APPLICATION FOR CERTIFICATION

On Behalf of

digiO2 International Co., Ltd.

BT Infrared Ear Thermometer

Models No.：ETH-102

FCC ID：X58-ETH-102

Brand：digiO2

Prepared for : digiO2 International Co., Ltd.
4F-13, No. 79, Sec. 1, Hsin Tai Wu Rd.,
Hsi-Chih Dist., New Taipei City 221, Taiwan

Prepared By : AUDIX Technology Corporation
EMC Department
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File Number	：	C1M1309242
Report Number	：	EM-F1010755
Date of Test	：	Oct. 03 ~ Nov. 06, 2013
Date of Report	：	Nov. 06, 2013

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TEST REPORT CERTIFICATION

Applicant	:	digiO2 International Co., Ltd.
Manufacturer	:	digiO2 International Co., Ltd.
EUT Description	:	BT Infrared Ear Thermometer
FCC ID	:	**X58-ETH-102**
	(A) Model No.	: ETH-102
	(B) Serial No.	: N/A
	(C) Brand	: digiO2
	(D) Power Supply	: DC 3V
	(E) Test Voltage	: DC 3V (Transferred via JIG Board)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C, Oct 2012
(FCC CFR 47 Part 15C, §15.205, §15.207, §15.209 and §15.247)
ANSI C63.4/2003
FCC Public Notice DA 00-705, Mar. 2000

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 limit.

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 FCC Part 15 standard.

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 : Oct. 03 ~ Nov. 06, 2013 Date of Report : Nov. 06, 2013

Producer : _____
(Annie Yu/Administrator)

Signatory : _____
(Leon Liu/Deputy General Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product	BT Infrared Ear Thermometer
Model Number	ETH-102
Serial Number	N/A
Brand Name	digiO2
Applicant	digiO2 International Co., Ltd. 4F-13, No. 79, Sec. 1, Hsin Tai Wu Rd., Hsi-Chih Dist., New Taipei City 221, Taiwan
Manufacturer	digiO2 International Co., Ltd. 4F-13, No. 79, Sec. 1, Hsin Tai Wu Rd., Hsi-Chih Dist., New Taipei City 221, Taiwan
FCC ID	X58-ETH-102
Fundamental Range	2402MHz ~ 2480MHz
Frequency Channel	79 channels (GFSK)
Radio Technology	FHSS (GFSK)
Data Transfer Rate	1Mbps
Antenna Type	Chip Dielectric Antenna
Antenna Gain	1.4dBi
Date of Receipt of Sample	Oct. 02, 2013
Date of Test	Oct. 03 ~ Nov. 06, 2013

1.2. Tested Supporting System Details

1.2.1. NOTEBOOK PC

Model Number	:	N20A Series
Serial Number	:	WB200903001
Manufacturer	:	ASUS
USB Cable	:	Non-Shielded, Detachable, 0.25m
AC Adapter	:	ASUS, M/N SADP-65NB BB DC Cord: Non-Shielded, Undetachable, 1.8m Bonded a ferrite core
AC Power Cord	:	Non-Shielded, Detachable, 1.8m

1.2.2. JIG BOARD

Model Number	:	N/A
Serial Number	:	N/A
Brand	:	digiO2
Bus Cable	:	Non-Shielded, Undetachable, 3.0m
USB Cable	:	Non-Shielded, Undetachable, 1.0m

1.3. Description of Test Facility

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

1.4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Radiation Test (Distance: 3m)	30MHz~300MHz	±2.91dB
	300MHz~1000MHz	±2.94dB
	Above 1GHz	± 5.02dB

Remark **:** Uncertainty = $ku_c(y)$

Test Item	Uncertainty
20dB Bandwidth	± 0.2kHz
Carrier Frequency Separation	± 0.2kHz
Time Of Occupancy	± 0.03sec
Maximum peak Output power	± 0.52dBm
Emission Limitations	± 0.13dB
Band Edges	± 0.13dB

2. POWERLINE 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】

3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

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

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Jul. 30, 13’	Jul. 29, 14’
2.	Test Receiver	R & S	ESCS30	100338	Jul. 01, 13’	Jun. 30, 14’
3.	Amplifier	HP	8447D	2944A06305	Feb. 19, 13’	Feb. 18, 14’
4.	Log Periodic Antenna	Schwarzbeck	UHALP 9108-A	0810	Mar. 02, 13’	Mar. 01, 14’
5.	Biconical Antenna	CHASE	VBA6106A	1264	Mar. 02, 13’	Mar. 01, 14’

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

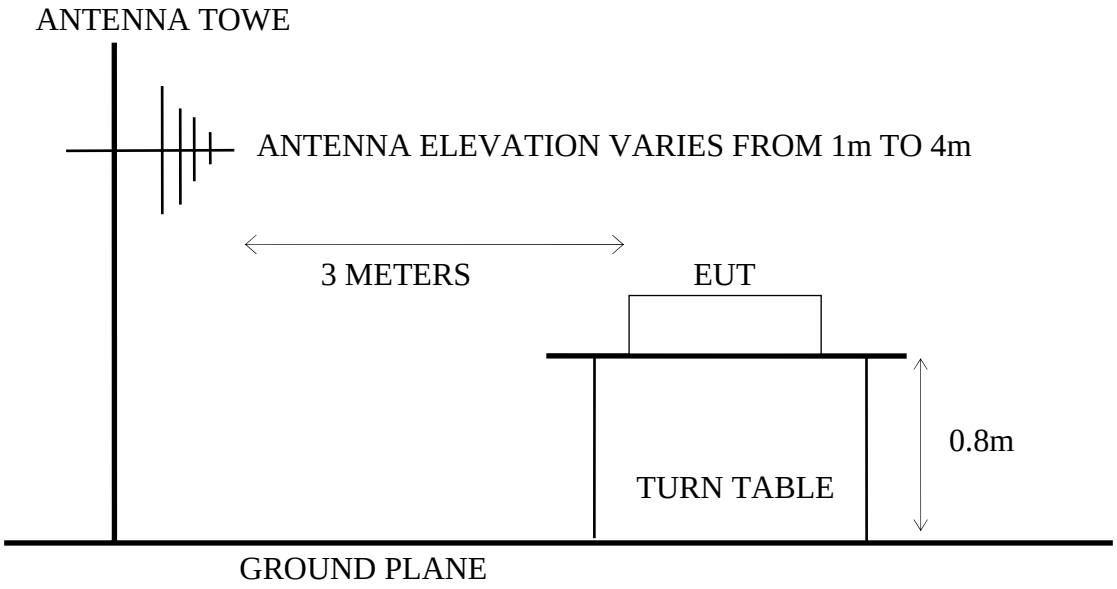
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Jul. 30, 13’	Jul. 29, 14’
2.	Test Receiver	R & S	ESCS30	100338	Jul. 01, 13’	Jun. 30, 14’
3.	Pre-Amplifier	HP	8449B	3008A02676	Mar. 01, 13’	Feb. 28, 14’
4.	2.4GHz Notch Filter	K&L	7NSL10-2441.5E130.5-00	1	Jun. 13, 13’	Jun. 12, 14’
5.	3.5G High Pass Filter	Microware Circuits	H3G018G1	484796	Jun. 13, 13’	Jun. 12, 14’
6.	Horn Antenna	EMCO	3115	9112-3775	May 07, 13’	May 06, 14’
7.	Horn Antenna	EMCO	3116	2653	Oct. 15, 12’	Oct. 14, 13’

3.2. Block Diagram of Test Setup

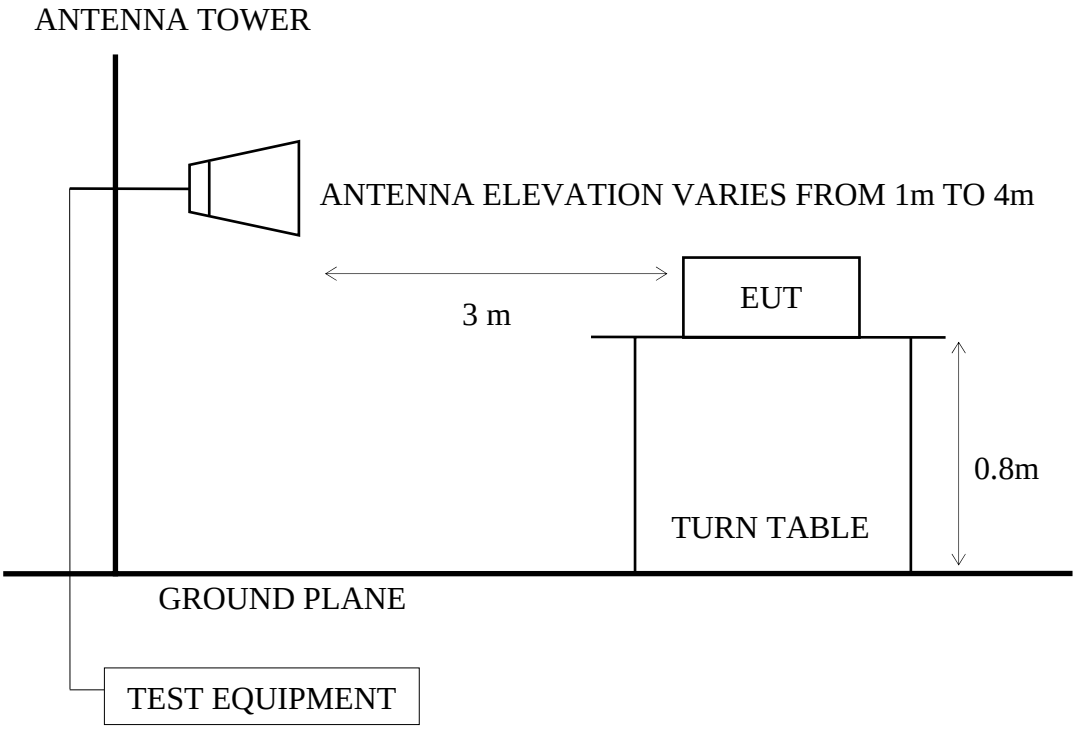
3.2.1. Block Diagram of connection between EUT and simulators

BT INFRARED EAR THERMOMETER (EUT)

3.2.2. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000MHz



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



3.3. Radiated Emission Limits (§15.209)

Frequency MHz	Distance Meters	Field Strengths Limits	
		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 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark： (1) Emission level (dBμV/m) = 20 log Emission level (μV/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).

3.4. Operating Condition of EUT

3.4.1. Set up the EUT (BT Infrared Ear Thermometer) and simulator as shown on 3.2.1.

3.4.2. To turn on the power of all equipments.

3.4.3. The Notebook PC was running test software “CSR Bluetsuit 3.0 exe.” to set EUT (BT Infrared Ear Thermometer) on transmitting and receiving during all testing.

3.4.4. The EUT set to continuously transmit signals at 2402MHz, 2441MHz and 2480MHz during all test time.

3.5. 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 calibrated biconical and log-periodical 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 FCC ANSI C63.4-2003 regulation during radiated measurement.

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^{th} harmonics from fundamental frequency) was checked.

Above 1GHz was measured with peak and average detector. For frequency from 1GHz to 25GHz, we checked it in 1 meter distance and with a shorter cable 2 meter instead of original's. There is no signal exist.

3.6. Radiated Emission Measurement Results

PASSED. (All the emissions not reported below are too low against the prescribed limits.)

EUT：BT Infrared Ear Thermometer M/N：ETH-102

Test Date：Oct. 08, 2013 Temperature：23℃ Humidity：52%

The radiation tests on three different axes (stand, lie and side), we assessed the value and we selected the worst radiation position "lie" for our measured results.

For Frequency Range 30MHz-1000MHz:

The EUT with following test modes were performed during this section testing and all the test results are listed in section 3.6.1.

No.	Test Mode and Frequency		Reference Test Data No.	
			Horizontal	Vertical
1.	Transmitting	2402MHz (CH0)	# 4	# 1
2.		2441MHz (CH39)	# 2	# 1
3.		2480MHz (CH78)	# 4	# 1

* All above final readings were measured with Peak detector.

For Frequency Range above 1GHz:

The EUT with following test modes was performed during this section testing and all the test results are listed in section 3.6.2.

No.	Test Mode and Frequency		Reference Test Data No.	
			Horizontal	Vertical
1.	Transmitting	2402MHz (CH0)	# 10	# 9
2.		2441MHz (CH39)	# 10	# 9
3.		2480MHz (CH78)	# 10	# 9

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

For Restricted Bands:

The EUT with following test modes was performed during this section testing and all the test results are listed in section 3.6.3. (The restricted bands defined in part 15.205(a))

No.	Test Mode and Frequency		Reference Test Data No.	
			Horizontal	Vertical
1.	Transmitting	2402MHz (CH0)	# 2	# 1
2.		2480MHz (CH78)	# 4	# 3

3.6.1. Frequency Range 30MHz-1000MHz Measurement Result

Transmit, Frequency: 2402MHz

Site no. : Audix NO.1 Chamber Data no. : 4
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
Limit : FCC PART 15C
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2402 MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
398.70	17.67	4.80	17.67	40.14	46.00	5.86	Peak
693.40	23.23	6.50	5.67	35.40	46.00	10.60	Peak

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

Site no. : Audix NO.1 Chamber Data no. : 1
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
Limit : FCC PART 15C
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2402 MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
106.95	17.77	2.20	12.42	32.39	43.50	11.11	Peak
360.20	16.14	4.40	11.98	32.52	46.00	13.48	Peak
399.40	17.69	4.80	16.65	39.14	46.00	6.86	Peak
485.50	18.76	6.20	14.61	39.57	46.00	6.43	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: 2441MHz

Site no. : Audix NO.1 Chamber Data no. : 2
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
Limit : FCC PART 15C
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2441 MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
58.89	13.16	1.60	6.93	21.69	40.00	18.31	Peak
348.30	15.26	4.31	14.94	34.51	46.00	11.49	Peak
398.70	17.67	4.80	16.78	39.25	46.00	6.75	Peak

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

Site no. : Audix NO.1 Chamber Data no. : 1
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
Limit : FCC PART 15C
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2441 MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
75.36	12.88	1.80	9.24	23.92	40.00	16.08	Peak
106.95	17.77	2.20	12.42	32.39	43.50	11.11	Peak
360.20	16.14	4.40	11.70	32.24	46.00	13.76	Peak
398.70	17.67	4.80	16.02	38.49	46.00	7.51	Peak
486.90	18.67	6.20	15.10	39.97	46.00	6.03	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. : Audix NO.1 Chamber Data no. : 4
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
Limit : FCC PART 15C
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2480 MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
335.70	15.08	4.20	13.44	32.72	46.00	13.28	Peak
400.10	17.66	4.80	9.98	32.44	46.00	13.56	Peak

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

Site no. : Audix NO.1 Chamber Data no. : 1
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
Limit : FCC PART 15C
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2480 MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
216.30	21.86	3.20	5.00	30.06	46.00	15.94	Peak
360.20	16.14	4.40	10.19	30.73	46.00	15.27	Peak
399.40	17.69	4.80	12.23	34.72	46.00	11.28	Peak
693.40	23.23	6.50	3.40	33.13	46.00	12.87	Peak

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

3.6.2. For Above 1GHz Frequency Range Measurement Results

Date of Test: Oct. 08, 2013 Temperature: 23℃

EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmitting Mode, Frequency: 2402MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4804.00	33.06	9.14	18.63	60.83	74.00	13.17

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.
4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804.00	60.83	-30.78	30.05	54.00	23.95

Remarks: 1. Duty Cycle Correction Factor =
20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
2. Average value=Peak value+ Duty Cycle Correction Factor
3. All final readings of measurement were with Average values.
4. The pre-amplifier factor has been subtracted by test program actively.

