# APPLICATION FOR CERTIFICATION On Behalf of Health & Life Co., Ltd. Automatic Wrist Blood Pressure Monitor Model No.: HL158HD FCC ID: 2ABTAHNL15HD

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# TEST REPORT CERTIFICATION

Applicant	:	Health & Life Co., I	Ltd.	
Manufacturer	:	Health & Life Co., I	.td.	
EUT Description	:	Automatic Wrist Blo	ood P	ressure Monitor
FCC ID	:	2ABTAHNL15HD		
		(A) Model No.	:	HL158HD
		(B) Serial No.	:	N/A
		(C) Power Supply	:	DC 3V
		(D) Test Voltage	:	DC 3V (Via Batteries)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C, Oct. 2013 (FCC CFR 47 Part 15C, §15.205, §15.207, §15.209 and §15.247) AND ANSI C63.4:2003

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C limits.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the requirements of FCC standards.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test: 2014. 12. 16 ~ 31

Producer:

(Annie Yu/Administrator)

Signatory:

Date of Report: 2015. 01. 05

# 1. DESCRIPTION OF REVISION HISTORY

Edition No.	Date of Rev.	Revision Summary	Report No.
0	2015. 01. 05	Original Report	EM-F150003

# 2. GENERAL INFORMATION

Product	Automatic Wrist Blood Pressure Monitor
Model Number	HL158HD
Serial Number	N/A
Applicant	Health & Life Co., Ltd. 9F, No.186, Jian Yi Road, Zhonghe District, New Taipei City, Taiwan
Manufacturer	Health & Life Co., Ltd. 9F, No.186, Jian Yi Road, Zhonghe District, New Taipei City, Taiwan
FCC ID	2ABTAHNL15HD
Fundamental Range	Bluetooth Low Energy: 2402MHz ~ 2480MHz
Frequency Channel	40 channels
Radio Technology	GFSK
Data Transfer Rate	1Mbps
Antenna Type	PCB Antenna, -2.44177dBi(Peak)
Date of Receipt of Sample	2014. 12. 12
Date of Test	2014. 12. 16 ~ 31

# 2.1. Description of Device (EUT)

2.2. Description of Test Facility

Name of Firm	:	AUDIX Technology Corporation EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Site (Semi-AC)	:	Semi-Anechoic Chamber No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan May 11, 2012 Renewal on Federal Communication Commission Registration Number: 90993
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	•	1724

2.3. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
	30MHz~300MHz	± 2.91dB
Radiation Test	300MHz~1000MHz	± 2.74dB
(Distance: 3m)	Above 1GHz	± 5.02dB

Test Item	Uncertainty
6dB Bandwidth	± 0.05kHz
Maximum peak output power	$\pm 0.33 dBm$
Emission Limitations	± 0.13dB
Band edges	± 0.13dB
Power spectral density	± 0.13dB

# 3. CONDUCTED EMISSION MEASUREMENT

【The EUT only employs battery power for operation, no conductive emission limits are required according to FCC Part 15 Section §15.207】

# 4. RADIATED EMISSION MEASUREMENT

### 4.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

4.1.1.For Frequency Range 30MHz~1000MHz (at Semi-Anechoic Chamber)

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9010A-503	MY52220119	2014. 06. 25	1 Year
2	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3	Amplifier	HP	8447D	2944A06305	2014. 02. 19	1 Year
4	Bilog Antenna	TESEQ	CBL6112D	33821	2014. 08. 02	1 Year

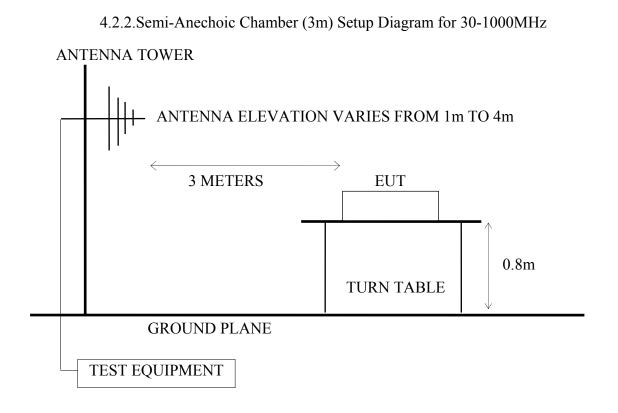
4.1.2.For Frequency Above 1GHz (at Semi-Anechoic Chamber)

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2014. 06. 25	1 Year
2	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3	Amplifier	Agilent	8449B	3008A02676	2014. 02. 21	1 Year
4	2.4GHz Notch Filter	K&L	7NSL10-2441 .5E130.5-00	1	2014. 06. 12	1 Year
5	3G High Pass Filter	Microware Circuits	H3G018G1	484796	2014. 06. 12	1 Year
6	Horn Antenna	EMCO	3115	9609-4927	2014. 06. 17	1 Year
7	Horn Antenna	EMCO	3116	2653	2014. 10. 10	1 Year

### 4.2. Test Setup

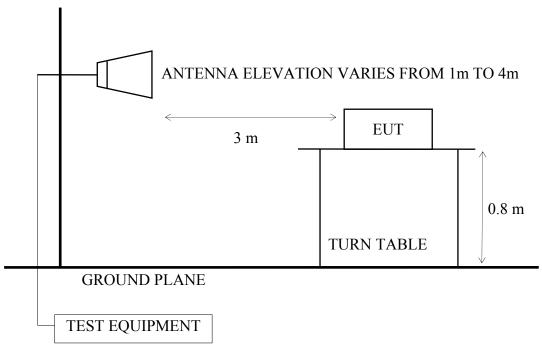
4.2.1.Block Diagram of connection between EUT and simulators

AUTOMATIC WRIST BLOOD PRESSURE MONITOR (EUT)



4.2.3.Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz





FREQUENCY	DISTANCE	FIELD STRENGTHS LIMITS		
MHz	Meters	μV/m	dBµV/m	
30 ~ 88	3	100	40.0	
88~216	3	150	43.5	
216~960	3	200	46.0	
Above 960	3	500	54.0	
Above 1000	3	74.0 dB $\mu$ V/m (Peak)		
		54.0 dBµV/m (Average)		

### 4.3. Radiated Emission Limits (§15.209)

Remark : (1) Emission level  $(dB\mu V/m) = 20 \log Emission level (\mu V/m)$ 

- (2) The tighter limit applies at the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a).
- (5) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35(b) and Part 15.205(b) & Part 15.209(e) and Part 15.207(c).

### 4.4. Operating Condition of EUT

- 4.4.1. Set up the EUT and simulator as shown on 4.2.
- 4.4.2. The EUT was set to continuously transmit signals at 2402MHz, 2440MHz and 2480MHz and receiving signal at 2440MHz during all test time.

### 4.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as bilog antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-2003 regulation.

