8.6 Test Results

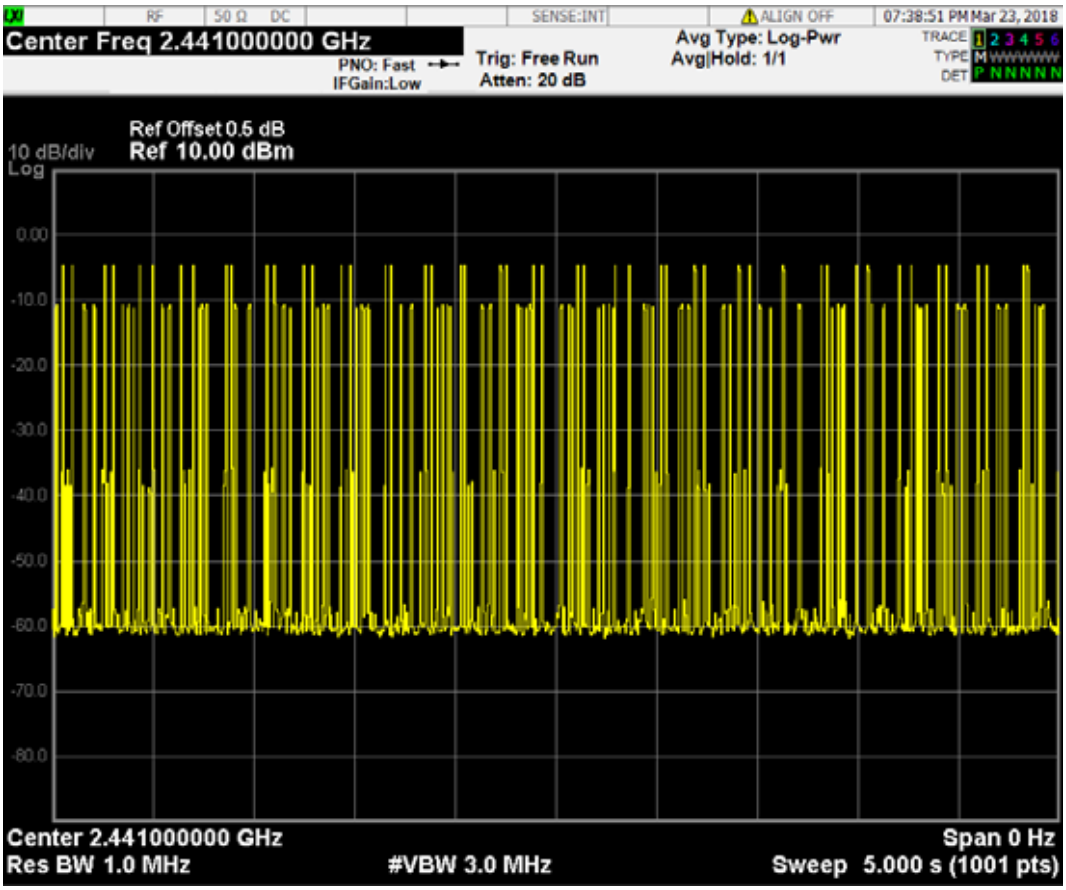
PASSED.

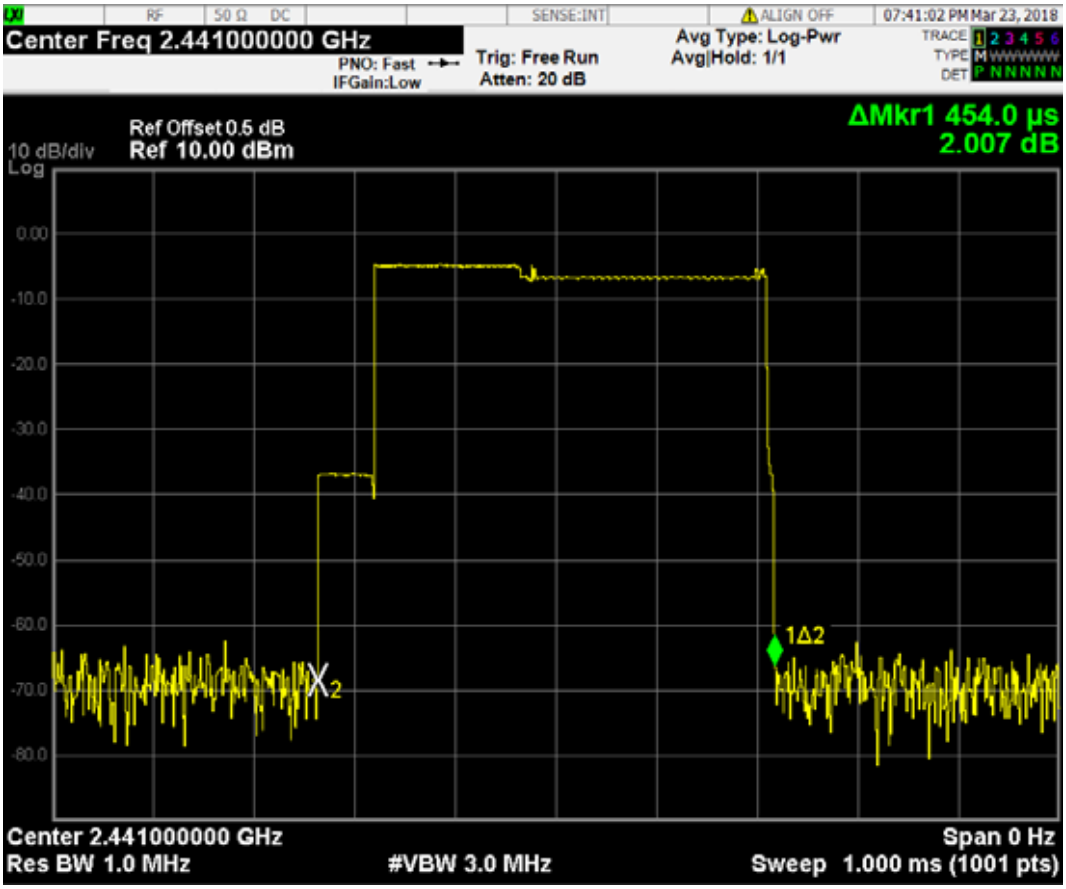
All the test results are attached in next pages.

(Test Date: 2018.03.23 Temperature: 23℃ Humidity: 51 %)

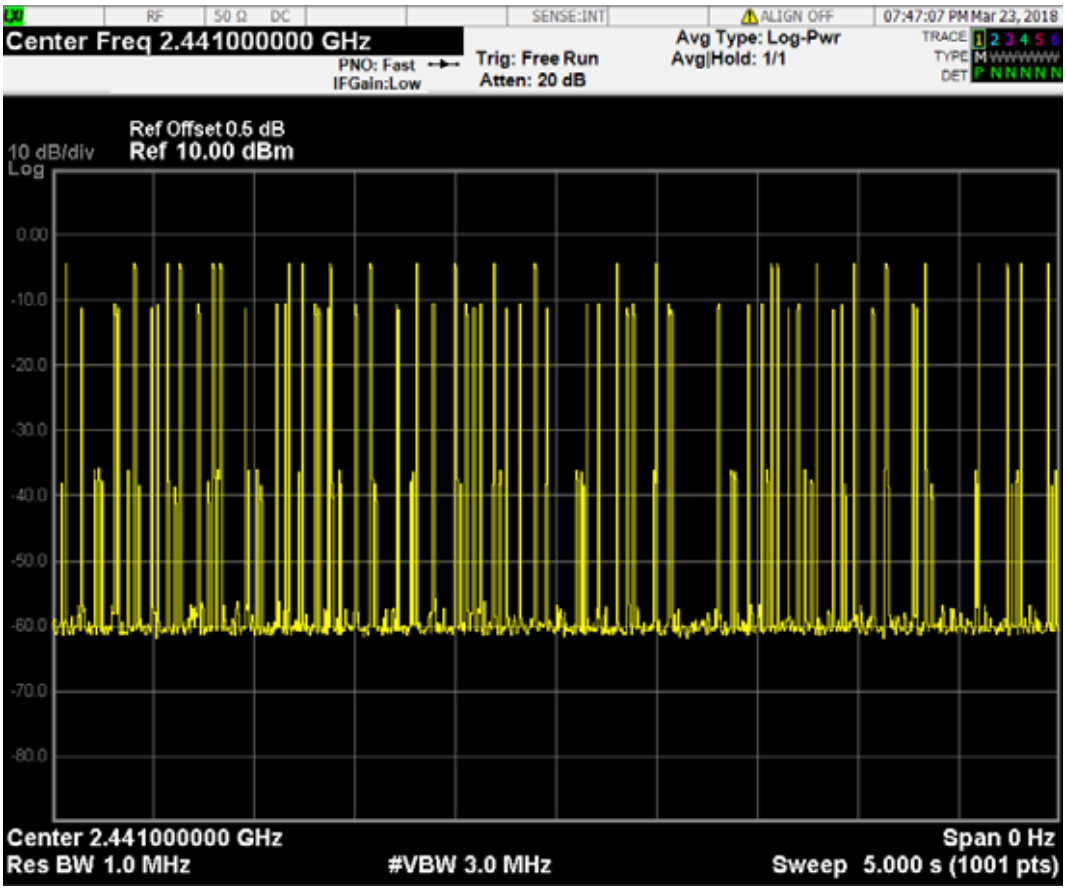
Modulation	**Dwell Time**	Limit
BT DH1	**49hops/5s*0.4*79channels*0.454ms = 140.595ms**	400 ms
BT DH3	**26hops/5s*0.4*79channels*1.715ms = 281.809ms**	400 ms
BT DH5	**16hops/5s*0.4*79channels*2.968ms = 300.124ms**	400 ms
BT 3DH1	**50hops/5s*0.4*79channels*0.454ms = 143.464ms**	400 ms
BT 3DH3	**24hops/5s*0.4*79channels*1.715ms = 260.131ms**	400 ms
BT 3DH5	**17hops/5s*0.4*79channels*2.968ms = 318.882ms**	400 ms

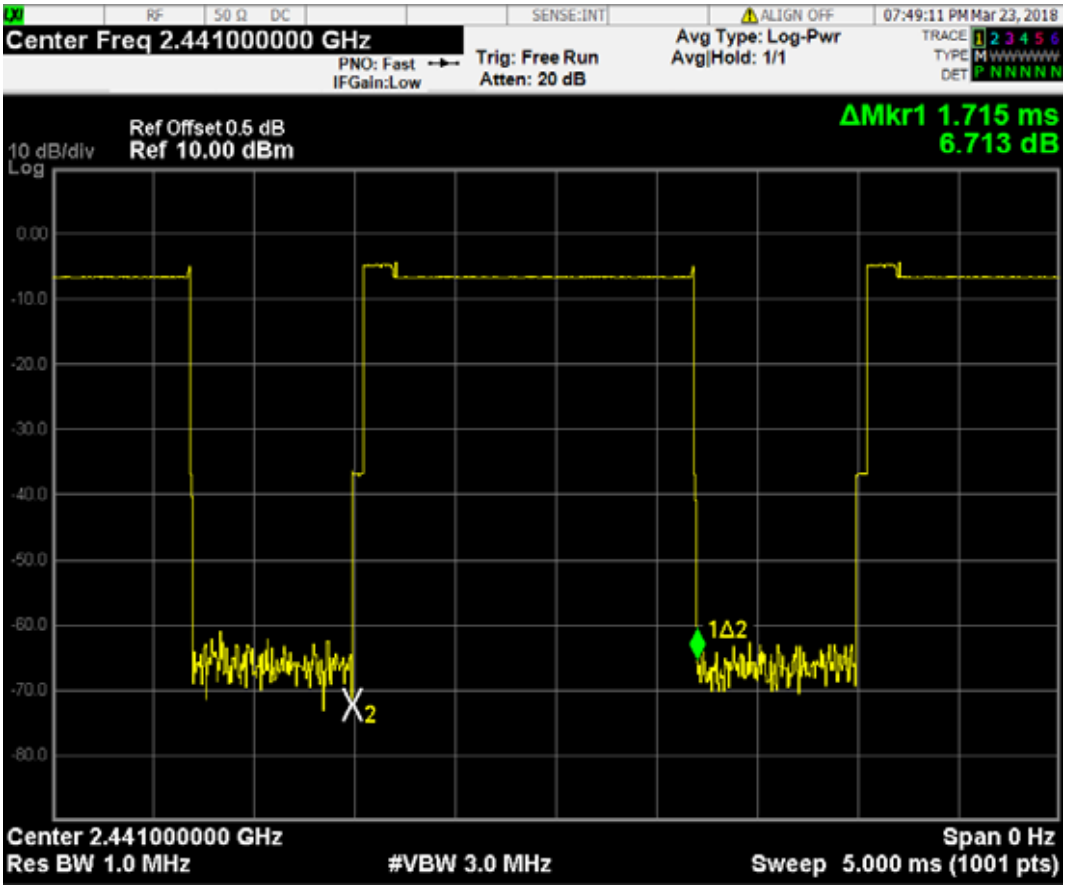
BT DH1


RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:38:51 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 s (1001 pts)

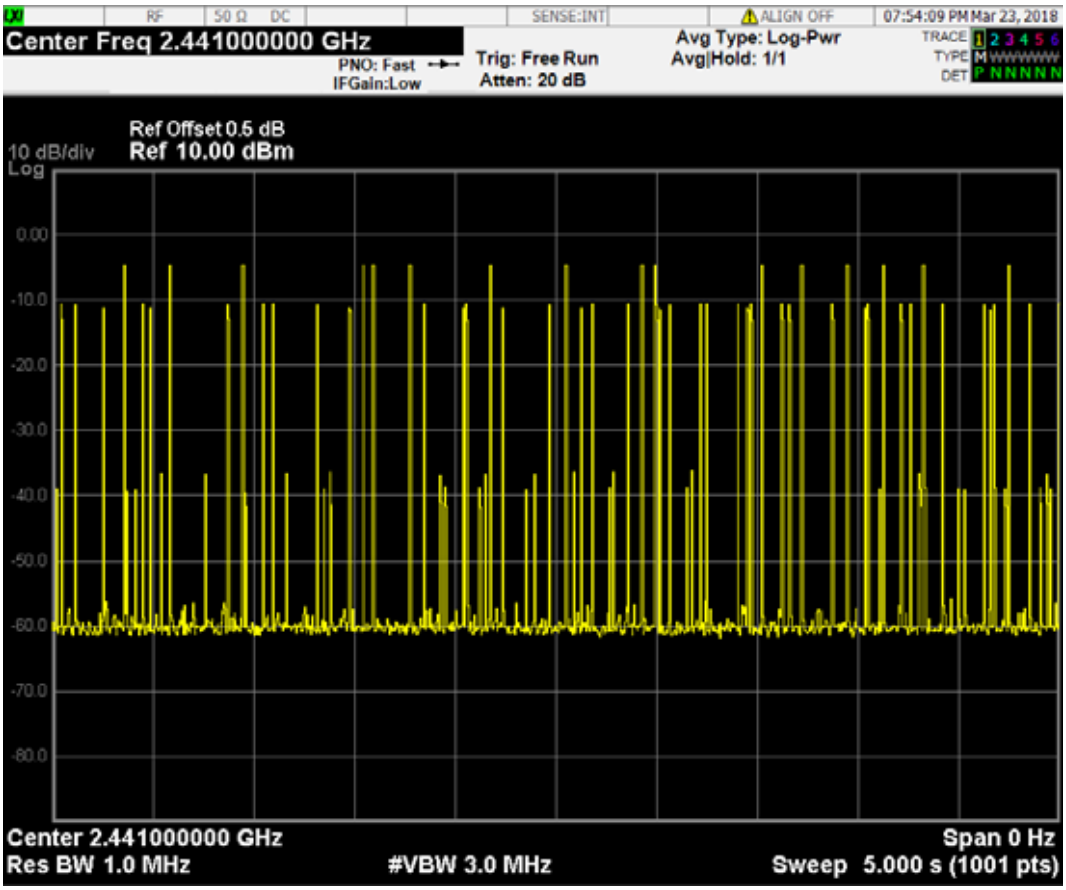

RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:41:02 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
ΔMkr1 454.0 µs
2.007 dB
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1Δ2
X2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)

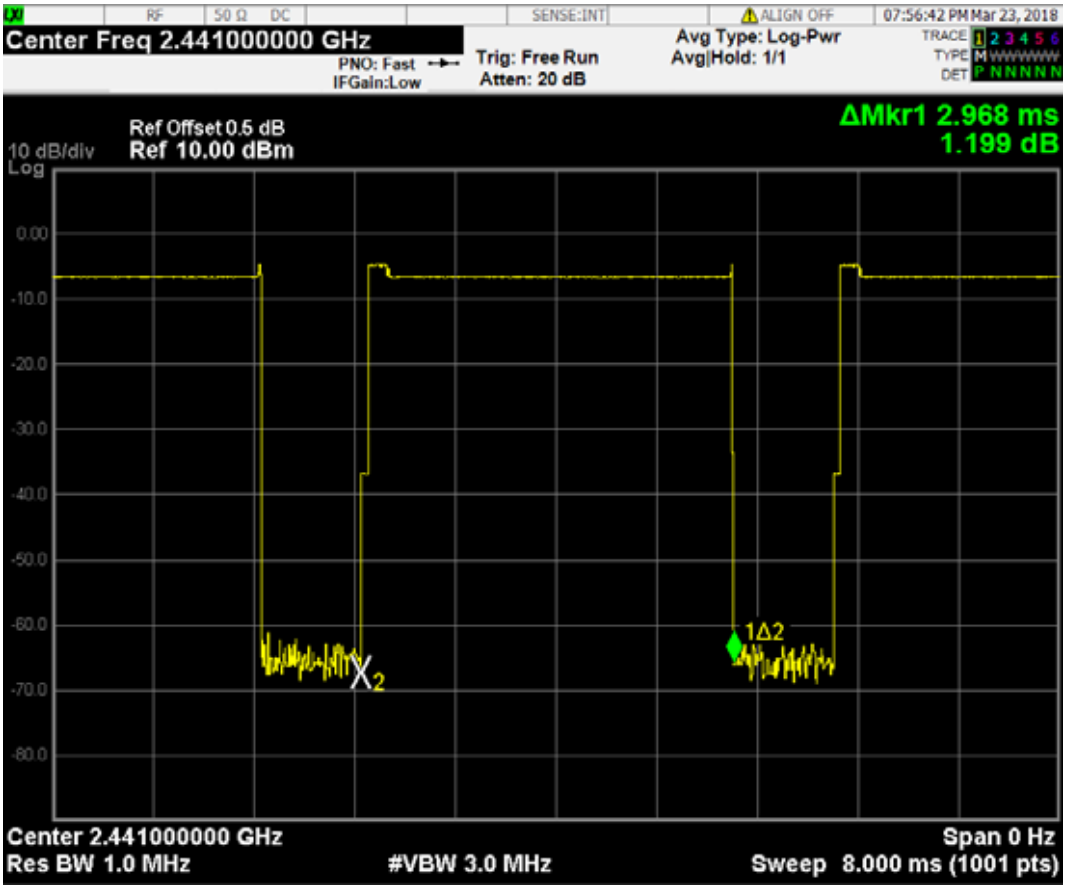
BT DH3


RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:47:07 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 s (1001 pts)

