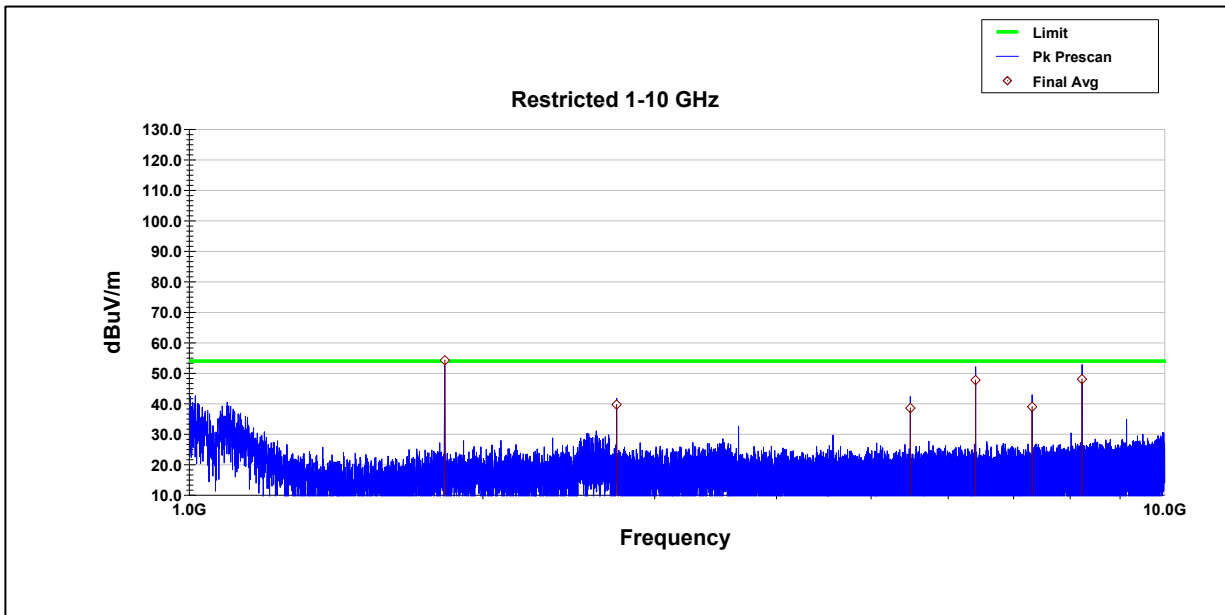


LoRa DTS SF 11 High Ch

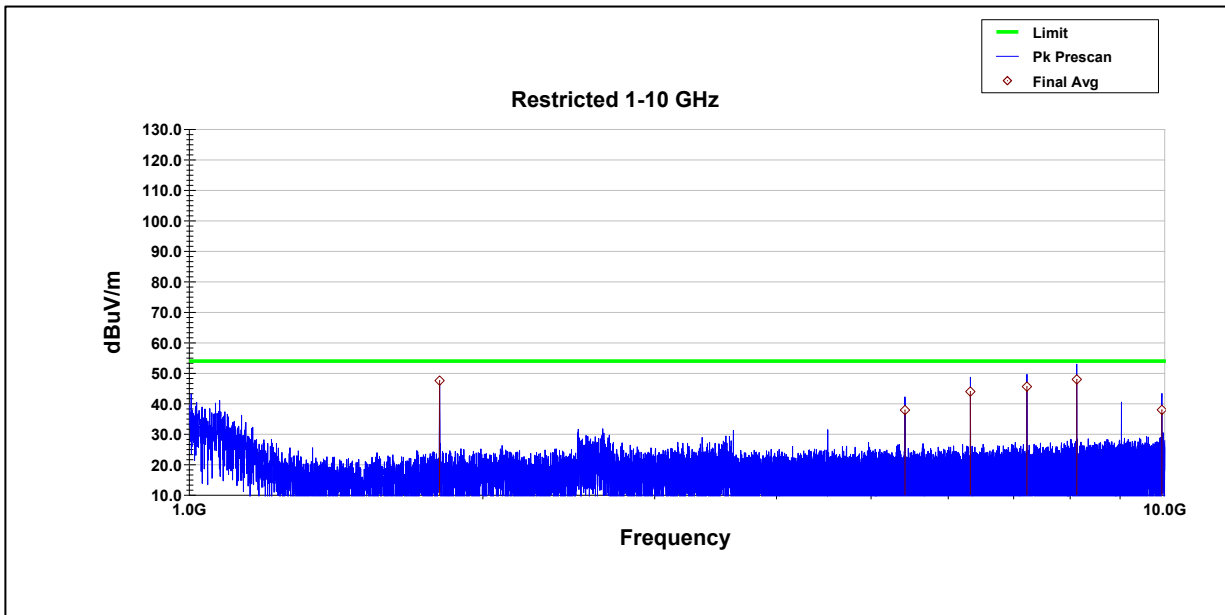


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1828.4	-46.10	5.10	95.30	54.30	54.00	0.30
2742.66	-59.30	3.80	95.30	39.70	54.00	-14.20
5485.811	-61.20	4.60	95.30	38.60	54.00	-15.40
6399.194	-52.20	4.70	95.30	47.80	54.00	-6.20
7314.41	-61.20	4.90	95.30	39.00	54.00	-15.00
8226.659	-53.00	5.80	95.30	48.10	54.00	-5.90

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

LoRa DTS SF 12 Low Ch

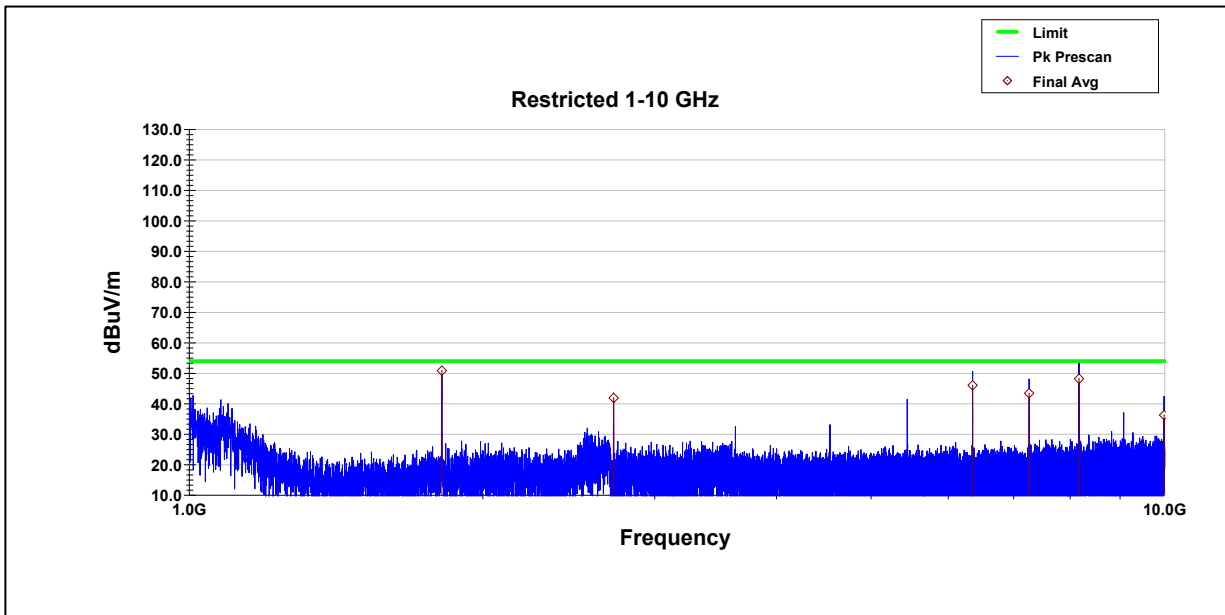


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1805.947	-52.80	5.10	95.30	47.60	54.00	-6.40
5417.559	-61.80	4.50	95.30	37.90	54.00	-16.00
6321.338	-56.10	4.80	95.30	44.00	54.00	-10.00
7223.825	-54.70	5.00	95.30	45.60	54.00	-8.40
8126.577	-52.90	5.70	95.30	48.00	54.00	-6.00
9934.406	-63.10	5.80	95.30	38.00	54.00	-16.00

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

LoRa DTS SF 12 Mid Ch

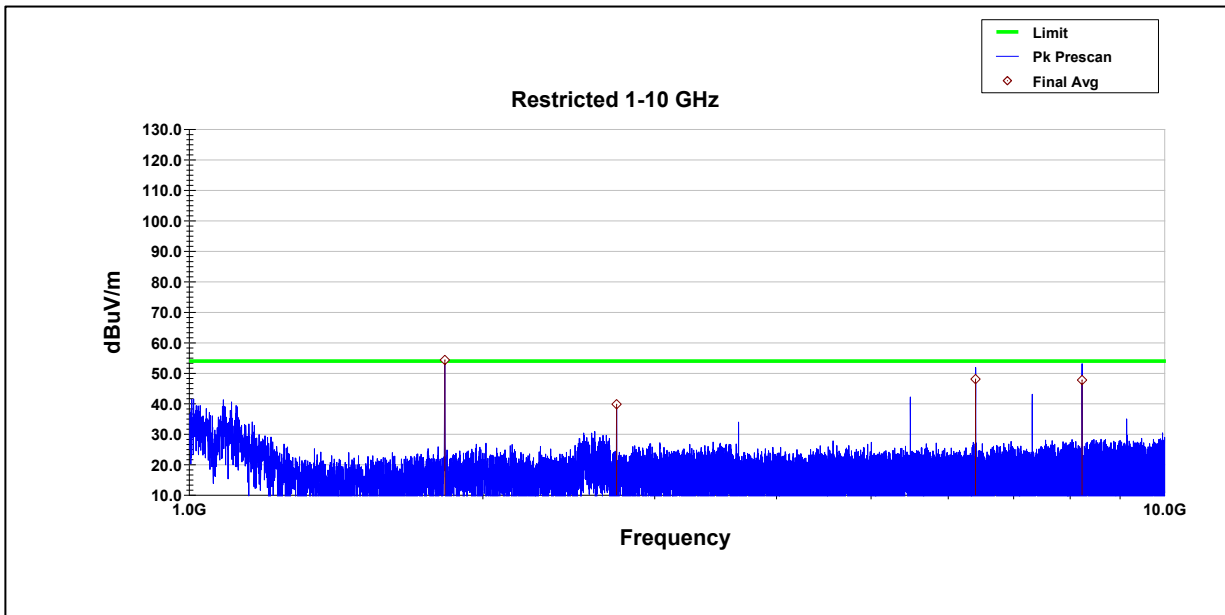


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1815.565	-49.50	5.10	95.30	50.80	54.00	-3.10
2723.458	-57.10	3.70	95.30	41.90	54.00	-12.10
6354.451	-54.10	4.90	95.30	46.10	54.00	-7.90
7262.305	-56.90	5.10	95.30	43.40	54.00	-10.50
8170.978	-52.40	5.30	95.30	48.20	54.00	-5.80
9987.425	-65.00	6.00	95.30	36.30	54.00	-17.70

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

LoRa DTS SF 12 High Ch

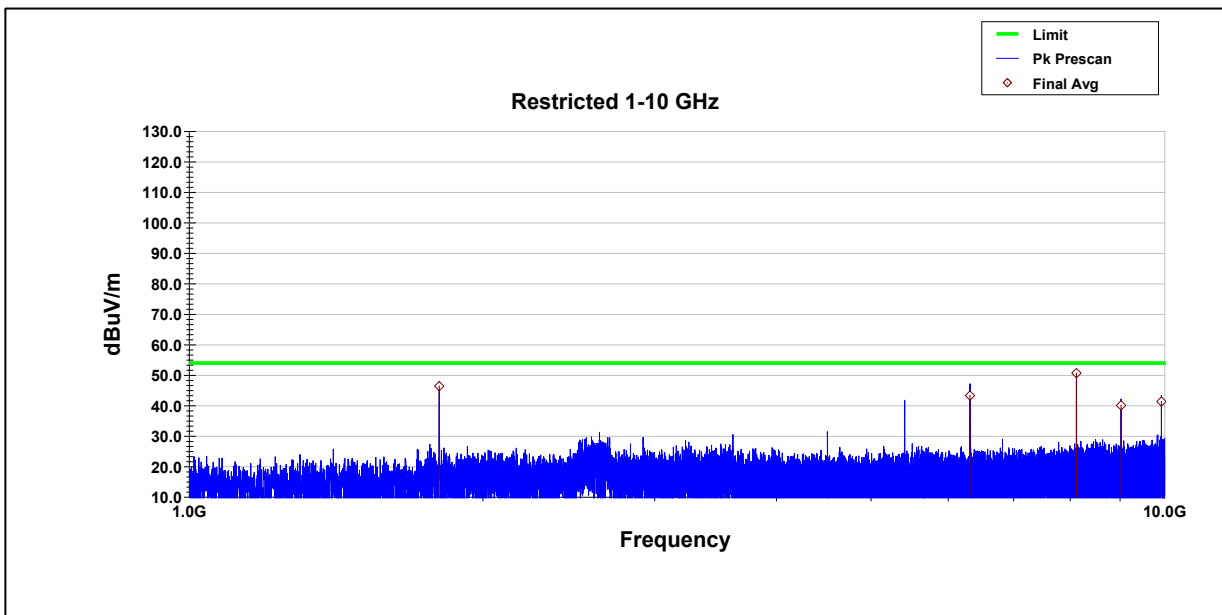


Frequency	Raw Avg	Path Loss	Converstion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1828.421	-46.00	5.10	95.30	54.40	54.00	0.40
2742.664	-59.30	3.80	95.30	39.80	54.00	-14.20
6398.947	-51.90	4.70	95.30	48.10	54.00	-5.90
8228.201	-53.30	5.80	95.30	47.80	54.00	-6.20

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

Sidewalk FSK Low Ch

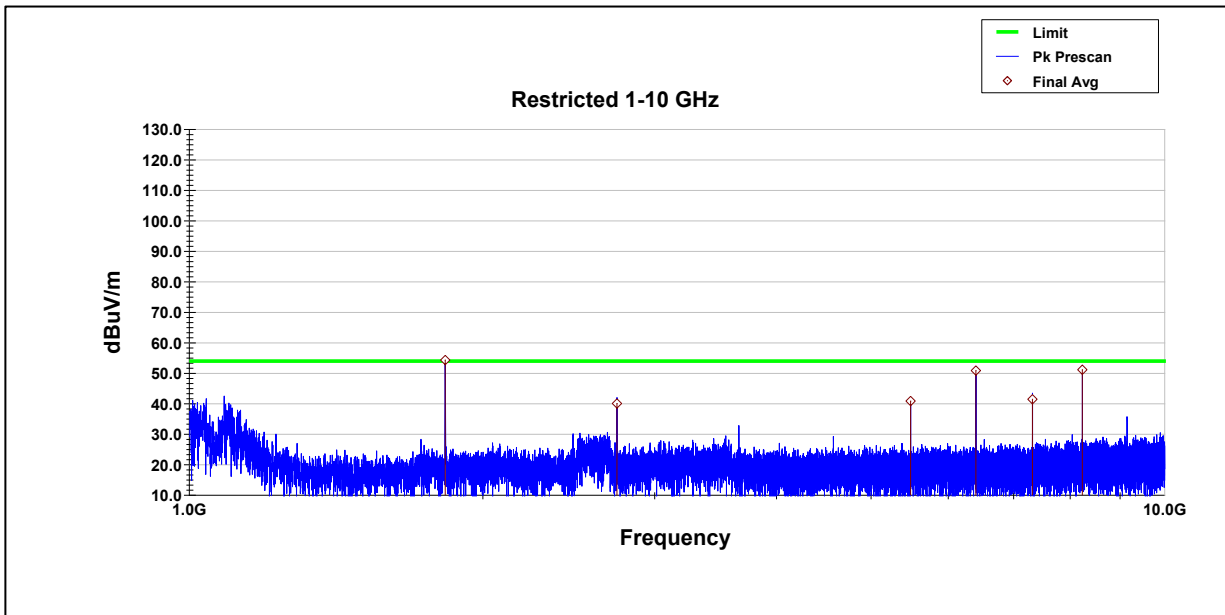


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1804.313	-53.90	5.10	95.30	46.40	54.00	-7.60
6315.514	-56.80	4.90	95.30	43.30	54.00	-10.60
8119.854	-50.20	5.60	95.30	50.70	54.00	-3.30
9022.024	-60.80	5.60	95.30	40.10	54.00	-13.90
9924.257	-59.80	6.00	95.30	41.40	54.00	-12.60

