# Appendix A

# RF Test Data for BLE V5.0(BDR/EDR) (Conducted Measurement)

**Product Name: AllSafe Gateway**

**Trade Mark: TraceSafe Technologies Inc.**

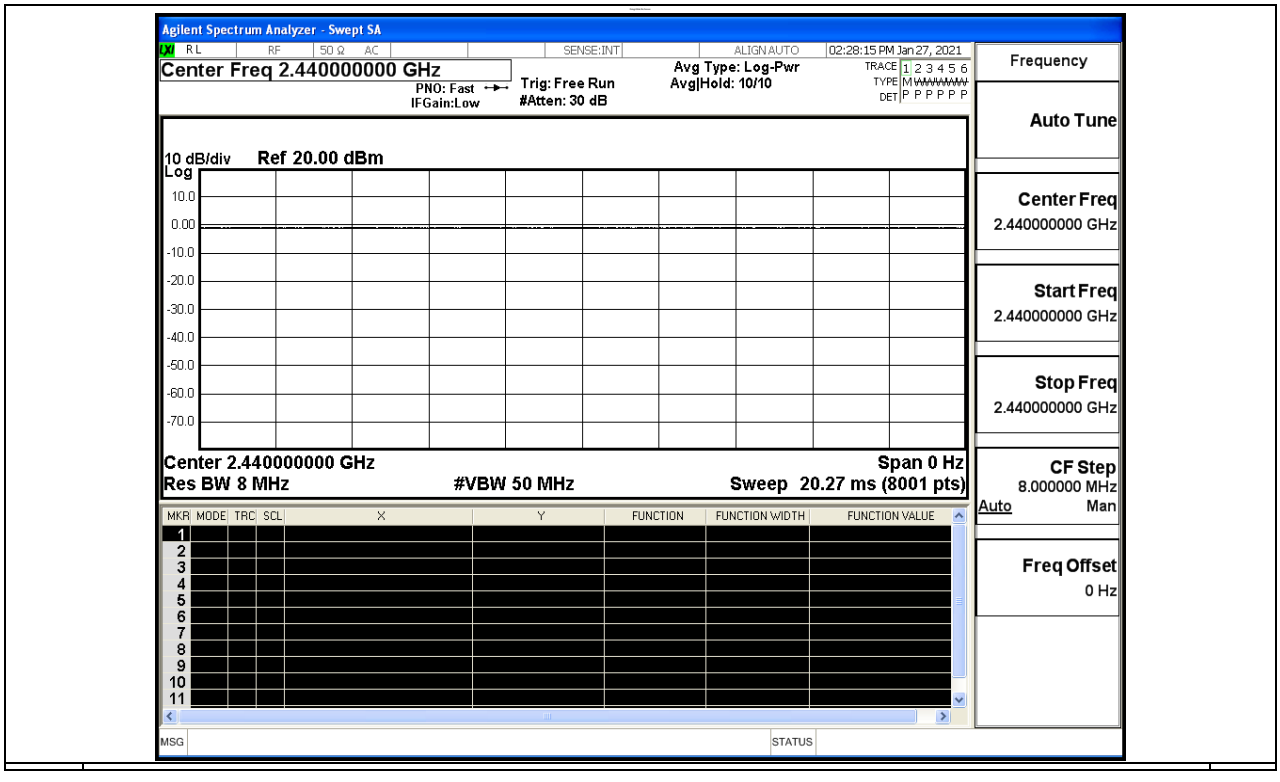
**Test Model(HVIN): TBUDW**

## Environmental Conditions

| | |
|---|---|
| Temperature: | 24.5°C |
| Relative Humidity: | 54.3% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Ken He |
| Supervised by: | Li Huan |

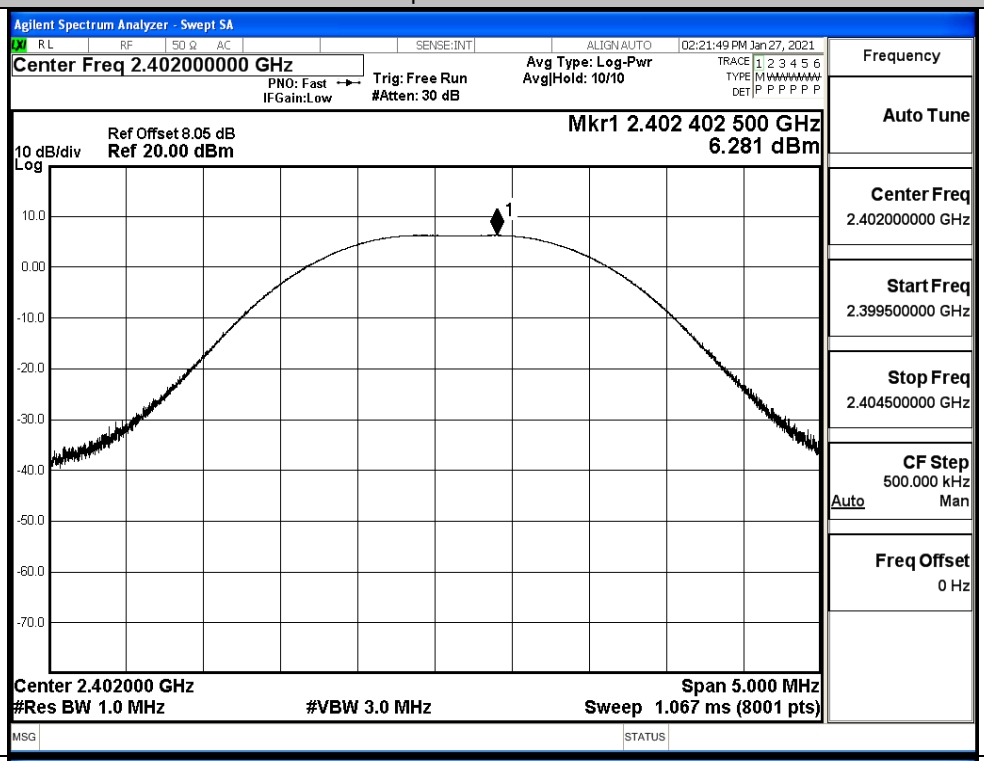
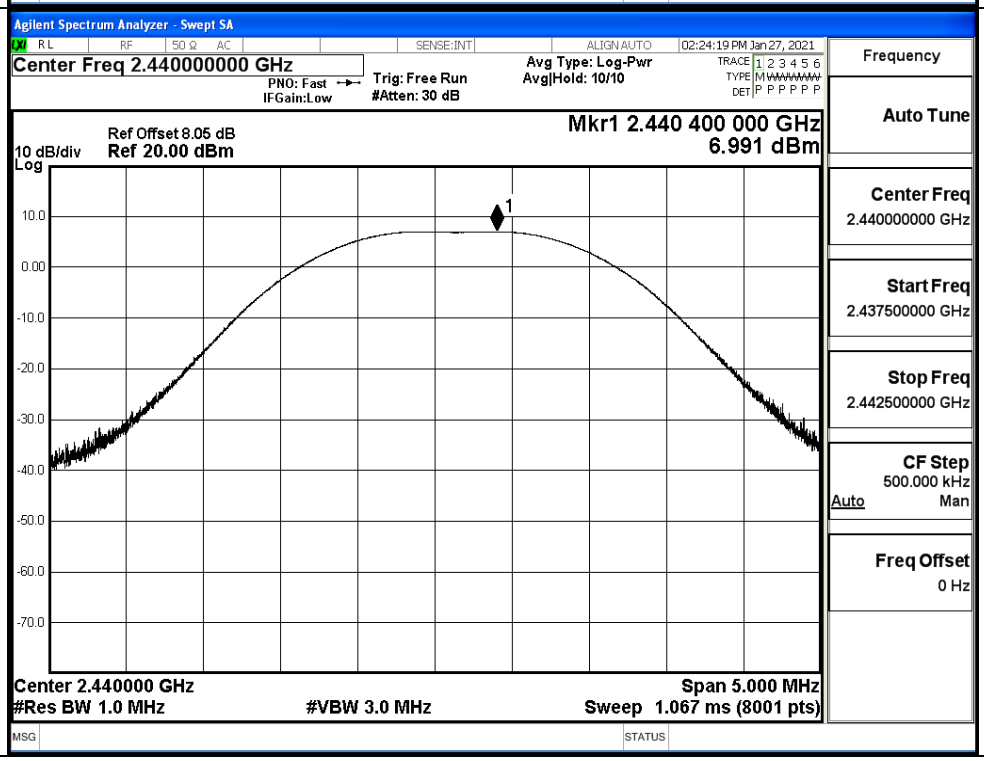
## A.1 Duty Cycle

