Appendix A

RF Test Data for BT V4.2(LE) (Conducted Measurement)

Product Name: Wingman Remote

Trade Mark: Bushnell Golf

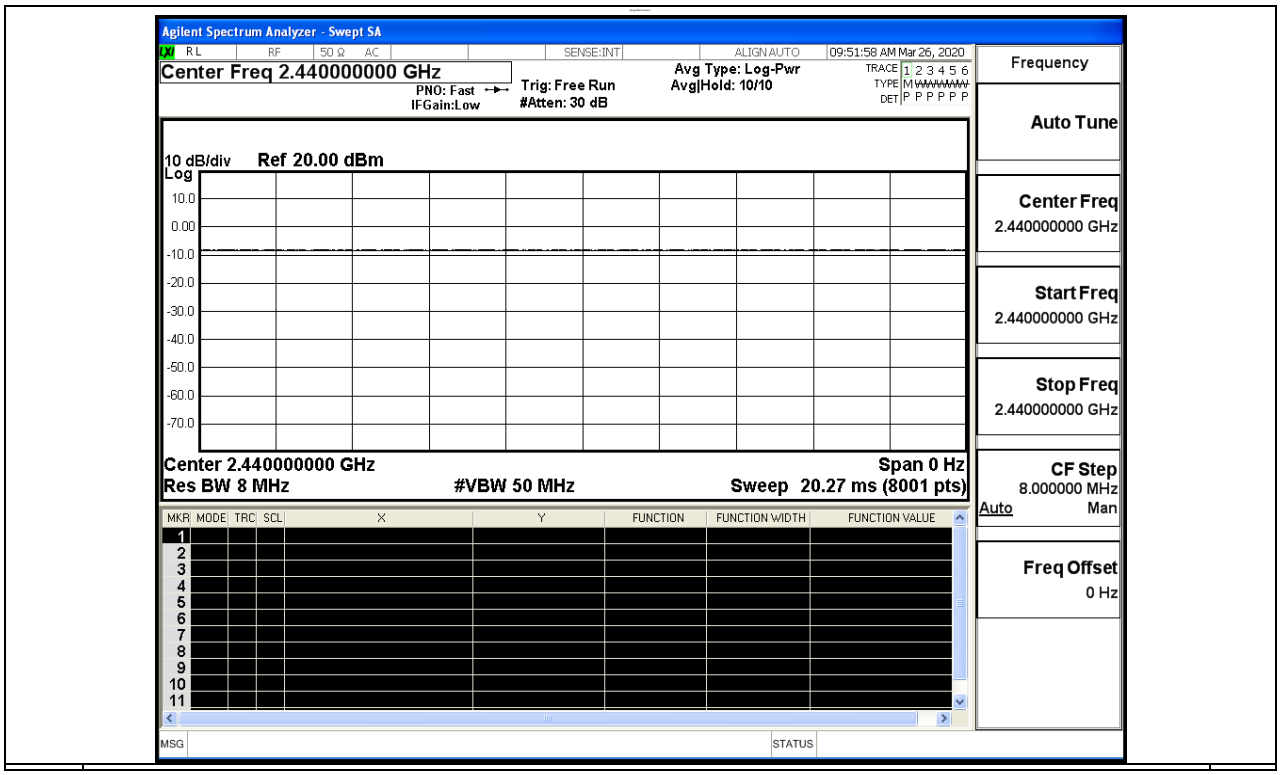
Test Model: 361915

Environmental Conditions

Temperature:	23.3 °C
Relative Humidity:	53.3%
ATM Pressure:	100.0 kPa
Test Engineer:	David.Luo
Supervised by:	Tom.Liu

