

Application for FCC Certification
On behalf of

Holley Group Co., Ltd.

Product Name: 1mW ZigBee Module

Model No.: HT-MDL-Z-EM-2400-001-A-V3.0.0

Serial No.: E2009093001

FCC ID: VQMHZME3A

Prepared For : Holley Group Co., Ltd.
No.181 Wuchang Avenue, Yuhang District,
Hangzhou 310023, P.R.China

Prepared By : Audix Technology (Shanghai) Co., Ltd.
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Report No. : ACI-F09089
Date of Test : Sep 30 - Oct 09, 2009
Date of Report : Oct 10, 2009

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TEST REPORT FOR FCC CERTIFICATE

Applicant : Holley Group Co., Ltd.
Manufacturer 1# : Holley Group Co., Ltd.
Trademark 1# : Holley
Manufacturer 2# : Zhejiang Hornetone Information Technology Co., Ltd.
Trademark 2# : Hornetone
EUT Description : 1mW ZigBee Module
(A) Model No. : HT-MDL-Z-EM-2400-001-A-V3.0.0
(B) Serial No. : E2009093001
(C) Power Supply : DC 3.3V

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART C OCTOBER 2008
AND ANSI C63.4-2003*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: HT-MDL-Z-EM-2400-001-A-V3.0.0, S/N: E2009093001), which was tested on Sep 30 -Oct 09, 2009 is technically compliance with the FCC limits.


This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Sep 30 - Oct 09, 2009 Date of Report : Oct 10, 2009

Producer : Zeno Gu
ZENO GU / Assistant

Review : Sammy Chen
SAMMY CHEN / Assistant Manager

 For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory : Byron Kwo
Authorized Signature EMC BYRON KWO / Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Results	Meets Limit
EMISSION			
Radiated Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2008 AND ANSI C63.4:2003 AND KDB558074	Pass	15.209(a) 15.205(a)(c)
6 dB Bandwidth Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2008 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(a)(2)
Maximum Peak Output Power Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2008 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(b)(3)
Emission Limitations Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2008 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(d)
Band Edge Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2008 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(d)
Power Spectral Density Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2008 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(e)

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description : 1mW ZigBee Module

Type of EUT ☒ Production ☐ Pre-product ☐ Pro-type

Model Number : HT-MDL-Z-EM-2400-001-A-V3.0.0

Serial Number : E2009093001

Applicant : Holley Group Co., Ltd.
No.181 Wuchang Avenue, Yuhang District,
Hangzhou 310023, P.R.China

Manufacturer 1# : Holley Group Co., Ltd.
No.181 Wuchang Avenue, Yuhang District,
Hangzhou 310023, P.R.China

Trademark 1# : Holley

Manufacturer 2# : Zhejiang Horntone Information Technology Co., Ltd.
No.181 Wuchang Avenue, Yuhang District,
Hangzhou 310023, P.R.China

Trademark 2# : Horntone

Power Supply : DC 3.3V (from Carry board)

Radio Tech : IEEE 802.15.4 (ZigBee®)

Freq. Band : 2405 MHz ~ 2480 MHz
In 5 MHz Separation

Tested Freq. : 2405 MHz (Channel 11)
2440 MHz (Channel 18)
2480 MHz (Channel 26)

Freq. Channel : 16 channels

Antenna1

Gain : 1.8 dBi

Manufacturer : Off the sheff

Model Number : HT-ANT-2400-2E

Antenna2

Gain : 2.1dBi

Manufacturer : Off the sheff

Model Number : HT-ANT-2400-2B

2.2 Peripherals

2.2.1 Carry board

Manufacturer : Holley
Model Number : 05-X02-27VSL1

2.2.2 Battery Box : Batteries (Size AA * 4)

2.3 Description of Test Facility

Site Description (Semi-Anechoic Chamber) : Sept. 17, 1998 file on
Apr 29, 2009 Renewed
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046, USA

Name of Firm : Audix Technology (Shanghai) Co., Ltd.

Site Location : 3 F 34 Bldg 680 Guiping Rd.,
Caohejing Hi-Tech Park,
Shanghai 200233, China

FCC registration Number : 91789

Accredited by NVLAP, Lab Code : 200371-0

2.4 Measurement Uncertainty

Radiated Emission Expanded Uncertainty : U = 3.02 dB
6 dB Bandwidth Expanded Uncertainty : U = 0.05 kHz
Maximum Peak Output Power Expanded Uncertainty : U = 0.30 dBm
Emission Limitations Expanded Uncertainty : U = 0.15 dB
Band Edge Expanded Uncertainty : U = 0.15 dB
Power Spectral Density Expanded Uncertainty : U = 0.15 dB

3 RADIATED EMISSION TEST

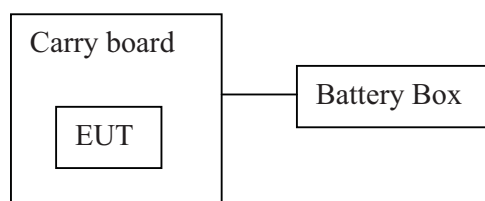
3.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

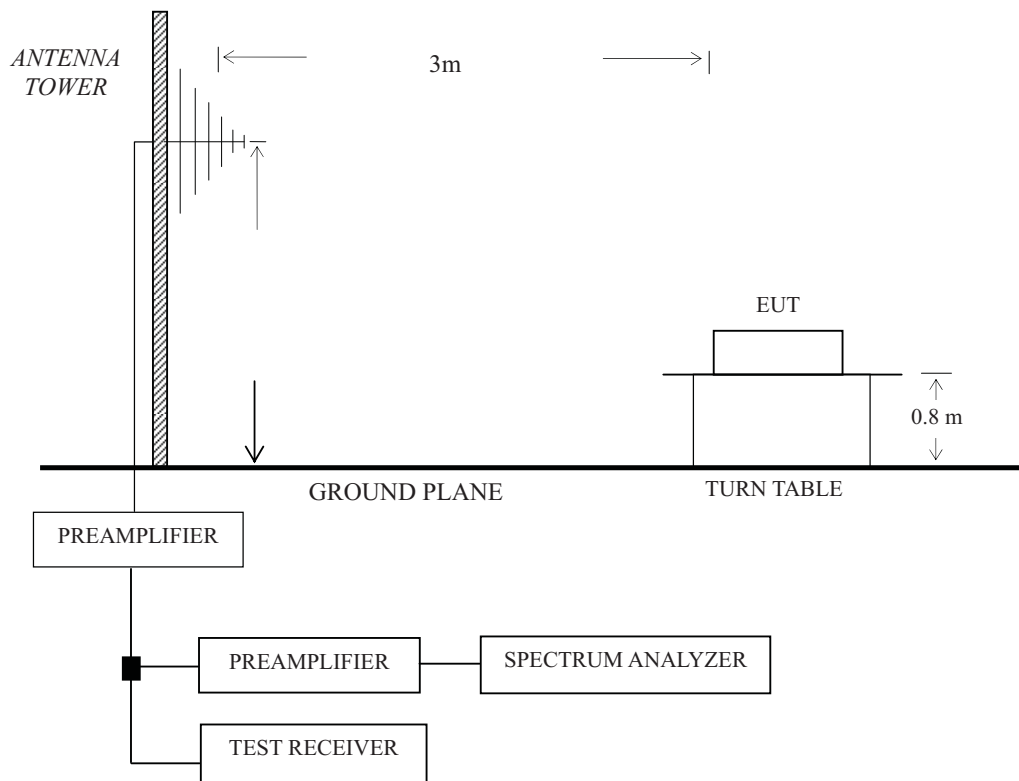
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	Agilent	8447D	2944A10548	Sep 19, 2009	Mar 19, 2010
2.	Preamplifier	HP	8449B	3008A00864	May 19, 2009	May 19, 2010
3.	Spectrum Analyzer	Agilent	E7405A	MY45106600	May 19, 2009	May 19, 2010
4.	Test Receiver	R&S	ESVS10	844594/001	Mar 07, 2009	Mar 07, 2010
5.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 14, 2008	May 14, 2010
6.	Horn Antenna	EMCO	3115	9607-4878	Oct 26, 2008	Oct 26, 2009
7.	Horn Antenna	EMCO	3116	00062643	Oct 26, 2008	Oct 26, 2009
8.	50 Ω Coaxial Switch	Anritsu	MP59B	6200426390	Sep 19, 2009	Mar 19, 2010
9.	Software	Audix	E3	SET00200 9912M295-2	-	-

3.2 Block Diagram of Test Setup

3.2.1 EUT & Peripherals



3.2.2 Test Setup



■ : 50 ohm Coaxial Switch

3.3 Radiated Emission Limit [FCC Part 15 Subpart C 15.209(a)&15.205(a)(c)]

Frequency (MHz)	Distance (m)	Field strength limits ($\mu\text{V/m}$)	
		($\mu\text{V/m}$)	dB($\mu\text{V/m}$)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	500	54.0 (Average)
Above 1000	3	5000	74.0 (Peak)

NOTE 1 - Emission Level dB ($\mu\text{V/m}$) = 20 log Emission Level ($\mu\text{V/m}$)
 NOTE 2 - The tighter limit applies at the band edges.
 NOTE 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.
 NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.
 NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

3.4 Test Configuration

The EUT (listed in Sec.2.1) and the Peripherals (listed in Sec.2.2) were installed as shown on Sec.3.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

3.5.1 Setup the EUT as shown in Sec. 3.2.

3.5.2 Turn on the power of all equipment.

3.5.3 Turn the EUT on the test mode and then test.

3.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable that is 0.8 meter above ground. The turntable rotated 360 degrees to determine the position of the maximum emission level. The 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 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.4:2003 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESVS10 was set at 120 kHz from 30M to 1000MHz.

The bandwidth of Spectrum Analyzer Agilent E7405A was set at 1MHz above 1 GHz.

The frequency range from 30 MHz to 25 GHz (Up to 10th harmonics from fundamental frequency) was checked.

The EUT was tested under the following test modes:

Mode	Operation	Channel	Frequency
1.	Transmitting	11	2405 MHz
2.		18	2440 MHz
3.		26	2480 MHz
4.	Receiving	18	2440 MHz
5.	Transmitting	11	2405 MHz
6.	Band-Edge	26	2480 MHz

All the test results are listed in Sec.3.7.

3.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

No.	Operation	Antenna	Channel	Frequency	Data Page	
1.	Transmitting	1	11	2405 MHz	P12	
2.		1	18	2440 MHz	P13	
3.		1	26	2480 MHz	P14	
4.		2	11	2405 MHz	P15	
5.		2	18	2440 MHz	P16	
6.		2	26	2480 MHz	P17	
7.	Receiving	1	18	2440 MHz	P18	
8.		2	18	2440 MHz	P19	
9.	Transmitting	1	11	2405 MHz	Band-Edge	P20-P23
10.		1	26	2480 MHz		P24-P27
11.		2	11	2405 MHz		P28-P31
12.		2	26	2480 MHz		P32-P35

NOTE 1 - All reading are Quasi-Peak values below or equal to 1GHz and Peak values above 1GHz. For measurements above 1 GHz, the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

For Band-Edge measurements, both peak and average value were measured.

NOTE 2 - 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 3 - The worst case is for Antenna2 Transmitting Ch26(2480MHz) test mode. The worst emission at horizontal polarization was detected at 191.99 MHz with corrected signal level of 27.61 dB (μV/m) (limit is 46.00 dB (μV/m)), when the antenna was 1.00 m height and the turntable was at 225°. The worst emission at vertical polarization was detected at 855.47 MHz with corrected signal level of 36.36 dB (μV/m) (limit is 46.00 dB (μV/m)), when the antenna was 1.00 m height and the turntable was at 300°.

EUT : 1mW ZigBee Module Temperature : 22°C

Model No. : HT-MDL-Z-EM-2400-001-A-V3.0.0 Humidity : 60%RH

Serial No. : E2009093001 Date of Test : Sep 30, 2009

Test Mode : Transmitting Ch11(2405MHz) Antenna : 1

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	31.94	-1.19	18.49	0.64	--	17.94	40.00	22.06
	188.11	13.67	10.20	1.47	--	25.34	43.50	18.16
	251.16	12.96	12.92	1.7	--	27.58	46.00	18.42
	352.04	13.22	15.37	2.06	--	30.65	46.00	15.35
	392.78	7.89	16.34	2.18	--	26.41	46.00	19.59
	602.30	6.21	19.21	2.74	--	28.16	46.00	17.84
	1072.00	50.57	23.75	3.88	34.11	44.09	74.00	29.91
	1600.00	49.64	26.00	5	34.16	46.48	74.00	27.52
	3688.00	43.7	32.34	7.89	34.20	49.73	74.00	24.27
Vertical	6220.00	39.92	34.88	10.88	34.52	51.16	74.00	22.84
	33.88	3.08	17.44	0.64	--	21.16	40.00	18.84
	166.77	10.78	10.31	1.34	--	22.43	43.50	21.07
	215.27	15.69	11.39	1.59	--	28.67	43.50	14.83
	396.66	3.23	16.44	2.19	--	21.86	46.00	24.14
	515.00	11.43	18.09	2.49	--	32.01	46.00	13.99
	741.98	7.76	20.13	3.07	--	30.96	46.00	15.04
	1072.00	50.56	23.75	3.88	34.11	44.08	74.00	29.92
	2488.00	51.1	29.00	5.99	34.20	51.89	74.00	22.11
	3892.00	43.86	32.93	8.37	34.20	50.96	74.00	23.04
	7564.00	38.80	36.23	12.45	35.37	52.11	74.00	21.89