The bandwidth of the R&S Test Receiver ESCS30 was set at 120kHz. (For 30MHz to 1000MHz)

The resolution bandwidth and video bandwidth of test spectrum analyzer is 1MHz for peak detection (PK) at frequency above 1GHz.

The resolution bandwidth of test spectrum analyzer is 1MHz and the video bandwidth is 10Hz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 25GHz (Up to 10<sup>th</sup> harmonics from fundamental frequency) was checked. 30MHz to 1000MHz was measured with Quasi-Peak detector.

Pursuant to ANSI C63.4 8.3.1.2, when peak value complies with the average limit, we didn't perform measurement in average detector.

### 4.6. Test Results

#### PASSED.

(All emissions not reported for there is no emission be found.)

EUT: Automatic Wrist Blood Pressure Monitor	M/N: HL158HD

Test Date: 2014. 12. 31 Temperature: 26 Humidity: 43%

#### For Frequency Range 30MHz~1000MHz:

The EUT with following test modes was performed during this section testing and all the test results are listed in section 4.6.1.

Mada	Channal	Fraguanay	Test Mede	Reference Test Data		
Mode	Channel	Frequency Test Mode		Horizontal	Vertical	
1.	CH 0	2402MHz		# 1	# 5	
2.	CH 19	2440MHz	Transmit	# 2	# 6	
3.	CH 39	2480MHz		# 3	# 7	

\* Above all final readings were measured with Quasi-Peak detector.

#### For Frequency above 1GHz:

The EUT with following test modes was performed during this section testing and all the test results are listed in section 4.6.2.

Mode	Chnnel	Frequency	Test Mode	Test Frequency Range
1.				1000-2680MHz
2.				2680-4000MHz
3.	- CH 0	24021411-	Transmit	4000-5500MHz*
4.		2402MHz	Transmit	5500-7500MHz
5.				7500-18000MHz
6.				18000-25000MHz
7.				1000-2680MHz
8.			Transmit	2680-4000MHz
9.	CII 10	2440MHz		4000-5500MHz*
10.	CH 19			5500-7500MHz
11.				7500-18000MHz
12.				18000-25000MHz
13.				1000-2680MHz
14.				2680-4000MHz
15.	СН 20	2480MHz	Transmit	4000-5500MHz*
16.	- CH 39 -	2400MITIZ	Tansmit	5500-7500MHz
17.				7500-18000MHz
18.				18000-25000MHz

Note: 1. Above all final readings were measured with Peak and Average detector. 2. The emissions (up to 25GHz) not reported are too low to be measured.

3."\*" means there is spurious emission falling the frequency band and be measures.

#### For Restricted Bands:

The EUT was tested in restricted bands and all the test results are listed in section 4.6.3. (The restricted bands defined in part 15.205(a))

Mada	Channal	Enganger	Teat Mede	Reference T	est Data No.
Mode	Channel	Frequency	Frequency Test Mode		Vertical
1	CH 0	2402MHz	T	# 1, # 2	# 3, # 4
2	СН 39	2480MHz	Transmit	# 5, # 6	# 7, # 8

# 4.6.1.For 30-1000MHz Frequency Range Measurement Results

## Transmit, Frequency: 2402MHz

Dis. / Ant. Limit Env. / Ins. EUT Power Rating	: HL158HD	21 Ant	ta no. : 1 t. pol. : HORIZON gineer : Jerome_	
Freq. (MHz)			Limits Margin (dBµV/m) (dB)	Remark
1 30.97 2 101.78 3 405.39	11.03 3.23 8.		$\begin{array}{cccc} 40.00 & 18.75 \\ 43.50 & 20.31 \\ 46.00 & 15.88 \end{array}$	Peak Peak Peak Peak
Remarks: 1. Emis 2. The	sion Level= Antenna Facto emission levels that are	r + Cable Loss + H 20dB below the off	Reading ficial limit are not r	eported.
	: Audix NO.1 Chambe : 3m CBL6112D 338		ta no. : 5 t. pol. : VERTICA	L
EUT Power Rating	: 30M-1G : 26*C / 43% N9010A : HL158HD : DC 3V : TX 2402MHz_BLE	. Ens	gineer : Jerome_	Chang
Freq. (MHz)		Emission ing Level μV) (dBμV/m)		Remark

1 30.97 18.07 2.34 1.79 22.20 40.00 17.80 Peak 2 93.05 9.67 3.17 8.25 21.09 43.50 22.41 Peak 3 580.96 18.08 6.49 4.79 29.36 46.00 16.64 Peak		(MHz)	(dB/m)	(dB)	(dBµ¥)	(dBµ¥/m)	(dBµV/m)	(dB)		
	1 2 3	93.05	9.67	3.17	8.25	$\bar{2}\bar{1}.\bar{0}\bar{9}$	43.50	22.41	Peak	_

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

### Transmit, Frequency: 2440MHz

Site no.	:	Audix NO.1 Chamber	Data no.		
Dis. / Ant.	:	3m CBL6112D 33821	Ant. pol.	:	HORIZONTAL
Limit		30M-1G			
Env. / Ins.	:	26*C / 43% N9010A	Engineer	:	Jerome_Chang
EUT	:	HL158HD			_
Power Rating	:	DC 3V			
Test Mode	:	TX 2440MHz_BLE			

	Freq. (MHz)			Reading		-		Margin (dB)	Remark	
3		15.65	5.71	8.64 8.14	22.90 29.50	46.0	50	18.88 20.60 16.50	Peak Peak Peak Peak	
Remarks				Factor + C t are 20dB			imit	are not re	ported.	
Dis. /	Ant.	: Audix : 3m - C : 30M-16	BL6112			)ata no. Ant. pol.		6 Vertical		
Dis. / Limit Env. / EUT	/ Ant. / Ins.	: 3m C : 30M-1G : 26*C / : HL158H	BL6112 43% N	D 33821	I	int. pol.	:		_	

	Freq. (MHz)	Factor	Cable Loss (dB)		Emission Level (dBµ∛/m)	-		Remark
$\begin{array}{c}1\\2\\3\end{array}$	30.00 93.05 580.96	$18.62 \\ 9.67 \\ 18.08$	$2.32 \\ 3.17 \\ 6.49$	$0.12 \\ 7.43 \\ 5.12$	21.06 20.27 29.69	$\begin{array}{r} 40.00\ 43.50\ 46.00\end{array}$	$     \begin{array}{r}       18.94 \\       23.23 \\       16.31     \end{array}   $	Peak Peak Peak

