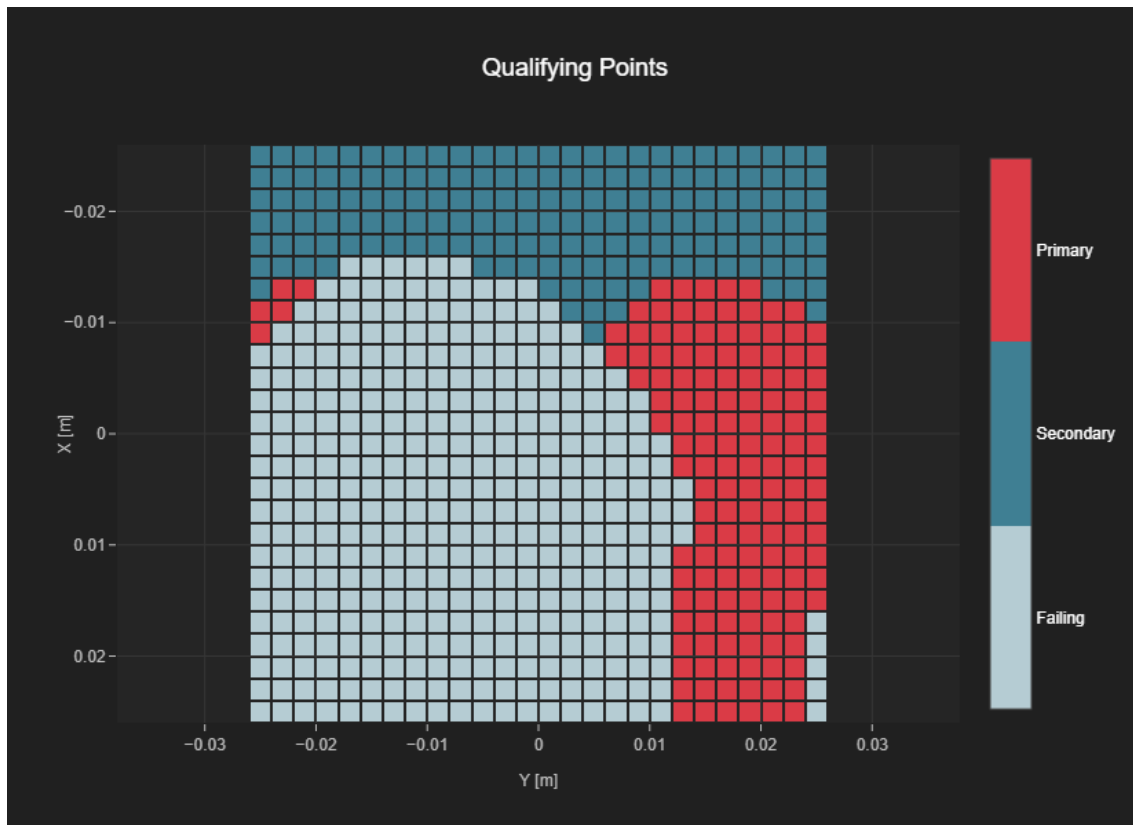
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
146	310	26	26



Plot 18 802.11b CH.1 5.5Mbps Voice EVS-NB Codec: 5.9 kbit/s

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

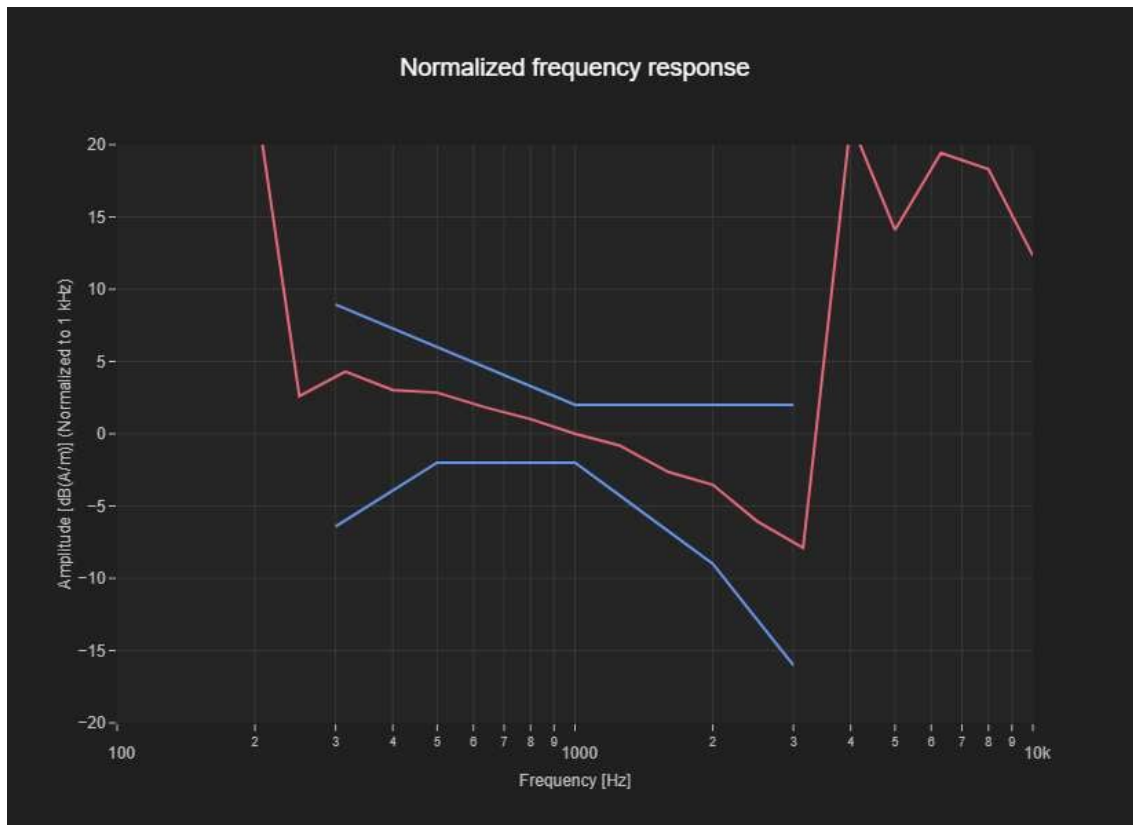
Band Name	Communication Systems Name	Channel	Frequency [MHz]
WLAN 2.4GHz	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	1	2412.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

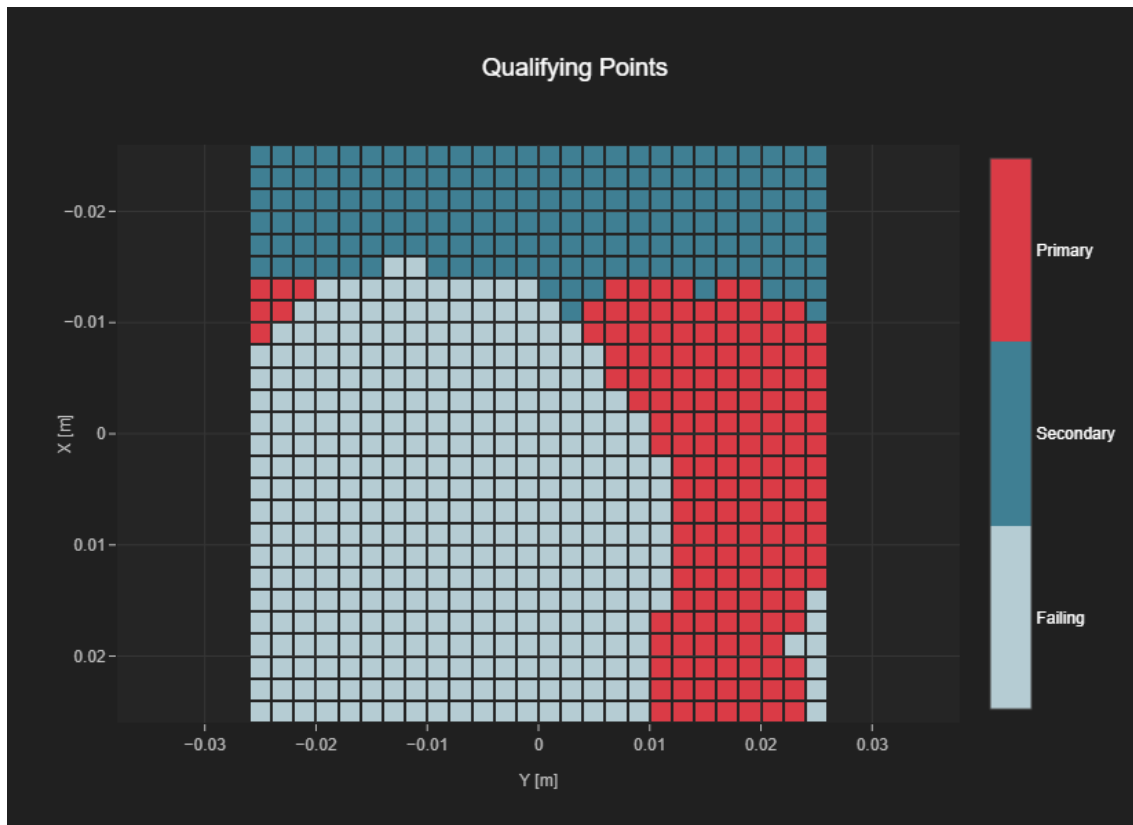
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
160	323	26	26



Plot 19 802.11b CH.11 5.5Mbps Voice EVS-NB Codec: 5.9 kbit/s

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

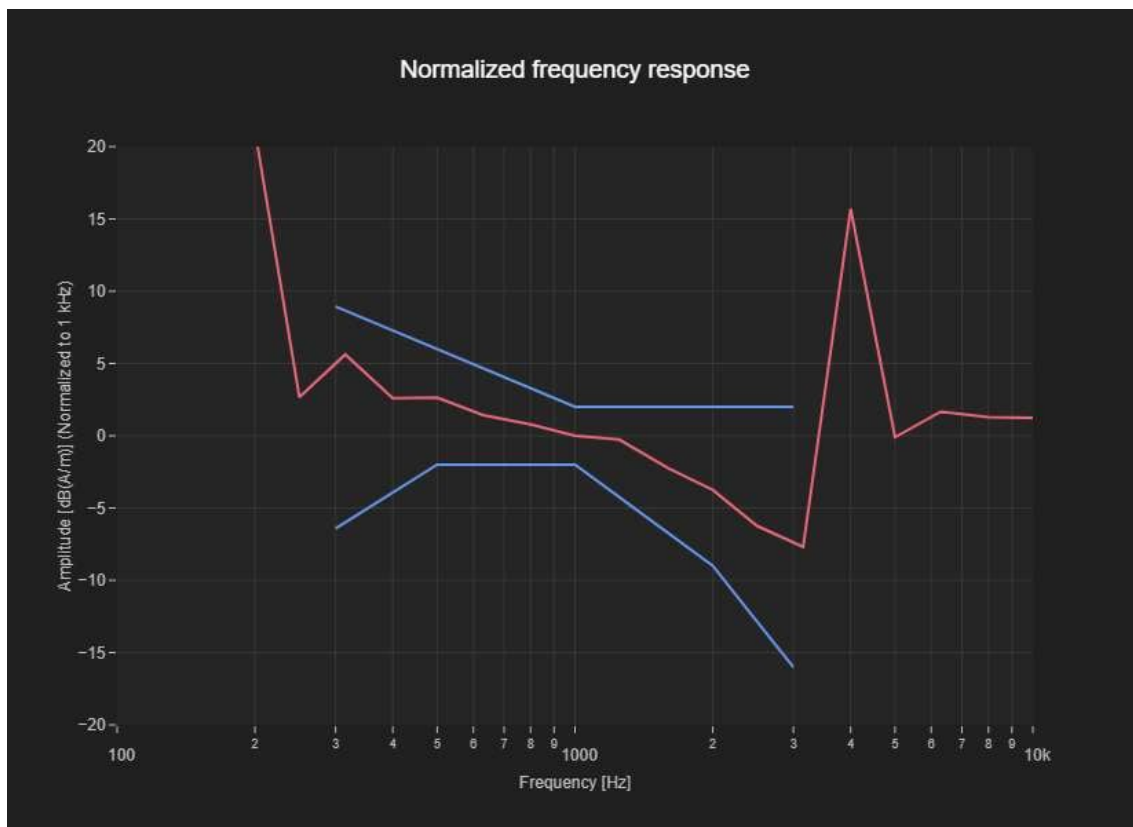
Band Name	Communication Systems Name	Channel	Frequency [MHz]
WLAN 2.4GHz	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	11	2462.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

