

# **FCC Test Report**

Report No.: AGC01110200344FE03

FCC ID		2AOKB-A3911RT
APPLICATION PURPOSE	-	Original Equipment
PRODUCT DESIGNATION	:	Soundcore Liberty Neo
BRAND NAME	÷	Soundcore
MODEL NAME		A3911RT
APPLICANT	•	Anker Innovations Limited
DATE OF ISSUE		Apr. 26, 2020
STANDARD(S)	-	FCC Part 15.247
<b>REPORT VERSION</b>	:	V1.0

## Attestation of Global Compliance (Shenzhen) Co., Ltd

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#### **REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0		Apr. 26, 2020	Valid	Initial Release





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#### **1. VERIFICATION OF CONFORMITY**

Applicant	Anker Innovations Limited
Address	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hongkong
Manufacturer	Anker Innovations Limited
Address	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hongkong
Factory	Cosonic Intelligent Technology Co., Ltd.
Address	No.06, Ximiaobianwang Section, Dongyuan Avenue, Shipai Town, Dongguan City, Guangdong Province, P.R. China
Product Designation	Soundcore Liberty Neo
Brand Name	Soundcore
Test Model	A3911RT
Date of test	Mar. 27, 2020 to Apr. 26, 2020
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC PART 15.247.

Prepared By

John Lerroy

John Zeng Project Engineer

Apr. 26, 2020

Reviewed By

Max Zham

Max Zhang Reviewer

Apr. 26, 2020

Approved By

Forrest Lei Authorized Officer

Apr. 26, 2020



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### 2. GENERAL INFORMATION

#### 2.1. PRODUCT DESCRIPTION

The EUT is designed as "Soundcore Liberty Neo". It is designed by way of utilizing the GFSK, Pi/4 DQPSK and 8DPSK technology to achieve the system operation.

A major technical description of EUT is described as following

<b>Operation Frequency</b>	2.402 GHz to 2.480GHz
RF Output Power	3.622dBm(Max)
Bluetooth Version	V5.0
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps
Number of channels	79 Channels
Hardware Version	V_B
Software Version	V1.2
Antenna Designation	FPC Antenna(Comply with requirements of the FCC part 15.203)
Antenna Gain	2.27dBi
Power Supply	DC 3.7V by battery
Note: The EUT doesn't support	BLE.

#### 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
No. 60	0	2402MHZ
0		2403MHZ
SC C		
	38	2440 MHZ
2402~2480MHZ	39	2441 MHZ
	40	2442 MHZ
A CC		
0	77	2479 MHZ
	78	2480 MHZ





#### 2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHZ, In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the

master. Additionally the type of connection(e.g. single of multislot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.

Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

#### 2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a 79 hopping sequence in data mode: 40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67 56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59 72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75 09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06 01, 51, 03, 55, 05, 04

#### 2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values: 1. LAP/UAP of the master of the connection.

2. Internal master clock

The LAP(lower address part) are the 24 LSB's of the 48 BD\_ADDRESS. The BD\_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP(upper address part) are the 24MSB's of the 48BD\_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For ehavior zation with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us.The clock has a cycle of about one day(23h30).In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire. LAP(24 bits),4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With this input values different mathematical procedures(permutations, additions, XOR-operations) are performed to generate te Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following ehavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer(and it Cannot be shorter) than the minimum resolution of the clock(312.5us).The hopping sequence will always Differ from the first one.





#### 2.6. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID:2AOKB-A3911RT** filing to comply with the FCC PART 15.247 requirements.

#### 2.7. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

#### 2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

#### 2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.





#### **3. MEASUREMENT UNCERTAINTY**

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard

uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

- Uncertainty of Conducted Emission, Uc = ±3.1 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±4.0 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB
- Uncertainty of total RF power, conducted,  $Uc = \pm 0.8$ dB
- Uncertainty of spurious emissions, conducted,  $Uc = \pm 2.7 dB$
- Uncertainty of Occupied Channel Bandwidth: Uc =  $\pm 2$  %
- Uncertainty of Dwell Time: Uc =  $\pm 2$  %
- Uncertainty of Frequency:  $Uc = \pm 2\%$





#### 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel π/4-DQPSK
5	Middle channel π/4-DQPSK
6	High channel π/4-DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
10	Hopping mode GFSK
11	Hopping mode π/4-DQPSK
12	Hopping mode 8DPSK

Note: 1. Only the result of the worst case was recorded in the report, if no other cases.

- 2. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
  - 3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

Software Setting

0 COM UART	Port 3      Baudrate=		- []		-		-
			Close		RE/	ALTEK	
Non Link Mode Hop	bing   LE Test   Tx Settings   Bal	ttery Resistance Cal				Hot Key	Made 1
Channel	0 -	Pkt-Tx (for MP)	- 1	7 FW Mode		1	CI Reset
Packet Type	3DH5 -	Exec	Stop	Clear Report			st Mode
Payload Type	PRBS9	Item	Value				
Tx Packet Count		Tx bits	162967936				
Tx Level	Max Dis_ThermalTrackin	ng Tx Pkt Count	19952				
Set PHY	LE 1M PHY	-					
Hit Target	0x000000c6967e	TX Report RX	Benort				
	arameter 2 Cal		Toport				
	arameter 2 Lai						
Message						Power Tracking	
	xcute[Pkt-Tx (for MP)] Success!! xcute[Pkt-Tx (for MP)] Stop!!	CONTRACTOR OF THE			1	C OFF	Set
XILBIA >>Enable TRX T	hread Mode!!					( ON	Get
>>Enable TRX							
	and solid in the flor mm () Success						
QCC-cr	Santa and a start						
accel							Carl States



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### 5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure :

EUT

Conducted Emission Configure :

EUT	ů N	AE

#### 5.2. EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Soundcore Liberty Neo	A3911RT	2AOKB-A3911RT	EUT
2	Control Box	N/A	USB-TTL	AE

#### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(1)	Peak Output Power	Compliant
15.247 (a)(1)	20 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.209	Radiated Emission	Compliant
15.247 (a)(1)(iii)	Number of Hopping Frequency	Compliant
15.247 (a)(1)(iii)	Time of Occupancy	Compliant
15.247 (a)(1)	Frequency Separation	Compliant
15.207	Conducted Emission	N/A

Note: The EUT can not use the BT function with charging.





