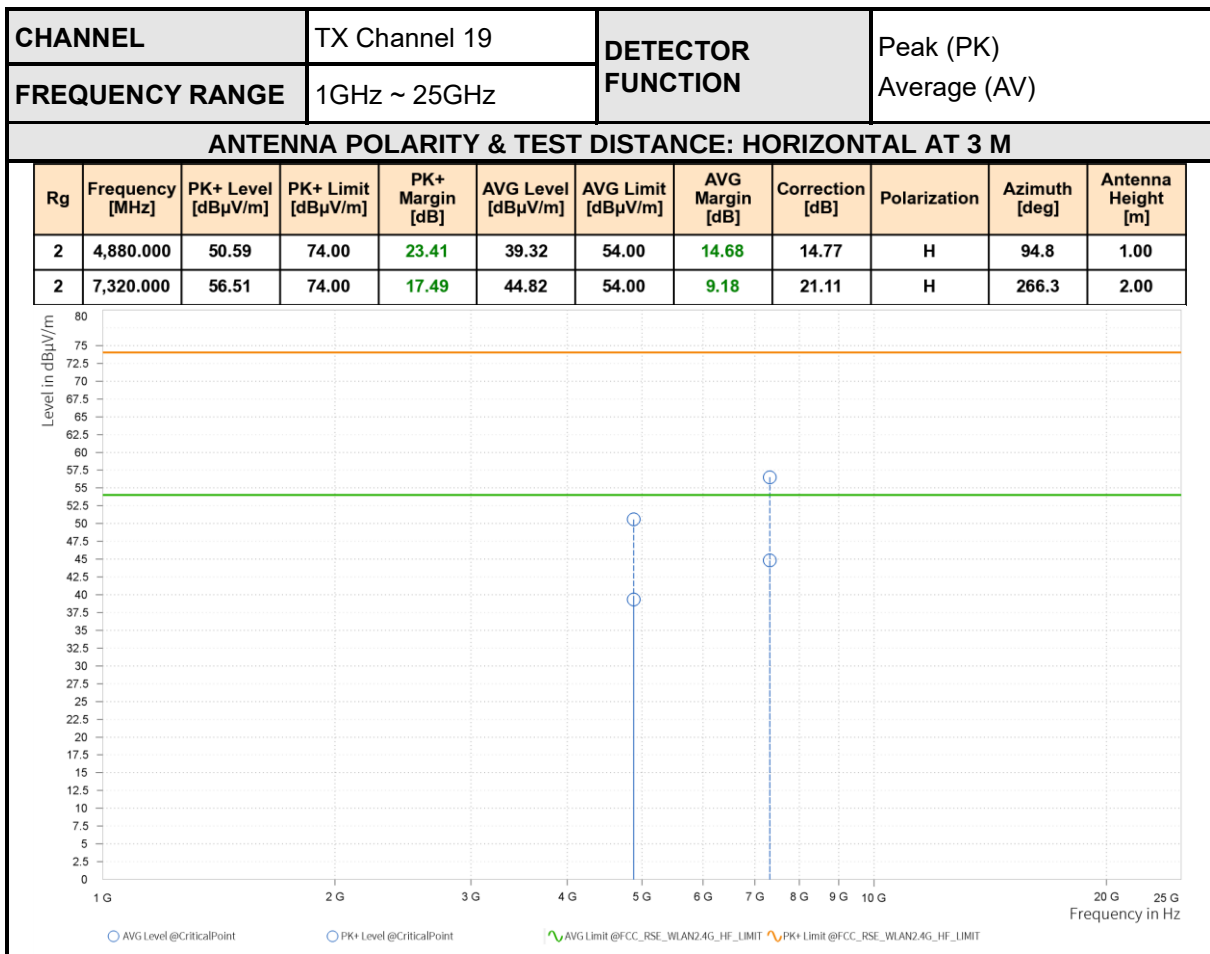
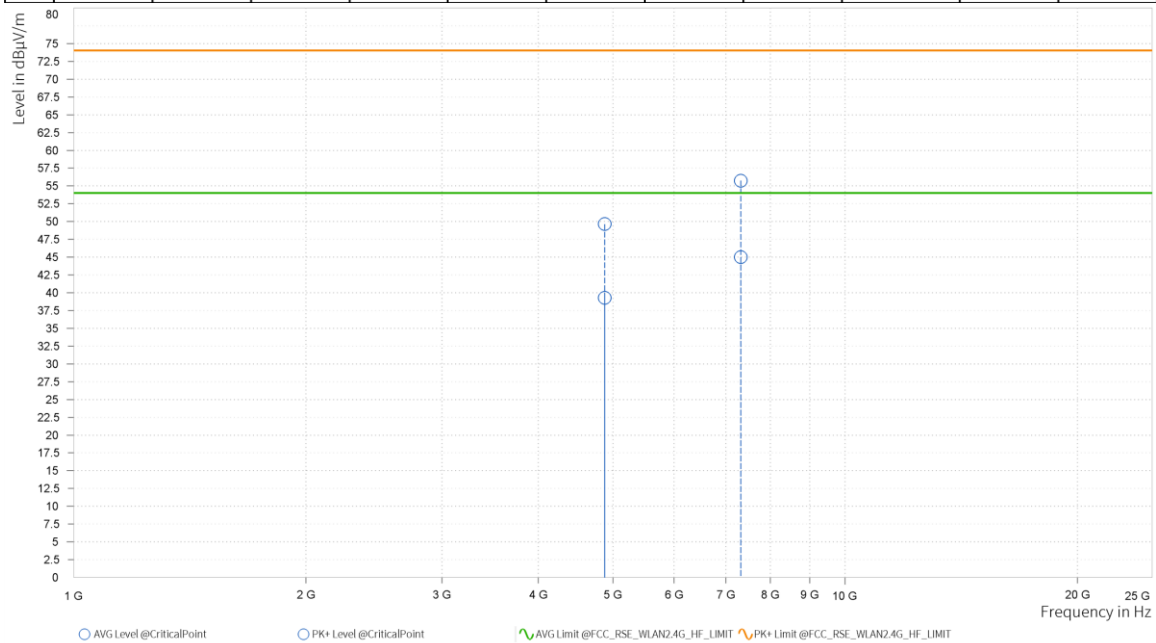






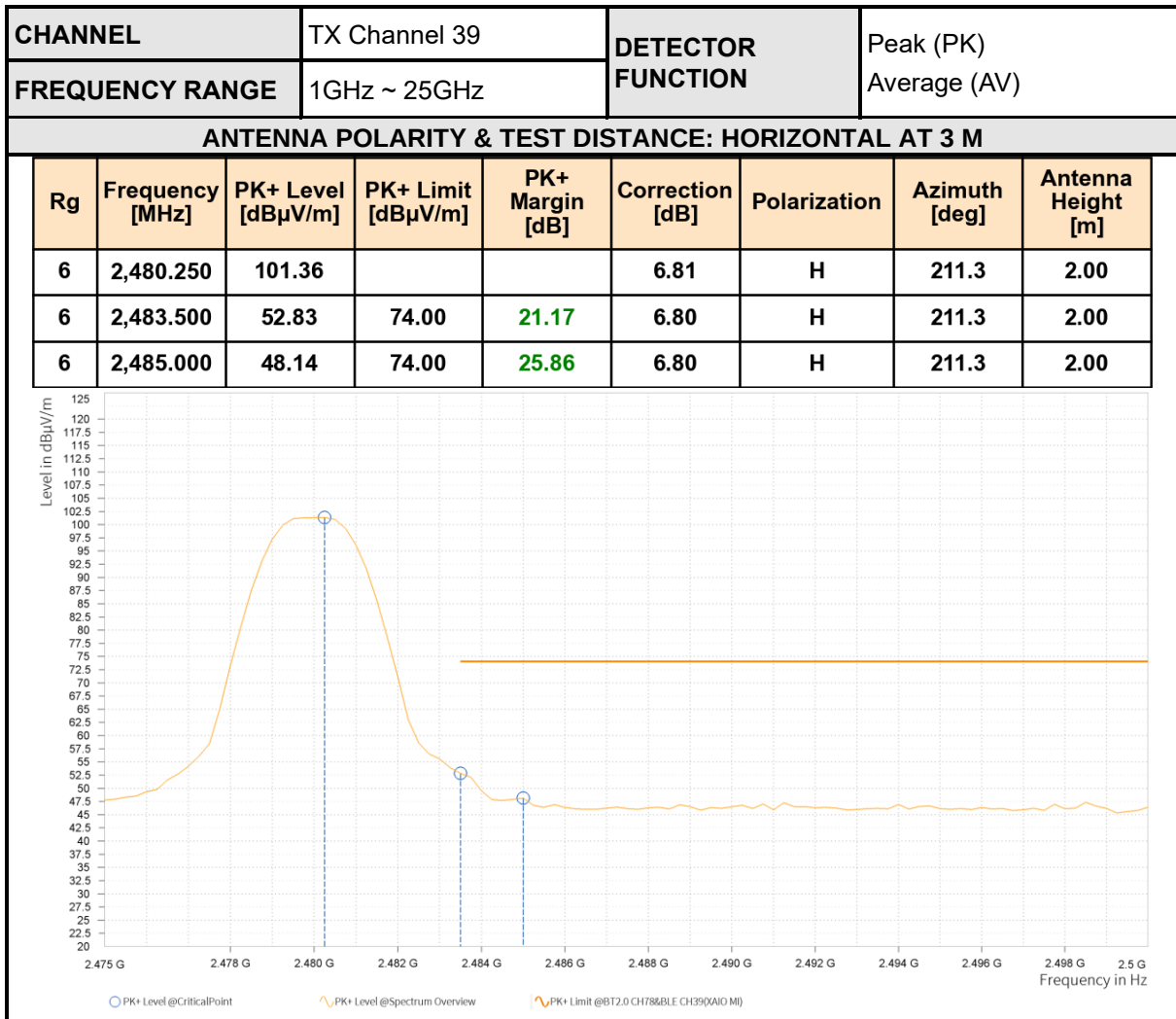
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	4,880.000	49.64	74.00	24.36	39.30	54.00	14.70	14.77	V	8.8	2.00
2	7,320.000	55.74	74.00	18.26	44.99	54.00	9.01	21.11	V	8.8	2.00



REMARKS:

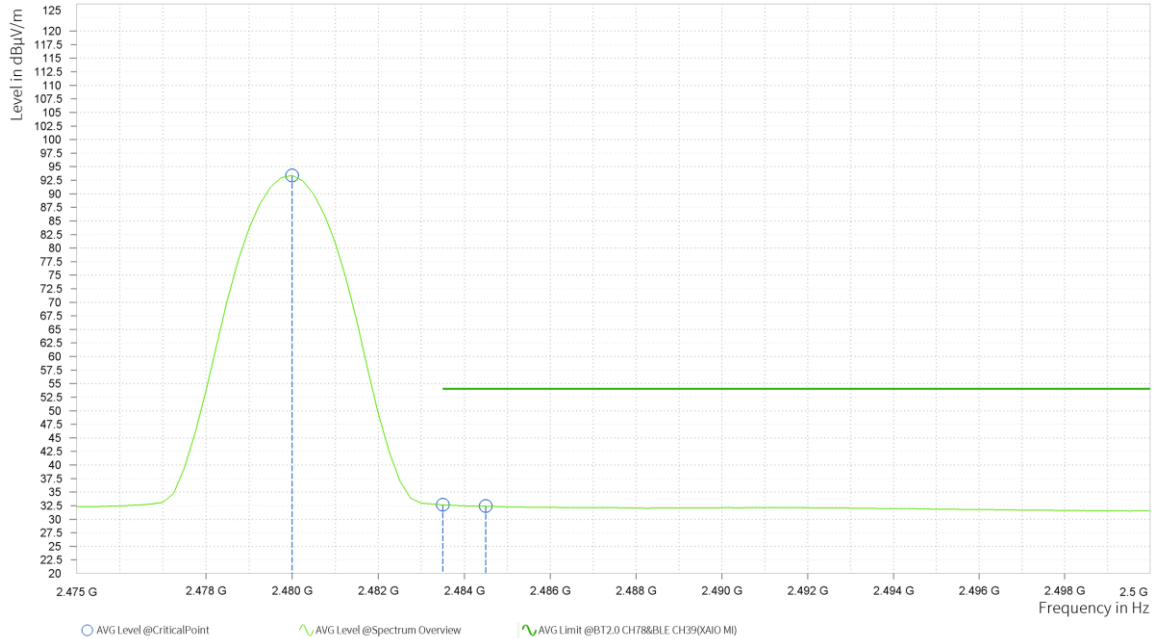
- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
- Margin value = Limit value–Emission level.
- 2440MHz: Fundamental frequency.





ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

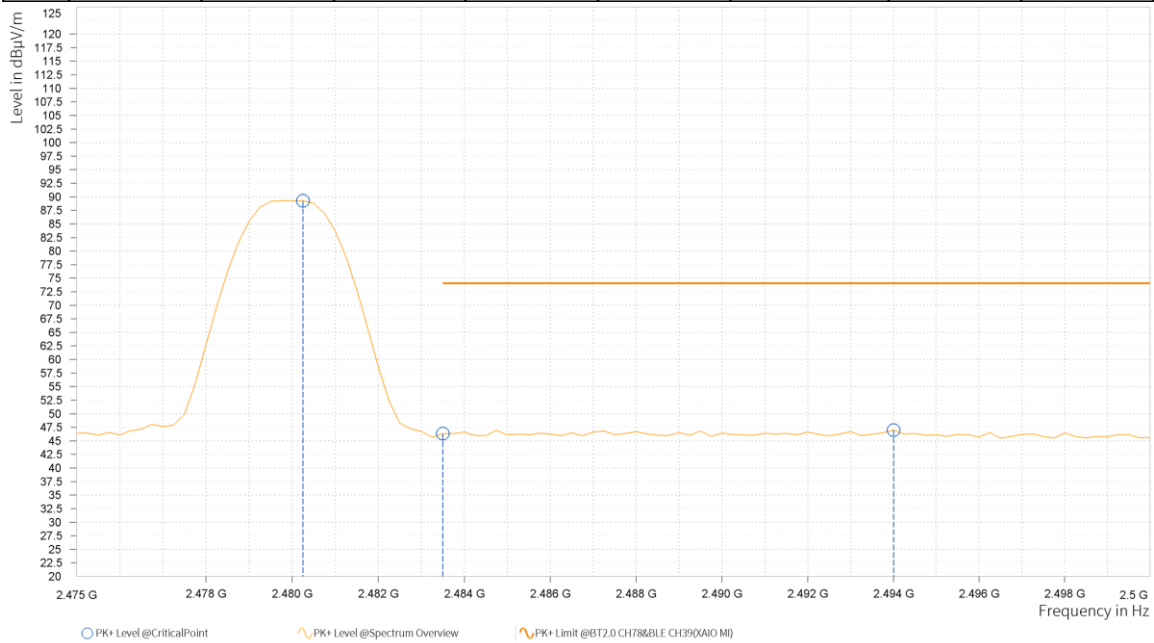
Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,480.000	93.39			6.81	H	209	2.00
6	2,483.500	32.64	54.00	21.36	6.80	H	209	2.00
6	2,484.500	32.41	54.00	21.59	6.80	H	209	2.00





ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

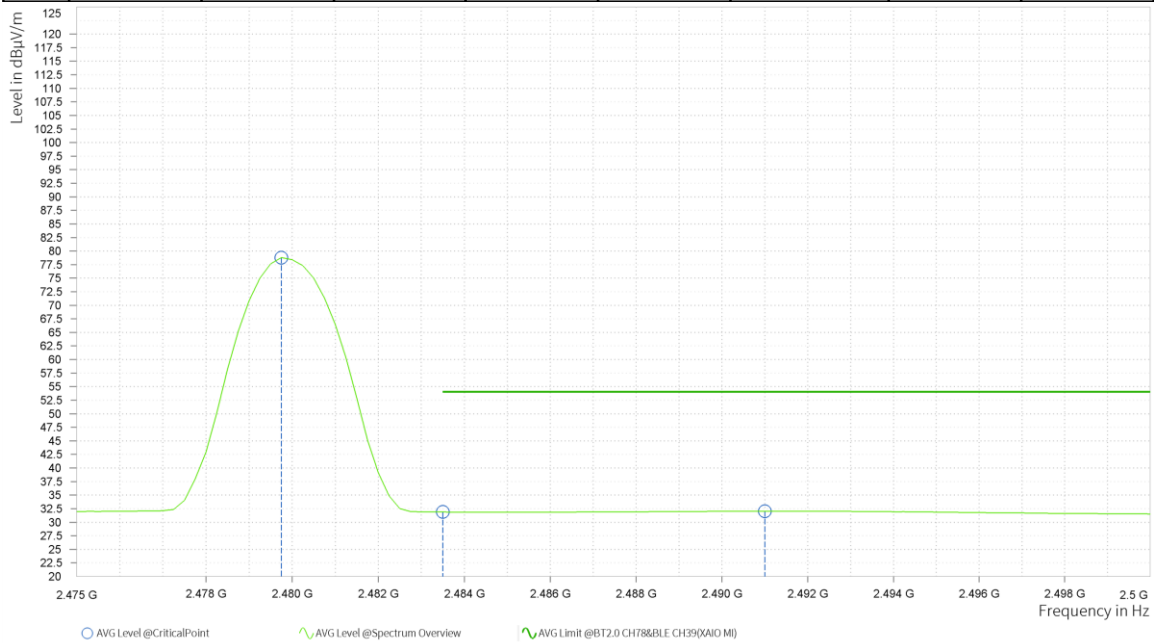
Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,480.250	89.27			6.81	V	151.1	1.00
6	2,483.500	46.32	74.00	27.68	6.80	V	4.9	1.00
6	2,494.000	46.99	74.00	27.01	6.79	V	131.2	2.00





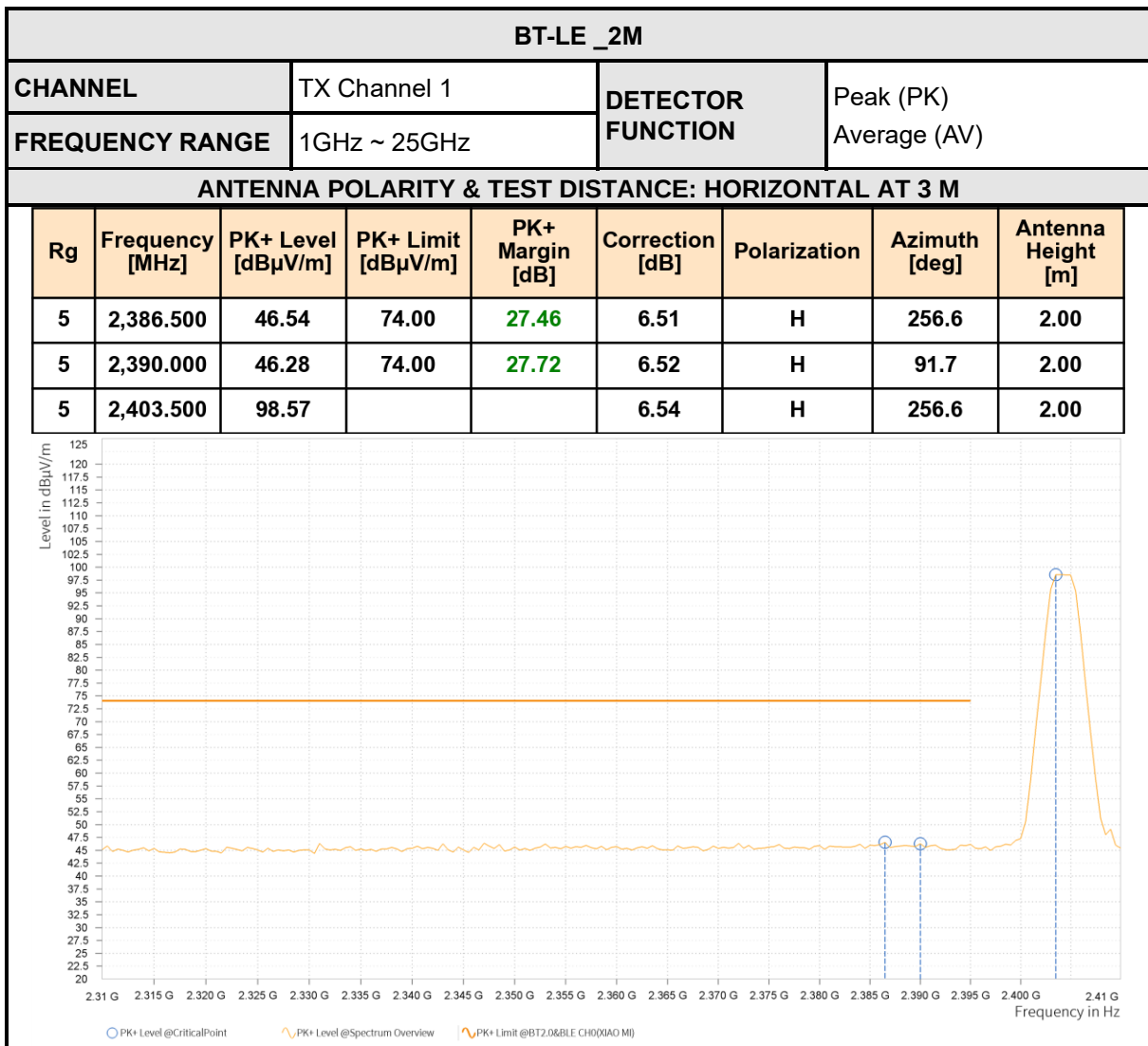
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.750	78.79			6.81	V	287.8	2.00
6	2,483.500	31.89	54.00	22.11	6.80	V	209	2.00
6	2,491.000	32.03	54.00	21.97	6.80	V	153.4	1.00



REMARKS:

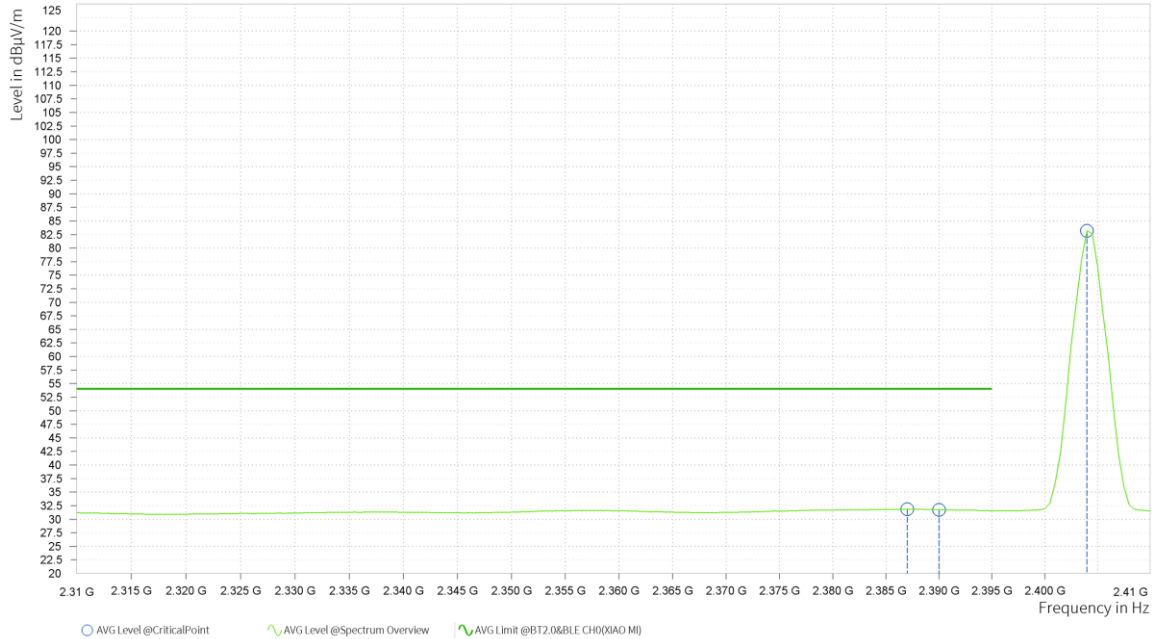
- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
- Margin value = Limit value–Emission level.
- 2480MHz: Fundamental frequency.





ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

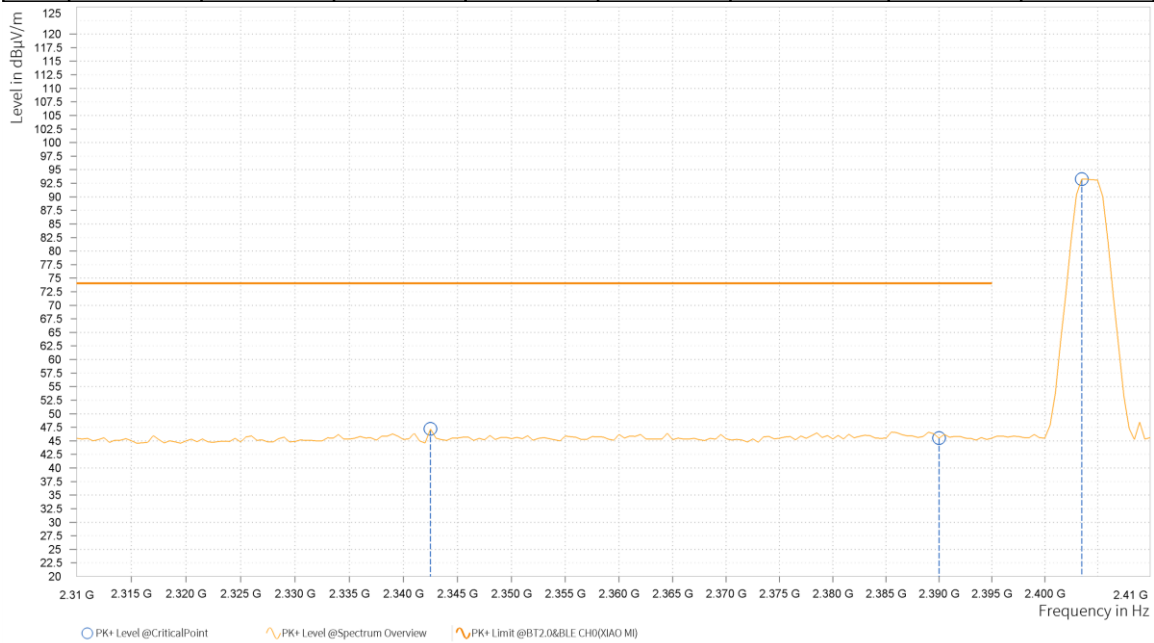
Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,387.000	31.84	54.00	22.16	6.51	H	256.7	2.00
5	2,390.000	31.76	54.00	22.24	6.52	H	355.8	2.00
5	2,404.000	83.20			6.54	H	256.7	2.00





ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

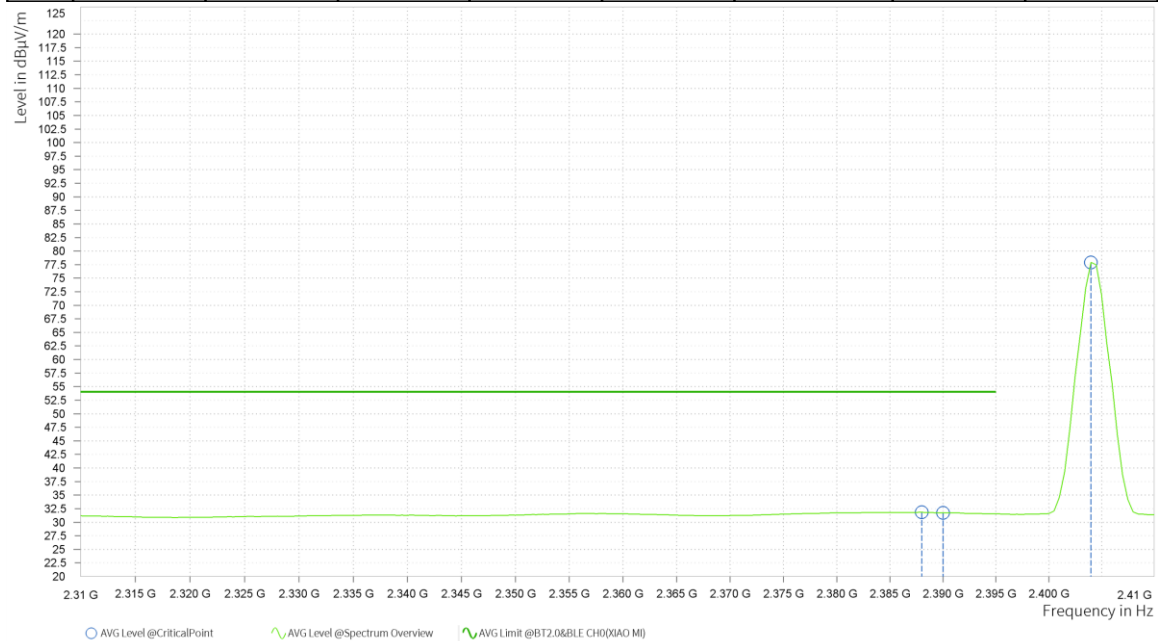
Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,342.500	47.20	74.00	26.80	6.45	V	359.1	1.00
5	2,390.000	45.52	74.00	28.48	6.52	V	1	1.00
5	2,403.500	93.26			6.54	V	203	2.00