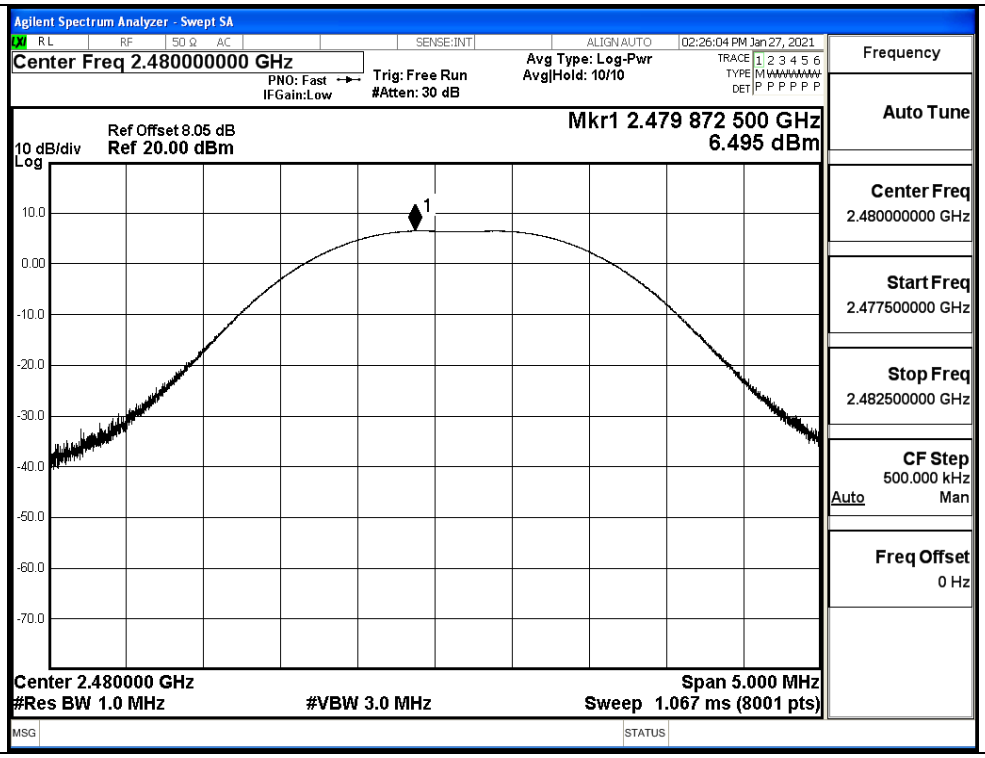
| Test Mode | Test Channel | Ant | Duty Cycle[%] | Verdict |
|---|---|---|---|---|
| BT LE | 2440 | Ant1 | 100 | PASS |



## A.2 Maximum Conducted Peak Output Power

| Mode | Channel | Conduct Peak Power[dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|
| BT LE | LCH | 6.281 | 30 | PASS |
| BT LE | MCH | 6.991 | 30 | PASS |
| BT LE | HCH | 6.495 | 30 | PASS |

| Test Graphs | | |
|---|---|---|
| LCH | |  |
| MCH | |  |

| | | |
|---|---|---|
| HCH | |  |

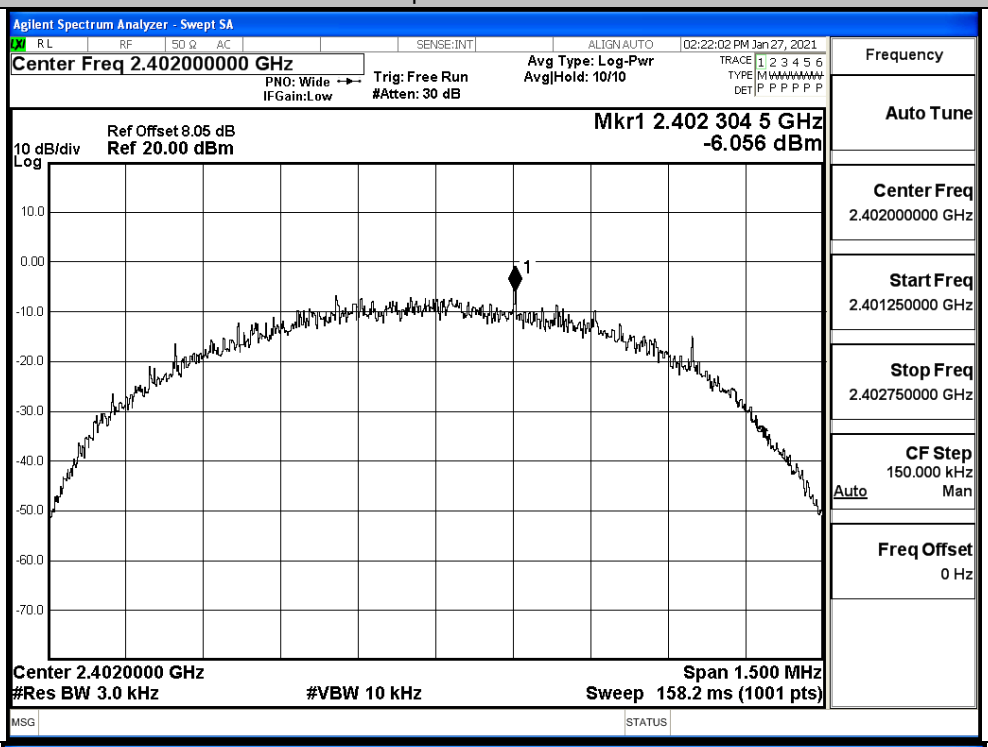
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
02:26:04 PM Jan 27, 2021
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P
Ref Offset 8.05 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.479 872 500 GHz
6.495 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.480000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Span 5.000 MHz
Sweep 1.067 ms (8001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.477500000 GHz
Stop Freq
2.482500000 GHz
CF Step
500.000 kHz
Auto
Man
Freq Offset
0 Hz

## A.3 Maximum Power Spectral Density

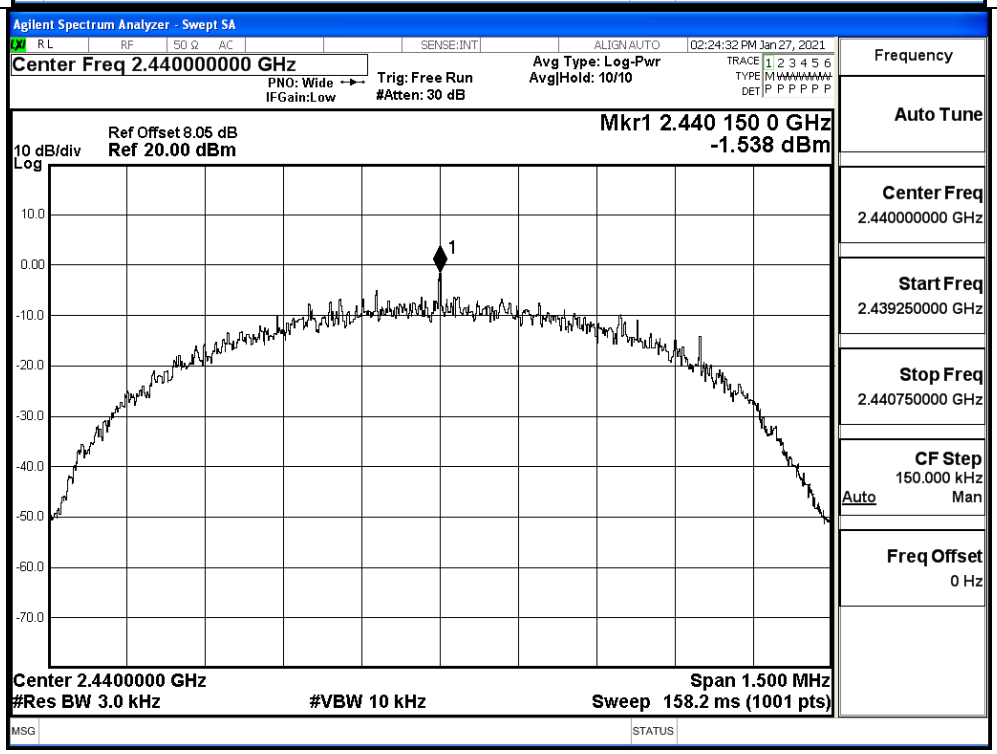
| Mode | Channel | PSD [dBm/3KHz] | Limit [dBm/3KHz] | Verdict |
|---|---|---|---|---|
| BT LE | LCH | -6.056 | 8 | PASS |
| BT LE | MCH | -1.538 | 8 | PASS |
| BT LE | HCH | -6.597 | 8 | PASS |

