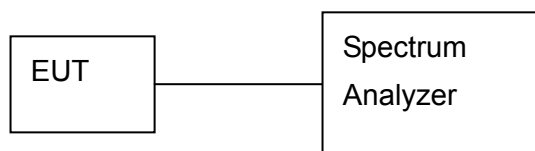


7 Average Time of Occupancy

7.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

7.2 Test Arrangement and Procedure



1. The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).
2. First, measure the number of pulses per 5 second, the RBW is set to 100 kHz and VBW is set to 100 kHz. Sweep is set to 5 sec. Span 0 Hz.
3. Second, measure the Pulse width, the RBW is set to 1MHz and VBW is set to 1MHz. Sweep is adjusted to appropriate time to show a complete pulse. Span 0 Hz.

7.3 Limit (§ 15.247(a)(1)(iii))

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

7.4 Test Result

Compliance.

The final test data are shown on the following page(s).

The Test Graphics of the worst case, BT EDR (3 Mbps), have been selected to show on the following page(s).

Bluetooth (1 Mbps) Channel <u>00</u>					
DH Packet	Number of Hopping channels	Number of Pulses per 5 sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	79	50	0.00042242	0.13348472	0.4
DH3	79	25	0.00167367	0.26443986	0.4
DH5	79	17	0.00292492	0.314253405	0.4

Bluetooth (1 Mbps) Channel <u>39</u>					
DH Packet	Number of Hopping channels	Number of Pulses per 5 sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	79	50	0.00042242	0.13348472	0.4
DH3	79	25	0.00168368	0.26602144	0.4
DH5	79	17	0.00292492	0.314253405	0.4

Bluetooth (1 Mbps) Channel <u>78</u>					
DH Packet	Number of Hopping channels	Number of Pulses per 5 sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	79	50	0.00042242	0.13348472	0.4
DH3	79	25	0.00168368	0.26602144	0.4
DH5	79	17	0.00292492	0.314253405	0.4

Remark:

AV time of Occupancy (sec) = 79 (number of hopping channels) * 0.4 (sec) * Number of Pulses per 5 sec / 5 * Pulse Width (sec)

Note : 1. The EUT does not support AFH mode.

Bluetooth EDR (2 Mbps) Channel 00

DH Packet	Number of Hopping channels	Number of Pulses per 5 sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	79	50	0.00044244	0.13981104	0.4
DH3	79	25	0.00169369	0.26760302	0.4
DH5	79	17	0.00294494	0.316404354	0.4

Bluetooth EDR (2 Mbps) Channel 39

DH Packet	Number of Hopping channels	Number of Pulses per 5 sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	79	50	0.00044244	0.13981104	0.4
DH3	79	25	0.00169369	0.26760302	0.4
DH5	79	17	0.00294494	0.316404354	0.4

Bluetooth EDR (2 Mbps) Channel 78

DH Packet	Number of Hopping channels	Number of Pulses per 5 sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	79	50	0.00045245	0.1429742	0.4
DH3	79	25	0.00169369	0.26760302	0.4
DH5	79	17	0.00294494	0.316404354	0.4

Remark:

AV time of Occupancy (sec) = 79 (number of hopping channels) * 0.4 (sec) * Number of Pulses per 5 sec / 5 * Pulse Width (sec)

Note : 1. The EUT does not support AFH mode.

Bluetooth EDR (3 Mbps) Channel 00

DH Packet	Number of Hopping channels	Number of Pulses per 5 sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	79	50	0.00044244	0.13981104	0.4
DH3	79	25	0.00169369	0.26760302	0.4
DH5	79	17	0.00294494	0.316404354	0.4

Bluetooth EDR (3 Mbps) Channel 39

DH Packet	Number of Hopping channels	Number of Pulses per 5 sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	79	50	0.00044244	0.13981104	0.4
DH3	79	25	0.00169369	0.26760302	0.4
DH5	79	17	0.00294494	0.316404354	0.4

Bluetooth EDR (3 Mbps) Channel 78

DH Packet	Number of Hopping channels	Number of Pulses per 5 sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	79	50	0.00045245	0.1429742	0.4
DH3	79	25	0.00169369	0.26760302	0.4
DH5	79	17	0.00296496	0.318555302	0.4

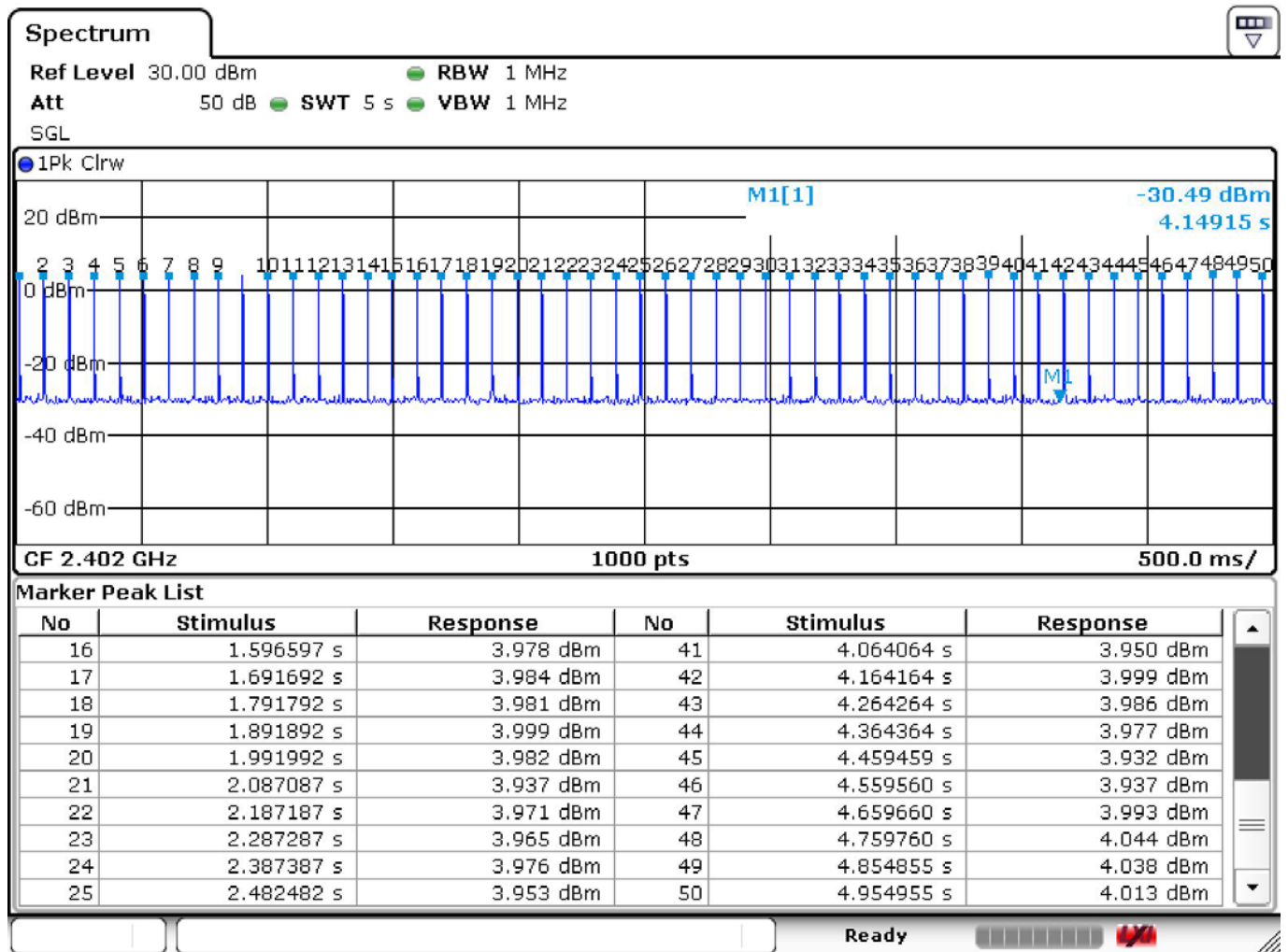
Remark:

AV time of Occupancy (sec) = 79 (number of hopping channels) * 0.4 (sec) * Number of Pulses per 5 sec / 5 * Pulse Width (sec)

Note : 1. The EUT does not support AFH mode.

Temperature	: 24.4°C	Humidity	: 49%
Test Date	: 21-Nov-2016	Tested by	: Eason Hsieh
Test Mode	: BT EDR (3 Mbps) DH1	Channel	: 00

Number of Pulses Per 5 sec



Pulse Width (sec)

Spectrum

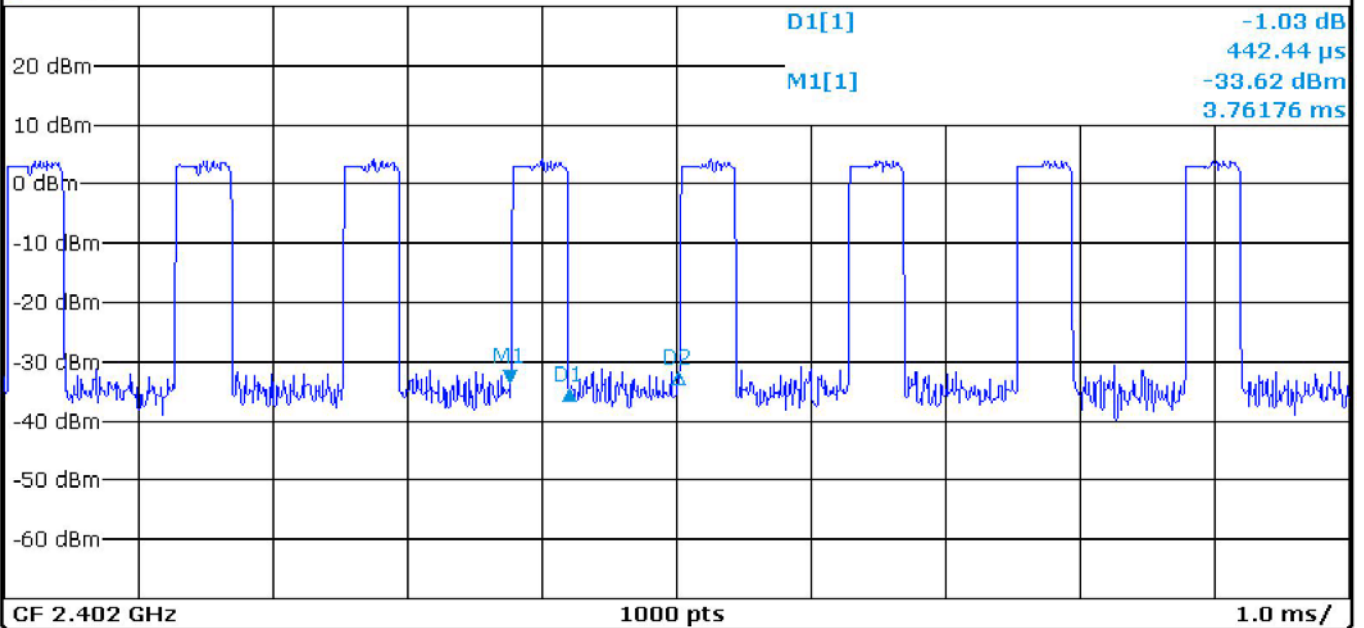


Ref Level 30.00 dBm RBW 1 MHz

Att 50 dB SWT 10 ms VBW 1 MHz

SGL

1Pk Clrw



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	3.7618 ms	-33.62 dBm		
D1	M1	1	442.4 μs	-1.03 dB		
D2	M1	1	1.2533 ms	1.85 dB		