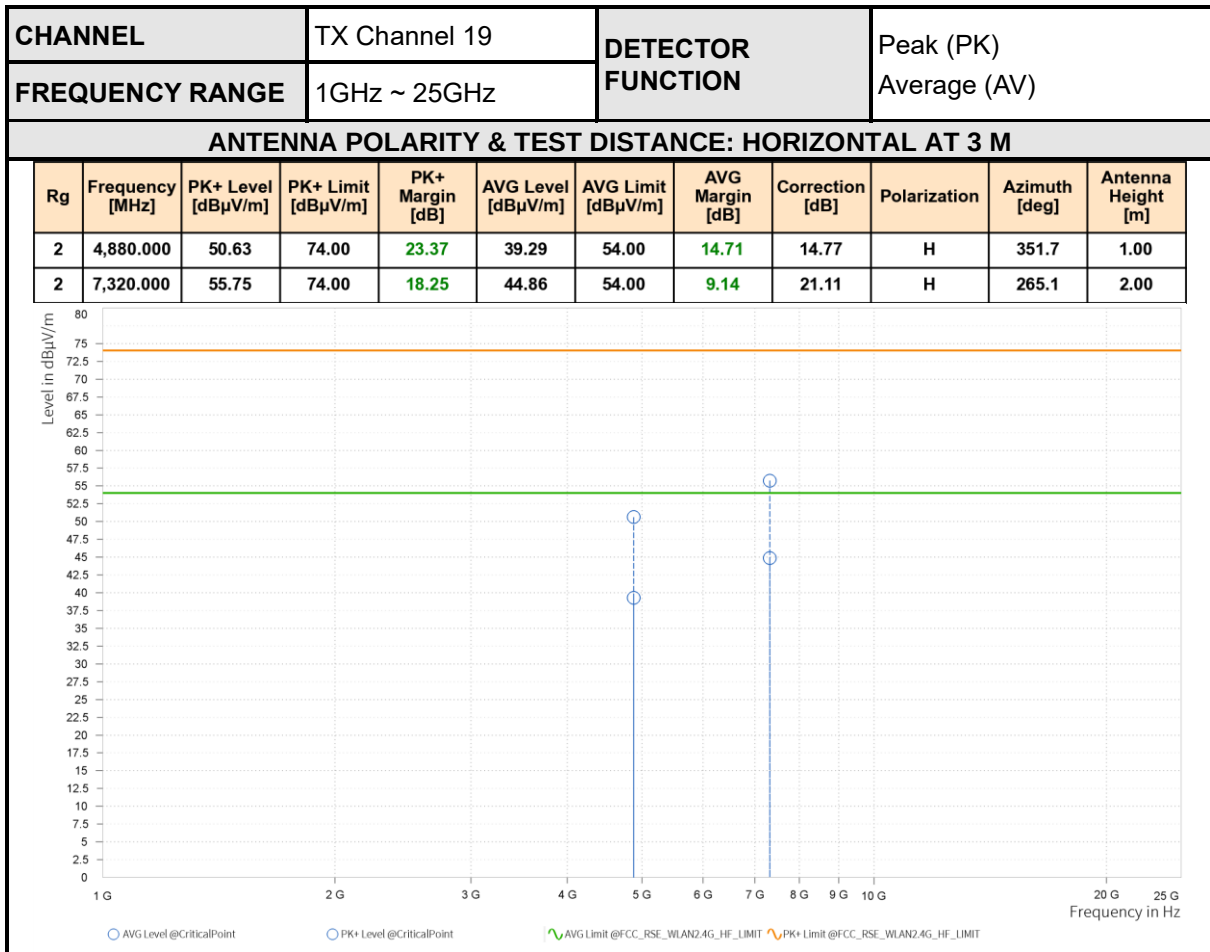
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,388.000	31.83	54.00	22.17	6.51	V	105.7	1.00
5	2,390.000	31.75	54.00	22.25	6.52	V	105.7	1.00
5	2,404.000	77.91			6.54	V	201.8	2.00



REMARKS:

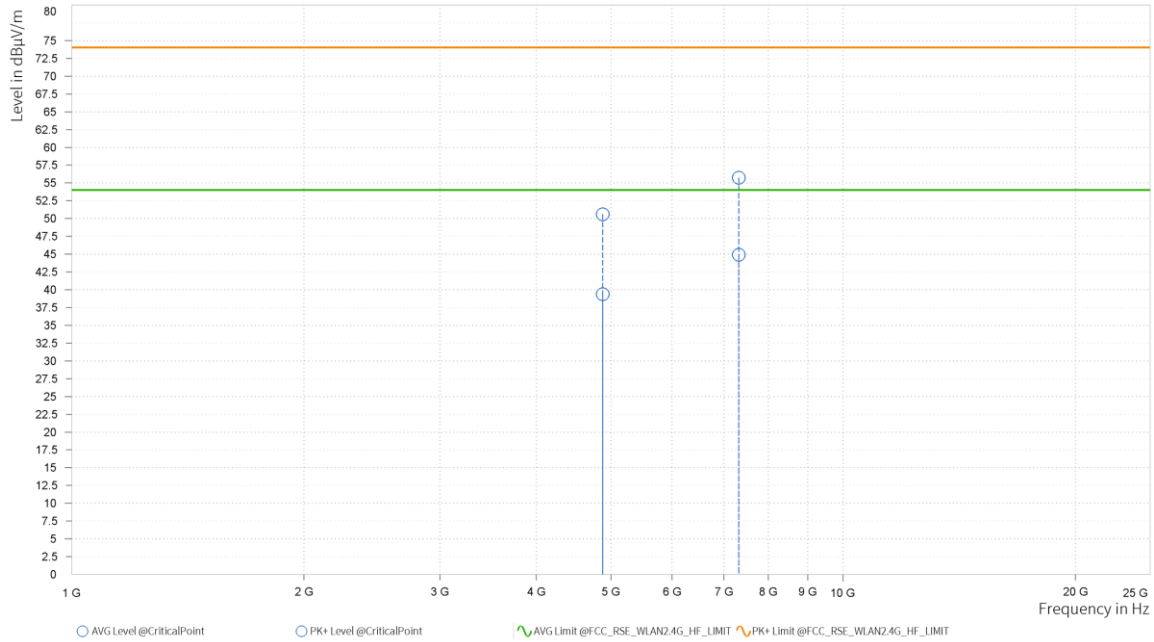
4. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
5. Margin value = Limit value–Emission level.
6. 2404MHz: Fundamental frequency.





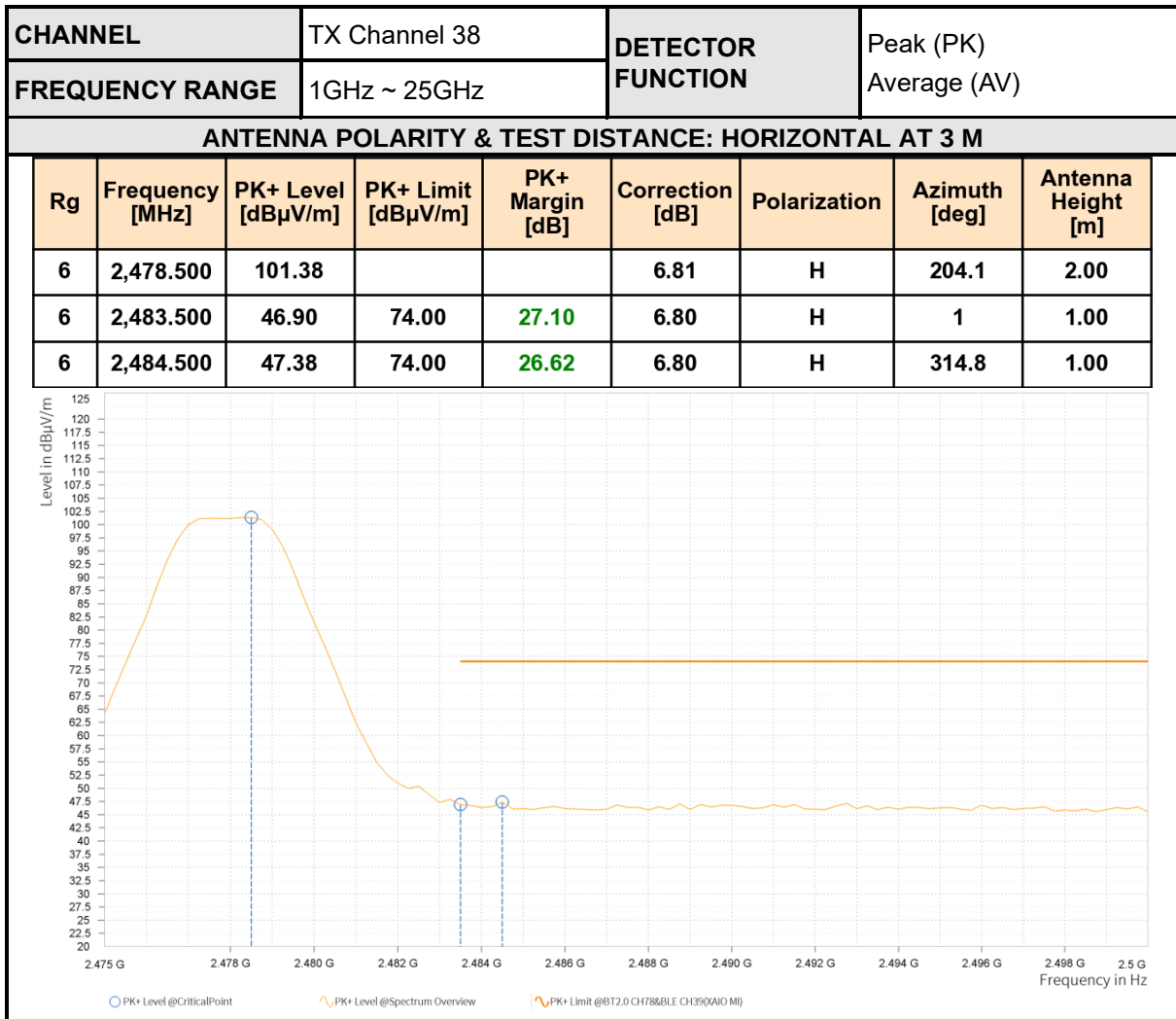
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	4,880.000	50.61	74.00	23.39	39.39	54.00	14.61	14.77	V	359	1.00
2	7,320.000	55.74	74.00	18.26	44.92	54.00	9.08	21.11	V	343	1.00



REMARKS:

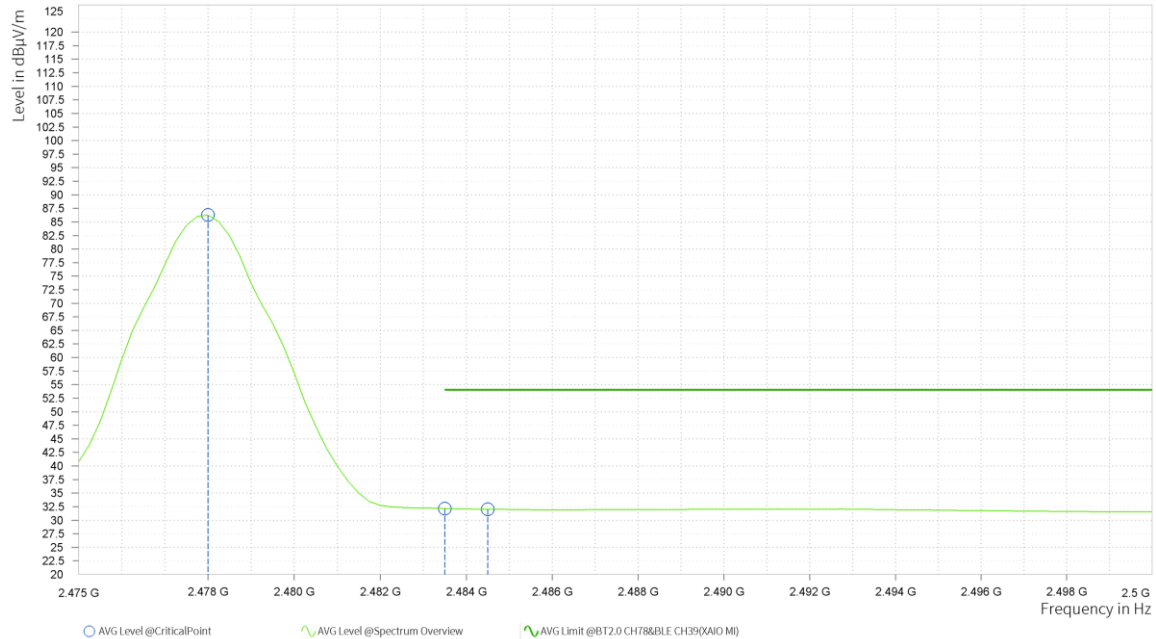
- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor.
- Margin value = Limit value–Emission level.
- 2440MHz: Fundamental frequency.





ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

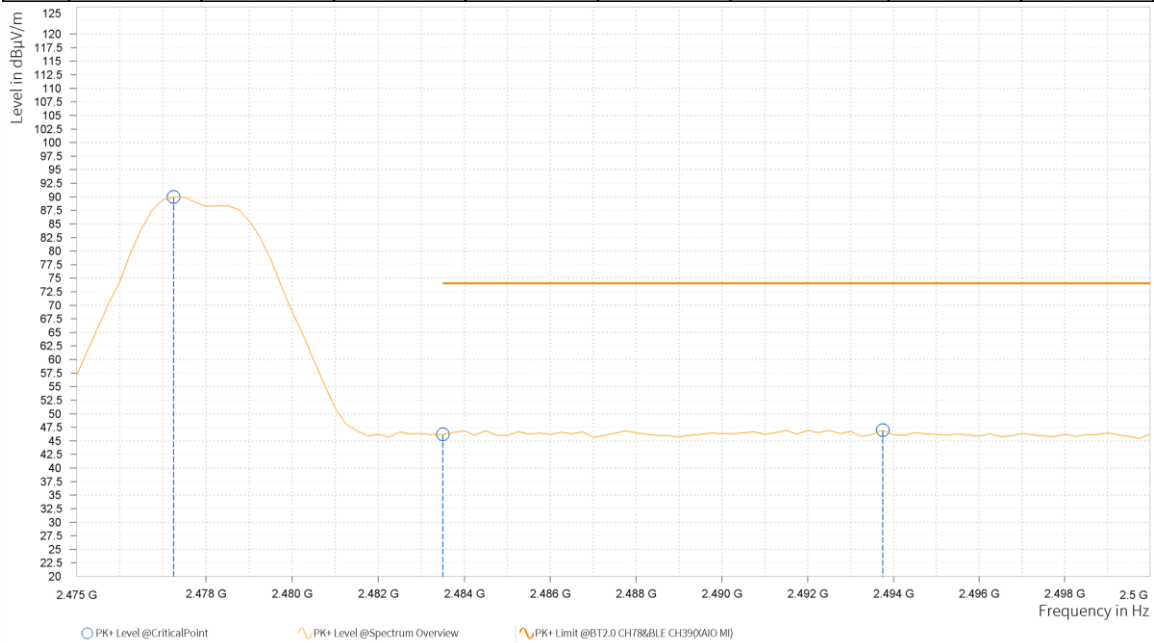
Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,478.000	86.26			6.81	H	204.2	2.00
6	2,483.500	32.16	54.00	21.84	6.80	H	204.2	2.00
6	2,484.500	32.03	54.00	21.97	6.80	H	204.2	2.00





ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

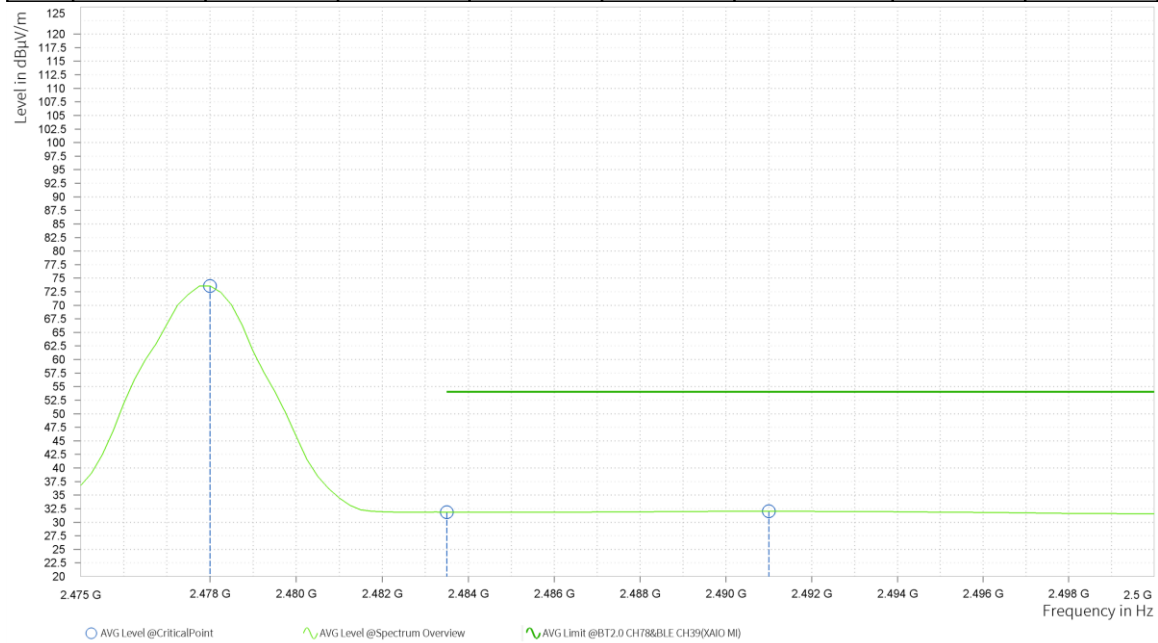
Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,477.250	89.96			6.81	V	125.3	2.00
6	2,483.500	46.20	74.00	27.80	6.80	V	284.2	2.00
6	2,493.750	46.97	74.00	27.03	6.80	V	205.4	2.00





ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,478.000	73.58			6.81	V	75.8	1.00
6	2,483.500	31.84	54.00	22.16	6.80	V	1.6	2.00
6	2,491.000	32.03	54.00	21.97	6.80	V	1	2.00



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
- Margin value = Limit value–Emission level.
- 2478MHz: Fundamental frequency.

