

RF Emission HAC TEST REPORT

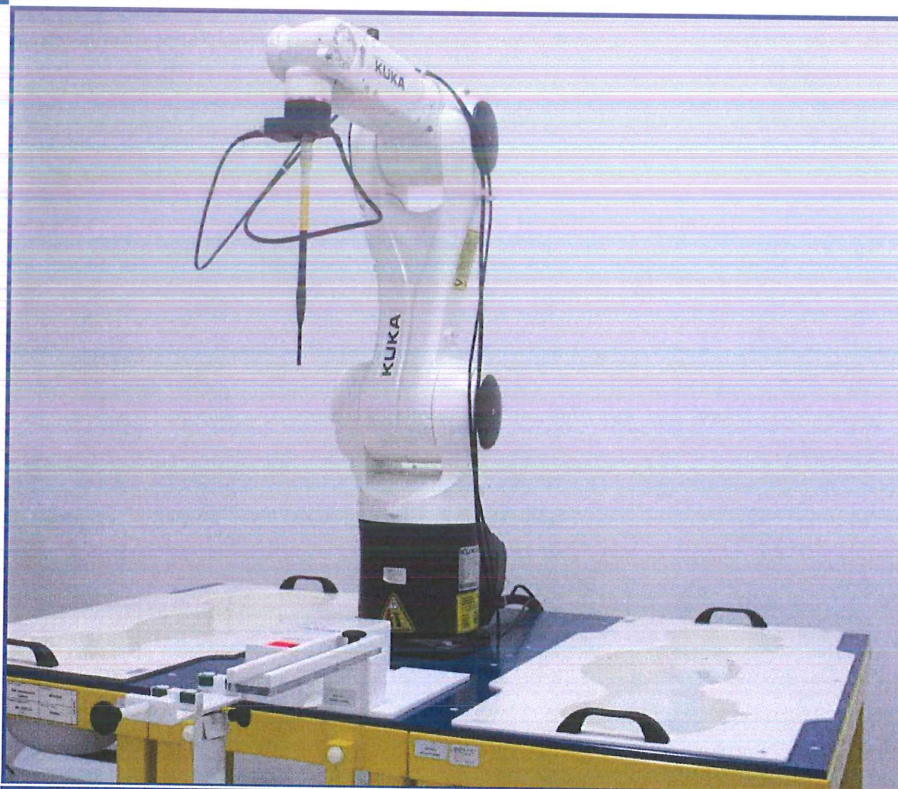
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Mobile Phone

ISSUED TO
vivo Mobile Communication Co., Ltd.

#283, BBK Road, Wusha, Chang'An, DongGuan City, China



Tested by: Zong Liyao
Zong Liyao
Date Oct. 10, 2020

Approved by: Wei Yanquan
Wei Yanquan
(Chief Engineer)

Date Oct. 10, 2020

Report No: BL-SZ2090180-702
EUT Name: Mobile Phone
Model Name: V2025
Brand Name: vivo
FCC ID: 2AUCY-V2025
Test Standard: FCC 47 CFR Part 20.19
ANSI C63.19: 2011
KDB 285076 D01 HAC Guidance v05r01
M-Rating: E-Field: M3
Test Conclusion: Pass
Test Date: Sep. 18, 2020 ~ Sep. 21, 2020
Date of Issue: Oct. 10, 2020

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Revision History

Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Oct. 10, 2020</u>	<u>Initial Issue</u>

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory is a testing organization accredited by American Association for Laboratory Accreditation (A2LA) according to ISO/IEC 17025. The accreditation certificate is 4344.01. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	21°C to 23°C
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 KPa to 102 KPa

1.4 Announce

- (1) The test report reference to the report template version v1.1.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	vivo Mobile Communication Co., Ltd.
Address	#283, BBK Road, Wusha, Chang'An, DongGuan City, China

2.2 Manufacturer Information

Manufacturer	vivo Mobile Communication Co., Ltd.
Address	#283, BBK Road, Wusha, Chang'An, DongGuan City, China

2.3 Factory Information

Factory	vivo Mobile Communication Co., Ltd.
Address	#283, BBK Road, Wusha, Chang'An, DongGuan City, China

2.4 General Description for Equipment under Test (EUT)

EUT Name	Mobile Phone
Model Name Under Test	V2025
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	MP_0.1
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	vivo
	Model No.	B-N8
	Serial No.	N/A
	Capacity	Rated Capacity: 3920mAh/15.17Wh Typical Capacity: 4000mAh/15.48Wh
	Rated Voltage	3.87 V
	Limited Voltage	4.45 V
Ancillary Equipment 2	Earphone	
	Model No.	XE160
	Length (Approx.)	1.2 m

2.6 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	GSM, WCDMA, LTE, WLAN, Bluetooth		
Frequency Range	GSM 850	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	GSM 1900	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	WCDMA Band 2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	WCDMA Band 4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	WCDMA Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	LTE Band 4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	LTE Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 7	TX: 2500 ~ 2570 MHz	RX: 2620 ~ 2690 MHz
	LTE Band 38	TX: 2570 ~ 2620 MHz	RX: 2570 ~ 2620 MHz
	802.11b/g /n(HT20/HT40)	2400 ~ 2483.5 MHz	
	802.11a/ /n(HT20/HT40) /ac(VHT20/VHT40 /VHT80)	5150 ~ 5250 MHz	
		5250 ~ 5350 MHz	
		5470 ~ 5725 MHz	
		5725 ~ 5850 MHz	
Bluetooth	2400 ~ 2483.5 MHz		
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna		
DTM	Support		
Hotspot Function	Support		
Power Reduction	Support		
Exposure Category	General Population/Uncontrolled exposure		
EUT Stage	Portable Device		
Product	Type		
	☒ Production unit		☐ Identical prototype

Note:

1. The Power Reduction please refer to section 8.6.
2. This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
3. This device 2.4GHz WLAN/5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz WLAN/5.5GHz WLAN supports WiFi Direct (GC only)
4. This device has two WWAN transmit antennas. WWAN down antenna is located at the bottom edge of the device, and WWAN up antenna is located at the top edge of the device. Up and Down antenna support the same WWAN frequency bands, and they can't transmit simultaneously.

2.7 EUT Air Interface description

Air Interface	Band	Type	C63.19 Tested	Simultaneous Transmitter	OTT	Power Reduction
GSM	850	VO	Yes	Bluetooth/WLAN	NA	Not Support
	1900	VO	Yes	Bluetooth/WLAN	NA	Not Support
	GPRS/EDGE	DT	No	Bluetooth/WLAN	Yes	Not Support
WCDMA	Band 2	VO	No	Bluetooth/WLAN	NA	Not Support
	Band 4	VO	No	Bluetooth/WLAN	NA	Not Support
	Band 5	VO	No	Bluetooth/WLAN	NA	Not Support
	HSUPA/HSDPA	VD	No	Bluetooth/WLAN	Yes	Not Support
LTE	Band 2	VD	No	Bluetooth/WLAN	Yes	Not Support
	Band 4	VD	No	Bluetooth/WLAN	Yes	Not Support
	Band 5	VD	No	Bluetooth/WLAN	Yes	Not Support
	Band 7	VD	No	Bluetooth/WLAN	Yes	Not Support
	Band 38	VD	Yes	Bluetooth/WLAN	Yes	Not Support
2.4G WLAN	2412~2462MHz	DT	No	WWAN	Yes	Not Support
5G WLAN	5150~5250 MHz	DT	No	WWAN	Yes	Not Support
	5250~5350 MHz	DT	No	WWAN	Yes	Not Support
	5470~5725 MHz	DT	No	WWAN	Yes	Not Support
	5725~5850 MHz	DT	No	WWAN	Yes	Not Support
Bluetooth	2402~2480 MHz	DT	No	WWAN	NA	Not Support

VO=CMRS Voice Service

DT=Digital Transport

VD=CMRS IP Voice Service and Digital Transport

OTT= OTT VoIP Calling (eg. Volet, Wi-Fi calling and etc.)

Note1: The air interface is exempted from testing by low power exemption that its average antenna input power plus its MIF is ≤ 17 dBm, and is rated as M4.

Note2: According to ANSI C63.19 2011 -version, for the air interface technology of a device is exempt from testing whose peak antenna input power, averaged over intervals ≤ 50 μ s, is ≤ 23 dBm. An RF air interface technology that is exempted from testing shall be rated as M4.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	FCC 47 CFR Part 20.19	Hearing aid-compatible mobile handsets.
2	ANSI C 63.19:2011	American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids
3	KDB 285076 D01 HAC Guidance v05r01	Provides equipment authorization guidance for mobile handsets subject to the requirements of Section 20.19 for hearing aid compatibility

3.2 HAC Test Configuration and Setting

For HAC RF emission testing, the EUT was linked and controlled by wireless communication test set. Communication between the EUT and the wireless communication test set was established by air link. The distance between the EUT and the communicating antenna of the test set is larger than 50 cm and the output power radiated from the wireless communication test set antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the wireless communication test set to radiate maximum output power during HAC testing.

3.3 Summary of HAC M-Rating

Band	Measurement Result		M-Rating
GSM 850	E-Field dB (V/m)	37.23	M4
GSM 1900	E-Field dB (V/m)	30.79	M3
LTE B38	E-Field dB (V/m)	21.69	M4

Note: For other frequency, the air interface is exempted from testing by low power exemption that its average antenna input power plus its MIF is ≤ 17 dBm, and is rated as M4.

3.4 ANSI C63.19 HAC RF Categories

3.4.1 RF Emissions

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

WD RF audio interference level categories:

Category	Limits for E-Field Emission (V/m)	
	<960MHz	>960MHz
M1	50 to 55	40 to 45
M2	45 to 50	35 to 40
M3	40 to 45	30 to 35
M4	<40	<30

3.5 HAC Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in ANSI C 63.19:2011. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Uncertainty Component	Uncertainty Value	Prob. Dist.	Div.	Ci (E)	Ci (H)	Std. Unc. (+/- %)	
						E	H
Measurement System							
Probe calibration	6.00	N	1.000	1	1	6.00	6.00
Axial Isotropy	2.02	R	1.732		1	1.17	1.17
Sensor Displacement	14.30	R	1.732	1	0.217	8.26	1.79
Boundary effect	2.50	R	1.732	1	1	0.87	0.87
Phantom Boundary Effect	6.89	R	1.732	1	0	3.52	0.00
Linearity	2.58	R	1.732	1	1	1.49	1.49
Scaling tp PMR Calibration	9.02	N	1.000	1	1	9.02	9.02
System detection limits	1.30	R	1.732	1	1	0.75	0.75
Readout Electronics	0.25	R	1.732	1	1	0.14	0.14
Response Time	1.23	R	1.732	1	1	0.71	0.71
Integration Time	2.15	R	1.732	1	1	1.24	1.24
RF ambient Conditions	2.03	R	1.732	1	1	1.17	1.17
RF Reflections	9.09	R	1.732	1	1	5.25	5.25
Probe positioner	0.63	N	1.000	1	0.71	0.63	0.45
Probe positioning	3.12	N	1.000	1	0.71	3.12	2.22
Extrapolation and Interpolation	1.18	R	1.732	1	1	0.68	0.68
Test sample Related							
Test sample positioning Vertical	2.73	R	1.732	1	0.71	1.58	1.12
Test sample positioning Lateral	1.19	R	1.732	1	1	0.69	0.69
Device holder and Phantom	2.20	N	1.000	1	1	2.20	2.20
Power drift	4.08	R	1.732	1	1	2.36	2.36
Phantom and Setup Related							
Phantom Thickness	2.00	N	1.000	1	0.6	2.00	1,20
Combined Std. Uncertainty(k=1)						16.18	13.25
Expanded Uncertainty on Power						32.35	26.50
Expanded Uncertainty on Field						16.18	13.25

4 SATIMO HSC MEASUREMENT SYSTEM

4.1 Definition of Hearing Aid Compatibility (HAC)

On July 10, 2003, the Federal Communications Commission (FCC) adopted new rules requiring wireless manufacturers and service providers to provide digital wireless phones that are compatible with hearing aids. The FCC has modified the exemption for wireless phones under the Hearing Aid Compatibility Act of 1998 (HAC Act) in WT Docket 01-309 RM-8658 to extend the benefits of wireless telecommunications to individuals with hearing disabilities. These benefits encompass business, social and emergency communications, which increase the value of the wireless network for everyone. An estimated more than 10% of the population in the United States show signs of hearing impairment and of that fraction, almost 80% use hearing aids. Approximately 500 million people worldwide suffer from hearing loss.

Compatibility Tests involved:

The standard calls for wireless communications devices to be measured for:

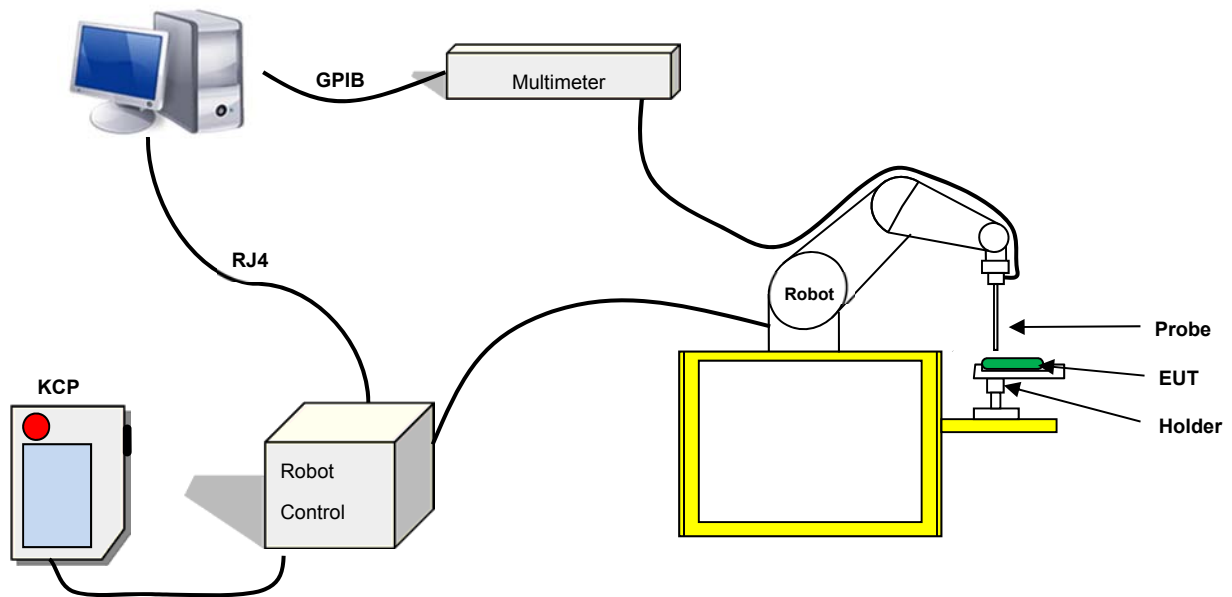
- RF Electric-field emissions.
- RF Magnetic- field emissions.
- T-coil mode, magnetic-signal strength in the audio band.
- T-coil mode, magnetic-signal frequency response through the audio band.
- T-coil mode, magnetic-signal and noise articulation index.

