5.9 Test of Radiated Emission

Radiated emissions from 30 MHz to 26.5 GHz were measured according to the methods defined in ANSI C63.4-2001. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 5.9.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

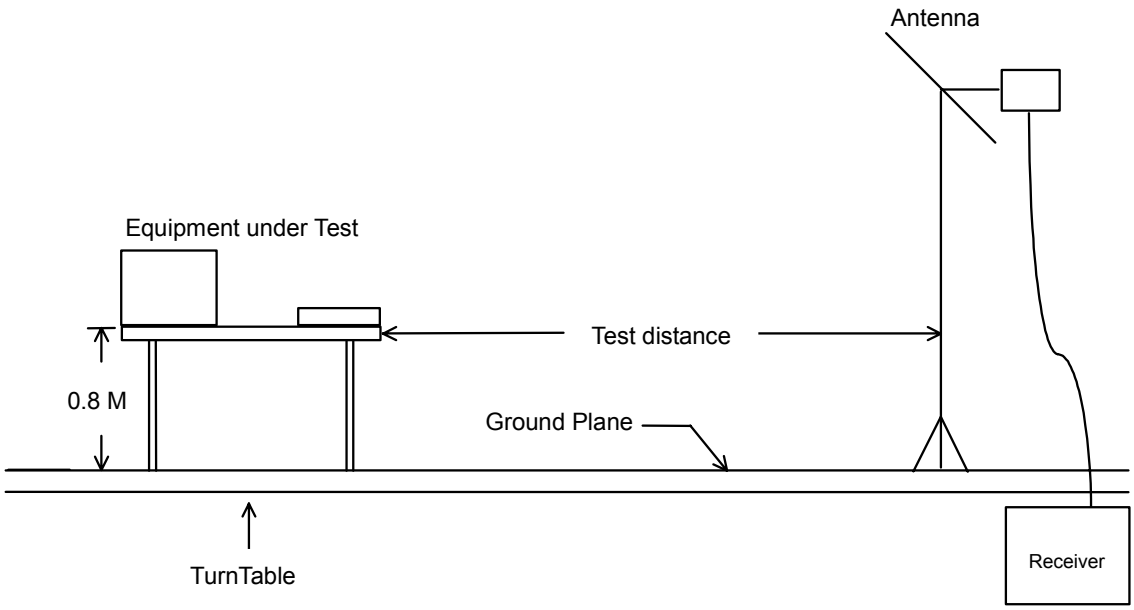
5.9.1 Major Measuring Instruments

● Amplifier	(MITEQ AFS44)
RF Gain	40 dB
Signal Input	100 MHz to 26.5 GHz
● Amplifier	(HP 8447D)
RF Gain	30 dB
Signal Input	100 kHz to 1.3 GHz
● Spectrum analyzer	(R&S FSP40)
Attenuation	10 dB
Start Frequency	1 GHz
Stop Frequency	24 GHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	9 kHz to 40 GHz

5.9.2 Test Procedures

1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.

5.9.3 Typical Test Setup Layout of Radiated Emission

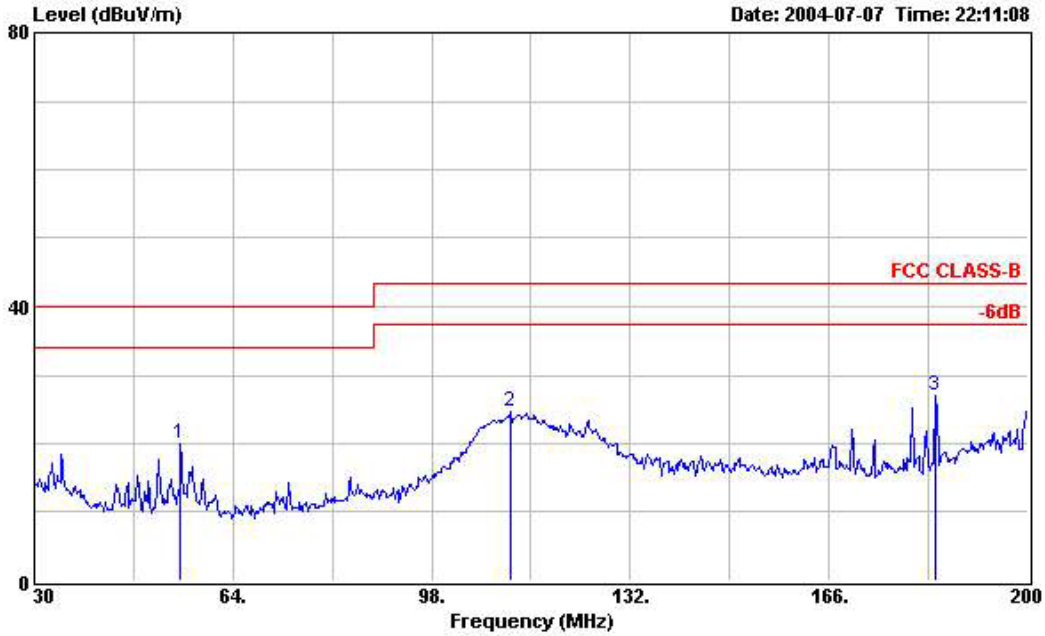


5.9.4 Test Result of Radiated Emission

- Test Mode: Mode 1
- Test Distance: 3 m
- Temperature: 26°C
- Relative Humidity: 53 %
- Test Date: July 07, 2004
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

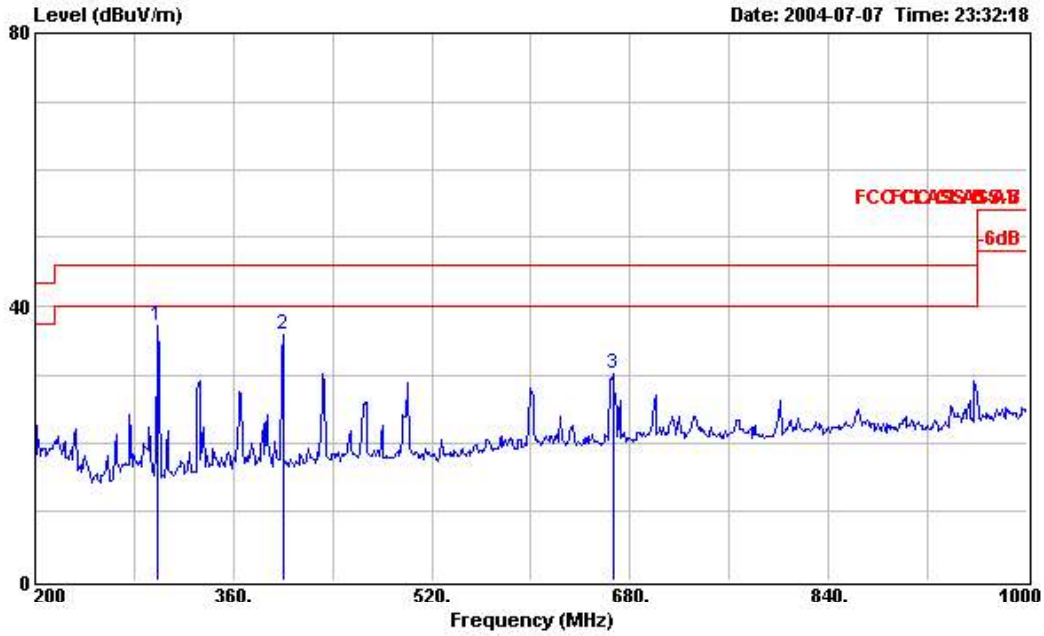
■ The test that passed at the minimum margin was marked by the frame in the following test record

