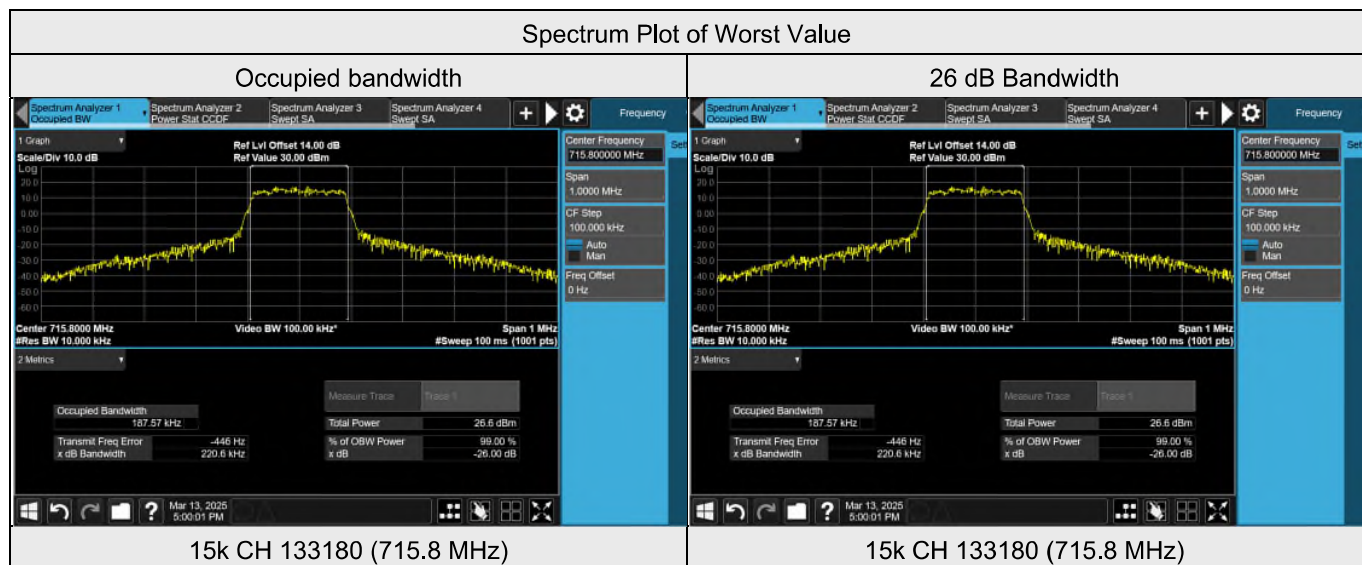


7.4.13 NB-IoT Band 85

NB-IoT Band 85				
Sub-carrier	Channel	Frequency (MHz)	Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
3.75k	134004	698.2	102.44	83.9
3.75k	134092	707	105.09	84.28
3.75k	134180	715.8	102.9	81.98
15k	134004	698.2	187.46	218.5
15k	134092	707	187.45	219.9
15k	134180	715.8	187.57	220.6



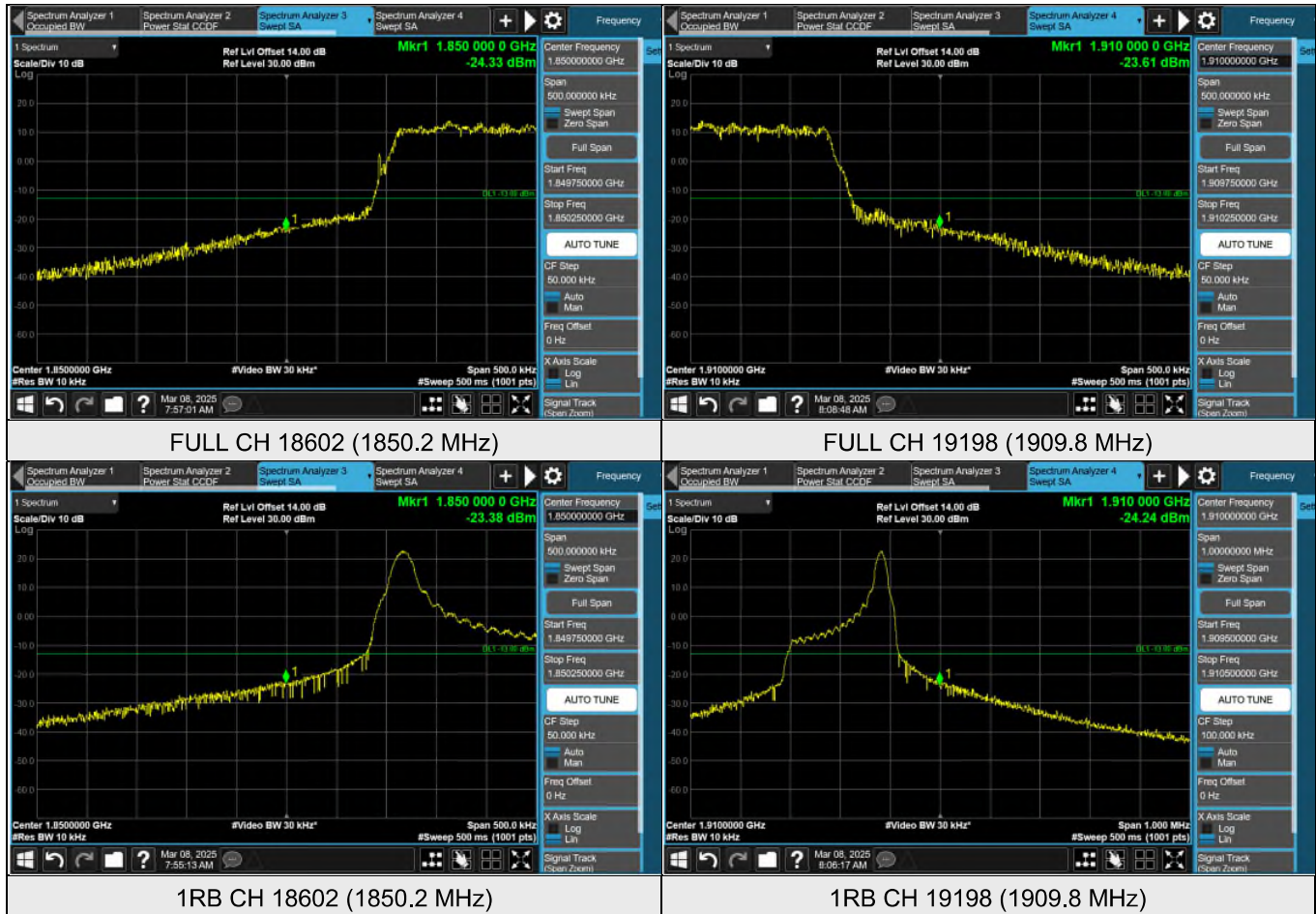
7.5 Conducted Spurious Emissions

Input Power:	3.8 Vdc	Environmental Conditions:	22°C, 75% RH	Tested By:	Match Tsui
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7.5.1 NB-IoT Band 2



Note: The signal at 9 kHz is IF signal from spectrum analyzer.



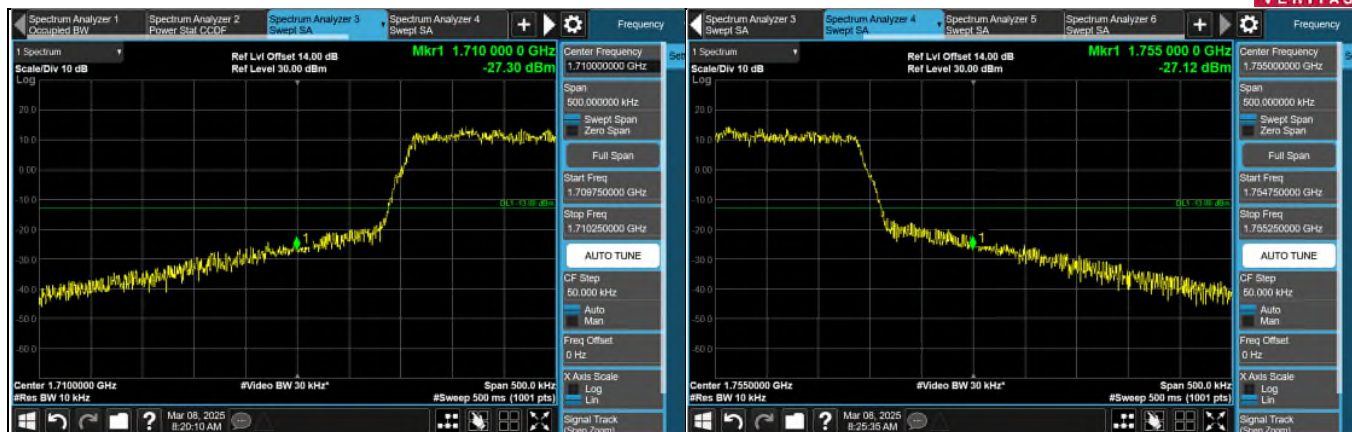
7.5.2 NB-IoT Band 4



Note: The signal at 9 kHz is IF signal from spectrum analyzer.

