FCC TEST REPORT FOR GUANGDONG LEIYON INTELLIGENCE TECHNOLOGY CORP. Bluetooth DJ Speaker Test Model: PA10130

: GUANGDONG LEIYON INTELLIGENCE TECHNOLOGY

: 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue,

: BBK Road of Wusha, Changan Town, Dongguan City,

: Shenzhen LCS Compliance Testing Laboratory Ltd.

Bao'an District, Shenzhen, Guangdong, China

Guangdong province, China, 523860.

Prepared for

Address

Prepared by Address

Tel

Web

Mail

Fax

Sample number

Date of Report

Date of Test

: webmaster@LCS-cert.com Date of receipt of test sample : July 20, 2016 Number of tested samples : 1 : Prototype : July 20, 2016~August 04,2016 : August 04,2016

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: (+86)755-82591332

: www.LCS-cert.com

CORP.

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I	FCC TEST REPORT FCC CFR 47 PART 15 C(15.247): 2015
Report Reference No	
Date of Issue	: August 04,2016
	: Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	: 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure	: Full application of Harmonised standards
	Partial application of Harmonised standards \Box
	Other standard testing method \Box
Applicant's Name	: GUANGDONG LEIYON INTELLIGENCE TECHNOLOGY CORP.
Address	: BBK Road of Wusha, Changan Town, Dongguan City, Guangdong province, China, 523860.
Test Specification	
Standard	: FCC CFR 47 PART 15 C(15.247): 2015 / ANSI C63.10: 2013
Test Report Form No	: : LCSEMC-1.0
TRF Originator	: Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	: Dated 2011-03
This publication may be reprod Shenzhen LCS Compliance Tes of the material. Shenzhen LCS will not assume liability for dar material due to its placement ar	
Test Item Description	: Bluetooth DJ Speaker
Trade Mark	: PRECISION, LEIYON
Test Model	: PA10130
Ratings	: Power Supply: DC 12 V Battery (7200mAh) Input: AC 110-240V, 50/60Hz, 3A
Result	: Positive
Compiled by:	Supervised by: Approved by:

Dick Su/ File administrators

VV

g In

Glin Lu/ Technique principal

TM

Gavin Liang/ Manager

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FCC -- TEST REPORT

Test Report No. : LCS1607191614E

August 04,2016 Date of issue

Test Model	: PA10130
EUT	: Bluetooth DJ Speaker
Applicant	: GUANGDONG LEIYON INTELLIGENCE
	TECHNOLOGY CORP.
Address	: BBK Road of Wusha, Changan Town, Dongguan City,
	Guangdong province, China, 523860.
T 1 1	
Telephone	
Fax	:/
Manufacturer	: GUANGDONG LEIYON INTELLIGENCE
	TECHNOLOGY CORP.
Addross	: BBK Road of Wusha, Changan Town, Dongguan City,
Address	
_ · · ·	Guangdong province, China, 523860.
Telephone	
Fax	:/
Factory	: GUANGDONG LEIYON INTELLIGENCE
	TECHNOLOGY CORP.
Address	: BBK Road of Wusha, Changan Town, Dongguan City,
	Guangdong province, China, 523860.
Telephone	:/
Fax.	

Test Result	Positive
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The test report merely corresponds to the test sample.

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Revision History

Revision	Issue Date	Revisions	Revised By
00	2016-08-04	Initial Issue	Gavin Liang

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 5.1 Maximum Conducted Output Power	
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 29
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 28 29 33 34
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 28 29 33 34
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 28 29 33 34 34
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 28 29 33 34 34 34 38
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 28 29 33 33 34 34 34 38 39
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 28 29 33 33 34 34 34 38 39 39
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 28 29 33 34 34 34 34 34 38 39 39
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 28 29 33 33 34 34 34 34 34 34 39 39 39
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 29 33 34 34 34 34 34 38 39 39 39 39 39 39
 5.1 Maximum Conducted Output Power	13 14 19 21 23 28 28 28 28 29 33 34 34 34 34 34 34 34 39 39 39 39 39 39 42 42

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1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT	: Bluetooth DJ Speaker
Test Model	: PA10130
Hardware Version	: LY-L01-AMP-V2.0
Software Version	: PA10130_20160714_1433.bin
Power Supply	: Power Supply: DC 12 V Battery (7200mAh) Input: AC 110-240V, 50/60Hz, 3A
Frequency Range	: 2402.00-2480.00MHz
Channel Spacing	: 1MHz
Channel Number	: 79 channels
Channel frequency	: 2402.00-2480.00MHz (Channel Frequency=2402+1(K-1), K=1, 2, 379)
Modulation Type	GFSK, π/4-DQPSK, 8-DPSK
Bluetooth Version	: V3.0+EDR
Antenna Description	: Internal Antenna, 2.5dBi(Max.)

1.2 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate

1.3 External I/O

I/O Port Description	Quantity	Cable
AUX IN	2	N/A
MIC Port	1	N/A
GUITAR Port	1	N/A
Audio IN Port	1	N/A
USB Port	1	N/A
SD Card Slot	1	N/A

1.4 Description of Test Facility

CNAS Registration Number. is L4595.

FCC Registration Number. is 899208.

Industry Canada Registration Number. is 9642A-1.

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ESMD Registration Number. is ARCB0108.

UL Registration Number. is 100571-492.

TUV SUD Registration Number. is SCN1081.

TUV RH Registration Number. is UA 50296516-001

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5 List Of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal Date	Due Date
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	June 18,2016	June 17,2017
Signal analyzer	Agilent	E4448A(External mixers to 40GHz)	US44300469	9kHz~40GHz	July 16,2016	July 15,2017
LISN	MESS Tec	NNB-2/16Z	99079	9KHz-30MHz	June 18,2016	June 17,2017
LISN (Support Unit)	EMCO	3819/2NM	9703-1839	9KHz-30MHz	June 18,2016	June 17,2017
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9KHz-30MHz	June 18,2016	June 17,2017
ISN	SCHAFFNER	ISN ST08	21653	9KHz-30MHz	June 18,2016	June 17,2017
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30M-1GHz 3m	June 18,2016	June 17,2017
Amplifier	SCHAFFNER	COA9231A	18667	9kHz-2GHzz	June 18,2016	June 17,2017
Amplifier	Agilent	8449B	3008A02120	1GHz-26.5GHz	July 16,2016	July 15,2017
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5GHz-40GHz	July 16,2016	July 15,2017
Spectrum Analyzer	Agilent	E4407B	MY41440292	9k-26.5GHz	July 16,2016	July 15,2017
MAX Signal Analyzer	Agilent	N9020A	MY50510140	20Hz~26.5GHz	Oct. 27,2015	Oct. 26,2016
Loop Antenna	R&S	HFH2-Z2	860004/001	9k-30MHz	June 18,2016	June 17,2017
By-log Antenna	SCHWARZBECK	VULB9163	9163-470	30MHz-1GHz	June 10,2016	June 09,2017
Horn Antenna	EMCO	3115	6741	1GHz-18GHz	June 10,2016	June 09,2017
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz-40GHz	June 10,2016	June 09,2017
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz-1GHz	June 18,2016	June 17,2017
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz-40GHz	June 18,2016	June 17,2017
Power Meter	R&S	NRVS	100444	DC-40GHz	June 18,2016	June 17,2017
Power Sensor	R&S	NRV-Z51	100458	DC-30GHz	June 18,2016	June 17,2017
Power Sensor	R&S	NRV-Z32	10057	30MHz-6GHz	June 18,2016	June 17,2017
RF CABLE-1m	JYE Bao	RG142	CB034-1m	20MHz-7GHz	June 18,2016	June 17,2017
RF CABLE-2m	JYE Bao	RG142	CB035-2m	20MHz-1GHz	June 18,2016	June 17,2017