TEST ENGINEER: DIO YANG

EUT : 1mW ZigBee Module Temperature : 22°C

Model No. : HT-MDL-Z-EM-2400-001-A-V3.0.0 Humidity : 60%RH

Serial No. : E2009093001 Date of Test : Sep 30, 2009

Test Mode : Transmitting Ch18(2440MHz) Antenna : 1

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	30.97	-1.79	19.03	0.63	--	17.87	40.00	22.13
	191.99	14.31	10.37	1.50	--	26.18	43.50	17.32
	250.19	12.72	12.90	1.70	--	27.32	46.00	18.68
	390.84	5.70	16.30	2.18	--	24.18	46.00	21.82
	525.67	4.55	18.24	2.51	--	25.30	46.00	20.70
	667.29	4.75	19.55	2.87	--	27.17	46.00	18.83
	1444.00	52.58	25.29	4.69	34.14	48.42	74.00	25.58
	2164.00	44.06	28.07	5.74	34.20	43.67	74.00	30.33
	3544.00	44.28	31.92	7.52	34.20	49.52	74.00	24.48
	7336.00	39.12	35.96	12.14	35.22	52.00	74.00	22.00
Vertical	35.82	6.44	16.45	0.65	--	23.54	40.00	16.46
	68.80	15.72	6.51	0.85	--	23.08	40.00	16.92
	166.77	11.14	10.31	1.34	--	22.79	43.50	20.71
	317.12	13.11	14.35	1.93	--	29.39	46.00	16.61
	381.14	12.82	16.10	2.15	--	31.07	46.00	14.93
	502.39	13.56	17.93	2.44	--	33.93	46.00	12.07
	1288.00	49.37	24.62	4.38	34.13	44.24	74.00	29.76
	1996.00	49.39	27.70	5.59	34.20	48.48	74.00	25.52
	3724.00	44.13	32.45	7.97	34.20	50.35	74.00	23.65
	6316.00	40.40	34.97	11.08	34.57	51.88	74.00	22.12

TEST ENGINEER: DIO YANG

EUT : 1mW ZigBee Module Temperature : 22°C

Model No. : HT-MDL-Z-EM-2400-001-A-V3.0.0 Humidity : 60%RH

Serial No. : E2009093001 Date of Test : Sep 30, 2009

Test Mode : Transmitting Ch26(2480MHz) Antenna : 1

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	34.85	-0.88	16.97	0.65	--	16.74	40.00	23.26
	139.61	14.16	12.12	1.20	--	27.48	43.50	16.02
	188.11	16.12	10.20	1.47	--	27.79	43.50	15.71
	399.57	5.45	16.50	2.20	--	24.15	46.00	21.85
	591.63	8.86	19.11	2.72	--	30.69	46.00	15.31
	736.16	3.71	20.07	3.04	--	26.82	46.00	19.18
	1072.00	50.59	23.75	3.88	34.11	44.11	74.00	29.89
	1996.00	46.32	27.70	5.59	34.20	45.41	74.00	28.59
	3364.00	43.82	31.31	7.31	34.20	48.24	74.00	25.76
	7708.00	38.69	36.41	12.58	35.44	52.24	74.00	21.76
Vertical	33.88	2.31	17.44	0.64	--	20.39	40.00	19.61
	166.77	12.01	10.31	1.34	--	23.66	43.50	19.84
	220.12	14.76	11.66	1.61	--	28.03	46.00	17.97
	515.00	9.40	18.09	2.49	--	29.98	46.00	16.02
	566.41	7.67	18.81	2.64	--	29.12	46.00	16.88
	918.52	6.47	21.84	3.46	--	31.77	46.00	14.23
	1600.00	54.45	26.00	5.00	34.16	51.29	74.00	22.71
	3196.00	44.27	30.81	7.17	34.20	48.05	74.00	25.95
	4576.00	41.23	33.37	9.82	34.25	50.17	74.00	23.83
	7384.00	39.89	36.02	12.24	35.25	52.90	74.00	21.10

TEST ENGINEER: DIO YANG

EUT : 1mW ZigBee Module Temperature : 22°C

Model No. : HT-MDL-Z-EM-2400-001-A-V3.0.0 Humidity : 60%RH

Serial No. : E2009093001 Date of Test : Oct 09, 2009

Test Mode : Transmitting Ch11(2405MHz) Antenna : 2

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	32.91	-1.66	17.95	0.64	--	16.93	40.00	23.07
	81.41	11.90	8.02	0.95	--	20.87	40.00	19.13
	191.99	14.75	10.37	1.50	--	26.62	43.50	16.88
	226.91	9.31	11.98	1.63	--	22.92	46.00	23.08
	335.55	6.83	14.90	2.00	--	23.73	46.00	22.27
	792.42	5.21	20.64	3.19	--	29.04	46.00	16.96
	1420.00	53.19	25.21	4.64	34.14	48.90	74.00	25.10
	2488.00	48.39	29.00	5.99	34.20	49.18	74.00	24.82
	4384.00	42.11	33.31	9.54	34.23	50.73	74.00	23.27
Vertical	7624.00	39.09	36.31	12.51	35.40	52.51	74.00	21.49
	37.76	3.99	15.20	0.66	--	19.85	40.00	20.15
	232.73	11.98	12.24	1.65	--	25.87	46.00	20.13
	279.29	6.25	13.52	1.80	--	21.57	46.00	24.43
	436.43	9.08	17.03	2.30	--	28.41	46.00	17.59
	592.60	9.80	19.11	2.72	--	31.63	46.00	14.37
	779.81	6.96	20.52	3.14	--	30.62	46.00	15.38
	1264.00	49.55	24.55	4.33	34.13	44.30	74.00	29.70
	1864.00	51.67	27.17	5.46	34.19	50.11	74.00	23.89
	3496.00	44.49	31.75	7.40	34.20	49.44	74.00	24.56
	6784.00	39.97	35.41	11.52	34.85	52.05	74.00	21.95

TEST ENGINEER: DIO YANG

EUT : 1mW ZigBee Module Temperature : 22°C

Model No. : HT-MDL-Z-EM-2400-001-A-V3.0.0 Humidity : 60%RH

Serial No. : E2009093001 Date of Test : Oct 09, 2009

Test Mode : Transmitting Ch18(2440MHz) Antenna : 2

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	33.88	-1.52	17.44	0.64	--	16.56	40.00	23.44
	137.67	7.21	12.19	1.19	--	20.59	43.50	22.91
	227.88	9.22	12.02	1.63	--	22.87	46.00	23.13
	335.55	5.27	14.90	2.00	--	22.17	46.00	23.83
	432.55	4.30	16.95	2.28	--	23.53	46.00	22.47
	721.61	3.99	19.91	2.99	--	26.89	46.00	19.11
	1600.00	51.93	26.00	5.00	34.16	48.77	74.00	25.23
	2920.00	44.37	30.11	6.87	34.20	47.15	74.00	26.85
	5800.00	41.08	34.48	10.34	34.38	51.52	74.00	22.48
Vertical	6700.00	40.61	35.33	11.48	34.80	52.62	74.00	21.38
	32.91.00	3.24	17.95	0.64	--	21.83	40.00	18.17
	124.09	15.83	12.81	1.16	--	29.80	43.50	13.7
	355.92	8.86	15.49	2.07	--	26.42	46.00	19.58
	437.40	9.76	17.03	2.30	--	29.09	46.00	16.91
	788.54	4.96	20.58	3.17	--	28.71	46.00	17.29
	960.23	6.51	22.13	3.55	--	32.19	54.00	21.81
	1072.00	51.33	23.75	3.88	34.11	44.85	74.00	29.15
	1864.00	49.82	27.17	5.46	34.19	48.26	74.00	25.74
	2512.00	49.95	29.05	6.03	34.20	50.83	74.00	23.17
	5428.00	42.61	34.01	10.07	34.35	52.34	74.00	21.66

TEST ENGINEER: DIO YANG

EUT : 1mW ZigBee Module Temperature : 22°C

Model No. : HT-MDL-Z-EM-2400-001-A-V3.0.0 Humidity : 60%RH

Serial No. : E2009093001 Date of Test : Oct 09, 2009

Test Mode : Transmitting Ch26(2480MHz) Antenna : 2

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	36.79	-0.98	15.80	0.66	--	15.48	40.00	24.52
	191.99	15.74	10.37	1.50	--	27.61	43.50	15.89
	250.19	12.87	12.90	1.70	--	27.47	46.00	18.53
	334.58	4.90	14.86	2.00	--	21.76	46.00	24.24
	557.68	4.21	18.68	2.62	--	25.51	46.00	20.49
	646.92	4.29	19.44	2.84	--	26.57	46.00	19.43
	1600.00	48.92	26.00	5.00	34.16	45.76	74.00	28.24
	2836.00	44.05	29.90	6.72	34.20	46.47	74.00	27.53
	4612.00	41.65	33.38	9.82	34.26	50.59	74.00	23.41
	6400.00	41.33	35.05	11.21	34.62	52.97	74.00	21.03
Vertical	37.76	2.96	15.20	0.66	--	18.82	40.00	21.18
	279.29	6.26	13.52	1.80	--	21.58	46.00	24.42
	382.11	10.57	16.13	2.15	--	28.85	46.00	17.15
	540.22	8.02	18.42	2.58	--	29.02	46.00	16.98
	855.47	11.74	21.28	3.34	--	36.36	46.00	9.64
	960.23	6.26	22.13	3.55	--	31.94	54.00	22.06
	1348.00	52.91	24.84	4.51	34.13	48.13	74.00	25.87
	1864.00	50.80	27.17	5.46	34.19	49.24	74.00	24.76
	3868.00	42.79	32.88	8.32	34.20	49.79	74.00	24.21
	6088.00	41.42	34.77	10.65	34.45	52.39	74.00	21.61

TEST ENGINEER: DIO YANG

EUT : 1mW ZigBee Module Temperature : 22°C

Model No. : HT-MDL-Z-EM-2400-001-A-V3.0.0 Humidity : 60%RH

Serial No. : E2009093001 Date of Test : Sep 30, 2009

Test Mode : Receiving Antenna : 1
Ch18(2440MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	31.94	-1.77	18.49	0.64	--	17.36	40.00	22.64
	188.11	14.34	10.20	1.47	--	26.01	43.50	17.49
	241.46	15.43	12.60	1.67	--	29.70	46.00	16.30
	384.05	7.07	16.17	2.16	--	25.40	46.00	20.60
	584.84	-0.30	19.03	2.70	--	21.43	46.00	24.57
	766.23	0.50	20.40	3.12	--	24.02	46.00	21.98
	1396.00	50.48	25.06	4.59	34.14	45.99	74.00	28.01
	1996.00	49.10	27.70	5.59	34.20	48.19	74.00	25.81
	3856.00	44.75	32.84	8.29	34.20	51.68	74.00	22.32
Vertical	6988.00	40.15	35.59	11.60	35.00	52.34	74.00	21.66
	32.91	2.41	17.95	0.64	--	21.00	40.00	19.00
	166.77	8.39	10.31	1.34	--	20.04	43.50	23.46
	279.29	12.5	13.52	1.80	--	27.82	46.00	18.18
	457.77	6.16	17.35	2.33	--	25.84	46.00	20.16
	741.01	-0.11	20.13	3.04	--	23.06	46.00	22.94
	856.44	3.77	21.28	3.34	--	28.39	46.00	17.61
	1169.00	45.27	24.14	4.13	34.12	39.42	74.00	34.58
	2512.00	51.70	29.05	6.03	34.20	52.58	74.00	21.42
	3580.00	42.99	32.03	7.59	34.20	48.41	74.00	25.59
	7876.00	38.41	36.57	12.71	35.54	52.15	74.00	21.85

TEST ENGINEER: DIO YANG

EUT : 1mW ZigBee Module Temperature : 22°C

Model No. : HT-MDL-Z-EM-2400-001-A-V3.0.0 Humidity : 60%RH

Serial No. : E2009093001 Date of Test : Oct 09, 2009

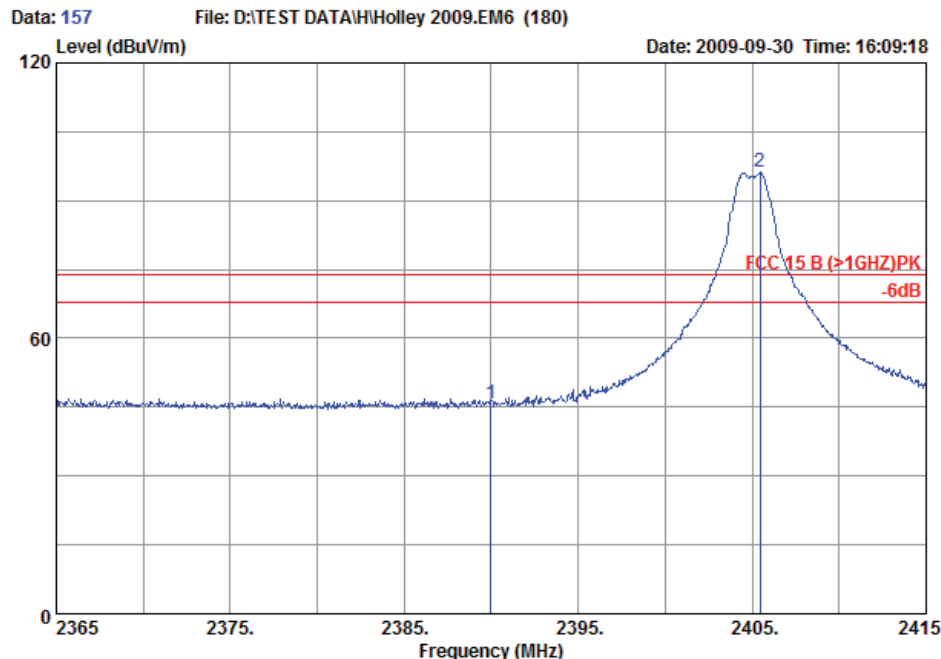
Test Mode : Receiving Antenna : 2
Ch18(2440MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	33.88	-1.14	17.44	0.64	--	16.94	40.00	23.06
	192.96	13.95	10.40	1.50	--	25.85	43.50	17.65
	238.55	14.68	12.48	1.67	--	28.83	46.00	17.17
	388.90	6.84	16.27	2.18	--	25.29	46.00	20.71
	431.58	4.14	16.95	2.28	--	23.37	46.00	22.63
	960.23	1.10	22.13	3.55	--	26.78	54.00	27.22
	1324.00	52.42	24.76	4.46	34.13	47.51	74.00	26.49
	2488.00	47.86	29.00	5.99	34.20	48.65	74.00	25.35
	4612.00	41.30	33.38	9.82	34.26	50.24	74.00	23.76
Vertical	6532.00	40.90	35.17	11.41	34.69	52.79	74.00	21.21
	35.82	1.25	16.45	0.65	--	18.35	40.00	21.65
	113.42	2.19	12.58	1.12	--	15.89	43.50	27.61
	188.11	4.44	10.20	1.47	--	16.11	43.50	27.39
	241.46	3.67	12.60	1.67	--	17.94	46.00	28.06
	533.43	13.28	18.33	2.56	--	34.17	46.00	11.83
	941.80	3.80	22.02	3.51	--	29.33	46.00	16.67
	1600.00	54.60	26.00	5.00	34.16	51.44	74.00	22.56
	1864.00	49.09	27.17	5.46	34.19	47.53	74.00	26.47
	4012.00	43.11	33.20	8.63	34.20	50.74	74.00	23.26
	6256.00	40.86	34.91	10.95	34.53	52.19	74.00	21.81