Spurious Emission



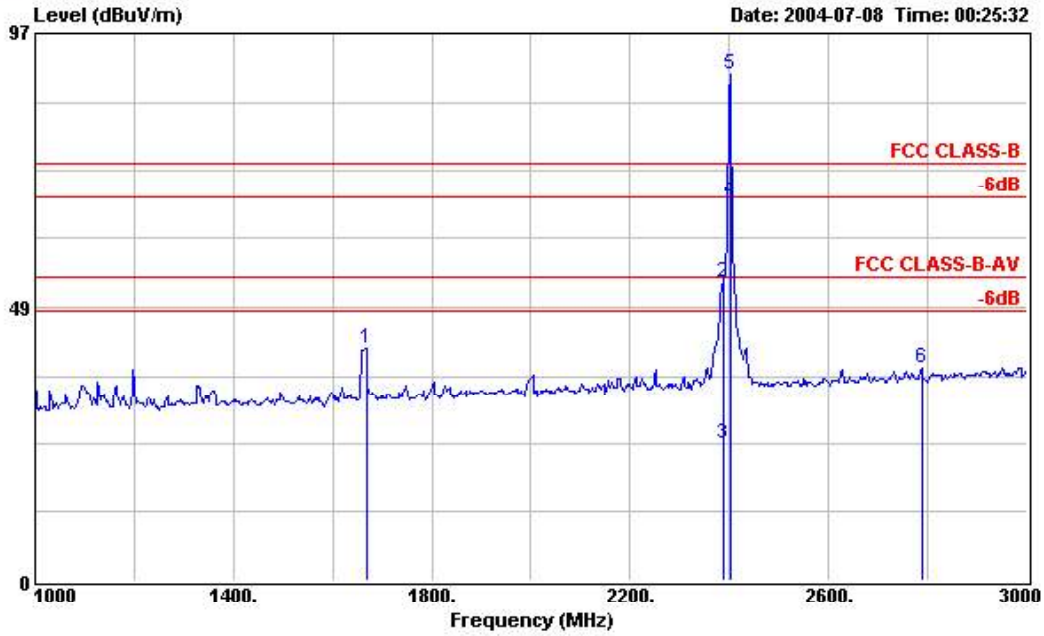
Site : 03CH03-HY
Condition : FCC CLASS-B 3m BIC-9124--301 HORIZONTAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH00_2402MHz
: BlueBooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	54.990	19.91	-20.09	40.00	36.43	10.21	1.26	27.99	Peak	---	---
2	111.430	24.79	-18.71	43.50	40.33	10.46	1.88	27.88	Peak	---	---
3	184.190	27.04	-16.46	43.50	38.33	13.99	2.45	27.73	Peak	---	---



Site : 03CH03-HY
Condition : FCC CLASS-B 3m LOG-9111-221 HORIZONTAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH00_2402MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	299.200	37.18	-8.82	46.00	48.22	13.19	3.08	27.31	Peak	---	---
2	400.000	35.77	-10.23	46.00	44.31	15.79	3.47	27.80	Peak	---	---
3	666.400	30.17	-15.83	46.00	35.13	19.12	4.65	28.73	Peak	---	---

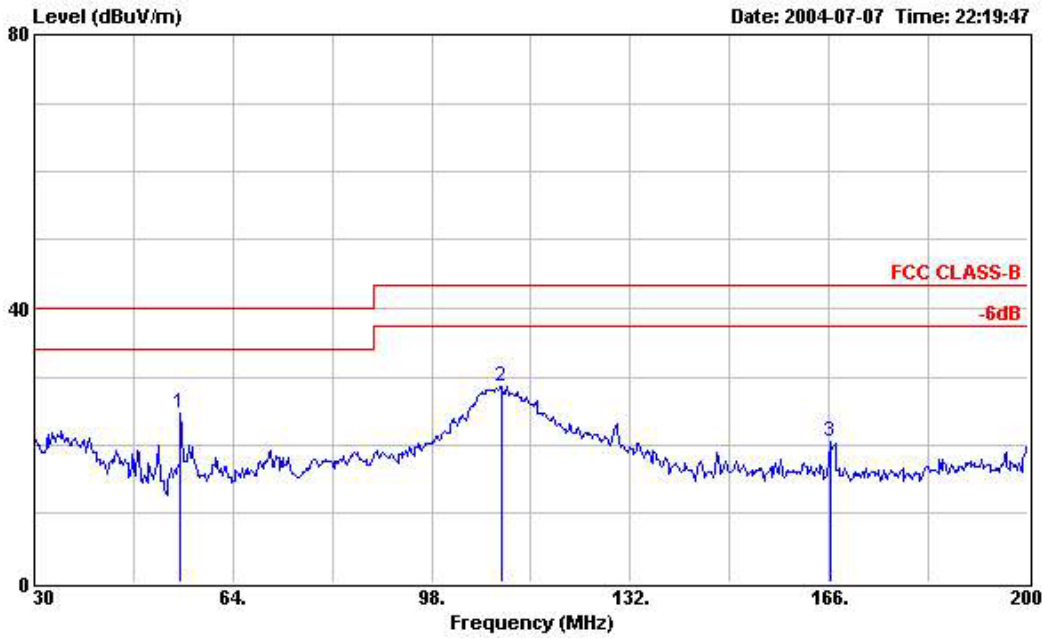


Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6821 HORIZONTAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH00_2402MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1668.000	41.14	-32.86	74.00	54.49	25.88	1.48	40.71	Peak	---	---
2	2388.000	52.80	-21.20	74.00	64.06	28.14	1.74	41.14	Peak	100	122
3	2388.000	24.32	-29.68	54.00	35.58	28.14	1.74	41.14	Average	100	122
4 X	2404.000	67.37			78.59	28.18	1.75	41.15	Average	100	324
5 X	2404.000	89.78			101.00	28.18	1.75	41.15	Peak	100	324
6	2788.000	37.81	-36.19	74.00	47.45	29.46	2.10	41.20	Peak	---	---

