

Page 1 of 72

# FCC Test Report

# Report No.: AGC03293171101FE03

FCC ID	Ē	2AF9P-SUDIOTWS
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	FR Global	True Wireless Earphones
BRAND NAME		Sudio
MODEL NAME		See Page 4
CLIENT		Sudio AB
DATE OF ISSUE	<u>111</u>	Jan. 11, 2018
STANDARD(S) TEST PROCEDURE(S)	:	FCC Part 15 Subpart C Section 15.249
REPORT VERSION		V1.0

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

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Report No.: AGC03293171101FE03 Page 2 of 72

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Report Version	Revise Time	Issued Date	Valid Version	Notes	
V1.0		Jan. 11, 2018	Valid	Initial release	

#### **Report Revise Record**

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Report No.: AGC03293171101FE03 Page 3 of 72

# TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY	4
2. GENERAL INFORMATION 2.1. PRODUCT DESCRIPTION 2.2. TABLE OF CARRIER FREQUENCYS	5 5
3. MEASUREMENT UNCERTAINTY	
4. DESCRIPTION OF TEST MODES	
5. SYSTEM TEST CONFIGURATION	8
5.1. CONFIGURATION OF EUT SYSTEM 5.2. EQUIPMENT USED IN EUT SYSTEM 5.3. SUMMARY OF TEST RESULTS	8 9
6. TEST FACILITY	10
7.TEST METHOD	11
8. TEST EQUIPMENT LIST	
9. RADIATED EMISSION	12
9.1TEST LIMIT 9.2. MEASUREMENT PROCEDURE 9.3. TEST SETUP 9.4. TEST RESULT	12 13 15 17
10. BAND EDGE EMISSION	32
10.1. MEASUREMENT PROCEDURE 10.2 TEST SETUP 10.3 RADIATED TEST RESULT	32
11. 20DB BANDWIDTH	37
11.1. MEASUREMENT PROCEDURE 11.2. TEST SET-UP 11.3. LIMITS AND MEASUREMENT RESULTS	37
12. FCC LINE CONDUCTED EMISSION TEST	
12.1. LIMITS OF LINE CONDUCTED EMISSION TEST 12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST 12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST 12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST 12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST	45 45 45
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	
APPENDIX B: PHOTOGRAPHS OF EUT	48

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#### Report No.: AGC03293171101FE03 Page 4 of 72

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

Applicant	Sudio AB
Address	Grev Turegatan 35, 11438, Stockholm, Sweden
Manufacturer	Cirque-audio Technology Co., Ltd.
Address	No. 2, Road Beiyiheng, Huangjiabao Industrial Park, Shipai Town, Dongguan City, Guangdong Province, China 523347
Product Designation	True Wireless Earphones
Brand Name	Sudio
Test Model	Nivå
Series Model	Sudio Nivå black, Sudio Nivå white, Sudio Nivå camouflage
Difference description	All the same except for the appearance color.
Date of test	Jan. 04, 2018 to Jan. 10, 2018
Deviation	None
Condition of Test Sample	Normal
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, the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.249. The test results of this report relate only to the tested sample identified in this report.

Harry Zhang

Tested By

Jan. 10, 2018 Henry Zhang(Zhang Zhuorui)

owers on

Reviewed By

Forrest Lei(Lei Yonggang)

Jan. 11, 2018

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#### 2. GENERAL INFORMATION 2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

<b>Operation Frequency</b>	2.402 GHz to 2.480GHz
RF Output Power	-2.32dBm(Max EIRP Power=Max radiation field-95.2)
Bluetooth Version	V4.2 • State •
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK
Number of channels	79 for BR/EDR
Hardware Version	ES2
Software Version	V0.3
Antenna Designation	Fixed Antenna
Antenna Gain	1.4dBi
Power Supply	DC 3.7V by battery

2. The EUT comprises left and right channel earphone, both are the same and have Only the test data of left earphone recorded in this report.

3. The EUT isn't support BLE.

#### 2.2. TABLE OF CARRIER FREQUENCYS

**BR/EDR** channel List

Frequency Band	Channel Number	Frequency
E E AND COM C	CC0 CC	2402MHz
	1	2403MHz
	The second se	
	38	2440 MHz
2400~2483.5MHz	39	2441 MHz
	40	2442 MHz
	The state of the s	
	77	2479 MHz
	78	2480 MHz

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#### 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y  $\pm$ 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 =  $\pm$ 3.2 dB

- Uncertainty of Radiated Emission below 1GHz,  $Uc = \pm 3.9 \text{ dB}$
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

			-mil	The partice	Attesta
	NO.		TEST MODE DESCRIPTION	ON	
®	The state of 1 contract of the state of the	For of Albert C	Low channel GFSK		
S	2	SO	Middle channel GFSK	THE STATE	K Completice
	3		High channel GFSK	C The station of	3000
A AMA	4	E Anno Clobal Com	Low channel π /4-DQPSI	6	
obal Colline	5	C C	Middle channel π /4-DQPS	SK	下版书
<u> </u>	6		High channel π /4-DQPS	K	3 The station of Global
ALC: NO	1 7	The Contraction	Low channel 8DPSK		
F Thomas	8 8	CC ***	Middle channel 8DPSK		
Attestan	9		High channel 8DPSK	TF.	bal Compliance
Þ	10	the state	BT Link	C Atlestation of Co	A.C.
(					

#### 4. DESCRIPTION OF TEST MODES

#### Note:

1. All the test modes can be supply by battery, only the result of the worst case was recorded in the report, if no other cases.

2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

3. The EUT used fully-charged battery when tested.

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Report No.: AGC03293171101FE03 Page 7 of 72

	00 Family LAB Test Tool - Version 1.4.11.0	
/iew Help		
COM1	🖂 🙆 😳 🕜 🧭 🧭	
RX Cry	stal Trim Test Mode	
CTX_START		3000
CTX_DATA	RF Freq.(MHz) 2402 Vrite GC to EEPROM (BR)	
BTX_PACKET	Tx GC 63 Write GC to EEPROM (EDR)	
	PKT Type 2-DH3	
	Data Type PN sequence 👻	
	Hopping on Execute	
	Specific Channels Hopping by continous fixed channel switching	
	Channels 15-0         11111111111111         Hopping Interval (ms)         10	
	Channels 31-16 111111111111111111111111111111111	
	Channels 47-32 111111111111111111111111111111111111	
	Channels 63-48 111111111111111111111111111111111111	
		21
:43:22] BTx Pack :48:30] BTx Pack		,d <sup>C</sup>
:48:30] BTx Pack :48:59] BTx Pack :51:11] BTx Pack :52:02] BTx Pack	et Complete! et Complete! et Complete! et Complete! et Complete! et Complete!	
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#### Report No.: AGC03293171101FE03 Page 8 of 72

#### **5. SYSTEM TEST CONFIGURATION 5.1. CONFIGURATION OF EUT SYSTEM**

Configure 1: (Normal hopping)

EUT

Configure 2: (Control continuous TX)

	H		palot		SC
EUT	2	Control box		PC	
					TF T

#### **5.2. EQUIPMENT USED IN EUT SYSTEM**

ltem	Equipment	Mfr/Brand	Model/Type No.	Remark
1	True Wireless Earphones	Sudio	Nivå	EUT
2	Battery	VDL	601115	Accessory
3	PC	APPLE	A1465	A.E
4	Control box	AIROHA	N/A	A.E
5	USB Cable	N/A	1m unshielded	A.E

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Report No.: AGC03293171101FE03 Page 9 of 72

#### **5.3. SUMMARY OF TEST RESULTS**

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249(a) §15.209	Radiated Emission	Compliant
§15.249(d)	Band Edges	Compliant
§15.207	Conduction Emission	N/A
§15.215	Bandwidth	Compliant

Note: N/A means it's not applicable to this item.