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

### Transmit, Frequency: 2480MHz

Site no. Dis. / Ant. Limit Env. / Ins. EUT Power Rating Test Mode	: Audix NO.1 Chamber : 3m CBL6112D 33821 : 30M-1G : 26*C / 43% N9010A : HL158HD : DC 3V : TX 2480MHz_BLE	Data no. : 3 Ant. pol. : HORIZONTAL Engineer : Jerome_Chang	
Freq. (MHz)	Ant. Cable Factor Loss Reading (dB/m) (dB) (dBµ∛)	Emission Level Limits Margin Remark (dBµV/m) (dBµV/m) (dB)	
1 30.97 2 101.78 3 407.33	18.07 2.34 0.92 11.03 3.23 8.94 15.67 5.72 7.93	21.33 40.00 18.67 Peak 23.20 43.50 20.30 Peak 29.32 46.00 16.68 Peak	
Remarks: 1. Emis: 2. The	sion Level= Antenna Factor + ( emission levels that are 20dB	Cable Loss + Reading below the official limit are not reported.	
Site no. Dis. / Ant.	: Audix NO.1 Chamber : 3m CBL6112D 33821	Data no. : 7 Ant. pol. : VERTICAL	
Limit Env. / Ins. EUT Power Rating Test Mode	: 30M-1G : 26*C / 43% N9010A : HL158HD : DC 3V : TX 2480MHz_BLE	Engineer : Jerome_Chang	
	Ant. Cable	Emission	

	Freq. (MHz)	Factor		Reading		Limits (dBµV/m)	Remark
$\begin{array}{c}1\\2\\3\end{array}$	33.88 93.05 752.65	$16.49 \\ 9.67 \\ 19.44$	3.17	2.81 7.32 3.02	$21.71 \\ 20.16 \\ 29.42$	$\begin{array}{r} 40.00 \\ 43.50 \\ 46.00 \end{array}$	 Peak Peak Peak

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

4 Date of Test :	.6.2.Above		equency Rang 12. 31	ge Measuremer Tempe	nt Results	26
EUT:	Autor		t Blood Press nitor	ure Hui	midity :	43%
Test Mode :			Transmit, Fro	equency: 24021	MHz	
Emission Frequency	Antenna Factor	Cable Loss	Meter Readin Horizon	g Level		Margin
(MHz)	(dB/m)	(dB)	(dBµV	) (dBµV/m	) $(dB\mu V/m)$	(dB)
4804.00	32.76	8.09	25.37	66.22	74.00	7.78
	ne emission	levels that		e Loss + Reading w the official lim Average Value Horizontal		ted. Margin
(MHz)	)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
4804.0	0	66.22	-14.74	51.49	54.00	2.52
(0. "T tha 2. Av Emission	605ms/3.3i " means than 100ms verage valu Antenna	ms)=-14.74 e period of e=Peak valu Cable	the pulse train ue+ Duty Cycle Meter		pulse train lengt tor	th is greater Margin
Frequency	Factor	Loss	Reading Vertica			
(MHz)	(dB/m)	(dB)	(dBµV)	) $(dB\mu V/m)$	) $(dB\mu V/m)$	(dB)
4804.00	32.76	8.09	18.11	58.96	74.00	15.04
				e Loss + Reading w the official lim	-	ted.
Emission Fre	quency	Peak Value	Duty Cycle Correction Factor	Average Value Vertical	Limit	Margin
(MHz)	)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
4804.0	0	58.96	-14.74	44.23	54.00	9.78
(0.	.605ms/3.3	ms)=-14.74		cumulative on/T) or 100ms if the		th is greater

"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms

2. Average value=Peak value+ Duty Cycle Correction Factor

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Date of Test :		2014.	12.31		Tempera	ature :	26	
EUT:	Autor		t Blood Press nitor	sure	Hum	idity:	43%	
Test Mode:		Transmit, Frequency: 244				IHz		
Emission Frequency	Antenna Factor	Cable Loss	Reading Leve Horizontal Horizon		mission Level orizontal	Limits	Margin	
(MHz)	(dB/m)	(dB)	(dBµV	/) (dl	BμV/m)	(dBµV/m)	(dB)	
4880.50	32.88	8.17	20.74	61	.79	74.00	12.21	
Remarks: 1. En 2. Th Emission Fre	e emission				icial limit	t are not report	ted. Margin	
	queney	Value	Correction Factor	Valu Horizo	ue		in an Bill	
(MHz)	)	(dB/m)	(dB)	(dBµV	//m) (	(dBµV/m)	(dB)	
4880.5	5	61.79	-14.74	47.0	)6	54.00	6.95	
"T tha	" means th an 100ms	-	the pulse train ue+ Duty Cyc	le Correc	-	ulse train lengt or Limits	h is greater Margin	
rrequency	Pactor	L035	Vertica	•	rtical			
(MHz)	(dB/m)	(dB)	(dBµV	') (dl	BμV/m)	$(dB\mu V/m)$	(dB)	
4880.50	32.88	8.17	22.27	63	.32	74.00	10.68	
Remarks: 1. En 2. Th					-	t are not report	ted.	
Emission Fre	quency	Peak Value	Duty Cycle Correction Factor	Aver Value V	0	Limit	Margin	
(MHz)	)	(dB/m)	(dB)	(dBµV	V/m)	(dBµV/m)	(dB)	
4880.5	0	63.32	-14.74	48.:	59	54.00	5.42	
(MHz) 4880.50 Remarks: 1. Du	) 0 Ity Cycle C	Value (dB/m) 63.32	Correction Factor (dB) -14.74 actor =20log (	Value V (dBµV 48.:	vertical √/m) 59	(dBµV/m) 54.00	(dB)	

"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms

2. Average value=Peak value+ Duty Cycle Correction Factor

Date of Test :		2014. 12. 31			perature :	26	
EUT:	Auto		t Blood Pres nitor	sure H	umidity :	43%	
Test Mode :		Transmit, Frequency: 2480MHz					
Emission Frequency	Antenna Factor	Cable Loss	Mete Readin Horizon	ng Level		Margin	
(MHz)	(dB/m)	(dB)	(dBµV	/) (dBµV/1	m) $(dB\mu V/m)$	(dB)	
4960.00	33.03	8.26	21.11	62.40	74.00	11.60	
	e emissior	n levels that	are 20dB belo	ow the official li	mit are not repor		
Emission Fre	quency	Peak Value	Duty Cycle Correction Factor	Average Value Horizontal	Limit	Margin	
(MHz)	)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)	
4960.0	0	62.40	-14.74	47.67	54.00	6.34	
tha 2. Av Emission	an 100ms verage valu Antenna	ie=Peak val	ue+ Duty Cyc	le Correction Fa		th is greater Margin	
Frequency	Factor	Loss	Readir Vertic	-	ıl		
(MHz)	(dB/m)	(dB)	(dBµV	$(dB\mu V/n)$	n) $(dB\mu V/m)$	(dB)	
4961.50	33.03	8.26	24.53	65.82	74.00	8.18	
Remarks: 1. En 2. Th					ng. mit are not repor	ted.	
Emission Fre	quency	Peak Value	Duty Cycle Correction Factor	Average Value Vertica	Limit l	Margin	
(MHz)	)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)	
4961.5	0	65.82	-14.74	51.09	54.00	2.92	
"T tha	.605ms/3.3 "" means th an 100ms	ms)=-14.74 ne period of	the pulse train	•	e pulse train leng	th is greater	