Date of Test: Oct. 08, 2013 Temperature: 23℃

EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmitting Mode, Frequency: 2402MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4804.00	33.06	9.14	15.67	57.87	74.00	16.13

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.
4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804.00	57.87	-30.78	27.09	54.00	26.91

Remarks: 1. Duty Cycle Correction Factor =
20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
2. Average value=Peak value+ Duty Cycle Correction Factor
3. All final readings of measurement were with Average values.
4. The pre-amplifier factor has been subtracted by test program activel

Date of Test: Oct. 08, 2013 Temperature: 23℃

EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmitting Mode, Frequency: 2441MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4882.00	33.18	8.96	20.14	62.28	74.00	11.72

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.
4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4882.00	62.28	-30.78	31.50	54.00	22.50

Remarks: 1. Duty Cycle Correction Factor =
20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
2. Average value=Peak value+ Duty Cycle Correction Factor
3. All final readings of measurement were with Average values.
4. The pre-amplifier factor has been subtracted by test program actively.

Date of Test: Oct. 08, 2013 Temperature: 23℃

EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmitting Mode, Frequency: 2441MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4882.00	33.18	8.96	17.22	59.36	74.00	14.64

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.
4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4882.00	59.36	-30.78	28.58	54.00	25.42

Remarks: 1. Duty Cycle Correction Factor =
20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
2. Average value=Peak value+ Duty Cycle Correction Factor
3. All final readings of measurement were with Average values.
4. The pre-amplifier factor has been subtracted by test program actively.

Date of Test: Oct. 08, 2013 Temperature: 23℃

EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmitting Mode, Frequency: 2480MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4960.00	33.34	9.12	19.46	61.92	74.00	12.08

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.
4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4960.00	61.92	-30.78	31.14	54.00	22.86

Remarks: 1. Duty Cycle Correction Factor =
20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
2. Average value=Peak value+ Duty Cycle Correction Factor
3. All final readings of measurement were with Average values.
4. The pre-amplifier factor has been subtracted by test program actively.

Date of Test: Oct. 08, 2013 Temperature: 23℃

EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmitting Mode, Frequency: 2480MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4960.00	33.34	9.12	17.72	60.18	74.00	13.82

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.
4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4960.00	60.18	-30.78	29.40	54.00	24.60

Remarks: 1. Duty Cycle Correction Factor =
20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
2. Average value=Peak value+ Duty Cycle Correction Factor
3. All final readings of measurement were with Average values.
4. The pre-amplifier factor has been subtracted by test program actively.

3.6.3. Restricted Bands Measurement Results

Date of Test: Oct. 08, 2013 Temperature: 23℃

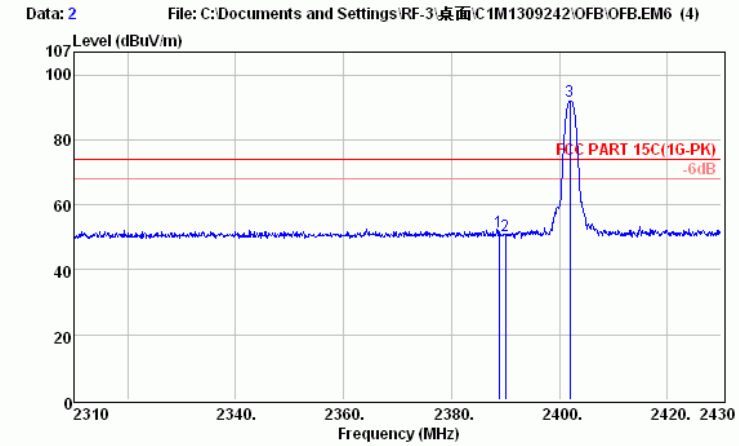
EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmit, Frequency: 2402MHz

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
Peak *	2388.84	28.47	6.34	16.73	51.54	74.00	22.46

	Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average *	2388.84	51.54	-30.78	20.76	54.00	33.24

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2310-2430MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.
4. Duty Cycle Correction Factor = 20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
5. The pre-amplifier factor has been subtracted by test program actively.



Site no. : Audix NO.1 Chamber Data no. : 2
Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C(1G-PK)
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2402 MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2388.84	28.47	6.34	16.73	51.54	74.00	22.46	Peak
2	2390.04	28.47	6.34	15.77	50.58	74.00	23.42	Peak
3	2401.92	28.47	6.36	57.03	91.86	74.00	-17.86	Peak

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

Date of Test: Oct. 08, 2013 Temperature: 23℃

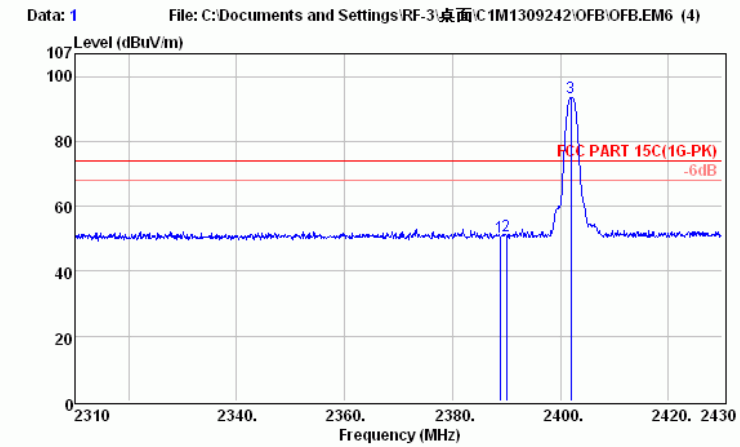
EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmit, Frequency: 2402MHz

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
Peak *	2388.84	28.47	6.34	15.78	50.59	74.00	23.41

	Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average *	2388.84	50.59	-30.78	19.81	54.00	34.19

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2310-2420MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.
4. Duty Cycle Correction Factor = 20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
5. The pre-amplifier factor has been subtracted by test program actively.



Site no. : Audix NO.1 Chamber Data no. : 1
Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
Limit : FCC PART 15C(1G-PK)
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2402 MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2388.84	28.47	6.34	15.78	50.59	74.00	23.41	Peak
2	2390.04	28.47	6.34	16.20	51.01	74.00	22.99	Peak
3	2401.92	28.47	6.36	58.61	93.44	74.00	-19.44	Peak

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

Date of Test: Oct. 08, 2013 Temperature: 23℃

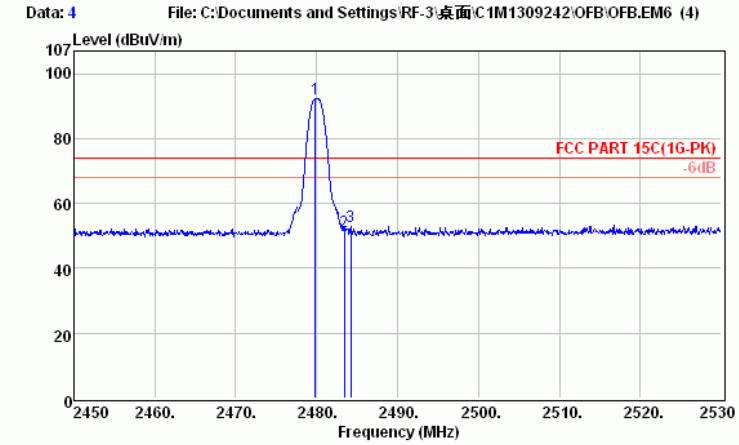
EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmit, Frequency: 2480MHz

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
Peak *	2483.44	2.66	6.45	16.10	51.21	74.00	22.79

	Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average *	2483.44	51.21	-30.78	20.43	54.00	33.57

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2460-2530MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.
4. Duty Cycle Correction Factor = 20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
5. The pre-amplifier factor has been subtracted by test program actively.



Site no. : Audix NO.1 Chamber Data no. : 4
Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C(1G-PK)
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2480 MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2479.84	28.66	6.44	57.18	92.28	74.00	-18.28	Peak
2	2483.44	28.66	6.45	16.10	51.21	74.00	22.79	Peak
3	2484.24	28.66	6.45	17.71	52.82	74.00	21.18	Peak

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

Date of Test: Oct. 08, 2013 Temperature: 23℃

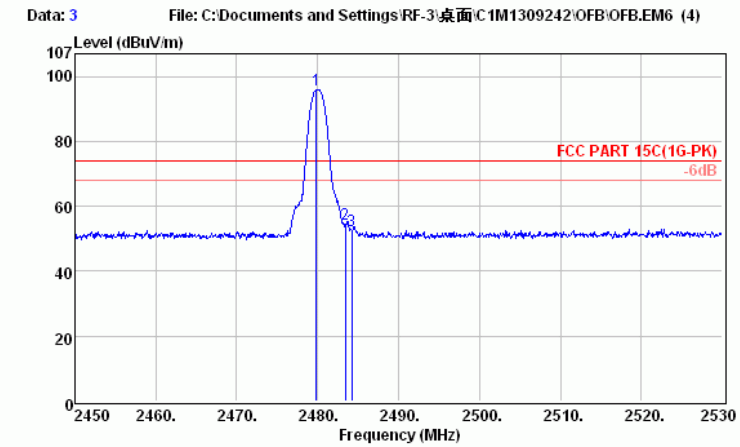
EUT: BT Infrared Ear Thermometer Humidity: 52%

Test Mode: Transmit, Frequency: 2480MHz

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
Peak *	2484.24	28.66	6.45	17.36	52.47	74.00	21.53

	Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average *	2484.24	52.47	-30.78	21.69	54.00	32.31

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2460-2530MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.
4. Duty Cycle Correction Factor = 20log(dwell time/100ms)=20log(2.890ms/100ms)=-30.78
5. The pre-amplifier factor has been subtracted by test program actively.



Site no. : Audix NO.1 Chamber Data no. : 3
Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
Limit : FCC PART 15C(1G-PK)
Env. / Ins. : 23*C/52% N9030A(140) Engineer : jianlun_hung
EUT : ETH-102
Power Rating : DC3V
Test Mode : Tx 2480 MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2479.84	28.66	6.44	60.66	95.76	74.00	-21.76	Peak
2	2488.44	28.66	6.45	19.30	54.41	74.00	19.59	Peak
3	2484.24	28.66	6.45	17.36	52.47	74.00	21.53	Peak

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

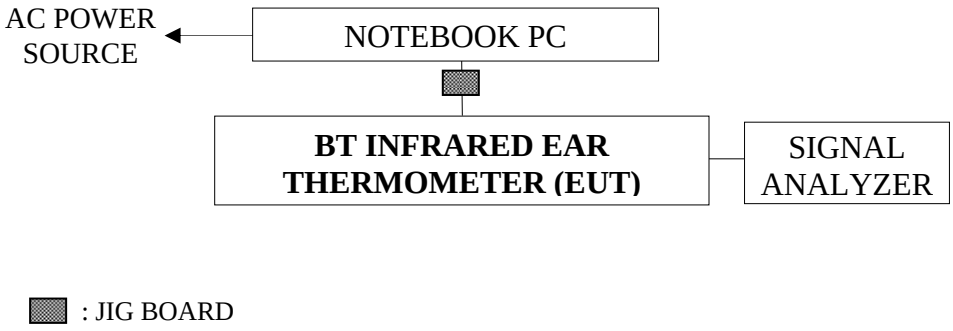
4. 20dB BANDWIDTH MEASUREMENT

4.1. Test Equipment

The following test equipment was used during the 20dB bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Signal Analyzer	Agilent	N9030A-544	US51350140	Jul. 30, 13'	Jul. 29, 14'

4.2. Block Diagram of Test Setup



4.3. Specification Limits [§15.247(a)(1)]

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

4.4. Operating Condition of EUT

4.4.1. Set up the EUT and simulator as shown on 4.2.

4.4.2. To turn on the power of all equipment.

4.4.3. The Notebook PC was running test software "CSR Bluesuit 3.0 exe." to set EUT (BT Infrared Ear Thermometer) on transmitting and receiving during all testing.

4.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The RBW of the fundamental frequency was measure by spectrum analyzer 1% of the 20dB bandwidth and the setting equal to RBW and VBW is equal to RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.6. Test Results

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

EUT：BT Infrared Ear Thermometer M/N：ETH-102

Test Date : Oct. 03, 2013 Temperature : 23℃ Humidity : 61%

No.	Channel	Test Frequency	**20dB Bandwidth**	**2/3 (20dB Bandwidth)**
1.	0	2402MHz	**0.924MHz**	**0.616MHz**
2.	39	2441MHz	**0.924MHz**	**0.616MHz**
3.	78	2480MHz	**0.924MHz**	**0.616MHz**

The maximum two-thirds of the 20dB bandwidth shall be at maximum 0.616MHz.

4.6.1. Figure 1: Channel 0, Frequency: 2402MHz

4.6.2. Figure 2: Channel 39, Frequency: 2441MHz

4.6.3. Figure 3: Channel 78, Frequency: 2480MHz

5. CARRIER FREQUENCY SEPARATION MEASUREMENT

5.1. Test Equipment

The following test equipment was used during the carrier frequency separation measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Signal Analyzer	Agilent	N9030A-544	US51350140	Jul. 30, 13’	Jul. 29, 14’

5.2. Block Diagram of Test Setup

The same as section.4.2.

5.3. Specification Limits [§15.247(a)(1)]

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output no greater than 125mW.

5.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

5.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The channel separation was measure by spectrum analyzer with RBW equal to 1% of the span. The video bandwidth not to be smaller than resolution bandwidth, the peak was mark on adjacent bandwidth, the between of peak is carrier frequency separation.

5.6. Test Results

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

EUT：BT Infrared Ear Thermometer M/N：ETH-102

Test Date : Oct. 03, 2013 Temperature : 23℃ Humidity : 61%

1. 2402MHz adjacent channel of carrier frequency separation: 1.000MHz。
2. 2441MHz adjacent channel of right carrier frequency separation: 1.000MHz。
3. 2441MHz adjacent channel of left carrier frequency separation: 1.000MHz。
4. 2480MHz adjacent channel of carrier frequency separation: 1.000MHz。

[Above values have met the requirement as specified in section 4.3: frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.]