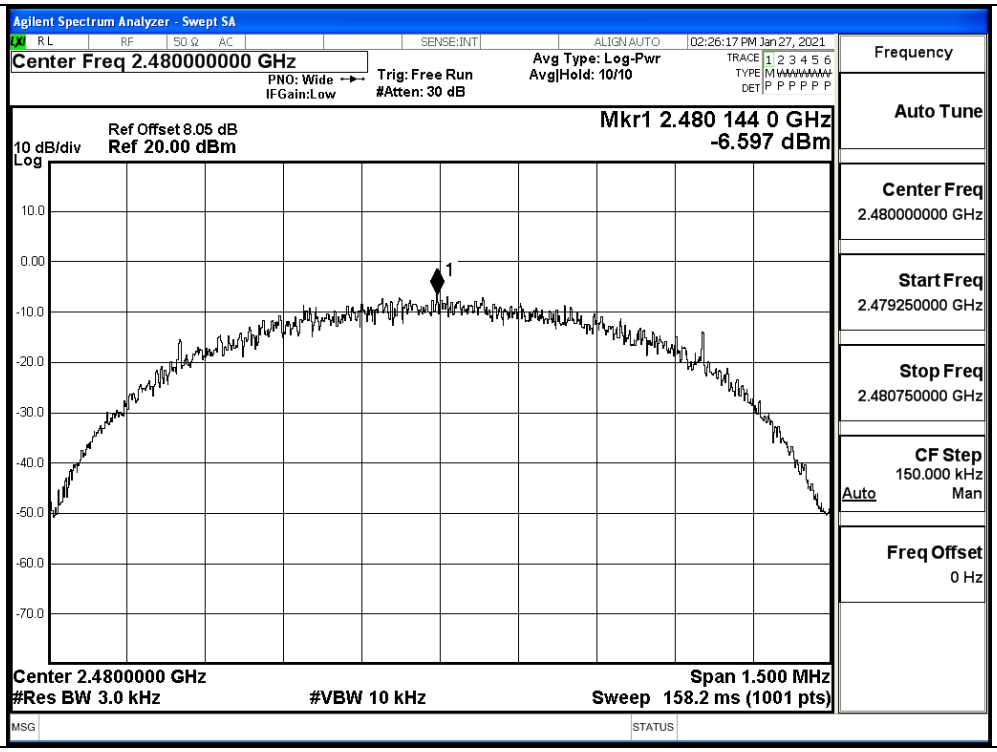
Test Graphs

LCH




MCH



| | |
|---|---|
| HCH |  |

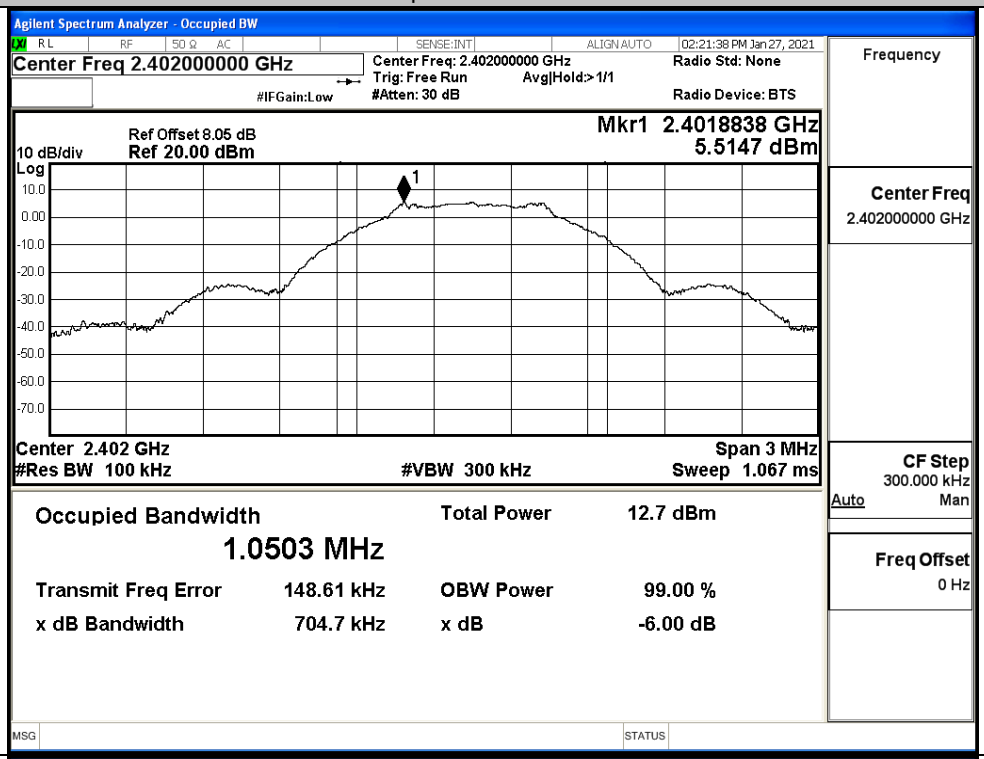
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
02:26:17 PM Jan 27, 2021
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Ref Offset 8.05 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.480 144 0 GHz
-6.597 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
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

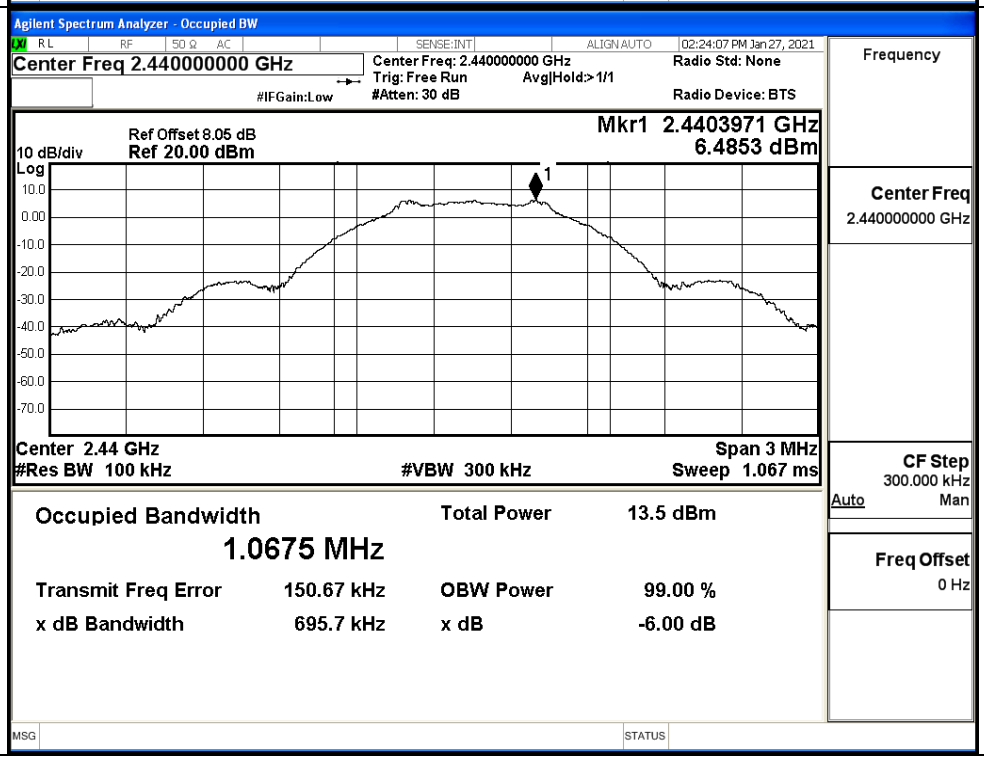
| Mode | Channel | 6dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|---|---|---|---|---|
| BT LE | LCH | 0.7047 | ⩾0.5 | PASS |
| BT LE | MCH | 0.6957 | ⩾0.5 | PASS |
| BT LE | HCH | 0.7345 | ⩾0.5 | PASS |

