FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment	**: Portable Terminal**
Trade Name	**: CIPHERLAB**
Model No.	**: 8500**
FCC ID	**: Q3N-8500**
IC ID	**: 5121A-8500**
Filing Type	**: Certification**
Applicant	**: SYNTECH INFORMATION CO., LTD.** 12F, 333 Dunhua S. Rd., Sec. 2, Taipei, Taiwan 106

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- The data shown in this test report were carried out on Jun. 15, 2005 at **Sporton International Inc. LAB.**
- Report No.: FR541416, Report Version: Rev. 01

Dr. Daniel Lee
EMC/SAR Director

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of this test report

Report Issue Date: Oct. 07, 2005

Original Report Issue Date	Description

1. General Description of Equipment under Test

1.1 Applicant

SYNTECH INFORMATION CO., LTD.
12F, 333 Dunhua S. Rd., Sec. 2, Taipei, Taiwan 106

1.2 Manufacturer

SYNTECH INFORMATION CO., LTD.
12F, 333 Dunhua S. Rd., Sec. 2, Taipei, Taiwan 106

1.3 Basic Description of Equipment under Test

Equipment	: Portable Terminal
Trade Name	: CIPHERLAB
Model No.	: 8500
FCC ID	: Q3N-8500
Power Supply Type	: From Battery 4.2V

1.4 Feature of Equipment under Test

Product Feature & Specification				
1. Type of Modulation	WLAN:CCK(5.5 and 11Mbps), QPSK(2Mbps), BPSK(1Mbps) BT: GFSK			
2. Number of Channels	WLAN: 11 Channels BT: 79 Channels			
3. Frequency Band	2.4GHz~2.4835GHz			
4. Carrier Frequency of each channel	WLAN: 2412MHz+(n-1)*5MHz, n=1~11 BT: 2402MHz+n*1MHz, n=0~78			
5. Channel Spacing	WLAN: 5MHz BT: 1MHz			
6. Maximum Output Power to Antenna (Normal Condition)	WLAN: 14.59 dBm BT: -1.32 dBm			
7. Type of Antenna Connector	SMD			
8. Antenna Type	PIFA			
9. Antenna Gain	1 dBi			
10. Function Type	Transmitter		Transceiver	V
11. Duty Cycle	100%			
12. Basic function of product	With Wireless LAN and BT for data networking applications			

2 Test Configuration of Equipment under Test

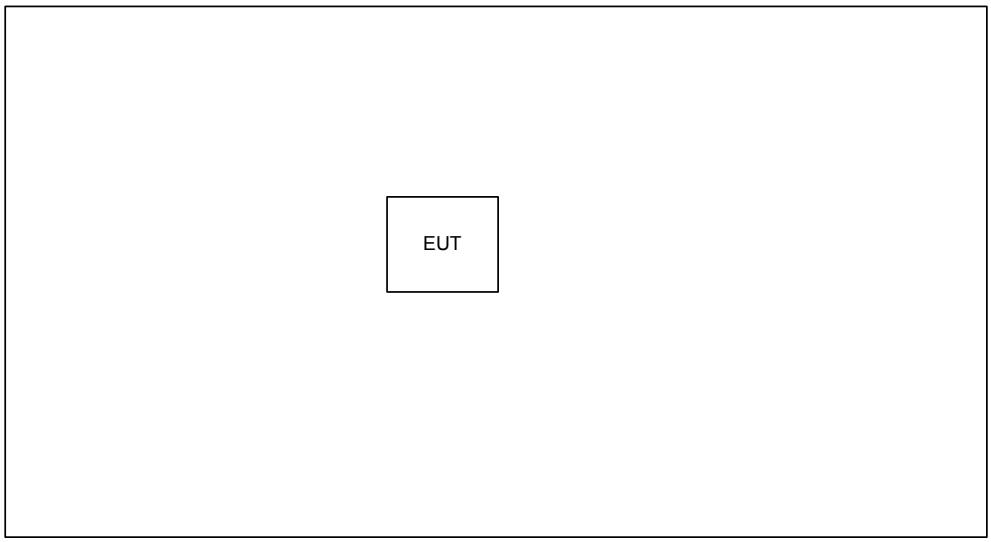
2.1 Test Manner

a. The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
b. For spurious emission below 1GHz, only one channel of each application was tested because it is not related to channel selection.
c. The EUT is programmed to transmit signal continuously for all testings.
d. Frequency range investigated: conduction 150 kHz to 30 MHz, radiation 30 MHz to 25000MHz.

2.2 Test Mode

Application	802.11b	BT	RF ID
Radiated Emission	Mode 1: Tx_CH01_2412 MHz Mode 2: Tx_CH06_2437 MHz Mode 3: Tx_CH11_2462 MHz	Mode 4: Tx_CH00_2402 MHz Mode 5: Tx_CH39_2441 MHz Mode 6: Tx_CH78_2480 MHz	Mode 7: RF ID Tx

2.3 Connection Diagram of Test System



2.4 Ancillary Equipment List

N/A

3. RF Utility

The programmed RF Utility is either installed in EUT or Notebook to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testings.

4. General Information of Test

Test Site Location : No. 30-2, Neighborhood 6, Village Ding-Fu, Lin-Kou Hsiag, Taipei Hsien, Taiwan, R.O.C.
TEL : 886-2-2601-1640
FAX : 886-2-2601-1695
Test Site No : CO02-LK

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-318-0055
Test Site No : 03CH06-HY

4.1 Test Voltage

120V/ 60Hz

4.2 Standard for Methods of Measurement

ANSI C63.4-2003

4.3 Test in Compliance with

47 CFR Part 15 Subpart C

4.4 Frequency Range Investigated

a. Radiation: from 30 MHz to 25000 MHz

4.5 Test Distance

The test distance of radiated emission from antenna to EUT is 3 m.

5. Test Data and Test Result

5.1 List of Measurements and Examinations

The Emission Mode: Wireless LAN

FCC Rule	Description of Test	Result
15.207	Conducted Emission	Pass
15.247(a)(2)	6dB Bandwidth	Pass
15.247(b)	Maximum Peak Output Power	Pass
15.209(a)	Radiated Emission	Pass
15.247 (c)	100kHz Bandwidth of Frequency Band Edges	Pass
15.247(d)	Power Spectral Density	Pass
15.203 15.247(b)(4)	Antenna Requirement	Pass

The Emission Mode: Bluetooth

FCC Rule	Description of Test	Result
15.247(a) (1)	Hopping Channel Bandwidth	Pass
15.247(a)(1)	Hopping Channel Separation	Pass
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Pass
15.247(a)(1)(iii)	Dwell Time of Each Frequency	Pass
15.247(b) (1)	Output Power	Pass
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass
15.207	Conducted Emission	Pass
15.209	Radiated Emission	Pass
15.203	Antenna Requirement	Pass

5.2 6dB Bandwidth Measurement

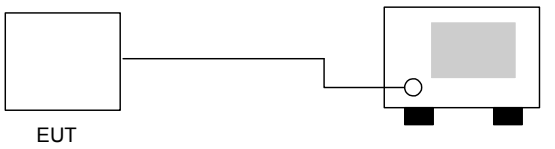
5.2.1 Measuring Instruments：

As described in chapter 6 of this test report.

5.2.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
3. The 6 dB bandwidth is defined as the frequency range where the power is higher than the peak power minus 6dB.

5.2.3 Test Setup Layout：



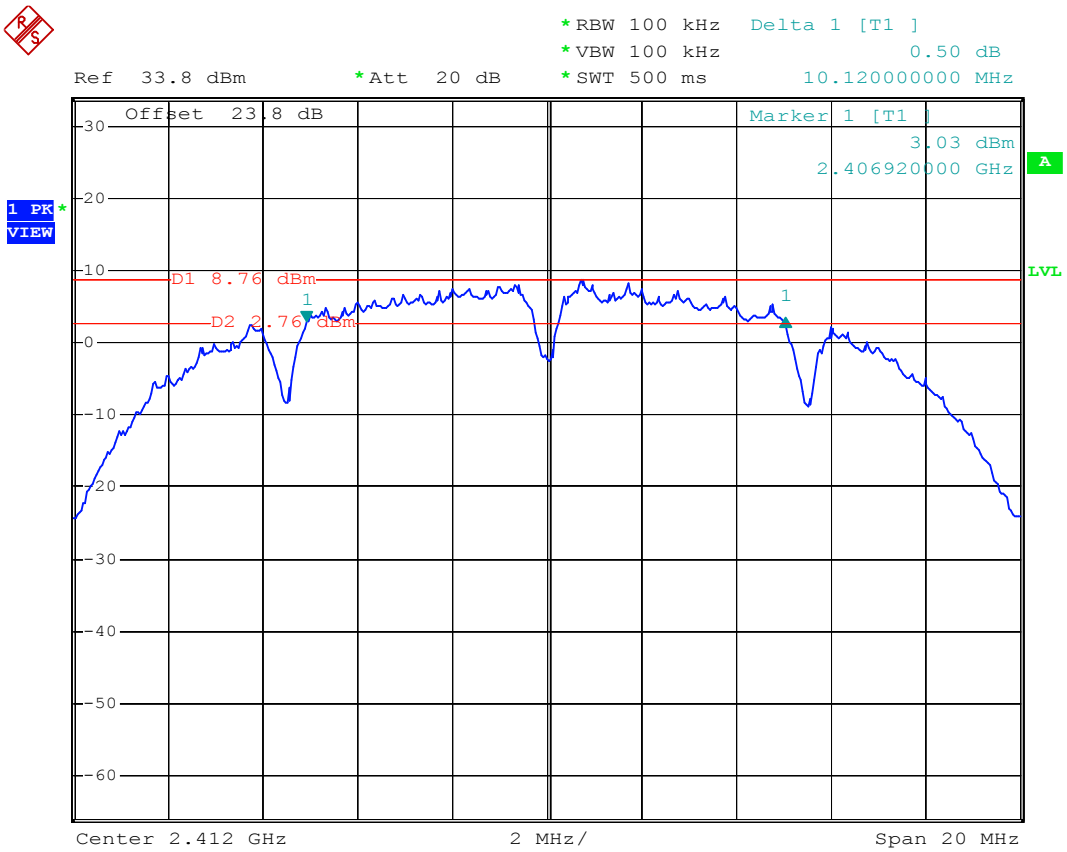
5.2.4 Test Result：

- Application Type : WLAN 802.11b
- Temperature : 27°C
- Relative Humidity : 58%
- Test Enginner : Jay

Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
01	2412	10.12	0.5	Mode 1
06	2437	10.04	0.5	Mode 2
11	2462	10.04	0.5	Mode 3

5.2.5 6dB Bandwidth

Mode 1



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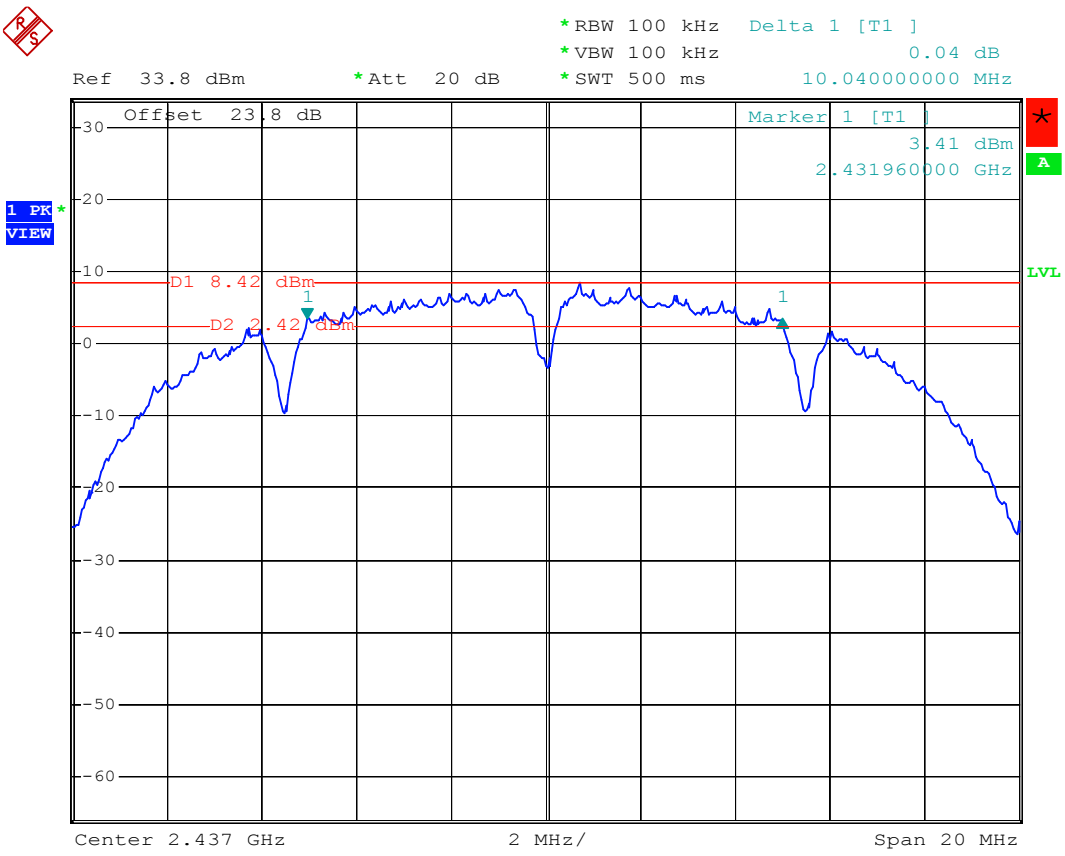
Mode 2