Figure 1: 2402MHz adjacent channel of carrier frequency separation

5.6.1. Figure 2: 2441MHz adjacent channel of right carrier frequency separation

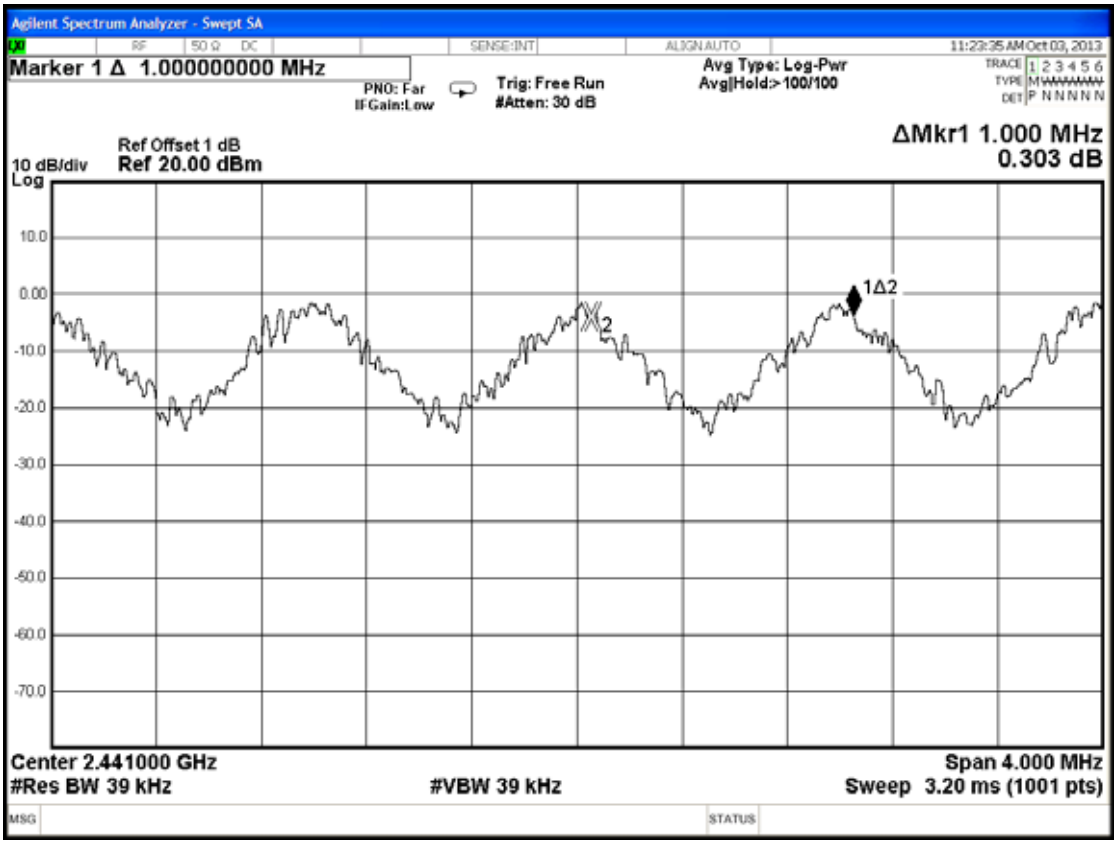
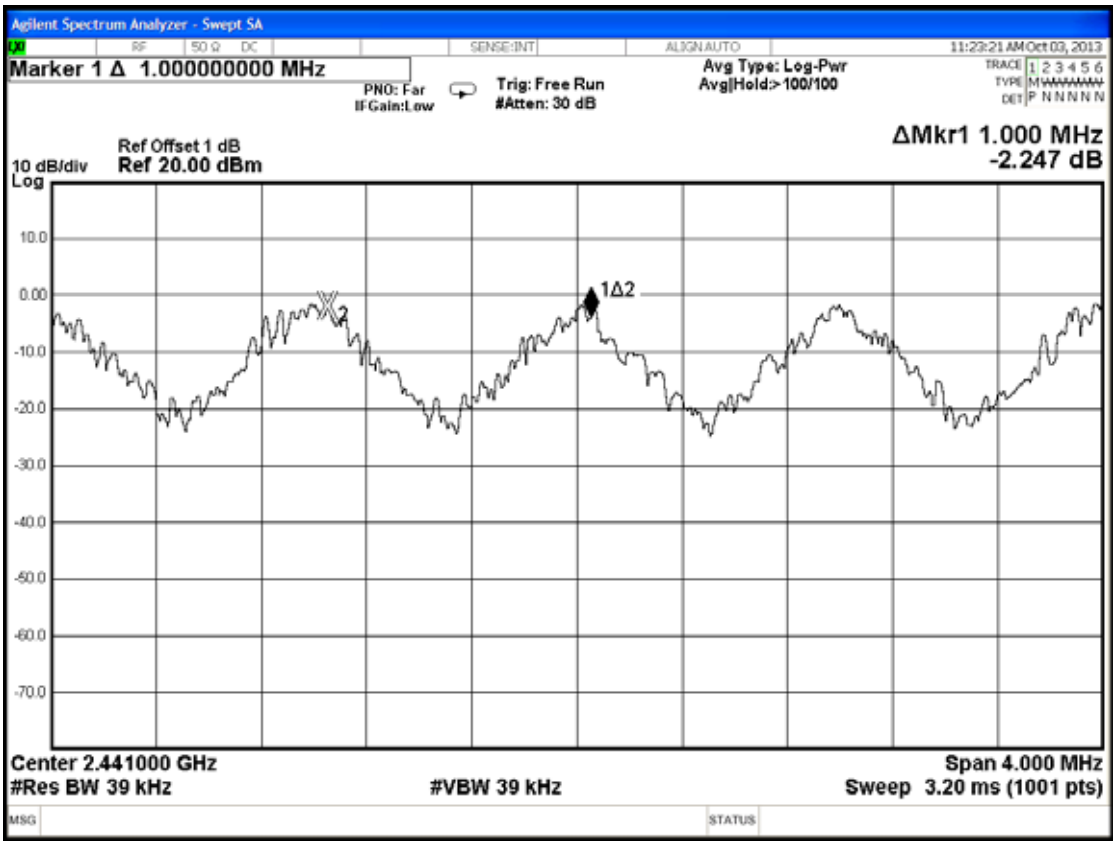


Figure 3: 2441MHz adjacent channel of left carrier frequency separation



5.6.2. Figure 4: 2480MHz adjacent channel of carrier frequency separation

6. TIME OF OCCUPANCY MEASUREMENT

6.1. Test Equipment

The following test equipment was used during the time of occupancy measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Signal Analyzer	Agilent	N9030A-544	US51350140	Jul. 30, 13’	Jul. 29, 14’

6.2. Block Diagram of Test Setup

The same as section.4.2.

6.3. Specification Limits [§15.247(a)(1)(iii)]

Frequency hopping systems in the 2400-2483.5MHz shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by number of hopping channels employed.

6.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

6.5. Test Procedure

The EUT was connected to the notebook. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 1MHz RBW and 1MHz VBW. VBW≥RBW ; Span=zero span.
Centred on a hopping channel sweep=as necessary to capture the entire dwell time per hopping channel ; Detector function=peak ; Trace=Max hold

6.6. Test Results

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

EUT：BT Infrared Ear Thermometer M/N：ETH-102

Test Date : Oct. 03, 2013 Temperature : 23℃ Humidity : 61%

6.6.1. Test Frequency：2402MHz

Duty cycle: 79channels*0.4 seconds = 31.6 seconds

DH1 : For each 5 seconds of 51 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

51 channels*31.6 seconds/5* 0.395ms = 127.32ms (<400ms)

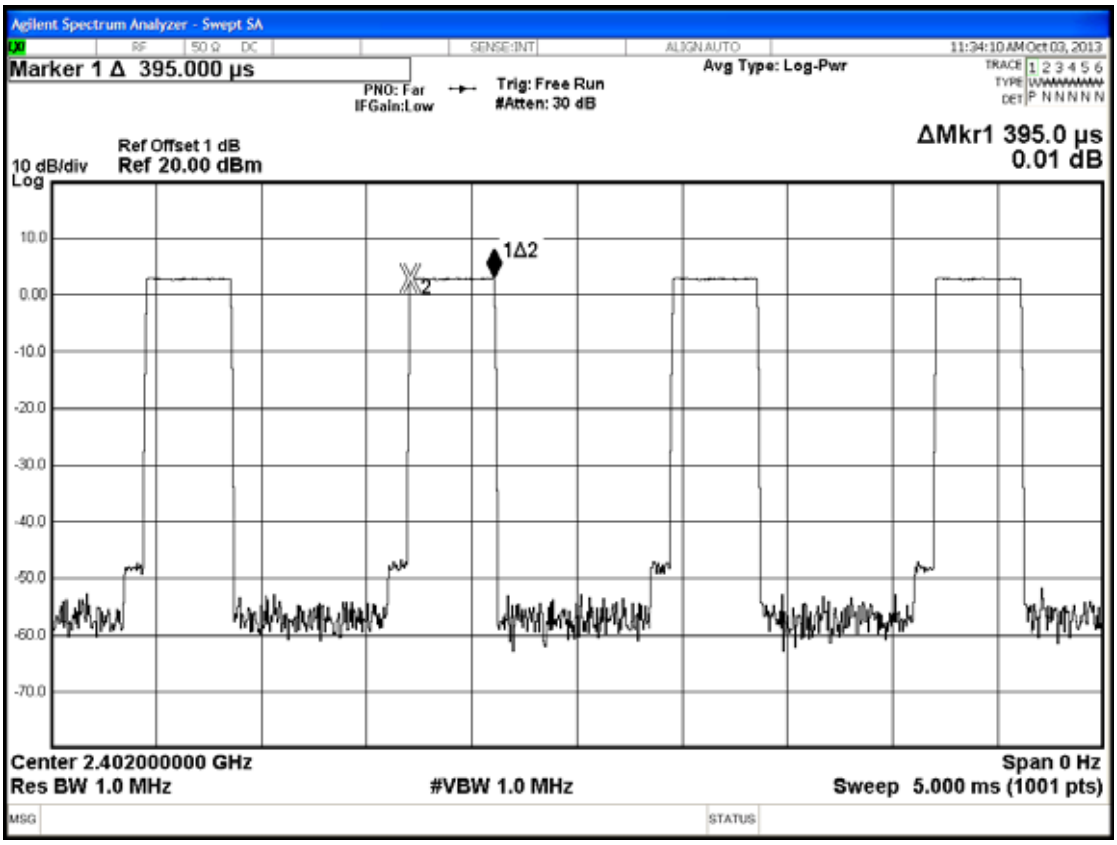
DH3 : For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels*31.6 seconds/5* 1.645ms = 259.91ms (<400ms)

DH5 : For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels*31.6 seconds/5* 2.89ms = 310.50ms (<400ms)

Figure 1: 2402MHz, DH1



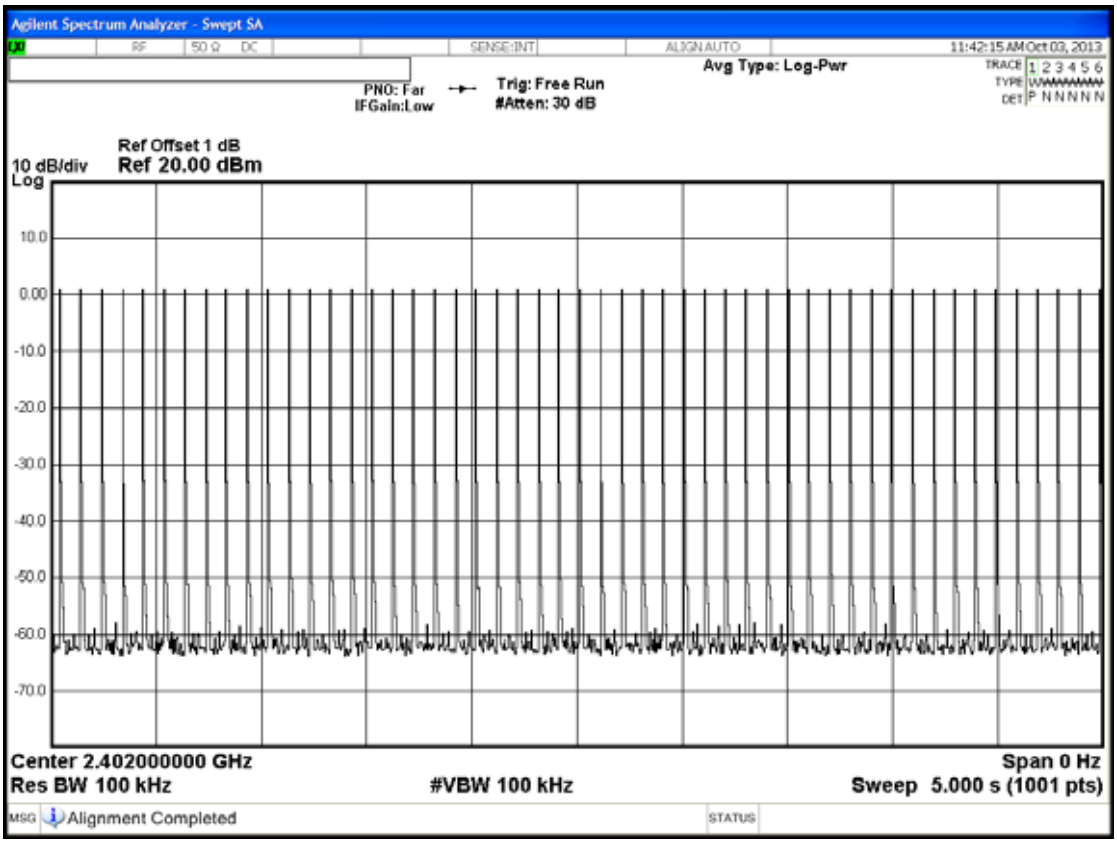
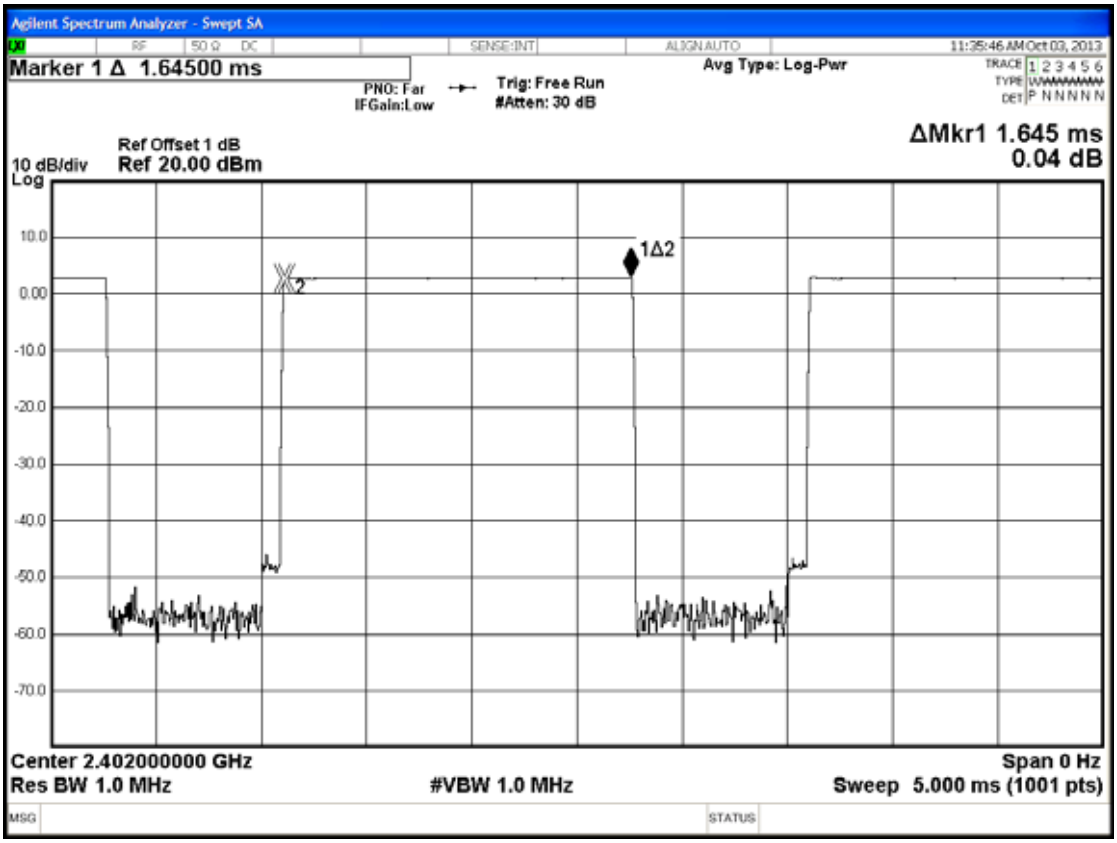


