Environmental Conditions

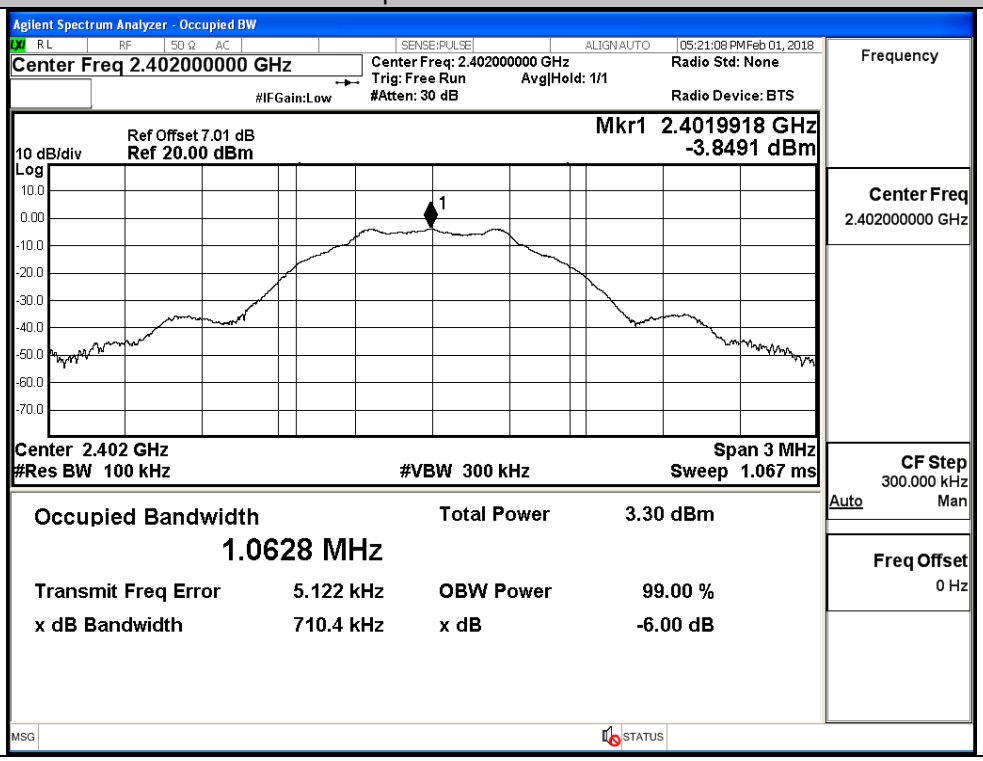
Temperature:	23.9 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.xu
Supervised by:	Tom.Liu

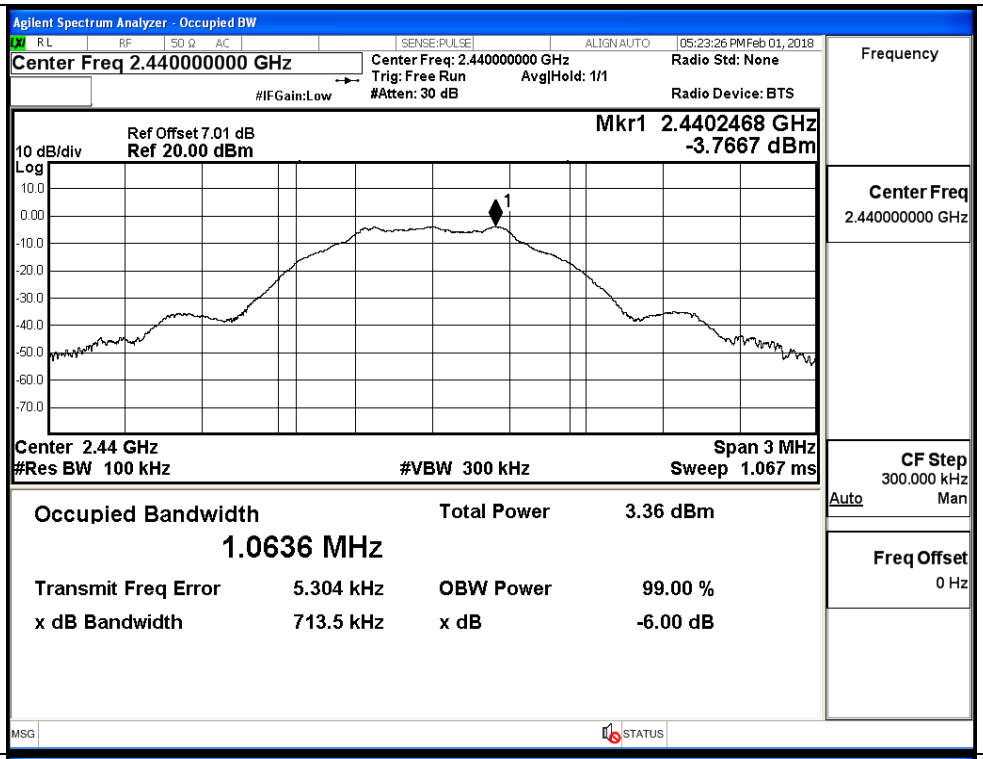
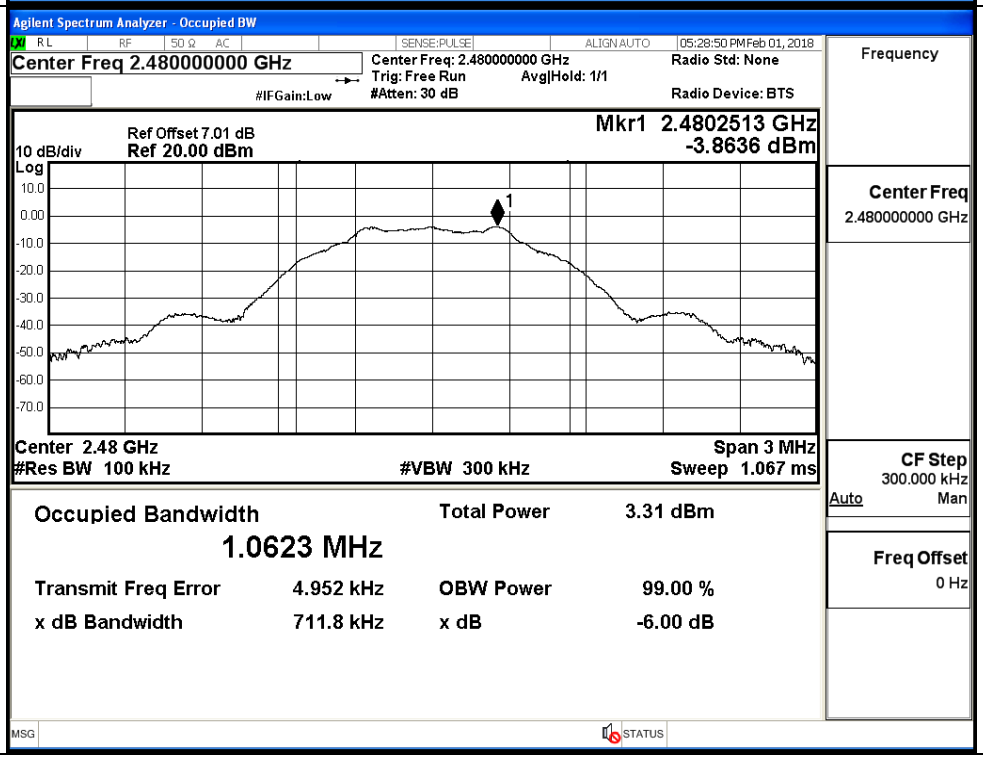
Appendix A): 6dB Bandwidth

