

### **FCC/IC - TEST REPORT**

Report Number	:	68.950.18.0254.0	01	Date of Iss	ue:	July 25, 2018
Model	:	BG410S				
Product Type	:	Bluetooth Heads	et			
Applicant	:	Plantronics, Inc.				
Address	:	345 Encinal Stree	et, Santa	Cruz, CA, 9	5060, USA	ι
Manufacturer	:	Plantronics, Inc.				
Address	:	345 Encinal Stree	et, Santa	Cruz, CA, 9	5060, USA	\
Test Result	:	n Positive o	⊃ Negati	ve		
Total pages including Appendices	:	31				

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### 2 Details about the Test Laboratory

### Details about the Test Laboratory

Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District Shenzhen 518052 P.R. China
Telephone: Fax:	86 755 8828 6998 86 755 8288 5299
FCC Registration	514049
IC Registration No.:	10320A -1



## **3** Description of the Equipment Under Test

Product:	Bluetooth Headset
Model no.:	BG410S
FCC ID:	AL8-BG410S
IC:	457A-BG410S
Options and accessories:	USB Cable
Rating:	3.7VDC, 182mAh (Supplied by Built Li-ion Polymer battery) 5VDC (Charged by USB port)
RF Transmission	2402MHz-2480MHz
Frequency: No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	Integrated Antenna
Antenna Gain:	2.0dBi
Description of the EUT:	The Equipment Under Test (EUT) is Bluetooth Headset operated at 2.4GHz



## 4 Summary of Test Standards

Test Standards				
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES			
10-1-2017 Edition	Subpart C - Intentional Radiators			
RSS-Gen Issue 5	General Requirements and Information for the Certification of Radio			
April 2018	Apparatus			
RSS-247	Digital Transmission Systems (DTSS), Frequency Hopping Systems			
Issue 2 February 2017	(FHSS) and License-Exempt Local Area Network (LE-LAN) Devices			

All the test methods were according to KDB558074 D01 v04 DTS Measurement Guidance and ANSI C63.10 (2013).



## 5 Summary of Test Results

	Technical Requirements						
FCC Part 15 Subpart C/RSS-247 Issue 2/RSS-Gen Issue 5							
Test Condition			Pages	Test	Test Result		
	[		. agee	Site	Pass	Fail	N/A
§15.207	RSS-Gen, 8.8	Conducted emission AC power port					$\square$
§15.247 (b) (1)	RSS-247 5.4(d)	Conducted peak output power	10	Site 1			
§15.247(a)(1)	RSS-247 5.1(a) & RSS-Gen 6.7	20dB bandwidth					$\square$
§15.247(a)(1)	RSS-247 5.1(b)	Carrier frequency separation					$\boxtimes$
§15.247(a)(1)(iii)	RSS-247 5.1(d)	Number of hopping frequencies					$\boxtimes$
§15.247(a)(1)(iii)	RSS-247 5.1(d)	Dwell Time					$\square$
§15.247(a)(2)	RSS-247 5.2(a)	6dB bandwidth and 99% Occupied Bandwidth	13	Site 1			
§15.247(e)	RSS-247 5.2(b)	Power spectral density	16	Site 1			
§15.247(d)	RSS-247 5.5	Spurious RF conducted emissions	20	Site 1			
§15.247(d)	RSS-247 5.5	Band edge	24	Site 1			
§15.247(d) & §15.209 & §15.205	RSS-247 Clause 5.5 & RSS-Gen 6.13 RSS-Gen 8.9 RSS-Gen 8.10	Spurious radiated emissions for transmitter	26	Site 1			
§15.203	RSS-Gen 6.8	Antenna requirement	See no	te 1			

Note 1: N/A=Not Applicable.

Note 2: The EUT uses a Integrated antenna, which gain is 2.0dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.



### 6 General Remarks

#### Remarks

This submittal(s) (test report) is intended for FCC ID: AL8-BG410S, IC: 457A-BG410S complies with Section 15.205, 15.209, 15.247 of the FCC Part 15, Subpart C, RSS-247 and RSS-Gen rules.

