Hearing Aid Compatibility (HAC) T-Coil Test Report

APPLICANT	**:**	**Doro AB**
EQUIPMENT	**:**	**GSM/GPRS WCDMA Mobile Telephone**
BRAND NAME	**:**	**doro**
MODEL NAME	**:**	**Doro PhoneEasy 626**
MARKETING NAME	**:**	**DORO PHONEEASY 626**
FCC ID	**:**	**WS5DORO626**
STANDARD	**:**	**FCC 47 CFR §20.19** **ANSI C63.19-2007**
T CATEGORY	**:**	**T4**

The product sample completely tested on Mar. 05, 2014. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

ilac-MRA

TAF Testing Laboratory 2353

SPORTON INTERNATIONAL (SHENZHEN) INC.

No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C.

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
HA312204-01B	Rev. 01	Initial issue of report	Mar. 18, 2014

1. Statement of Compliance

The Hearing Aid Compliance (HAC) maximum results found during testing for the **Doro AB, DUT: GSM/GPRS WCDMA Mobile Telephone, Brand Name: doro, Model Name: Doro PhoneEasy 626, Marketing Name: Doro PhoneEasy 626** are as follows:

Reference (63.19)	Description	Verdict
7.3.1.1	Axial Field Intensity	Pass
7.3.1.2	Radial Field Intensity	Pass
7.3.2	Frequency Response	Pass
7.3.3	Signal Quality	T4

Band	(S+N)/N in dB	T Rating
GSM850	**39.99**	**T4**
GSM1900	**42.94**	**T4**
WCDMA Band V	**52.90**	**T4**
WCDMA Band II	**52.76**	**T4**

They are in compliance with HAC limits specified in guidelines FCC 47CFR §20.19 and ANSI Standard ANSI C63.19.

Results Summary : T Category = T4 (ANSI C63.19-2007)

2. Administration Data

2.1 Testing Laboratory

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL:+86-755-8637-9589 FAX: +86-755-8637-9595	
Test Site No.	**Sporton Site No. :**	
	SAR01-SZ	

2.2 Applicant

Company Name	Doro AB
Address	Magistratsvägen 10 SE-226 43 Lund Sweden

2.3 Manufacturer

Company Name	CK TELECOM LTD.
Address	Technology Road. High-Tech Development Zone. Heyuan, Guangdong, P.R.China.

2.4 Application Details

Date of Start during the Test	Mar. 05, 2014
Date of End during the Test	Mar. 05, 2014

3. General Information

3.1 Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	GSM/GPRS WCDMA Mobile Telephone
Brand Name	doro
Model Name	Doro PhoneEasy 626
Marketing Name	Doro PhoneEasy 626
FCC ID	WS5DORO626
IMEI Code	Sample 1: 359574050000240 Sample 2: 359574050001511 Sample 3: 359574050000885
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Antenna Type	WWAN: Fixed Internal Antenna Bluetooth: PIFA Antenna
HW Version	SHUTTLE-V2.0
SW Version	SHUTTLE-S13A_DORO626_L3EN_111_140224
Type of Modulation	GSM: GMSK GPRS: GMSK WCDMA (Rel 99): QPSK HSDPA (Rel 6): QPSK HSUPA (Rel 6): QPSK Bluetooth : GFSK Bluetooth EDR : π/4-DQPSK, 8-DPSK
EUT Stage	Production Unit

List of Accessory:

Specification of Accessory		
Battery	**Brand Name**	doro
	Model Name	DBF-800B

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

List of air interfaces / frequency bands

Air Interface	Band (MHz)	Voice/Data	C63.19-2007 Tested	Concurrent connections	Reduced power 20.19 (c)(1)
GSM	850, 1900	Voice	Yes	Bluetooth	No
WCDMA	Band V, Band II	Data(*)	Yes	Bluetooth	No
Bluetooth	2450	Data	No	GSM, WCDMA	No

Note:

1. (*): The voice function maybe be activated via 3rd party software application.
2. Per KDB 285076 D01 v04)10)a), during T-Coil test, concurrent transmission is disabled.

3.2 Product Photos

Refer to Appendix C.

3.3 Applied Standards

The Standard ANSI C63.19:2007 represents performance requirements for acceptable interoperability of hearing aids with wireless communications devices. When these parameters are met, a hearing aid operates acceptably in close proximity to a wireless communications device.

3.4 Test Conditions

3.4.1 Ambient Condition

Ambient Temperature	20-24℃
Humidity	<60%
Acoustic Ambient Noise	>10dB below the measurement level

3.4.2 Test Configuration

The device was controlled by using a base station emulator R&S CMU200. Communication between the device and the emulator was established by coaxial connection. The DUT was set from the emulator to radiate maximum output power during all testing.

4. Hearing Aid Compliance (HAC)

4.1 Introduction

In September 2006, the T-Coil requirements of ANSI C63.19 Standard went into effect. The federal communication commission (FCC) adopted ANSI C63.19 as HAC test standard.

5. HAC T-Coil Measurement Setup

5.1 System Configuration

Fig. 5.1 T-Coil setup with HAC Test Arch and AMCC

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Some of the components are described in details in the following sub-sections.

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 ~ 20 kHz (RF sensitivity <-100dB, fully RF shielded)
Sensitivity	<-50dB A/m @ 1 kHz
Pre-amplifier	40 dB, symmetric
Dimensions	Tip diameter/ length: 6/ 290 mm, sensor according to ANSI-PC63.19

5.2.1 Probe Calibration in AMCC

The probe sensitivity at 1 kHz is 0.06556 V/(A/m) (-23.66 dBV/(A/m)) was calibrated by AMCC coil for verification of setup performance. The evaluated probe sensitivity was able to be compared to the calibration of the AM1D probe. The frequency response and sensitivity was shown in Fig. 5.2. The probe signal is represented after application of an ideal integrator. The green curve represents the current though the AMCC, the blue curve the integrated probe signal. The DIFFERENCE between the two curves is equivalent to the frequency response of the probe system and shows the characteristics. The probe/system complies with the frequency response and linearity requirements in C63.19 according to the Speag's calibrated report as shown in Annex B (AM1D probe: SPAM100AF) (1)The frequency response has been tested within +/- 0.5 dB of ideal differentiator from 100 Hz to 10 kHz. (2)The linearity has also been tested within 0.1dB from 5 dB below limitation to 16 dB above noise level. The AMCC coil is qualified according to certificate report, SDHACPO02A as shown in Annex B.

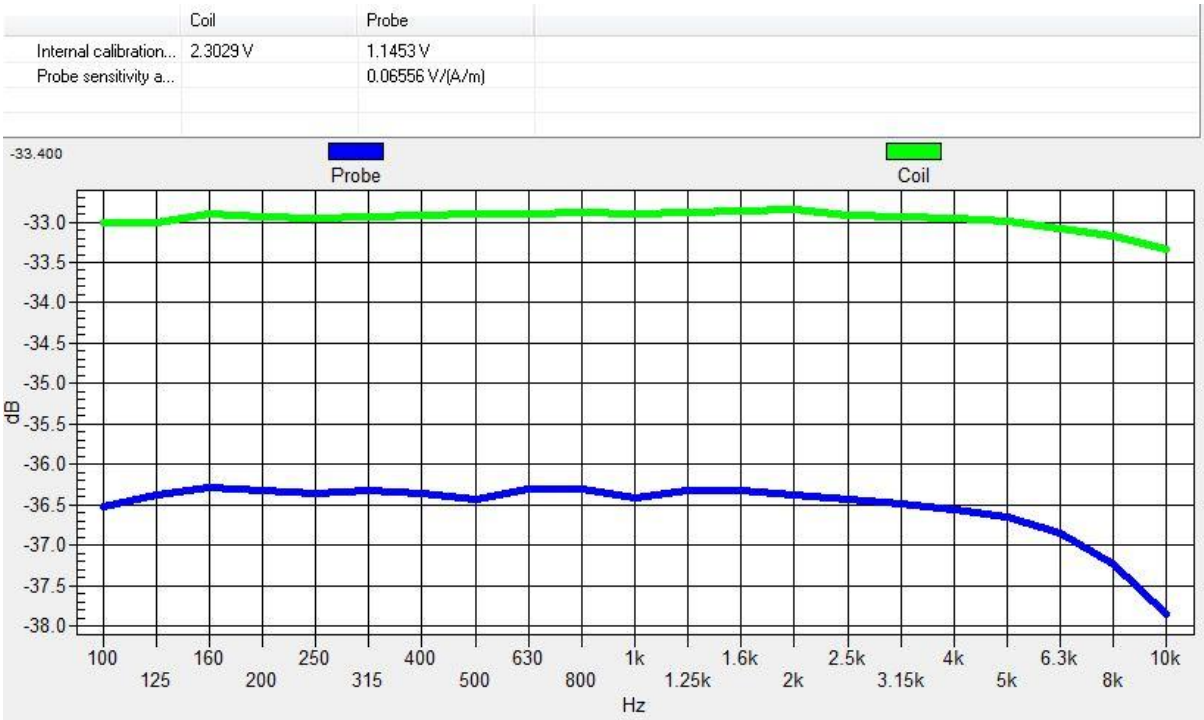


Fig. 5.2 The frequency response and sensitivity of AM1D probe

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 10 Ohm permits monitoring the current with a scale of 1:10.

Port description:

Signal	Connector	Resistance
Coil In	BNC	typically 50 Ohm
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

Fig. 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 DATA Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig. 5.4 Photo of DAE

5.6 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

Fig. 5.5 Photo of DASY5

5.7 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Fig. 5.6 Photo of Server for DASY5

5.8 Phone Positioner

The phone positioner shown in Fig. 5.7 is used to adjust DUT to the suitable position.

Fig. 5.7 Phone Positioner

5.9 Test Arch Phantom

Construction :	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

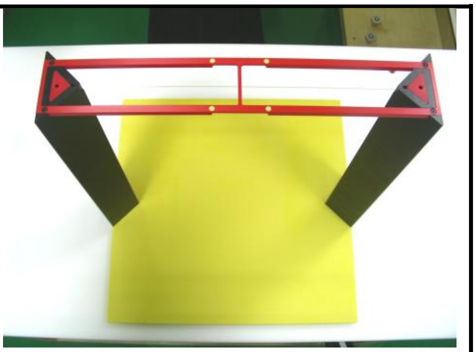


Fig. 5.8 Photo of Arch Phantom

5.10 Cabling of System

The principal cabling of the T-Coil setup is shown in Fig. 5.9. All cables provided with the basic setup have a length of approximately 5 m.

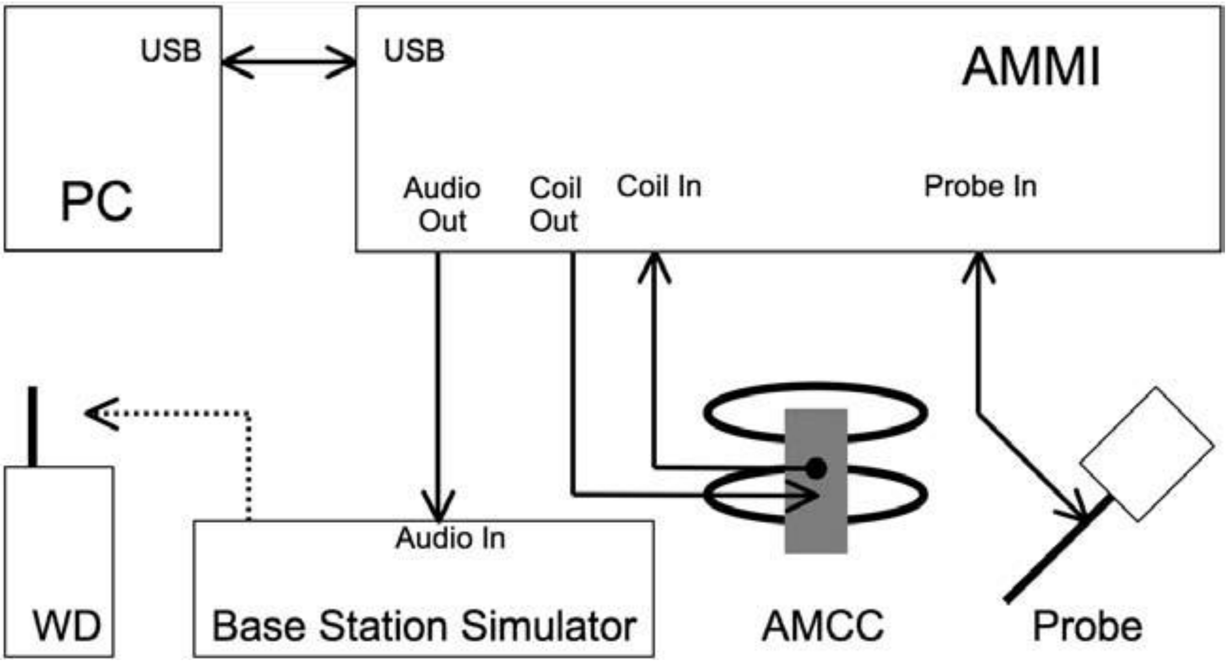


Fig. 5.9 T-Coil setup cabling

5.11 HAC Extension Software

Specification:

Precise teaching	Easy teaching with adaptive distance verification
Measurement area	Flexible selection of measurement area, predefined according to ANSI C63.19
Evaluation	ABM: spectral processing, filtering, weighting and evaluation according to ANSI C63.19
Report	Documentation ready for compliance report

5.12 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Data Acquisition Electronics	DAE4	1303	Nov. 22, 2013	Nov. 21, 2014
SPEAG	Active Audio Magnetic Field Probe	AM1DV3	3106	Mar. 25, 2013	Mar. 24, 2014
SPEAG	Test Arch Phantom	Par phantom	1105	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
R&S	Universal Radio Communication Tester	CMU200	112352	Nov. 12, 2013	Nov. 11, 2014
SPEAG	Audio Magnetic Measuring Instrument	AMMI	1137	NA	NA
SPEAG	Helmholtz calibration coil	AMCC	NA	NA	NA

Table 5.1 Test Equipment List

5.13 Reference Input of Audio Signal Spectrum

With the reference job "use as reference" in the beginning of a procedure, measure the spectrum of the current when applied to the AMCC, i.e. the input magnetic field spectrum, as shown below Fig. 5.12 and Fig. 5.13. For this, the delay of the window shall be set to a multiple of the signal period and at least 2s. From the measurement on the device, using the same signal, the postprocessor deducts the input spectrum, so the result represents the net DUT response.

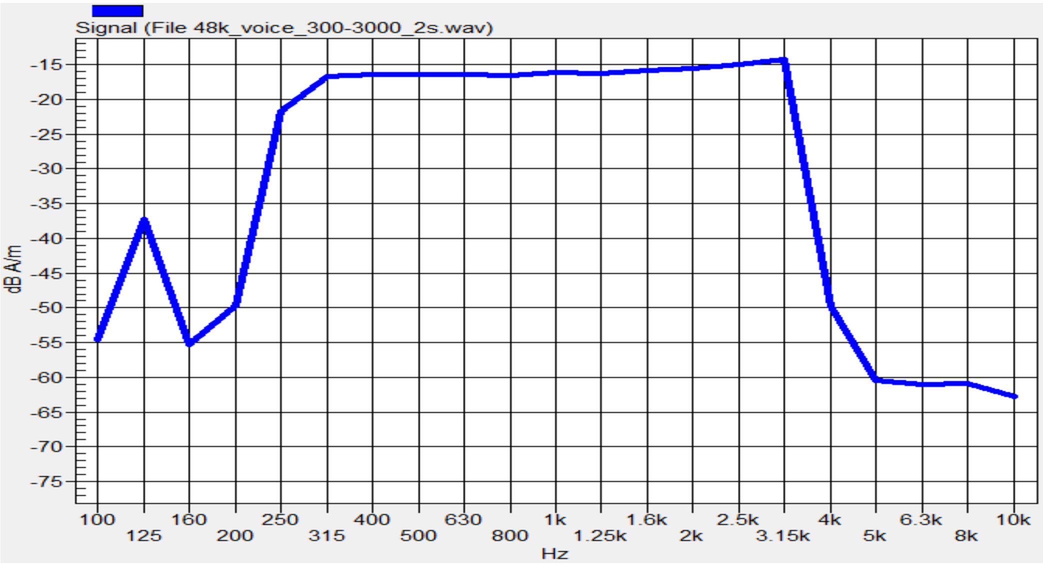


Fig. 5.12 Audio signal spectrum of the broadband signal (48kHz_voice_300Hz~3 kHz)

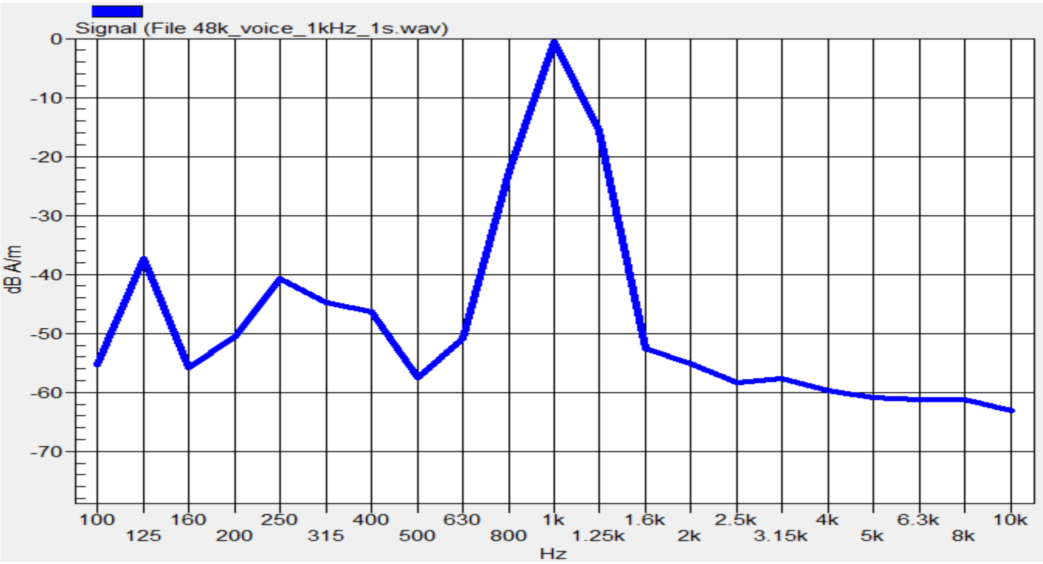


Fig. 5.13 Audio signal spectrum of the narrowband signal (48kHz_voice_1kHz)

5.14 Signal Verification

According to ANSI C63.19:2007 section 6.3.2.1, the normal speech input level for HAC T-coil tests shall be set to -16 dBm0 for GSM and UMTS (WCDMA), and to -18 dBm0 for CDMA. This technical note shows a possibility to evaluate and set the correct level with the HAC T-Coil setup with a Rohde&Schwarz communication tester CMU200 with audio option B52 and B85.

Establish a call from the CMU200 to a wireless device. Select CMU200 Network Bitstream "Decoder Cal" to have a 1 kHz signal with a level of 3.14 dBm0 at the speech output. Run the measurement job and read the voltage level at the multi-meter display "Coil signal". Read the RMS voltage corresponding to 3.14 dBm0 and note it. Calculate the desired signal levels of -16 dBm0:

3.14 dBm0 = -2.45 dBV
-16 dBm0 = -21.59 dBV

Determine the 1 kHz input level to generate the desired signal level of -16 dBm0. Select CMU200 Network Bitstream "Codec Cal" to loop the input via the codec to the output. Run the measurement job (AMMI 1 kHz signal with gain 10 inserted) and read the voltage level at the multimeter display "Coil signal". Calculate the required gain setting for the above levels:

Gain 10 = -20.7 dBV
Difference for -16 dBm0 = -21.59 - (-20.7) = -0.89 dB
Gain factor = 10 ^ ((-0.89) / 20) = 0.903
Resulting Gain = 10 x 0.903 = 9.03

The predefined signal types have the following differences / factors compared to the 1 kHz sine signal:

Signal Type	Duration (s)	Peak to RMS (dB)	RMS (dB)	Gain Factor	Gain Setting
48k_voice_1kHz	1	16.2	-12.7	4.33	39.08
48k_voice_300Hz~3kHz	2	21.6	-18.6	8.48	76.54

6. Description for DUT Testing Position

Fig.6.1 illustrate the references and reference plane that shall be used in a typical DUT emissions measurement. The principle of this section is applied to DUT with similar geometry. Please refer to Appendix D for the setup photographs.

- The area is 5 cm by 5 cm.
- The area is centered on the audio frequency output transducer of the DUT.
- The area is in a reference plane, which is defined as 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 DUT handset, which, in normal handset use, rest against the ear.
- The measurement plane is parallel to, and 10 mm in front of, the reference plane.

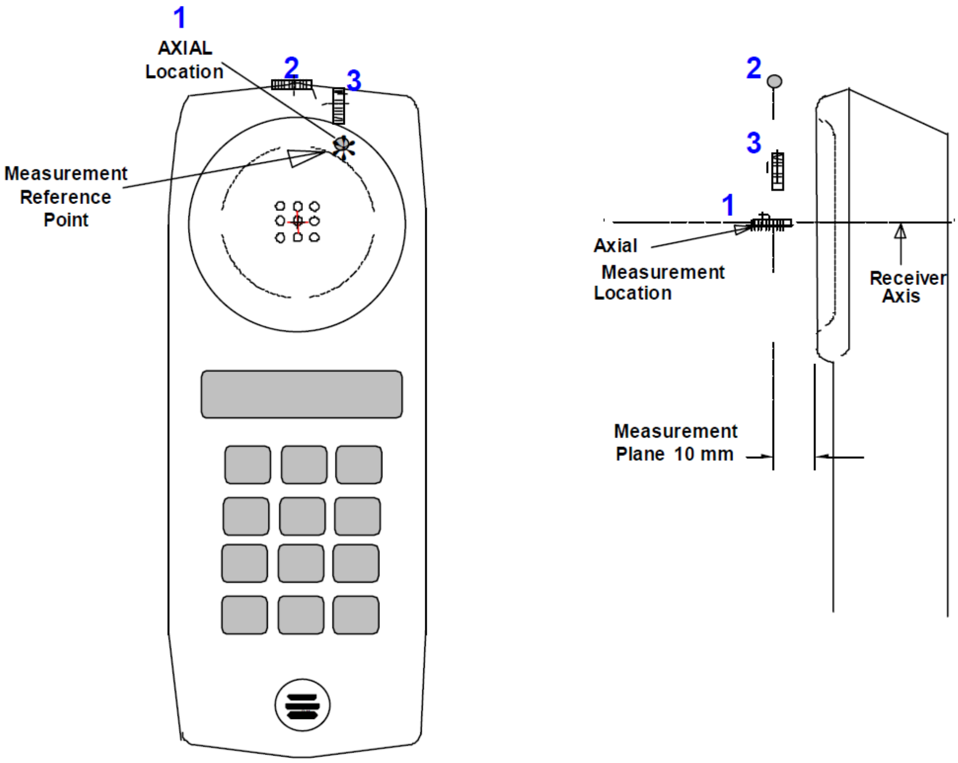


Fig 6.1 A typical DUT reference and plane for T-Coil measurements

7. T-Coil Test Procedure

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 6.3.2.1, as shown in this report of section 5.12.
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 of C63.19 per 7.3.2.
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 6.3.4.4. 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.

a) 5x5 cm scan z (axial) with narrowband voice signal and noise scan(for S/N)
b) Robot movement to point of the best S/N of the previous z (axial) scan, with wide band voice signal (allowing extraction of the frequency response) and noise measurement (to observe the S/N) (allowing later extraction of the frequency response).
c) 5x5 cm scan x (longitudinal) with narrowband voice signal and noise scan.
d) 5x5 cm scan y (lateral) with narrowband voice signal and noise scan.
With the above scans, full characterization according to the standard is possible. Optimum points can be found by interpolation from scans.
Other sequences allowing shorter scanning time are possible if the noise level in the periphery of the scanning area is not higher than at the axial point. Scanning with a short signal, without the noise and maybe in a limited area leads to the signal maximum in the neighborhood of the optimal point. The signal plus noise scans can then be limited to a small area or even points. The frequency response measurement need only be taken at the optimum z point (high S and S/N) with the wide band signal, because it should not depend on the location and be measured without low noise influence. Automatic probe positioning for this purpose is supported with the "Move to measured maximum" or "Move to interpolated maximum" command in order to anchor further T-Coil jobs to the

"current position" found.

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 these samples.
9. At an optimal point measurement, the SNR (ABM1/ABM2) was calculated for axial, radial transverse and radial longitudinal orientation, and the frequency response was measured in axial axis.
10. Corrected for the frequency response after the DUT measurement since the DASY system had known the spectrum of the input signal by using a reference job, as shown in this report of section 5.12.
11. In SEMCAD post-processing, 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.
12. Classified the signal quality based on the table 8.1: T-Coil Signal Quality Categories.

8. T-Coil Signal Quality Categories

This section 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 no immunity to an interference signal in the audio band, which is the intended reception band for this mode. A device is assessed beginning by determining the category of the RF environment in the area of the T-Coil source.

The RF measurements made for the T-Coil evaluation are used to assign the category T1 through T4. The limitation is given in Table 8.1. This establishes the RF environment presented by the WD to a hearing aid.

Category	Telephone parameters WD signal quality ((signal + noise) to noise ratio in dB)
Category T1	0 to 10 dB
Category T2	10 to 20 dB
Category T3	20 to 30 dB
Category T4	> 30 dB

Table 8.1 T-Coil Signal Quality Categories

9. HAC T-Coil Test Results

9.1 Magnitude Result

The Table 9.1 shows testing result in position coordinates which are defined as deviation from earpiece center in millimeters. Axial measurement location was defined by the manufacture of the device. Signal strength measurement scans are presented in appendix A.