The hearing aid must be measured for:

- RF immunity in microphone mode
- RF immunity in T-coil mode

4.2 SATIMO HAC System

SATIMO HAC System Diagram:



4.2.1 Robot

The SATIMO HAC system uses the high precision robots from KUKA. For the 6-axis controller system, the robot controller version (KUKA) from KUKA is used. The KUKA 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)

4.2.2 HAC E-Field Probe



Serial Number:	SN 24/13 EPH41
Frequency:	0.7GHz – 2.5GHz
Probe length:	330mm
Length of one dipole:	3.3mm
Maximum external diameter:	8mm
Probe extremity diameter:	5mm
Distance between dipoles/probe extremity:	3mm
Resistance of the three dipole (at the connector):	Dipole 1:R1=2.1807 M Ω Dipole 2:R1=2.0612 M Ω Dipole 3:R3=2.1892 M Ω
Connector (HIROSE series SR30)	6 wire male (Hirose SR30series)

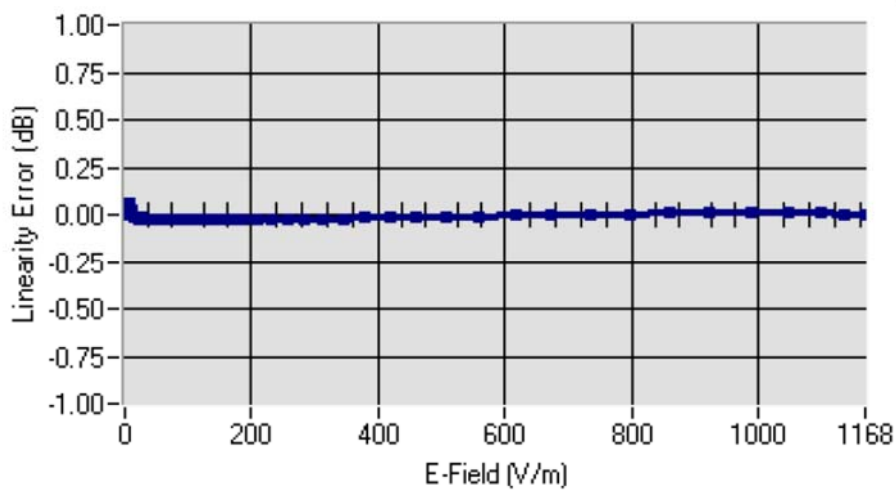
E-Field Probe Calibration Process

All methods used to perform the measurements and calibrations comply with the ANSI C63.19 and IEEE 1309 standards.

LINEARITY

The linearity was determined using a standard dipole with the probe positioned 10 mm above the dipole. The input power of the dipole was adjusted from -15 to 36 dBm using a 1dB step (to cover the range 2V/m to 1000V/m).

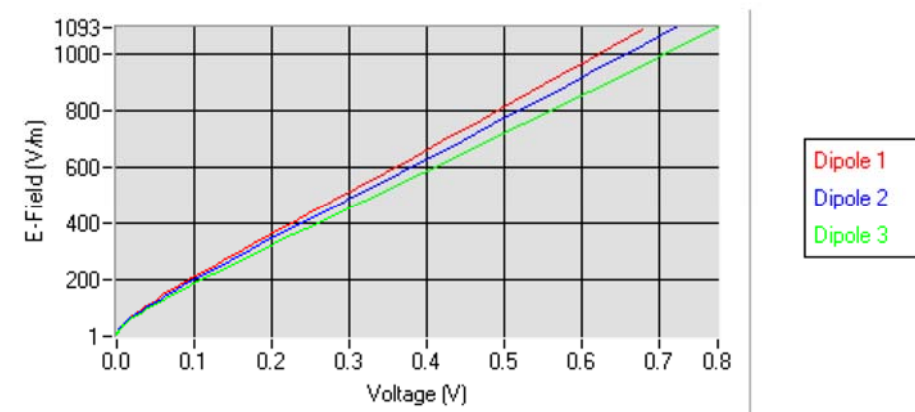
Linearity: +/- 1.49% (+/- 0.07 dB)



SENSITIVITY

The sensitivity factors of the three dipoles were determined using the waveguide method outlined in the fore mentioned standards.

Calibration curves

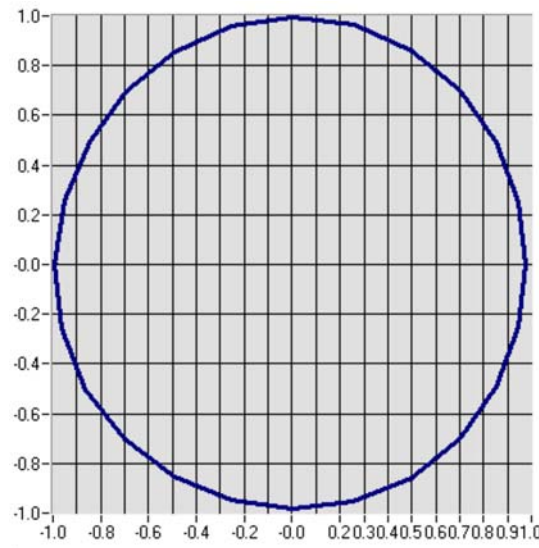


Frequency (GHz)	Normz dipole 1 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normz dipole 2 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normz dipole 3 ($\mu\text{V}/(\text{V}/\text{m})^2$)
0.7GHz-2.5GHz	6.54	4.86	5.80
Frequency (GHz)	DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
0.7GHz-2.5GHz	96	96	92

ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole. The probe was rotated along its main axis from 0 - 360 degrees in 15 degree steps.

Isotropy: +/- 1.22% (+/- 0.05 dB)



4.2.3 HAC H-Field Probe



Serial Number:	SN 24/13 EPH49
Frequency:	0.7GHz – 2.5GHz
Probe length:	330mm
Length of one dipole:	3.3mm
Maximum external diameter:	8mm
Probe extremity diameter:	5mm
Distance between dipoles/probe extremity:	3mm
Resistance of the three dipole (at the connector):	Dipole 1:R1=0.289 MΩ Dipole 2:R1=0.287 MΩ Dipole 3:R3=0.281 MΩ
Connector (HIROSE series SR30)	6 wire male (Hirose SR30series)

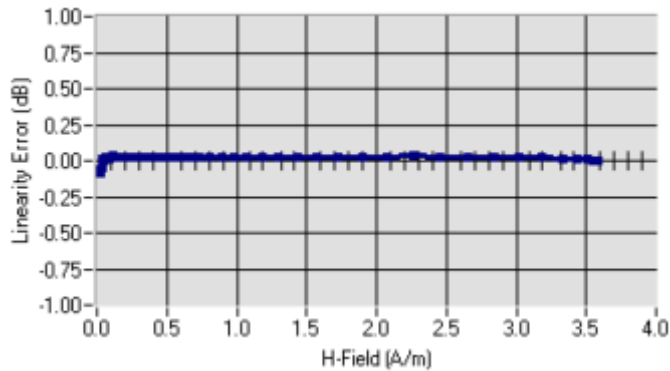
Calibration Method Procedure

All methods used to perform the measurements and calibrations comply with the ANSI C63.19 and IEEE 1309 standards.

LINEARITY

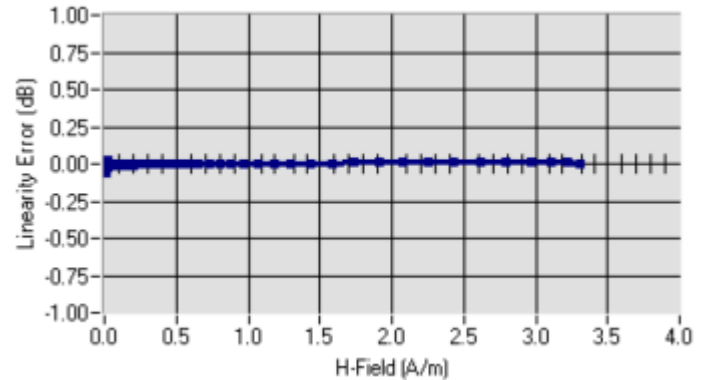
The linearity was determined using a standard dipole with the probe positioned 10 mm above the dipole. The input power of the dipole was adjusted from -15 to 36 dBm using a 1dB step (to cover the range 0.01A/m to 2A/m).

Linearity: +/- 1.83% (+/- 0.08 dB)



Linearity @ 835MHz

Linearity: +/- 1.36% (+/- 0.06 dB)

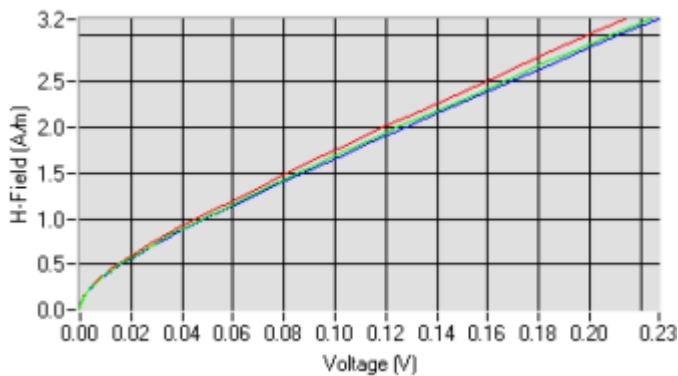


Linearity @ 1900MHz

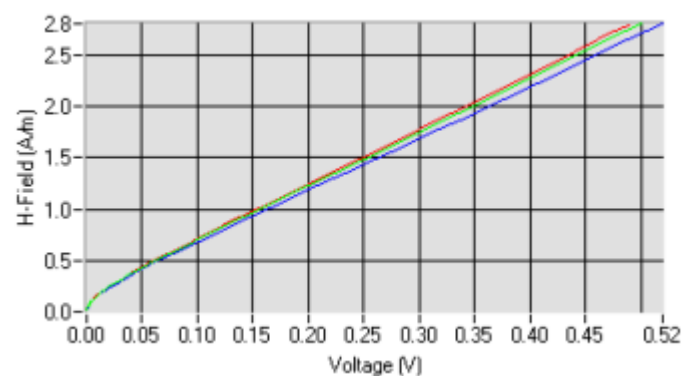
SENSITIVITY

The sensitivity factors of the three dipoles were determined using the waveguide method outlined in the fore mentioned standards.

Frequency (GHz)	Normz loop 1 ($\mu\text{V}/(\text{A/m})^2$)	Normz loop 2 ($\mu\text{V}/(\text{A/m})^2$)	Normz loop 3 ($\mu\text{V}/(\text{A/m})^2$)
0.7GHz-1.0GHz	0.062	0.072	0.068
1.7GHz-2.5GHz	0.35	0.41	0.37
Frequency (GHz)	DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
0.7GHz-2.5GHz	112	102	106



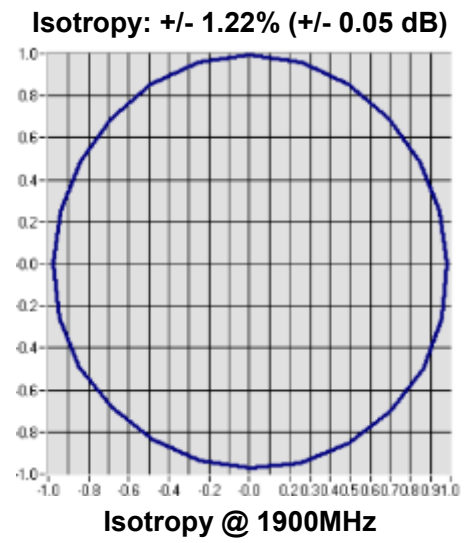
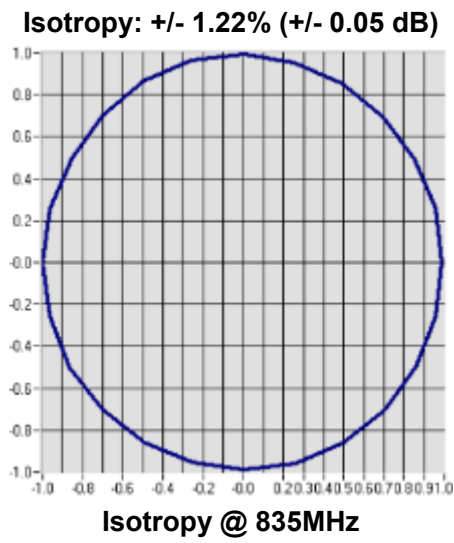
Calibration Curves @ 835MHz



Calibration Curves @ 1900MHz

ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole. The probe was rotated along its main axis from 0 - 360 degrees in 15 degree steps.

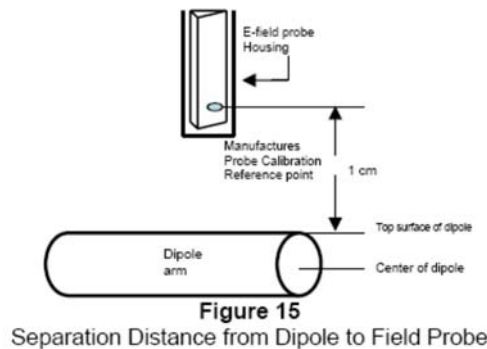


5 SYSTEM VERIFICATION

5.1 System Check Procedure

The input signal was an unmodulated continuous wave. The following points were taken into consideration in performing this check:

- Average Input Power $P = 100\text{mW RMS}$ (20dBm RMS) after adjustment for return loss
- The test fixture must meet the 2 wavelength separation criterion
- The proper measurement of the 1 cm probe to dipole separation, which is measured from top surface of the dipole to the calibration reference point of the sensor, defined by the probe manufacturer is shown in the following diagram:

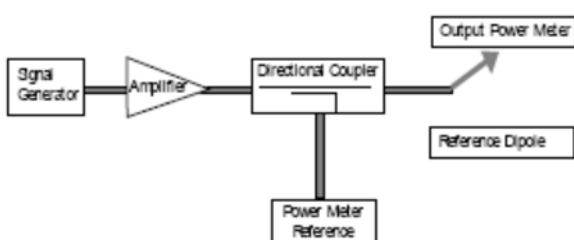


RF power was recorded using both an average reading meter and a peak reading meter. Readings of the probe are provided by the measurement system. To assure proper operation of the near-field measurement probe the input power to the dipole shall be commensurate with the full rated output power of the wireless device (e.g. - for a cellular phone wireless device the average peak antenna input power will be on the order of 100mW (i.e. - 20dBm) RMS after adjustment for any mismatch.

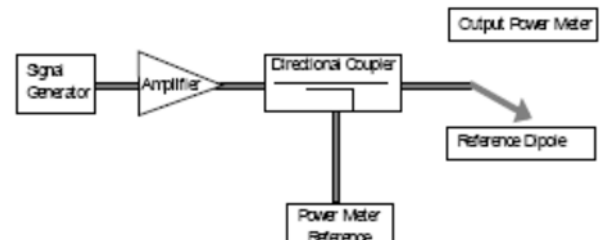
5.2 Validation Procedure

A dipole antenna meeting the requirements given in PC63.19 was placed in the position normally occupied by the WD. The length of the dipole was scanned with both E-field and H-field probes and the maximum values for each were recorded. Using the near-field measurement system, scan the antenna over the radiating dipole and record the greatest field reading observed. Due to the nature of E-fields about free-space dipoles, the two E-field peaks measured over the dipole are averaged to compensate for non-parallelity of the setup see manufacturer method on dipole calibration certificates, Field strength measurements shall be made only when the probe is stationary. RF power was recorded using both an average and a peak power reading meter.

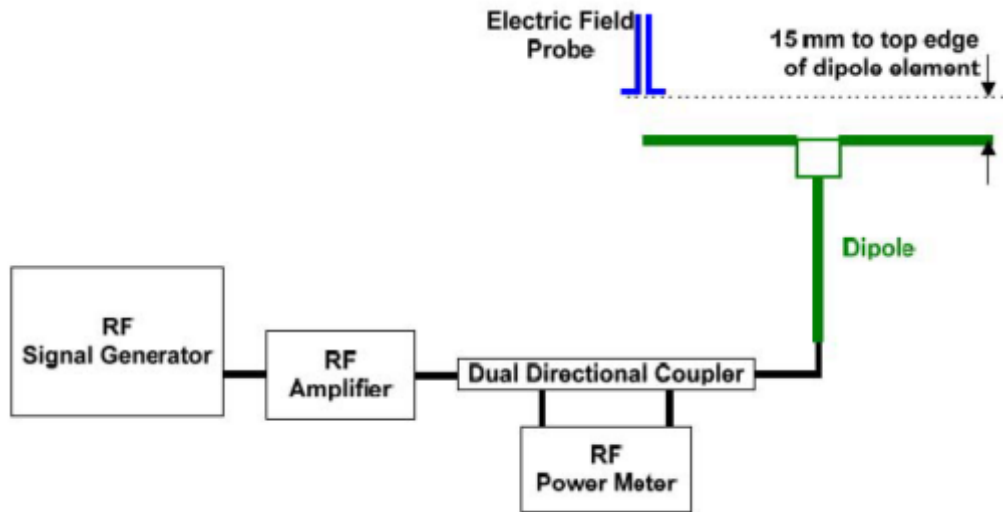
Setup for Desired Output Power to Dipole



Setup to Dipole



5.3 System Validation Setup



Using this setup configuration, the signal generator was adjusted for the desired output power 20dBm (100mW) at a specified frequency. The reference power from the coupled port of the directional coupler is recorded. Next, the output cable is connected to the reference dipole

5.4 System Validation Results

Comparing to the original HAC value provided by SATIMO, the validation data should be within its specification of 10 %.