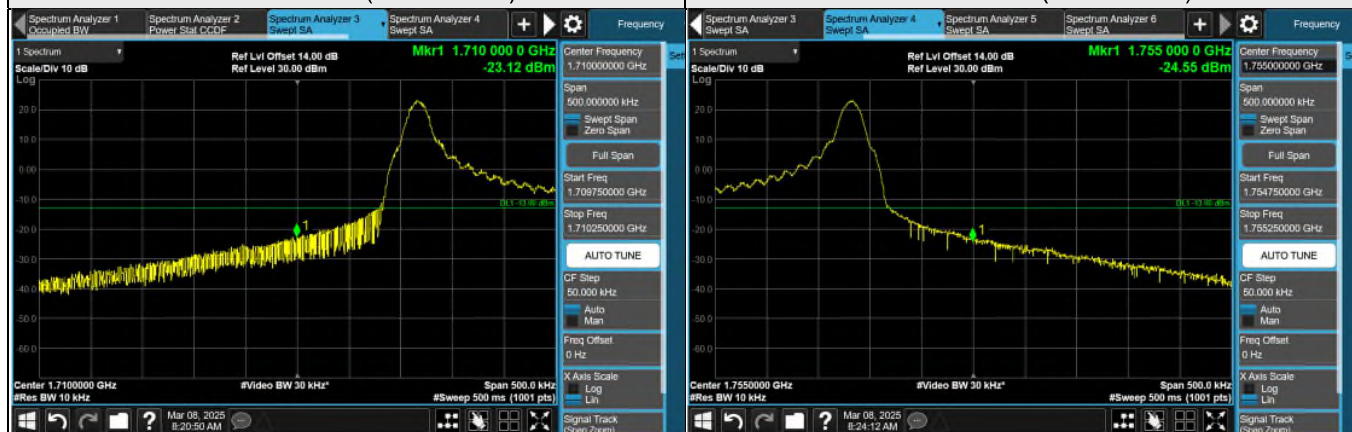


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FULL CH 19952 (1710.2 MHz)

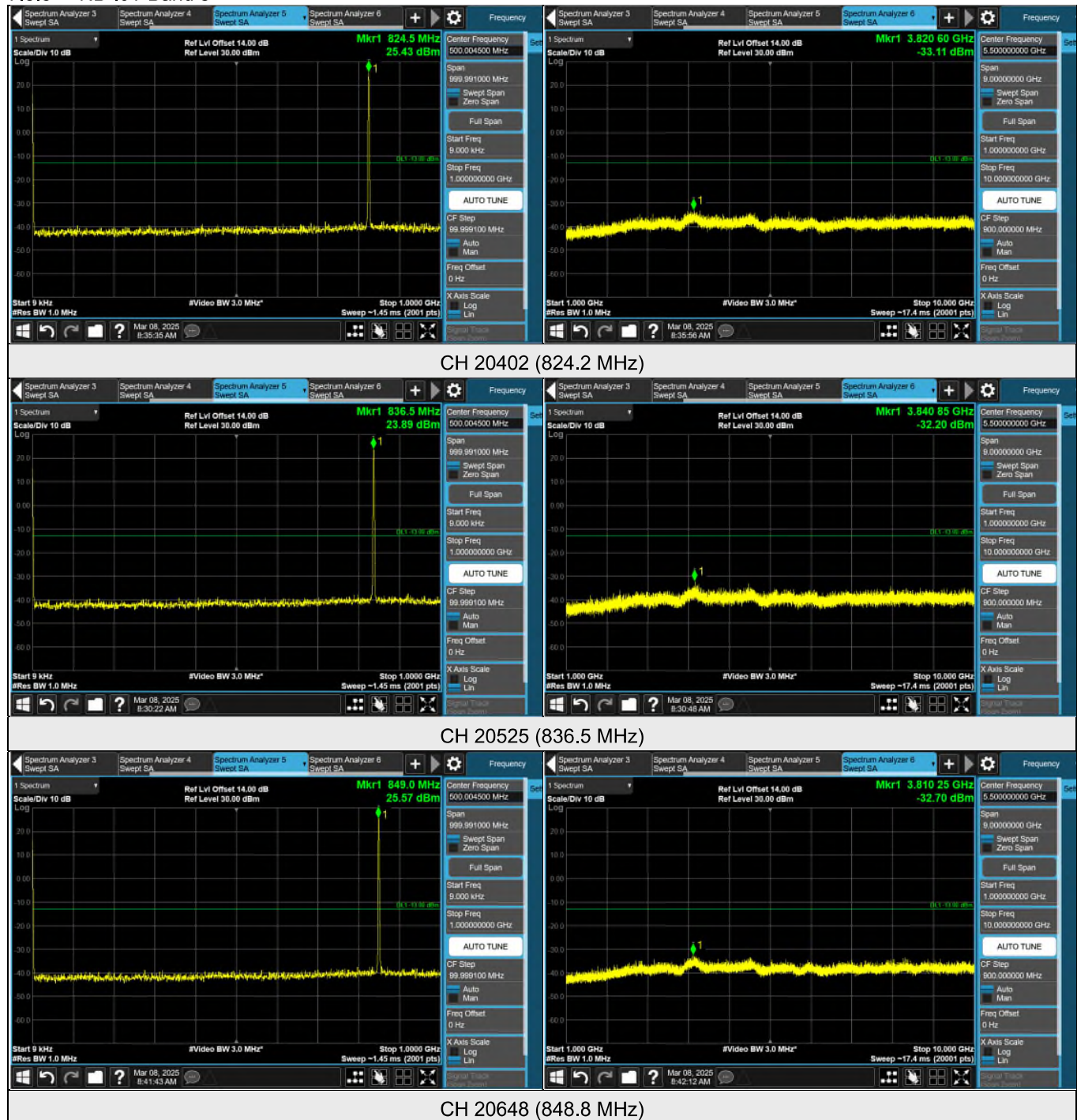
FULL CH 20398 (1754.8 MHz)



1RB CH 19952 (1710.2 MHz)

1RB CH 20398 (1754.8 MHz)

7.5.3 NB-IoT Band 5



Note: The signal at 9 kHz is IF signal from spectrum analyzer.

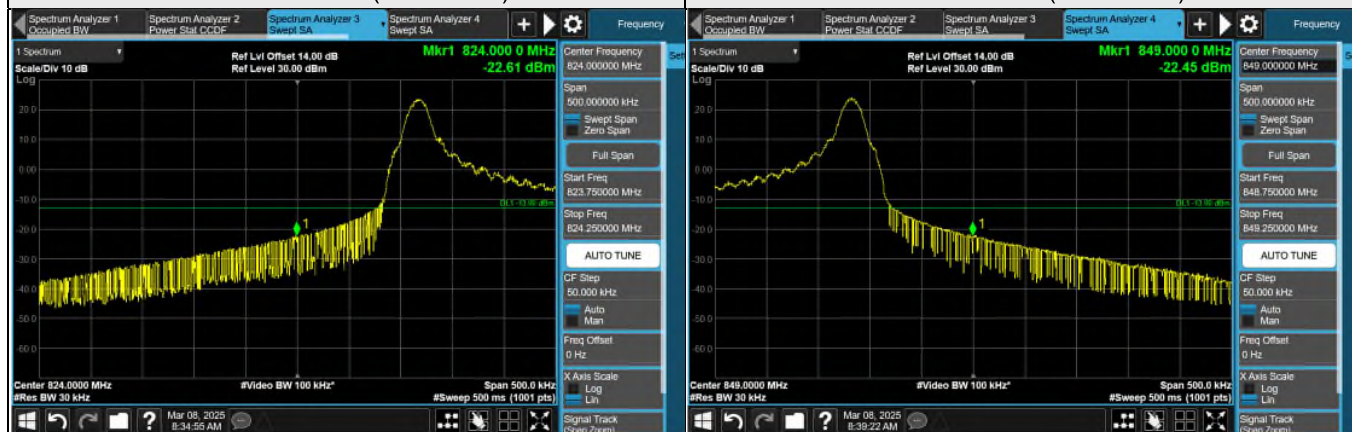


BUREAU
VERITAS



FULL CH 20402 (824.2 MHz)

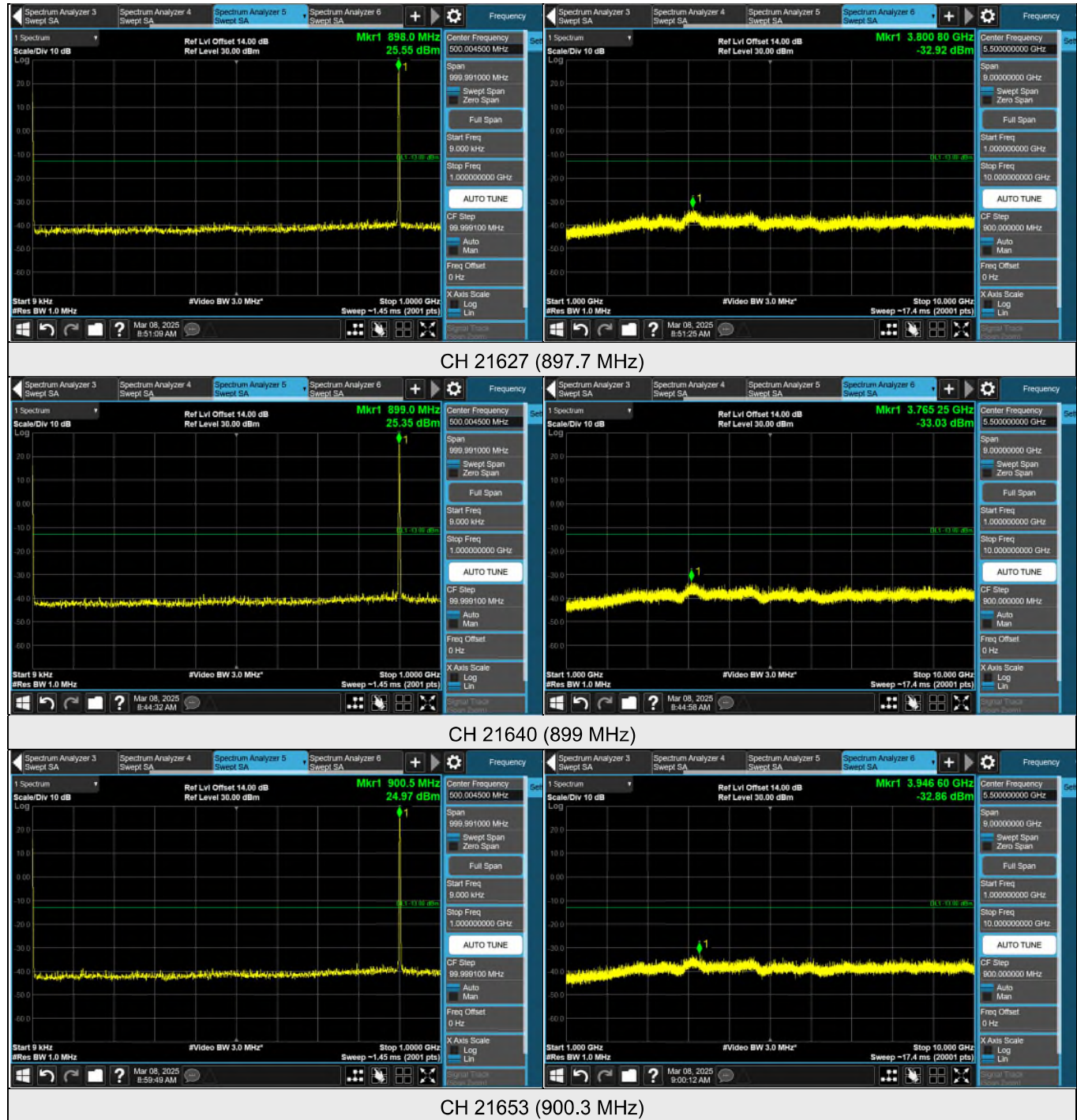
FULL CH 20648 (848.8 MHz)



1RB CH 20402 (824.2 MHz)

1RB CH 20648 (848.8 MHz)

7.5.4 NB-IoT Band 8



Note: The signal at 9 kHz is IF signal from spectrum analyzer.



