

### 9.3.1. Band 255 ANT 5

#### Band 255 SCS 3.75kHz and 15kHz – Ant 5



## 10. RADIATED TEST RESULTS

### Radiated measurement using the Field Strength Method

Using the test configuration shown in Figure 6 below, we measure the radiated emissions directly from the EUT and convert the measured field strength or received power to EIRP, as required, for comparison to the applicable limits. As stated in 5.5.1 of ANSI C63.26-2015, the field strength measurement method using a test site validated to the requirements of ANSI C63.4 is an alternative to the substitution measurement method.

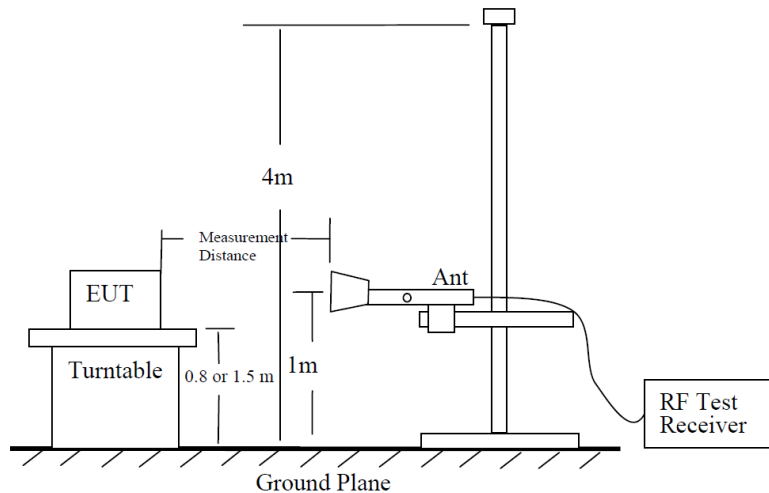


Figure 6—Test site-up for radiated ERP and/or EIRP measurements

### Radiated Power Measurement Calculation According to ANSI C63.26-2015

- a)  $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$ .
- b)  $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$ .
- c)  $E \text{ (dB}\mu\text{V/m)} = \text{EIRP (dBm)} - 20\log(D) + 104.8$ ; where D is the measurement distance (in the far field region) in m.
- d)  $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$ ; where D is the measurement distance (in the far field region) in m.

So, from d)

The measuring distance is usually at 3m, then  $20 \cdot \log(3) = 9.5424$

Then,  $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 9.5424 - 104.8 = E \text{ (dB}\mu\text{V/m)} - 95.2576$

## 10.1. FIELD STRENGTH OF SPURIOUS RADIATION – ANT1

### LIMITS

FCC §25.202

(f) Emission limitations. Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

(3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;

### TEST PROCEDURE

KDB 971168 D01 v03r01/D02 v02r02

For each out of band emissions measurement:

- Set display line at -13 dBm (the limit of  $43 + 10\text{Log}(P)$ )
- Set RWB  $\geq$  4kHz and VBW  $\geq$  3 x RBW with peak detector for all measurements. The limit is an average limit so any emissions that exceed the limit using the peak detector are measured using rms detection with an averaging time of 2ms.

### RESULTS

Plots are provided for the mid channel. Tabular data for all channels is presented. For SCS3.75kHz and SCS15kHz radiated harmonics testing 1SC0 was chosen as the worst mode to test.

### 10.1.1. Band 23 ANT 1 (Above 1GHz) – QPSK 3.75kHz 1SC0

#### Low Channel: QPSK 3.75kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4001	45.03	Pk	33.4	-95.2	0	-45.68	-62.45	-13	-49.45	0-360	150	H
2	* 4001	45.99	Pk	33.4	-95.2	0	-45.68	-61.49	-13	-48.49	0-360	150	V
3	6000	46.06	Pk	35.7	-95.2	0	-44.75	-58.19	-13	-45.19	0-360	150	H
4	6000	44.83	Pk	35.7	-95.2	0	-44.75	-59.42	-13	-46.42	0-360	150	V
5	8000	44.96	Pk	35.8	-95.2	0	-43.03	-57.47	-13	-44.47	0-360	150	H
6	8000	44.57	Pk	35.8	-95.2	0	-43.03	-57.86	-13	-44.86	0-360	150	V

Pk - Peak detector  
 \* - Noise Floor

#### Middle Channel: QPSK 3.75kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4020	47.05	Pk	33.4	-95.2	0	-45.38	-60.13	-13	-47.13	0-360	149	H
5	* 8040.5	43.82	Pk	35.8	-95.2	0	-43.12	-58.7	-13	-45.7	0-360	149	H
2	* 4020	46.19	Pk	33.4	-95.2	0	-45.38	-60.99	-13	-47.99	0-360	149	V
6	* 8040.5	44.41	Pk	35.8	-95.2	0	-43.12	-58.11	-13	-45.11	0-360	149	V
3	6030.5	46.33	Pk	35.8	-95.2	0	-44.54	-57.61	-13	-44.61	0-360	149	H
4	6030.5	44.67	Pk	35.8	-95.2	0	-44.54	-59.27	-13	-46.27	0-360	149	V

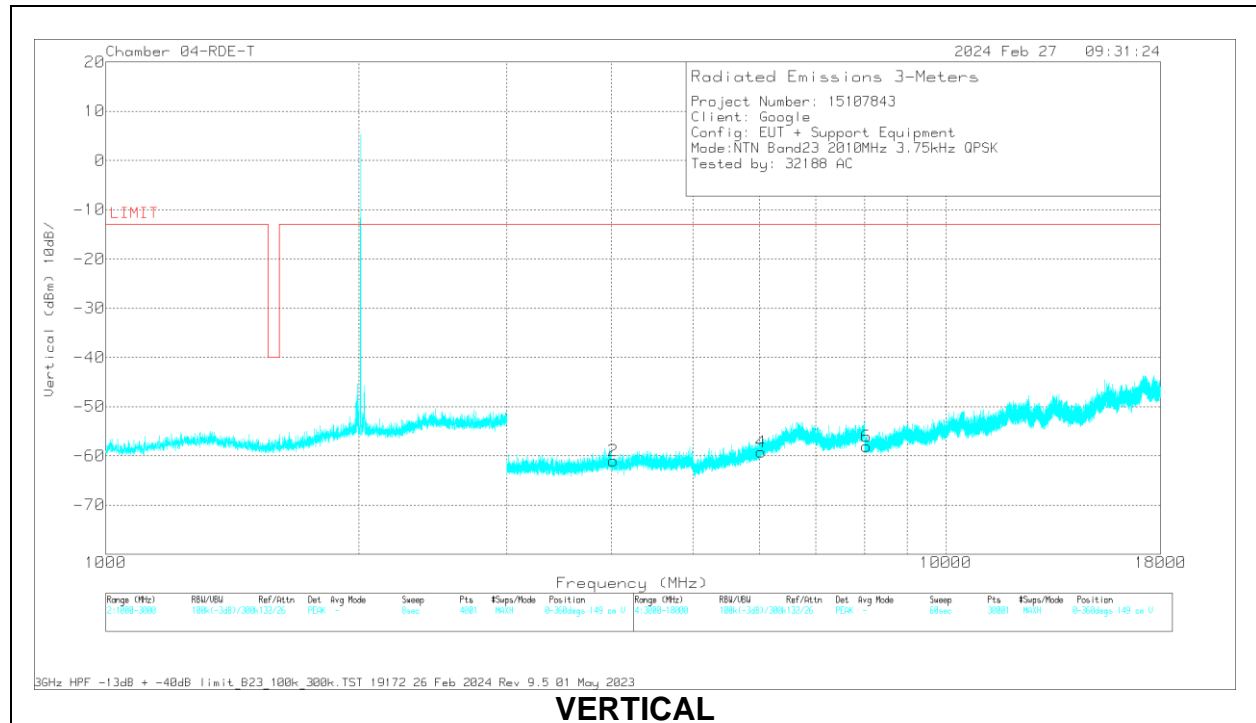
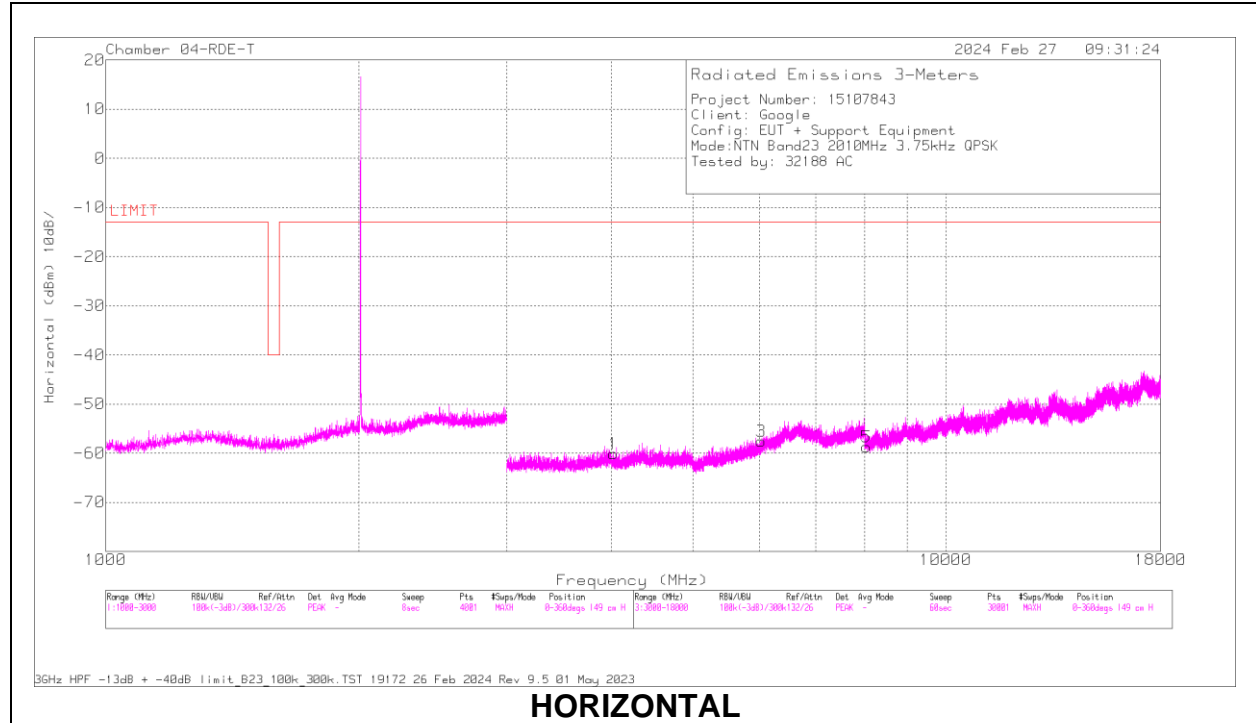
Pk - Peak detector  
 \* - Noise Floor

#### High Channel: QPSK 3.75kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4039.25	45.4	Pk	33.4	-95.2	0	-45.78	-62.18	-13	-49.18	0-360	150	H
3	* 8078	46.31	Pk	35.8	-95.2	0	-42.75	-55.84	-13	-42.84	0-360	150	H
4	* 4032	47.7	Pk	33.4	-95.2	0	-45.79	-59.89	-13	-46.89	0-360	150	V
6	* 8098	46.28	Pk	35.8	-95.2	0	-43.04	-56.16	-13	-43.16	0-360	150	V
2	6035.5	47.85	Pk	35.8	-95.2	0	-44.5	-56.05	-13	-43.05	0-360	150	H
5	6065	47.52	Pk	35.9	-95.2	0	-44.37	-56.15	-13	-43.15	0-360	150	V

Pk - Peak detector  
 \* - Noise Floor

**Middle Channel: QPSK 3.75kHz 1SC0**



### 10.1.2. Band 23 ANT 1 (Above 1GHz) – QPSK 15kHz 1SC0

#### Low Channel: QPSK 15kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4000	45.35	Pk	33.4	-95.2	0	-45.66	-62.11	-13	-49.11	0-360	150	H
2	* 4000	46.06	Pk	33.4	-95.2	0	-45.66	-61.4	-13	-48.4	0-360	150	V
3	8000.5	45.67	Pk	35.7	-95.2	0	-44.74	-58.57	-13	-45.57	0-360	150	H
4	8000.5	45.05	Pk	35.7	-95.2	0	-44.74	-59.19	-13	-46.19	0-360	150	V
5	8000.5	44.08	Pk	35.8	-95.2	0	-43	-58.32	-13	-45.32	0-360	150	H
6	8000.5	44.68	Pk	35.8	-95.2	0	-43	-57.72	-13	-44.72	0-360	150	V

Pk - Peak detector

\* - Noise Floor

#### Middle Channel: QPSK 15kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4020	44.78	Pk	33.4	-95.2	0	-45.38	-62.4	-13	-49.4	0-360	149	H
5	* 8040.5	45.72	Pk	35.8	-95.2	0	-43.12	-56.8	-13	-43.8	0-360	149	H
2	* 4020	46.44	Pk	33.4	-95.2	0	-45.38	-60.74	-13	-47.74	0-360	149	V
6	* 8040.5	43.76	Pk	35.8	-95.2	0	-43.12	-58.76	-13	-45.76	0-360	149	V
3	6030.5	45.46	Pk	35.8	-95.2	0	-44.54	-58.48	-13	-45.48	0-360	149	H
4	6030.5	44.74	Pk	35.8	-95.2	0	-44.54	-59.2	-13	-46.2	0-360	149	V

