Hearing Aid Compatibility
（HAC）
T-Coil TEST REPORT

Report No: STS2009191H02

Issued for

Excellus Communications, LLC

27298 Wetland Road, Suite 101 Harrisburg, SD 57032 USA

Product Name:	4G phone
Brand Name:	Snapfon
Model No.:	Snapfon ez4G
Series Model:	N/A
FCC ID:	2AW56-EZ4G
Test Standard:	ANSI C63.19:2011
	FCC 47 CFR Part 20.19
T-Rating:	T3
Test Result:	Pass

ShenZhen STS Test Services Co.,Ltd.
A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
TEL: +86-755 3688 6288 FAX: +86-755 3688 6277 E-mail:sts@stsapp.com

Test Report Certification

Applicant's name	:	Excellus Communications, LLC
Address	:	27298 Wetland Road, Suite 101 Harrisburg, SD 57032 USA
Manufacture's Name	:	Ying Tai Electronics Co., Ltd
Address	:	ROOM 803, CHEVALIER HOUSE 45-51 CHATHAM ROAD SOUTH, TSIM SHA TSUI, KOWLOON, HONG KONG

Product description

Product name	:	4G phone
Trademark	:	Snapfon
Model and/or type reference	:	Snapfon ez4G
Serial Model：		N/A
Standards	:	ANSI C63.19:2011 FCC 47 CFR Part 20.19

The device was tested by Shenzhen STS Test Services Co., Ltd. The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of Test	:	
Date (s) of performance of tests	:	05 Oct. 2020
Date of Issue	:	07 Oct. 2020
Test Result	:	**Pass**

Testing Engineer **:** Aaron Bu

(Aaron Bu)

Technical Manager **:** Sean she

(Sean she)

Authorized Signatory **:** Vita Li

(Vita Li)

TABLE OF CONTENS

1. General Information

1.1 EUT Description

Product Name	4G phone		
Brand Name	Snapfon		
Model Name	Snapfon ez4G		
Series Model	N/A		
Model Difference	N/A		
Hardware Version	G1-MB-V1.1		
Software Version	Snapfon_ez4G_v2.0_20200821_1249		
Device Type	Portable Device		
EUT Stage	Production Unit		
Frequency Range	GSM 850: 824.2~848.8MHz PCS1900: 1850.2~1909.8MHz WCDMA Band II: 1852.4~1907.6MHz WCDMA Band IV:1712.4~1752.6 MHz WCDMA Band V: 826.4~846.6MHz WLAN802.11b/g/n(HT20): 2412~2462MHz WLAN802.11n(HT40): 2422~2452MHz Bluetooth: 2402~ 2480MHz GPS: 1575.42MHz FM: 87.5 MHz to 108 MHz		
Summary of T-Rating	Band	T-Rating	Frequency response
	GSM 850	T4	PASS
	PCS 1900	T3	PASS
	WCDMA Band II	T3	PASS
	WCDMA Band IV	T3	PASS
	WCDMA Band V	T3	PASS
Operating Mode:	GSM: GSM Voice; GPRS; Class 12 WCDMA: RMC, HSDPA, HSUPA Release 6 WLAN: 802.11 b/g/n(HT20) /n(HT40) Bluetooth: 4.2+EDR (GFSK +π/4DQPSK+8DPSK) BLE:GFSK		
Antenna Specification:	GSM, WCDMA: PIFA Antenna BT, WLAN: PIFA Antenna		
SIM Card	Only supports one SIM card		
Battery	Rated Voltage: 3.7V Charge Limit: 4.2V Capacity :1500mAh		

1.2 Test Environment

Ambient conditions in the SAR laboratory:

Items	Required
Temperature (℃)	18-25
Humidity (%RH)	30-70

1.3 Test Facility

ShenZhen STS Test Services Co.,Ltd.

A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC Registration No.: 625569

A2LA Certificate No.: 4338.01

IC Registration No.: 12108A

1.4. Test Standards

No.	Identity	Document Title
1	FCC 47 CFR Part 20.19	Hearing aid-compatible mobile handsets.
2	ANSI C63.19:2011	American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids
3	285076 D01 HAC Guidance v05r01	Equipment authorization Guidance For Hearing Aid Compatibility

2. Hearing Aid Compatibility (HAC)

2.1 Introduction

The purpose of the Hearing Aid Compatibility extension is to enable measurements of the near electric and magnetic fields generated by wireless communication devices in the region controlled for use by a hearing aid in accordance with ANSI-C63.19-2011 FCC has granted a request for waiver of the HAC rules in section 20.19 for dual band GSM handsets. The waiver has specific conditions, as stated in the order (FCC 05-166) and expires 1 August 2007.
The purpose of this standard is to establish categories for hearing aids and for WD (wireless communications devices) that can indicate to health care practitioners and hearing aid users which hearing aids are compatible with which WD, and to provide tests that can be used to assess the electromagnetic characteristics of hearing aids and WD and assign them to these categories. The various parameters required, in order to demonstrate compatibility and accessibility are measured. The design of the standard is such that when a hearing aid and WD achieve one of the categories specified, as measured by the methodology of this standard, the indicated performance is realized.

In order to provide for the usability of a hearing aid with a WD, several factors must be coordinated:
a) Radio frequency (RF) measurements of the near-field electric and magnetic fields emitted by a WD to categorize these emissions for correlation with the RF immunity of a hearing aid.
b) Magnetic field measurements of a WD emitted via the audio transducer associated with the T-coil mode of the hearing aid, for assessment of hearing aid performance.
c) Measurements with the hearing aid and a simulation of the categorized WD T-coil emissions to assess the hearing aid RF immunity in the T-coil mode.

The WD radio frequency (RF) and audio band emissions are measured.

Hence, the following are measurements made for the WD:
a) RF E-Field emissions
c) T-coil mode, magnetic signal strength in the audio band
d) T-coil mode, magnetic signal and noise articulation index
e) T-coil mode, magnetic signal frequency response through the audio band

Corresponding to the WD measurements, the hearing aid is measured for:
a) RF immunity in microphone mode
b) RF immunity in T-coil mode

2.2 ANSI/IEEE PC 63.19 Performance Categories

The table below provides the signal quality requirement for the intended audio magnetic signal from a wireless device. 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. The only criterion that can be measured is the RF immunity in T-coil mode. This is measured using the same procedure as the audio coupling mode at the same levels. The signal quality of the axial and radial components of the magnetic field was used to determine the T-coil mode category.

Category	Telephone RF Parameter Wirless Device Signal Quality (Signal+Noise-to-noise ratio in dB)
N/A	0-10 dB
T2	10-20 dB
T3	20-30 dB
T4	>30 dB
Magnetic Coupling Parameters	

FCC wireless hearing aid compatibility rules ensure that consumers with hearing loss are able to access wireless communications services through a wide selection of handsets without experiencing disabling radio frequency (RF) interference or other technical obstacles. To define and measure the hearing aid compatibility of handsets, in CFR47 part 20.19 ANSI C63.19 is referenced. A handset is considered hearing aid-compatible for acoustic coupling if it meets a rating of at least M3 under ANSI C63.19, and A handset is considered hearing aid compatible for inductive coupling if it meets a rating of at least T3.

For inductive coupling, the wireless communication devices should be measured as below.

