5 CONDUCTED EMISSION MEASUREMENT

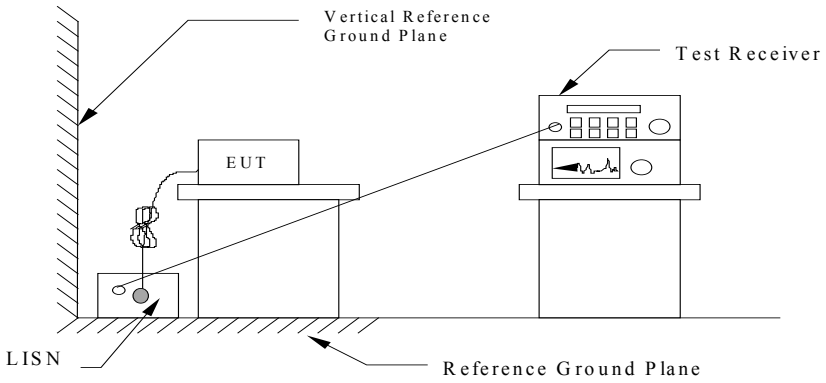
5.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to § 15.107(a) and §15.207(a) respectively. Both Limits are identical specification.

5.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration



5.3 Conducted Emission Data

5.3.1
Operation Mode: 2402 MHz

Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

Freq. (MHz)	Meter Reading (dBuV)				Factor (dB)	Result (dBuV)				Limit (dBuV)		Margins (dB)
	Q.P Value		AVG. Value			Q.P Value		AVG. Value		Q.P Value	AVG. Value	Q.P. or AVG.
	L1	L2	L1	L2		L1	L2	L1	L2			
0.287	33.4	***	----	----	0.2	33.6	***	----	----	60.6	50.6	-27.0
0.291	***	30.1	----	----	0.2	***	30.3	----	----	60.5	50.5	-30.2
0.574	36.2	36.7	----	----	0.2	36.4	36.9	----	----	56.0	46.0	-19.1
0.734	29.9	***	----	----	0.2	30.1	***	----	----	56.0	46.0	-25.9
0.859	***	34.9	----	----	0.2	***	35.1	----	----	56.0	46.0	-20.9
0.863	34.5	***	----	----	0.2	34.7	***	----	----	56.0	46.0	-21.3
0.977	***	31.6	----	----	0.2	***	31.8	----	----	56.0	46.0	-24.2
1.039	28.9	***	----	----	0.2	29.1	***	----	----	56.0	46.0	-26.9
1.223	***	29.5	----	----	0.2	***	29.7	----	----	56.0	46.0	-26.3
1.766	26.2	***	----	----	0.2	26.4	***	----	----	56.0	46.0	-29.6
1.898	***	28.4	----	----	0.2	***	28.6	----	----	56.0	46.0	-27.4
0.287	33.4	***	----	----	0.2	33.6	***	----	----	60.6	50.6	-27.0

Note:

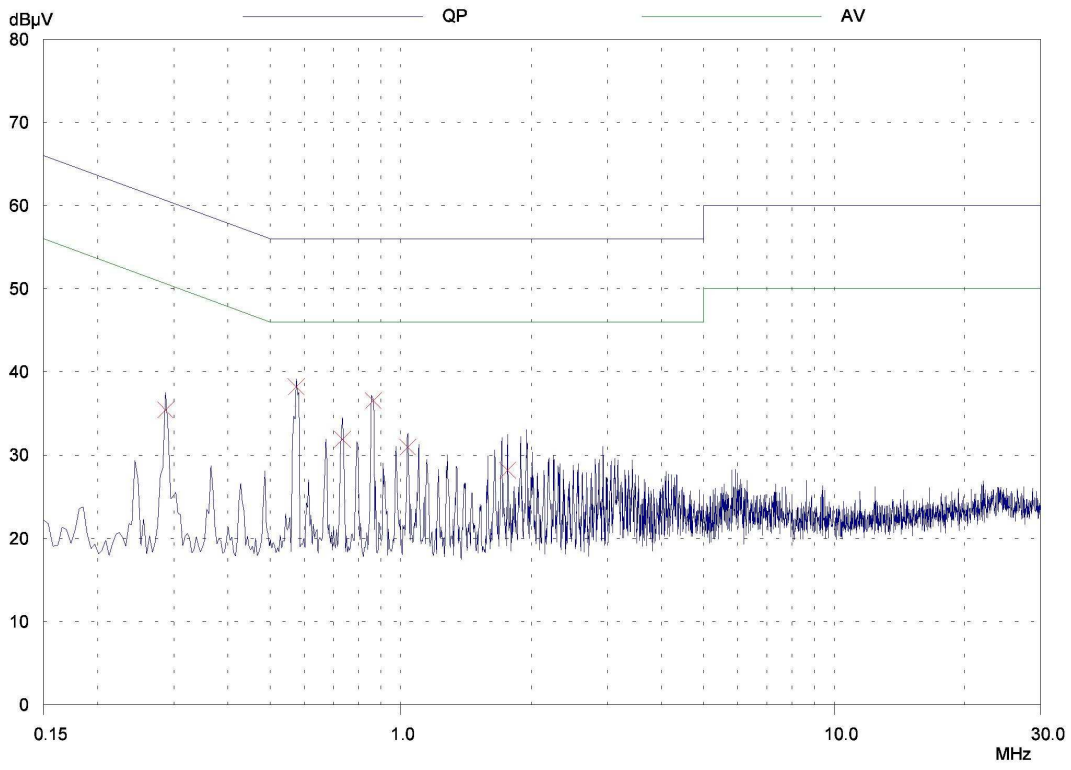
1. “***” means the value was too low to be measured.
2. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. “#” means the noise was too low, so record the peak value.
4. The estimated measurement uncertainty of the result measurement is ±2.5dB.
5. Please refer to page 34 to page 35 for chart.

CONDUCTED EMISSION TEST

PEAK VALUE

EUT:	Bluetooth Headset
Manuf:	
Op Cond:	Operation
Operator:	JAMES
Test Spec:	FCC
Comment:	L1
	CH00
Result File:	ce_l1.dat :

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	6 dB

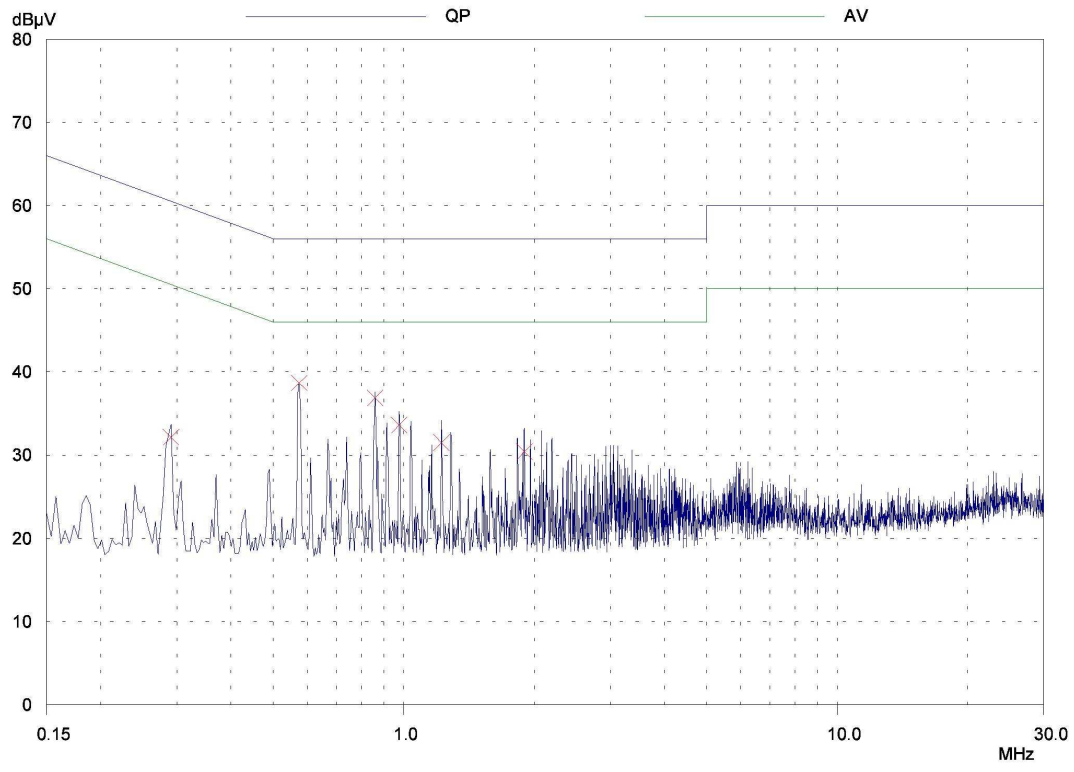


CONDUCTED EMISSION TEST

PEAK VALUE

EUT:	Bluetooth Headset
Manuf:	
Op Cond:	Operation
Operator:	JAMES
Test Spec:	FCC
Comment:	L2
	CH00
Result File:	ce_l2.dat :

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	6 dB



5.3.2
Operation Mode: 2441 MHz

Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

Freq. (MHz)	**Meter Reading** (dBuV)				**Factor** (dB)	**Result** (dBuV)				**Limit** (dBuV)		**Margins** (dB)
	Q.P Value		AVG. Value			Q.P Value		AVG. Value		Q.P Value	AVG. Value	Q.P. or AVG.
	L1	L2	L1	L2		L1	L2	L1	L2			
0.286	32.4	***	----	----	0.2	32.6	***	----	----	60.6	50.6	-28.0
0.291	***	30.1	----	----	0.2	***	30.3	----	----	60.5	50.5	-30.2
0.574	35.2	36.7	----	----	0.2	35.4	36.9	----	----	56.0	46.0	-19.1
0.653	***	28.4	----	----	0.2	***	28.6	----	----	56.0	46.0	-27.4
0.724	***	31.6	----	----	0.2	***	31.8	----	----	56.0	46.0	-24.2
0.731	28.9	***	----	----	0.2	29.1	***	----	----	56.0	46.0	-26.9
0.859	***	30.5	----	----	0.2	***	30.7	----	----	56.0	46.0	-25.3
0.863	32.5	***	----	----	0.2	32.7	***	----	----	56.0	46.0	-23.3
0.977	***	29.2	----	----	0.2	***	29.4	----	----	56.0	46.0	-26.6
1.030	27.9	***	----	----	0.2	28.1	***	----	----	56.0	46.0	-27.9
1.767	25.9	***	----	----	0.2	26.1	***	----	----	56.0	46.0	-29.9

Note:

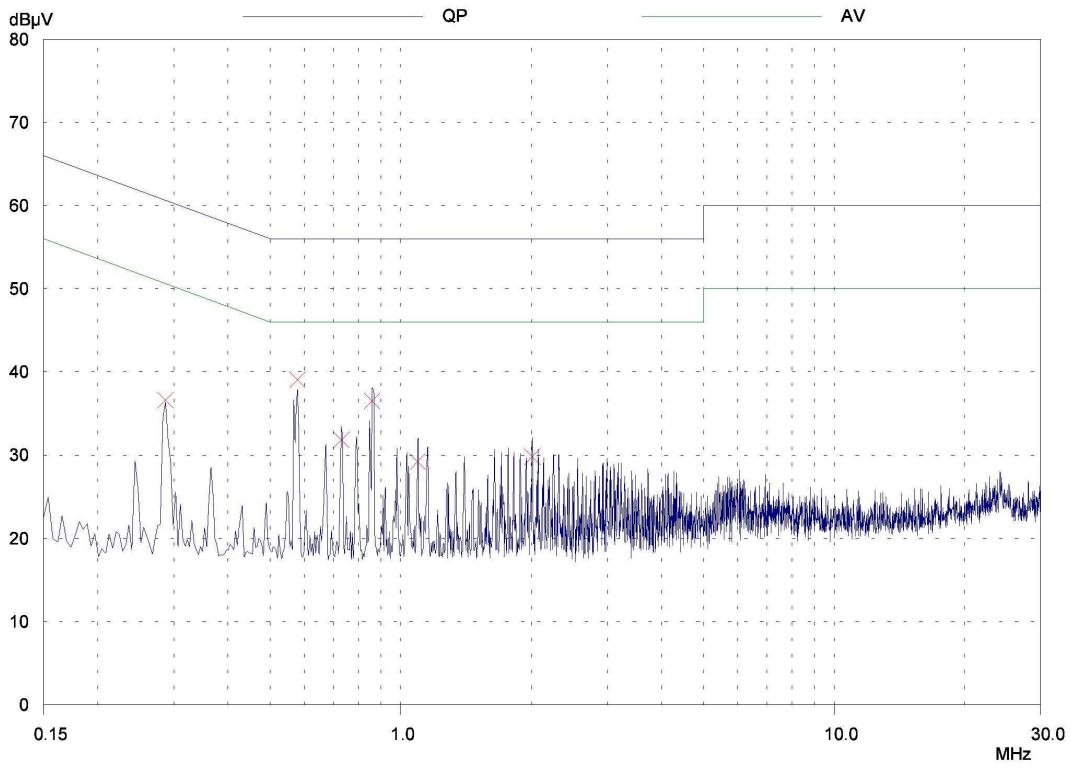
1. "***" means the value was too low to be measured.
2. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. "#" means the noise was too low, so record the peak value.
4. The estimated measurement uncertainty of the result measurement is ±2.5dB.
5. Please refer to page 37 to page 38 for chart.