A.1 Duty Cycle

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

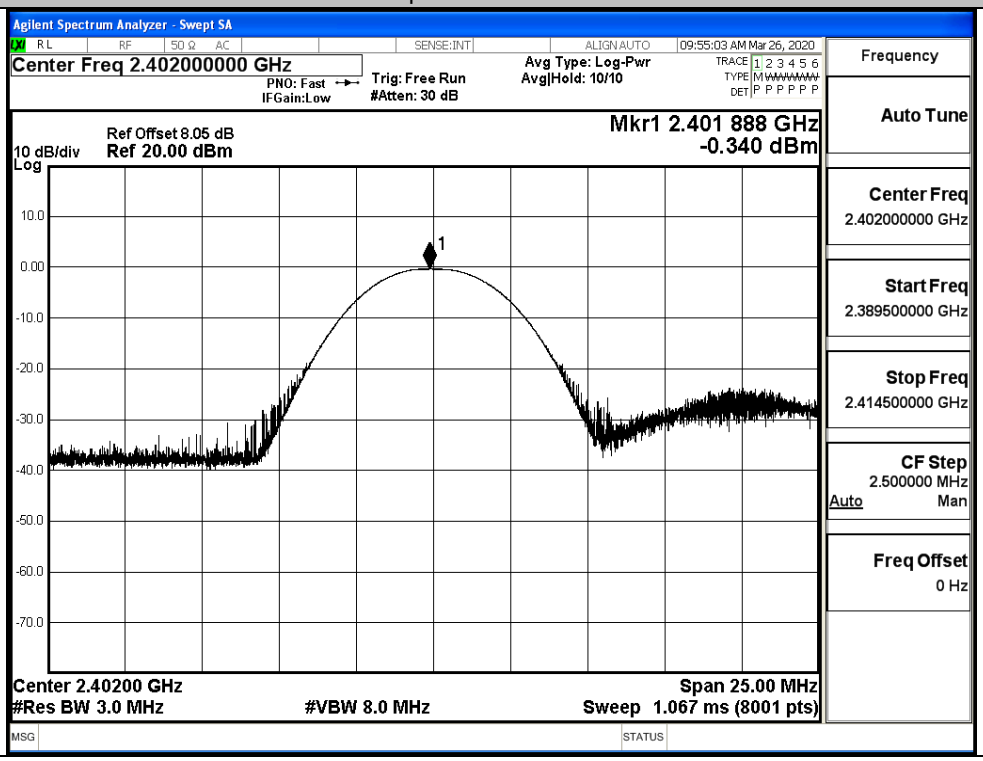


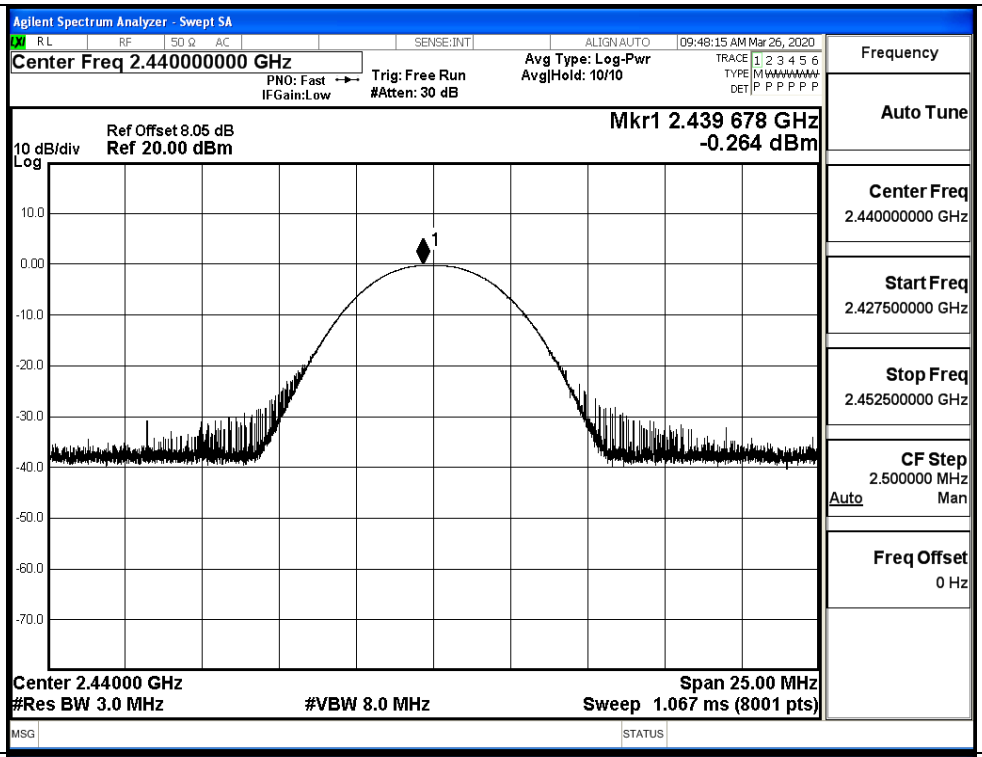
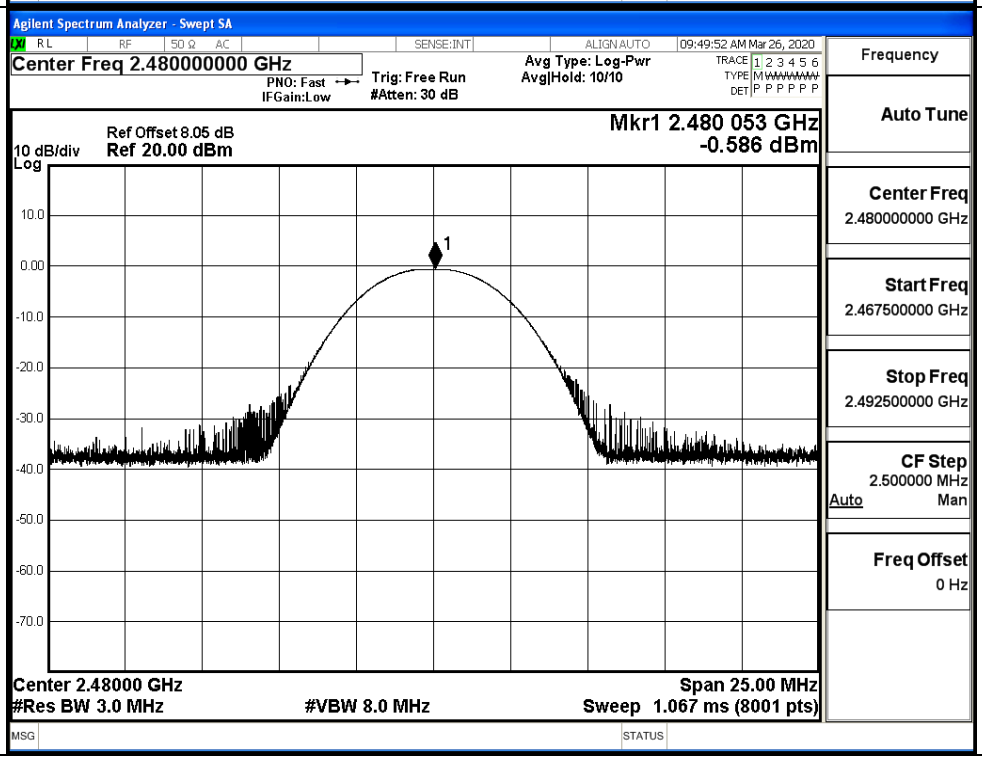
A.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	-0.34	30	PASS
BT LE	MCH	-0.264	30	PASS
BT LE	HCH	-0.586	30	PASS

EIRP

Mode	Channel	Conduct Peak Power (dBm)	Antenna Gain (dBi) Max	EIRP (dBm)
BT LE	LCH	-0.34	0	-0.34
BT LE	MCH	-0.264	0	-0.264
BT LE	HCH	-0.586	0	-0.586

Test Graphs	
LCH	

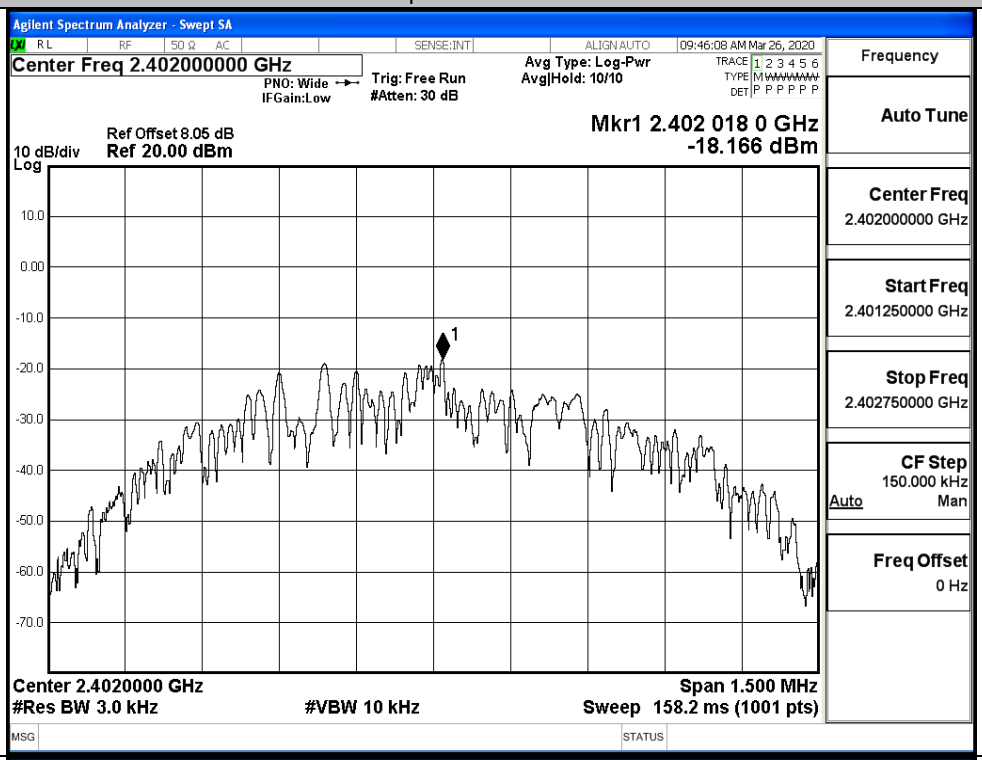
MCH		 Agilent Spectrum Analyzer - Swept SA Center Freq 2.440000000 GHz PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg|Hold: 10/10 09:48:15 AM Mar 26, 2020 Ref Offset 8.05 dB 10 dB/div Log Ref 20.00 dBm Mkr1 2.439 678 GHz -0.264 dBm Center 2.44000 GHz #Res BW 3.0 MHz #VBW 8.0 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
HCH		 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 09:49:52 AM Mar 26, 2020 Ref Offset 8.05 dB 10 dB/div Log Ref 20.00 dBm Mkr1 2.480 053 GHz -0.586 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