1) Magnetic signal strength in the audio band
2) Magnetic signal frequency response through the audio band
3) Magnetic signal to noise

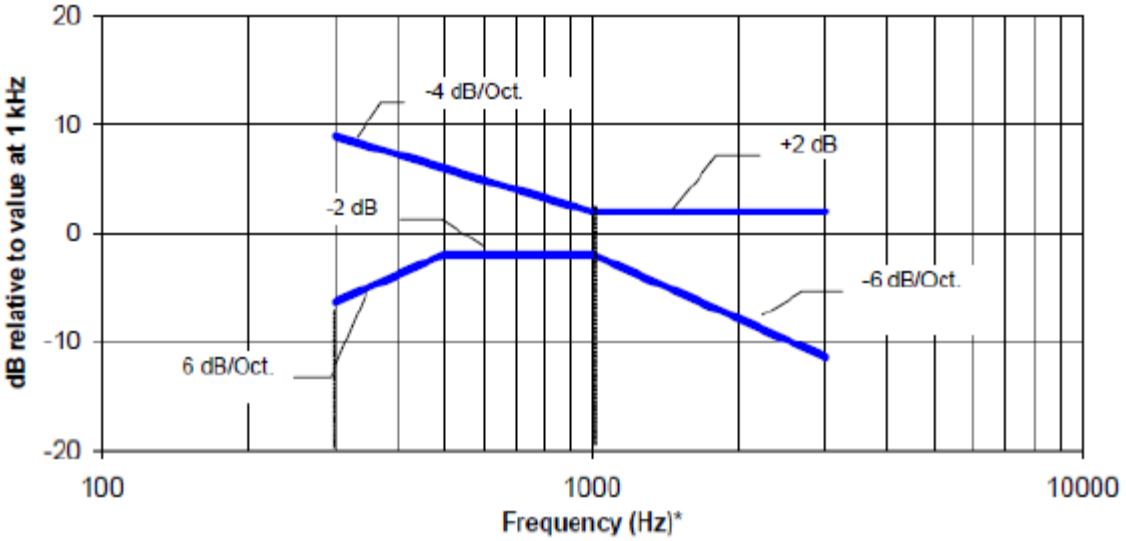
1. T-Coil Coupling Field Intensity

When measured as specified in this standard, the T-Coil signal shall be $\geqslant$ –18 dB (A/m) at 1 kHz, in a 1/3 octave band filter for all orientations.

2. T-Coil Frequency Response

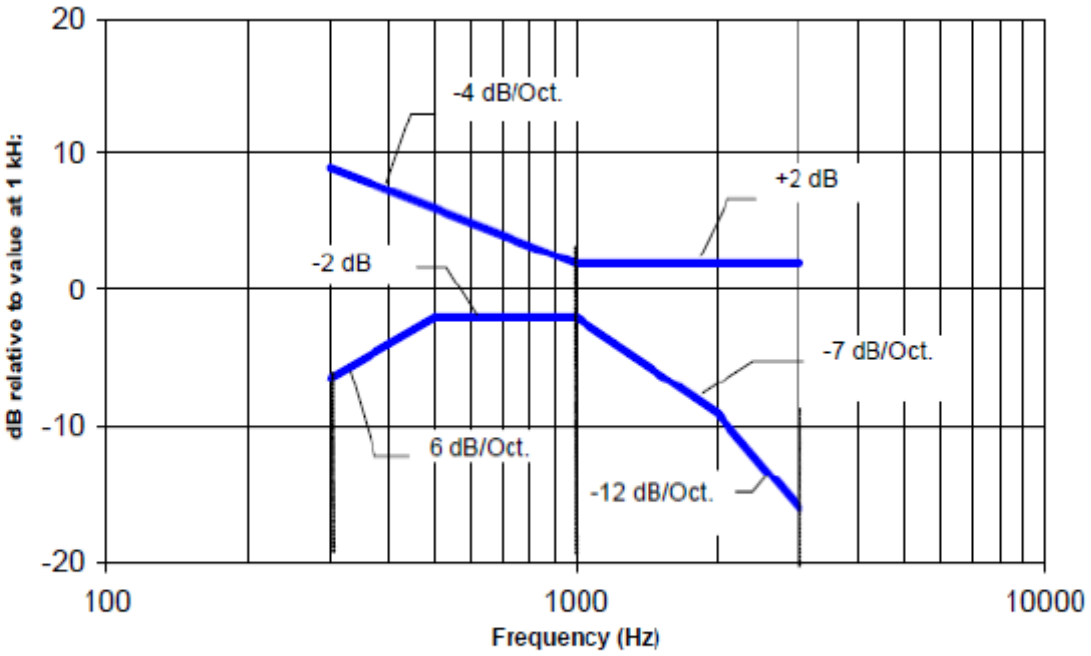
The frequency response of the perpendicular component of the magnetic field, measured in 1/3 octave bands, shall follow the response curve specified in this sub-clause, over the frequency range 300 Hz to 3000 Hz.

Figure 4.1 and Figure 4.2 provide the boundaries as a function of 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—The frequency response is between 300 Hz and 3000 Hz.

Fig. 4.1 Magnetic field frequency response for WDs with field strength≤-15dB at 1 KHz



NOTE—The frequency response is between 300 Hz and 3000 Hz.

Fig. 4.2 Magnetic field frequency response for WDs with a field that exceeds –15 dB(A/m) at 1 kHz

2.3 Axis Articulated Robot

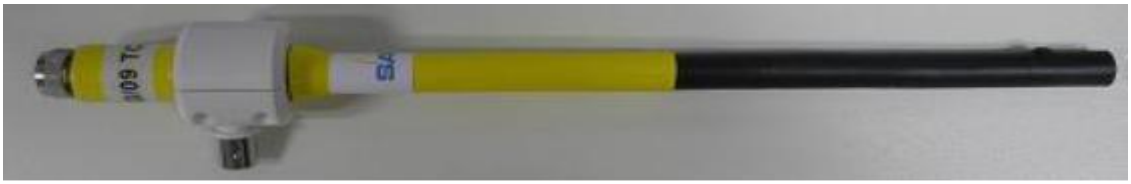
ALSAS-10U utilizes a six articulated robot, which is controlled using a Pentium based real-time movement controller. The movement kinematics engine utilizes proprietary (Thermo CRS) interpolation and extrapolation algorithms, which allow full freedom of movement for each of the six joints within the working envelop. Utilization of joint 6 allows for full probe rotation with a tolerance better than 0.05mm around the central axis.

Robot /Controller Manufacturer	KUKA
Number of Axis	Six independently controlled axis
Positioning Repeatability	＜±0.03mm
Controller Type	KR C4 compact
Robot Reach	901mm
Communication	RS232 and LAN compatible

2.4 Universal Device Positioner

The universal device positioner allows complete freedom of movement of the EUT. Developed to hold a EUT in a free-space scenario any additional loading attributable to the material used in the construction of the positioner has been eliminated. Repeatability has been enhanced through the linear scales which form the design used to indicate positioning for any given test scenario in all major axes.

2.5 T-Coil Probe



Coil Dimension	6.55 mm length * 2.29 mm diameter
DC resistance	860.6 Ω
Wire size	51AWG
Inductance at 1 kHz	132.1 mH at 1 kHz