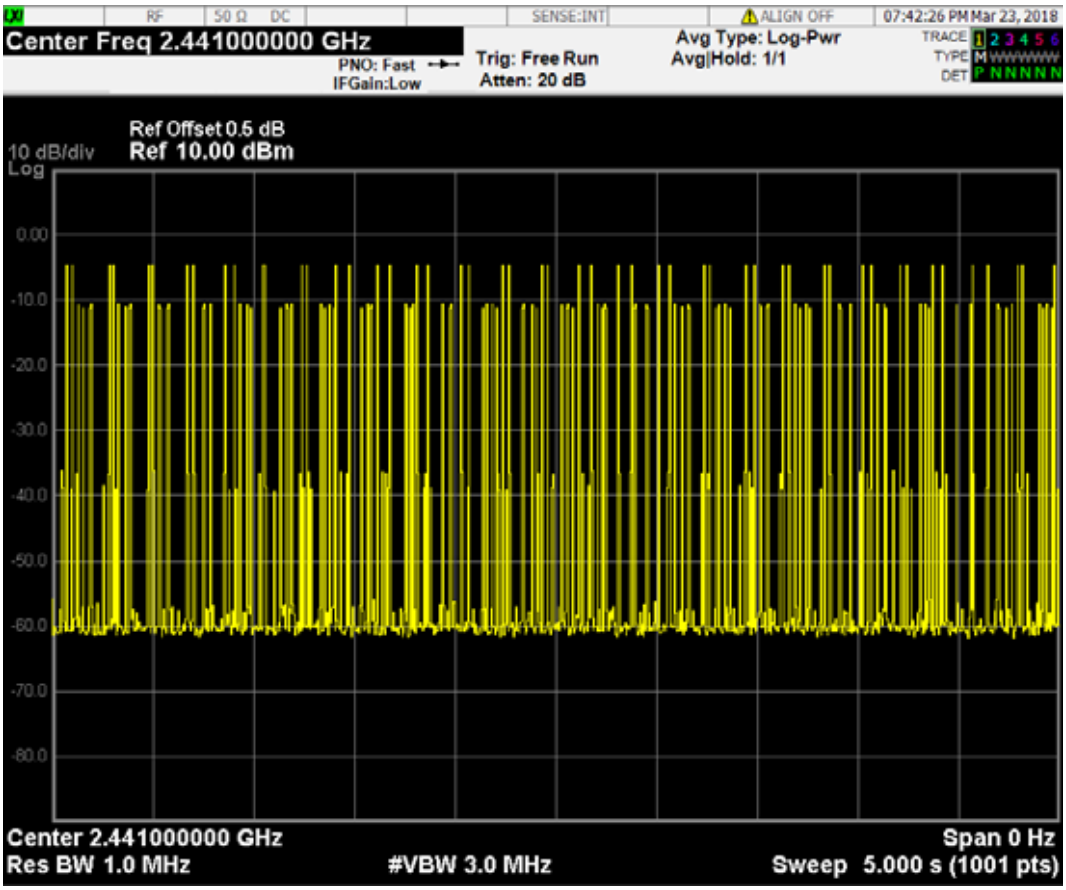

RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:49:11 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
ΔMkr1 1.715 ms
6.713 dB
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1Δ2
X2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)

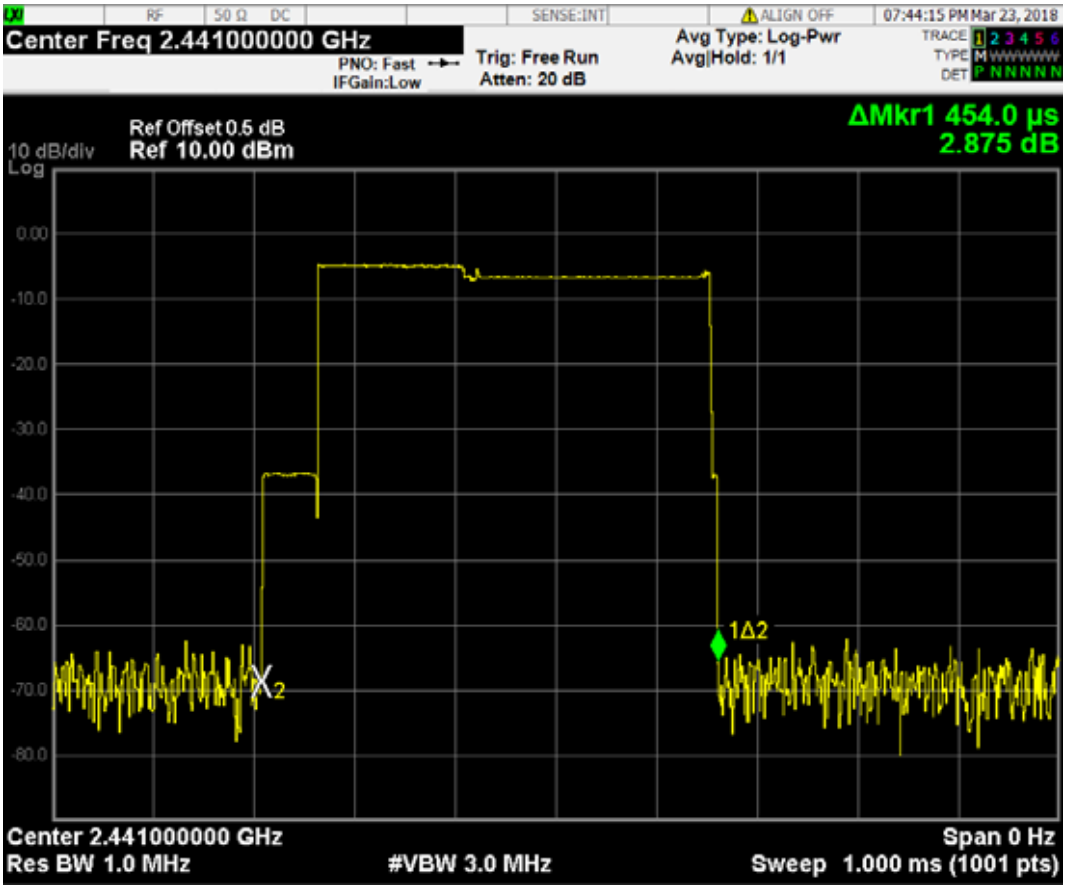
BT DH5


RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:54:09 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 s (1001 pts)

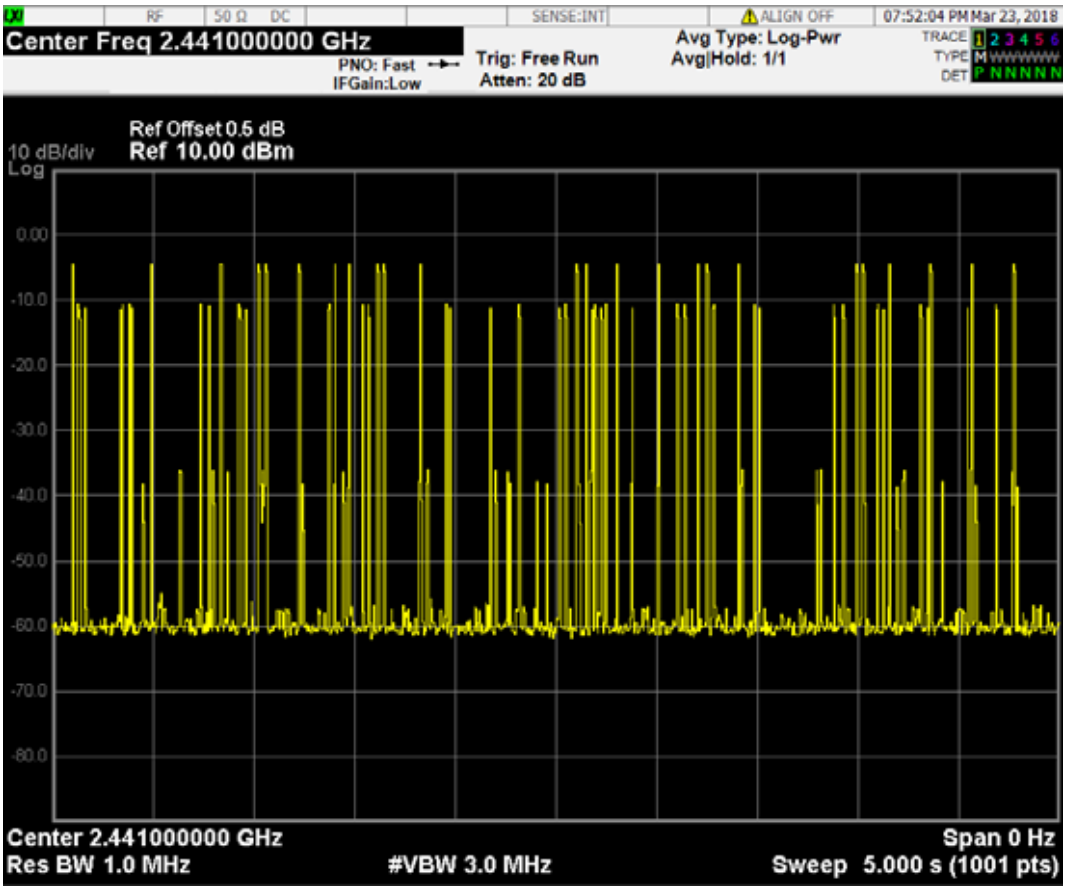

RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:56:42 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
ΔMkr1 2.968 ms
1.199 dB
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1Δ2
X2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 8.000 ms (1001 pts)

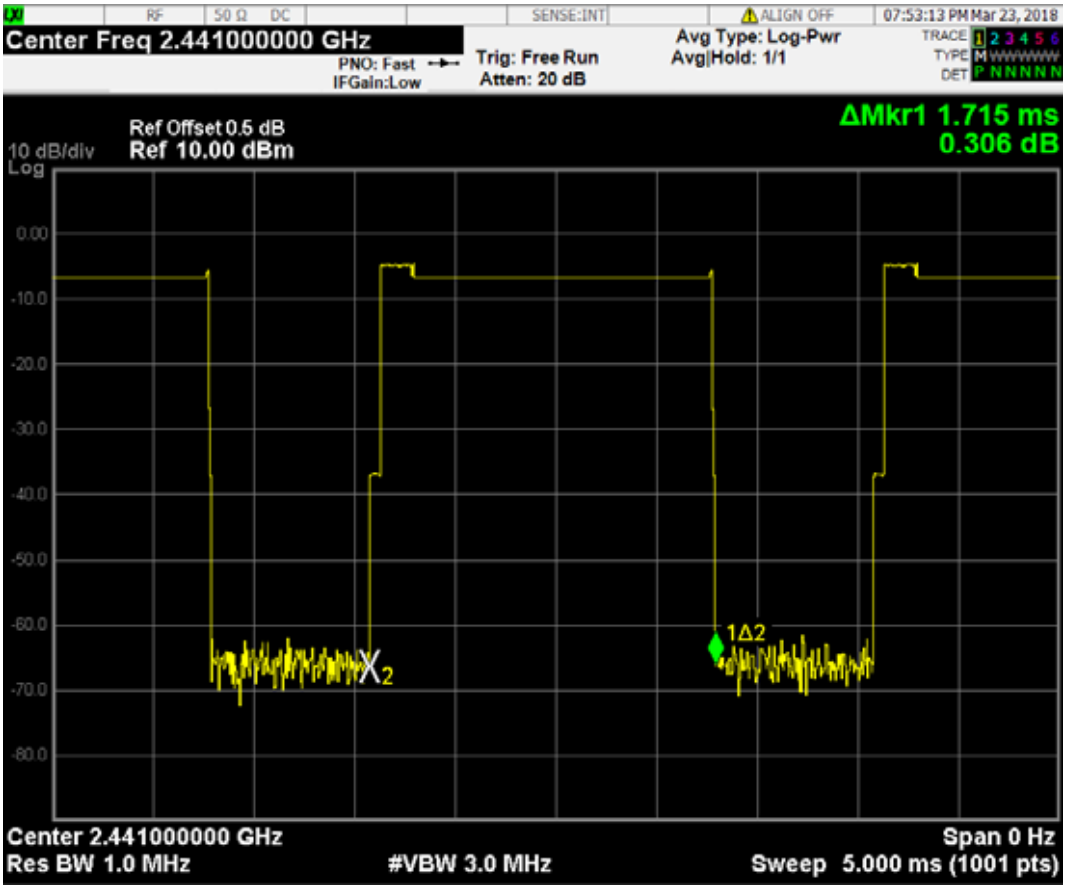
BT 3DH1


RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:42:26 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 s (1001 pts)

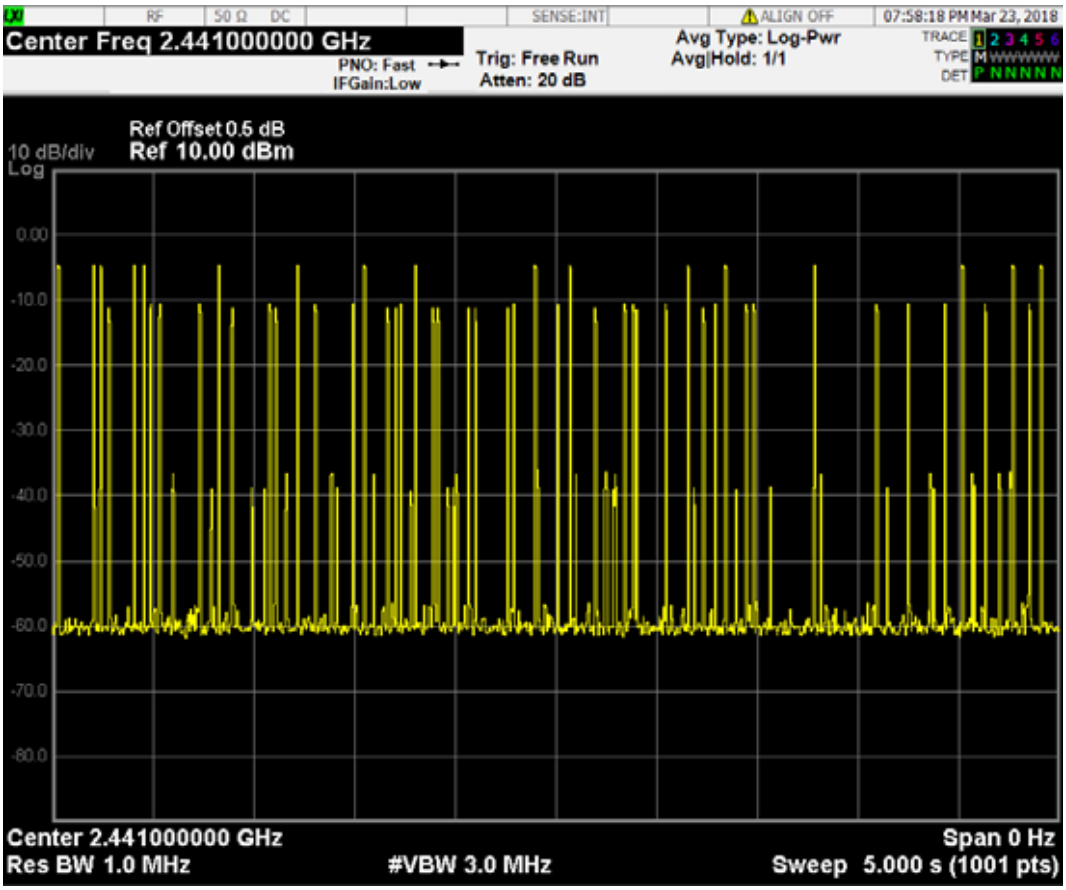

RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:44:15 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
ΔMkr1 454.0 µs
2.875 dB
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1Δ2
2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)

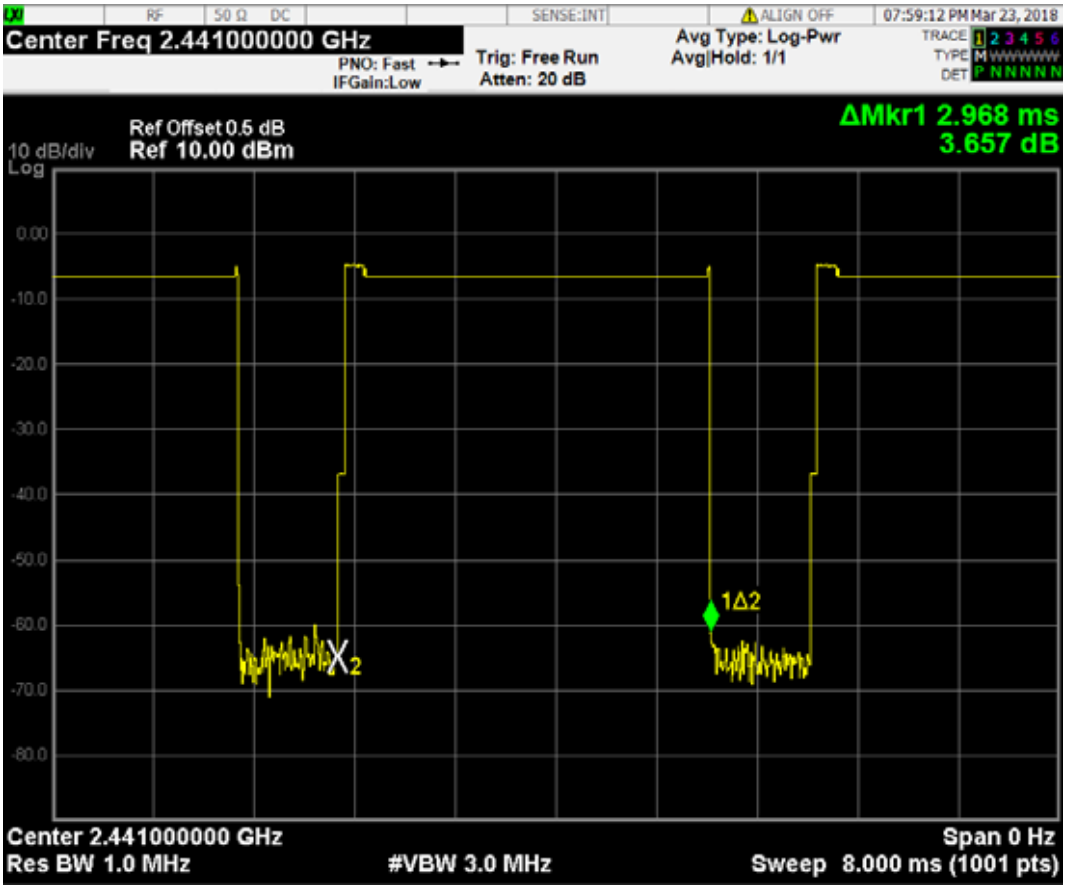
BT 3DH3


RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:52:04 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 s (1001 pts)


RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:53:13 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
ΔMkr1 1.715 ms
0.306 dB
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1Δ2
X2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)

BT 3DH5


RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:58:18 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 s (1001 pts)


RF 50 Ω DC
SENSE:INT
ALIGN OFF
07:59:12 PM Mar 23, 2018
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
ΔMkr1 2.968 ms
3.657 dB
Ref Offset 0.5 dB
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1Δ2
X2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 8.000 ms (1001 pts)

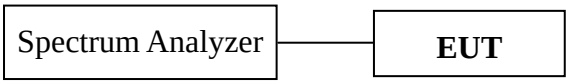
9 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

9.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2017	Jun 11, 2018

9.2 Block Diagram of Test Setup



9.3 Specification Limits (§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.

9.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

9.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.
Use the following spectrum analyzer settings:
a) Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
b) RBW > the 20 dB bandwidth of the emission being measured
c) VBW ≥ RBW
d) Sweep = auto
e) Detector function = peak
f) Trace = max hold
g) Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power. The limit is specified in one of the subparagraphs of this Section. Submit this plot. A peak responding power meter may be used instead of a spectrum analyzer.