TEST ENGINEER: DIO YANG



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Site no : Audix ACI (3m Chamber) Data no. : 157
 Dis. / Ant. : 3m /EMC03115
 Limit : FCC 15 B (>1GHz)PK Ant. pol. : HORIZONTAL
 Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
 EUT : 1mW ZigBee Module
 M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
 S/N : E2009093001
 Power Rating: DC 3.3V
 Test Mode : Transmitting CH 11 (2405MHz)
 Memo : Antenna 1

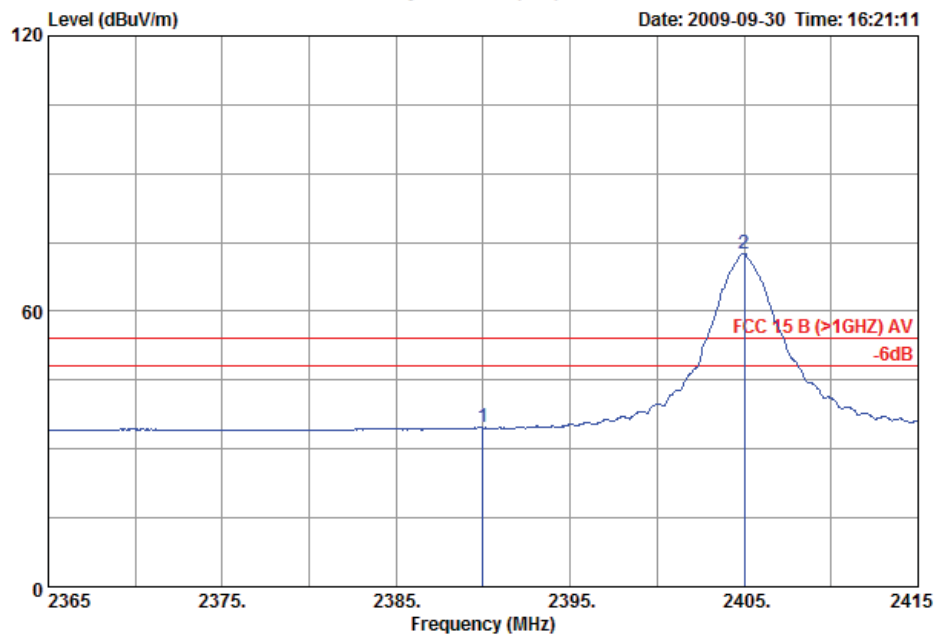
	Freq. (MHz)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.70	34.20	5.93	45.32	45.75	74.00	28.25	Peak
2	2405.450	28.75	34.20	5.94	95.63	96.12	74.00	-22.12	Peak

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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Data: 162 File: D:\TEST DATA\Holley 2009.EM6 (180)



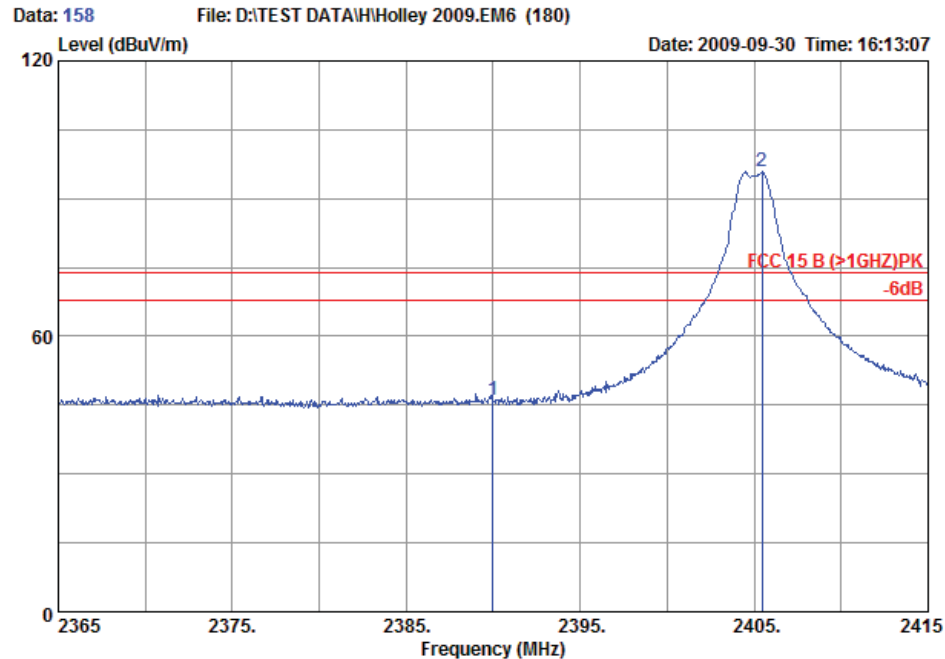
Site no : Audix ACI (3m Chamber) Data no. : 162
 Dis. / Ant. : 3m /EMC03115
 Limit : FCC 15 B (>1GHz) AV Ant. pol. : HORIZONTAL
 Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
 EUT : 1mW ZigBee Module
 M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
 S/N : E2009093001
 Power Rating: DC 3.3V
 Test Mode : Transmitting CH 11 (2405MHz)
 Memo : Antenna 1

	Freq.	Antenna	Preamp	Cable	Reading	Emission	Limits	Margin	Remark
	(MHz)	Factor	Factor	Loss	(dBuV)	Level	(dBuV/m)	(dB)	
		(dB/m)	(dB)	(dB)		(dBuV/m)			
1	2390.000	28.70	34.20	5.93	34.26	34.69	54.00	19.31	Average
2	2405.000	28.75	34.20	5.94	72.17	72.66	54.00	-18.66	Average

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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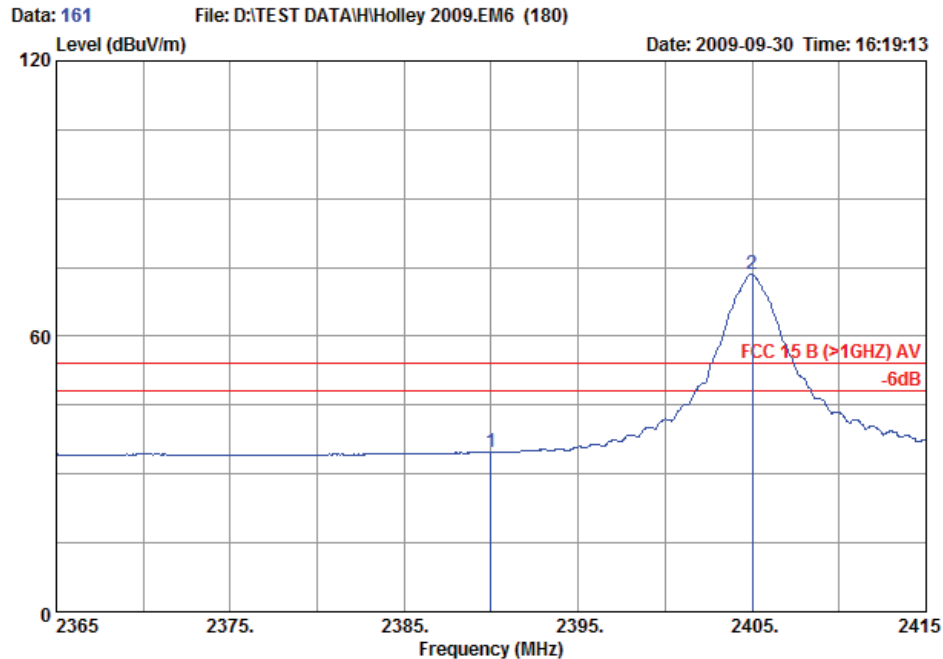
Site no : Audix ACI (3m Chamber) Data no. : 158
Dis. / Ant. : 3m /EMC03115
Limit : FCC 15 B (>1GHZ)PK Ant. pol. : VERTICAL
Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
EUT : 1mW ZigBee Module
M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
S/N : E2009093001
Power Rating: DC 3.3V
Test Mode : Transmitting CH 11 (2405MHz)
Memo : Antenna 1

	Freq. (MHz)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.70	34.20	5.93	45.58	46.01	74.00	27.99	Peak
2	2405.450	28.75	34.20	5.94	95.37	95.86	74.00	-21.86	Peak

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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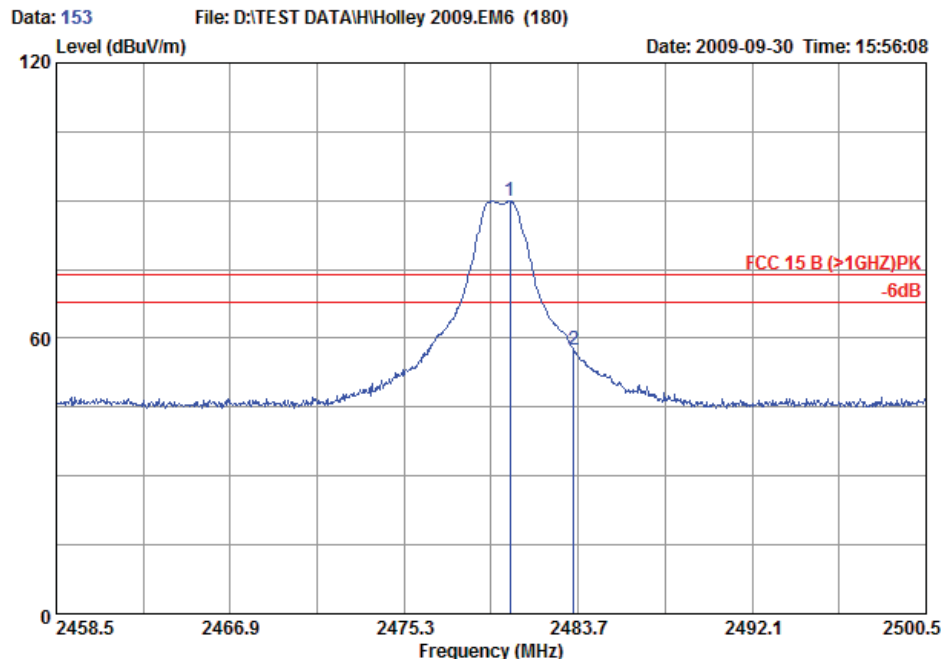
Site no : Audix ACI (3m Chamber) Data no. : 161
Dis. / Ant. : 3m /EMC03115
Limit : FCC 15 B (>1GHZ) AV Ant. pol. : VERTICAL
Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
EUT : 1mW ZigBee Module
M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
S/N : E2009093001
Power Rating: DC 3.3V
Test Mode : Transmitting CH 11 (2405MHz)
Memo : Antenna 1

	Freq. (MHz)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.70	34.20	5.93	34.44	34.87	54.00	19.13	Average
2	2405.000	28.75	34.20	5.94	73.20	73.69	54.00	-19.69	Average

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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Site no : Audix ACI (3m Chamber) Data no. : 153
Dis. / Ant. : 3m /EMC03115
Limit : FCC 15 B (>1GHZ)PK Ant. pol. : HORIZONTAL
Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
EUT : 1mW ZigBee Module
M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
S/N : E2009093001
Power Rating: DC 3.3V
Test Mode : Transmitting CH 26 (2480MHz)
Memo : Antenna 1