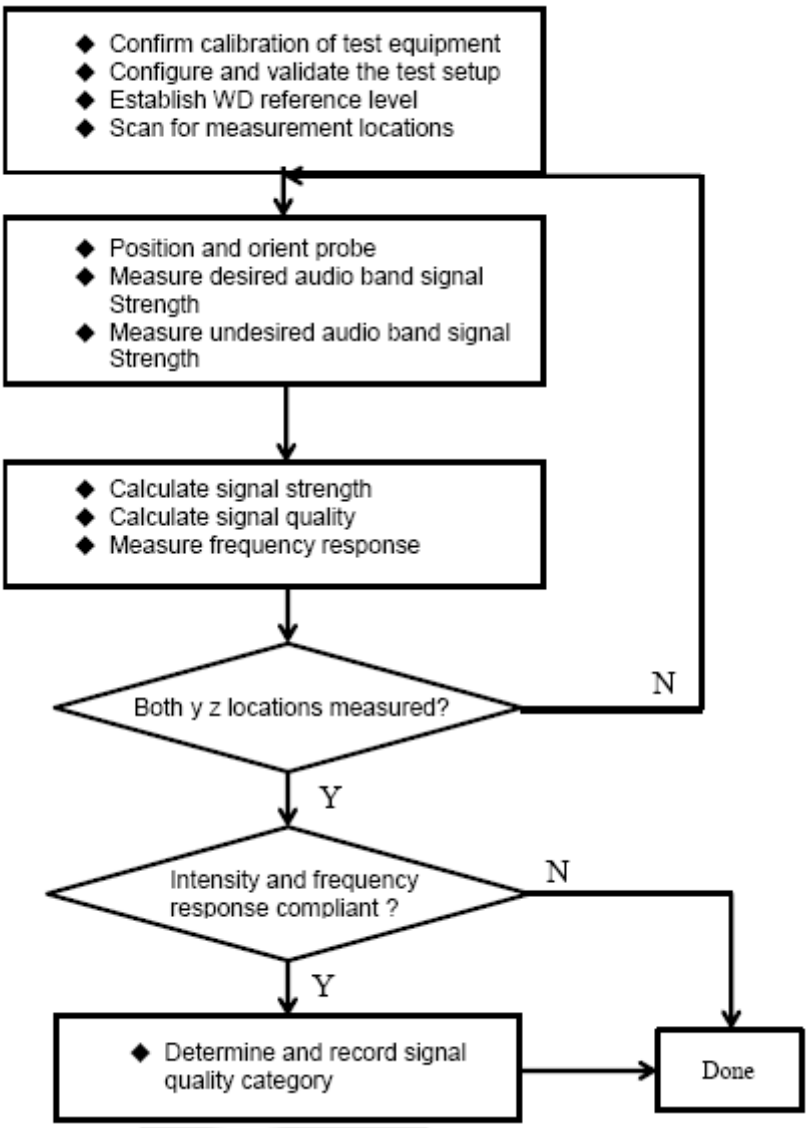
System Hardware

The HAC positioning ruler is used to position the phone properly with the regard to the position of the probe during a measurement. The positioning system is made of a dedicated frame that can be fixed on the table. The tip of the probe is positioned on a reference point located on the top of the positioning ruler. The distance between this reference point and the cross located on the ruler being known, the speaker of the phone is positioned on this cross in order to make sure both probe and phone are positioned properly.

During the measurement, the HAC ruler has to be removed so that it does not interfere with the measurement.

Test Procedure
T-coil Test Flow

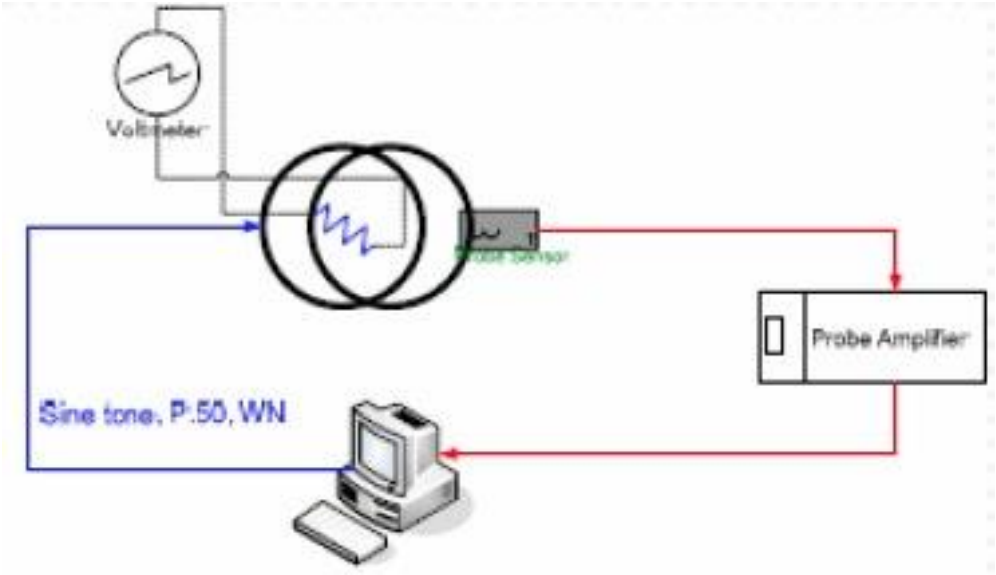
The flow diagram below was followed:



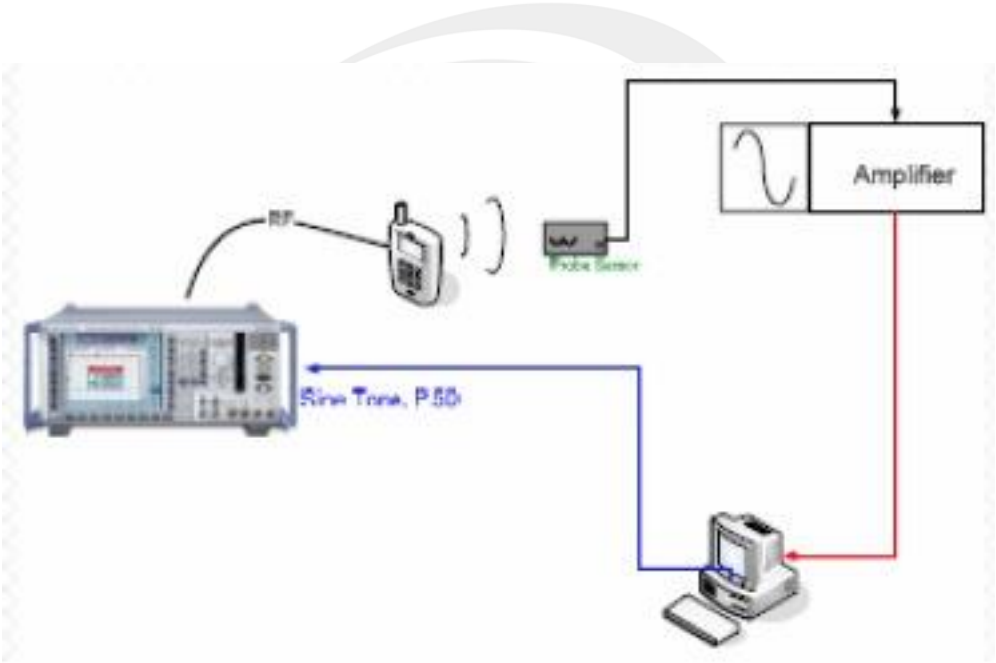
T-Coil Signal Test Process

Test Setup

The equipment was connected as shown in an acoustic/RF hemi-anechoic chamber:



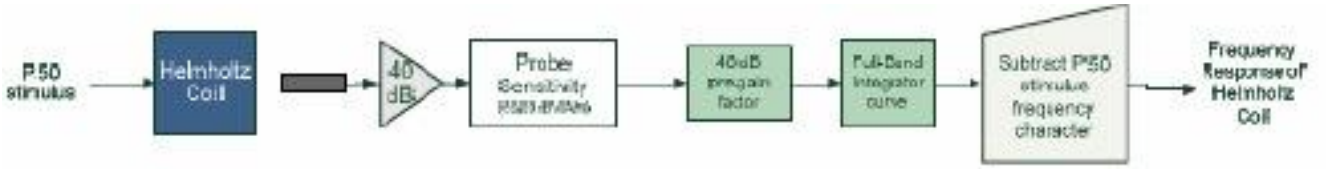
Validation Setup with Helmholtz Coil



T-Coil Test Setup

Test Procedure

Frequency Response Validation The frequency response through the Helmholtz Coil was verified to be within 0.5 dB relative to 1 kHz, between 300 – 3000 Hz using the ITU-P.50 artificial speech signal as shown below:



Measurement Validation WD noise measurements are filtered with A-weighting and Half-Band Integration over a frequency range of 100Hz – 10 kHz to process ABM2 measurements. Below is the verification of the system processing A-weighting and Half-Band integration between system input to output within 0.5 dB of the theoretical result:

f(Hz)	HBI, A- Measured (dB re 1kHz)	HBI, A- Theoretical (dB re 1kHz)	dB Var.
100	-16.150	-16.170	0.012
125	-13.241	-13.250	0.008
160	-10.333	-10.340	0.007
200	-8.005	-8.010	0.006
250	-5.915	-5.920	0.005
315	-4.035	-4.040	0.005
400	-2.395	-2.400	0.004
500	-1.207	-1.210	0.003
630	-0.347	-0.350	0.003
800	0.068	0.070	0.002
1000	0.001	0.000	0.001
1250	-0.501	-0.500	-0.001
1600	-1.511	-1.510	-0.001
2000	-2.783	-2.780	-0.003
2500	-4.323	-4.320	-0.003
3150	-6.175	-6.170	-0.005
4000	-8.338	-8.330	-0.008
5000	-10.599	-10.590	-0.009
6300	-13.212	-13.200	-0.010
8000	-16.284	-16.270	-0.011
10000	-19.539	-19.520	-0.015