The test procedure is defined in FCC Public Notice DA 00-705, Mar.2000 (the Procedure “ Peak Output Power” was used).

9.6 Test Results

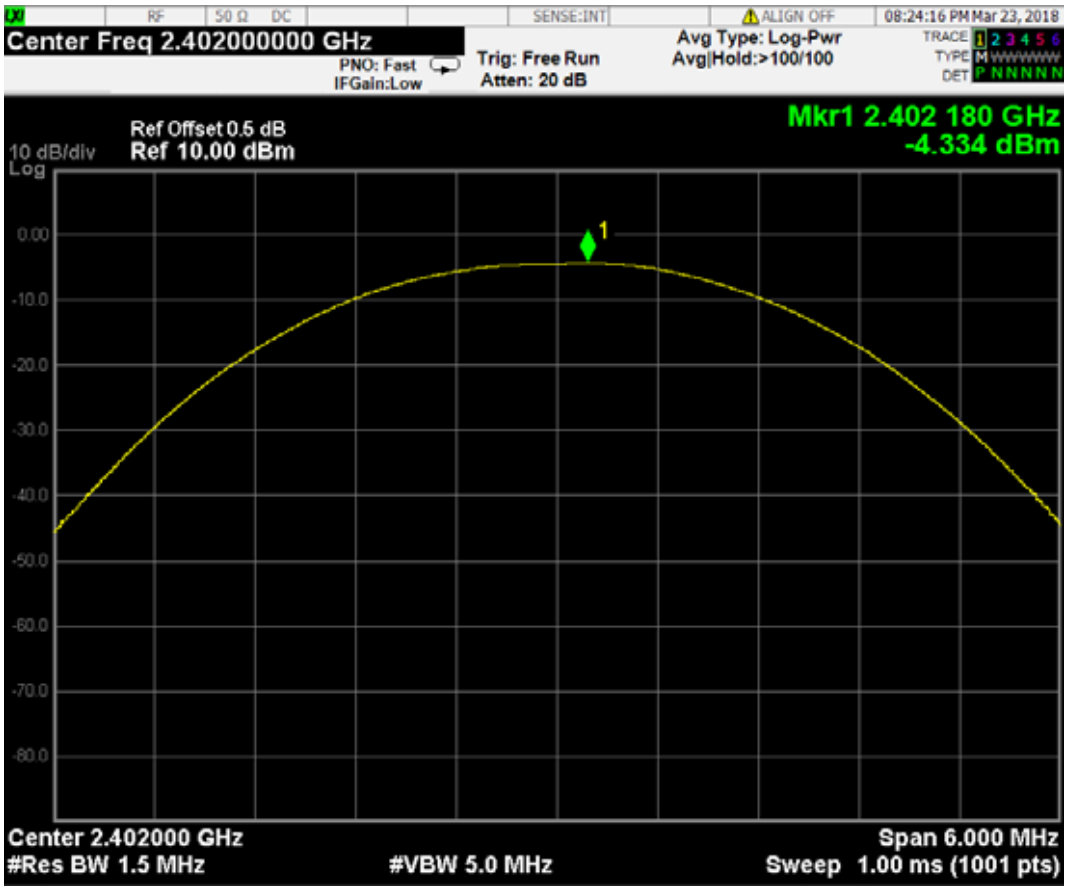
PASSED.

All the test results are attached in next pages.

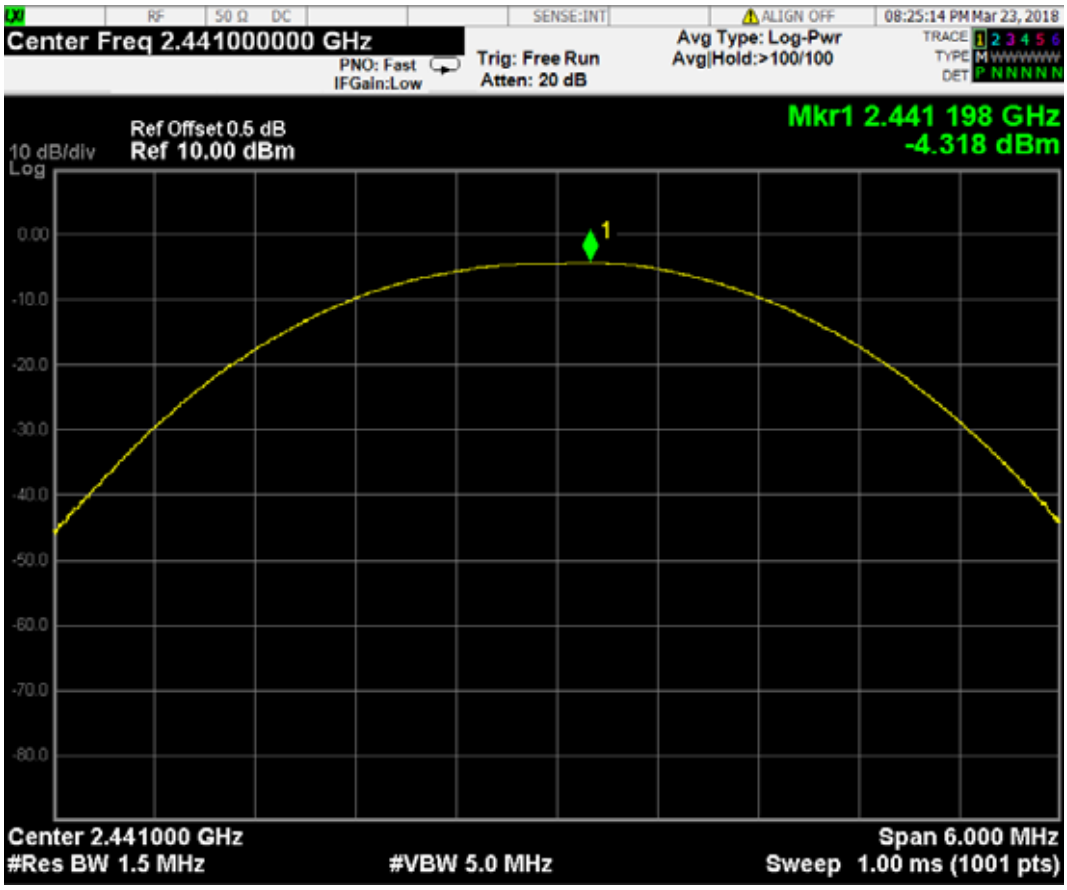
(Test Date: 2018.03.23 Temperature: 23℃ Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	**Peak Output Power (dBm)**	Limit
BT DH1	00	2402	**-4.334**	30 dBm
	39	2441	**-4.318**	30 dBm
	78	2480	**-4.315**	30 dBm
BT DH3	00	2402	**-3.914**	30 dBm
	39	2441	**-3.908**	30 dBm
	78	2480	**-3.969**	30 dBm
BT DH5	00	2402	**-4.322**	30 dBm
	39	2441	**-4.314**	30 dBm
	78	2480	**-4.343**	30 dBm
BT 3DH1	00	2402	**-4.530**	30 dBm
	39	2441	**-4.509**	30 dBm
	78	2480	**-4.519**	30 dBm
BT 3DH3	00	2402	**-4.207**	30 dBm
	39	2441	**-4.172**	30 dBm
	78	2480	**-4.154**	30 dBm
BT 3DH5	00	2402	**-4.543**	30 dBm
	39	2441	**-4.509**	30 dBm
	78	2480	**-4.512**	30 dBm

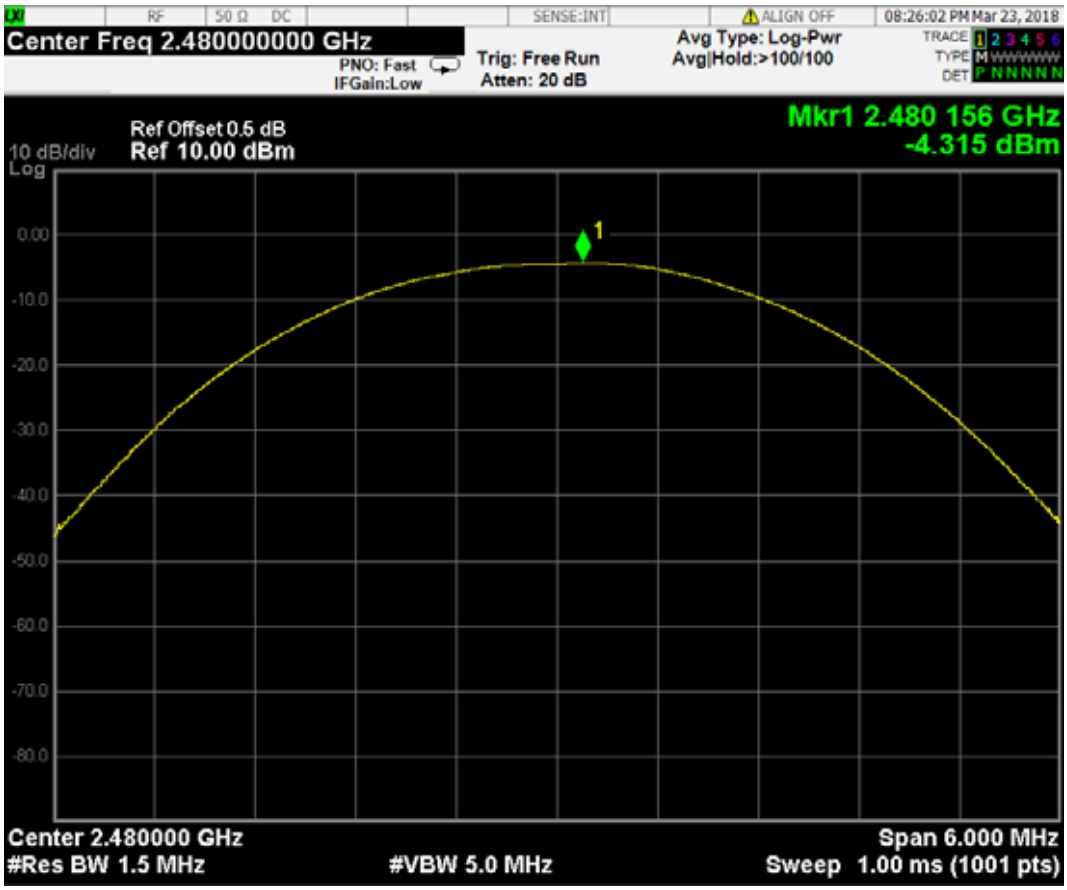
BT DH1: CH00 (2402 MHz)



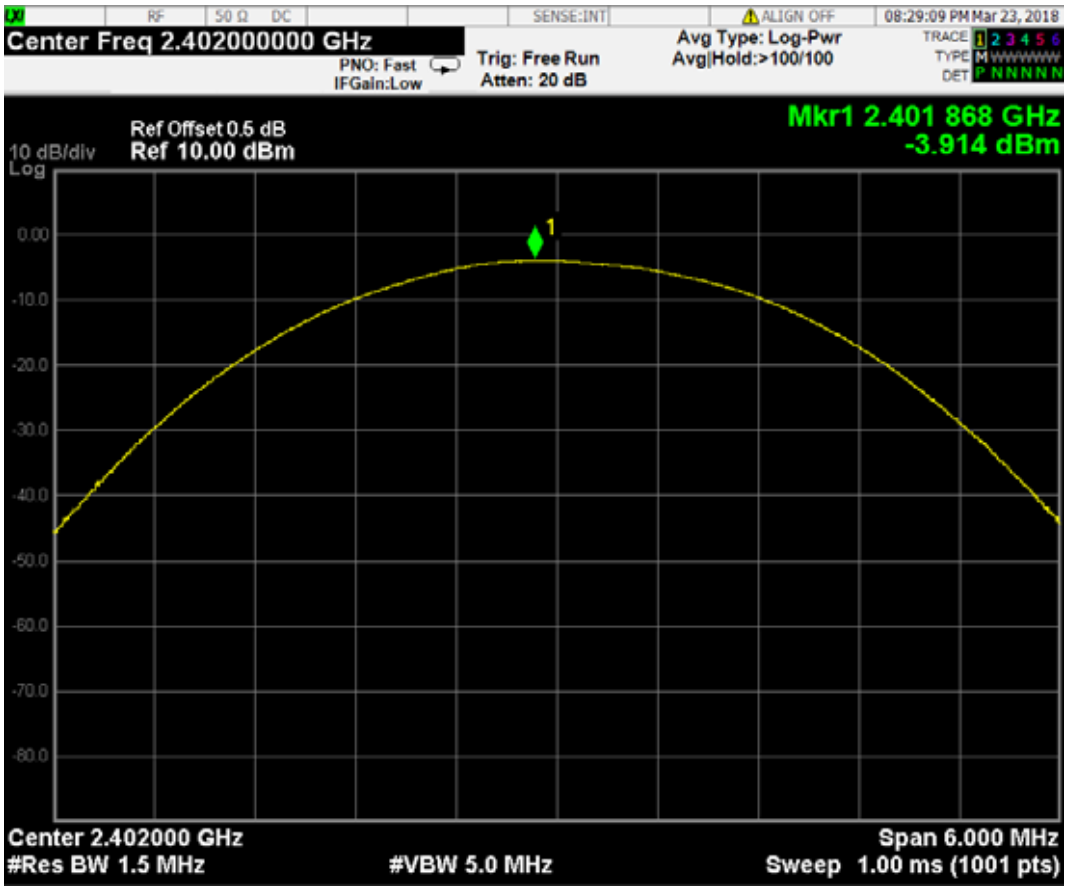
BT DH1: CH39 (2441 MHz)



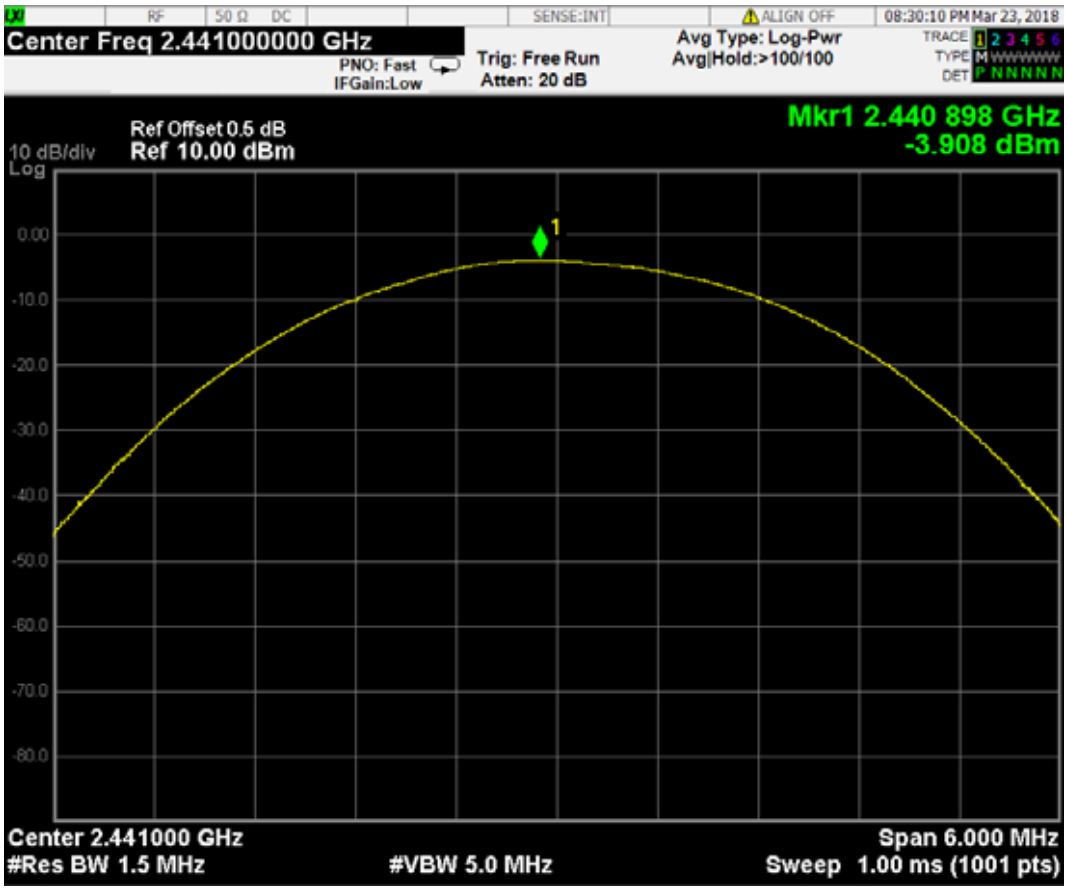
BT DH1: CH78 (2480 MHz)



