# HAC T-Coil TESTREPORT

# No. I18Z60272-SEM04

**For**

**TCL Communication Ltd.**

**GSM Quad-band/HSPA-UMTS Six-band/LTE 18-bands mobile phone**

**Model Name: BBE100-2**

**With**

**Hardware Version: 04**

**Software Version: V6R13-6**

**FCC ID: 2ACCJN024**

**Results Summary: T Category = T3**

**Issued Date: 2018-7-2**

**Test Laboratory:**

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## REPORT HISTORY

| Report Number | Revision | Issue Date | Description |
|---|---|---|---|
| I18Z60272-SEM04 | Rev.0 | 2018-7-2 | Initial creation of test report |

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# 1 Test Laboratory

## 1.1 Testing Location

| Company Name: | CTTL(Shouxiang) |
|---|---|
| Address: | No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China100191 |

## 1.2 Testing Environment

| Temperature: | 18°C~25°C, |
|---|---|
| Relative humidity: | 30%~ 70% |
| Ground system resistance: | < 0.5 $\Omega$ |
| Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards. | |
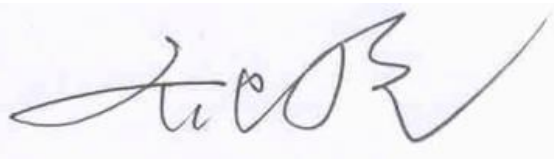
## 1.3 Project Data

| Project Leader: | Qi Dianyuan |
|---|---|
| Test Engineer: | Lin Hao |
| Testing Start Date: | June 20, 2018 |
| Testing End Date: | June 30, 2018 |
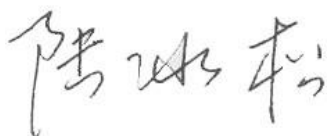
## 1.4 Signature

**Lin Xiaojun**

**(Prepared this test report)**

**Qi Dianyuan**

**(Reviewed this test report)**

**Lu Bingsong**

**Deputy Director of the laboratory**

**(Approved this test report)**

## 2 Client Information

### 2.1 Applicant Information

| | |
|---|---|
| Company Name: | TCL Communication Ltd. |
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| City: | Shenzhen |
| Country: | China |
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### 2.2 Manufacturer Information

| | |
|---|---|
| Company Name: | TCL Communication Ltd. |
| Address/Post: | 7/F, Block F4, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052 Shenzhen, Guangdong |
| City: | Shenzhen |
| Country: | China |
| Contact Person: | Gong Zhizhou |
| E-mail: | zhizhou.gong@tcl.com |
| Telephone: | 0086-755-36611722 |
| Fax: | 0086-75536612000-81722 |

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

## 3.1 About EUT

| Description: | GSM Quad-band/HSPA-UMTS Six-band/LTE 18-bands mobile phone |
|---|---|
| Model name: | BBE100-2 |
| Operating mode(s): | GSM 850/900/1800/1900 WCDMA850/900/1700/1900/2100<br>LTE B1/2/3/4/5/7/8/12/13/17/20/28/29/38/39/40/41/66, BT, WLAN |

## 3.2 Internal Identification of EUT used during the test

| EUT ID* | IMEI | HW Version | SW Version |
|---|---|---|---|
| EUT1 | 015138000009564 | 04 | V6R13-6 |
| EUT2 | 015138000200049 | 04 | V6R13-6 |

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

## 3.3 Internal Identification of AE used during the test

| AE ID | Description | Model | SN | Manufacturer |
|---|---|---|---|---|
| AE1 | Battery | TLp029C1 | / | BYD |

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

## 3.4 Air Interfaces / Bands Indicating Operating Modes

| Air-interface | Band(MHz) | Type | C63.19/tested | Simultaneous Transmissions | OTT |
|---|---|---|---|---|---|
| GSM | 850 | VO | Yes | BT, WLAN | NA |
| | 1900 | | | | |
| GPRS/EDGE | 850 | DT | NA | | |
| | 1900 | | | | |
| WCDMA (UMTS) | 850 | VO | Yes | BT, WLAN | NA |
| | 1700 | | | | |
| | 1900 | | | | |
| | HSPA | DT | NA | | |
| LTE | Band 2/5/7/12/13/41/66 | V/D | Yes | BT, WLAN | NA |
| BT | 2450 | DT | NA | GSM, WCDMA, LTE | NA |
| WLAN | 5G | V/D | Yes | GSM, WCDMA, LTE | NA |
| WLAN | 2450 | V/D | Yes | GSM, WCDMA, LTE | NA |

VO: Voice CMRS/PSTN Service Only     V/D: Voice CMRS/PSTN and Data Service
DT: Digital Transport

* HAC Rating was not based on concurrent voice and data modes, Non current mode was found to represent worst case rating for both M and T rating

## 4 Reference Documents

The following document listed in this section is referred for testing.

| Reference | Title | Version |
|---|---|---|
| ANSI C63.19-2011 | American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids | 2011 Edition |

# 5 OPERATIONAL CONDITIONS DURING TEST

## 5.1 HAC MEASUREMENT SET-UP

These measurements are performed using the DASY5 NEO automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Stäubli), robot controller, Intel Core2 computer, near-field probe, probe alignment sensor. The robot is a six-axis industrial robot performing precise movements. A cell controller system contains the power supply, robot controller, teach pendant (Joystick),and remote control, is used to drive the robot motors. The PC consists of the HP Intel Core21.86 GHz computer with Windows XP system and HAC Measurement Software DASY5 NEO, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE)circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.
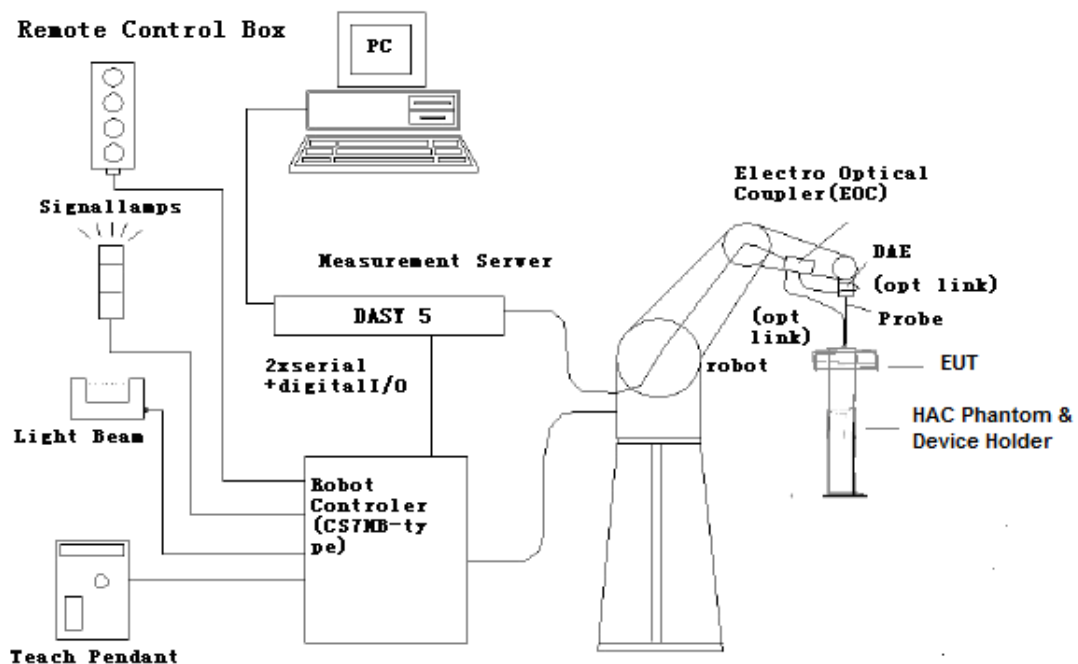


**Figure 5.1 HAC Test Measurement Set-up**

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.
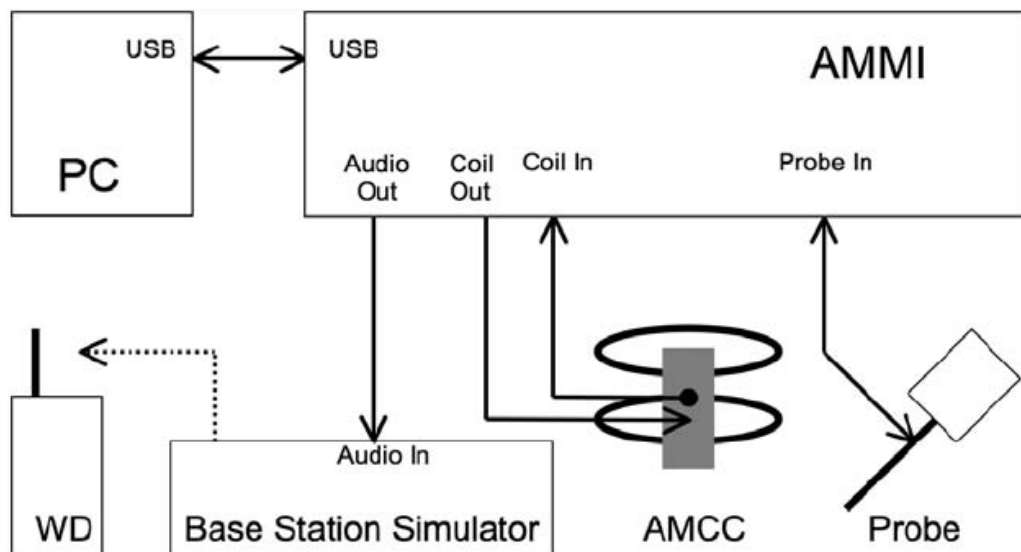




**Figure 5.2 T-Coil setup with HAC Test Arch and AMCC**

## 5.2 AM1D probe

The AM1D probe is an active probe with a single sensor. It is fully RF-shielded and has a rounded tip 6mm in diameter incorporating a pickup coil with its center offset 3mm from the tip and the sides. The symmetric signal preamplifier in the probe is fed via the shielded symmetric output cable from the AMMI with a 48V "phantom" voltage supply. The 7-pin connector on the back in the axis of the probe does not carry any signals. It is mounted to the DAE for the correct orientation of the sensor. If the probe axis is tilted 54.7 degree from the vertical, the sensor is approximately vertical when the signal connector is at the underside of the probe (cable hanging downwards).