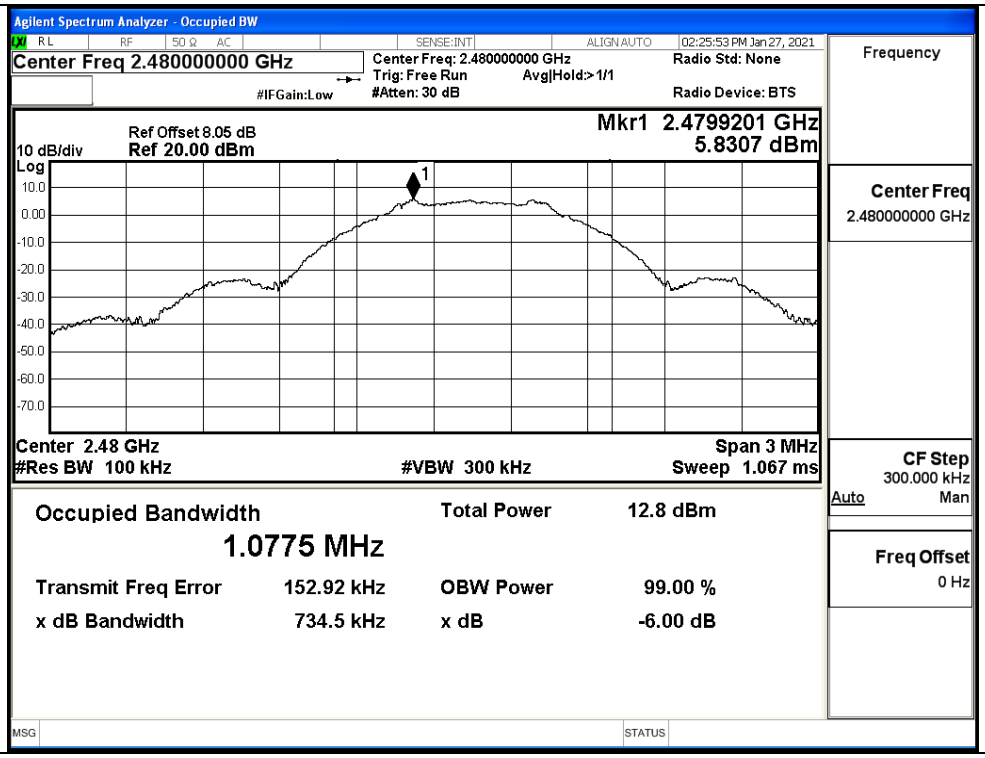
Test Graphs

LCH




MCH



| | | |
|---|---|---|
| HCH |  | |

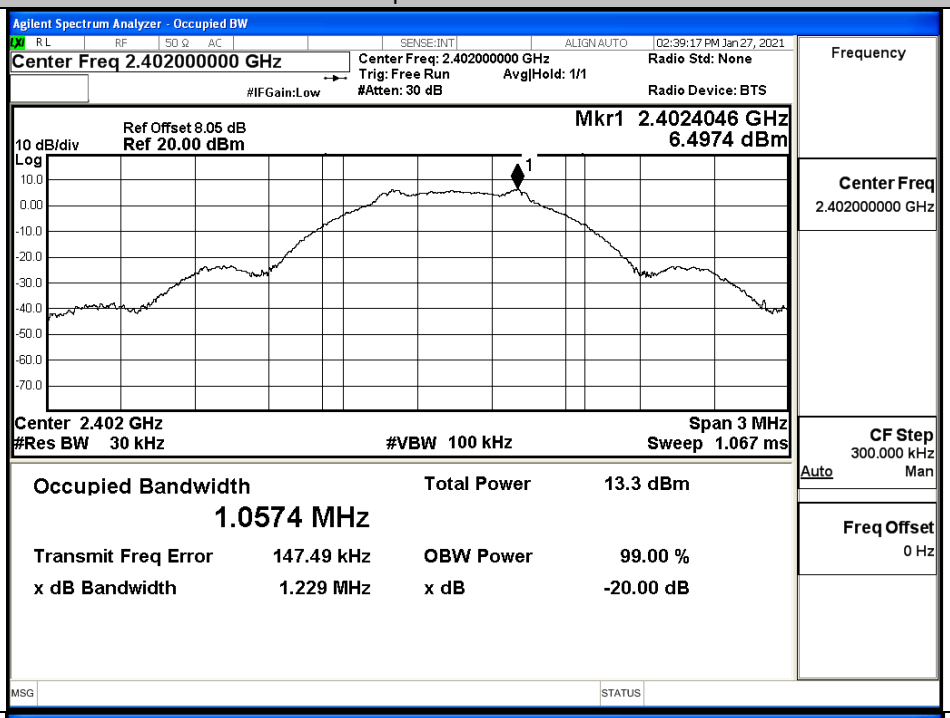
Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
02:25:53 PM Jan 27, 2021
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>1/1
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.4799201 GHz
5.8307 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
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
1.0775 MHz
Total Power 12.8 dBm
Transmit Freq Error 152.92 kHz
OBW Power 99.00 %
x dB Bandwidth 734.5 kHz
x dB -6.00 dB
Freq Offset
0 Hz
MSG
STATUS

## A.5 Occupied Bandwidth

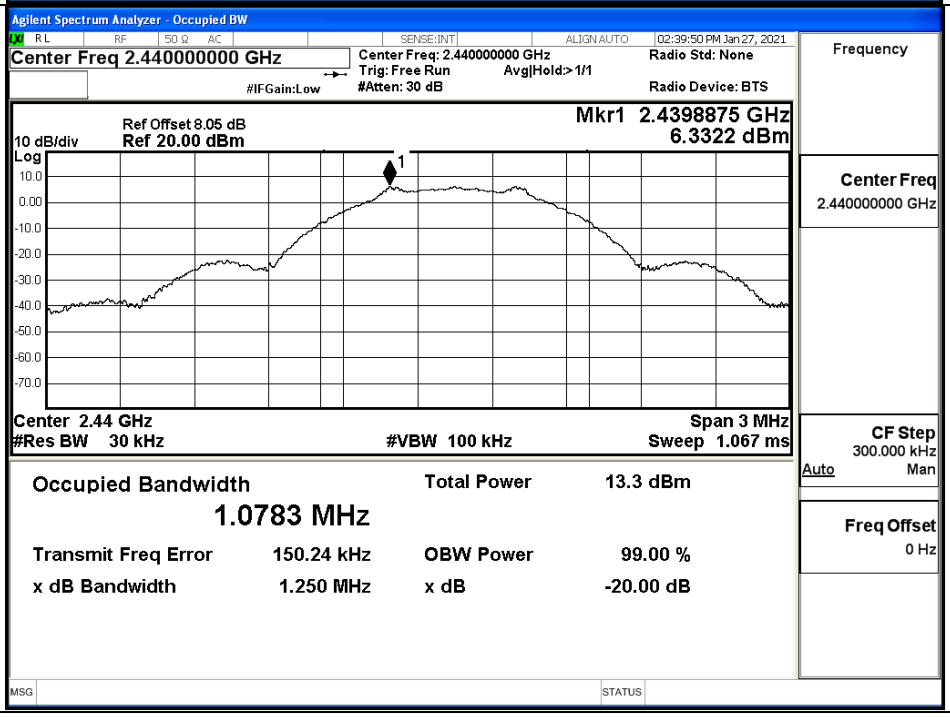
| Mode | Channel | 99% Bandwidth [MHz] | Limit [MHz] | Verdict |
|---|---|---|---|---|
| BT LE | LCH | 1.229 | ⩾0.5 | PASS |
| BT LE | MCH | 1.250 | ⩾0.5 | PASS |
| BT LE | HCH | 1.231 | ⩾0.5 | PASS |

