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# FCC Test Report

# Report No.: AGC00454180101FE03

FCC ID	Ē	2AL9B-HY-615
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	FK of Global	Bluetooth Headphones
BRAND NAME		S.LAI
MODEL NAME	8	HY-615, GG-IRBH
CLIENT		SHENZHEN SHENGLAI TECHNOLOGY CO.,LIMITED
DATE OF ISSUE	111	Feb. 03, 2018
STANDARD(S) TEST PROCEDURE(S)	ianu :	FCC Part 15 Subpart C Section 15.249
REPORT VERSION	•	V1.0

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

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Report Version	Revise Time	Issued Date	Valid Version	Notes		
V1.0		Feb. 03, 2018	Valid	Initial release		

#### **Report Revise Record**

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Applicant	SHENZHEN SHENGLAI TECHNOLOGY CO., LIMITED		
Address	ROOM 709, BLOCK B, XINTIAN CENTURY BUSINESS CENTRE, FUMING ROAD, FUTIAN DISTRICT, SHENZHEN, CHINA		
Manufacturer	SHENZHEN SHENGLAI TECHNOLOGY CO.,LIMITED		
Address	ROOM 709, BLOCK B, XINTIAN CENTURY BUSINESS CENTRE, FUMING ROAD, FUTIAN DISTRICT, SHENZHEN,CHINA		
Product Designation	Bluetooth Headphones		
Brand Name	S.LAI		
Test Model	HY-615		
Series Model	GG-IRBH		
Difference description	All the same except for the appearance color.		
Date of test	Jan. 26, 2018 to Feb. 01, 2018		
Deviation	None State The State of State		
Condition of Test Sample	Normal		
Report Template	AGCRT-US-BR/RF		

**1. VERIFICATION OF CONFORMITY** 

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.

Jonhan Wand

Tested By

Jonhen Wang(Wang Yonghuan) Feb. 01, 2018

owes is

Reviewed By

Forrest Lei(Lei Yonggang)

Feb. 03, 2018

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## 2. GENERAL INFORMATION 2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following	g
--	---

Operation Frequency	2.402 GHz to 2.480GHz
RF Output Power	-1.84dBm(Max EIRP Power=Max radiation field-95.2)
Bluetooth Version	V4.2
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK
Number of channels	79 for BR/EDR
Hardware Version	V1.0
Software Version	V1.0
Antenna Designation	PCB Antenna
Antenna Gain	0dBi
Power Supply	DC 3.7V by battery

#### 2.2. TABLE OF CARRIER FREQUENCYS

**BR/EDR** channel List

Frequency Band	Channel Number	Frequency	
The sum of Contract of Stresson of Contract	0	2402MHz	
NOU		2403MHz	
The the and	The scontine Come of the state	GO TO SOUT	
C The survey of Counter C	38	2440 MHz	
2400~2483.5MHz	39	2441 MHz	
	40	2442 MHz	
The Constance Constance	C Barrier - C Barrier		
GC to C	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

NO.		TEST MOD	<b>DE DESCRIPTION</b>		
C To d Cool	auto of Gobalt Constant	Low ch	nannel GFSK		
2 2	SO	Middle o	channel GFSK	intere E	K Computerce
3		High cł	hannel GFSK	C Attestation of	Bonn CC
1 4 KB	C A Jona Constant	Low chan	nel π /4-DQPSK	30	
5 m <sup>con</sup>	40 × 60	Middle char	nnel π /4-DQPSK	AR TH	石 植 一
6		High chan	nel π /4-DQPSK	Final Global Comme	3 Fratation of Global C
7	T A MARCE R F A COM	Low ch	annel 8DPSK	- CC	
8	idea C Press	Middle c	hannel 8DPSK		
9		High ch	nannel 8DPSK	AF T	ha Compliance
10		BT Link	with charging	C Attestation of Co	a.C
11 In Comment	B R Franciscom	Allese allo	BT Link		

## 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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	Softwa	are Setting
	💑 AppoTech RF Control Kit V4.2.17	ی 🚺
8	IC Model CW6691x	Specification   FIX RX mode   (1)check FIX_RX_24xx   (2)check Frequency to set Frequency number
3	Port COM3 Rate: 921600	FIX TX mode (1)uncheck FIX_RX_24xx (2)check Frequency to set Frequency number (3)check power to set TX signal amplitude (4)Modulation Enable OFF
F.G	RF Trim Eix_RX_24x SingleTone Hopping: OFF	TX Modulation mode (1)uncheck FIX_RX_24xx (2)check Frequency to set Frequency number (3)check power to set TX signal amplitude (4)Modulation Enable ON (5)select Packet Type
	I → Frequency 2 (2-80) Tx Modulation: ON I   I → Power 7 (0-7) Packet Type: DH1 I	Hopping mode (1)uncheck FIX_PX_24xx (2)uncheck Fix-guency to enable Hopping ON and TX Modulation OFF
	Test scenario 3 Transmitter testl1010 pattern	(3) check power (4) select Packet Type

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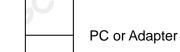
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# **5. SYSTEM TEST CONFIGURATION 5.1. CONFIGURATION OF EUT SYSTEM**

Configure 1: (Normal hopping)

EUT



Note: Owing to the EUT has own battery, testing may be performed while PC or adapter removed.