Specification:

| Frequency range | 0.1~20kHz (RF sensitivity < -100dB, fully RF shielded) |
|---|---|
| Sensitivity | < -50dB A/m @ 1kHz |
| Pre-amplifier | 40dB, symmetric |
| Dimensions | Tip diameter/length: 6/290mm, sensor according to ANSI-C63.19 |

## 5.3 AMCC

The Audio Magnetic Calibration coil is a Helmholtz Coil designed for calibration of the AM1D probe. The two horizontal coils generate a homogeneous magnetic field in the z direction. The DC input resistance is adjusted by a series resistor to approximately 50Ohm, and a shunt resistor of 10Ohm permits monitoring the current with a scale of 1:10

Port description:

| Signal | Connector | Resistance |
|---|---|---|
| Coil In | BNC | Typically 50Ohm |
| Coil Monitor | BNO | 10Ohm±1% (100mV corresponding to 1 A/m) |

Specification:

| Dimensions | 370 x 370 x 196 mm, according to ANSI-C63.19 |
|---|---|

## 5.4 AMMI



**Figure 5.3 AMMI front panel**

The Audio Magnetic Measuring Instrument (AMMI) is a desktop 19-inch unit containing a sampling unit, a waveform generator for test and calibration signals, and a USB interface.

Specification:

| Sampling rate | 48 kHz / 24 bit |
|---|---|
| Dynamic range | 85 dB |
| Test signal generation | User selectable and predefined (vis PC) |
| Calibration | Auto-calibration / full system calibration using AMCC with monitor output |
| Dimensions | 482 x 65 x 270 mm |

## 5.5 Test Arch Phantom &Phone Positioner

The Test Arch phantom should be positioned horizontally on a stable surface. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. It enables easy and well defined positioning of the phone and validation dipoles as well as simple teaching of the robot (Dimensions: 370 x 370 x 370 mm).

The Phone Positioner supports accurate and reliable positioning of any phone with effect on near field $< \pm 0.5$ dB.
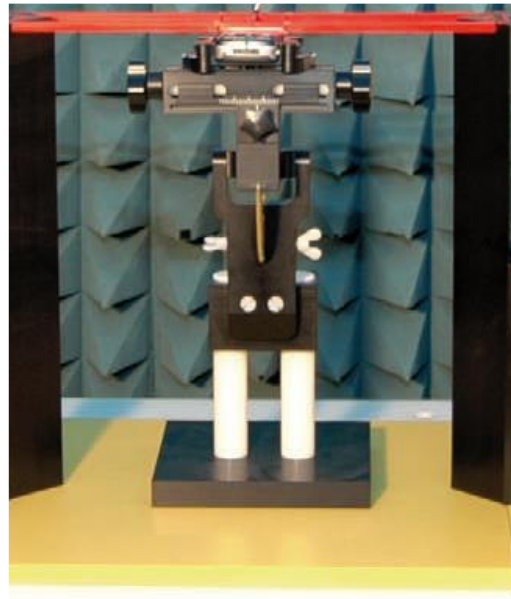


**Figure 5.4 HAC Phantom & Device Holder**

## 5.6 Robotic System Specifications

**Specifications**
    **Positioner:** Stäubli Unimation Corp. Robot Model: RX160L
    **Repeatability:** ±0.02 mm
    **No. of Axis:** 6
**Data Acquisition Electronic (DAE) System**
    **Cell Controller**
    **Processor:**Intel Core2
    **Clock Speed:** 1.86GHz
    **Operating System:** Windows XP
    **Data Converter**
    **Features:**Signal Amplifier, multiplexer, A/D converter, and control logic
    **Software:** DASY5 software
    **Connecting Lines:**Optical downlink for data and status info.
      Optical uplink for commands and clock

## 5.7 T-Coil measurement points and reference plane

Figure 6.5 illustrates the standard probe orientations. Position 1 is the perpendicular orientation of the probe coil; orientation 2 is the transverse orientations. The space between the measurement positions is not fixed. It is recommended that a scan of the WD be done for each probe coil orientation and that the maximum level recorded be used as the reading for that orientation of the probe coil.

1) The reference plane is the planar area that contains the highest point in the area of the phone that normally rests against the user's ear. It is parallel to the centerline of the receiver area of the phone and is defined by the points of the receiver-end of the WD handset, which, in normal handset use, rest against the ear.

2) The measurement plane is parallel to, and 10 mm in front of, the reference plane.

3) The reference axis is normal to the reference plane and passes through the center of the receiver speaker section (or the center of the hole array); or may be centered on a secondary inductive source. The actual location of the measurement point shall be noted in the test report as the measurement reference point.

4) The measurement points may be located where the axial and radial field intensity measurements are optimum with regard to the requirements. However, the measurement points should be near the acoustic output of the WD and shall be located in the same half of the phone as the WD receiver. In a WD handset with a centered receiver and a circularly symmetrical magnetic field, the measurement axis and the reference axis would coincide.

5) The relative spacing of each measurement orientation is not fixed. The axial and two radial orientations should be chosen to select the optimal position.

6) The measurement point for the axial position is located 10 mm from the reference plane on the measurement axis. The actual location of the measurement point shall be noted in test reports and designated as the measurement reference point.
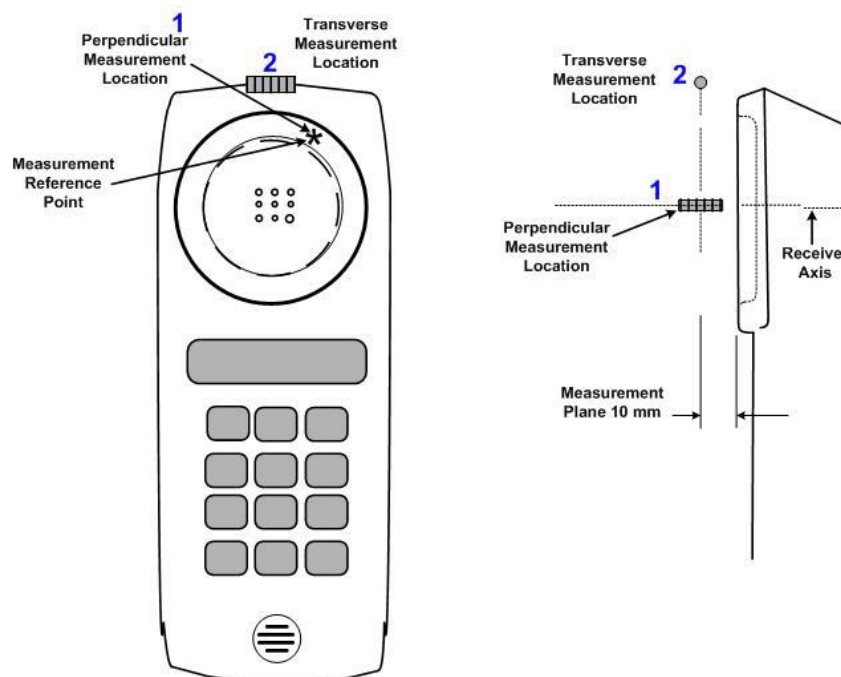


**Figure 5.5 Axis and planes for WD audio frequency magnetic field measurements**

# 6 T-Coil TEST PROCEDUERES

**The following illustrate a typical test scan over a wireless communications device:**

1) Geometry and signal check: system probe alignment, proper operation of the field probe, probe measurement system, other instrumentation, and the positioning system was confirmed. A surface calibration was performed before each setup change to ensure repeatable spacing and proper maintenance of the measurement plane using the test Arch.

2) Set the reference drive level of signal voice defined in C63.19 per 7.4.2.1.

3) The ambient and test system background noise (dB A/m) was measured as well as ABM2 over the full measurement. The maximum noise level must be at least 10dB below the limit.

