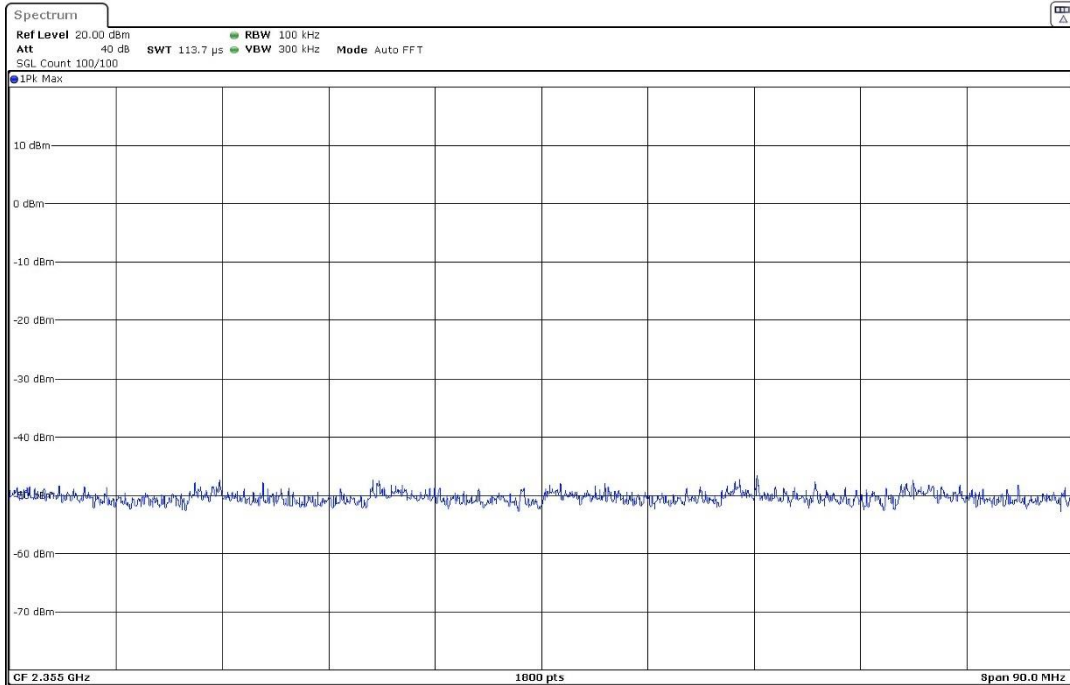
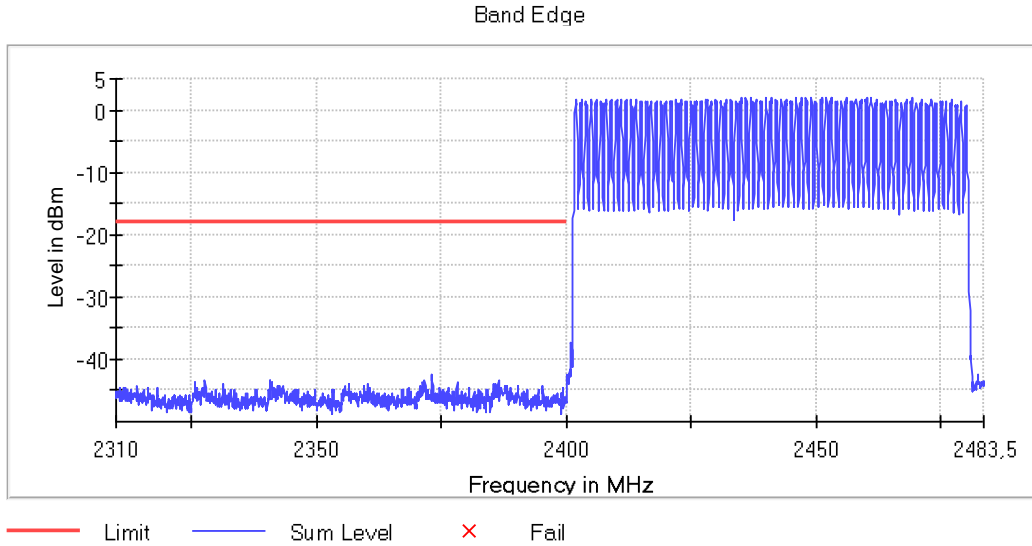
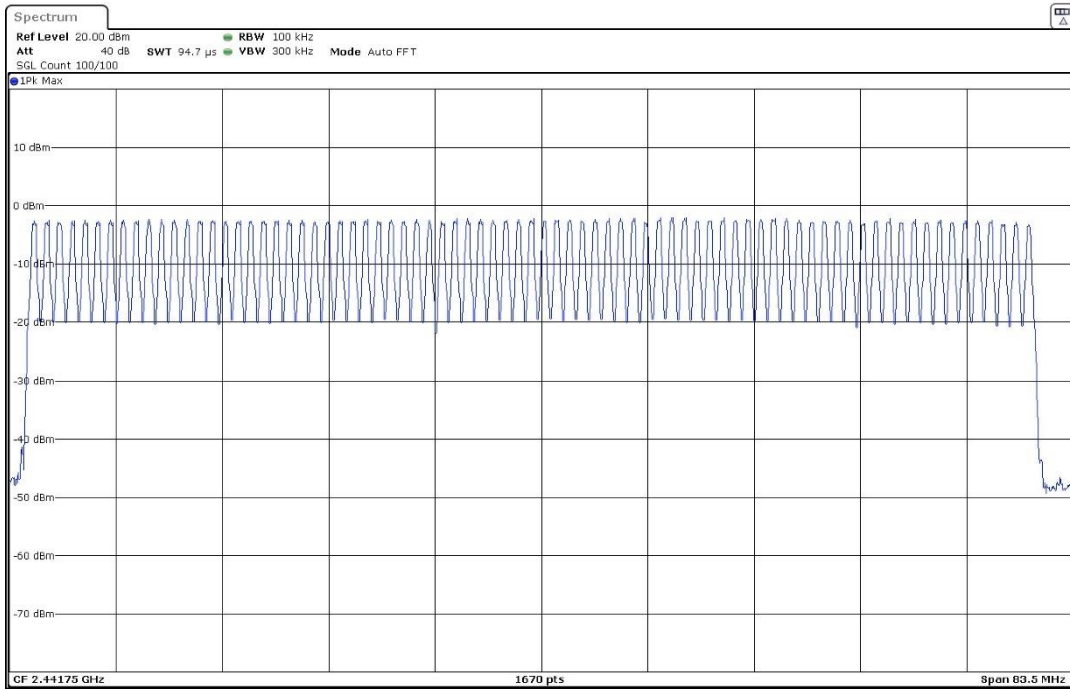


Attachments

Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2402.00, Hopping Mode: ON, Modulation: BT (GFSK 1-DH5), Number of Transmission Chains = 1

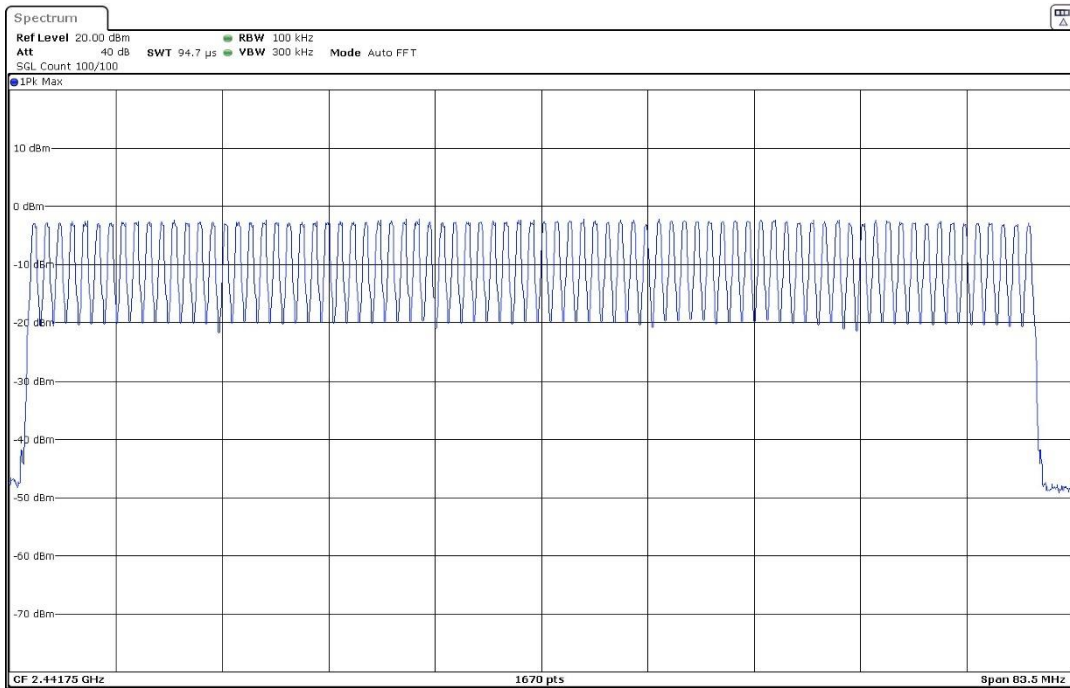
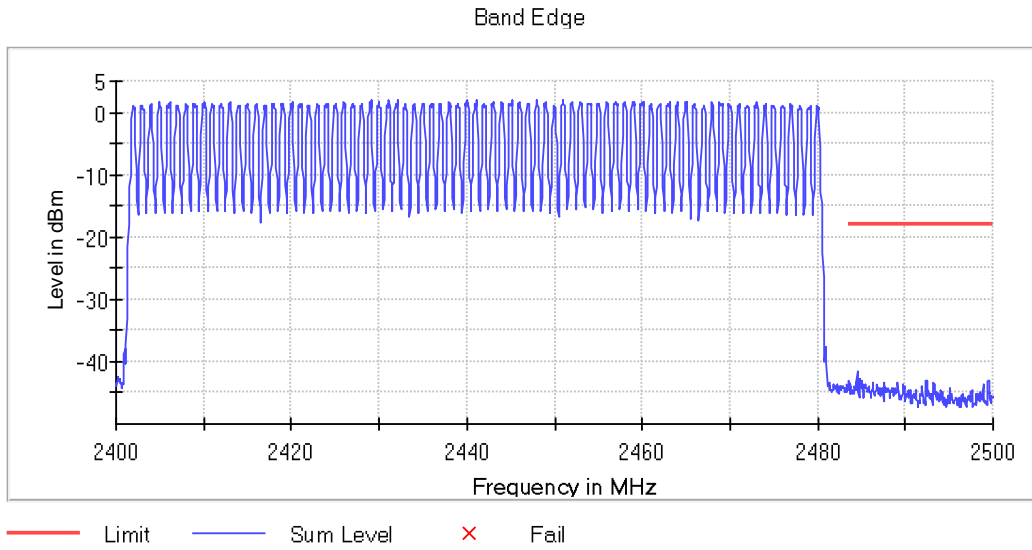
Plots:

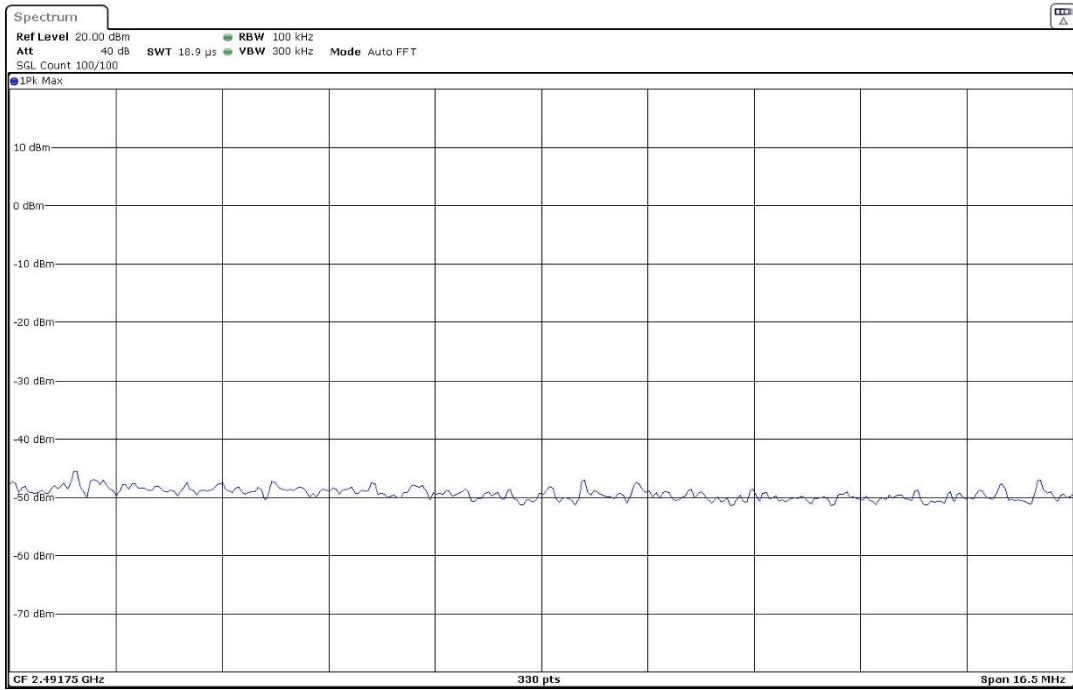




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2480.00, Hopping Mode: ON, Modulation: BT (GFSK 1-DH5), Number of Transmission Chains = 1

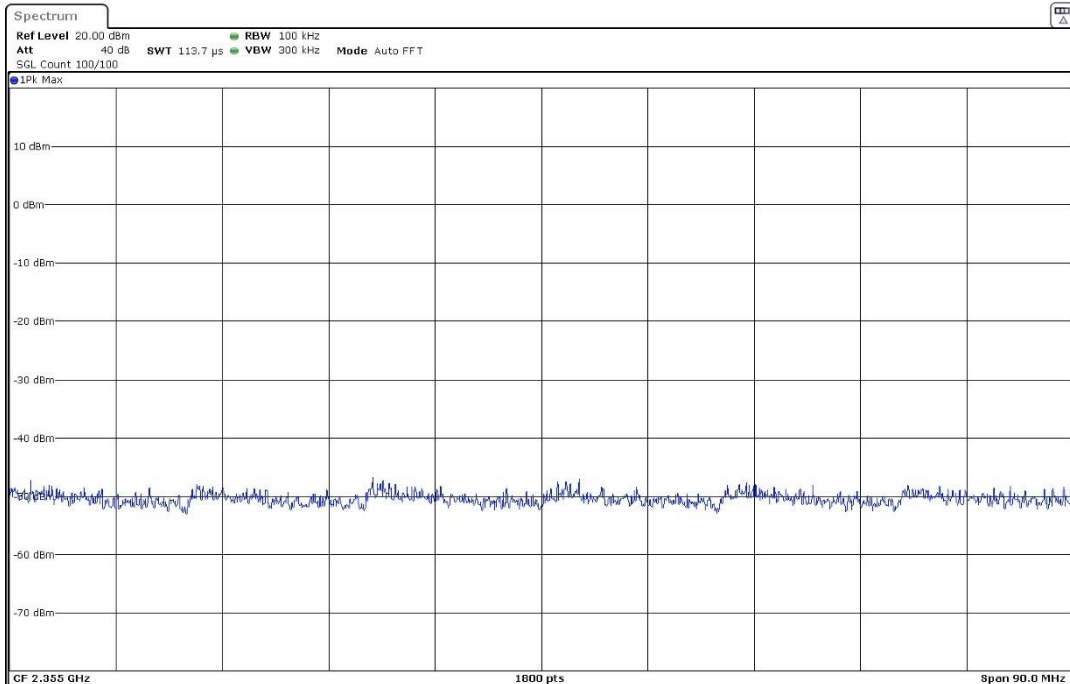
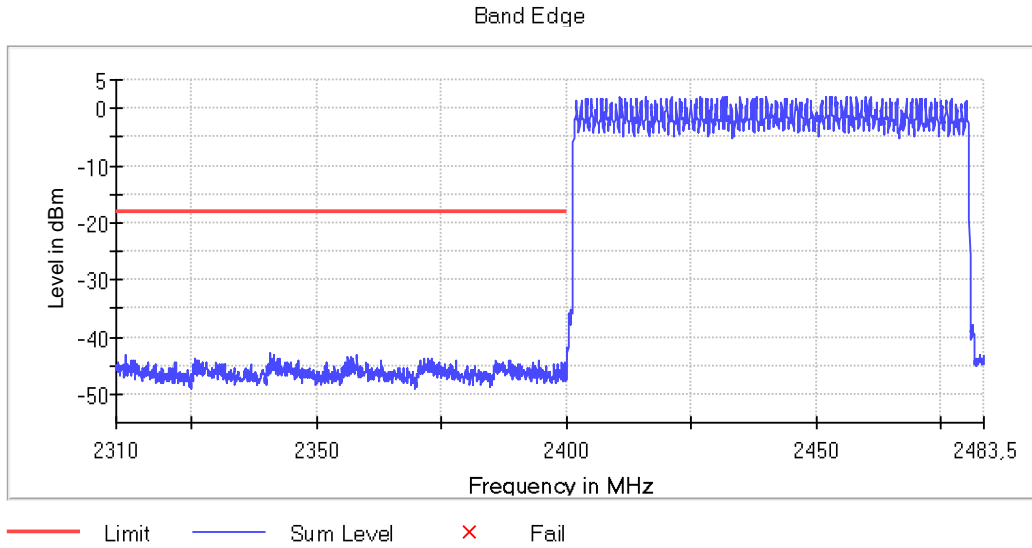
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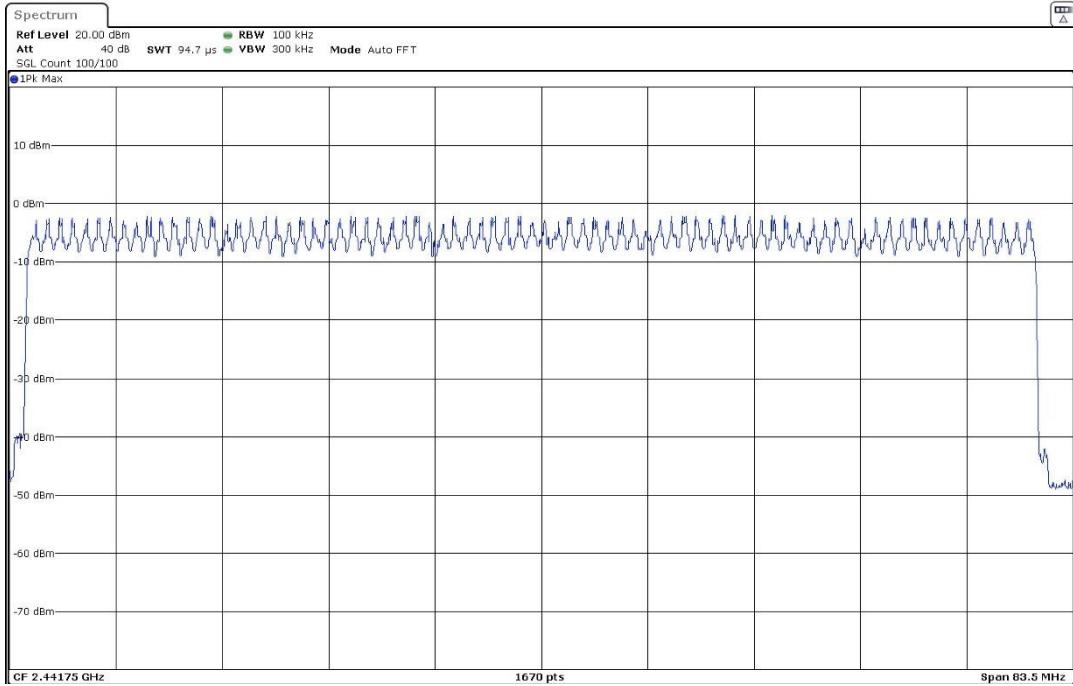




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2402.00, Hopping Mode: ON, Modulation: BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1