CONDUCTED EMISSION TEST

PEAK VALUE

EUT:	Bluetooth Headset
Manuf:	
Op Cond:	Operation
Operator:	JAMES
Test Spec:	FCC
Comment:	L1
	CH39
Result File:	ce_l1.dat :

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	6 dB

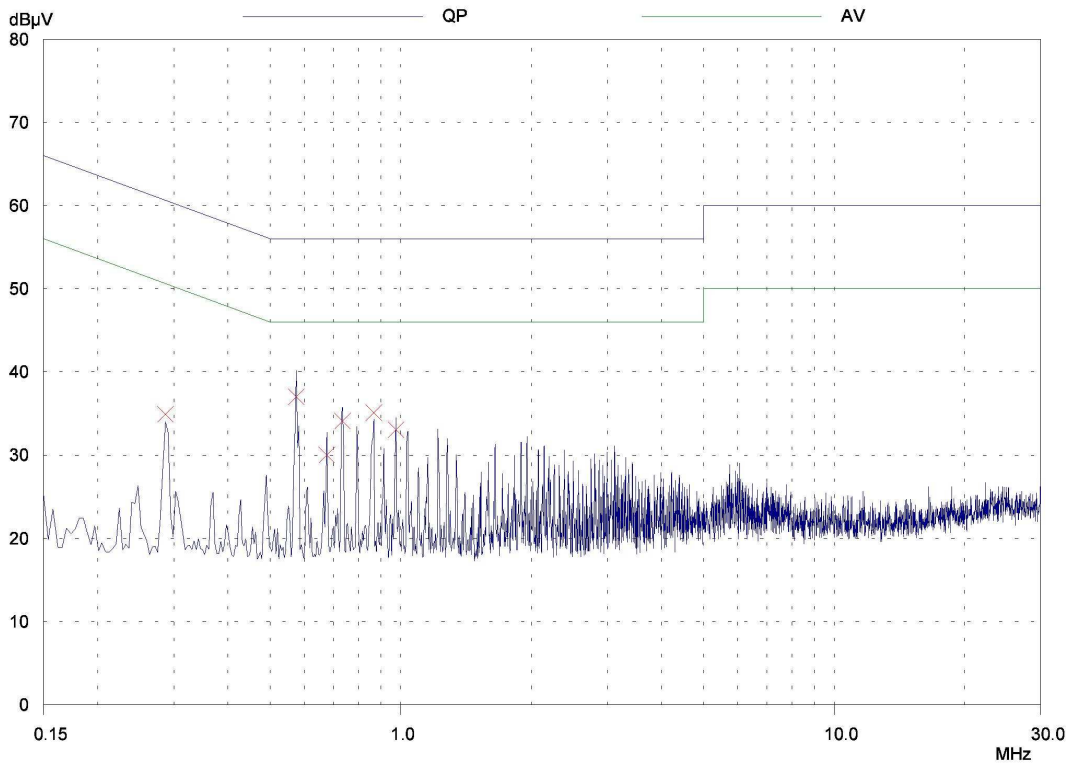


CONDUCTED EMISSION TEST

PEAK VALUE

EUT:	Bluetooth Headset
Manuf:	
Op Cond:	Operation
Operator:	JAMES
Test Spec:	FCC
Comment:	L2
	CH39
Result File:	ce_l2.dat :

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	6 dB



5.3.3

Operation Mode: 2480 MHz

Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

Freq. (MHz)	**Meter Reading** (dBuV)				**Factor** (dB)	**Result** (dBuV)				**Limit** (dBuV)		**Margins** (dB)
	Q.P Value		AVG. Value			Q.P Value		AVG. Value		Q.P Value	AVG. Value	Q.P. or AVG.
	L1	L2	L1	L2		L1	L2	L1	L2			
0.214	25.6	***	----	----	0.2	25.8	***	----	----	63.0	53.0	-37.2
0.291	29.1	30.1	----	----	0.2	29.3	30.3	----	----	60.5	50.5	-30.2
0.574	36.3	36.7	----	----	0.2	36.5	36.9	----	----	56.0	46.0	-19.1
0.652	***	28.8	----	----	0.2	***	29.0	----	----	56.0	46.0	-27.0
0.713	***	30.7	----	----	0.2	***	30.9	----	----	56.0	46.0	-25.1
0.829	***	31.3	----	----	0.2	***	31.5	----	----	56.0	46.0	-24.5
0.859	34.6	***	----	----	0.2	34.8	***	----	----	56.0	46.0	-21.2
0.972	***	28.1	----	----	0.2	***	28.3	----	----	56.0	46.0	-27.7
0.977	31.6	***	----	----	0.2	31.8	***	----	----	56.0	46.0	-24.2
1.223	30.1	***	----	----	0.2	30.3	***	----	----	56.0	46.0	-25.7

Note:

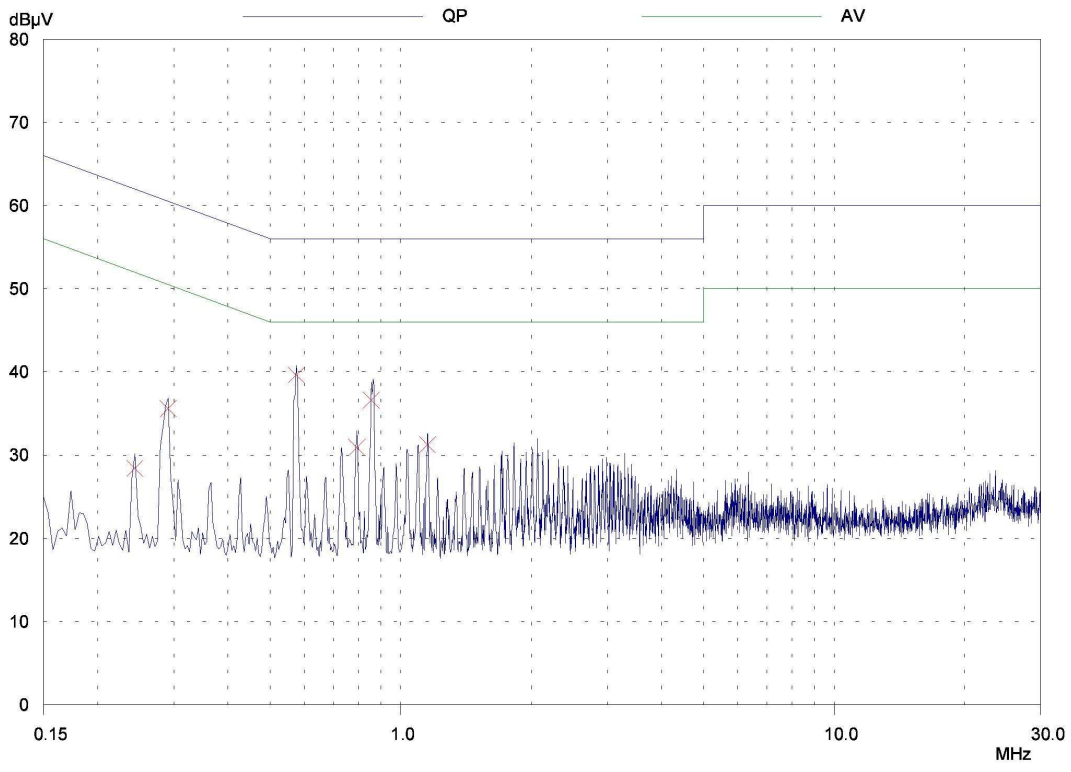
1. "***" means the value was too low to be measured.
2. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. "#" means the noise was too low, so record the peak value.
4. The estimated measurement uncertainty of the result measurement is ±2.5dB.
5. Please refer to page 40 to page 41 for chart.

CONDUCTED EMISSION TEST

PEAK VALUE

EUT:	Bluetooth Headset
Manuf:	
Op Cond:	Operation
Operator:	JAMES
Test Spec:	FCC
Comment:	L1
	CH78
Result File:	ce_l1.dat :

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	6 dB

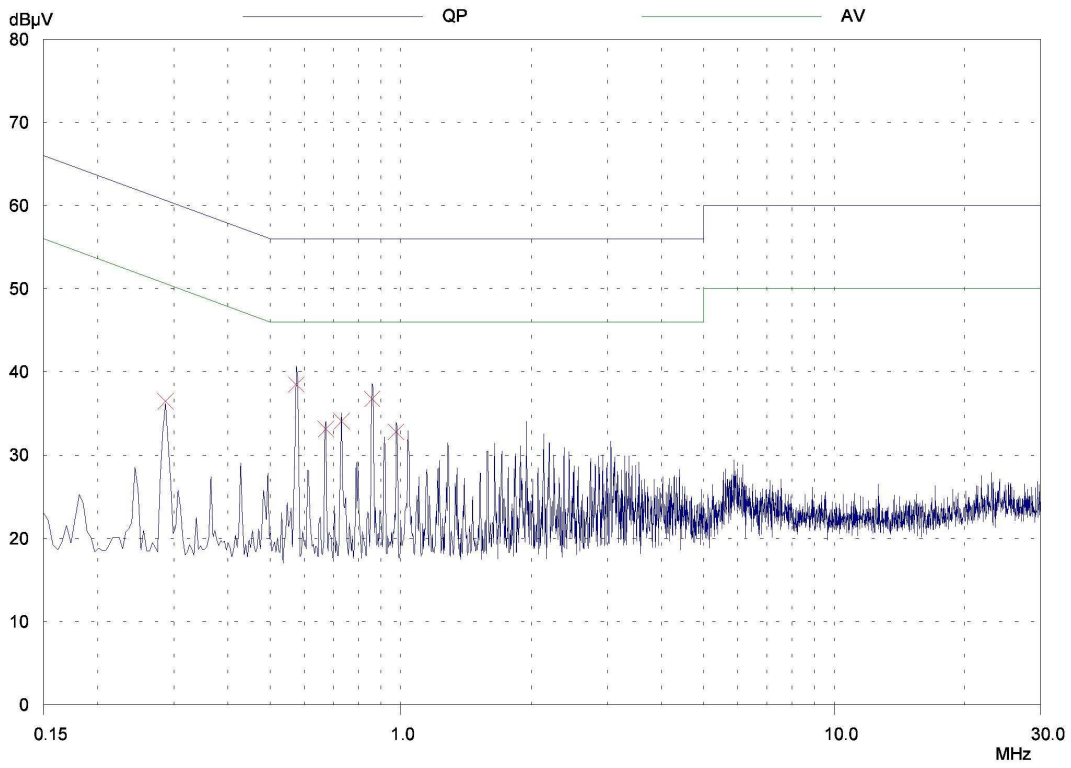


CONDUCTED EMISSION TEST

PEAK VALUE

EUT:	Bluetooth Headset
Manuf:	
Op Cond:	Operation
Operator:	JAMES
Test Spec:	FCC
Comment:	L2
	CH78
Result File:	ce_l2.dat :

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	6 dB



5.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR (Included Cable Loss)

Assume a receiver reading of 22.5 dB μ V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB μ V.

RESULT = 22.5 + 0.1 = 22.6 dB μ V

Level in μ V = Common Antilogarithm[(22.6 dB μ V)/20]

= 13.48 μ V

5.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test.

Equipment	Manufacturer	Model No.	Next Cal. Due
RF Test Receiver	Rohde and Schwarz	ESCS30	03/31/2006
Line Impedance Stabilization network	EMCO	3825	11/09/2005
Line Impedance Stabilization network	Rolf Heine	NNB-2/16Z	03/31/2006

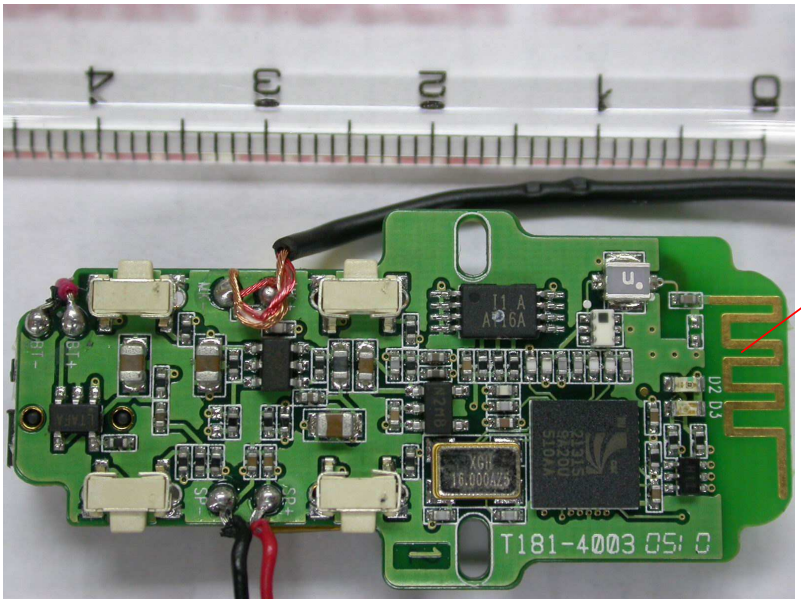
6 ANTENNA REQUIREMENT

6.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to §15.247 (b), if Receving antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.2 Antenna Construction and Directional Gain

Highly efficient chip antennas fix on the PCB. The peak gain of antenna used is 3.0 dBi.