Figure 2: 2402MHz, DH3



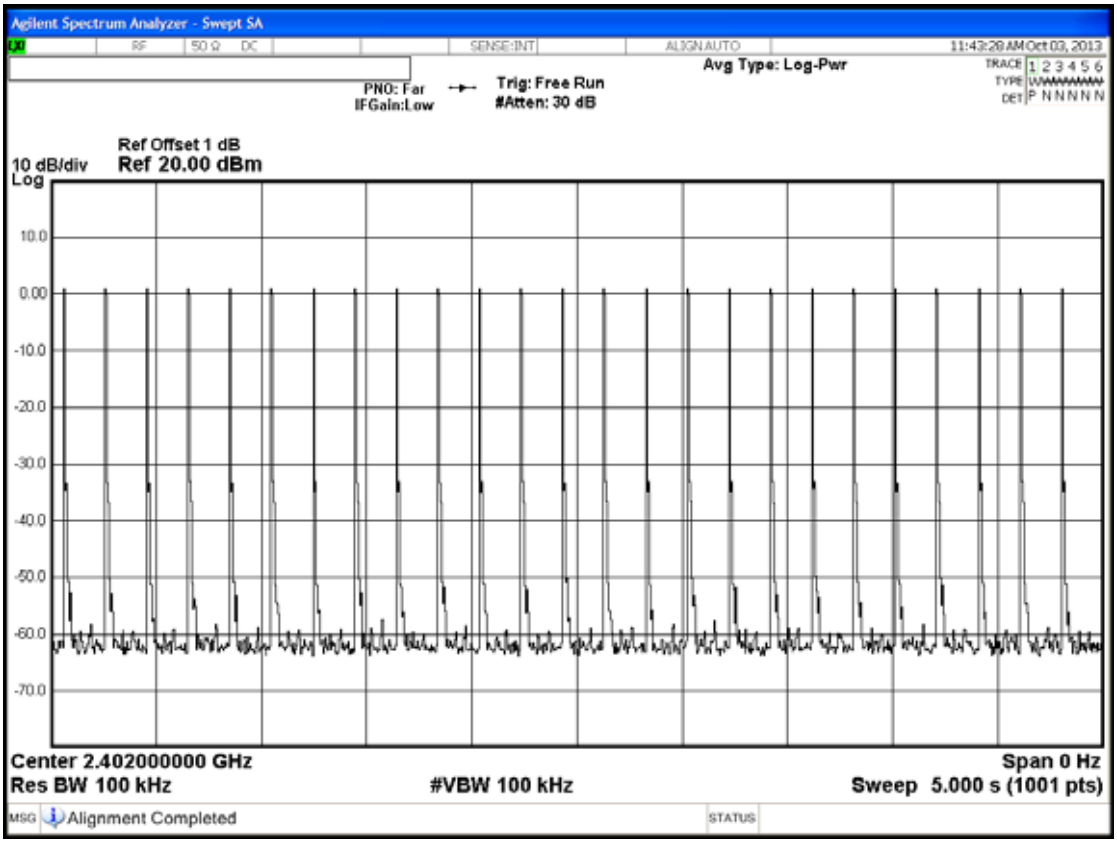
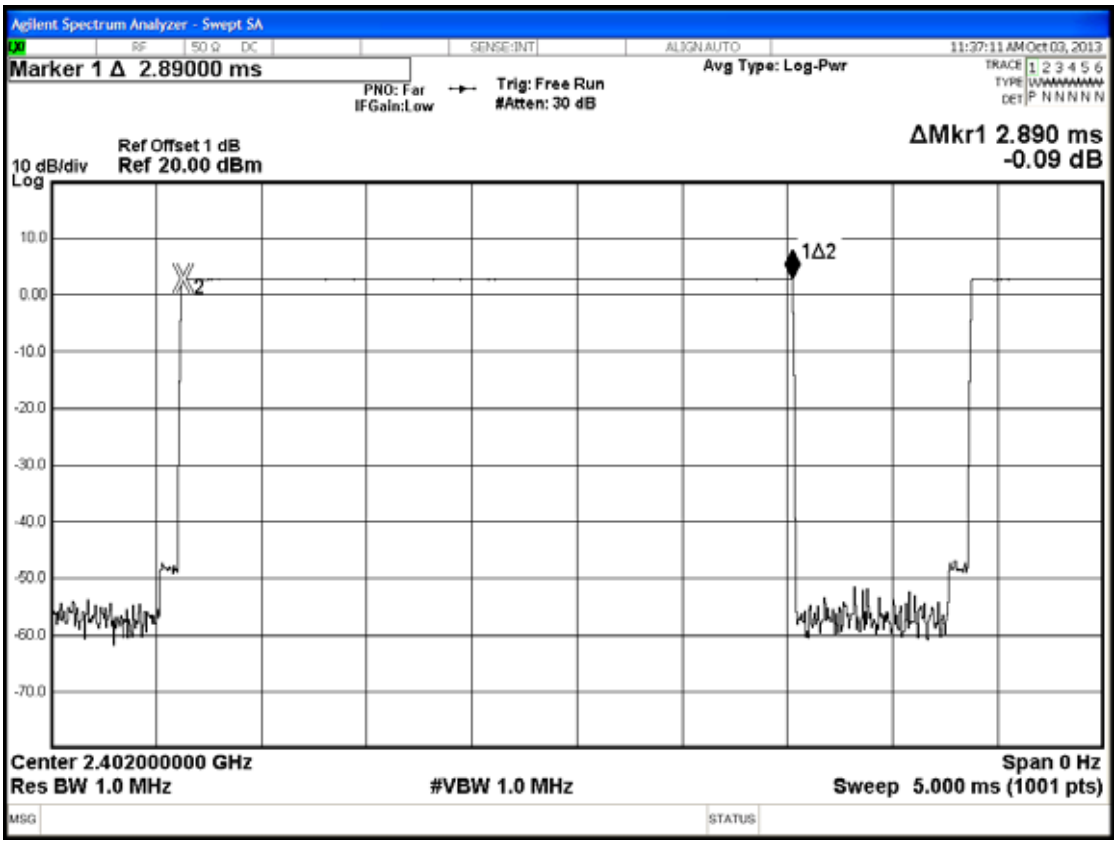
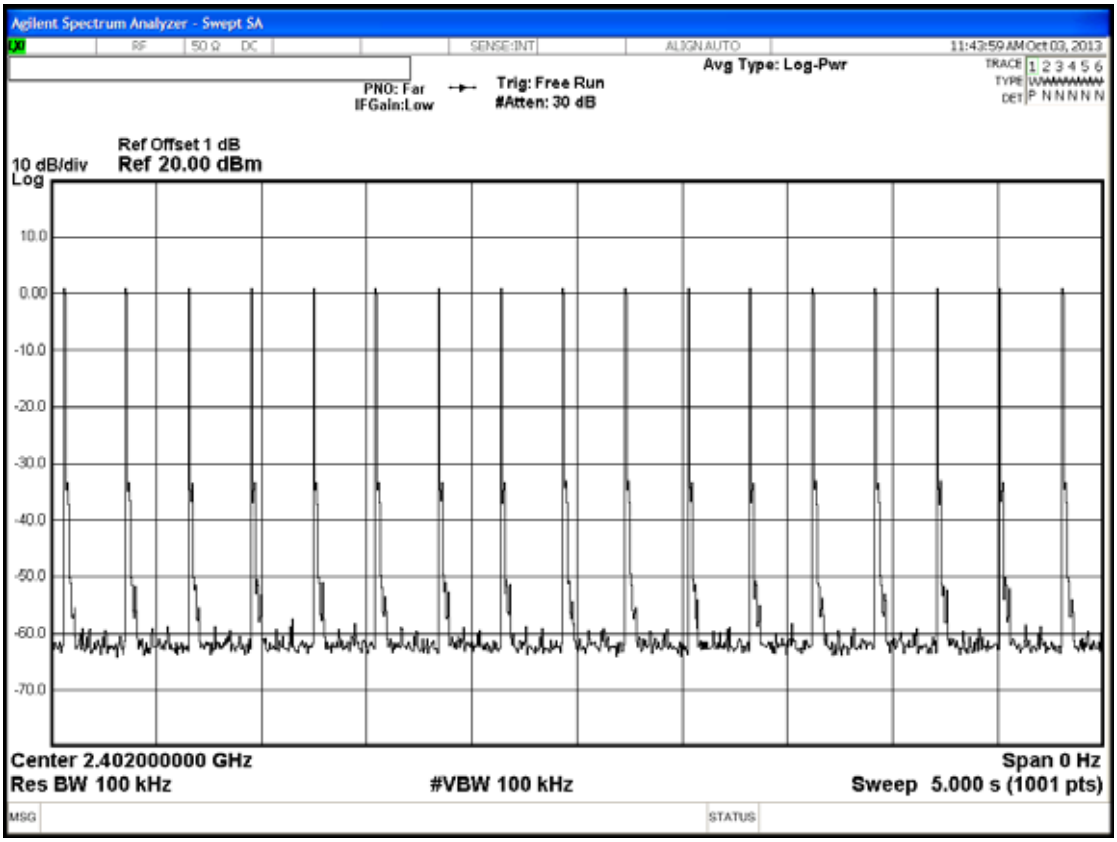


Figure 3: 2402MHz, DH5





6.6.2. Test Frequency：2441MHz

Duty cycle: 79channels*0.4 seconds = 31.6 seconds

DH1 : For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds/5* 0.395ms = 124.82ms (<400ms)

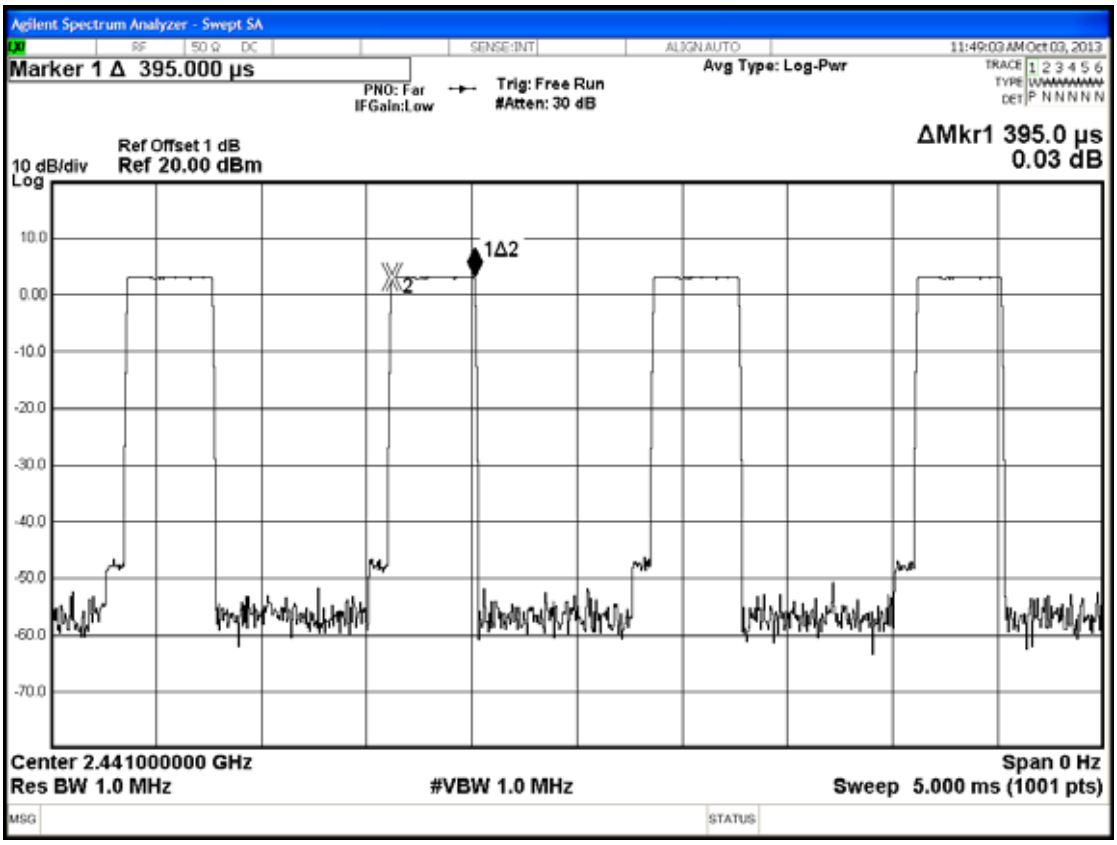
DH3 : For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels*31.6 seconds/5* 1.645ms = 259.91ms (<400ms)

DH5 : For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels*31.6 seconds/5* 2.89ms = 310.50ms (<400ms)

