# TEST REPORT

## No.24B01N002659-001-Audio

**For**

**ASUSTeK COMPUTER INC.**

**ASUS Phone(Mobile Phone)**

**Model Name: ASUSAI2501E, ASUSAI2501D**

**With**

**Hardware Version: R2.0C**

**Software Version: 35.1400.1400.10**

**FCC ID: MSQAI2501**

**Issued Date: 2024-12-13**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

**Test Laboratory:**

**SAICT, Shenzhen Academy of Information and Communications Technology**

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000.

Tel:+86(0)755-33322000, Fax:+86(0)755-33322001

Email: yewu@caict.ac.cn. www.saict.ac.cn

# Revision Version

| Report Number | Revision | Description | Issued Date |
|---|---|---|---|
| 24B01N002659-001-Audio | Rev.0 | 1st edition | 2024-12-13 |

NOTE: The previous version of the report is invalid for this revised edition.

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# 1. Summary of Test Report

## 1.1. Test Items

| | |
|---|---|
| Description | ASUS Phone(Mobile Phone) |
| Model Name | ASUSAI2501E, ASUSAI2501D |
| Applicant's name | ASUSTeK COMPUTER INC. |
| Manufacturer's Name | ASUSTeK COMPUTER INC. |

## 1.2. Test Standards

| | |
|---|---|
| ANSI C63.19 | 2019 |
| ANSI/TIA-5050 | 2018 |

## 1.3. Test Result

All test items are passed. Please refer to "5.2 Summary of Test Results" for detail.

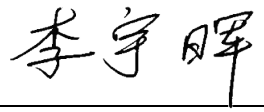
## 1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China518000

## 1.5. Project Data

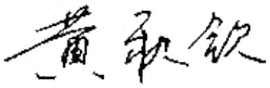
| | |
|---|---|
| Project Leader | Liang Shuzhen |
| Testing Start Date: | 2024-11-01 |
| Testing End Date: | 2024-11-23 |

## 1.6. Signature



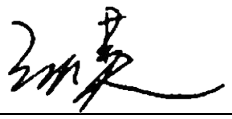
**Li Yuhui**

**(Prepared this test report)**



**Huang Qiuqin**

**(Reviewed this test report)**



**Zhang Hao**

**(Approved this test report)**

# 2. Client Information

## 2.1. Applicant Information

Company Name: ASUSTeK COMPUTER INC.
Address/Post: 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Contact: /
Email: /
Telephone: /
Fax: /

## 2.2. Manufacturer Information

Company Name: ASUSTeK COMPUTER INC.
Address/Post: 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Contact: /
Email: /
Telephone: /
Fax: /

# 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

## 3.1. About EUT

| | |
|---|---|
| Description | ASUS Phone(Mobile Phone) |
| Model Name | ASUSAI2501E, ASUSAI2501D |
| Brand Name | ASUS |
| Frequency Bands: | GSM 850/900/1800/1900,<br>WCDMA Band I/II/IV/V/VI/VIII/XIX,<br>LTE Band 1/2/3/4/5/7/8/12/17/18/19/20/25/26/28/29/30/32/34/38/39/40/41/42/43/48/66/71<br>NR n1/n2/n3/n5/n7/n8/n12/n18/n20/n25/n26/n28/n29/n30/n38/n40/n41/n48/n66/n71/n77/n78/n79<br>Bluetooth, WLAN 2.4GHz/5GHz/6GHz |
| Condition of EUT as received | No abnormality in appearance |

Note: Photographs of EUT are shown in ANNEX A of this test report. Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

## 3.2. Internal Identification of EUT

| EUT ID* | SN or IMEI | Model Name | HW Version | SW Version | Sample Arrival Date |
|---|---|---|---|---|---|
| UT01aa | 351480090101253 | ASUSAI2501E | R2.0C | 35.1400.1400.10 | 2024-11-01 |
| UT03aa | 354319780100091 | ASUSAI2501D | R2.0C | 35.1400.1400.10 | 2024-11-01 |

*EUT ID: is used to identify the test sample in the lab internally.

*UT01aa is the primary test prototype, and unless otherwise specified, all test results are based on tests conducted using UT01aa. UT03aa was only used for testing a subset of test cases, which will be indicated in the test result list.

## 3.3. Internal Identification of AE Used During The Test

**AE:**

| | |
|---|---|
| AEID* | / |
| Description | / |
| Type | / |
| Manufacturer | / |

*AE ID: is used to identify the test sample in the lab internally.

## 3.4. General Description

Equipment undertest (EUT) is a ASUS Phone(Mobile Phone) with integrated antenna.
Manual and specifications of the EUT were provided to fulfil the test.
Samples undergoing test were selected by the Client.

## 4. Reference Documents for Testing

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|---|---|---|
| ANSI C63.19 | American National Standard Methods of Measurement of Compatibility between Wireless Communications Devicesand Hearing Aids | 2019 |
| ANSI/TIA-5050 | Telecommunications Communications Products Receve Volume Control Requirements for Wireless (Mobile) Devices | 2018 |
| KDB 285076 D05v01 | HAC COMPLIANCE UNDER WAIVER DA 23-914 | 2023 |

# 5. Test Results

Abbreviations used in this clause:

**P** Passed
**F** Failed
**NA** not applicable
**NM** not measured

## 5.1. Testing Environment

Normal Temperature: 15-35°C
Relative Humidity: 20-75%
Local Bottom noise: 12.5dB

## 5.2. Summary of Test Results

See **ANNEX C** for detail

| Summary of Test Results | VERDICT | | | |
|---|---|---|---|---|
| | NA | P | F | NM |
| Receive Volume Control Performance | | P | | |
| Receive Distrotion and Noise Performance | | P | | |
| Receive Acoustic Frequence Response Performance | | P | | |

The lowest conversational gain is 9.99dB with a hearing aid, and 15.88dB without a hearing-aid.

## 5.3. Statement

Since the information of samples in this report is provided by the client, the laboratory is not responsible for the authenticity of sample information.

This report takes measured values as criterion of test conclusion. The test conlusion meets the limit requirements.

# 6. Test Equipments Utilized

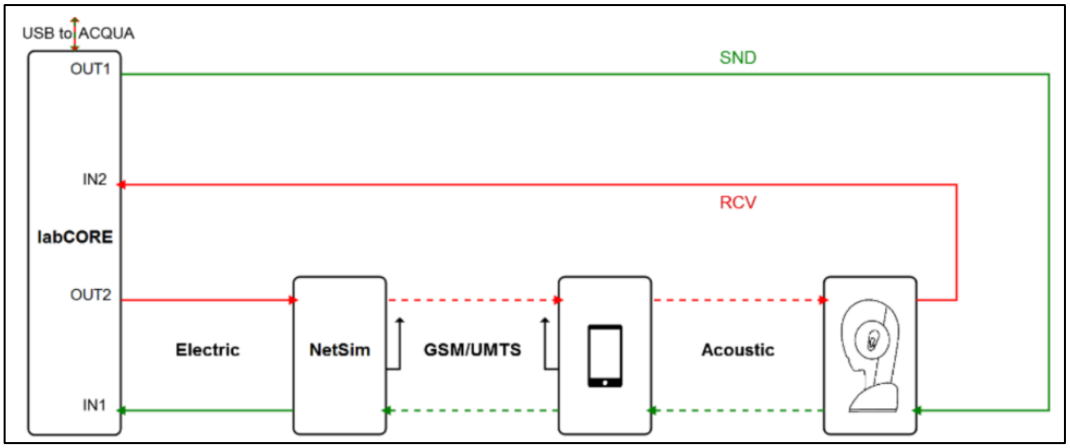
## 6.1. Test Equipments

| Hardware | | | Acoustics Lab | | |
|---|---|---|---|---|---|
| **No.** | **Name** | **Type** | **SN** | **Manufacturer** | **Cal.Due Date** |
| 1 | Measurement Frontend | labCORE | 77000455 | HEAD acoustics | 2026-07-23 |
| 2 | Artificial Head | HMS II.3 | 12306254 | HEAD acoustics | 2025-05-18 |
| 3 | Anechoic Chamber | 5.10m×4.10m×2.50m | 20170802 | Landtop | 2027-08-04 |
| 4 | Universal Radio Communication Tester | CMW500 | 129146 | R&S | 2025-04-10 |
| 5 | Universal Radio Communication Tester | CMW500 | 152499 | R&S | 2025-07-11 |

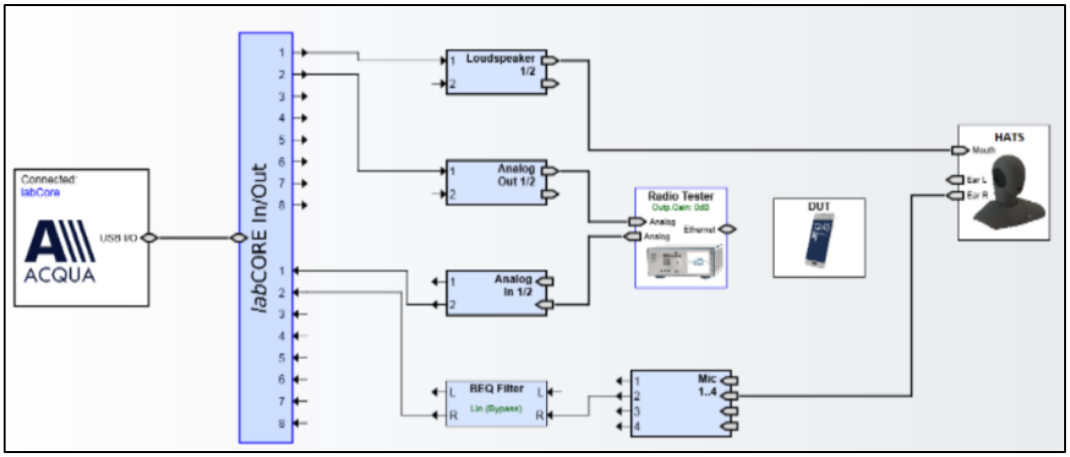
| Software | |
|---|---|
| **Name** | **Version** |
| ACQUA | V6.0.200 |

## 6.2. GSM and WCDMA Test Connection Diagrams

Test signal connection:

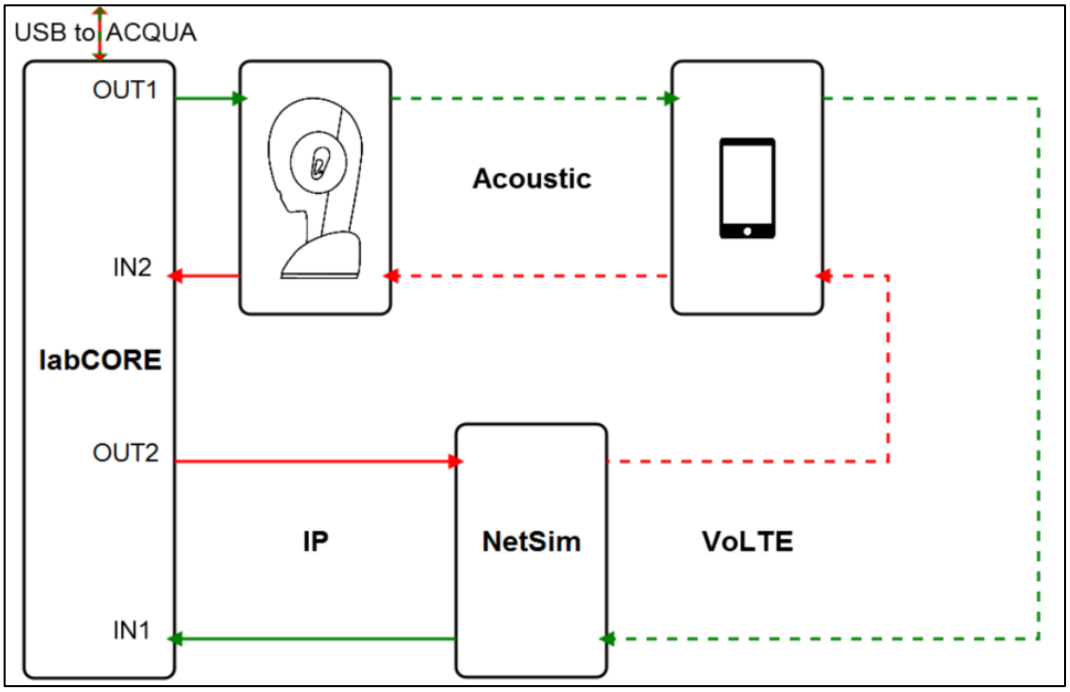



Hardware Configuration connection:

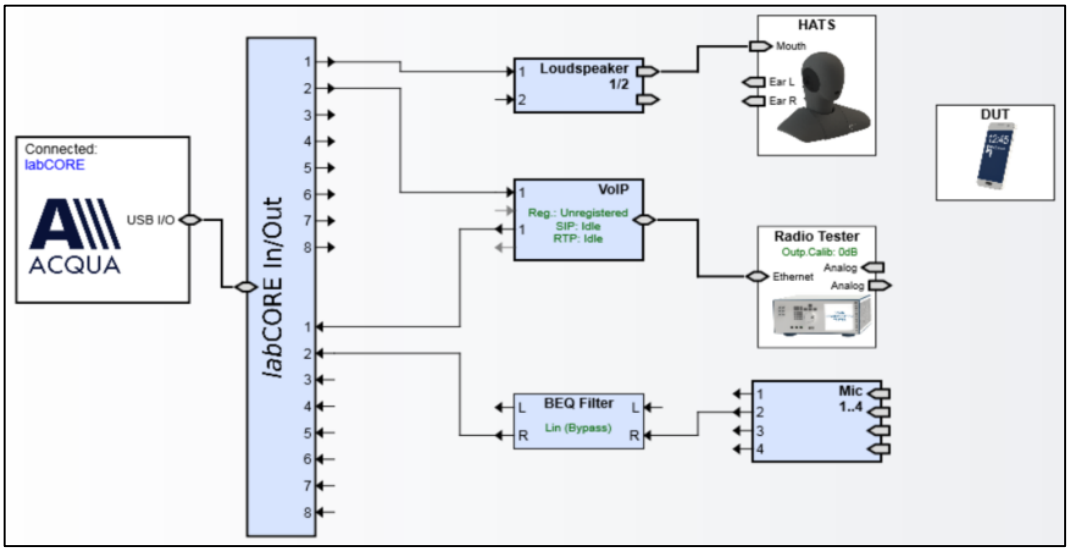


## 6.3. LTE Test Connection Diagrams

Test signal connection:

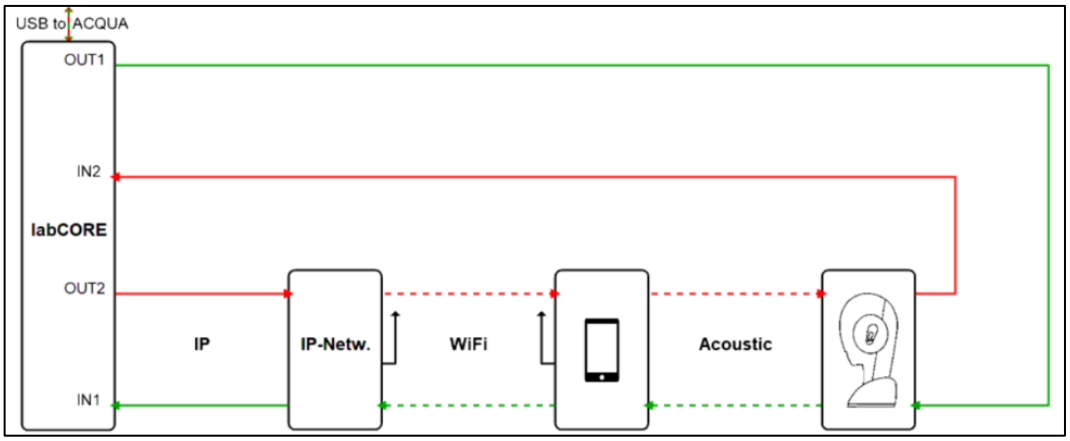



Hardware Configuration connection:

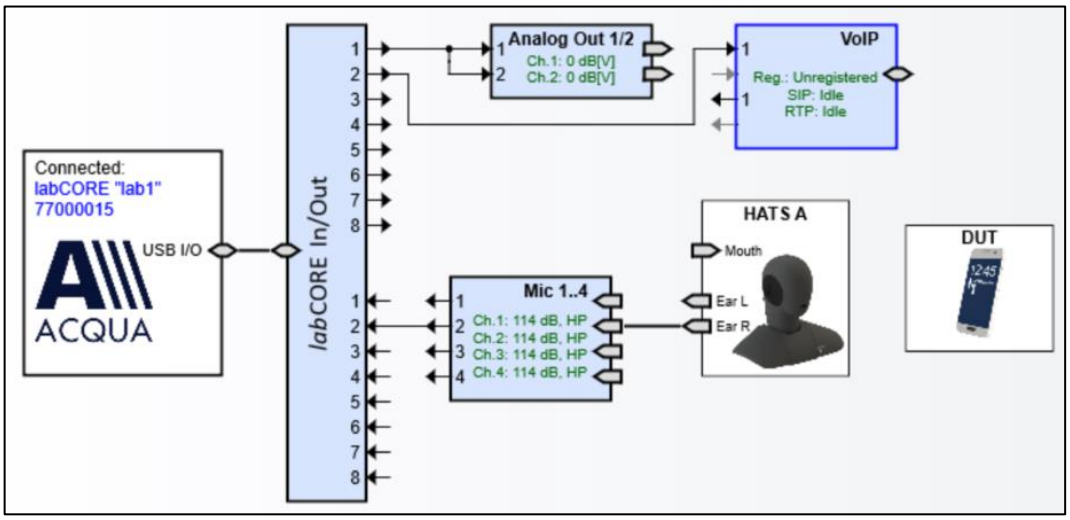


## 6.4. WiFi Test Connection Diagrams

Test signal connection:




Hardware Configuration connection:



# ANNEX A EUT photograph

**Please refer to the ANNEX A.**

# ANNEX B Test Method and requirements

## B.1 Receive Volume Control Performance

**Test Method:**

1. Configure the DUT with a mounting force of 8N and test equipment in anactive call state with the applicable codec for the transmission mode under test.
2. Set the DUT volume control to the maximum setting.
3. Apply the real speech test signal at a level of -20 dBm0 at the RETP and measure the acoustic output at the Drum Reference Point (DRP) over one complete sequence of the test signal.
4. Over the applicable frequency band, determine the ASL in dBSPL for the resulting sound pressurelevel in accordance with Method B of ITU-T Recommendation P.56:
    a. Narrowband 100 Hz through 4000 Hz.
    b. Wideband 100 Hz through 7720 Hz.
5. Calculate the Conversational Gain by subtracting 70 dB from the measured dBSPL
    [Conversational Gain=(Measured dBSPL Level -70 dBSPL) dB]
6. Repeat steps 2-5 with a mounting force of 2N.

