



FCC RF Test Report

APPLICANT : Tabletop Media, LLC d/b/a Ziosk
EQUIPMENT : Ziosk Aurizon
BRAND NAME : Ziosk
MODEL NAME : Z500
FCC ID : XOX-Z500
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Jan. 10, 2020 and testing was completed on Mar. 14, 2020. We, Sporton International (ShenZhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (ShenZhen) Inc., the test report shall not be reproduced except in full.

Reviewed by: Derreck Chen / Supervisor

Approved by: Eric Shih / Manager



Sportun International (ShenZhen) Inc.

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REVISION HISTORY



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(b)(3)	Peak Output Power	≤ 30dBm	Pass	-
3.2	15.247(d)	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.57 dB at 400.540 MHz
3.3	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Tabletop Media, LLC d/b/a Ziosk

12404 Park Central Dr, Suite 350, Dallas, TX 75251

1.2 Manufacturer

SMTC de Chihuahua SA. DE C.V.

Washington 3701 building 20. Parque Industrial Las Americas, Chihuahua, Chih. 31200

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Ziosk Aurizon
Brand Name	Ziosk
Model Name	Z500
FCC ID	XOX-Z500
EUT supports Radios application	NFC WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	5.1.R
SW Version	Android 5.1.1
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report for Z500. The change note could be referred to the product equality declaration which is exhibit separately. Based on the similarity between current and previous project, only the related test cases from original test report (Sportun Report Number FR820812B) were verified for the differences.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	40
Carrier Frequency of Each Channel	40 Channel(37 hopping + 3 advertising channel)
Maximum Output Power to Antenna	6.20 dBm (0.0042 W)
Antenna Type / Gain	PIFA Antenna type with gain 1.51 dBi
Type of Modulation	Bluetooth LE : GFSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sportun International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sportun International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sportun Site No.	FCC Designation No.	FCC Test Firm Registration No.
	TH01-SZ	CN1256	421272

Test Firm	Sportun International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan Shenzhen, 518055 People's Republic of China TEL: +86-755-33202398		
Test Site No.	Sportun Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH02-SZ	AUDIX	E3	6.2009-8-24a



1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	0	2402	21	2444
	1	2404	22	2446
	2	2406	23	2448
	3	2408	24	2450
	4	2410	25	2452
	5	2412	26	2454
	6	2414	27	2456
	7	2416	28	2458
	8	2418	29	2460
	9	2420	30	2462
	10	2422	31	2464
	11	2424	32	2466
	12	2426	33	2468
	13	2428	34	2470
	14	2430	35	2472
	15	2432	36	2474
	16	2434	37	2476
	17	2436	38	2478
	18	2438	39	2480
	19	2440	-	-
	20	2442	-	-



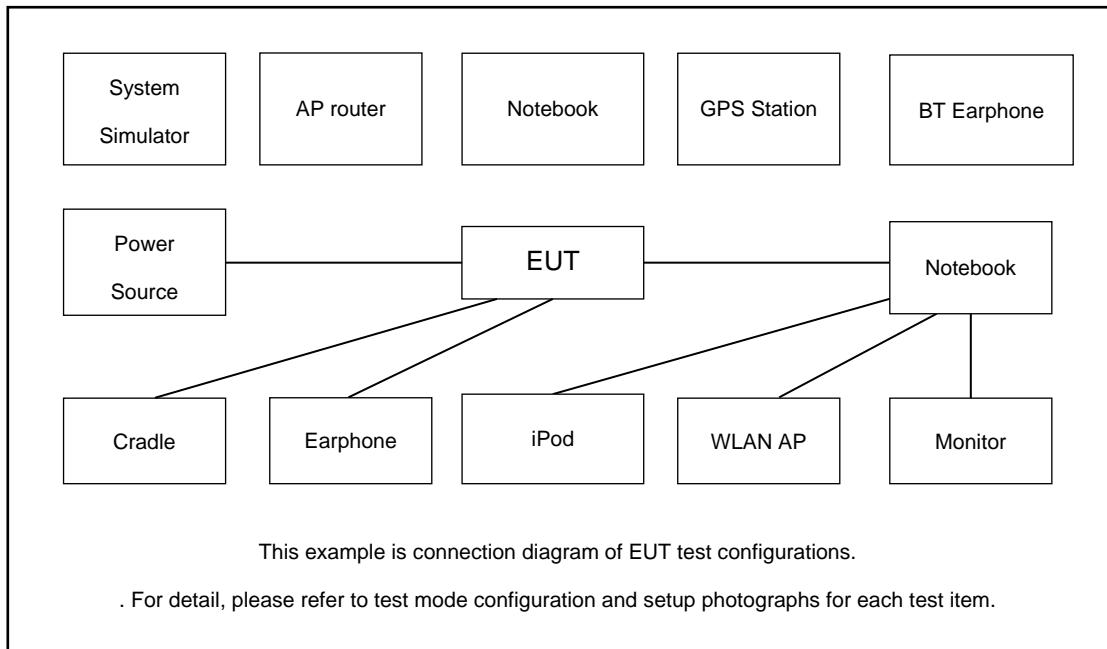
2.2 Test Mode

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	Data Rate / Modulation
	Bluetooth – LE / GFSK
Conducted TCs	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps
Radiated TCs	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	BT Base Station	Anritus	8852B	N/A	N/A	Unshielded,1.8m