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#### 6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District B112-B113, Bldg.12, Baoan Bldg Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen 518012
NVLAP Lab Code	600153-0
Designation Number	CN5028
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0

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#### 7. TEST METHOD

All measurements contained in this report were conducted with ANSI C63.10-2013

#### 8. TEST EQUIPMENT LIST

#### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model S/N		Cal. Date	Cal. Due	
TEST RECEIVER	EST RECEIVER R&S		101206	Jun.20, 2017	Jun.19, 2018	
LISN	LISN R&S		100086	Aug.21, 2017	Aug.20, 2018	

#### TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.20, 2017	Jun.19, 2018
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.08, 2017	Dec.07, 2018
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.20, 2017	Sep.19, 2018
preamplifier	ChengYi	EMC184045SE	980508	Sep.15, 2017	Sep.14, 2018
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 18, 2017	May 17, 2019
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.20, 2017	Jun.19, 2018
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2018
Loop Antenna	A.H.Systems,Inc	SAS-562B	<b>C</b> <sup>M</sup>	Mar. 01, 2016	Feb. 28, 2018

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#### Report No.: AGC03293171101FE03 Page 12 of 72

### 9. RADIATED EMISSION

#### 9.1TEST LIMIT

Standard FCC15.249

Fundamental	Field Strength of Fundamental	Field Strength of Harmonics
Frequency	(millivolts/meter)	(microvolts/meter)
900-928MHz	50	500
2400-2483.5MHz	50 6 6	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

#### Standard FCC 15.209

Frequency	Distance	Field Strengths Limit					
(MHz)	Meters	μ V/m	dB(µV)/m				
0.009 ~ 0.490	300	2400/F(kHz)					
0.490 ~ 1.705	30	24000/F(kHz)					
1.705 ~ 30	30	30	Stand Contraction of Contraction of Contraction				
30 ~ 88	3	100	40.0				
88 ~ 216	3 <b>_ C</b>	150	43.5				
216 ~ 960	3	200	46.0				
960 ~ 1000	3	500	54.0				
Above 1000	3 A GC	Other:74.0 dB(µV)/m (Average)	(Peak) 54.0 dB(µV)/m				

Remark: (1) Emission level dB $\mu$  V = 20 log Emission level  $\mu$  V/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

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Report No.: AGC03293171101FE03 Page 13 of 72

#### 9.2. MEASUREMENT PROCEDURE

- The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)
- The measuring distance of 3m shall used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)
- 3. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.
- 4. The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- 5. All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform(Below 1GHz)
- 6. All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak & AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)

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Report No.: AGC03293171101FE03 Page 14 of 72

	Spectrum Parameter	Setting
(a) and	Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
C Pres	Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
	Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Freedom & Columb	Start ~Stop Frequency	1GHz~26.5GHz RBW 2MHz/ VBW 6MHz for Peak, RBW 1.5MHz/ VBW 10Hz for Average
	Receiver Parameter	Setting
8 <i>1</i> 54	Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
~.C *	Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
	Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

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

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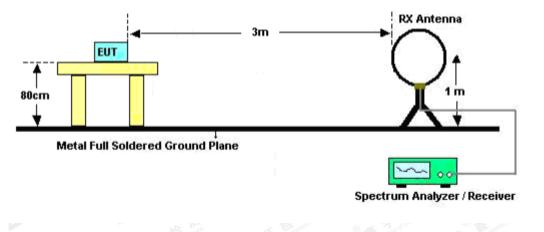




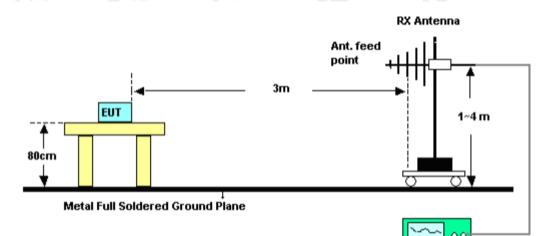
Report No.: AGC03293171101FE03 Page 15 of 72

#### 9.3. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



#### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



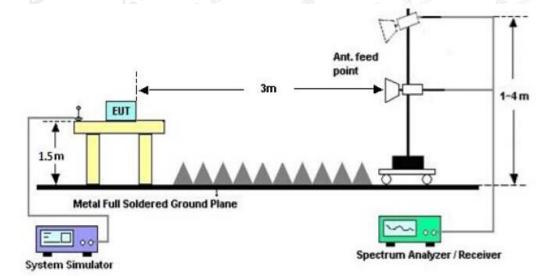
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Spectrum Analyzer / Receiver



Report No.: AGC03293171101FE03 Page 16 of 72



#### RADIATED EMISSION TEST SETUP ABOVE 1000MHz

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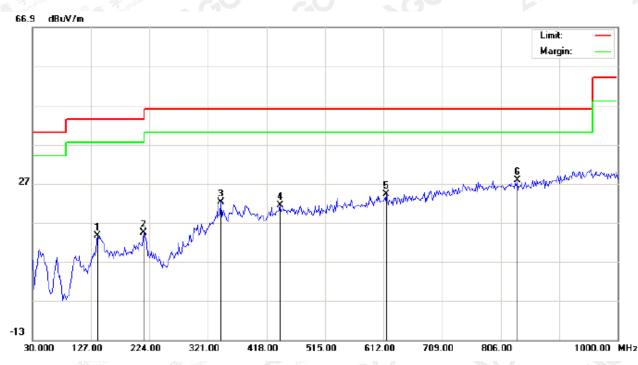
Report No.: AGC03293171101FE03 Page 17 of 72

# 9.4. TEST RESULT (Worst modulation: GFSK) FOR BR/EDR

#### **RADIATED EMISSION BELOW 30MHz**

No emission found between lowest internal used/generated frequencies to 30MHz. **RADIATED EMISSION BELOW 1GHz** 

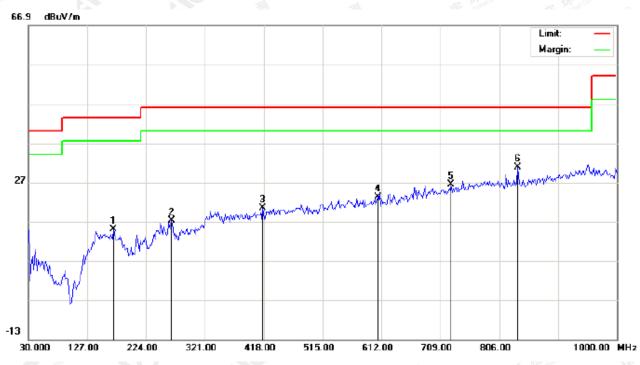
RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL-HORIZONTAL



Ν	lo.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		-	MHz	dBu∀	dB/m	dBu\//m	dBuV/m	dB		cm	degree	
Γ	1		138.3167	-0.85	14.41	13.56	43.50	-29.94	peak			
	2		214.3000	3.93	10.54	14.47	43.50	-29.03	peak			
	3		342.0167	3.92	18.21	22.13	46.00	-23.87	peak			
Γ	4		440.6333	1.11	20.31	21.42	46.00	-24.58	peak			
	5		616.8500	0.47	23.77	24.24	46.00	-21.76	peak			
	6	*	833.4833	0.56	27.31	27.87	46.00	-18.13	peak			

#### **RESULT: PASS**

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RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL -VERT	ICAL
--	------

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBu∀/m	dBuV/m	dB		cm	degree	
1		170.6500	0.28	14.66	14.94	43.50	-28.56	peak			
2		266.0333	2.83	14.38	17.21	46.00	-28.79	peak			
3		416.3833	0.74	19.57	20.31	46.00	-25.69	peak			
4		605.5333	0.28	22.85	23.13	46.00	-22.87	peak			
5		726.7833	0.37	25.96	26.33	46.00	-19.67	peak			
6	*	836.7167	3.40	27.31	30.71	46.00	-15.29	peak			

