Appendix A

RF Test Data for BT V5.0 (BLE) (Conducted Measurement)

Product Name: Steplight

Trade Mark: RING

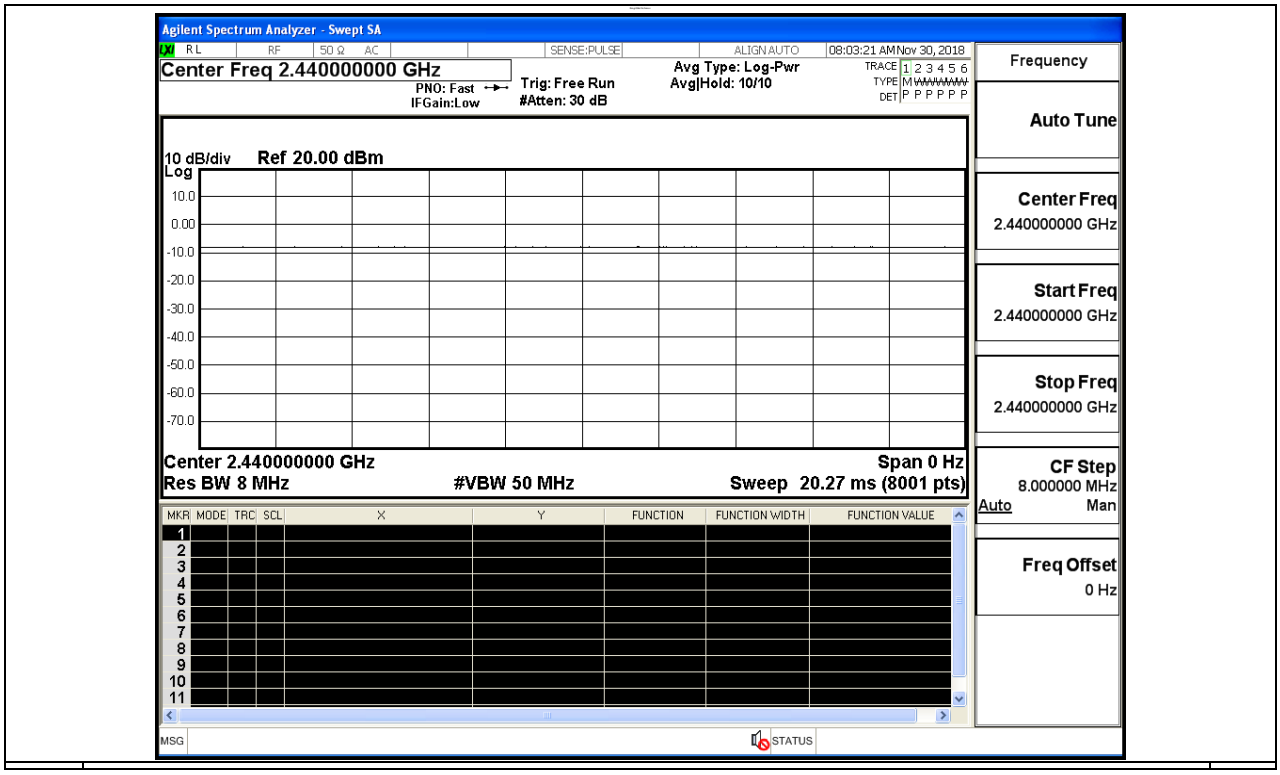
Test Model: 5LD1S8

Environmental Conditions

Temperature:	24.5 ° C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Jayden.Zhuo

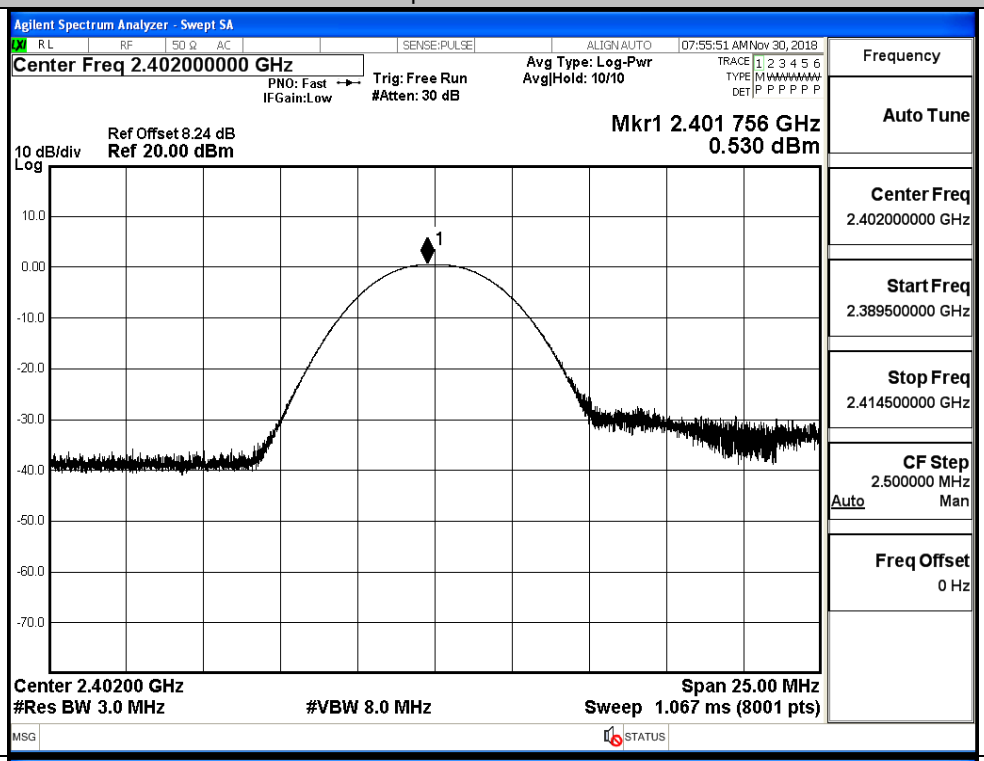
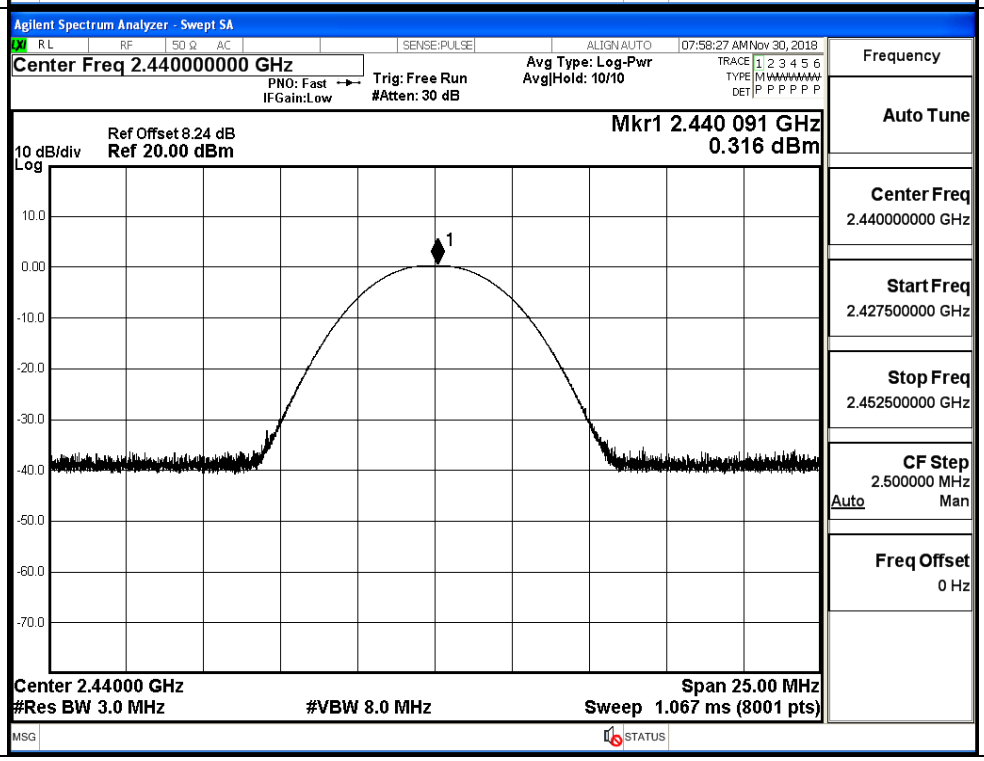
A.1 Duty Cycle