Test Result

Mode	Channel	6dB Bandwidth [MHz]	Limit[MHz]	Verdict
BLE	LCH	0.7104	>=0.5	PASS
BLE	MCH	0.7135	>=0.5	PASS
BLE	HCH	0.7118	>=0.5	PASS

Test Graphs

Graphs	
LCH	

MCH		
HCH		

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.440000000 GHz
Center Freq: 2.440000000 GHz
Trig: Free Run Avg|Hold: 1/1
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
05:23:26 PM Feb 01, 2018
Ref Offset 7.01 dB
10 dB/div Ref 20.00 dBm
Log
Mkr1 2.4402468 GHz
-3.7667 dBm
Center 2.44 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3 MHz
Sweep 1.067 ms
Occupied Bandwidth
1.0636 MHz
Total Power 3.36 dBm
Transmit Freq Error 5.304 kHz
OBW Power 99.00 %
x dB Bandwidth 713.5 kHz
x dB -6.00 dB
Frequency
Center Freq
2.440000000 GHz
CF Step
300.000 kHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

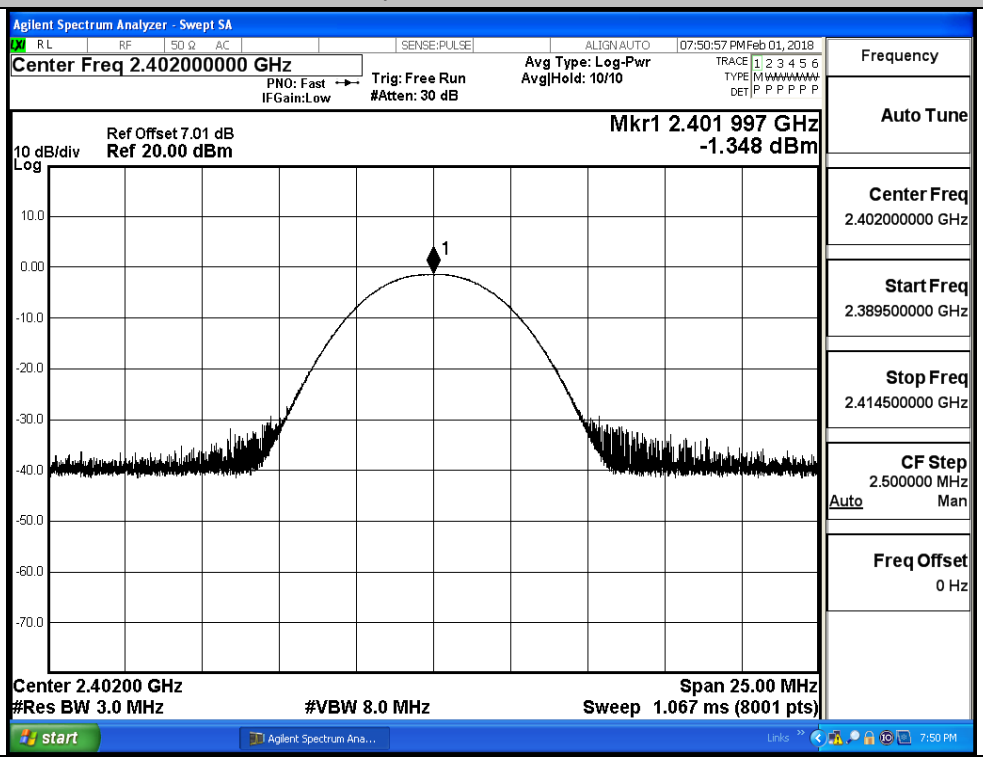
Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run Avg|Hold: 1/1
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
05:28:50 PM Feb 01, 2018
Ref Offset 7.01 dB
10 dB/div Ref 20.00 dBm
Log
Mkr1 2.4802513 GHz
-3.8636 dBm
Center 2.48 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3 MHz
Sweep 1.067 ms
Occupied Bandwidth
1.0623 MHz
Total Power 3.31 dBm
Transmit Freq Error 4.952 kHz
OBW Power 99.00 %
x dB Bandwidth 711.8 kHz
x dB -6.00 dB
Frequency
Center Freq
2.480000000 GHz
CF Step
300.000 kHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

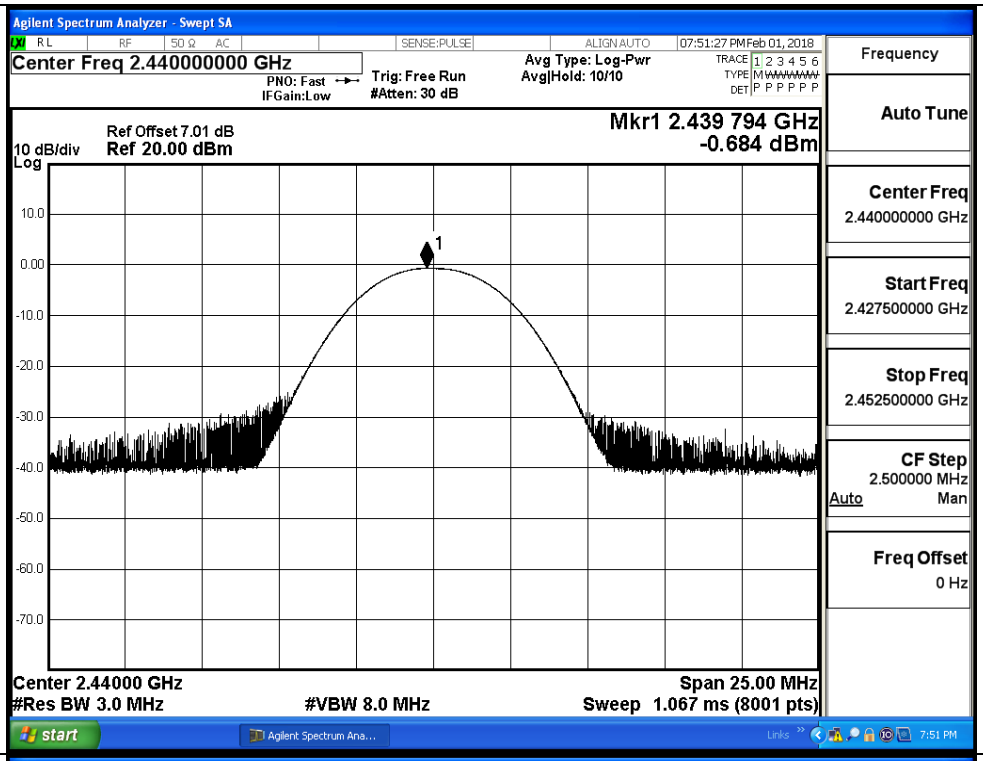
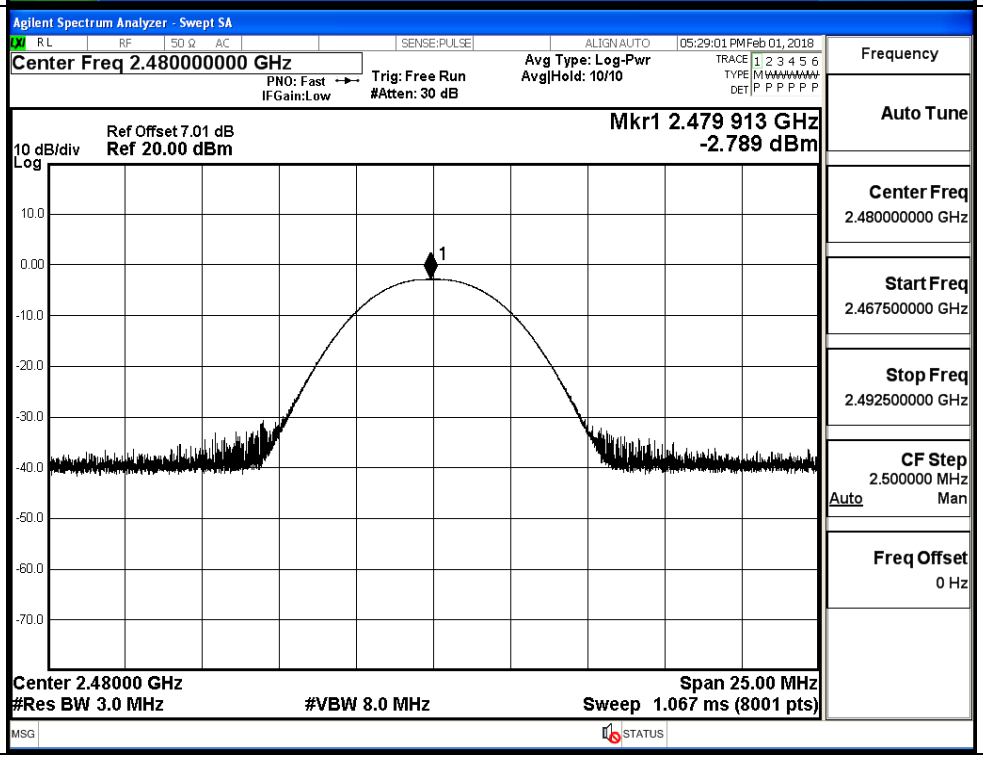
Appendix B): Conducted Peak Output Power