Frequency	Input Power (dBm)	E-field Result (V/m)	Target Field (V/m)	Tolerance (%)	Date
835 MHz	20.0	214.12	220.4	-2.86	31/5/2020
1900MHz	20.0	155.84	153.4	1.62	28/5/2020
2450MHz	20.0	136.81	134.7	1.57	30/5/2020

6 Modulation Interference Factor (MIF)

The HAC Standard ANSI C63.19-2011 defines a new scaling using the Modulation Interference Factor (MIF). For any specific fixed and repeatable modulated signal, a modulation interference factor (MIF, expressed in dB) may be developed that relates its interference potential to its steady-state rms signal level or average power level. This factor is a function only of the audio-frequency amplitude modulation characteristics of the signal and is the same for field-strength and conducted power measurements. It is important to emphasize that the MIF is valid only for a specific repeatable audio-frequency amplitude modulation characteristic. Any change in modulation characteristic requires determination and application of a new MIF.

The MIF may be determined using a radiated RF field, a conducted RF signal, or in a preliminary stage, a mathematical analysis of a modeled RF signal:

- a) Verify the slope accuracy and dynamic range capability over the desired operating frequency band of a fast probe or sensor, square-law detector, as specified in D.3, and weighting system as specified in D.4 and D.5. For the probe and instrumentation included in the measurement of MIF, additional calibration and application of calibration factors are not required.
- b) Using RF illumination or conducted coupling, apply the specific modulated signal in question to the measurement system at a level within its confirmed operating dynamic range.
- c) Measure the steady-state rms level at the output of the fast probe or sensor.
- d) Measure the steady-state average level at the weighting output.
- e) Without changing the square-law detector or weighting system, and using RF illumination or conducted coupling, substitute for the specific modulated signal a 1kHz, 80% amplitude-modulated carrier at the same frequency and adjust its strength until the level at the weighting output equals the step d) measurement.
- f) Without changing the carrier level from step e), remove the 1 kHz modulation and again measure the steady-state rms level indicated at the output of the fast probe or sensor.
- g) The MIF for the specific modulation characteristic is provided by the ratio of the step f) measurement to the step c) measurement, expressed in dB ($20 \times \log(\text{step f})/(\text{step c})$).

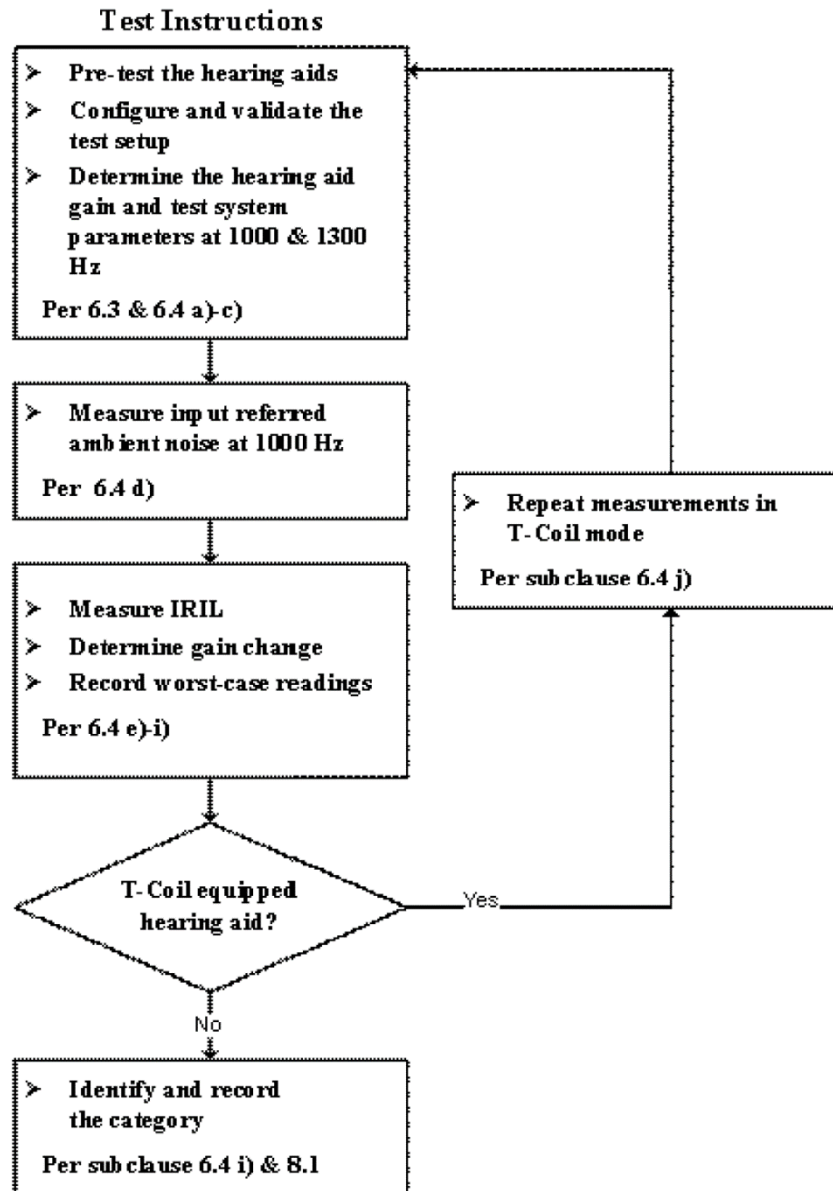
In practice, step e) and step f) need not be repeated for each MIF determination if the relationship between the two measurements has been preestablished for the measurement system over the operating frequency and dynamic ranges.

MIF table

Probe	Signal Type	MIF
E-Field Probe	CW	-99.00
	GSM-FDD (TDMA, GMSK)	3.63
	EDGE-FDD (TDMA, 8PSK, TN 0)	3.75
	UMTS-FDD (WCDMA, AMR)	-25.43
	UMTS-FDD (HSPA+)	-20.39
	CDMA2000 (1xRTT, RC3)	-19.71
	CDMA2000 (1xRTT, RC1 SO3, 1/8th Rate 25 fr.)	3.26
	CDMA2000 (1xEV-DO, Rev. 0)	-17.67
	LTE-FDD(SC-FDMA,1RB,20MHz,16-QAM)	-9.76
	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	-1.62
	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	-1.44

7 HAC RF IMMUNITY MEASUREMENT PROCEDURES

7.1 HAC Measurement Process Diagram



7.2 HAC RF Test Setup



Reference and plane for RF emission measurements

7.3 RF Emission Measurement Procedure

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

- Proper operation of the field probe, probe measurement system, other instrumentation, and the positioning system was confirmed.
- WD is positioned in its intended test position, acoustic output point of the device perpendicular to the field probe.
- The WD operation for maximum rated RF output power was configured and confirmed with 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 WD audio output was positioned tangent (as physically possible) to the measurement plane.
- A surface calibration was performed before each setup change to ensure repeatable spacing and proper maintenance of the measurement plane using the HAC Phantom.
- The measurement system measured the field strength at the reference location.

8 CONDUCTED RF OUPUT POWER

8.1 GSM

8.1.1 GSM 850

GSM 850(UAT)								
GSM850 Band	Burst Average Power(dBm)			Tune-up Limit (dBm)	Frame-Averaged power (dBm)			Tune-up Limit (dBm)
Channel	128	190	251		128	190	251	
GSM (GMSK, 1-Slot)	32.23	32.25	32.20	33.50	23.04	23.06	23.01	24.31
GPRS (GMSK, 1-Slot)	32.20	32.24	32.19	33.50	23.01	23.05	23.00	24.31
GPRS (GMSK, 2-Slots)	27.25	27.32	27.28	29.00	21.12	21.19	21.15	22.87
GPRS (GMSK, 3-Slots)	25.93	25.91	25.80	27.50	21.51	21.49	21.38	23.08
GPRS (GMSK, 4-Slots)	25.25	25.61	25.63	27.00	22.07	22.43	22.45	23.82
EGPRS (8PSK, 1-Slot)	26.67	26.70	26.62	27.50	17.48	17.51	17.43	18.31
EGPRS (8PSK, 2-Slots)	21.88	22.03	21.82	23.00	15.75	15.90	15.69	16.87
EGPRS (8PSK, 3-Slots)	20.37	20.63	20.28	21.50	15.95	16.21	15.86	17.08
EGPRS (8PSK, 4-Slots)	19.75	19.78	19.75	21.00	16.57	16.60	16.57	17.82

GSM 850(DAT)								
GSM850 Band	Burst Average Power(dBm)			Tune-up Limit (dBm)	Frame-Averaged power (dBm)			Tune-up Limit (dBm)
Channel	128	190	251		128	190	251	
GSM (GMSK, 1-Slot)	32.23	32.25	32.20	33.50	23.04	23.06	23.01	24.31
GPRS (GMSK, 1-Slot)	32.20	32.24	32.19	33.50	23.01	23.05	23.00	24.31
GPRS (GMSK, 2-Slots)	30.19	30.26	30.22	32.00	24.06	24.13	24.09	25.87
GPRS (GMSK, 3-Slots)	28.38	28.36	28.25	30.00	23.96	23.94	23.83	25.58
GPRS (GMSK, 4-Slots)	26.24	26.60	26.62	28.00	23.06	23.42	23.44	24.82
EGPRS (8PSK, 1-Slot)	26.67	26.70	26.62	27.50	17.48	17.51	17.43	18.31
EGPRS (8PSK, 2-Slots)	24.85	25.00	24.79	26.00	18.72	18.87	18.66	19.87
EGPRS (8PSK, 3-Slots)	22.85	23.11	22.76	24.00	18.43	18.69	18.34	19.58
EGPRS (8PSK, 4-Slots)	20.72	20.75	20.72	22.00	17.54	17.57	17.54	18.82

8.1.2 GSM 1900

GSM 1900(UAT)								
GSM1900 Band	Burst Average Power(dBm)			Tune-up	Frame-Averaged power(dBm)			Tune-up
Channel	512	661	810	Limit (dBm)	512	661	810	Limit (dBm)
GSM (GMSK, 1-Slot)	23.35	23.30	23.20	24.50	14.16	14.11	14.01	15.31
GPRS (GMSK, 1-Slot)	23.33	23.29	23.18	24.50	14.14	14.10	13.99	15.31
GPRS (GMSK, 2-Slots)	20.40	20.37	20.42	21.50	14.27	14.24	14.29	15.37
GPRS (GMSK, 3-Slots)	19.95	19.94	19.75	21.00	15.53	15.52	15.33	16.58
GPRS (GMSK, 4-Slots)	18.33	18.30	18.11	19.00	15.15	15.12	14.93	15.82
EGPRS (8PSK, 1-Slot)	19.56	19.62	19.58	20.50	10.37	10.43	10.39	11.31
EGPRS (8PSK, 2-Slots)	16.58	16.48	16.22	17.50	10.45	10.35	10.09	11.37
EGPRS (8PSK, 3-Slots)	16.04	15.96	15.70	17.00	11.62	11.54	11.28	12.58
EGPRS (8PSK, 4-Slots)	13.86	13.65	13.70	15.00	10.68	10.47	10.52	11.82

GSM 1900(DAT)								
GSM900 Band	Burst Average Power(dBm)			Tune-up	Frame-Averaged power (dBm)			Tune-up
Channel	512	661	810	Limit (dBm)	512	661	810	Limit (dBm)
GSM (GMSK, 1-Slot)	29.50	29.47	29.35	30.50	20.31	20.28	20.16	21.31
GPRS (GMSK, 1-Slot)	29.48	29.46	29.33	30.50	20.29	20.27	20.14	21.31
GPRS (GMSK, 2-Slots)	28.05	28.03	27.96	29.00	21.92	21.90	21.83	22.87
GPRS (GMSK, 3-Slots)	25.95	25.94	25.75	27.00	21.53	21.52	21.33	22.58
GPRS (GMSK, 4-Slots)	24.33	24.30	24.11	25.00	21.15	21.12	20.93	21.82
EGPRS (8PSK, 1-Slot)	25.59	25.69	25.47	26.50	16.40	16.50	16.28	17.31
EGPRS (8PSK, 2-Slots)	24.10	23.92	23.67	25.00	17.97	17.79	17.54	18.87
EGPRS (8PSK, 3-Slots)	22.02	21.79	21.57	23.00	17.60	17.37	17.15	18.58
EGPRS (8PSK, 4-Slots)	19.86	19.72	19.52	21.00	16.68	16.54	16.34	17.82

8.2 WCDMA

8.2.1 WCDMA Band 2

WCDMA	Band 2(UAT)			
Channel	9262	9400	9538	Tune-up Limit (dBm)
AMR 12.2Kbps	14.98	14.86	15.02	16.00
RMC 12.2Kbps	15.00	14.89	15.05	16.00
HSDPA Subtest-1	14.07	13.97	14.00	15.00
HSDPA Subtest-2	13.95	13.84	13.99	15.00
HSDPA Subtest-3	13.68	13.51	13.62	14.50
HSDPA Subtest-4	13.45	13.36	13.64	14.50
HSUPA Subtest-1	14.06	14.00	14.02	15.00
HSUPA Subtest-2	12.02	11.97	12.10	13.00
HSUPA Subtest-3	13.16	12.91	13.12	14.00
HSUPA Subtest-4	12.14	11.90	12.10	13.00
HSUPA Subtest-5	14.02	13.99	14.13	15.00

WCDMA	Band 2(DAT)			
Channel	9262	9400	9538	Tune-up Limit (dBm)
AMR 12.2Kbps	21.87	21.78	21.97	23.00
RMC 12.2Kbps	21.99	21.89	22.02	23.00
HSDPA Subtest-1	21.02	20.89	21.06	22.00
HSDPA Subtest-2	21.01	20.89	21.09	22.00
HSDPA Subtest-3	20.50	20.38	20.53	21.50
HSDPA Subtest-4	20.52	20.40	20.59	21.50
HSUPA Subtest-1	20.94	20.92	21.00	22.00
HSUPA Subtest-2	19.00	18.94	19.10	20.00
HSUPA Subtest-3	20.01	20.00	20.09	21.00
HSUPA Subtest-4	18.95	18.87	19.01	20.00
HSUPA Subtest-5	20.96	20.89	20.99	22.00

8.2.2 WCDMA Band 4

WCDMA	Band 4(UAT)			
Channel	1312	1412	1513	Tune-up Limit (dBm)
AMR 12.2Kbps	14.96	15.00	14.97	16.00
RMC 12.2Kbps	14.97	15.01	14.99	16.00
HSDPA Subtest-1	13.98	14.05	13.95	15.00
HSDPA Subtest-2	14.02	14.17	14.05	15.00
HSDPA Subtest-3	13.70	13.47	13.40	14.50
HSDPA Subtest-4	13.63	13.50	13.50	14.50
HSUPA Subtest-1	13.97	13.90	14.19	15.00
HSUPA Subtest-2	12.15	12.05	12.08	13.00
HSUPA Subtest-3	13.20	12.90	13.31	14.00
HSUPA Subtest-4	12.34	12.04	12.26	13.00
HSUPA Subtest-5	14.03	13.94	14.28	15.00