2.5 EUT Operation Test Setup

For BLE function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

3 Test Result

3.1 Output Power Measurement

3.1.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

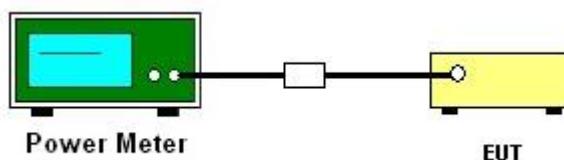
3.1.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.2 Method AVGPM-G method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.1.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.



3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (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

3.2.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.



3.2.3 Test Procedures

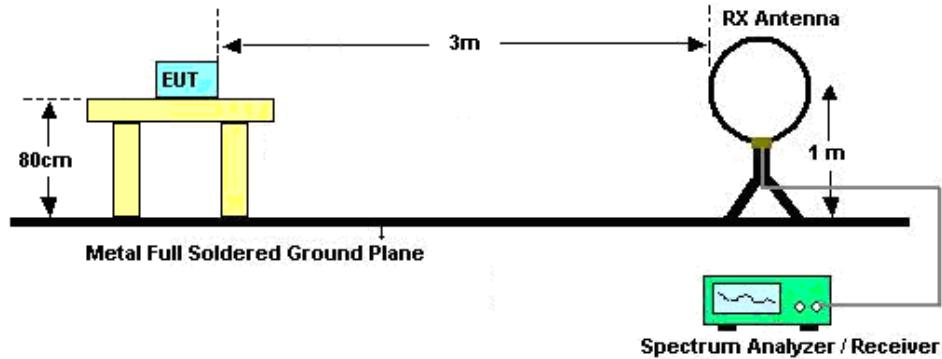
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

For average measurement:

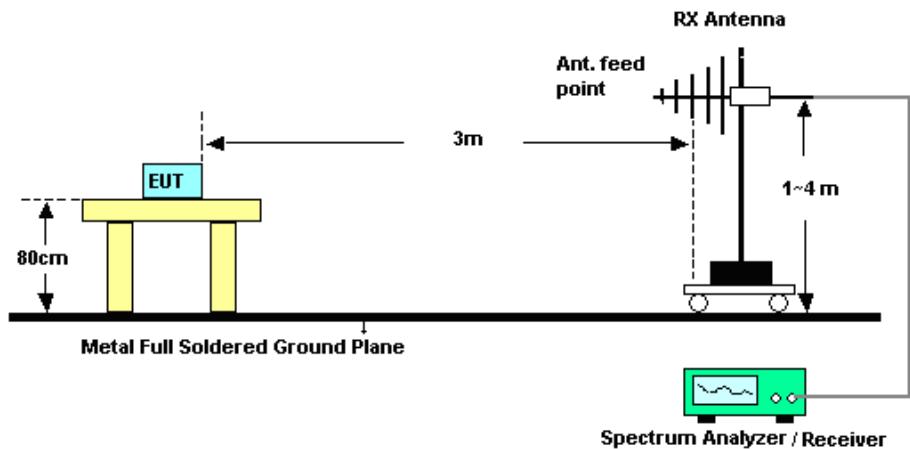
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.2.4 Test Setup

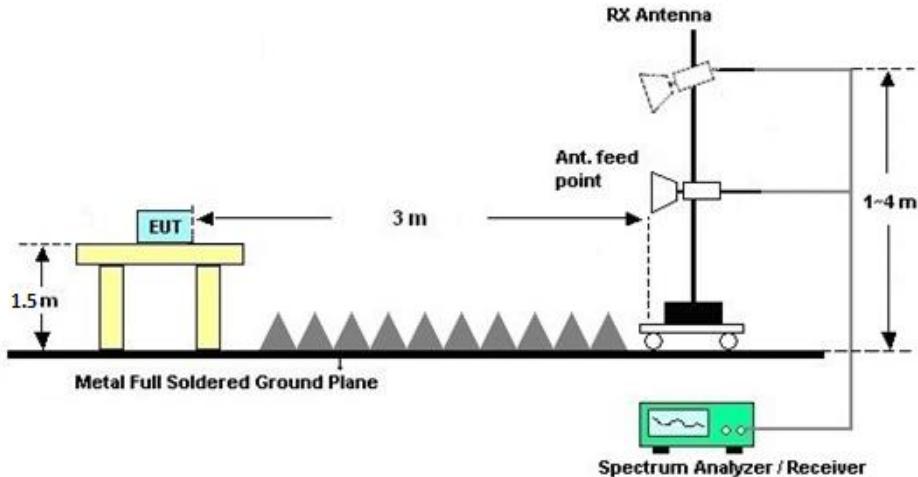
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.2.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.2.7 Duty Cycle

Please refer to Appendix C.