3.3 6 dB BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	R&S	ESW 44	101973	Feb.24,24	Feb.23,26
Open Switch and Control Unit	R&S	OSP-B157W8	100836	N/A	N/A
Vector Signal Generator	R&S	SMBV100B	102176	Feb.15,24	Feb.14,26
Signal Generator	R&S	SMB100A03	182185	Feb.15,24	Feb.14,26
Wideband Radio Communication	R&S	CMW500	169399	Jun.25,24	Jun.24,26
Hygrothermograph	DELI	20210528	SZ015	Sep.05,24	Sep.04,26
PC	LENOVO	E14	HRSW0024	N/A	N/A
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.27,24	Apr.26,26
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.27,24	Apr.26,26
Test Software	EMC32	EMC32	N/A	N/A	N/A
Temperature Chamber	votsch	VT4002	58566078100050	May.30,24	May.29,26
Power Meter	R&S	NRX	102380	Feb.15,24	Feb.14,26
Power Meter probe	R&S	NRP6A	102942	Feb.15,24	Feb.14,26

NOTE:

1. The calibration interval of the above test instruments is 12/ 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.



3.3.3 TEST PROCEDURE

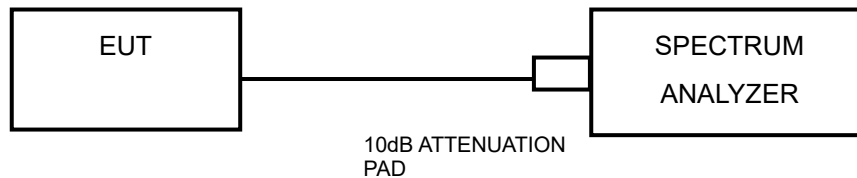
1. Set RBW = shall be in the range of 1% to 5% of the 0BW but not less than 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



3.3.4 DEVIATION FROM TEST STANDARD

No deviation.

3.3.5 TEST SETUP



3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.3.7 TEST RESULTS

Please Refer to Appendix B Of this test report..

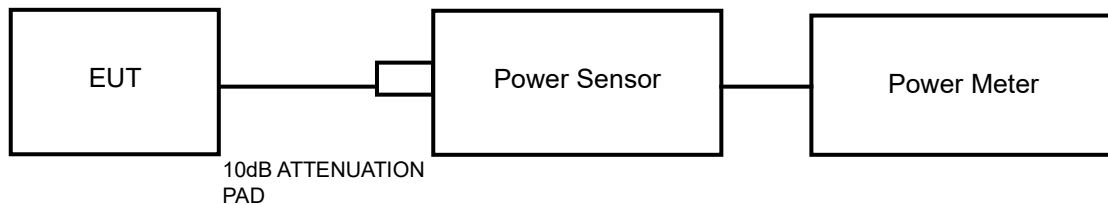


3.4 CONDUCTED OUTPUT POWER

3.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



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3.4.7 TEST RESULTS

3.4.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix B Of this test report..



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3.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

Please Refer to Appendix B Of this test report..

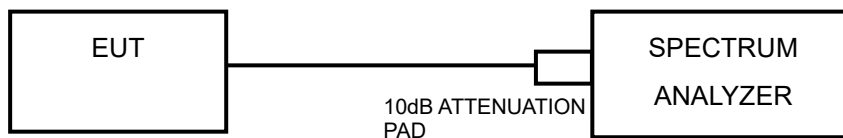


3.5 POWER SPECTRAL DENSITY MEASUREMENT

3.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.2 TEST SETUP



3.5.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.5.4 TEST PROCEDURE

1. Set the span to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW $\geq 3 \times$ RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

3.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



Please Refer to Appendix B Of this test report..

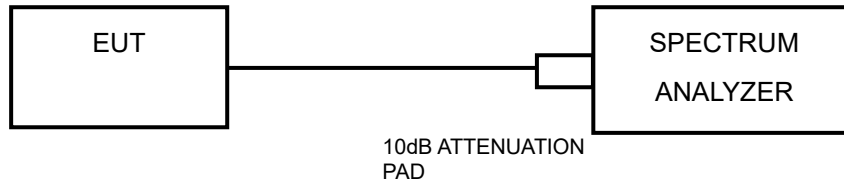


3.6 OUT OF BAND EMISSION MEASUREMENT

3.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.6.2 TEST SETUP



3.6.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.



MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

3.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.6.7 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix B Of this test report..



3.7 ANTENNA REQUIREMENTS

3.7.1 STANDARD APPLICABLE

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.7.2 ANTENNA CONNECTED CONSTRUCTION

An embedded-in antenna design is used.

3.7.3 ANTENNA GAIN

According to FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain=GANT +Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain= 10 log(NANT/ Nss) dB;

For power measurements on IEEE 802.11 devices,Array Gain = 0 dB for NANT≤ 4;

The EUT supports Cyclic Delay Diversity (CDD) mode,

For power measurements,the directional GANT is set equal to the antenna having the highest gain as following formulas.

Directional Gain = Max.Gain + Array Gain.

For PSD measurements,the directional GANT is calculation is following F)2)f)ii of KDB 662911 D01 v02r01.

The directional gain is calculated as following table.

2.4GHz	Ant 0 (dBi)	Ant 1 (dBi)	DG For Power (dBi)	DG For PSD (dBi)	Beamforming Gain	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	-0.02	-2.74	-0.02	1.63	3.01	-6.02	-4.37

NOTE: DG= directional gain, Power Limit Reduction = DG For Power Gain -6dbi<0
PSD Limit Reduction = DG For PSD – 6dBi<0. Therefore, it is not necessary to reduce maximum peak output power and PSD limit.



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4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



Test Report No.: PSZ-QBJ2501200112RF10

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

**6 APPENDIX B:BLE****DTS BANDWIDTH****ANT0 TEST RESULT**

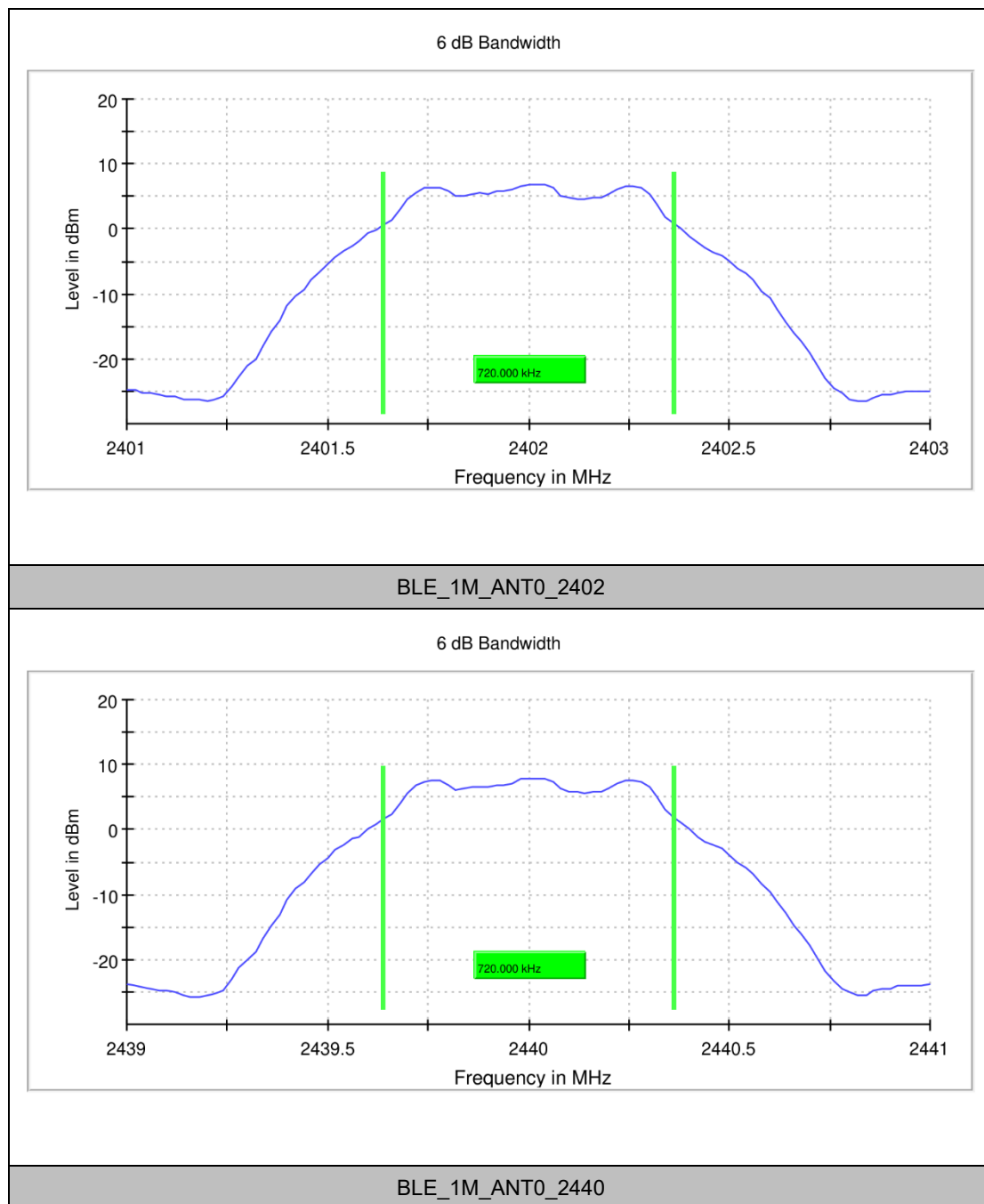
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	ANT0	2402	0.720	2401.640	2402.360	0.5	PASS
		2440	0.720	2439.640	2440.360	0.5	PASS
		2480	0.720	2479.640	2480.360	0.5	PASS
BLE_2M	ANT0	2404	1.240	2403.400	2404.640	0.5	PASS
		2440	1.280	2439.360	2440.640	0.5	PASS
		2478	1.280	2477.360	2478.640	0.5	PASS

ANT1 TEST RESULT

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	ANT1	2402	0.720	2401.640	2402.360	0.5	PASS
		2440	0.720	2439.640	2440.360	0.5	PASS
		2480	0.720	2479.640	2480.360	0.5	PASS
BLE_2M	ANT1	2404	1.280	2403.360	2404.640	0.5	PASS
		2440	1.280	2439.360	2440.640	0.5	PASS
		2478	1.240	2477.400	2478.640	0.5	PASS