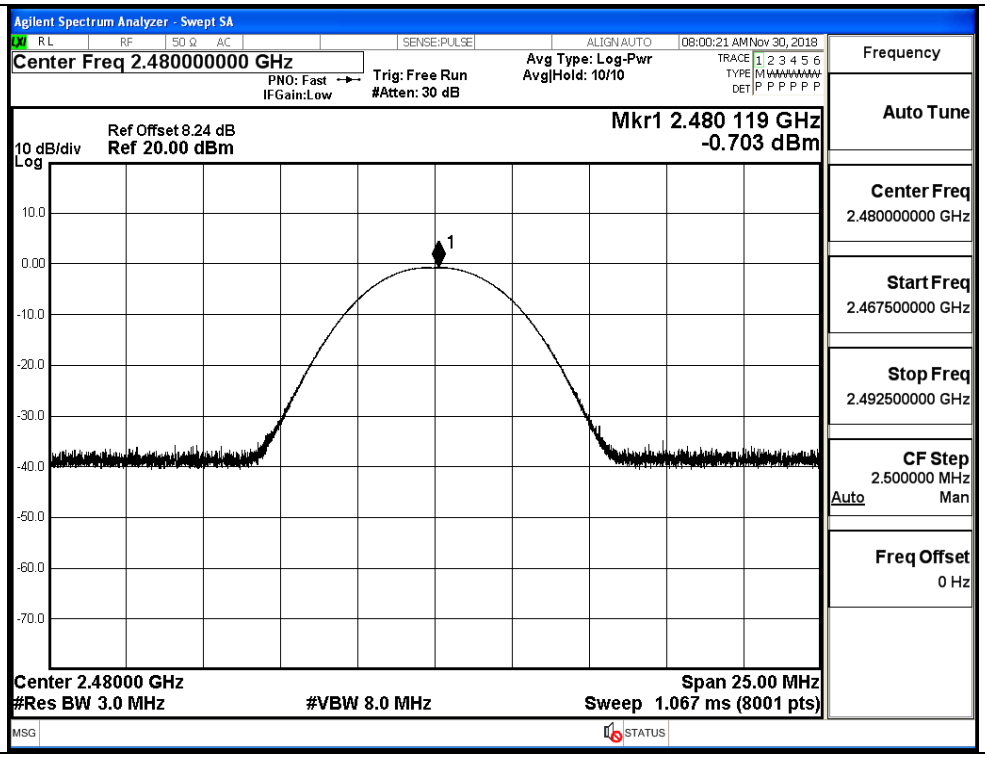
Test Mode	Data Rate	Test Channel	Ant	Duty Cycle[%]	Verdict
BT LE	1M	2440	Ant1	100	PASS



A.2 Maximum Conducted Peak Output Power

Mode	Data Rate	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	1M	LCH	0.530	30	PASS
BT LE	1M	MCH	0.316	30	PASS
BT LE	1M	HCH	-0.703	30	PASS

Test Graphs		
LCH		
MCH		

HCH		

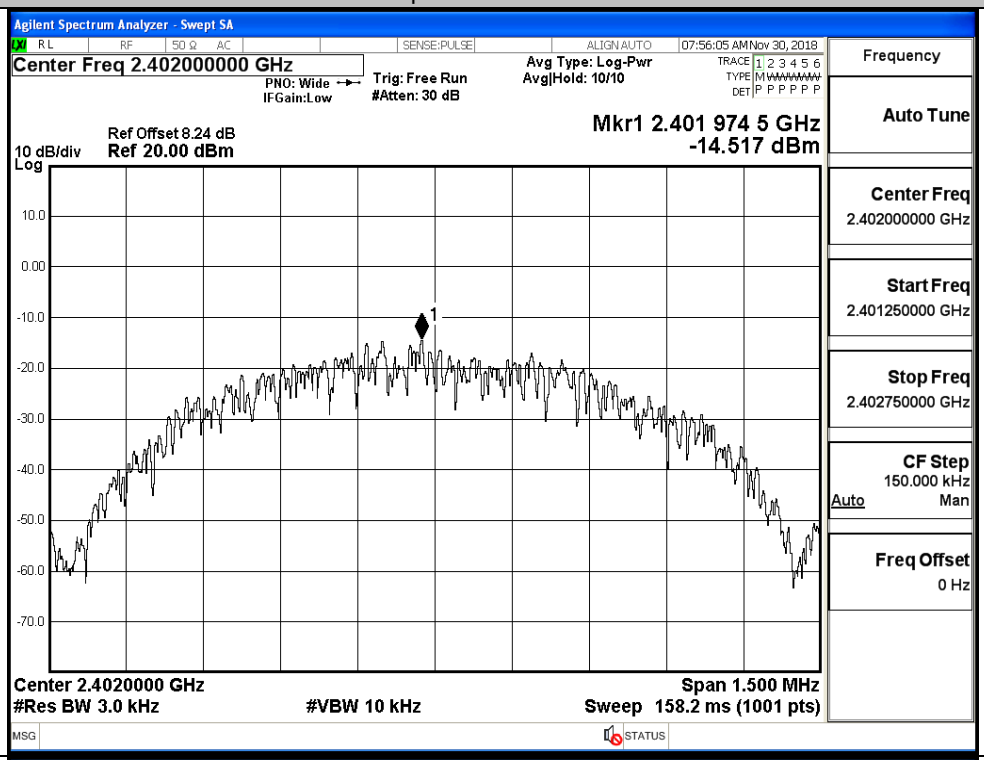
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
08:00:21 AM Nov 30, 2018
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P
Ref Offset 8.24 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.480 119 GHz
-0.703 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.48000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 25.00 MHz
Sweep 1.067 ms (8001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.467500000 GHz
Stop Freq
2.492500000 GHz
CF Step
2.500000 MHz
Auto
Man
Freq Offset
0 Hz

A.3 Maximum Power Spectral Density

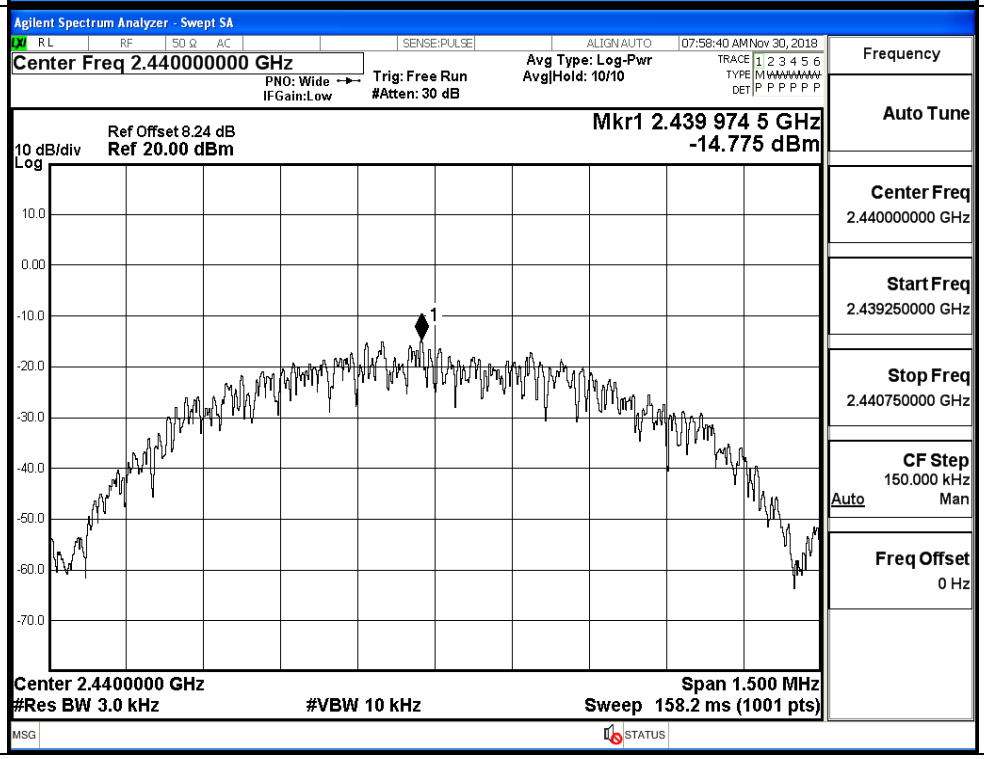
Mode	Data Rate	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	1M	LCH	-14.517	8	PASS
BT LE	1M	MCH	-14.775	8	PASS
BT LE	1M	HCH	-15.836	8	PASS