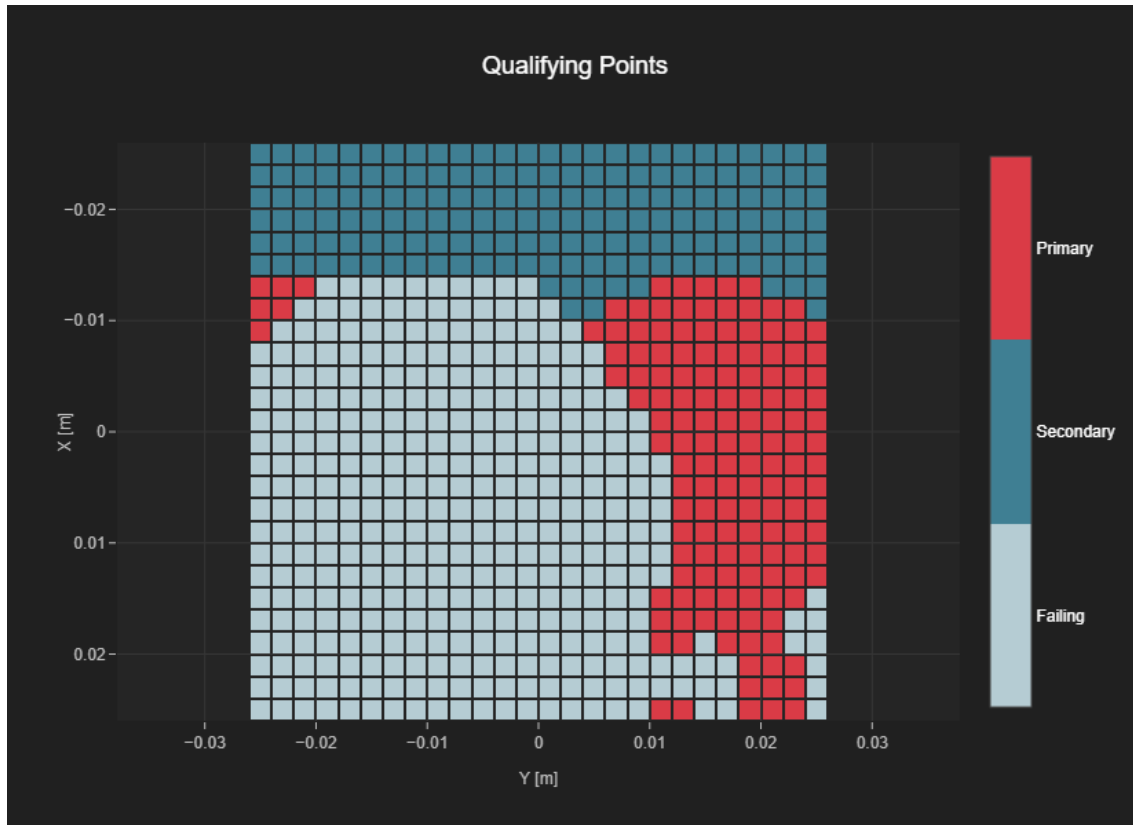
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
147	314	26	26



Plot 20 802.11ac20 CH.40 MCS0 Voice EVS-WB Codec: 5.9 kbit/s

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

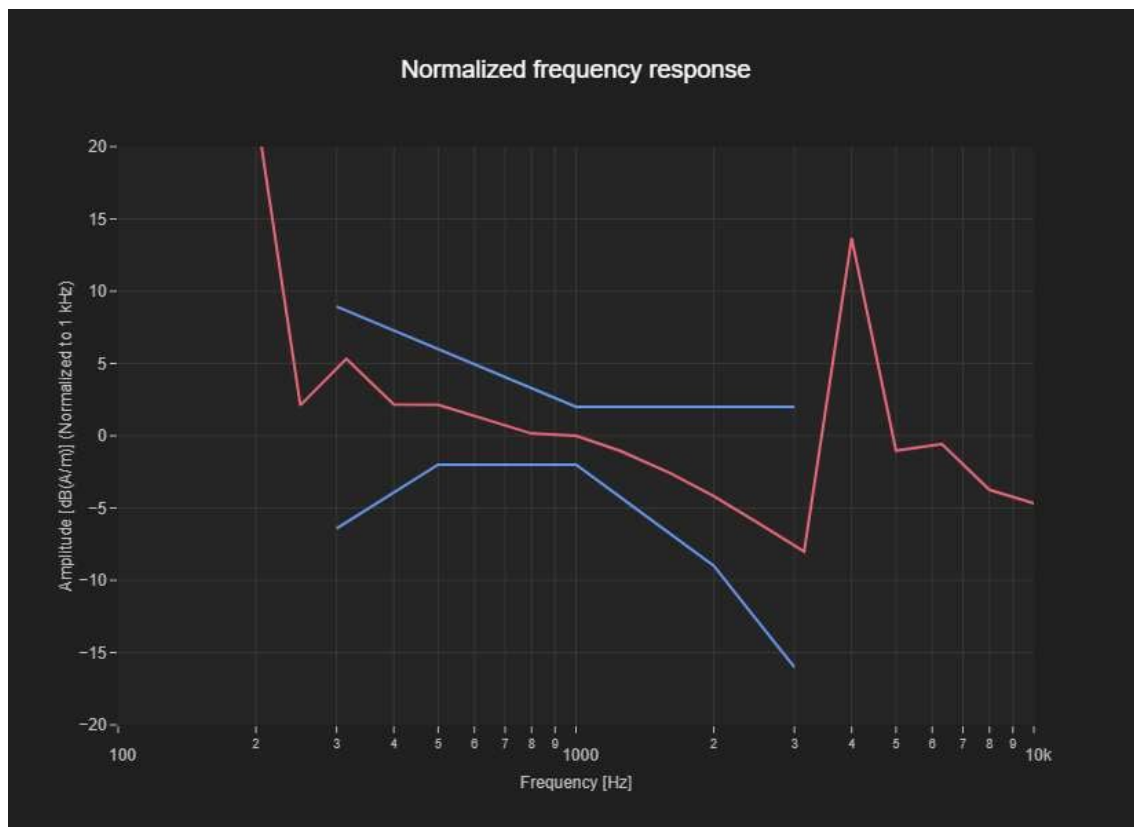
Band Name	Communication Systems Name	Channel	Frequency [MHz]
WLAN 5GHz	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	40	5200.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

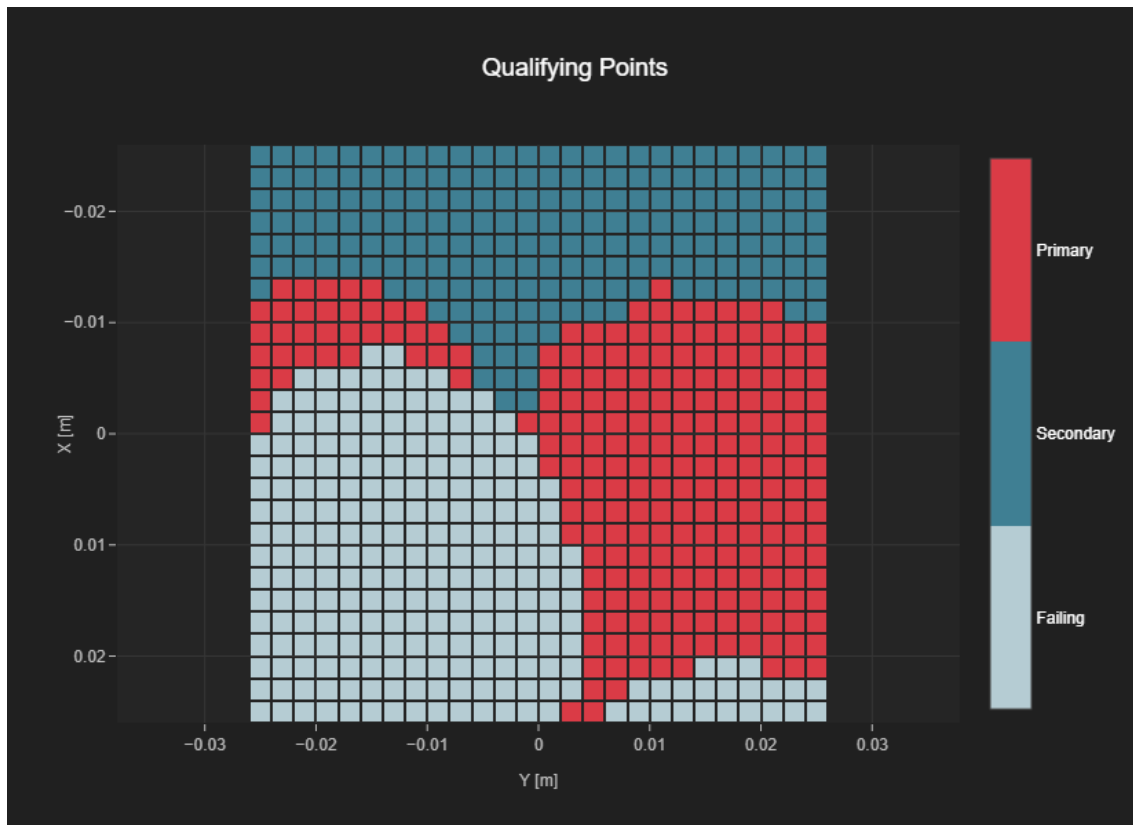
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
237	437	26	26



Plot 21 802.11ac20 CH.149 MCS0 Voice EVS-WB Codec: 5.9 kbit/s

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

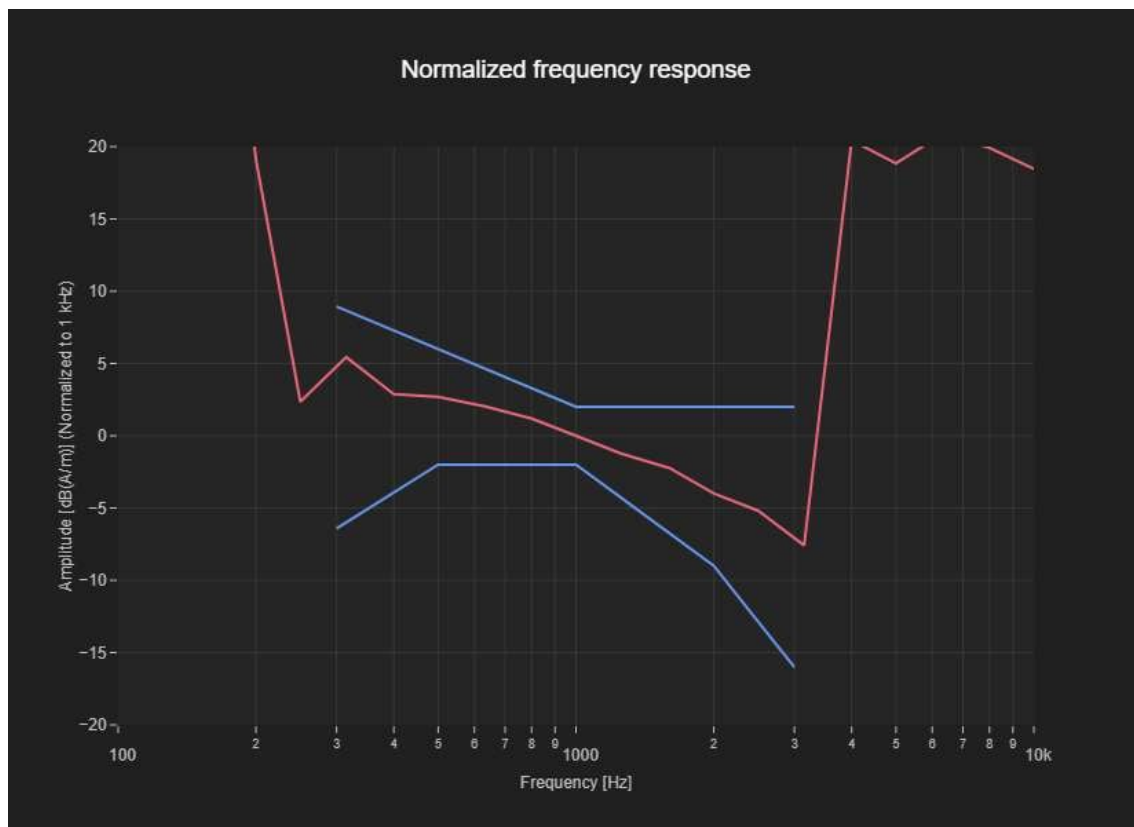
Band Name	Communication Systems Name	Channel	Frequency [MHz]
WLAN 5GHz	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	149	5745.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

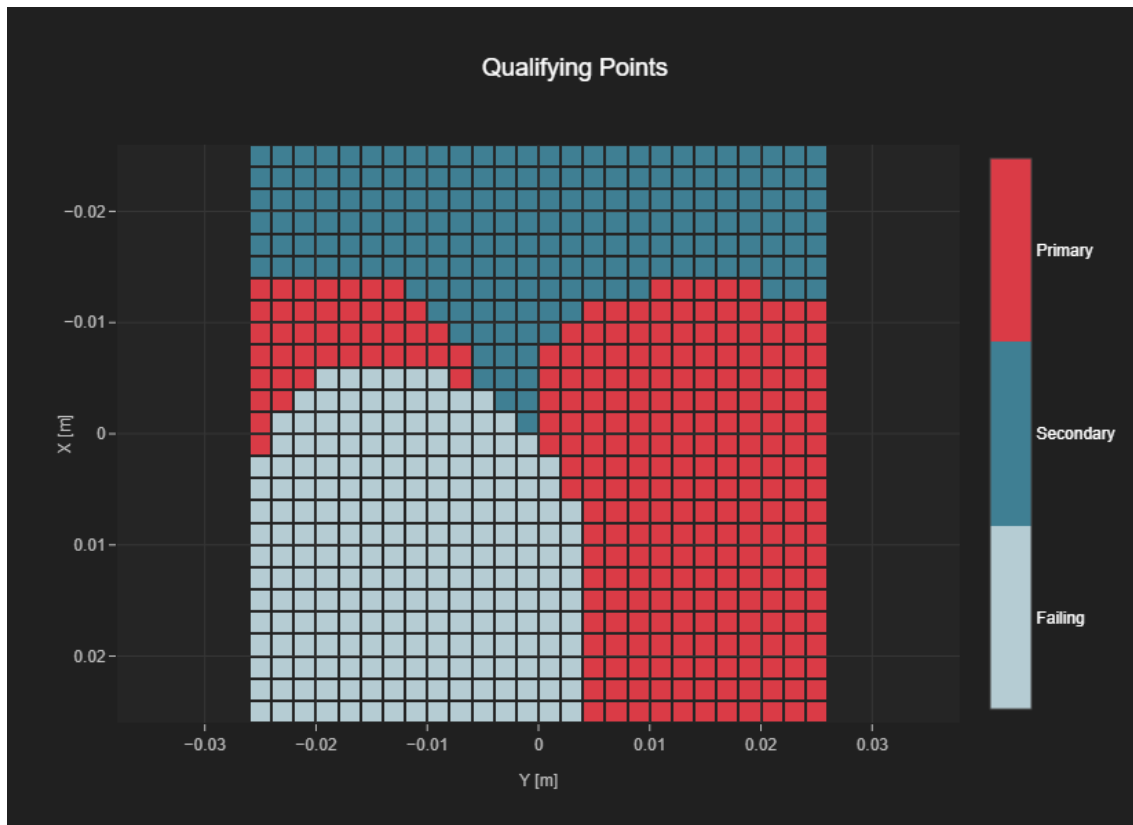
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
269	460	26	26