4) The DUT was positioned in its intended test position, acoustic output point of the device perpendicular to the field probe.

5) The DUT operation for maximum rated RF output power was configured and connected by using of coaxial cable connection to the base station simulator at the test channel and other normal operating parameters as intended for the test. The battery was ensured to be fully charged before each test. The center sub-grid was centered over the center of the acoustic output (also audio band magnetic output, if applicable). The DUT audio output was positioned tangent (as physically possible) to the measurement plane.

6) The DUT's RF emission field was eliminated from T-coil results by using a well RF-shielding of the probe, AM1D, and by using of coaxial cable connection to a Base Station Simulator. One test channel was pre-measurement to avoid this possibility.

7) Determined the optimal measurement locations for the DUT by following the three steps, coarse resolution scan, fine resolution scans, and point measurement, as described in C63.19 per 7.4.4.2. At each measurement locations, samples in the measurement window duration were evaluated to get ABM1 and the signal spectrum. The noise measurement was performed after the scan with the signal, the same happened, just with the voice signal switched off. The ABM2 was calculated from this second scan.

8) All results resulting from a measurement point in a T-Coil job were calculated from the signal samples during this window interval. ABM values were averaged over the sequence of there samples.

9) At an optimal point measurement, the SNR (ABM1/ABM2) was calculated for perpendicular and transverse orientation, and the frequency response was measured for perpendicular.

10) Corrected for the frequency response after the DUT measurement since the DASY5 system had known the spectrum of the input signal by using a reference job.

11) In SEMCAD postprocessing, the spectral points are in addition scaled with the high-pass (half-band) and the A-weighting, bandwidth compensated factor (BWC) and those results are final as shown in this report.

# 7 T-Coil PERFORMANCE REQUIREMENTS

In order to be rated for T-Coil use, a WD shall meet the requirements for signal level and signal quality contained in this part.

## 7.1 T-Coil coupling field intensity

When measured as specified in ANSI C63.19, the T-Coil signal shall be ≥ –18 dB (A/m) at 1 kHz, ina1/3 octave band filter for all orientations.

## 7.2 Frequency response

The frequency response of the axial component of the magnetic field, measured in 1/3 octave bands, shall follow the response curve specified in this sub-clause, over the frequency range 300 Hz to 3000 Hz. Figure 7.1 and Figure 7.2 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.
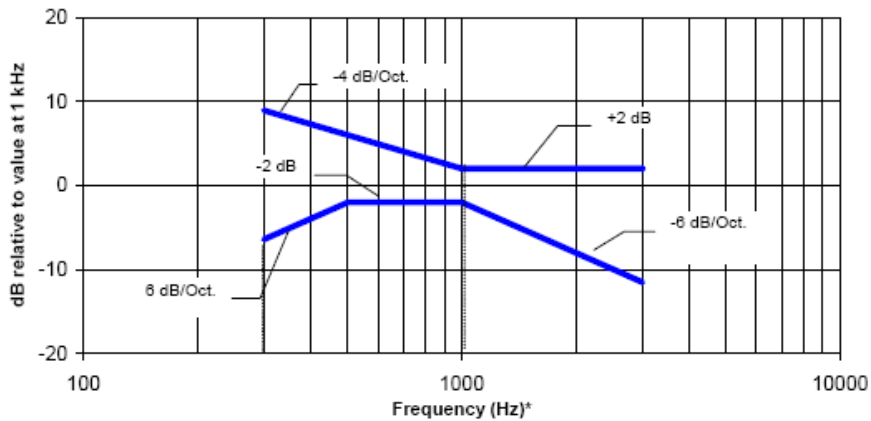


NOTE—Frequency response is between 300 Hz and 3000 Hz.

**Figure 7.1—Magnetic field frequency response for WDs with a field ≤ –15 dB (A/m) at 1 kHz**
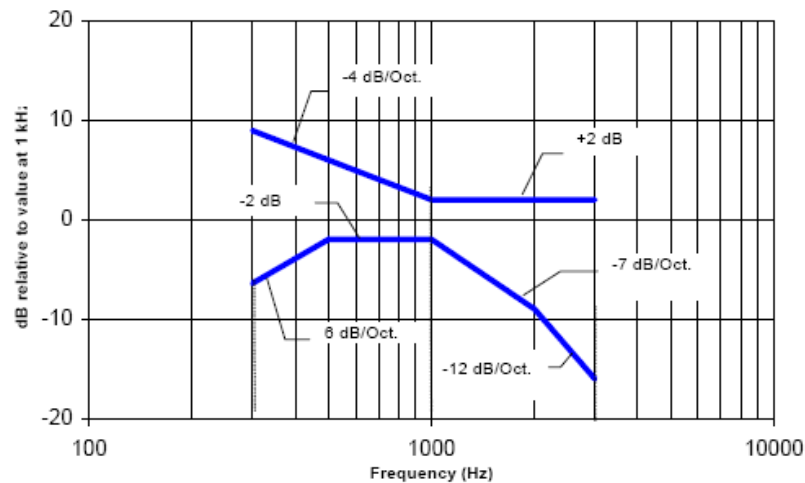


NOTE—Frequency response is between 300 Hz and 3000 Hz.

**Figure 7.2—Magnetic field frequency response for WDs with a fieldthat exceeds –15 dB(A/m) at 1 kHz**

## 7.3 Signal quality

This part provides the signal quality requirement for the intended T-Coil signal from a WD. Only the RF immunity of the hearing aid is measured in T-Coil mode. It is assumed that a hearing aid can have noimmunity to an interference signal in the audio band, which is the intended reception band for this mode. So, the only criteria that can be measured is the RF immunity in T-Coil mode. This is measured using the same procedure as for the audio coupling mode and at the same levels.

The worst signal quality of the three T-Coil signal measurements shall be used to determine the T-Coil mode category per Table 1

**Table 1:T-Coil signal quality categories**

| Category | Telephone parameters<br>WD signal quality<br>[(signal + noise) – to – noise ratio in decibels] |
|----------|------------------------------------------------------------------------------------------------|
| Category T1 | 0 dB to 10 dB |
| Category T2 | 10 dB to 20 dB |
| Category T3 | 20 dB to 30 dB |
| Category T4 | > 30 dB |

# 8 VOLTE TEST SYSTEM SETUP AND DUT CONFIGURATION

## 8.1 Test System Setup for VoLTE over IMS T-coil Testing

The general test setup used for VoLTE over IMS is shown below. The callbox used when performing VoLTE over IMS T-coil measurements is a CMW500. The Data Application Unit (DAU) of the CMW500 was used to simulate the IP Multimedia Subsystem (IMS) server.



**Figure 8.1 Test Setup for VoLTE over IMS T-coil Measurements**

## 8.2 Codec Configuration

An investigation was performed to determine the audio codec configuration to be used for testing. The EVS Primary NB 13.2kbps setting was used for the audio codec on the CMW500 for VoLTE over IMS T-coil testing. See below table for comparisons between different codecs and codec data rates:

**Table 8-1 AMR Codec Investigation – VoLTE over IMS**

| Codec Setting | WB AMR 23.85kbps | WB AMR 6.60kbps | NB AMR 12.2kbps | NB AMR 4.75kbps | Orientation | Band/BW | Channel |
|---|---|---|---|---|---|---|---|
| ABM1 (dBA/m) | 9.49 | 9.39 | 8.9 | 10.03 | Z(axial) | B2/20M | 18900 |
| Frequency Response | PASS | PASS | PASS | PASS | | | |
| SNR (dB) | 52.39 | 52.12 | 50.69 | 51.9 | | | |

**Table 8-2 EVS Codec Investigation – VoLTE over IMS**

| Codec Setting | EVS Primary SWB 13.2kbps | EVS Primary SWB 9.6kbps | EVS Primary WB 13.2kbps | EVS Primary WB 5.9kbps | EVS Primary NB 13.2kbps | EVS Primary NB 5.9kbps | Orientation | Band /BW | Channel |
|---|---|---|---|---|---|---|---|---|---|
| ABM1 (dBA/m) | 12.95 | 9.32 | 6.38 | 9.25 | 6.34 | 6.24 | Z(axial) | B2/20M | 18900 |
| Frequency Response | PASS | PASS | PASS | PASS | PASS | PASS | | | |
| SNR (dB) | 62.7 | 50.85 | 49.14 | 50.89 | 48.68 | 49.52 | | | |

## 8.3 Radio Configuration

An investigation was performed to determine the modulation and RB configuration to be used for testing. 16QAM, 1RB, 0RB offset was used for the testing as the worst-case configuration for the handset. See below table for comparisons between different radio configurations:

**Table 8-3 VoLTE over IMS SNR by Radio Configuration**

| Frequency [MHz] | Channel | Bandwidth [MHz] | Modulation | RB Size | RB Offset | ABM1 [dB(A/m)] | SNR [dB] |
|---|---|---|---|---|---|---|---|
| 1880 | 18900 | 20 | QPSK | 1 | 0 | 0.17 | 42.78 |
| 1880 | 18900 | 20 | QPSK | 1 | 50 | -0.31 | 42.16 |
| 1880 | 18900 | 20 | QPSK | 1 | 99 | 0.05 | 43.01 |
| 1880 | 18900 | 20 | QPSK | 50 | 0 | 0 | 43.24 |
| 1880 | 18900 | 20 | QPSK | 50 | 25 | 0.02 | 43.31 |
| 1880 | 18900 | 20 | QPSK | 50 | 50 | 0.17 | 43.68 |
| 1880 | 18900 | 20 | QPSK | 100 | 0 | -0.22 | 42.98 |
| 1880 | 18900 | 20 | 16QAM | 1 | 0 | 0.33 | 40.58 |
| 1880 | 18900 | 20 | 16QAM | 1 | 50 | 0 | 39.05 |
| 1880 | 18900 | 20 | 16QAM | 1 | 99 | 0.53 | 41.56 |
| 1880 | 18900 | 20 | 16QAM | 50 | 0 | 0.17 | 43.2 |
| 1880 | 18900 | 20 | 16QAM | 50 | 25 | 0.14 | 43.34 |
| 1880 | 18900 | 20 | 16QAM | 50 | 50 | -0.13 | 43.07 |
| 1880 | 18900 | 20 | 16QAM | 100 | 0 | -0.55 | 42.64 |

# 9 VOWIFI TEST SYSTEM SETUP AND DUT CONFIGURATION

## 9.1 Test System Setup for VoWiFI over IMS T-coil Testing

The general test setup used for VoWiFi over IMS, or CMRS WiFi Calling, is shown below. The callbox used when performing VoWiFi over IMS T-coil measurements is a CMW500. The Data Application Unit (DAU) of the CMW500 was used to simulate the IP Multimedia Subsystem (IMS) server.
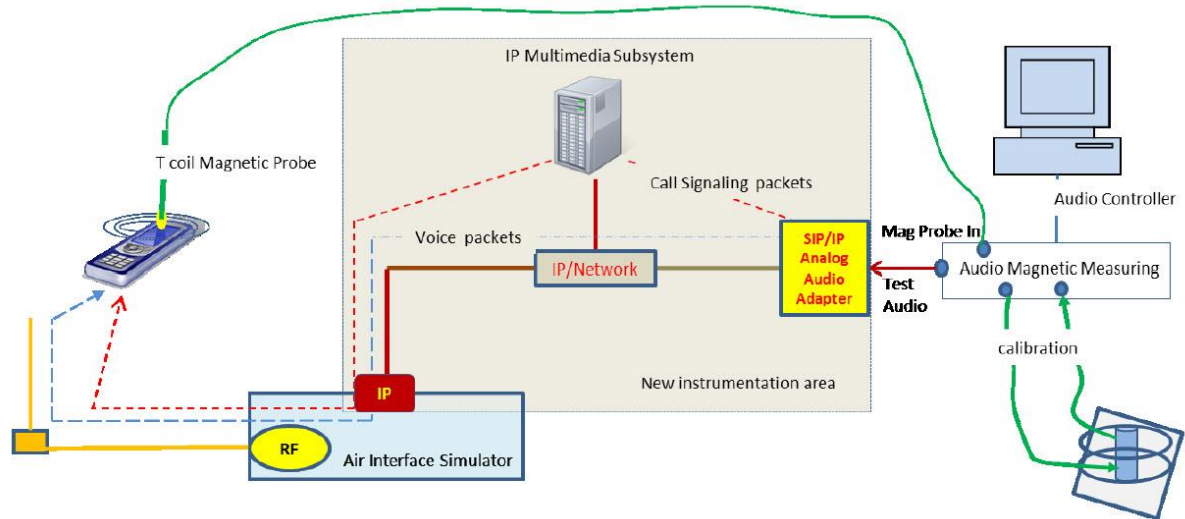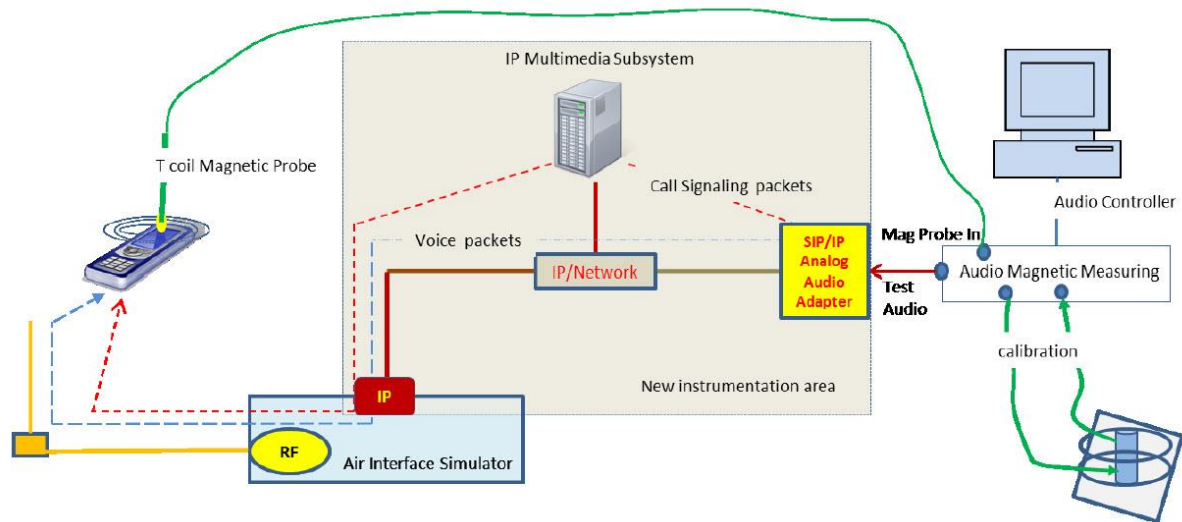


**Figure 9.1 Test Setup for VoLTE over IMS T-coil Measurements**

## 9.2 Codec Configuration

An investigation was performed to determine the audio codec configuration to be used for testing. The EVS Primary WB 23.85kbps setting was used for the audio codec on the CMW500 for VoWiFi over IMS T-coil testing. See below table for comparisons between different codecs and codec data rates:

### Table 9-1 AMR Codec Investigation – VoWiFi over IMS

| Codec Setting | WB AMR 23.85kbps | WB AMR 6.60kbps | NB AMR 12.2kbps | NB AMR 4.75kbps | Orientation | Mode | Channel |
|---|---|---|---|---|---|---|---|
| ABM1 (dBA/m) | 9.42 | 9.57 | 9.89 | 9.33 | Z(axial) | 2.4GHz 802.11b | 6 |
| Frequency Response | PASS | PASS | PASS | PASS | | | |
| SNR (dB) | 47.24 | 48.76 | 48.23 | 47.52 | | | |

### Table 9-2 EVS Codec Investigation – VoWiFi over IMS

| Codec Setting | EVS Primary SWB 13.2kbps | EVS Primary SWB 9.6kbps | EVS Primary WB 13.2kbps | EVS Primary WB 5.9kbps | EVS Primary NB 13.2kbps | EVS Primary NB 5.9kbps | Orientation | Mode | Channel |
|---|---|---|---|---|---|---|---|---|---|
| ABM1 (dBA/m) | 10.07 | 10.22 | 9.68 | 9.22 | 10.02 | 9.89 | Z(axial) | 2.4GHz 802.11b | 6 |
| Frequency Response | PASS | PASS | PASS | PASS | PASS | PASS | | | |
| SNR (dB) | 49.34 | 49.26 | 48.79 | 48.56 | 48.91 | 48.65 | | | |

## 9.3 Radio Configuration

An investigation was performed on all applicable data rates and modulations to determine the radio configuration to be used for testing. See below table for comparisons between different radio configurations in each 802.11 standard:

### Table 9-3 802.11b SNR by Radio Configuration

| Mode | Channel | Modulation | Data Rate [Mbps] | ABM1 [dB(A/m)] | SNR [dB] |
|------|---------|-----------|------------------|----------------|----------|
| 802.11b | 6 | DSSS | 1 | 10.11 | 48.98 |
| 802.11b | 6 | DSSS | 2 | 9.59 | 48.75 |
| 802.11b | 6 | CCK | 5.5 | 9.42 | 47.24 |
| 802.11b | 6 | CCK | 11 | 9.68 | 48.56 |

### Table 9-4 802.11g/a SNR by Radio Configuration

| Mode | Channel | Modulation | Data Rate [Mbps] | ABM1 [dB(A/m)] | SNR [dB] |
|------|---------|-----------|------------------|----------------|----------|
| 802.11g | 6 | BPSK | 6 | 6.78 | 50.12 |
| 802.11g | 6 | BPSK | 9 | 4.49 | 49.97 |
| 802.11g | 6 | QPSK | 12 | 5.87 | 51.38 |
| 802.11g | 6 | QPSK | 18 | 6.45 | 50.32 |
| 802.11g | 6 | 16-QAM | 24 | 6.12 | 51.12 |
| 802.11g | 6 | 16-QAM | 36 | 5.88 | 50.37 |
| 802.11g | 6 | 64-QAM | 48 | 4.62 | 49.99 |
| 802.11g | 6 | 64-QAM | 54 | 6.51 | 50.16 |