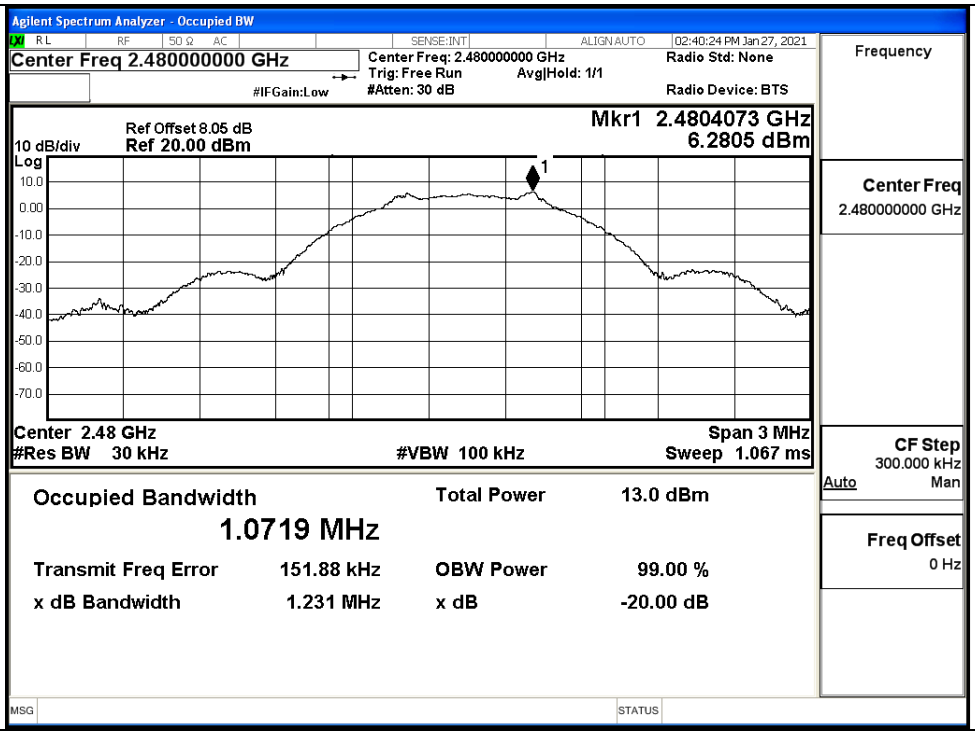
Test Graphs

LCH




MCH

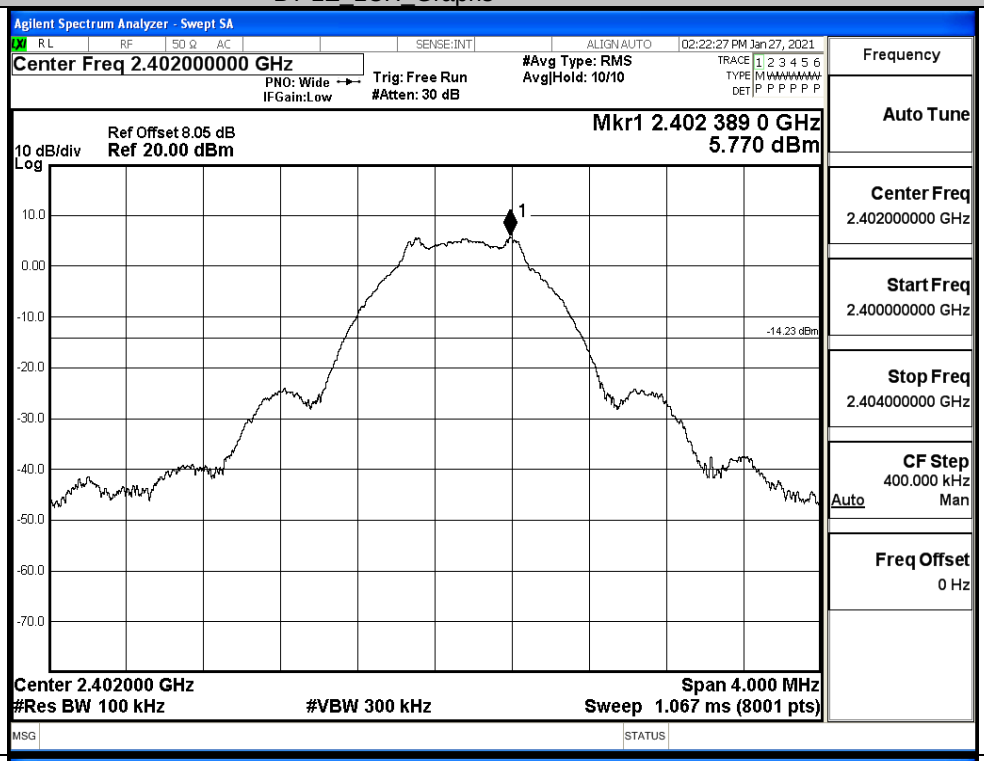
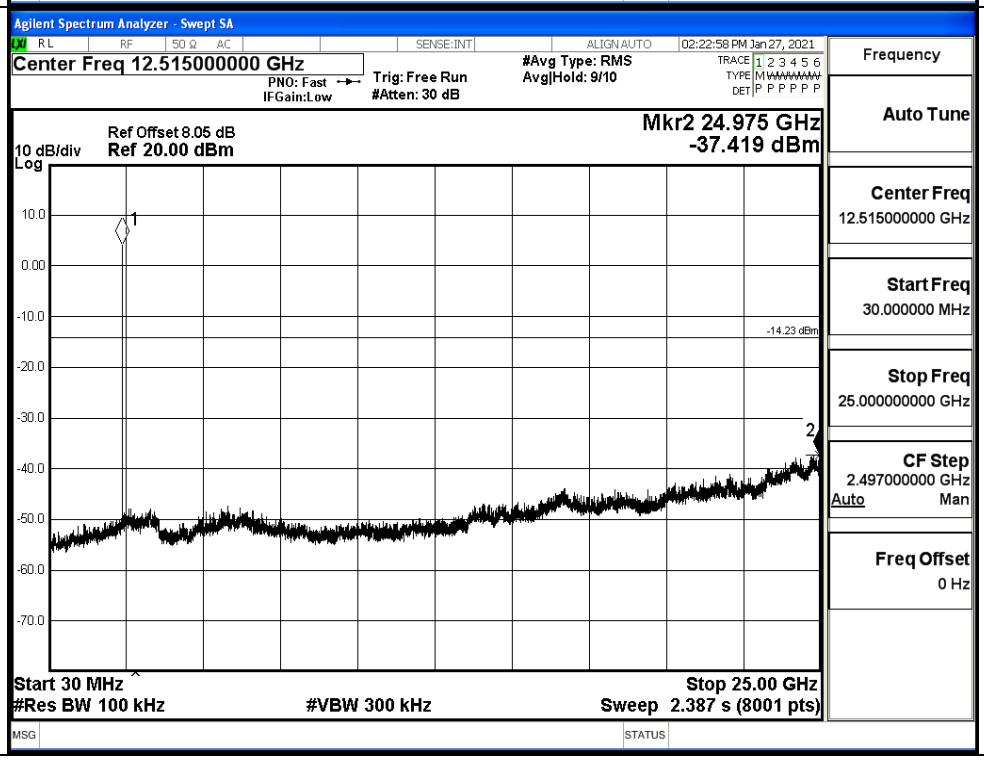