Plot 22 802.11ac20 CH.157 MCS0 Voice EVS-WB Codec: 5.9 kbit/s

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3153	October 10, 2025	DAE4 Sn1417	February 18, 2025

Communication Systems

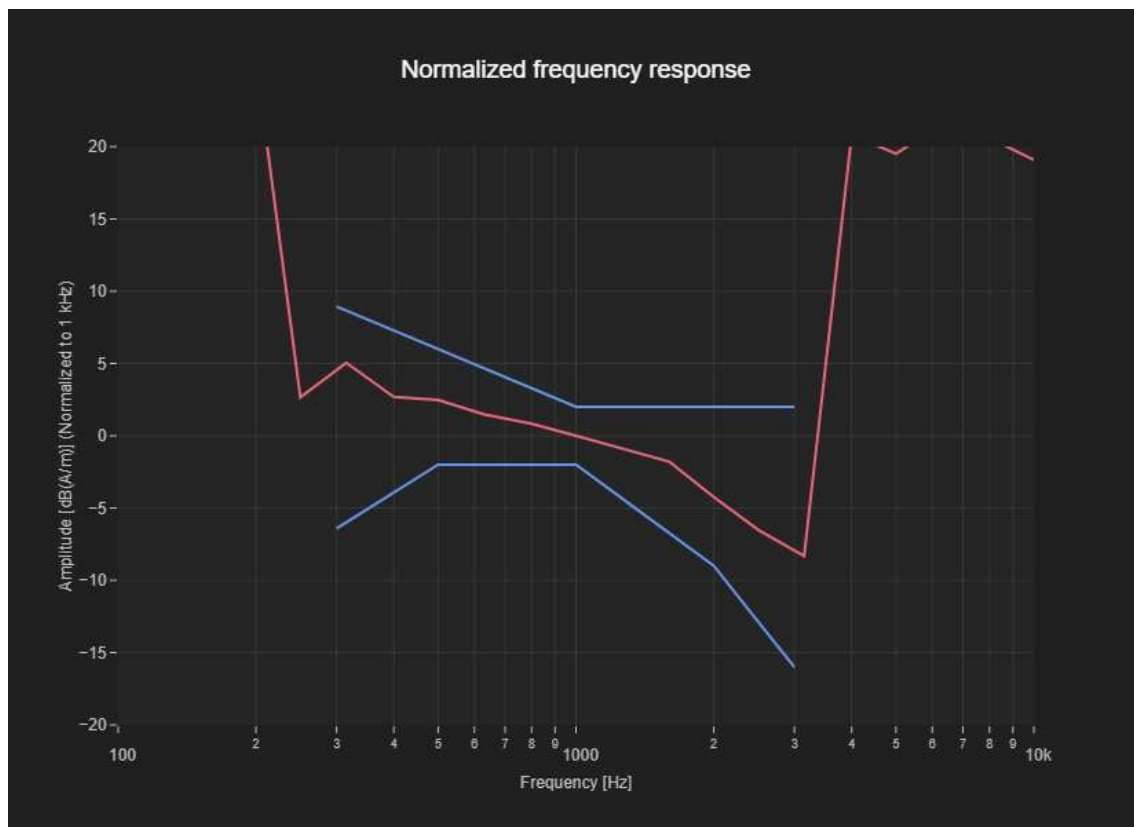
Band Name	Communication Systems Name	Channel	Frequency [MHz]
WLAN 5GHz	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	157	5785.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

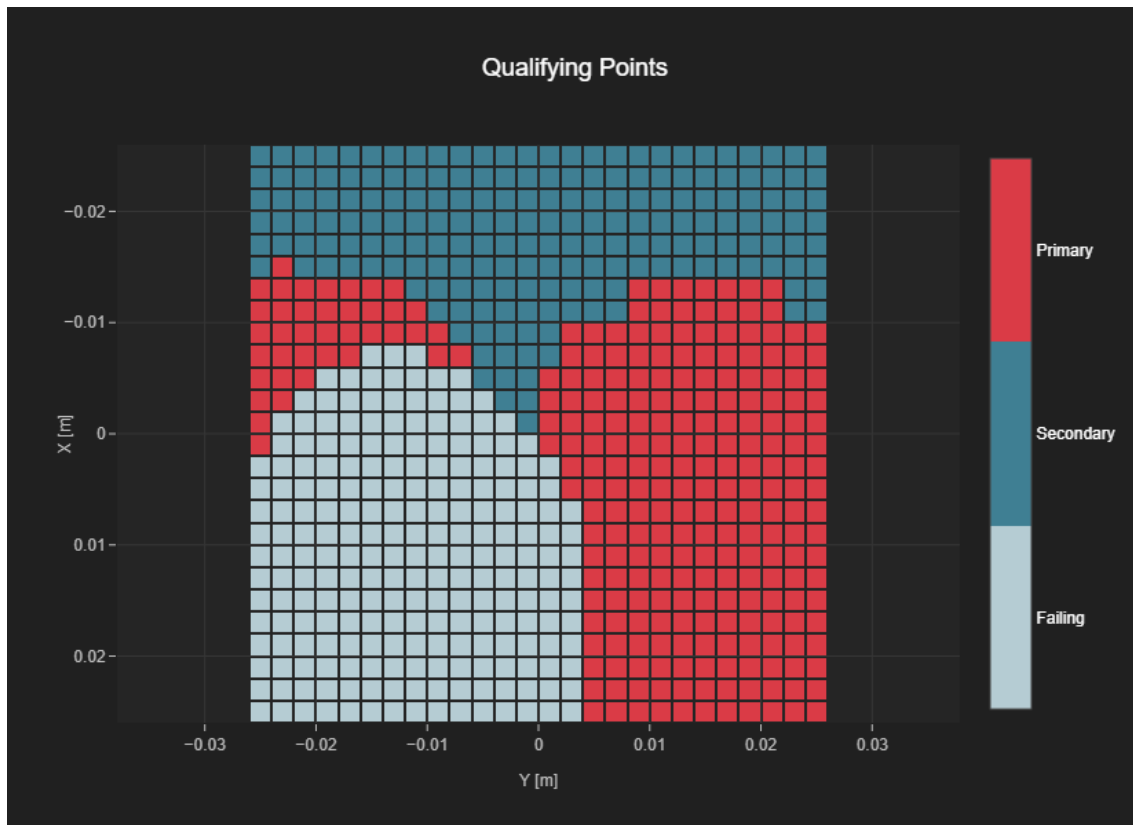
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
263	456	26	26



Plot 23 GSM850 CH.128 EDGE 2 slots Google Meet Codec: 6 kbit/s ANT A

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

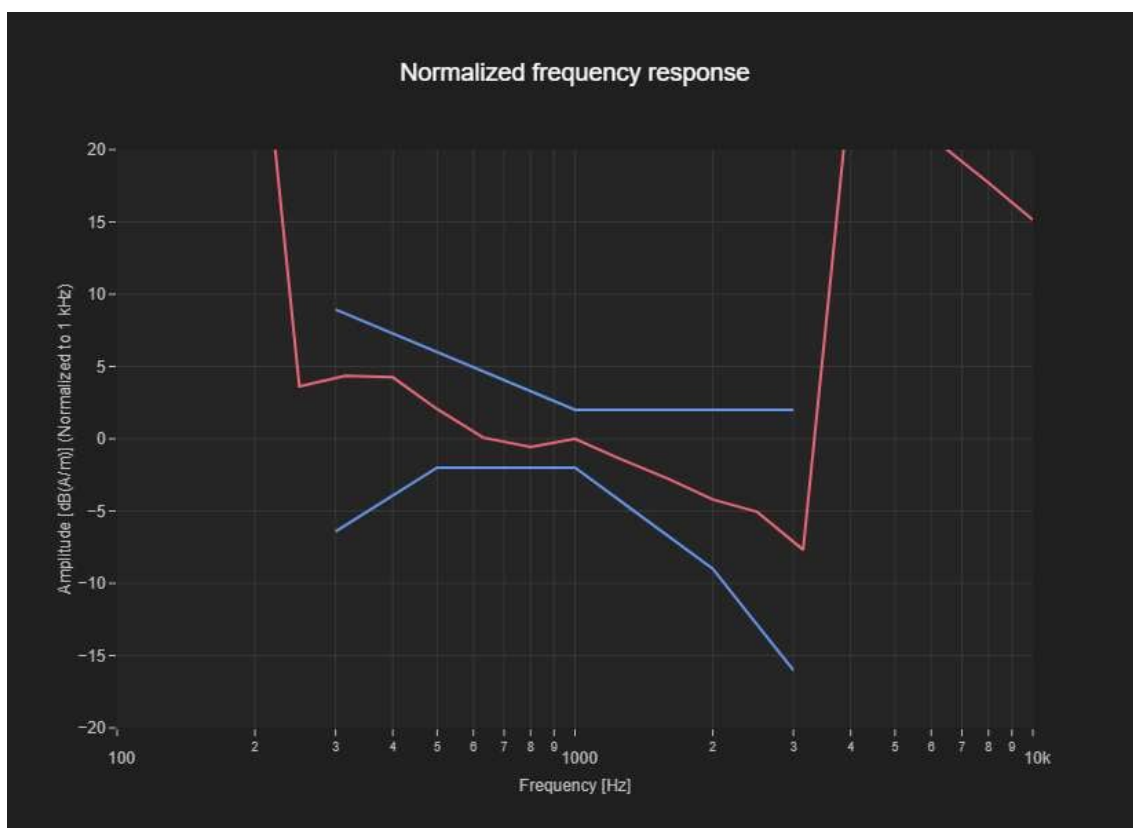
Band Name	Communication Systems Name	Channel	Frequency [MHz]
GSM 850	EDGE-FDD (TDMA, 8PSK, TN 0-1)	128	824.2

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

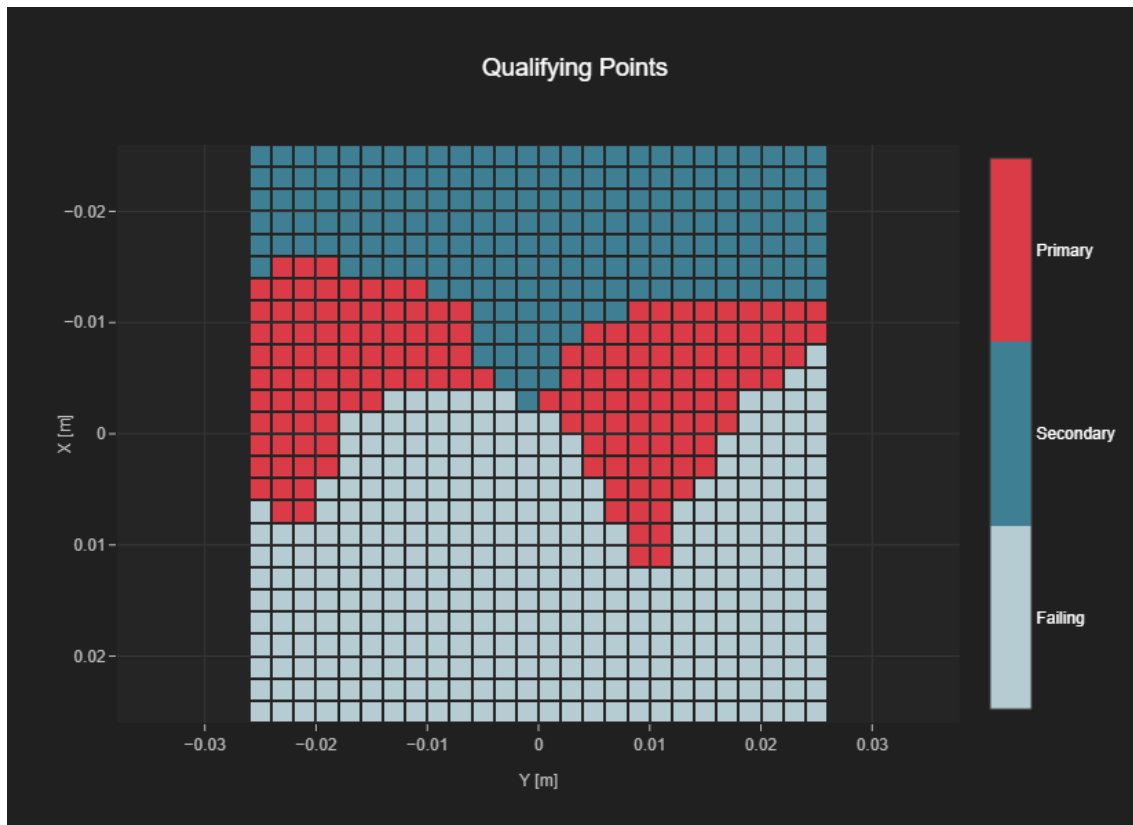
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	6.0	2.0	1.42



