



FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment : PDA Phone
Trade Name : Inventec
Model No. : Mercury
FCC ID : DGIBC0037AAA000
Filing Type : Certification
Applicant : **Inventec Corporation**
Inventec Building, 66 Hou-Kang Street Shih-Lin District, Taipei
11170, Taiwan

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- The data shown in this test report were carried out on Dec. 17, 2005 at **Sporton International Inc. LAB.**
- Report No.: FR5N2312, Report Version: Rev. 01.

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EMC/SAR Director

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Report Version: Rev. 01



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History of this test report

Report Issue Date: Dec. 22, 2005

Report No.	Description



1. General Description of Equipment under Test

1.1. Applicant

Inventec Corporation

Inventec Building, 66 Hou-Kang Street Shih-Lin District, Taipei 11170, Taiwan

1.2. Manufacturer

Inventec Corporation

Inventec Building, 66 Hou-Kang Street Shih-Lin District, Taipei 11170, Taiwan

1.3. Basic Description of Equipment under Test

Equipment : PDA Phone
Trade Name : Inventec
Model No. : Mercury
FCC ID : DGIBC0037AAA000
Power Supply Type : Switching
AC Power Cord : AC 120V, Weave-Shielded, Wall-mount, 1.6 meter, 2 pin
Battery : Mercury_01
Adapter : P005WA050F

1.4. Feature of Equipment under Test

Product Feature & Specification			
1. Modulation Type/Data Rate	GFSK		
2. Frequency Range.	2400 MHz ~ 2483.5 MHz		
Number of Channels	79		
3. Carrier Frequency of each channel	2402+ n*1 MHz, n= 0~78		
4. Channel Spacing	1 MHz		
5. Maximum Output Power to Antenna (Normal condition)	0.34 dBm		
6. Type of Antenna Connector	N/A		
7. Antenna Type	Chip Antenna		
8. Antenna Gain	0.16 dBi		
9. HW Version	2.03		
10. SW Version	0.4.1		
11. Function Type	Transmitter		Transceiver V
12. Power Rating (DC/AC , Voltage)	3.6V / 35mA		
13. DUT Stage	Identical Prototype		

2. Test Configuration of Equipment under Test

2.1. Test Manner

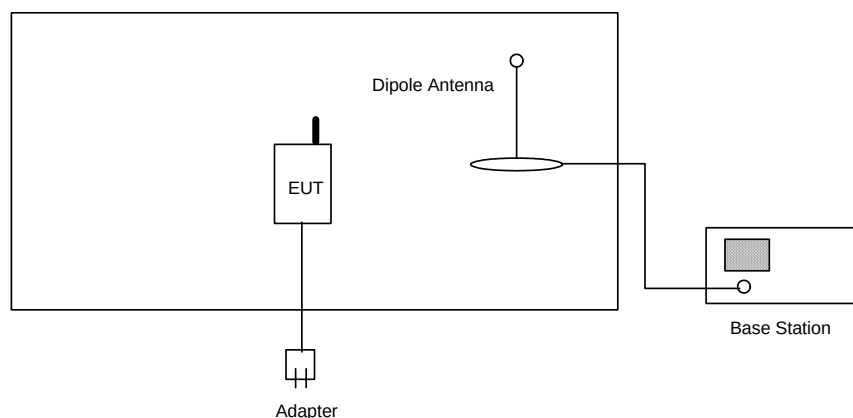
- The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
- For spurious emission below 1GHz, only one channel of each application was tested because it is not related to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

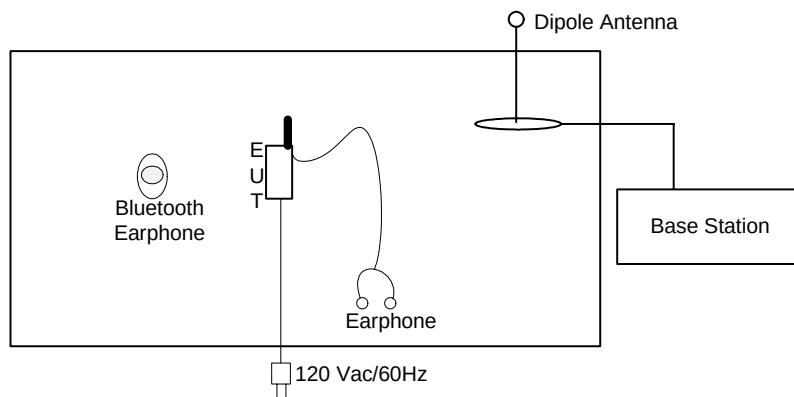
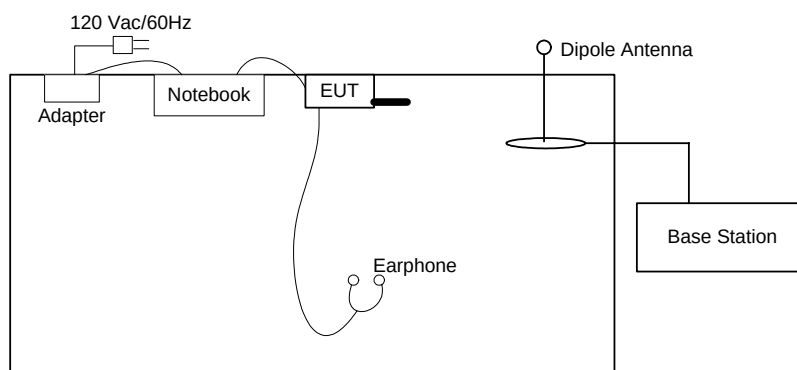
2.2. Test Mode

Application	Bluetooth
Radiated Emission and conducted test items	Mode 1: Tx_CH00_2402 MHz Mode 2: Tx_CH39_2441 MHz Mode 3: Tx_CH78_2480 MHz
Conducted Emission	Mode 1: PCS Idle Mode + MP3 Player + BT Link + Earphone + Adapter Mode 2: PCS Idle Mode + MP3 Player + BT Link + Earphone + USB Link

2.3. Connection Diagram of Test System

<Radiation Emission>



<Conducted Emission>
<Mode 1>

<Mode 2>

2.4. Ancillary Equipment List

Item	Equipment	Model No.	Power Cord
1.	Base Station (R&S)	CMU200	N/A
2.	Bluetooth Earphone (Free Style)	JD-100	N/A
3.	Notebook (DELL)	D400	N/A
4.	USB Cable	N/A	Non-Shielded, 1m
5.	Dipole Antenna (Sporton)	N/A	N/A



3. RF Utility

During the test, the following programs on WINXP were executed:

The EUT is in USB link mode with BT earphone for conducted emission or in BT continuous Tx Mode controlled by RF utility and base station simulator for radiation emission and other conducted tests.



4. General Information of Test

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 : CO01-HY, 03CH06-HY

4.1. Test Voltage

AC 120V

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

Conduction: from 150 kHz to 30 MHz

Radiation: from 30 MHz to 25000MHz

4.5. Test Distance

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

5. Report of Measurements and Examinations

5.1. List of Measurements and Examinations

FCC Rule	Description of Test	Result	Section
15.247(a)(1)	Hopping Channel Separation	Pass	5.2
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Pass	5.3
15.247(a)(1)	Hopping Channel Bandwidth	Pass	5.4
15.247(a)(1)(iii)	Dwell Time of Each Frequency within a 30 Second Period	Pass	5.5
15.247(b)(1)	Output Power	Pass	5.6
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass	5.7
15.207	Conducted Emission	Pass	5.8
15.209	Radiated Emission	Pass	5.9
15.203	Antenna Requirement	Pass	5.10

5.2. Hopping Channel Separation

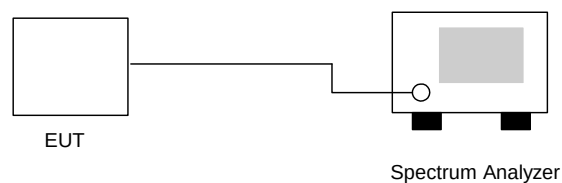
5.2.1. Measuring Instruments :

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 30kHz and VBW to 100kHz.
3. The Hopping Channel Separation is defined as the channel is separated with the next channel.

5.2.3. Test Setup Layout :



5.2.4. Test Result : The spectrum analyzer plots are attached as below

- Temperature: 26°C
- Relative Humidity: 54%
- Test Engineer : Jay

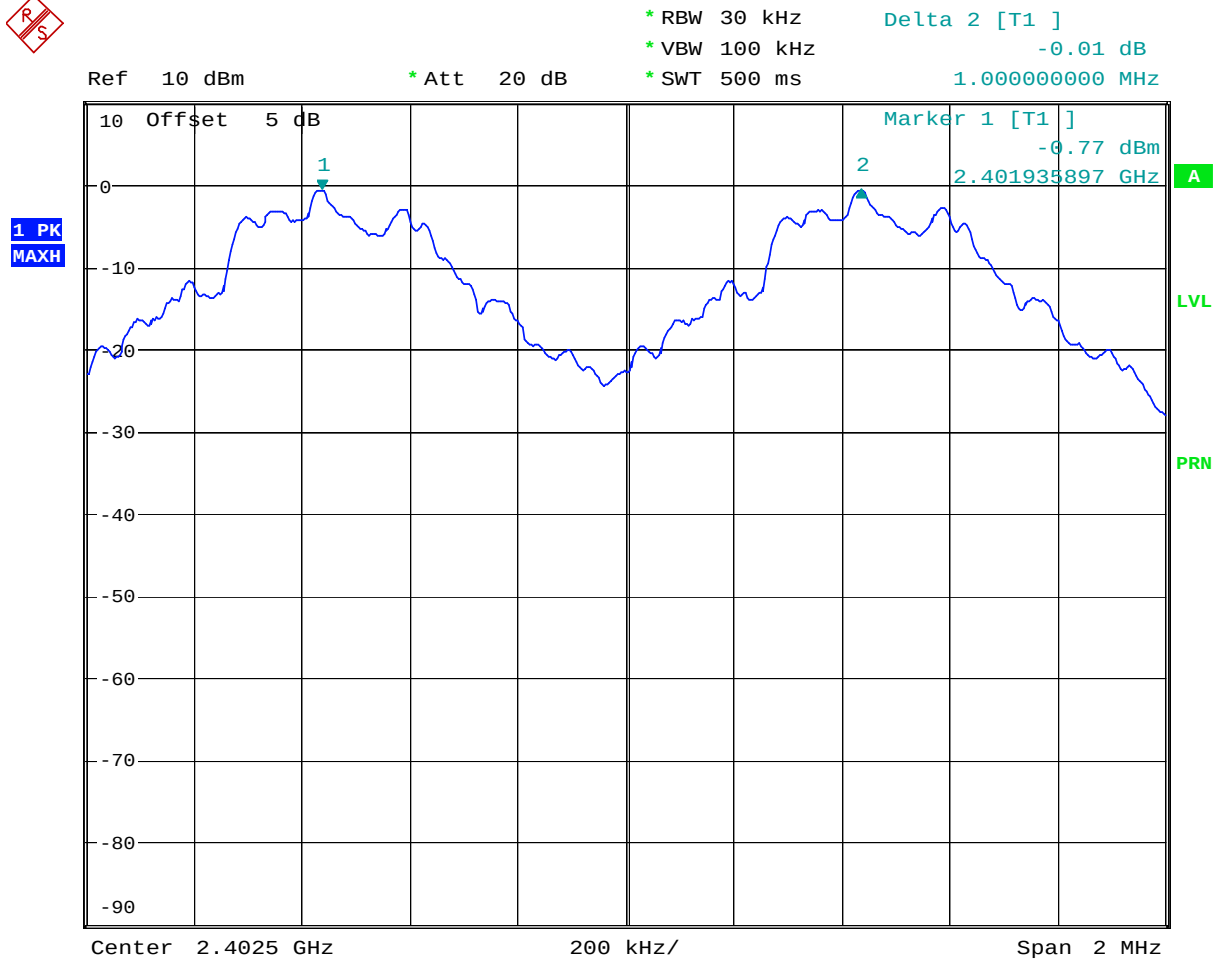
Channel	Frequency (MHz)	Hopping Channel Separation (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	1.000	0.877	Mode 1
39	2441	1.003	0.885	Mode 2
78	2480	1.006	0.875	Mode 3

Remark: Limit is the greater one of 25kHz or the 20dB bandwidth of the hopping channel.



5.2.5 Hopping Channel Separation

Mode 1: CH00 (2402MHz)



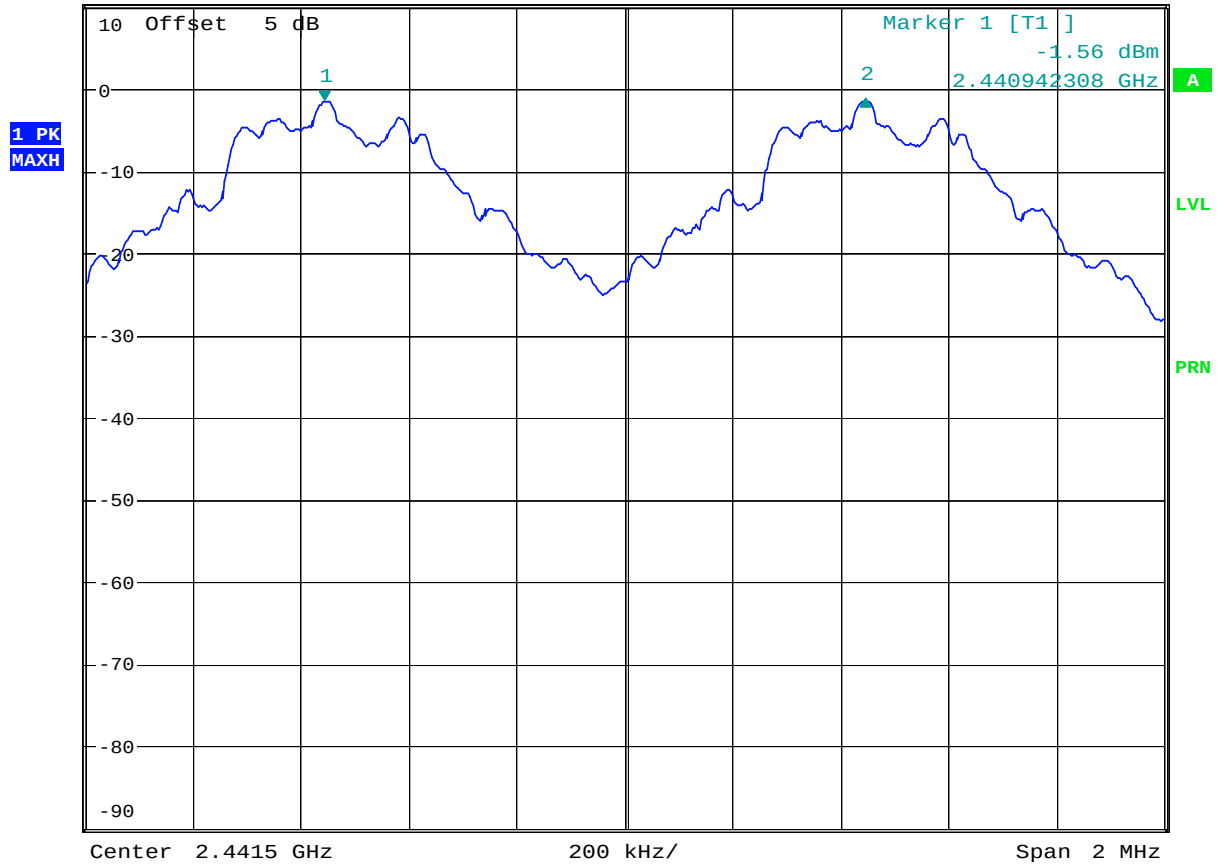
Date: 16.DEC.2005 20:18:19



Mode 2: CH39 (2441MHz)



Ref 10 dBm * Att 20 dB * RBW 30 kHz Delta 2 [T1] 0.02 dB
* VBW 100 kHz * SWT 500 ms 1.003205128 MHz



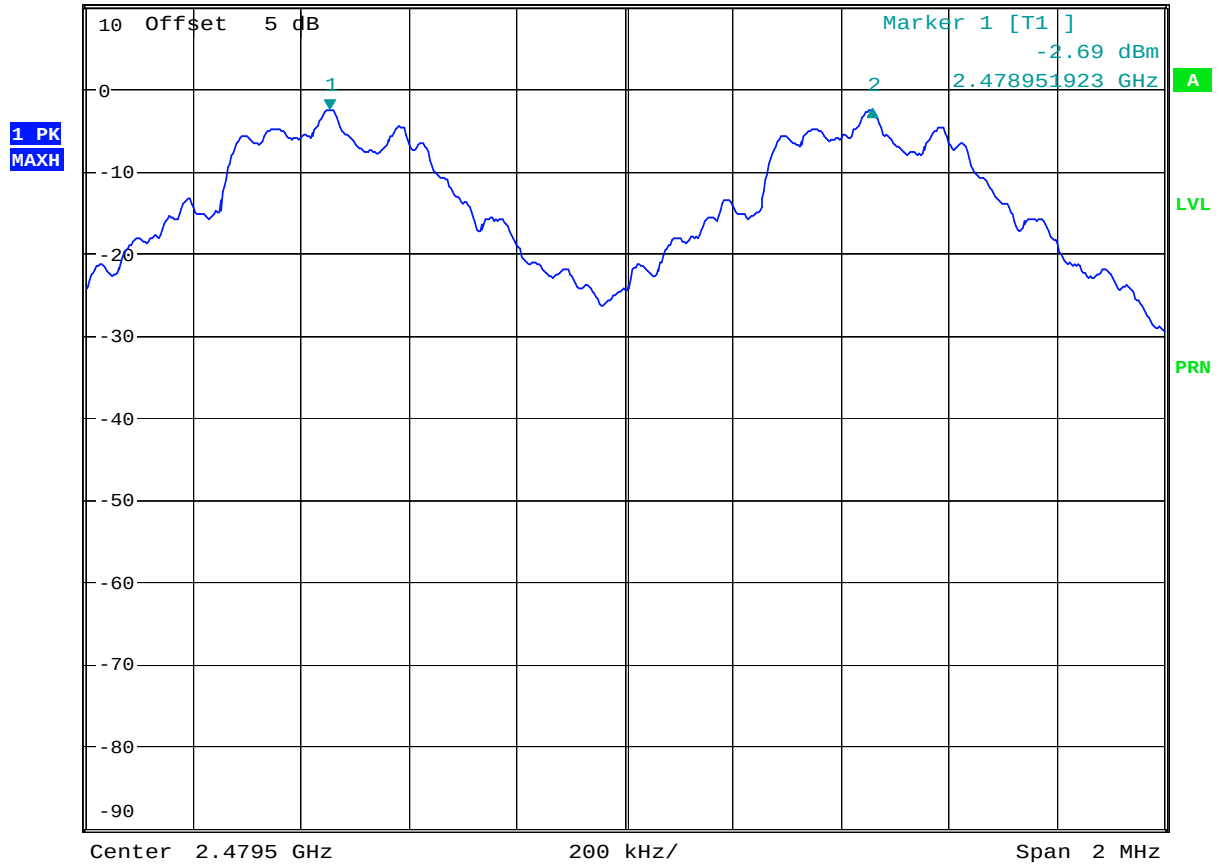
Date: 16.DEC.2005 20:19:34



Mode 3: CH78 (2480MHz)



Ref 10 dBm * Att 20 dB * RBW 30 kHz Delta 2 [T1]
* VBW 100 kHz -0.10 dB
* SWT 500 ms 1.006410256 MHz



Date: 16.DEC.2005 20:20:41

5.3. Number of Hopping Frequency

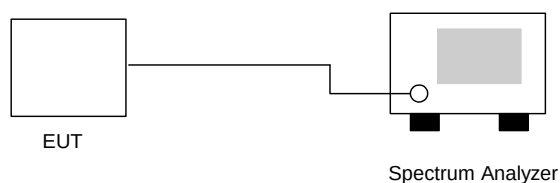
5.3.1. Measuring Instruments :

As described in chapter 6 of this test report.

