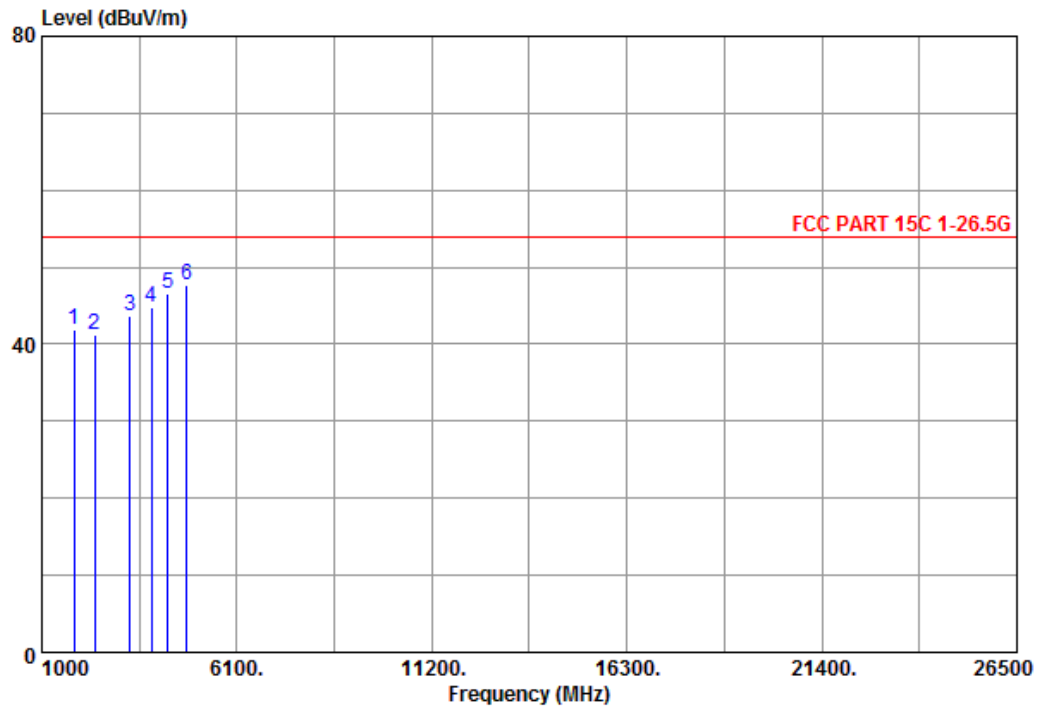


### Radiated Emission Test Data (Above 1 GHz)

Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Polarization	: Horizontal	Channel	: 39
Test Mode	: Mode 8		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	1841.500	51.36	-9.47	41.89	54.00	-12.11	---	---	
2	2377.000	48.95	-7.69	41.26	54.00	-12.74	---	---	
3	3295.000	48.60	-5.01	43.59	54.00	-10.41	---	---	
4	3856.000	48.09	-3.38	44.71	54.00	-9.29	---	---	
5	4289.500	48.24	-1.68	46.56	54.00	-7.44	---	---	
6	@4799.500	47.20	0.49	47.69	54.00	-6.31	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

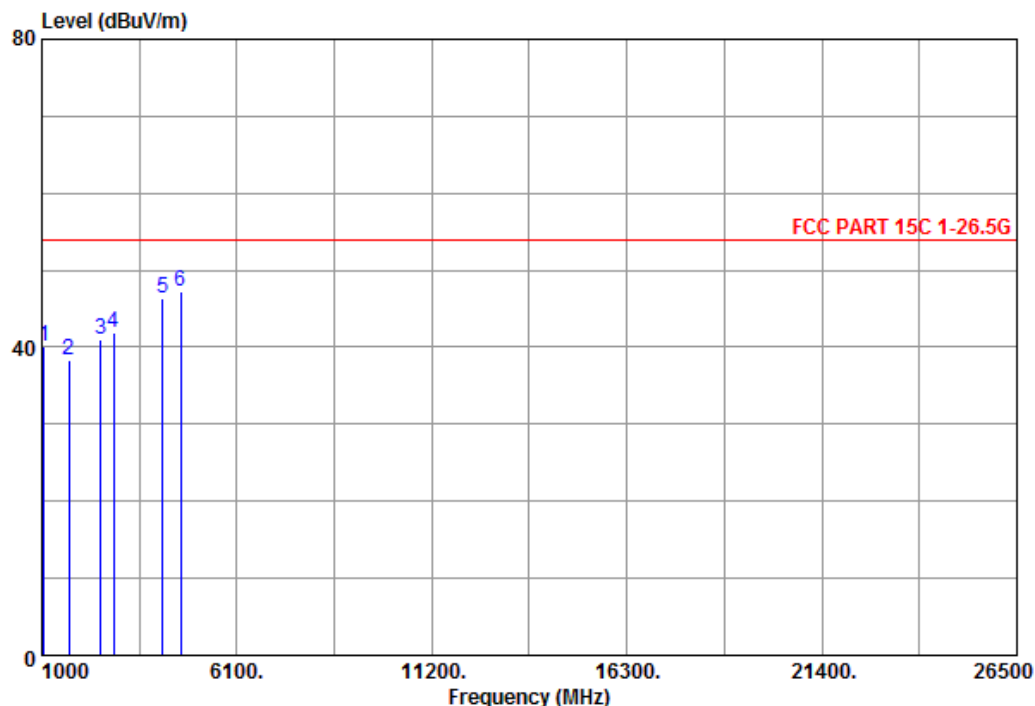
@ :Maximum Data x :Over Limit

Remark :

- Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
  - Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.
  - Average Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1 GHz)**

Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Polarization	: Vertical	Channel	: 39
Test Mode	: Mode 8		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	1051.000	53.18	-13.10	40.08	54.00	-13.92	---	---	
2	1714.000	48.32	-10.08	38.24	54.00	-15.76	---	---	
3	2530.000	48.16	-7.23	40.93	54.00	-13.07	---	---	
4	2887.000	48.07	-6.18	41.89	54.00	-12.11	---	---	
5	4162.000	48.62	-2.26	46.36	54.00	-7.64	---	---	
6	@4621.000	47.57	-0.30	47.27	54.00	-6.73	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
 Result = Reading + C.F ; Margin = Result - Limit

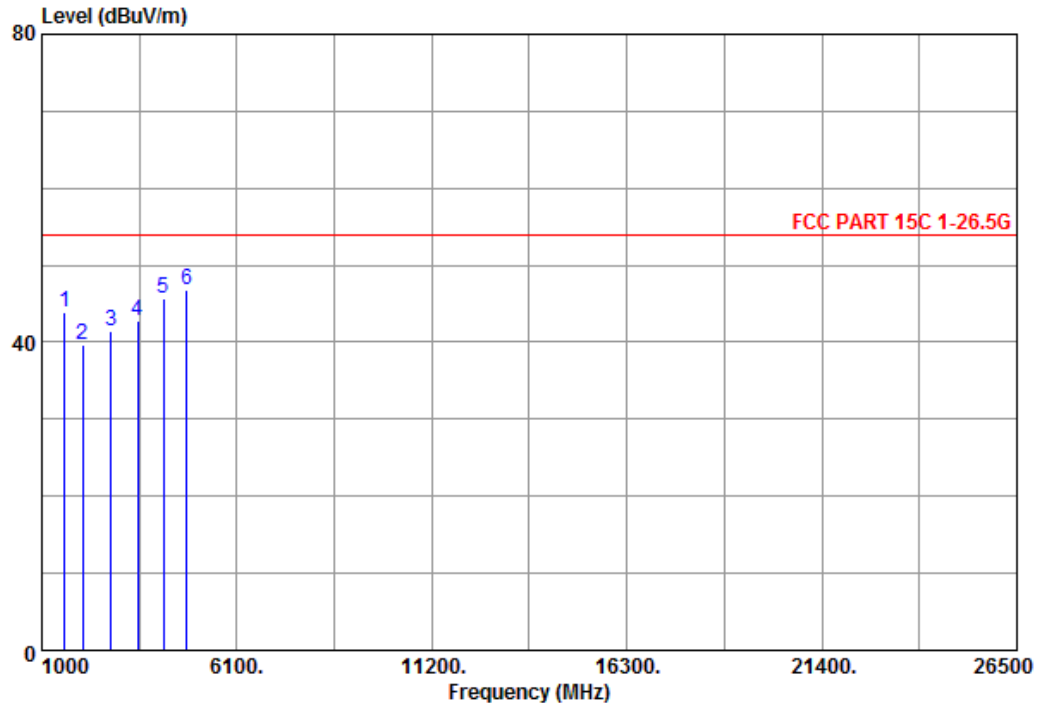
@ :Maximum Data    x :Over Limit

Remark :

- Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
  - Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.
  - Average Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep = AUTO.

## Radiated Emission Test Data (Above 1 GHz)

Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Polarization	: Horizontal	Channel	: 78
Test Mode	: Mode 9		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	1586.500	54.49	-10.70	43.79	54.00	-10.21	---	---	
2	2071.000	48.14	-8.58	39.56	54.00	-14.44	---	---	
3	2810.500	47.79	-6.44	41.35	54.00	-12.65	---	---	
4	3499.000	47.30	-4.40	42.90	54.00	-11.10	---	---	
5	4187.500	47.89	-2.12	45.77	54.00	-8.23	---	---	
6	@4799.500	46.39	0.49	46.88	54.00	-7.12	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
 Result = Reading + C.F ; Margin = Result - Limit

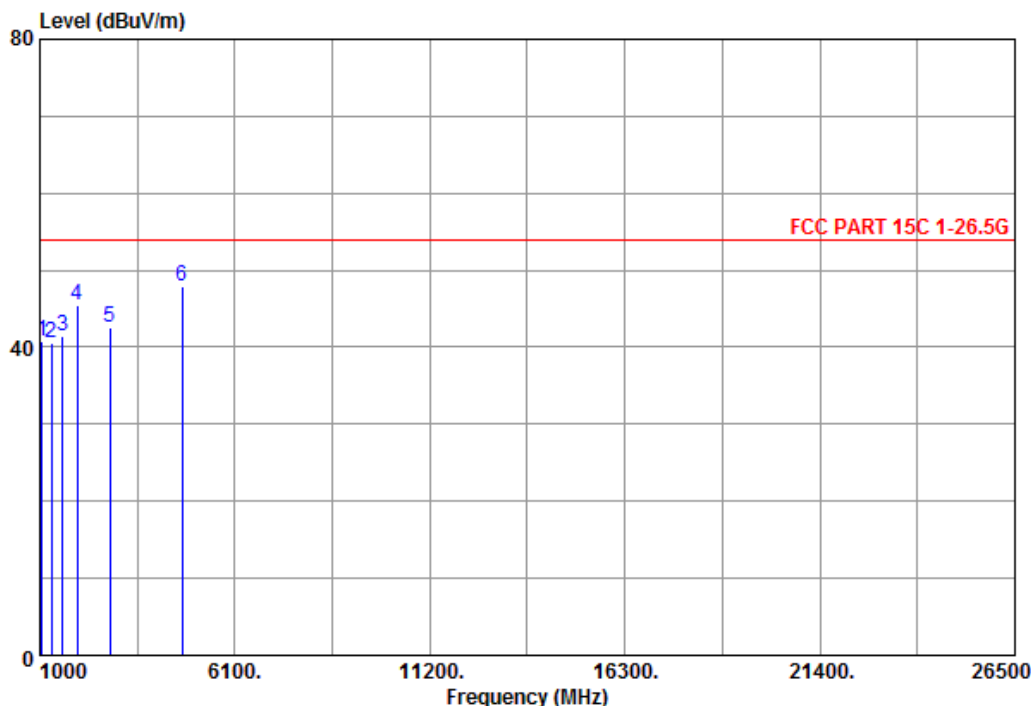
@ :Maximum Data    x :Over Limit

Remark :

- Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
  - Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.
  - Average Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep = AUTO.

## Radiated Emission Test Data (Above 1 GHz)

Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Polarization	: Vertical	Channel	: 78
Test Mode	: Mode 9		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	1051.000	53.97	-13.10	40.87	54.00	-13.13	---	---	
2	1306.000	52.53	-11.93	40.60	54.00	-13.40	---	---	
3	1586.500	52.05	-10.70	41.35	54.00	-12.65	---	---	
4	1969.000	54.40	-8.94	45.46	54.00	-8.54	---	---	
5	2836.000	48.90	-6.34	42.56	54.00	-11.44	---	---	
6	@4723.000	47.74	0.15	47.89	54.00	-6.11	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
 Result = Reading + C.F ; Margin = Result - Limit

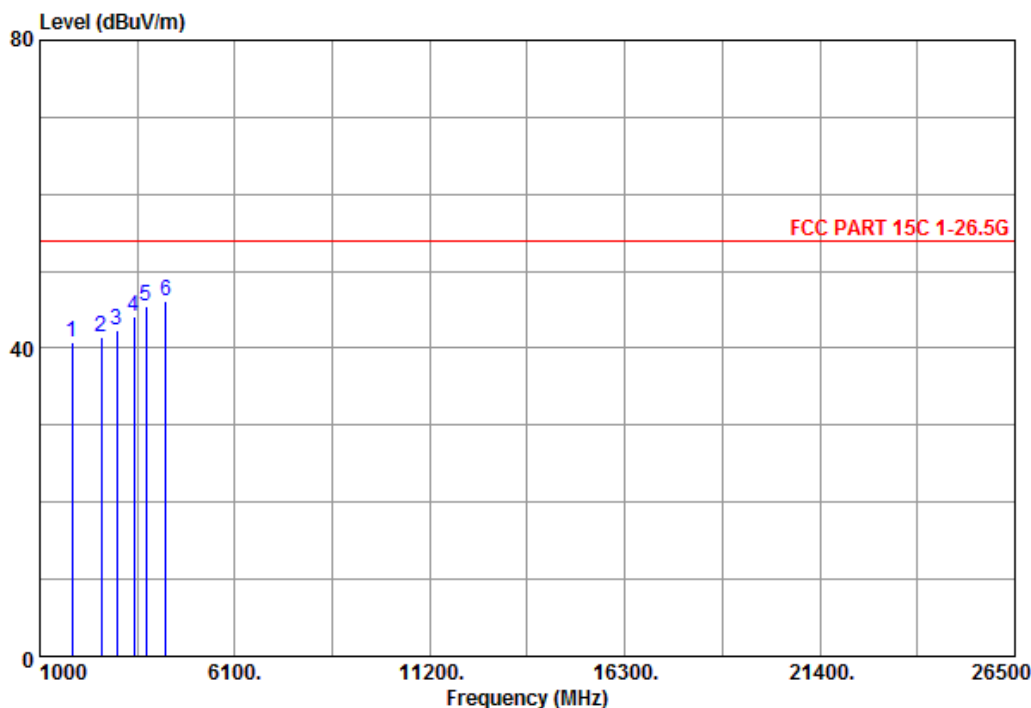
@ :Maximum Data    x :Over Limit

Remark :

- Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
  - Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.
  - Average Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep = AUTO.

## Radiated Emission Test Data (Above 1 GHz)

Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Polarization	: Horizontal	Channel	: RX
Test Mode	: Mode 10		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	1841.500	50.17	-9.47	40.70	54.00	-13.30	---	---	
2	2606.500	48.48	-7.04	41.44	54.00	-12.56	---	---	
3	3014.500	48.24	-5.84	42.40	54.00	-11.60	---	---	
4	3473.500	48.56	-4.46	44.10	54.00	-9.90	---	---	
5	3779.500	49.01	-3.58	45.43	54.00	-8.57	---	---	
6	4289.500	47.84	-1.68	46.16	54.00	-7.84	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

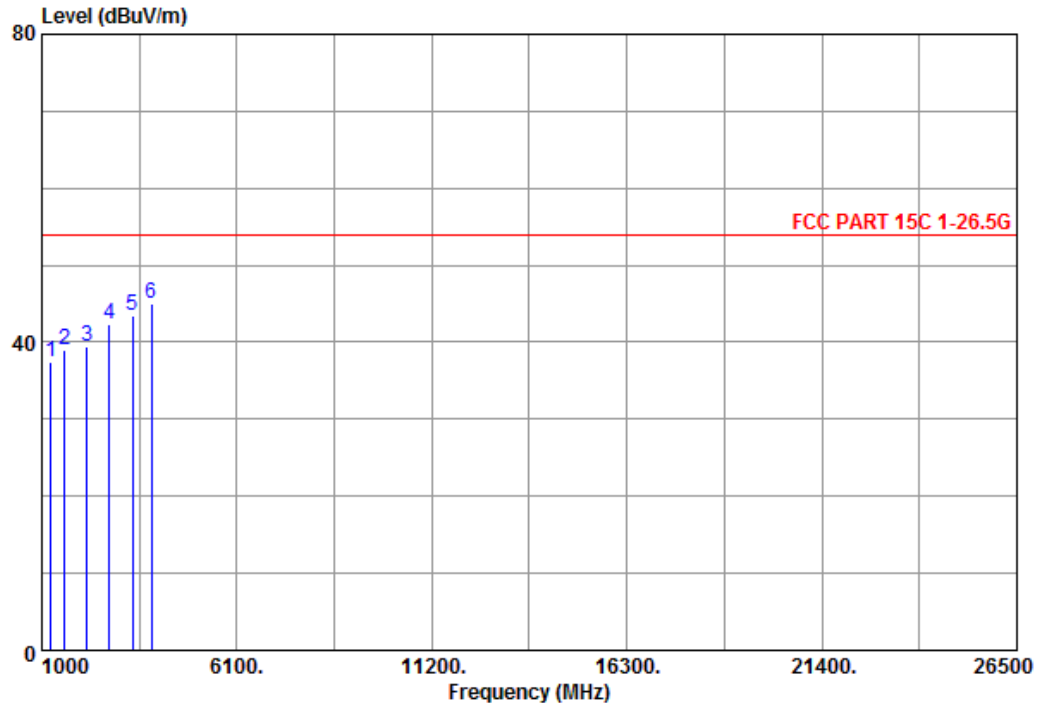
@ :Maximum Data x :Over Limit

Remark :

- Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
  - Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.
  - Average Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep = AUTO.

## Radiated Emission Test Data (Above 1 GHz)

Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Polarization	: Vertical	Channel	: RX
Test Mode	: Mode 10		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	1229.500	49.79	-12.25	37.54	54.00	-16.46	---	---	
2	1586.500	49.66	-10.70	38.96	54.00	-15.04	---	---	
3	2173.000	47.79	-8.28	39.51	54.00	-14.49	---	---	
4	2759.500	48.80	-6.54	42.26	54.00	-11.74	---	---	
5	3371.500	48.16	-4.76	43.40	54.00	-10.60	---	---	
6	@3856.000	48.49	-3.38	45.11	54.00	-8.89	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data    x :Over Limit

Remark :

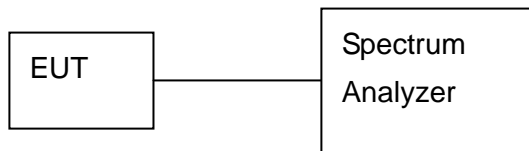
- Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
  - Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.
  - Average Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep = AUTO.

## 4 20 dB Bandwidth

### 4.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 4.2 Test Arrangement and Procedure



1. The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 300kHz VBW. Measured the -20 dB bandwidth and plotted the graph.

### 4.3 Limit

None; For report purpose only.

### 4.4 Test Result

**No non-compliance noted.**

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

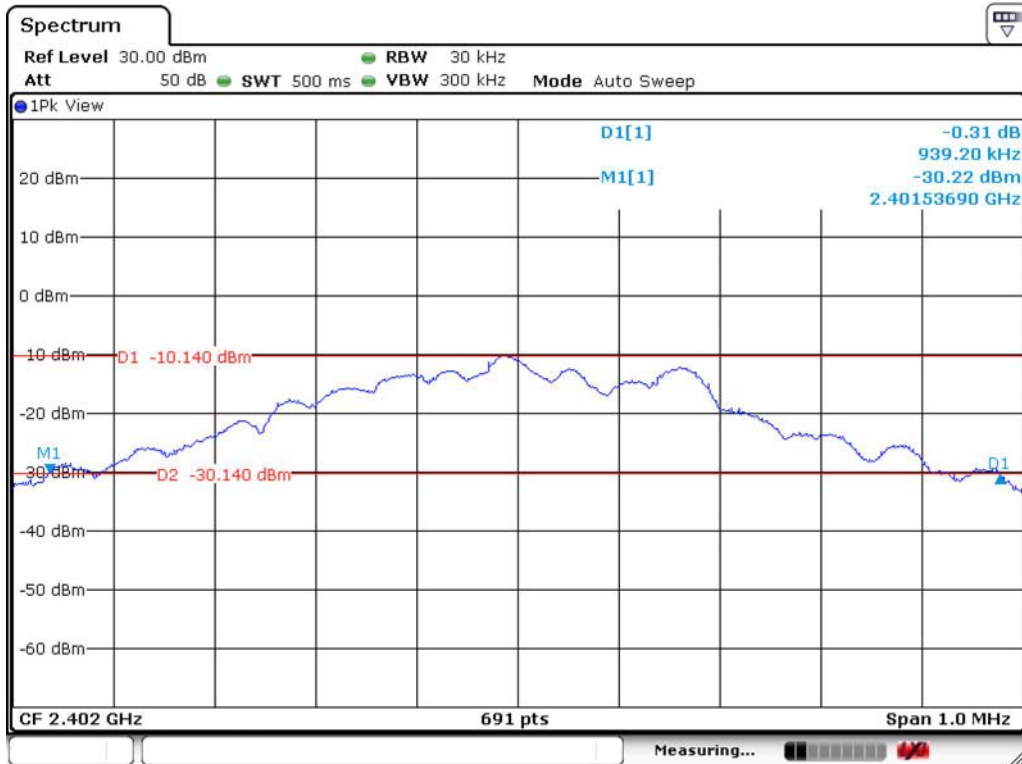
Bluetooth 1 Mbps		
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2402	0.9392
Middle	2441	0.9373
High	2480	0.9436

Bluetooth EDR 2 Mbps		
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2402	1.2851
Middle	2441	1.2702
High	2480	1.2619

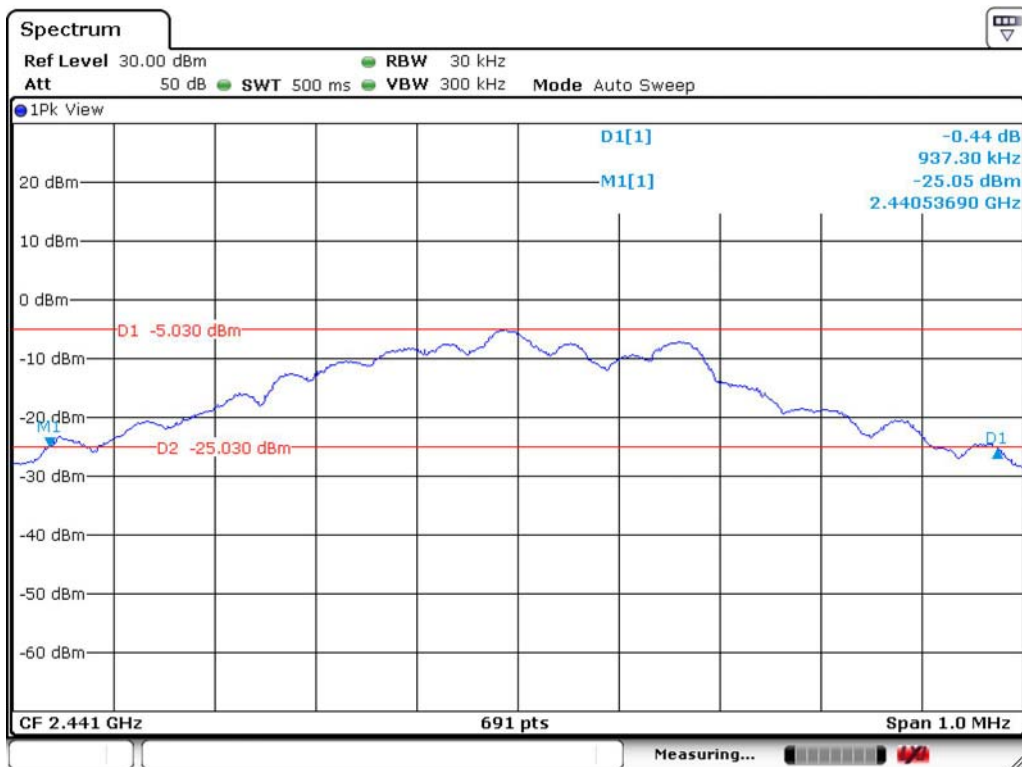
Bluetooth EDR 3 Mbps		
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2402	1.2996
Middle	2441	1.3049
High	2480	1.2996



Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Test Mode	: BT (1Mbps)	Channel	: 2402



Test Mode	: BT (1Mbps)	Channel	: 2441
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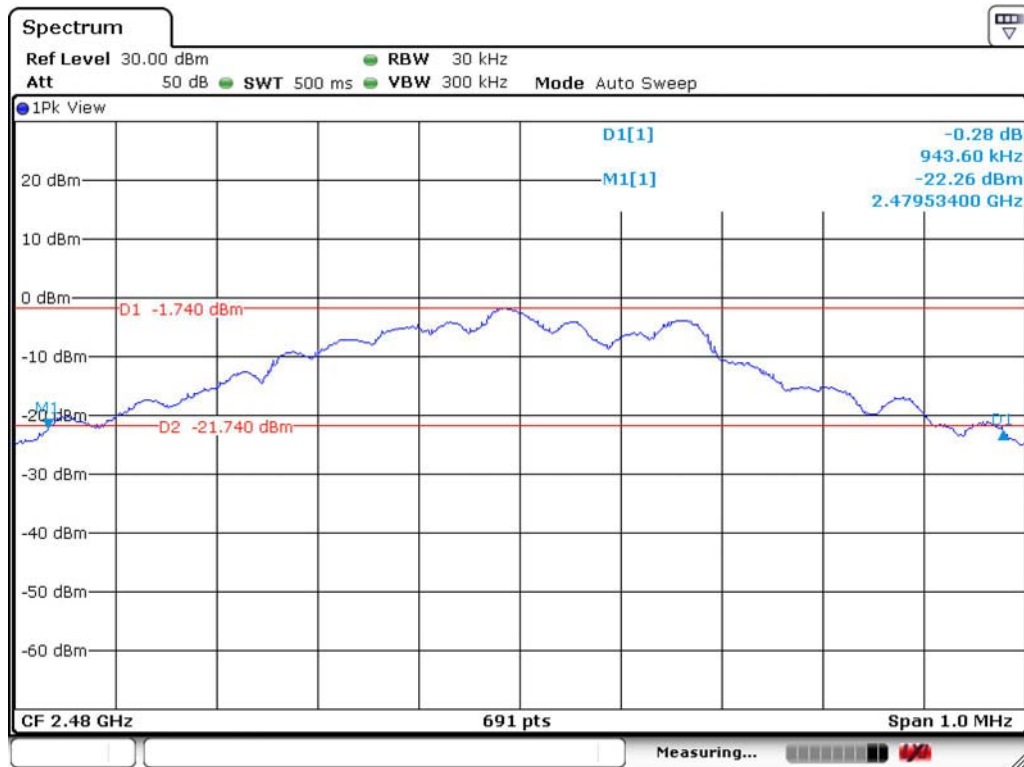






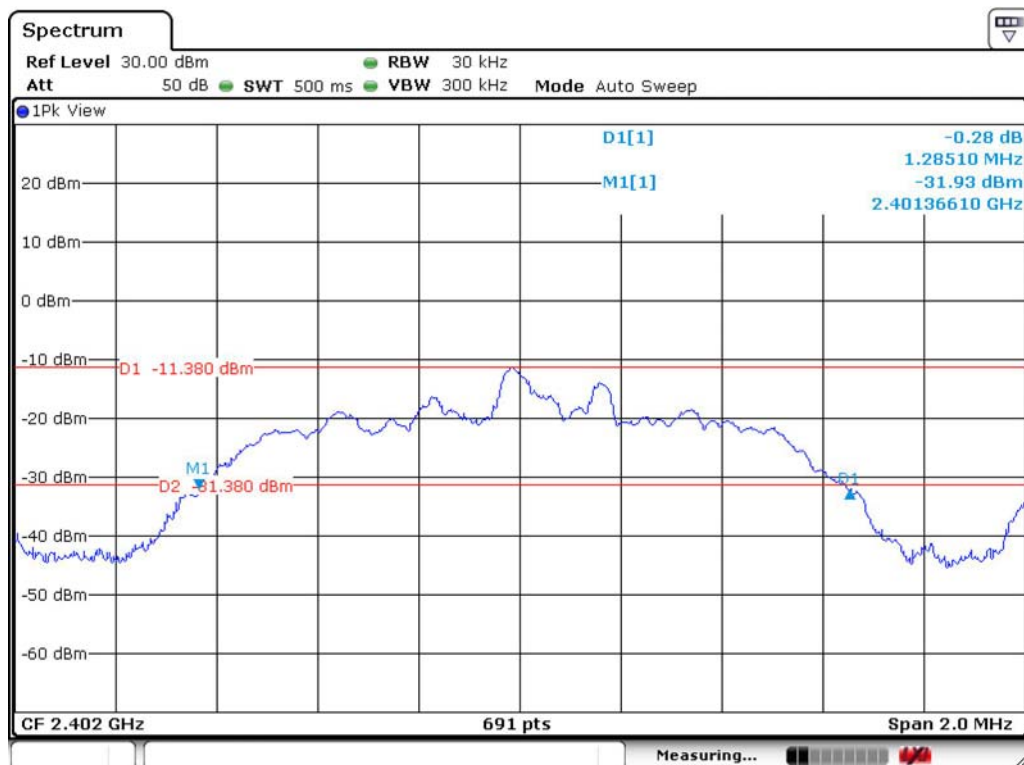
Test Mode : BT (1 Mbps)

Channel : 2480



Test Mode : BT EDR (2 Mbps)