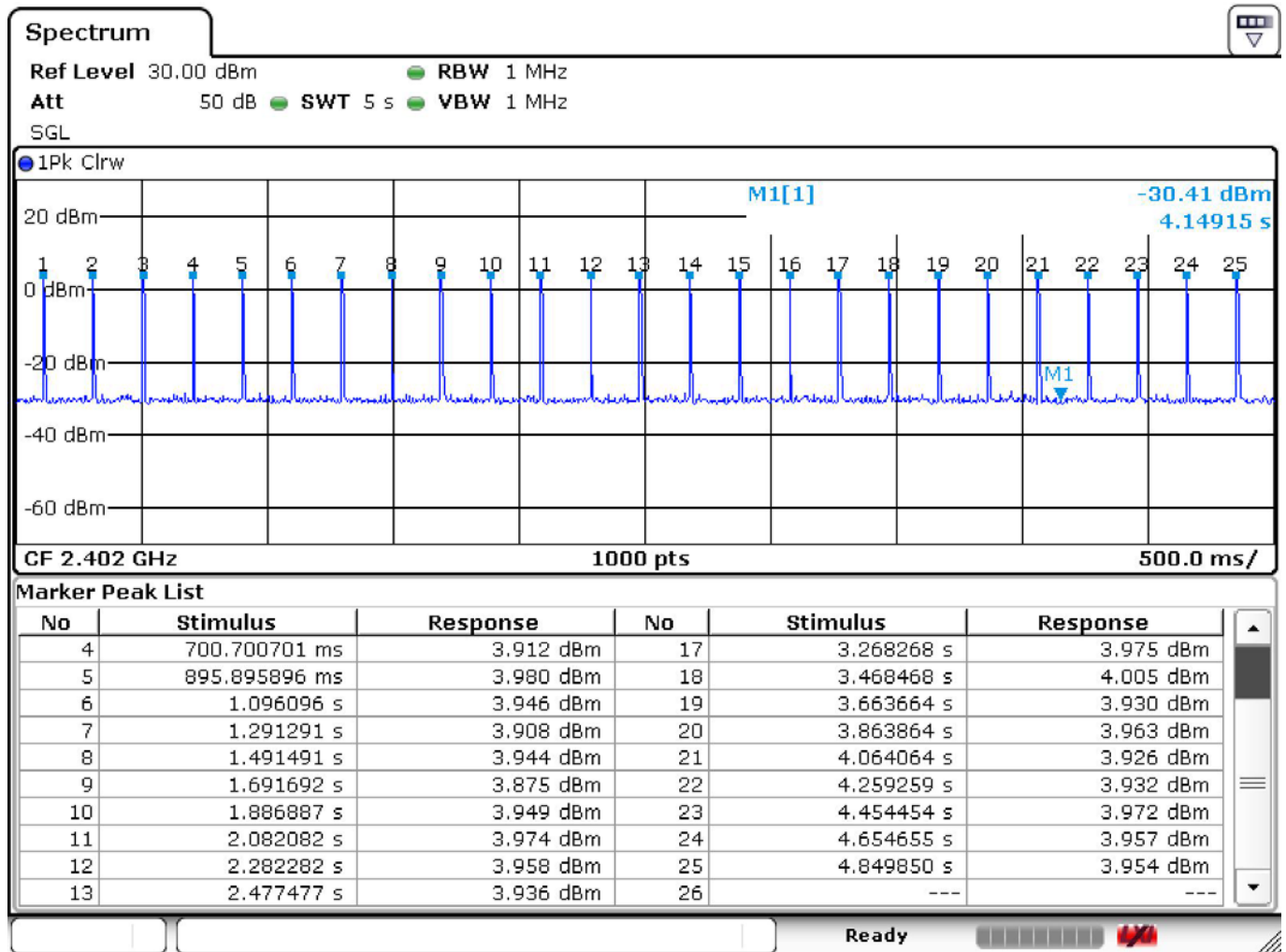
Ready



Test Mode : BT EDR (3 Mbps) DH3

Channel : 00

Number of Pulses Per 5 sec



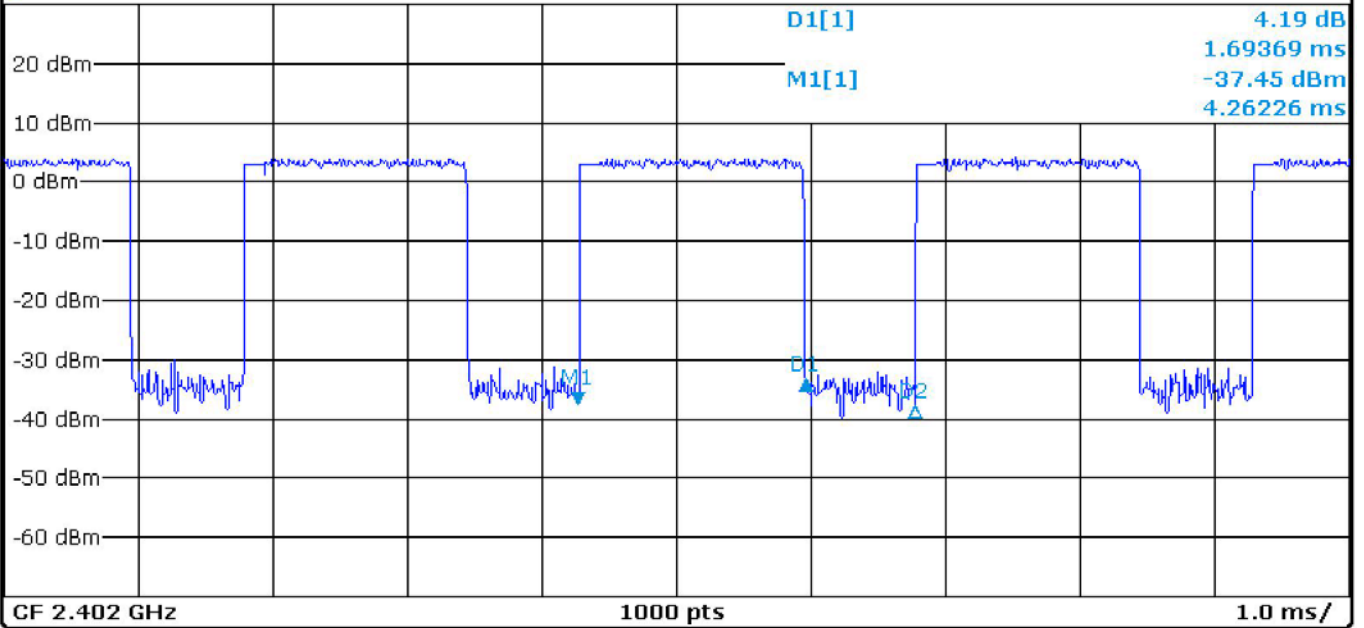
Pulse Width (sec)

Spectrum



Ref Level 30.00 dBm RBW 1 MHz
Att 50 dB SWT 10 ms VBW 1 MHz
SGL

1Pk Clrw



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	4.2623 ms	-37.45 dBm		
D1	M1	1	1.6937 ms	4.19 dB		
D2	M1	1	2.5045 ms	-0.31 dB		

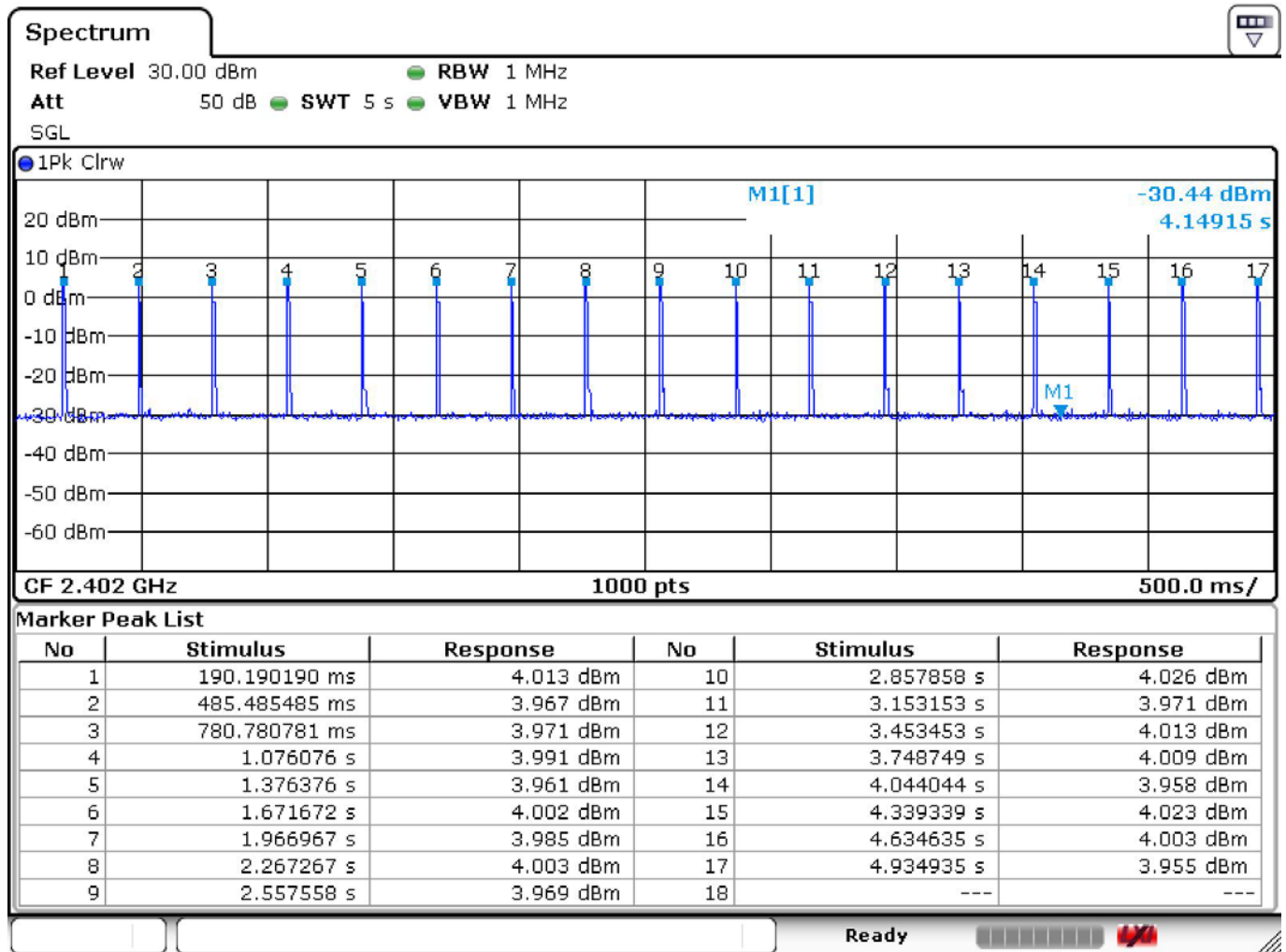
Ready



Test Mode : BT EDR (3 Mbps) DH5

Channel : 00

Number of Pulses Per 5 sec



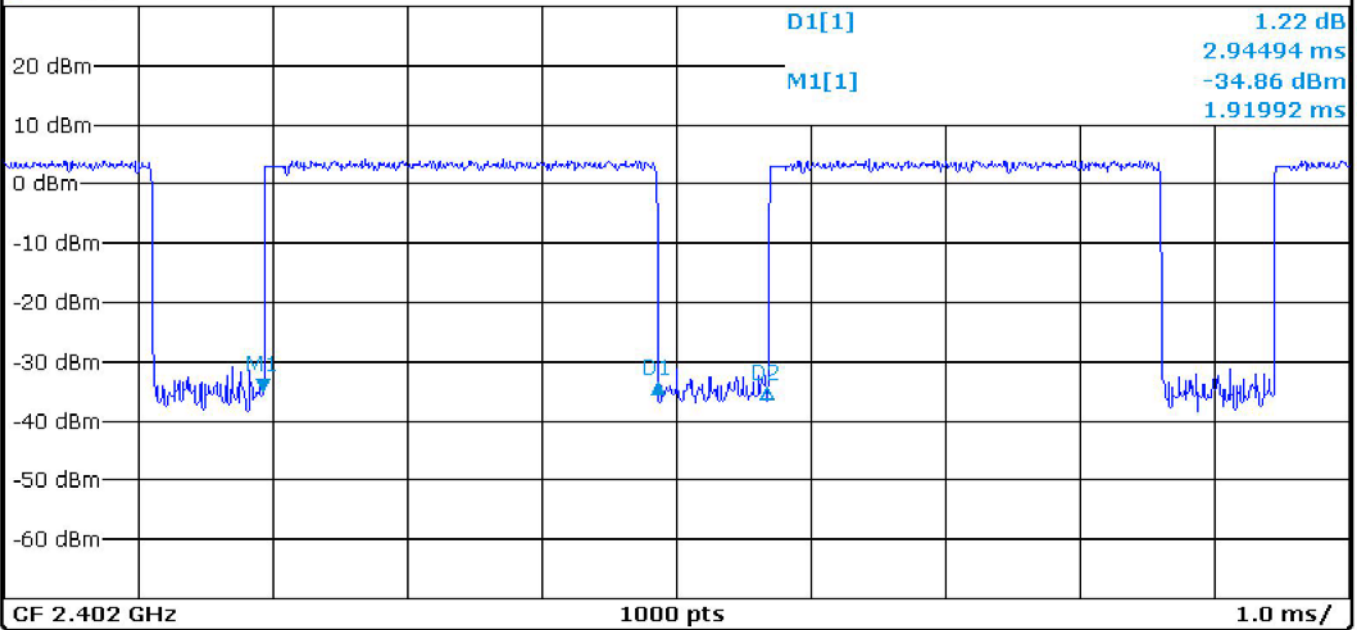
Pulse Width (sec)