	.6.3.Restrict	ted Bands 1 2014, 11	Measurement R		turo ·	26		
Date of Test :		2014. 1.	2. 31	Tempera		26		
EUT:	Automa	atic Wrist I Moni	Blood Pressure tor	Humi	dity :	43%		
Test Mode :		Transmit, Frequency: 2402MHz						
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin		
(MHz)	(dB/m)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)		
$2386.44 \\ 2390.04 \\ 2402.28$	$28.20 \\ 28.20 \\ 28.21$	5.23 5.24 5.26	26.94 16.87 63.70	60.37 50.31 97.17	$74.00 \\ 74.00 \\ 74.00 \\ 74.00$	$13.63 \\ 23.69 \\ -23.17$		

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value Horizontal	Limit	Margin
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
2386.44	60.37	-14.74	45.64	54.00	8.37
2390.04	50.31	-14.74	35.58	54.00	18.43

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) =

(0.605 ms/3.3 ms) = -14.74

"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms

2. Low frequency section (spurious in the restricted band 2310-2430MHz).

3. Average value=Peak value+ Duty Cycle Correction Factor

Date of Test :		2014. 12. 31			ature :	26	
EUT:	Autom	atic Wrist Moni	Blood Pressure tor	Hum	idity :	43%	
Test Mode :		Transmit, Frequency: 2402MHz					
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin	
(MHz)	(dB/m)	(dB)	(dBµV)	$(dB\mu V/m)$	(dBµV/m)	(dB)	
2370.00 2390.04 2402.28	28.18 28.20 28.21	5.21 5.24 5.26	21.09 16.63 58.44	54.48 50.07 91.91	74.00 74.00 74.00	19.52 23.93 -17.91	

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value Vertical	Limit	Margin
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
2370.00	54.48	-14.74	39.75	54.00	14.26
2390.04	50.07	-14.74	35.34	54.00	18.67

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) =

(0.605 ms/3.3 ms) = -14.74

"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms

2. Low frequency section (spurious in the restricted band 2310-2430MHz).

3. Average value=Peak value+ Duty Cycle Correction Factor

FCC ID: 2ABTAHNL15HD Page 23 of 51

Date of Test :		2014. 1	2. 31	Tempera	ture :	26
EUT:	Automatic Wrist Blood Pressure Monitor			Humi	dity :	43%
Test Mode :		Т	Fransmit, Freque	ency: 2480M	Hz	
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin
(MHz)	(dB/m)	(dB)	(dBµV)	$(dB\mu V/m)$	(dBµV/m)	(dB)
2480.24 2483.52 2483.68	28.28 28.29 28.29	5.36 5.37 5.37	60.04 29.31 28.79	93.68 62.97 62.45	$74.00 \\ 74.00 \\ 74.00 \\ 74.00$	-19.68 11.03 11.55

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value Horizontal	Limit	Margin
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
2483.52	62.97	-14.74	48.24	54.00	5.77
2483.68	62.45	-14.74	47.72	54.00	6.29

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) =

(0.605ms/3.3ms)=-14.74

"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms

2. High frequency section (spurious in the restricted band 2450-2530MHz).

3. Average value=Peak value+ Duty Cycle Correction Factor

Date of Test :		2014. 1	2.31	Tempera	iture :	26
EUT:	Autom	atic Wrist Moni	Blood Pressure	Hum	idity:	43%
Test Mode :			Hz			
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin
(MHz)	(dB/m)	(dB)	$(dB\mu V)$	(dBµV/m)	$(dB\mu V/m)$	(dB)
2480.32 2483.52 2483.76	28.28 28.29 28.29	5.36 5.37 5.37	58.92 28.63 26.66	92.56 62.29 60.32	74.00 74.00 74.00	-18.56 11.71 13.68

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value Vertical	Limit	Margin
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
2480.52	62.29	-14.74	47.56	54.00	6.45
2483.76	60.32	-14.74	45.59	54.00	8.42

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) =

(0.605 ms/3.3 ms) = -14.74

"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms

2. High frequency section (spurious in the restricted band 2450-2530MHz).

3. Average value=Peak value+ Duty Cycle Correction Factor

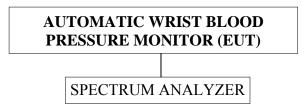
# 5. DUTY CYCLE CORRECTION FACTOR

### 5.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2013. 11. 08	1 Year

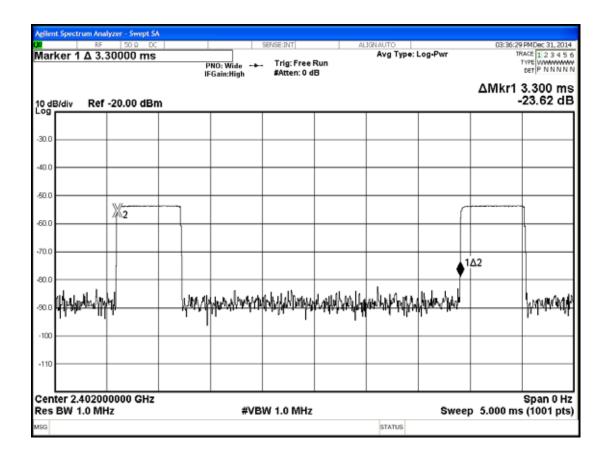
### 5.2. Test Setup



## 5.3. Test Results

### PASSED.

Test Date: 20 Agilent Spectrum Analyzer - Smept SA RF 50 0 DC	014. 12. 31			IGNAUTO	nidity : 5	03:35:57	PMDec 31, 2014
Marker 1 ∆ 605.000 µs 10 dB/div Ref -20.00 dBm	PNO: W IFGain:I			Avg Type: I	Log-Pwr	1	ос 12345 РЕГРИНИИ 605.0 µs 1.55 dE
30.0							
60.0 60.0	<sup>1Δ2</sup>						
80.0				1			
	UM/Hypon	alemeterinitedia gabilitatique	dayyullaniylay	ang palanta	hiphers person		hutan
-110 Center 2.402000000 GHz							Span 0 Hi
Res BW 1.0 MHz		#VBW 1.0 MHz		STATUS	Sweep	5.000 ms	(1001 pts



- Duty Cycle Factor=20log(cumulative on/T)=20log (0.605/3.3)= -14.74
- T: The period of the pulse train or 100ms if the pulse train length is greater than 100ms

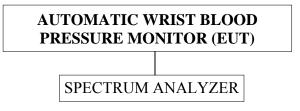
# 6. 6dB BANDWIDTH MEASUREMENT

### 6.1. Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

### 6.2. Block Diagram of Test Setup



6.3. Specification Limits [§15.247(a)(2)]

The minimum 6dB bandwidth shall be at least 500kHz.

### 6.4. Operating Condition of EUT

- 6.4.1. Set up the EUT and simulator as shown on 6.2.
- 6.4.2. The EUT was on transmitting frequency function during the testing.