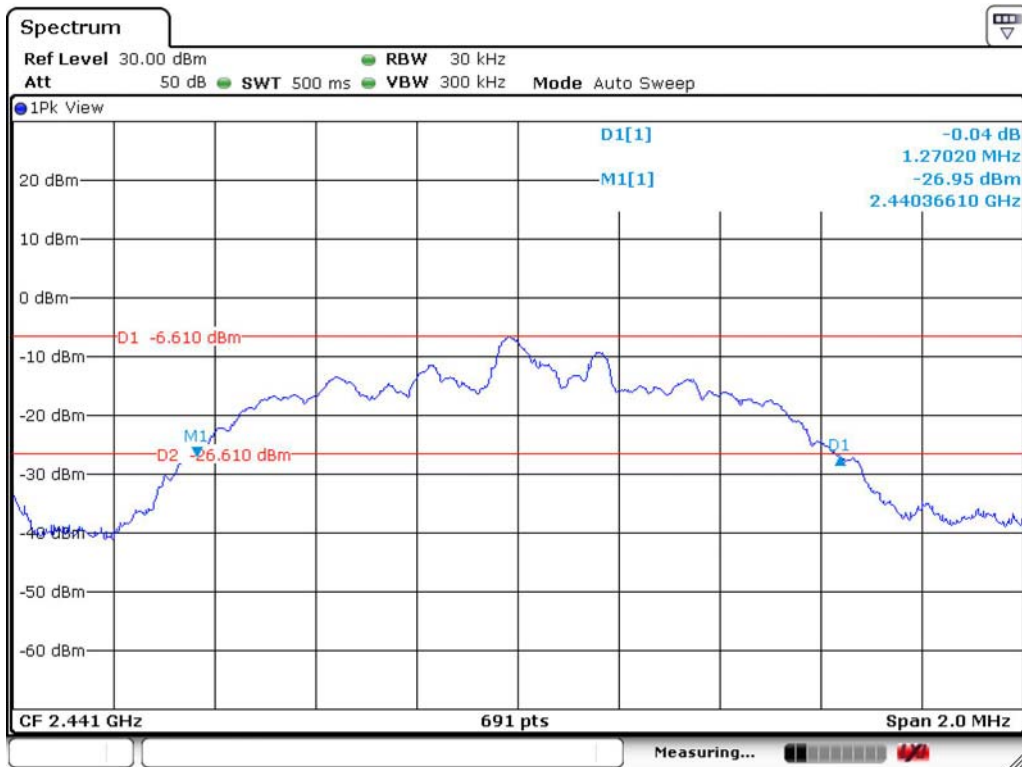
Channel : 2402





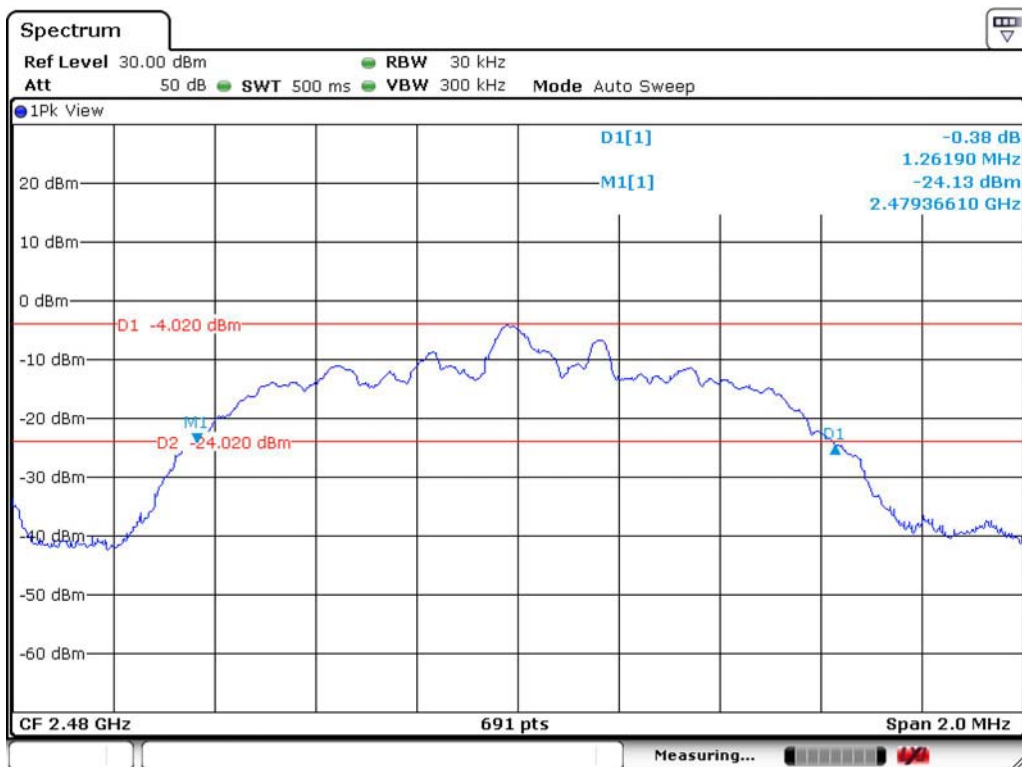
Test Mode : BT EDR (2 Mbps)

Channel : 2441



Test Mode : BT EDR (2 Mbps)

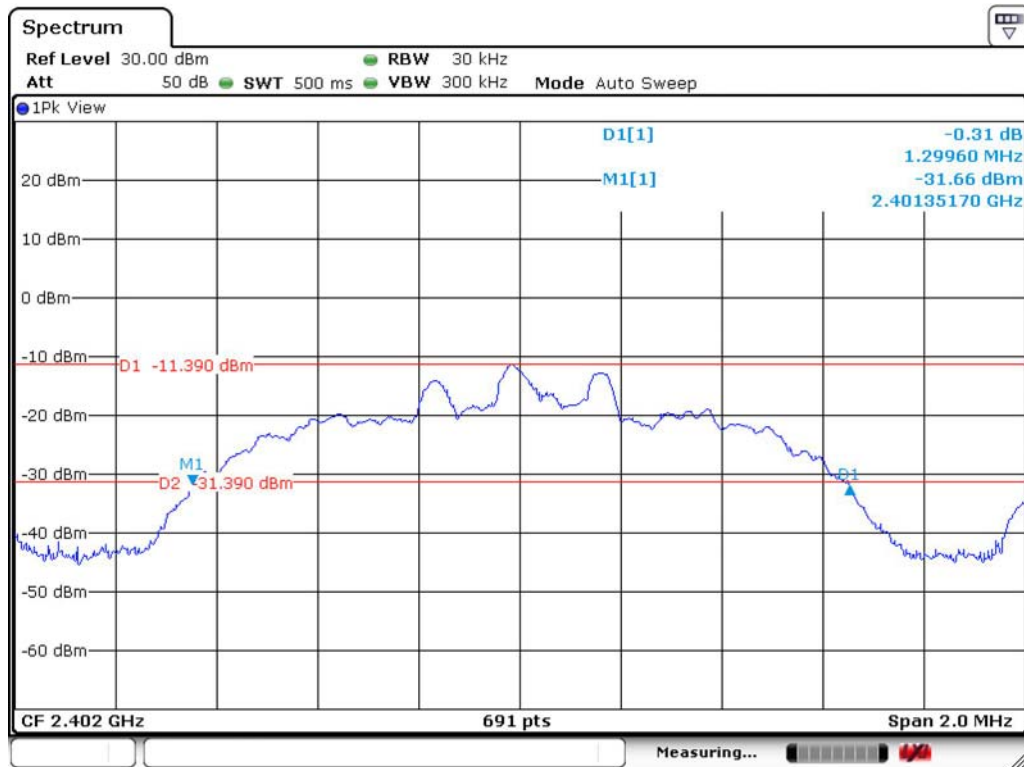
Channel : 2480





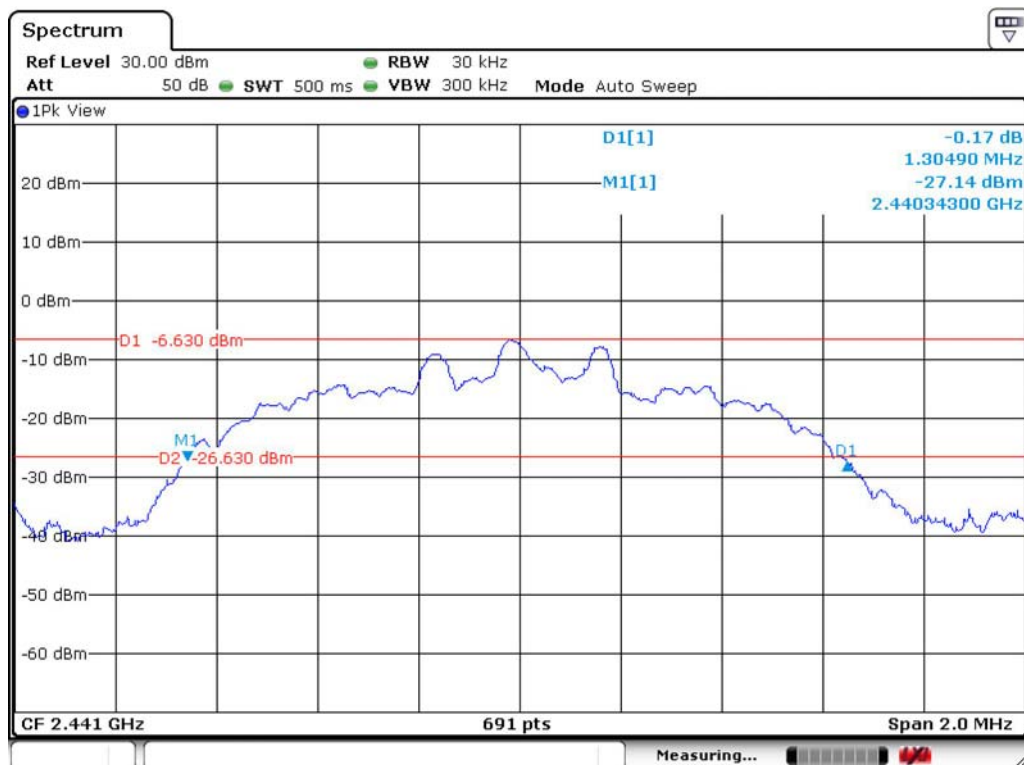
Test Mode : BT EDR (3 Mbps)

Channel : 2402



Test Mode : BT EDR (3 Mbps)

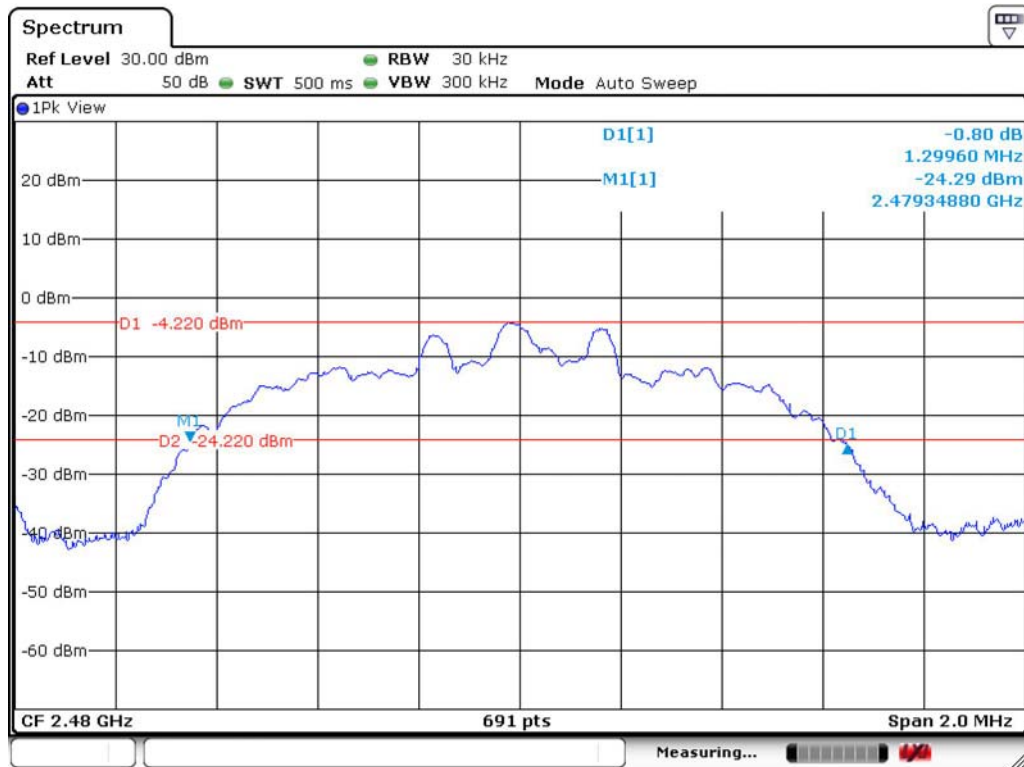
Channel : 2441





Test Mode : BT EDR (3 Mbps)

Channel : 2480



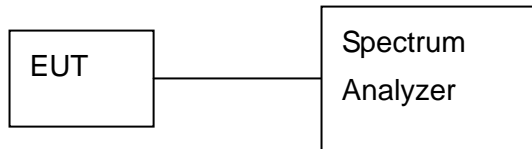


## 5 Hopping Frequency Separation

### 5.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 5.2 Test Arrangement and Procedure



1. The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 300kHz VBW.
3. Mark the peak outputs of two adjacent channels. And, measured the separation between the marked peak outputs of two adjacent channels.

### 5.3 Limit (§ 15.247(a)(1))

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### 5.4 Test Result

#### Compliance.

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

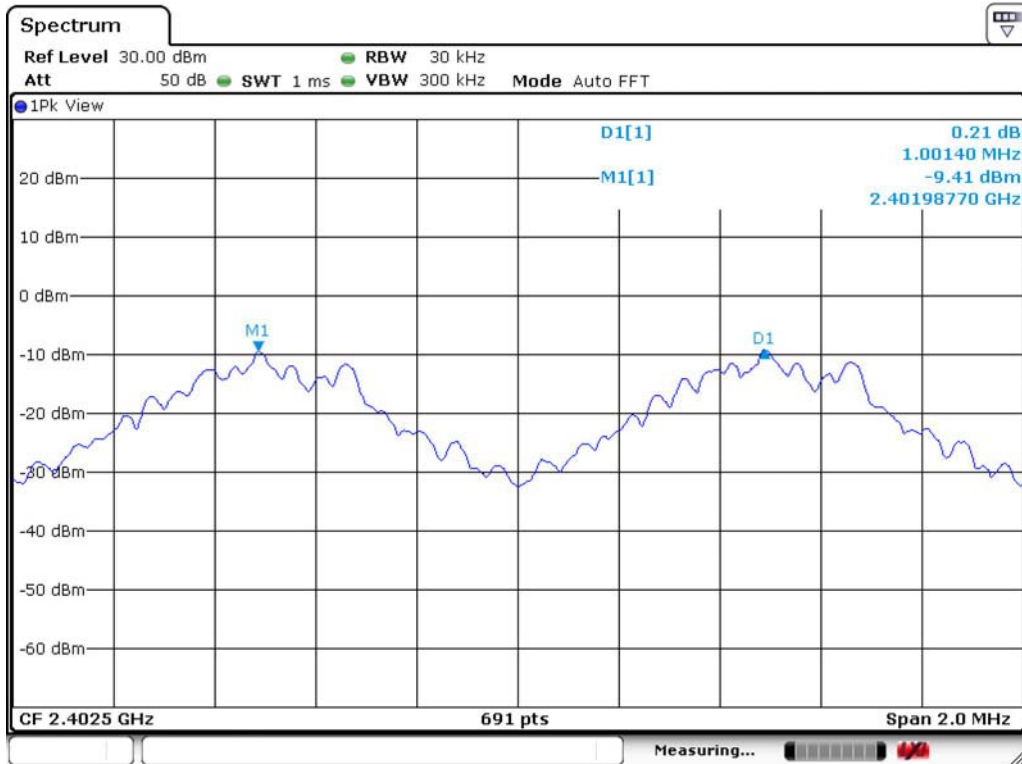
Bluetooth 1 Mbps					
Channel	Frequency (MHz)	20 dB bandwidth (MHz)	Limit (2/3 of 20dB bandwidth) (MHz)	Result	Verdict
Low	2402	0.9392	0.6261	1.0014	Pass
Middle	2441	0.9373	0.6249	0.9986	Pass
High	2480	0.9436	0.6291	1.0014	Pass

Bluetooth EDR 2 Mbps					
Channel	Frequency (MHz)	20 dB bandwidth (MHz)	Limit (2/3 of 20dB bandwidth) (MHz)	Result	Verdict
Low	2402	1.2851	0.8567	0.9957	Pass
Middle	2441	1.2702	0.8468	1.0014	Pass
High	2480	1.2619	0.8413	1.0014	Pass

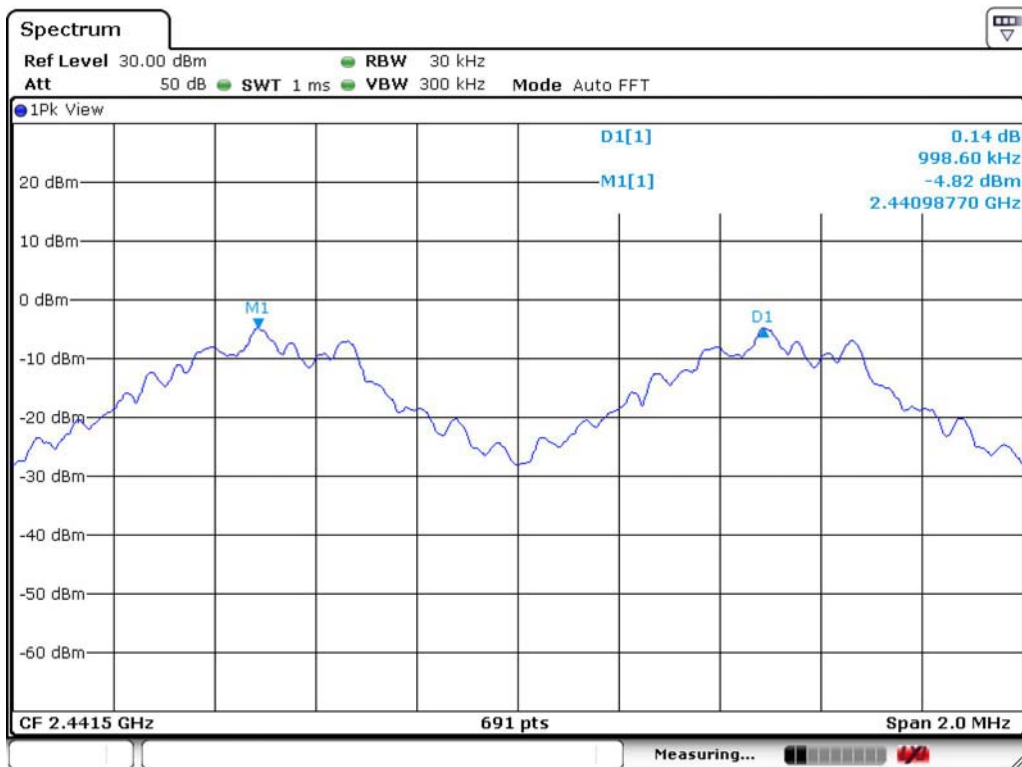
Bluetooth EDR 3 Mbps					
Channel	Frequency (MHz)	20 dB bandwidth (MHz)	Limit (2/3 of 20dB bandwidth) (MHz)	Result	Verdict
Low	2402	1.2996	0.8664	0.9986	Pass
Middle	2441	1.3049	0.8699	1.0014	Pass
High	2480	1.2996	0.8664	1.0043	Pass



Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Test Mode	: BT (1Mbps)	Channel	: 2402



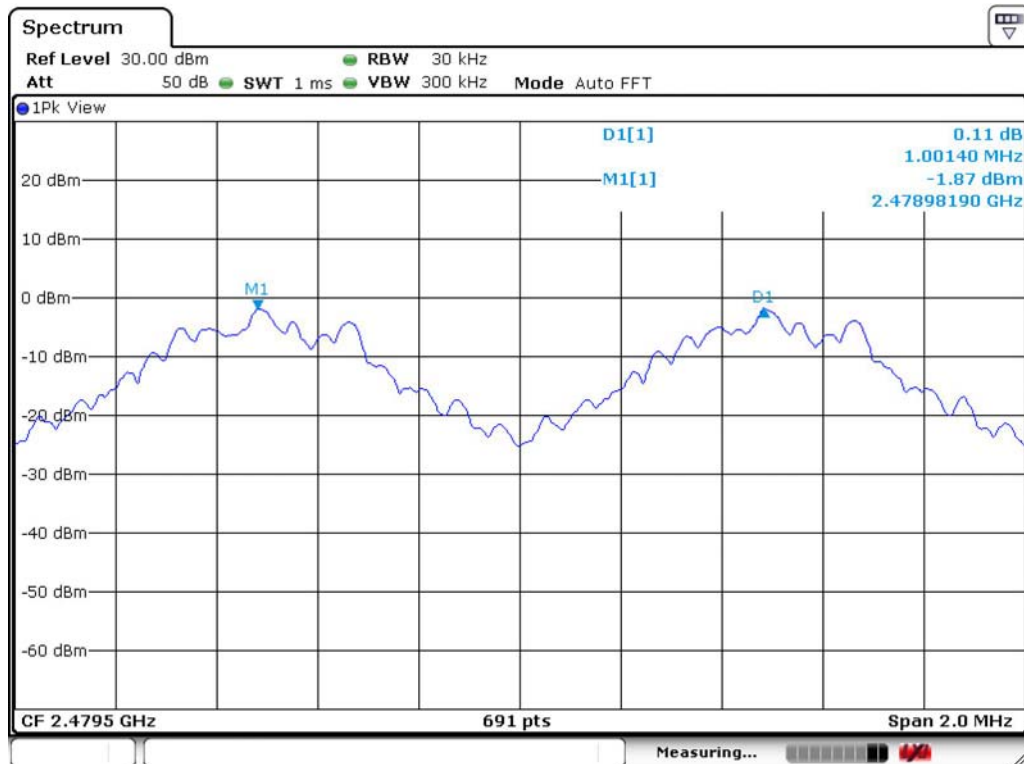
Test Mode	: BT (1Mbps)	Channel	: 2441
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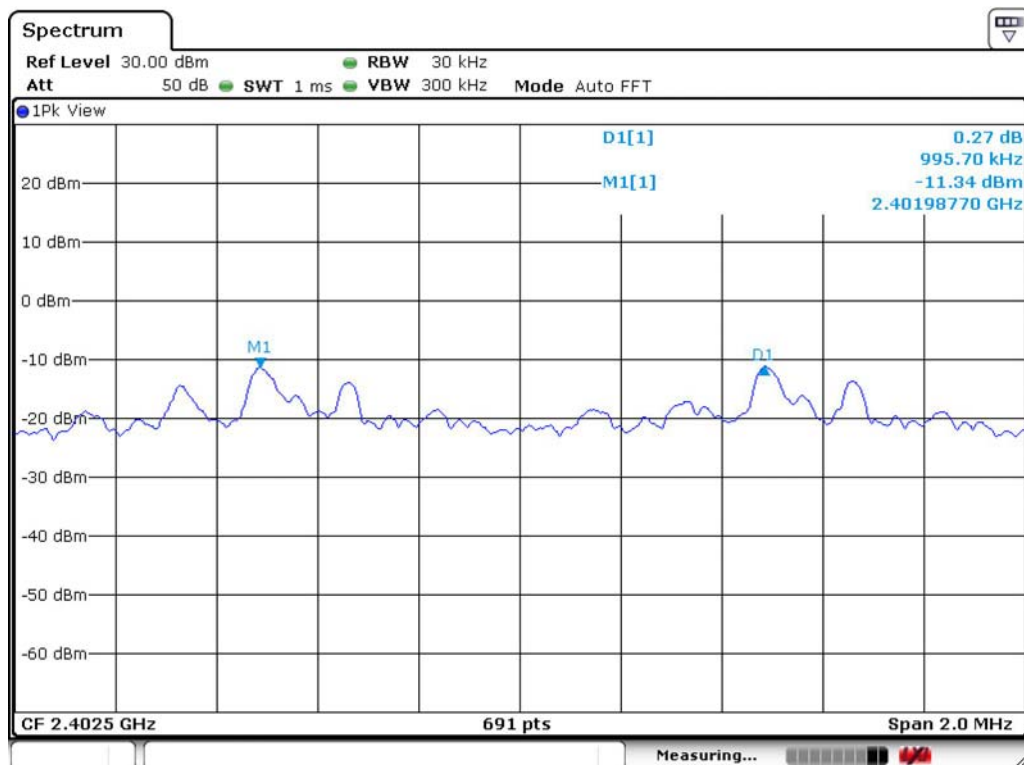
Test Mode : BT (1 Mbps)

Channel : 2480



Test Mode : BT EDR (2 Mbps)

Channel : 2402

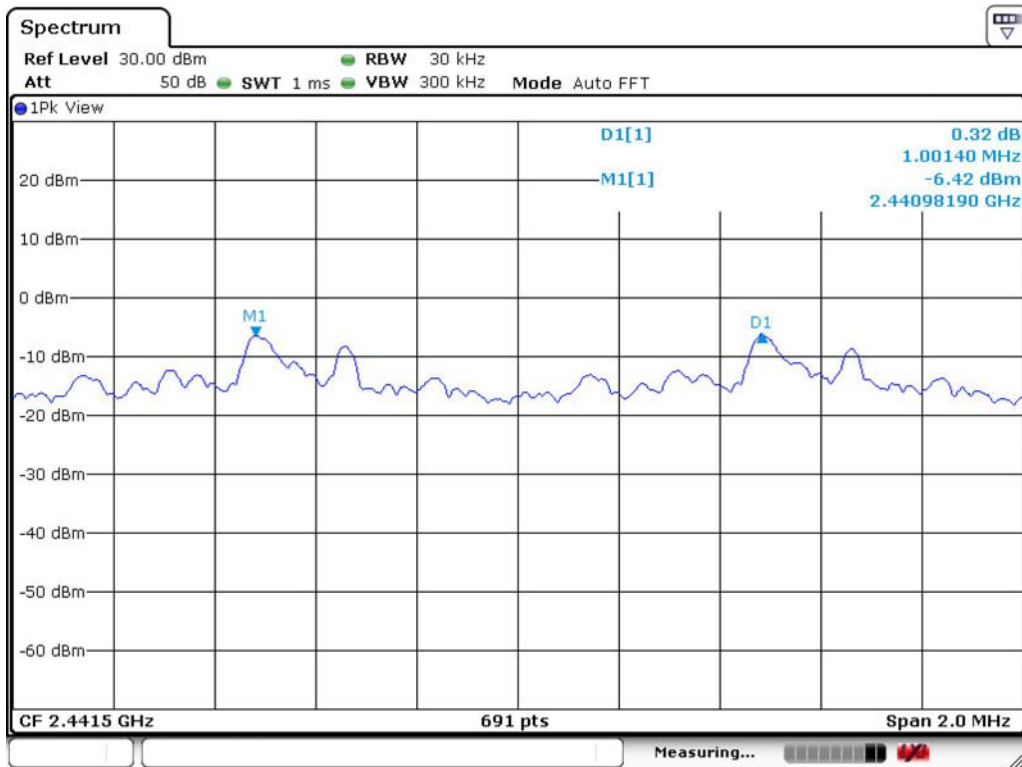






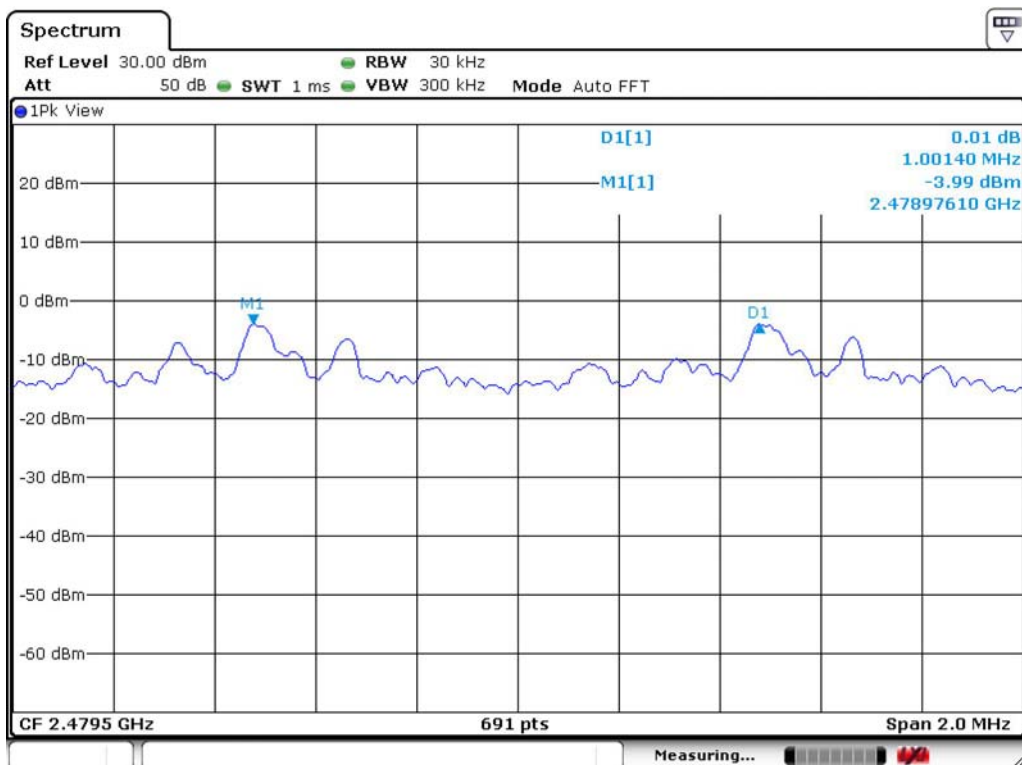
Test Mode : BT EDR (2 Mbps)

Channel : 2441



Test Mode : BT EDR (2 Mbps)

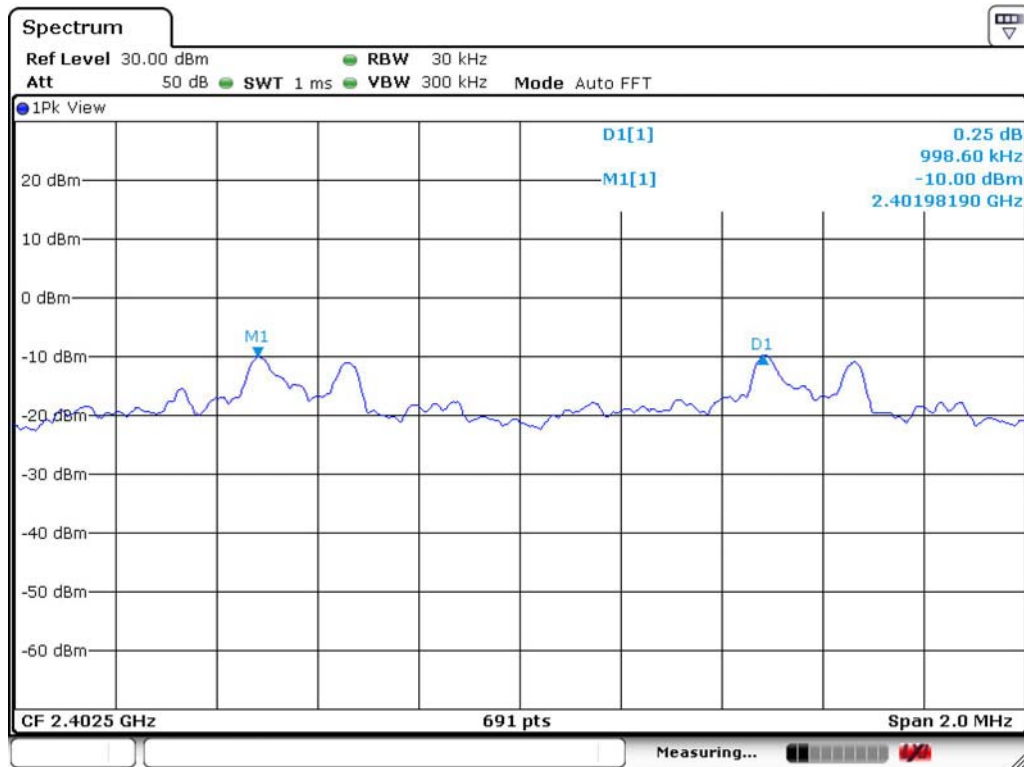
Channel : 2480





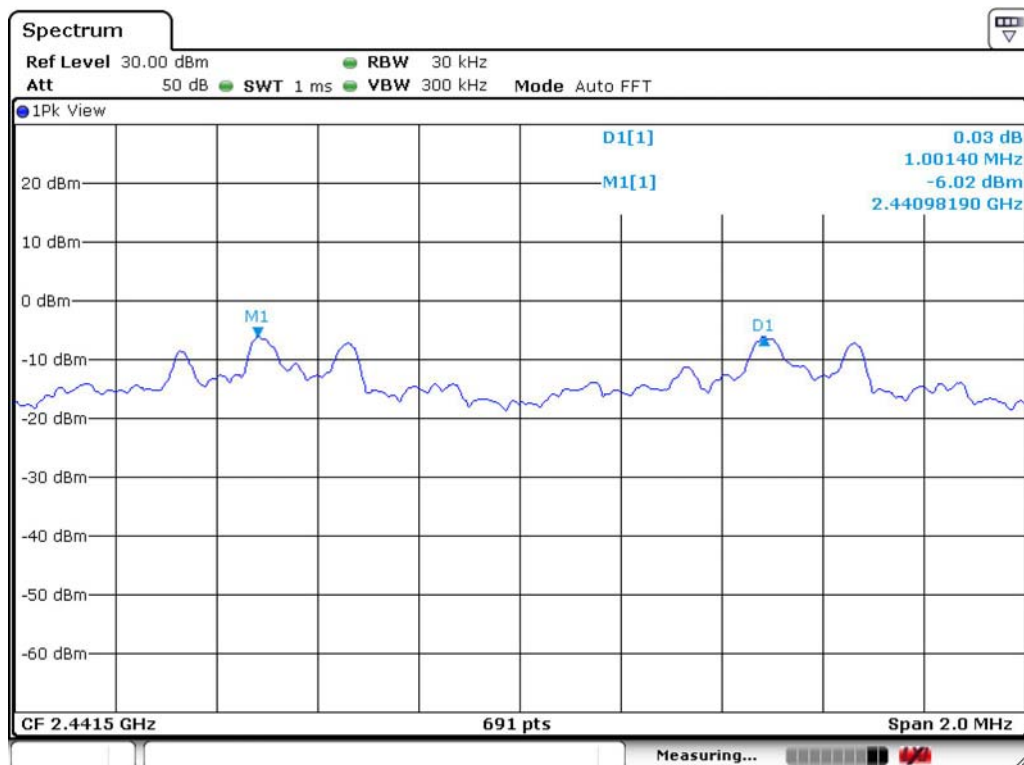
Test Mode : BT EDR (3 Mbps)

Channel : 2402



Test Mode : BT EDR (3 Mbps)

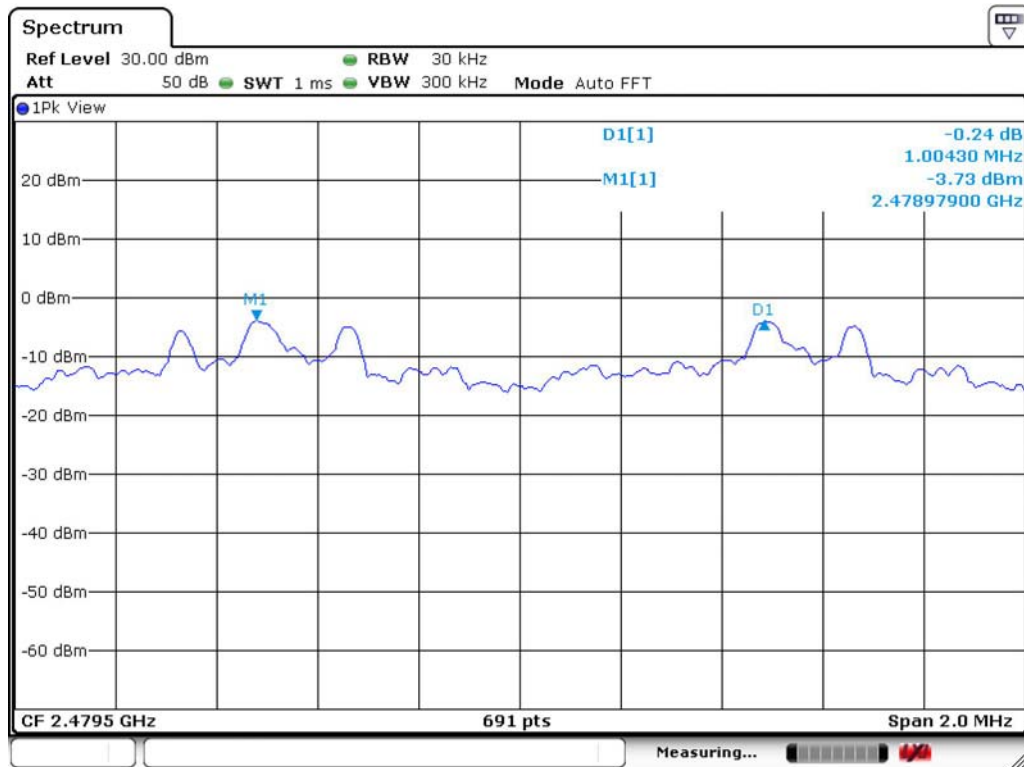
Channel : 2441





Test Mode : BT EDR (3 Mbps)

Channel : 2480



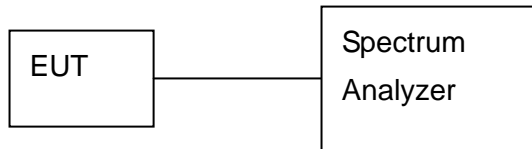


## 6 Number of Hopping Channels

### 6.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 6.2 Test Arrangement and Procedure



1. The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).
2. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps.
3. The RBW is set to 100 kHz and VBW is set to 100 kHz .
4. Max Hold.