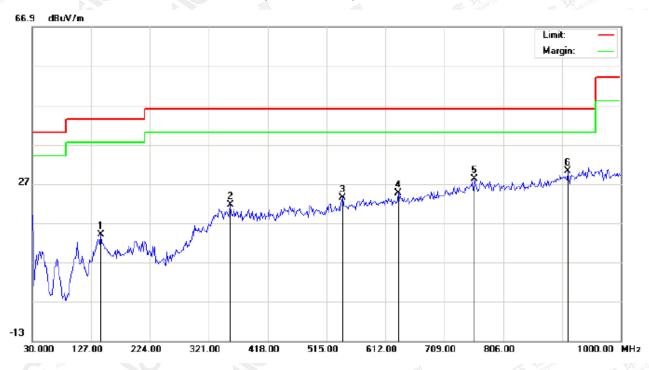
#### **RESULT: PASS**

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

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

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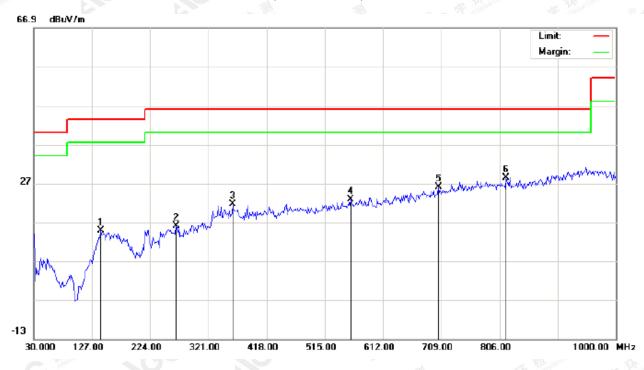
RADIATED EMISSION TEST- (30MHz-1GHz)-MIDDLE CHANNEL-HORIZONTAL

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∨	dB/m	dBu∀/m	dBuV/m	dB		cm	degree	
1		143.1667	-0.38	14.43	14.05	43.50	-29.45	peak			
2		356.5667	2.84	18.78	21.62	46.00	-24.38	peak			
3		540.8667	1.17	22.23	23.40	46.00	-22.60	peak			
4		633.0167	0.75	23.81	24.56	46.00	-21.44	peak			
5		759.1167	1.46	26.76	28.22	46.00	-17.78	peak			
6	*	912.7000	1.32	28.96	30.28	46.00	-15.72	peak			

**RESULT: PASS** 

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RADIATED EMISSION TEST- (30MHz-1GHz)- MIDDLE CHANNEL -VERTICAL

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		141.5500	-0.32	15.21	14.89	43.50	-28.61	peak			
2		267.6500	1.61	14.43	16.04	46.00	-29.96	peak			
3		361.4166	2.82	18.82	21.64	46.00	-24.36	peak			
4		558.6500	0.26	22.52	22.78	46.00	-23.22	peak			
5		704.1500	0.76	25.31	26.07	46.00	-19.93	peak			
6	*	817.3167	1.18	27.32	28.50	46.00	-17.50	peak			

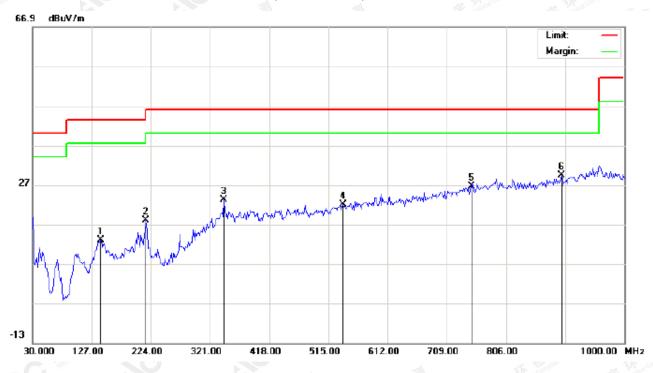
#### **RESULT: PASS**

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

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

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RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL-HORIZONTAL

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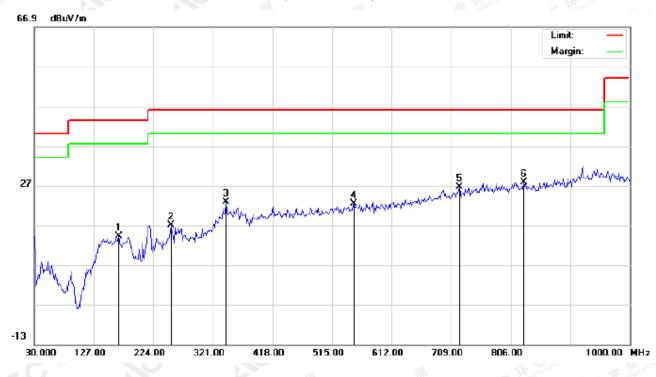
GC

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBu\//m	dBuV/m	dB		cm	degree	
1		141.5500	-1.75	14.82	13.07	43.50	-30.43	peak			
2		215.9167	7.71	10.38	18.09	43.50	-25.41	peak			
3		343.6333	4.88	18.32	23.20	46.00	-22.80	peak			
4		539.2500	-0.15	22.19	22.04	46.00	-23.96	peak			
5		749.4167	0.02	26.61	26.63	46.00	-19.37	peak			
6	*	896.5333	0.92	28.52	29.44	46.00	-16.56	peak			

**RESULT: PASS** 

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RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL -VERTICAL

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		167.4167	-0.69	14.86	14.17	43.50	-29.33	peak			
2		253.1000	3.02	13.99	17.01	46.00	-28.99	peak			
3		342.0167	4.61	18.21	22.82	46.00	-23.18	peak			
4		550.5667	-0.04	22.48	22.44	46.00	-23.56	peak			
5		721.9333	0.72	25.82	26.54	46.00	-19.46	peak			
6	*	827.0167	0.54	27.31	27.85	46.00	-18.15	peak			

#### **RESULT: PASS**

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

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

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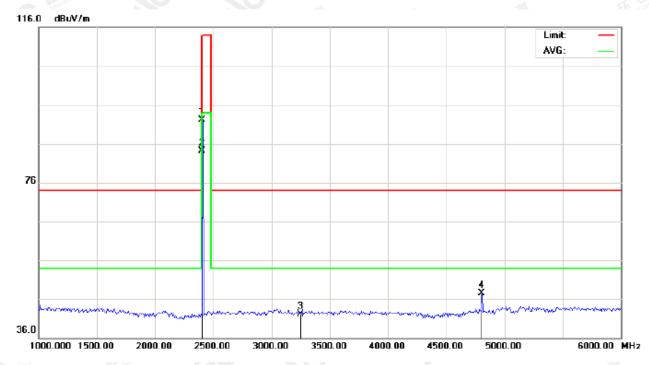
Report No.: AGC03293171101FE03 Page 23 of 72

#### **RADIATED EMISSION ABOVE 1GHz**

(Worst modulation: GFSK)

FOR BR/EDR

#### RADIATED EMISSION TEST- (ABOVE 1GHz)-LOW CHANNEL-HORIZONTAL

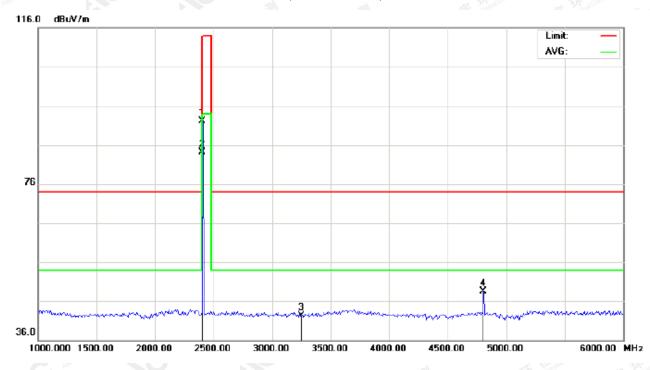


No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	•	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2402.000	81.71	10.32	92.03	114.00	-21.97	peak			
2	*	2402.000	73.84	10.32	84.16	94.00	-9.84	AVG	100	40	
3		3251.000	30.22	11.88	42.10	74.00	-31.90	peak			
4		4804.000	39.74	7.69	47.43	74.00	-26.57	peak			