5.3.2. Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
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.

5.3.3. Test Setup Layout :

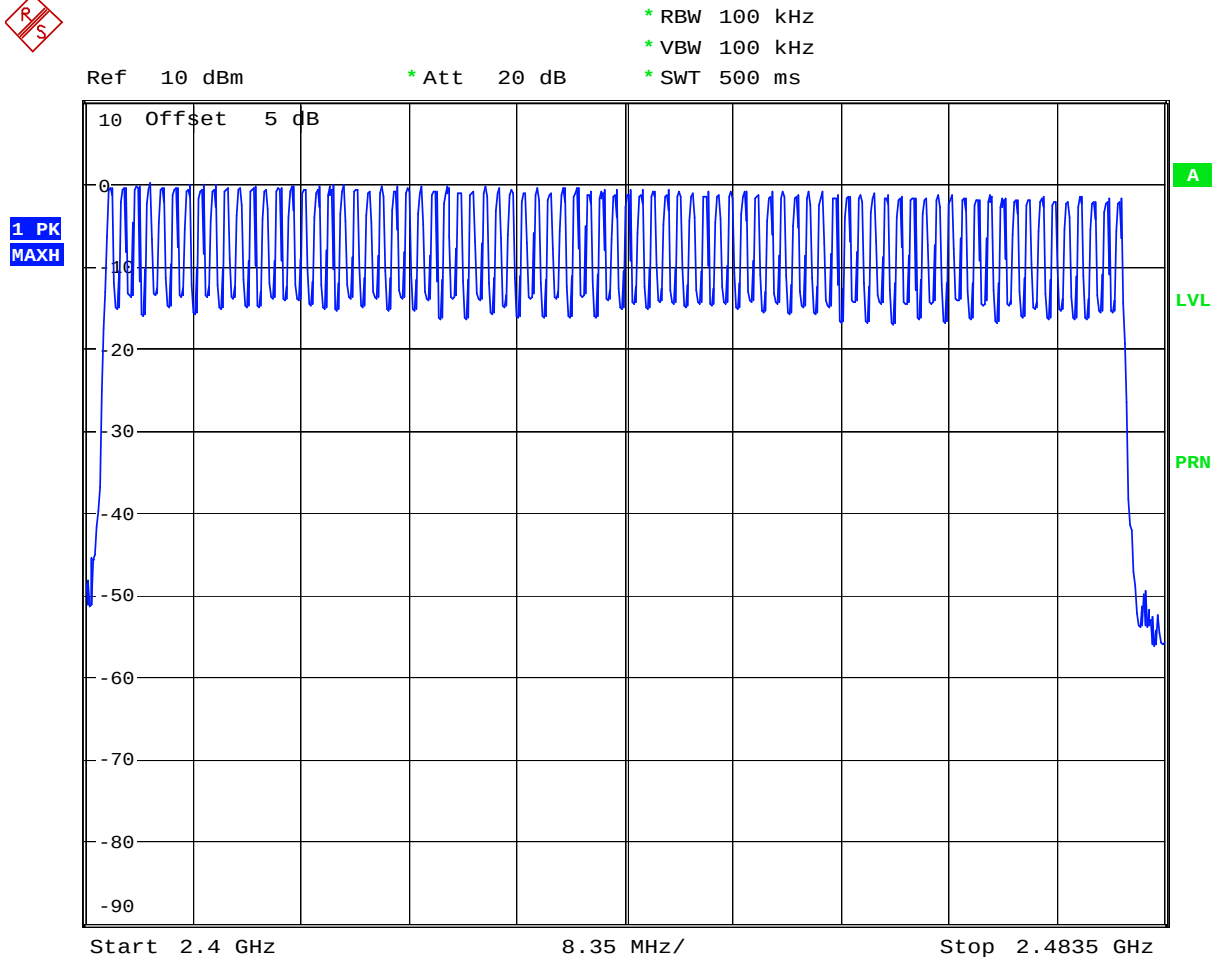


5.3.4. Test Result : See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 54%
- Test Engineer : Jay

Number of Hopping Frequency (Channel)	Limits (Channel)
79	15

5.3.5 Number of Hopping Frequency



Date: 16.DEC.2005 21:28:17

5.4 Hopping Channel Bandwidth

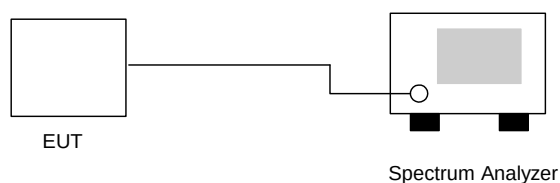
5.4.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.4.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 30kHz and VBW to 300kHz.
3. The Hopping Channel bandwidth is defined as the frequency range where the power is higher than peak power minus 20dB.

5.4.3 Test Setup Layout :



5.4.4 Test Result : See spectrum analyzer plots below

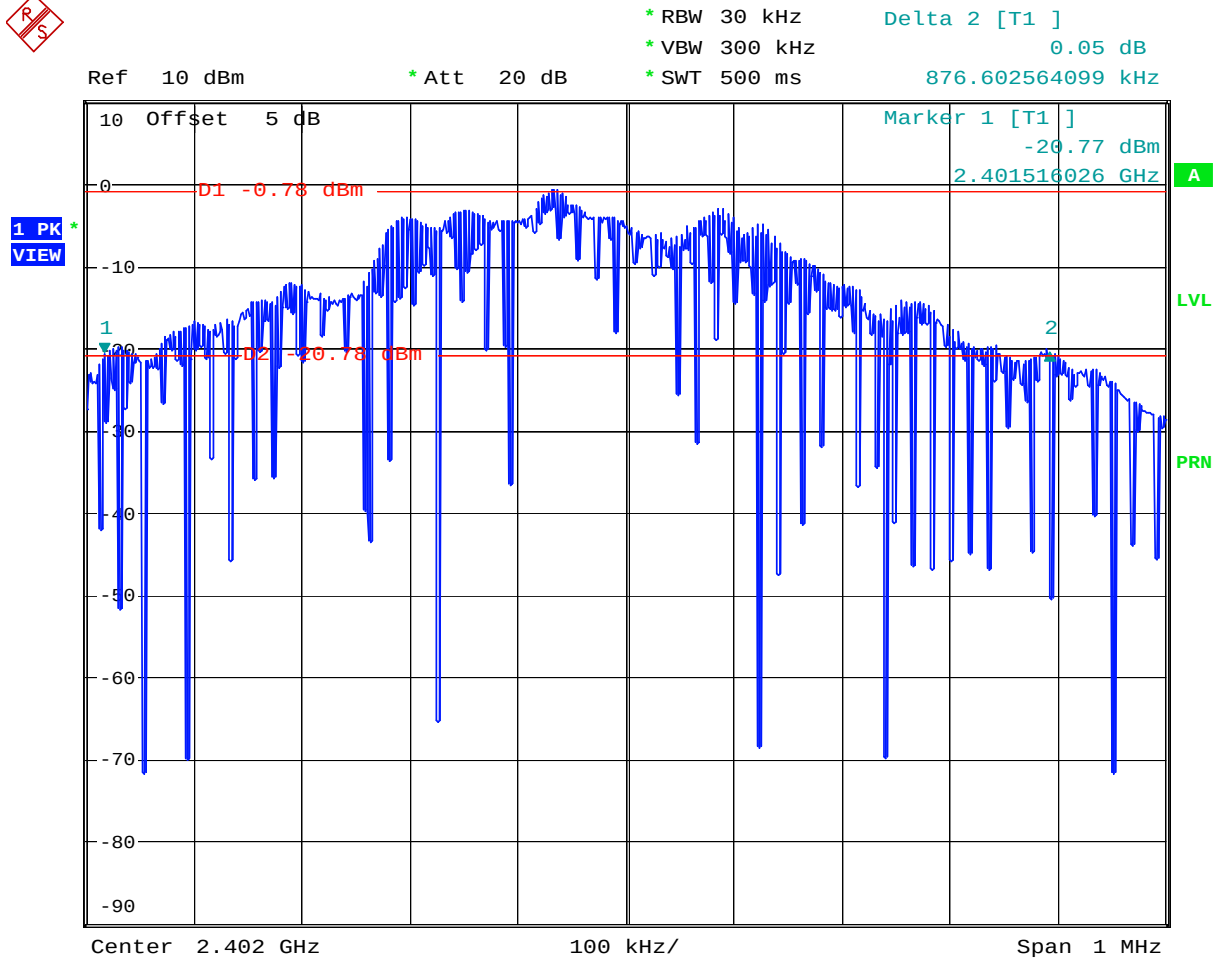
- Temperature: 26°C
- Relative Humidity: 54%
- Test Engineer : Jay

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.877	1.0	Mode 1
39	2441	0.885	1.0	Mode 2
78	2480	0.875	1.0	Mode 3



5.4.5 Hopping Channel Bandwidth

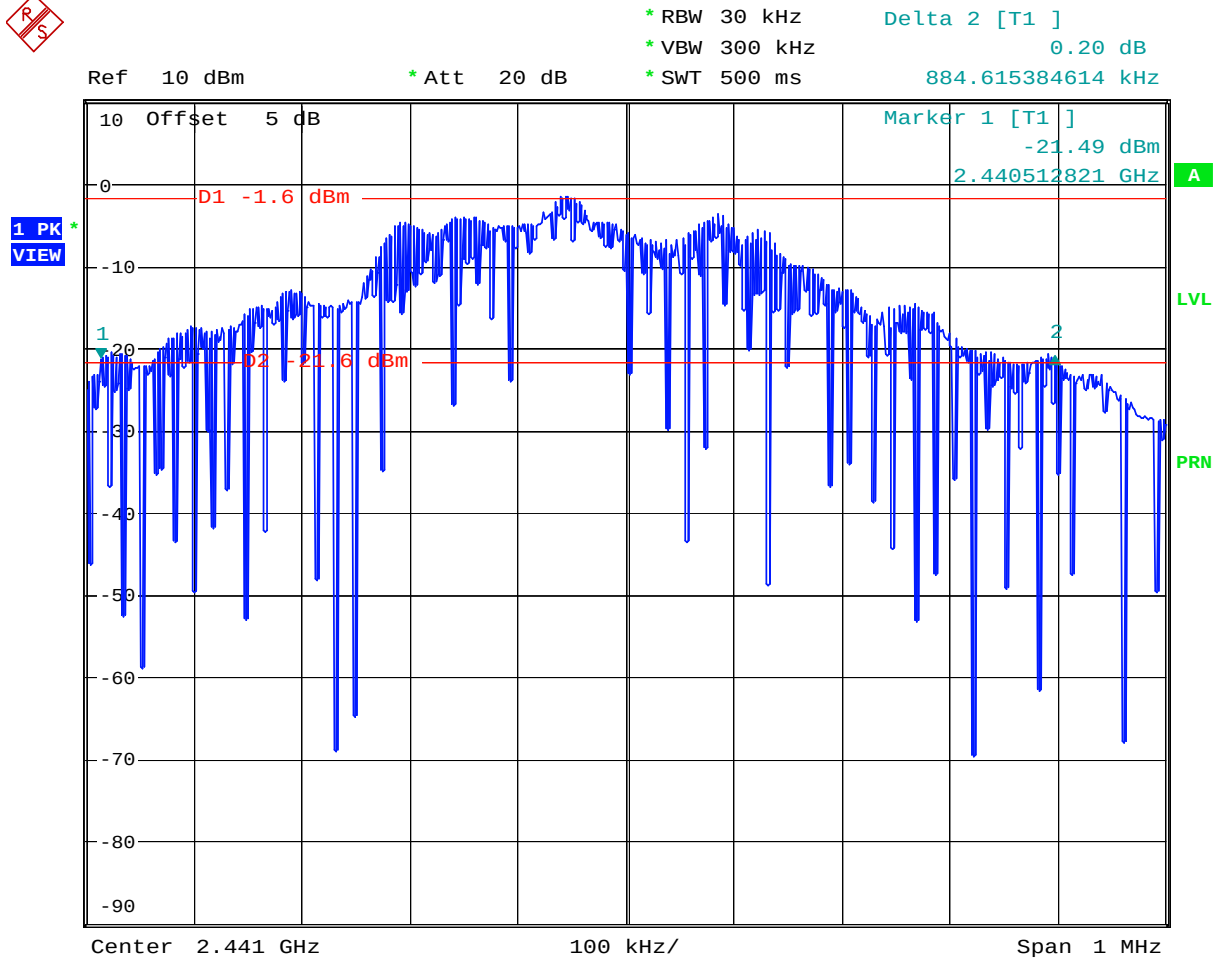
Mode 1: CH00 (2402MHz)



Date: 16.DEC.2005 20:03:12



Mode 2: CH39 (2441MHz)



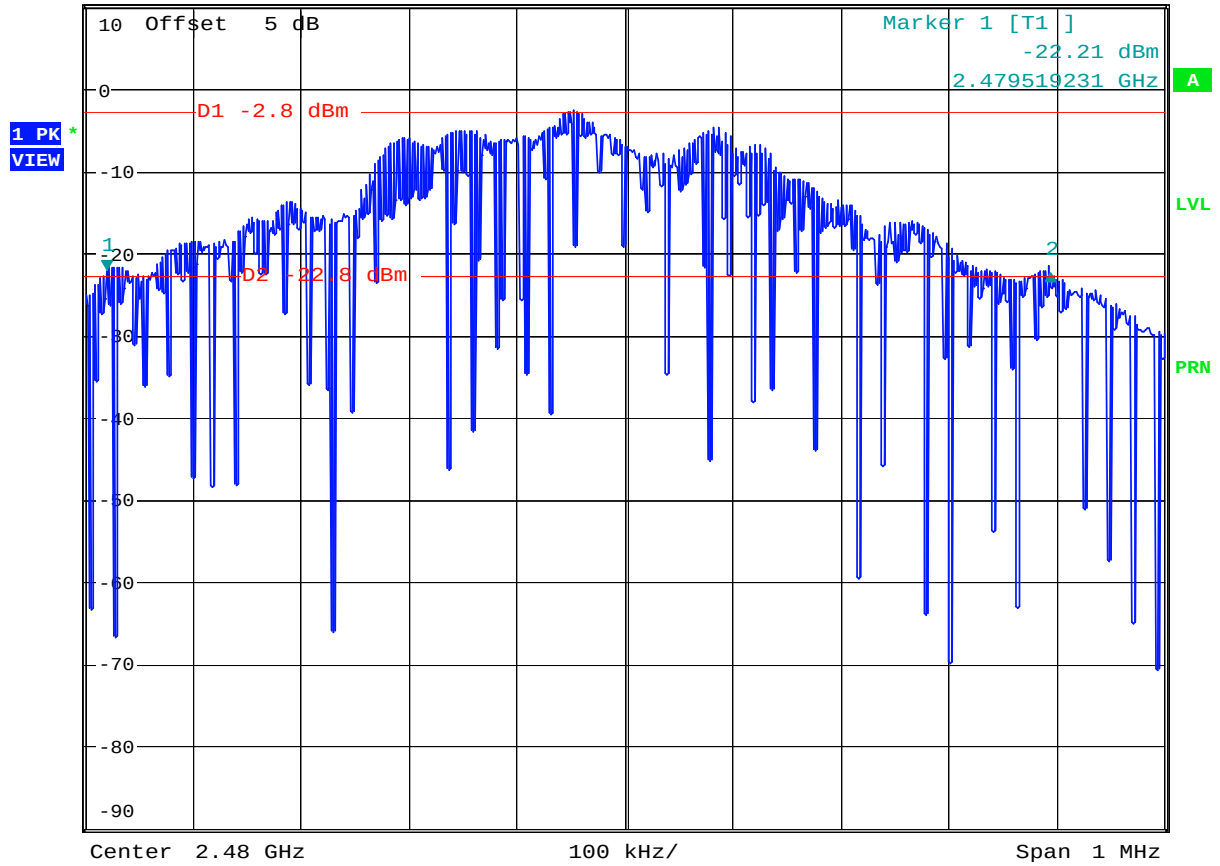
Date: 16.DEC.2005 19:55:31



Mode 3: CH78 (2480MHz)



Ref 10 dBm * Att 20 dB * RBW 30 kHz Delta 2 [T1]
* VBW 300 kHz -0.43 dB
* SWT 500 ms 874.999999998 kHz



Date: 16.DEC.2005 19:51:47

5.5 Dwell Time of Each Frequency within a 30 Seconds Period

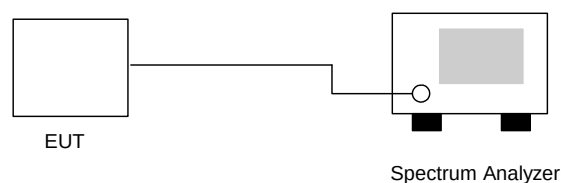
5.5.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.5.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
3. Set the center frequency on any frequency would be measured and set the frequency span to zero span.
4. The equation = $30 \times (1600/79) \times t$ (t = the time duration of one single pulse)

5.5.3 Test Setup Layout :



5.5.4 Test Result : See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 54%
- Test Engineer : Jay

Ch00

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	10.2	442.3	0.143	0.4
DH3	5.5	1705.12	0.296	0.4
DH5	3.5	2987.17	0.330	0.4

CH39

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	10.4	445.51	0.146	0.4
DH3	4.9	1697.11	0.263	0.4
DH5	3.2	2971.15	0.300	0.4