### 6.3 Limit (§ 15.247(a)(1)(iii))

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

### 6.4 Test Result

#### **Compliance.**

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

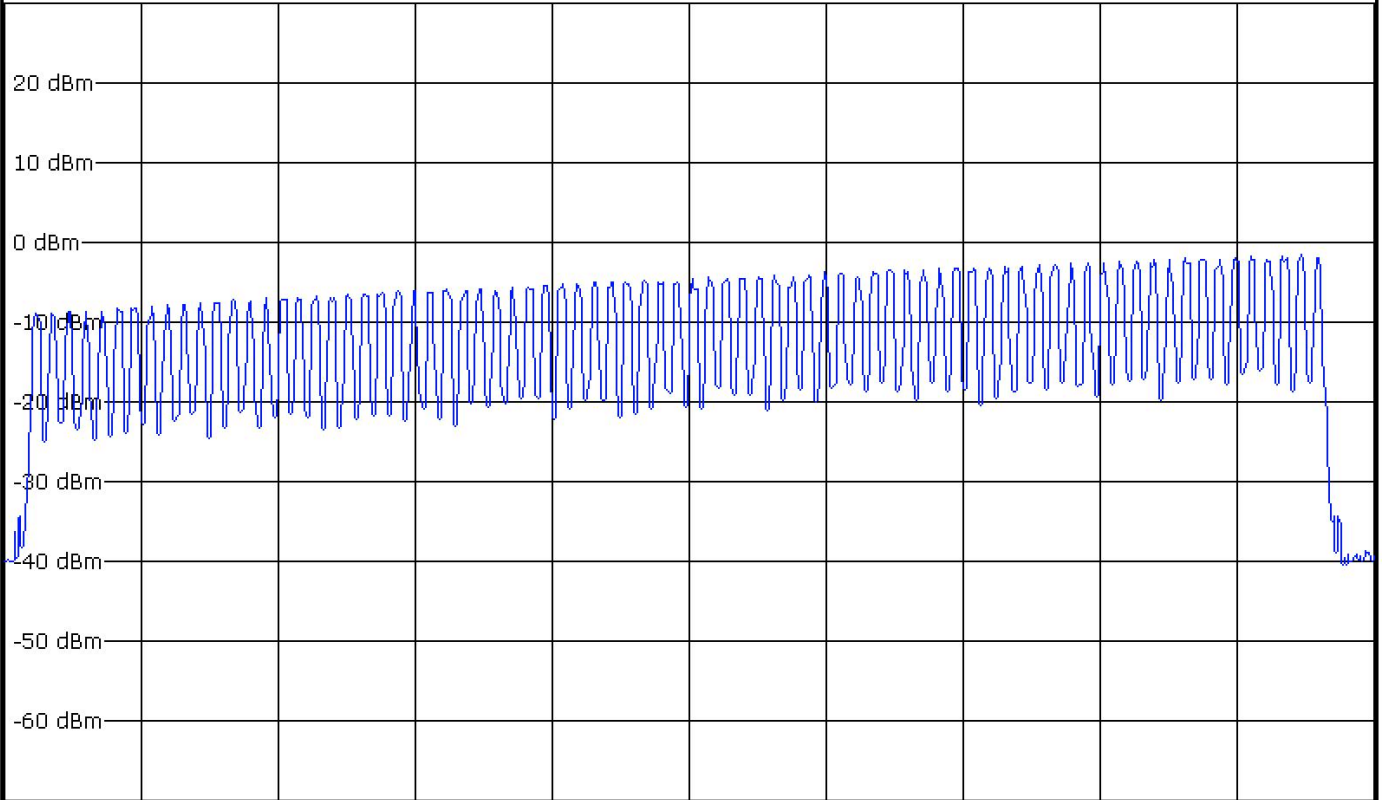


# Spectrum



Ref Level 30.00 dBm RBW 100 kHz  
Att 50 dB SWT 10 ms VBW 100 kHz Mode Auto Sweep

1Pk View



Start 2.4 GHz 691 pts Stop 2.4835 GHz  
Measuring...

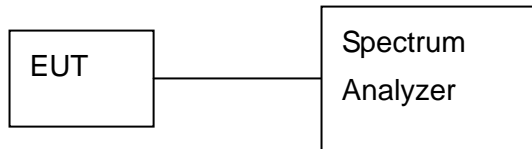


## 7 Average Time of Occupancy

### 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 Average number of pulses per second, the RBW is set to 1MHz and VBW is set to 1MHz. Sweep is set to 1 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).



Bluetooth (1 Mbps) Channel <u>00</u>				
DH Packet	AV Number of Pulses per sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	10.0	0.00046522	0.14701	0.4
DH3	5.1	0.00171014	0.275606	0.4
DH5	3.4	0.00295652	0.317649	0.4

Bluetooth EDR (2 Mbps) Channel <u>00</u>				
DH Packet	AV Number of Pulses per sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	9.8	0.00046087	0.142722	0.4
DH3	5.0	0.00171014	0.270202	0.4
DH5	3.4	0.00300725	0.323099	0.4

Bluetooth EDR (3 Mbps) Channel <u>00</u>				
DH Packet	AV Number of Pulses per sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	10.0	0.00045217	0.142886	0.4
DH3	5.0	0.00171304	0.27066	0.4
DH5	3.3	0.00295942	0.308608	0.4
Remark: AV time of Occupancy = 79 (Total Channel) * 0.4 (sec) * AV Number of Pulses per sec * Pulse Width (sec)				

**Bluetooth (1 Mbps) Channel 39**

DH Packet	AV Number of Pulses per sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	9.9	0.00044203	0.138285	0.4
DH3	5.1	0.00172029	0.277242	0.4
DH5	3.4	0.00298116	0.320296	0.4

**Bluetooth EDR (2 Mbps) Channel 39**

DH Packet	AV Number of Pulses per sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	10.0	0.0004942	0.156167	0.4
DH3	5.0	0.0017058	0.269516	0.4
DH5	3.4	0.00298116	0.320296	0.4

**Bluetooth EDR (3 Mbps) Channel 39**

DH Packet	AV Number of Pulses per sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	10.0	0.00045942	0.145177	0.4
DH3	5.1	0.00171304	0.276074	0.4
DH5	3.3	0.00297391	0.310119	0.4

Remark: AV time of Occupancy = 79 (Total Channel) \* 0.4 (sec) \* AV Number of Pulses per sec \* Pulse Width (sec)



**Bluetooth (1 Mbps) Channel 78**

DH Packet	AV Number of Pulses per sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	9.8	0.00045072	0.139579	0.4
DH3	5.0	0.00171449	0.270889	0.4
DH5	3.4	0.00298261	0.320452	0.4

**Bluetooth EDR (2 Mbps) Channel 78**

DH Packet	AV Number of Pulses per sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	10.0	0.00045507	0.143802	0.4
DH3	5.1	0.00173623	0.279811	0.4
DH5	3.5	0.00298986	0.330679	0.4

**Bluetooth EDR (3 Mbps) Channel 78**

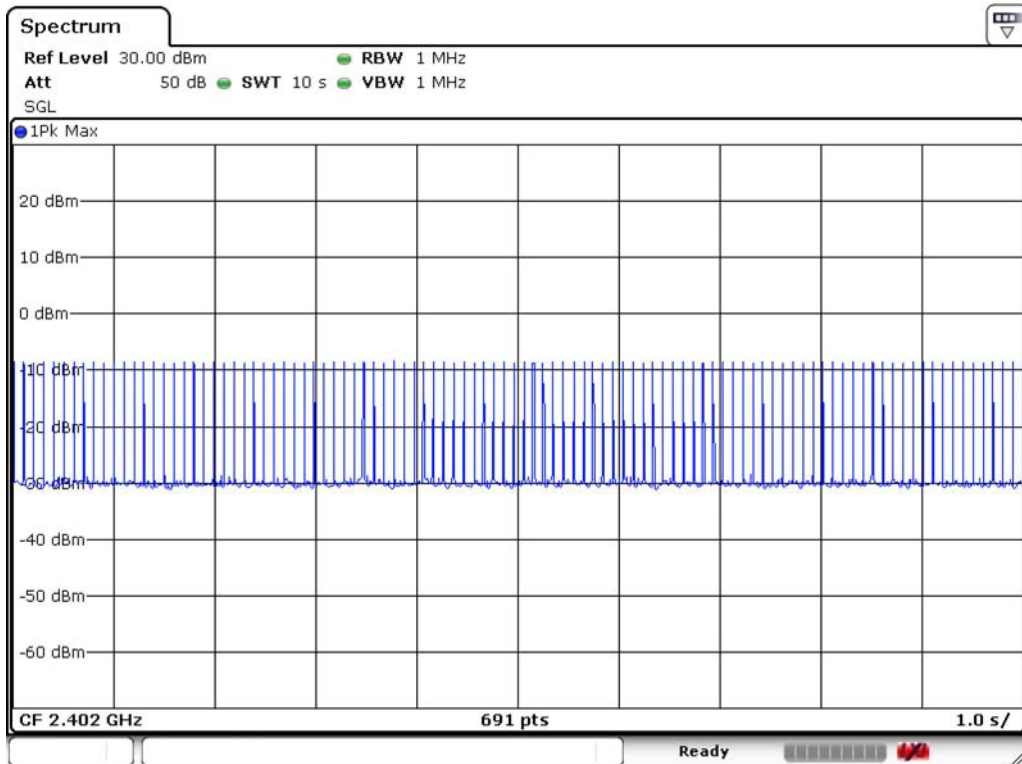
DH Packet	AV Number of Pulses per sec	Pulse Width (sec)	AV time of Occupancy (sec)	Limit (sec)
DH1	9.9	0.00046812	0.146447	0.4
DH3	5.0	0.00172174	0.272035	0.4
DH5	3.4	0.0029971	0.322008	0.4

Remark: AV time of Occupancy = 79 (Total Channel) \* 0.4 (sec) \* AV Number of Pulses per sec \* Pulse Width (sec)

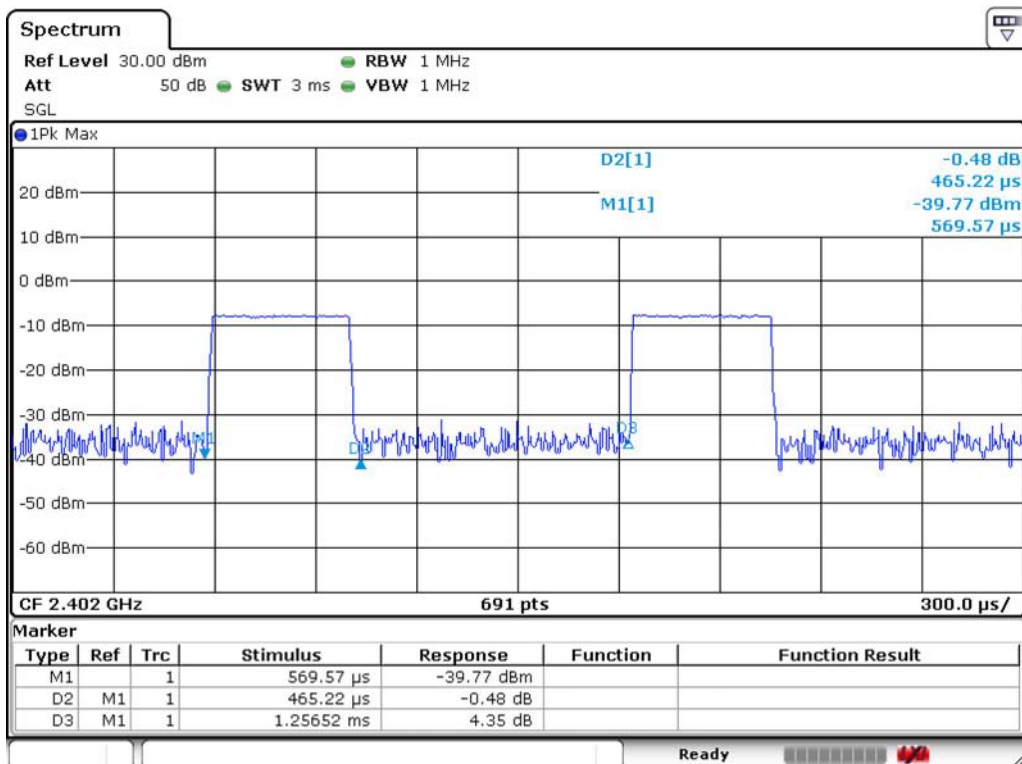


Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Test Mode	: BT (1Mbps) DH1	Channel	: 2402

Average Number of Pulses Per sec



Pulse Width (sec)

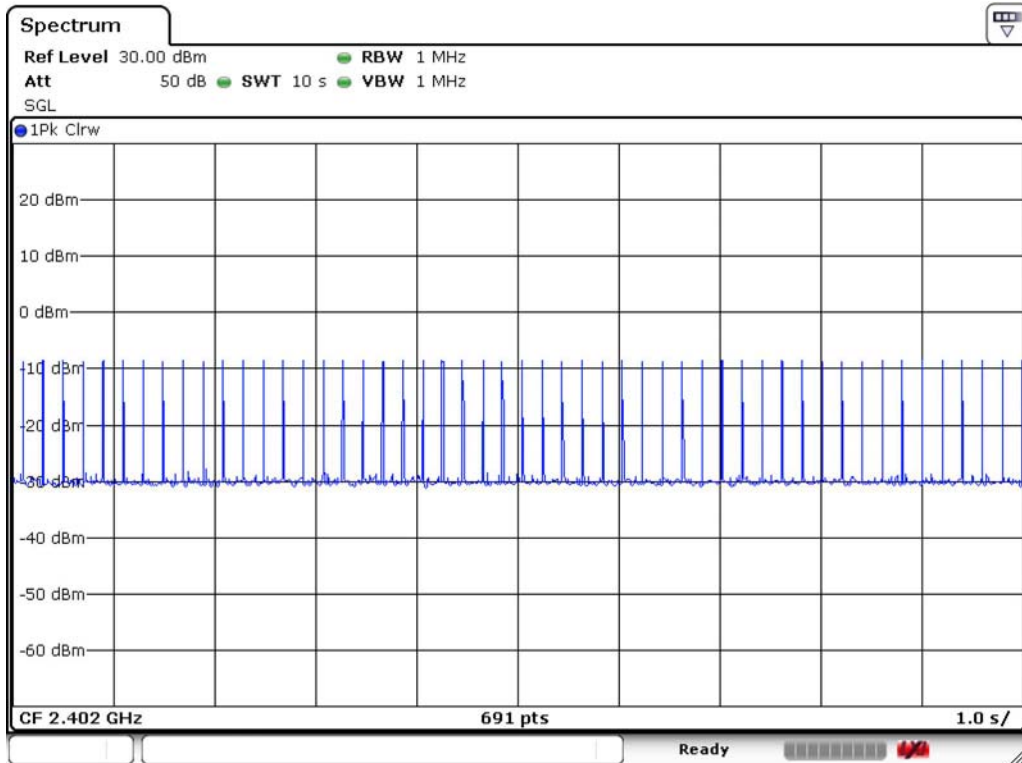




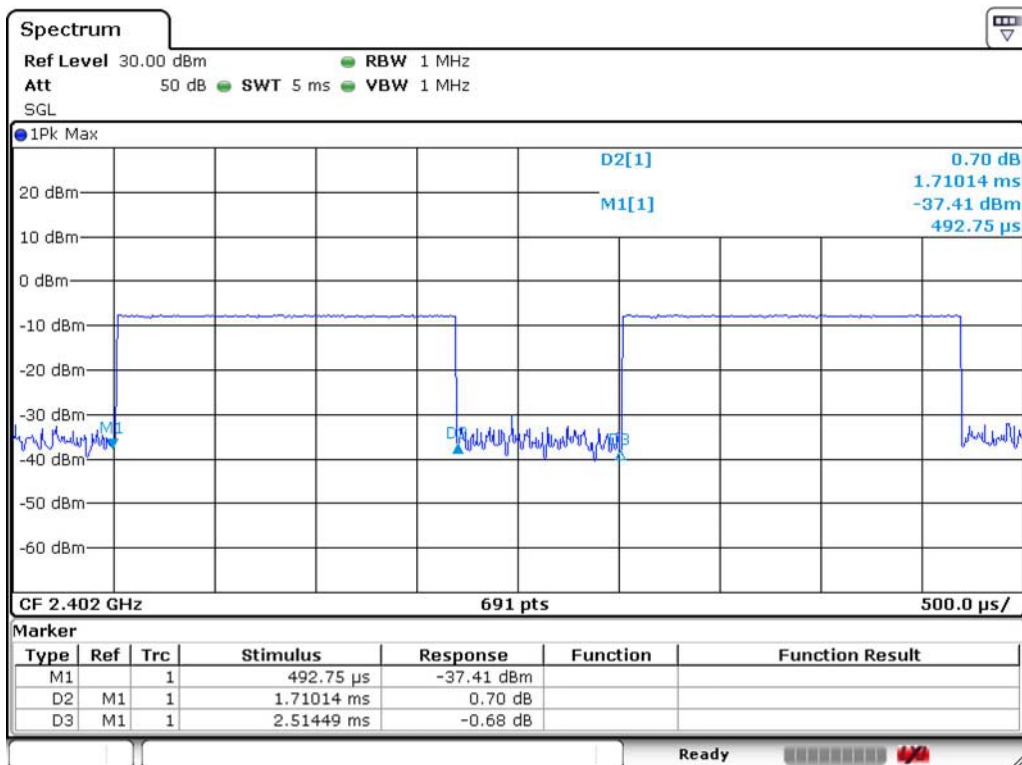
Test Mode : BT (1Mbps) DH3

Channel : 2402

Average Number of Pulses Per sec



Pulse Width (sec)

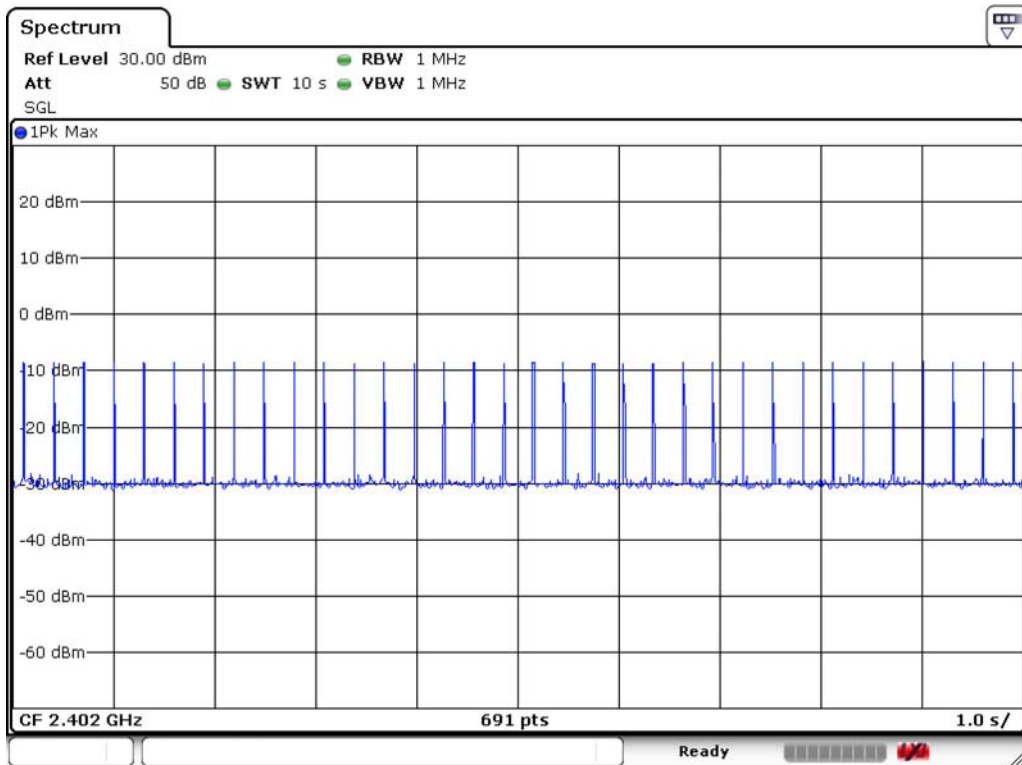




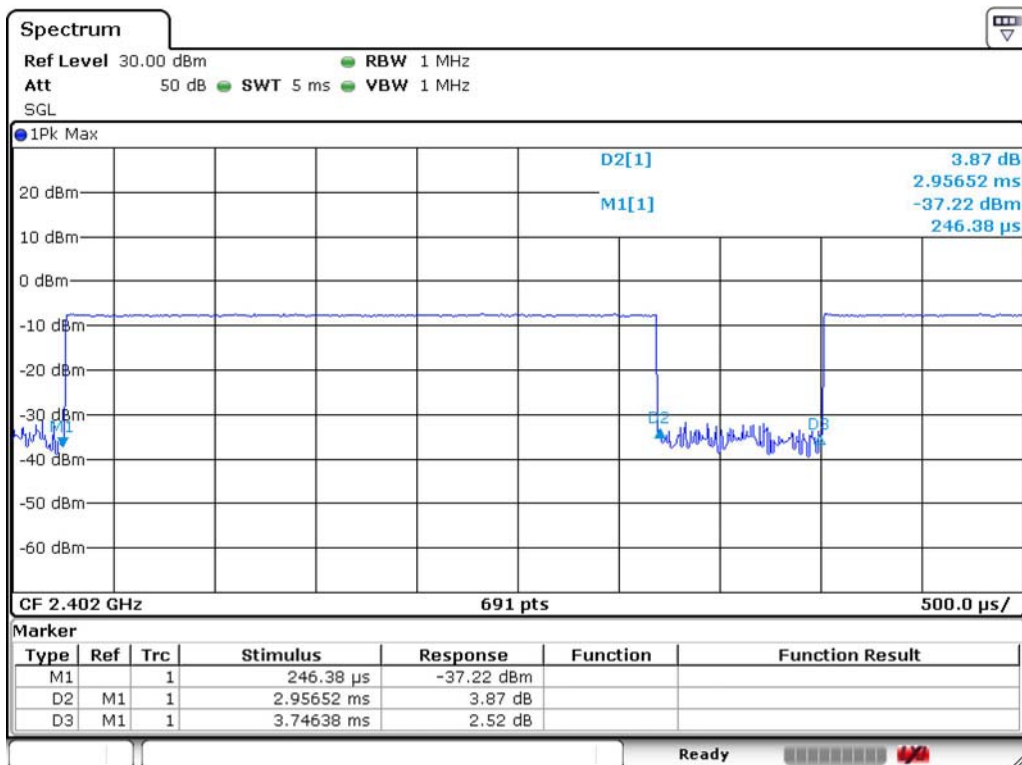
Test Mode : BT (1Mbps) DH5

Channel : 2402

Average Number of Pulses Per sec



Pulse Width (sec)

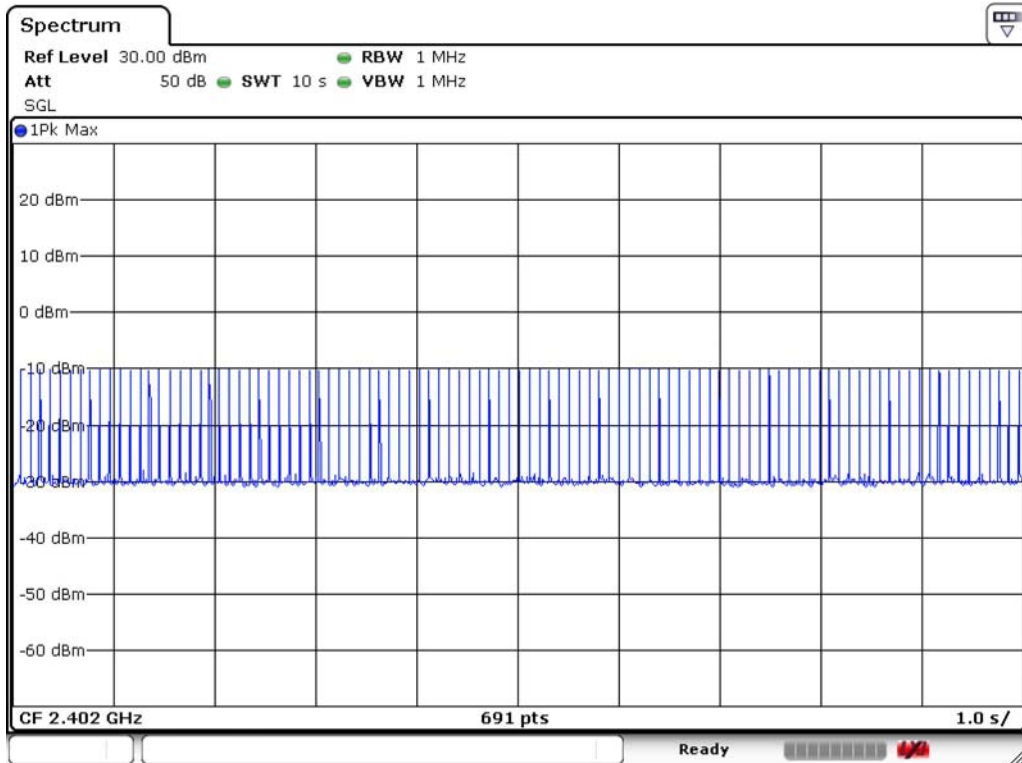




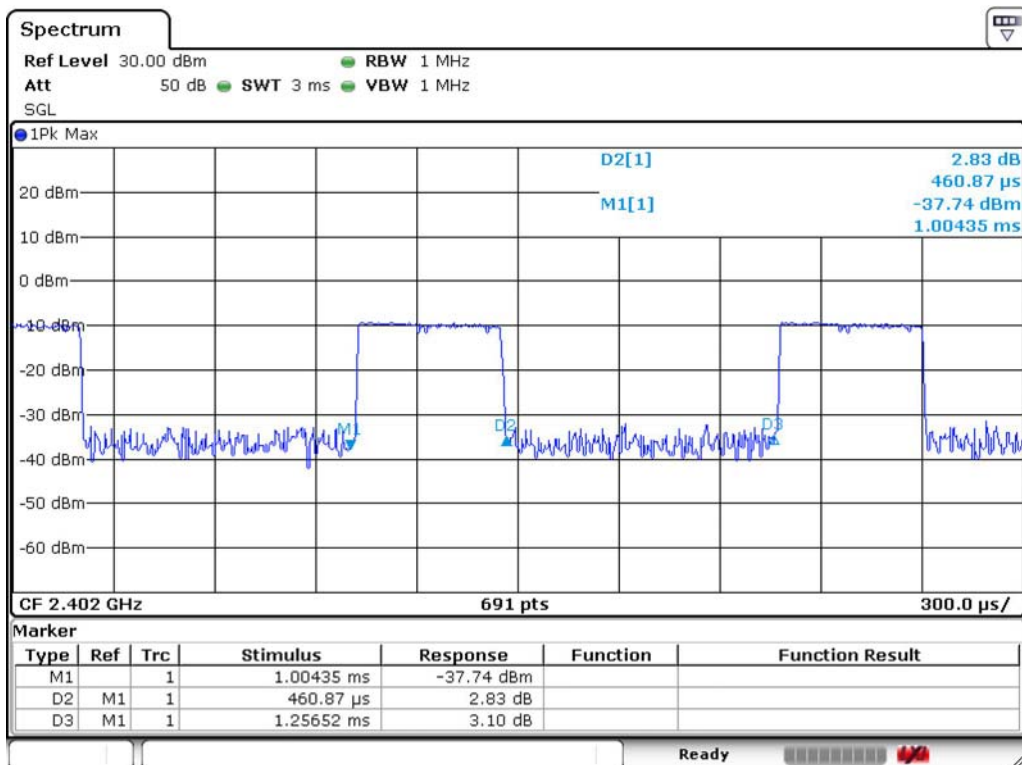
Test Mode : BT EDR (2Mbps) DH1

Channel : 2402

Average Number of Pulses Per sec



Pulse Width (sec)

