

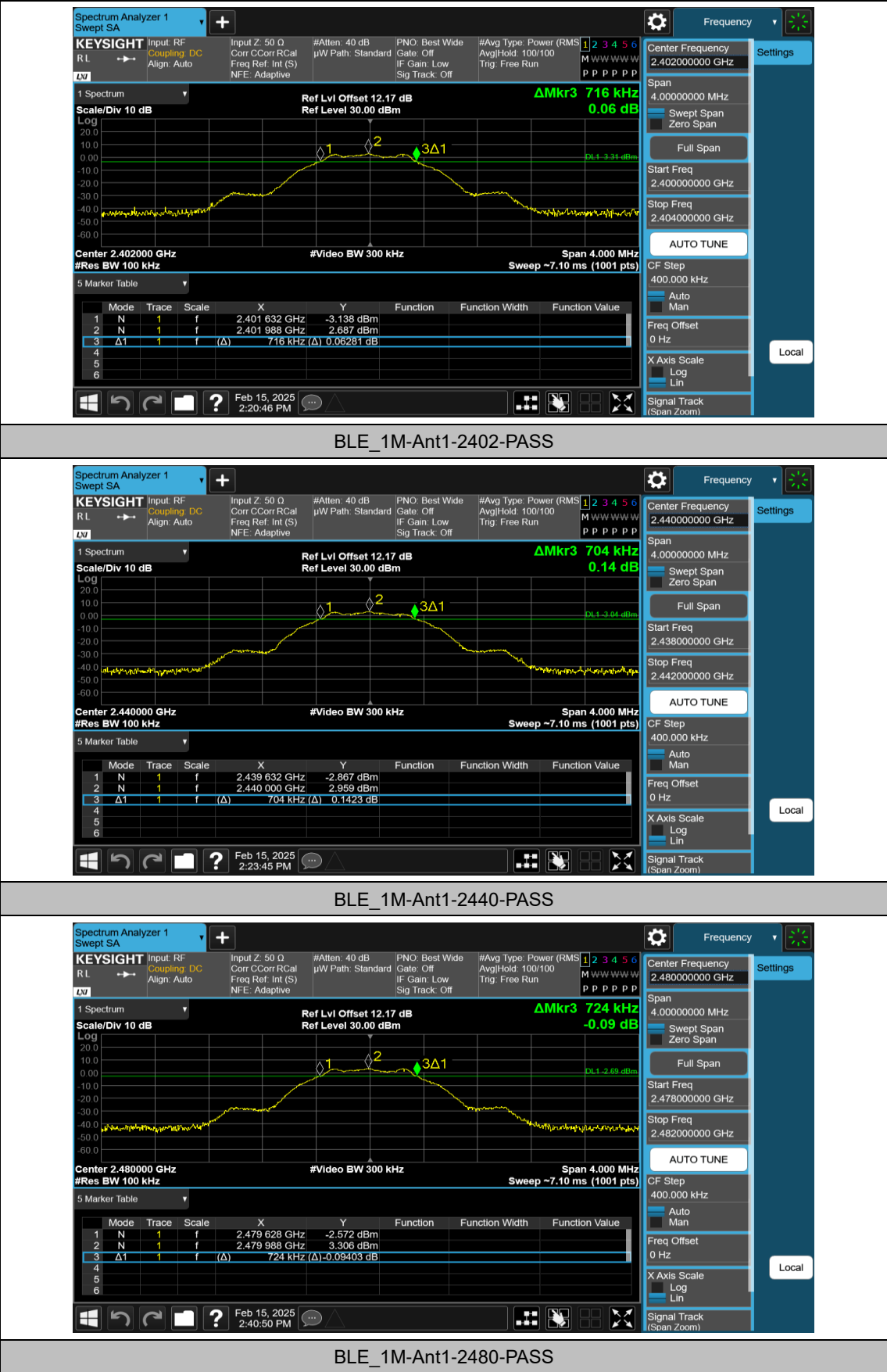
Appendix B of report 2501B0803SHA-002

DTS Bandwidth

Test Result

TestMode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
BLE_1M	Ant1	2402	0.716	2401.632	2402.348	0.5	PASS
BLE_1M	Ant1	2440	0.704	2439.632	2440.336	0.5	PASS
BLE_1M	Ant1	2480	0.724	2479.628	2480.352	0.5	PASS

Test Graphs



BLE_1M-Ant1-2402-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: CCorr RCal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 40 dB

μ W Path: Standard

PNO: Best Wide

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 100/100

Trig: Free Run

1 2 3 4 5 6

M W W W W W

P P P P P P

Center Frequency

2.440000000 GHz

Span

4.000000000 MHz

Swept Span

Zero Span

Full Span

Start Freq

2.438000000 GHz

Stop Freq

2.442000000 GHz

AUTO TUNE

CF Step

400.000 kHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 30.00 dBm

Δ Mkr3 704 kHz

0.14 dB

Center 2.440000 GHz

#Res BW 100 kHz

#Video BW 300 kHz

Span 4.000 MHz

Sweep ~7.10 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.439 632 GHz	-2.867 dBm			
2	N	1	f	2.440 000 GHz	2.959 dBm			
3	Δ 1	1	f	(Δ)	704 kHz (Δ)	0.1423 dB		
4								
5								
6								

Feb 15, 2025

2:23:45 PM

BLE_1M-Ant1-2440-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: CCorr RCal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 40 dB