Pk - Peak detector

\* - Noise Floor

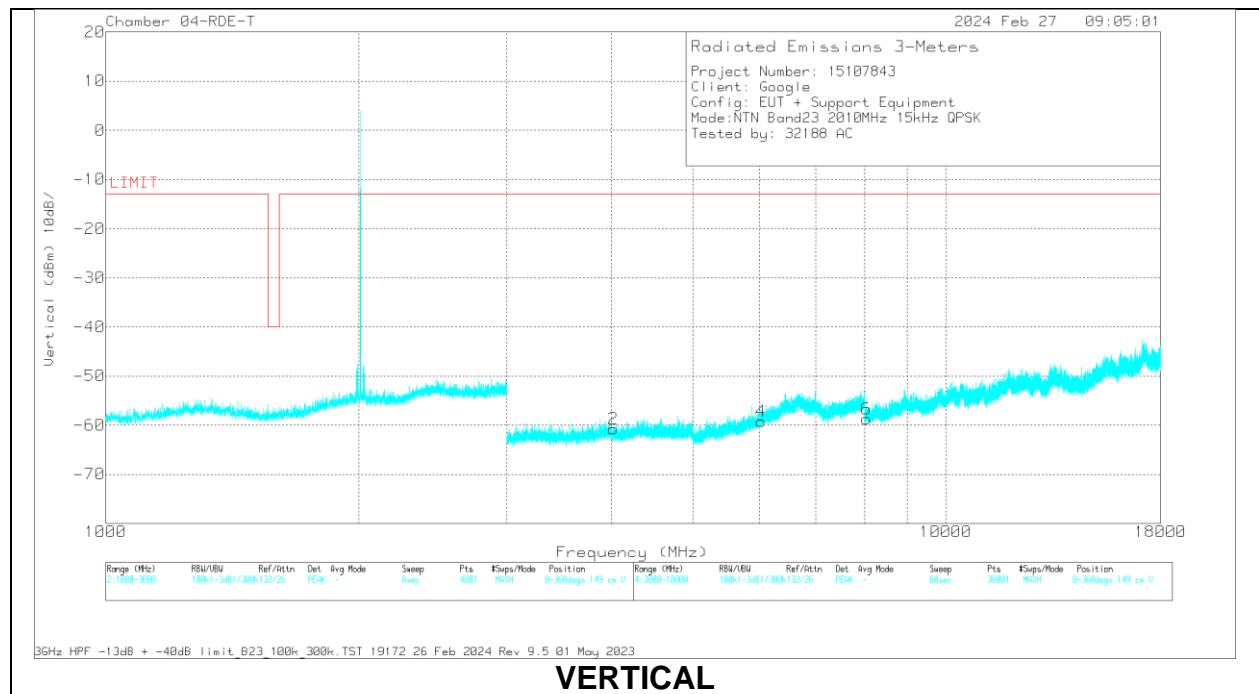
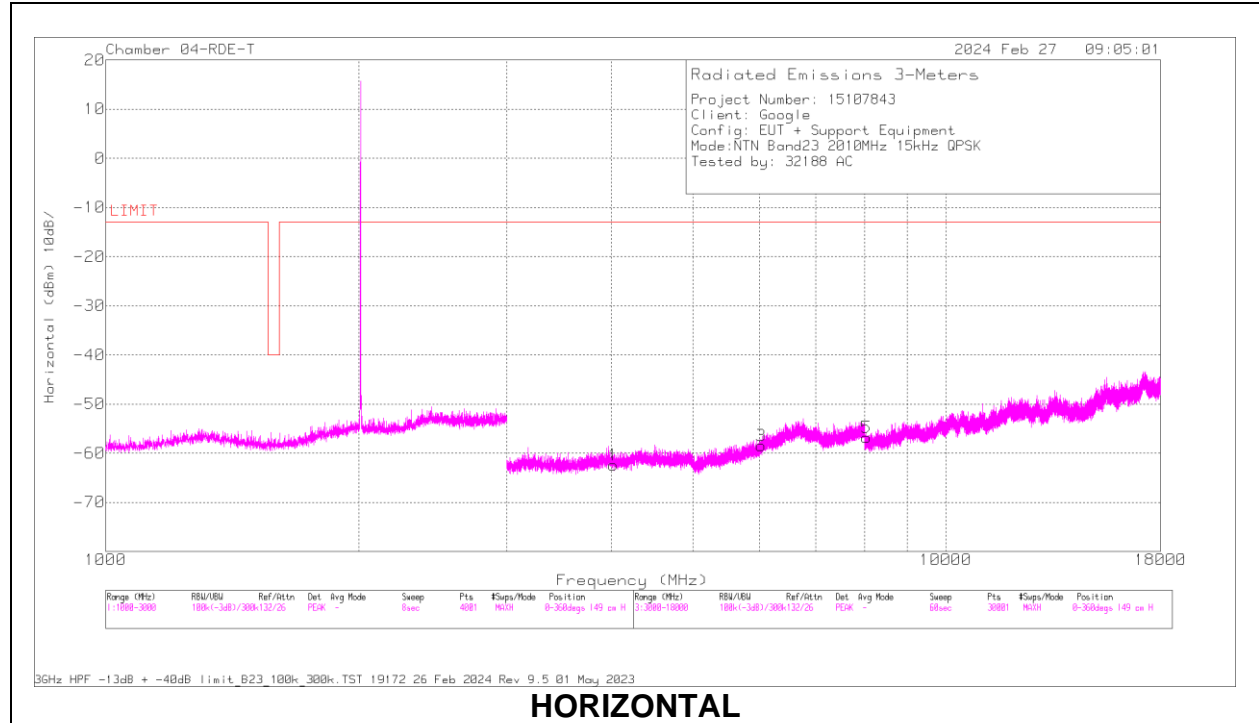
#### High Channel: QPSK 15kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4030.5	47.19	Pk	33.4	-95.2	0	-45.73	-60.34	-13	-47.34	0-360	150	H
3	* 8067.5	46.13	Pk	35.8	-95.2	0	-42.9	-56.17	-13	-43.17	0-360	150	H
4	* 4038	47.7	Pk	33.4	-95.2	0	-45.78	-59.88	-13	-46.88	0-360	150	V
6	* 8085	45.85	Pk	35.8	-95.2	0	-42.9	-56.45	-13	-43.45	0-360	150	V
2	6077.5	46.66	Pk	36	-95.2	0	-44.29	-56.83	-13	-43.83	0-360	150	H
5	6103.5	47.02	Pk	36.1	-95.2	0	-44.35	-56.43	-13	-43.43	0-360	150	V

Pk - Peak detector

\* - Noise Floor

**Middle Channel: QPSK 15kHz 1SC0**



### 10.1.3. Band 23 ANT 1 (Above 1GHz) - BPSK 3.75kHz 1SC0

#### Low Channel: BPSK 3.75kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3984.5	48.02	Pk	33.4	-95.2	0	-45.53	-59.31	-13	-46.31	0-360	150	H
4	* 3989	47.71	Pk	33.4	-95.2	0	-45.27	-59.36	-13	-46.36	0-360	150	V
5	6000	47.15	Pk	35.7	-95.2	0	-44.75	-57.1	-13	-44.1	0-360	150	V
2	6029	46.36	Pk	35.8	-95.2	0	-44.51	-57.55	-13	-44.55	0-360	150	H
6	7993.5	49.63	Pk	35.8	-95.2	0	-43.26	-53.03	-13	-40.03	0-360	150	V
3	7995.5	48.68	Pk	35.8	-95.2	0	-43.22	-53.94	-13	-40.94	0-360	150	H

Pk - Peak detector  
 \* - Noise Floor

#### Middle Channel: BPSK 3.75kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4020.5	45.34	Pk	33.4	-95.2	0	-45.42	-61.88	-13	-48.88	0-360	150	H
5	* 8041	45.02	Pk	35.8	-95.2	0	-43.11	-57.49	-13	-44.49	0-360	150	H
2	* 4020.5	45.3	Pk	33.4	-95.2	0	-45.42	-61.92	-13	-48.92	0-360	150	V
6	* 8041	44.12	Pk	35.8	-95.2	0	-43.11	-58.39	-13	-45.39	0-360	150	V
3	6030.5	44.21	Pk	35.8	-95.2	0	-44.54	-59.73	-13	-46.73	0-360	150	H
4	6030.5	46.72	Pk	35.8	-95.2	0	-44.54	-57.22	-13	-44.22	0-360	150	V

Pk - Peak detector  
 \* - Noise Floor

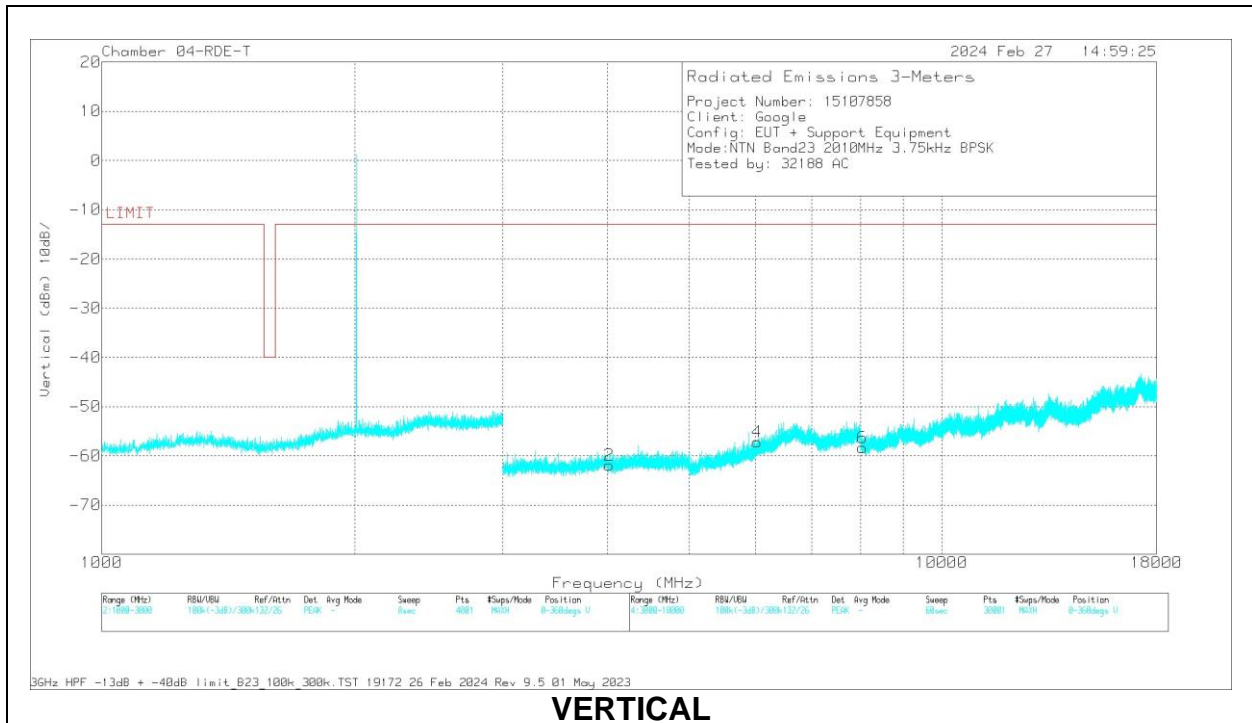
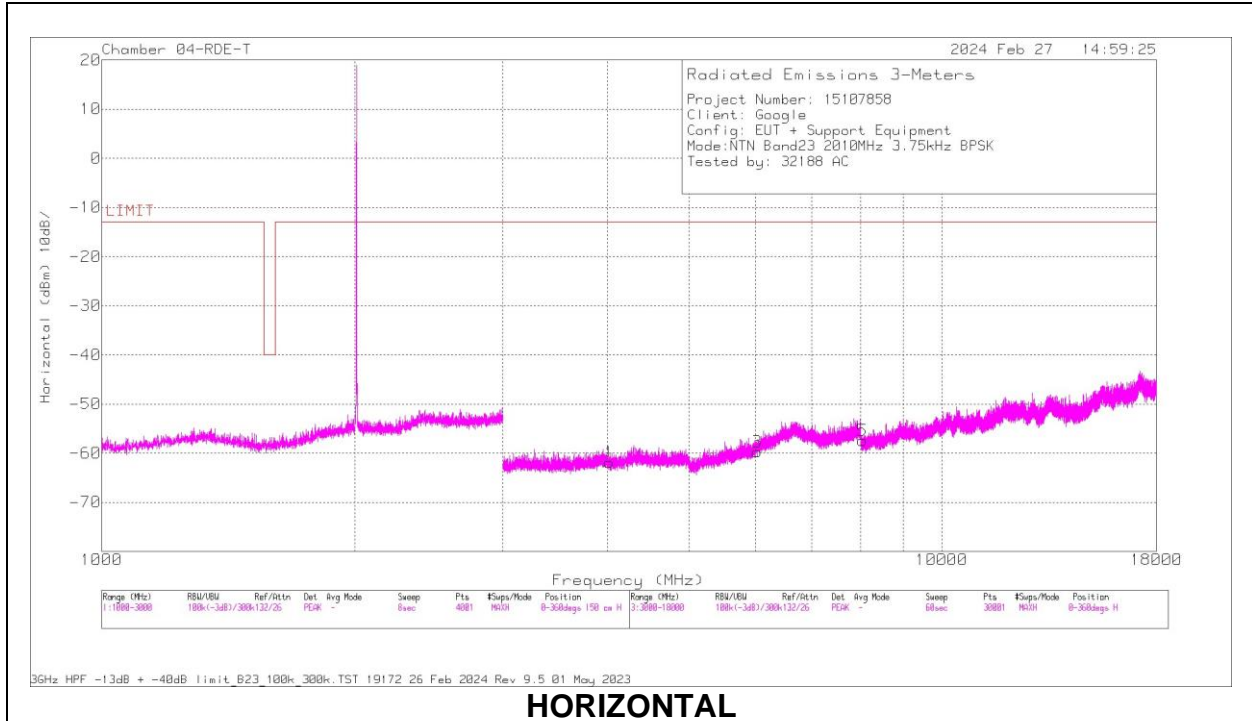
#### High Channel: BPSK 3.75kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4015	47.5	Pk	33.4	-95.2	0	-45.36	-59.66	-13	-46.66	0-360	150	H
3	* 8109	46.36	Pk	35.8	-95.2	0	-43.19	-56.23	-13	-43.23	0-360	150	H
4	* 4022	47.78	Pk	33.4	-95.2	0	-45.62	-59.64	-13	-46.64	0-360	150	V
6	* 8098	47.2	Pk	35.8	-95.2	0	-43.04	-55.24	-13	-42.24	0-360	150	V
5	6026	47.48	Pk	35.8	-95.2	0	-44.58	-56.5	-13	-43.5	0-360	150	V
2	6047	47.02	Pk	35.8	-95.2	0	-44.41	-56.79	-13	-43.79	0-360	150	H

Pk - Peak detector  
 \* - Noise Floor



**Middle Channel: BPSK 3.75kHz 1SC0**



### 10.1.4. Band 23 ANT 1 (Above 1GHz) - BPSK 15kHz 1SC0

#### Low Channel: BPSK 15kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3991	47.72	Pk	33.4	-95.2	0	-45.37	-59.45	-13	-46.45	0-360	150	H
4	* 4015	47.46	Pk	33.4	-95.2	0	-45.36	-59.7	-13	-46.7	0-360	150	V
5	5964	47.56	Pk	35.6	-95.2	0	-45.06	-57.1	-13	-44.1	0-360	150	V
2	5984	47.27	Pk	35.6	-95.2	0	-44.86	-57.19	-13	-44.19	0-360	150	H
6	7986.5	49.22	Pk	35.8	-95.2	0	-43.37	-53.55	-13	-40.55	0-360	150	V
3	7999.5	48.18	Pk	35.8	-95.2	0	-43.07	-54.29	-13	-41.29	0-360	150	H

Pk - Peak detector  
 \* - Noise Floor

#### Middle Channel: BPSK 15kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4021	45.86	Pk	33.4	-95.2	0	-45.46	-61.4	-13	-48.4	0-360	150	H
5	* 8040.5	44.54	Pk	35.8	-95.2	0	-43.12	-57.98	-13	-44.98	0-360	150	H
2	* 4021	45.45	Pk	33.4	-95.2	0	-45.46	-61.81	-13	-48.81	0-360	150	V
6	* 8040.5	44.14	Pk	35.8	-95.2	0	-43.12	-58.38	-13	-45.38	0-360	150	V
3	6030.5	45.85	Pk	35.8	-95.2	0	-44.54	-58.09	-13	-45.09	0-360	150	H
4	6030.5	44.28	Pk	35.8	-95.2	0	-44.54	-59.66	-13	-46.66	0-360	150	V

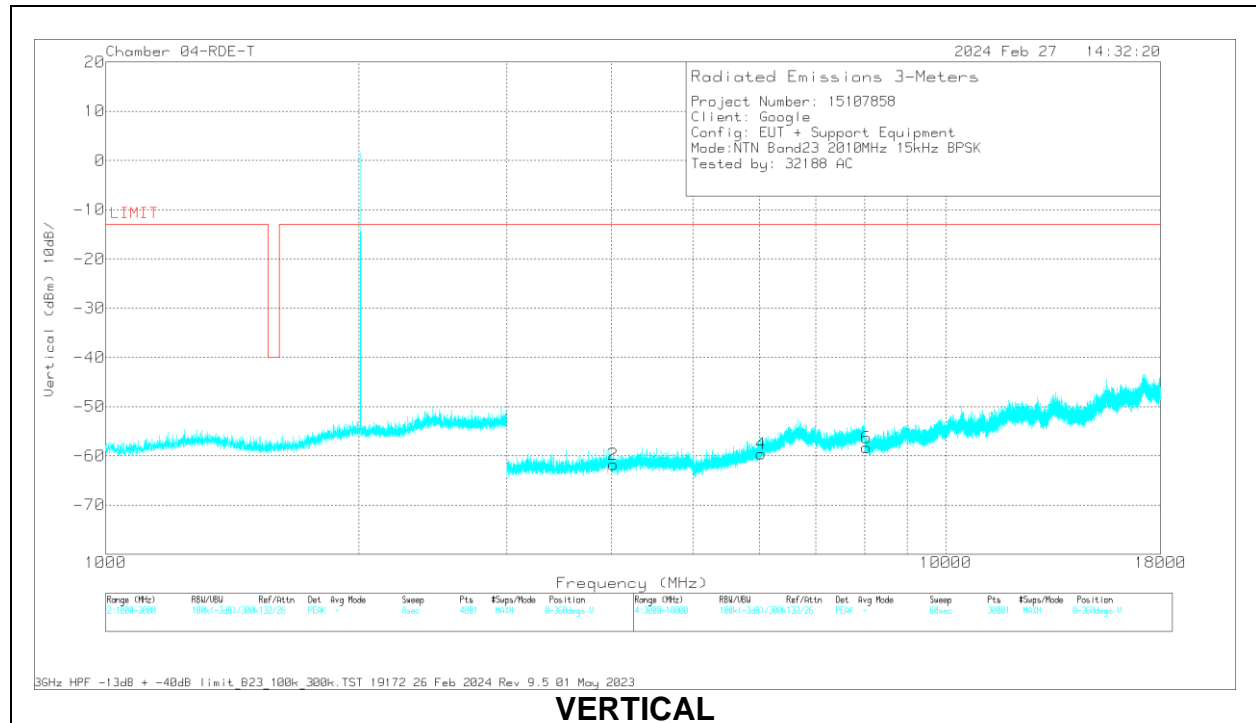
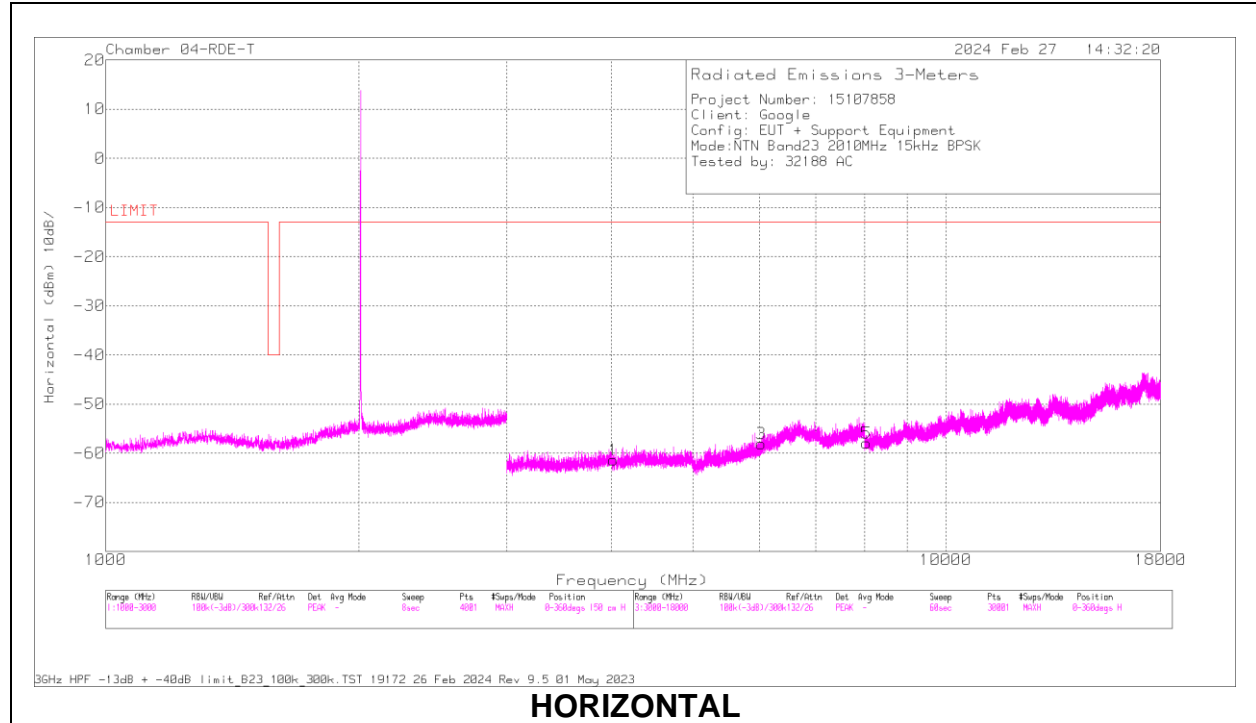
Pk - Peak detector  
 \* - Noise Floor