### 6.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 1.5% EBW, VBW $\ge$ 3xRBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

The measurement guideline was according to 558074 D01 v03r02.

## 6.6. Test Results

**PASSED.** All the test results are attached in next pages.

Test Date: 2014. 12. 16 Temperature: 25 Humidity: 55%

Mode	Type of Network	Channel	Frequency	6dB Bandwidth
1		CH0	2402MHz	0.6572 MHz
2	Bluetooth Low Energy	CH19	2440MHz	0.6107 MHz
3		CH39	2480MHz	0.5621 MHz

[Limit: least 500kHz]

🚺 Agilent Spectr	um Analyzer - Occupied BW RF 50 Ω AC		SENSE:INT	ALIGN AUTO	06:30:12 PM Dec 16, 201
Marker 1 2	2.4009 GHz	#FGain:Low	Center Freq: 2.40200 Trig: Free Run #Atten: 20 dB	00000 GHz Avg Hold:>10/10	Radio Std: None Radio Device: BTS
10 dB/div	Ref Offset 1.6 dB Ref 10.00 dBm				Mkr1 2.400875 GHz -19.243 dBm
0.00			mm	~~	
-10.0			/		
-30.0					m mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm
-50.0	~				
-60.0					
-80.0					
Center 2.4 Res BW 47			VBW 470	(Hz	Span 5 MHz Sweep 2.733 ms
Occupied Bandwidth			Total Power	14.5 dBm	
	1.	8728 MHz			
Transm	it Freq Error	-184.48 kHz	OBW Power	99.00 %	
x dB Ba	ndwidth	657.2 kHz	x dB	-6.00 dB	
usg				STATUS	

#### Bluetooth Low Energy, Frequency: 2402MHz

## Bluetooth Low Energy, Frequency: 2440MHz

Agilent Spectrum Analyzer - Occupied BW		L enver-und	1101 1170	06:33:23 PM Dec 16, 2014
Marker 1 Hz		Center Freq: 2.440000		Radio Std: None
	#IFGain:Low	<ul> <li>Trig: Free Run #Atten: 20 dB</li> </ul>	Avg Hold:>10/10	Radio Device: BTS
Ref Offset 1.6 dE 10 dB/div Ref 10.00 dBr				
0.00		m		
10.0		Jan 1	- L	
20.0				
			II When	
40.0	~		- Way	man my
when				a come former f
50.0				
60.0				
70.0				
80.0				
Center 2.44 GHz				Span 5 MH
Res BW 47 kHz		VBW 470 kH	z	Sweep 2.733 ms
Occupied Bandwidt	th	Total Power	13.6 dBm	
1.	1860 MHz			
Transmit Freq Error -32.206 kHz		OBW Power	99.00 %	
x dB Bandwidth	610.7 kHz	x dB	-6.00 dB	
ASG			STATUS	

	um Analyzer - Occupied BW		-	×						- F 🗈
<b>N</b>	RF 50 Ω AC			SENSE:INT		LIGN AUTO		De d		PM Dec 16, 2014
Marker 1 2	2.4806 GHz			Total Care	q: 2.48000000 Run	Avg Hold:>	10/10	Rad	io Std: N	one
		#IFG	ain:Low 🔭	#Atten: 20					io Device	
	Ref Offset 1.6 dB							Mkr1		567 GHz
10 dB/div	Ref 10.00 dBm	1							-14.	078 dBm
0.00					~					
			$\sim$	$\mu \sigma \sigma \cdots \sigma$		han I	1			
-10.0						- ~ • •	ĺ			
-20.0		- A					m	-		
-30.0		~					ha		-m	~
40.0 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~								~	www.
-50.0										
-60.0								-		
-70.0						++				
-80.0	_							_		
Center 2.4 Res BW 27				VB	N 270 kHz	,				pan 3 MHz 4.933 ms
Res DW 2	RH2			101	4 270 KHZ				oweep	4.900 1115
Occup	ied Bandwidt	h		Total P	ower	13.4 di	Bm			
	1.1	1345 N	1Hz							
-				0.014/ 0		00.00				
Transm	it Freq Error	-4.402	ZKHZ	OBW Power 99.00 %		%				
x dB Ba	ndwidth	562.1	l kHz	x dB		-6.00	dB			
MSG						STATUS				
						0				

### Bluetooth Low Energy, Frequency: 2480MHz

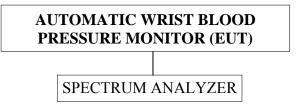
# 7. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

### 7.1. Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

### 7.2. Block Diagram of Test Setup



7.3. Specification Limits [§15.247(b)-(3)]

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is: 1Watt. (30dBm)

### 7.4. Operating Condition of EUT

- 7.4.1. Set up the EUT and simulator as shown on 7.2.
- 7.4.2. The EUT was on transmitting frequency function during the testing.

### 7.5. Test Procedure

The transmitter output was connected to the power sensor and record the reading of power meter.

The measurement guideline was according to 558074 D01 v03r02.

7.6. Test Results

**PASSED.** All the test results are listed below.

Test Date: 2014. 12. 16 Temperature: 25 Humidity: 55%

Mode	Type of Network	Channel	Test Frequency	Output Power(dBm)
1		CH0	2402MHz	6.394
2	Bluetooth Low Energy	CH19	2440MHz	6.037
3		CH39	2480MHz	5.742

[Limit: 1Watt. (30dBm)]

M Agilent Spectrum Analyzer - Swept SA			- 6 <b>-</b>
Marker 1 2.402245000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	07:03:35 PM Dec 16, 2014 TRACE 1 2 3 4 5 6
Marker 1 2.402245000000 Onz	PNO: Wide Trig: Free Run IFGain:Low Atten: 20 dB	Avg Hold:>100/100	DET P NNNN
Ref Offset 1.6 dB 10 dB/div Ref 11.60 dBm		M	kr1 2.402 245 GHz 6.394 dBm
1.60	•		
S.40		Mallake .	To Bylake
			rochard and a sound a s
-28.4			M. n., 11
-38.4			
-48.4			
50.4			
68.4			
-78.4			
Center 2.402000 GHz #Res BW 1.0 MHz	VBW 3.0 MHz	Swee	Span 5.000 MHz p   2.533 ms (1001 pts
MSG		STATUS	

## Bluetooth Low Energy, Frequency: 2402MHz

### Bluetooth Low Energy, Frequency: 2440MHz

Agilent Spectrum Analyzer - Swept SA			- 4 👪
RF 50 Ω AC	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	07:03:50 PM Dec 16, 2014 TRACE 1 2 3 4 5 6
Marker 1 2.439780000000 GHz	PNO: Wide Trig: Free Run IFGain:Low Atten: 20 dB	Avg Hold:>100/100	TYPE MWWWWW DET P NNNNN
Ref Offset 1.5 dB 10 dB/div Ref 11.60 dBm		M	r1 2.439 780 GHz 6.037 dBm
1.60	<b>↓</b> 1		
		and a start of the	
-8.40 -18.4 -28.4			AND THE REAL PROPERTY OF
			adhadhidild
-38.4			
48.4			
68.4			
68.4			
-78.4			
Center 2.440000 GHz #Res BW 1.0 MHz	VBW 3.0 MHz	Sweer	Span 5.000 MHz 2.533 ms (1001 pts)
MSG		STATUS	

