FCC - TEST REPORT

Report Number	:	**68.950.18.0480.01**	Date of Issue:	November 16, 2018
Model	:	**C1**		
Product Type	:	Puppy Cube		
Applicant	:	Guangzhou Puppy Robotics Co., Ltd.		
Address	:	Room 4001, No.16, Huaxia Road, Tianhe District, Guangzhou, Guangdong, P.R.China		
Manufacturer	:	Guangzhou Puppy Robotics Co., Ltd.		
Address	:	Room 4001, No.16, Huaxia Road, Tianhe District, Guangzhou, Guangdong, P.R.China		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	**23**		

1 Table of Contents

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

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:	86 755 8828 6998
Fax:	86 755 8828 5299
FCC Test Site Registration Number:	514049
IC Test Site Registration Number:	10320A-1

3 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2017 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

Test Method

1: KDB 558074 D01 15.247 Meas Guidance V05.

2: ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

3: ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices.

4 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C				
Test Condition		Test Result	Verdict	Test Site
§15.207	Conducted emission AC power port	Appendix I	Pass	Site 1
§15.247(b)(1)	Conducted output power for FHSS	Appendix C	Pass	Site 1
§15.247(b)(3)	Conducted output power for DTS	--	N/A	--
§15.247(e)	Power spectral density	--	N/A	--
§15.247(a)(2)	6dB bandwidth	--	N/A	--
§15.247(a)(1)	20dB Occupied bandwidth	Appendix A	Pass	Site 1
--	99% Occupied Bandwidth	Appendix B	Pass	Site 1
§15.247(a)(1)	Carrier frequency separation	Appendix D	Pass	Site 1
§15.247(a)(1)(iii)	Number of hopping frequencies	Appendix F	Pass	Site 1
§15.247(a)(1)(iii)	Dwell Time	Appendix E	Pass	Site 1
§15.247(d)	Spurious RF conducted emissions	Appendix H	Pass	Site 1
§15.247(d)	Band edge	Appendix G	Pass	Site 1
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	See page 21	Pass	Site 1
§15.203	Antenna requirement	See note 2	Pass	--

Note 1: N/A – Not Applicable.
Note 2: The EUT uses an integrated antenna, the antenna gain: 3.6dBi. According to §15.203, it is considered sufficiently to comply with the provisions of this section.

5 Description of the Equipment Under Test

Product:	Puppy Cube
Model no.:	C1
FCC ID:	2ARDX-PAIPMSVT01
Rating:	11.1Vdc, 4900mAh (supplied by an internal rechargeable battery Pack) or 19Vdc, 3A (Supplied by an External adapter, Model: NSA60ED-190300 Input: 100-240VAC, 50/60Hz, 1.5A Output: 19VDC, 3.0A)
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	79
Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Antenna Type:	Integrated Metal Antenna
Antenna Gain:	3.6dBi for 2.4GHz
Description of the EUT:	The Equipment Under Test (EUT) is a Puppy Cube supports 2.4GHz Bluetooth/Wi-Fi, 5GHz Wi-Fi functions.

6 Systems test configuration

6.1 Sub-Assembly

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
LAPTOP	LENOVO	T400	2768L54

6.2 Test software information:

Test Software Version	SecureCRT.		
Modulation	Setting TX Power	TX Pattern	Packet Type
GFSK	0x9	0xF	DH5
π/4-DQPSK	0x9	0xF	2DH5
8-DPSK	0x9	0xF	3DH5

6.3 Customized Configurations

EUT Conf.	**Signal Description**	**Operating Frequency**
DH5_Hop	GFSK modulation, package type DH5, hopping on.	---
DH5_Ch0	GFSK modulation, package type DH5, hopping off.	Ch No. 0 / 2402 MHz
DH5_Ch39	GFSK modulation, package type DH5, hopping off.	Ch No. 39 / 2441 MHz
DH5_Ch78	GFSK modulation, package type DH5, hopping off.	Ch No. 78 / 2480 MHz
2DH5_Hop	π/4-DQPSK modulation, package type 2DH5, hopping on.	---
2DH5_Ch0	π/4-DQPSK modulation, package type 2DH5, hopping off.	Ch No. 0 / 2402 MHz
2DH5_Ch39	π/4-DQPSK modulation, package type 2DH5, hopping off.	Ch No. 39 / 2441 MHz
2DH5_Ch78	π/4-DQPSK modulation, package type 2DH5, hopping off.	Ch No. 78 / 2480 MHz
3DH5_Hop	8-DPSK modulation, package type 3DH5, hopping on.	---
3DH5_Ch0	8-DPSK modulation, package type 3DH5, hopping off.	Ch No. 0 / 2402 MHz
3DH5_Ch39	8-DPSK modulation, package type 3DH5, hopping off.	Ch No. 39 / 2441 MHz
3DH5_Ch78	8-DPSK modulation, package type 3DH5, hopping off.	Ch No. 78 / 2480 MHz