Figure 1: 2441MHz, DH1



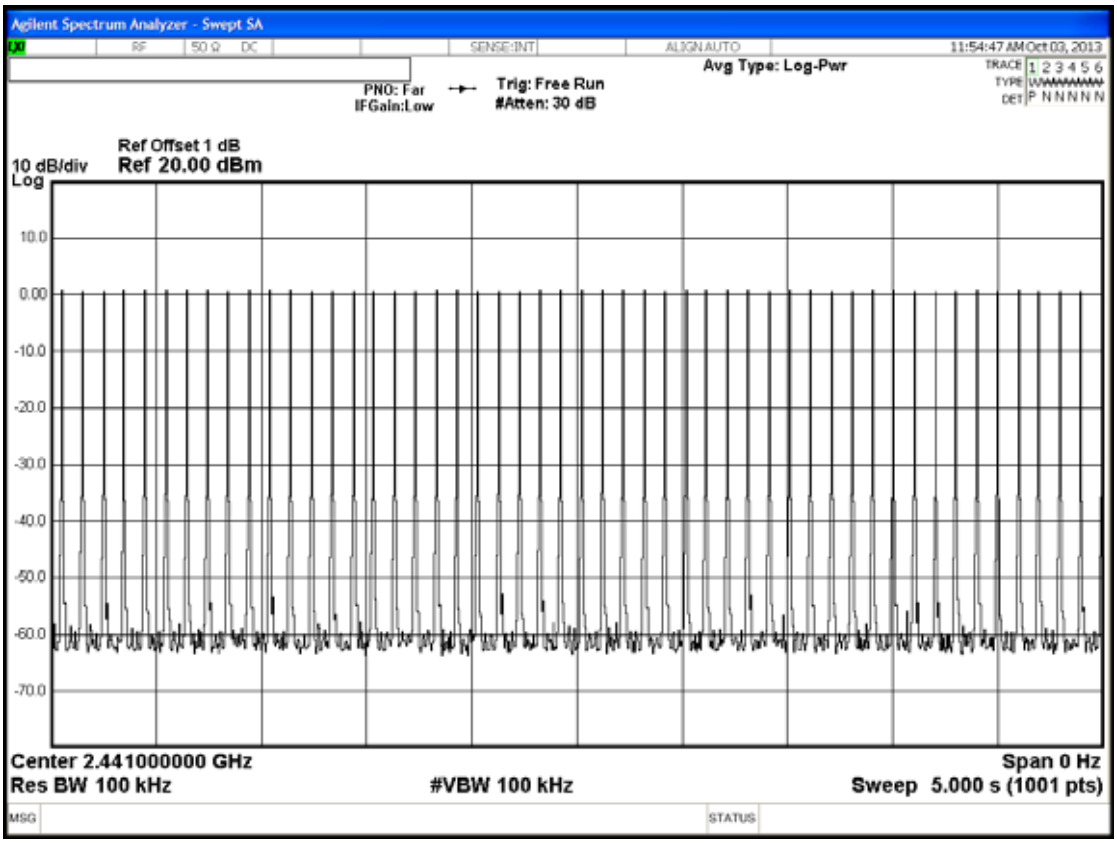
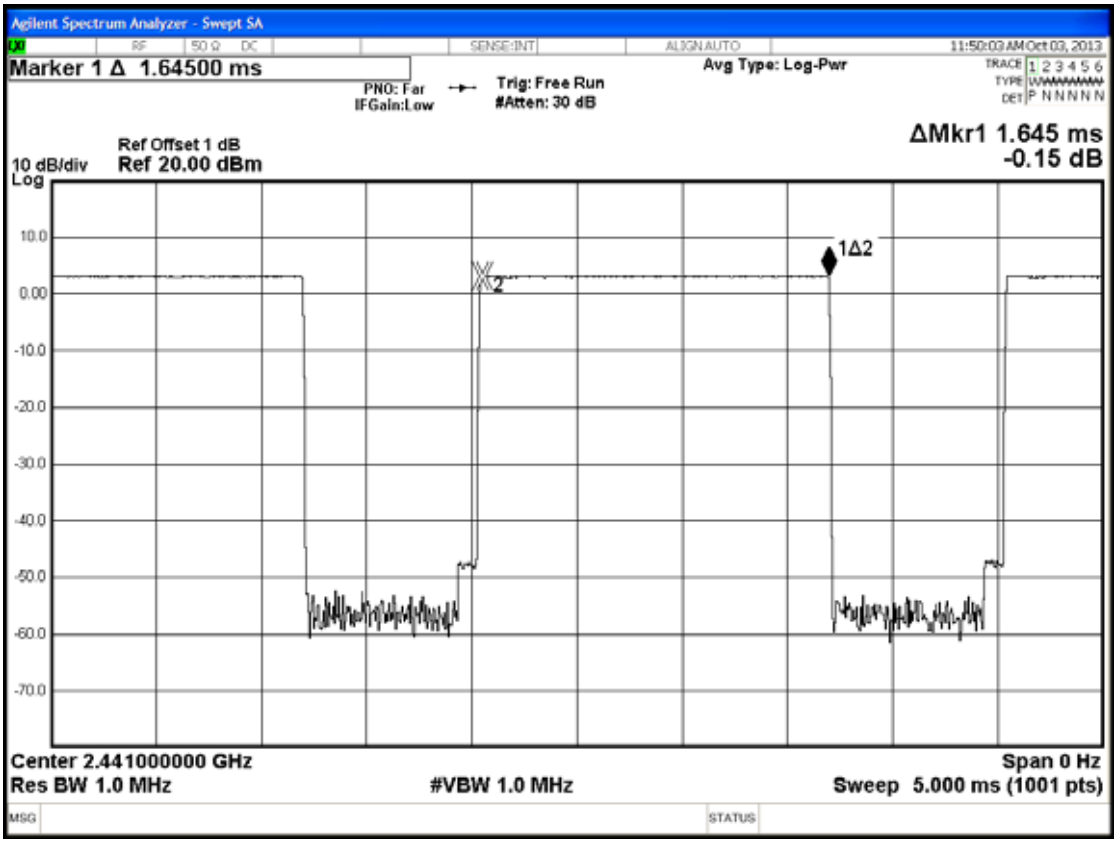


Figure 2: 2441MHz, DH3



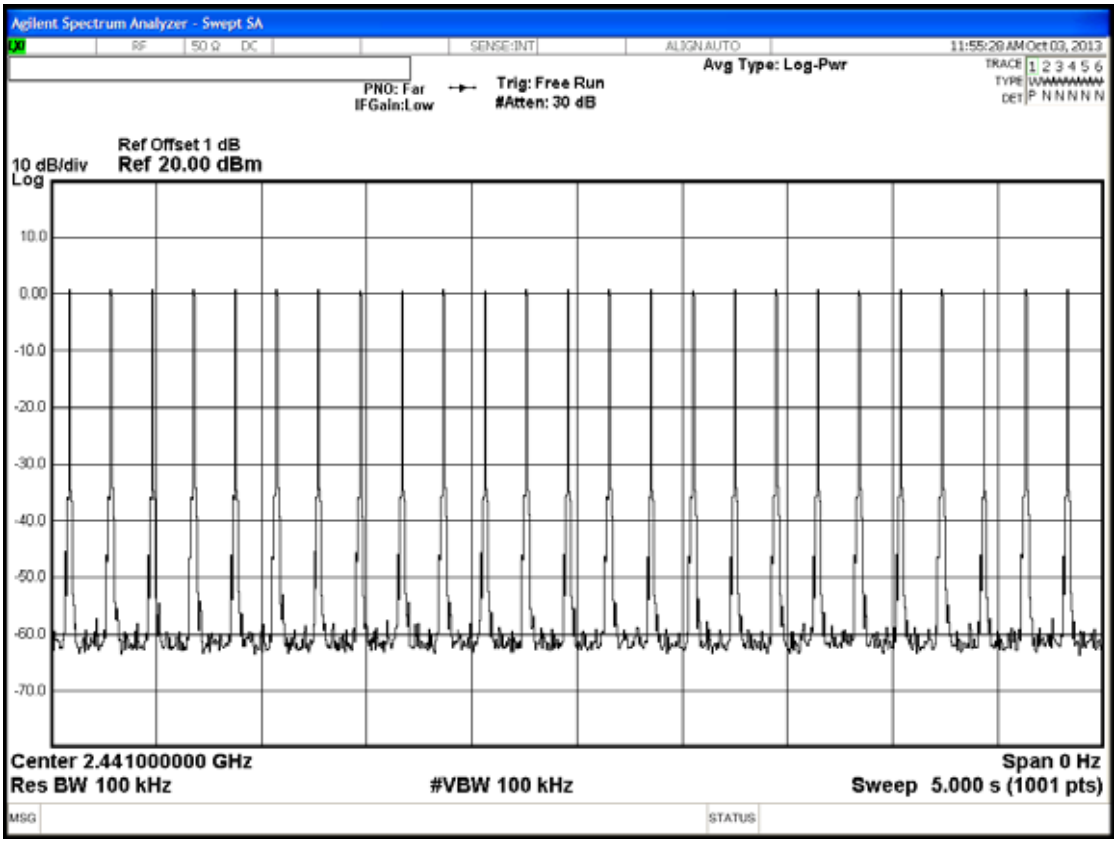
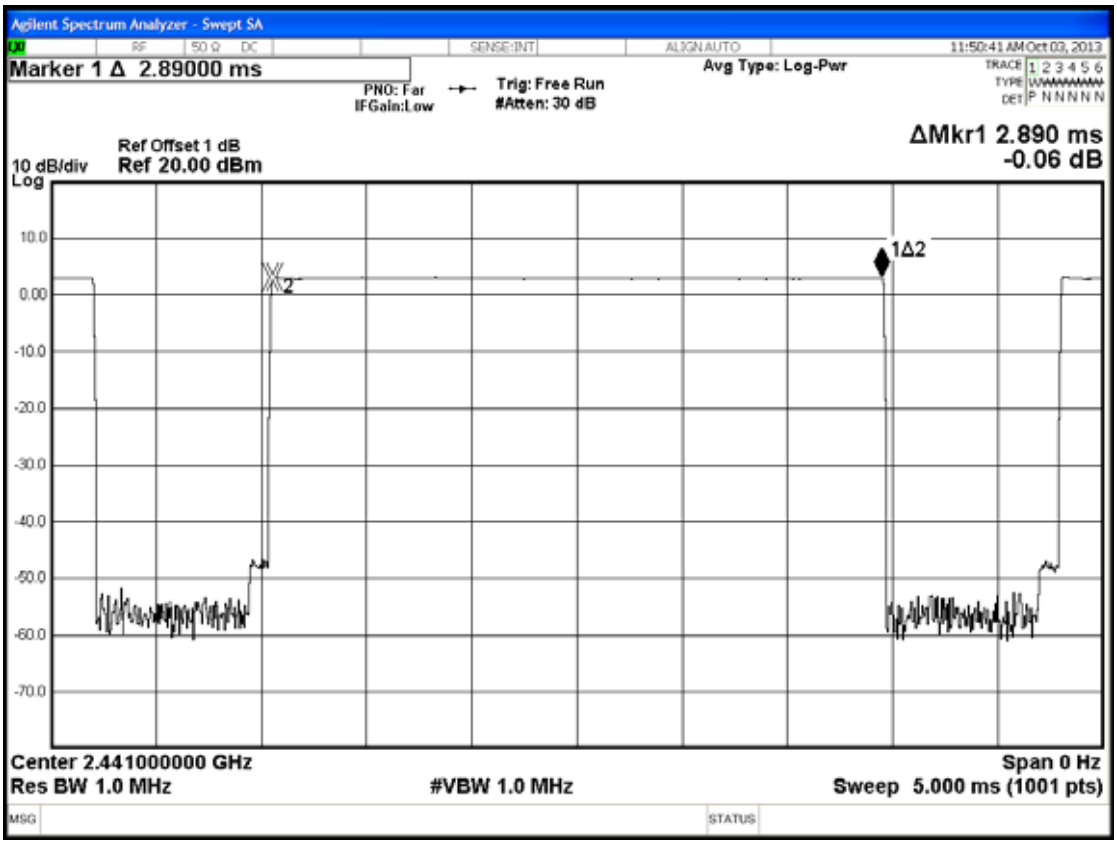
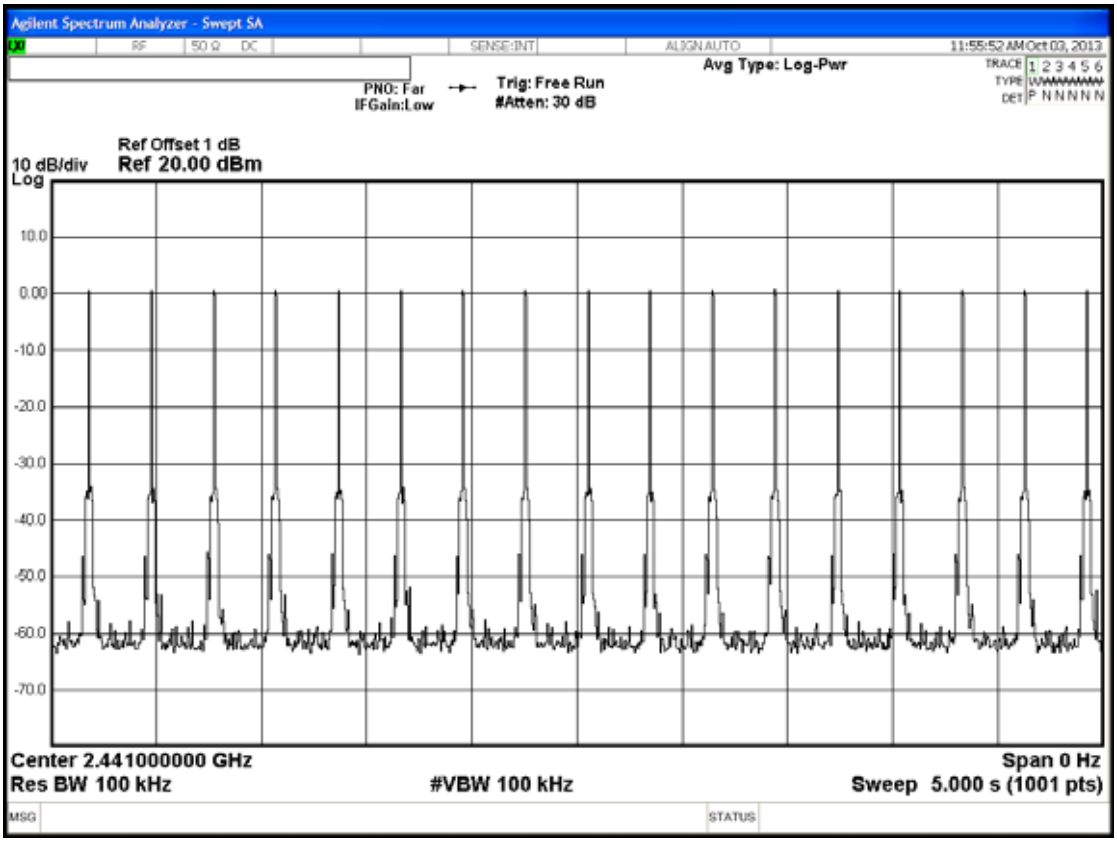


Figure 3: 2441MHz, DH5





6.6.3. Test Frequency：2480MHz

Duty cycle: 79channels*0.4 seconds = 31.6 seconds

DH1 : For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds/5* 0.395ms = 124.82ms (<400ms)