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

Sidewalk FSK Mid Ch

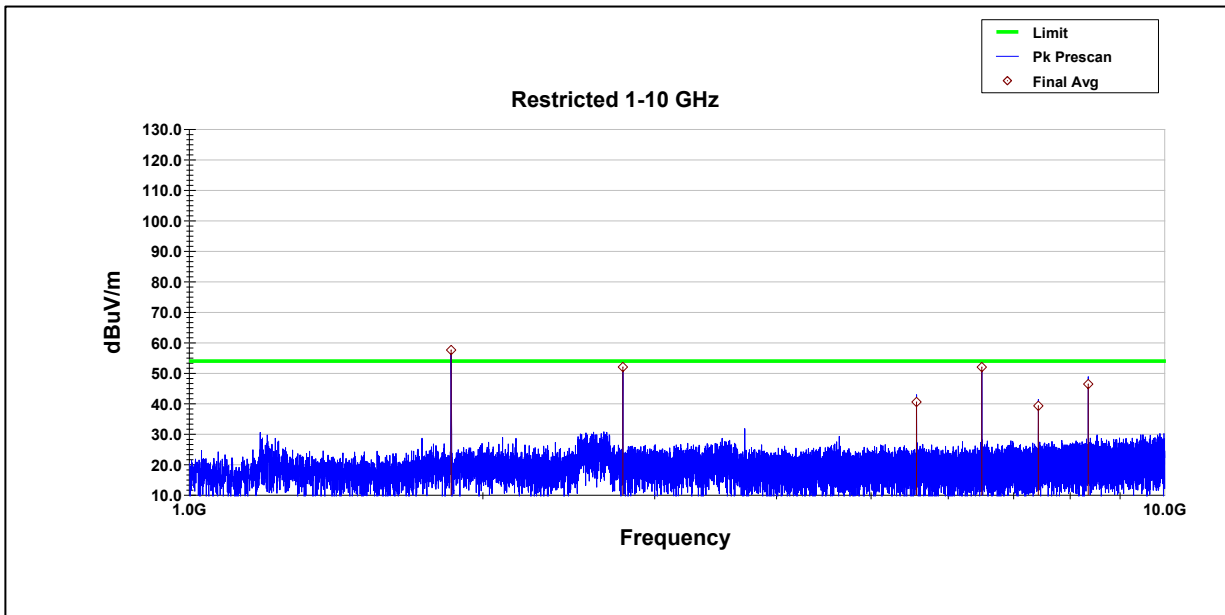


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1829.948	-46.00	5.10	95.30	54.30	54.00	0.40
2744.999	-59.00	3.90	95.30	40.10	54.00	-13.90
5489.958	-59.00	4.60	95.30	40.90	54.00	-13.10
6404.989	-49.10	4.70	95.30	50.90	54.00	-3.10
7320.079	-58.70	4.90	95.30	41.50	54.00	-12.50
8235.046	-49.80	5.70	95.30	51.20	54.00	-2.80

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

Sidewalk FSK High Ch

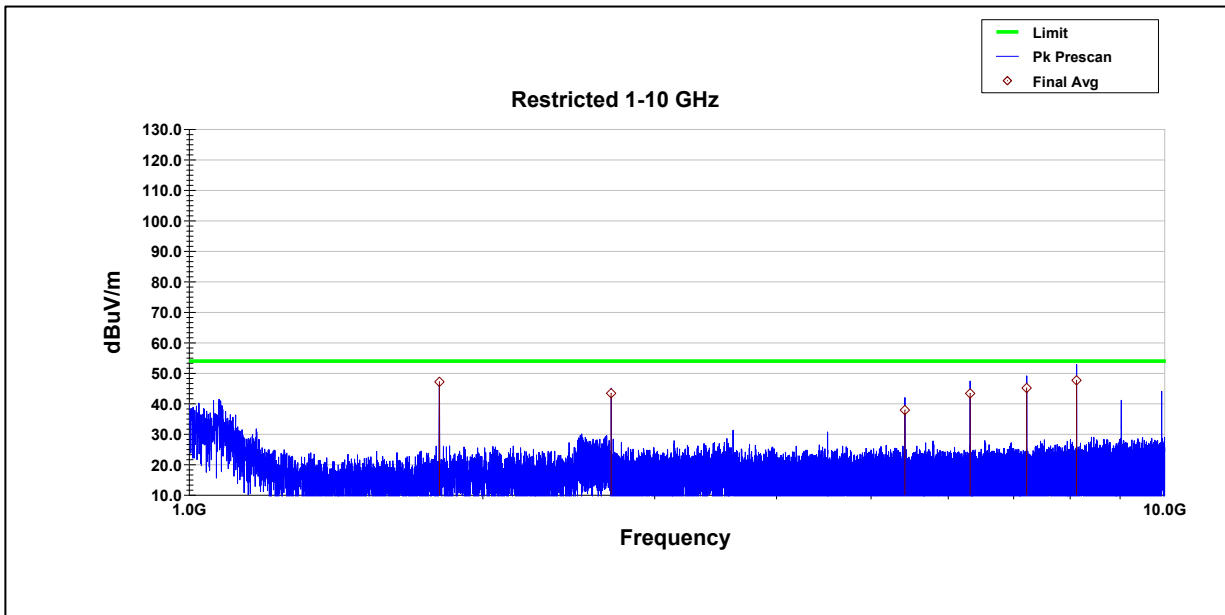


Frequency	Raw Avg	Path Loss	Converston	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1855.533	-42.70	5.00	95.30	57.60	54.00	3.60
2783.372	-47.00	3.80	95.30	52.10	54.00	-1.90
5566.802	-59.40	4.70	95.30	40.60	54.00	-13.40
6494.626	-48.10	4.90	95.30	52.00	54.00	-2.00
7422.537	-60.90	5.00	95.30	39.30	54.00	-14.70
8350.182	-54.60	5.70	95.30	46.40	54.00	-7.50

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

Sidewalk LoRa DTS Low Ch

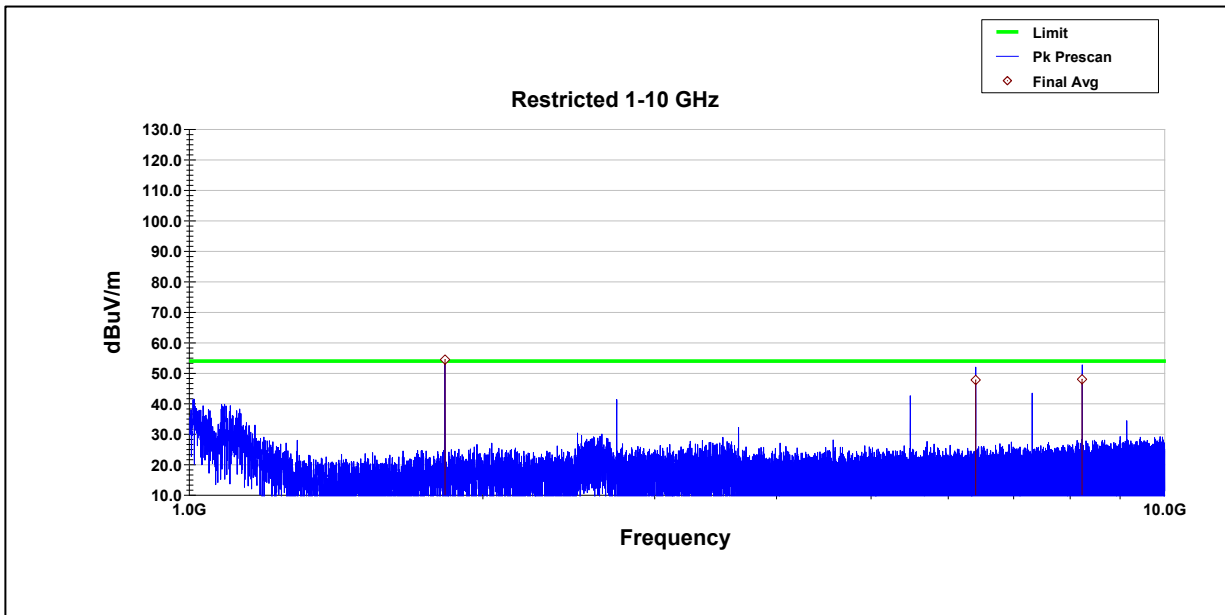


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1805.009	-53.20	5.10	95.30	47.20	54.00	-6.80
2707.463	-55.60	3.70	95.30	43.40	54.00	-10.50
5416.002	-61.80	4.50	95.30	37.90	54.00	-16.00
6318.015	-56.70	4.90	95.30	43.40	54.00	-10.60
7220.046	-55.10	5.00	95.30	45.10	54.00	-8.80
8121.658	-53.20	5.60	95.30	47.70	54.00	-6.30

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

Sidewalk LoRa DTS Mid Ch

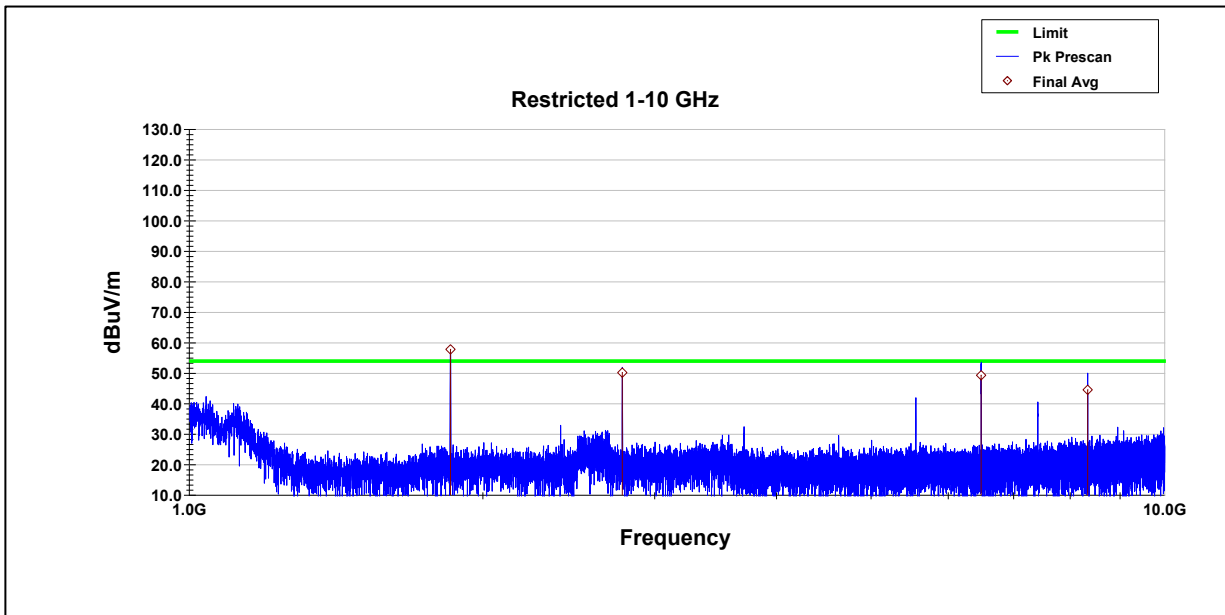


Frequency	Raw Avg	Path Loss	Converstion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1829.052	-45.90	5.10	95.30	54.50	54.00	0.50
6401.986	-52.20	4.70	95.30	47.80	54.00	-6.20
8228.844	-53.00	5.80	95.30	48.00	54.00	-6.00

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

Sidewalk LoRa DTS High Ch



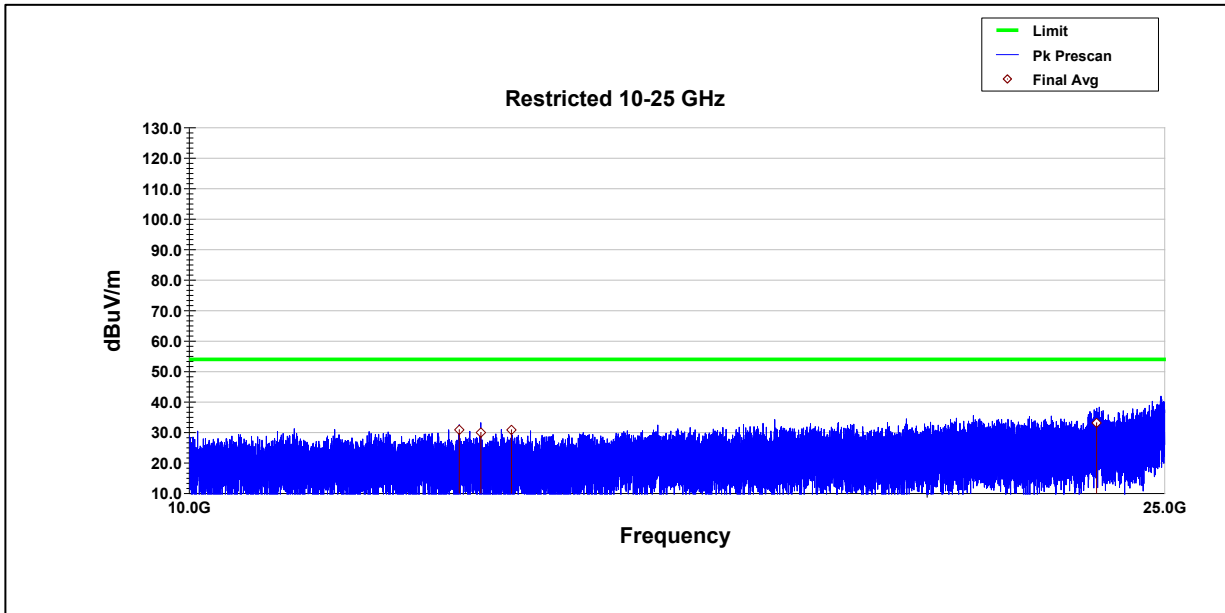
Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1852.97	-42.50	5.10	95.30	57.80	54.00	3.80
2779.495	-48.90	3.80	95.30	50.20	54.00	-3.80
6484.851	-50.90	5.00	95.30	49.40	54.00	-4.60
8338.399	-56.40	5.70	95.30	44.60	54.00	-9.40

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

10-25 GHz

LoRa FHSS SF 7 Low Ch

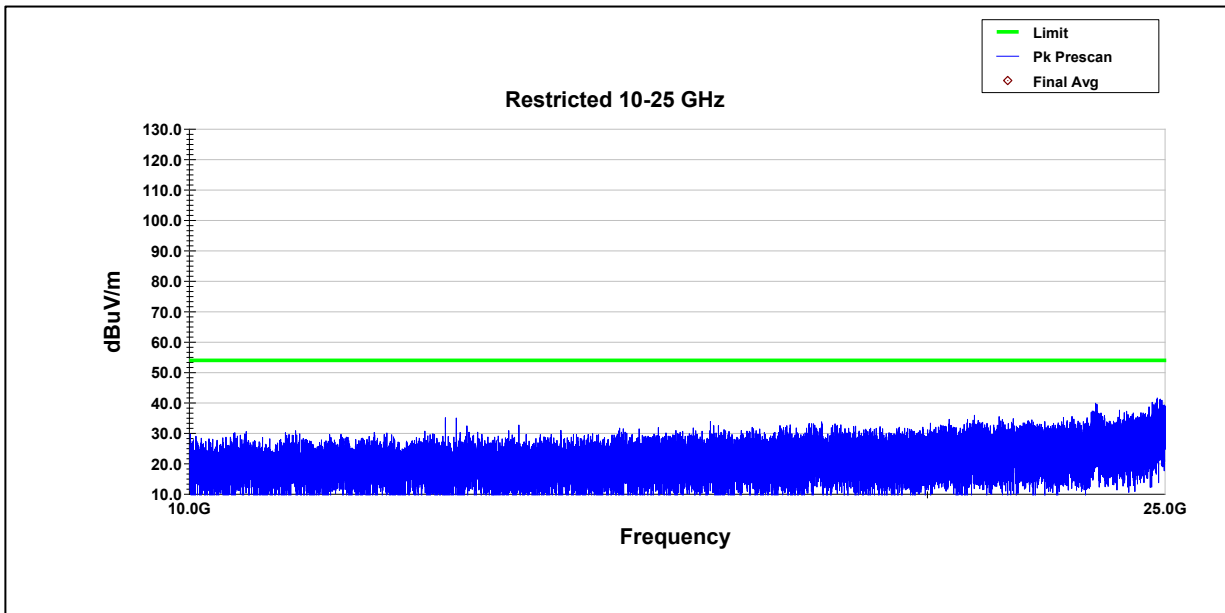


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
12887.781	-70.30	5.90	95.30	30.90	54.00	-23.10
13151.078	-71.40	6.10	95.30	30.00	54.00	-24.00
13534.586	-70.80	6.40	95.30	30.90	54.00	-23.10
23452.256	-73.20	11.10	95.30	33.10	54.00	-20.80