3 Test Equipment List

Instrument	Manufacturer	Model	S/N	Cal. Date	Cal. Due Date
T-coil Probe	MVG	STCOIL	SN 06/14 TCP30	2020.07.14	2021.07.13
Reference Validation Dipole 835MHz	MVG	SID835	SN 13/14 DHA55	2020.07.14	2023.07.13
Reference Validation Dipole 1900MHz	MVG	SIDB1900	SN 13/14 DHB59	2020.07.14	2023.07.13
Network Analyzer	Agilent	8753ES	US38432810	2019.10.11	2020.10.10
Multi Meter	Keithley	Multi Meter 2000	4050073	2019.10.11	2020.10.10
Wireless Communication Test Set	R&S	CMW500	117239	2019.10.09	2020.10.08
Power Amplifier	DESAY	ZHL-42W	9638	2019.10.09	2020.10.08
Power Meter	R&S	NRP	100510	2019.10.16	2020.10.15
Power Meter	Agilent	E4418B	GB43312526	2019.10.16	2020.10.15
Power Sensor	R&S	NRP-Z11	101919	2019.10.09	2020.10.08
Power Sensor	Agilent	E9301A	MY41497725	2019.10.09	2020.10.08
Temperature hygrometer	SuWei	SW-108	N/A	2019.10.13	2020.10.12

4 Measurement Uncertainty

Measurement Uncertainty of RF Emission Test					
Uncertainty Component	Tol. (±dB)	Prob. Dst.	Dvi	Uncertainty （dB）	Uncertainty （%）
Measurement System					
RF reflections	0.1	R	√3	0.06	
Field Probe conv. Factor	0.4	R	√3	0.23	
Field Probe anisotropy	0.25	R	√3	0.14	
Positioning accuracy	0.1	R	√3	0.12	
Probe cable placement	0.2	R	√3	0.06	
System repeatability	0.2	R	√3	0.12	
EUT repeatability	0.4	N	1	0.40	
Combined Standard Uncertainty		N	1	0.52	
Expanded uncertainty (95% CONFIDENCE INTERVAL）		N	k=2	1.03	12.65
REPORTED Expanded uncertainty （confidence level of 95%，k=2）		N	k=2	1.03	13.00

Measurement Uncertainty of T-Coil Test					
Uncertainty Component	Tol. (±dB)	Prob. Dst.	Dvi	Uncertainty （dB）	Uncertainty （%）
Measurement System					
RF reflections	0.1	R	√3	0.06	
Acoustic noise	0.1	R	√3	0.06	
Probe coil sensitivity	0.49	R	√3	0.28	
Reference signal level	0.25	R	√3	0.14	
Positioning accuracy	0.4	R	√3	0.23	
Cable loss	0.1	N	2	0.05	
Frequency analyzer	0.15	R	√3	0.09	
System repeatability	0.2	N	1	0.20	
Repeatability of the WD	0.4	N	1	0.40	
Combined Standard Uncertainty		N	1	0.61	
Expanded uncertainty （confidence level of 95%，k=2）		N	k=2	1.22	15.05
REPORTED Expanded uncertainty （confidence level of 95%，k=2）		N	k=2	1.20	15.00

5. Schematic Test Configuration

During HAC test, EUT was operating in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established.

The Absolute Radio Frequency Channel Number (ARFCN) was allocated to 128, 190 and 251 respectively in the case of GSM 850MHz, or to 512, 661 and 810 respectively in the case of PCS 1900MHz, or to 4132, 4183 and 4233 respectively in the case of WCDMA 850MHz, or to 9262, 9400 and 9538 respectively in the case of WCDMA 1900MHz. or to 1312, 1413 and 1513 respectively in the case of WCDMA 1700MHz. The EUT was commanded to operate at maximum transmitting power.

The EUT should use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link was used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset.

The signal transmitted by the simulator to the antenna feeding point should be lower than the output power level of the handset by at least 35 dB

Air-interface	Band (MHz)	Type	C63.19-2011 Tested	Simultaneous Transmissions Scenarios invoice (Not to be tested)	Reduced power
GSM	850	Voice	Yes	Yes: WIFI or BT	N/A
	1900	Voice	Yes	Yes: WIFI or BT	N/A
	GPRS	Data	N/A	N/A	N/A
WCDMA	850	Voice	Yes	Yes: WIFI or BT	N/A
	1900	Voice	Yes	Yes: WIFI or BT	N/A
	HSDPA	Data	N/A	N/A	N/A
	HSUPA	Data	N/A	N/A	N/A
WIFI	2.4G	Data	N/A	Yes GSM or WCDMA	N/A
BT	2.4G	Data	N/A	Yes GSM or WCDMA	N/A

The volume is at the maximum value, and the backlight of the phone is turned off. The Manufacturer doesn't design HAC mode software on the EUT

Note: The EUT 4G only supports data mode, not 4G voice mode.

6 .OVERALL MEASUREMENT SUMMARY

6.1 Conducted Power (Unit: dBm)

Burst Average Power (dBm)						
Band	GSM 850			PCS 1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
GSM(GMSK, 1-Slot)	32.17	32.32	32.42	29.39	29.24	29.21

Band	WCDMA Band V			WCDMA Band IV			WCDMA Band II		
Channel	4132	4183	4233	1312	1413	1513	9262	9400	9538
Frequency (MHz)	826.4	836.6	846.6	1712.6	1740	1752.4	1852.4	1880.0	1907.6
RMC 12.2Kbps	21.93	21.35	22.39	22.98	22.56	23.84	22.60	22.55	23.19

6.2 T-coil for GSM:

T-Coil Test Result

Plot No.	Mode	Channel	Frequency (MHz)	T Rating
1	GSM850	190	836.6	T4
2	PCS1900	661	1880.0	T3
3	WCDMA1900	4183	836.6	T3
4	WCDMA1700	1413	1752.4	T3
5	WCDMA850	9400	1880.0	T3

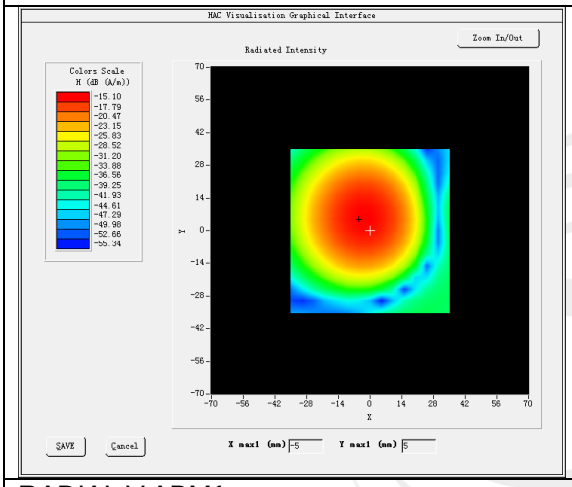
Remark:
1. There is special HAC mode software on this EUT.
2. The volume was adjusted to maximum level and the backlight turned off during T-Coil testing