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
156	347	19	26



Plot 24 GSM850 CH.190 EDGE 2 slots Google Meet Codec: 6 kbit/s ANT A

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

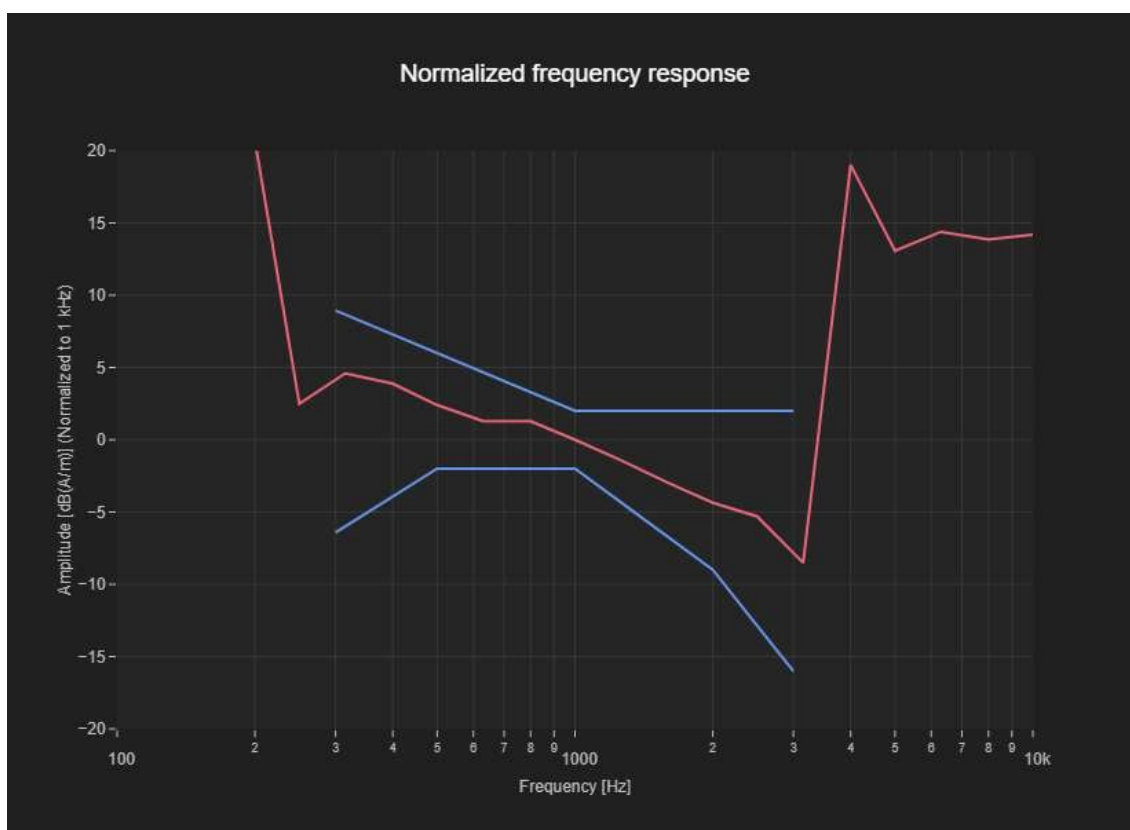
Band Name	Communication Systems Name	Channel	Frequency [MHz]
GSM 850	EDGE-FDD (TDMA, 8PSK, TN 0-1)	190	836.6

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

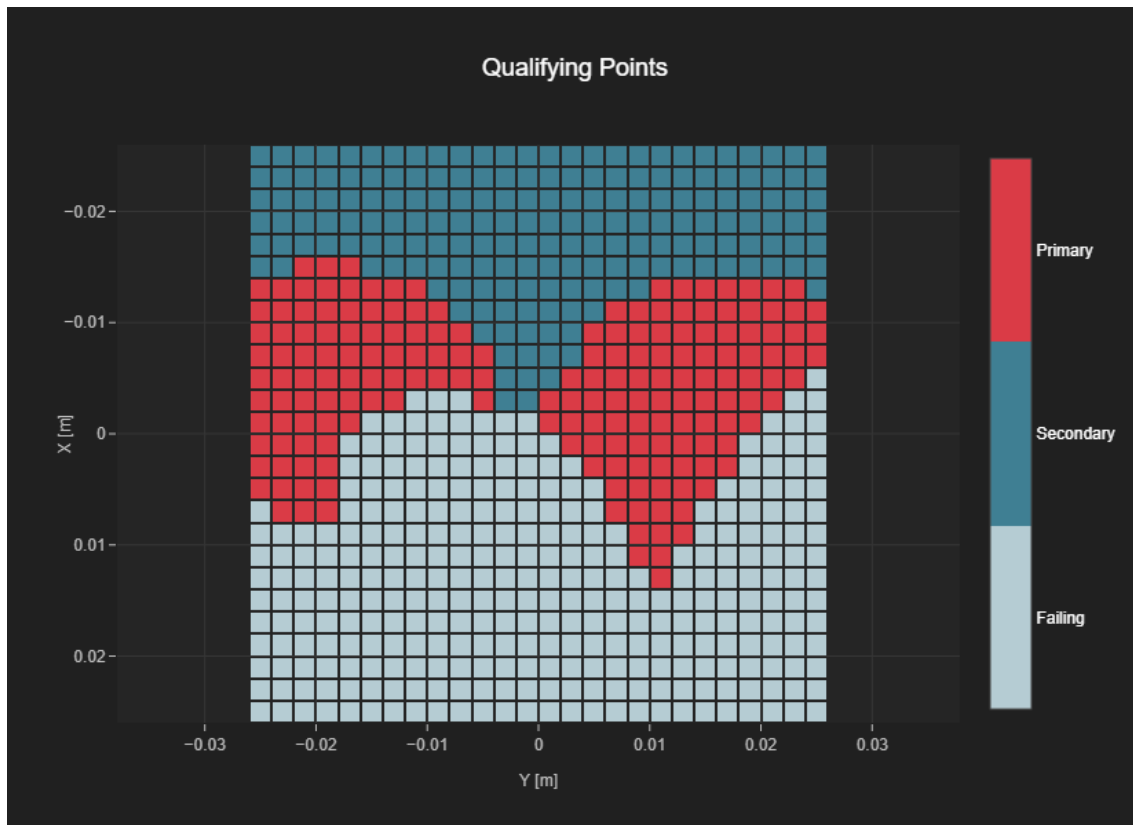
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	4.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
181	366	20	26



Plot 25 GSM850 CH.251 EDGE 2 slots Google Meet Codec: 6 kbit/s ANT A T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

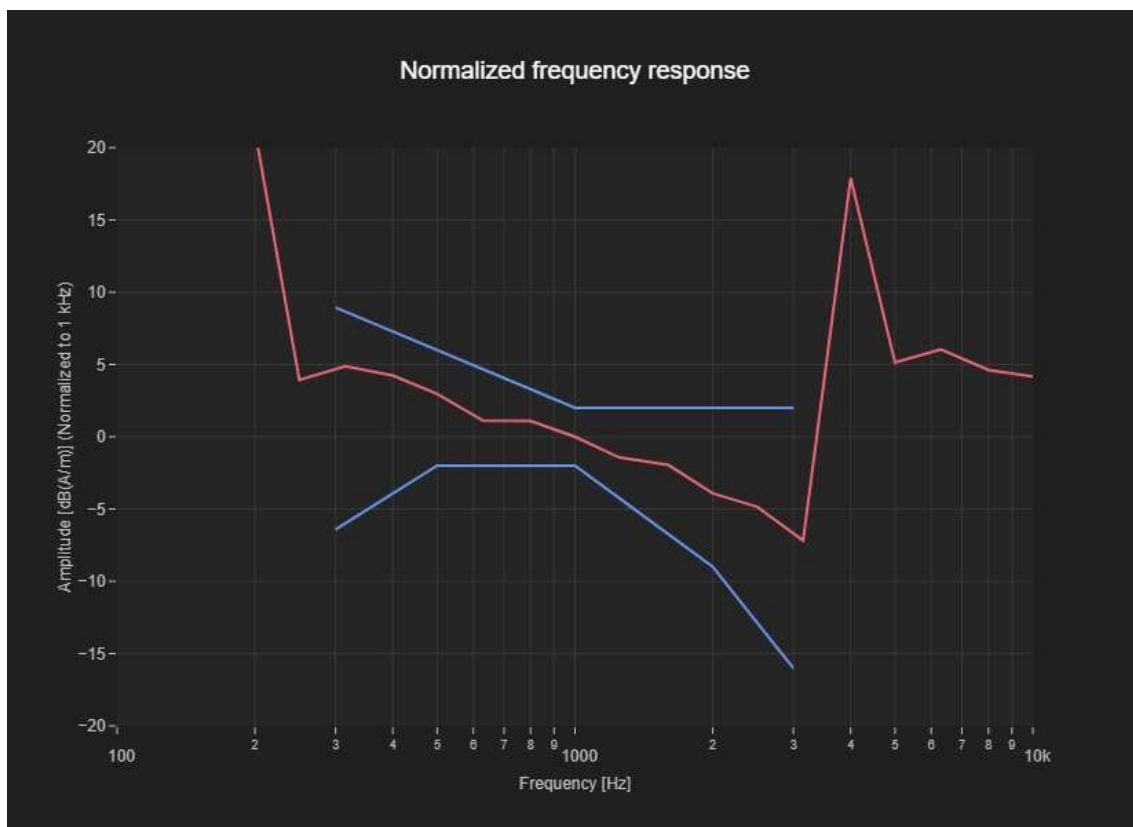
Band Name	Communication Systems Name	Channel	Frequency [MHz]
GSM 850	EDGE-FDD (TDMA, 8PSK, TN 0-1)	251	848.8

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

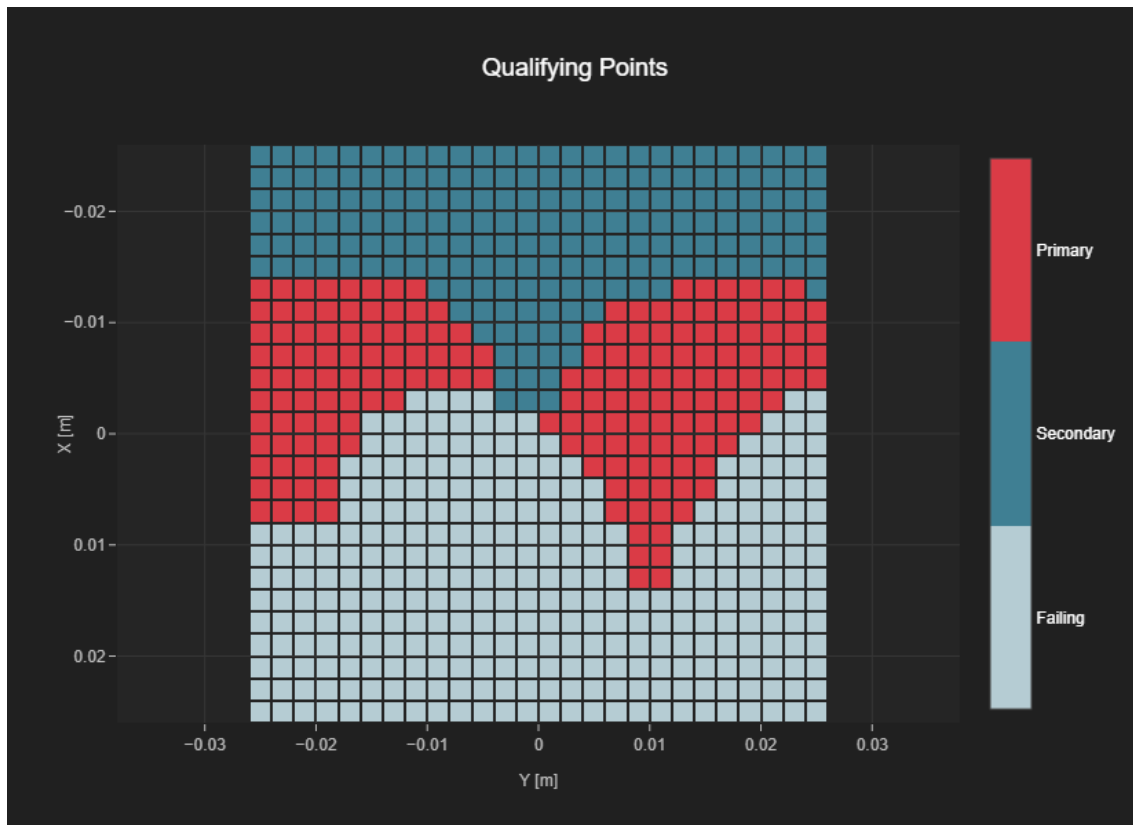
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	4.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
177	367	20	26



Plot 26 UMTS Band 2 CH.9538 Google Meet Codec: 75 kbit/s ANT B T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