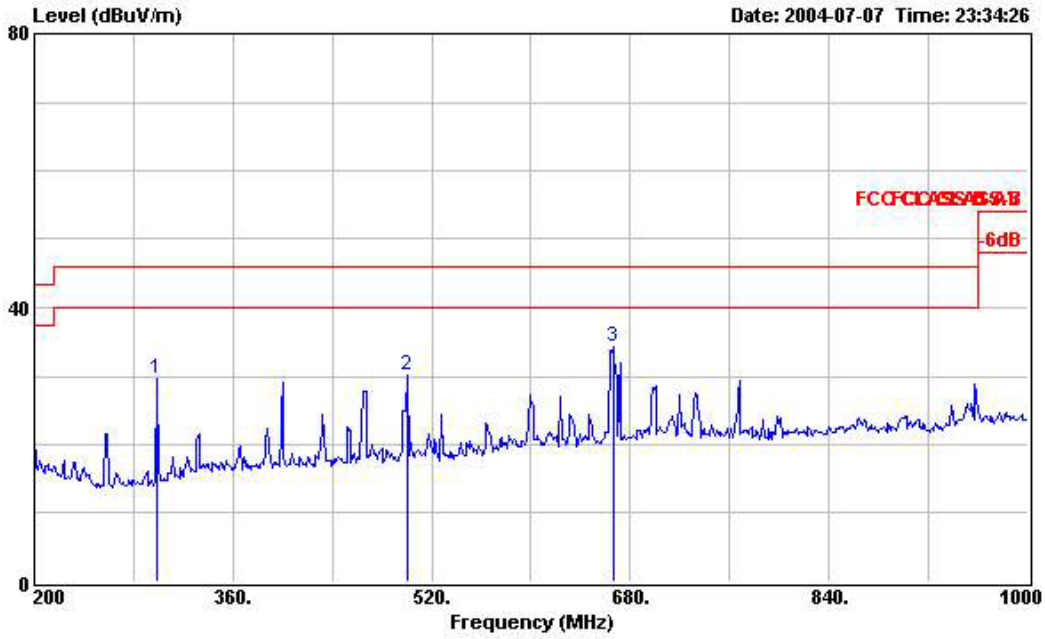
Remark:

1. The “X” represent a fundamental frequency.
2. Frequency from 2788MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.



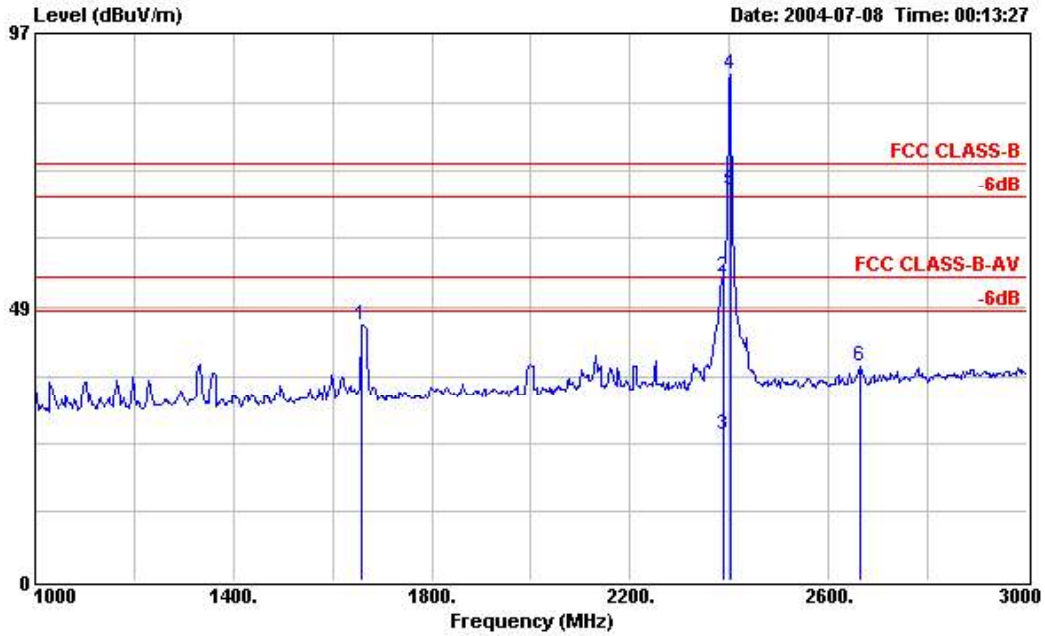
Site : 03CH03-HY
Condition : FCC CLASS-B 3m BIC-9124--301 VERTICAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH00_2402MHz
: BlueBooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	54.990	24.56	-15.44	40.00	41.08	10.21	1.26	27.99	Peak	---	---
2	109.900	28.60	-14.90	43.50	44.18	10.43	1.87	27.88	Peak	---	---
3	166.340	20.64	-22.86	43.50	33.03	13.05	2.33	27.77	Peak	---	---



Site : 03CH03-HY
Condition : FCC CLASS-B 3m LOG-9111-221 VERTICAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH00_2402MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	298.400	29.55	-16.45	46.00	40.62	13.16	3.08	27.31	Peak	---	---
2	500.000	30.07	-15.93	46.00	37.54	17.35	3.88	28.70	Peak	---	---
3	666.400	34.19	-11.81	46.00	39.15	19.12	4.65	28.73	Peak	---	---



Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6821 VERTICAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH00_2402MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1660.000	45.42	-28.58	74.00	58.79	25.85	1.48	40.70	Peak	---	---
2	2388.000	53.86	-20.14	74.00	65.12	28.14	1.74	41.14	Peak	103	70
3	2388.000	25.86	-28.14	54.00	37.12	28.14	1.74	41.14	Average	103	70
4 X	2404.000	89.78			101.00	28.18	1.75	41.15	Peak	100	77
5 X	2404.000	69.35			80.57	28.18	1.75	41.15	Average	100	77
6	2662.000	38.18	-35.82	74.00	48.39	29.01	1.98	41.20	Peak	---	---

Remark:

1. The “X” represent a fundamental frequency.
2. Frequency from 2662MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Preamp Factor (dB)	Limits (dBuV/m)	Emission (dBuV/m)	Margin (dB)	Detect Mode
2404.000	H	28.18	1.75	59.85	41.15	-	89.78	-	Peak
2404.000	H	28.18	1.75	37.44	41.15	-	67.37	-	A.V.
2404.000	V	28.18	1.75	59.85	41.15	-	89.78	-	Peak
2404.000	V	28.18	1.75	39.42	41.15	-	69.35	-	A.V.
4804.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
7206.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
9608.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
12010.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
14412.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
16814.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
19216.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
21618.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
24020.000	V/H	-	-	-	-	-	-	-	Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

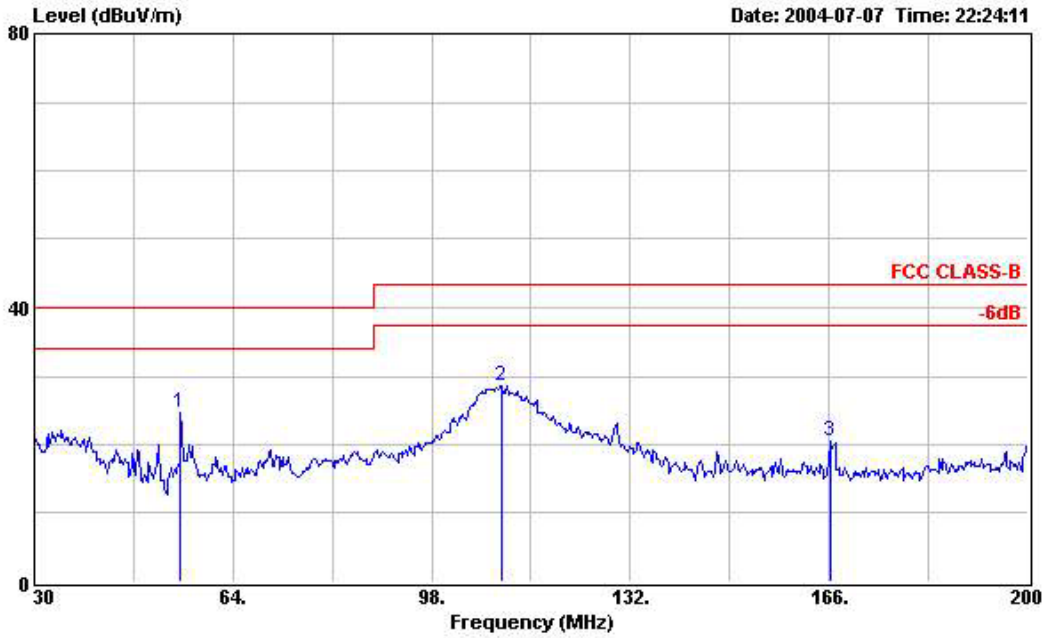
Test Engineer: 