Agilent Spectrum Analyzer - Swept SA	<u> </u>					- 6 E
RF 50 Ω AC	SENSE:INT		ALIGN AUTO		07:04:01	PM Dec 16, 2014
Marker 1 2.479725000000 GHz		Free Run n: 20 dB	Avg Type: L Avg Hold:>1	00/100	т	ACE 1 2 3 4 5 6 YPE MWWWWW DET P NNNN
Ref Offset 1.6 dB 10 dB/div Ref 11.60 dBm				Mk	r1 2.479 5.	725 GHz 742 dBm
1.60	<b>1</b>					
840 184 284				**		Billion
28.4 What had been a					- dift	MANAM
38.4						
48.4						
50.4						
68.4						
-78.4						
Center 2.480000 GHz					Span	5.000 MHz
#Res BW 1.0 MHz	VBW 3.0 M	IHz		Sweep	2.533 ms	(1001 pts
ASG			STATUS			

#### **Bluetooth Low Energy, Frequency: 2480MHz**

## 8. EMISSION LIMITATIONS MEASUREMENT

### 8.1. Test Equipment

The following test equipment was used during the emission limitations test:

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

### 8.2. Block Diagram of Test Setup

The same as section 6.2

### 8.3. Specification Limits (§15.247(c))

- 8.3.1. In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).( This test result attaching to §4.6.3)
- 8.3.2. The reference level for determining limit of emission limitations is according to the value measured indicated in plots at section 8.6.

### 8.4. Operating Condition of EUT

- 8.4.1. Set up the EUT and simulator as shown on 8.2.
- 8.4.2. The EUT was on transmitting frequency function during the testing.

#### 8.5. Test Procedure

The RF output of EUT was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100kHz RBW and 300kHz VBW.

The measurement guideline was according to 558074 D01 v03r02.

## 8.6. Test Results

**PASSED.** The testing data was attached in the next pages.

Test Date: 2014. 12. 16 Temperature: 25 Humidity: 55%

alyzer - Swept SA m Ar 06:31:13 PM Dec 16, 2014 TRAGE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N Avg Type: Log-Pwr Avg[Hold:>100/100 Marker 1 224.000000000 MHz Trig: Free Run Atten: 20 dB PNO: Fast G Mkr1 224.00 MHz -40.819 dBm Ref Offset 1.6 dB Ref 11.60 dBm 10 dB/div 1.60 8.40 -14.03 dB 18.4 28 38.4 48.4 68 اسه فألبريان فبالا با يعينا. Start 30.0 MHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 3.200 ms (1001 pts) #VBW 300 kHz STATUS

<b>Test Frequency:</b>	CH 0, 2402MHz
------------------------	---------------

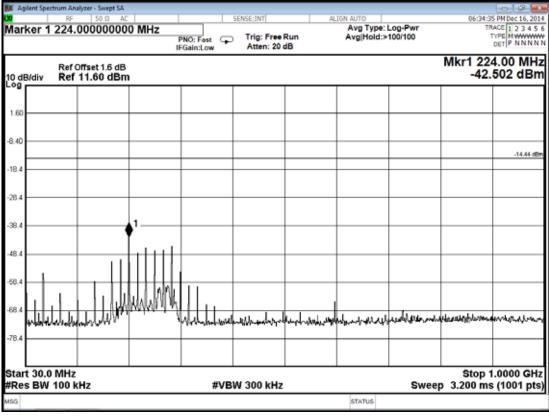
🛤 Agilent Spe	ctrum Analyzer - Swept SA								
Marker 1	RF 50 Q AC	GHz PNO: Fe	я <b>ф</b>	Trig: Free Atten: 20 d	Run	Avg Type: I Avg Hold:>		TR	PM Dec 16, 2014 ACE 1 2 3 4 5 6 YPE MWWWWW DET P N N N N
10 dB/div	Ref Offset 1.6 dB Ref 11.60 dBm							Mkr1 4. -45.	804 GHz 606 dBm
1.60			$\square$						
-8.40									-14.03 dBe
-18.4			$\square$						-14.03 (0)4
-28.4									
-38.4									1
-48.4			ik di	1					
				hum	mhule <sup>t</sup> haithlead	man share	entry for the second		·
·78.4	anna anna bhairte Ma	une de la	- 1				in a second		
Start 1.00								Stop	5.000 GHz
#Res BW	100 kHz		#VBW	/ 300 kHz		STATUS	Sweep	13.00 ms	(1001 pts)

💓 Agilent S	Spectrum Ana	lyzer - Swept SA S0 Ω AC		SE	NSE:INT		ALIGN AUTO		06/21 /	👝 🕼 💽
Marker		00000000	P	NO: Fast Gain:Low	Trig: Free Atten: 20		Avg Ty	pe: Log-Pwr ld: 99/100	т	RACE 1 2 3 4 5 0 TYPE MWWWW DET P NNNN
10 dB/div		offset 1.6 dB 11.60 dBm	1						Mkr2 9 -48.	.610 GHz 754 dBm
1.60										
-8.40										-14.03 dBm
-18.4										
-28.4										
-48.4					Q'					$\oint^2$
-58.4					_					
-68.4		تدب بدايد خانف		e-944.constant	mulanam	****	4m.dp.d.a.d.a	and the second second second	man	- Sugar Sala
-78.4										
	000 GH: W 100 k	-		#VBW	300 kHz			Swee	Stop p 16.27 m	10.000 GHz s (1001 pts)
1 N 2 N	TRC SCL	;	7.205 GHz 9.610 GHz	-47.776 di -48.754 di	Bm	CTION	FUNCTION WIDTH		FUNCTION VALUE	-
3 4			5.010 0112	40.704 01	200					
5										
7 8										
9 10										
11										•
ISG							STATUS			

