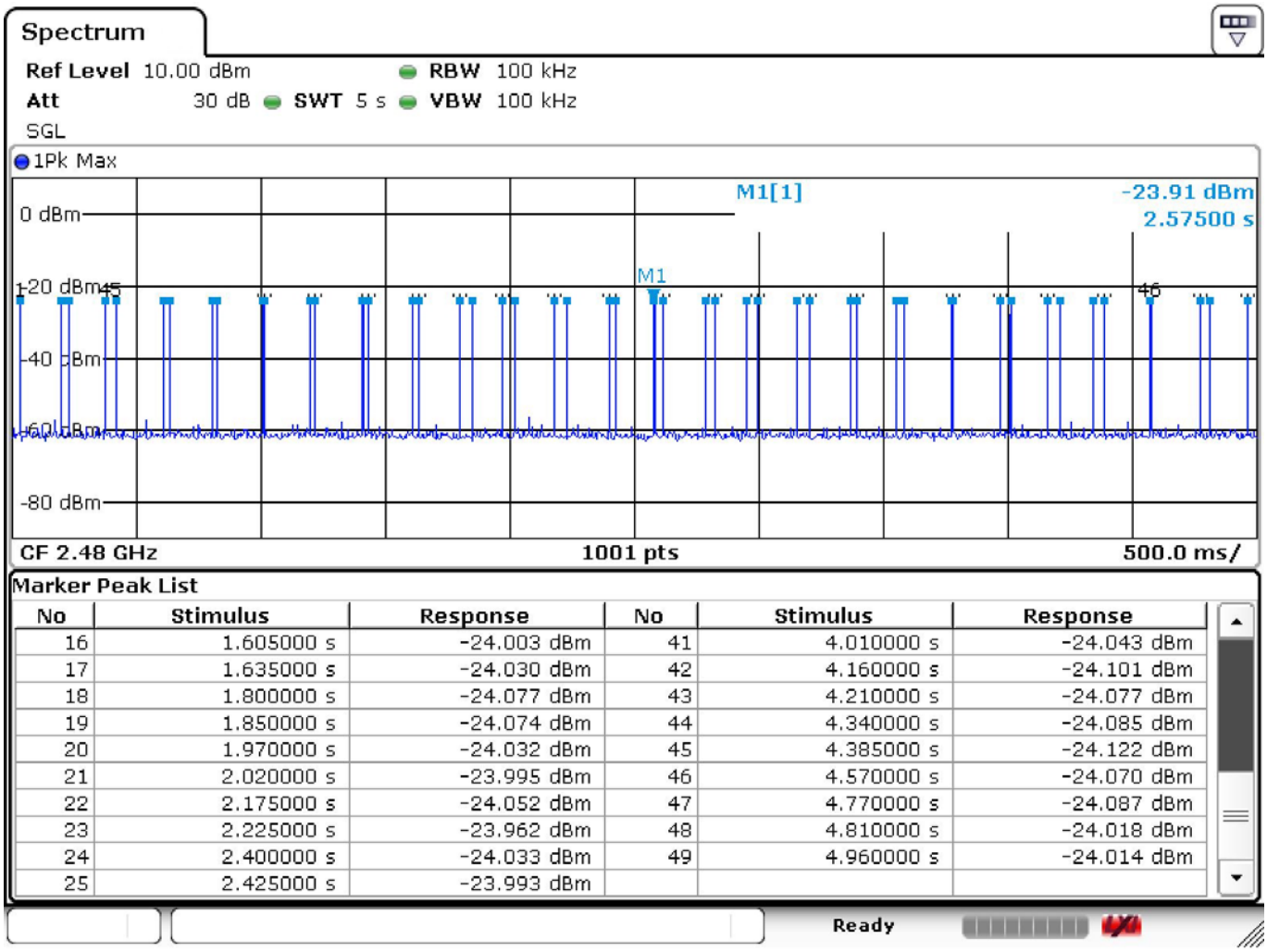
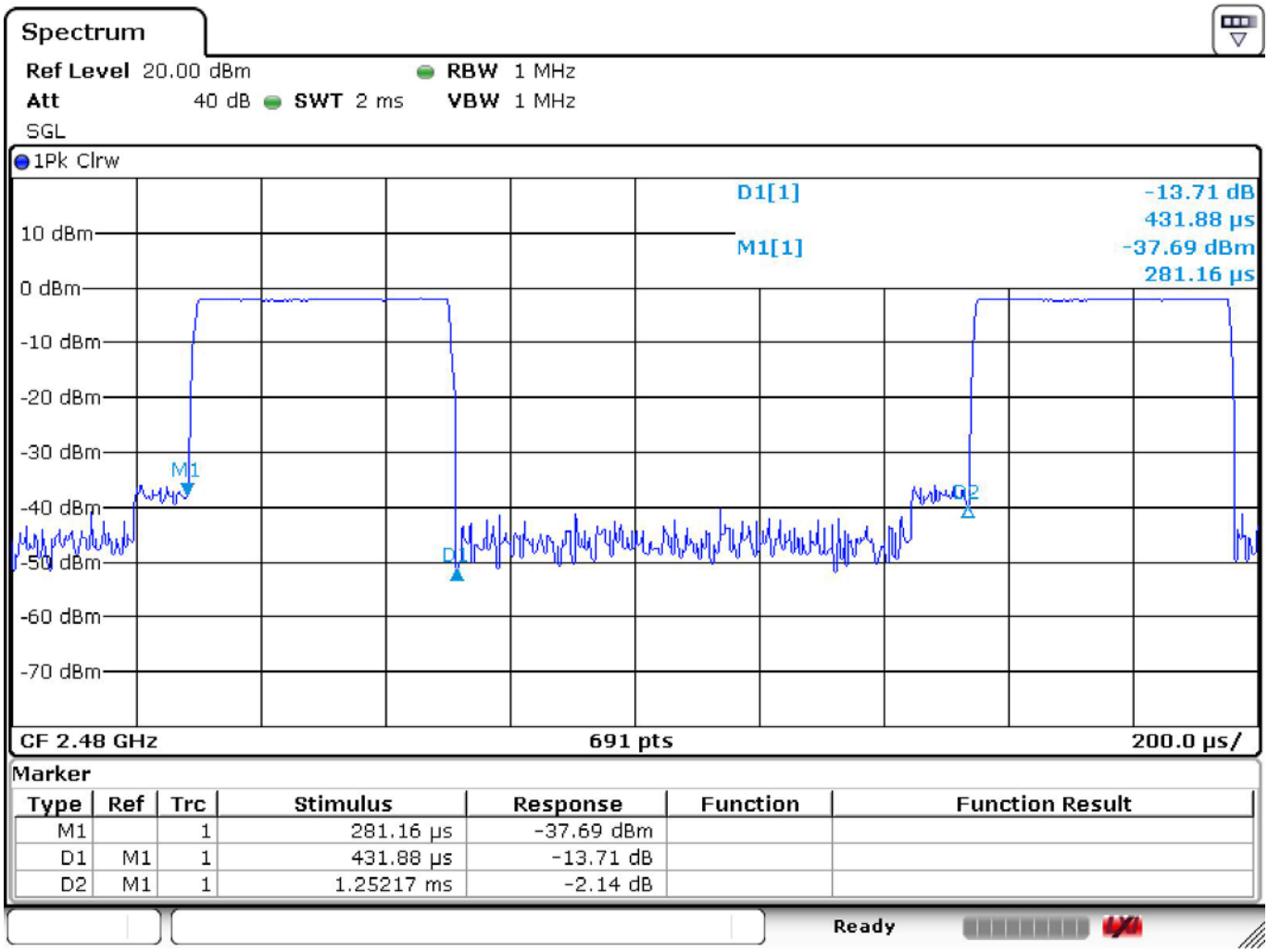
Test Mode : BT (1 Mbps) DH1 Channel : 78