**Test requirement:**

According to KDB 285076 D05v01, only CMRS narrowband and CMRS wideband voice codecs are required to comply with the volume control requirements of the TIA 5050-2018 Volume Control Standard as amended as follows:

1. For the 2N mounting force test, one narrowband and one wideband voice codec embedded with the handset must pass with at least one volume control setting with a conversational gain of ≥ 6 dB for all voice services, bands of operation and air interfaces over which it operates using one codec bit rate of the applicant’s choosing.

2. For the 8N mounting force test, one narrowband and one wideband voice codec embedded with the handset must pass with at least one volume control setting with a conversational gain of ≥ 6 dB for all voice services, bands of operation and air interfaces over which they operate but is not required to meet or exceed the full 18 dB of conversational gain specified in section 5.1.1 of the TIA 5050 Volume Control Standard using one codec bit rate of the applicant’s choosing.

## B.2 Receive Distrotion and Noise Performance

**Test Method:**

1. Configure the DUT with a mounting force of 8N and test equipment in anactive call state with the applicable codec for the transmission mode under test with the volumecontrol at the setting determined in B.1.
2. Receive distortion and noise is measured using the PN-SDNR procedure.
3. To ensure DUT activation, apply the real speech test signal at a level of -20 dBm0 followed immediately by the initial 1/3 octave center firequency PN test signal in TIA 5050 Table A.1 based on thenarrowband or wideband operating mode. Measure the acoustic output at the DRP over the completesequence of the PN test signal.
4.Translate the measurement made at the DRP to the FF using the translation data in TIA 5050 Annex B.
5. Calculate the acoustic output unweighted total signal power of the stimulus measurement band asdescribed in TIA 5050 A.2.
6. Calculate the notched A-weighting distortion and noise components as described in A.3.
7. Calculate the ratio of the signal power to the total A-weighted distortion and noise power using Eq TIA 5050 A-1.
8. Repeat for each of the remaining 1/3 octave center frequencies in TIA 5050 Table A.I based on the narrowband or wideband operating mode.
9. Repeat steps 2-8 with a mounting force of 2N.

**Test requirement:**

With a mounting force of 8N and 2N, the ratio of the stimulus signal power to the 100 Hz to 8000 Hz total A-weighted distortion and noise power shall be ≥ 20 dB when tested over the range of 1/3 octaveband center frequencies:

a. Narrowband transmission mode: Each 1/3 octave band center frequency from 400 Hz to 3150 Hz
b. Wideband transmission mode: Each 1/3 octave band center frequency from 250 Hz to 5000 Hz.

## B.3 Receive Acoustic Frequence Response Performance

**Test Method:**

1. Configure the DUT with a mounting force of 8N and test equipment in anactive call state with the applicable codec for the transmission mode under test with the volumecontrol at the setting determined in B.1.
2. Apply the real speech test signal with a level of -20 dBm0 at the RETP.
3. Capture the frequency spectrum at the DRP of the HATS using real-time analysis with 1/12 octave bands over the frequency range from 100 Hz to 4000 Hz for narrowband measurements, or over thefrequency range from 100 Hz to 8000 Hz for wideband measurements, averaged over the entireduration of the test signal.
4. Transform the DRP frequency spectrum measurement to the FF or DF (see TIA 5050 Annex B).
5. Divide the 1/12 octave measurement data by the 1/12 octave frequency spectrum of the test signal atthe RETP and present the measurement in terms of dB(Pa/V).
6. Apply the applicable frequency response limits to determine compliance.
7. Repeat with a mounting force of 2N.

**Test requirement:**

For the volume control settings determined in B.1 with a mounting force of 8N and 2N, the receive frequency response shall be measured at the DRP in 1/12 octave bands. After translation to the FF or DF, it shall fall between the applicable upper and lower limits.

a. Narrowband: The 1/12 octave band frequency response after translation to the FF or DF shall fall between the upper and lower limits given in Table B.3-1 and shown in Figure 1

**Table B.3-1 – Narrowband Receive Frequency Response Limits**

| Lower Limit Frequency (Hz) | Lower Limit (dB) | Upper Limit Frequency (Hz) | Upper Limit (dB) |
|---|---|---|---|
| 300 | -6 | 100 | +6 |
| 3400 | -6 | 4000 | +6 |

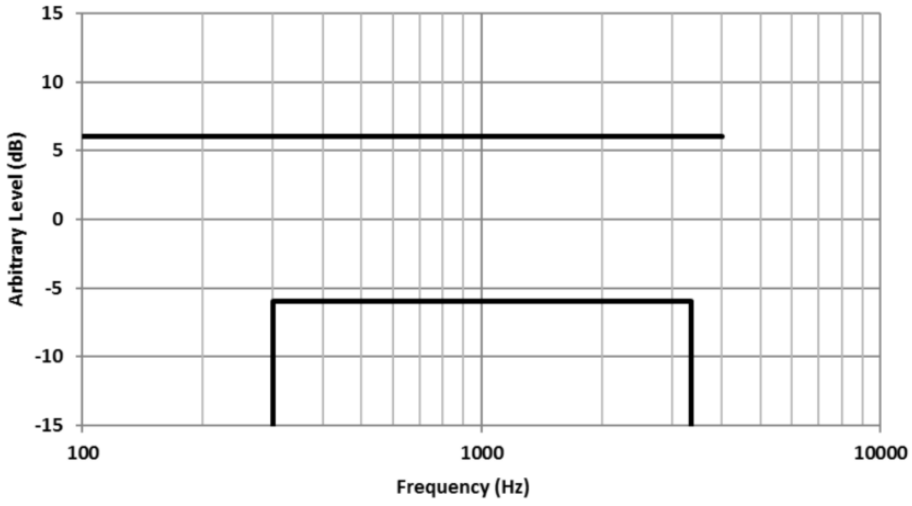



**Figure B.3-1 – Narrowband Receive Frequency Response Limits**

b. Wideband: The 1/12 octave band frequency response after translation to the FF or DF shall fall between the upper and lower limits given in Table B.3-2 and shown in Figure 2.

**Table B.3-2 – Wideband Receive Frequency Response Limits**

| Lower Limit Frequency (Hz) | Lower Limit (dB) | Upper Limit Frequency (Hz) | Upper Limit (dB) |
|---|---|---|---|
| 300 | -10 | 100 | +6 |
| 300 | -6 | 1000 | +6 |
| 5000 | -6 | 2000 | +8 |
| 6300 | -12 | 8000 | +8 |

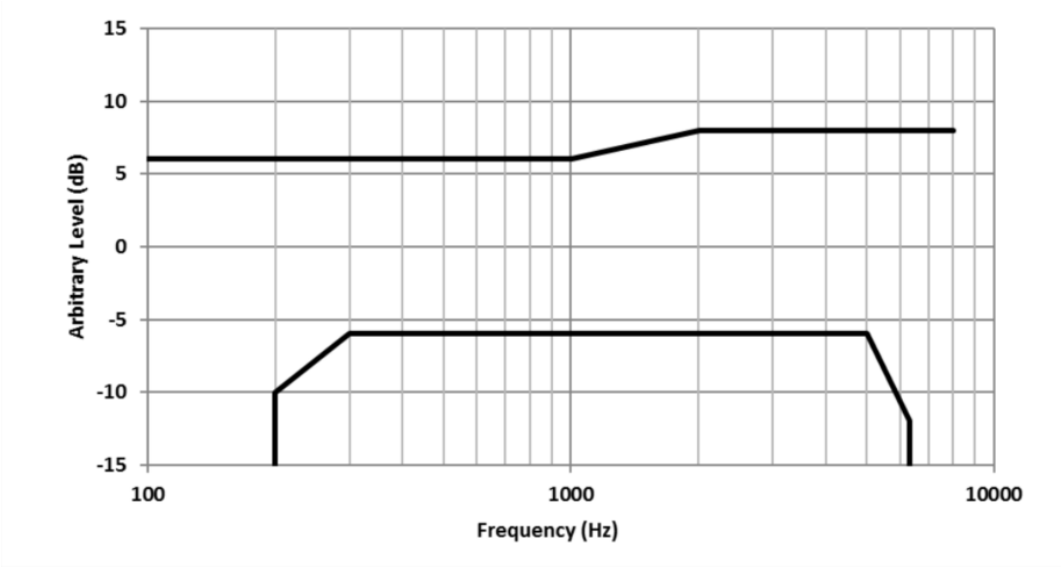



**Figure B.3-2 – Wideband Receive Frequency Response Limits**

# ANNEX C Detailed Test Results

## C.1. GSM Test Results

< EUT Supported Codec >

| | AMR-NB Bit Rate |
|---|---|
| GSM | 4.75 Kbps |
| | 5.15 Kbps |
| | 5.90 Kbps |
| | 6.60 Kbps |
| | 7.40 Kbps |
| | 7.95 Kbps |
| | 10.20 Kbps |
| | 12.20 Kbps |

< Summary Tests Results >

| GSM Band | Channel | Volune Level | Codec | Voice Bandwith | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] | Minimum Receive Distrotion | | Receive Acoustic Frequence Response |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | [Hz] | [dB] | |
| GSM850 | 162 | Max | AMR | NB | 2N | 83.20 | 13.20 | 2000 | 26.64 | Pass |
| GSM850 | 162 | Max | AMR | NB | 8N | 85.31 | 15.31 | 3150 | 24.65 | Pass |
| GSM1900 | 600 | Max | AMR | NB | 2N | 83.20 | 13.20 | 2500 | 26.64 | Pass |
| GSM1900 | 600 | Max | AMR | NB | 8N | 85.17 | 15.17 | 3150 | 23.72 | Pass |

Please refer to Annex D.1 for the Frequency Response.

## C.2. WCDMA Test Results

< EUT Supported Codec >

| | AMR-NB Bit Rate | AMR-WB Bit Rate |
|---|---|---|
| WCDMA | 4.75 Kbps | 6.60 Kbps |
| | 5.15 Kbps | 8.85 Kbps |
| | 5.90 Kbps | 12.65 Kbps |
| | 6.60 Kbps | 14.25 Kbps |
| | 7.40 Kbps | 15.85 Kbps |
| | 7.95 Kbps | 18.25 Kbps |
| | 10.20 Kbps | 19.85 Kbps |
| | 12.20 Kbps | 23.05 Kbps |
| | / | 23.85 Kbps |

< Summary Tests Results >

| WCDMA Band | Channel | Volune Level | Codec | Voice Bandwith | Bit Rate [kbps] | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] | Minimum Receive Distrotion | | Receive Acoustic Frequence Response |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | [Hz] | [dB] | |
| Band II | 9262 | Max | AMR | NB | 12.20 | 2N | 82.85 | 12.85 | 2000 | 25.85 | Pass |
| Band II | 9262 | Max | AMR | NB | 12.20 | 8N | 85.10 | 15.10 | 3150 | 23.96 | Pass |
| Band IV | 1312 | Max | AMR | NB | 12.20 | 2N | 82.86 | 12.86 | 2000 | 26.22 | Pass |
| Band IV | 1312 | Max | AMR | NB | 12.20 | 8N | 85.07 | 15.07 | 3150 | 23.50 | Pass |
| Band V | 4132 | Max | AMR | NB | 12.20 | 2N | 83.06 | 13.06 | 2000 | 26.46 | Pass |
| Band V | 4132 | Max | AMR | NB | 12.20 | 8N | 85.10 | 15.10 | 3150 | 23.81 | Pass |

Please refer to Annex D.2 for the Frequency Response.

## C.3. LTE Test Results

< EUT Supported Codec >

| | AMR-NB Bit Rate | AMR-WB Bit Rate |
|---|---|---|
| VoLTE | 4.75 Kbps | 6.60 Kbps |
| | 5.15 Kbps | 8.85 Kbps |
| | 5.90 Kbps | 12.65 Kbps |
| | 6.60 Kbps | 14.25 Kbps |
| | 7.40 Kbps | 15.85 Kbps |
| | 7.95 Kbps | 18.25 Kbps |
| | 10.20 Kbps | 19.85 Kbps |
| | 12.20 Kbps | 23.05 Kbps |
| | / | 23.85 Kbps |

An investigation was performed to determine the modulation, the bandwidth configuration and RB configuration to be used for testing. For LTE FDD bands, 1.4MHz BW, QPSK, 1RB, 0RB offset was used for the testing as the worst-case configuration for the handset. For TD-LTE bands, 5MHz BW, QPSK, 1RB, 0RB offset was used for the testing as the worst-case configuration for the handset. See below table for comparisons between different radios configurations:

< Radio Configuration Investigation >

| LTE Band | | Channel | Bandwidth [MHz] | Modulation | RB Size | RB Off Size | Volune Level | Codec | NB/WB | Bit Rate [kbps] | 2N/8N | Minimum Distortion | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | [Hz] | [dB] |
| LTE FDD | Band 2 | 18900 | 20 | QPSK | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 25.50 |
| | Band 2 | 18900 | 20 | QPSK | 50 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 25.54 |
| | Band 2 | 18900 | 20 | QPSK | 100 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 25.56 |
| | Band 2 | 18900 | 20 | 16QAM | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 25.57 |
| | Band 2 | 18900 | 15 | QPSK | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 25.39 |

| LTE Band | | Channel | Bandwidth [MHz] | Modulation | RB Size | RB Off Size | Volune Level | Codec | NB/WB | Bit Rate [kbps] | 2N/8N | Minimum Distortion | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | [Hz] | [dB] |
| | Band 2 | 18900 | 10 | QPSK | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 25.84 |
| | Band 2 | 18900 | 5 | QPSK | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 25.35 |
| | Band 2 | 18900 | 3 | QPSK | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 25.07 |
| | **Band 2** | **18900** | **1.4** | **QPSK** | **1** | **0** | **Max** | **AMR** | **NB** | **12.2** | **8N** | **3150** | **25.00** |
| TD-LTE | Band 41 | 41140 | 20 | QPSK | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 24.30 |
| | Band 41 | 41140 | 20 | QPSK | 50 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 24.32 |
| | Band 41 | 41140 | 20 | QPSK | 100 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 24.33 |
| | Band 41 | 41140 | 20 | 16QAM | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 24.17 |
| | Band 41 | 41140 | 20 | 64QAM | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 24.18 |
| | Band 41 | 41140 | 10 | QPSK | 1 | 0 | Max | AMR | NB | 12.2 | 8N | 3150 | 24.06 |
| | **Band 41** | **41140** | **5** | **QPSK** | **1** | **0** | **Max** | **AMR** | **NB** | **12.2** | **8N** | **3150** | **24.05** |

< LTE FDD Summary Tests Results >

| LTE Band | Channel | Volune Level | Codec | Voice Bandwith | Bit Rate [kbps] | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] | Minimum Distortion | | Receive Acoustic Frequence Response |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | [Hz] | [dB] | |
| Band 2 | 18900 | Max | AMR | NB | 12.20 | 2N | 83.35 | 13.35 | 2000 | 26.33 | Pass |
| Band 2 | 18900 | Max | AMR | NB | 12.20 | 8N | 86.58 | 16.58 | 3150 | 25.76 | Pass |
| Band 4 | 20175 | Max | AMR | NB | 12.20 | 2N | 83.81 | 13.81 | 2000 | 26.32 | Pass |
| Band 4 | 20175 | Max | AMR | NB | 12.20 | 8N | 86.49 | 16.49 | 3150 | 25.83 | Pass |
| Band 5 | 20525 | Max | AMR | NB | 12.20 | 2N | 83.68 | 13.68 | 2000 | 25.64 | Pass |
| Band 5 | 20525 | Max | AMR | NB | 12.20 | 8N | 86.16 | 16.16 | 3150 | 22.75 | Pass |
| Band 7 | 21100 | Max | AMR | NB | 12.20 | 2N | 82.99 | 12.99 | 2000 | 25.95 | Pass |

| LTE Band | Channel | Volune Level | Codec | Voice Bandwith | Bit Rate [kbps] | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] | Minimum Distortion | | Receive Acoustic Frequence Response |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | [Hz] | [dB] | |
| Band 7 | 21100 | Max | AMR | NB | 12.20 | 8N | 86.67 | 16.67 | 3150 | 26.19 | Pass |
| Band 12 | 23095 | Max | AMR | NB | 12.20 | 2N | 84.09 | 14.09 | 2000 | 26.65 | Pass |
| Band 12 | 23095 | Max | AMR | NB | 12.20 | 8N | 85.90 | 15.90 | 3150 | 22.83 | Pass |
| Band 17 | 23790 | Max | AMR | NB | 12.20 | 2N | 82.60 | 12.60 | 2500 | 26.53 | Pass |
| Band 17 | 23790 | Max | AMR | NB | 12.20 | 8N | 84.64 | 14.64 | 3150 | 22.57 | Pass |
| Band 25 | 26365 | Max | AMR | NB | 12.20 | 2N | 84.01 | 14.01 | 1250 | 26.66 | Pass |
| Band 25 | 26365 | Max | AMR | NB | 12.20 | 8N | 86.20 | 16.20 | 3150 | 21.96 | Pass |
| Band 26 | 26865 | Max | AMR | NB | 12.20 | 2N | 83.98 | 13.98 | 2000 | 26.39 | Pass |
| Band 26 | 26865 | Max | AMR | NB | 12.20 | 8N | 86.39 | 16.39 | 3150 | 21.67 | Pass |
| Band 30 | 27710 | Max | AMR | NB | 12.20 | 2N | 82.83 | 12.83 | 2500 | 26.18 | Pass |
| Band 30 | 27710 | Max | AMR | NB | 12.20 | 8N | 84.82 | 14.82 | 3150 | 20.00 | Pass |
| Band 66 | 132322 | Max | AMR | NB | 12.20 | 2N | 84.02 | 14.02 | 2500 | 26.17 | Pass |
| Band 66 | 132322 | Max | AMR | NB | 12.20 | 8N | 86.46 | 16.46 | 3150 | 26.24 | Pass |
| Band 71 | 133297 | Max | AMR | NB | 12.20 | 2N | 82.98 | 12.98 | 2000 | 26.12 | Pass |
| Band 71 | 133297 | Max | AMR | NB | 12.20 | 8N | 86.57 | 16.57 | 3150 | 25.13 | Pass |

Please refer to Annex D.3 for the Frequency Response.