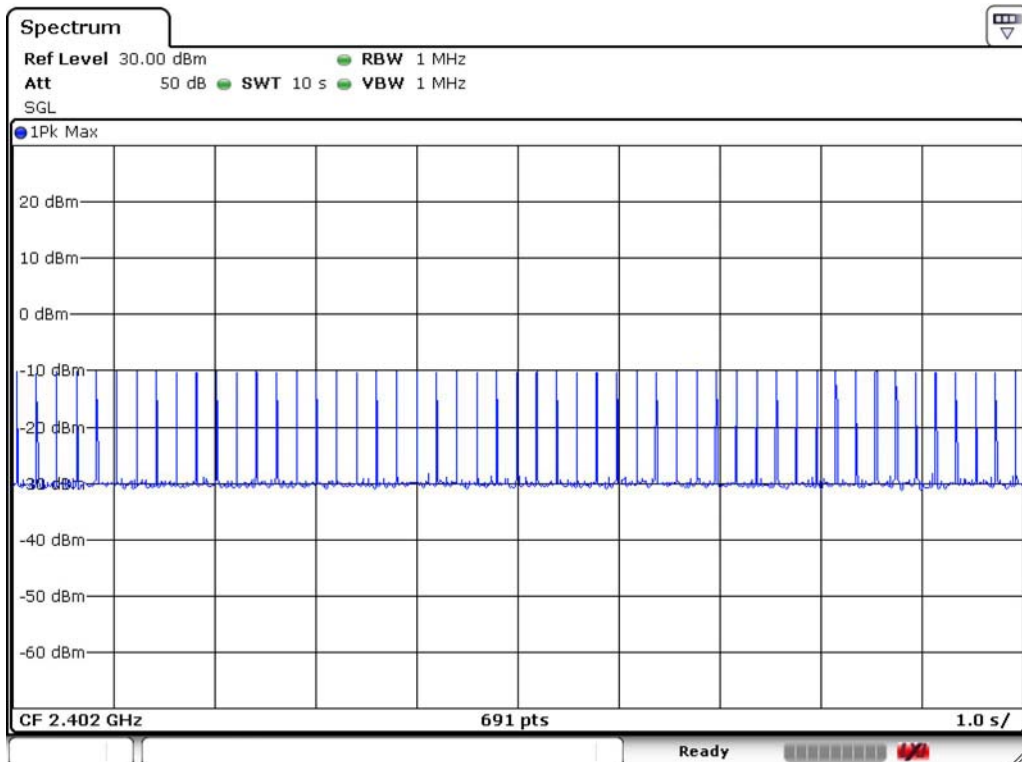




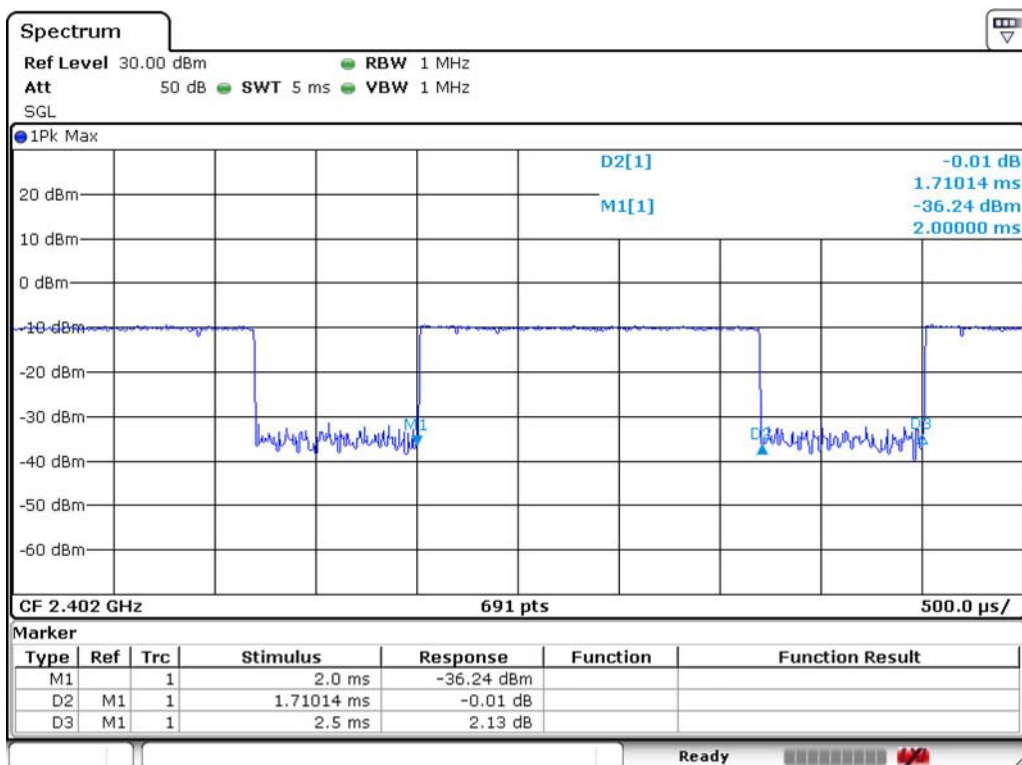
Test Mode : BT EDR (2Mbps) DH3

Channel : 2402

Average Number of Pulses Per sec



Pulse Width (sec)

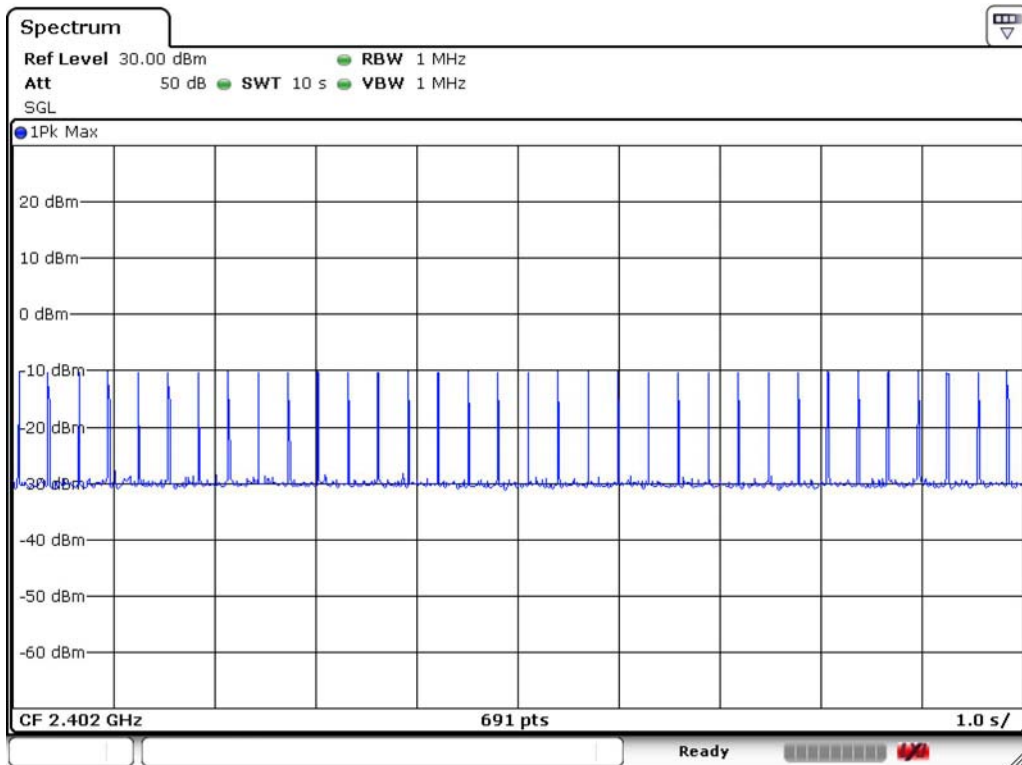




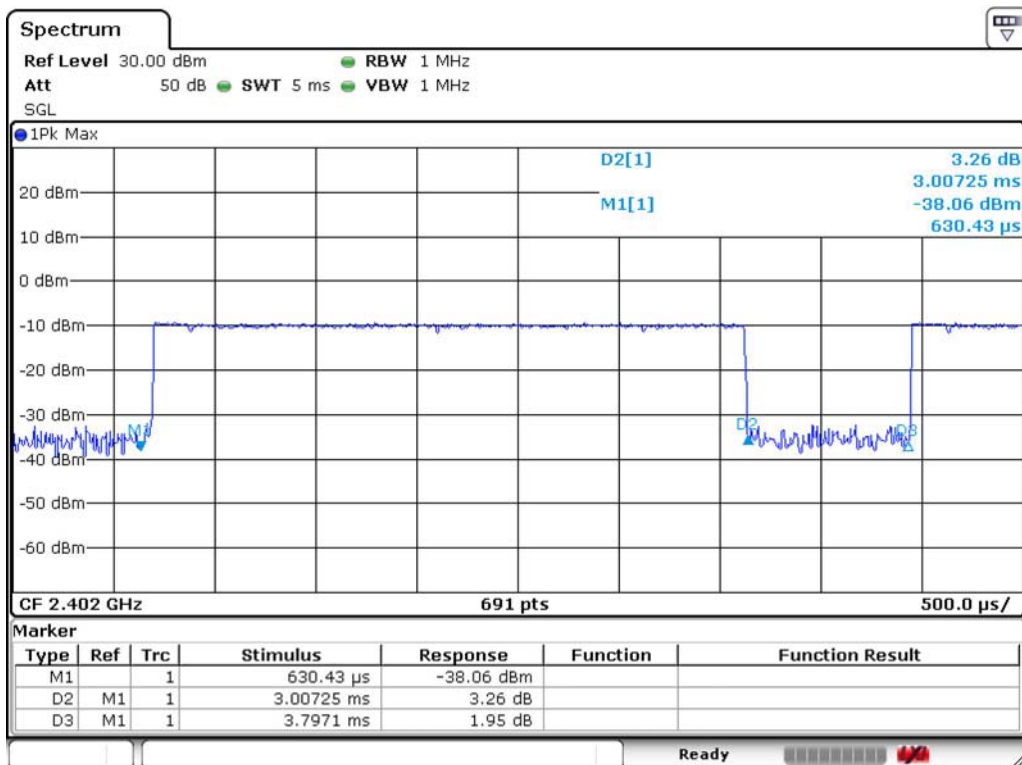
Test Mode : BT EDR (2Mbps) DH5

Channel : 2402

Average Number of Pulses Per sec



Pulse Width (sec)



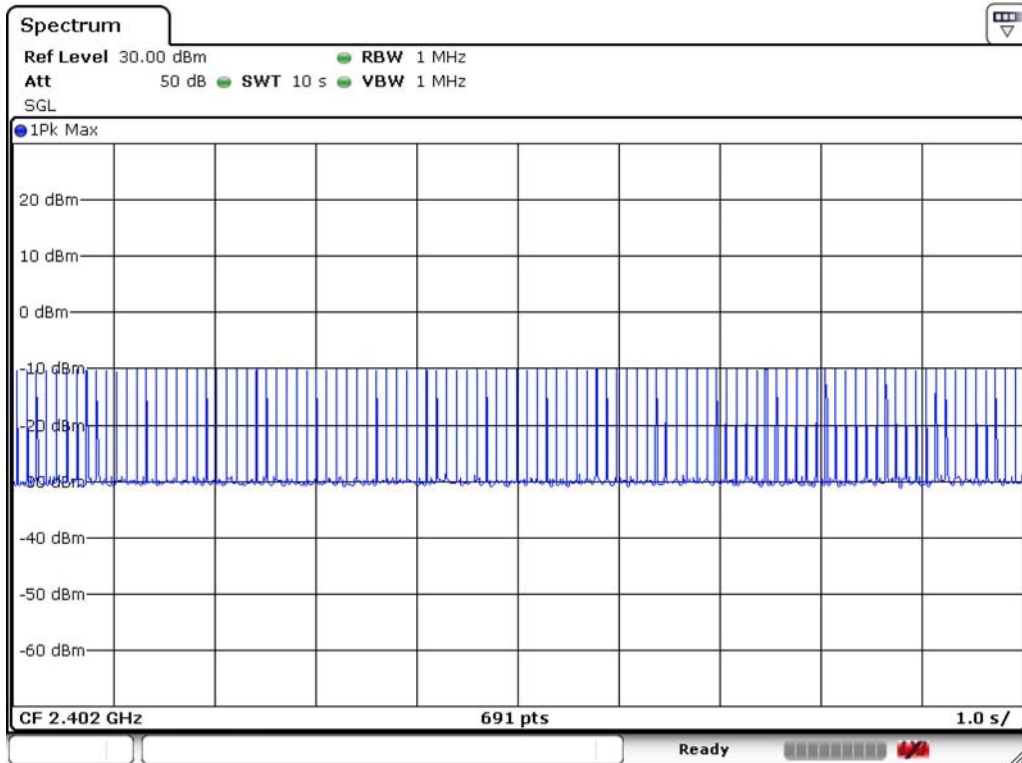




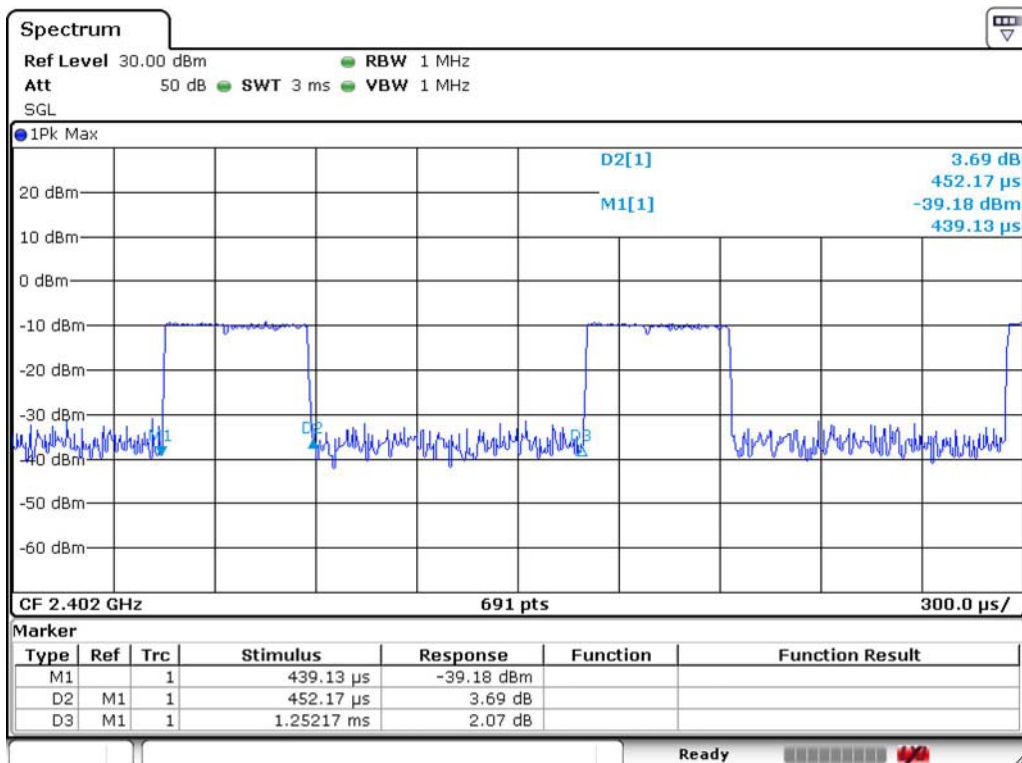
Test Mode : BT EDR (3Mbps) DH1

Channel : 2402

Average Number of Pulses Per sec



Pulse Width (sec)



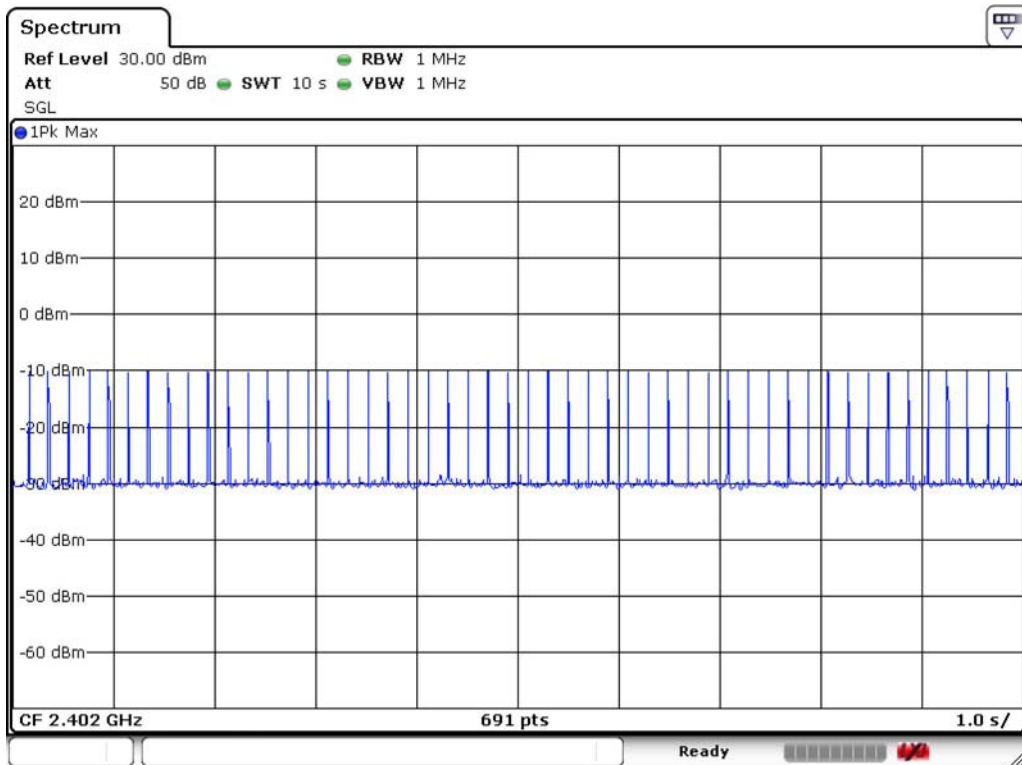




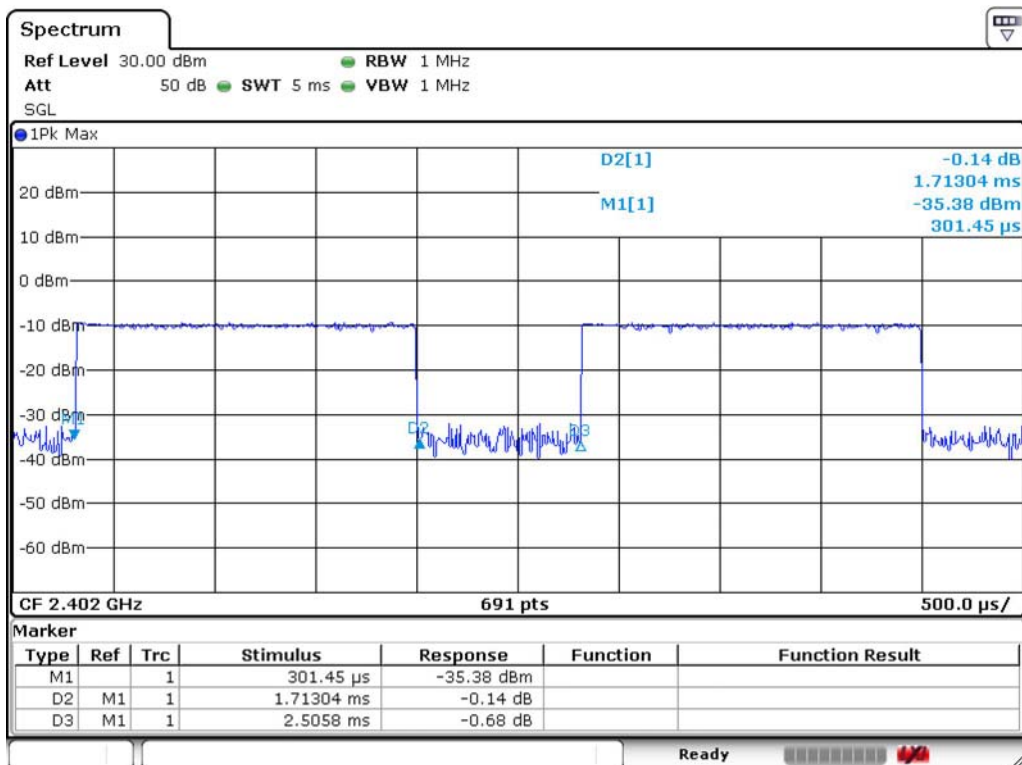
Test Mode : BT EDR (3Mbps) DH3

Channel : 2402

Average Number of Pulses Per sec



Pulse Width (sec)

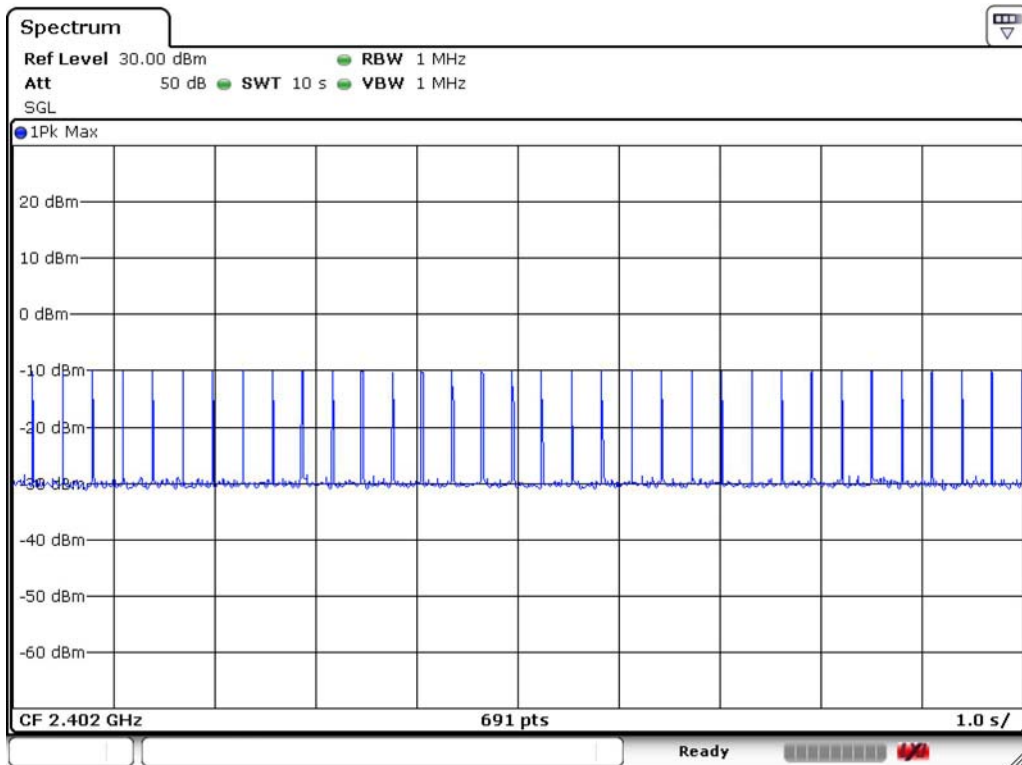




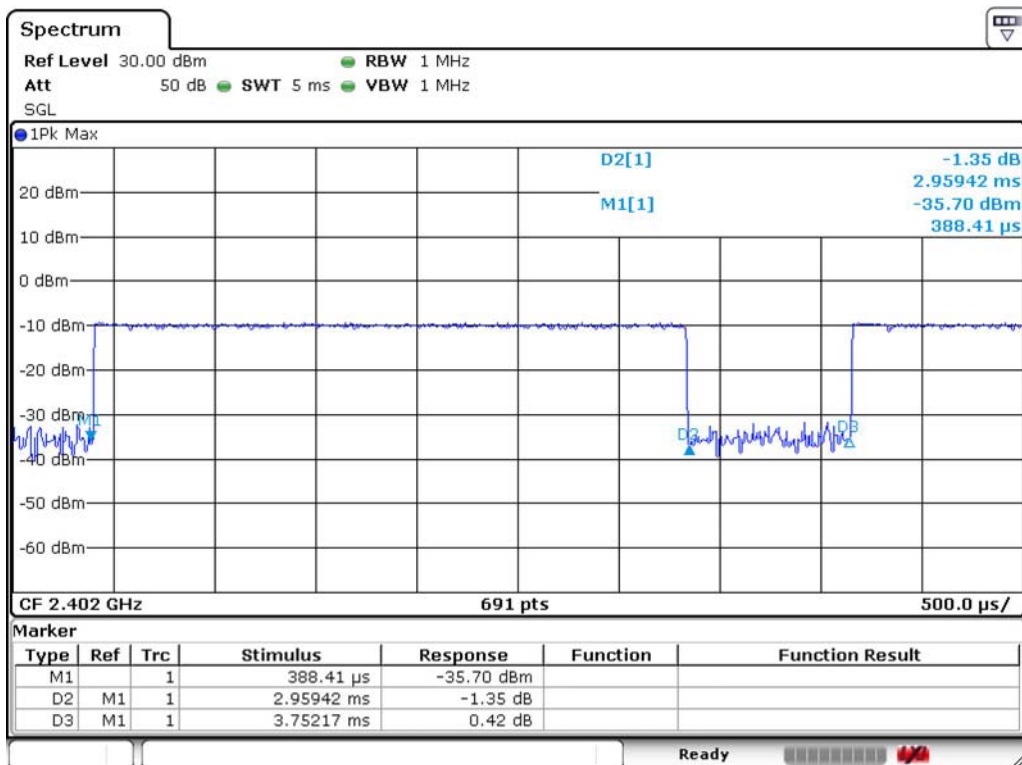
Test Mode : BT EDR (3Mbps) DH5

Channel : 2402

Average Number of Pulses Per sec



Pulse Width (sec)

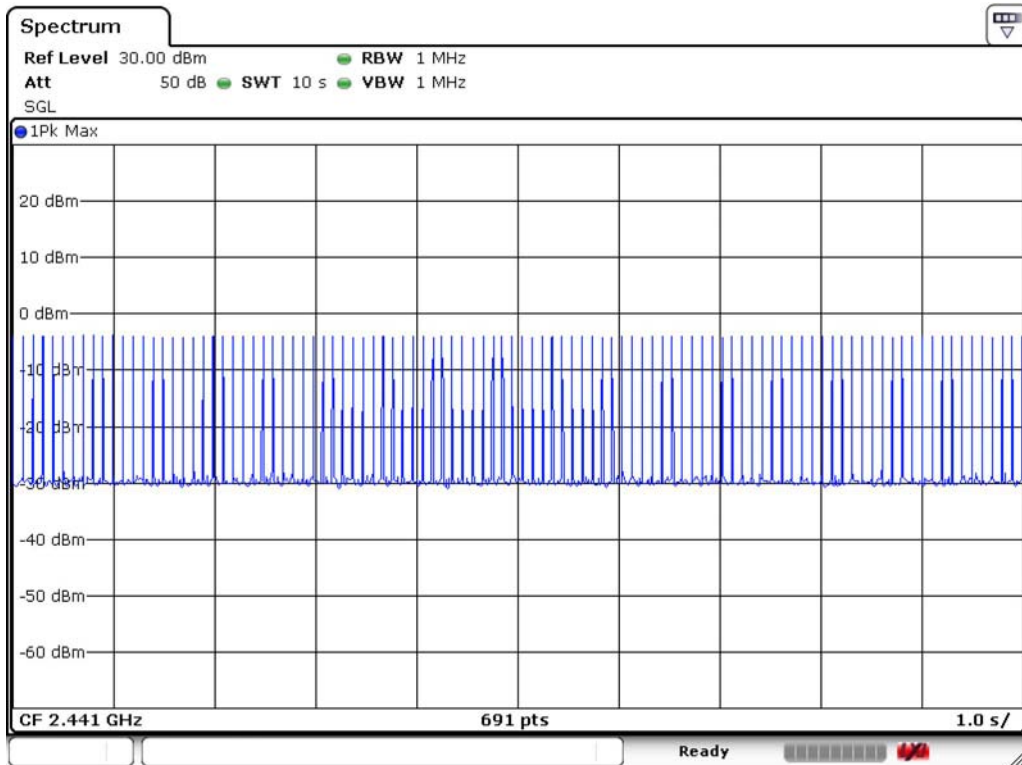




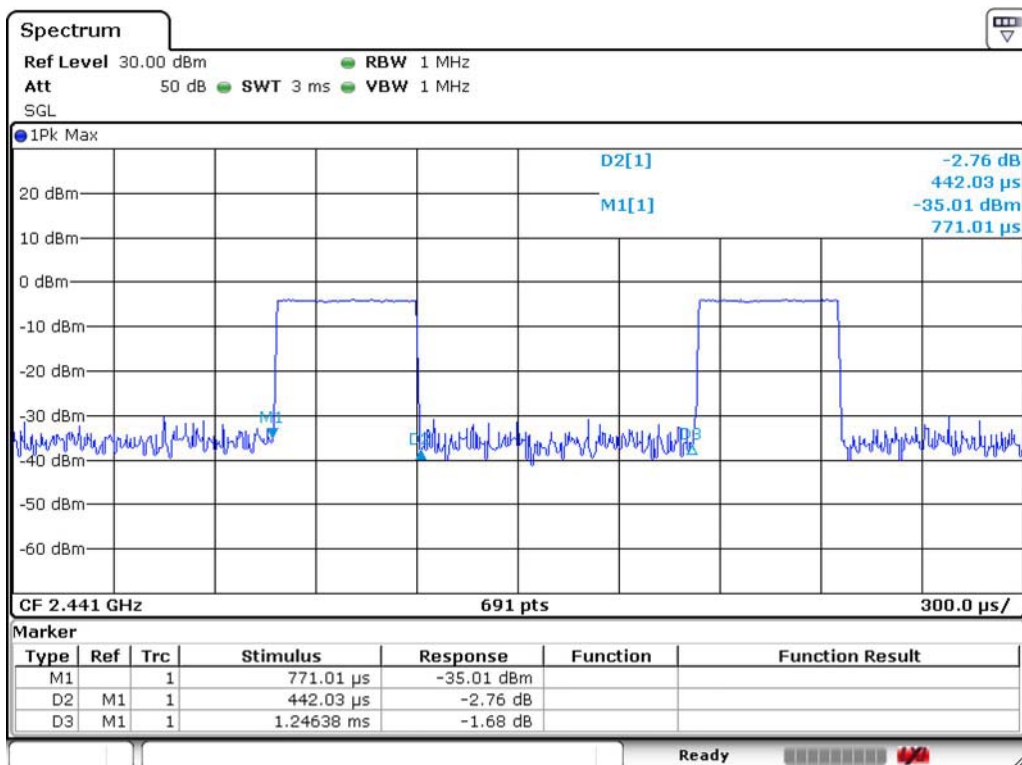
Test Mode : BT (1Mbps) DH1

Channel : 2441

Average Number of Pulses Per sec



Pulse Width (sec)