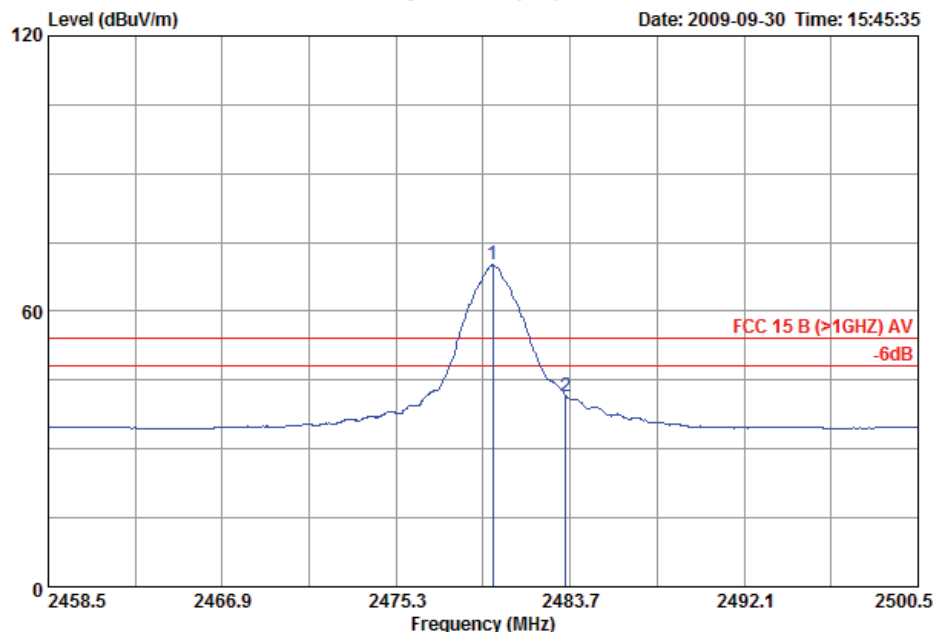
Freq. (MHz)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1 2480.424	28.95	34.20	5.99	89.21	89.95	74.00	-15.95	Peak
2 2483.500	28.95	34.20	5.99	56.80	57.54	74.00	16.46	Peak

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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Data: 150 File: D:\TEST DATA\H\Holley 2009.EM6 (180)



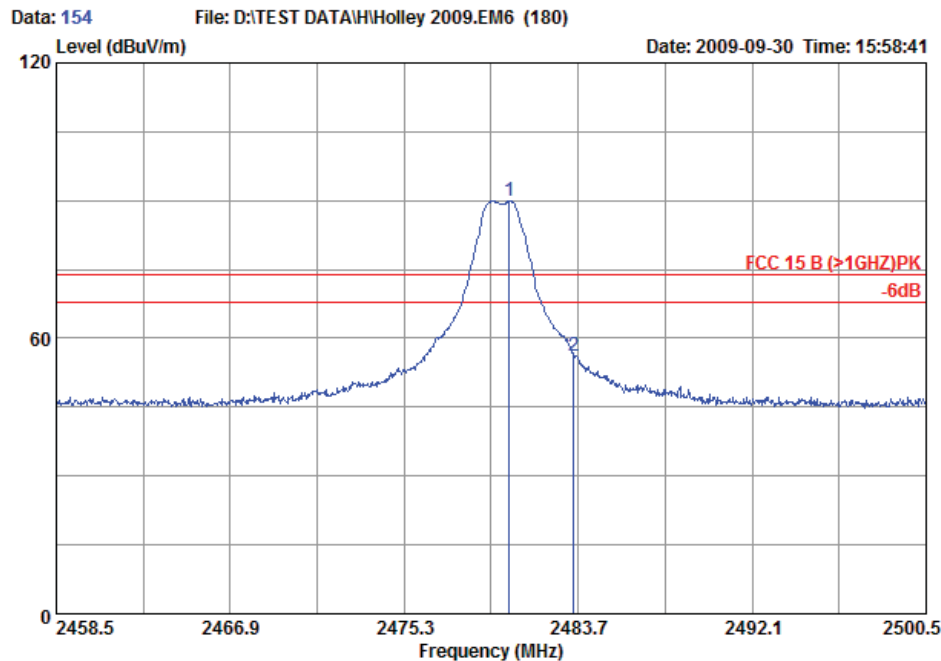
Site no : Audix ACI (3m Chamber) Data no. : 150
 Dis. / Ant. : 3m /EMCO3115
 Limit : FCC 15 B (>1GHz) AV Ant. pol. : HORIZONTAL
 Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
 EUT : 1mW ZigBee Module
 M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
 S/N : E2009093001
 Power Rating: DC 3.3V
 Test Mode : Transmitting CH 26 (2480MHz)
 Memo : Antenna 1

	Freq.	Antenna	Preamp	Cable	Reading	Emission	Limits	Margin	Remark
	(MHz)	Factor	Factor	Loss	(dBuV)	Level	(dBuV/m)	(dB)	
		(dB/m)	(dB)	(dB)		(dBuV/m)	(dBuV/m)		
1	2479.962	28.95	34.20	5.99	69.41	70.15	54.00	-16.15	Average
2	2483.500	28.95	34.20	5.99	40.69	41.43	54.00	12.57	Average

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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Site no : Audix ACI (3m Chamber) Data no. : 154
Dis. / Ant. : 3m /EMC03115
Limit : FCC 15 B (>1GHZ)PK Ant. pol. : VERTICAL
Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
EUT : 1mW ZigBee Module
M/N : HT-MDL-Z-EM-2400-001-A-V3.0.0
S/N : E2009093001
Power Rating: DC 3.3V
Test Mode : Transmitting CH 26 (2480MHz)
Memo : Antenna 1

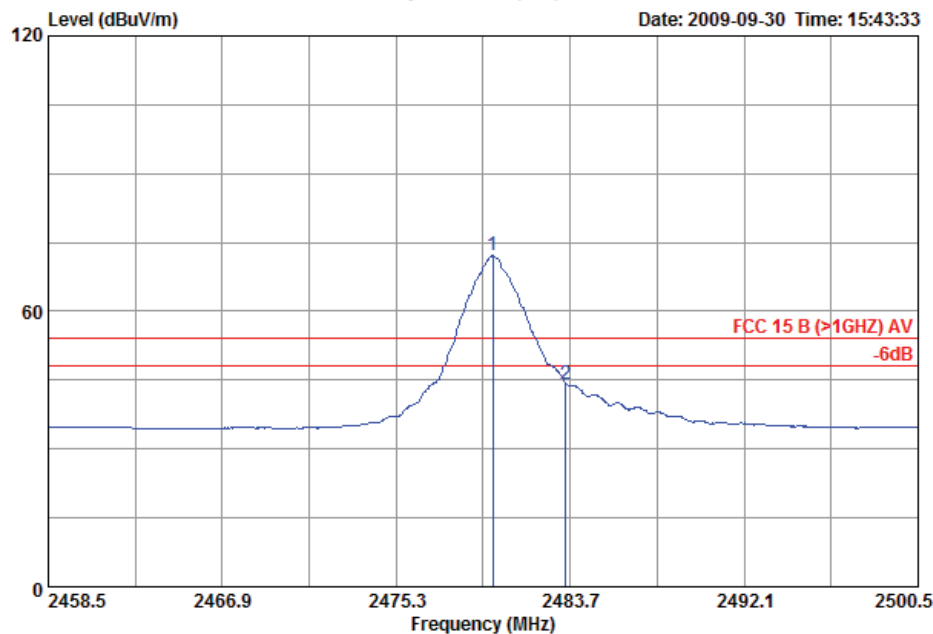
	Freq.	Antenna	Preamp	Cable	Reading	Emission	Limits	Margin	Remark
	(MHz)	Factor	Factor	Loss	(dBuV)	Level	(dBuV/m)	(dB)	
		(dB/m)	(dB)	(dB)		(dBuV/m)	(dBuV/m)		
1	2480.382	28.95	34.20	5.99	89.16	89.90	74.00	-15.90	Peak
2	2483.500	28.95	34.20	5.99	55.53	56.27	74.00	17.73	Peak

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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Data: 149 File: D:\TEST DATA\Holley 2009.EM6 (180)



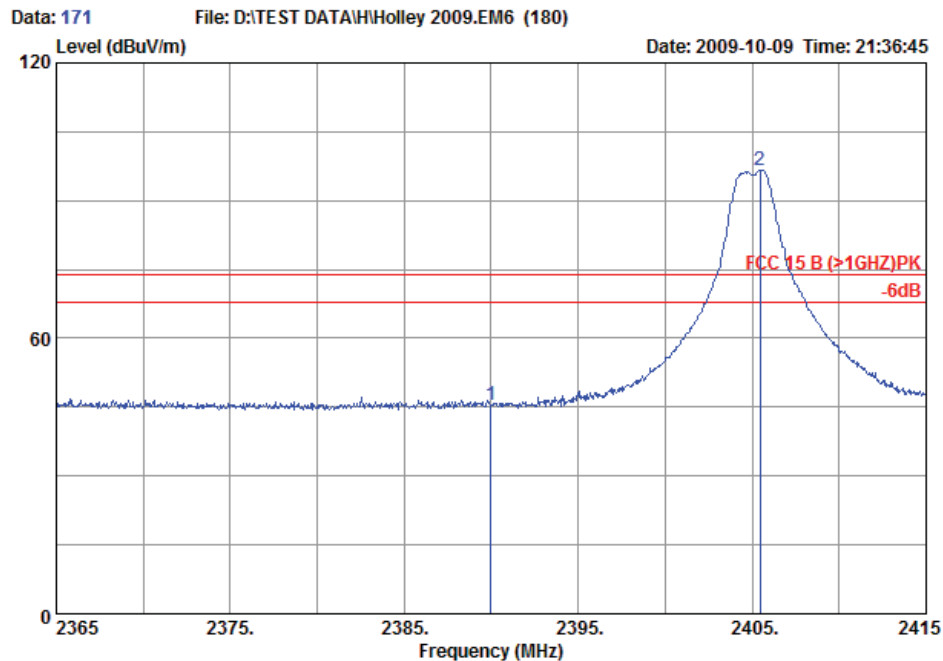
Site no : Audix ACI (3m Chamber) Data no. : 149
 Dis. / Ant. : 3m /EMC03115
 Limit : FCC 15 B (>1GHz) AV Ant. pol. : VERTICAL
 Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
 EUT : 1mW ZigBee Module
 M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
 S/N : E2009093001
 Power Rating: DC 3.3V
 Test Mode : Transmitting CH 26 (2480MHz)
 Memo : Antenna 1

	Freq.	Antenna	Preamp	Cable	Reading	Emission	Limits	Margin	Remark
	(MHz)	Factor	Factor	Loss	(dBuV)	Level	(dBuV/m)	(dB)	
		(dB/m)	(dB)	(dB)		(dBuV/m)	(dBuV/m)		
1	2479.962	28.95	34.20	5.99	71.36	72.10	54.00	-18.10	Average
2	2483.500	28.95	34.20	5.99	43.51	44.25	54.00	9.75	Average

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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Site no : Audix ACI (3m Chamber) Data no. : 171
 Dis. / Ant. : 3m /EMC03115
 Limit : FCC 15 B (>1GHz)PK Ant. pol. : HORIZONTAL
 Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
 EUT : 1mW ZigBee Module
 M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
 S/N : E2009093001
 Power Rating: DC 3.3V
 Test Mode : Transmitting CH 11 (2405MHz)
 Memo : Antenna 2

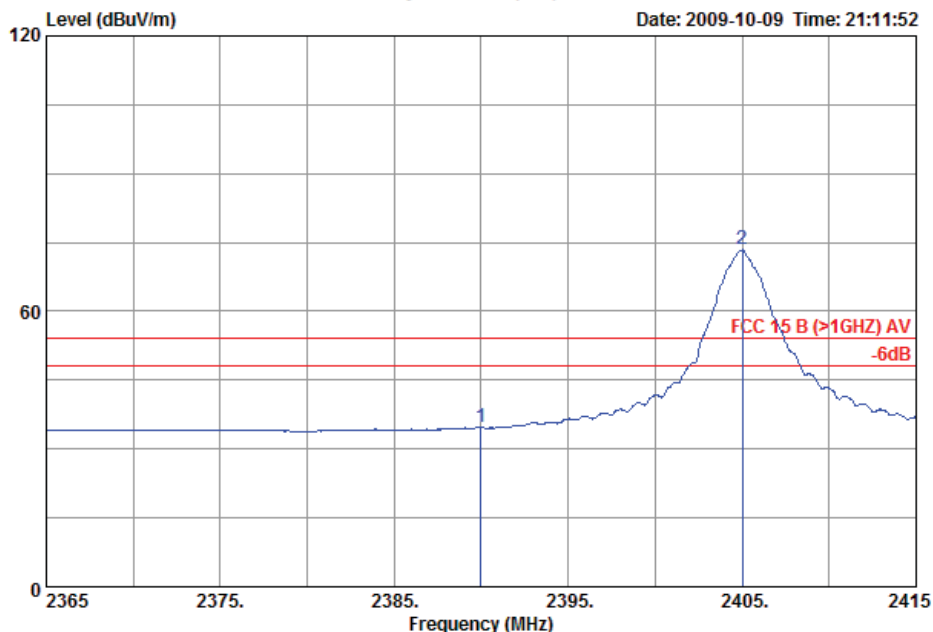
	Freq. (MHz)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.70	34.20	5.93	44.87	45.30	74.00	28.70	Peak
2	2405.450	28.75	34.20	5.94	96.27	96.76	74.00	-22.76	Peak

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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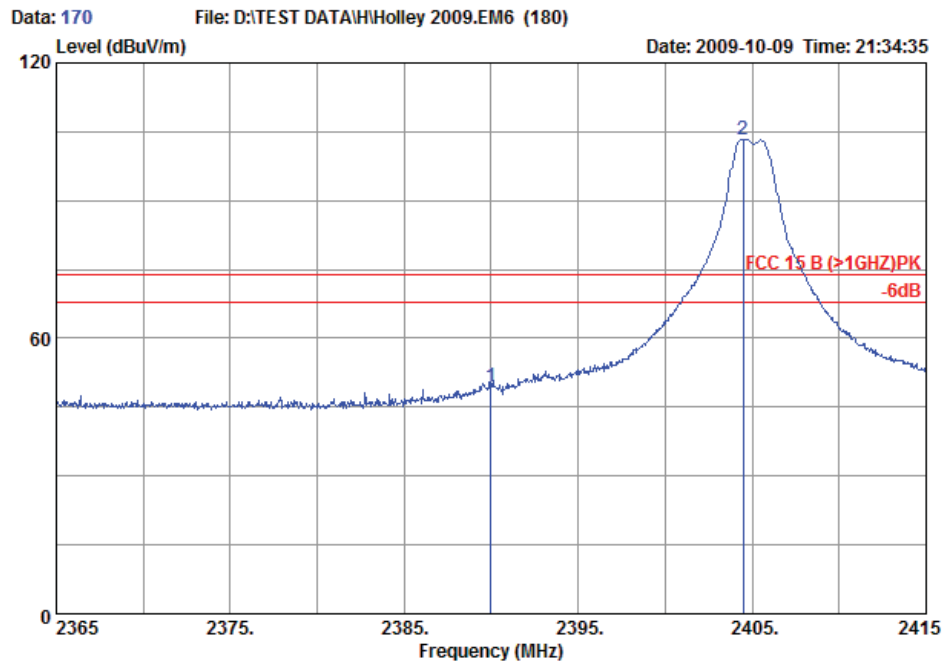
Site no : Audix ACI (3m Chamber) Data no. : 167
Dis. / Ant. : 3m /EMC03115
Limit : FCC 15 B (>1GHz) AV Ant. pol. : HORIZONTAL
Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
EUT : 1mW ZigBee Module
M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
S/N : E2009093001
Power Rating: DC 3.3V
Test Mode : Transmitting CH 11 (2405MHz)
Memo : Antenna 2

