REPORT No.: SZ22080062S02

Hearing Aid Compatibility (HAC) RF Emission Test Report

APPLICANT	:	Reliance Communications LLC
PRODUCT NAME	:	Orbic Journey V
MODEL NAME	:	RC2210LPP, RC2210L
BRAND NAME	:	Orbic
FCC ID	:	2ABGH-RC2200L
STANDARD(S)	:	FCC 47 CFR Part 20(20.19) ANSI C63.19-2011
RECEIPT DATE	:	2022-08-04
TEST DATE	:	2022-08-08
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Edited by: Xie Yiyun (Rapporteur)

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DIRECTORY

Change History		
Version	Date	Reason for Change
1.0	2022-08-26	First edition

1. Technical Information

Note: Provide by Applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Reliance Communications LLC
Applicant Address:	1560 Fifth Ave Bay Shore, NY 11706
Manufacturer:	Unimaxcomm
Manufacturer Address:	35F,HBC HuiLong Center Building-II Minzhi Street,Longhua, Shenzhen, P.R. China 518110

1.2. Equipment under Test (EUT) Description

EUT Name:	Orbic Journey V
EUT No.:	3#
Hardware Version:	V1.1
Software Version:	ORB2210L_v1.1.2_BVZPP
Frequency Bands:	GSM 850: 824 MHz ~ 849 MHz GSM 1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 13: 777 MHz ~ 787 MHz WLAN 2.4GHz: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Modulation Mode:	GSM/GPRS: GMSK EDGE: 8PSK WCDMA: QPSK, 16QAM LTE: QPSK, 16QAM 802.11b: DSSS 802.11a/g/n-HT20: OFDM BR+EDR: GFSK(1Mbps), π/4-DQPSK(2Mbps), 8-DPSK(3Mbps) Bluetooth LE: GFSK
VoLTE Mode:	Support
SIM Cards Description:	GSM+WCDMA+LTE

Note:

1. This report was updated based on the original report FA912802A (by Sporton International (Shenzhen) Inc.), Model: RC2200L. The change under this application is to disable CDMA BC0/BC1 and enable UMTS B2/4/5 by software, the others RF features are the same as before. In addition, there is some basic information changed: Product name is Orbic Journey V and Orbic Journey, model number is RC2210L and RC2210LPP respectively. Therefore enable UMTS Band II/IV/V requires HAC RF measurements and its latest results will be recorded in this report. The other test results still refer to the test results in the original test report.
2. For more detailed description, please refer to specification or user manual supplied by the applicant and/or manufacturer.

1.3. Photographs of the EUT

Note: Please refer to the External Photos for the Photos of the EUT

1.4. Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method determination /Remark
FCC 47 CFR Part 20(20.19)	Hearing aid-compatible mobile handsets.	No deviation
ANSI C63.19-2011	American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids	No deviation
KDB 285076 D01v06	HAC Guidance	No deviation
Note 1: The test item is not applicable. **Note 2:** Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.		

2. RF Audio Interference Level

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. According to ANSI C63.19 2011 version, for acoustic coupling, the RF electric field emissions of wireless communication devices should be measured and rated according to the emission level as below.

Table 3.1 WD RF audio Interference level categories in logarithmic units

Emission Categories	E-field Emissions	
	＜960MHz	＞960MHz
M1	50 to 55 dB (V/m)	45 to 50 dB (V/m)
M2	45 to 50 dB (V/m)	35 to 40 dB (V/m)
M3	40 to 45 dB (V/m)	30 to 35 dB (V/m)
M4	＜40 dB (V/m)	＜30 dB (V/m)

Table 3.2 System performance classification table

System classification	Category sum Hearing aid category + telephone category
Usable	Hearing aid category + telephone category = 4
Normal use	Hearing aid category + telephone category = 5
Excellent performance	Hearing aid category + telephone category = ≥6

3. Air Interface and Operating Mode

Air Interface	Band	Transport Type	Simultaneous Transmitter	Name of Voice Service	Power Reduction
WCDMA (UMTS)	Band II	VO	N/A	CMRS Voice	No
	Band IV				No
	Band V				No

Where:
VO=Voice Only
DT=Digital Transport only
VD=CMRS and IP Voice Service over Digital Transport
BT=Bluetooth
* Ref Lev in accordance with 7.4.2.1 of ANSI C63.19-2011 and the July 2012 VoLTE interpretation
** Ref Lev −20 dBm0
*** Ref Lev XYNet established by KDB Inquiry NNNNNN @ −16 dBm0

Note:

1) Air Interface/Band MHz: List of all air interfaces and bands supported by the handset.

2) Type: For each air interface, indicate the type of voice transport mode:

i. VO = legacy Cellular Voice Service, from Table 7.1 in 7.4.2.1 of ANSI C63.19-2011;

ii. DT = Digital Transport only (no voice); and

iii. VD = IP Voice Service over Digital Transport.

3) Simultaneous Transmitter: Indicate any air interface/bands that operate in simultaneous or concurrent service transmission mode.