WCDMA	Band 4(DAT)			
Channel	1312	1412	1513	Tune-up Limit (dBm)
AMR 12.2Kbps	21.42	21.47	21.45	22.50
RMC 12.2Kbps	21.45	21.48	21.47	22.50
HSDPA Subtest-1	20.44	20.44	20.46	21.50
HSDPA Subtest-2	20.50	20.48	20.50	21.50
HSDPA Subtest-3	20.00	19.98	19.99	21.00
HSDPA Subtest-4	20.00	19.96	20.01	21.00
HSUPA Subtest-1	20.57	20.48	20.60	21.50
HSUPA Subtest-2	18.59	18.41	18.62	19.50
HSUPA Subtest-3	19.55	19.35	19.67	20.50
HSUPA Subtest-4	18.64	18.45	18.71	19.50
HSUPA Subtest-5	20.58	20.51	20.69	21.50

8.2.3 WCDMA Band 5

WCDMA	Band 5(UAT&DAT)			
Channel	4132	4182	4233	Tune-up Limit (dBm)
AMR 12.2Kbps	22.81	22.91	22.88	24.00
RMC 12.2Kbps	22.85	22.95	22.89	24.00
HSDPA Subtest-1	21.91	21.89	21.96	23.00
HSDPA Subtest-2	21.94	21.93	22.01	23.00
HSDPA Subtest-3	21.45	21.43	21.53	22.50
HSDPA Subtest-4	21.44	21.44	21.52	22.50
HSUPA Subtest-1	21.88	21.87	21.94	23.00
HSUPA Subtest-2	19.95	19.87	20.09	21.00
HSUPA Subtest-3	20.92	20.98	21.04	22.00
HSUPA Subtest-4	19.91	19.98	20.00	21.00
HSUPA Subtest-5	21.85	21.92	21.95	23.00

8.3 LTE

8.3.1 LTE Band 2

FDD LTE Band 2(UAT)									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18700	18900	19100		18700	18900	19100	
20 MHz	1 (RB_Pos:0)	15.14	15.13	15.03	16.00	15.12	15.10	15.00	16.00
	1 (RB_Pos:50)	15.20	15.18	14.97	16.00	15.12	15.03	14.81	16.00
	1 (RB_Pos:99)	14.95	15.26	14.96	16.00	15.14	15.08	14.82	16.00
	50 (RB_Pos:0)	15.11	15.21	15.08	16.00	14.76	14.79	14.60	16.00
	50 (RB_Pos:25)	15.21	15.23	15.01	16.00	14.73	14.80	14.51	16.00
	50 (RB_Pos:50)	15.16	15.16	15.00	16.00	14.77	14.75	14.49	16.00
	100 (RB_Pos:0)	15.21	15.22	15.11	16.00	14.76	14.73	14.62	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18675	18900	19125		18675	18900	19125	
15 MHz	1 (RB_Pos:0)	15.17	15.18	15.06	16.00	14.59	15.10	14.95	16.00
	1 (RB_Pos:38)	15.14	15.13	14.94	16.00	14.56	15.09	14.98	16.00
	1 (RB_Pos:74)	15.13	15.13	14.93	16.00	14.55	15.07	14.83	16.00
	36 (RB_Pos:0)	15.15	15.14	14.96	16.00	14.71	14.78	14.50	16.00
	36 (RB_Pos:20)	15.19	15.21	15.00	16.00	14.75	14.82	14.52	16.00
	36 (RB_Pos:39)	15.13	15.17	14.90	16.00	14.71	14.80	14.50	16.00
	75 (RB_Pos:0)	15.13	15.13	14.95	16.00	14.72	14.77	14.53	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18650	18900	19150		18650	18900	19150	
10 MHz	1 (RB_Pos:0)	15.17	15.12	14.95	16.00	14.60	15.07	14.56	16.00
	1 (RB_Pos:25)	15.06	15.04	14.85	16.00	14.54	14.98	14.47	16.00
	1 (RB_Pos:49)	15.12	15.10	14.90	16.00	14.56	15.06	14.45	16.00
	25 (RB_Pos:0)	15.16	15.17	14.99	16.00	14.73	14.77	14.57	16.00
	25 (RB_Pos:12)	15.23	15.20	14.99	16.00	14.77	14.79	14.61	16.00
	25 (RB_Pos:25)	15.18	15.15	14.97	16.00	14.69	14.75	14.55	16.00
	50 (RB_Pos:0)	15.18	15.20	14.97	16.00	14.73	14.78	14.54	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18625	18900	19175		18625	18900	19175	
5 MHz	1 (RB_Pos:0)	15.20	15.17	14.90	16.00	14.89	15.19	14.59	16.00
	1 (RB_Pos:13)	15.17	15.15	14.92	16.00	14.87	15.06	14.58	16.00
	1 (RB_Pos:24)	15.11	15.12	14.83	16.00	14.85	15.15	14.56	16.00
	12 (RB_Pos:0)	15.19	15.15	14.95	16.00	14.79	14.84	14.52	16.00

	12 (RB_Pos:6)	15.14	15.13	14.93	16.00	14.77	14.86	14.56	16.00
	12 (RB_Pos:13)	15.15	15.10	14.91	16.00	14.74	14.81	14.52	16.00
	25 (RB_Pos:0)	15.16	15.13	14.91	16.00	14.69	14.73	14.45	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18615	18900	19185		18615	18900	19185	
3.0 MHz	1 (RB_Pos:0)	15.15	15.09	14.85	16.00	14.59	15.02	14.50	16.00
	1 (RB_Pos:8)	15.10	15.05	14.84	16.00	14.56	15.00	14.42	16.00
	1 (RB_Pos:14)	15.12	15.05	14.83	16.00	14.52	15.01	14.39	16.00
	8 (RB_Pos:0)	15.21	15.12	14.89	16.00	14.82	14.77	14.46	16.00
	8 (RB_Pos:3)	15.22	15.15	14.94	16.00	14.80	14.74	14.49	16.00
	8 (RB_Pos:7)	15.18	15.13	14.88	16.00	14.81	14.71	14.47	16.00
	15 (RB_Pos:0)	15.12	15.13	14.92	16.00	14.72	14.72	14.37	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18607	18900	19193		18607	18900	19193	
1.4 MHz	1 (RB_Pos:0)	15.07	14.98	14.80	16.00	14.72	14.97	14.33	16.00
	1 (RB_Pos:3)	15.12	15.06	14.85	16.00	14.80	15.00	14.40	16.00
	1 (RB_Pos:5)	15.05	14.98	14.76	16.00	14.73	14.97	14.32	16.00
	3 (RB_Pos:0)	15.10	15.06	14.84	16.00	14.71	14.83	14.53	16.00
	3 (RB_Pos:1)	15.18	15.13	14.92	16.00	14.74	14.90	14.59	16.00
	3 (RB_Pos:3)	15.11	15.08	14.85	16.00	14.69	14.82	14.55	16.00
	6 (RB_Pos:0)	15.05	15.01	14.82	16.00	14.75	14.47	14.53	16.00

FDD LTE Band 2(DAT)									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18700	18900	19100		18700	18900	19100	
20 MHz	1 (RB_Pos:0)	21.77	21.73	21.59	23.00	21.29	21.27	21.07	22.00
	1 (RB_Pos:50)	21.73	21.72	21.48	23.00	21.24	21.22	20.98	22.00
	1 (RB_Pos:99)	21.80	21.89	21.64	23.00	21.36	21.22	20.88	22.00
	50 (RB_Pos:0)	20.81	20.79	20.76	22.00	19.90	19.96	19.80	21.00
	50 (RB_Pos:25)	20.80	20.91	20.67	22.00	19.89	19.95	19.73	21.00
	50 (RB_Pos:50)	20.79	20.78	20.61	22.00	19.87	19.89	19.67	21.00
	100 (RB_Pos:0)	20.81	20.82	20.79	22.00	19.94	19.92	19.86	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18675	18900	19125		18675	18900	19125	
15 MHz	1 (RB_Pos:0)	21.80	21.73	21.55	23.00	20.69	21.21	21.02	22.00
	1 (RB_Pos:38)	21.75	21.68	21.50	23.00	20.70	21.22	21.06	22.00
	1 (RB_Pos:74)	21.75	21.71	21.50	23.00	20.69	21.18	20.88	22.00

	36 (RB_Pos:0)	20.84	20.77	20.61	22.00	19.93	19.95	19.71	21.00
	36 (RB_Pos:20)	20.81	20.80	20.59	22.00	19.89	19.96	19.67	21.00
	36 (RB_Pos:39)	20.83	20.76	20.57	22.00	19.90	19.95	19.66	21.00
	75 (RB_Pos:0)	20.78	20.74	20.60	22.00	19.88	19.96	19.71	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18650	18900	19150		18650	18900	19150	
10 MHz	1 (RB_Pos:0)	21.82	21.71	21.53	23.00	20.70	21.24	20.69	22.00
	1 (RB_Pos:25)	21.77	21.69	21.51	23.00	20.70	21.19	20.65	22.00
	1 (RB_Pos:49)	21.80	21.73	21.50	23.00	20.69	21.19	20.51	22.00
	25 (RB_Pos:0)	20.81	20.80	20.63	22.00	19.87	19.91	19.82	21.00
	25 (RB_Pos:12)	20.79	20.82	20.64	22.00	19.88	19.97	19.83	21.00
	25 (RB_Pos:25)	20.80	20.76	20.60	22.00	19.81	19.93	19.77	21.00
	50 (RB_Pos:0)	20.80	20.81	20.62	22.00	19.87	19.97	19.74	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18625	18900	19175		18625	18900	19175	
5 MHz	1 (RB_Pos:0)	21.81	21.78	21.54	23.00	20.97	21.40	20.77	22.00
	1 (RB_Pos:13)	21.84	21.79	21.56	23.00	21.01	21.39	20.73	22.00
	1 (RB_Pos:24)	21.77	21.74	21.52	23.00	20.97	21.33	20.66	22.00
	12 (RB_Pos:0)	20.81	20.79	20.60	22.00	19.92	20.07	19.75	21.00
	12 (RB_Pos:6)	20.78	20.75	20.62	22.00	19.89	20.05	19.77	21.00
	12 (RB_Pos:13)	20.76	20.78	20.62	22.00	19.89	20.00	19.71	21.00
	25 (RB_Pos:0)	20.77	20.77	20.61	22.00	19.88	19.97	19.65	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18615	18900	19185		18615	18900	19185	
3.0 MHz	1 (RB_Pos:0)	21.78	21.70	21.53	23.00	20.67	21.20	20.64	22.00
	1 (RB_Pos:8)	21.75	21.68	21.50	23.00	20.67	21.19	20.51	22.00
	1 (RB_Pos:14)	21.77	21.67	21.51	23.00	20.64	21.18	20.52	22.00
	8 (RB_Pos:0)	20.83	20.73	20.51	22.00	19.96	19.92	19.65	21.00
	8 (RB_Pos:3)	20.82	20.77	20.58	22.00	19.97	19.95	19.70	21.00
	8 (RB_Pos:7)	20.82	20.73	20.54	22.00	19.92	19.91	19.63	21.00
	15 (RB_Pos:0)	20.75	20.72	20.54	22.00	19.83	19.90	19.59	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	18607	18900	19193		18607	18900	19193	
1.4 MHz	1 (RB_Pos:0)	21.72	21.59	21.39	23.00	20.81	21.14	20.46	22.00
	1 (RB_Pos:3)	21.76	21.64	21.48	23.00	20.87	21.22	20.53	22.00
	1 (RB_Pos:5)	21.73	21.60	21.42	23.00	20.82	21.11	20.47	22.00
	3 (RB_Pos:0)	21.62	21.69	21.42	23.00	20.68	21.05	20.64	22.00

	3 (RB_Pos:1)	21.69	21.75	21.50	23.00	20.76	21.07	20.70	22.00
	3 (RB_Pos:3)	21.58	21.68	21.46	23.00	20.68	21.02	20.63	22.00
	6 (RB_Pos:0)	20.71	20.64	20.47	22.00	19.91	19.66	19.72	21.00

8.3.2 LTE Band 4

FDD LTE Band 4(UAT)									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20050	20175	20300		20050	20175	20300	
20 MHz	1 (RB_Pos:0)	15.21	15.28	15.21	16.00	15.18	15.10	15.02	16.00
	1 (RB_Pos:50)	15.09	15.07	15.08	16.00	15.02	14.89	14.92	16.00
	1 (RB_Pos:99)	15.13	15.20	15.11	16.00	15.12	15.00	14.99	16.00
	50 (RB_Pos:0)	15.23	15.24	15.18	16.00	14.64	14.70	14.65	16.00
	50 (RB_Pos:25)	15.21	15.18	15.16	16.00	14.65	14.67	14.58	16.00
	50 (RB_Pos:50)	15.19	15.17	15.21	16.00	14.62	14.61	14.62	16.00
	100 (RB_Pos:0)	15.21	15.23	15.14	16.00	14.65	14.63	14.58	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20025	20175	20325		20025	20175	20325	
15 MHz	1 (RB_Pos:0)	15.21	15.21	15.20	16.00	14.61	15.09	15.10	16.00
	1 (RB_Pos:38)	15.10	15.06	15.14	16.00	14.46	14.86	14.94	16.00
	1 (RB_Pos:74)	15.13	15.08	15.14	16.00	14.56	14.98	15.05	16.00
	36 (RB_Pos:0)	15.14	15.15	15.15	16.00	14.58	14.71	14.56	16.00
	36 (RB_Pos:20)	15.17	15.19	15.19	16.00	14.64	14.65	14.62	16.00
	36 (RB_Pos:39)	15.17	15.14	15.16	16.00	14.60	14.63	14.64	16.00
	75 (RB_Pos:0)	15.18	15.14	15.09	16.00	14.61	14.63	14.54	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20000	20175	20350		20000	20175	20350	
10 MHz	1 (RB_Pos:0)	15.14	15.13	15.17	16.00	14.55	14.92	14.63	16.00
	1 (RB_Pos:25)	15.04	15.05	15.06	16.00	14.44	14.86	14.56	16.00
	1 (RB_Pos:49)	15.10	15.10	15.08	16.00	14.47	14.85	14.53	16.00
	25 (RB_Pos:0)	15.16	15.14	15.17	16.00	14.65	14.63	14.70	16.00
	25 (RB_Pos:12)	15.16	15.18	15.15	16.00	14.63	14.60	14.71	16.00
	25 (RB_Pos:25)	15.16	15.14	15.12	16.00	14.64	14.58	14.69	16.00
	50 (RB_Pos:0)	15.15	15.18	15.17	16.00	14.62	14.60	14.66	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	19975	20175	20375		19975	20175	20375	
5 MHz	1 (RB_Pos:0)	15.11	15.12	15.13	16.00	14.71	15.04	14.69	16.00