### 6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

#### TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due		
TEST RECEIVER	ST RECEIVER R&S ESCI		10096	Jun. 12, 2019	Jun. 11, 2020		
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020		
2.4GHz Fliter	2.4GHz Fliter EM Electronics 2400-2500MHz		2.4GHz Fliter EM Electronics 24		N/A	Feb. 25, 2020	Feb. 24, 2021
Attenuator	ZHINAN	E-002	N/A	Sep. 09, 2019	Sep. 08, 2020		
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.21, 2019	Sep. 20, 2021		
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 13, 2018	Jun. 12, 2020		
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2018	May 16, 2020		
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 15, 2019	Oct. 16, 2020		
ANTENNA SCHWARZBE		NTENNA SCHWARZBECK VULB9168 4		Sep. 20, 2019	Sep. 19, 2021		
Test software	FARA	EZ-EMC (Ver RA-03A)	N/A	N/A	N/A		





#### 7. PEAK OUTPUT POWER

#### 7.1. MEASUREMENT PROCEDURE

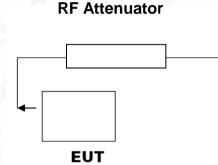
For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
- 3. RBW > 20 dB bandwidth of the emission being measured.
- 4. VBW  $\geq$  RBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.

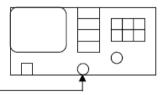
Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

#### 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

#### PEAK POWER TEST SETUP



#### Spectrum Analyzer









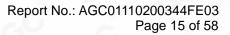
#### 7.3. LIMITS AND MEASUREMENT RESULT

	PEAK OUTPUT POWER MEA		
Frequency (GHz)	FOR GFSK MOUD Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	0.585	30	Pass
2.441	0.749	30	Pass
2.480	0.860	30	Pass



CH0









**CH78** 

gilent Spectrum Analyzer - Swept SA RF 50 Ω AC Marker 1 2.47985000000	PNO: East 🕞 Trig: Free Run	ALIGNAUTO 01:38:52 PM Apr 23, 202 Avg Type: Log-Pwr TRACE 1234 Avg Hold:>100/100 TYPE	Peak Search
0 dB/div Ref 10.00 dBm	IFGain:Low Atten: 20 dB	Mkr1 2.479 850 GH 0.860 dB	Next Pe
.00 0.00	<b>↓</b> <sup>1</sup>		Next Pk Rig
20.0			Next Pk L
40.0			Marker De
io.o			Mkr→
0.0			Mkr→Ref
Center 2.480000 GHz Res BW 1.5 MHz	#VBW 5.0 MHz	Span 5.000 Mł Sweep 1.000 ms (1001 pt	Hz 1 o s)
sg		STATUS	



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	PEAK OUTPUT POWER MEA FOR II /4-DQPSK M		
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	2.945	30	Pass
2.441	3.156	30	Pass
2.480	3.164	30	Pass











**CH78** 





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	FOR 8DPSK MOD	DULATION	
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	3.339	30	Pass
2.441	3.562	30	Pass
2.480	3.622	30	Pass











**CH78** 

RF 50 Ω AC Iarker 1 2.47997000000	DO GHZ PNO: Fast IFGain:Low Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	01:39:24 PM Apr 23, 2020 TRACE 123456 TYPE MWWWWW DET PNNNN	Peak Search
0 dB/div Ref 10.00 dBm		Mkr1	2.479 970 GHz 3.622 dBm	Next Pe
0.00	<u></u> 1			Next Pk Riç
20.0 <b>Marine and Annual Control Contro</b>				Next Pk L
40.0				Marker De
io.o				Mkr
0.0				Mkr→Ref
80.0 Center 2.480000 GHz Res BW 1.5 MHz	#VBW 5.0 MHz	Sweep 1	Span 5.000 MHz .000 ms (1001 pts)	<b>M</b> d 1 d
SG		STATUS		



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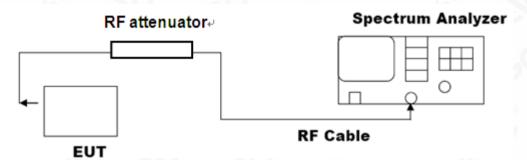


#### 8. 20DB BANDWIDTH

#### **8.1. MEASUREMENT PROCEDURE**

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hoping channel The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
- 4. Set SPA Trace 1 Max hold, then View.

#### 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



#### 8.3. LIMITS AND MEASUREMENT RESULTS

MEASURE	MENT RESULT FOR GF	SK MOUDULATION	
Appliachta Limita		Measurement Resu	lt
Applicable Limits	Test Data	a (MHz)	Criteria
	Low Channel	0.9580	PASS
N/A	Middle Channel	0.9588	PASS
	High Channel	0.9516	PASS





#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

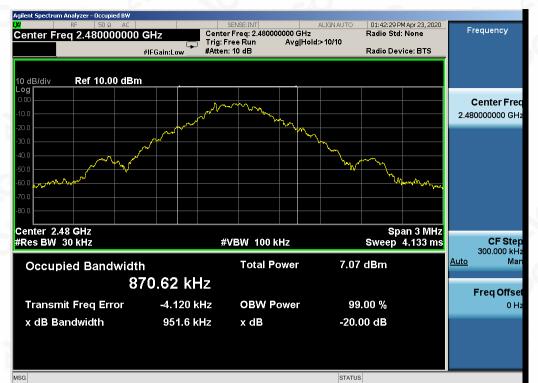
#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL