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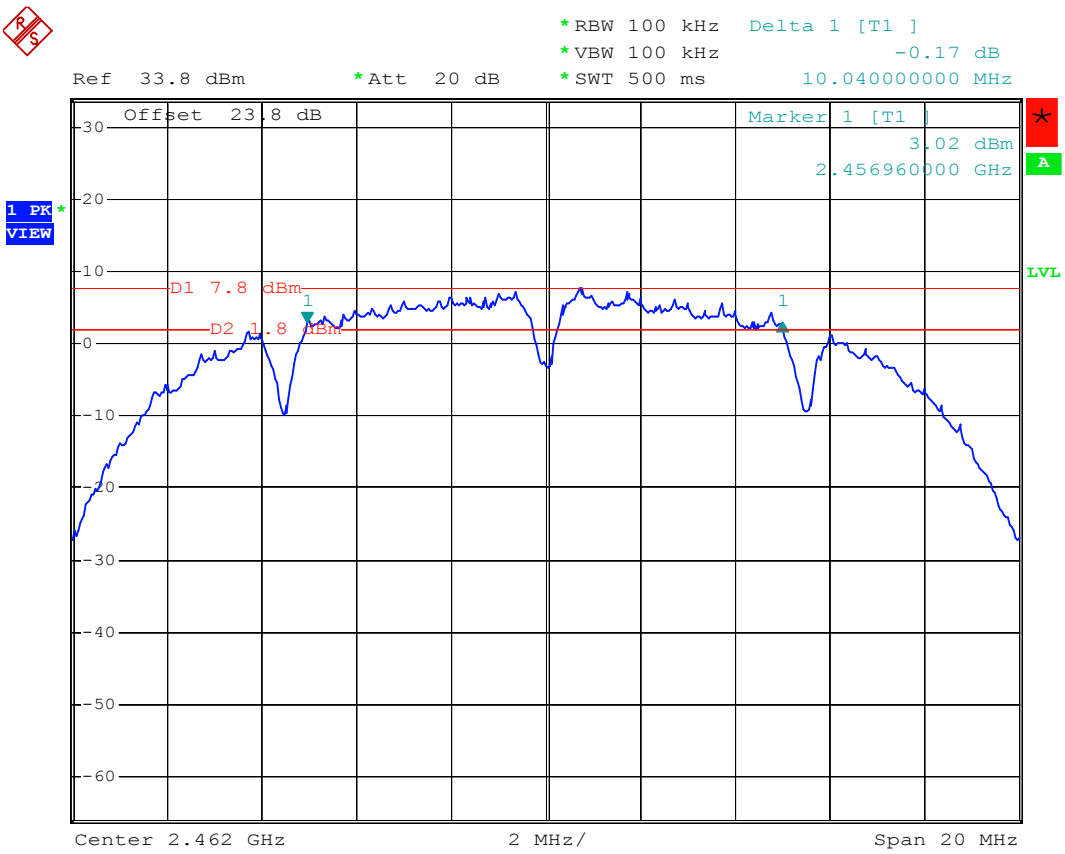
Mode 3



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5.3 Power Spectral Density Measurement

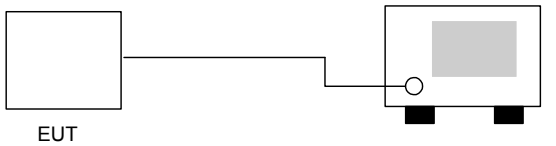
5.3.1 Measuring Instruments：

As described in chapter 6 of this test report.

5.3.2 Test Procedure：

1. The transmitter output was connected to spectrum analyzer directly.
2. The spectrum analyzer's resolution bandwidth was set at 3kHz RBW and 30kHz VBW as that of the fundamental frequency. Set the sweep time=span/3kHz.
3. The power spectral density was measured and recorded.
4. The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

5.3.3 Test Setup Layout：



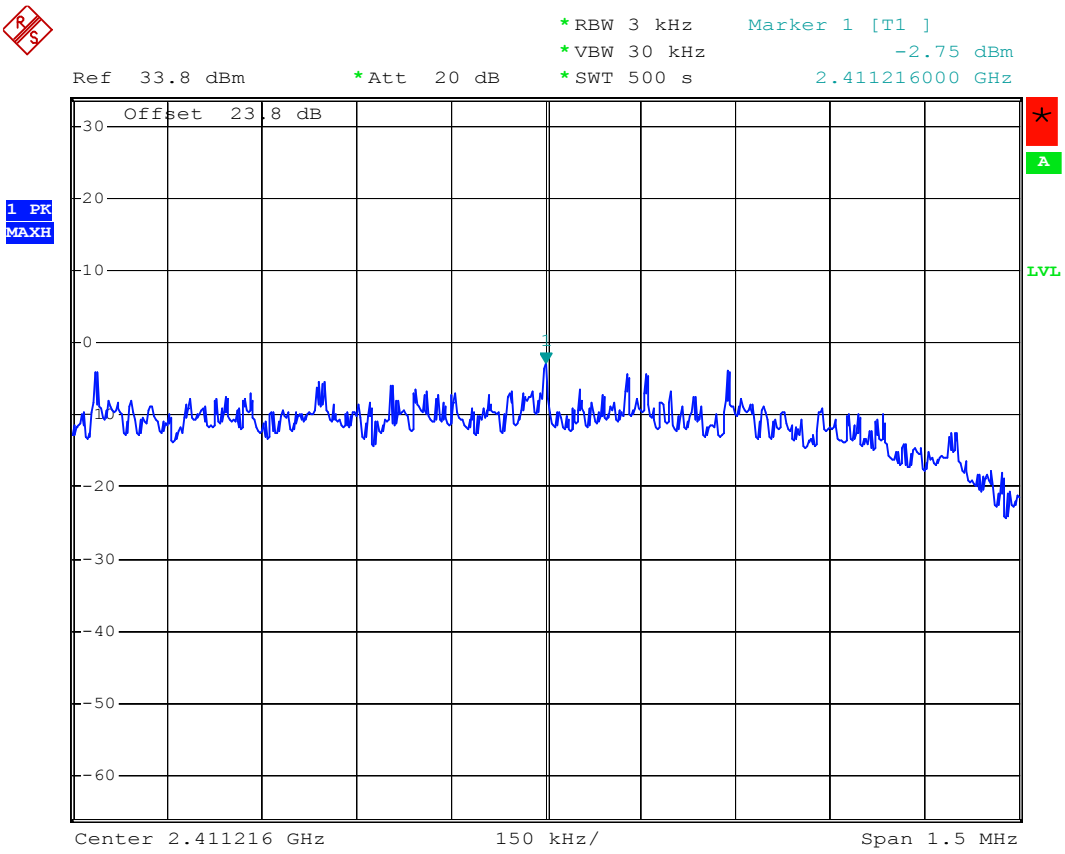
5.3.4 Test Result：

- Application Type : 802.11b
- Temperature : 27°C,
- Relative Humidity : 58%
- Test Enginner : Jay

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
01	2412	-2.75	8	Mode 1
06	2437	-3.02	8	Mode 2
11	2462	-3.73	8	Mode 3

5.3.5 Power Spectral Density

Mode 1



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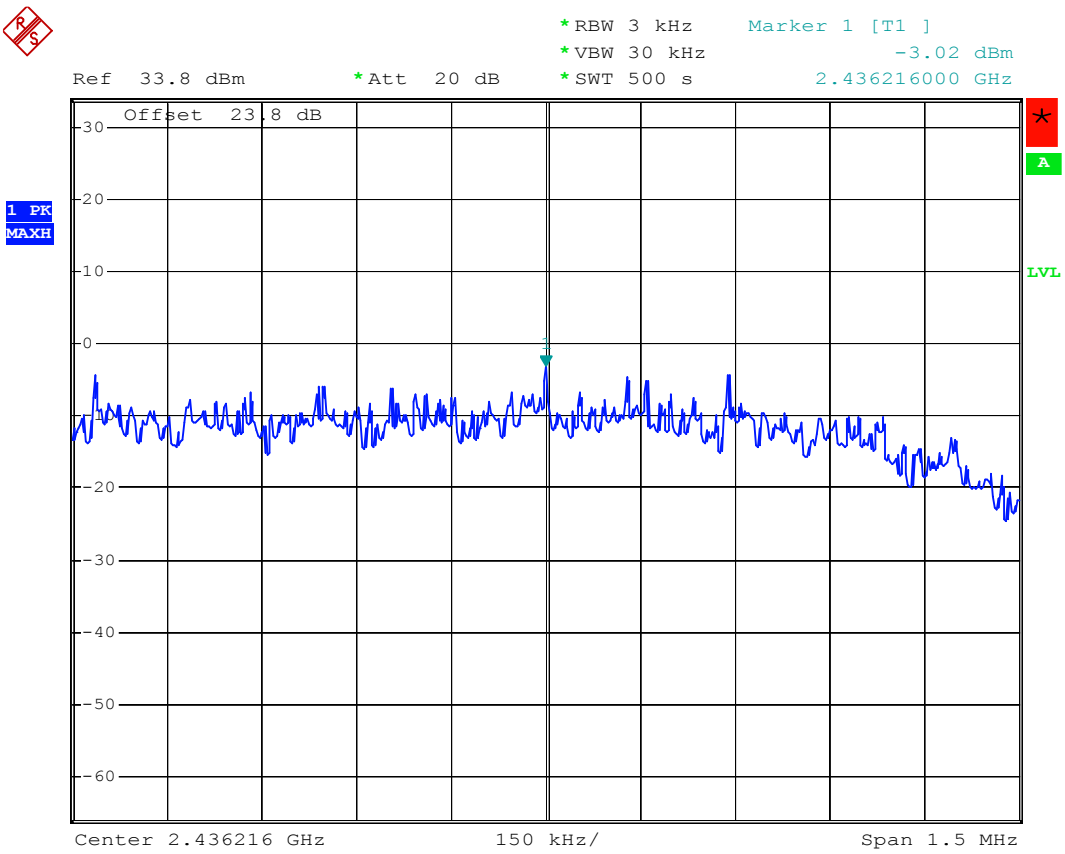
Mode 2



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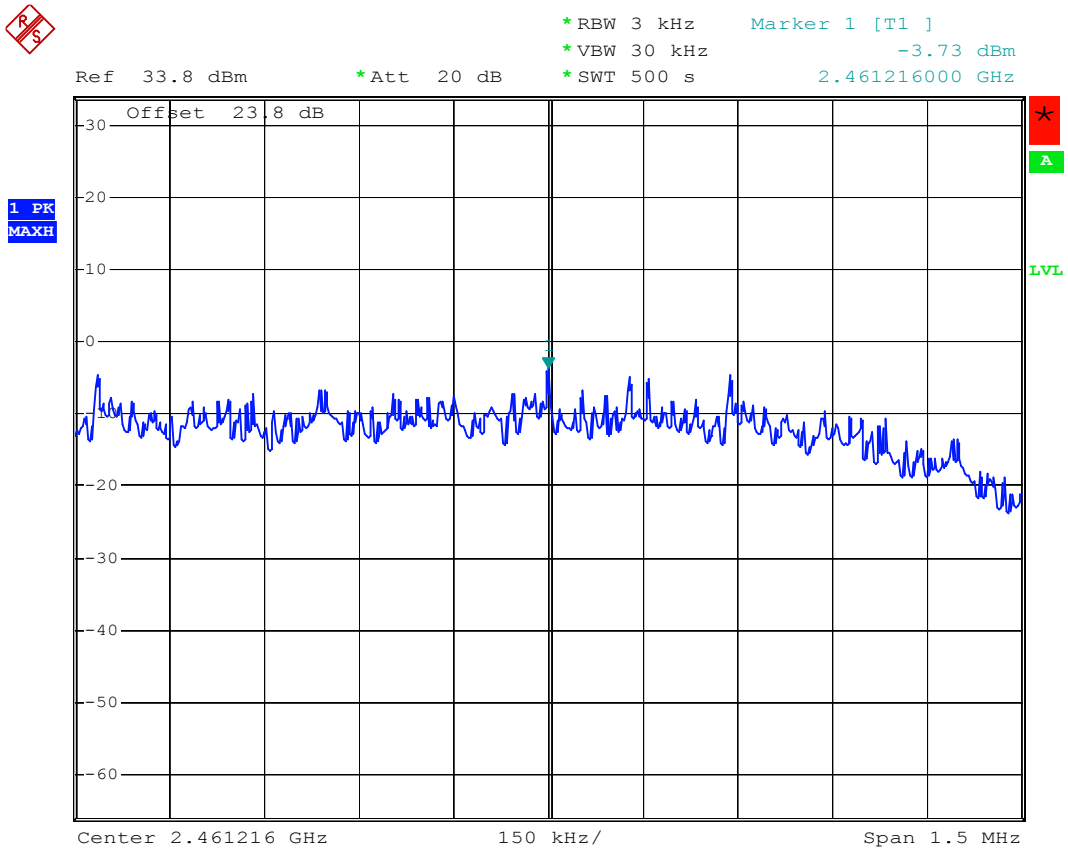
Mode 3



Date: 22.APR.2005 18:21:37

5.4 Band Edges Measurement

5.4.1 Measuring Instruments：

As described in chapter 6 of this test report.

5.4.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100 kHz bandwidth from band edge.
3. The band edges was measured and recorded.