Number of Pulses Per 5 sec



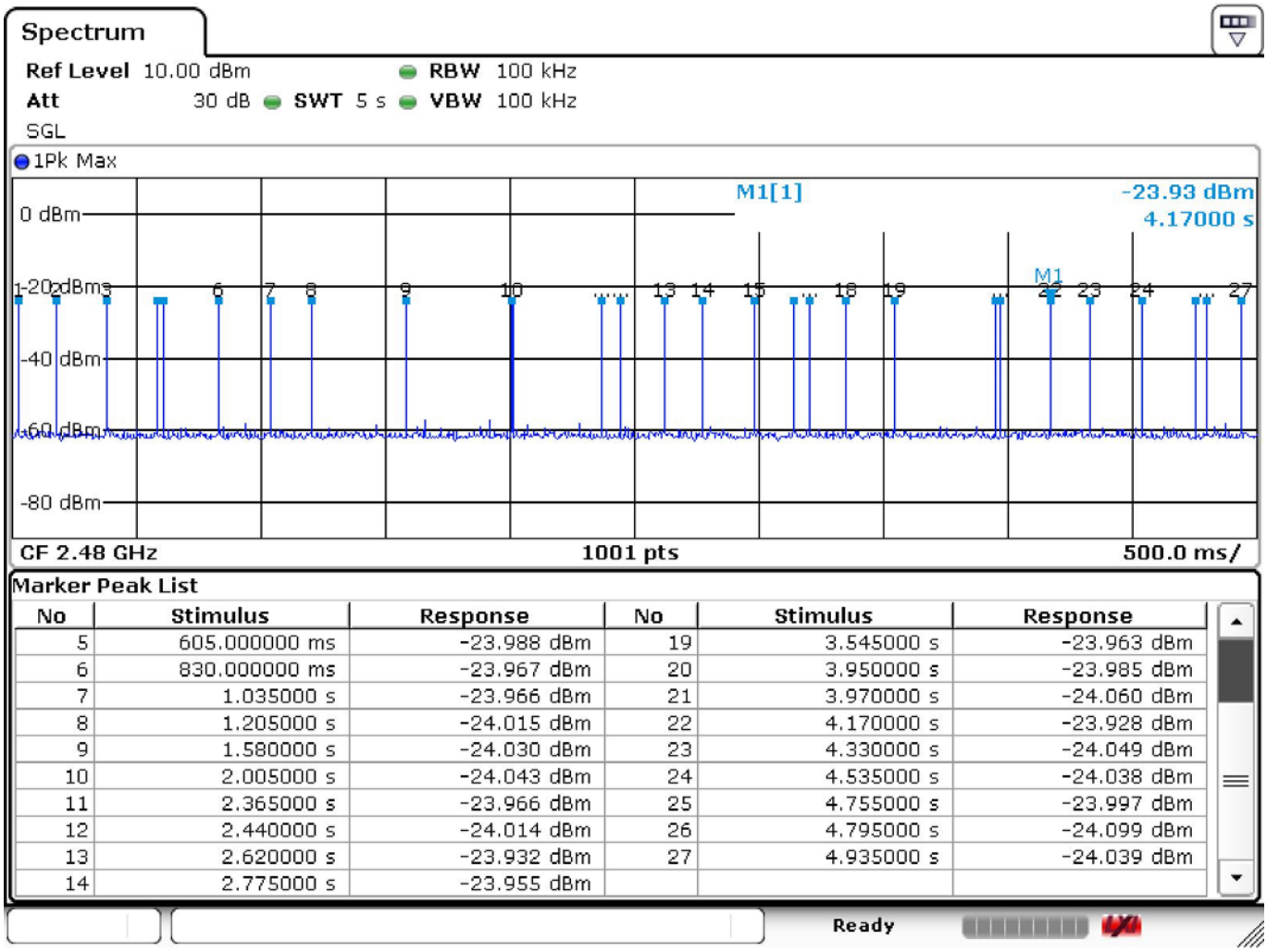
No	Stimulus	Response	No	Stimulus	Response
16	1.605000 s	-24.003 dBm	41	4.010000 s	-24.043 dBm
17	1.635000 s	-24.030 dBm	42	4.160000 s	-24.101 dBm
18	1.800000 s	-24.077 dBm	43	4.210000 s	-24.077 dBm
19	1.850000 s	-24.074 dBm	44	4.340000 s	-24.085 dBm
20	1.970000 s	-24.032 dBm	45	4.385000 s	-24.122 dBm
21	2.020000 s	-23.995 dBm	46	4.570000 s	-24.070 dBm
22	2.175000 s	-24.052 dBm	47	4.770000 s	-24.087 dBm
23	2.225000 s	-23.962 dBm	48	4.810000 s	-24.018 dBm
24	2.400000 s	-24.033 dBm	49	4.960000 s	-24.014 dBm
25	2.425000 s	-23.993 dBm			

Pulse Width (sec)


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 40 dB
SWT 2 ms
VBW 1 MHz
SGL
1Pk Clrw
D1[1]
-13.71 dB
431.88 µs
M1[1]
-37.69 dBm
281.16 µs
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
D1
D2
CF 2.48 GHz
691 pts
200.0 µs/
Marker
Type Ref Trc Stimulus Response Function Function Result
M1 1 281.16 µs -37.69 dBm
D1 M1 1 431.88 µs -13.71 dB
D2 M1 1 1.25217 ms -2.14 dB
Ready

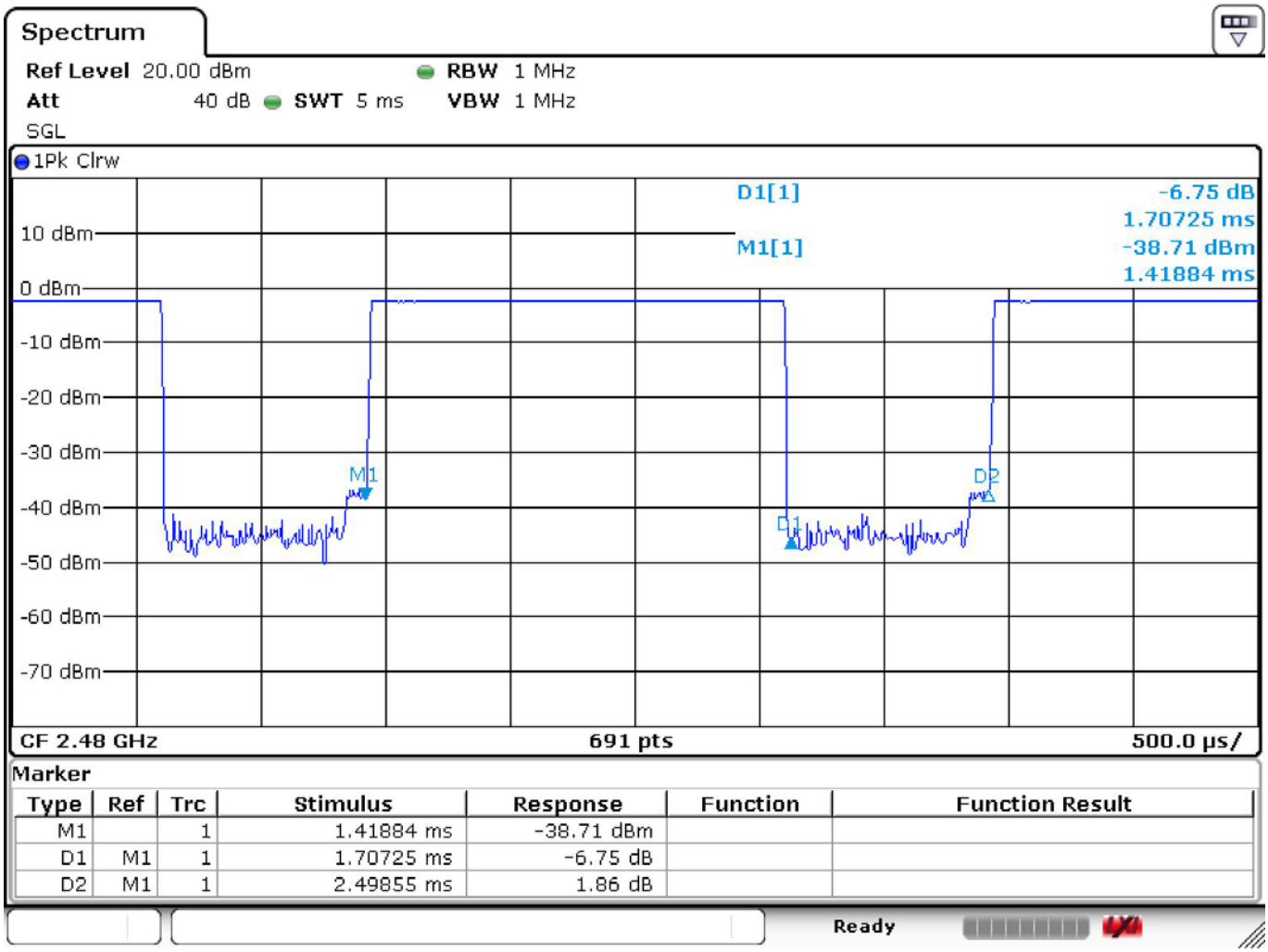
Test Mode : BT (1 Mbps) DH3 Channel : 78