< TD-LTE Summary Tests Results >

| LTE Band | Channel | Volune Level | Codec | Voice Bandwith | Bit Rate [kbps] | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] | Minimum Distortion | | Receive Acoustic Frequence Response |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | [Hz] | [dB] | |
| Band 38 | 38000 | Max | AMR | NB | 12.20 | 2N | 83.28 | 13.28 | 2000 | 26.35 | Pass |

| LTE Band | Channel | Volune Level | Codec | Voice Bandwith | Bit Rate [kbps] | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] | Minimum Distortion | | Receive Acoustic Frequence Response |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | [Hz] | [dB] | |
| Band 38 | 38000 | Max | AMR | NB | 12.20 | 8N | 86.26 | 16.26 | 3150 | 24.32 | Pass |
| Band 41 | 40620 | Max | AMR | NB | 12.20 | 2N | 82.16 | 12.16 | 2000 | 26.32 | Pass |
| Band 41 | 40620 | Max | AMR | NB | 12.20 | 8N | 83.97 | 13.97 | 3150 | 22.54 | Pass |
| Band 42 | 42590 | Max | AMR | NB | 12.20 | 2N | 82.72 | 12.72 | 2000 | 26.37 | Pass |
| Band 42 | 42590 | Max | AMR | NB | 12.20 | 8N | 84.43 | 14.43 | 3150 | 22.60 | Pass |
| Band 43 | 44590 | Max | AMR | NB | 12.20 | 2N | 83.05 | 13.05 | 2000 | 26.46 | Pass |
| Band 43 | 44590 | Max | AMR | NB | 12.20 | 8N | 84.64 | 14.64 | 3150 | 22.66 | Pass |
| Band 48 | 55990 | Max | AMR | NB | 12.20 | 2N | 82.58 | 12.58 | 2000 | 26.34 | Pass |
| Band 48 | 55990 | Max | AMR | NB | 12.20 | 8N | 84.46 | 14.46 | 3150 | 22.59 | Pass |

Please refer to Annex D.3 for the Frequency Response.

## C.4. WiFi Test Results

< EUT Supported Codec >

| | AMR-NB Bit Rate | AMR-WB Bit Rate |
|---|---|---|
| VoWiFi (AMR Codec) | 4.75 Kbps | 6.60 Kbps |
| | 5.15 Kbps | 8.85 Kbps |
| | 5.90 Kbps | 12.65 Kbps |
| | 6.60 Kbps | 14.25 Kbps |
| | 7.40 Kbps | 15.85 Kbps |
| | 7.95 Kbps | 18.25 Kbps |
| | 10.20 Kbps | 19.85 Kbps |
| | 12.20 Kbps | 23.05 Kbps |
| | / | 23.85 Kbps |

< Summary Tests Results >

| WLAN Band | WLAN Standard | Channel | Volune Level | Codec | Voice Bandwith | Bit Rate [kbps] | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] | Minimum Distortion | | Receive Acoustic Frequence Response |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | [Hz] | [dB] | |
| 2.4GHz | IEEE 802.11b | 7 | Max | AMR | NB | 12.20 | 2N | 80.82 | 10.82 | 2000 | 26.21 | Pass |
| 2.4GHz | IEEE 802.11b | 7 | Max | AMR | NB | 12.20 | 8N | 82.77 | 12.77 | 3150 | 22.19 | Pass |
| UNII-1 | IEEE 802.11a | 40 | Max | AMR | NB | 12.20 | 2N | 80.84 | 10.84 | 2500 | 22.51 | Pass |
| UNII-1 | IEEE 802.11a | 40 | Max | AMR | NB | 12.20 | 8N | 82.64 | 12.64 | 3150 | 23.61 | Pass |
| UNII-2A | IEEE 802.11a | 64 | Max | AMR | NB | 12.20 | 2N | 80.88 | 10.88 | 3150 | 25.7 | Pass |
| UNII-2A | IEEE 802.11a | 64 | Max | AMR | NB | 12.20 | 8N | 82.75 | 12.75 | 3150 | 22.71 | Pass |
| UNII-2C | IEEE 802.11a | 120 | Max | AMR | NB | 12.20 | 2N | 79.99 | 9.99 | 1250 | 25.67 | Pass |
| UNII-2C | IEEE 802.11a | 120 | Max | AMR | NB | 12.20 | 8N | 82.44 | 12.44 | 3150 | 22.27 | Pass |

| WLAN Band | WLAN Standard | Channel | Volune Level | Codec | Voice Bandwith | Bit Rate [kbps] | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] | Minimum Distortion | | Receive Acoustic Frequence Response |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | [Hz] | [dB] | |
| UNII-3 | IEEE 802.11a | 157 | Max | AMR | NB | 12.20 | 2N | 80.95 | 10.95 | 2000 | 26.12 | Pass |
| UNII-3 | IEEE 802.11a | 157 | Max | AMR | NB | 12.20 | 8N | 82.70 | 12.70 | 3150 | 22.67 | Pass |
| UNII-5 | IEEE 802.11ax | 1 | Max | AMR | NB | 12.20 | 2N | 80.86 | 10.86 | 2000 | 26.02 | Pass |
| UNII-5 | IEEE 802.11ax | 1 | Max | AMR | NB | 12.20 | 8N | 83.26 | 13.26 | 3150 | 24.3 | Pass |

Please refer to Annex D.4 for the Frequency Response.

The lowest conversational gain is 9.99dB with a hearing aid.

Turn off the accessibility feature - hearing aid function in the phone, and test with the same configuration.

| WLAN Band | WLAN Standard | Channel | Volune Level | Codec | Voice Bandwith | Bit Rate [kbps] | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] |
|---|---|---|---|---|---|---|---|---|---|
| UNII-2C | IEEE 802.11a | 120 | Max | AMR | NB | 12.20 | 2N | 85.88 | 15.88 |

The test prototype has been changed to UT03aa, and test with the same configuration.

| Hearing Aid Function | WLAN Band | WLAN Standard | Channel | Volune Level | Codec | Voice Bandwith | Bit Rate [kbps] | 2N/8N | Receive Volume Control [dBSPL] | Conversational Gain [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| On | UNII-2C | IEEE 802.11a | 120 | Max | AMR | NB | 12.20 | 2N | 80.65 | 10.65 |
| Off | UNII-2C | IEEE 802.11a | 120 | Max | AMR | NB | 12.20 | 2N | 85.95 | 15.95 |

