

8. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 Standard Applicable

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum 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, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW,VBW=100KHz, Start = 2.483GHz, Stop = 2.403GHz or Start = 2.479GHz, Stop = 2.499GHz, Sweep = auto.
5. Mark Peak ,2.4GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

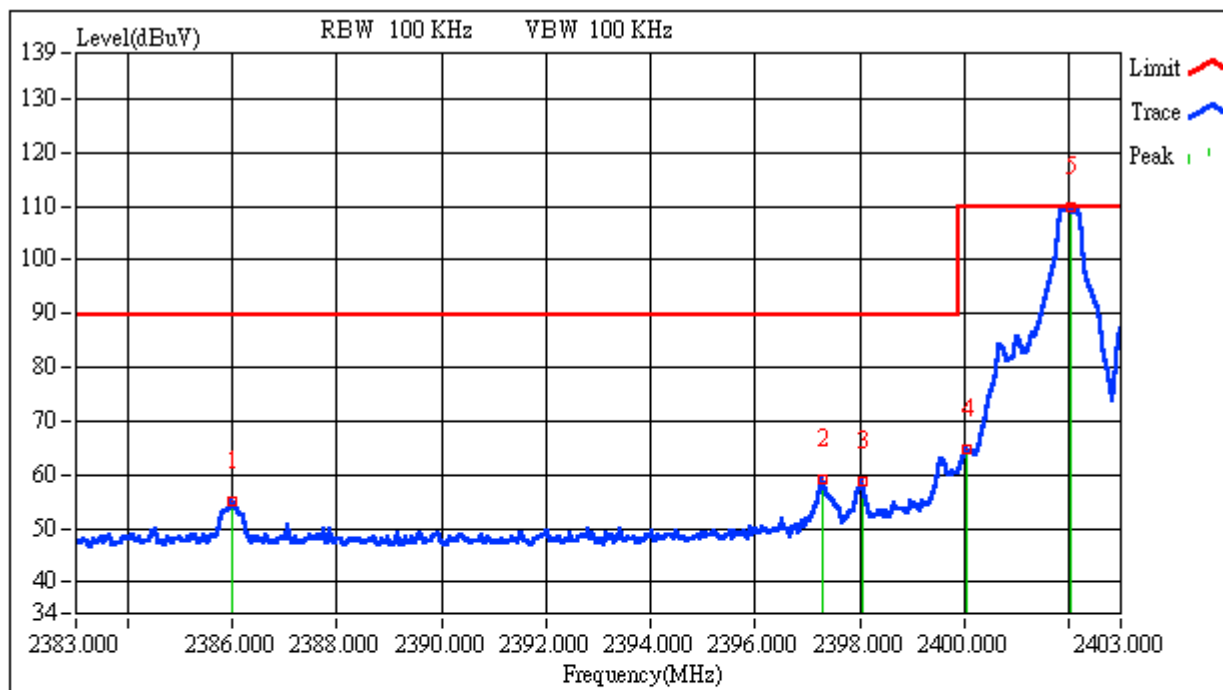
8.3 Measurement Result

Refer to attach spectrum analyzer data chart.

8.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	ADVANTEST	R3271A	NA	10/15/2001	10/14/2002
low loss cable	Huber + Suhner	Sucoflex 104	N/A	N/A	N/A

Out of Band Test Data CH-Low



Custom Name:

EPOX

Engineer:

markba_lee

Model Name:

BT-DG02

Report No.:

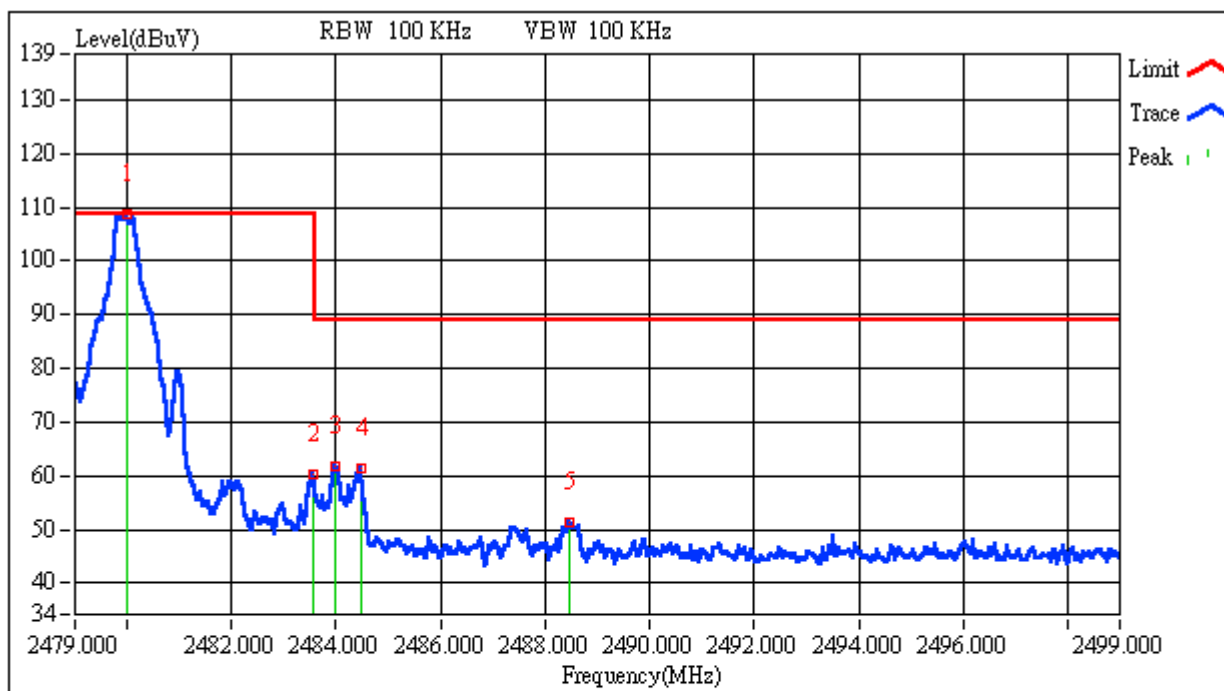
020034-R

Test Mode:

TX CH-LOW(2402MHz)

	Frequency(MHz)	Read Level (dBuV)	Probe (dB)	Cable Loss (dB)	Level(dBuV)
1	2386.0000	54.50	0.00	0.56	55.06
2	2397.2800	58.67	0.00	0.56	59.23
3	2398.0400	58.20	0.00	0.56	58.76
4	2400.0400	64.11	0.00	0.56	64.67
5	2402.0400	109.14	0.00	0.56	109.70

Out of Band Test Data CH-Low



Custom Name:

EPOX

Engineer:

markba_lee

Model Name:

BT-DG02

Report No.:

020034-R

Test Mode:

TX CH-HIGH(2480MHz)

	Frequency(MHz)	Read Level (dBuV)	Probe (dB)	Cable Loss (dB)	Level(dBuV)
1	2480.0000	108.40	0.00	0.52	108.92
2	2483.5600	59.60	0.00	0.52	60.12
3	2484.0000	61.13	0.00	0.52	61.65
4	2484.4800	60.80	0.00	0.52	61.32
5	2488.4800	50.90	0.00	0.52	51.42

9. SPURIOUS RADIATED EMISSION TEST

9.1 Standard Applicable

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

9.2 EUT Setup

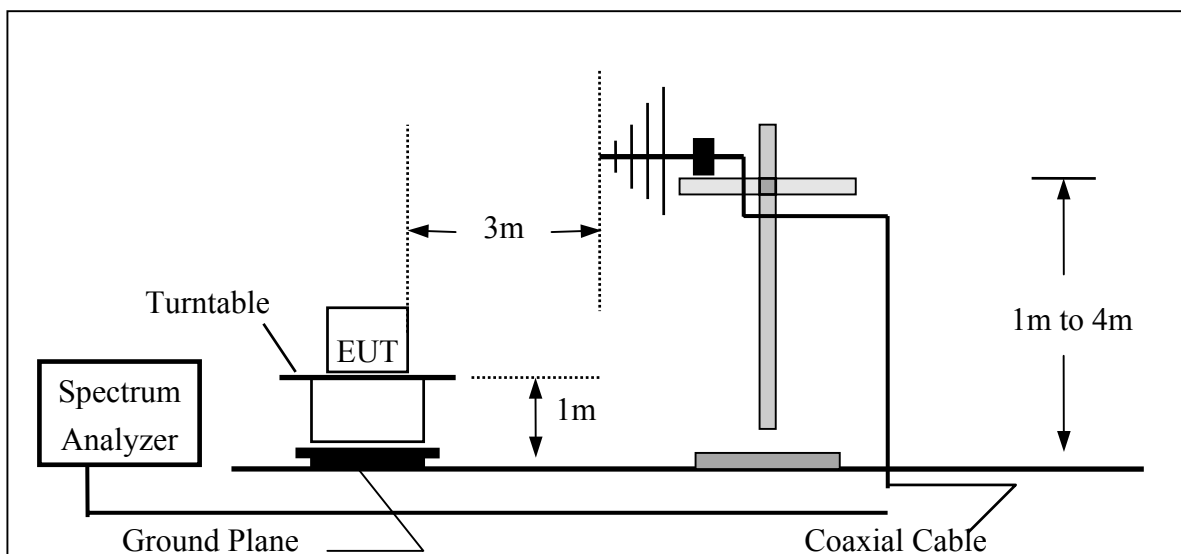
1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.4-1992.
2. The EUT was put in the front of the test table. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor printer, K/B, and mouse were placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The keyboard was placed directly in the front of the monitor, flushed with the front tabletop. The mouse was placed next to the Keyboard, flushed with the back of keyboard.
4. The spacing between the peripherals was 10 centimeters.
5. External I/O cables were draped along the edge of the test table and bundle when necessary.
6. The host PC system was connected with 110Vac/60Hz power source.