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FULL CH 21627(897.7 MHz)

FULL CH 20653 (900.3 MHz)



1RB CH 21627(897.7 MHz)

1RB CH 20653 (900.3 MHz)

7.5.5 NB-IoT Band 12



Note: The signal at 9 kHz is IF signal from spectrum analyzer.

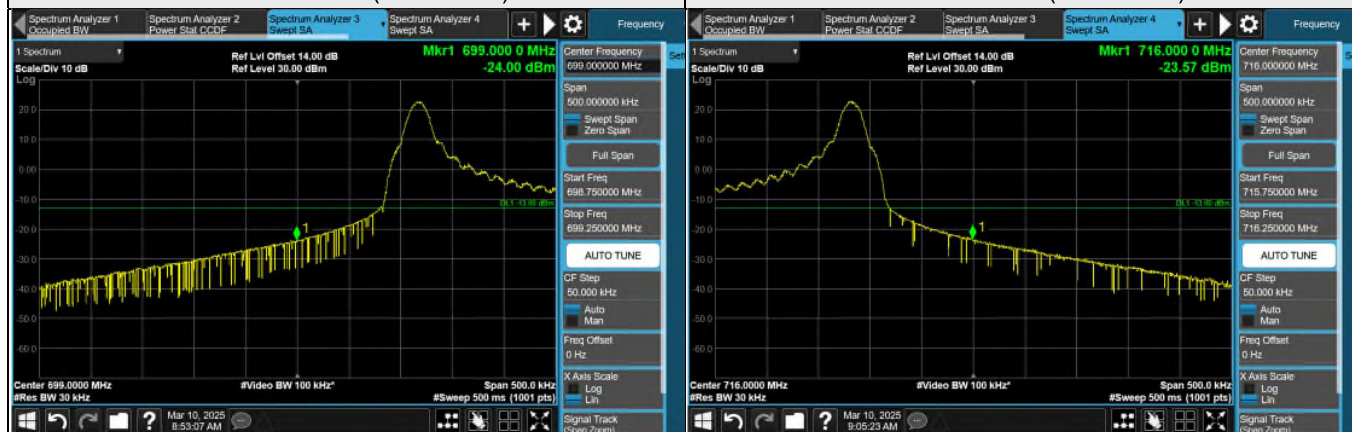


BUREAU
VERITAS



FULL CH 23012 (699.2 MHz)

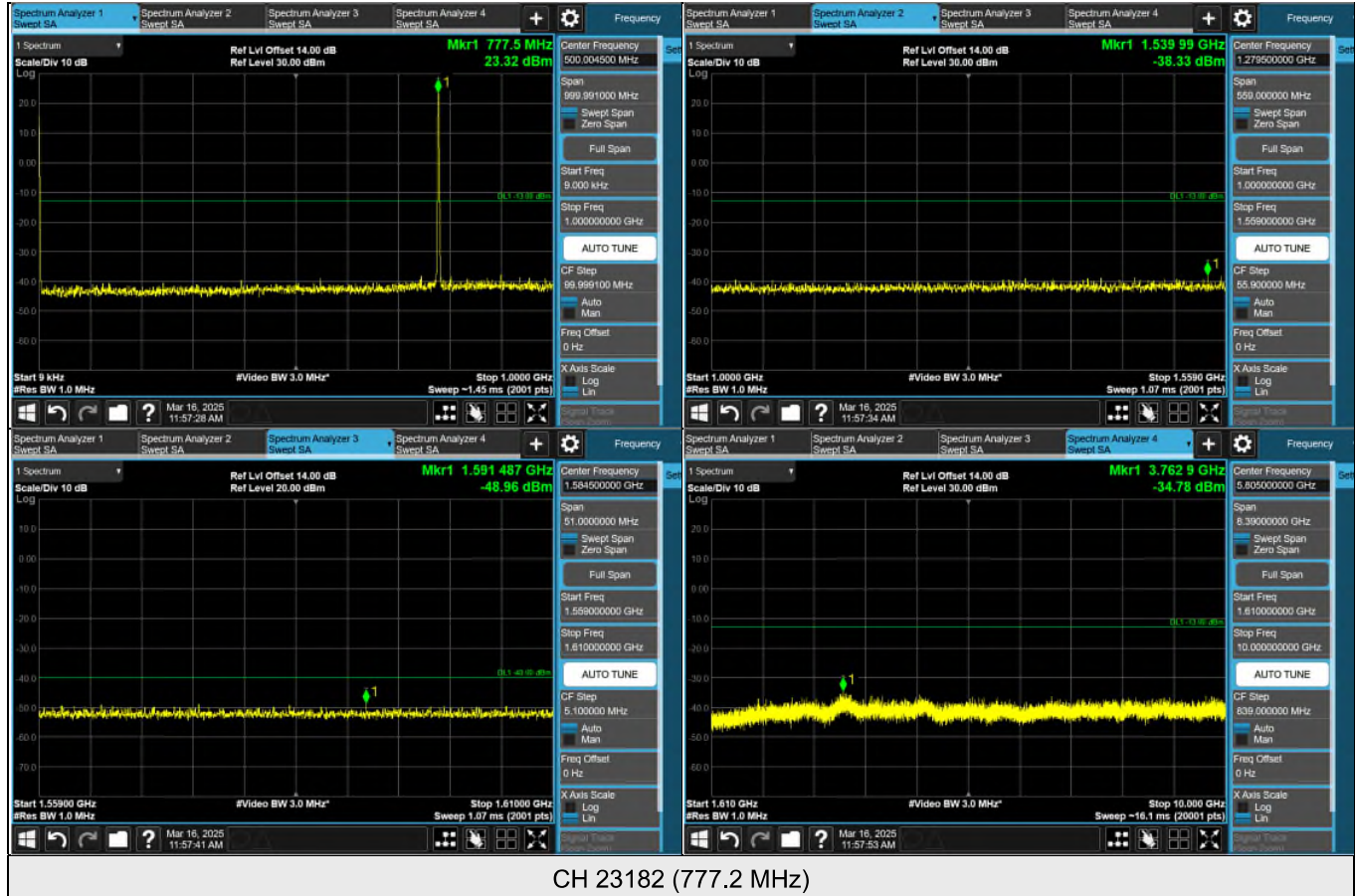
FULL CH 23178 (715.8 MHz)



1RB CH 23012 (699.2 MHz)

1RB CH 23178 (715.8 MHz)

7.5.6 NB-IoT Band 13





FULL CH 23182 (777.2 MHz)

FULL CH 23278 (786.8 MHz)



1RB CH 23182 (777.2 MHz)

1RB CH 23278 (786.8 MHz)

7.5.7 NB-IoT Band 14



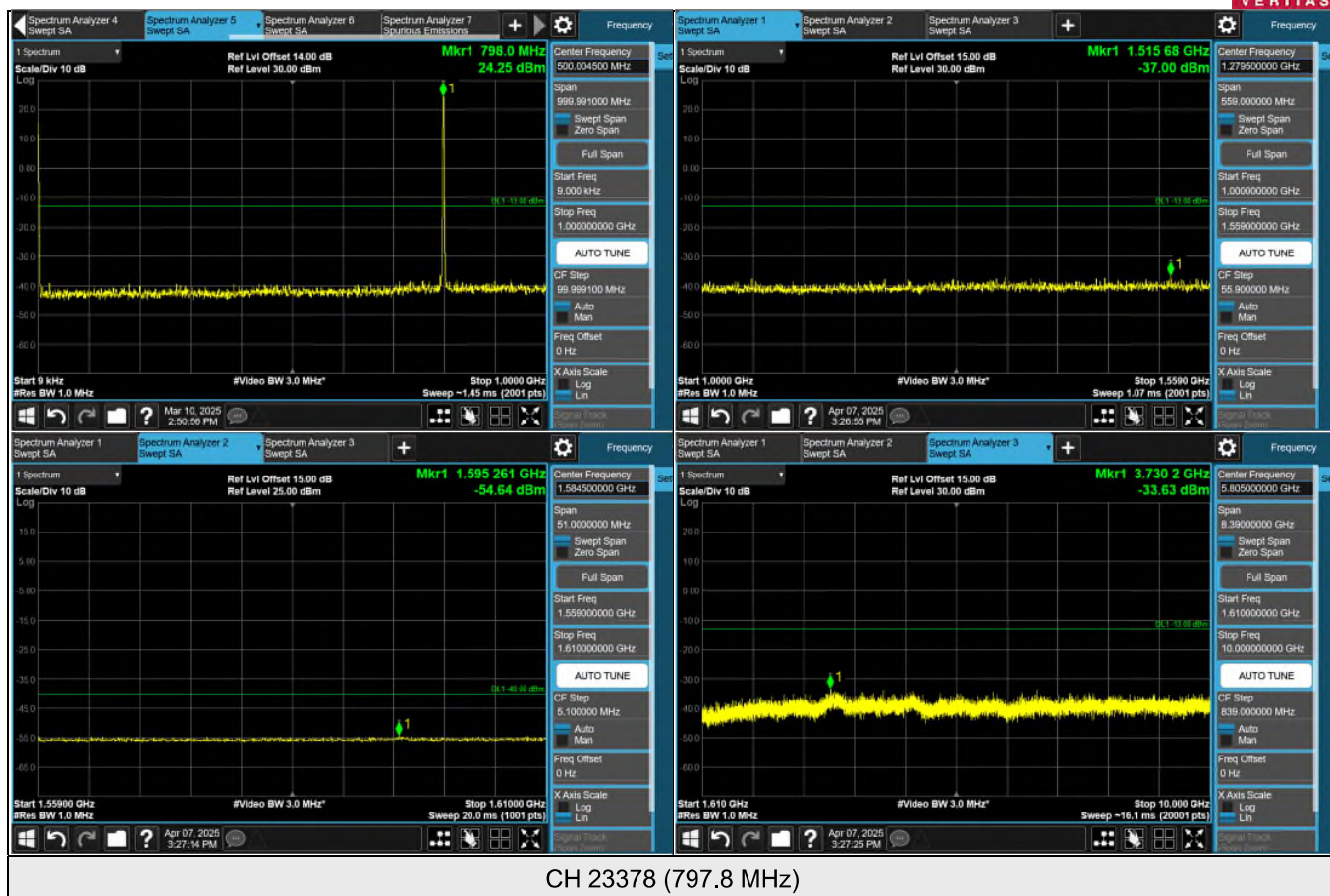
CH 23282 (788.2 MHz)



CH 23300 (793 MHz)