#### **RESULT: PASS**

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#### RADIATED EMISSION TEST- (ABOVE 1GHz)-LOW CHANNEL- VERTICAL

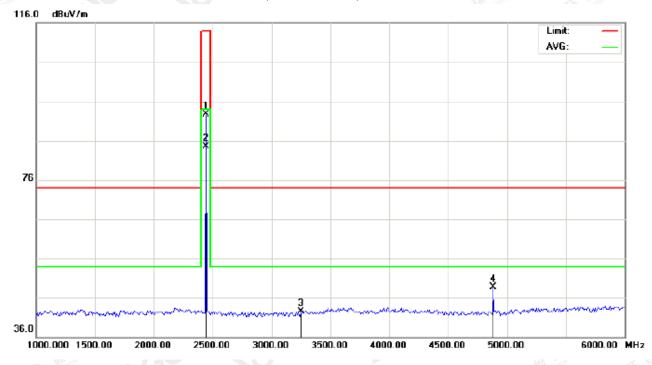
N	lo.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		-	MHz	dBu∨	dB/m	dBu\//m	dBuV/m	dB		cm	degree	
	1		2402.000	81.69	10.32	92.01	114.00	-21.99	peak			
	2	*	2402.000	73.70	10.32	84.02	94.00	-9.98	AVG	100	56	
	3		3251.000	30.40	11.88	42.28	74.00	-31.72	peak			
Γ	4		4804.000	40.88	7.69	48.57	74.00	-25.43	peak			

**RESULT: PASS** 

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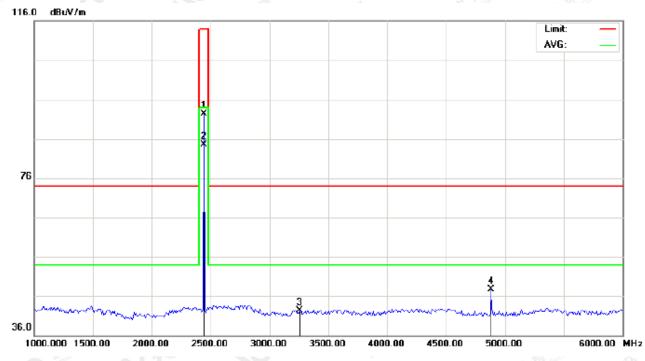
#### RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL-HORIZONTAL

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2441.000	82.25	10.36	92.61	114.00	-21.39	peak			
2	*	2441.000	74.21	10.36	84.57	94.00	-9.43	AVG	100	39	
3		3251.000	30.57	11.88	42.45	74.00	-31.55	peak			
4		4882.000	40.88	7.89	48.77	74.00	-25.23	peak			

**RESULT: PASS** 

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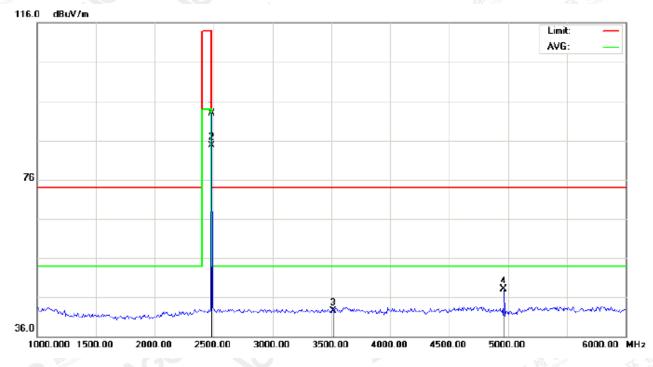
#### RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL- VERTICAL

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	•	MHz	dBu∀	dB/m	dBuV/m	dBu∨/m	dB		cm	degree	
1		2441.000	81.99	10.36	92.35	114.00	-21.65	peak			
2	*	2441.000	74.06	10.36	84.42	94.00	-9.58	AVG	100	55	
3		3256.000	30.39	11.88	42.27	74.00	-31.73	peak			
4		4882.000	39.81	7.89	47.70	74.00	-26.30	peak			

**RESULT: PASS** 

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#### RADIATED EMISSION TEST- (ABOVE 1GHz)-HIGH CHANNEL-HORIZONTAL

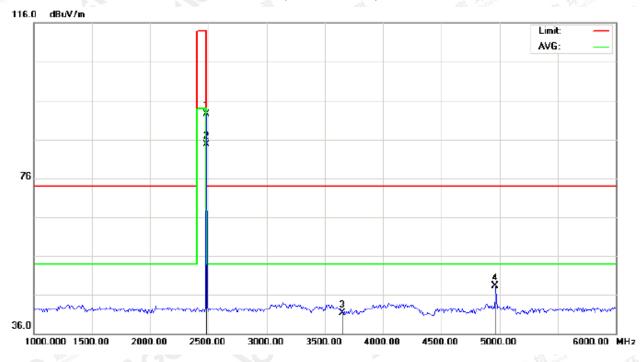
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2480.000	82.47	10.41	92.88	114.00	-21.12	peak			
2	*	2480.000	74.28	10.41	84.69	94.00	-9.31	AVG	100	40	
3		3516.000	30.29	12.21	42.50	74.00	-31.50	peak			
4		4960.000	40.01	8.09	48.10	74.00	-25.90	peak			

**RESULT: PASS** 

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#### RADIATED EMISSION TEST- (ABOVE 1GHz)-HIGH CHANNEL- VERTICAL

N	. M	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBu∀/m	dBuV/m	dB		cm	degree	
1		2480.000	82.19	10.41	92.60	114.00	-21.40	peak			
2	*	2480.000	74.20	10.41	84.61	94.00	-9.39	AVG	100	55	
3		3652.000	28.28	13.05	41.33	74.00	-32.67	peak			
4		4960.000	40.16	8.09	48.25	74.00	-25.75	peak			

#### **RESULT: PASS**

Note: 6~25GHz at least have 20dB margin. No recording in the test report.

Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.

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

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Field strength of the fundamental signal

#### 1Mbps Result:

Peak value

Reading Level	Factor	Measurement	Limit	Over	Antenna
(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
81.71	10.32	92.03	114	-21.97	Horizontal
81.69	10.32	92.01	114	-21.99	Vertical
82.25	10.36	92.61	114 🐋	-21.39	Horizontal
81.99	10.36	92.35	114	-21.65	Vertical
82.47	10.41	92.88	114	-21.12	Horizontal
82.19	10.41	92.60	114	-21.40	Vertical
	Level (dBuv) 81.71 81.69 82.25 81.99 82.47	Level         Factor           (dBuv)         (dB/m)           81.71         10.32           81.69         10.32           82.25         10.36           81.99         10.36           82.47         10.41	LevelFactorMeasurement(dBuv)(dB/m)(dBuv/m)81.7110.3292.0381.6910.3292.0182.2510.3692.6181.9910.3692.3582.4710.4192.88	LevelFactorMeasurementLimit(dBuv)(dB/m)(dBuv/m)(dBuv/m)81.7110.3292.0311481.6910.3292.0111482.2510.3692.6111481.9910.3692.3511482.4710.4192.88114	LevelFactorMeasurementLimitOver(dBuv)(dB/m)(dBuv/m)(dBuv/m)(dB)81.7110.3292.03114-21.9781.6910.3292.01114-21.9982.2510.3692.61114-21.3981.9910.3692.35114-21.6582.4710.4192.88114-21.12

#### Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	73.84	10.32	84.16	94	-9.84	Horizontal
2402	73.70	10.32	84.02	94	-9.98	Vertical
2441	74.21	10.36	84.57	94	-9.43	Horizontal
2441	74.06	10.36	84.42	94	-9.58	Vertical
2480	74.28	10.41	84.69	94	-9.31	Horizontal
2480	74.20	10.41	84.61	94	-9.39	Vertical