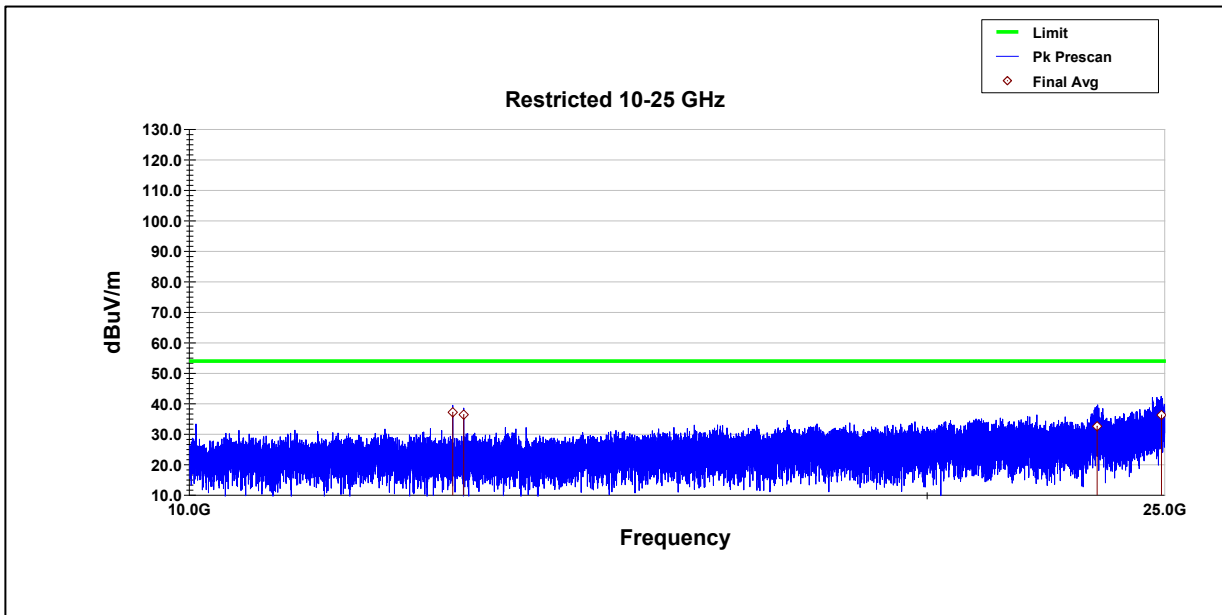
$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

LoRa FHSS SF 7 Mid Ch



LoRa FHSS SF 7 High Ch

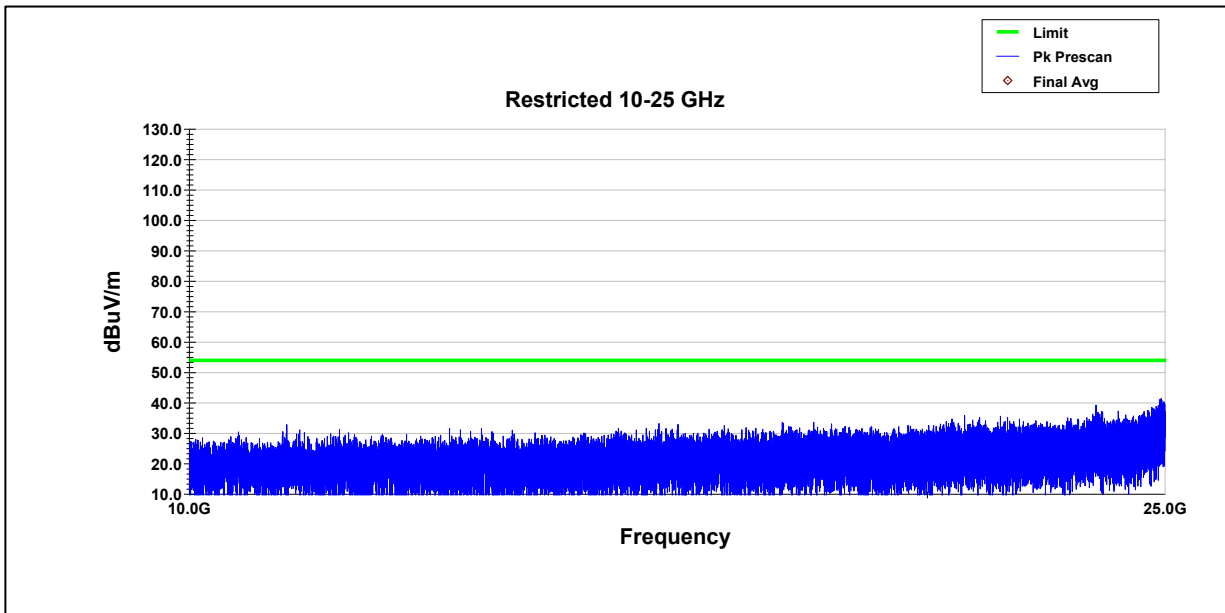


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
12808.656	-64.00	5.90	95.30	37.20	54.00	-16.80
12941.587	-64.80	6.00	95.30	36.40	54.00	-17.60
23465.404	-73.60	11.00	95.30	32.60	54.00	-21.40
24925.596	-72.60	13.60	95.30	36.30	54.00	-17.70

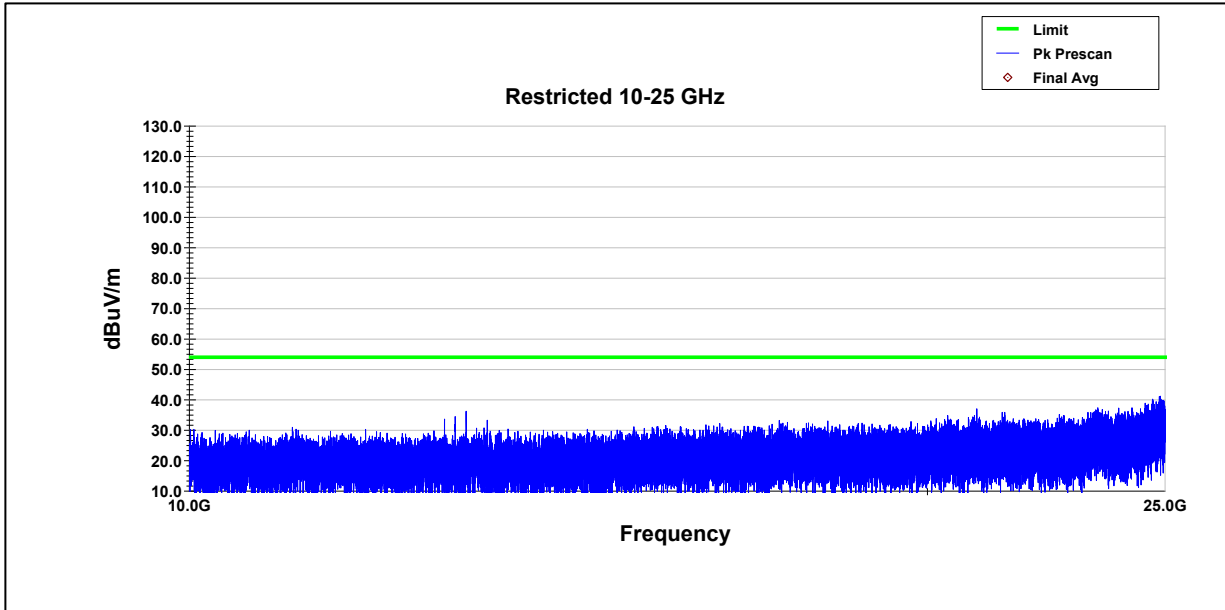
$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

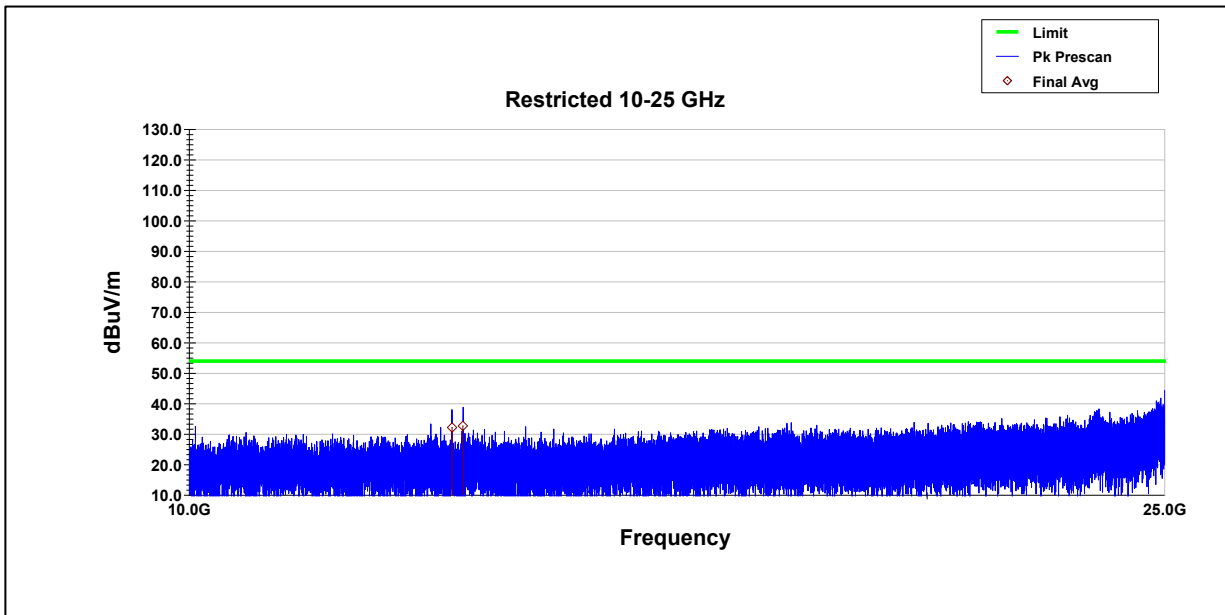
LoRa DTS SF 11 Low Ch



LoRa DTS SF 11 Mid Ch



LoRa DTS SF 11 High Ch

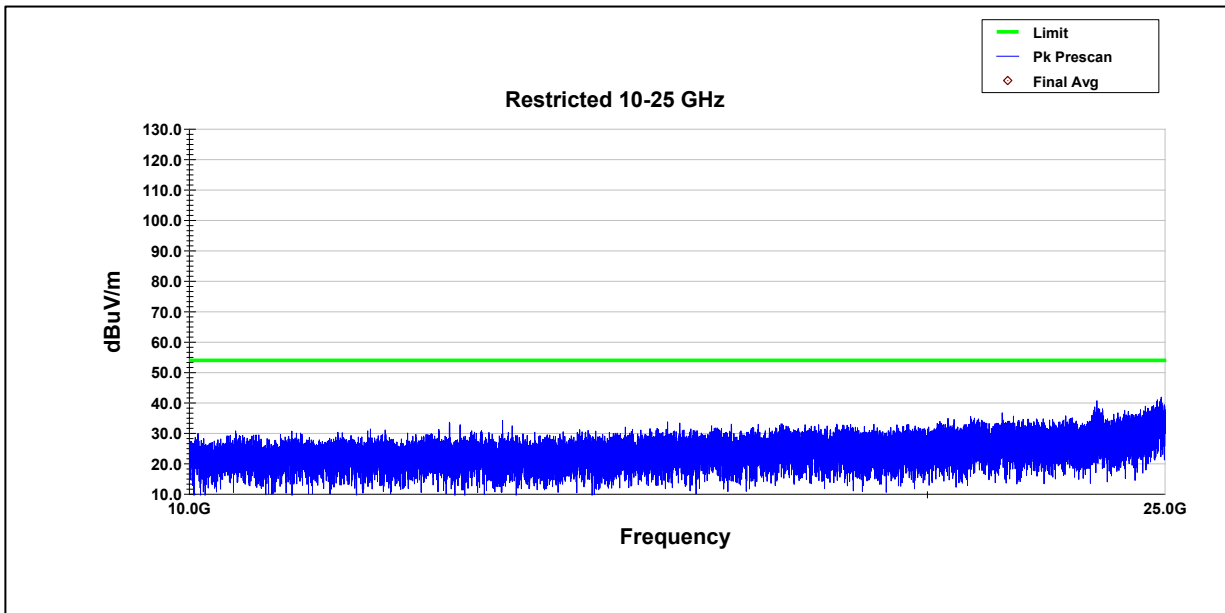


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
12801.024	-69.00	5.90	95.30	32.20	54.00	-21.80
12930.943	-68.40	5.90	95.30	32.70	54.00	-21.30

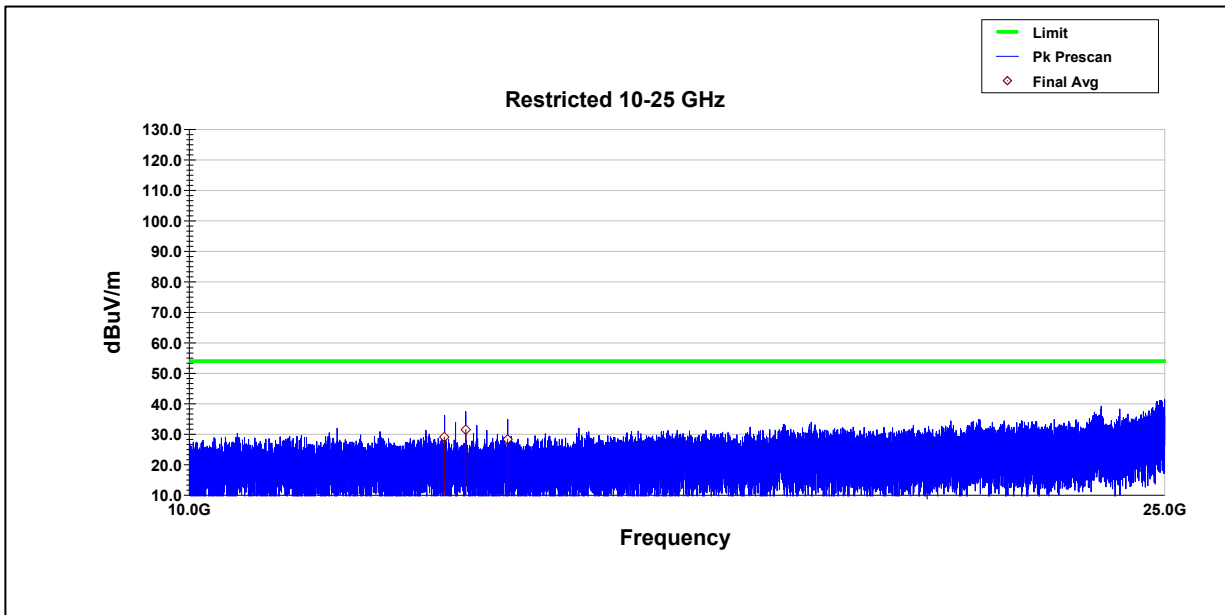
$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