A.3 Maximum Power Spectral Density

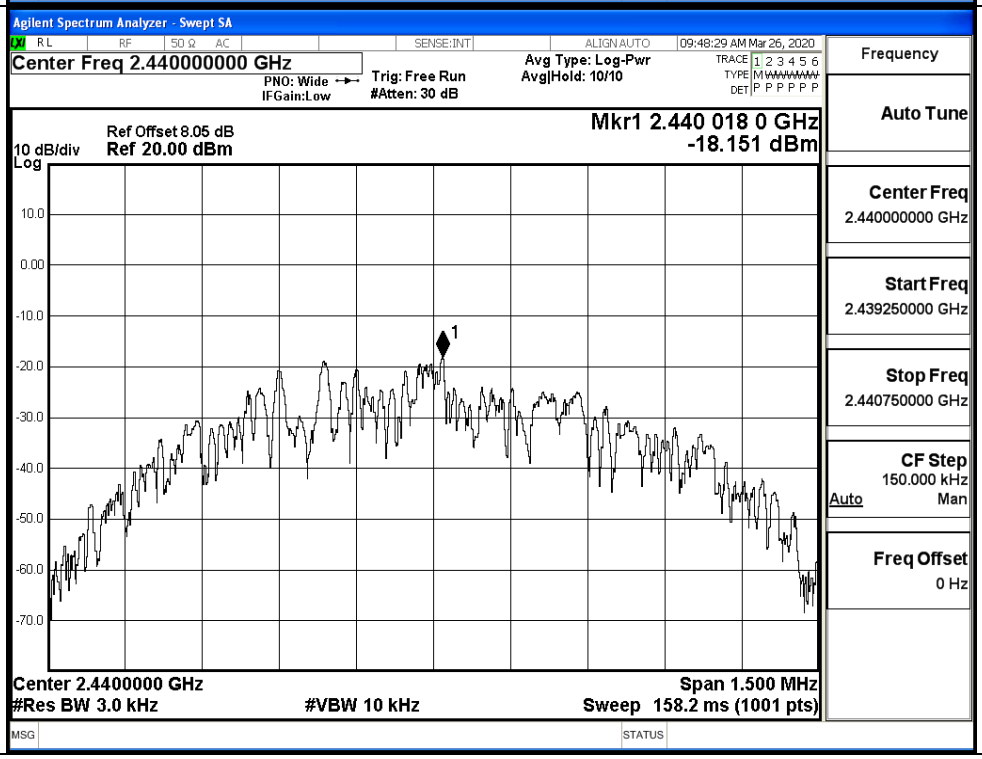
Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-18.166	8	PASS
BT LE	MCH	-18.151	8	PASS
BT LE	HCH	-18.669	8	PASS

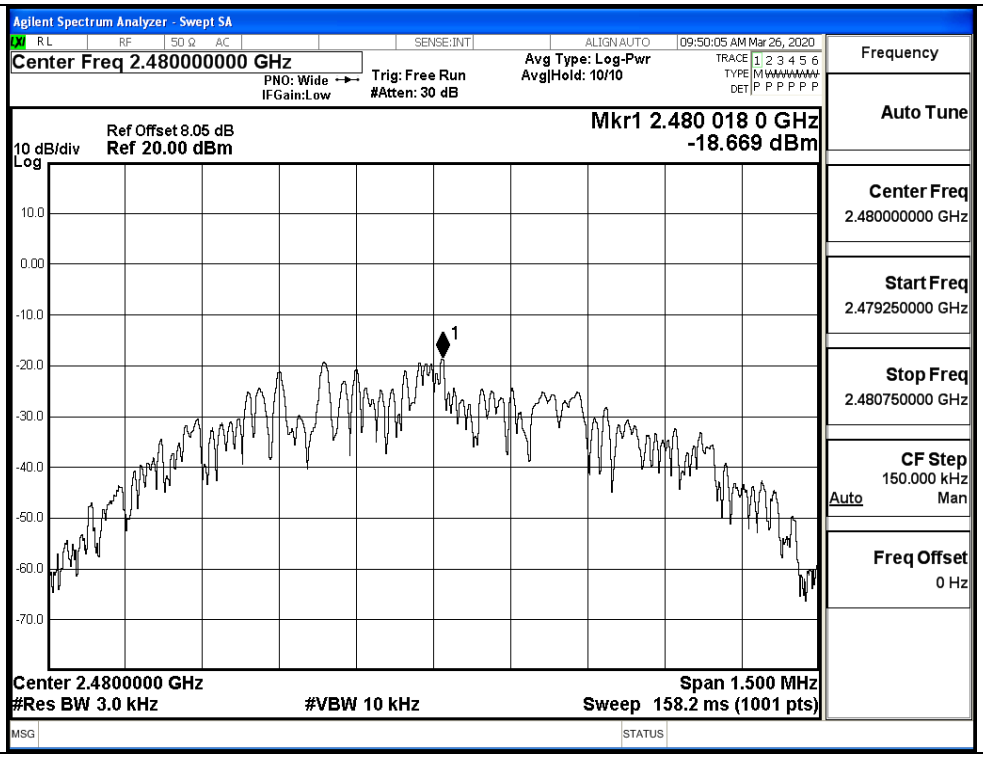
Test Graphs

LCH



MCH



HCH		

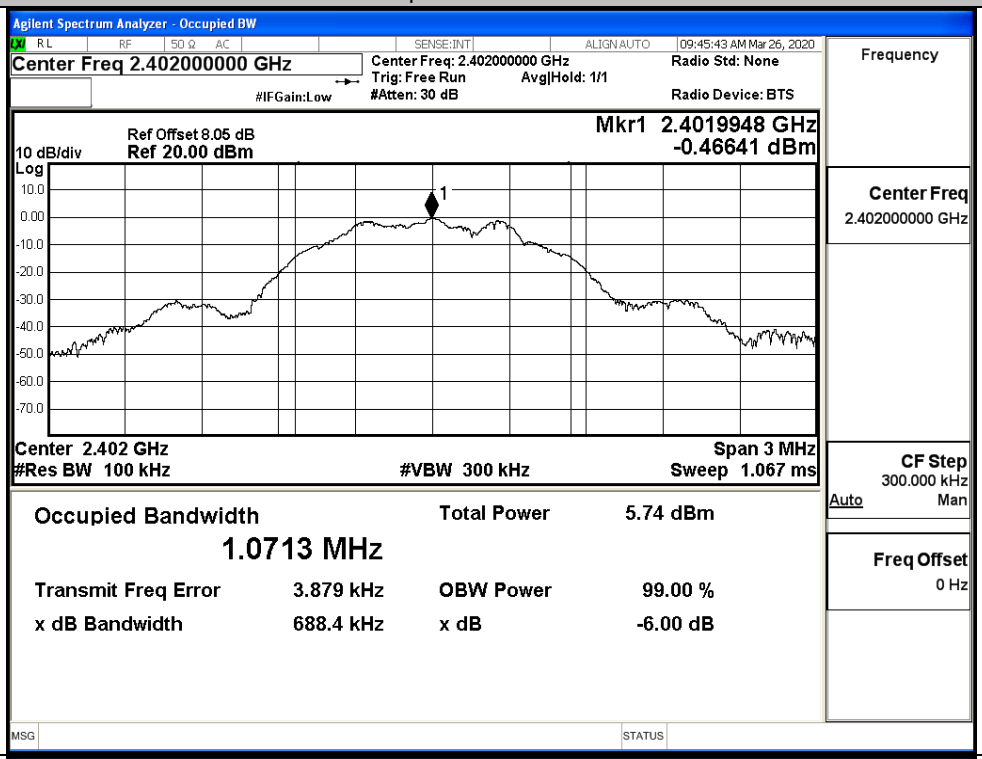
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:50:05 AM Mar 26, 2020
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P
Ref Offset 8.05 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.480 018 0 GHz
-18.669 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

