# **FCC RF Test Report**

APPLICANT : Motorola Mobility, LLC EQUIPMENT : Mobile Cellular Phone

**BRAND NAME**: Motorola

MODEL NAME : 10062 (Single SIM), 10060 ( Dual SIM)

FCC ID : IHDT56WA4

STANDARD : FCC Part 15 Subpart C §15.247

**CLASSIFICATION**: (DTS) Digital Transmission System

This is a variant report which is only valid together with the original test report. The product was received on Feb. 03, 2017 and testing was completed on Feb. 25, 2017. We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 1 of 17
Report Issued Date : Mar. 20, 2017

Testing Laboratory 1190

: Rev. 01

Report No.: FR720310-02B

Report Template No.: BU5-FR15CBT4.0 Version 1.3

Report Version

## **TABLE OF CONTENTS**

RE\	/ISION	N HISTORY	3
SUI	ИMAR	Y OF TEST RESULT	4
1	GENE	RAL DESCRIPTION	5
	1.1	Applicant	5
	1.2	Manufacturer	5
	1.3	Product Feature of Equipment Under Test	5
	1.4	Product Specification of Equipment Under Test	6
	1.5	Modification of EUT	6
	1.6	Testing Location	7
	1.7	Applicable Standards	7
2	TEST	CONFIGURATION OF EQUIPMENT UNDER TEST	8
	2.1	Carrier Frequency Channel	8
	2.2	Descriptions of Test Mode	
	2.3	Test Mode	9
	2.4	Connection Diagram of Test System	10
	2.5	EUT Operation Test Setup	10
3	TEST	RESULT	11
	3.1	Radiated Band Edges and Spurious Emission Measurement	11
	3.2	Antenna Requirements	
4	LIST	OF MEASURING EQUIPMENT	16
5	UNCE	RTAINTY OF EVALUATION	17
APF	PENDI	X A. RADIATED SPURIOUS EMISSION	
APF	PENDI	X B. RADIATED SPURIOUS EMISSION PLOTS	
APF	PENDI	X C. DUTY CYCLE PLOTS	
۸DI	וחושכ	Y D ODIGINAL PEROPT	

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 2 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No. : FR720310-02B

## **REVISION HISTORY**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR720310-02B	Rev. 01	Initial issue of report	Mar. 20, 2017

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 3 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No. : FR720310-02B

## **SUMMARY OF TEST RESULT**

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 4.12 dB at 30.810 MHz
3.2	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 4 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No. : FR720310-02B

## 1 General Description

#### 1.1 Applicant

#### Motorola Mobility, LLC

222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States

#### 1.2 Manufacturer

#### **Motorola Mobility, LLC**

222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States

### 1.3 Product Feature of Equipment Under Test

Product Feature			
Equipment	Mobile Cellular Phone		
Brand Name	Motorola		
Model Name	10062 (Single SIM), 10060 ( Dual SIM)		
FCC ID	IHDT56WA4		
IMEI Code	IMEI 1: 351889080006290 IMEI 2: 351889080006308		
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE/NFC/FM WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 Bluetooth BR/EDR/LE		
HW Version	DVT2		
EUT Stage	Identical Prototype		

Report No.: FR720310-02B

#### 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. All the test cases were performed on original report which can be referred to Sporton Report Number FR720310B.

 SPORTON INTERNATIONAL INC.
 Page Number
 : 5 of 17

 TEL: 886-3-327-3456
 Report Issued Date
 : Mar. 20, 2017

 FAX: 886-3-328-4978
 Report Version
 : Rev. 01

FCC ID : IHDT56WA4 Report Template No.: BU5-FR15CBT4.0 Version 1.3

Accessory List				
AC Adoptor 1	Brand Name: Motorola			
AC Adapter 1	Model Name: SPN5970A			
AC Adoptor 3	Brand Name: Motorola			
AC Adapter 2	Model Name: SPN5993A			
AC Adoptor 2	Brand Name: Motorola			
AC Adapter 3	Model Name: SPN5978A			
Pottory 1	Brand Name: Motorola			
Battery 1	Model Name: SNN5983A			
Pottory 2	Brand Name: Motorola			
Battery 2	Model Name: SNN5985A			
Farnhana	Brand Name: Motorola			
Earphone	Model Name: SH38C16618			
LISP Cable	Brand Name: Motorola			
USB Cable	Model Name: SKN6473A			