Test Result

Mode	Channel	Conduct Peak Power[dBm]	Limit[dBm]	Verdict
BLE	LCH	-1.348	30	PASS
BLE	MCH	-0.684	30	PASS
BLE	HCH	-2.789	30	PASS

Test Graphs

Graphs		
LCH		

MCH		
HCH		

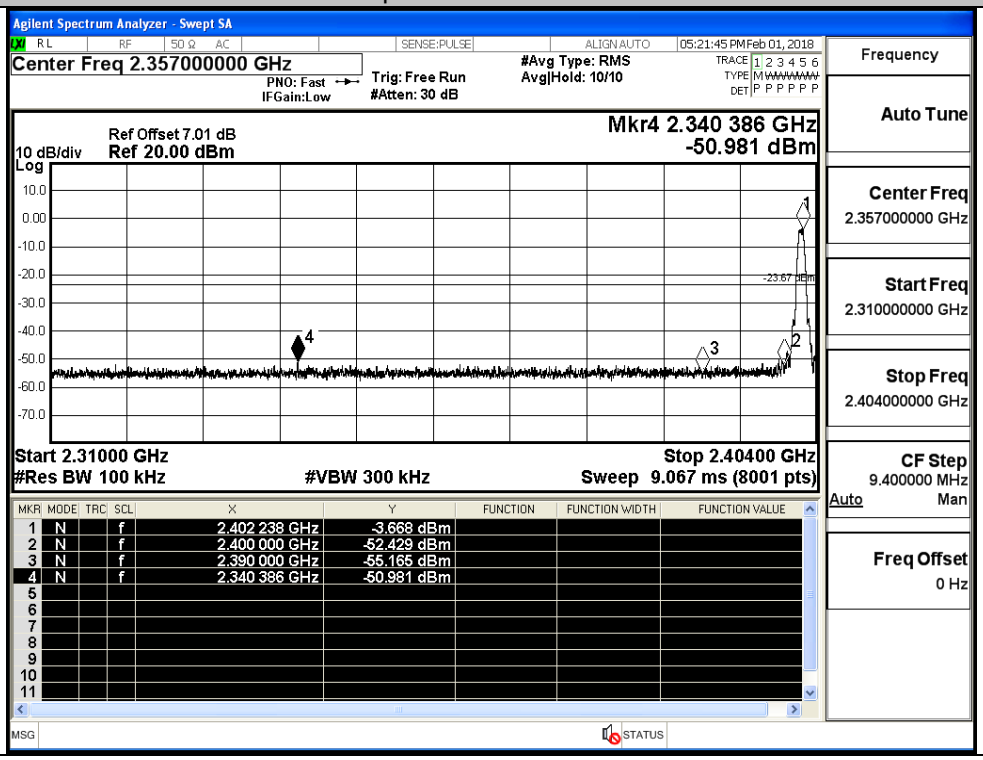
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.440000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
07:51:27 PM Feb 01, 2018
Ref Offset 7.01 dB
10 dB/div Ref 20.00 dBm
Log
Mkr1 2.439 794 GHz
-0.684 dBm
Center 2.44000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 25.00 MHz
Sweep 1.067 ms (8001 pts)
Frequency
Auto Tune
Center Freq
2.440000000 GHz
Start Freq
2.427500000 GHz
Stop Freq
2.452500000 GHz
CF Step
2.500000 MHz
Auto Man
Freq Offset
0 Hz
start
7:51 PM
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
05:29:01 PM Feb 01, 2018
Ref Offset 7.01 dB
10 dB/div Ref 20.00 dBm
Log
Mkr1 2.479 913 GHz
-2.789 dBm
Center 2.48000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 25.00 MHz
Sweep 1.067 ms (8001 pts)
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
MSG
STATUS

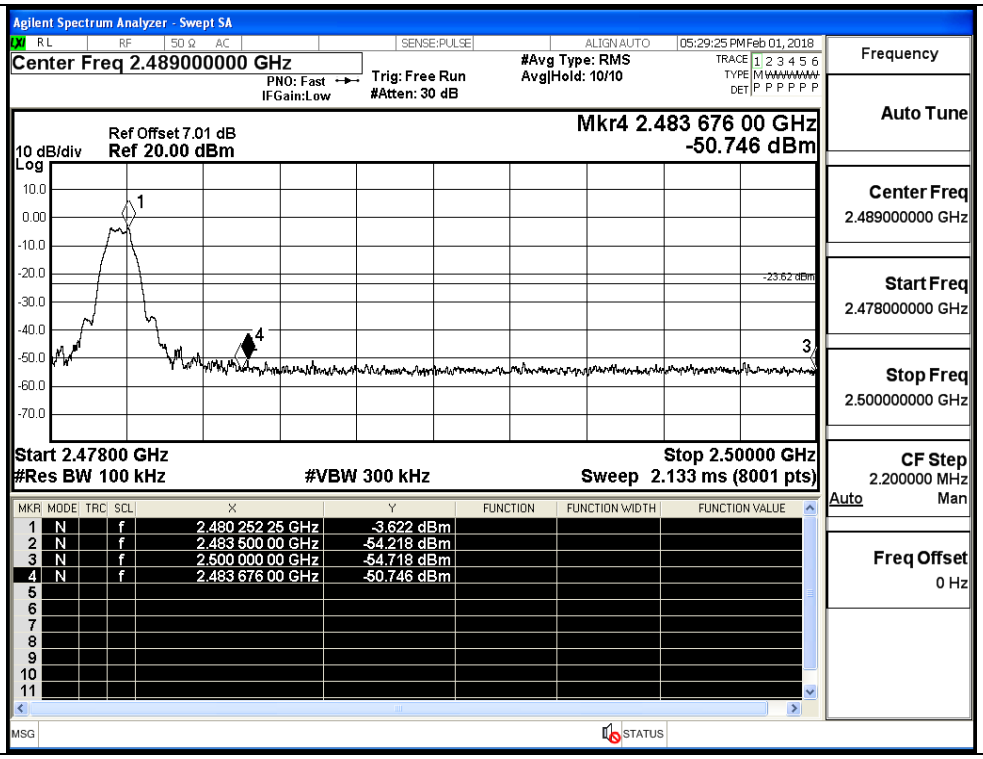
Appendix C): Band-edge for RF Conducted Emissions