6.4 Test Environments

Enviroment Parameter	Temperature	Voltage	Relative Humidity
NVLV	25.6℃	11.1VDC	56.4%

7 General Remarks

Remarks
This submittal(s) (test report) is intended for FCC ID: 2ARDX-PAIPMSVT01, complies with Section 15.207, 15.209, 15.205, 15.247 of the FCC Part 15, Subpart C.
The Model: C1 supports Bluetooth BR+EDR/Bluetooth Low Energy/Wi-Fi functions, the TX and RX range is 2402MHz-2480MHz for Bluetooth, 2412MHz – 2462MHz for 2.4GHz Wi-Fi, 5180MHz – 5320MHz, 5500MHz – 5700MHz, 5745MHz – 5825MHz for 5GHz Wi-Fi.

This report is for the Bluetooth BR+EDR part.

SUMMARY:
All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

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

Sample Received Date: October 25, 2018

Testing Start Date: October 25, 2018

Testing End Date: November 15, 2018

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Reviewed by:	Prepared by:	Tested by:
Laurent Yuan	Aaron Lai	Louise Liu
EMC Project Manager	EMC Project Engineer	EMC Test Engineer

8 Description of Test

8.1 Conducted Emission

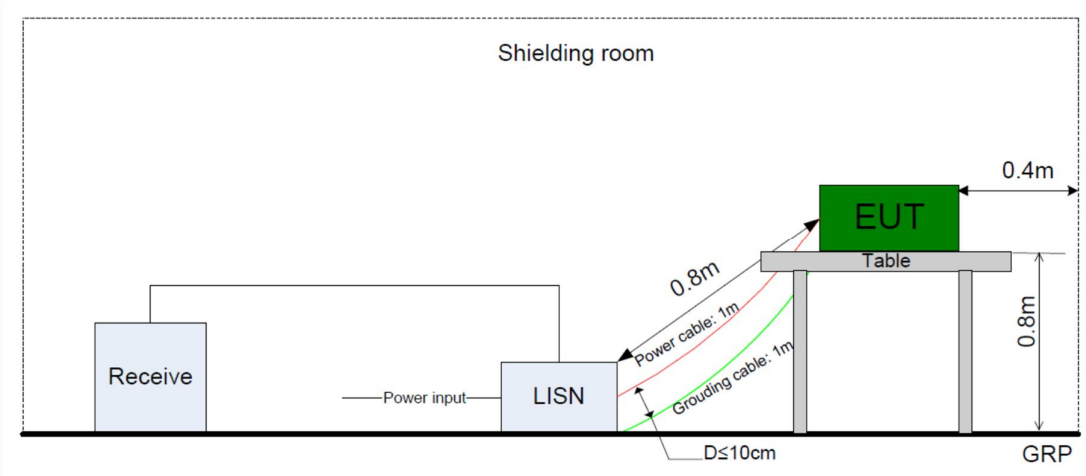
Test Method:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance.
4. A EMI test receiver is used to test the emissions from both sides of AC line.

Test Setup:

The mains cable of the EUT (per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.



Limit:

Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Remark: * Decreasing linear

Test Result: Pass

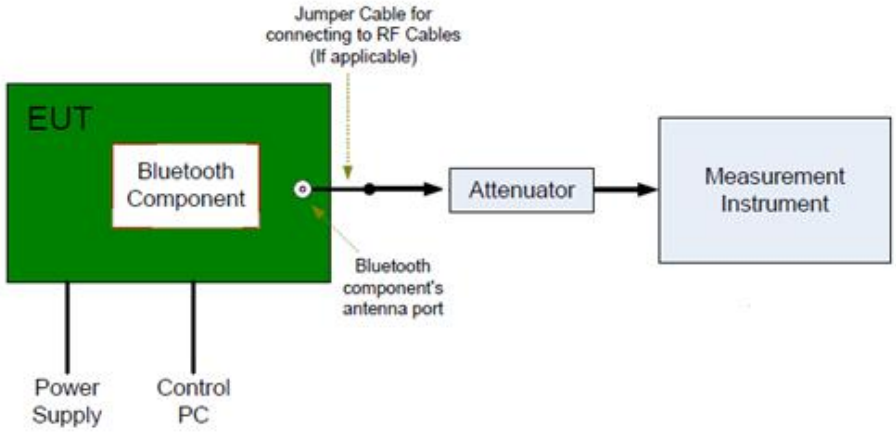
8.2 Conducted Peak output power

Test Method:

1. Connect EUT test port to Power meter.
2. Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
3. Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.
4. Repeat above procedures until all frequencies measured were complete.

Test Setup:

The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



Limits:

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

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

Test Result: Pass

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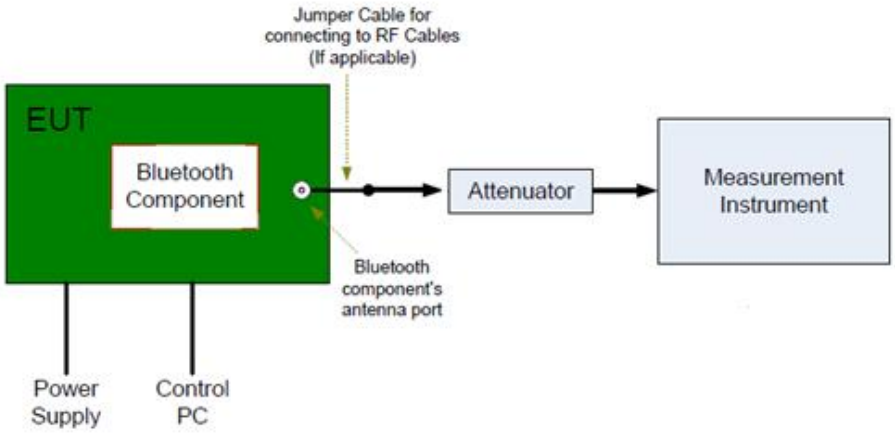
8.3 20 dB bandwidth

Test Method:

1. Connect EUT test port to spectrum analyzer.
2. Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
3. Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.
4. Set Span = approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel.
5. Set RBW ≥ 1% of the 20dB bandwidth, VBW ≥ RBW.
6. Set Sweep = auto.
7. Set Detector function = peak.
8. Allow the trace to stabilize.
9. Repeat above procedures until all frequencies measured were complete.

Test Setup:

The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



Limit:

Limit [kHz]
N/A

Test Result: Pass

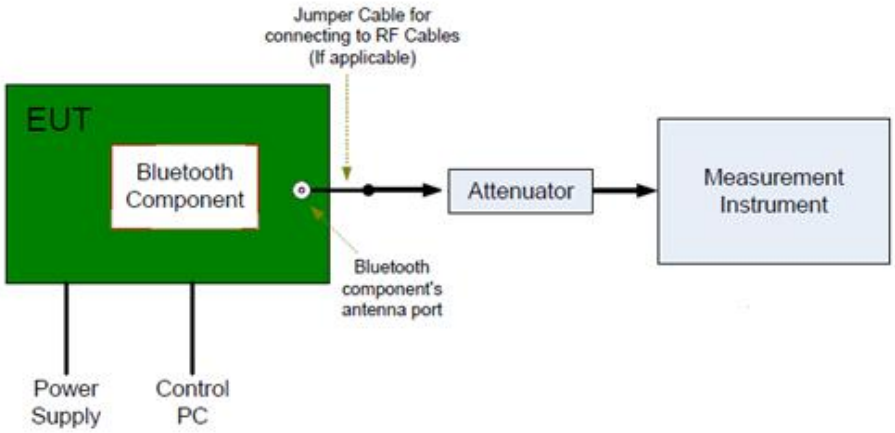
8.4 99% Occupied Bandwidth

Test Method:

1. Connect EUT test port to spectrum analyzer.
2. Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
3. Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.
4. Set Span = approximately 2 to 3 times the 99% bandwidth, centered on a hopping channel.
5. Set RBW ≥ 1% of the 99% bandwidth, VBW ≥ RBW.
6. Set Sweep = auto.
7. Set Detector function = peak.
8. Allow the trace to stabilize.
9. Repeat above procedures until all frequencies measured were complete.