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1.6 Statement of The Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.7 Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
		9KHz~30MHz	3.10dB	(1)
		30MHz~200MHz	2.96dB	(1)
Radiation Uncertainty	:	200MHz~1000MHz	3.10dB	(1)
		1GHz~26.5GHz	3.80dB	(1)
		26.5GHz~40GHz	3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	1.63dB	(1)
Power disturbance	:	30MHz~300MHz	1.60dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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1.8 Description Of Test Modes

Bluetooth operates in the unlicensed ISM Band at 2.4GHz. With the introduction of the enhanced data rate (EDR) feature, the data rates can be up to 3 Mb/s. An increase in the peak data rate beyond the basic rate of 1 Mb/s is achieved by modulating the RF carrier using GFSK techniques, resulting in an increase of two to three times the number of bits

per symbol. The 2 Mb/s EDR packets use $a\pi/4$ -DQPSK modulation and the 3 Mb/s EDR packets use 8DPSK modulation. The following operating modes were applied for the related test items. For radiated measurement, the test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position. All test modes were tested, only the result of the worst case was recorded in the report.

Mode of Operations	Frequency Range	Data Rate	
	(MHz)	(Mbps)	
	2402	1	
GFSK	2441	1	
	2480	1	
	2402	2	
π /4 DQPSK	2441	2	
	2480	2	
	2402	3	
8-DPSK	2441	3	
	2480	3	
F	For Conducted Emission	1	
Test Mode		TX Mode	
For Radiated Emission			
Test Mode		TX Mode	

Worst-case mode and channel used for 150kHz-30 MHz power line conducted emissions was the mode and channel with the highest output power, that was determined to be TX(1Mbps-Hopping Mode).

Worst-case mode and channel used for 9kHz-1000 MHz radiated emissions was determined to be TX-Low Channel (2402MHz, 1Mbps).

***Note: Using a temporary antenna connector for the EUT when the conducted measurements are performed.

For pre-testing, when performed with LiPo Battery Charger, the input Voltage/Frequency AC 120V/60Hz and AC 240V/60Hz were used. Only recorded the worst case in this report.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013, FCC CFR PART 15C 15.207, 15.209, 15.247 and DA 00-705.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209, 15.247 under the FCC Rules Part 15 Subpart C.

2.3 General Test Procedures

2.3.1 Conducted Emissions

According to the requirements in Section 6.2 of ANSI C63.10: 2013, AC power-line conducted emissions shall be measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table and the turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10: 2013

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a continuous transmit condition.

3.2 EUT Exercise Software

N/A.

3.3 Special Accessories

N/A.

3.4 Block Diagram/Schematics

Please refer to the related document.

3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6 Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULTS

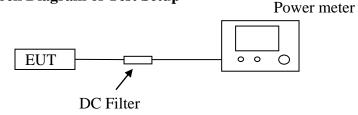
Applied Standard: FCC Part 15 Subpart C				
FCC Rules	FCC Rules Description of Test			
§15.247(b)(1)	Maximum Conducted Output Power	Compliant		
§15.247(a)(1)	Frequency Separation And 20 dB Bandwidth	Compliant		
§15.247(a)(1)(iii)	Number Of Hopping Frequency	Compliant		
§15.247(a)(1)(iii)	Time Of Occupancy (Dwell Time)	Compliant		
§15.209, §15.247(d)	Radiated and Conducted Spurious Emissions	Compliant		
§15.205	Emissions at Restricted Band	Compliant		
§15.207(a)	Line Conducted Emissions Comp			
§15.203	Antenna Requirements	Compliant		

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5. ANTENNA PORT MEASUREMENT

5.1 Maximum Conducted Output Power

5.1.1 Block Diagram of Test Setup



5.1.2 Limit

According to § 15.247(b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

5.1.3 Test Procedure

The transmitter output is connected to the Power Meter.

5.1.4 Test Results

Channel	Frequency (MHz)	Output Power (dBm, Peak)	Output Power (mW)	Limit (mW)	Result
	2402	-5.27	0.30	1000	Pass
GFSK	2441	-5.64	0.27	1000	Pass
	2480	-5.93	0.26	1000	Pass
π /4	2402	-5.85	0.26	125	Pass
	2441	-6.13	0.24	125	Pass
DQPSK	2480	-6.78	0.21	125	Pass
	2402	-6.04	0.25	125	Pass
8-DPSK	2441	-6.32	0.23	125	Pass
	2480	-6.93	0.20	125	Pass

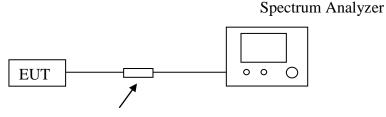
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5.2 Frequency Separation and 20 dB Bandwidth

5.2.1 Limit

According to \$15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

5.2.2 Block Diagram of Test Setup



DC Filter

5.2.3 Test Procedure

A. Place the EUT on the table and set it in transmitting mode.

- B. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.
- C. Set to the maximum power setting and enable the EUT transmit continuously.
- D. For carrier frequency separation measurement, use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels; RBW / VBW=100KHz / 300KHz; Sweep = auto; Detector function = peak; Trace = max hold.

 E. For 20dB bandwidth measurement, use the following spectrum analyzer settings: Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW/VBW=30KHz / 100KHz; Sweep = auto; Detector function = peak; Trace = max hold.