Plot No.	Band	Channel	Sample	Probe Position	ABM1 (dB A/m)	ABM2 (dB A/m)	SNR (dB)	T Rating
01	GSM850	189	#1	Axial (Z)	9.08	-48.83	57.91	T4
				Radial 1 (X)	-0.93	-41.47	40.54	T4
				Radial 2 (Y)	-0.82	-54.54	53.72	T4
05	GSM850	189	#2	Axial (Z)	8.07	-49.06	57.13	T4
				Radial 1 (X)	-1.28	-41.62	40.34	T4
				Radial 2 (Y)	0.03	-53.81	53.84	T4
09	GSM850	189	#3	Axial (Z)	8.80	-50.09	58.47	T4
				Radial 1 (X)	**-1.02**	**-41.01**	**39.99**	**T4**
				Radial 2 (Y)	1.96	-51.78	53.74	T4
02	GSM1900	661	#1	Axial (Z)	7.45	-51.52	58.97	T4
				Radial 1 (X)	-0.59	-44.83	44.24	T4
				Radial 2 (Y)	-0.90	-54.40	53.50	T4
06	GSM1900	661	#2	Axial (Z)	6.23	-51.23	57.46	T4
				Radial 1 (X)	**-2.19**	**-45.13**	**42.94**	**T4**
				Radial 2 (Y)	-2.08	-54.67	52.59	T4
10	GSM1900	661	#3	Axial (Z)	8.83	-50.05	58.88	T4
				Radial 1 (X)	-0.58	-44.95	44.37	T4
				Radial 2 (Y)	0.84	-53.64	54.48	T4
03	WCDMA Band V	4182	#1	Axial (Z)	9.27	-50.96	60.23	T4
				Radial 1 (X)	-0.26	-54.13	53.87	T4
				Radial 2 (Y)	-0.64	-54.68	54.04	T4
07	WCDMA Band V	4182	#2	Axial (Z)	8.35	-49.95	58.30	T4
				Radial 1 (X)	-1.70	-54.96	53.26	T4
				Radial 2 (Y)	-2.03	-55.03	53.00	T4
11	WCDMA Band V	4182	#3	Axial (Z)	6.15	-53.04	59.19	T4
				Radial 1 (X)	**-0.98**	**-53.88**	**52.90**	**T4**
				Radial 2 (Y)	0.15	-53.89	54.04	T4
04	WCDMA Band II	9400	#1	Axial (Z)	7.48	-52.08	59.56	T4
				Radial 1 (X)	-0.22	-54.65	54.43	T4
				Radial 2 (Y)	0.69	-54.27	54.96	T4
08	WCDMA Band II	9400	#2	Axial (Z)	5.45	-52.68	58.13	T4
				Radial 1 (X)	-1.48	-54.87	53.39	T4
				Radial 2 (Y)	-1.78	-54.67	52.89	T4
12	WCDMA Band II	9400	#3	Axial (Z)	5.40	-53.30	58.70	T4
				Radial 1 (X)	-0.16	-53.39	53.23	T4
				Radial 2 (Y)	**-1.03**	**-53.79**	**52.76**	**T4**

Table 9.1 Test Result for Various Positions

Remark:

1. There is no special HAC mode software on this DUT.
2. The volume was adjusted to maximum level and the backlight turned off during T-Coil testing.
3. Test Engineer：Luke Lu

9.2 Frequency Response Plots

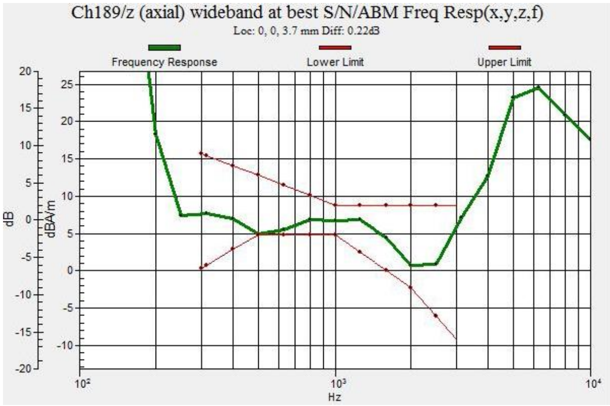


Fig 9.1 GSM850 Ch189 for Sample #3

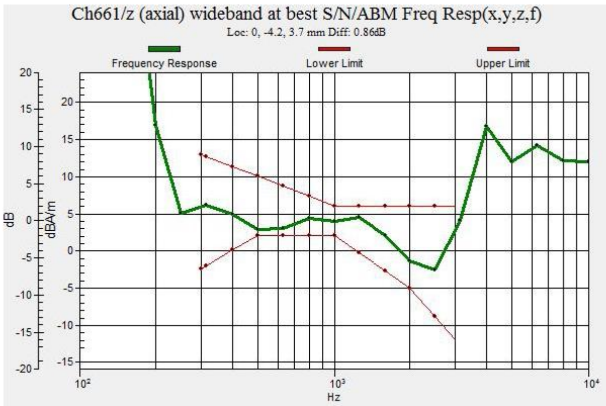
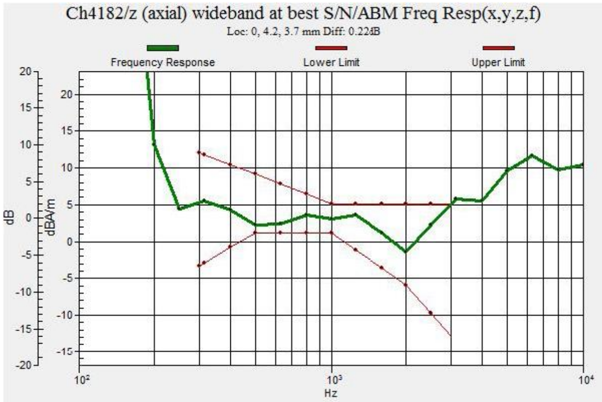
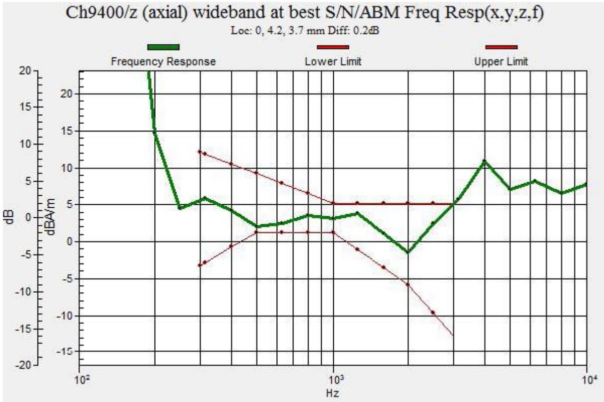


Fig 9.2 GSM1900 Ch661 for Sample #2



g 9.3 WCDMA Band V Ch4182 for Sample #3



ig 9.4 WCDMA Band II Ch9400 for Sample #3

9.3 T-Coil Coupling Field Intensity

9.3.1 Axial Field Intensity

Cell Phone Mode	Minimum limit (dB A/m)	Result (dB A/m)	Verdict
GSM850	-18	8.07	**Pass**
GSM1900	-18	6.23	**Pass**
WCDMA Band V	-18	6.15	**Pass**
WCDMA Band II	-18	5.40	**Pass**

9.3.2 Radial Field Intensity

Cell Phone Mode	Minimum limit (dB A/m)	Result (dB A/m)	Verdict
GSM850	-18	-1.28	**Pass**
GSM1900	-18	-2.19	**Pass**
WCDMA Band V	-18	-2.03	**Pass**
WCDMA Band II	-18	-1.78	**Pass**

9.3.3 Frequency Response at Axial Measurement Point

Cell Phone Mode	Verdict
GSM850	**Pass**
GSM1900	**Pass**
WCDMA Band V	**Pass**
WCDMA Band II	**Pass**

9.3.4 Signal Quality

Cell Phone Mode	Minimum limit (dB)				Minimum Result (dB)	Verdict
	T1	T2	T3	T4		
GSM850	0	10	20	>30	**39.99**	**T4**
GSM1900	0	10	20	>30	**42.94**	**T4**
WCDMA Band V	0	10	20	>30	**52.90**	**T4**
WCDMA Band II	0	10	20	>30	**52.76**	**T4**

10. Uncertainty Assessment

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table 10.1.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-shape
Multiplying factor[(a)]	1/k [(b)]	1/√3	1/√6	1/√2

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) *κ* is the coverage factor

Table 10.1 Multiplying Factions for Various Distributions

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is showed in Table 10.2.

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (ABM1)	Ci (ABM2)	Standard Uncertainty (ABM1)	Standard Uncertainty (ABM2)
Probe Sensitivity							
Reference Level	3.0	Normal	1	1	1	± 3.0 %	± 3.0 %
AMCC Geometry	0.4	Rectangular	√3	1	1	± 0.2 %	± 0.2 %
AMCC Current	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Probe Positioning During Calibrate	0.1	Rectangular	√3	1	1	± 0.1 %	± 0.1 %
Noise Contribution	0.7	Rectangular	√3	0.0143	1	± 0.0 %	± 0.4 %
Frequency Slope	5.9	Rectangular	√3	0.1	1	± 0.3 %	± 3.5 %
Probe System							
Repeatability / Drift	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Linearity / Dynamic Range	0.6	Rectangular	√3	1	1	± 0.4 %	± 0.4 %
Acoustic Noise	1.0	Rectangular	√3	0.1	1	± 0.1 %	± 0.6 %
Probe Angle	2.3	Rectangular	√3	1	1	± 1.4 %	± 1.4 %
Spectral Processing	0.9	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	0.6	Normal	1	1	5	± 0.6 %	± 3.0 %
Field Disturbation	0.2	Rectangular	√3	1	1	± 0.1 %	± 0.1 %
Test Signal							
Reference Signal Spectral Response	0.6	Rectangular	√3	0	1	± 0.0 %	± 0.4 %
Positioning							
Probe Positioning	1.9	Rectangular	√3	1	1	± 1.1 %	± 1.1 %
Phantom Thickness	0.9	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
DUT Positioning	1.9	Rectangular	√3	1	1	± 1.1 %	± 1.1 %
External Contributions							
RF Interference	0.0	Rectangular	√3	1	0.3	± 0.0 %	± 0.0 %
Test Signal Variation	2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %
Combined Standard Uncertainty						± 4.1 %	± 6.1 %
Coverage Factor for 95 %						K = 2	
Expanded Uncertainty						**± 8.1 %**	**± 12.3 %**

Table 10.2 Uncertainty Budget of DASY

11. References

[1] ANSI C63.19 2007, “American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids”, 8 June 2007

[2] SPEAG DASY System Handbook

Appendix A. Plots of T-Coil Measurement

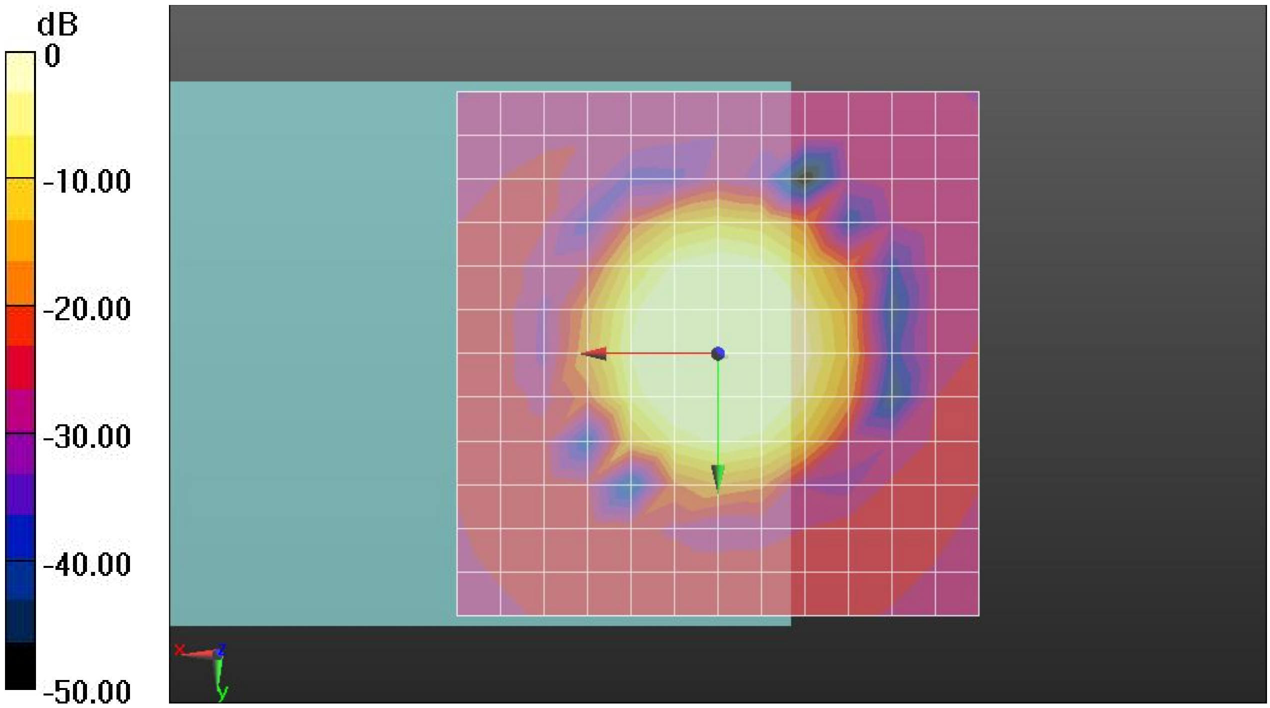
The plots are shown as follows.

01 HAC T-Coil_GSM850_GSM Voice_Ch189_Z_#1

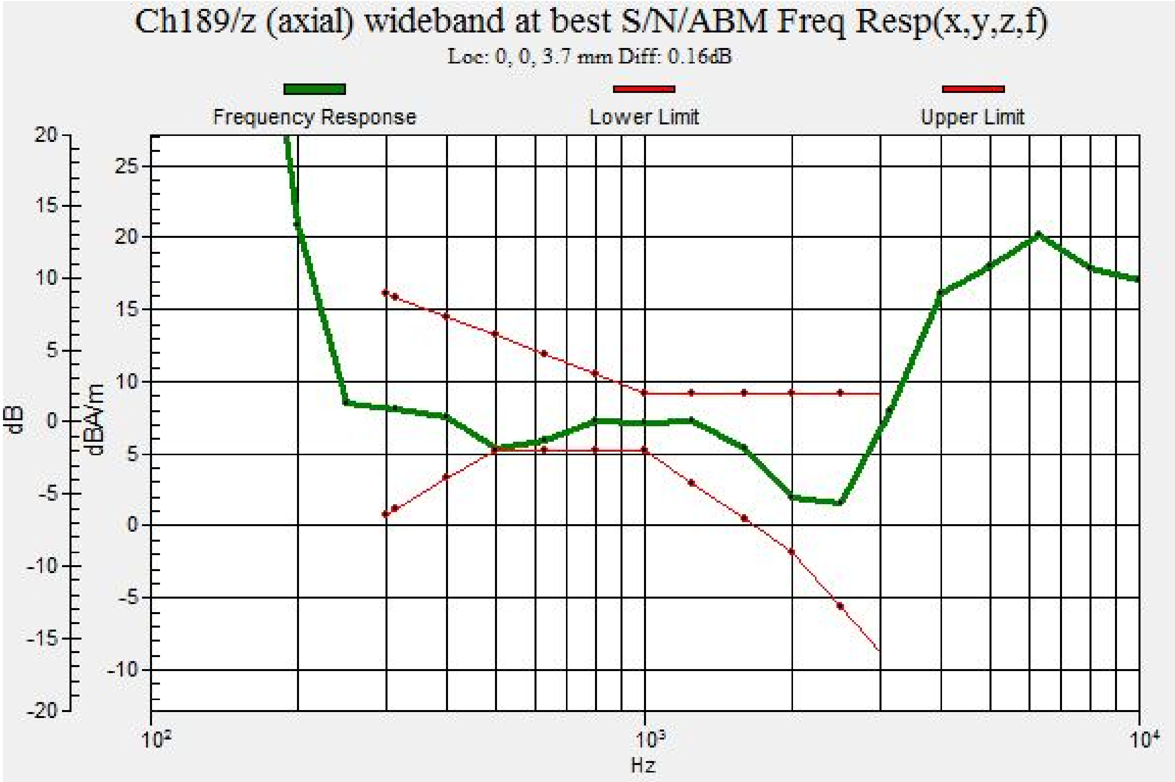
Communication System: UID 0, Generic GSM (0); Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

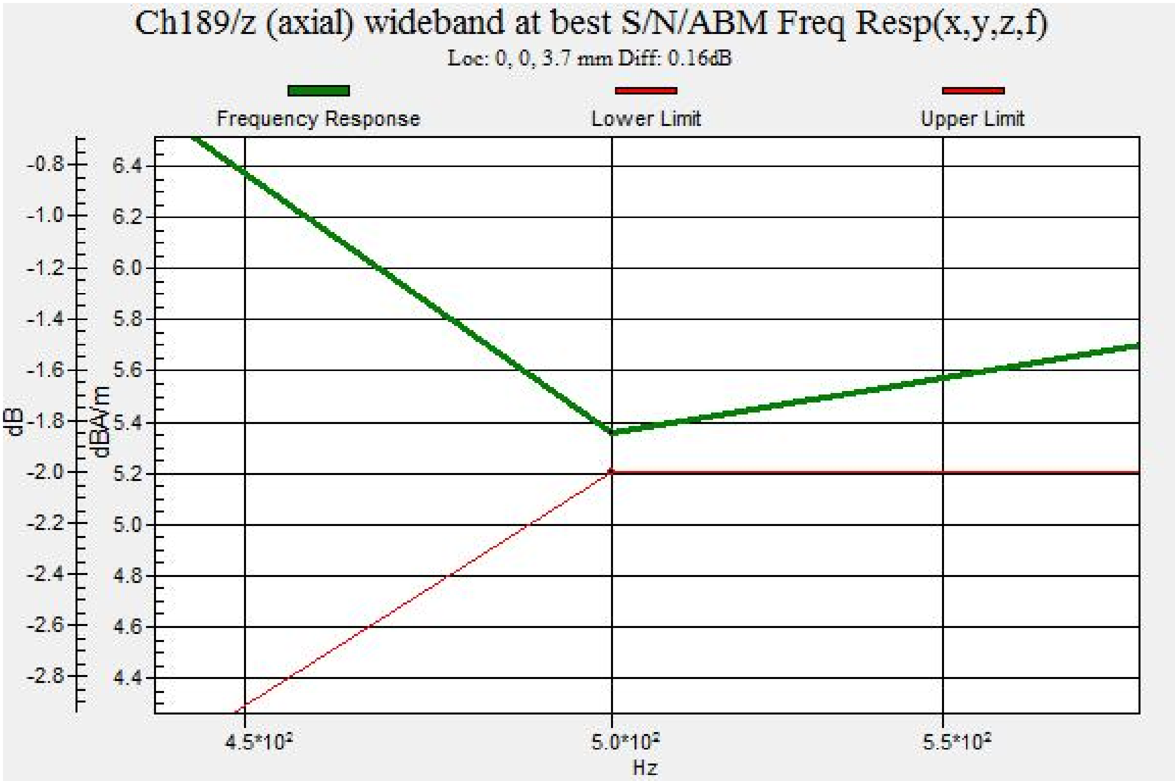
DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch189/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 57.91 dB
ABM1 comp = 9.08 dBA/m
BWC Factor = 0.16 dB
Location: 0, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m


Ch189/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.16dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

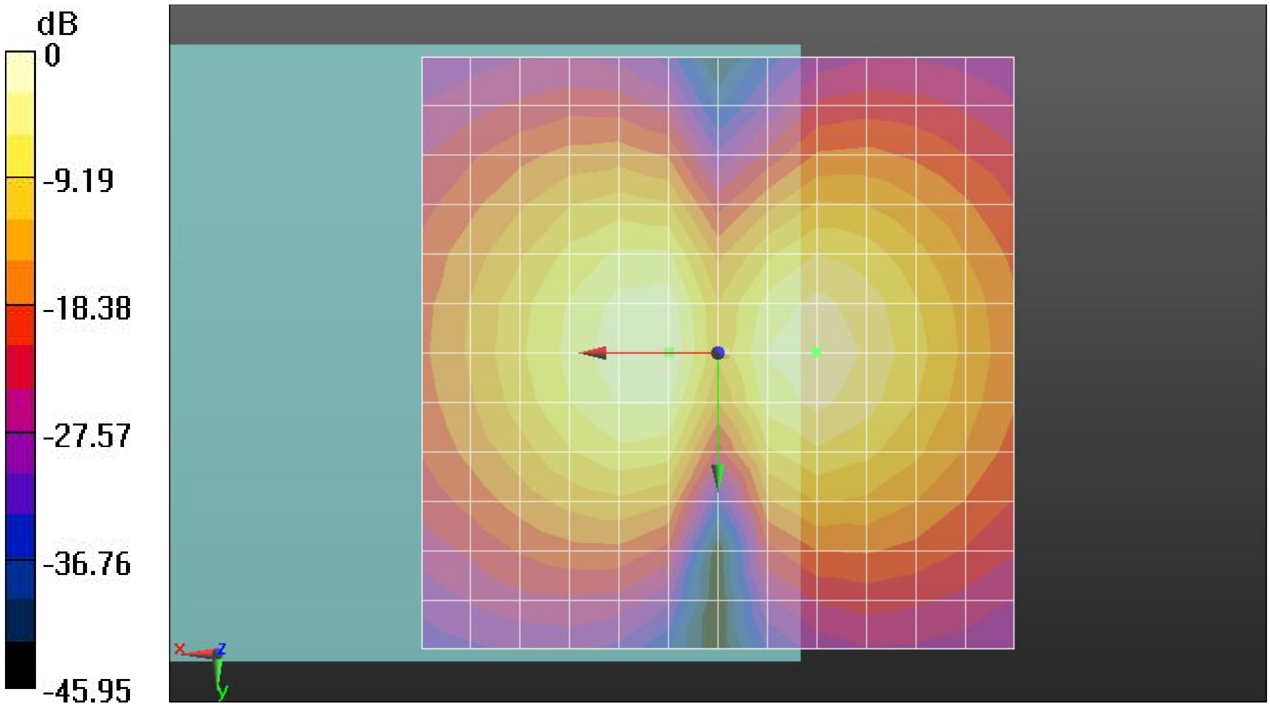

Ch189/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.16dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
4.5*10²
5.0*10²
5.5*10²
Hz

01 HAC T-Coil_GSM850_GSM Voice_Ch189_X_#1

Communication System: UID 0, Generic GSM (0); Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch189/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 40.54 dB
ABM1 comp = -0.93 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



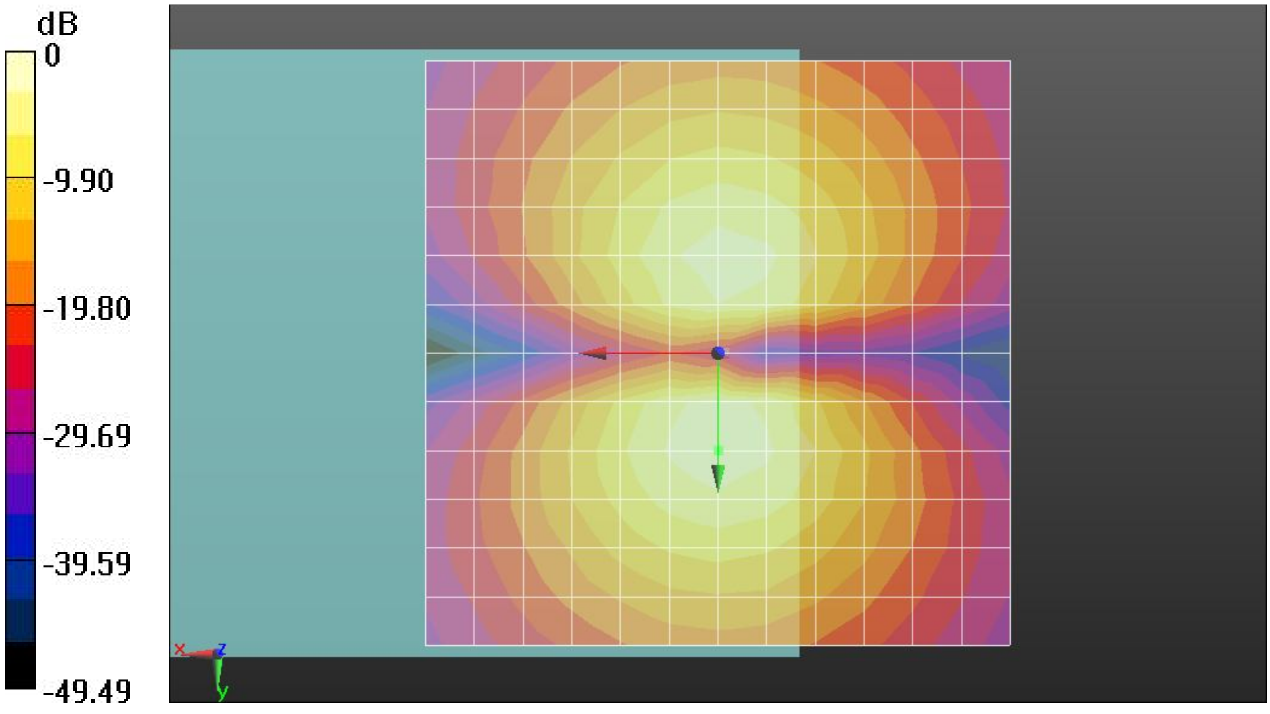
0 dB = 1.000 A/m = 0.00 dBA/m

01 HAC T-Coil_GSM850_GSM Voice_Ch189_Y_#1

Communication System: UID 0, Generic GSM (0); Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch189/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 53.72 dB
ABM1 comp = -0.82 dBA/m
BWC Factor = 0.16 dB
Location: 0, 8.3, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

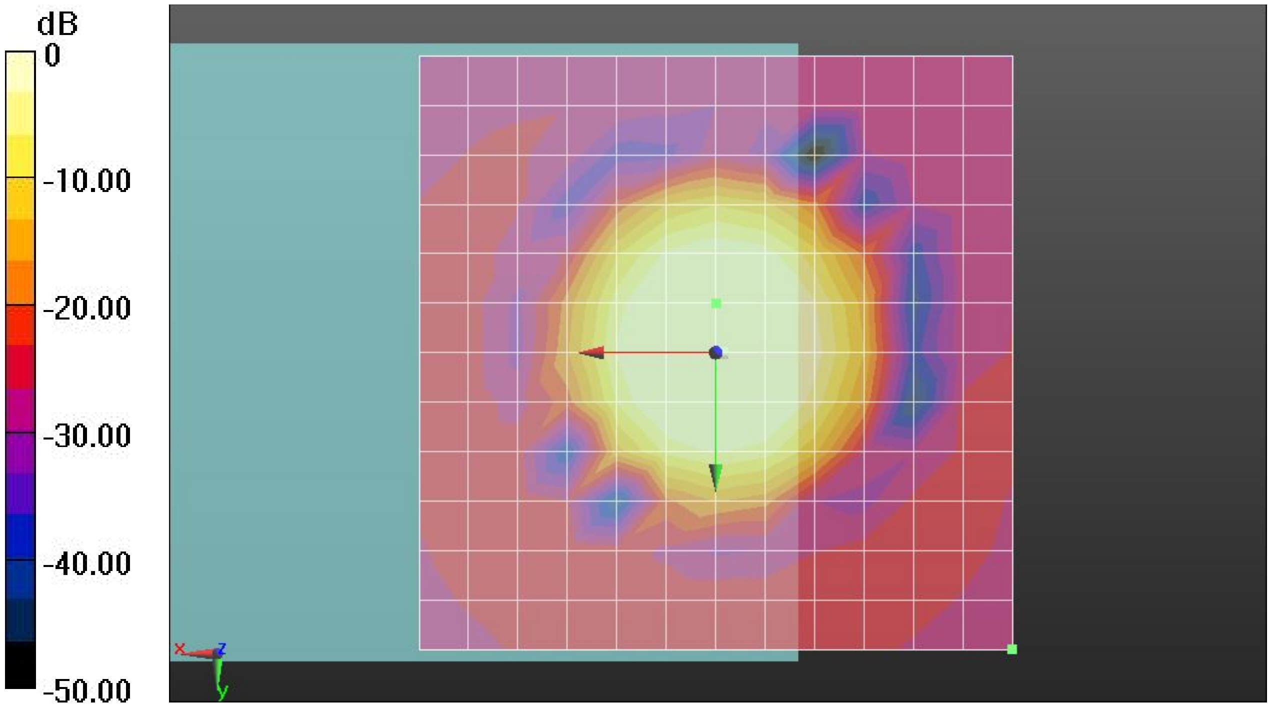
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