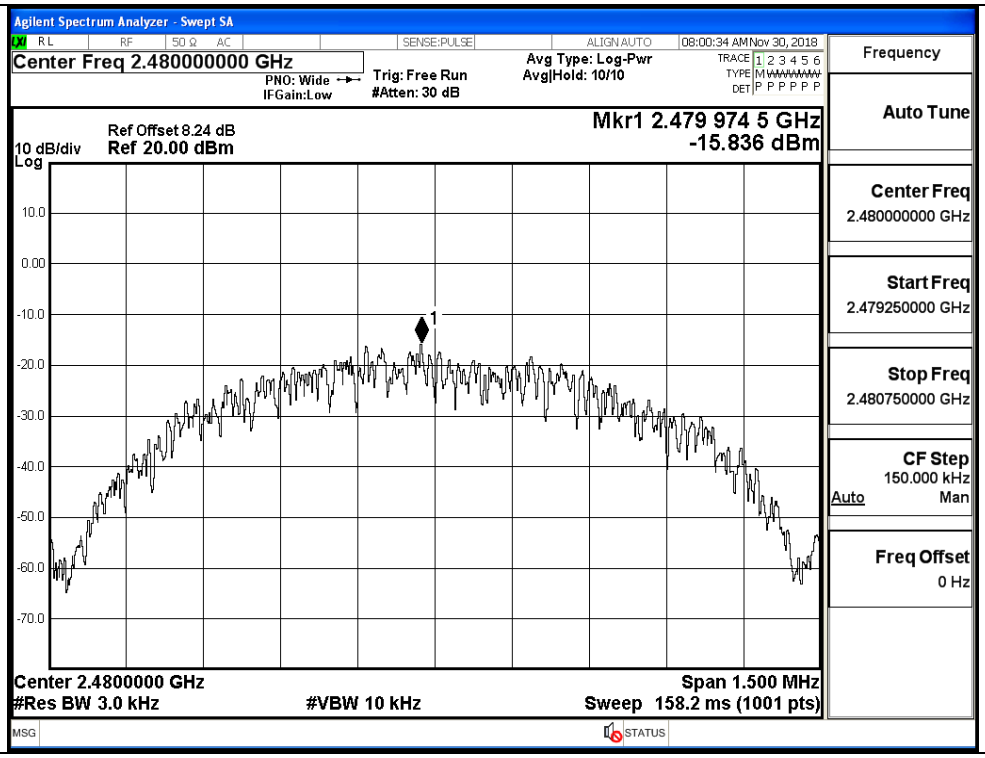
Test Graphs

LCH



MCH



HCH		

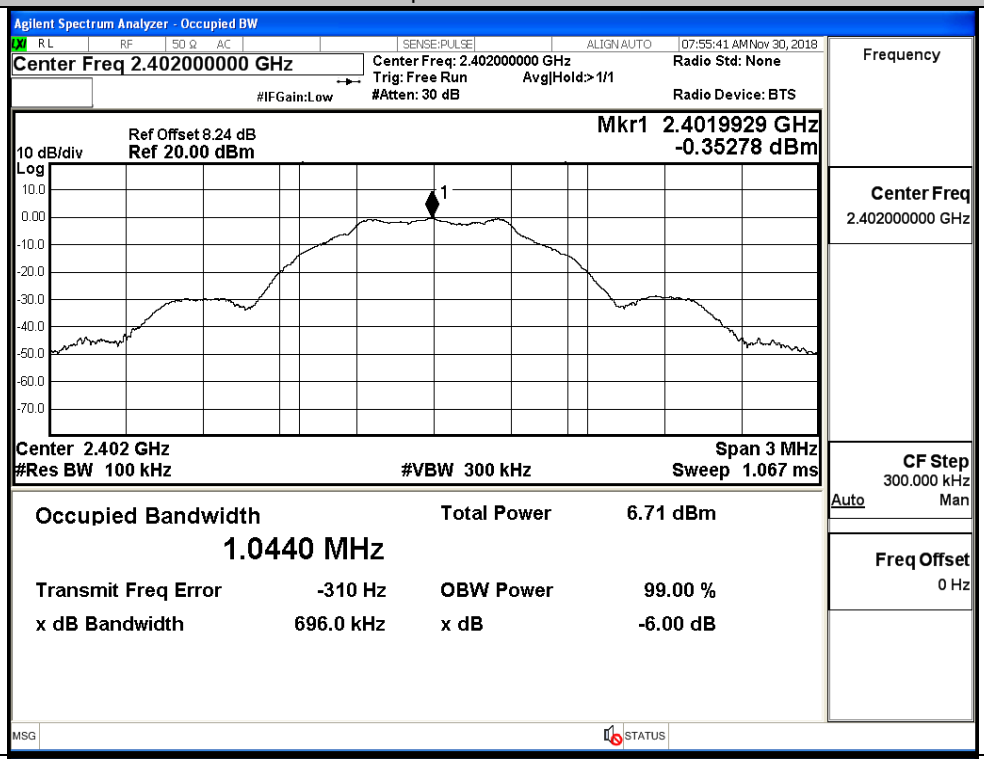
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
08:00:34 AM Nov 30, 2018
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P
Ref Offset 8.24 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.479 974 5 GHz
-15.836 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.4800000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 1.500 MHz
Sweep 158.2 ms (1001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479250000 GHz
Stop Freq
2.480750000 GHz
CF Step
150.000 kHz
Auto
Man
Freq Offset
0 Hz

A.4 6dB Bandwidth

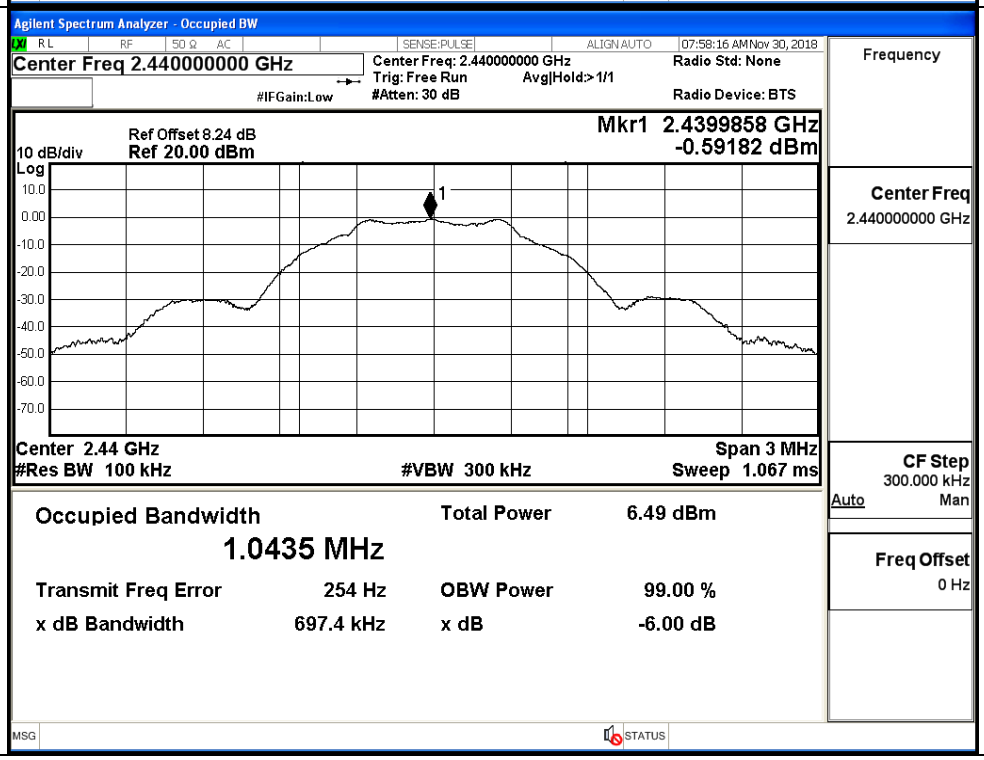
Mode	Data Rate	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	1M	LCH	0.6960	≥0.5	PASS
BT LE	1M	MCH	0.6974	≥0.5	PASS
BT LE	1M	HCH	0.6989	≥0.5	PASS