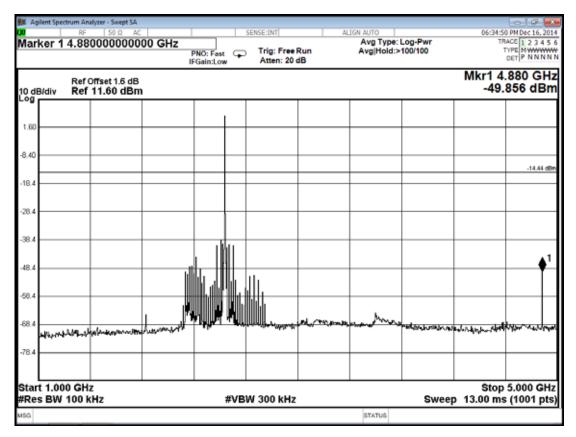
Agilent Spe		yzer - Swept SA									
	RF	50 Ω AC			SENSE:INT		ALIG	Avg Type	Lon Dur		:52 PM Dec 16, 2 TRACE 1 2 3 4
arker 1	12.01	0000000	P	NO: Fast Gain:Low	Trig: Free Atten: 20			Avg Hold:			TYPE MWWW DET P N N N
dB/div		ffset 1.6 dB 11.60 dBn	,								2.010 GH 2.543 dB
8											
4											-14.03 (
4											
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4						+					
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art 10.0 es BW				#VB	W 300 kH	z			Swee	Stop 20 16.27 m	15.000 Gl is (1001 pi
MODE T	RC SCL		12.010 GHz	-52.543		NCTION	FUNCTIO	N WIDTH		FUNCTION VALUE	
N 1	f		14.410 GHz	-49.895							
	++										
			'								•
								STATUS			

🚺 Agile	ent Spectru	m Analyzer - Swi								00
<mark>M</mark> ark.	or 1 1	RF 50 S	2 AC	20-	SENSE:INT	Al	LIGN AUTO Avg Type:	og-Pwr		7 PM Dec 16, 2014 ACE 1 2 3 4 5 6
mark	9111	0.305000	0000000		Trig: Free Atten: 20		Avg Hold: 9		T	DET P NNNN
10 dB/		Ref Offset 1. Ref 11.60		1 Gam. Com					Mkr1 18. -62.	.385 GHz 059 dBm
Г°°Г										
1.60										
-8.40 -										
▎▕		_								-14.03 dBm
-18.4										
-28.4		_								
-38.4										
-30.4										
-48.4										
-58.4							<b></b> 1			
-68.4 V	بأسعهم إرددا	-low-parties	******	minument	ingenturation and the	in the second	and the shall be	nymetre harring	a	- <sub>Al</sub> berthesherderge
-78.4										
	15.00								Stop 2	0.000 GHz
	BW 1	00 kHz		#V	BW 300 kHz	!		Sweep	) 16.27 ms	(1001 pts)
MSG							STATUS			

Agilent Spectrum Anal								- 6 💌
	50 Ω AC 80000000000 GHz	PNO: Fast	Trig: Free Atten: 20	Run	Avg Type: Avg Hold: 2	1/100	TR I	5 PM Dec 16, 2014 ACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N
	ffset 1.6 dB 11.60 dBm						Mkr1 24 -58.	.980 GHz 349 dBm
1.60								
-8.40								-14.03 dBn
-18.4								
-28.4								
-38.4								
-48.4							1.	1
-68.4 Manhartanth	interested at the second se	last When Ista	lay the states of the second s	millin harmonia	second states	person in the second	hardereradiser.	Arit Man Add
-78.4								
Start 20.000 GH #Res BW 100 ki		#VB	W 300 kHz			Sweep		5.000 GHz (1001 pts)
MSG					STATUS			



#### Test Frequency: CH 19, 2440MHz

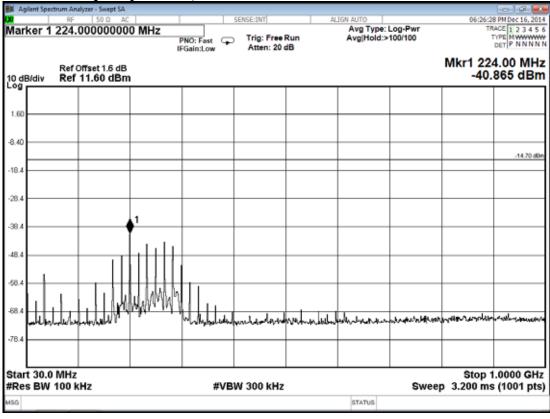


🎉 Agi	lent Sp	ectru	m An RF	alyzer - Swept SA 50 Ω AC			SENSE:1N	T		AL	IGN AUTO			06:35	03 PM Dec	
Mari	ker	29	.76	00000000	P	NO: Fast Gain:Low		Free n: 20			Avg Ty Avg Hol	d:>100/100	r		TYPE MW DET P N	3456
10 dE	3/div			Offset 1.6 dB 11.60 dBn	n									Mkr2 9 -46	.760 .807 c	
Log 1.60												_				
-8.40												_			-14	4.44 dBm
-18.4																
-28.4 -38.4								<u>~1</u>								2_
-48.4								Ŷ.				_				)°
-58.4								⊢								
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-78.4																
Star #Res						#VB	W 300	kHz				s	weep	Stop 16.27 m	10.000 s (1001	GHz 1 pts)
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3	N	1	f		9.760 GHz	-46.807	dBm									
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11																
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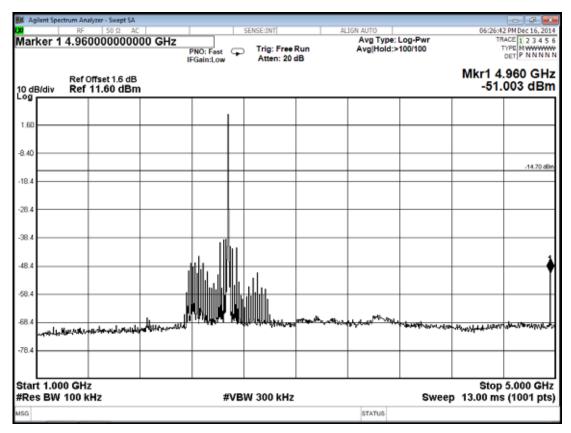
Agilent S		nalyzer - Swept SA									
	RF	50 Ω AC			SENSE:INT		AL	IGN AUTO	e: Log-Pwr		14 PM Dec 16, 20 RACE 1 2 3 4 5
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Markor 1	RF 50 Ω AC			SENSE:INT	AL	IGN AUTO AVG Type: I	og-Pwr		ACE 1 2 3 4 5 6
Agilent Spe	ctrum Analyzer - Swept SA								- 6 E

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Marker 1	RF 50 Ω /	0000 GHz		SENSE:INT		Avg Type: Avg Hold:		TR	S PM Dec 16, 201- ACE 1 2 3 4 5 6
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Start 20.0 #Res BW	00 GHz 100 kHz		#VB	W 300 kHz			Sweep	Stop 2 16.27 ms	5.000 GHz (1001 pts
ISG						STATUS			