BG410S is a Bluetooth Headset with Bluetooth 5.0, but it supports 1Mbps only for for Bluetooth Low Energy, but does not support 2Mbps.The TX and RX range is 2402MHz-2480MHz.

Note: The report is for BLE only

#### SUMMARY:

All tests according to the regulations cited on page 5 were

n - Performed

O - Not Performed

The Equipment under Test

n - Fulfills the general approval requirements.

• - **Does not** fulfill the general approval requirements.

Sample Received Date:	June 15, 2018

Testing Start Date: June 15, 2018

Testing End Date: July 4, 2018

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:

an

Phoebe Hu EMC Section Manager

Prepared by:

Tested by:

Mark chen

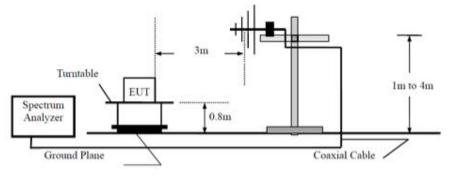
Mark Chen EMC Project Engineer

Tree them

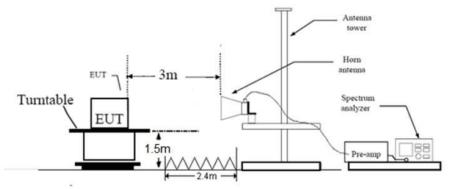
Tree Zhan EMC Test Engineer

### 7 Test Setups

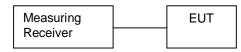
Below 1GHz



### Above 1GHz



## Conducted RF test setups







## 8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Notebook	Lenovo	X220	
Adapter			

Test software: Airoha.AB152x\_verC\_Lab Test Tool, which used to control the EUT in continues transmitting mode.

The system was configured to channel 0, 19, and 39 for the test.



## 9 Technical Requirement

### 9.1 Conducted peak output power

#### **Test Method**

- Use the following spectrum analyzer settings: RBW > the 6dB bandwidth of the emission being measured, VBW≥3RBW, Span≥3RBW Sweep = auto, Detector function = peak, Trace = max hold.
- 2. Add a correction factor to the display.
- 3. Allow the 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.

### Limits

According to §15.247 (b) (1), conducted peak output power limit as below:

Frequency Range	Limit	Limit
MHz	W	dBm
2400-2483.5	≤1	≤30

### Test result as below table

Frequency MHz	Conducted Peak Output Power dBm	Result
Bottom channel 2402MHz	4.47	Pass
Middle channel 2440MHz	5.40	Pass
Top channel 2480MHz	5.73	Pass



#### Low channel 2402MHz

Count 100/100 1Pk View	 				
		P	M1[1]	4.47 2.40230680	
20 dBm	1				
10 dBm	 	M1			
0 dBm					
-10 dBm	 				
-20 dBm					
-30 dBm	 				
-40 dBm					
-50 dBm					
-60 dBm					

Date: 25 JUN 2018 12:04:14

#### Middle channel 2440MHz

Ref Level 30.00 d           Att         40           Count 100/100         40		dB 👄 RBW 3 MH ms 👄 VBW 10 MH		
1Pk View	T T			
			M1[1]	5.40 dBn 2.44037630 GH
20 dBm				
10 dBm				
			M.	
0 dBm				
-10 dBm				
-20 dBm				
-30 dBm				
-40 dBm				
-50 dBm				
22				
-60 dBm				
CF 2.44 GHz		691	L pts	Span 4.0 MHz

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Ref Level 30 Att Count 100/100	40 dB <b>SWT</b>	: 1.00 dB 👄 RBW 1 ms 👄 VBW :		Sweep		
1Pk View	<i>(k</i> )	84. BV	350			
20 dBm			M1[1	1	5.3 2.480185	73 dBm 20 GHz
LO dBm						
			MI		-	
) dBm-			10			
10 dBm						
20 dBm						
30 dBm						
40 dBm						
50 dBm						
60 dBm		_				

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### 9.2 Power spectral density

#### **Test Method**

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

- 1. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
- 2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
- 3. Repeat above procedures until other frequencies measured were completed.