μ W Path: Standard

PNO: Best Wide

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 100/100

Trig: Free Run

1 2 3 4 5 6

M W W W W W

P P P P P P

Center Frequency

2.480000000 GHz

Span

4.000000000 MHz

Swept Span

Zero Span

Full Span

Start Freq

2.478000000 GHz

Stop Freq

2.482000000 GHz

AUTO TUNE

CF Step

400.000 kHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 30.00 dBm

Δ Mkr3 724 kHz

-0.09 dB

Center 2.480000 GHz

#Res BW 100 kHz

#Video BW 300 kHz

Span 4.000 MHz

Sweep ~7.10 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.479 628 GHz	-2.572 dBm			
2	N	1	f	2.479 988 GHz	3.306 dBm			
3	Δ 1	1	f	(Δ)	724 kHz (Δ)	-0.09403 dB		
4								
5								
6								

Feb 15, 2025

2:40:50 PM

BLE_1M-Ant1-2480-PASS

FCC ID:2A64B-DEX68

IC:28593-DEX68

Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Frequency [MHz]	OCB [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
BLE_1M	Ant1	2402	1.0353	2401.4852	2402.5205	---	---
BLE_1M	Ant1	2440	1.0427	2439.4762	2440.5189	---	---
BLE_1M	Ant1	2480	1.0360	2479.4844	2480.5204	---	---

Test Graphs

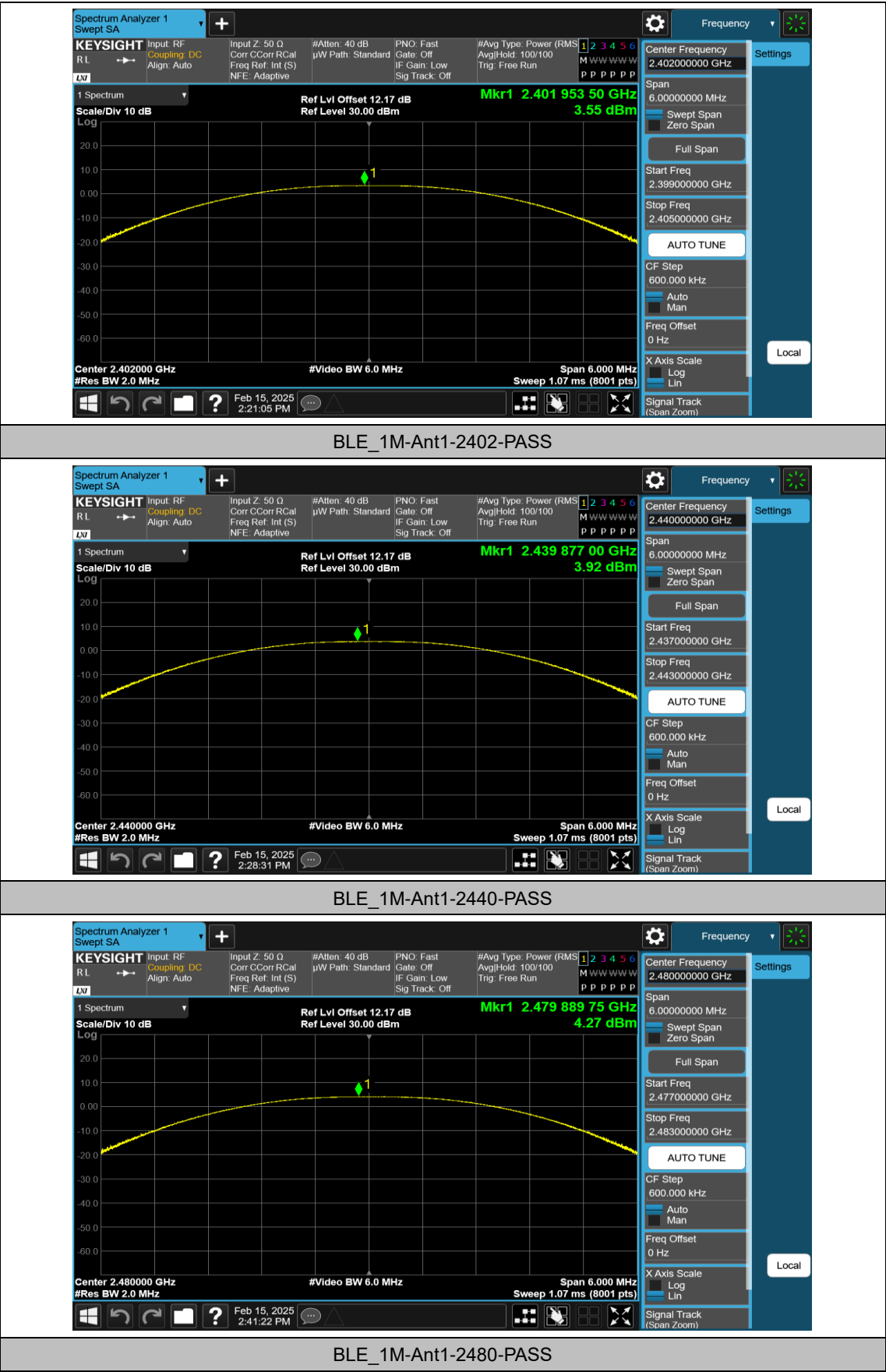


Maximum conducted output power

Test Result Peak

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	3.55	≤30	6.10	≤36	PASS
BLE_1M	Ant1	2440	3.92	≤30	6.47	≤36	PASS
BLE_1M	Ant1	2480	4.27	≤30	6.82	≤36	PASS