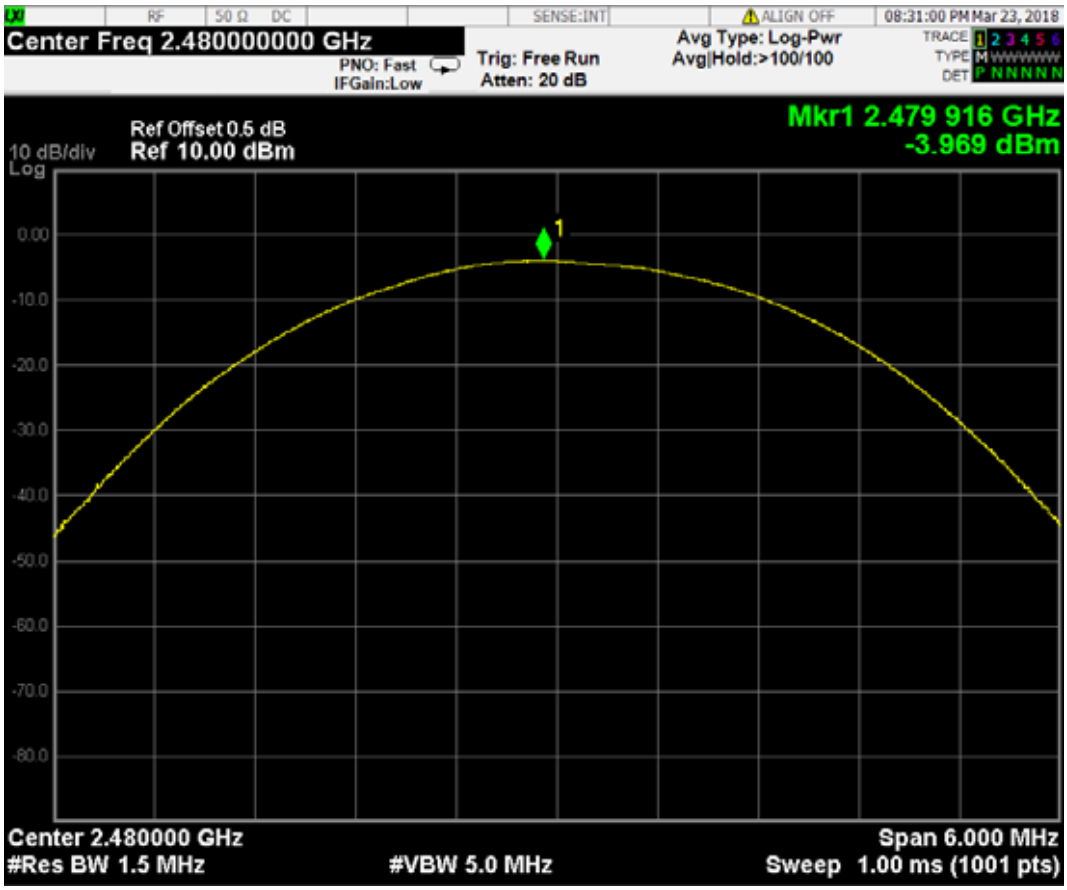
BT DH3: CH00 (2402 MHz)



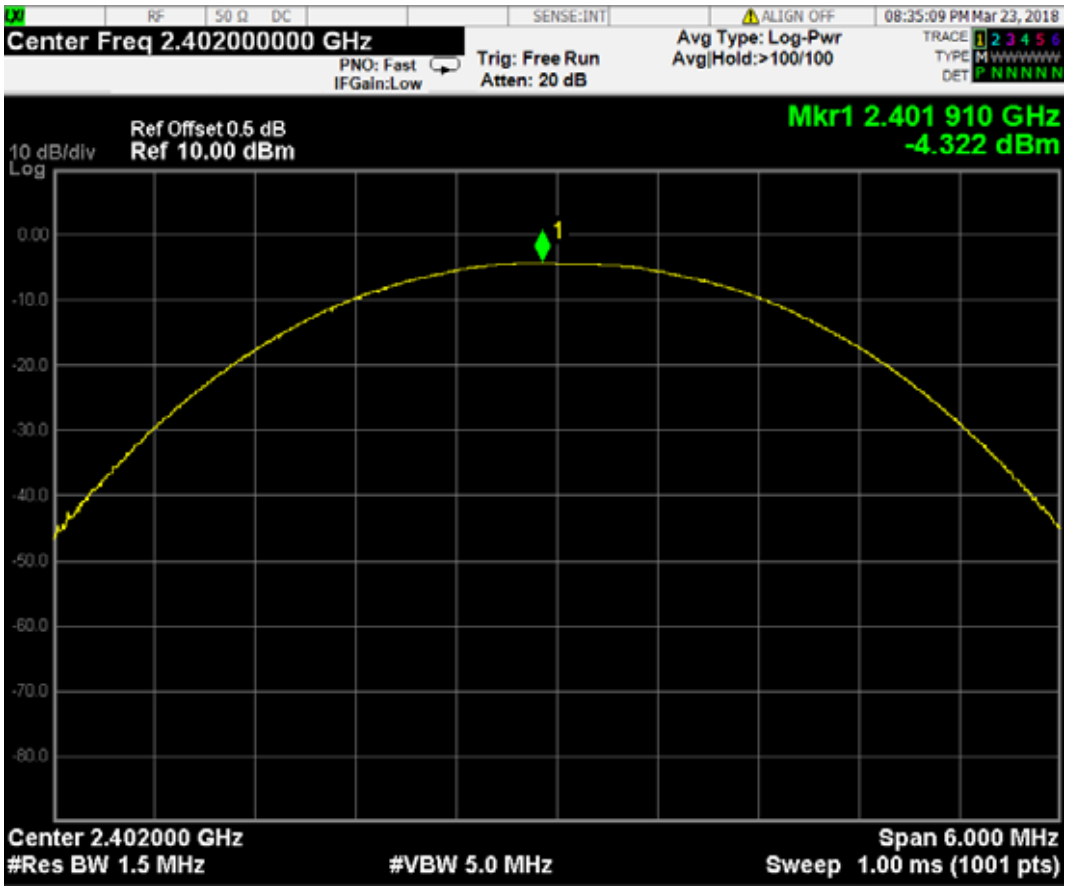
BT DH3: CH39 (2441 MHz)



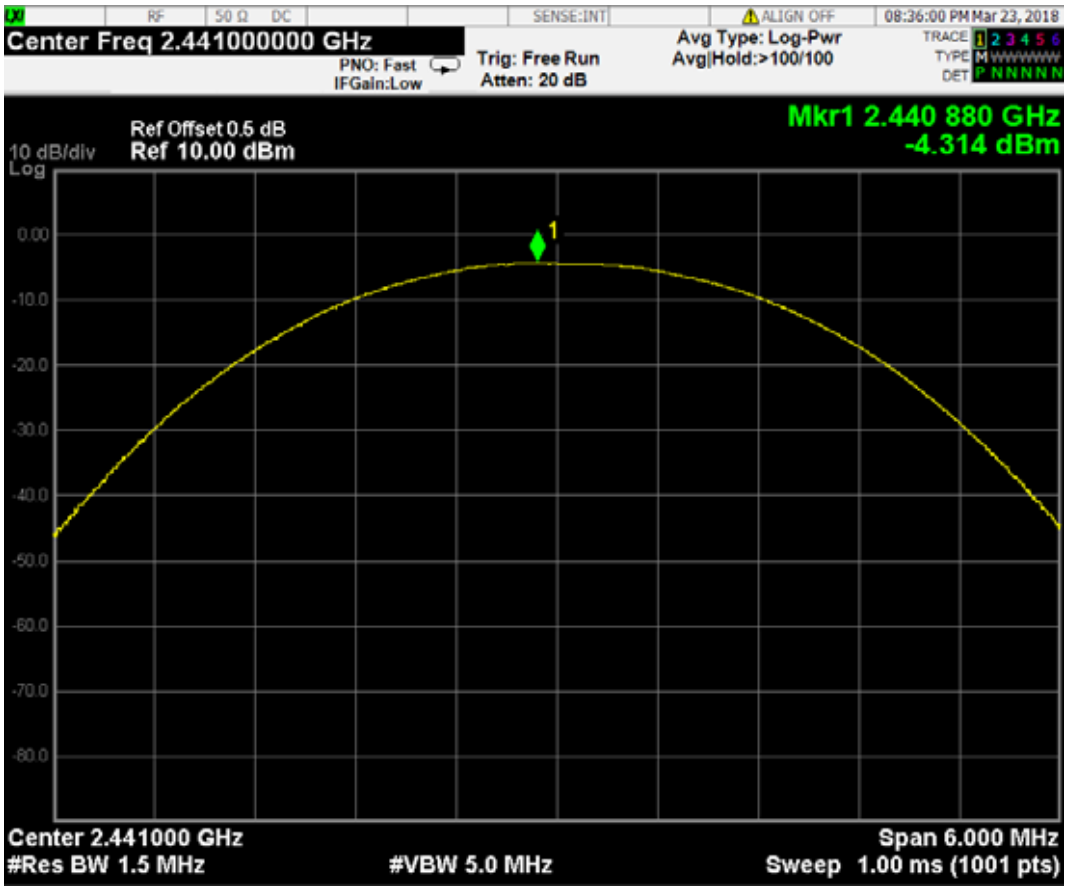
BT DH3: CH78 (2480 MHz)



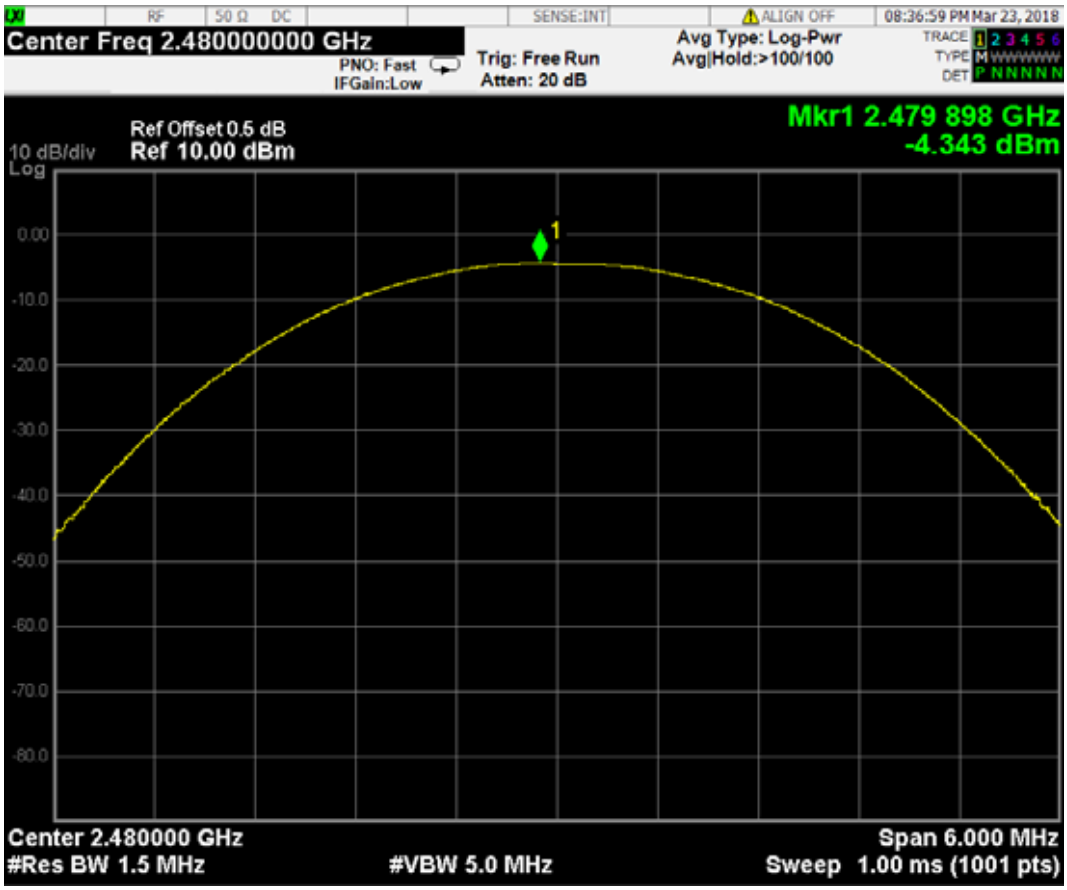
BT DH5: CH00 (2402 MHz)



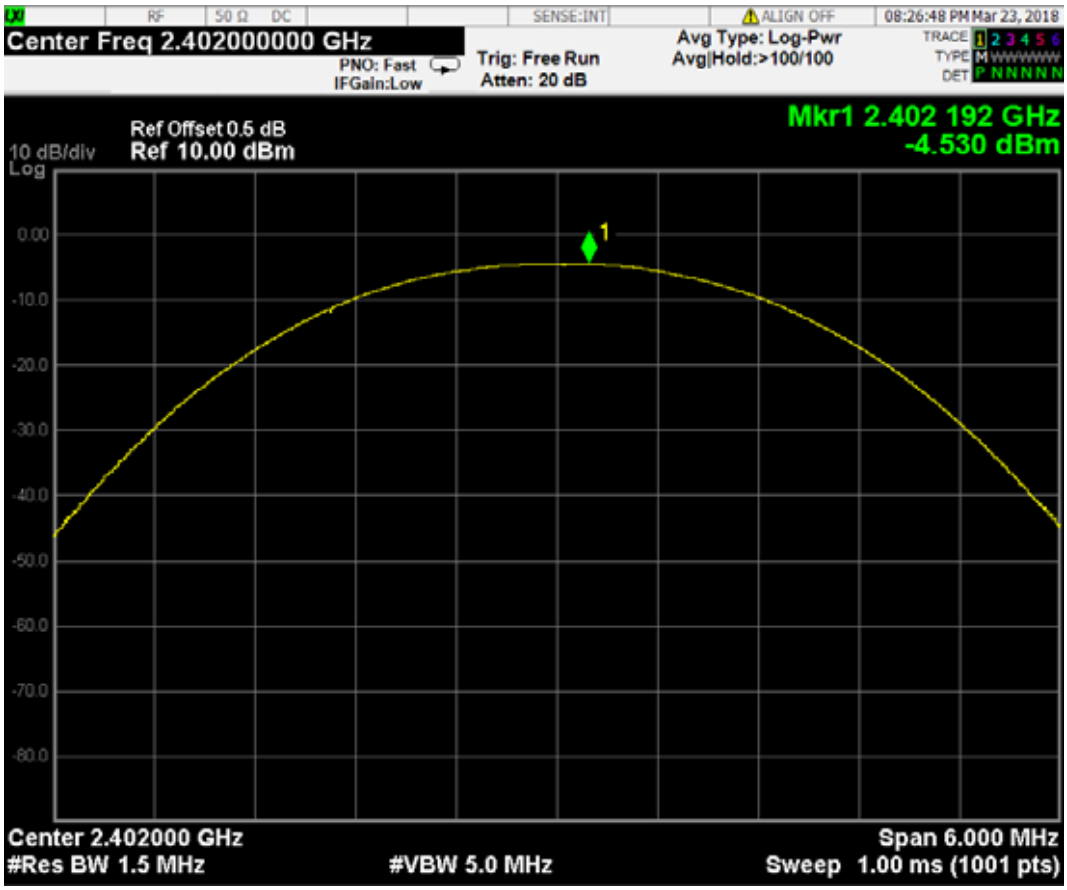
BT DH5: CH39 (2441 MHz)



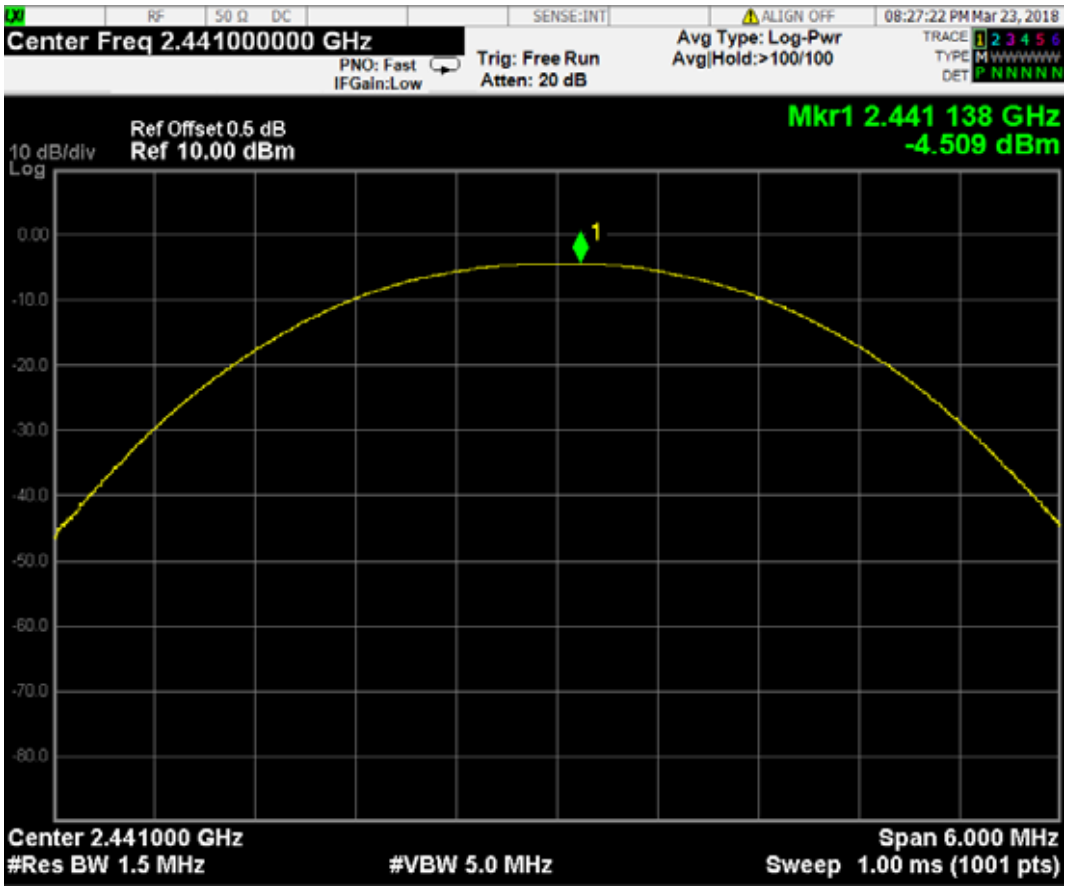
BT DH5: CH78 (2480 MHz)