#### Limit

#### Limit [dBm]

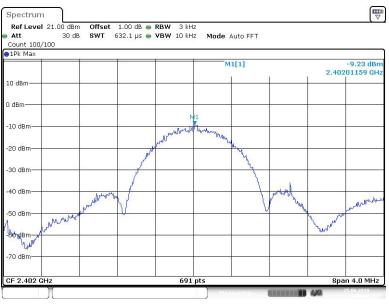
≤8

Test result

Frequency	Power spectral density	Result
MHz Top channel 2402MHz	<b>dBm</b> -9.23	Pass
Middle channel 2440MHz Bottom channel 2480MHz	-8.57 -7.92	Pass Pass



Low channel 2402MHz



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High channel 2480MHz
----------------------

8				М	1[1]		2.480	-7.92 dB 004058 GF
10 dBm	2							
dBm								
10 dBm		3	Here With	Terring way				
20 dBm		M	Mart	- W	Mun Vy			
30 dBm		1			hy h			
40 dBm	walder	wy/				pro Ally		
	manter	¥.	7		V	ų	Murden	wwww
SU CHIM							Ser al	-

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### 9.3 6 dB Bandwidth and 99% Occupied Bandwidth

#### **Test Method**

1. Use the following spectrum analyzer settings:

RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold 2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be  $\geq$  6 dB.

3. Allow the trace to stabilize, record the X dB Bandwidth value.

### Limit

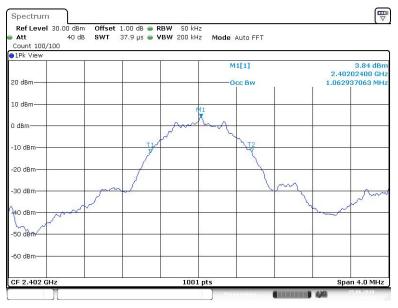
	Limit [kŀ	lz]	
-	≥500		
Test result			
Frequency MHz	6dB bandwidth kHz	99 bandwidth kHz	Result
Bottom channel 2402MHz	704	1063	Pass
Middle channel 2440MHz	704	1059	Pass
Top channel 2480MHz	704	1063	Pass



#### 6 dB Bandwidth

Spect		30.00 dBr	m Offset 1.00 dB 📟	DDUU 100 HUS			7
Att		40 d		VBW 300 kHz	Mode Auto FFT		
Count 1Pk Vi		00					
					M1[1]		-2.06 dBr
20 dBm							2.40166800 GH
					M2[1]		3.98 dBr 2.40202000 GH
10 dBm	-			M2		TT	2110202000 011
0 dBm-	200			MI			
J UBIII-	D	1 -2.016	dBm		A		
-10 dBm					1		
-20 dBm					/	1000 m	
00 dn-						Jun	0-
-30 dBm							
40 dBm		$\sim$					and the second second
~	~						
-50 dBm							
-60 dBm							
-60 aBri	1				6		
CF 2.4	32 GH	z		1001 pt	s		Span 4.0 MHz
1arker							
Туре	Ref		X-value	Y-value	Function	Funct	ion Result
M1		1	2.401668 GHz	-2.06 dBm			
M2 D3	M1	1	2.40202 GHz 704.0 kHz	3.98 dBm 0.02 dB			

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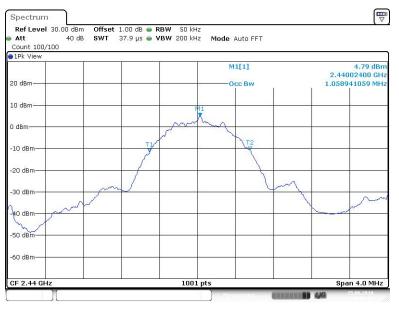
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Middle channel 2440MHz