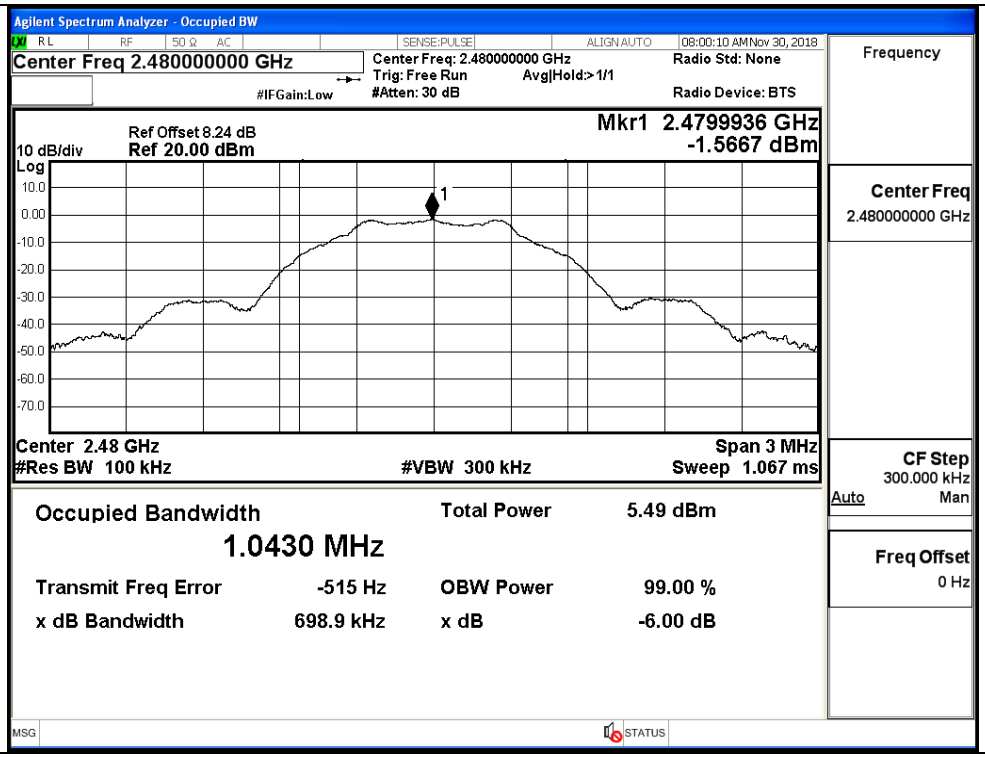
Test Graphs

LCH



MCH



HCH		

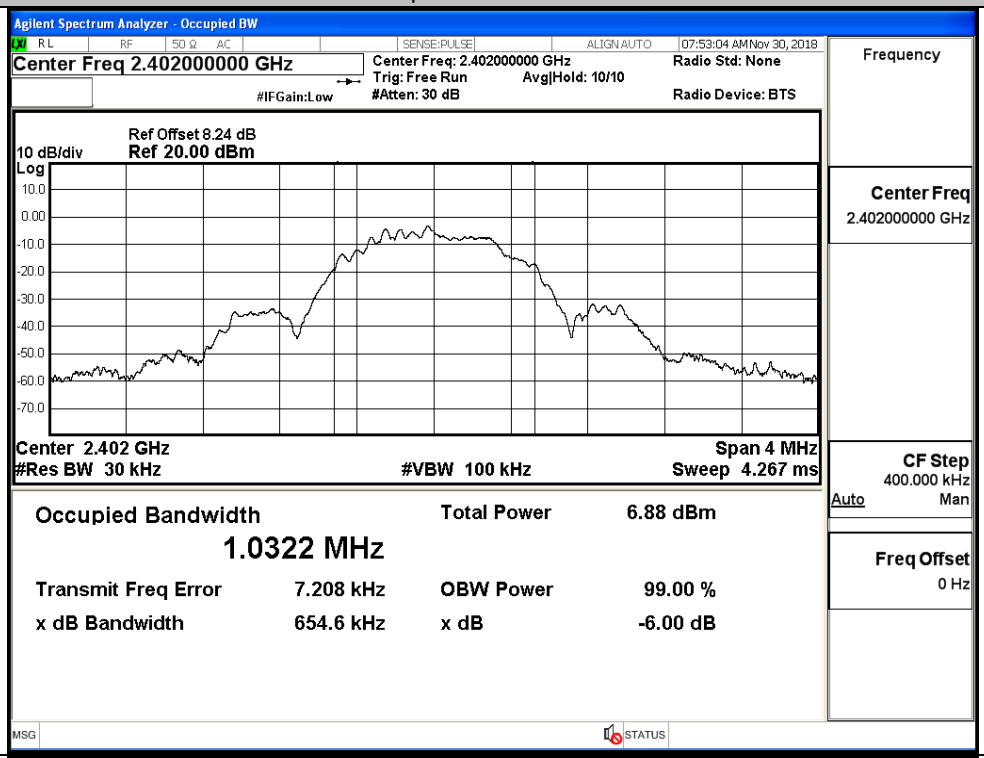
Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
08:00:10 AM Nov 30, 2018
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>1/1
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 8.24 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.4799936 GHz
-1.5667 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3 MHz
Sweep 1.067 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
1.0430 MHz
Total Power 5.49 dBm
Transmit Freq Error -515 Hz
OBW Power 99.00 %
x dB Bandwidth 698.9 kHz
x dB -6.00 dB
Freq Offset
0 Hz
MSG
STATUS

A.5 Occupied Bandwidth

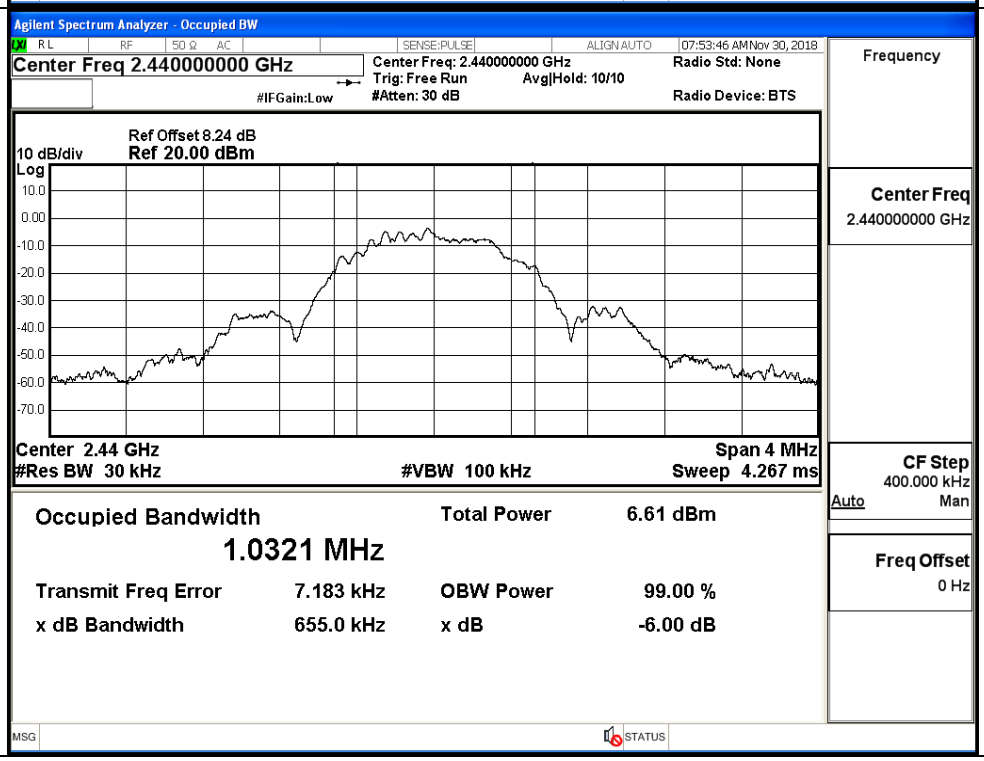
Mode	Data Rate	Channel	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	1M	LCH	1.0322	No Limit	PASS
BT LE	1M	MCH	1.0321	No Limit	PASS
BT LE	1M	HCH	1.0342	No Limit	PASS