## 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	7.40 dBm (0.0055 W)		
Antenna Type / Gain	Loop Antenna type with gain -0.50 dBi		
Type of Modulation	Bluetooth LE : GFSK		

#### 1.5 Modification of EUT

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

SPORTON INTERNATIONAL INC. TEL: 886-3-327-3456

FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 6 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No.: FR720310-02B

#### 1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park,		
Test Site Location	Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.		
rest Site Location	TEL: +886-3-327-3456		
	FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		
rest site No.	TH05-HY		

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC.		
	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist,		
Toot Site Leastion	Taoyuan City, Taiwan (R.O.C.)		
Test Site Location	TEL: +886-3-327-0868		
	FAX: +886-3-327-0855		
Test Site No.	Sporton Site No.		
Test Site NO.	03CH11-HY		

**Note:** The test site complies with ANSI C63.4 2014 requirement.

## 1.7 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05
- ANSI C63.10-2013

#### Remark:

- 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.

SPORTON INTERNATIONAL INC.

Page Number TEL: 886-3-327-3456 Report Issued Date: Mar. 20, 2017 FAX: 886-3-328-4978 Report Version FCC ID: IHDT56WA4

Report Template No.: BU5-FR15CBT4.0 Version 1.3

: 7 of 17

: Rev. 01

## 2 Test Configuration of Equipment Under Test

## 2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (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
2400-2483.5 MHz	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	-	-

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 8 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No.: FR720310-02B

#### 2.2 Descriptions of Test Mode

The RF output power was recorded in the following table:

	<u> </u>	
	Frequency	Bluetooth – LE RF Output Power
Channel		Data Rate / Modulation
Chamilei		GFSK
		1Mbps
Ch00	2402MHz	6.78 dBm
Ch19	2440MHz	<mark>7.40</mark> dBm
Ch39	2480MHz	4.98 dBm

Report No.: FR720310-02B

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 (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests, X, Y, Z in three orthogonal panels to determine the final configuration (Z plane as worst plane) from all possible combinations.

#### 2.3 Test Mode

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

	Summary table of Test Cases	
Took Itom	Data Rate / Modulation	
Test Item	Bluetooth – LE / GFSK	
Radiated	Made 4: Diveteeth Ty CU20, 2400 MHz, 4Mhze	
TCs Mode 1: Bluetooth Tx CH39_2480 MHz_1Mbps		
Remark: All the radiated test cases were performance with Adapter 1 and Battery 1.		

 SPORTON INTERNATIONAL INC.
 Page Number
 : 9 of 17

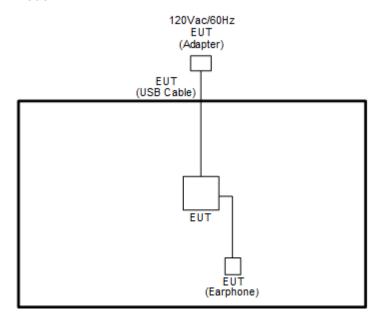
 TEL: 886-3-327-3456
 Report Issued Date
 : Mar. 20, 2017

 FAX: 886-3-328-4978
 Report Version
 : Rev. 01

FCC ID : IHDT56WA4 Report Template No.: BU5-FR15CBT4.0 Version 1.3

## 2.4 Connection Diagram of Test System

<Bluetooth - LE Tx Mode>



### 2.5 EUT Operation Test Setup

For Bluetooth function, programmed RF utility, "QRCT" installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 10 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No.: FR720310-02B

#### 3 Test Result

#### 3.1 Radiated Band Edges and Spurious Emission Measurement

#### 3.1.1 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 FCC section 15.209 limits as below.

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(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

#### 3.1.2 Measuring Instruments

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

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 11 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No.: FR720310-02B

#### 3.1.3 Test Procedures

- 1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
- 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.
- 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 measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- 7. 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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \ge 1$  GHz for peak measurement. For average measurement:
    - VBW = 10 Hz, when duty cycle is no less than 98 percent.
    - VBW ≥ 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.