Test Setup:

The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



Limit:

Limit [kHz]
N/A

Test Result: Pass

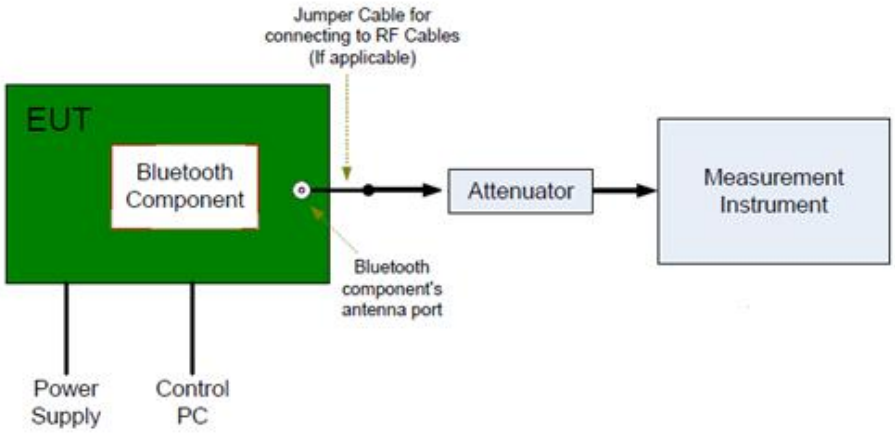
8.5 Carrier Frequency Separation

Test Method:

1. Connect EUT test port to spectrum analyzer.
2. Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
3. Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.
4. Set Span = wide enough to capture the peaks of two adjacent channels.
5. Set RBW ≥ 1% of the span, VBW ≥ RBW.
6. Set Sweep = auto.
7. Set Detector function = peak.
8. Allow the trace to stabilize.
9. Repeat above procedures until all frequencies measured were complete.

Test Setup:

The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



Limit:

Limit kHz
⩾25KHz or 2/3 of the 20 dB bandwidth which is greater

Test Result: Pass

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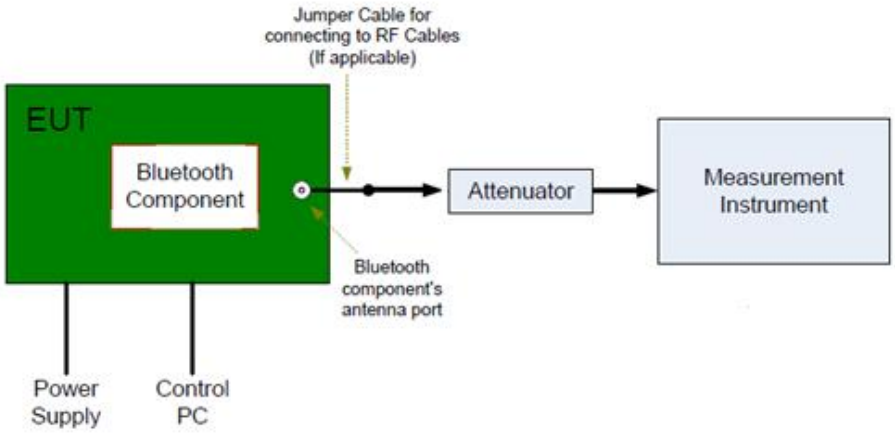
8.6 Number of hopping frequencies

Test Method:

1. Connect EUT test port to spectrum analyzer.
2. Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
3. Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.
4. Set Span = Span = the frequency band of operation.
5. Set RBW ≥ 1% of the span, VBW ≥ RBW.
6. Set Sweep = auto.
7. Set Detector function = peak.
8. Allow the trace to stabilize.
9. Repeat above procedures until all frequencies measured were complete.