3.2.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B.



3.3 Antenna Requirements

3.3.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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 rule.

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.3.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Nov. 02, 2019	Feb. 28, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 13, 2020	Feb. 28, 2020	Jan. 12, 2021	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 13, 2020	Feb. 28, 2020	Jan. 12, 2021	Conducted (TH01-KS)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY551502 13	10Hz~44GHz	Apr. 19, 2019	Mar. 07, 2020~Mar. 14, 2020	Apr. 18, 2020	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 29, 2018	Mar. 07, 2020~Mar. 14, 2020	May 28, 2020	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Jul. 19, 2019	Mar. 07, 2020~Mar. 14, 2020	Jul. 18, 2020	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Aug. 27, 2019	Mar. 07, 2020~Mar. 14, 2020	Aug. 26, 2020	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 22. 2019	Mar. 07, 2020~Mar. 14, 2020	Jul. 21. 2020	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr.18, 2019	Mar. 07, 2020~Mar. 14, 2020	Apr. 17, 2020	Radiation (03CH02-SZ)
LF Amplifier	Burgeon	BPA-530	102211	0.01~3000Mhz	Oct. 18,2019	Mar. 07, 2020~Mar. 14, 2020	Oct. 17,2020	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1943528	1GHz~18GHz	Oct. 18,2019	Mar. 07, 2020~Mar. 14, 2020	Oct. 17,2020	Radiation (03CH02-SZ)
HF Amplifier	KEYSIGHT	83017A	MY532701 05	0.5GHz~26.5GHz	Oct. 18,2019	Mar. 07, 2020~Mar. 14, 2020	Oct. 17,2020	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002 470	N/A	NCR	Mar. 07, 2020~Mar. 14, 2020	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Mar. 07, 2020~Mar. 14, 2020	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Mar. 07, 2020~Mar. 14, 2020	NCR	Radiation (03CH02-SZ)

NCR: No Calibration Required



5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2U_c(y))	5.0 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2U_c(y))	5.0 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2U_c(y))	4.4 dB
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Appendix A. Conducted Test Results

Bluetooth Low Energy

Test Engineer:	Jensen Wu	Temperature:	21~25	°C
Test Date:	2020/2/28	Relative Humidity:	51~54	%

TEST RESULTS DATA**Peak Power Table**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	5.91	30.00				Pass
BLE	1Mbps	1	19	2440	6.20	30.00				Pass
BLE	1Mbps	1	39	2480	5.76	30.00				Pass

TEST RESULTS DATA**Average Power Table****(Reporting Only)**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
BLE	1Mbps	1	0	2402	1.99	5.60
BLE	1Mbps	1	19	2440	1.99	5.97
BLE	1Mbps	1	39	2480	1.99	5.33



Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
												Avg.	
		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2346.435	47.99	-26.01	74	45.4	27.9	7.51	32.82	204	3	P	H
		2389.695	38.4	-15.6	54	35.96	27.7	7.54	32.8	204	3	A	H
	*	2402	101.48	-	-	99.02	27.7	7.54	32.78	204	3	P	H
		2402	100.73	-	-	98.27	27.7	7.54	32.78	204	3	A	H
		2360.715	47.83	-26.17	74	45.31	27.83	7.51	32.82	331	70	P	V
		2348.43	38.35	-15.65	54	35.76	27.9	7.51	32.82	331	70	A	V
	*	2402	94.44	-	-	91.98	27.7	7.54	32.78	331	70	P	V
	*	2402	93.71	-	-	91.25	27.7	7.54	32.78	331	70	A	V
BLE CH 19 2440MHz		2353.96	48.05	-25.95	74	45.53	27.83	7.51	32.82	175	3	P	H
		2373.14	38.65	-15.35	54	36.17	27.77	7.51	32.8	175	3	A	H
	*	2440	101.29	-	-	98.91	27.6	7.54	32.76	175	3	P	H
	*	2440	100.32	-	-	97.94	27.6	7.54	32.76	175	3	A	H
		2484.04	47.3	-26.7	74	45.02	27.47	7.53	32.72	175	3	P	H
		2493.07	38.29	-15.71	54	36.06	27.4	7.53	32.7	175	3	A	H
		2380.7	47.9	-26.1	74	45.42	27.77	7.51	32.8	325	72	P	V
		2356.9	43.46	-10.54	54	40.94	27.83	7.51	32.82	325	72	A	V
	*	2440	94.3	-	-	91.92	27.6	7.54	32.76	325	72	P	V
	*	2440	93.38	-	-	91	27.6	7.54	32.76	325	72	A	V
		2499.44	47.16	-26.84	74	44.93	27.4	7.53	32.7	325	72	P	V
		2486.49	38.03	-15.97	54	35.75	27.47	7.53	32.72	325	72	A	V