Test Graphs Peak



BLE_1M-Ant1-2402-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: C Corr RCal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 40 dB

μ W Path: Standard

PNO: Fast

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 100/100

Trig: Free Run

1 2 3 4 5 6

M W W W W W

P P P P P P

Center Frequency

2.440000000 GHz

Span

6.000000000 MHz

Swept Span

Zero Span

Full Span

Start Freq

2.437000000 GHz

Stop Freq

2.443000000 GHz

AUTO TUNE

CF Step

600.000 kHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 30.00 dBm

Mkr1 2.439 877 00 GHz

3.92 dBm

Center 2.440000 GHz

#Res BW 2.0 MHz

#Video BW 6.0 MHz

Span 6.000 MHz

Sweep 1.07 ms (8001 pts)

Feb 15, 2025

2:28:31 PM

BLE_1M-Ant1-2440-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: C Corr RCal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 40 dB

μ W Path: Standard

PNO: Fast

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 100/100

Trig: Free Run

1 2 3 4 5 6

M W W W W W

P P P P P P

Center Frequency

2.480000000 GHz

Span

6.000000000 MHz

Swept Span

Zero Span

Full Span

Start Freq

2.477000000 GHz

Stop Freq

2.483000000 GHz

AUTO TUNE

CF Step

600.000 kHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 30.00 dBm

Mkr1 2.479 889 75 GHz

4.27 dBm

Center 2.480000 GHz

#Res BW 2.0 MHz

#Video BW 6.0 MHz

Span 6.000 MHz

Sweep 1.07 ms (8001 pts)