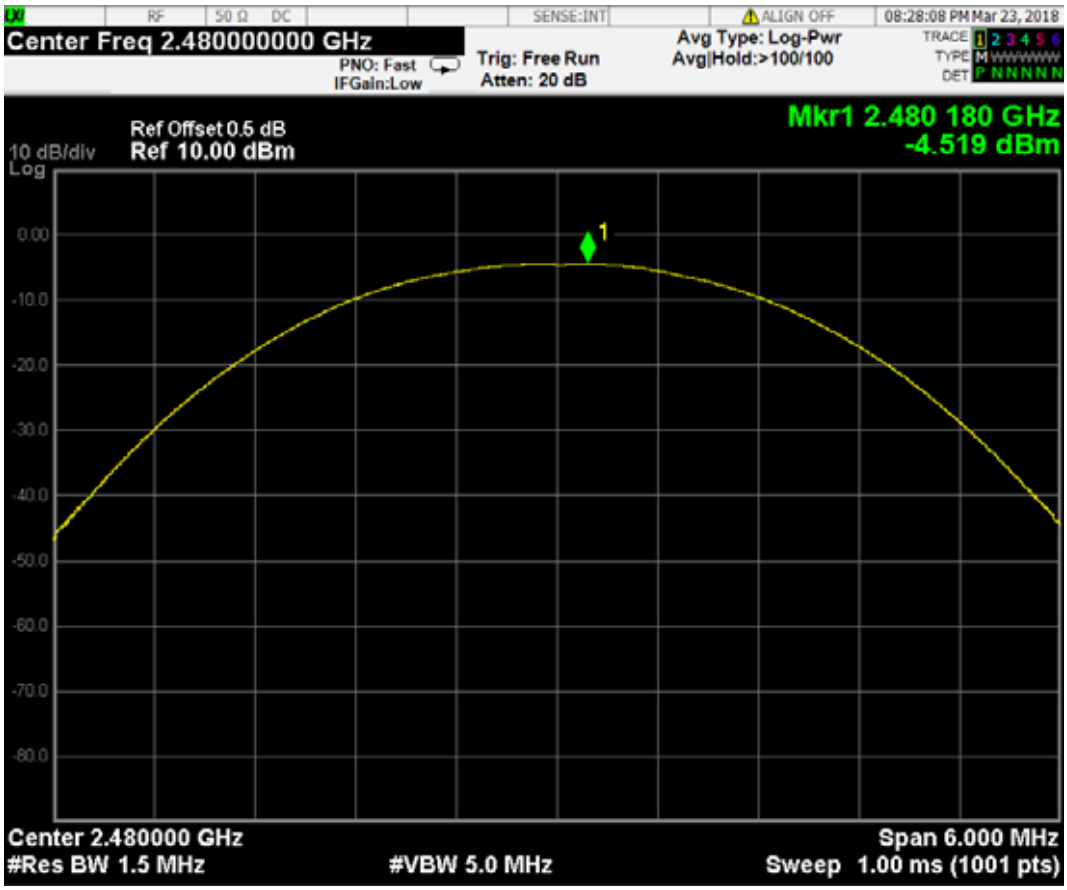
BT 3DH1: CH00 (2402 MHz)



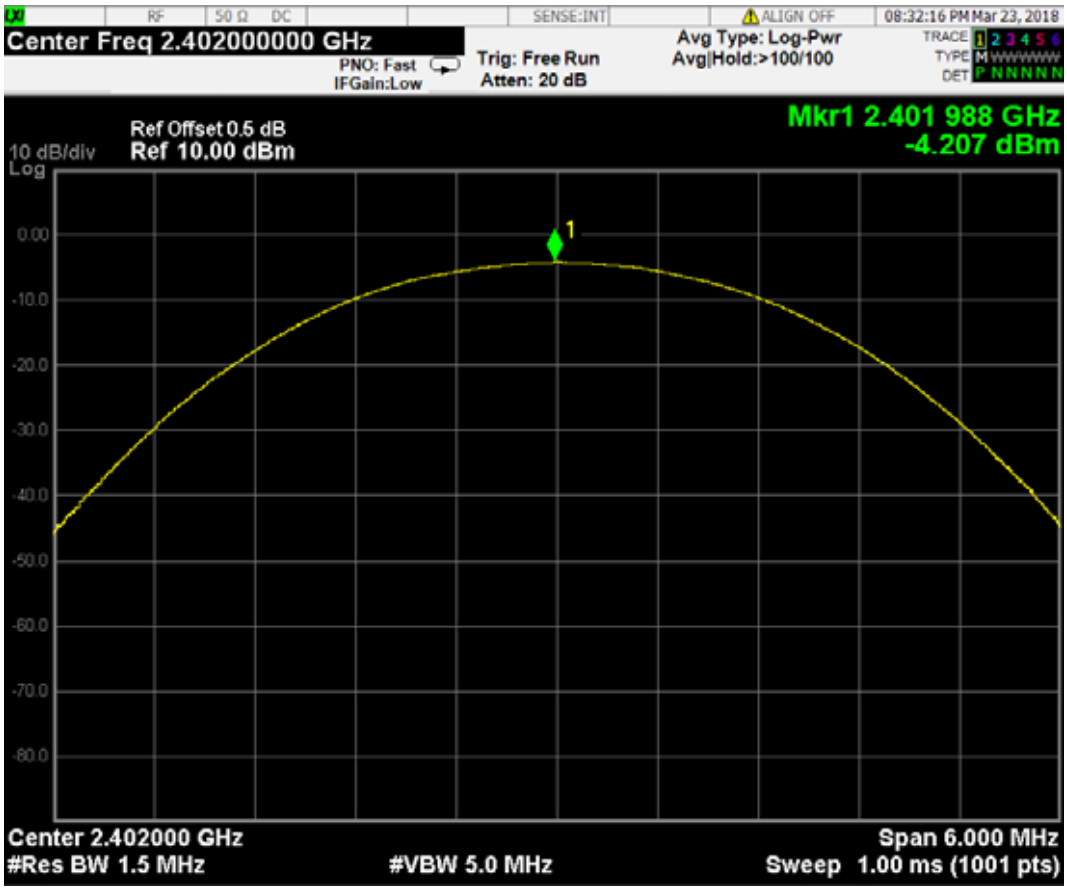
BT 3DH1: CH39 (2441 MHz)



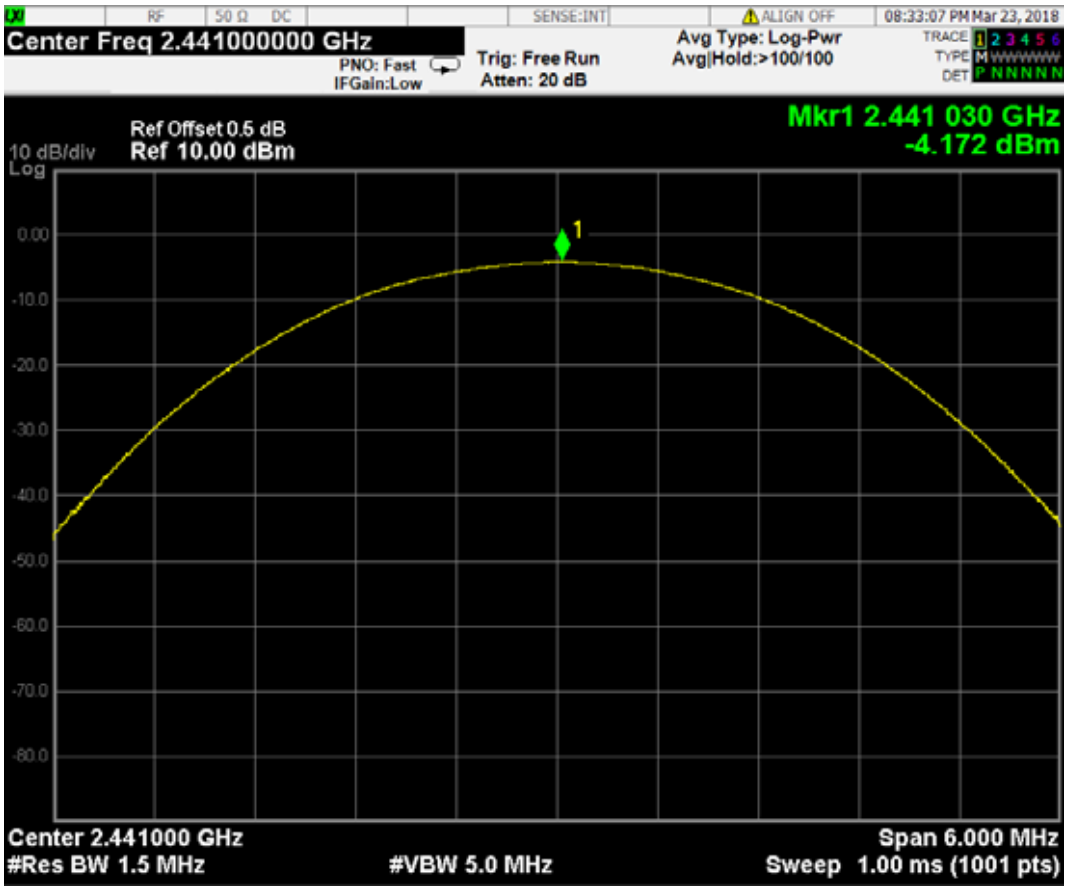
BT 3DH1: CH78 (2480 MHz)



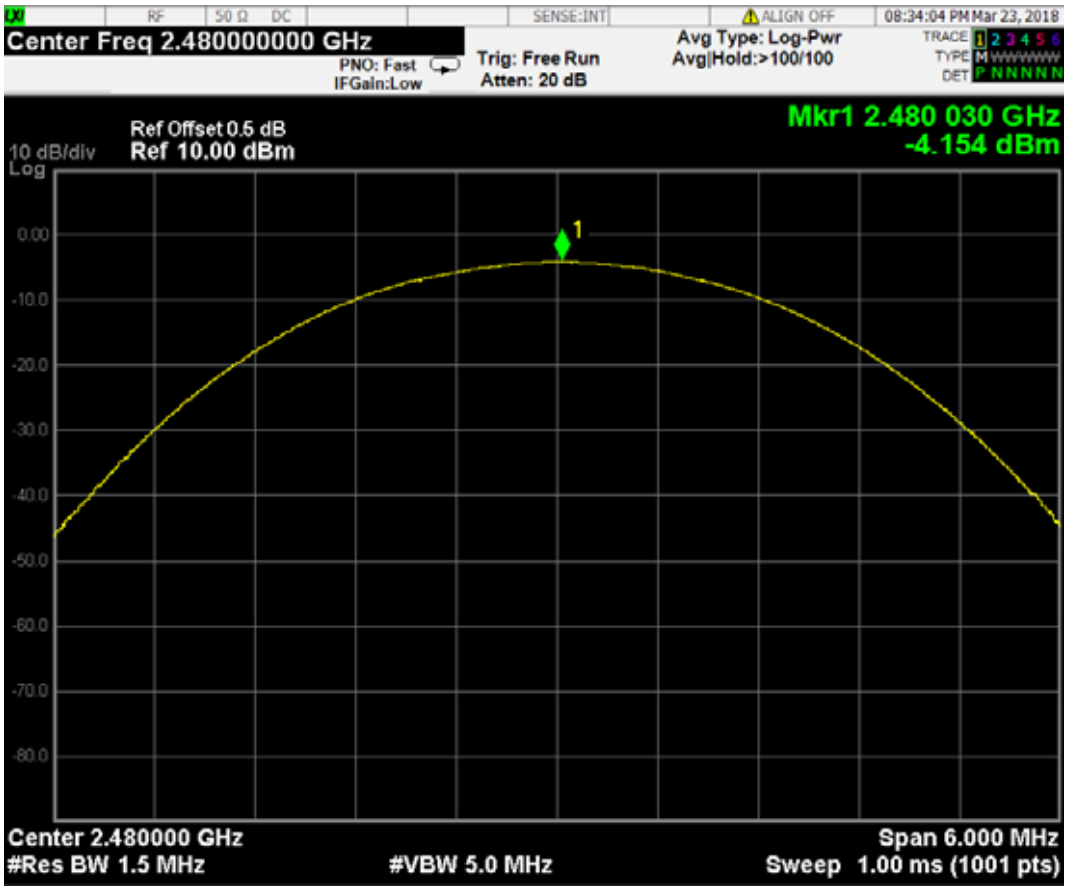
BT 3DH3: CH00 (2402 MHz)



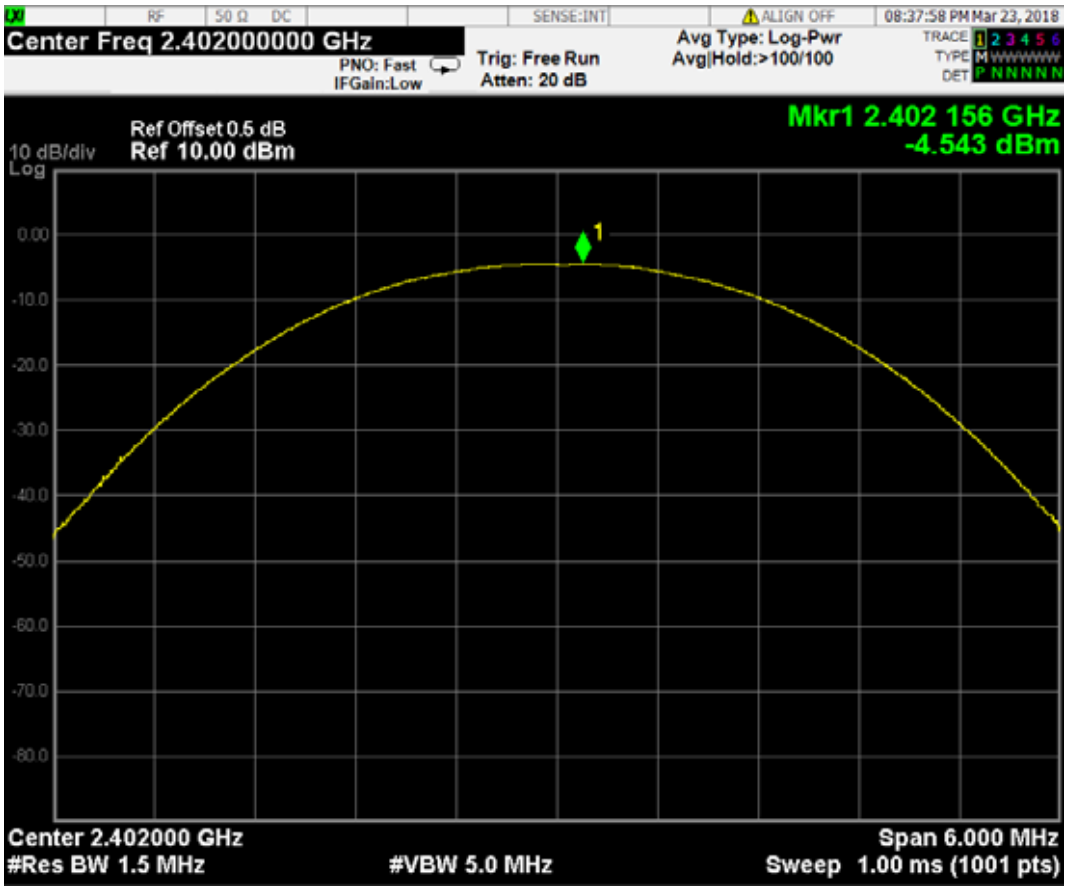
BT 3DH3: CH39 (2441 MHz)



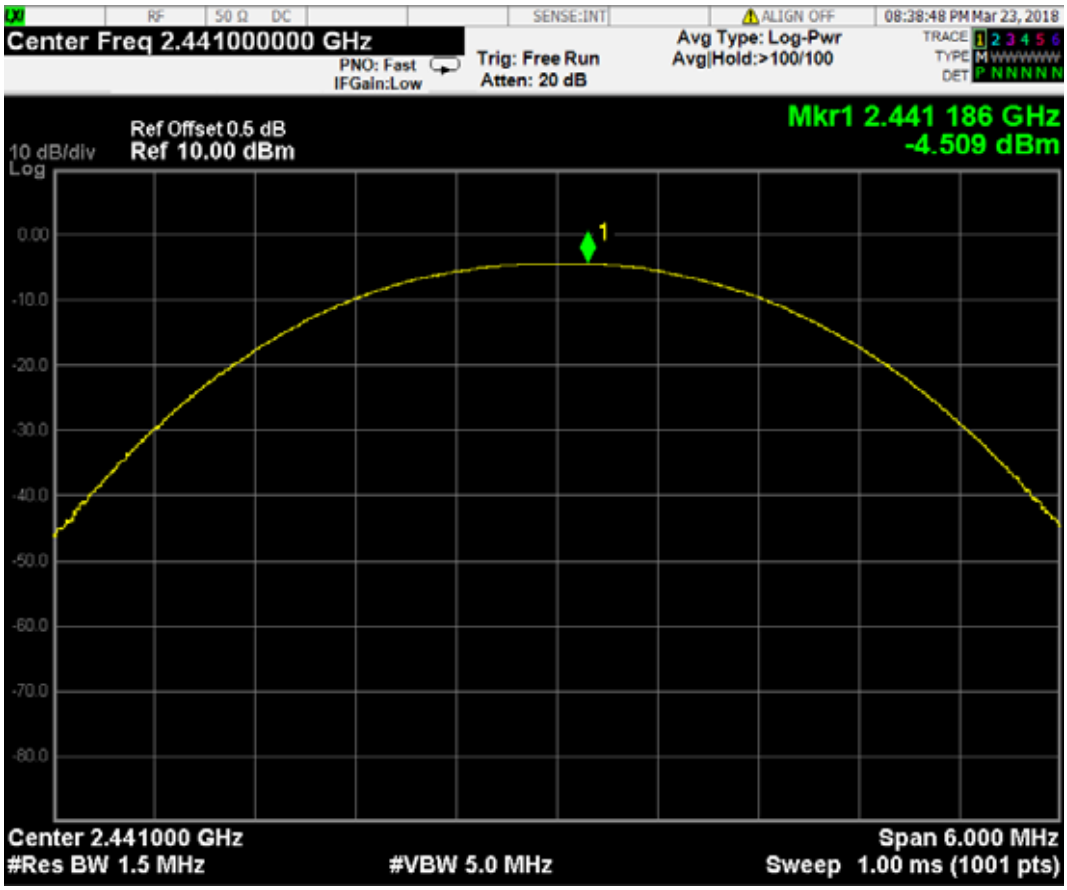
BT 3DH3: CH78 (2480 MHz)



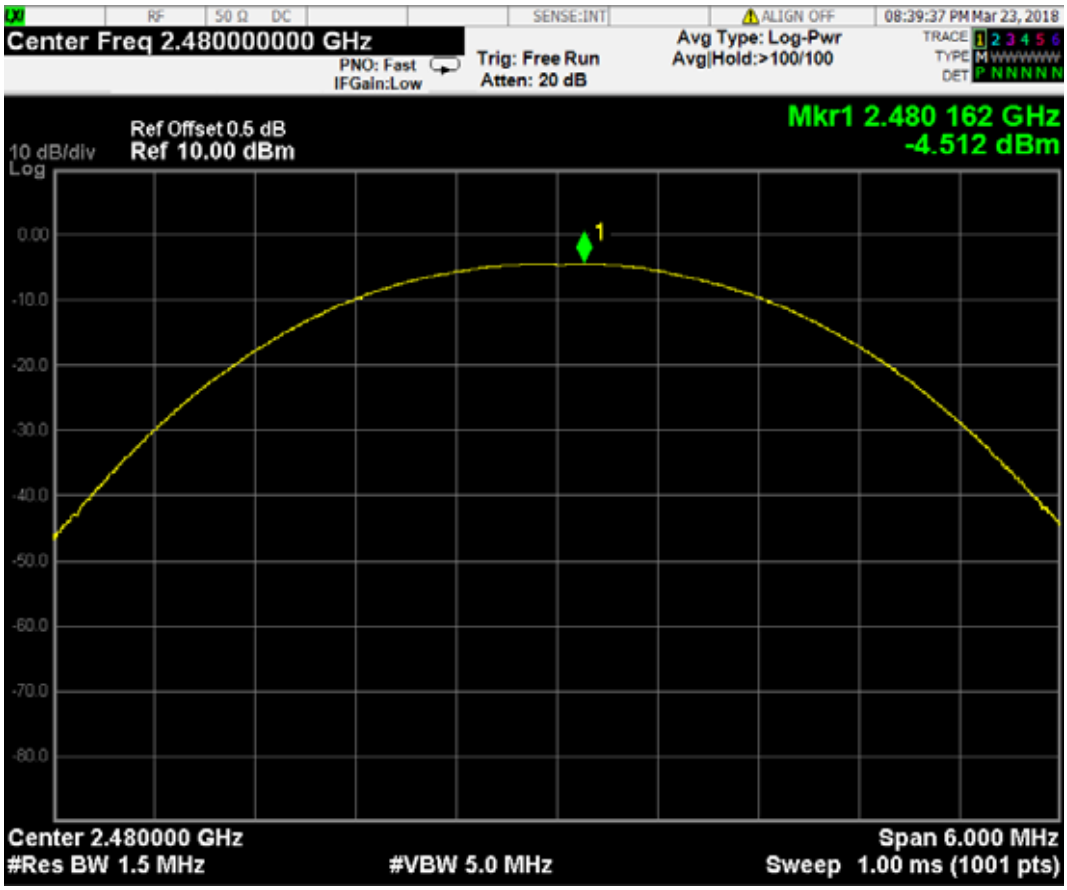
BT 3DH5: CH00 (2402 MHz)



BT 3DH5: CH39 (2441 MHz)



BT 3DH5: CH78 (2480 MHz)



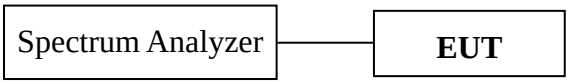
10 BAND EDGE MEASUREMENT

10.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2017	Jun 11, 2018

10.2 Block Diagram of Test Setup



10.3 Specification Limits (§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)). (※This test result attaching to §4.7)

10.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one and have its hopping function enabled.