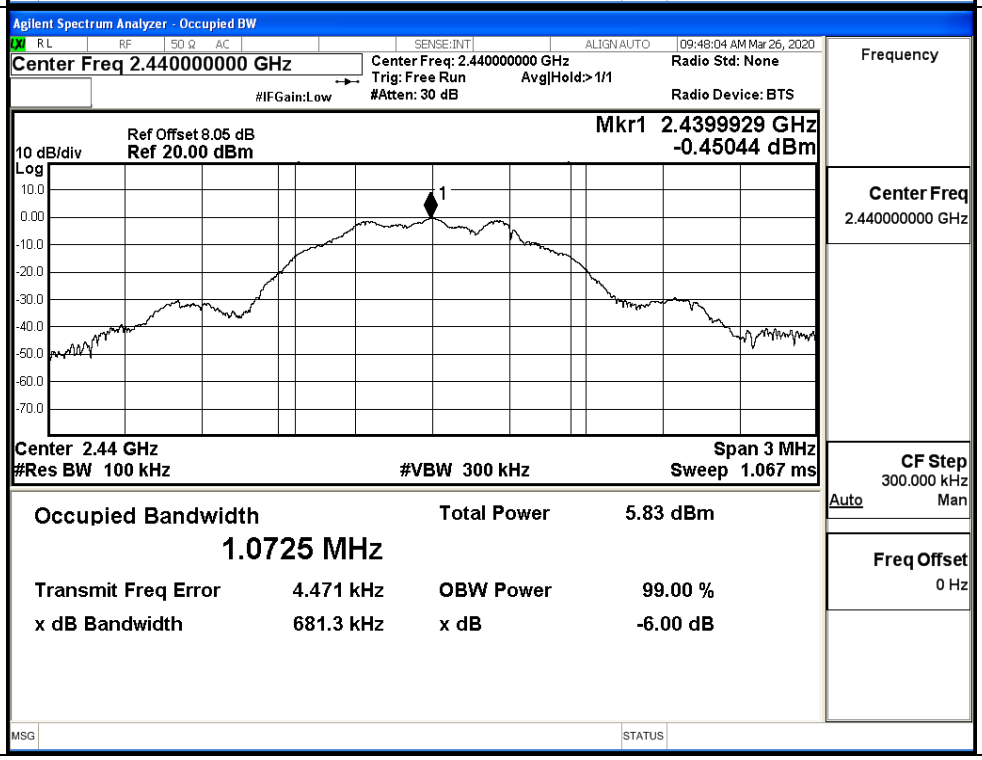
Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6884	⩾0.5	PASS
BT LE	MCH	0.6813	⩾0.5	PASS
BT LE	HCH	0.6763	⩾0.5	PASS

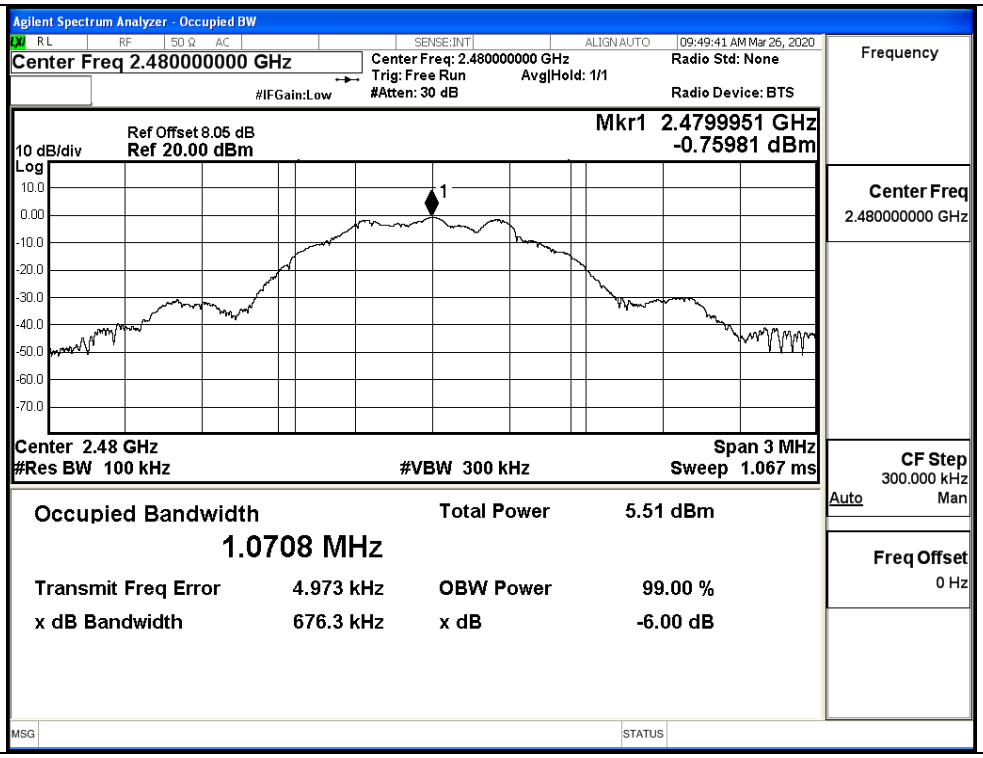
Test Graphs

LCH



MCH



HCH		

Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:49:41 AM Mar 26, 2020
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 8.05 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.4799951 GHz
-0.75981 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
1.0708 MHz
Total Power
5.51 dBm
Transmit Freq Error
4.973 kHz
OBW Power
99.00 %
x dB Bandwidth
676.3 kHz
x dB
-6.00 dB
Freq Offset
0 Hz
MSG
STATUS

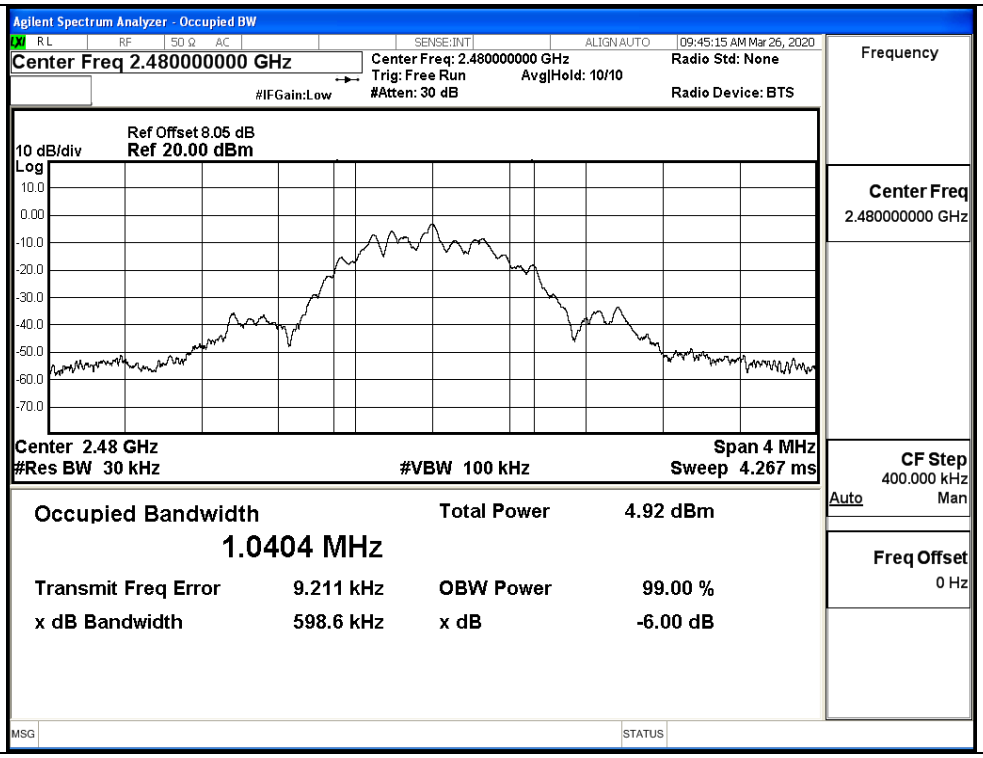
A.5 Occupied Bandwidth

Mode	Channel	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	1.0381	⩾0.5	PASS
BT LE	MCH	1.0409	⩾0.5	PASS
BT LE	HCH	1.0404	⩾0.5	PASS