7 20dB EMISSION BANDWIDTH MEASUREMENT

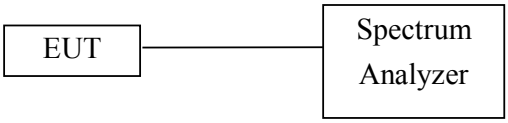
7.1 Standard Applicable

According to 15.247(a)(1), for frequency hopping systems, hopping channel carrier frequencies seperated by a minimum of 25kHz or the 20dB bandwidth of hopping channel, whichever is greater.

7.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect it to measurement instrument. Then set it to any convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Figure 4: Emission bandwidth measurement configuration.



7.3 Measurement Equipment

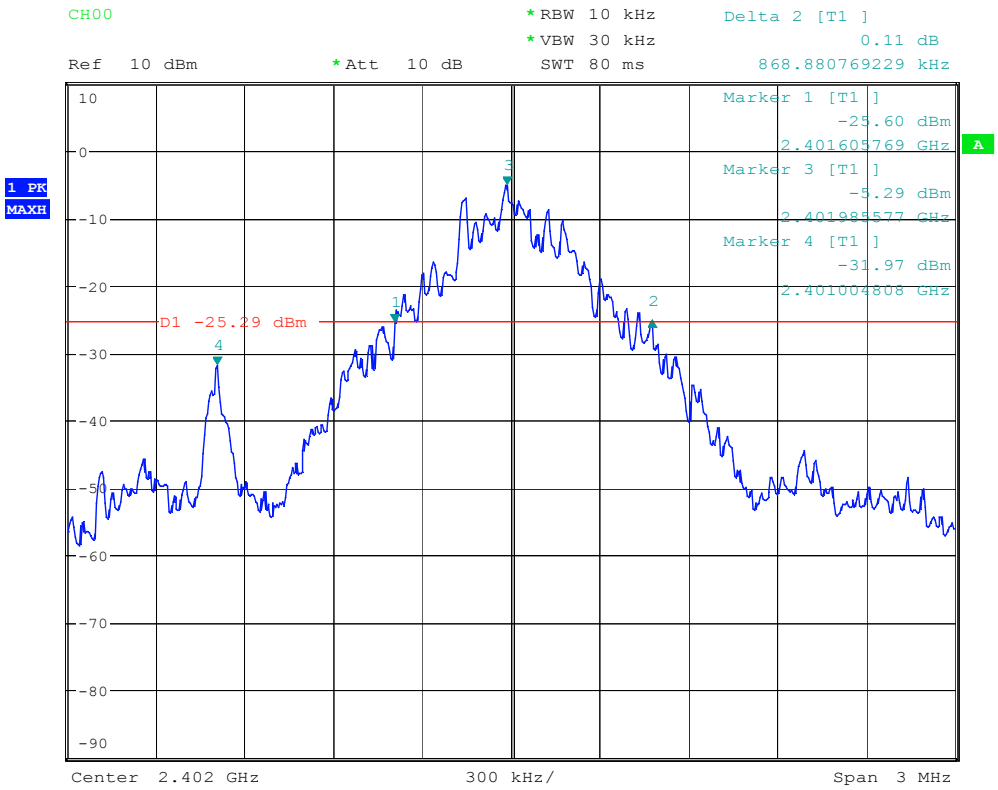
Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	10/03/2005

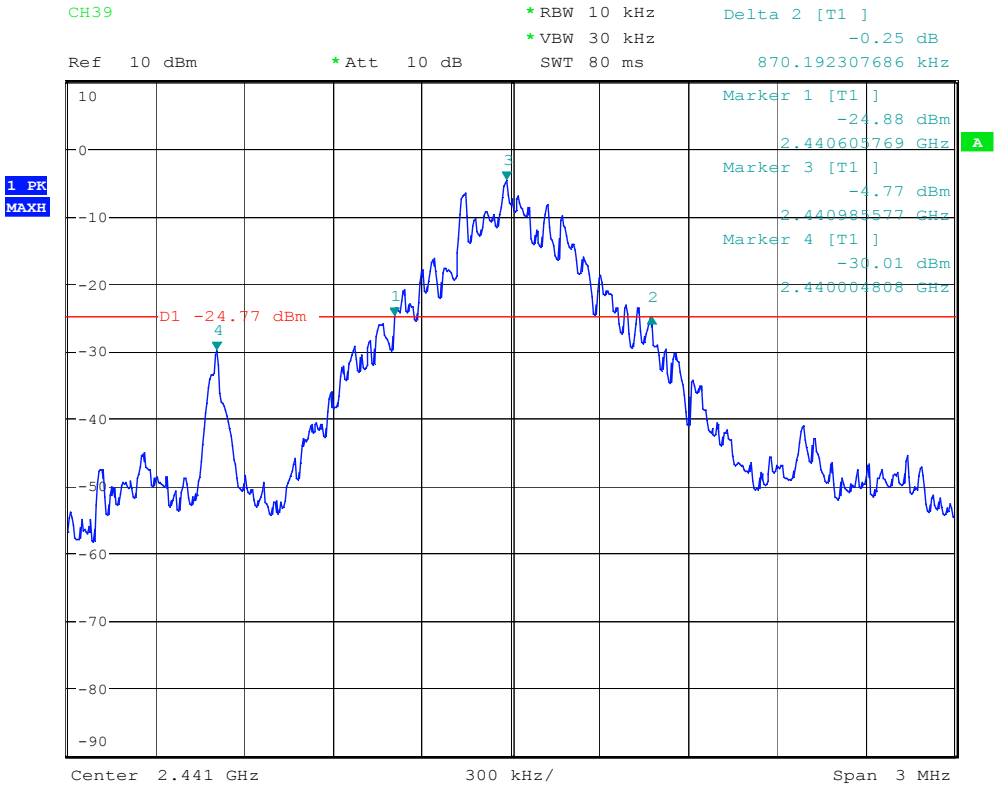
7.4 Measurement Data

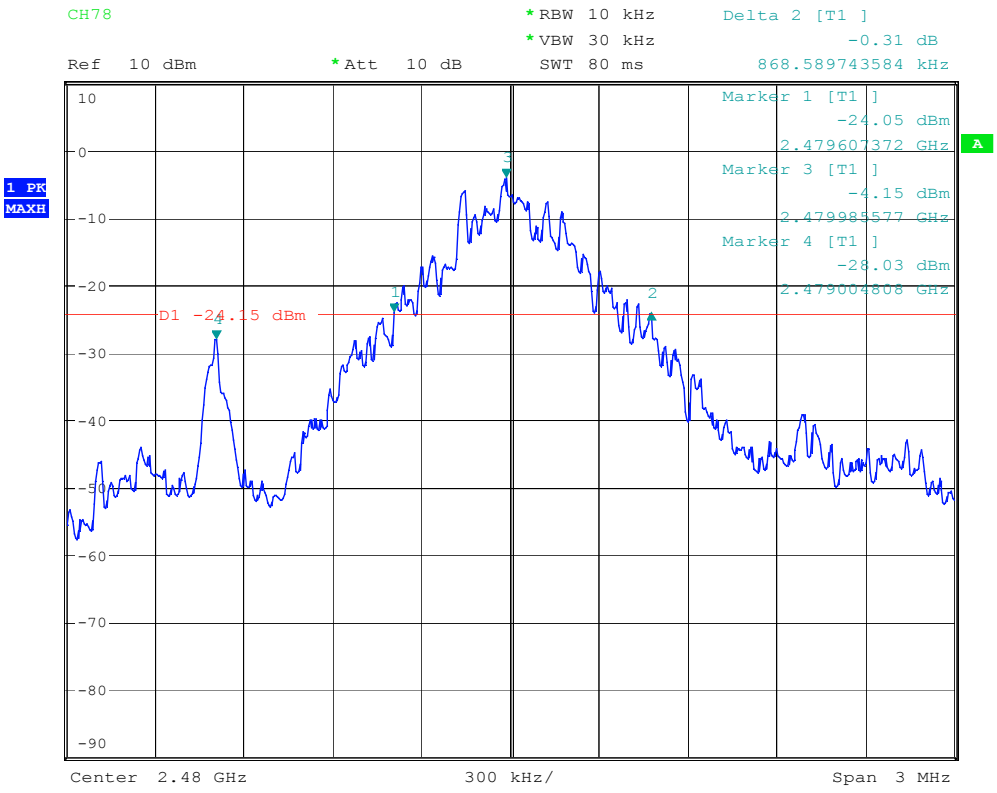
Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	Chart
0	2402	0.869	Page 46
39	2441	0.870	Page 47
78	2480	0.869	Page 48

Note: Please refer to page 46 to page 48 for chart.


CH00
*RBW 10 kHz
*VBW 30 kHz
Ref 10 dBm
*Att 10 dB
SWT 80 ms
Delta 2 [T1]
0.11 dB
868.880769229 kHz
Marker 1 [T1]
-25.60 dBm
2.401605769 GHz
Marker 3 [T1]
-5.29 dBm
2.401985577 GHz
Marker 4 [T1]
-31.97 dBm
2.401004808 GHz
1 PK
MAXH
A
D1 -25.29 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.402 GHz
300 kHz/
Span 3 MHz


CH39
*RBW 10 kHz
*VBW 30 kHz
Ref 10 dBm
*Att 10 dB
SWT 80 ms
Delta 2 [T1]
-0.25 dB
870.192307686 kHz
Marker 1 [T1]
-24.88 dBm
2.440605769 GHz
Marker 3 [T1]
-4.77 dBm
2.440985577 GHz
Marker 4 [T1]
-30.01 dBm
2.440004808 GHz
1 PK
MAXH
A
D1 -24.77 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.441 GHz
300 kHz/
Span 3 MHz


CH78
*RBW 10 kHz
*VBW 30 kHz
Ref 10 dBm
*Att 10 dB
SWT 80 ms
Delta 2 [T1]
-0.31 dB
868.589743584 kHz
Marker 1 [T1]
-24.05 dBm
2.479607372 GHz
Marker 3 [T1]
-4.15 dBm
2.479985577 GHz
Marker 4 [T1]
-28.03 dBm
2.479004808 GHz
1 PK
MAXH
A
D1 -24.15 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.48 GHz
300 kHz/
Span 3 MHz

8 OUTPUT POWER MEASUREMENT

8.1 Standard Applicable

For frequency hopping system, according to 15.247(b), the maximum peak output power of the transmitter shall not exceed 1 Watt. If Receving antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz.
4. Measure the highest amplitude appearing on spectral display and record the level to calculate result data.
5. Repeat above procedures until all frequencies measured were complete.