Result Table

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
BLE	LCH	-3.668	-50.981	-23.67	PASS
BLE	HCH	-3.622	-50.746	-23.62	PASS

Test Graphs

Graphs	
LCH	

HCH		

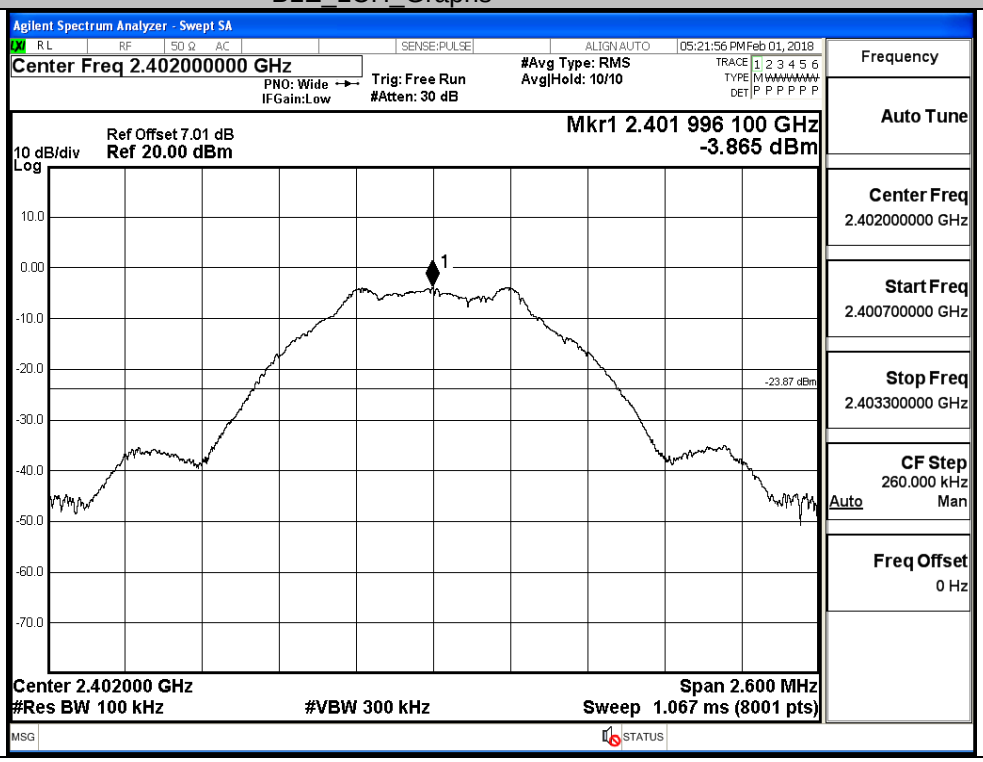
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.489000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
05:29:25 PM Feb 01, 2018
Ref Offset 7.01 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr4 2.483 676 00 GHz
-50.746 dBm
-23.62 dBm
Start 2.47800 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.133 ms (8001 pts)
1 N 1 f 2.480 252 25 GHz -3.622 dBm
2 N 1 f 2.483 500 00 GHz -54.218 dBm
3 N 1 f 2.500 000 00 GHz -54.718 dBm
4 N 1 f 2.483 676 00 GHz -50.746 dBm
Frequency
Auto Tune
Center Freq
2.489000000 GHz
Start Freq
2.478000000 GHz
Stop Freq
2.500000000 GHz
CF Step
2.200000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

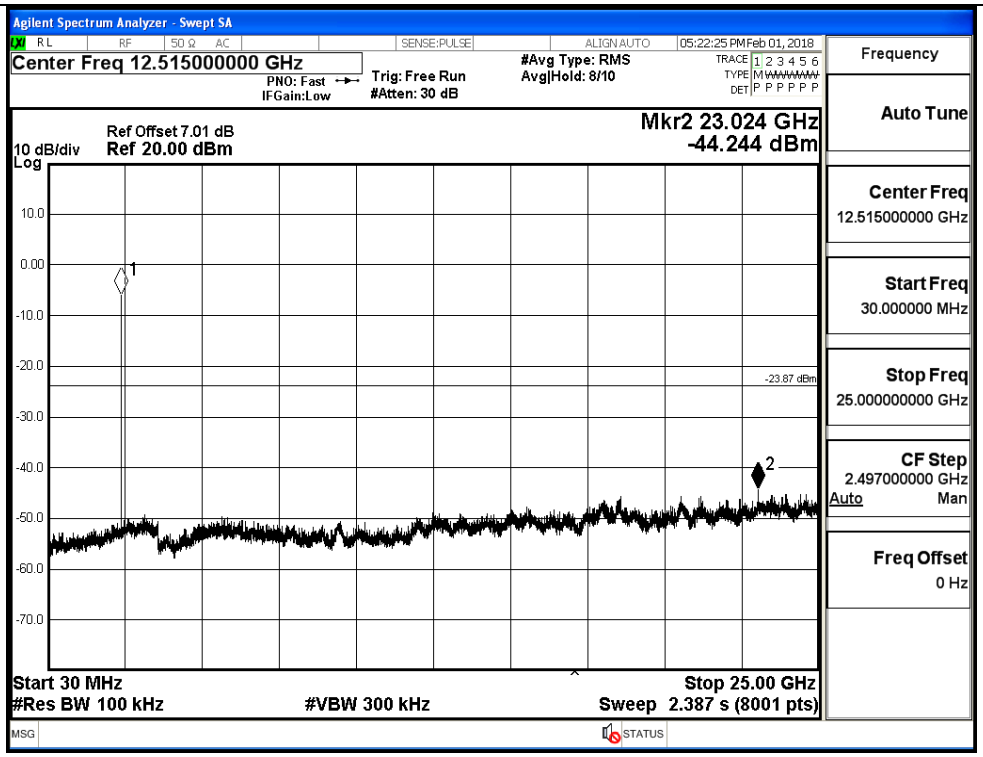
Appendix D): RF Conducted Spurious Emissions