#### High Channel: BPSK 15kHz 1SC0

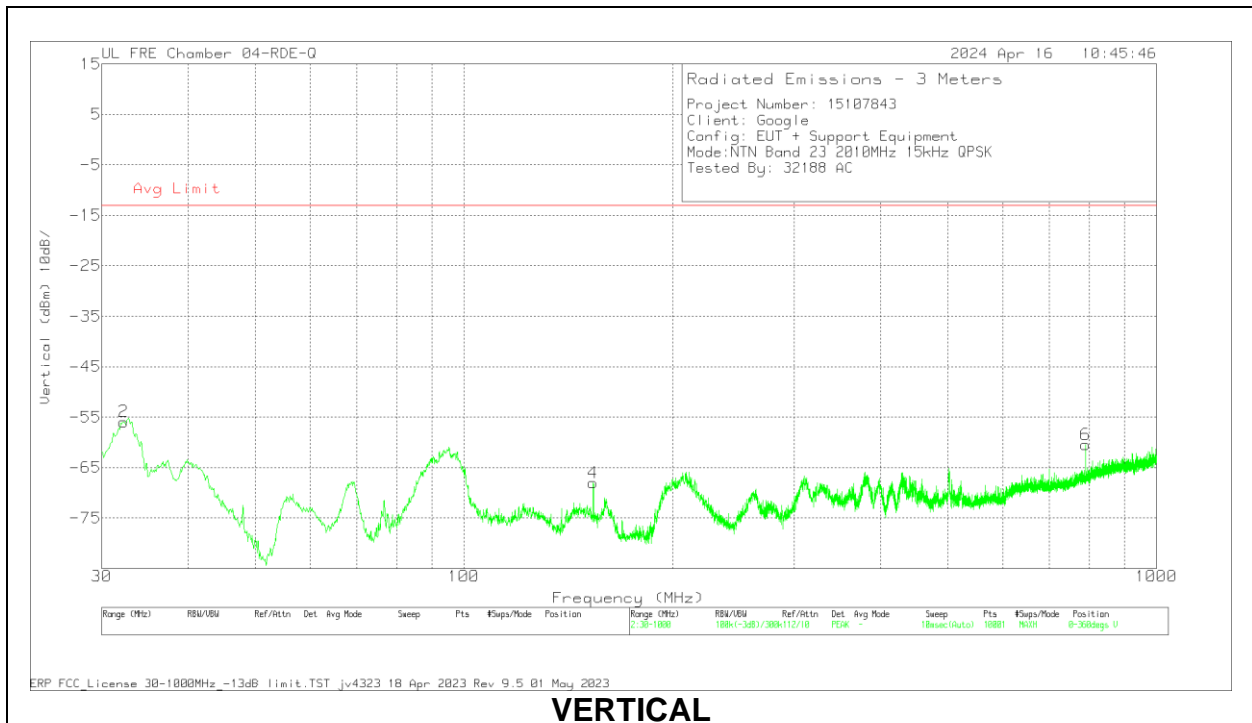
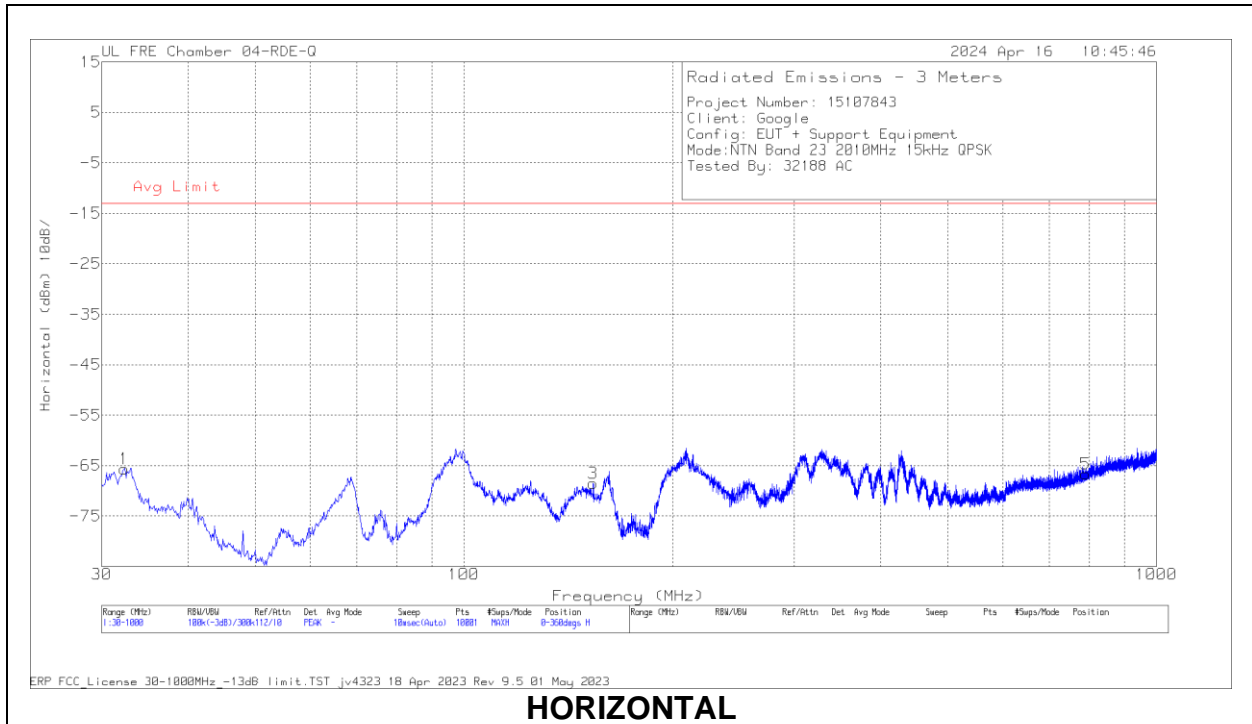
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4019.5	47.93	Pk	33.4	-95.2	0	-45.38	-59.25	-13	-46.25	0-360	150	H
3	* 8064.5	46.65	Pk	35.8	-95.2	0	-42.92	-55.67	-13	-42.67	0-360	150	H
4	* 4050	48.18	Pk	33.4	-95.2	0	-45.6	-59.22	-13	-46.22	0-360	150	V
6	* 8096.5	46	Pk	35.8	-95.2	0	-43.01	-56.41	-13	-43.41	0-360	150	V
2	6056	46.88	Pk	35.9	-95.2	0	-44.38	-56.8	-13	-43.8	0-360	150	H
5	6074	47.15	Pk	36	-95.2	0	-44.31	-56.36	-13	-43.36	0-360	150	V

Pk - Peak detector  
 \* - Noise Floor

**Middle Channel: BPSK 15kHz 1SC0**



**10.1.5. Band 23 ANT 1 (Below 1GHz)**



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	85151 ACF (dB)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	32.231	46.08	Pk	25.6	-32.4	-95.2	-55.92	-13	-42.92	0-360	99	V
1	32.328	36.33	Pk	25.6	-32.4	-95.2	-65.67	-13	-52.67	0-360	200	H
3	153.772	39.99	Pk	18.2	-31.5	-95.2	-68.51	-13	-55.51	0-360	99	H
4	153.772	40.47	Pk	18.2	-31.5	-95.2	-68.03	-13	-55.03	0-360	99	V
6	789.898	36.75	Pk	26.9	-28.9	-95.2	-60.45	-13	-47.45	0-360	200	V
5	789.995	30.53	Pk	26.9	-28.9	-95.2	-66.67	-13	-53.67	0-360	99	H

Pk - Peak detector

### 10.1.6. Band 255 ANT 5 (Above 1GHz) - QPSK 3.75kHz 1SC0

#### Low Channel: QPSK 3.75kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4874	48.26	Pk	34	-95.2	-46.62	-59.56	-13	-46.56	0-360	149	H
5	* 4861	48.06	Pk	34	-95.2	-46.69	-59.83	-13	-46.83	0-360	149	V
1	3270	45.97	Pk	32.8	-95.2	-44.57	-61	-13	-48	0-360	149	H
4	3274.5	46.65	Pk	32.8	-95.2	-44.79	-60.54	-13	-47.54	0-360	149	V
6	6498	48.1	Pk	36.6	-95.2	-44.21	-54.71	-13	-41.71	0-360	149	V
3	6502.5	48.11	Pk	36.6	-95.2	-44.21	-54.7	-13	-41.7	0-360	149	H

Pk - Peak detector  
 \* - Noise Floor

#### Middle Channel: QPSK 3.75kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4942.5	48.36	Pk	34.1	-95.2	-46.55	-59.29	-13	-46.29	0-360	149	H
5	* 4925	47.78	Pk	34	-95.2	-46.54	-59.96	-13	-46.96	0-360	149	V
1	3286	47.77	Pk	32.8	-95.2	-44.85	-59.48	-13	-46.48	0-360	149	H
4	3286	46.73	Pk	32.8	-95.2	-44.85	-60.52	-13	-47.52	0-360	149	V
6	6578.5	48.16	Pk	36.8	-95.2	-44.19	-54.43	-13	-41.43	0-360	149	V
3	6582.5	48.03	Pk	36.8	-95.2	-44.16	-54.53	-13	-41.53	0-360	149	H

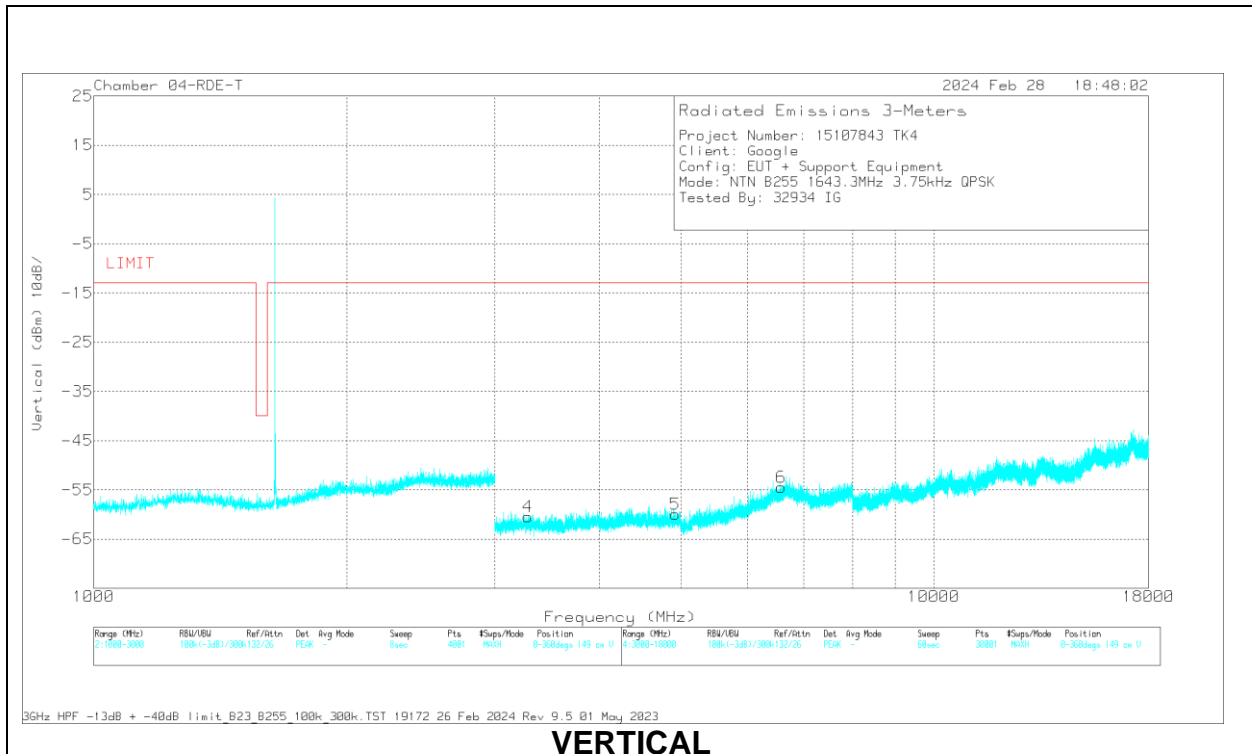
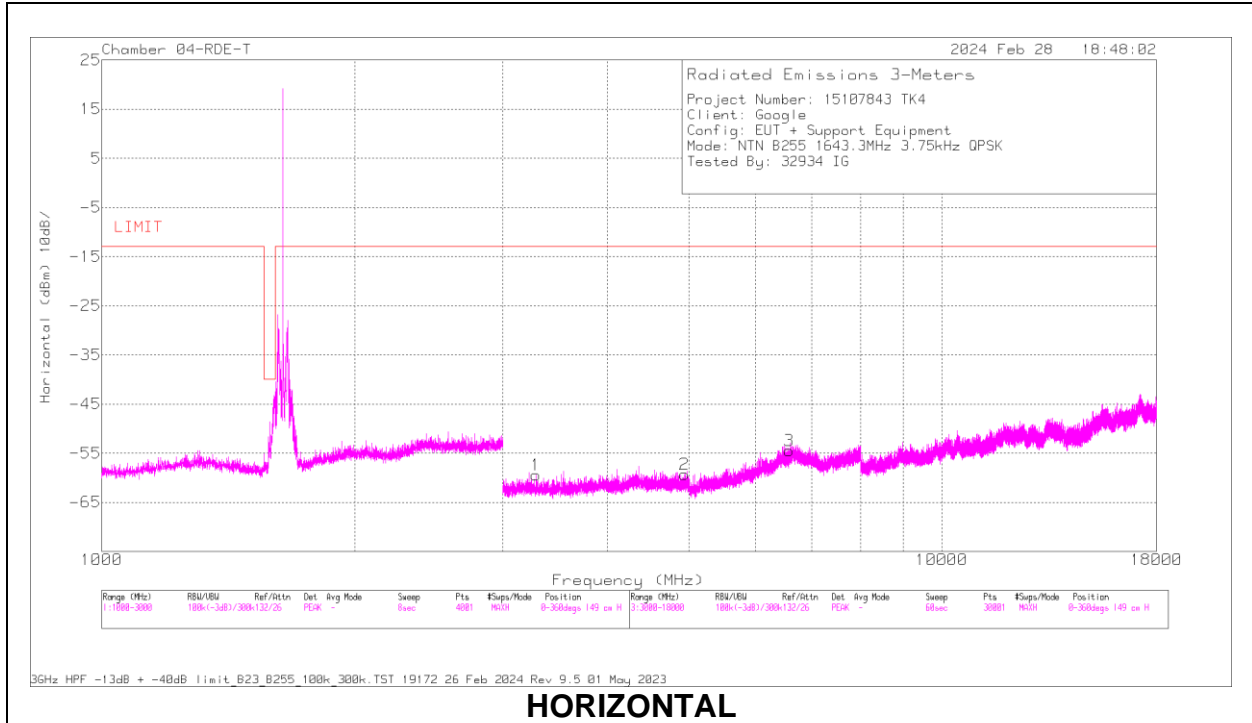
Pk - Peak detector  
 \* - Noise Floor