	1 (RB_Pos:13)	15.13	15.16	15.14	16.00	14.76	15.07	14.74	16.00
	1 (RB_Pos:24)	15.07	15.09	15.13	16.00	14.71	15.02	14.67	16.00
	12 (RB_Pos:0)	15.14	15.16	15.18	16.00	14.67	14.70	14.62	16.00
	12 (RB_Pos:6)	15.16	15.17	15.18	16.00	14.70	14.69	14.65	16.00
	12 (RB_Pos:13)	15.17	15.10	15.15	16.00	14.68	14.68	14.66	16.00
	25 (RB_Pos:0)	15.10	15.12	15.15	16.00	14.60	14.60	14.52	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	19965	20175	20385		19965	20175	20385	
3.0 MHz	1 (RB_Pos:0)	15.07	15.05	15.09	16.00	14.45	14.85	14.60	16.00
	1 (RB_Pos:8)	15.06	15.06	15.08	16.00	14.45	14.86	14.55	16.00
	1 (RB_Pos:14)	15.06	15.07	15.07	16.00	14.41	14.87	14.53	16.00
	8 (RB_Pos:0)	15.13	15.14	15.10	16.00	14.69	14.61	14.58	16.00
	8 (RB_Pos:3)	15.17	15.16	15.15	16.00	14.67	14.63	14.61	16.00
	8 (RB_Pos:7)	15.13	15.14	15.12	16.00	14.67	14.59	14.58	16.00
	15 (RB_Pos:0)	15.12	15.15	15.15	16.00	14.62	14.58	14.49	16.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	19957	20175	20393		19957	20175	20393	
1.4 MHz	1 (RB_Pos:0)	15.01	15.03	14.97	16.00	14.59	14.77	14.45	16.00
	1 (RB_Pos:3)	15.09	15.06	15.06	16.00	14.66	14.86	14.54	16.00
	1 (RB_Pos:5)	15.02	15.02	14.96	16.00	14.59	14.78	14.49	16.00
	3 (RB_Pos:0)	15.06	15.03	15.08	16.00	14.60	14.71	14.69	16.00
	3 (RB_Pos:1)	15.11	15.08	15.13	16.00	14.64	14.73	14.75	16.00
	3 (RB_Pos:3)	15.06	15.02	15.09	16.00	14.61	14.67	14.70	16.00
	6 (RB_Pos:0)	15.03	15.01	14.95	16.00	14.61	14.32	14.61	16.00

FDD LTE Band 4(DAT)									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20050	20175	20300		20050	20175	20300	
20 MHz	1 (RB_Pos:0)	21.41	21.42	21.37	22.50	20.98	20.91	20.78	21.50
	1 (RB_Pos:50)	21.23	21.26	21.25	22.50	20.85	20.74	20.74	21.50
	1 (RB_Pos:99)	21.32	21.34	21.32	22.50	20.95	20.79	20.82	21.50
	50 (RB_Pos:0)	20.37	20.49	20.40	21.50	19.53	19.48	19.43	20.50
	50 (RB_Pos:25)	20.36	20.39	20.32	21.50	19.54	19.48	19.39	20.50
	50 (RB_Pos:50)	20.33	20.45	20.43	21.50	19.51	19.44	19.48	20.50
	100 (RB_Pos:0)	20.35	20.36	20.34	21.50	19.54	19.44	19.42	20.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20025	20175	20325		20025	20175	20325	

15 MHz	1 (RB_Pos:0)	21.36	21.40	21.36	22.50	20.37	20.86	20.81	21.50
	1 (RB_Pos:38)	21.23	21.24	21.33	22.50	20.23	20.67	20.74	21.50
	1 (RB_Pos:74)	21.27	21.27	21.34	22.50	20.30	20.68	20.83	21.50
	36 (RB_Pos:0)	20.36	20.34	20.28	21.50	19.46	19.54	19.39	20.50
	36 (RB_Pos:20)	20.38	20.36	20.37	21.50	19.46	19.48	19.45	20.50
	36 (RB_Pos:39)	20.34	20.34	20.35	21.50	19.44	19.46	19.45	20.50
	75 (RB_Pos:0)	20.35	20.35	20.26	21.50	19.44	19.48	19.37	20.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20000	20175	20350		20000	20175	20350	
10 MHz	1 (RB_Pos:0)	21.38	21.33	21.39	22.50	20.30	20.77	20.46	21.50
	1 (RB_Pos:25)	21.29	21.24	21.27	22.50	20.27	20.70	20.39	21.50
	1 (RB_Pos:49)	21.33	21.25	21.29	22.50	20.30	20.68	20.37	21.50
	25 (RB_Pos:0)	20.36	20.34	20.36	21.50	19.48	19.51	19.58	20.50
	25 (RB_Pos:12)	20.36	20.36	20.37	21.50	19.47	19.46	19.52	20.50
	25 (RB_Pos:25)	20.33	20.35	20.34	21.50	19.49	19.44	19.50	20.50
	50 (RB_Pos:0)	20.36	20.37	20.39	21.50	19.46	19.47	19.50	20.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	19975	20175	20375		19975	20175	20375	
5 MHz	1 (RB_Pos:0)	21.32	21.32	21.33	22.50	20.54	20.89	20.53	21.50
	1 (RB_Pos:13)	21.36	21.29	21.35	22.50	20.57	20.92	20.54	21.50
	1 (RB_Pos:24)	21.27	21.29	21.28	22.50	20.57	20.83	20.50	21.50
	12 (RB_Pos:0)	20.37	20.30	20.31	21.50	19.48	19.54	19.50	20.50
	12 (RB_Pos:6)	20.38	20.34	20.34	21.50	19.51	19.52	19.51	20.50
	12 (RB_Pos:13)	20.34	20.31	20.34	21.50	19.51	19.50	19.48	20.50
	25 (RB_Pos:0)	20.31	20.31	20.32	21.50	19.49	19.46	19.39	20.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	19965	20175	20385		19965	20175	20385	
3.0 MHz	1 (RB_Pos:0)	21.34	21.28	21.30	22.50	20.21	20.74	20.44	21.50
	1 (RB_Pos:8)	21.29	21.23	21.26	22.50	20.22	20.68	20.38	21.50
	1 (RB_Pos:14)	21.26	21.25	21.26	22.50	20.22	20.68	20.37	21.50
	8 (RB_Pos:0)	20.34	20.34	20.29	21.50	19.52	19.44	19.41	20.50
	8 (RB_Pos:3)	20.40	20.35	20.33	21.50	19.53	19.47	19.46	20.50
	8 (RB_Pos:7)	20.33	20.32	20.29	21.50	19.51	19.40	19.41	20.50
	15 (RB_Pos:0)	20.35	20.28	20.32	21.50	19.44	19.43	19.33	20.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	19957	20175	20393		19957	20175	20393	
1.4 MHz	1 (RB_Pos:0)	21.22	21.19	21.20	22.50	20.33	20.63	20.35	21.50

	1 (RB_Pos:3)	21.29	21.24	21.28	22.50	20.42	20.69	20.38	21.50
	1 (RB_Pos:5)	21.23	21.20	21.21	22.50	20.36	20.64	20.35	21.50
	3 (RB_Pos:0)	21.24	21.22	21.29	22.50	20.37	20.51	20.57	21.50
	3 (RB_Pos:1)	21.31	21.26	21.36	22.50	20.44	20.56	20.60	21.50
	3 (RB_Pos:3)	21.22	21.20	21.30	22.50	20.40	20.51	20.55	21.50
	6 (RB_Pos:0)	20.21	20.19	20.15	21.50	19.44	19.16	19.45	20.50

8.3.3 LTE Band 5

FDD LTE Band 5UAT&DAT									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20450	20525	20600		20450	20525	20600	
10 MHz	1 (RB_Pos:0)	23.30	23.28	23.15	24.50	22.11	22.49	22.05	23.50
	1 (RB_Pos:25)	23.21	23.27	23.09	24.50	22.04	22.53	21.98	23.50
	1 (RB_Pos:49)	23.34	23.43	23.16	24.50	22.12	22.43	21.91	23.50
	25 (RB_Pos:0)	22.28	22.28	22.19	23.50	21.30	21.29	21.19	22.50
	25 (RB_Pos:12)	22.28	22.38	22.10	23.50	21.23	21.27	21.15	22.50
	25 (RB_Pos:25)	22.33	22.35	22.07	23.50	21.32	21.26	21.10	22.50
	50 (RB_Pos:0)	22.36	22.40	22.12	23.50	21.36	21.27	21.13	22.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20425	20525	20625		20425	20525	20625	
5 MHz	1 (RB_Pos:0)	23.29	23.29	23.02	24.50	22.26	22.54	21.92	23.50
	1 (RB_Pos:13)	23.25	23.26	23.06	24.50	22.28	22.49	21.86	23.50
	1 (RB_Pos:24)	23.19	23.12	23.00	24.50	22.21	22.42	21.88	23.50
	12 (RB_Pos:0)	22.26	22.16	22.04	23.50	21.24	21.15	20.93	22.50
	12 (RB_Pos:6)	22.23	22.20	22.04	23.50	21.23	21.26	20.85	22.50
	12 (RB_Pos:13)	22.22	22.20	22.03	23.50	21.18	21.20	20.90	22.50
	25 (RB_Pos:0)	22.17	22.15	21.96	23.50	21.15	21.14	20.73	22.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20415	20525	20635		20415	20525	20635	
3.0 MHz	1 (RB_Pos:0)	22.97	22.99	22.80	24.50	21.92	22.34	21.77	23.50
	1 (RB_Pos:8)	22.94	22.92	22.74	24.50	21.95	22.28	21.73	23.50
	1 (RB_Pos:14)	22.90	22.81	22.72	24.50	21.89	22.23	21.68	23.50
	8 (RB_Pos:0)	22.01	22.00	21.71	23.50	21.25	21.13	20.89	22.50
	8 (RB_Pos:3)	22.02	22.01	21.76	23.50	21.23	21.13	20.89	22.50
	8 (RB_Pos:7)	21.99	21.98	21.70	23.50	21.19	21.16	20.89	22.50
	15 (RB_Pos:0)	21.97	21.94	21.69	23.50	21.14	21.08	20.72	22.50
Bandwidth	RB Set	Power (dBm)							

(MHz)	Channel	QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
		20407	20525	20643		20407	20525	20643	
1.4 MHz	1 (RB_Pos:0)	23.25	23.22	23.09	24.50	22.05	22.29	21.68	23.50
	1 (RB_Pos:3)	23.15	23.15	23.03	24.50	22.14	22.33	21.73	23.50
	1 (RB_Pos:5)	23.10	23.07	22.98	24.50	22.02	22.26	21.72	23.50
	3 (RB_Pos:0)	22.91	22.86	22.65	23.50	22.07	22.04	21.76	23.50
	3 (RB_Pos:1)	22.97	22.89	22.72	23.50	22.06	22.14	21.78	23.50
	3 (RB_Pos:3)	22.92	22.87	22.64	23.50	22.10	22.10	21.79	23.50
	6 (RB_Pos:0)	22.25	22.21	21.95	23.50	21.20	20.92	20.95	22.50

8.3.4 LTE Band 7

FDD LTE Band 7(UAT)									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20850	21100	21350		20850	21100	21350	
20 MHz	1 (RB_Pos:0)	13.55	13.71	13.59	14.00	13.60	13.53	13.51	14.00
	1 (RB_Pos:50)	13.44	13.46	13.62	14.00	13.42	13.42	13.55	14.00
	1 (RB_Pos:99)	13.43	13.61	13.61	14.00	13.48	13.49	13.51	14.00
	50 (RB_Pos:0)	13.42	13.41	13.29	14.00	13.07	13.09	13.13	14.00
	50 (RB_Pos:25)	13.38	13.51	13.24	14.00	12.98	13.11	13.12	14.00
	50 (RB_Pos:50)	13.36	13.41	13.58	14.00	13.05	13.03	13.20	14.00
	100 (RB_Pos:0)	13.33	13.46	13.34	14.00	13.02	13.05	13.11	14.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20825	21100	21375		20825	21100	21375	
15 MHz	1 (RB_Pos:0)	13.42	13.47	13.54	14.00	13.01	13.48	13.56	14.00
	1 (RB_Pos:38)	13.39	13.41	13.33	14.00	12.97	13.39	13.66	14.00
	1 (RB_Pos:74)	13.37	13.47	13.56	14.00	12.90	13.40	13.54	14.00
	36 (RB_Pos:0)	13.47	13.43	13.52	14.00	13.15	13.19	13.14	14.00
	36 (RB_Pos:20)	13.51	13.45	13.56	14.00	13.11	13.20	13.19	14.00
	36 (RB_Pos:39)	13.42	13.40	13.57	14.00	13.09	13.12	13.20	14.00
	75 (RB_Pos:0)	13.37	13.35	13.46	14.00	13.05	13.11	13.09	14.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20800	21100	21400		20800	21100	21400	
10 MHz	1 (RB_Pos:0)	13.40	13.43	13.56	14.00	13.02	13.41	13.24	14.00
	1 (RB_Pos:25)	13.36	13.34	13.57	14.00	12.94	13.34	13.16	14.00
	1 (RB_Pos:49)	13.41	13.35	13.58	14.00	12.92	13.34	13.18	14.00
	25 (RB_Pos:0)	13.46	13.41	13.59	14.00	13.12	13.08	13.36	14.00

	25 (RB_Pos:12)	13.50	13.44	13.33	14.00	13.10	13.12	13.33	14.00
	25 (RB_Pos:25)	13.47	13.39	13.59	14.00	13.06	13.07	13.28	14.00
	50 (RB_Pos:0)	13.38	13.38	13.59	14.00	13.03	13.05	13.23	14.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20775	21100	21425		20775	21100	21425	
5 MHz	1 (RB_Pos:0)	13.41	13.42	13.57	14.00	13.24	13.52	13.31	14.00
	1 (RB_Pos:13)	13.49	13.43	13.60	14.00	13.28	13.59	13.32	14.00
	1 (RB_Pos:24)	13.42	13.38	13.53	14.00	13.21	13.50	13.28	14.00
	12 (RB_Pos:0)	13.47	13.43	13.56	14.00	13.14	13.22	13.24	14.00
	12 (RB_Pos:6)	13.46	13.43	13.33	14.00	13.19	13.22	13.26	14.00
	12 (RB_Pos:13)	13.42	13.40	13.56	14.00	13.16	13.18	13.20	14.00
	25 (RB_Pos:0)	13.41	13.37	13.57	14.00	13.08	13.10	13.12	14.00

FDD LTE Band 7(DAT)									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20850	21100	21350		20850	21100	21350	
20 MHz	1 (RB_Pos:0)	22.98	23.09	22.96	24.00	22.44	22.37	22.36	23.00
	1 (RB_Pos:50)	22.94	22.90	22.95	24.00	22.37	22.35	22.45	23.00
	1 (RB_Pos:99)	22.90	22.96	22.93	24.00	22.43	22.37	22.35	23.00
	50 (RB_Pos:0)	21.88	21.90	21.88	23.00	20.89	21.02	21.06	22.00
	50 (RB_Pos:25)	21.87	21.98	21.94	23.00	20.88	21.02	21.02	22.00
	50 (RB_Pos:50)	21.85	21.86	21.89	23.00	20.85	20.95	21.08	22.00
	100 (RB_Pos:0)	21.87	21.90	21.85	23.00	20.88	20.95	21.04	22.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20825	21100	21375		20825	21100	21375	
15 MHz	1 (RB_Pos:0)	22.96	22.92	23.00	24.00	21.87	22.38	22.41	23.00
	1 (RB_Pos:38)	22.96	22.86	22.89	24.00	21.85	22.31	22.38	23.00
	1 (RB_Pos:74)	22.92	22.96	23.00	24.00	21.81	22.35	22.30	23.00
	36 (RB_Pos:0)	21.93	21.89	21.92	23.00	20.97	21.05	21.00	22.00
	36 (RB_Pos:20)	21.94	21.91	21.92	23.00	20.99	21.04	21.00	22.00
	36 (RB_Pos:39)	21.92	21.90	22.02	23.00	20.95	20.99	21.03	22.00
	75 (RB_Pos:0)	21.87	21.84	21.90	23.00	20.94	21.01	21.04	22.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20800	21100	21400		20800	21100	21400	
10 MHz	1 (RB_Pos:0)	22.99	22.87	22.89	24.00	21.87	22.29	22.07	23.00
	1 (RB_Pos:25)	22.93	22.86	23.01	24.00	21.82	22.26	22.01	23.00
	1 (RB_Pos:49)	22.99	22.82	22.99	24.00	21.83	22.27	21.96	23.00