# ANNEX D Frequency Response Plots

## D.1. GSM Frequency Response Plots

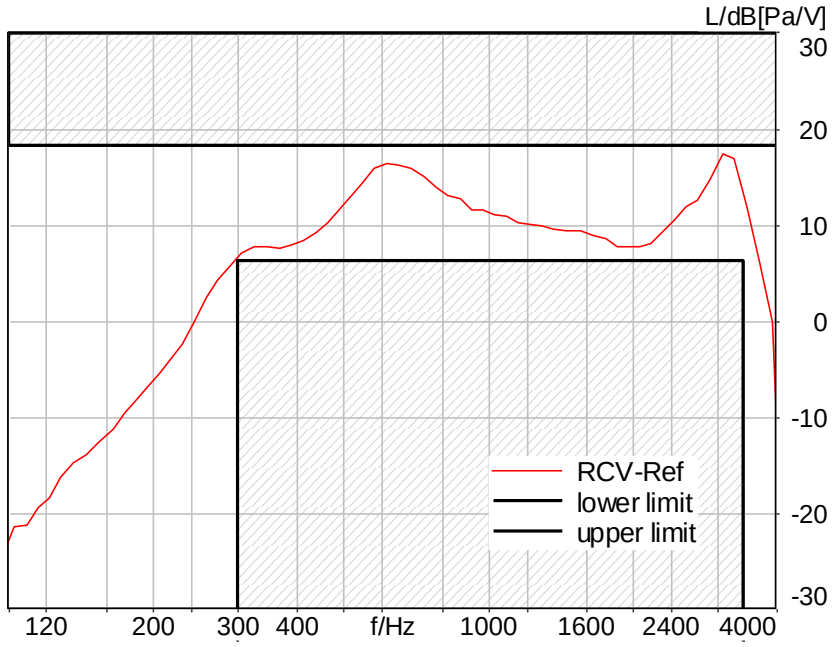



**Figure D.1-1 – GSM850 2N FF Norrowband Frequency Response**

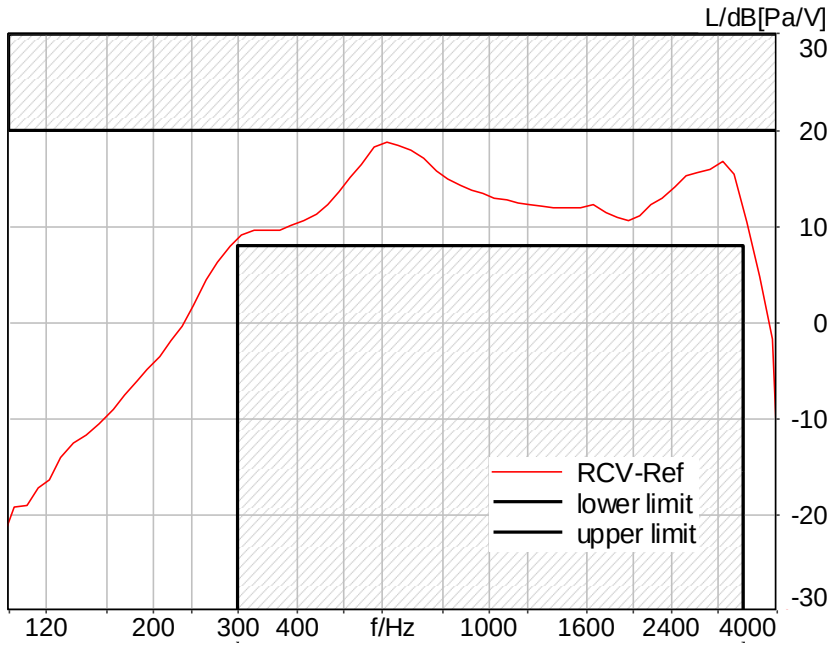



**Figure D.1-2 – GSM850 8N FF Norrowband Frequency Response**

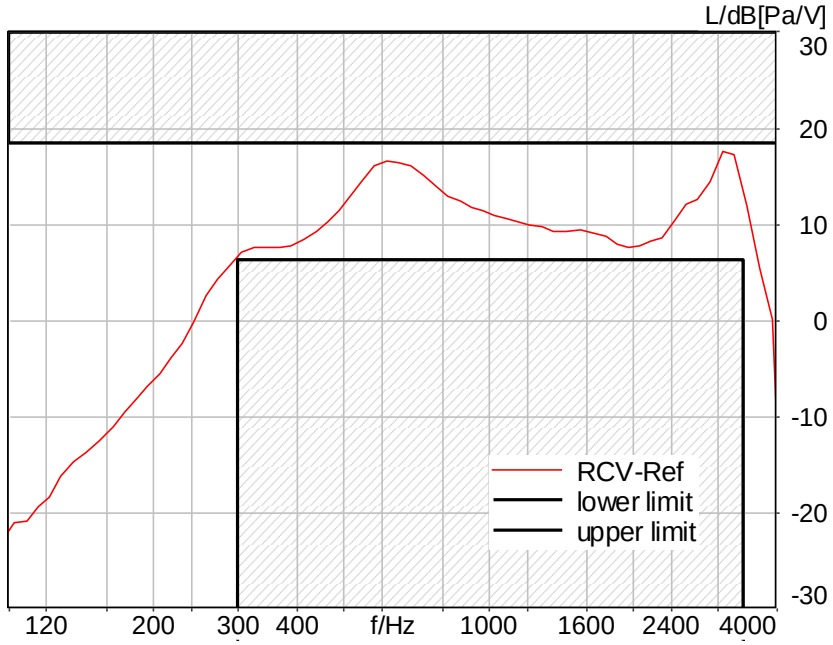



**Figure D.1-3 – GSM1900 2N FF Norrowband Frequency Response**

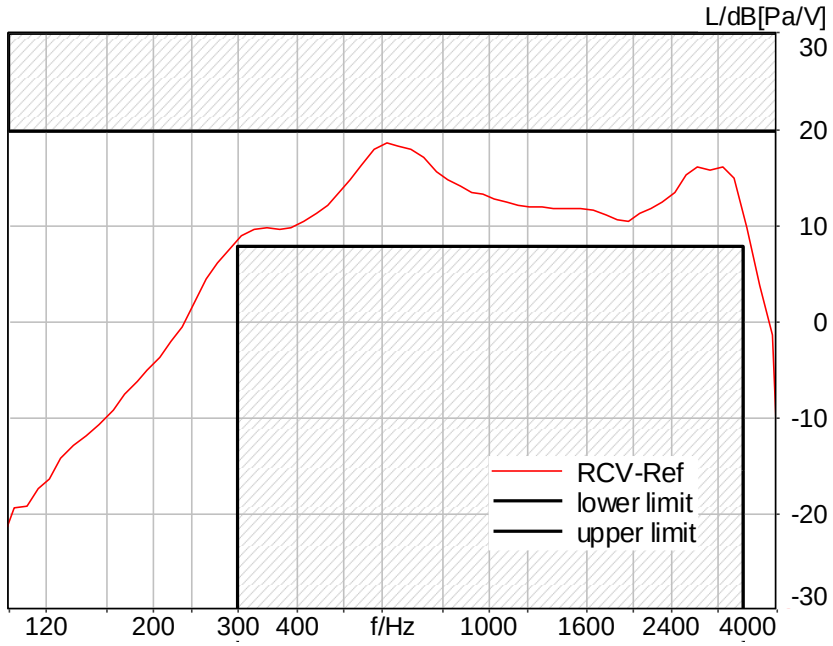



**Figure D.1-4 – GSM1900 8N FF Norrowband Frequency Response**

## D.2. WCDMA Frequency Response Plots

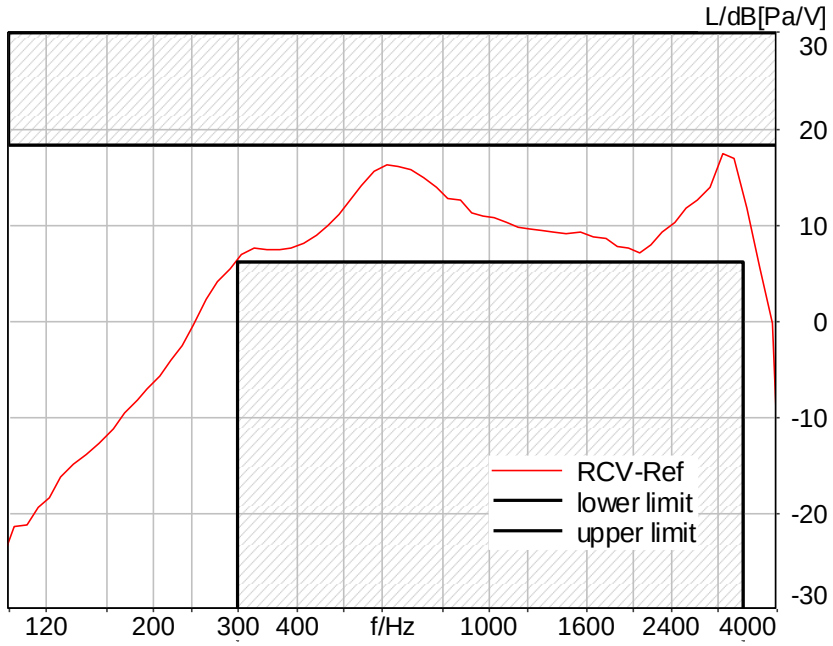



**Figure D.2-1 – WCDMA Band II 2N FF Norrowband Frequency Response**

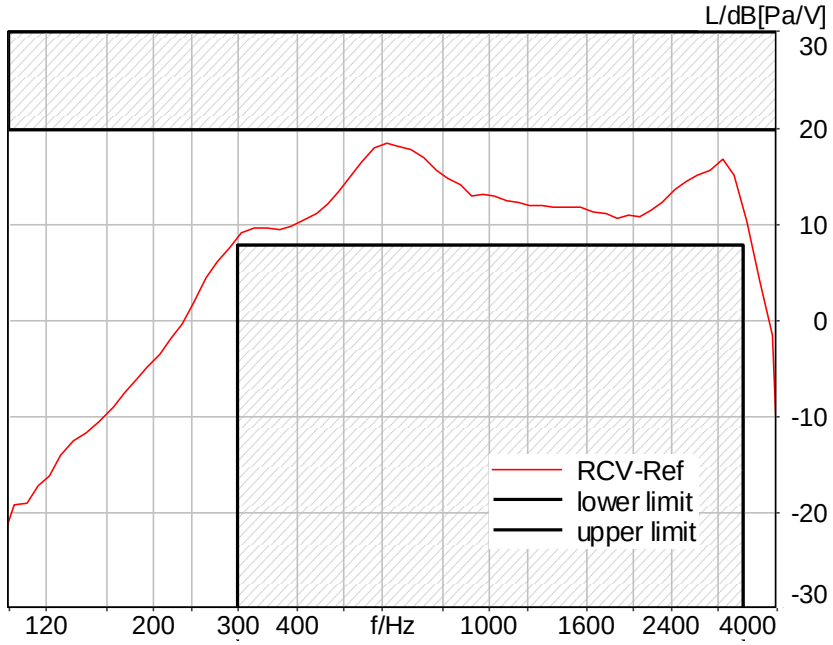



**Figure D.2-2 – WCDMA Band II 8N FF Norrowband Frequency Response**

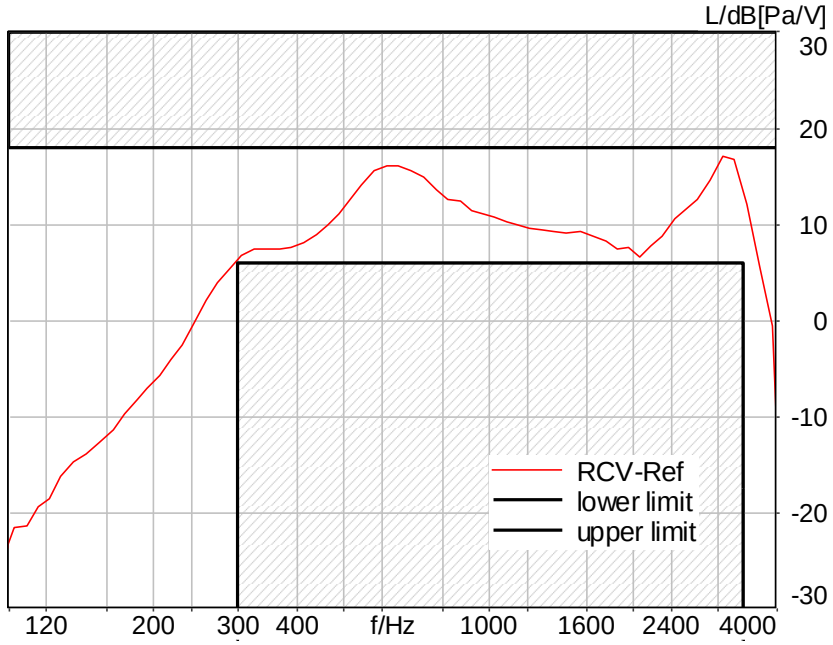



**Figure D.2-3 – WCDMA Band IV 2N FF Norrowband Frequency Response**

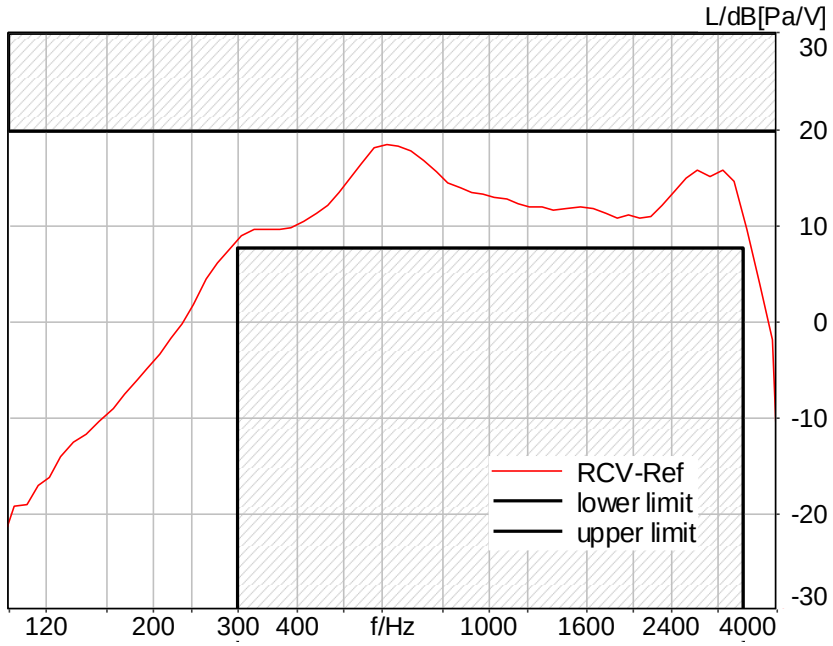



**Figure D.2-4 – WCDMA Band IV 8N FF Norrowband Frequency Response**

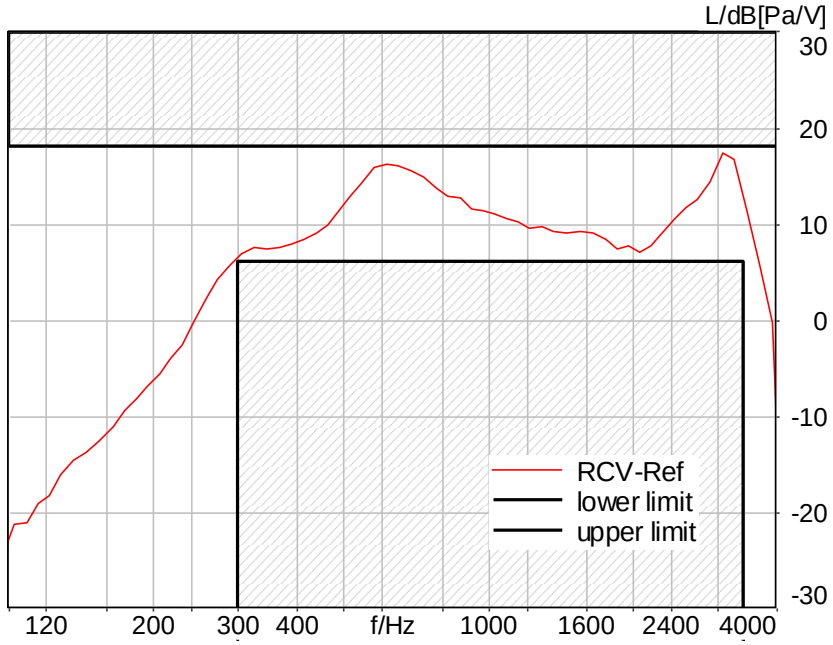



**Figure D.2-5 – WCDMA Band V 2N FF Norrowband Frequency Response**

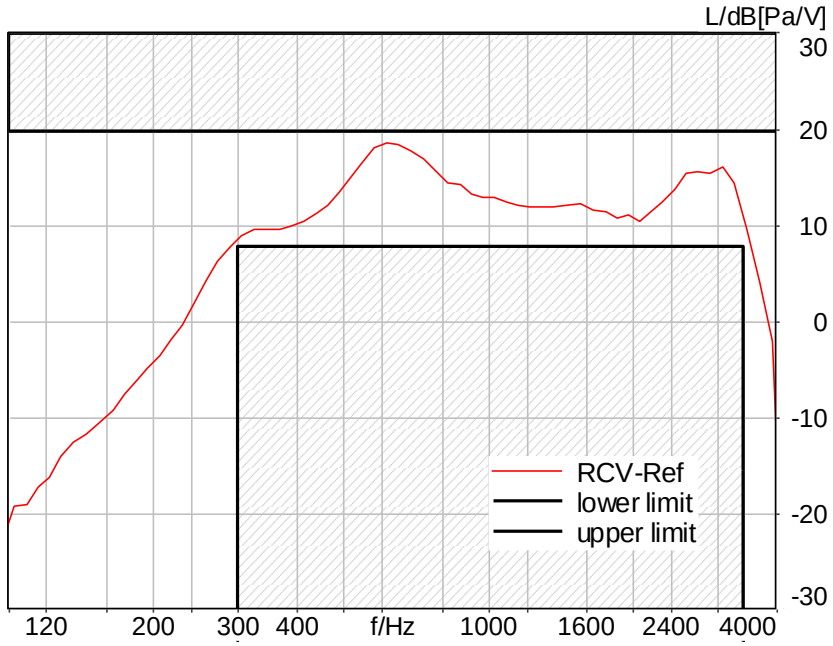



**Figure D.2-6 – WCDMA Band V 8N FF Norrowband Frequency Response**

## D.3. LTE Frequency Response Plots

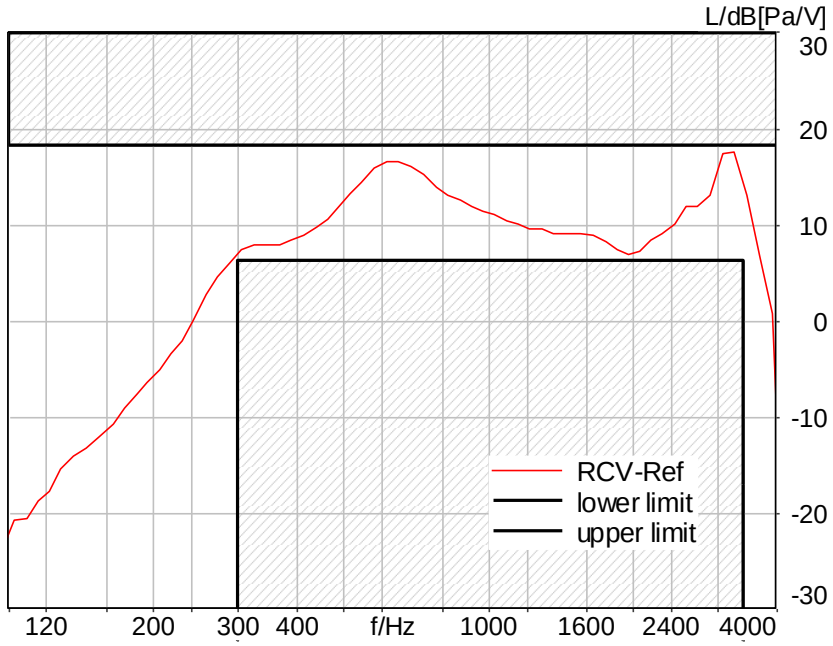