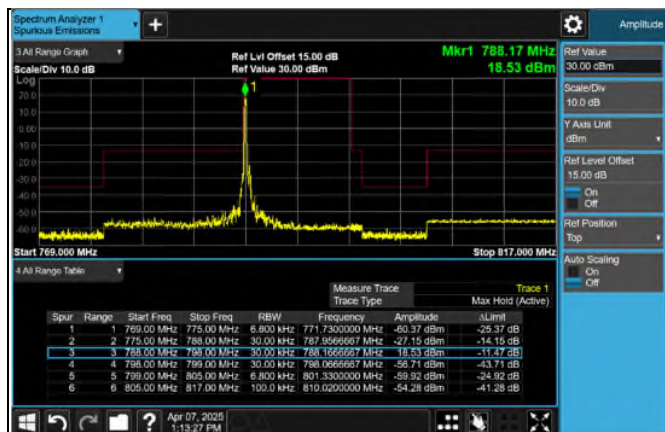
BUREAU
VERITAS



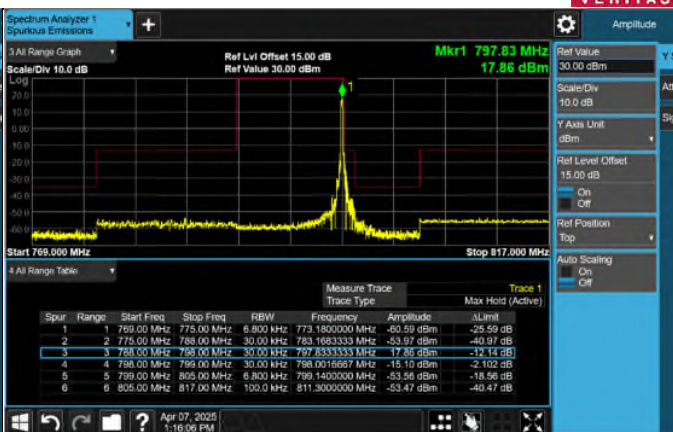
Note: The signal at 9 kHz is IF signal from spectrum analyzer.



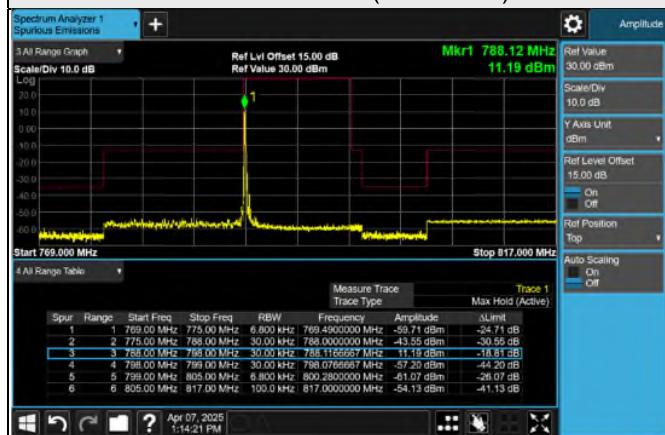
BUREAU
VERITAS



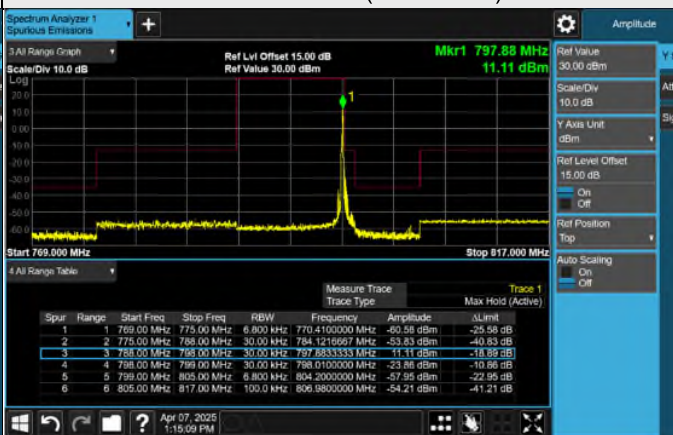
FULL CH 23282 (788.2 MHz)



FULL CH 23378 (797.8 MHz)



1RB CH 23282 (788.2 MHz)



1RB CH 23378 (797.8 MHz)

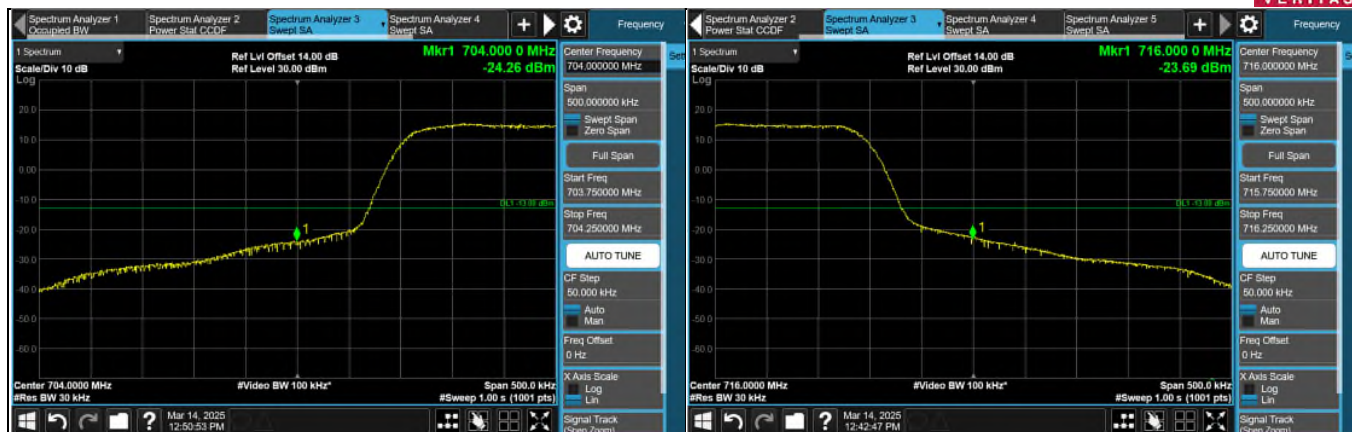
7.5.8 NB-IoT Band 17



Note: The signal at 9 kHz is IF signal from spectrum analyzer.

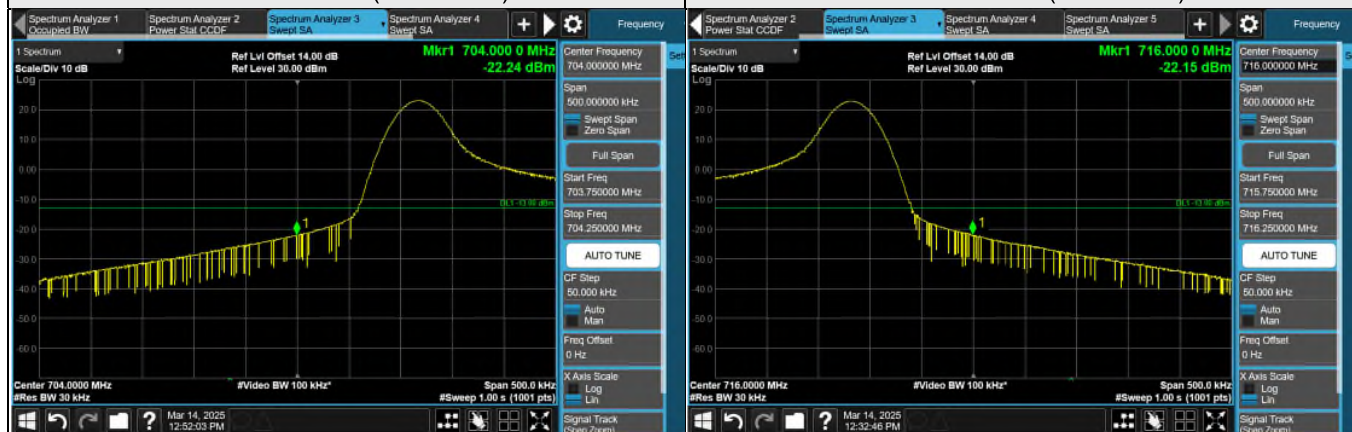


BUREAU
VERITAS



FULL CH 23732 (704.2 MHz)

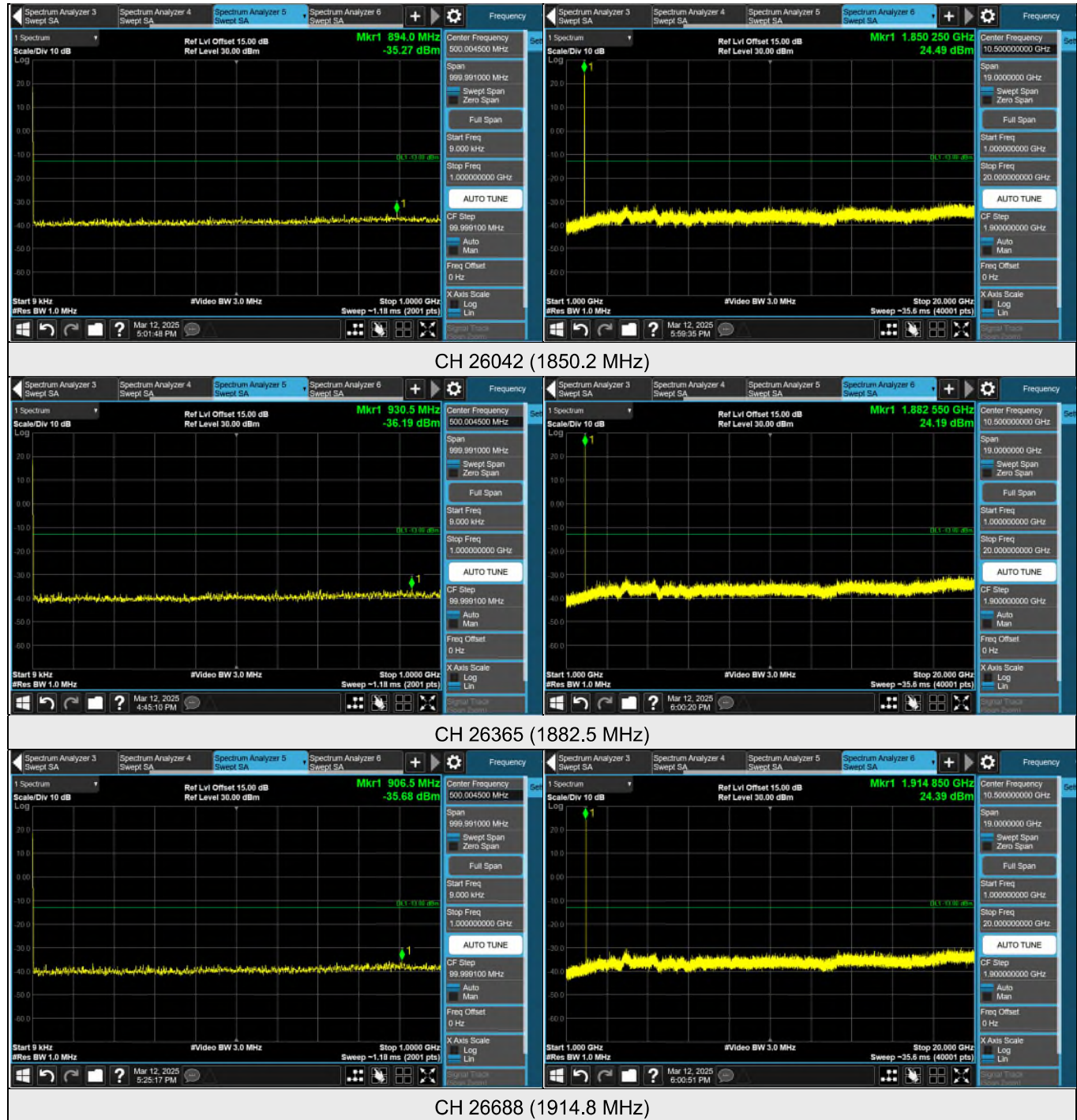
FULL CH 23848 (715.8 MHz)