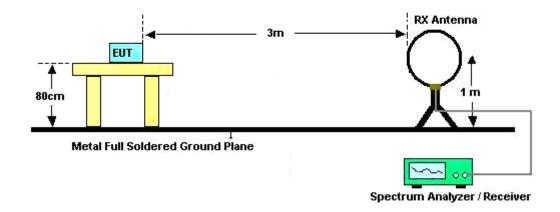
SPORTON INTERNATIONAL INC.
TEL: 886-3-327-3456

FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 12 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

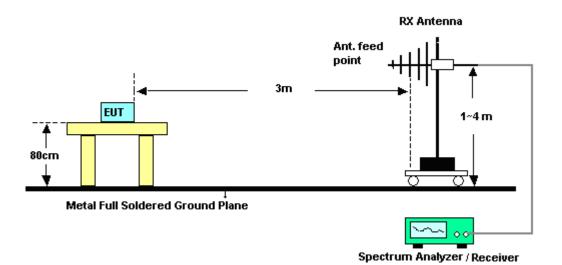
Report No.: FR720310-02B

#### 3.1.4 Test Setup

#### For radiated emissions below 30MHz



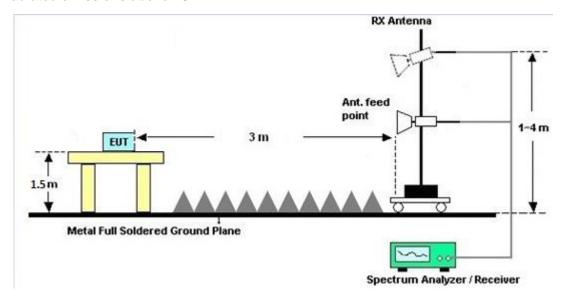
#### For radiated emissions from 30MHz to 1GHz



TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 13 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No.: FR720310-02B

#### For radiated emissions above 1GHz



#### 3.1.5 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 per 15.31(o) was not reported.

#### 3.1.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

#### 3.1.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix A and B.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 14 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No.: FR720310-02B

#### 3.2 Antenna Requirements

#### 3.2.1 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 FCC rule.

#### 3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

#### 3.2.3 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.

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 15 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No.: FR720310-02B

## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Agilent	E4416A	GB412923 44	300MHz~40GH z	Dec. 26, 2016	Feb. 17, 2017	Dec. 25, 2017	Conducted (TH05-HY)
Power Sensor	Agilent	E9327A	US404415 48	300MHz~40GH z	Dec. 26, 2016	Feb. 17, 2017	Dec. 25, 2017	Conducted (TH05-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 10, 2016	Feb. 24, 2017 ~ Feb. 25, 2017	Nov. 09, 2017	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Feb. 24, 2017 ~ Feb. 25, 2017	Sep. 01, 2017	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D	35414	30MHz~1GHz	Oct. 15, 2016	Feb. 24, 2017 ~ Feb. 25, 2017	Oct. 14, 2017	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-152 2	1GHz ~ 18GHz	Mar. 30, 2016	Feb. 24, 2017 ~ Feb. 25, 2017	Mar. 31, 2017	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY532700 80	1GHz~26.5GHz	Nov. 10, 2016	Feb. 24, 2017 ~ Feb. 25, 2017	Nov. 09, 2017	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY523502 76	10Hz ~ 44GHZ	Mar. 21, 2016	Feb. 24, 2017 ~ Feb. 25, 2017	Mar. 20, 2017	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1~4m	N/A	Feb. 24, 2017 ~ Feb. 25, 2017	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Feb. 24, 2017 ~ Feb. 25, 2017	N/A	Radiation (03CH11-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1815698	1GHz~18GHz	Dec. 01, 2016	Feb. 24, 2017 ~ Feb. 25, 2017	Nov. 30, 2017	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170 584	18GHz- 40GHz	Nov. 08, 2016	Feb. 24, 2017 ~ Feb. 25, 2017	Nov. 07, 2017	Radiation (03CH11-HY)
Preamplifier	MITEQ	JS44-180040 00-33-8P	1840917	18GHz ~ 40GHz	Jun.14, 2016	Feb. 24, 2017 ~ Feb. 25, 2017	Jun.13, 2017	Radiation (03CH11-HY)

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 16 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No. : FR720310-02B

## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence	5.2
of 95% (U = 2Uc(y))	5.2

#### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence	
of 95% (U = 2Uc(y))	5.5

#### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence	5.2
of 95% (U = 2Uc(y))	3.2