Number of Pulses Per 5 sec



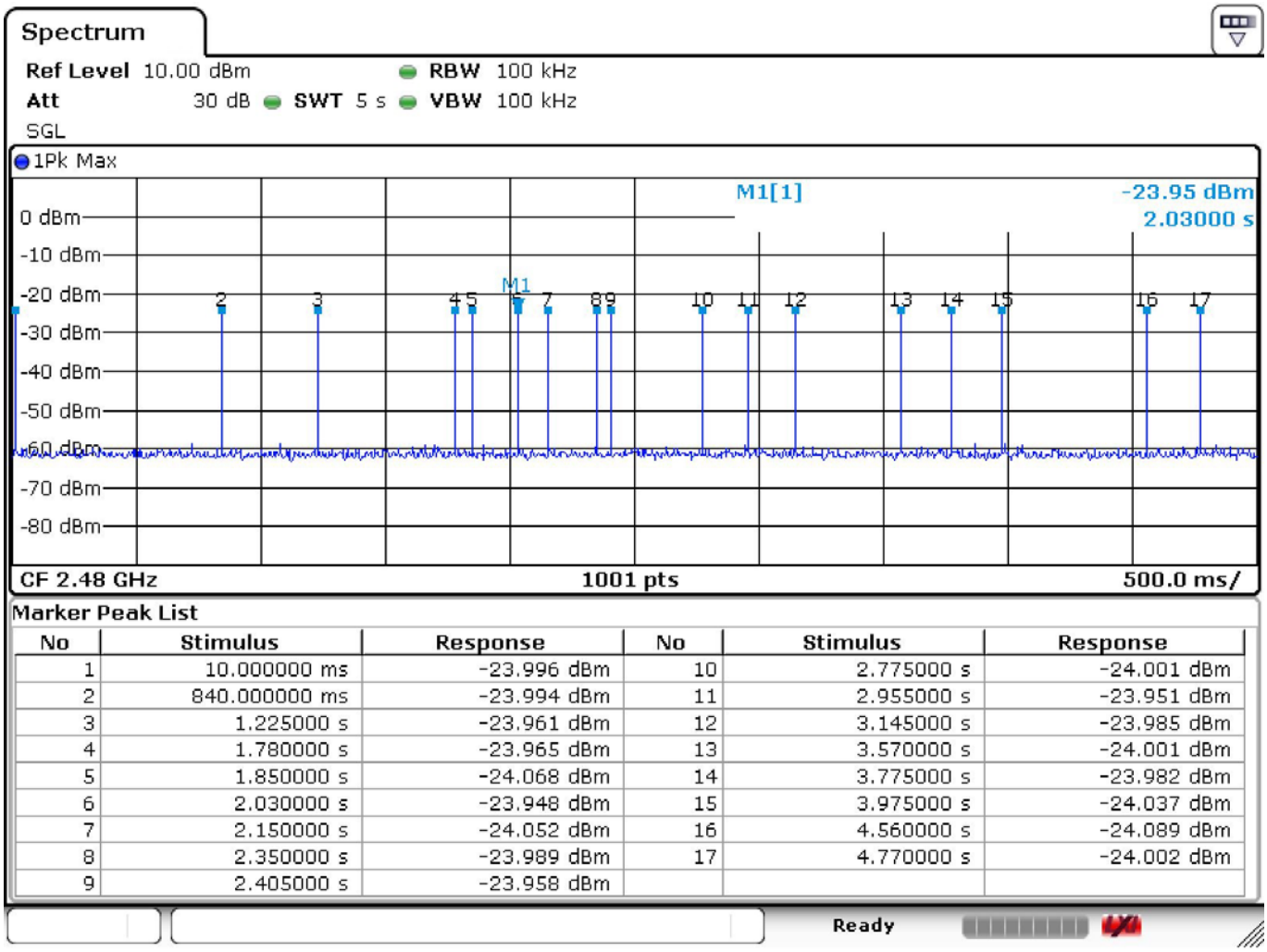
No	Stimulus	Response	No	Stimulus	Response
5	605.000000 ms	-23.988 dBm	19	3.545000 s	-23.963 dBm
6	830.000000 ms	-23.967 dBm	20	3.950000 s	-23.985 dBm
7	1.035000 s	-23.966 dBm	21	3.970000 s	-24.060 dBm
8	1.205000 s	-24.015 dBm	22	4.170000 s	-23.928 dBm
9	1.580000 s	-24.030 dBm	23	4.330000 s	-24.049 dBm
10	2.005000 s	-24.043 dBm	24	4.535000 s	-24.038 dBm
11	2.365000 s	-23.966 dBm	25	4.755000 s	-23.997 dBm
12	2.440000 s	-24.014 dBm	26	4.795000 s	-24.099 dBm
13	2.620000 s	-23.932 dBm	27	4.935000 s	-24.039 dBm
14	2.775000 s	-23.955 dBm			

Pulse Width (sec)


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 40 dB
SWT 5 ms
VBW 1 MHz
SGL
1Pk Clrw
D1[1]
-6.75 dB
1.70725 ms
M1[1]
-38.71 dBm
1.41884 ms
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
D2
D1
CF 2.48 GHz
691 pts
500.0 µs/
Marker
Type Ref Trc Stimulus Response Function Function Result
M1 1 1.41884 ms -38.71 dBm
D1 M1 1 1.70725 ms -6.75 dB
D2 M1 1 2.49855 ms 1.86 dB
Ready

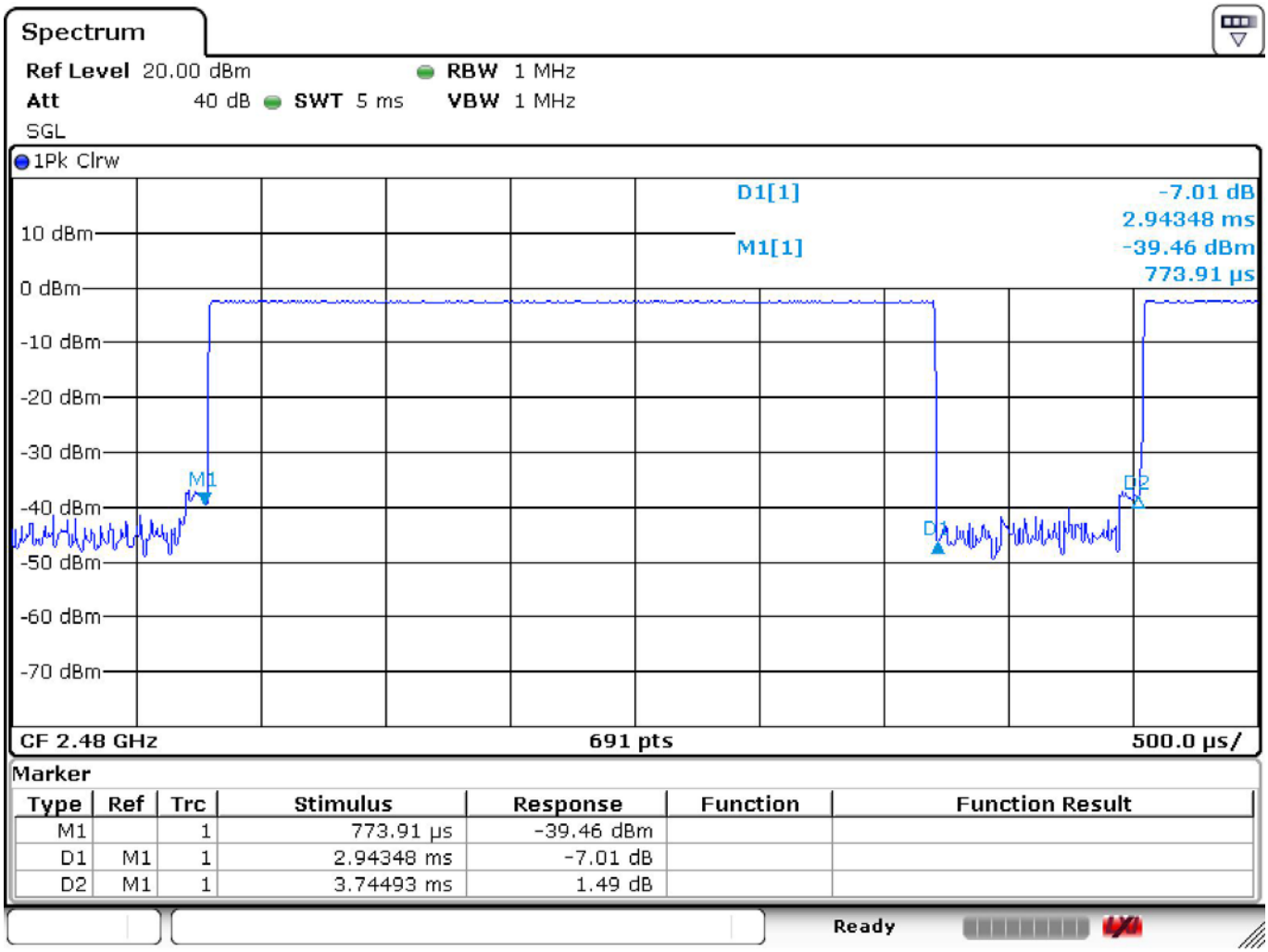
Test Mode : BT (1 Mbps) DH5 Channel : 78

Number of Pulses Per 5 sec



No	Stimulus	Response	No	Stimulus	Response
1	10.000000 ms	-23.996 dBm	10	2.775000 s	-24.001 dBm
2	840.000000 ms	-23.994 dBm	11	2.955000 s	-23.951 dBm
3	1.225000 s	-23.961 dBm	12	3.145000 s	-23.985 dBm
4	1.780000 s	-23.965 dBm	13	3.570000 s	-24.001 dBm
5	1.850000 s	-24.068 dBm	14	3.775000 s	-23.982 dBm
6	2.030000 s	-23.948 dBm	15	3.975000 s	-24.037 dBm
7	2.150000 s	-24.052 dBm	16	4.560000 s	-24.089 dBm
8	2.350000 s	-23.989 dBm	17	4.770000 s	-24.002 dBm
9	2.405000 s	-23.958 dBm			

Pulse Width (sec)

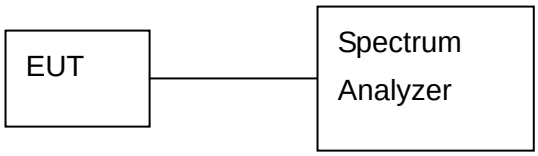

Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 40 dB
SWT 5 ms
VBW 1 MHz
SGL
1Pk Clrw
D1[1]
-7.01 dB
2.94348 ms
M1[1]
-39.46 dBm
773.91 µs
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
D1
D2
CF 2.48 GHz
691 pts
500.0 µs/
Marker
Type Ref Trc Stimulus Response Function Function Result
M1 1 773.91 µs -39.46 dBm
D1 M1 1 2.94348 ms -7.01 dB
D2 M1 1 3.74493 ms 1.49 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.