LoRa DTS SF 12 Low Ch



LoRa DTS SF 12 Mid Ch

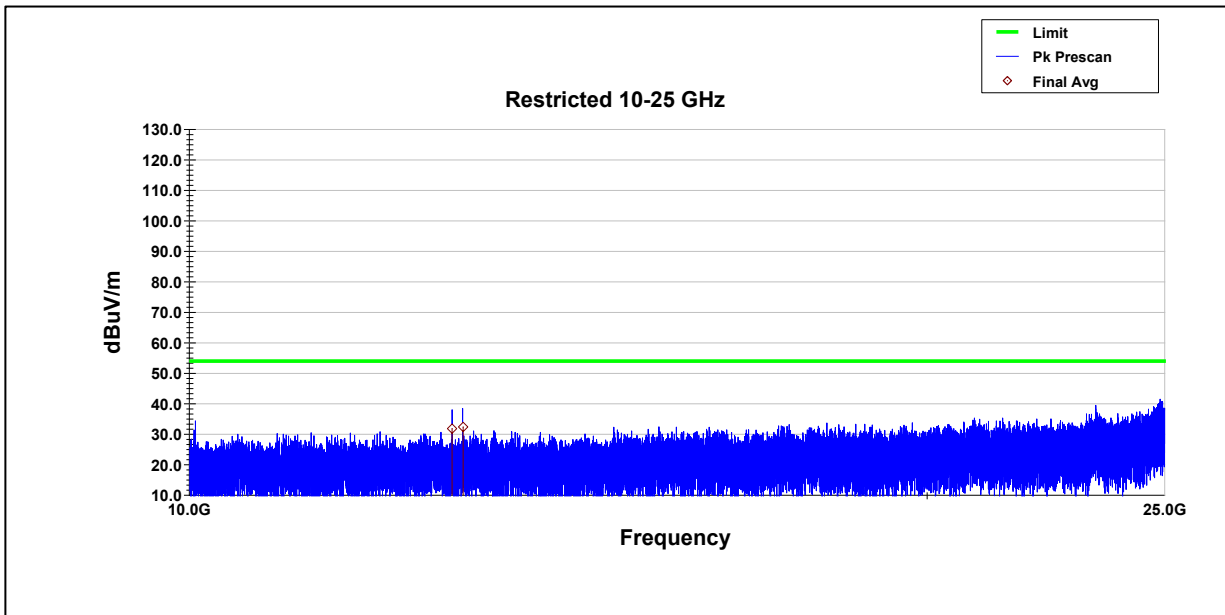


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
12707.627	-72.10	5.90	95.30	29.10	54.00	-24.90
12966.198	-69.70	6.00	95.30	31.50	54.00	-22.50
13485.978	-73.20	6.30	95.30	28.30	54.00	-25.60

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

LoRa DTS SF 12 High Ch

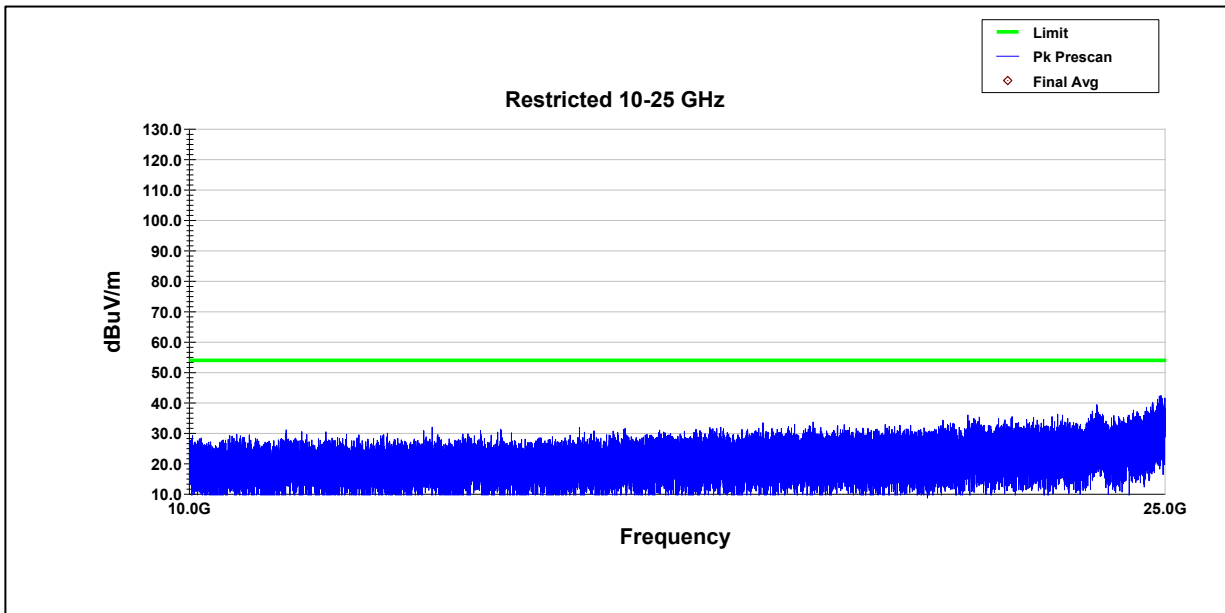


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
12800.219	-69.40	5.90	95.30	31.80	54.00	-22.10
12934.238	-68.80	5.90	95.30	32.40	54.00	-21.60

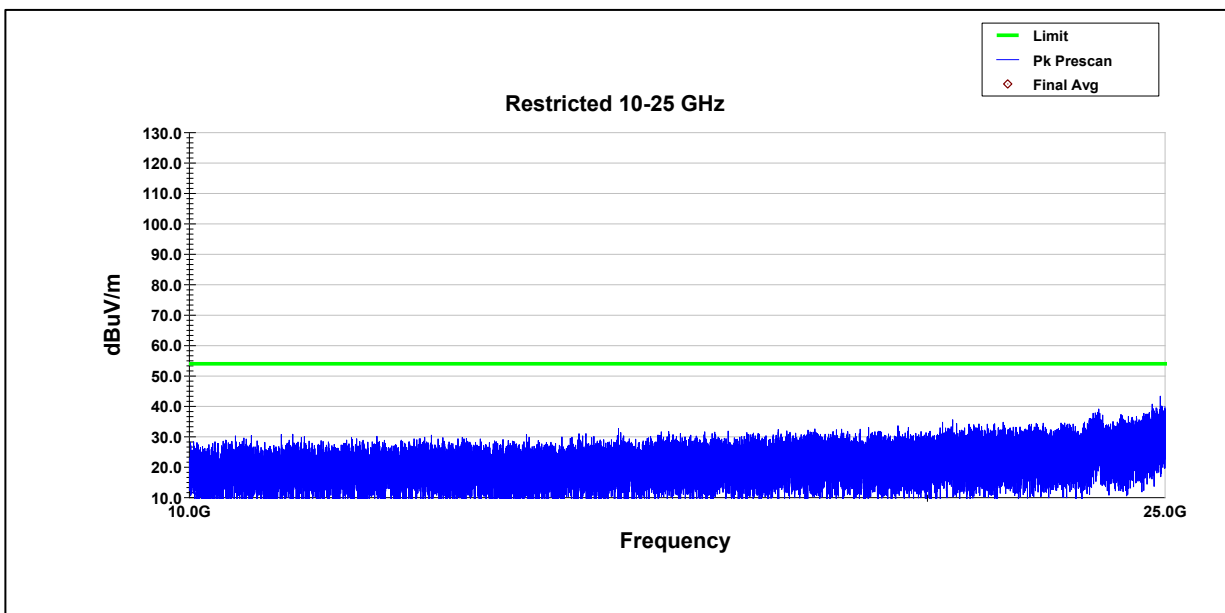
$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

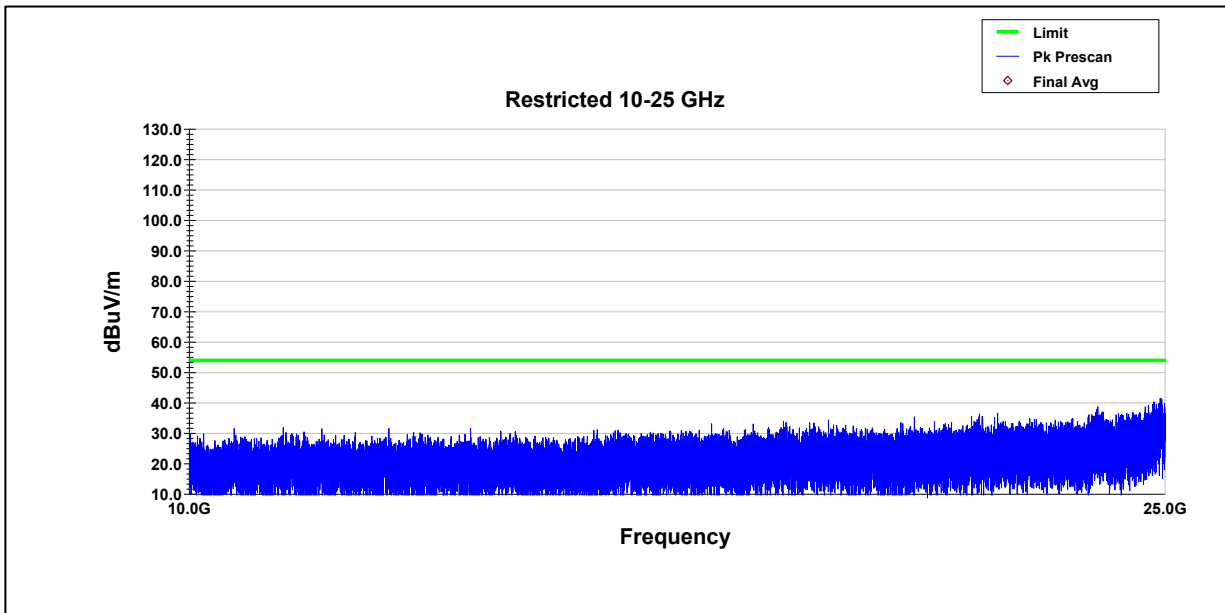
Sidewalk FSK Low Ch



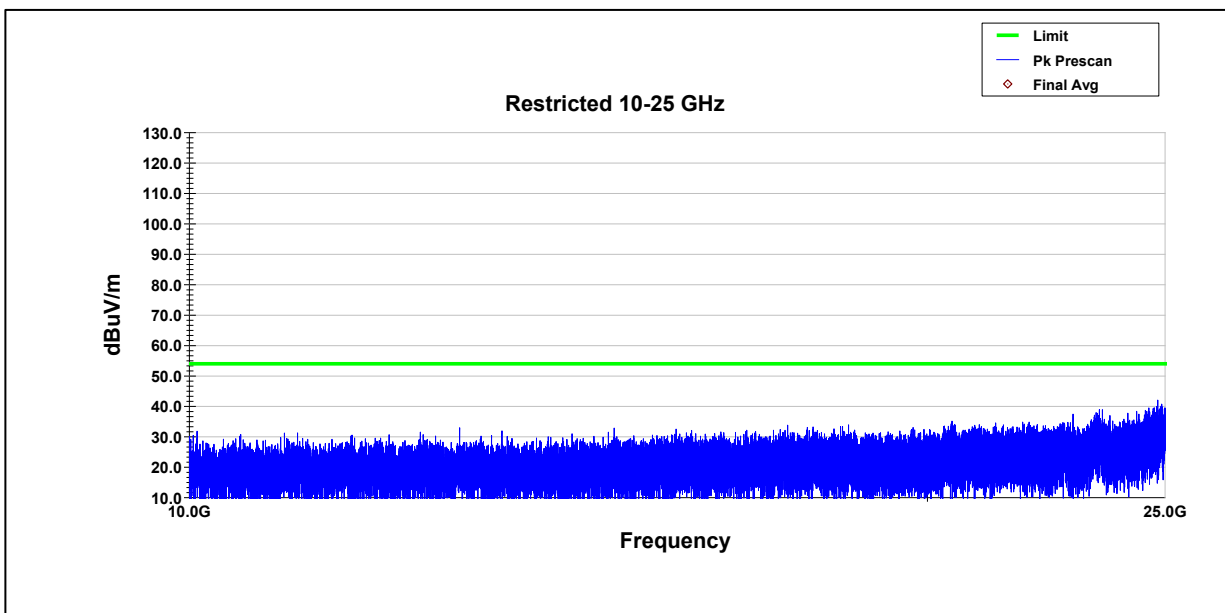
Sidewalk FSK Mid Ch



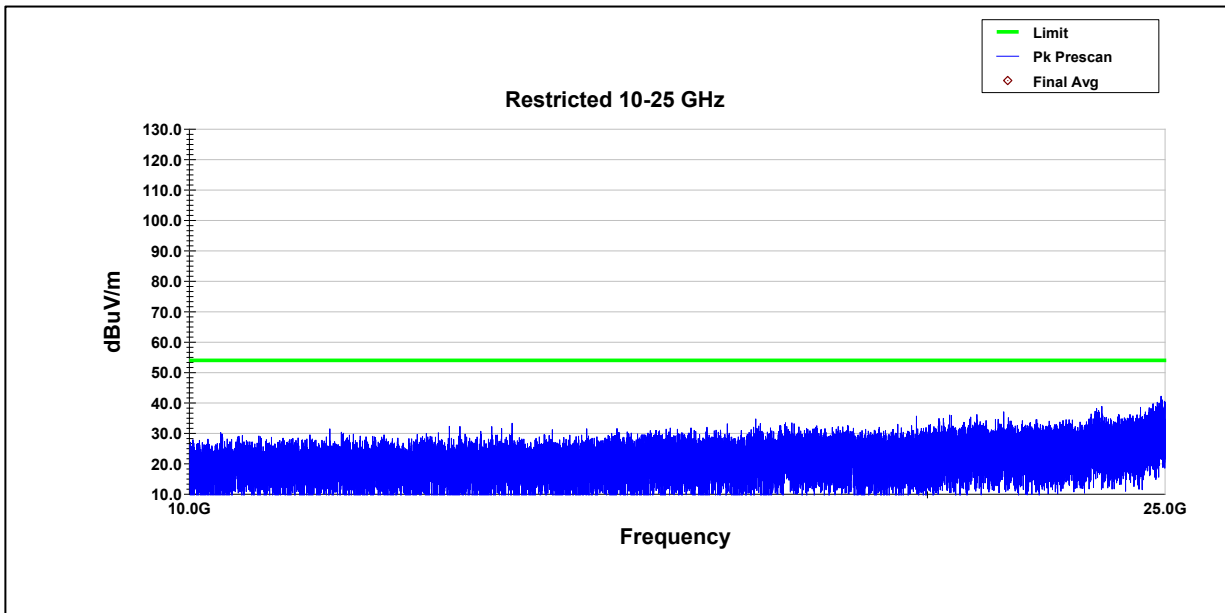
Sidewalk FSK High Ch



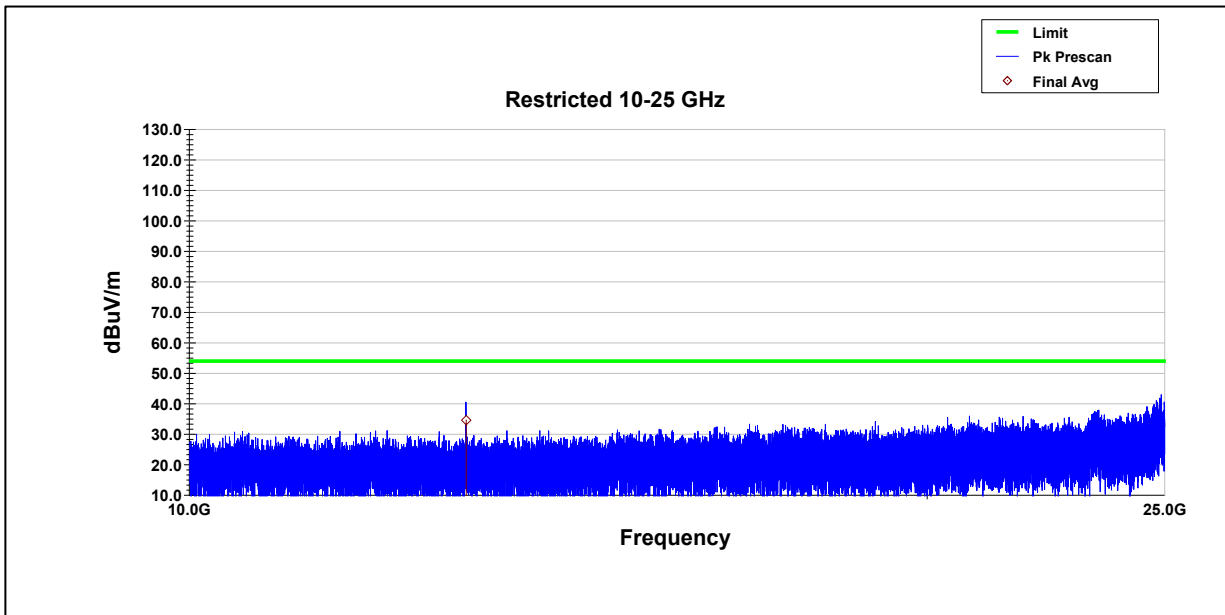
Sidewalk LoRa DTS Low Ch



Sidewalk LoRa DTS Mid Ch



Sidewalk LoRa DTS High Ch



Frequency	Raw Avg	Path Loss	Converstion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
12972.679	-66.60	6.00	95.30	34.60	54.00	-19.40