Test Graphs

LCH

MCH

HCH		

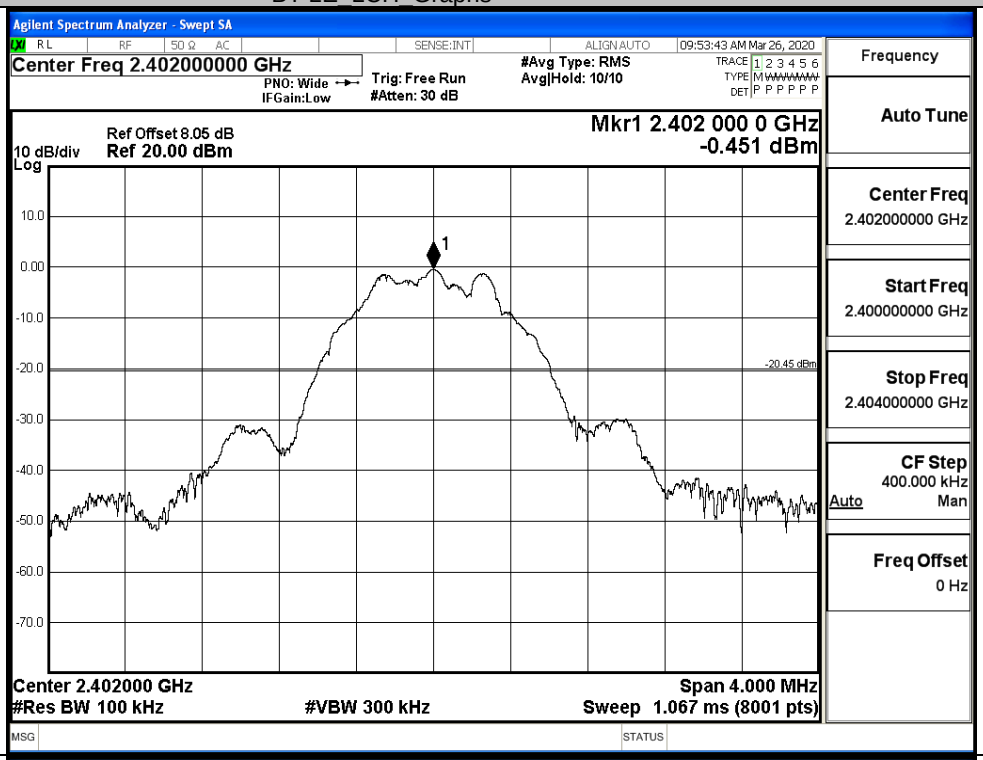
Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:45:15 AM Mar 26, 2020
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 10/10
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Log
10.0
0.00
-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
1.0404 MHz
Total Power 4.92 dBm
Transmit Freq Error 9.211 kHz
OBW Power 99.00 %
x dB Bandwidth 598.6 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

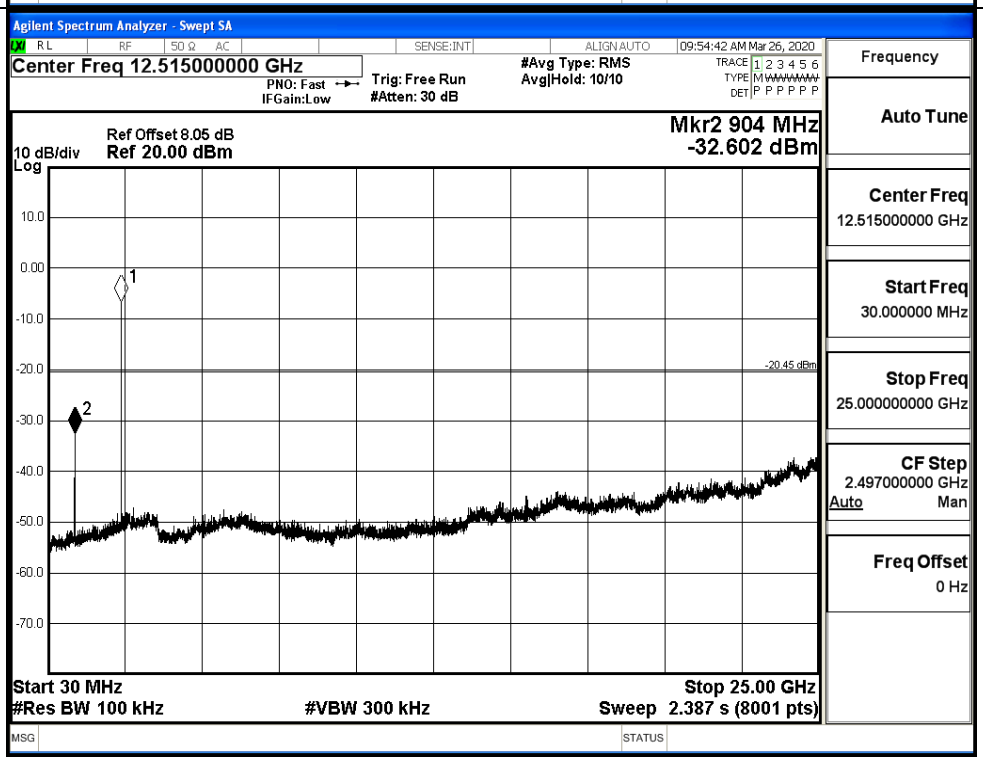
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	-0.451	-32.602	-20.451	PASS
BT LE	MCH	-0.418	-37.441	-20.418	PASS
BT LE	HCH	-0.757	-35.957	-20.757	PASS

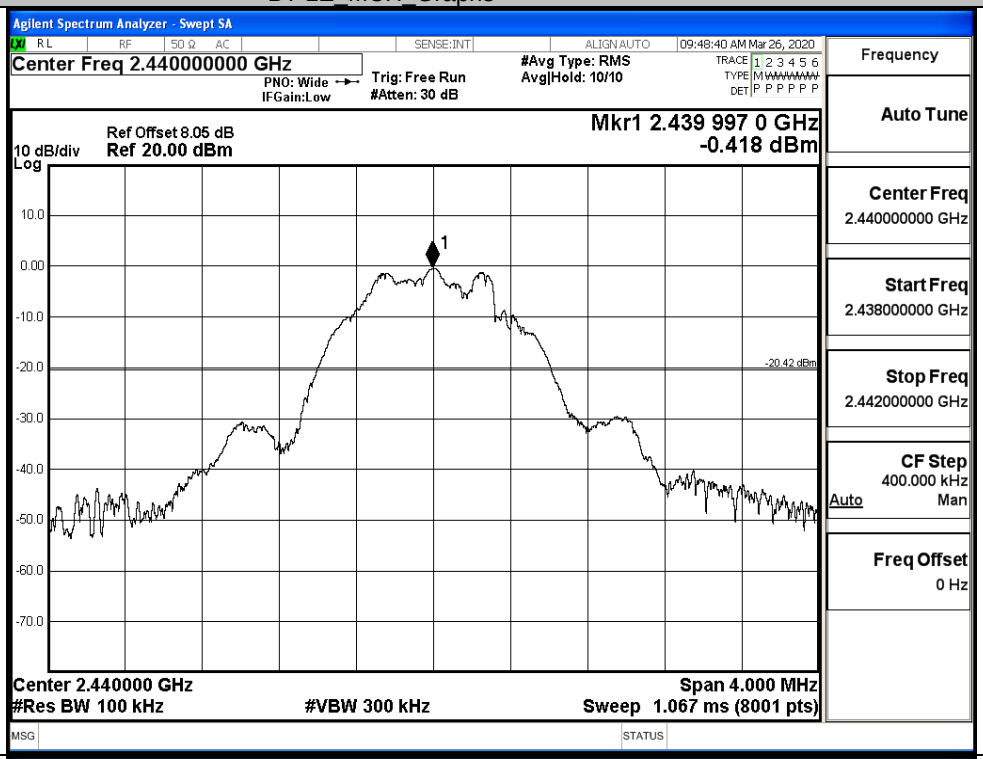
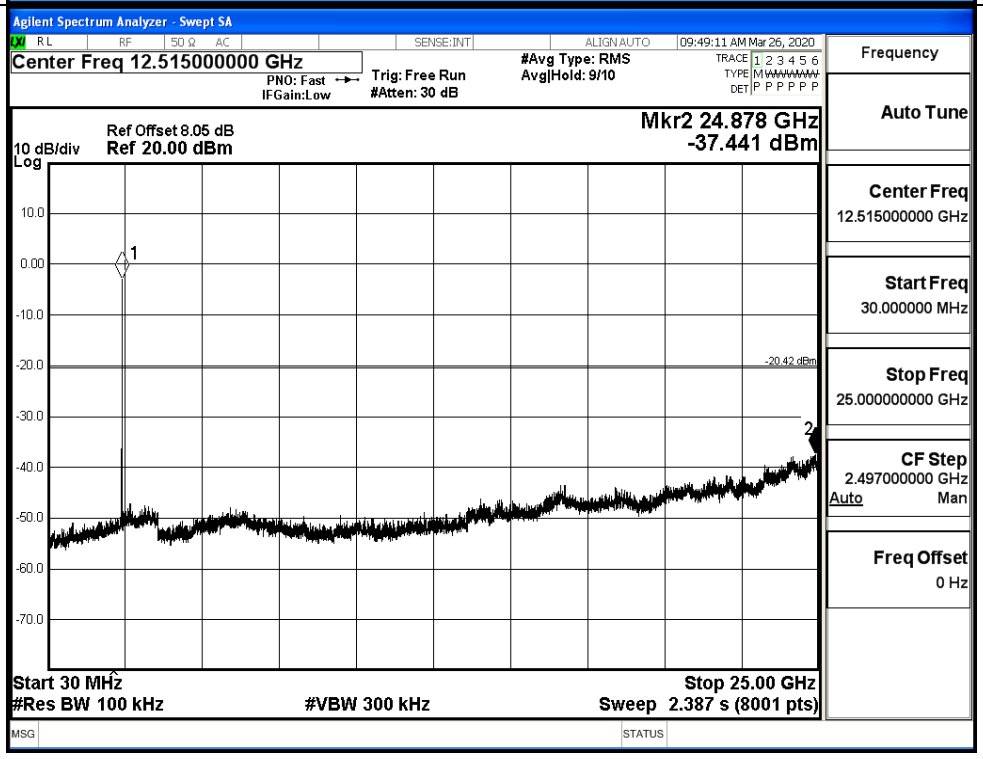
BT LE_LCH_Graphs