7. ANNEX C SYSTEM VERIFICATION (TMFS)

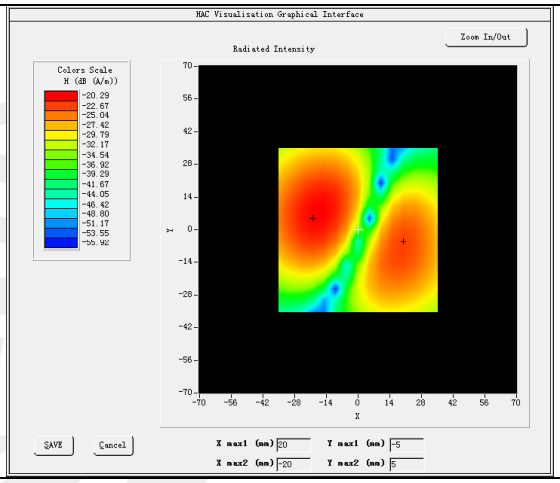
Test Summary

C63.19	Mode	Band	Test Description	Minimum Limit	Location	Measured	Category	Verdict
				dBA/m	-	dBA/m	-	Pass/Fail
7.3.1.1	Val		Intensity, Axial	-	Max	-13.96	-	-
7.3.1.2			Intensity, RadialH	-	Right side	-22.42	-	-
				-	Left side	-20.18	-	-
7.3.1.2			Intensity, RadialV	-	Upper side	-22.06	-	-
				-	Lower side	-19.35	-	-

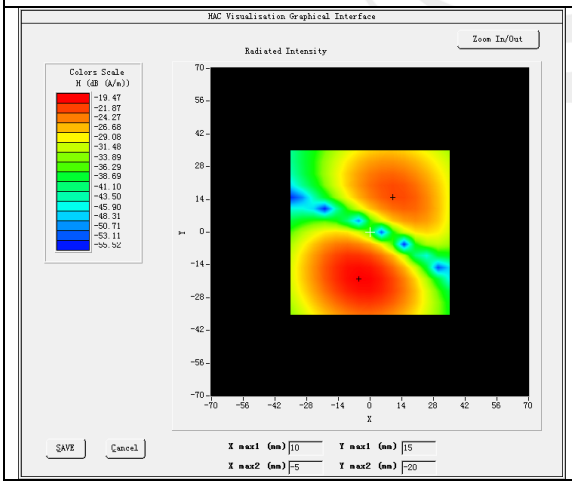
AXIAL ABM1



RADIAL H ABM1



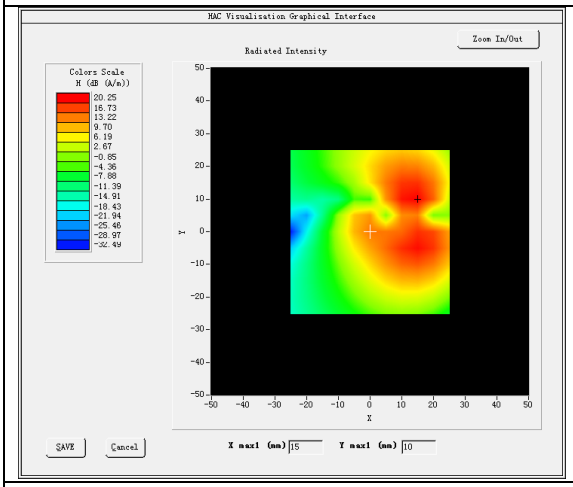
RADIAL V ABM1



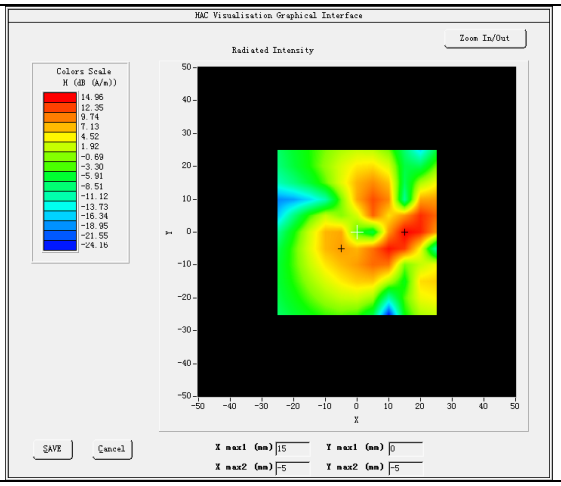
8. TEST PLOTS

Measurement Results GSM850 Frequency (MHz): 836.6

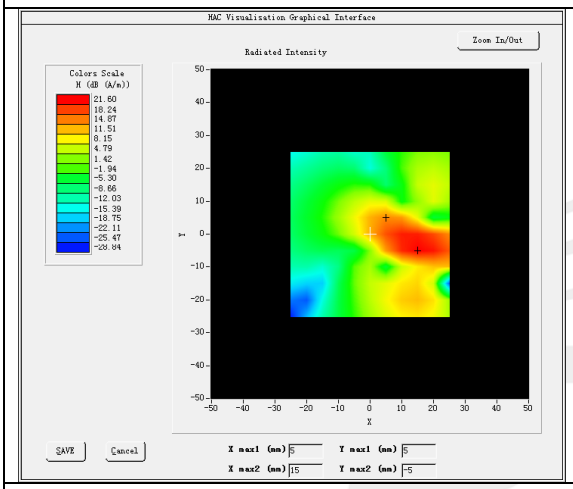
AXIAL ABM1



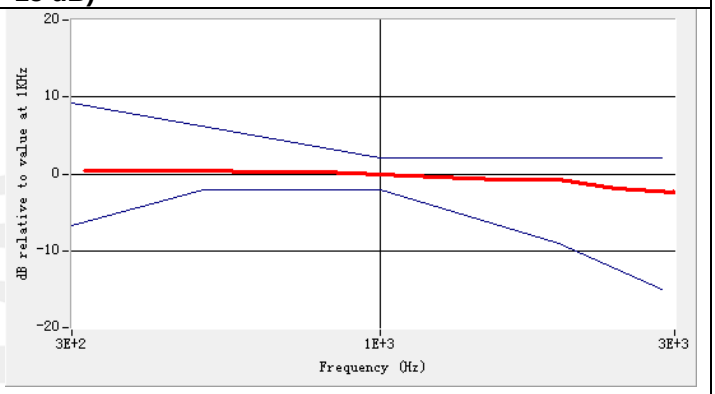
RADIAL H ABM1



RADIAL V ABM1



Magnetic field frequency response (field that exeeds -15 dB)



Raw Data Results

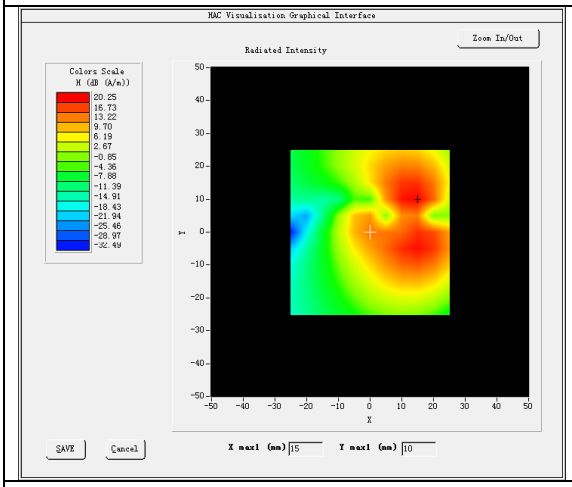
	Axial			Radial H						Radial V					
	128	189	250	128		189		250		128		189		250	
	Max	Max	Max	Left	Right	Left	Right	Left	Right	Max	Max	Max	Left	Right	Left
ABM1, dBA/m	NULL	20.25	NULL	NULL	NULL	14.96	8.36	NULL	NULL	NULL	20.25	NULL	NULL	NULL	14.96
ABM2, dBA/m	NULL	-17.67	NULL	NULL	NULL	-14.15	-27.54	NULL	NULL	NULL	-17.67	NULL	NULL	NULL	-14.15
Ambient noise, dBA/m	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00
Freq Reponse Margin (dB)	-	2.00	-	-	-	-	-	-	-	-	2.00	-	-	-	-
S+N/N(dB)	NULL	38.09	NULL	NULL	NULL	29.35	36.21	NULL	NULL	NULL	38.09	NULL	NULL	NULL	29.35
S+N/N per orientation (dB)	38.09			29.35						21.55					