Spectrum



Ref Level 30.00 dBm RBW 1 MHz
Att 50 dB SWT 10 ms VBW 1 MHz
SGL

1Pk Clrw



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	1.9199 ms	-34.86 dBm		
D1	M1	1	2.9449 ms	1.22 dB		
D2	M1	1	3.7558 ms	0.55 dB		

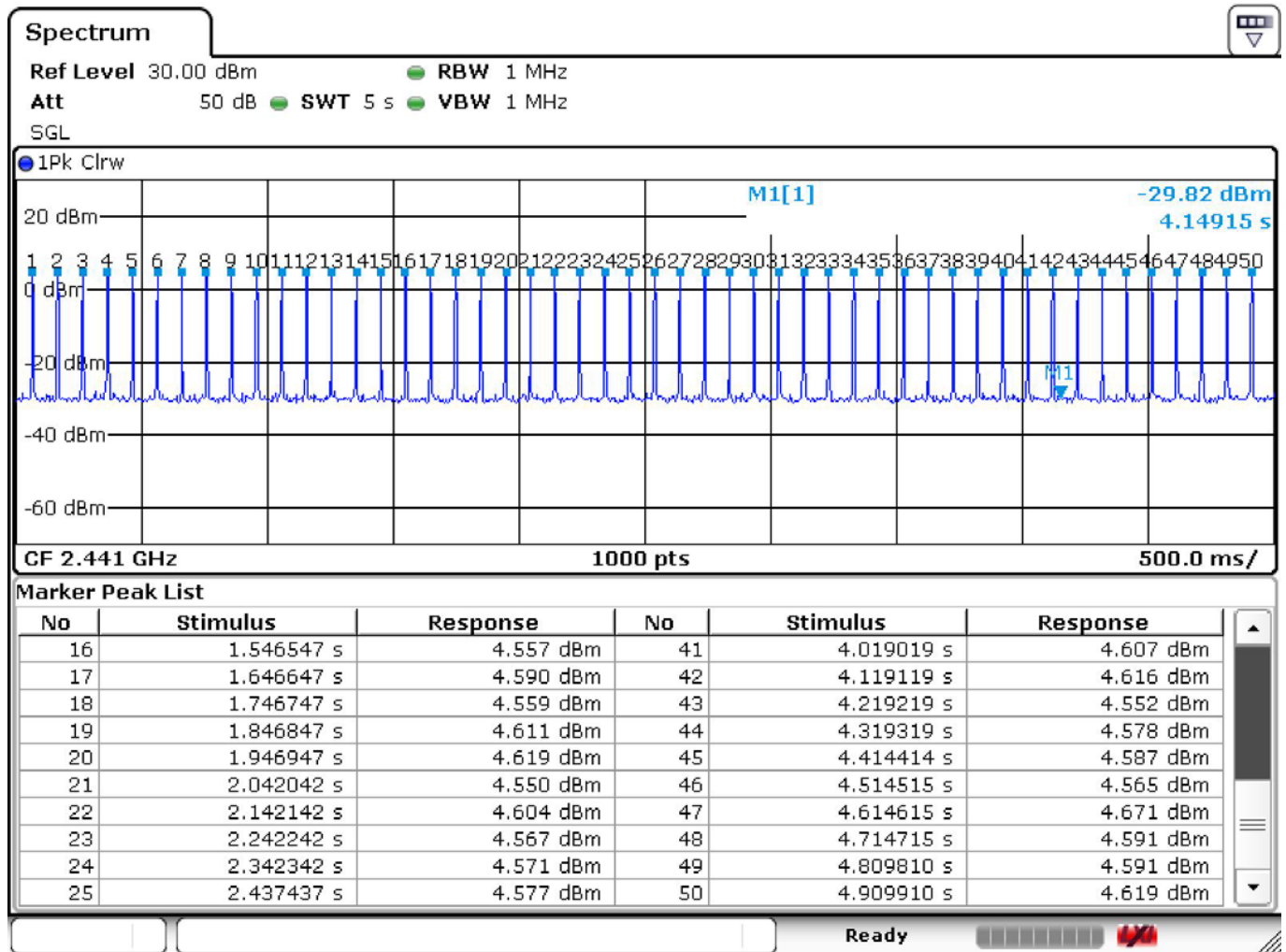
Ready



Test Mode : BT EDR (3 Mbps) DH1

Channel : 39

Number of Pulses Per 5 sec



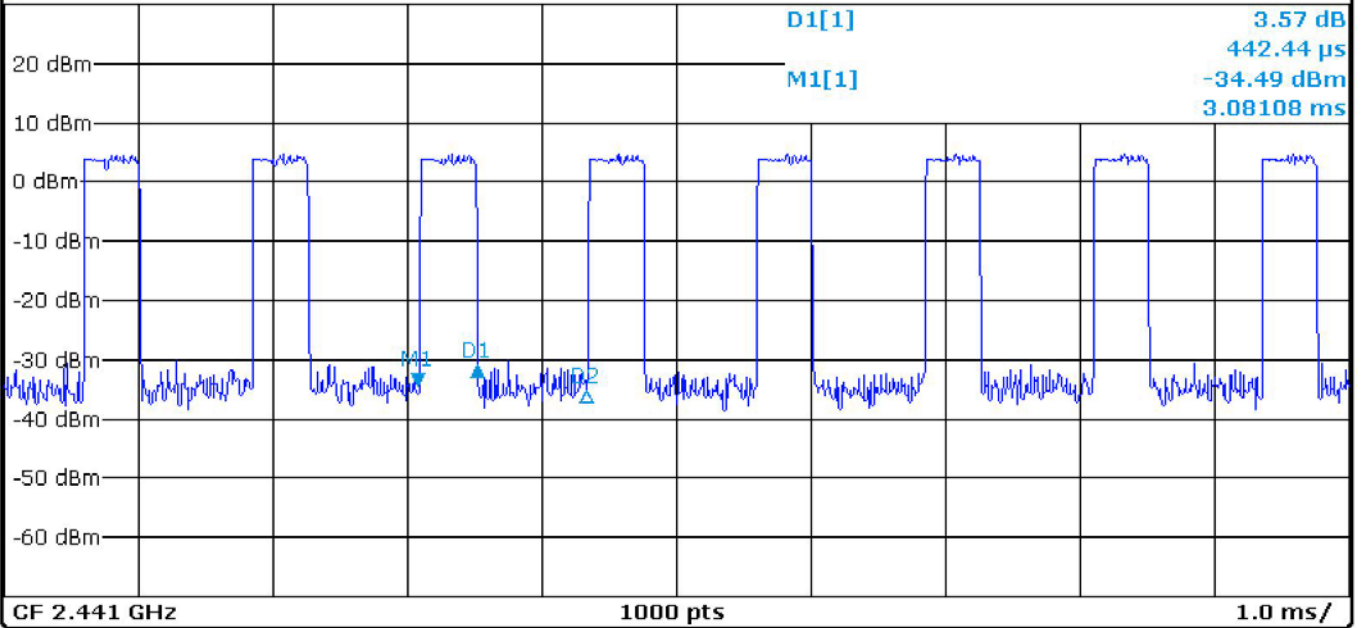
Pulse Width (sec)

Spectrum



Ref Level 30.00 dBm RBW 1 MHz
Att 50 dB SWT 10 ms VBW 1 MHz
SGL

1Pk Clrw



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	3.0811 ms	-34.49 dBm		
D1	M1	1	442.4 μs	3.57 dB		
D2	M1	1	1.2533 ms	-0.72 dB		

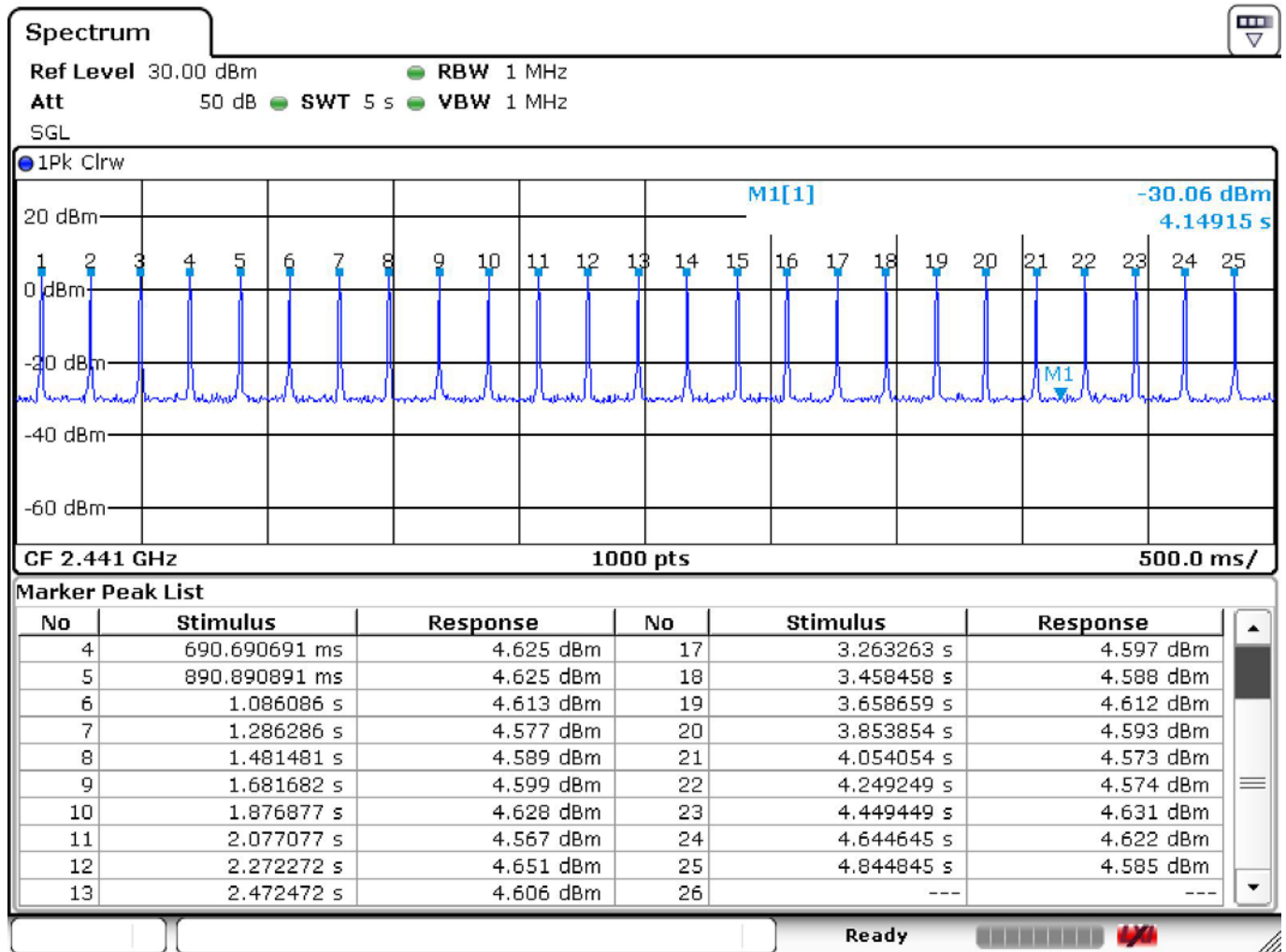
Ready



Test Mode : BT EDR (3 Mbps) DH3

Channel : 39

Number of Pulses Per 5 sec



Pulse Width (sec)