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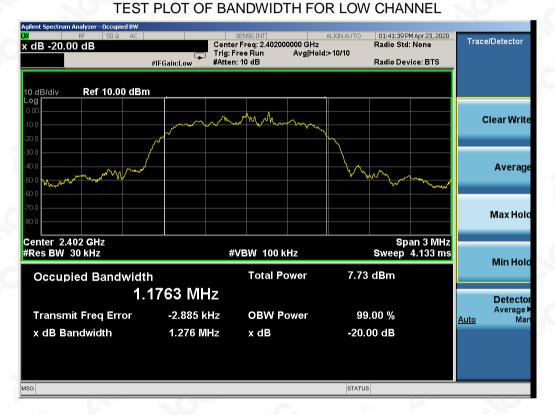
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China



#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



MEASUREME	NT RESULT FOR II /4-	DQPSK MODULATIO	N
Annlinghla Linsita		Measurement Result	
Applicable Limits	Test Data	(MHz)	Criteria
	Low Channel	1.276	PASS
N/A	Middle Channel	1.310	PASS
	High Channel	1.284	PASS

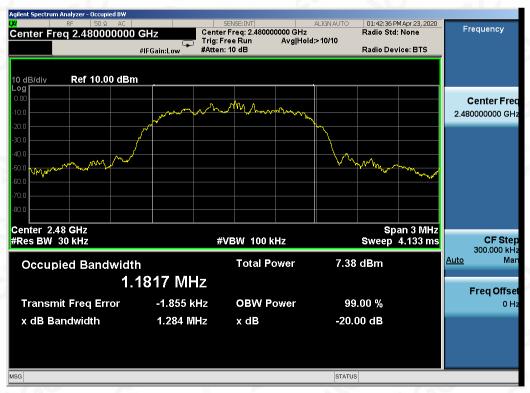






#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





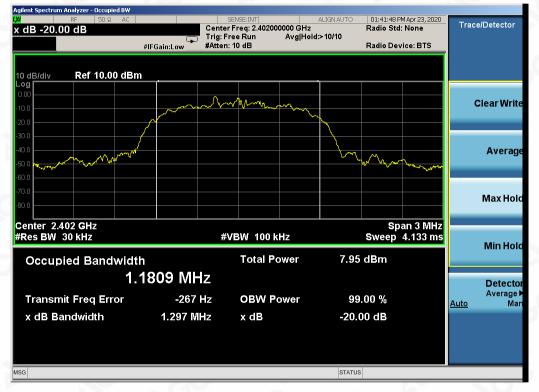
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MEASU	REMENT RESULT FOR 8D	PSK MODULATION	
Annlinghle Limite		Measurement Result	
Applicable Limits	Test Data	Criteria	
	Low Channel	1.297	PASS
N/A	Middle Channel	1.301	PASS
	High Channel	1.297	PASS

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

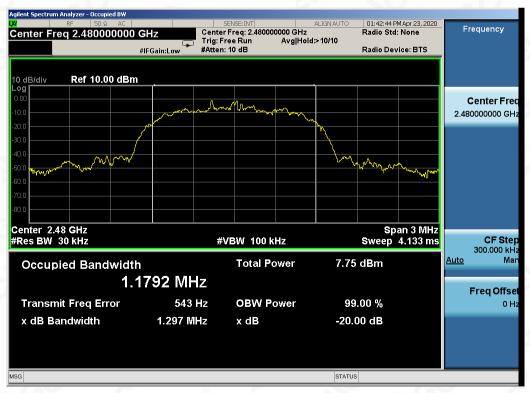






#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





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#### 9. CONDUCTED SPURIOUS EMISSION

#### 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
- 3. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic. RBW = 100 kHz; VBW= 300 kHz; Sweep = auto; Detector function = peak.
- 4. Set SPA Trace 1 Max hold, then View.

#### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2

#### 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

#### 9.4. LIMITS AND MEASUREMENT RESULT

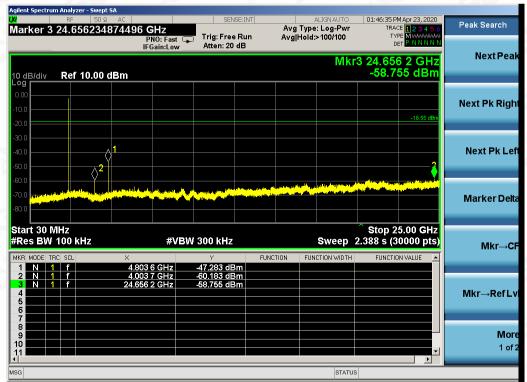
LIMITS AND MEA	ASUREMENT RESULT	
Applieghte Limite	Measurement Res	sult
Applicable Limits	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS
intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -20dBc than the limit Specified on the TOP Channel	PASS





#### TEST RESULT FOR ENTIRE FREQUENCY RANGE TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 8DPSK MODULATION IN LOW CHANNEL







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#### TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN MIDDLE CHANNEL

												_
_	4 Apr 23, 2020	01·47·47 P	ALIGN AUTO		=-INIT	SENS		5A AC	zer - Swept 9 50 Ω	Analy	ctrum	ent Spe
Peak Searcl	E 1 2 3 4 5 6	TRAC	: Log-Pwr	Avg Typ			SHz	226608			r 3 2	arke
	PE MWWWWW T P N N N N N	TYI	>100/100	Avg Hol		Trig: Free Atten: 20 d	NO: Fast 🗔					
NextP						Atten. 20 c	Gain:Low	II <del>.</del>				
Noxer	6 8 GHz		Mkr									
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Mkr→Rei												4
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Marker Delta

Mkr→CF

Mkr→RefLv

More 1 of 2



#### TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN HIGH CHANNEL

Note: The peak emissions without marker on the above plots are fundamental wave and need not to compare with the limit. The 8DPSK modulation is the worst case and only those data recorded in the report.