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#### Report No.: AGC03293171101FE03 Page 30 of 72

#### 2Mbps Result:

#### Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	81.63	10.32	91.95	114	-22.05	Horizontal
2402	81.55	10.32	91.87	114	-22.13	Vertical
2441	82.17	10.36	92.53	114	-21.47	Horizontal
2441	81.93	10.36	92.29	114	-21.71	Vertical
2480	82.40	10.41	92.81	114	-21.19	Horizontal
2480	82.10	10.41	92.51	114	-21.49	Vertical

#### Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	73.75	10.32	84.07	94	-9.93	Horizontal
2402	73.60	10.32	83.92	94	-10.08	Vertical
2441	74.15	10.36	84.51	94	-9.49	Horizontal
2441	73.99	10.36	84.35	94	-9.65	Vertical
2480	74.19	10.41	84.60	94	-9.40	Horizontal
2480	74.12	10.41	84.53	94	-9.47	Vertical

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#### Report No.: AGC03293171101FE03 Page 31 of 72

#### 3Mbps Result:

Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	81.57	10.32	91.89	114	-22.11	Horizontal
2402	81.43	10.32	91.75	114	-22.25	Vertical
2441	82.11	10.36	92.47	114	-21.53	Horizontal
2441	81.85	10.36	92.21	114	-21.79	Vertical
2480	82.32	10.41	92.73	114	-21.27	Horizontal
2480	82.02	10.41	92.43	114	-21.57	Vertical

#### Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	73.69	10.32	84.01	94	-9.99	Horizontal
2402	73.49	10.32	83.81	94	-10.19	Vertical
2441	74.07	10.36	84.43	94	-9.57	Horizontal
2441	73.85	10.36	84.21	94	-9.79	Vertical
2480	74.00	10.41	84.41	94	-9.59	Horizontal
2480	74.02	10.41	84.43	94	-9.57	Vertical

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Report No.: AGC03293171101FE03 Page 32 of 72

#### **10. BAND EDGE EMISSION**

#### 10.1. MEASUREMENT PROCEDURE

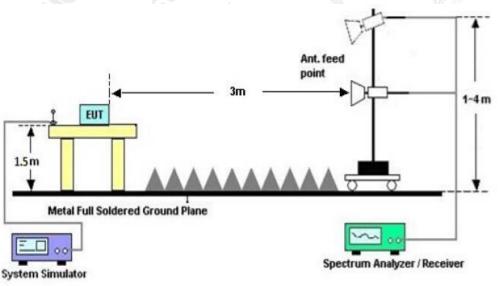
1. The EUT operates at hopping-off test mode. The lowest or highest channels are tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.

2. Max hold the trace of the setup 1,and the EUT operates at hopping-on test mode to verify the largest spurious emissions power.

3. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission.

Start frequency(MHz)	Stop frequency(MHz)
2200	2405
2478	2500

#### 10.2 TEST SETUP



RADIATED EMISSION TEST SETUP

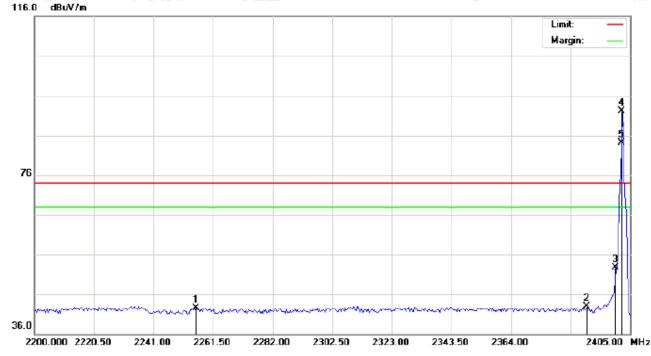
The results shown in this jest report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at attp://www.agc.gett.com.





# 10.3 RADIATED TEST RESULT (Worst modulation: GFSK) FOR BR/EDR

# TEST PLOT OF BAND EDGE FOR LOW CHANNEL-Horizontal



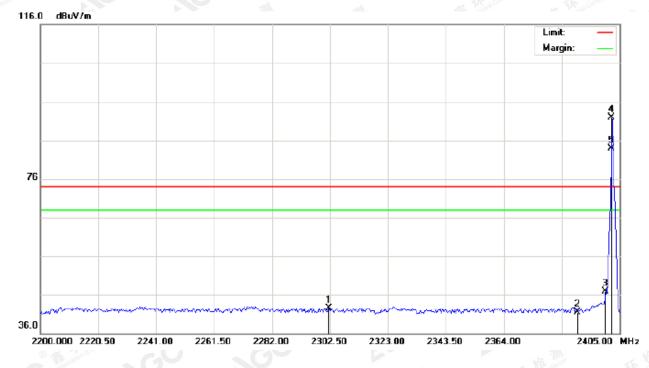
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2255.692	32.32	10.16	42.48	74.00	-31.52	peak			
2		2390.000	32.50	10.31	42.81	74.00	-31.19	peak			
3		2400.000	42.47	10.32	52.79	74.00	-21.21	peak			
4	*	2402.000	81.81	10.32	92.13	74.00	18.13	peak			
5	Х	2402.000	73.79	10.32	84.11	74.00	10.11	AVG	100	40	

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Report No.: AGC03293171101FE03 Page 34 of 72



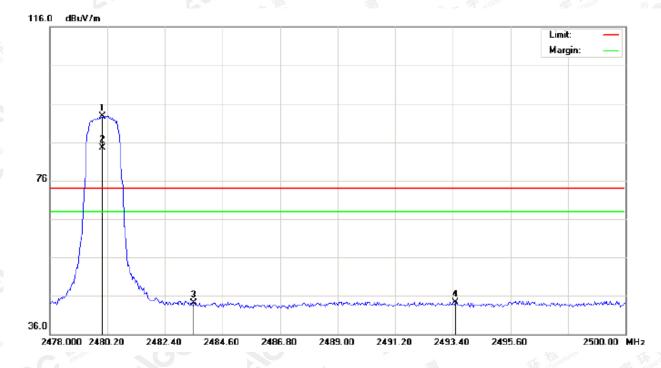
#### TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	•	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2302.000	32.25	10.21	42.46	74.00	-31.54	peak			
2		2390.000	31.21	10.31	41.52	74.00	-32.48	peak			
3		2400.000	36.56	10.32	46.88	74.00	-27.12	peak			
4	*	2402.000	81.51	10.32	91.83	74.00	17.83	peak			
5	Х	2402.000	73.54	10.32	83.86	74.00	9.86	AVG	100	55	

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Report No.: AGC03293171101FE03 Page 35 of 72



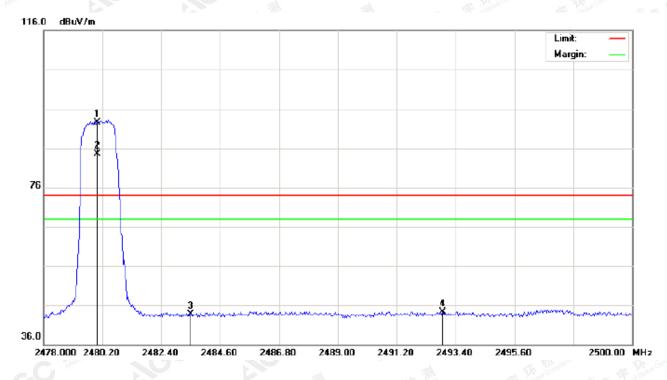
#### TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height		Comment
	•	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	82.22	10.41	92.63	74.00	18.63	peak			
2	Х	2480.000	74.19	10.41	84.60	74.00	10.60	AVG	100	41	
3		2483.500	33.69	10.41	44.10	74.00	-29.90	peak			
4		2493.510	33.87	10.42	44.29	74.00	-29.71	peak			

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Report No.: AGC03293171101FE03 Page 36 of 72



#### TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-Vertical

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height		Comment
	-	MHz	dBu∀	dB/m	dBu\//m	dBuV/m	dB		cm	degree	
1	*	2480.000	82.12	10.41	92.53	74.00	18.53	peak			
2	Х	2480.000	74.10	10.41	84.51	74.00	10.51	AVG	100	51	
3		2483.500	33.26	10.41	43.67	74.00	-30.33	peak			
4		2492.923	33.88	10.42	44.30	74.00	-29.70	peak			

#### **RESULT: PASS**

Note: Factor=Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system. Hopping on mode and Hopping off mode have been tested, but only worst case reported.