02 HAC T-Coil_GSM1900_GSM Voice_Ch661_Z_#1

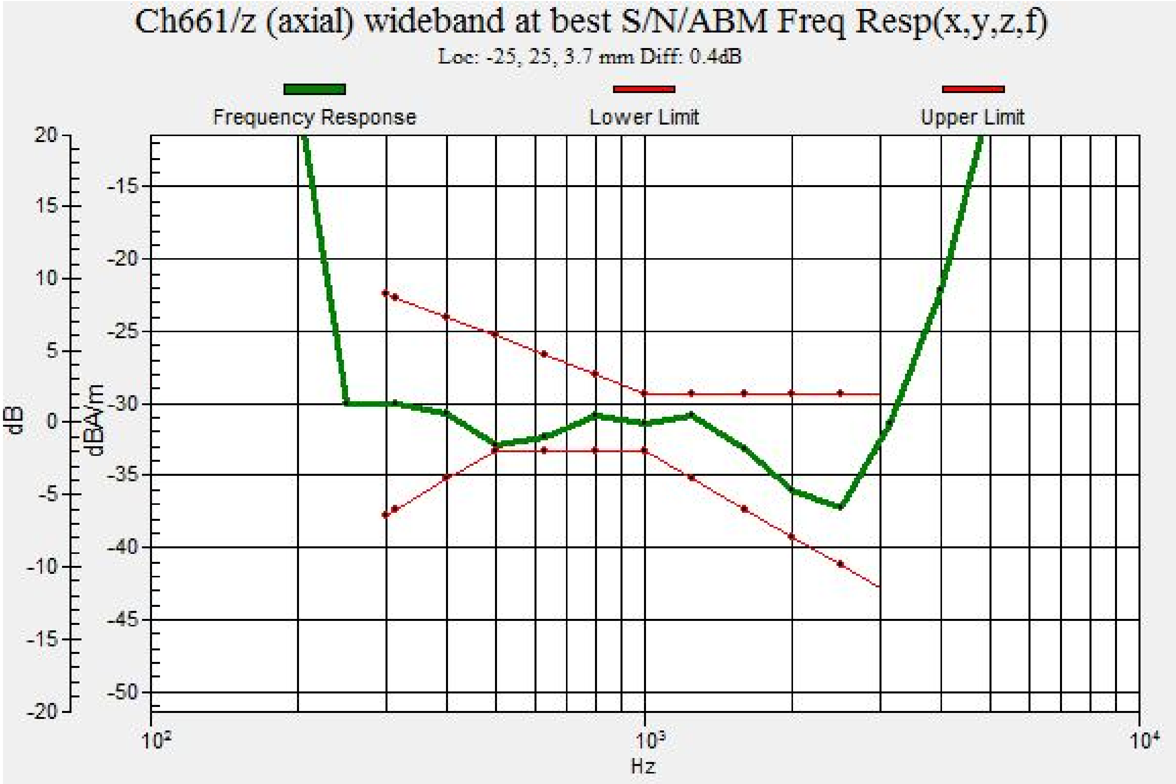
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

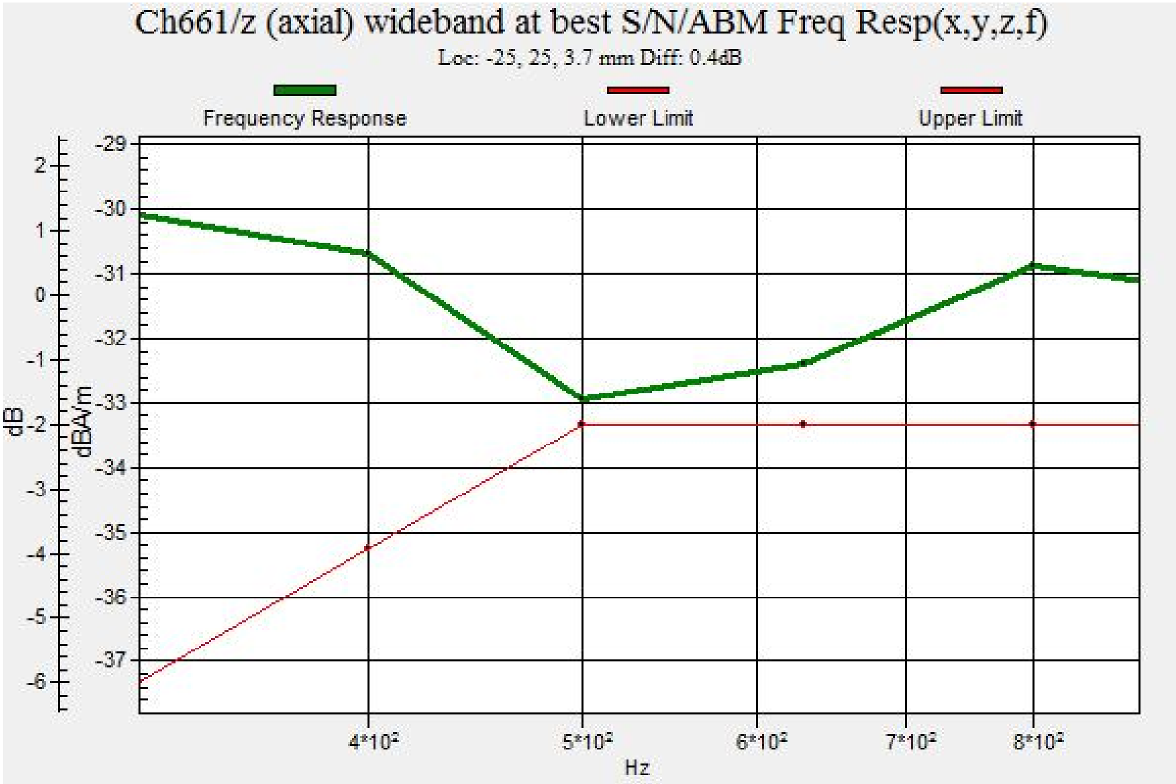
DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch661/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 58.97 dB
ABM1 comp = 7.45 dBA/m
BWC Factor = 0.16 dB
Location: 0, -4.2, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m


Ch661/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: -25, 25, 3.7 mm Diff: 0.4dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

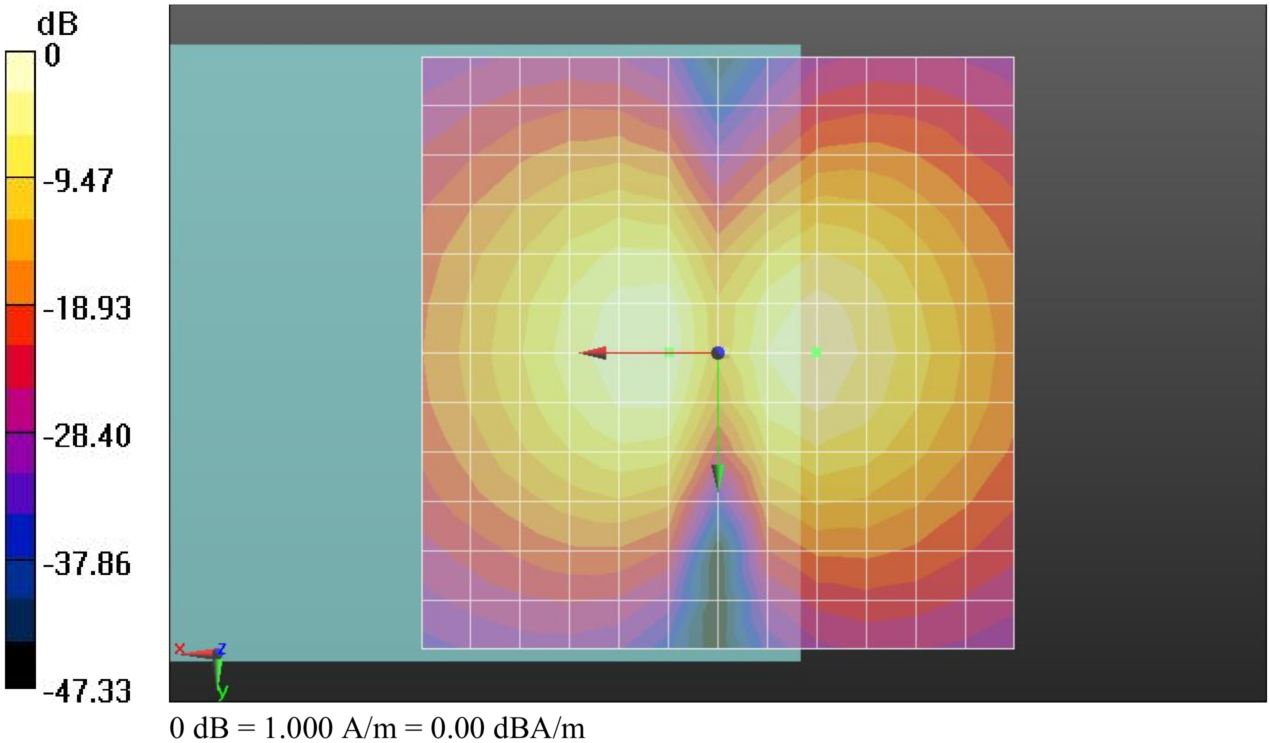

Ch661/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: -25, 25, 3.7 mm Diff: 0.4dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

02 HAC T-Coil_GSM1900_GSM Voice_Ch661_X_#1

Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch661/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 44.24 dB
ABM1 comp = -0.59 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



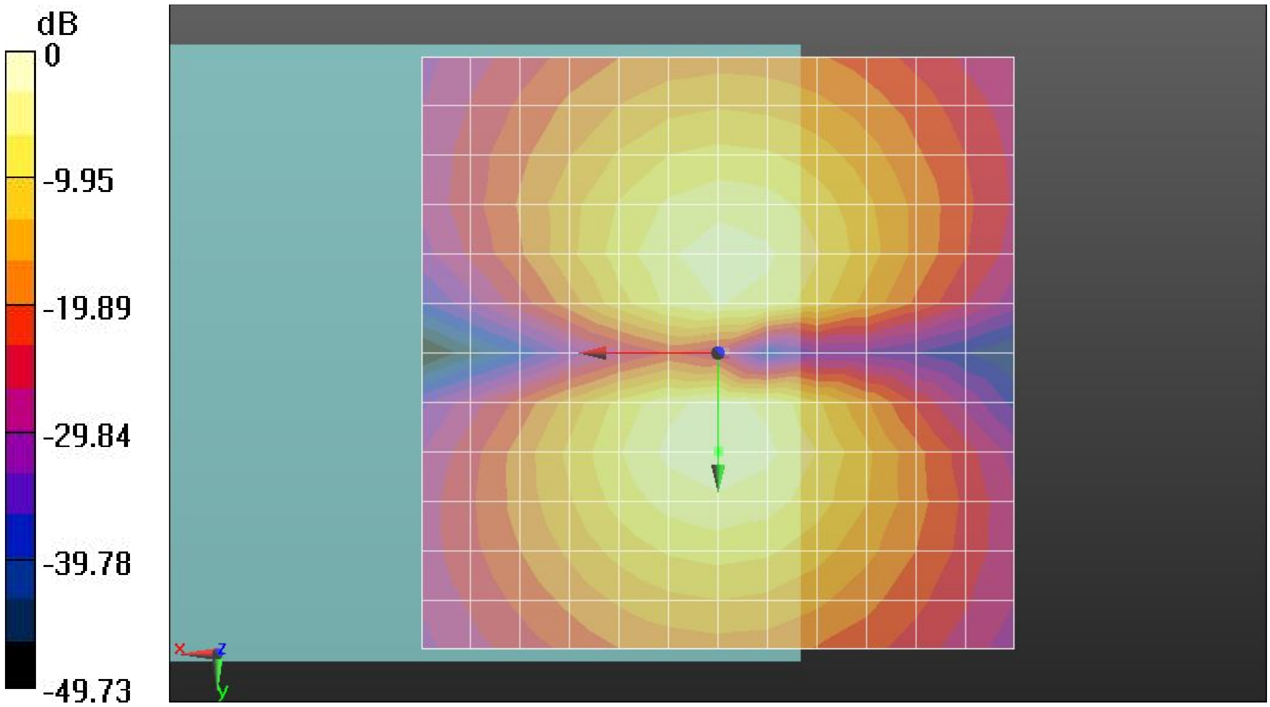
0 dB = 1.000 A/m = 0.00 dBA/m

02 HAC T-Coil_GSM1900_GSM Voice_Ch661_Y_#1

Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch661/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 53.50 dB
ABM1 comp = -0.90 dBA/m
BWC Factor = 0.16 dB
Location: 0, 8.3, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

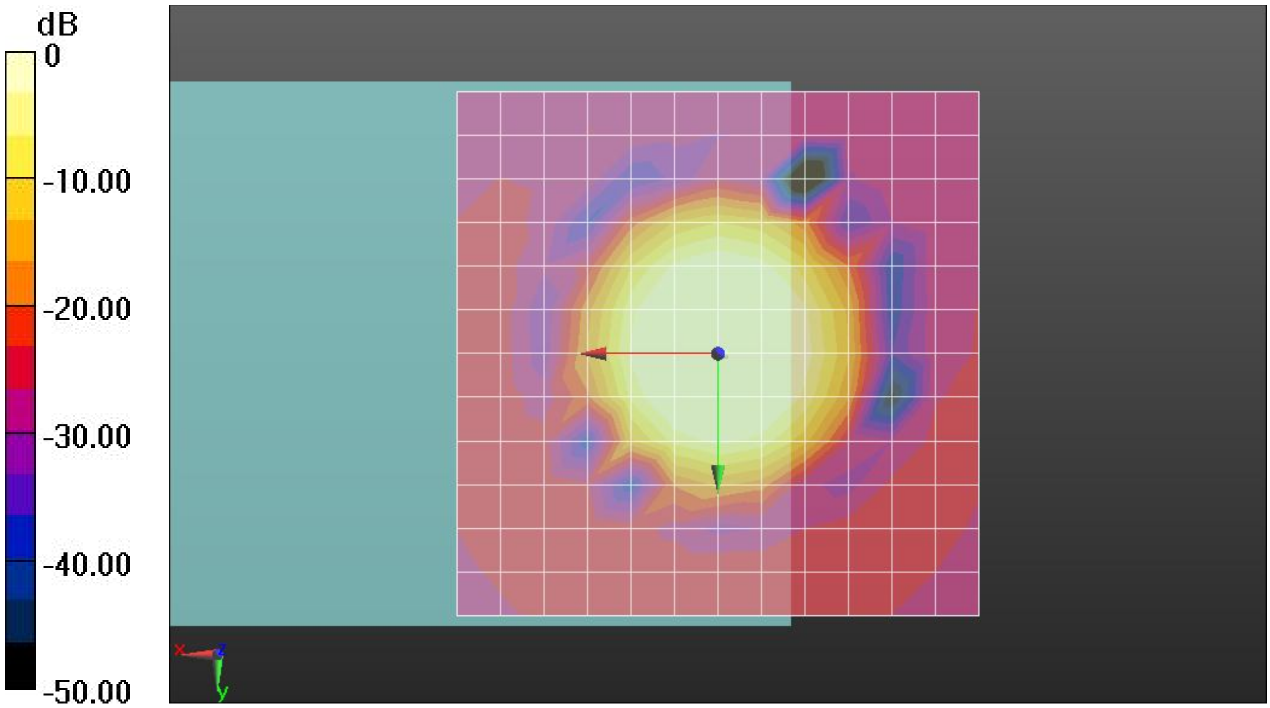
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

03 HAC T-Coil_WCDMA Band V_Voice_Ch4182_Z_#1

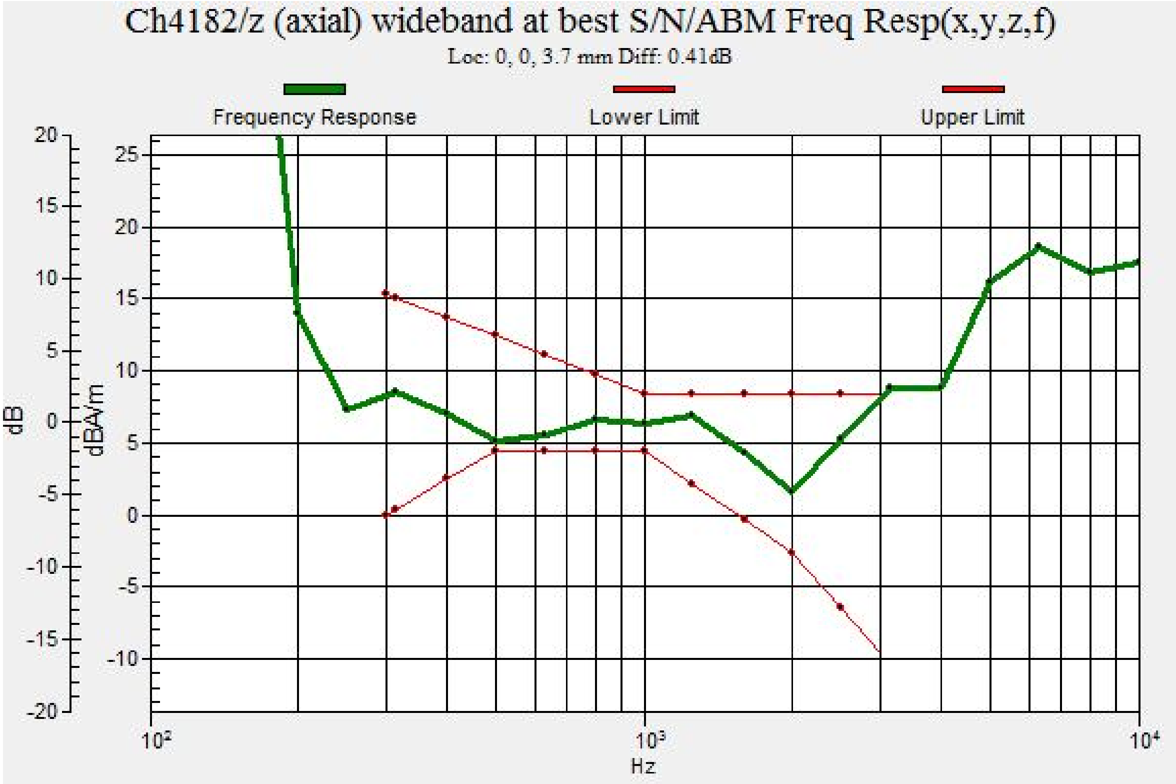
Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

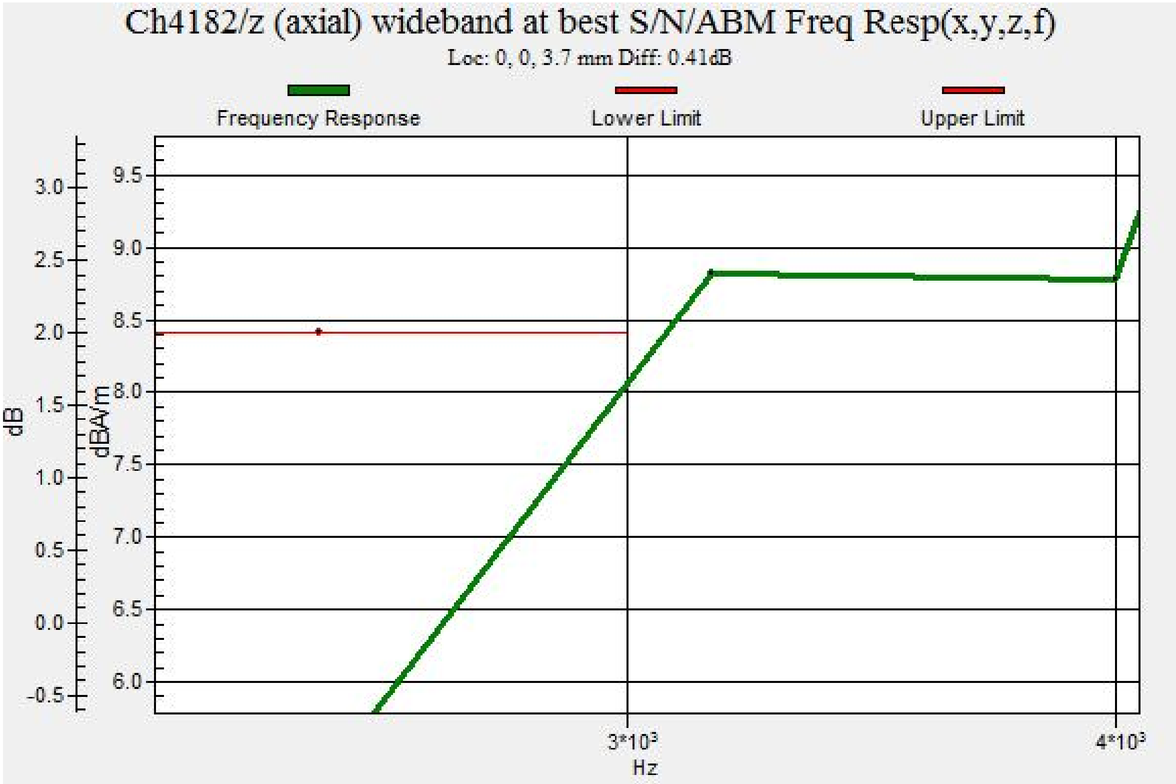
DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch4182/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 60.23 dB
ABM1 comp = 9.27 dBA/m
BWC Factor = 0.16 dB
Location: 0, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m


Ch4182/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.41dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz


Ch4182/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.41dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

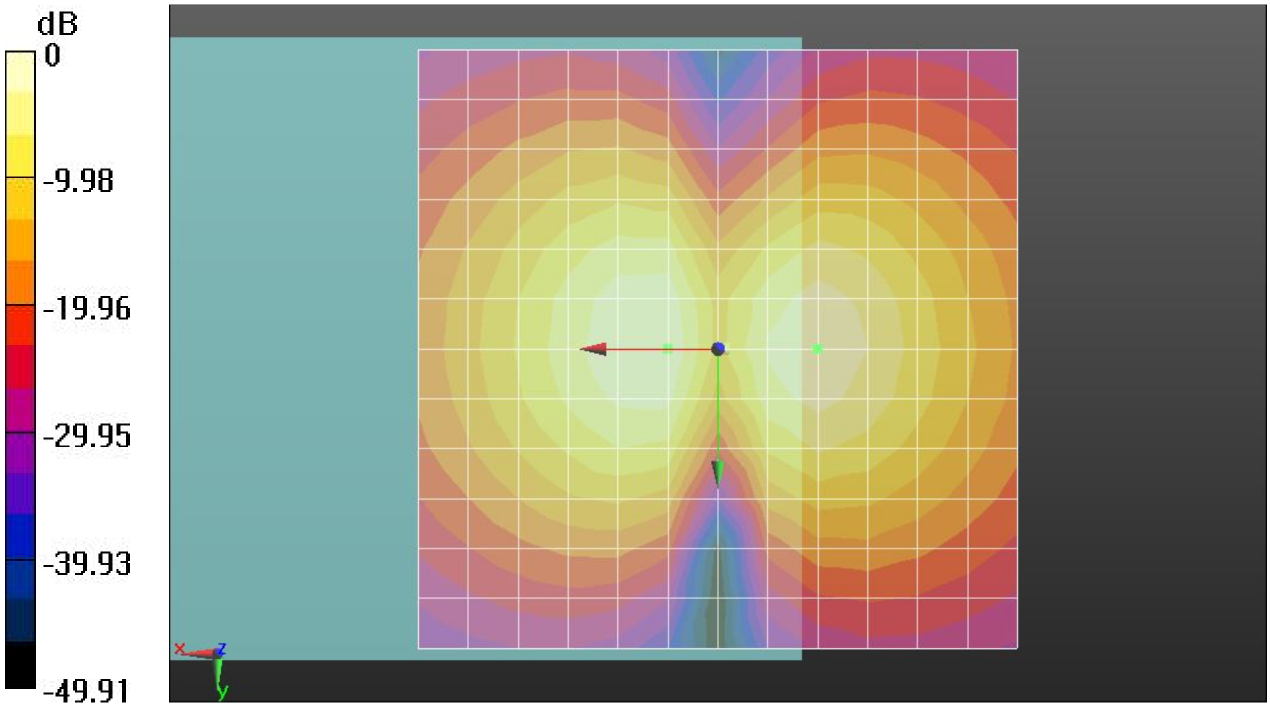
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

03 HAC T-Coil_WCDMA Band V_Voice_Ch4182_X_#1

Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch4182/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 53.87 dB
ABM1 comp = -0.26 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



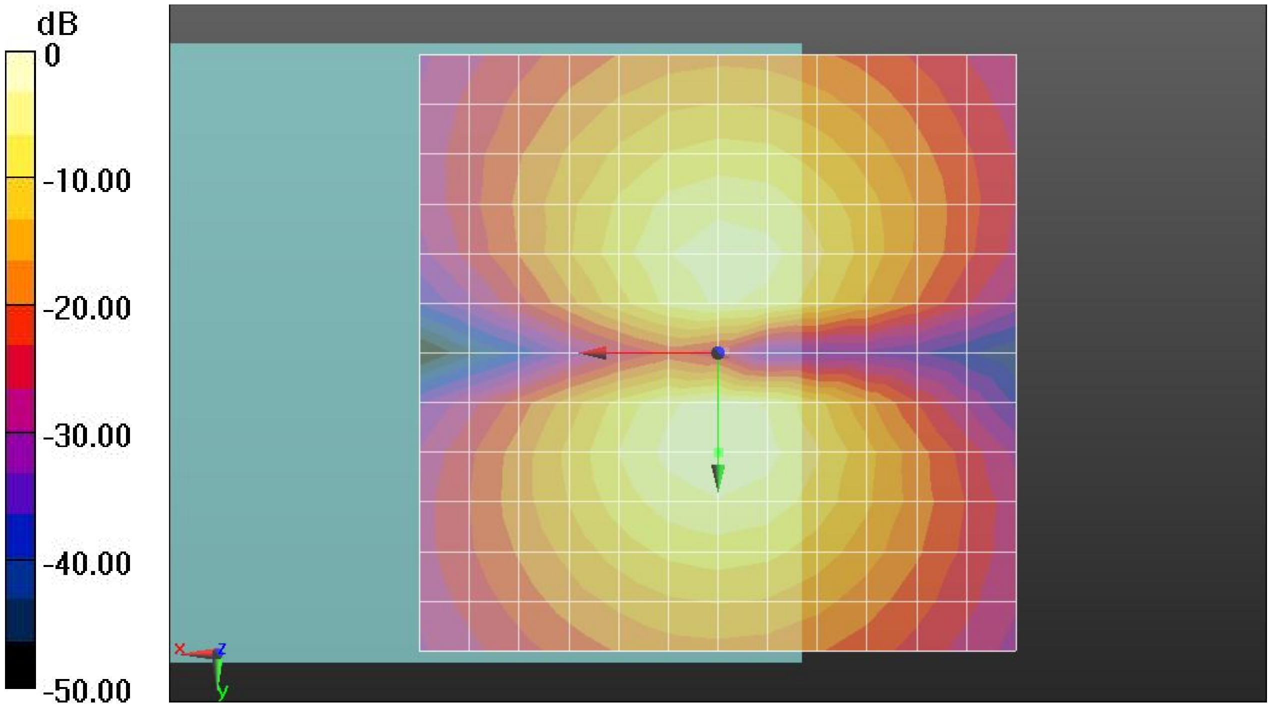
0 dB = 1.000 A/m = 0.00 dBA/m

03 HAC T-Coil_WCDMA Band V_Voice_Ch4182_Y_#1

Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch4182/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 54.04 dB
ABM1 comp = -0.64 dBA/m
BWC Factor = 0.16 dB
Location: 0, 8.3, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