	Freq. (MHz)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.70	34.20	5.93	34.31	34.74	54.00	19.26	Average
2	2405.000	28.75	34.20	5.94	72.89	73.38	54.00	-19.38	Average

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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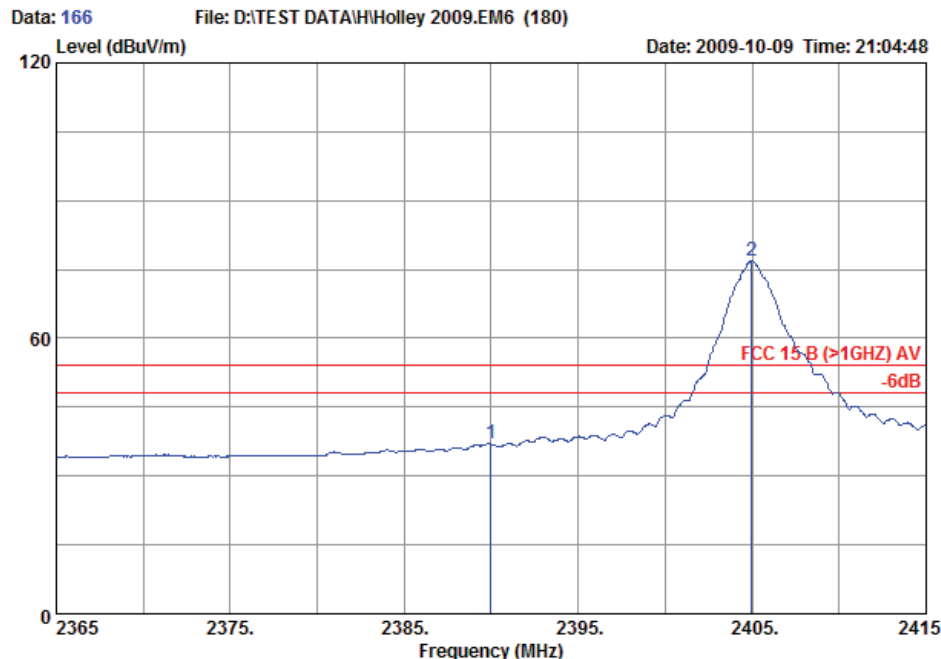
Site no : Audix ACI (3m Chamber) Data no. : 170
Dis. / Ant. : 3m /EMC03115
Limit : FCC 15 B (>1GHZ)PK Ant. pol. : VERTICAL
Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
EUT : 1mW ZigBee Module
M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
S/N : E2009093001
Power Rating: DC 3.3V
Test Mode : Transmitting CH 11 (2405MHz)
Memo : Antenna 2

	Freq. (MHz)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.70	34.20	5.93	49.03	49.46	74.00	24.54	Peak
2	2404.500	28.75	34.20	5.94	102.94	103.43	74.00	-29.43	Peak

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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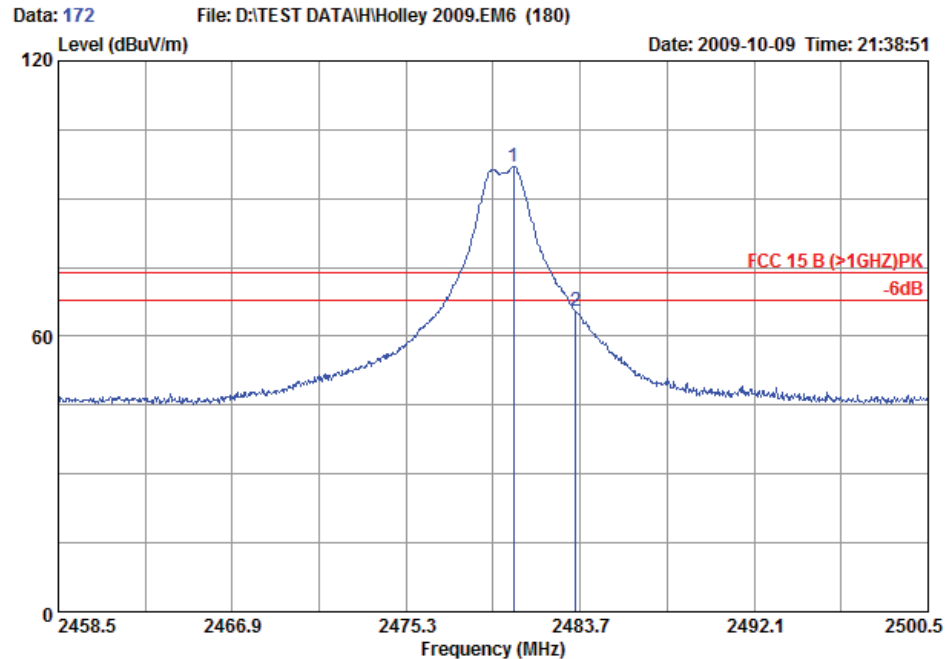
Site no : Audix ACI (3m Chamber) Data no. : 166
Dis. / Ant. : 3m /EMCO3115
Limit : FCC 15 B (>1GHz) AV Ant. pol. : VERTICAL
Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
EUT : 1mW ZigBee Module
M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
S/N : E2009093001
Power Rating: DC 3.3V
Test Mode : Transmitting CH 11 (2405MHz)
Memo : Antenna 2

	Freq.	Antenna	Preamp	Cable	Reading	Emission	Limits	Margin	Remark
	(MHz)	Factor	Factor	Loss	(dBuV)	Level	(dBuV/m)	(dB)	
		(dB/m)	(dB)	(dB)		(dBuV/m)	(dBuV/m)		
1	2390.000	28.70	34.20	5.93	36.56	36.99	54.00	17.01	Average
2	2404.950	28.75	34.20	5.94	76.44	76.93	54.00	-22.93	Average

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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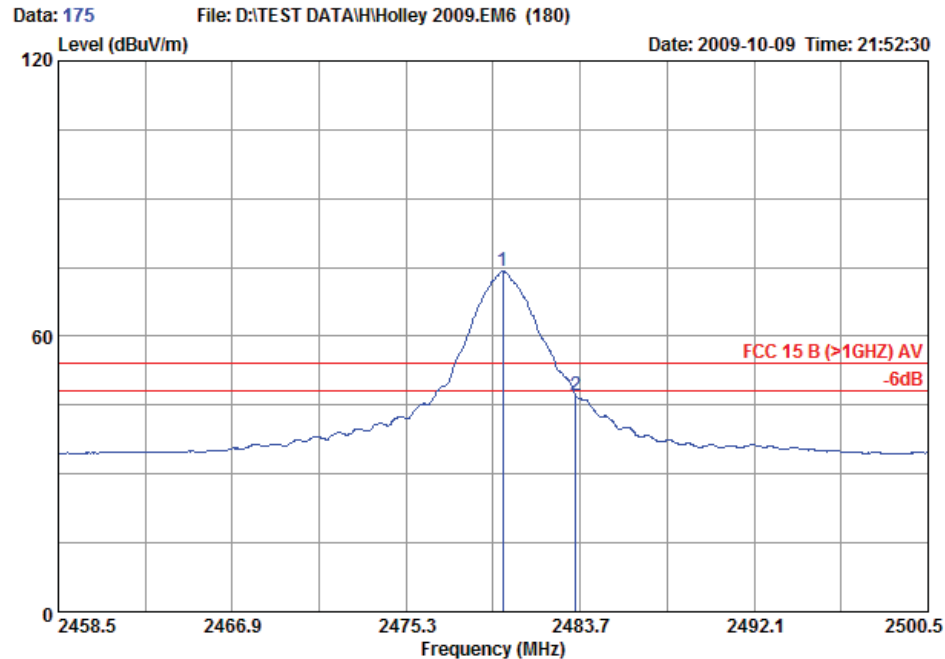
Site no : Audix ACI (3m Chamber) Data no. : 172
Dis. / Ant. : 3m /EMC03115
Limit : FCC 15 B (>1GHZ)PK Ant. pol. : HORIZONTAL
Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
EUT : 1mW ZigBee Module
M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
S/N : E2009093001
Power Rating: DC 3.3V
Test Mode : Transmitting CH 26 (2480MHz)
Memo : Antenna 2

	Freq. (MHz)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.466	28.95	34.20	5.99	96.19	96.93	74.00	-22.93	Peak
2	2483.500	28.95	34.20	5.99	64.64	65.38	74.00	8.62	Peak

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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Site no : Audix ACI (3m Chamber) Data no. : 175
Dis. / Ant. : 3m /EMC03115
Limit : FCC 15 B (>1GHz) AV Ant. pol. : HORIZONTAL
Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
EUT : 1mW ZigBee Module
M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
S/N : E2009093001
Power Rating: DC 3.3V
Test Mode : Transmitting CH 26 (2480MHz)
Memo : Antenna 2

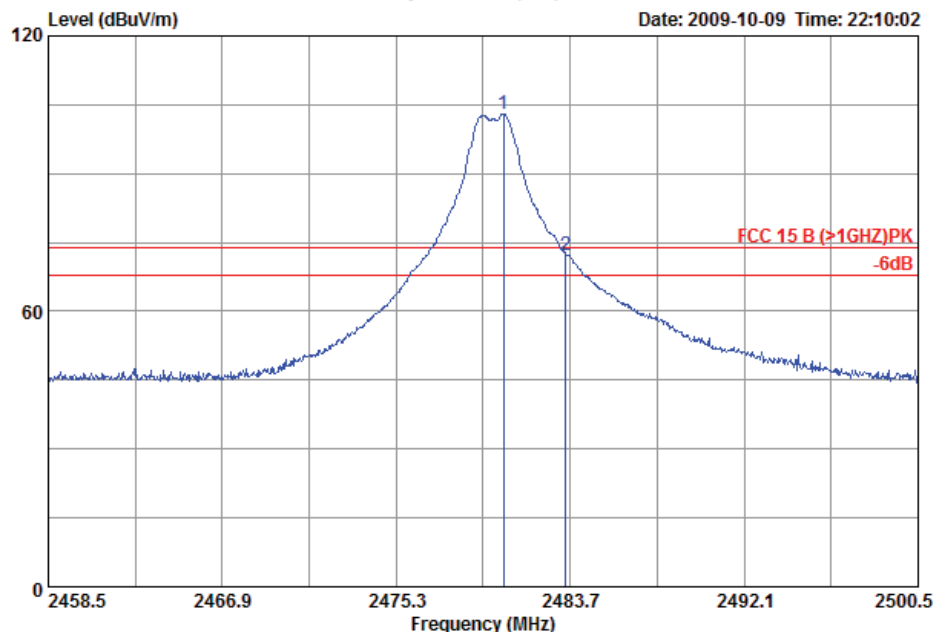
Freq.	Antenna	Preamp	Cable	Reading	Emission	Limits	Margin	Remark
(MHz)	Factor	Factor	Loss	(dBuV)	Level	(dBuV/m)	(dB)	
	(dB/m)	(dB)	(dB)		(dBuV/m)	(dBuV/m)		
1 2479.962	28.95	34.20	5.99	73.47	74.21	54.00	-20.21	Average
2 2483.500	28.95	34.20	5.99	46.23	46.97	54.00	7.03	Average

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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Data: 179 File: D:\TEST DATA\Holley 2009.EM6 (180)



Site no	: Audix ACI (3m Chamber)	Data no.	: 179
Dis. / Ant.	: 3m /EMC03115		
Limit	: FCC 15 B (>1GHz)PK	Ant. pol.	: VERTICAL
Env. / Ins.	: 25'C 60% / E7405A	Engineer	: Dio
EUT	: 1mW ZigBee Module		
M/N	: HT-MDL-2-EM-2400-001-A-V3.0.0		
S/N	: E2009093001		
Power Rating:	DC 3.3V		
Test Mode	: Transmitting CH 26 (2480MHz)		
Memo	: Antenna 2		

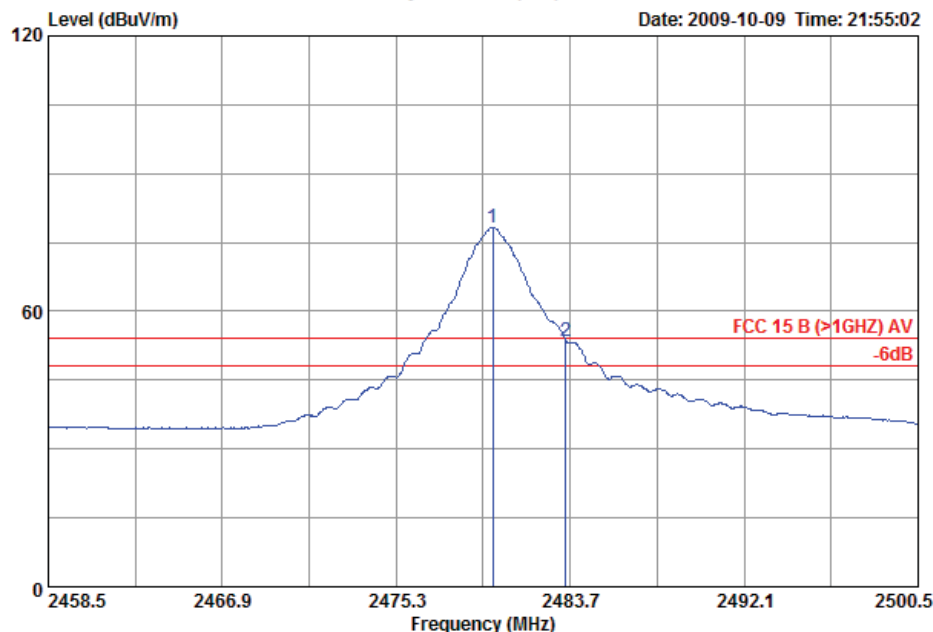
	Freq.	Antenna	Preamp	Cable	Reading	Emission	Limits	Margin	Remark
	(MHz)	Factor	Factor	Loss	(dBuV)	Level	(dBuV/m)	(dB)	
		(dB/m)	(dB)	(dB)		(dBuV/m)	(dBuV/m)		
1	2480.466	28.95	34.20	5.99	102.18	102.92	74.00	-28.92	Peak
2	2483.500	28.95	34.20	5.99	71.45	72.19	74.00	1.81	Peak

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.