8.3 Measurement Equipment

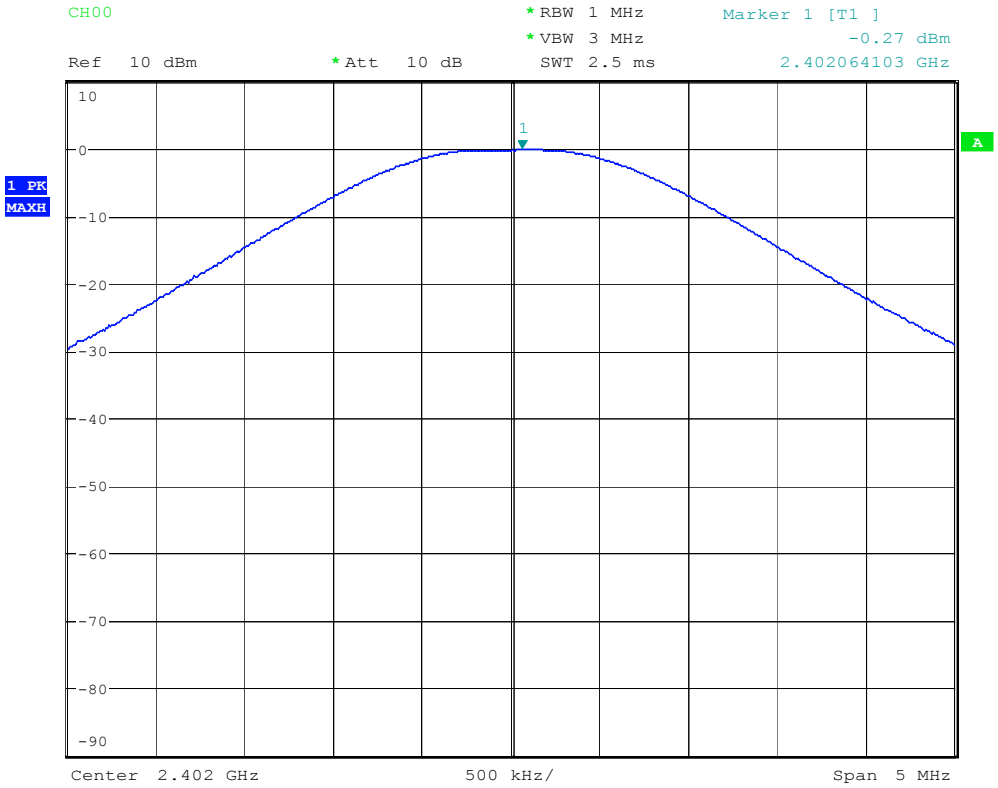
Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	10/03/2005

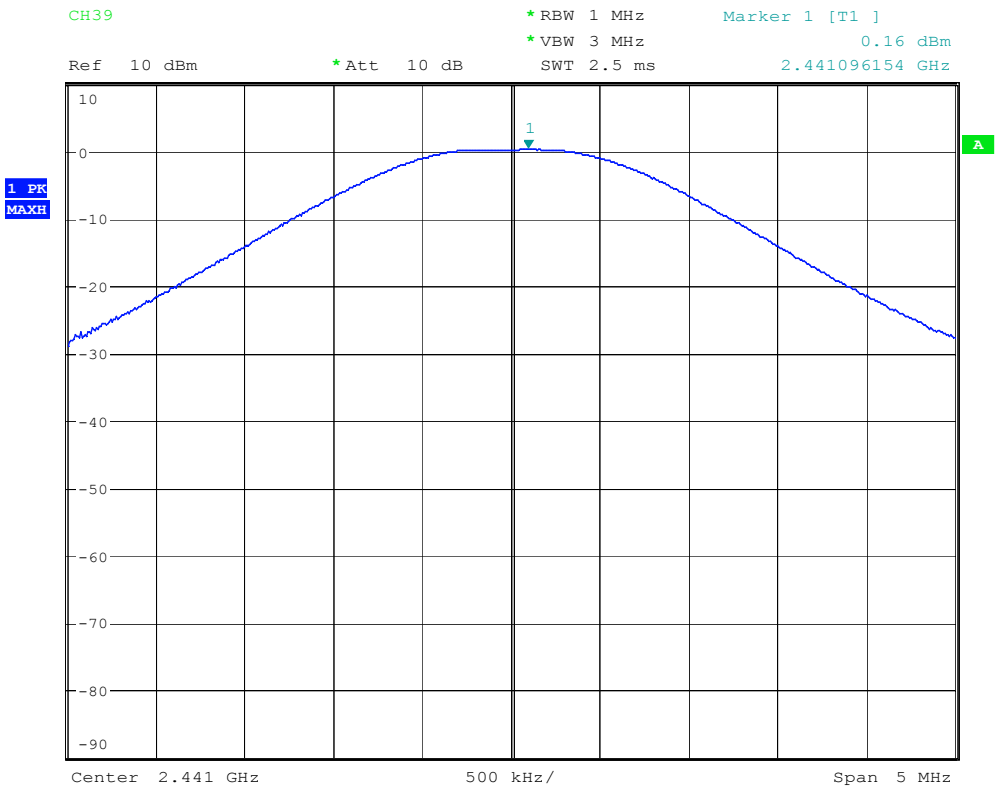
8.4 Measurement Data

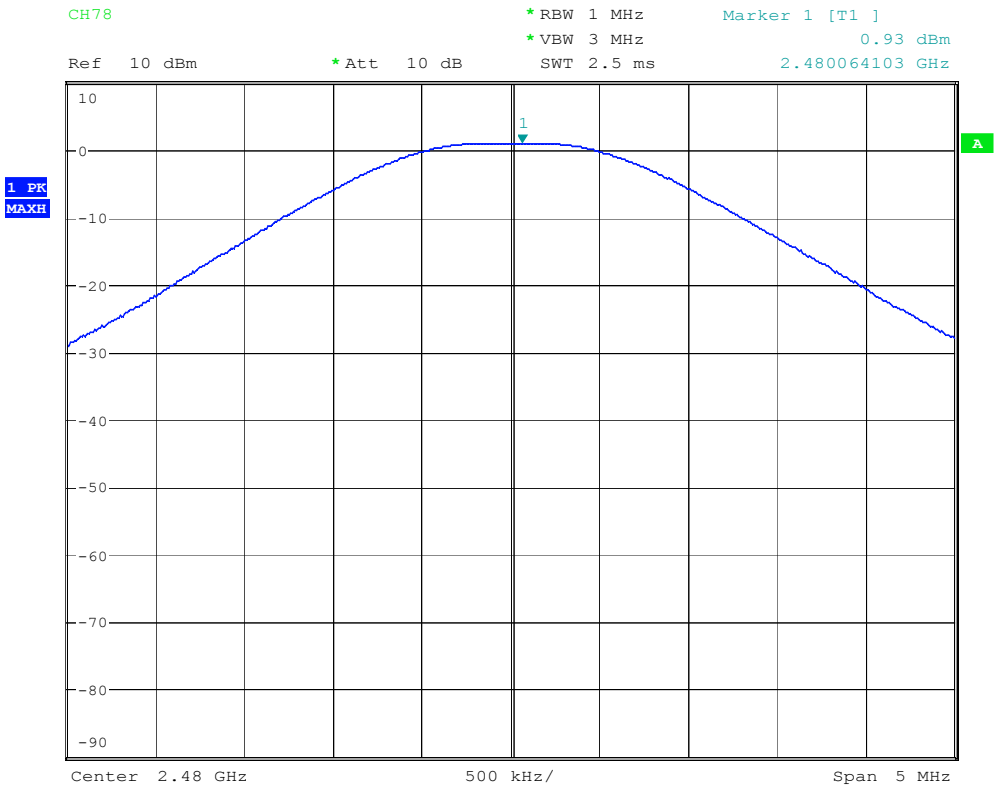
Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

Channel	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	Maximum Peak Output Power (dBm)	Maximum Peak Output Power (mW)	FCC Limit (mW)	Chart
0	2402	-0.27	0.5	0.23	1.05	1000	Page 51
39	2441	0.16	0.5	0.66	1.16	1000	Page 52
78	2480	0.93	0.5	1.43	1.39	1000	Page 53

Note: Please refer to page 51 to page 53 for chart.


CH00
*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
-0.27 dBm
Ref 10 dBm
*Att 10 dB
SWT 2.5 ms
2.402064103 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1
1 PK
MAXH
A
Center 2.402 GHz
500 kHz/
Span 5 MHz


CH39
*RBW 1 MHz
*VBW 3 MHz
Marker 1 [T1]
0.16 dBm
Ref 10 dBm
*Att 10 dB
SWT 2.5 ms
2.441096154 GHz
1 PK
MAXH
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.441 GHz
500 kHz/
Span 5 MHz


CH78
*RBW 1 MHz
*VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
0.93 dBm
2.480064103 GHz
Ref 10 dBm
*Att 10 dB
1 PK
MAXH
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.48 GHz
500 kHz/
Span 5 MHz

9 OUT-OF-BAND RF CONDUCTED SPURIOUS EMISSION MEASUREMENT

9.1 Standard Applicable

According to 15.247(c), if any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in §15.209(a), whichever results in the lesser attenuation.

9.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

9.3 Measurement Equipment

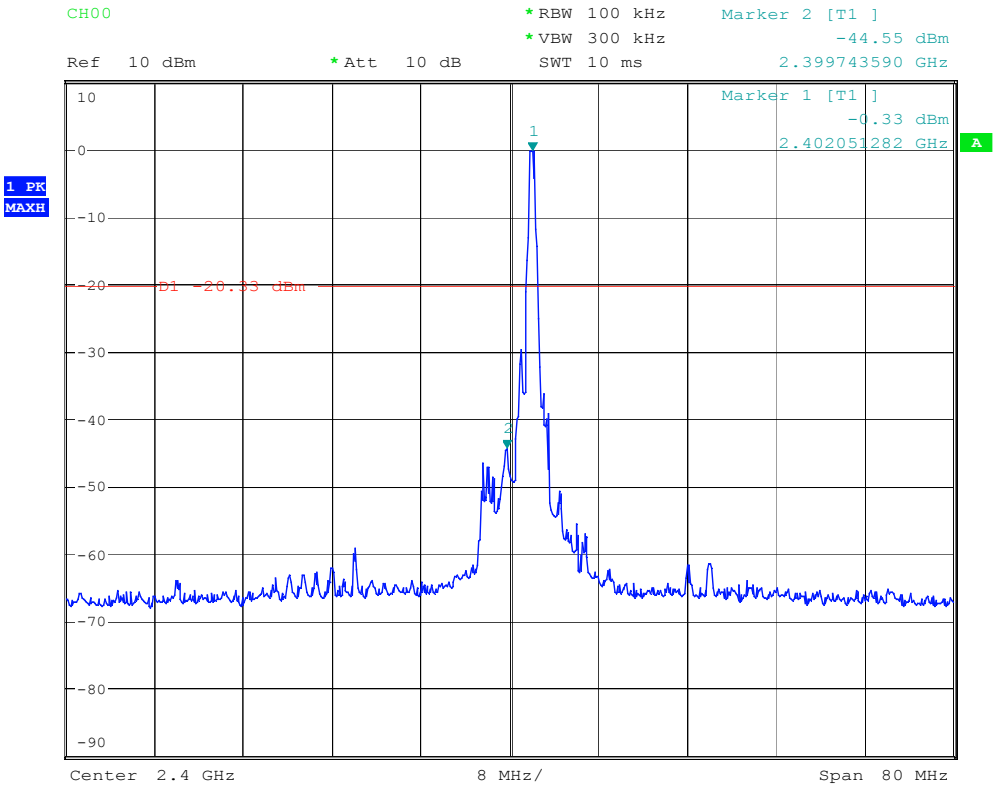
Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	10/03/2005