#### High Channel: QPSK 3.75kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4978	47.72	Pk	34.1	-95.2	-46.69	-60.07	-13	-47.07	0-360	149	H
5	* 4965	48.38	Pk	34.1	-95.2	-46.55	-59.27	-13	-46.27	0-360	149	V
4	3324.5	47.25	Pk	32.9	-95.2	-44.75	-59.8	-13	-46.8	0-360	149	V
1	3327.5	46.78	Pk	32.9	-95.2	-44.87	-60.39	-13	-47.39	0-360	149	H
3	6632.5	48.27	Pk	36.9	-95.2	-43.5	-53.53	-13	-40.53	0-360	149	H
6	6670.5	48.2	Pk	37	-95.2	-43.69	-53.69	-13	-40.69	0-360	149	V

Pk - Peak detector  
 \* - Noise Floor

**Middle Channel: QPSK 3.75kHz 1SC0**



### 10.1.7. Band 255 ANT 5 (Above 1GHz) – QPSK 15kHz 1SC0

#### Low Channel: QPSK 15kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4883.5	48.5	Pk	34	-95.2	-46.79	-59.49	-13	-46.49	0-360	149	H
5	* 4906.5	48.04	Pk	34	-95.2	-46.76	-59.92	-13	-46.92	0-360	149	H
4	3237.5	47.48	Pk	32.7	-95.2	-44.86	-59.88	-13	-46.88	0-360	149	H
1	3254.5	46.8	Pk	32.8	-95.2	-44.85	-60.45	-13	-47.45	0-360	149	H
3	6503	48.11	Pk	36.6	-95.2	-44.23	-54.72	-13	-41.72	0-360	149	H
6	6503	48.11	Pk	36.6	-95.2	-44.23	-54.72	-13	-41.72	0-360	149	H

Pk - Peak detector

\* - Noise Floor

#### Middle Channel: QPSK 15kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4940.5	48.19	Pk	34.1	-95.2	-46.66	-59.57	-13	-46.57	0-360	149	H
5	* 4954.5	48.13	Pk	34.1	-95.2	-46.74	-59.71	-13	-46.71	0-360	149	V
1	3286	47.09	Pk	32.8	-95.2	-44.85	-60.16	-13	-47.16	0-360	149	H
4	3291	47.31	Pk	32.8	-95.2	-44.83	-59.92	-13	-46.92	0-360	149	V
3	6589	48.51	Pk	36.8	-95.2	-44.08	-53.97	-13	-40.97	0-360	149	H
6	6591	48.33	Pk	36.8	-95.2	-44.18	-54.25	-13	-41.25	0-360	149	V

Pk - Peak detector

\* - Noise Floor

#### High Channel: QPSK 15kHz 1SC0

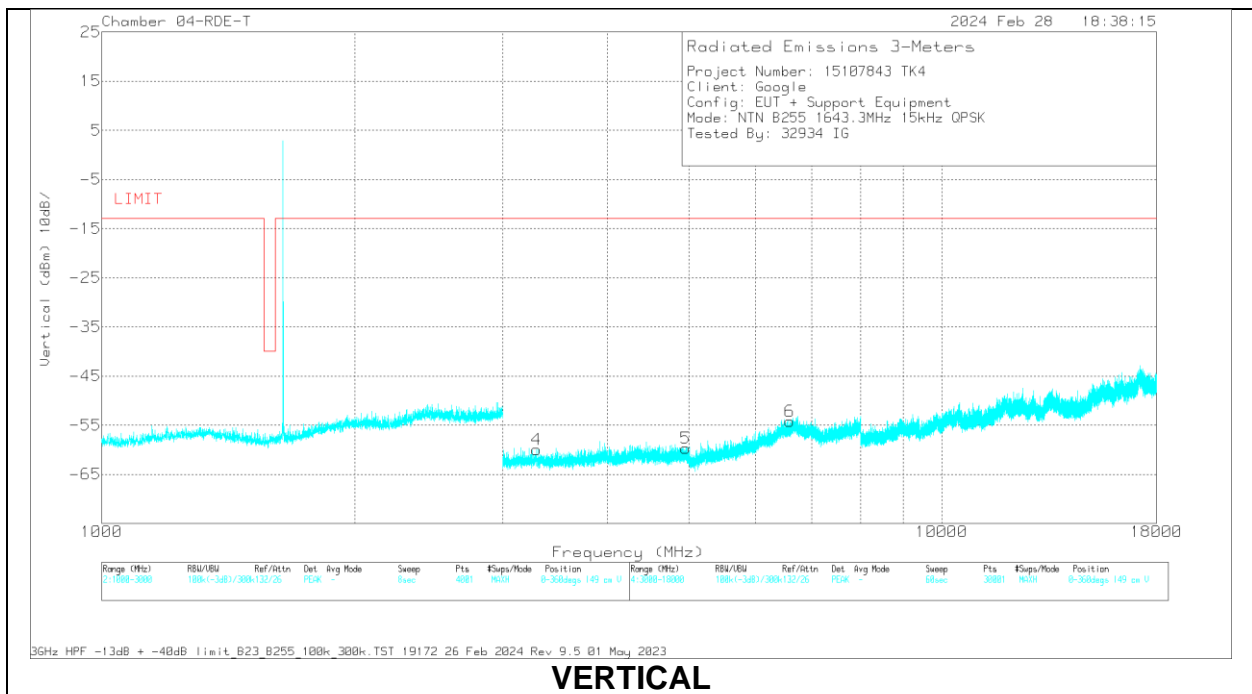
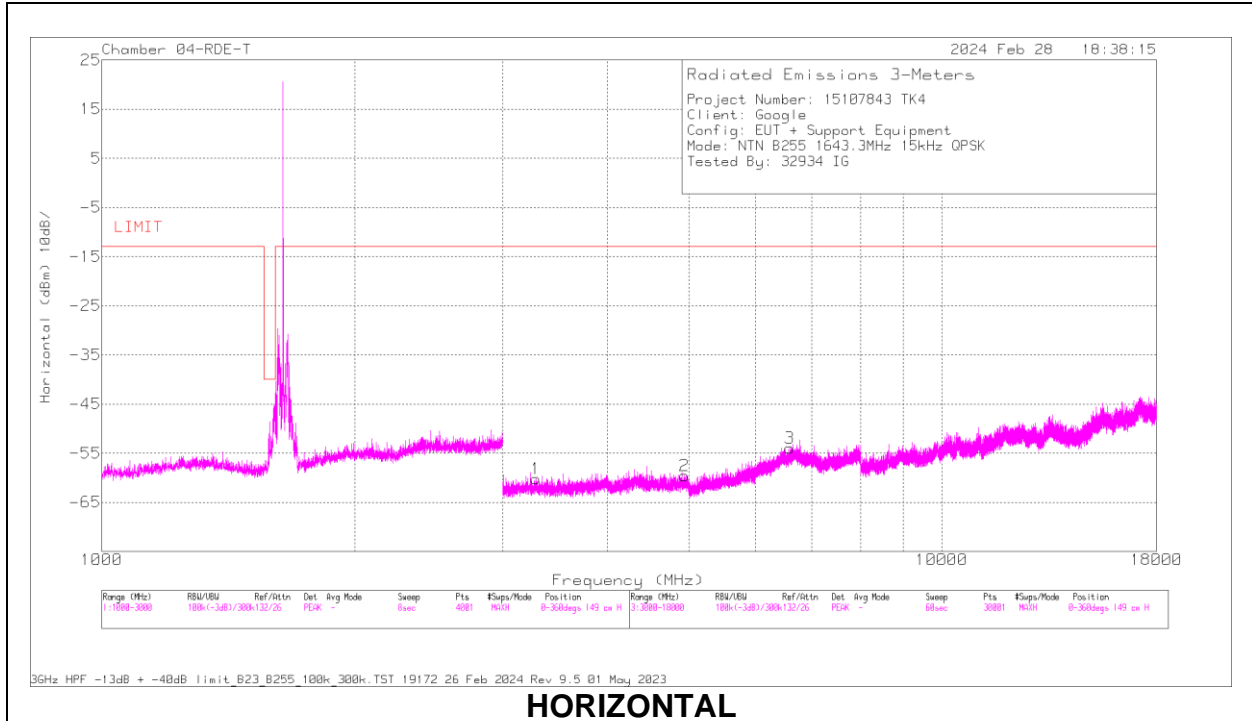
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4973.5	47.88	Pk	34.1	-95.2	-46.42	-59.64	-13	-46.64	0-360	149	H
5	* 4988	47.72	Pk	34.1	-95.2	-46.56	-59.94	-13	-46.94	0-360	149	V
1	3323.5	46.06	Pk	32.9	-95.2	-44.75	-60.99	-13	-47.99	0-360	149	H
4	3327	46.69	Pk	32.9	-95.2	-44.83	-60.44	-13	-47.44	0-360	149	V
6	6610	47.57	Pk	36.9	-95.2	-43.97	-54.7	-13	-41.7	0-360	149	V
3	6628.5	48.11	Pk	36.9	-95.2	-43.55	-53.74	-13	-40.74	0-360	149	H

Pk - Peak detector

\* - Noise Floor



**Middle Channel: QPSK 15kHz 1SC0**



**10.1.8. Band 255 ANT 5 (Above 1GHz) - BPSK 3.75kHz 1SC0**

**Low Channel: BPSK 3.75kHz 1SC0**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4887	48.67	Pk	34	-95.2	-46.64	-59.17	-13	-46.17	0-360	149	H
5	* 4879	48.25	Pk	34	-95.2	-46.69	-59.64	-13	-46.64	0-360	149	V
4	3230.5	46.45	Pk	32.7	-95.2	-44.78	-60.83	-13	-47.83	0-360	149	V
1	3245.5	47.02	Pk	32.7	-95.2	-45.01	-60.49	-13	-47.49	0-360	149	H
6	6502	48.13	Pk	36.6	-95.2	-44.18	-54.65	-13	-41.65	0-360	149	V
3	6519	48.91	Pk	36.6	-95.2	-44.5	-54.19	-13	-41.19	0-360	149	H

Pk - Peak detector

\* - Noise Floor

**Middle Channel: BPSK 3.75kHz 1SC0**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4924.5	48.84	Pk	34	-95.2	-46.56	-58.92	-13	-45.92	0-360	149	H
5	* 4941.5	48.22	Pk	34.1	-95.2	-46.58	-59.46	-13	-46.46	0-360	149	V
4	3268	46.32	Pk	32.8	-95.2	-44.75	-60.83	-13	-47.83	0-360	149	V
1	3279	46.82	Pk	32.8	-95.2	-44.88	-60.46	-13	-47.46	0-360	149	H
3	6557.5	48.26	Pk	36.8	-95.2	-44.26	-54.4	-13	-41.4	0-360	149	H
6	6586	48.68	Pk	36.8	-95.2	-44.06	-53.78	-13	-40.78	0-360	149	V

Pk - Peak detector

\* - Noise Floor

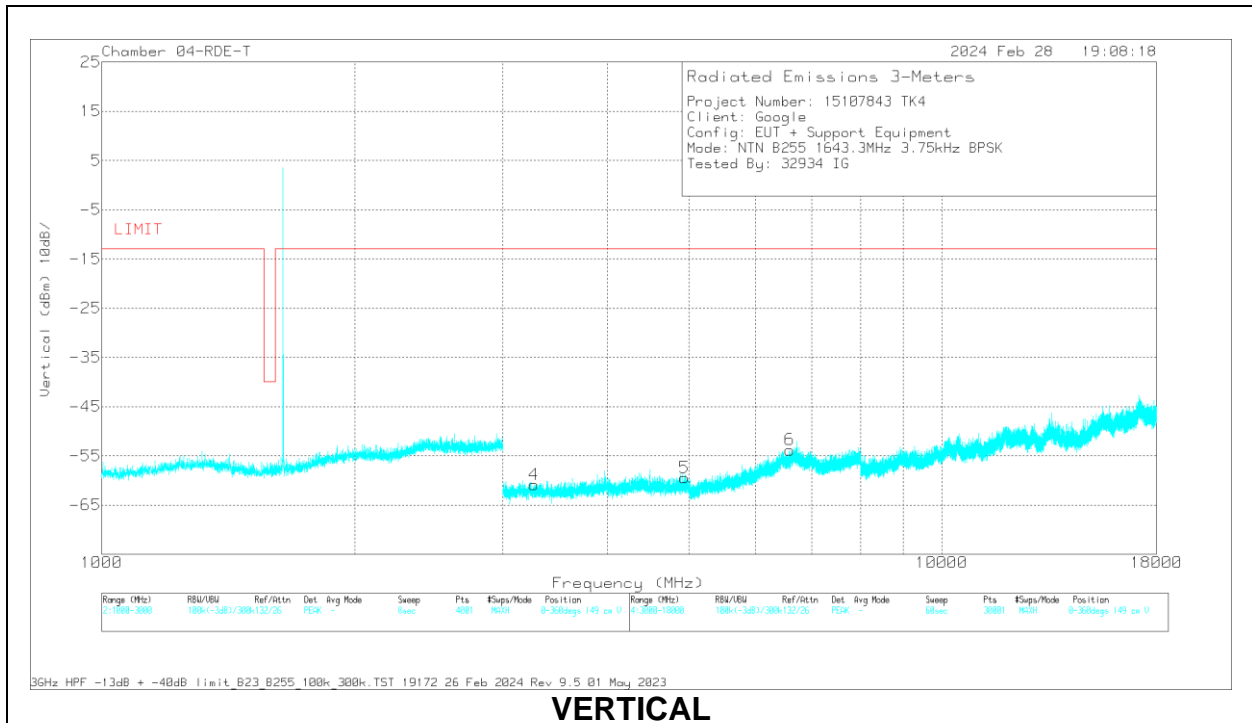
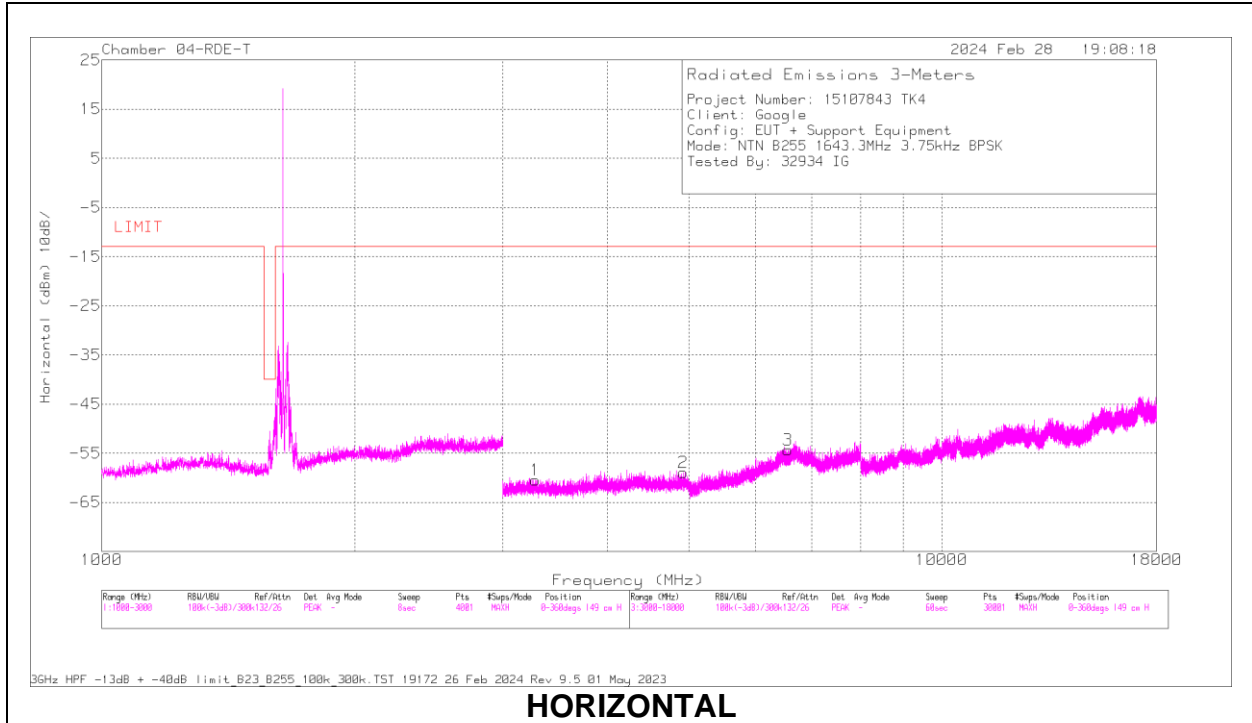
**High Channel: BPSK 3.75kHz 1SC0**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4979	48.38	Pk	34.1	-95.2	-46.69	-59.41	-13	-46.41	0-360	149	H
5	* 4981.5	47.77	Pk	34.1	-95.2	-46.65	-59.98	-13	-46.98	0-360	149	V
4	3328	47.1	Pk	32.9	-95.2	-44.91	-60.11	-13	-47.11	0-360	149	V
1	3331.5	47.21	Pk	32.9	-95.2	-44.73	-59.82	-13	-46.82	0-360	149	H
6	6614	47.81	Pk	36.9	-95.2	-43.88	-54.37	-13	-41.37	0-360	149	V
3	6630	47.54	Pk	36.9	-95.2	-43.57	-54.33	-13	-41.33	0-360	149	H