Configure 2: (Control continuous TX)



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

ltem	Equipment	Mfr/Brand	Model/Type No.	Remark
1	Bluetooth Headphones	S.LAI	HY-615	EUT
2	Battery	C ZNT C	402030	Accessory
3	PC PC	APPLE	A1465	A.E
4	Control box	DOFLY	N/A	A.E
5	Adapter	IPRO	NTR-S01	A.E
6	USB Cable	N/A	1m unshielded	A.E
7	Mobile Phone	VIVO	X5	A.E

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#### **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	Compliant
§15.215	Bandwidth	Compliant

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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		
Test Firm Registration Number	682566		
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	Equipment Manufacturer		S/N	Cal. Date	Cal. Due	
TEST RECEIVER	R&S	ESPI	101206	Jun.20, 2017	Jun.19, 2018	
LISN	R&S	ESH2-Z5	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> <u>-</u>	Mar. 01, 2016	Feb. 28, 2018

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# 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	E England Con Call					
30 ~ 88	3	100	40.0					
88 ~ 216	3	150	43.5					
216 ~ 960	3	200	46.0					
960 ~ 1000	3	500	54.0					
Above 1000	3 South States	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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#### 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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	Spectrum Parameter	Setting
al Comp	Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
C AME	Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
	Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Alternation of Contractor	Start ~Stop Frequency	1GHz~26.5GHz RBW 2MHz/ VBW 6MHz for Peak, RBW 1.5MHz/ VBW 10Hz for Average
	Receiver Parameter	Setting
© <i>15</i>	Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
C.C	Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
0	Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

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

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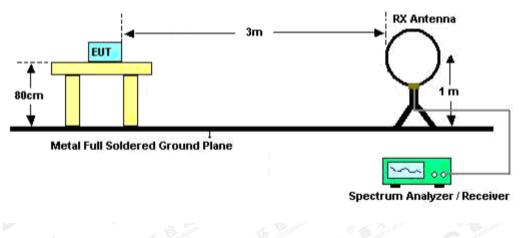




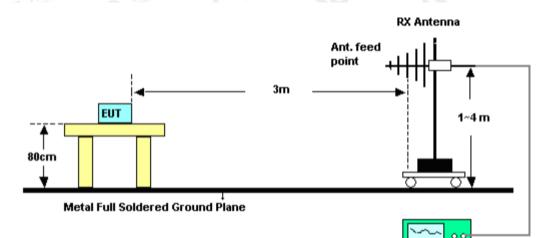
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#### 9.3. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



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



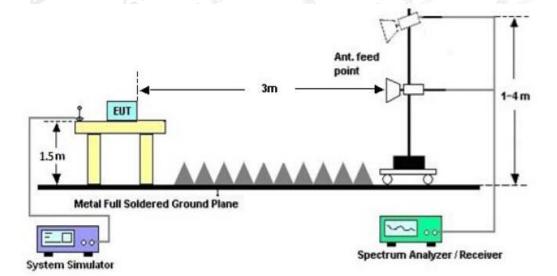
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Spectrum Analyzer / Receiver



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RADIATED EMISSION TEST SETUP ABOVE 1000MHz

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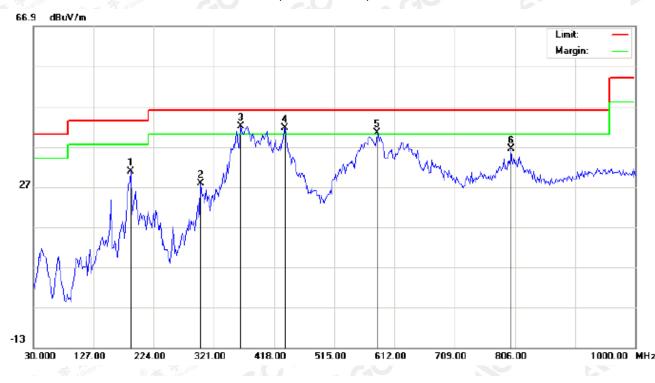
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# 9.4. TEST RESULT (Worst modulation: GFSK) FOR BR/EDR

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

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

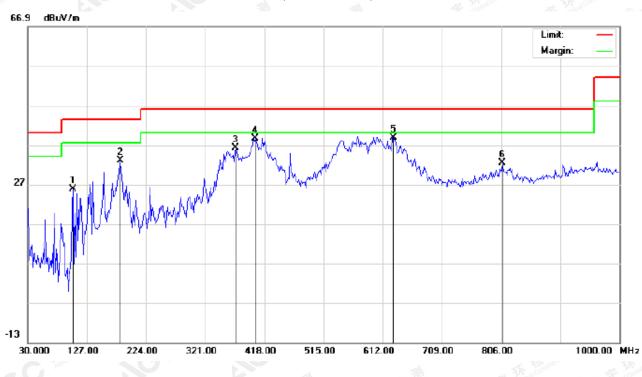
RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL-HORIZONTAL



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		186.8167	19.45	11.39	30.84	43.50	-12.66	peak			
2		299.9833	12.45	15.41	27.86	46.00	-18.14	peak			
3	*	364.6500	23.25	18.84	42.09	46.00	-3.91	peak			
4	İ	435.7833	21.53	20.16	41.69	46.00	-4.31	peak			
5	İ	584.5167	17.04	23.34	40.38	46.00	-5.62	peak			
6		799.5333	9.09	27.31	36.40	46.00	-9.60	peak			

RESULT: PASS

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RADIATED EMISSION TEST- (30MHz-1GHz)-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		104.3667	26.81	-0.93	25.88	43.50	-17.62	peak			
2		181.9667	19.35	13.57	32.92	43.50	-10.58	peak			
3		371.1167	17.31	18.88	36.19	46.00	-9.81	peak			
4		403.4500	19.52	19.17	38.69	46.00	-7.31	peak			
5	*	629.7833	15.48	23.40	38.88	46.00	-7.12	peak			
6		807.6167	4.99	27.32	32.31	46.00	-13.69	peak			