Feb 15, 2025

2:41:22 PM

BLE_1M-Ant1-2480-PASS

FCC ID: 2A64B-DEX68

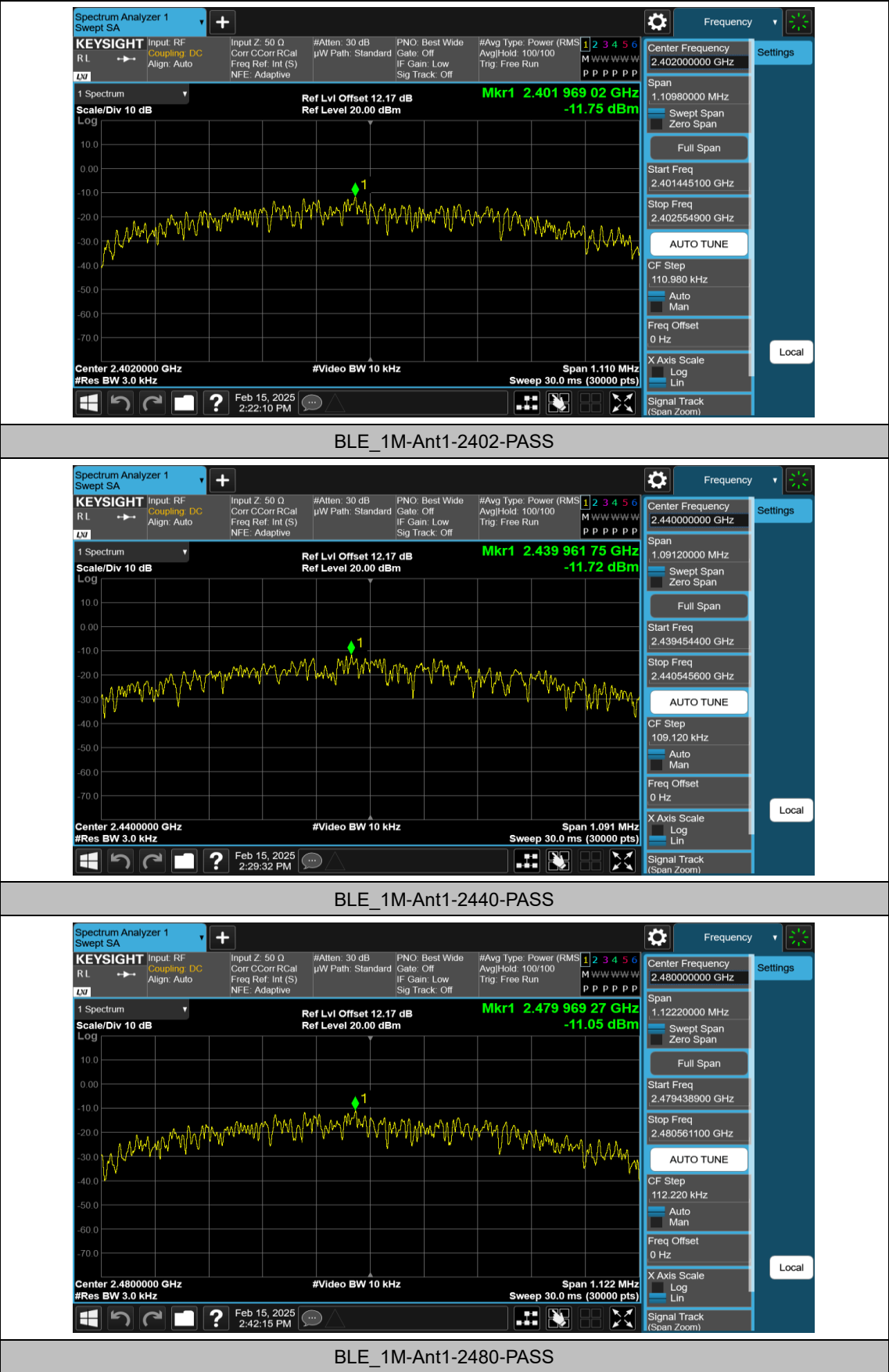
IC: 28593-DEX68

Maximum power spectral density

Test Result

TestMode	Antenna	Frequency [MHz]	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-11.75	≤8.00	PASS
BLE_1M	Ant1	2440	-11.72	≤8.00	PASS
BLE_1M	Ant1	2480	-11.05	≤8.00	PASS

Test Graphs



BLE_1M-Ant1-2402-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: CCorr RCal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 30 dB

μ W Path: Standard

PNO: Best Wide

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 100/100

Trig: Free Run

1 2 3 4 5 6

M W W W W W

P P P P P P

Center Frequency

2.440000000 GHz

Span

1.091200000 MHz

Swept Span

Zero Span

Full Span

Start Freq

2.439454400 GHz

Stop Freq

2.440545600 GHz

AUTO TUNE

CF Step

109.120 kHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 20.00 dBm

Mkr1 2.439 961 75 GHz

-11.72 dBm

Center 2.44000000 GHz

#Res BW 3.0 kHz

#Video BW 10 kHz

Span 1.091 MHz

Sweep 30.0 ms (30000 pts)

Feb 15, 2025 2:29:10 PM

BLE_1M-Ant1-2440-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: CCorr RCal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 30 dB

μ W Path: Standard

PNO: Best Wide

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 100/100

Trig: Free Run

1 2 3 4 5 6

M W W W W W

P P P P P P

Center Frequency

2.480000000 GHz

Span

1.122200000 MHz

Swept Span

Zero Span

Full Span

Start Freq

2.479438900 GHz

Stop Freq

2.480561100 GHz

AUTO TUNE

CF Step

112.220 kHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 20.00 dBm

Mkr1 2.479 969 27 GHz

-11.05 dBm

Center 2.48000000 GHz

#Res BW 3.0 kHz

#Video BW 10 kHz

Span 1.122 MHz

Sweep 30.0 ms (30000 pts)