FUNCTION

FUNCTION WIDTH

STATUS

#VBW 300 kHz

57.981 dBr



Start 30 MHz

#Res BW 100 kHz

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Stop 25.00 GHz

FUNCTION VALUE

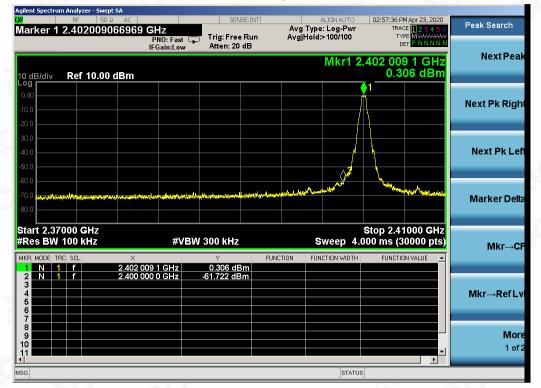
Sweep 2.388 s (30000 pts)



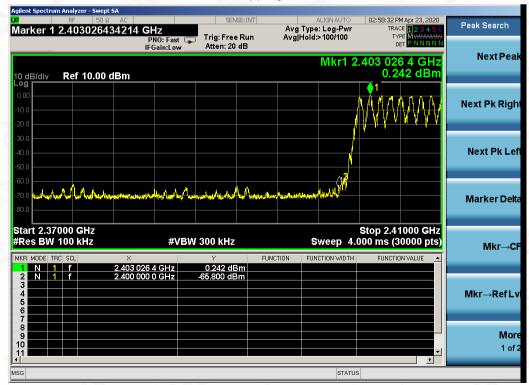
#### TEST RESULT FOR BAND EDGE

#### GFSK MODULATION IN LOW CHANNEL

Hopping off



Hopping on



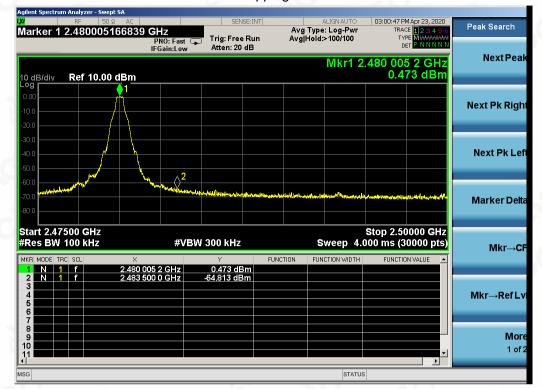
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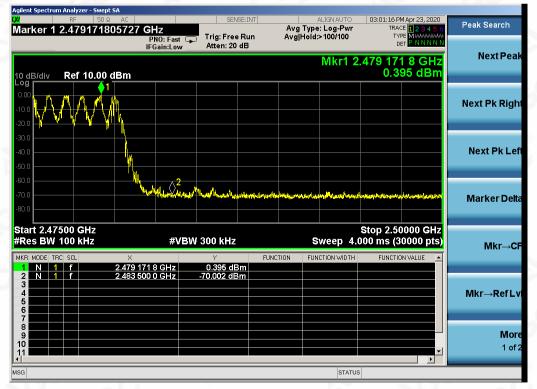
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#### GFSK MODULATION IN HIGH CHANNEL Hopping off

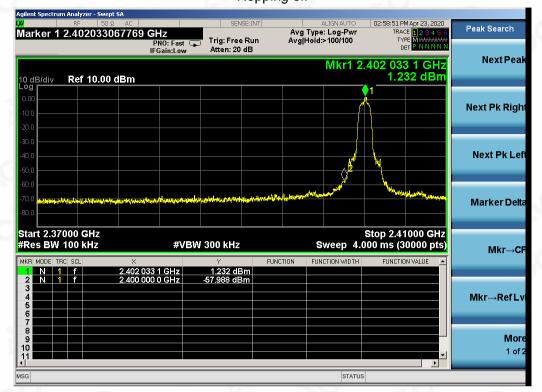
Hopping on





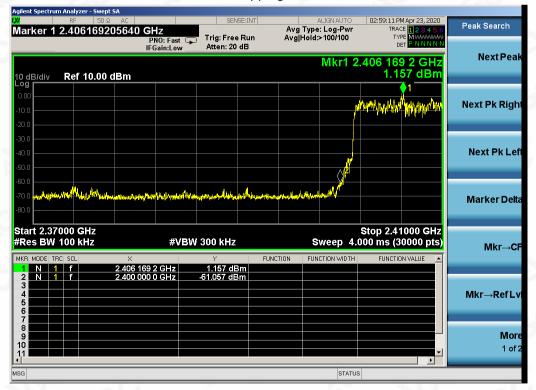
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#### $\pi$ /4-DQPSK MODULATION IN LOW CHANNEL Hopping off

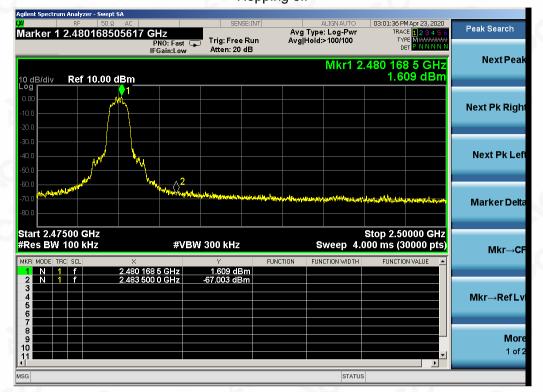
Hopping on



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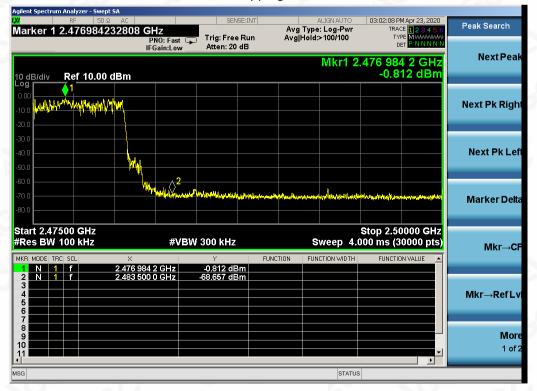
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#### $\pi$ /4-DQPSK MODULATION IN HIGH CHANNEL Hopping off