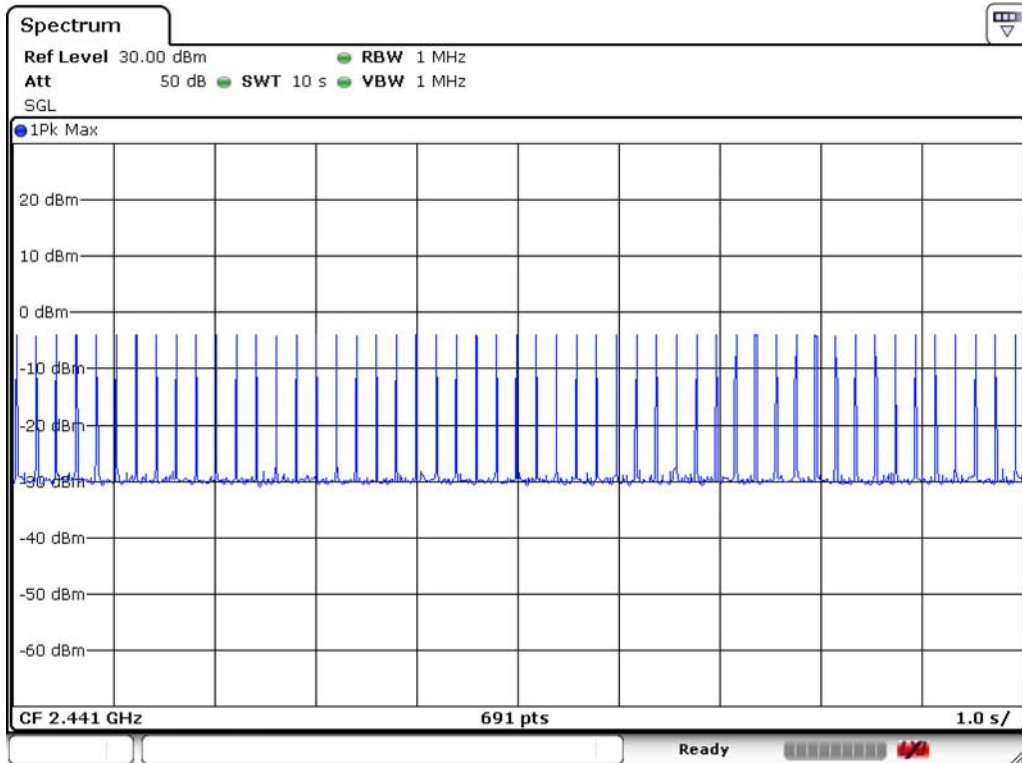




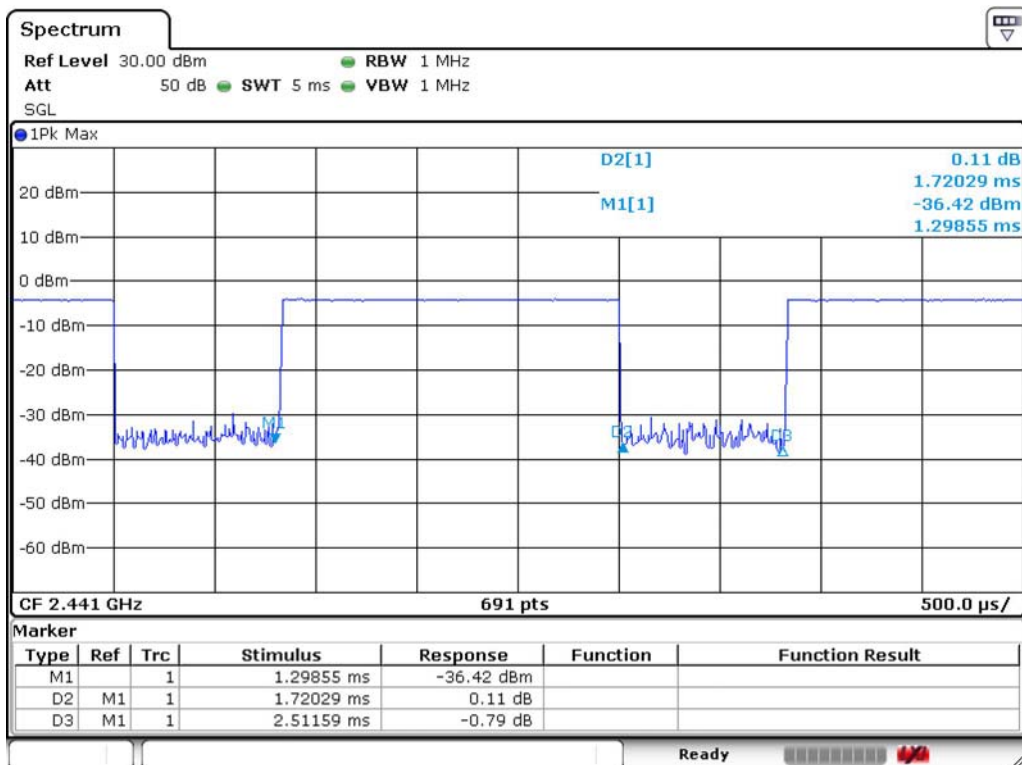
Test Mode : BT (1Mbps) DH3

Channel : 2441

Average Number of Pulses Per sec



Pulse Width (sec)

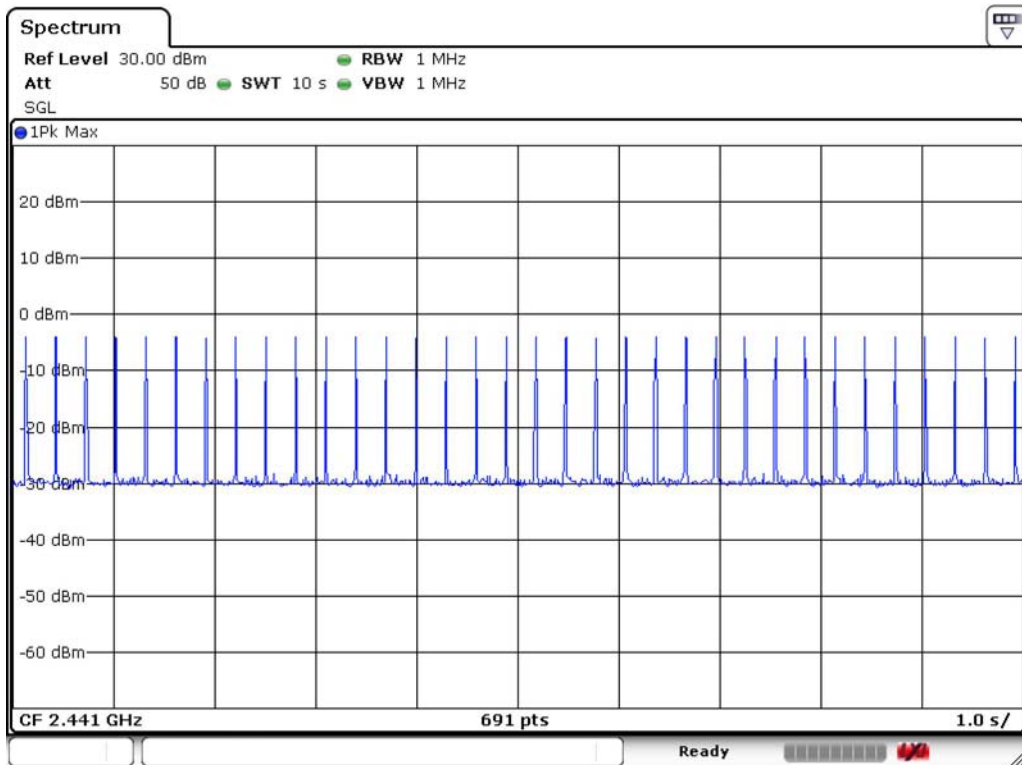




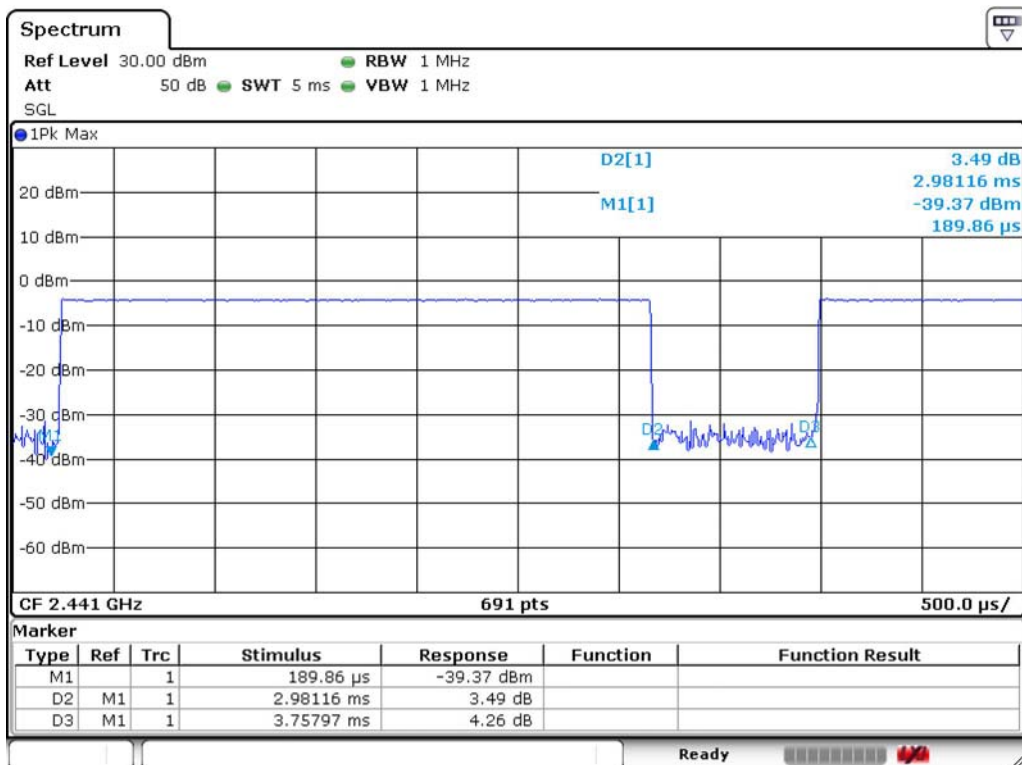
Test Mode : BT (1Mbps) DH5

Channel : 2441

Average Number of Pulses Per sec



Pulse Width (sec)

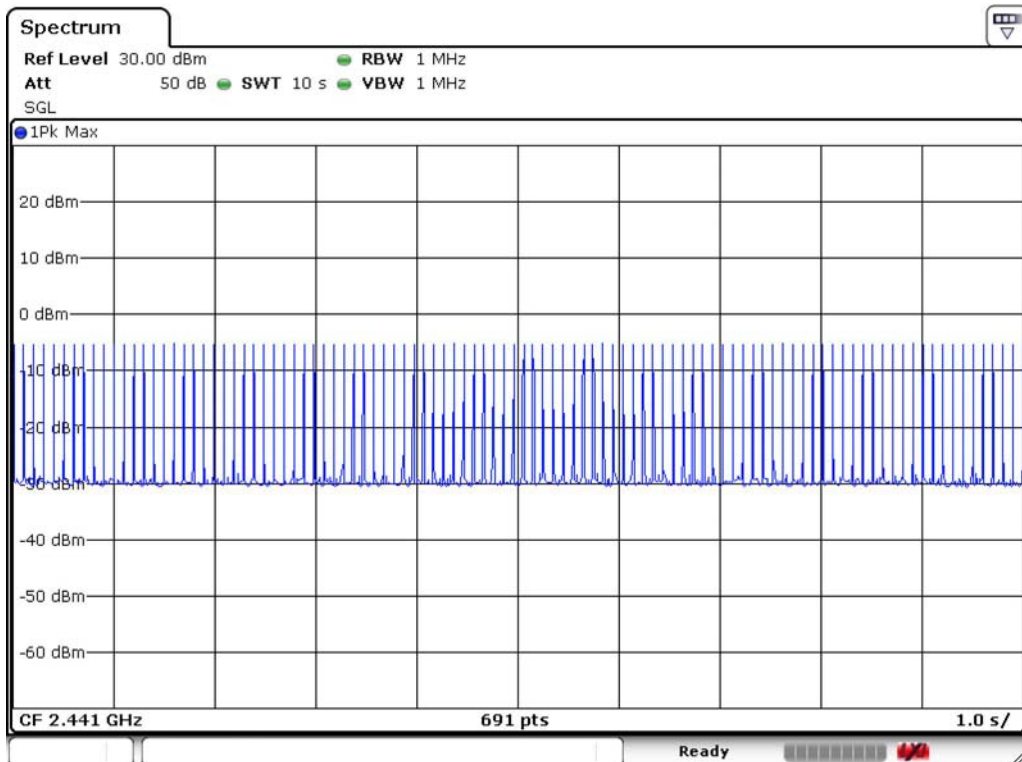




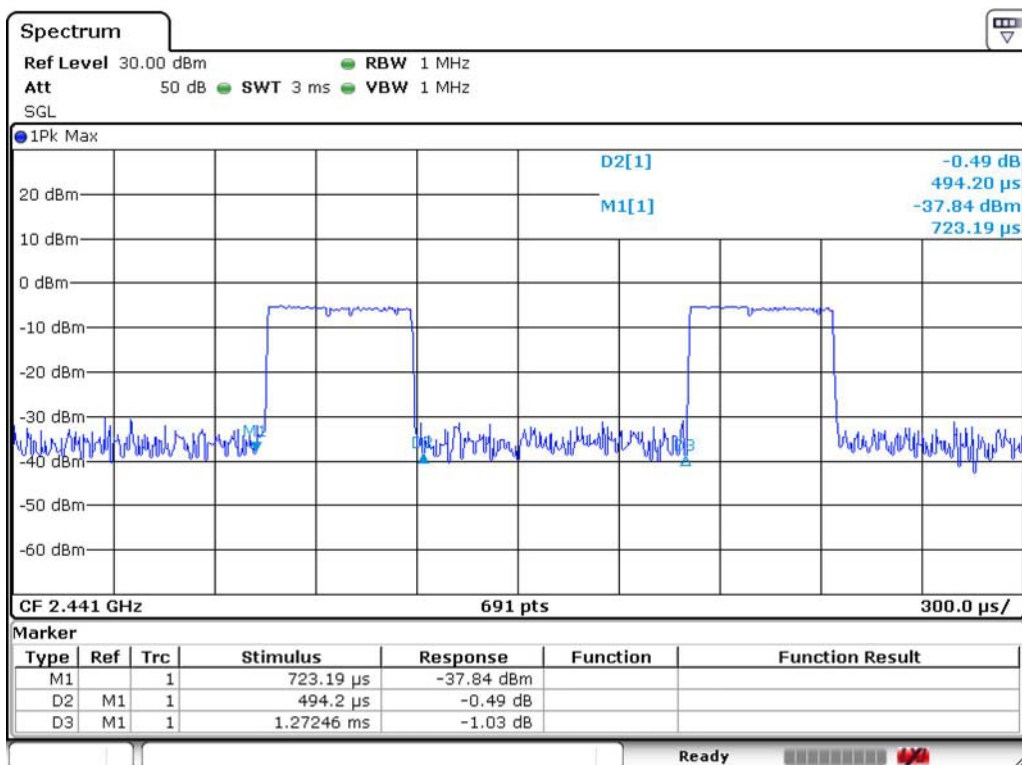
Test Mode : BT EDR (2Mbps) DH1

Channel : 2441

Average Number of Pulses Per sec



Pulse Width (sec)

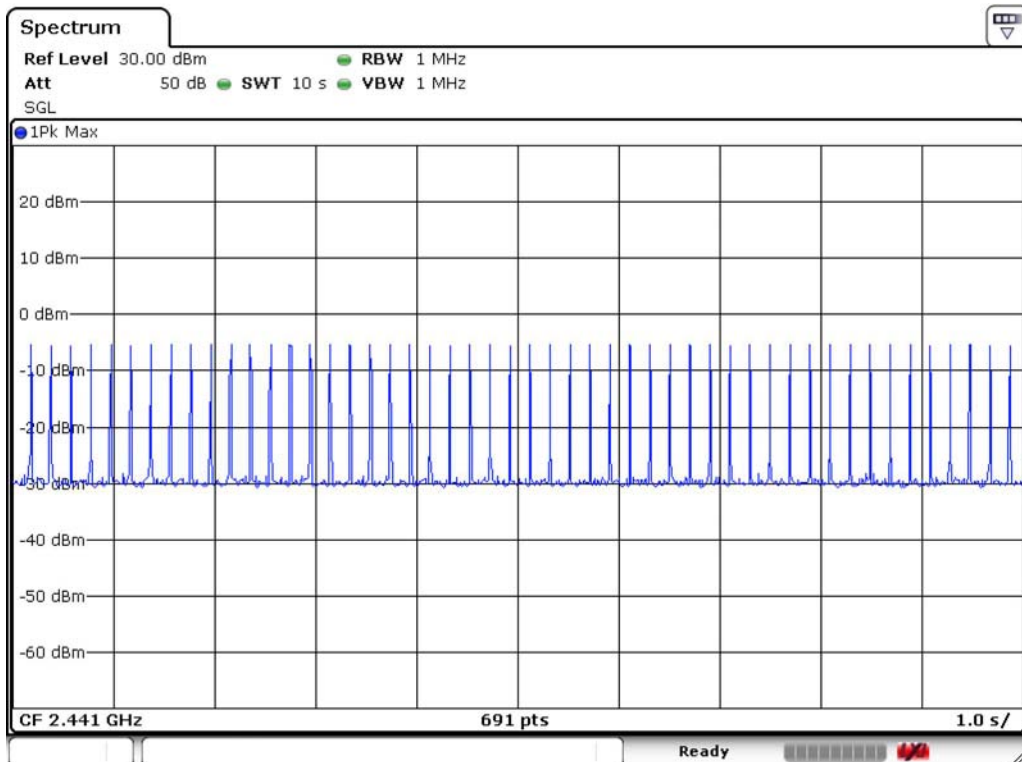




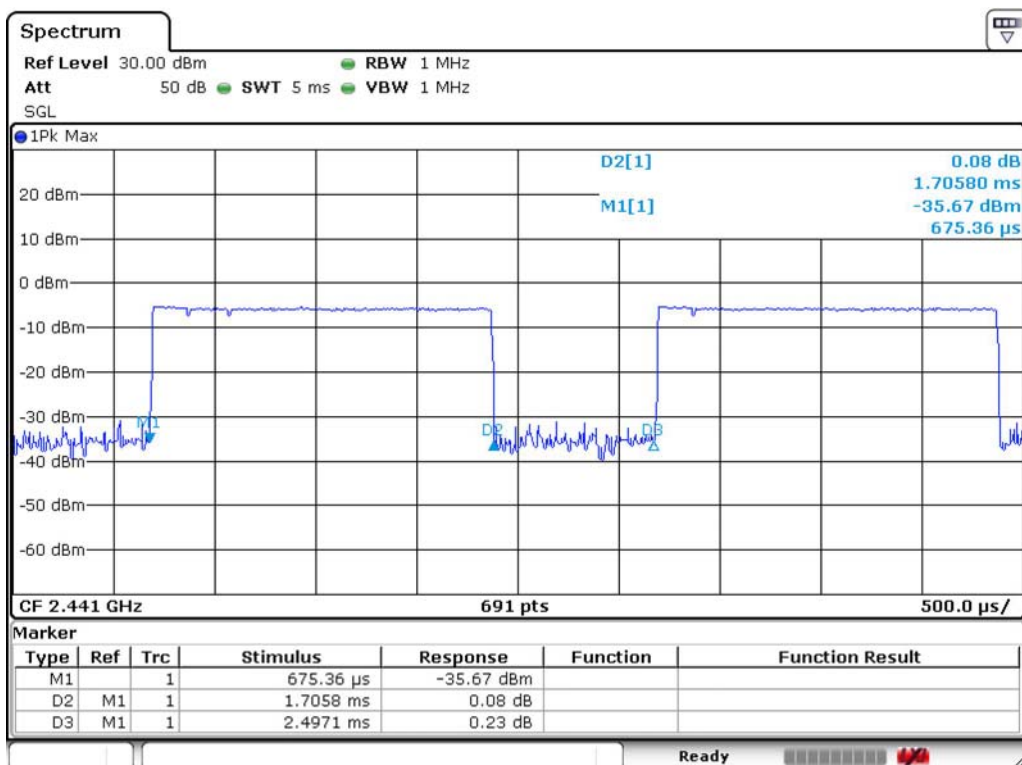
Test Mode : BT EDR (2Mbps) DH3

Channel : 2441

Average Number of Pulses Per sec



Pulse Width (sec)



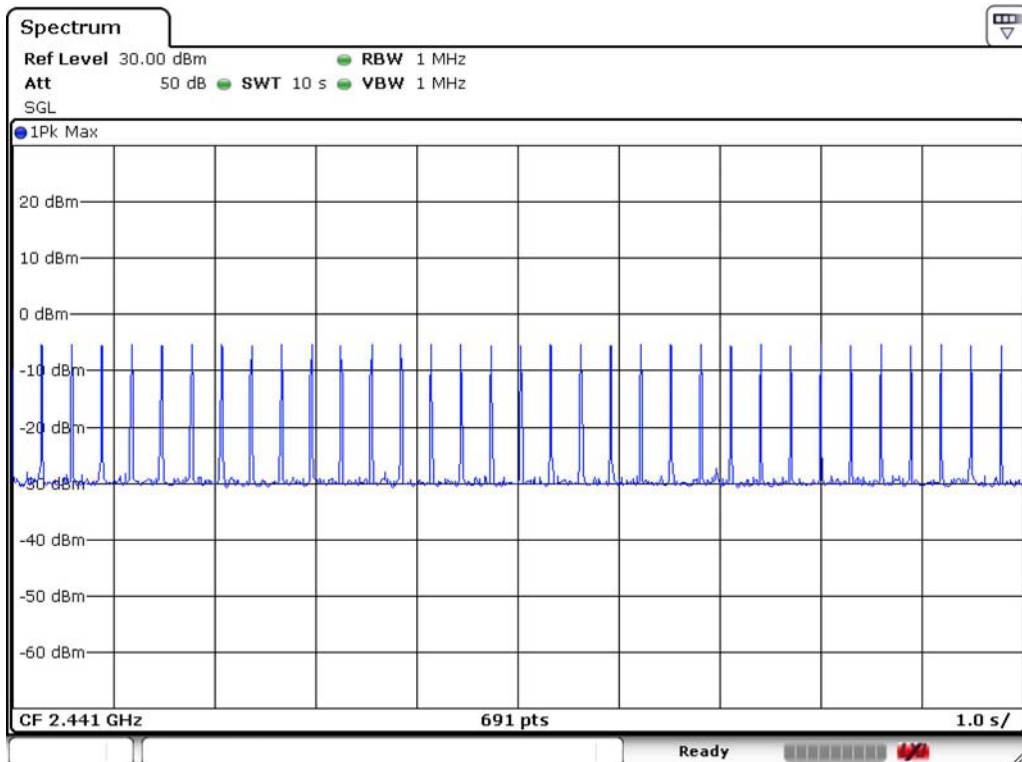




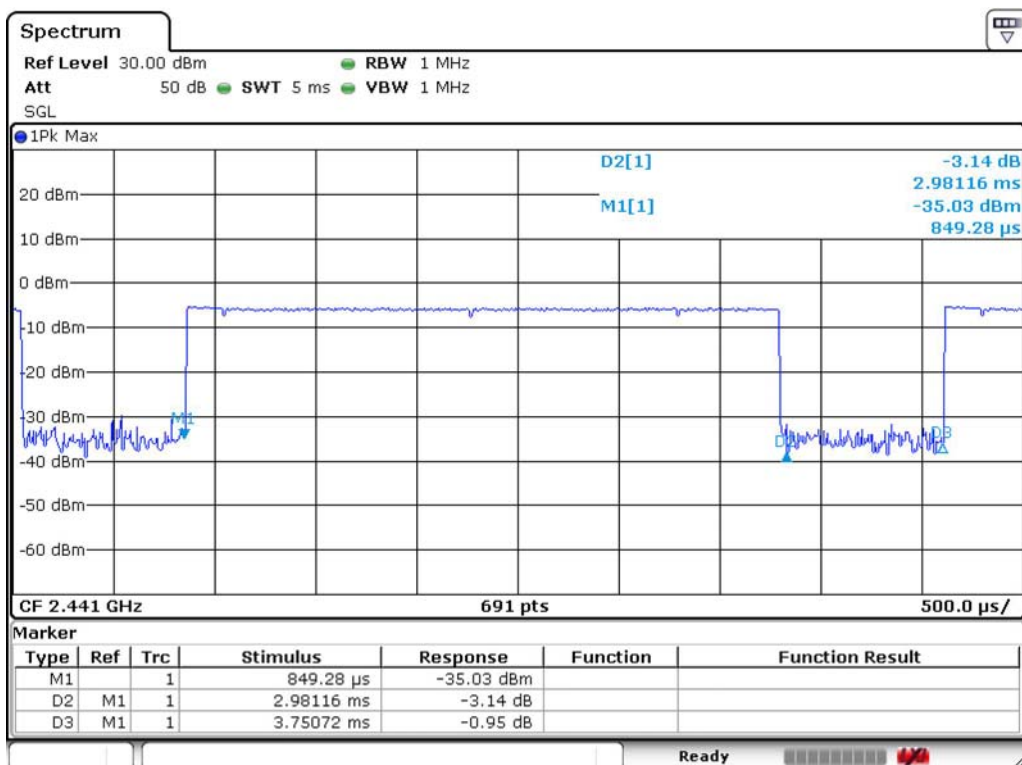
Test Mode : BT EDR (2Mbps) DH5

Channel : 2441

Average Number of Pulses Per sec



Pulse Width (sec)



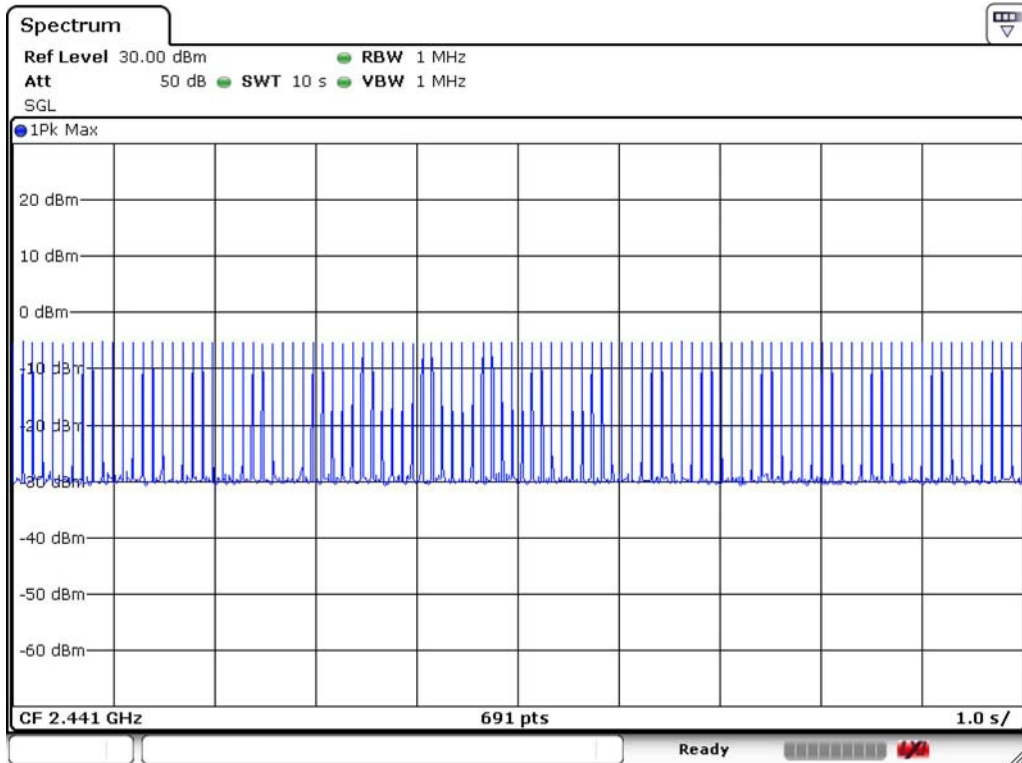




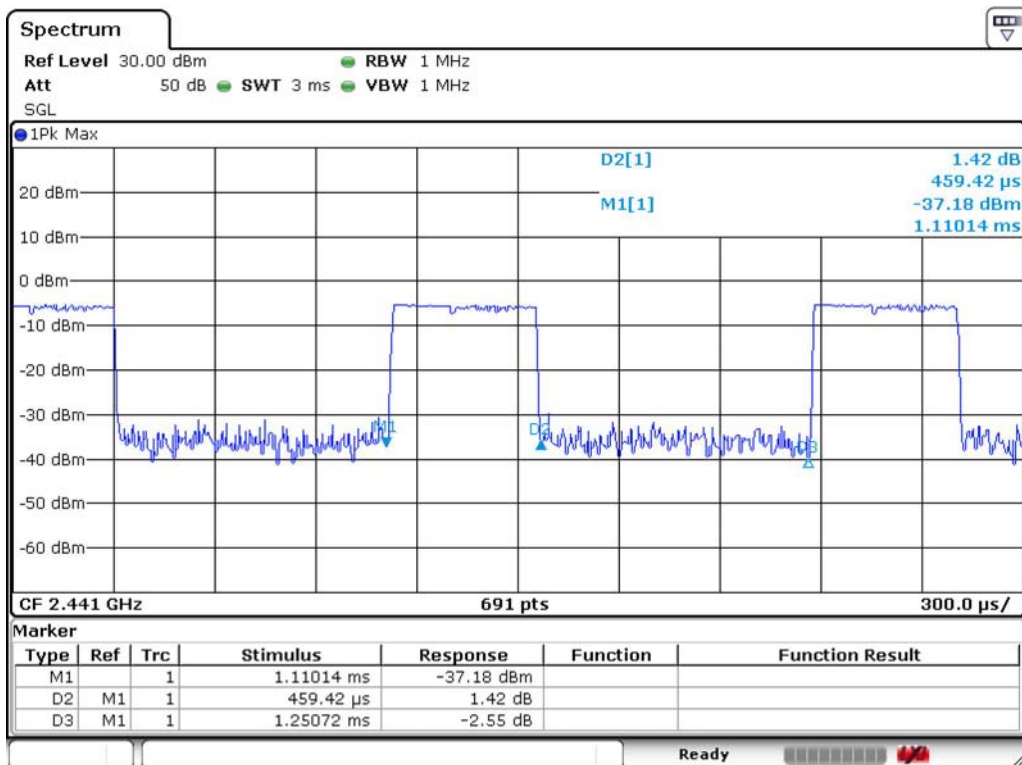
Test Mode : BT EDR (3Mbps) DH1

Channel : 2441

Average Number of Pulses Per sec



Pulse Width (sec)