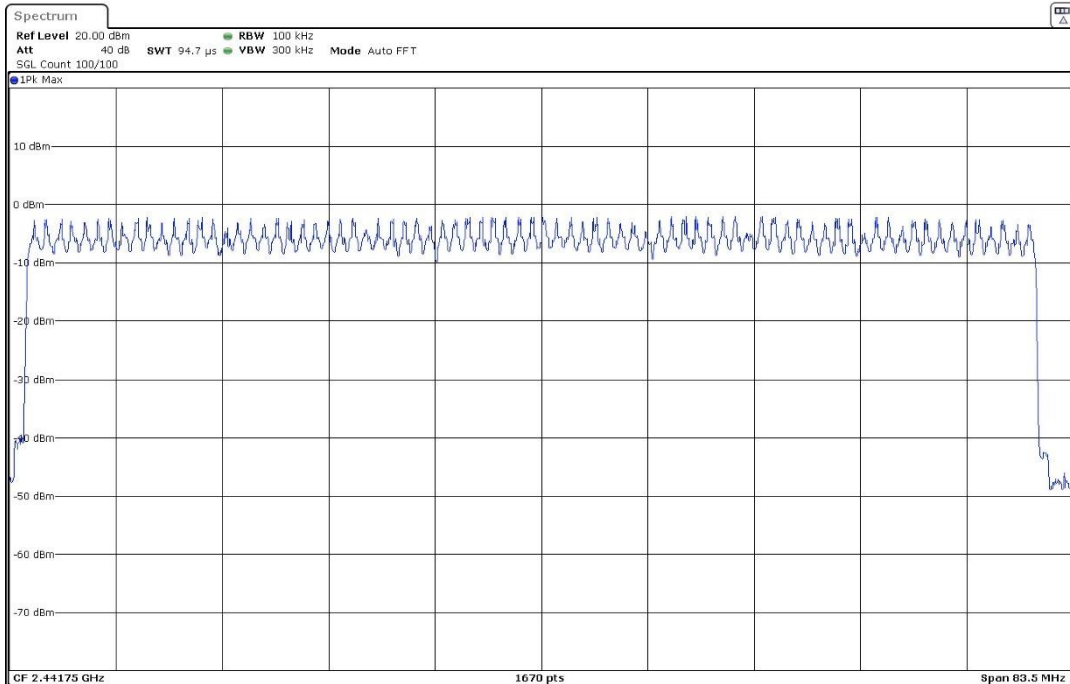
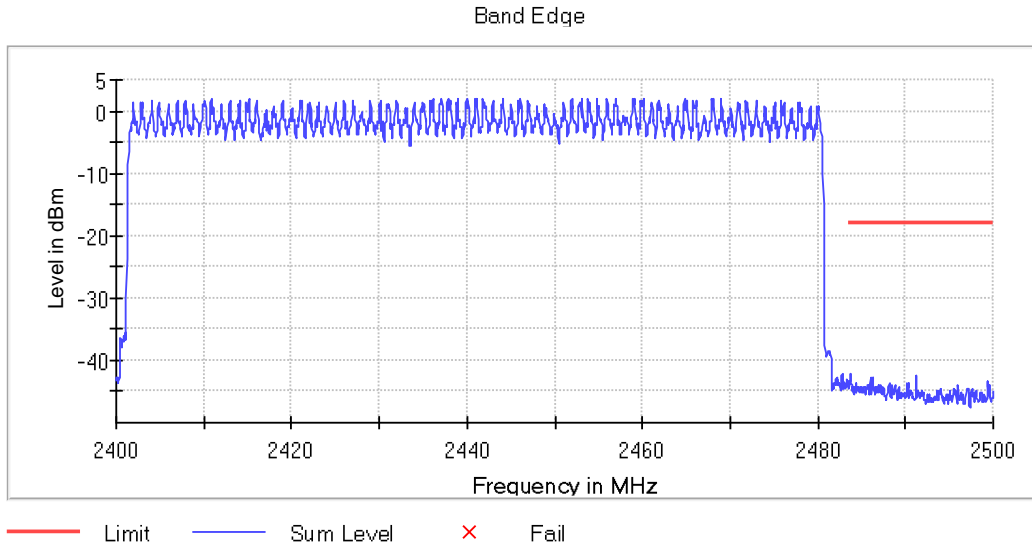
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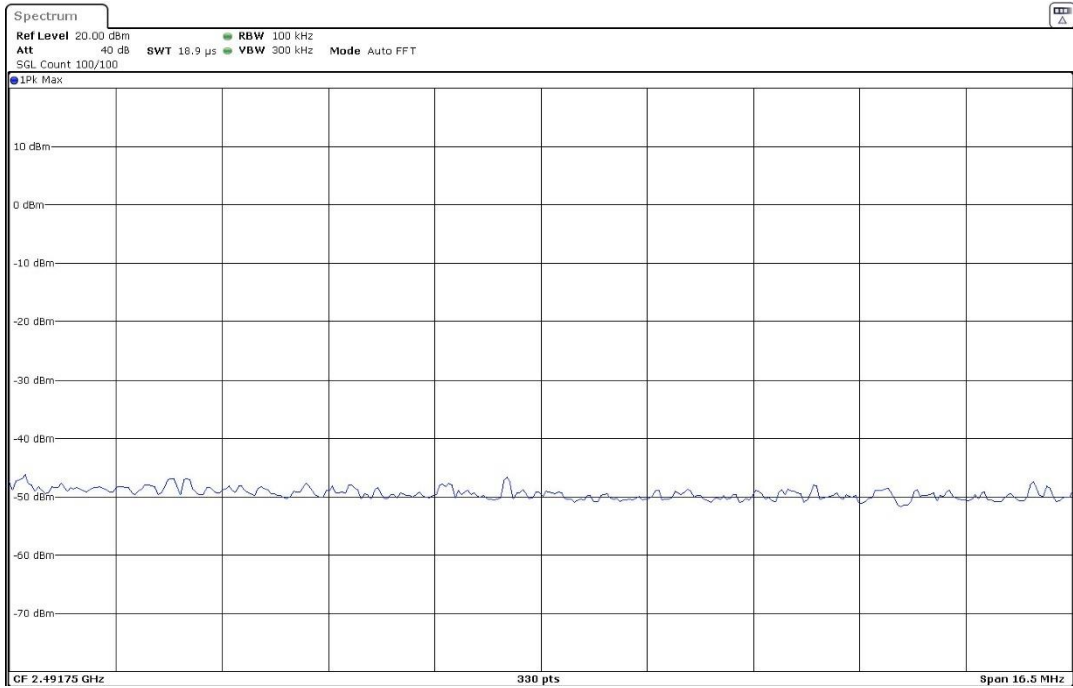




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2480.00, Hopping Mode: ON, Modulation: BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1

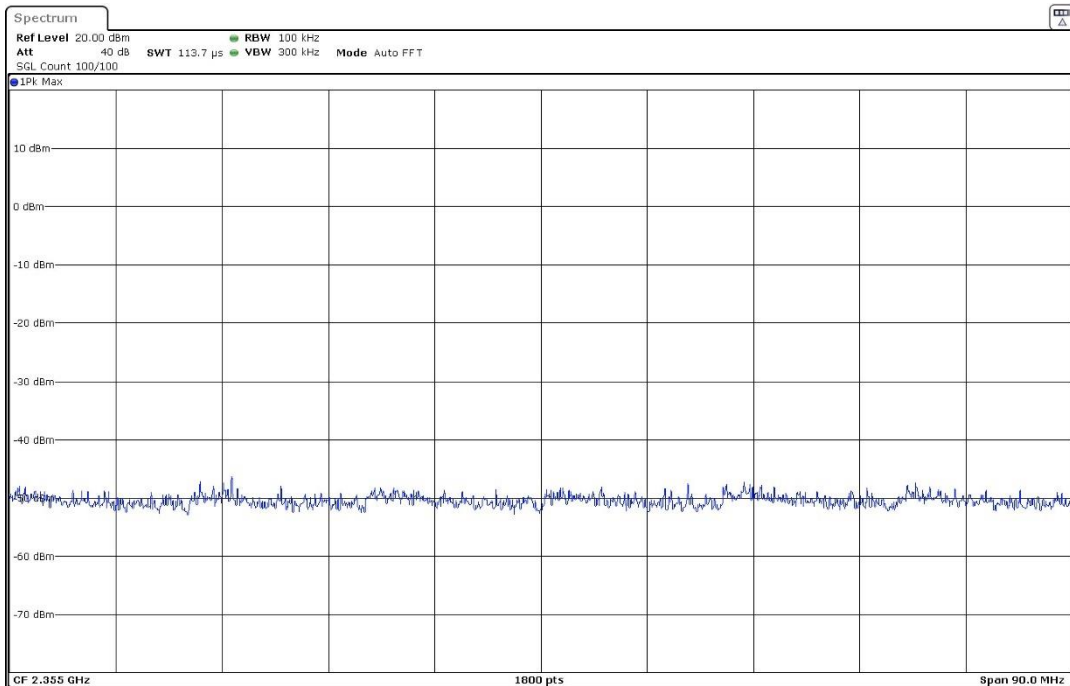
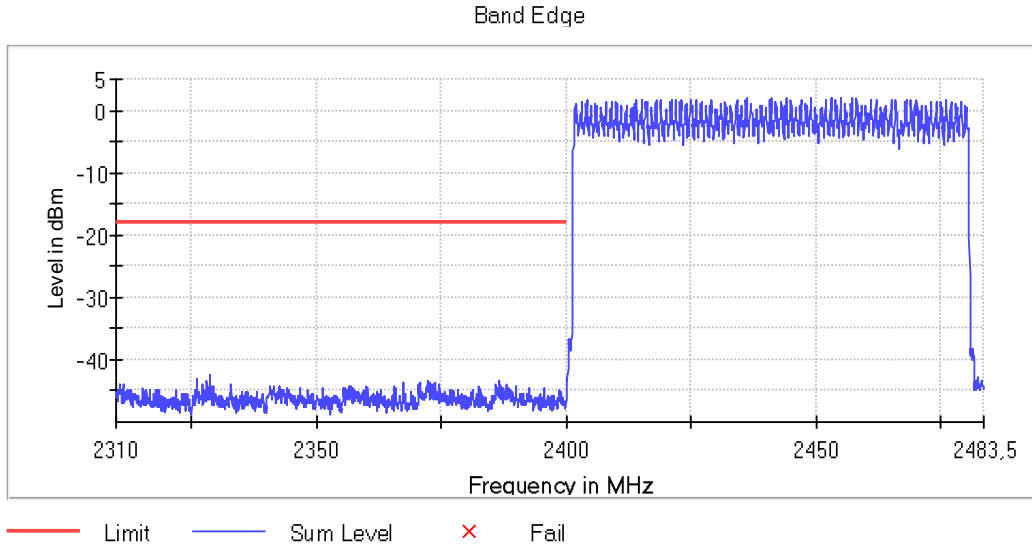
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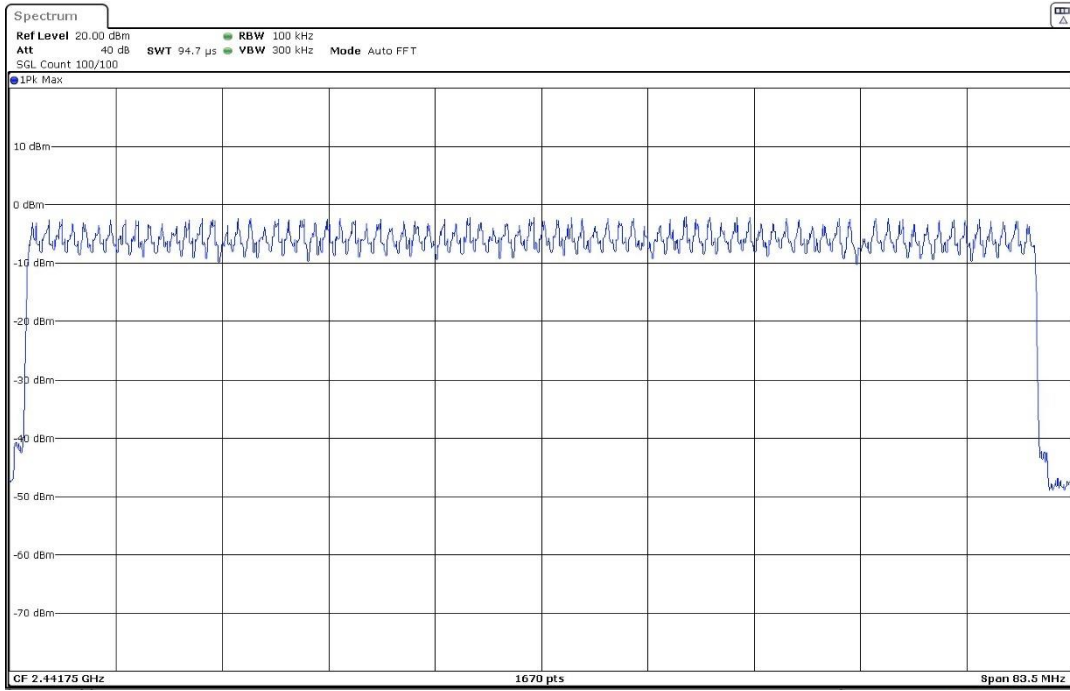




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2402.00, Hopping Mode: ON, Modulation: BT (8DPSK 3-DH5), Number of Transmission Chains = 1

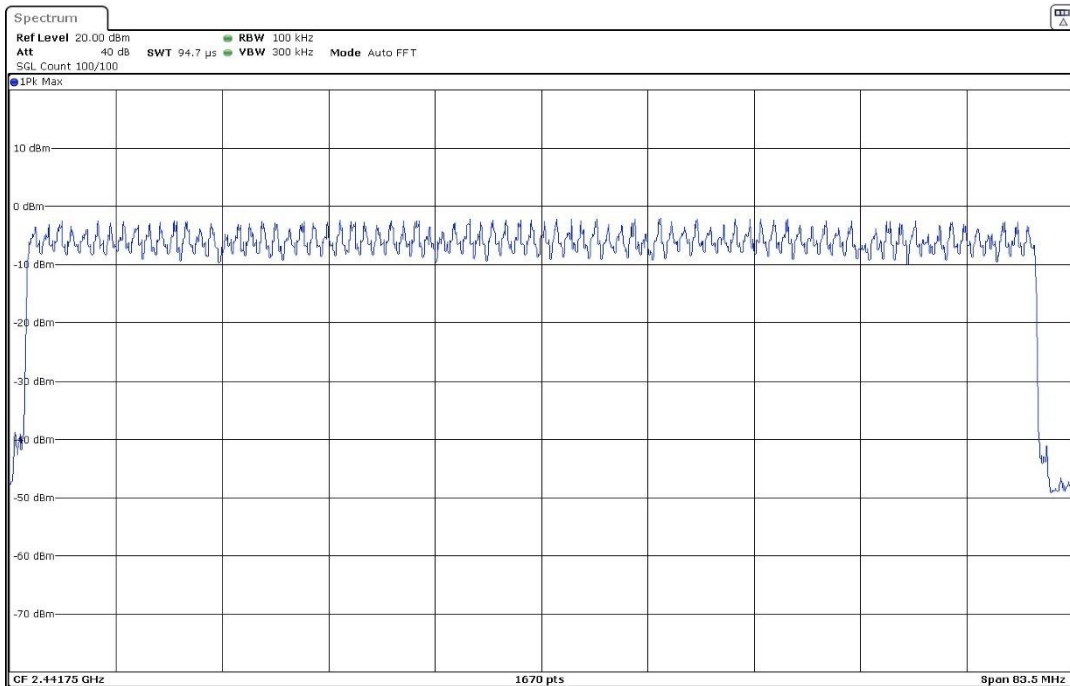
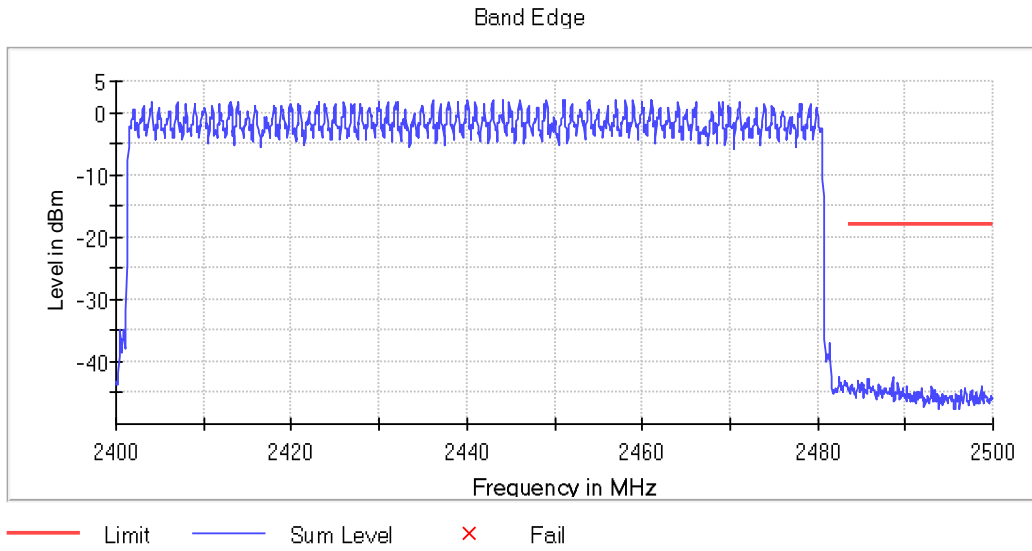
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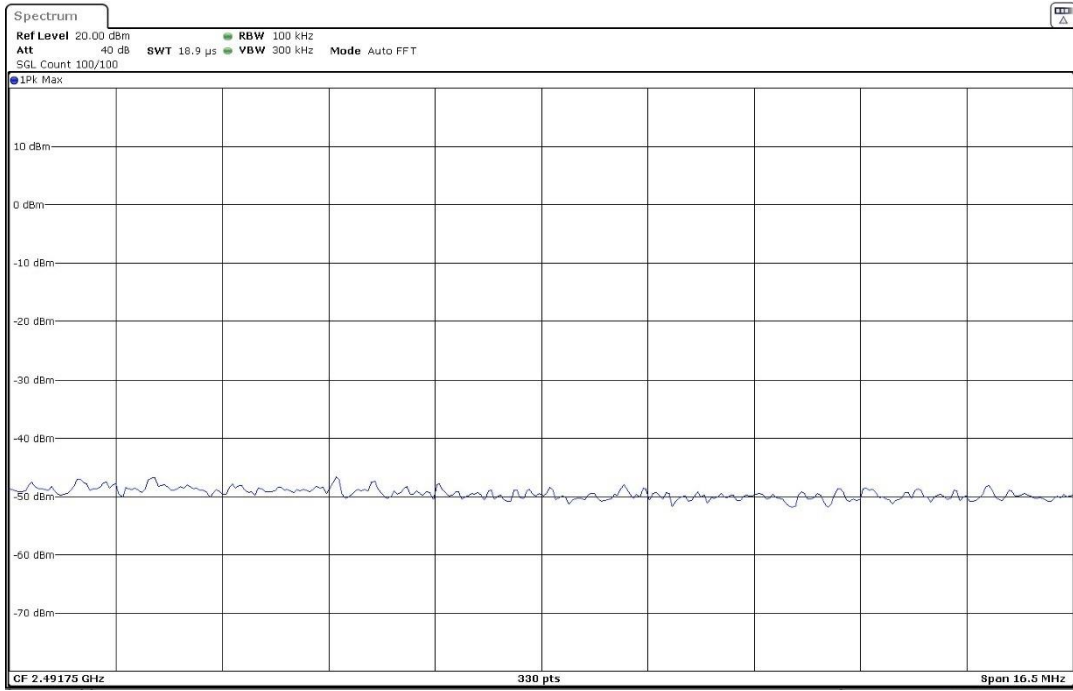




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2480.00, Hopping Mode: ON, Modulation: BT (8DPSK 3-DH5), Number of Transmission Chains = 1

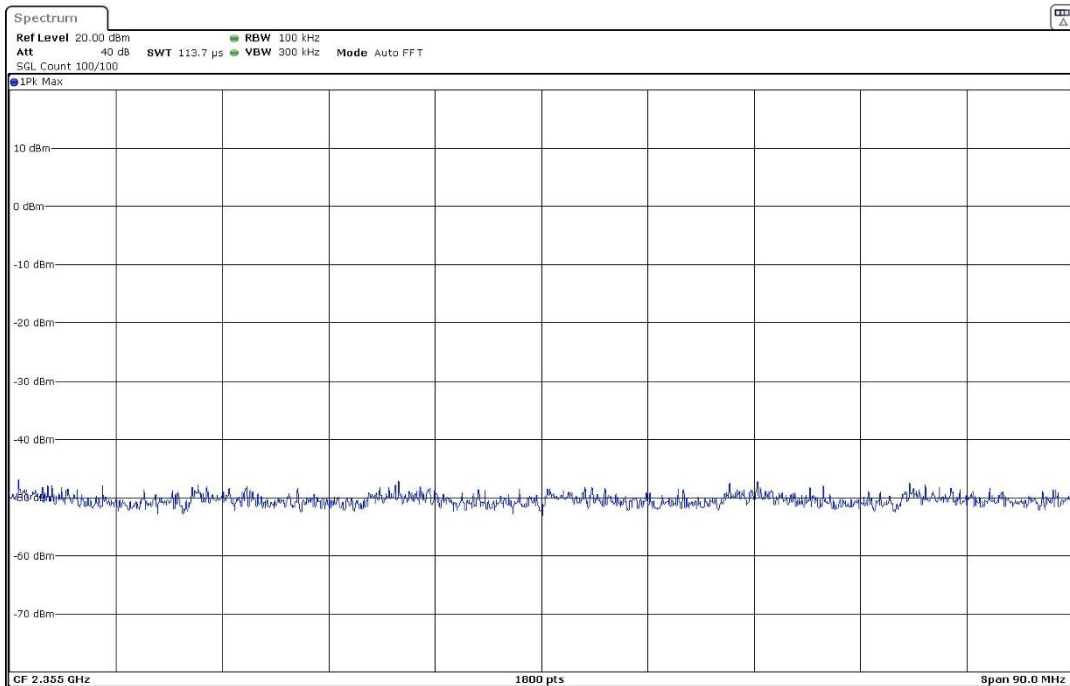
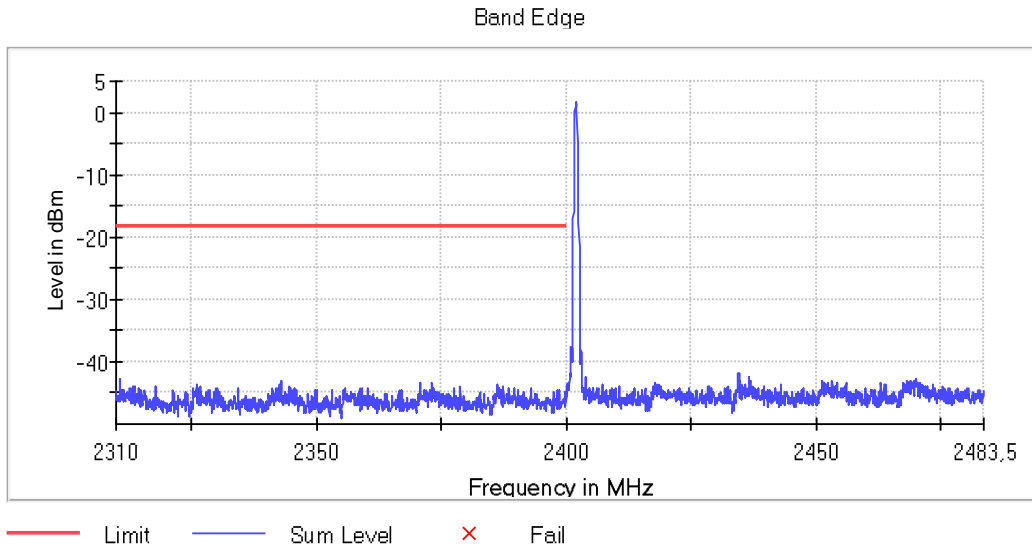
Plots:

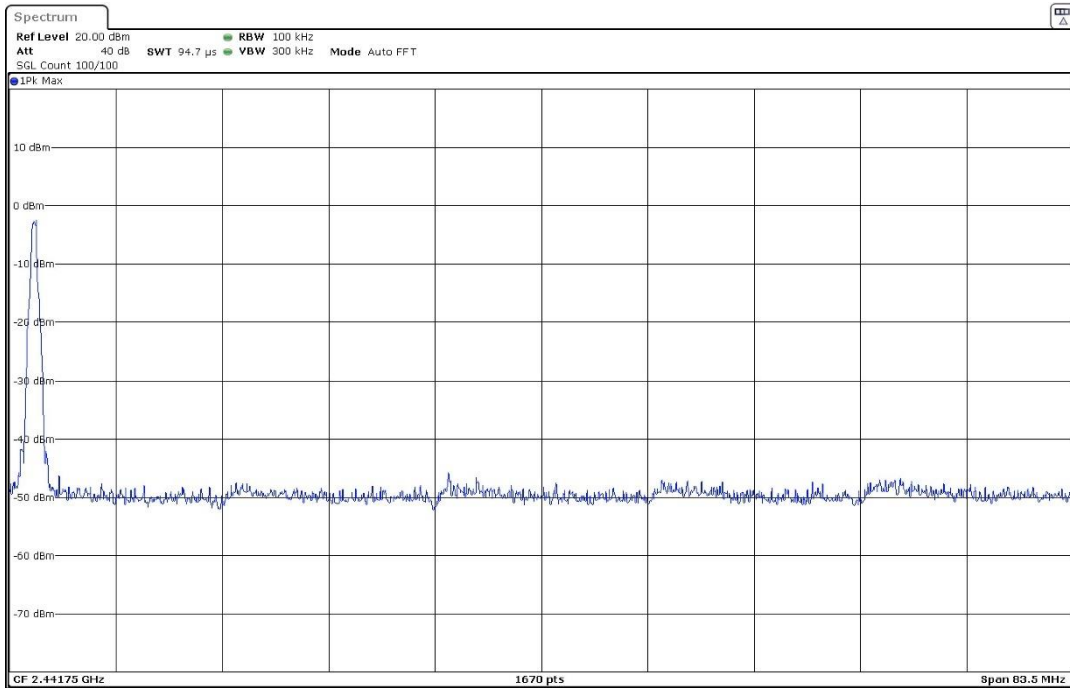




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2402.00, Hopping Mode: OFF, Modulation: BT (GFSK 1-DH5), Number of Transmission Chains = 1

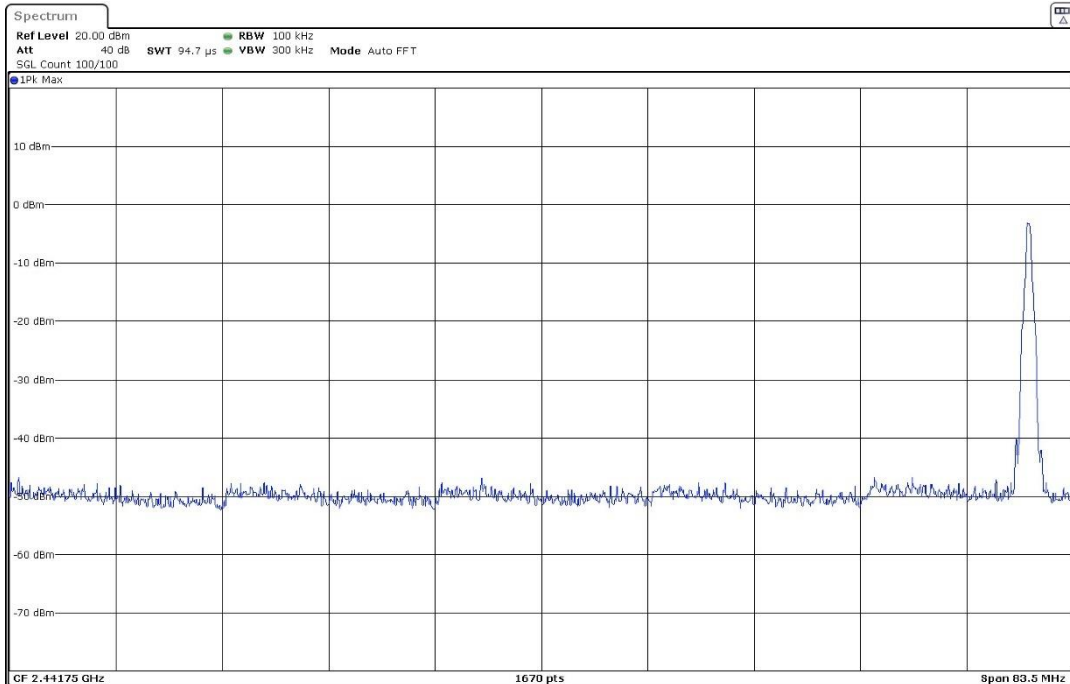
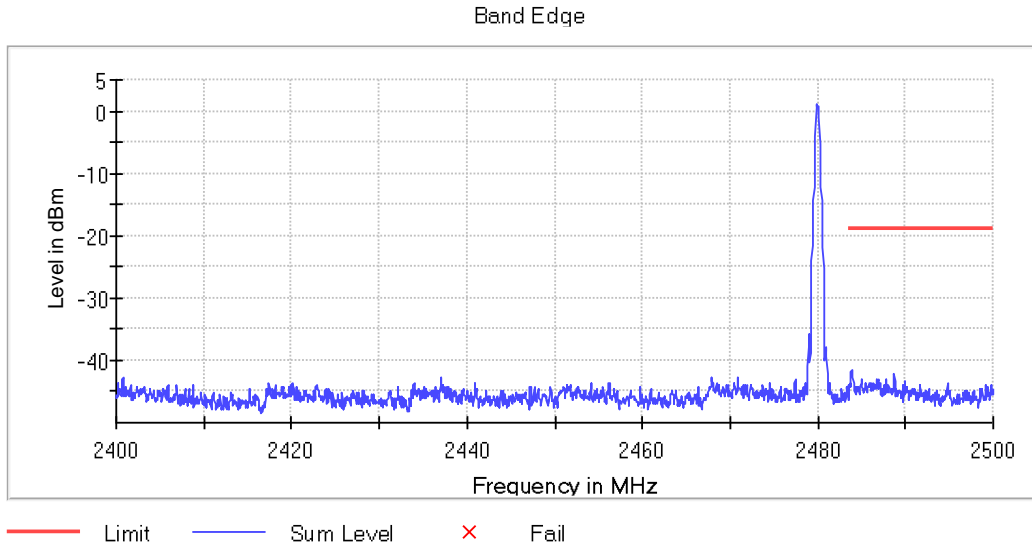
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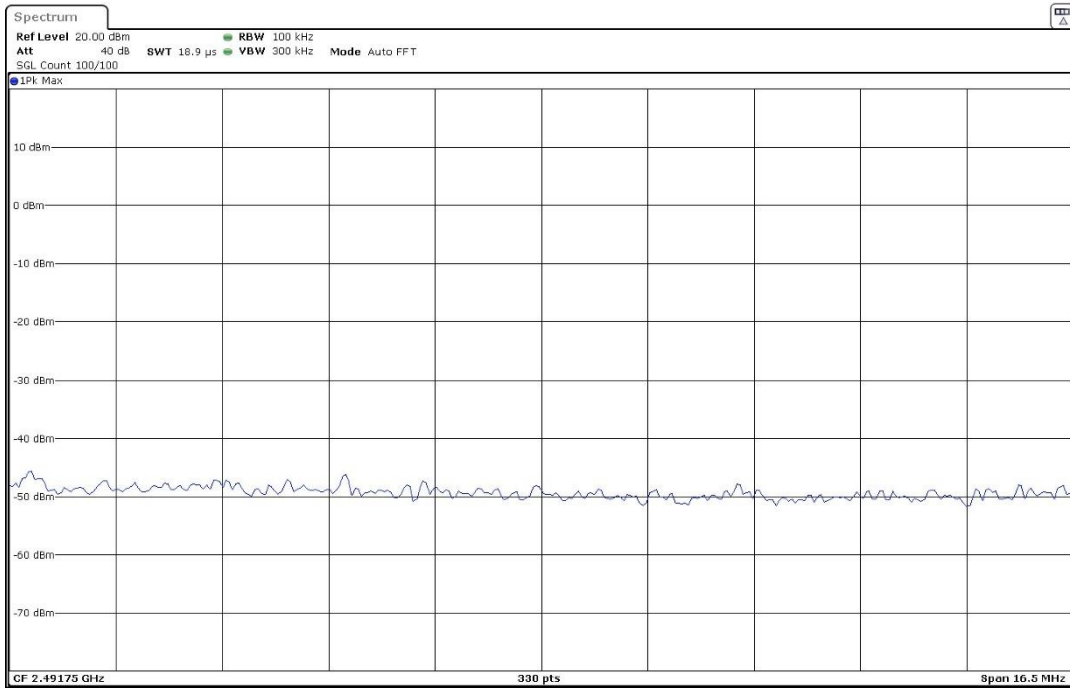




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2480.00, Hopping Mode: OFF, Modulation: BT (GFSK 1-DH5), Number of Transmission Chains = 1

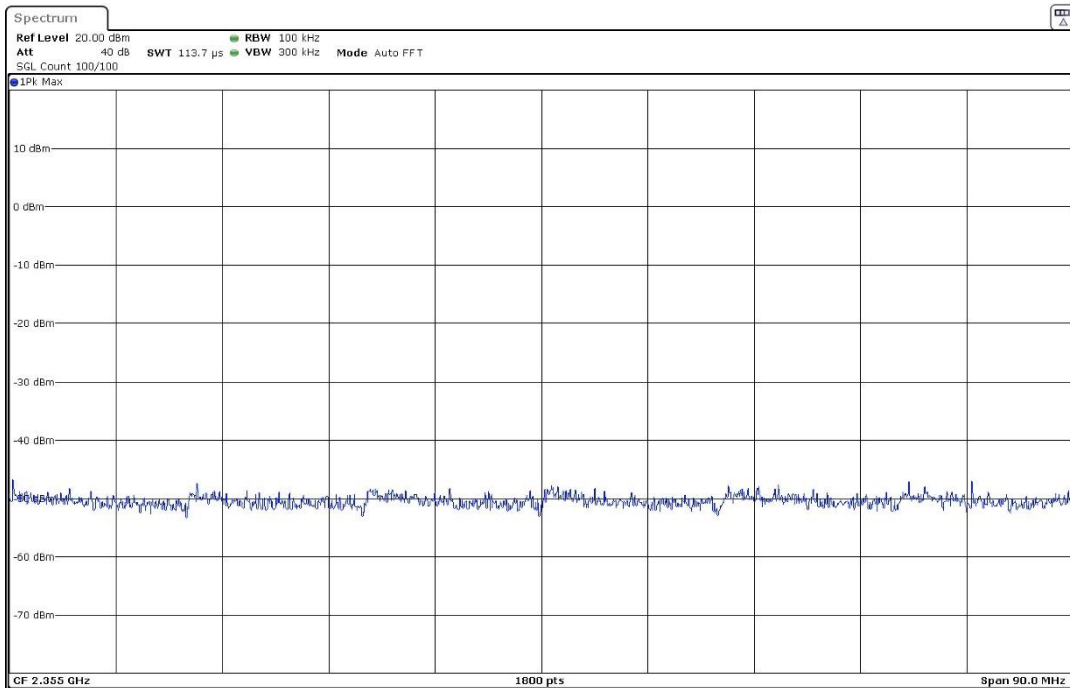
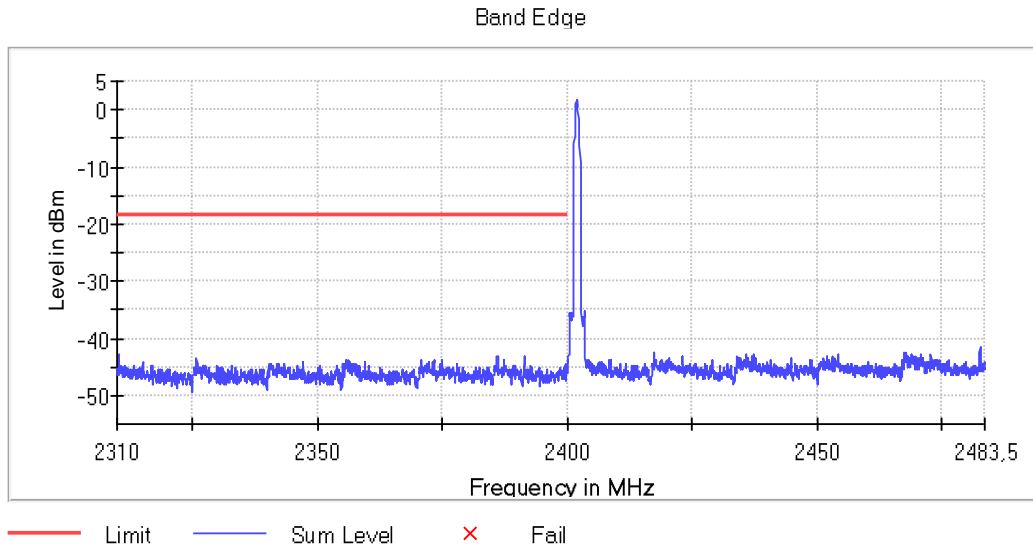
Plots:

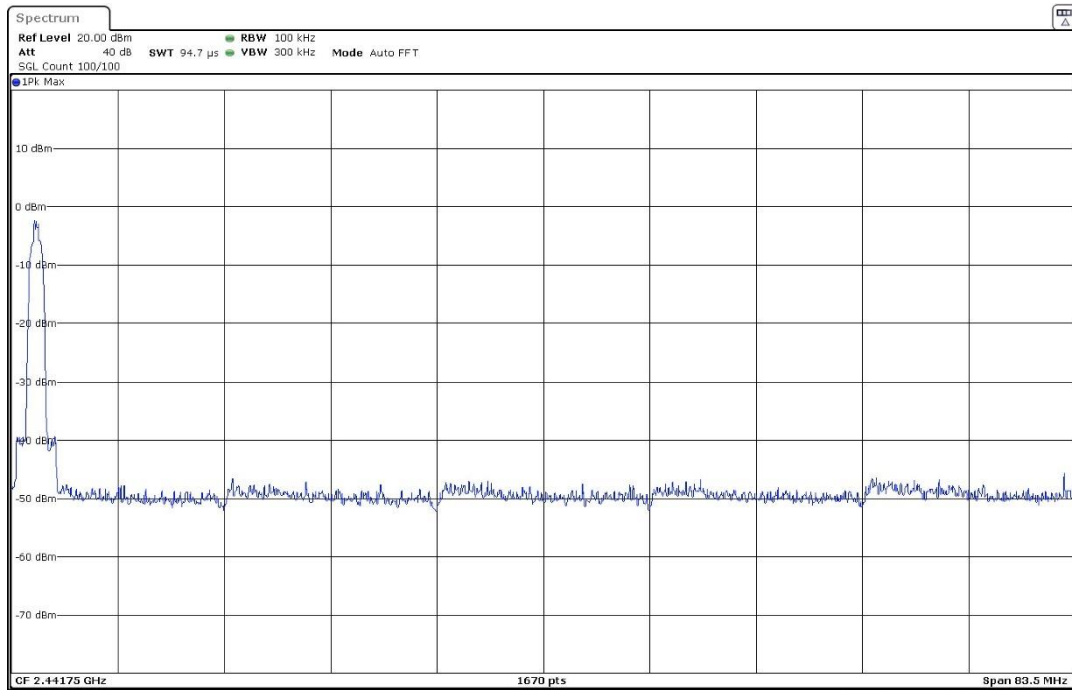




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2402.00, Hopping Mode: OFF, Modulation: BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1

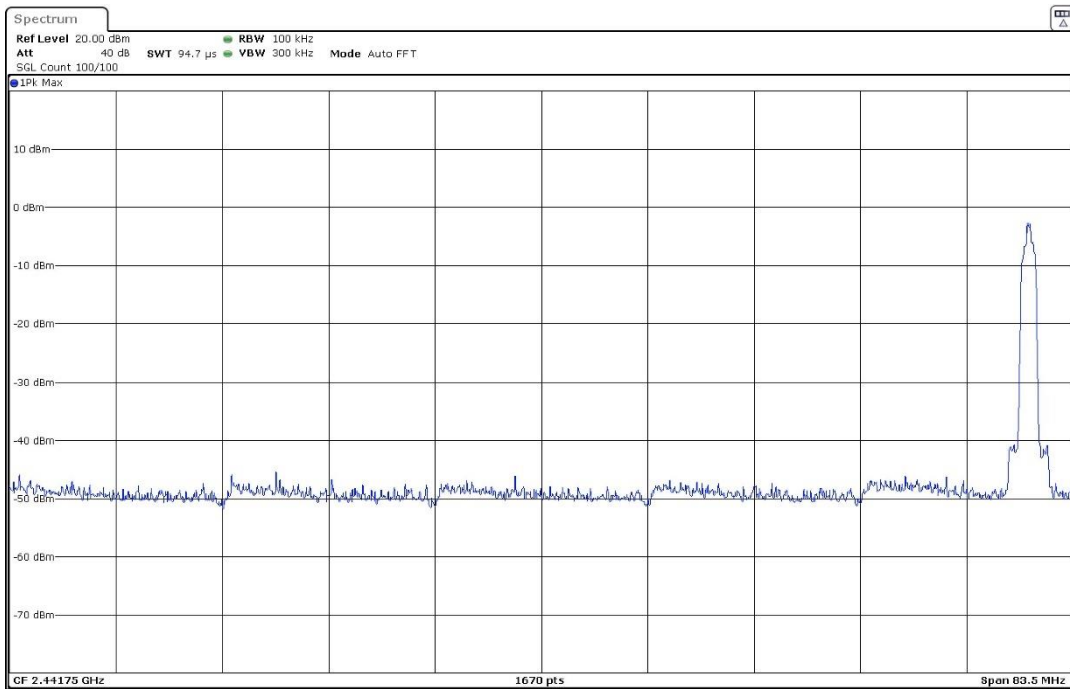
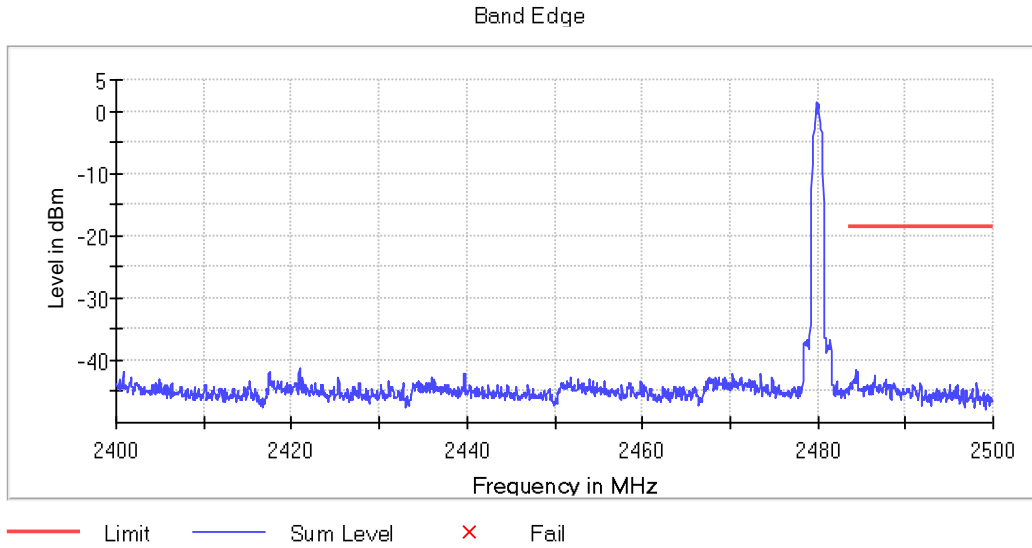
Plots:

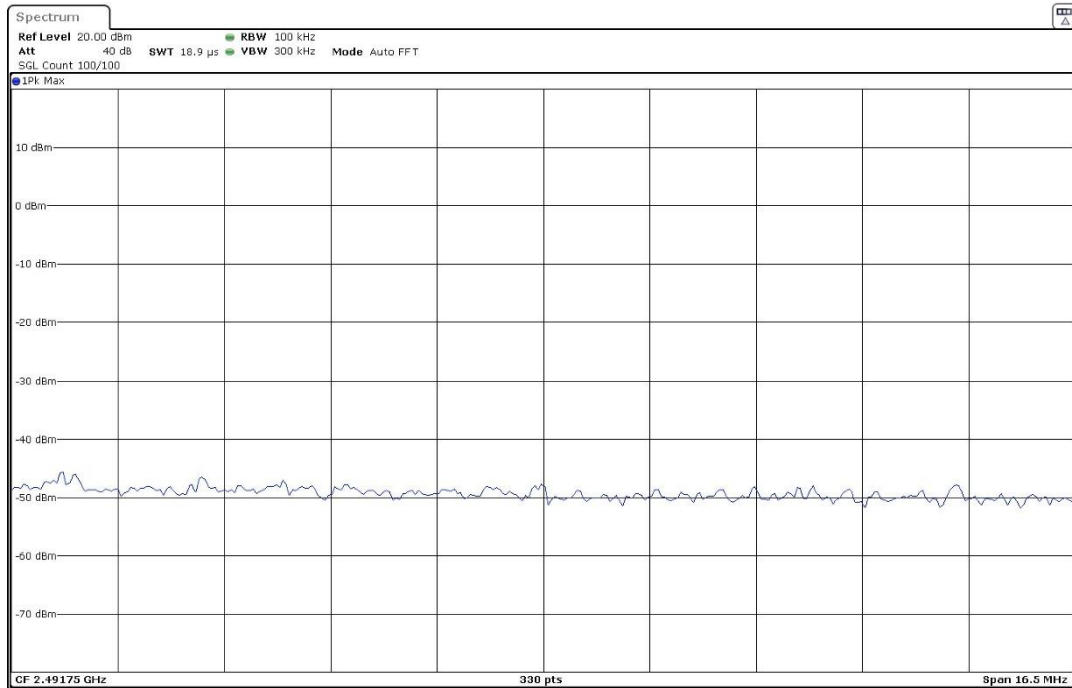




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2480.00, Hopping Mode: OFF, Modulation: BT (Pi/4 DQPSK 2-DH5), Number of Transmission Chains = 1

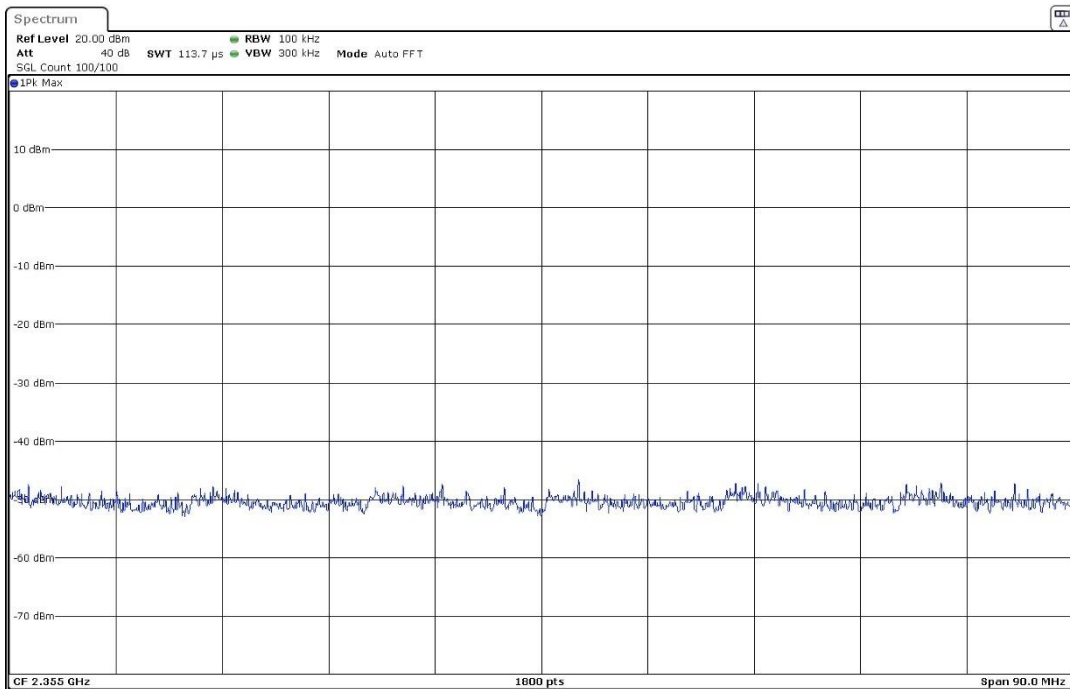
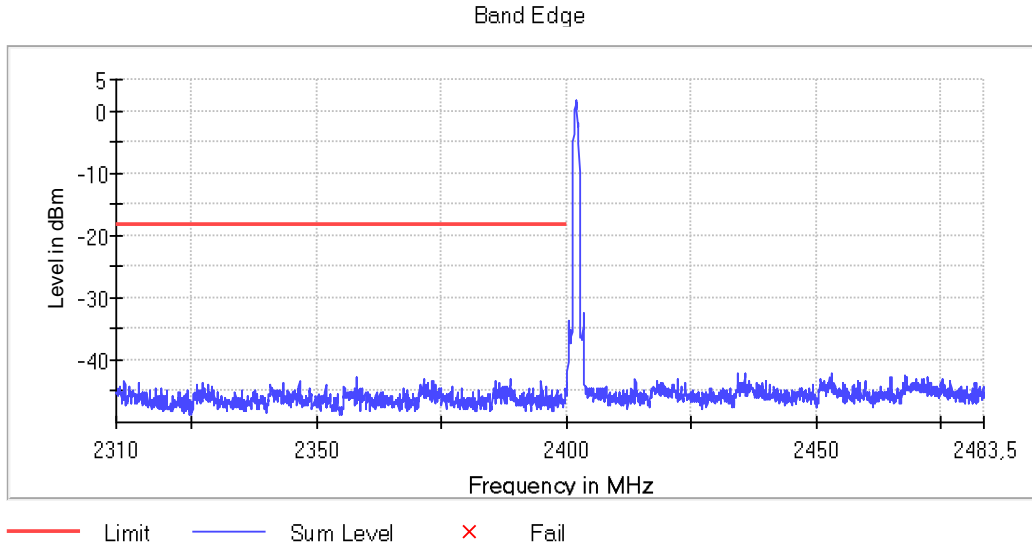
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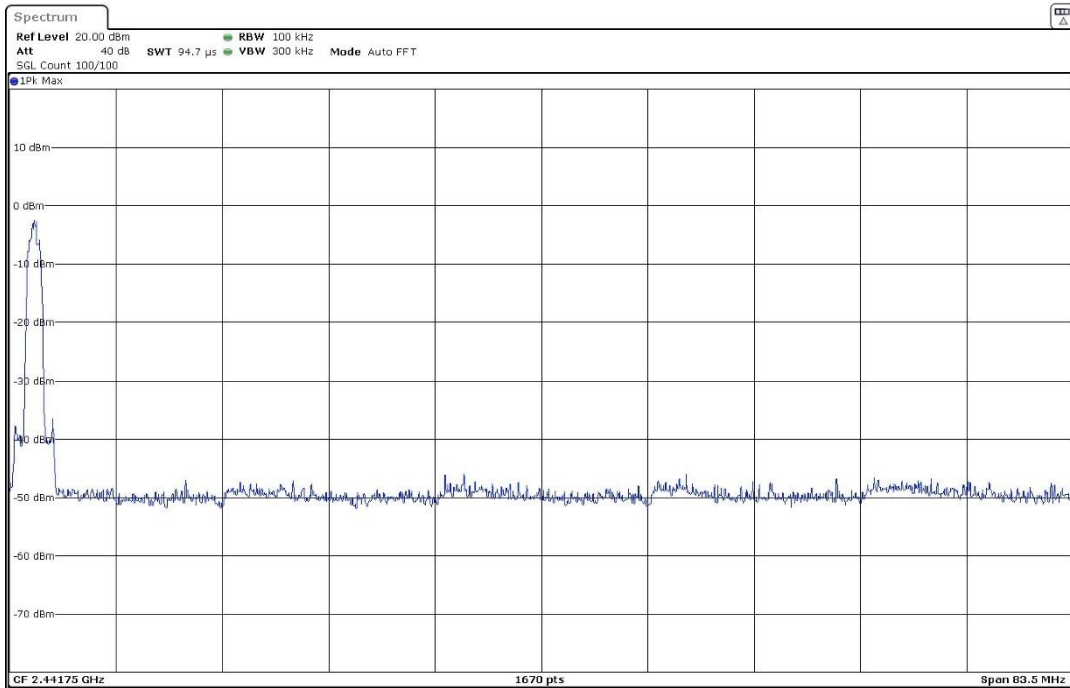




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2402.00, Hopping Mode: OFF, Modulation: BT (8DPSK 3-DH5), Number of Transmission Chains = 1

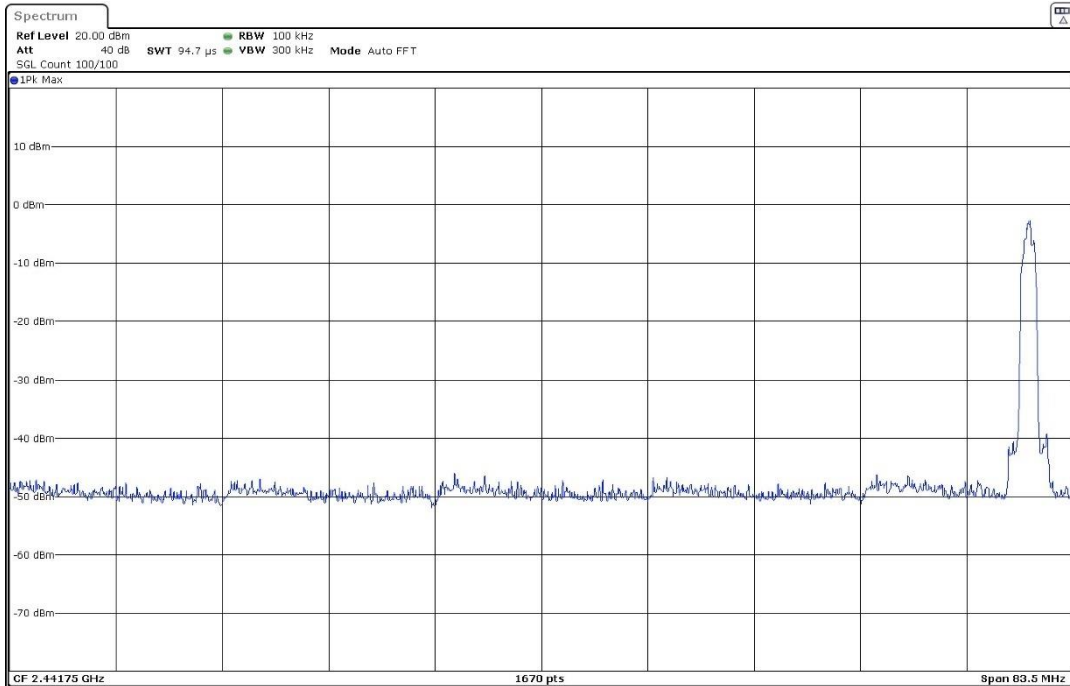
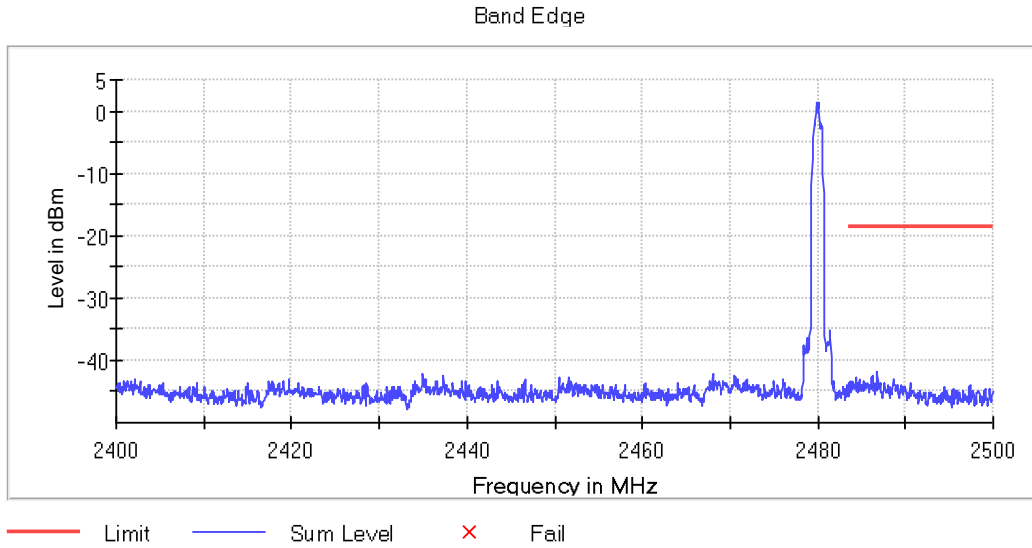
Plots:

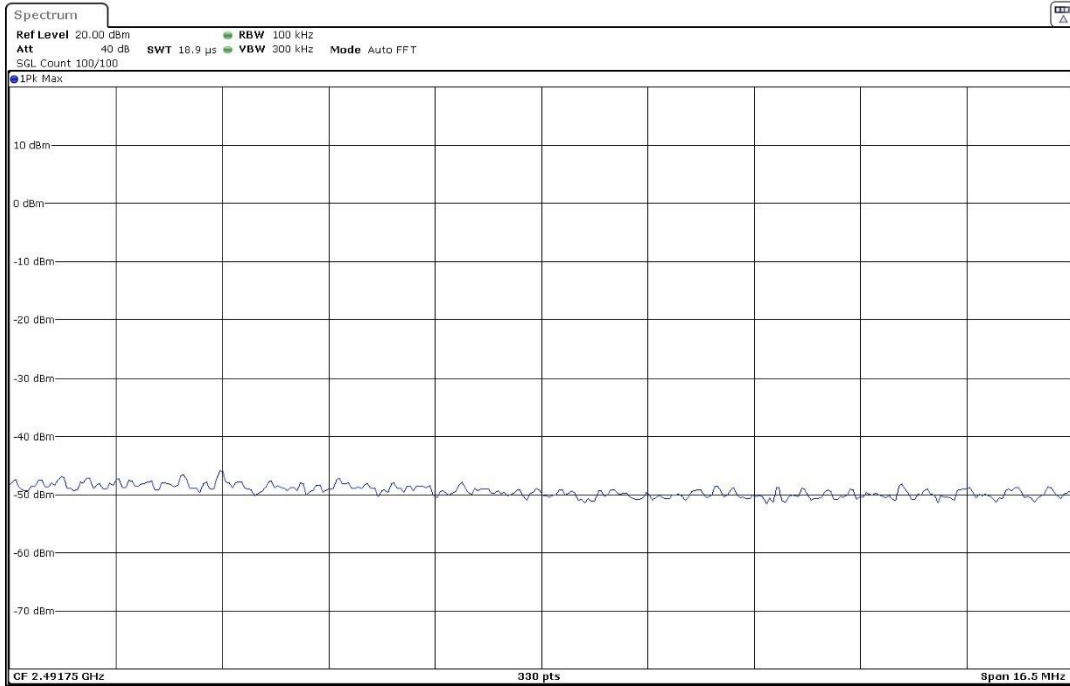




Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2480.00, Hopping Mode: OFF, Modulation: BT (8DPSK 3-DH5), Number of Transmission Chains = 1

Plots:





FCC 15.247 (d) Emission limitations radiated (Transmitter)

Limits

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)):

Frequency Range (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

Results

Frequency range 30 MHz – 1 GHz:

The spurious frequencies detected do not depend on either the modulation or the operating channel.

Spurious frequencies detected at less than 20 dB below the limit:

Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl ($\text{dB}\mu\text{V/m}$)	Pol	Detector
[0.03, 1]	875.022	44.02	V	QP

Frequency range 1 GHz – 26 GHz:

Modulation: BT (GFSK 1-DH5)

Spurious frequencies detected at less than 20 dB below the limit:

Freq (MHz)	Freq Rng (GHz)	Unwanted Freq (GHz)	Unwanted Lvl (dB μ V/m)	Pol	Detector
2402.0000	[3, 17]	4.9924	45.69	V	Peak
		5.0213	45.82	H	Peak
2441.0000		4.9253	45.78	V	Peak
		4.9734	49.51	V	Peak
2480.0000		5.0691	47.40	V	Peak
		4.2334	46.06	V	Peak
		4.9536	45.73	V	Peak
		5.0405	45.82	H	Peak

Modulation: BT (Pi/4 DQPSK 2-DH5)

Spurious frequencies detected at less than 20 dB below the limit:

Freq (MHz)	Freq Rng (GHz)	Unwanted Freq (GHz)	Unwanted Lvl (dB μ V/m)	Pol	Detector
2402.0000	[3, 17]	5.1557	46.96	V	Peak
		5.1645	47.72	V	Peak
		5.4219	48.21	V	Peak
2441.0000		5.0201	47.77	V	Peak
		5.0884	49.74	V	Peak
2480.0000		4.8966	45.60	H	Peak
		4.9926	44.87	H	Peak
		5.0308	45.76	H	Peak

Modulation: BT (8DPSK 3-DH5)

Spurious frequencies detected at less than 20 dB below the limit:

Freq (MHz)	Freq Rng (GHz)	Unwanted Freq (GHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2402.0000	[3, 17]	4.2337	43.62	V	Peak
		4.9058	44.31	H	Peak
2441.0000		5.0308	46.47	V	Peak
		5.0980	49.23	V	Peak
2480.0000		4.2330	43.69	V	Peak
		4.8483	44.37	V	Peak
		4.9832	44.76	H	Peak

Verdict

Pass

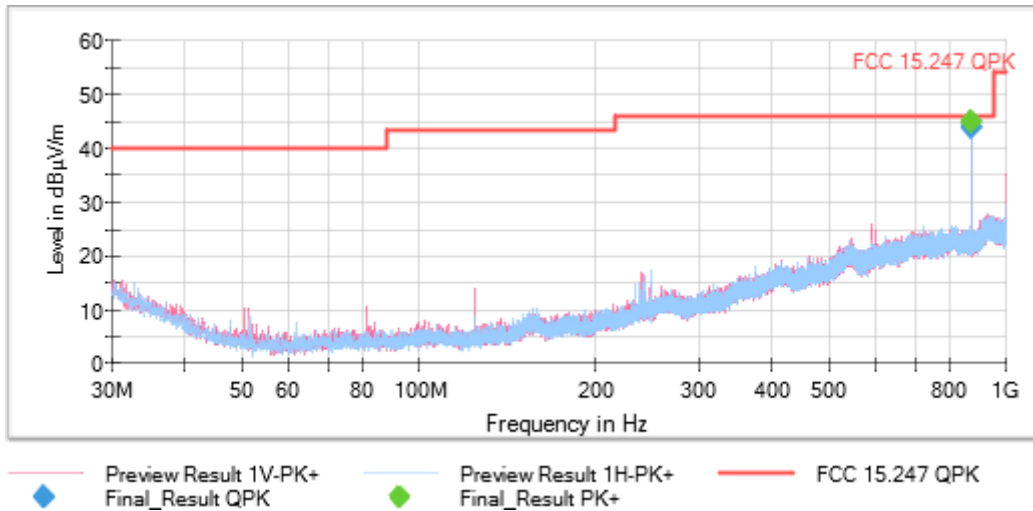
Attachments

The setting for each range of frequency is indicated in the following tables:

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB
Receiver: [ESW 44] 1 GHz - 3 GHz	30,769 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
Receiver: [ESW 44] 3 GHz - 17 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	30 dB
Receiver: [FSV 40] 17 GHz - 26 GHz	300 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Equipment Type = Digital Transmission System (DTS), Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1

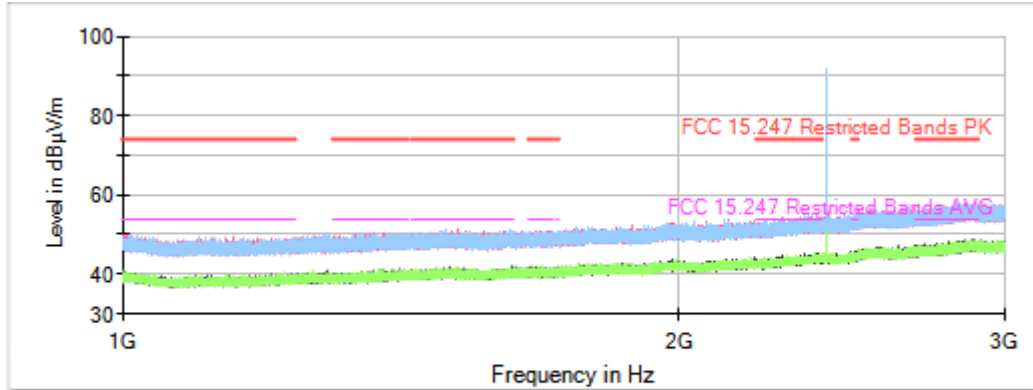
Images:



This plot is valid for all channel and all modulations

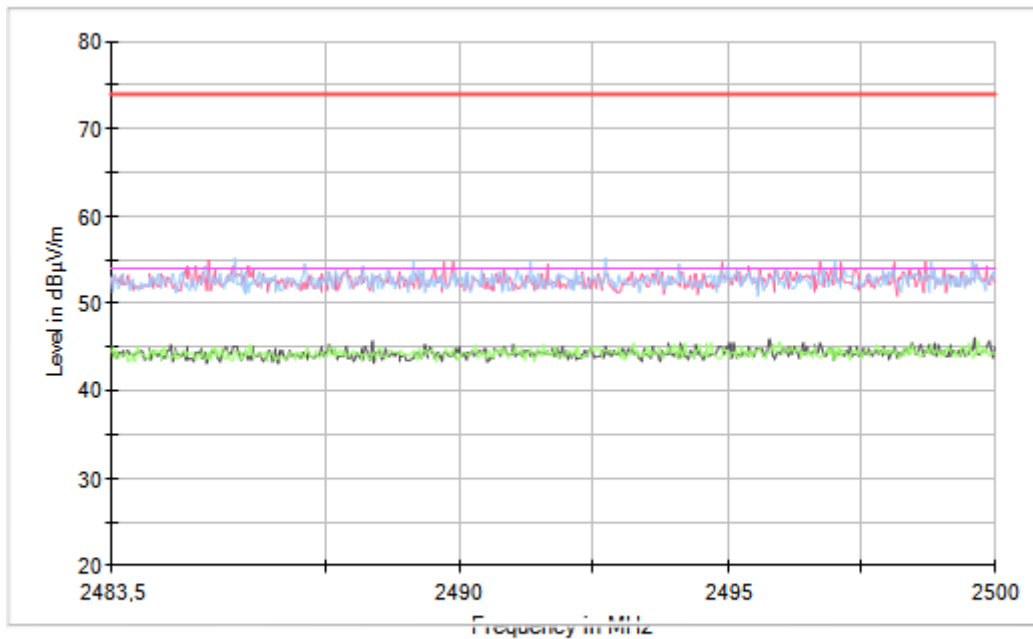
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1

Images:



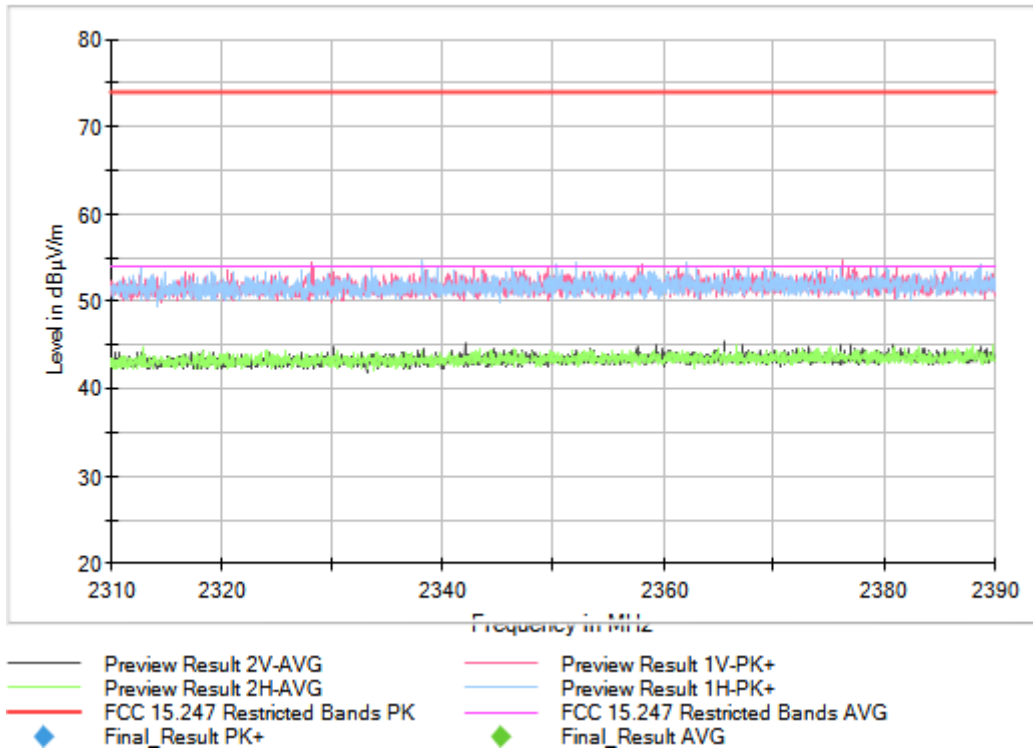
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



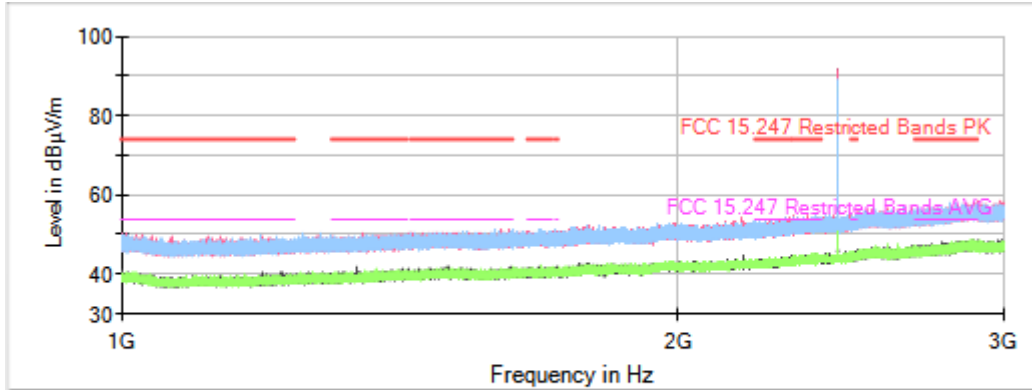
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



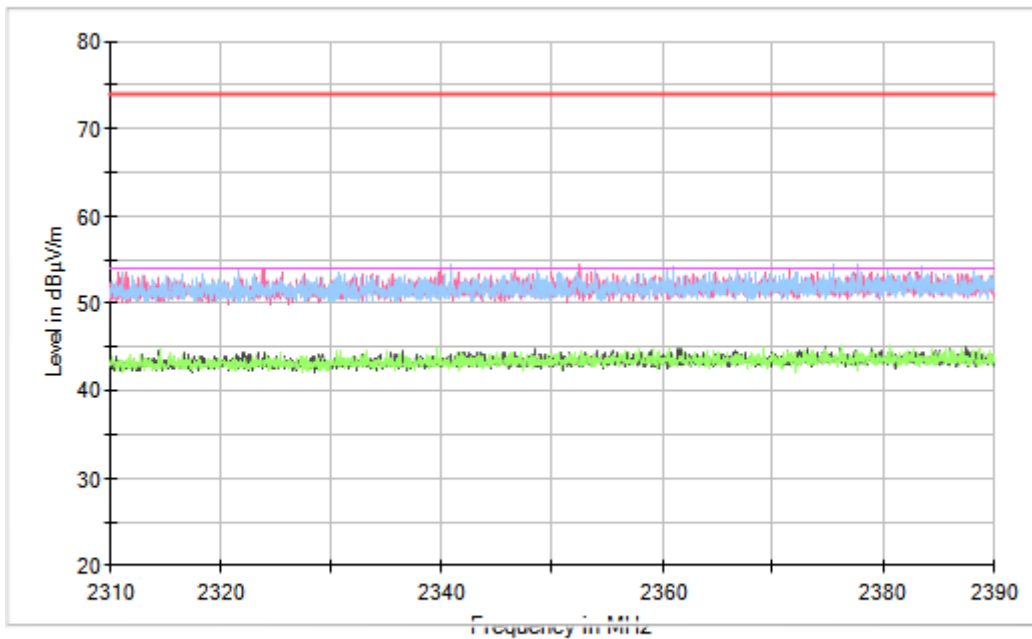
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1

Images:



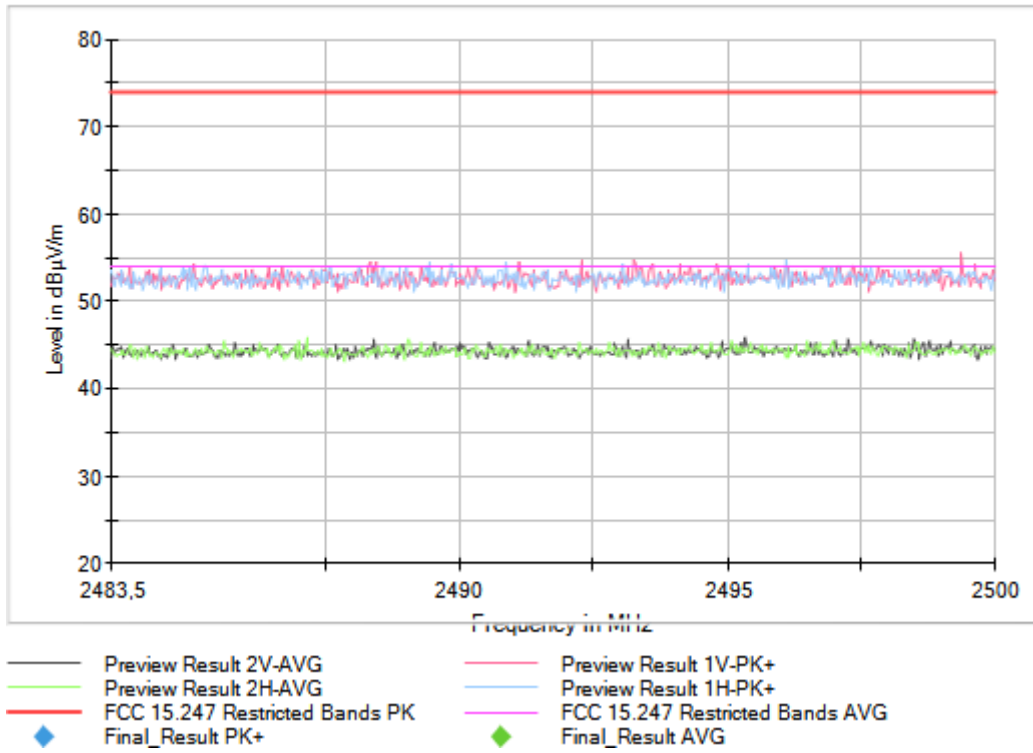
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



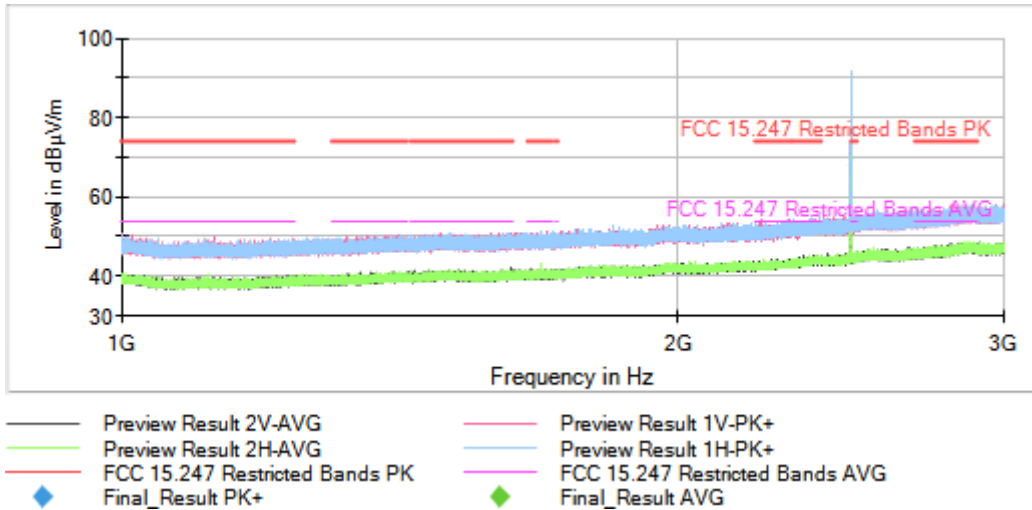
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum

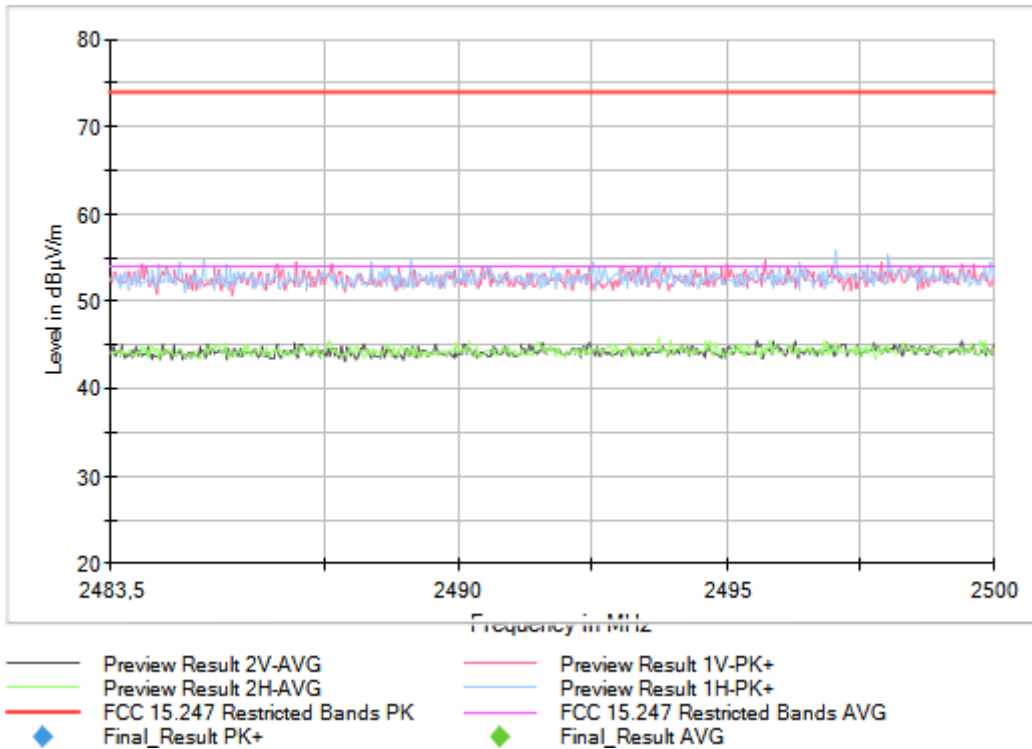


Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1,
 Measurement Point = 1

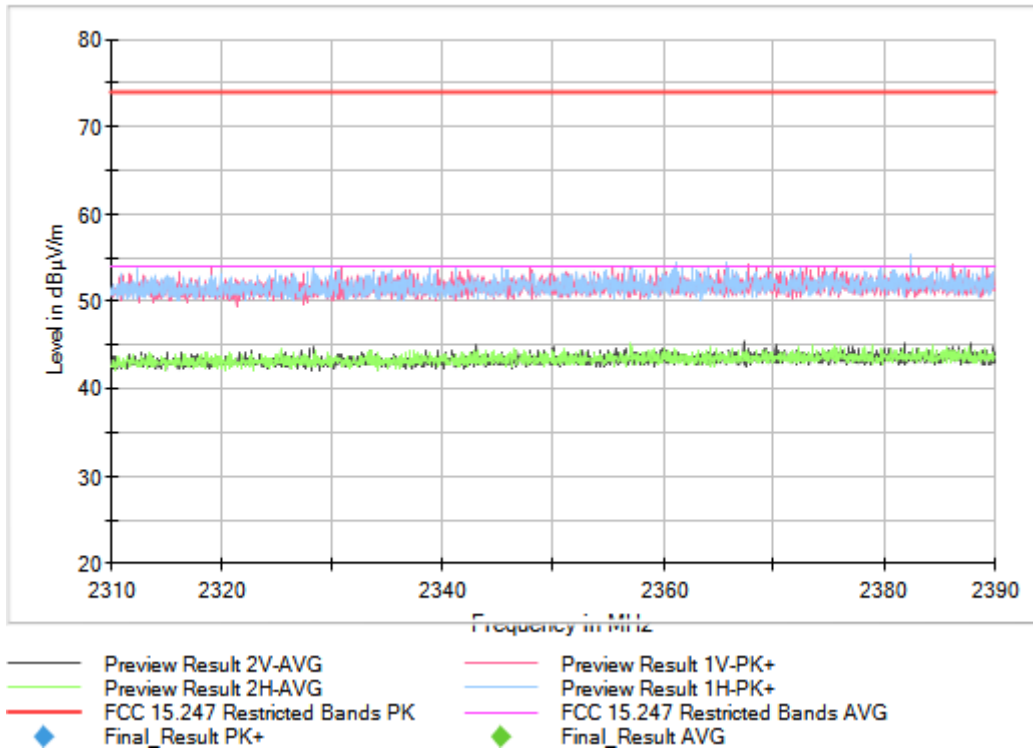
Images:



Full Spectrum

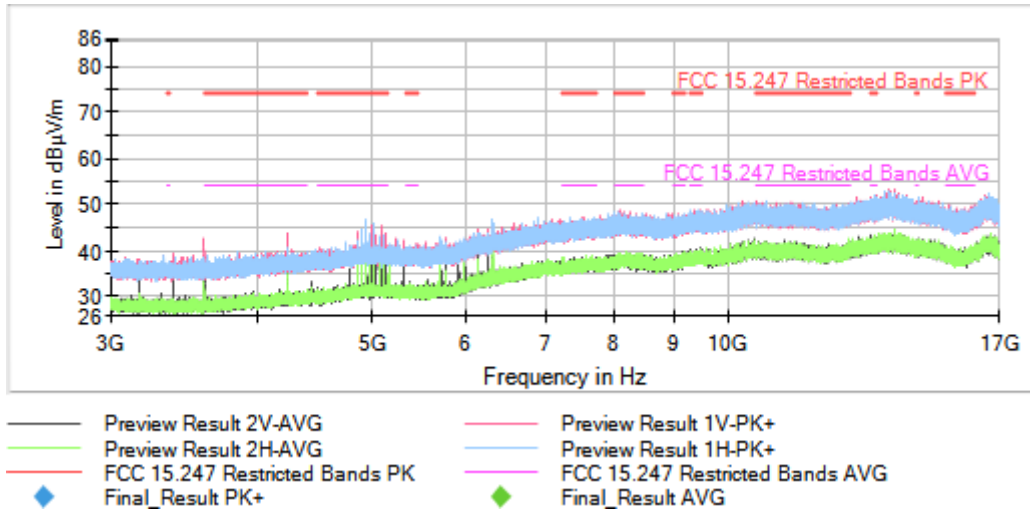


Full Spectrum



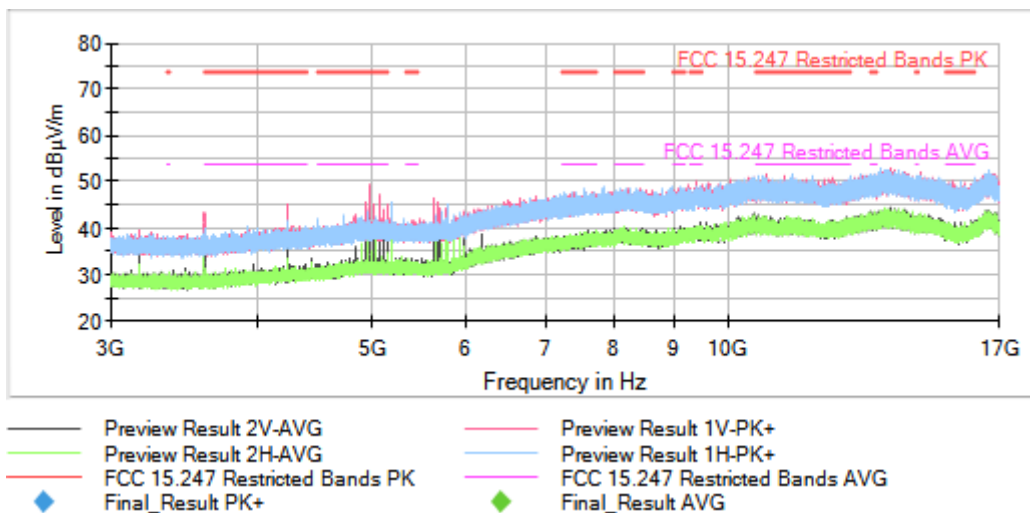
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1,
 Measurement Point = 1