CH78

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	10.3	439.1	0.143	0.4
DH3	5.5	1705.12	0.296	0.4
DH5	3.3	2971.15	0.310	0.4

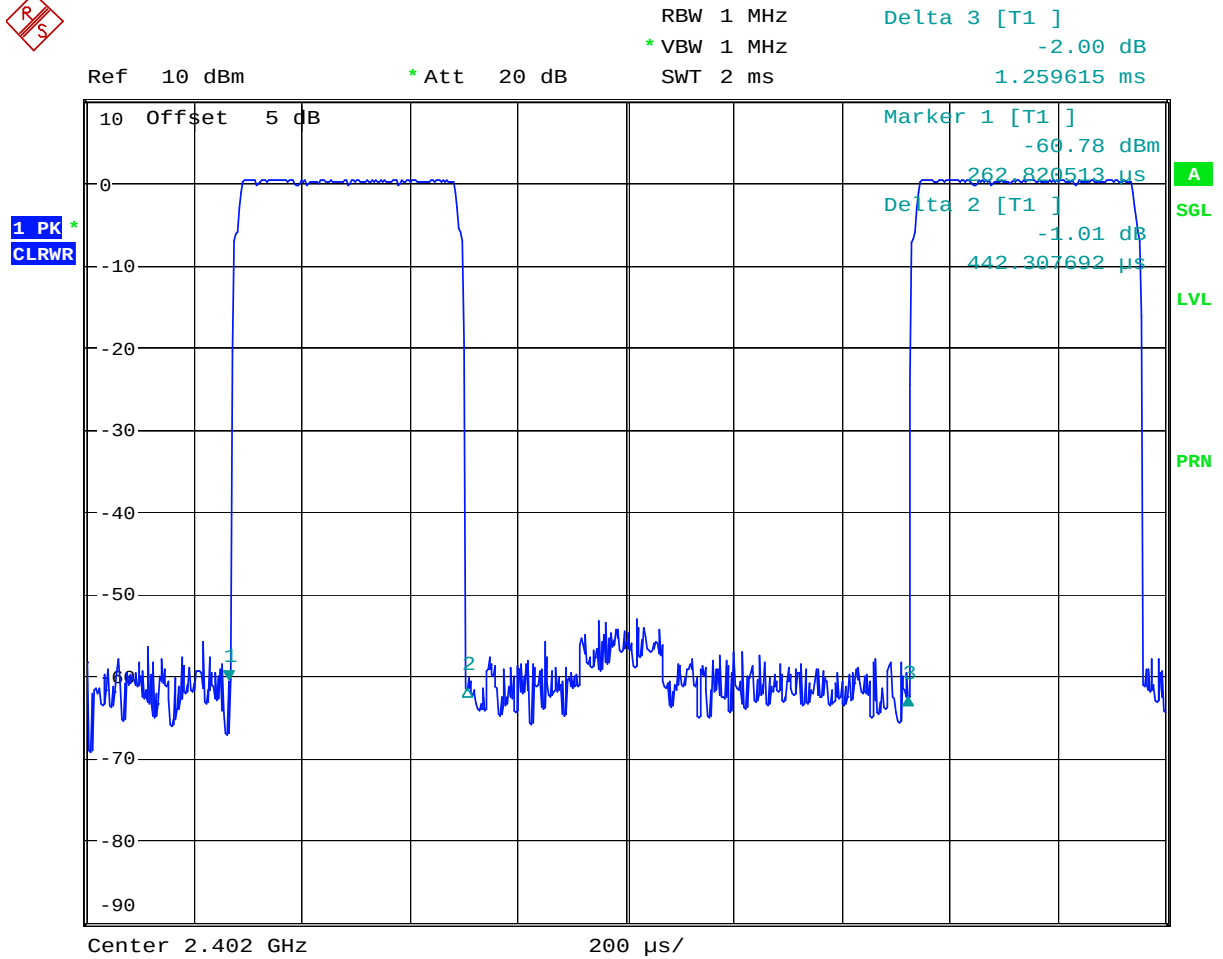
※ Remark:

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)

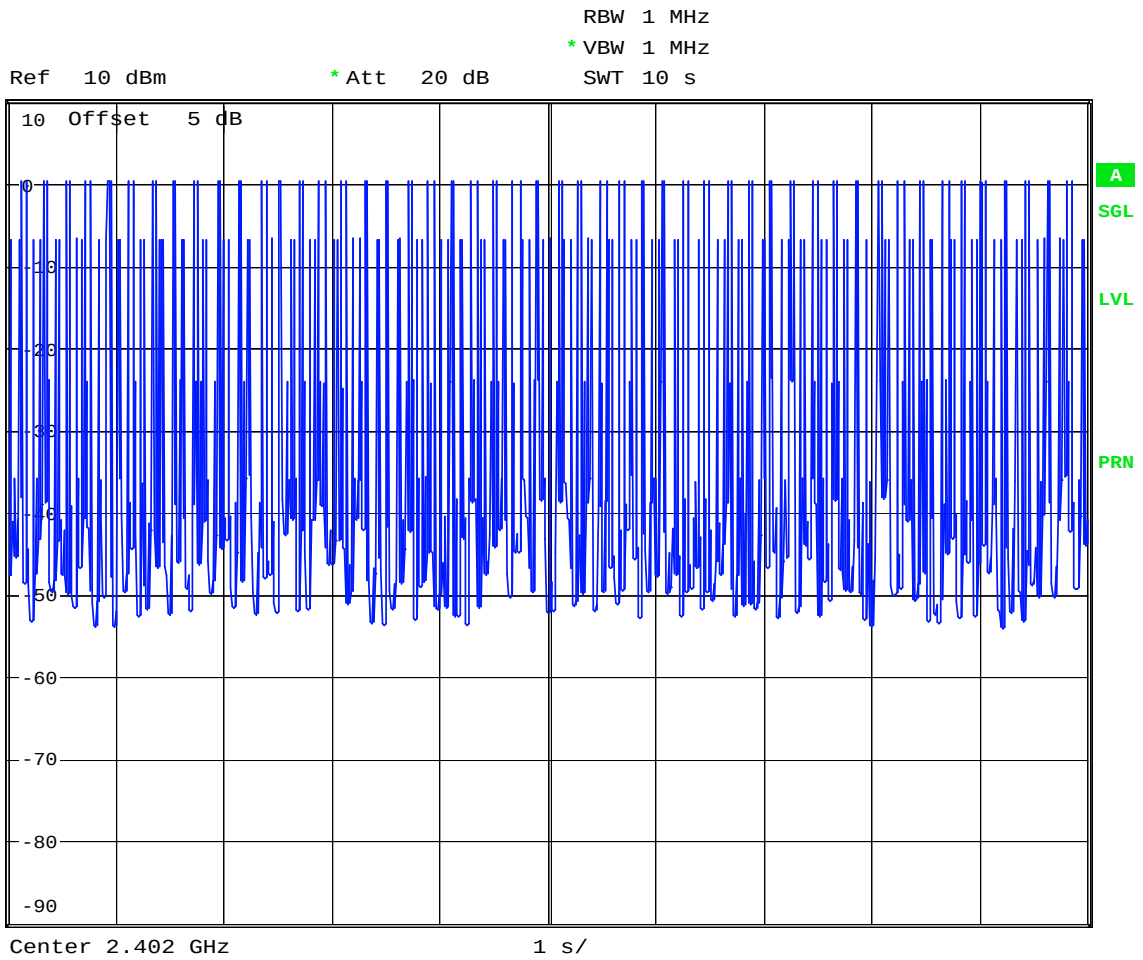


5.5.5 Dwell Time

DH1 (CH00)



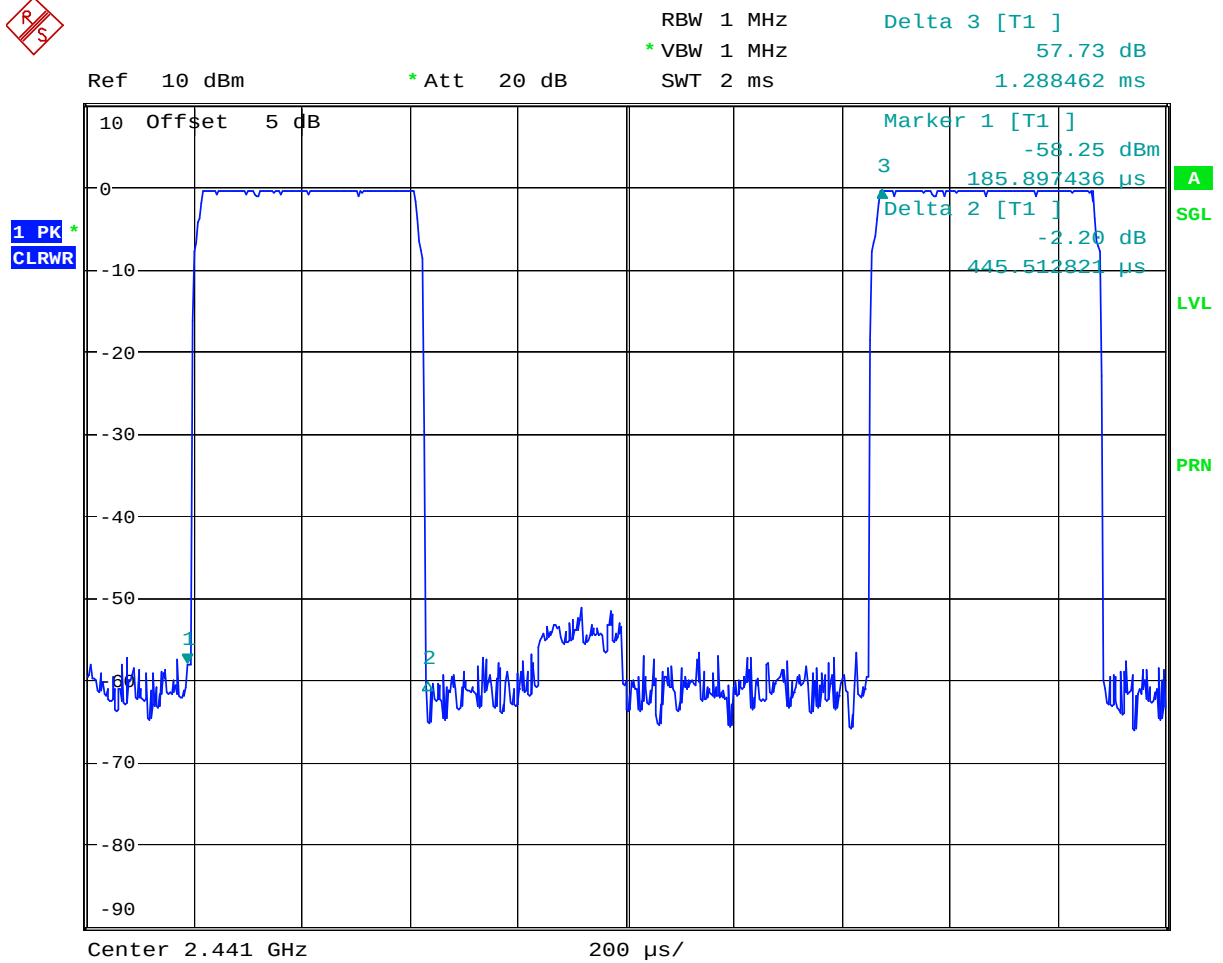
Date: 16.DEC.2005 21:57:44



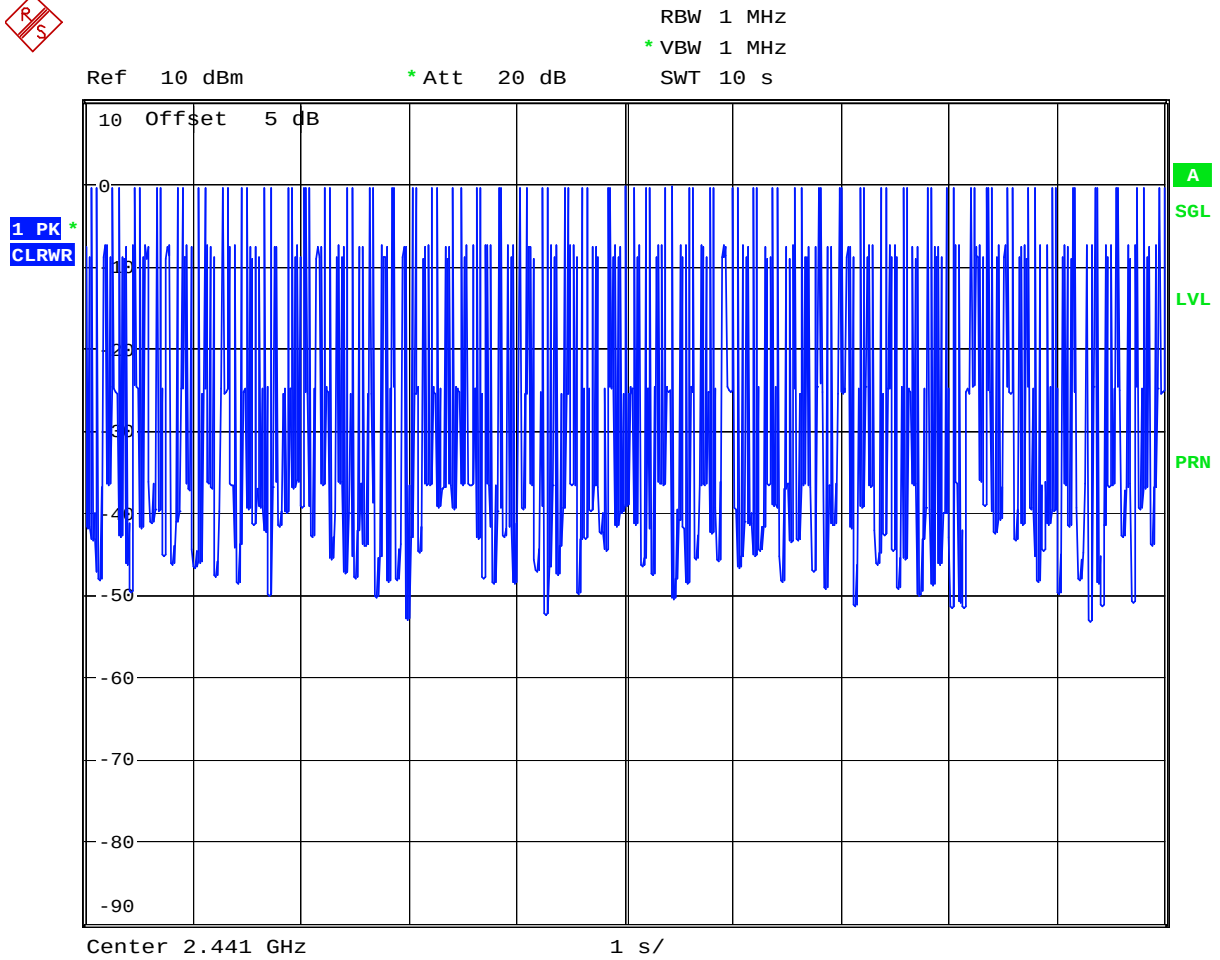
Date: 16.DEC.2005 21:05:43



DH1 (CH39)