Att		30.00 dB 40 c		<ul> <li>RBW 100 kHz</li> <li>VBW 300 kHz</li> </ul>	Mode Auto FFT		
1Pk Vi		00					
					M1[1]		-1.05 dB
20 dBm	_						2.43967200 GH
					M2[1]		5.01 dB 2.44026400 GF
10 dBm	-				M2	1 1	2.44020400 GH
	_			MI	- ha		
dBm-	D	1 -0.989	dBm		2		
-10 dBm				/			
			1		1		
-20 dBm	<u>ו</u> -ר				^		
-30 dBm	1 <u> </u>					1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
40 dBm							
1 de de la							
-50 dBm	1						
-60 dBm	1-1-						
CF 2.4	4 GHz	1		1001 pt	s		Span 4.0 MHz
1arker							
Type M1	Ref	Trc 1	X-value 2.439672 GHz	Y-value -1.05 dBm	Function	Funct	ion Result
M1 M2	-	1	2.439672 GHz 2.440264 GHz	-1.05 dBm 5.01 dBm			
D3	M1	1	704.0 kHz	-0.08 dB			

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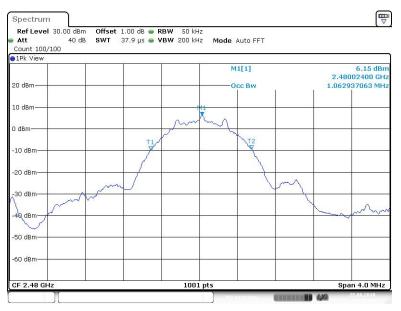
#### Report Number: 68.950.18.0254.01



High channel 2480	MHz
-------------------	-----

Att		30.00 dB 40 c			Mode Auto FF	т	
1Pk Vi							
	1				M1[1]		0.21 dBn
20 dBm							2.47966400 GH
20 0011	8-38-			2	M2[1]		6.35 dBr
10 dBm					M2		2.48026400 GH
10 0011				MIA -			
0 dBm-		1 0.348	dBm	MI	Eg ~		
o abiii		1 0.010	abiii		-		
-10 dBm			(	S1.	1		
10 000					1		
-20 dBm	-					1	
	8		$\sim$				
-30 dBm			7~				
1	1	~	-				
-40 dBm	4						
-50 dBm			-				
-60 dBm				7 2			
CF 2.4	3 GHz	3		1001 pt:	5		Span 4.0 MHz
1arker							
Type	Ref	Trc	X-value	Y-value	Function	Funct	ion Result
M1		1	2.479664 GHz	0.21 dBm			
M2		1	2.480264 GHz	6.35 dBm			
D3	M1	1	704.0 kHz	0.14 dB			

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### 9.4 Spurious RF conducted emissions

#### **Test Method**

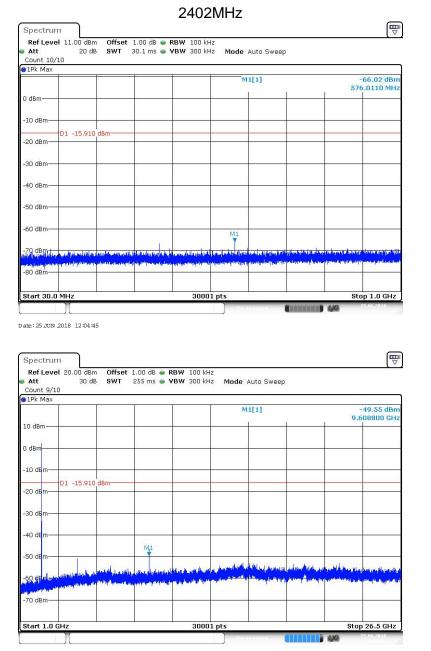
- 1. Establish a reference level by using the following procedure:
  - a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
  - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
- 2. Use the maximum PSD level to establish the reference level.
  - a. Set the center frequency and span to encompass frequency range to be measured.
  - b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
- 3. Repeat above procedures until other frequencies measured were completed.

### Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20



#### **Spurious RF conducted emissions**



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2440	MHz
------	-----

Count 10/10	20 dB <b>SWT</b>	30.1 ms 👄 🛛	/BW 300 kH	z Mode	Auto Sweep			
Count 10/10 1Pk Max								
	11			M	1[1]		52	64.44 dBn
								.0220 MH
0 dBm								
2010-2020								
-10 dBm								
	-15.170 dBm							
-20 dBm								
-30 dBm								
-30 UBIII								
-40 dBm								
10 dbm								
-50 dBm								
-60 dBm		MI		0 0	-		-	
				1				_
TO dBm	ر من الله الحرف المعدل. بالتار حجر عل	and and the state of the	الار والليو بط الروجول	Alle and the fill	ALLAND THE ALLAND	madula da la		and the blue but
allowed a star start fill (1994) Allowed a start start fill (1994)	Represented and the second of	Annalis interferentieren data an	ethometers ( , ), joint o	and the second second		plane admin	and the best of the special	n harlangara pr
-80 dBm			7					
Start 30.0 MH	lz		3000	1 pts			Sto	p 1.0 GHz
	8 12:06:40							F
Spectrum Ref Level 2	0.00 dBm Offse				Auto Sween	5		<b>H</b> ∇
Spectrum Ref Level 2 Att Count 9/10					Auto Sweep			<b>₩</b>
Spectrum Ref Level 2 Att Count 9/10	0.00 dBm Offse			z Mode .				
Spectrum Ref Level 2 Att Count 9/10	0.00 dBm Offse			z Mode .	Auto Sweep	2		45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 1Pk Max	0.00 dBm Offse			z Mode .				
Spectrum Ref Level 2 Att Count 9/10 1Pk Max	0.00 dBm Offse			z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 1Pk Max	0.00 dBm Offse			z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 1Pk Max 10 dBm 0 dBm	0.00 dBm Offse			z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 1Pk Max 10 dBm 0 dBm	0.00 dBm Offse			z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 1Pk Max 10 dBm -10 dBm -10 dBm 01	0.00 dBm Offse			z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 1Pk Max 10 dBm -10 dBm -10 dBm 01	0.00 dBm Offse 30 dB SWT			z Mode .				45.84 dBn
Spectrum           Ref Level 2           Att           Count 9/10           IPk Max           10 dBm           -10 dBm           -20 dBm	0.00 dBm Offse 30 dB SWT			z Mode .				45.84 dBn
Spectrum           Ref Level 2           Att           Count 9/10           IPk Max           10 dBm           -10 dBm           -20 dBm	0.00 dBm Offse 30 dB SWT			z Mode .				45.84 dBn
Spectrum           Ref Level 2           Att           Count 9/10           1Pk Max           10 dBm           -10 dBm           -20 dBm           -30 dBm	0.00 dBm Offse 30 dB SWT	255 ms • V		z Mode .				45.84 dBn
Spectrum           Ref Level 2           Att           Count 9/10           IPk Max           10 dBm           -10 dBm           -20 dBm	0.00 dBm Offse 30 dB SWT			z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm -30 dBm	0.00 dBm Offse 30 dB SWT	255 ms • V		z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 1Pk Max 10 dBm -10 dBm -10 dBm -20 dBm -30 dBm -40 dBm	0.00 dBm Offse 30 dB SWT	255 ms • V	BW 300 kH	Z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 1Pk Max 10 dBm -10 dBm -10 dBm -20 dBm -30 dBm -40 dBm	-15.170 dBm	255 ms • V	BW 300 kH	z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 PIPk Max 10 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm	0.00 dBm Offse 30 dB SWT	255 ms • V	BW 300 kH	Z Mode .				45.84 dBn
Spectrum Ref Level 2 Att Count 9/10 PIPk Max 10 dBm -0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm	-15.170 dBm	255 ms • V	BW 300 kH	Z Mode .				45.84 dBn
Att     Count 9/10     DIPk Max     ID dBm     D dB	-15.170 dBm	255 ms • V	BW 300 kH	Z Mode .		Line and a second		45.84 dBn