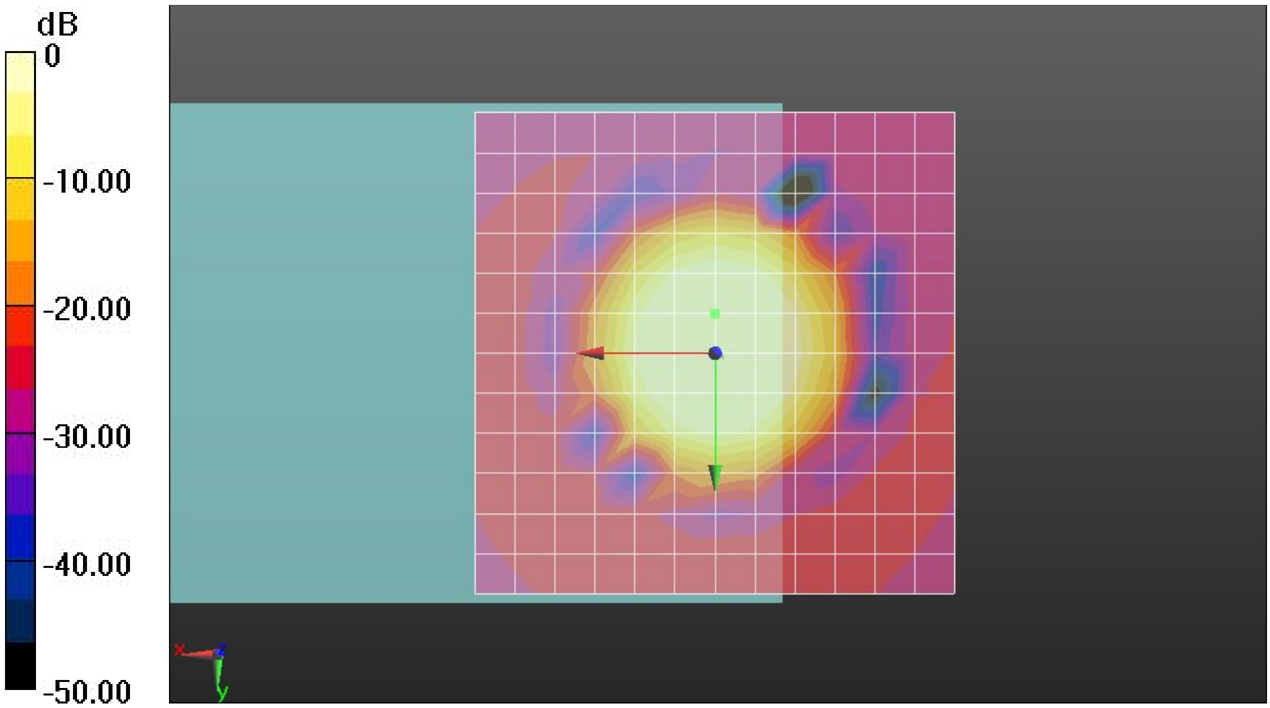
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2014.03.05

04 HAC T-Coil_WCDMA Band II_Voice_Ch9400_Z_#1

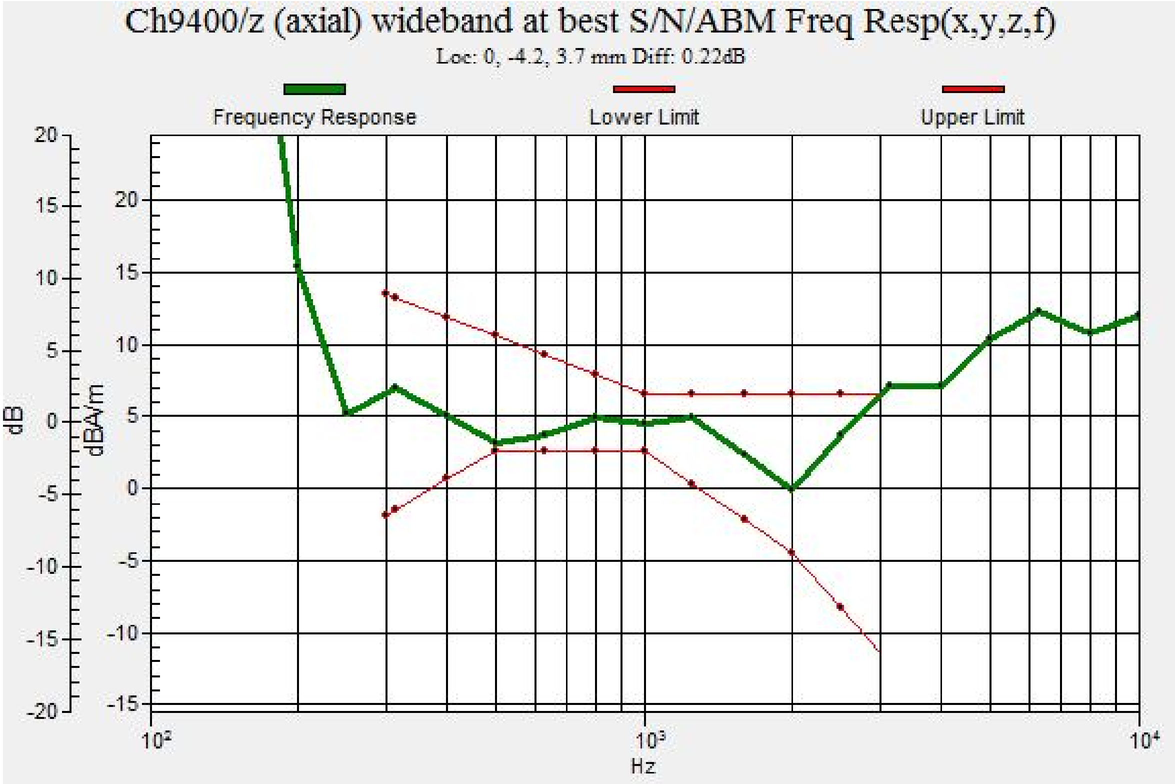
Communication System: UID 0, UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

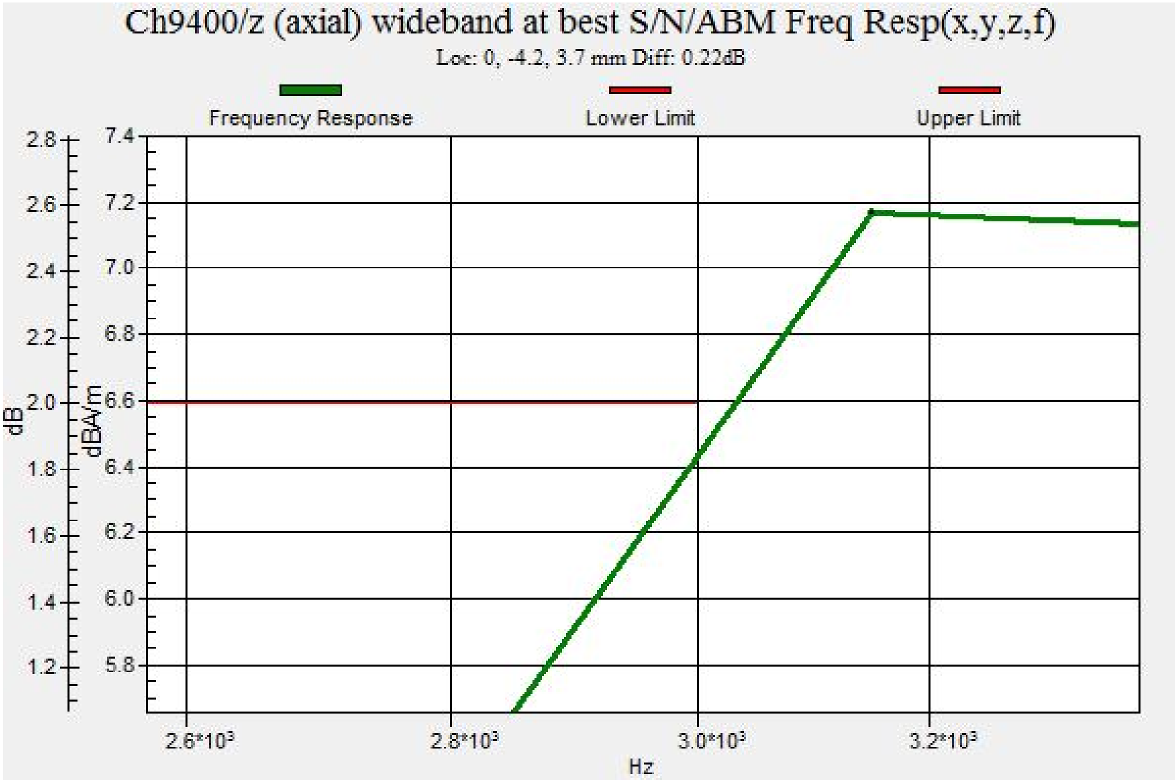
DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9400/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 59.56 dB
ABM1 comp = 7.48 dBA/m
BWC Factor = 0.16 dB
Location: 0, -4.2, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m


Ch9400/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, -4.2, 3.7 mm Diff: 0.22dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz


Ch9400/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, -4.2, 3.7 mm Diff: 0.22dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
2.6*10³
2.8*10³
3.0*10³
3.2*10³
Hz

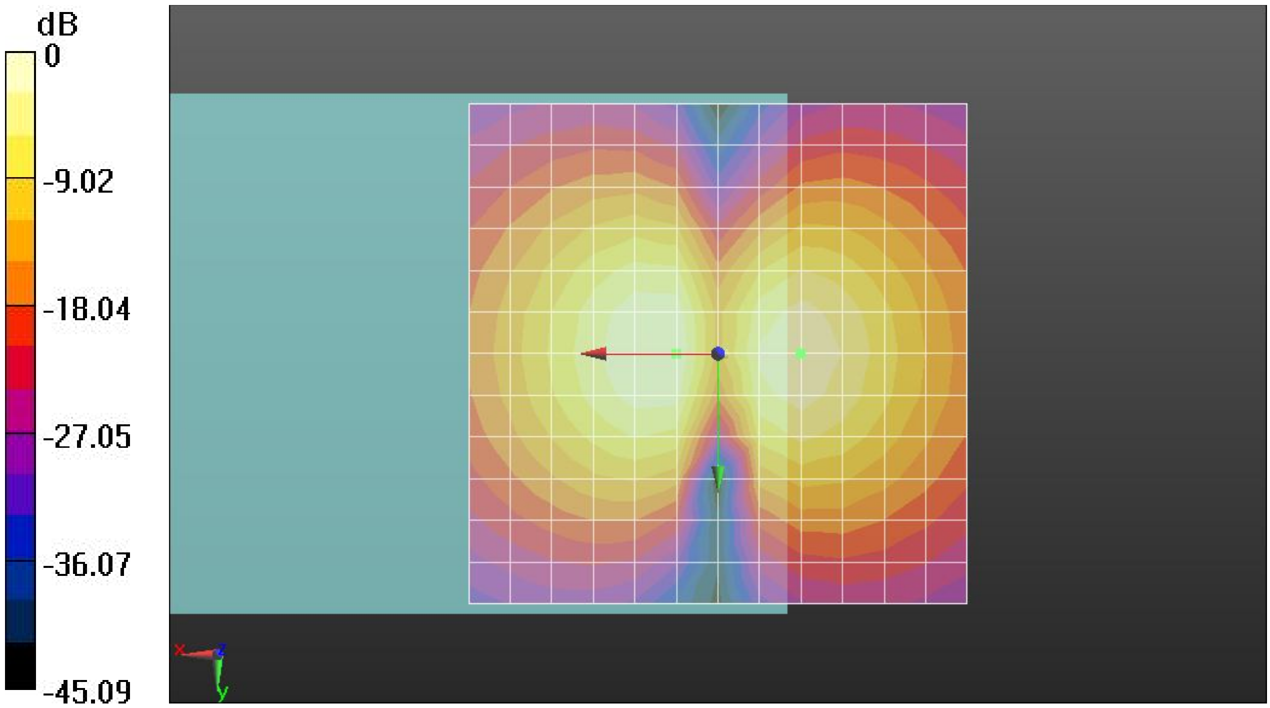
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

04 HAC T-Coil_WCDMA Band II_Voice_Ch9400_X_#1

Communication System: UID 0, UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9400/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 54.43 dB
ABM1 comp = -0.22 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

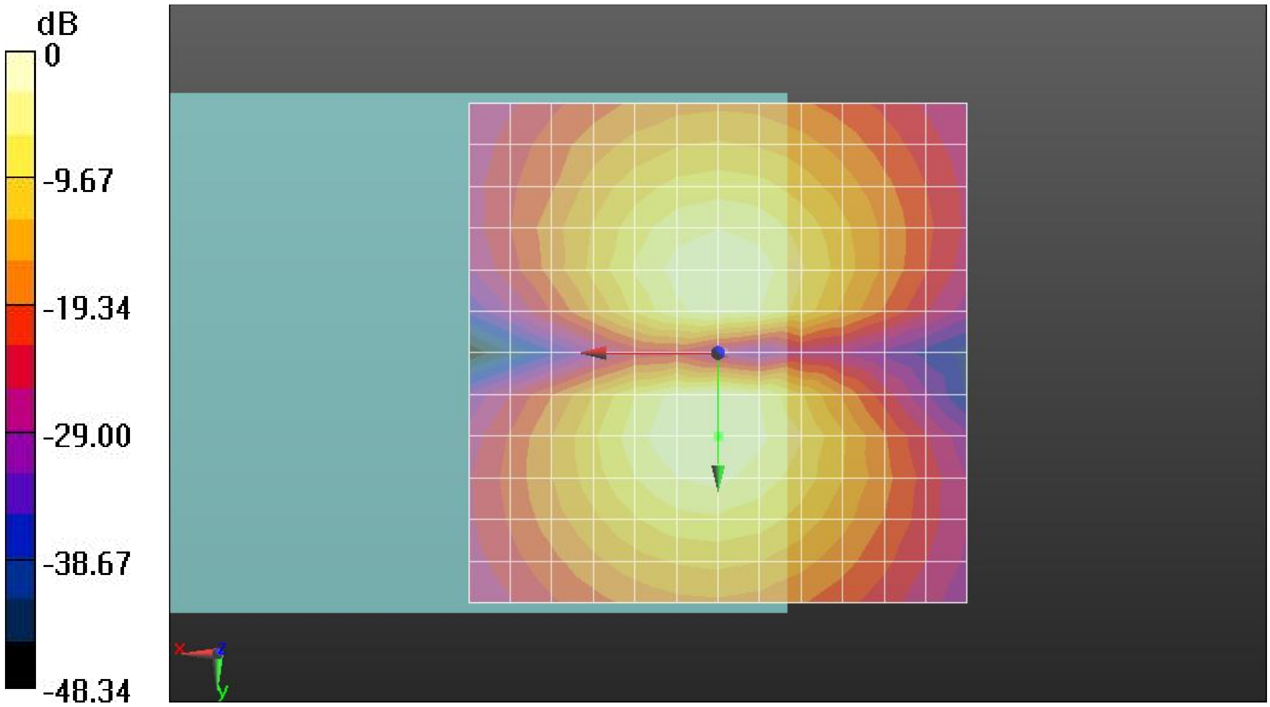
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2014.03.05

04 HAC T-Coil_WCDMA Band II_Voice_Ch9400_Y_#1

Communication System: UID 0, UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9400/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 54.96 dB
ABM1 comp = 0.69 dBA/m
BWC Factor = 0.16 dB
Location: 0, 8.3, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

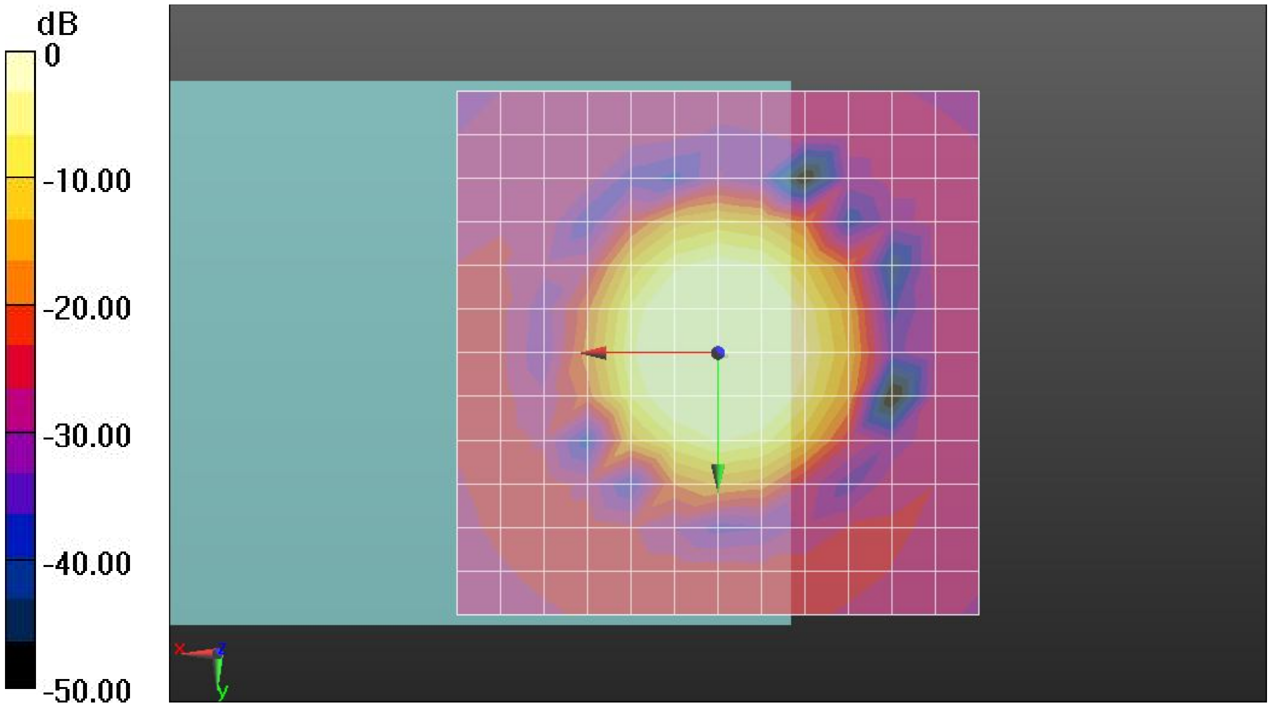
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

05 HAC T-Coil_GSM850_GSM Voice_Ch189_Z_#2

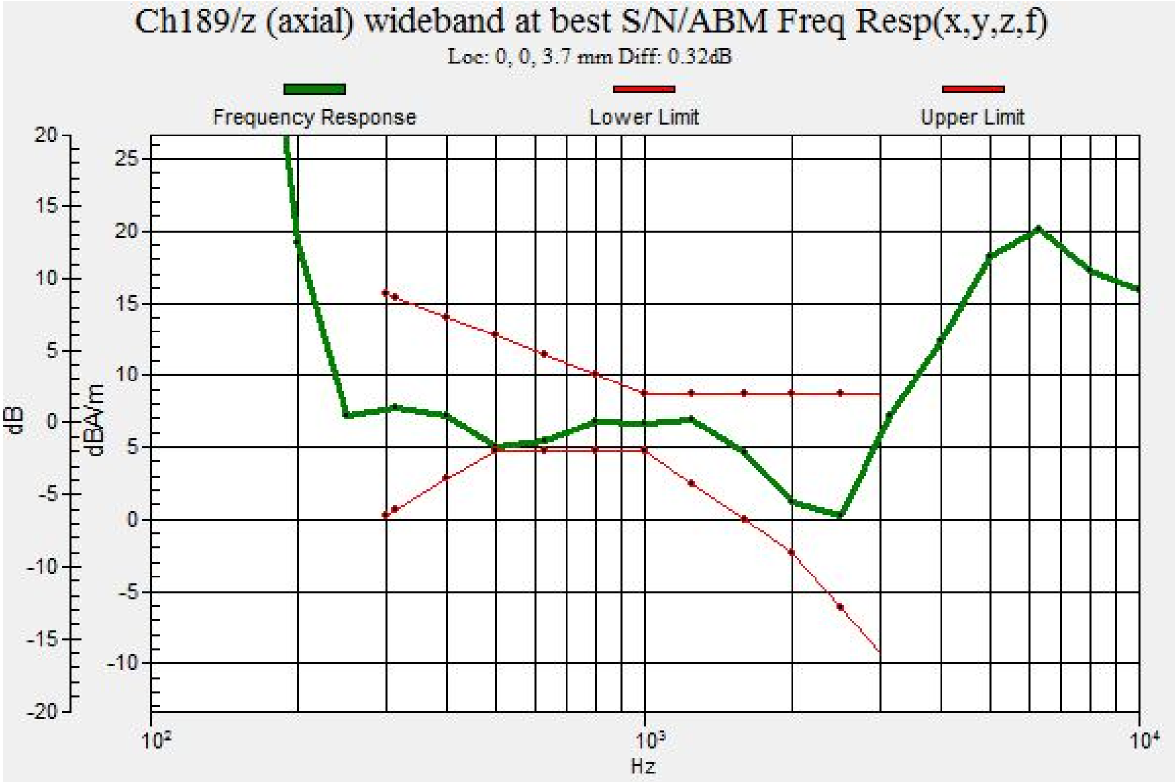
Communication System: UID 0, Generic GSM (0); Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

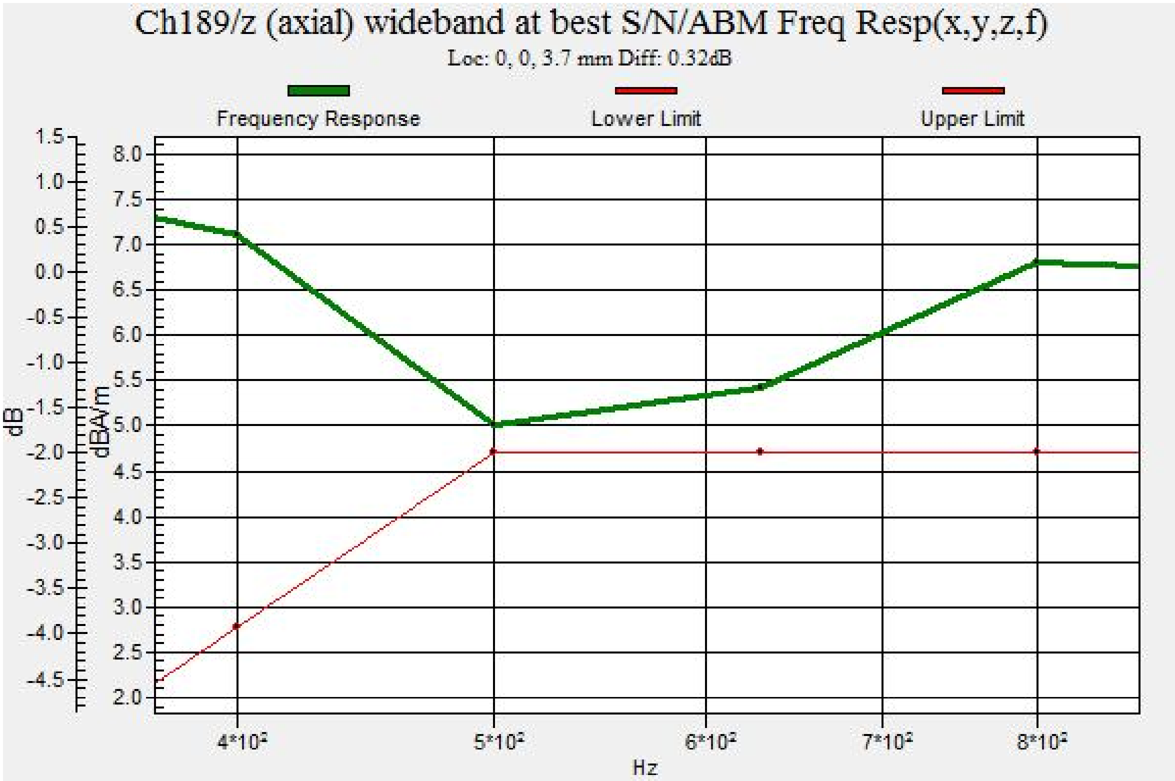
DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch189/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 57.13 dB
ABM1 comp = 8.07 dBA/m
BWC Factor = 0.16 dB
Location: 0, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m


Ch189/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.32dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz


Ch189/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.32dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

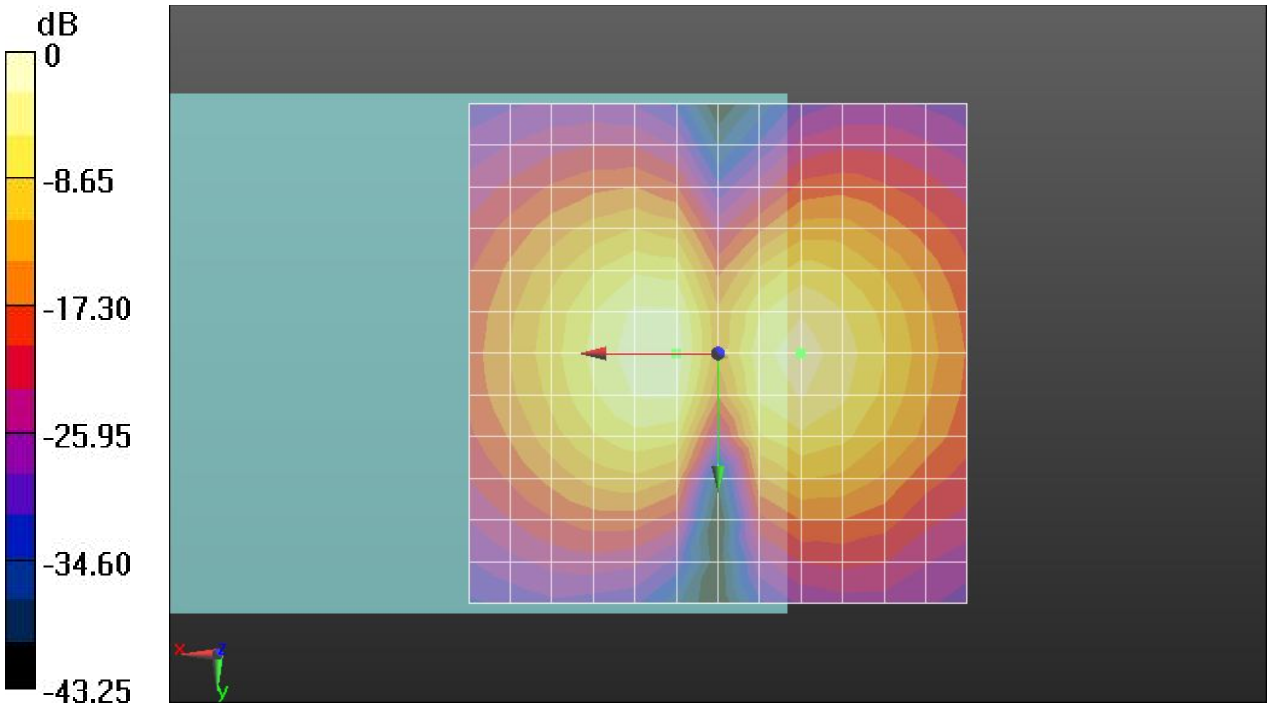
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