Test Setup:

The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



Limit:

Limit number
⩾ 15

Test Result: Pass

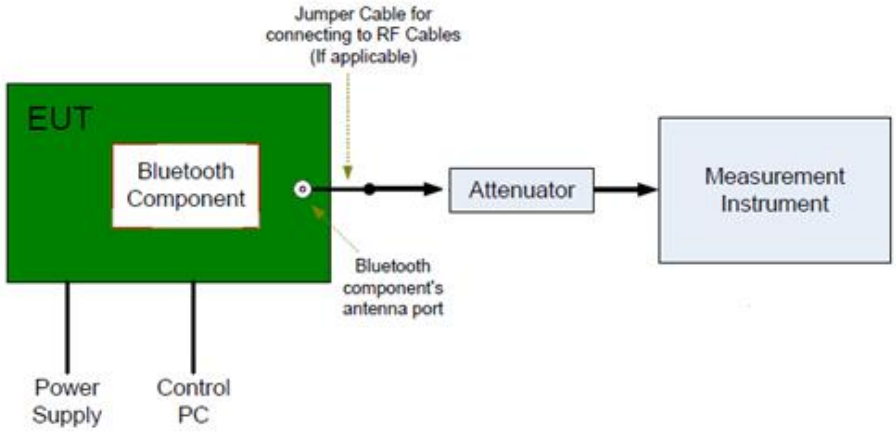
8.7 Dwell Time

Test Method:

1. Connect EUT test port to spectrum analyzer.
2. Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
3. Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.
4. Set Span = zero span, centered on a hopping channel.
5. Set RBW = 1 MHz, VBW ≥ RBW.
6. Set Sweep = auto.
7. Set Detector function = peak.
8. Allow the trace to stabilize.
9. Repeat above procedures until all frequencies measured were complete.

Test Setup:

The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



Limit:

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Remark:

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows:
The duration for dwell time calculation: 0.4 [s] * hopping number = 0.4 [s] * 79 [ch] = 31.6 [s*ch];

The burst width, which is directly measured, refers to the duration on one channel hop.

The maximum number of hopping channels in 31.6s for DH5=1600 / 6 / 79 *31.6=106.67

Test Result: Pass

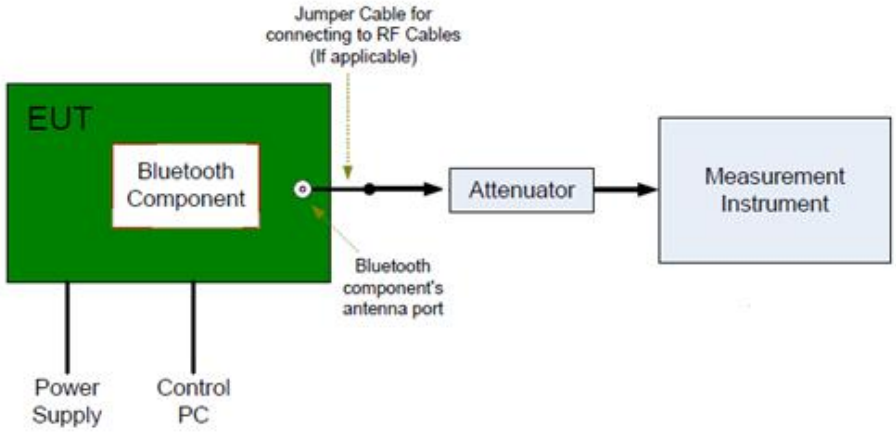
8.8 Spurious RF conducted emissions

Test Method:

1. Connect EUT test port to spectrum analyzer.
2. Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
3. Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.
4. Set Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.
5. Set RBW = 100 kHz, VBW ≥ RBW.
6. Set Sweep = auto.
7. Set Detector function = peak.
8. Allow the trace to stabilize.
9. Repeat above procedures until all frequencies measured were complete.

Test Setup:

The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



Limit:

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

Test Result: Pass

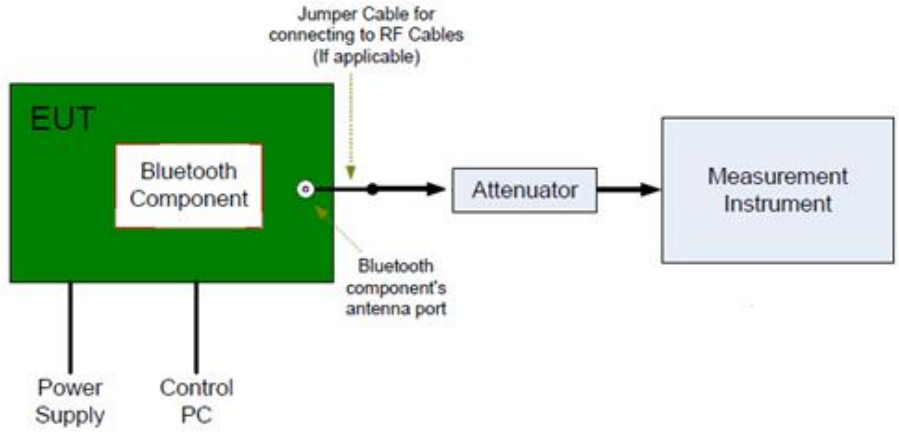
8.9 Band edge testing

Test Method:

1. Connect EUT test port to spectrum analyzer.
2. Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
3. Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.
4. Set Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.
5. Set RBW ≥ 1% of the span, VBW ≥ RBW.
6. Set Sweep = auto.
7. Set Detector function = peak.
8. Allow the trace to stabilize.
9. Repeat above procedures until all frequencies measured were complete.