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

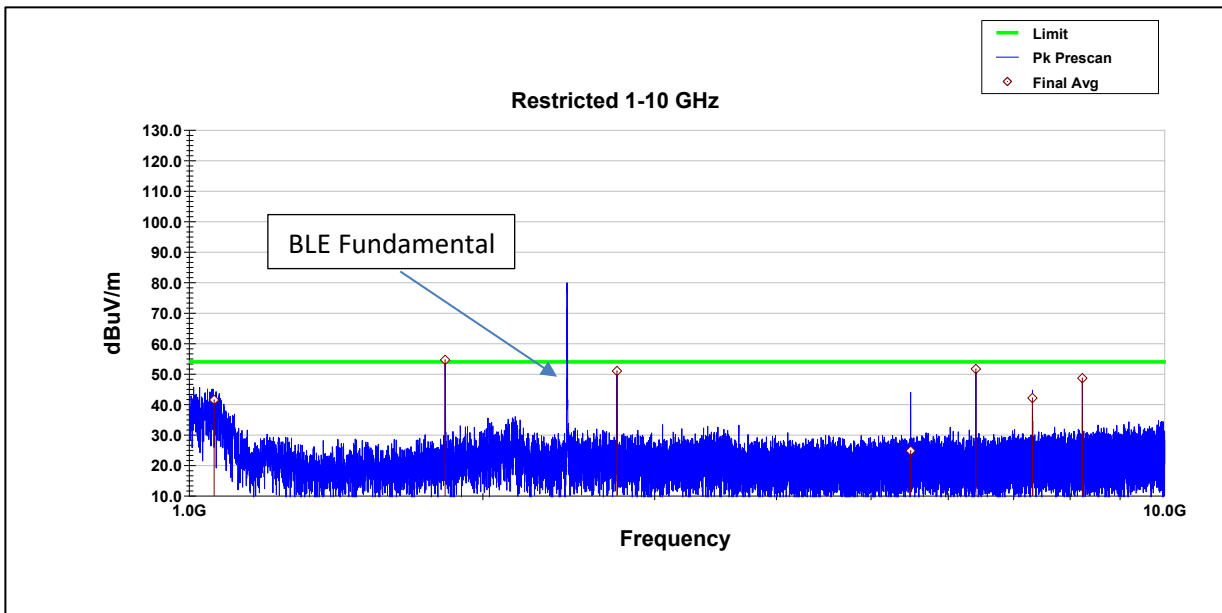
$$\text{Margin} = \text{Final} - \text{Limit}$$

Simultaneous Data

For simultaneous data below 1 GHz, please see radiated data below.

1-10 GHz

BLE 2M Mid LoRa FHSS SF7 High

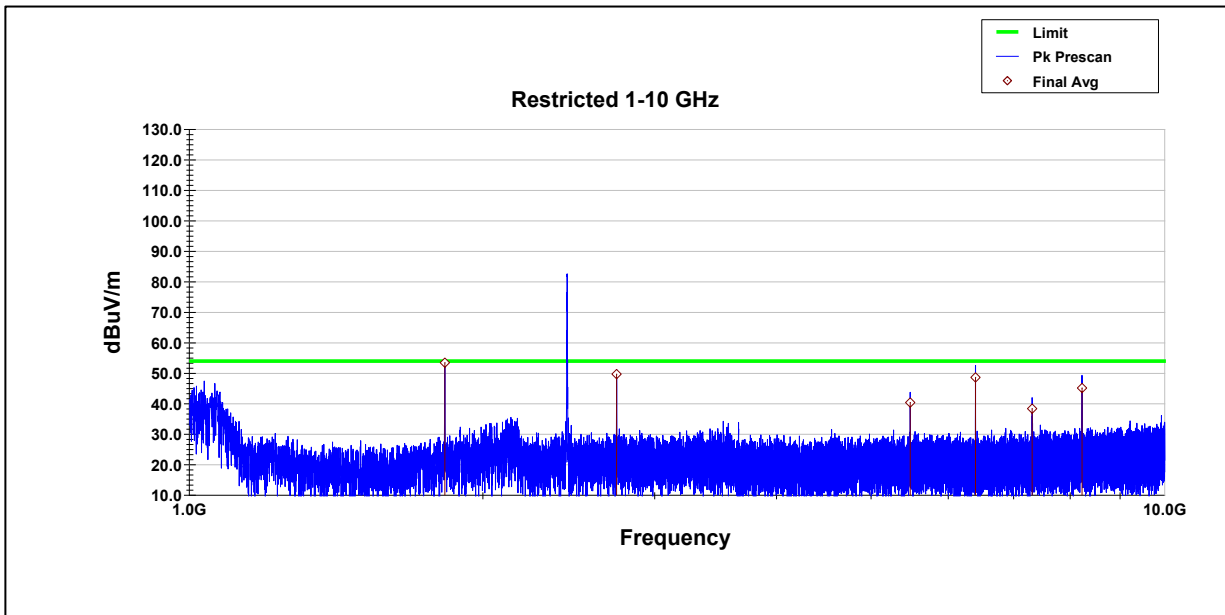


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1060.469	-61.50	7.80	95.30	41.50	54.00	-12.40
1829.768	-49.40	8.80	95.30	54.70	54.00	0.70
2744.71	-52.20	8.00	95.30	51.00	54.00	-3.00
5491.381	-79.50	9.10	95.30	24.90	54.00	-29.10
6404.238	-52.70	9.20	95.30	51.70	54.00	-2.30
7319.199	-62.50	9.40	95.30	42.20	54.00	-11.80
8234.085	-56.60	10.00	95.30	48.70	54.00	-5.30

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

BLE 2M mid LoRa DTS SF11 High

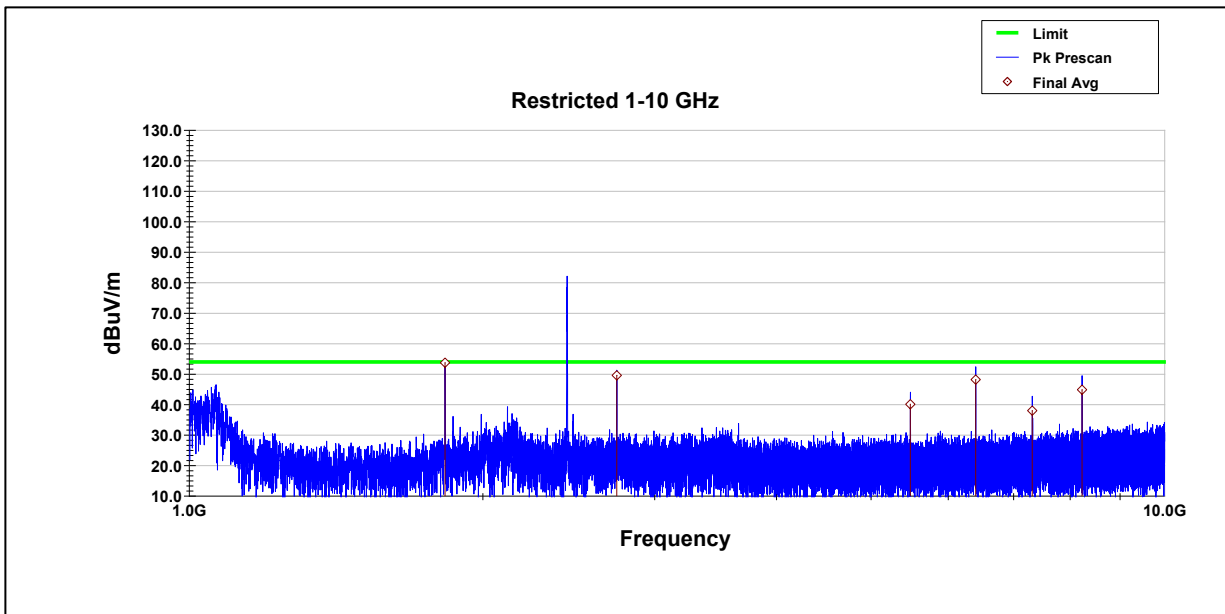


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1828.342	-50.60	8.80	95.30	53.50	54.00	-0.50
2742.651	-53.50	8.00	95.30	49.70	54.00	-4.30
5485.016	-63.90	9.00	95.30	40.40	54.00	-13.60
6398.725	-55.80	9.10	95.30	48.60	54.00	-5.40
7314.413	-66.30	9.40	95.30	38.40	54.00	-15.60
8228.437	-60.10	10.00	95.30	45.10	54.00	-8.80

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

BLE 2M Mid Sidewalk LoRa DTS Mid

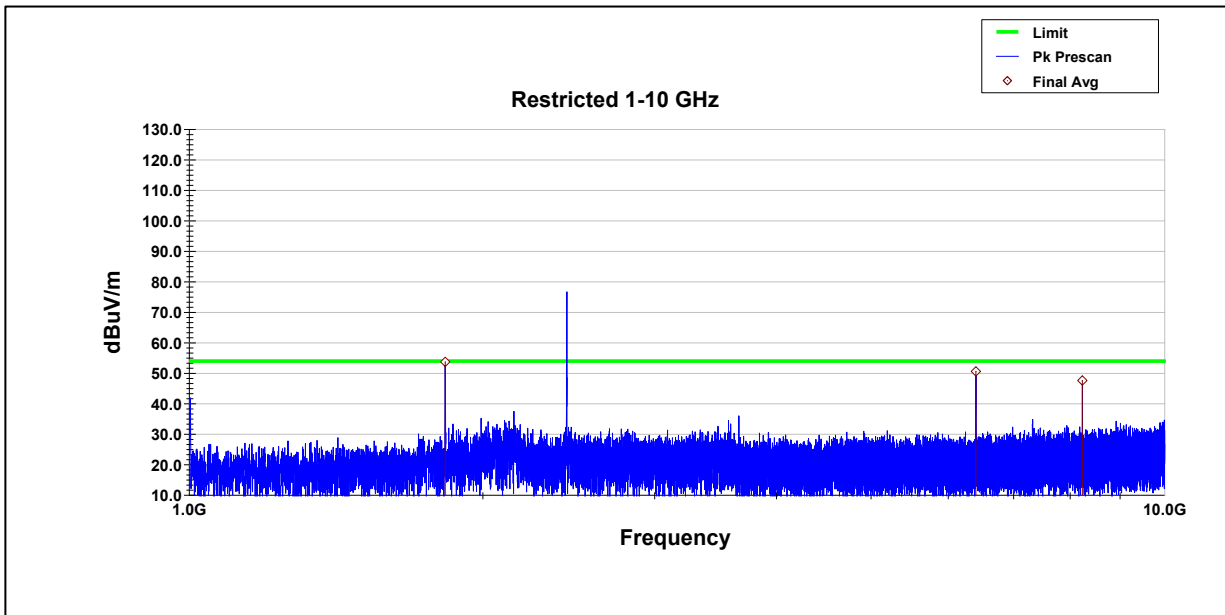


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1828.993	-50.30	8.80	95.30	53.80	54.00	-0.20
2743.506	-53.60	8.00	95.30	49.60	54.00	-4.40
5486.721	-64.20	9.00	95.30	40.10	54.00	-13.90
6401.45	-56.20	9.10	95.30	48.20	54.00	-5.80
7315.864	-66.70	9.40	95.30	38.00	54.00	-16.00
8229.284	-60.30	10.00	95.30	44.90	54.00	-9.10

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

BLE 2M Mid Sidewalk FSK Mid



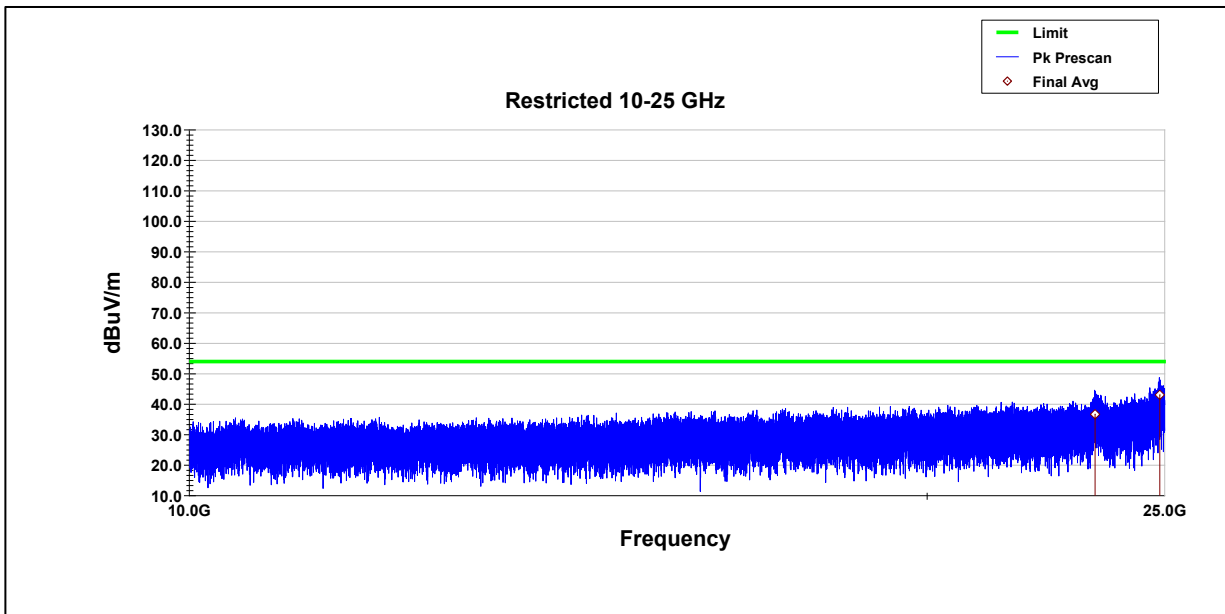
Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
1829.957	-50.30	8.80	95.30	53.80	54.00	-0.20
6404.967	-53.80	9.20	95.30	50.60	54.00	-3.40
8234.962	-57.60	10.00	95.30	47.60	54.00	-6.40