Spectrum

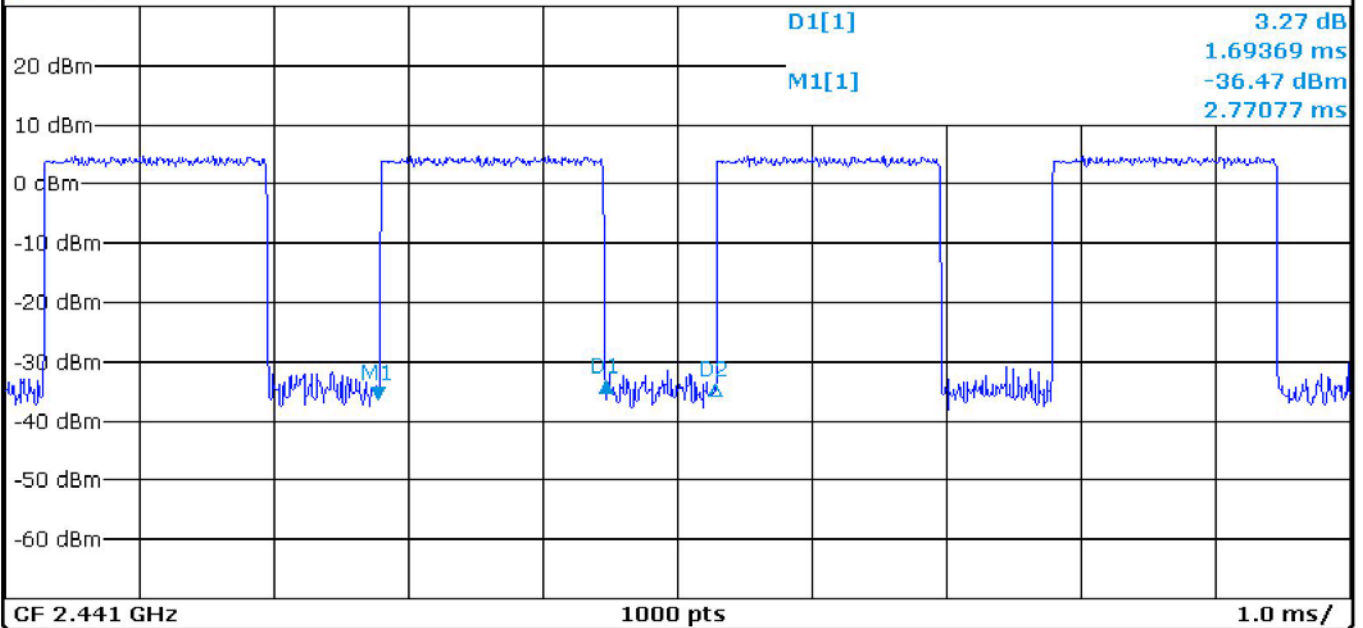


Ref Level 30.00 dBm RBW 1 MHz

Att 50 dB SWT 10 ms VBW 1 MHz

SGL

1Pk Clrw



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	2.7708 ms	-36.47 dBm		
D1	M1	1	1.6937 ms	3.27 dB		
D2	M1	1	2.5045 ms	2.76 dB		

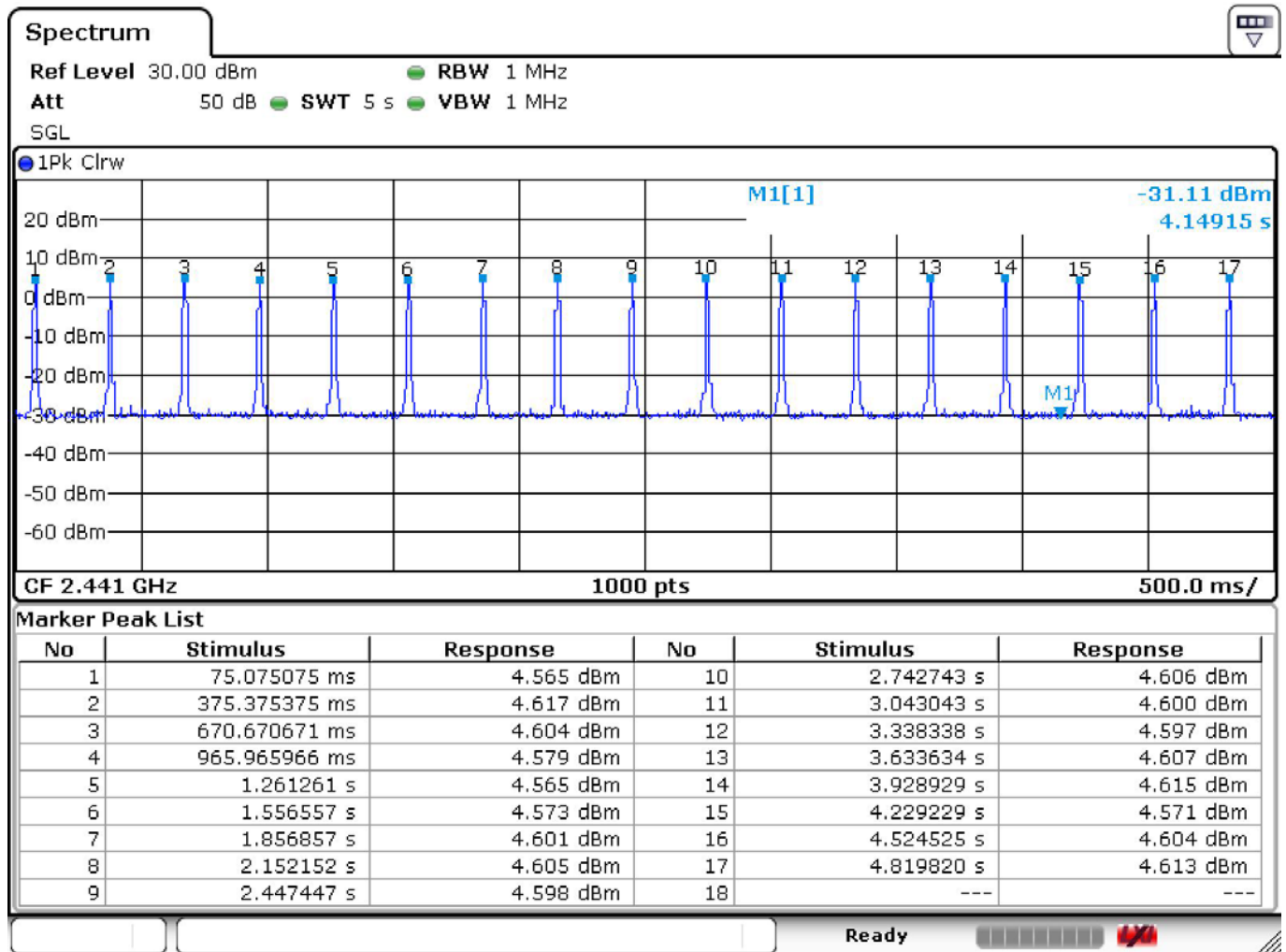
Ready



Test Mode : BT EDR (3 Mbps) DH5

Channel : 39

Number of Pulses Per 5 sec



Pulse Width (sec)

Spectrum

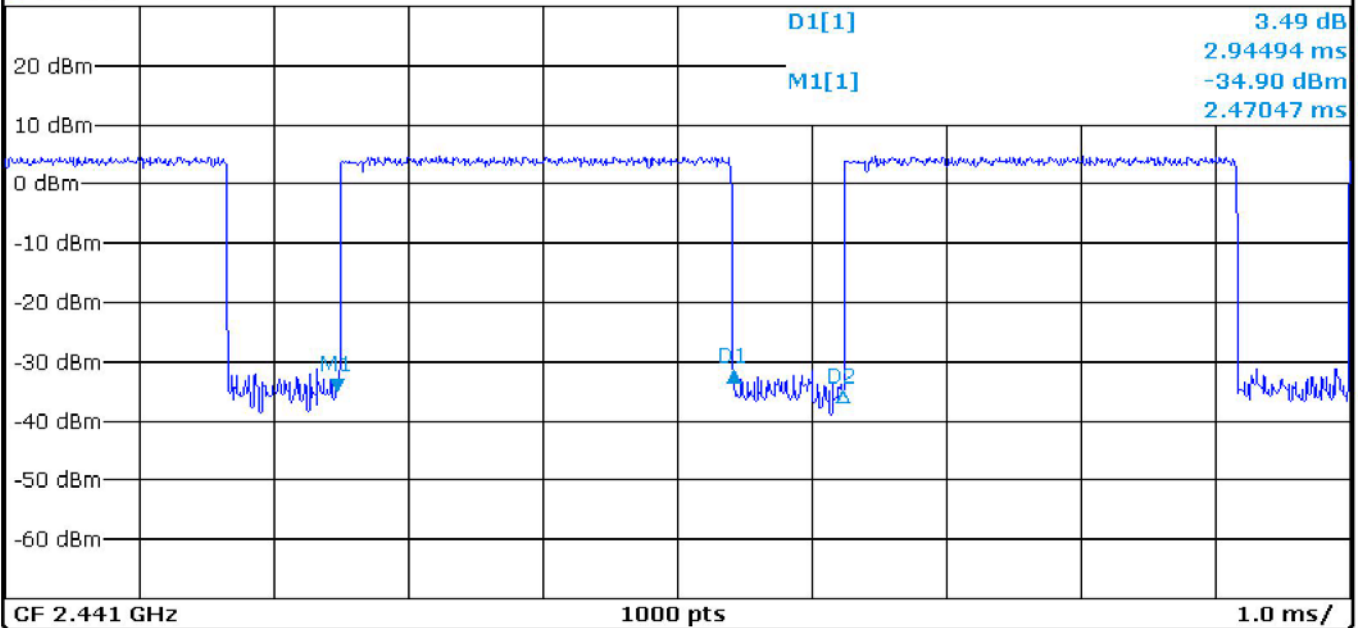


Ref Level 30.00 dBm RBW 1 MHz

Att 50 dB SWT 10 ms VBW 1 MHz

SGL

1Pk Clrw



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	2.4705 ms	-34.90 dBm		
D1	M1	1	2.9449 ms	3.49 dB		
D2	M1	1	3.7558 ms	0.01 dB		

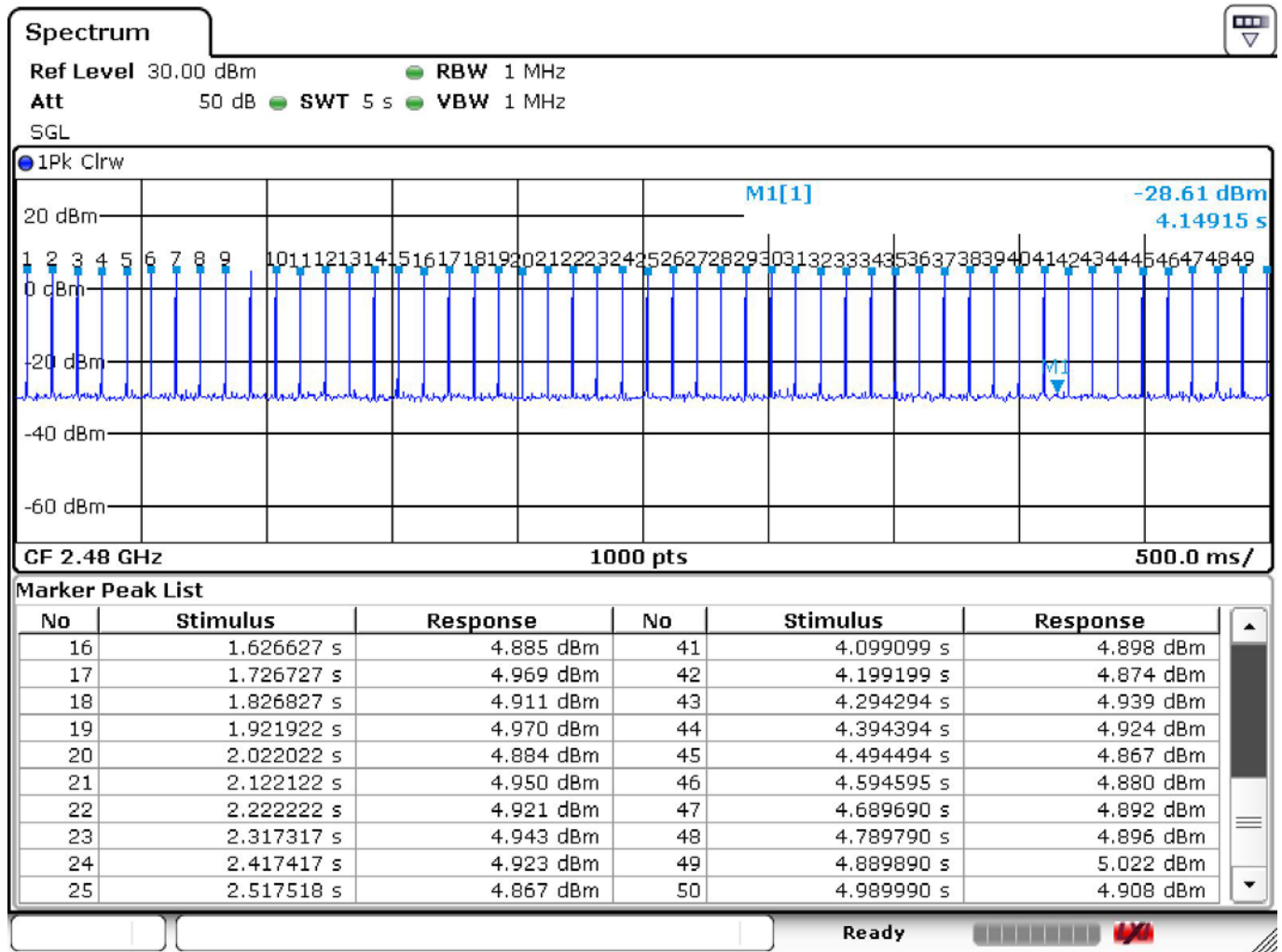
Ready



Test Mode : BT EDR (3 Mbps) DH1

Channel : 78

Number of Pulses Per 5 sec



Pulse Width (sec)