### Table 9-5 802.11n/ac 20MHz BW SNR by Radio Configuration

| Mode | Bandwidth [MHz] | Channel | Modulation | Data Rate [Mbps] | ABM1 [dB(A/m)] | SNR [dB] |
|------|-----------------|---------|-----------|------------------|----------------|----------|
| 802.11n | 20 | 44 | BPSK | 6.5 | 10.67 | 53.91 |
| 802.11n | 20 | 44 | QPSK | 13 | 9.83 | 54.68 |
| 802.11n | 20 | 44 | QPSK | 19.5 | 10.87 | 54.87 |
| 802.11n | 20 | 44 | 16-QAM | 26 | 9.36 | 53.97 |
| 802.11n | 20 | 44 | 16-QAM | 39 | 10.92 | 55.02 |
| 802.11n | 20 | 44 | 64-QAM | 52 | 8.98 | 54.66 |
| 802.11n | 20 | 44 | 64-QAM | 58.5 | 10.02 | 54.21 |
| 802.11n | 20 | 44 | 64-QAM | 65 | 10.48 | 54.87 |
| 802.11ac | 20 | 44 | 256-QAM | 78 | 10.23 | 53.96 |

**Table 9-6 802.11n/ac 40MHz BW SNR by Radio Configuration**

| Mode | Bandwidth [MHz] | Channel | Modulation | Data Rate [Mbps] | ABM1 [dB(A/m)] | SNR [dB] |
|---|---|---|---|---|---|---|
| 802.11n | 40 | 46 | BPSK | 13.5 | 13.02 | 54.28 |
| 802.11n | 40 | 46 | QPSK | 27 | 12.87 | 54.89 |
| 802.11n | 40 | 46 | QPSK | 40.5 | 12.36 | 54.46 |
| 802.11n | 40 | 46 | 16-QAM | 54 | 11.96 | 55.02 |
| 802.11n | 40 | 46 | 16-QAM | 81 | 12.49 | 54.01 |
| 802.11n | 40 | 46 | 64-QAM | 108 | 12.62 | 54.72 |
| 802.11n | 40 | 46 | 64-QAM | 121.5 | 12.95 | 54.09 |
| 802.11n | 40 | 46 | 64-QAM | 135 | 13.08 | 54.21 |
| 802.11ac | 40 | 46 | 256-QAM | 162 | 12.47 | 54.66 |
| 802.11ac | 40 | 46 | 256-QAM | 180 | 12.61 | 54.38 |

**Table 9-7 802.11ac 80MHz BW SNR by Radio Configuration**

| Mode | Bandwidth [MHz] | Channel | Modulation | Data Rate [Mbps] | ABM1 [dB(A/m)] | SNR [dB] |
|---|---|---|---|---|---|---|
| 802.11ac | 80 | 42 | BPSK | 29.3 | 12.19 | 53.92 |
| 802.11ac | 80 | 42 | QPSK | 58.5 | 12.02 | 53.95 |
| 802.11ac | 80 | 42 | QPSK | 87.8 | 10.57 | 55.06 |
| 802.11ac | 80 | 42 | 16-QAM | 117 | 11.02 | 55.21 |
| 802.11ac | 80 | 42 | 16-QAM | 175.5 | 12.33 | 54.79 |
| 802.11ac | 80 | 42 | 64-QAM | 234 | 11.56 | 54.33 |
| 802.11ac | 80 | 42 | 64-QAM | 263.3 | 11.78 | 54.08 |
| 802.11ac | 80 | 42 | 64-QAM | 292.5 | 12.03 | 54.72 |
| 802.11ac | 80 | 42 | 256-QAM | 351 | 10.78 | 53.98 |
| 802.11ac | 80 | 42 | 256-QAM | 390 | 11.04 | 54.68 |

## 10 HAC T-Coil TEST DATA SUMMARY

### 10.1 Test Results for 2/3G

| Probe Position | Band | Ch. | Measurement Position (x mm, y mm) | ABM1 (dB A/m) | SNR (dB) | T category |
|---|---|---|---|---|---|---|
| transverse | GSM 850 | 190 | 5.4 , -8.8 | -2.62 | 27.55 | T3 |
| | PCS 1900 | 661 | 5 , -9.2 | -2.65 | 30.11 | T4 |
| | W850 | 4407 | 4.2 , -15.8 | -3.05 | 41.47 | T4 |
| | W1900 | 9800 | 5 , -13.8 | -1.67 | 40.19 | T4 |
| | W1700 | 1637 | 5.4 , -12.9 | -1.59 | 41.75 | T4 |
| perpendicular | GSM 850 | 190 | 0 , -1.3 | -3.62 | 31.39 | T4 |
| | PCS 1900 | 661 | 0.4 , -0.8 | -3.06 | 36.38 | T4 |
| | W850 | 4407 | 7.9 , -1.7 | 7.84 | 48.15 | T4 |
| | W1900 | 9800 | 7.9 , -0.4 | 7.85 | 48 | T4 |
| | W1700 | 1637 | 8.3,0 | 8.56 | 48.51 | T4 |

Note:

1. Bluetooth and WiFi function is turn off and microphone is muted.

2. Signal strength measurement scan plots are presented in Annex B.

3. The volume is adjusted to maximum level during T-Coil testing.

### 10.2 Test Results for LTE

| Probe Position | Band | Ch. | Bandwidth | Measurement Position (x mm, y mm) | ABM1 (dB A/m) | SNR (dB) | T category |
|---|---|---|---|---|---|---|---|
| Transverse y | LTE B2 | 18900 | 1.4M | 3.8 , -12.9 | 1.74 | 40.36 | T4 |
| | | | 3M | 3.3 , -12.9 | 1.58 | 38.52 | T4 |
| | | | 5M | 1.3 , -12.9 | 1.6 | 42.1 | T4 |
| | | | 10M | 3.8 , -11.3 | 1.66 | 39.6 | T4 |
| | | | 15M | 2.9 , -17.1 | 2.27 | 41.28 | T4 |
| | | | 20M | -2.5 , -13.3 | -2.4 | 41.22 | T4 |
| | LTE B5 | 20525 | 1.4M | 2.5，-12.9 | 1.94 | 43.26 | T4 |
| | | | 3M | 0,-12.9 | 0.8 | 43.34 | T4 |
| | | | 5M | 0.8，-12.5 | 1.2 | 45.22 | T4 |
| | | | 10M | 2.1，-12.5 | 1.52 | 44.3 | T4 |
| | LTE B7 | 21100 | 5M | 2.5 , -12.5 | 1.12 | 41.51 | T4 |
| | | | 10M | 3.3 , -13.3 | 0.92 | 42.22 | T4 |
| | | | 15M | 1.7 , -12.9 | 0.7 | 43.41 | T4 |
| | | | 20M | 4.2 , -12.9 | 1.03 | 42.6 | T4 |
| | LTE B12 | 23095 | 1.4M | 7.1 , -12.5 | 4.51 | 46.62 | T4 |
| | | | 3M | 5.4 , -12.9 | 4.26 | 46.62 | T4 |
| | | | 5M | 4.2 , -12.5 | 4.14 | 48.09 | T4 |
| | | | 10M | 3.8 , -13.3 | 3.6 | 46.26 | T4 |
| | LTE B13 | 23230 | 5M | 7.1, -9.2 | 4.60 | 43.11 | T4 |
| | | | 10M | 3.8，-12.1 | 2.37 | 41.12 | T4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **LTE B66** | 132322 | 1.4M | 4.6 , -13.3 | 1.57 | 42.00 | **T4** |
| | | | 3M | 3.8 , -13.3 | 1.88 | 41.97 | **T4** |
| | | | 5M | 4.2 , -12.5 | 2.35 | 43.79 | **T4** |
| | | | 10M | 3.3 , -12.5 | 1.30 | 41.75 | **T4** |
| | | | 15M | 3.8 , -12.5 | 1.96 | 41.81 | **T4** |
| | | | 20M | 3.8 , -12.5 | 2.04 | 41.90 | **T4** |
| | **LTE B41** | 40620 | 5M | 3.8,4.6 | 5.64 | 35.18 | **T4** |
| | | | 10M | 4.2,4.7 | 5.32 | 37.09 | **T4** |
| | | | 15M | 4.8,3.9 | 5.44 | 37.52 | **T4** |
| | | | 20M | 4.2,4.2 | 5.25 | 35.66 | **T4** |
| **Perpendicular z** | **LTE B2** | 18900 | 1.4M | 0.4 , -4.2 | 6.13 | 48.22 | **T4** |
| | | | 3M | 0.8 , -4.2 | 6.82 | 47.96 | **T4** |
| | | | 5M | 1.3 , -3.3 | 7.27 | 48.88 | **T4** |
| | | | 10M | 0.4,-1.7 | 7.05 | 48.25 | **T4** |
| | | | 15M | 1.7 , -2.1 | 4.64 | 46.93 | **T4** |
| | | | 20M | 3.3,-3.8 | 8.25 | 49.74 | **T4** |
| | **LTE B5** | 20525 | 1.4M | 7.5, -0.8 | -3.83 | 40.55 | **T4** |
| | | | 3M | 2.1, -1.3 | -3.87 | 40.83 | **T4** |
| | | | 5M | 4.2, -0.4 | -4.01 | 40.98 | **T4** |
| | | | 10M | 2.9, -1.3 | -4.09 | 42.01 | **T4** |
| | **LTE B7** | 21100 | 5M | 3.8 , -1.3. | 8.73 | 50.9 | **T4** |
| | | | 10M | 3.8 , -2.5 | 8.4 | 50.5 | **T4** |
| | | | 15M | 4.2 , -0.8 | 8.53 | 51.42 | **T4** |
| | | | 20M | 0.8 , -1.3 | 6.52 | 51.28 | **T4** |
| | **LTE B12** | 23095 | 1.4M | 5 , -1.7 | 9.85 | 51.43 | **T4** |
| | | | 3M | 6.3 , -1.3 | 10.72 | 51.83 | **T4** |
| | | | 5M | 4.6 , -2.1 | 9.89 | 52.78 | **T4** |
| | | | 10M | 4.6 , -0.8 | 8.6 | 53.45 | **T4** |
| | **LTE B13** | 26865 | 5M | 3.8 , -0.8 | 8.85 | 49.45 | **T4** |
| | | | 10M | 3.8 , -1.3 | 9.18 | 47.99 | **T4** |
| | **LTE B66** | 132322 | 1.4M | 5 , -3.3 | 8.49 | 49.67 | **T4** |
| | | | 3M | 4.2 , -3.8 | 9.07 | 49.86 | **T4** |
| | | | 5M | 4.6 , -1.3 | 8.43 | 50.47 | **T4** |
| | | | 10M | 3.8 , -0.8 | 7.48 | 49.30 | **T4** |
| | | | 15M | 4.2 , -1.7 | 8.05 | 49.36 | **T4** |
| | | | 20M | 3.8 , -2.1 | 7.79 | 49.39 | **T4** |
| | **LTE B41** | 40620 | 5M | -0.8 , -2.5 | 7.11 | 46.8 | **T4** |
| | | | 10M | 0.9 , -2.1 | 5.25 | 44.79 | **T4** |
| | | | 15M | 1.6 , -2.2 | 5.38 | 45.27 | **T4** |
| | | | 20M | 0.4 , -2.1 | 4.1 | 44.31 | **T4** |