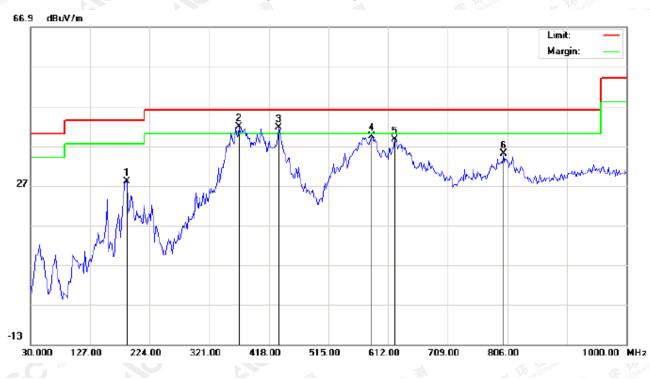
## **RESULT: PASS**

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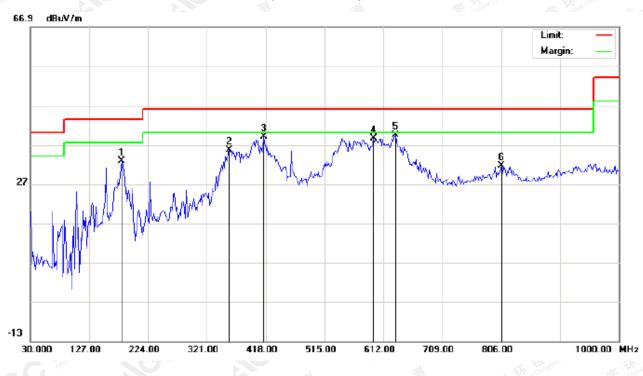
RADIATED EMISSION TEST- (30MHz-1GHz)-MIDDLE CHANNEL-HORIZONTAL

No.		Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBu∀/m	dBuV/m	dB		cm	degree	
1		186.8167	16.67	11.39	28.06	43.50	-15.44	peak			
2	*	369.5000	22.99	18.87	41.86	46.00	-4.14	peak			
3	İ	434.1667	21.57	20.11	41.68	46.00	-4.32	peak			
4		586.1332	16.03	23.38	39.41	46.00	-6.59	peak			
5		623.3167	14.73	23.79	38.52	46.00	-7.48	peak			
6		799.5333	7.68	27.31	34.99	46.00	-11.01	peak			

**RESULT: PASS** 

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

	٩٥.	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		180.3500	18.78	13.98	32.76	43.50	-10.74	peak			
Γ	2		358.1833	16.77	18.79	35.56	46.00	-10.44	peak			
Γ	3		414.7667	19.41	19.52	38.93	46.00	-7.07	peak			
Γ	4		595.8333	15.86	22.71	38.57	46.00	-7.43	peak			
	5	*	631.4000	15.91	23.43	39.34	46.00	-6.66	peak			
	6		806.0000	4.34	27.32	31.66	46.00	-14.34	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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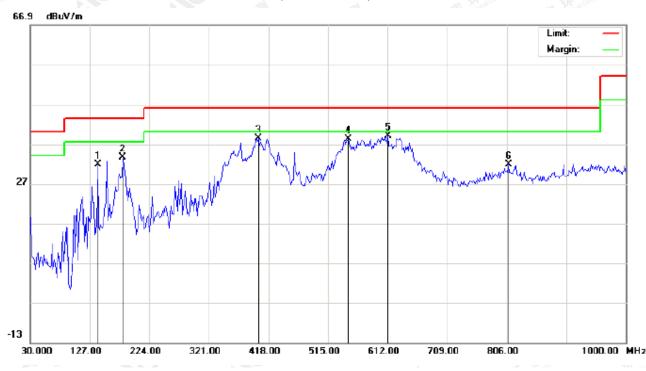
RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL-HORIZONTAL

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		185.2000	17.43	11.31	28.74	43.50	-14.76	peak			
2	*	369.5000	23.02	18.87	41.89	46.00	-4.11	peak			
3	İ	434.1667	20.99	20.11	41.10	46.00	-4.90	peak			
4		590.9833	16.14	23.50	39.64	46.00	-6.36	peak			
5		623.3167	15.00	23.79	38.79	46.00	-7.21	peak			
6		799.5333	7.65	27.31	34.96	46.00	-11.04	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		139.9333	16.57	15.17	31.74	43.50	-11.76	peak			
2		180.3500	19.59	13.98	33.57	43.50	-9.93	peak			
3		401.8333	19.24	19.13	38.37	46.00	-7.63	peak			
4		547.3333	15.79	22.41	38.20	46.00	-7.80	peak			
5	*	612.0000	16.01	23.00	39.01	46.00	-6.99	peak			
6		809.2333	4.41	27.32	31.73	46.00	-14.27	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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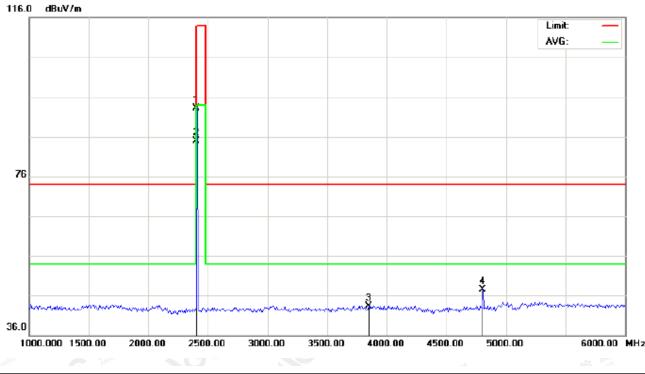
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#### **RADIATED EMISSION ABOVE 1GHz**

(Worst modulation: GFSK)