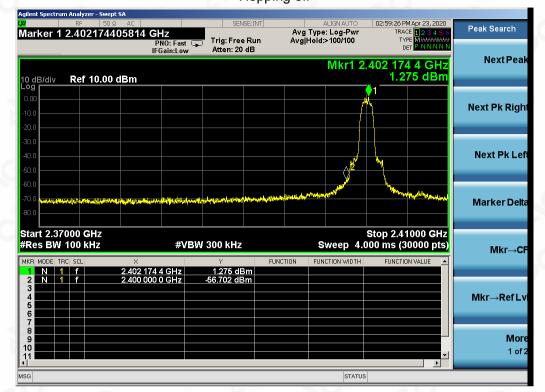
Hopping on





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#### 8DPSK MODULATION IN LOW CHANNEL Hopping off

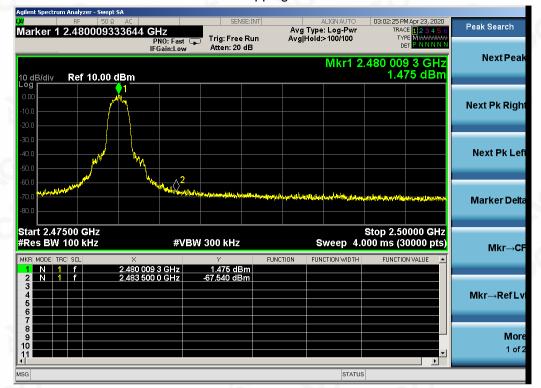
Hopping on





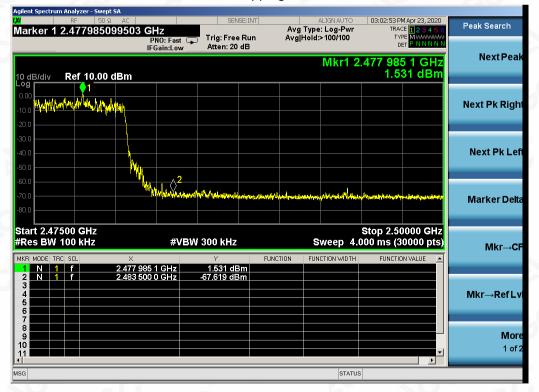
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#### 8DPSK MODULATION IN HIGH CHANNEL Hopping off

Hopping on





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## **10. RADIATED EMISSION**

### **10.1. MEASUREMENT PROCEDURE**

- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.





The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

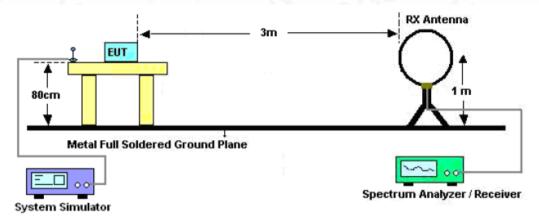
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP



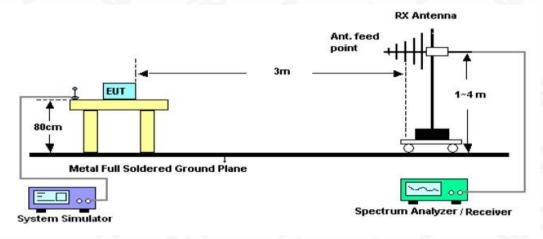


### 10.2. TEST SETUP

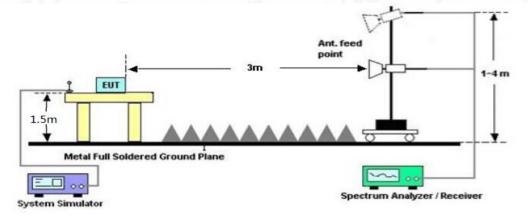
Radiated Emission Test-Setup Frequency Below 30MHz



## RADIATED EMISSION TEST SETUP 30MHz-1000MHz



#### RADIATED EMISSION TEST SETUP ABOVE 1000MHz





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### **10.3. LIMITS AND MEASUREMENT RESULT**

#### 15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission, the test records reported below are the worst result compared to other modes.

## **10.4. TEST RESULT**

### **RADIATED EMISSION BELOW 30MHZ**

No emission found between lowest internal used/generated frequencies to 30MHz.