	25 (RB_Pos:0)	21.95	21.94	22.01	23.00	20.93	21.04	21.23	22.00
	25 (RB_Pos:12)	21.99	21.93	22.01	23.00	20.96	21.04	21.21	22.00
	25 (RB_Pos:25)	21.90	21.89	21.99	23.00	20.93	21.02	21.17	22.00
	50 (RB_Pos:0)	21.88	21.92	22.05	23.00	20.85	20.96	21.14	22.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20775	21100	21425		20775	21100	21425	
5 MHz	1 (RB_Pos:0)	22.98	22.85	22.91	24.00	22.45	22.06	22.16	23.00
	1 (RB_Pos:13)	23.02	22.92	23.03	24.00	22.49	22.12	22.20	23.00
	1 (RB_Pos:24)	22.97	22.84	22.95	24.00	22.45	22.02	22.14	23.00
	12 (RB_Pos:0)	21.93	21.91	22.01	23.00	21.09	21.07	21.15	22.00
	12 (RB_Pos:6)	21.97	21.94	22.02	23.00	21.12	21.06	21.18	22.00
	12 (RB_Pos:13)	21.91	21.94	21.99	23.00	21.06	21.04	21.13	22.00
	25 (RB_Pos:0)	21.92	21.92	21.98	23.00	20.99	20.95	21.09	22.00

8.3.5 LTE Band 38

TDD LTE Band 38(UAT)									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37850	38000	38150		37850	38000	38150	
20 MHz	1 (RB_Pos:0)	15.54	15.76	15.52	16.50	15.44	15.35	15.60	16.50
	1 (RB_Pos:50)	15.48	15.51	15.45	16.50	15.33	15.28	15.54	16.50
	1 (RB_Pos:99)	15.60	15.53	15.47	16.50	15.43	15.37	15.55	16.50
	50 (RB_Pos:0)	15.57	15.49	15.44	16.50	15.15	15.20	15.22	16.50
	50 (RB_Pos:25)	15.54	15.60	15.44	16.50	15.12	15.20	15.25	16.50
	50 (RB_Pos:50)	15.49	15.55	15.41	16.50	15.18	15.18	15.20	16.50
	100 (RB_Pos:0)	15.56	15.60	15.40	16.50	15.21	15.18	15.15	16.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37825	38000	38175		37825	38000	38175	
15 MHz	1 (RB_Pos:0)	15.53	15.53	15.61	16.50	15.45	15.67	15.52	16.50
	1 (RB_Pos:38)	15.49	15.49	15.58	16.50	15.40	15.63	15.48	16.50
	1 (RB_Pos:74)	15.43	15.47	15.51	16.50	15.34	15.58	15.44	16.50
	36 (RB_Pos:0)	15.56	15.50	15.56	16.50	15.21	15.28	15.23	16.50
	36 (RB_Pos:20)	15.52	15.56	15.57	16.50	15.21	15.27	15.25	16.50
	36 (RB_Pos:39)	15.51	15.47	15.52	16.50	15.19	15.26	15.21	16.50
	75 (RB_Pos:0)	15.48	15.48	15.50	16.50	15.21	15.25	15.18	16.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit	16QAM			Tune up limit
	Channel	37800	38000	38200		37800	38000	38200	

					(dBm)				(dBm)
10 MHz	1 (RB_Pos:0)	15.47	15.46	15.53	16.50	15.39	15.59	15.55	16.50
	1 (RB_Pos:25)	15.43	15.43	15.45	16.50	15.33	15.56	15.43	16.50
	1 (RB_Pos:49)	15.44	15.43	15.49	16.50	15.36	15.55	15.51	16.50
	25 (RB_Pos:0)	15.54	15.54	15.56	16.50	15.18	15.21	15.22	16.50
	25 (RB_Pos:12)	15.55	15.53	15.57	16.50	15.22	15.29	15.25	16.50
	25 (RB_Pos:25)	15.55	15.48	15.54	16.50	15.18	15.24	15.21	16.50
	50 (RB_Pos:0)	15.49	15.45	15.52	16.50	15.15	15.24	15.22	16.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37775	38000	38225		37775	38000	38225	
5 MHz	1 (RB_Pos:0)	15.50	15.56	15.44	16.50	15.45	15.56	15.35	16.50
	1 (RB_Pos:13)	15.56	15.62	15.46	16.50	15.44	15.59	15.39	16.50
	1 (RB_Pos:24)	15.52	15.57	15.40	16.50	15.39	15.60	15.33	16.50
	12 (RB_Pos:0)	15.54	15.64	15.52	16.50	15.19	15.30	15.19	16.50
	12 (RB_Pos:6)	15.56	15.64	15.58	16.50	15.22	15.40	15.26	16.50
	12 (RB_Pos:13)	15.55	15.60	15.53	16.50	15.21	15.36	15.22	16.50
	25 (RB_Pos:0)	15.51	15.57	15.51	16.50	15.19	15.26	15.17	16.50

TDD LTE Band 38(DAT)									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37850	38000	38150		37850	38000	38150	
20 MHz	1 (RB_Pos:0)	23.54	23.57	23.53	24.50	22.78	22.70	22.88	23.50
	1 (RB_Pos:50)	23.48	23.48	23.47	24.50	22.71	22.66	22.83	23.50
	1 (RB_Pos:99)	23.56	23.43	23.44	24.50	22.81	22.64	22.82	23.50
	50 (RB_Pos:0)	22.43	22.47	22.38	23.50	21.48	21.53	21.50	22.50
	50 (RB_Pos:25)	22.44	22.49	22.37	23.50	21.50	21.56	21.49	22.50
	50 (RB_Pos:50)	22.42	22.44	22.35	23.50	21.52	21.53	21.44	22.50
	100 (RB_Pos:0)	22.50	22.52	22.39	23.50	21.54	21.53	21.46	22.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37825	38000	38175		37825	38000	38175	
15 MHz	1 (RB_Pos:0)	23.50	23.54	23.53	24.50	22.74	22.89	22.80	23.50
	1 (RB_Pos:38)	23.44	23.51	23.47	24.50	22.70	22.90	22.78	23.50
	1 (RB_Pos:74)	23.40	23.46	23.36	24.50	22.62	22.86	22.70	23.50
	36 (RB_Pos:0)	22.50	22.46	22.37	23.50	21.54	21.55	21.48	22.50
	36 (RB_Pos:20)	22.47	22.52	22.42	23.50	21.57	21.55	21.54	22.50
	36 (RB_Pos:39)	22.42	22.45	22.29	23.50	21.51	21.48	21.45	22.50
	75 (RB_Pos:0)	22.42	22.45	22.38	23.50	21.53	21.51	21.45	22.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up	16QAM			Tune up

	Channel	37800	38000	38200	limit (dBm)	37800	38000	38200	limit (dBm)
10 MHz	1 (RB_Pos:0)	23.45	23.48	23.43	24.50	22.68	22.86	22.81	23.50
	1 (RB_Pos:25)	23.37	23.41	23.36	24.50	22.63	22.83	22.70	23.50
	1 (RB_Pos:49)	23.39	23.42	23.36	24.50	22.66	22.82	22.71	23.50
	25 (RB_Pos:0)	22.46	22.44	22.37	23.50	21.47	21.51	21.47	22.50
	25 (RB_Pos:12)	22.43	22.44	22.34	23.50	21.50	21.50	21.50	22.50
	25 (RB_Pos:25)	22.41	22.41	22.33	23.50	21.47	21.46	21.44	22.50
	50 (RB_Pos:0)	22.42	22.44	22.29	23.50	21.44	21.48	21.49	22.50
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37775	38000	38225		37775	38000	38225	
5 MHz	1 (RB_Pos:0)	23.49	23.42	23.34	24.50	22.77	22.69	22.64	23.50
	1 (RB_Pos:13)	23.55	23.49	23.42	24.50	22.84	22.69	22.73	23.50
	1 (RB_Pos:24)	23.52	23.44	23.33	24.50	22.82	22.68	22.62	23.50
	12 (RB_Pos:0)	22.44	22.48	22.36	23.50	21.55	21.52	21.39	22.50
	12 (RB_Pos:6)	22.47	22.42	22.26	23.50	21.55	21.59	21.33	22.50
	12 (RB_Pos:13)	22.42	22.42	22.30	23.50	21.55	21.55	21.34	22.50
	25 (RB_Pos:0)	22.40	22.38	22.24	23.50	21.49	21.49	21.35	22.50

8.4 WIFI

8.4.1 2.4G WIFI

Band (GHz)	Mode	Channel	Freq. (MHz)	Conducted Power (dBm)	Tune-up Limit (dBm)
2.4 (2.4~2.4835)	802.11b	1	2412	18.89	20.00
		6	2437	19.62	20.00
		11	2462	18.63	20.00
	802.11g	1	2412	17.47	18.50
		6	2437	18.34	18.50
		11	2462	16.38	17.50
	802.11n(HT20)	1	2412	17.35	18.50
		6	2437	18.26	18.50
		11	2462	15.21	16.50

8.4.2 5G WIFI

Band (GHz)	Mode	Channel	Freq. (MHz)	Conducted Power (dBm)	Tune-up Limit (dBm)
5.2 (5.15~5.25)	802.11a	36	5180	16.81	18.00
		44	5220	16.86	18.00
		48	5240	16.94	18.00
	802.11n(HT20)	36	5180	16.77	18.00
		44	5220	16.84	18.00
		48	5240	16.89	18.00
	802.11n(HT40)	38	5190	12.68	13.50
		46	5230	12.78	13.50
	802.11ac(VHT20)	36	5180	17.82	19.00
		44	5220	17.77	19.00
		48	5240	17.79	19.00
	802.11ac(VHT40)	38	5190	13.13	14.50
		46	5230	13.16	14.50
	802.11ac(VHT80)	42	5210	12.58	13.50
5.3 (5.25~5.35)	802.11a	52	5260	17.26	18.00
		60	5300	17.66	18.00
		64	5320	17.93	18.00
	802.11n(HT20)	52	5260	17.16	18.00
		60	5300	17.63	18.00
		64	5320	17.90	18.00
	802.11n(HT40)	54	5270	12.86	13.50
		62	5310	13.11	13.50
	802.11ac(VHT20)	52	5260	17.87	19.00
		60	5300	18.46	19.00
		64	5320	18.78	19.00
	802.11ac(VHT40)	54	5270	13.77	14.50
		62	5310	14.15	14.50
	802.11ac(VHT80)	58	5290	12.85	13.50
5.6 (5.47~5.725)	802.11a	100	5500	12.32	13.00
		116	5580	12.90	13.00
		140	5700	12.95	13.00
		144	5720	12.93	13.00
	802.11n(HT20)	100	5500	12.27	13.00
		116	5580	12.83	13.00
		140	5700	12.90	13.00
		144	5720	12.76	13.00
	802.11n(HT40)	102	5510	12.73	13.50
		118	5590	13.25	13.50

		134	5670	13.34	13.50
		142	5710	13.12	13.50
	802.11ac(VHT20)	100	5500	11.90	13.00
		116	5580	12.55	13.00
		140	5700	12.77	13.00
		144	5720	12.62	13.00
	802.11ac(VHT40)	102	5510	12.48	13.50
		118	5590	13.03	13.50
		134	5670	13.24	13.50
		142	5710	13.21	13.50
	802.11ac(VHT80)	106	5530	12.55	13.50
		122	5610	13.37	13.50
		138	5690	13.30	13.50
5.8 (5.725~5.850)	802.11a	149	5745	12.80	13.00
		157	5785	12.49	13.00
		165	5825	12.78	13.00
	802.11n(HT20)	149	5745	12.53	13.00
		157	5785	12.20	13.00
		165	5825	12.65	13.00
	802.11n(HT40)	151	5755	12.79	13.50
		159	5795	12.87	13.50
	802.11ac(VHT20)	149	5745	12.52	13.00
		157	5785	12.24	13.00
		165	5825	12.69	13.00
	802.11ac(VHT40)	151	5755	13.01	13.50
		159	5795	12.85	13.50
	802.11ac(VHT80)	155	5775	12.59	13.50

8.5 Bluetooth

Mode	GFSK			$\pi/4$ -DQPSK		
Channel	0	39	78	0	39	78
Frequency (MHz)	2402	2441	2480	2402	2441	2480
Average Power (dBm)	11.18	11.99	11.49	10.92	11.57	11.22
Tune-Up Limit (dBm)	12.50			12.50		
Mode	8-DPSK			/		
Channel	0	39	78	/	/	/
Frequency (MHz)	2402	2441	2480	/	/	/
Average Power (dBm)	11.11	11.81	11.36	/	/	/
Tune-Up Limit (dBm)	12.50			/		
Mode	BLE (1Mbps)			BLE (2Mbps)		
Channel	0	19	39	0	19	39
Frequency (MHz)	2402	2440	2480	2402	2440	2480
Average Power (dBm)	1.92	2.77	4.69	1.88	2.38	4.77
Tune-Up Limit (dBm)	5.00			5.00		

9 LOW-POWER EXEMPTION

9.1 Tune-up Power

Mode	Antenna	Tune-up Limit power(dBm)
GSM 850	UAT	33.50
	DAT	33.50
EGPRS 850	UAT	27.50
	DAT	27.50
GSM 1900	UAT	24.50
	DAT	30.50
EGPRS 1900	UAT	20.50
	DAT	26.50
WCDMA Band2	UAT	16.00
	DAT	23.00
WCDMABand2 HSPA	UAT	15.00
	DAT	22.00
WCDMA Band4	UAT	16.00
	DAT	22.50
WCDMABand4HSPA	UAT	15.00
	DAT	21.50
WCDMA Band5	UAT	24.00
	DAT	24.00
WCDMABand5 HSPA	UAT	23.00
	DAT	23.00
LTE Band2	UAT	16.00
	DAT	23.00
LTE Band4	UAT	16.00
	DAT	22.50
LTE Band5	UAT	24.50
	DAT	24.50
LTE Band7	UAT	14.00
	DAT	24.00
LTE Band38	UAT	16.50
	DAT	24.50

Mode	Tune-up Power (dBm)
2.4G WLAN 802.11b	20.00
2.4G WLAN 802.11g	18.50
2.4G WLAN 802.11n20	18.50
5G WLAN 802.11a	18.00
5G WLAN 802.11n20	18.00
5G WLAN 802.11n40	13.50
5G WLAN 802.11ac20	19.00
5G WLAN 802.11ac40	14.50
5G WLAN 802.11ac80	13.50
Note: According to ANSI C63.19 2011, for 2.4GHz or 5GHz WLAN RF emissions testing exemption shall be applied to an RF air interface technology in a device whose peak antenna input power, averaged over intervals $\leq 50 \mu s$ 20, is ≤ 23 dBm.	

9.2 RF Emissions Lower Power Exemption

Mode	Antenna	Tune-up Limit power(dBm)	MIF	Power + MIF(dB)	C63.19 Test Required?
GSM 850	UAT	33.50	3.63	37.13	Yes
	DAT	33.50	3.63	37.13	Yes
EGPRS 850	UAT	27.50	3.75	31.25	Yes ²
	DAT	27.50	3.75	31.25	Yes ²
GSM 1900	UAT	24.50	3.63	28.13	Yes
	DAT	30.50	3.63	34.13	Yes
EGPRS 1900	UAT	20.50	3.75	24.25	Yes ²
	DAT	26.50	3.75	30.25	Yes ²
WCDMA Band2	UAT	16.00	-25.43	-9.43	No
	DAT	23.00	-25.43	-2.43	No
WCDMABand2HSPA	UAT	15.00	-20.39	-5.39	No
	DAT	22.00	-20.39	1.61	No
WCDMA Band4	UAT	16.00	-25.43	-9.43	No
	DAT	22.50	-25.43	-2.93	No
WCDMABand4HSPA	UAT	15.00	-20.39	-5.39	No
	DAT	21.50	-20.39	1.11	No
WCDMA Band5	UAT	24.00	-25.43	-1.43	No
	DAT	24.00	-25.43	-1.43	No
WCDMABand5HSPA	UAT	23.00	-20.39	2.61	No
	DAT	23.00	-20.39	2.61	No
LTE Band2	UAT	23.00	-9.76	13.24	No
	DAT	16.00	-9.76	6.24	No
LTE Band4	UAT	22.50	-9.76	12.74	No
	DAT	16.00	-9.76	6.24	No
LTE Band5	UAT	24.50	-9.76	14.74	No
	DAT	24.50	-9.76	14.74	No
LTE Band7	UAT	14.00	-9.76	4.24	No
	DAT	24.00	-9.76	14.24	No
LTE Band38	UAT	16.50	-1.62	14.88	No
	DAT	24.50	-1.62	22.88	Yes

Note1: According to ANSI C63.19 2011-version, for the air interface technology of a device is exempt from testing when its average antenna input power plus its MIF is ≤ 17 dBm for any of its operating modes.