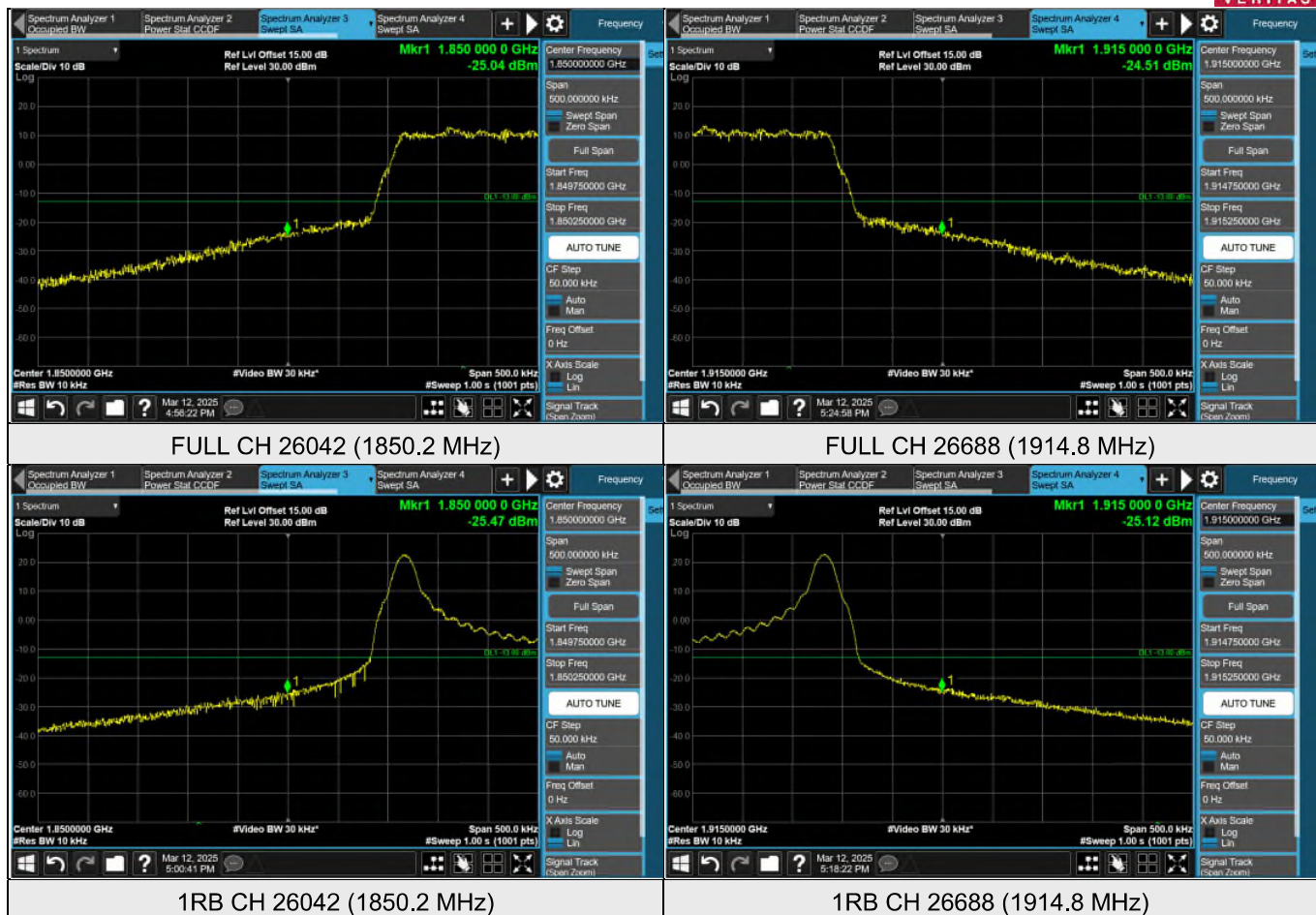
1RB CH 23732 (704.2 MHz)

1RB CH 23848 (715.8 MHz)

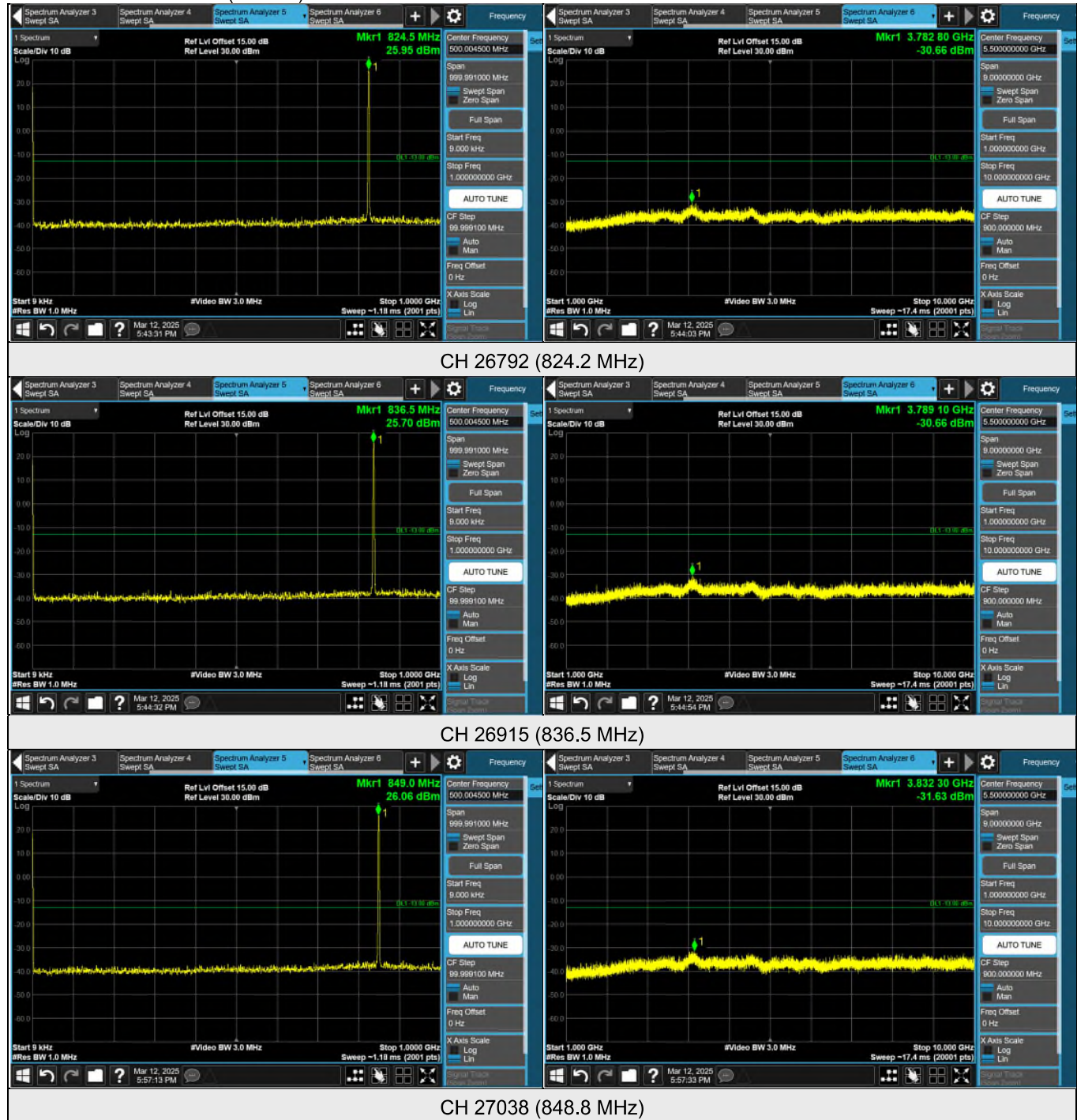
7.5.9 NB-IoT Band 25



Note: The signal at 9 kHz is IF signal from spectrum analyzer.



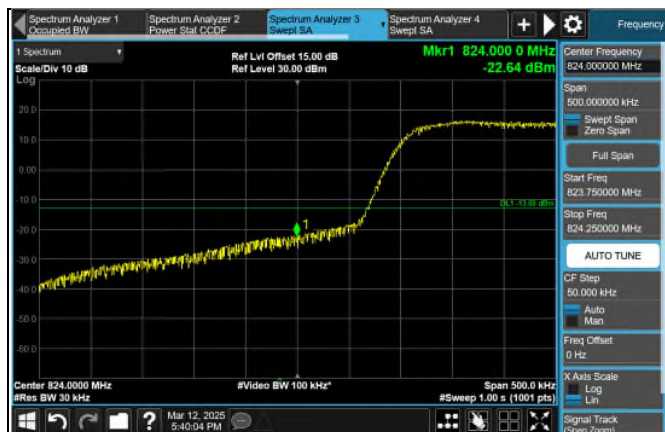
7.5.10 NB-IoT Band 26 (Part 22)



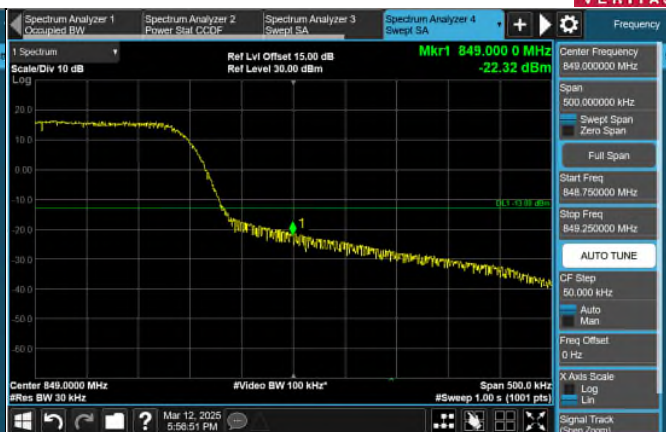
Note: The signal at 9 kHz is IF signal from spectrum analyzer.