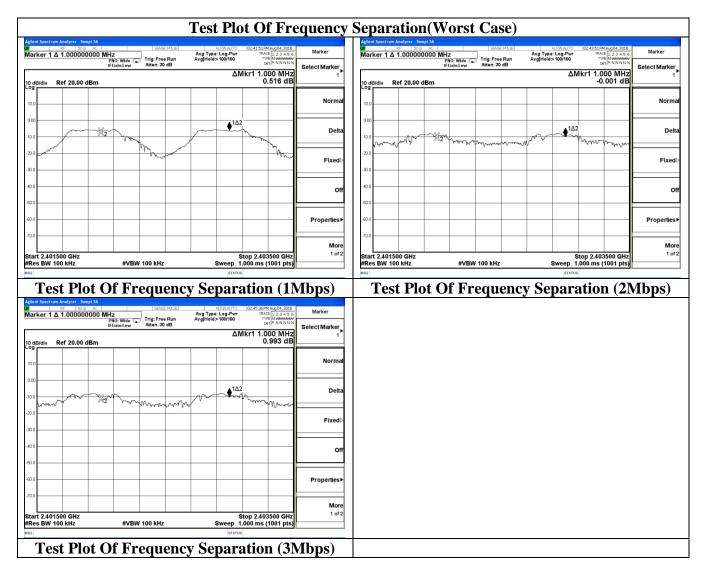
5.2.4 Test Results								
The Measurement Result With 1Mbps For GFSK Modulation								
	,	20dB Bandwid	Ith Measurement					
C	hannel	20dB Ban	dwidth (MHz)	Lin	nit			
	Low	().514	Non-spe	ecified			
I	Middle	().564	Non-specified				
	High	().553	Non-specified				
	C	hannel Separa	tion Measurement	ţ				
Channel	Channel Separ	ation (MHz)	Limit (M	(Hz)	Result			
Low	1.000		0.514		Pass			
Middle	1.00	0	0.564		Pass			
High	1.00	0	0.553		Pass			

The Measurement Result With 2Mbps For π /4 DQPSK Modulation									
20dB Bandwidth Measurement									
C	Channel20dB Bandwidth (MHz)Limit								
	Low	1	1.115	Non-spe	ecified				
1	Middle	1	1.116	Non-spe	ecified				
	High	1	1.116	Non-specified					
	C	hannel Separa	tion Measuremen	t					
Channel	Channel Separ	ation (MHz)	Limit (N	IHz)	Result				
Low	1.000		0.743		Pass				
Middle	1.000		0.744		Pass				
High	1.00	0	0.744	1	Pass				

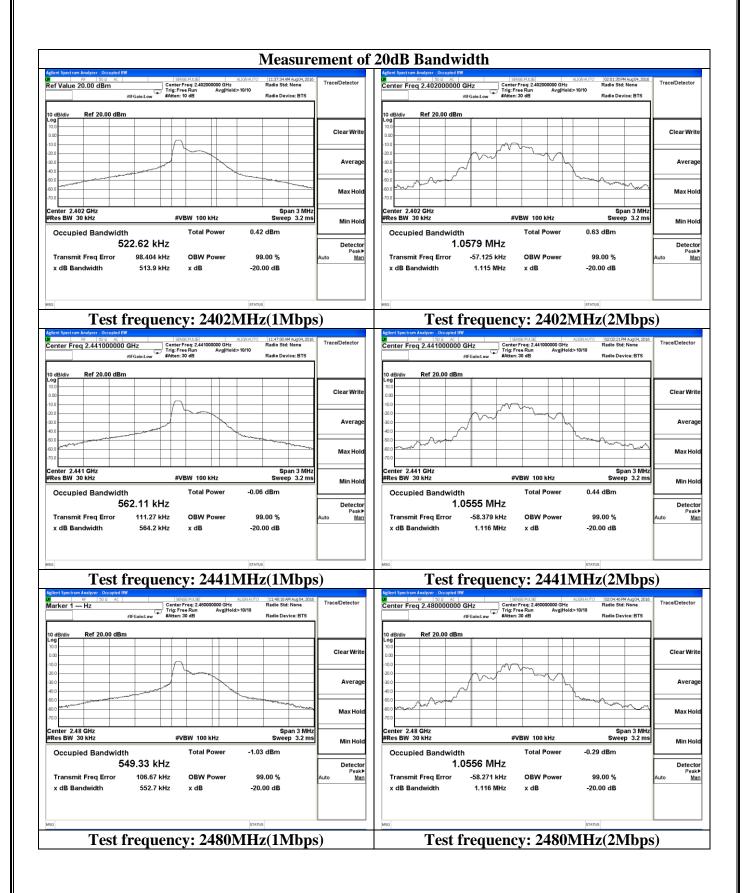
The Measurement Result With 3Mbps For 8-DPSK Modulation									
	20dB Bandwidth Measurement								
C	Channel20dB Bandwidth (MHz)Limit								
	Low		1.192	Non-specified					
I	Middle	1.195		1.195		Non-specified			
	High	1.195		Non-specified					
	Cl	hannel Separa	tion Measuremen	t					
Channel	Channel Separ	ation (MHz)	Limit (MHz)	Result					
Low	1.000		0.795	Pass					
Middle	1.000		0.797	Pass					
High	1.00	0	0.797	Pass					

The test data refer to the following page.

This report shall not be reproduced except in full, without the written approval of Shenzhen LCS Compliance Testing Laboratory Ltd.. Page 15 of 43 For Frequency Separation Measurement, the Low, Mid and High channels were performed and only recorded the worst test plots for Low in this report.