5.4.3 Test Result：

- Application Type : WLAN 802.11b and BT
- Temperature : 27°C,
- Relative Humidity : 58%
- Test Enginner : Jay

- Test Result in WLAN lower band (Channel 1) : PASS
- Test Result in WLAN higher band (Channel 11) : PASS
- Test Result in BT lower band (Channel 00) PASS
- Test Result in BT higher band (Channel 78) PASS

5.4.4 Note on Band Edge Emission：

➢WLAN 802.11b

CH01 (Horizontal)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2390.00	71.38	-2.62	74.00	71.61	30.48	35.14	4.43	Peak
2390.00	53.89	-0.11	54.00	54.12	30.48	35.14	4.43	Average

CH01 (Vertical)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2390.00	73.33	-2.67	74.00	71.56	30.48	35.14	3.32	Peak
2390.00	53.24	-0.76	54.00	53.47	30.48	35.14	3.32	Average

CH11 (Horizontal)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2483.50	57.40	-16.60	74.00	57.66	30.41	35.19	4.52	Peak
2483.50	48.04	-25.96	54.00	48.29	30.41	35.19	4.52	Average

CH11 (Vertical)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2484.00	59.08	-14.92	74.00	59.33	30.41	35.19	4.52	Peak
2484.00	48.93	-5.07	54.00	49.18	30.41	35.19	4.52	Average

➢BT

CH00 (Horizontal)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2370.00	46.66	-27.34	74.00	46.89	30.50	35.13	4.40	Peak
2370.00	39.72	-14.28	54.00	39.95	30.50	35.13	4.40	Average

CH00 (Vertical)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2390.00	44.92	-29.08	74.00	37.45	30.48	35.14	4.43	Peak
2390.00	37.22	-16.78	54.00	45.15	30.48	35.14	4.43	Average

CH78 (Horizontal)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2483.50	55.23	-18.77	74.00	55.48	30.41	35.19	4.52	Peak
2483.50	46.87	-7.13	54.00	47.12	30.41	35.19	4.52	Average

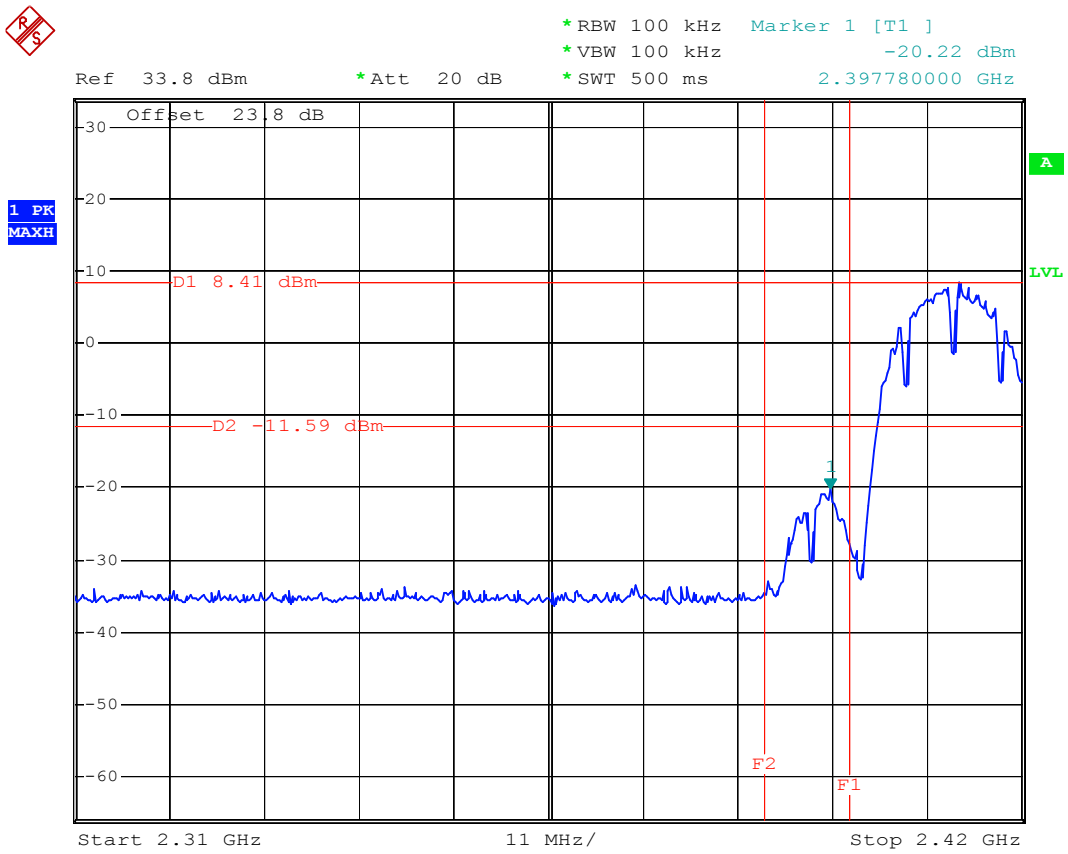
CH78 (Vertical)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2483.50	49.43	-24.57	74.00	49.68	30.41	35.19	4.52	Peak
2483.50	42.20	-11.80	5400	42.45	30.41	35.19	4.52	Average

5.4.5 20dB Band Edge

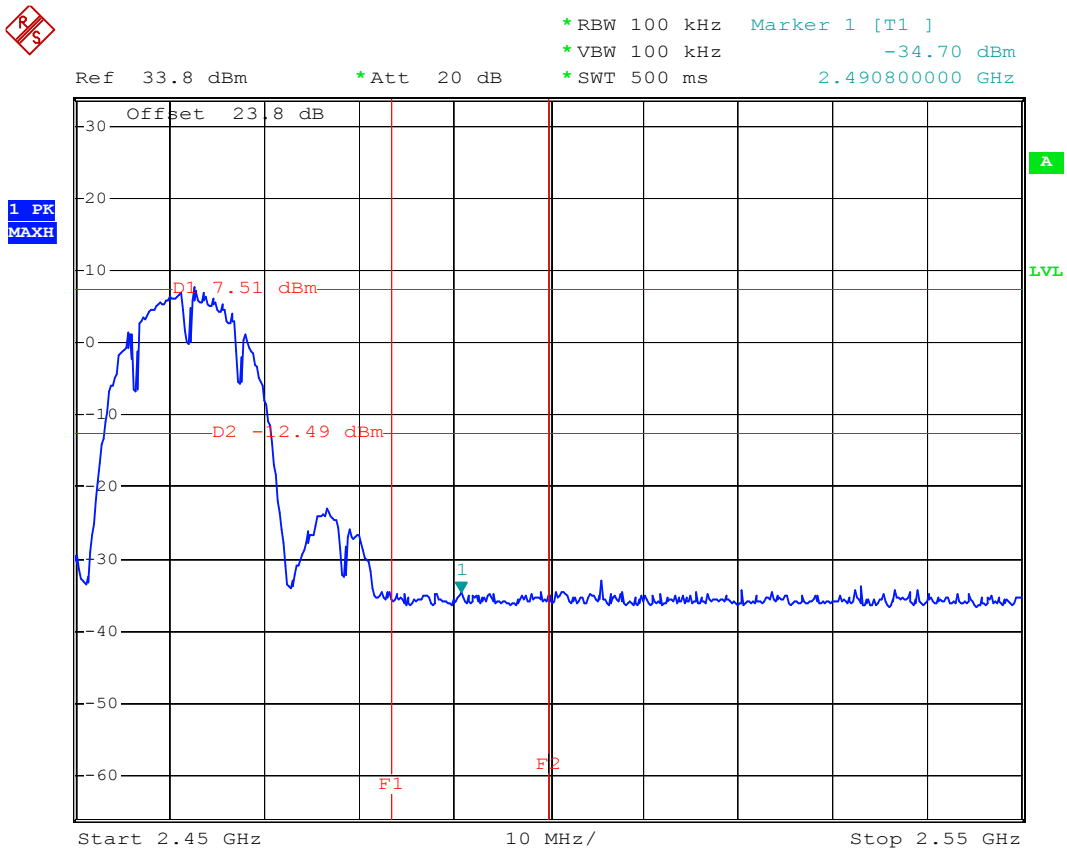
WLAN 802.11b:

CH01



Date: 22.APR.2005 18:26:18

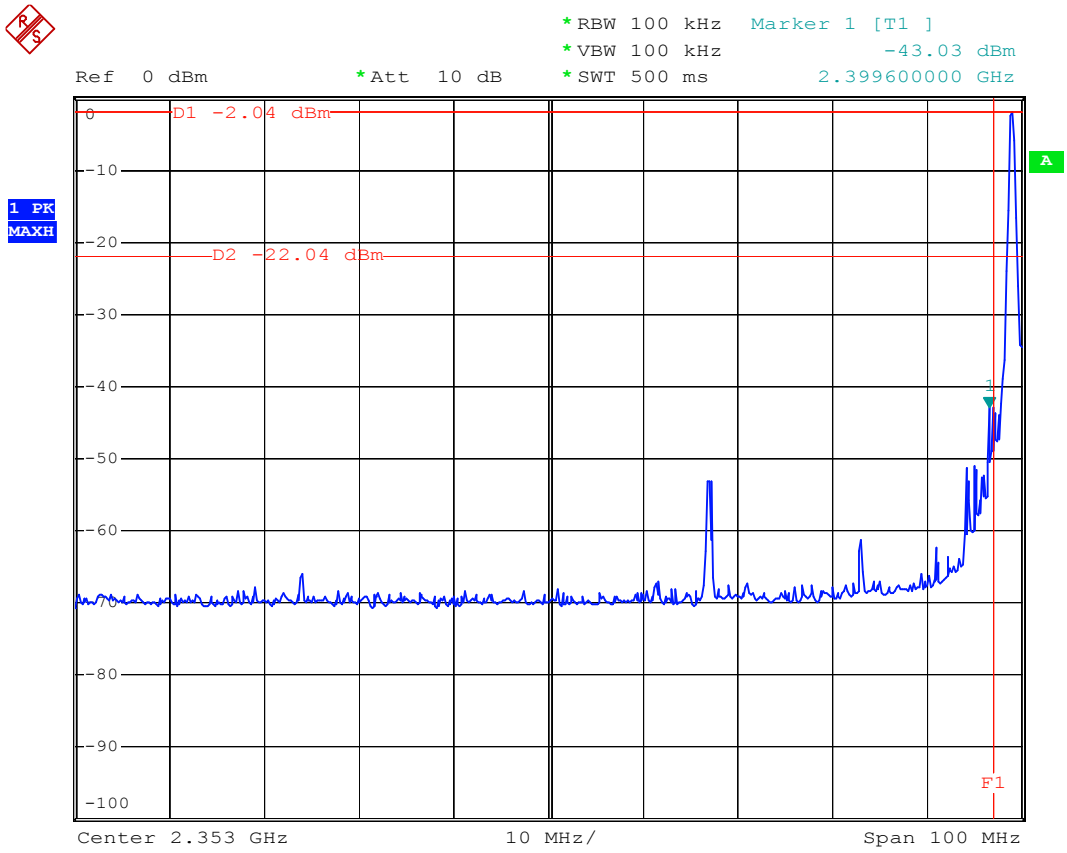
CH11



Date: 22.APR.2005 18:27:29

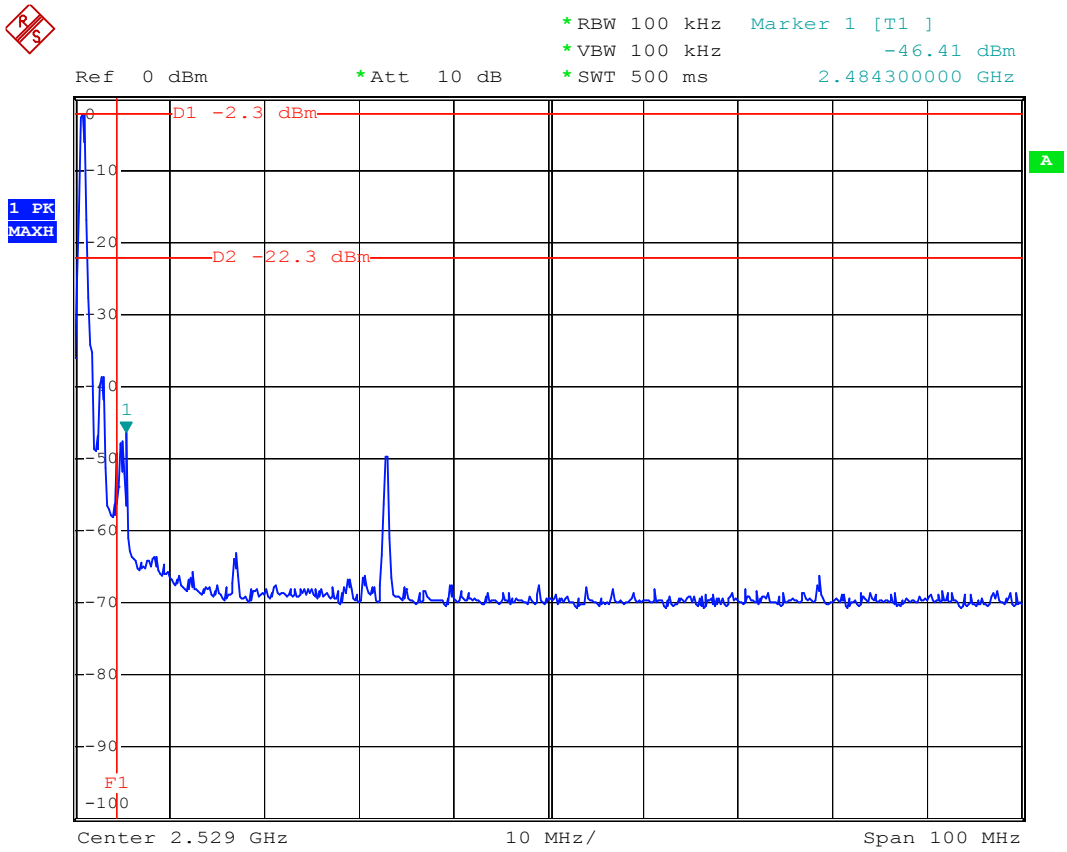
Bluetooth:

CH00



Date: 17.MAY.2005 21:38:34

CH78



Date: 17.MAY.2005 21:47:51

5.5 Hopping Channel Separation

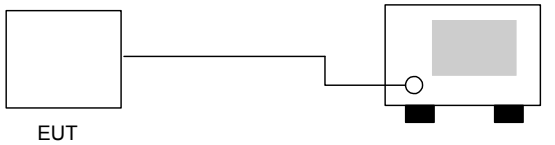
5.5.1 Measuring Instruments：

As described in chapter 9 of this test report.