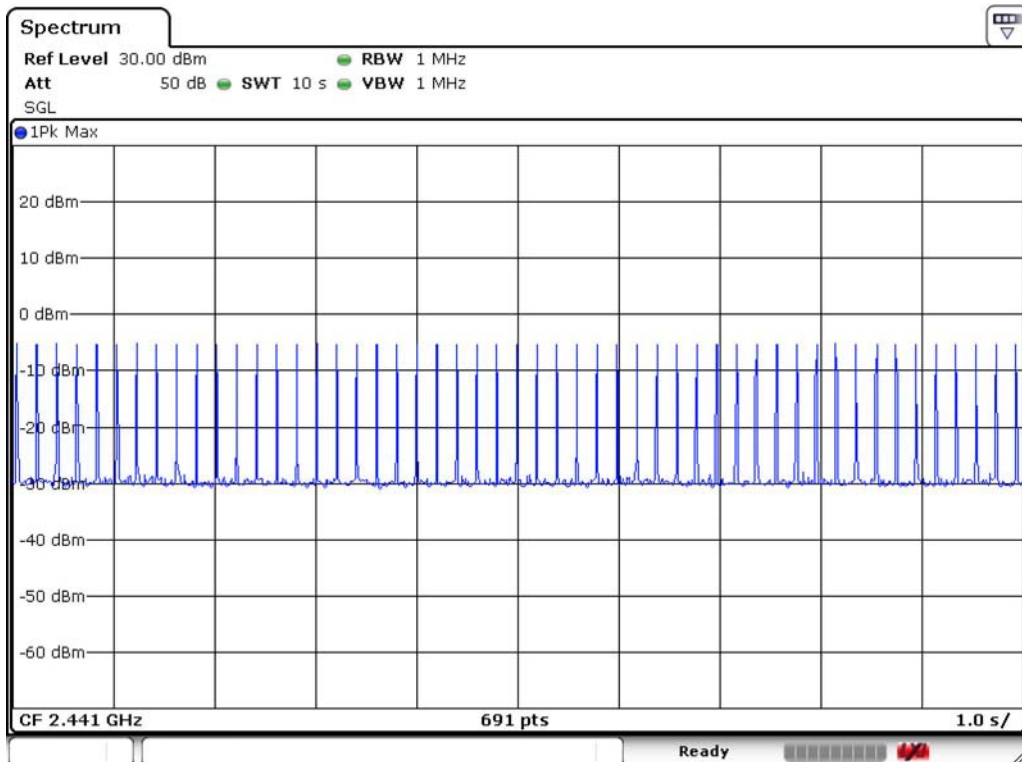




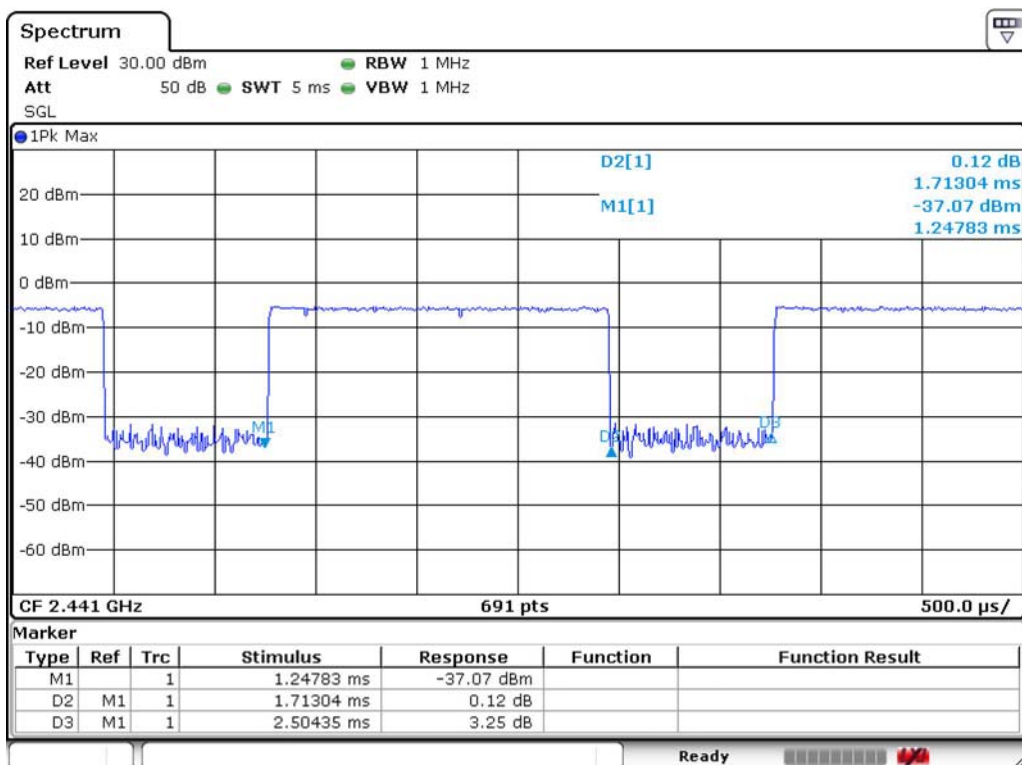
Test Mode : BT EDR (3Mbps) DH3

Channel : 2441

Average Number of Pulses Per sec



Pulse Width (sec)

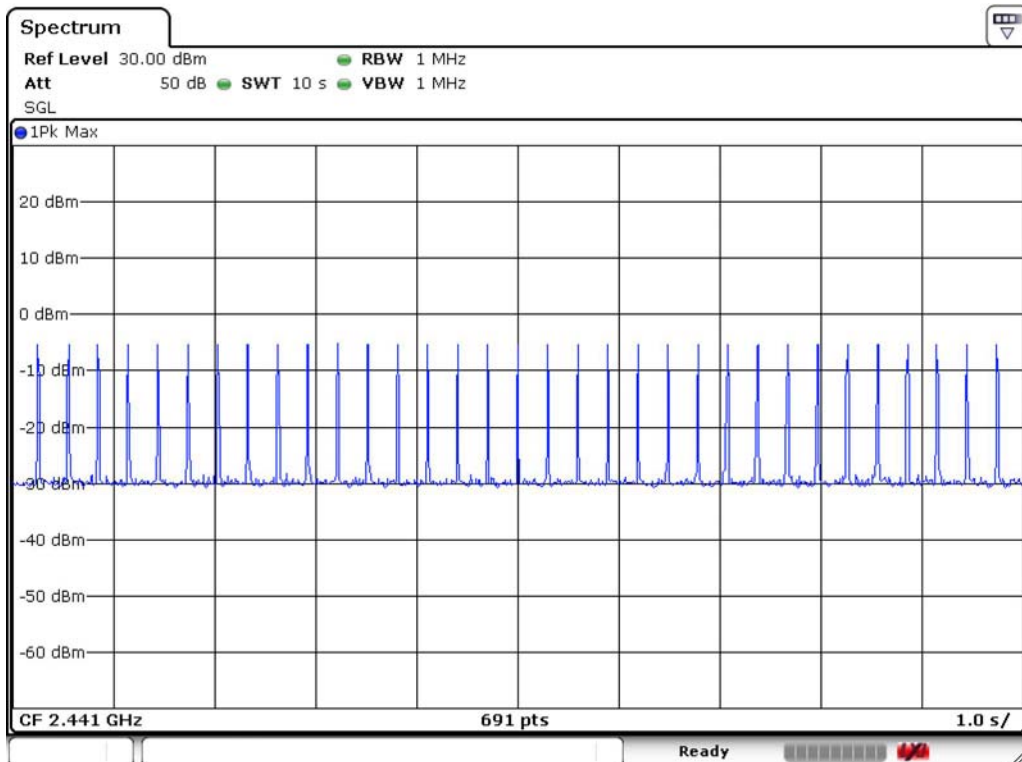




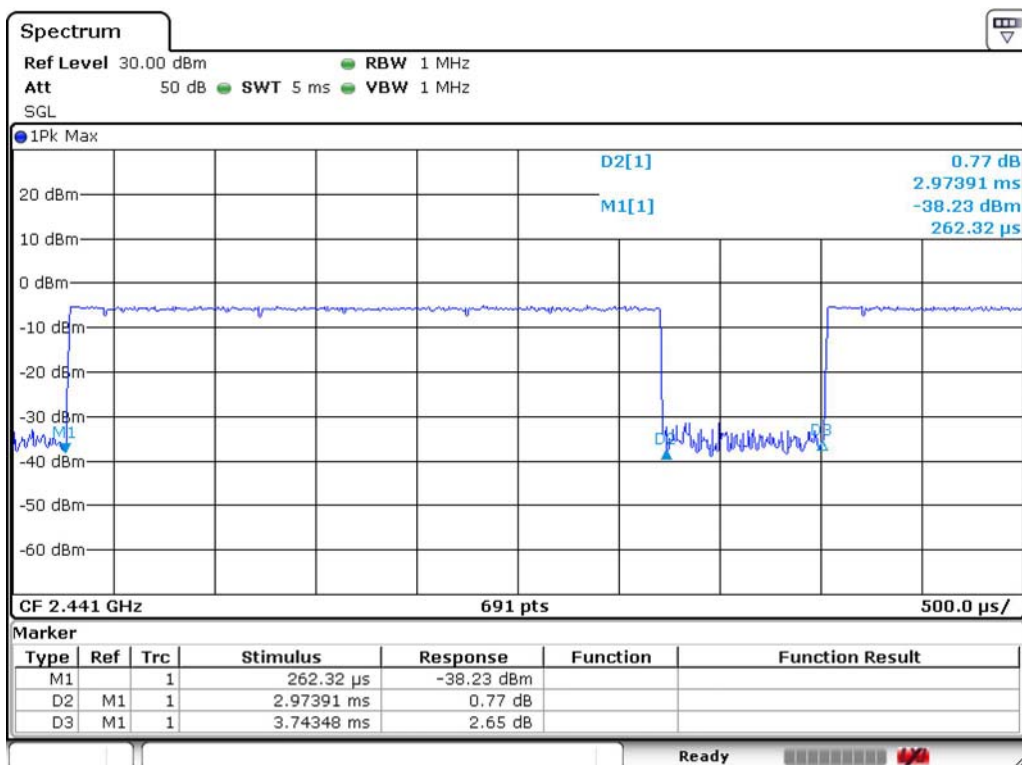
Test Mode : BT EDR (3Mbps) DH5

Channel : 2441

Average Number of Pulses Per sec



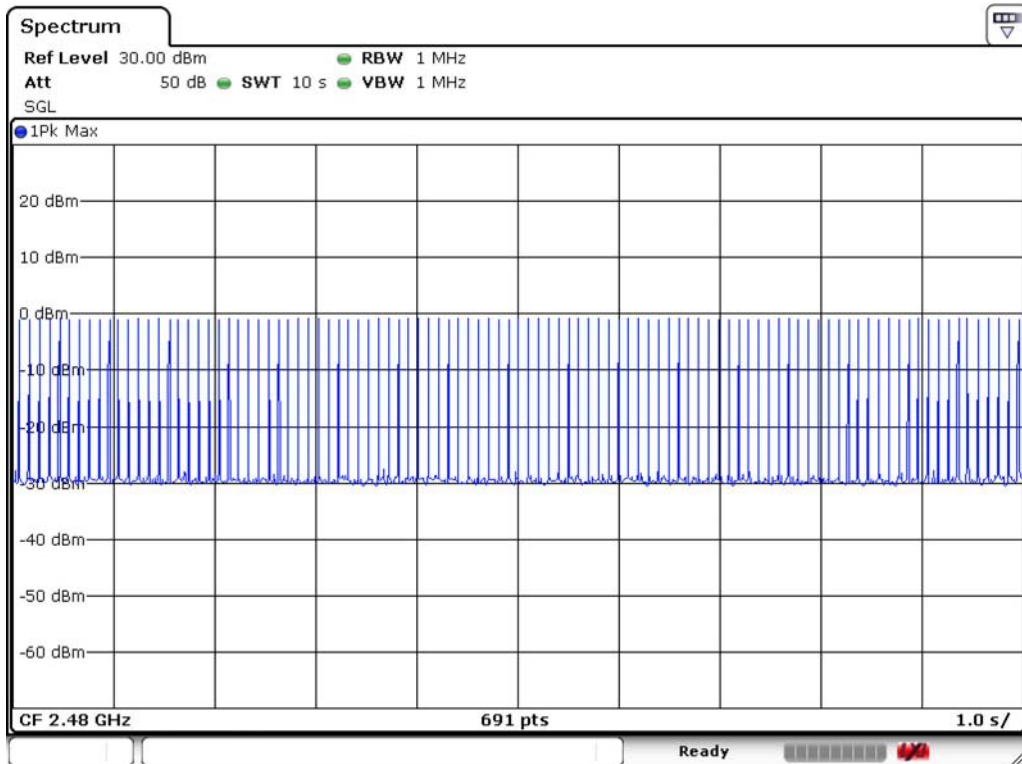
Pulse Width (sec)



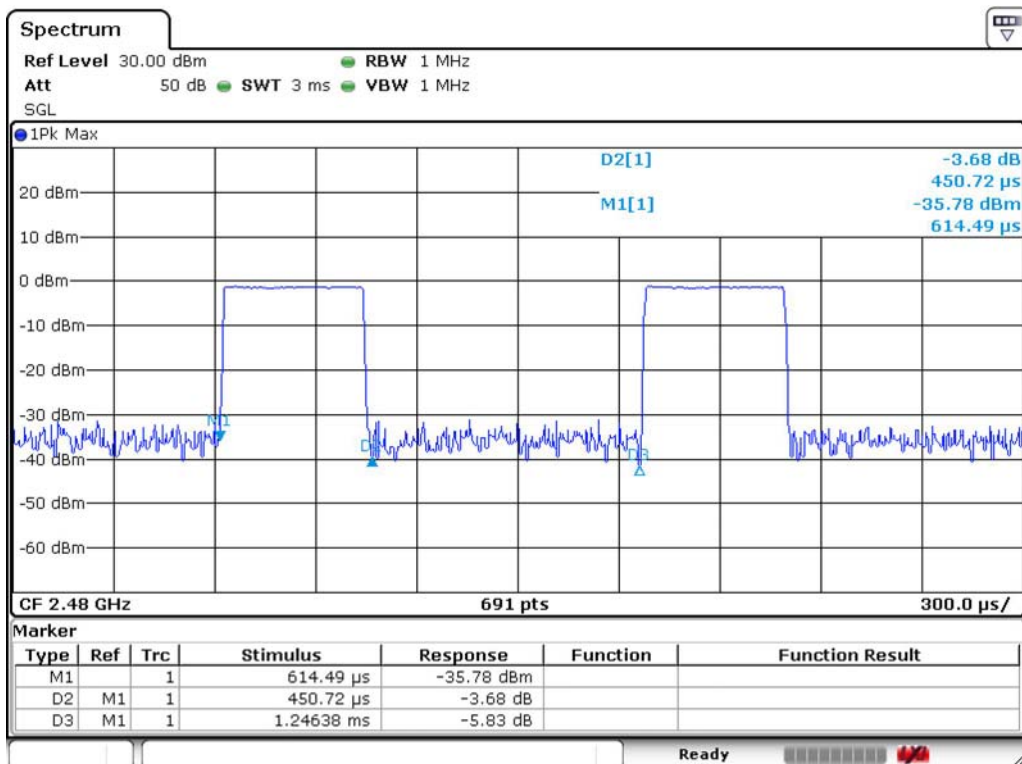


Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Test Mode	: BT (1Mbps) DH1	Channel	: 2480

Average Number of Pulses Per sec



Pulse Width (sec)

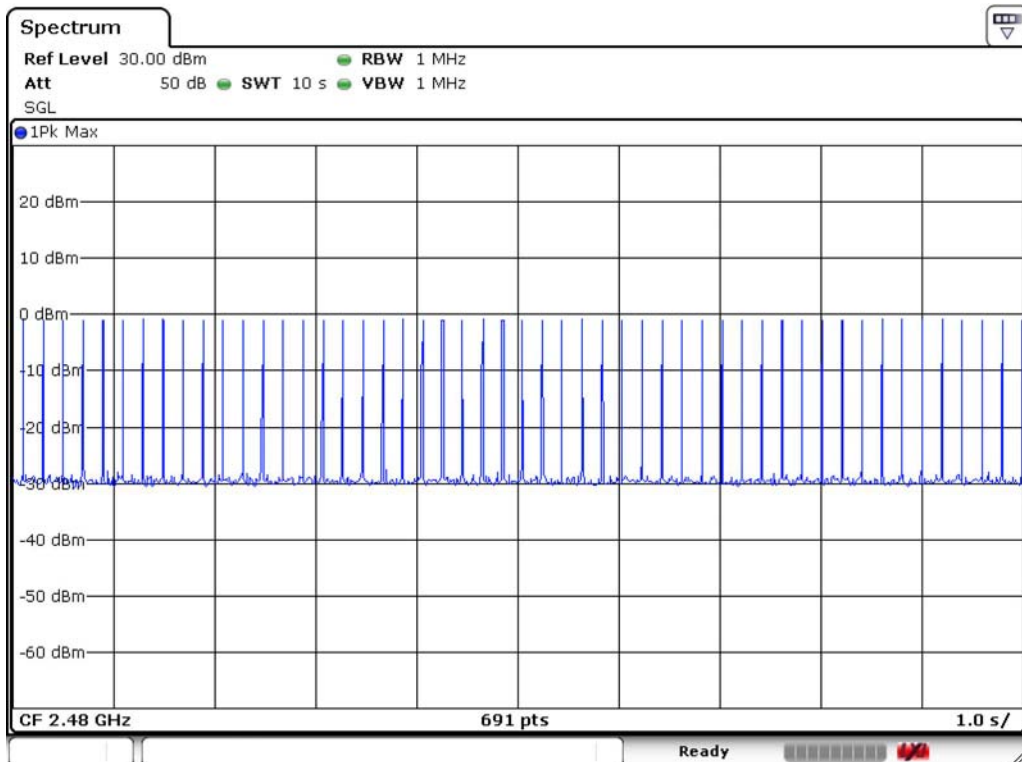




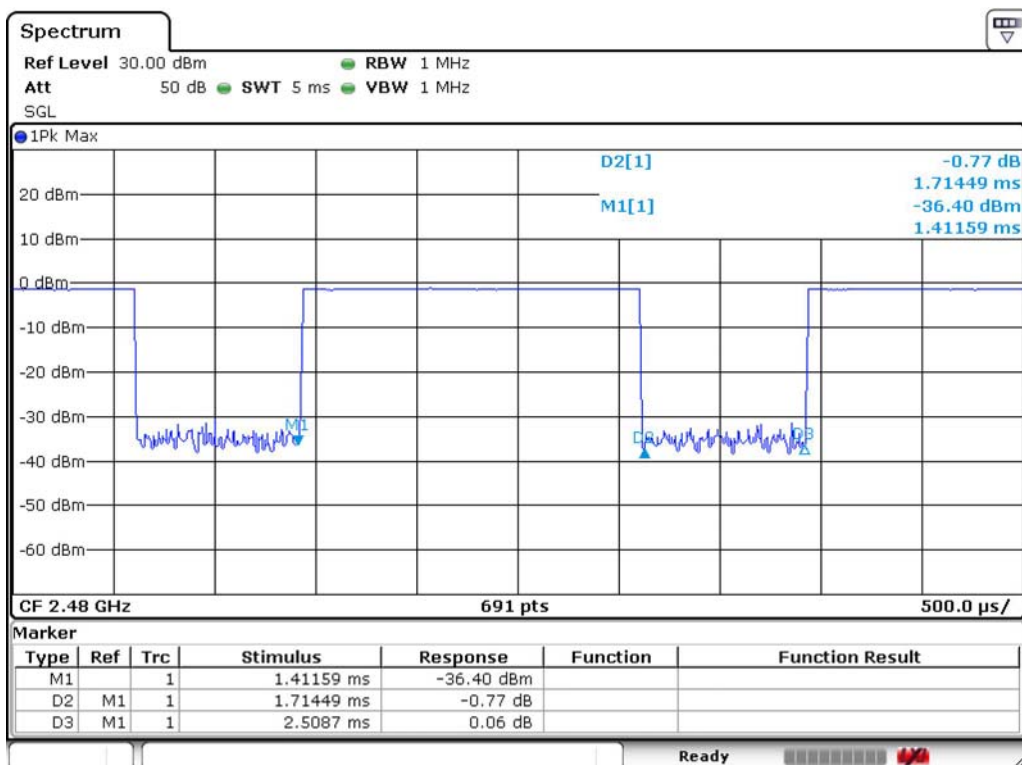
Test Mode : BT (1Mbps) DH3

Channel : 2480

Average Number of Pulses Per sec



Pulse Width (sec)

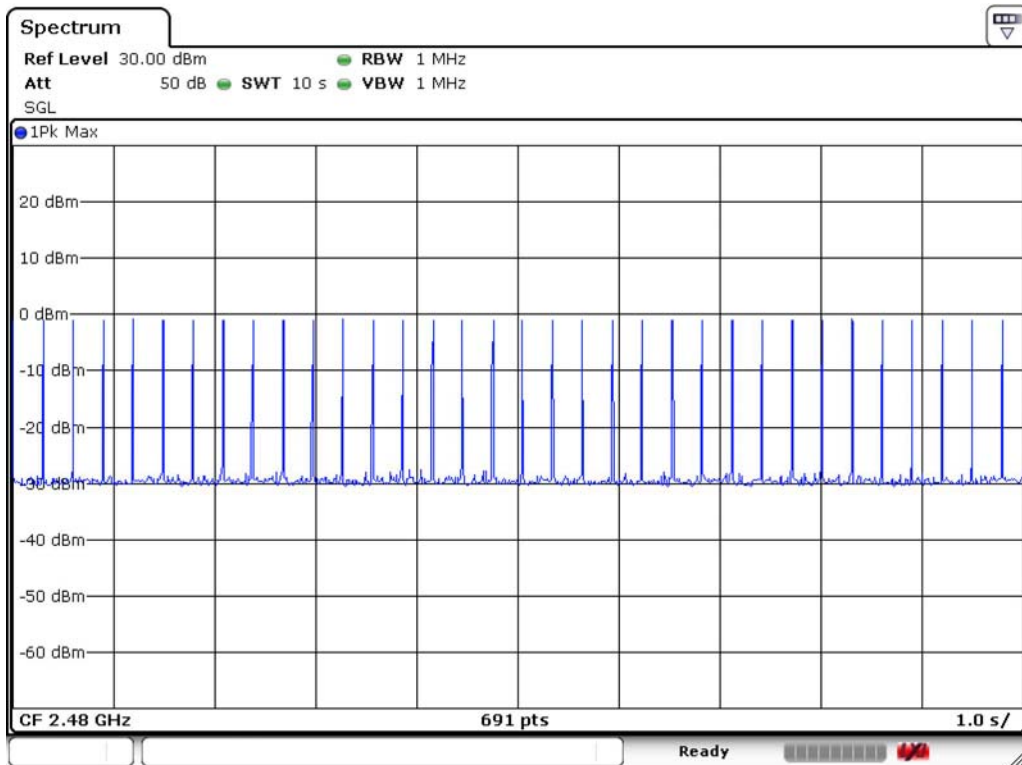




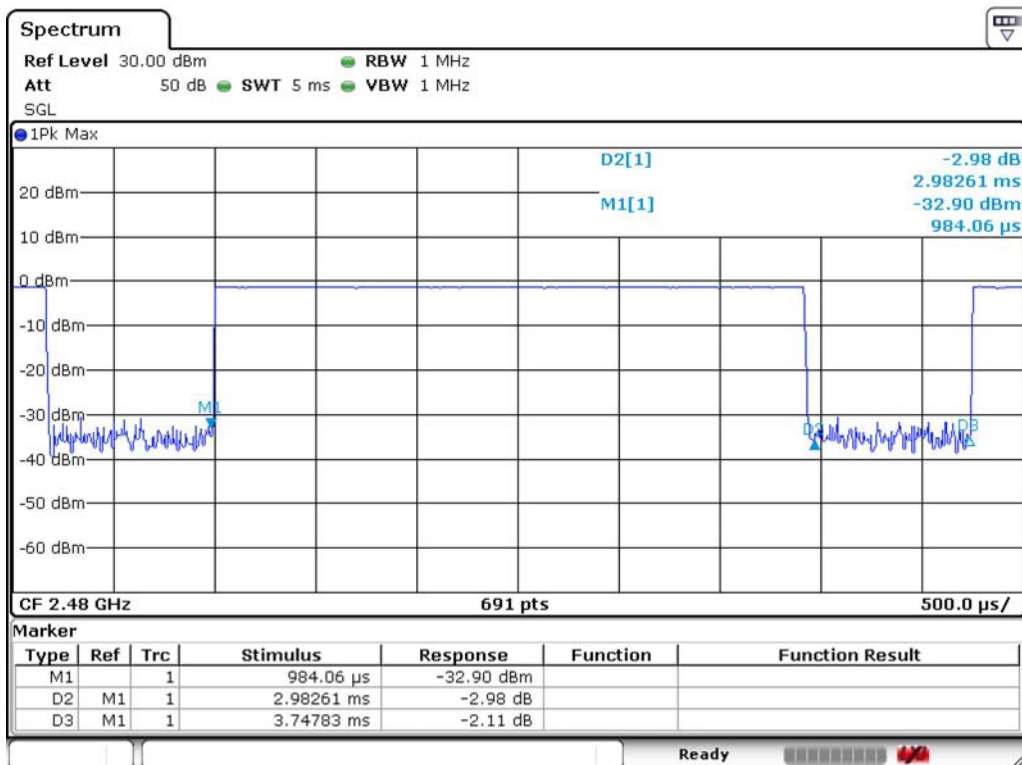
Test Mode : BT (1Mbps) DH5

Channel : 2480

Average Number of Pulses Per sec



Pulse Width (sec)



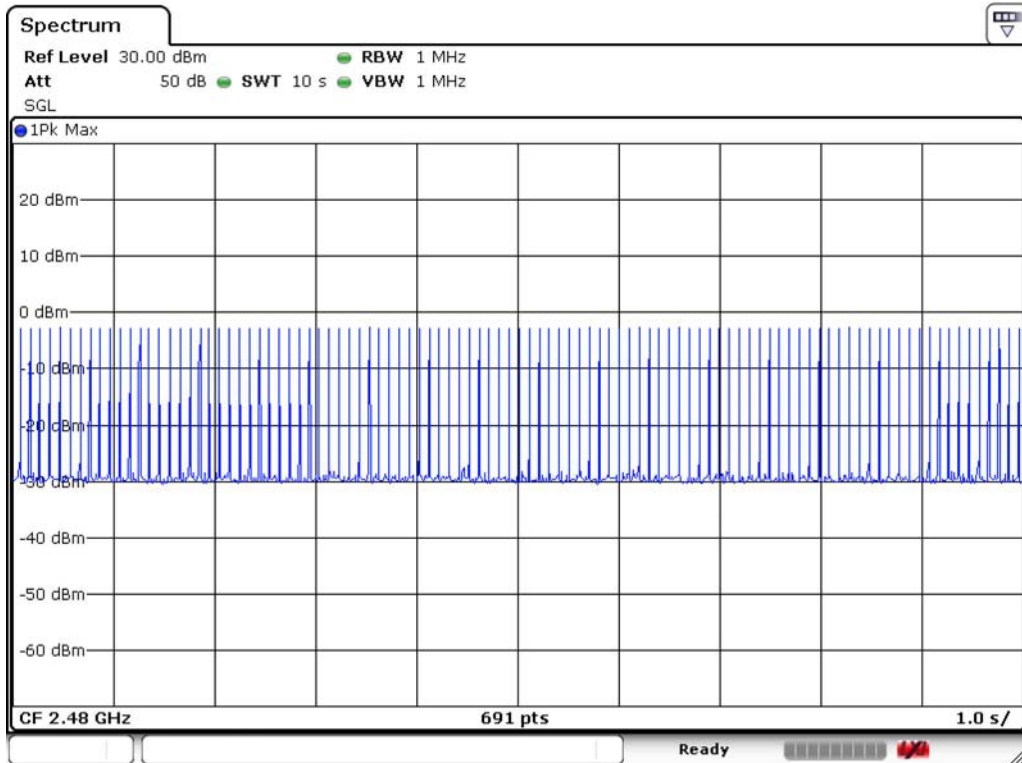




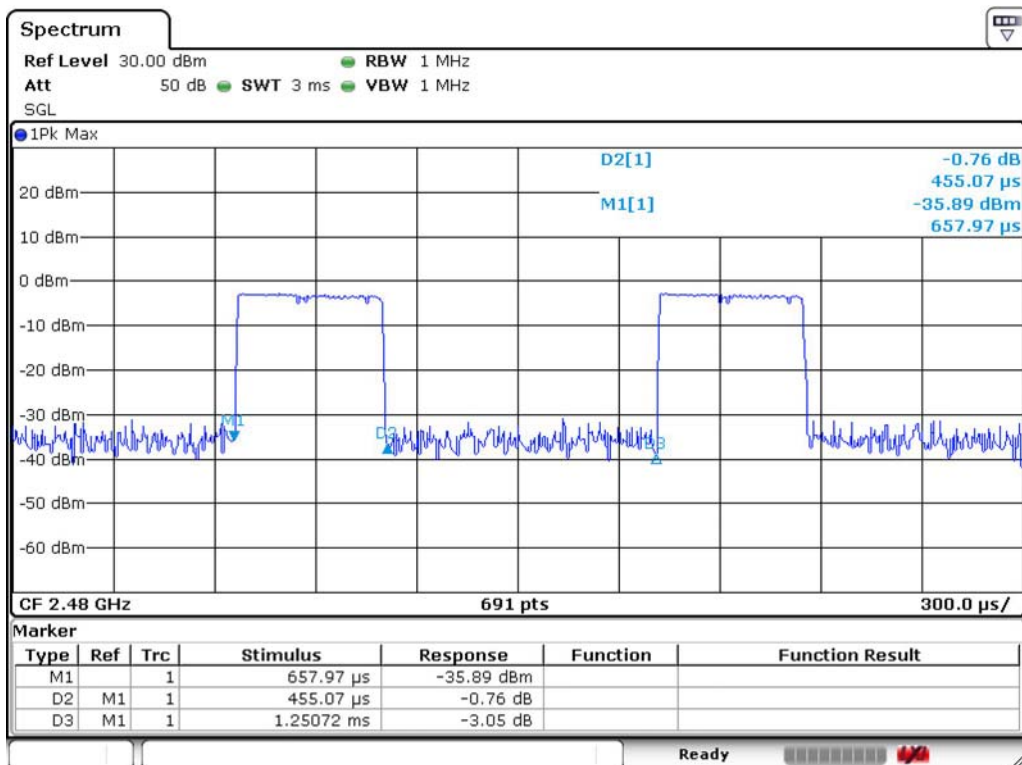
Test Mode : BT EDR (2Mbps) DH1

Channel : 2480

Average Number of Pulses Per sec



Pulse Width (sec)

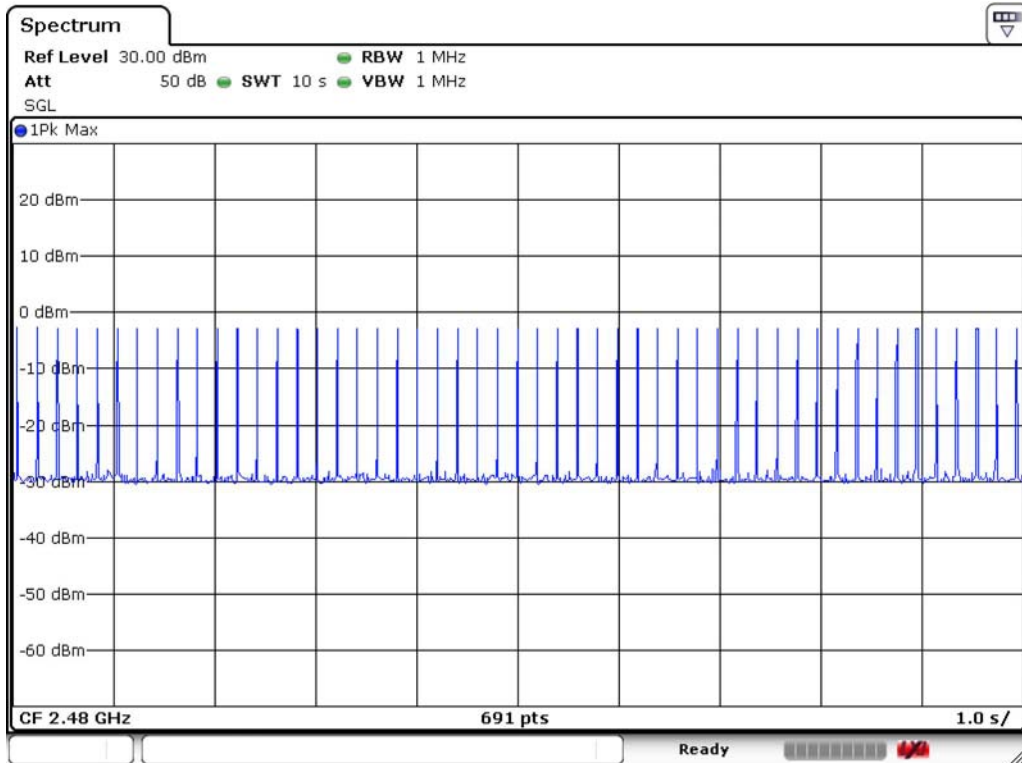




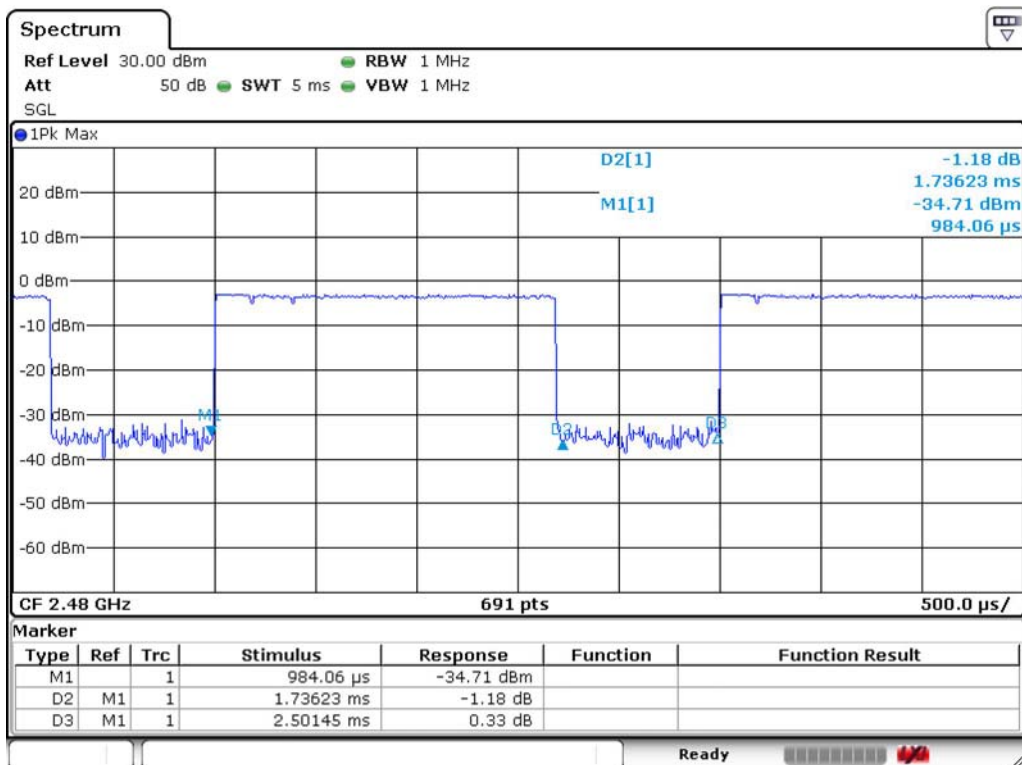
Test Mode : BT EDR (2Mbps) DH3

Channel : 2480

Average Number of Pulses Per sec



Pulse Width (sec)