Test Summary

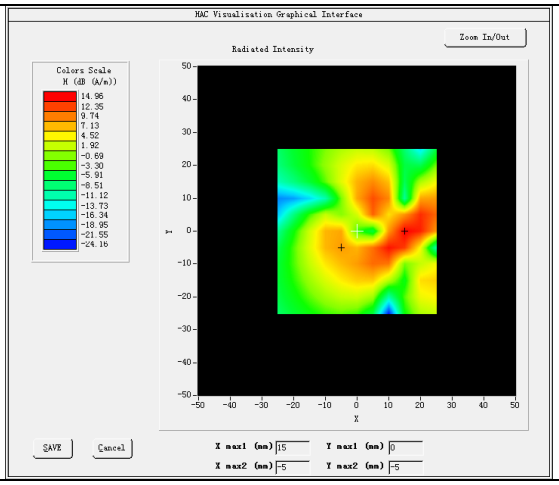
C63.19	Mode	Band	Test Description	Minimum Limit	Location	Measured	Category	Verdict
				dBA/m	-	dBA/m	-	Pass/Fail
7.3.1.1	GSM	GSM850	Intensity, Axial	-18	Max	20.21	-	PASS
7.3.1.2			Intensity, RadialH	-18	Right side	14.85	-	PASS
				-18	Left side	8.27	-	PASS
7.3.1.2			Intensity, RadialV	-18	Upper side	14.04	-	PASS
				-18	Lower side	21.27	-	PASS
7.3.3			Signal to noise/noise, Axial	20	Max	37.48	T4	PASS
7.3.3			Signal to noise/noise, RadialH	20	Right side	29.26	T3	PASS
				20	Left side	36.04	T4	PASS
7.3.3			Signal to noise/noise, RadialV	20	Upper side	21.15	T3	PASS
				20	Lower side	35.10	T4	PASS
7.3.2			Frequency reponse, Axial	0	-	2.00	-	PASS

Measurement Results GSM1900 Frequency (MHz): 1880.0

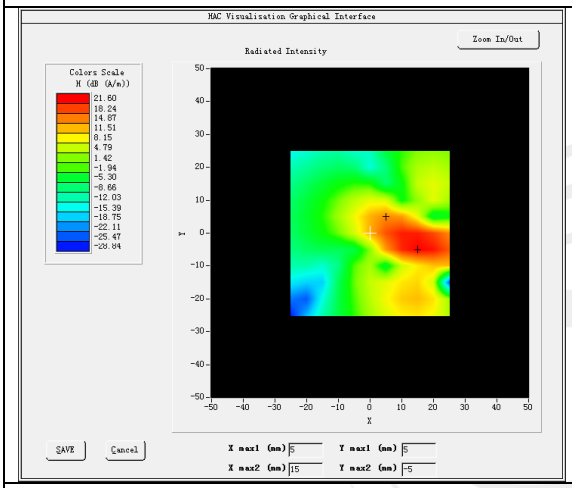
AXIAL ABM1



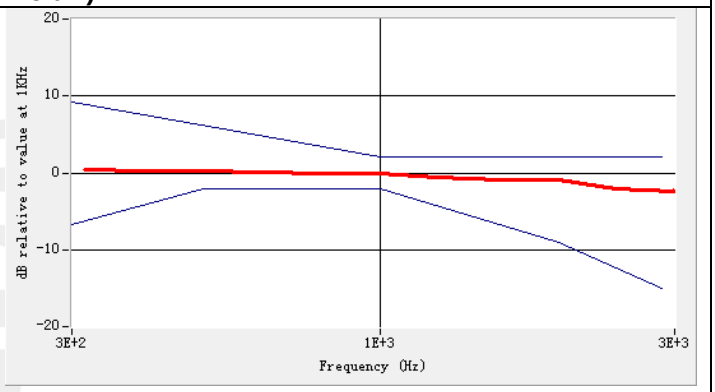
RADIAL H ABM1



RADIAL V ABM1



Magnetic field frequency response (field that exeeds -15 dB)



Raw Data Results

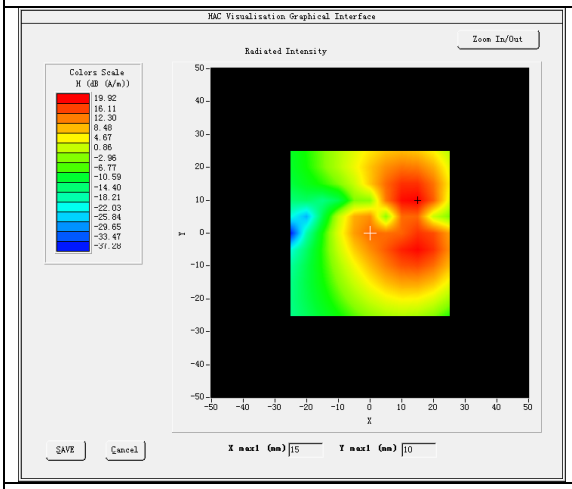
	Axial			Radial H						Radial V					
	513	661	809	513		661		809		513		661		809	
	Max	Max	Max	Left	Right	Left	Right	Left	Right	Up	Down	Up	Down	Up	Down
ABM1, dBA/m	NULL	20.15	NULL	NULL	NULL	14.92	8.37	NULL	NULL	NULL	NULL	14.15	21.58	NULL	NULL
ABM2, dBA/m	NULL	-20.32	NULL	NULL	NULL	-16.82	-29.46	NULL	NULL	NULL	NULL	-9.95	-16.48	NULL	NULL
Ambient noise, dBA/m	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00
Freq Reponse Margin (dB)	-	2.00	-	-	-	-	-	-	-	-	-	-	-	-	-
S+N/N(dB)	NULL	40.64	NULL	NULL	NULL	31.98	38.12	NULL	NULL	NULL	NULL	24.30	38.46	NULL	NULL
S+N/N per orientation (dB)	40.64			31.98						24.30					

Test Summary

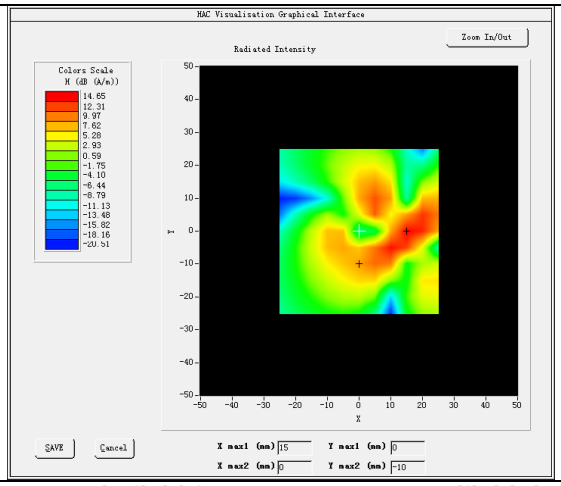
C63.19	Mode	Band	Test Description	Minimum Limit	Location	Measured	Category	Verdict
				dBA/m	-	dBA/m	-	Pass/Fail
7.3.1.1	GSM	GSM1900	Intensity, Axial	-18	Max	20.04	-	PASS
7.3.1.2			Intensity, RadialH	-18	Right side	14.82	-	PASS
				-18	Left side	8.27	-	PASS
7.3.1.2			Intensity, RadialV	-18	Upper side	14.04	-	PASS
				-18	Lower side	21.18	-	PASS
7.3.3			Signal to noise/noise, Axial	20	Max	38.67	T4	PASS
7.3.3			Signal to noise/noise, RadialH	20	Right side	30.48	T4	PASS
				20	Left side	35.74	T4	PASS
7.3.3			Signal to noise/noise, RadialV	20	Upper side	24.41	T3	PASS
				20	Lower side	37.18	T4	PASS
7.3.2			Frequency reponse, Axial	0	-	2.00	-	PASS