Date: 16.DEC.2005 21:56:27



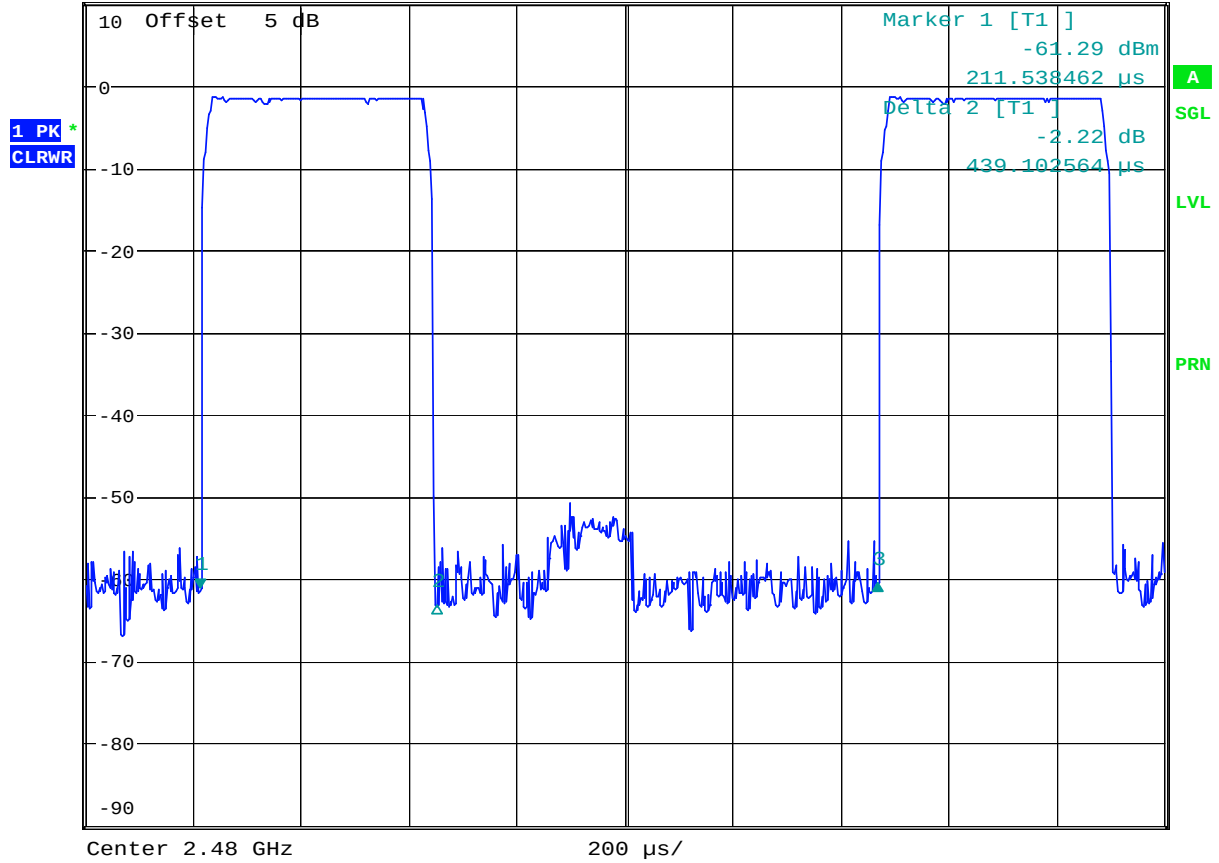
Date: 16.DEC.2005 21:04:52



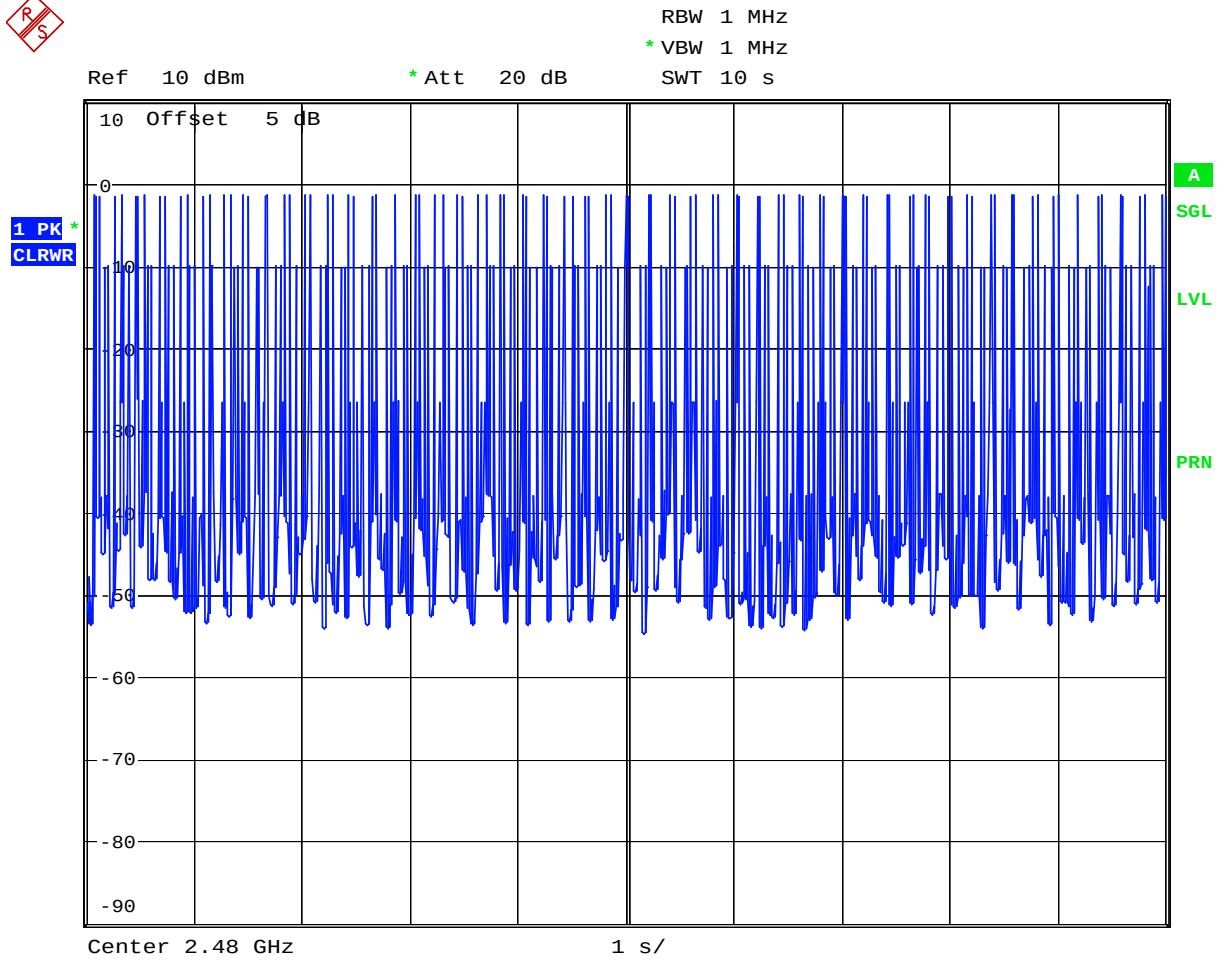
DH1 (CH78)



Ref 10 dBm * Att 20 dB RBW 1 MHz Delta 3 [T1] 0.69 dB
* VBW 1 MHz SWT 2 ms 1.256410 ms



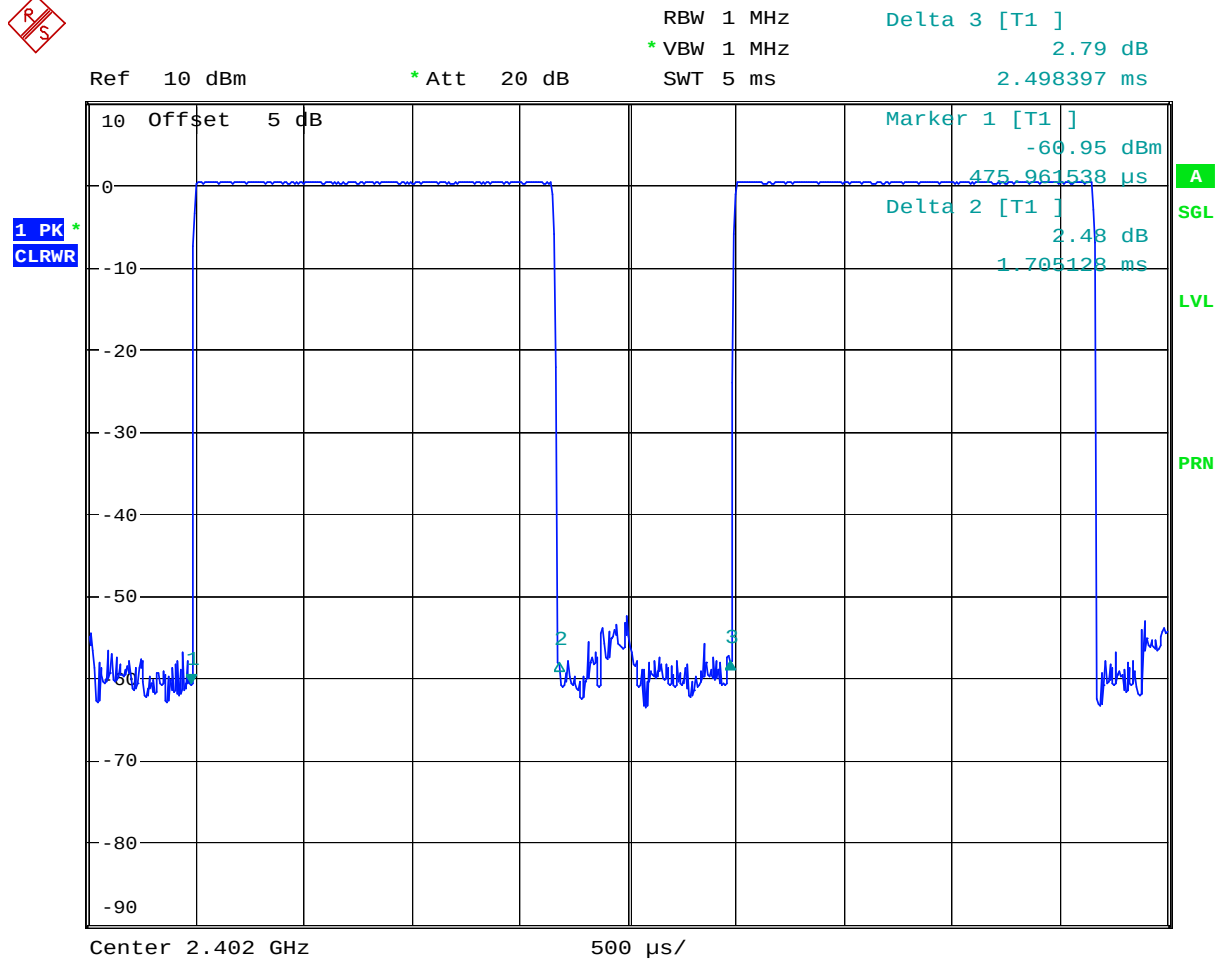
Date: 16.DEC.2005 20:49:22



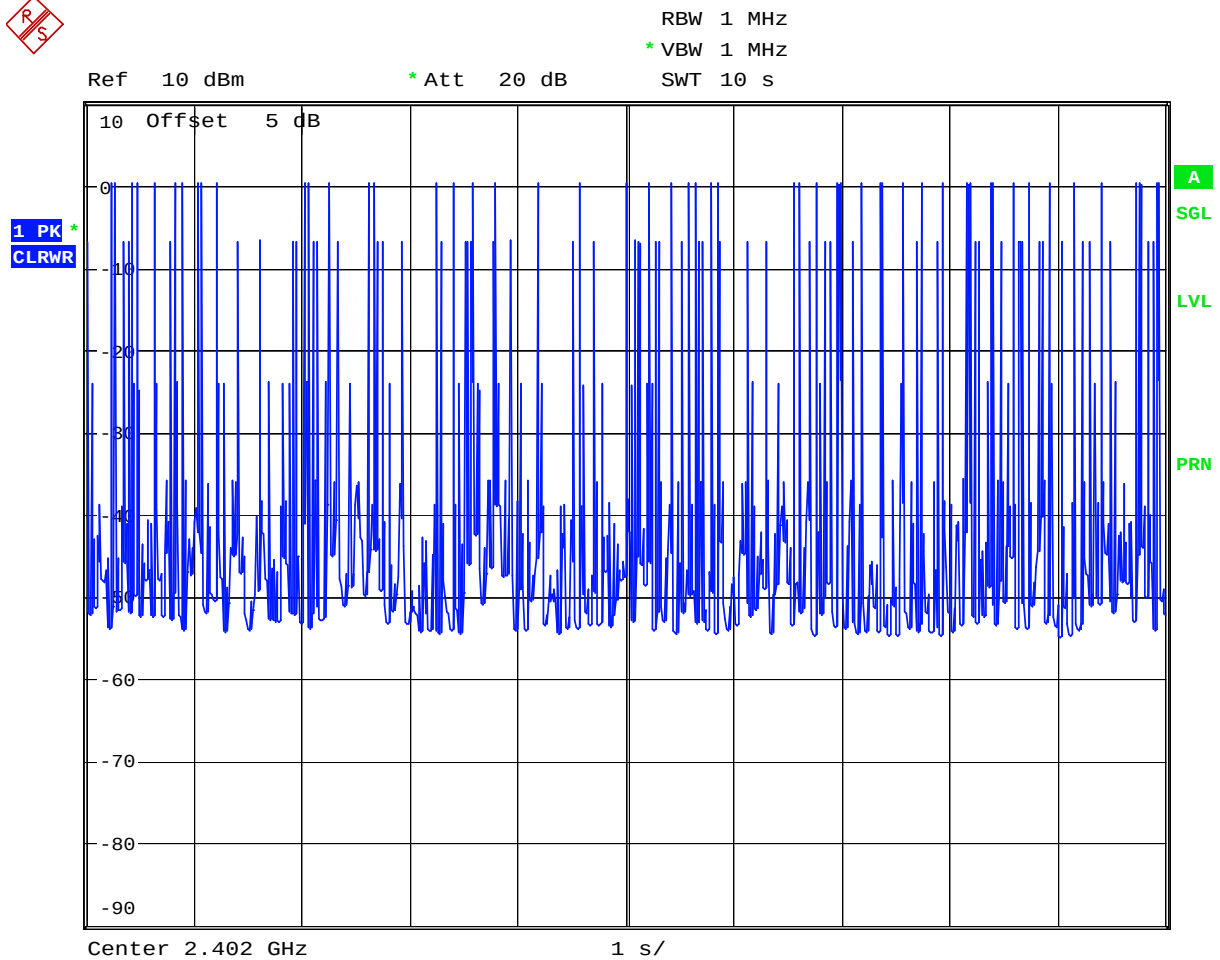
Date: 16.DEC.2005 21:03:56



DH3 (CH00)



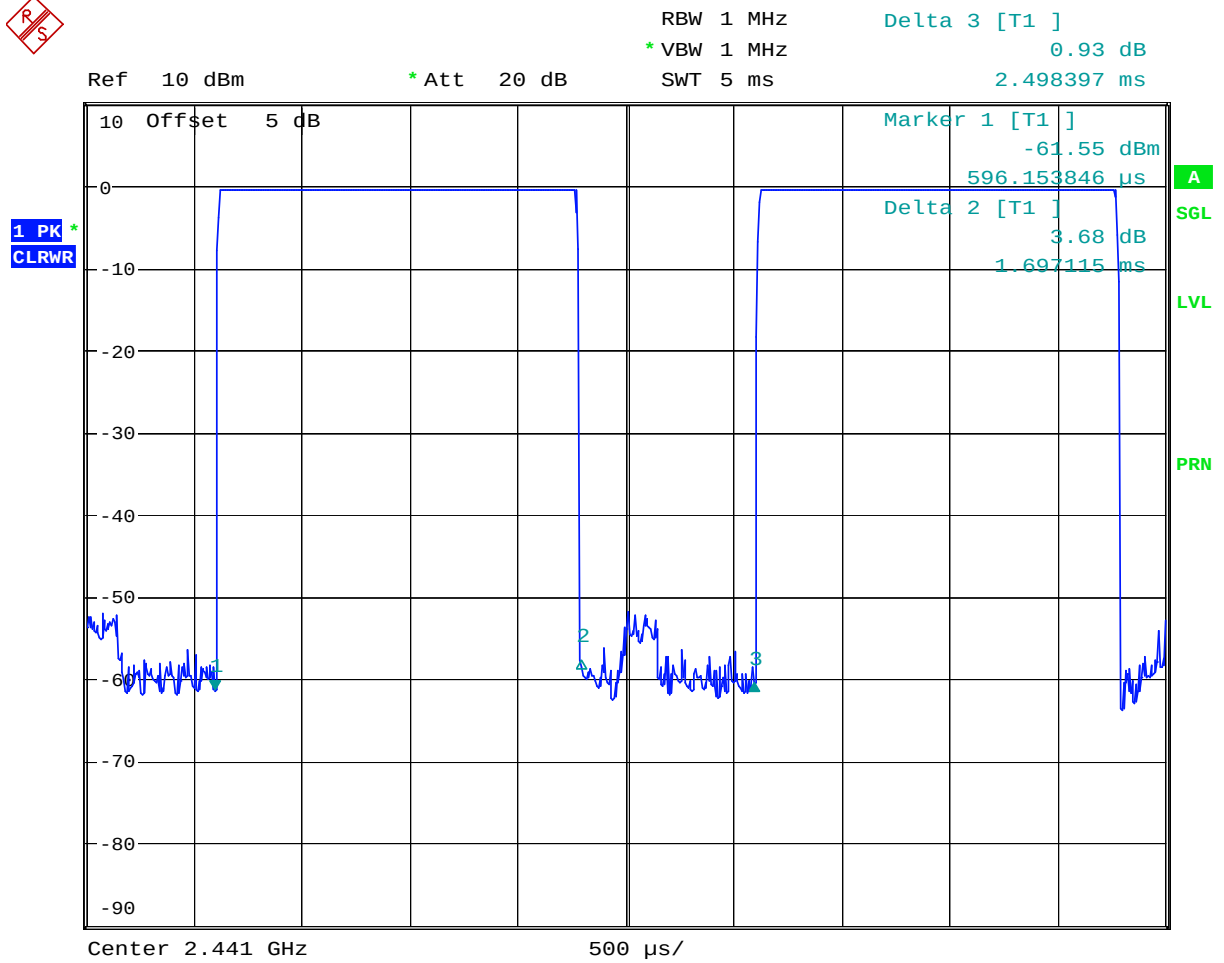
Date: 16.DEC.2005 20:53:07



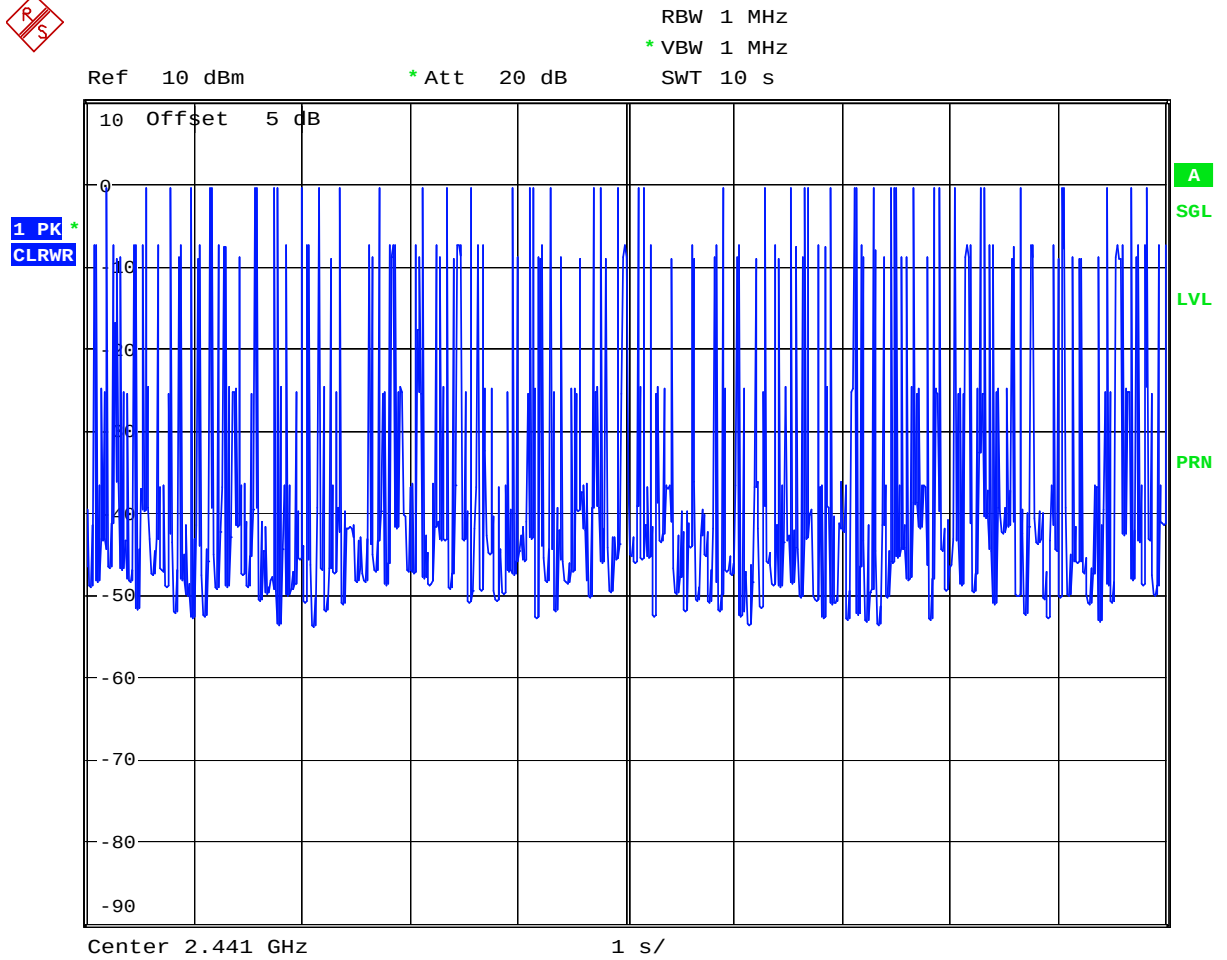
Date: 16.DEC.2005 21:06:27



DH3 (CH39)