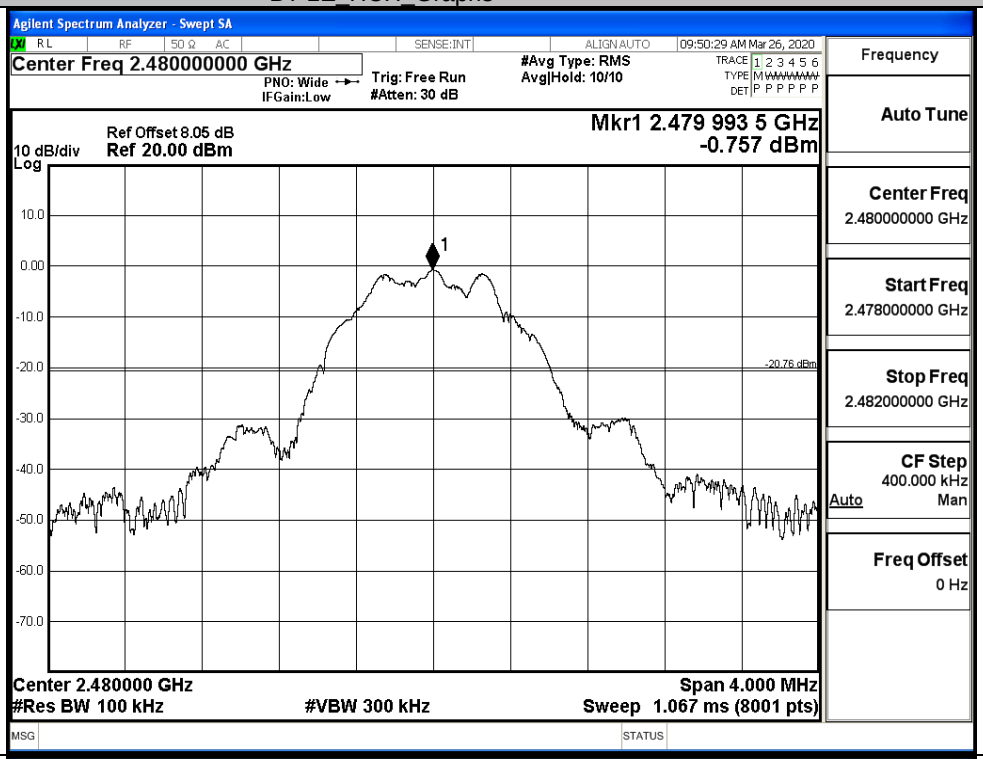
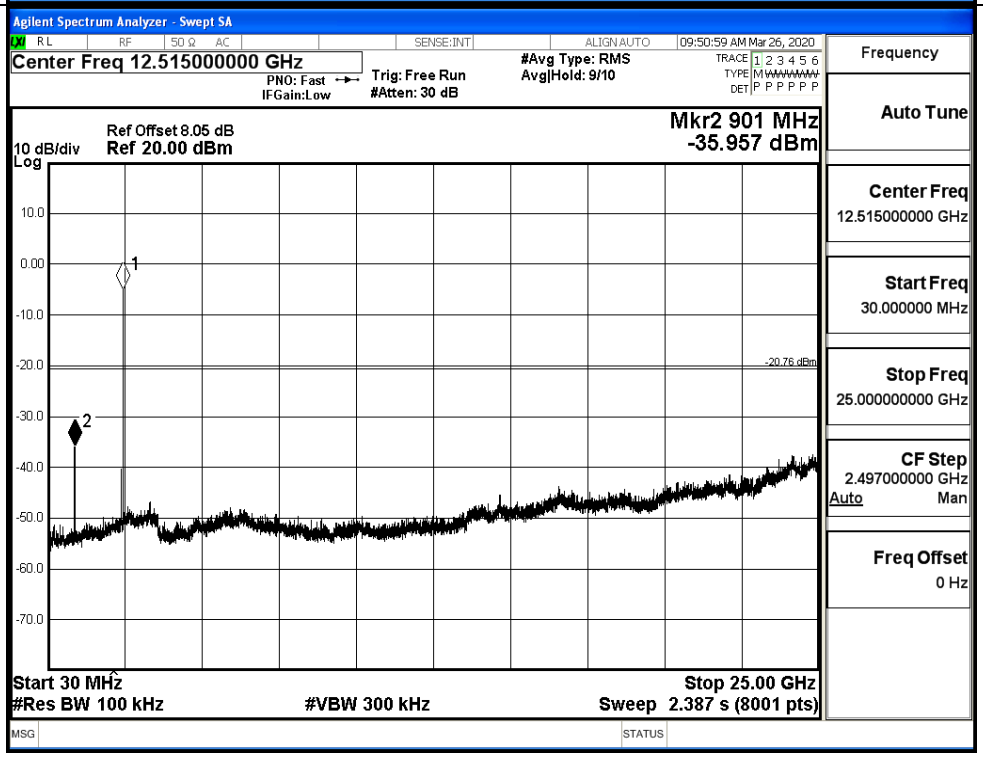
Pref/BT LE/LCH