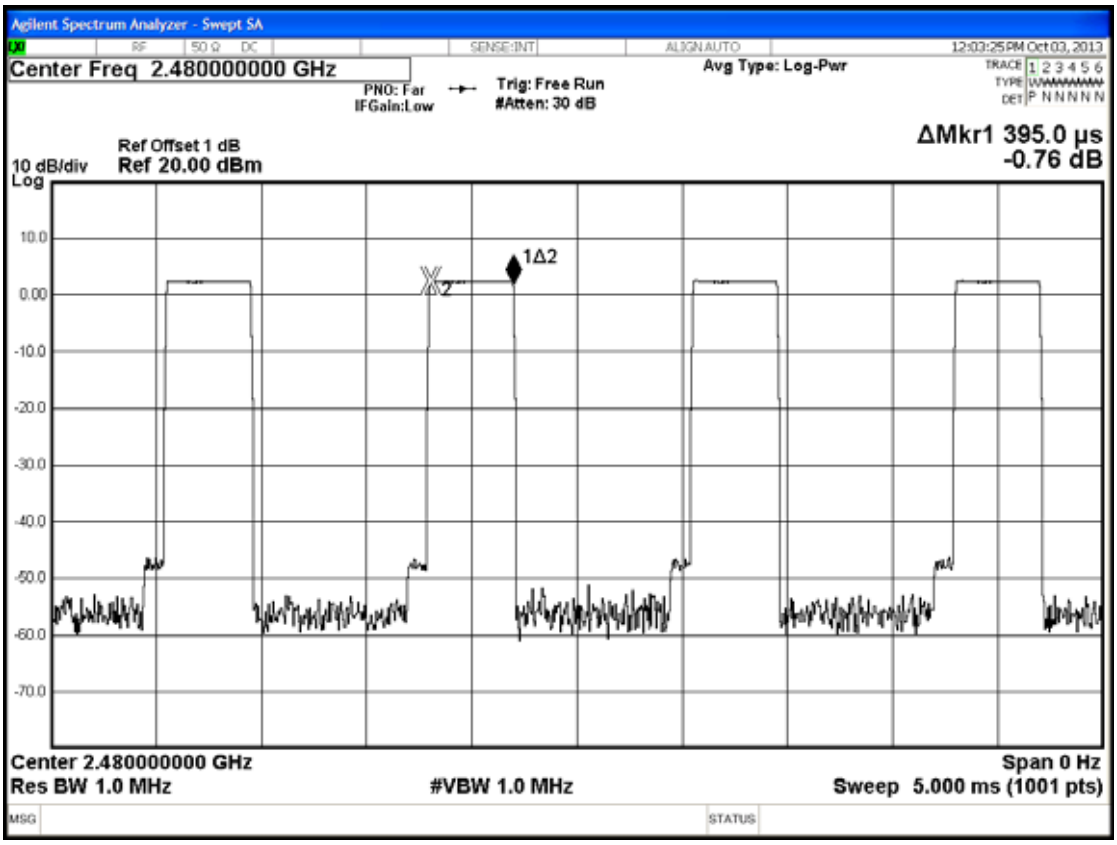
DH3 : For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels*31.6 seconds/5* 1.645ms = 259.91ms (<400ms)

DH5 : For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels*31.6 seconds/5* 2.89ms = 310.50ms (<400ms)

Figure 1: 2480MHz, DH1



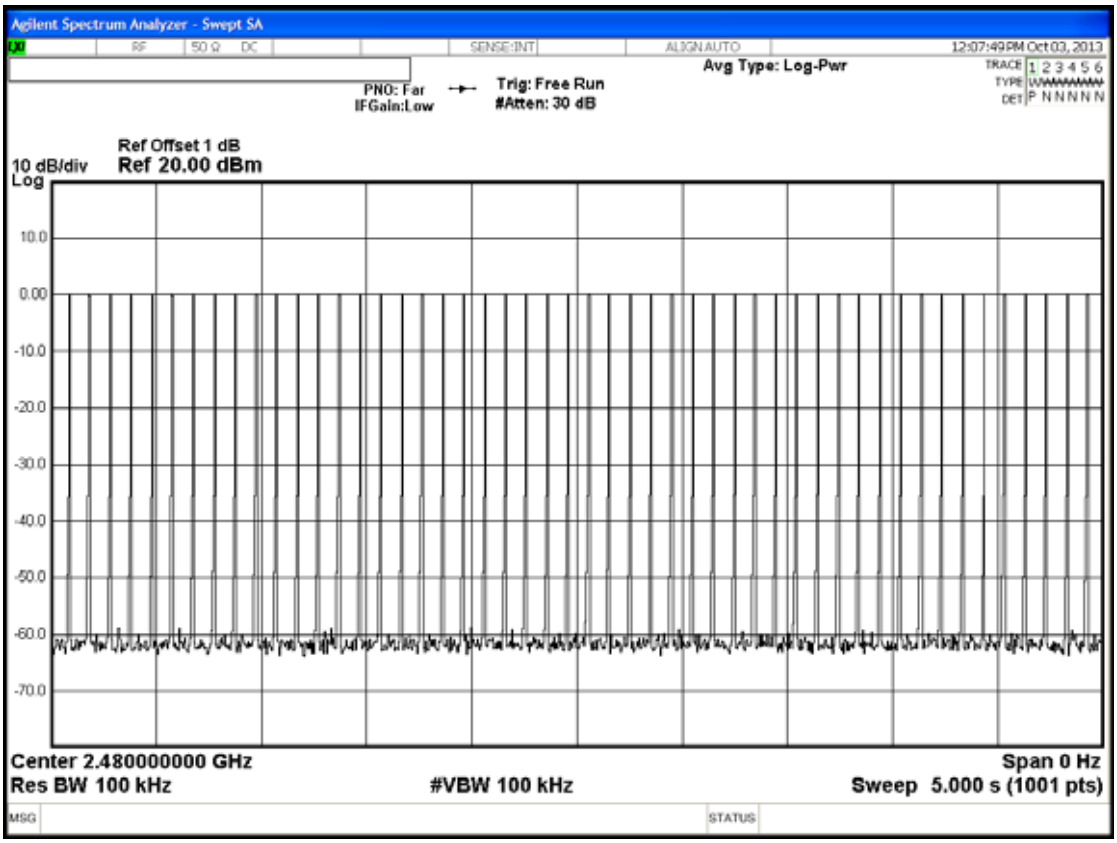
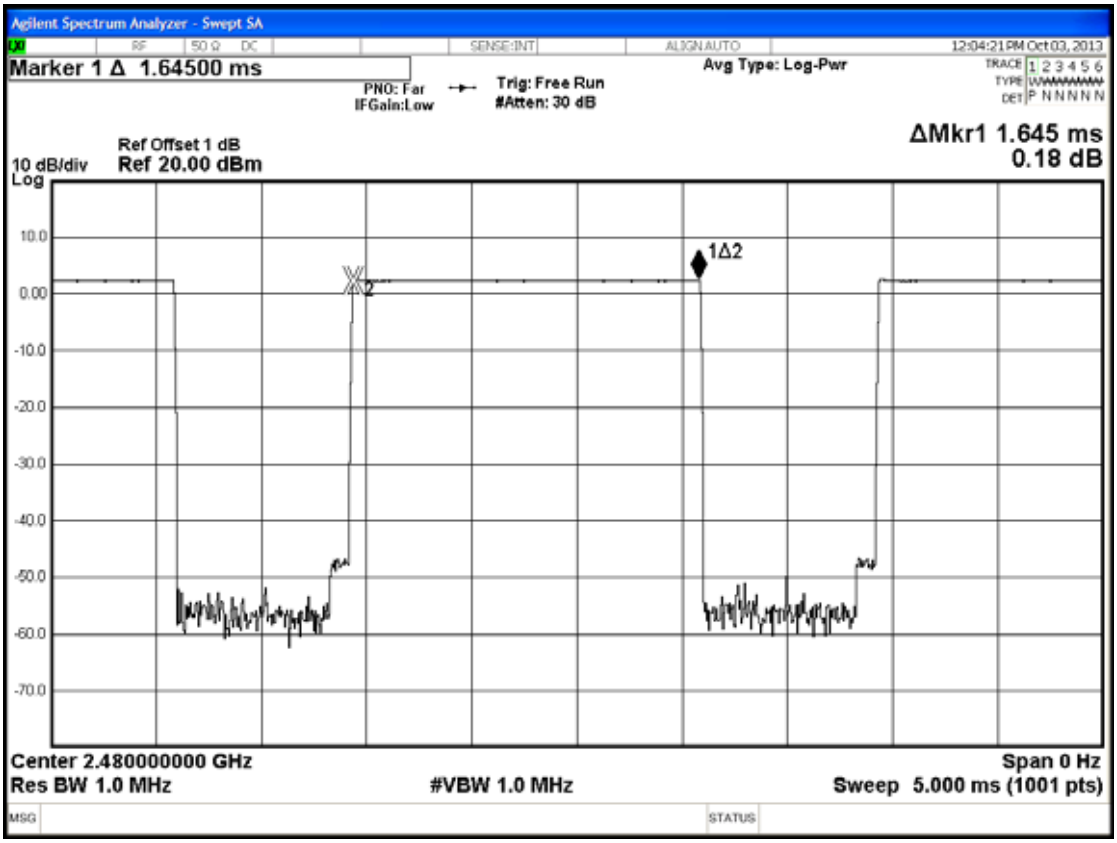


Figure 2: 2480MHz, DH3



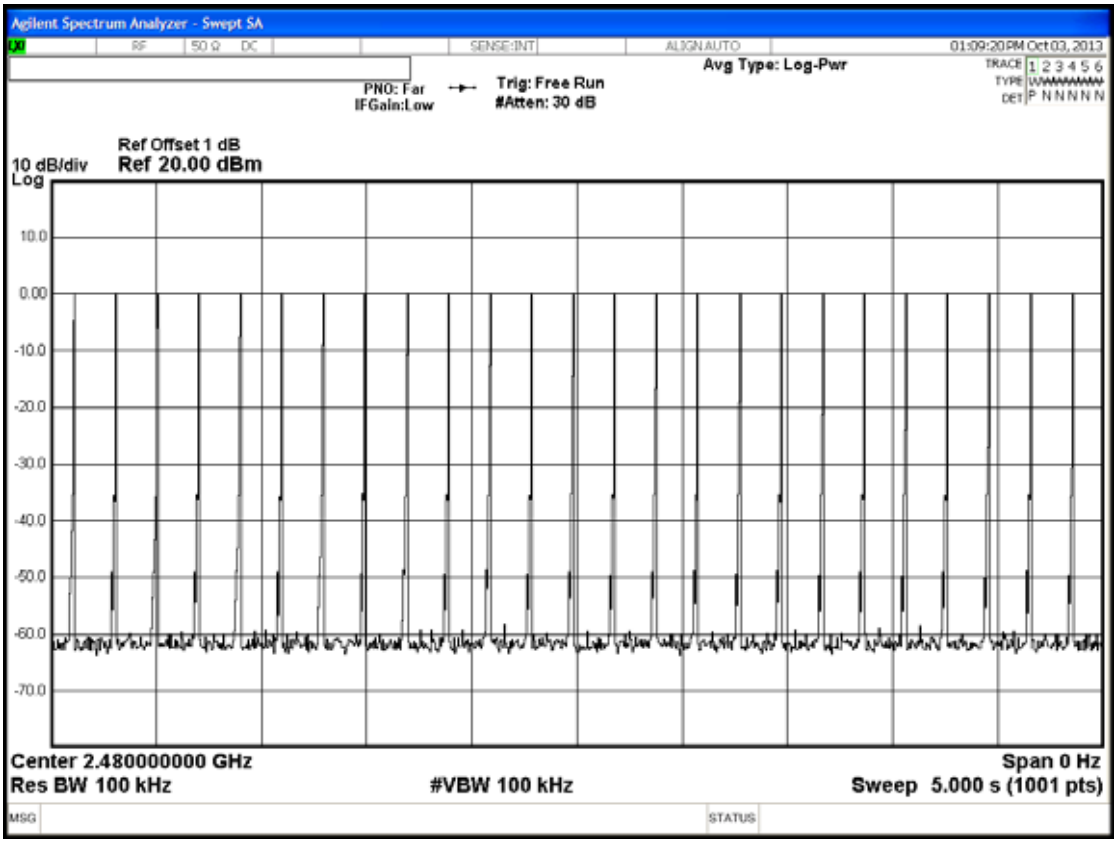
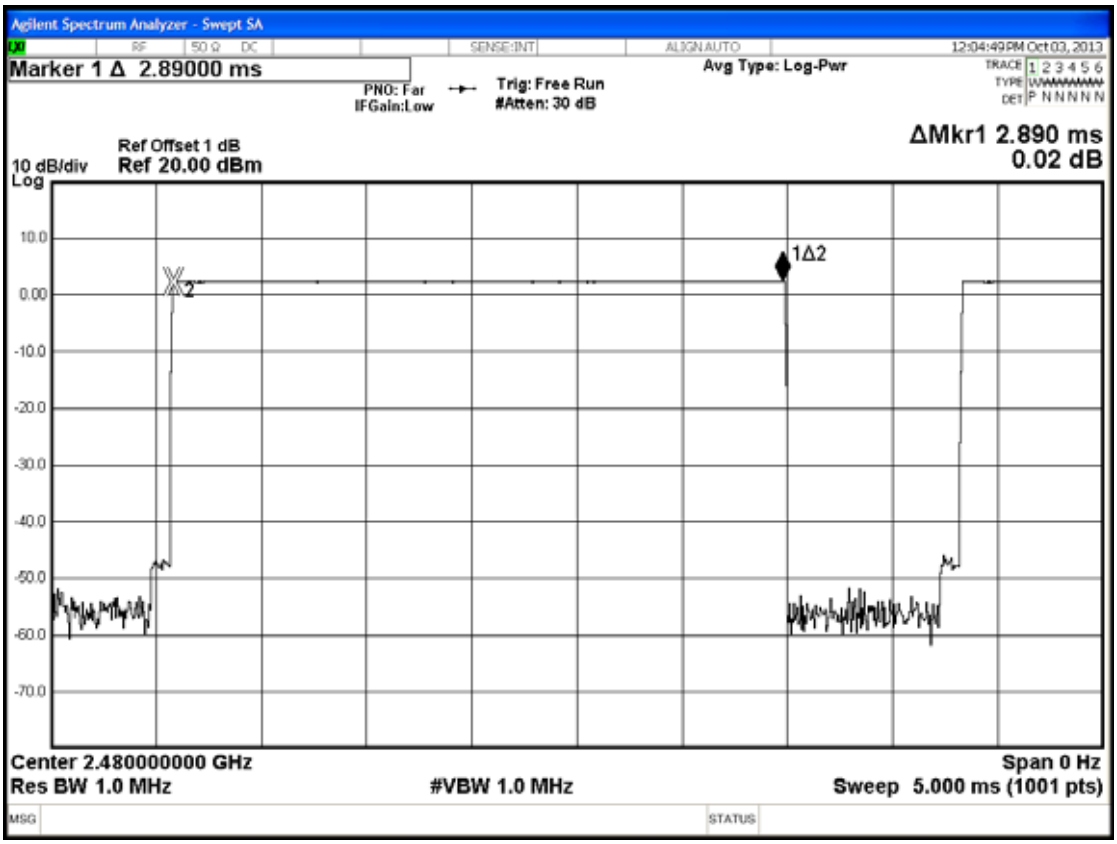
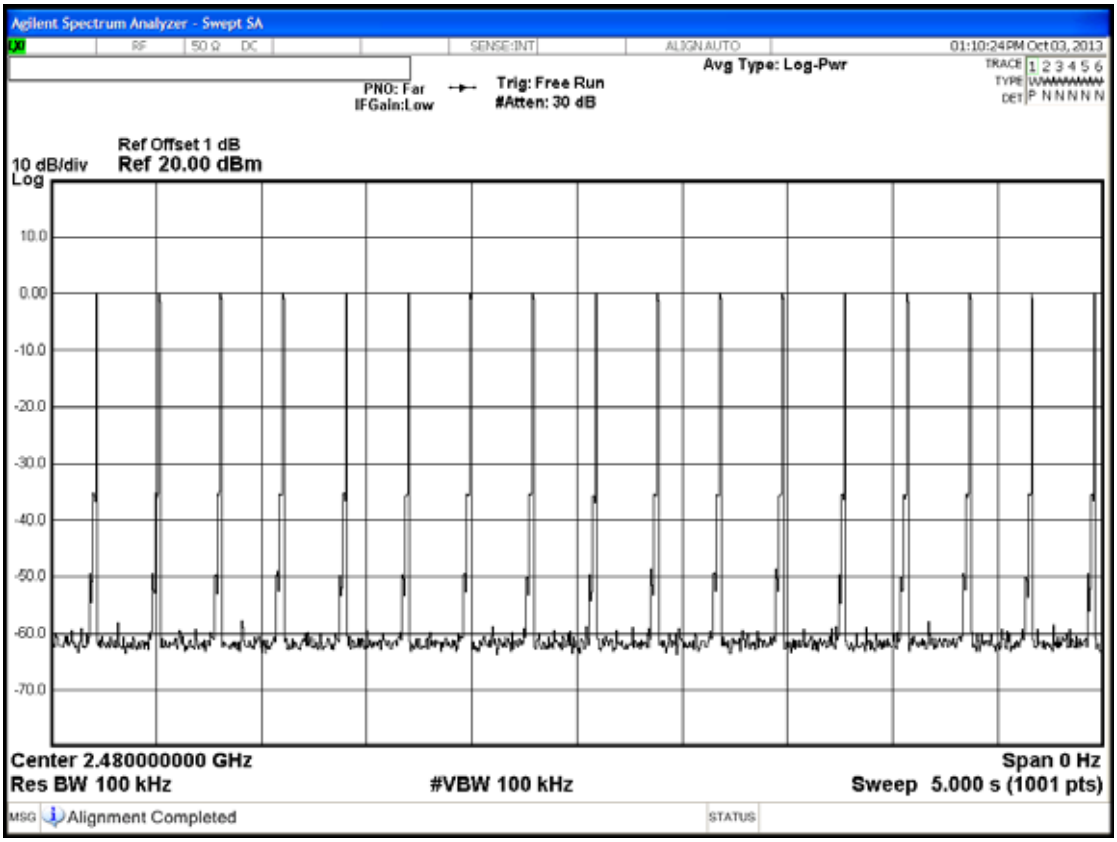