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Data: 176 File: D:\TEST DATA\Holley 2009.EM6 (180)



Site no : Audix ACI (3m Chamber) Data no. : 176
 Dis. / Ant. : 3m /EMC03115
 Limit : FCC 15 B (>1GHz) AV Ant. pol. : VERTICAL
 Env. / Ins. : 25'C 60% / E7405A Engineer : Dio
 EUT : 1mW ZigBee Module
 M/N : HT-MDL-2-EM-2400-001-A-V3.0.0
 S/N : E2009093001
 Power Rating: DC 3.3V
 Test Mode : Transmitting CH 26 (2480MHz)
 Memo : Antenna 2

	Freq.	Antenna	Preamp	Cable	Reading	Emission	Limits	Margin	Remark
	(MHz)	Factor	Factor	Loss	(dBuV)	Level	(dBuV/m)	(dB)	
		(dB/m)	(dB)	(dB)		(dBuV/m)	(dBuV/m)		
1	2479.962	28.95	34.20	5.99	77.64	78.38	54.00	-24.38	Average
2	2483.500	28.95	34.20	5.99	52.90	53.64	54.00	0.36	Average

Remarks: Emission Level= Antenna Factor + Cable Loss - Preamp Factor + Reading.

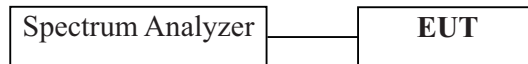
4 6 dB BANDWIDTH MEASUREMENT

4.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY45106600	May 19, 2009	May 19, 2010

4.2 Block Diagram of Test Setup



4.3 Specification Limits (§15.247(a)(2))

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

4.4 Operating Condition of EUT

The test program “Hyper-Terminal” was used to enable the EUT to transmit and receive data at different channel frequency individually.

4.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100 kHz RBW and 100 kHz VBW. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB. The test procedure is defined in KDB558074.

4.6 Test Results

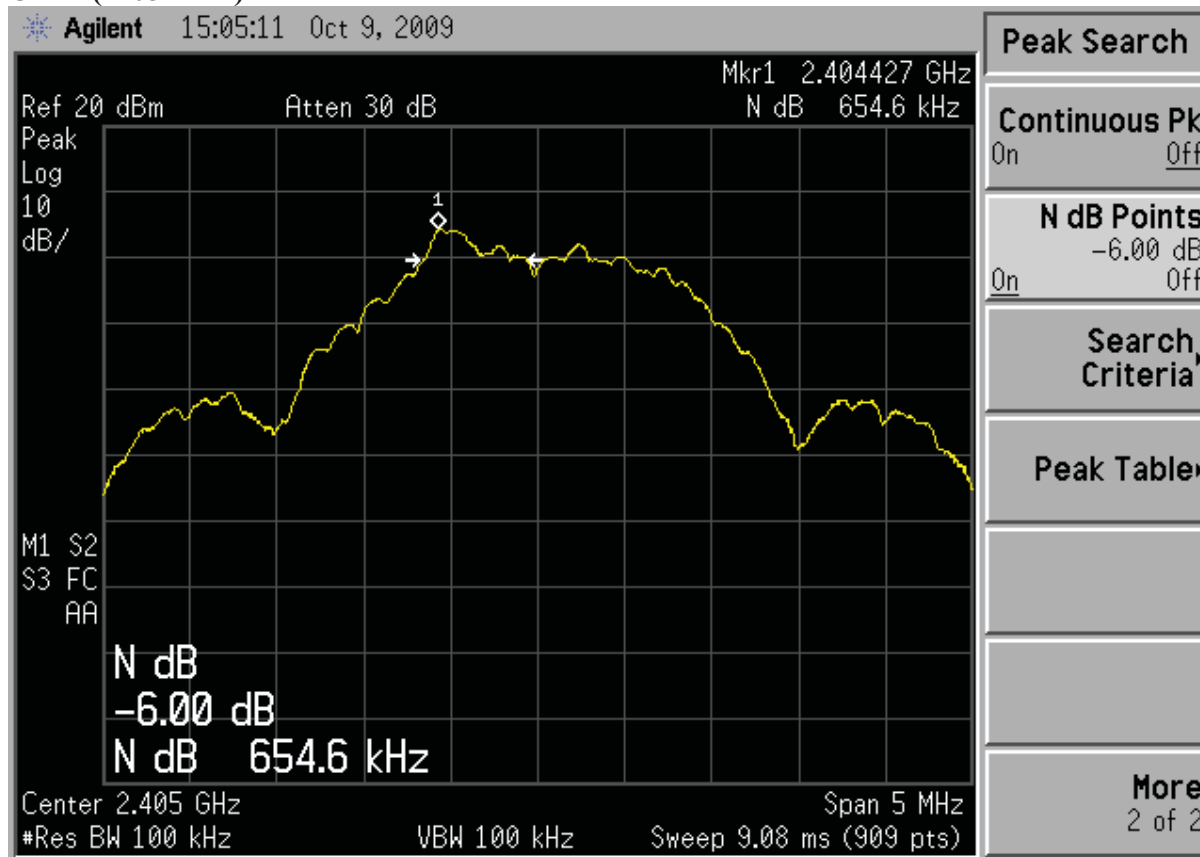
PASSED.

All the test results are attached in next pages.

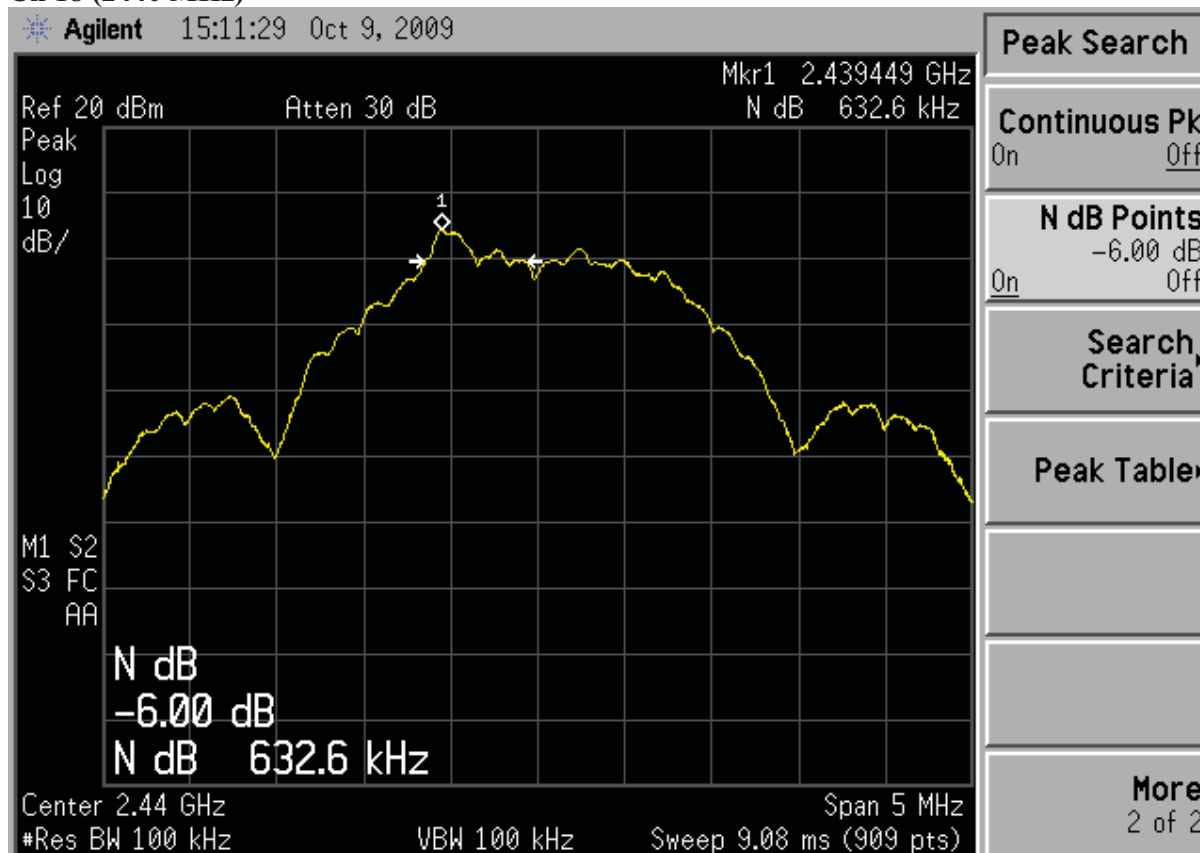
(Test Date : Oct 09, 2009 Temperature : 24°C Humidity : 52 %)

Channel	Frequency	6dB Bandwidth
11	2405 MHz	654.6 kHz
18	2440 MHz	632.6 kHz
26	2480 MHz	605.1 kHz

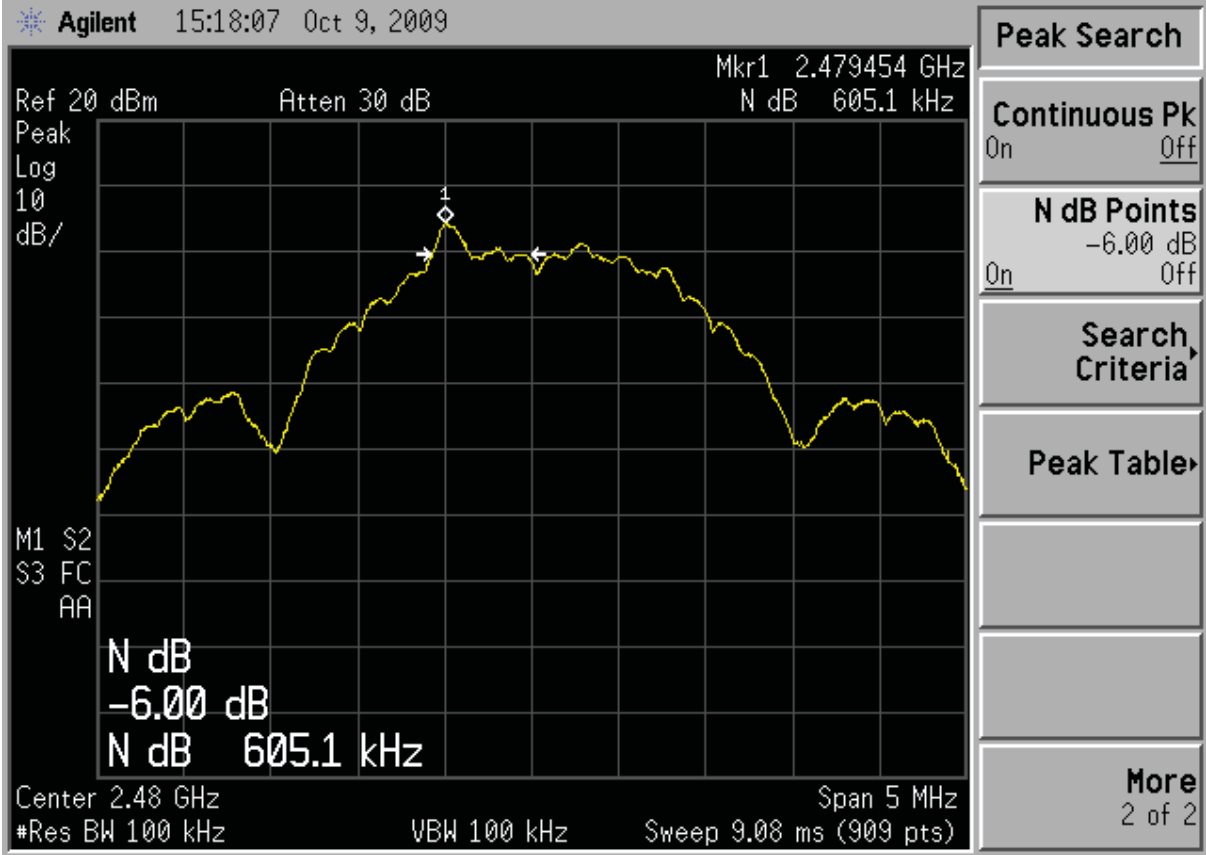
Ch 11 (2405 MHz)



Ch 18 (2440 MHz)



Ch 26 (2480MHz)



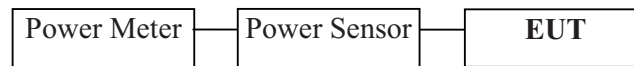
5 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

5.1 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.	Power Meter	Anritsu	ML2487A	6K00003245	Aug 05, 2009	Aug 05, 2010
2.	Power Sensor	Anritsu	MA2491A	32489	Aug 05, 2009	Aug 05, 2010

5.2 Block Diagram of Test Setup



5.3 Specification Limits ((§15.247(b)(3))

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

5.4 Operating Condition of EUT

The test program “Hyper-Terminal” was used to enable the EUT to transmit and receive data at different channel frequency individually.