5.5.2 Test Procedure：

1. The output of EUT was connected to the spectrum analyzer by a low loss cable..
2. Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
3. The Hopping Channel Separation is defined as the channel is separated with the next channel.

5.5.3 Test Setup Layout：



5.5.4 Test Result：The spectrum analyzer plots are attached as below

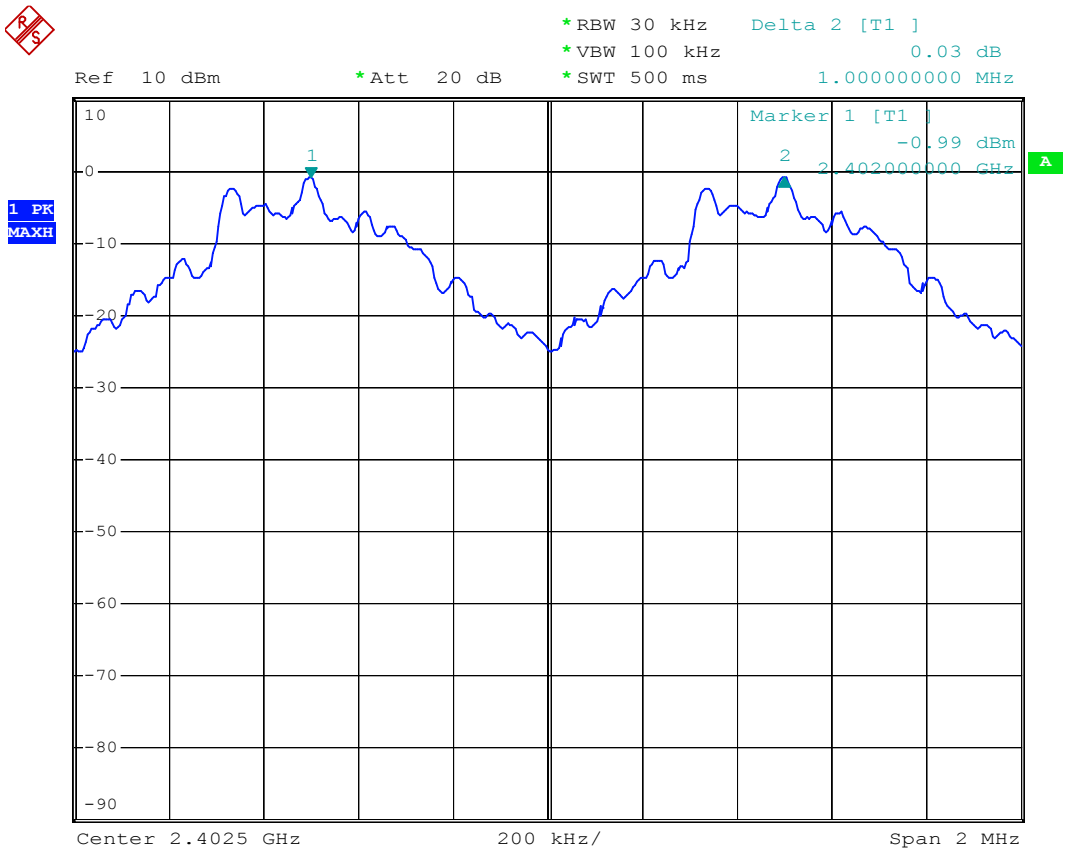
- Application Type : BT
- Temperature : 27°C
- Relative Humidity : 58%
- Test Enginner : Jay

Channel	Frequency (MHz)	Carrier Frequency Separation (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	1	0.816	Mode 1
39	2441	1	0.812	Mode 2
78	2480	1	0.824	Mode 3

Note: Limits =25kHz or the 20dB bandwidth of the hopping channel, which ever is greater

5.5.5 Hopping Channel Seperation

Mode 1



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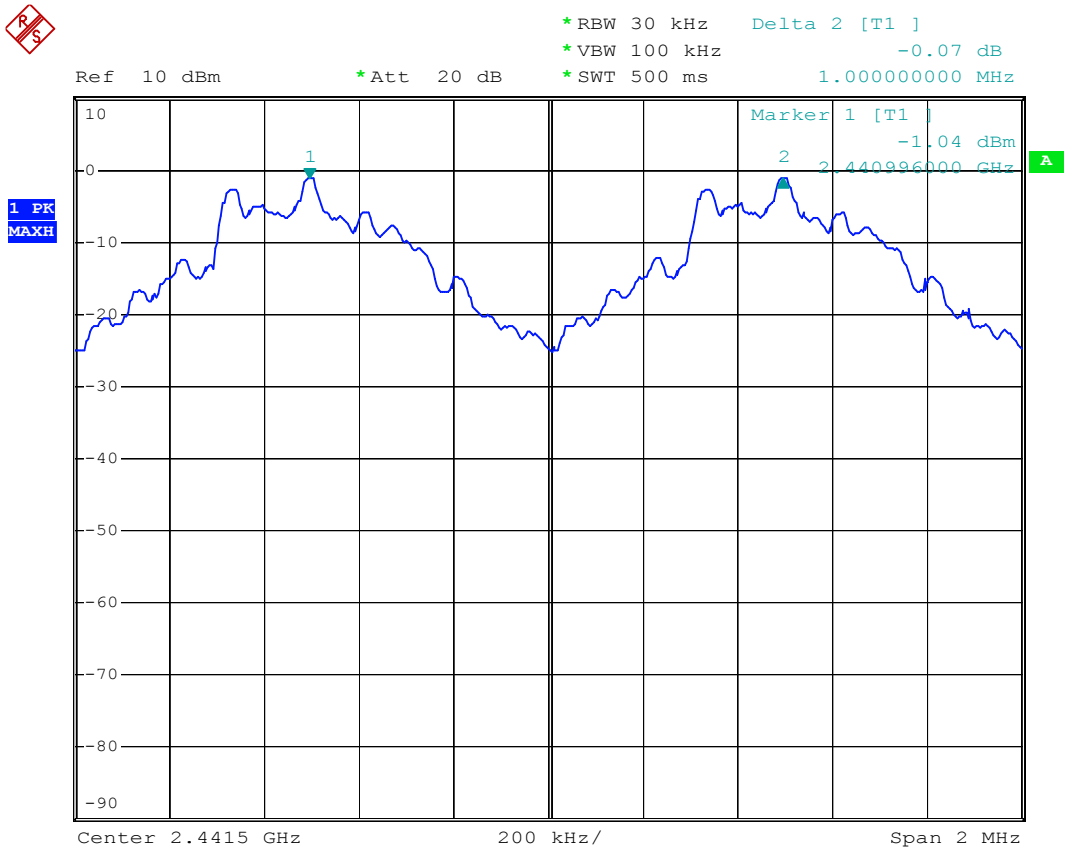
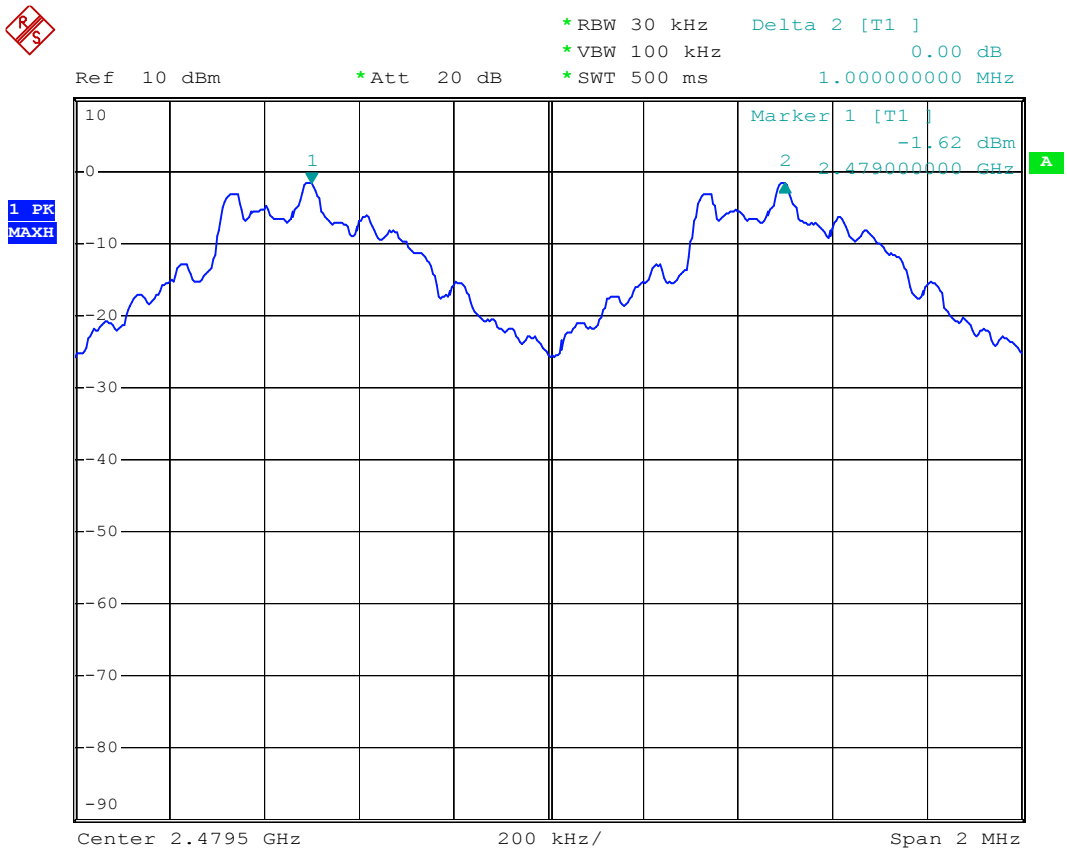
Mode 2



Date: 17.MAY.2005 23:50:58

Mode 3



Date: 17.MAY.2005 23:50:25

5.6 Number of Hopping Frequency

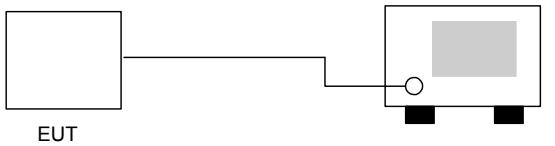
5.6.1 Measuring Instruments：

As described in chapter 9 of this test report.

5.6.2 Test Procedure：

1. The output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
3. The number of hopping frequency used is defined as the device has the numbers of total channel.

5.6.3 Test Setup Layout：

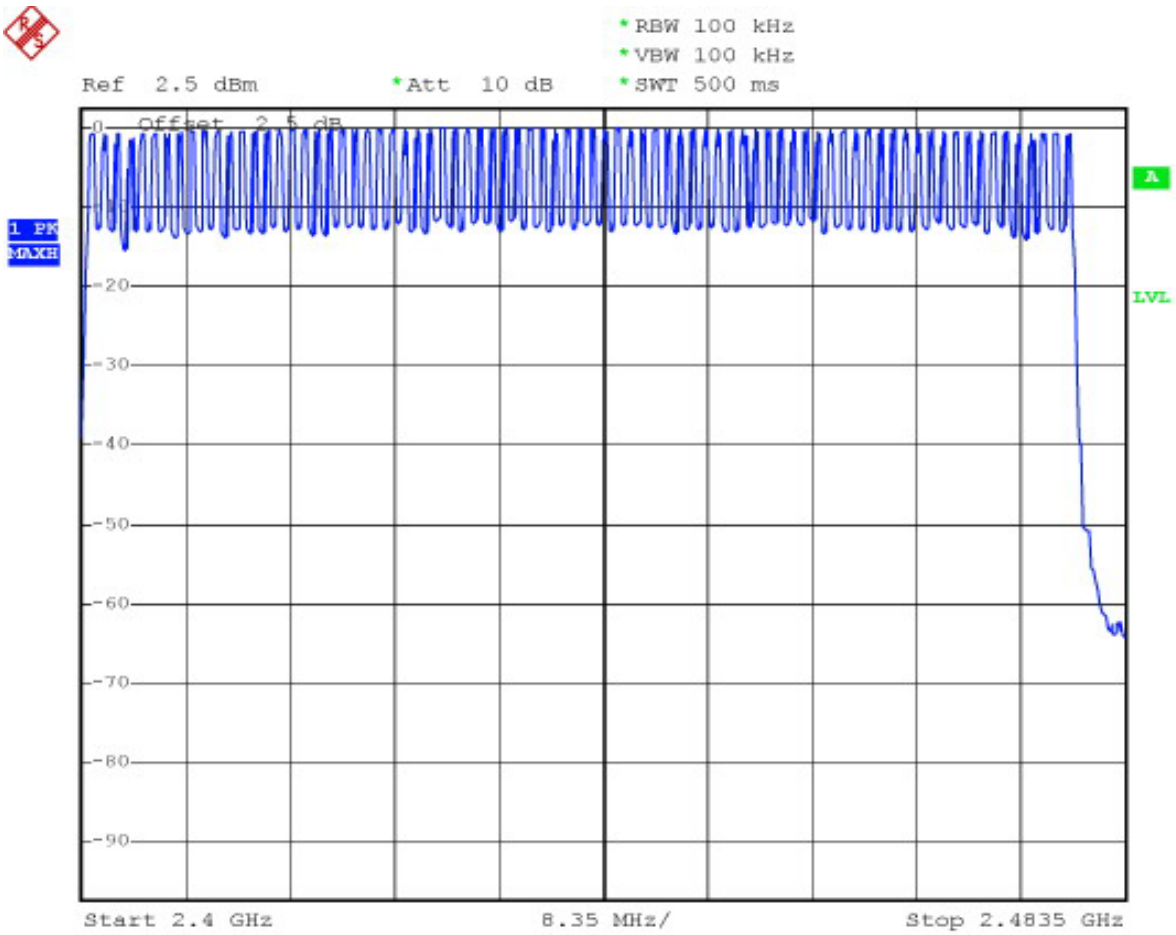


5.6.4 Test Result：See spectrum analyzer plots below

- Application Type : BT
- Temperature : 27°C,
- Relative Humidity : 58%
- Test Enginner : Jay

Number of Hopping Frequency (Channel)	Limits (Channel)
79	75

5.6. Number of Hopping Frequency



5.7 Hopping Channel Bandwidth

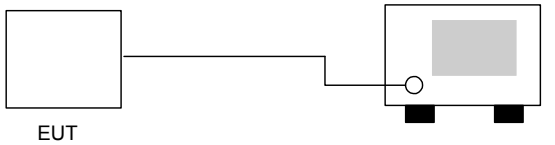
5.7.1 Measuring Instruments：

As described in chapter 9 of this test report.