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Measure	ement of	20dB Bandwidth	
Agilent Spectrum Analyzer - Occupied BW		Agilent Spectrum Analyzer - Occupied BW	
RF 50.0 AC SENSE-PULSE ALIGNAUTO 01:49:31 PM Aux04.2016	Trace/Detector	RF 50 Ω AC SENSE-PULSE ALIGNAUTO 01:47:54PM Aug04, 2016	or
Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None Trig: Free Run Avg Hold>10/10	TacerDetector	Center Fred 2.441000000 GHZ	
#IFGain:Low #Atten: 30 dB Radio Device: BTS		#IFGain:Low #Atten: 30 dB Radio Device: BTS	
10 dB/div Ref 20.00 dBm		10 dB/div Ref 20.00 dBm	
Log		10.0	
0.00	Clear Write	0.00 Clear W	rite
-10.0		-10.0	_
200			
-30.0	Average	-30.0 Aver	age
-40.0		40.0	-
		500	
800 mm	Max Hold	60.0 Max H	old
-70.0	Max Holu	-70.0	oiu
Center 2.402 GHz Span 3 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms		Center 2.441 GHz Span 3 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms	
#100 BT 00 MIL #100 KIL2 3WEEP 3.2 IIIS	Min Hold	#Res BW 30 kHz = #VBW 100 kHz = 3weep 3.2 lits	old
Occupied Bandwidth Total Power 0.63 dBm		Occupied Bandwidth Total Power 0.47 dBm	
1.1292 MHz	Detector	1.1271 MHz Detect	ctor
	Peak►	Pe	ak▶
Transmit Freq Error -43.354 kHz OBW Power 99.00 %	Auto <u>Man</u>	Transmit Freq Error -43.485 kHz OBW Power 99.00 % Auto	Man
x dB Bandwidth 1.192 MHz x dB -20.00 dB		x dB Bandwidth 1.195 MHz x dB -20.00 dB	
MSG STATUS		MSG STATUS	
Test frequency: 2402MHz(3Mbps	5)	Test frequency: 2441MHz(3Mbps)	
Agilent Spectrum Analyzer - Occupied BW	,		
RF 50 g AC SENSERUSE ALIGNAUTO 01:46:51 PM Aug04, 2016 Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None	Trace/Detector		
Trig: Free Run Avg Hold:> 10/10			
#IFGain:Low #Atten: 30 dB Radio Device: BTS			
10 dB/div Ref 20.00 dBm			
10.0	Clear Write		
0.00	Clear Write		
-10.0			
	Average		
-40.0			
500 mm m			
100.0	Max Hold		
-70.0			
Center 2.48 GHz Span 3 MHz			
#Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms	Min Hold		
Occupied Bandwidth Total Power -0.19 dBm			
1.1292 MHz			
1.1232 WITZ	Detector Peak		
Transmit Freq Error 45.217 kHz OBW Power 99.00 %	Auto <u>Man</u>		
x dB Bandwidth 1.195 MHz x dB -20.00 dB			
MSG STATUS			
Test frequency: 2480MHz(3Mbps	3)		
	·)	1	

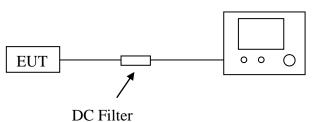
5.3 Number Of Hopping Frequency

5.3.1 Limit

According to §15.247(a)(1)(iii), Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

5.3.2 Block Diagram of Test Setup

Spectrum Analyzer



5.3.3 Test Procedure

- A. Place the EUT on the table and set it in transmitting mode.
- B. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.
- C. Set Spectrum Analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
- D. Set the Spectrum Analyzer as RBW, VBW=1MHz.
- E. Max hold, view and count how many channel in the band.

5.3.4 Test Results

Test Mode	Measurement Result (No. of Ch)	Limit (No. of Ch)	Result
Hopping(GFSK)	79	≥15	Pass
Hopping(π /4-DQPSK)	79	≥15	Pass
Hopping(8-DPSK)	79	≥15	Pass

The worst test data refer to the following page.

Marker	1 Aug 04, 2016 E 1 2 3 4 5 6		ALIGN AUTO : Log-Pwr		E:PULSE	SENSE	I-	AC NU	F 50 Ω		
Select Marker		TYF		Avg Hold:		Trig: Free Atten: 30	1Z NO: Fast 😱 Gain:Low		39.00000	ker 1Δ	lark
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Test Plot For Number of Hopping Channel(GFSK)

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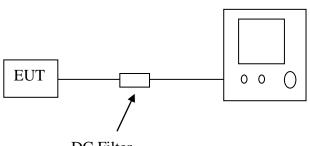
5.4 Time Of Occupancy (Dwell Time)

5.4.1 Limit

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

5.4.2 Block Diagram of Test Setup





DC Filter

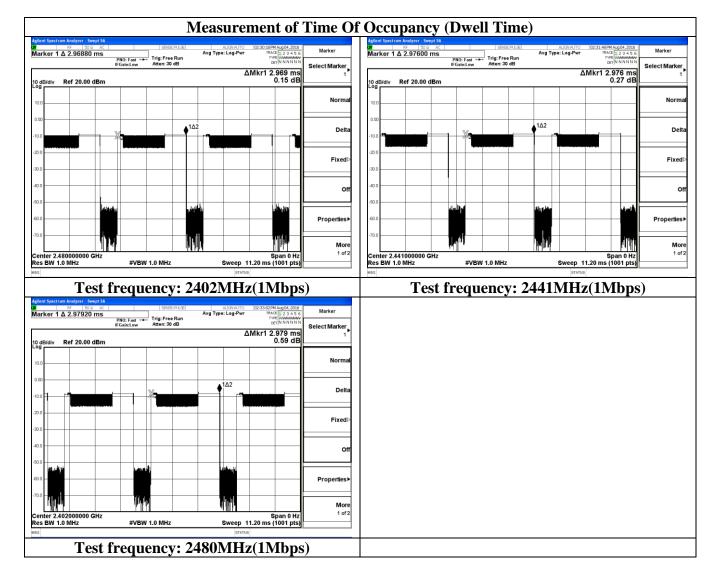
5.4.3 Test Procedure

- A. Place the EUT on the table and set it in transmitting mode.
- B. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.
- C. Set center frequency of Spectrum Analyzer = operating frequency.
- D. Set the Spectrum Analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.
- E. Repeat above procedures until all frequency measured were complete.

The Measurement Result With The Worst Case of 1Mbps For GFSK Modulation								
Channel	Time of Pulse for DH5 (ms)	Period Time (s)	Dwell Time (ms)	Limit (ms)				
Low	2.969	31.6	316.7	400				
Middle	2.976	31.6	317.4	400				
High	2.979	31.6	317.8	400				

5.4.4 Test Results

Calculation formula: Dwell Time(DH5)=Burst Length(ms)*(1600/6)/79*31.6



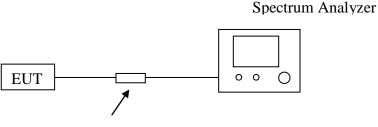
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5.5 Conducted Spurious Emissions and Band Edges Test

5.5.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a)is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.5.2 Block Diagram of Test Setup



DC Filter

5.5.3 Test Procedure

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 300 KHz.