Test Setup:

The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



Limit:

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the100 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 that the transmitter demonstrates compliance with the peak conducted power limits.

Test Result: Pass

8.10 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 3meter 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.
For Below 30MHz
Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 200 Hz, VBW≥RBW from 9KHz to 0.15MHz, RBW 9KHz VBW≥RBW from 0.15MHz to 30MHz for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

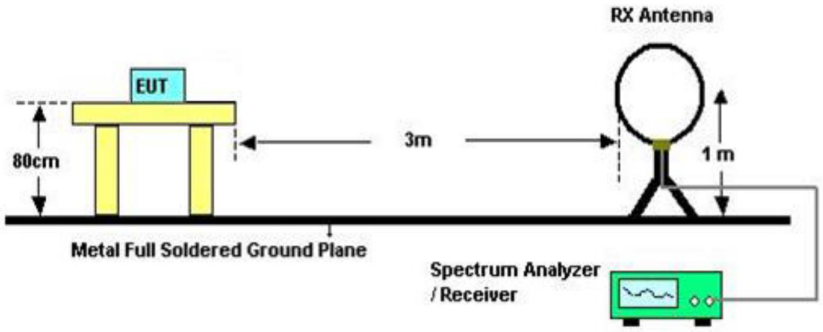
Note:

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 frequency above 1GHz.

Test Setup:

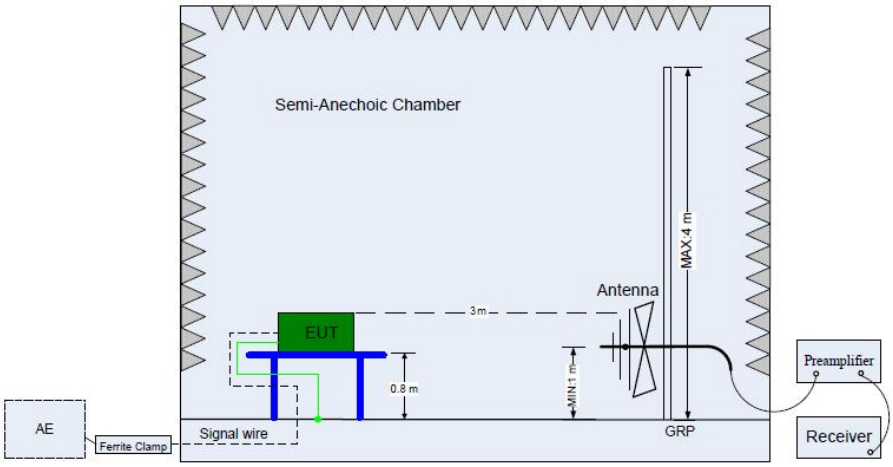
Test Setup 1: Radiated Emission test below 30MHz

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3m. The setup is according to ANSI C63.4.



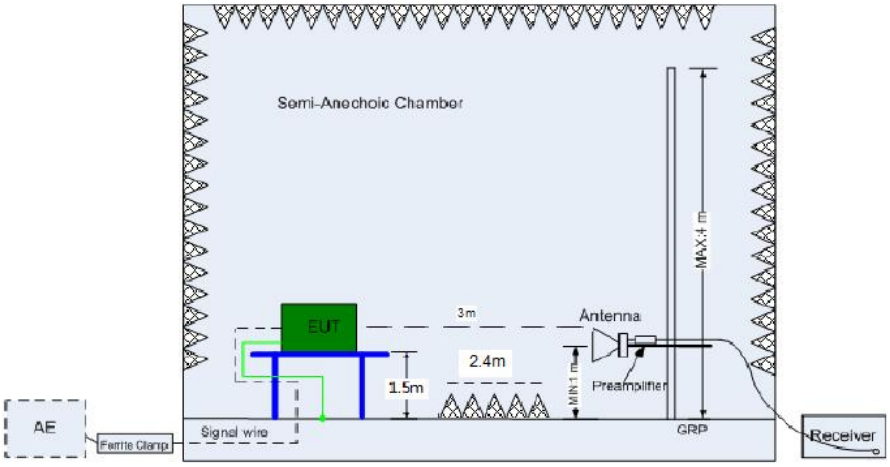
Test Setup 2: Radiated Emission test below 1GHz

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3m. The setup is according to ANSI C63.4.