Figure 3: 2480MHz, DH5





7. NUMBER OF HOPPING CHANNELS MEASUREMENT

7.1. Test Equipment

The following test equipment was used during the number of hopping channels measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Signal Analyzer	Agilent	N9030A-544	US51350140	Jul. 30, 13’	Jul. 29, 14’

7.2. Block Diagram of Test Setup

The same as section.4.2.

7.3. Specification Limits [§15.247(a)(1)(iii)]

Frequency hopping systems which use fewer than 20 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels.

7.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

7.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100kHz RBW and 100kHz VBW. Sweep=Auto ; Detector function=peak ; Trace=Max hold

7.6. Test Results

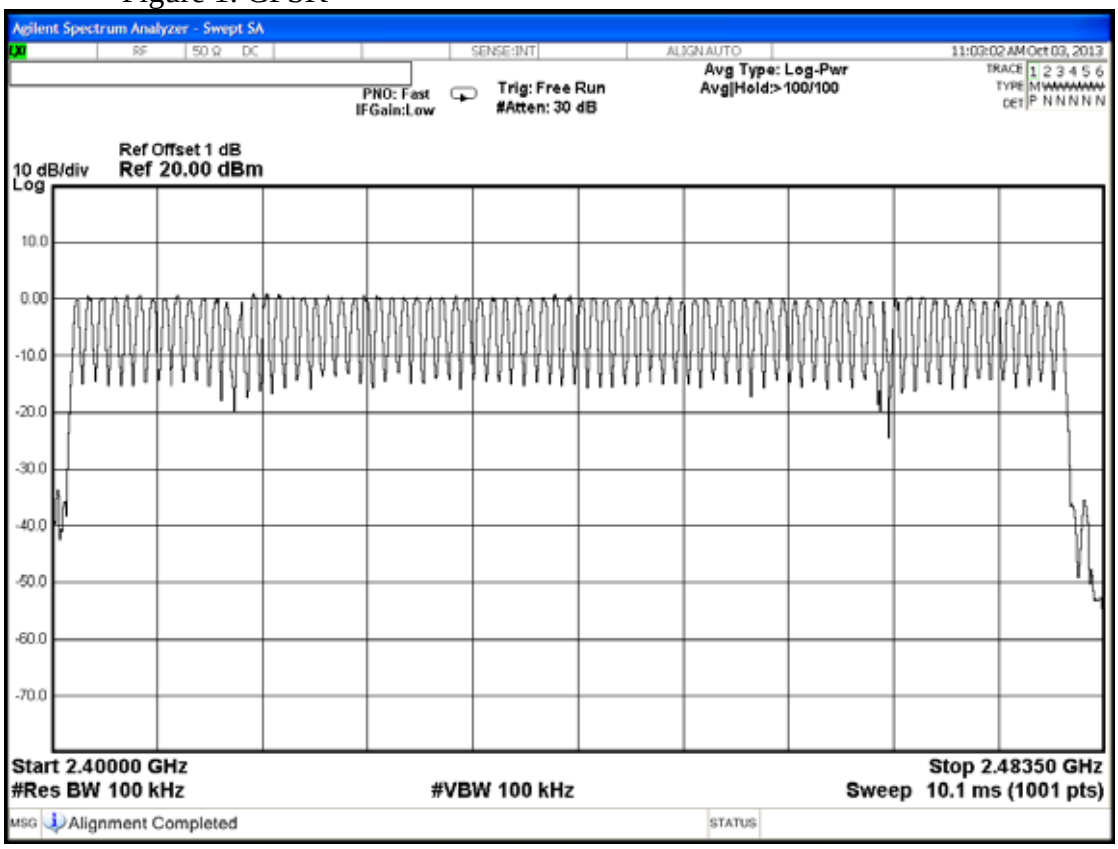
PASSED. All the test results are attached in next page.

EUT：BT Infrared Ear Thermometer M/N：ETH-102

Test Date : Oct. 03, 2013 Temperature : 23℃ Humidity : 61%

The number hopping channel is 79.

Figure 1: GFSK



8. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

8.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Signal Analyzer	Agilent	N9030A-544	US51350140	Jul. 30, 13’	Jul. 29, 14’

8.2. Block Diagram of Test Setup

The same as section.4.2.

8.3. Specification Limits [§15.247(b)-(1)]

The Limits of maximum Peak Output Power for frequency hopping systems in 2400-2483.5MHz is: 0.125Watt. (21dBm)

8.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in 4.4 .

8.5. Test Procedure

The transmitter output was connected to the spectrum analyzer.
Span can encompass the waveform
RBW>EBW
VBW≧RBW
Span=5MHz

8.6. Test Results

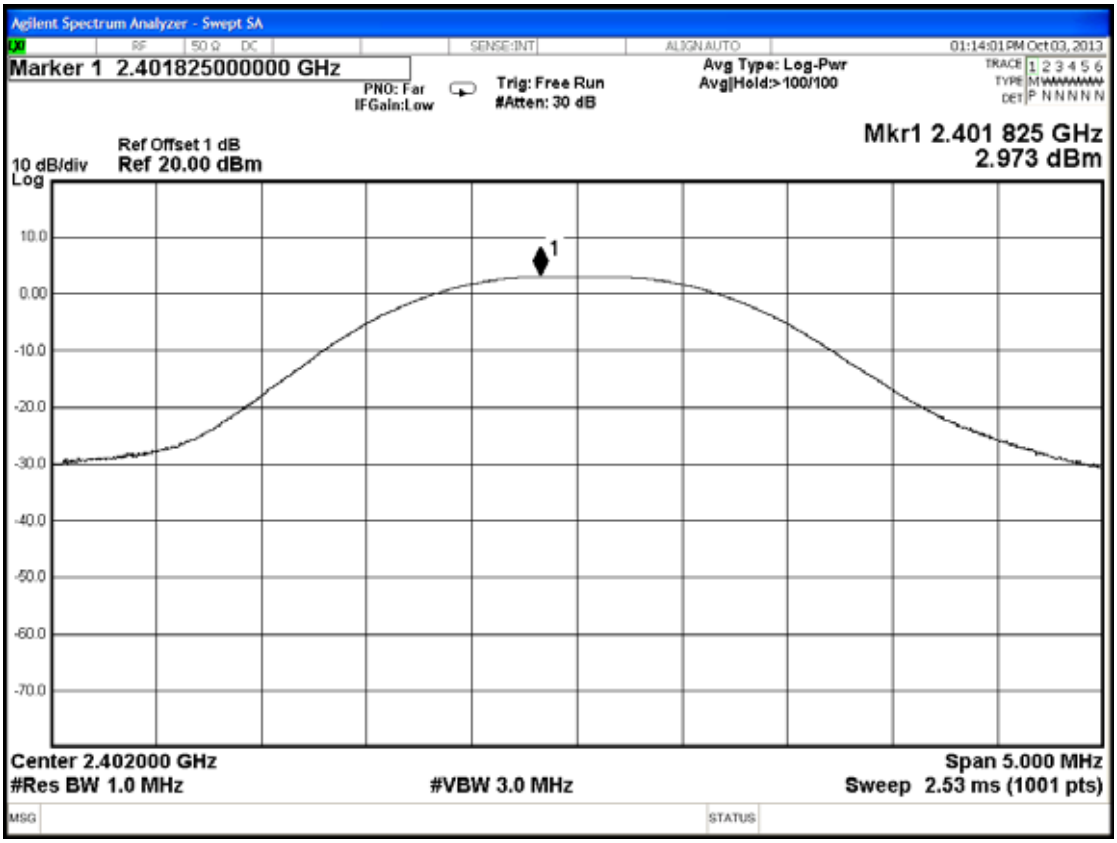
PASSED. All the test results are listed below.

EUT：BT Infrared Ear Thermometer M/N：ETH-102

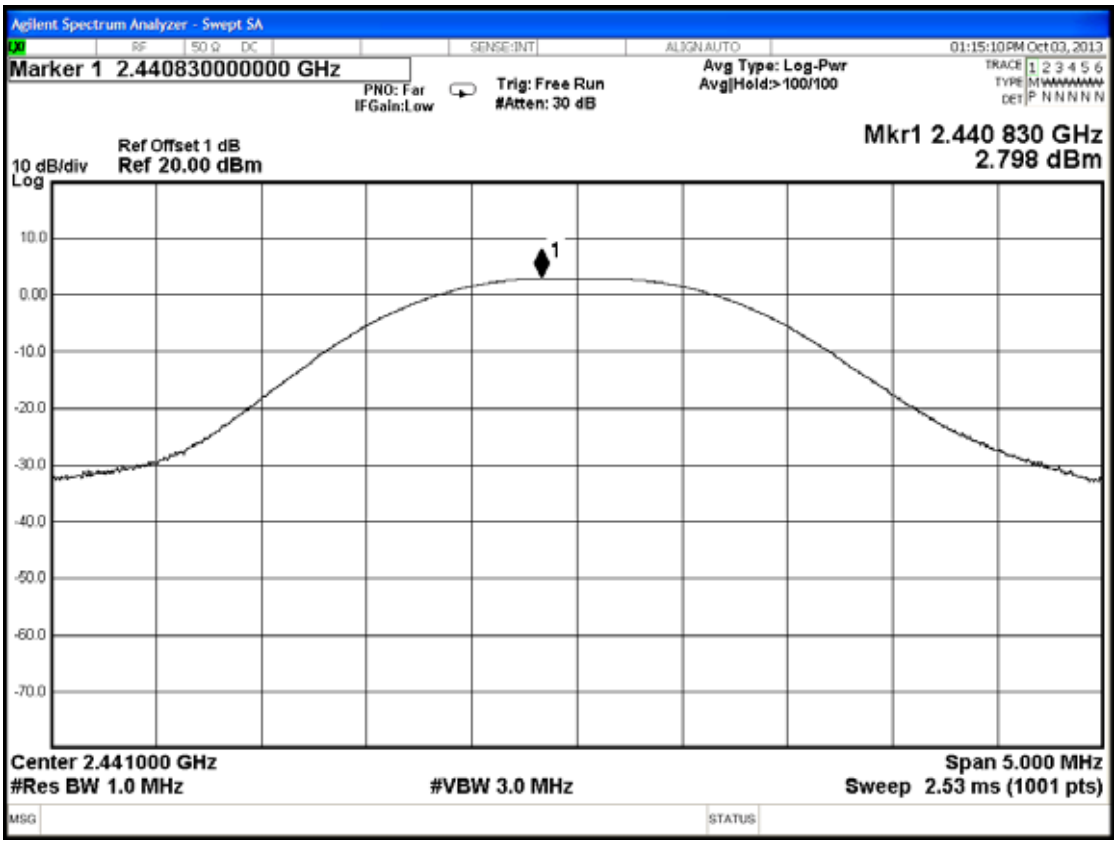
Test Date : Oct. 03, 2013 Temperature : 23℃ Humidity : 61%

No.	Channel	Test Frequency	**Peak Output Power**	Limit
1.	0	2402MHz	**2.973 dBm**	21dBm
2.	39	2441MHz	**2.798 dBm**	21dBm
3.	78	2480MHz	**2.193 dBm**	21dBm

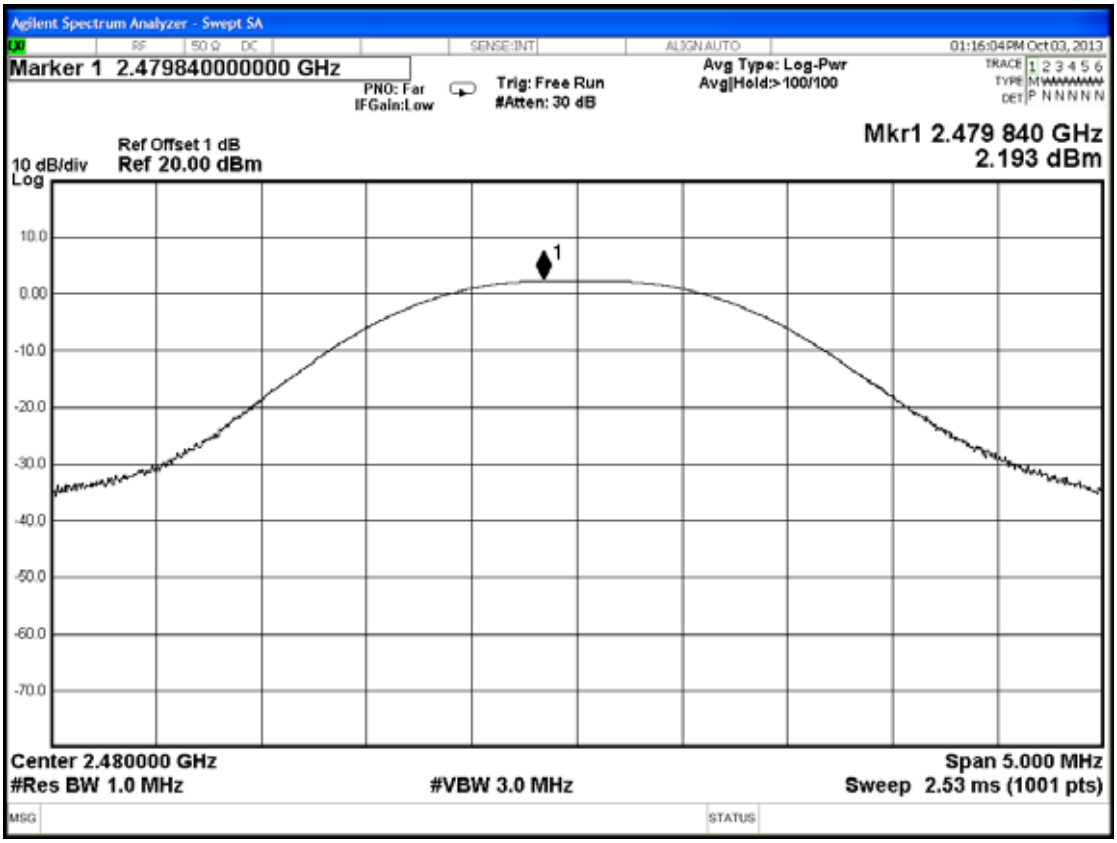
8.6.1. Figure 1: Channel 0, Frequency: 2402MHz



8.6.2. Figure 2: Channel 39, Frequency: 2441MHz



8.6.3. Figure 3: Channel 78, Frequency: 2480MHz



9. EMISSION LIMITATIONS MEASUREMENT

All emission levels have been compliance with the limit specified in 15.209, thus conducted limitation is not required and presented.