Date: 16.DEC.2005 20:52:03



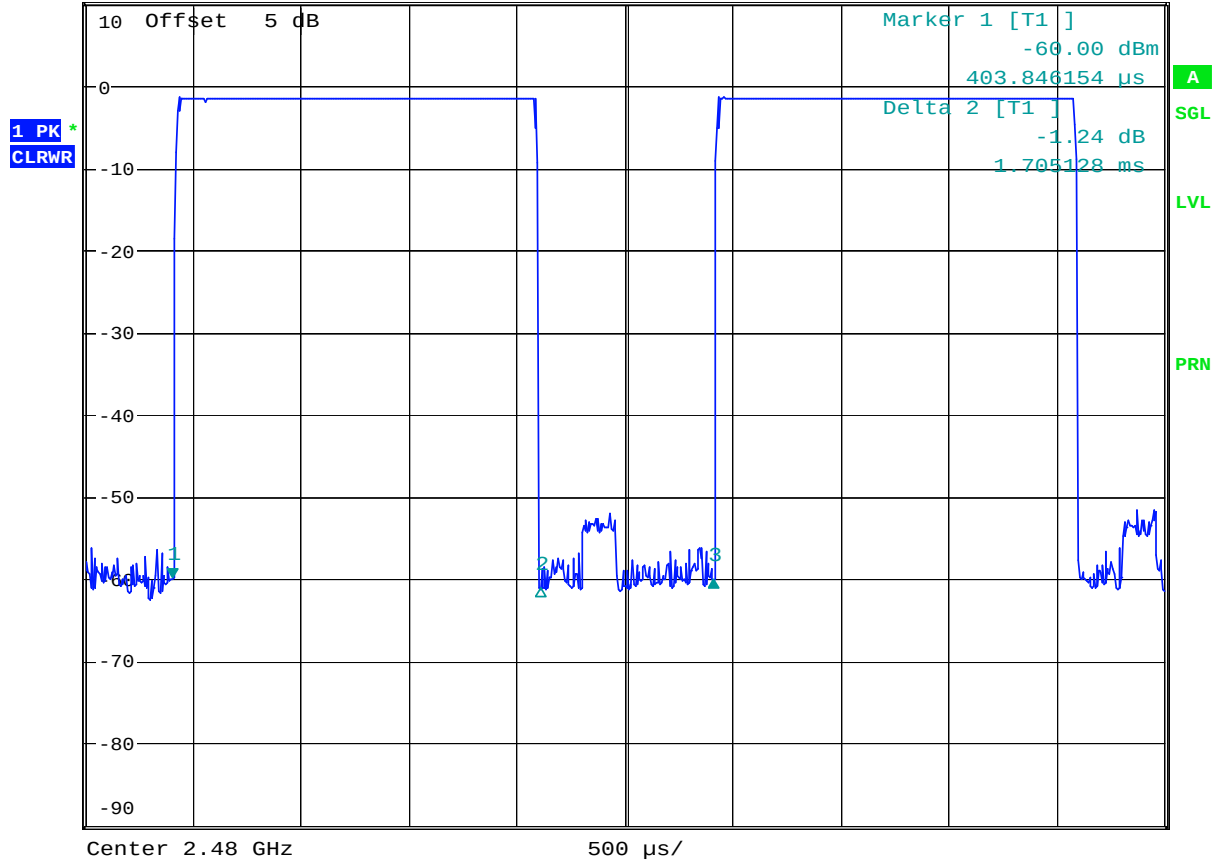
Date: 16.DEC.2005 21:07:04



DH3 (CH78)



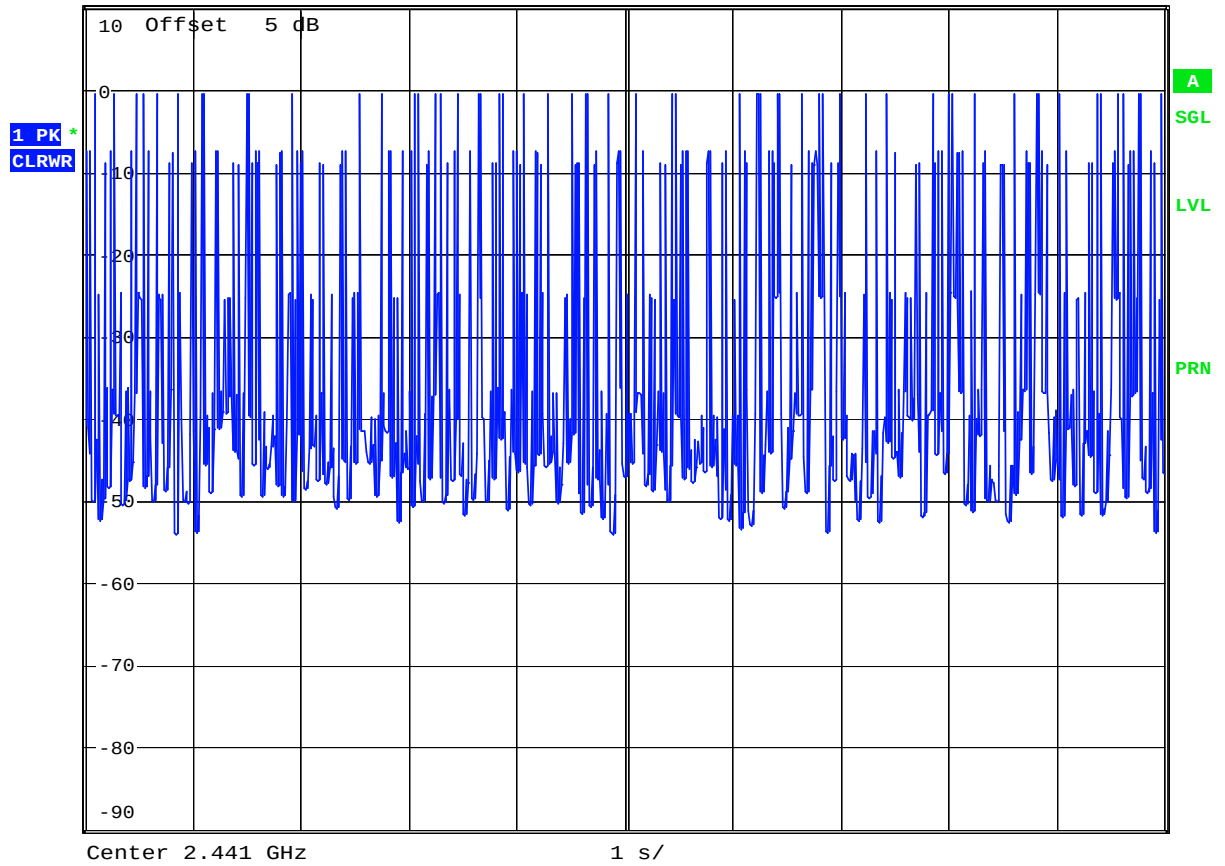
Ref 10 dBm * Att 20 dB RBW 1 MHz Delta 3 [T1] -0.35 dB
* VBW 1 MHz SWT 5 ms 2.506410 ms



Date: 16.DEC.2005 20:51:03



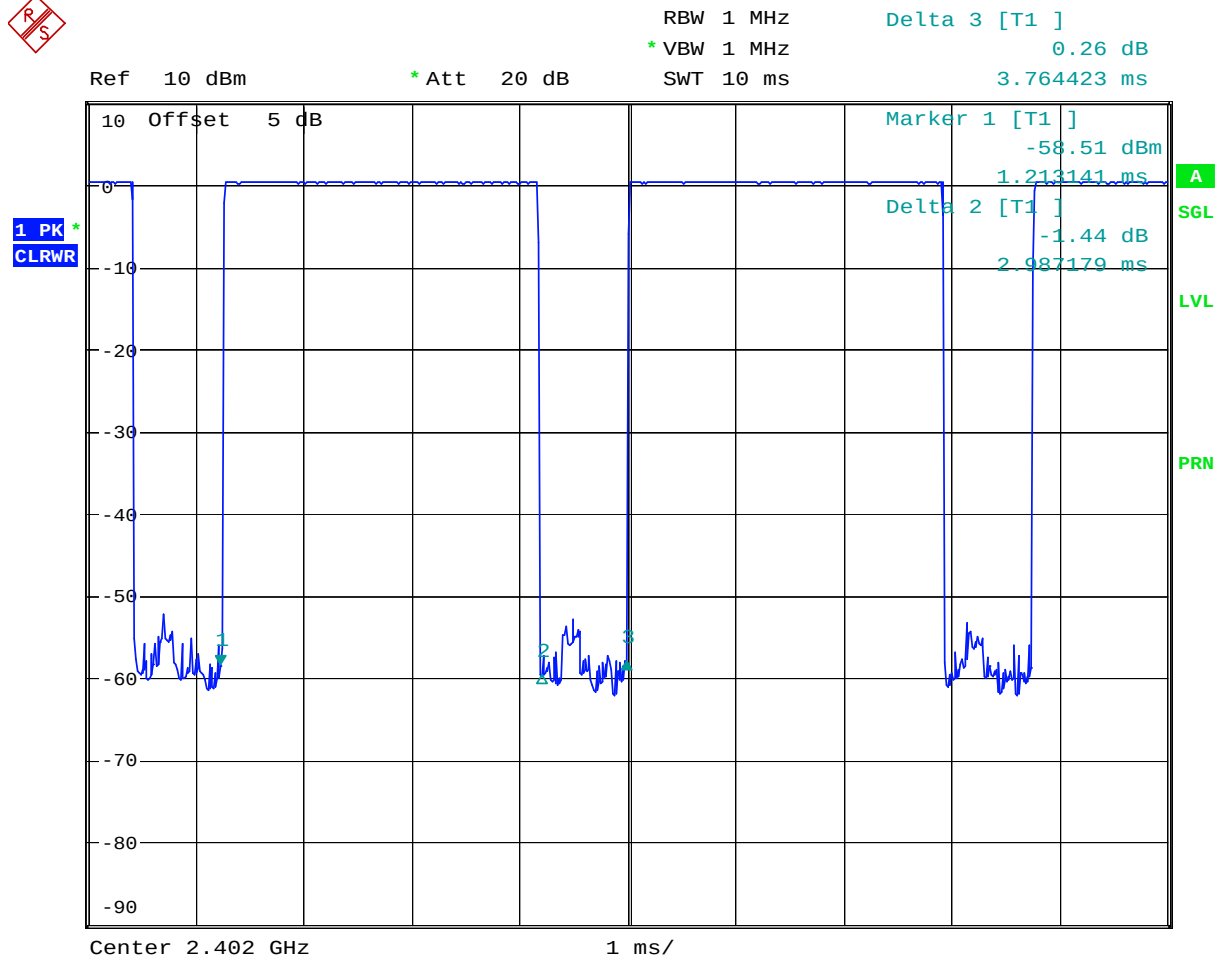
Ref 10 dBm * Att 20 dB RBW 1 MHz
* VBW 1 MHz SWT 10 s



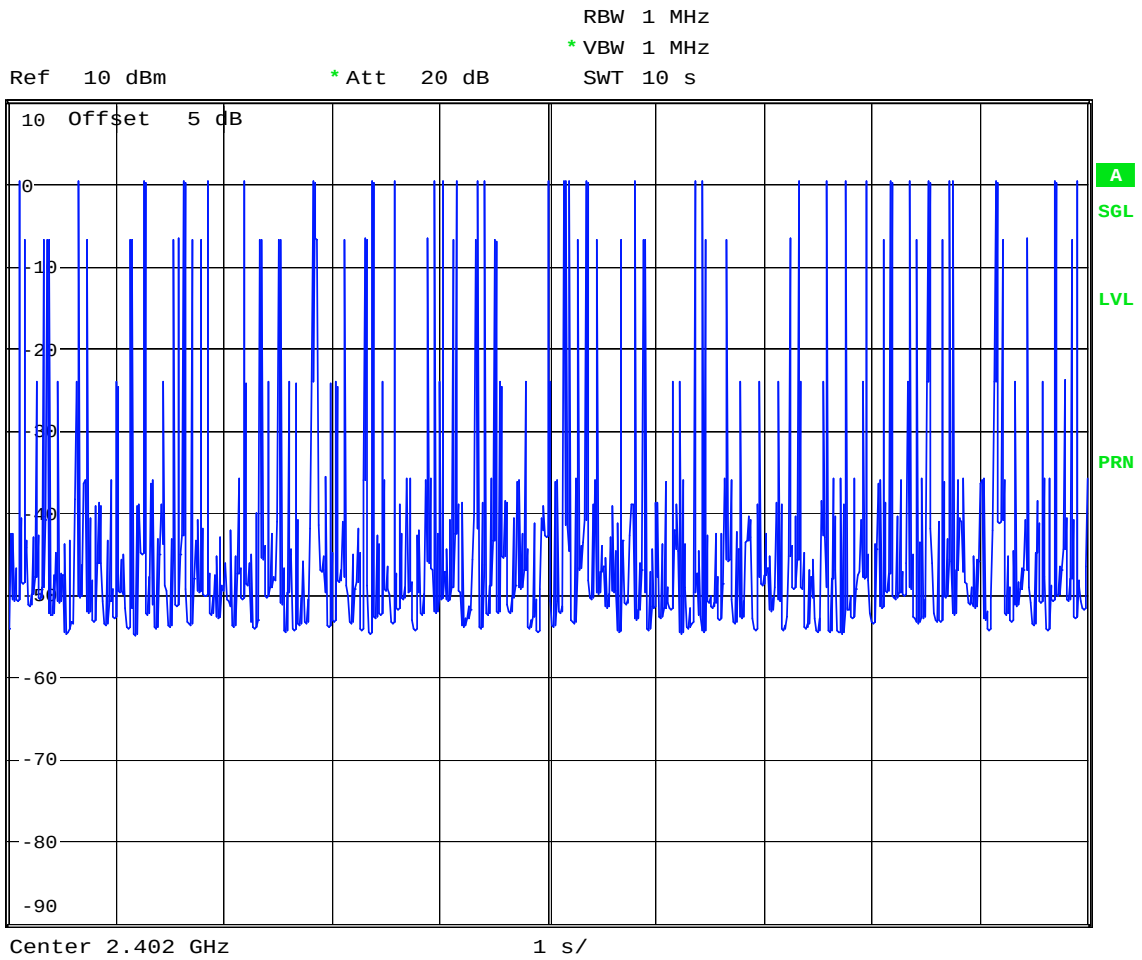
Date: 16.DEC.2005 21:07:40



DH5 (CH00)