Measurements are made over the 9kHz to 26.5GHz range with the transmitter set to the lowest, middle, and highest channels

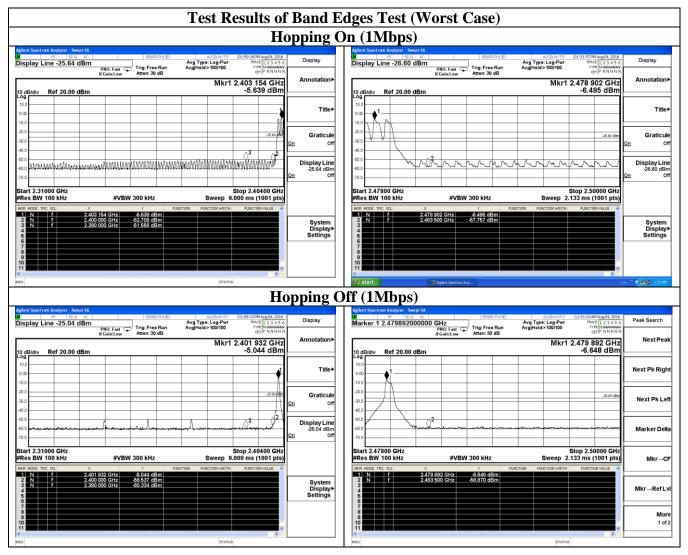
5.5.4 Test Results of Conducted Spurious Emissions

No non-compliance noted. Only record the worst test result (TX-GFSK) in this report. The test data refer to the following page.

Test Results of Conduc	cted Spi	rious Emissions (Worst Case)
Agilent Spectrum Analyzer - Swept SA Sense-RU.SE ALIGNAUTO 02:23:01.0M Aug/04.2016	Display	Aplient Spectrum Analyzer - Swept SA D RF 50.9 AC SENSERUSE ALIGNAUTO 02:22:07PM Aug04, 2016 Disclosed
Display Line -25.85 dBm Avg Type: Leg-Pwr TRACE 12.2.3.45 6 From Free Run Avg Heid: 10/100 CFT Revenue IFGaint.ow Atten: 30 dB CFT Revenue CFT RNNNN		PN0: Fast Trig: Free Run Avg[Hold: 13/100 Trif: NNNNN IFGain:Low Atten: 30 dB
Mkr1 2.401 6 GHz 10 dB/div Ref 20.00 dBm -5.854 dBm	Annotation►	Mkr1 2.440 7 GHz 10 dB/div Ref 20.00 dBm -5.421 dBm
10 dB/div Ref 20.00 dBm5.854 dBm 100	Title►	
	l nie •	
000	Graticule	300
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	<u>on</u> Off	
Start 9 kHz Stop 26.50 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.533 s (40001 pts)		Start 9 kHz Stop 26.50 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.533 s (40001 pts)
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3 N f 902.3 MHz 54.870 dBm 4 5	Display► Settings	3 N F 902.3 MHz 49.308 dBm Display► 5 Settings
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Test frequency: 2402MHz(1Mbps))	Test frequency: 2441MHz(1Mbps)
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	Display Line -26.92 dBm	
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3 N f 4,960 1 GHz 48,303 dBm 4 N f 1,743 7 GHz 52,597 dBm 5 N f 912.3 MHz 40,568 dBm	Display► Settings	
KING STATUS AC coupled: Accy uns	-	
Test frequency: 2480MHz(1Mbps))	

5.5.5 Test Results of Band Edges Test

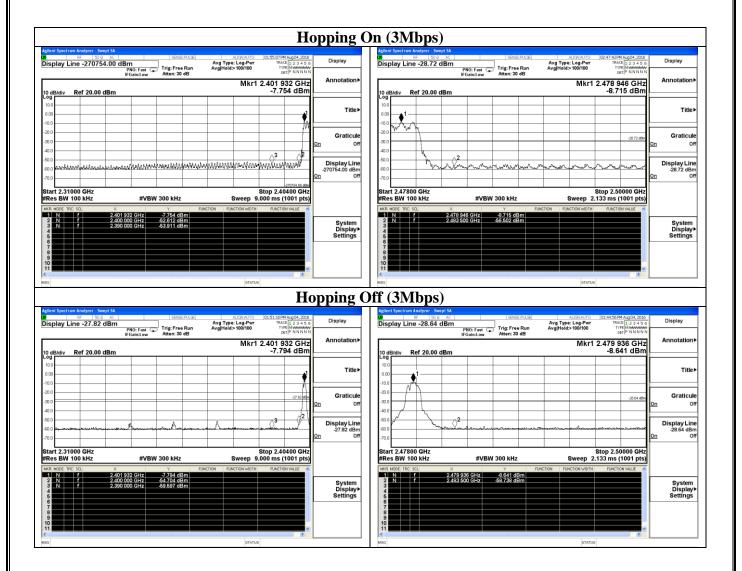
No non-compliance noted. Only record the worst test result in this report. The test data refer to the following page.



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6. RADIATED MEASUREMENT

6.1 Standard Applicable

According to §15.247 (d): 20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

6.2 Instruments Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 100kHz for QP

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6.3 Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor-standing and typically installed with its base in direct electrical contact with, or connected to, a grounded metal floor or grid, the EUT shall be connected to, or placed directly on, the test site (or turntable) reference ground plane in a manner representative of this contact or connection.

--- If the EUT is a floor-standing and not typically installed with its base in direct electrical contact with, or connected to, a metal floor or grid, the EUT shall not be placed in direct electrical contact with the test site (or turntable) reference ground plane. If necessary to prevent direct metallic contact of the EUT and the reference ground plane, insulating material (up to 12 mm thick) shall be placed under the EUT.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0 ° to 315 ° using 45 ° steps.

--- The antenna height is 0.8m meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0 ° to 360 °) and by rotating the elevation axes (0 ° to 360 °).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor-standing and typically installed with its base in direct electrical contact with, or connected to, a grounded metal floor or grid, the EUT shall be connected to, or placed directly on, the test site (or turntable) reference ground plane in a manner representative of this contact or connection.

--- If the EUT is a floor-standing and not typically installed with its base in direct electrical contact with, or connected to, a metal floor or grid, the EUT shall not be placed in direct electrical contact with the test site (or turntable) reference ground plane. If necessary to prevent direct metallic contact of the EUT and the reference ground plane, insulating material (up to 12 mm thick) shall be placed under the EUT.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0 ° to 315 ° using 45 ° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

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3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor-standing and typically installed with its base in direct electrical contact with, or connected to, a grounded metal floor or grid, the EUT shall be connected to, or placed directly on, the test site (or turntable) reference ground plane in a manner representative of this contact or connection.

--- If the EUT is a floor-standing and not typically installed with its base in direct electrical contact with, or connected to, a metal floor or grid, the EUT shall not be placed in direct electrical contact with the test site (or turntable) reference ground plane. If necessary to prevent direct metallic contact of the EUT and the reference ground plane, insulating material (up to 12 mm thick) shall be placed under the EUT.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0 ° to 315 ° using 45 ° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45 °) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

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4) Sequence of testing above 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor-standing and typically installed with its base in direct electrical contact with, or connected to, a grounded metal floor or grid, the EUT shall be connected to, or placed directly on, the test site (or turntable) reference ground plane in a manner representative of this contact or connection.