Images:



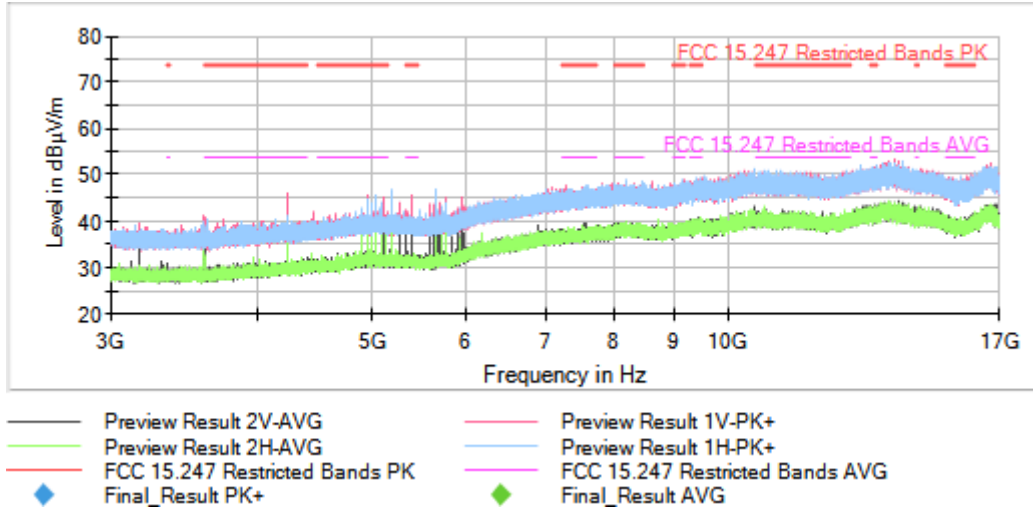
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1,
 Measurement Point = 1

Images:



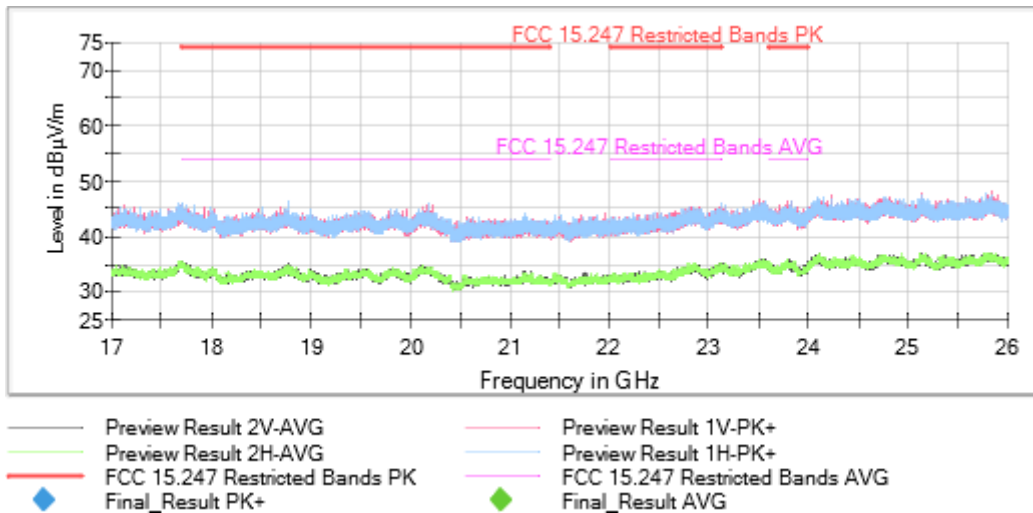
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (GFSK 1-DH5), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1,
 Measurement Point = 1

Images:



Equipment Type = Digital Transmission System (DTS), Frequency Range GHz = [17, 26], Number of
 Transmission Chains = 1, Measurement Point = 1

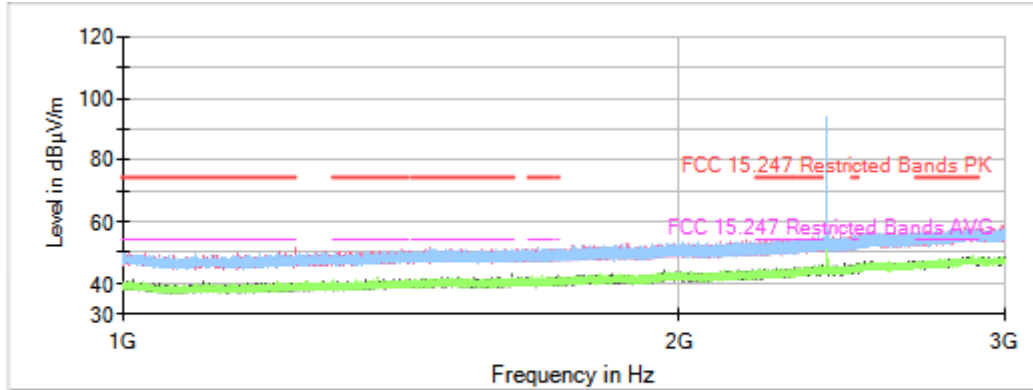
Images:



This plot is valid for all channel and all modulations

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (Pi/4 DQPSK 2-DH5), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1,
 Measurement Point = 1

Images:



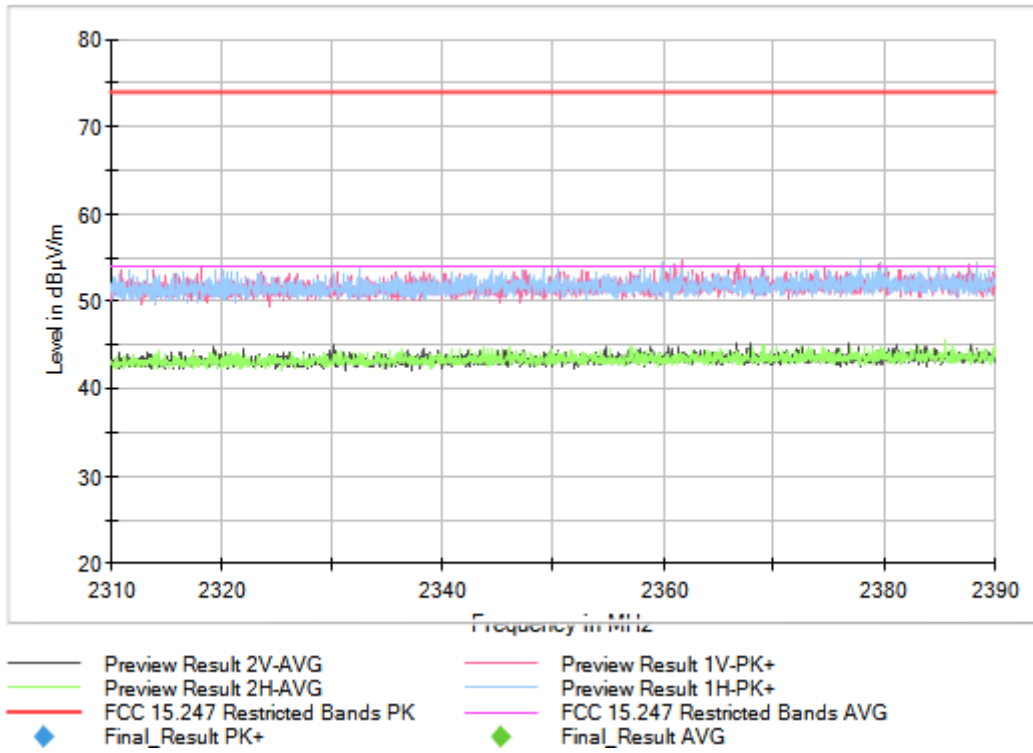
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



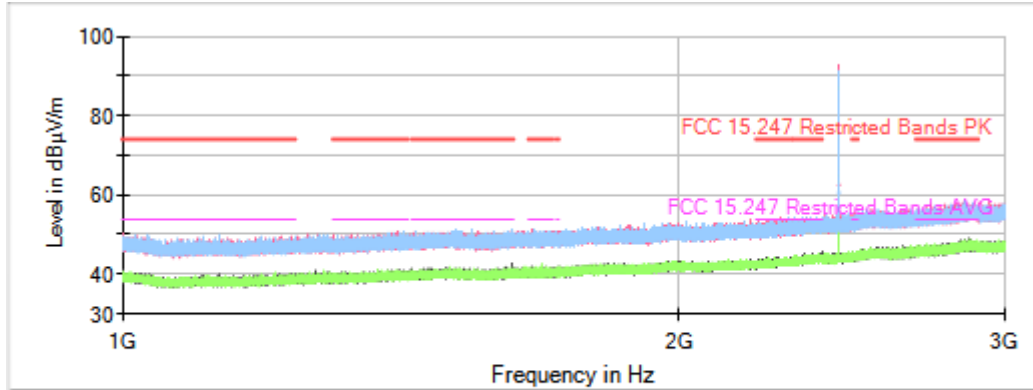
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



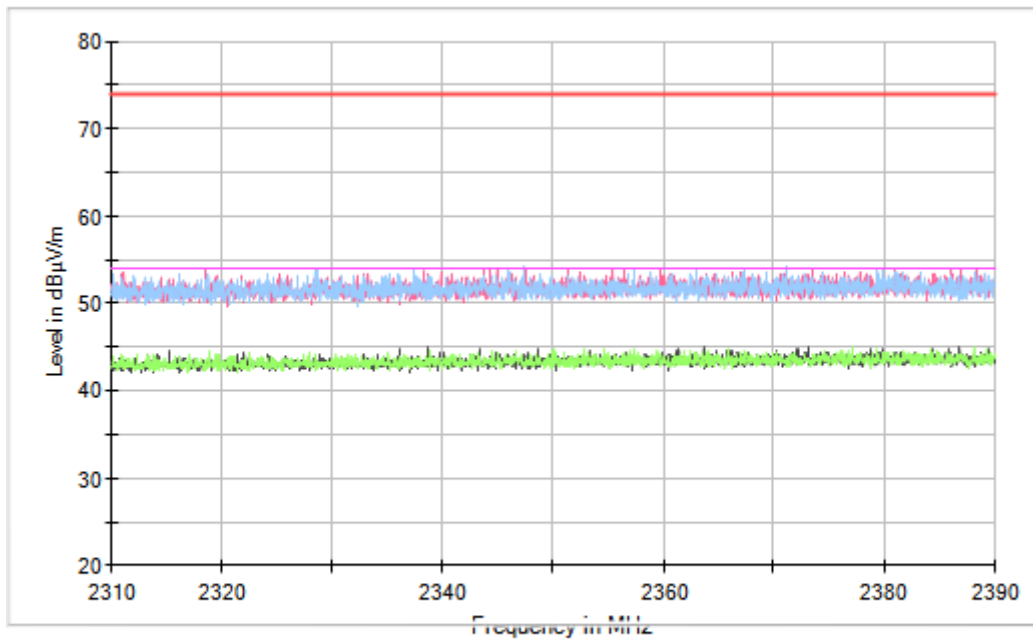
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (Pi/4 DQPSK 2-DH5), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1

Images:



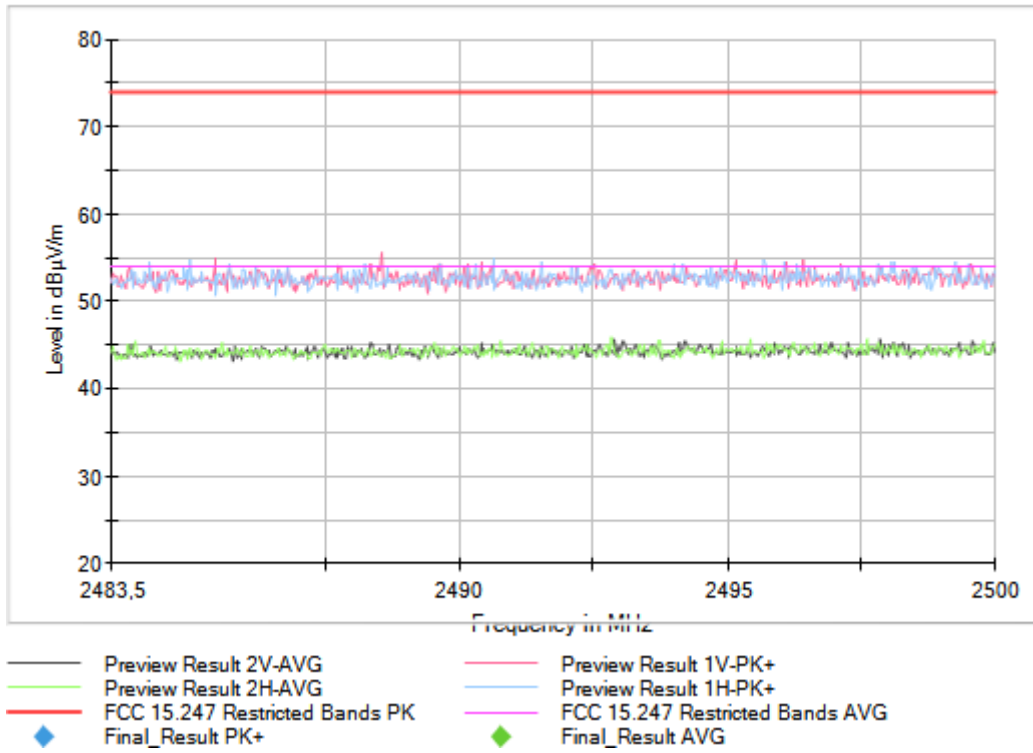
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



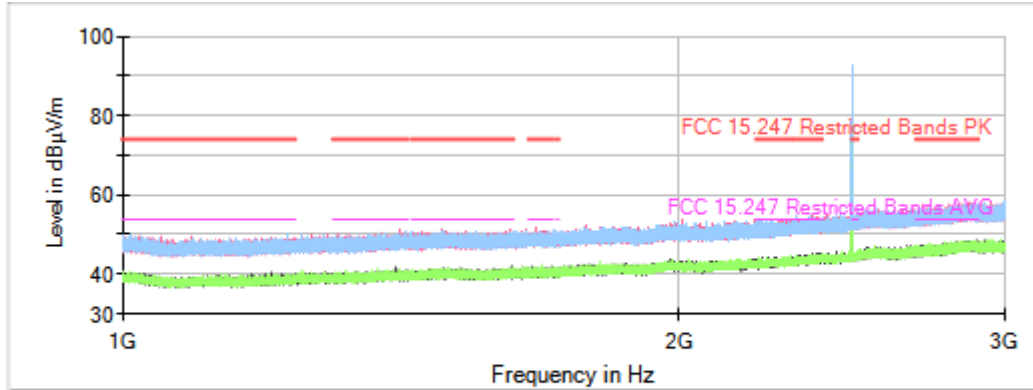
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



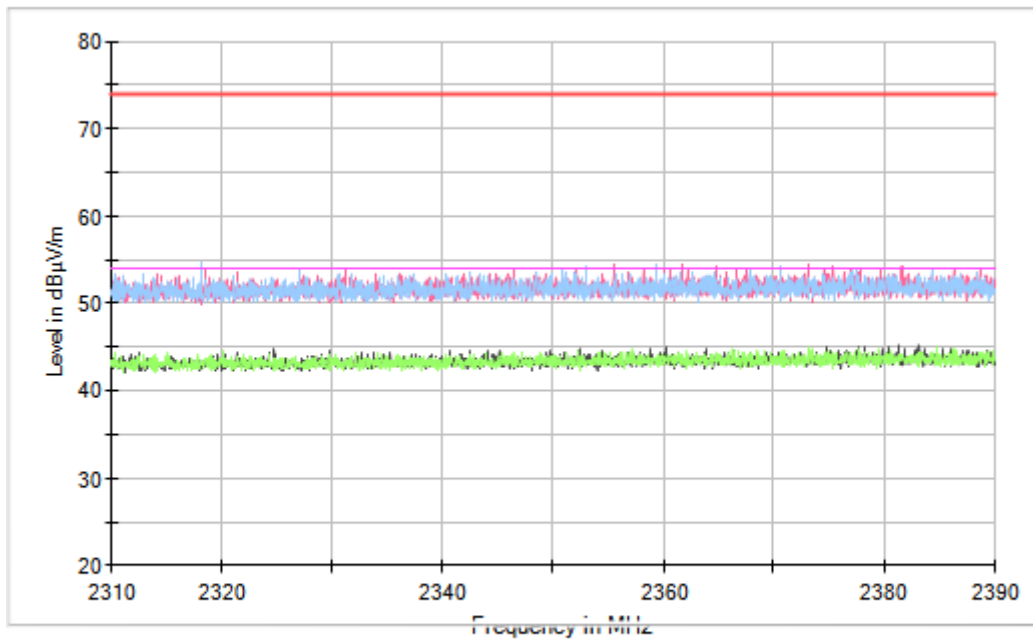
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (Pi/4 DQPSK 2-DH5), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1,
 Measurement Point = 1

Images:



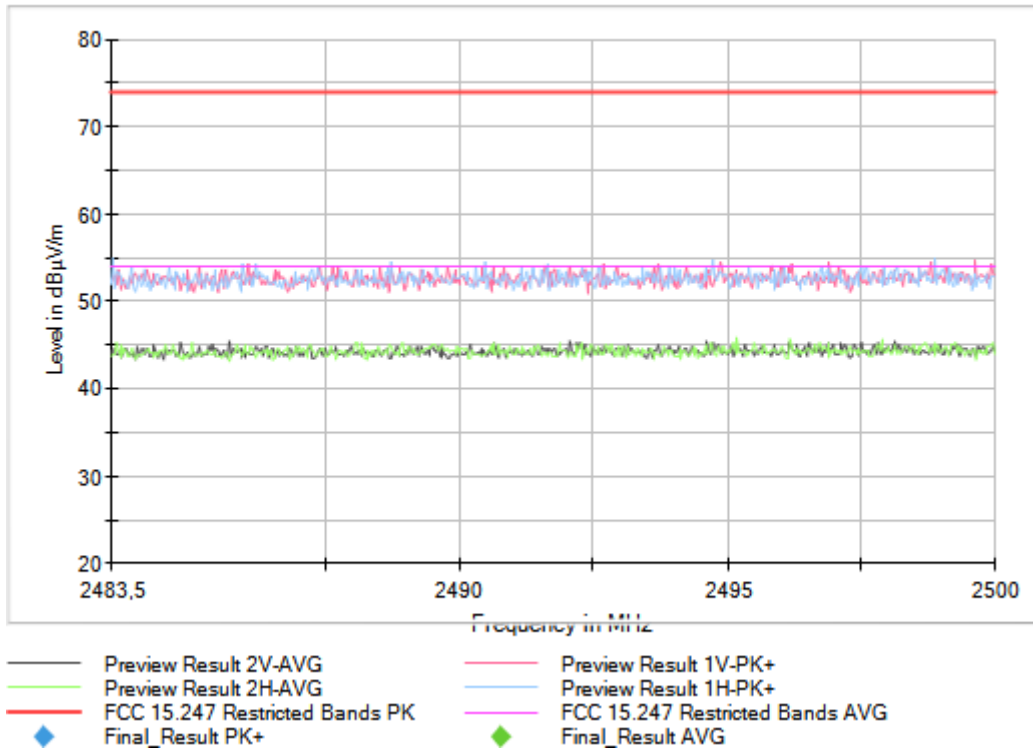
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



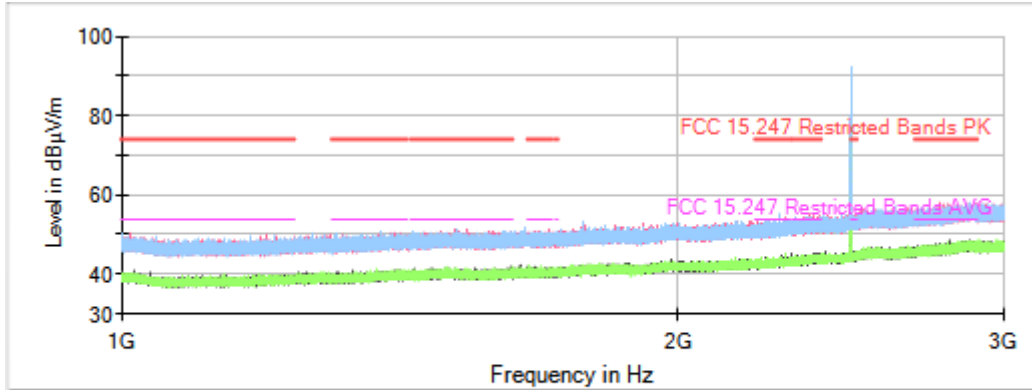
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