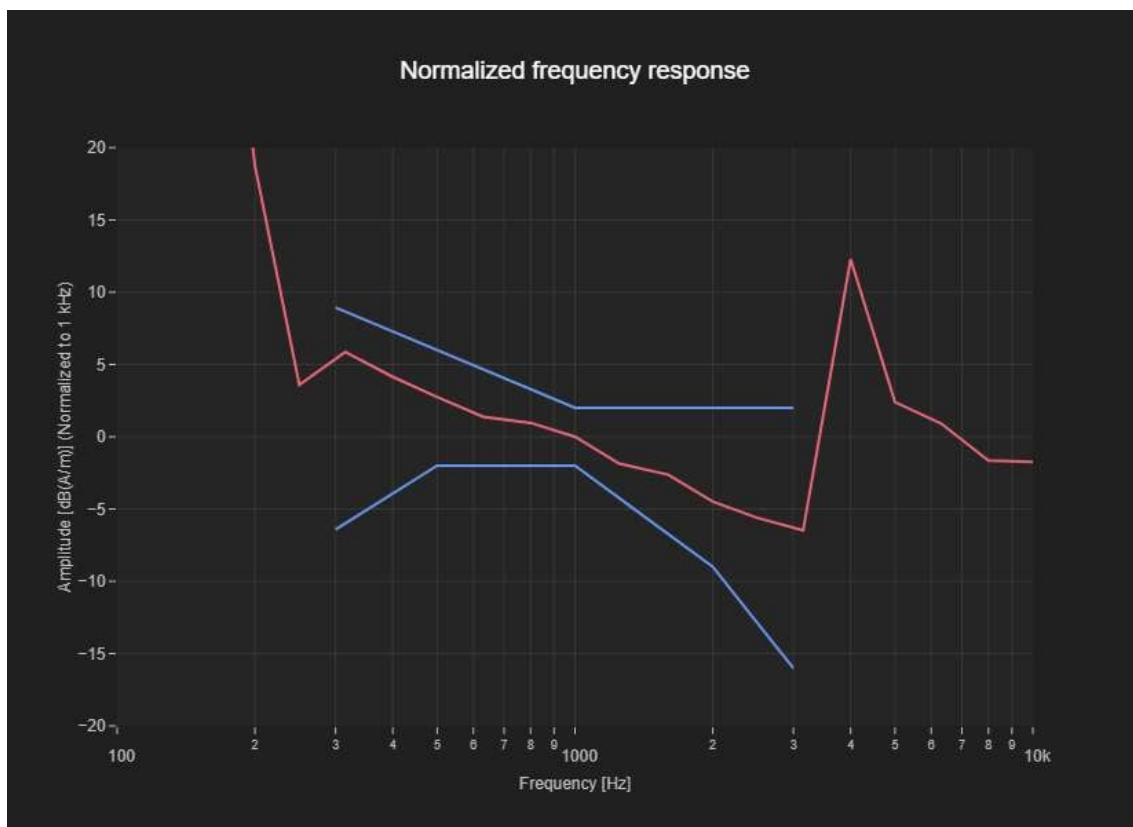
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 2	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	9538	1907.6

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

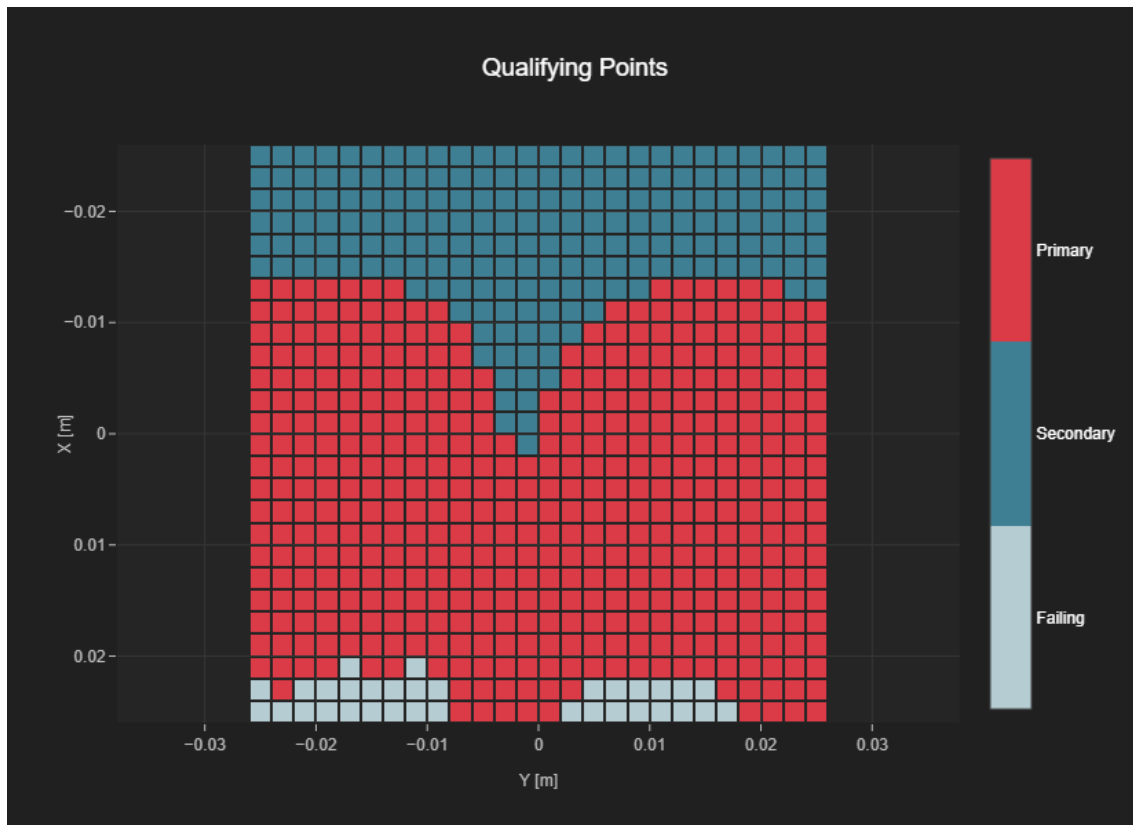
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
450	643	26	26



Plot 27 LTE Band 25 20MHz 16QAM 1RB 0offset CH.26365

Google Meet Codec: 75 kbit/s ANT F

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

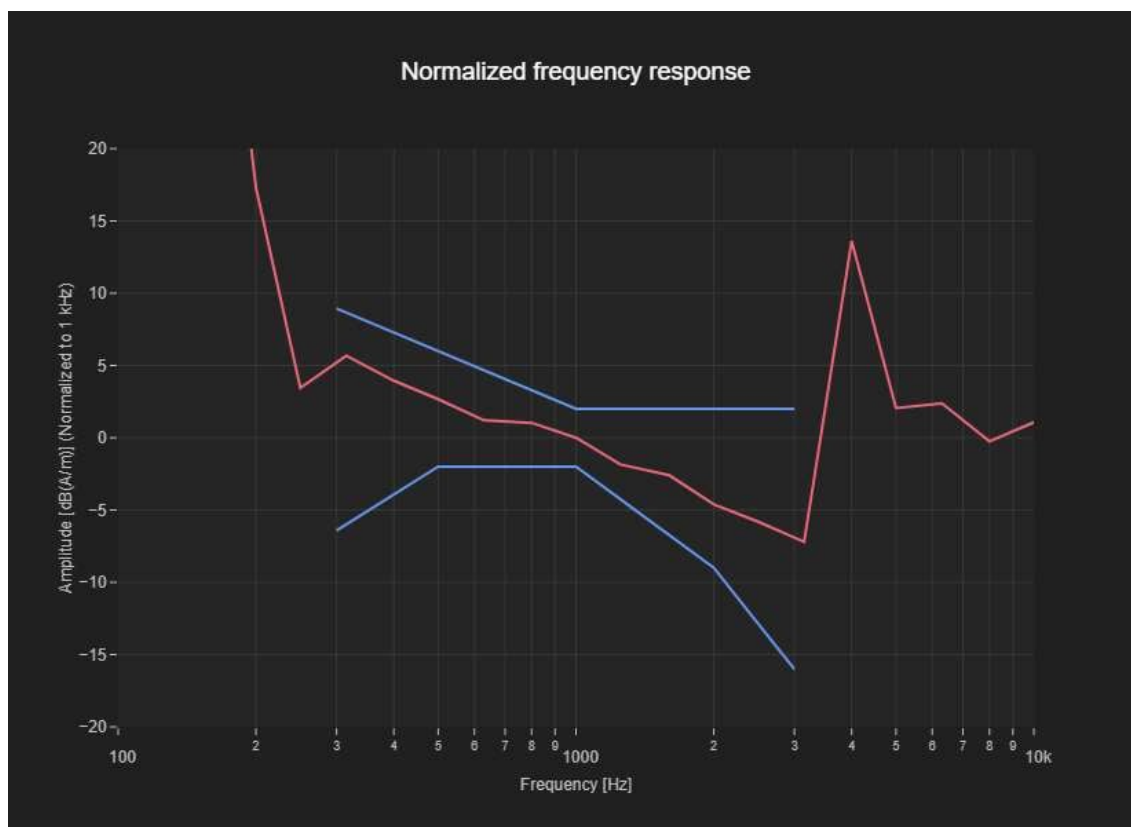
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 25	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	26365	1882.5

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

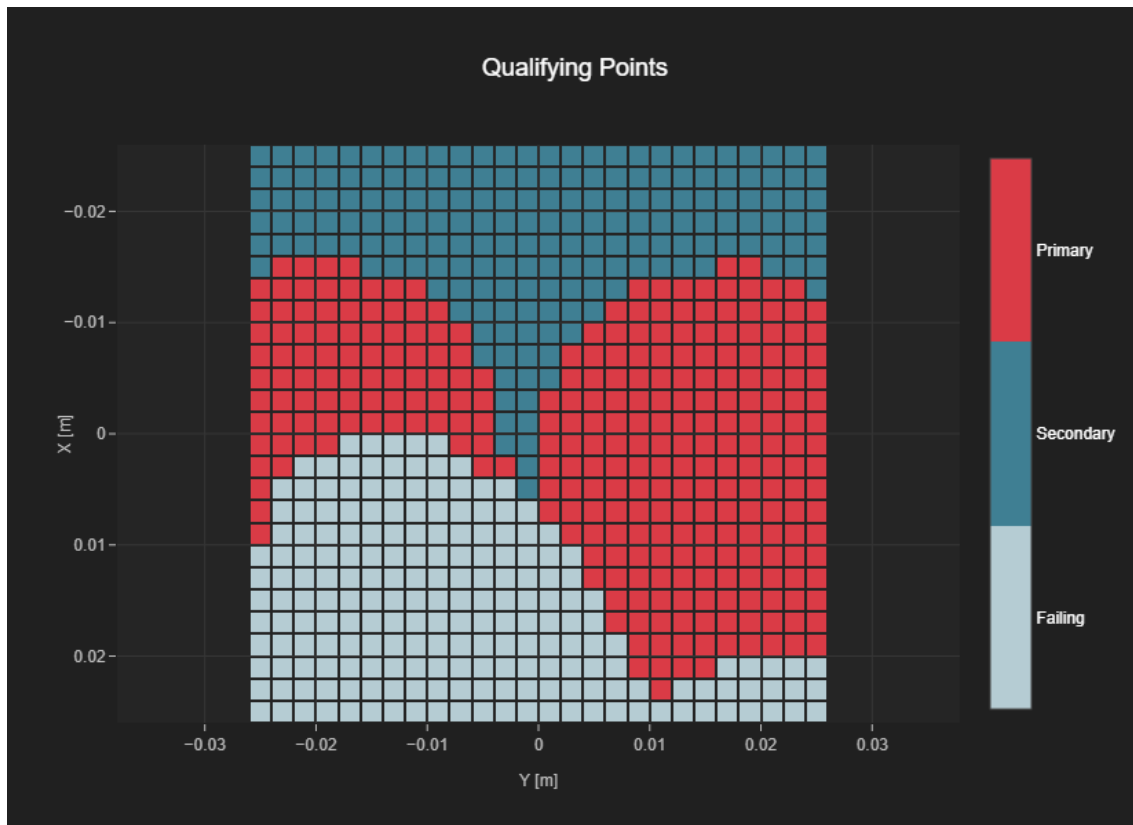
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
288	475	25	26