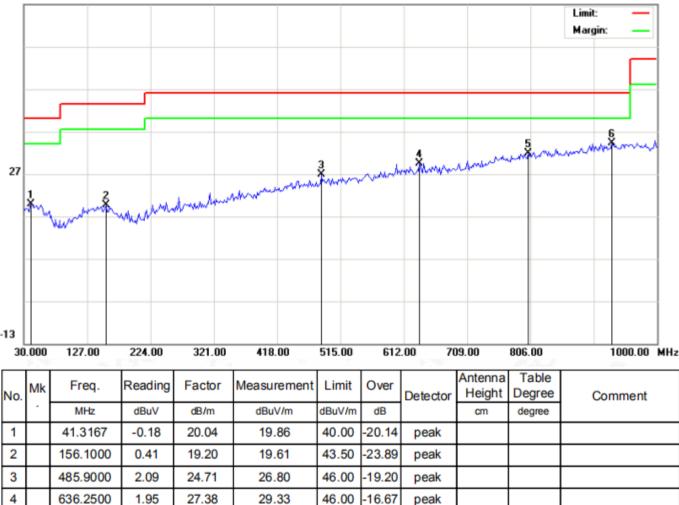




#### **RADIATED EMISSION BELOW 1GHZ**

EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Horizontal

#### 66.9 dBuV/m



31.76

34.16

**RESULT: PASS** 

802.7667

930.4833

1.31

2.20

30.45

31.96

5

6



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-14.24

-11.84

peak

peak

46.00

46.00

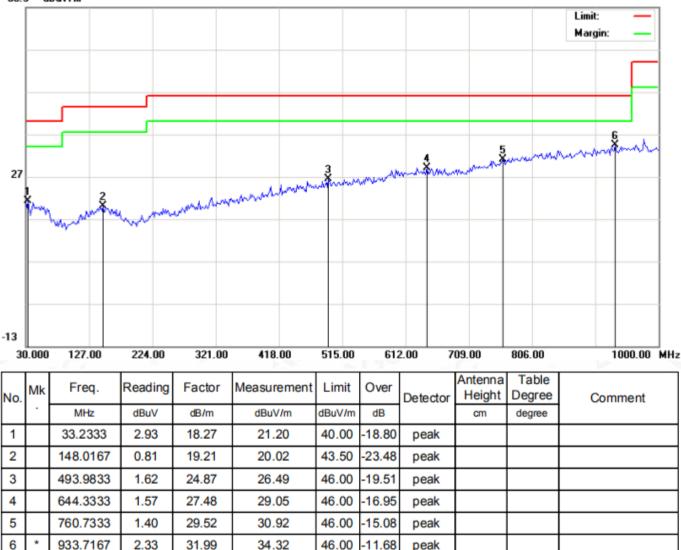
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EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Vertical

66.9 dBuV/m



### **RESULT: PASS**

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

34.32

31.99

2. All test modes had been pre-tested. The mode 9 is the worst case and recorded in the report.

46.00

11.68

peak



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## **RADIATED EMISSION ABOVE 1GHZ**

EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	48.61	0.08	48.69	74	-25.31	peak 💿
4804.000	44.59	0.08	44.67	54	-9.33	AVG
7206.000	45.73	2.21	47.94	74	-26.06	peak
7206.000	41.08	2.21	43.29	54	-10.71	AVG
60	20			00	20	
Remark:			6			
actor = Anter	na Factor + Cable	e Loss – Pre-	amplifier.	®		
		States and states				

EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical

Frequency	Meter Reading	Factor	<b>Emission Level</b>	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	49.63	0.08	49.71	74	-24.29	peak
4804.000	44.21	0.08	44.29	54	-9.71	AVG
7206.000	47.77	2.21	49.98	74	-24.02	peak
7206.000	42.13	2.21	44.34	54	-9.66	AVG
						C.
		- C.U.	8			

Factor = Antenna Factor + Cable Loss – Pre-amplifier.





#### Report No.: AGC01110200344FE03 Page 44 of 58

EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4882.000	48.69	0.14	48.83	74	-25.17	peak
4882.000	44.42	0.14	44.56	54	-9.44	AVG
7323.000	46.82	2.36	49.18	74	-24.82	peak
7323.000	40.36	2.36	42.72	54	-11.28	AVG
8				Ö		
emark:	- 6	©		×66		0
ctor = Anter	na Factor + Cable	Loss – Pre-	amplifier.			- 6

EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Tree
(MHz)	(dBµV)	) (dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4882.000	50.36	0.14	50.5	74	-23.5	peak
4882.000	45.91	0.14	46.05	54	-7.95	AVG
7323.000	47.94	2.36	50.3	74	-23.7	peak
7323.000	42.53	2.36	44.89	54	-9.11	AVG
		(2)		G	- 6	6
		C.				G

Factor = Antenna Factor + Cable Loss – Pre-amplifier.





#### Report No.: AGC01110200344FE03 Page 45 of 58

EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	49.31	0.22	49.53	74	-24.47	peak
4960.000	45.16	0.22	45.38	54	-8.62	AVG
7440.000	47.09	2.64	49.73	74	-24.27	peak
7440.000	41.85	2.64	44.49	54	-9.51	AVG
®				0		
emark:		0		~0 <sup>C</sup>	Ĝ	8
actor = Anter	nna Factor + Cable	e Loss – Pre-	amplifier.			- 6

 EUT
 Soundcore Liberty Neo
 Model Name
 A3911RT

 Temperature
 25°C
 Relative Humidity
 55.4%

-			
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Vertical

Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(dBµV)	) (dB)	(dBµV/m)	(dBµV/m)	(dB)	
51.23	0.22	51.45	74	-22.55	peak
46.13	0.22	46.35	54	-7.65	AVG
48.66	2.64	51.3	74	-22.7	peak
43.73	2.64	46.37	54	-7.63	AVG
	(2)		G	- 6	8
				0	G
	- 69				2 c
	(dBµV) 51.23 46.13 48.66	(dBµV)         (dB)           51.23         0.22           46.13         0.22           48.66         2.64	(dBµV)         (dB)         (dBµV/m)           51.23         0.22         51.45           46.13         0.22         46.35           48.66         2.64         51.3	(dBµV)         (dB)         (dBµV/m)         (dBµV/m)           51.23         0.22         51.45         74           46.13         0.22         46.35         54           48.66         2.64         51.3         74	(dBµV)         (dB)         (dBµV/m)         (dBµV/m)         (dB)           51.23         0.22         51.45         74         -22.55           46.13         0.22         46.35         54         -7.65           48.66         2.64         51.3         74         -22.7

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

## **RESULT: PASS**

**Note:** Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report. Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

All test modes had been tested. The 8DPSK modulation is the worst case and recorded in the report.