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2480MHz

Att	00 dBm Offset 20 dB SWT	30.1 ms 👄 VB	W 300 kHz Mode	Auto Sweep		
Count 10/10 1Pk Max						
ALL REPORT		-	N	11[1]	-62.6	
				1	384.022	0 MH
0 dBm						
-10 dBm						
	13.640 dBm					
-20 dBm		11				
2021 20						
-30 dBm						
-40 dBm			8			
-40 ubin						
-50 dBm						
		-				
-60 dBm		M1	0	8		
70.0	L.			1		
KURPEN TRADES				Index and the second of the	ingen en ging her big i provins Banden an	ALL ALL ALL
-80 dBm	ik him film an	and an induction like and the second second	and have been defined and the second seco	a diserte a province a second		5
Start 30.0 MHz			30001 pts		Stop 1.0	GHz
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Spectrum Ref Level 20.1 Att Count 9/10	00 dBm Offset				25.66.2	
Spectrum Ref Level 20.1 Att Count 9/10	00 dBm Offset		¥ 300 kHz Mode		-40.2	
Spectrum Ref Level 20.1 Att Count 9/10 1Pk Max	00 dBm Offset		¥ 300 kHz Mode	Auto Sweep		
Spectrum Ref Level 20.1 Att Count 9/10 1Pk Max	00 dBm Offset		¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum Ref Level 20.4 Att Count 9/10 1Pk Max	00 dBm Offset		¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.1           Att           Count 9/10           1PK Max           10 dBm           0 dBm	00 dBm Offset		¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.0           Att           Count 9/10           PIPk Max           10 dBm           -10 dBm	0 dBm Offset 30 dB SWT		¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.0           Att           Count 9/10           PIPk Max           10 dBm           -10 dBm           -10 dBm	00 dBm Offset		¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.0           Att           Count 9/10           1Pk Max           10 dBm           -10 dBm           01 -	0 dBm Offset 30 dB SWT		¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.1           Att           Count 9/10           1Pk Max           10 dBm           -10 dBm           -20 dBm	0 dBm Offset 30 dB SWT		¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.1           Att           Count 9/10           1Pk Max           10 dBm           -10 dBm           -20 dBm	0 dBm Offset 30 dB SWT	255 ms • VB4	¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum Ref Level 20.1 Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm -30 dBm	0 dBm Offset 30 dB SWT		¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.1           Att           Count 9/10           1PK Max           10 dBm           -10 dBm           -10 dBm           -30 dBm           -30 dBm	0 dBm Offset 30 dB SWT	255 ms • VB4	¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.1           Att           Count 9/10           1PK Max           10 dBm           -10 dBm           -10 dBm           -30 dBm           -30 dBm	0 dBm Offset 30 dB SWT	255 ms • VB4	¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.1           Att           Count 9/10           1PK Max           10 dBm           -0 dBm           -20 dBm           -30 dBm           -40 dBm           -50 dBm	0 dBm Offset 30 dB SWT	255 ms • VBV	V 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.1           Att           Count 9/10           1PK Max           10 dBm           -10 dBm           -20 dBm           -30 dBm           -40 dBm           -50 dBm	0 dBm Offset 30 dB SWT	255 ms • VBV	¥ 300 kHz Mode	Auto Sweep	-40.2	
Spectrum           Ref Level 20.1           Att           Count 9/10           IPk Max           10 dBm           -10 dBm           -20 dBm           -30 dBm           -50 dBm           -60 dBm	0 dBm Offset 30 dB SWT	255 ms • VBV	V 300 kHz Mode	Auto Sweep	-40.2	
Ref Level 20.4           Att           Count 9/10           1PK Max           10 dBm           -10 dBm           -10 dBm           -30 dBm           -40 dBm           -50 dBm	0 dBm Offset 30 dB SWT	255 ms • VBV	V 300 kHz Mode	Auto Sweep	-40.2	

Date: 25 JUN 2018 12:08:24

EMC\_SZ\_FR\_21.00 FCC Release 2014-03-20 TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299



### 9.5 Band edge

#### **Test Method**

- Use the following spectrum analyzer settings: Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100 kHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section.