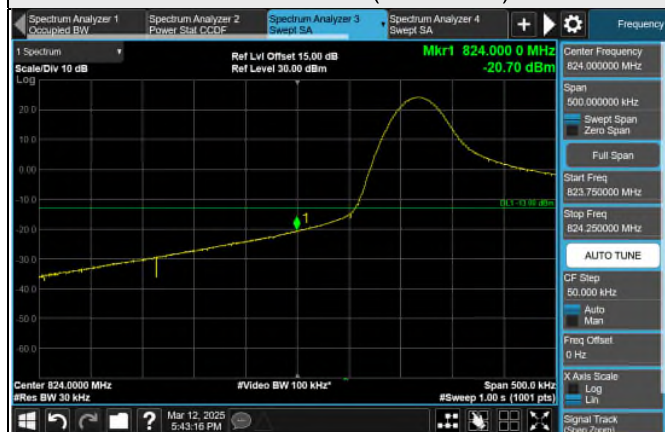
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FULL CH 26792 (824.2 MHz)



FULL CH 27038 (848.8 MHz)

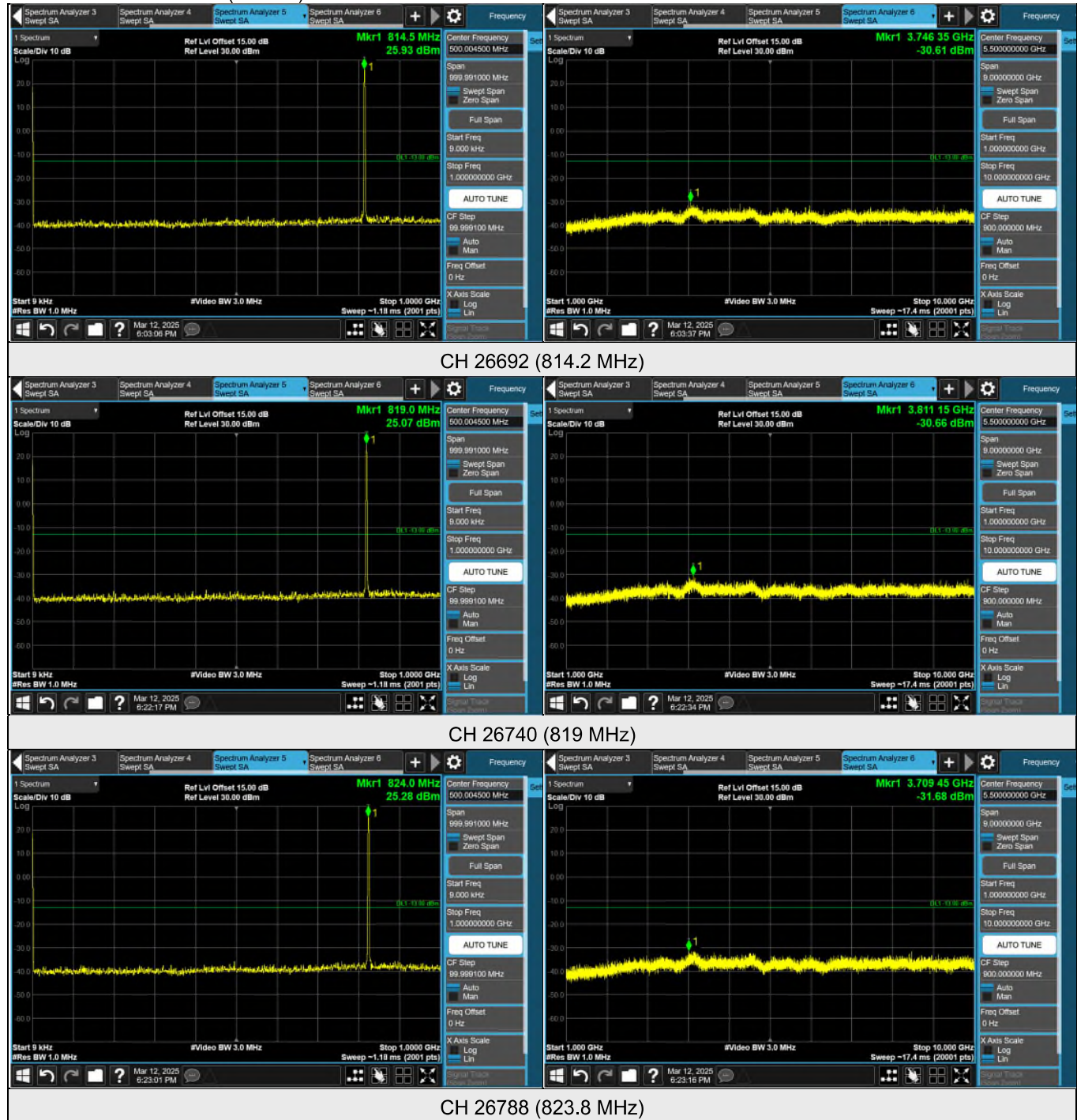


1RB CH 26792 (824.2 MHz)

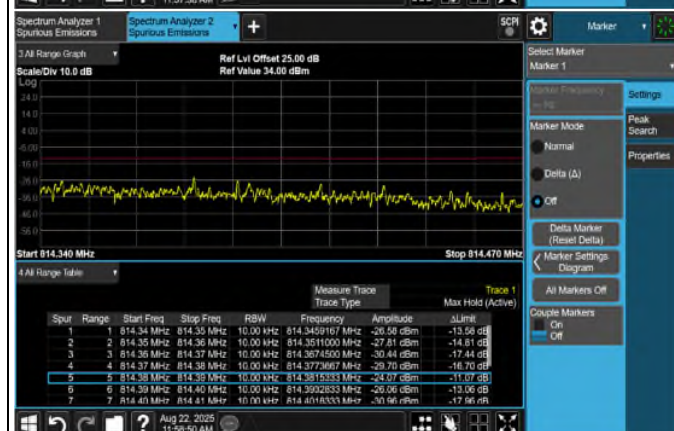
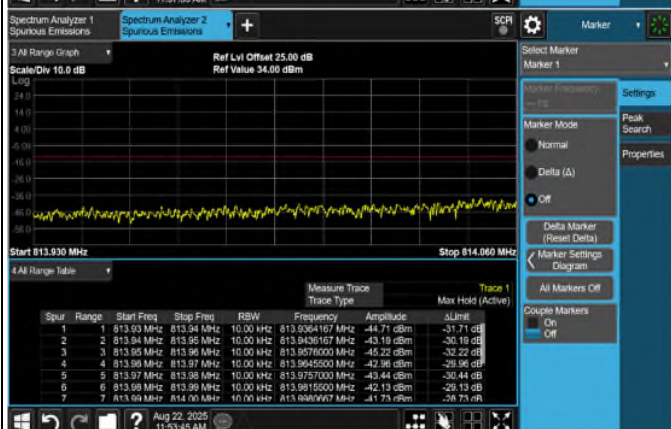
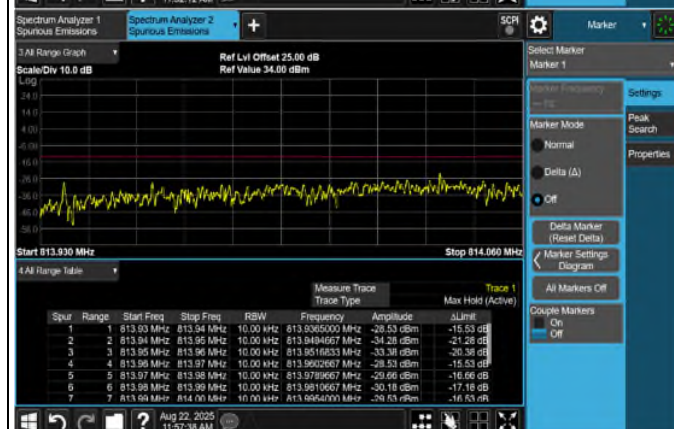


1RB CH 27038 (848.8 MHz)

7.5.11 NB-IoT Band 26 (Part 90)



Note: The signal at 9 kHz is IF signal from spectrum analyzer.

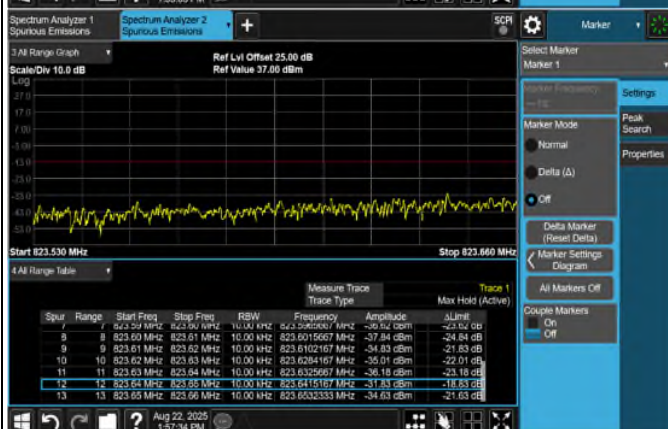
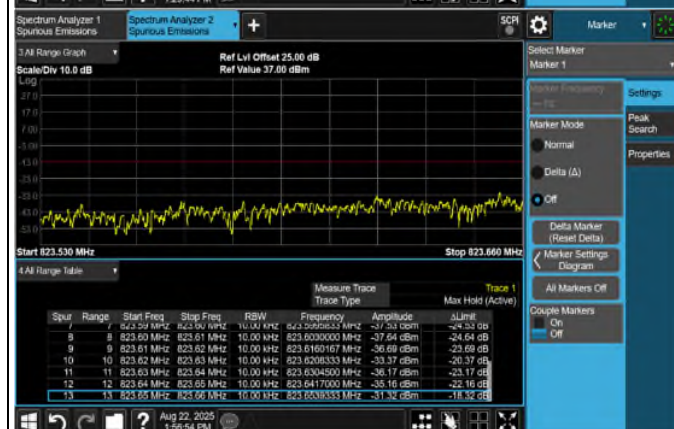


FULL CH 26692 (814.2 MHz)

1RB#0 CH 26692 (814.2 MHz)



1RB#MAX CH 26692 (814.2 MHz)



FULL RB CH 26788 (823.8 MHz)