Measurement Results WCDMA 850 Frequency (MHz): 836.6

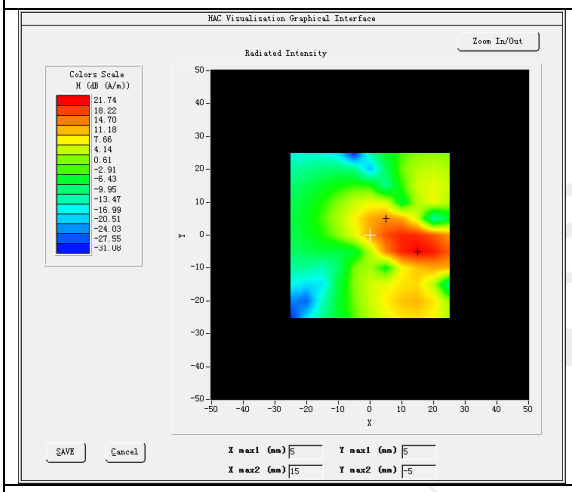
AXIAL ABM1



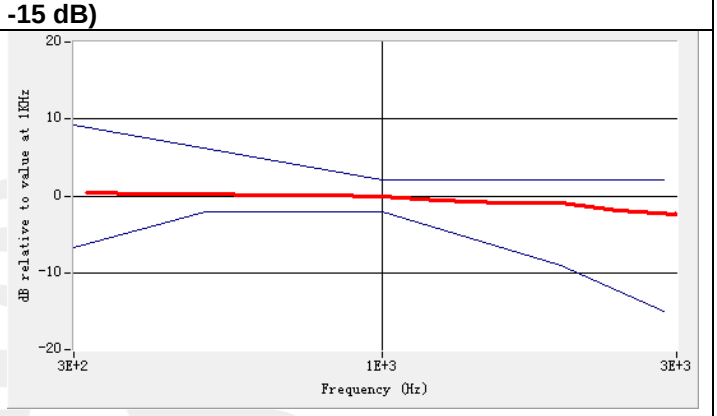
RADIAL H ABM1



RADIAL V ABM1



Magnetic field frequency response (field that exeeds -15 dB)



Raw Data Results

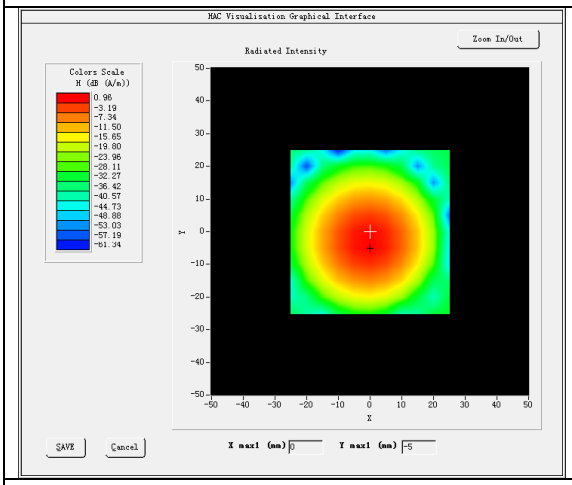
	Axial			Radial H						Radial V					
	4132	4182	4233	4132		4182		4233		4132		4182		4233	
	Max	Max	Max	Left	Right	Left	Right	Left	Right	Max	Max	Max	Left	Right	Left
ABM1, dBA/m	NULL	19.92	NULL	NULL	NULL	14.65	8.50	NULL	NULL	NULL	19.92	NULL	NULL	NULL	14.65
ABM2, dBA/m	NULL	-28.88	NULL	NULL	NULL	-33.57	-39.05	NULL	NULL	NULL	-28.88	NULL	NULL	NULL	-33.57
Ambient noise, dBA/m	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00
Freq Reponse Margin (dB)	-	2.00	-	-	-	-	-	-	-	-	2.00	-	-	-	-
S+N/N(dB)	NULL	48.97	NULL	NULL	NULL	48.46	47.83	NULL	NULL	NULL	48.97	NULL	NULL	NULL	48.46
S+N/N per orientation (dB)	48.97			47.83						41.34					

Test Summary

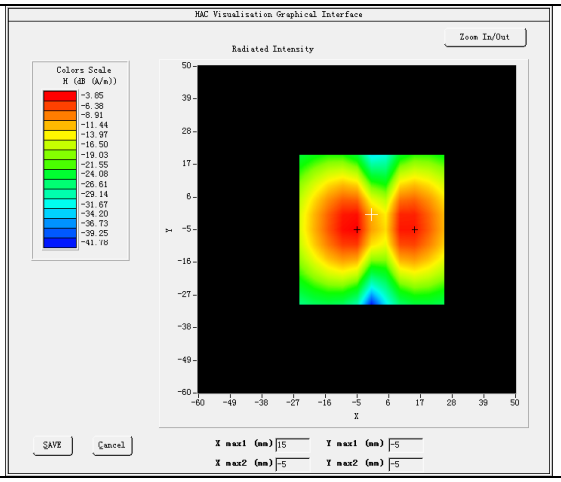
C63.19	Mode	Band	Test Description	Minimum Limit	Location	Measured	Category	Verdict
				dBA/m	-	dBA/m	-	Pass/Fail
7.3.1.1	WCDMA	WCDMA 850	Intensity, Axial	-18	Max	19.57	-	PASS
7.3.1.2			Intensity, RadialH	-18	Right side	14.42	-	PASS
				-18	Left side	8.37	-	PASS
7.3.1.2			Intensity, RadialV	-18	Upper side	13.48	-	PASS
				-18	Lower side	21.27	-	PASS
7.3.3			Signal to noise/noise, Axial	20	Max	46.84	T4	PASS
7.3.3			Signal to noise/noise, RadialH	20	Right side	46.28	T4	PASS
				20	Left side	44.48	T4	PASS
7.3.3			Signal to noise/noise, RadialV	20	Upper side	39.16	T4	PASS
				20	Lower side	46.34	T4	PASS
7.3.2			Frequency reponse, Axial	0	-	2.00	-	PASS

Measurement Results WCDMA1700 Frequency (MHz): 1740.0

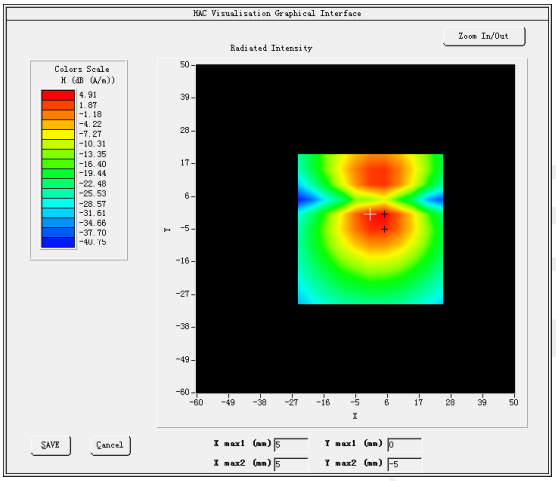
AXIAL ABM1



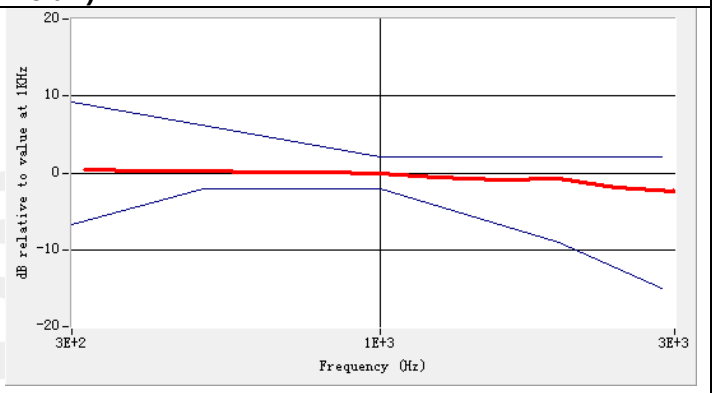
RADIAL H ABM1



RADIAL V ABM1



Magnetic field frequency response (field that exeeds -15 dB)