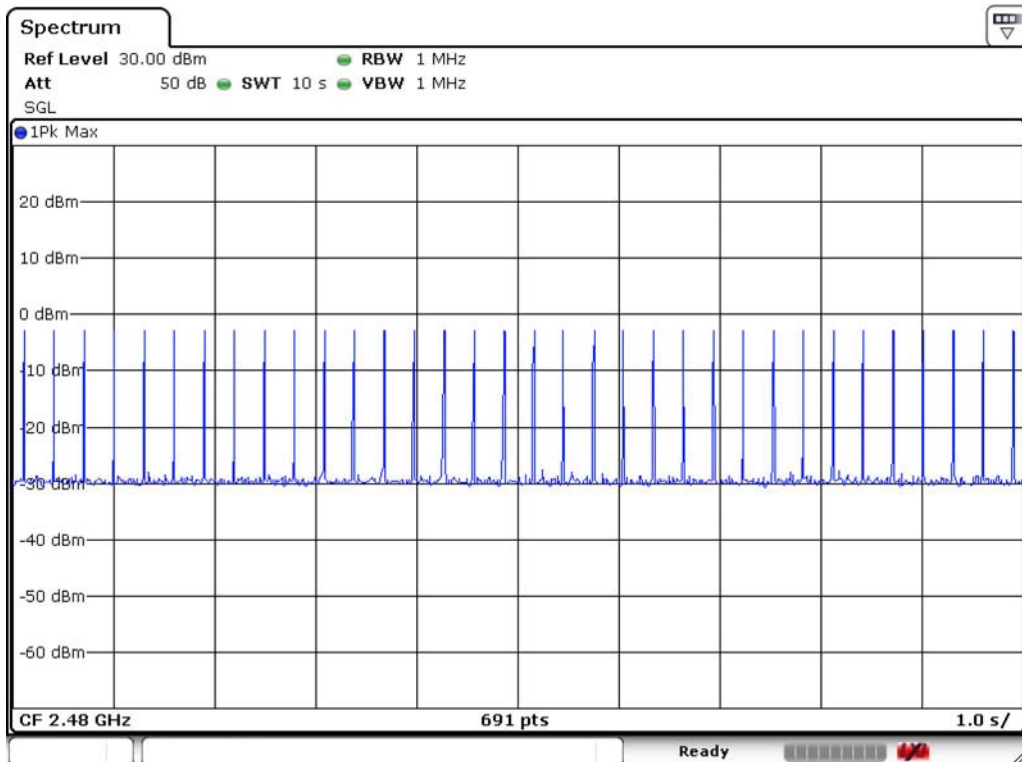




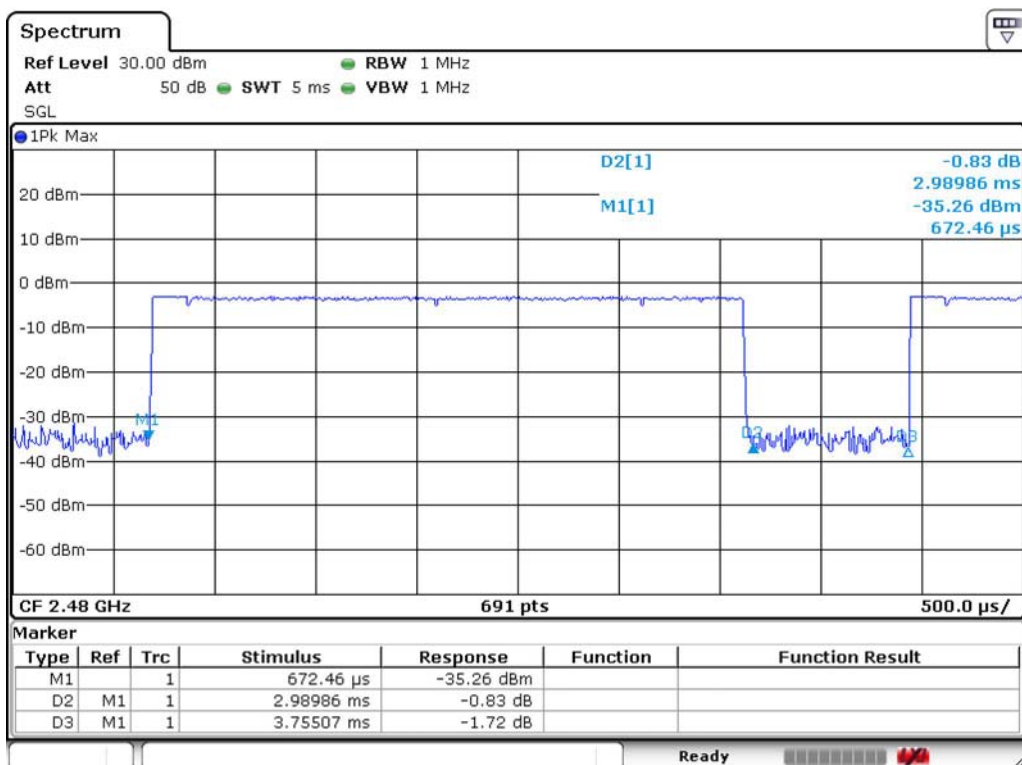
Test Mode : BT EDR (2Mbps) DH5

Channel : 2480

Average Number of Pulses Per sec



Pulse Width (sec)

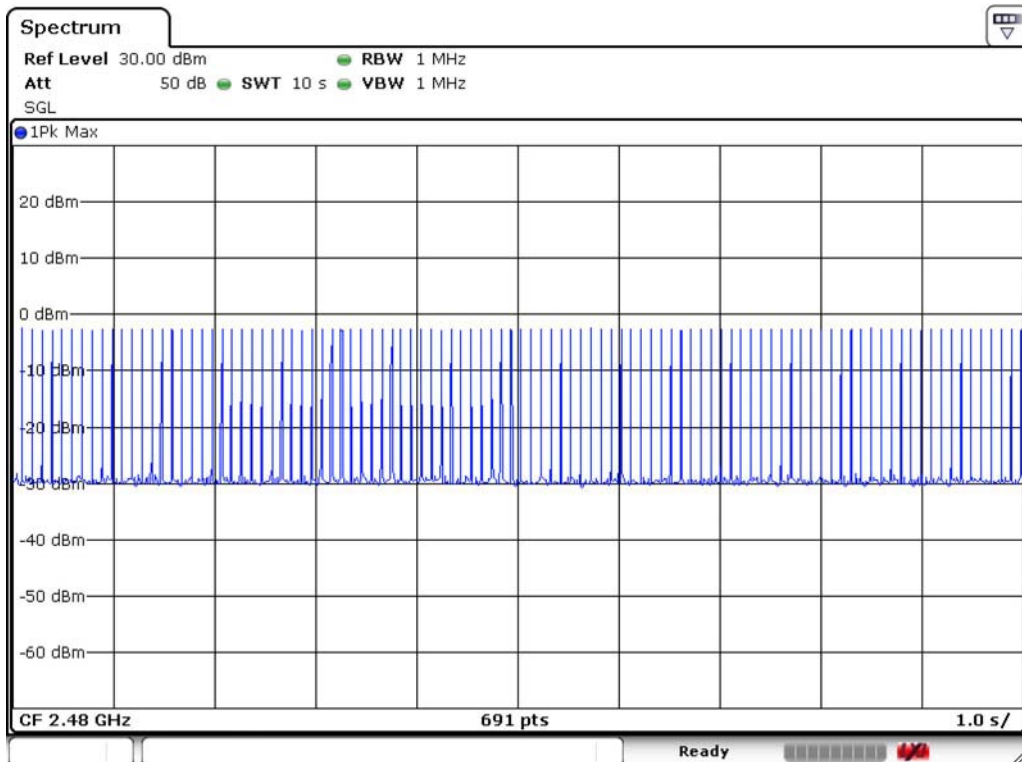




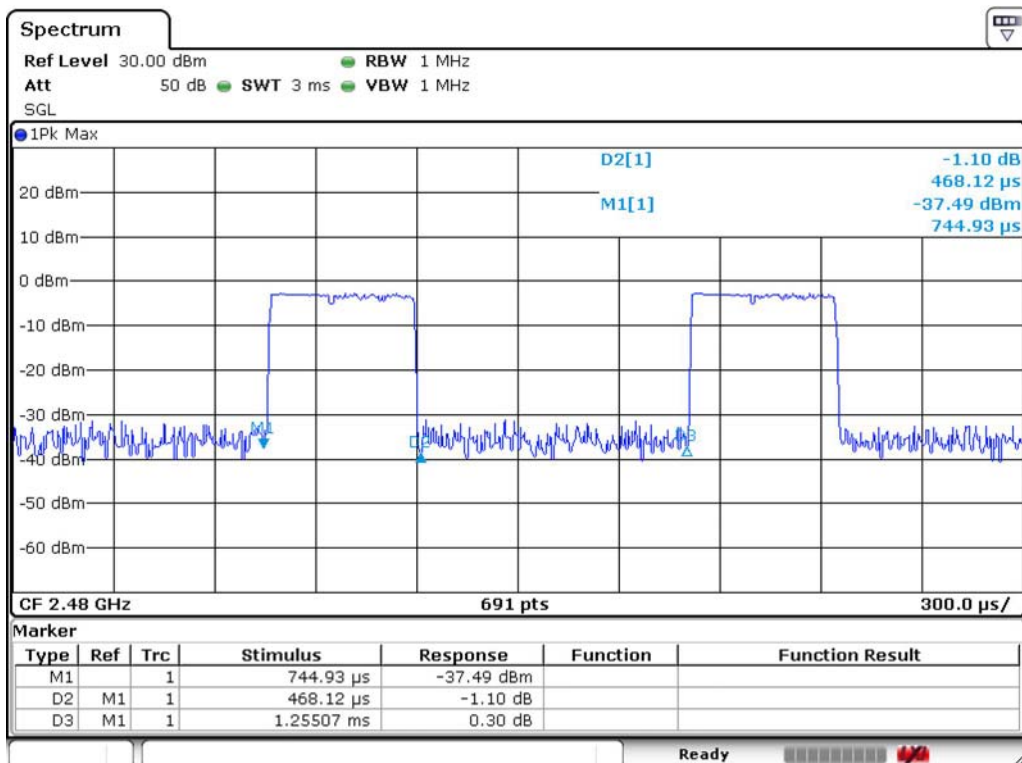
Test Mode : BT EDR (3Mbps) DH1

Channel : 2480

Average Number of Pulses Per sec



Pulse Width (sec)

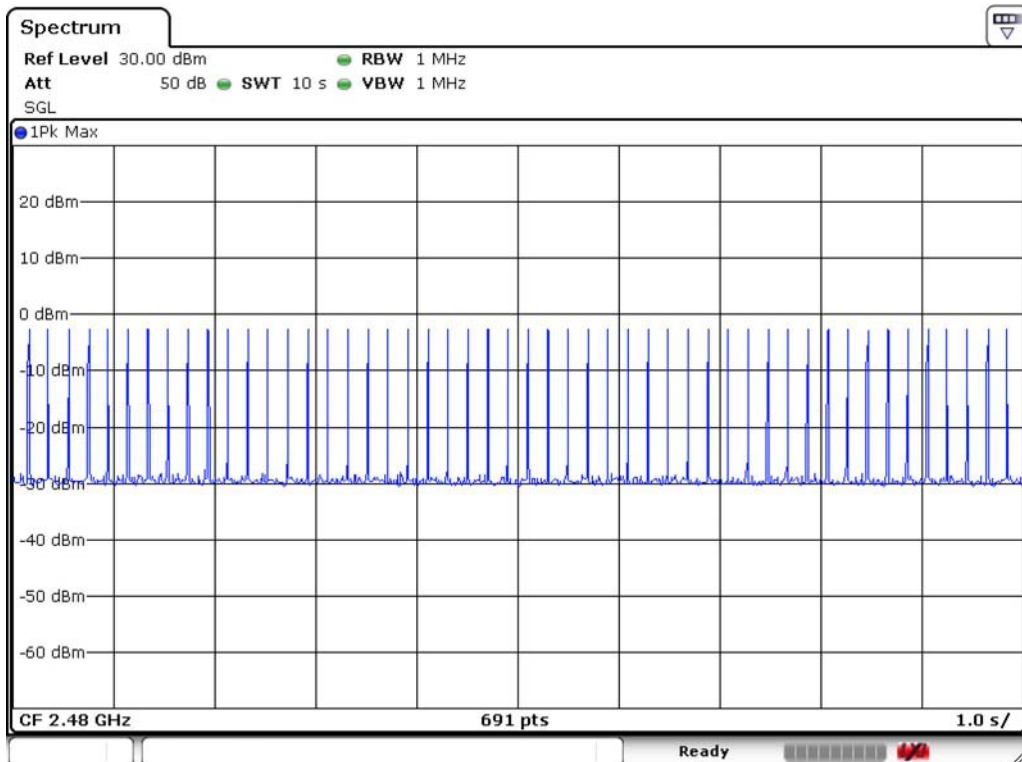




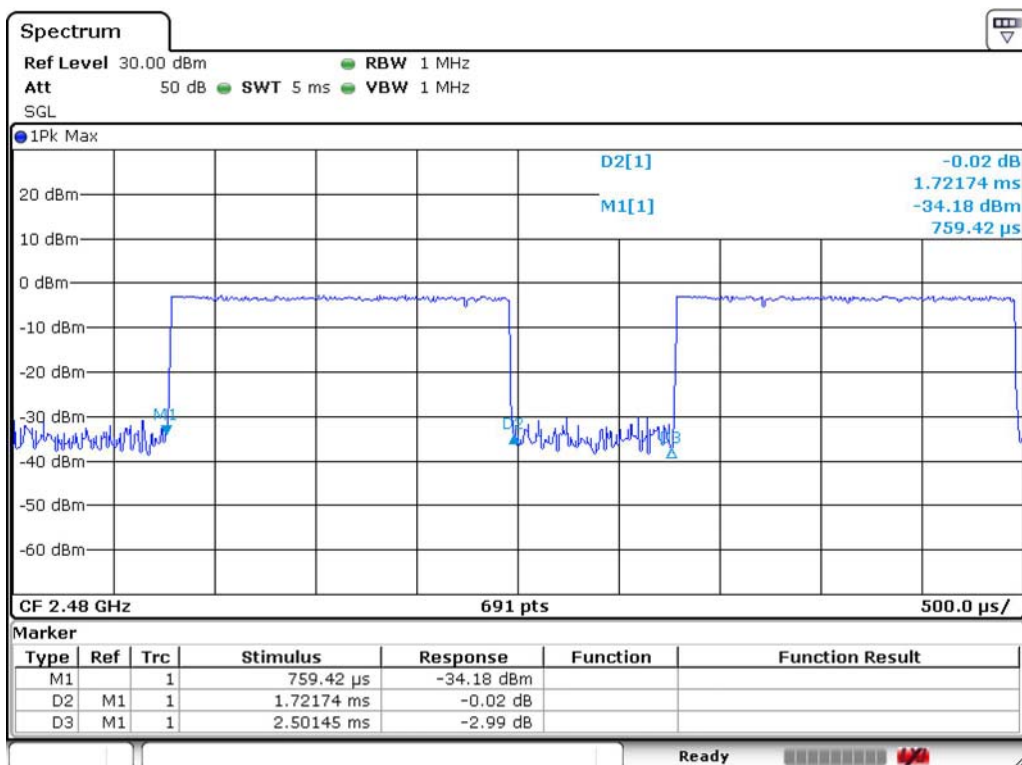
Test Mode : BT EDR (3Mbps) DH3

Channel : 2480

Average Number of Pulses Per sec



Pulse Width (sec)

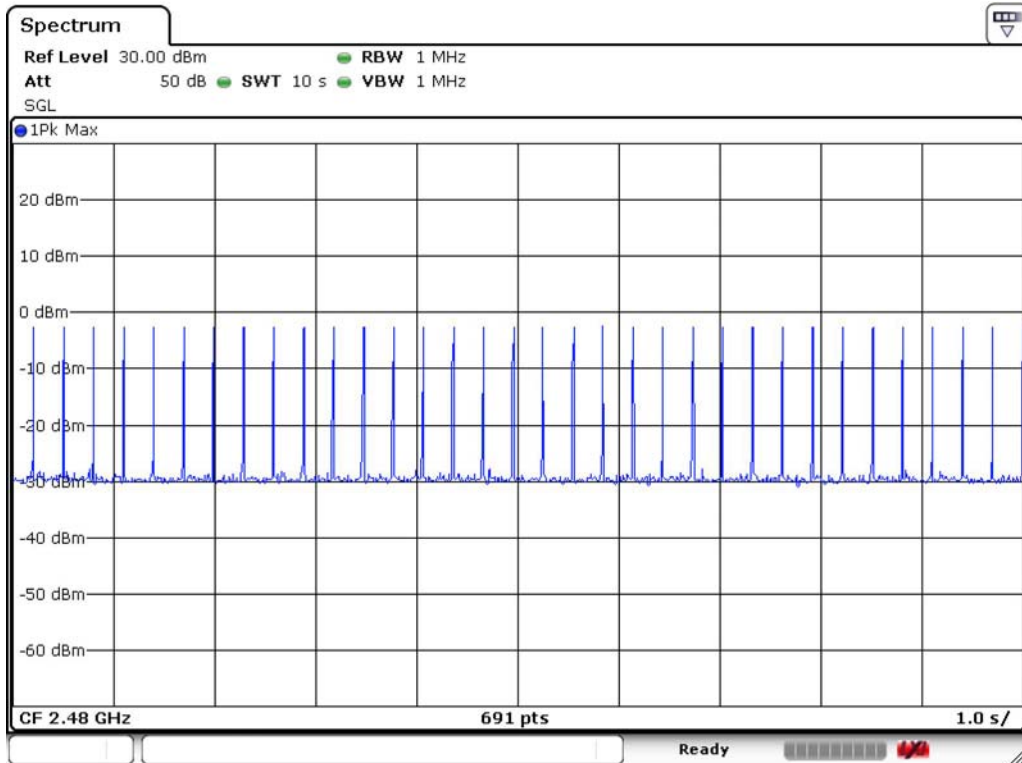




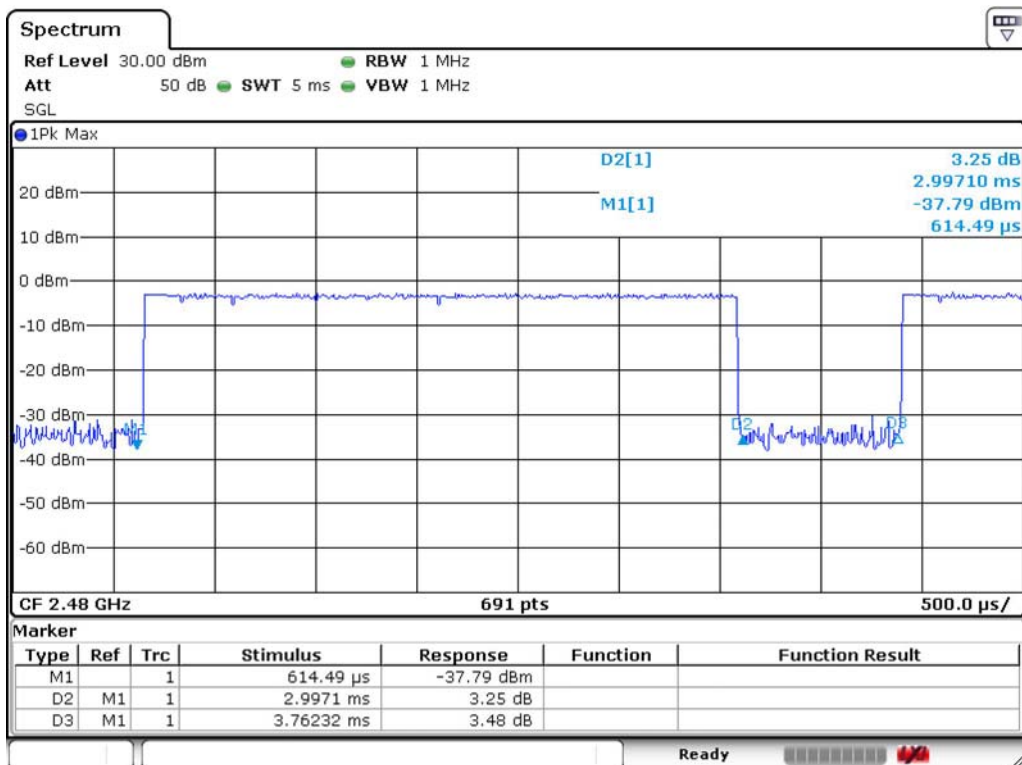
Test Mode : BT EDR (3Mbps) DH5

Channel : 2480

Average Number of Pulses Per sec



Pulse Width (sec)

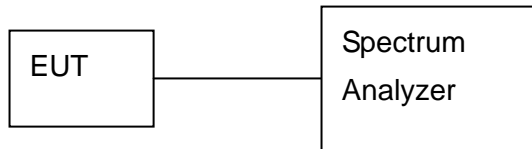


## 8 Peak Output Power

### 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 1.8 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**

Channel	Frequency (MHz)	Result (dBm)	Limit (dBm)
00	2402	-7.62	30
39	2441	-3.66	30
78	2480	-0.75	30

**Bluetooth EDR 2 Mbps**

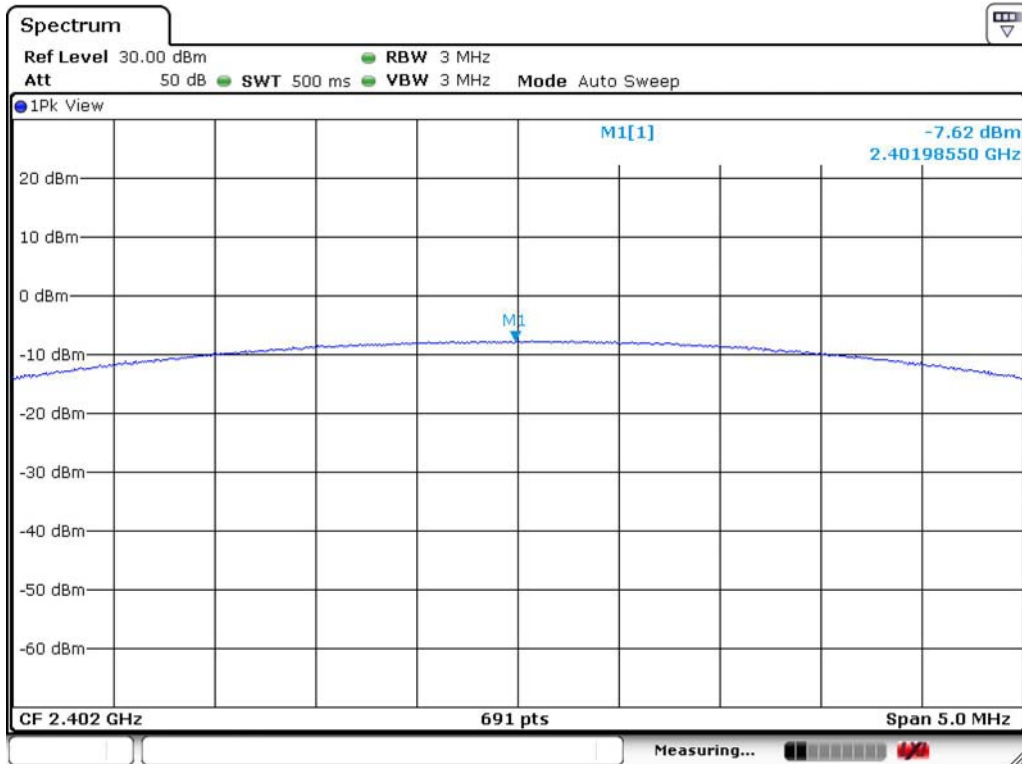
Channel	Frequency (MHz)	Result (dBm)	Limit (dBm)
00	2402	-9.04	30
39	2441	-4.73	30
78	2480	-2.13	30

**Bluetooth EDR 3 Mbps**

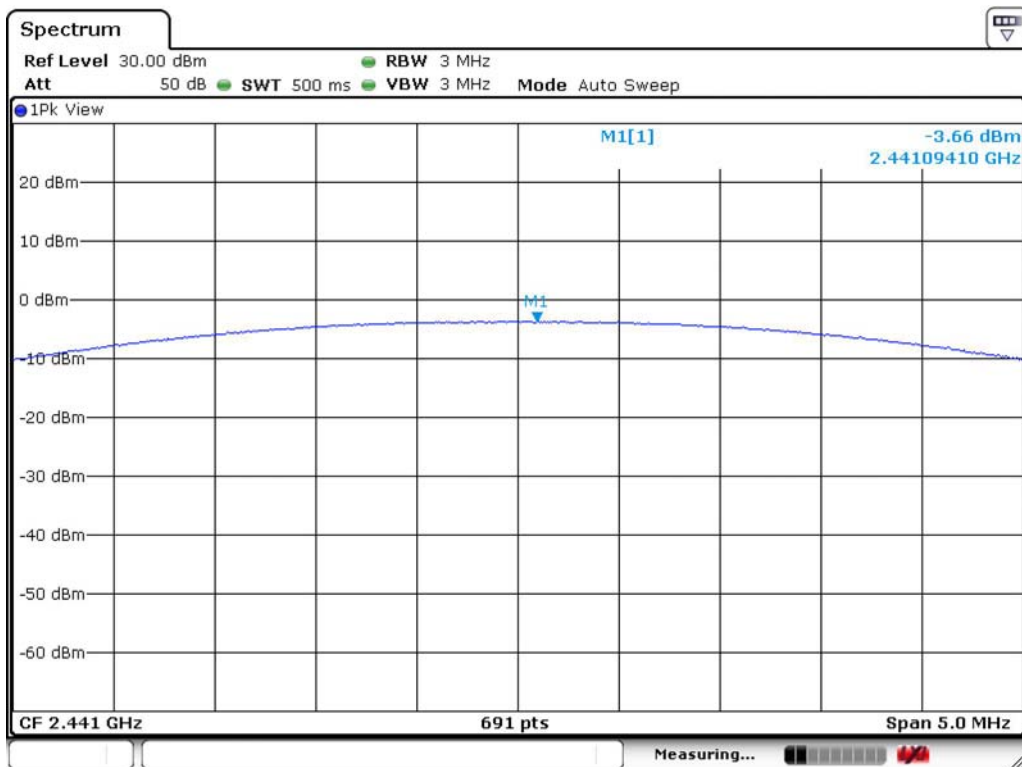
Channel	Frequency (MHz)	Result (dBm)	Limit (dBm)
00	2402	-8.92	30
39	2441	-4.41	30
78	2480	-1.83	30



Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Test Mode	: BT (1Mbps)	Channel	: 2402



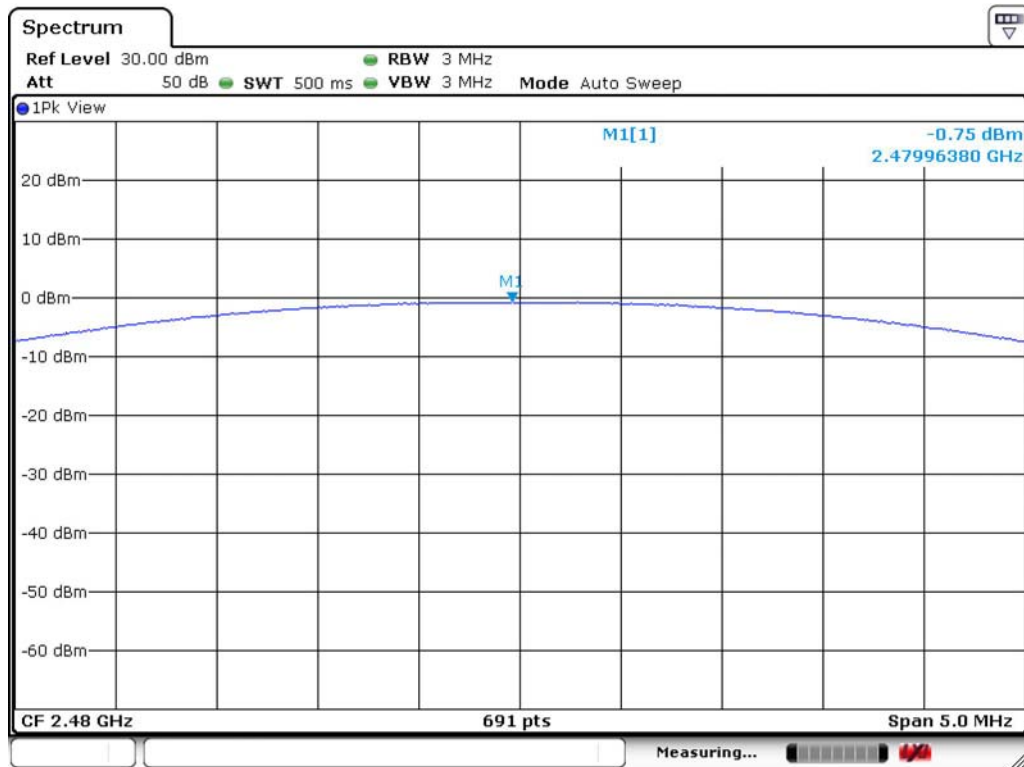
Test Mode	: BT (1Mbps)	Channel	: 2441
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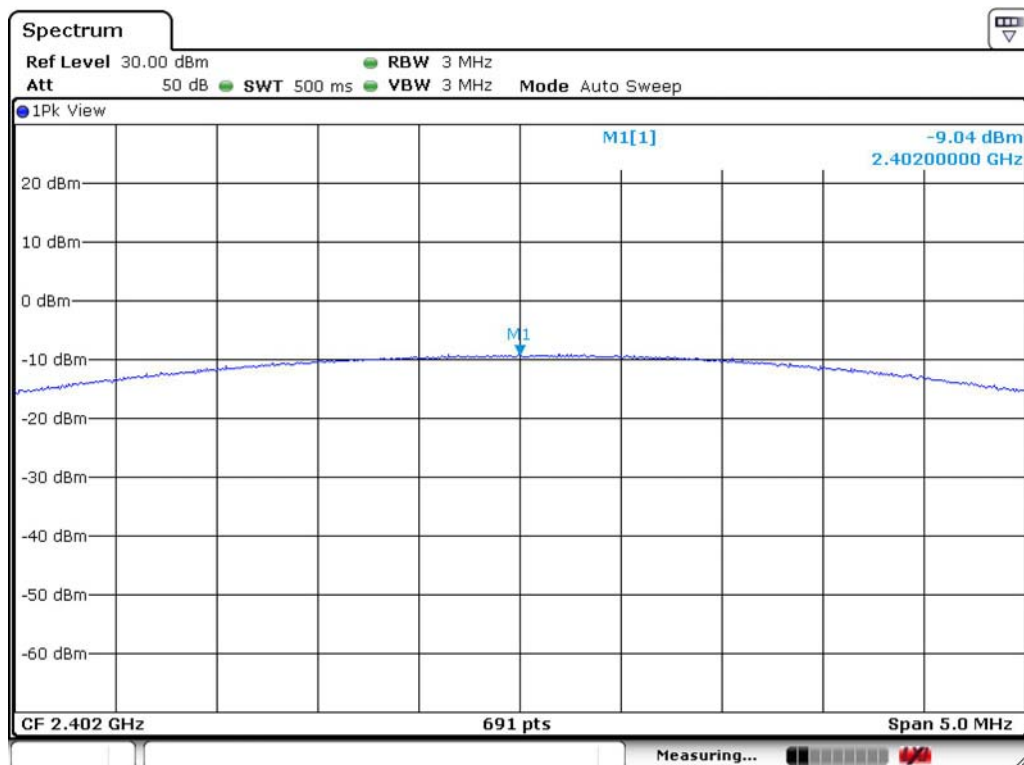
Test Mode : BT (1 Mbps)