Spectrum

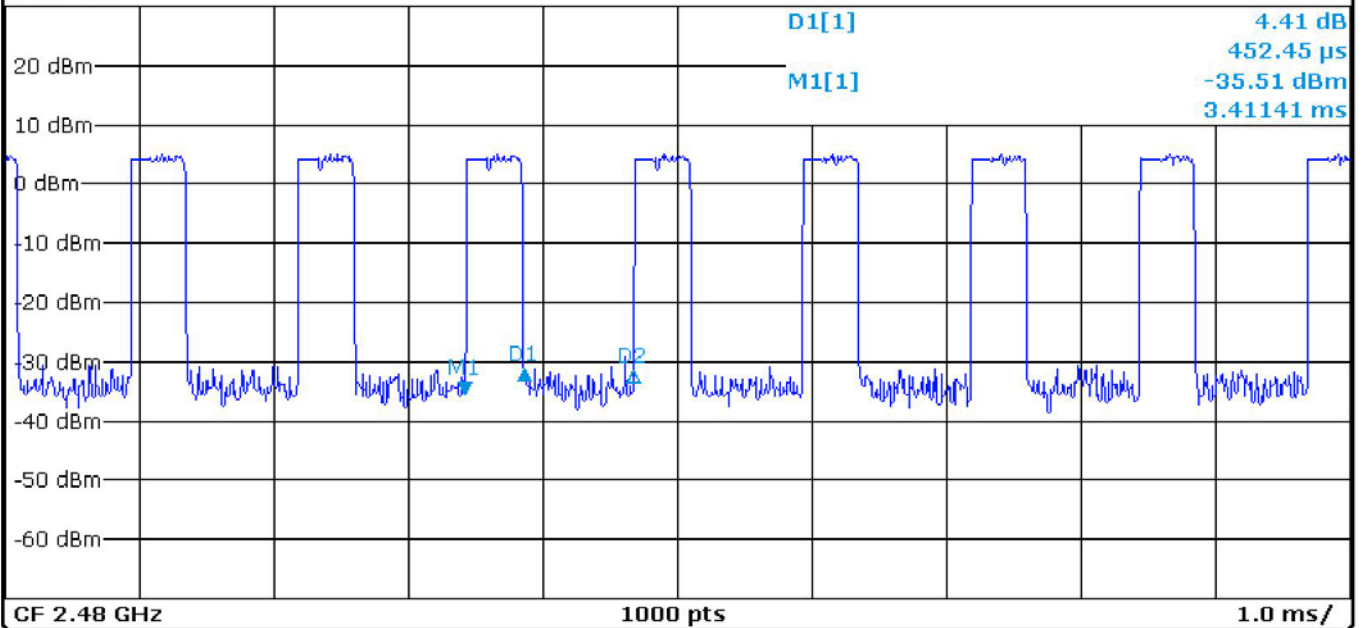


Ref Level 30.00 dBm RBW 1 MHz

Att 50 dB SWT 10 ms VBW 1 MHz

SGL

1Pk Clrw



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	3.4114 ms	-35.51 dBm		
D1	M1	1	452.5 μs	4.41 dB		
D2	M1	1	1.2533 ms	4.09 dB		

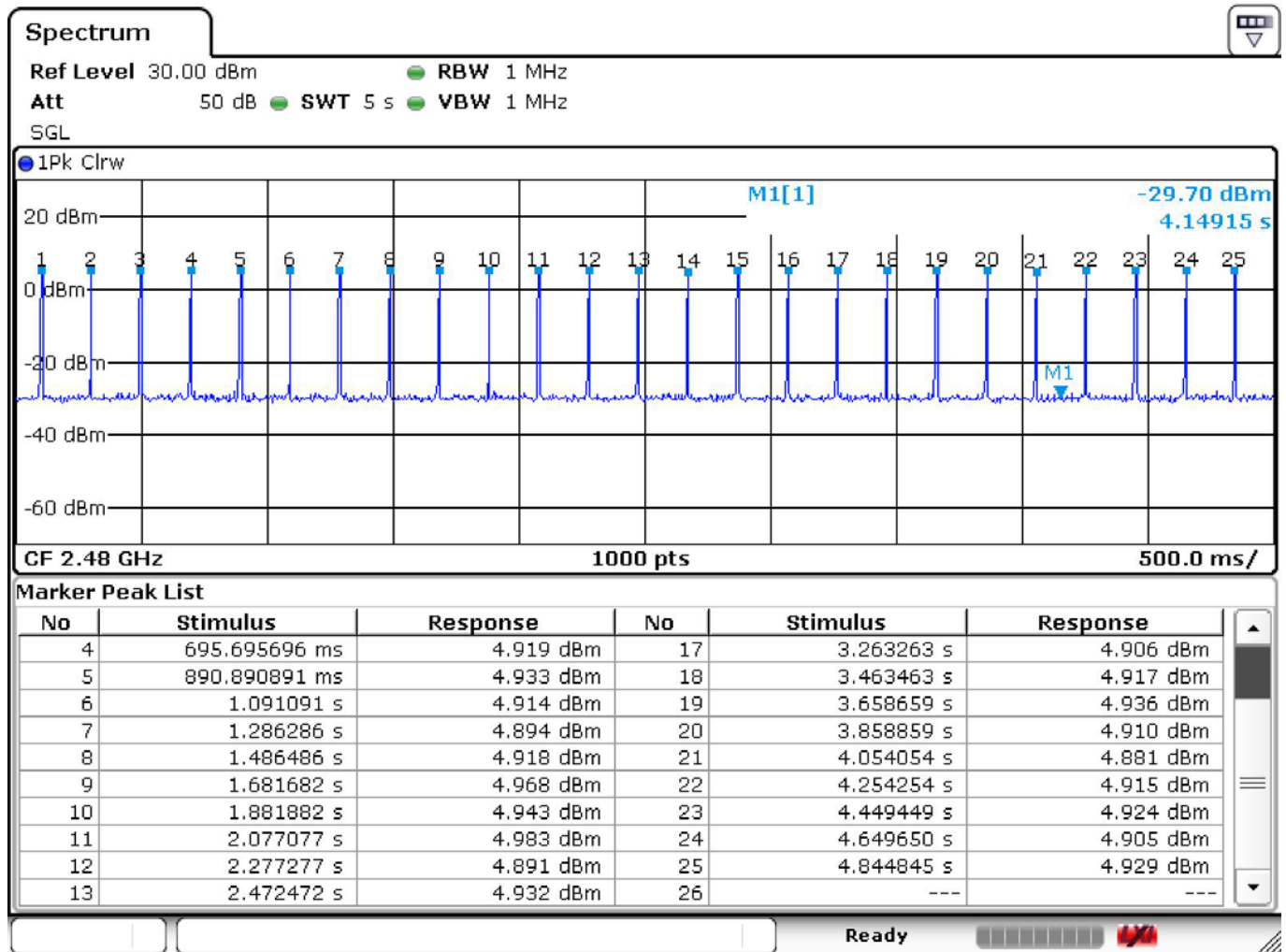
Ready



Test Mode : BT EDR (3 Mbps) DH3

Channel : 78

Number of Pulses Per 5 sec



Pulse Width (sec)

Spectrum

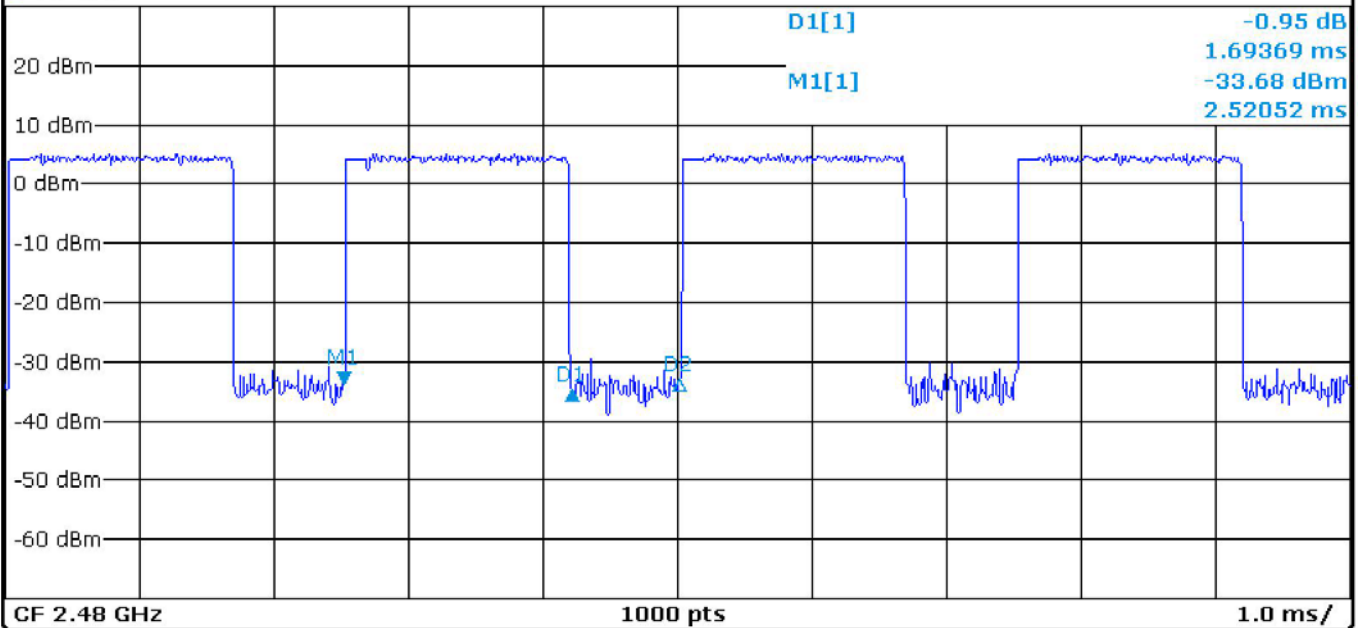


Ref Level 30.00 dBm RBW 1 MHz

Att 50 dB SWT 10 ms VBW 1 MHz

SGL

1Pk Clrw



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	2.5205 ms	-33.68 dBm		
D1	M1	1	1.6937 ms	-0.95 dB		
D2	M1	1	2.4945 ms	0.64 dB		

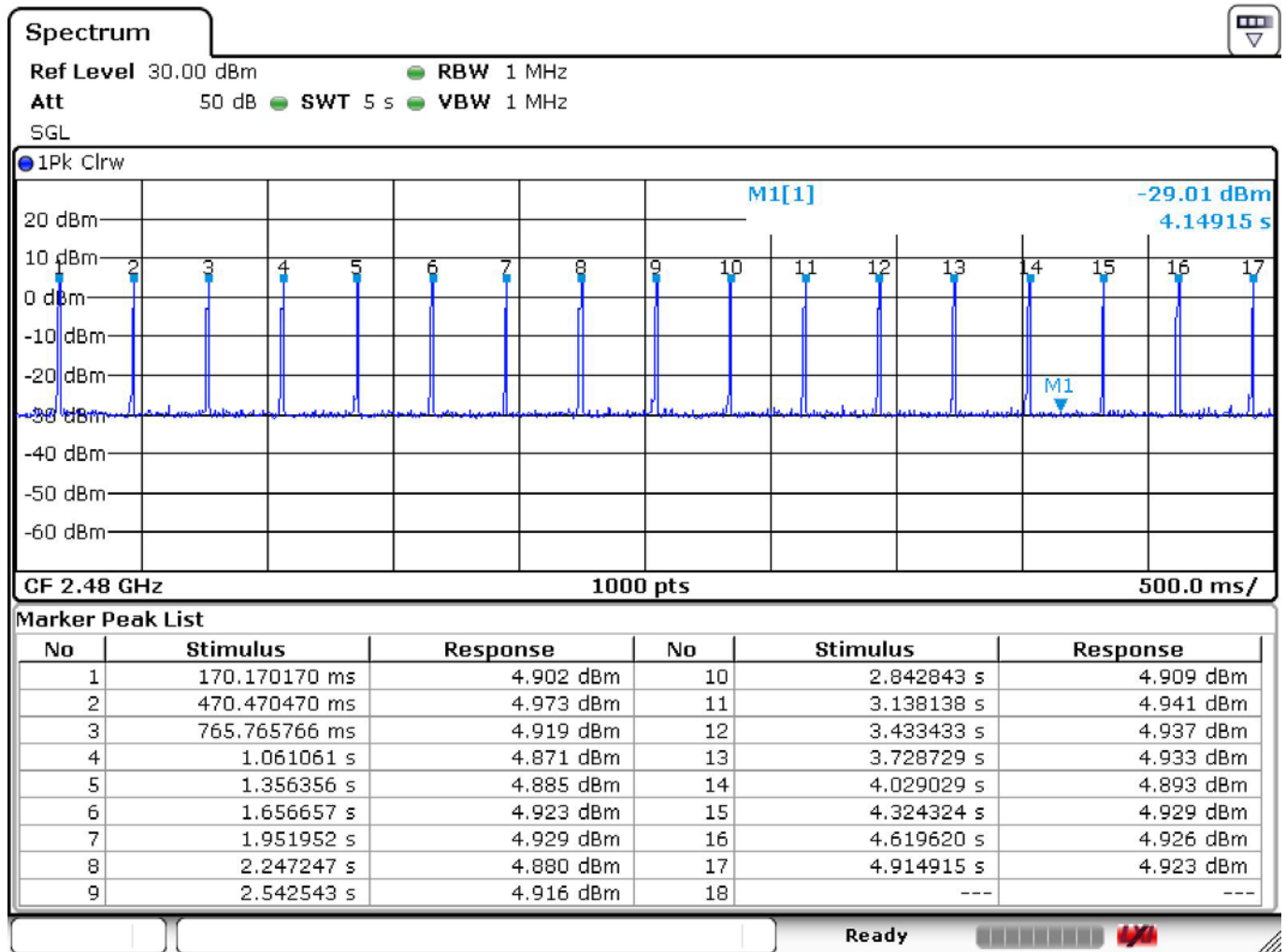
Ready



Test Mode : BT EDR (3 Mbps) DH5

Channel : 78

Number of Pulses Per 5 sec



Pulse Width (sec)