10.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.
Use the following spectrum analyzer settings:
a) Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation
b) RBW ≥ 1% of the span
c) VBW ≥ RBW
d) Sweep = auto
e) Detector function = peak
f) Trace = max hold
g) Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band

emission. The marker-delta value now displayed must comply with the limit specified in this Section. Submit this plot.
Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit. Submit this plot.

The test procedure is defined in FCC Public Notice DA 00-705, Mar.2000 (the Procedure " Band-edge Compliance of RF Conducted Emissions" was used).

10.6 Test Results

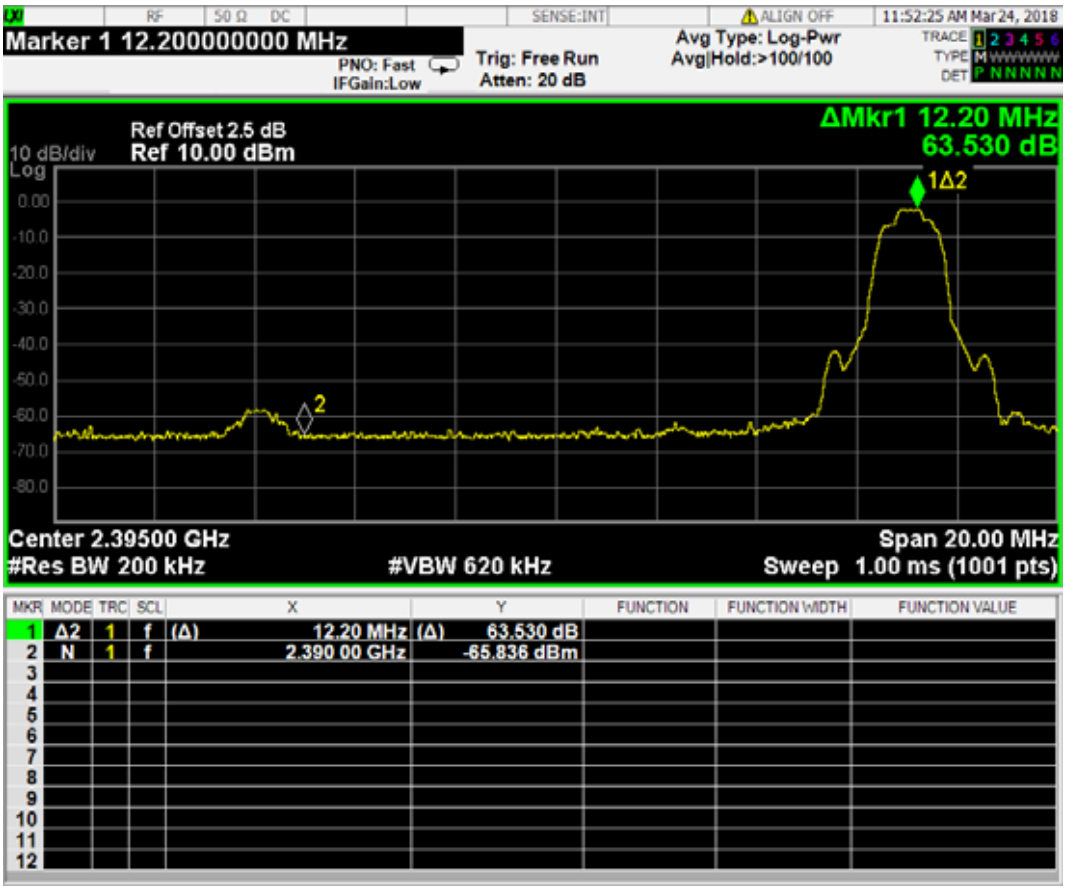
PASSED.

All the test results are attached in next pages.

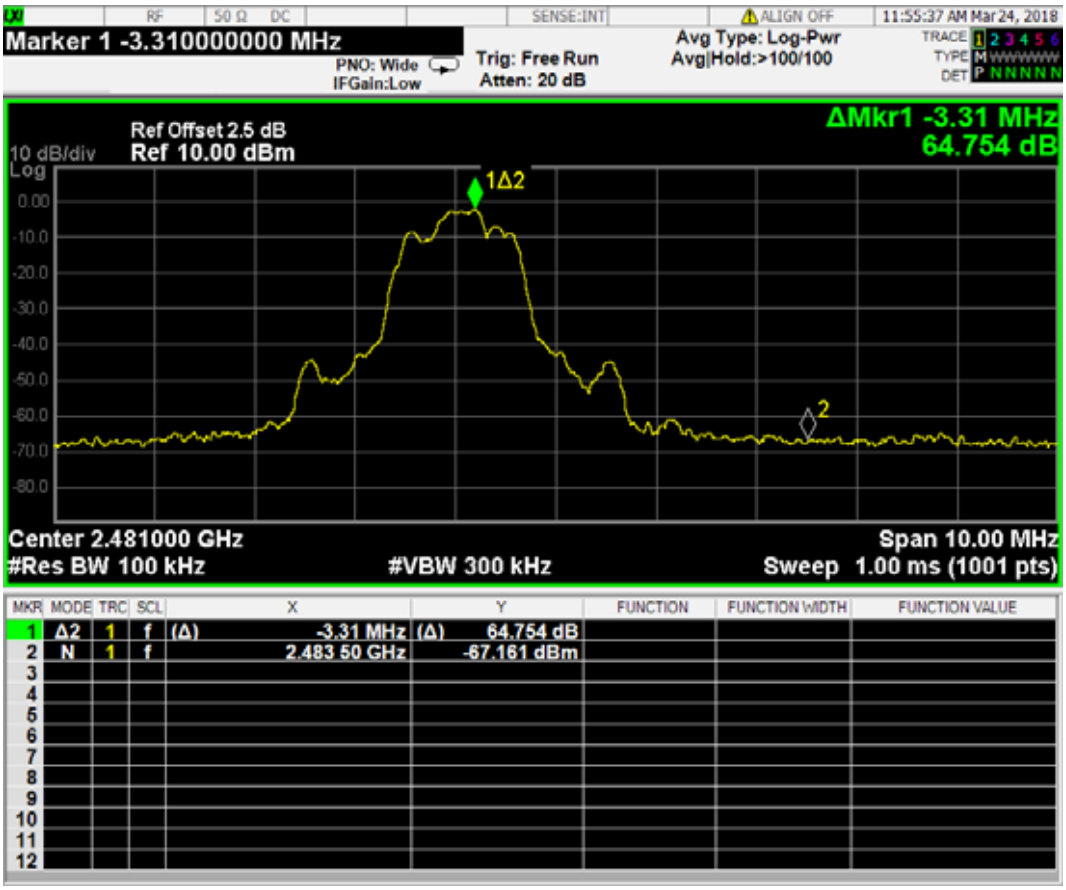
(Test Date: 2018.03.24 Temperature: 23℃ Humidity: 51 %)

Modulation	Location	Channel	Frequency (MHz)	**Delta Marker (dB)**
BT DH1	Lower Edge	00	2402	**63.530**
	Upper Edge	78	2480	**64.754**
BT DH3	Lower Edge	00	2402	**63.158**
	Upper Edge	78	2480	**63.325**
BT DH5	Lower Edge	00	2402	**63.662**
	Upper Edge	78	2480	**64.552**
BT 3DH1	Lower Edge	00	2402	**63.881**
	Upper Edge	78	2480	**64.021**
BT 3DH3	Lower Edge	00	2402	**63.966**
	Upper Edge	78	2480	**64.741**
BT 3DH5	Lower Edge	00	2402	**62.978**
	Upper Edge	78	2480	**63.803**
BT DH1 Hopping	Lower Edge	Hopping		**56.446**
	Upper Edge	Hopping		**65.228**
BT DH3 Hopping	Lower Edge	Hopping		**58.440**
	Upper Edge	Hopping		**64.726**
BT DH5 Hopping	Lower Edge	Hopping		**59.142**
	Upper Edge	Hopping		**60.755**
BT 3DH1 Hopping	Lower Edge	Hopping		**57.825**
	Upper Edge	Hopping		**62.291**
BT 3DH3 Hopping	Lower Edge	Hopping		**57.594**
	Upper Edge	Hopping		**64.288**
BT 3DH5 Hopping	Lower Edge	Hopping		**57.387**
	Upper Edge	Hopping		**64.667**

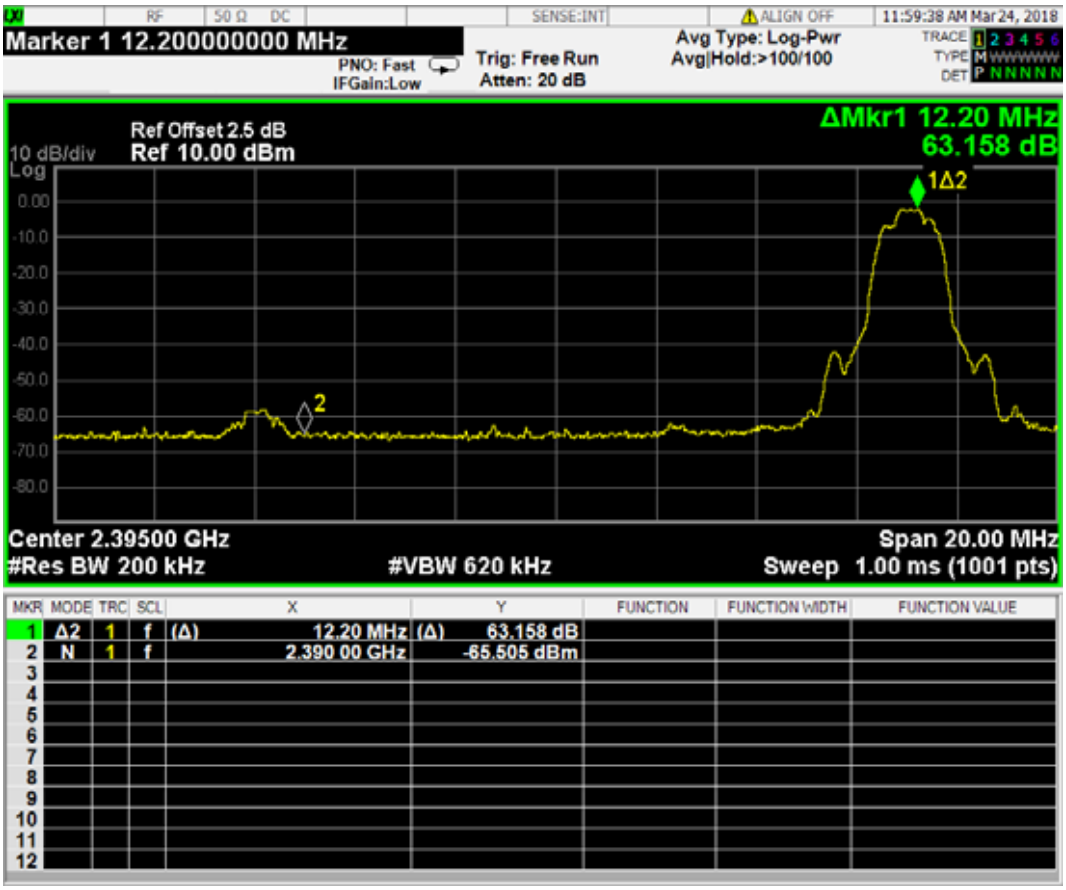
BT DH1: CH00 (2402 MHz)



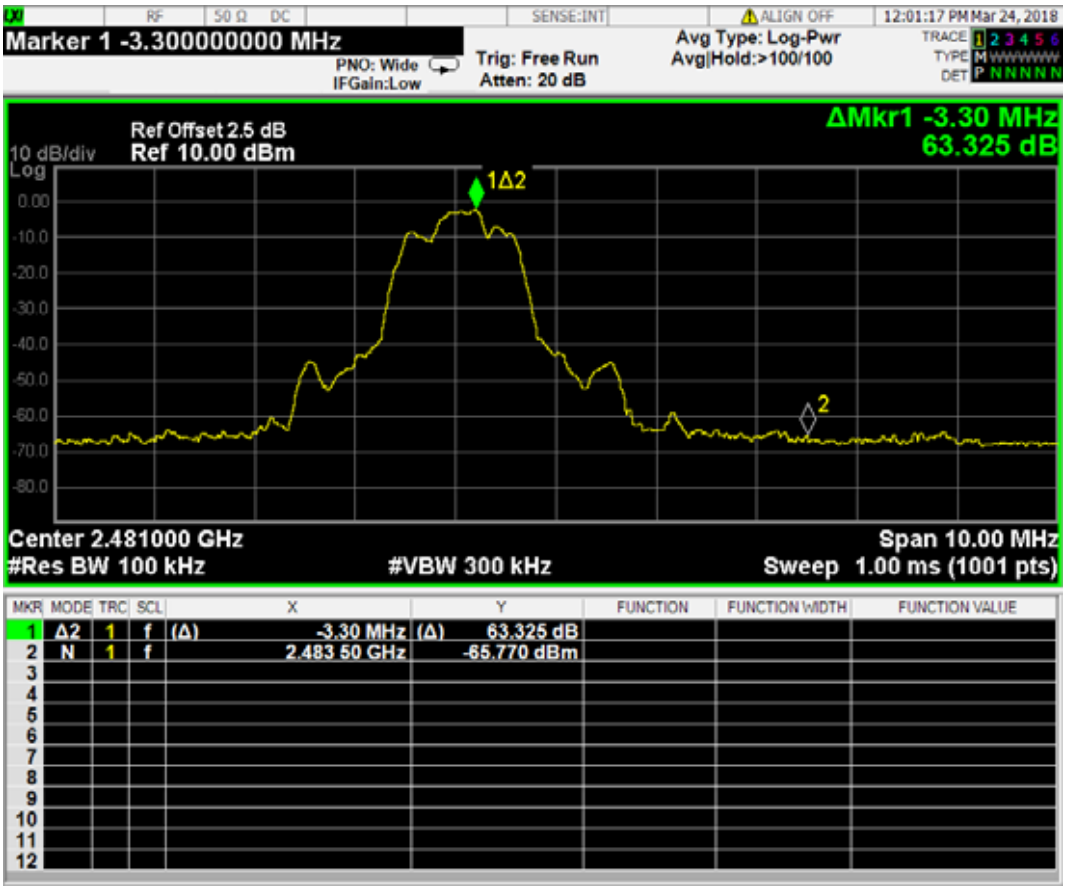
BT DH1: CH79 (2480 MHz)



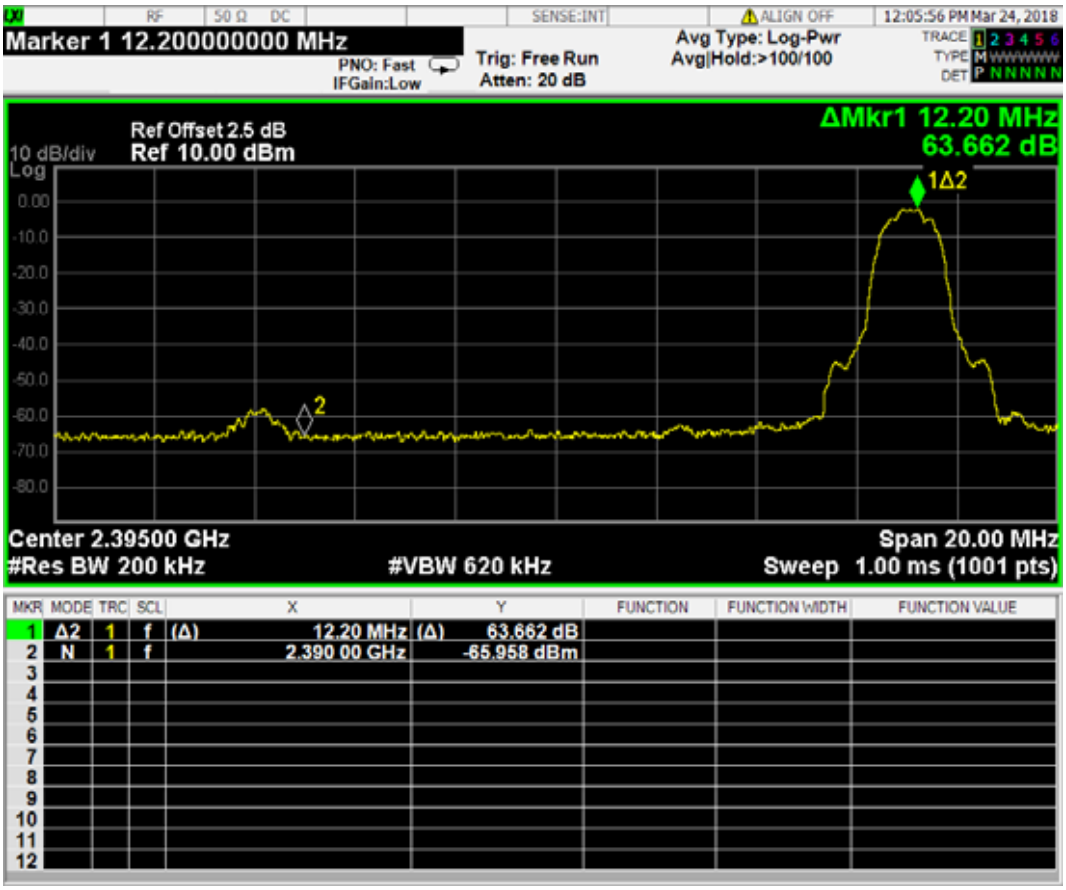
BT DH3: CH00 (2402 MHz)