9.3 Measurement Procedure

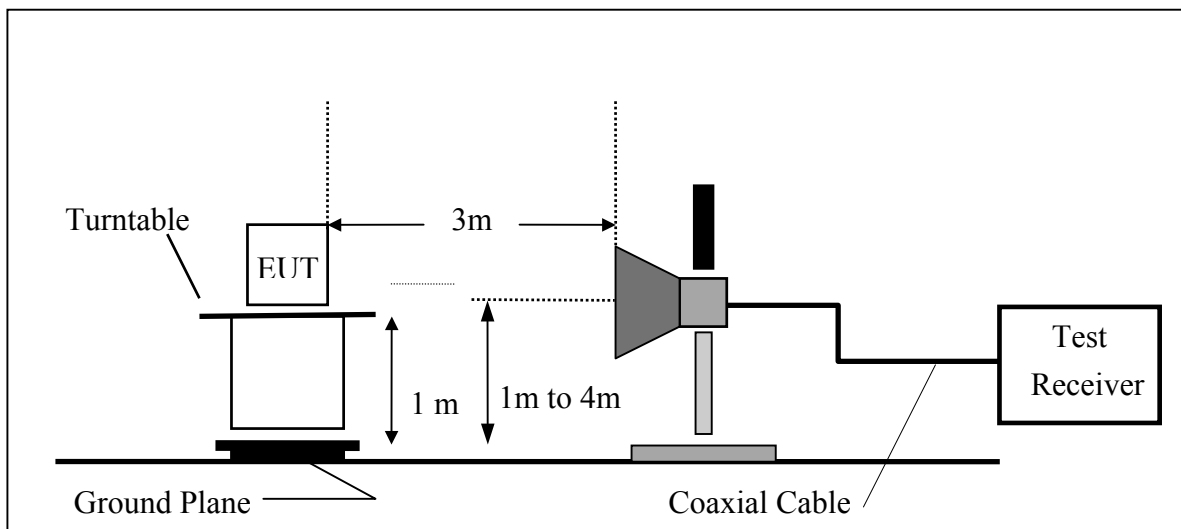
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.

9.4 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



9.5 Measurement Equipment Used:

Open Area Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	ADVANTEST	R3261A	N/A	03/19/2002	03/18/2003
EMI Test Receiver	R&S	ESVS20	838804/004	01/05/2002	01/04/2003
Pre-Amplifier	HP	8447D	2944A09173	03/04/2002	03/03/2003
Bilog Antenna	SCHWAZBECK	VULB9163	145	07/06/2002	07/05/2003
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M53867	N.C.R	N.C.R
Site NSA	C&C	N/A	N/A	11/17/2001	11/16/2002
Horn antenna	Schwarzbeck	BBHA 9120	D210	2/24/2002	2/23/2003
Pre-Amplifier	HP	8449B	3008B00965	10/01/2001	10/02/2002

9.6 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.7 Measurement Result (below 1GHz)

Refer to attach tabular data sheets.

15.209 Radiated Test Data – TX CH-Low Horizontal

C&C LABORATORY CO., LTD.

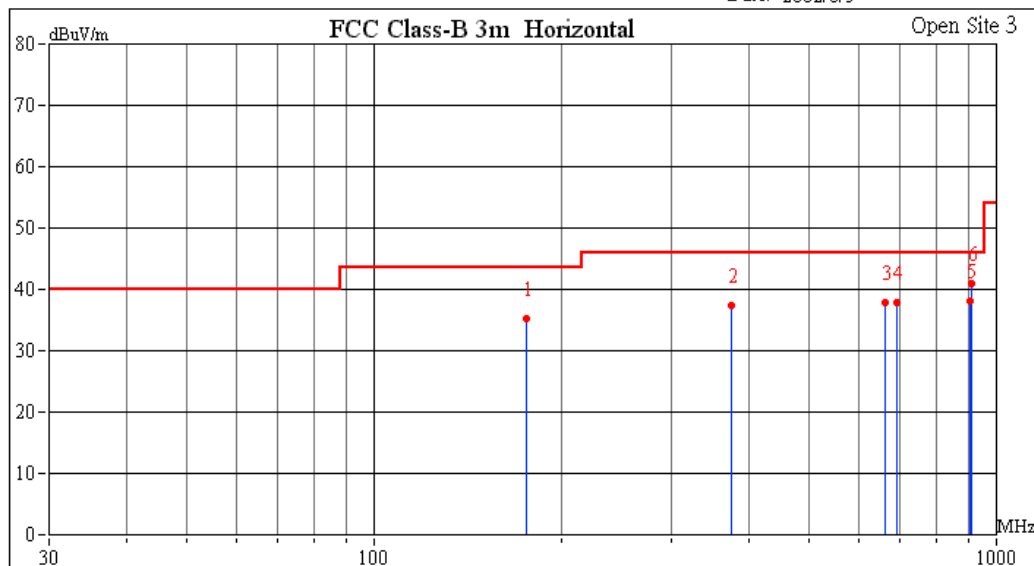
Custom Name: EPOX

Test Mode: TX CH-LOW(2402MHz)

Model Name: BT-DG02

Engineer Name: markba lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – TX CH-Low Vertical

C&C LABORATORY CO., LTD.

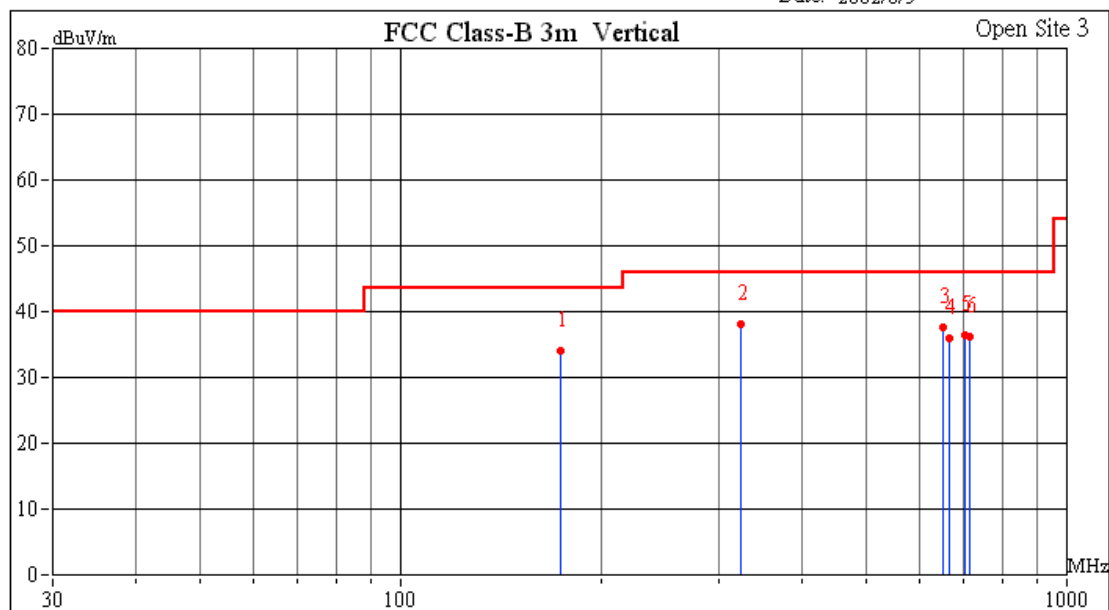
Custom Name: EPOX

Test Mode: TX CH-LOW(2402MHz)

Model Name: BT-DG02

Engineer Name: markba lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – TX CH-Mid Horizontal

C&C LABORATORY CO., LTD.

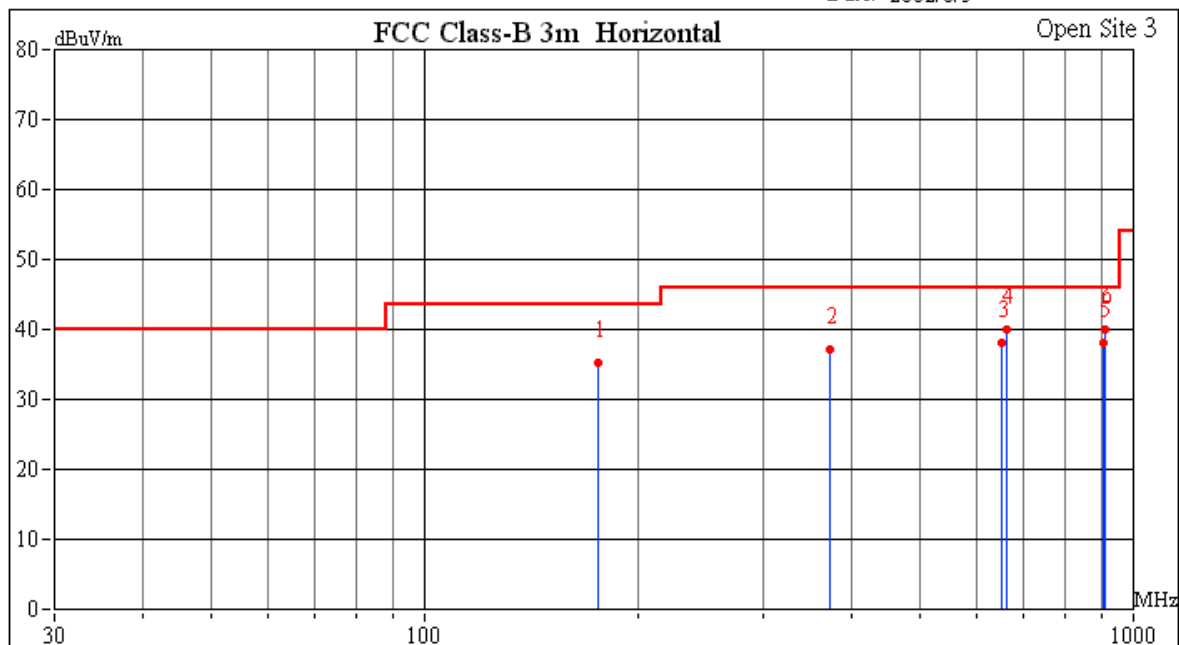
Custom Name: EPOX

Test Mode: TX CH-MID(2441MHz)

Model Name: BT-DG02

Engineer Name: markba lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – TX CH-Mid Vertical

C^{MID}&C LABORATORY CO., LTD.