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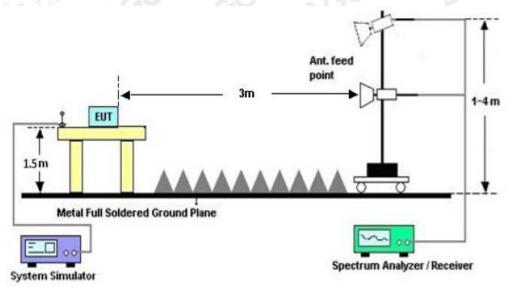
#### Report No.: AGC03293171101FE03 Page 37 of 72

# 11. 20DB BANDWIDTH

#### 11.1. MEASUREMENT PROCEDURE

- 1. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 2. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hoping channel
- RBW  $\geq$  1% of the 20 dB bandwidth, VBW  $\geq$  3RBW; Sweep = auto; Detector function = peak
- 3. Set SPA Trace 1 Max hold, then View.

# 11.2. TEST SET-UP

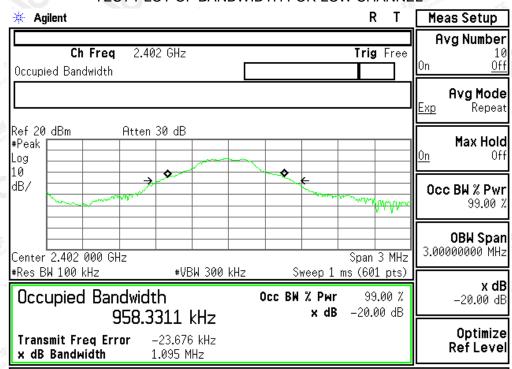


# **11.3. LIMITS AND MEASUREMENT RESULTS**

## FOR BR/EDR

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT					
	Measurement Result				
Applicable Limits		Test Data (MHz)		Decult	
		99%OBW (MHz)	-20dB BW(MHz)	Result	
The Constant of American	Low Channel	0.958	1.095	PASS	
N/A	Middle Channel	0.951	1.107	PASS	
	High Channel	0.954	1.103	PASS	

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TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

#### Copyright 2000–2006 Agilent Technologies

#### 🔆 Agilent R Meas Setup Т Avg Number Ch Frea 2.441 GHz Trig Free 0n Off Occupied Bandwidth Avg Mode Repeat Exp Atten 30 dB Ref 20 dBm Max Hold #Peak Ûn Log 10 ¢ ¢ dB/ Occ BW % Pwr UNA A 99.00 % **OBW** Span 3.00000000 MH; Center 2.441 000 GHz Span 3 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1 ms (601 pts) x dB Occupied Bandwidth Occ BW % Pwr 99.00 % -20.00 dE -20.00 dB x dB 951.1716 kHz Optimize **Transmit Freg Error** -26.077 kHz **Ref Level** x dB Bandwidth 1.107 MHz Copyright 2000–2006 Agilent Technologies

TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

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* Agilent	RT	Meas Setup
Ch Freq 2.48 GHz Occupied Bandwidth	Trig Fre	e Avg Number 10 On <u>Off</u>
	<u> </u>	Avg Mode
Ref 20 dBm Atten 30 dB #Peak Log 10		Max Hold
dB/		<b>Occ B₩ % Pwr</b> 99.00 %
Center 2.480 000 GHz	Span 3 MH	
<pre>#Res BW 100 kHz #VBW 300 kHz Occupied Bandwidth 953.8884 kHz</pre>	Sweep 1 ms (601 pts Occ BW % Pwr 99.00 % x dB -20.00 dE	x dB -20.00 dB
Transmit Freq Error -26.758 kHz x dB Bandwidth 1.103 MHz		Optimize RefLevel
Copyright 2000–2006 Agilent Technologie	s	

# TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

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BLUET	OOTH 2MBPS LIN	MITS AND MEASU	REMENT RESULT		
	Measurement Result				
Applicable Limits		Test Data (MHz)			
		99%OBW (MHz)	-20dB BW(MHz)	Result	
The continues	Low Channel	1.290	1.389	PASS	
N/A	Middle Channel	1.289	1.377	PASS	
GU	High Channel	1.287	1.385	PASS	
	110-		M. M. Go	ober Aus	

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#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

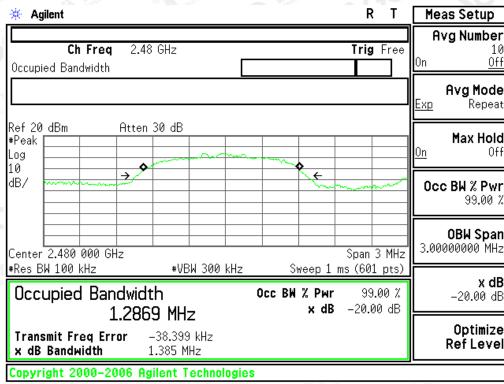
* Agilent	RT	Meas Setup
Ch Freq 2.402 GHz Occupied Bandwidth	Trig Free	Avg Number 10 On <u>Off</u>
		<b>Avg Mode</b> <u>Exp</u> Repeat
Ref 20 dBm Atten 30 dB #Peak Log 10		Max Hold <u>On</u> Off
		<b>0cc BW % Pwr</b> 99.00 %
Center 2.402 000 GHz	Span 3 MHz	<b>OBW Span</b> 3.00000000 MHz
*Res BW 100 kHz *VBW 300 kH Occupied Bandwidth 1.2900 MHz	Hz Sweep 1 ms (601 pts) Occ BW % Pwr 99.00 % × dB -20.00 dB	<b>x dB</b> –20.00 dB
L.2900 MHZ Transmit Freq Error -30.531 kHz x dB Bandwidth 1.389 MHz		Optimize Ref Level
Copyright 2000-2006 Agilent Technolog	gies	

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* Agilent	RT	Meas Setup
Ch Freq 2.441 GHz	Trig Free	Avg Numbe
		Avg Mod Exp Repe
ef 20 dBm Atten 30 dB Peak g 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		<u>Мах Но</u> <u>0n</u> 0
	K.← ····································	0cc BW % Pv 99.00
enter 2.441 000 GHz	Span 3 MHz	<b>OBW Sp</b> a 3.00000000 M
oodapiod banamaan	Sweep 1 ms (601 pts) Occ BW % Pwr 99.00 % x dB -20.00 dB	<b>x (</b> -20.00
<b>1.2885 MHz</b> Transmit Freq Error –37.294 kHz x dB Bandwidth 1.377 MHz		Optimiz RefLev
opyright 2000-2006 Agilent Technologies		
TEST PLOT OF BANDWID	TH FOR HIGH CHANNE	Lusano
Agilent	RT	Meas Setup
Ch France - 0.40.00-	Trin Fran	Avg Numbe

#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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BLUET	OOTH 3MBPS LI	MITS AND MEASU	REMENT RESULT		
	Measurement Result				
Applicable Limits		Test Data (MHz)			
		99%OBW (MHz)	-20dB BW(MHz)	Result	
The second second	Low Channel	1.300	1.401	PASS	
N/A	Middle Channel	1.291	1.399	PASS	
SGC "	High Channel	1.285	1.391	PASS	
	110-		Mind Con	Har Ale	