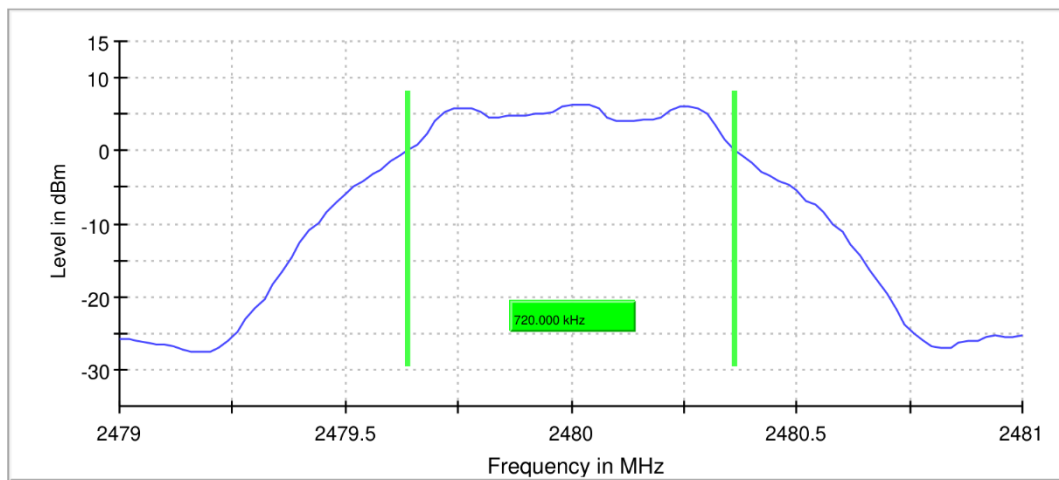


ANT0 TEST GRAPHS



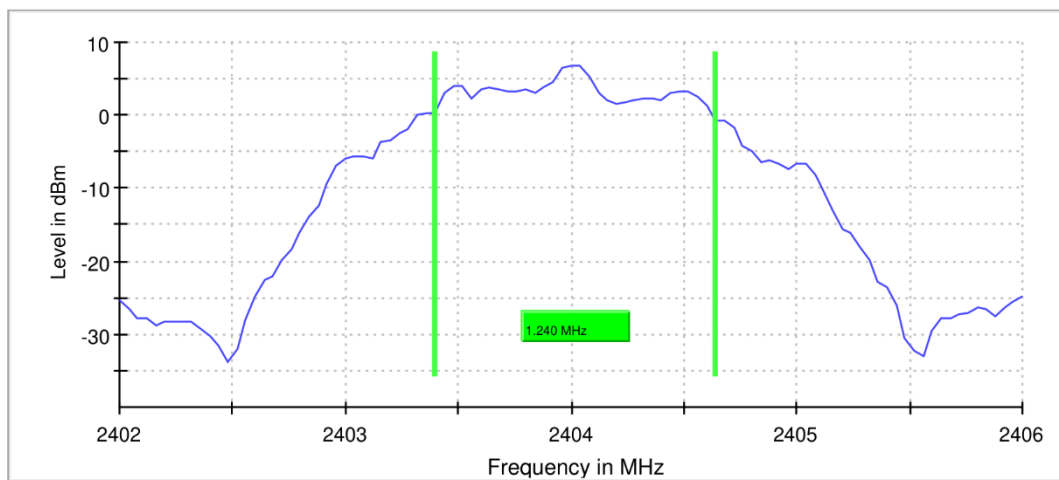


6 dB Bandwidth

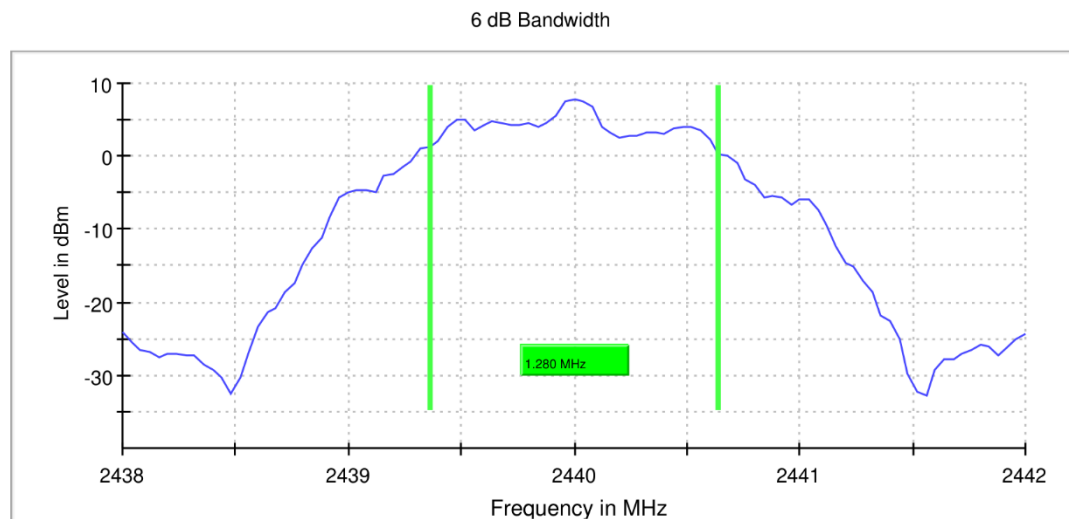


BLE_1M_ANT0_2480

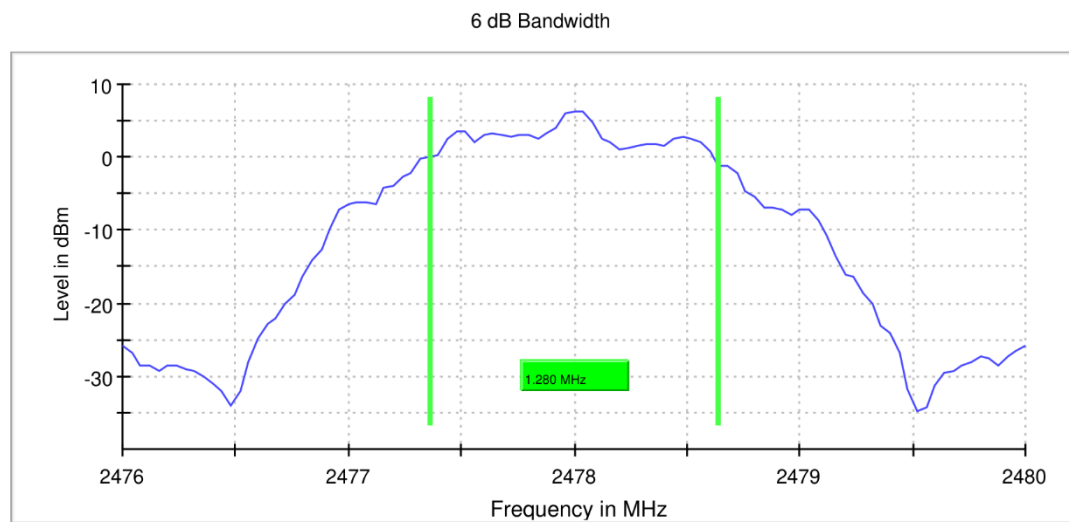
6 dB Bandwidth



BLE_2M_ANT0_2404



BLE_2M_ANT0_2440



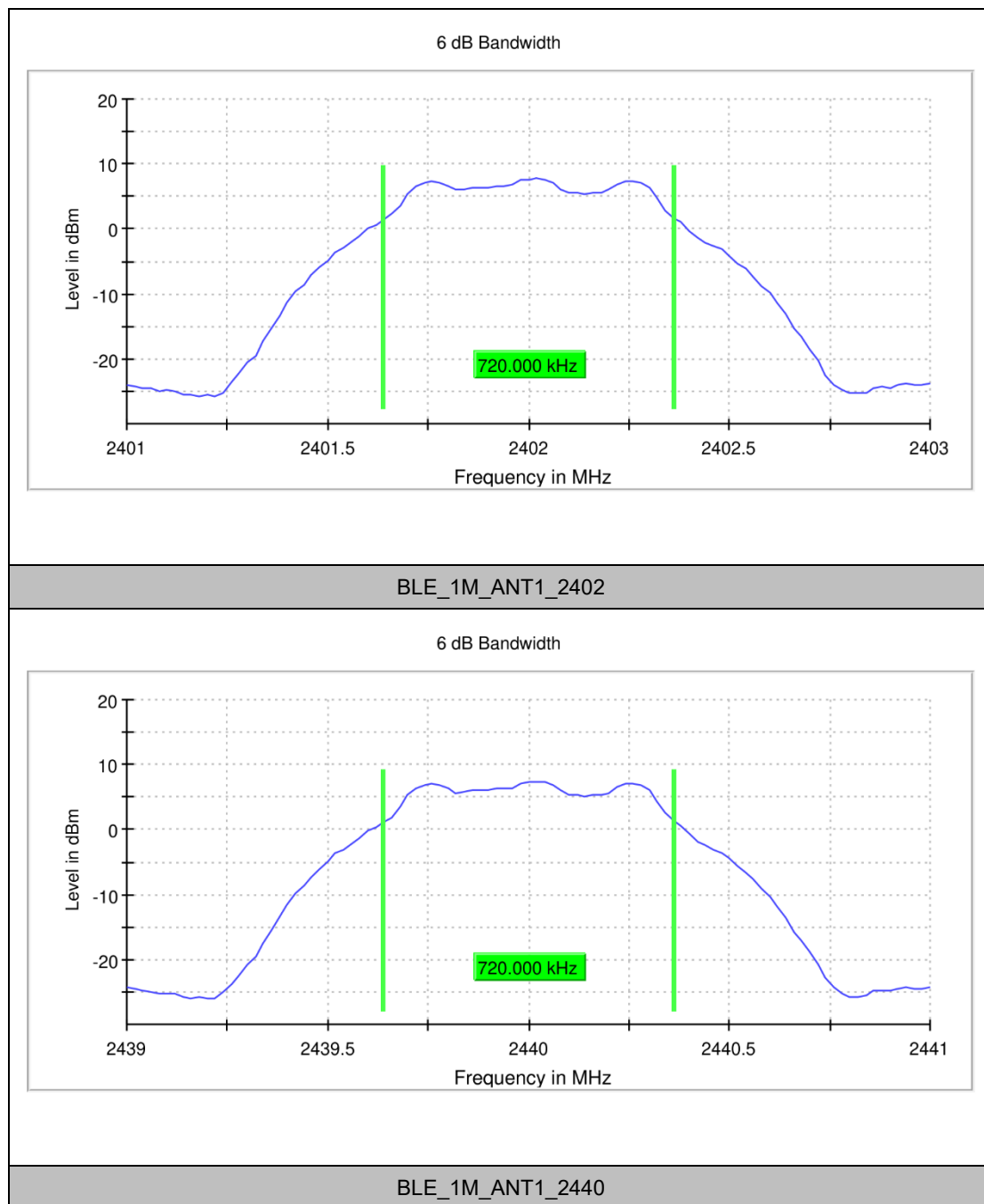
BLE_2M_ANT0_2478

RBW 100.000 kHz

VBW 300.000 kHz

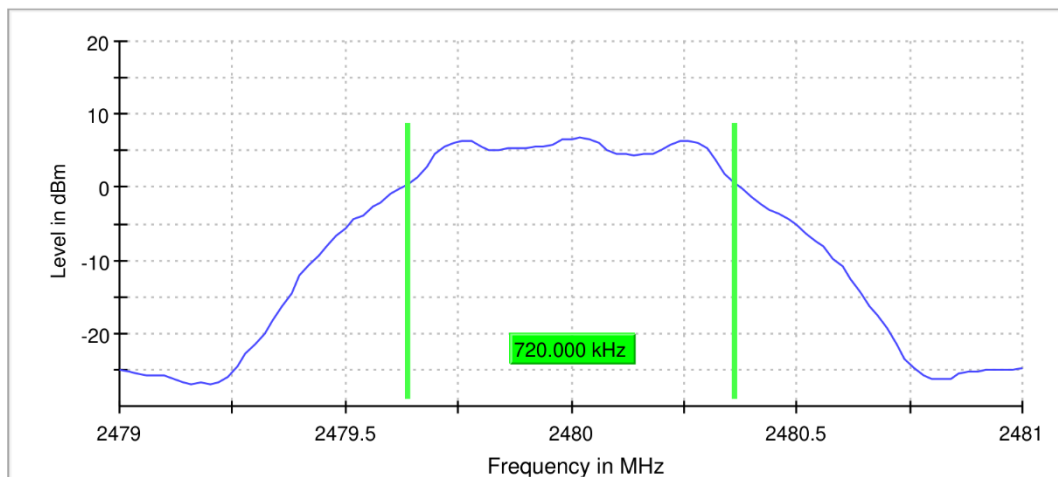


ANT1 TEST GRAPHS



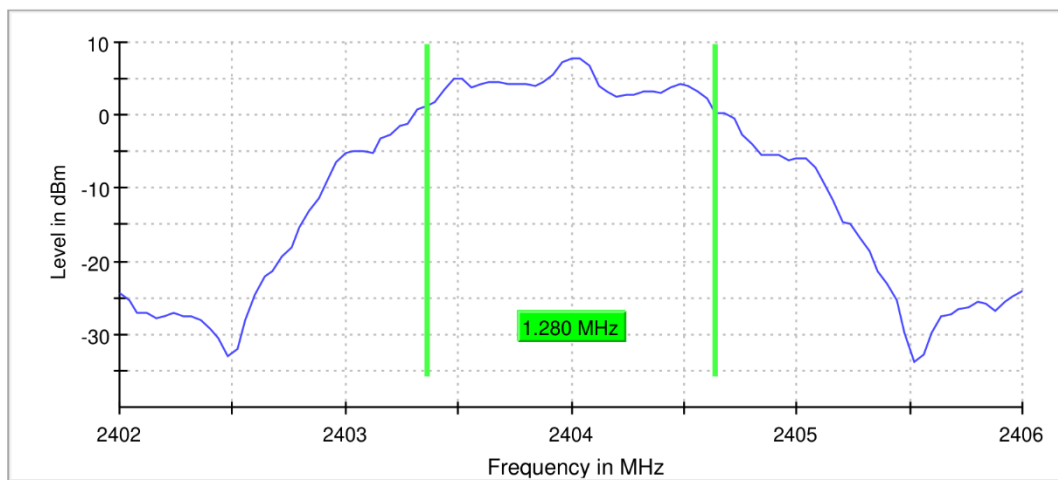


6 dB Bandwidth



BLE_1M_ANT1_2480

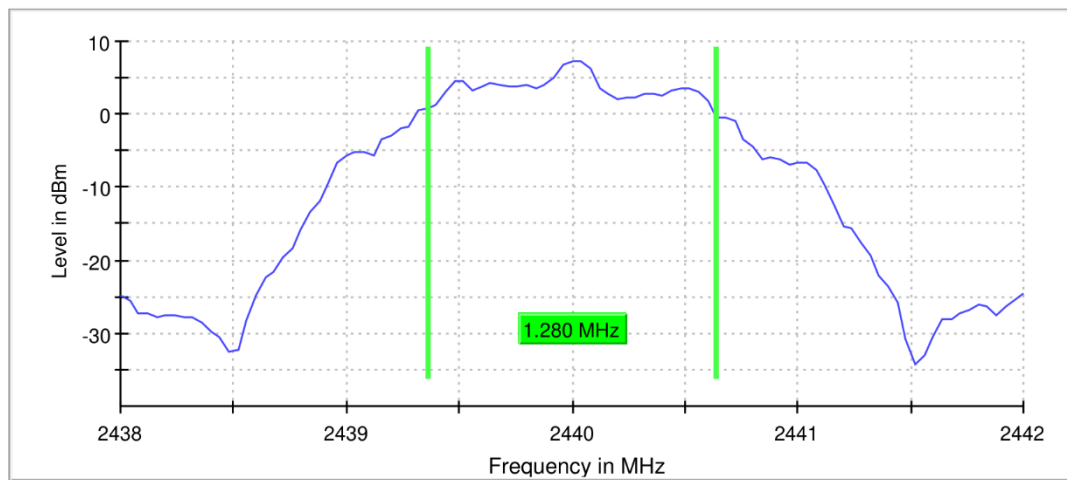
6 dB Bandwidth



BLE_2M_ANT1_2404

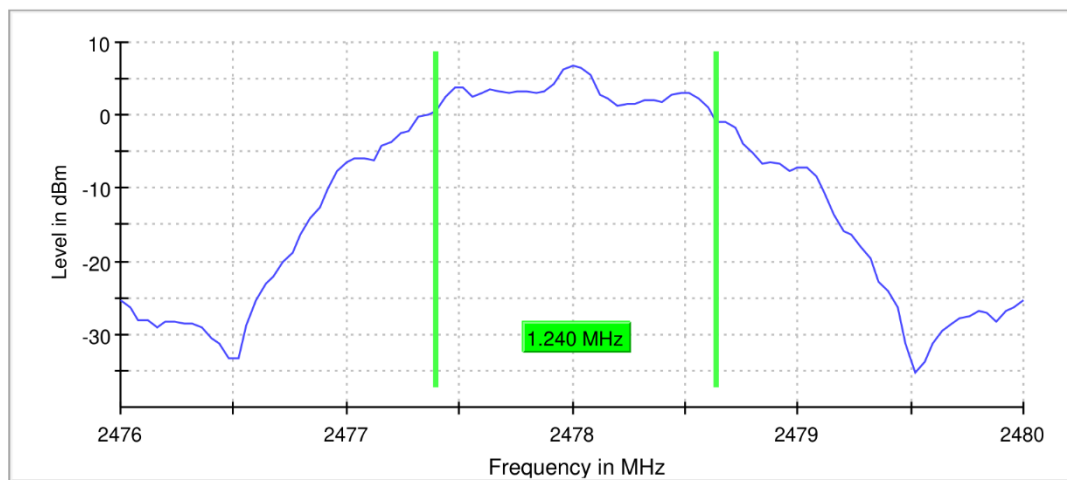


6 dB Bandwidth



BLE_2M_ANT1_2440

6 dB Bandwidth



BLE_2M_ANT1_2478

RBW 100.000 kHz

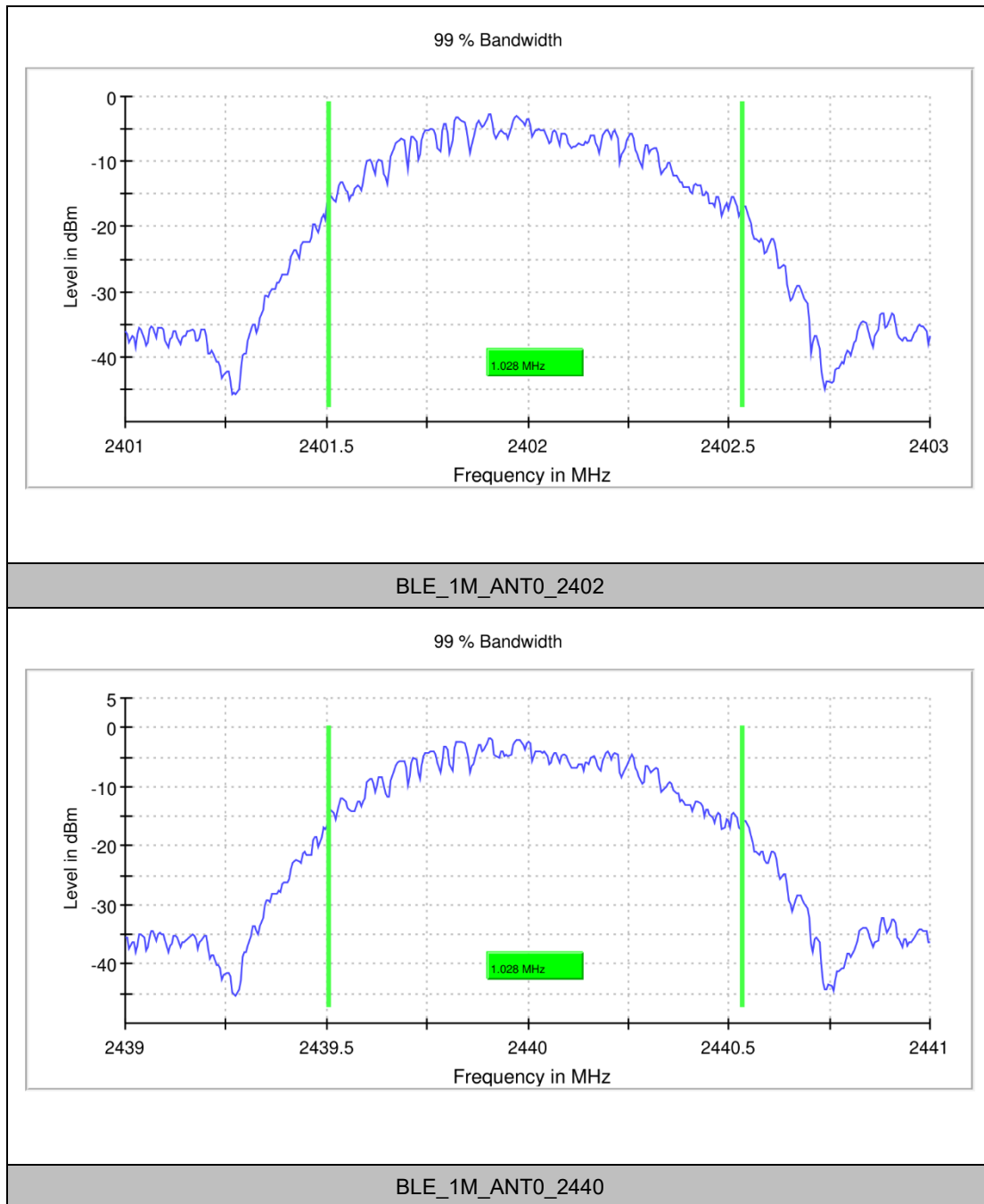
VBW 300.000 kHz

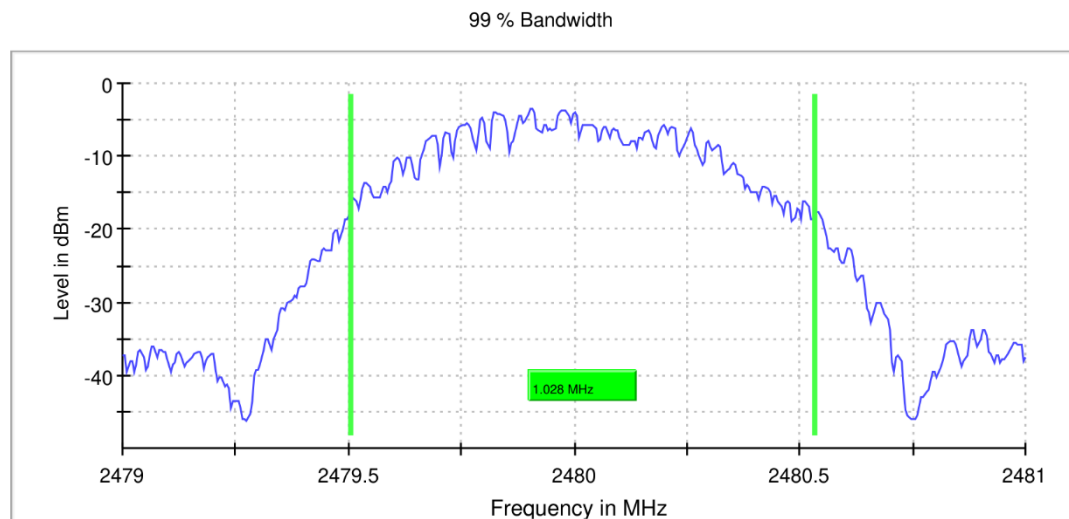
**OCCUPIED CHANNEL BANDWIDTH****TEST RESULT**

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	ANT0	2402	1.028	2401.506	2402.534	2400-24835	PASS
		2440	1.028	2439.506	2440.534	2400-24835	PASS
		2480	1.028	2479.506	2480.534	2400-24835	PASS
BLE_2M	ANT0	2404	2.045	2403.003	2405.048	2400-24835	PASS
		2440	2.045	2439.003	2441.048	2400-24835	PASS
		2478	2.045	2477.003	2479.048	2400-24835	PASS

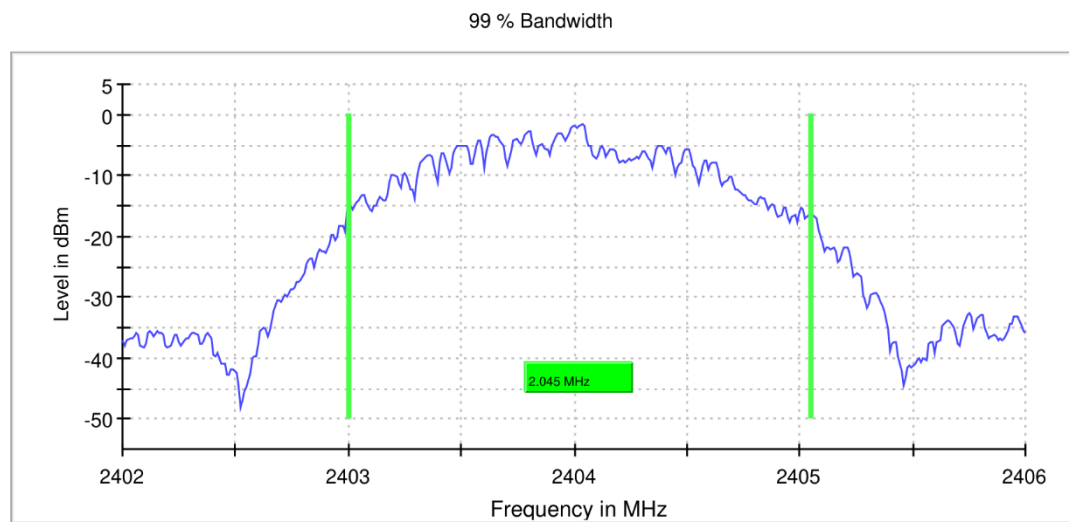