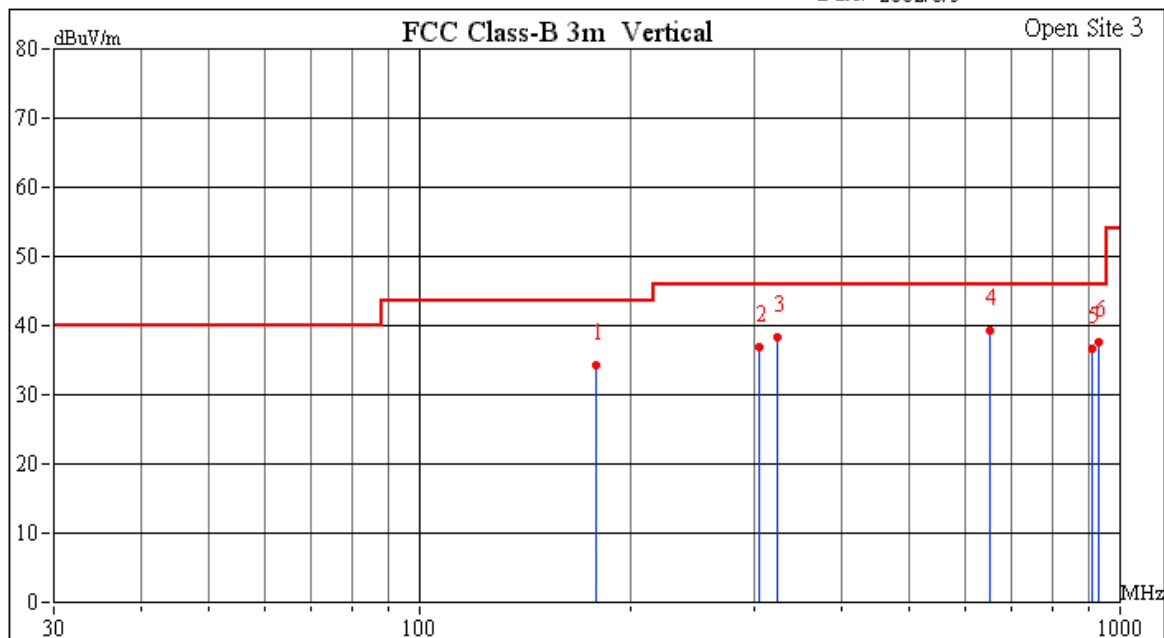
Custom Name: EPOX

Test Mode: TX CH-MID(2441MHz)

Model Name: BT-DG02

Engineer Name: markba_lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – TX CH-High Horizontal

C&C LABORATORY CO., LTD.

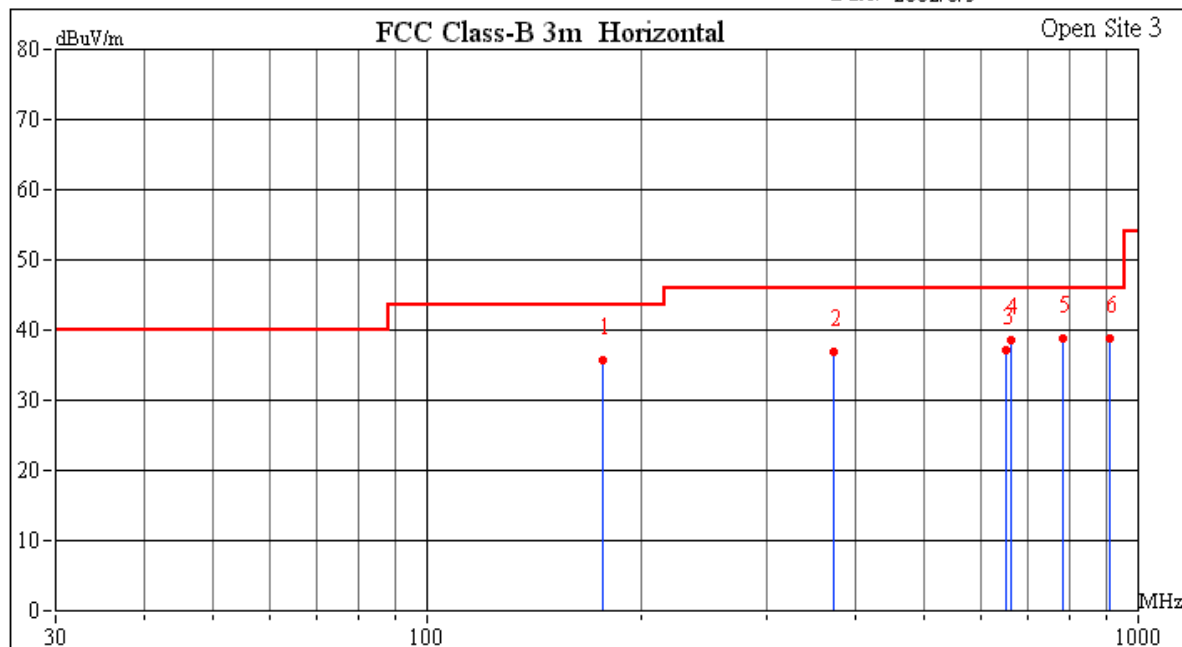
Custom Name: EPOX

Test Mode: TX CH-HIGH(2480MHz)

Model Name: BT-DG02

Engineer Name: markba lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – TX CH-High Vertical

C&C LABORATORY CO., LTD.

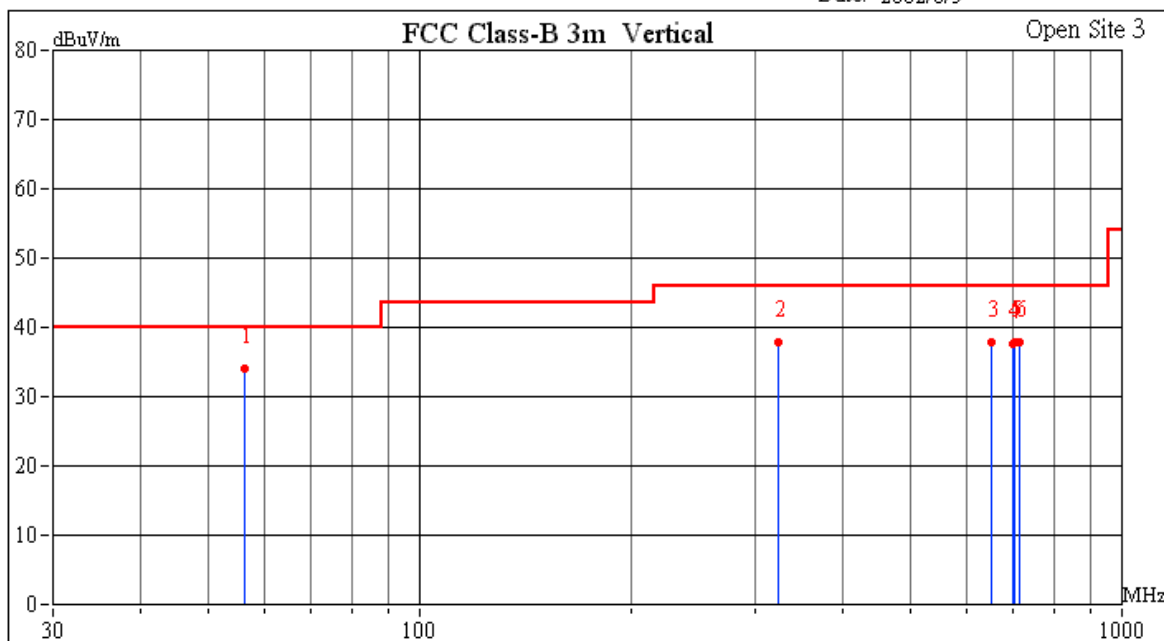
Custom Name: EPOX

Test Mode: TX CH-HIGH(2480MHz)

Model Name: BT-DG02

Engineer Name: markba lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – RX CH-Low Horizontal

C&C LABORATORY CO., LTD.

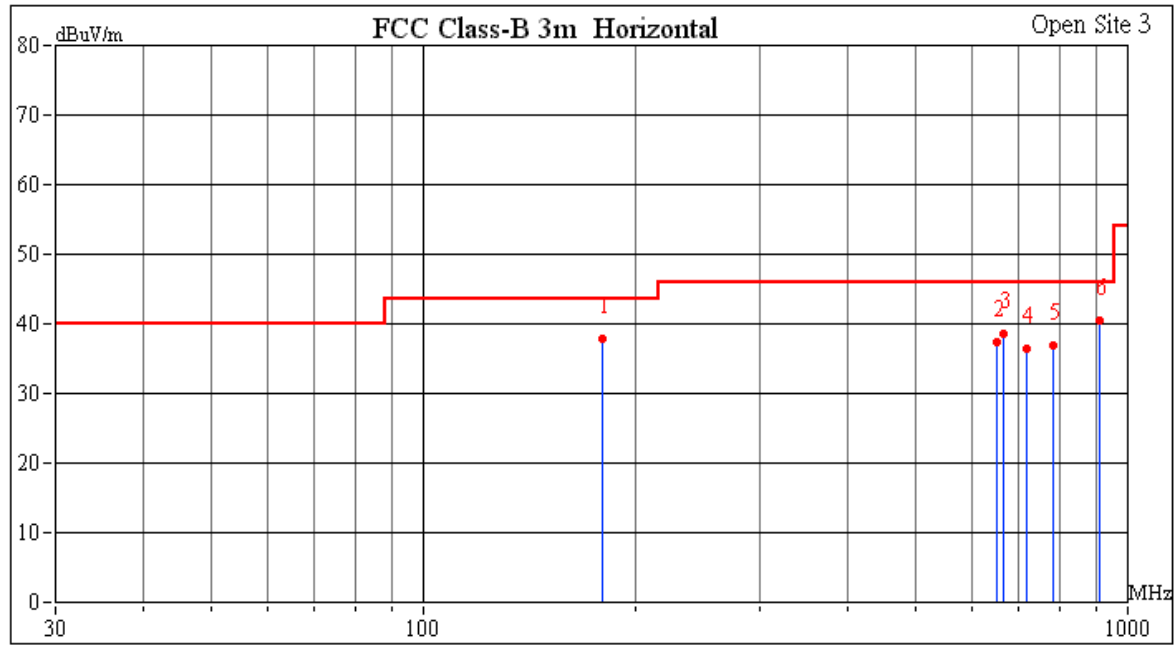
Custom Name: EPOX

Test Mode: RX CH-LOW(2402MHz)

Model Name: BT-DG02

Engineer Name: markba_lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – RX CH-Low Vertical

C&C LABORATORY CO., LTD.