Raw Data Results

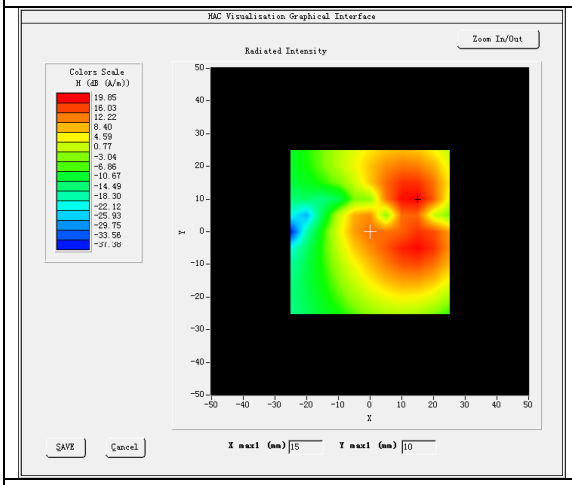
	Axial			Radial H						Radial V					
	9262	9400	9538	9262		9400		9538		9262		9400		9538	
	Max	Max	Max	Left	Right	Left	Right	Left	Right	Up	Down	Up	Down	Up	Down
ABM1, dBA/m	NULL	19.85	NULL	NULL	NULL	14.59	8.47	NULL	NULL	NULL	NULL	13.80	21.72	NULL	NULL
ABM2, dBA/m	NULL	-29.10	NULL	NULL	NULL	-33.83	-39.02	NULL	NULL	NULL	NULL	-27.88	-28.10	NULL	NULL
Ambient noise, dBA/m	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00
Freq Reponse Margin (dB)	-	2.00	-	-	-	-	-	-	-	-	-	-	-	-	-
S+N/N(dB)	NULL	49.11	NULL	NULL	NULL	48.66	47.76	NULL	NULL	NULL	NULL	41.85	50.20	NULL	NULL
S+N/N per orientation (dB)	49.11			47.76						41.85					

Test Summary

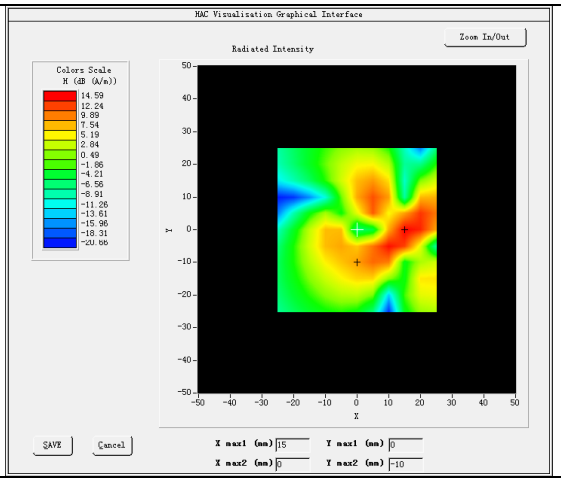
C63.19	Mode	Band	Test Description	Minimum Limit	Location	Measured	Category	Verdict
				dBA/m	-	dBA/m	-	Pass/Fail
7.3.1.1	WCDMA	Band4_WCDMA1700	Intensity, Axial	-18	Max	-2.54	-	PASS
7.3.1.2			Intensity, RadialH	-18	Max	-8.71	-	PASS
				-	-	-	-	-
7.3.1.2			Intensity, RadialV	-18	Max	-2.26	-	PASS
				-	-	-	-	-
7.3.3			Signal to noise/noise, Axial	20	Max	37.84	T4	PASS
7.3.3			Signal to noise/noise, RadialH	20	Max	31.98	T4	PASS
				-	-	-	-	-
7.3.3			Signal to noise/noise, RadialV	20	Max	32.05	T4	PASS
				-	-	-	-	-
7.3.2			Frequency reponse, Axial	-	-	-	-	-

Measurement Results WCDMA1900 Frequency (MHz): 1880.0

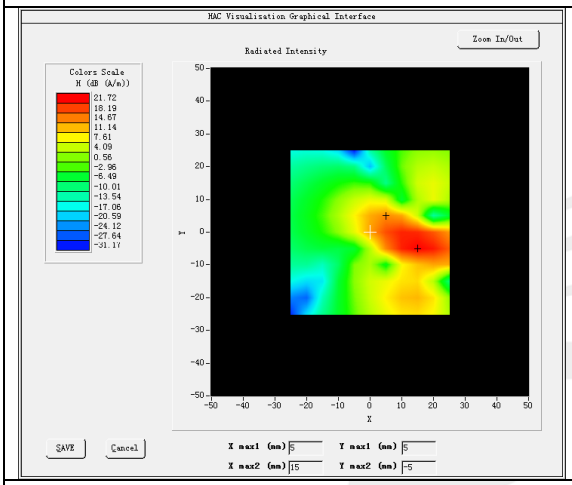
AXIAL ABM1



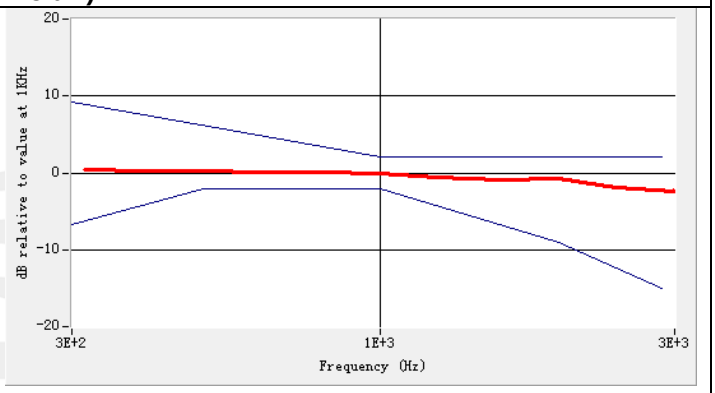
RADIAL H ABM1



RADIAL V ABM1



Magnetic field frequency response (field that exeeds -15 dB)



Raw Data Results

	Axial			Radial H						Radial V					
	9262	9400	9538	9262		9400		9538		9262		9400		9538	
	Max	Max	Max	Left	Right	Left	Right	Left	Right	Up	Down	Up	Down	Up	Down
ABM1, dBA/m	NULL	19.85	NULL	NULL	NULL	14.59	8.47	NULL	NULL	NULL	NULL	13.80	21.72	NULL	NULL
ABM2, dBA/m	NULL	-29.10	NULL	NULL	NULL	-33.83	-39.02	NULL	NULL	NULL	NULL	-27.88	-28.10	NULL	NULL
Ambient noise, dBA/m	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00
Freq Reponse Margin (dB)	-	2.00	-	-	-	-	-	-	-	-	-	-	-	-	-
S+N/N(dB)	NULL	49.11	NULL	NULL	NULL	48.66	47.76	NULL	NULL	NULL	NULL	41.85	50.20	NULL	NULL
S+N/N per orientation (dB)	49.11			47.76						41.85					

Test Summary

C63.19	Mode	Band	Test Description	Minimum Limit	Location	Measured	Category	Verdict
				dBA/m	-	dBA/m	-	Pass/Fail
7.3.1.1	WCDMA	Band2_WCDMA1900	Intensity, Axial	-18	Max	19.68	-	PASS
7.3.1.2			Intensity, RadialH	-18	Right side	14.17	-	PASS
				-18	Left side	8.34	-	PASS
7.3.1.2			Intensity, RadialV	-18	Upper side	13.48	-	PASS
				-18	Lower side	21.57	-	PASS
7.3.3			Signal to noise/noise, Axial	20	Max	48.05	T4	PASS
7.3.3			Signal to noise/noise, RadialH	20	Right side	47.36	T4	PASS
				20	Left side	45.75	T4	PASS
7.3.3			Signal to noise/noise, RadialV	20	Upper side	40.58	T4	PASS
				20	Lower side	49.21	T4	PASS
7.3.2			Frequency reponse, Axial	0	-	2.00	-	PASS

5. T-coil Test Photo

9. Probe Calibration And Dipole Calibration Report

The following pages include the probe calibration used to evaluate HAC for the DUT.