Puw/BT LE/LCH



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

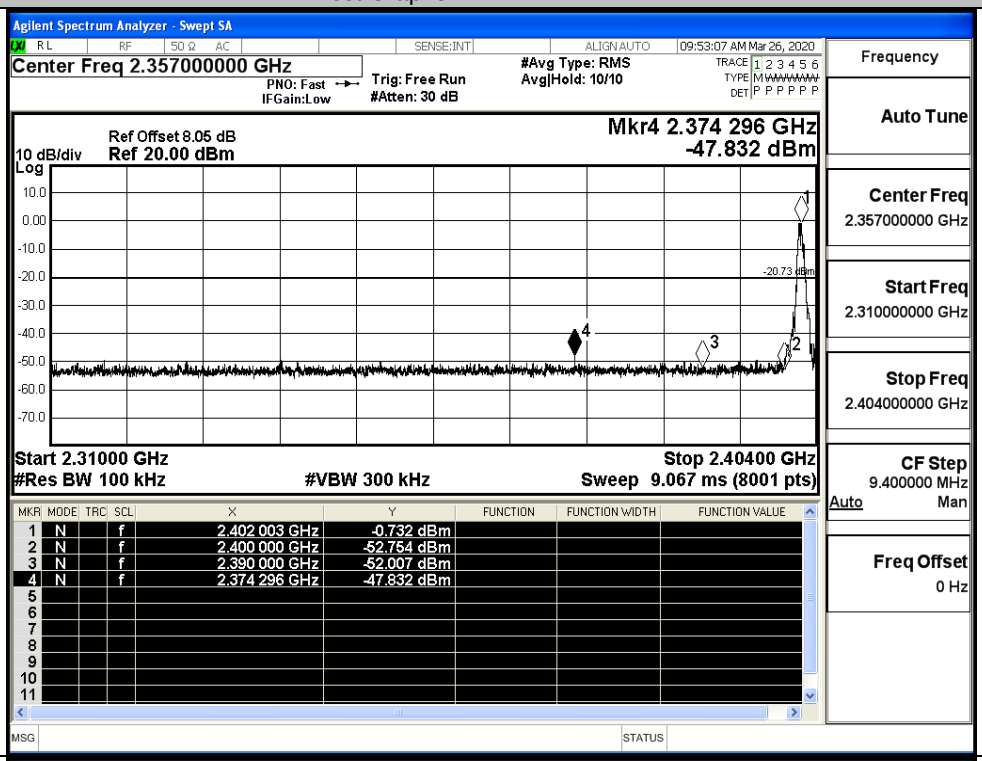
BT LE_HCH_Graphs	
Pref/BT LE/HCH	
Puw/BT LE/HCH	

A.7 Band-edge for RF Conducted Emissions

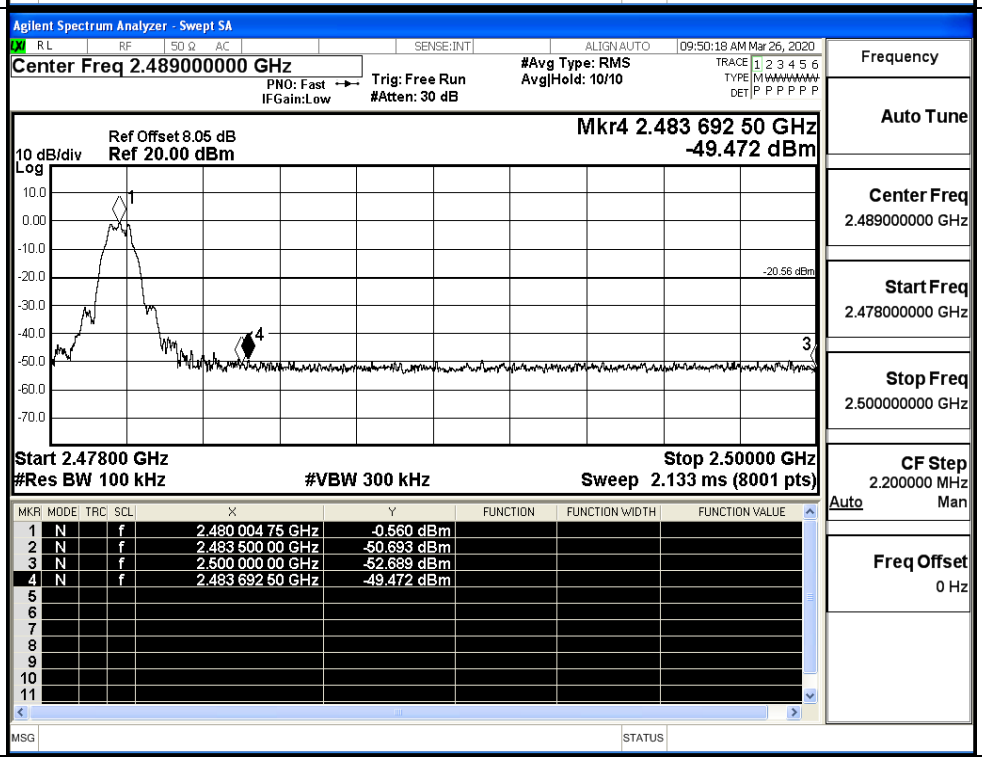
Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	-0.732	-47.832	-20.73	PASS
BT LE	HCH	-0.560	-49.472	-20.56	PASS