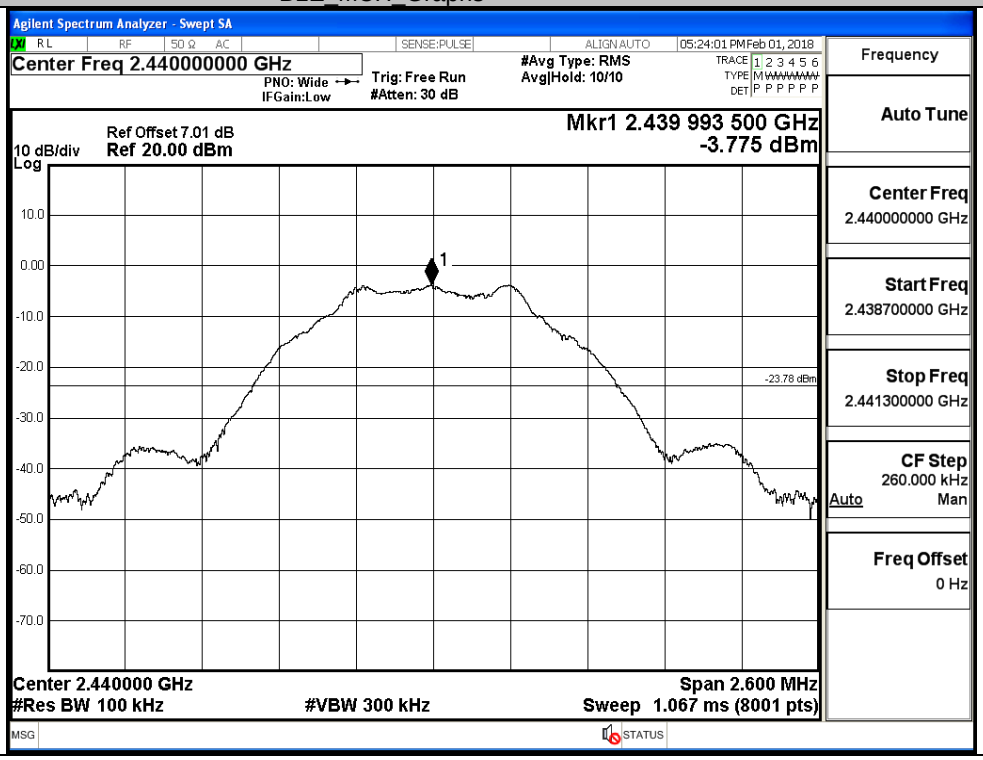
Result Table

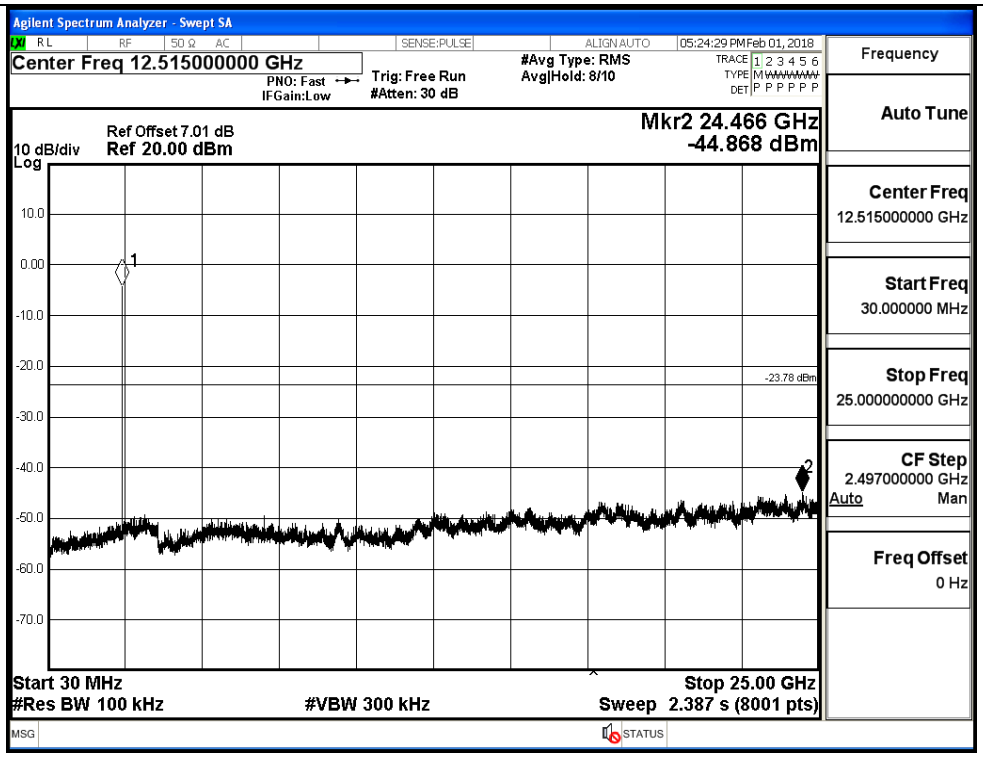
Mode	Channel	Pref [dBm]	Puw[dBm]	Limit[dBm]	Verdict
BLE	LCH	-3.865	-44.244	-23.865	PASS
BLE	MCH	-3.775	-44.868	-23.775	PASS
BLE	HCH	-2.711	-45.209	-22.711	PASS