Note:

1.  Bluetooth and WiFi function is turn off and microphone is muted.

2.  The worse case of each band for signal strength measurement scan plots are presented in Annex B.

3.  The volume is adjusted to maximum level during T-Coil testing.

## 10.3 Test Results for WiFi

| Probe Position | Mode | Ch. | Bandwidth | Measurement Position (x mm, y mm) | ABM1 (dB A/m) | SNR (dB) | T category |
|---|---|---|---|---|---|---|---|
| Transverse y | 802.11b | 6 | 20M | 7.5 , -12.1 | 5.23 | 49.91 | T4 |
| | 802.11g | 6 | 20M | 4.2 , -12.9 | 3.03 | 50.52 | T4 |
| | 802.11n | 6 | 20M | 5.4 , -12.8 | 6.54 | 50.68 | T4 |
| | 802.11n | 6 | 40M | 7.9 , -11.9 | 5.77 | 49.97 | T4 |
| | 802.11a UNII-1 | 44 | 20M | 8.6 , -11.5 | 7.32 | 52.91 | T4 |
| | 802.11n UNII-1 | 44 | 20M | 8.3 , -12.5 | 6.03 | 52.82 | T4 |
| | | 46 | 40M | 9.6 , -11.7 | 6.03 | 56.3 | T4 |
| | 802.11ac UNII-1 | 44 | 20M | 5.6 , -11.8 | 8.22 | 53.86 | T4 |
| | | 46 | 40M | 5.2 , -12.3 | 7.88 | 54.25 | T4 |
| | | 42 | 80M | 4.2 , -12.1 | 2.52 | 53.73 | T4 |
| | 802.11n | 60 | 20M | 6.8 , -11.9 | 4.96 | 53.21 | T4 |
| | 802.11n | 124 | 20M | 5.2 , -12.4 | 5.87 | 54.02 | T4 |
| | 802.11n | 157 | 20M | 5.8 , -12.5 | 7.51 | 53.89 | T4 |
| Perpendicular z | 802.11b | 6 | 20M | 4.2 , -1.3 | 9.42 | 47.24 | T4 |
| | 802.11g | 6 | 20M | -0.4,0 | 4.49 | 49.97 | T4 |
| | 802.11n | 6 | 20M | 3.2 , -0.9 | 6.78 | 49.24 | T4 |
| | 802.11n | 6 | 40M | 1.5 , -1.4 | 8.62 | 50.77 | T4 |
| | 802.11a UNII-1 | 44 | 20M | 4.1 , -3.1 | 9.82 | 53.94 | T4 |
| | 802.11n UNII-1 | 44 | 20M | 4.2 , -2.5 | 10.67 | 53.91 | T4 |
| | | 46 | 40M | 7.9 , -0.4 | 12.49 | 54.01 | T4 |
| | 802.11ac UNII-1 | 44 | 20M | 4.2 , -3.5 | 8.45 | 55.53 | T4 |
| | | 46 | 40M | 4.7 , -11.6 | 6.31 | 54.72 | T4 |
| | | 42 | 80M | 4.2 , -12.1 | 12.19 | 53.92 | T4 |
| | 802.11n | 60 | 20M | 5.7 , -10.8 | 8.13 | 54.81 | T4 |
| | 802.11n | 124 | 20M | 4.8 , -12.2 | 7.45 | 54.77 | T4 |
| | 802.11n | 157 | 20M | 4.9 , -9.7 | 6.92 | 55.12 | T4 |

Note:

1. Bluetooth and WiFi function is turn off and microphone is muted.

2. The worse case of each mode for signal strength measurement scan plots are presented in Annex B.

3. The volume is adjusted to maximum level during T-Coil testing.

## 10.4 Total Measurement Conclusion

| Probe Position | Frequency Band(MHz) | ABM1 | Frequency Response | T Category |
|---|---|---|---|---|
| Transverse | GSM 850 | Pass | / | T3 |
| | GSM 1900 | Pass | | T4 |
| | WCDMA850 | Pass | | T4 |
| | WCDMA1900 | Pass | | T4 |
| | WCDMA1700 | Pass | | T4 |
| | LTE B2 | Pass | Pass | T4 |
| | LTE B5 | Pass | Pass | T4 |
| | LTE B7 | Pass | Pass | T4 |
| | LTE B12 | Pass | Pass | T4 |
| | LTE B13 | Pass | Pass | T4 |
| | LTE B66 | Pass | Pass | T4 |
| | LTE B41 | Pass | Pass | T4 |
| | 802.11b | Pass | Pass | T4 |
| | 802.11g | Pass | Pass | T4 |
| | 802.11n-2.4GHz | Pass | Pass | T4 |
| | 802.11a | Pass | Pass | T4 |
| | 802.11n-5GHz | Pass | Pass | T4 |
| | 802.11ac | Pass | Pass | T4 |
| Perpendicular | GSM 850 | Pass | Pass | T4 |
| | GSM 1900 | Pass | Pass | T4 |
| | WCDMA850 | Pass | Pass | T4 |
| | WCDMA1900 | Pass | Pass | T4 |
| | WCDMA1700 | Pass | Pass | T4 |
| | LTE B2 | Pass | Pass | T4 |
| | LTE B5 | Pass | Pass | T4 |
| | LTE B7 | Pass | Pass | T4 |
| | LTE B12 | Pass | Pass | T4 |
| | LTE B13 | Pass | Pass | T4 |
| | LTE B66 | Pass | Pass | T4 |
| | LTE B41 | Pass | Pass | T4 |
| | 802.11b | Pass | Pass | T4 |
| | 802.11g | Pass | Pass | T4 |
| | 802.11n-2.4GHz | Pass | Pass | T4 |
| | 802.11a | Pass | Pass | T4 |
| | 802.11n-5GHz | Pass | Pass | T4 |
| | 802.11ac | Pass | Pass | T4 |