Jay

- Test Mode: Mode 2
- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 53 %
- Test Date: July 07, 2004
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

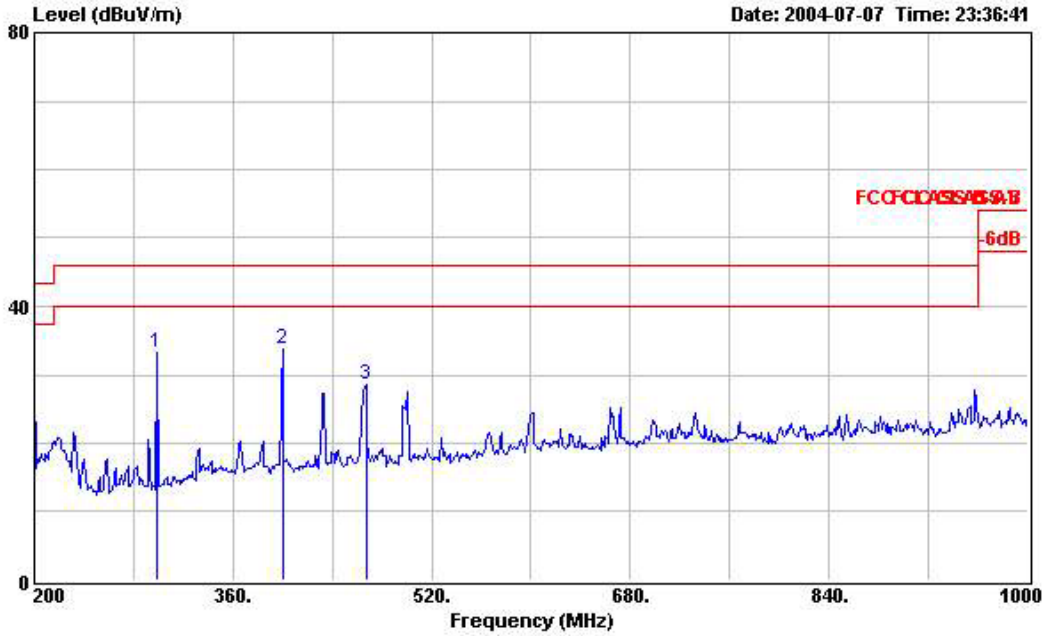
The test that passed at the minimum margin was marked by the frame in the following test record

Spurious Emission



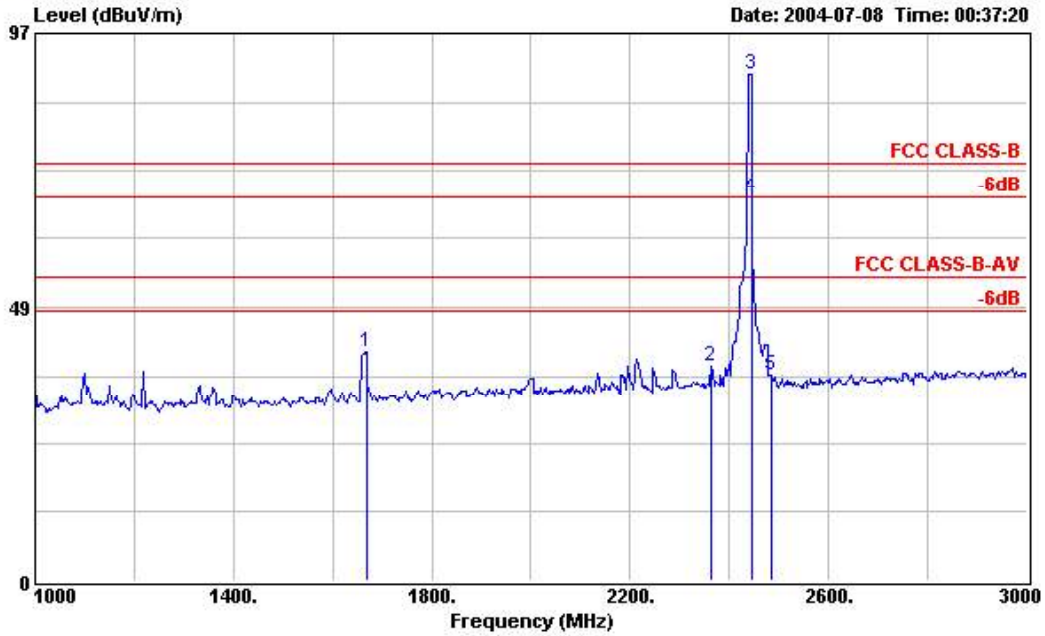
Site : 03CH03-HY
Condition : FCC CLASS-B 3m BIC-9124--301 HORIZONTAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH39_2441MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	54.990	24.56	-15.44	40.00	41.08	10.21	1.26	27.99	Peak	---	---
2	109.900	28.60	-14.90	43.50	44.18	10.43	1.87	27.88	Peak	---	---
3	166.340	20.64	-22.86	43.50	33.03	13.05	2.33	27.77	Peak	---	---



Site : 03CH03-HY
Condition : FCC CLASS-B 3m LOG-9111-221 HORIZONTAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH39_2441MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	298.400	33.35	-12.65	46.00	44.42	13.16	3.08	27.31	Peak	---	---
2	400.000	33.79	-12.21	46.00	42.33	15.79	3.47	27.80	Peak	---	---
3	467.200	28.46	-17.54	46.00	36.20	16.86	3.80	28.40	Peak	---	---