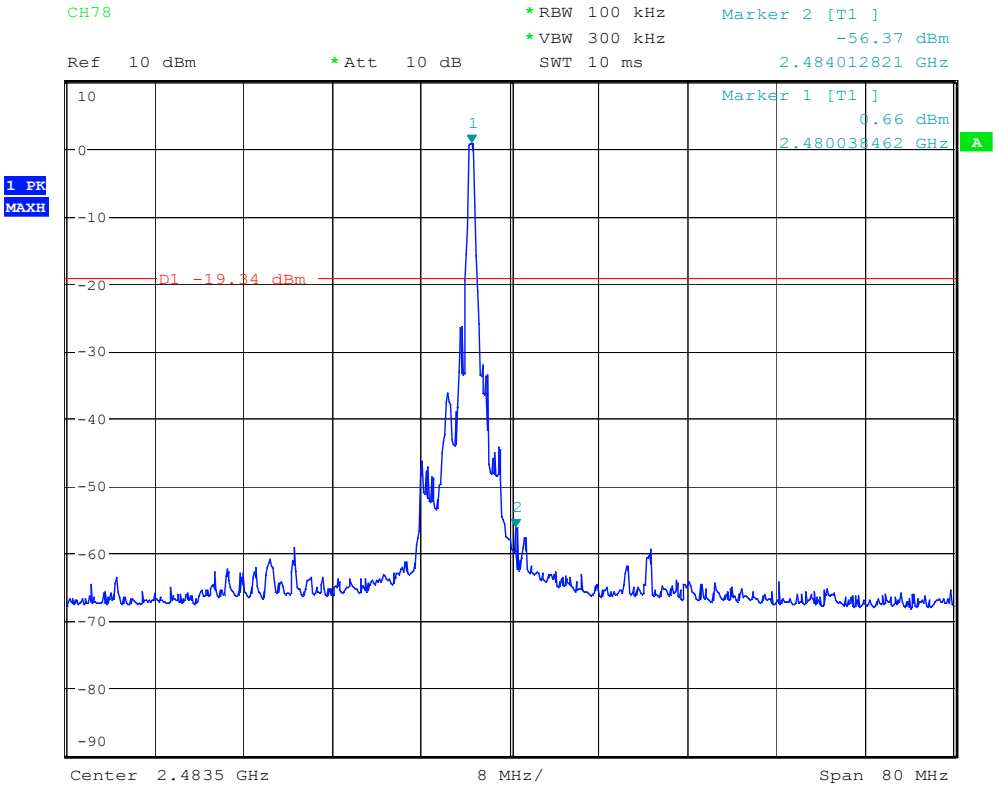
9.4 Measurement Data

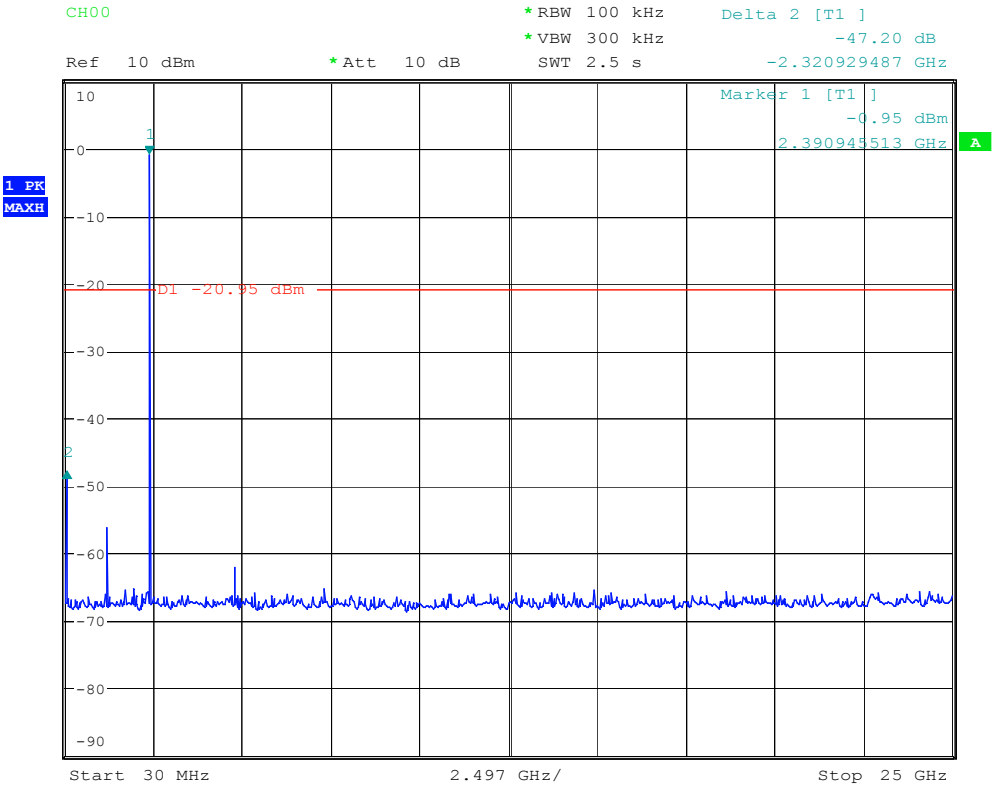
Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

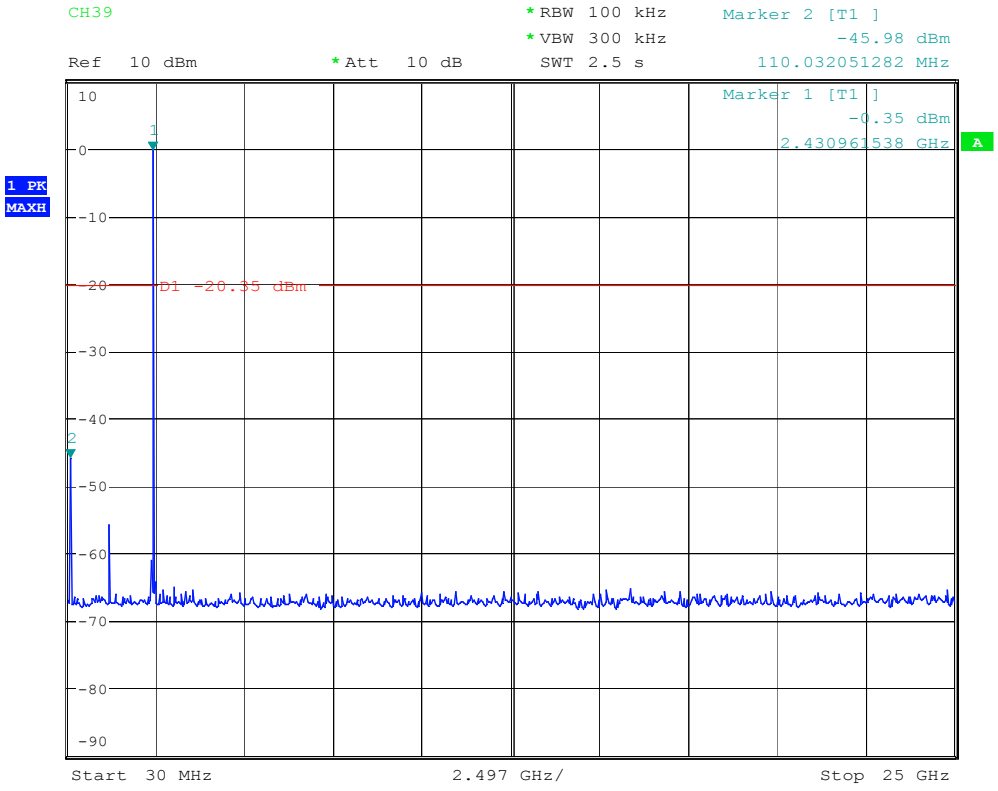
Channel	Test Frequency Range	Note	Chart
0	2360 MHz - 2440 MHz	Lower Band Edge	Page 56
78	2443.5 MHz - 2523.5 MHz	Upper Band Edge	Page 57
0	30 MHz - 25 GHz		Page 58
39	30 MHz - 25 GHz		Page 59
78	30 MHz - 25 GHz		Page 60

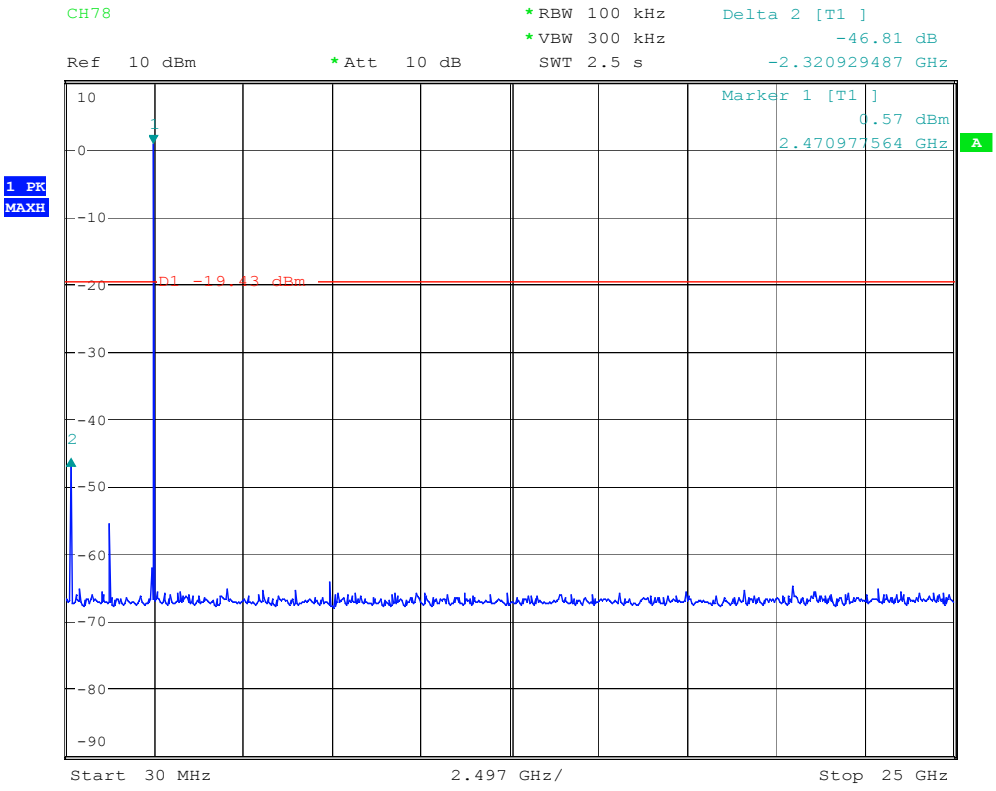
Note: Please refer to page 56 to page 60 for chart.


CH00
*RBW 100 kHz
*VBW 300 kHz
Ref 10 dBm
*Att 10 dB
SWT 10 ms
Marker 2 [T1]
-44.55 dBm
2.399743590 GHz
Marker 1 [T1]
-0.33 dBm
2.402051282 GHz
1 PK
MAXH
A
D1 -20.33 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.4 GHz
8 MHz/
Span 80 MHz


CH78
*RBW 100 kHz
*VBW 300 kHz
Marker 2 [T1]
-56.37 dBm
Ref 10 dBm
*Att 10 dB
SWT 10 ms
2.484012821 GHz
Marker 1 [T1]
0.66 dBm
2.480038462 GHz
1 PK
MAXH
A
D1 -19.34 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.4835 GHz
8 MHz/
Span 80 MHz


CH00
*RBW 100 kHz
*VBW 300 kHz
Ref 10 dBm
*Att 10 dB
SWT 2.5 s
Delta 2 [T1]
-47.20 dB
-2.320929487 GHz
Marker 1 [T1]
-0.95 dBm
2.390945513 GHz
A
1 PK
MAXH
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
D1 -20.95 dBm
Start 30 MHz
2.497 GHz/
Stop 25 GHz


CH39
*RBW 100 kHz
*VBW 300 kHz
Ref 10 dBm
*Att 10 dB
SWT 2.5 s
Marker 2 [T1]
-45.98 dBm
110.032051282 MHz
Marker 1 [T1]
-0.35 dBm
2.430961538 GHz
A
1 PK
MAXH
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
D1 -20.35 dBm
Start 30 MHz
2.497 GHz/
Stop 25 GHz


CH78
*RBW 100 kHz
*VBW 300 kHz
Ref 10 dBm
*Att 10 dB
SWT 2.5 s
Delta 2 [T1]
-46.81 dB
-2.320929487 GHz
Marker 1 [T1]
0.57 dBm
2.470977564 GHz
A
1 PK
MAXH
D1 -19.43 dBm
Start 30 MHz
2.497 GHz/
Stop 25 GHz

10 NUMBER of HOPPING CHANNELS

10.1 Standard Applicable

According to 15.247(b)(1), for frequency hopping systems, operating in the 2400-2483.5MHz band employing at least 75 hopping channels

10.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set EUT to hopping operating mode and set spectrum analyzer miximum to measure the number of hopping channels.

10.3 Measurement Equipment

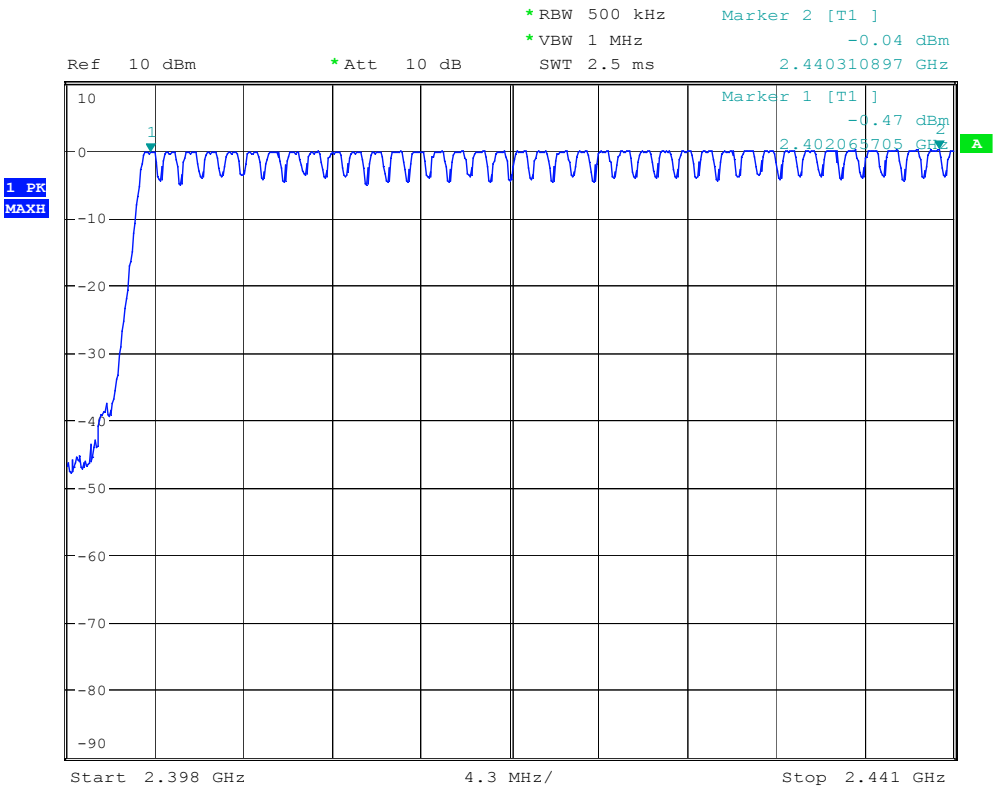
Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	10/03/2005