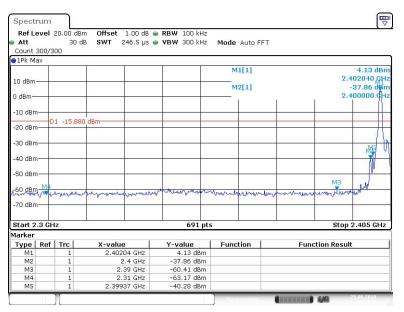
#### Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20



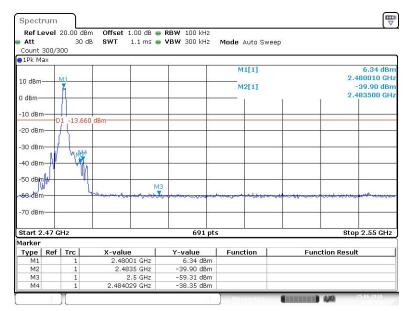
#### **Band edge testing**

2402MHz



Date: 25 JUN 2018 12:04:30

#### 2480MHz



Date: 25 JUN 2018 12:07:58

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## 9.6 Spurious radiated emissions for transmitter

### **Test Method**

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.

3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

5: Use the following spectrum analyzer settings According to C63.10:

#### For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 1MHz, VBW≥RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100 KHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

#### Note:

1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.

2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.

3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log(1/duty cycle).

4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at requencyabove1GHz



### Limit

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK



### Spurious radiated emissions for transmitter

#### Transmitting spurious emission test result as below:

Low channel 2402MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
Dallu	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
30-	859.73	30.42	Н	46	QP	15.58	-16.3	Pass
1000MHz	860.48	28.41	V	46	QP	17.59	-16.2	Pass
			Н	74	PK			Pass
1000-			Н	54	AV			Pass
25000MHz			V	74	PK			Pass
			V	54	AV			Pass

Middle channel 2440MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
Ballu	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
30-			Н	43.5	QP			Pass
1000MHz			Н	46	QP			Pass
			Н	74	PK			Pass
1000-			Н	54	AV			Pass
25000MHz			V	74	PK			Pass
			V	54	AV			Pass



#### High channel 2480MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
Dallu	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
30-			Н	43.5	QP			Pass
1000MHz			Н	46	QP			Pass
			Н	74	PK			Pass
1000-			Н	54	AV			Pass
25000MHz			V	74	PK			Pass
			V	54	AV			Pass

Remark:

- (1) "\*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- (2) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.
- (3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain Below 1GHz: Corrector factor = Antenna Factor + Cable Loss



# **10 Test Equipment List**

### **List of Test Instruments**

adiated Emission Test					
Description	Manufacturer	Model no.	Serial no.	cal. due date	
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2018-7-14	
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2018-7-14	
Horn Antenna	Rohde & Schwarz	HF907	102294	2018-7-14	
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2018-7-14	
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2018-7-7	
Attenuator	Agilent	8491A	MY39264334	2018-7-7	
3m Semi-anechoic chamber	TDK	9X6X6		2020-7-7	
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A	

#### TS8997 Test System

Description	Manufacturer	Model no.	Serial no.	cal. due date
Signal Generator	Rohde & Schwarz	SMB100A	108272	2018-7-7
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2018-7-7
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2018-7-7
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2018-7-7
Power Splitter	Weinschel	1580	SC319	2018-7-7
10dB Attenuator	Weinschel	56-10	58764	2018-7-14
10dB Attenuator	R&S	DNF	DNF-001	2018-7-14
10dB Attenuator	R&S	DNF	DNF-002	2018-7-14
10dB Attenuator	R&S	DNF	DNF-003	2018-7-14
10dB Attenuator	R&S	DNF	DNF-004	2018-7-14
Test software	Rohde & Schwarz	EMC32	Version 9.26.01	N/A



## **11 System Measurement Uncertainty**

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty				
Test Items	Extended Uncertainty			
Uncertainty for Radiated Spurious Emission 25MHz-	Horizontal: 4.98dB;			
3000MHz	Vertical: 5.06dB;			
Uncertainty for Radiated Spurious Emission 3000MHz-	Horizontal: 4.95dB;			
18000MHz	Vertical: 4.94dB;			
Uncertainty for Radiated Spurious Emission 18000MHz-	Horizontal: 5.14dB;			
40000MHz	Vertical: 5.12dB;			
Uncertainty for Conducted RF test with TS 8997	Power level test involved:			
	1.05dB			