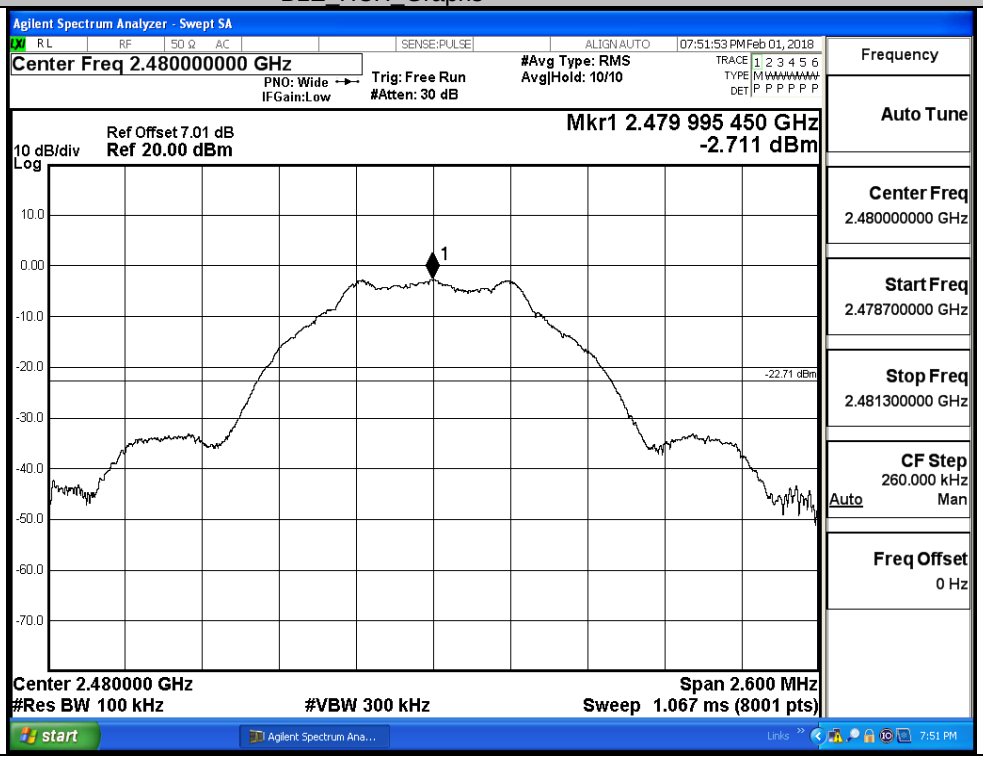
Test Graphs

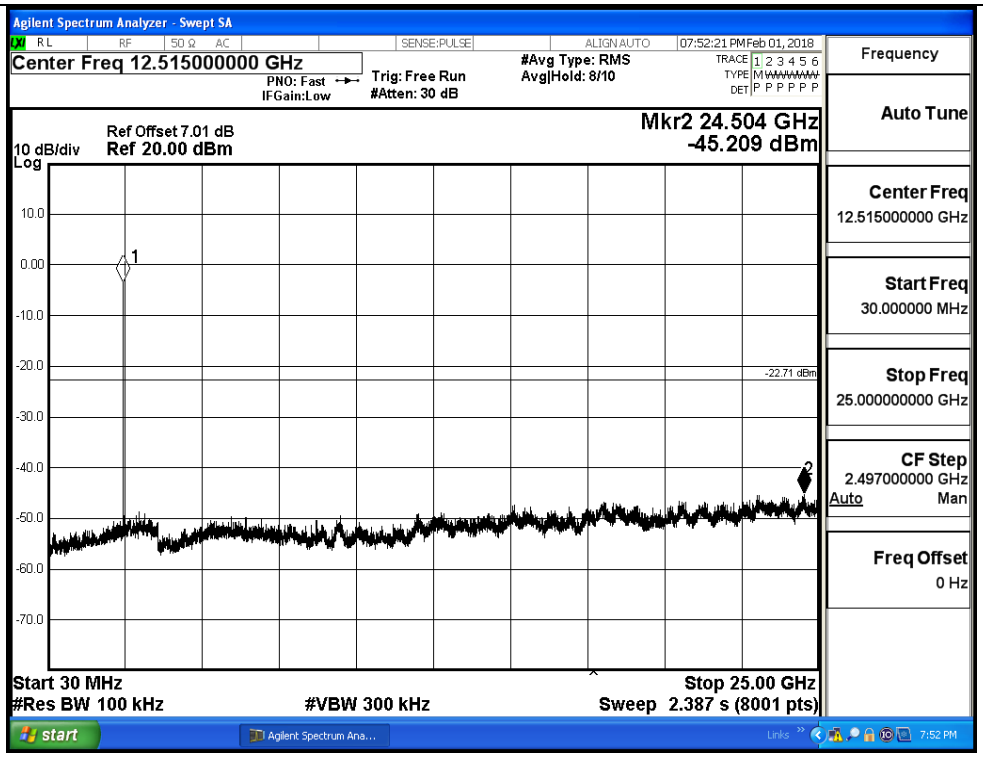
BLE_LCH_Graphs	
Pref/BLE/LCH	

Puw/BLE/LCH	

BLE_MCH_Graphs	
Pref/BLE/MCH	

Puw/BLE/MCH	

BLE_HCH_Graphs	
Pref/BLE/HCH	

Puw/BLE/HCH	

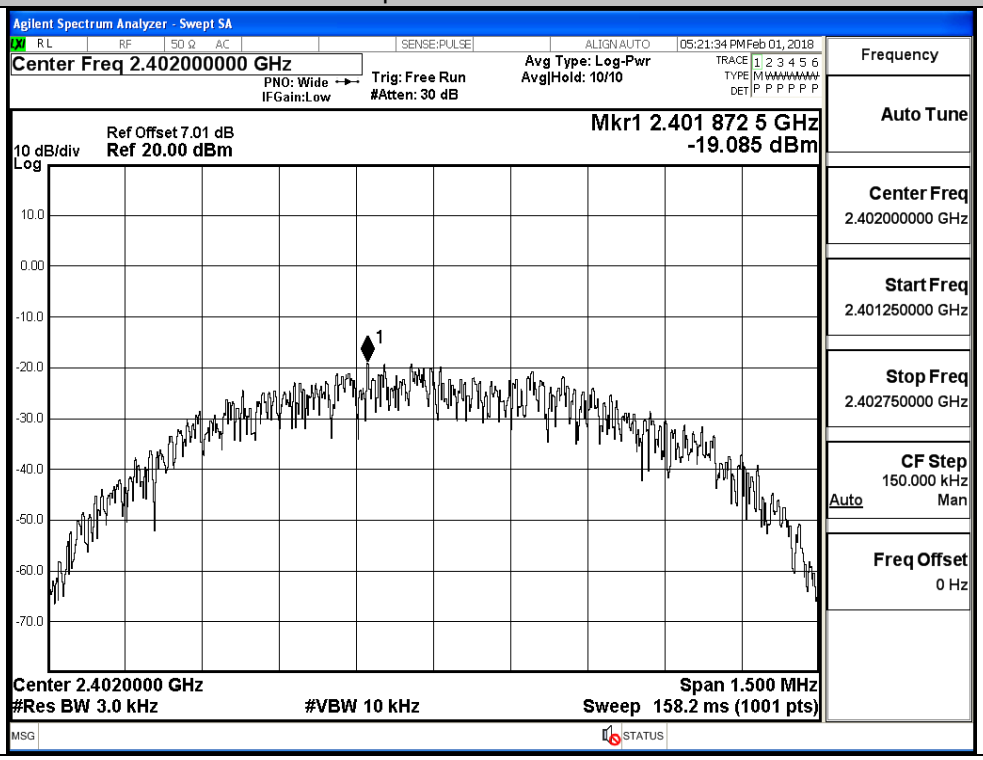
Agilent Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 8/10
07:52:21 PM Feb 01, 2018
Ref Offset 7.01 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr2 24.504 GHz
-45.209 dBm
-22.71 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (8001 pts)
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz
start
7:52 PM

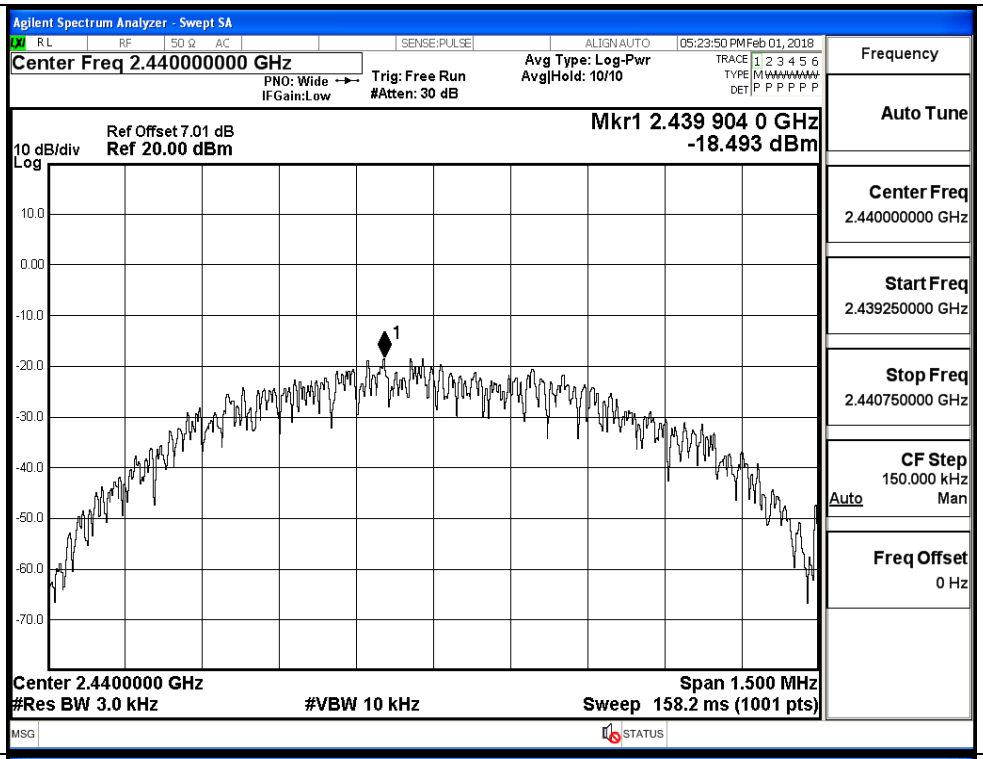
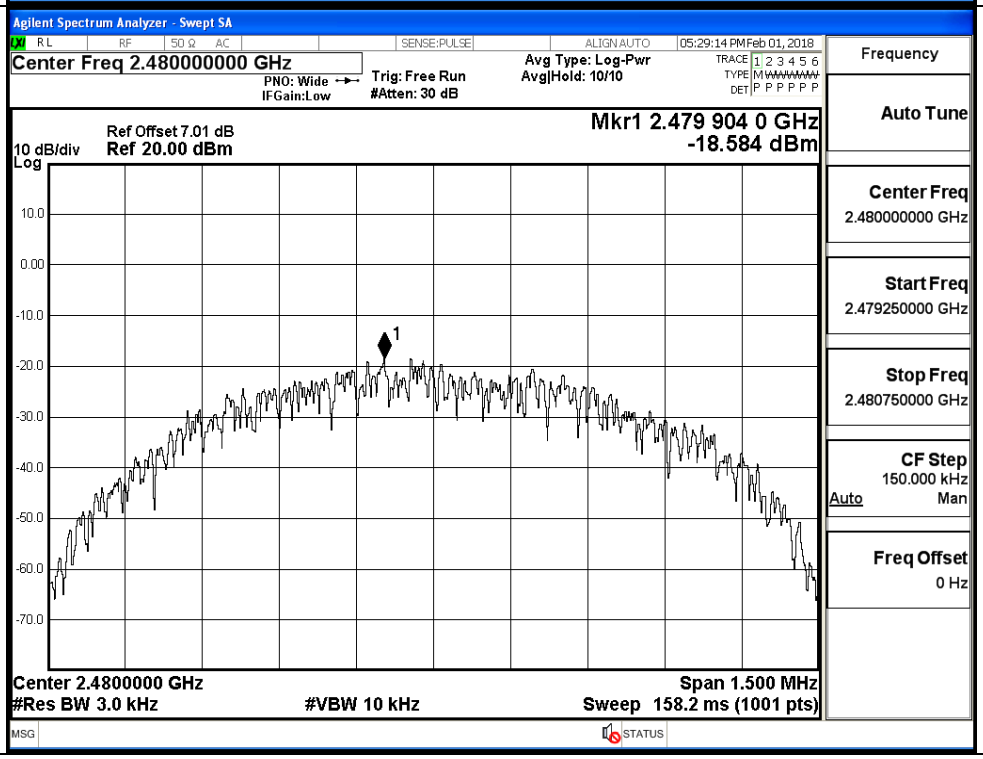
Appendix E): Power Spectral Density