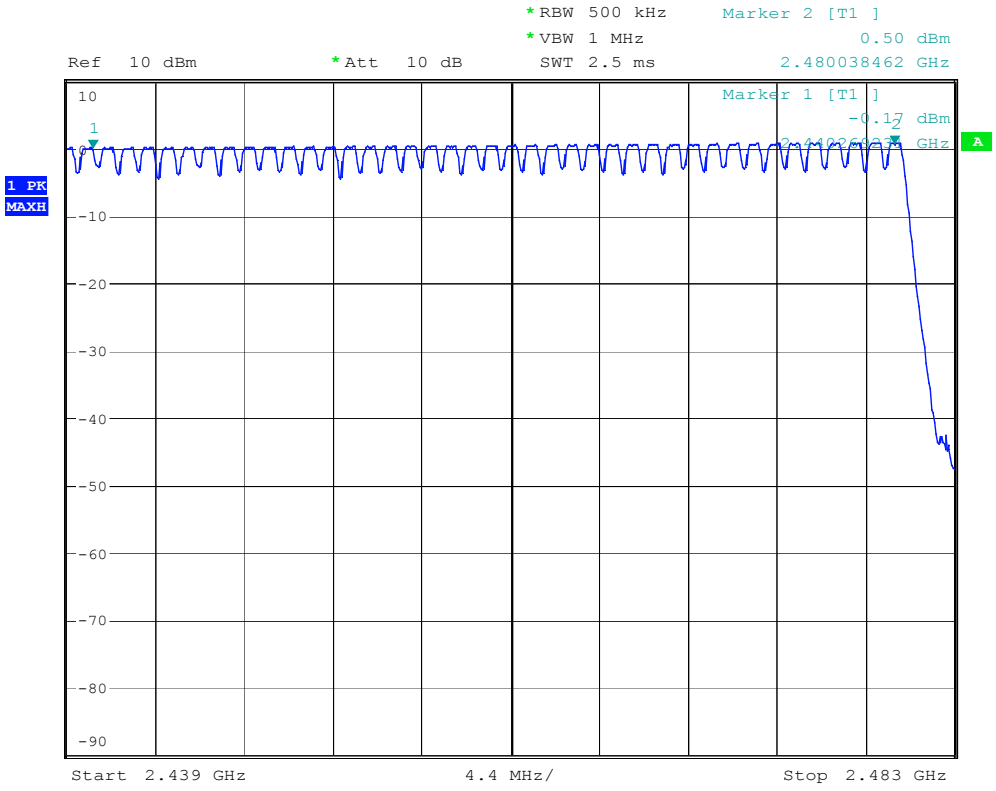
10.4 Measurement Data

Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

Number of hopping channels = 79 channels

Note: Please refer to page 62 for chart


*RBW 500 kHz
*VBW 1 MHz
Ref 10 dBm
*Att 10 dB
SWT 2.5 ms
Marker 2 [T1]
-0.04 dBm
2.440310897 GHz
Marker 1 [T1]
-0.47 dBm
2.402065705 GHz
1 PK
MAXH
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.398 GHz
4.3 MHz/
Stop 2.441 GHz


*RBW 500 kHz
*VBW 1 MHz
Ref 10 dBm
*Att 10 dB
SWT 2.5 ms
Marker 2 [T1]
0.50 dBm
2.480038462 GHz
Marker 1 [T1]
-0.17 dBm
1 PK
MAXH
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.439 GHz
4.4 MHz/
Stop 2.483 GHz

.0

11 HOPPING CHANNEL CARRIER FREQUENCY SEPARATED

11.1 Standard Applicable

According to 15.247(a)(1), the frequency hopping system shall have hopping channel carrier frequencies seperated by minimum of 25kHz or the 20dB bandwidth of hopping channel, whichever is greater.

11.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any measurement frequency within its operating ragne and make sure the instrument is operated in its linear range.
3. Set spectrum analyzer maximum hold to measure channel carrier frequency , then adjust channel carrier frequency to adjacent channel.
4. Repeat above procedure until all measured frequencies were complete.

11.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	10/03/2005

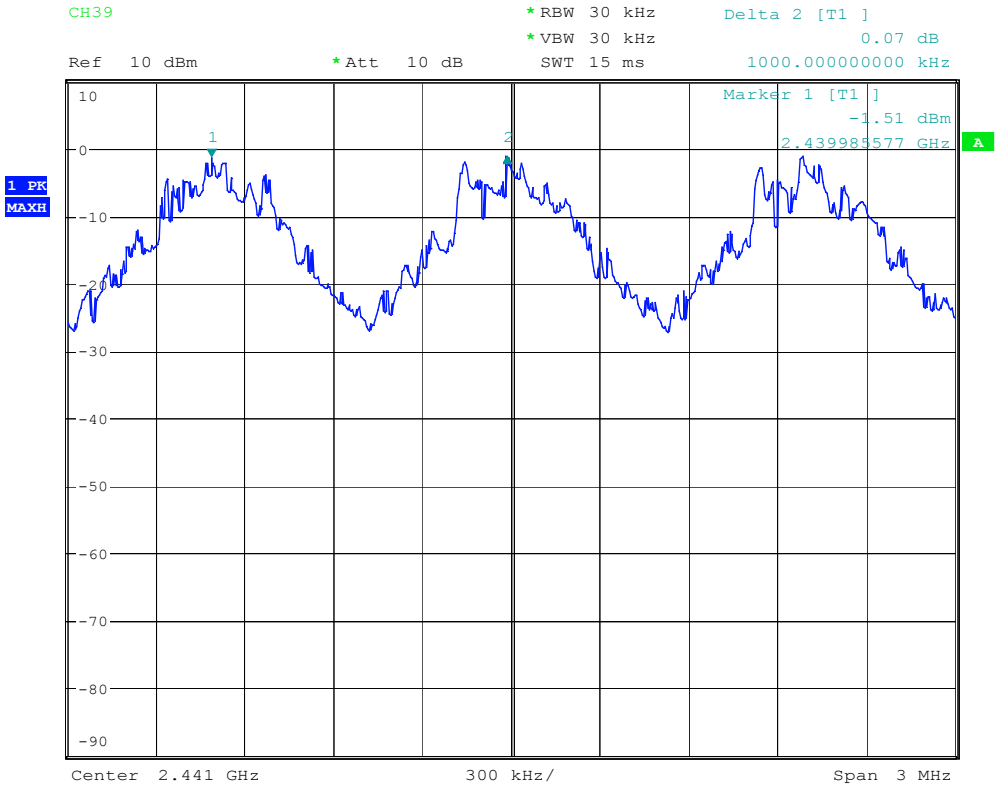
11.4 Measurement Data

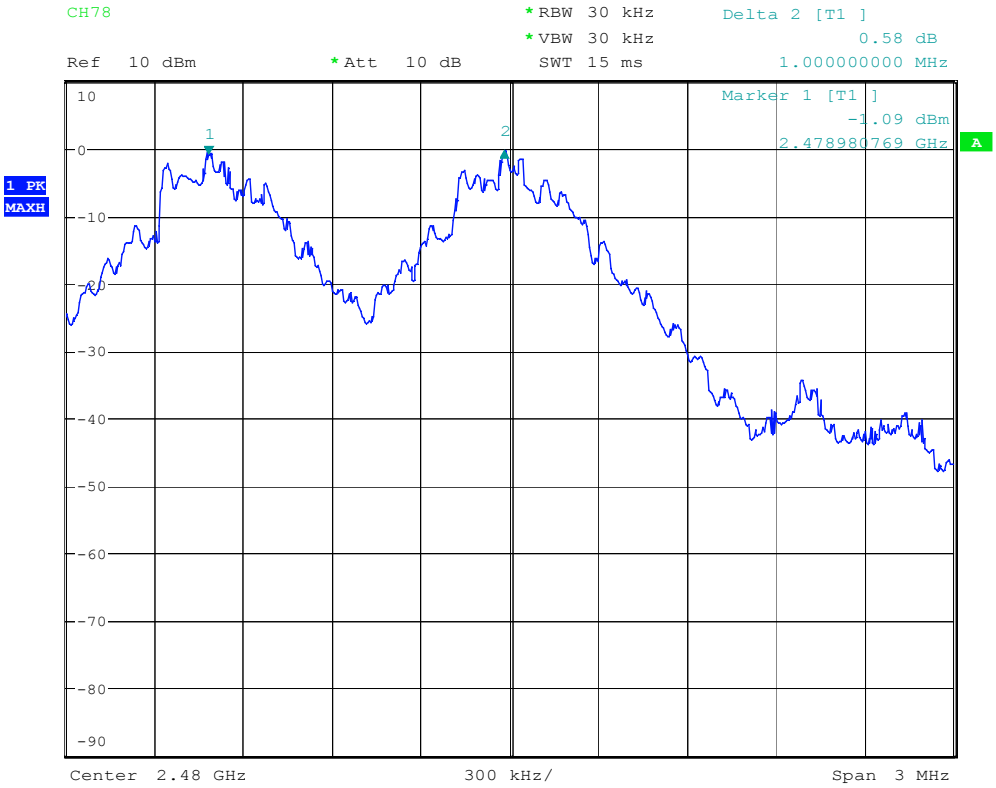
Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

Channel	Frequency (MHz)	Hopping Channel Carrier Frequency Separated (MHz)	Chart
0	2402	1	Page 65
39	2441	1	Page 66
78	2480	1	Page 67

Note: Please refer to page 65 to page 67 for chart.


CH00
*RBW 30 kHz
*VBW 30 kHz
Ref 10 dBm
*Att 10 dB
SWT 15 ms
Delta 2 [T1]
1.11 dB
1.000000000 MHz
Marker 1 [T1]
-2.91 dBm
2.401980769 GHz
1 PK
MAXH
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.402 GHz
300 kHz/
Span 3 MHz


CH39
*RBW 30 kHz
*VBW 30 kHz
Ref 10 dBm
*Att 10 dB
SWT 15 ms
Delta 2 [T1]
0.07 dB
1000.000000000 kHz
Marker 1 [T1]
-1.51 dBm
2.439985577 GHz
A
1 PK
MAXH
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.441 GHz
300 kHz/
Span 3 MHz


CH78
*RBW 30 kHz
*VBW 30 kHz
Ref 10 dBm
*Att 10 dB
SWT 15 ms
Delta 2 [T1]
0.58 dB
1.000000000 MHz
Marker 1 [T1]
-1.09 dBm
2.478980769 GHz
A
1 PK
MAXH
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1
2
Center 2.48 GHz
300 kHz/
Span 3 MHz

12 POWER SPECTRAL DENSITY

12.1 Standard Applicable

According to 15.247(d), for bluetooth device, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater them 8dBm in any 3kHz band during any time interral of continuous transmission.

12.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 3kHz, VBW to 30 kHz, sweep 300kHz and sweep time 100 sec.
4. Measure the highest amplitude appearing on spectral display and record the level to calculate result data.
5. Repeat above procedures until all frequencies measured were complete.