#### FOR BR/EDR

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

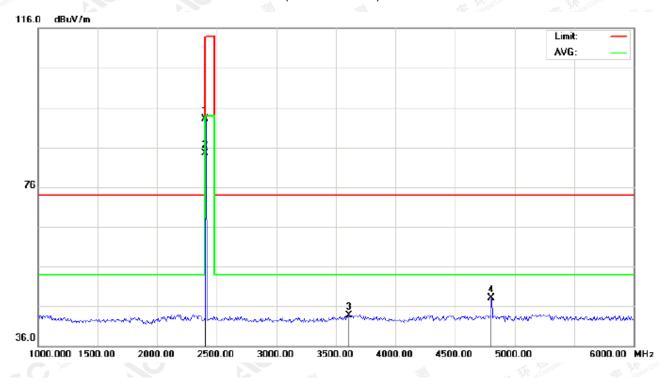


No	, м	k Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∨	dB/m	dBu∀/m	dBuV/m	dB		cm	degree	
1		2402.000	83.04	10.32	93.36	114.00	-20.64	peak			
2	*	2402.000	74.53	10.32	84.85	94.00	-9.15	AVG	100	251	
3		3850.000	29.09	14.27	43.36	74.00	-30.64	peak			
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

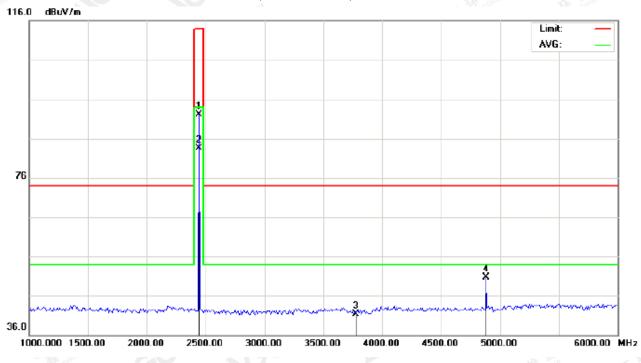
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∨	dB/m	dBu\//m	dBuV/m	dB		cm	degree	
1		2402.000	82.82	10.32	93.14	114.00	-20.86	peak			
2	*	2402.000	74.19	10.32	84.51	94.00	-9.49	AVG	100	128	
3		3608.333	30.93	12.78	43.71	74.00	-30.29	peak			
4		4804.000	40.38	7.69	48.07	74.00	-25.93	peak			

**RESULT: PASS** 

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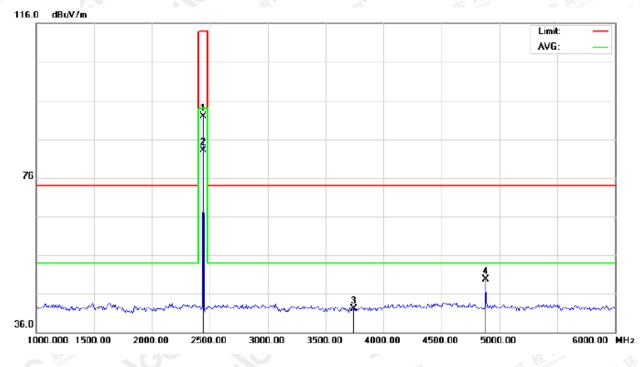
RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL-HORIZONTAL

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBu∀/m	dBuV/m	dB		cm	degree	
1		2441.000	81.74	10.36	92.10	114.00	-21.90	peak			
2	*	2441.000	73.05	10.36	83.41	94.00	-10.59	AVG	100	256	
3		3775.000	27.60	13.80	41.40	74.00	-32.60	peak			
4		4882.000	42.88	7.89	50.77	74.00	-23.23	peak			

**RESULT: PASS** 

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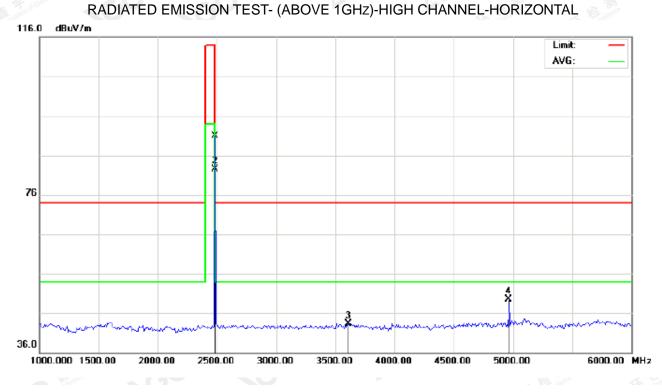
#### RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL- VERTICAL

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height		Comment
	-	MHz	dBu∀	dB/m	dBu∀/m	dBuV/m	dB		cm	degree	
1		2441.000	81.49	10.36	91.85	114.00	-22.15	peak			
2	*	2441.000	72.73	10.36	83.09	94.00	-10.91	AVG	100	119	
3		3741.667	28.50	13.60	42.10	74.00	-31.90	peak			
4		4882.000	41.81	7.89	49.70	74.00	-24.30	peak			

**RESULT: PASS** 

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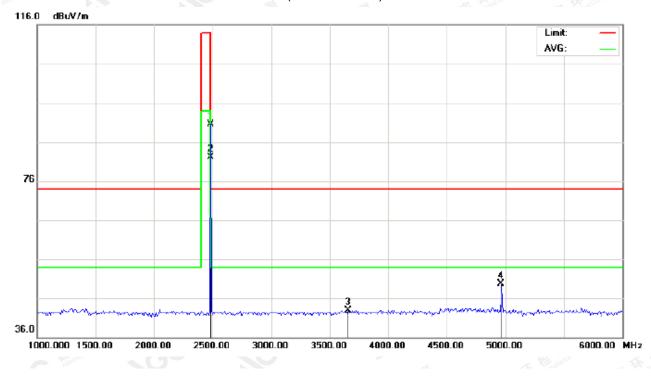
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	•	MHz	dBu∀	dB/m	dBu∀/m	dBuV/m	dB		cm	degree	
1		2480.000	80.47	10.41	90.88	114.00	-23.12	peak			
2	*	2480.000	72.04	10.41	82.45	94.00	-11.55	AVG	100	253	
3		3608.333	30.58	12.78	43.36	74.00	-30.64	peak			
4		4960.000	41.51	8.09	49.60	74.00	-24.40	peak			