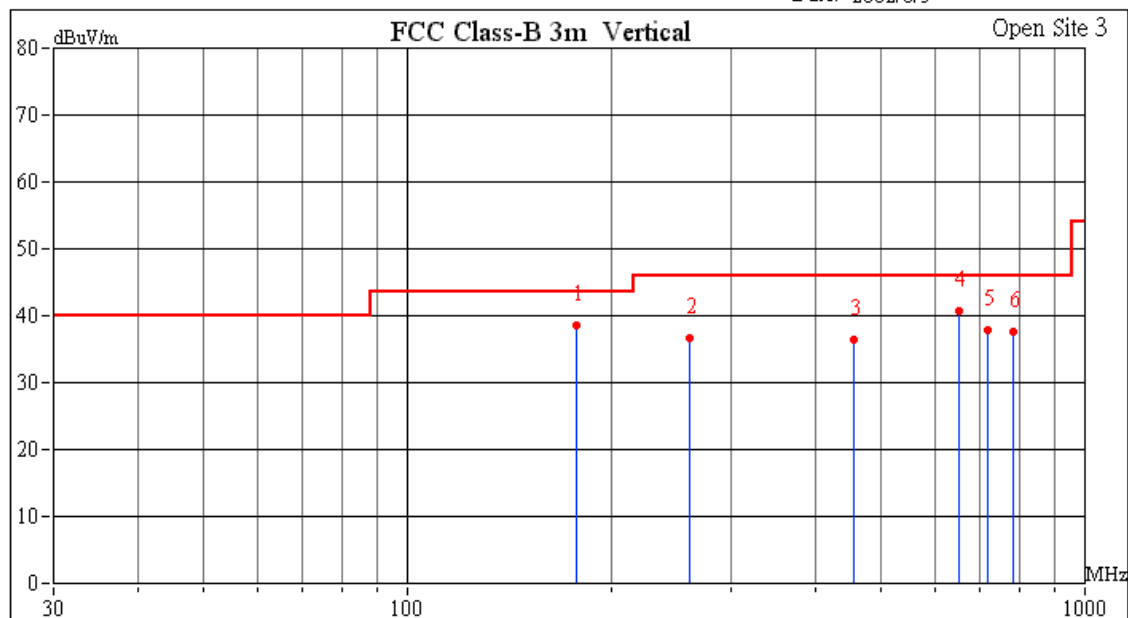
Custom Name: EPOX

Test Mode: RX CH-LOW(2402MHz)

Model Name: BT-DG02

Engineer Name: markba_lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – RX CH-Mid Horizontal

C&C LABORATORY CO., LTD.

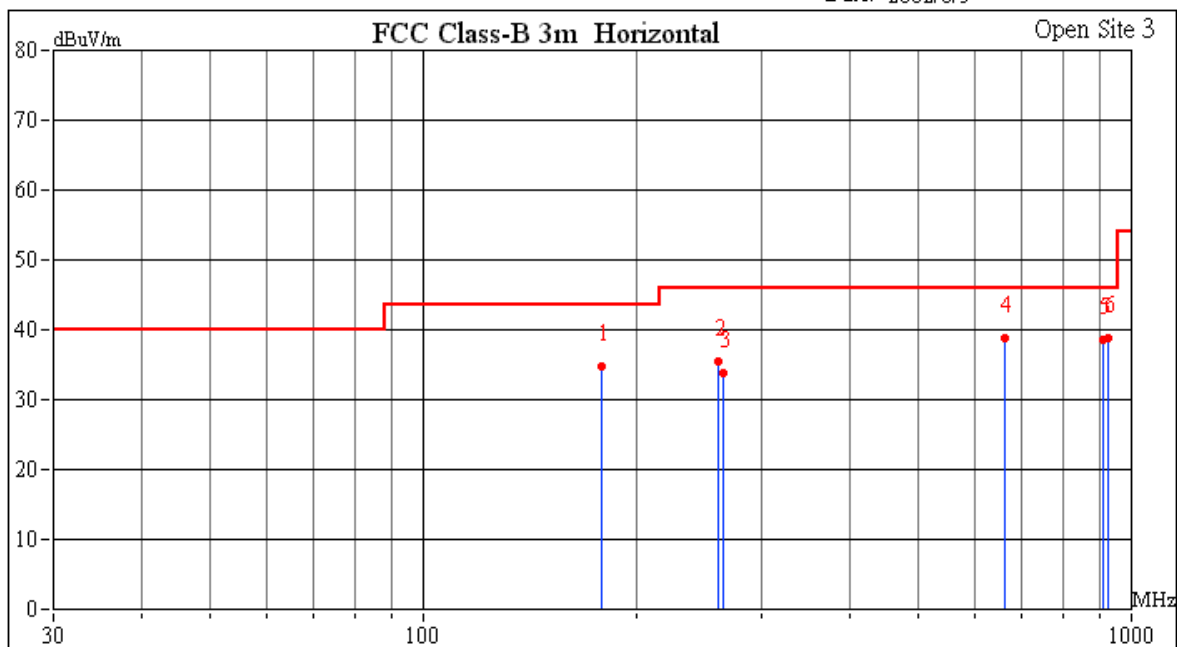
Custom Name: EPOX

Test Mode: RX CH-MID(2441MHz)

Model Name: BT-DG02

Engineer Name: markba lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – RX CH-Mid Vertical

C&C LABORATORY CO., LTD.

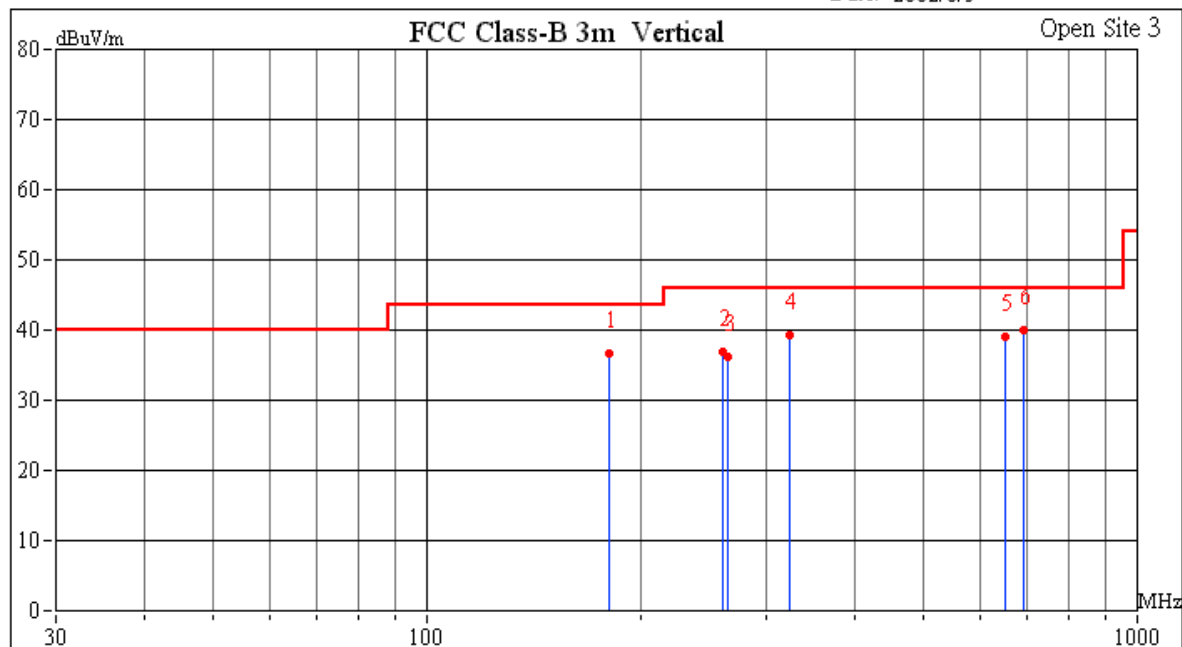
Custom Name: EPOX

Test Mode: RX CH-MID(2441MHz)

Model Name: BT-DG02

Engineer Name: markba lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – RX CH-High Horizontal

C&C LABORATORY CO., LTD.

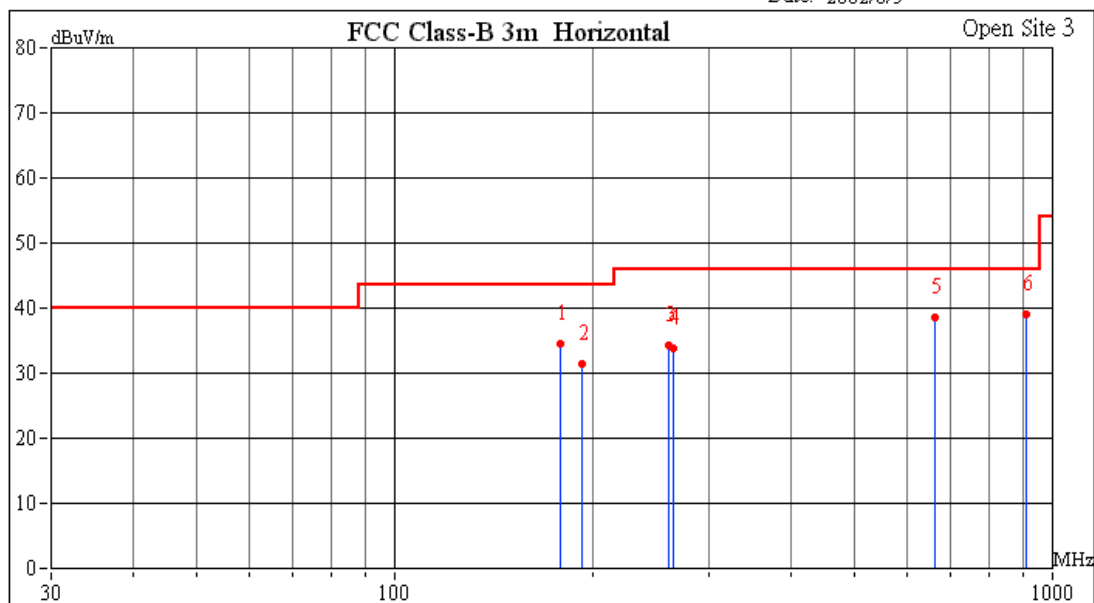
Custom Name: EPOX

Test Mode: RX CH-HIGH(2480MHz)

Model Name: BT-DG02

Engineer Name: markba_lee

Date: 2002/8/5

[illegible]

15.209 Radiated Test Data – RX CH-High Vertical

C&C LABORATORY CO., LTD.