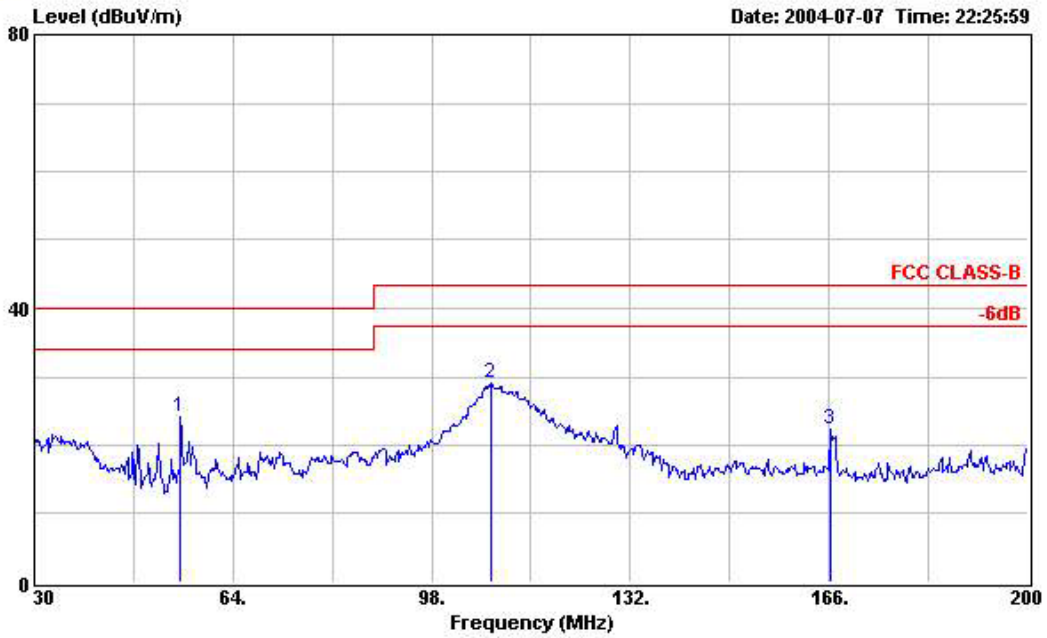


Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6821 HORIZONTAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH39_2441MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1668.000	40.70	-33.30	74.00	54.05	25.88	1.48	40.71	Peak	---	---
2	2364.000	38.12	-35.88	74.00	49.44	28.07	1.73	41.12	Peak	---	---
3 X	2444.000	89.88			100.99	28.28	1.78	41.17	Peak	100	326
4 X	2444.000	68.13			79.24	28.28	1.78	41.17	Average	100	326
5	2484.000	36.50	-37.50	74.00	47.50	28.39	1.81	41.20	Peak	---	---

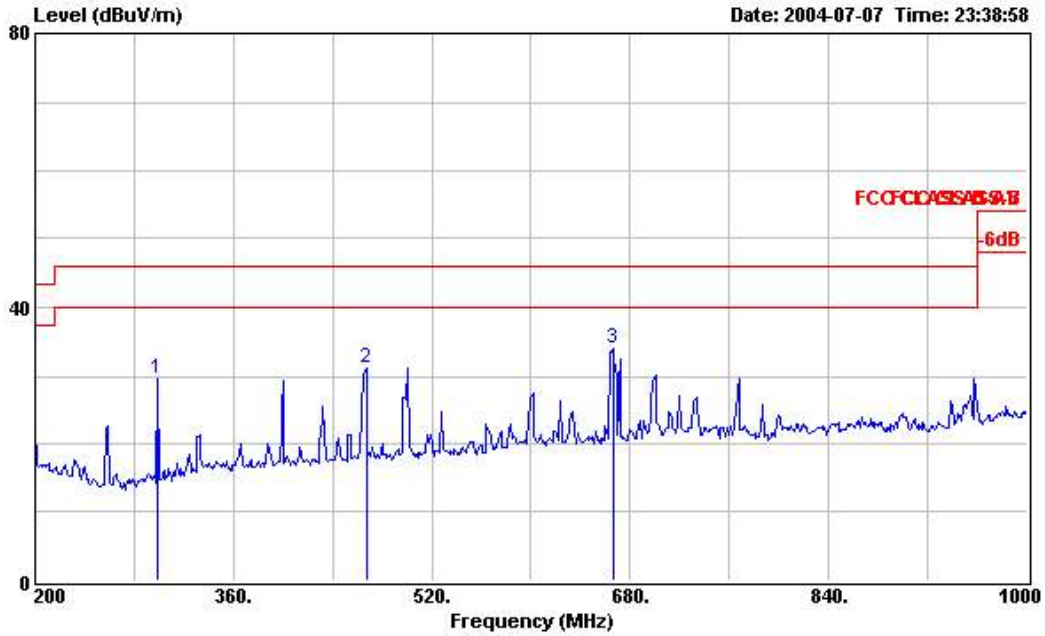
Remark:

1. The “X” represent a fundamental frequency.
2. Frequency from 2484MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.



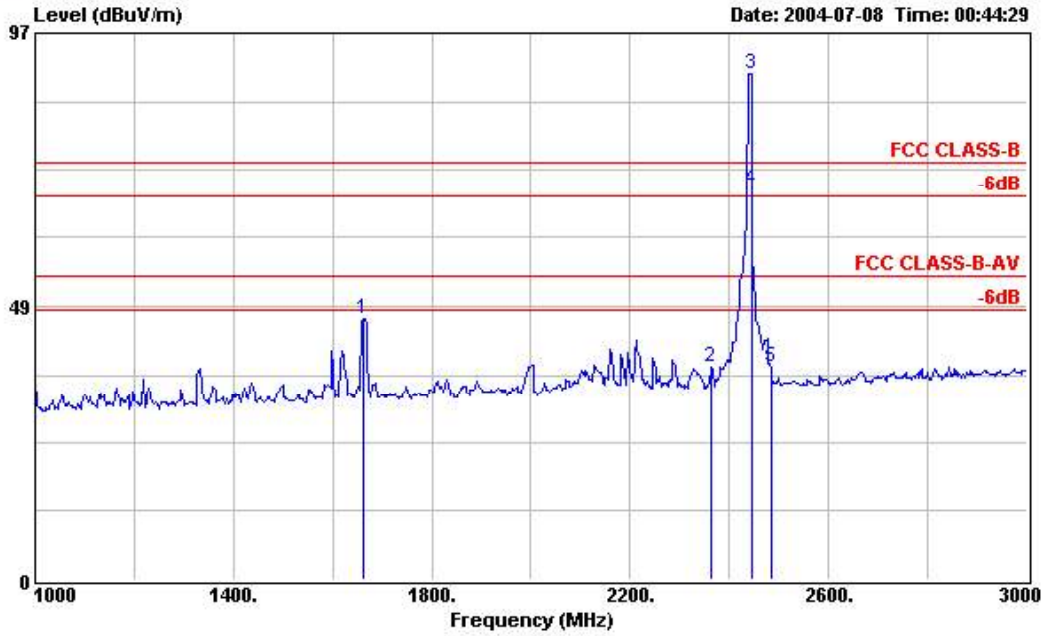
Site : 03CH03-HY
Condition : FCC CLASS-B 3m BIC-9124--301 VERTICAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH39_2441MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	54.990	24.21	-15.79	40.00	40.73	10.21	1.26	27.99	Peak	---	---
2	108.030	29.05	-14.45	43.50	44.77	10.31	1.85	27.88	Peak	---	---
3	166.340	22.21	-21.29	43.50	34.60	13.05	2.33	27.77	Peak	---	---



Site : 03CH03-HY
Condition : FCC CLASS-B 3m LOG-9111-221 VERTICAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH39_2441MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	298.400	29.62	-16.38	46.00	40.69	13.16	3.08	27.31	Peak	---	---
2	467.200	31.10	-14.90	46.00	38.84	16.86	3.80	28.40	Peak	---	---
3	666.400	34.05	-11.95	46.00	39.01	19.12	4.65	28.73	Peak	---	---



Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6821 VERTICAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH39_2441MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1662.000	46.37	-27.63	74.00	59.73	25.86	1.48	40.70	Peak	---	---
2	2364.000	37.71	-36.29	74.00	49.03	28.07	1.73	41.12	Peak	---	---
3 X	2444.000	89.88			100.99	28.28	1.78	41.17	Peak	100	116
4 X	2444.000	69.21			80.32	28.28	1.78	41.17	Average	100	116
5	2484.000	37.77	-36.23	74.00	48.77	28.39	1.81	41.20	Peak	---	---