**Figure D.3-1 – LTE Band 2 2N FF Norrowband Frequency Response**

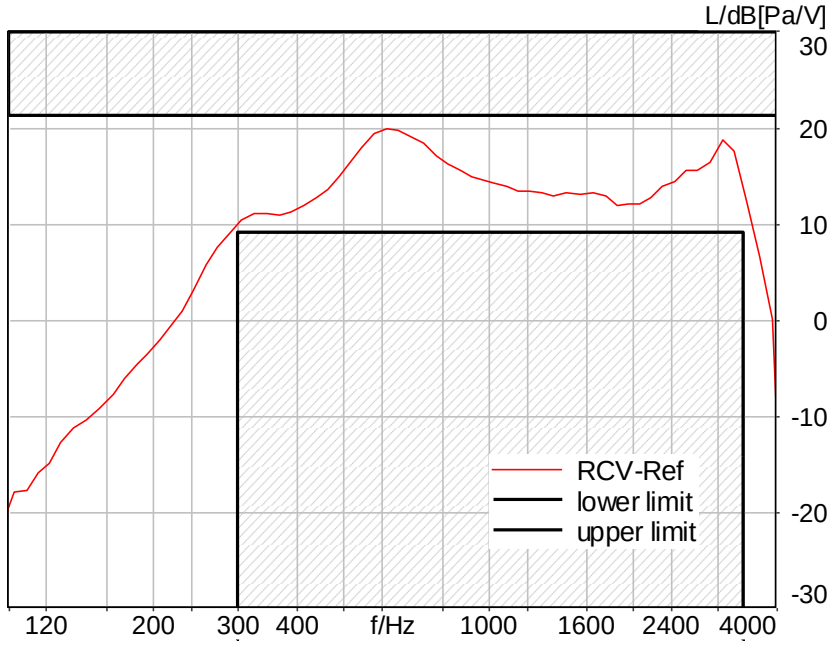



**Figure D.3-2 – LTE Band 2 8N FF Norrowband Frequency Response**

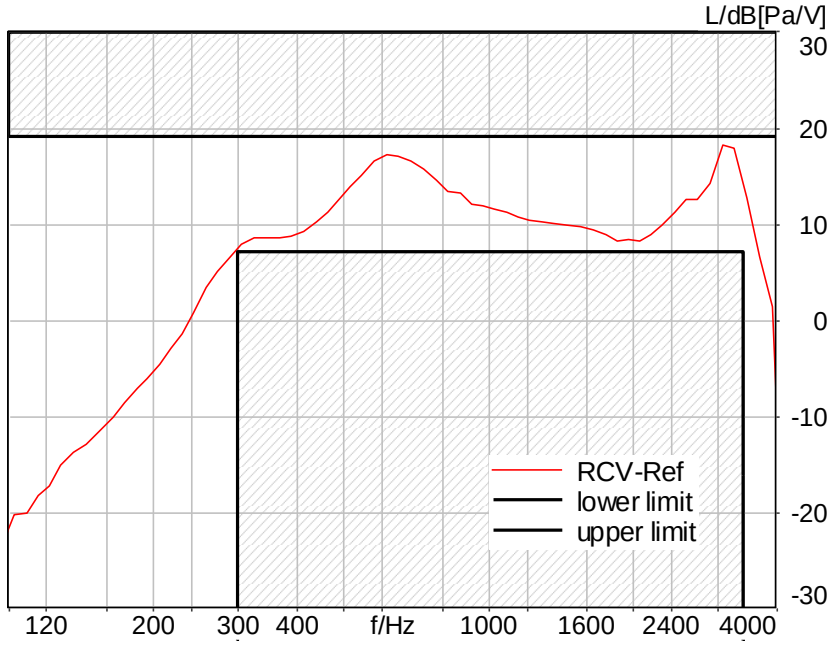



**Figure D.3-3 – LTE Band 4 2N FF Norrowband Frequency Response**

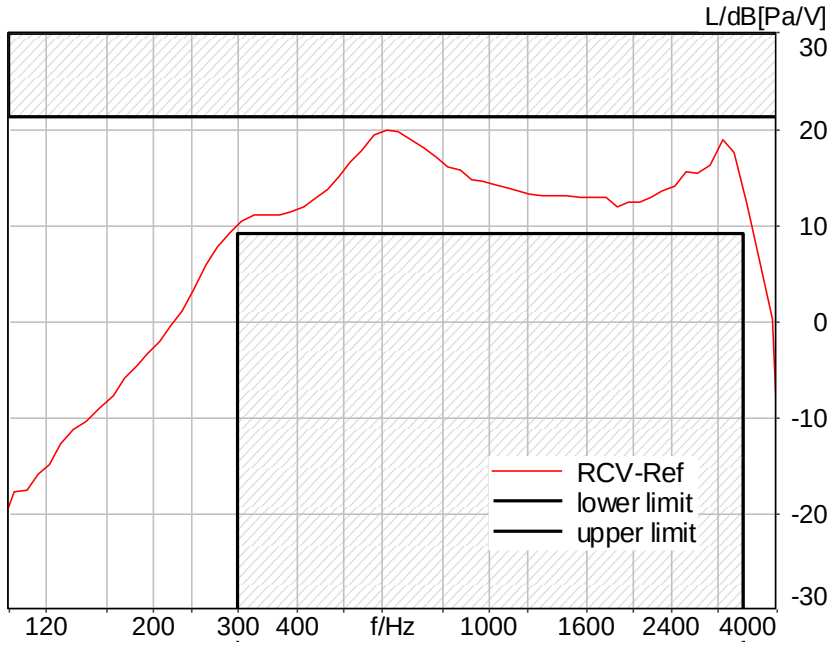



**Figure D.3-4 – LTE Band 4 8N FF Norrowband Frequency Response**

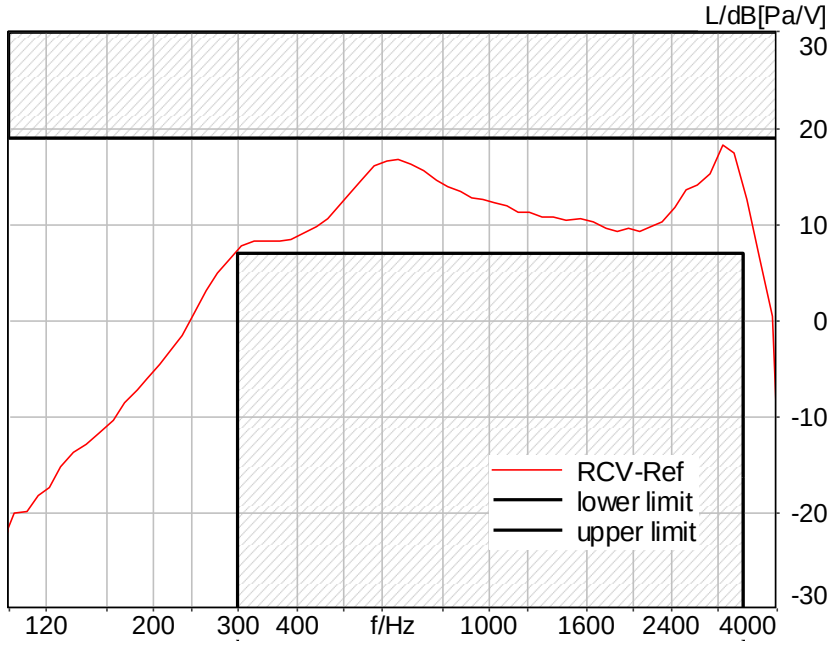



**Figure D.3-5 – LTE Band 5 2N FF Norrowband Frequency Response**

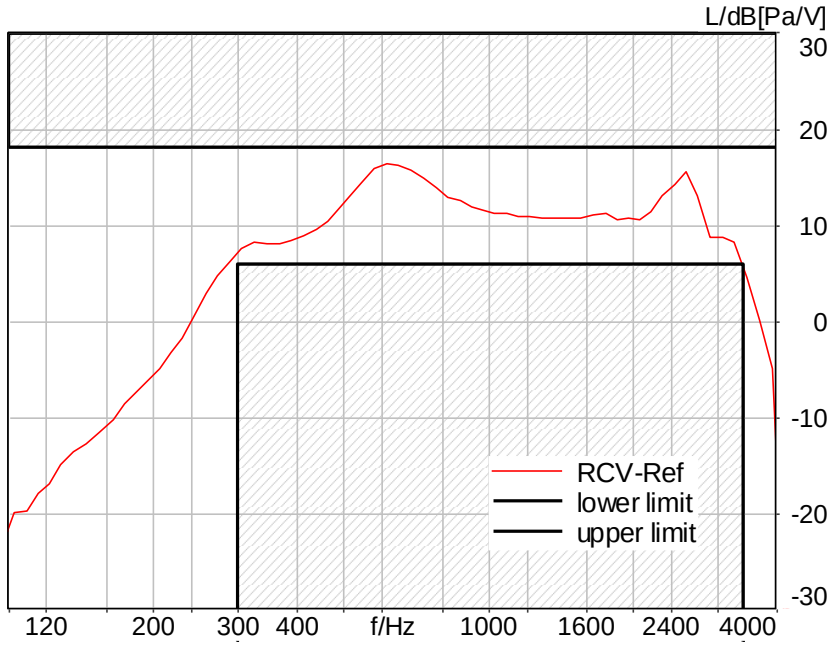



**Figure D.3-6 – LTE Band 5 8N FF Norrowband Frequency Response**

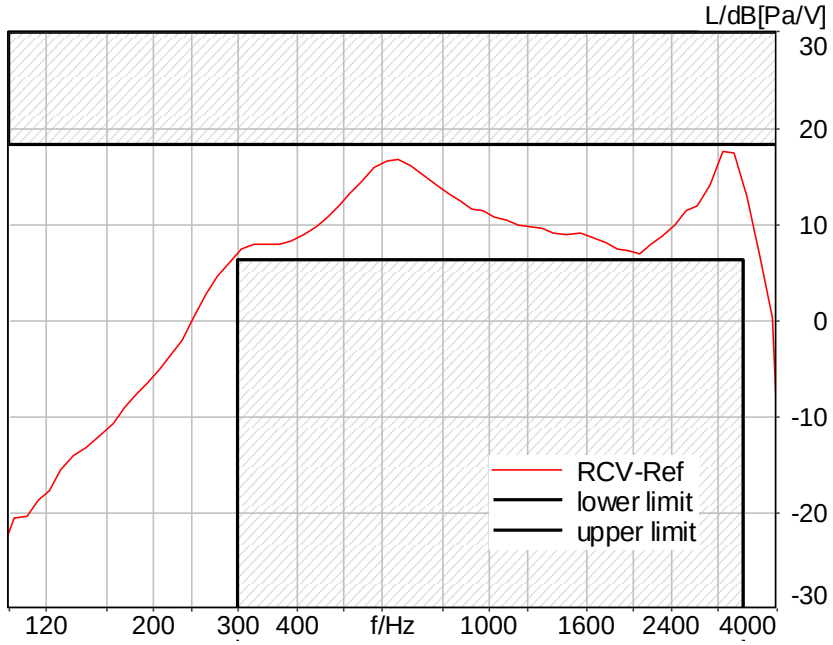



**Figure D.3-7 – LTE Band 7 2N FF Norrowband Frequency Response**

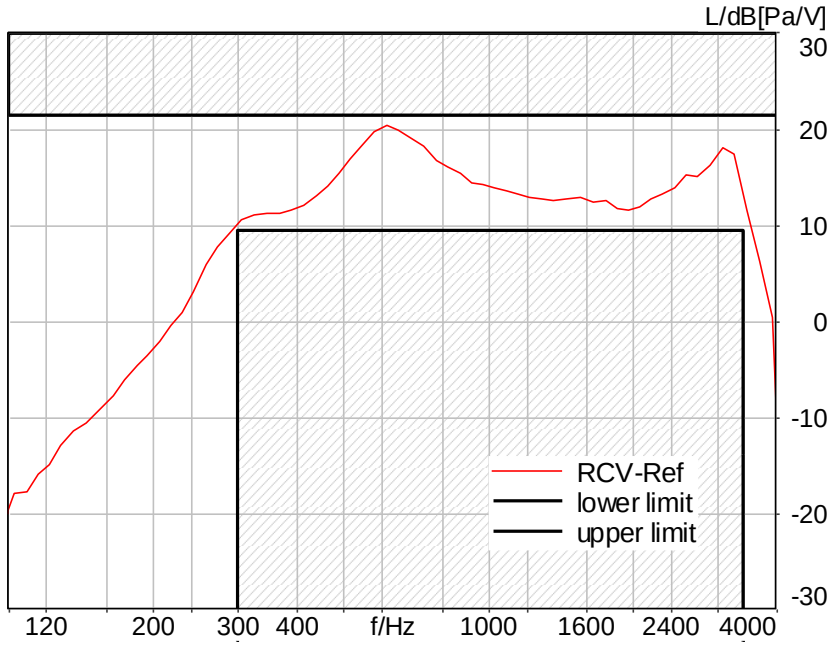



**Figure D.3-8 – LTE Band 7 8N FF Norrowband Frequency Response**

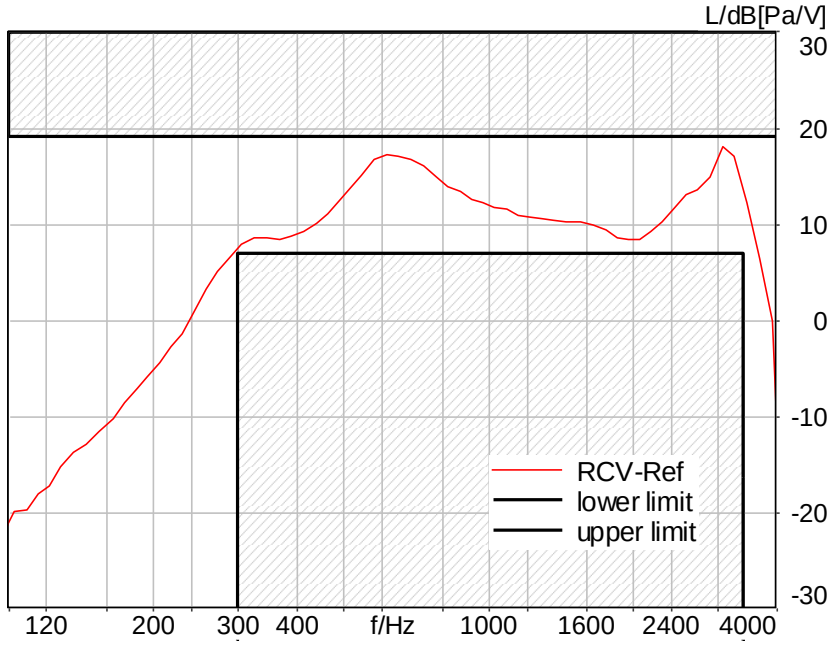



**Figure D.3-9 – LTE Band 12 2N FF Norrowband Frequency Response**

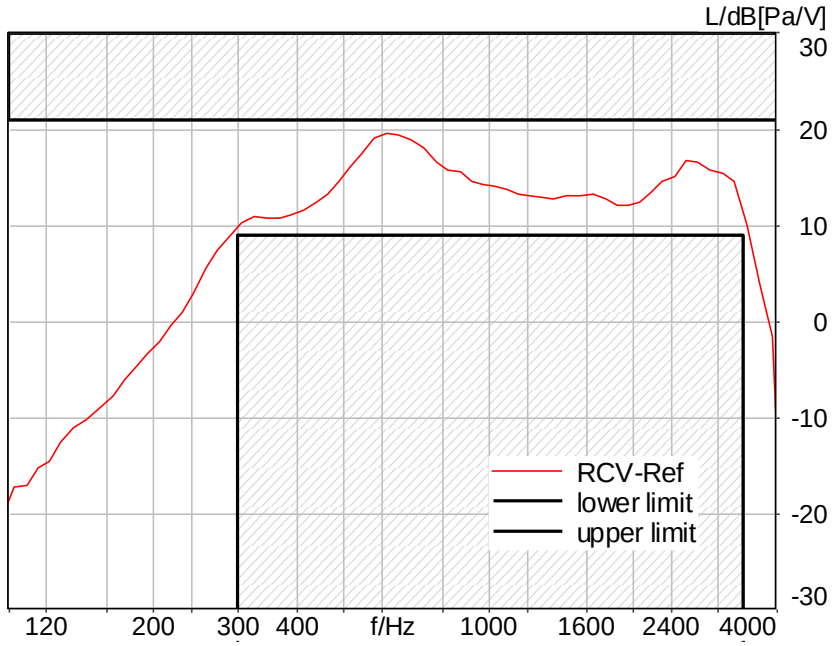



**Figure D.3-10 – LTE Band 12 8N FF Norrowband Frequency Response**

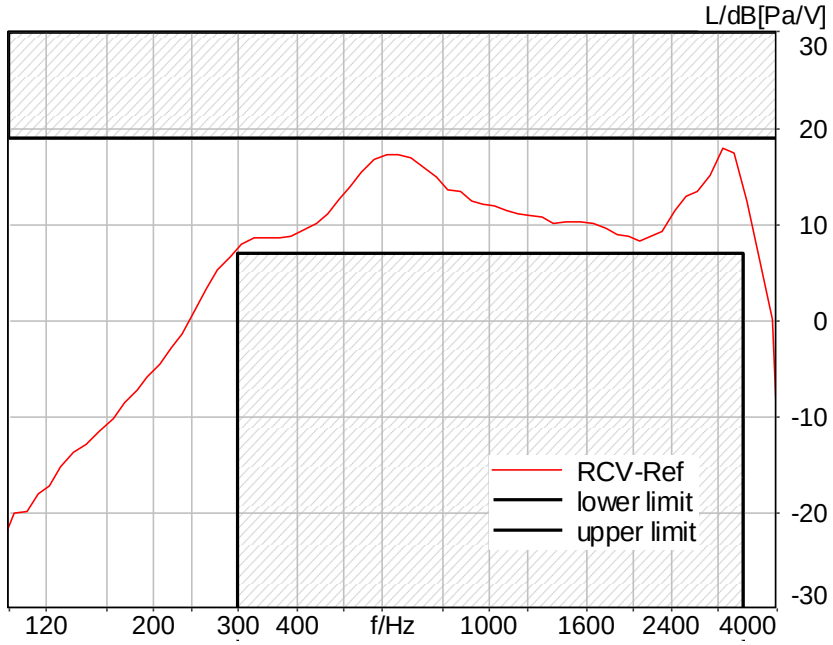



**Figure D.3-11 – LTE Band 17 2N FF Norrowband Frequency Response**

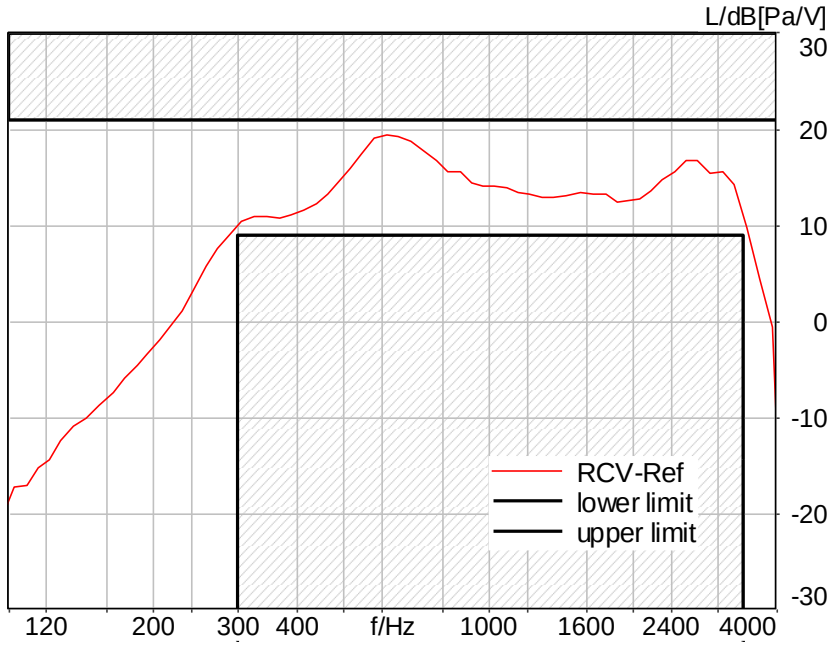



**Figure D.3-12 – LTE Band 17 8N FF Norrowband Frequency Response**

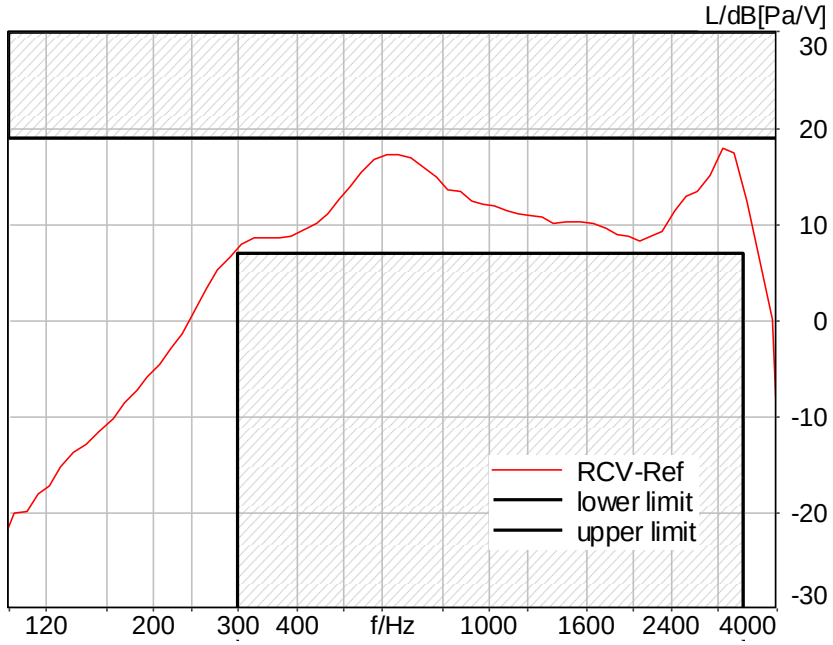