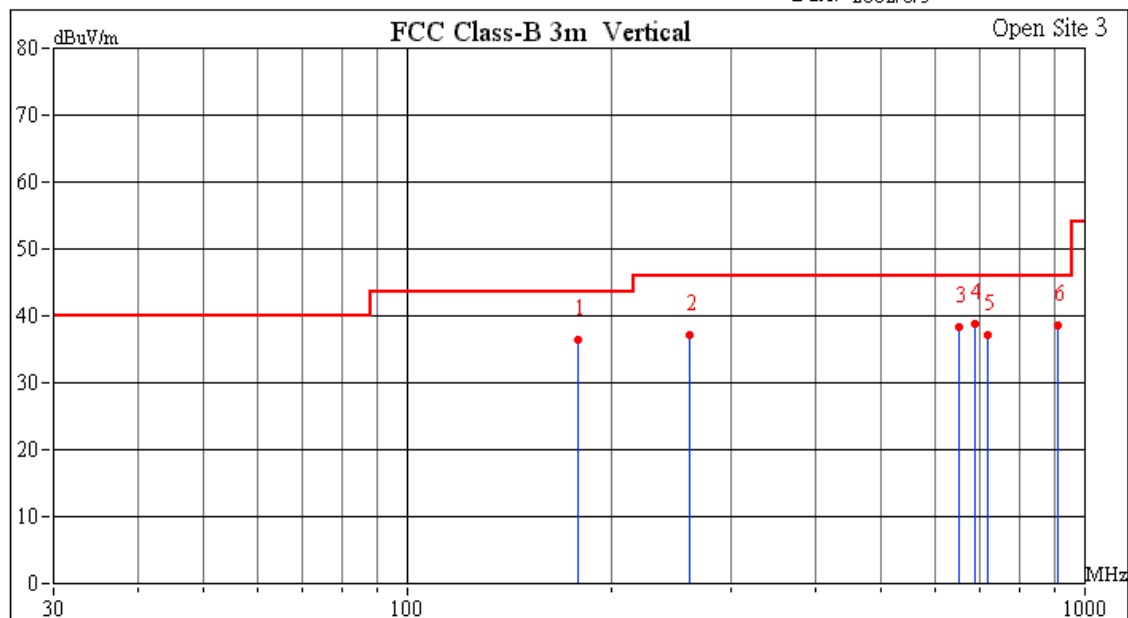
Custom Name: EPOX

Test Mode: RX CH-HIGH(2480MHz)

Model Name: BT-DG02

Engineer Name: markba lee

Date: 2002/8/5

[illegible]

9.8 Measurement Result (above 1GHz)

Operation Mode: TX Mode
 Fundamental Frequency: 2402MHz (CH Low)
 Temperature : 30 °C
 Humidity : 55%

Test Date : 8/02/2002
 Test By: Markba Lee
 Pol: VERTICAL

Freq.	Reading	AF	Closs	Pre-amp	Filter	Dist	Level	Limit	Margin	Mark	Pol
(MHz)	(dBuV)	(dBuV)	(dB)	(dB)	dB	dB	(dBuV/m)	FCC_B	(dB)	(P/Q/A)	(H/V)
1060.00	57.03	24.71	2.78	38.86	0.00	0.00	45.66	54.00	-8.34	P	3mV
1172.00	52.16	24.91	2.86	38.44	0.00	0.00	41.49	54.00	-12.51	P	3mV
1220.00	51.41	25.00	2.88	38.34	0.00	0.00	40.95	54.00	-13.05	P	3mV
1484.00	53.39	25.47	3.14	38.10	0.00	0.00	43.90	54.00	-10.10	P	3mV
1656.00	52.80	25.78	3.30	37.80	0.00	0.00	44.08	54.00	-9.92	P	3mV
1844.00	52.77	26.12	3.48	37.80	0.00	0.00	44.57	54.00	-9.43	P	3mV
2016.00	54.09	26.44	3.63	37.60	0.00	0.00	46.56	54.00	-7.44	P	3mV
2224.00	49.38	26.94	3.82	37.51	0.00	0.00	42.63	54.00	-11.37	P	3mV
2284.00	49.66	27.08	3.88	37.48	0.00	0.00	43.14	54.00	-10.86	P	3mV
2436.00	51.78	27.45	3.98	37.41	0.00	0.00	45.80	54.00	-8.20	P	3mV
2500.00	56.29	27.60	4.03	37.38	0.00	0.00	50.54	54.00	-3.46	P	3mV
2740.00	49.53	28.13	4.23	37.58	0.00	0.00	44.31	54.00	-9.69	P	3mV
2796.00	48.78	28.25	4.29	37.63	0.00	0.00	43.69	54.00	-10.31	P	3mV
2928.00	48.74	28.54	4.36	37.74	0.00	0.00	43.90	54.00	-10.10	P	3mV
3450.00	48.10	29.15	4.74	37.44	0.00	0.00	44.55	54.00	-9.45	P	3mV
4804.00	---	---	---	---	---	---	---	---	---	P	3mV
7206.00	---	---	---	---	---	---	---	---	---	P	3mV
9608.00	---	---	---	---	---	---	---	---	---	P	3mV
12010.00	---	---	---	---	---	---	---	---	---	P	3mV
14412.00	---	---	---	---	---	---	---	---	---	P	3mV
16814.00	---	---	---	---	---	---	---	---	---	P	3mV
19216.00	---	---	---	---	---	---	---	---	---	P	3mV
21618.00	---	---	---	---	---	---	---	---	---	P	3mV

Note :

- Measurement was up to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamp gain, Filter: High Pass Filter
 Insertion Loss (3.5GHz) Dist: Correction to extra plate reading to 3m specification distance 1M
 measurement distance: -9.5dB
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz

Operation Mode: TX Mode
 Fundamental Frequency: 2402MHz (CH Low)
 Temperature : 30 °C
 Humidity : 55%

Test Date : 8/02/2002
 Test By: Markba Lee
 Pol: HORIZONTAL

Freq. (MHz)	Reading (dBuV)	AF (dBuV)	Closs (dB)	Pre-amp (dB)	Filter dB	Dist dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Mark (P/Q/A)	Pol (H/V)
1060.00	55.16	24.71	2.78	38.86	0.00	0.00	43.79	54.00	-10.21	P	3 m H
1092.00	49.83	24.77	2.81	37.74	0.00	0.00	39.67	54.00	-14.33	P	3 m H
1172.00	53.03	24.91	2.86	38.44	0.00	0.00	42.36	54.00	-11.64	P	3 m H
1224.00	54.42	25.00	2.89	38.34	0.00	0.00	43.97	54.00	-10.03	P	3 m H
1456.00	49.74	25.42	3.12	38.18	0.00	0.00	40.10	54.00	-13.90	P	3 m H
1488.00	50.94	25.48	3.15	38.09	0.00	0.00	41.48	54.00	-12.52	P	3 m H
1656.00	49.75	25.78	3.3	38.10	0.00	0.00	40.73	54.00	-13.27	P	3 m H
1704.00	48.50	25.87	3.35	37.82	0.00	0.00	39.90	54.00	-14.10	P	3 m H
1748.00	48.04	25.95	3.40	37.84	0.00	0.00	39.55	54.00	-14.45	P	3 m H
1844.00	50.11	26.12	3.61	37.80	0.00	0.00	42.04	54.00	-11.96	P	3 m H
1992.00	50.36	26.39	3.94	37.62	0.00	0.00	43.07	54.00	-10.93	P	3 m H
2372.00	47.26	27.29	3.98	37.44	0.00	0.00	41.09	54.00	-12.91	P	3 m H
2436.00	47.73	27.45	4.03	37.41	0.00	0.00	41.80	54.00	-12.20	P	3 m H
2496.00	50.80	27.59	4.27	37.38	0.00	0.00	45.28	54.00	-8.72	P	3 m H
2784.00	46.92	28.22	4.27	37.62	0.00	0.00	41.79	54.00	-12.21	P	3 m H
2916.00	46.59	28.52	4.37	37.73	0.00	0.00	41.75	54.00	-12.25	P	3 m H
4804.00	---	---	---	---	---	---	---	---	---	P	3 m H
7206.00	---	---	---	---	---	---	---	---	---	P	3 m H
9608.00	---	---	---	---	---	---	---	---	---	P	3 m H
12010.00	---	---	---	---	---	---	---	---	---	P	3 m H
14412.00	---	---	---	---	---	---	---	---	---	P	3 m H
16814.00	---	---	---	---	---	---	---	---	---	P	3 m H
19216.00	---	---	---	---	---	---	---	---	---	P	3 m H
21618.00	---	---	---	---	---	---	---	---	---	P	3 m H
24020.00	---	---	---	---	---	---	---	---	---	P	3 m H

Note :

- Measurement was up to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamp gain, Filter: High Pass Filter
 Insertion Loss (3.5GHz) Dist: Correction to extra plate reading to 3m specification distance 1M
 measurement distance: -9.5dB
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz

Operation Mode: TX Mode
Fundamental Frequency: 2441MHz (CH MID)
Temperature : 30 °C
Humidity : 55%