Feb 15, 2025 2:42:15 PM

BLE_1M-Ant1-2480-PASS

FCC ID:2A64B-DEX68

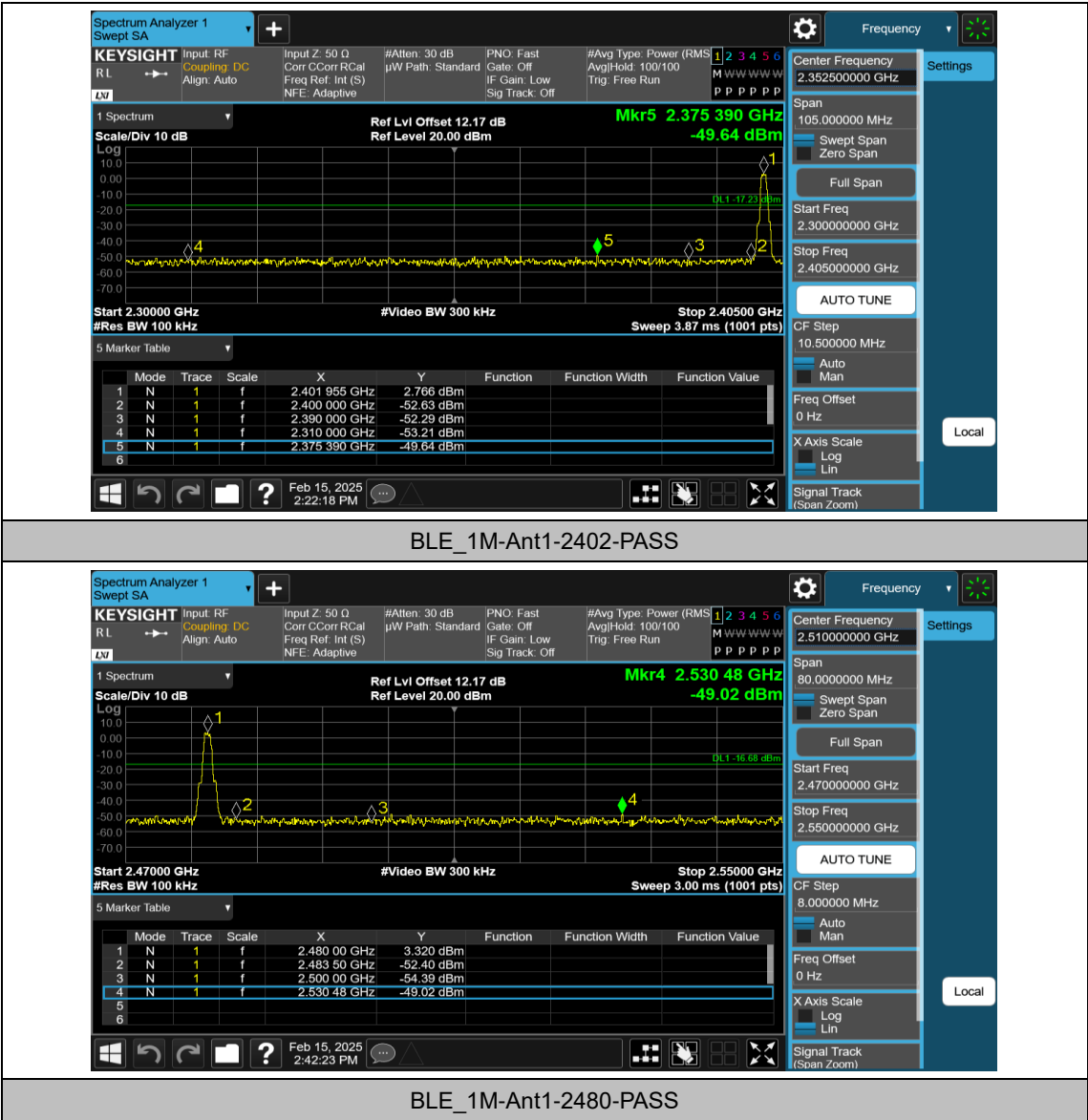
IC:28593-DEX68

Band edge measurements

Test Result

TestMode	Antenna	ChName	Frequency [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	Low	2402	2.77	-49.64	≤-17.23	PASS
BLE_1M	Ant1	High	2480	3.32	-49.02	≤-16.68	PASS

Test Graphs



BLE_1M-Ant1-2402-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: C

Corr: R

Cal: Int (S)

NFE: Adaptive

#Atten: 30 dB

μ W Path: Standard

PNO: Fast

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 100/100

Trig: Free Run

1 2 3 4 5 6

M W W W W W

P P P P P P

Center Frequency

2.510000000 GHz

Span

80.000000 MHz

Swept Span

Zero Span

Full Span

Start Freq

2.470000000 GHz

Stop Freq

2.550000000 GHz

AUTO TUNE

CF Step

8.000000 MHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Ref Lvl Offset 12.17 dB

Ref Level 20.00 dBm

Mkr4 2.530 48 GHz

-49.02 dBm

Start 2.47000 GHz

#Res BW 100 kHz

#Video BW 300 kHz

Stop 2.55000 GHz

Sweep 3.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.480000 GHz	3.320 dBm			
2	N	1	f	2.483500 GHz	-52.40 dBm			
3	N	1	f	2.500000 GHz	-54.39 dBm			
4	N	1	f	2.530480 GHz	-49.02 dBm			
5								
6								