05 HAC T-Coil_GSM850_GSM Voice_Ch189_X_#2

Communication System: UID 0, Generic GSM (0); Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch189/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 40.34 dB
ABM1 comp = -1.28 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

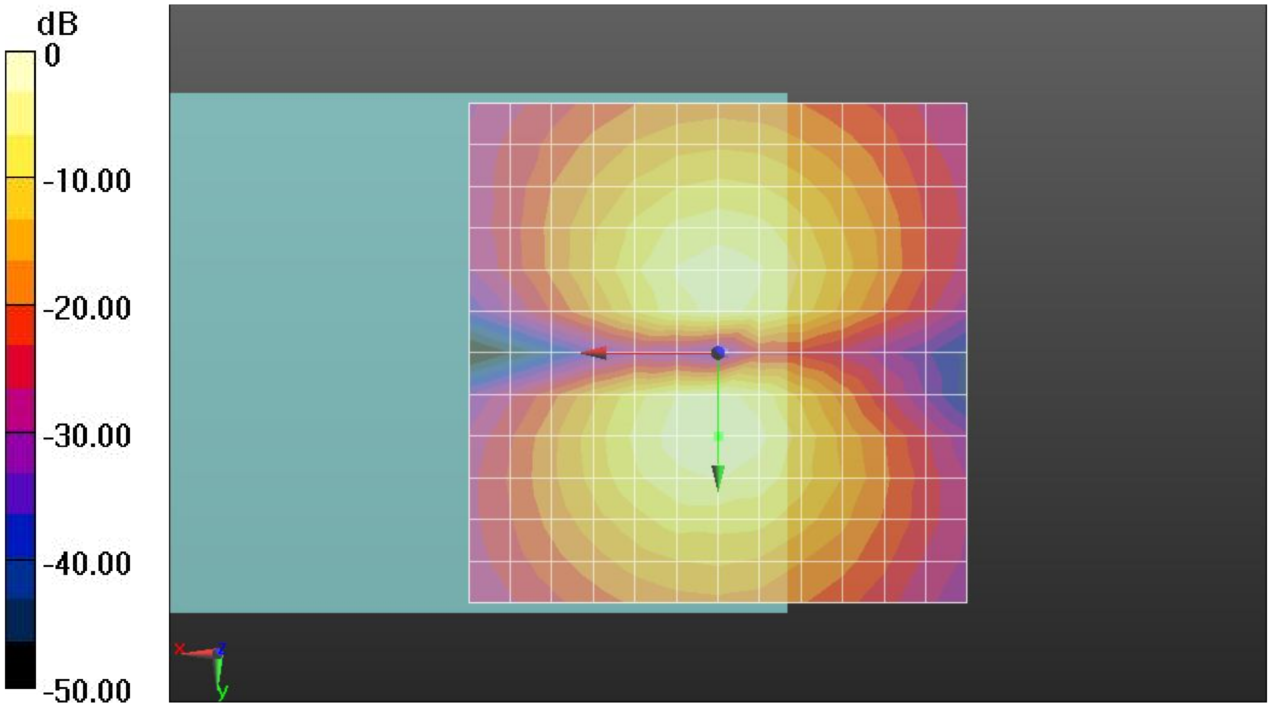
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

05 HAC T-Coil_GSM850_GSM Voice_Ch189_Y_#2

Communication System: UID 0, Generic GSM (0); Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch189/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 53.84 dB
ABM1 comp = 0.03 dBA/m
BWC Factor = 0.16 dB
Location: 0, 8.3, 3.7 mm



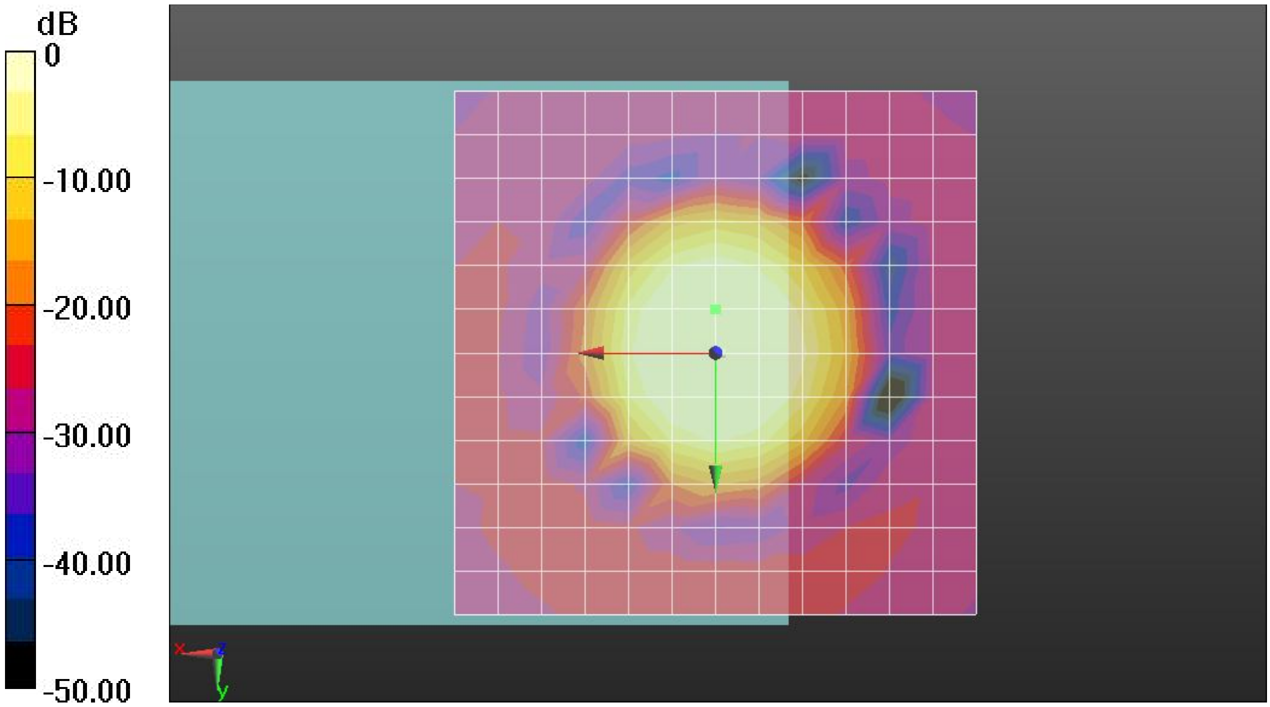
0 dB = 1.000 A/m = 0.00 dBA/m

06 HAC T-Coil_GSM1900_GSM Voice_Ch661_Z_#2

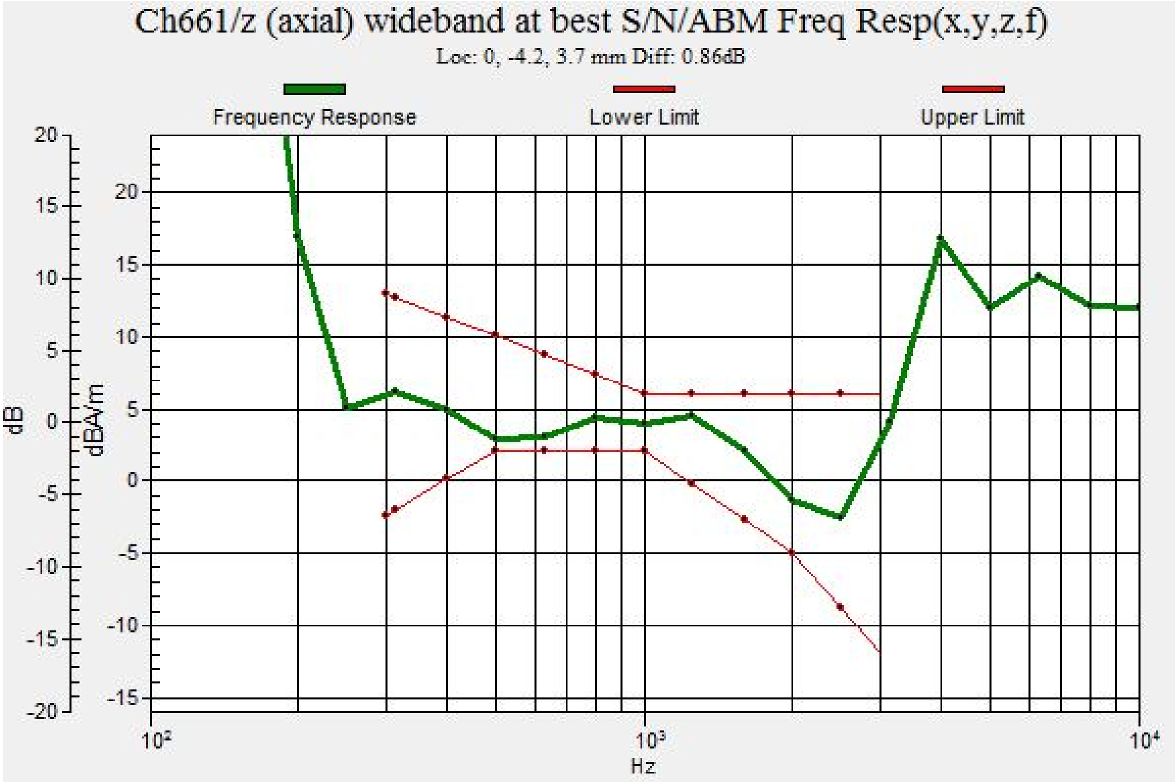
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch661/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 57.46 dB
ABM1 comp = 6.23 dBA/m
BWC Factor = 0.16 dB
Location: 0, -4.2, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m



Ch661/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, -4.2, 3.7 mm Diff: 0.86dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

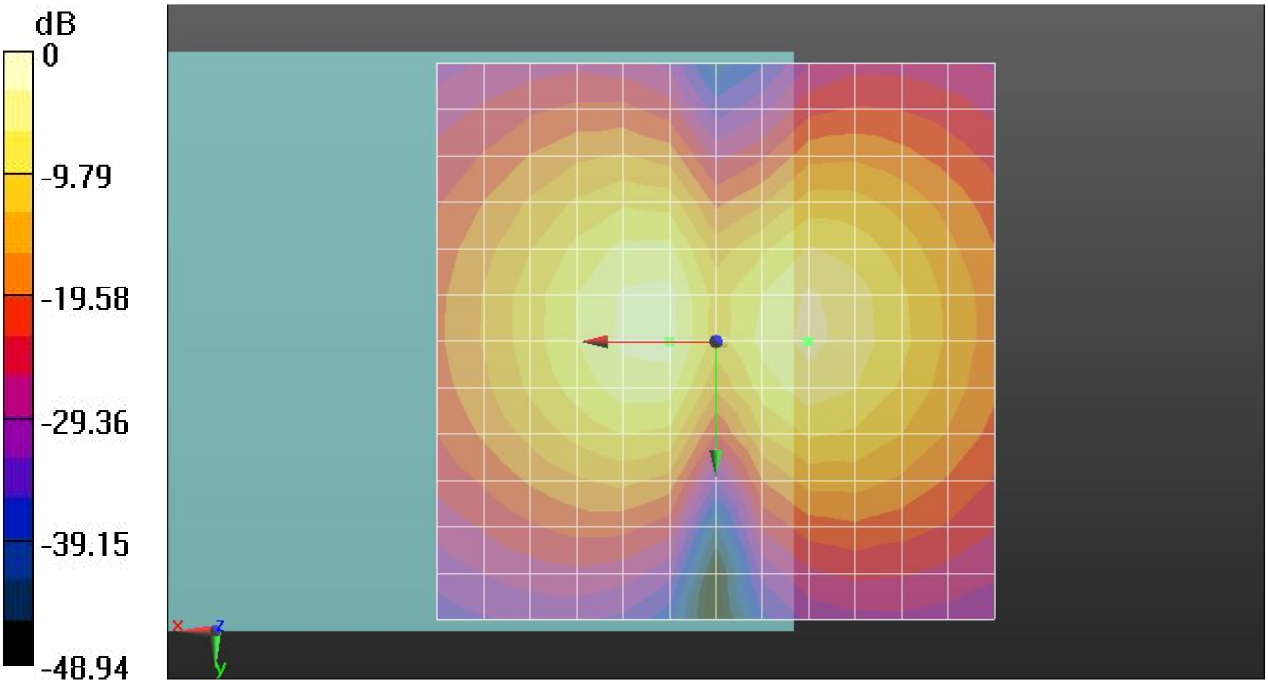
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2014.03.05

06 HAC T-Coil_GSM1900_GSM Voice_Ch661_X_#2

Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch661/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 42.94 dB
ABM1 comp = -2.19 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



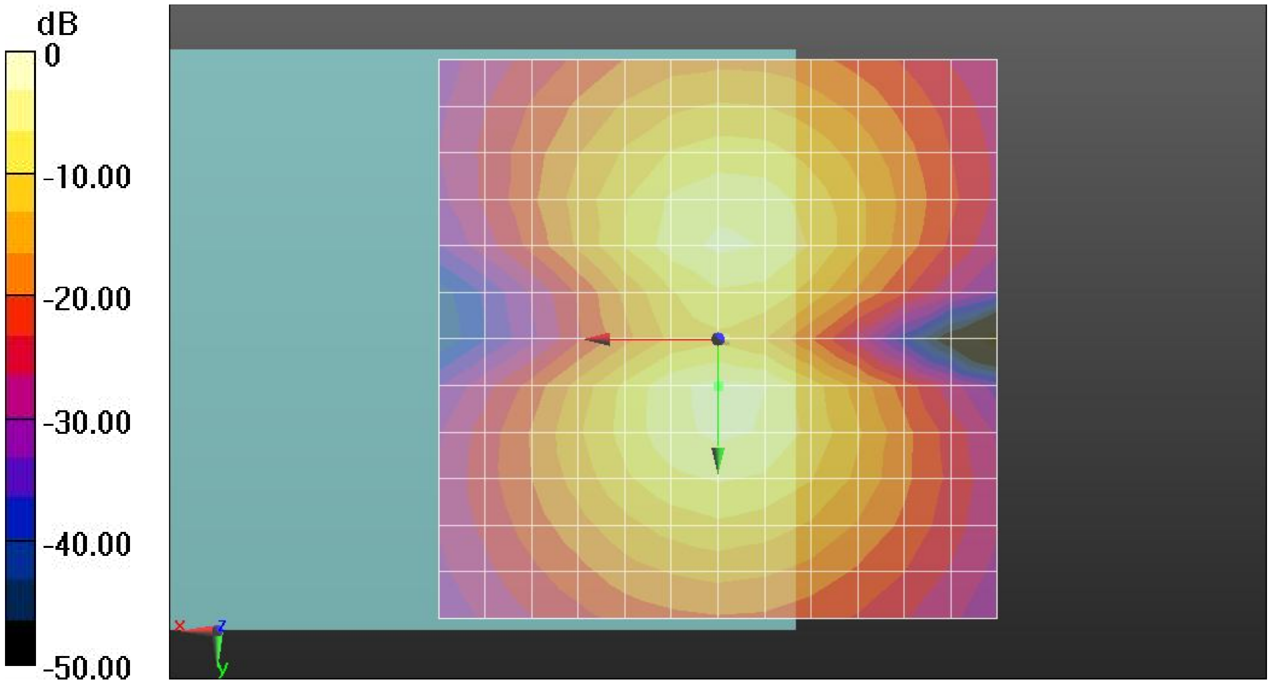
0 dB = 1.000 A/m = 0.00 dBA/m

06 HAC T-Coil_GSM1900_GSM Voice_Ch661_Y_#2

Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch661/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 52.59 dB
ABM1 comp = -2.08 dBA/m
BWC Factor = 0.16 dB
Location: 0, 4.2, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

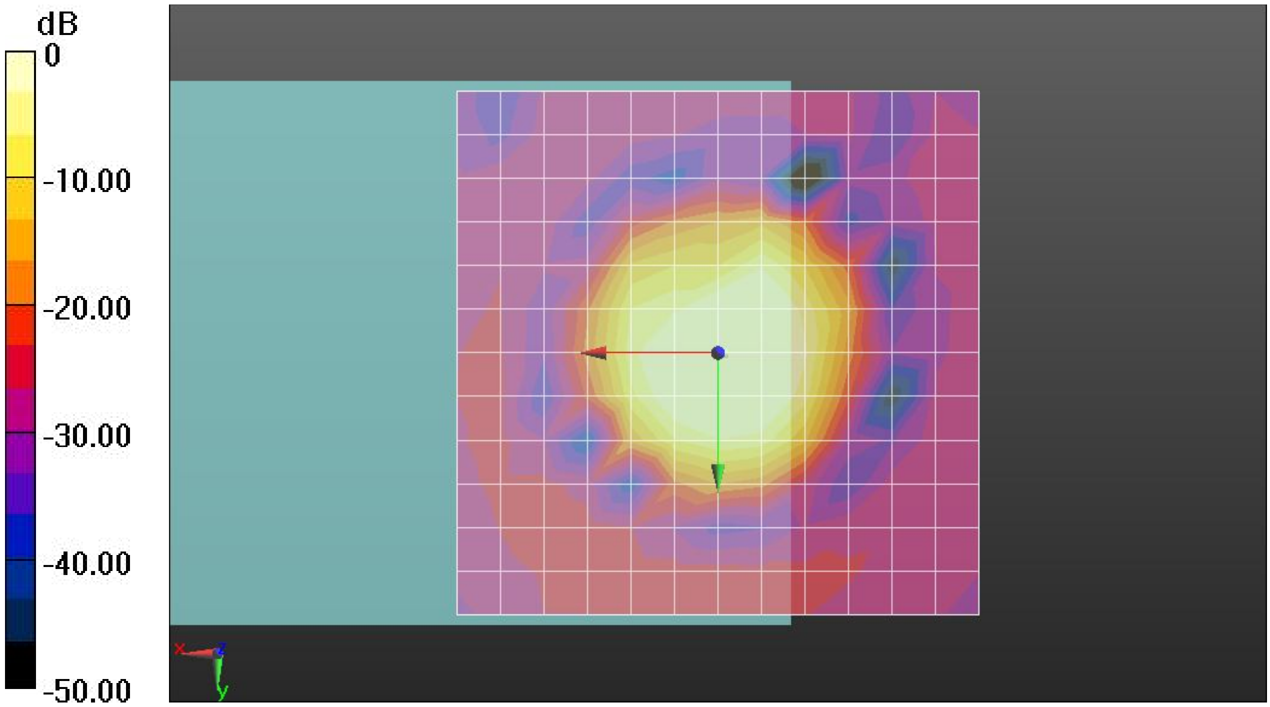
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

07 HAC T-Coil_WCDMA Band V_Voice_Ch4182_Z_#2

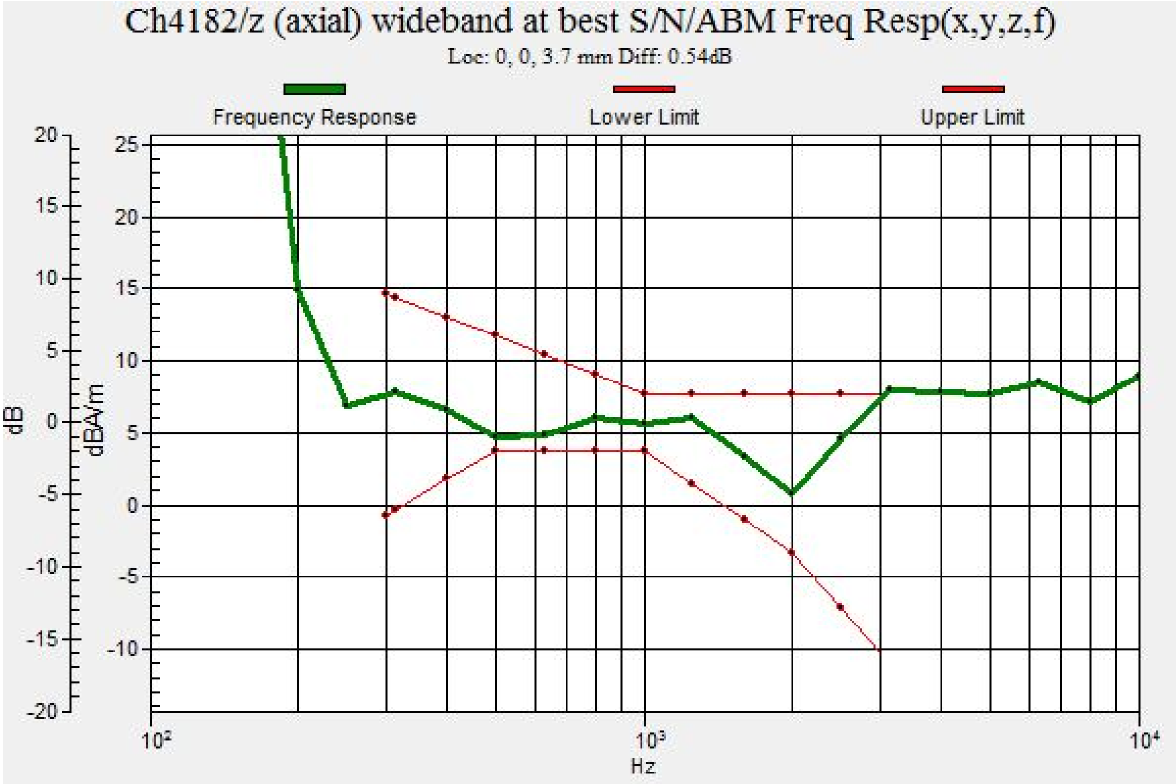
Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

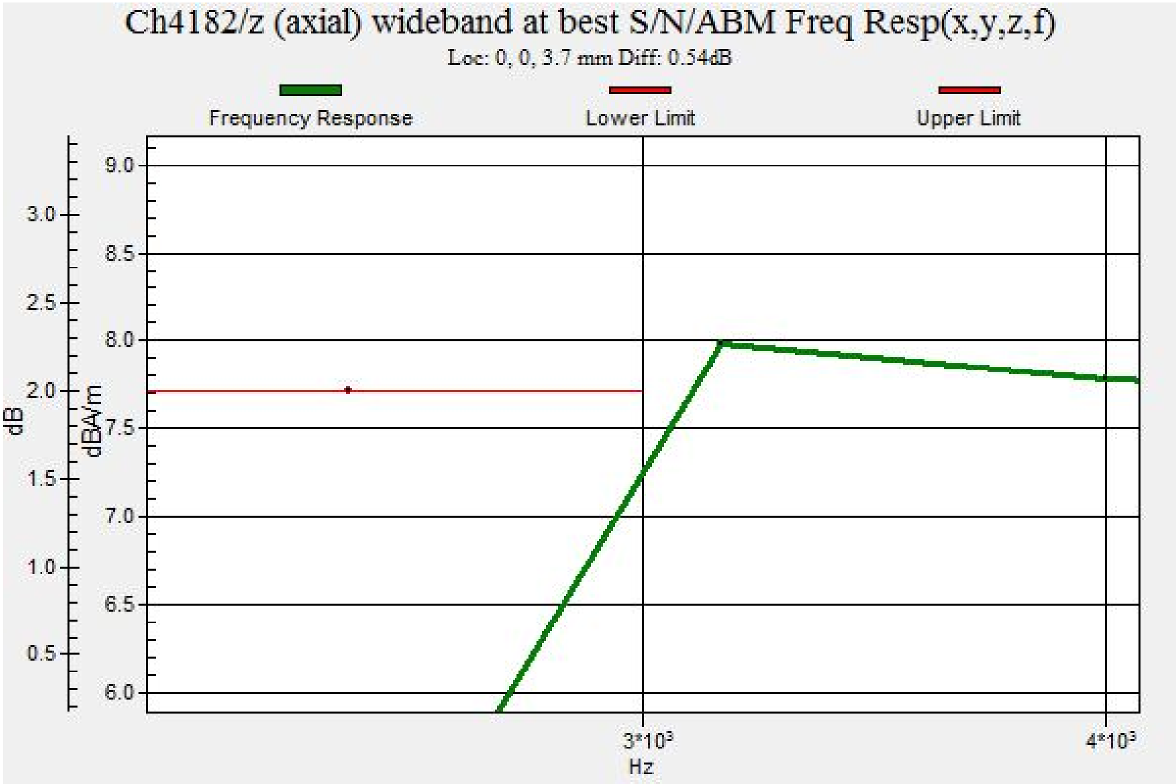
Ch4182/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 58.30 dB
ABM1 comp = 8.35 dBA/m
BWC Factor = 0.16 dB
Location: 0, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m



Ch4182/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.54dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz



Ch4182/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.54dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
3*10³
4*10³
Hz

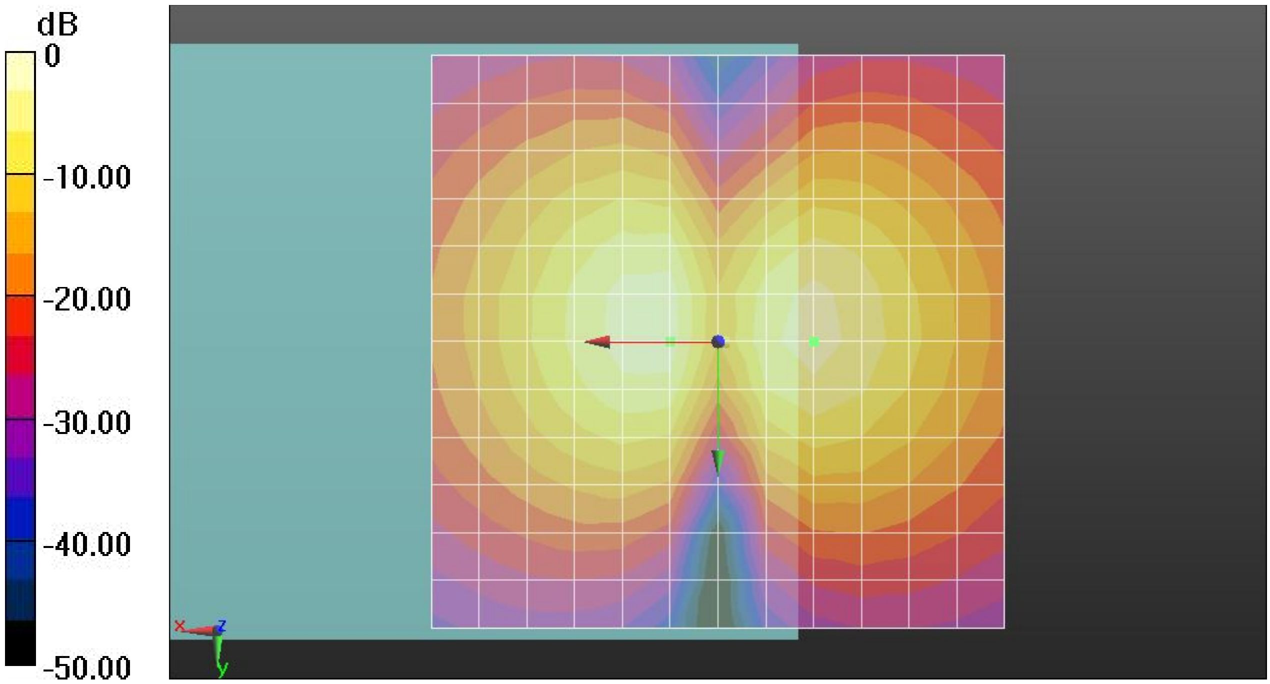
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