Pk - Peak detector

\* - Noise Floor

**Middle Channel: BPSK 3.75kHz 1SC0**



### 10.1.9. Band 255 ANT 5 (Above 1GHz) - BPSK 15kHz 1SC0

#### Low Channel: BPSK 15kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4879.5	49.09	Pk	34	-95.2	-46.66	-58.77	-13	-45.77	0-360	149	H
5	* 4893	48.11	Pk	34	-95.2	-46.59	-59.68	-13	-46.68	0-360	149	V
4	3237	47.62	Pk	32.7	-95.2	-44.89	-59.77	-13	-46.77	0-360	149	V
1	3244.5	46.5	Pk	32.7	-95.2	-45.04	-61.04	-13	-48.04	0-360	149	H
6	6484.5	49.29	Pk	36.6	-95.2	-44.09	-53.4	-13	-40.4	0-360	149	V
3	6505.5	48.1	Pk	36.6	-95.2	-44.35	-54.85	-13	-41.85	0-360	149	H

Pk - Peak detector  
 \* - Noise Floor

#### Middle Channel: BPSK 15kHz 1SC0

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4938.5	48.46	Pk	34.1	-95.2	-46.7	-59.34	-13	-46.34	0-360	149	H
5	* 4938.5	48.53	Pk	34.1	-95.2	-46.7	-59.27	-13	-46.27	0-360	149	V
4	3284	47.05	Pk	32.8	-95.2	-44.82	-60.17	-13	-47.17	0-360	149	V
1	3285.5	47.97	Pk	32.8	-95.2	-44.8	-59.23	-13	-46.23	0-360	149	H
6	6567.5	48.9	Pk	36.8	-95.2	-44.36	-53.86	-13	-40.86	0-360	149	V
3	6584	48.06	Pk	36.8	-95.2	-44.13	-54.47	-13	-41.47	0-360	149	H

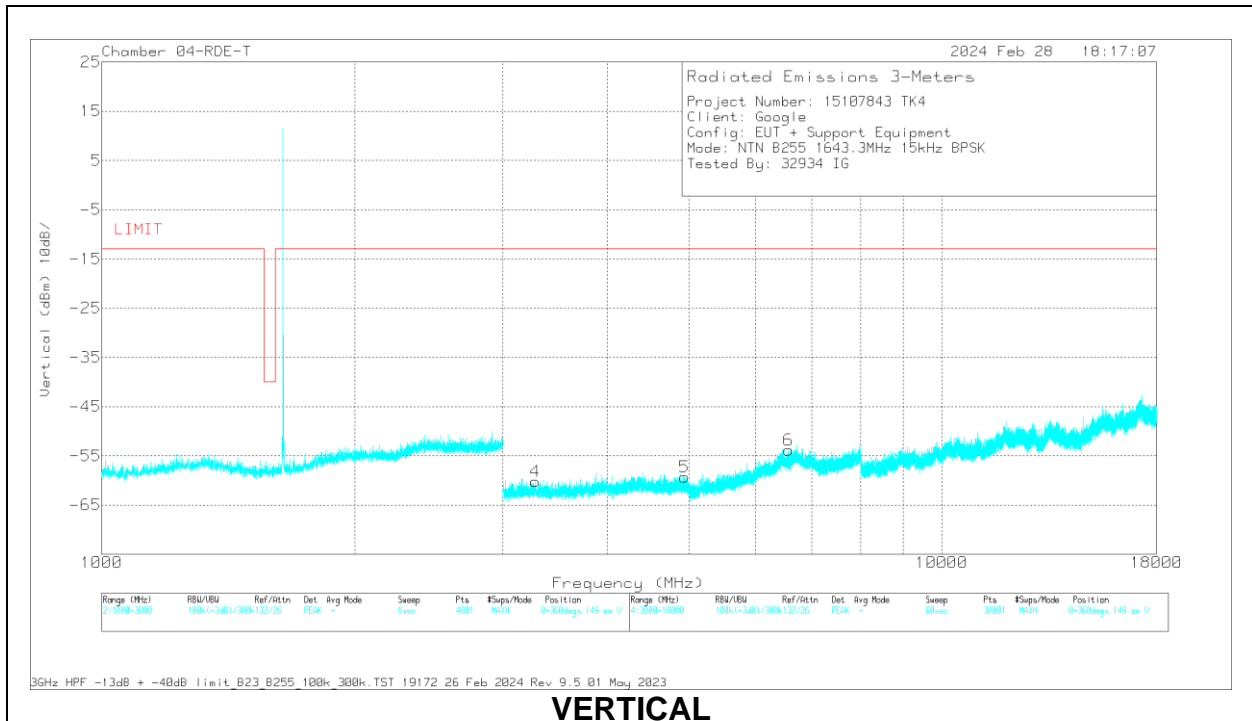
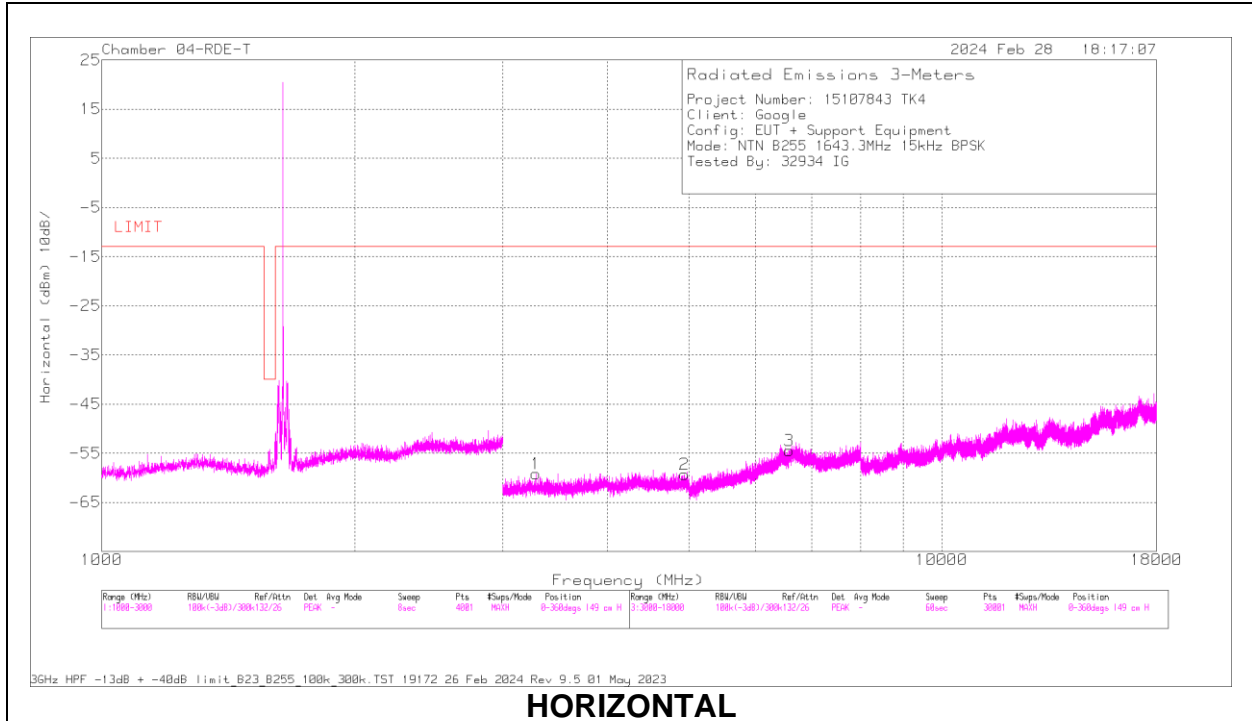
Pk - Peak detector  
 \* - Noise Floor

#### High Channel: BPSK 15kHz 1SC0

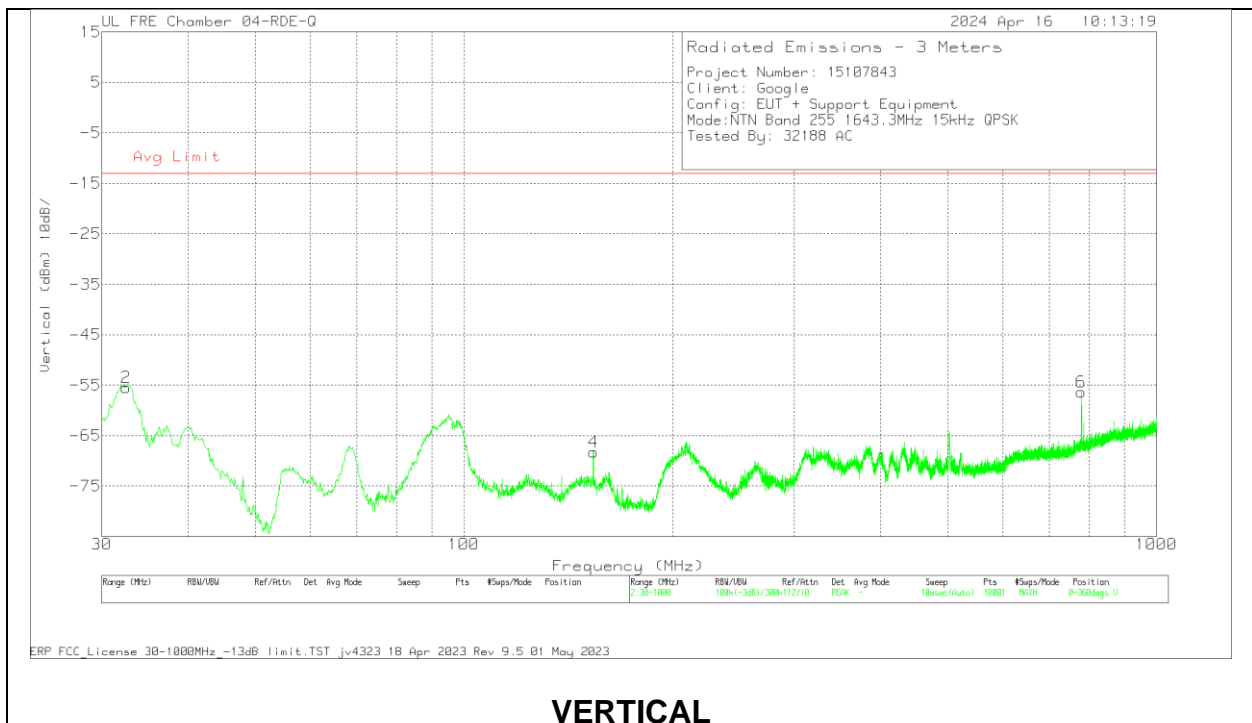
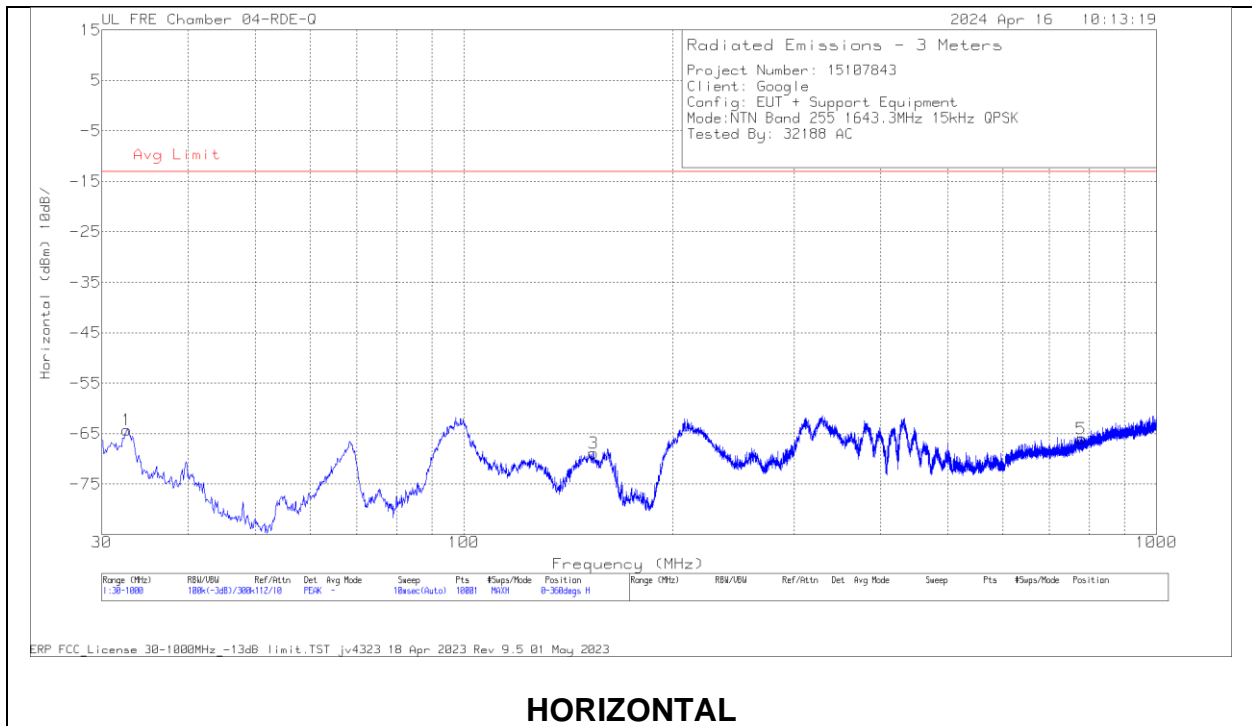
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80430 ACF (dB)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4978.5	48.7	Pk	34.1	-95.2	-46.69	-59.09	-13	-46.09	0-360	149	H
5	* 4969	47.67	Pk	34.1	-95.2	-46.67	-60.1	-13	-47.1	0-360	149	V
4	3320.5	46.96	Pk	32.9	-95.2	-45.06	-60.4	-13	-47.4	0-360	149	V
1	3330.5	46.26	Pk	32.9	-95.2	-44.78	-60.82	-13	-47.82	0-360	149	H
3	6630	49.44	Pk	36.9	-95.2	-43.57	-52.43	-13	-39.43	0-360	149	H
6	6633	48.61	Pk	36.9	-95.2	-43.48	-53.17	-13	-40.17	0-360	149	V

Pk - Peak detector  
 \* - Noise Floor

**Middle Channel: BPSK 15kHz 1SC0**



### 10.1.10. Band 255 ANT 5 (Below 1GHz)



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80706 ACF (dB)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	32.522	46.58	Pk	25.4	-32.3	-95.2	-55.52	-13	-42.52	0-360	99	V
1	32.619	37.85	Pk	25.4	-32.3	-95.2	-64.25	-13	-51.25	0-360	200	H
3	153.869	39.66	Pk	18.2	-31.5	-95.2	-68.84	-13	-55.84	0-360	200	H
4	153.869	40.2	Pk	18.2	-31.5	-95.2	-68.3	-13	-55.3	0-360	99	V
5	778.452	31.31	Pk	26.8	-29	-95.2	-66.09	-13	-53.09	0-360	100	H
6	778.452	41.02	Pk	26.8	-29	-95.2	-56.38	-13	-43.38	0-360	300	V

Pk - Peak detector

## 10.2. ADDITIONAL UNWANTED EMISSION (1559MHz – 1610MHz)

### LIMITS

FCC §25.216

Limits on emissions from mobile earth stations for protection of aeronautical radionavigation-satellite service

- (a) The e.i.r.p. density of emissions from mobile earth stations placed in service on or before July 21, 2002 ...
- (b) The e.i.r.p. density of emissions from mobile earth stations placed in service on or before July 21, 2002 ...
- (c) The e.i.r.p. density of emissions from mobile earth stations placed in service after July 21, 2002 with assigned uplink frequencies between 1610 MHz and 1660.5 MHz shall not exceed  $-70$  dBW/MHz, averaged over any 2 millisecond active transmission interval, in the band 1559-1605 MHz. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed  $-80$  dBW, averaged over any 2 millisecond active transmission interval, in the 1559-1605 MHz band.