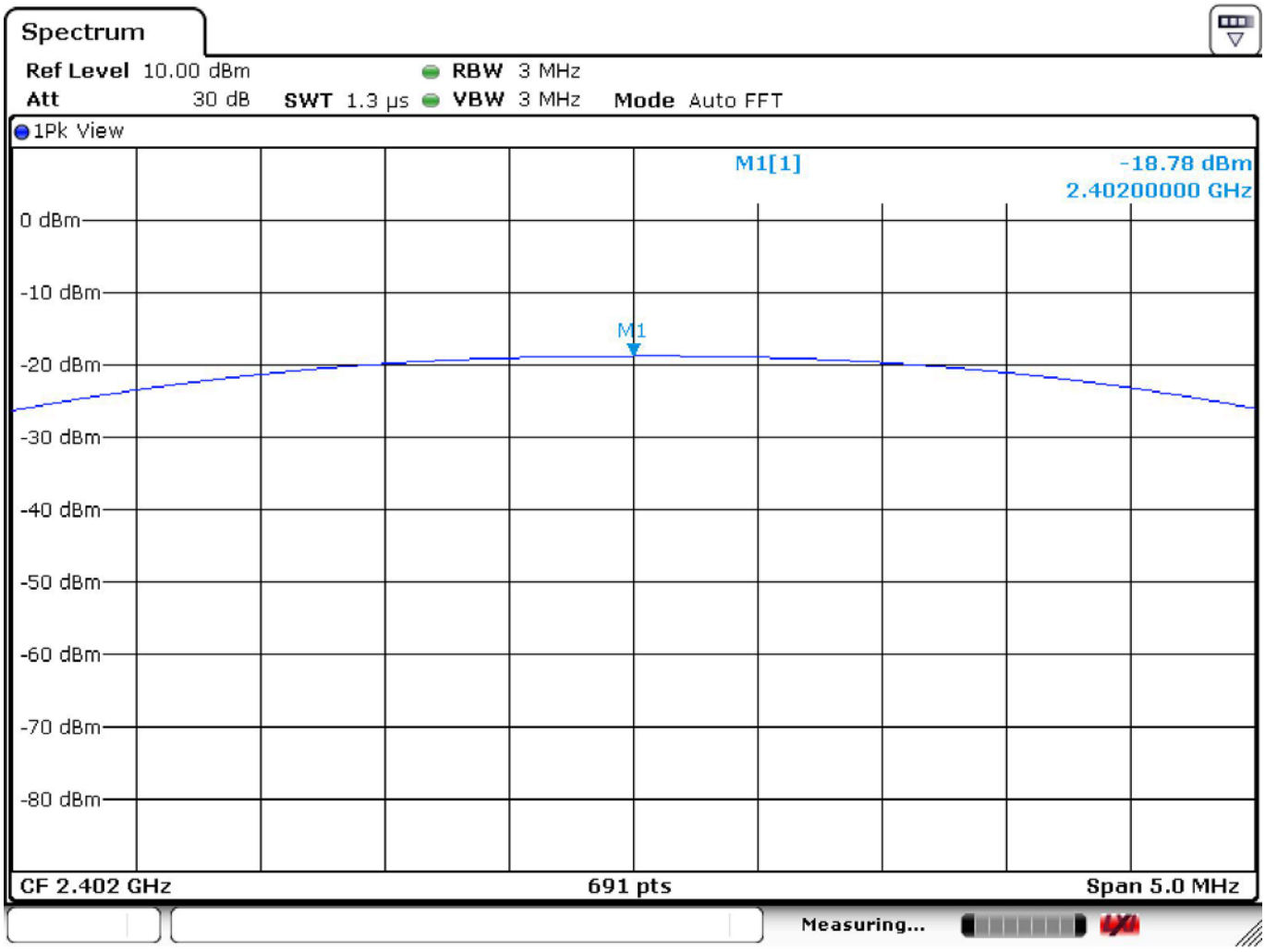
8.4 Test Result

Compliance.

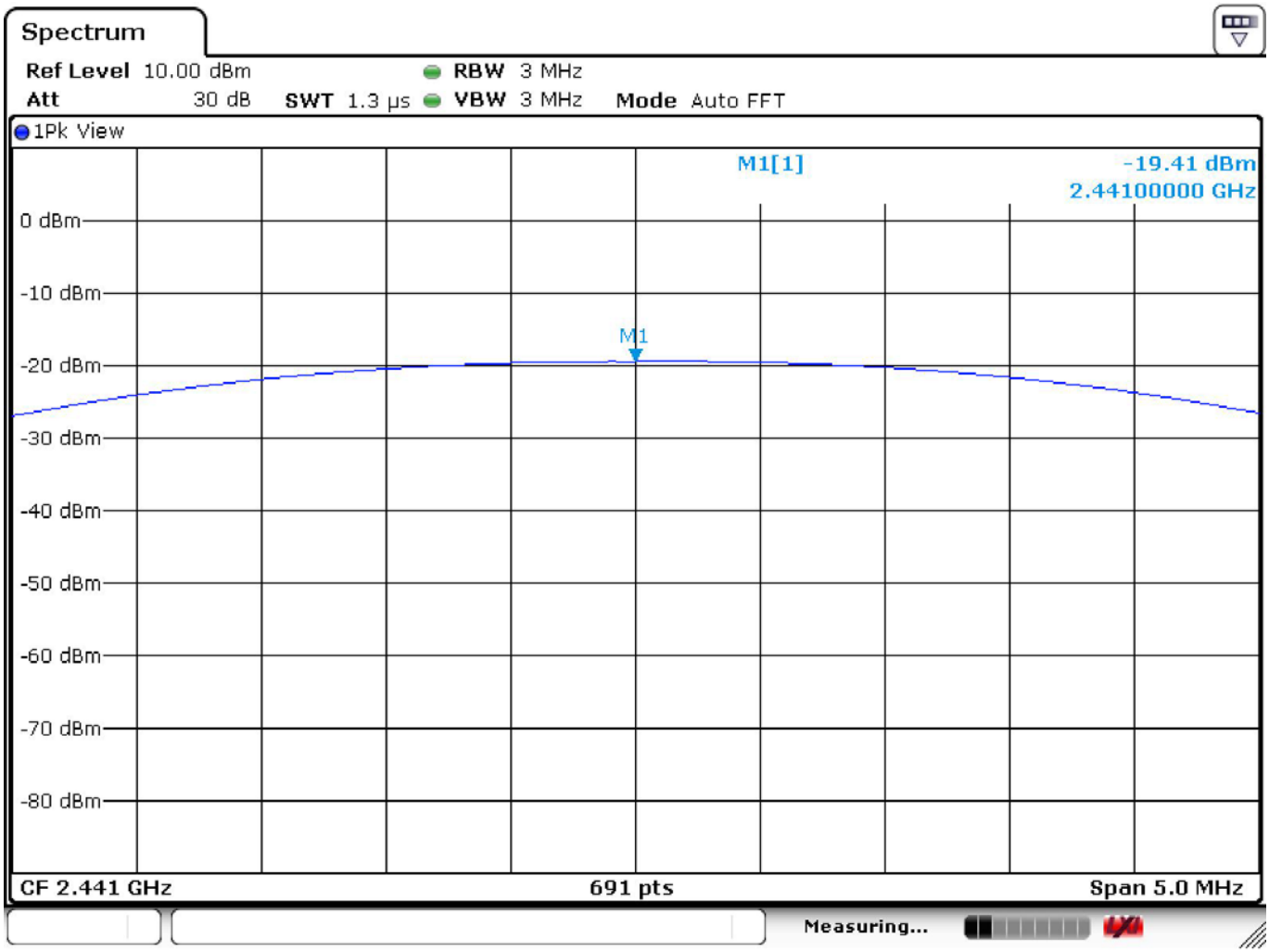
The final test data are shown on the following page(s).

Bluetooth 1 Mbps (DH5)			
Channel	**Frequency (MHz)**	**Result (dBm)**	**Limit (dBm)**
00	2402	-18.78	30
39	2441	-19.41	30
78	2480	-22.77	30

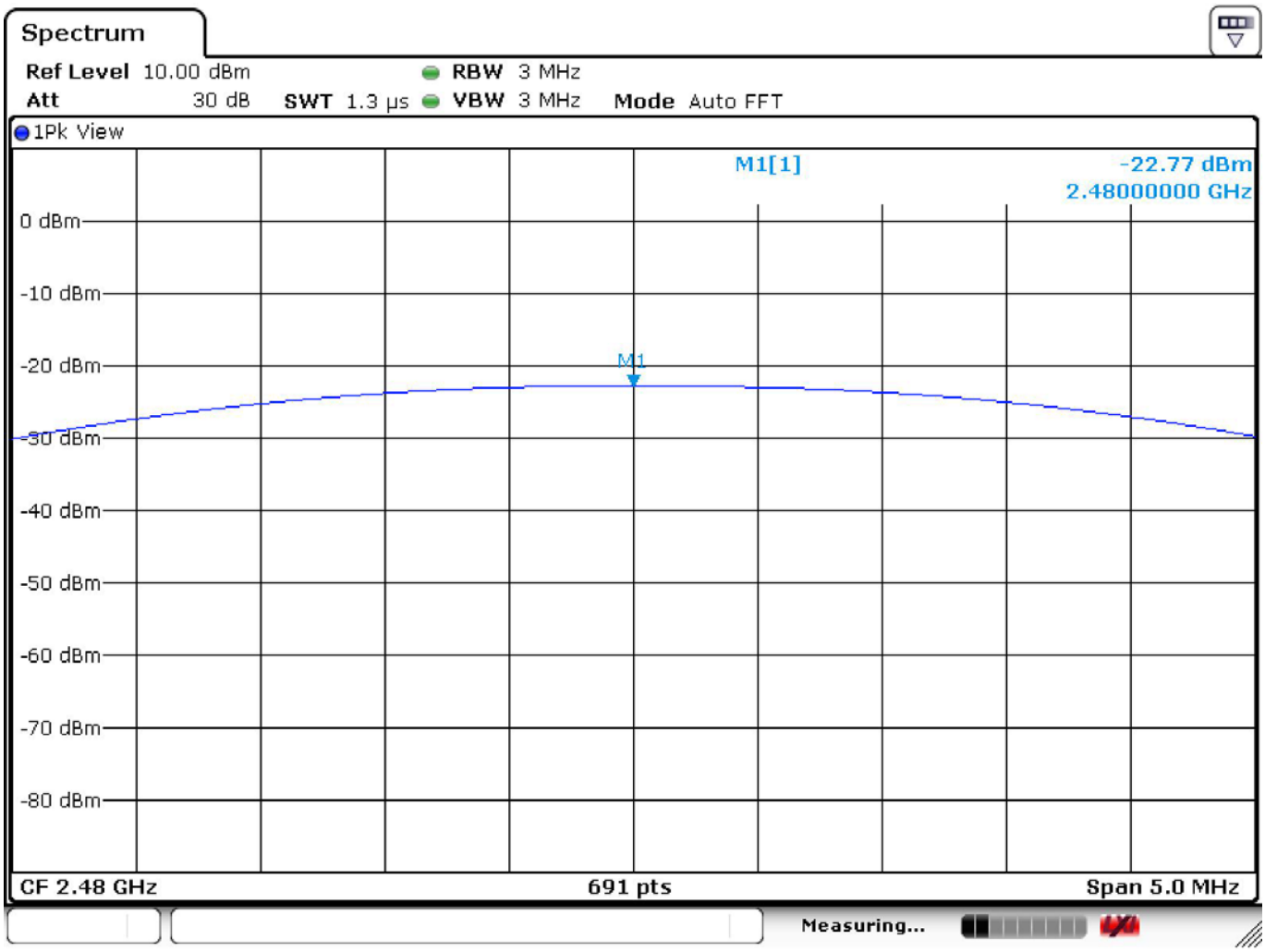
Temperature	:	28.4℃	Humidity	:	47%
Test Date	:	17-Sep-2015	Tested by	:	Eason Hsieh
Test Mode	:	BT (1Mbps) DH5	Channel	:	00