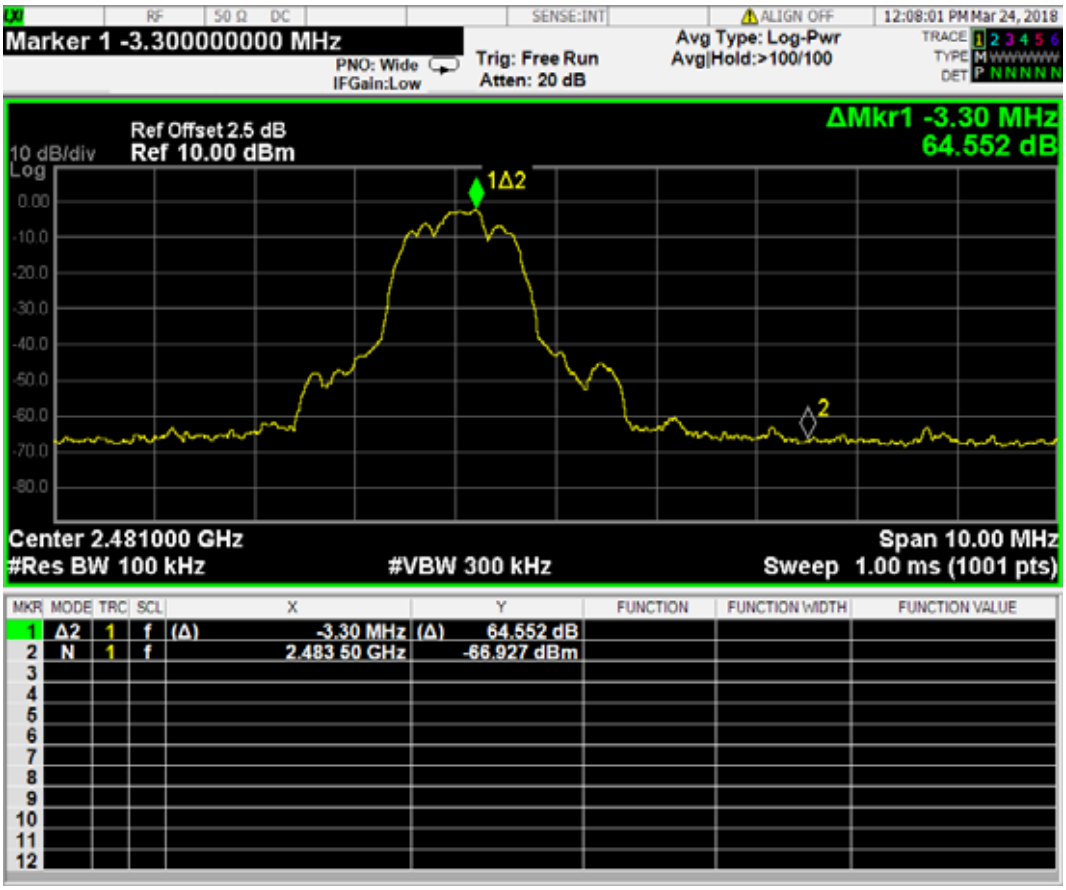
BT DH3: CH79 (2480 MHz)



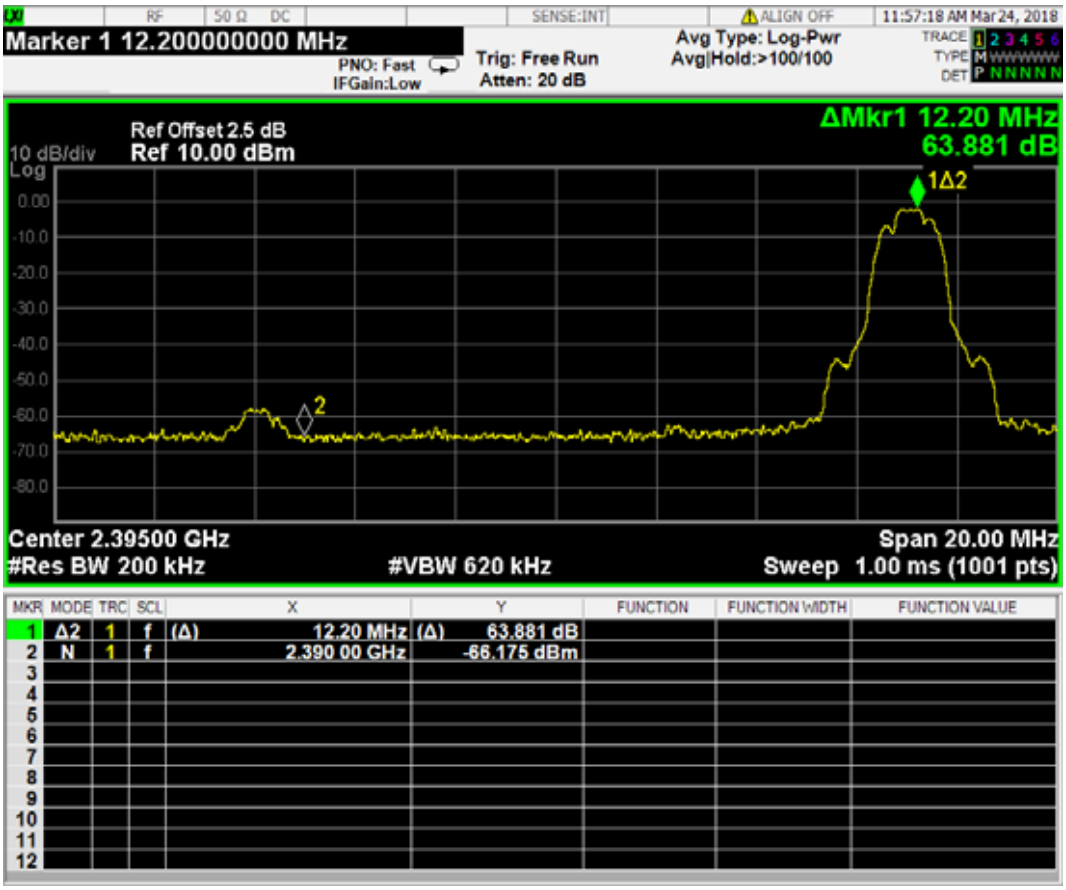
BT DH5: CH00 (2402 MHz)



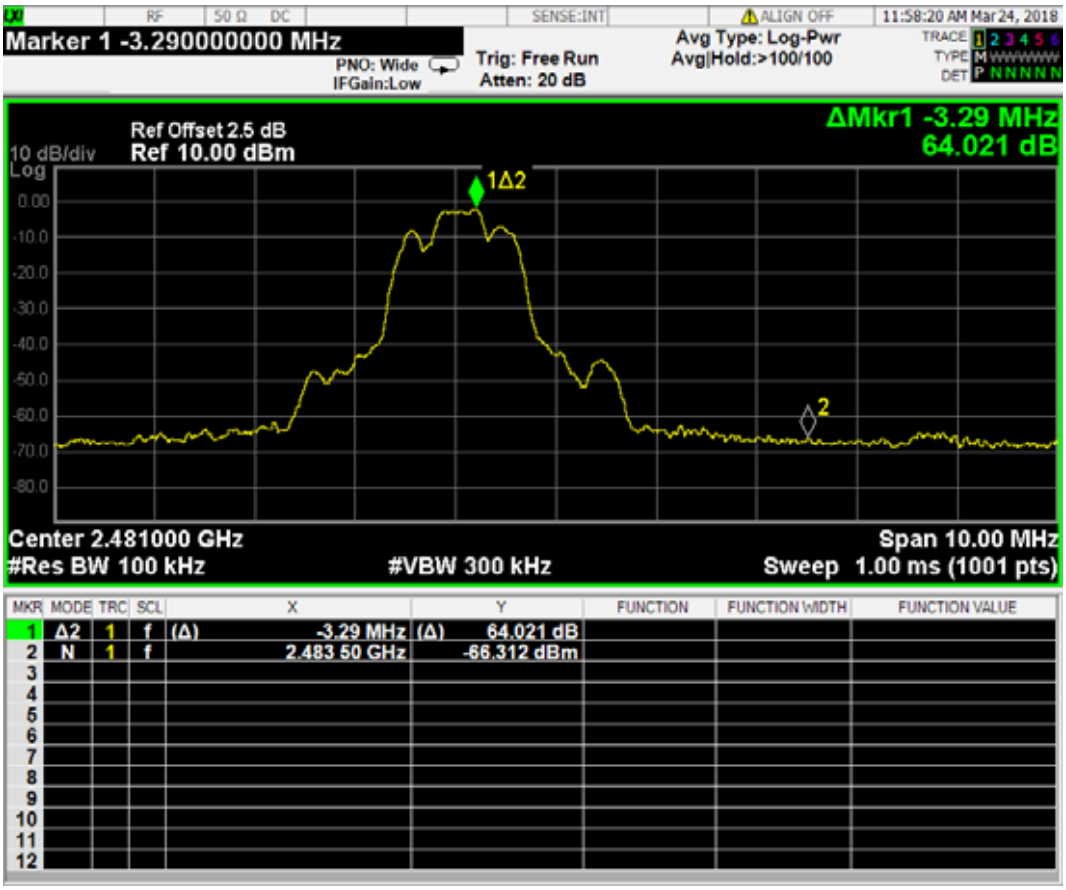
BT DH5: CH79 (2480 MHz)



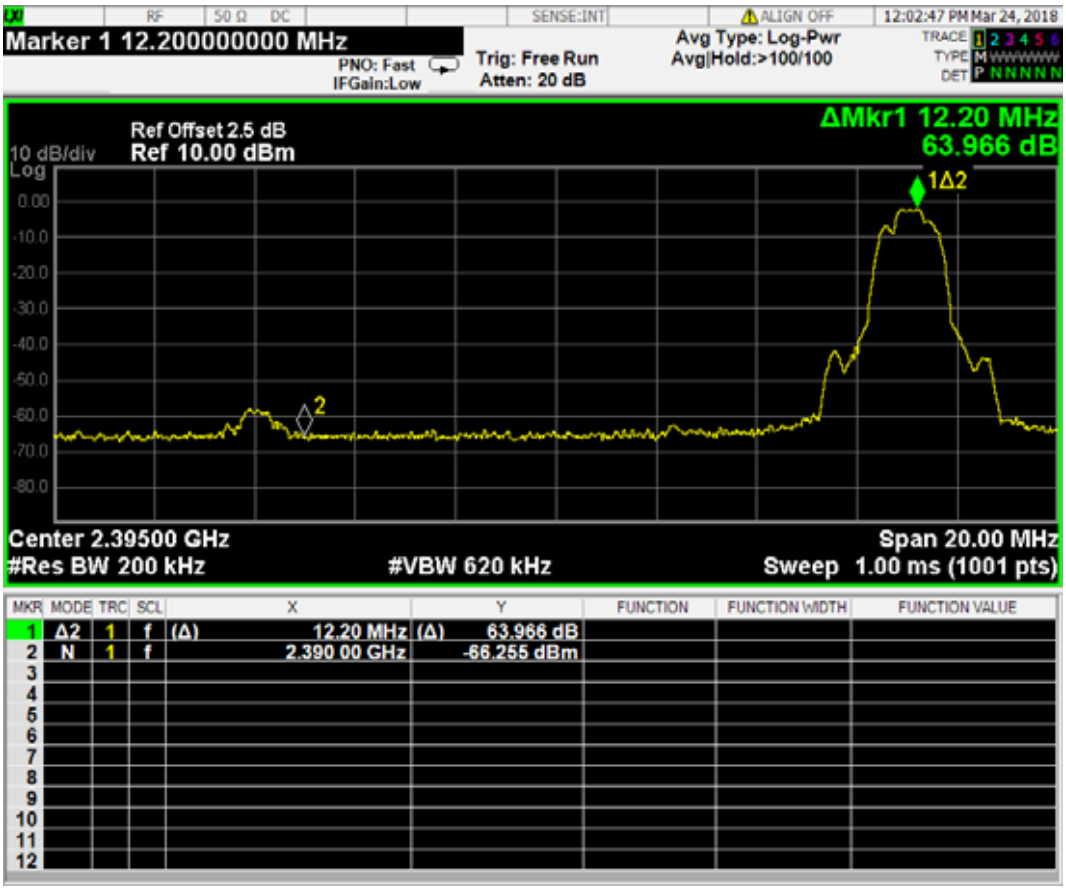
BT 3DH1: CH00 (2402 MHz)



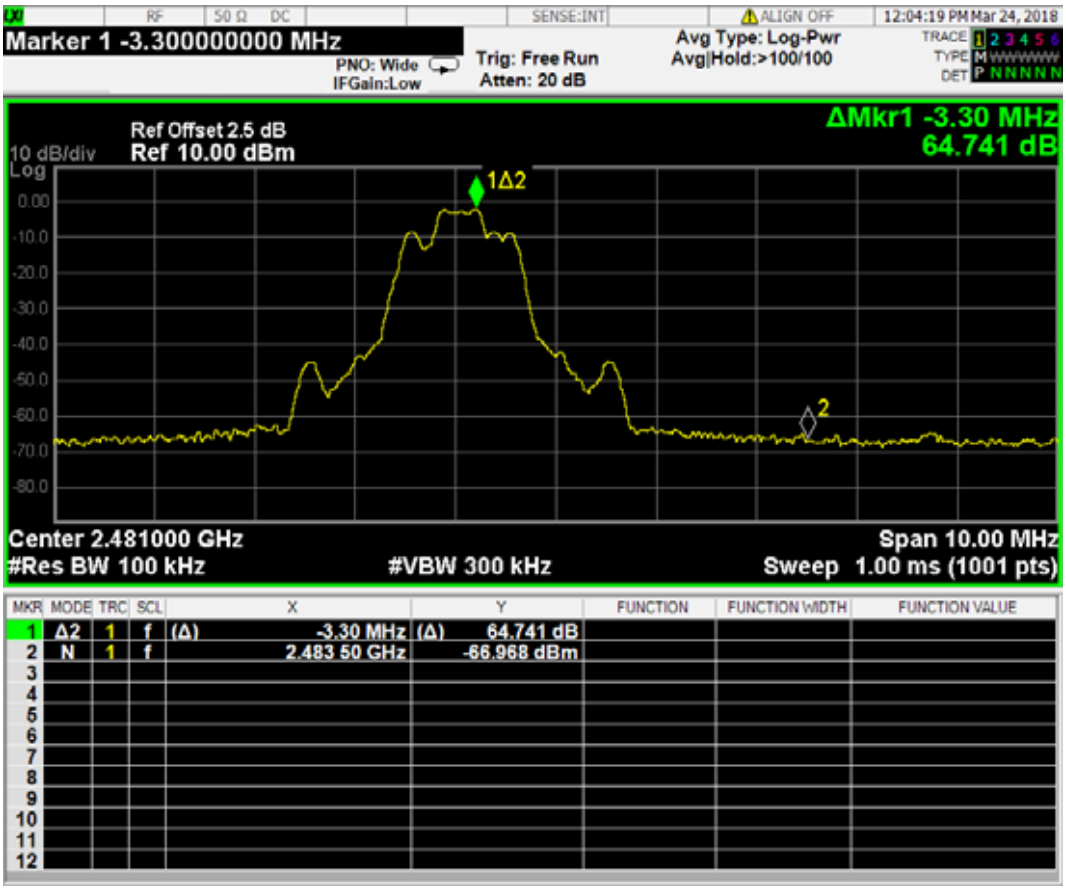
BT 3DH1: CH79 (2480 MHz)



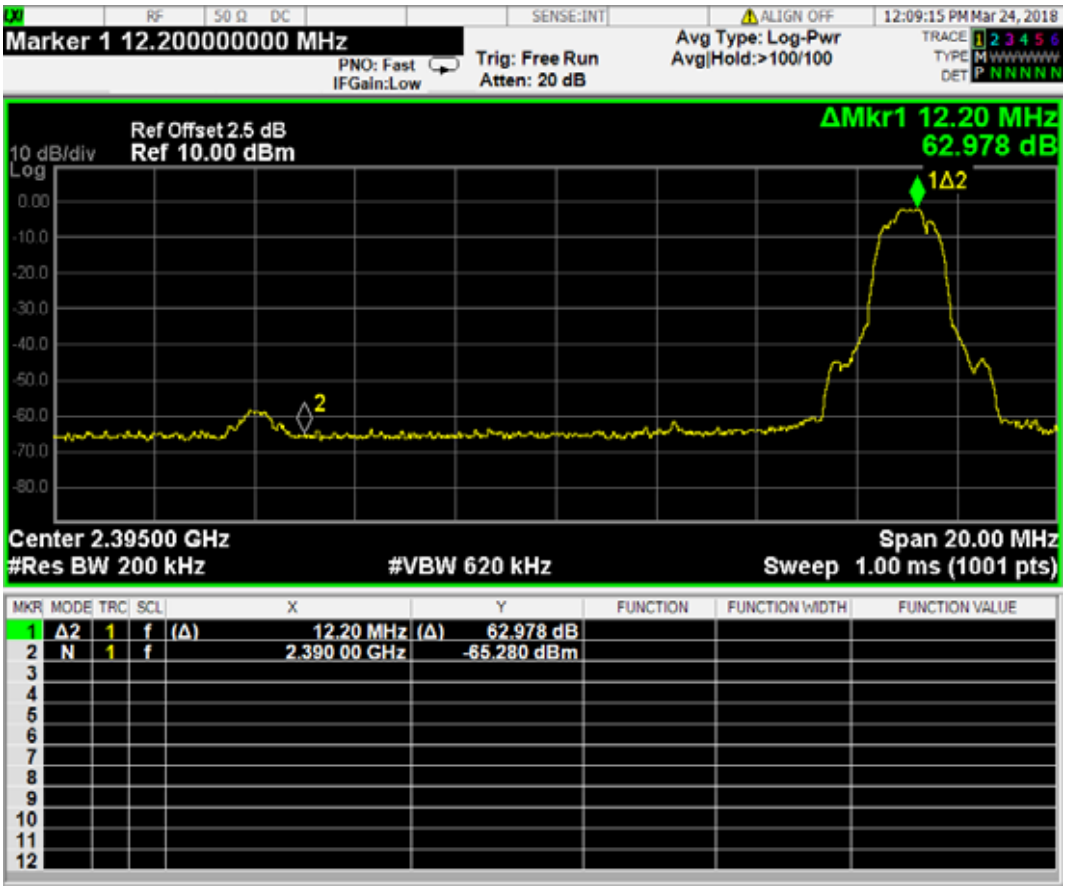
BT 3DH3: CH00 (2402 MHz)