**RESULT: PASS** 

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

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		2480.000	80.19	10.41	90.60	114.00	-23.40	peak			
2	*	2480.000	71.71	10.41	82.12	94.00	-11.88	AVG	100	127	
3		3658.333	29.74	13.09	42.83	74.00	-31.17	peak			
4		4960.000	41.66	8.09	49.75	74.00	-24.25	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

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	83.04	10.32	93.36	114	-20.64	Horizontal
2402	82.82	10.32	93.14	114	-20.86	Vertical
2441	81.74	10.36	92.10	114	-21.90	Horizontal
2441	81.49	10.36	91.85	114	-22.15	Vertical
2480	80.47	10.41	90.88	114	-23.12	Horizontal
2480	80.19	10.41	90.60	114	-23.40	Vertical

#### Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna	
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization	
2402	74.53	10.32	84.85	94	-9.15	Horizontal	
2402	74.19	10.32	84.51	94	-9.49	Vertical	
2441	73.05	10.36	83.41	94	-10.59	Horizontal	
2441	72.73	10.36	83.09	94	-10.91	Vertical	
2480	72.04	10.41	82.45	94	-11.55	Horizontal	
2480	71.71	10.41	82.12	94	-11.88	Vertical	

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#### 2Mbps Result:

#### Peak value

Frequency	Reading Level	Factor	Measurement Limit		Factor Measurement Limit Over	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization	
2402	82.50	10.32	92.82	114	-21.18	Horizontal	
2402	82.31	10.32	92.63	114	-21.37	Vertical	
2441	81.18	10.36	91.54	114	-22.46	Horizontal	
2441	80.96	10.36	91.32	114	-22.68	Vertical	
2480	79.96	10.41	90.37	114	-23.63	Horizontal	
2480	79.63	10.41	90.04	114	-23.96	Vertical	

#### Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	73.98	10.32	84.30	94	-9.70	Horizontal
2402	73.65	10.32	83.97	94	-10.03	Vertical
2441	72.51	10.36	82.87	94	-11.13	Horizontal
2441	72.18	10.36	82.54	94	-11.46	Vertical
2480	71.51	10.41	81.92	94	-12.08	Horizontal
2480	71.19	10.41	81.60	94	-12.4	Vertical

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#### 3Mbps Result:

## Peak value

Frequency	Reading Level	- Factor I Measurement I I Im		Limit	Over	Antenna	
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization	
2402	82.02	10.32	92.34	114	-21.66	Horizontal	
2402	81.84	10.32	92.16	114	-21.84	Vertical	
2441	80.69	10.36	91.05	114	-22.95	Horizontal	
2441	80.50	10.36	90.86	114	-23.14 🚬	Vertical	
2480	79.50	10.41	89.91	114	-24.09	Horizontal	
2480	79.15	10.41	89.56	114	-24.44	Vertical	

#### Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	73.51	10.32	83.83	94	-10.17	Horizontal
2402	73.16	10.32	83.48	94	-10.52	Vertical
2441	72.02	10.36	82.38	94	-11.62	Horizontal
2441	71.70	10.36	82.06	94	-11.94	Vertical
2480	71.04	10.41	81.45	94	-12.55	Horizontal
2480	70.72	10.41	81.13	94	-12.87	Vertical

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# **10. BAND EDGE EMISSION**

#### 10.1. MEASUREMENT PROCEDURE

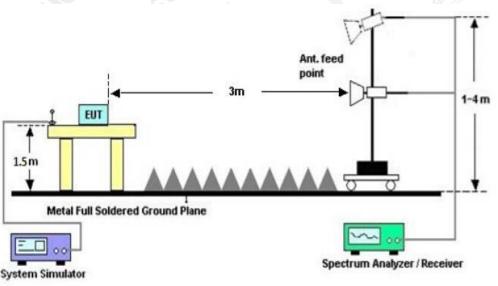
1. The EUT operates at hopping-off test mode. The lowest or highest channels are tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.

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(MH	z)	Stop frequency(MHz)				
The second	2200	South Contraction	not C The station	2405	SCC "		
C Treasulton of Circles	2478	C Allestation of Gird	GO	2500			

#### 10.2 TEST SETUP



RADIATED EMISSION TEST SETUP

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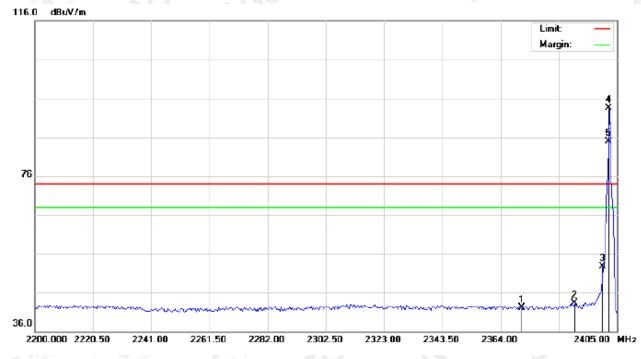