FCC §25.216

(g) Mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies in the 1610-1626.5 MHz band shall suppress the power density of emissions in the 1605-1610 MHz band-segment to an extent determined by linear interpolation from  $-70$  dBW/MHz at 1605 MHz to  $-10$  dBW/MHz at 1610 MHz averaged over any 2 millisecond active transmission interval. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed a level determined by linear interpolation from  $-80$  dBW at 1605 MHz to  $-20$  dBW at 1610 MHz, averaged over any 2 millisecond active transmission interval.

### TEST PROCEDURE

KDB 971168 D01 v03r01/D02 v02r02

Measure wideband emissions using either:

- RBW = 1MHz, VB = 3MHz
- RBW < 1MHz, integrate over 1MHz if necessary

Measure narrowband emissions using:

- RBW = 10kHz, VB = 30kHz as worst case setting

Set detector = rms, sweep time ~ number of points x 2ms, and sweep multiple times with max hold enabled. When the detector is set to rms the number of points is set to exceed the minimum number required by ANSI C63.26 for average measurements. A peak detector may be used (e.g. to avoid slow sweep times for the narrowband emissions measurements) in lieu of average rms detection as this will provide a more conservative (higher) measured value than the rms value.

### RESULTS

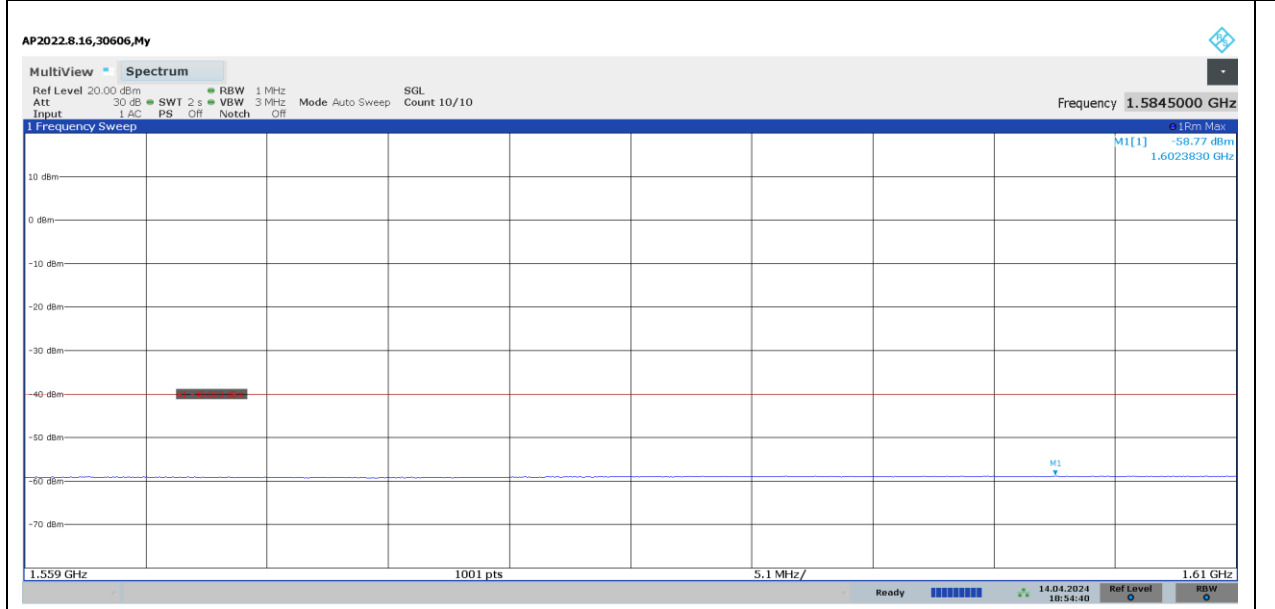
Both horizontal / vertical polarizations and low/ mid/ high channels were investigated on ANT 1 and ANT 5. No emissions were found on both horizontal and vertical polarization and plots for the mid channel.



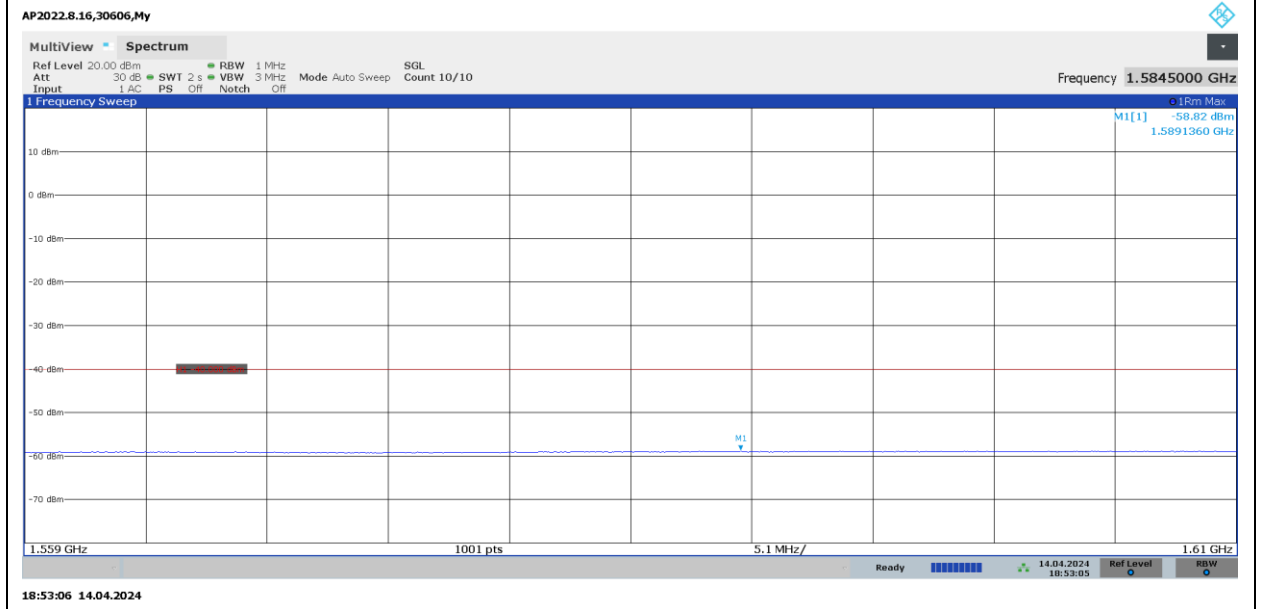
Test Engineer ID:	32188 AC	Test Date:	2024-03-22 to 2024-03-25
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### 10.2.1. Band 23 ANT 1