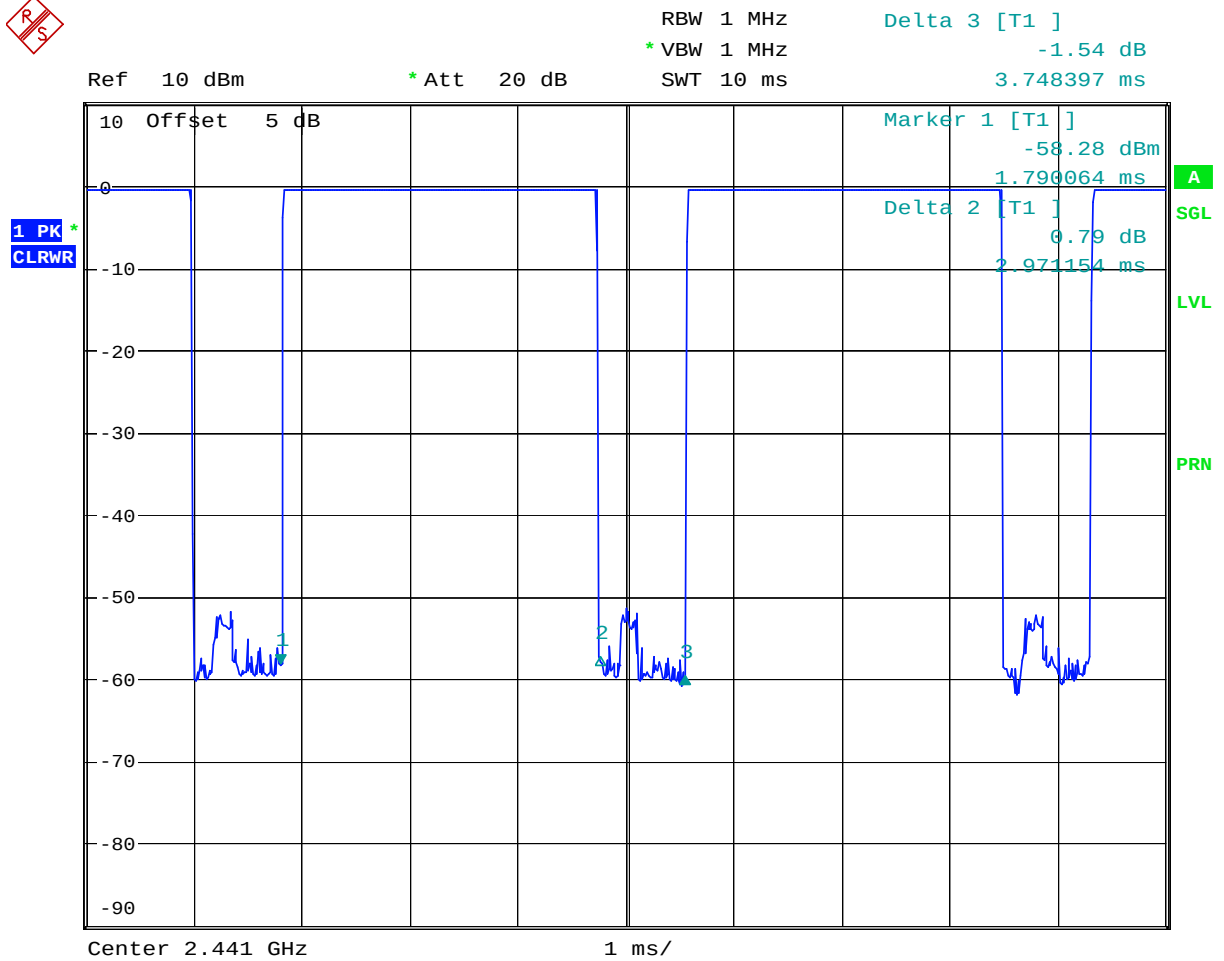
Date: 16.DEC.2005 20:55:15



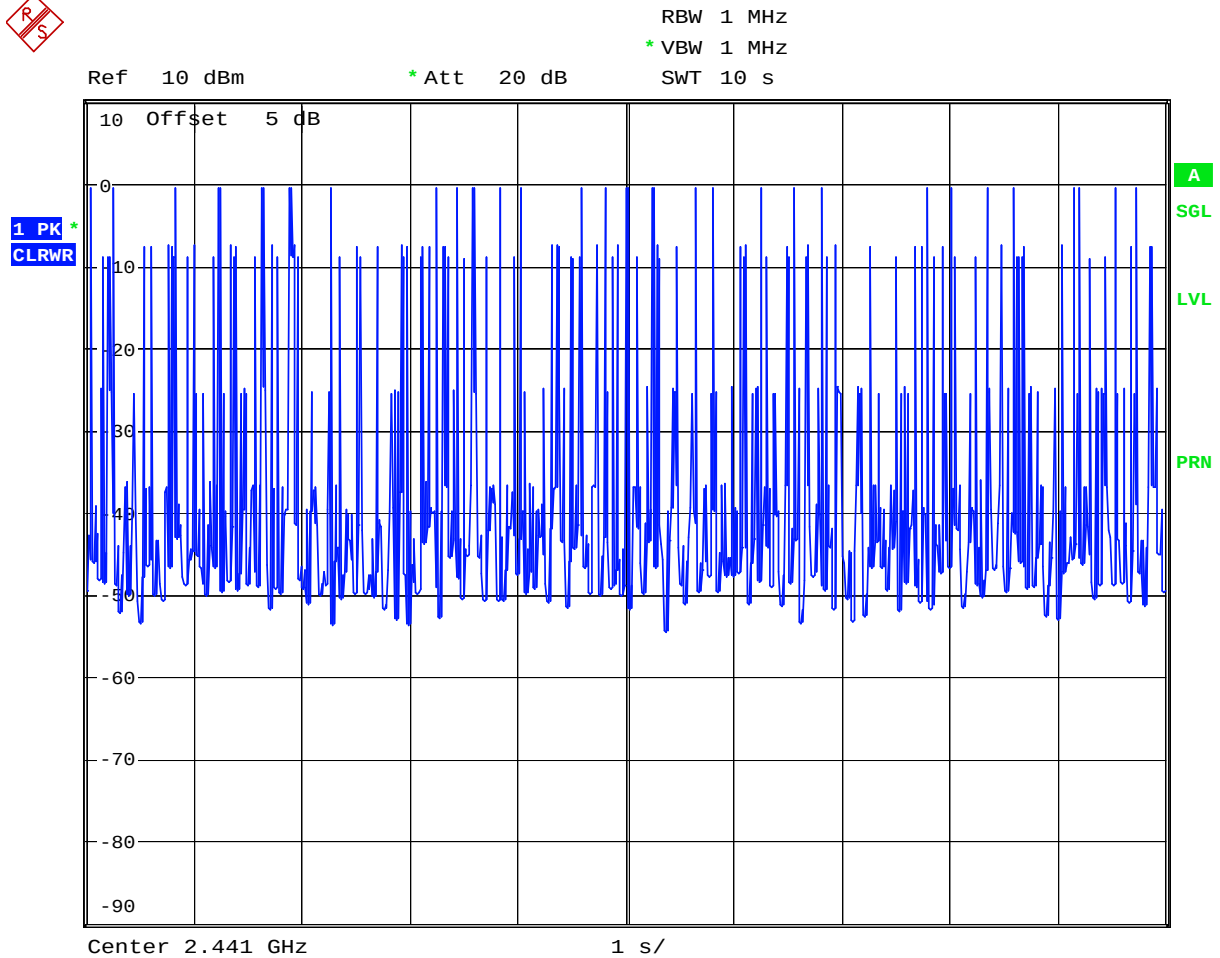
Date: 16.DEC.2005 21:10:33



DH5 (CH39)



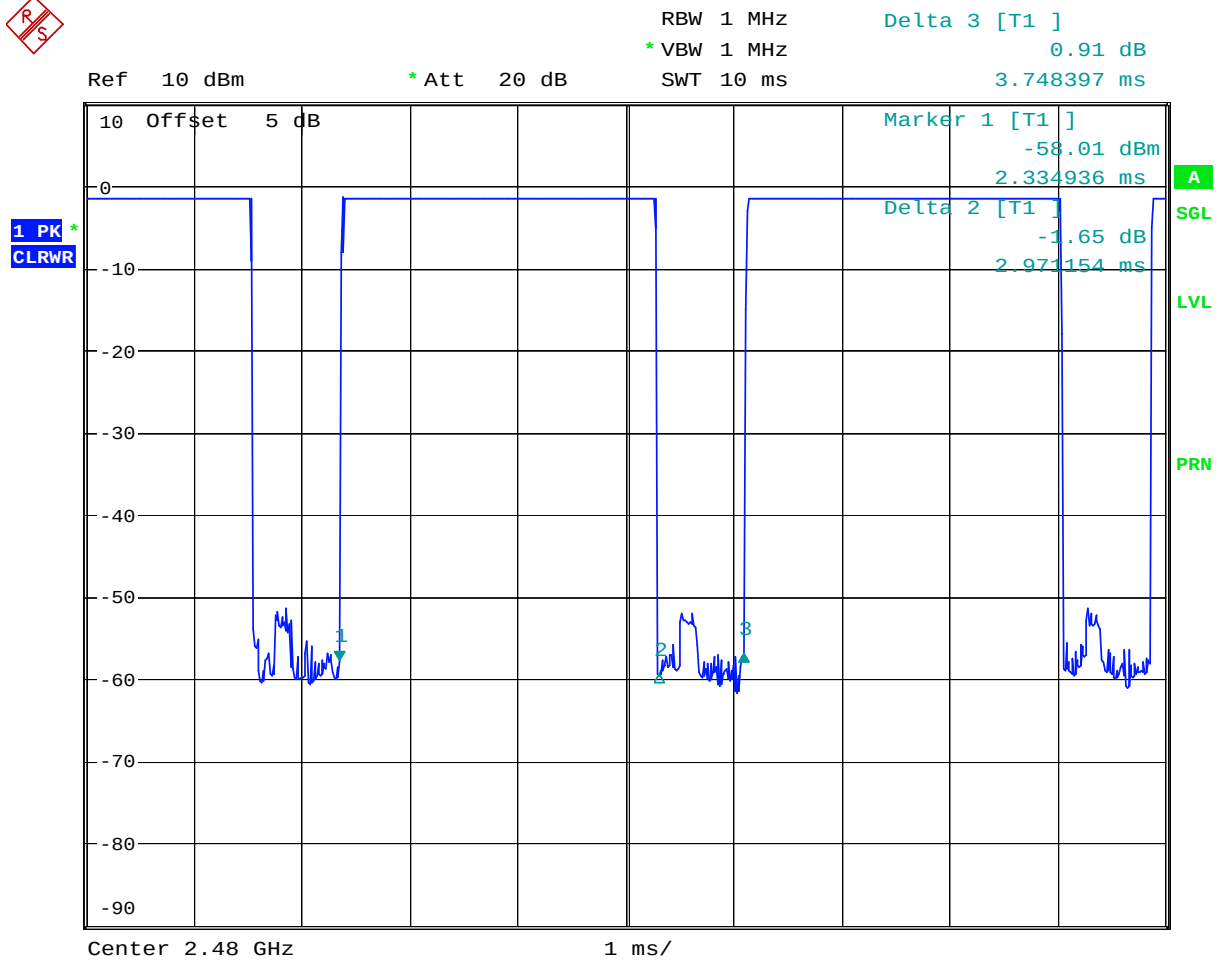
Date: 16.DEC.2005 20:56:12



Date: 16.DEC.2005 21:09:39



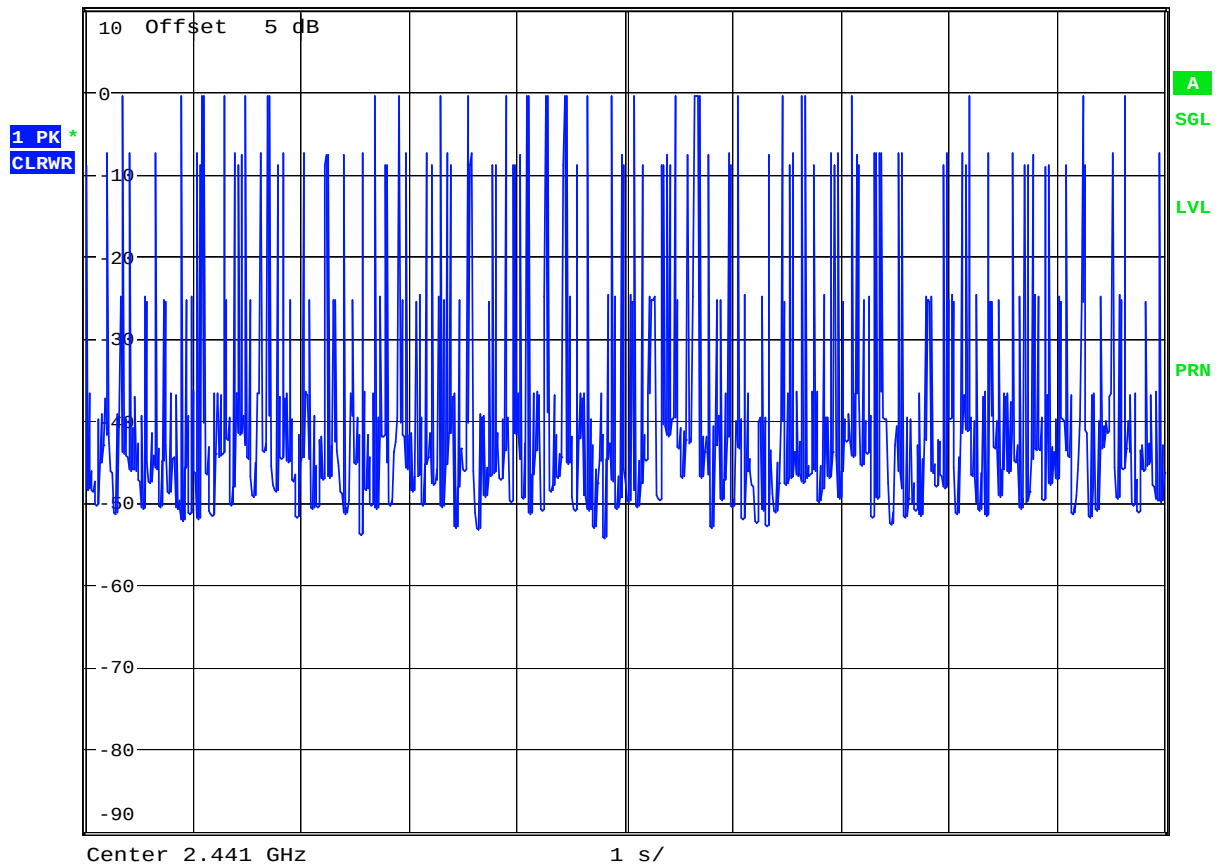
DH5 (CH78)



Date: 16.DEC.2005 20:56:56



Ref 10 dBm * Att 20 dB RBW 1 MHz
* VBW 1 MHz SWT 10 s



Date: 16.DEC.2005 21:09:09

5.6 Output Power

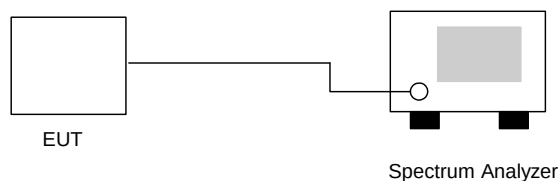
5.6.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.6.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
2. The center frequency of the spectrum analyzer was set to the fundamental frequency and set RBW to 3MHz and VBW to 3MHz.

5.6.3 Test Setup Layout :



5.6.4 Test Result : See spectrum analyzer plots below

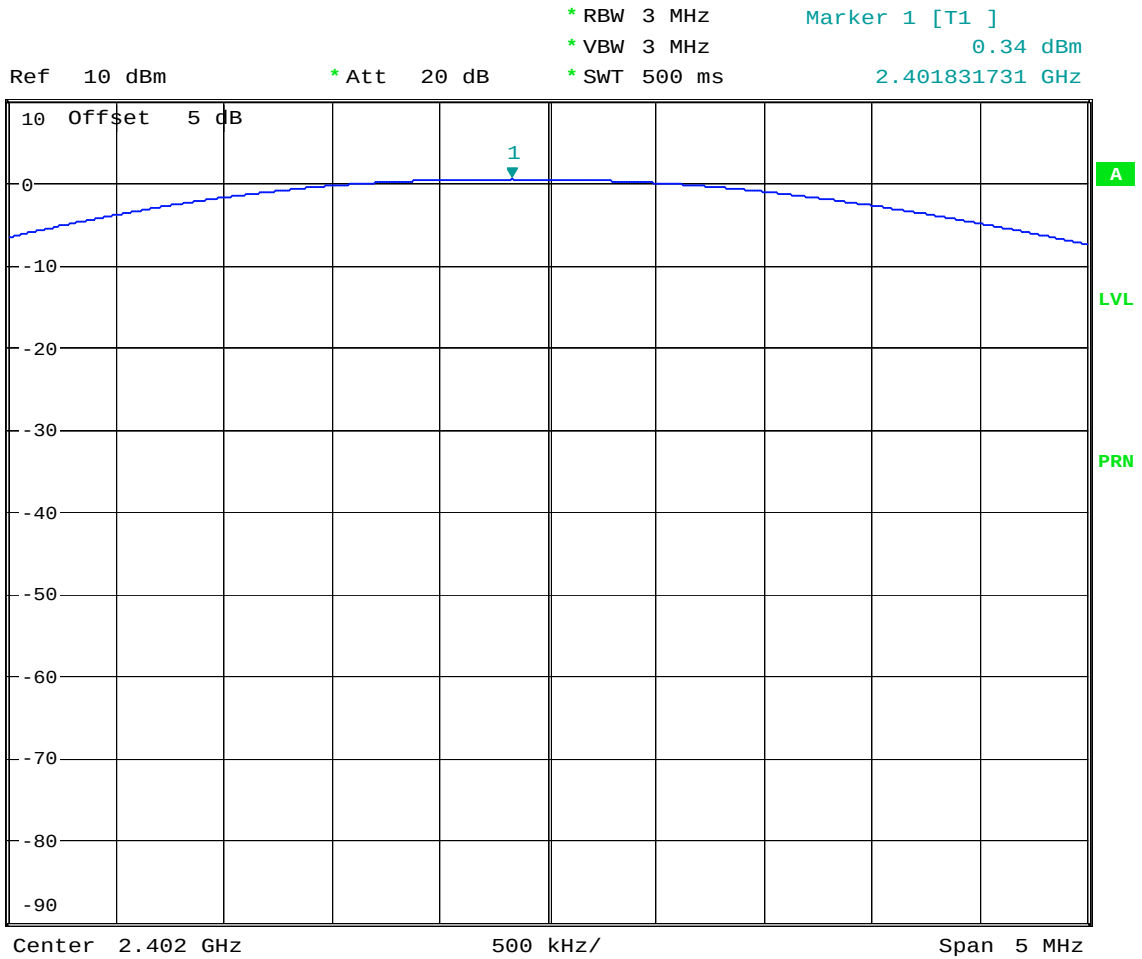
- Temperature: 26°C
- Relative Humidity: 54%
- Test Engineer : Jay

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)	Plot Ref. No.
00	2402	0.34	1W/30 dBm	Mode 1
39	2441	-0.41	1W/30 dBm	Mode 2
78	2480	-1.45	1W/30 dBm	Mode 3



5.6.5 Output Power

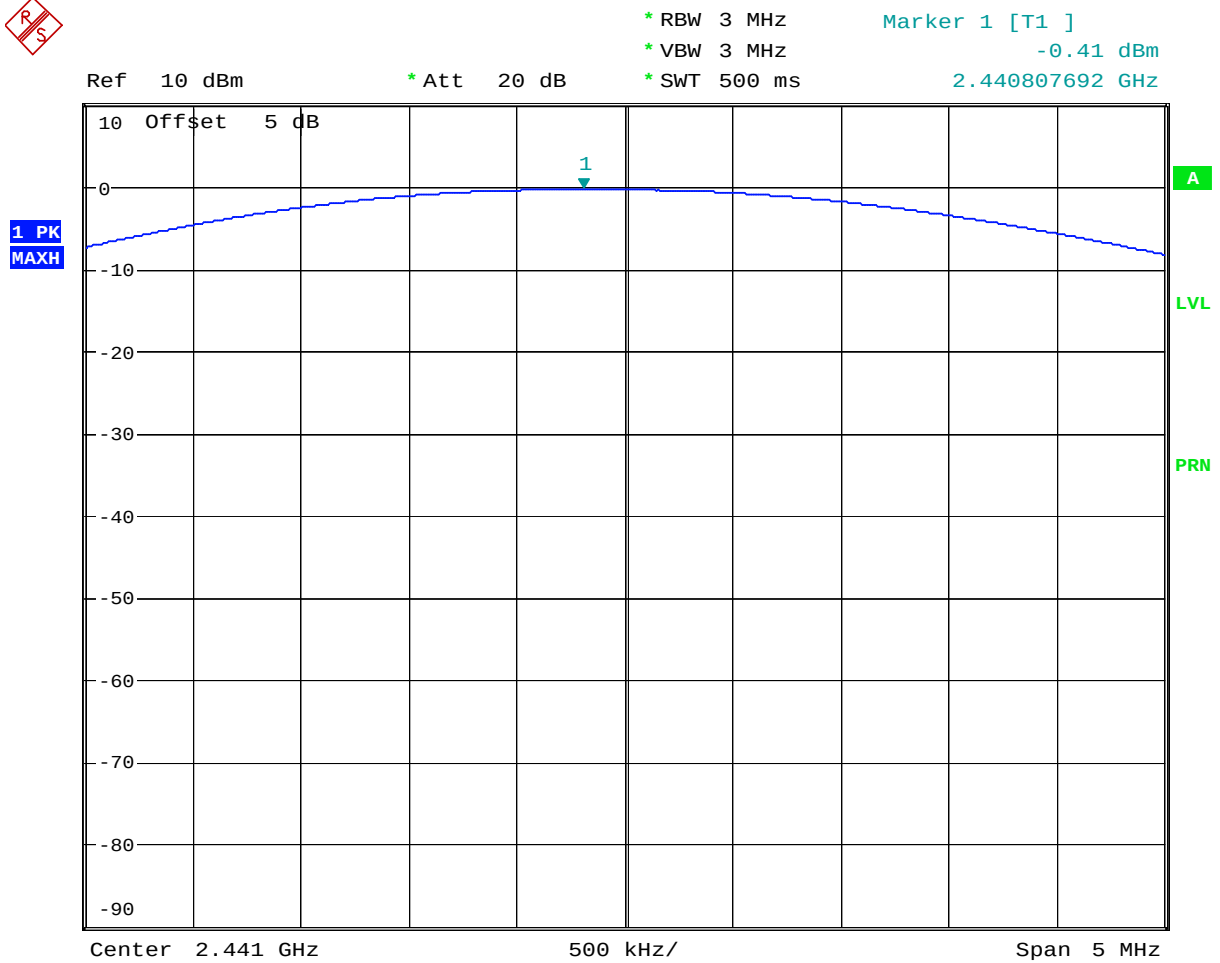
Mode 1: CH00 (2402MHz)