12.3 Measurement Equipment

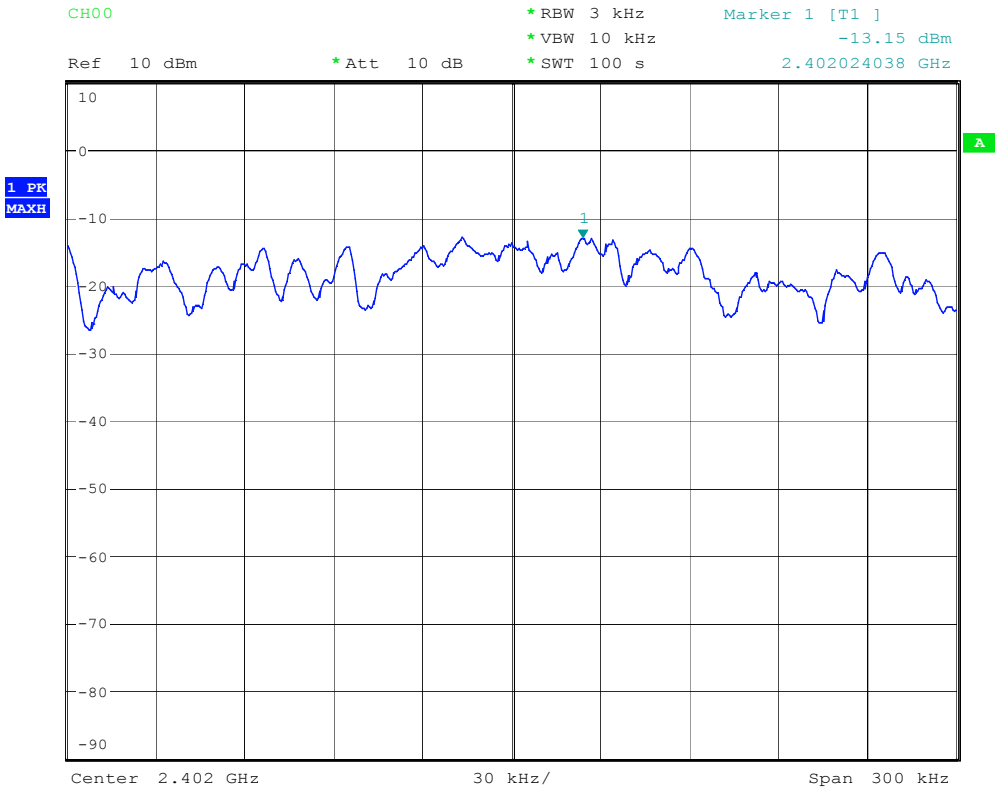
Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	10/03/2005

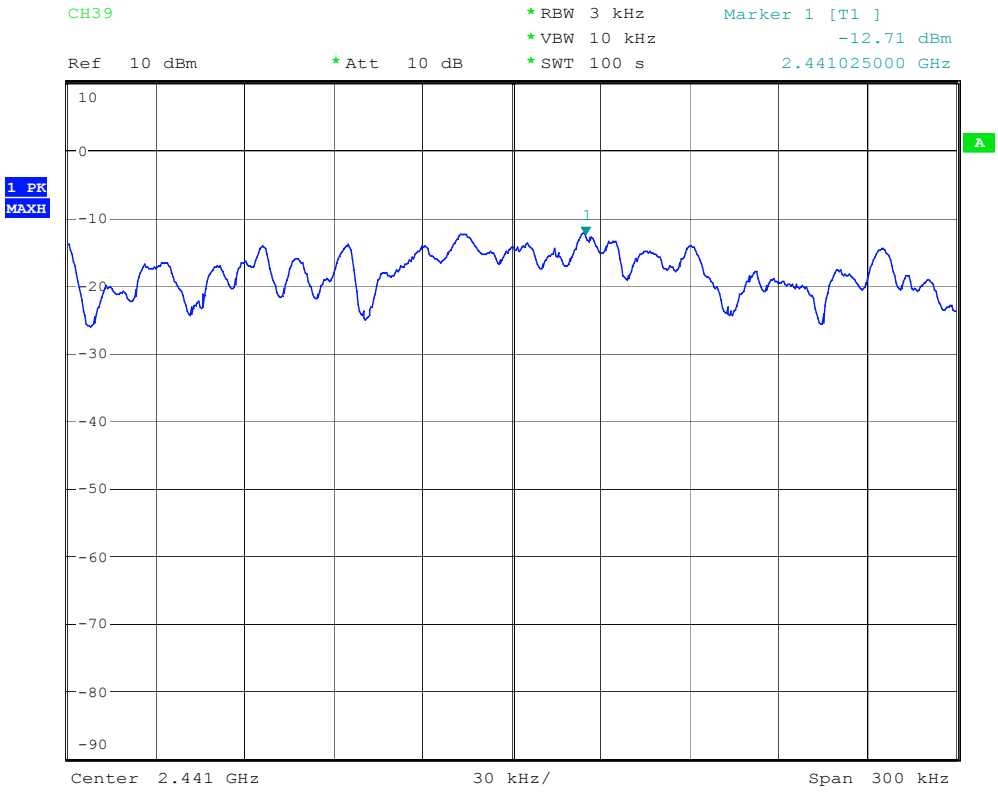
12.4 Measurement Data

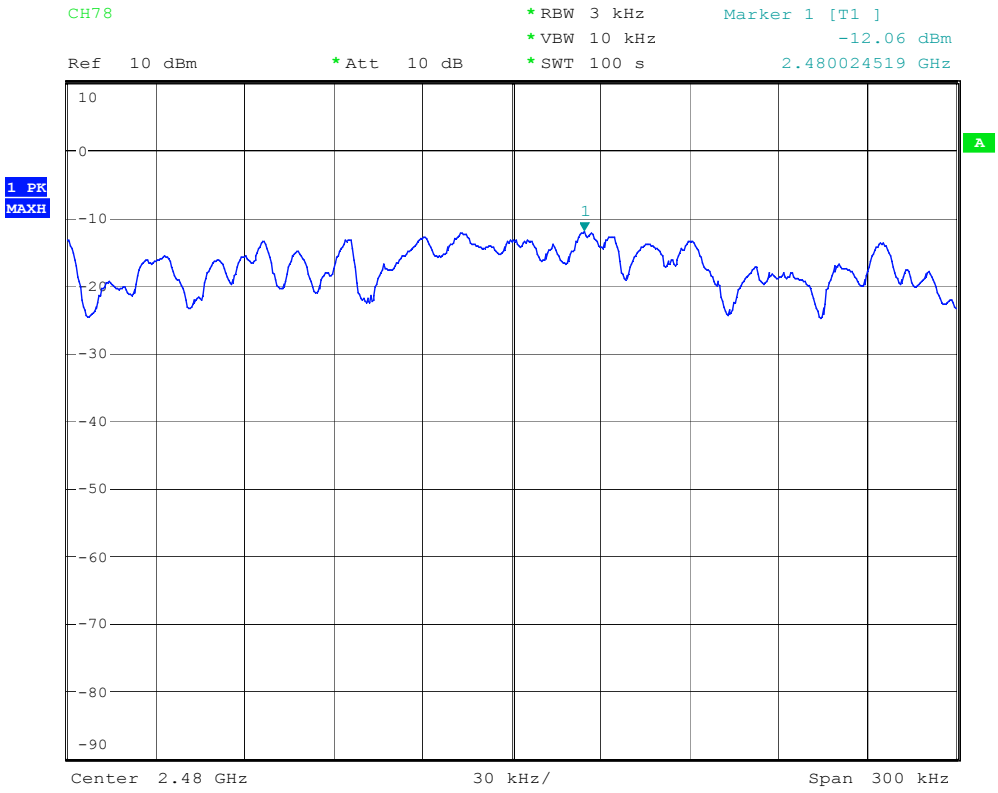
Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

Channel	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	Power Spectral Density (dBm)	FCC Limit (dBm)	Chart
0	2402	-13.2	0.5	-12.7	8	Page 70
39	2441	-12.7	0.5	-12.2	8	Page 71
78	2480	-12.1	0.5	-11.6	8	Page 72

Note: Please refer to page 70 to page 72 for chart.


CH00
*RBW 3 kHz
*VBW 10 kHz
*SWT 100 s
Marker 1 [T1]
-13.15 dBm
2.402024038 GHz
Ref 10 dBm
*Att 10 dB
1 PK
MAXH
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.402 GHz
30 kHz/
Span 300 kHz


CH39
*RBW 3 kHz
*VBW 10 kHz
*SWT 100 s
Marker 1 [T1]
-12.71 dBm
2.441025000 GHz
Ref 10 dBm
*Att 10 dB
1 PK
MAXH
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.441 GHz
30 kHz/
Span 300 kHz


CH78
*RBW 3 kHz
*VBW 10 kHz
*SWT 100 s
Marker 1 [T1]
-12.06 dBm
2.480024519 GHz
Ref 10 dBm
*Att 10 dB
1 PK
MAXH
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.48 GHz
30 kHz/
Span 300 kHz

13 Dwell Time

13.1 Standard Applicable

According to 15.247(a)(1)(iii), frequency hopping system in the 2400-2483.5MHz band employing at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 second multiplied by the number of hopping channels employed.

13.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The setup of the EUT as shown in figure 4.

13.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	10/03/2005

13.4 Measurement Data

Test Date : Jun. 15, 2005 Temperature : 19℃ Humidity : 55%

DH1

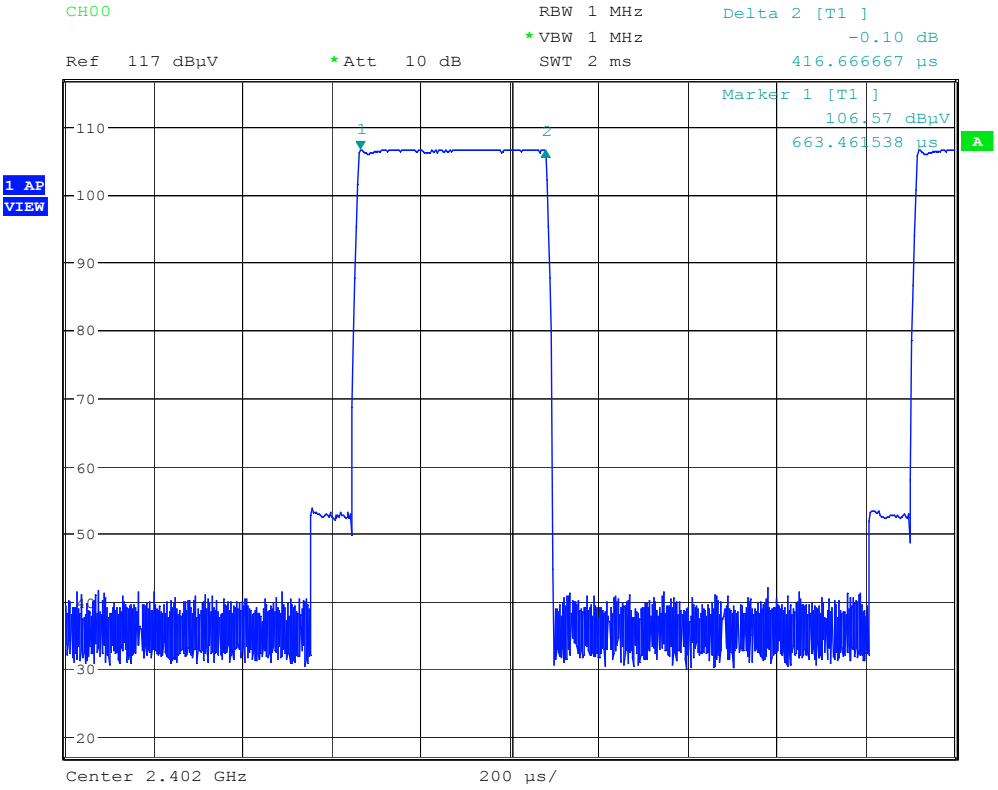
Test period=0.4(second/channel)× 79 channel=31.6sec

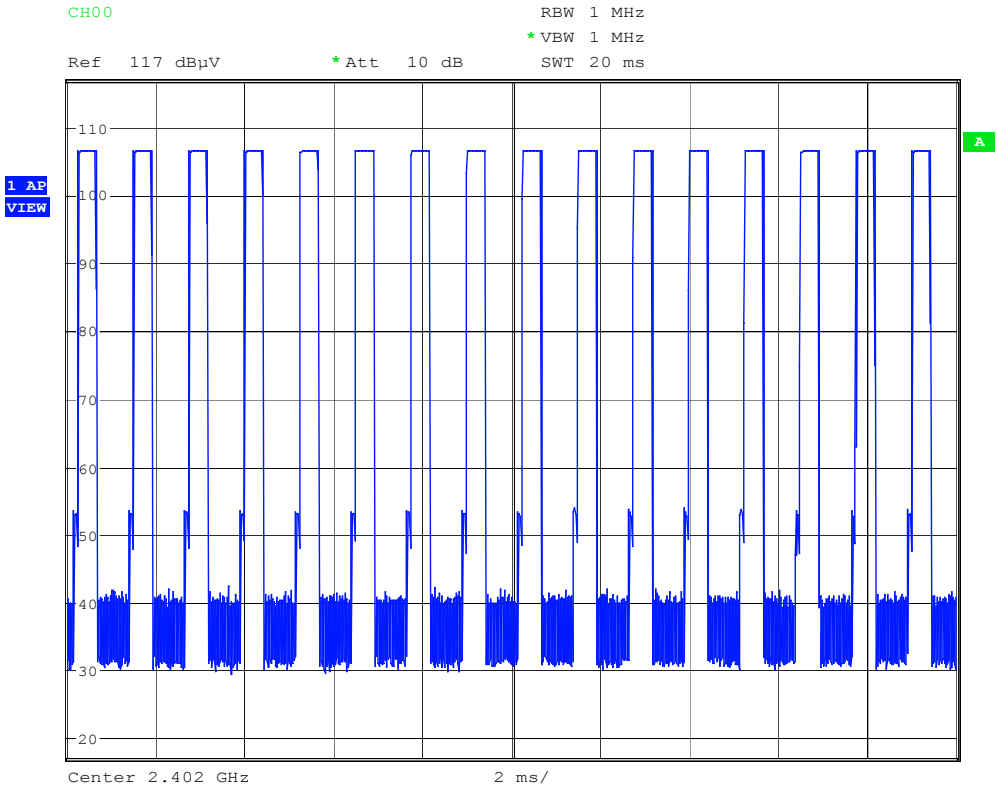
a) 2402MHz dwell time= 416.667 us× $\frac{800}{79}$ ×31.6 = 133.333 ms