4) Name of Voice Service: See Q4 in 285076 D03 HAC FAQ for further clarification.

a) Ref Lev in accordance with 7.4.2.1 of ANSI C63.19-2011 and the July 2012 VoLTE interpretation

b) ** Ref Lev −20 dBm0

c) *** Ref Lev XYNet established by KDB Inquiry NNNNNN @ −16 dBm0

4. Modulation Interference Factor

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 Modulation Interference factor (MIF, in dB) is added to the measured average E-field (in dBV/m) and converts it to the RF Audio Interference level (in dBV/m). This level considers the audible amplitude modulation components in the RF E-field. CW fields without amplitude modulation are assumed to not interfere with the hearing aid electronics. Modulations without time slots and low fluctuations at low frequencies have low MIF values, TDMA modulations with narrow transmission and repetition rates of few 100 Hz have high MIF values and give similar classifications as ANSI C63.19-2011. ER3D, EF3D and EU2D E-field probes have a bandwidth <10 kHz and can therefore not evaluate the RF envelope in the full audio band. DASY52 is therefore using the indirect measurement method according to ANSI C63.19-2011 which is the primary method. These near field probes read the averaged E-field measurement. Especially for the new high peak-to-average (PAR) signal types, the probes shall be linearized by PMR calibration in order to not overestimate the field reading. Probe Modulation Response (PMR) calibration linearizes the probe response over its dynamic range for specific modulations which are characterized by their UID and result in an uncertainty specified in the probe calibration certificate. The MIF is characteristic for a given waveform envelope and can be used as a constant conversion factor if the probe has been PMR calibrated. The evaluation method for the MIF is defined in ANSI C63.19-2011 section D.7. An RMS demodulated RF signal is fed to a spectral filter (similar to an A weighting filter) and forwarded to a temporal filter acting as a quasi-peak detector. The averaged output of these filtering is scaled to a 1 kHz 80% AM signal as reference. MIF measurement requires additional instrumentation and is not well suited for evaluation by the end user with reasonable uncertainty. It may alliteratively be determined through analysis and simulation, because it is constant and characteristic for a communication signal. DASY52 uses well-defined signals for PMR calibration. The MIF of these signals has been determined by simulation and it is automatically applied. The MIF measurement uncertainty is estimated as follows, declared by HAC equipment provider SPEAG, for modulation frequencies from slotted waveforms with fundamental frequency and at least 2 harmonics within 10 kHz:

0.2 dB for MIF	0.5 dB for MIF	1 dB for MIF
-7dB to +5 dB	-13dB to +11 dB	> -20 dB

MIF values applied in this test report were provided by the HAC equipment provider of SPEAG, and the worst values for all air interface are listed below to be determine the Low-power Exemption.

UID	Communication System Name	MIF(dB)
10021	GSM-FDD(TDMA,GMSK)	3.63
10025	EDGE-FDD (TDMA, 8PSK, TN 0)	3.75
10460	UMTS-FDD(WCDMA, AMR)	-25.43
10225	UMTS-FDD (HSPA+)	-20.39
10169	LTE-FDD(SC-FDMA,1RB,20MHz,QPSK)	-15.63
10170	LTE-FDD(SC-FDMA,1RB,20MHz,16-QAM)	-9.76
10179	LTE-FDD(SC-FDMA,1RB,20MHz,64-QAM)	-9.93
10181	LTE-FDD(SC-FDMA,1RB,15MHz,QPSK)	-15.63
10175	LTE-FDD(SC-FDMA,1RB,10MHz,QPSK)	-15.63
10177	LTE-FDD(SC-FDMA,1RB,5MHz,QPSK)	-15.63
10184	LTE-FDD(SC-FDMA,1RB,3MHz,QPSK)	-15.62
10187	LTE-FDD(SC-FDMA,1RB,1.4MHz,QPSK)	-15.62
10172	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	-1.62
10173	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	-1.44
10174	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	-1.54
10240	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	-1.62
10237	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	-1.62
10234	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	-1.62
10231	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	-1.62
10228	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	-1.62
10061	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	-2.02
10077	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	0.12
10427	IEEE 802.11n (HT Greeneld, 150 Mbps, 64-QAM)	-13.44
10069	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	-3.15
10616	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	-5.57

5. Conducted Power

The maximum tune-up power of WCDMA was recorded in the annex E of SZ22080062S01.

6. Low-power Exemption

Air Interface	Max Tune-up Limit (dBm)	Worst Case MIF (dB)	Power + MIF(dB)	C63.19 test required
WCDMA Band II	21.00	-25.43	-4.43	No
WCDMA Band IV	21.50	-25.43	-3.93	No
WCDMA Band V	24.00	-25.43	-1.43	No

Note:

1. 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.
2. For all of bands, the worst case of max tune-up limit will be test RF, therefore WCDMA modes is not necessary for testing.
3. HAC RF rating is M4 for the air interface which meets the low power exemption.

Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
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2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

Note：

The main report is end here and the other appendix (B,C,D,E) will be submitted separately.

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