Feb 15, 2025 2:42:23 PM

BLE_1M-Ant1-2480-PASS

FCC ID: 2A64B-DEX68

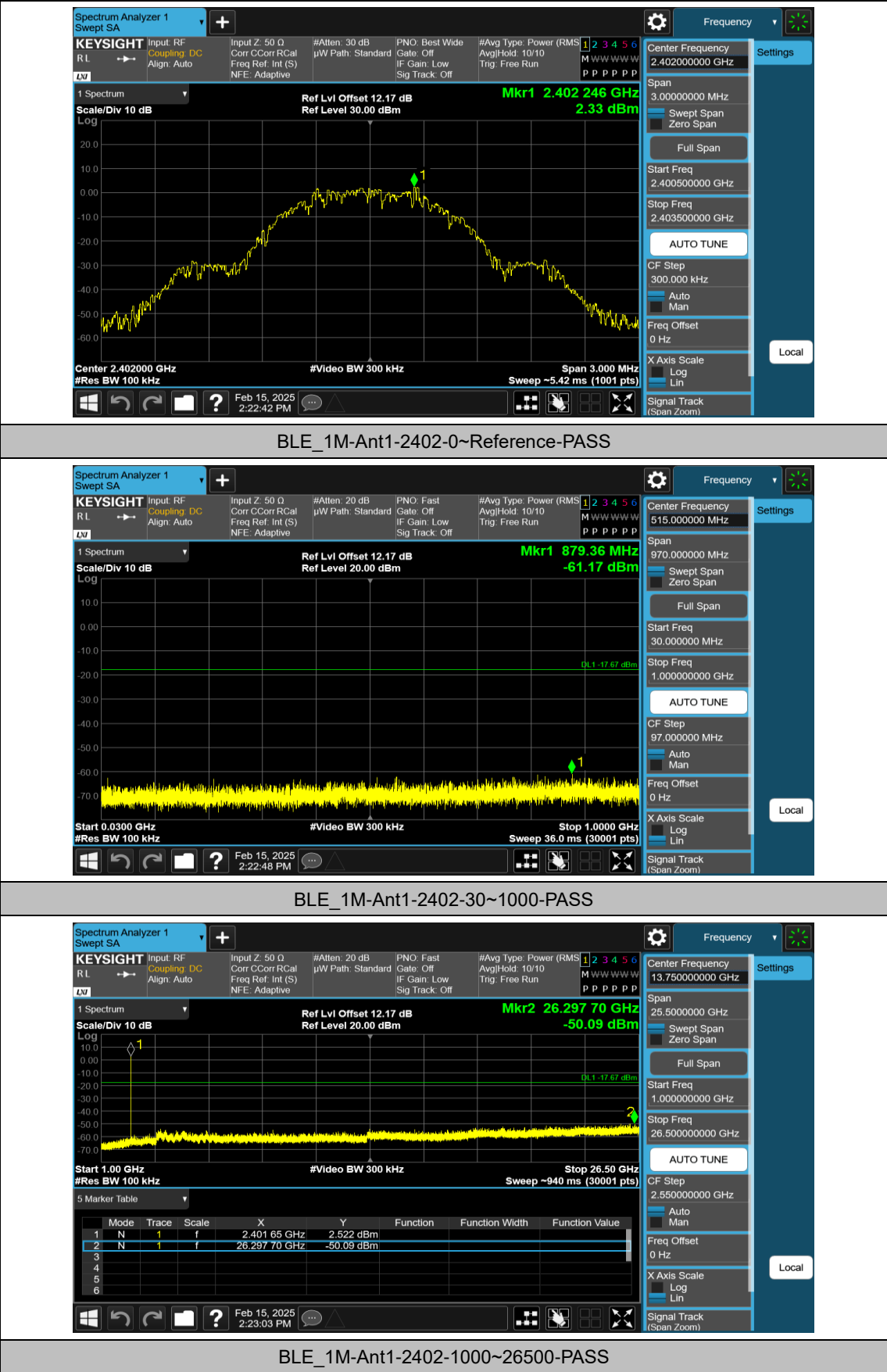
IC: 28593-DEX68

Conducted Spurious Emission

Test Result

TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	2402	0~Reference	2.33	2.33	---	PASS
BLE_1M	Ant1	2402	30~1000	2.33	-61.17	≤-17.67	PASS
BLE_1M	Ant1	2402	1000~26500	2.33	-50.09	≤-17.67	PASS
BLE_1M	Ant1	2440	0~Reference	2.49	2.49	---	PASS
BLE_1M	Ant1	2440	30~1000	2.49	-61.88	≤-17.51	PASS
BLE_1M	Ant1	2440	1000~26500	2.49	-50.15	≤-17.51	PASS
BLE_1M	Ant1	2480	0~Reference	3.32	3.32	---	PASS
BLE_1M	Ant1	2480	30~1000	3.32	-61.38	≤-16.68	PASS
BLE_1M	Ant1	2480	1000~26500	3.32	-50.33	≤-16.68	PASS

Test Graphs



BLE_1M-Ant1-2402-0~Reference-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: C

Corr: R

Cal: Cal

#Atten: 20 dB

μ W Path: Standard

PNO: Fast

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 10/10

Trig: Free Run

1 2 3 4 5 6

M W W W W W

P P P P P P

Center Frequency

515.000000 MHz

Span

970.000000 MHz

Swept Span

Zero Span

Full Span

Start Freq

30.0000000 MHz

Stop Freq

1.000000000 GHz

AUTO TUNE

CF Step

97.0000000 MHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 20.00 dBm

Mkr1 879.36 MHz

-61.17 dBm

Start 0.0300 GHz

#Res BW 100 kHz

#Video BW 300 kHz

Stop 1.0000 GHz

Sweep 36.0 ms (30001 pts)

Feb 15, 2025

2:22:48 PM

BLE_1M-Ant1-2402-30~1000-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: C

Corr: R

Cal: Cal

#Atten: 20 dB

μ W Path: Standard

PNO: Fast

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 10/10

Trig: Free Run

1 2 3 4 5 6

M W W W W W

P P P P P P

Center Frequency

13.75000000 GHz

Span

25.5000000 GHz

Swept Span

Zero Span

Full Span

Start Freq

1.000000000 GHz

Stop Freq

26.500000000 GHz

AUTO TUNE

CF Step

2.550000000 GHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 20.00 dBm

Mkr2 26.297 70 GHz

-50.09 dBm

Start 1.00 GHz

#Res BW 100 kHz

#Video BW 300 kHz

Stop 26.50 GHz

Sweep ~940 ms (30001 pts)