5.7.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer by a low loss cable.
2. Set RBW of spectrum analyzer to 30kHz and VBW to 300kHz.
3. The Hopping Channel bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

5.7.3 Test Setup Layout：



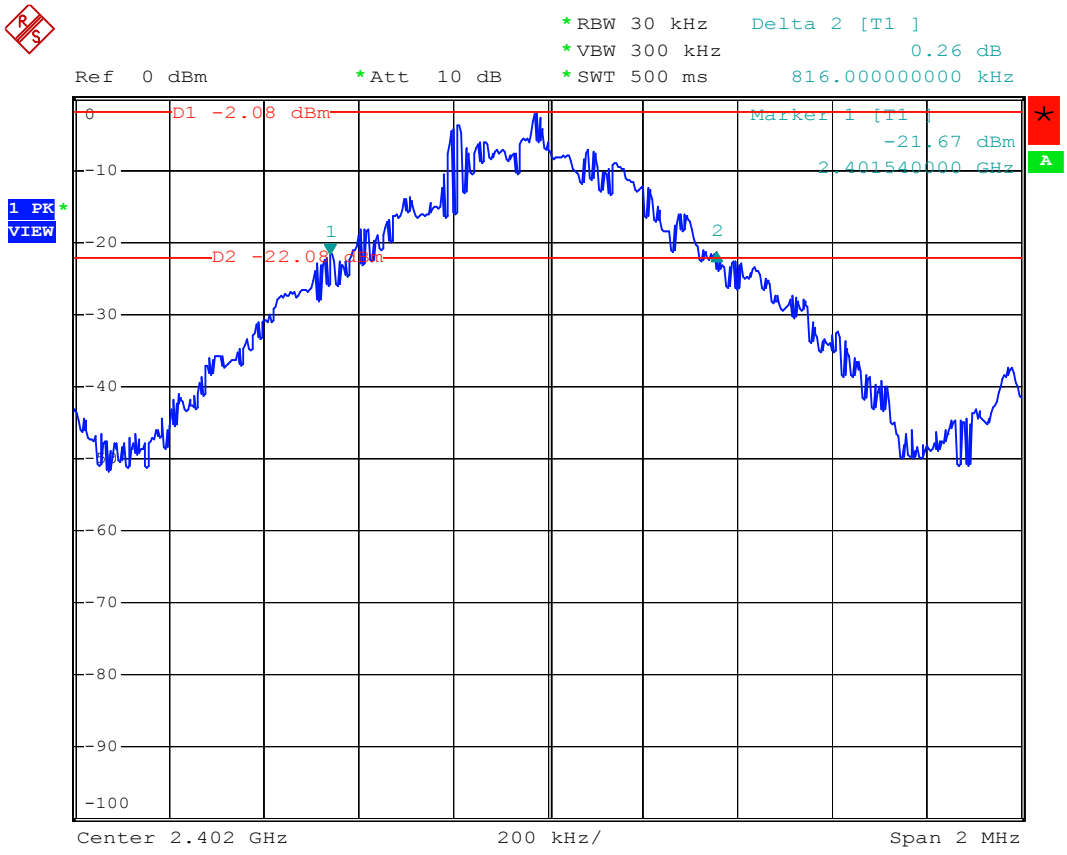
5.7.4 Test Result：See spectrum analyzer plots below

- Application Type : BT
- Temperature : 27°C,
- Relative Humidity : 58%
- Test Enginner : Jay

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.816	1.0	Mode 1
39	2441	0.812	1.0	Mode 2
78	2480	0.824	1.0	Mode 3

5.7.5 Hopping Channel Bandwidth

Mode 1



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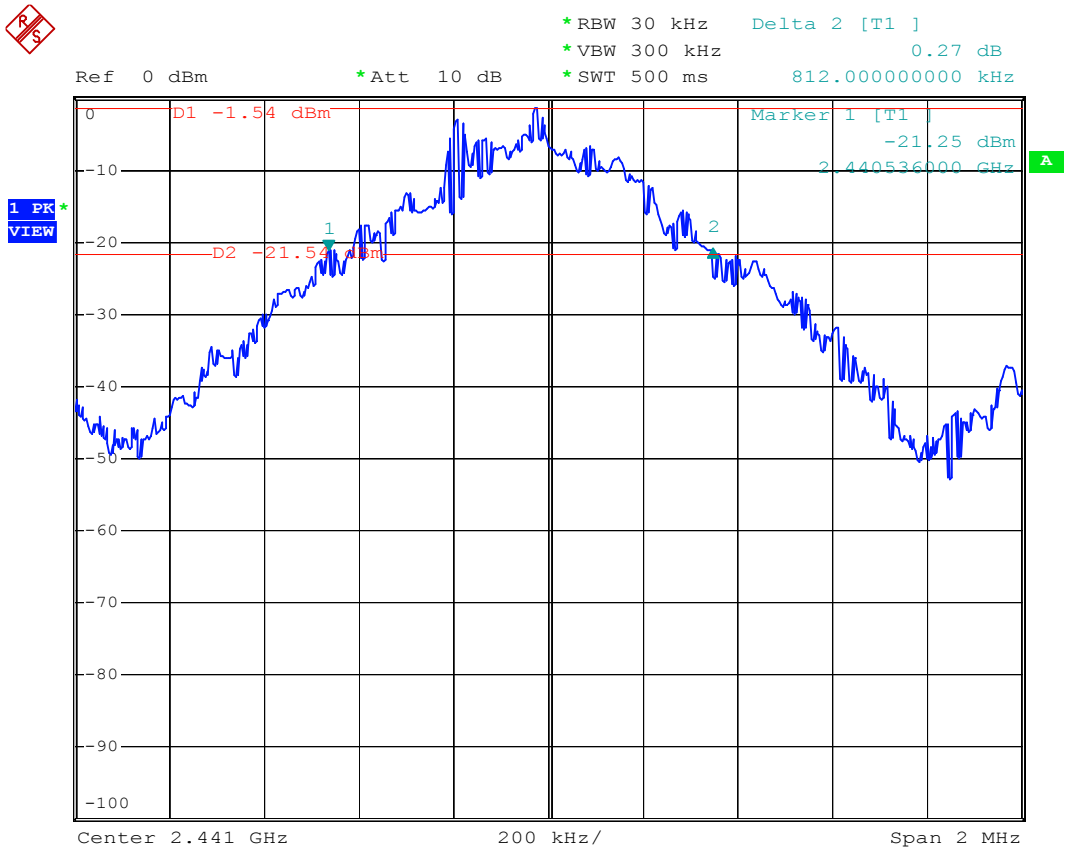
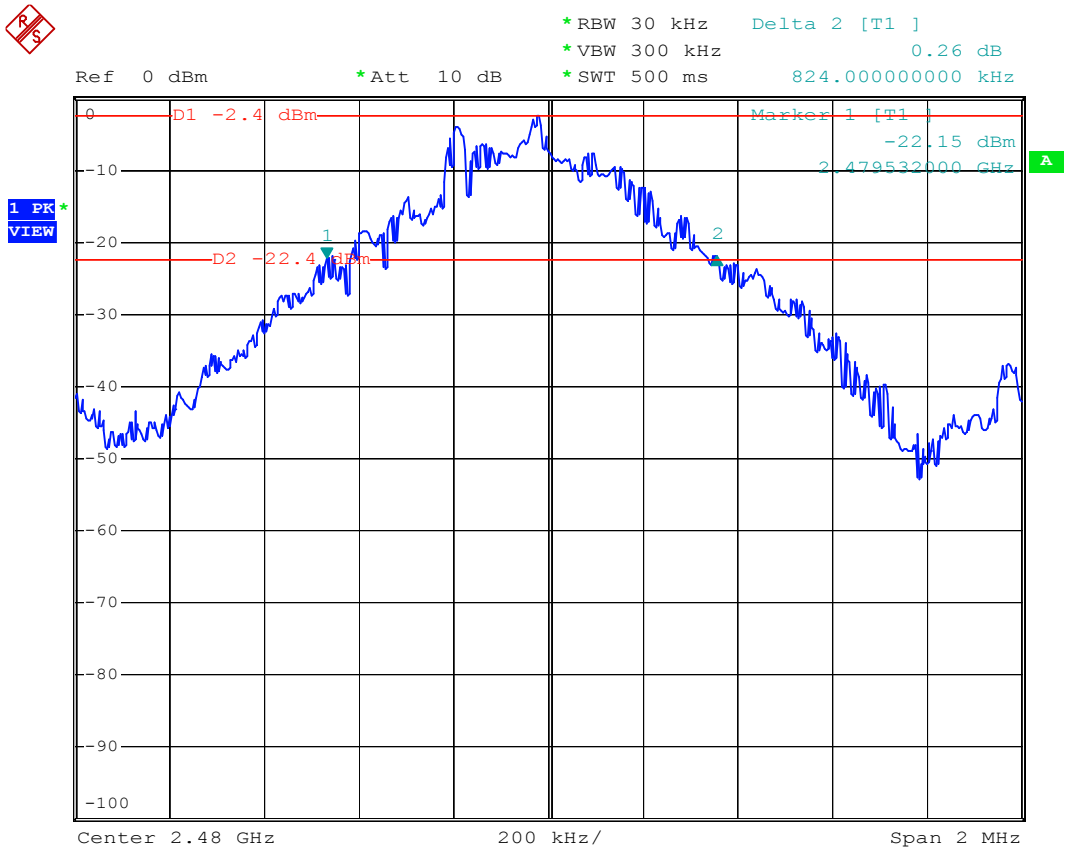
Mode 2



Date: 17.MAY.2005 21:45:03

Mode 3



Date: 17.MAY.2005 21:47:09

5.8 Dwell Time of Each Frequency within a 30 Seconds Period

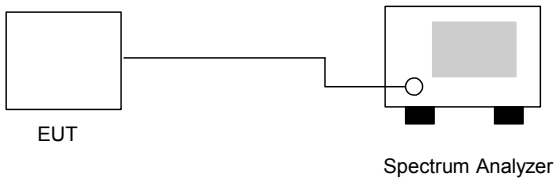
5.8.1 Measuring Instruments：

As described in chapter 9 of this test report.