1RB#0 CH 26788 (823.8 MHz)



1RB#MAX CH 26788 (823.3 MHz)

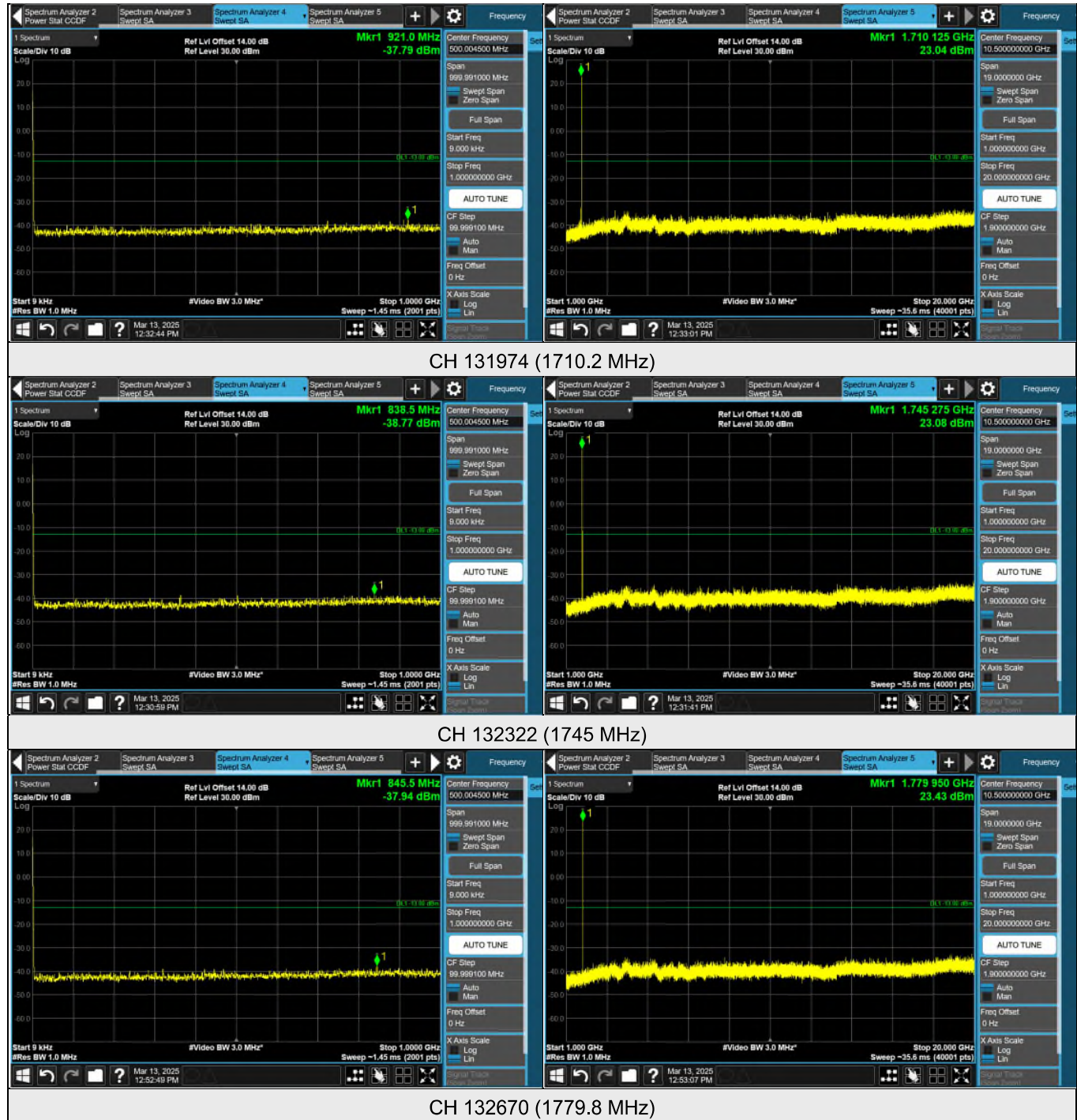
[RBW = 10 kHz / Reference RBW = 30 KHz]

Worst-case integrated BW power = [Max Measured Value (dBm) with RBW=10kHz] + 10log(100/10)

To compensate for this integration before comparison to the limit, 10 dB was added to Ref Lvl Offset.

i.e. 15.00 dB CF + 10 dB integration compensation factor = 25.00 dB Ref Lvl Offset

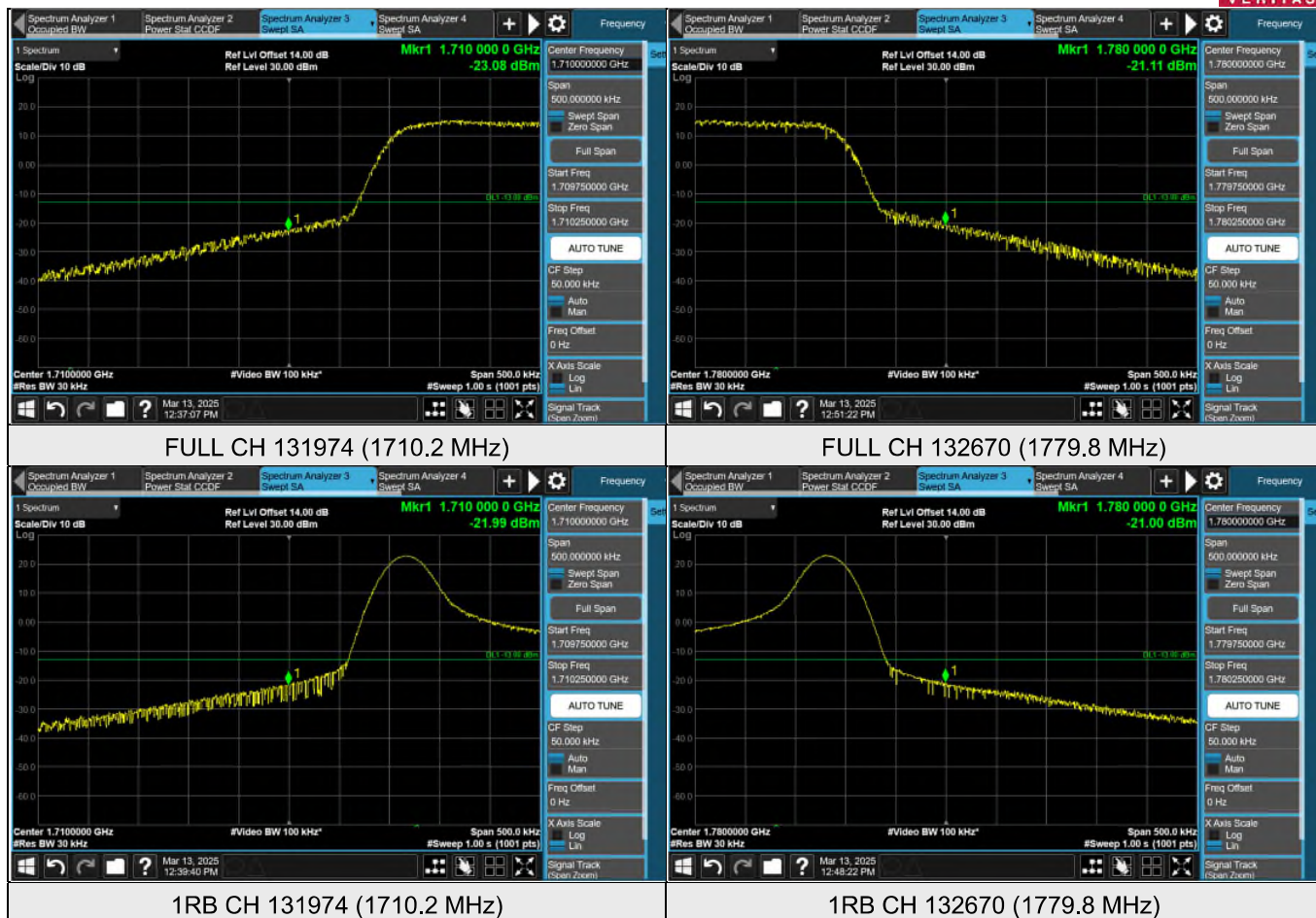
7.5.12 NB-IoT Band 66



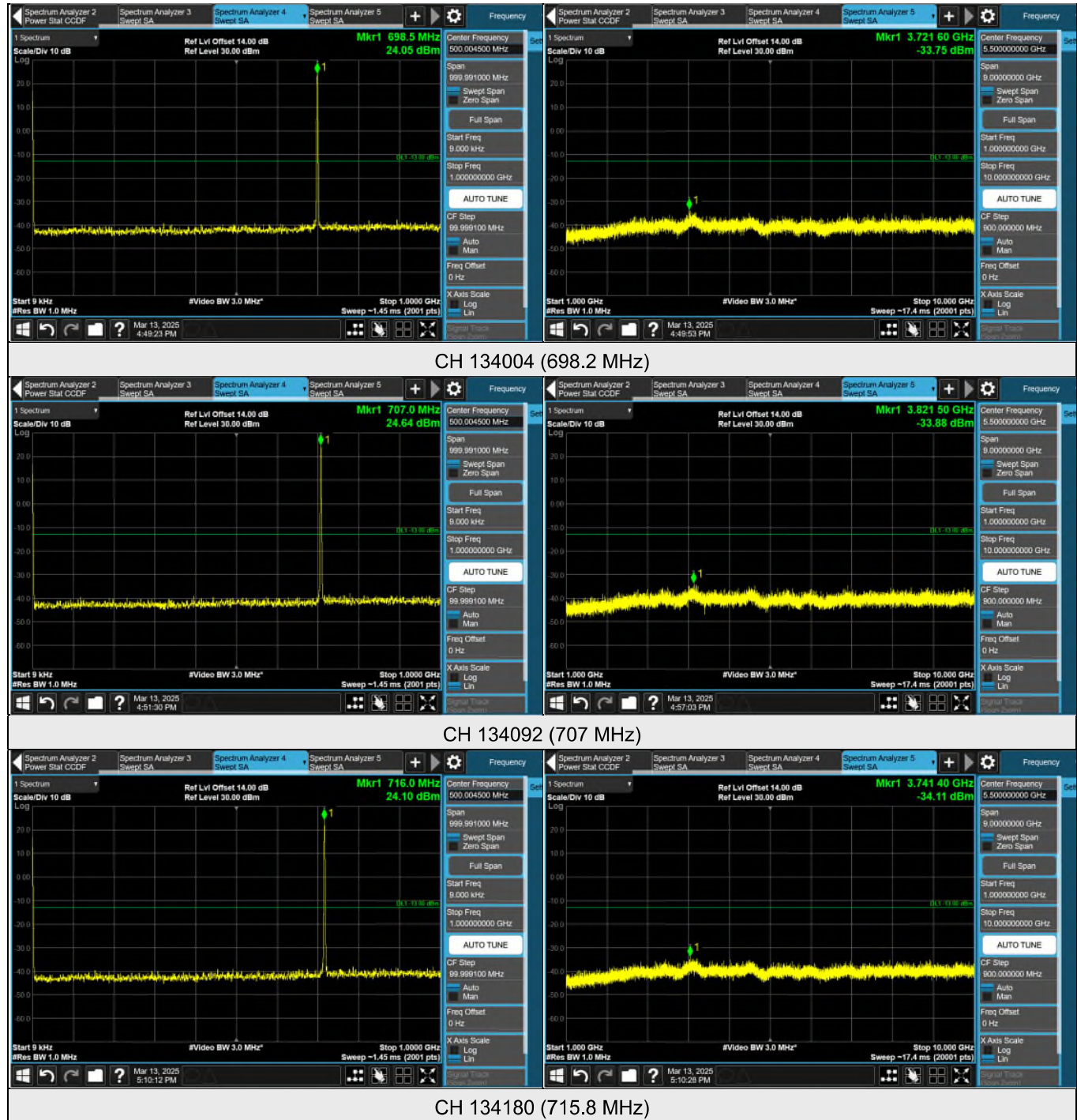
Note: The signal at 9 kHz is IF signal from spectrum analyzer.