TEST GRAPHS





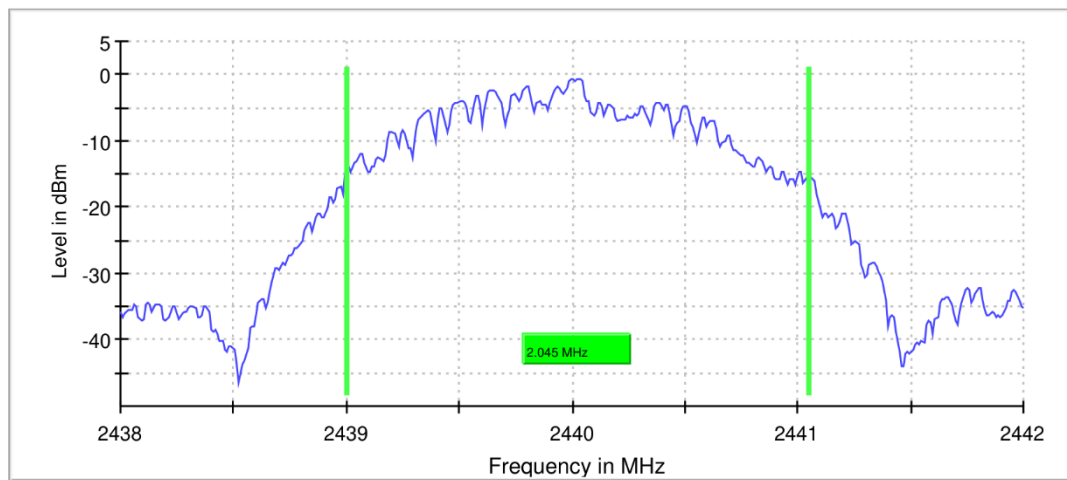
BLE_1M_ANT0_2480



BLE_2M_ANT0_2404

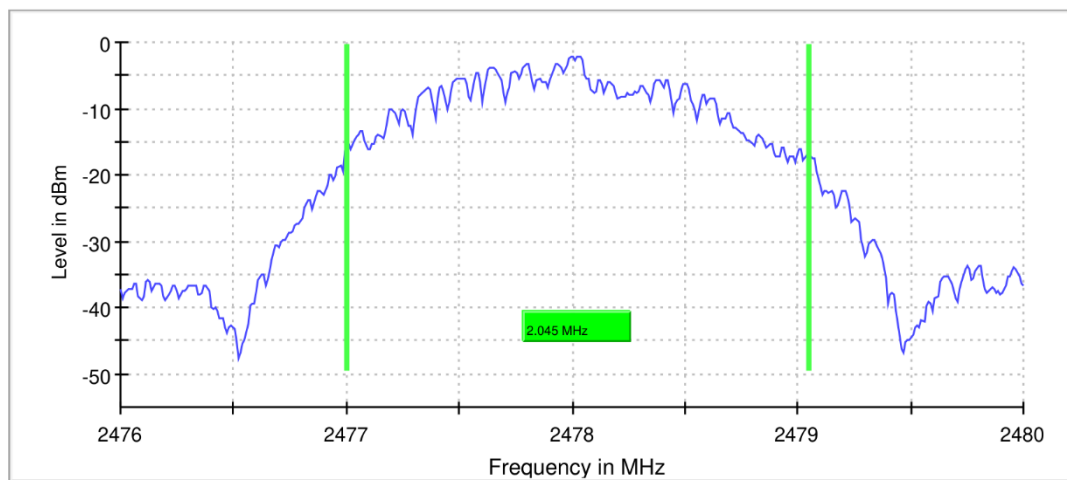


99 % Bandwidth



BLE_2M_ANT0_2440

99 % Bandwidth



BLE_2M_ANT0_2478

RBW 30.000 kHz

VBW 100.000 kHz

**MAXIMUM CONDUCTED OUTPUT POWER****TEST RESULT**

TestMode	Antenna	Channel	Average power [dBm]	Peak power [dBm]	Peak power [mw]	Limit [dBm]	Verdict	Power Setting
BLE_1M	Ant0	2402	7.33	7.94	6.22	≤30	PASS	7
		2440	8.36	9.27	8.45	≤30	PASS	7
		2480	6.58	7.26	5.32	≤30	PASS	7
BLE_2M	Ant0	2404	7.28	7.93	6.21	≤30	PASS	7
		2440	8.39	9.09	8.11	≤30	PASS	7
		2478	6.67	7.37	5.46	≤30	PASS	7

TestMode	Antenna	Channel	Average power [dBm]	Peak power [dBm]	Peak power [mw]	Limit [dBm]	Verdict	Power Setting
BLE_1M	ANT1	2402	7.22	7.93	6.21	≤30	PASS	7
		2440	7.68	8.57	7.19	≤30	PASS	7
		2480	6.71	7.46	5.57	≤30	PASS	7
BLE_2M	ANT1	2404	7.33	8.15	6.53	≤30	PASS	7
		2440	7.76	8.37	6.87	≤30	PASS	7
		2478	6.92	7.70	5.89	≤30	PASS	7

MAXIMUM POWER SPECTRAL DENSITY**ANT0 TEST RESULT**

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	ANT0	2402	-8.04	≤8	PASS
		2440	-7.35	≤8	PASS
		2480	-8.97	≤8	PASS
BLE_2M	ANT0	2404	-10.26	≤8	PASS



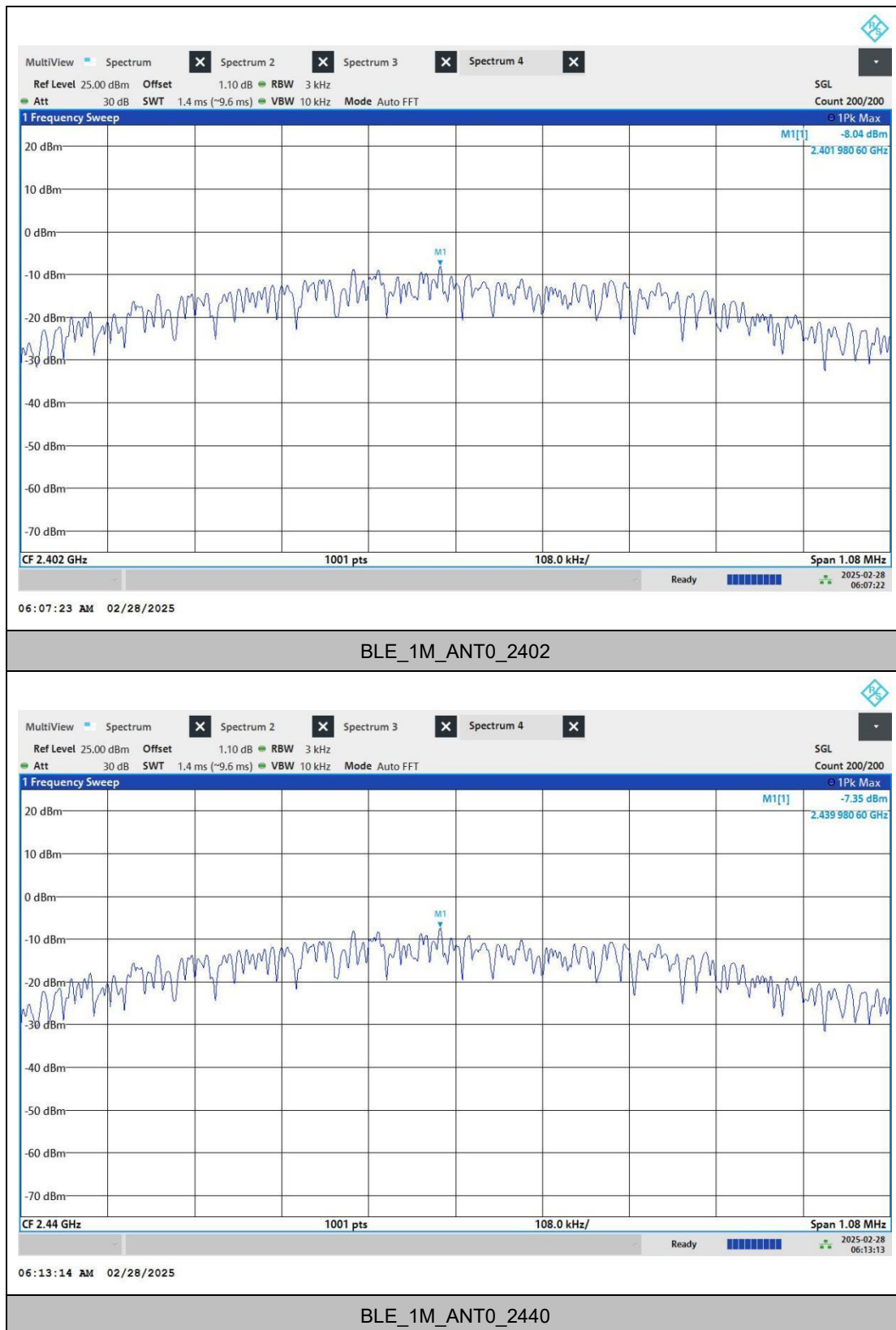
		2440	-9.54	≤8	PASS
		2478	-11.08	≤8	PASS