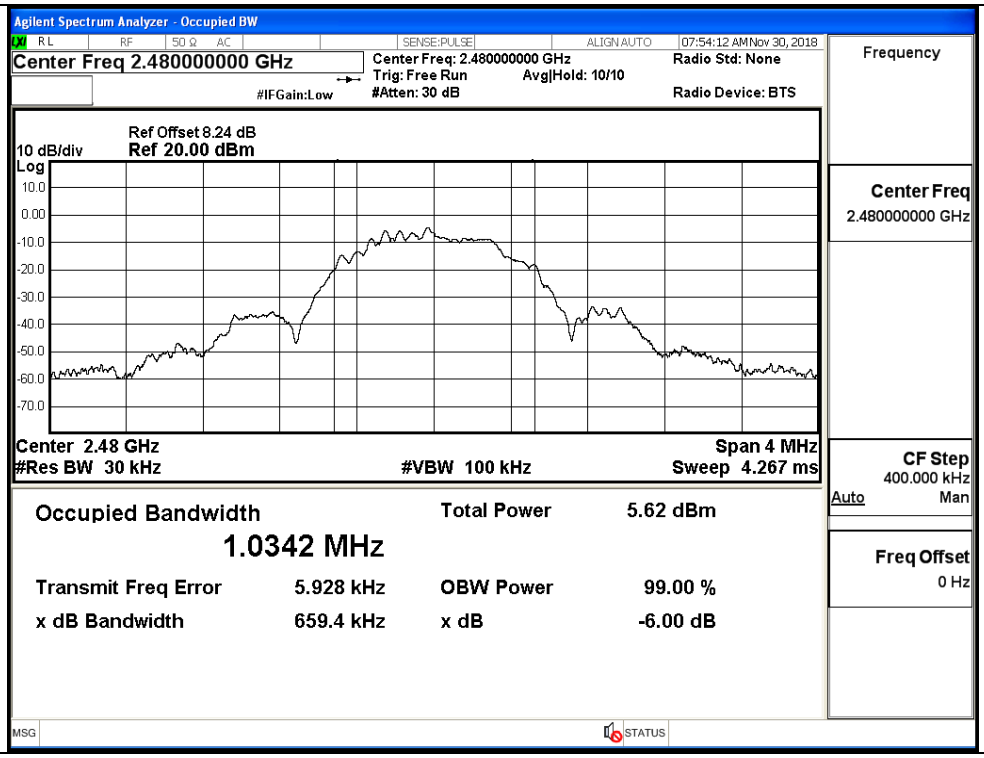
Test Graphs

LCH



MCH

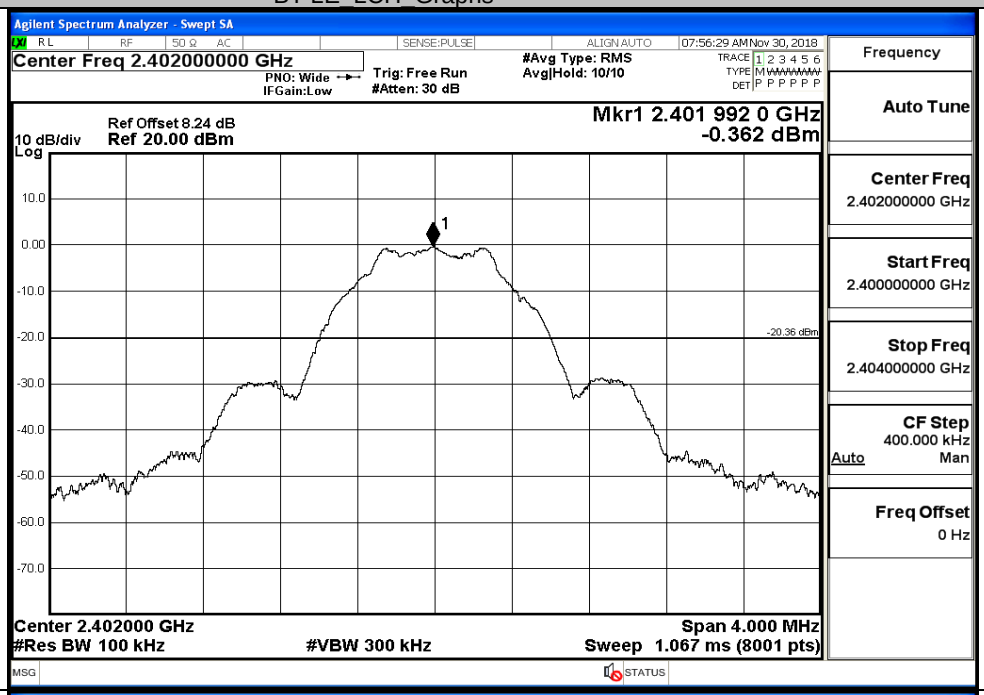
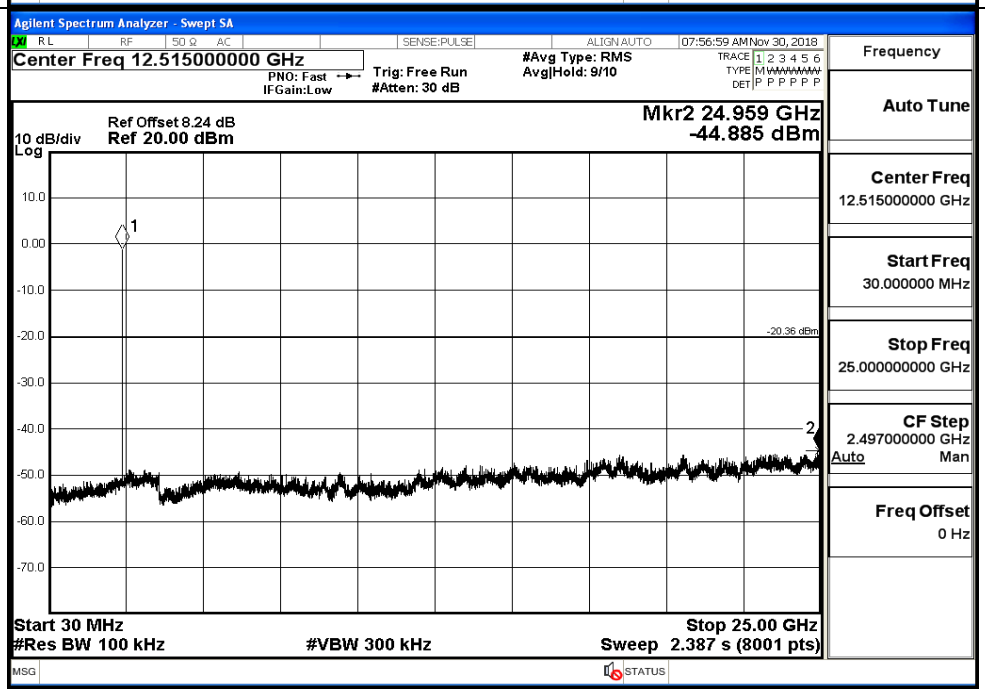