--- If the EUT is a floor-standing and not typically installed with its base in direct electrical contact with, or connected to, a metal floor or grid, the EUT shall not be placed in direct electrical contact with the test site (or turntable) reference ground plane. If necessary to prevent direct metallic contact of the EUT and the reference ground plane, insulating material (up to 12 mm thick) shall be placed under the EUT.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Premeasurement:

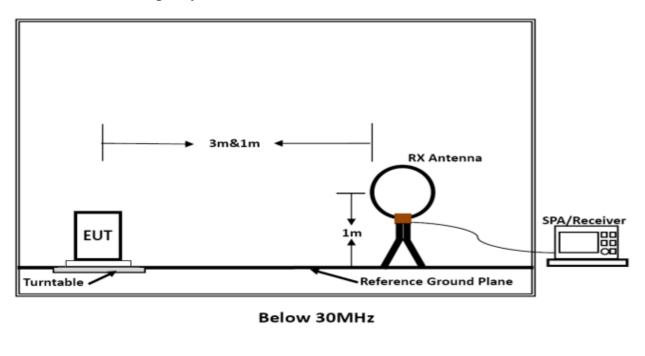
--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

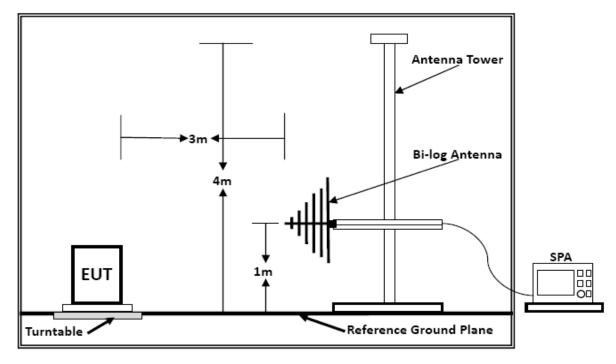
Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

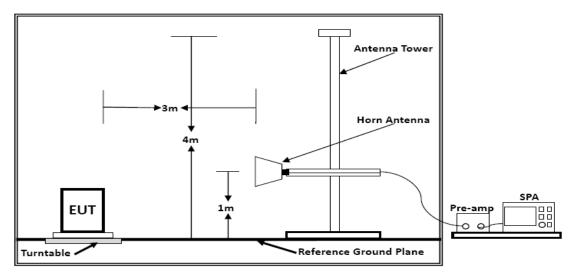
6.4 Test Setup Layout







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Above 1GHz

6.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.6 Results for Radiated Emissions

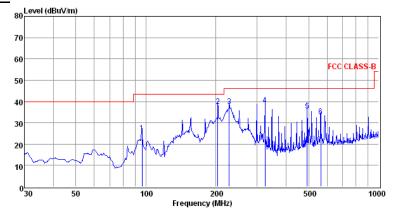
PASS.

Only record the worst test result in this report. The radiated emissions from 9kHz to 30MHz are at least 20dB below the official limit and no need to report. The test data please refer to following page:

Below 1GHz



AC120V/60Hz



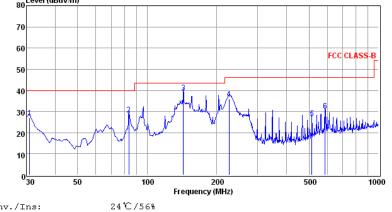
Env./Ins: pol:

24°C/56% HORIZONTAL

Freq Reading CabLos Antfac Measured Limit Over Remark

	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	96.10	11.94	0.58	12.91	25.43	43.50	-18.07	QP
2	203.52	26.39	0.82	10.68	37.89	43.50	-5.61	QP
3	227.69	25.30	0.93	11.54	37.77	46.00	-8.23	QP
4	324.46	23.70	1.10	13.51	38.31	46.00	-7.69	QP
5	492.47	17.84	1.50	16.39	35.73	46.00	-10.27	QP
6	564.64	13.84	1.47	17.79	33.10	46.00	-12.90	QP

Note: 1. All readings are Quasi-peak values. 2. Measured= Reading + Antenna Factor + Cable Loss 3. The emission that ate 20db blow the offficial limit are not reported 80 Level (dBu/Vm)



Env./Ins: pol:

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	30.96	14.31	0.39	12.32	27.02	40.00	-12.98	OP
2	83.23	18.27	0.54	9.68	28.49	40.00	-11.51	QP
3	143.33	29.97	0.71	8.21	38.89	43.50	-4.61	QP
4	226.10	23.68	0.89	11.47	36.04	46.00	-9.96	QP
5	515.44	8.54	1.30	16.87	26.71	46.00	-19.29	QP
6	586.84	10.66	1.50	18.20	30.36	46.00	-15.64	QP

Note: 1. All readings are Quasi-peak values.

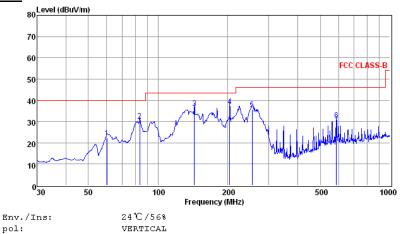
VERTICAL

2. Measured= Reading + Antenna Factor + Cable Loss

3. The emission that ate 20db blow the offficial limit are not reported

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AC240V/60Hz



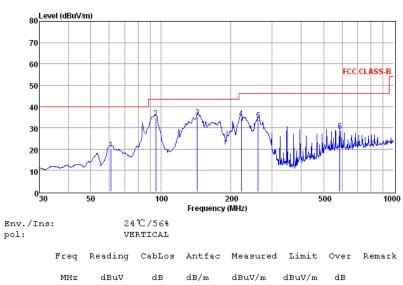
Freq Reading CabLos Antfac Measured Limit Over Remark

	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	60.07	9.16	0.49	12.66	22.31	40.00	-17.69	QP
2	83.23	19.98	0.54	9.68	30.20	40.00	-9.80	QP
3	143.33	27.49	0.71	8.21	36.41	43.50	-7.09	QP
4	203.52	25.81	0.82	10.68	37.31	43.50	-6.19	QP
5	254.73	22.61	1.02	12.06	35.69	46.00	-10.31	QP
6	586.84	10.84	1.50	18.20	30.54	46.00	-15.46	QP

Note: 1. All readings are Quasi-peak values.