5.5 Test Procedure

This is an RF conducted test. Use a direct connection between the antenna port of the transmitter and the power meter, through suitable attenuation. We use Power Output Option 1 (which defined in KDB558074) to measure the power output. Power Output Option 1 is a peak measurement. The transmitter output was connected to the power meter that was designed to detect peak value automatically.

5.6 Test Results

PASSED. All the test results are listed below.

(Test date: Oct 09, 2009 Temperature : 24°C Humidity : 52 %)

Channel	Frequency	Peak Output Power	Limit
11	2405 MHz	3.76 dBm	30 dBm
18	2440 MHz	3.44 dBm	30 dBm
26	2480 MHz	2.97 dBm	30 dBm

6 EMISSION LIMITATIONS MEASUREMENT

6.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY45106600	May 19, 2009	May 19, 2010

6.2 Block Diagram of Test Setup

The same as Section. 4.2.

6.3 Specification Limits (§15.247(d))

In any 100 kHz 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 20 dB below that in the 100 kHz 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 Section. 4.7)

6.4 Operating Condition of EUT

The test program “Hyper-Terminal” was used to enable the EUT to transmit and receive data at different channel frequency individually.

6.5 Test Procedure

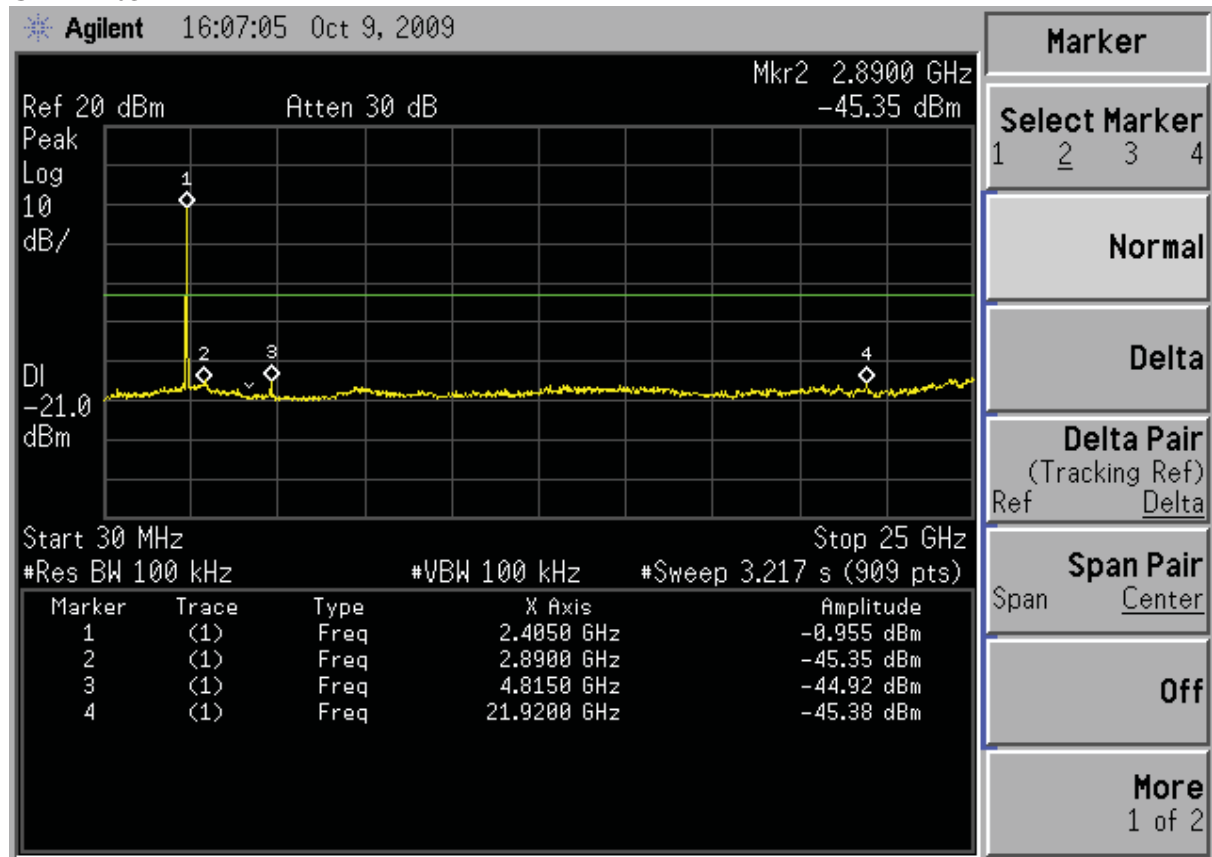
The transmitter output was connected to the spectrum analyzer. Set RBW = 100 kHz, VBW = 100 kHz, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

6.6 Test Results

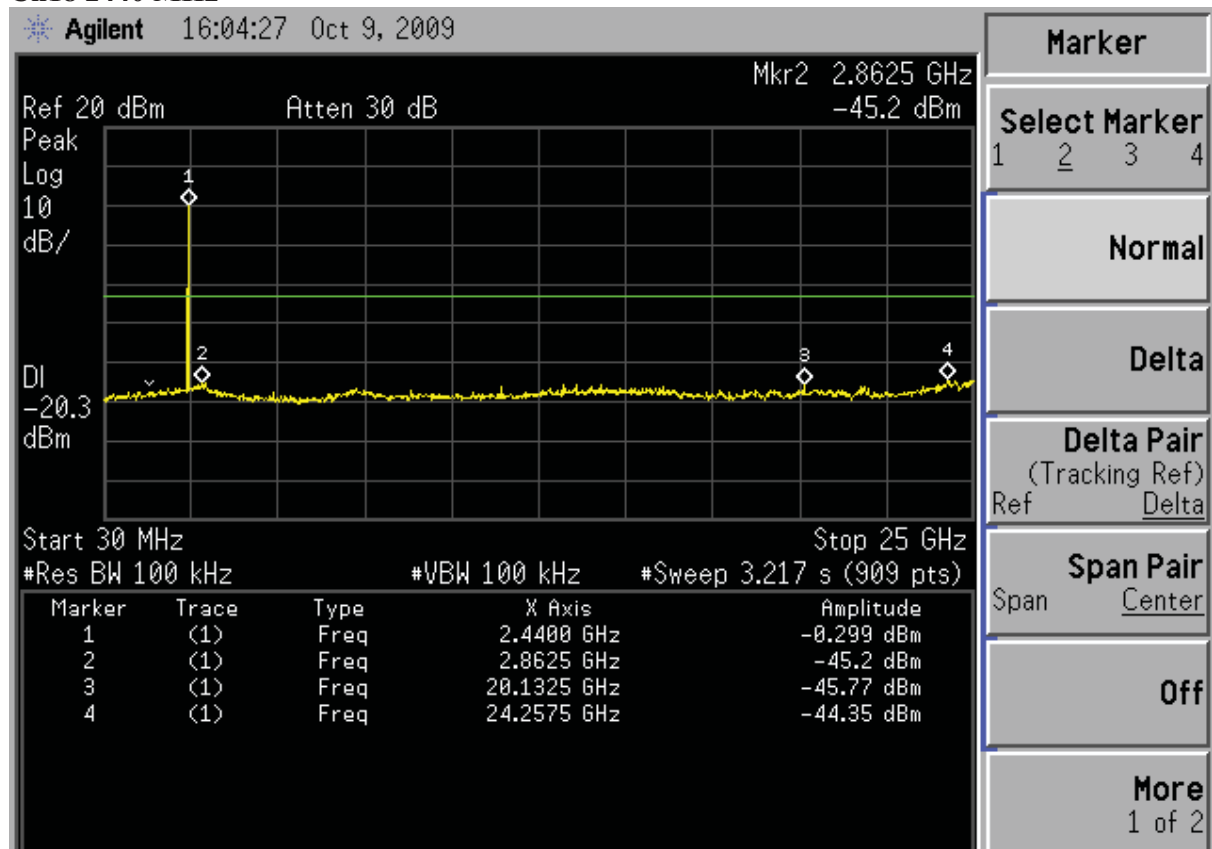
PASSED.

The testing data was attached in the next pages.

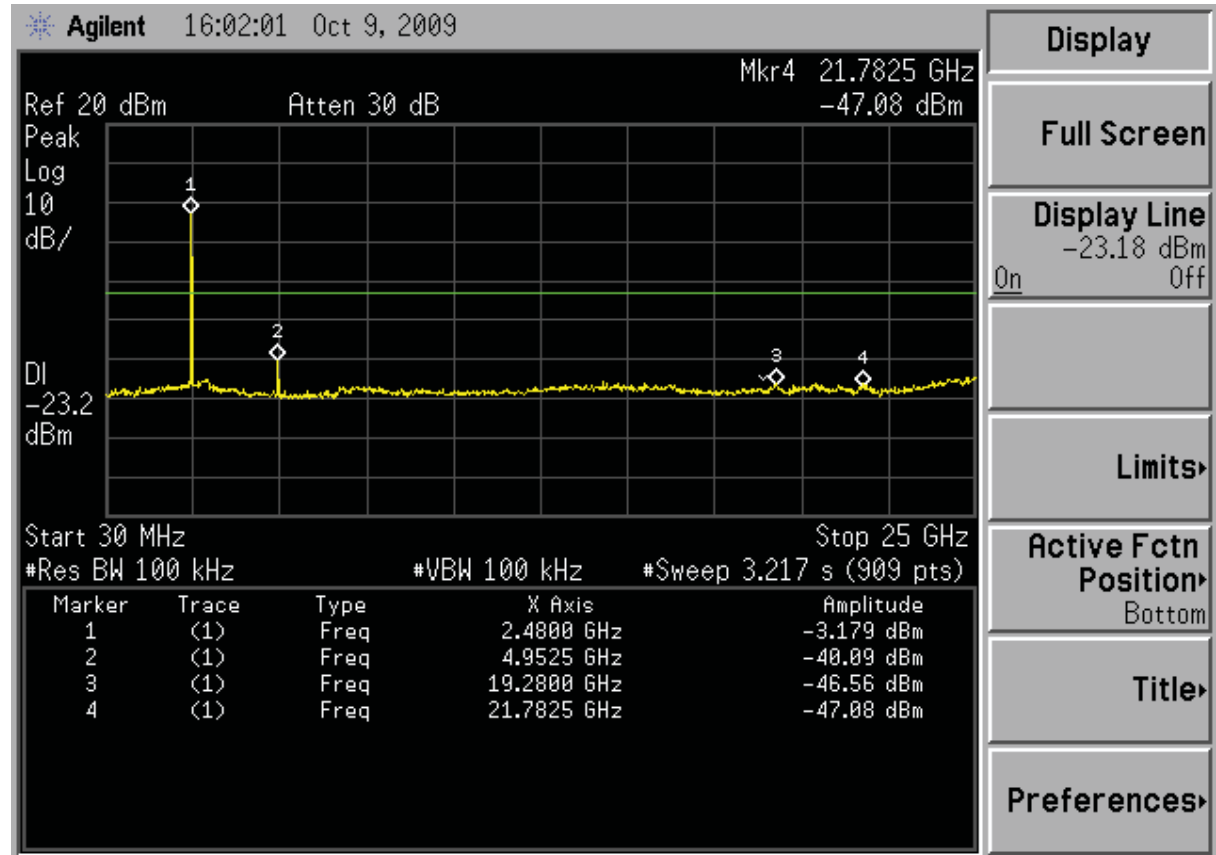
Ch11 2405 MHz



Ch18 2440 MHz



Ch26 2480 MHz



7 BAND EDGES MEASUREMENT

7.1 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.	Spectrum Analyzer	Agilent	E7405A	MY45106600	May 19, 2009	May 19, 2010

7.2 Block Diagram of Test Setup

The same as section.4.2.

7.3 Specification Limits (§15.247(d))

In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

7.4 Operating Condition of EUT

The test program “Hyper-Terminal” was used to enable the EUT to transmit and receive data at different channel frequency individually.