# 10.3 RADIATED TEST RESULT (Worst modulation: GFSK)

# FOR BR/EDR

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



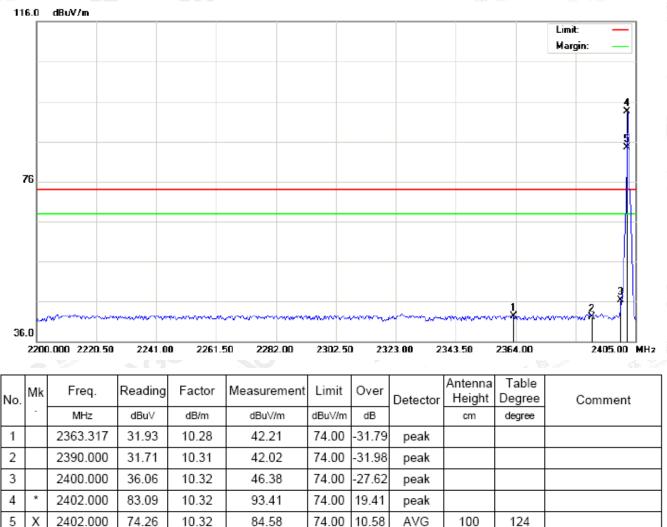
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height		Comment
	-	MHz	dBu∨	dB/m	dBu\//m	dBuV/m	dB		cm	degree	
1		2371.517	31.84	10.29	42.13	74.00	-31.87	peak			
2		2390.000	33.00	10.31	43.31	74.00	-30.69	peak			
3		2400.000	42.47	10.32	52.79	74.00	-21.21	peak			
4	*	2402.000	83.22	10.32	93.54	74.00	19.54	peak			
5	Х	2402.000	74.59	10.32	84.91	74.00	10.91	AVG	100	255	

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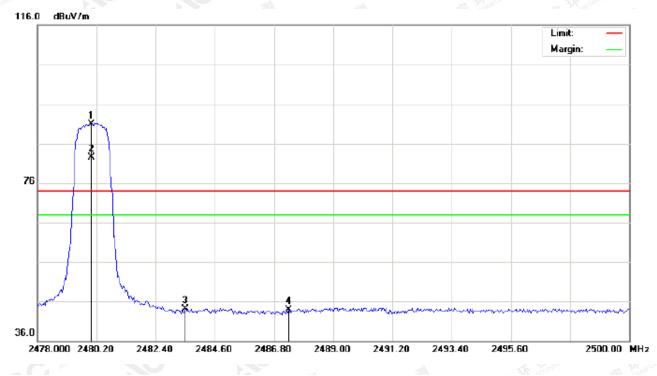


#### TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical

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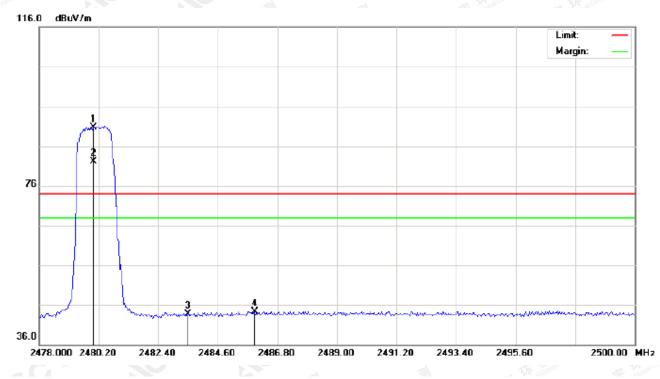
#### TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal

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	80.55	10.41	90.96	74.00	16.96	peak			
2	Х	2480.000	72.06	10.41	82.47	74.00	8.47	AVG	100	258	
3		2483.500	33.69	10.41	44.10	74.00	-29.90	peak			
4		2487.350	33.51	10.42	43.93	74.00	-30.07	peak			

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

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	*	2480.000	80.32	10.41	90.73	74.00	16.73	peak			
2	Х	2480.000	71.67	10.41	82.08	74.00	8.08	AVG	100	121	
3		2483.500	33.26	10.41	43.67	74.00	-30.33	peak			
4		2485.957	33.98	10.41	44.39	74.00	-29.61	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.

The results show the may be treport 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.



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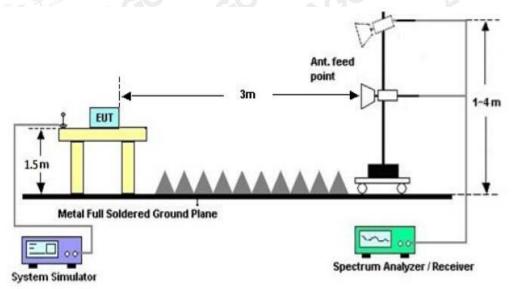
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# 11. 20DB BANDWIDTH

#### **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**

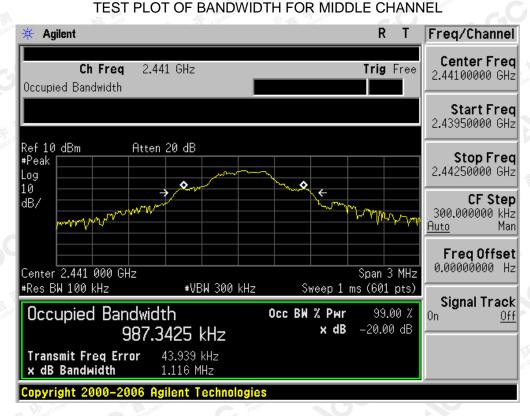
#### FOR BR/EDR

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT								
	Measurement Result							
Applicable Limits		Desult						
		99%OBW (MHz)	-20dB BW(MHz)	Result				
Const Comment	Low Channel	0.985	1.123	PASS				
N/A	Middle Channel	0.987	1.116	PASS				
The second second	High Channel	0.989	1.118	PASS				

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#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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# TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