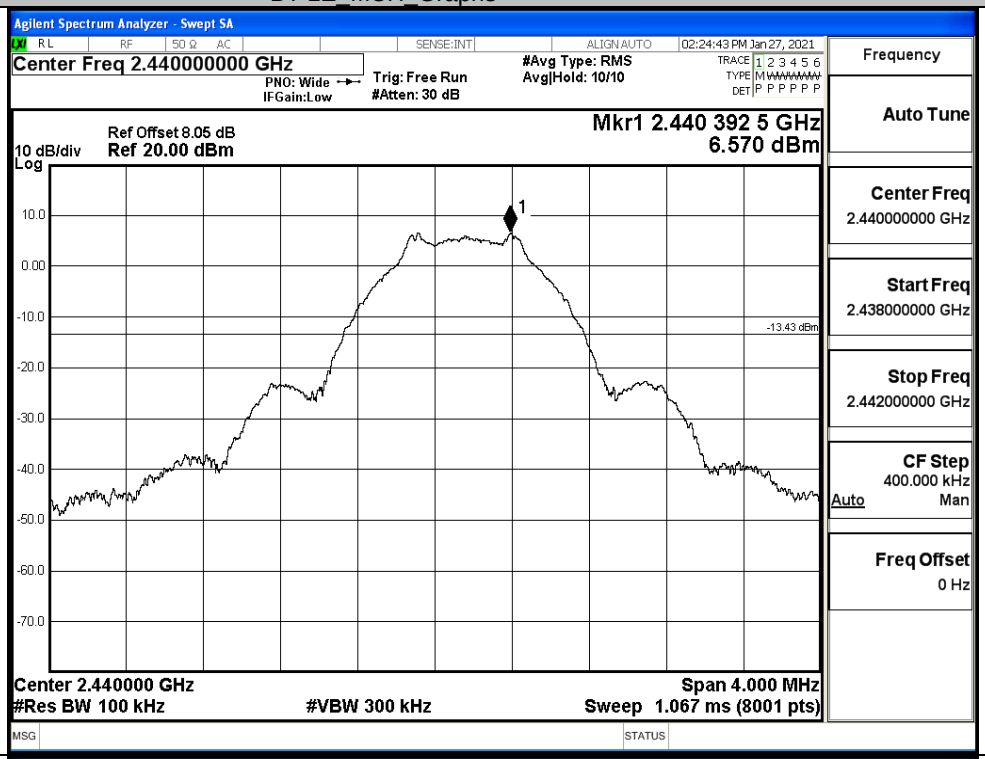
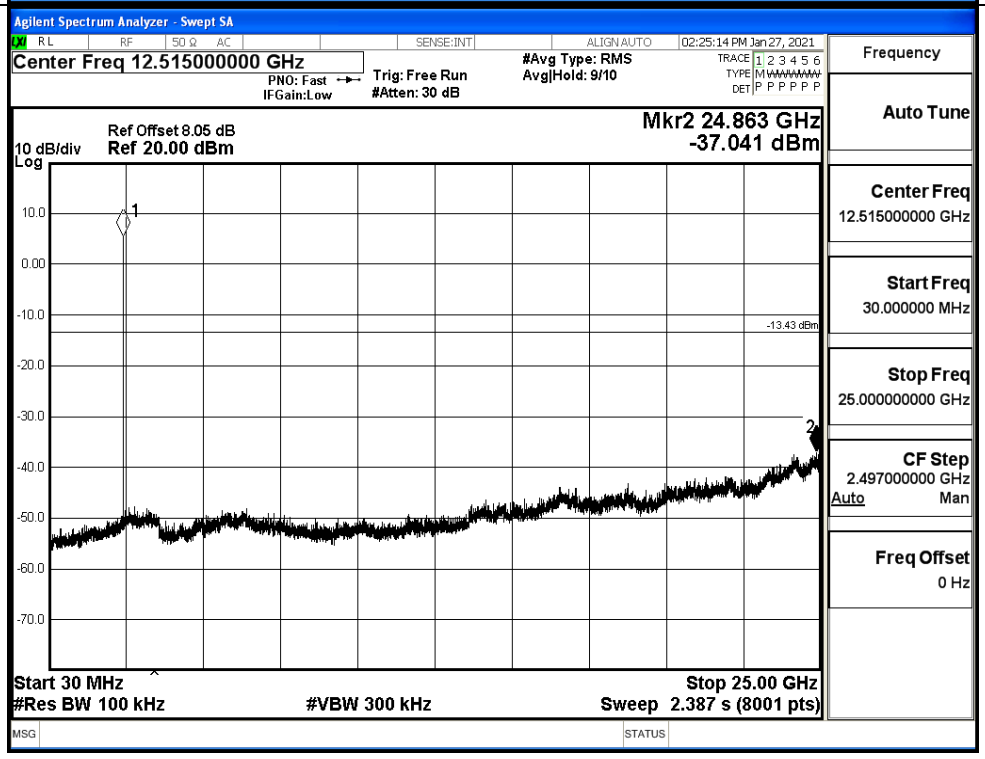
| | | |
|---|---|---|
| HCH | |  |

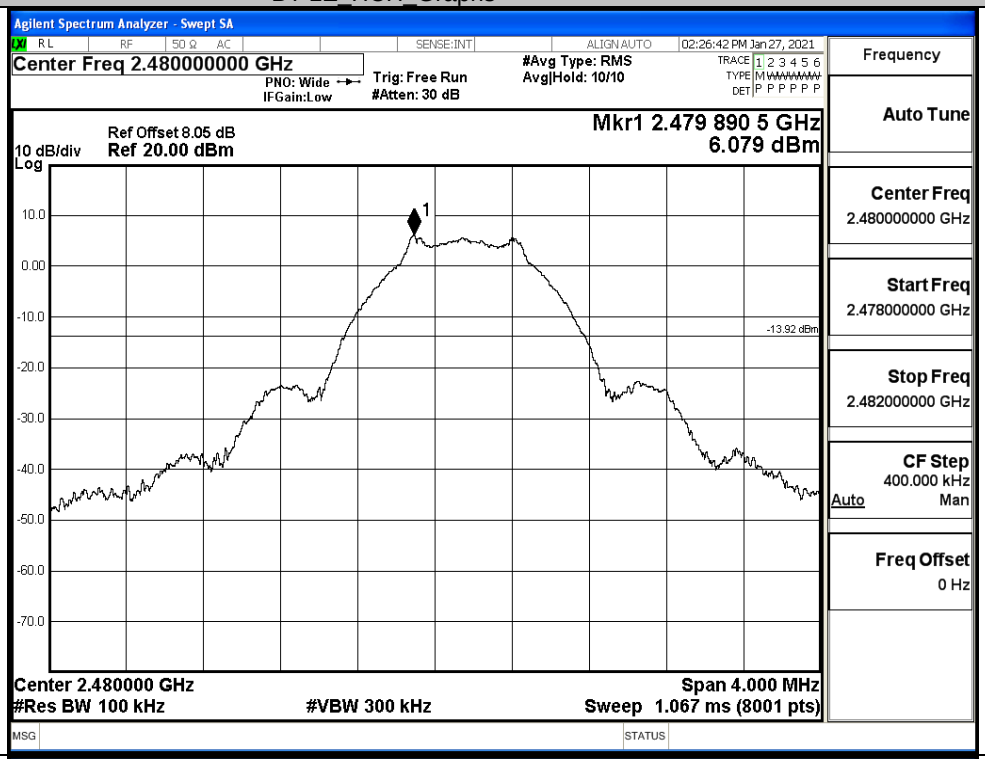
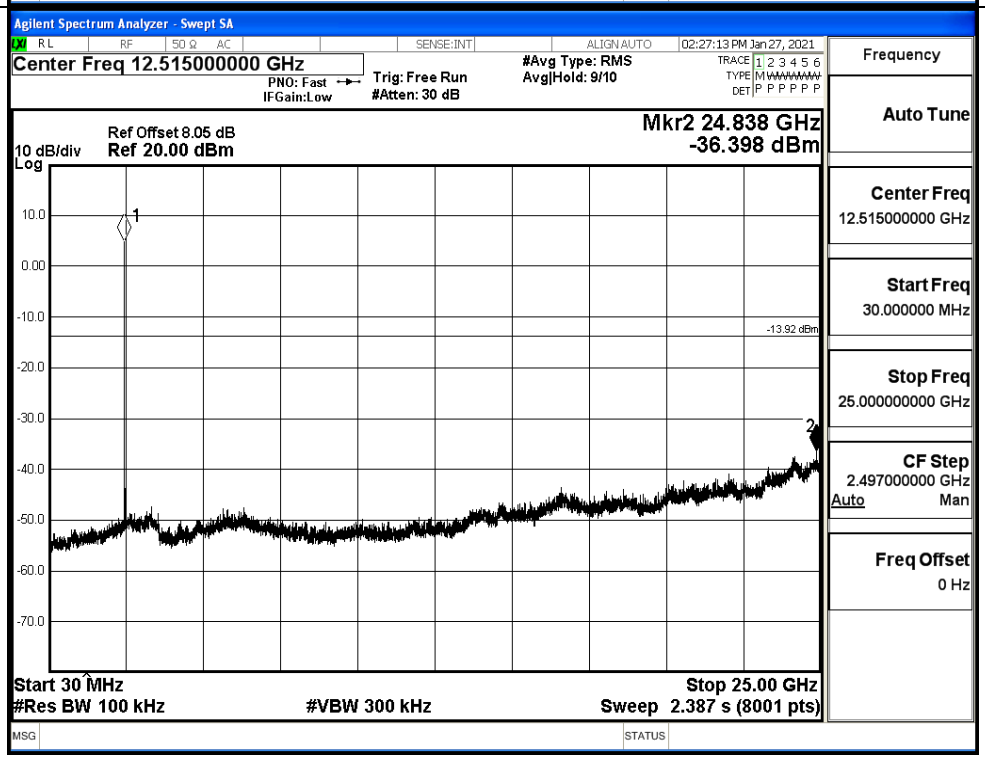