5.8.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer by a low loss cable.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
3. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
4. The calculate =0.4 * 79 * (1600/79) * t (t = the time duration of one single pulse)

5.8.3 Test Setup Layout：



5.8.4 Test Result：See spectrum analyzer plots below

- Application Type : BT
- Temperature : 27°C,
- Relative Humidity : 58%
- Test Enginner : Jay

Ch00

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	10.1	548	0.17	0.4
DH3	5.1	1810	0.29	0.4
DH5	3.4	3080	0.33	0.4

CH39

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	10	544	0.17	0.4
DH3	5.1	1810	0.29	0.4
DH5	3.4	3080	0.33	0.4

CH78

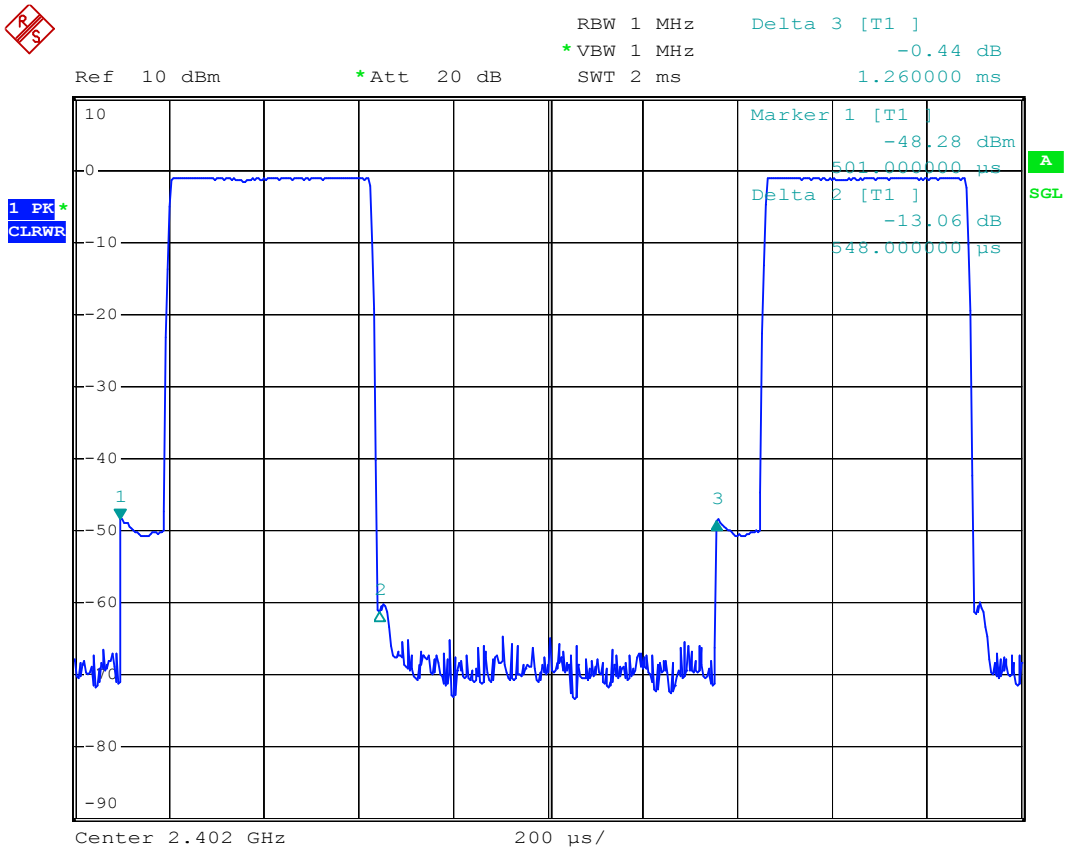
Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	10	544	0.17	0.4
DH3	5	1800	0.28	0.4
DH5	3.3	3080	0.32	0.4

※ Remark:

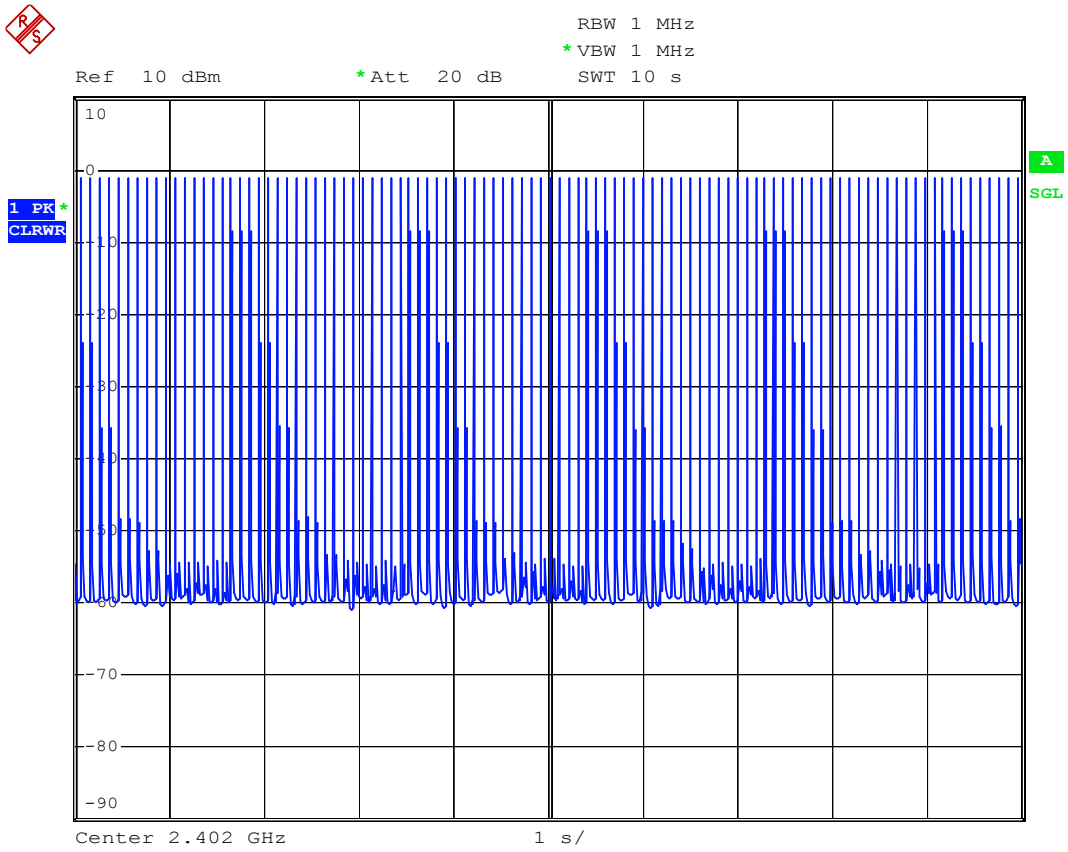
1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

5.8.5 Dwell Time

DH1 (CH00)

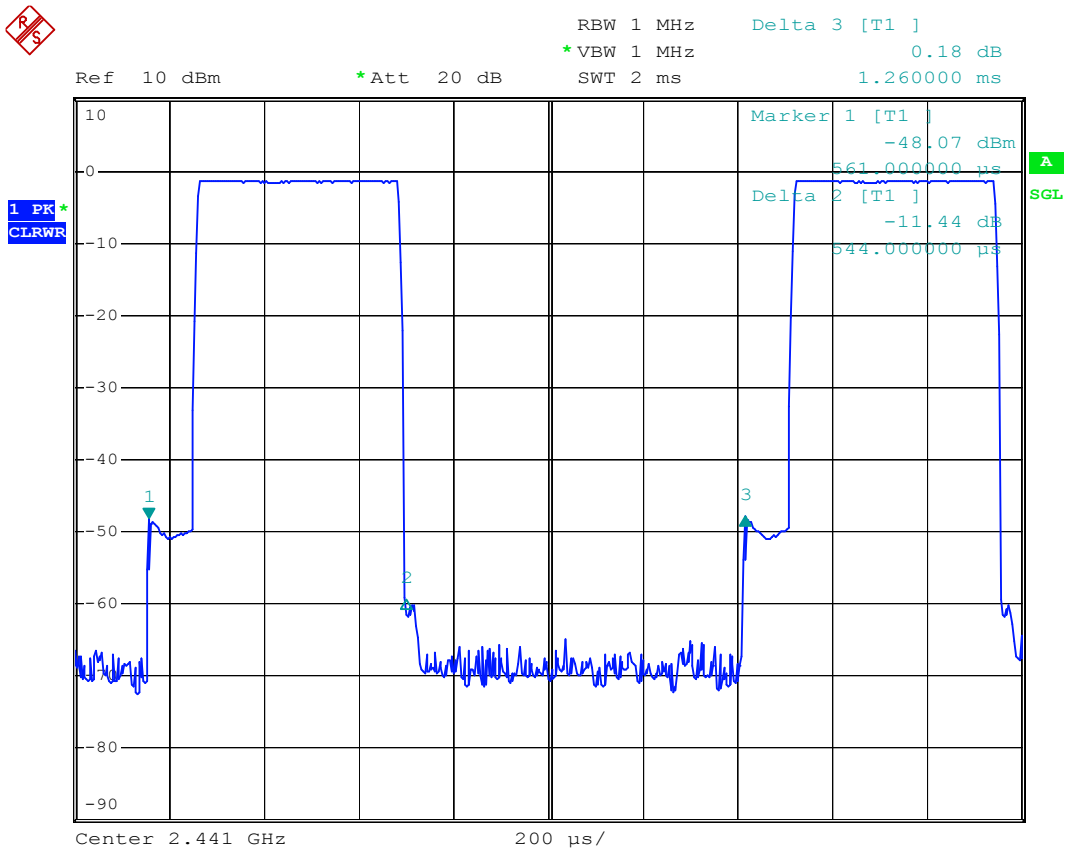


Date: 17.MAY.2005 23:52:35

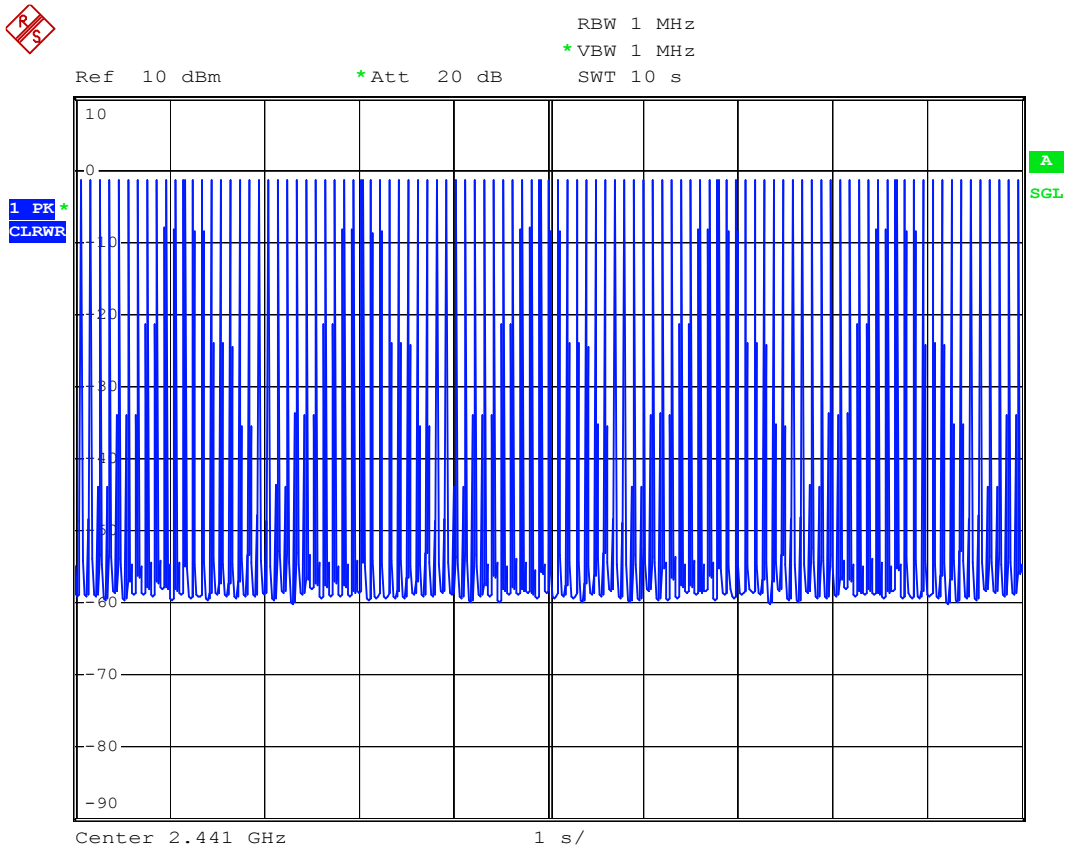


Date: 18.MAY.2005 00:06:26

DH1 (CH39)