Remark:

1. The “X” represent a fundamental frequency.
2. Frequency from 2484MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Preamp Factor (dB)	Limits (dBuV/m)	Emission (dBuV/m)	Margin (dB)	Detect Mode
2444.000	H	28.28	1.78	59.82	41.17	-	89.88	-	Peak
2444.000	H	28.28	1.78	38.07	41.17	-	68.13	-	A.V.
2444.000	V	28.28	1.78	59.82	41.17	-	89.88	-	Peak
2444.000	V	28.28	1.78	32.15	41.17	-	62.21	-	A.V.
2882.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
7323.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
9764.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
12205.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
14646.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
17087.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
19528.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
21969.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
24410.000	V/H	-	-	-	-	-	-	-	Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

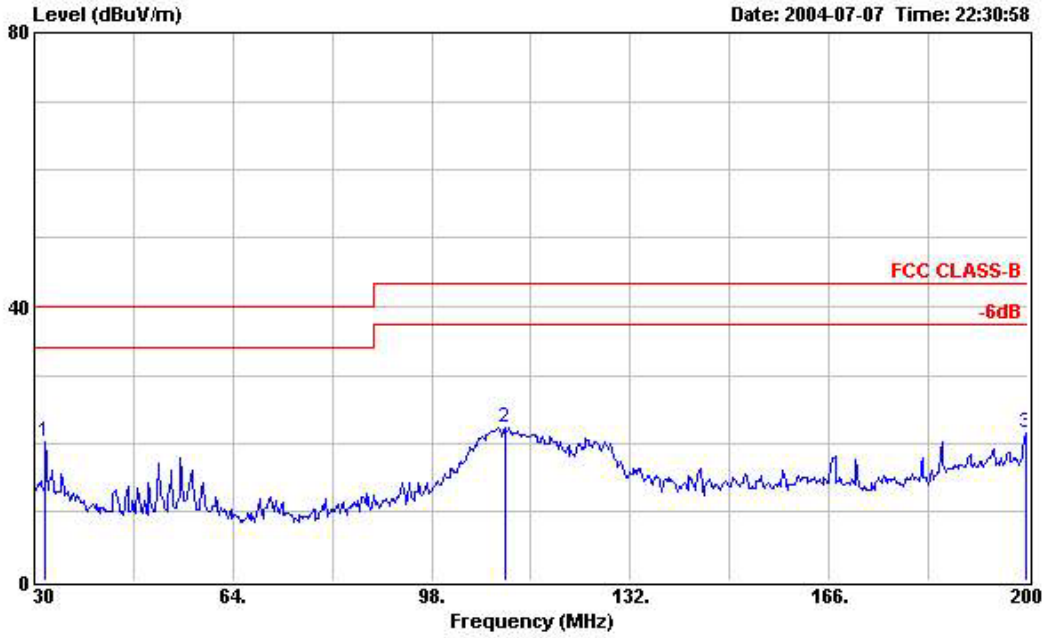
Test Engineer: 

Jay

- Test Mode: Mode 3
- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 53 %
- Test Date: July 07, 2004
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

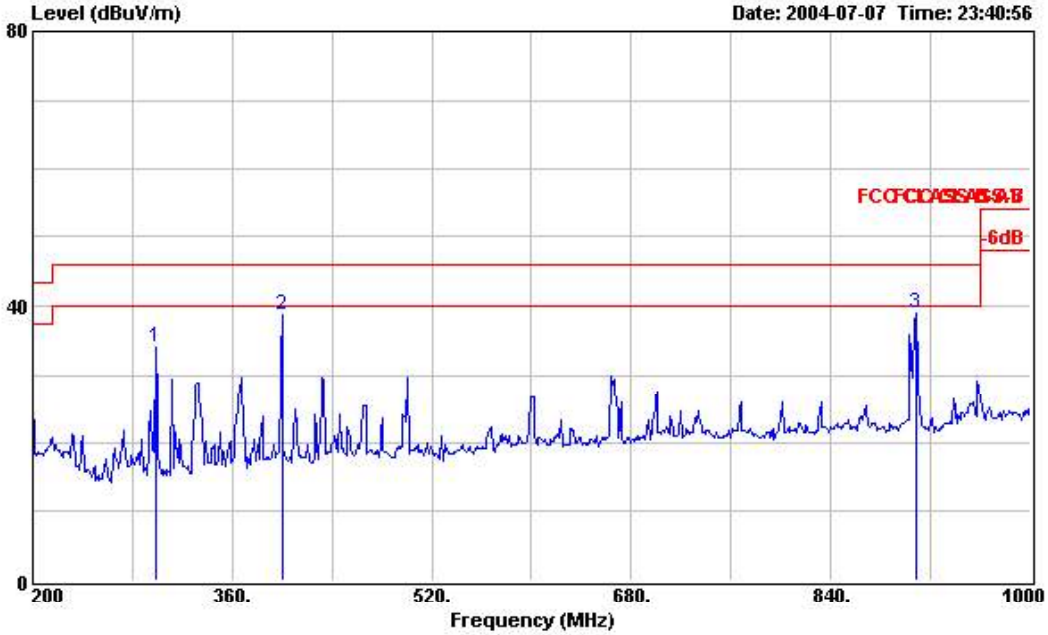
The test that passed at the minimum margin was marked by the frame in the following test record

Spurious Emission



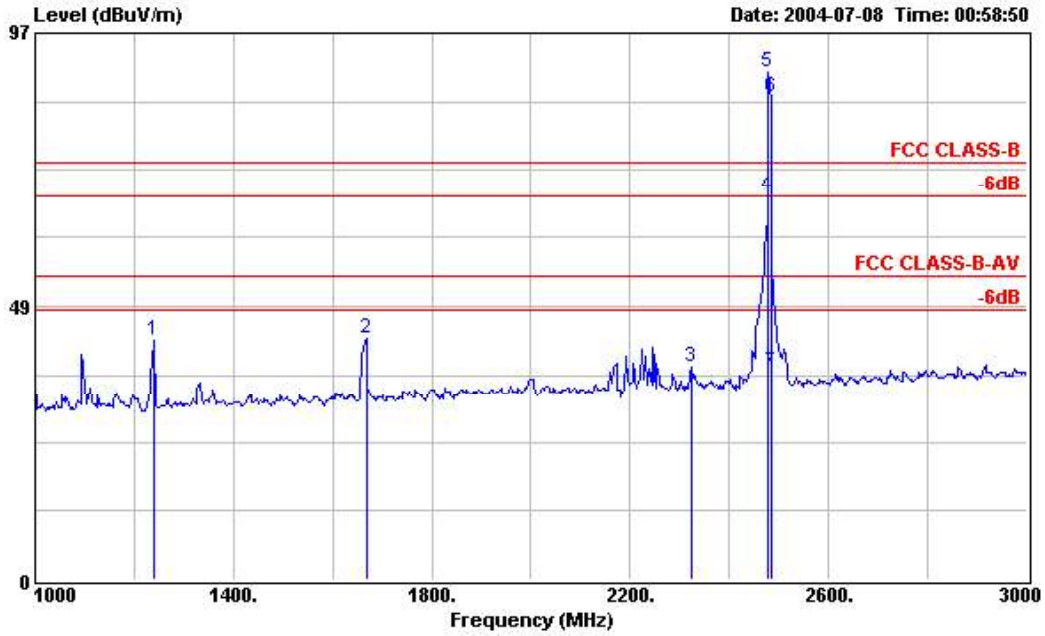
Site : 03CH03-HY
Condition : FCC CLASS-B 3m BIC-9124--301 HORIZONTAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH78_2480MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	31.870	20.28	-19.72	40.00	34.43	13.71	0.18	28.04	Peak	---	---
2	110.580	22.30	-21.20	43.50	39.17	10.45	0.56	27.88	Peak	---	---
3	199.660	21.52	-21.98	43.50	33.40	14.79	1.03	27.70	Peak	---	---