Note2: EGPRS data modes is not necessary due the GSM Voice mode is the worst case.

Note3: HAC RF rating is M4 for the air interface which meets the low power exemption.

10 HAC RF EMISSION Test Results

10.1 E-Filled Emission Test Results

Band	Mode	Antenna	Ch.	Freq. (MHz)	Peak E-Field (dB(V/m))	M-Rating	Meas. No.
GSM 850	Voice	UAT	128	824.20	33.20	M4	1#
			190	836.60	35.23	M4	2#
			251	848.80	37.23	M4	3#
GSM 850	Voice	DAT	128	824.20	31.39	M4	4#
			190	836.60	33.40	M4	5#
			251	848.80	33.31	M4	6#
GSM 1900	Voice	UAT	512	1850.20	28.54	M4	7#
			661	1880.00	30.63	M3	8#
			810	1909.80	30.79	M3	9#
GSM 1900	Voice	DAT	512	1850.20	24.73	M4	10#
			661	1880.00	26.34	M4	11#
			810	1909.80	25.81	M4	12#
LTE Band 38	QPSK	DAT	37850	2580.00	21.62	M4	13#
			38000	2595.00	21.69	M4	14#
			38150	2610.00	21.62	M4	15#

11 TEST EQUIPMENTS LIST

Description	Manufacturer	Model	Serial No./Version	Cal. Date	Cal. Due
PC	Dell	N/A	N/A	N/A	N/A
800-950MHz Dipole	SATIMO	SIDB835	SN 18/12 DHA41	2019/11/16	2020/11/15
1700-2000MHz Dipole	SATIMO	SIDB1900	SN 18/12 DHB46	2019/11/16	2020/11/15
2100-2600MHZ Dipole	SATIMO	SIDB2450	SN 18/12 DHB48	2019/11/16	2020/11/15
E-Field Probe	SATIMO	SCE	SN 24/13 EPH41	2019/11/16	2020/11/15
Antenna	SATIMO	ANTA3	SN 17/13 ZNTA45	N/A	N/A
MultiMeter	Keithley	MultiMeter 2000	4024022	2020/06/11	2021/06/10
Signal Generator	R&S	SMB100A	177746	2020/06/08	2021/06/07
Power Meter	R&S	NRVD-B2	7250BJ-0112/2011	2019/10/30	2020/10/29
Power Sensor	R&S	NRV-Z4	100381	2019/10/30	2020/10/29
Power Sensor	R&S	NRV-Z2	100211	2019/10/30	2020/10/29
Wireless Communication Test Set	Agilent	8960-E5515C	MY47510286	2020/06/08	2021/06/07
Wireless Communication Test Set	R&S	CMW 500	151885	2020/06/08	2021/06/07
Directional coupler	AA-MCS	AAMCS-UDC	000272	N/A	N/A

ANNEX A HAC TEST RESULT OF SYSTEM VERIFICATION

E-Field System Check Data(835MHz)

Experimental conditions.

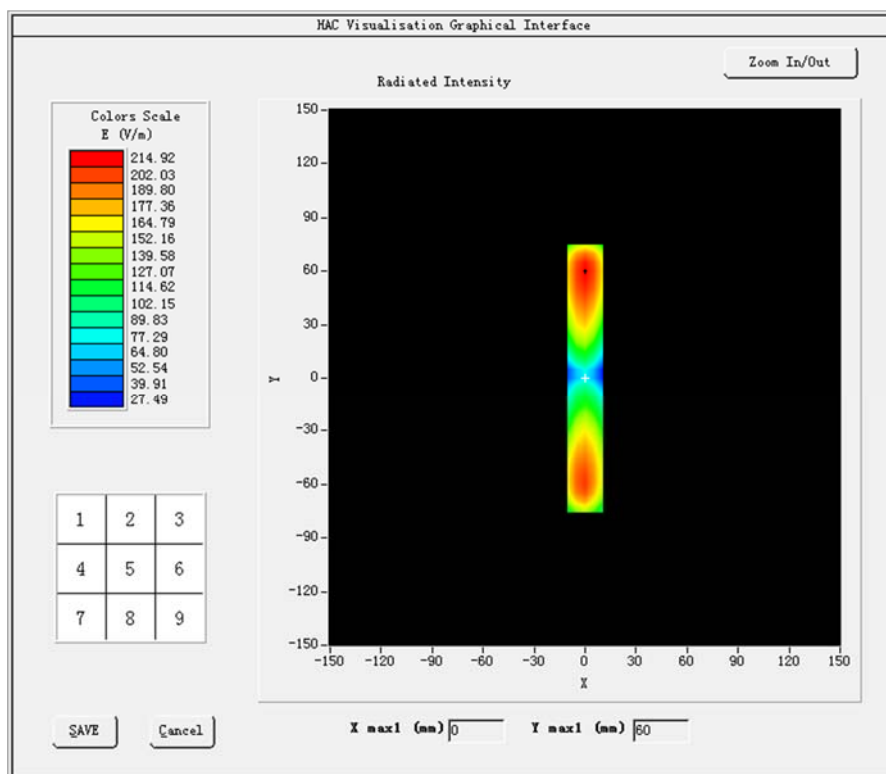
Grid size (mm x mm)	20.0, 150.0
Step (mm)	5
Band	835MHz
Channel	
Signal	CW
Date of measurement	18/9/2020

HAC Measurement Results

Frequency (MHz): 835.000000

Maximum value of total field = 214.92 V/m

SURFACE E-Field



E-Filed System Check Data (1900MHz)

Experimental conditions

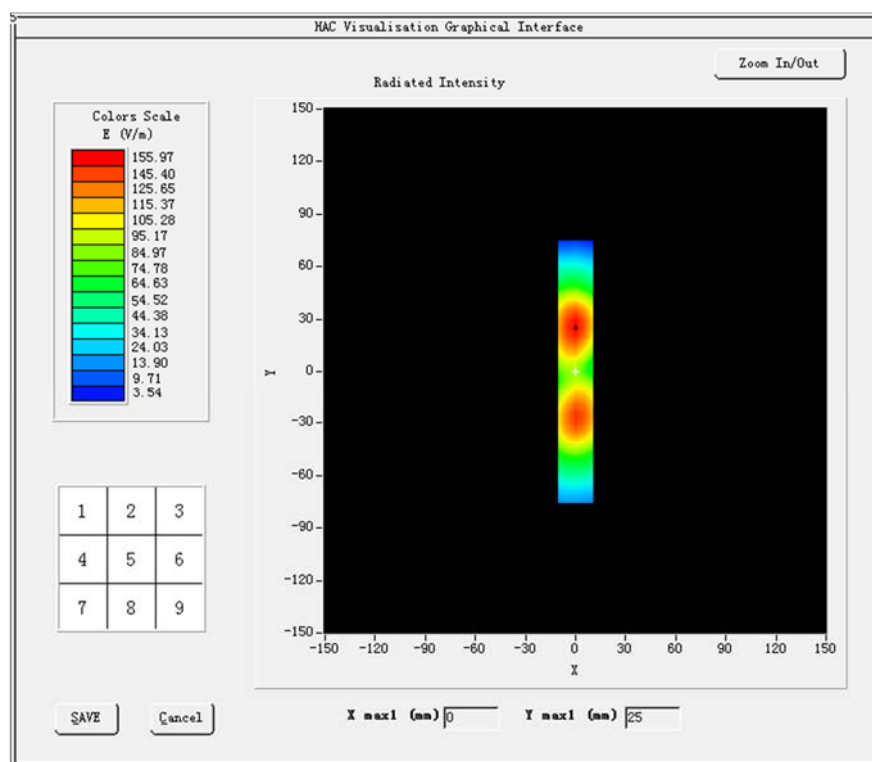
Grid size (mm x mm)	20.0, 150.0
Step (mm)	5
Band	1900 MHz
Channel	
Signal	CW
Date of measurement	19/9/2020

HAC Measurement Results

Frequency (MHz): 1900.000000

Maximum value of total field = 155.97 V/m

SURFACE HAC



E-Filed System Check Data (2450MHz)

Experimental conditions

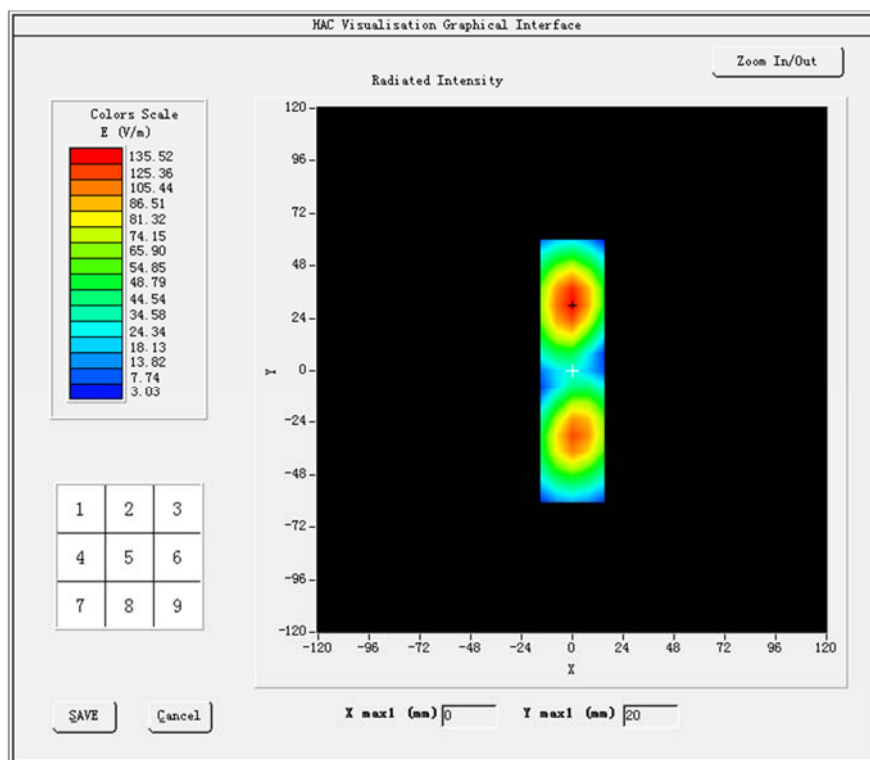
Grid size (mm x mm)	20.0, 80.0
Step (mm)	5
Band	2450 MHz
Channel	
Signal	CW
Date of measurement	21/9/2020

HAC Measurement Results

Frequency (MHz): 2450.000000

Maximum value of total field = 135.52 V/m

SURFACE HAC



ANNEX B HAC RF MEASUREMENT RESULT

MEASUREMENT 1

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM850
Channel	Low
Signal	GSM
Date of measurement	09/18/2020

HAC Measurement Results

Lower Band (Channel 128):

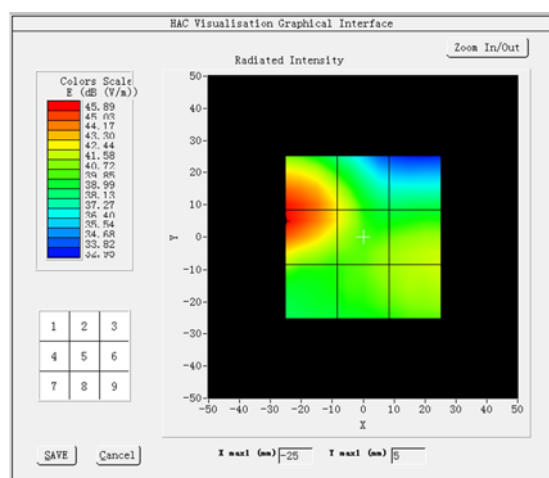
Frequency (MHz): 824.200000

Maximum value of total field = 33.20 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 36.57	Grid 2: 33.04	Grid 3: 29.54
Grid 4: 36.88	Grid 5: 33.20	Grid 6: 32.64
Grid 7: 32.09	Grid 8: 32.02	Grid 9: 32.63

MEASUREMENT 2

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM850
Channel	Middle
Signal	GSM
Date of measurement	09/18/2020

HAC Measurement Results

Middle Band (Channel 190):

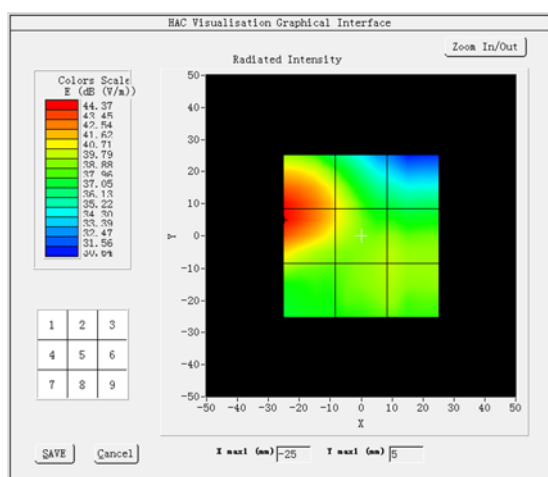
Frequency (MHz): 836.600000

Maximum value of total field = 35.23 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 38.82	Grid 2: 35.11	Grid 3: 31.27
Grid 4: 39.03	Grid 5: 35.23	Grid 6: 34.16
Grid 7: 34.43	Grid 8: 34.15	Grid 9: 34.16

MEASUREMENT 3

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM850
Channel	High
Signal	GSM
Date of measurement	09/18/2020

HAC Measurement Results

Higher Band (Channel 251):

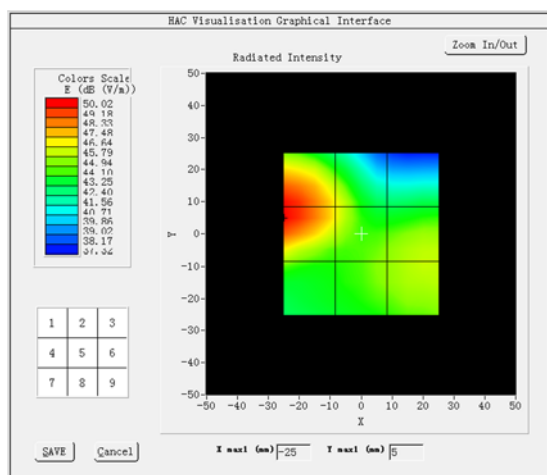
Frequency (MHz): 848.800000

Maximum value of total field = 37.23 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 40.80	Grid 2: 37.12	Grid 3: 33.85
Grid 4: 41.03	Grid 5: 37.23	Grid 6: 36.71
Grid 7: 36.23	Grid 8: 36.09	Grid 9: 36.73

MEASUREMENT 4

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM850
Channel	Low
Signal	GSM
Date of measurement	09/18/2020

HAC Measurement Results

Lower Band (Channel 128):

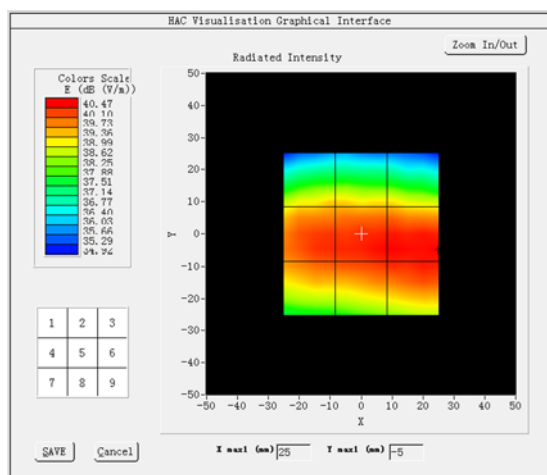
Frequency (MHz): 824.200000

Maximum value of total field = 31.39 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 30.15	Grid 2: 30.14	Grid 3: 30.01
Grid 4: 31.19	Grid 5: 31.39	Grid 6: 31.41
Grid 7: 31.02	Grid 8: 31.27	Grid 9: 31.32