**Figure D.3-13 – LTE Band 25 2N FF Norrowband Frequency Response**

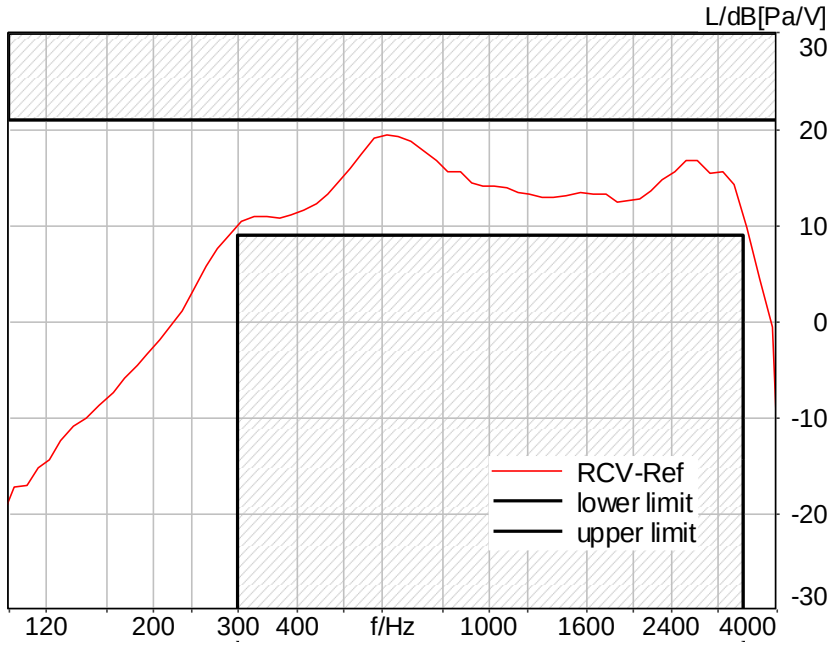



**Figure D.3-14 – LTE Band 25 8N FF Norrowband Frequency Response**

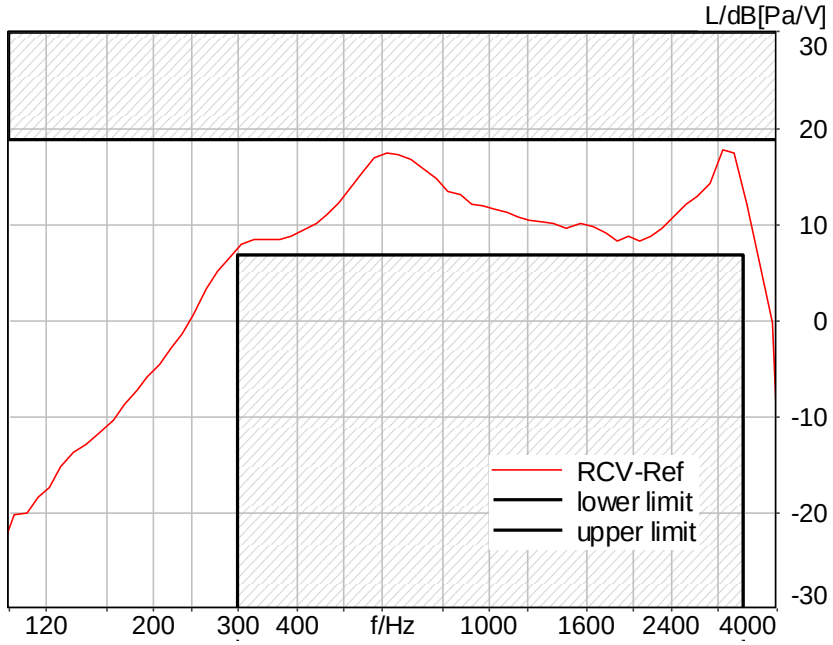



**Figure D.3-15 – LTE Band 26 2N FF Norrowband Frequency Response**

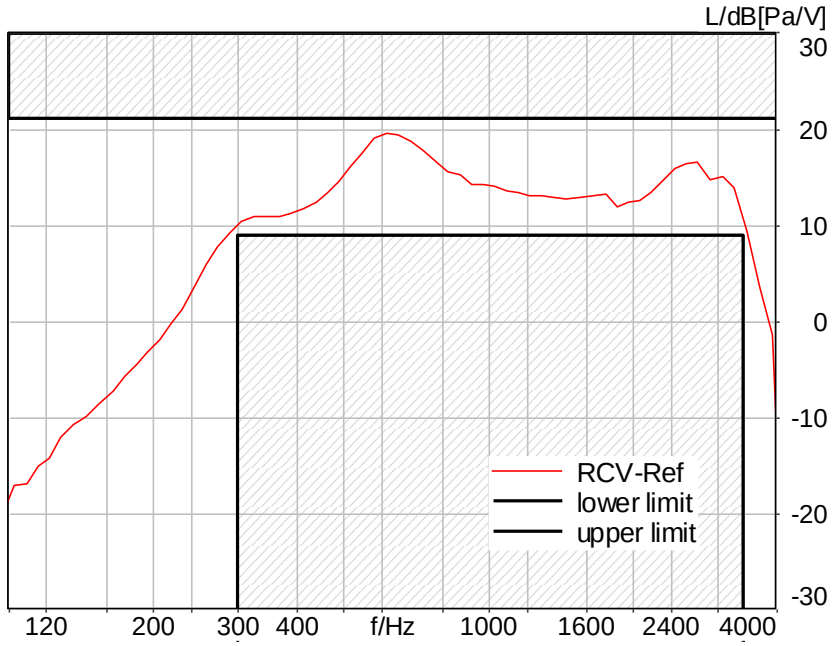



**Figure D.3-16 – LTE Band 26 8N FF Norrowband Frequency Response**

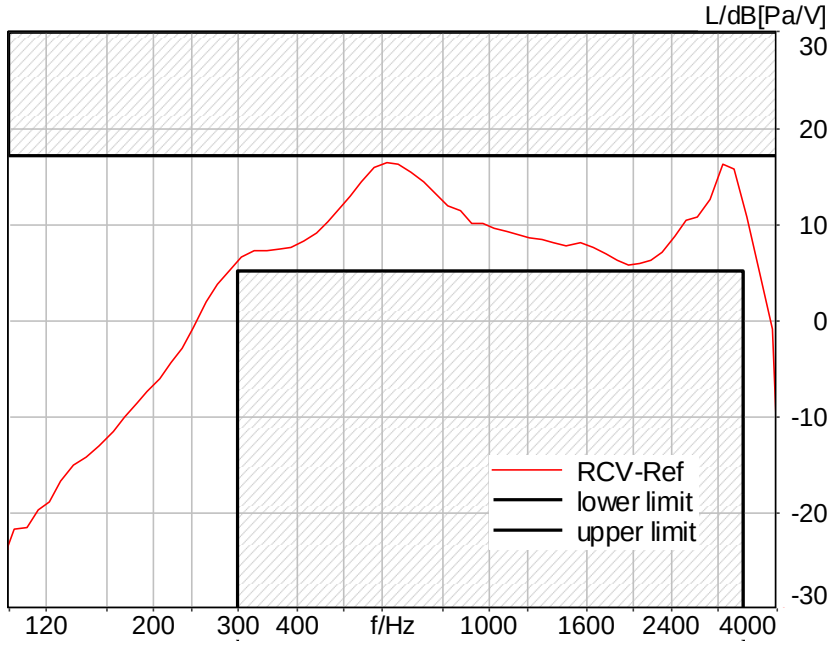



**Figure D.3-17 – LTE Band 30 2N FF Norrowband Frequency Response**

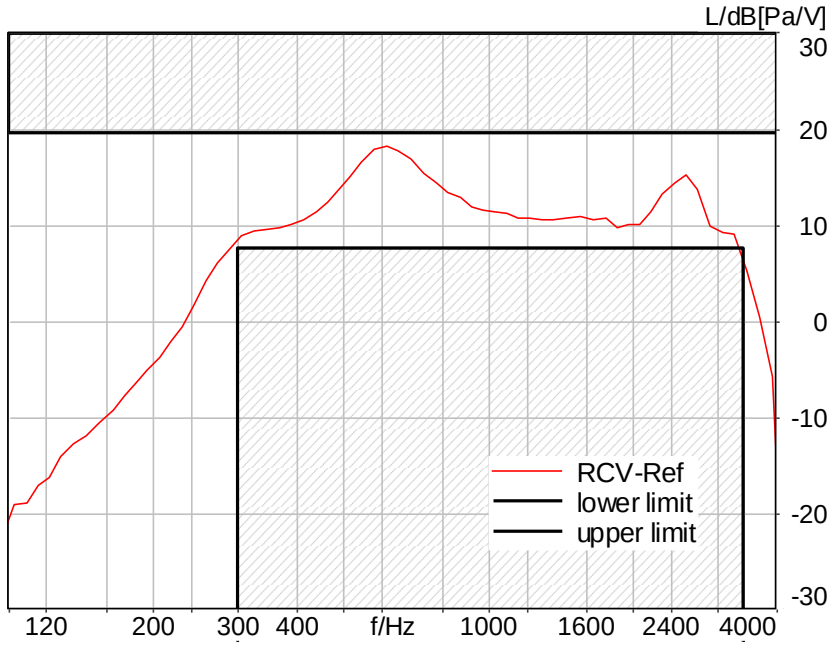



**Figure D.3-18 – LTE Band 30 8N FF Norrowband Frequency Response**

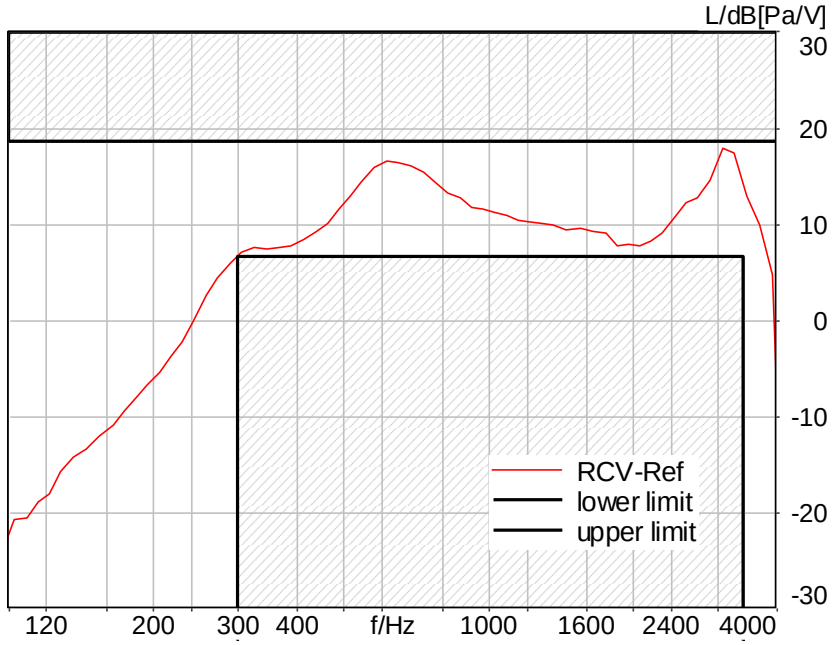



**Figure D.3-19 – LTE Band 38 2N FF Norrowband Frequency Response**

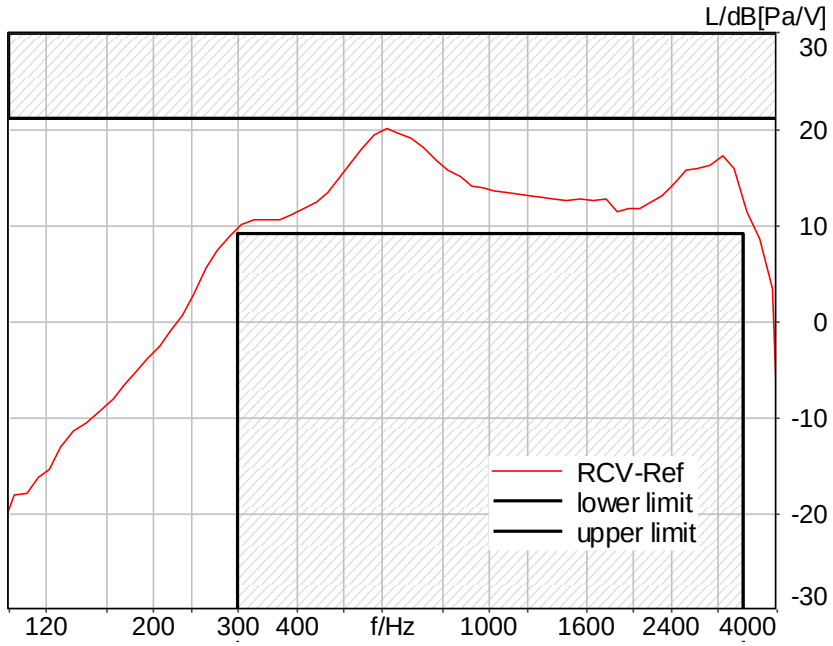



**Figure D.3-20 – LTE Band 38 8N FF Norrowband Frequency Response**

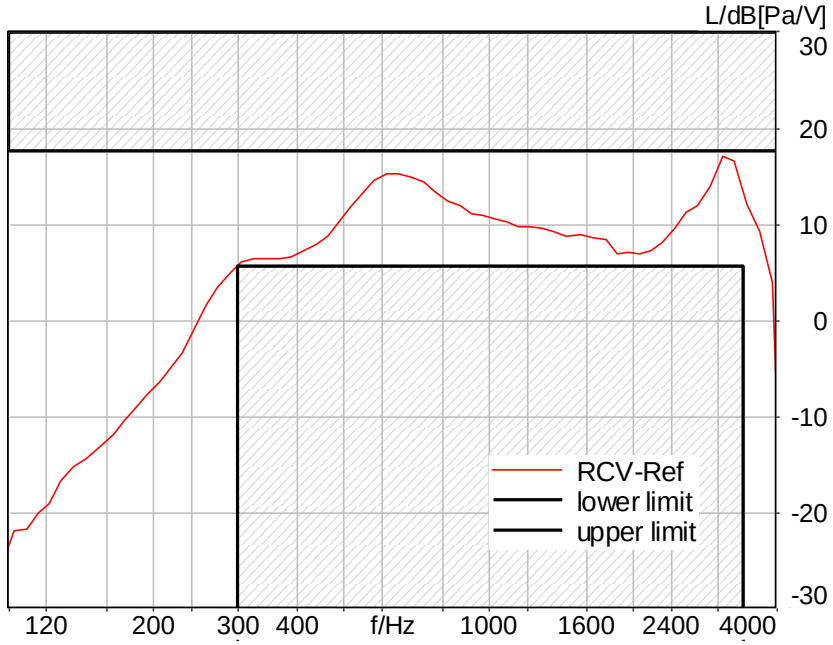



**Figure D.3-21 – LTE Band 41 2N FF Norrowband Frequency Response**

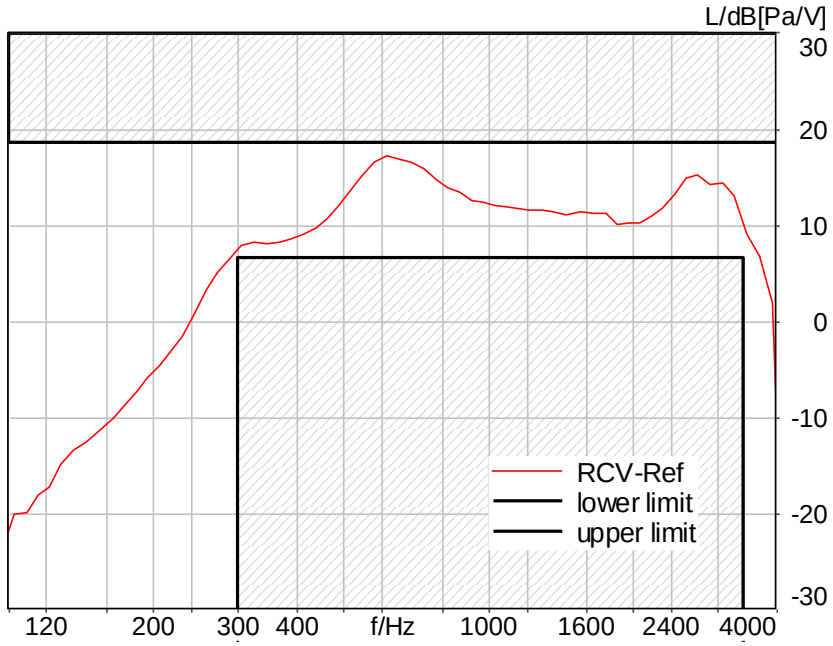



**Figure D.3-22 – LTE Band 41 8N FF Norrowband Frequency Response**

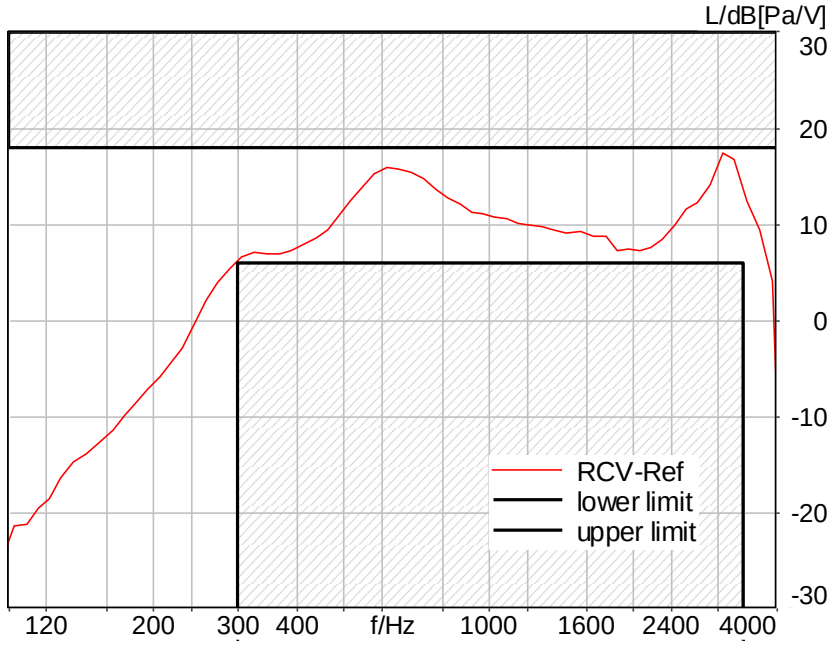



**Figure D.3-23 – LTE Band 42 2N FF Norrowband Frequency Response**

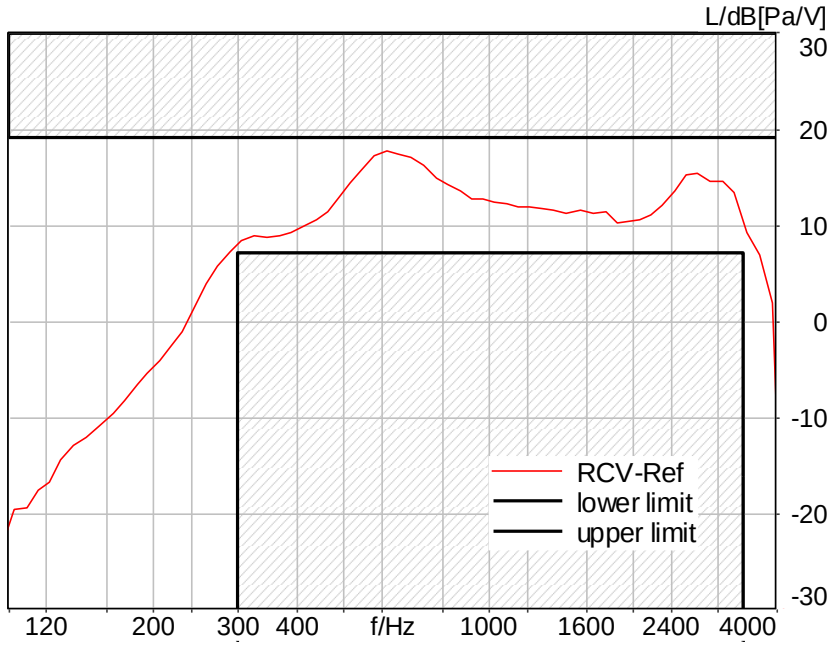