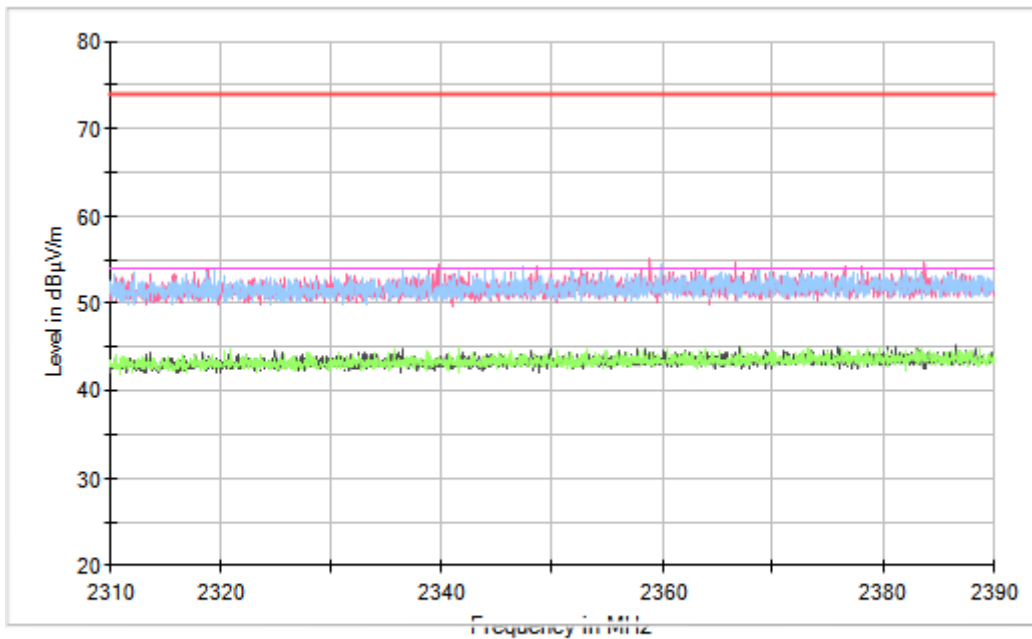
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 Measurement Point = 1

Images:



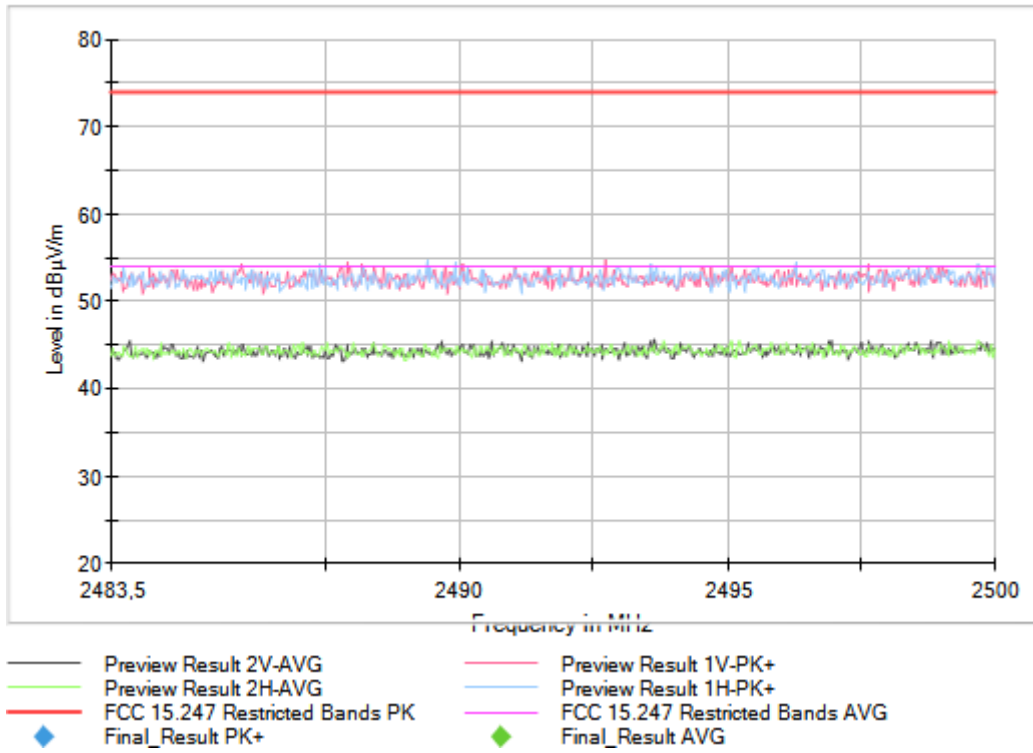
- Preview Result 2V-AVG
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- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



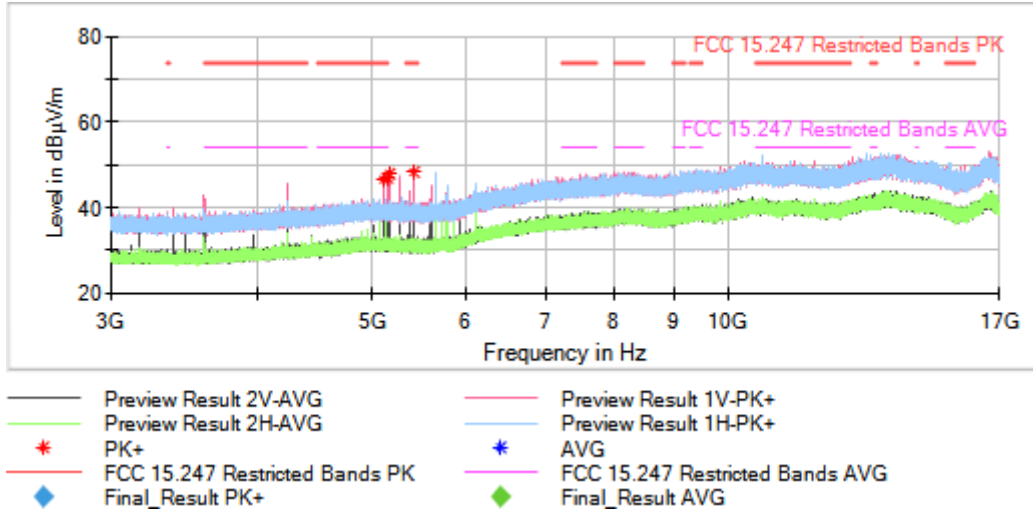
- Preview Result 2V-AVG
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- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



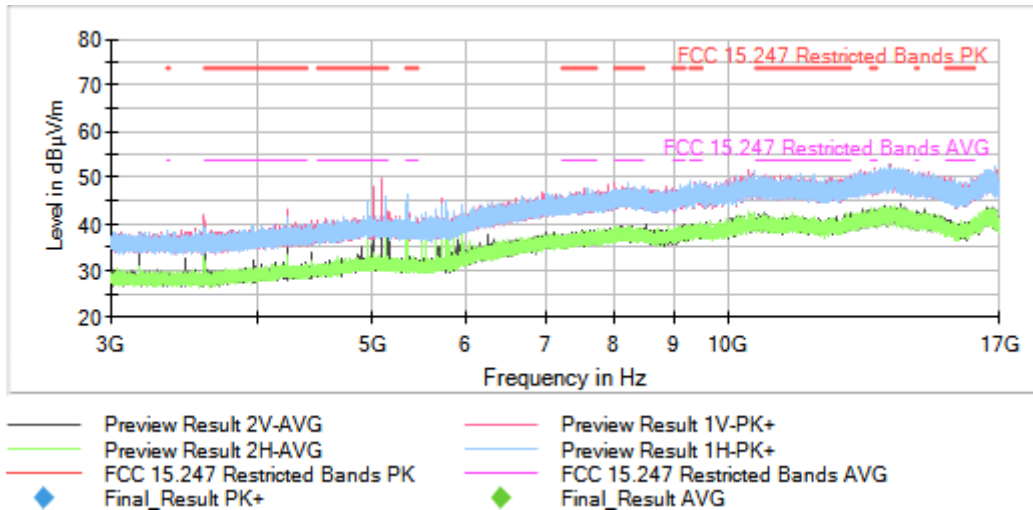
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Images:



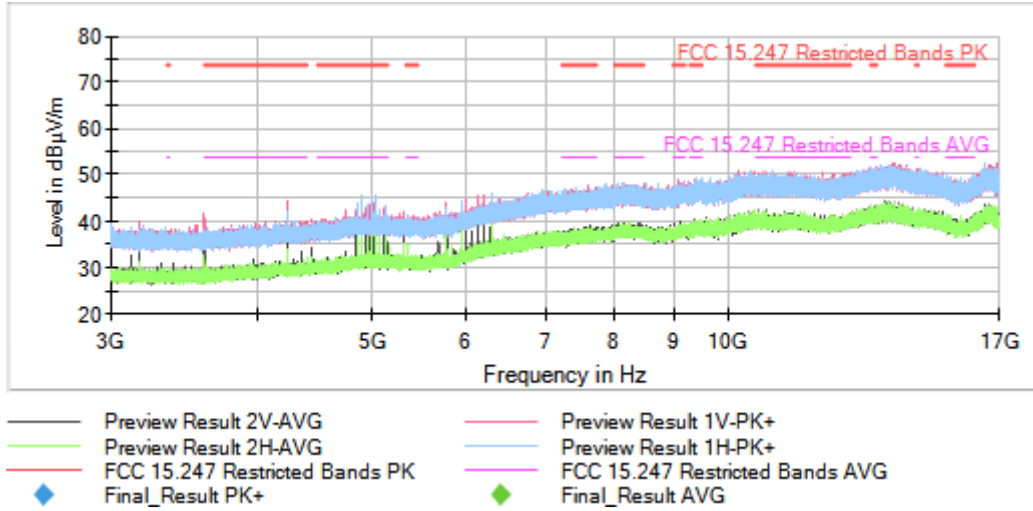
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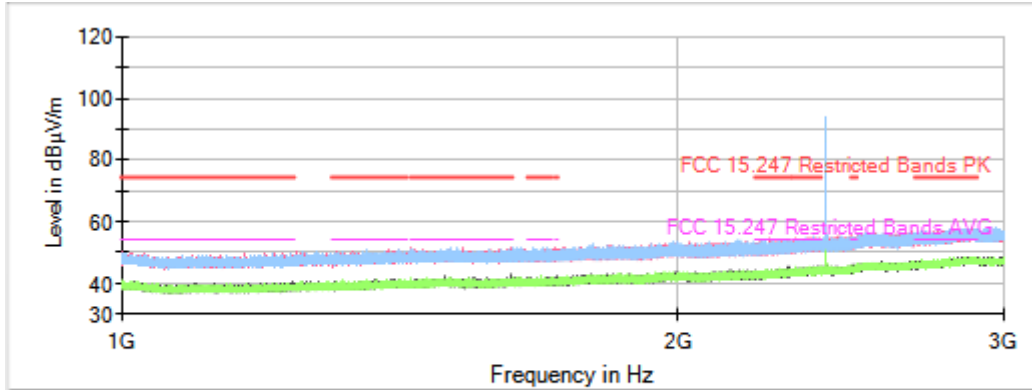
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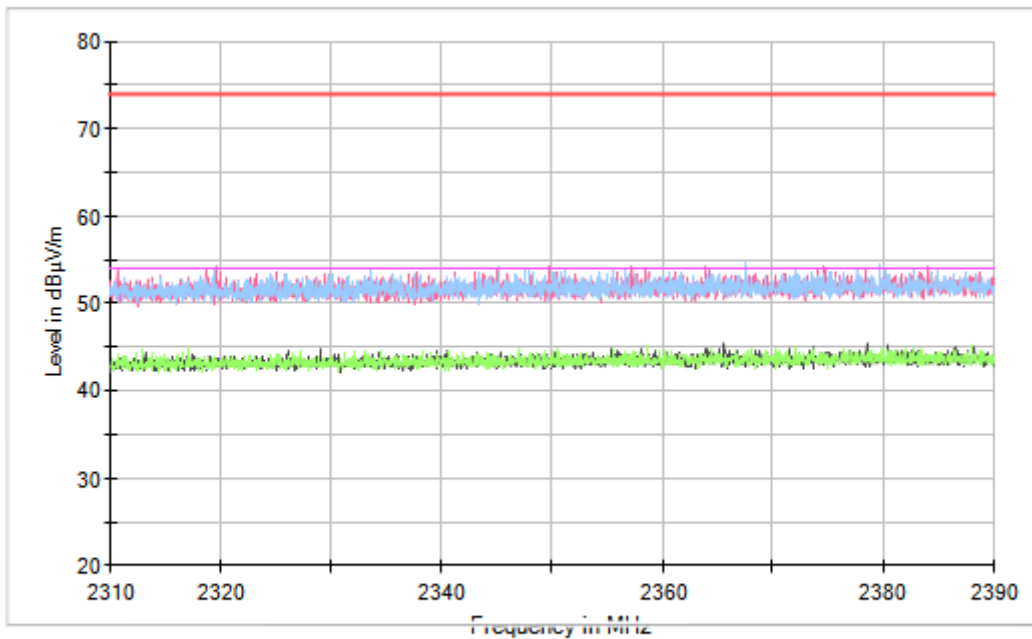
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Images:



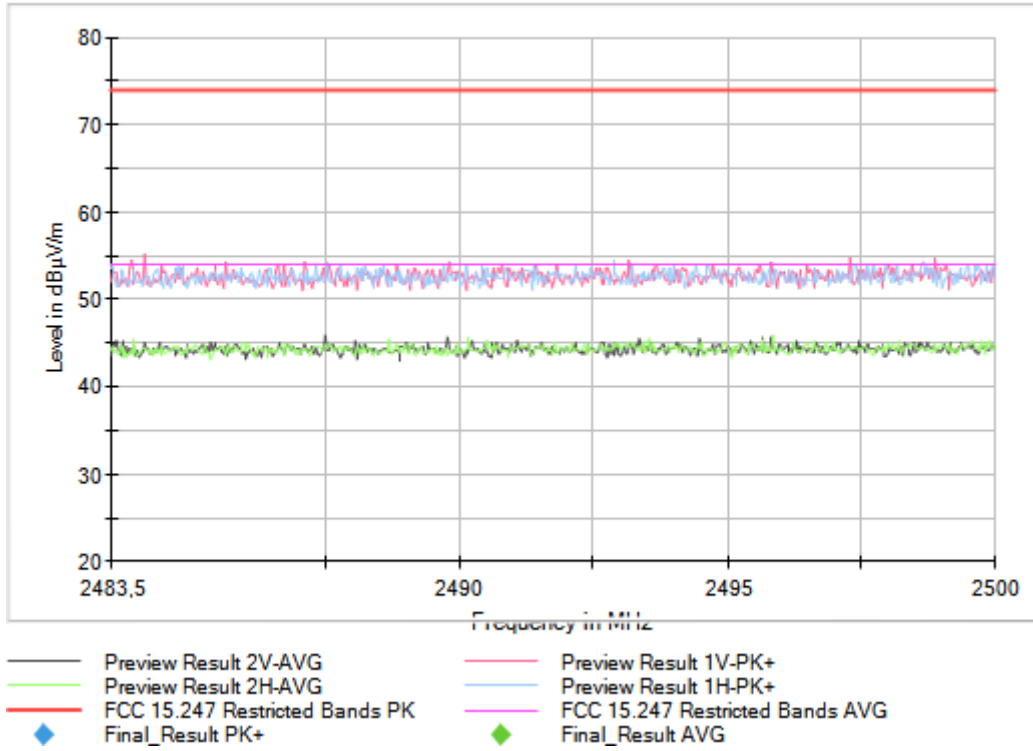
- Preview Result 2V-AVG
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- FCC 15.247 Restricted Bands PK
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- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Full Spectrum



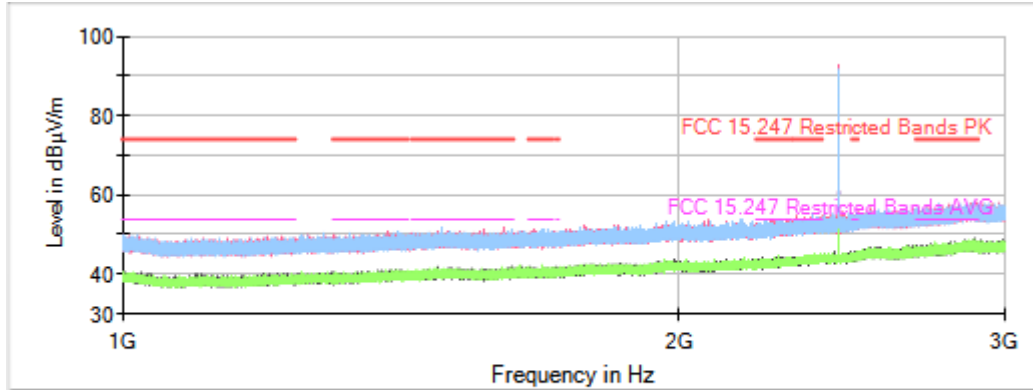
- Preview Result 2V-AVG
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Full Spectrum



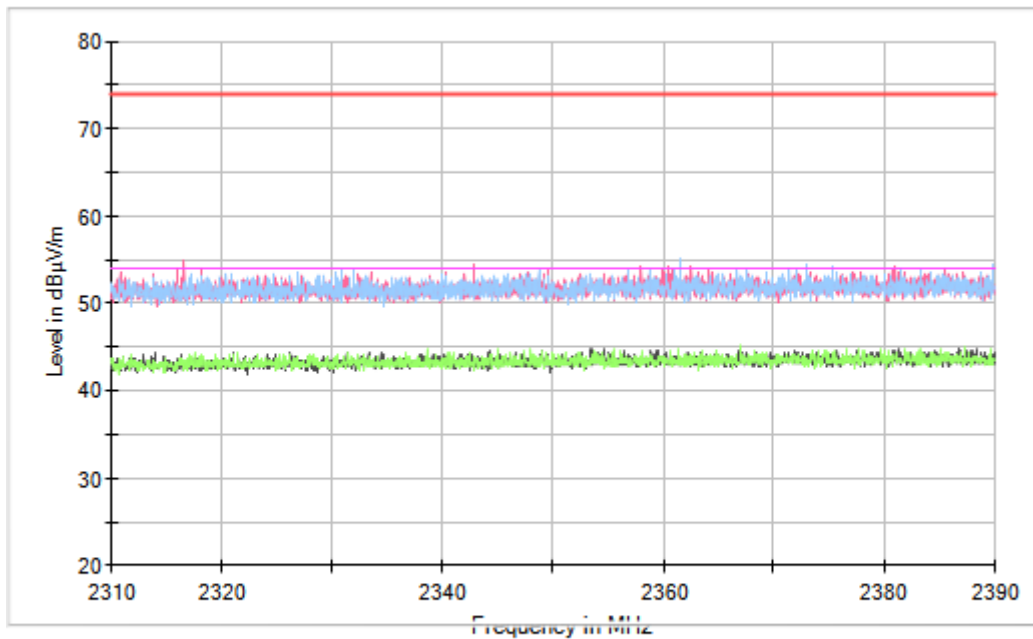
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Images:



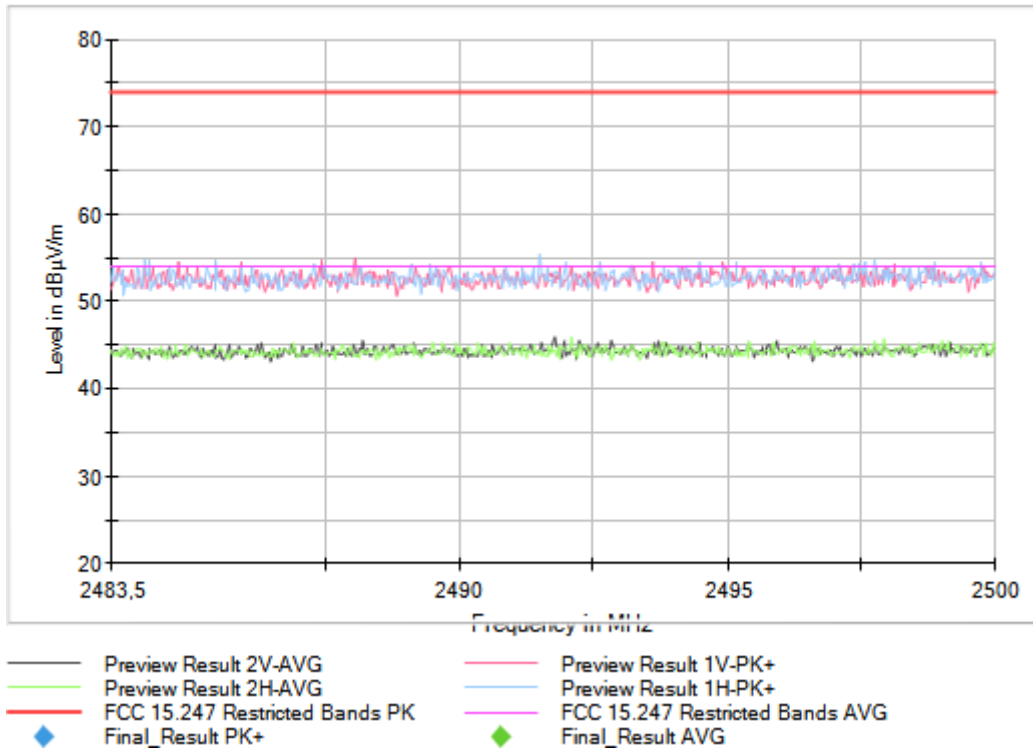
- | | |
|----------------------------------|-----------------------------------|
| — Preview Result 2V-AVG | — Preview Result 1V-PK+ |
| — Preview Result 2H-AVG | — Preview Result 1H-PK+ |
| — FCC 15.247 Restricted Bands PK | — FCC 15.247 Restricted Bands AVG |
| ◆ Final_Result PK+ | ◆ Final_Result AVG |