Plot 28 LTE Band 41 20MHz QPSK 1RB 0offset CH.40185

Google Meet Codec: 40 kbit/s ANT B

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

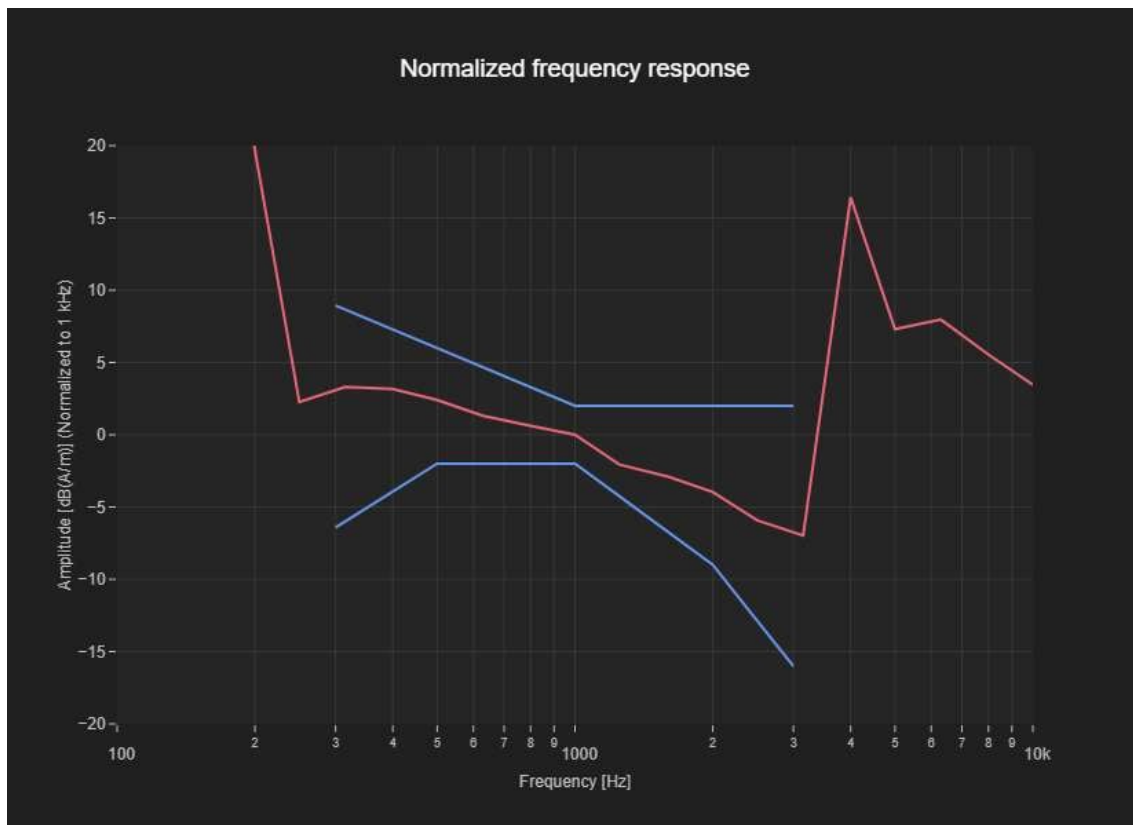
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	40185	2549.5

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

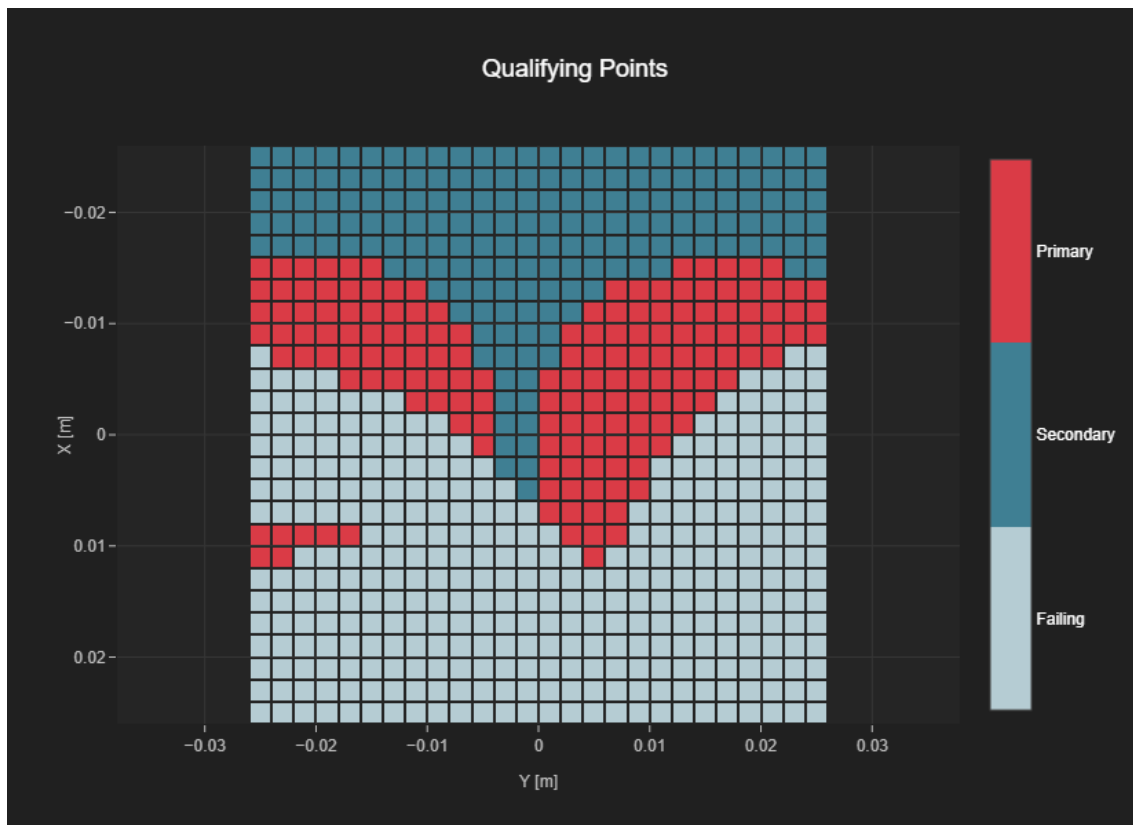
Results

Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
159	337	19	26



Plot 29 NR Band n25 CP QPSK 40MHz 1RB 1offset CH.376500

Google Meet Codec: 40 kbit/s Ant.F

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

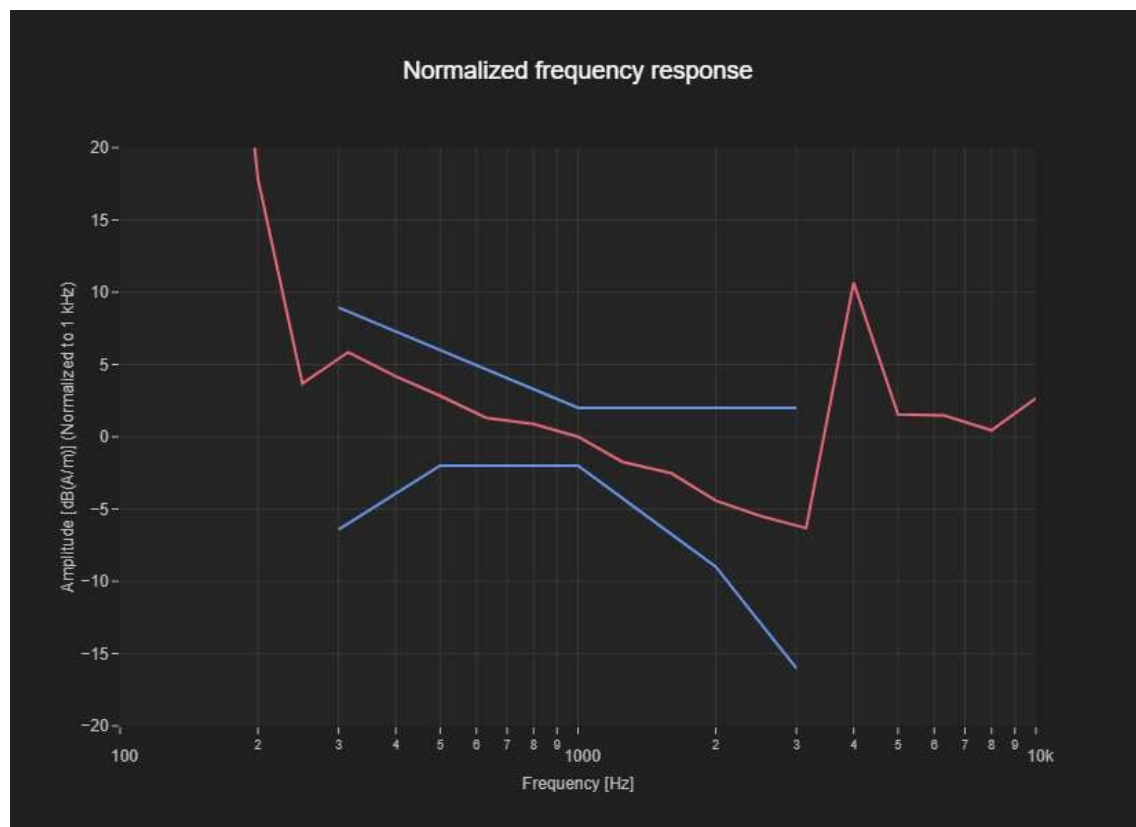
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n25	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	376500	1882.5

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

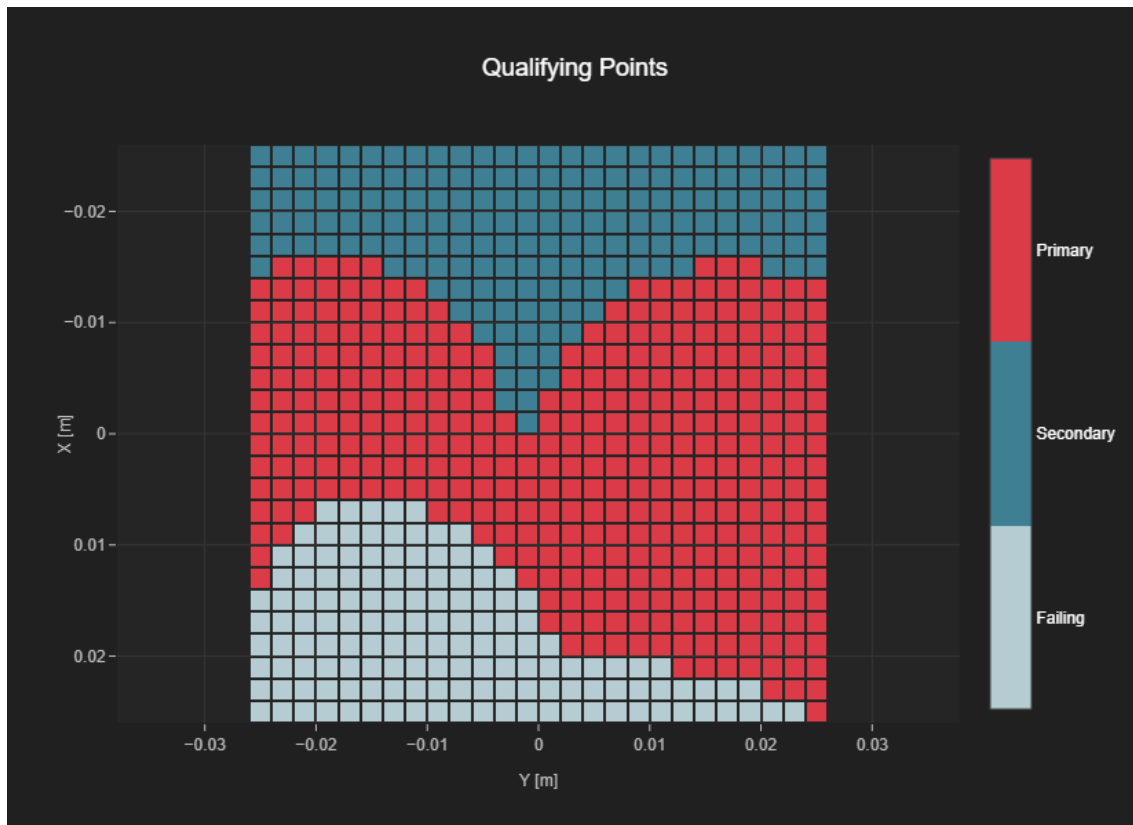
Results

Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
357	535	26	26



Plot 30 NR Band n77 DFT-s OFDM 100MHz QPSK 1RB 1offset CH.650000

Google Meet Codec: 6 kbit/s Ant.G

T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

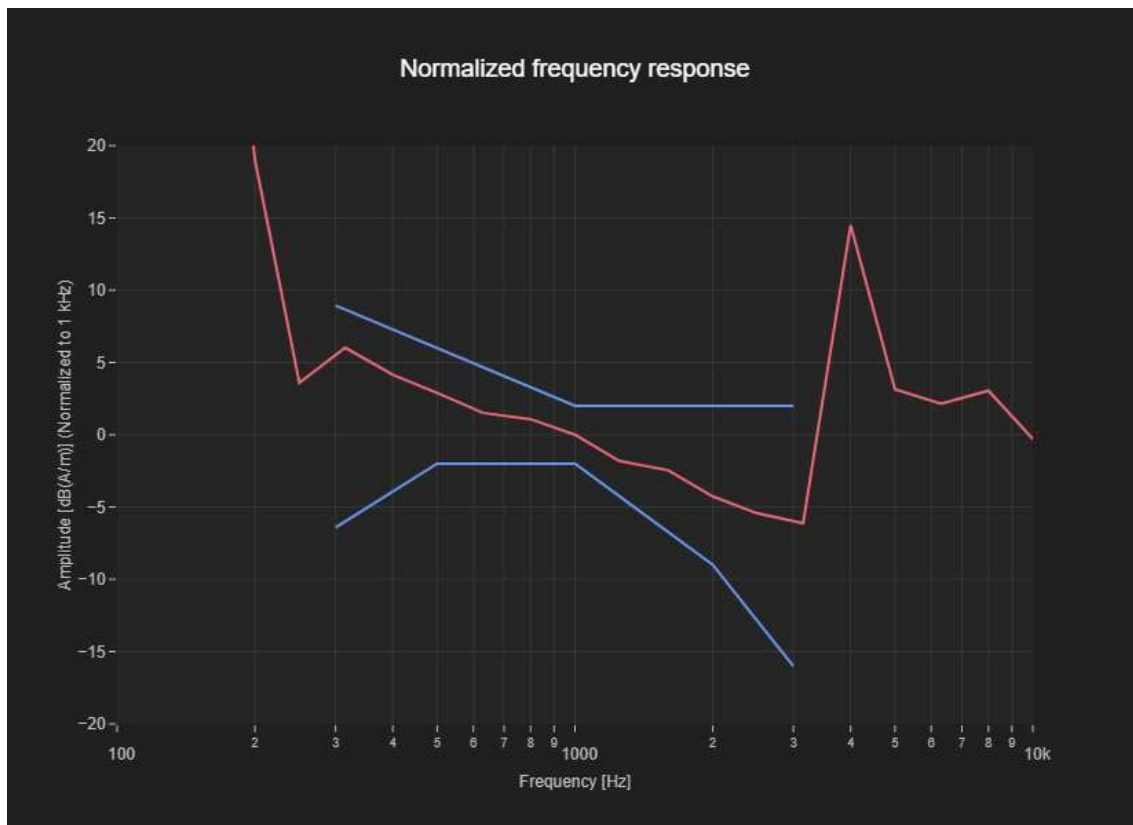
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n77	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	650000	3750.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