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

10-25 GHz

BLE 2M Mid LoRa FHSS SF 7 High

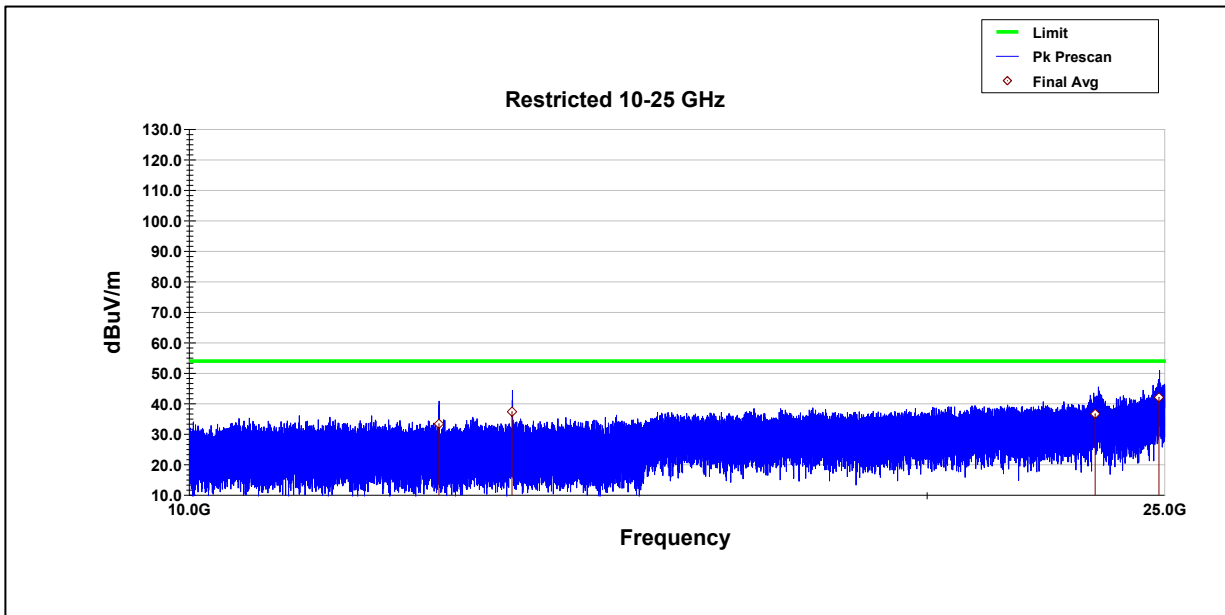


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
23418.915	-73.80	15.20	95.30	36.70	54.00	-17.30
24887.666	-72.50	20.30	95.30	43.10	54.00	-10.90

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

BLE 2M Mid LoRa DTS SF 11 High

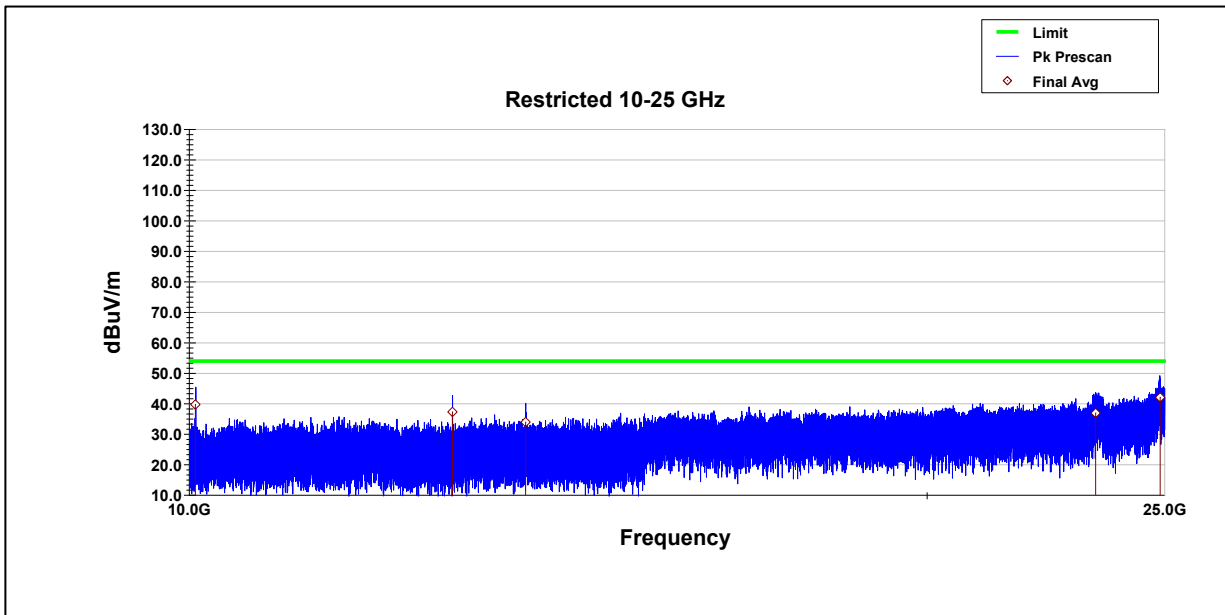


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
12644.32	-71.80	9.90	95.30	33.40	54.00	-20.60
13542.405	-68.80	10.90	95.30	37.40	54.00	-16.60
23420.327	-73.80	15.20	95.30	36.60	54.00	-17.30
24867.066	-72.50	19.30	95.30	42.10	54.00	-11.90

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

BLE 2M Mid Sidewalk LoRa Mid

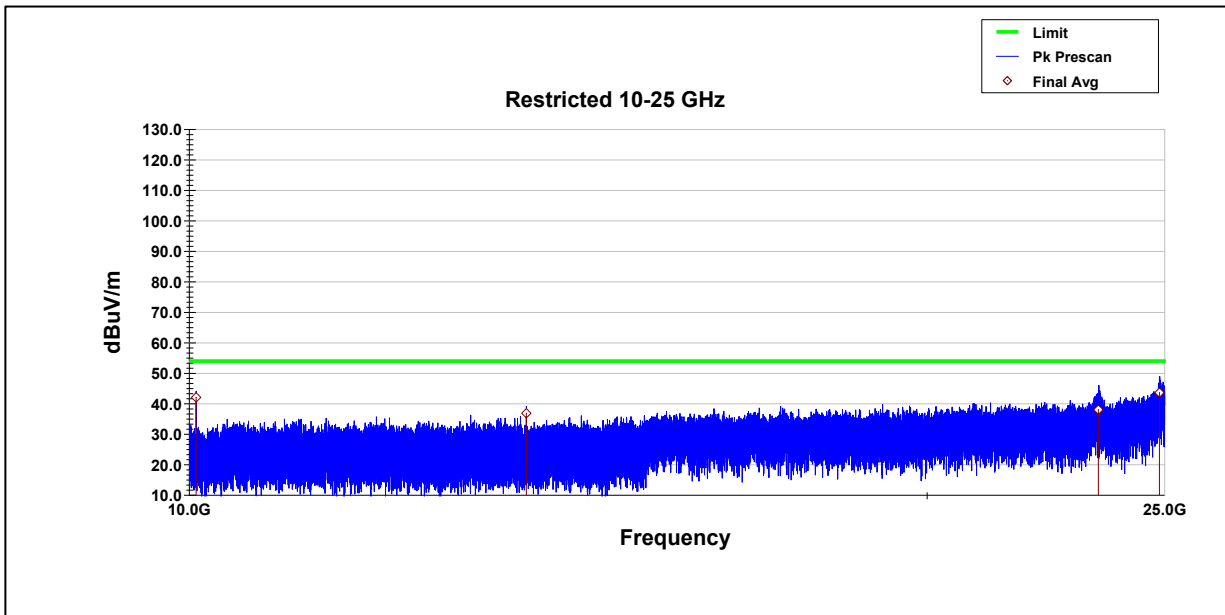


Frequency	Raw Avg	Path Loss	Conversion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
10057.829	-65.60	10.00	95.30	39.70	54.00	-14.20
12804.898	-68.30	10.40	95.30	37.30	54.00	-16.70
13716.004	-72.30	11.00	95.30	33.90	54.00	-20.00
23432.066	-73.60	15.20	95.30	36.90	54.00	-17.00
24896.609	-72.60	19.40	95.30	42.10	54.00	-11.90

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

$$\text{Margin} = \text{Final} - \text{Limit}$$

BLE 2M Mid Sidewalk FSK Mid



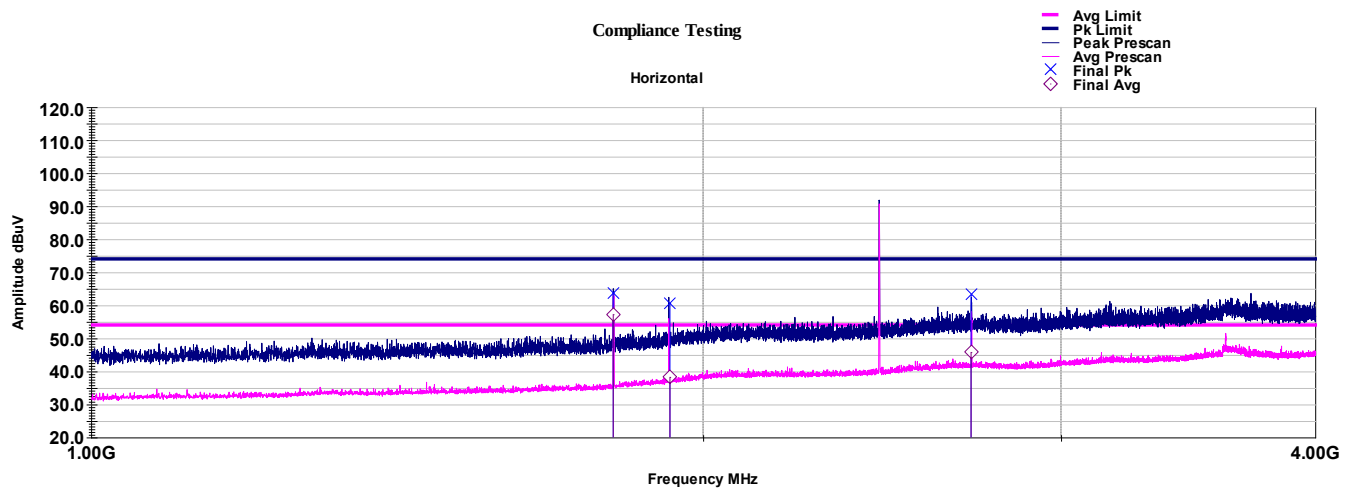
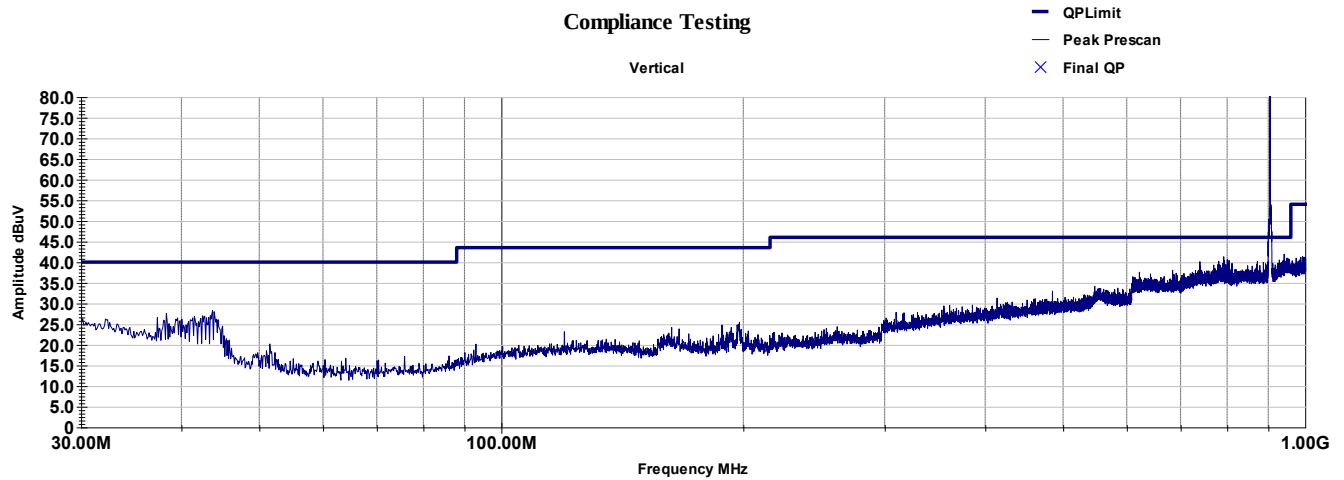
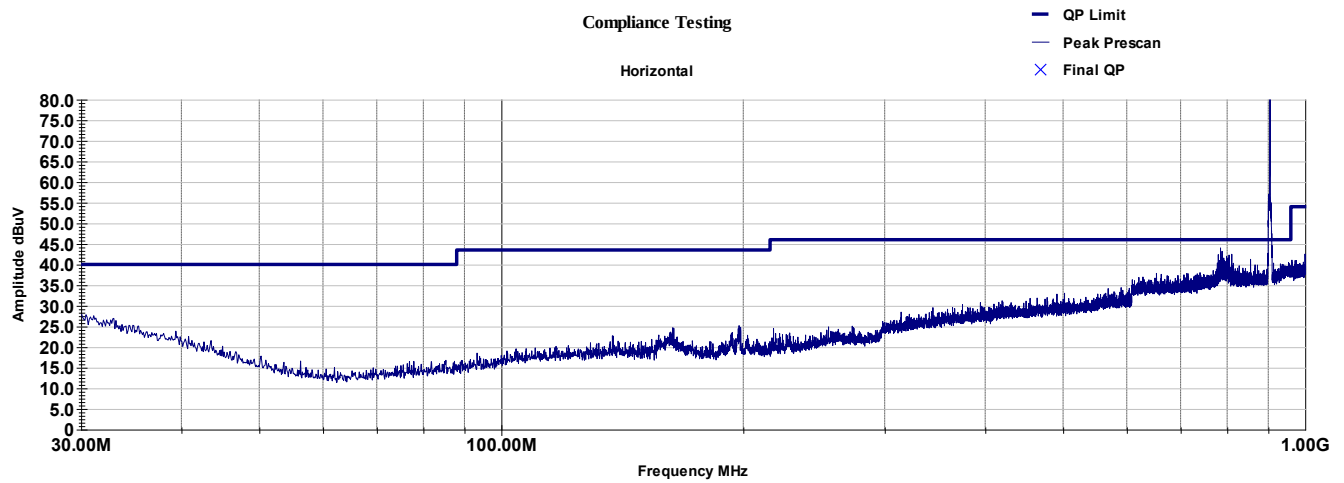
Frequency	Raw Avg	Path Loss	Converstion	Final Avg	Limit	Margin
MHz	dBm	dB	dB	dBuV/m	dBuV/m	dB
10064.879	-63.20	10.00	95.30	42.10	54.00	-11.90
13725.243	-69.40	11.10	95.30	36.90	54.00	-17.10
23490.425	-73.60	16.30	95.30	38.00	54.00	-15.90
24877.791	-72.40	20.80	95.30	43.60	54.00	-10.30

$$\text{Final} = \text{Raw} + \text{Path Loss} + \text{Conversion}$$

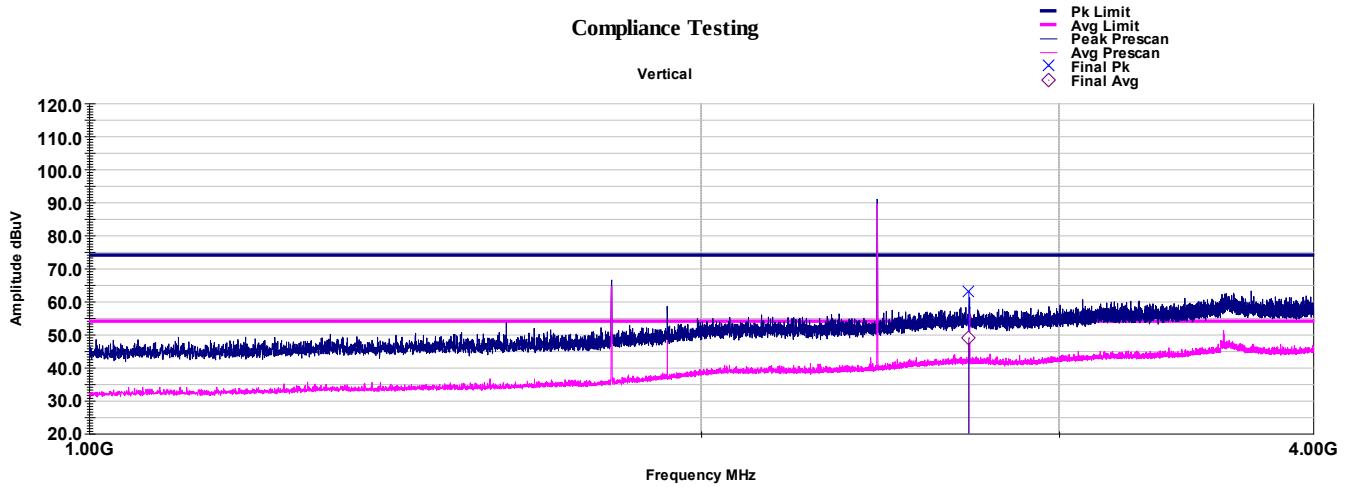
$$\text{Margin} = \text{Final} - \text{Limit}$$