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : 17 of 17
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report No. : FR720310-02B

## Appendix A. Radiated Spurious Emission

Test Engineer :	JC Liao, Jacky Hung, and Ken Wu	Temperature :	20~24°C
rest Engineer .		Relative Humidity :	50~54%

#### 2.4GHz 2400~2483.5MHz

#### BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
		, <b></b> .		Limit	Line	Level	Factor	Loss	Factor	Pos		Avg.	
		(MHz)	( dBµV/m )	(dB)	( dBµV/m )	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	(cm)	( deg )	(P/A)	(H/V)
	*	2480	97.14	-	-	94.29	27.45	8.98	33.58	369	138	Р	Н
	*	2480	96.18	-	-	93.33	27.45	8.98	33.58	369	138	Α	Н
		2492.4	54.39	-19.61	74	51.48	27.5	8.98	33.57	369	138	Р	Н
		2495.32	45.06	-8.94	54	42.15	27.5	8.98	33.57	369	138	Α	Н
51.5													Н
BLE													Н
CH 39 2480MHz	*	2480	101.49	-	-	98.64	27.45	8.98	33.58	108	118	Р	V
2400WII IZ	*	2480	100.85	-	-	98	27.45	8.98	33.58	108	118	Α	V
		2497.32	54.67	-19.33	74	51.76	27.5	8.98	33.57	108	118	Р	V
		2484.24	45.02	-8.98	54	42.17	27.45	8.98	33.58	108	118	Α	V
													V
													V
	1. No	o other spurious	s found.										
Remark		results are PA		Peak and	Average lim	it line							
	£. All	Toodito are I A	oo agamat i	Jan and	, worage iiiii								

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 Page Number

: A1 of A5

#### 2.4GHz 2400~2483.5MHz

#### BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	
		(MHz)	( dBµV/m )	(dB)	( dBµV/m )	(dBµV)	( dB/m )	(dB)	(dB)	( cm )	( deg )	(P/A)	
		4960	37.02	-36.98	74	52.1	31.94	11.12	58.14	100	0	Р	Н
		7440	40.41	-33.59	74	49.26	37.44	12.88	59.17	100	0	Р	Н
D. F.													Н
BLE													Н
CH 39 2480MHz		4960	37.43	-36.57	74	52.51	31.94	11.12	58.14	100	0	Р	V
2400WII 12		7440	42.45	-31.55	74	51.3	37.44	12.88	59.17	100	0	Р	<b>V</b>
													٧
													V
Damanla	1. No	o other spurious	s found.										
Remark	2. Al	l results are PA	SS against F	eak and	Average lim	it line.							

TEL: 886-3-327-3456 FAX: 886-3-328-4978

#### **Emission below 1GHz**

#### 2.4GHz BLE (LF)

	( MHz ) 30	( dBµV/m )	Limit (dB)	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
			(dB)								,	
	30		( 42 )	( $dB\mu V/m$ )	(dBµV)	( dB/m )	(dB)	( dB )	( cm )	(deg)	(P/A)	(H/V)
		23.26	-16.74	40	28.77	25.7	1.29	32.5			Р	Н
_	99.12	25.27	-18.23	43.5	40.26	15.98	1.51	32.48			Р	Н
	199.56	29.98	-13.52	43.5	44.77	16	2.1	32.89			Р	Н
	519.1	29.3	-16.7	46	33.96	24.36	3.38	32.4			Р	Н
	787.2	30.19	-15.81	46	30	28.15	4.26	32.22			Р	Η
	941.9	33.36	-12.64	46	29.56	30.38	4.69	31.27	100	0	Р	Н
												Н
												Н
												Н
												Н
2.4GHz												Н
BLE												Н
LF	30.81	35.88	-4.12	40	41.9	25.18	1.29	32.49	200	159	Р	V
	32.43	34.78	-5.22	40	41.84	24.14	1.29	32.49			Р	V
	40.53	34.11	-5.89	40	45.57	19.74	1.29	32.49			Р	V
	458.9	25.47	-20.53	46	31.28	23.44	3.11	32.36			Р	V
	613.6	28.07	-17.93	46	31.02	25.84	3.67	32.46			Р	V
	957.3	33.87	-12.13	46	29.74	30.58	4.69	31.14			Р	V
												V
												V
												V
												V
												V
												V