(Below 1 GHz)

Test Setup 3: Radiated Emission test above 1GHz
The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3m. The setup is according to ANSI C63.4.



(Above 1 GHz)

Limit:
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.

§ 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

§15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

Test Result: Pass

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According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

The only worse case (which is subject to the maximum EIRP, GFSK mode) test result is listed in the report.

GFSK Modulation 2402MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Corr.	Result
	MHz	dBuV/m		dBµV/m		dB	(dB)	
30-1000MHz	839.95	35.89	H	46.00	QP	10.11	-16.3	Pass
	890.98	35.51	V	46.00	QP	10.49	-15.5	Pass
1000-25000MHz	4803.28*	47.58	H	74.00	PK	26.42	3.7	Pass
	--	--	H	54.00	AV	--	--	Pass
	4803.75*	51.83	V	74.00	PK	22.17	3.7	Pass
	7206.09*	50.80	V	74.00	PK	23.20	6.0	Pass
	--	--	V	54.00	AV	--	--	Pass

GFSK Modulation 2441MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Corr.	Result
	MHz	dBuV/m		dBµV/m		dB	(dB)	
30-1000MHz	--	--	H	43.5	QP	--	--	Pass
	--	--	V	46	QP	--	---	Pass
1000-25000MHz	4881.56*	46.55	H	74.00	PK	27.45	**3.8**	Pass
	7322.34*	47.62	H	74.00	PK	26.38	**7.0**	Pass
	--	--	H	54.00	AV	--	--	Pass
	4882.03*	49.82	V	74.00	PK	24.18	3.8	Pass
	7322.34*	50.74	V	74.00	PK	23.26	7.0	Pass
	--	--	V	54.00	AV	--	--	Pass

GFSK Modulation 2480MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Corr.	Result
	MHz	dBuV/m		dBµV/m		dB	(dB)	
30-1000MHz	--	--	H	43.50	QP	--	--	Pass
	--	--	V	46.00	QP	--	---	Pass
1000-25000MHz	4959.84*	45.05	H	74.00	PK	28.95	4.3	Pass
	7439.53*	45.64	H	74.00	PK	28.36	8.2	Pass
	--	--	H	54.00	AV	--	--	Pass
	4959.84*	47.37	V	74.00	PK	26.63	4.3	Pass
	7440.46*	51.75	V	74.00	PK	22.25	8.2	Pass
	--	--	V	54.00	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.
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss.
(5) The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

9 Test Equipment List

Radiated 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

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2018-7-14
LISN	Rohde & Schwarz	ENV4200	100249	2018-7-14
LISN	Rohde & Schwarz	ENV432	101318	2018-7-14
LISN	Rohde & Schwarz	ENV216	100326	2018-7-14
ISN	Rohde & Schwarz	ENY81	100177	2018-7-14
ISN	Rohde & Schwarz	ENY81-CA6	101664	2018-7-14
High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	9420-584	2018-7-14
RF Current Probe	Rohde & Schwarz	EZ-17	100816	2018-7-14
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2018-7-7
Test software	Rohde & Schwarz	EMC32	Version9.15.00	N/A

TS8997 Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	108272	2018-7-7
Vector Signal Generator	Rohde & Schwarz	SMBV100A	262825	2018-7-23
Communication Synthetical Test Instrument	Rohde & Schwarz	CMW 270	101251	2019-2-15
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 10.38.00	N/A
Test software	Tonscend	System for BT/WI-FI	Version 2.6	N/A

10 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	
Items	**Extended Uncertainty**
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.80dB; Vertical: 4.87dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.59dB; Vertical: 4.58dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.05dB; Vertical: 5.04dB;
Uncertainty for Conducted RF test with TS 8997	Power level test involved: 2.13dB Frequency test involved: 0.6×10^{-7}
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV432 or ENV4200)	3.21dB