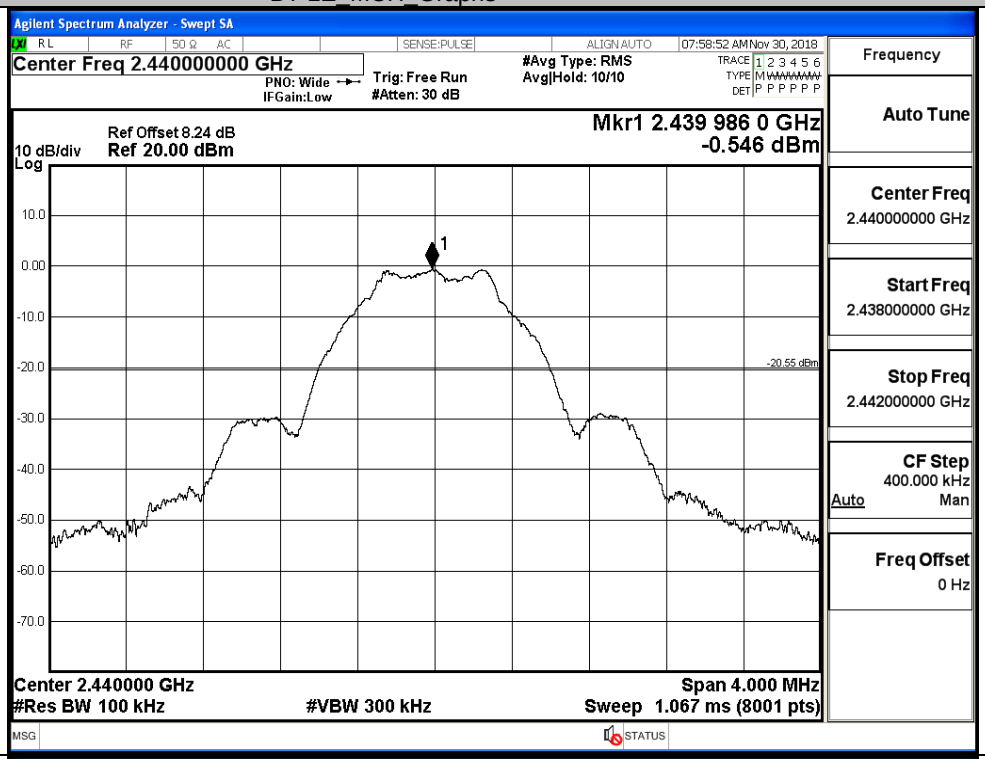
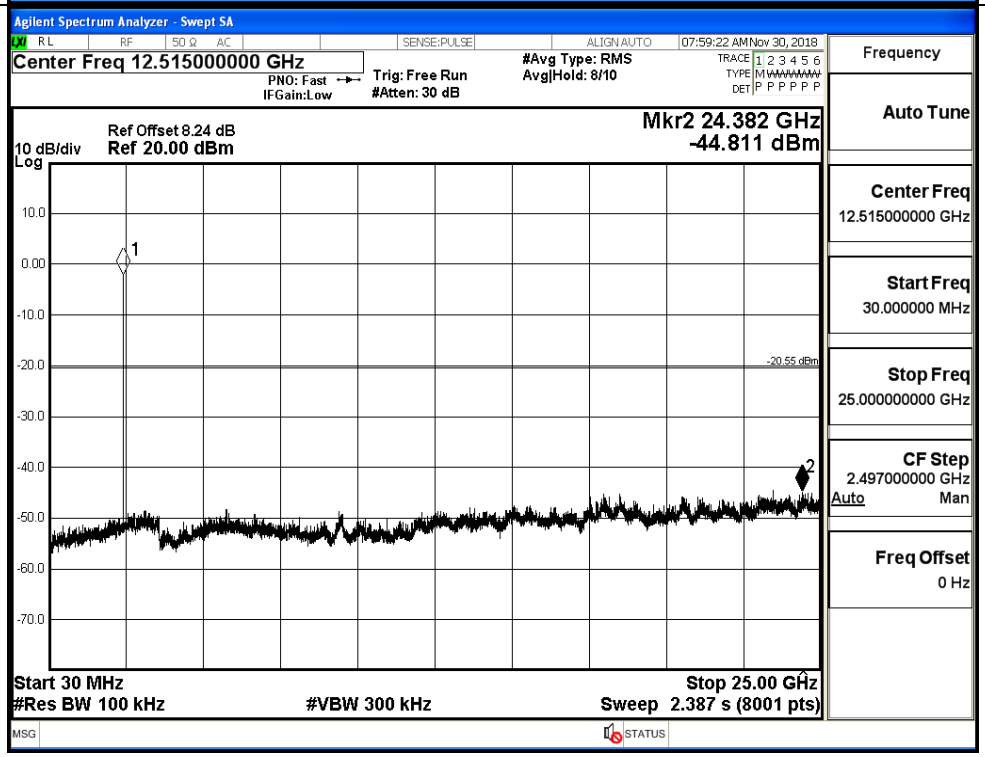
HCH		

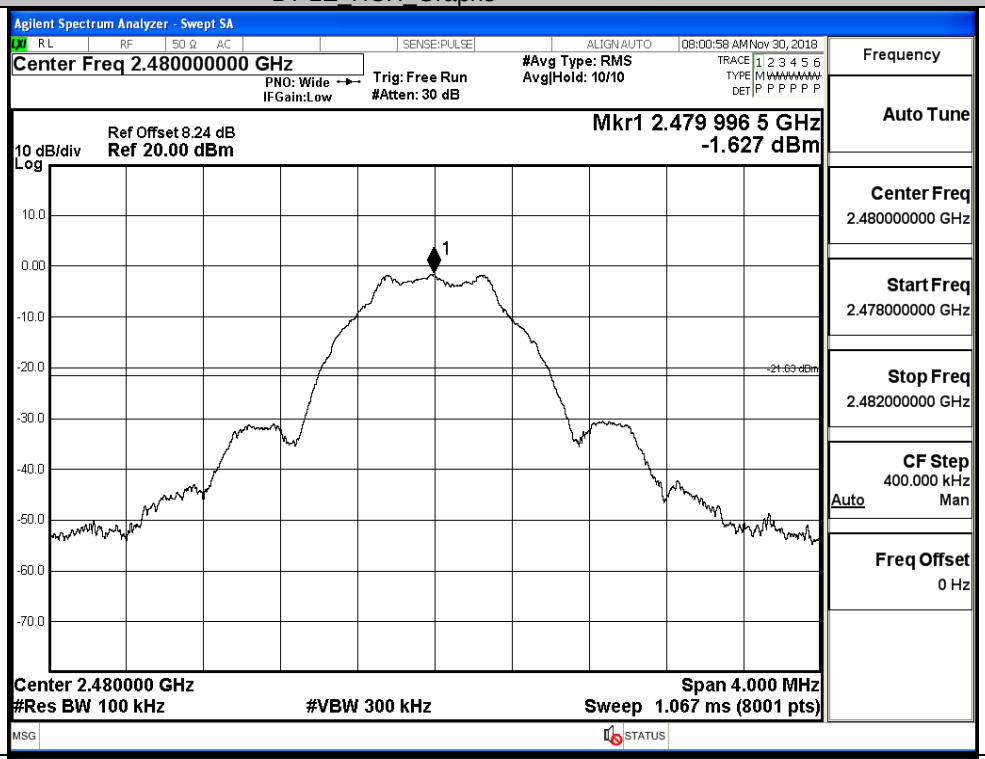
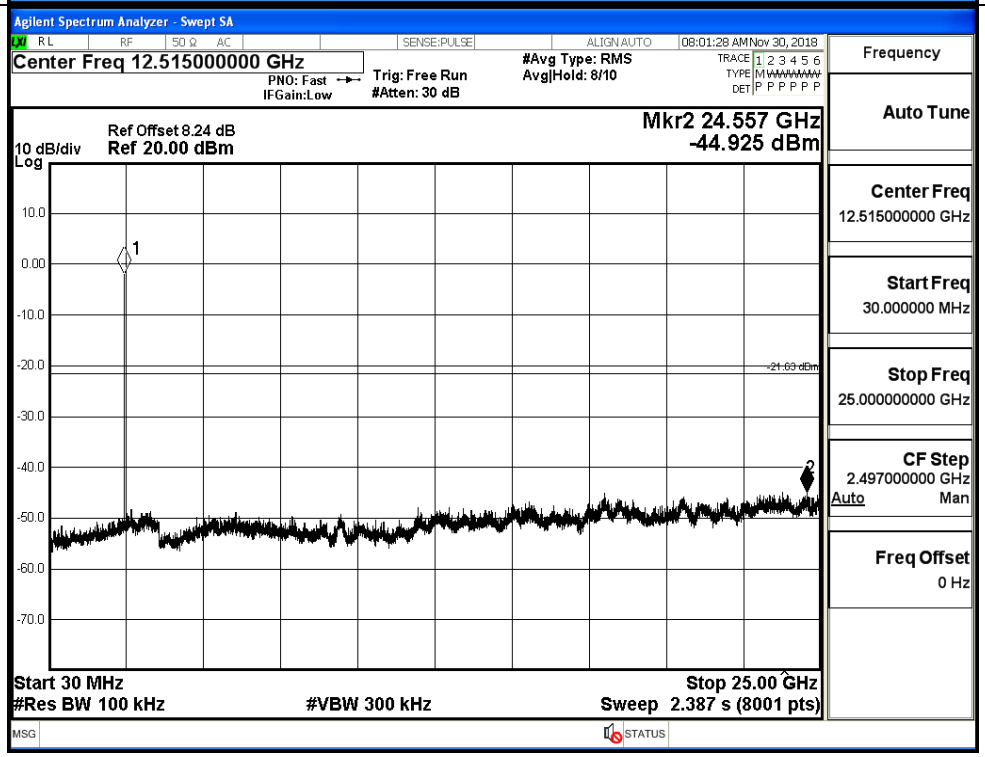
Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
07:54:12 AM Nov 30, 2018
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 10/10
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 8.24 dB
10 dB/div
Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 4 MHz
Sweep 4.267 ms
Occupied Bandwidth
1.0342 MHz
Total Power 5.62 dBm
Transmit Freq Error 5.928 kHz
OBW Power 99.00 %
x dB Bandwidth 659.4 kHz
x dB -6.00 dB
MSG
STATUS
Frequency
Center Freq
2.480000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz

A.6 RF Conducted Spurious Emissions

Mode	Data Rate	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	1M	LCH	-0.362	-44.885	-20.362	PASS
BT LE	1M	MCH	-0.546	-44.811	-20.546	PASS
BT LE	1M	HCH	-1.627	-44.925	-21.627	PASS

BT LE_LCH_Graphs	
Pref/BT LE/LCH	
Puw/BT LE/LCH	

BT LE_MCH_Graphs	
Pref/BT LE/MCH	
Puw/BT LE/MCH	

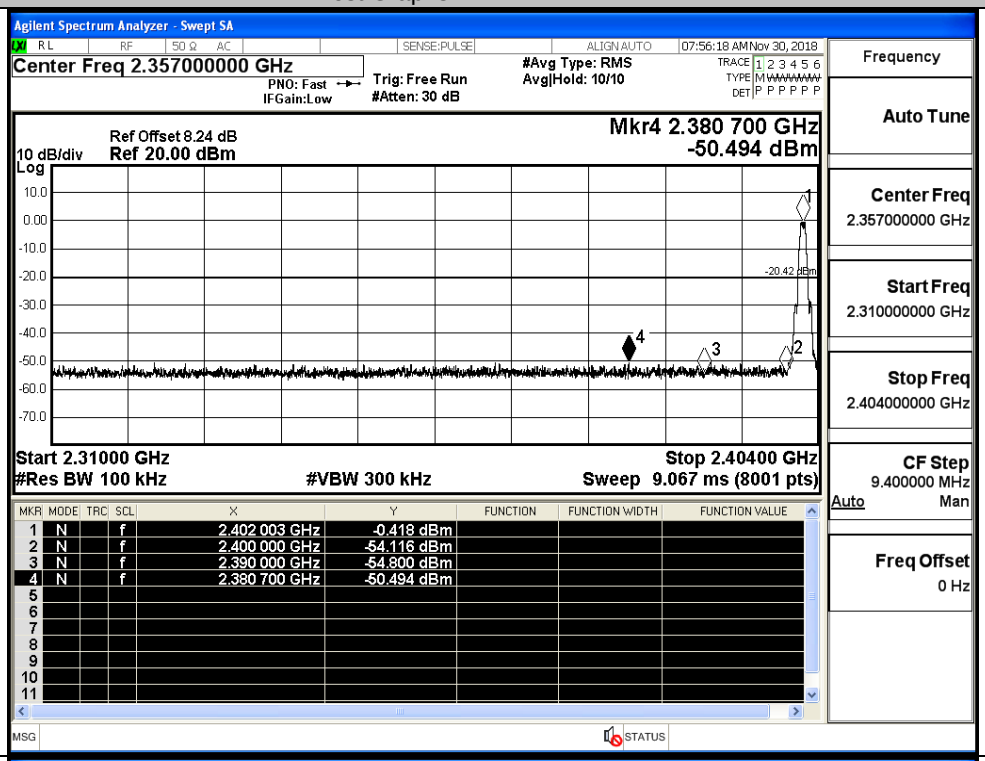
BT LE_HCH_Graphs	
Pref/BT LE/HCH	
Puw/BT LE/HCH	

A.7 Band-edge for RF Conducted Emissions

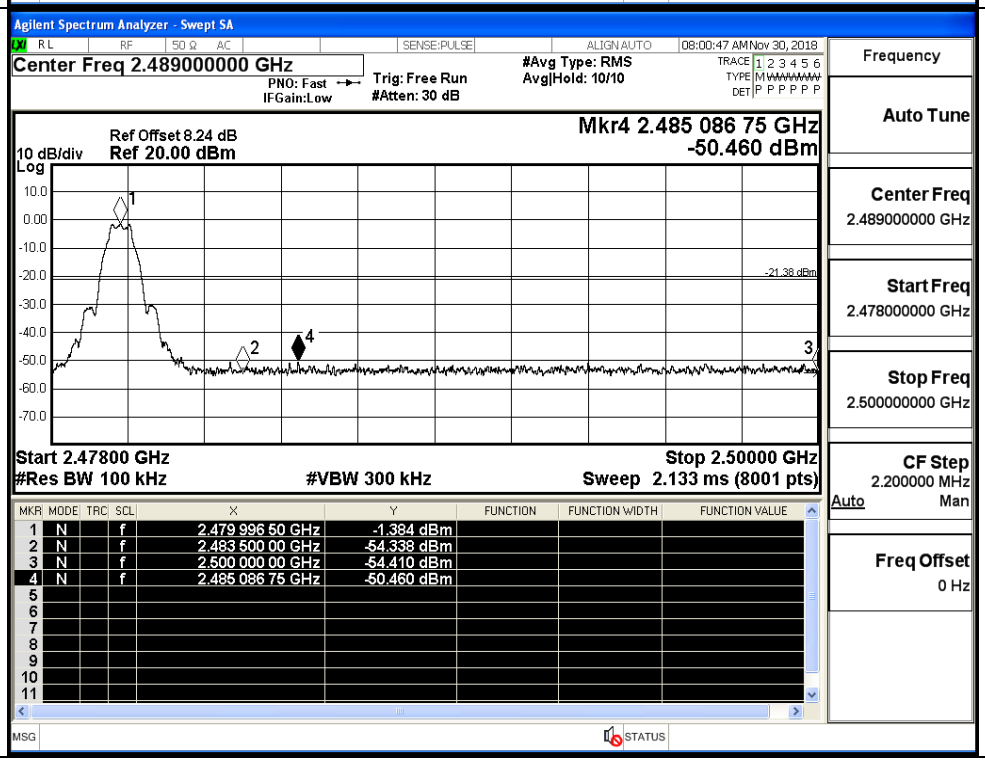
Mode	Data Rate	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
BT LE	1M	LCH	-0.418	-50.494	-20.42	PASS
BT LE	1M	HCH	-1.384	-50.460	-21.38	PASS