07 HAC T-Coil_WCDMA Band V_Voice_Ch4182_X_#2

Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch4182/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 53.26 dB
ABM1 comp = -1.70 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

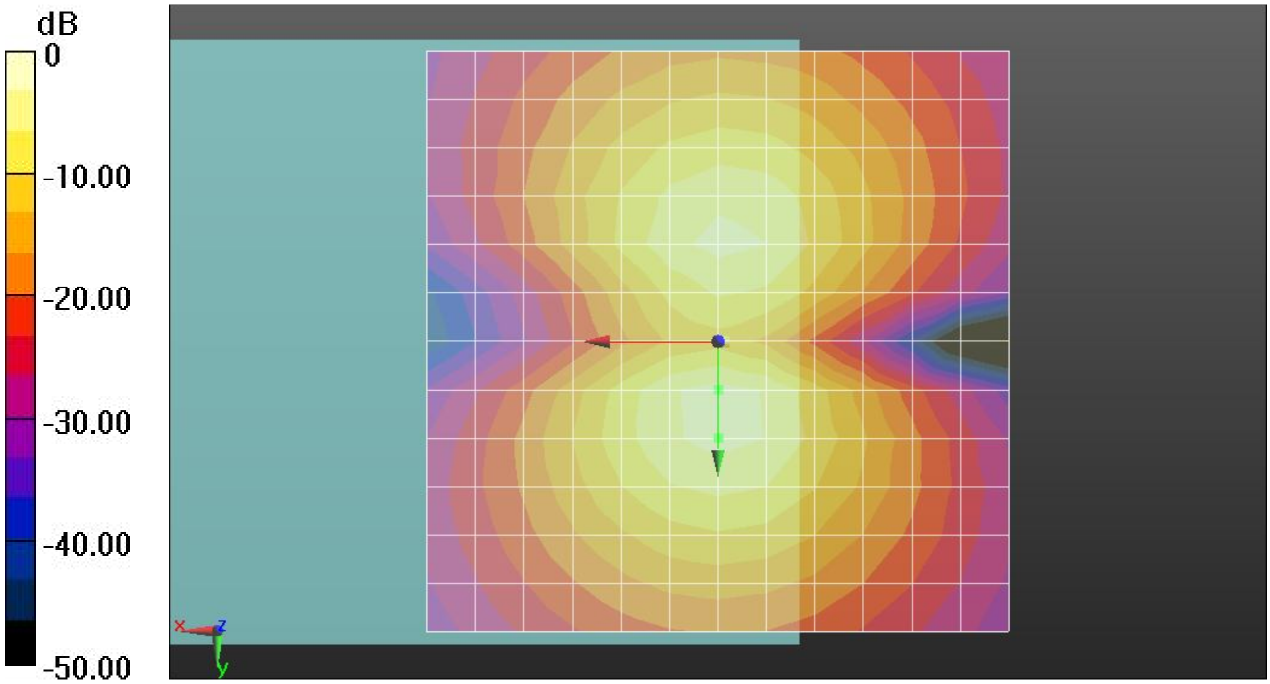
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

07 HAC T-Coil_WCDMA Band V_Voice_Ch4182_Y_#2

Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch4182/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 53.00 dB
ABM1 comp = -2.03 dBA/m
BWC Factor = 0.16 dB
Location: 0, 8.3, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

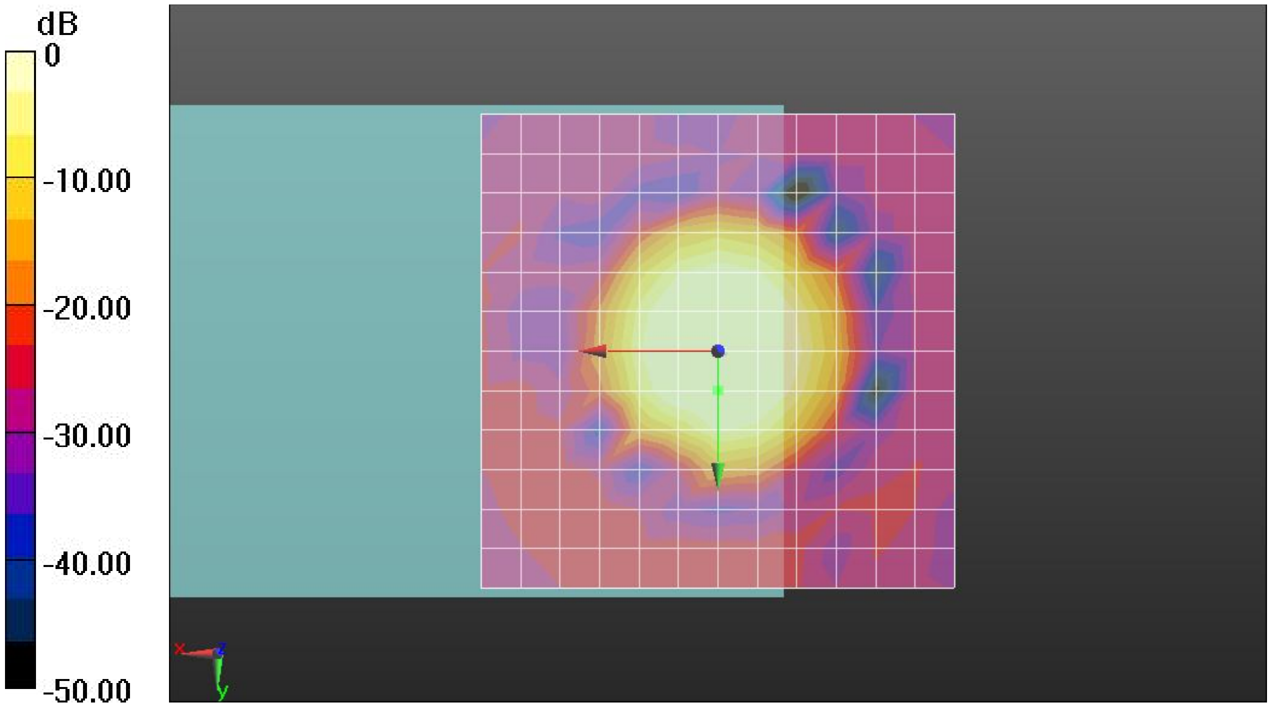
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

08 HAC T-Coil_WCDMA Band II_Voice_Ch9400_Z_#2

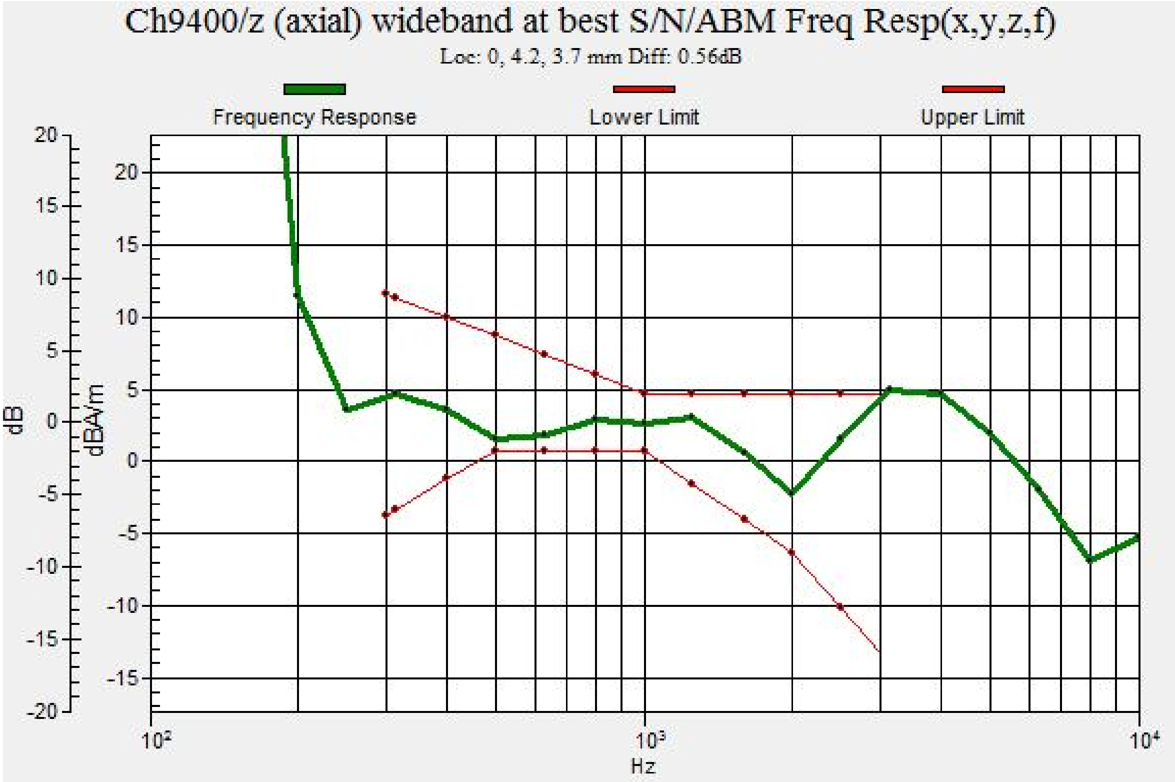
Communication System: UID 0, UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

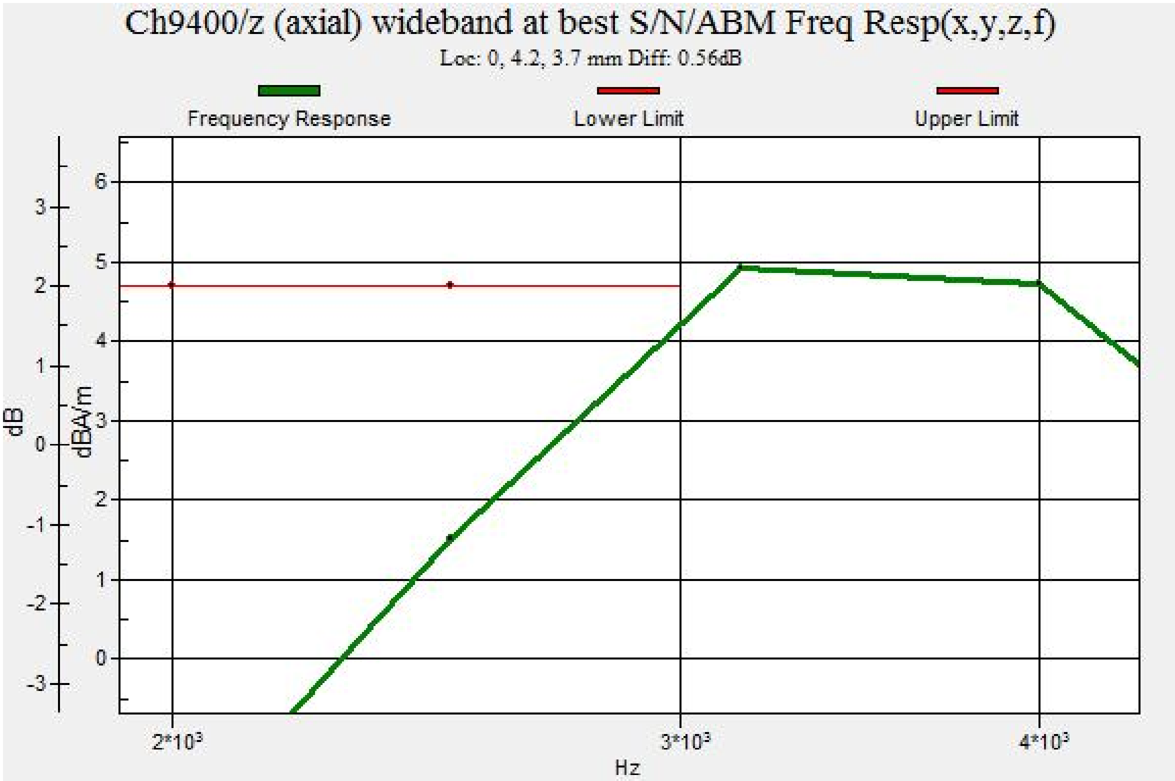
DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9400/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 58.13 dB
ABM1 comp = 5.45 dBA/m
BWC Factor = 0.16 dB
Location: 0, 4.2, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m


Ch9400/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 4.2, 3.7 mm Diff: 0.56dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

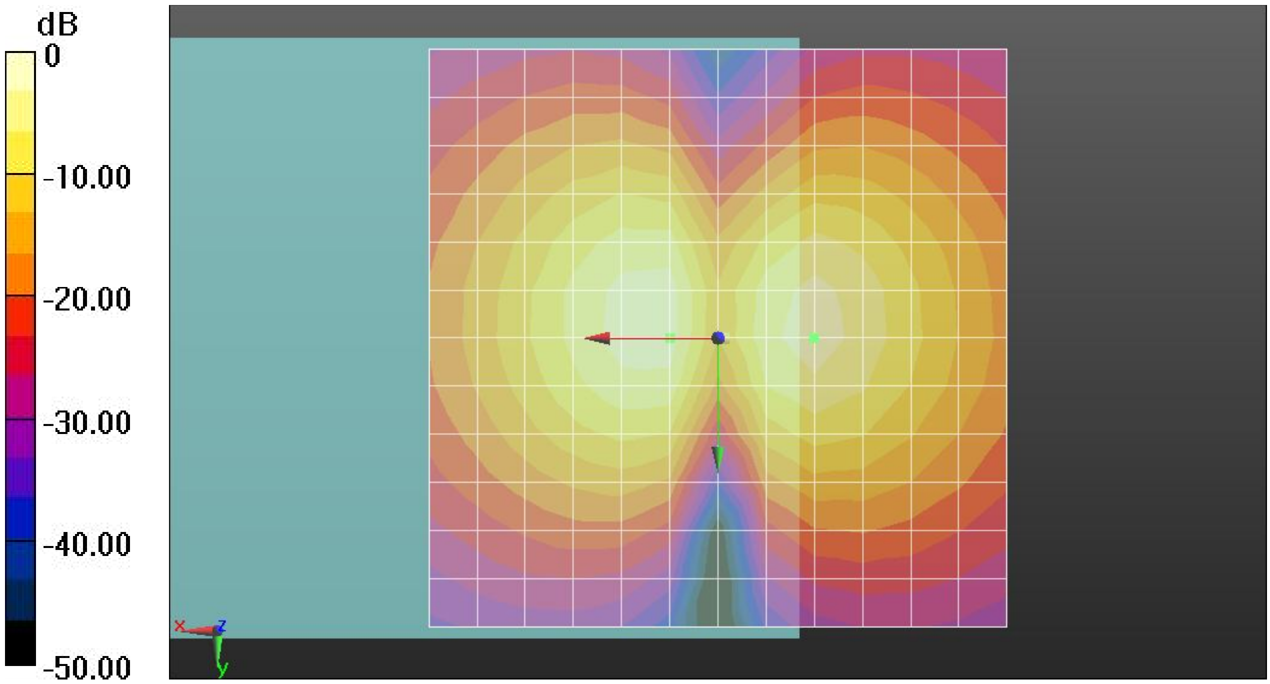

Ch9400/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 4.2, 3.7 mm Diff: 0.56dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

08 HAC T-Coil_WCDMA Band II_Voice_Ch9400_X_#2

Communication System: UID 0, UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9400/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 53.39 dB
ABM1 comp = -1.48 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

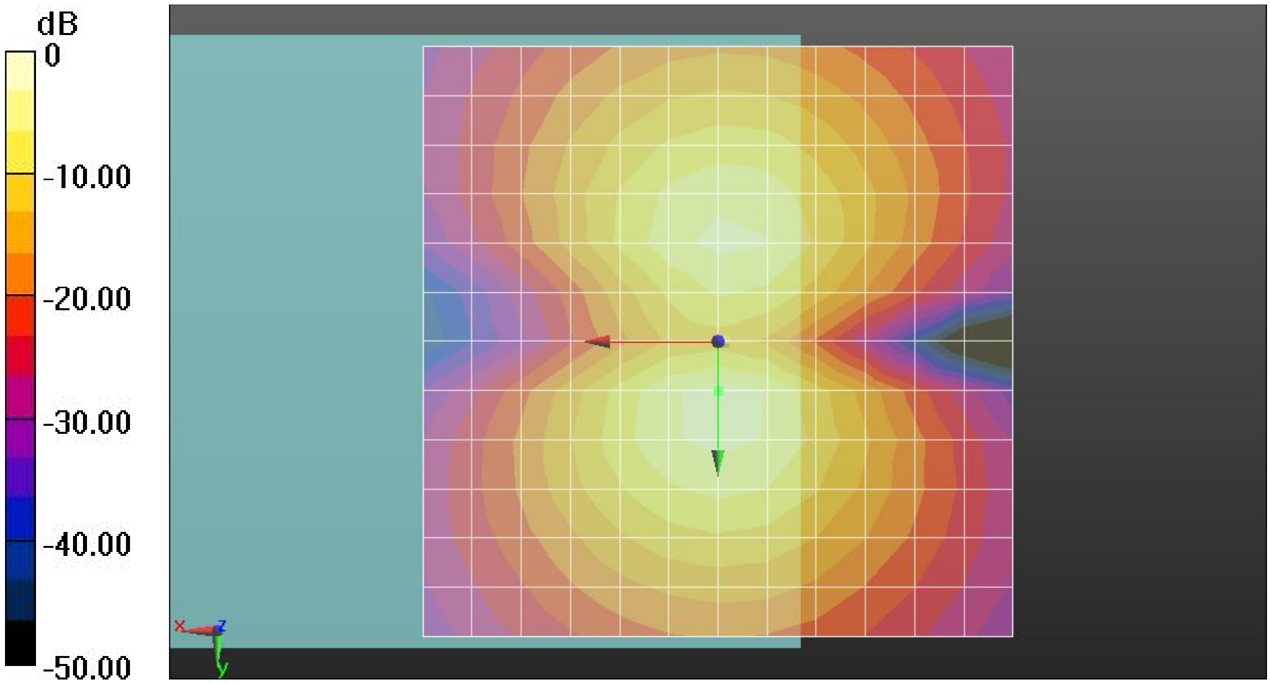
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

08 HAC T-Coil_WCDMA Band II_Voice_Ch9400_Y_#2

Communication System: UID 0, UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9400/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 52.89 dB
ABM1 comp = -1.78 dBA/m
BWC Factor = 0.16 dB
Location: 0, 4.2, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

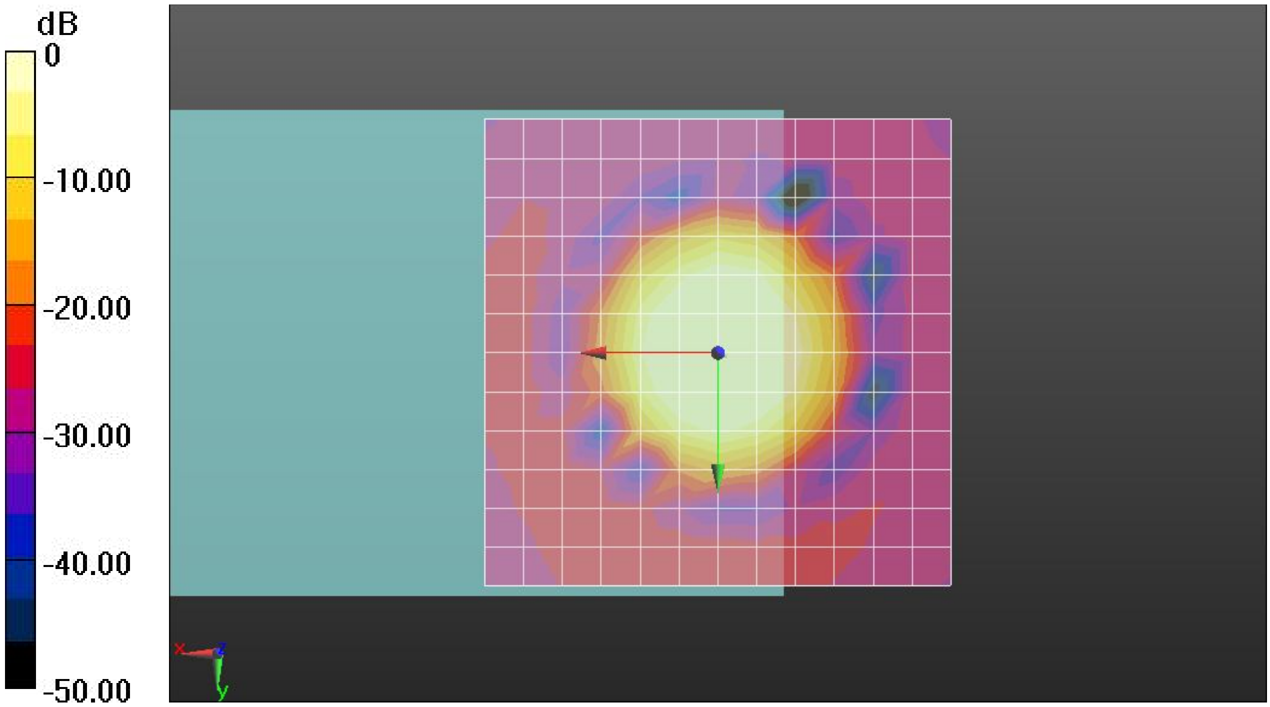
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

09 HAC T-Coil_GSM850_GSM Voice_Ch189_Z_#3

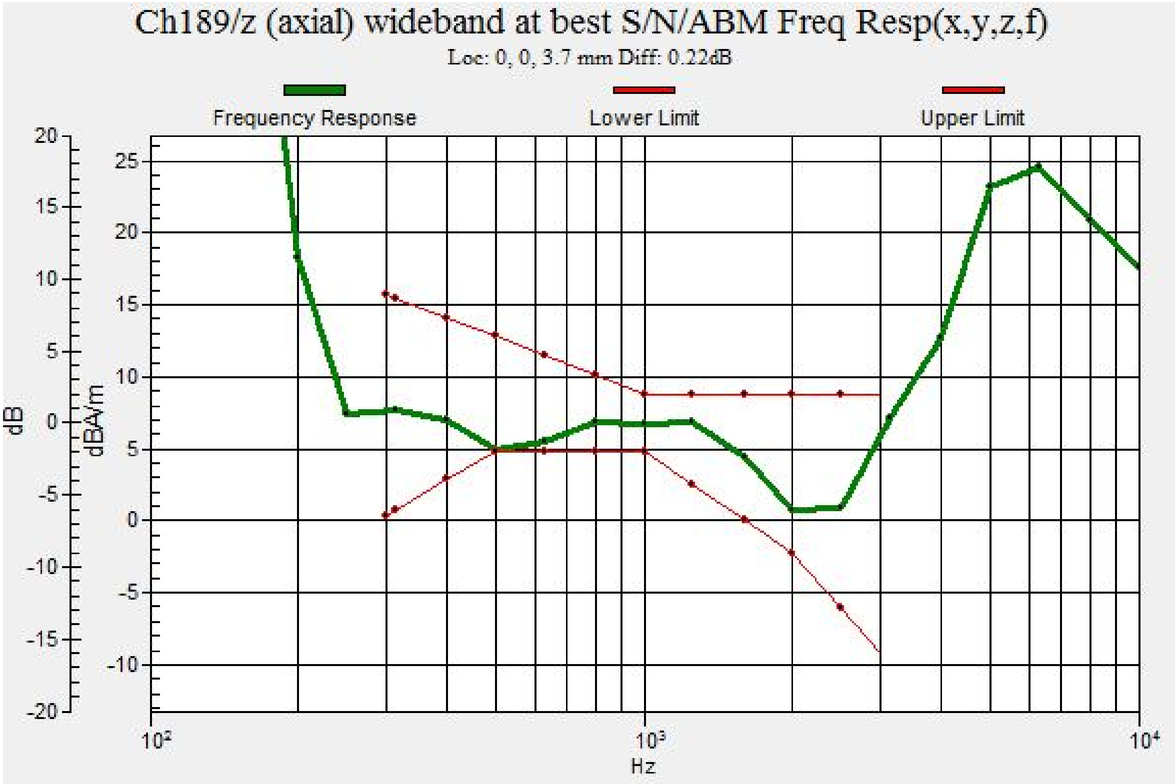
Communication System: UID 0, Generic GSM (0); Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

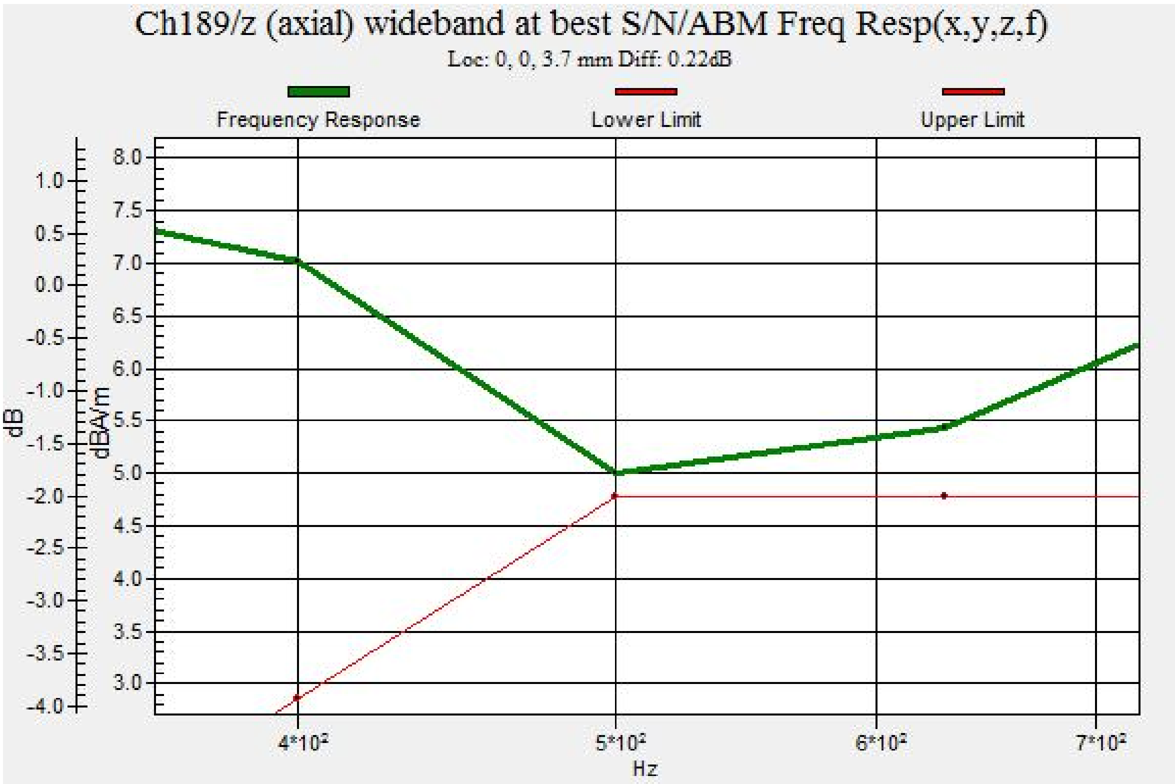
Ch189/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 58.47 dB
ABM1 comp = 8.80 dBA/m
BWC Factor = 0.16 dB
Location: 0, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m