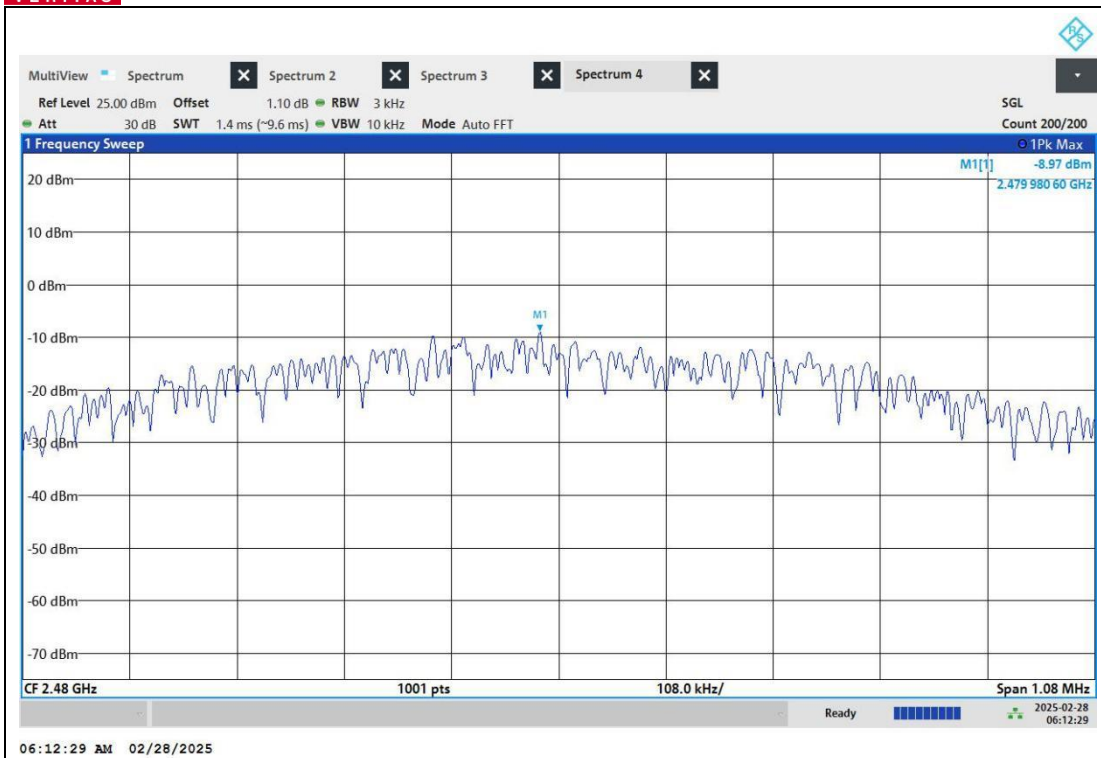
ANT1 TEST RESULT

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	ANT1	2402	-7.99	≤8	PASS
		2440	-7.91	≤8	PASS
		2480	-8.70	≤8	PASS
BLE_2M	ANT1	2404	-10.05	≤8	PASS
		2440	-10.12	≤8	PASS
		2478	-10.88	≤8	PASS