Date: 17.MAY.2005 23:59:58



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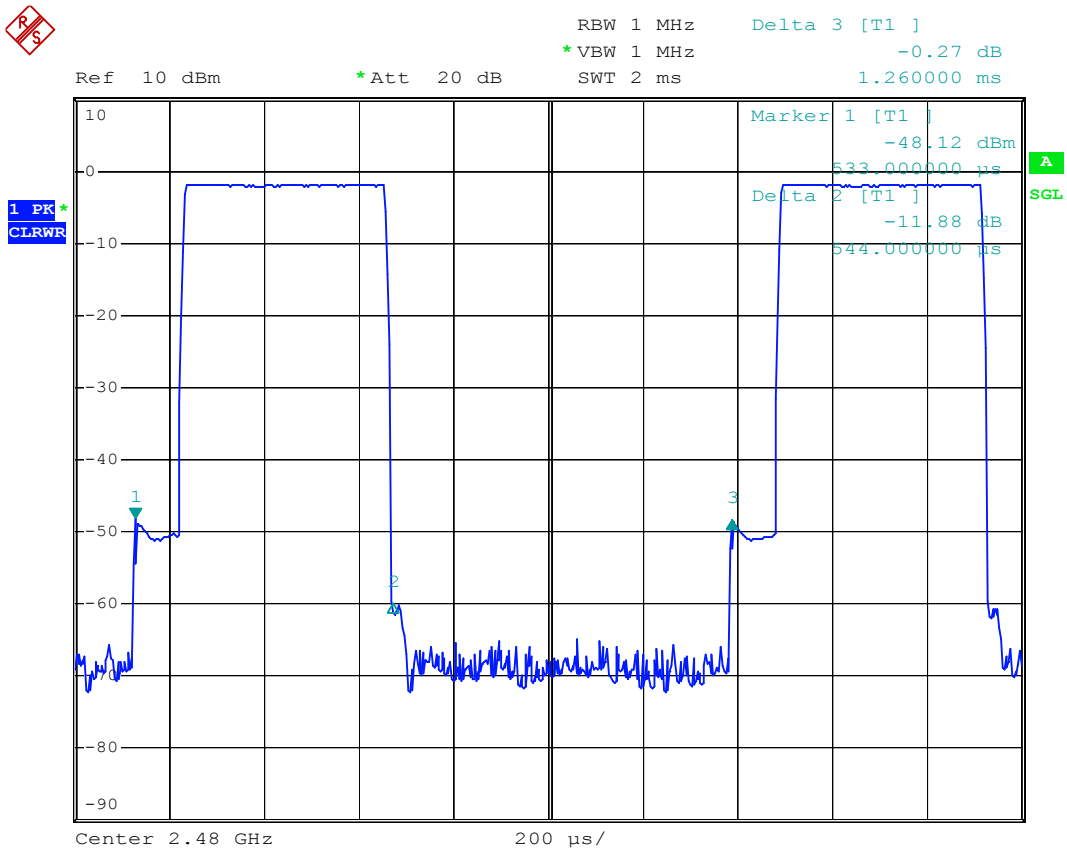
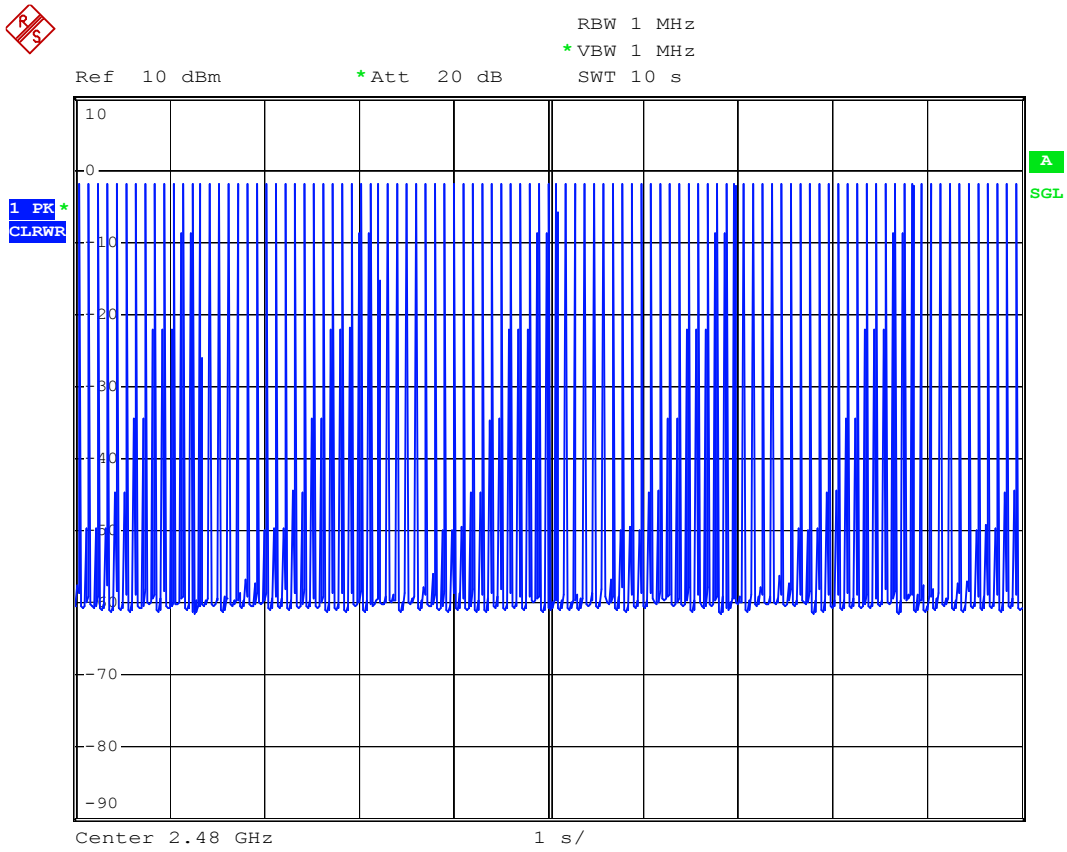
DH1 (CH78)

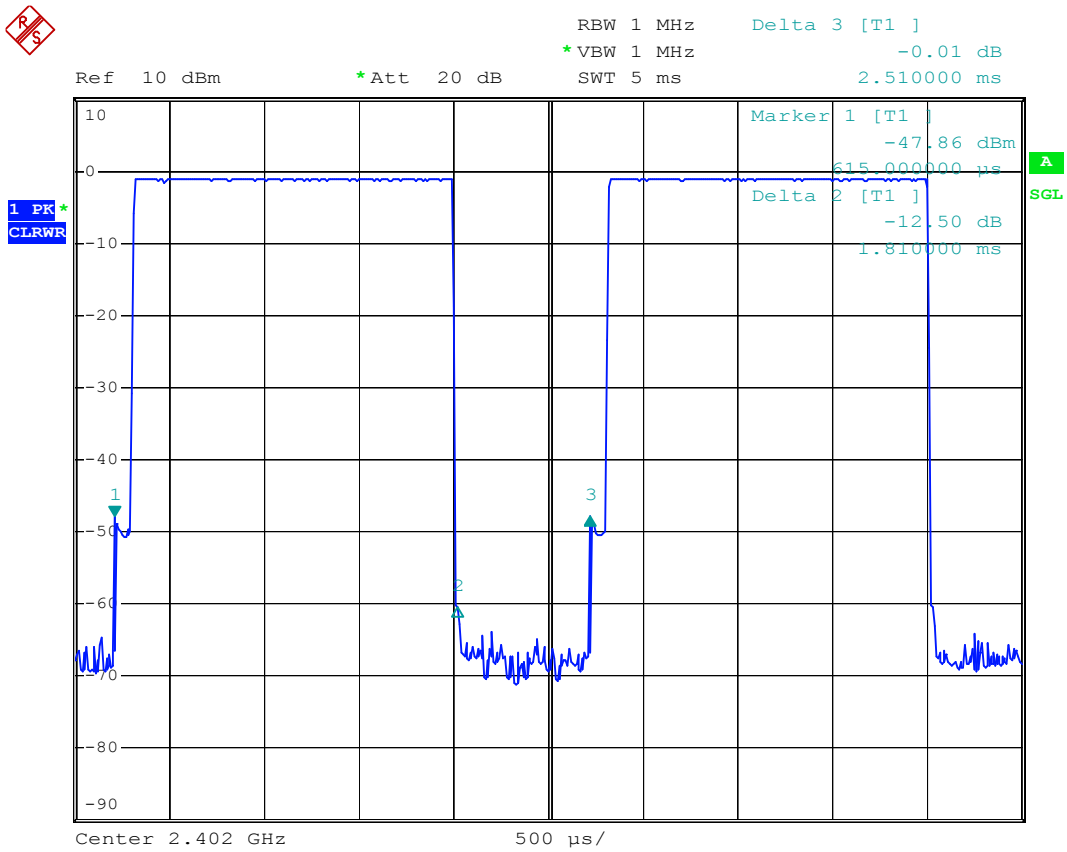


Date: 18.MAY.2005 00:00:44

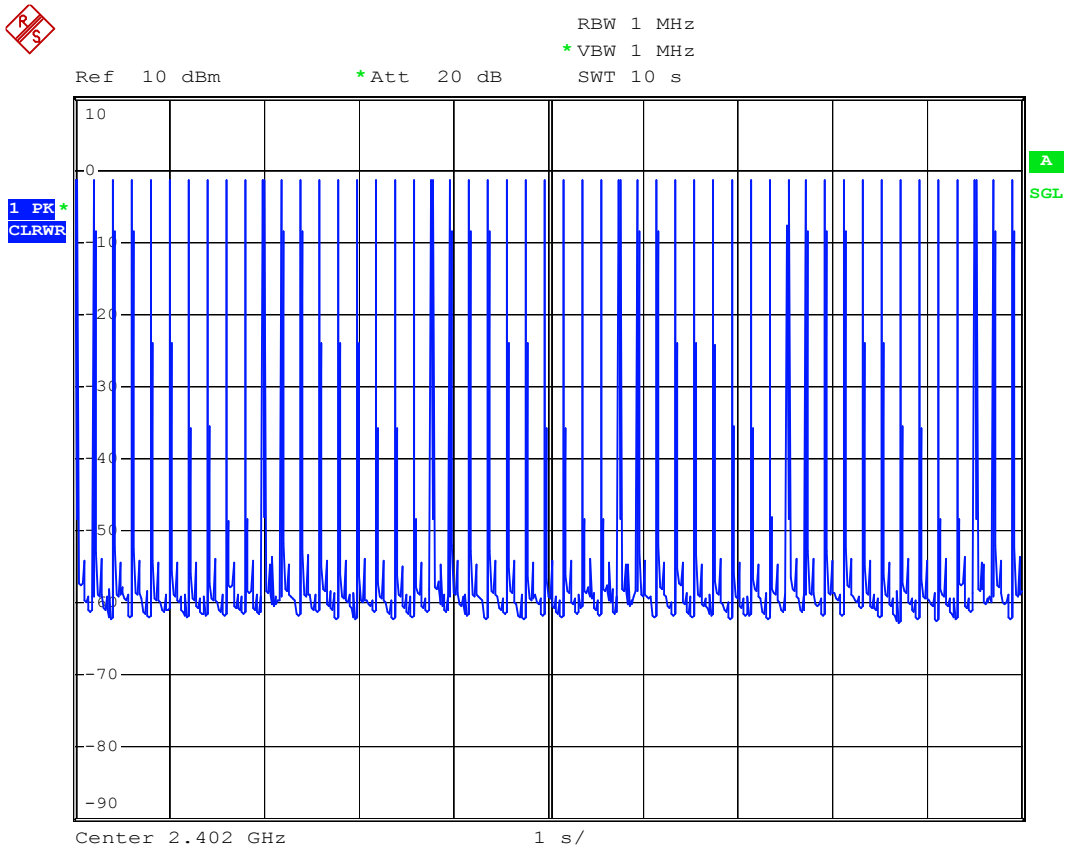


Date: 18.MAY.2005 00:05:32

DH3 (CH00)

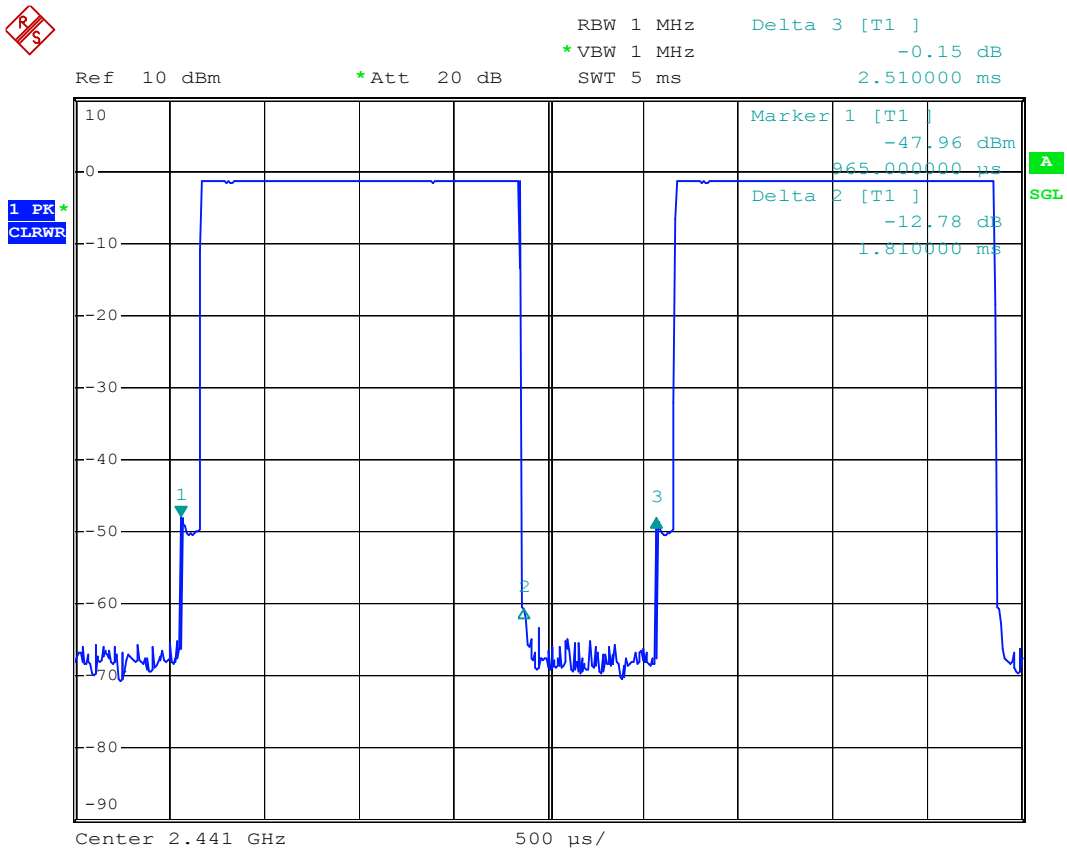


Date: 17.MAY.2005 23:53:14



Date: 18.MAY.2005 00:04:10

DH3 (CH39)