Ch189/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.22dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz



Ch189/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.22dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

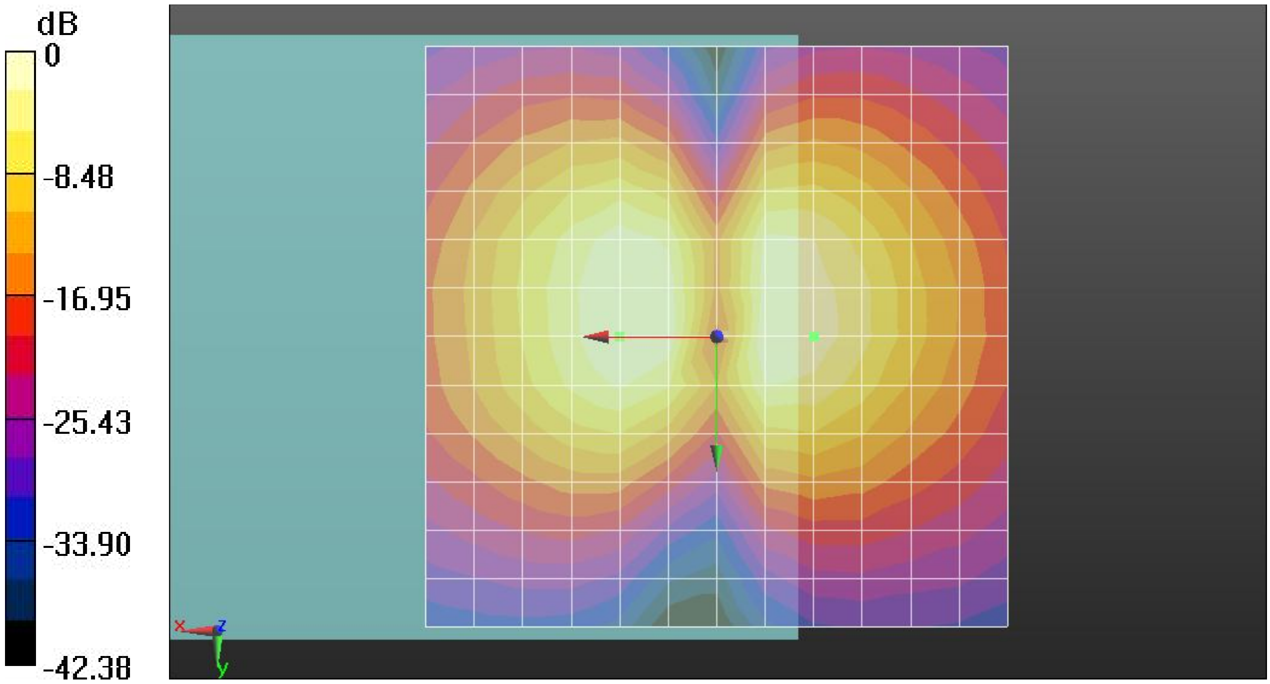
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2014.03.05

09 HAC T-Coil_GSM850_GSM Voice_Ch189_X_#3

Communication System: UID 0, Generic GSM (0); Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch189/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 39.99 dB
ABM1 comp = -1.02 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

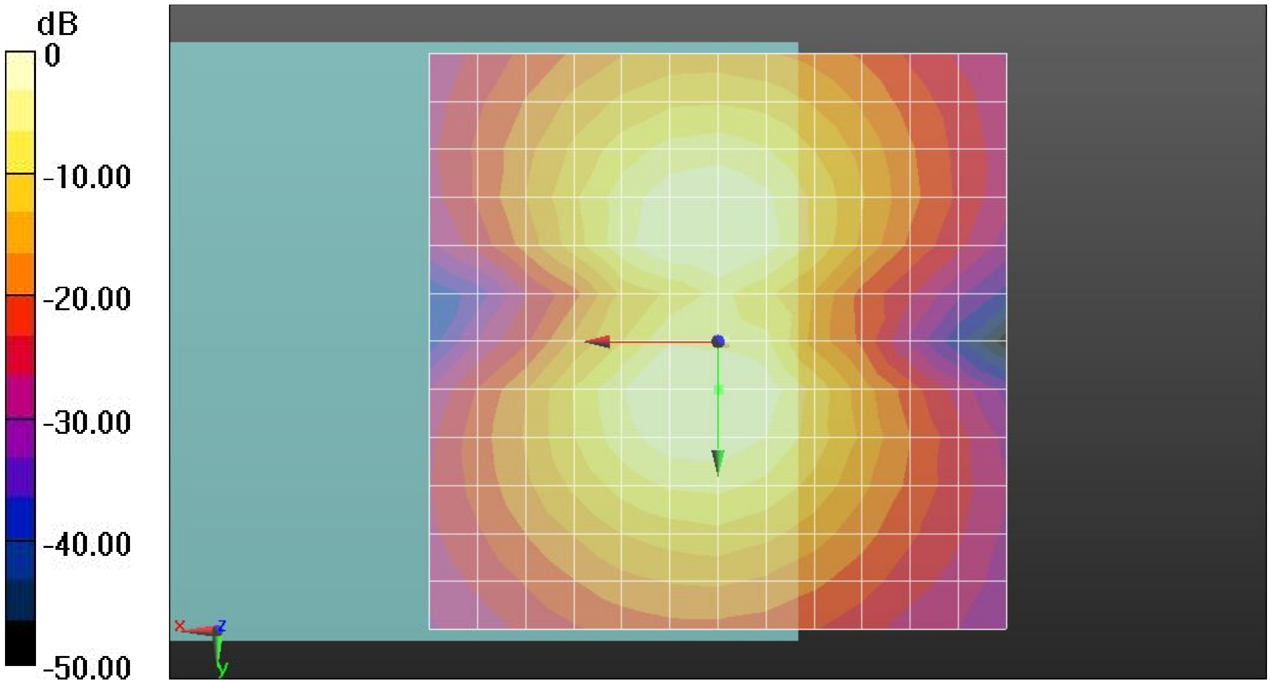
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

09 HAC T-Coil_GSM850_GSM Voice_Ch189_Y_#3

Communication System: UID 0, Generic GSM (0); Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch189/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 53.74 dB
ABM1 comp = 1.96 dBA/m
BWC Factor = 0.16 dB
Location: 0, 4.2, 3.7 mm



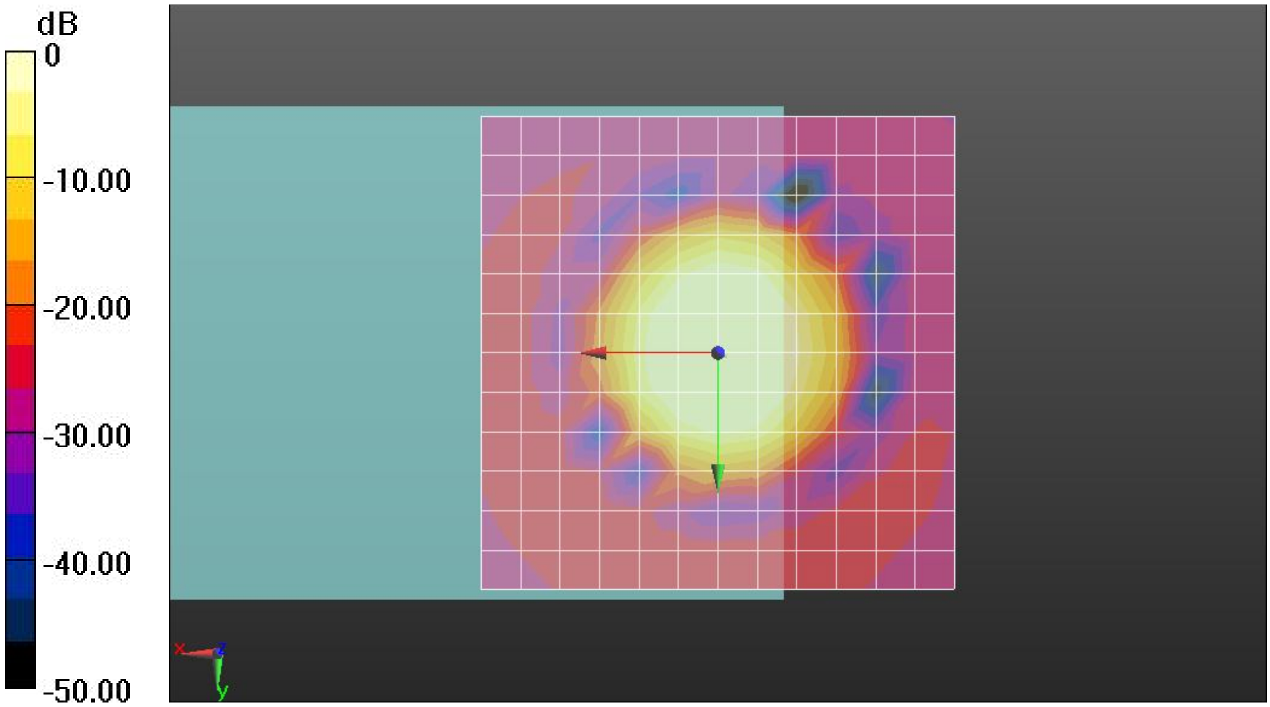
0 dB = 1.000 A/m = 0.00 dBA/m

10 HAC T-Coil_GSM1900_GSM Voice_Ch661_Z_#3

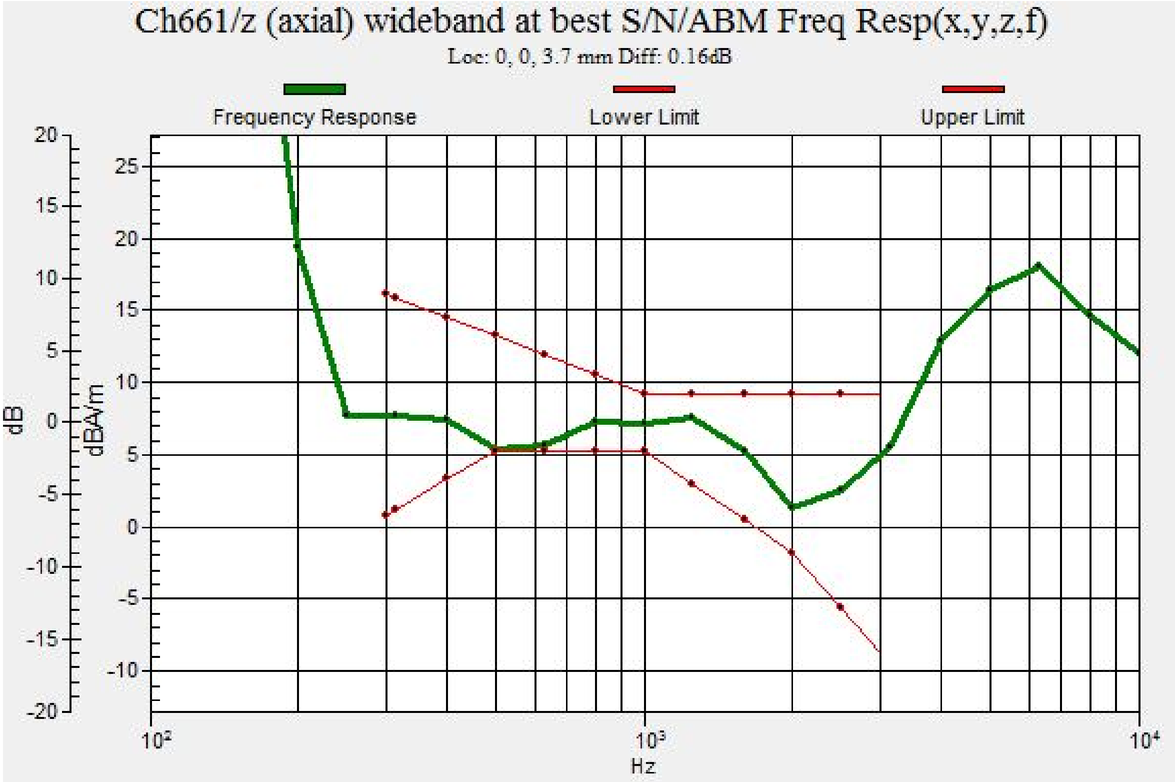
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

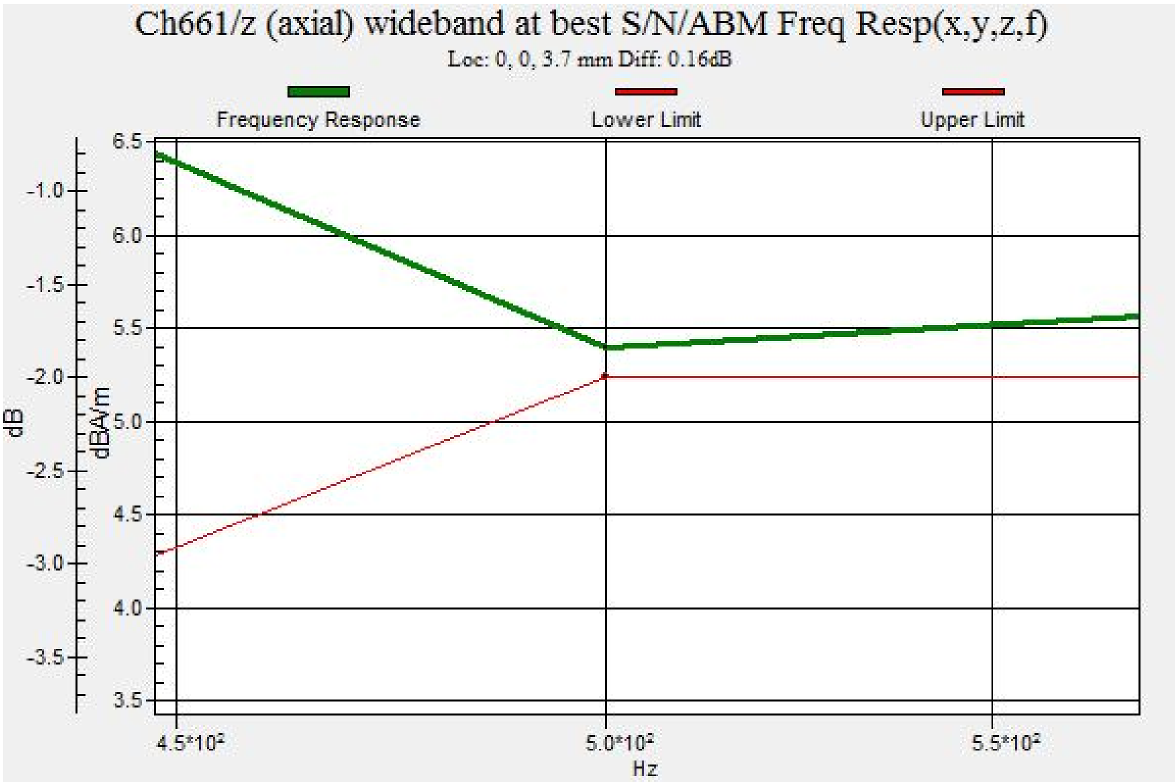
DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch661/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 58.88 dB
ABM1 comp = 8.83 dBA/m
BWC Factor = 0.16 dB
Location: 0, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m


Ch661/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.16dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz
10^2
10^3
10^4


Ch661/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 0, 3.7 mm Diff: 0.16dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz
4.5*10²
5.0*10²
5.5*10²

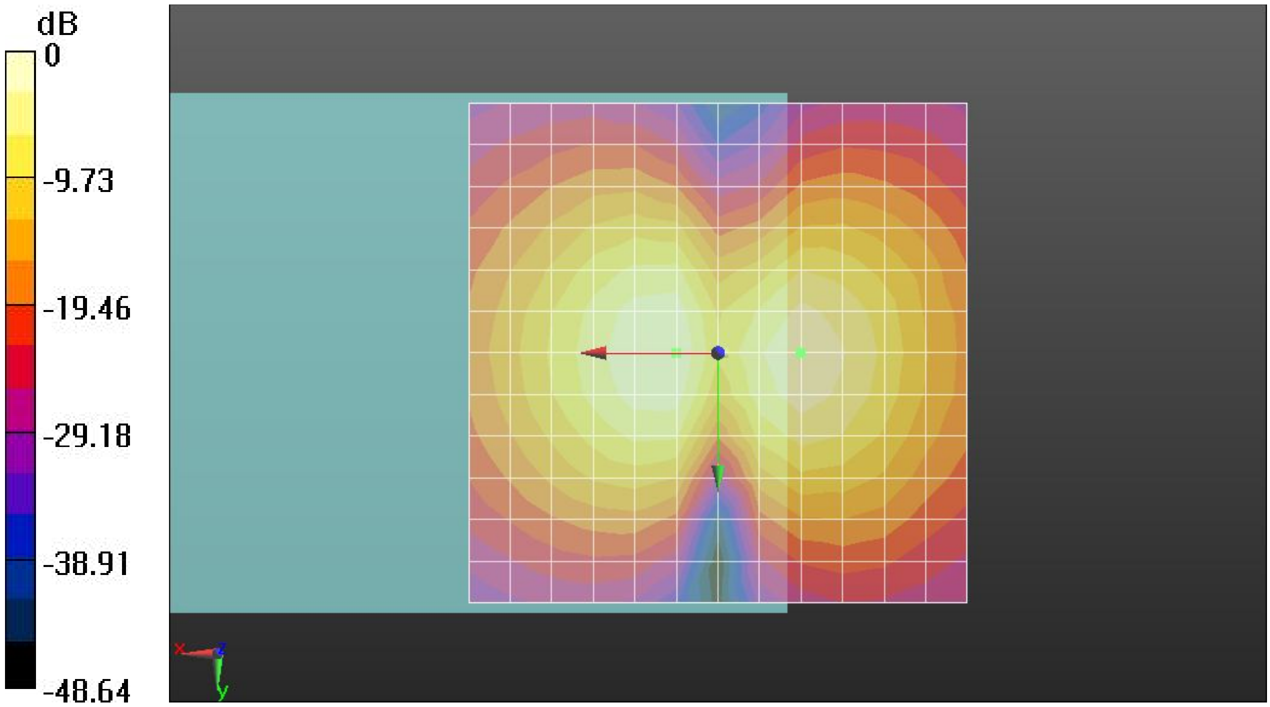
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

10 HAC T-Coil_GSM1900_GSM Voice_Ch661_X_#3

Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch661/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 44.37 dB
ABM1 comp = -0.58 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

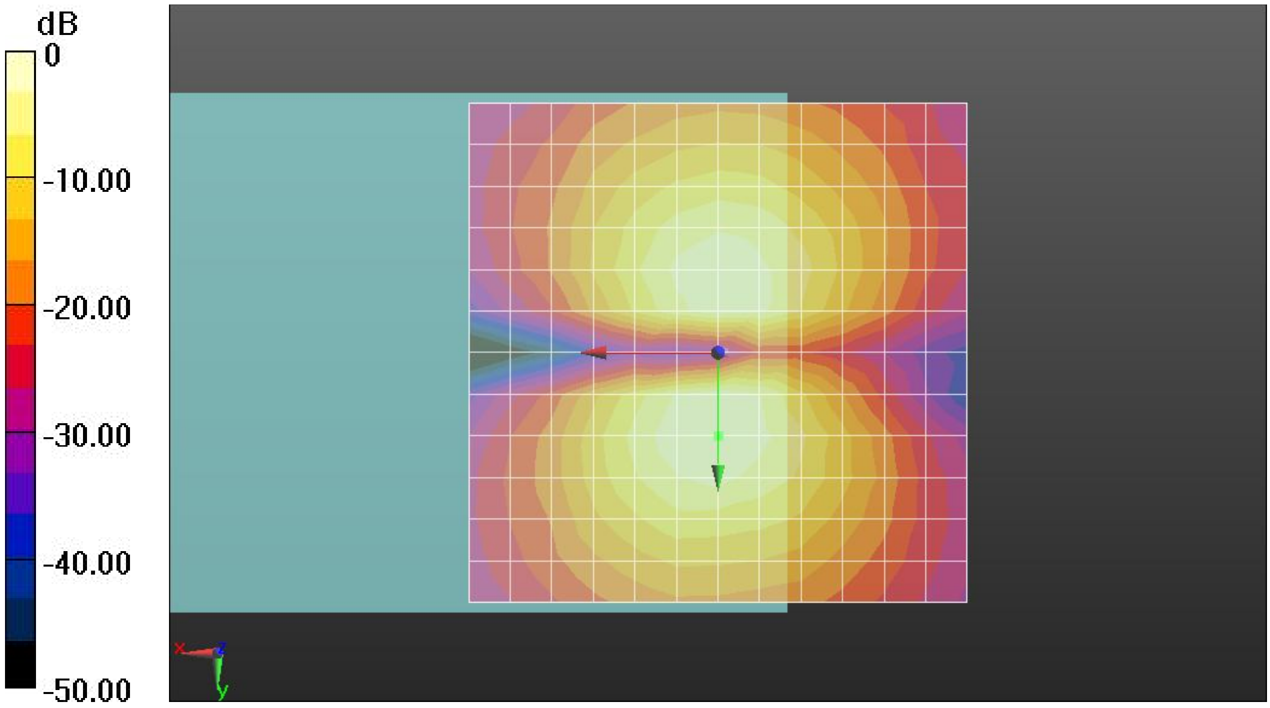
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

10 HAC T-Coil_GSM1900_GSM Voice_Ch661_Y_#3

Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch661/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 54.48 dB
ABM1 comp = 0.84 dBA/m
BWC Factor = 0.16 dB
Location: 0, 8.3, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

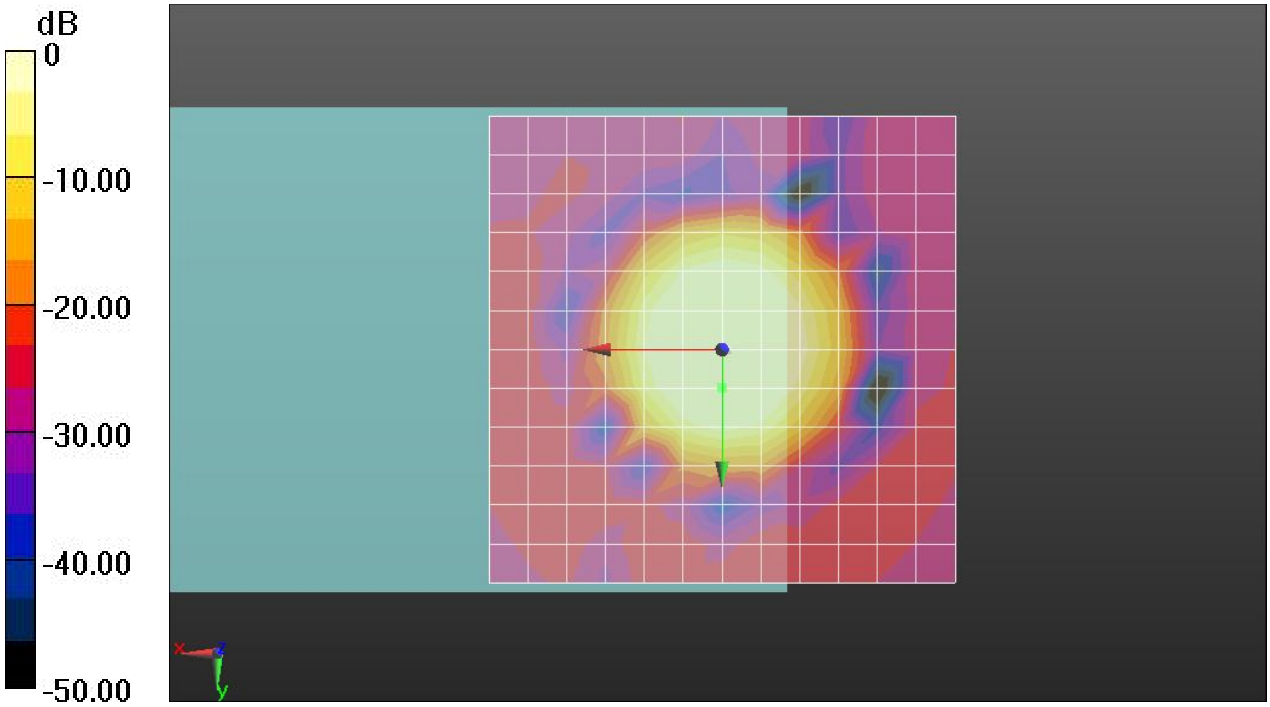
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