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Alles	litze	Å.	na Minal Co	K Colu				
BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT								
	Measurement Result							
Applicable Limits		Result						
	99%OBW (MHz) -20dB BW(MHz)							
The the second second	Low Channel	1.205	1.354	PASS				
N/A	Middle Channel	1.202	1.358	PASS				
	High Channel	1.200	1.359	PASS				
	100-	1111	M. Co.	apa. Alla				

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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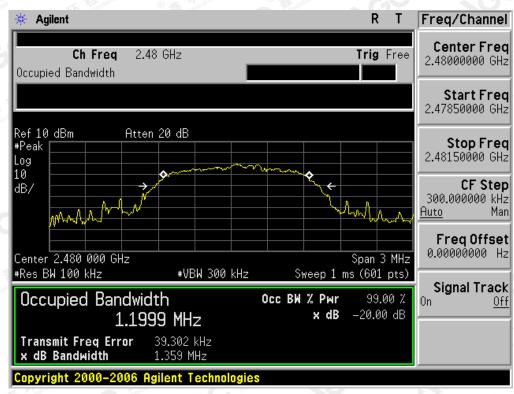






# TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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BLUETOOTH 3MBPS LIMITS AND MEASUREMENT RESULT									
	Measurement Result								
Applicable Limits		Result							
The the and the the second	Low Channel	1.209	1.361	PASS					
N/A	Middle Channel	1.206	1.332	PASS					
	High Channel	1.213	1.348	PASS					

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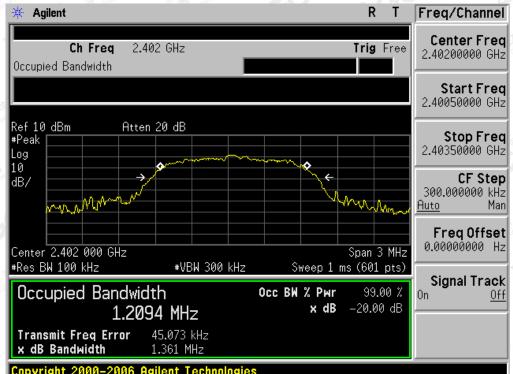
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GC

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#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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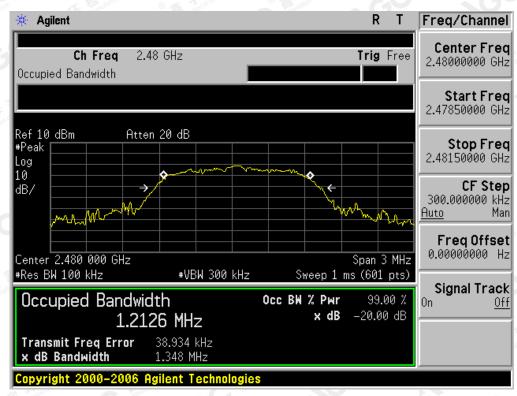
## TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

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#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

**Agilent Technolog** 



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

# 12.1. LIMITS OF LINE CONDUCTED EMISSION TEST

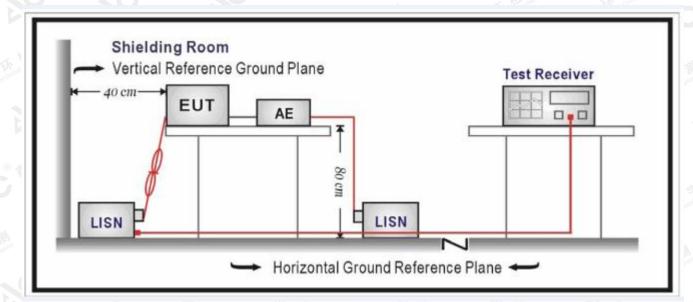
Francisco	Maximum RF Line Voltage							
Frequency	Q.P.( dBuV)	Average( dBuV)						
150kHz~500kHz	66-56	56-46						
500kHz~5MHz	© 56 56	46						
5MHz~30MHz	60	50						

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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#### 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.
- 2. 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.

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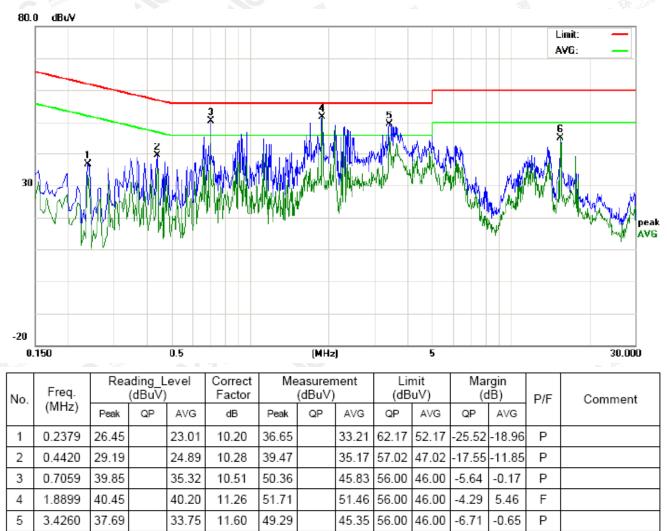
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### 12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