2. Measured= Reading + Antenna Factor + Cable Loss

3. The emission that ate 20db blow the offficial limit are not reported



1	61.13	7.22	0.49	12.24	19.95	40.00	-20.05	QP
2	95.09	20.92	0.58	12.85	34.35	43.50	-9.15	QP
3	143.33	26.21	0.71	8.21	35.13	43.50	-8.37	QP
4	221.39	22.16	0.95	11.26	34.37	46.00	-11.63	QP
5	261.98	20.54	0.96	12.11	33.61	46.00	-12.39	QP
6	586.84	8.96	1.50	18.20	28.66	46.00	-17.34	QP

Note: 1. All readings are Quasi-peak values. 2. Measured= Reading + Antenna Factor + Cable Loss 3. The emission that ate 20db blow the offficial limit are not reported

***Note:

Pre-scan all mode and recorded the worst case results in this report (TX-Low Channel(1Mbps)). Emission level $(dBuV/m) = 20 \log Emission \ level (uV/m)$. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

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Above 1GHz

The worst test result for GFSK, Tx-Low Channel:

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4804.19	44.09	33.06	35.04	3.94	46.05	74	-27.95	Peak	Horizontal
4804.19	35.51	33.06	35.04	3.94	37.47	54	-16.53	Average	Horizontal
4804.14	46.19	33.06	35.04	3.94	48.15	74	-25.85	Peak	Vertical
4804.20	36.10	33.06	35.04	3.94	38.06	54	-15.94	Average	Vertical

The worst test result for GFSK, Tx-Middle Channel:

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4882.21	45.98	33.16	35.15	3.96	47.95	74	-26.05	Peak	Horizontal
4882.20	33.60	33.16	35.15	3.96	35.57	54	-18.43	Average	Horizontal
4882.14	45.86	33.16	35.15	3.96	47.83	74	-26.17	Peak	Vertical
4882.24	36.83	33.16	35.15	3.96	38.80	54	-15.20	Average	Vertical

The worst test result for GFSK, Tx-High Channel:

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4960.31	42.05	33.26	35.14	3.98	44.15	74	-29.85	Peak	Horizontal
4960.38	33.60	33.26	35.14	3.98	35.70	54	-18.30	Average	Horizontal
4960.25	43.64	33.26	35.14	3.98	45.74	74	-28.26	Peak	Vertical
4960.36	36.57	33.26	35.14	3.98	38.67	54	-15.33	Average	Vertical

Notes:

1. Measuring frequencies from 9k~10th harmonic (ex. 26GHz), No emission found between lowest internal used/generated frequency to 30MHz.

2. Radiated emissions measured in frequency range from 9k~10th harmonic (ex. 26GHz) were made with an instrument using Peak detector mode.

3. 18~25GHz at least have 20dB margin. No recording in the test report.

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6.7 Results for Band edge Testing (Radiated)

Note: Only recorded the worst test result.

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
2376.39	42.42	32.89	35.16	3.51	43.66	74	-30.34	Peak	Horizontal
2376.42	31.86	32.90	35.16	3.51	33.11	54	-20.89	Average	Horizontal
2389.97	45.30	32.92	35.16	3.54	46.60	74	-27.40	Peak	Horizontal
2389.92	36.86	32.92	35.16	3.54	38.16	54	-15.84	Average	Horizontal
2376.48	44.64	32.89	35.16	3.51	45.88	74	-28.12	Peak	Vertical
2376.42	33.41	32.90	35.16	3.51	34.66	54	-19.34	Average	Vertical
2389.94	46.70	32.92	35.16	3.54	48.00	74	-26.00	Peak	Vertical
2390.03	36.08	32.92	35.16	3.54	37.38	54	-16.62	Average	Vertical

Tx-2402, GFSK, Non-hopping

Tx-2480, GFSK, Non-hopping

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
2483.51	48.32	33.06	35.18	3.60	49.80	74	-24.20	Peak	Horizontal
2483.50	35.52	33.08	35.18	3.60	37.02	54	-16.98	Average	Horizontal
2488.74	43.77	33.08	35.18	3.62	45.29	74	-28.71	Peak	Horizontal
2488.76	34.28	33.08	35.18	3.62	35.80	54	-18.20	Average	Horizontal
2483.49	46.00	33.06	35.18	3.60	47.48	74	-26.52	Peak	Vertical
2483.58	36.77	33.08	35.18	3.60	38.27	54	-15.73	Average	Vertical
2488.74	42.91	33.08	35.18	3.62	44.43	74	-29.57	Peak	Vertical
2488.79	33.63	33.08	35.18	3.62	35.15	54	-18.85	Average	Vertical

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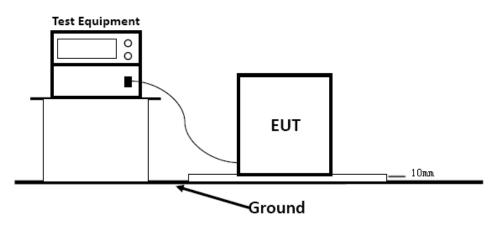
7. LINE CONDUCTED EMISSIONS

7.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Erromon Dongo (MHz)	Limits (dBµV)				
Frequency Range(MHz)	Quasi-peak	Average			
0.15 to 0.50	66 to 56	56 to 46			
0.50 to 5	56	46			
5 to 30	60	50			

7.2 Block Diagram of Test Setup

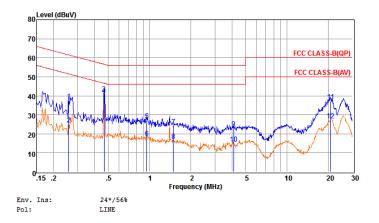


7.3 Test Results

PASS. Only record the worst test result in this report. The test data please refer to following page.

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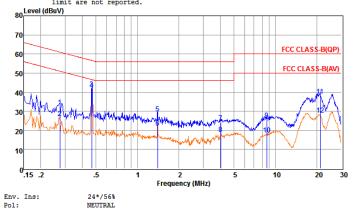
AC 120V/60Hz



Freq Reading LisnFac CabLos Atten_Fac Measured Limit Over Remark

MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1 0.25751 2 0.25761 3 0.46614 4 0.46624 5 0.95313 6 0.95323	17.87 5.24 21.60 20.87 7.33 -1.70	9.63 9.63 9.62 9.62 9.63 9.63	0.03 0.03 0.04 0.04 0.05 0.05	10.00 10.00 10.00 10.00 10.00 10.00 10.00	37.53 24.90 41.26 40.53 27.01 17.98	61.51 51.51 56.58 46.58 56.00 46.00	 -23.98 -26.61 -15.32 -6.05 -28.99 -28.02	QP Average QP Average QP Average
7 1.48743 8 1.48843 9 4.09199 10 4.09299 1120.81374 1220.81474	4.40 -3.36 3.08 -4.71 17.36 7.08	9.64 9.65 9.65 9.74 9.74	0.05 0.05 0.06 0.06 0.12 0.12	10.00 10.00 10.00 10.00 10.00 10.00	24.09 16.33 22.79 15.00 37.22 26.94	56.00 46.00 56.00 46.00 60.00 50.00	-31.91 -29.67 -33.21 -31.00 -22.78 -23.06	QP Average QP Average QP Average

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss+Atten_Fac. 2. The emission levels that are 20dB below the official limit are not reported.