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978

#### Note symbol

Report No. : FR720310-02B

*	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 <b>over limit</b> line.
P/A	Peak or Average
H/V	Horizontal or Vertical

**SPORTON INTERNATIONAL INC.** Page Number : A4 of A5

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

Report No.: FR720310-02B

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)	( dBµV/m )	(dB)	(dBµV/m)	(dBµV)	( 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	Р	Н
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	Α	Н

1. Level( $dB\mu V/m$ ) =

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

2. Over Limit(dB) = Level(dB $\mu$ V/m) – Limit Line(dB $\mu$ V/m)

#### For Peak Limit @ 2390MHz:

- 1. Level(dBµV/m)
- = Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) Preamp Factor(dB)
- $= 32.22(dB/m) + 4.58(dB) + 54.51(dB\mu V) 35.86 (dB)$
- $= 55.45 (dB\mu V/m)$
- 2. Over Limit(dB)
- = Level(dBµV/m) Limit Line(dBµV/m)
- $= 55.45(dB\mu V/m) 74(dB\mu V/m)$
- = -18.55(dB)

#### For Average Limit @ 2390MHz:

- 1. Level(dBµV/m)
- = Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dB $\mu$ V) Preamp Factor(dB)
- $= 32.22(dB/m) + 4.58(dB) + 42.6(dB\mu V) 35.86 (dB)$
- $= 43.54 (dB\mu V/m)$
- 2. Over Limit(dB)
- = Level( $dB\mu V/m$ ) Limit Line( $dB\mu V/m$ )
- $= 43.54(dB\mu V/m) 54(dB\mu V/m)$
- = -10.46(dB)

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

SPORTON INTERNATIONAL INC. Page Number : A5 of A5

## **Appendix B. Radiated Spurious Emission Plots**

Test Engineer :	JC Liao, Jacky Hung, and Ken Wu	Temperature :	20~24°C
rest Engineer .		Relative Humidity :	50~54%