Radiated Test Data

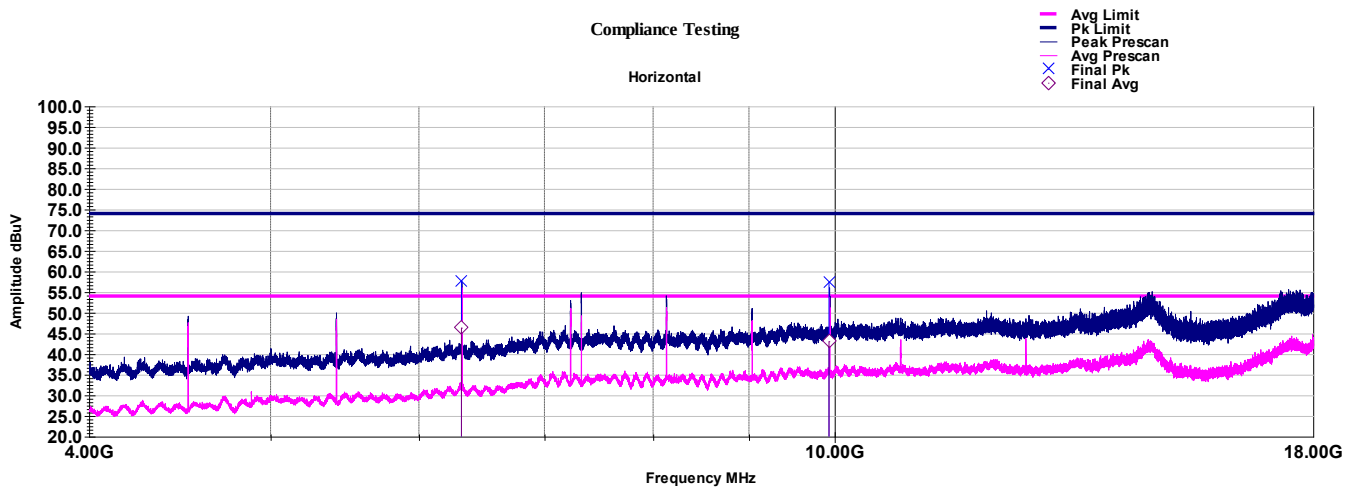
SF 12 Low Ch



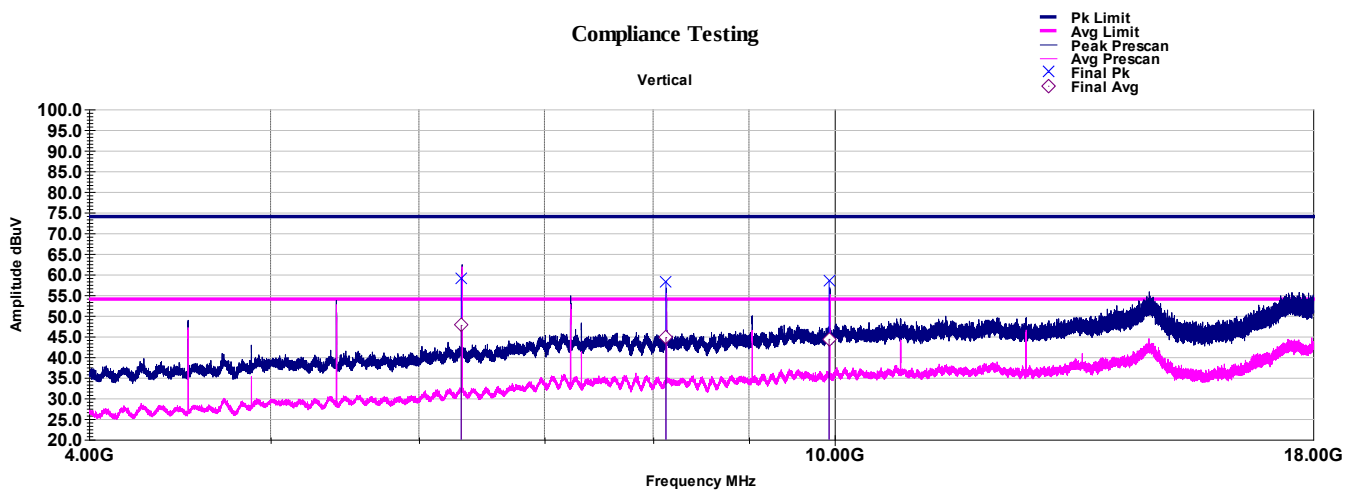
Compliance Testing



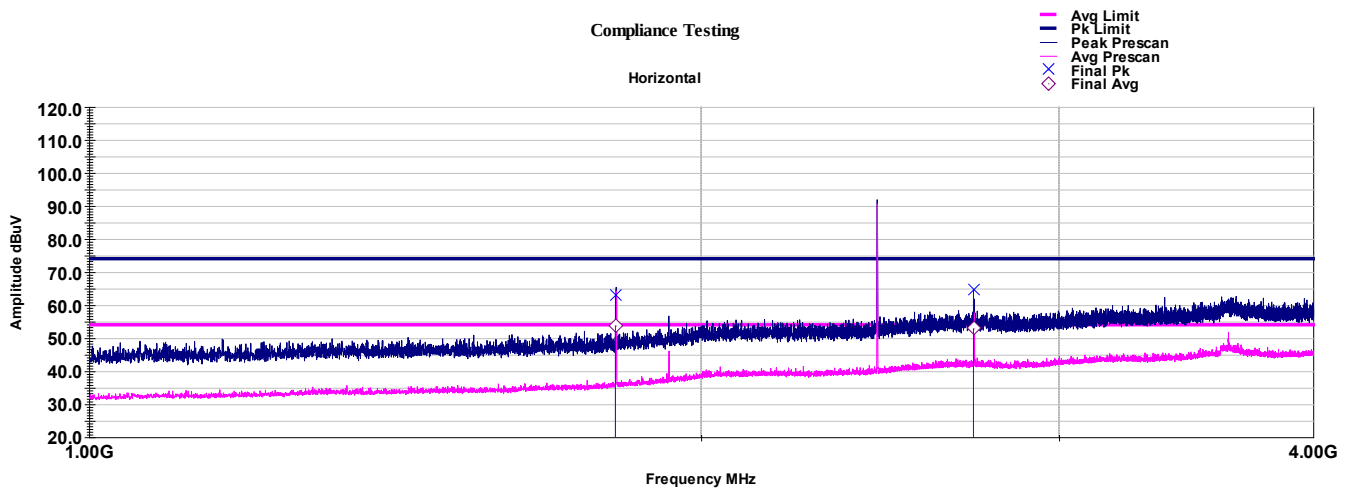
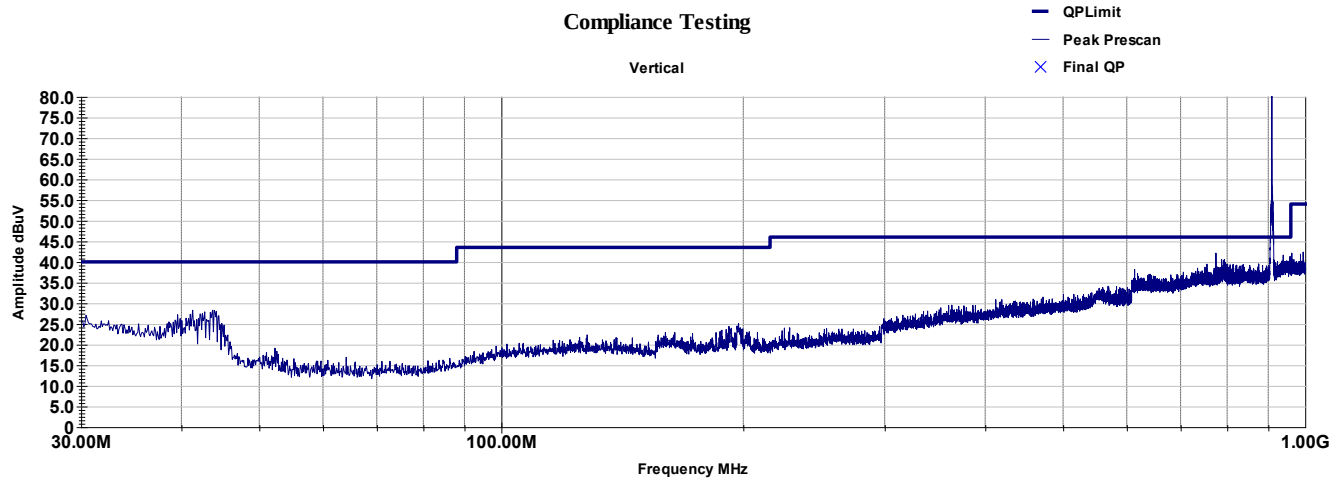
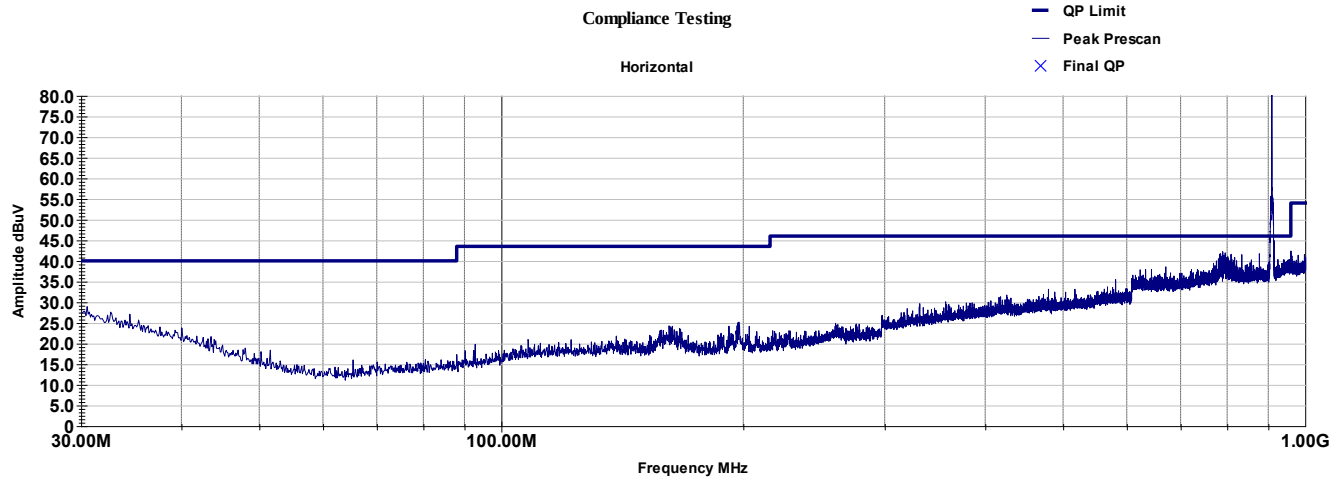
Compliance Testing