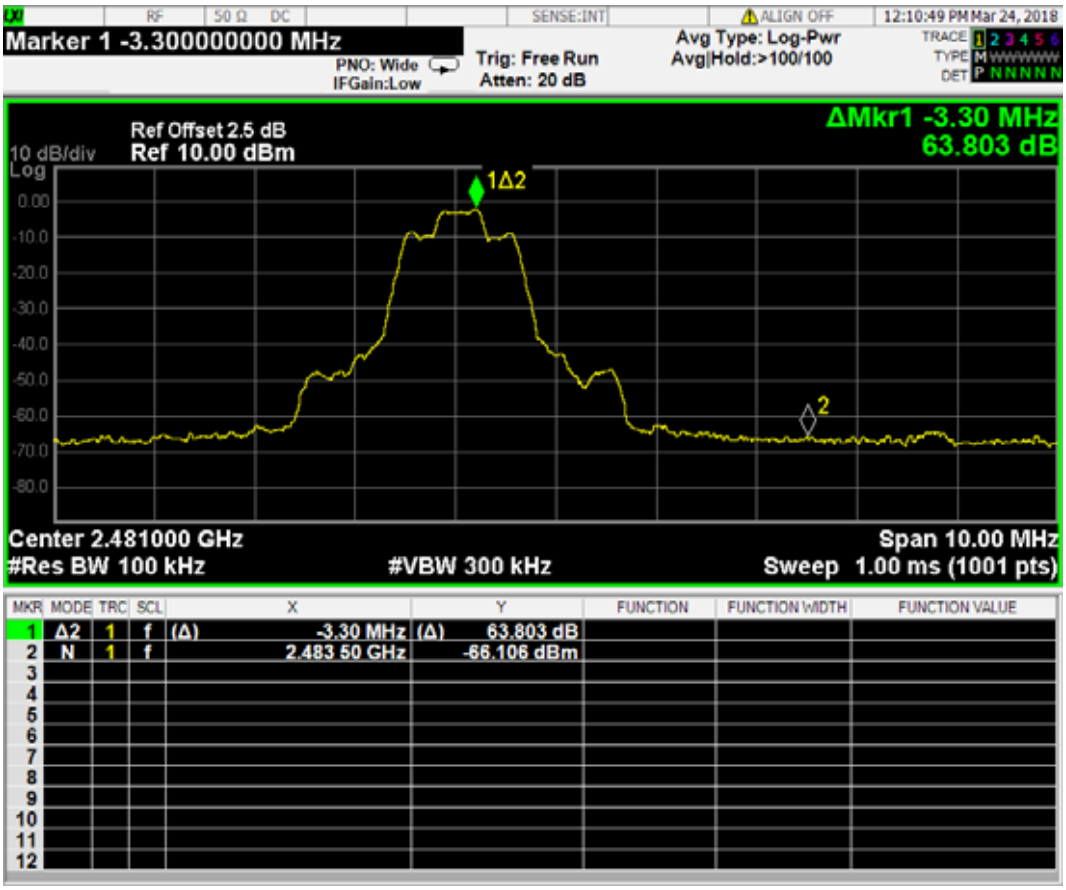
BT 3DH3: CH79 (2480 MHz)



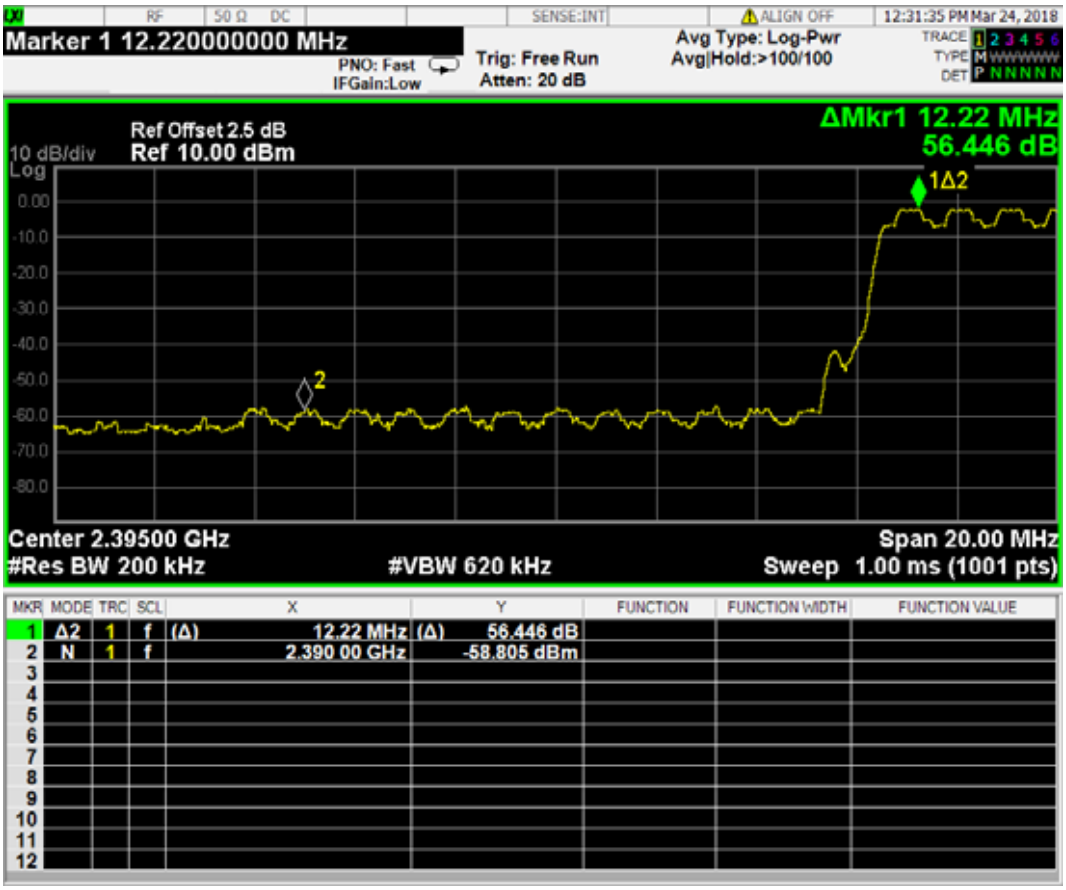
BT 3DH5: CH00 (2402 MHz)



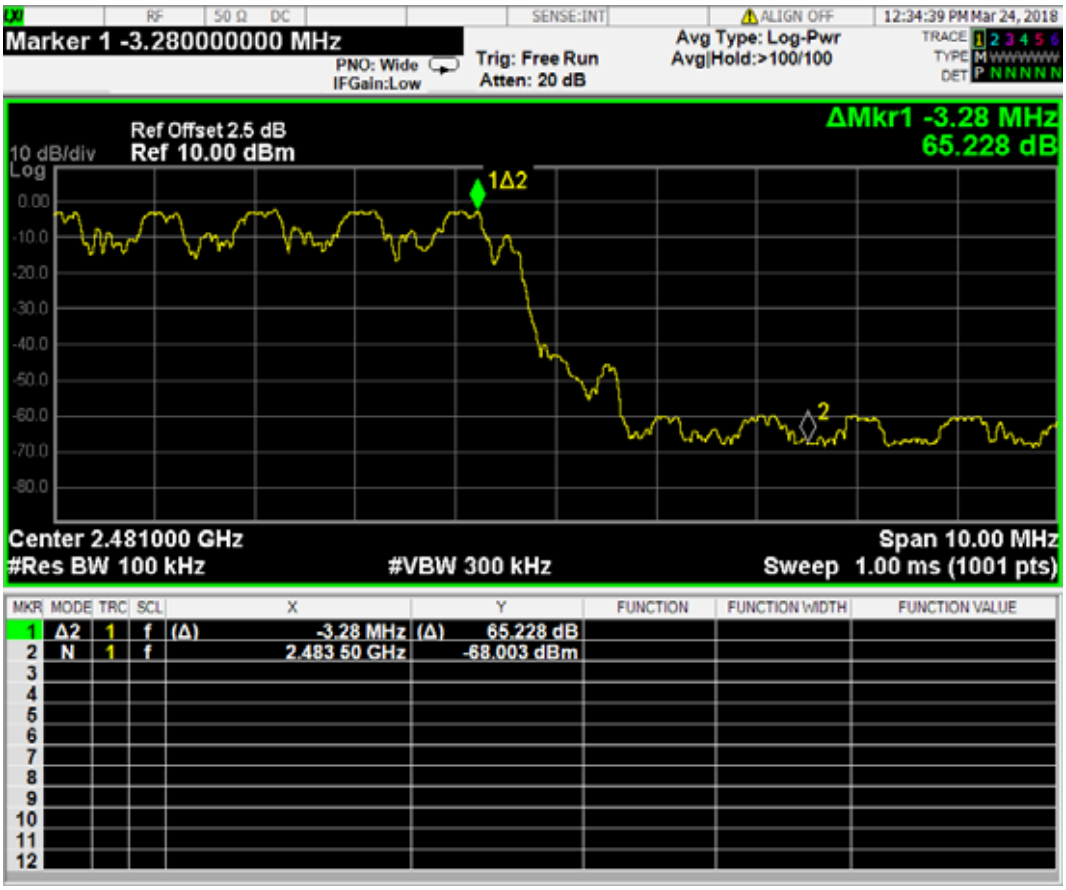
BT 3DH5: CH79 (2480 MHz)



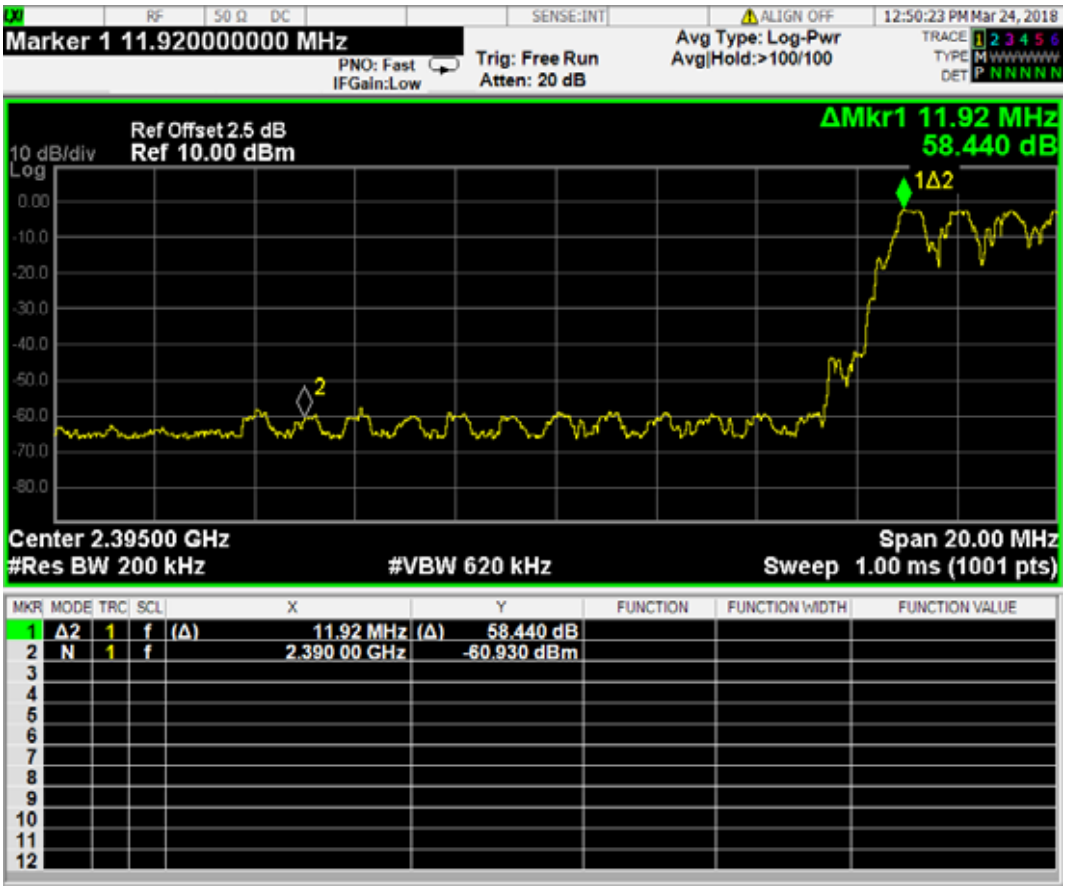
BT DH1: Hopping (Lower edge)



BT DH1: Hopping (Upper edge)

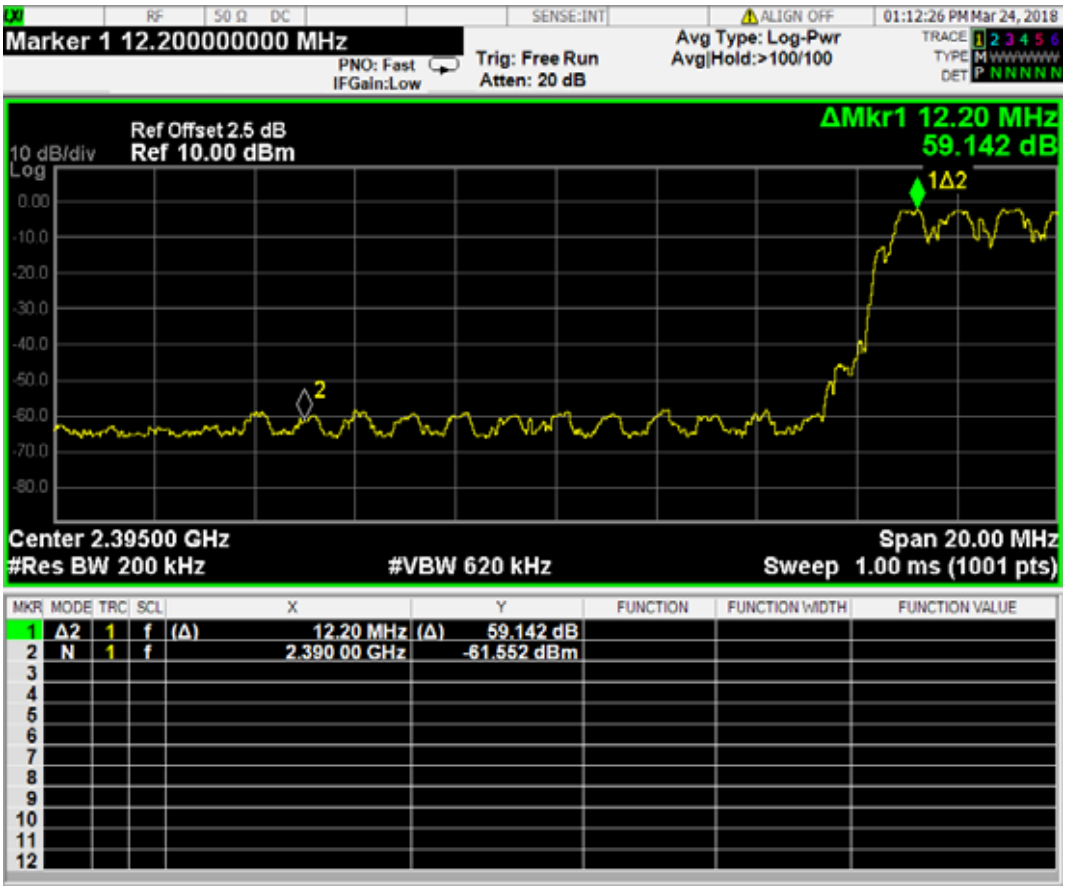
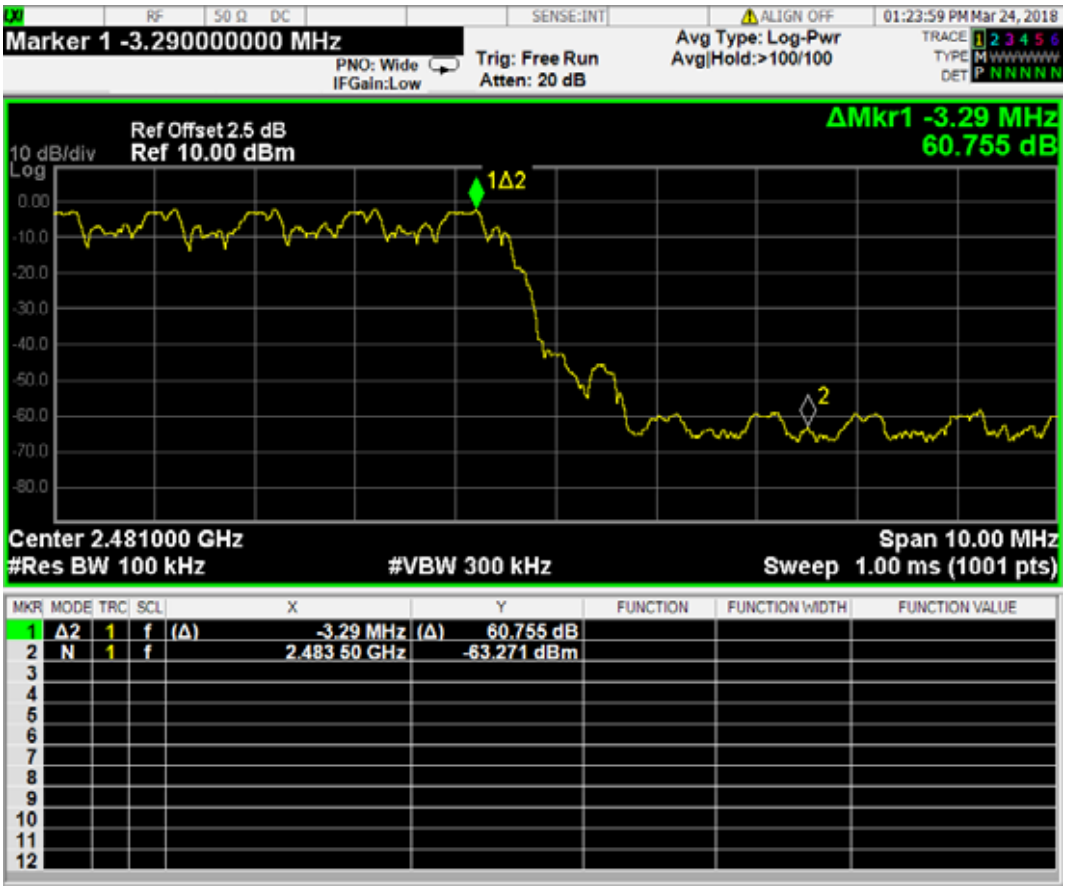


BT DH3: Hopping (Lower edge)



BT DH3: Hopping (Upper edge)

BT DH5: Hopping (Lower edge)



BT DH5: Hopping (Upper edge)