## A.6 RF Conducted Spurious Emissions

| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|
| BT LE | LCH | 5.77 | -37.419 | -14.230 | PASS |
| BT LE | MCH | 6.57 | -37.041 | -13.430 | PASS |
| BT LE | HCH | 6.079 | -36.398 | -13.921 | 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 |  |

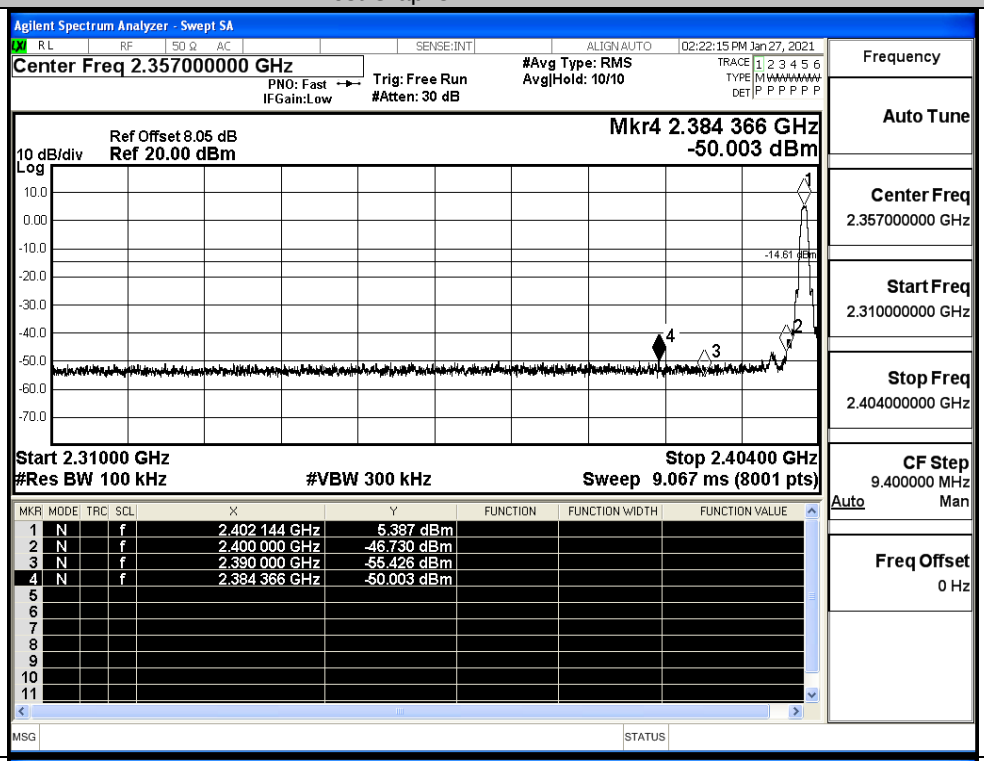
| BT LE_HCH_Graphs | |
|---|---|
| Pref/BT LE/HCH |  |
| Puw/BT LE/HCH |  |

## A.7 Band-edge for RF Conducted Emissions

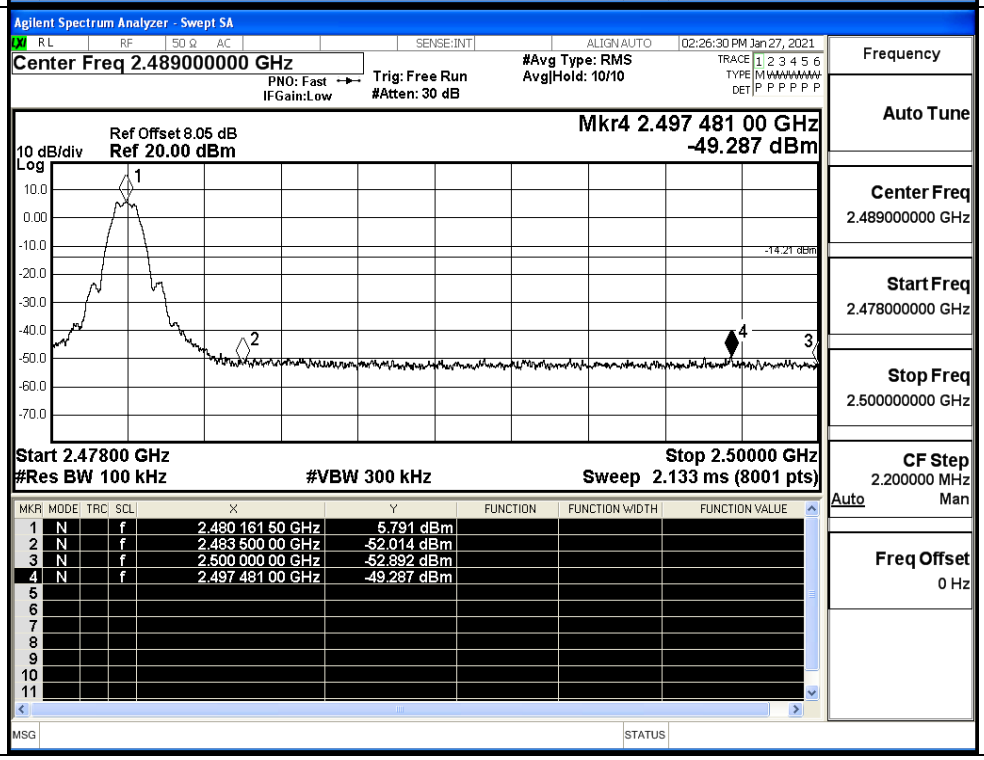
| Mode | Channel | Carrier Power[dBm] | Max.Spurious Level [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|
| BT LE | LCH | 5.387 | -50.003 | -14.61 | PASS |
| BT LE | HCH | 5.791 | -49.287 | -14.21 | PASS |