Test Mode : BT (1Mbps) DH5 Channel : 39



Test Mode : BT (1 Mbps) DH5 Channel : 78

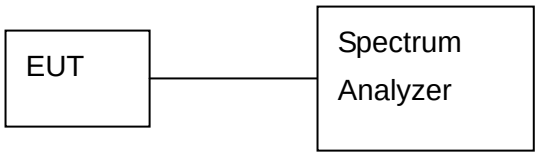


9 100kHz Bandwidth of Band Edges

9.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

9.2 Test Arrangement and Procedure



1. Remove the antenna from the transmitter and connected it to a spectrum analyzer through a low loss RF cable (connect an attenuator, if it's necessary).
2. The RBW is set to 100 kHz and VBW is set to 100 kHz. Sweep set to Auto. Span set to 100MHz.
3. Max Hold. Mark Peak and record max level.
4. Keep the same instrument setting, perform the hopping function.
5. Max Hold. Mark Peak and record max level.

9.3 Limit (§ 15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

9.4 Test Result

Compliance.

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

Since the fix channel mode is the worst case, data of the hopping mode were not recorded in this report.

Bluetooth (1Mbps) Channel: 00 non-Hopping mode					
Measured Result				Result (dB)	Limit (dB)
Lower Channel (MHz)	Max Peak Power (dBm)	Highest Freq. at Lower Band edge (MHz)	Max Peak Power at Lower Band edge (dBm)		
2402.06	-18.97	2400	-59.41	40.44	20

Remark: Result (dB) = Max Peak Power – Max Peak power at lower band edge. When Result > Limit, it's a pass.

Bluetooth (1Mbps) Channel: 00 Hopping mode					
Measured Result				Result (dB)	Limit (dB)
Lower Channel (MHz)	Max Peak Power (dBm)	Highest Freq. at Lower Band edge (MHz)	Max Peak Power at Lower Band edge (dBm)		
2408.05	-18.8	2326.13	-56.96	38.16	20

Remark: Result (dB) = Max Peak Power – Max Peak power at lower band edge. When Result > Limit, it's a pass.

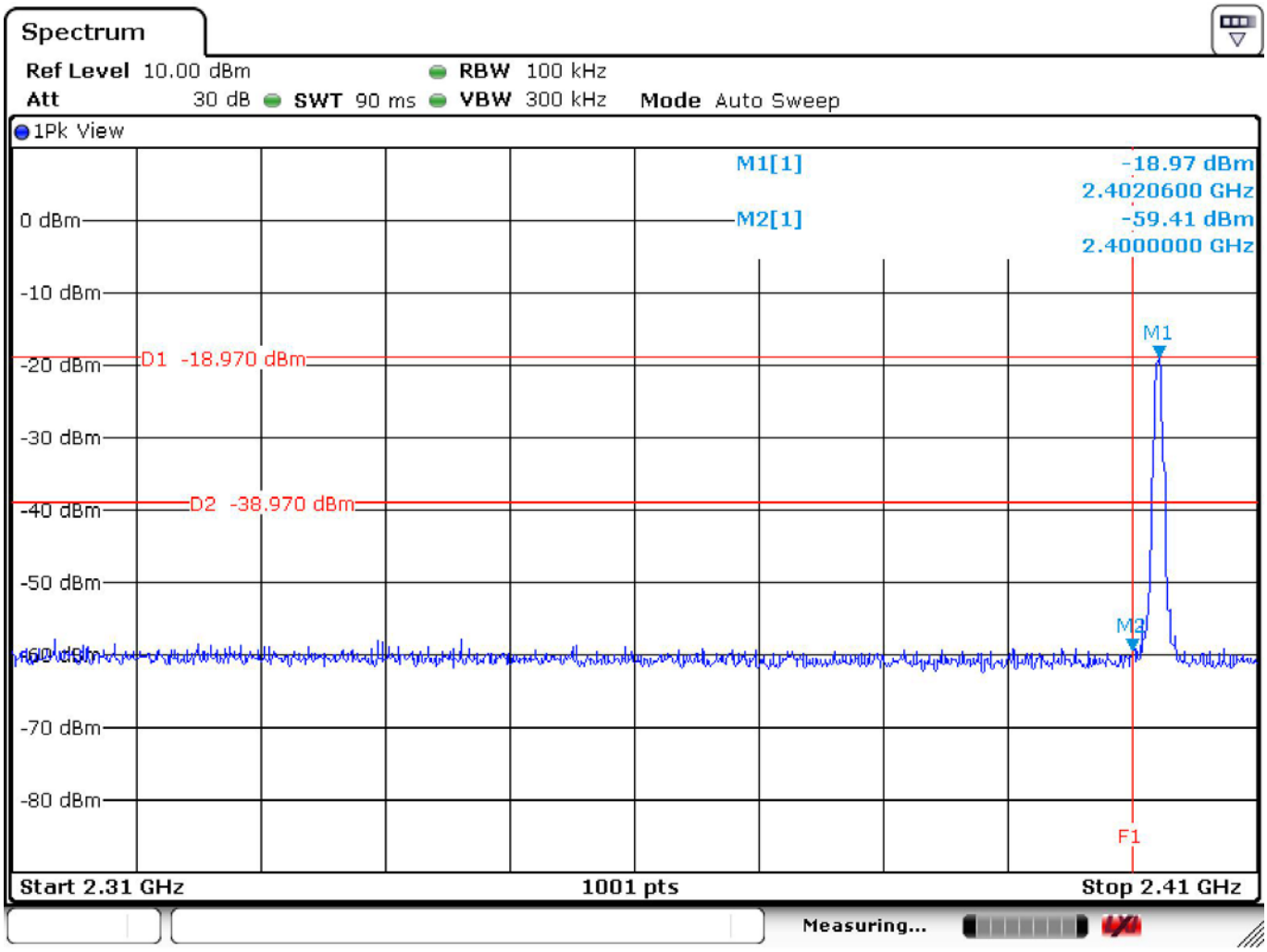
Bluetooth (1Mbps) Channel: 78 non-Hopping mode					
Measured Result				Result (dB)	Limit (dB)
Upper Channel (MHz)	Max Peak Power (dBm)	Highest Freq. at Upper Band edge (MHz)	Max Peak Power at Upper Band edge (dBm)		
2480	-23.12	2578.6	-58.47	35.35	20

Remark: Result (dB) = Max Peak Power – Max Peak power at upper band edge. When Result > Limit, it's a pass.