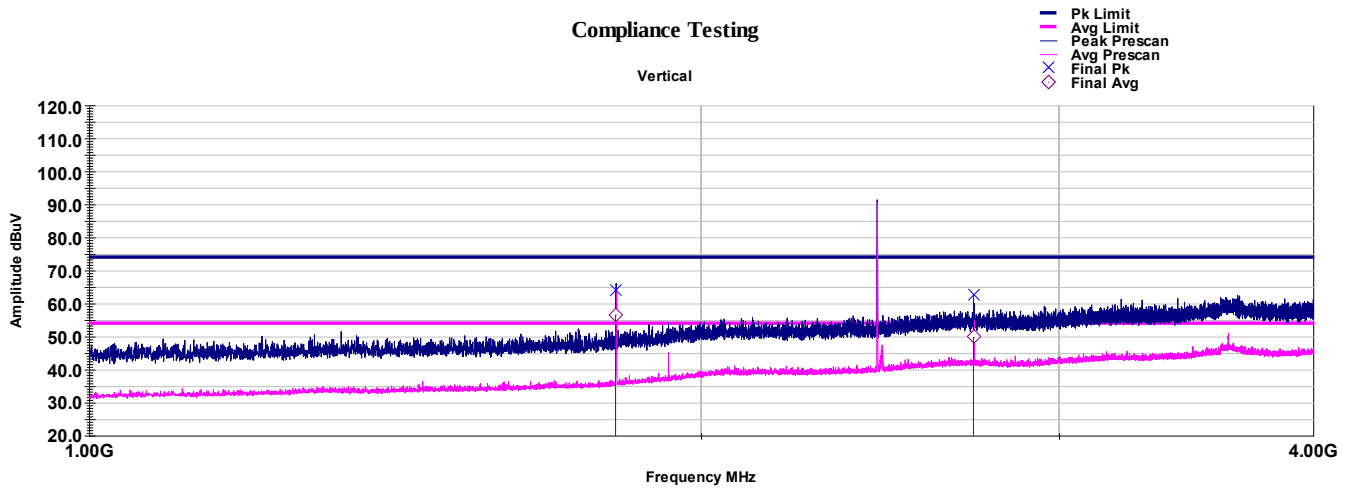
Compliance Testing



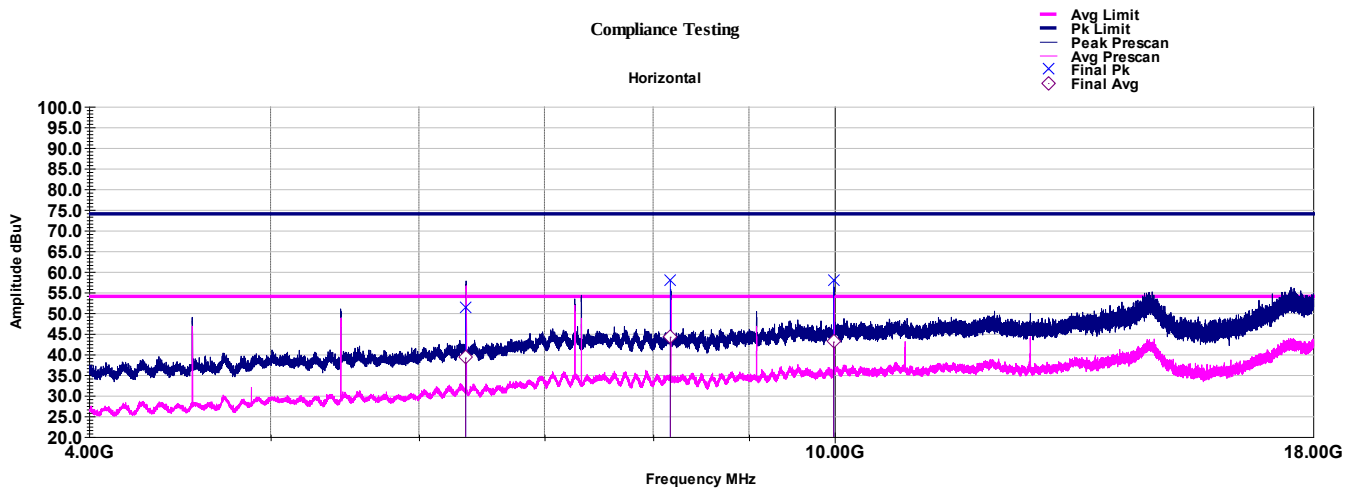
SF 12 Mid Ch



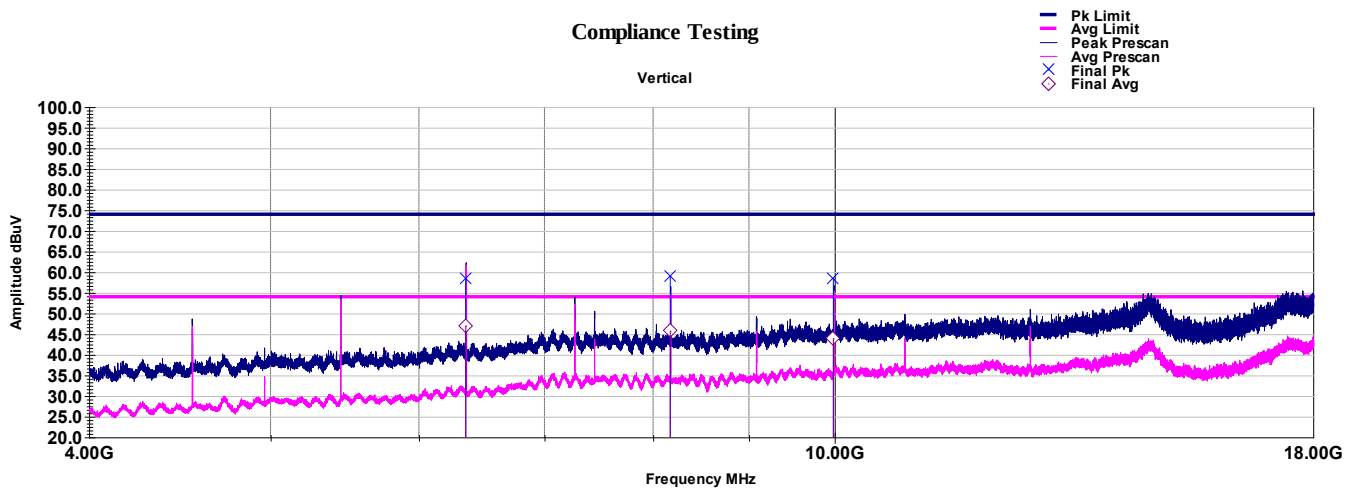
Compliance Testing



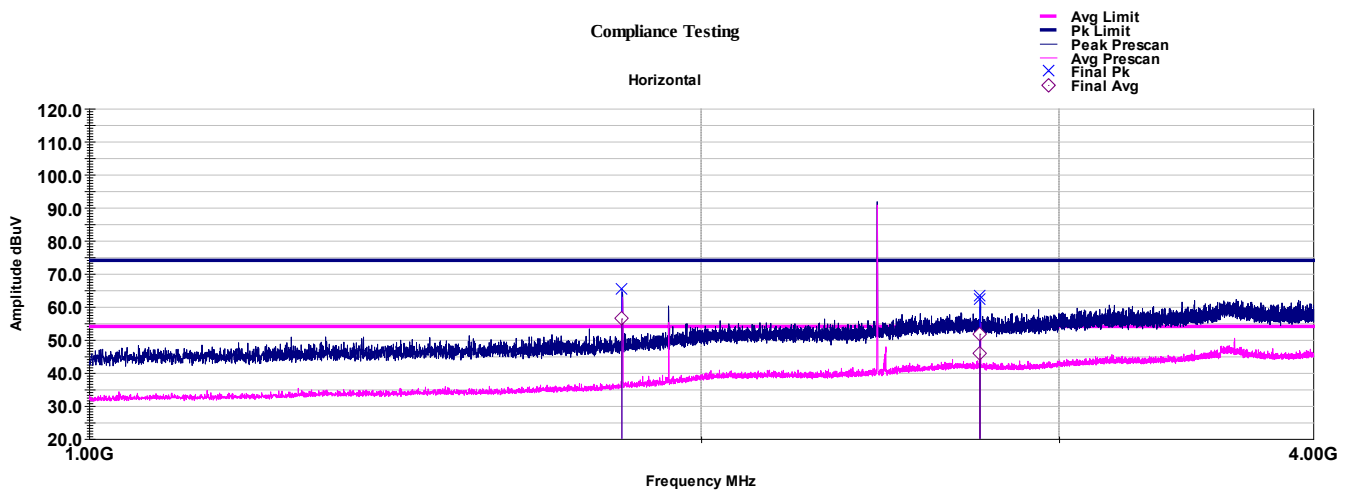
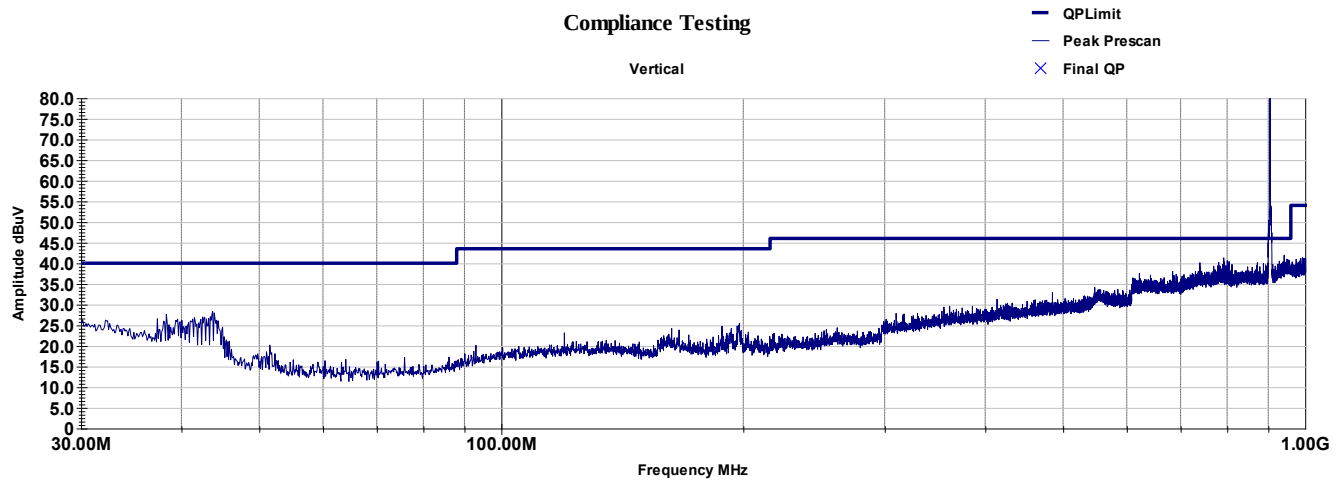
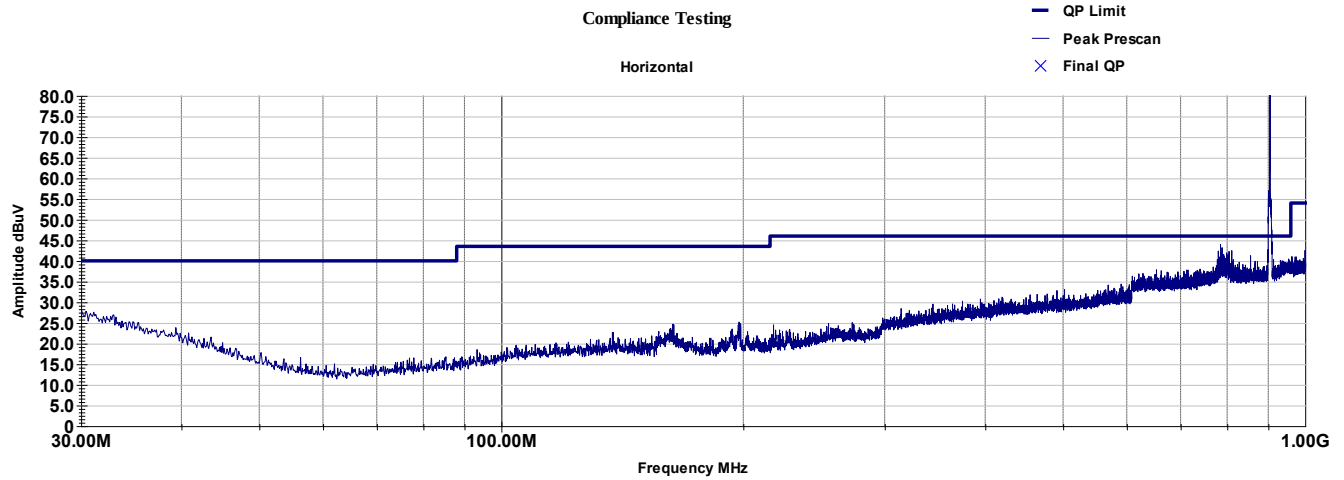
Compliance Testing



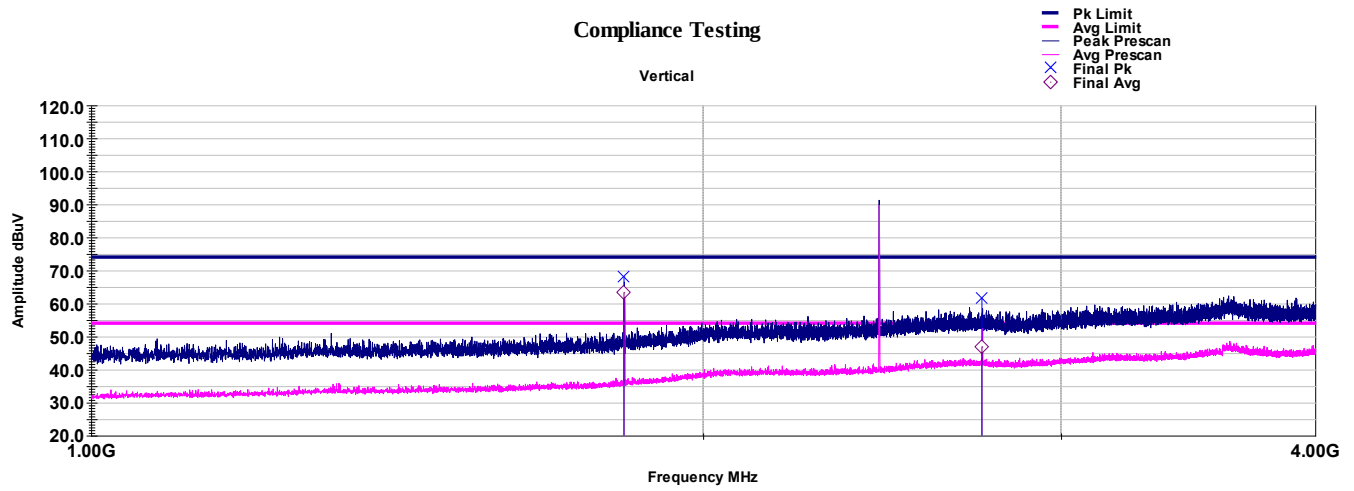
Compliance Testing



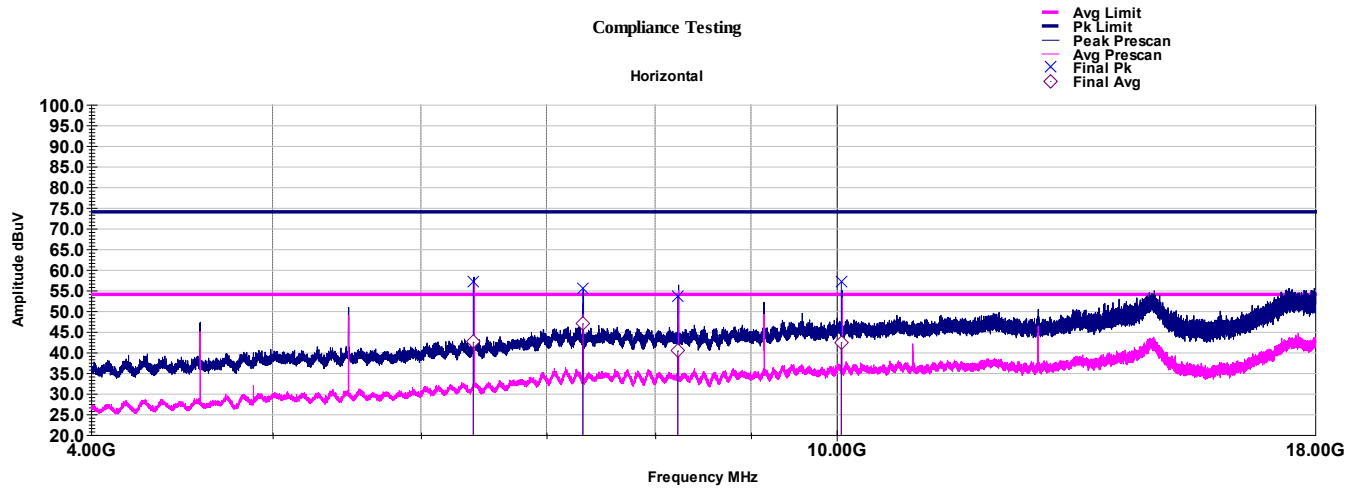
SF 12 High Ch



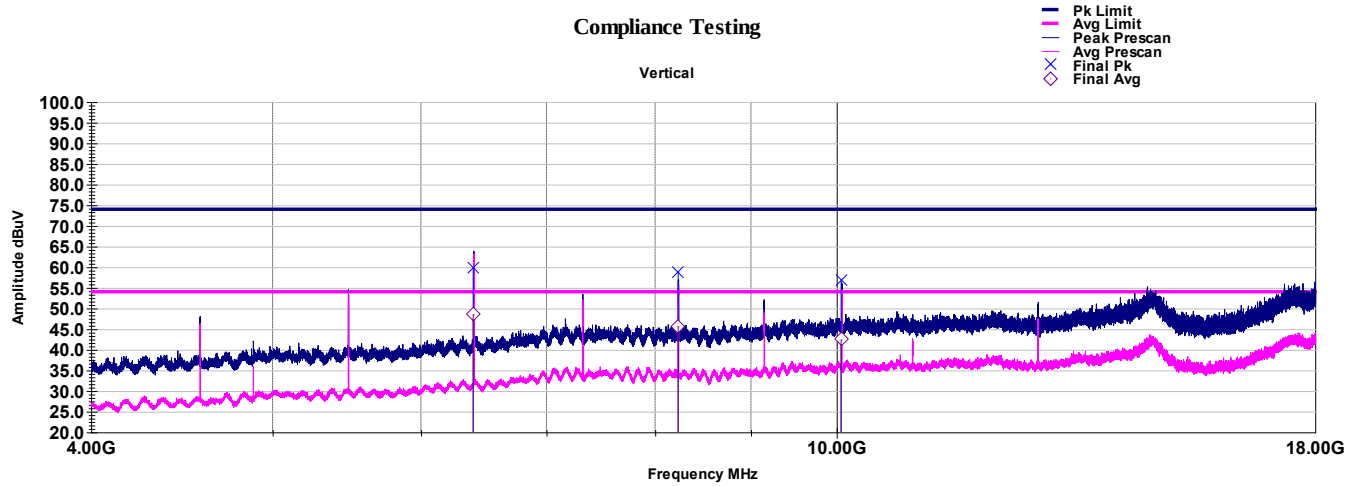
Compliance Testing



Compliance Testing



Compliance Testing



Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
18 – 26 GHz horn	Emco	3116	i00085	02/22/2021	02/22/2023
Horn Antenna	ARA	DRG-118/A	i00271	08/11/22	08/10/24
Bi-Log antenna	Teseq	CBL 6111Dk	i00349	01/20/21	01/20/23
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	7/17/20	7/17/23
Spectrum Analyzer	Agilent	E4445A	i00471	12/27/2021	12/27/2022
EMI Analyzer	Rohde & Schwarz	FSU 26	i00501	05/10/22	05/10/23
EMI Receiver	Keysight	N9038A	i00552	02/24/22	02/24/23
Environmental Sensor	Omega	iBTHX-W-5	i00631	11/03/21	11/03/22*
Preamplifier	Eravant	SBB-0115034018-2F2F-E3	i00650	Verified on: 11/15/22	

*Calibration extended with the approval of Quality Manager.

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

Measurement Uncertainty

Measurement Uncertainty (U_{lab}) for Compliance Testing is listed in the table below.

Measurement	U_{lab}
Radio Frequency	$\pm 3.3 \times 10^{-8}$
RF Power, conducted	± 1.5 dB
RF Power Density, conducted	± 1.0 dB
Conducted Emissions	± 1.8 dB
Radiated Emissions	± 4.5 dB
Temperature	± 1.5 deg C
Humidity	± 4.3 %
DC voltage	± 0.20 VDC
AC Voltage	± 1.2 VAC

The reported expanded uncertainty $\pm U_{lab}$ (dB) has been estimated at a 95% confidence level ($k=2$)

U_{lab} is less than or equal to U_{ETSI} therefore

- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit
- Non-Compliance is deemed to occur if any measured disturbance exceeds the disturbance limit

End of Test Report