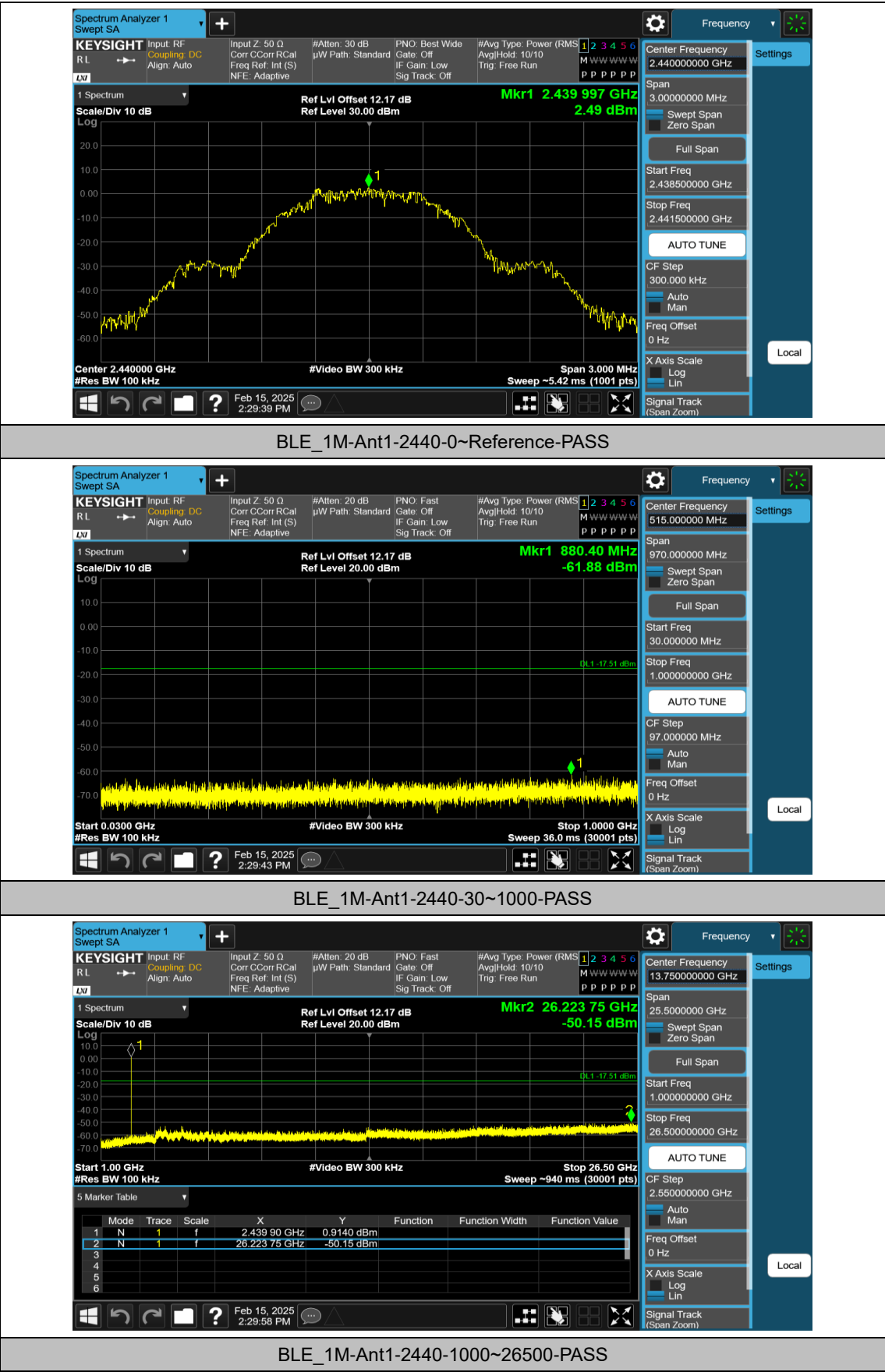
5 Marker Table

Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	f	2.401 65 GHz	2.522 dBm			
2	N	f	26.297 70 GHz	-50.09 dBm			
3							
4							
5							
6							

Feb 15, 2025

2:23:03 PM

BLE_1M-Ant1-2402-1000~26500-PASS



BLE_1M-Ant1-2440-0~Reference-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: C Corr: R Cal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 20 dB

μ W Path: Standard

PNO: Fast

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 10/10

Trig: Free Run

1 2 3 4 5 6

M W W W W W

p p p p p p

Center Frequency

515.000000 MHz

Span

970.000000 MHz

Swept Span

Zero Span

Full Span

Start Freq

30.0000000 MHz

Stop Freq

1.000000000 GHz

AUTO TUNE

CF Step

97.000000 MHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 20.00 dBm

Mkr1 880.40 MHz

-61.88 dBm

Start 0.0300 GHz

#Res BW 100 kHz

#Video BW 300 kHz

Stop 1.0000 GHz

Sweep 36.0 ms (30001 pts)

Feb 15, 2025

2:29:43 PM

BLE_1M-Ant1-2440-30~1000-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: C Corr: R Cal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 20 dB

μ W Path: Standard

PNO: Fast

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 10/10

Trig: Free Run

1 2 3 4 5 6

M W W W W W

p p p p p p

Center Frequency

13.75000000 GHz

Span

25.50000000 GHz

Swept Span

Zero Span

Full Span

Start Freq

1.000000000 GHz

Stop Freq

26.500000000 GHz

AUTO TUNE

CF Step

2.550000000 GHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 20.00 dBm

Mkr2 26.223 75 GHz

-50.15 dBm

Start 1.00 GHz

#Res BW 100 kHz

#Video BW 300 kHz

Stop 26.50 GHz

Sweep ~940 ms (30001 pts)