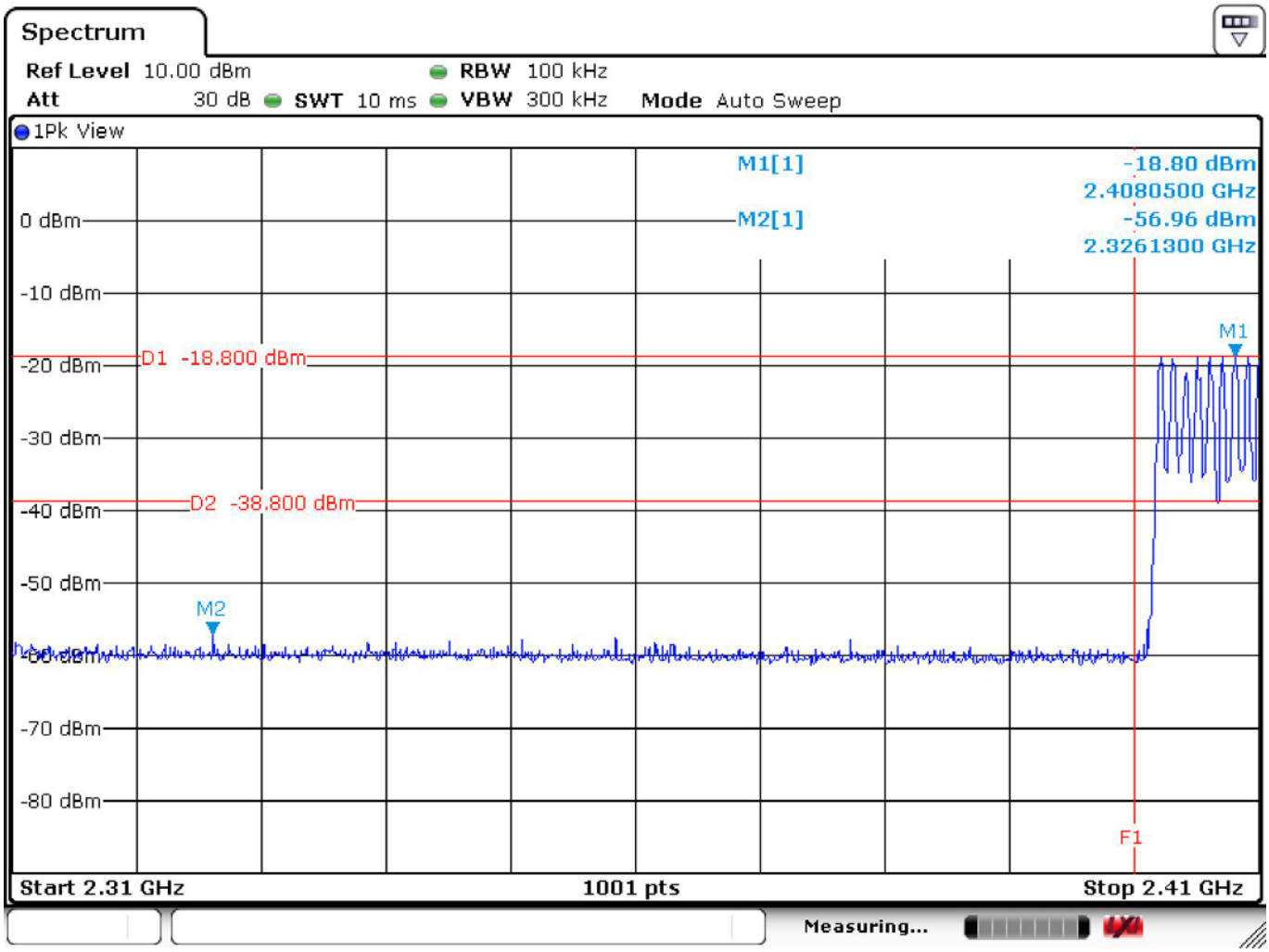
Bluetooth (1Mbps) Channel: 78 Hopping mode					
Measured Result				Result (dB)	Limit (dB)
Upper Channel (MHz)	Max Peak Power (dBm)	Highest Freq. at Upper Band edge (MHz)	Max Peak Power at Upper Band edge (dBm)		
2472.09	-22.45	2505.93	-57.01	34.56	20

Remark: Result (dB) = Max Peak Power – Max Peak power at Upper band edge. When Result > Limit, it's a pass.

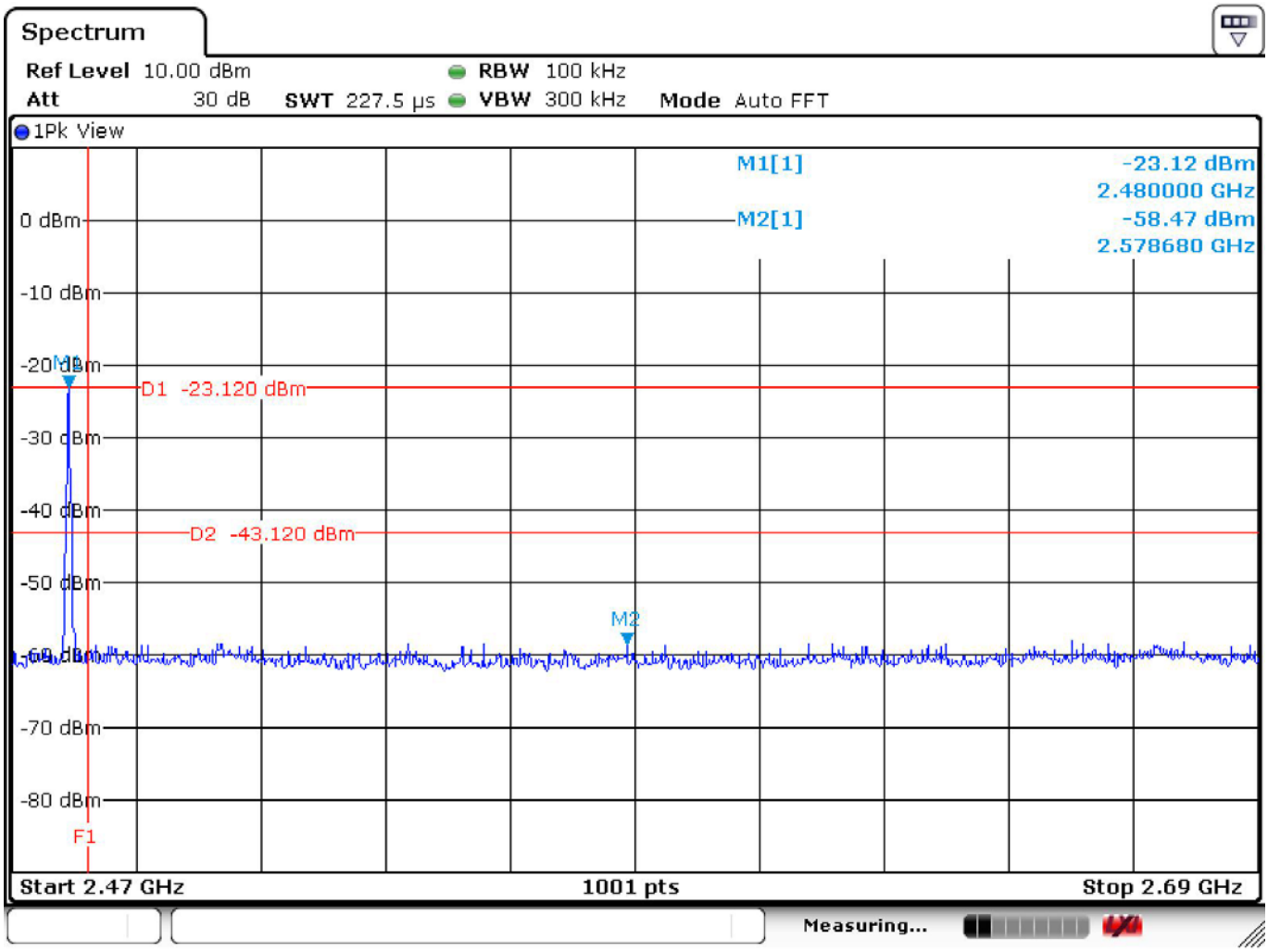
Temperature	:	28.4℃	Humidity	:	47%
Test Date	:	17-Sep-2015	Tested by	:	Eason Hsieh
Test Mode	:	BT (1Mbps) non-hopping mode	Channel	:	2402



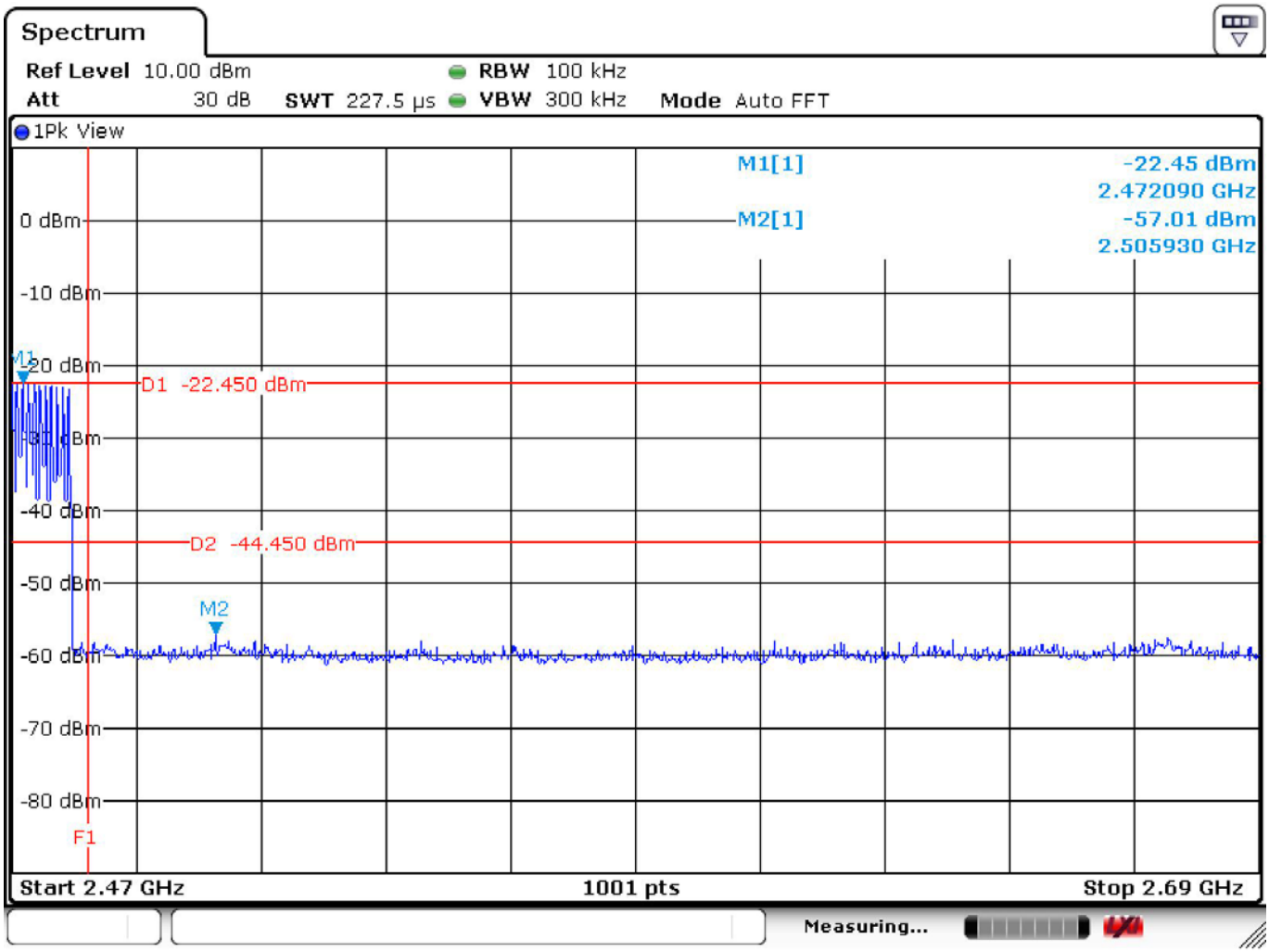
Test Mode : BT (1 Mbps) Hopping mode Channel : 2402



Test Mode : BT (1 Mbps) non-hopping mode Channel : 2480



Test Mode : BT (1 Mbps) Hopping mode Channel : 2480

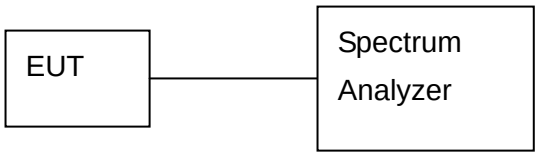


10 Spurious RF Conducted Emissions

10.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

10.2 Test Arrangement and Procedure



1. Remove the antenna from the transmitter and connected it to a spectrum analyzer through a low loss RF cable (connect an attenuator, if it's necessary).
2. Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.