Spectrum

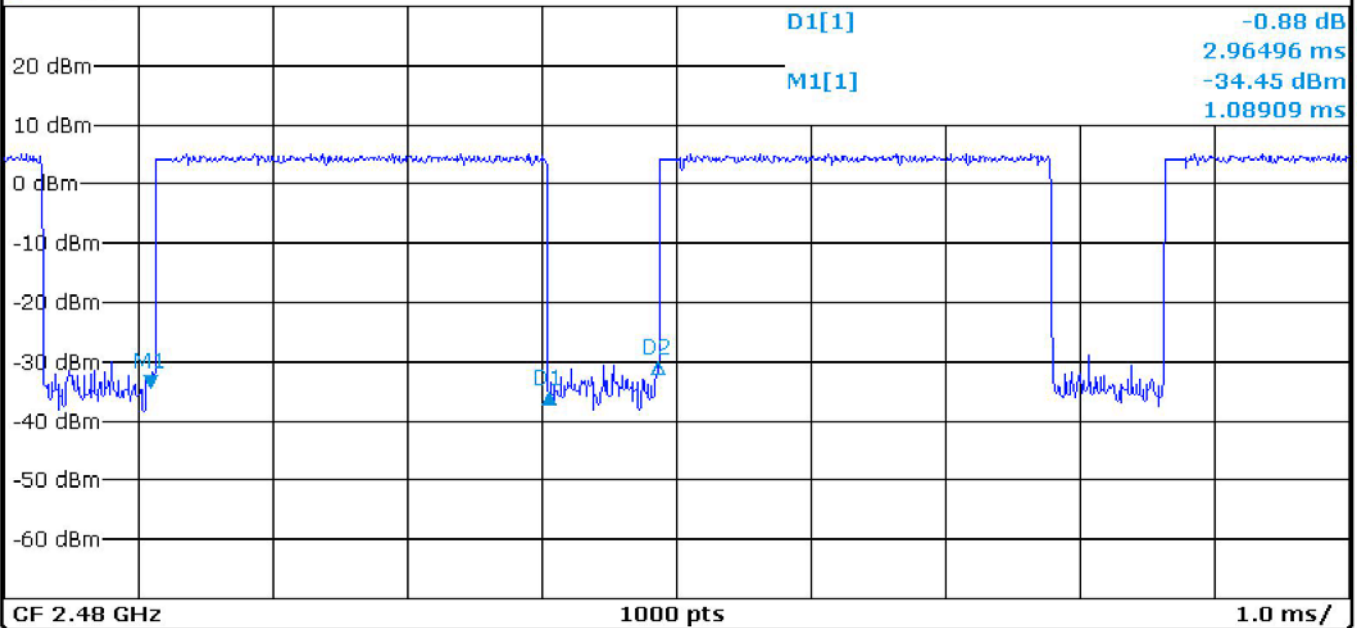


Ref Level 30.00 dBm RBW 1 MHz

Att 50 dB SWT 10 ms VBW 1 MHz

SGL

1Pk Clrw



Marker

Type	Ref	Trc	Stimulus	Response	Function	Function Result
M1		1	1.0891 ms	-34.45 dBm		
D1	M1	1	2.965 ms	-0.88 dB		
D2	M1	1	3.7758 ms	4.31 dB		

Ready

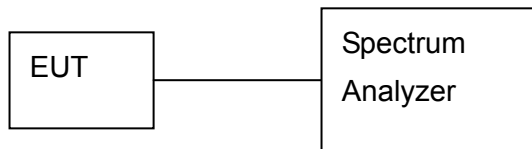


8 Peak Output Power

8.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

8.2 Test Arrangement and Procedure



1. The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).
2. The RBW is set to 3MHz and VBW is set to 3MHz. Span set to 5MHz.
3. Max Hold..

8.3 Limit (§ 15.247(b))

15.247(b) - The maximum peak conducted output power of the intentional radiator shall not exceed the following:

15.247(b)(1) - For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

15.247(b)(4) - The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 3 dBi, therefore, the limit is 30 dBm.

8.4 Test Result

Compliance.

The final test data are shown on the following page(s).

The Test Graphics of the worst case, BT (1 Mbps), have been selected to show on the following page(s).

Bluetooth 1 Mbps

Channel	Frequency (MHz)	Result (dBm)	Limit (dBm)
00	2402	4.53	30
39	2441	4.54	30
78	2480	4.69	30

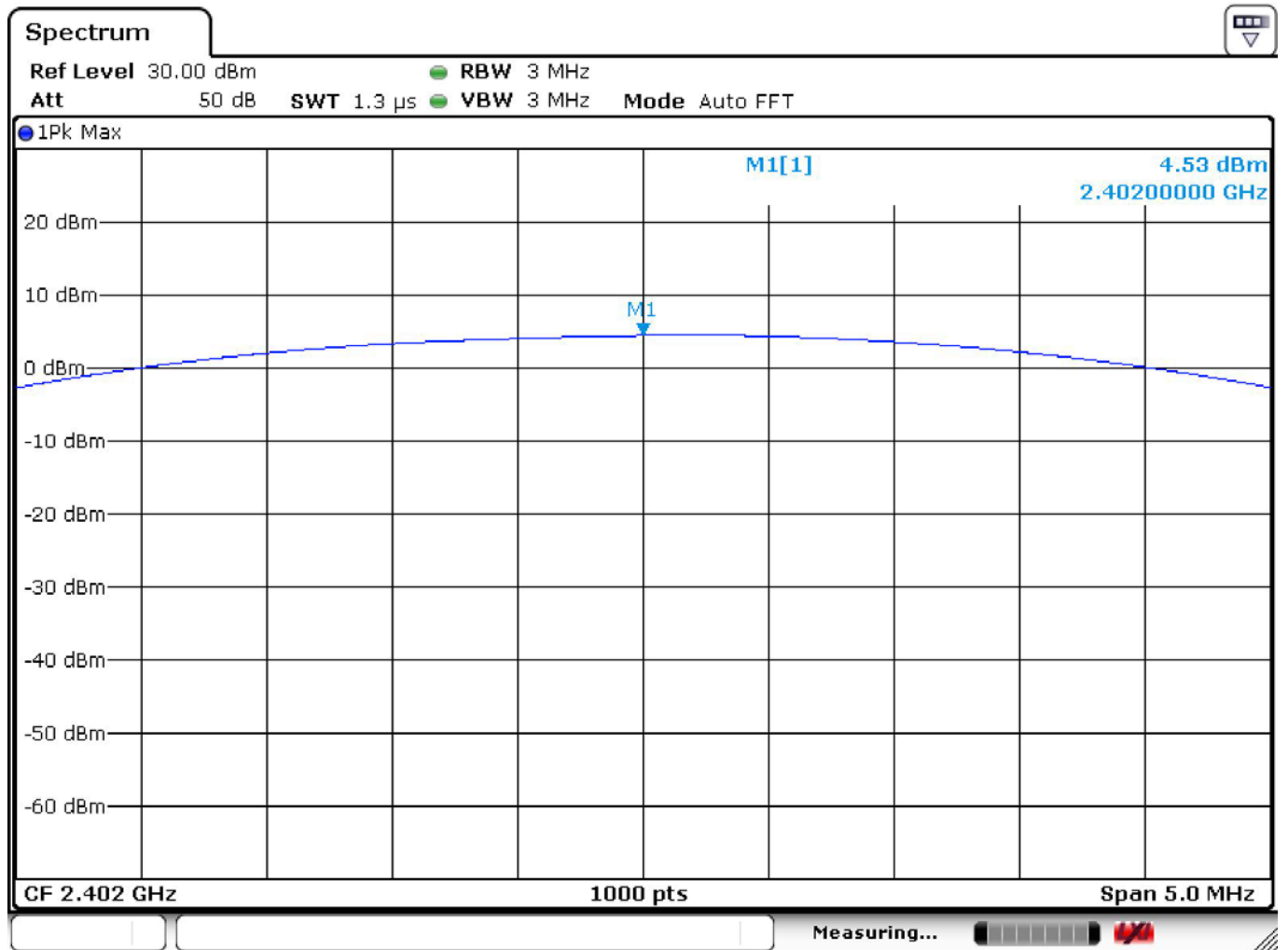
Bluetooth 2 Mbps

Channel	Frequency (MHz)	Result (dBm)	Limit (dBm)
00	2402	4.12	30
39	2441	4.05	30
78	2480	4.56	30

Bluetooth 3 Mbps

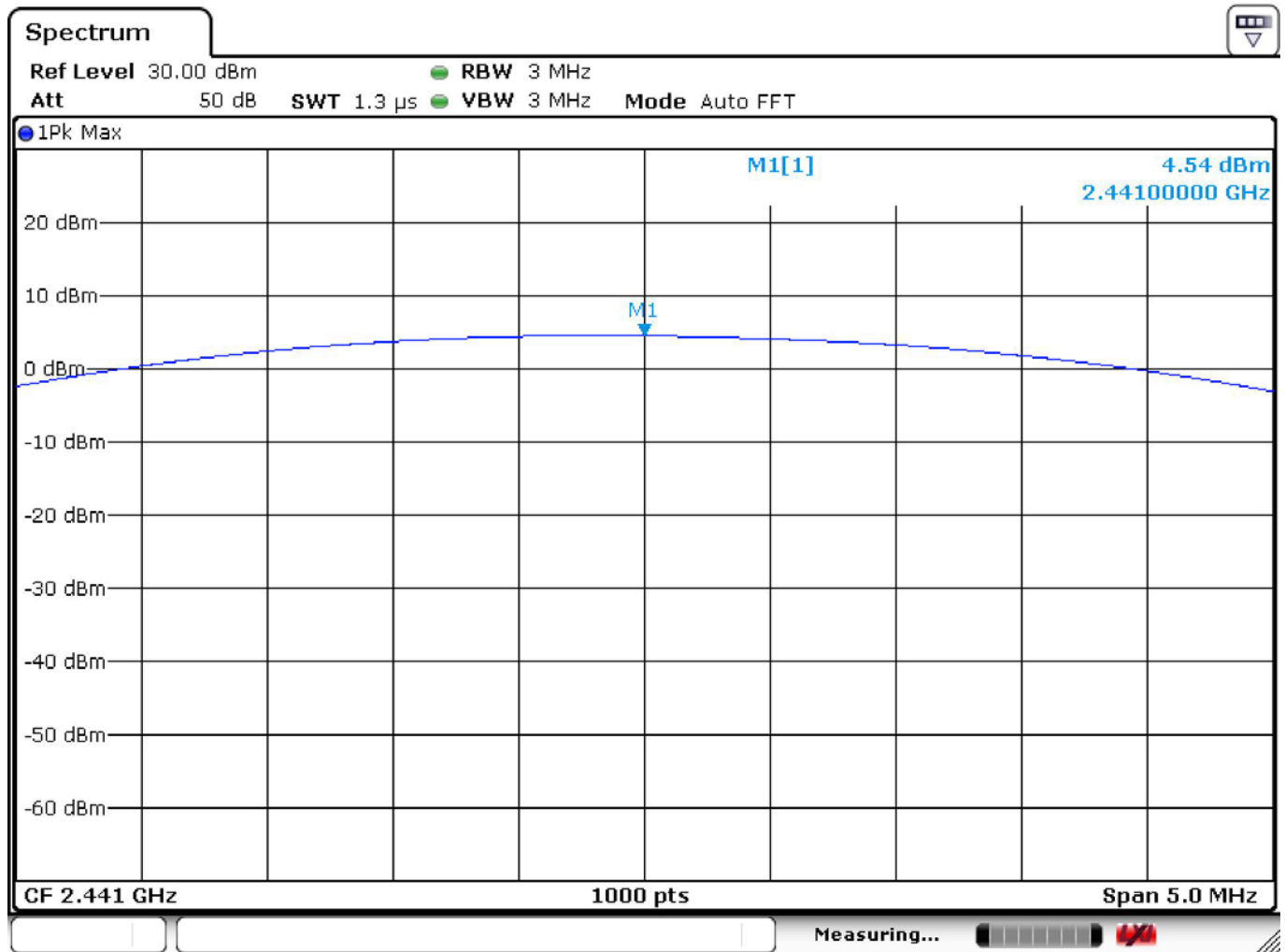
Channel	Frequency (MHz)	Result (dBm)	Limit (dBm)
00	2402	4.39	30
39	2441	4.31	30
78	2480	4.41	30