Result Table

Mode	Channel	PSD [dBm/3KHz]	Verdict
BLE	LCH	-19.085	PASS
BLE	MCH	-18.493	PASS
BLE	HCH	-18.584	PASS

Test Graphs

Graphs	
LCH	

MCH		 Agilent Spectrum Analyzer - Swept SA Center Freq 2.440000000 GHz PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg|Hold: 10/10 05:23:50 PM Feb 01, 2018 Ref Offset 7.01 dB 10 dB/div Ref 20.00 dBm Log Mkr1 2.439 904 0 GHz -18.493 dBm Center 2.4400000 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 1.500 MHz Sweep 158.2 ms (1001 pts) Frequency Auto Tune Center Freq 2.440000000 GHz Start Freq 2.439250000 GHz Stop Freq 2.440750000 GHz CF Step 150.000 kHz Auto Man Freq Offset 0 Hz
HCH		 Agilent Spectrum Analyzer - Swept SA Center Freq 2.480000000 GHz PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg|Hold: 10/10 05:29:14 PM Feb 01, 2018 Ref Offset 7.01 dB 10 dB/div Ref 20.00 dBm Log Mkr1 2.479 904 0 GHz -18.584 dBm Center 2.4800000 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 1.500 MHz Sweep 158.2 ms (1001 pts) 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

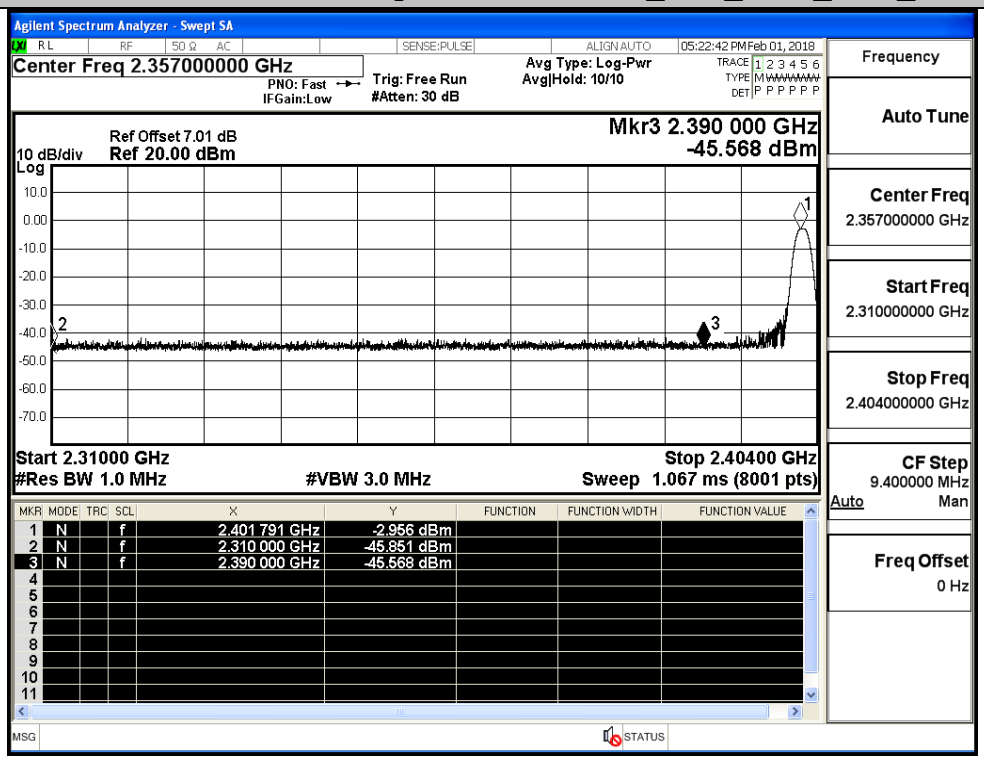
Appendix F):Restrict-band band-edge measurements