## 11 MEASUREMENT UNCERTAINTY

| No. | Error source | Type | Uncertainty Value $a_i$ (%) | Prob. Dist. | Div. | ABM1 ci | ABM2 ci | Std. Unc. ABM1 $u_i'$ (%) | Std. Unc. ABM2 $u_i'$ (%) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | System Repeatability | A | 0.016 | N | 1 | 1 | 1 | 0.016 | 0.016 |
| **Probe Sensitivity** | | | | | | | | | |
| 2 | Reference Level | B | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 3.0 | 3.0 |
| 3 | AMCC Geometry | B | 0.4 | R | $\sqrt{3}$ | 1 | 1 | 0.2 | 0.2 |
| 4 | AMCC Current | B | 0.6 | R | $\sqrt{3}$ | 1 | 1 | 0.4 | 0.4 |
| 5 | Probe Positioning during Calibration | B | 0.1 | R | $\sqrt{3}$ | 1 | 1 | 0.1 | 0.1 |
| 6 | Noise Contribution | B | 0.7 | R | $\sqrt{3}$ | 0.0143 | 1 | 0.0 | 0.4 |
| 7 | Frequency Slope | B | 5.9 | R | $\sqrt{3}$ | 0.1 | 1 | 0.3 | 3.5 |
| **Probe System** | | | | | | | | | |
| 8 | Repeatability / Drift | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 |
| 9 | Linearity / DynamicRange | B | 0.6 | N | 1 | 1 | 1 | 0.4 | 0.4 |
| 10 | Acoustic Noise | B | 1.0 | R | $\sqrt{3}$ | 0.1 | 1 | 0.1 | 0.6 |
| 11 | Probe Angle | B | 2.3 | R | $\sqrt{3}$ | 1 | 1 | 1.4 | 1.4 |
| 12 | Spectral Processing | B | 0.9 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 |
| 13 | Integration Time | B | 0.6 | N | 1 | 1 | 5 | 0.6 | 3.0 |
| 14 | Field Distribution | B | 0.2 | R | $\sqrt{3}$ | 1 | 1 | 0.1 | 0.1 |
| **Test Signal** | | | | | | | | | |
| 15 | Ref.Signal Spectral Response | B | 0.6 | R | $\sqrt{3}$ | 0 | 1 | 0.0 | 0.4 |
| **Positioning** | | | | | | | | | |
| 16 | Probe Positioning | B | 1.9 | R | $\sqrt{3}$ | 1 | 1 | 1.1 | 1.1 |
| 17 | Phantom Thickness | B | 0.9 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 |

| 18 | DUT Positioning | B | 1.9 | R | $\sqrt{3}$ | 1 | 1 | 1.1 | 1.1 |
|----|----|----|----|----|----|----|----|----|----|
| **External Contributions** | | | | | | | | | |
| 19 | RF Interference | B | 0.0 | R | $\sqrt{3}$ | 1 | 0.3 | 0.0 | 0.0 |
| 20 | Test Signal Variation | B | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.2 | 1.2 |
| Combined Std. Uncertainty (ABM Field) | | $u_c^{'} = \sqrt{\sum_{i=1}^{20} c_i^2 u_i^2}$ | | | | | | 4.1 | 6.1 |
| Expanded Std. Uncertainty | | $u_e = 2u_c$ | | N | $k = 2$ | | | 8.2 | 12.2 |

## 12 MAIN TEST INSTRUMENTS

**List of Main Instruments**

| No. | Name | Type | Serial Number | Calibration Date | Valid Period |
|----|----|----|----|----|----|
| 01 | Audio Magnetic 1D Field Probe | AM1DV2 | 1064 | July 20, 2017 | NCR |
| 02 | Audio Magnetic Calibration Coil | AMCC | 1064 | NCR | NCR |
| 03 | Audio Measuring Instrument | AMMI | 1044 | NCR | NCR |
| 04 | HAC Test Arch | N/A | 1014 | NCR | NCR |
| 05 | DAE | DAE4 | 777 | September 8, 2017 | One year |
| 06 | Software | DASY5 V5.0 Build 119.9 | N/A | NCR | NCR |
| 07 | Software | SEMCAD V13.2 Build 87 | N/A | NCR | NCR |
| 08 | Universal Radio Communication Tester | CMU 200 | 105948 | October 31, 2017 | One year |
| 09 | Universal Radio Communication Tester | CMW 500 | 164049 | September 12, 2017 | One year |

***END OF REPORT BODY***

## ANNEX A TEST LAYOUT



**Picture A1: HAC T-Coil System Layout**

## ANNEX B TEST PLOTS

**T-Coil GSM 850 Transverse**
Date: 2018-6-20
Electronics: DAE4 Sn777
Medium: Air
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m$^3$
Ambient Temperature:22.5ºC
Communication System: UID 0, GSM 850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Probe: AM1DV2 - 1064;

**T-Coil/General Scans/y (transversal) 4.2mm 50 x 50/ABM Interpolated Signal(x,y,z) (121x121x1):**Interpolated grid: dx=1.000 mm, dy=1.000 mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.15
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

**Cursor:**
ABM1 = 2.21 dBA/m
BWC Factor = 0.16 dB
Location: 11.7, 4.6, 3.7 mm

**T-Coil/General Scans/y (transversal) 4.2mm 50 x 50/ABM Interpolated SNR(x,y,z) (121x121x1):**Interpolated grid: dx=1.000 mm, dy=1.000 mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.15
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

**Cursor:**
ABM1/ABM2 = 27.55 dB
ABM1 comp = -2.62 dBA/m
BWC Factor = 0.16 dB
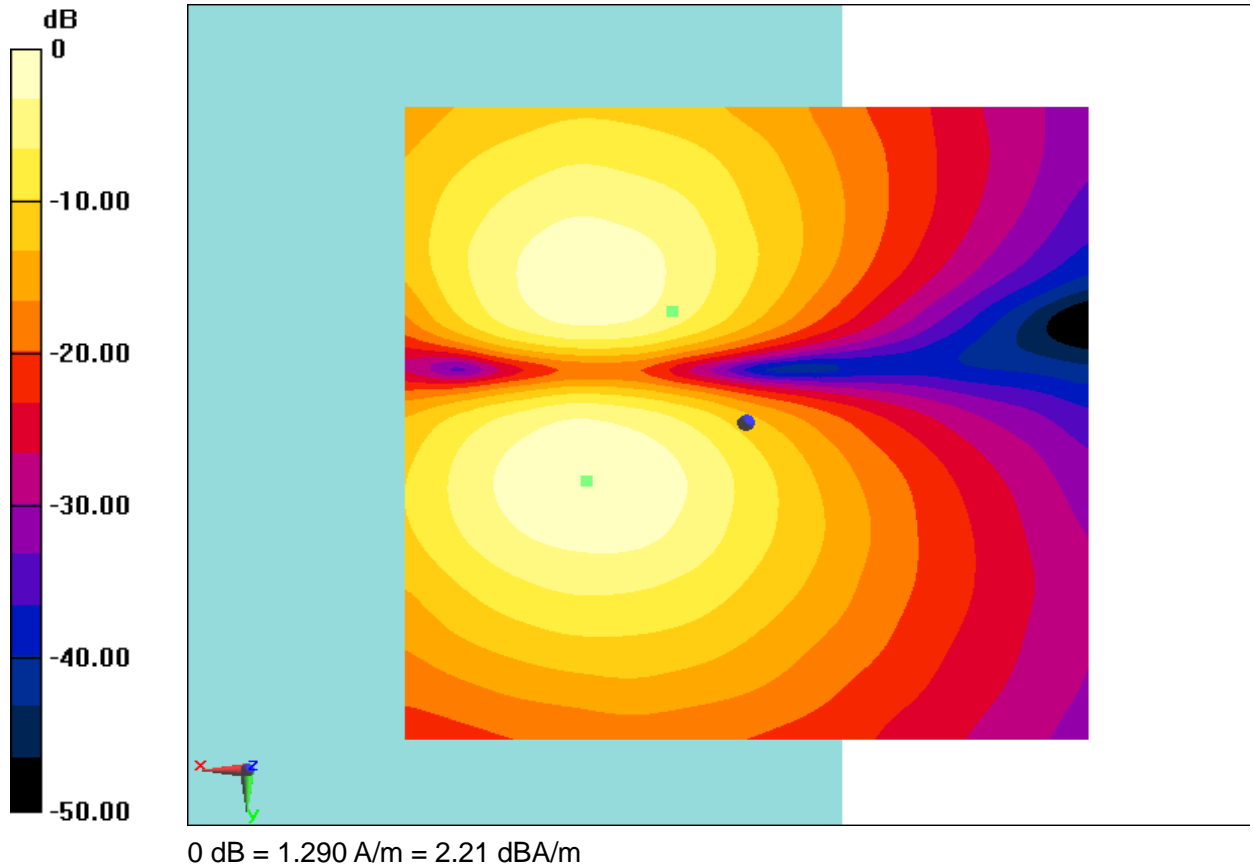Location: 5.4, -8.8, 3.7 mm

0 dB = 1.290 A/m = 2.21 dBA/m

**Fig B.1 T-Coil GSM 850**

**T-Coil GSM 850 Perpendicular**

Date: 2018-6-20

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: $\sigma$ = 0 mho/m, $\varepsilon_r$ = 1; $\rho$ = 1 kg/m$^3$

Ambient Temperature:22.5$^o$C

Communication System: UID 0, GSM 850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:8.3

Probe: AM1DV2 - 1064;

**T-Coil/General Scans/z (axial) 4.2mm 50 x 50/ABM Interpolated Signal(x,y,z) (121x121x1):**Interpolated grid: dx=1.000 mm, dy=1.000 mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav