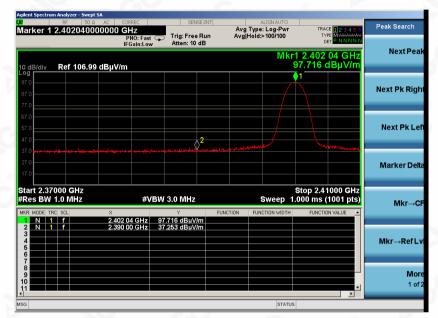




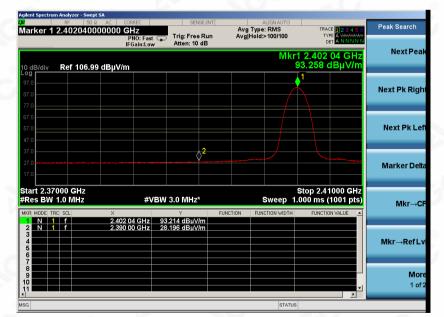
EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Horizontal

#### TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

ΡK







**RESULT: PASS** 



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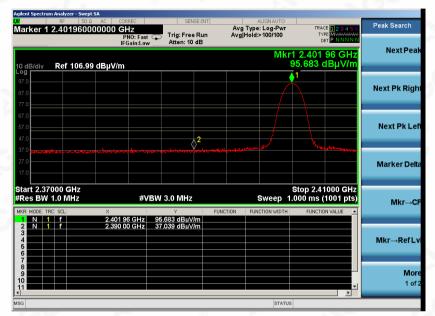
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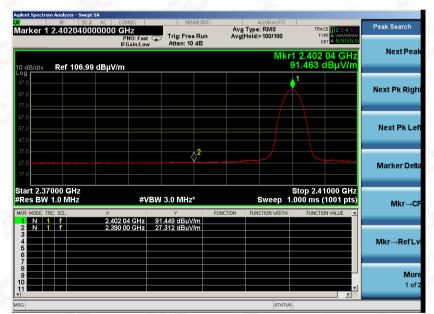
#### Report No.: AGC01110200344FE03 Page 47 of 58

EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical

PK



#### AV



**RESULT: PASS** 

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EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Horizontal

PK



#### AV



**RESULT: PASS** 



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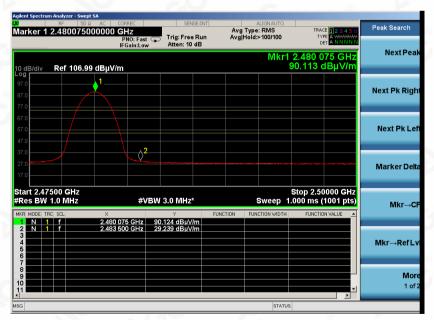
#### Report No.: AGC01110200344FE03 Page 49 of 58

EUT	Soundcore Liberty Neo	Model Name	A3911RT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Vertical

PK



AV



#### **RESULT: PASS**

**Note**: The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB( $\mu$ V) to represent the Amplitude. Use the F dB( $\mu$ V/m) to represent the Field Strength. So A=F. All test modes had been pre-tested. The 8DPSK modulation is the worst case and recorded in the report.





## **11. NUMBER OF HOPPING FREQUENCY**

### **11.1. MEASUREMENT PROCEDURE**

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.

2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

3. VBW  $\geq$  RBW. Sweep: Auto. Detector function: Peak. Trace: Max hold.

4. Allow the trace to stabilize.

## **11.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)**

Same as described in section 8.2

### **11.3. MEASUREMENT EQUIPMENT USED**

The same as described in section 6

### **11.4. LIMITS AND MEASUREMENT RESULT**

TOTAL NO. OF	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
HOPPING CHANNEL	>=15	79	PASS

## Marker Avg Type: Log-Pwr Avg|Hold:>100/100 Trig: Free Run Atten: 30 dB Select Marke AMkr1 Ref 20.00 dBm Norm aanaamahniidaannoo aanaanaanna kanaamahahniidan kanaanna kanaanna kanaanna kanaanna kanaa kanaa kanaa kanaa ka Delt Fixed Stop 2.48350 GHz 8.000 ms (1001 pts #VBW 300 kHz Sweep 0 78.072 5 MHz 2.401 920 5 GHz 0.649 dE Properties Мо

TEST PLOT FOR NO. OF TOTAL CHANNELS

Note: The GFSK modulation is the worst case and recorded in the report.





# 12. TIME OF OCCUPANCY (DWELL TIME)

## **12.1. MEASUREMENT PROCEDURE**

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Zero span, centered on a hopping channel.

2. RBW shall be  $\leq$  channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.

3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.

4. Detector function: Peak. Trace: Max hold.

5. Use the marker-delta function to determine the transmit time per hop.

6. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer)  $\times$  (period specified in the requirements / analyzer sweep time)

7. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

## 12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

## 12.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

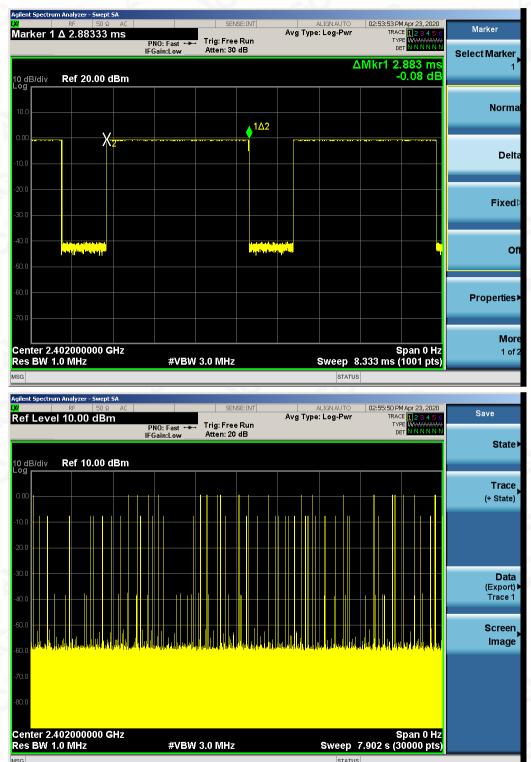
## **12.4. LIMITS AND MEASUREMENT RESULT**

Channel	Time of Pulse for DH5 (ms)	Number of hops in the period specified in the requirements	Sweep Time (ms)	Limit (ms)
Low	2.883	21*4	242.172	400
Middle	2.883	22*4	253.704	400
High	2.883	28*4	322.896	400

Note: The 8DPSK modulation is the worst case and recorded in the report.