3. Typically, several plots are required to cover this entire span.
4. RBW = 100 kHz ; VBW ≧ RBW ; Sweep = auto
5. Detector function = peak ; Trace = max hold ; Allow the trace to stabilize.
6. Set the marker on the peak of any spurious emission recorded.
7. The level displayed must comply with the limit specified in this Section.
8. Submit these plots.

10.3 Limit (§ 15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

10.4 Test Result

Compliance.

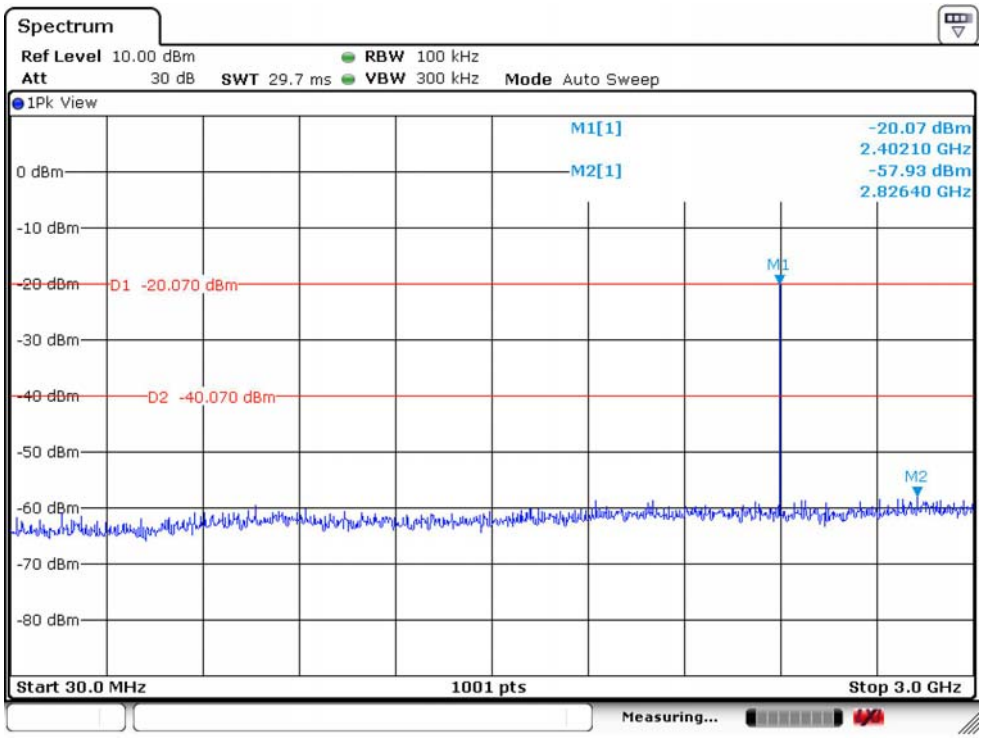
The final test data are shown on the following page(s).

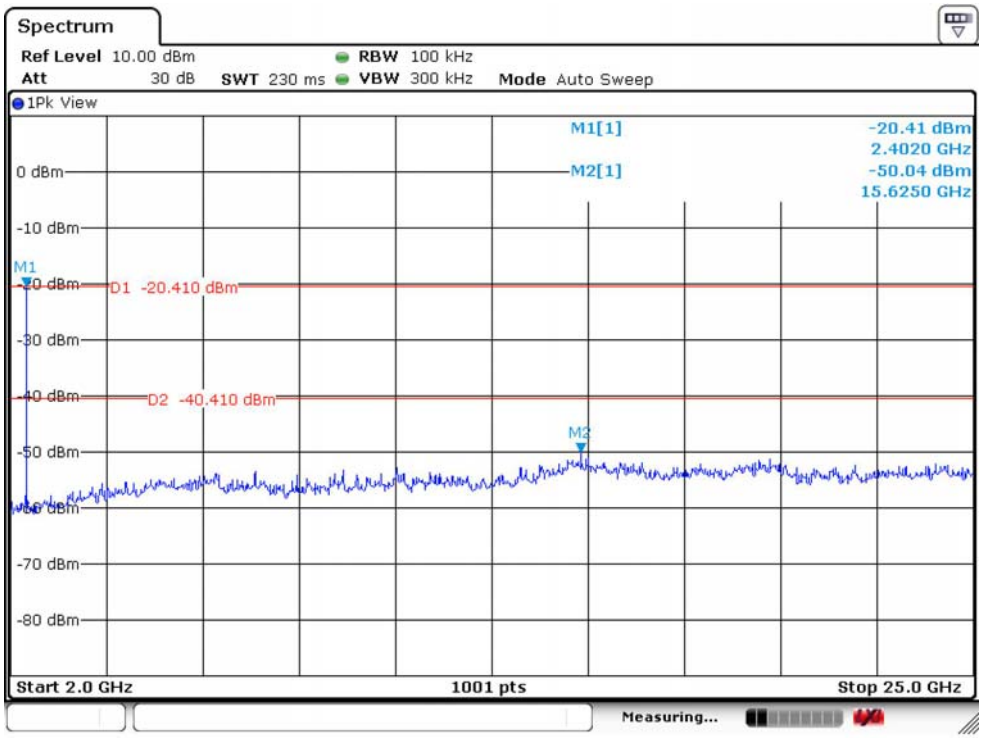
Since the fix channel mode is the worst case, data of the hopping mode were not recorded in this report.

Bluetooth (1Mbps) Channel: 00					
Measured Result				Result (dB)	Limit (dB)
(GHz)	Max Peak Power (dBm)	Highest Freq. at spurious emissions (GHz)	Max Peak Power at spurious emissions (dBm)		
2.40210	-20.07	2.82640	-57.93	37.86	20
2.4020	-20.41	15.6250	-50.04	29.63	20

Remark: Result (dB) = Max Peak Power – Max Peak power at spurious emissions.

When Result > Limit, it's a pass.