Site : 03CH03-HY
Condition : FCC CLASS-B 3m LOG-9111-221 HORIZONTAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH78_2480MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	299.200	34.06	-11.94	46.00	45.10	13.19	3.08	27.31	Peak	---	---
2	400.000	38.67	-7.33	46.00	47.21	15.79	3.47	27.80	Peak	---	---
3	908.800	38.85	-7.15	46.00	40.56	21.21	5.37	28.29	Peak	---	---



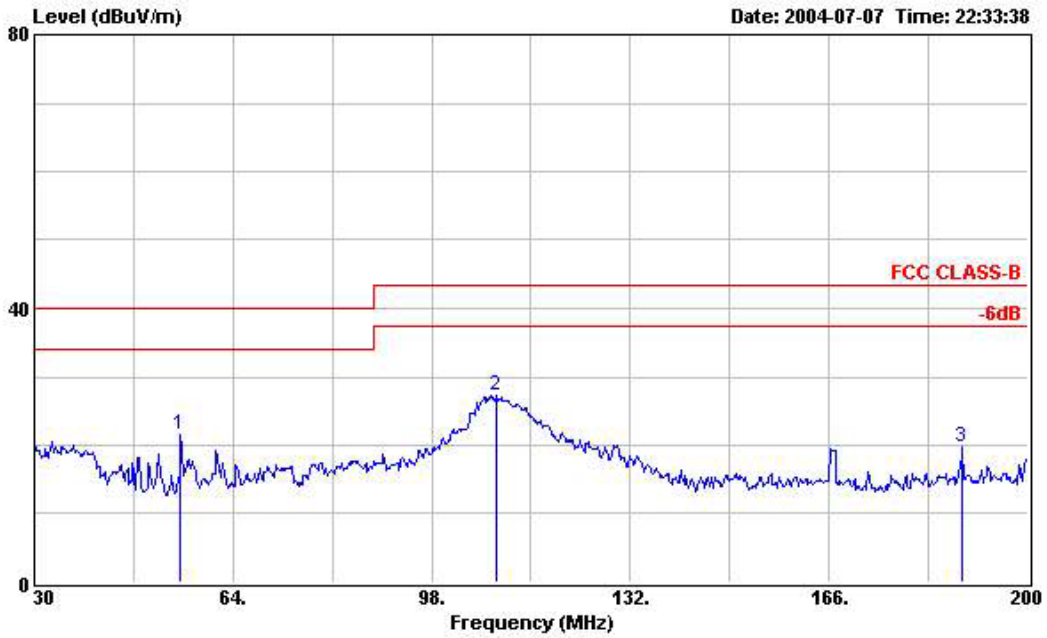
Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6821 HORIZONTAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH78_2480MHz
: Bluebooth

		Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1		1238.000	42.58	-31.42	74.00	57.14	24.50	1.29	40.35	Peak	---	---
2		1668.000	42.97	-31.03	74.00	56.32	25.88	1.48	40.71	Peak	---	---
3		2324.000	37.65	-36.35	74.00	49.08	27.97	1.70	41.10	Peak	---	---
4	X	2478.000	68.10			79.12	28.37	1.80	41.19	Average	100	345
5	X	2478.000	89.98			101.00	28.37	1.80	41.19	Peak	100	345
6	X	2484.000	85.61	11.61	74.00	96.61	28.39	1.81	41.20	Peak	100	330
7		2484.000	36.88	-17.12	54.00	47.88	28.39	1.81	41.20	Average	100	330

Remark:

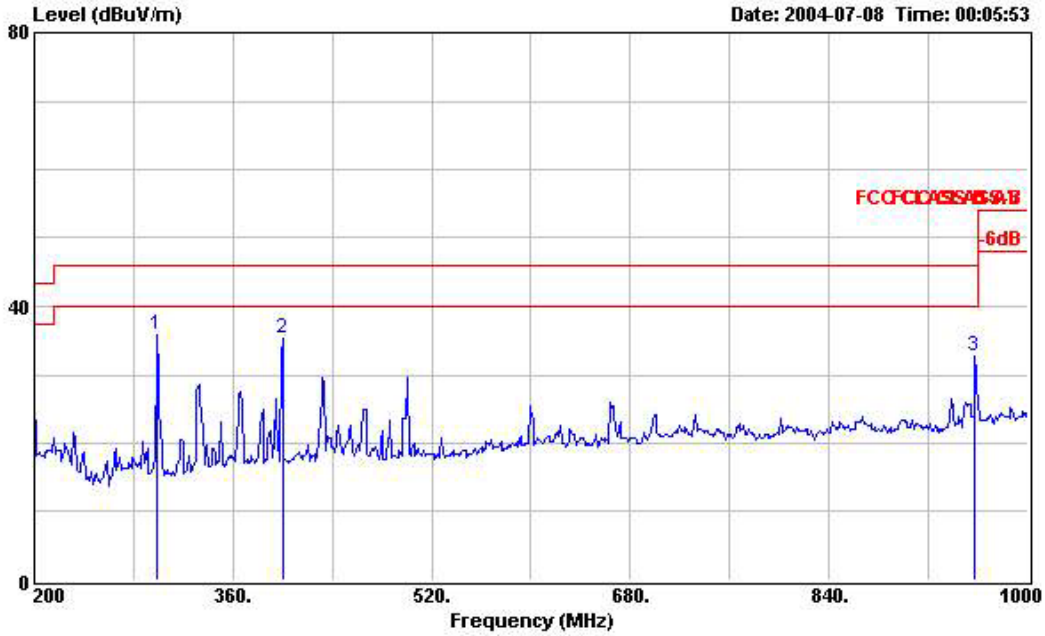
1. The “X” represent a fundamental frequency.