**Figure D.3-24 – LTE Band 42 8N FF Norrowband Frequency Response**

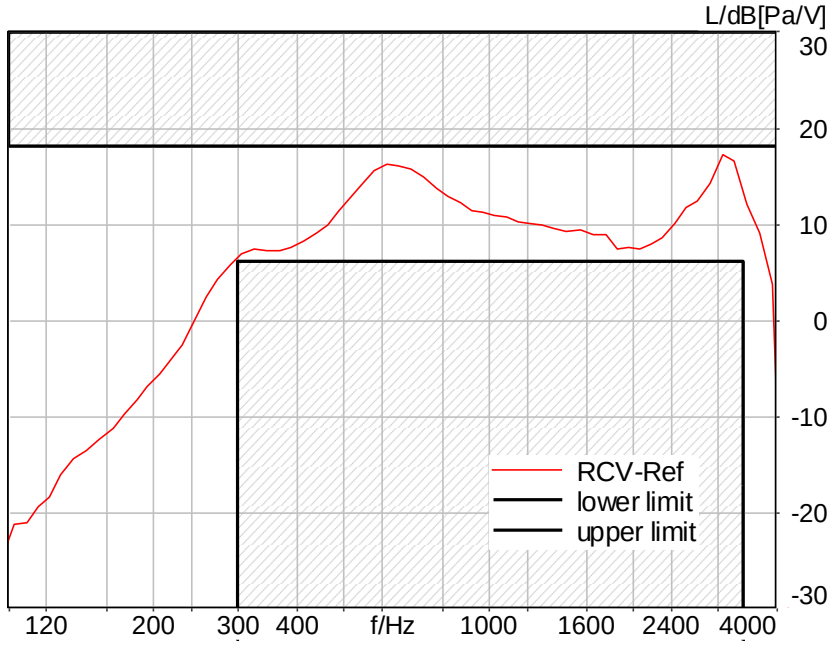



**Figure D.3-25 – LTE Band 43 2N FF Norrowband Frequency Response**

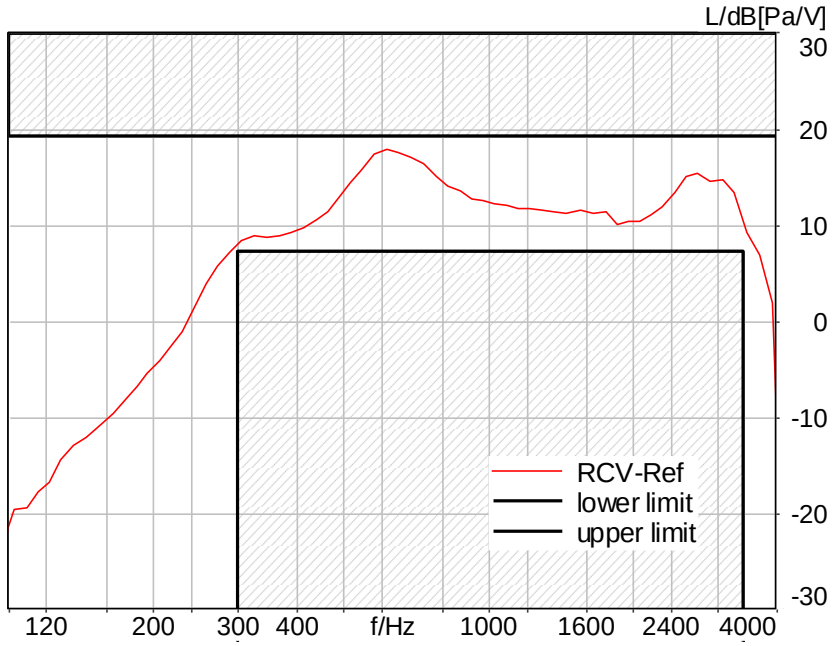



**Figure D.3-26 – LTE Band 43 8N FF Norrowband Frequency Response**

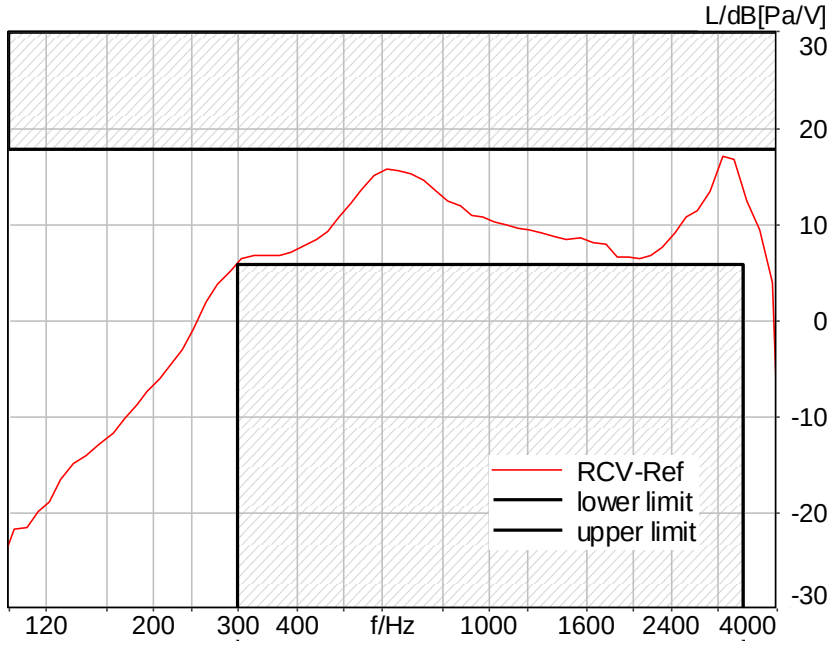



**Figure D.3-27 – LTE Band 48 2N FF Norrowband Frequency Response**

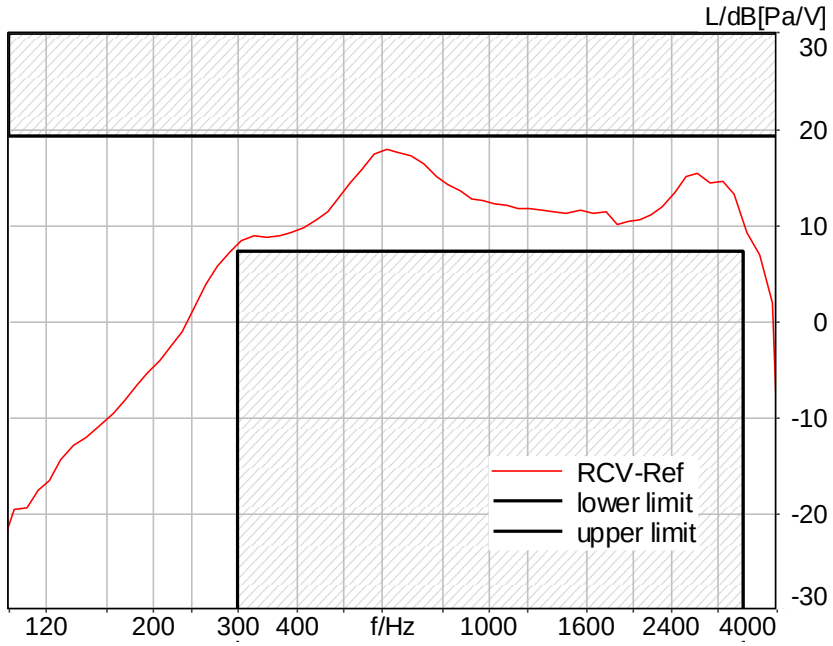



**Figure D.3-28 – LTE Band 48 8N FF Norrowband Frequency Response**

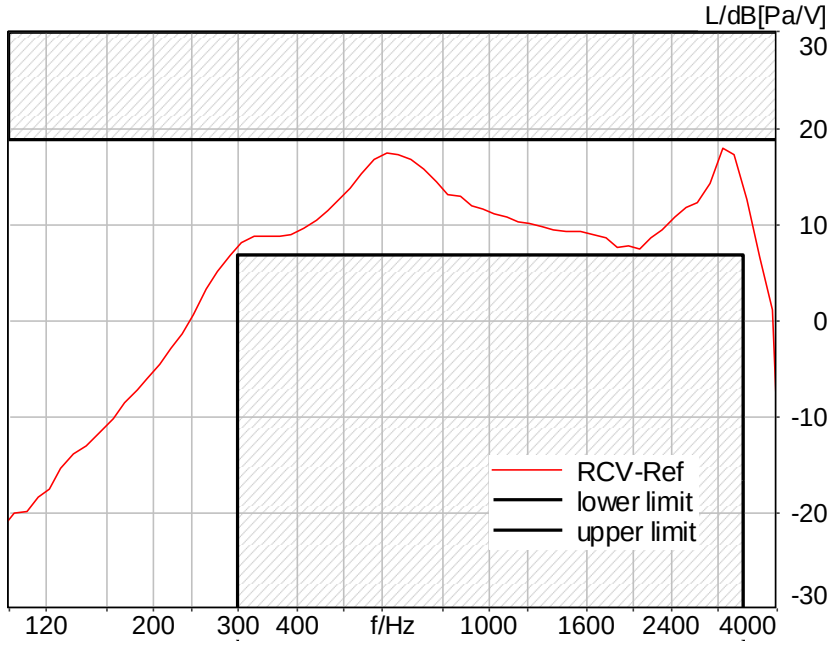



**Figure D.3-29 – LTE Band 66 2N FF Norrowband Frequency Response**

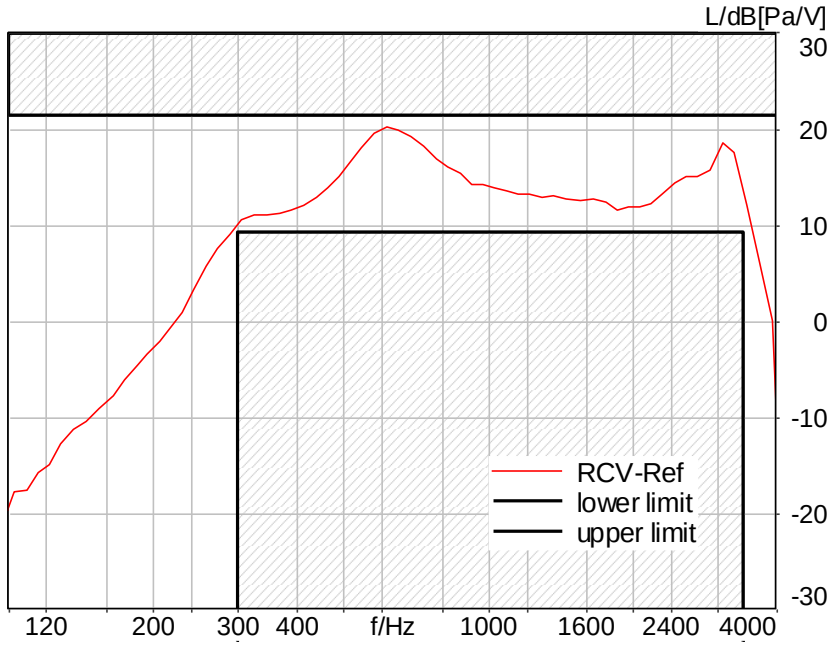



**Figure D.3-30 – LTE Band 66 8N FF Norrowband Frequency Response**

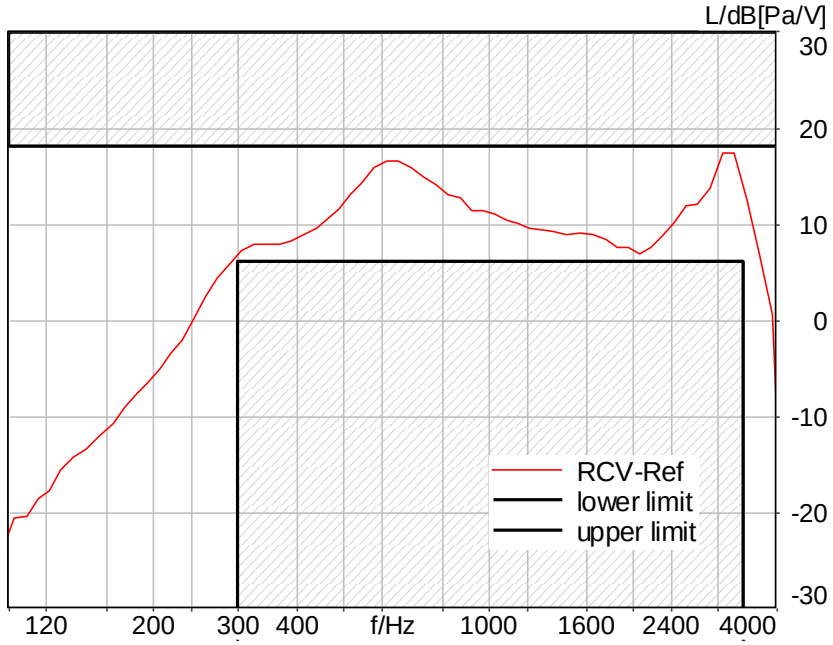



**Figure D.3-31 – LTE Band 71 2N FF Norrowband Frequency Response**

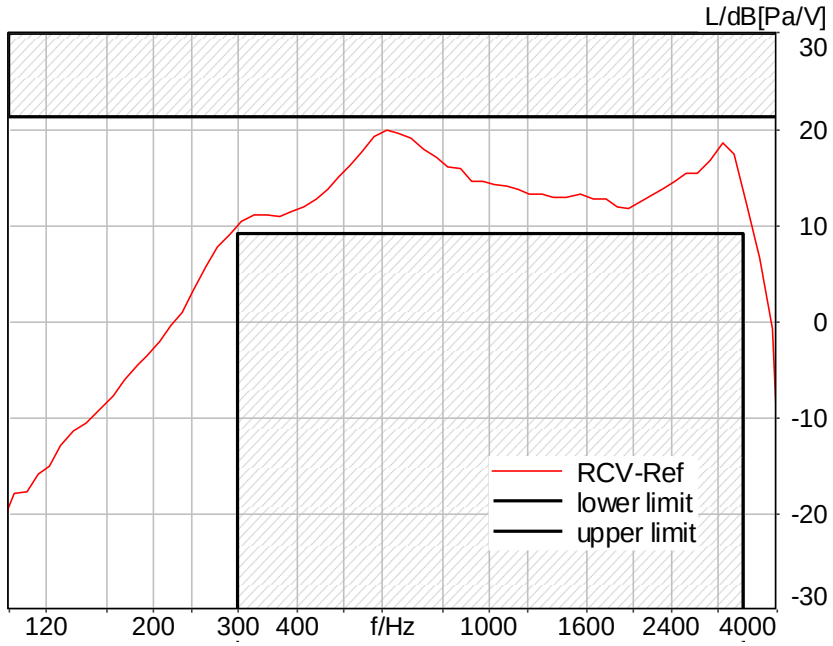



**Figure D.3-32 – LTE Band 71 8N FF Norrowband Frequency Response**

## D.4. WiFi Frequency Response Plots

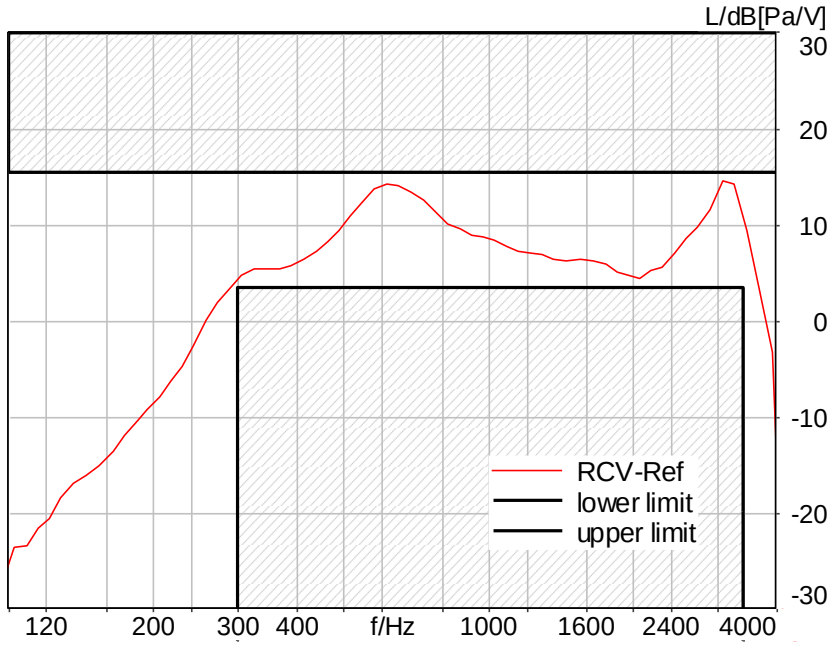



**Figure D.4-1 – WLAN 2.4GHz 2N FF Norrowband Frequency Response**

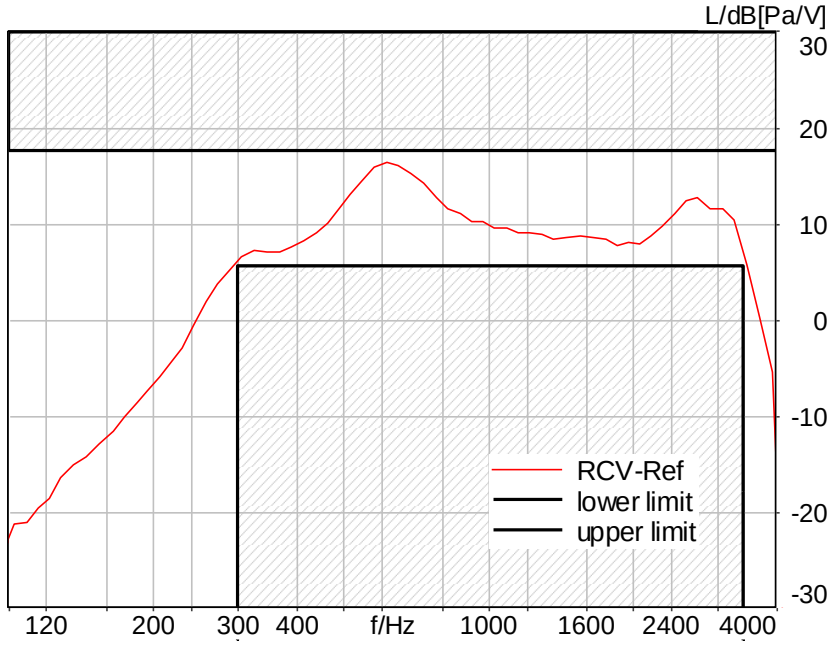



**Figure D.4-2 – WLAN 2.4GHz 8N FF Norrowband Frequency Response**

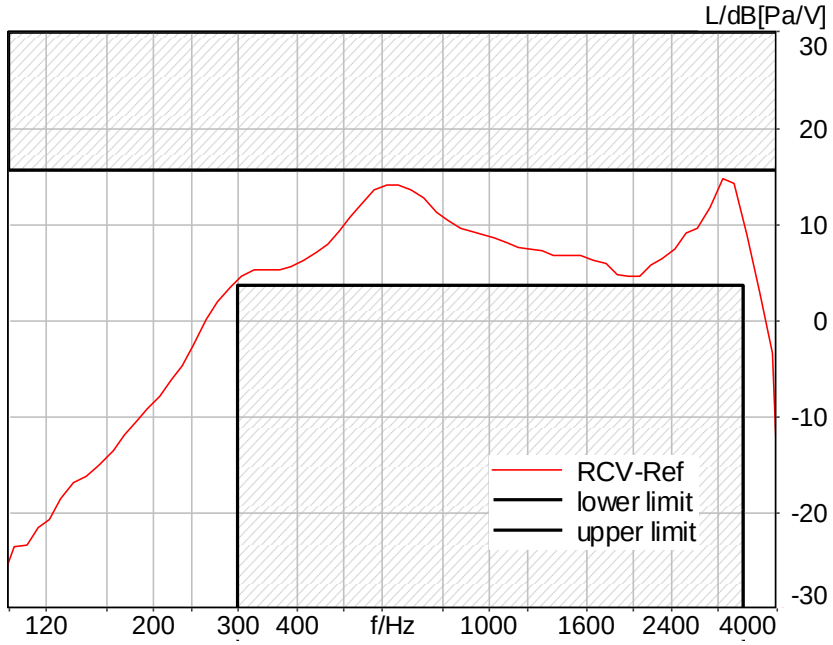



**Figure D.4-3 – WLAN UNII-1 2N FF Norrowband Frequency Response**

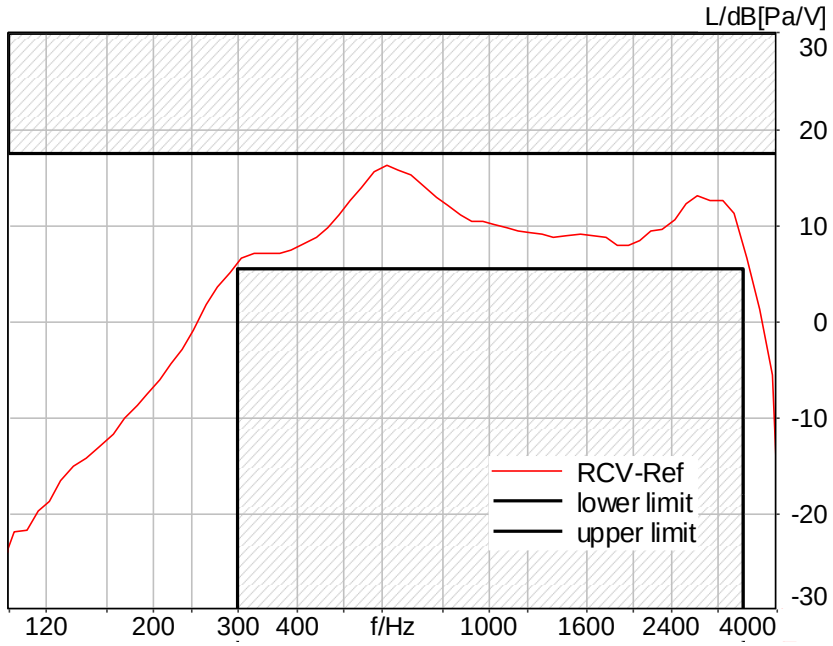