#### Band 23 SCS 3.75kHz – QPSK

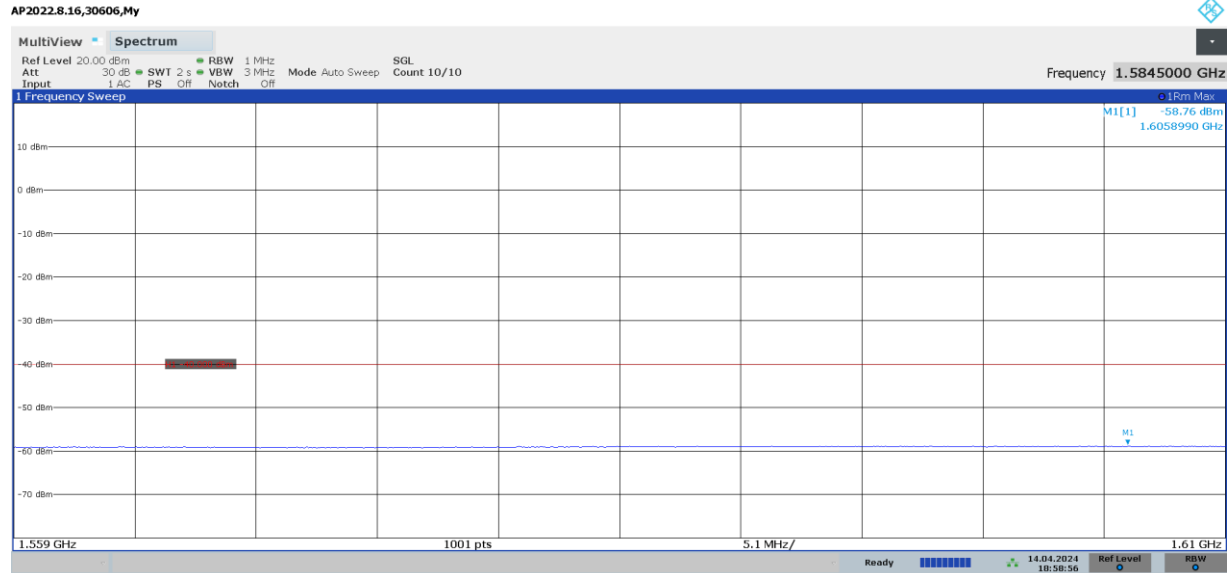


Middle Channel 1SC0 - Vertical

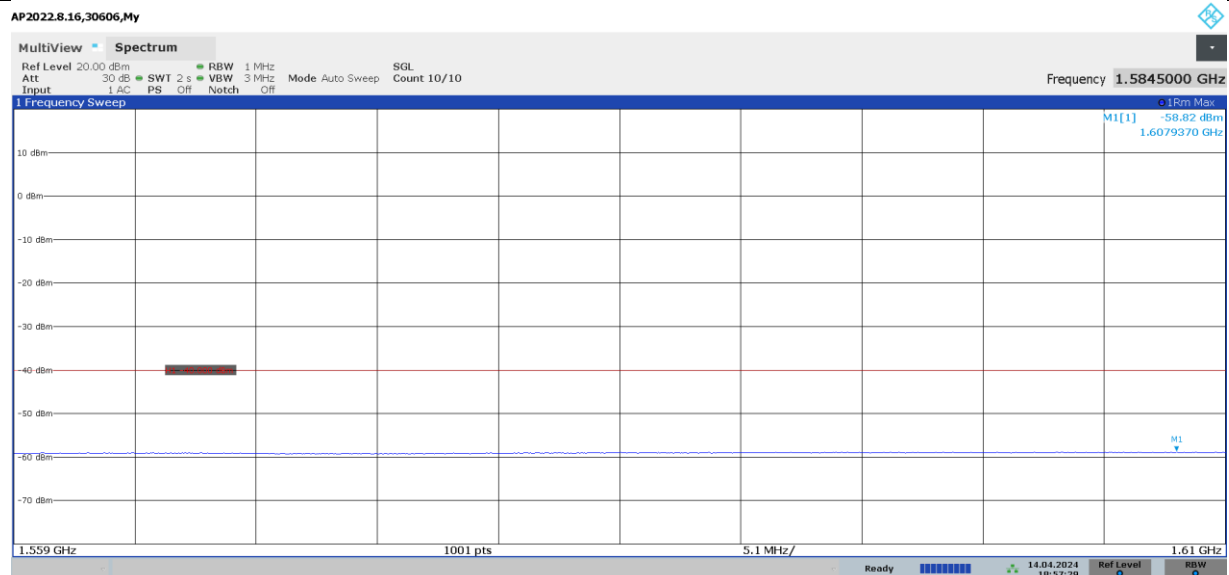


Middle Channel 1SC0 - Horizontal

### Band 23 SCS 15kHz – QPSK



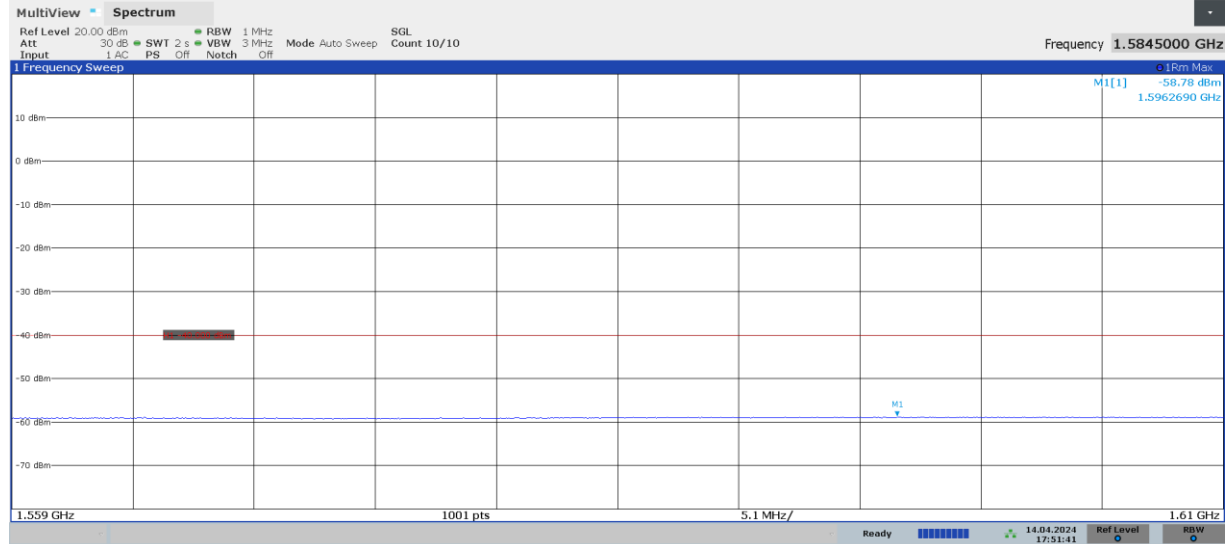
Middle Channel 1SC0 - Vertical



Middle Channel 1SC0 - Horizontal

### Band 23 SCS 3.75kHz – BPSK

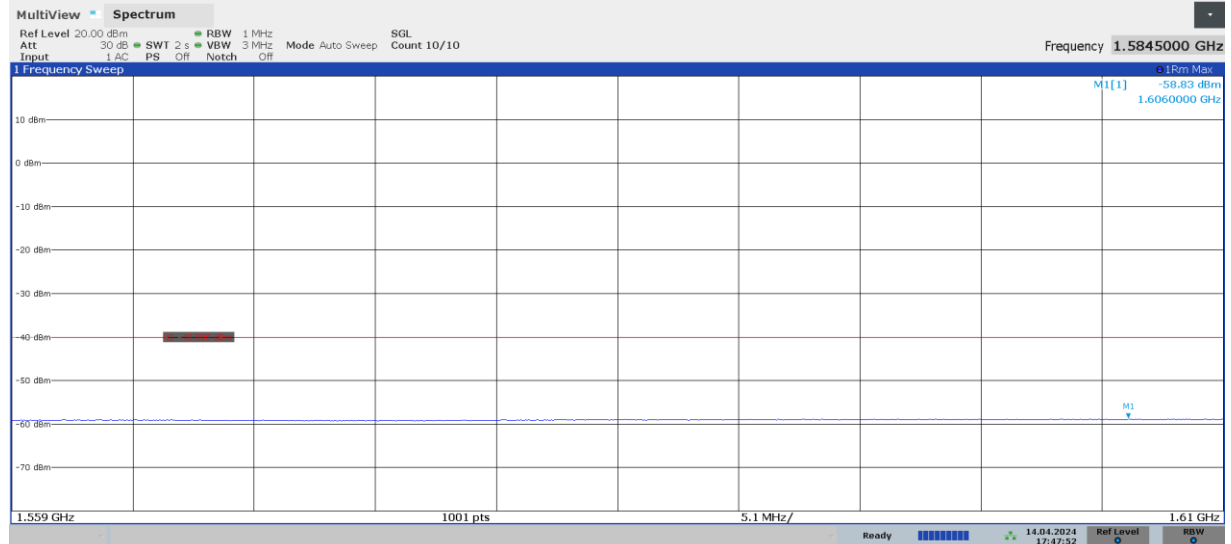
AP2022.8.16,30606,My



17:51:41 14.04.2024

Middle Channel 1SC0 - Vertical

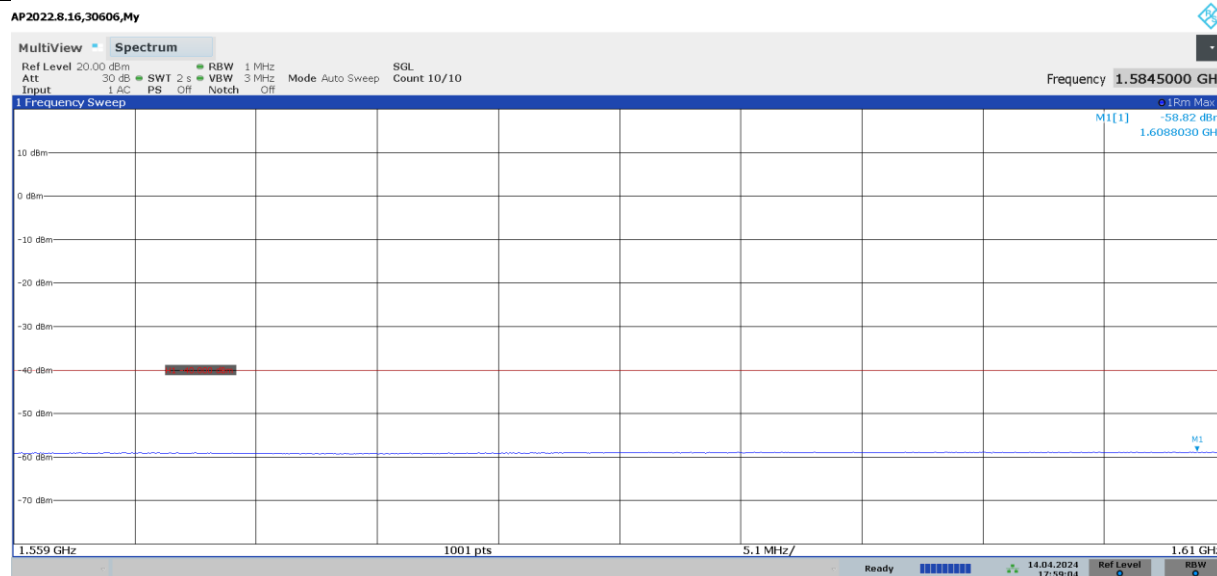
AP2022.8.16,30606,My



17:47:53 14.04.2024

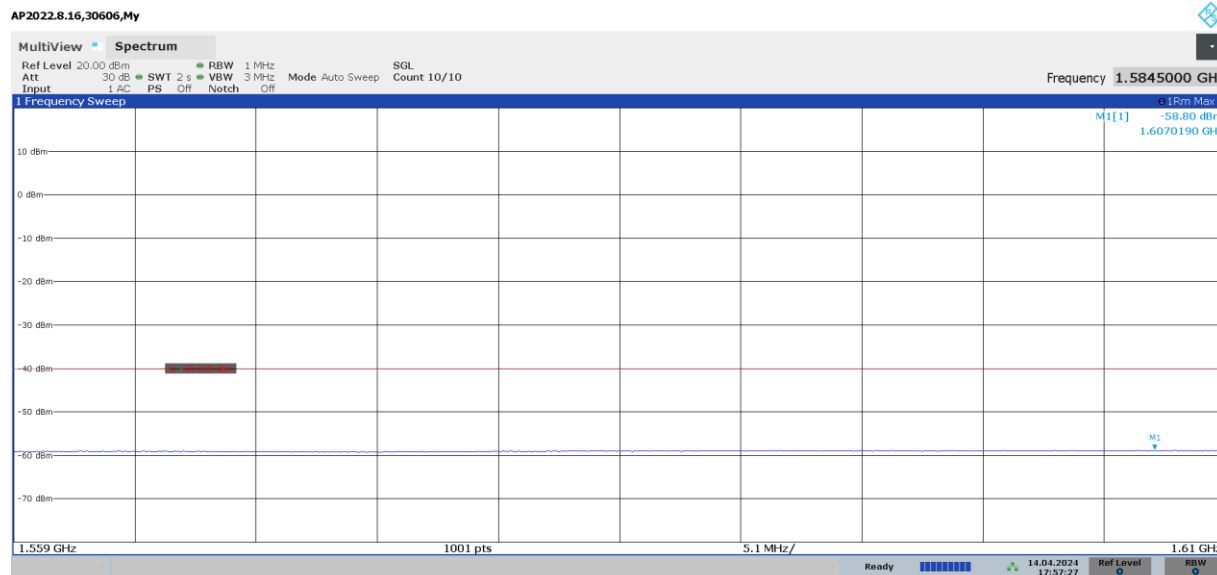
Middle Channel 1SC0 - Horizontal

### Band 23 SCS 15kHz – BPSK



17:59:04 14.04.2024

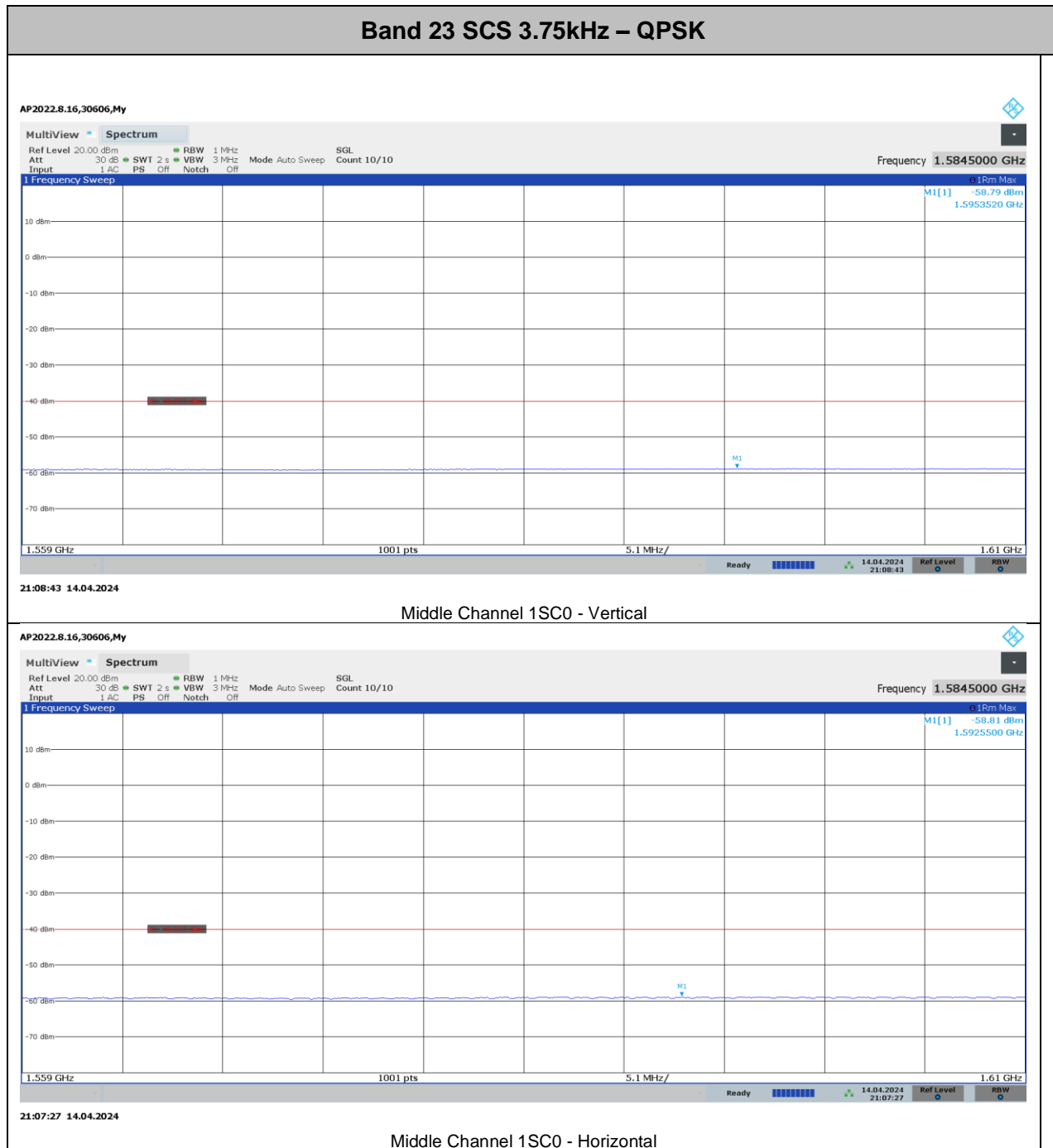
Middle Channel 1SC0 - Vertical



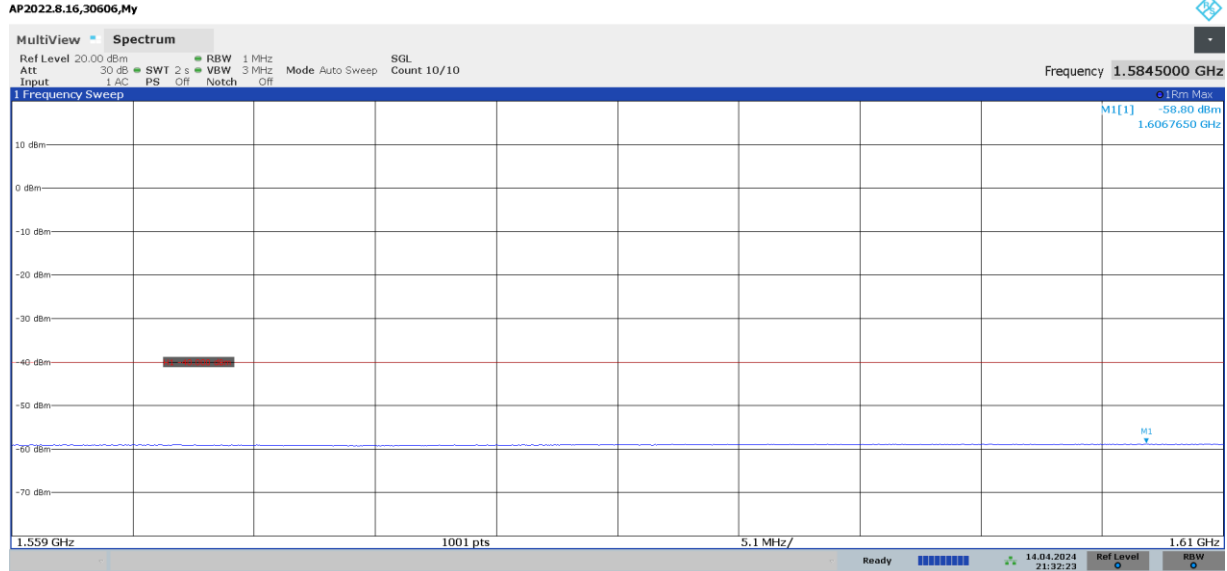
17:57:27 14.04.2024

Middle Channel 1SC0 - Horizontal

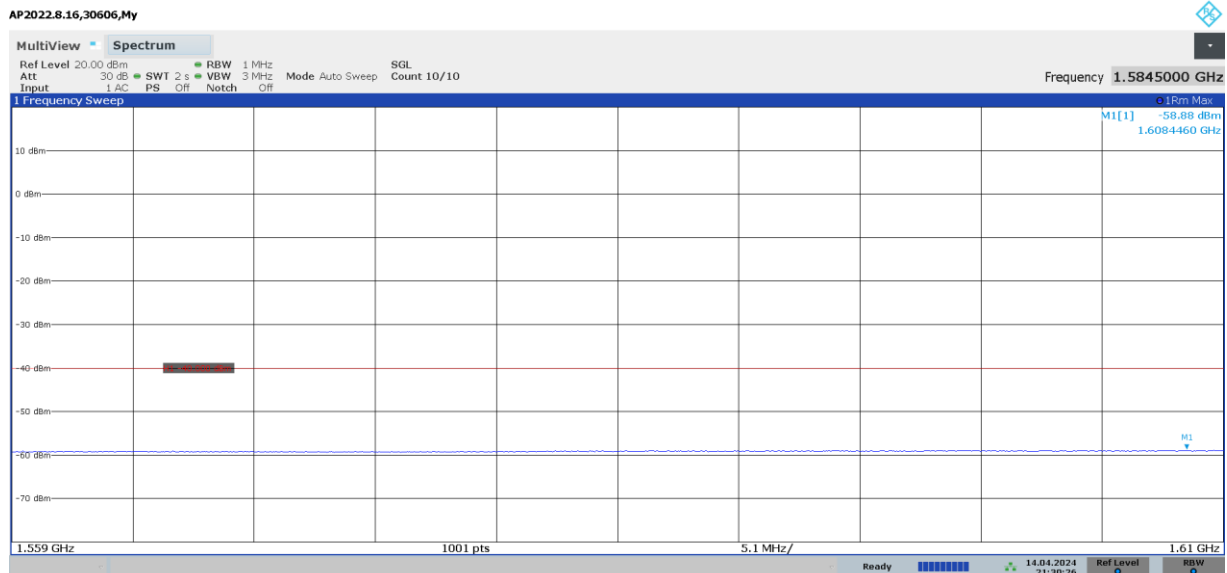
### 10.2.2. Band 255 ANT 5



### Band 23 SCS 15kHz – QPSK

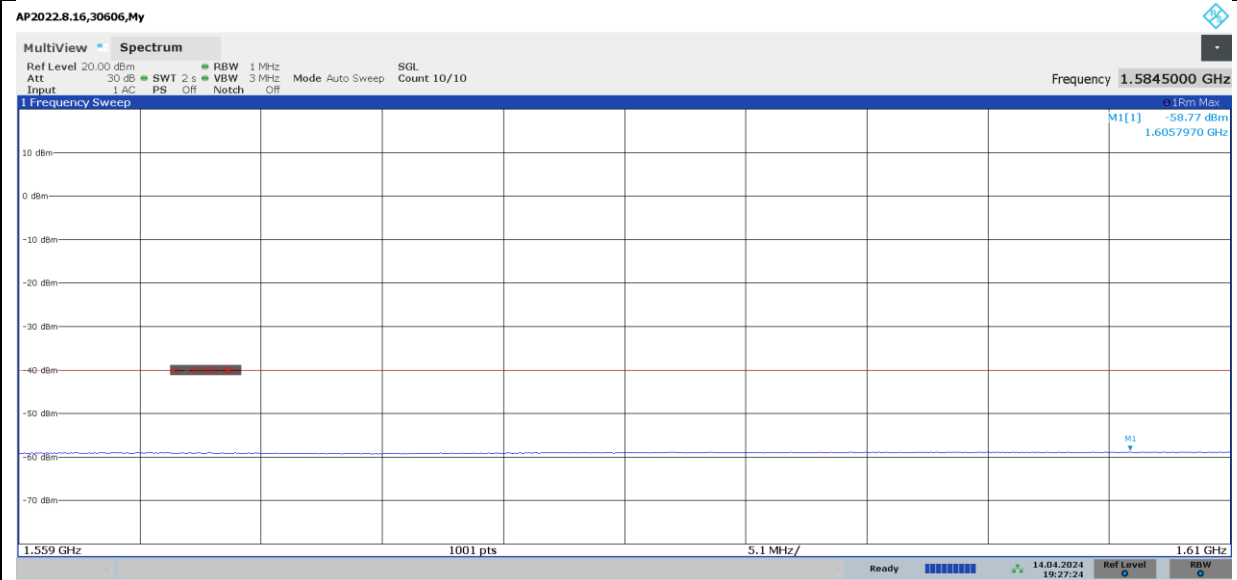


Middle Channel 1SC0 - Vertical



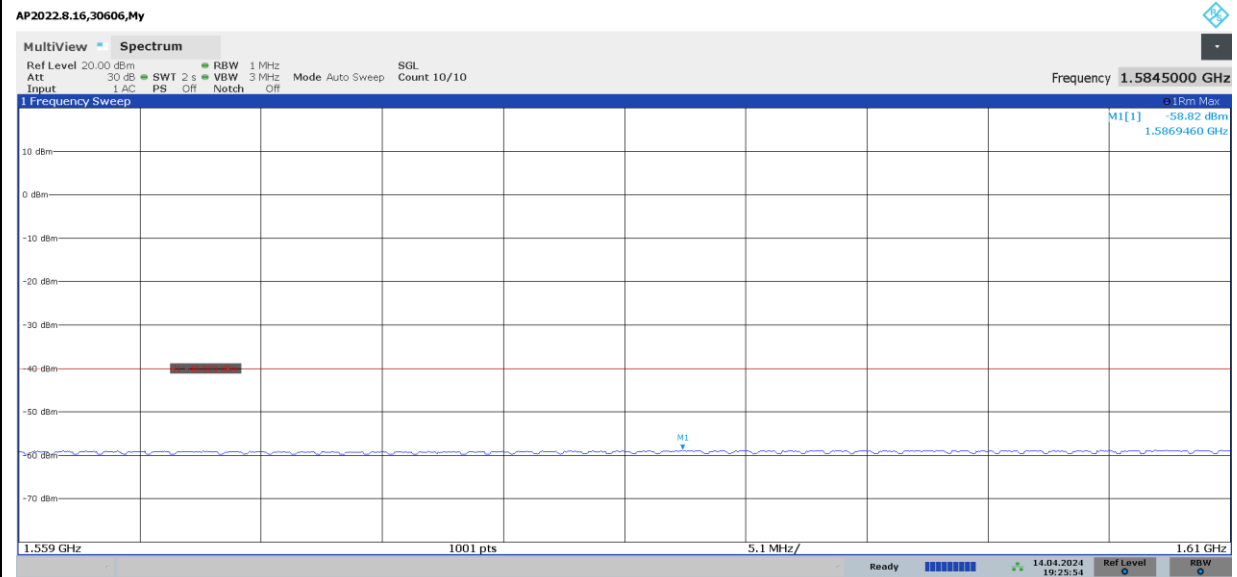
Middle Channel 1SC0 - Horizontal

### Band 23 SCS 3.75kHz – BPSK



19:27:25 14.04.2024

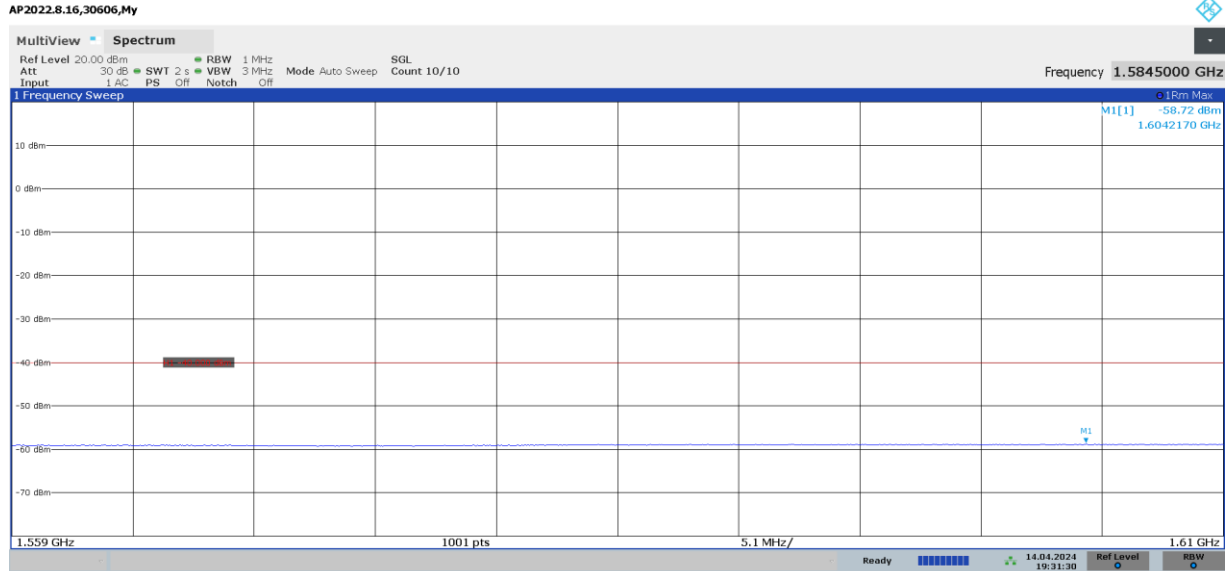
Middle Channel 1SC0 - Vertical



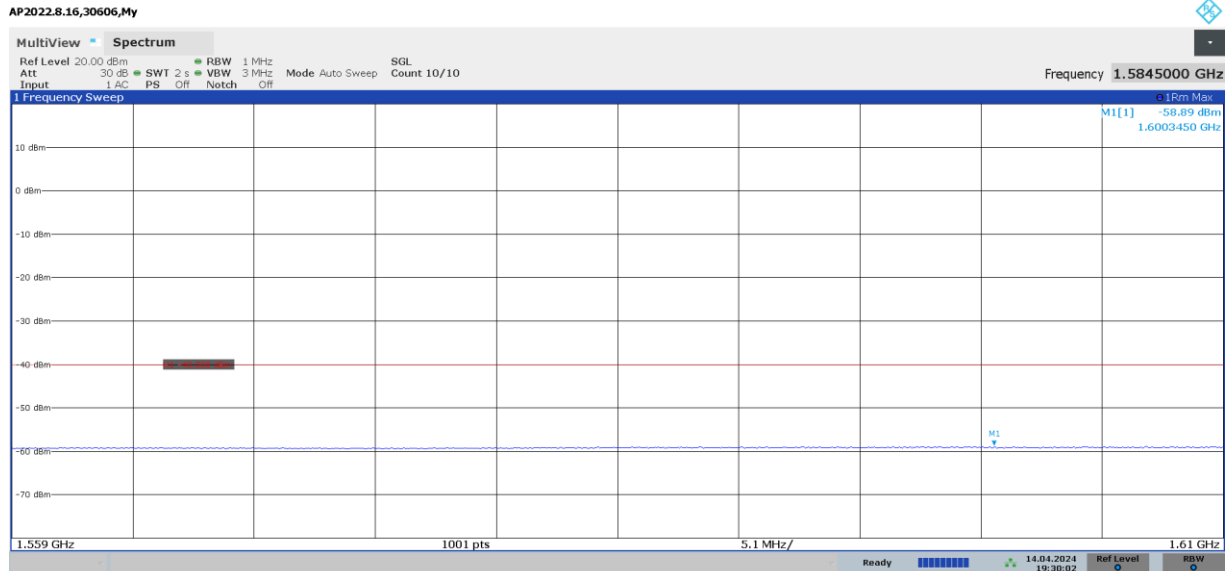
19:25:54 14.04.2024

Middle Channel 1SC0 - Horizontal

### Band 23 SCS 15kHz – BPSK



Middle Channel 1SC0 - Vertical



Middle Channel 1SC0 - Horizontal



### **10.3. CARRIER-OFF STATE EMISSIONS (1559MHz – 1610MHz)**

#### **LIMITS**

FCC §25.216

Limits on emissions from mobile earth stations for protection of aeronautical radionavigation-satellite service

(i) The e.i.r.p density of carrier-off state emissions from mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies between 1 and 3 GHz shall not exceed  $-80$  dBW/MHz in the 1559-1610 MHz band averaged over any two millisecond interval.

#### **TEST PROCEDURE**

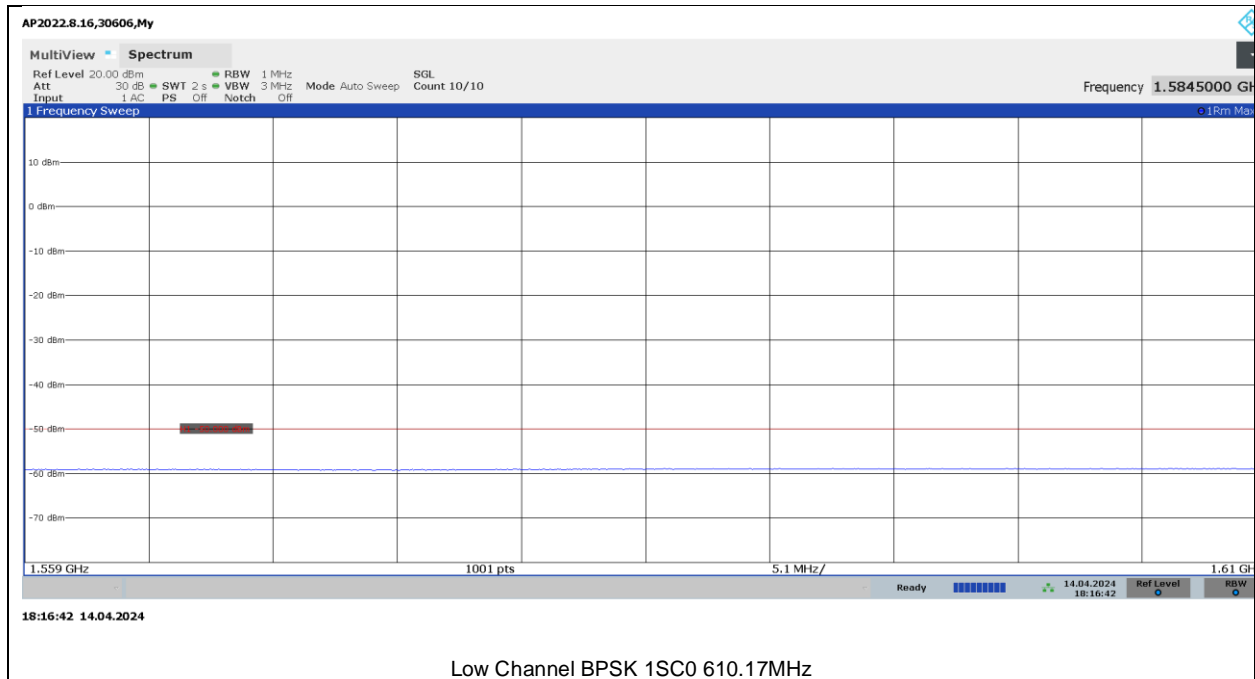
KDB 971168 D01 v03r01/D02 v02r02

Set RBW = 1MHz, VB = 3MHz, Detector = RMS, Sweep Time = Number of Points x 2ms, and sweep multiple times with Max Hold enabled.

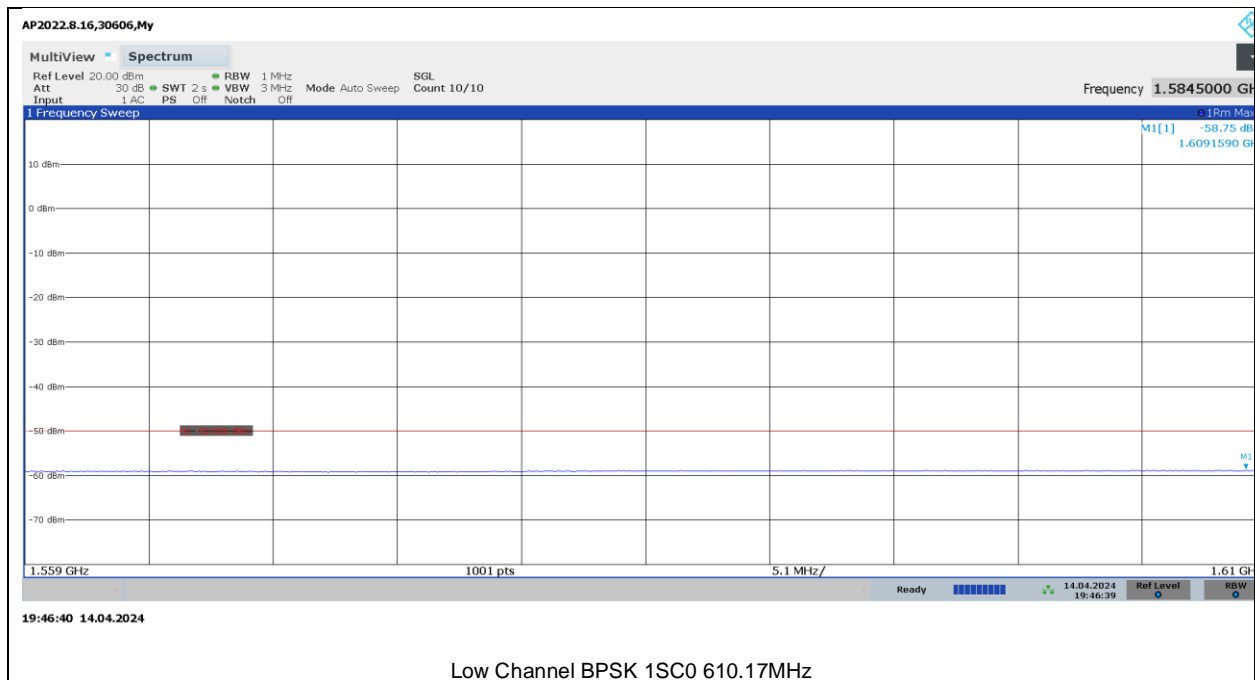
#### **RESULTS**

No emissions were found on both horizontal and vertical polarization for ANT 1 and ANT 5.

### 10.3.1. Band 23 ANT 1



### 10.3.2. Band 255 ANT 5 Missing data



## 10.4. FREQUENCY STABILITY

### LIMITS

FCC §25.202

(d) Frequency tolerance, Earth stations. The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

### TEST PROCEDURE

Use spectrum with Frequency Error measurement capability.

- Temp. = -30°C to +50°C
- Voltage = (85% - 115%)

Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.  
End Voltage, 3.01VDC.

#### **Frequency Stability vs Temperature:**

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50°C is reached.

#### **Frequency Stability vs Voltage:**

The peak frequency error is recorded (worst-case).

### RESULTS

**10.4.1. Band 23 ANT 1**

<b>Test Engineer ID:</b>	32061WY	<b>Test Date:</b>	2024-04-04
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**Middle Channel / QPSK / SCS 15kHz**

Frequency Reference (MHz)		2010.00000		Frequency Reading (MHz)	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -10dB BW (MHz)	F high @ -10dB BW (MHz)			
Temperature	Voltage					
Normal (20 C)	Normal	2009.858551	2010.154289	2010.006420		
Extreme (50C)		2009.845677	2010.16099	2010.003334	-3086.6	-1.54
Extreme (40C)		2009.850394	2010.158874	2010.004634	-1786.1	-0.89
Extreme (30C)		2009.845573	2010.150386	2009.997980	-8440.3	-4.20
Extreme (10C)		2009.856519	2010.170124	2010.013322	6901.4	3.43
Extreme (0C)		2009.858935	2010.175094	2010.017015	10594.5	5.27
Extreme (-10C)		2009.861673	2010.165405	2010.013539	7119.1	3.54
Extreme (-20C)		2009.862656	2010.169755	2010.016206	9785.4	4.87
Extreme (-30C)		2009.851715	2010.161431	2010.006573	152.8	0.08
20C		15%	2009.857569	2010.154258	2010.005914	-506.5
	-15%	2009.870482	2010.160369	2010.015426	9005.5	4.48
	End Point	2009.852636	2010.161818	2010.007227	806.6	0.40

**10.4.2. Band 255 ANT 5**

<b>Test Engineer ID:</b>	32061WY	<b>Test Date:</b>	2024-04-05
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**Middle Channel / QPSK / SCS 15kHz**

Frequency Reference (MHz)		1643.29156		Frequency Reading (MHz)	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -10dB BW (MHz)	F high @ -10dB BW (MHz)			
Temperature	Voltage					
Normal (20 C)	Normal	1643.139316	1643.443809	1643.291562		
Extreme (50C)		1643.130296	1643.435662	1643.282979	-8583.5	-5.22
Extreme (40C)		1643.143474	1643.433333	1643.288402	-3160.5	-1.92
Extreme (30C)		1643.146972	1643.433319	1643.290145	-1417.1	-0.86
Extreme (10C)		1643.151131	1643.443709	1643.297420	5857.7	3.56
Extreme (0C)		1643.151178	1643.448577	1643.299877	8314.9	5.06
Extreme (-10C)		1643.150873	1643.447467	1643.299170	7607.7	4.63
Extreme (-20C)		1643.15053	1643.445258	1643.297894	6331.5	3.85
Extreme (-30C)		1643.135641	1643.437551	1643.286596	-4966.3	-3.02
20C		15%	1643.146001	1643.442658	1643.294329	2767.0
	-15%	1643.132942	1643.437972	1643.285457	-6105.4	-3.72
	End Point	1643.134973	1643.443716	1643.289344	-2218.1	-1.35

## 11. SETUP PHOTOS

Please refer to 15107843-EP1 for Setup Photo Report.

**END OF REPORT**