Test Date : 8/02/2002
Test By: Markba Lee
Pol: VERTICAL

Freq. (MHz)	Reading (dBuV)	AF (dBuV)	Closs (dB)	Pre-amp (dB)	Filter dB	Dist dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Mark (P/Q/A)	Pol (H/V)
1060.00	56.55	24.71	2.78	38.86	0.00	0.00	45.18	54.00	-8.82	P	3mV
1164.00	54.07	24.90	2.85	38.47	0.00	0.00	43.35	54.00	-10.65	P	3mV
1220.00	53.42	25.00	2.88	38.34	0.00	0.00	42.96	54.00	-11.04	P	3mV
1480.00	52.95	25.46	3.14	38.12	0.00	0.00	43.43	54.00	-10.57	P	3mV
1656.00	51.35	25.78	3.30	37.80	0.00	0.00	42.63	54.00	-11.37	P	3mV
1840.00	53.02	26.11	3.48	37.81	0.00	0.00	44.80	54.00	-9.20	P	3mV
1924.00	49.84	26.46	3.54	37.70	0.00	0.00	42.14	54.00	-11.86	P	3mV
2024.00	53.41	27.46	3.64	37.60	0.00	0.00	46.91	54.00	-7.09	P	3mV
2496.00	57.58	27.59	4.03	37.38	0.00	0.00	51.82	54.00	-2.18	P	3mV
2740.00	50.92	28.13	4.23	37.58	0.00	0.00	45.70	54.00	-8.30	P	3mV
4882.00	---	---	---	---	---	---	---	---	---	P	3mV
8323.00	---	---	---	---	---	---	---	---	---	P	3mV
9764.00	---	---	---	---	---	---	---	---	---	P	3mV
12205.00	---	---	---	---	---	---	---	---	---	P	3mV
14646.00	---	---	---	---	---	---	---	---	---	P	3mV
17087.00	---	---	---	---	---	---	---	---	---	P	3mV
19528.00	---	---	---	---	---	---	---	---	---	P	3mV
21969.00	---	---	---	---	---	---	---	---	---	P	3mV
24410.00	---	---	---	---	---	---	---	---	---	P	3mV

Note :

- Measurement was up to 10th harmonic, Remark “---” means that the emissions level is too low to be easured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamp gain, Filter: High Pass Filter
Insertion Loss (3.5GHz) Dist: Correction to extra plate reading to 3m specification distance 1M
measurement distance: -9.5dB
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz

Operation Mode: TX Mode
 Fundamental Frequency: 2441MHz (CH MID)
 Temperature : 30 °C
 Humidity : 55%

Test Date : 8/02/2002
 Test By: Markba Lee
 Pol: HORIZONTAL

Freq. (MHz)	Reading (dBuV)	AF (dBuV)	Closs (dB)	Pre-amp (dB)	Filter dB	Dist dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Mark (P/Q/A)	Pol (H/V)
1064.00	54.89	24.72	2.78	38.84	0.00	0.00	43.55	54.00	-10.45	P	3mH
1164.00	55.01	24.90	2.85	38.47	0.00	0.00	44.29	54.00	-9.71	P	3mH
1224.00	54.56	25.00	2.89	38.34	0.00	0.00	44.11	54.00	-9.89	P	3mH
1460.00	49.27	25.43	3.12	38.17	0.00	0.00	39.65	54.00	-14.35	P	3mH
1484.00	49.34	25.47	3.14	38.10	0.00	0.00	39.85	54.00	-14.15	P	3mH
1656.00	49.73	25.78	3.30	37.80	0.00	0.00	41.01	54.00	-12.99	P	3mH
1840.00	49.90	26.11	3.48	37.81	0.00	0.00	41.68	54.00	-12.32	P	3mH
2500.00	50.95	27.60	4.03	37.38	0.00	0.00	45.20	54.00	-8.80	P	3mH
3460.00	48.80	29.16	4.74	37.43	0.00	0.00	45.27	54.00	-8.73	P	3mH
4882.00	---	---	---	---	---	---	---	---	---	P	3mH
8323.00	---	---	---	---	---	---	---	---	---	P	3mH
9764.00	---	---	---	---	---	---	---	---	---	P	3mH
12205.00	---	---	---	---	---	---	---	---	---	P	3mH
14646.00	---	---	---	---	---	---	---	---	---	P	3mH
17087.00	---	---	---	---	---	---	---	---	---	P	3mH
19528.00	---	---	---	---	---	---	---	---	---	P	3mH
21969.00	---	---	---	---	---	---	---	---	---	P	3mH
24410.00	---	---	---	---	---	---	---	---	---	P	3mH

Note :

- Measurement was up to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamp gain, Filter: High Pass Filter
 Insertion Loss (3.5GHz) Dist: Correction to extra plate reading to 3m specification distance 1M
 measurement distance: -9.5dB
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz

Operation Mode: TX Mode
 Fundamental Frequency: 2480MHz (CH HIGH)
 Temperature : 30 °C
 Humidity : 55%

Test Date : 8/02/2002
 Test By: Markba Lee
 Pol: VERTICAL

Freq.	Reading	AF	Closs	Pre-amp	Filter	Dist	Level	Limit	Margin	Mark	Pol
(MHz)	(dBuV)	(dBuV)	(dB)	(dB)	dB	dB	(dBuV/m)	FCC_B	(dB)	(P/Q/A)	(H/V)
1064.00	55.37	24.72	2.78	38.84	0.00	0.00	44.03	54.00	-9.97	P	3mV
1172.00	52.74	24.91	2.86	38.44	0.00	0.00	42.07	54.00	-11.93	P	3mV
1196.00	50.58	24.95	2.87	38.35	0.00	0.00	40.05	54.00	-13.95	P	3mV
1228.00	52.28	25.10	2.93	38.34	0.00	0.00	41.97	54.00	-12.03	P	3mV
1432.00	49.14	25.38	9.00	38.25	0.00	0.00	45.27	54.00	-8.73	P	3mV
1468.00	50.86	25.44	3.13	38.15	0.00	0.00	41.18	54.00	-12.82	P	3mV
1484.00	52.97	25.47	3.14	38.10	0.00	0.00	43.43	54.00	-10.57	P	3mV
1656.00	51.73	25.78	3.30	37.80	0.00	0.00	42.71	54.00	-11.29	P	3mV
1840.00	52.77	26.11	3.48	37.81	0.00	0.00	44.56	54.00	-9.44	P	3mV
2020.00	54.68	26.45	3.64	37.60	0.00	0.00	46.96	54.00	-7.04	P	3mV
2396.00	52.00	27.35	3.95	37.43	0.00	0.00	45.70	54.00	-8.30	P	3mV
2424.00	52.00	27.42	3.97	37.41	0.00	0.00	45.96	54.00	-8.04	P	3mV
2740.00	49.70	28.13	4.23	37.58	0.00	0.00	44.65	54.00	-9.35	P	3mV
2792.00	48.29	28.24	4.28	37.63	0.00	0.00	43.23	54.00	-10.77	P	3mV
2920.00	48.55	28.52	4.36	37.73	0.00	0.00	43.80	54.00	-10.20	P	3mV
3450.00	47.26	29.15	4.74	37.44	0.00	0.00	43.42	54.00	-10.58	P	3mV
4960.00	---	---	---	---	---	---	---	---	---	P	3mV
7440.00	---	---	---	---	---	---	---	---	---	P	3mV
9920.00	---	---	---	---	---	---	---	---	---	P	3mV
12400.00	---	---	---	---	---	---	---	---	---	P	3mV
14880.00	---	---	---	---	---	---	---	---	---	P	3mV
17360.00	---	---	---	---	---	---	---	---	---	P	3mV
19840.00	---	---	---	---	---	---	---	---	---	P	3mV
22320.00	---	---	---	---	---	---	---	---	---	P	3mV
24800.00	---	---	---	---	---	---	---	---	---	P	3mV

Note :

- Measurement was up to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamp gain, Filter: High Pass Filter
 Insertion Loss (3.5GHz) Dist: Correction to extra plate reading to 3m specification distance 1M
 measurement distance: -9.5dB
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz

Operation Mode: TX Mode
 Fundamental Frequency: 2480MHz (CH HIGH)
 Temperature : 30 °C
 Humidity : 55%

Test Date : 8/02/2002
 Test By: Markba Lee
 Pol: HORIZONTAL

Freq. (MHz)	Reading (dBuV)	AF (dBuV)	Closs (dB)	Pre-amp (dB)	Filter dB	Dist dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Mark (P/Q/A)	Pol (H/V)
1064.00	55.27	24.72	2.78	38.84	0.00	0.00	43.93	54.00	-10.07	P	3mH
1176.00	54.03	24.92	2.86	38.43	0.00	0.00	43.38	54.00	-10.62	P	3mH
1216.00	55.67	24.99	2.88	38.34	0.00	0.00	45.20	54.00	-8.80	P	3mH
1456.00	49.58	25.42	3.12	38.18	0.00	0.00	39.94	54.00	-14.06	P	3mH
1484.00	49.69	25.47	3.14	38.10	0.00	0.00	40.20	54.00	-13.80	P	3mH
1656.00	50.39	25.78	3.30	37.80	0.00	0.00	41.37	54.00	-12.63	P	3mH
1704.00	48.03	25.87	3.35	37.82	0.00	0.00	39.45	54.00	-14.55	P	3mH
1840.00	49.69	26.11	3.48	37.81	0.00	0.00	41.46	54.00	-12.54	P	3mH
2000.00	47.20	26.40	3.62	37.61	0.00	0.00	39.41	54.00	-14.59	P	3mH
2024.00	47.15	26.46	3.76	37.60	0.00	0.00	39.76	54.00	-14.24	P	3mH
2396.00	48.23	27.35	3.95	37.43	0.00	0.00	41.93	54.00	-12.07	P	3mH
2784.00	47.98	26.59	3.69	37.57	0.00	0.00	40.83	54.00	-13.17	P	3mH
4960.00	---	---	---	---	---	---	---	---	---	P	3mH
7440.00	---	---	---	---	---	---	---	---	---	P	3mH
9920.00	---	---	---	---	---	---	---	---	---	P	3mH
12400.00	---	---	---	---	---	---	---	---	---	P	3mH
14880.00	---	---	---	---	---	---	---	---	---	P	3mH
17360.00	---	---	---	---	---	---	---	---	---	P	3mH
19840.00	---	---	---	---	---	---	---	---	---	P	3mH
22320.00	---	---	---	---	---	---	---	---	---	P	3mH
24800.00	---	---	---	---	---	---	---	---	---	P	3mH

Note :

- Measurement was up to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Closs: Cable Loss, Pre-Amp: Preamp gain, Filter: High Pass Filter
 Insertion Loss (3.5GHz) Dist: Correction to extra plate reading to 3m specification distance 1M
 measurement distance: -9.5dB
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz

10. FREQUENCY SEPARATION

10.1 Standard Applicable

According to §15.247(a), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 20dB bandwidth of the hopping channel, whichever is greater.