**Figure D.4-4 – WLAN UNII-1 8N FF Norrowband Frequency Response**

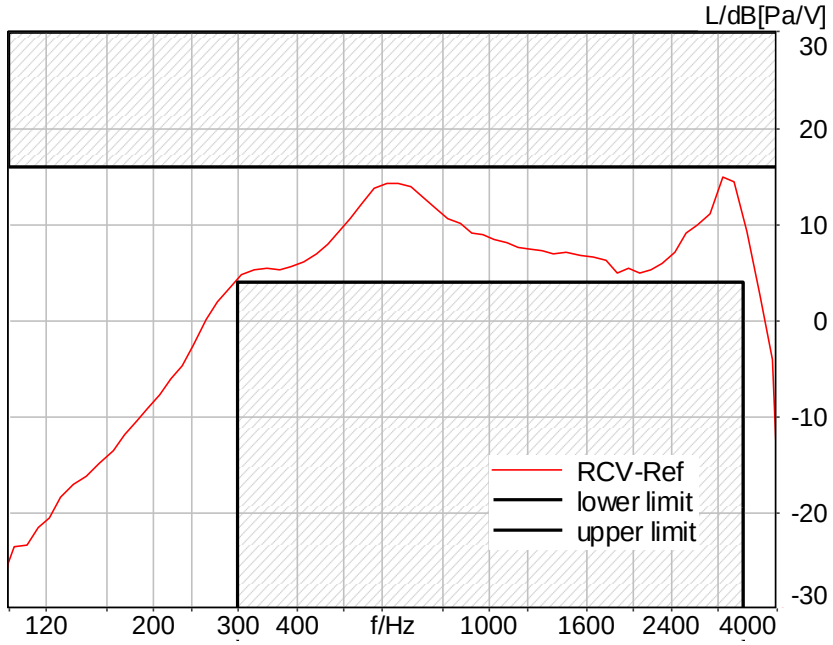



**Figure D.4-5 – WLAN UNII-2A 2N FF Norrowband Frequency Response**

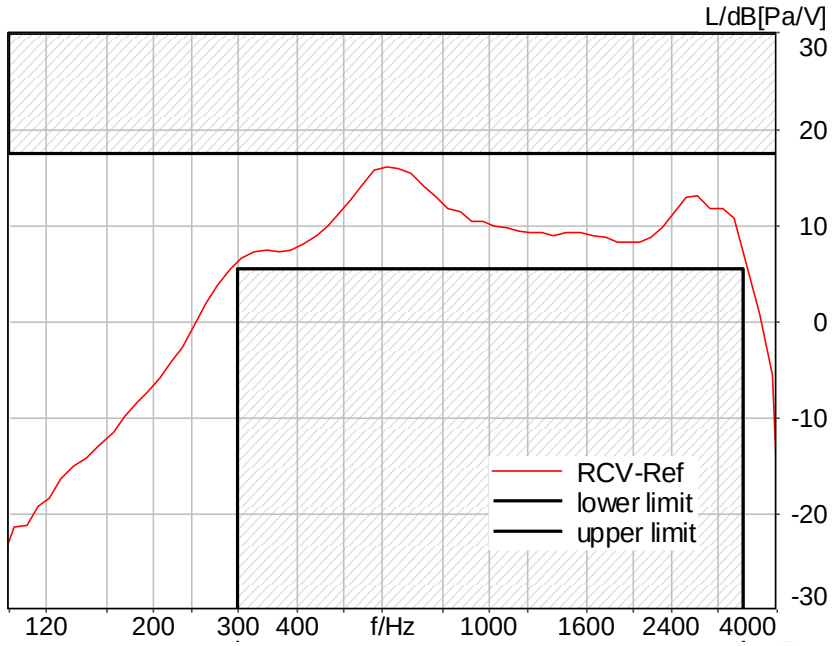



**Figure D.4-6 – WLAN UNII-2A 8N FF Norrowband Frequency Response**

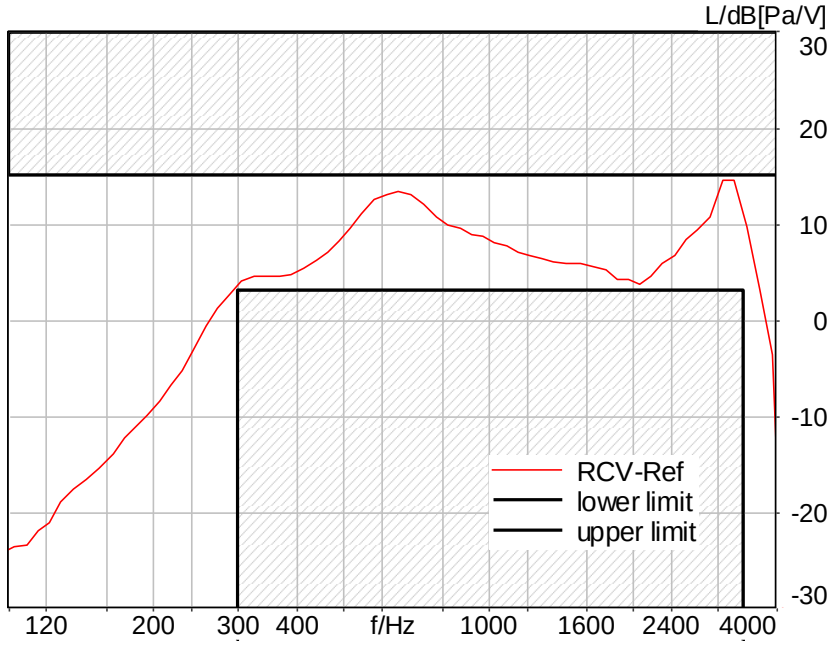



**Figure D.4-7 – WLAN UNII-2C 2N FF Norrowband Frequency Response**

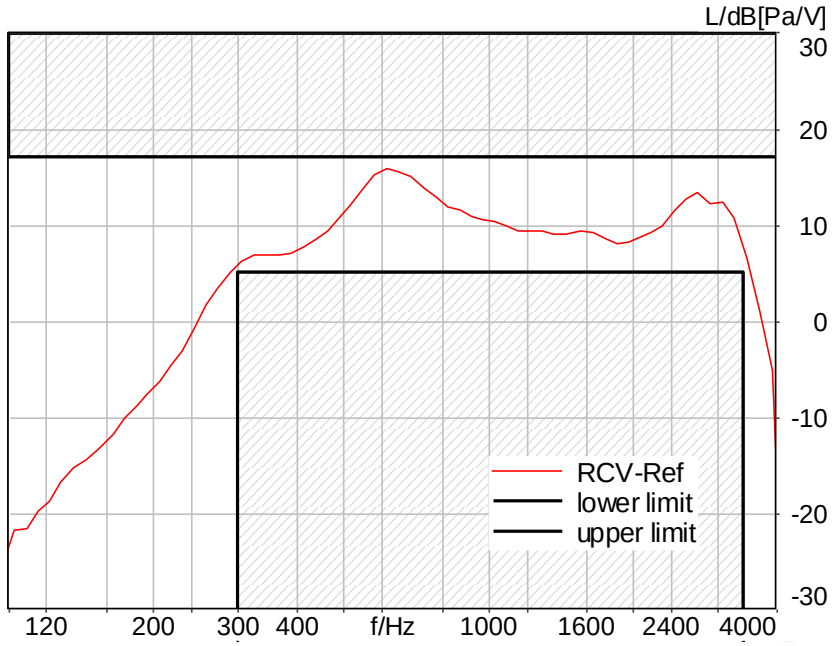



**Figure D.4-8 – WLAN UNII-2C 8N FF Norrowband Frequency Response**

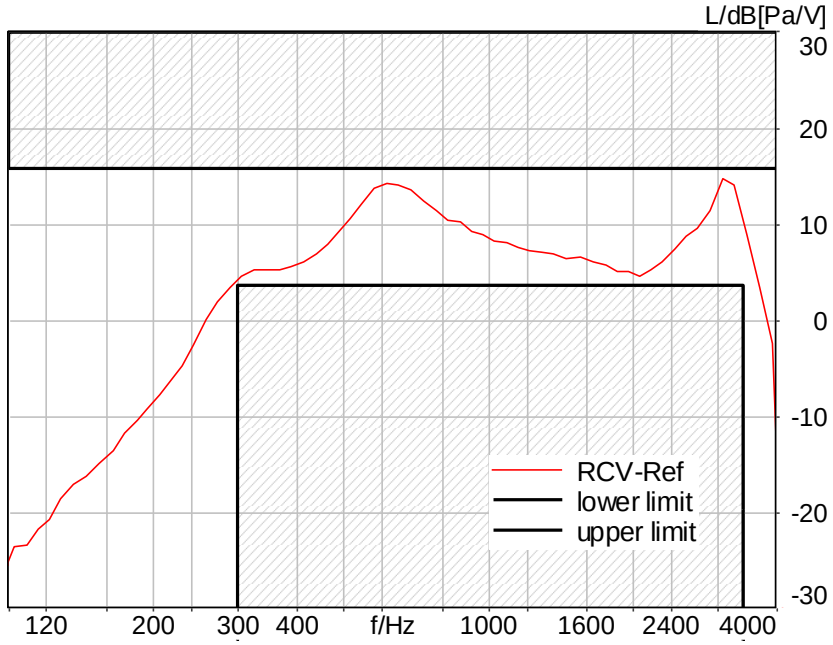



**Figure D.4-9 – WLAN UNII-3 2N FF Norrowband Frequency Response**

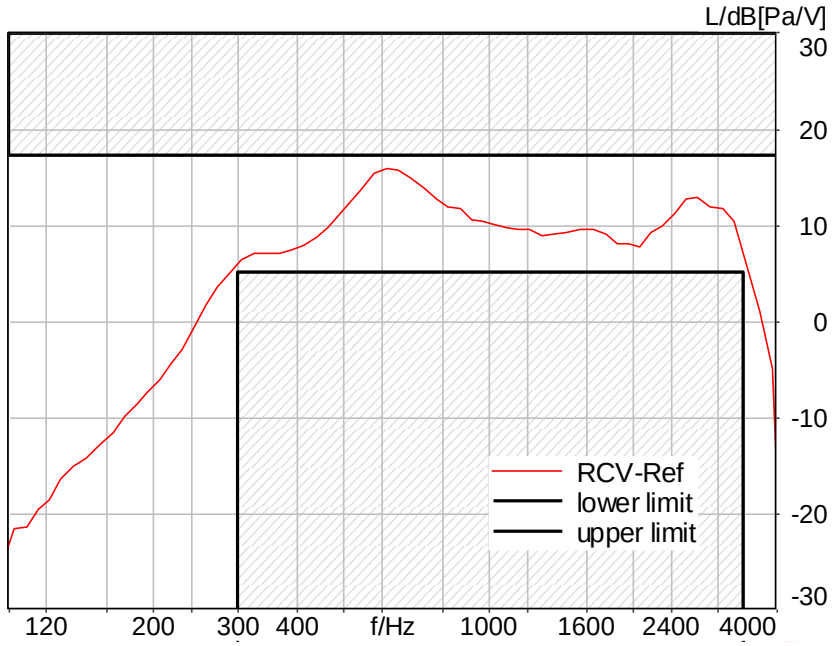



**Figure D.4-10 – WLAN UNII-3 8N FF Norrowband Frequency Response**

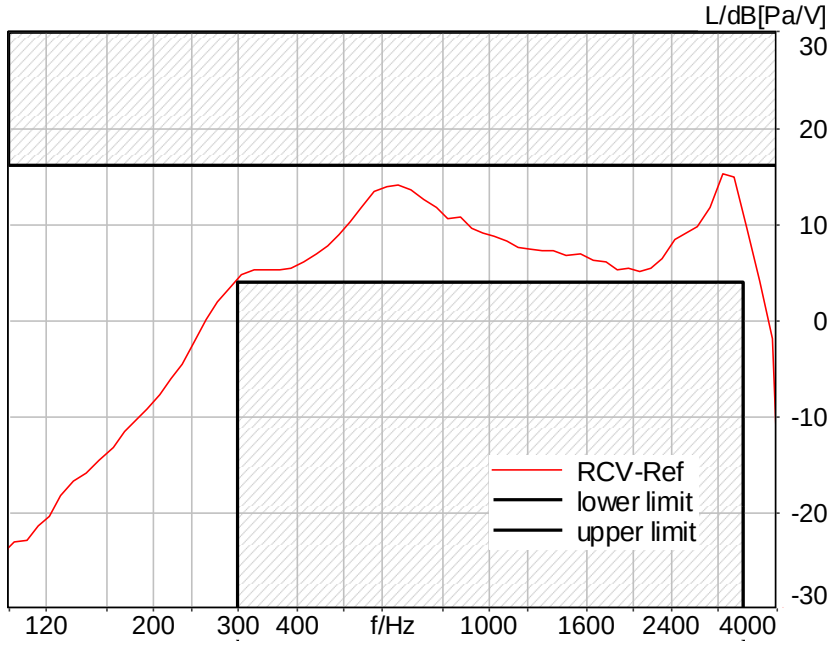



**Figure D.4-11 – WLAN UNII-5 2N FF Norrowband Frequency Response**

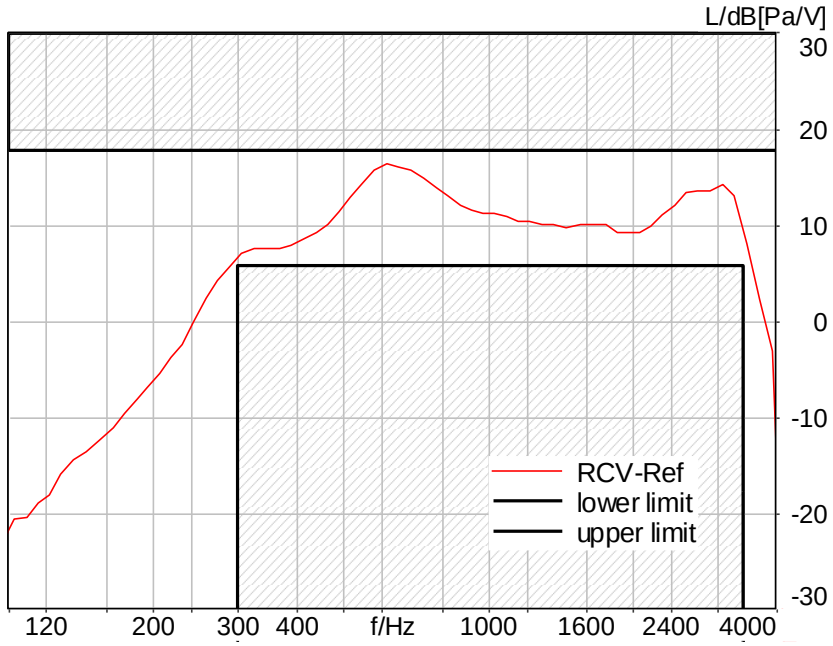



**Figure D.4-12 – WLAN UNII-5 8N FF Norrowband Frequency Response**

## ANNEX E Test Setup Diagrams

Test Diagrams

| | | |
|---|---|---|
| Artificial Ear Type | | 3.3 |
| Pressure Force [N] | | 2/8 |
| Center Fork Offset [°] | | / |
| Postion | | |
| Xe [°] | Ye [°] | Ze [°] |
| H | H | +5 |

Please refer to the ANNEX E For the photo of Test Layout

*****END OF REPORT*****