MEASUREMENT 5

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM850
Channel	Middle
Signal	GSM
Date of measurement	09/18/2020

HAC Measurement Results

Middle Band (Channel 190):

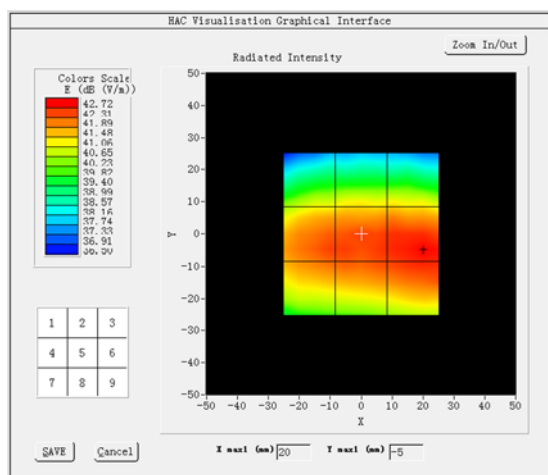
Frequency (MHz): 836.600000

Maximum value of total field = 33.40 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 31.73	Grid 2: 32.00	Grid 3: 31.96
Grid 4: 33.27	Grid 5: 33.40	Grid 6: 33.66
Grid 7: 33.12	Grid 8: 33.27	Grid 9: 33.52

MEASUREMENT 6

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM850
Channel	High
Signal	GSM
Date of measurement	09/18/2020

HAC Measurement Results

Higher Band (Channel 251):

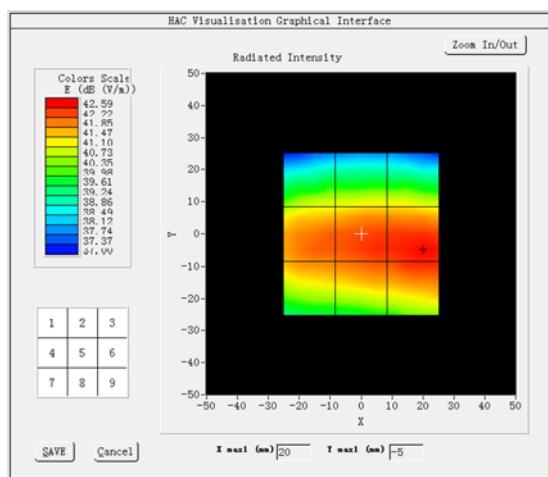
Frequency (MHz): 848.800000

Maximum value of total field = 33.31 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 31.74	Grid 2: 31.89	Grid 3: 31.89
Grid 4: 33.06	Grid 5: 33.31	Grid 6: 33.52
Grid 7: 32.84	Grid 8: 33.14	Grid 9: 33.41

MEASUREMENT 7

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM1900
Channel	Low
Signal	GSM
Date of measurement	09/19/2020

HAC Measurement Results

Lower Band (Channel 512):

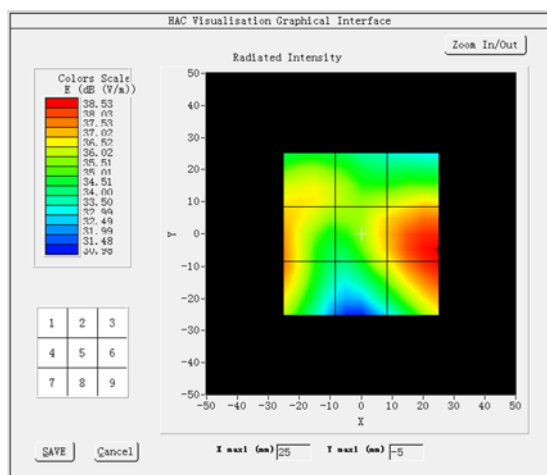
Frequency (MHz): 1850.200000

Maximum value of total field = 28.54 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 27.65	Grid 2: 27.06	Grid 3: 27.62
Grid 4: 28.49	Grid 5: 28.08	Grid 6: 29.54
Grid 7: 28.54	Grid 8: 27.59	Grid 9: 29.50

MEASUREMENT 8

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM1900
Channel	Middle
Signal	GSM
Date of measurement	09/19/2020

HAC Measurement Results

Middle Band (Channel 661):

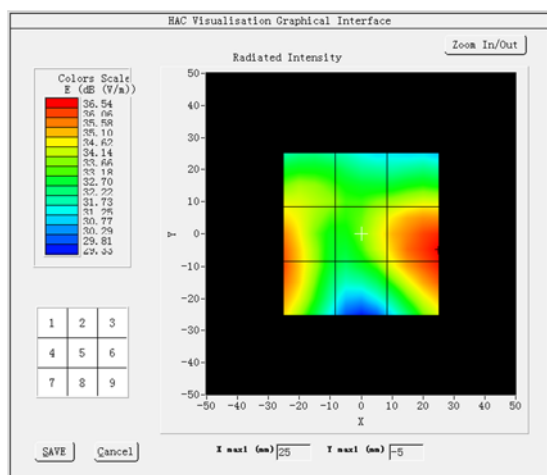
Frequency (MHz): 1880.000000

Maximum value of total field = 30.63 dB (V/m)

Hearing Aid Near-Field Category: M3

SURFACE HAC

E in dB (V/m)



Grid 1: 28.96	Grid 2: 28.45	Grid 3: 28.95
Grid 4: 30.55	Grid 5: 29.59	Grid 6: 31.17
Grid 7: 30.63	Grid 8: 29.11	Grid 9: 31.06

MEASUREMENT 9

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM1900
Channel	High
Signal	GSM
Date of measurement	09/19/2020

HAC Measurement Results

Higher Band (Channel 810):

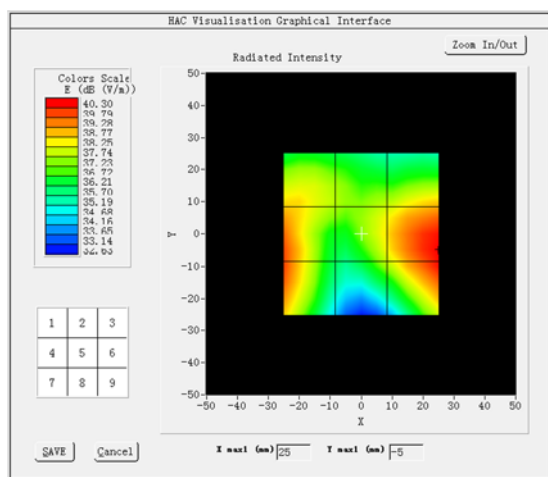
Frequency (MHz): 1909.800000

Maximum value of total field = 30.79 dB (V/m)

Hearing Aid Near-Field Category: M3

SURFACE HAC

E in dB (V/m)



Grid 1: 29.50	Grid 2: 28.58	Grid 3: 29.58
Grid 4: 30.77	Grid 5: 29.54	Grid 6: 31.29
Grid 7: 30.79	Grid 8: 28.94	Grid 9: 31.26

MEASUREMENT 10

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM1900
Channel	Low
Signal	GSM
Date of measurement	09/19/2020

HAC Measurement Results

Lower Band (Channel 512):

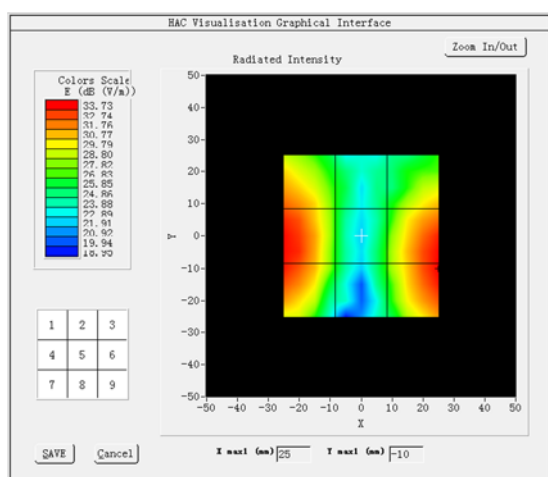
Frequency (MHz): 1850.200000

Maximum value of total field = 24.73 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 23.12	Grid 2: 17.37	Grid 3: 21.65
Grid 4: 24.62	Grid 5: 18.91	Grid 6: 24.70
Grid 7: 24.50	Grid 8: 18.91	Grid 9: 24.73

MEASUREMENT 11

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM1900
Channel	Middle
Signal	GSM
Date of measurement	09/19/2020

HAC Measurement Results

Middle Band (Channel 661):

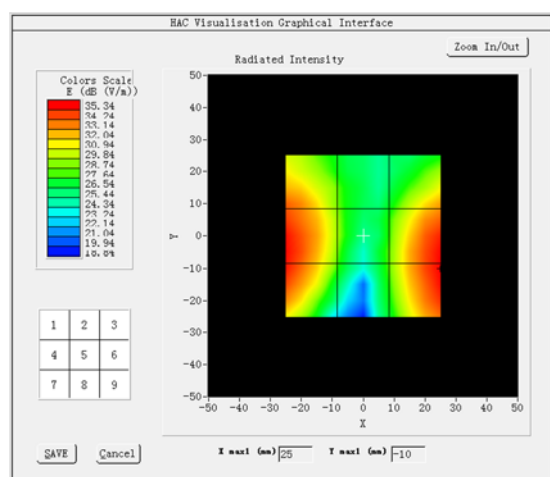
Frequency (MHz): 1880.000000

Maximum value of total field = 26.34 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 24.65	Grid 2: 18.98	Grid 3: 23.44
Grid 4: 26.23	Grid 5: 19.81	Grid 6: 26.31
Grid 7: 26.12	Grid 8: 19.82	Grid 9: 26.34

MEASUREMENT 12

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	GSM1900
Channel	High
Signal	GSM
Date of measurement	09/19/2020

HAC Measurement Results

Higher Band (Channel 810):

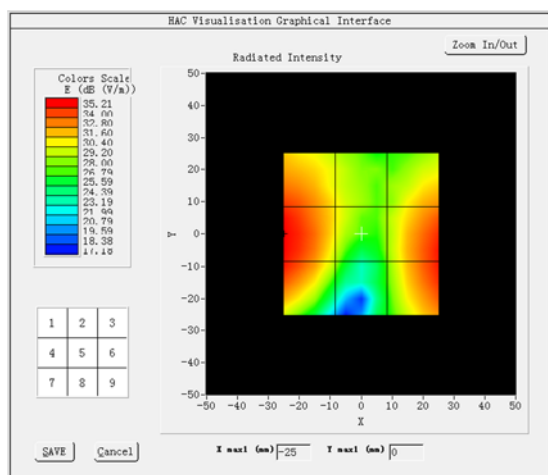
Frequency (MHz): 1909.800000

Maximum value of total field = 25.81 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 25.00	Grid 2: 21.03	Grid 3: 23.22
Grid 4: 26.21	Grid 5: 21.18	Grid 6: 25.81
Grid 7: 25.97	Grid 8: 19.23	Grid 9: 25.79

MEASUREMENT 13

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	LTE band 38
Channel	Low
Signal	LTE
Date of measurement	09/21/2020

HAC Measurement Results

Lower Band (Channel 37850):

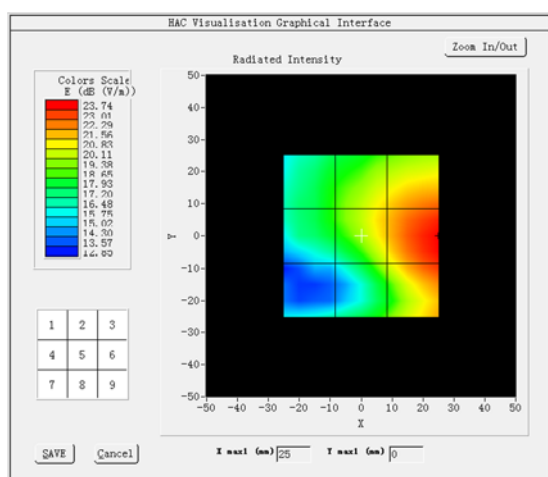
Frequency (MHz): 2580.000000

Maximum value of total field = 21.62 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 18.95	Grid 2: 21.23	Grid 3: 22.50
Grid 4: 18.97	Grid 5: 21.62	Grid 6: 23.76
Grid 7: 16.55	Grid 8: 20.55	Grid 9: 23.36

MEASUREMENT 14

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	LTE band 38
Channel	Middle
Signal	LTE
Date of measurement	09/21/2020

HAC Measurement Results

Middle Band (Channel 38000):

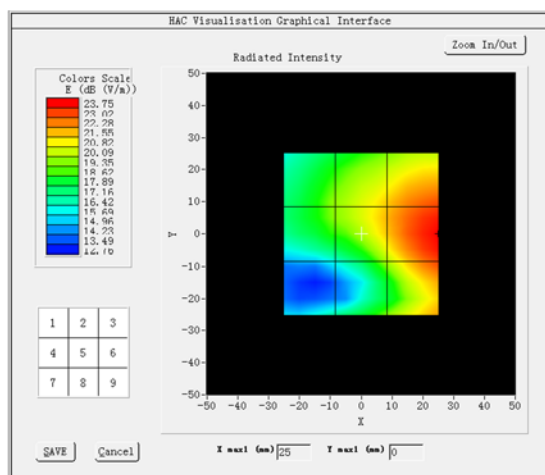
Frequency (MHz): 2595.000000

Maximum value of total field = 21.69 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 19.51	Grid 2: 21.38	Grid 3: 22.80
Grid 4: 19.54	Grid 5: 21.69	Grid 6: 23.75
Grid 7: 16.64	Grid 8: 20.07	Grid 9: 23.12

MEASUREMENT 15

Experimental conditions.

Grid size (mm x mm)	50.0, 50.0
Step (mm)	5
Band	LTE band 38
Channel	High
Signal	LTE
Date of measurement	09/21/2020

HAC Measurement Results

Higher Band (Channel 38150):

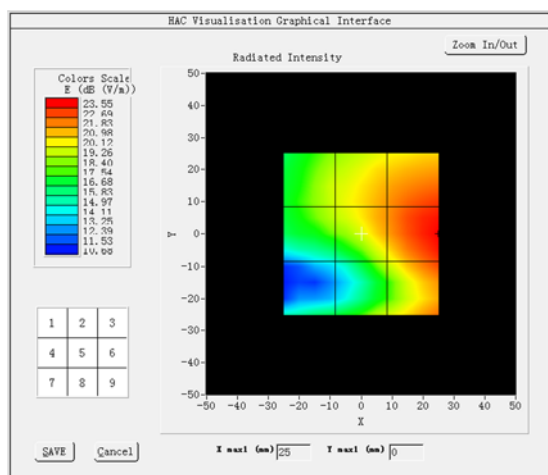
Frequency (MHz): 2610.000000

Maximum value of total field = 21.62 dB (V/m)

Hearing Aid Near-Field Category: M4

SURFACE HAC

E in dB (V/m)



Grid 1: 19.57	Grid 2: 21.52	Grid 3: 22.78
Grid 4: 19.50	Grid 5: 21.62	Grid 6: 23.55
Grid 7: 16.50	Grid 8: 19.78	Grid 9: 22.84

ANNEX C EUT EXTERNAL PHOTO

Please refer the document “BL-SZ2090180-AW. PDF”.

ANNEX D TEST SETUP PHOTO

Please refer the document “BL-SZ2090180-AS-2. PDF”.

ANNEX E CALIBRATION REPORT

Please refer the document “CALIBRATION REPORT_HAC.pdf”.

--END OF REPORT--