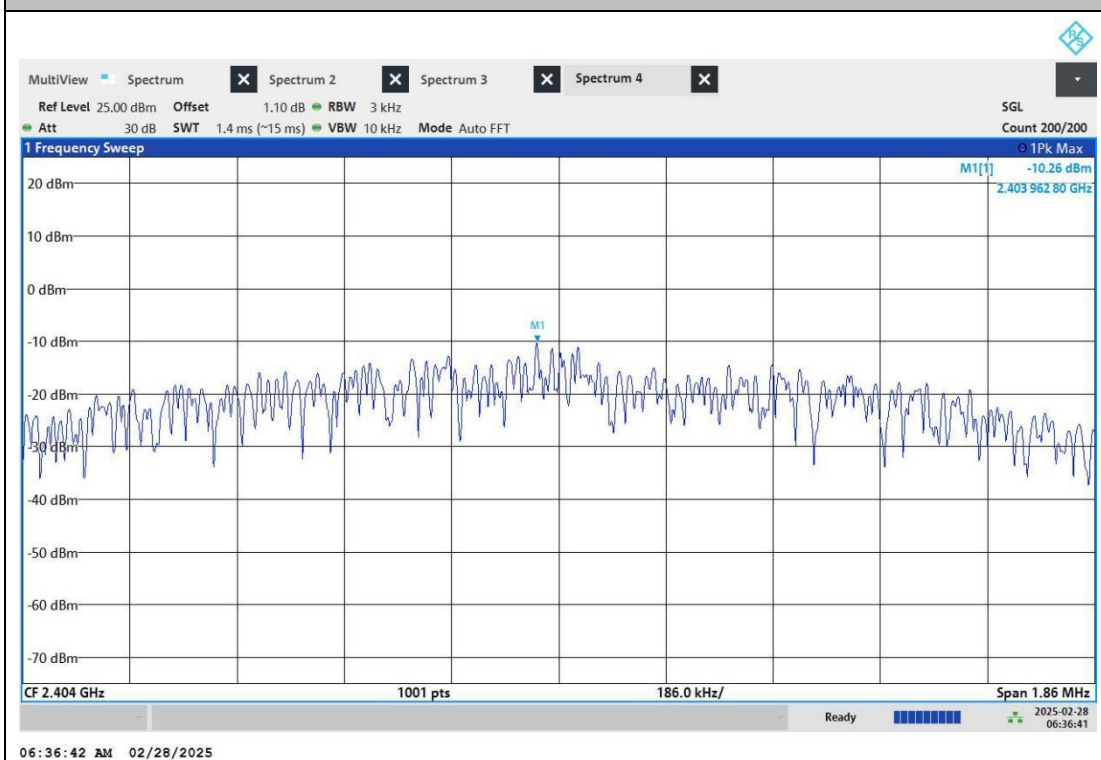


ANT0 TEST GRAPHS

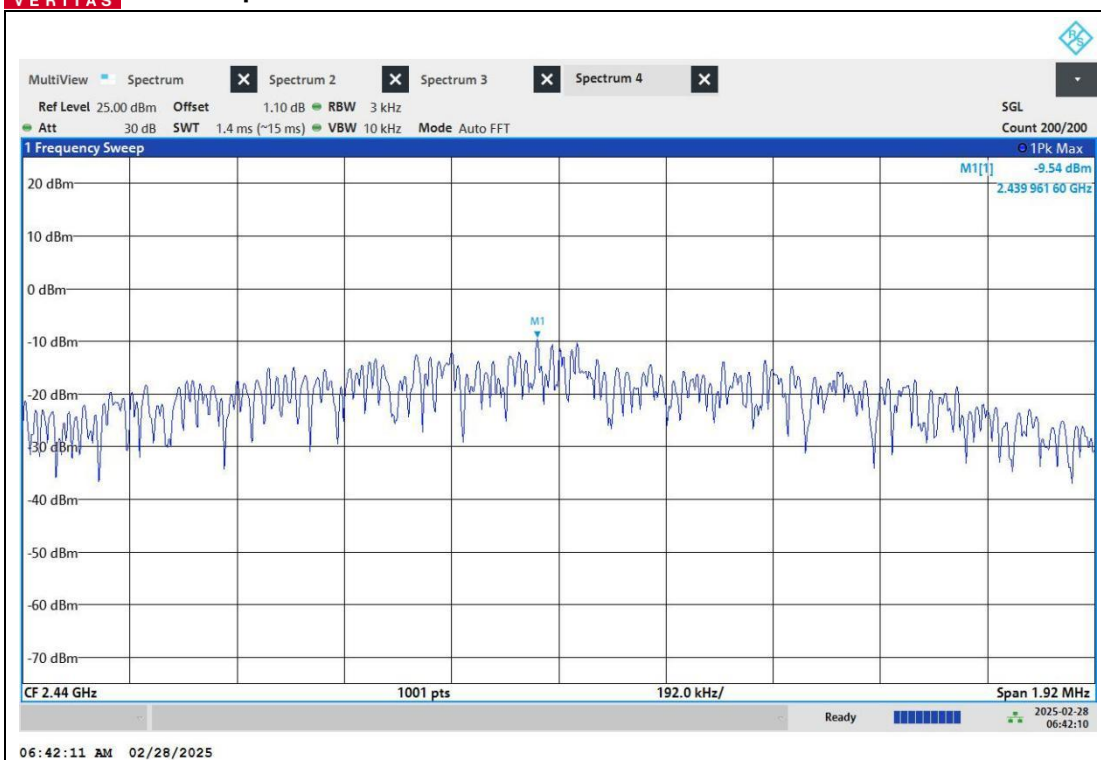




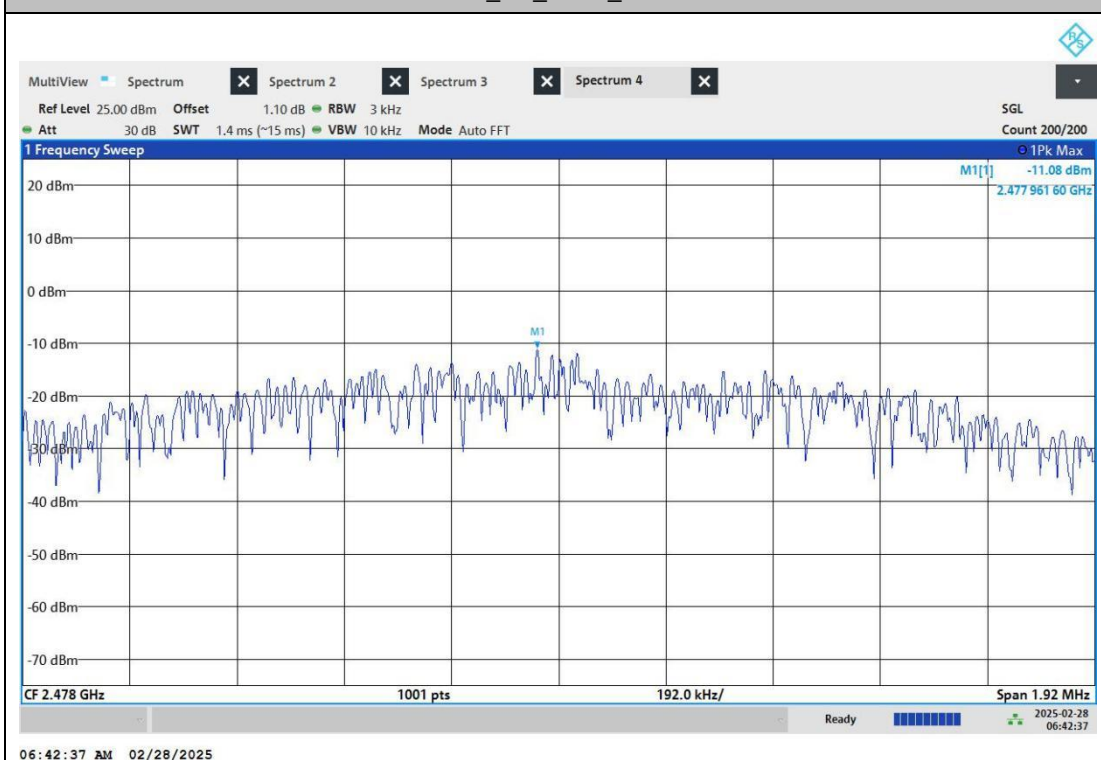
BLE_1M_ANT0_2480



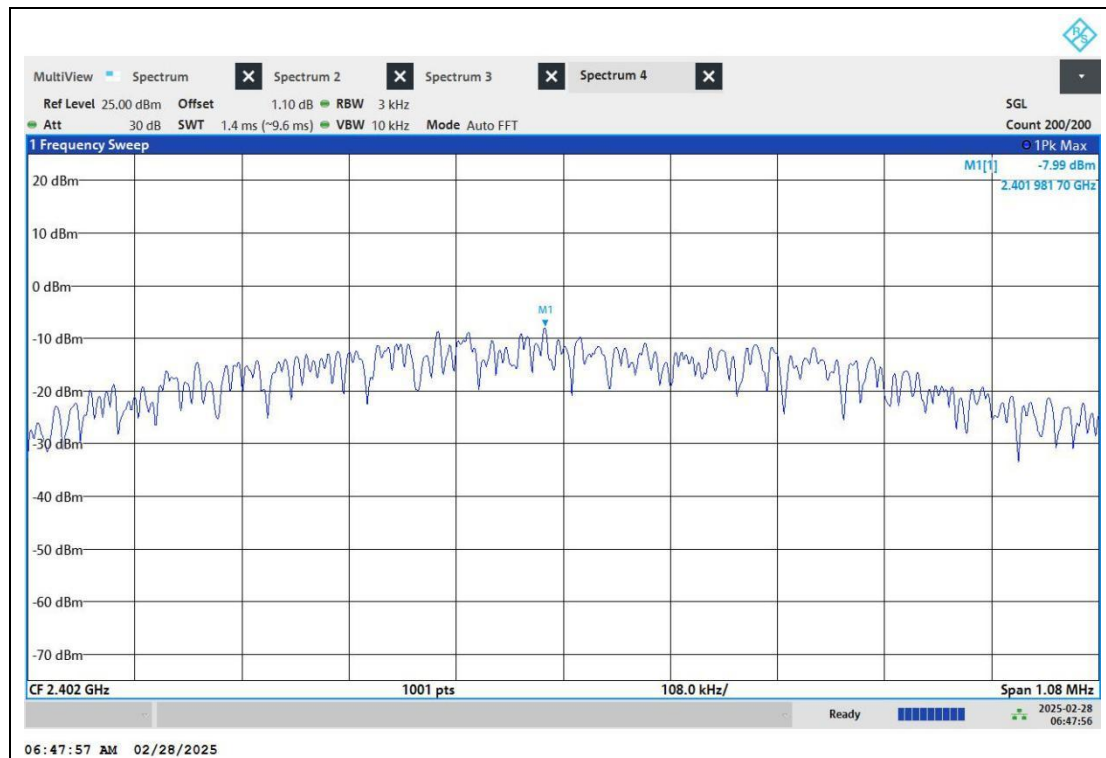
BLE_2M_ANT0_2404



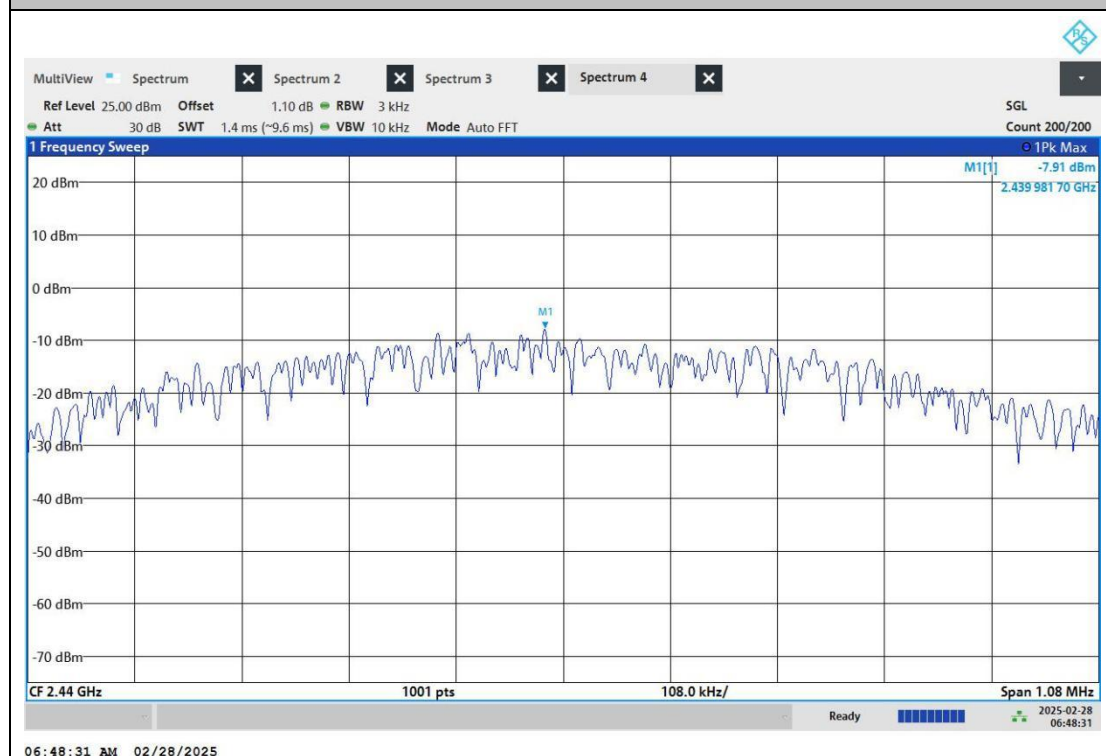
BLE_2M_ANT0_2440



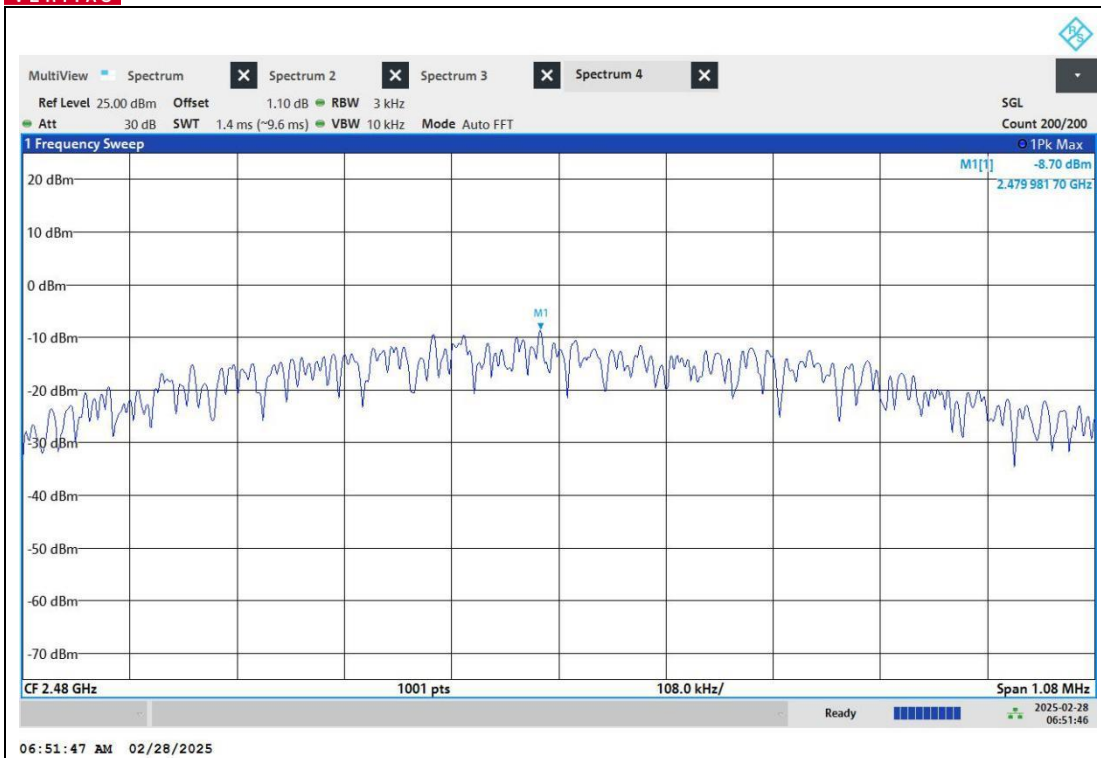
BLE_2M_ANT0_2478



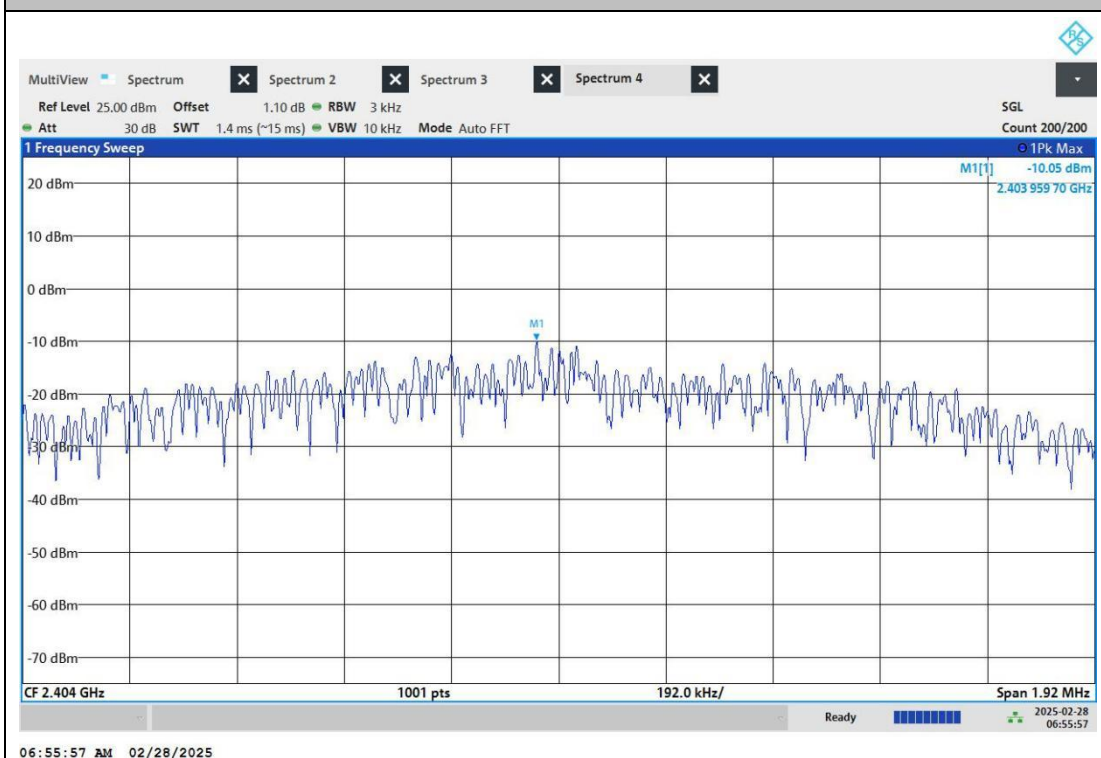
BLE_1M_ANT1_2402



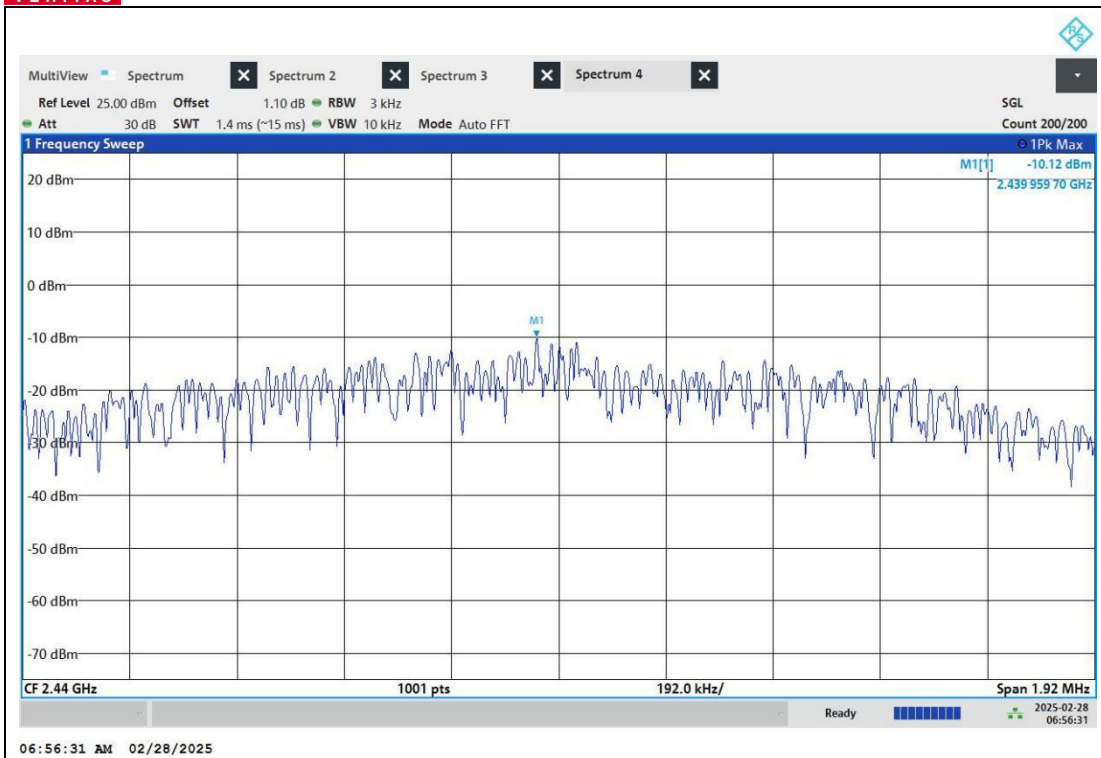
BLE_1M_ANT1_2440



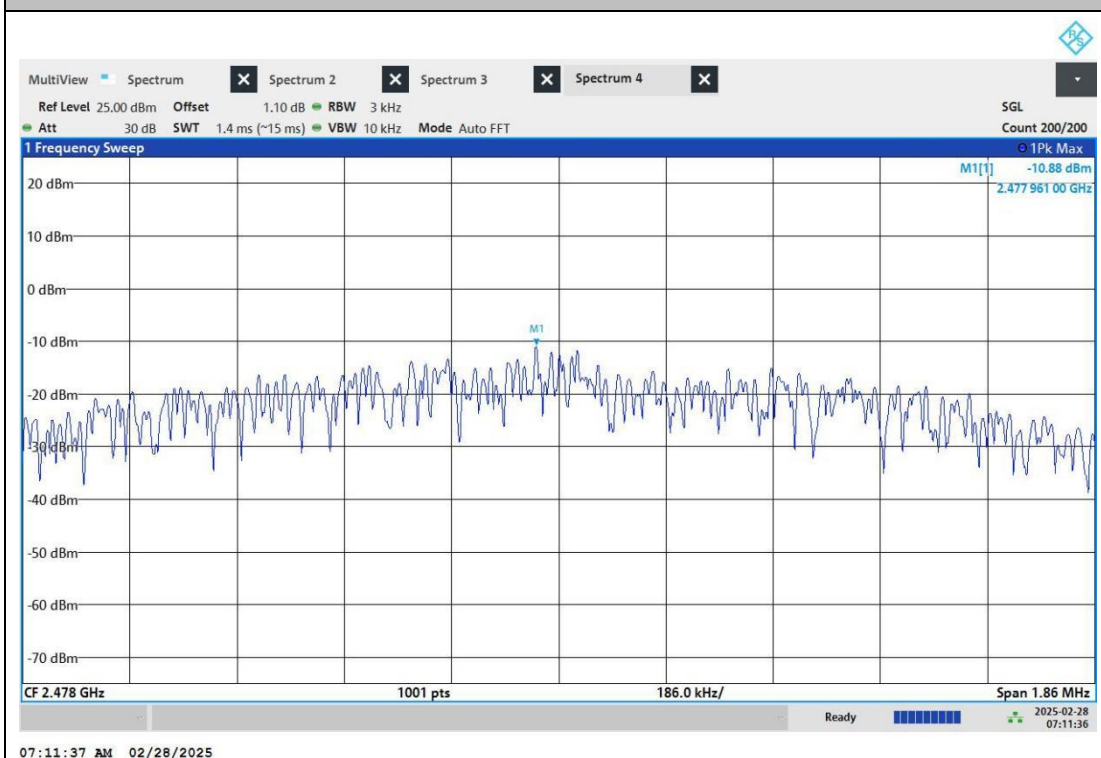
BLE_1M_ANT1_2480



BLE_2M_ANT1_2404



BLE_2M_ANT1_2440



BLE_2M_ANT1_2478



BAND EDGE MEASUREMENTS

ANT0 TEST RESULT

TestMode	Antenna	ChName	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	ANT0	Low	2402	See test graph	See test graph	PASS
		High	2480	See test graph	See test graph	PASS
BLE_2M	ANT0	Low	2404	See test graph	See test graph	PASS
		High	2478	See test graph	See test graph	PASS



ANT1 TEST RESULT

TestMode	Antenna	ChName	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	ANT1	Low	2402	See test graph	See test graph	PASS
		High	2480	See test graph	See test graph	PASS
BLE_2M	ANT1	Low	2404	See test graph	See test graph	PASS
		High	2478	See test graph	See test graph	PASS

ANT0 TEST GRAPHS