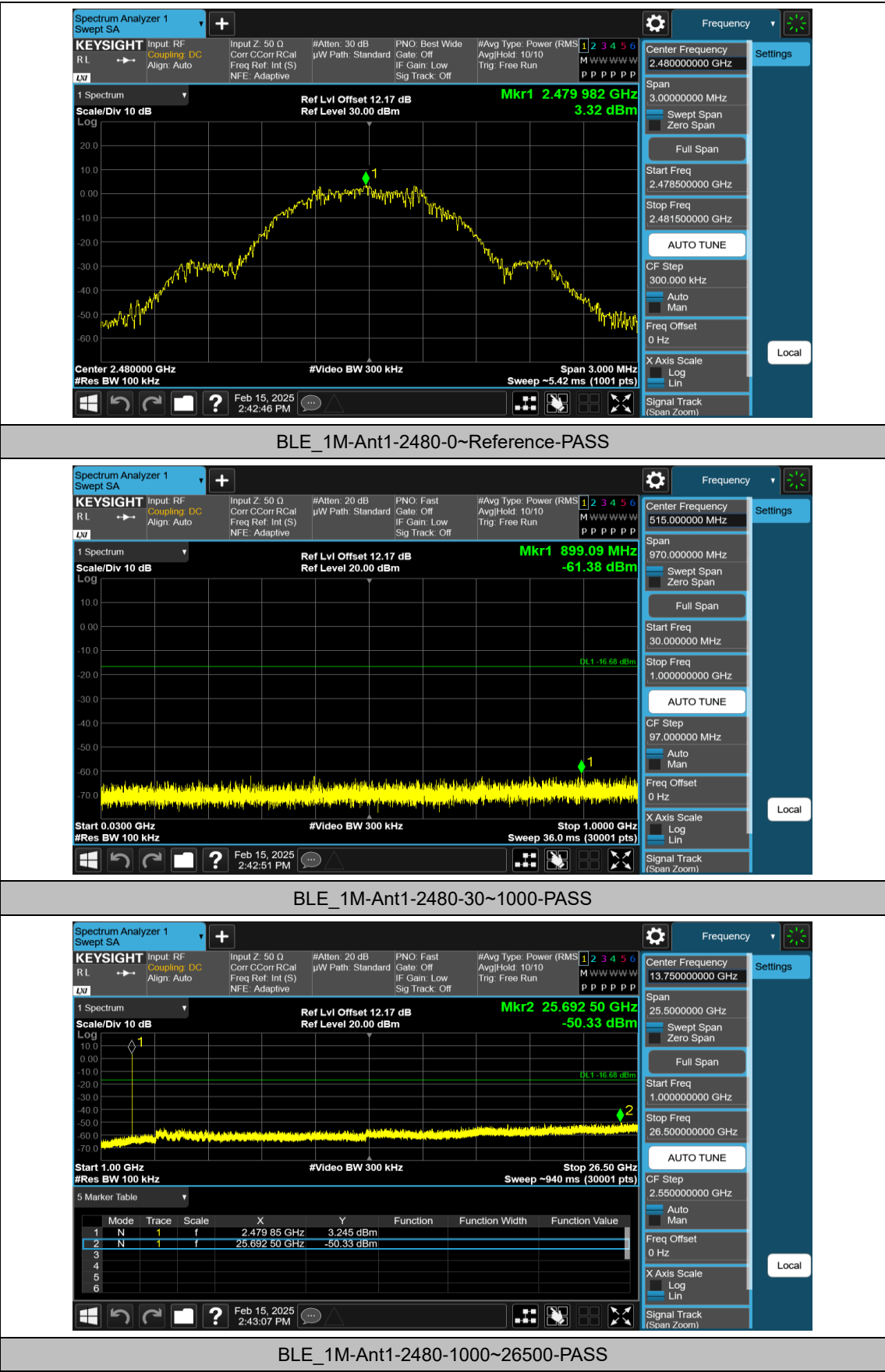
Feb 15, 2025

2:29:58 PM

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.439 90 GHz	0.9140 dBm			
2	N	1	f	26.223 75 GHz	-50.15 dBm			
3								
4								
5								
6								

BLE_1M-Ant1-2440-1000~26500-PASS



BLE_1M-Ant1-2480-0~Reference-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: CCorr

RCal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 20 dB

μ W Path: Standard

PNO: Fast

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 10/10

Trig: Free Run

1 2 3 4 5 6

M W W W W W

p p p p p p

Center Frequency

515.000000 MHz

Span

970.000000 MHz

Swept Span

Zero Span

Full Span

Start Freq

30.0000000 MHz

Stop Freq

1.000000000 GHz

AUTO TUNE

CF Step

97.000000 MHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 20.00 dBm

Mkr1 899.09 MHz

-61.38 dBm

Start 0.0300 GHz

#Res BW 100 kHz

#Video BW 300 kHz

Stop 1.0000 GHz

Sweep 36.0 ms (30001 pts)

Feb 15, 2025

2:42:51 PM

BLE_1M-Ant1-2480-30~1000-PASS

Spectrum Analyzer 1

Swept SA

KEYSIGHT

Input: RF

Coupling: DC

Align: Auto

Input Z: 50 Ω

Corr: CCorr

RCal

Freq Ref: Int (S)

NFE: Adaptive

#Atten: 20 dB

μ W Path: Standard

PNO: Fast

Gate: Off

IF Gain: Low

Sig Track: Off

#Avg Type: Power (RMS)

Avg/Hold: 10/10

Trig: Free Run

1 2 3 4 5 6

M W W W W W

p p p p p p

Center Frequency

13.75000000 GHz

Span

25.5000000 GHz

Swept Span

Zero Span

Full Span

Start Freq

1.000000000 GHz

Stop Freq

26.500000000 GHz

AUTO TUNE

CF Step

2.550000000 GHz

Auto

Man

Freq Offset

0 Hz

X Axis Scale

Log

Lin

Signal Track

(Span Zoom)

Local

1 Spectrum

Scale/Div 10 dB

Log

Ref Lvl Offset 12.17 dB

Ref Level 20.00 dBm

Mkr2 25.692 50 GHz

-50.33 dBm

Start 1.00 GHz

#Res BW 100 kHz

#Video BW 300 kHz

Stop 26.50 GHz

Sweep ~940 ms (30001 pts)

Feb 15, 2025

2:43:07 PM

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.479 85 GHz	3.245 dBm			
2	N	1	f	25.692 50 GHz	-50.33 dBm			
3								
4								
5								
6								

BLE_1M-Ant1-2480-1000~26500-PASS