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#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

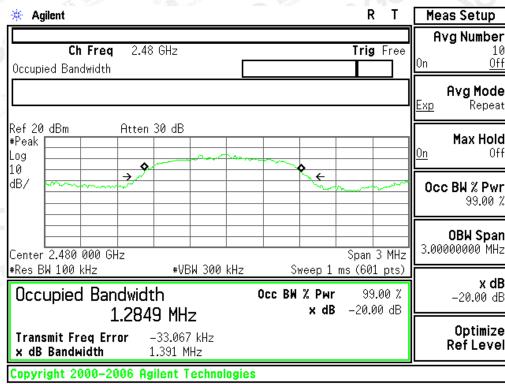
* Agilent	R T Meas Setup
Ch Freq 2.402 GHz Occupied Bandwidth	Trig Free On Of
	Avg Mode Exp Repea
Ref 20 dBm Atten 30 dB #Peak Log 10	Max Hold
dB/	Occ BW % Pwi 99.00 \$
Center 2.402 000 GHz	Span 3 MHz 3.0000000 MHz
#Res BW 100 kHz #VBW 300 kHz           Occupied Bandwidth           1.2995 MHz	Hz Sweep 1 ms (601 pts) Осс ВМ % Рыг 99.00 % х dB -20.00 dB
Transmit Freq Error -28.974 kHz x dB Bandwidth 1.401 MHz	Optimize Ref Leve
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🔆 Agilent			R	т [	Meas Setup
<b>Ch Freq</b> 2. Occupied Bandwidth	441 GHz		Trig F		Avg Number 1 On <u>Of</u>
	Ļ				Avg Mode Exp Repea
Peak	n 30 dB				Max Hold On Of
dB/			~~~~	~~~~	Occ BW % Pwi 99.00 \$
Center 2.441 000 GHz			Span 3		<b>OBW Spai</b> 3.00000000 MH;
Res BW 100 kHz Occupied Bandwid 1 20	<u>+VBW 300 kHz</u> dth 12 MHz	Sweep 1 r Occ BW % Pwr x dB	ms (601 ) 99.0 –20.00	0%	<b>x de</b> -20.00 de
エンン Transmit Freq Error x dB Bandwidth	-38.169 kHz 1.399 MHz				Optimize RefLeve
Copyright 2000-2006	Agilent Technologie	S			
TEST P	LOT OF BANDWI	DTH FOR HIG	Н СНА	NNEI	Attestation
* Agilent	C 4 Nor of Car	- Staton	R	т <u>[</u>	Meas Setup
					0

#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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# **12. FCC LINE CONDUCTED EMISSION TEST**

## 12.1. LIMITS OF LINE CONDUCTED EMISSION TEST

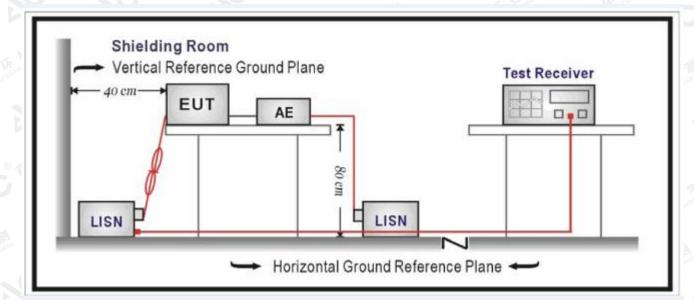
Francisco	Maximum RF Line Voltage			
Frequency	Q.P.( dBuV)	Average( dBuV)		
150kHz~500kHz	66-56	56-46		
500kHz~5MHz	© 56 56 °	46		
5MHz~30MHz	60	50		

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.

## 12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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Report No.: AGC03293171101FE03 Page 45 of 72

#### 12.3. 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 or PC which received 120V/60Hzpower 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.

## 12.4. 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.

## 12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

N/A

Note: The BT function of EUT didn't work when charging.

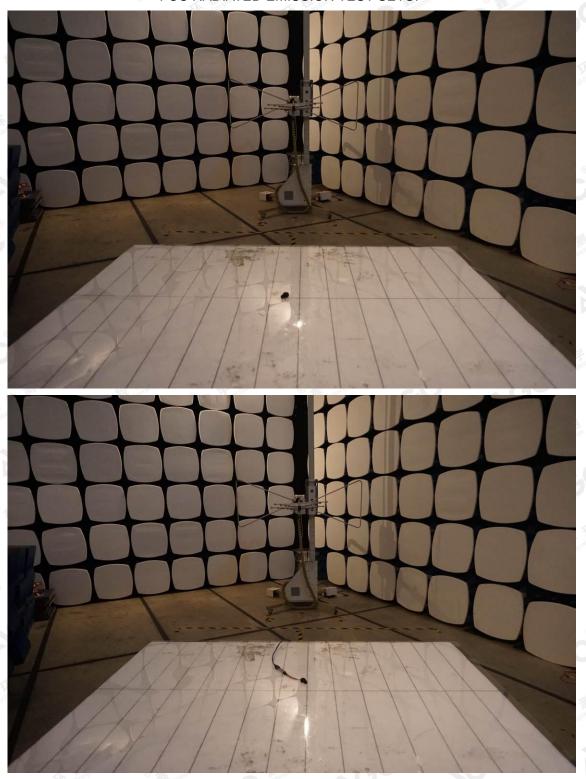
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Report No.: AGC03293171101FE03 Page 46 of 72

APPENDIX A: PHOTOGRAPHS OF TEST SETUP FCC RADIATED EMISSION TEST SETUP

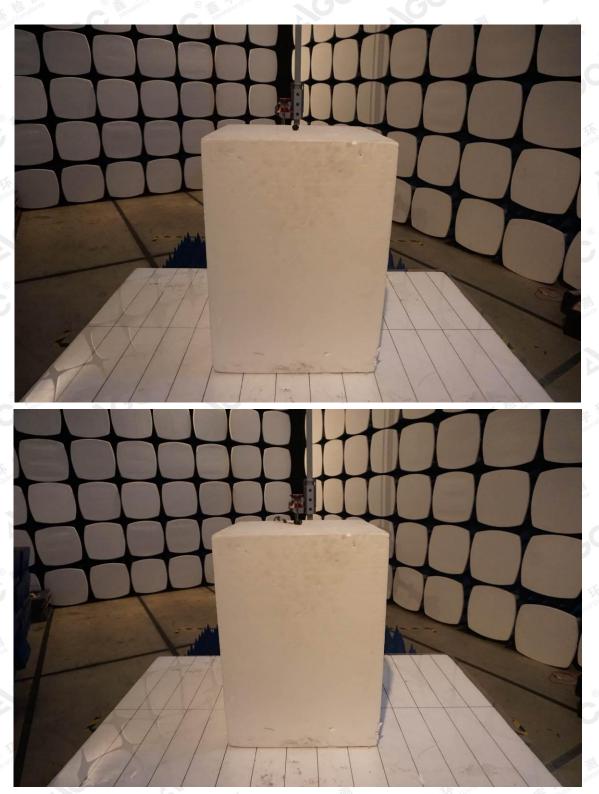


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Report No.: AGC03293171101FE03 Page 47 of 72



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Report No.: AGC03293171101FE03 Page 48 of 72

# **APPENDIX B: PHOTOGRAPHS OF EUT**

TOTAL VIEW OF EUT





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#### Report No.: AGC03293171101FE03 Page 49 of 72



#### FRONT VIEW OF EUT



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Report No.: AGC03293171101FE03 Page 50 of 72

# BACK VIEW OF EUT



LEFT VIEW OF EUT



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Report No.: AGC03293171101FE03 Page 51 of 72

# **RIGHT VIEW OF EUT**



Left VIEW OF EUT (Port)