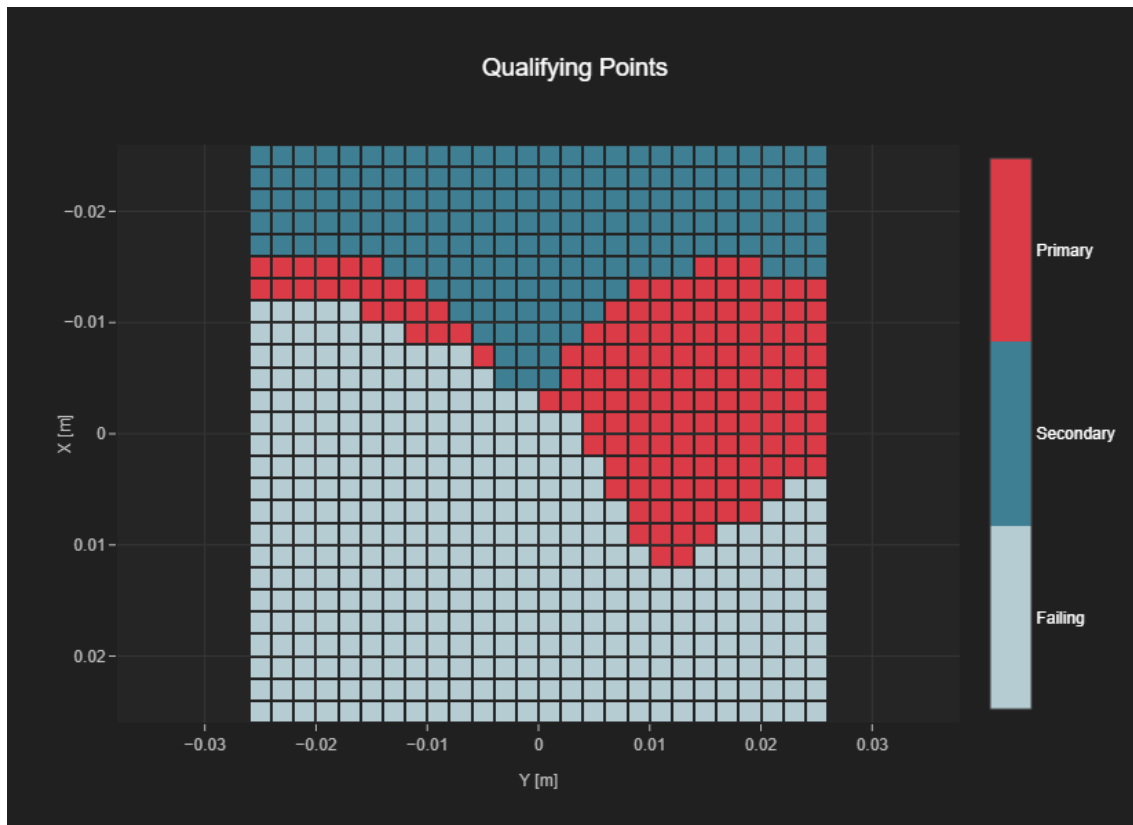
Results

Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	2.0



T-Coil Coupling Mode Test Report Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
144	318	19	26



Plot 31 Wi-Fi 2.4 GHz 802.11b 5.5Mbps CH.6 Google Meet Codec: 6 kbit/s
T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

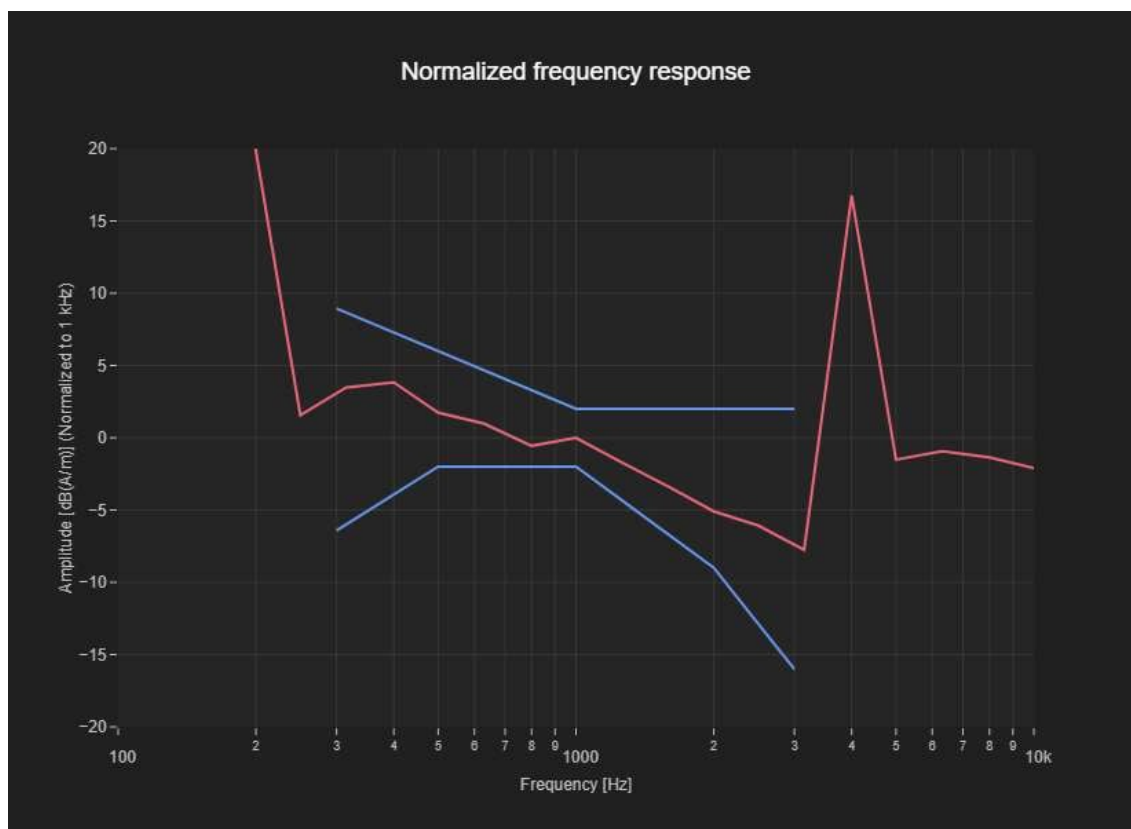
Band Name	Communication Systems Name	Channel	Frequency [MHz]
WLAN 2.4GHz	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	6	2437.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

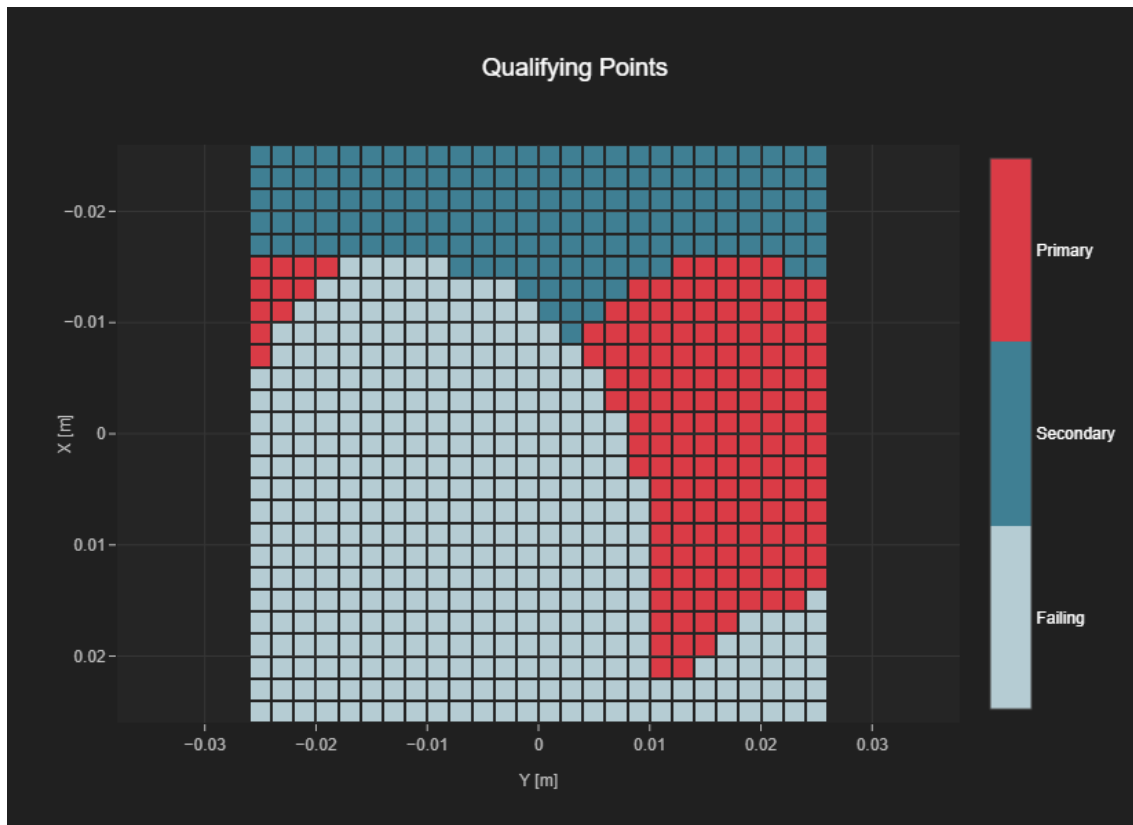
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	2.0	1.44



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
160	311	24	26



Plot 32 Wi-Fi 5 GHz 802.11ac20 MCS0 CH.120 Google Meet Codec: 40 kbit/s
T-Coil Signal Test Report

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
AM1DV3 - 3050	January 20, 2025	DAE4 Sn869	March 19, 2025

Communication Systems

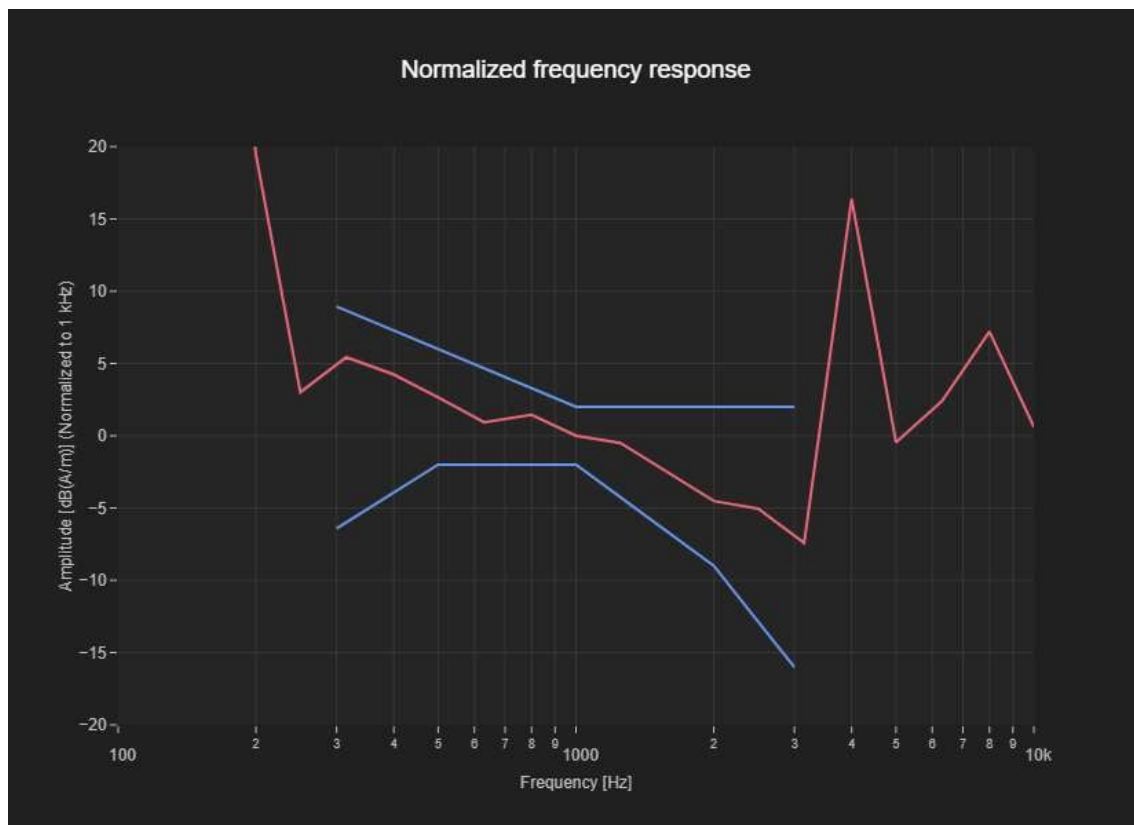
Band Name	Communication Systems Name	Channel	Frequency [MHz]
WLAN 5GHz	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	120	5600.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
52.0	52.0	4.0	4.0	10.0