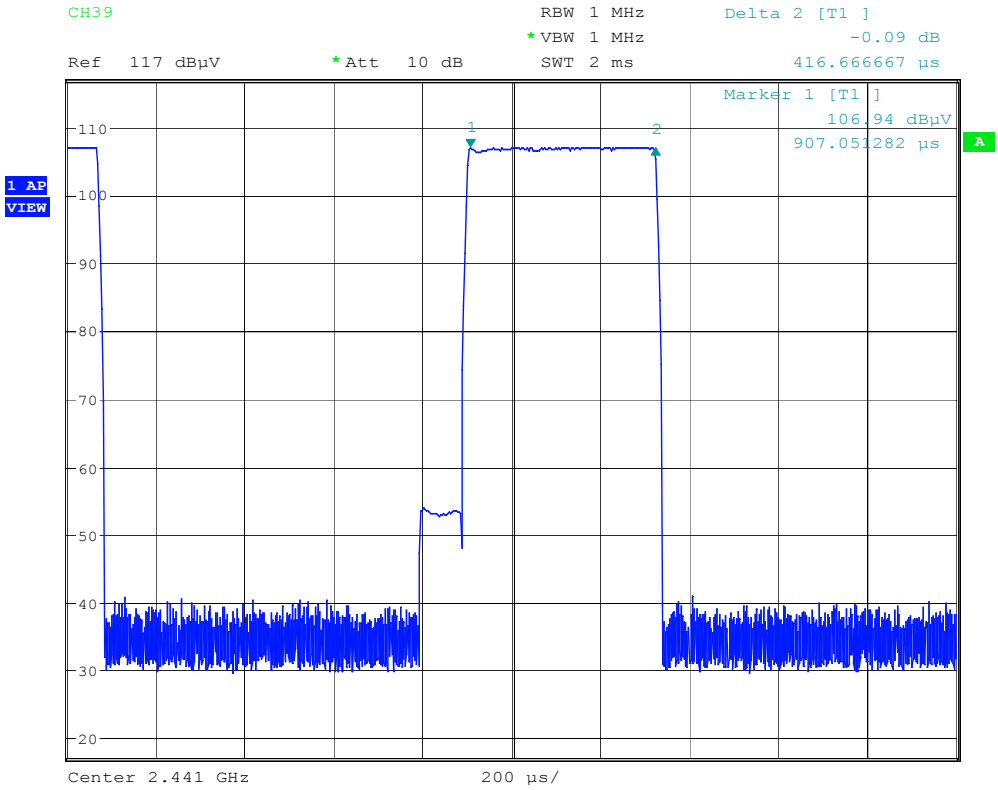
b) 2441MHz dwell time= 416.667 us× $\frac{800}{79}$ ×31.6 = 133.333 ms

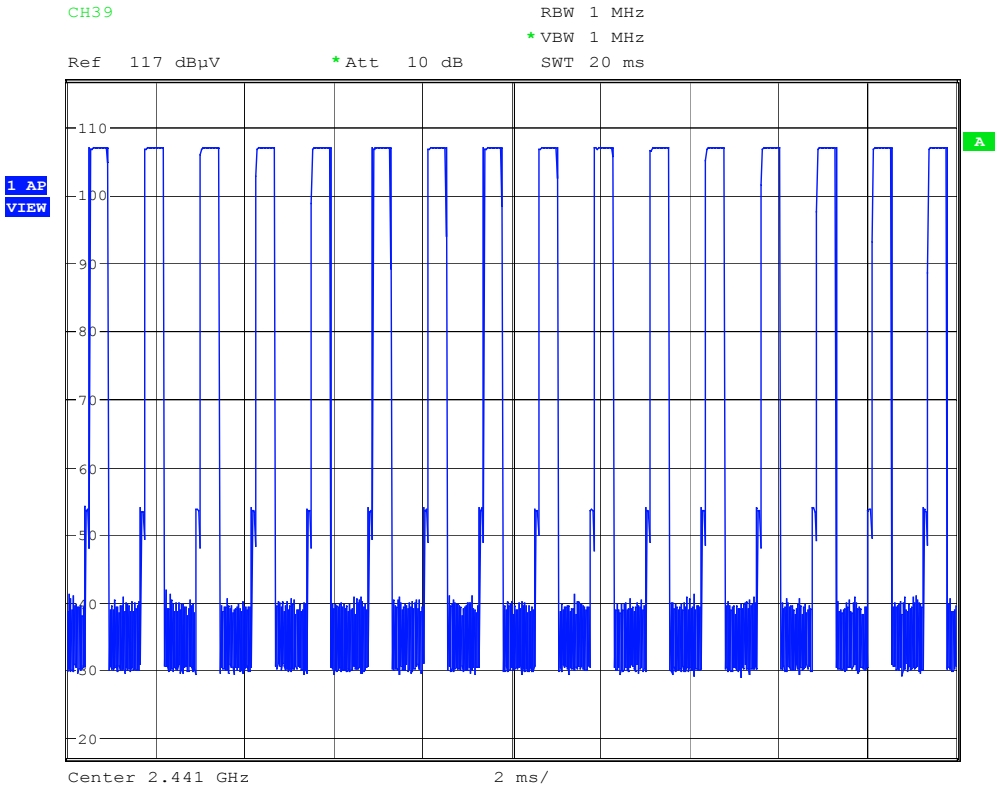
c) 2480MHz dwell time= 416.667 us× $\frac{800}{79}$ ×31.6 = 133.333 ms

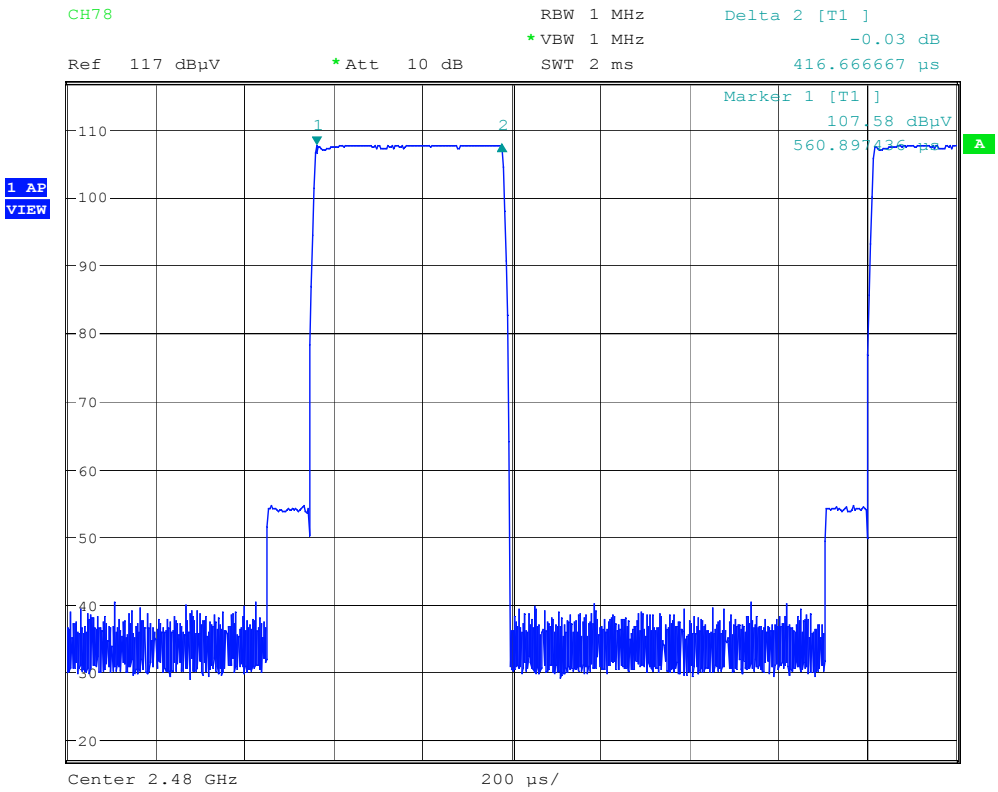
Note: Please refer to page 74 to page 79 for chart.

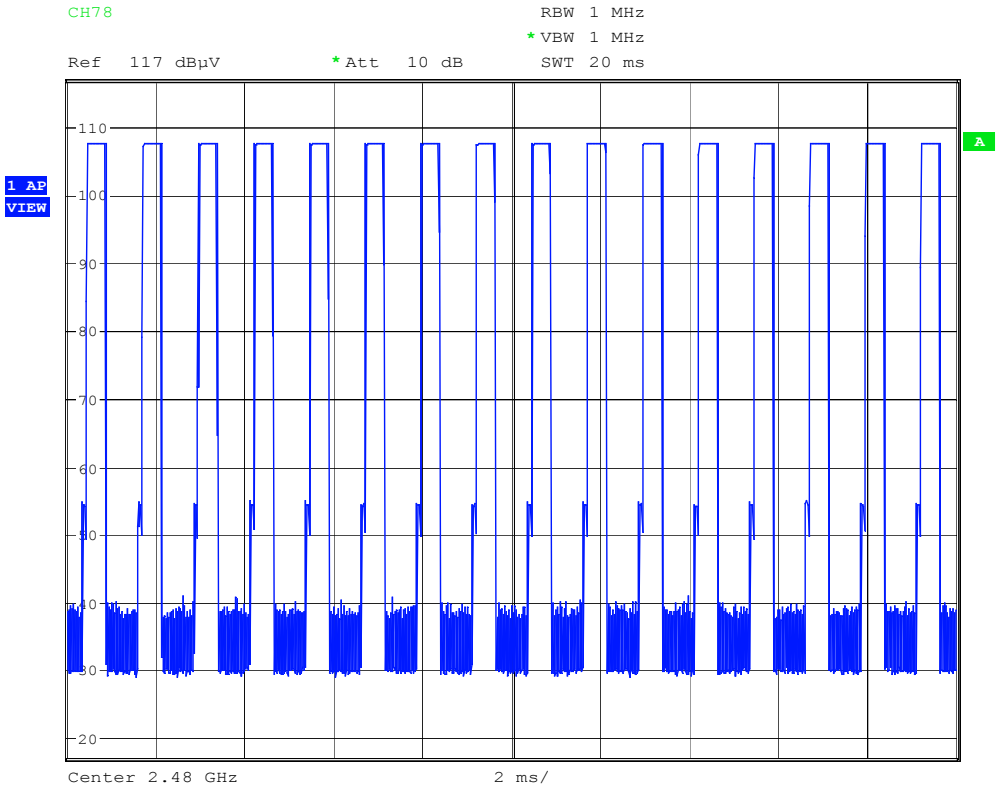

CH00
RBW 1 MHz
*VBW 1 MHz
SWT 2 ms
Delta 2 [T1]
-0.10 dB
416.666667 µs
Ref 117 dBµV
*Att 10 dB
Marker 1 [T1]
106.57 dBµV
663.461538 µs
1 AP
VIEW
A
110
100
90
80
70
60
50
30
20
Center 2.402 GHz
200 µs/


CH00
RBW 1 MHz
*VBW 1 MHz
Ref 117 dBµV
*Att 10 dB
SWT 20 ms
110
100
90
80
70
60
50
40
30
20
1 AP
VIEW
A
Center 2.402 GHz
2 ms/


CH39
RBW 1 MHz
*VBW 1 MHz
SWT 2 ms
Delta 2 [T1]
-0.09 dB
416.666667 µs
Ref 117 dBµV
*Att 10 dB
Marker 1 [T1]
106.94 dBµV
907.051282 µs
1 AP
VIEW
A
110
100
90
80
70
60
50
40
30
20
Center 2.441 GHz
200 µs/


CH39
RBW 1 MHz
*VBW 1 MHz
Ref 117 dBµV
*Att 10 dB
SWT 20 ms
1 AP
VIEW
A
110
100
90
80
70
60
50
40
30
20
Center 2.441 GHz
2 ms/


CH78
RBW 1 MHz
*VBW 1 MHz
SWT 2 ms
Delta 2 [T1]
-0.03 dB
416.666667 µs
Ref 117 dBµV
*Att 10 dB
Marker 1 [T1]
107.58 dBµV
560.897436 µs
1 AP
VIEW
A
110
100
90
80
70
60
50
40
30
20
Center 2.48 GHz
200 µs/


CH78
RBW 1 MHz
*VBW 1 MHz
Ref 117 dBµV
*Att 10 dB
SWT 20 ms
1 AP
VIEW
A
110
100
90
80
70
60
50
40
30
20
Center 2.48 GHz
2 ms/