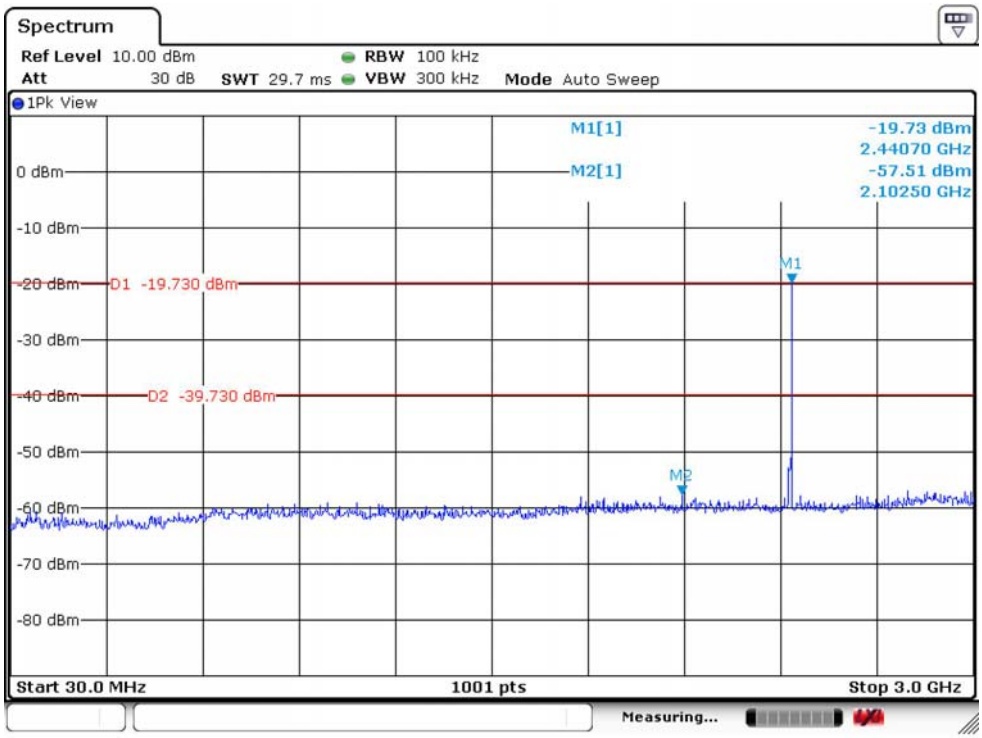


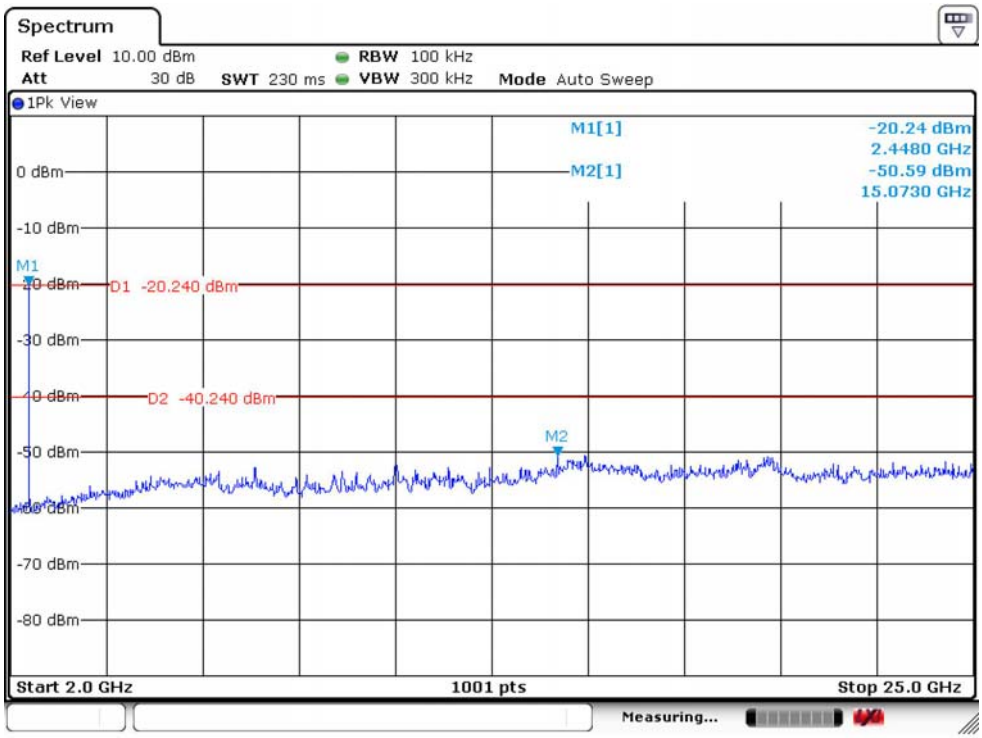


Bluetooth (1Mbps) Channel: 39					
Measured Result				Result (dB)	Limit (dB)
(GHz)	Max Peak Power (dBm)	Highest Freq. at spurious emissions (GHz)	Max Peak Power at spurious emissions (dBm)		
2.4407	-19.73	2.10250	-57.51	37.78	20
2.4480	-20.24	15.0730	-50.59	30.35	20

Remark: Result (dB) = Max Peak Power – Max Peak power at spurious emissions.

When Result > Limit, it's a pass.

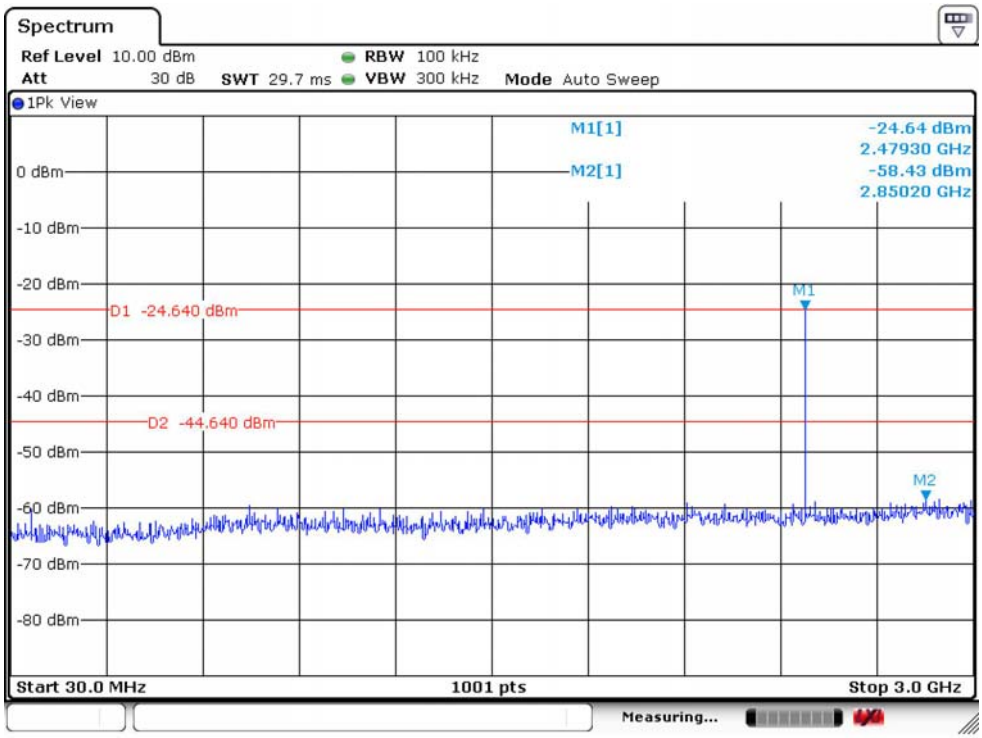


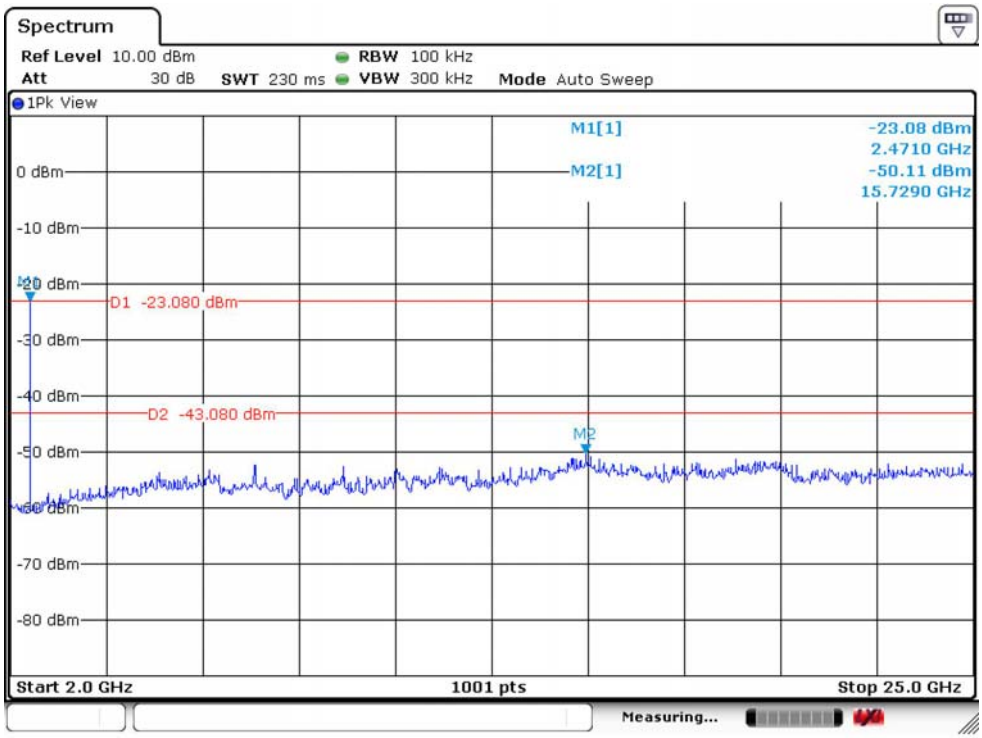


Bluetooth (1Mbps) Channel: 78					
Measured Result				Result (dB)	Limit (dB)
(GHz)	Max Peak Power (dBm)	Highest Freq. at spurious emissions (GHz)	Max Peak Power at spurious emissions (dBm)		
2.47930	-24.64	2.85020	-58.43	33.79	20
2.4710	-23.08	15.7290	-50.11	27.03	20

Remark: Result (dB) = Max Peak Power – Max Peak power at spurious emissions.

When Result > Limit, it's a pass.





11 Antenna requirement

11.1 Limit (§ 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. The use of a permanently attached antenna or of an antenna that uses a uniue coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

11.2 Test Result

Compliance.

The EUT applies a PCB antenna.

12 Information about the FHSS characteristics

12.1 Pseudorandom Frequency Hopping Sequence

The channel is represented by a pseudo-random hopping sequence hopping through the 79 RF channels.

The hopping sequence is unique for the piconet and is determined by the Bluetooth device address of the master; the phase in the hopping sequence is determined by the Bluetooth clock of the master.

The channel is divided into time slots where each slot corresponds to an RF hop frequency. Consecutive hops correspond to different RF hop frequencies. The nominal hop rate is 1600 hops/s.

12.2 Example of a 79 hopping sequence in data mode:

02, 05, 31 , 24, 20, 10,43, 36, 30, 23, 40, 06, 21, 50, 44, 09, 71 , 78, 01, 13, 73, 07, 70, 72, 35, 62, 42, 11, 41, 08, 16, 29, 60, 15, 34, 61, 58, 04, 67, 12, 22, 53, 57, 18, 27, 76, 39, 32, 17, 77, 52, 33, 56, 46, 37, 47, 64, 49, 45, 38, 69, 14, 51, 26, 79, 19, 28, 65, 75, 54, 48, 03, 25, 66, 05, 16, 68, 74, 59, 63, 55

12.3 Equal Hopping Frequency Use

Due to each the GFSK of modulation of hopping frequency will be transmitted in accordance to the frequency tables described above, there is no any frequency will be able to hop more times than other. Therefore each frequency will be used equally.

---------- End of Test Report ----------