Results

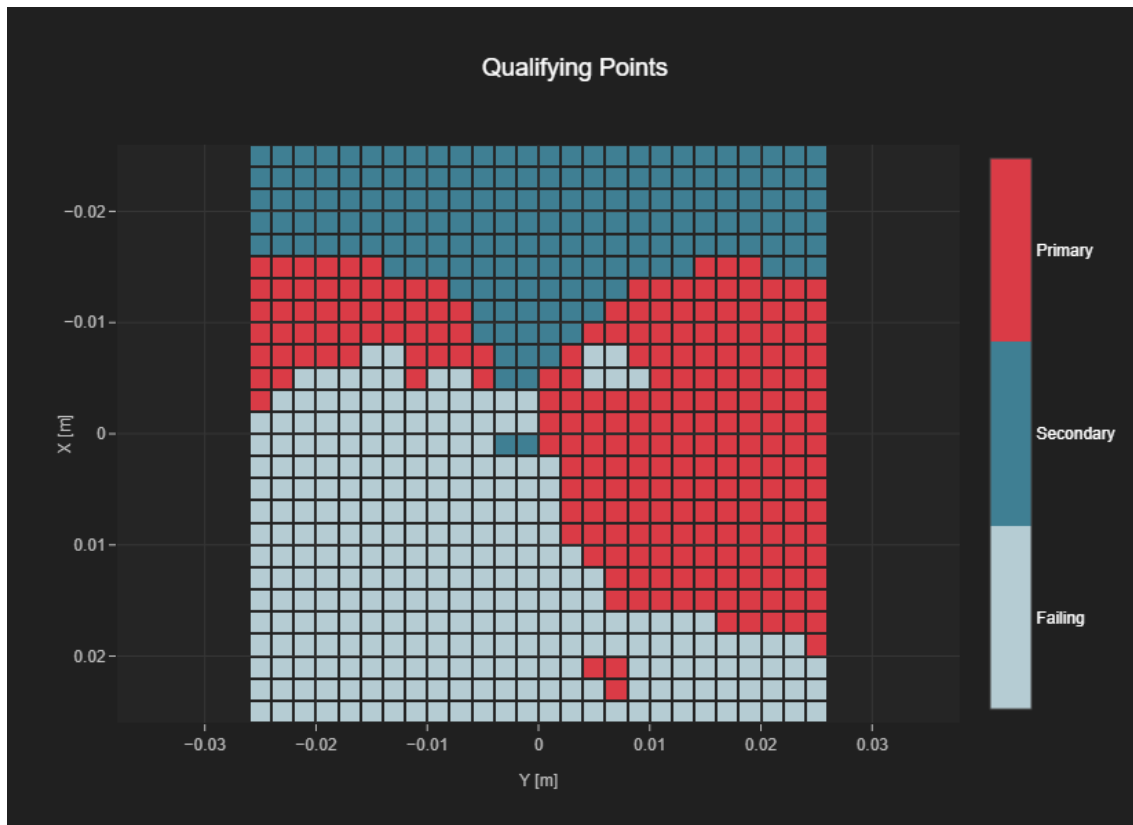
Audio File	Measurement Duration [s]	Margin Upper Bound [dB]	Margin Lower Bound [dB]
48k_voice_300-3000_2s.wav	2.0	1.84	2.0



T-Coil Coupling Mode Test Report

Results

Primary Group Contiguous Point Count	Secondary Group Point Count	Secondary Group Max Longitudinal	Secondary Group Max Transverse
229	402	23	26



Appendix C. HAC T-Coil Probe Certificates

Calibration Laboratory of
Schmid & Partner
Engineering AG
 Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
 The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client: **HCT**
 Gyeonggi-do, Republic of Korea

Certificate No.: **AM1DV3-3153_Oct25**

CALIBRATION CERTIFICATE

Object: **AM1DV3 - SN: 3153**

Calibration procedure(s): **QA CAL-24.v4**
 Calibration procedure for AM1D magnetic field probes and TMFS in the audio range

Calibration date: **October 10, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility; environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	15-Aug-25 (No. 43873)	Aug-26
Reference Probe AM1DV3	SN: 3000	19-Sep-25 (No. AM1DV3-3000_Sep25)	Sep-26
DAE4	SN: 781	07-Feb-25 (No. DAE4-781_Feb25)	Feb-26
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
AMCC	SN: 1050	01-Oct-13 (in house check Sep-25)	Sep-26
AMMI Audio Measuring Instrument	SN: 1062	26-Sep-12 (in house check Sep-25)	Sep-26

Calibrated by: **Name** **Function**
 Claude Leubler Laboratory Technician

Approved by: **Name** **Technical Manager**
 Sven Kühn

Signature

Issued: October 14, 2025

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No.: AM1DV3-3153_Oct25

Page 1 of 3

결	날	자	화	인	자
재	강	지	원	장	
44/44	DL	17-13	8.7	17-13	
일	2025.10.30		2025.10.30		

References

- [1] ANSI-C63.19-2007
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
- [2] ANSI-C63.19-2019 (ANSI-C63.19-2011)
American National Standard, Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
- [3] DASY System Handbook

Description of the AM1D probe

The AM1D Audio Magnetic Field Probe is a fully shielded magnetic field probe for the frequency range from 100 Hz to 20 kHz. The pickup coil is compliant with the dimensional requirements of [1+2]. The probe includes a symmetric low noise amplifier for the signal available at the shielded 3 pin connector at the side. Power is supplied via the same connector (phantom power supply) and monitored via the LED near the connector. The 7 pin connector at the end of the probe does not carry any signals, but determines the angle of the sensor when mounted on the DAE. The probe supports mechanical detection of the surface.

The single sensor in the probe is arranged in a tilt angle allowing measurement of 3 orthogonal field components when rotating the probe by 120° around its axis. It is aligned with the perpendicular component of the field, if the probe axis is tilted nominally 35.3° above the measurement plane, using the connector rotation and sensor angle stated below.

The probe is fully RF shielded when operated with the matching signal cable (shielded) and allows measurement of audio magnetic fields in the close vicinity of RF emitting wireless devices according to [1+2] without additional shielding.

Handling of the item

The probe is manufactured from stainless steel. In order to maintain the performance and calibration of the probe, it must not be opened. The probe is designed for operation in air and shall not be exposed to humidity or liquids. For proper operation of the surface detection and emergency stop functions in a DASY system, the probe must be operated with the special probe cup provided (larger diameter).

Methods Applied and Interpretation of Parameters

- *Coordinate System:* The AM1D probe is mounted in the DASY system for operation with a HAC Test Arch phantom with AMCC Helmholtz calibration coil according to [3], with the tip pointing to "southwest" orientation.
- *Functional Test:* The functional test preceding calibration includes test of Noise level
RF immunity (1kHz AM modulated signal). The shield of the probe cable must be well connected. Frequency response verification from 100 Hz to 10 kHz.
- *Connector Rotation:* The connector at the end of the probe does not carry any signals and is used for fixation to the DAE only. The probe is operated in the center of the AMCC Helmholtz coil using a 1 kHz magnetic field signal. Its angle is determined from the two minima at nominally +120° and -120° rotation, so the sensor in the tip of the probe is aligned to the vertical plane in z-direction, corresponding to the field maximum in the AMCC Helmholtz calibration coil.
- *Sensor Angle:* The sensor tilting in the vertical plane from the ideal vertical direction is determined from the two minima at nominally +120° and -120°. DASY system uses this angle to align the sensor for radial measurements to the x and y axis in the horizontal plane.

Sensitivity: With the probe sensor aligned to the z-field in the AMCC, the output of the probe is compared to the magnetic field in the AMCC at 1 kHz. The field in the AMCC Helmholtz coil is given by the geometry and the current through the coil, which is monitored on the precision shunt resistor of the coil.

AM1D probe identification and configuration data

Item	AM1DV3 Audio Magnetic 1D Field Probe
Type No	SP AM1 001 BA
Serial No	3153

Overall length	296 mm
Tip diameter	6.0 mm (at the tip)
Sensor offset	3.0 mm (centre of sensor from tip)
Internal Amplifier	20 dB

Manufacturer / Origin	Schmid & Partner Engineering AG, Zurich, Switzerland
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Calibration data

Connector rotation angle	(in DASY system)	235.6°	+/- 3.6 ° (k=2)
Sensor angle	(in DASY system)	0.74°	+/- 0.5 ° (k=2)
Sensitivity at 1 kHz	(in DASY system)	0.00738 V/(A/m)	+/- 2.2 % (k=2)

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Calibration Laboratory of
Schmid & Partner
Engineering AG
 Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
 The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **HCT**
 Gyeonggi-do, Republic of Korea

Certificate No. **AM1DV3-3050_Jan25**

CALIBRATION CERTIFICATE

Object: **AM1DV3 - SN: 3050**

Calibration procedure(s): **QA CAL-24.v4**
 Calibration procedure for AM1D magnetic field probes and TMFS in the
 audio range

Calibration date: **January 20, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	27-Aug-24 (No. 40547)	Aug-25
Reference Probe AM1DV3	SN: 3000	25-Sep-24 (No. AM1DV3-3000_Sep24)	Sep-25
DAE4	SN: 781	16-Feb-24 (No. DAE4-781_Feb24)	Feb-25
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
AMCC	SN: 1050	01-Oct-13 (in house check Sep-24)	Sep-25
AMMI Audio Measuring Instrument	SN: 1062	26-Sep-12 (in house check Sep-24)	Sep-25

Calibrated by: **Ardona Georgiadou** Laboratory Technician

Approved by: **Sven Kühn** Technical Manager

issued: January 20, 2025

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: AM1DV3-3050_Jan25

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Handwritten notes and signatures:
 2/21/25
 PL 76214
 2025.02.07
 2025.02.07

[References]

- [1] ANSI-C63.19-2007
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
- [2] ANSI-C63.19-2019 (ANSI-C63.19-2011)
American National Standard, Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
- [3] DASY System Handbook

Description of the AM1D probe

The AM1D Audio Magnetic Field Probe is a fully shielded magnetic field probe for the frequency range from 100 Hz to 20 kHz. The pickup coil is compliant with the dimensional requirements of [1+2]. The probe includes a symmetric low noise amplifier for the signal available at the shielded 3 pin connector at the side. Power is supplied via the same connector (phantom power supply) and monitored via the LED near the connector. The 7 pin connector at the end of the probe does not carry any signals, but determines the angle of the sensor when mounted on the DAE. The probe supports mechanical detection of the surface.

The single sensor in the probe is arranged in a tilt angle allowing measurement of 3 orthogonal field components when rotating the probe by 120° around its axis. It is aligned with the perpendicular component of the field, if the probe axis is tilted nominally 35.3° above the measurement plane, using the connector rotation and sensor angle stated below.

The probe is fully RF shielded when operated with the matching signal cable (shielded) and allows measurement of audio magnetic fields in the close vicinity of RF emitting wireless devices according to [1+2] without additional shielding.

Handling of the item

The probe is manufactured from stainless steel. In order to maintain the performance and calibration of the probe, it must not be opened. The probe is designed for operation in air and shall not be exposed to humidity or liquids. For proper operation of the surface detection and emergency stop functions in a DASY system, the probe must be operated with the special probe cup provided (larger diameter).

Methods Applied and Interpretation of Parameters

- *Coordinate System:* The AM1D probe is mounted in the DASY system for operation with a HAC Test Arch phantom with AMCC Helmholtz calibration coil according to [3], with the tip pointing to "southwest" orientation.
- *Functional Test:* The functional test preceding calibration includes test of Noise level
RF immunity (1kHz AM modulated signal). The shield of the probe cable must be well connected.
Frequency response verification from 100 Hz to 10 kHz.
- *Connector Rotation:* The connector at the end of the probe does not carry any signals and is used for fixation to the DAE only. The probe is operated in the center of the AMCC Helmholtz coil using a 1 kHz magnetic field signal. Its angle is determined from the two minima at nominally +120° and -120° rotation, so the sensor in the tip of the probe is aligned to the vertical plane in z-direction, corresponding to the field maximum in the AMCC Helmholtz calibration coil.
- *Sensor Angle:* The sensor tilting in the vertical plane from the ideal vertical direction is determined from the two minima at nominally +120° and -120°. DASY system uses this angle to align the sensor for radial measurements to the x and y axis in the horizontal plane.

Sensitivity: With the probe sensor aligned to the z-field in the AMCC, the output of the probe is compared to the magnetic field in the AMCC at 1 kHz. The field in the AMCC Helmholtz coil is given by the geometry and the current through the coil, which is monitored on the precision shunt resistor of the coil.

AM1D probe identification and configuration data

Item	AM1DV3 Audio Magnetic 1D Field Probe
Type No	SP AM1 001 BA
Serial No	3050

Overall length	296 mm
Tip diameter	6.0 mm (at the tip)
Sensor offset	3.0 mm (centre of sensor from tip)
Internal Amplifier	20 dB

Manufacturer / Origin	Schmid & Partner Engineering AG, Zurich, Switzerland
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Calibration data

Connector rotation angle	(in DASY system)	215.2°	+/- 3.6 ° (k=2)
Sensor angle	(in DASY system)	0.27°	+/- 0.5 ° (k=2)
Sensitivity at 1 kHz	(in DASY system)	0.00753 V/(A/m)	+/- 2.2 % (k=2)

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

End.