Test Frequency: CH 39, 2480MHz



Agilent Spec	ctrum Analyzer - Swept RF 50 Q	AC	SENSE:	MT	ALIGN AUTO		06:26:57 PM Dec 1	
arker 2	7.44000000	0000 GHz	0: Fast Tri	g: Free Run ten: 20 dB	Avg Typ	e: Log-Pwr d:>100/100	TRACE 1 2 TYPE MW DET P N	345
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art 5.00 es BW	0 GHz 100 kHz		#VBW 30	0 kHz		Swee	Stop 10.000 p 16.27 ms (1001	Gł i pi
R MODE TI	RC SCL	× 9.920 GHz	-45.928 dBm	FUNCTION	FUNCTION WIDTH	f	UNCTION VALUE	
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Agilent S		alyzer - Swept SA								
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	TRC SCL		x	Y		CTION	FUNCTION WIDTH		FUNCTION VALUE	
N			12.400 GHz 14.880 GHz	-55.066 -55.054						
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	ilent Spec		ilyzer - Swept SA	_							- 6 💌
Mari	ker 1	RF 18.4	50 Ω AC			SENSE:INT		IGN AUTO Avg Type: I	Log-Pwr	TR	ACE 1 2 3 4 5 6
					PNO: Fast Gain:Low	Atten: 20		Avg Hold: 7	5/100		DET P NNNNN
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LOG											
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	ctrum Analyzer - Swept SA								- 4 📧
Marker 1	RF 50 0 AC 24.035000000	000 GHz	D: Fast	Trig: Free I Atten: 20 c	Run	Avg Type: I Avg Hold: 3		TR	PM Dec 16, 2014 ACE 1 2 3 4 5 6 YPE MWWWWW DET P NNNN
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-78.4									
Start 20.0 #Res BW			#VB	N 300 kHz			Sweep		5.000 GHz (1001 pts)
usg						STATUS			

# 9. BAND EDGES MEASUREMENT

#### 9.1. Test Equipment

The following test equipment was used during the band edges measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

# 9.2. Block Diagram of Test Setup

The same as section.6.2.

# 9.3. Specification Limits [§15.247(c)]

- 9.3.1. In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.205(c)).( This test result attaching to §4.6.3)
- 9.3.2. The reference level for determining limit of emission limitations is according to the value measured indicated in plots at section 9.6.

# 9.4. Operating Condition of EUT

- 9.4.1. Set up the EUT and simulator as shown on 9.2.
- 9.4.2. The EUT was on transmitting frequency function during the testing.
- 9.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. Set both RBW=100 kHz and VBW to 300kHz with suitable frequency span including 100kHz bandwidth from band edge.

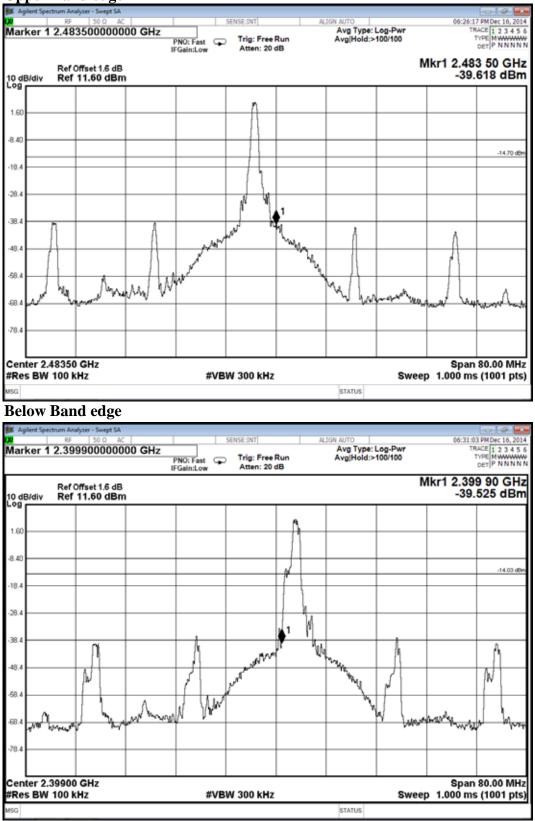
The measurement guideline was according to 558074 D01 v03r02.

#### 9.6. Test Results

**PASSED.** All the test results are attached in next pages.

Test Date: 2014. 12. 16 Temperature: 25 Humidity: 55%

#### Bluetooth Low Energy, Upper Band edge



# **10. POWER SPECTRAL DENSITY MEASUREMENT**

#### 10.1. Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

#### 10.2. Block Diagram of Test Setup

The same as section.6.2.

# 10.3. Specification Limits [§15.247(d)]

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

# 10.4. Operating Condition of EUT

10.4.1. Set up the EUT and simulator as shown on 10.2.

10.4.2. The EUT was on transmitting frequency function during the testing.

#### 10.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 100kHz RBW and  $\geq$ 300kHz VBW, set sweep time = Auto.

The measurement guideline was according to 558074 D01 v03r02.

#### 10.6. Test Results

**PASSED.** All the test results are attached in next pages.

Test Date: 2014. 12. 16 Temperature: 25 Humidity: 55%

Mode	Type of Network	Channel	Frequency	Power Spectral Density
1	Bluetooth Low Energy	CH0	2402MHz	5.974 dBm
2		CH19	2440MHz	5.563 dBm
3		CH39	2480MHz	5.258 dBm

[Limit: 8dBm]

🊺 Agilent Spe	ctrum Analyzer - Swept SA								- 6 <b>- 1</b>
Marker 1	RF 50 Ω AC	00 GHz	PNO: Wide G	SENSE:INT Trig: Free F Atten: 20 d	Run	Avg Type: Avg Hold:>	100/100	TR	8 PM Dec 16, 2014 ACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N
10 dB/div	Ref Offset 1.6 dB Ref 11.60 dBm						Mkr	1 2.402 0 5.	61 1 GHz 974 dBm
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-18.4									
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-78.4									
Center 2. #Res BW	4020000 GHz 100 kHz		#VB	W 300 kHz			Sweep	Span 5 1.000 ms	985.5 kHz (1001 pts)
MSG						STATUS			

# Bluetooth Low Energy, Frequency: 2402MHz

# Bluetooth Low Energy, Frequency: 2440MHz

Agilent Spectrum A				SENSE:INT		IGN AUTO		06-24-2	4 PM Dec 16, 2014
Marker 1 2.4		1	PNO: Wide G		Run	Avg Type: I Avg Hold:>		TR	DET P NNNNN
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Center 2.4400 #Res BW 100			#VB	W 300 kHz			Sweep	Spar 0 1.000 ms	916.0 kHz (1001 pts)
MSG						STATUS			

	Analyzer - Swept SA					- 4	
	RF 50 Ω AC		SENSE:INT	ALIGN AUTO		06:24:28 PM Dec 1	
Marker 1 2.4	180068283000 GHz	PNO: Wide	Trig: Free Run Atten: 20 dB	Avg Type: Log Avg Hold:>100		TRACE 1 2 3 TYPE MWW DET P N I	*****
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48.4							
58.4							
68.4							
-78.4							
Center 2.480 #Res BW 100		#VB	W 300 kHz		Sweep	Span 843.0 1.000 ms (1001	kHz pts
ASG				STATUS			

#### Bluetooth Low Energy, Frequency: 2480MHz

# **11.DEVIATION TO TEST SPECIFICATIONS** [NONE]