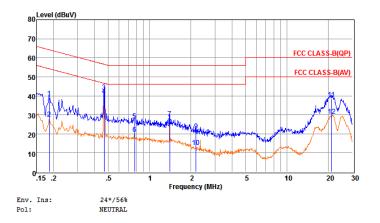
Freq Reading LisnFac CabLos Atten_Fac Measured Limit Over Remark

MH	z dBuV	dB	dB	dB	dBuV	dBuV	dB	
1 0.2744	2 12.88	9,60	0.03	10.00	32.51	60.98	-28.47	QP
2 0.2745	2 6.69	9.60	0.03	10.00	26.32	50.98	-24.66	Average
3 0.4661	4 22.15	9.62	0.04	10.00	41.81	56.58	-14.77	QP
4 0.4662	4 21.67	9.62	0.04	10.00	41.33	46.58	-5.25	Average
5 1.4032	2 9.09	9.63	0.05	10.00	28.77	56.00	-27.23	QP
6 1.4042	2 1.81	9.63	0.05	10.00	21.49	46.00	-24.51	Average
7 4.0061	8 4.29	9.65	0.06	10.00	24.00	56.00	-32.00	QP
8 4.0071	8 -1.65	9.65	0.06	10.00	18.06	46.00	-27.94	Average
9 8.6373	2 5.91	9.71	0.08	10.00	25.70	60.00	-34.30	QP
10 8.6383	2 -1.87	9.71	0.08	10.00	17.92	50.00	-32.08	Average
1121.0354	7 18.16	9.85	0.12	10.00	38.13	60.00	-21.87	QP
1221.0364	7 8.42	9.85	0.12	10.00	28.39	50.00	-21.61	Average

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss+Atten_Fac. 2. The emission levels that are 20dB below the official limit are not reported.

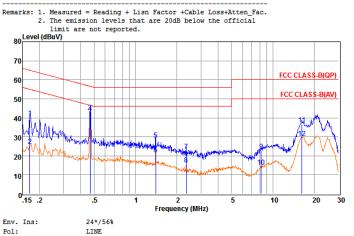
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AC 240V/60Hz



Reading LisnFac CabLos Atten_Fac Measured Limit Remark Freq Over

MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1 0.18639	19.43	9.62	0.02	10.00	39.07	64.20	-25.13	QP
2 0.18649	8.42	9.62	0.02	10.00	28.06	54.19	-26.13	Average
3 0.46614	22.51	9.62	0.04	10.00	42.17	56.58	-14.41	QP
4 0.46624	20.41	9.62	0.04	10.00	40.07	46.58	-6.51	Average
5 0.77931	7.36	9.63	0.04	10.00	27.03	56.00	-28.97	QP
6 0.77941	0.29	9.63	0.04	10.00	19.96	46.00	-26.04	Average
7 1.40322	8.44	9.63	0.05	10.00	28.12	56.00	-27.88	QP
8 1.40422	4.64	9.63	0.05	10.00	24.32	46.00	-21.68	Average
9 2.17827	1.89	9.63	0.05	10.00	21.57	56.00	-34.43	QP
10 2.17927	-6.74	9.63	0.05	10.00	12.94	46.00	-33.06	Average
1121.03547	18.42	9.85	0.12	10.00	38.39	60.00	-21.61	QP
1221.03647	9.44	9.85	0.12	10.00	29.41	50.00	-20.59	Average



Freq Reading LisnFac CabLos Atten_Fac Measured Limit Over Remark MHz dBuV dB dB dB dBuV dBuV dB 1 0.17034 2 0.17044 3 0.46614 20.57 5.70 0.02 -24.75 -29.62 9.60 10.00 40.19 64.94 QP Average 9.60 10.00 25.32 54.94 56.58 23.42 9.62 0.04 10.00 43.08 -13.50OP 4 0.46624 5 1.40322 6 1.40422 7 2.33359 10.00 10.00 10.00 42.48 28.50 20.74 22.74 46.58 56.00 46.00 56.00 -4.10 -27.50 -25.26 22.82 9.62 0.04 Äverage QP 1.06 9.63 0.05 Average -33.26 3.05 9.64 0.05 10.00 OP 8 2.33459 9 8.19160 10 8.19260 -4.10 2.84 -5.53 9.64 9.68 0.05 0.07 0.07 10.00 10.00 10.00 15.59 22.59 14.22 46.00 60.00 50.00 -30.41 -37.41 -35.78 Average QP 9.68 Average 1116.22564 16.75 9.72 0.11 10.00 36.58 60.00 -23.42 OP 1216.22664 9.69 9.72 0.11 10.00 29.52 50.00 -20.48 Äverage

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss+Atten Fac. 2. The emission levels that are 20dB below the official limit are not reported.

Note: Pre-scan all modes and recorded the worst case results in this report.

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8. ANTENNA REQUIREMENT

8.1 Standard Applicable

According to antenna requirement of §15.203.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

And according to \$15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

8.2 Antenna Connected Construction

8.2.1. Standard Applicable

According to §15.203 & RSS-Gen, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2.2. Antenna Connector Construction

The directional gains of antenna used for transmitting is 2.5dBi, and the antenna is connected to PCB board and no consideration of replacement. Please see EUT photo for details.

8.2.3. Results: Compliance.

Measurement

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.

Conducted power refers ANSI C63.10:2013 Output power test procedure for frequency-hopping spread-spectrum (FHSS) devices.

Radiated power refers to ANSI C63.10:2013 Radiated emissions tests.

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Measurement parameters:

Measurement parameter					
Detector:	Peak				
Sweep time:	Auto				
Resolution bandwidth:	3 MHz				
Video bandwidth:	3 MHz				
Trace-Mode:	Max hold				

Note: The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal Bluetooth devices, the GFSK mode is used.

Limits:

FCC	IC				
Antenna Gain					
6.0dBi					

Tnom	Vnom	lowest channel 2402 MHz	middle channel 2440 MHz	highest channel 2480 MHz	
Conducted power [dBm] Measured with GFSK modulation		-5.27	-5.64	-5.93	
Radiated power [dBm] Measured with GFSK modulation		-2.80	-3.21	-3.48	
Gain [dBi] Calculated		2.47	2.43	2.45	
Me	easurement unce	ertainty	\pm 1.6 dB (cond.) / ± 3.8 dB (rad.)		

Result: -/-

-----THE END OF TEST REPORT------

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