2. Frequency from 2484MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.



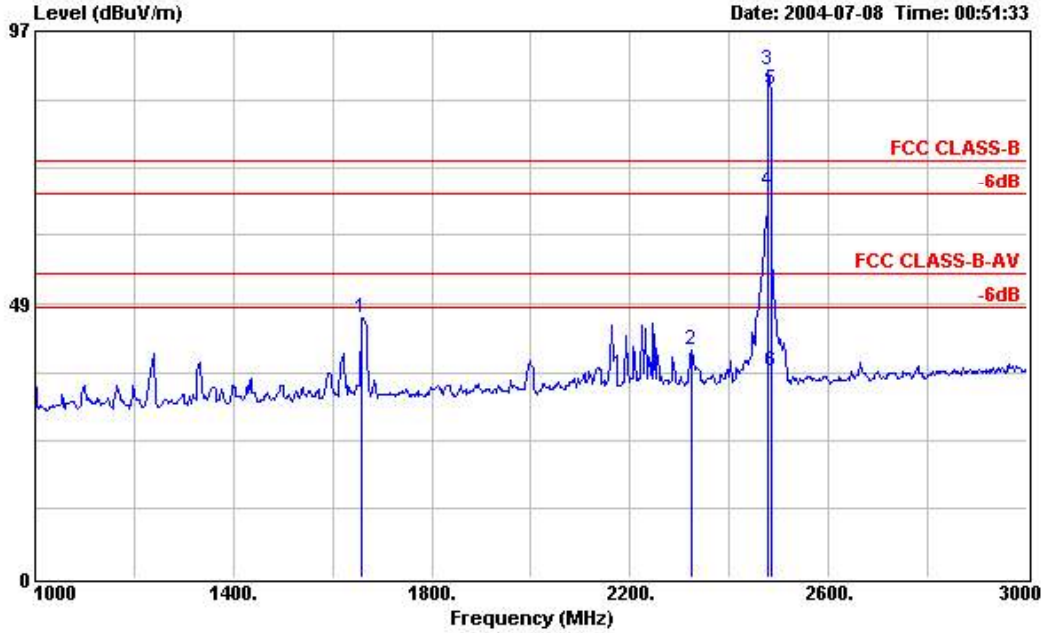
Site : 03CH03-HY
Condition : FCC CLASS-B 3m BIC-9124--301 VERTICAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH78_2480MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	54.990	21.53	-18.47	40.00	38.97	10.21	0.34	27.99	Peak	---	---
2	109.220	27.29	-16.21	43.50	44.24	10.38	0.55	27.88	Peak	---	---
3	188.780	19.80	-23.70	43.50	32.25	14.45	0.82	27.72	Peak	---	---



Site : 03CH03-HY
Condition : FCC CLASS-B 3m LOG-9111-221 VERTICAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH78_2480MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	299.200	35.91	-10.09	46.00	46.95	13.19	3.08	27.31	Peak	---	---
2	400.000	35.28	-10.72	46.00	43.82	15.79	3.47	27.80	Peak	---	---
3	957.600	32.73	-13.27	46.00	33.42	21.90	5.65	28.24	Peak	---	---



Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6821 VERTICAL
EUT : Dongle
Model : BT-DG05A
Power : 120Vac/60Hz
Memo : Tx_CH78_2480MHz
: Bluebooth

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1660.000	45.99	-28.01	74.00	59.36	25.85	1.48	40.70	Peak	---	---
2	2324.000	40.44	-33.56	74.00	51.87	27.97	1.70	41.10	Peak	---	---
3 X	2478.000	89.98			101.00	28.37	1.80	41.19	Peak	100	245
4 X	2478.000	68.73			79.75	28.37	1.80	41.19	Average	100	245
5 X	2484.000	86.69	12.69	74.00	97.69	28.39	1.81	41.20	Peak	100	262
6	2484.000	36.40	-17.60	54.00	47.40	28.39	1.81	41.20	Average	100	262

Remark:

1. The “X” represent a fundamental frequency.
2. Frequency from 2484MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Preamp Factor (dB)	Limits (dBuV/m)	Emission (dBuV/m)	Margin (dB)	Detect Mode
2478.000	H	28.37	1.80	59.81	41.19	-	89.98	-	Peak
2478.000	H	28.37	1.80	37.93	41.19	-	68.10	-	A.V.
2478.000	V	28.37	1.80	59.81	41.19	-	89.98	-	Peak
2478.000	V	28.37	1.80	38.56	41.19	-	68.73	-	A.V.
4960.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
7440.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
9920.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
12400.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
14880.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
17360.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
19840.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
22320.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
24800.000	V/H	-	-	-	-	-	-	-	Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer: 

Jay

6. Antenna Requirements

The EUT use a printed antenna. It is considered to meet antenna requirement of FCC.

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that assembled by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if directional gain of transmitting antennas greater than 6dBi are used, the power shall be reduced by the same amount in unit dB comparing to the directional gain of the antenna minus 6dBi.

Antenna Connected Construction

The antenna used in this product is printed antenna without connector.

7. RF Exposure

FCC Rules and Regulations Part 1.1307,1.1310,2.1091,2.1093:

RF Exposure Compliance

7.1 Limit For Maximum Permissible Exposure (MPE)

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

F=frequency in MHz *Plane-wave equivalent power density

7.2 MPE Calculations

Power Density =Pd (mW/cm^2) = EIRP/4 π d^2

EIRP = P · G

P＝Peak output power (mW)

G＝Antenna numeric gain (numeric)

d＝Separation distance (cm)

Because the EUT belongs to General Population/ Uncontrolled Exposure, the limit of power density is 1.0 mW/cm^2.

Channel NO.	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Calculated RF Exposure at d=20cm (mW/cm^2)	Limit (mW/cm^2)
Channel 00	0.00	1.00	0.29	1.07	0.0002	1.00
Channel 39	0.00	1.00	0.32	1.08	0.0002	1.00
Channel 78	0.00	1.00	0.01	1.00	0.0002	1.00

7.3 FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm during normal operation.

8. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9 KHz – 2.75 GHz	Feb. 16, 2004	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9 KHz – 30 MHz	Jun. 09, 2004	Conduction (CO04-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9 KHz – 30 MHz	Apr. 27, 2004	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB044	9KHz~30MHz	Apr. 21, 2004	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2004	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 23, 2003	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 24, 2003	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 24, 2003	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Jul. 23, 2003	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6821	1GHz – 18GHz	Sep. 12, 2003	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Horn Antenna	Schwarzbeck	BBHA9170	154	15GHz~40GHz	Jun. 09, 2004	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec. 05, 2003	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.

9. Uncertainty of Test Site

Uncertainty of Conducted Emission Measurement (30MHz ~ 1000MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.10	Normal(k=2)	0.05
Cable loss	0.10	Normal(k=2)	0.05
AMN insertion loss	2.50	Rectangular	0.63
Receiver Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch Receiver VSWR Γ1= LISN VSWR Γ2= Uncertainty=20log(1-Γ1*Γ2)	+0.34/-0.35	U-shape	0.24
combined standard uncertainty Uc(y)	**1.13**		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	**2.26**		

Uncertainty of Radiated Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch Receiver VSWR Γ1= 0.20 Antenna VSWR Γ2= 0.23 Uncertainty=20log(1-Γ1*Γ2)	+0.39/-0.41	U-shaped	0.28
combined standard uncertainty Uc(y)	**1.27**		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	**2.54**		

U=√{(1/2)²+(0.3/2)²+(2²+0.5²+2²+0.25²+2²)/3+(0.54)²/2}=2.2 for 10m test distance

U=√{(1/2)²+(0.3/2)²+(2²+3²+2²+0.25²+2²)/3+(0.54)²/2}=2.7 for 3m test distance

Uncertainty of Conducted Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	Ci	$Ci*u($
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	±1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	±0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR Γ1= 0.197 Antenna VSWR Γ2= 0.194 Uncertainty=20log(1-Γ1*Γ2*Γ3)	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty Uc(y)	**2.36**				
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**4.72**				

U=√{(0.3/2)² +(2²+1.5²+0.2²)/3+(0.2)²/2}=1.66