7.5 Test Procedure

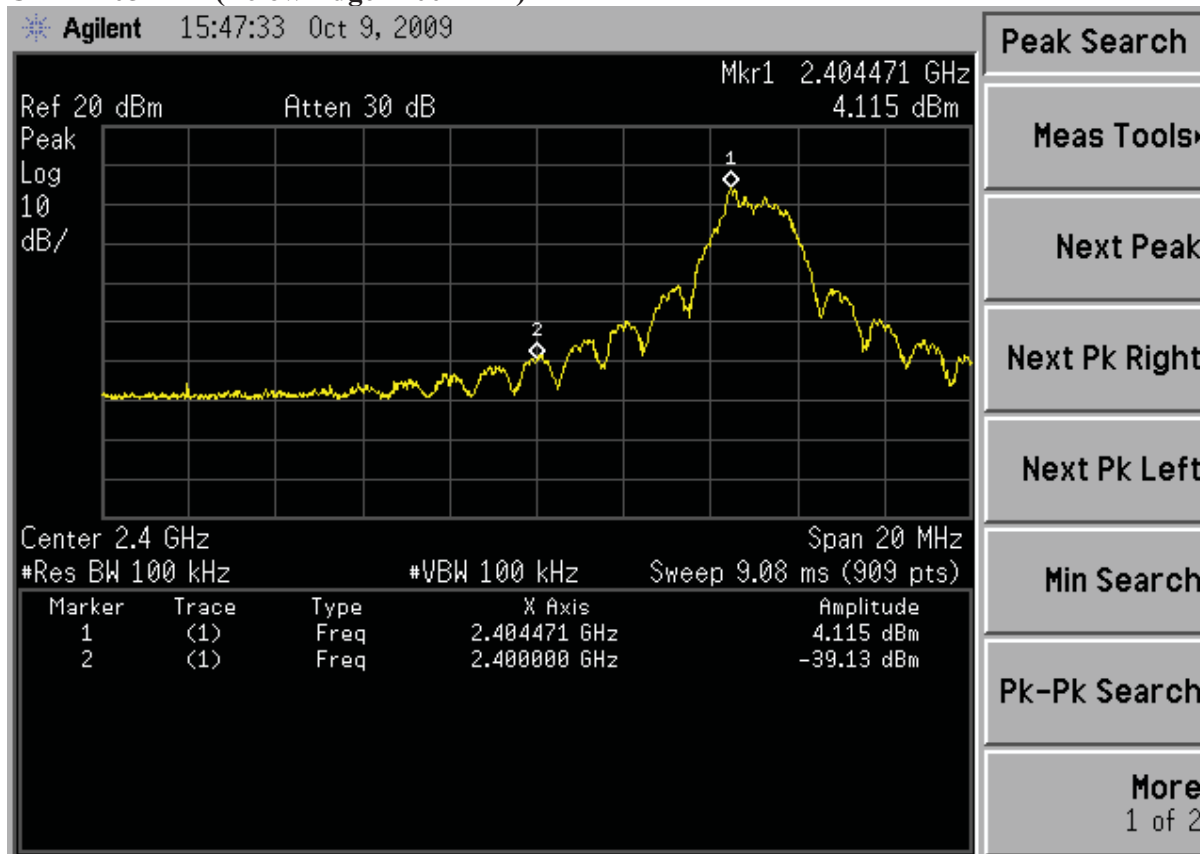
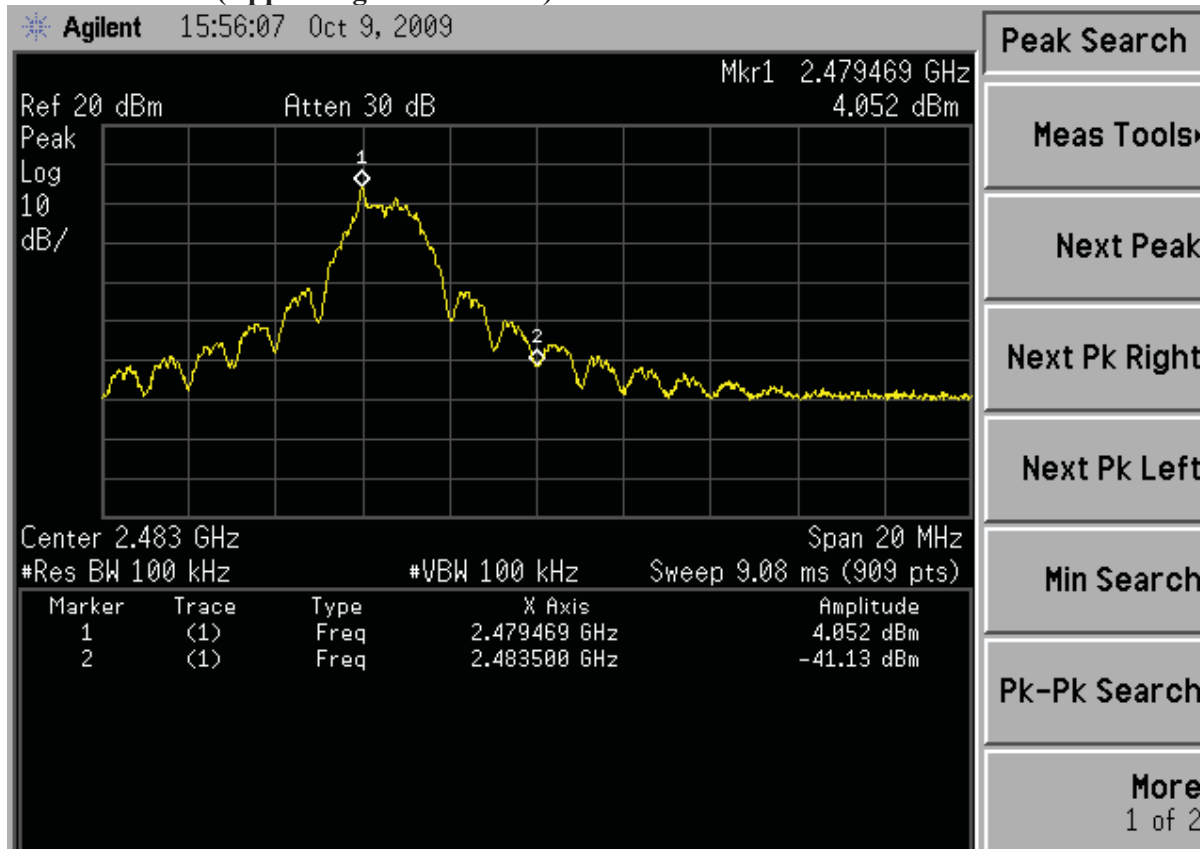
The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100kHz bandwidth from band edge.

7.6 Test Results

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

(Test date: Oct 09, 2009 Temperature : 24°C Humidity : 52 %)

Location	Channel	Frequency	Delta Marker	Result
Below Band Edge	11	2400 MHz	43.245 dB	More than 20 dB below the highest level of the desired power
Upper Band Edge	26	2483.5 MHz	45.182 dB	

Ch11 2405MHz (Below Edge 2400 MHz)**Ch26 2480MHz (Upper Edge 2483.5 MHz)**

8 POWER SPECTRAL DENSITY MEASUREMENT

8.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY45106600	May 19, 2009	May 19, 2010

8.2 Block Diagram of Test Setup

The same as section.4.2.

8.3 Specification Limits (§15.247(e))

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

8.4 Operating Condition of EUT

The test program “Hyper-Terminal” was used to enable the EUT to transmit and receive data at different channel frequency individually.

8.5 Test Procedure

The same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output is measured, then a peak power spectral density measurement is required. Use PSD Option 1 (which defined in KDB558074) if Power output Option 1 was used.

PSD Option 1:

Locate and zoom in on emission peak(s) within the passband. Set RBW = 3kHz, VBW > RBW, sweep = (SPAN/3kHz). The peak level measured must be no greater than +8 dBm.

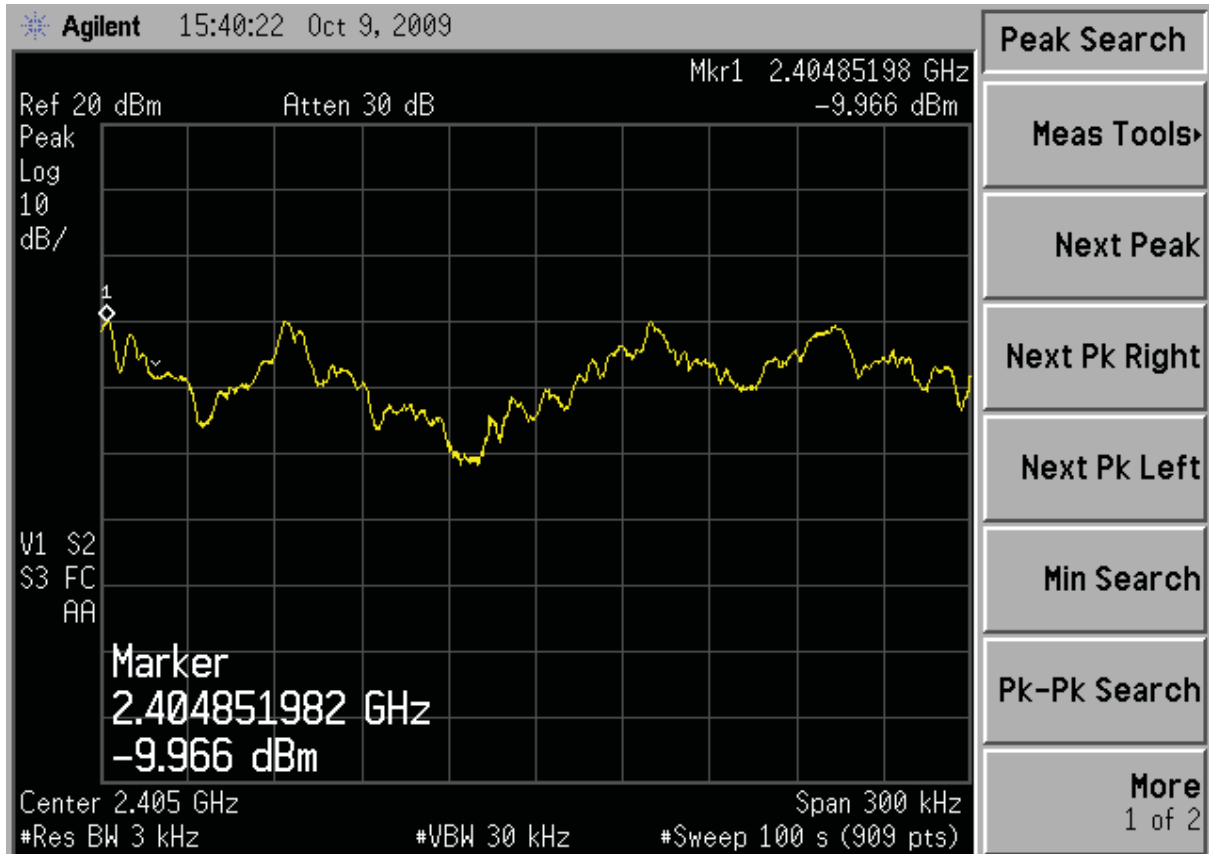
The transmitter output was connected to the spectrum analyzer. The fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz.

8.6 Test Results

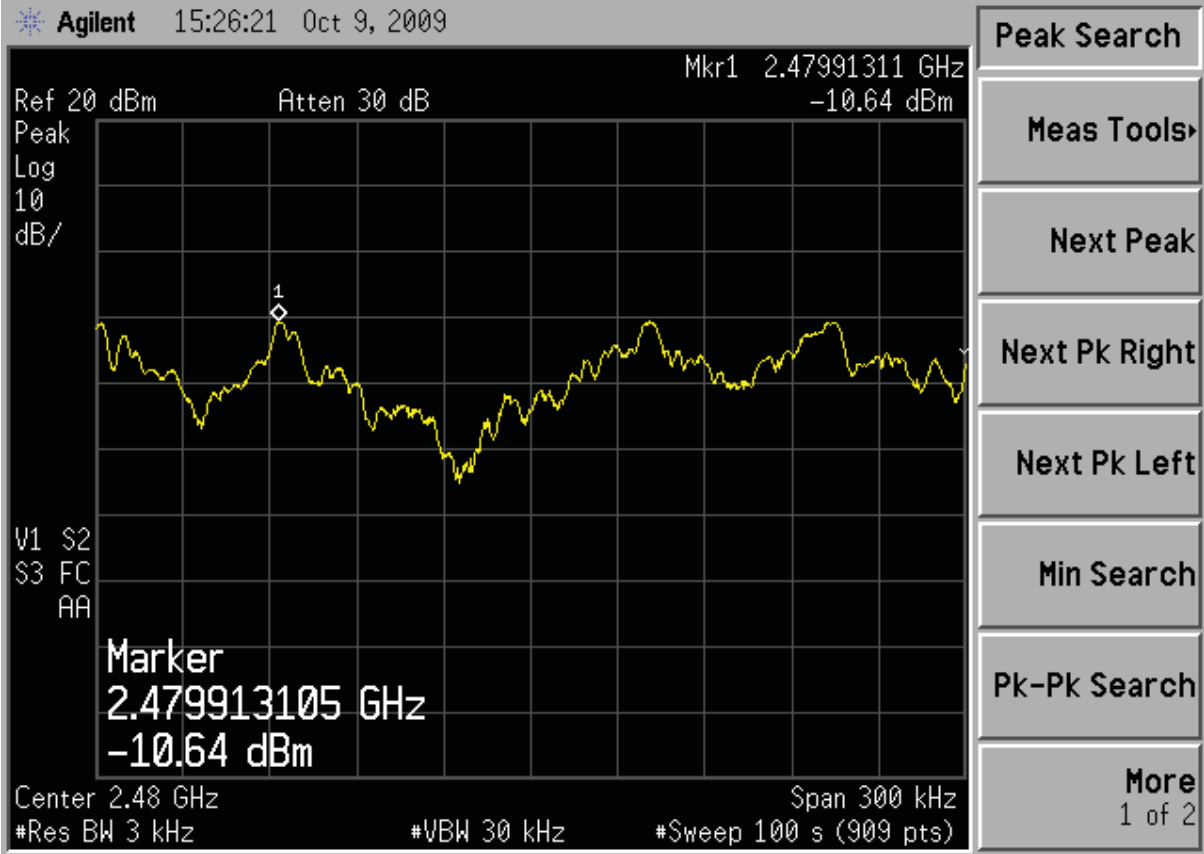
PASSED. All the test results are attached in next pages.

(Test date: Oct 09, 2009 Temperature : 24°C Humidity : 52 %)

Channel	Frequency	Power Spectral Density	Limit
11	2405 MHz	-9.966 dBm	8dBm
18	2440 MHz	-10.41 dBm	8dBm
26	2480 MHz	-10.64 dBm	8dBm

Ch11 2405 MHz**Ch18 2440 MHz**

Ch26 2480 MHz



9 DEVIATION TO TEST SPECIFICATIONS

None.