Test Graphs

LCH



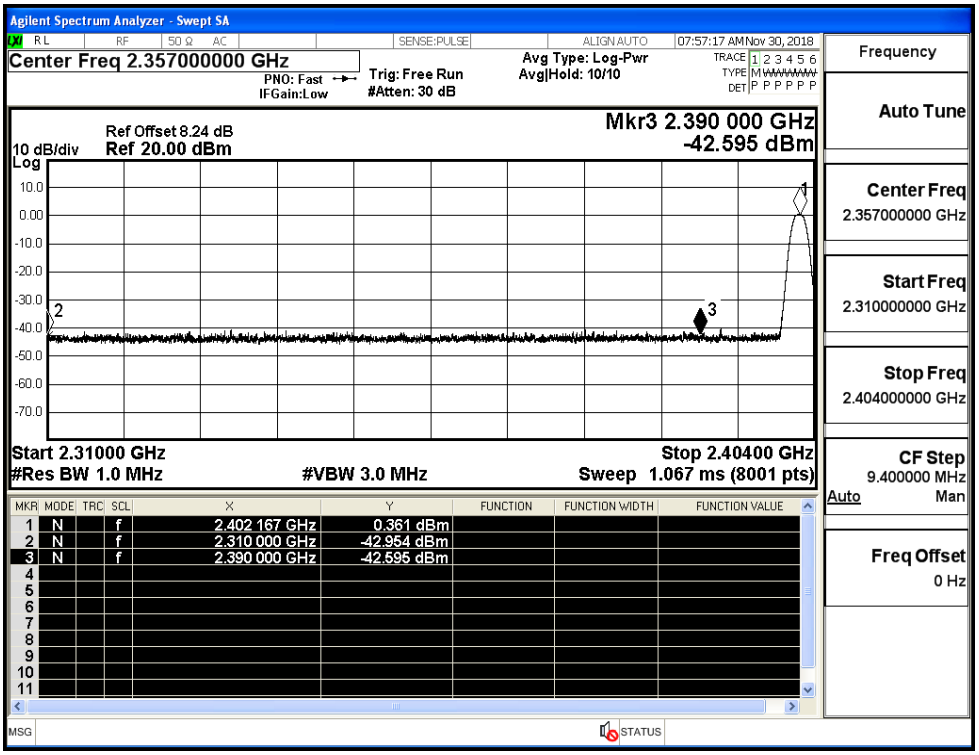
HCH



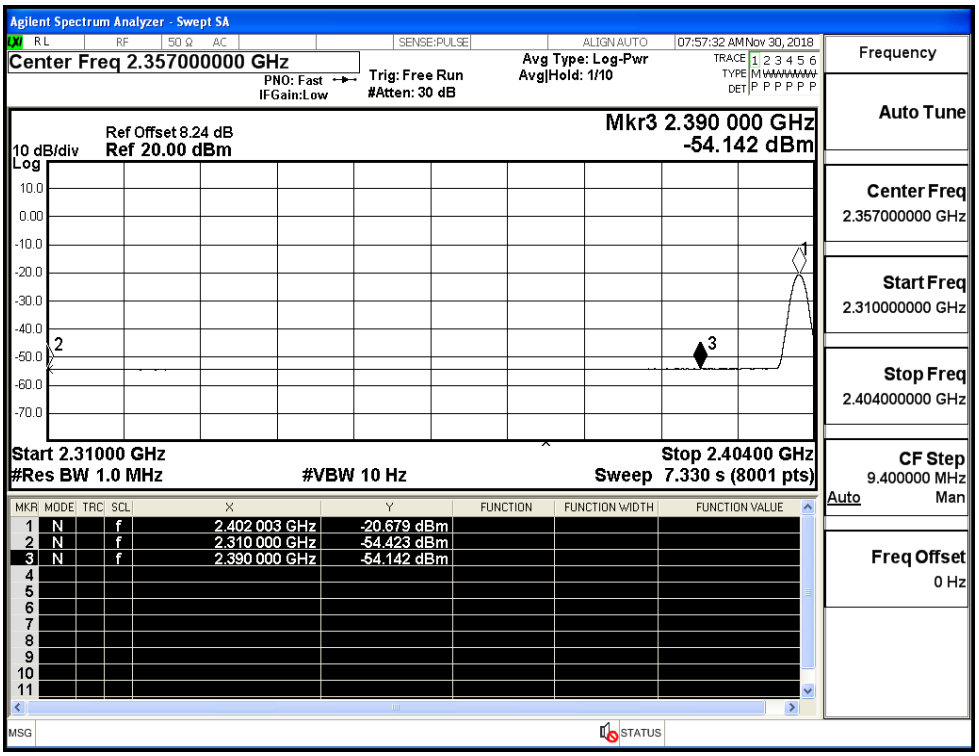
A.8 Restrict-band band-edge measurements

Test Mode	Data Rate	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
BT LE	1M	2402	Ant1	2310.0	-42.95	2.0	0	52.30	PEAK	74	PASS
			Ant1	2310.0	-54.42	2.0	0	40.83	AV	54	PASS
			Ant1	2390.0	-42.60	2.0	0	52.66	PEAK	74	PASS
			Ant1	2390.0	-54.14	2.0	0	41.12	AV	54	PASS
		2480	Ant1	2483.5	-43.12	2.0	0	52.14	PEAK	74	PASS
			Ant1	2483.5	-53.89	2.0	0	41.37	AV	54	PASS
			Ant1	2500.0	-43.80	2.0	0	51.46	PEAK	74	PASS
			Ant1	2500.0	-53.78	2.0	0	41.48	AV	54	PASS

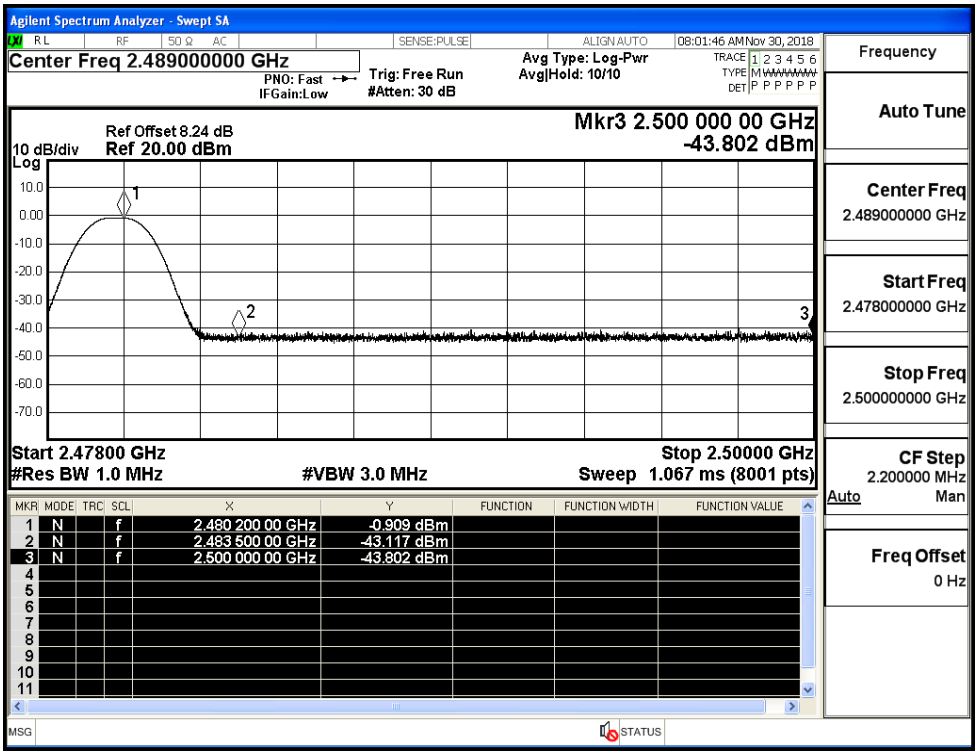
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



Restrict-band band-edge measurements_BT LE_2402_Ant1_AV



Restrict-band band-edge measurements_BT LE_2480_Ant1_PEAK



Restrict-band band-edge measurements_BT LE_2480_Ant1_AV