BLE CH 39 2480MHz	*	2480	100.15	-	-	97.87	27.47	7.53	32.72	100	350	P	H
	*	2480	99.38	-	-	97.1	27.47	7.53	32.72	100	350	A	H
		2483.56	53.85	-20.15	74	51.57	27.47	7.53	32.72	100	350	P	H
		2489.64	42.92	-11.08	54	40.71	27.4	7.53	32.72	100	350	A	H
	*	2480	93.18	-	-	90.9	27.47	7.53	32.72	296	79	P	V
	*	2480	92.5	-	-	90.22	27.47	7.53	32.72	296	79	A	V
		2484.04	52.35	-21.65	74	50.07	27.47	7.53	32.72	296	79	P	V
		2489.52	38.96	-15.04	54	36.75	27.4	7.53	32.72	296	79	A	V
	Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.											



2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		4804	38.48	-35.52	74	51.9	31.1	9.86	54.38	186	360	P	H
		4804	40.11	-33.89	74	53.53	31.1	9.86	54.38	160	196	P	V
BLE CH 19 2440MHz		4880	39.05	-34.95	74	52.39	31.13	9.88	54.35	113	196	P	H
		7320	44.09	-29.91	74	50.34	36.4	11.88	54.53	160	360	P	H
		4880	39.23	-34.77	74	52.57	31.13	9.88	54.35	184	153	P	V
		7320	44.31	-29.69	74	50.56	36.4	11.88	54.53	160	186	P	V
BLE CH 39 2480MHz		4960	37.55	-36.45	74	50.56	31.37	9.93	54.31	195	139	P	H
		7440	44.22	-29.78	74	50.34	36.5	12.03	54.65	192	169	P	H
		4960	37.89	-36.11	74	50.9	31.37	9.93	54.31	163	120	P	V
		7440	44.41	-29.59	74	50.53	36.5	12.03	54.65	185	205	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.			
														(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		30.97	23.55	-16.45	40	30.96	23.82	0.74	31.97	-	-	-	-	P	H										
		119.24	19.71	-23.79	43.5	32	17.94	1.42	31.65	-	-	-	-	P	H										
		245.34	28.5	-17.5	46	39.68	18.01	2.06	31.25	-	-	-	-	P	H										
		400.54	38.43	-7.57	46	45.35	21.62	2.65	31.19	100	225	P	H												
		666.32	29.98	-16.02	46	33.02	24.76	3.44	31.24	-	-	-	-	P	H										
		867.11	33.8	-12.2	46	34.61	26.4	3.97	31.18	-	-	-	-	P	H										
		33.88	24.19	-15.81	40	33.32	22.08	0.77	31.98	-	-	-	-	P	V										
		126.03	21.1	-22.4	43.5	33.45	17.82	1.46	31.63	-	-	-	-	P	V										
		385.02	34.48	-11.52	46	41.83	21.25	2.6	31.2	100	236	P	V												
		600.36	32.69	-13.31	46	36.19	24.5	3.27	31.27	-	-	-	-	P	V										
		790.48	31.58	-14.42	46	32.91	26.07	3.77	31.17	-	-	-	-	P	V										
		954.41	32.96	-13.04	46	33.13	26.99	4.18	31.34	-	-	-	-	P	V										
Remark	1. No other spurious found. 2. All results are PASS against limit line.																								

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dB μ V/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dB μ V/m) – Limit Line(dB μ V/m)

For Peak Limit @ 2390MHz:

1. Level(dB μ V/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dB μ V) – 35.86 (dB)

= 55.45 (dB μ V/m)

2. Over Limit(dB)

= Level(dB μ V/m) – Limit Line(dB μ V/m)

= 55.45(dB μ V/m) – 74(dB μ V/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dB μ V/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dB μ V) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dB μ V) – 35.86 (dB)

= 43.54 (dB μ V/m)

2. Over Limit(dB)

= Level(dB μ V/m) – Limit Line(dB μ V/m)

= 43.54(dB μ V/m) – 54(dB μ V/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
Bluetooth LE	63.21	0.388	2.575	3KHz

Bluetooth LE