Temperature	: 24.4°C	Humidity	: 49%
Test Date	: 21-Nov-2016	Tested by	: Eason Hsieh
Test Mode	: BT (1Mbps)	Channel	: 00



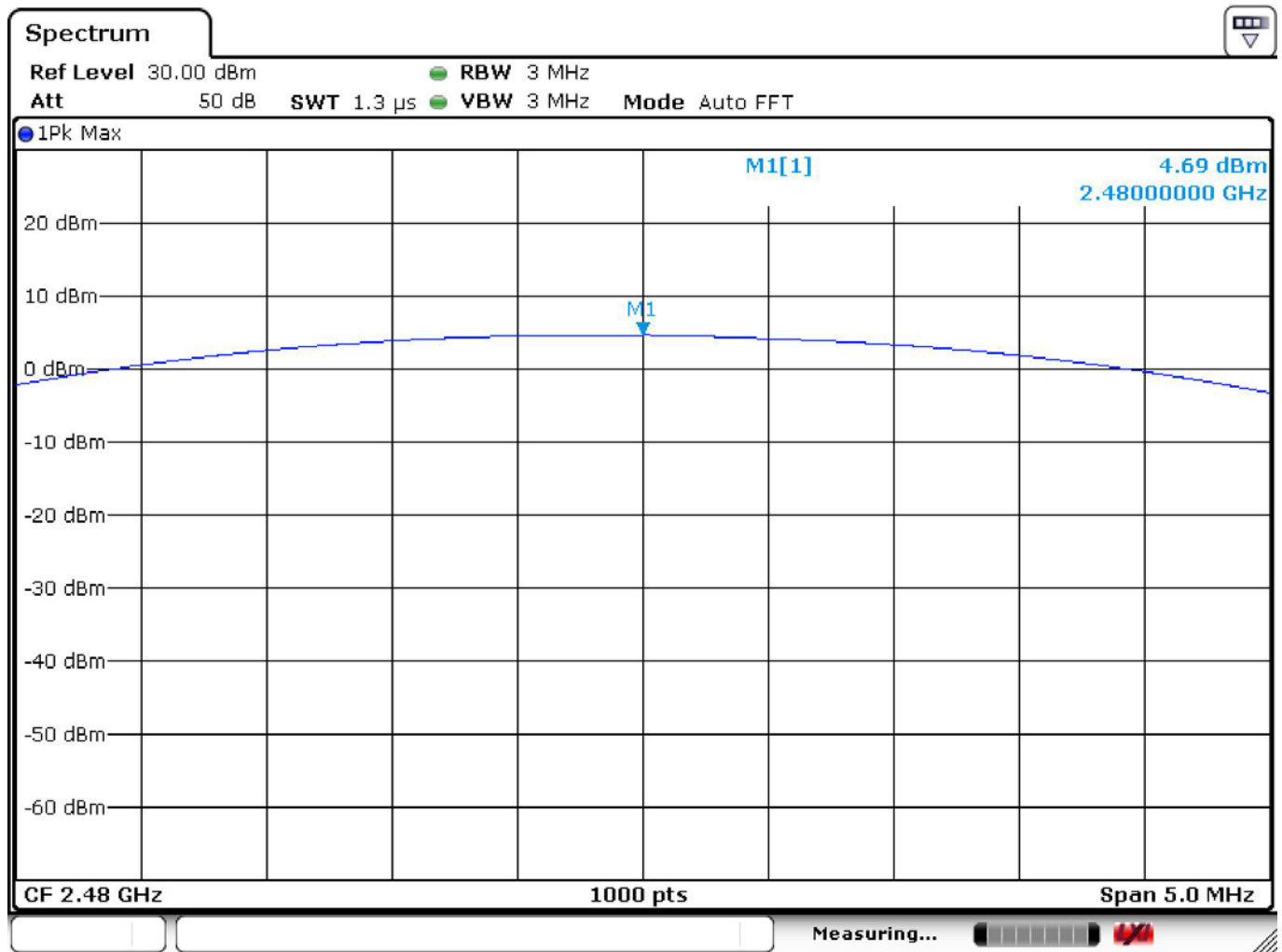
Test Mode : BT (1Mbps)

Channel : 39



Test Mode : BT (1 Mbps)

Channel : 78



Temperature : 24.4°C

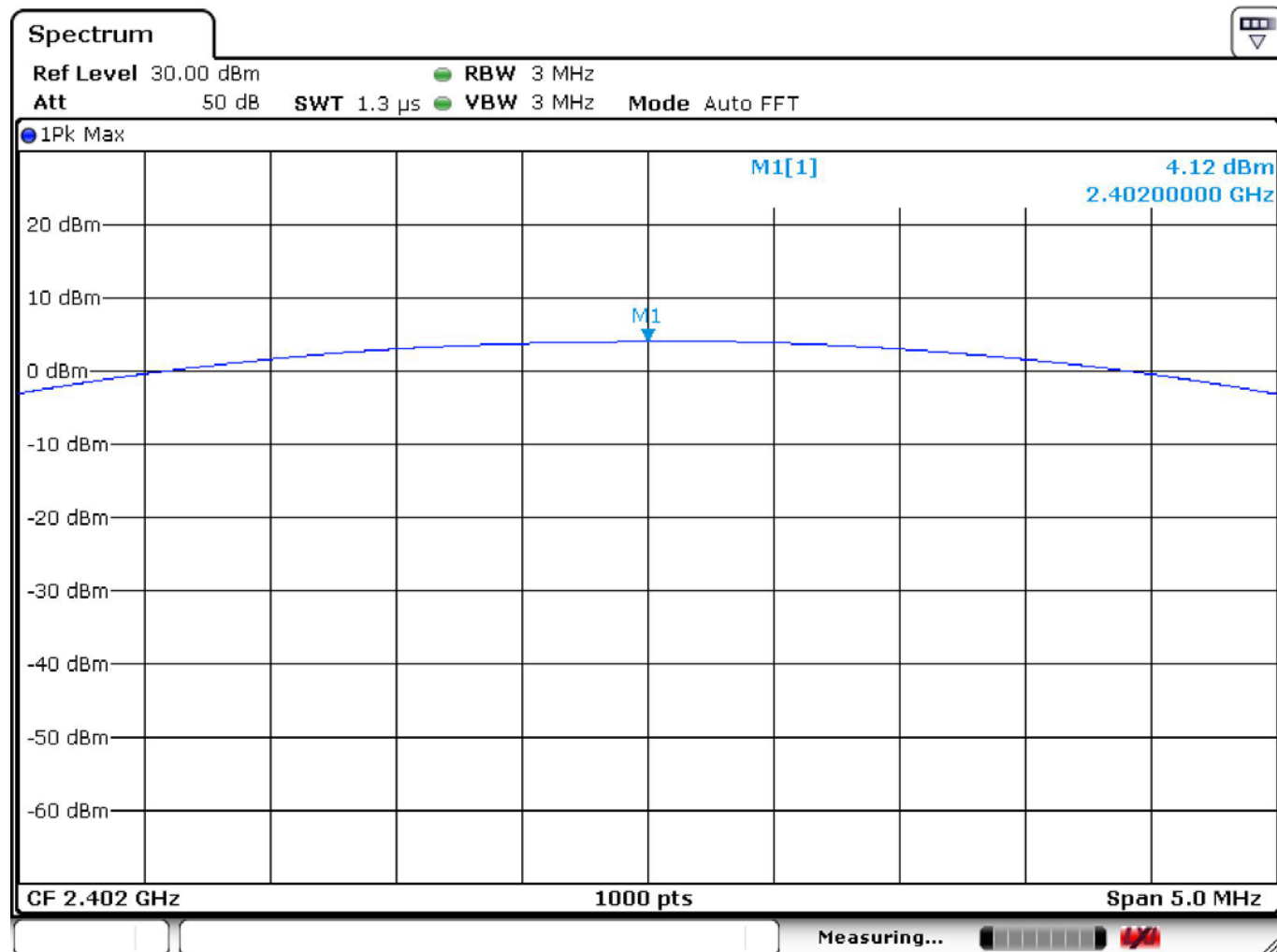
Humidity : 49%

Test Date : 21-Nov-2016

Tested by : Eason Hsieh

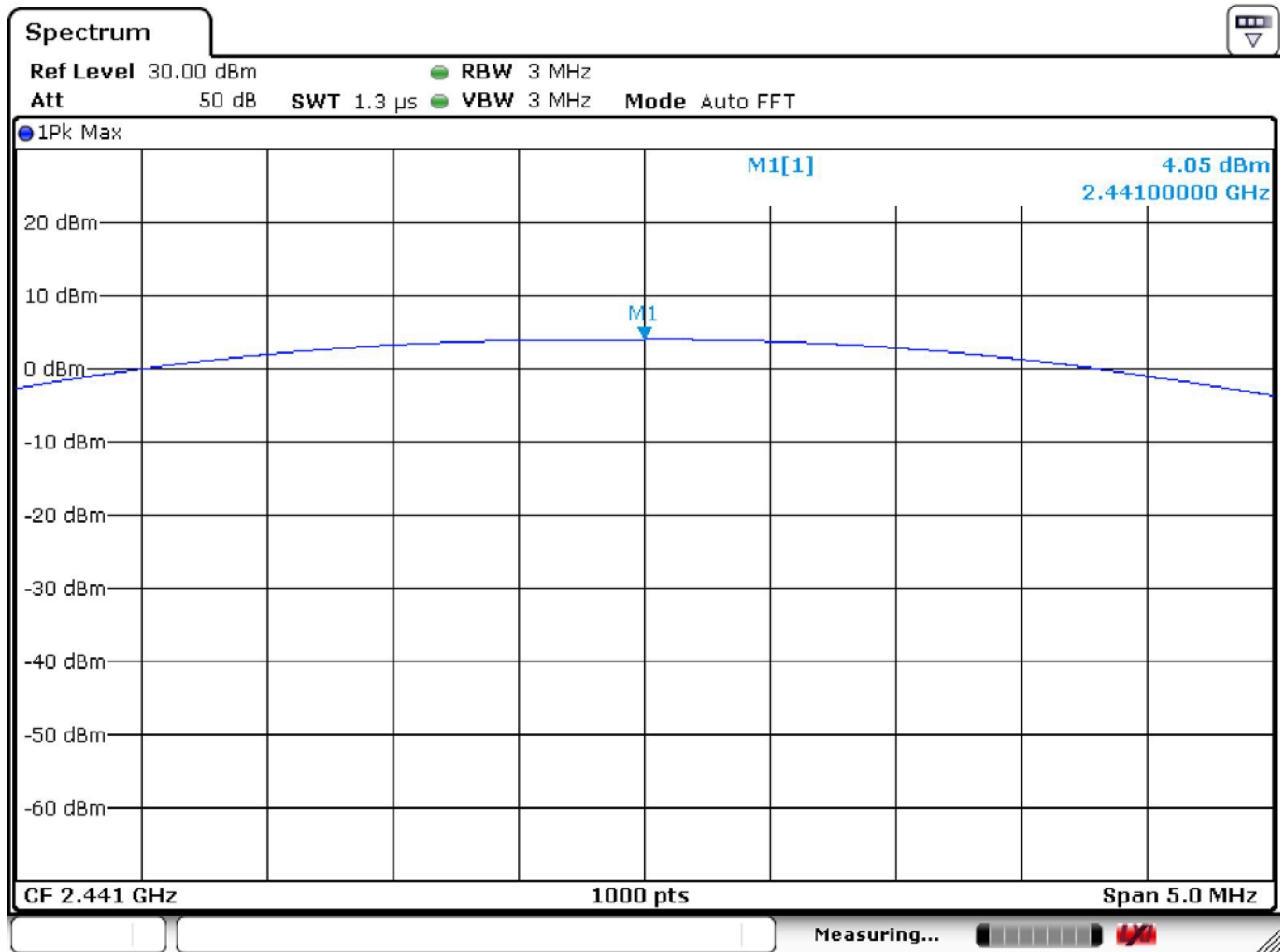
Test Mode : BT (2Mbps)