10.2 9.2 Measurement Procedure

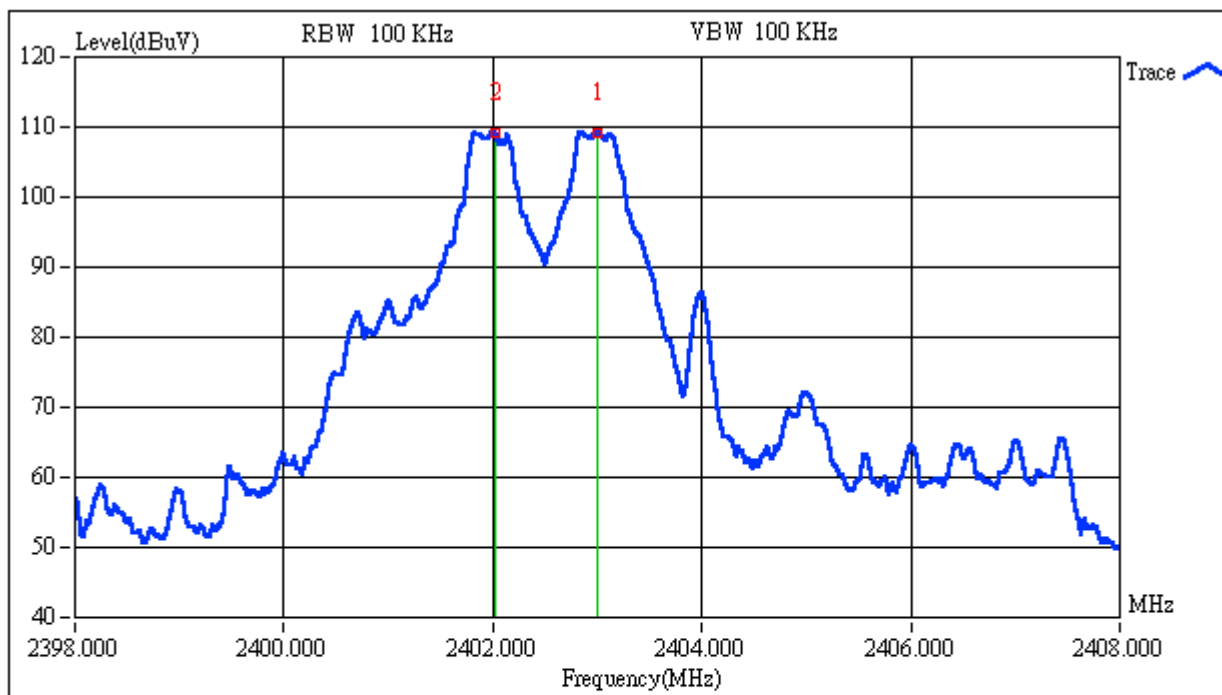
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel .
4. Set the spectrum analyzer as RBW,VBW=100KHz, Adjust Span to 10 MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

10.3 Measurement Result

CH	Frequency	Channel separation	Limit	Result
	(MHz)	MHz	kHz	
	2400.00	0.98	≥ 25	PASS

10.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	ADVANTEST	R3271A	NA	10/15/2001	10/14/2002
low loss cable	Huber + Suhner	Sucoflex 104	N/A	N/A	N/A

Frequency Separation Test Data

Custom Name:

EPOX

Engineer:

markba_lee

Peak 2403.00 MHz

Band Width

109.24 dBuV

0.980 MHz

Model Name:

BT-DG02

Report No.:

020034-R

Delta1 2402.02 MHz Delta2 2403.00 MHz

Test Mode:

TX CHANNEL SEPARATION

109.01 dBuV

109.24 dBuV

11. NUMBER OF HOPPING FREQUENCY

11.1 Standard Applicable

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz and 5725MHz – 5850MHz bands shall use at least 75 hopping frequencies.

11.2 Measurement Procedure

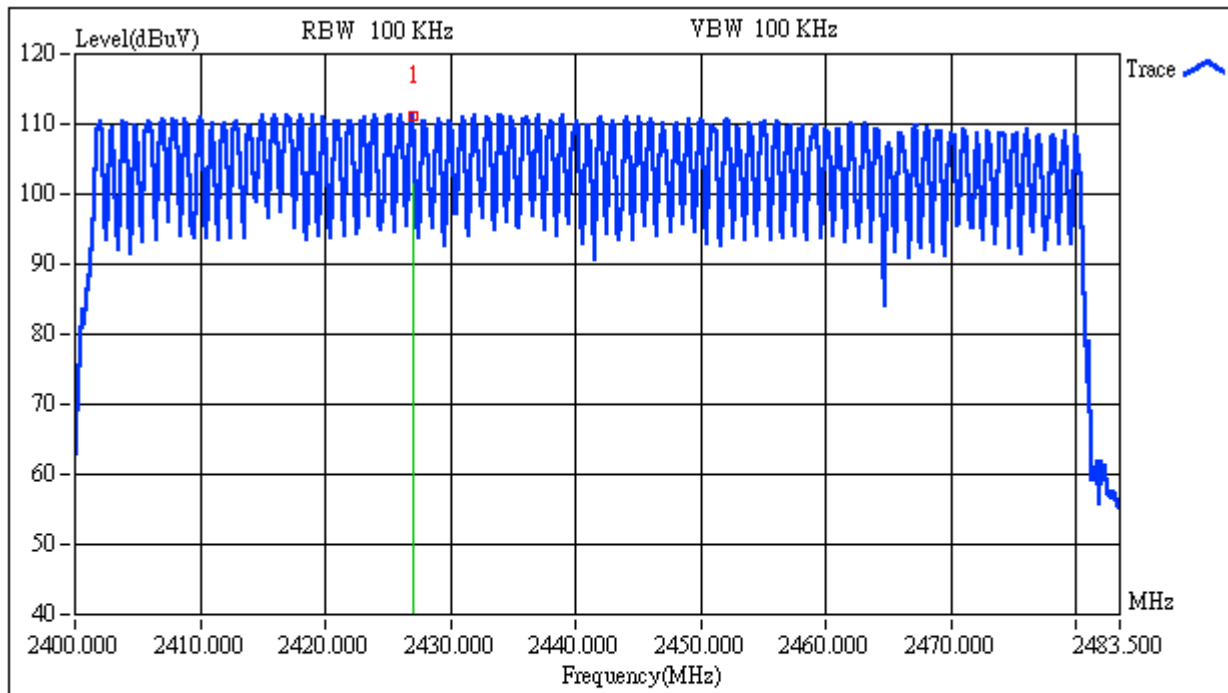
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
4. Set the spectrum analyzer as RBW,VBW=100KHz,
5. Max hold, view and count how many channel in the band.

11.3 Measurement Result

Total no of hopping channel	Limit (CH)	Measurement result (CH)	Result
	75	79	PASS

11.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	ADVANTEST	R3271A	NA	10/15/2001	10/14/2002
low loss cable	Huber + Suhner	Sucoflex 104	N/A	N/A	N/A

Channel Number

Custom Name:

EPOX

Engineer:

markba_lee

Peak 0.00 MHz

Band Width

0.00 dBuV

0.000 MHz

Model Name:

BT-DG02

Report No.:

020034-R

Delta1 0.00 MHz Delta2 0.00 MHz

Test Mode:

TX HOPPING ON

0.00 dBuV

0.00 dBuV

12. TIME OF OCCUPANCY (DWELL TIME)

12.1 Standard Applicable

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz and 5725MHz – 5850MHz bands. The average time of occupancy on any frequency shall not greater than 0.4 s within a 30s period.

12.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW,VBW=1MHz, Span = 0Hz , Adjust Sweep = 30s.
5. Repeat above procedures until all frequency measured were complete.

12.3 Measurement Result

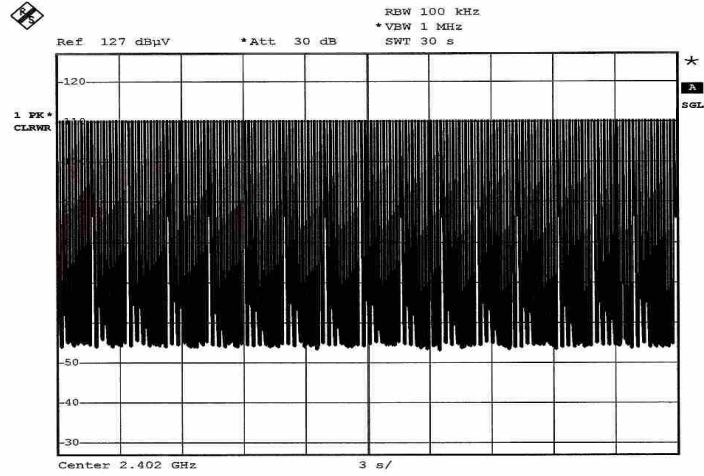
440u*300=0.132 Secend

Total of Dwell Time (ms)	Limit (ms)	Result
	400	PASS

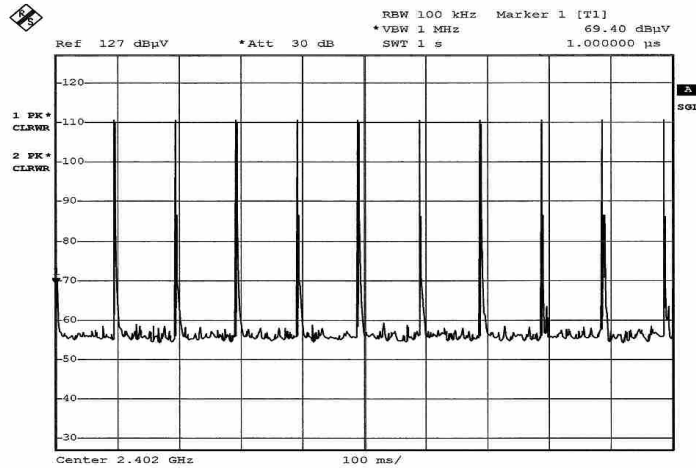
12.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	ADVANTEST	R3271A	NA	10/15/2001	10/14/2002
low loss cable	Huber + Suhner	Sucoflex 104	N/A	N/A	N/A