Test Graphs

LCH



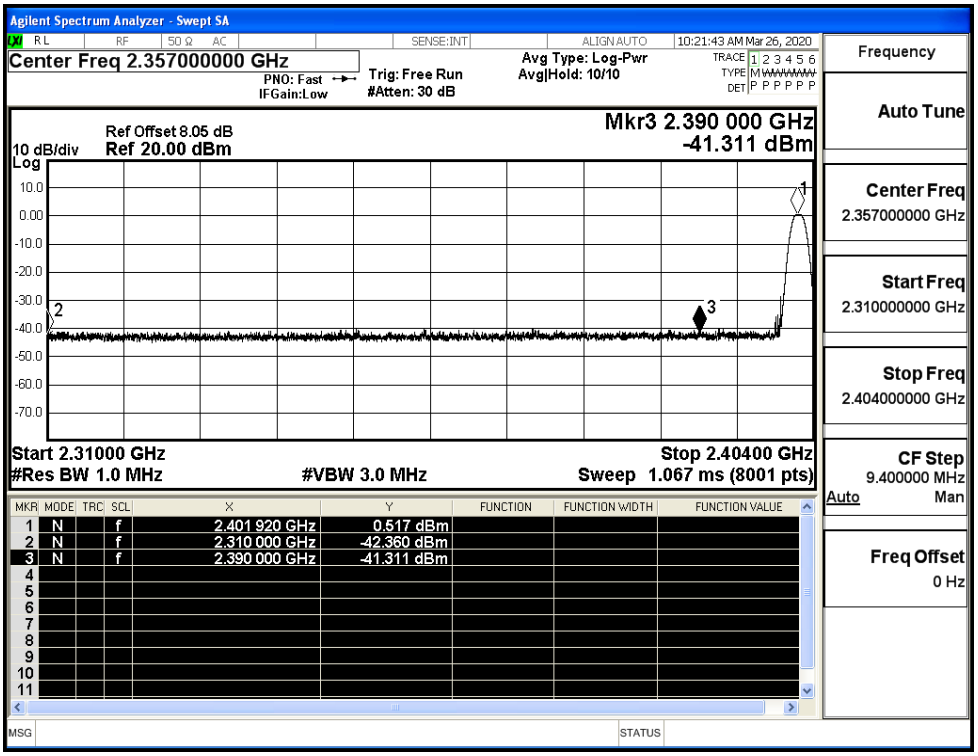
HCH



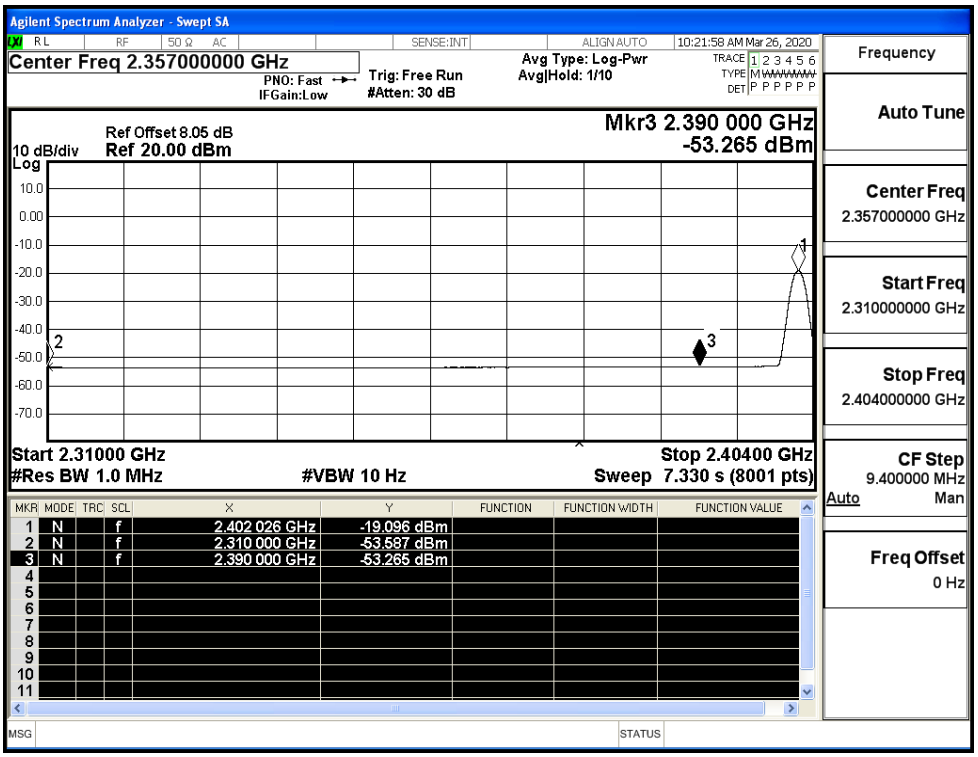
A.8 Restrict-band band-edge measurements

Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdi
BT LE	2402	Ant1	2310.0	-42.36	2.0	0	54.90	PEAK	74	PASS
		Ant1	2310.0	-53.59	2.0	0	43.67	AV	54	PASS
		Ant1	2390.0	-41.31	2.0	0	55.95	PEAK	74	PASS
		Ant1	2390.0	-53.27	2.0	0	43.99	AV	54	PASS
	2480	Ant1	2483.5	-39.16	2.0	0	58.10	PEAK	74	PASS
		Ant1	2483.5	-52.80	2.0	0	44.46	AV	54	PASS
		Ant1	2500.0	-41.72	2.0	0	55.54	PEAK	74	PASS
		Ant1	2500.0	-52.63	2.0	0	44.62	AV	54	PASS

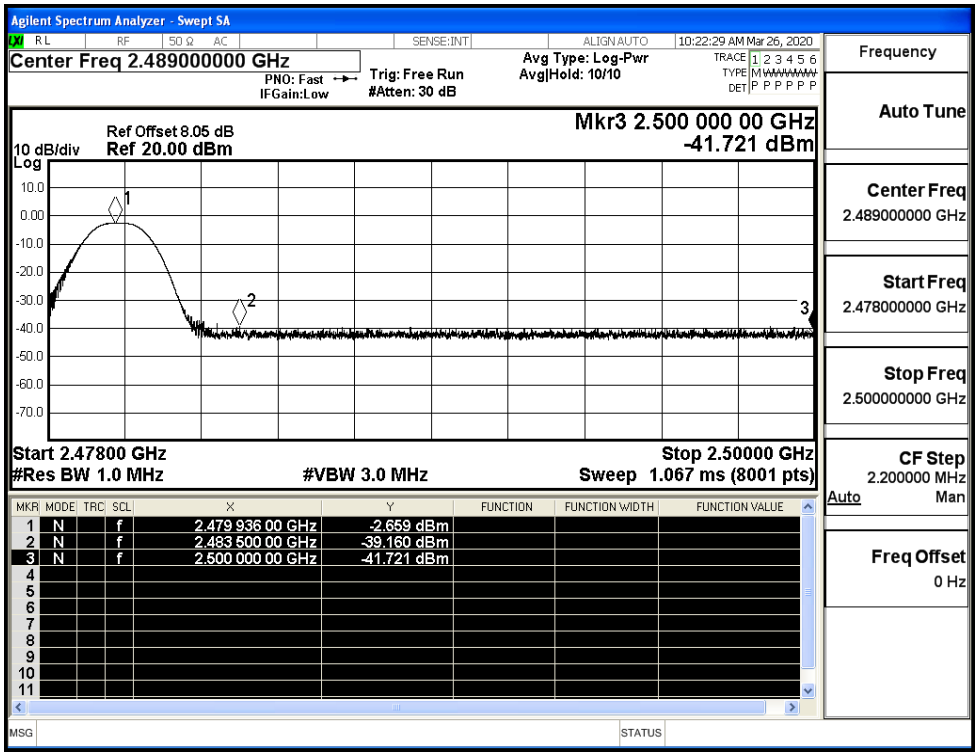
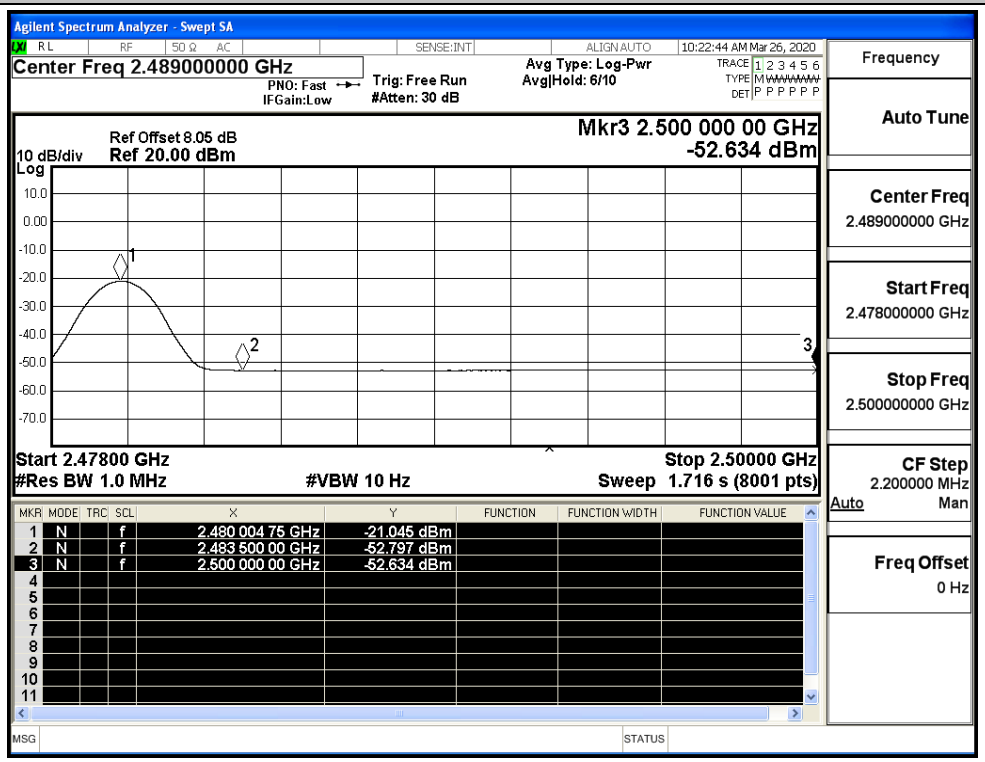
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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