Channel : 00



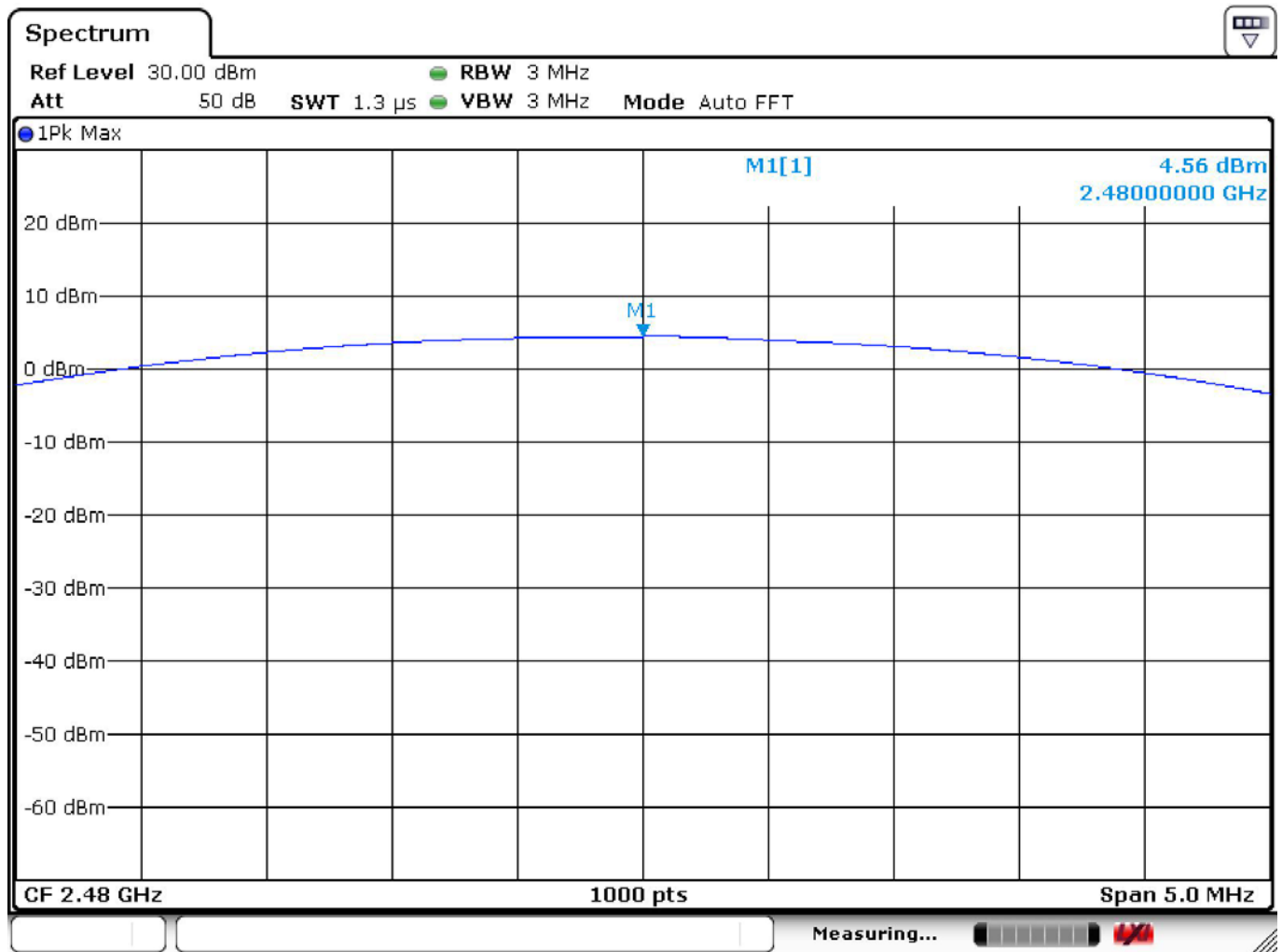
Test Mode : BT (2Mbps)

Channel : 39

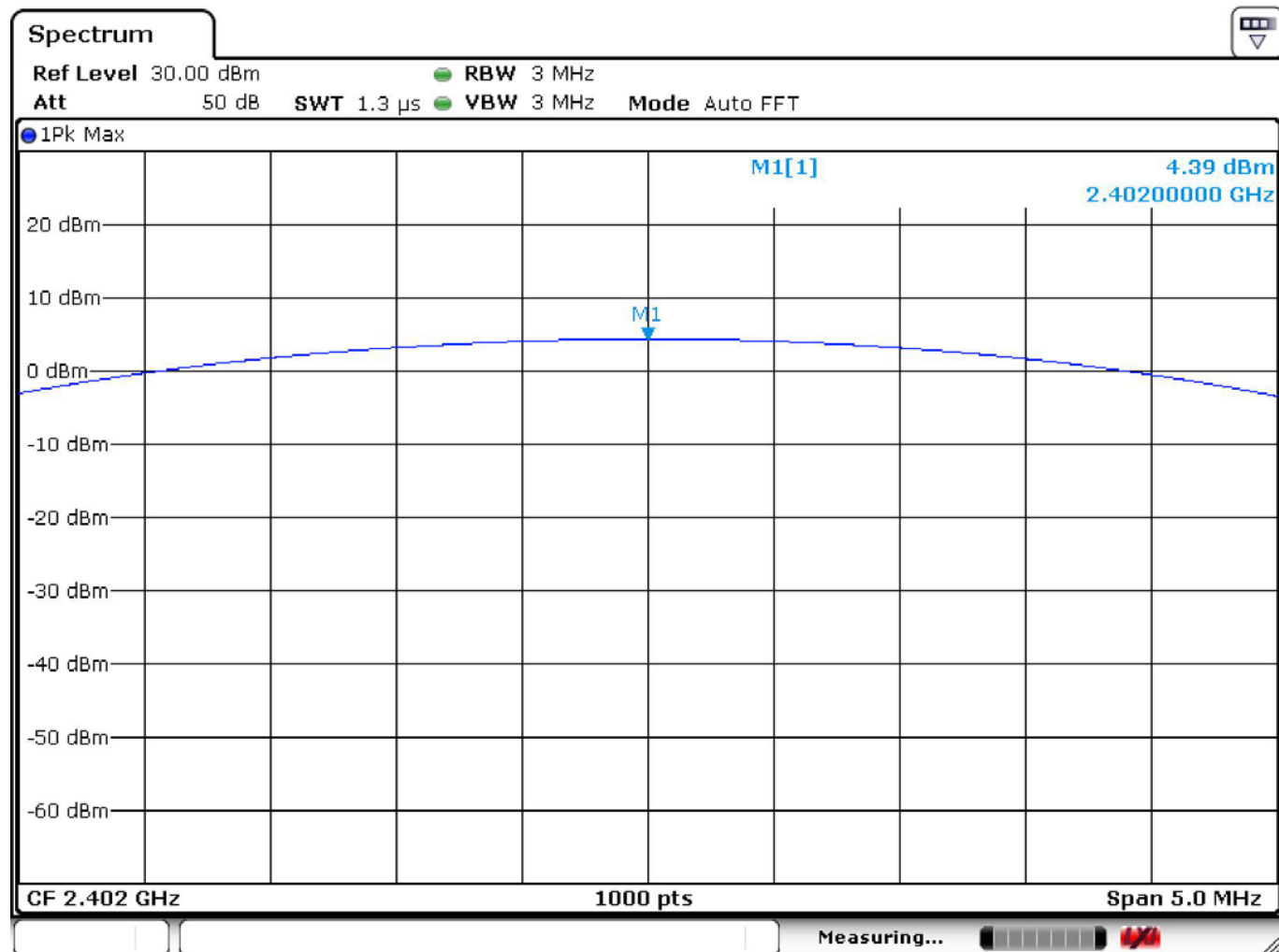


Test Mode : BT (2 Mbps)

Channel : 78

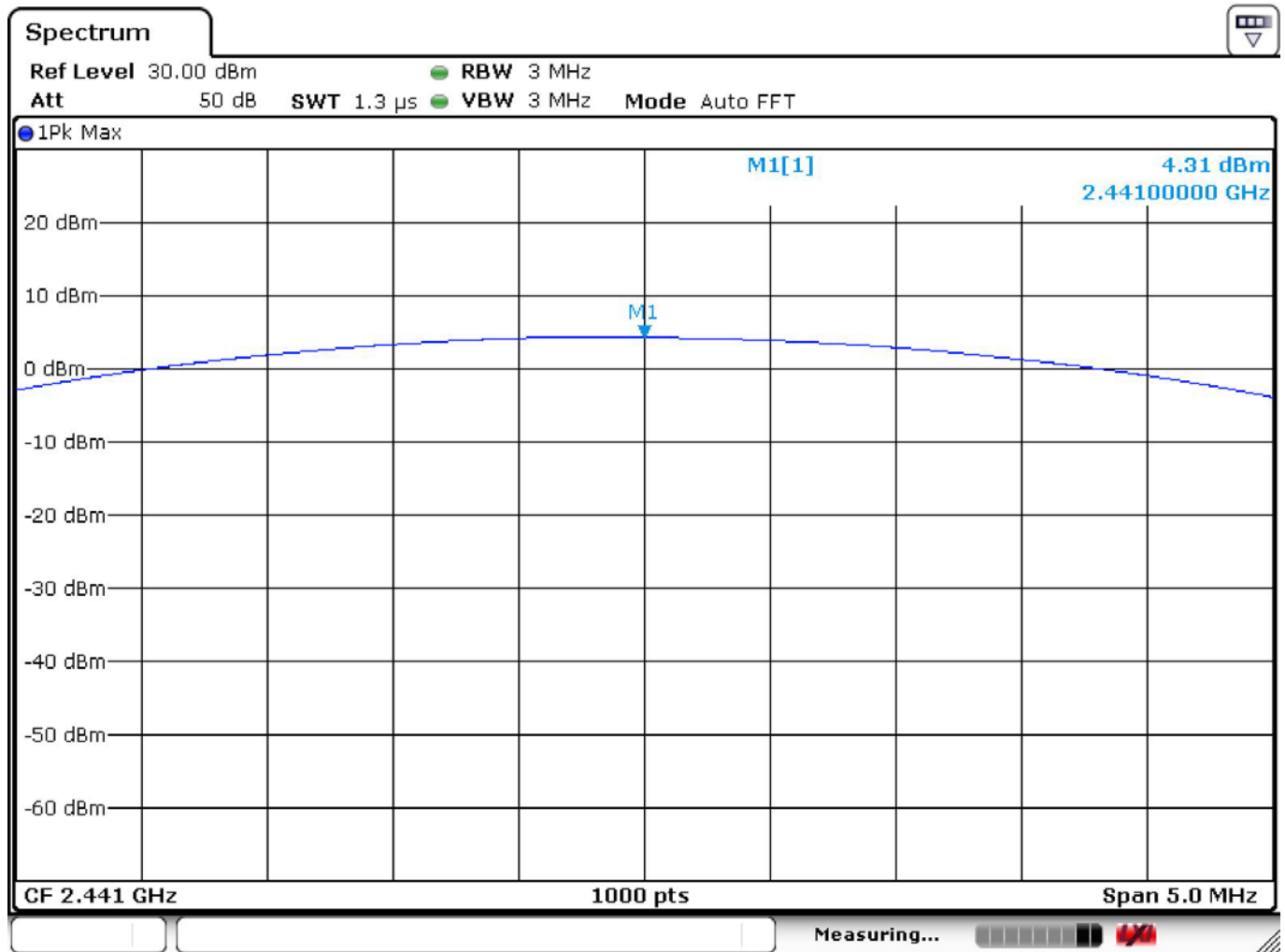


Temperature	: 24.4°C	Humidity	: 49%
Test Date	: 21-Nov-2016	Tested by	: Eason Hsieh
Test Mode	: BT (3Mbps)	Channel	: 00



Test Mode : BT (3Mbps)

Channel : 39



Test Mode : BT (3 Mbps)

Channel : 78