11 HAC T-Coil_WCDMA Band V_Voice_Ch4182_Z_#3

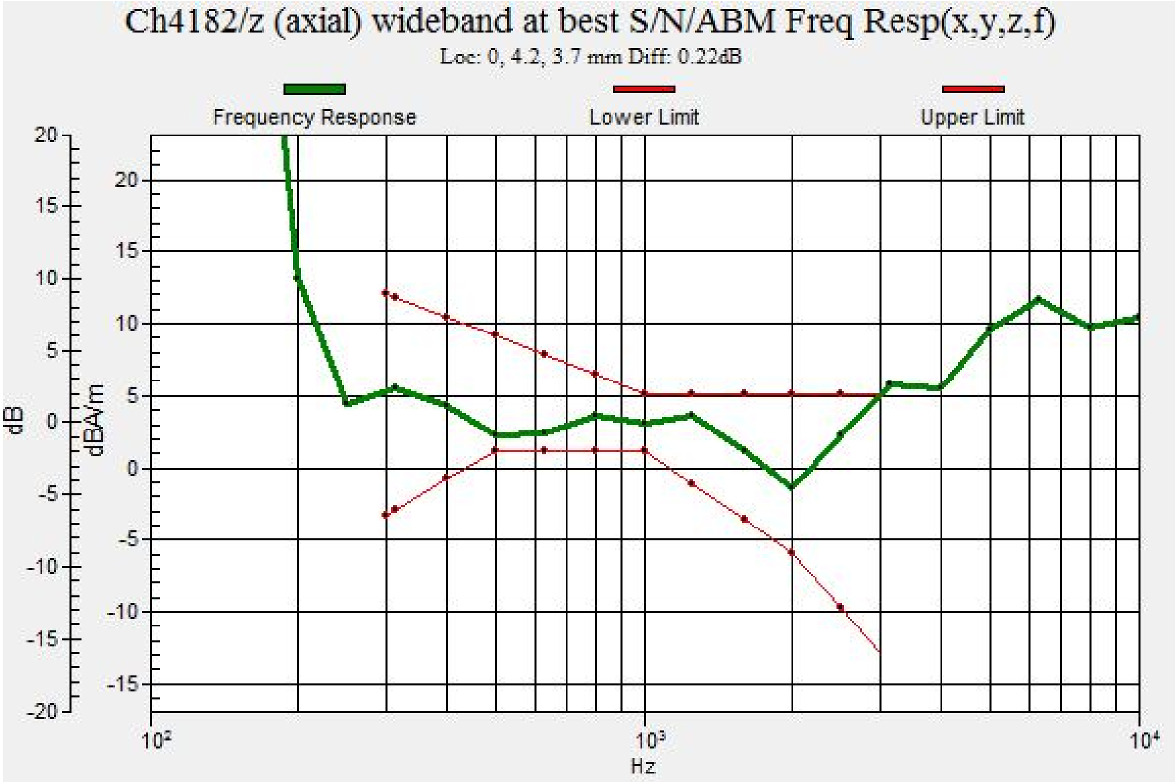
Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

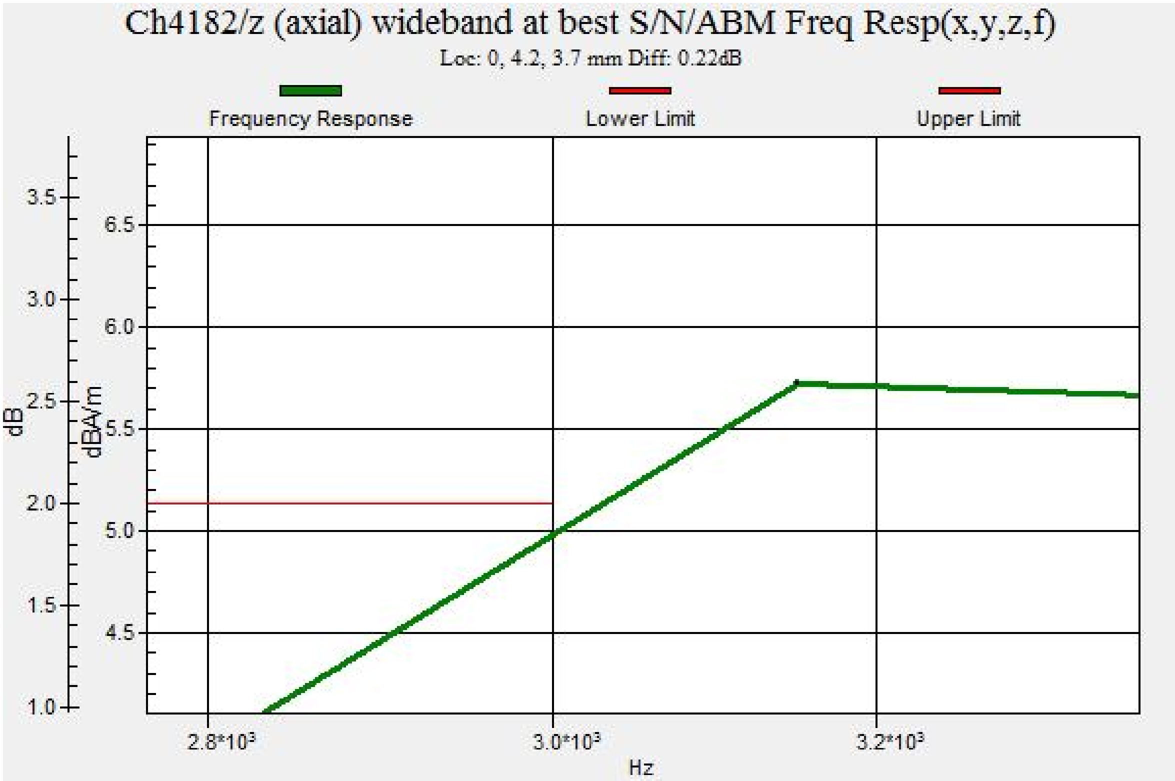
Ch4182/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 59.19 dB
ABM1 comp = 6.15 dBA/m
BWC Factor = 0.16 dB
Location: 0, 4.2, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m



Ch4182/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 4.2, 3.7 mm Diff: 0.22dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz



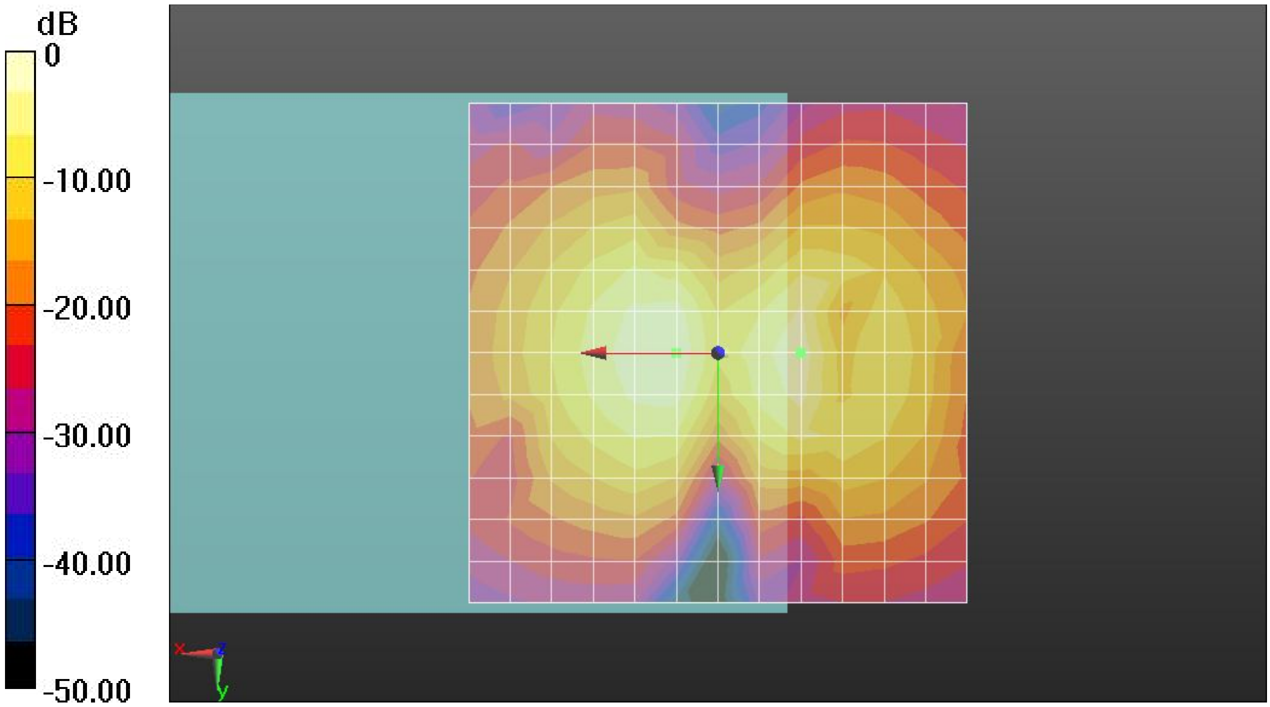
Ch4182/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 4.2, 3.7 mm Diff: 0.22dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
2.8*10³
3.0*10³
3.2*10³
Hz

11 HAC T-Coil_WCDMA Band V_Voice_Ch4182_X_#3

Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch4182/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 52.90 dB
ABM1 comp = -0.98 dBA/m
BWC Factor = 0.16 dB
Location: -8.3, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

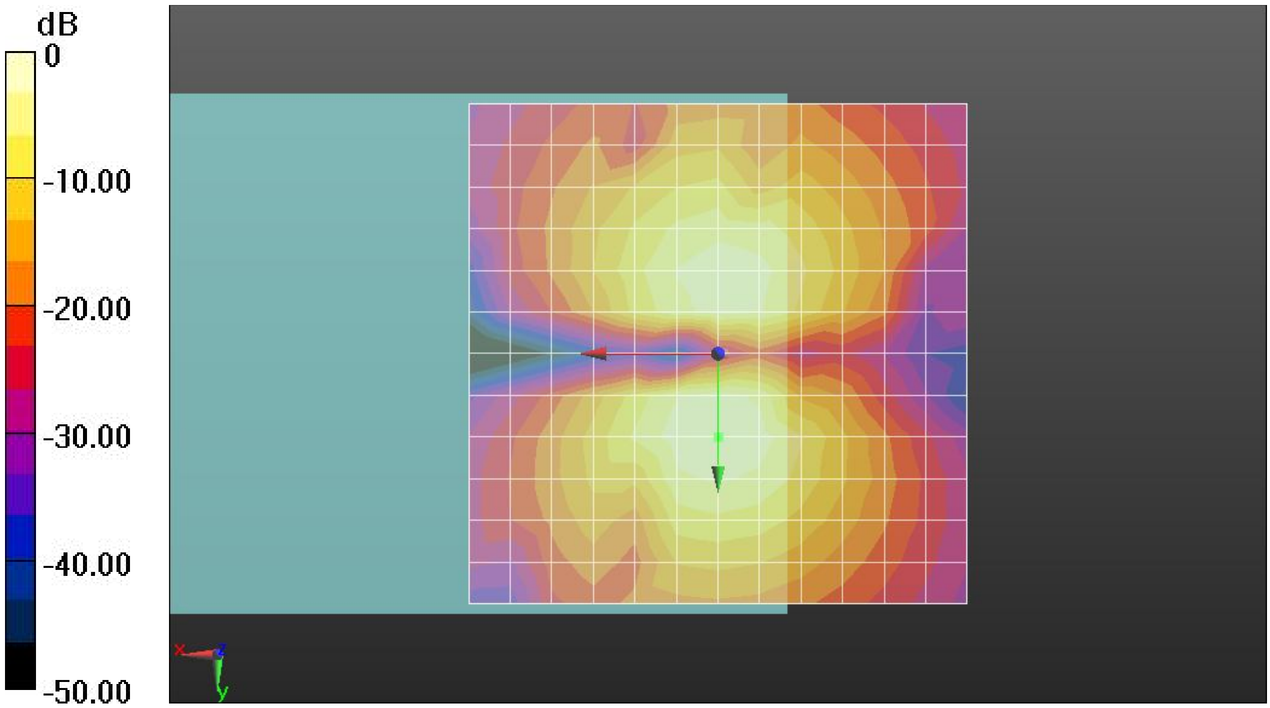
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

11 HAC T-Coil_WCDMA Band V_Voice_Ch4182_Y_#3

Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch4182/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 54.04 dB
ABM1 comp = 0.15 dBA/m
BWC Factor = 0.16 dB
Location: 0, 8.3, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

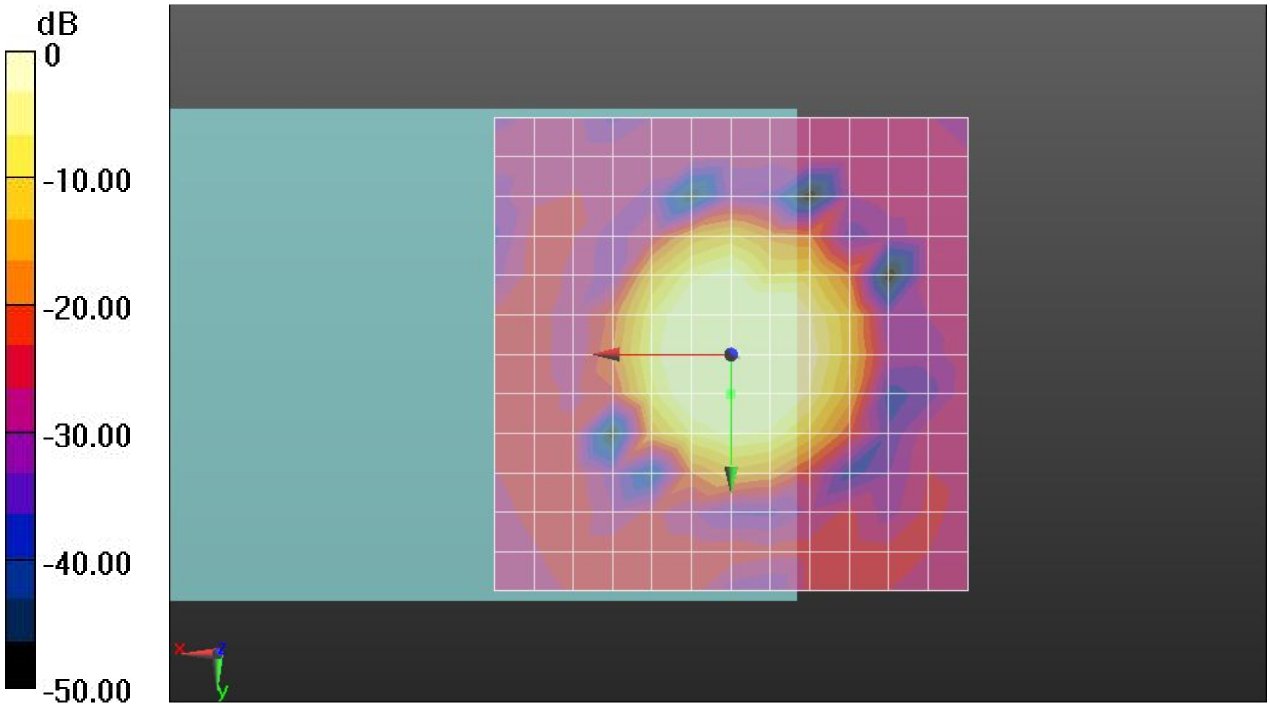
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

12 HAC T-Coil_WCDMA Band II_Voice_Ch9400_Z_#3

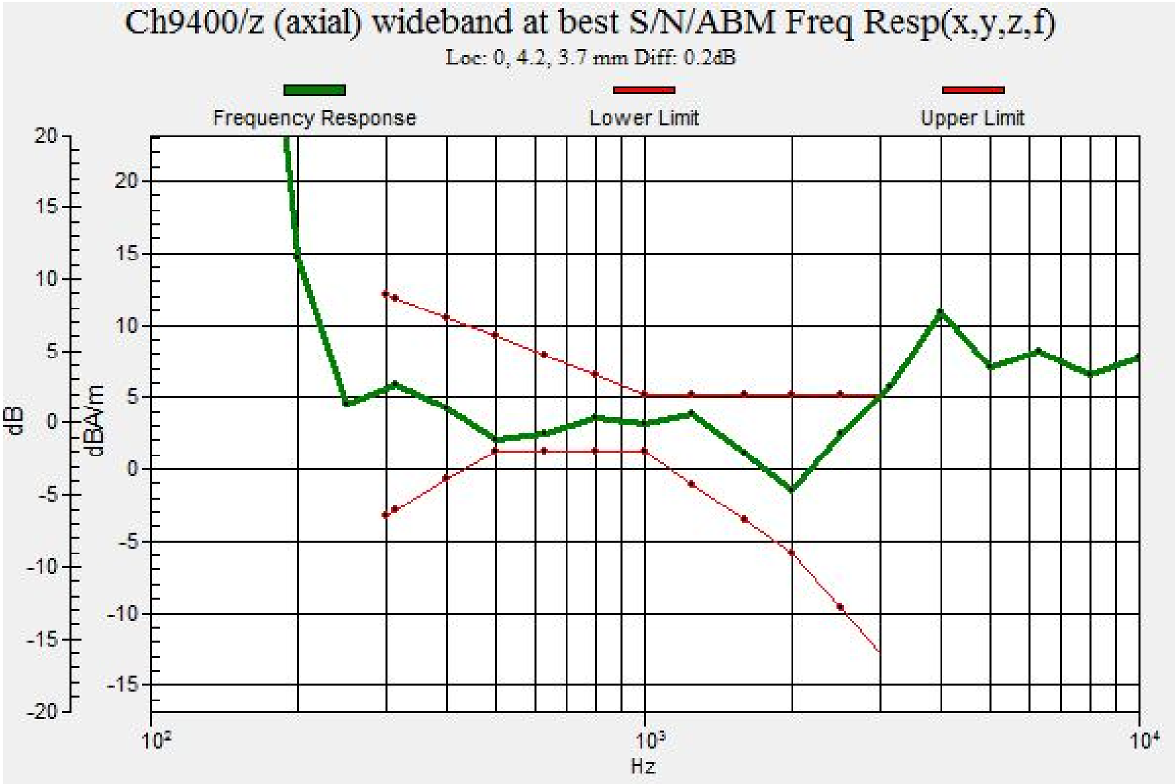
Communication System: UID 0, UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

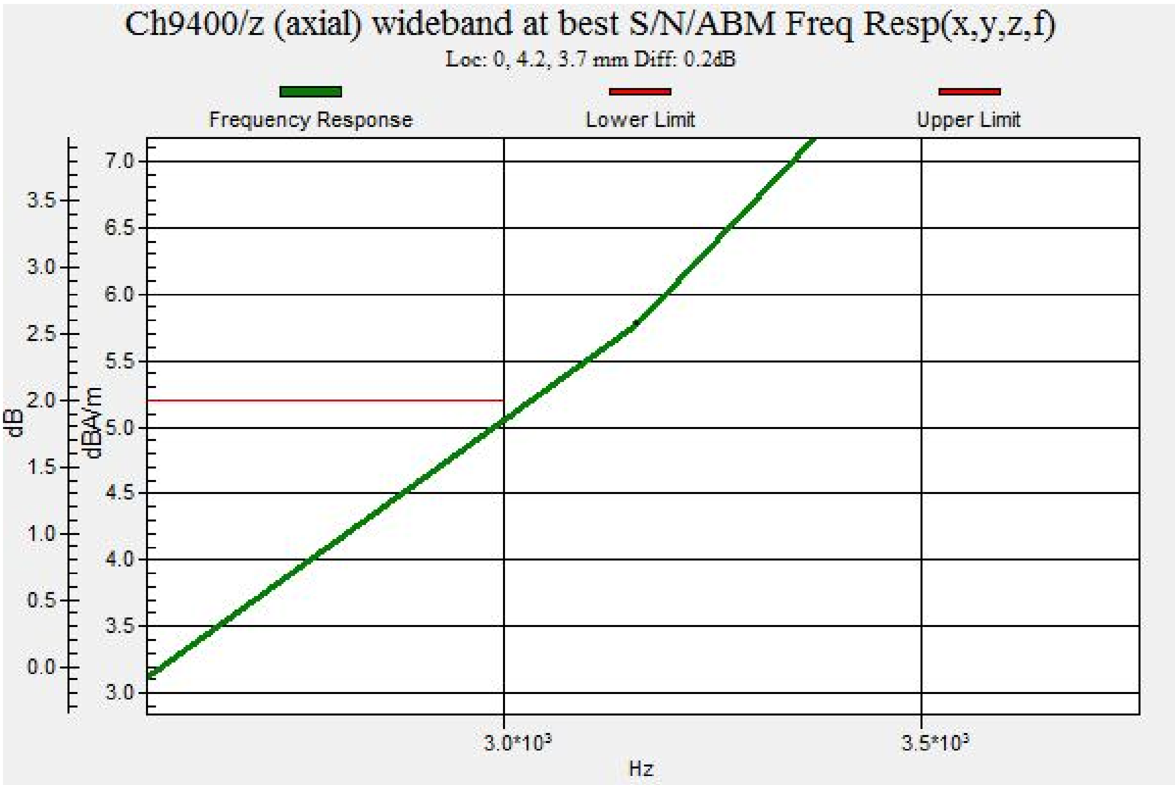
DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9400/z (axial) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 58.70 dB
ABM1 comp = 5.40 dBA/m
BWC Factor = 0.16 dB
Location: 0, 4.2, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m


Ch9400/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 4.2, 3.7 mm Diff: 0.2dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz


Ch9400/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: 0, 4.2, 3.7 mm Diff: 0.2dB
Frequency Response
Lower Limit
Upper Limit
dB
dBA/m
Hz

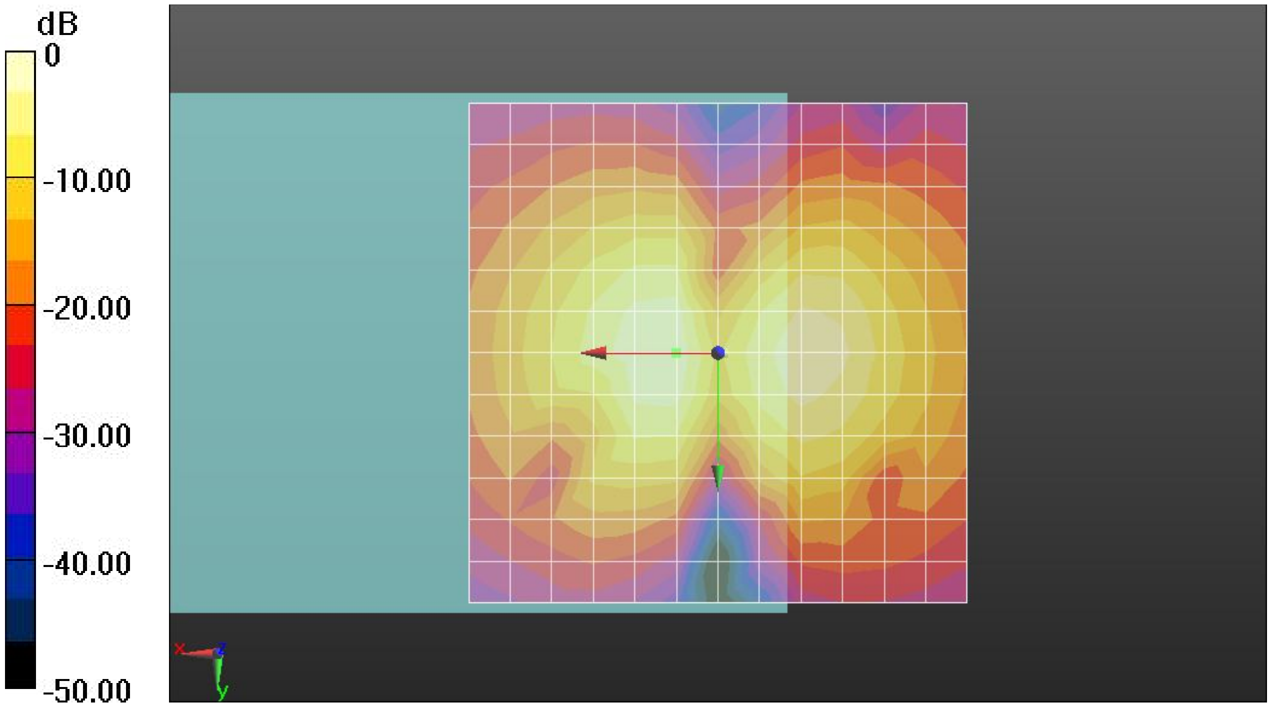
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2014.03.05

12 HAC T-Coil_WCDMA Band II_Voice_Ch9400_X_#3

Communication System: UID 0, UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9400/x (longitudinal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 53.23 dB
ABM1 comp = -0.16 dBA/m
BWC Factor = 0.16 dB
Location: 4.2, 0, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m

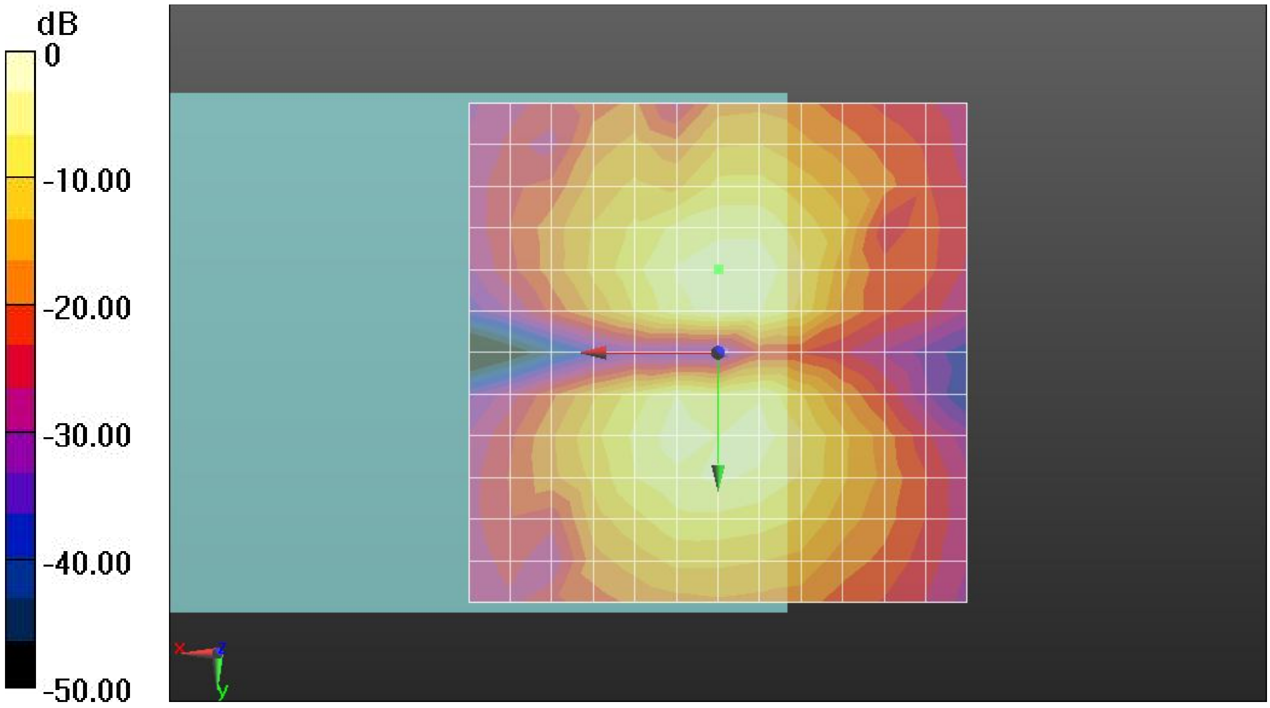
Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.03.05

12 HAC T-Coil_WCDMA Band II_Voice_Ch9400_Y_#3

Communication System: UID 0, UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.5 ℃

DASY5 Configuration:
- Probe: AM1DV3 - 3106; ; Calibrated: 2013.03.25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn1303; Calibrated: 2013.11.22
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9400/y (transversal) 4.2mm 50 x 50/ABM SNR(x,y,z) (13x13x1): Measurement grid: dx=10mm, dy=10mm
ABM1/ABM2 = 52.76 dB
ABM1 comp = -1.03 dBA/m
BWC Factor = 0.16 dB
Location: 0, -8.3, 3.7 mm



0 dB = 1.000 A/m = 0.00 dBA/m