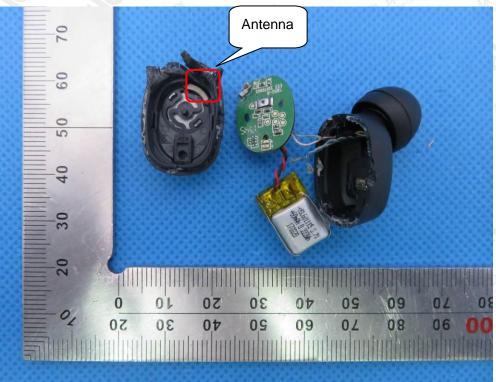
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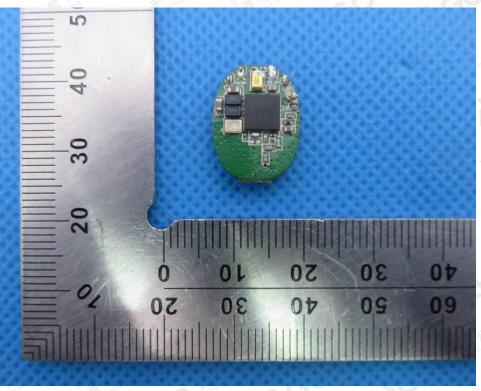


Report No.: AGC03293171101FE03 Page 52 of 72

# OPEN VIEW OF EUT



#### **INTERNAL VIEW OF EUT-1**

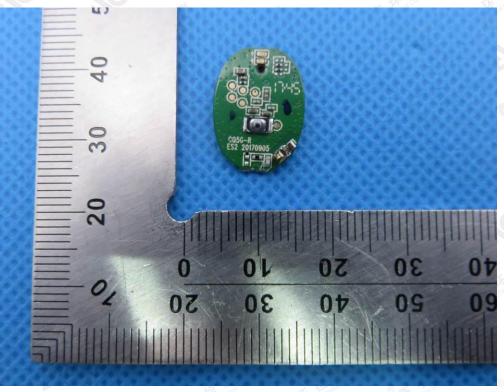


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Report No.: AGC03293171101FE03 Page 53 of 72

## INTERNAL VIEW OF EUT-2



**INTERNAL VIEW OF EUT-3** 



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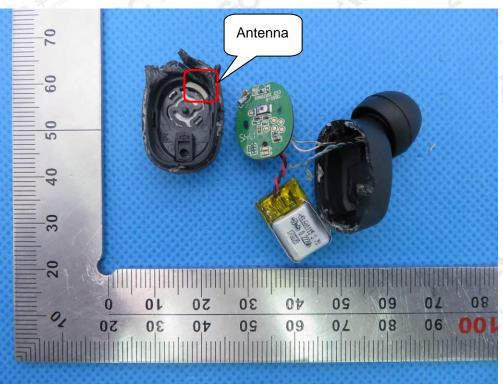


Report No.: AGC03293171101FE03 Page 54 of 72

Right VIEW OF EUT (Port)



**OPEN VIEW OF EUT** 

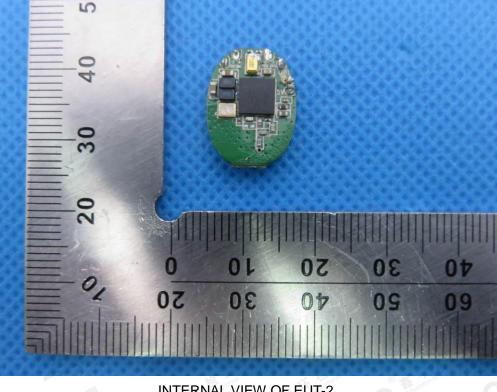


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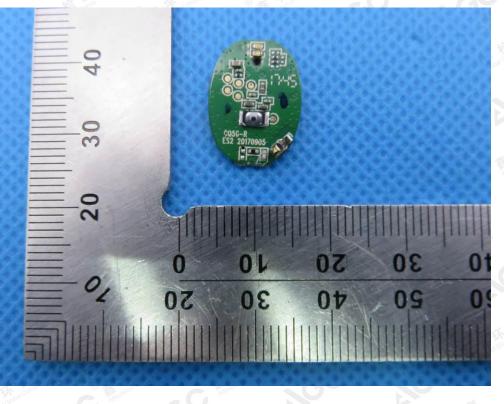


Report No.: AGC03293171101FE03 Page 55 of 72

#### **INTERNAL VIEW OF EUT-1**



**INTERNAL VIEW OF EUT-2** 



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## **INTERNAL VIEW OF EUT-3**



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Report No.: AGC03293171101FE03 Page 57 of 72

# Charging Dock VIEW OF EUT(Port)-1



VIEW OF EUT(Port)-2

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Report No.: AGC03293171101FE03 Page 58 of 72

Series Model Sudio Nivå white TOTAL VIEW OF EUT



#### TOP VIEW OF EUT



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Report No.: AGC03293171101FE03 Page 59 of 72

BOTTOM VIEW OF EUT

FRONT VIEW OF EUT



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Report No.: AGC03293171101FE03 Page 60 of 72

# BACK VIEW OF EUT



LEFT VIEW OF EUT



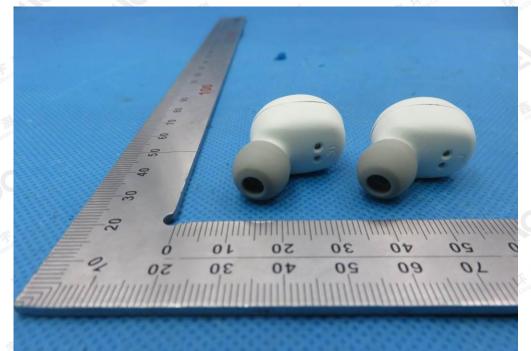
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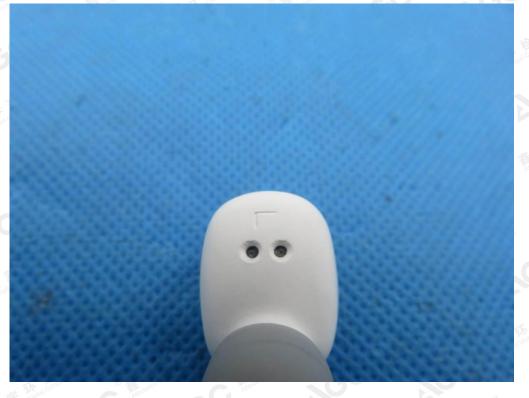


Report No.: AGC03293171101FE03 Page 61 of 72

## **RIGHT VIEW OF EUT**



VIEW OF EUT (Port)-left



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Report No.: AGC03293171101FE03 Page 62 of 72

# VIEW OF EUT (Port)-right

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Report No.: AGC03293171101FE03 Page 63 of 72

# Sudio Nivå camouflage TOTAL VIEW OF EUT





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#### Report No.: AGC03293171101FE03 Page 64 of 72

#### BOTTOM VIEW OF EUT



#### FRONT VIEW OF EUT



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Report No.: AGC03293171101FE03 Page 65 of 72

## BACK VIEW OF EUT



LEFT VIEW OF EUT



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Report No.: AGC03293171101FE03 Page 66 of 72

#### **RIGHT VIEW OF EUT**



#### VIEW OF EUT (Port)-left



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# VIEW OF EUT (Port)-right



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#### Report No.: AGC03293171101FE03 Page 68 of 72

# Sudio Nivå black TOTAL VIEW OF EUT





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Report No.: AGC03293171101FE03 Page 69 of 72

#### BOTTOM VIEW OF EUT



#### FRONT VIEW OF EUT



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Report No.: AGC03293171101FE03 Page 70 of 72

# BACK VIEW OF EUT



#### LEFT VIEW OF EUT



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Report No.: AGC03293171101FE03 Page 71 of 72

# **RIGHT VIEW OF EUT**



#### VIEW OF EUT (Port)-left



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Report No.: AGC03293171101FE03 Page 72 of 72

# VIEW OF EUT (Port)-right



# ----END OF REPORT----

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