Test Graphs

LCH



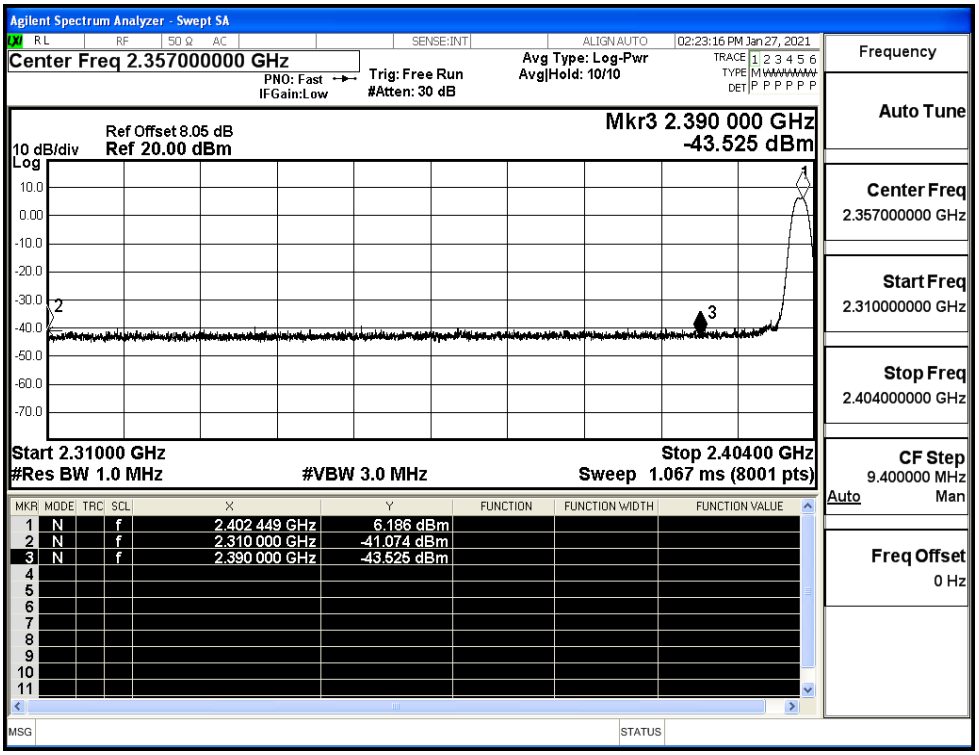

HCH



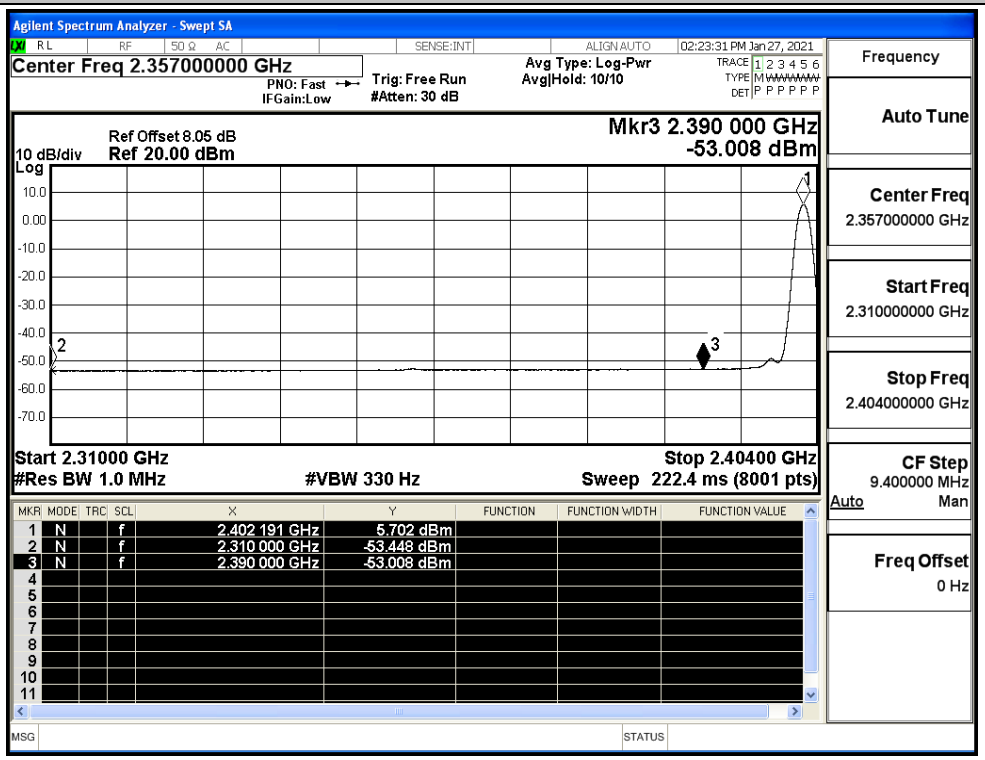
## A.8 Restrict-band band-edge measurements

| 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 | -41.07 | 2.0 | 0 | 56.19 | PEAK | 74 | PASS |
| | | Ant1 | 2310.0 | -53.45 | 2.0 | 0 | 43.81 | AV | 54 | PASS |
| | | Ant1 | 2390.0 | -43.53 | 2.0 | 0 | 53.73 | PEAK | 74 | PASS |
| | | Ant1 | 2390.0 | -53.01 | 2.0 | 0 | 44.25 | AV | 54 | PASS |
| | 2480 | Ant1 | 2483.5 | -39.63 | 2.0 | 0 | 57.63 | PEAK | 74 | PASS |
| | | Ant1 | 2483.5 | -51.13 | 2.0 | 0 | 46.13 | AV | 54 | PASS |
| | | Ant1 | 2500.0 | -41.22 | 2.0 | 0 | 56.04 | PEAK | 74 | PASS |
| | | Ant1 | 2500.0 | -52.34 | 2.0 | 0 | 44.92 | AV | 54 | PASS |

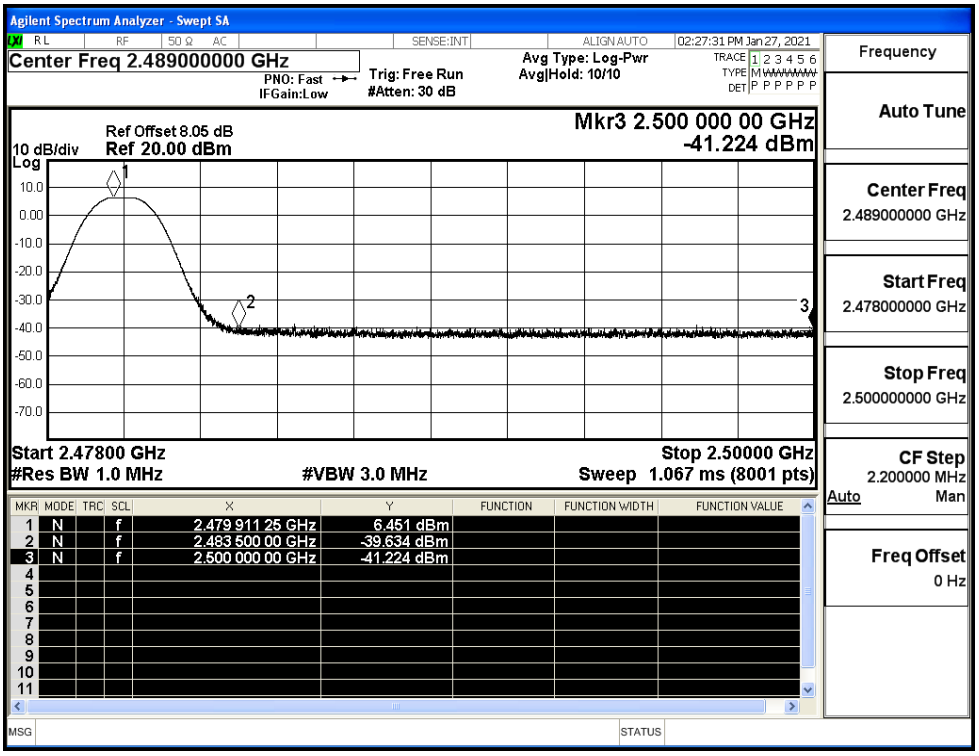
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK




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