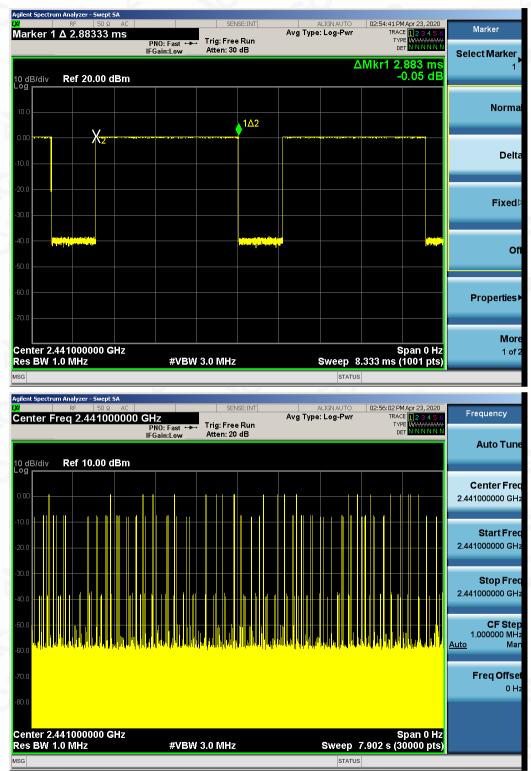
## TEST PLOT OF LOW CHANNEL



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## TEST PLOT OF MIDDLE CHANNEL

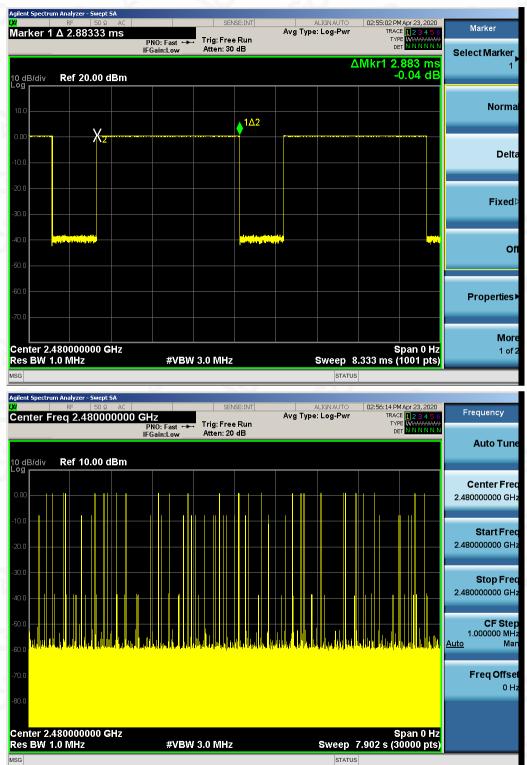


Attestation of Global Compliance(Shenzhen)Co.,Ltd.

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Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China Tel: +86-755 2523 4088 E-mail:agc@agc-cert.com Service Hotline:400 089 2118





## TEST PLOT OF HIGH CHANNEL



Attestation of Global Compliance(Shenzhen)Co.,Ltd.

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Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China Tel: +86-755 2523 4088 E-mail:agc@agc-cert.com Service Hotline:400 089 2118



## **13. FREQUENCY SEPARATION**

### **13.1. MEASUREMENT PROCEDURE**

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Wide enough to capture the peaks of two adjacent channels.

2. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.

3. Video (or average) bandwidth (VBW)  $\geq$  RBW.

4. Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize.

Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

#### **13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)**

Same as described in section 6.2

#### 13.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.3

### **13.4. LIMITS AND MEASUREMENT RESULT**

CHANNEL	CHANNEL SEPARATION KHz	LIMIT (KHz)	RESULT
CH01-CH02	1005	>=25 KHz or 2/3 20 dB BW	PASS

### TEST PLOT FOR FREQUENCY SEPARATION



Note: The 8DPSK modulation is the worst case and recorded in the report.



## 14. FCC LINE CONDUCTED EMISSION TEST

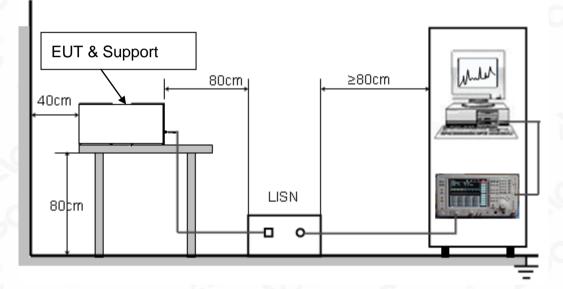
## 14.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note: 1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

## 14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST







## 14.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipments received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received DC charging voltage by adapter which received AC120V/60Hz power by a LISN.
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### 14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.

### 14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Note: The EUT can not use the BT function with charging.





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# APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC01110200344AP01

## **APPENDIX B: PHOTOGRAPHS OF EUT**

Refer to the Report No.: AGC01110200344AP01

----END OF REPORT----