Channel : 2480



Test Mode : BT EDR (2 Mbps)

Channel : 2402

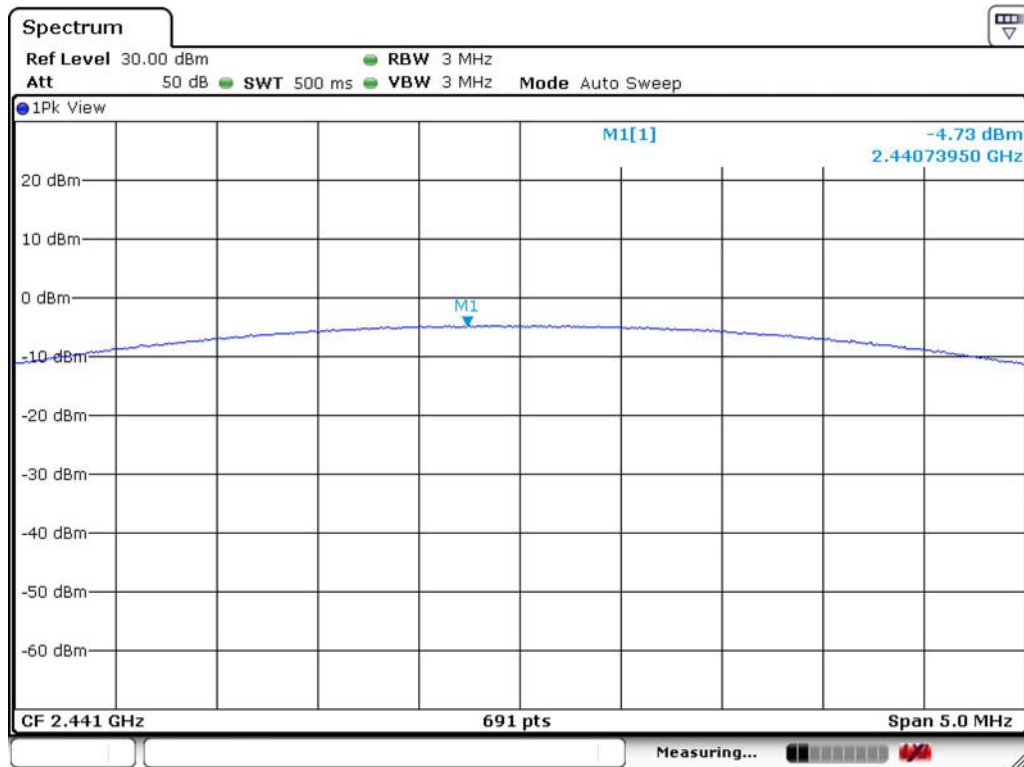






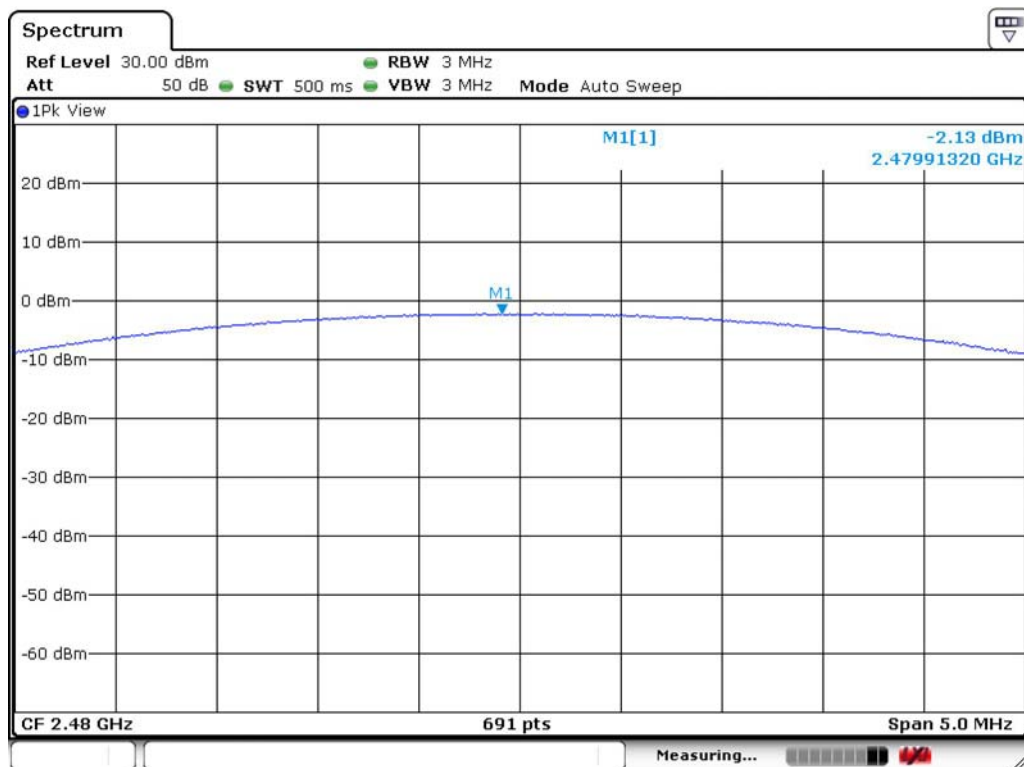
Test Mode : BT EDR (2 Mbps)

Channel : 2441



Test Mode : BT EDR (2 Mbps)

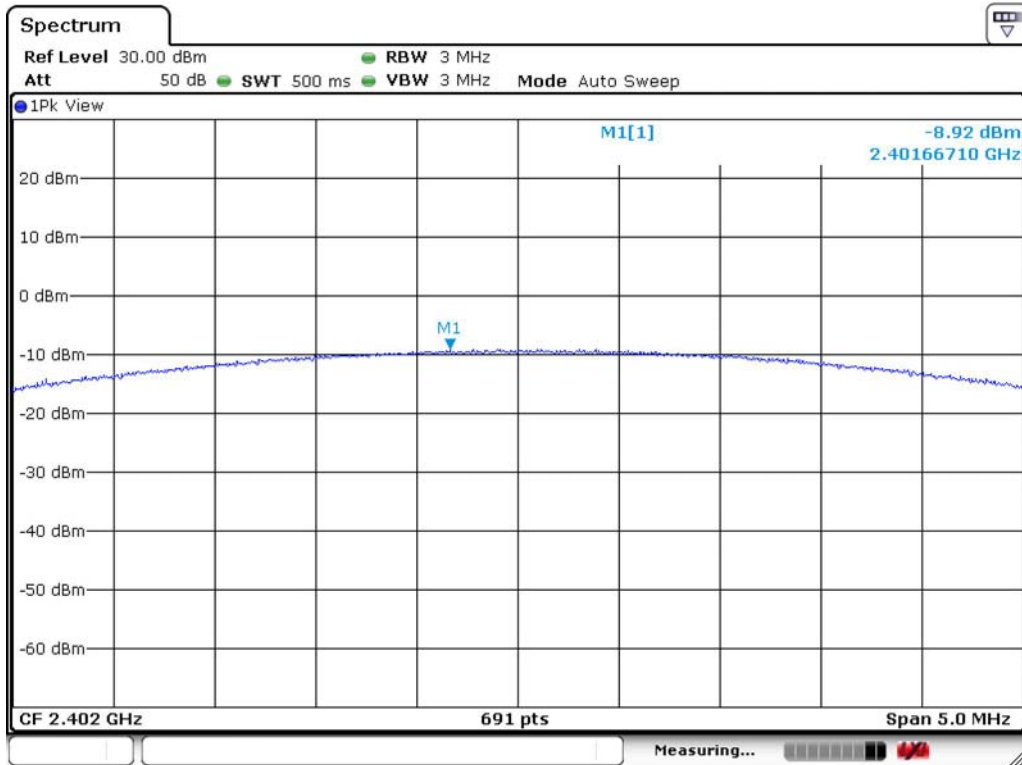
Channel : 2480





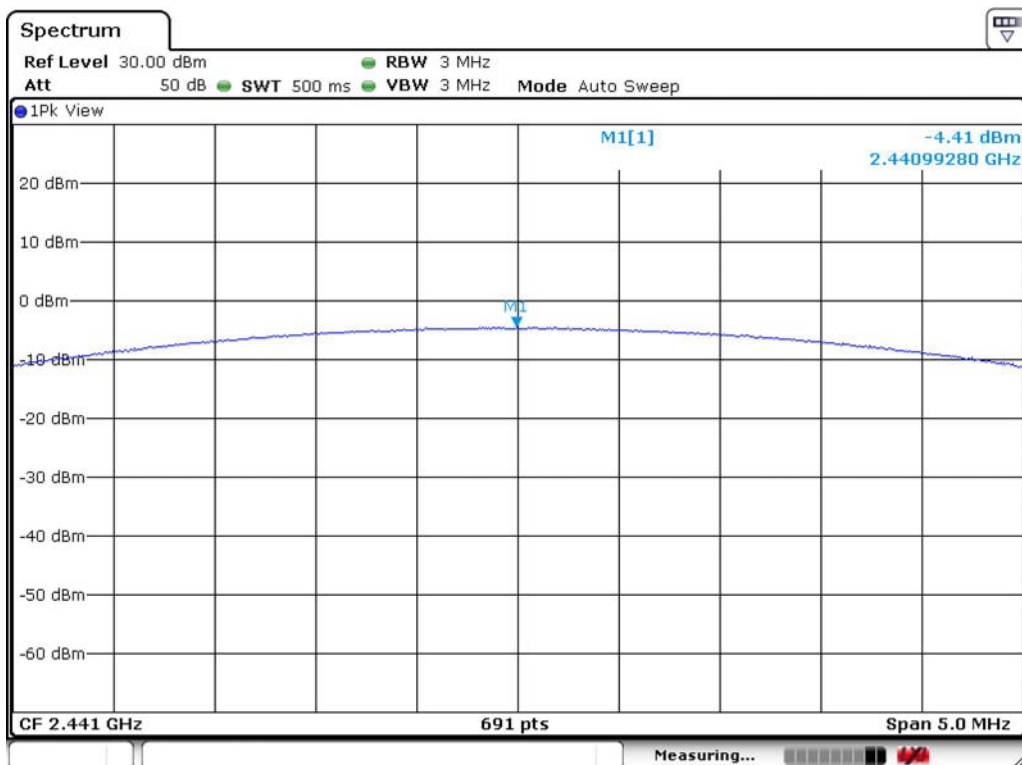
Test Mode : BT EDR (3 Mbps)

Channel : 2402



Test Mode : BT EDR (3 Mbps)

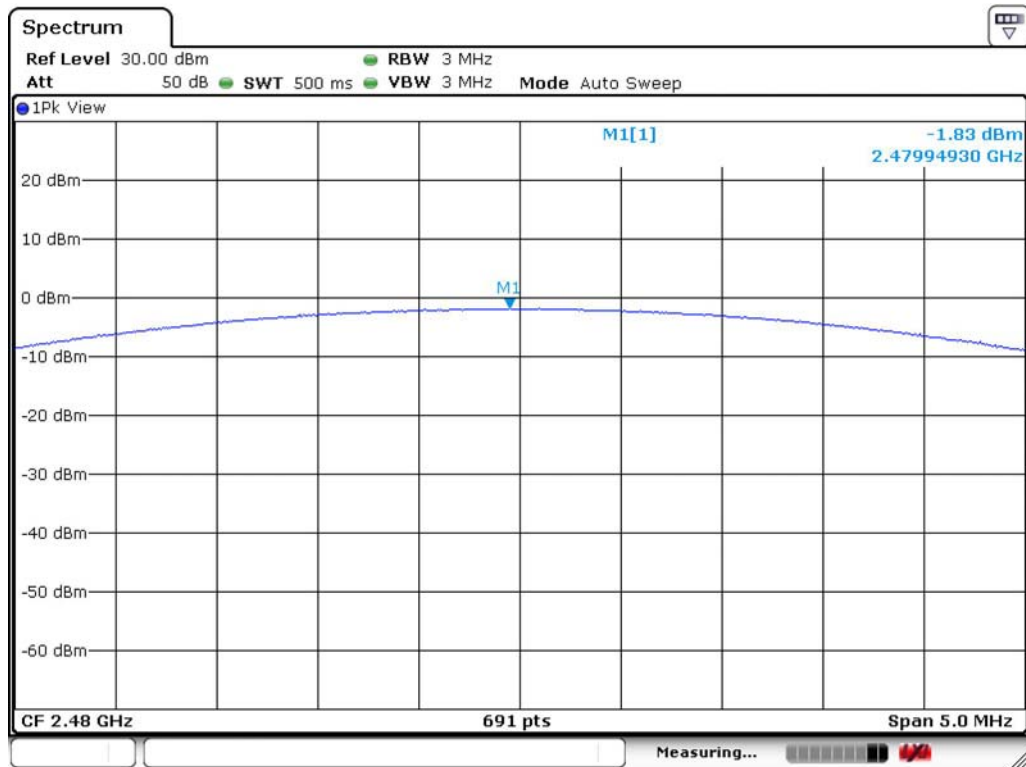
Channel : 2441





Test Mode : BT EDR (3 Mbps)

Channel : 2480



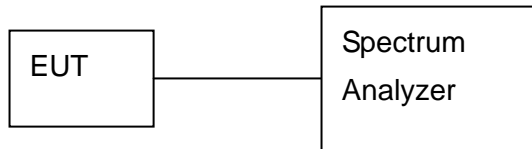


## 9 100kHz Bandwidth of Band Edges

### 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.

### 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).

Bluetooth (1Mbps) Channel: <u>00</u>					
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	-8.19	2399.16	-39.18	30.99	20

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

Bluetooth EDR (2Mbps) Channel: <u>00</u>					
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)		
2401.91	-9.92	2399.71	-40.34	30.42	20

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

Bluetooth EDR (3Mbps) Channel: <u>00</u>					
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	-10.11	2398.84	-39.30	29.19	20

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



Bluetooth (1Mbps) Channel: <u>78</u>					
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)		
2479.97	-1.19	2488.22	-38.25	37.06	20

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

Bluetooth EDR (2Mbps) Channel: <u>78</u>					
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)		
2479.97	-3.15	2484.45	-38.84	35.69	20

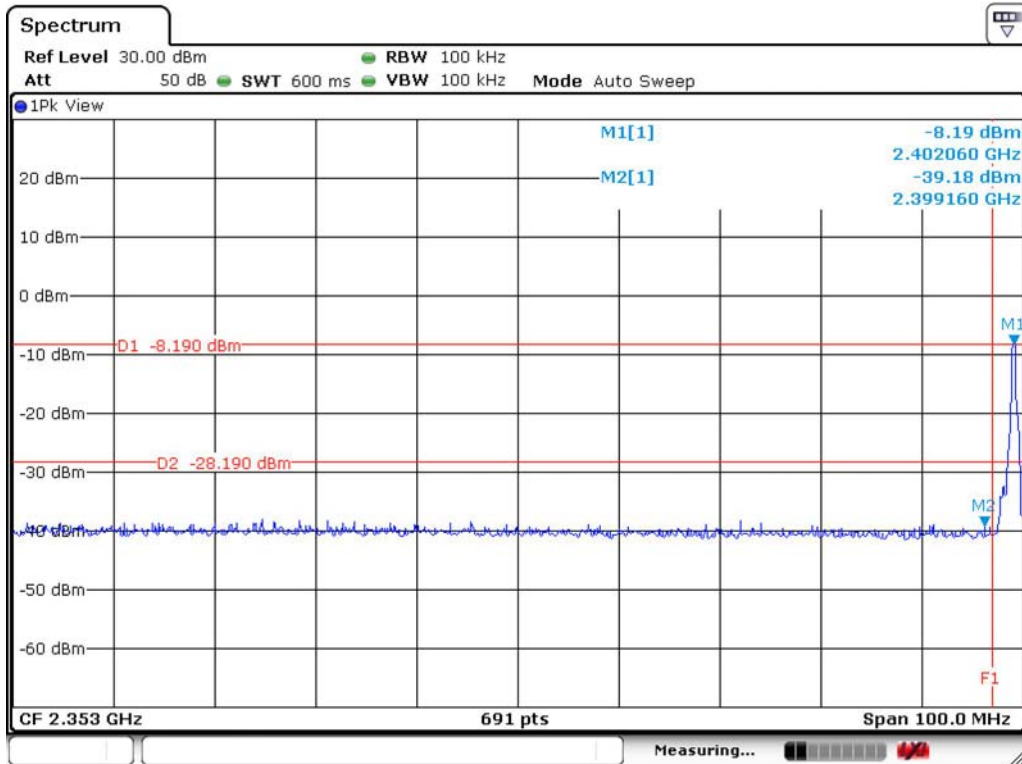
Remark: Result (dB) = Max Peak Power – Max Peak power at Upper band edge. When Result > Limit, it's a pass.

Bluetooth EDR (3Mbps) Channel: <u>78</u>					
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)		
2479.97	-3.11	2485.76	-39.18	36.07	20

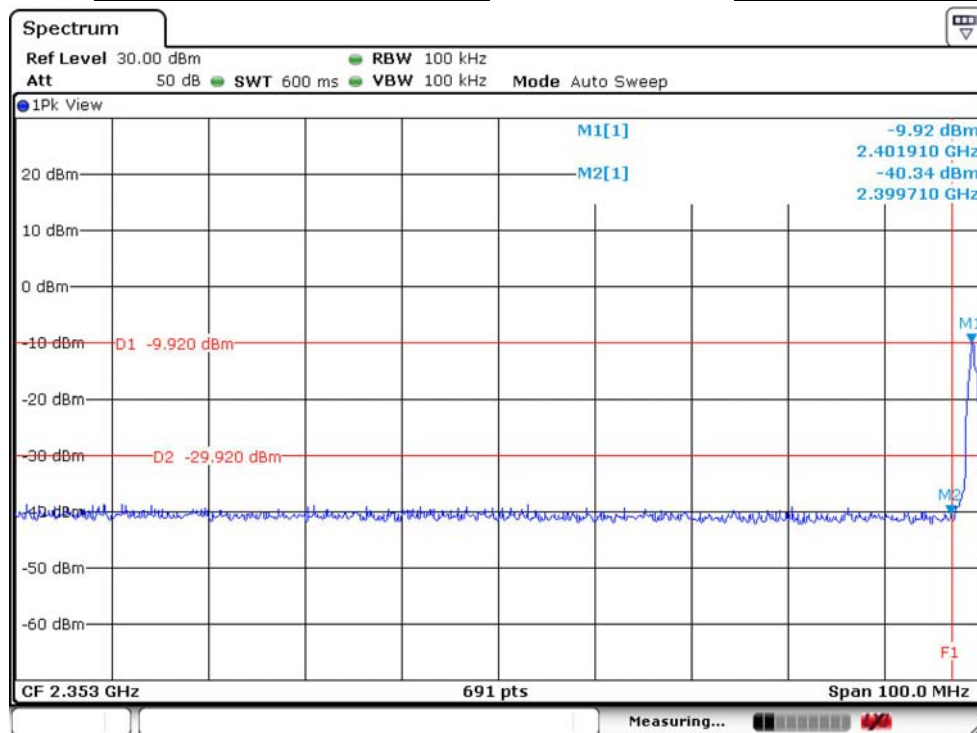
Remark: Result (dB) = Max Peak Power – Max Peak power at Upper band edge. When Result > Limit, it's a pass.



Temperature	: 26°C	Humidity	: 33%
Test Date	: 09-Oct-2013	Tested by	: Kidd Liao
Test Mode	: BT (1Mbps)	Channel	: 2402



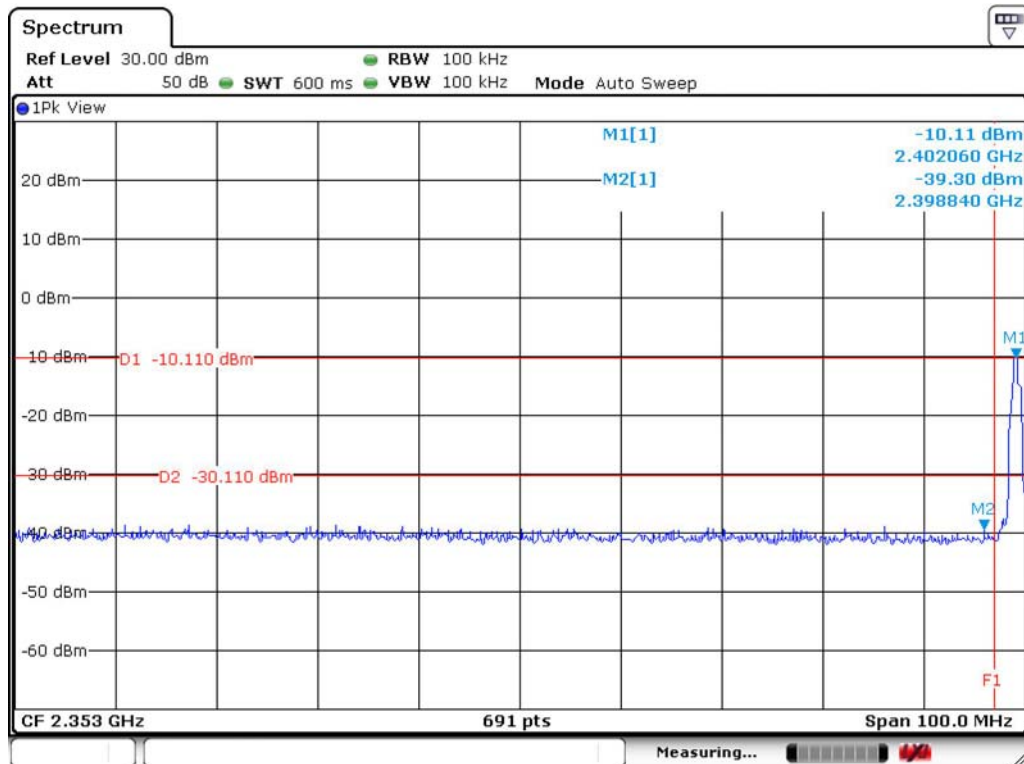
Test Mode	: BT EDR (2 Mbps)	Channel	: 2402
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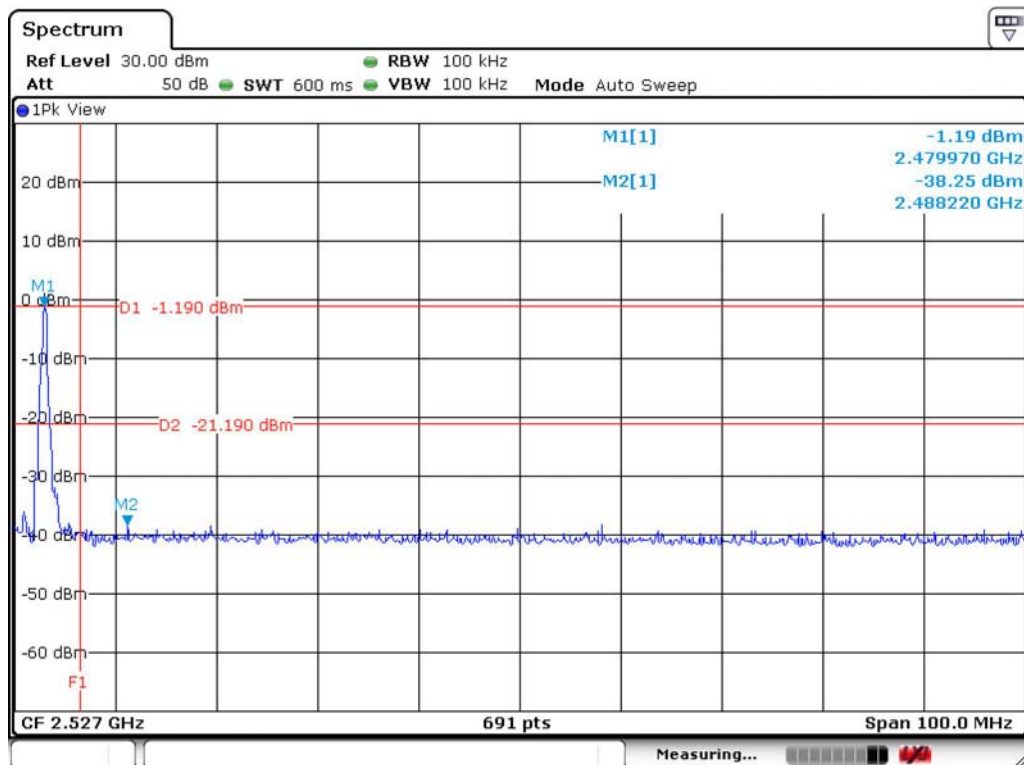
Test Mode : BT EDR (3 Mbps)

Channel : 2402



Test Mode : BT (1 Mbps)

Channel : 2480

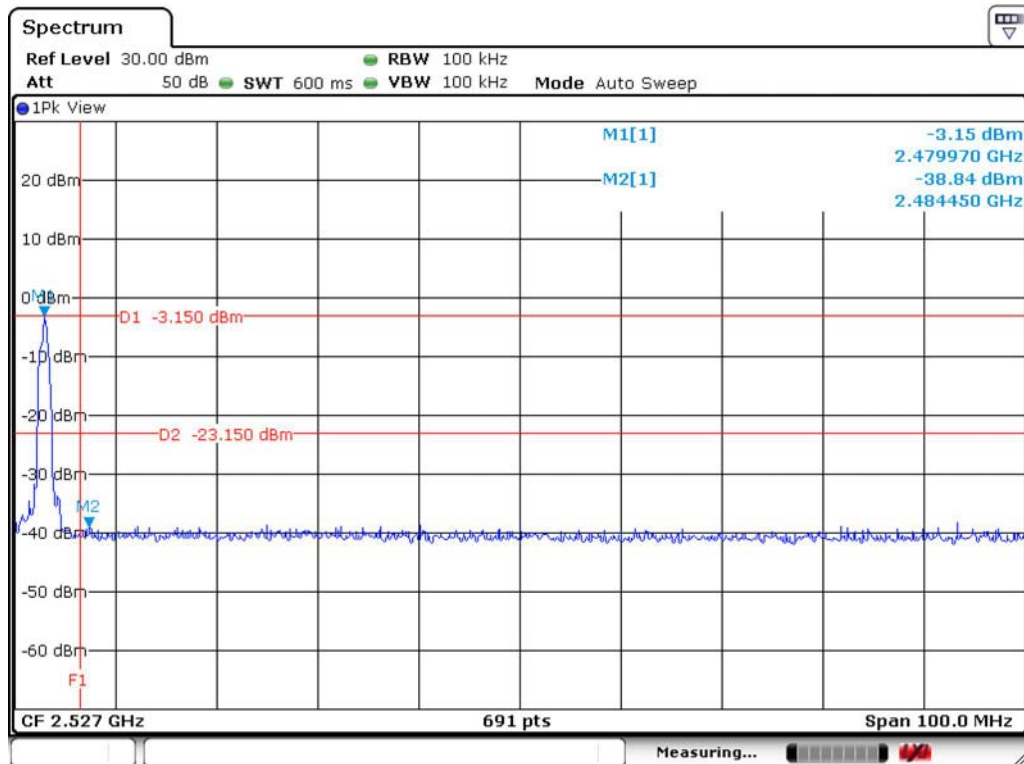






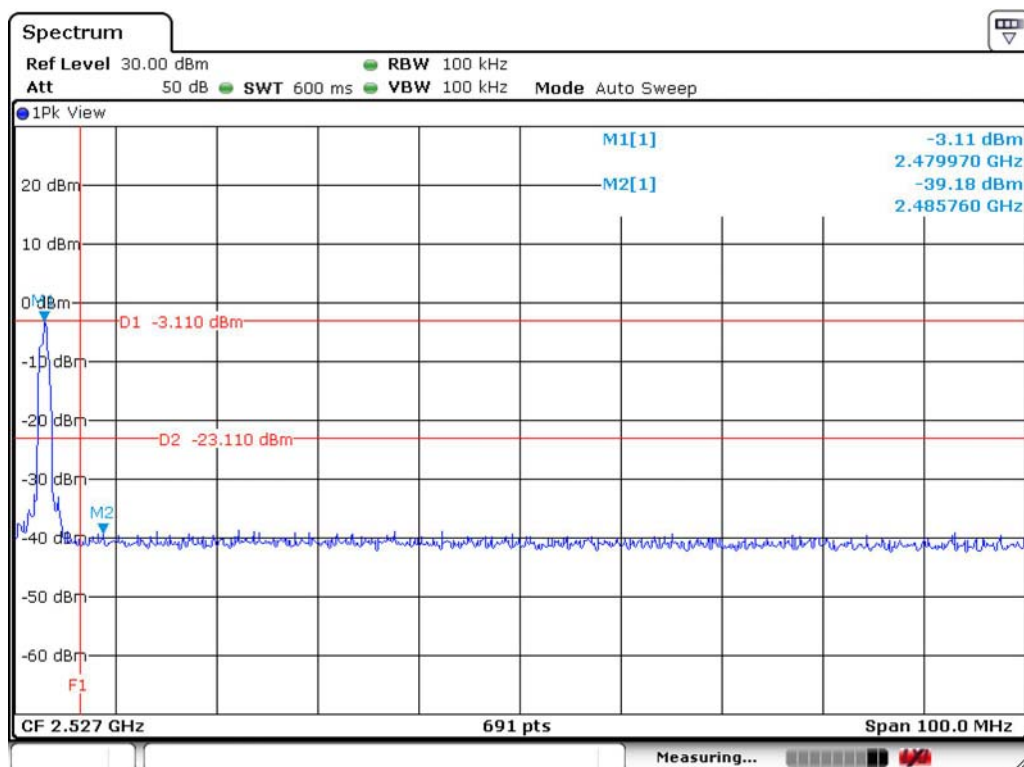
Test Mode : BT EDR (2 Mbps)

Channel : 2480



Test Mode : BT EDR (3 Mbps)

Channel : 2480





## 10 Antenna requirement

### 10.1 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 unique 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.

### 10.2 Test Result

**Compliance.**

**The EUT applies a chip antenna.**