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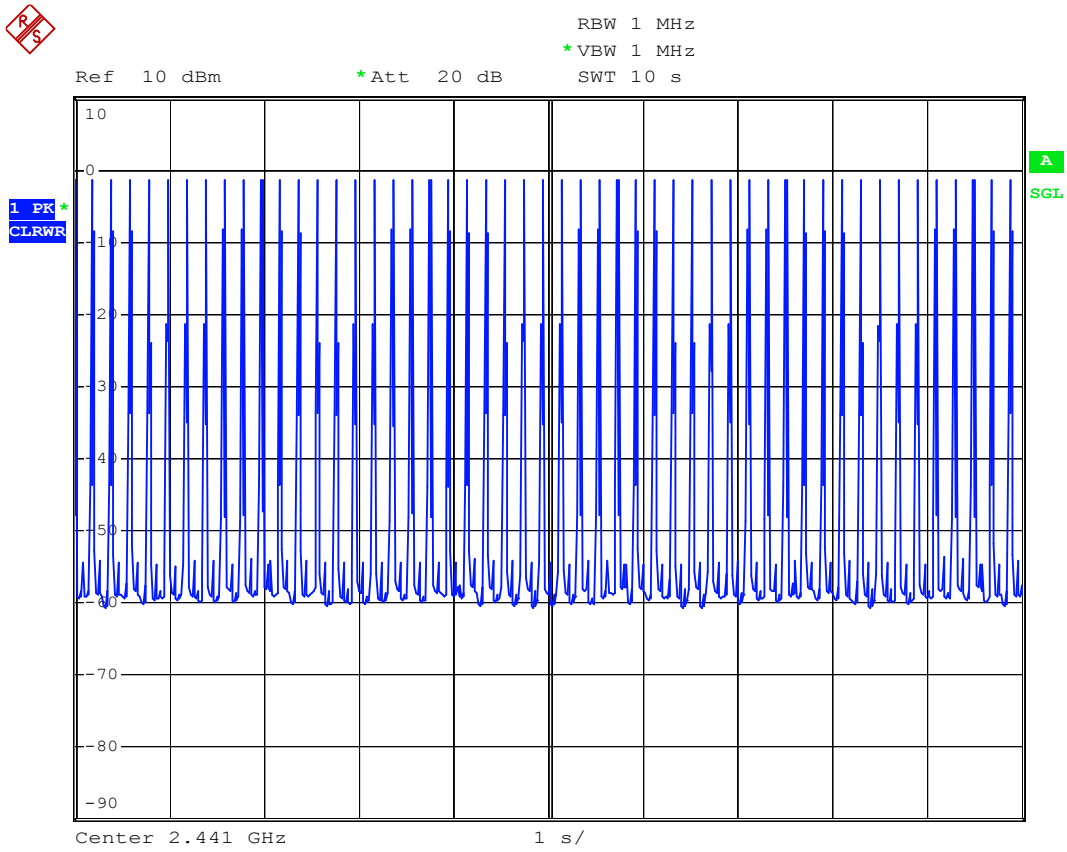

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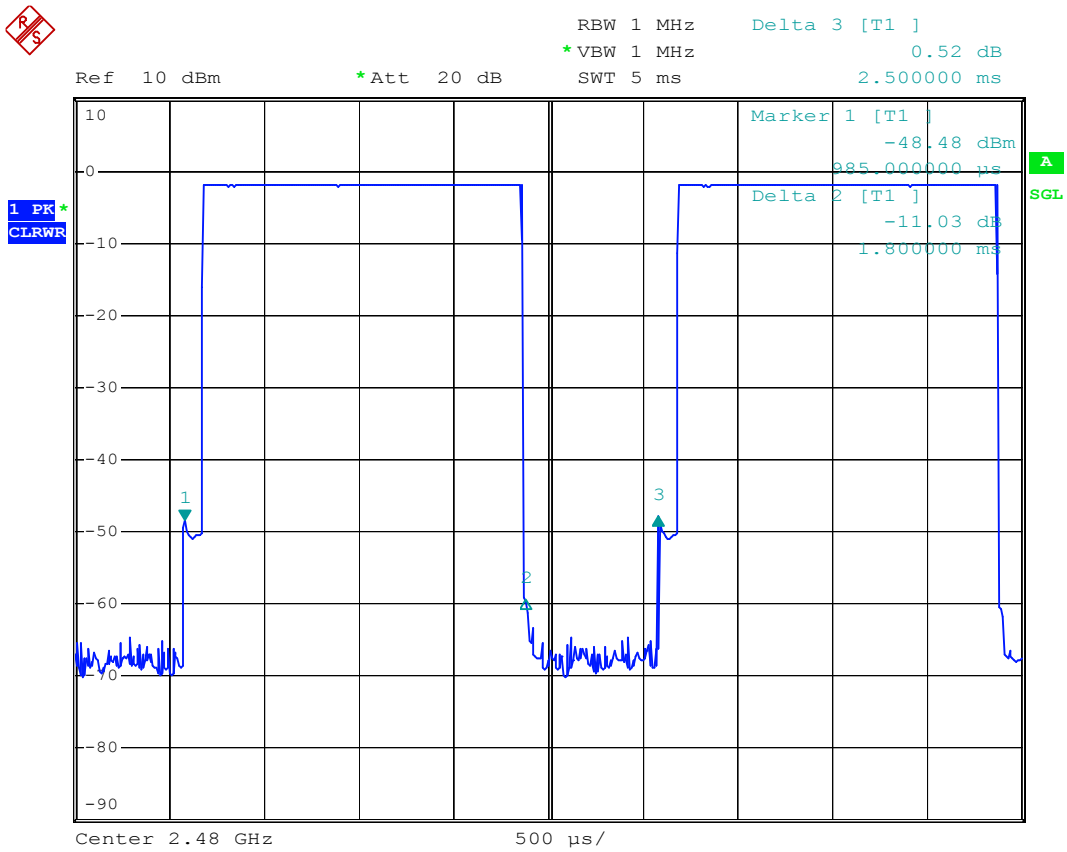
DH3 (CH78)



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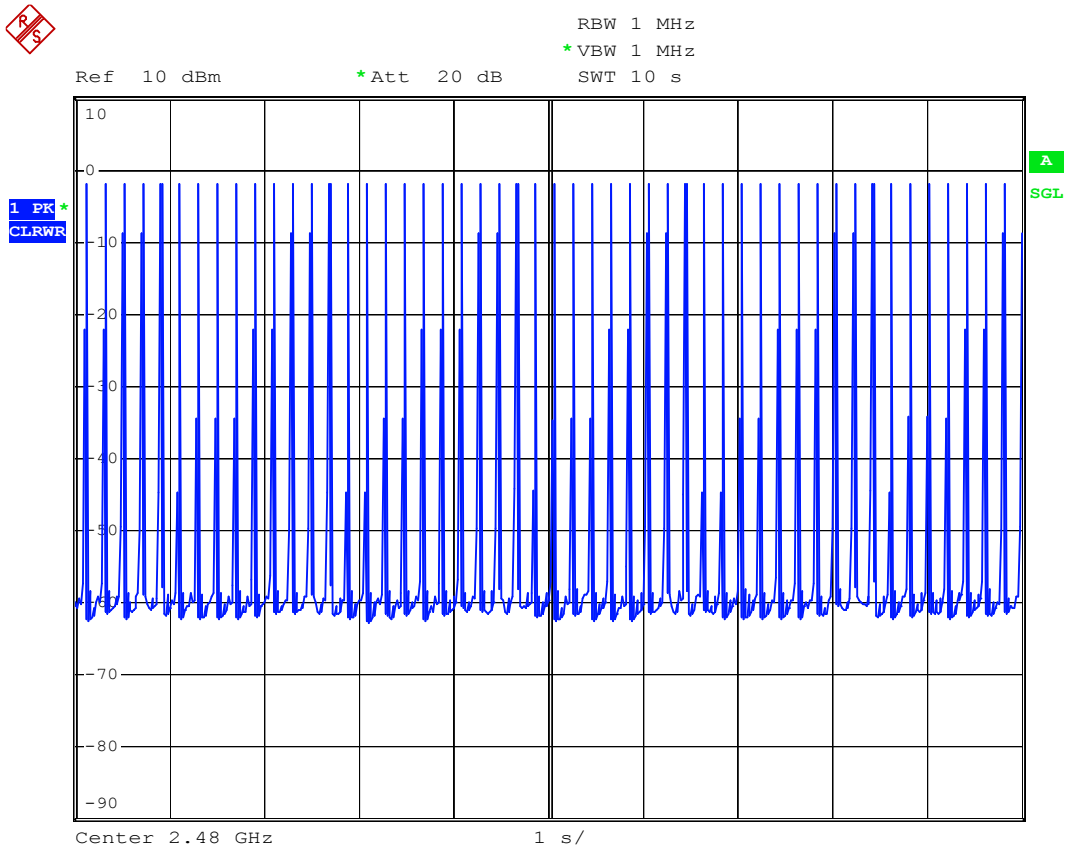
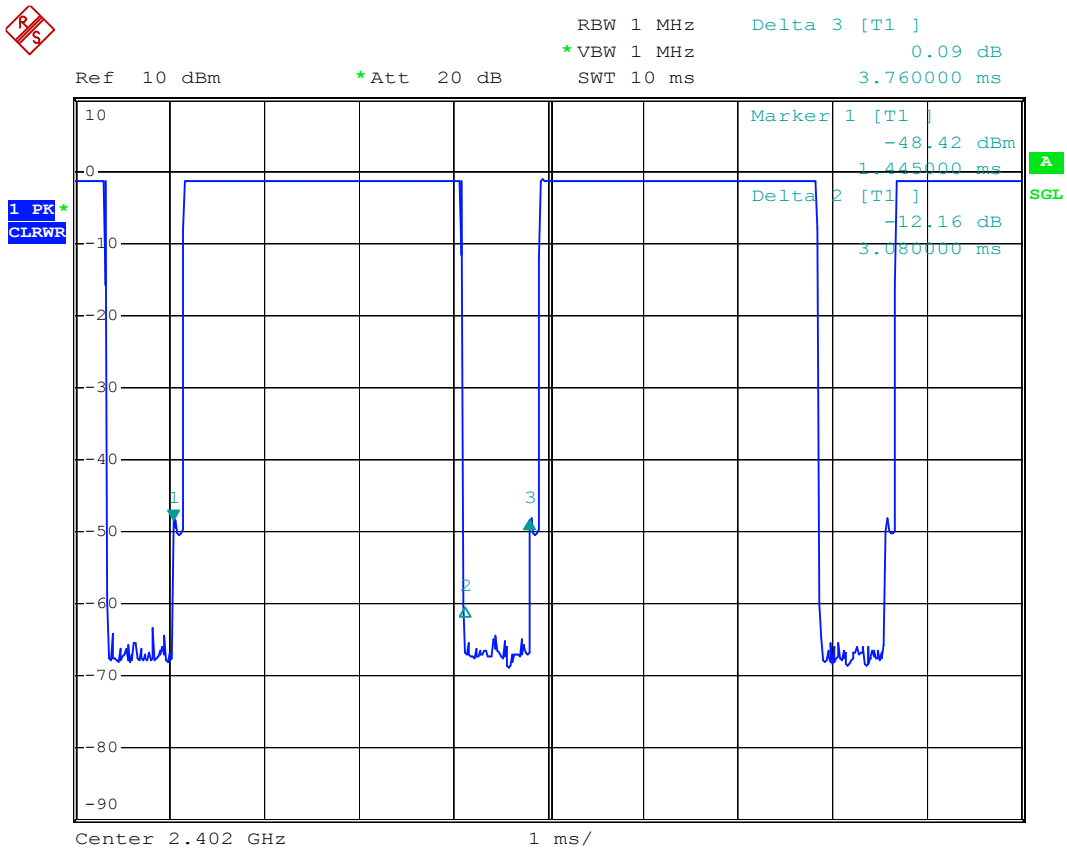


Date: 18.MAY.2005 00:05:01

DH5 (CH00)



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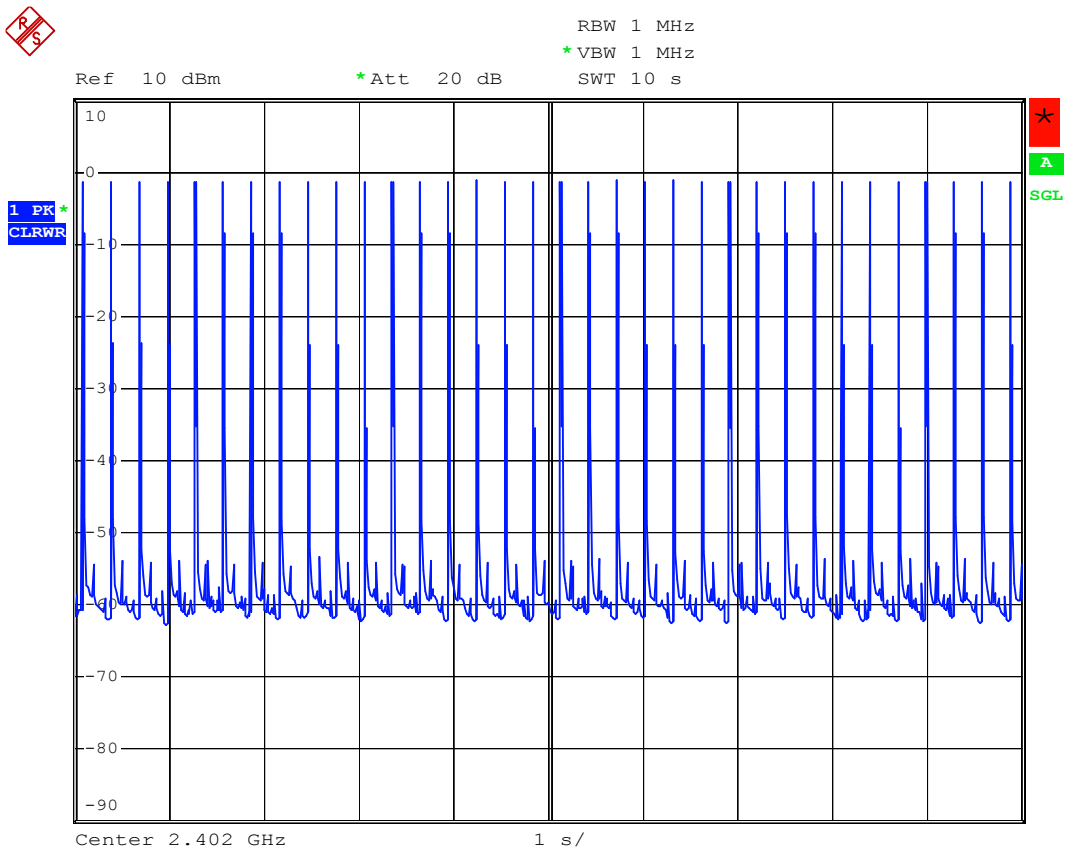

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