#### By adapter(worst case)

#### FOR BR/EDR

Line Conducted Emission Test Line 1-L



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45.30

60.00

50.00

14.80

-4.70

Ρ



6

15.5498

31.03

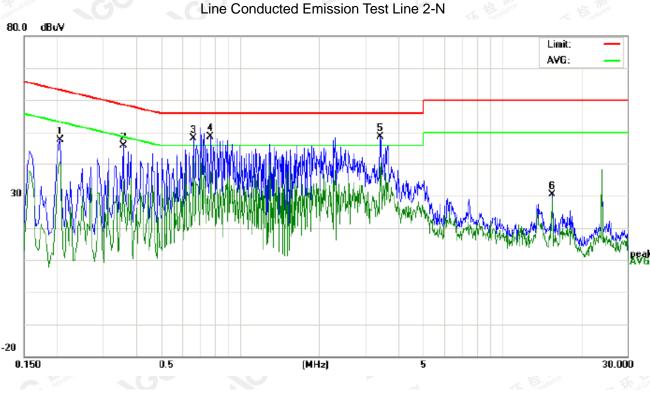
31.13

14.17

45.20



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No. Freq.					Correct Measurement Factor (dBuV)		Limit (dBuV)		Margin (dB)		P/F	Comment		
	(MHz)	Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2058	37.49		30.33	10.17	47.66		40.50	63.37	53.37	-15.71	-12.87	Р	
2	0.3578	35.70		24.46	10.28	45.98		34.74	58.78	48.78	-12.80	-14.04	Р	
3	0.6620	37.69		31.26	10.47	48.16		41.73	56.00	46.00	-7.84	-4.27	Р	
4	0.7740	11.26		2.69	10.52	21.78		13.21	56.00	46.00	-34.22	-32.79	Р	
5	3.4220	37.03		26.34	11.60	48.63		37.94	56.00	46.00	-7.37	-8.06	Р	
6	15.5496	16.29		15.30	14.17	30.46		29.47	60.00	50.00	-29.54	-20.53	Р	

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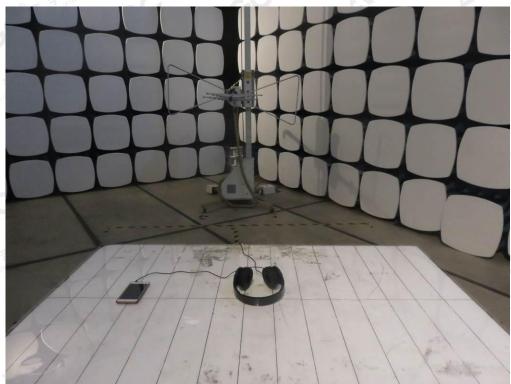


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# APPENDIX A: PHOTOGRAPHS OF TEST SETUP FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP

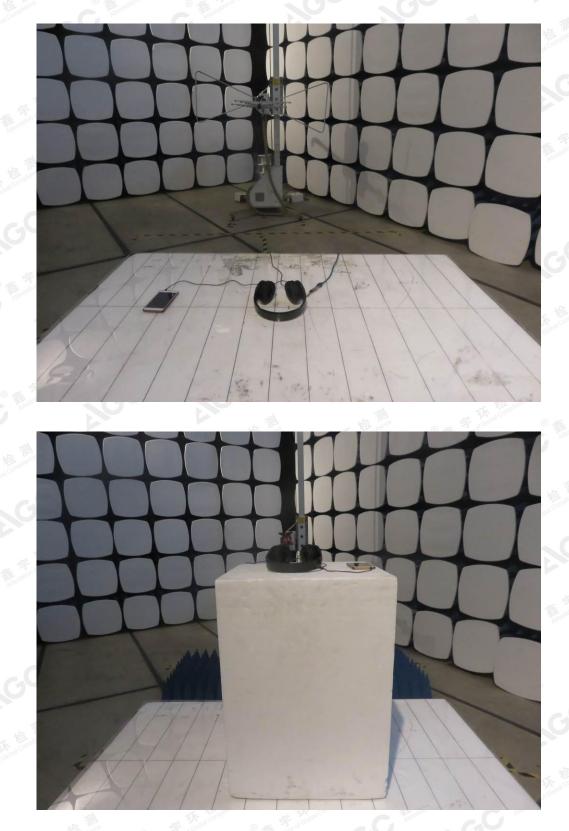


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# APPENDIX B: PHOTOGRAPHS OF EUT TOP VIEW OF EUT



BOTTOM VIEW OF EUT



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# FRONT VIEW OF EUT



BACK VIEW OF EUT



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# LEFT VIEW OF EUT



**RIGHT VIEW OF EUT** 



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# VIEW OF EUT (PORT)-1

#### VIEW OF EUT (PORT)-2

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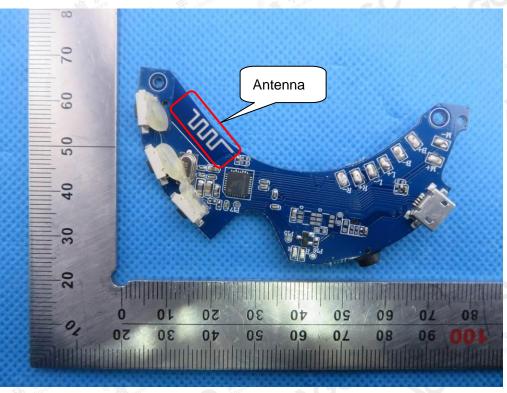


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### OPEN VIEW OF EUT



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



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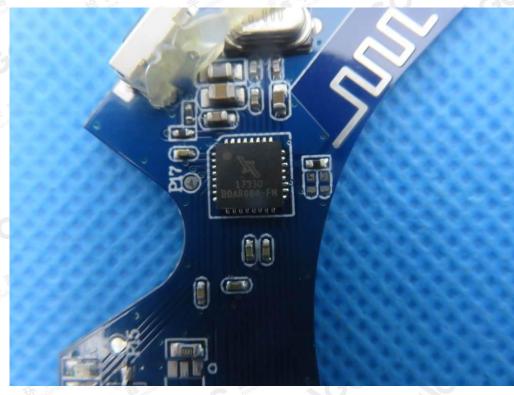


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#### **INTERNAL VIEW OF EUT-2**



**INTERNAL VIEW OF EUT-3** 



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## VIEW OF ADAPTER(AE)



The adapter was supplied by AGC ----END OF REPORT----

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