10. BAND EDGES MEASUREMENT

10.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Signal Analyzer	Agilent	N9030A-544	US51350140	Jul. 30, 13'	Jul. 29, 14'

10.2. Block Diagram of Test Setup

The same as section.4.2.

10.3. Specification Limits [§15.247(c)]

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 §3.6.3)

10.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

10.5. Test Procedure

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

10.6. Test Results

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

EUT：BT Infrared Ear Thermometer M/N：ETH-102

Test Date : Oct. 03, 2013 Temperature : 23℃ Humidity : 61%

1. Below Band edge : The highest emission level is -37.067dBm on 2.39990GHz。
2. Upper Band edge: The highest emission level is -46.921dBm on 2.48360GHz。

10.6.1. Hopping Mode

Test Date : Nov. 06, 2013 Temperature : 24℃ Humidity : 60%

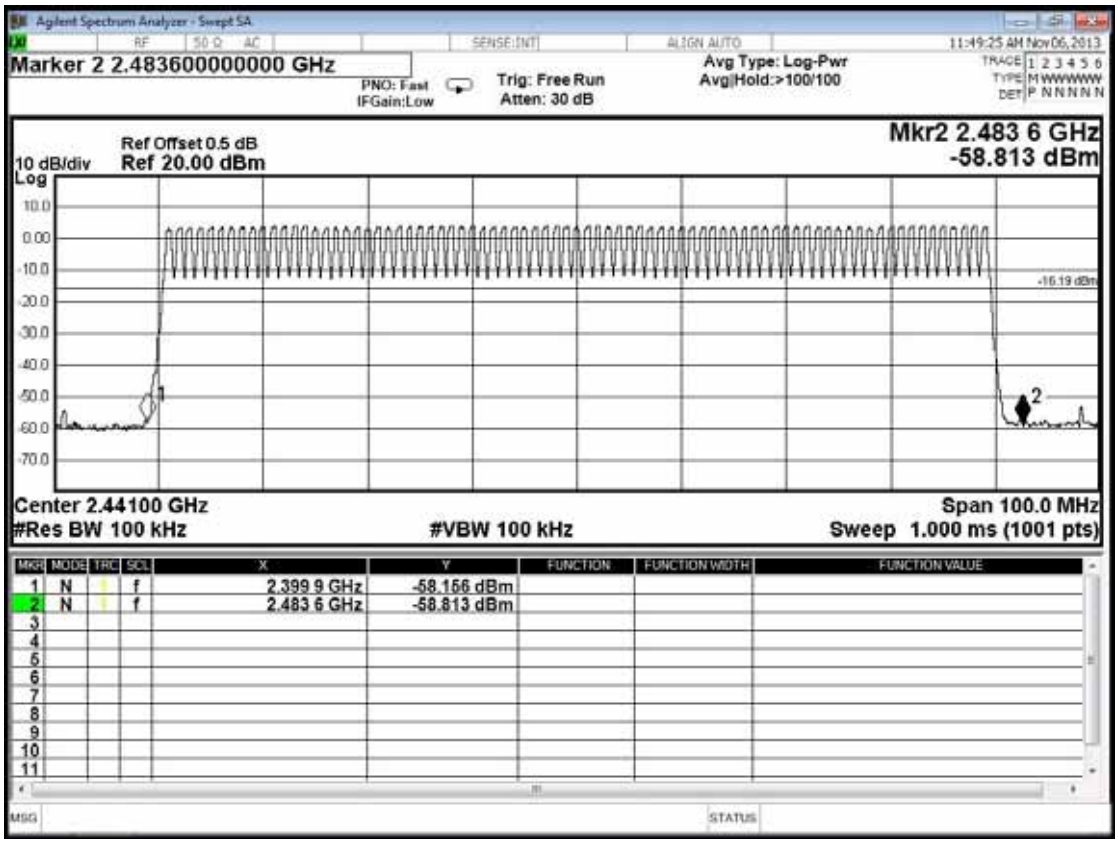
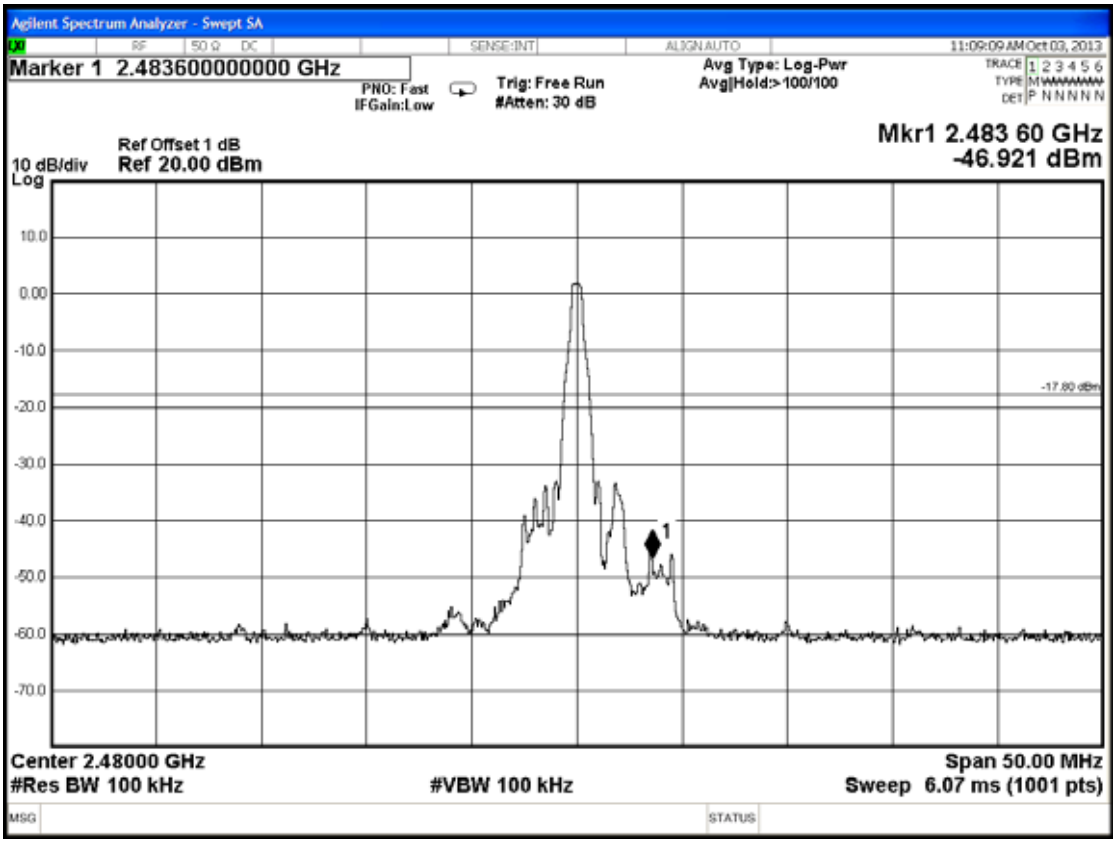


Figure 1: Below Band edge

Figure 2: Upper Band edge



11. DEVIATION TO TEST SPECIFICATIONS

【NONE】

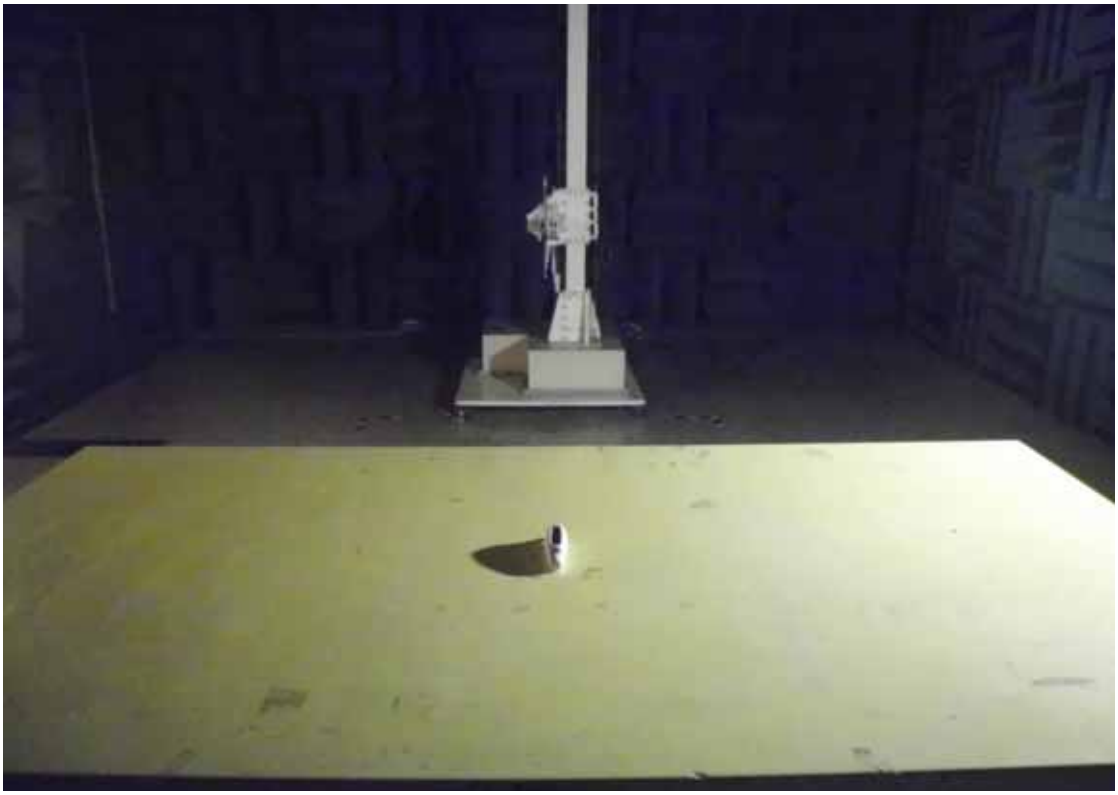
12. PHOTOGRAPHS

12.1. Photos of Radiated Emission Measurement at Semi-Anechoic Chamber

12.1.1. Frequency Range 30MHz-1GHz

Position: Side

Position: Lie



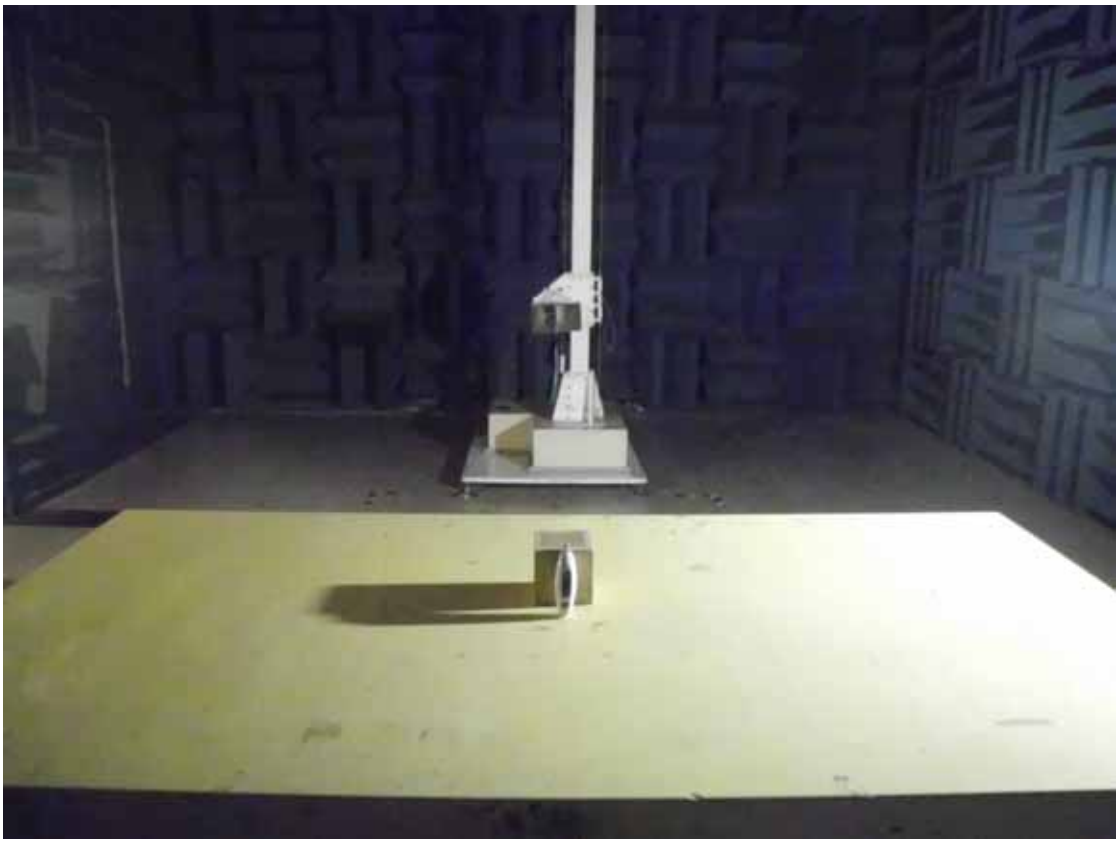
Position: Stand

12.1.2. Frequency Range Above 1GHz

Position: Side

Position: Lie

Position: Stand



12.2.Photo of Section RF Conducted Measurement