Result Table

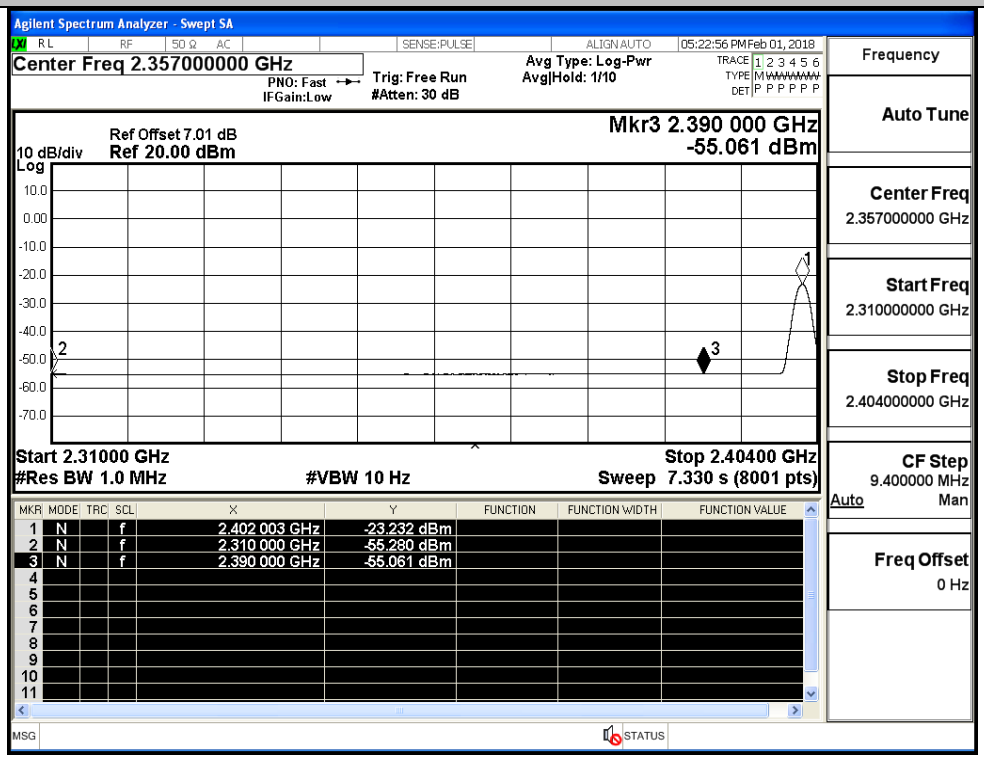
Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
BLE	2402	Ant1	2310.0	-45.85	2	0	49.41	PEAK	74	PASS
BLE	2402	Ant1	2310.0	-55.28	2	0	39.98	AV	54	PASS
BLE	2402	Ant1	2390.0	-45.57	2	0	49.69	PEAK	74	PASS
BLE	2402	Ant1	2390.0	-55.06	2	0	40.20	AV	54	PASS
BLE	2480	Ant1	2483.5	-39.70	2	0	55.56	PEAK	74	PASS
BLE	2480	Ant1	2483.5	-54.75	2	0	40.51	AV	54	PASS
BLE	2480	Ant1	2500.0	-43.80	2	0	51.46	PEAK	74	PASS
BLE	2480	Ant1	2500.0	-54.69	2	0	40.57	AV	54	PASS

Test Graphs

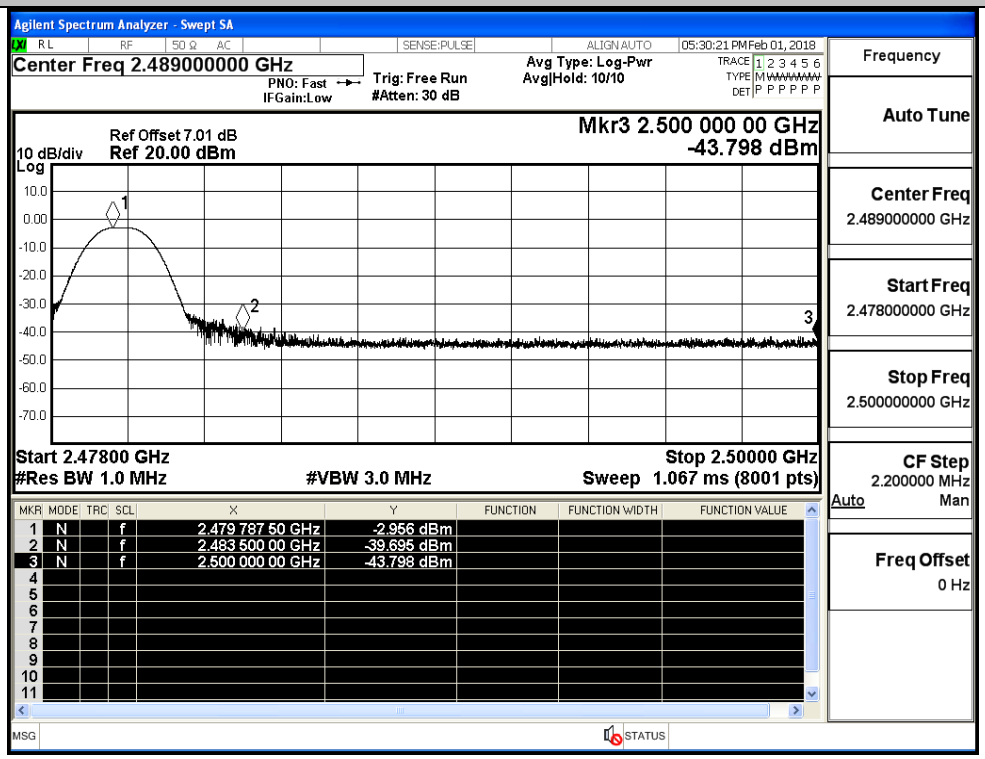
Restrict-band band-edge measurements_BLE_2402_Ant1_PEAK



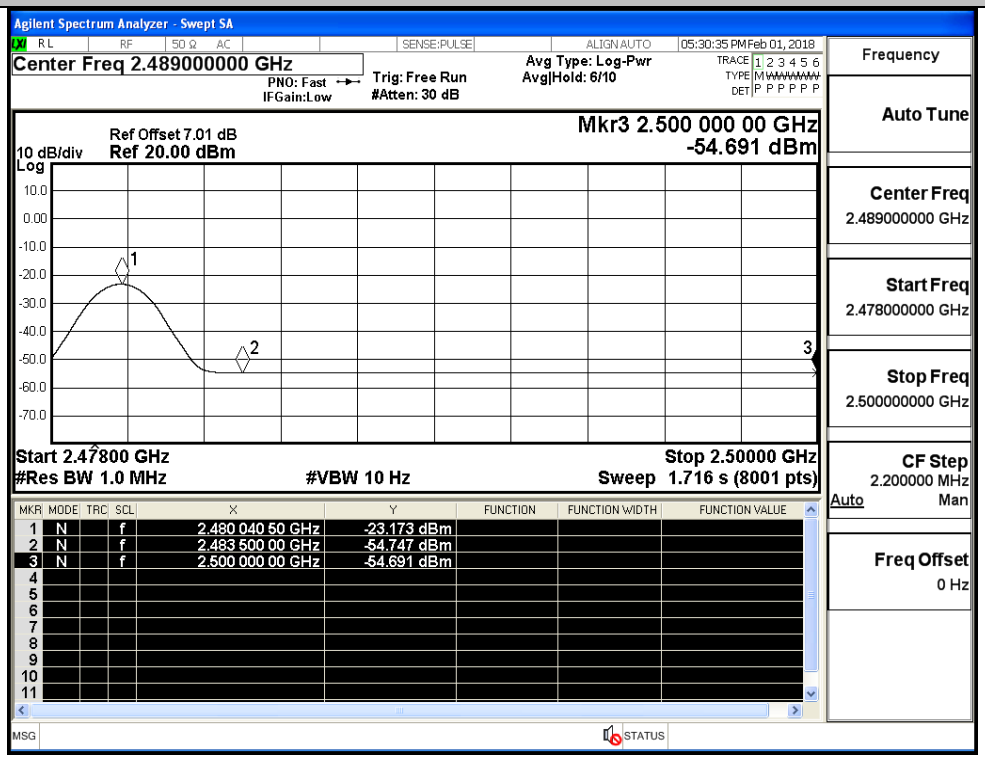
Restrict-band band-edge measurements_BLE_2402_Ant1_AV



Restrict-band band-edge measurements_BLE_2480_Ant1_PEAK



Restrict-band band-edge measurements_BLE_2480_Ant1_AV



Appendix G):Duty Cycle

Result Table

Test Mode	Test	Ant	Duty Cycle[%]	Verdict
BLE	2440	Ant1	100	PASS

Test Graphs