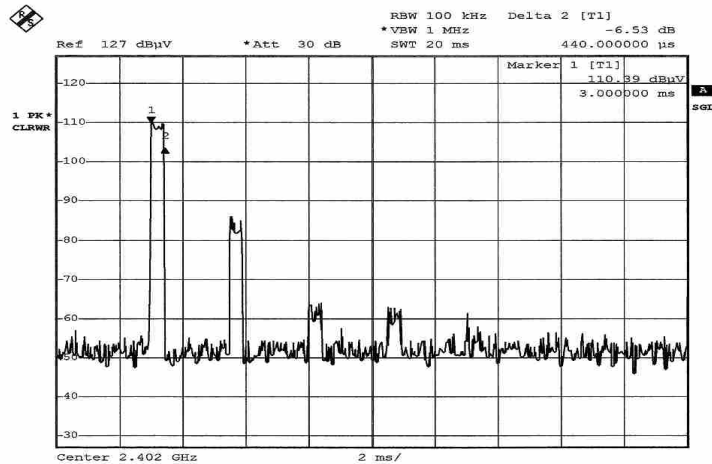
Dwell Time Test Data CH-Low



Comment A: TX CH-LOW(2402MHz)
Date: 31.JUL.2002 10:59:08

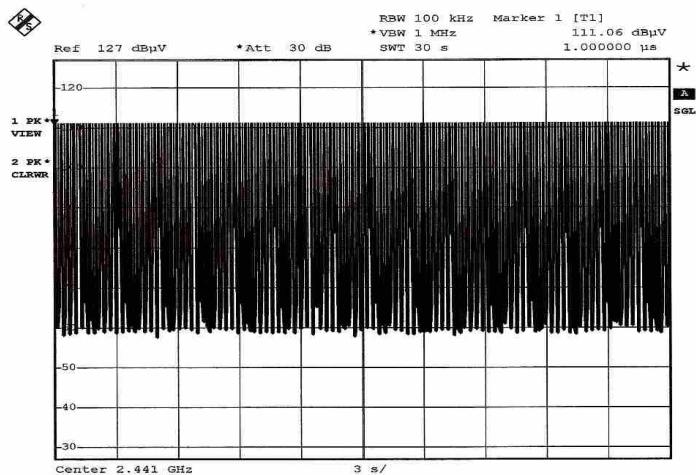


Comment A: TX CH-LOW(2402MHz)
Date: 31.JUL.2002 13:56:40

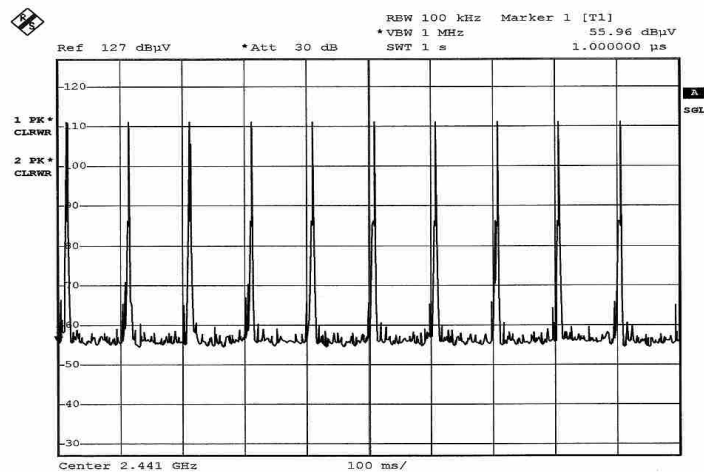


Comment A: TX CH-LOW(2402MHz)
Date: 31.JUL.2002 11:11:49

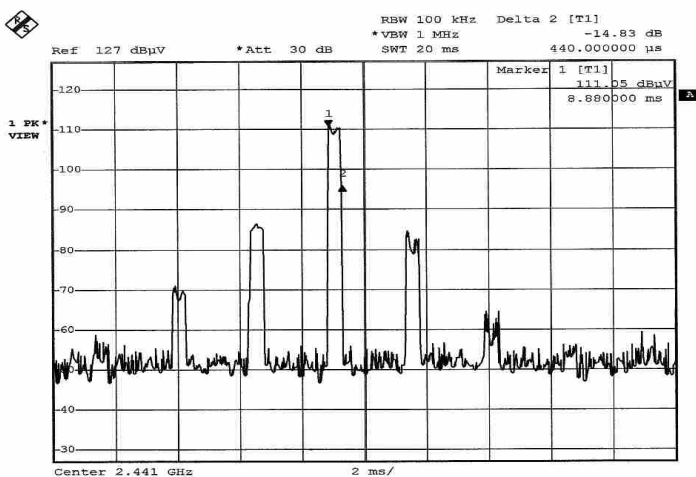
Dwell Time Test Data CH-Mid



Comment A: TX CH-MID(2441MHz)
Date: 31.JUL.2002 14:03:18

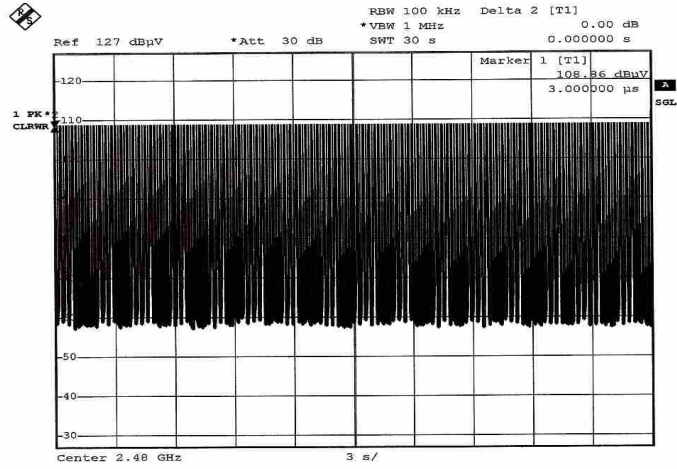


Comment A: TX CH-MID(2441MHz)
Date: 31.JUL.2002 14:01:18

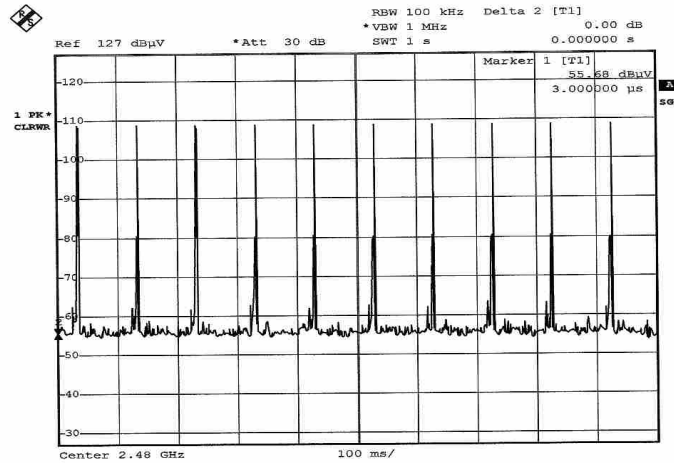


Comment A: TX CH-MID(2441MHz)
Date: 31.JUL.2002 14:05:17

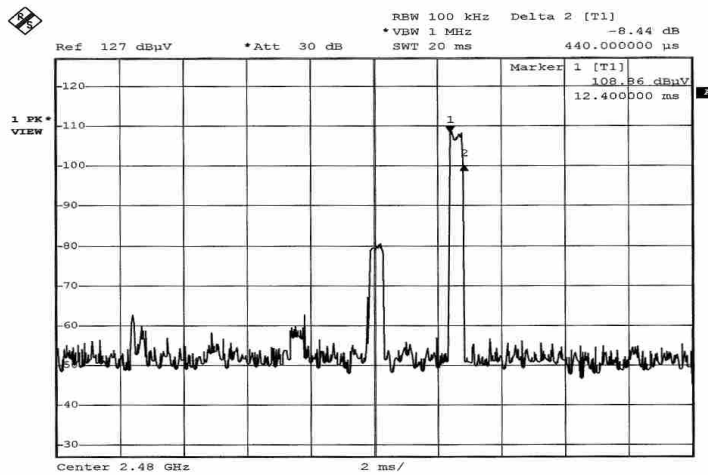
Dwell Time Test Data CH-High



Comment A: TX CH-HIGH(2480MHz)
Date: 31.JUL.2002 14:12:02



Comment A: TX CH-HIGH(2480MHz)
Date: 31.JUL.2002 14:13:55



Comment A: TX CH-HIGH(2480MHz)
Date: 31.JUL.2002 14:16:09

13. ANTENNA REQUIREMENT

13.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

And according to §15.246(1), if transmitting antennas of directional gain greater than 6dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

13.2 Antenna Connected Construction

The directional gain of antenna used for transmitting is 2 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

14. RF EXPOSURE

14.1 Standard Applicable

According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

MPE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG / 4 \pi R^2$$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 3.58(dBm)

Maximum peak output power at antenna input terminal: 2.28 (mW)

Antenna gain (typical): 2(dBi)

Maximum antenna gain: 1.58 (numeric)

Prediction distance: 3 (cm)

Prediction frequency: 2441 (MHz)

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm²)

Power density at predication frequency at 3 (cm) distance

$$S = PG / 4 \pi R^2; \quad S = 3.58 + 2/4 * \pi * 3^2 \quad S = 0.03(\text{mW}/\text{cm}^2)$$

14.2 Measurement Result

The predicted power density level at 3 cm is 0.03 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 2441MHz.