Date: 16.DEC.2005 19:45:11



Mode 2: CH39 (2441MHz)



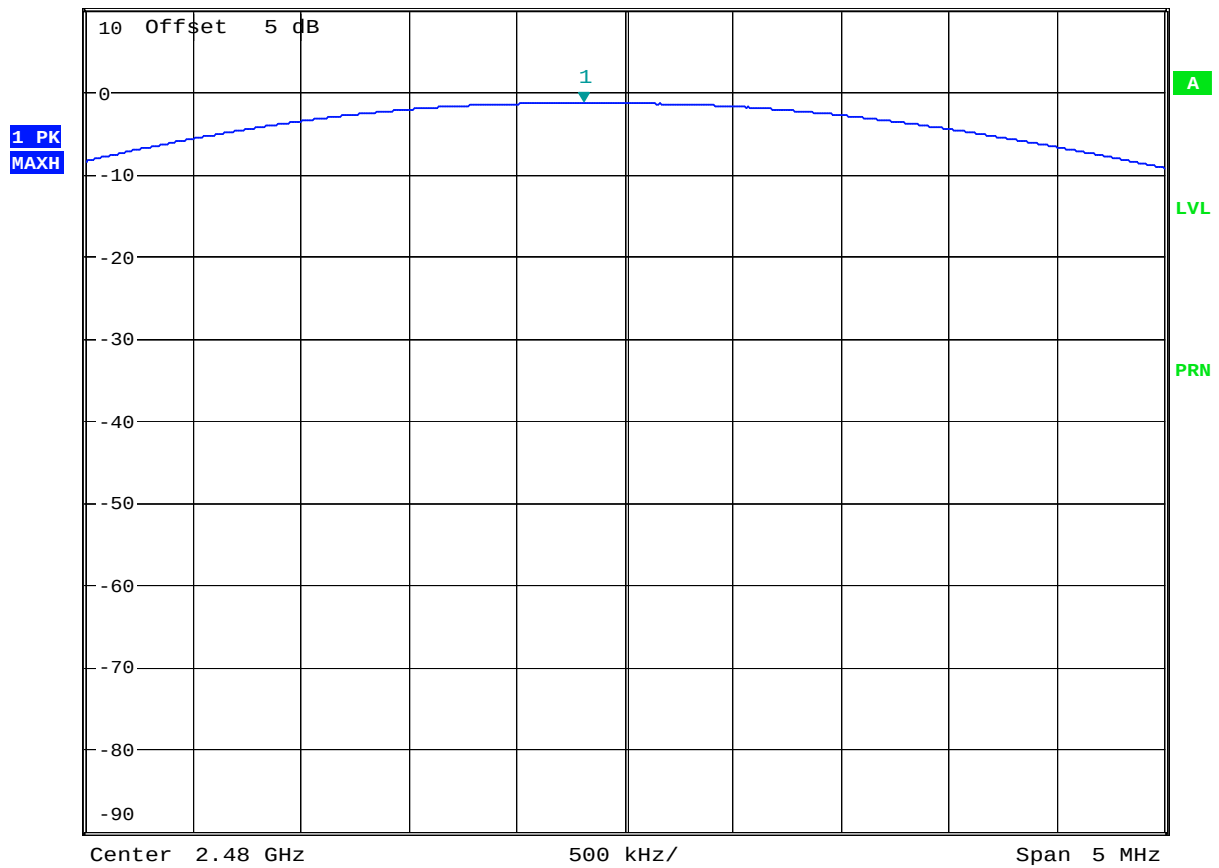
Date: 16.DEC.2005 19:46:29



Mode 3: CH78 (2480MHz)



Ref 10 dBm * Att 20 dB * RBW 3 MHz * VBW 3 MHz * SWT 500 ms Marker 1 [T1] -1.45 dBm 2.479807692 GHz



Date: 16.DEC.2005 19:47:43

5.7 100kHz Bandwidth of Frequency Band Edges

5.7.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.7.2 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 for the conducted measurement, and RBW/VBW=1MHz/1MHz for peak measurement and RBW/VBW=1MHz/300Hz for average measurement in the radiated measurement.
3. The band edges was measured and recorded.

5.7.3 Test Result :

- Temperature: 26°C
- Relative Humidity: 54%
- Test Engineer : Jay

Test Result in lower band (Channel 00) : PASS

Test Result in higher band(Channel 78) : PASS

5.7.4 Note on Band edge Emission

CH00 (Horizontal)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Detect Mode
2390.00	50.47	-23.53	74.00	51.18	30.48	4.26	35.46	200	0	Peak
2390.00	38.61	-15.39	54.00	39.32	30.48	4.26	35.46	100	206	Average

CH00 (Vertical)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Detect Mode
2390.00	50.55	-23.45	74.00	51.27	30.48	4.26	35.46	200	0	Peak
2390.00	38.64	-15.36	54.00	39.35	30.48	4.26	35.46	100	323	Average

**CH78 (Horizontal)**

Frequency	Level	Over	Limit	Read		Cable	Preamp	Ant	Table	Detect
(MHz)	(dBuV/m)	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Mode
		(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	(cm)	(deg)	
2483.50	70.30	-3.70	74.00	71.04	30.41	4.36	35.51	200	0	Peak
2483.50	41.79	-12.21	54.00	42.53	30.41	4.36	35.51	100	192	Average

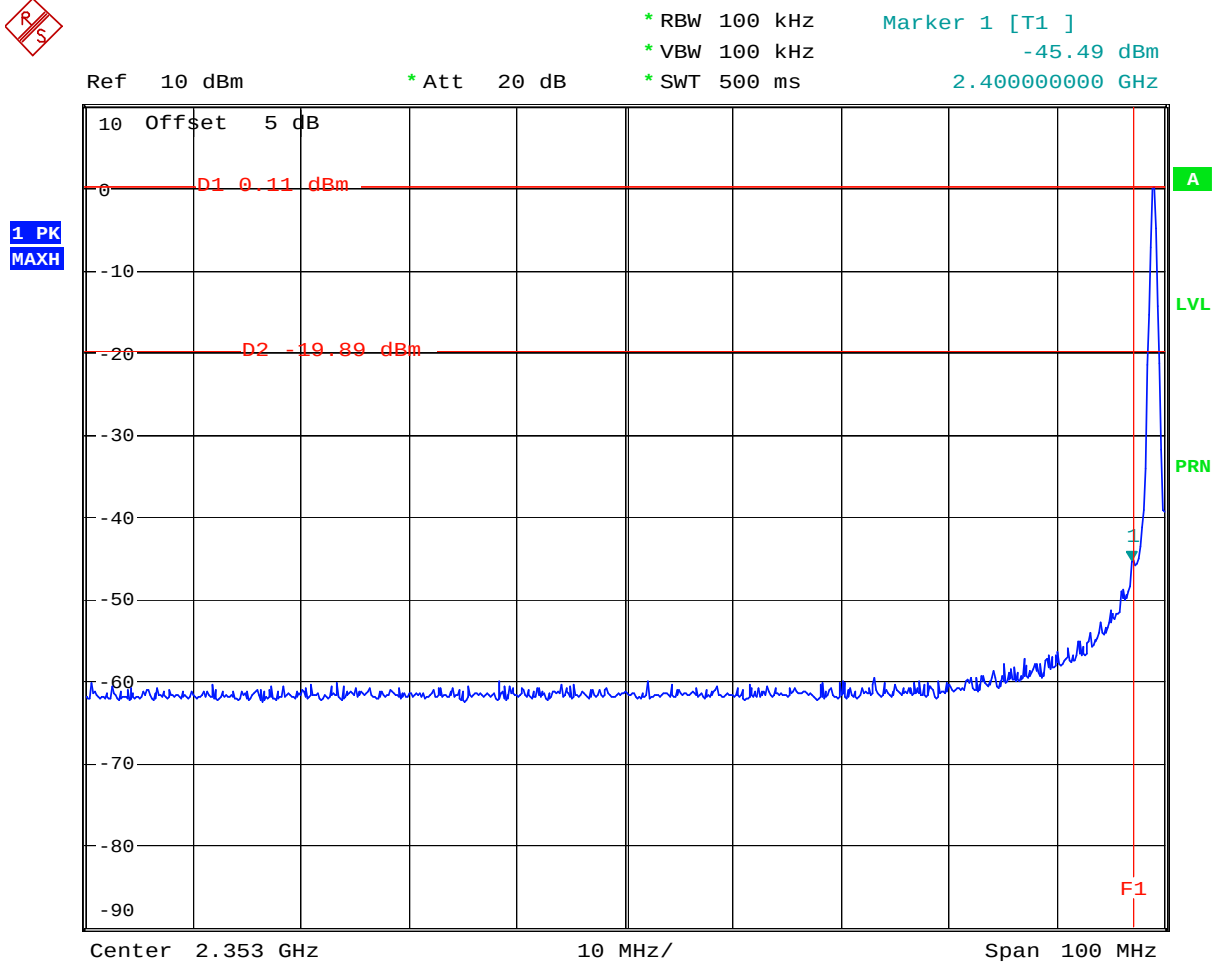
CH78 (Vertical)

Frequency	Level	Over	Limit	Read		Cable	Preamp	Ant	Table	Detect
(MHz)	(dBuV/m)	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Mode
		(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	(cm)	(deg)	
2483.50	70.22	-3.78	74.00	70.96	30.41	4.36	35.51	200	0	Peak
2483.50	41.90	-12.10	54.00	42.64	30.41	4.36	35.51	129	44	Average



5.7.5 Frequency Band Edge

Mode 1: CH00 (2402 MHz)



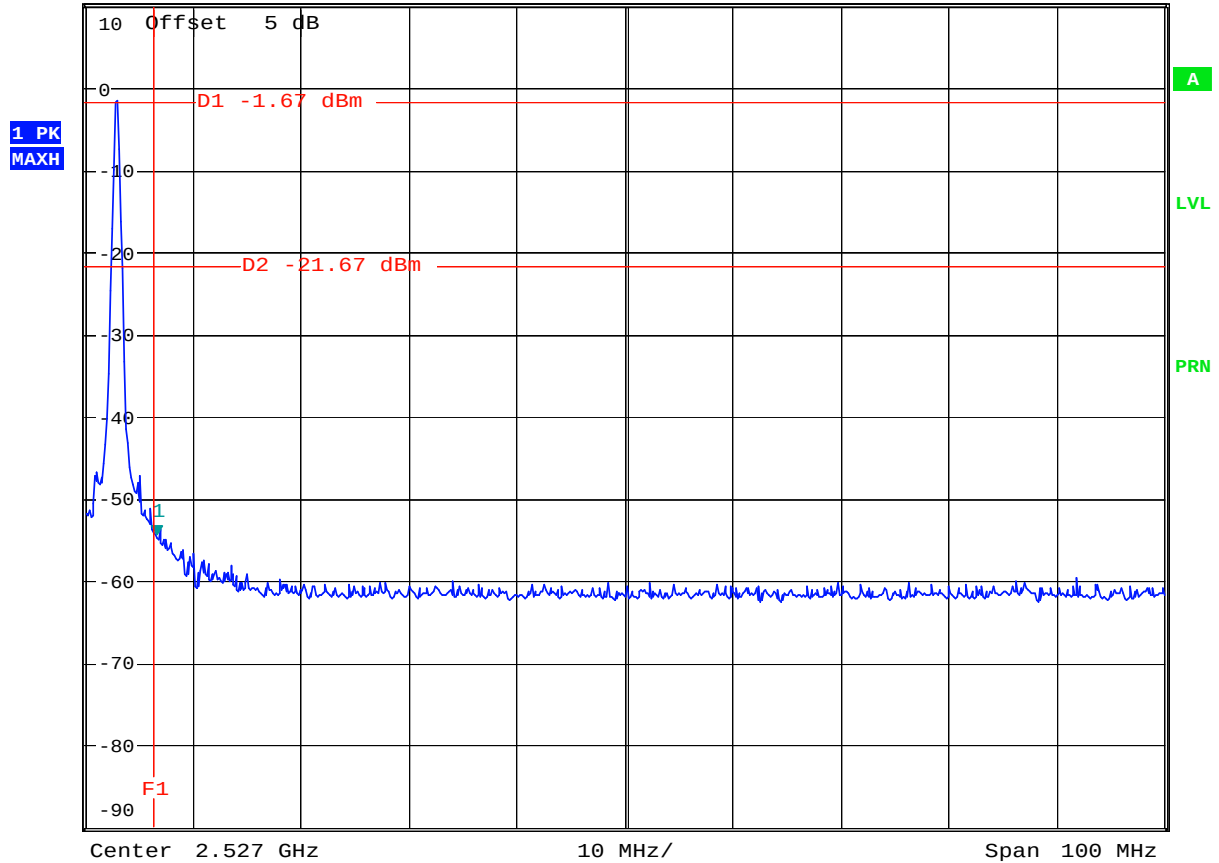
Date: 16.DEC.2005 20:24:53



Mode 3: CH78 (2480 MHz)



Ref 10 dBm * Att 20 dB * RBW 100 kHz * VBW 100 kHz * SWT 500 ms Marker 1 [T1] -54.52 dBm 2.483500000 GHz



Date: 16.DEC.2005 20:27:23



5.8 Conducted Emission

5.8.1 Measuring Instruments

As described in chapter 6 of this test Report.

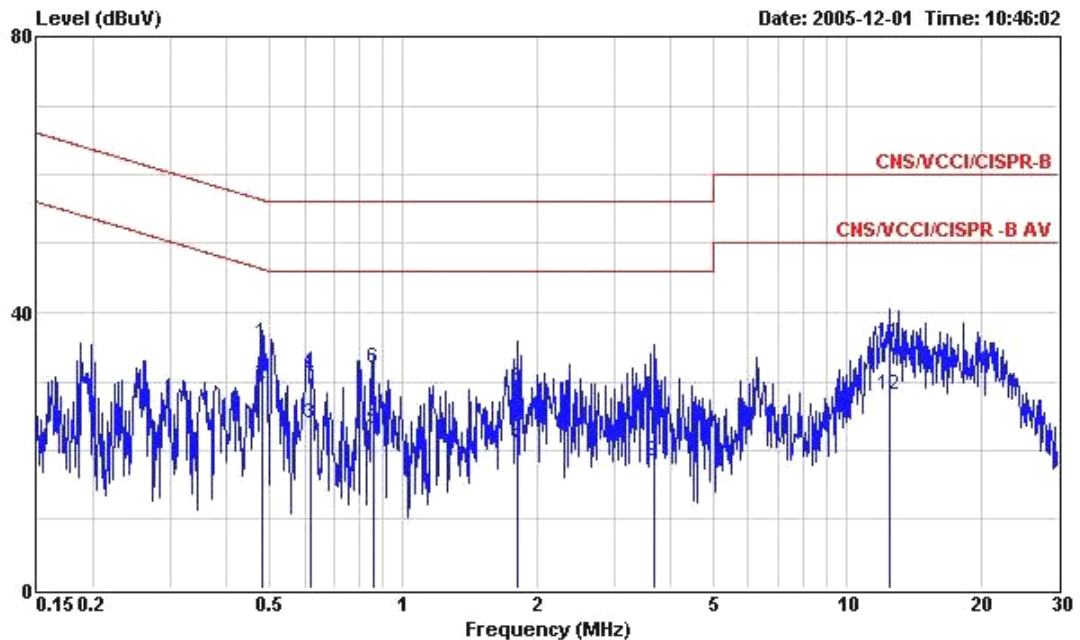
5.8.2 Test Procedures :

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power port of a line impedance stabilization network (LISN).
- c. All the support units are connected to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

5.8.3 Test Data Test Mode 1

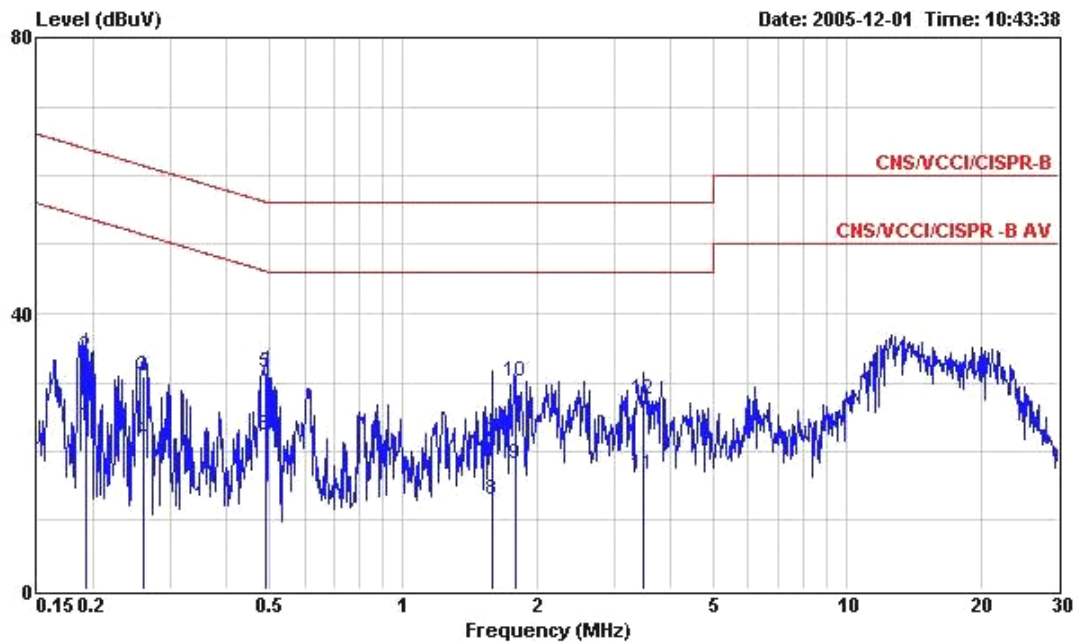
- Temperature: 26°C
- Relative Humidity: 54%
- Test Engineer : Jay
- Test Mode : Mode 1