Full Spectrum



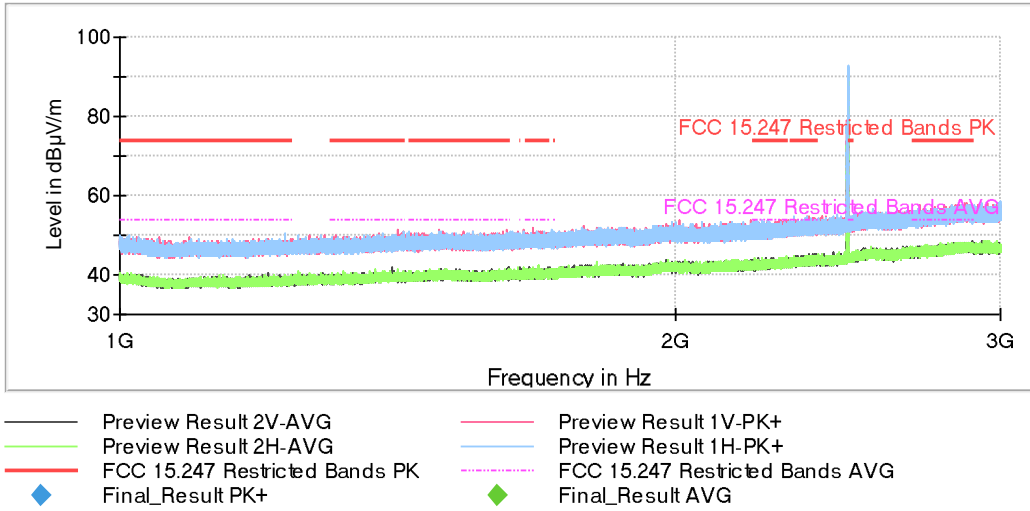
- | | |
|----------------------------------|-----------------------------------|
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| — Preview Result 2H-AVG | — Preview Result 1H-PK+ |
| — FCC 15.247 Restricted Bands PK | — FCC 15.247 Restricted Bands AVG |
| ◆ Final_Result PK+ | ◆ Final_Result AVG |

Full Spectrum

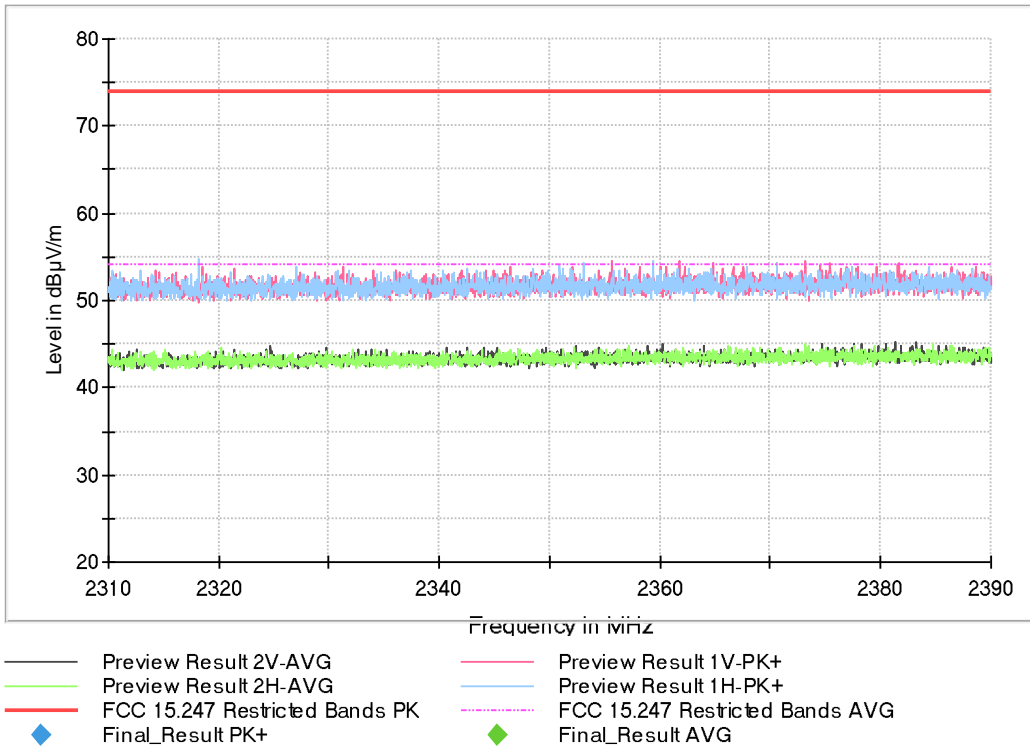


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 Measurement Point = 1

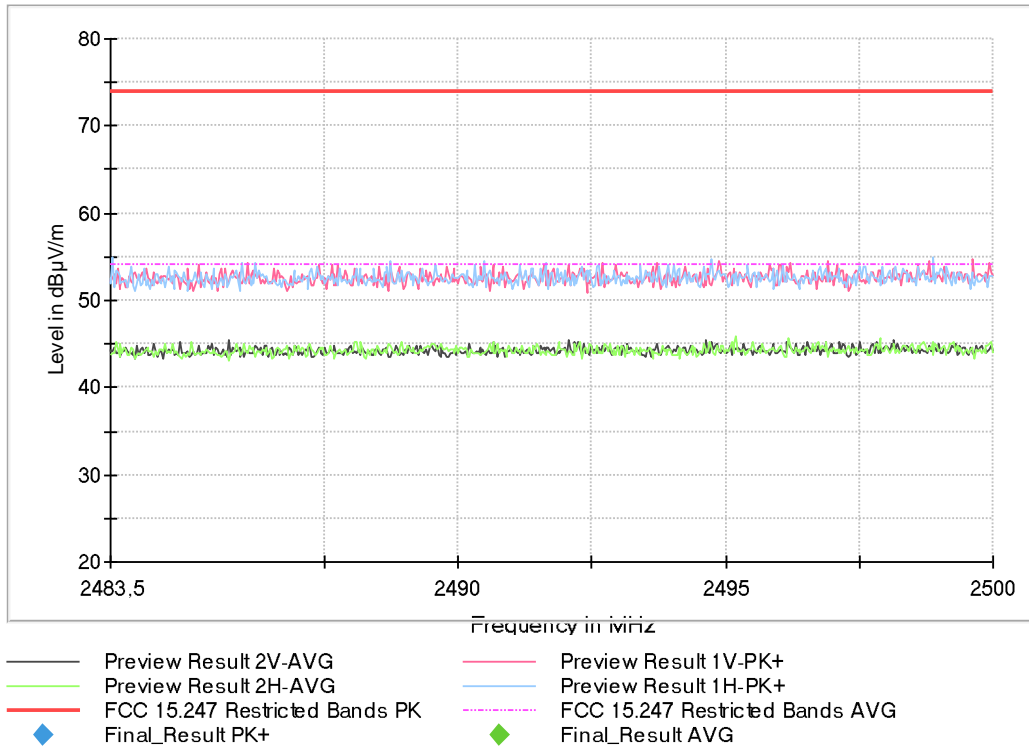
Images:



Full Spectrum

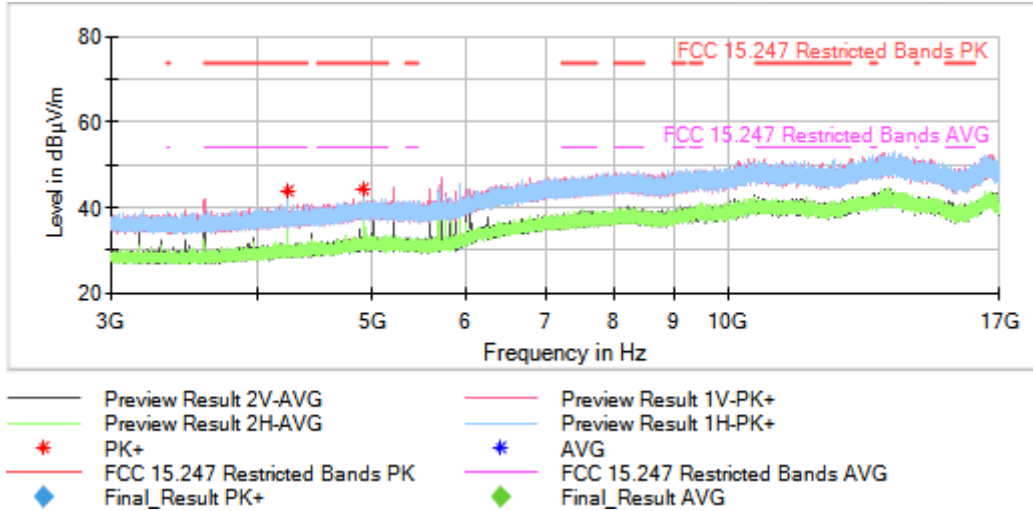


Full Spectrum



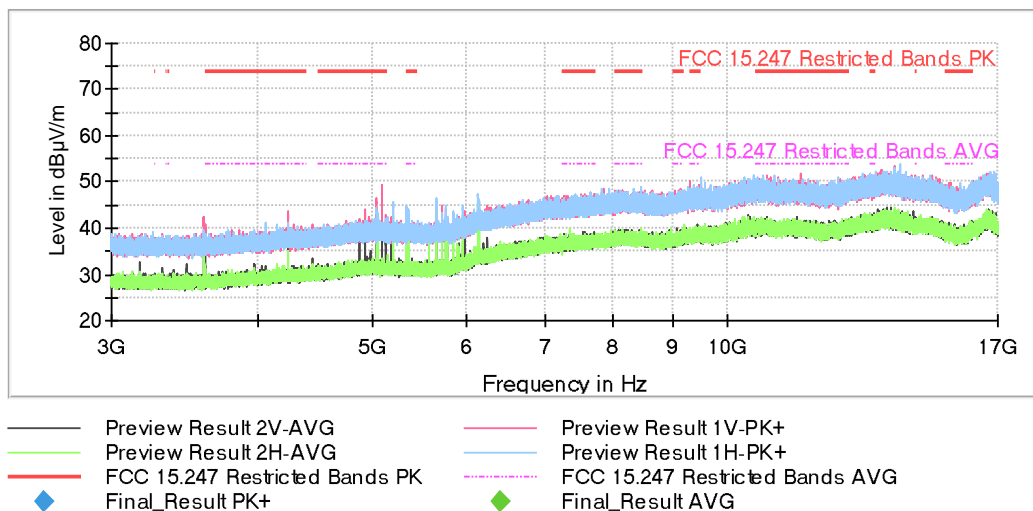
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Images:



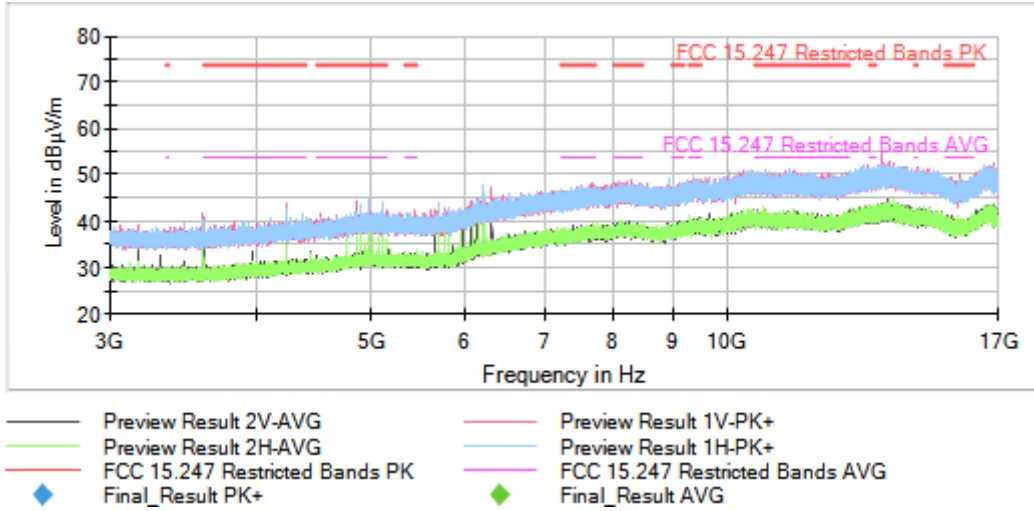
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
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Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
 Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1,
 Measurement Point = 1

Images:



Appendix B: Test results. Bluetooth EDR. Chipset 2

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	12Vdc
Type of Power Supply:	Battery

ANTENNA (*):

Type of Antenna:	External antenna
Maximum Declared Antenna Gain:	2dBi

TEST FREQUENCIES (*):

Low Channel:	2402 MHz
Middle Channel:	2441 MHz
High Channel:	2480 MHz

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is connected to the TS8997 using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.



RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1.5 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

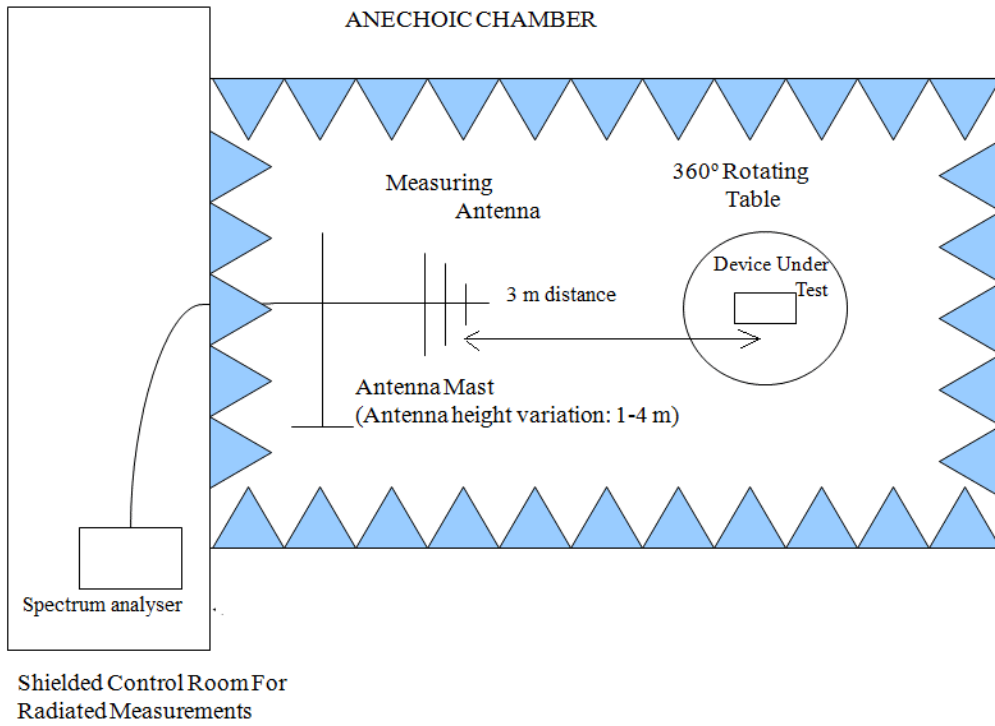
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation were varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

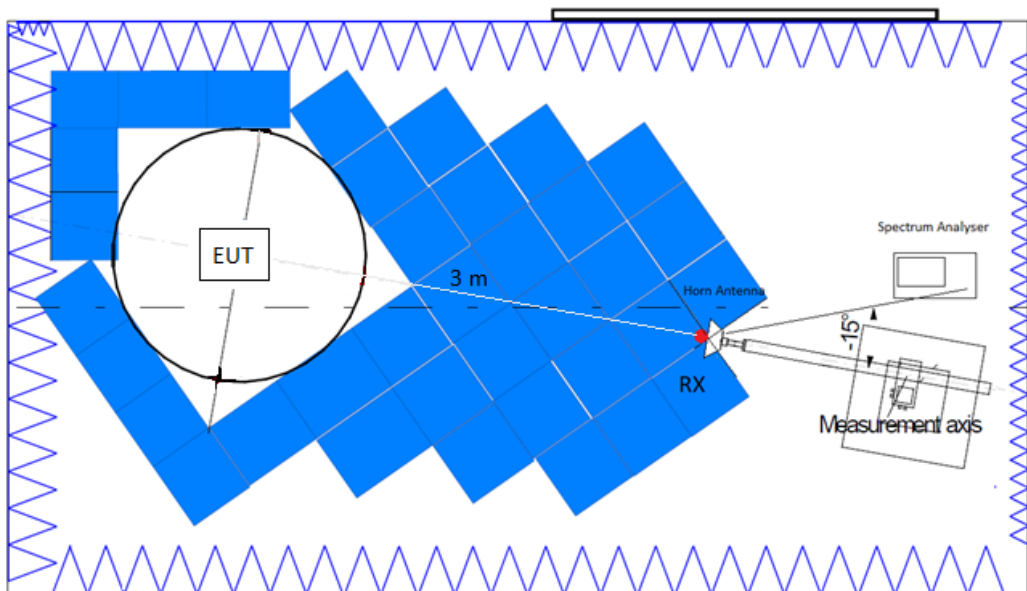
Measurements were made in both horizontal and vertical planes of polarization.

A resolution bandwidth/video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

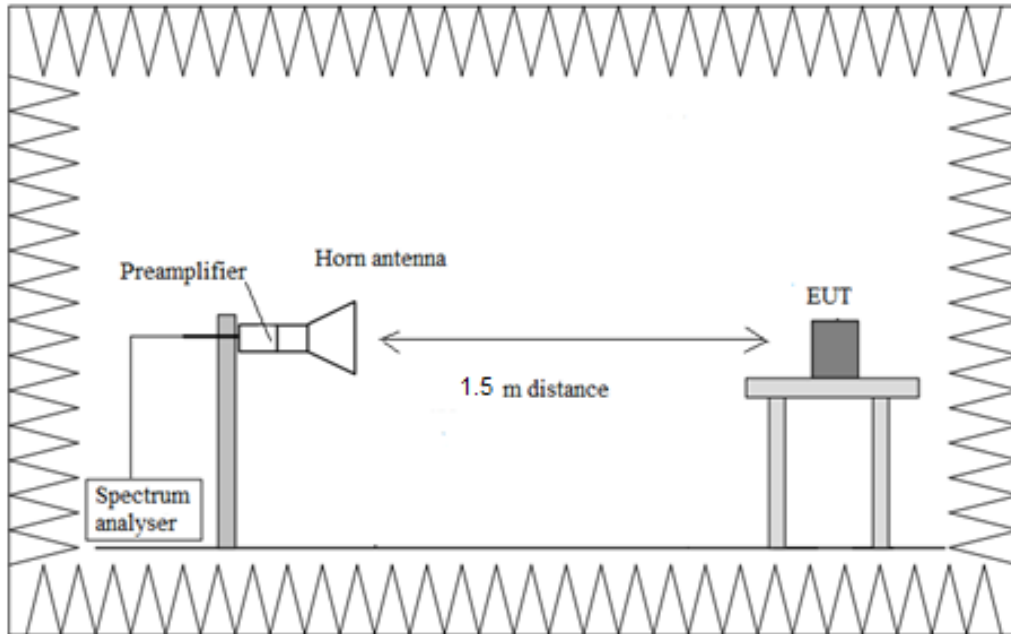
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



TEST CASES DETAILS

Occupied Channel Bandwidth 99%

Results

Modulation: BT (GFSK 1-DH5)

Freq (MHz)	Occ Ch BW (MHz)
2402.00000	0.835
2441.00000	0.840
2480.00000	0.840

Modulation: BT (Pi/4 DQPSK 2-DH5)

Freq (MHz)	Occ Ch BW (MHz)
2402.00000	1.165
2441.00000	1.170
2480.00000	1.175

Modulation: BT (8DPSK 3-DH5)

Freq (MHz)	Occ Ch BW (MHz)
2402.00000	1.185
2441.00000	1.185
2480.00000	1.185

Verdict

Pass