Output Gain: 37.15

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

**Cursor:**

ABM1 = 9.98 dBA/m

BWC Factor = 0.16 dB

Location: 12.1, -3.8, 3.7 mm

**T-Coil/General Scans/z (axial) 4.2mm 50 x 50/ABM Interpolated SNR(x,y,z) (121x121x1):**Interpolated grid: dx=1.000 mm, dy=1.000 mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav

Output Gain: 37.15

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

**Cursor:**

ABM1/ABM2 = 31.39 dB

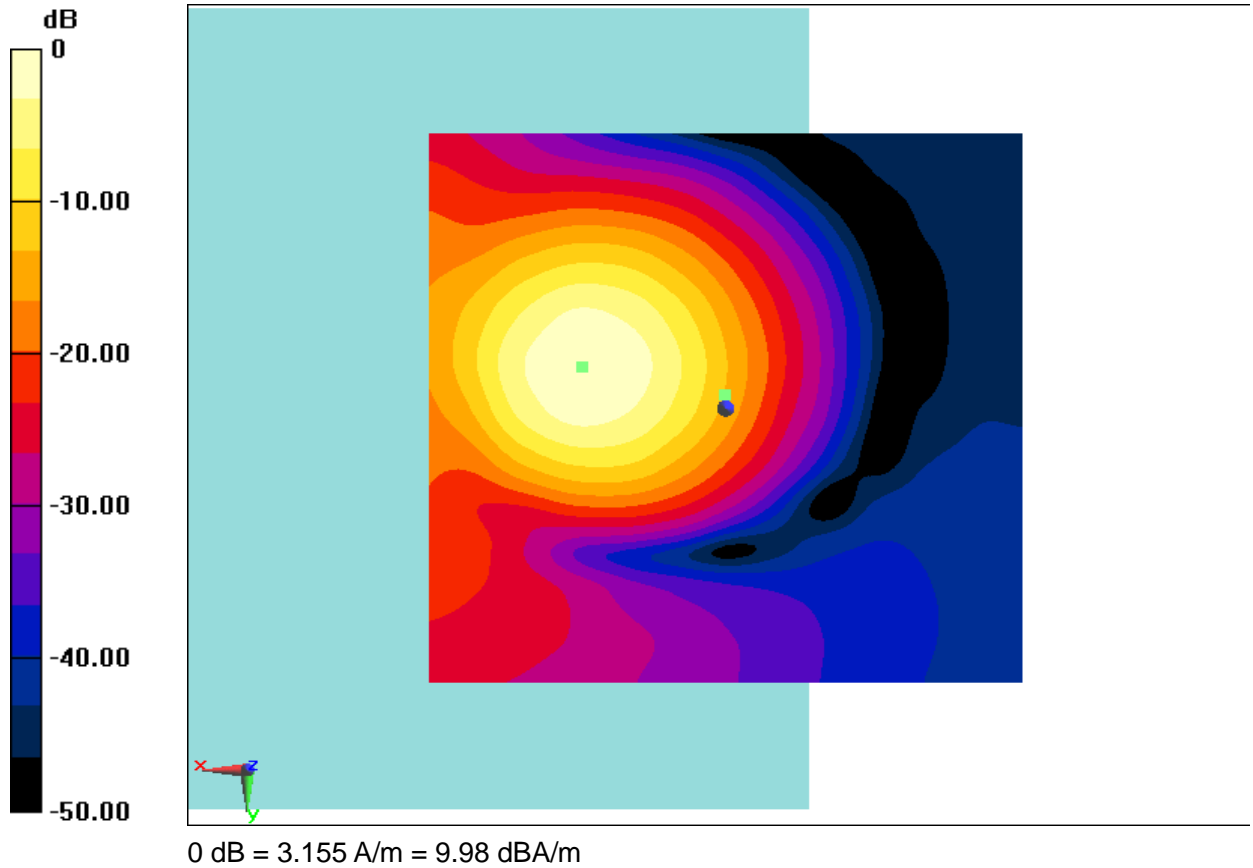ABM1 comp = -3.62 dBA/m

BWC Factor = 0.16 dB

Location: 0, -1.3, 3.7 mm

0 dB = 3.155 A/m = 9.98 dBA/m

**Fig B.2 T-Coil GSM 850**

**T-Coil GSM 1900 Transverse**

Date: 2018-6-20

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: σ = 0 mho/m, $\varepsilon_r$ = 1; ρ = 1 kg/m$^3$

Ambient Temperature:22.5ºC

Communication System: UID 0, GSM 1900MHz new (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3

Probe: AM1DV2 - 1064;

**T-Coil/General Scans/y (transversal) 4.2mm 50 x 50/ABM Interpolated Signal(x,y,z) (121x121x1):**Interpolated grid: dx=1.000 mm, dy=1.000 mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav

Output Gain: 37.15

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

**Cursor:**

ABM1 = 2.43 dBA/m

BWC Factor = 0.16 dB

Location: 11.7, 4.2, 3.7 mm

**T-Coil/General Scans/y (transversal) 4.2mm 50 x 50/ABM Interpolated SNR(x,y,z) (121x121x1):**Interpolated grid: dx=1.000 mm, dy=1.000 mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav

Output Gain: 37.15

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

**Cursor:**

ABM1/ABM2 = 30.11 dB

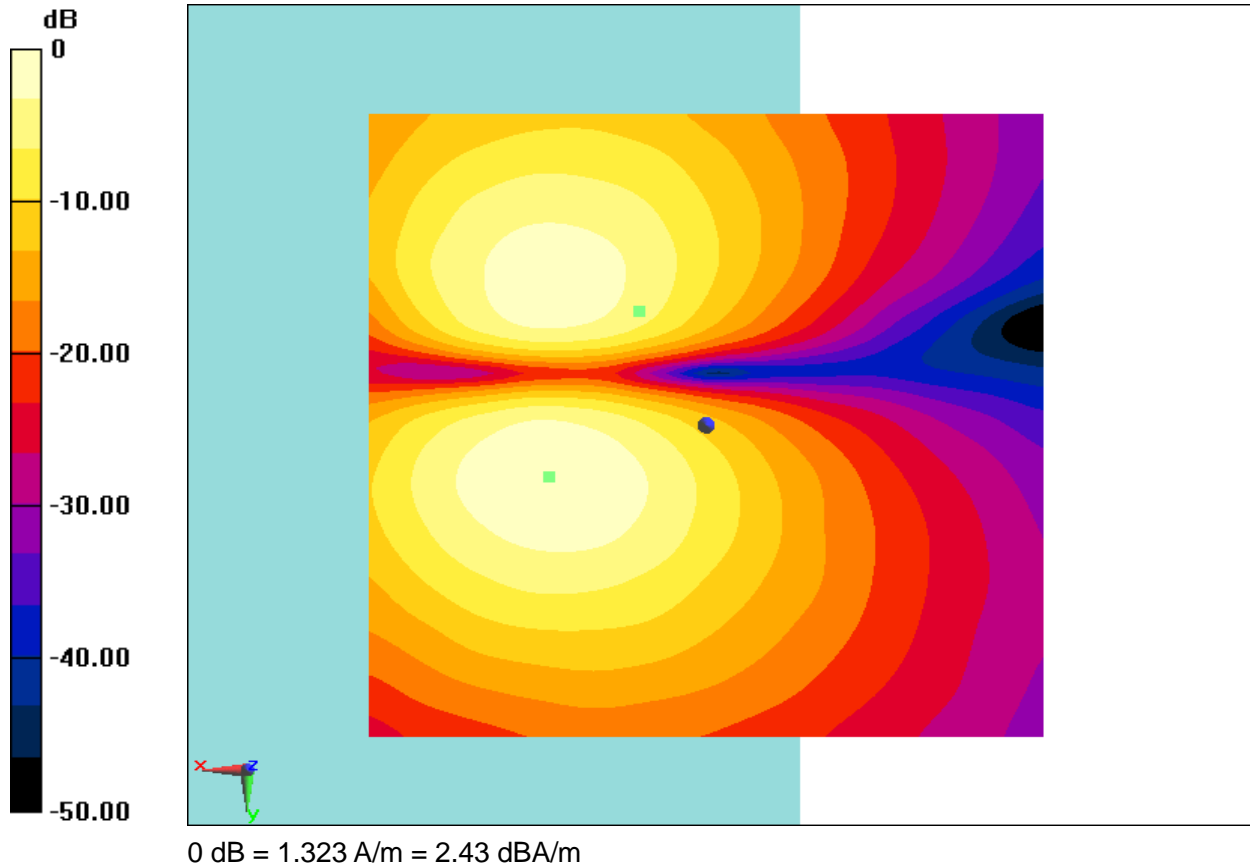ABM1 comp = -2.65 dBA/m

BWC Factor = 0.16 dB

Location: 5, -9.2, 3.7 mm

0 dB = 1.323 A/m = 2.43 dBA/m

**Fig B.3 T-Coil GSM 1900**