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



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2001/004 200505 LINE
EUT : PDA Phone
Power : 120V/60Hz
Model : FD5N2312
Memo : PCS 1900 IDLE + EARPHONE +BT LINK
Memo : +MP3+CHARGER
Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.482	35.47	-20.83	56.30	35.35	0.07	0.05	QP
2	0.482	29.60	-16.70	46.30	29.48	0.07	0.05	Average
3	0.617	24.01	-21.99	46.00	23.86	0.08	0.07	Average
4	0.617	30.72	-25.28	56.00	30.57	0.08	0.07	QP
5	0.858	23.21	-22.79	46.00	23.02	0.10	0.09	Average
6	0.858	32.03	-23.97	56.00	31.84	0.10	0.09	QP
7	1.809	20.32	-25.68	46.00	20.09	0.11	0.12	Average
8	1.809	29.06	-26.94	56.00	28.83	0.11	0.12	QP
9	3.680	18.35	-27.65	46.00	17.99	0.20	0.16	Average
10	3.680	26.44	-29.56	56.00	26.08	0.20	0.16	QP
11	12.453	35.59	-24.41	60.00	35.08	0.21	0.30	QP
12	12.453	28.07	-21.93	50.00	27.56	0.21	0.30	Average



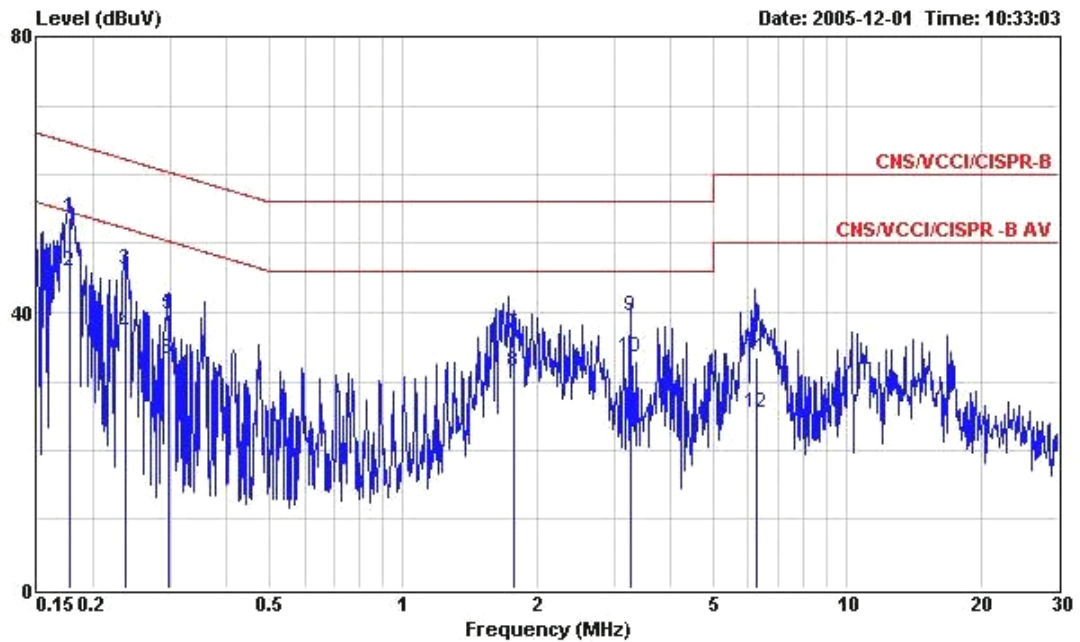
Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2001/004 200505 NEUTRAL
 EUT : PDA Phone
 Power : 120V/60Hz
 Model : FD5N2312
 Memo : PCS 1900 IDLE + EARPHONE +BT LINK
 Memo : +MP3+CHARGER
 Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.193	23.60	-30.29	53.89	23.47	0.11	0.02	Average
2	0.193	33.73	-30.16	63.89	33.60	0.11	0.02	QP
3	0.259	30.80	-30.66	61.46	30.66	0.11	0.03	QP
4	0.259	21.69	-29.77	51.46	21.55	0.11	0.03	Average
5	0.493	31.42	-24.70	56.12	31.23	0.14	0.05	QP
6	0.493	22.35	-23.77	46.12	22.16	0.14	0.05	Average
7	1.594	21.25	-34.75	56.00	20.91	0.23	0.11	QP
8	1.594	12.96	-33.04	46.00	12.62	0.23	0.11	Average
9	1.790	18.08	-27.92	46.00	17.73	0.23	0.12	Average
10	1.790	30.07	-25.93	56.00	29.72	0.23	0.12	QP
11	3.486	16.71	-29.29	46.00	16.33	0.23	0.15	Average
12	3.486	27.65	-28.35	56.00	27.27	0.23	0.15	QP

5.8.4 Test Data Test Mode 2

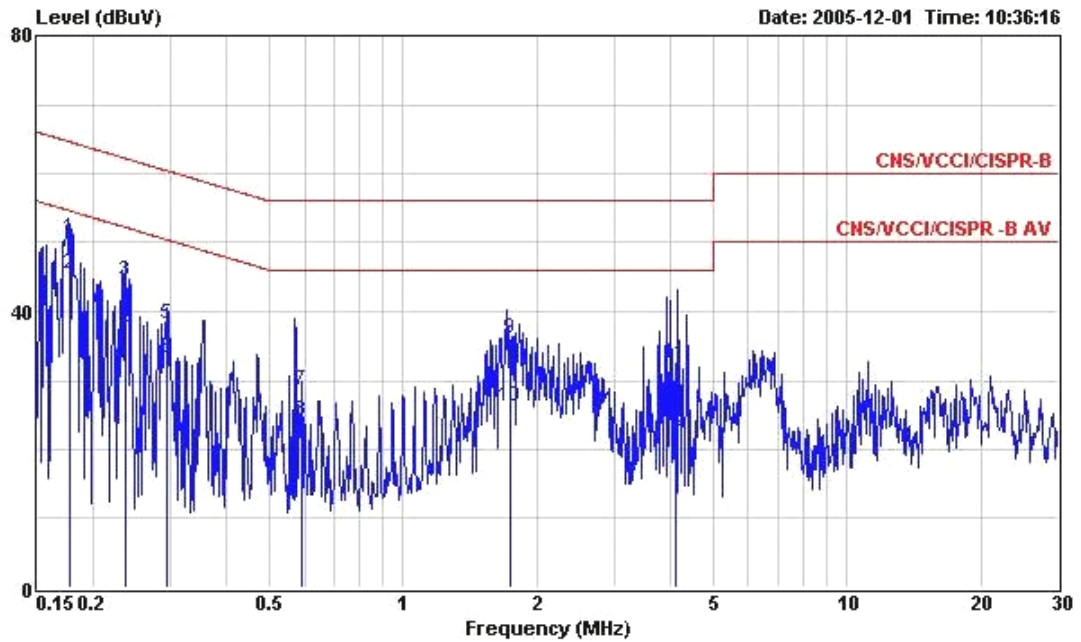
- Temperature: 26°C
- Relative Humidity: 54%
- Test Engineer : Jay
- Test Mode : Mode 1

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



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2001/004 200505 LINE
 EUT : PDA Phone
 Power : 120V/60Hz
 Model : FD5N2312
 Memo : PCS 1900 IDLE + EARPHONE +BT LINK
 Memo : +MP3+USB LINK
 Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.178	53.65	-10.93	64.58	53.56	0.06	0.03	QP
2	0.178	45.86	-8.72	54.58	45.77	0.06	0.03	Average
3	0.238	46.25	-15.92	62.17	46.16	0.06	0.03	QP
4	0.238	36.78	-15.39	52.17	36.69	0.06	0.03	Average
5	0.297	39.67	-20.66	60.33	39.58	0.06	0.03	QP
6	0.297	33.25	-17.08	50.33	33.16	0.06	0.03	Average
7	1.770	36.90	-19.10	56.00	36.67	0.11	0.12	QP
8	1.770	31.38	-14.62	46.00	31.15	0.11	0.12	Average
9	3.260	39.38	-16.62	56.00	39.05	0.18	0.15	QP
10	3.260	33.47	-12.53	46.00	33.14	0.18	0.15	Average
11	6.236	33.55	-26.45	60.00	33.13	0.21	0.21	QP
12	6.236	25.49	-24.51	50.00	25.07	0.21	0.21	Average



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2001/004 200505 NEUTRAL
 EUT : PDA Phone
 Power : 120V/60Hz
 Model : FD5N2312
 Memo : PCS 1900 IDLE + EARPHONE +BT LINK
 Memo : +MP3+USB LINK
 Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.178	50.66	-13.92	64.58	50.52	0.11	0.03	QP
2	0.178	45.58	-9.00	54.58	45.44	0.11	0.03	Average
3	0.237	44.32	-17.88	62.20	44.19	0.11	0.02	QP
4	0.237	37.08	-15.12	52.20	36.95	0.11	0.02	Average
5	0.294	38.31	-22.10	60.41	38.17	0.11	0.03	QP
6	0.294	33.30	-17.11	50.41	33.16	0.11	0.03	Average
7	0.589	28.54	-27.46	56.00	28.31	0.16	0.07	QP
8	0.589	24.18	-21.82	46.00	23.95	0.16	0.07	Average
9	1.744	36.08	-19.92	56.00	35.73	0.23	0.12	QP
10	1.744	26.18	-19.82	46.00	25.83	0.23	0.12	Average
11	4.108	32.48	-23.52	56.00	32.09	0.23	0.16	QP
12	4.108	22.51	-23.49	46.00	22.12	0.23	0.16	Average

5.9 Radiated Emission Measurement

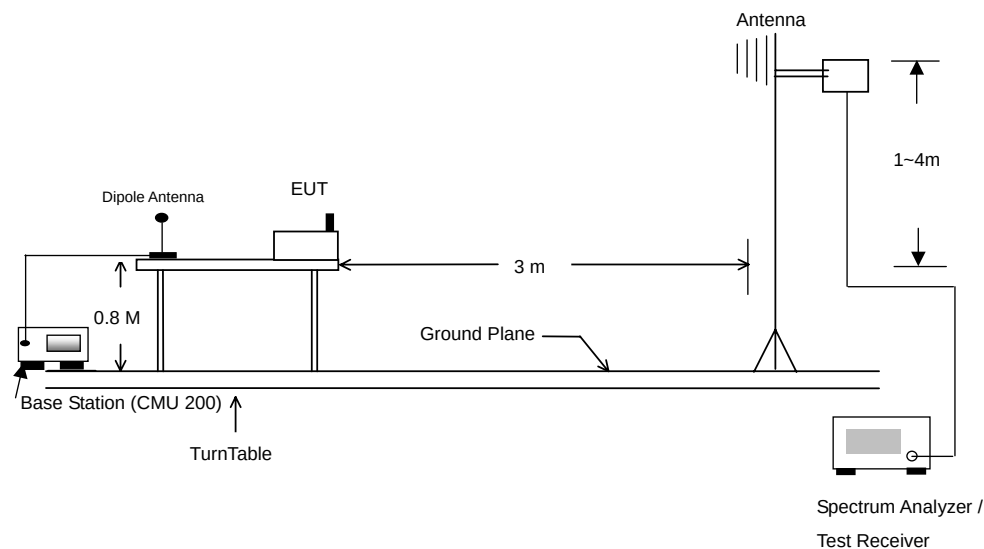
5.9.1 Measuring Instruments

As described in chapter 6 of this Report.

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. For testing below 1GHz, 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.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

5.9.3 Typical Test Setup Layout of Radiated Emission





5.9.4 Test Data

- Temperature : 23 °C
- Relating Humidity : 53 %
- Test Enginner : Jay
- Test Mode : Mode 1
- Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamplifier Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1	2390.00	50.47	-23.53	74.00	51.18	30.48	4.26	35.46	200	0 Peak
2	2390.00	38.61	-15.39	54.00	39.32	30.48	4.26	35.46	100	206 Average
3 @	2402.00	93.32			94.03	30.48	4.26	35.46	200	0 Peak
4 X	2402.00	57.40			58.11	30.48	4.26	35.46	100	206 Average
5	2484.00	49.70	-24.30	74.00	50.43	30.41	4.36	35.51	200	0 Peak
6	2484.00	38.54	-15.46	54.00	39.28	30.41	4.36	35.51	100	206 Average

Remark: #3 and #4 Fundamental Signal

- Test Mode : Mode 1
- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamplifier Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1	2390.00	50.55	-23.45	74.00	51.27	30.48	4.26	35.46	200	0 Peak
2	2390.00	38.64	-15.36	54.00	39.35	30.48	4.26	35.46	100	323 Average
3 X	2402.00	57.25			57.97	30.47	4.26	35.46	100	323 Average
4 @	2402.00	95.20			95.92	30.47	4.26	35.46	200	0 Peak
5	2500.00	50.04	-23.96	74.00	50.78	30.40	4.39	35.53	200	0 Peak
6	2500.00	38.53	-15.47	54.00	39.27	30.40	4.39	35.53	100	323 Average

Remark: #3 and #4 Fundamental Signal

- Test Mode : Mode 2
- Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 !	201.18	37.93	-5.57	43.50	55.84	9.91	3.52	31.34	400	0 Peak
2 !	207.93	38.45	-5.05	43.50	56.47	9.77	3.57	31.36	400	0 Peak
3 !	233.58	40.22	-5.78	46.00	57.16	10.51	3.79	31.23	400	0 Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1	402.90	34.62	-11.38	46.00	44.37	15.97	5.10	30.82	100	0 Peak
2	799.80	35.22	-10.78	46.00	35.99	21.90	7.45	30.12	100	0 Peak
3	1000.00	35.44	-18.56	54.00	34.68	22.97	8.42	30.63	100	0 Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1	2328.00	49.93	-24.07	74.00	50.62	30.54	4.17	35.40	0	0 Peak
2	2328.00	38.52	-15.48	54.00	39.22	30.54	4.17	35.40	100	166 Average
3 X	2441.00	57.81			58.55	30.44	4.29	35.47	100	166 Average
4 X	2441.00	92.33			93.07	30.44	4.29	35.47	0	0 Peak
5	2488.00	49.70	-24.30	74.00	50.45	30.40	4.36	35.51	0	0 Peak
6	2488.00	38.38	-15.62	54.00	39.13	30.40	4.36	35.51	100	166 Average

Remark: #3 and #4 Fundamental Signal



- Test Mode : Mode 2
- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	195.24	36.26	-7.24	43.50	54.31	9.72	3.46	31.24	400	0 Peak
2	207.93	35.42	-8.08	43.50	53.43	9.77	3.57	31.36	400	0 Peak
3	233.58	37.80	-8.20	46.00	54.73	10.51	3.79	31.23	400	0 Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	428.80	31.21	-14.79	46.00	40.60	16.42	5.24	31.05	100	0 Peak
2	726.30	34.31	-11.69	46.00	38.02	19.79	7.03	30.53	100	0 Peak
3	805.40	34.49	-11.51	46.00	35.56	21.80	7.48	30.36	100	0 Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	2334.00	50.46	-23.54	74.00	51.15	30.54	4.17	35.40	200	0 Peak
2	2334.00	38.70	-15.30	54.00	39.40	30.54	4.17	35.40	100	37 Average
3 X	2441.00	58.54			59.28	30.44	4.29	35.47	100	37 Average
4 @	2441.00	95.02			95.76	30.44	4.29	35.47	200	0 Peak
5	2500.00	49.58	-24.42	74.00	50.32	30.40	4.39	35.53	200	0 Peak
6	2500.00	38.53	-15.47	54.00	39.27	30.40	4.39	35.53	100	37 Average

Remark: #3 and #4 Fundamental Signal



- Test Mode : Mode 3
- Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2318.00	50.27	-23.73	74.00	50.97	30.54	4.17	35.40	200	0	Peak
2	2318.00	38.58	-15.42	54.00	39.28	30.54	4.17	35.40	100	192	Average
3 @	2480.00	94.52			95.26	30.41	4.36	35.51	200	0	Peak
4 X	2480.00	58.48			59.22	30.41	4.36	35.51	100	192	Average
5 !	2483.50	70.30	-3.70	74.00	71.04	30.41	4.36	35.51	200	0	Peak
6	2483.50	41.79	-12.21	54.00	42.53	30.41	4.36	35.51	100	192	Average

Remark: #3 and #4 Fundamental Signal.

- Test Mode : Mode 3
- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2338.00	50.49	-23.51	74.00	51.20	30.52	4.17	35.40	200	0	Peak
2	2338.00	38.77	-15.23	54.00	39.48	30.52	4.17	35.40	129	44	Average
3 X	2480.00	57.30			58.04	30.41	4.36	35.51	129	44	Average
4 X	2480.00	93.63			94.36	30.41	4.36	35.51	200	0	Peak
5 !	2483.50	70.22	-3.78	74.00	70.96	30.41	4.36	35.51	200	0	Peak
6	2483.50	41.90	-12.10	54.00	42.64	30.41	4.36	35.51	129	44	Average

Remark: #3 and #4 Fundamental Signal

Remark: There is no more obvious emission except the listings above.



5.10 Antenna Requirements

5.10.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no other antenna except 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 is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

5.10.2 Antenna Connected Construction

The antenna used in this product is a chip antenna without connector and it is considered to meet antenna requirement of FCC.

5.10.3 Antenna Gain

The antenna gain of EUT is less than 6dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

6. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Oct. 19, 2005	Oct. 19, 2006	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Apr. 26, 2005	Apr. 26, 2006	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Apr. 20, 2005	Apr. 20, 2006	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 – 60Hz	N/A	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9kHz – 30MHz	Dec. 23, 2004	Dec. 23, 2005	Conduction (CO01-HY)
Spectrum analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Jul. 25, 2005	Jul. 24, 2006	Radiation (03CH06-HY)
Receiver	R&S	ESCS30	100356	9KHz-2.75GHz	Jun. 28, 2005	Jun. 27, 2006	Radiation (03CH06-HY)
Controller	CT	SC100	N/A	N/A	N/A	N/A	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Nov. 22, 2004	Nov. 22, 2006	Radiation (03CH06-HY)
Horn Antenna	Com-Power	AH118	071025	1G-18G	Feb. 22, 2005	Feb. 22, 2006	Radiation (03CH06-HY)
SHF-EHF Horn	SCHWARZBECK	BBHA 9170	9170-249	14G - 40G	Jul. 21, 2005	Jul. 20, 2006	Radiation (03CH06-HY)
HF Amplifier	MITEQ	AFS44	973248	0.1G - 26.5G	Nov. 23, 2005	Nov. 22, 2006	Radiation (03CH06-HY)
Amplifier	MITEQ	AMF-6F	997165	26G - 40G	Jul. 21, 2005	Jul. 20, 2006	Radiation (03CH06-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	N/A	Radiation (03CH06-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	N/A	Radiation (03CH06-HY)

7. Uncertainty Evaluation

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

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	+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 (30MHz ~ 1000MHz)

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	+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		

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

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	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 $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\log(1 - \Gamma_1 * \Gamma_2 * \Gamma_3)$	+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				