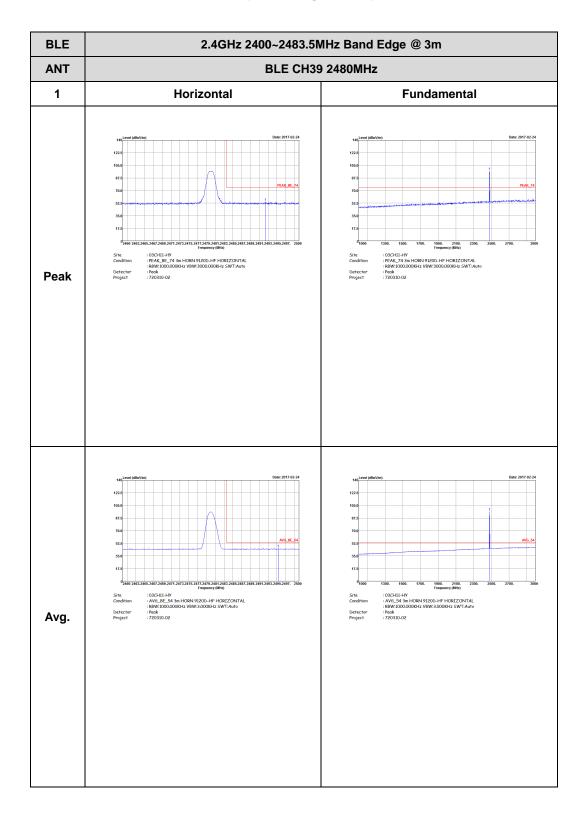
Report No. : FR720310-02B

## **Note symbol**

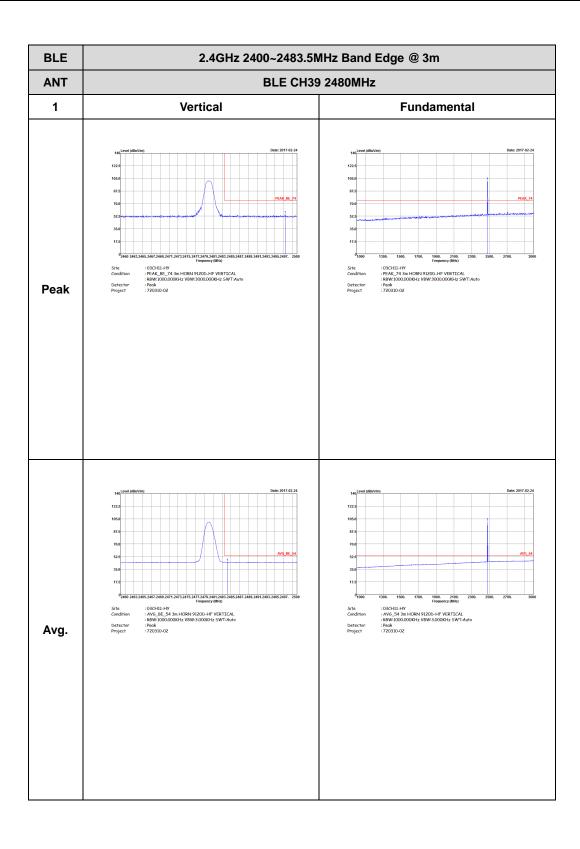
-L	Low channel location
-R	High channel location

SPORTON INTERNATIONAL INC. Page Number : B1 of B5

## 2.4GHz 2400~2483.5MHz BLE (Band Edge @ 3m)

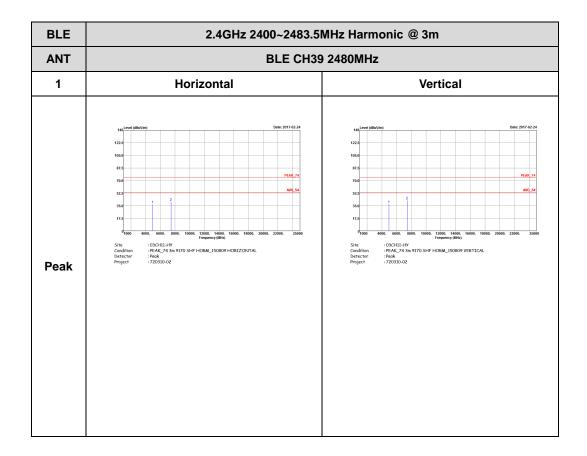


TEL: 886-3-327-3456 FAX: 886-3-328-4978



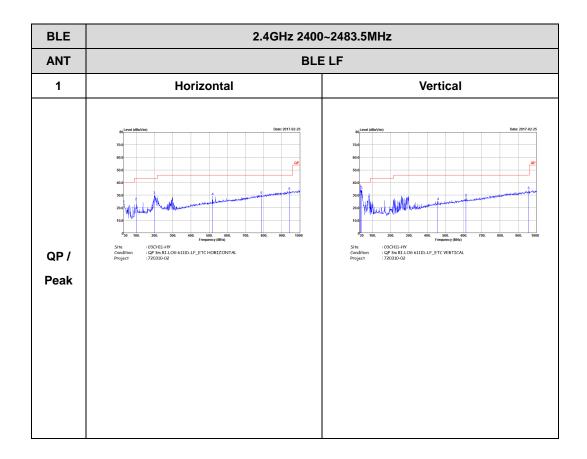
TEL: 886-3-327-3456 FAX: 886-3-328-4978

## 2.4GHz 2400~2483.5MHz BLE (Harmonic @ 3m)



TEL: 886-3-327-3456 FAX: 886-3-328-4978

## Emission below 1GHz 2.4GHz BLE (LF)



TEL: 886-3-327-3456 FAX: 886-3-328-4978

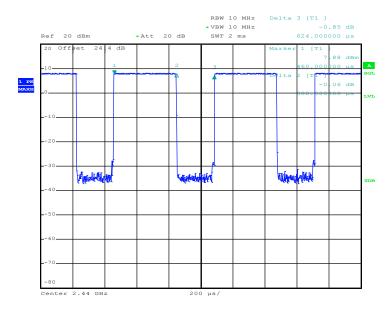


Report No. : FR720310-02B

## Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth -LE	66.5	388	2.577319588	3kHz

#### Bluetooth - LE



Date: 17.FEB.2017 20:40:45

## **Appendix D. Original Report**

Please refer to Sporton report number FR720310B.

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: IHDT56WA4 Page Number : D1 of D1
Report Issued Date : Mar. 20, 2017
Report Version : Rev. 01

Report Template No.: BU5-FR15CBT4.0 Version 1.3