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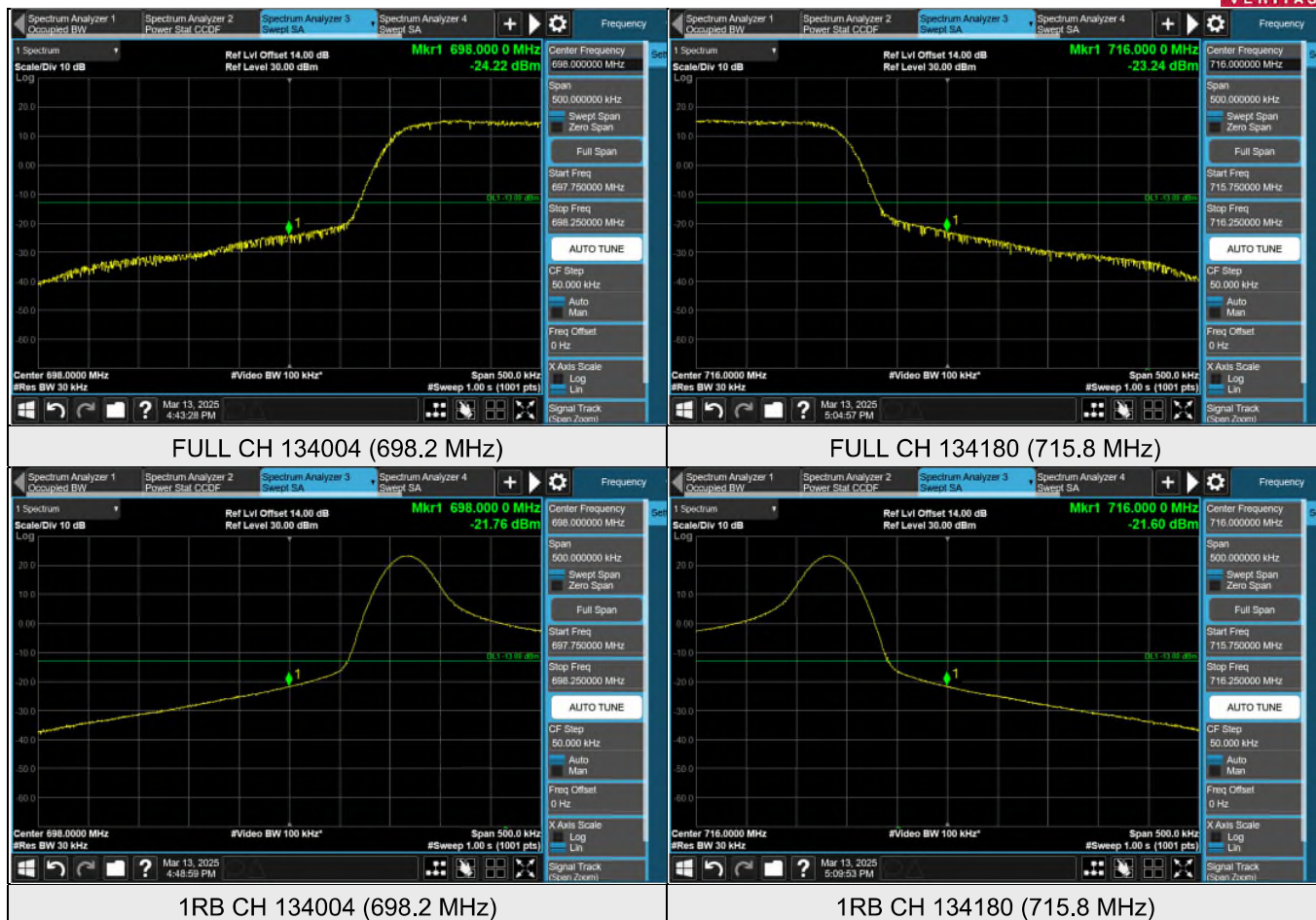
7.5.13 NB-IoT Band 85



Note: The signal at 9 kHz is IF signal from spectrum analyzer.



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7.6 Radiated Spurious Emissions below 1GHz

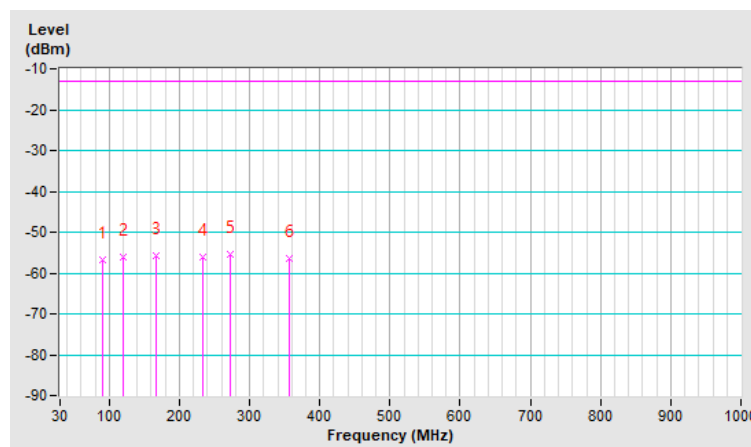
7.6.1 NB-IoT Band 2

RF Mode	NB-IoT Band 2	Channel	CH 18900 : 1880 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	91.11	-56.78	-13.00	-43.78	1.37 H	285	57.26	-114.04
2	119.24	-56.18	-13.00	-43.18	2.29 H	161	54.15	-110.33
3	167.74	-55.62	-13.00	-42.62	1.57 H	251	52.58	-108.20
4	232.73	-56.27	-13.00	-43.27	1.82 H	304	53.85	-110.12
5	273.47	-55.52	-13.00	-42.52	1.66 H	283	52.70	-108.22
6	355.92	-56.37	-13.00	-43.37	1.89 H	25	49.64	-106.01

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

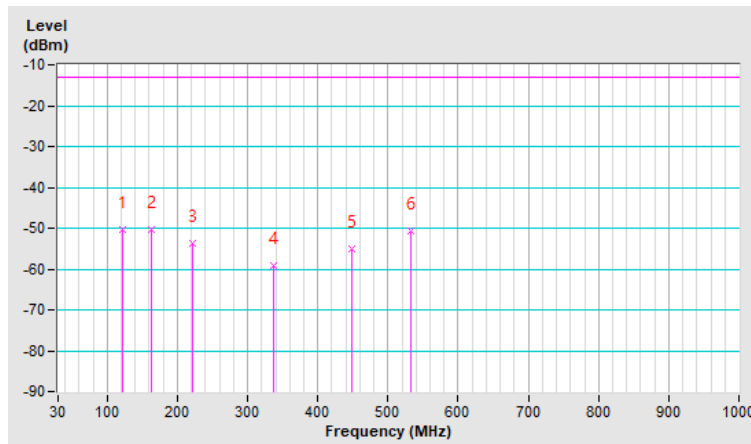


RF Mode	NB-IoT Band 2	Channel	CH 18900 : 1880 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	121.18	-50.22	-13.00	-37.22	2.59 V	151	59.96	-110.18
2	162.89	-50.20	-13.00	-37.20	2.48 V	135	57.72	-107.92
3	221.09	-53.74	-13.00	-40.74	1.83 V	251	57.67	-111.41
4	336.52	-59.16	-13.00	-46.16	1.20 V	170	47.12	-106.28
5	448.07	-55.09	-13.00	-42.09	1.59 V	253	48.12	-103.21
6	533.43	-50.76	-13.00	-37.76	1.84 V	201	51.16	-101.92

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



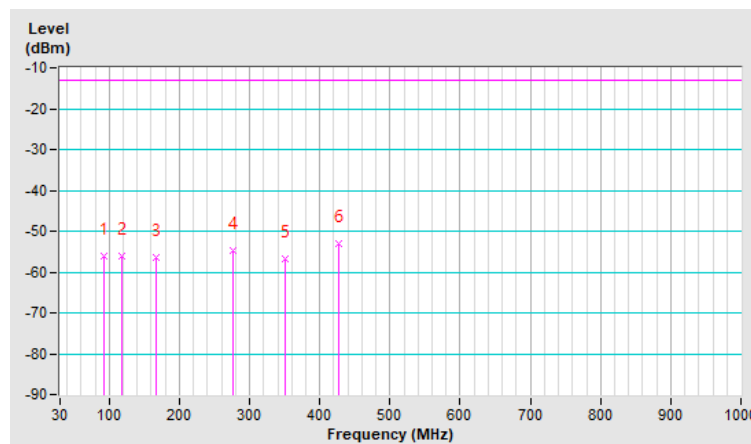
7.6.2 NB-IoT Band 4

RF Mode	NB-IoT Band 4	Channel	CH 20175 : 1732.5 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	92.08	-56.17	-13.00	-43.17	2.20 H	193	57.68	-113.85
2	117.30	-56.04	-13.00	-43.04	1.75 H	112	54.42	-110.46
3	167.74	-56.46	-13.00	-43.46	1.49 H	203	51.74	-108.20
4	276.38	-54.81	-13.00	-41.81	1.80 H	27	53.24	-108.05
5	351.07	-56.92	-13.00	-43.92	2.36 H	184	49.26	-106.18
6	426.73	-53.19	-13.00	-40.19	1.15 H	72	50.80	-103.99

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

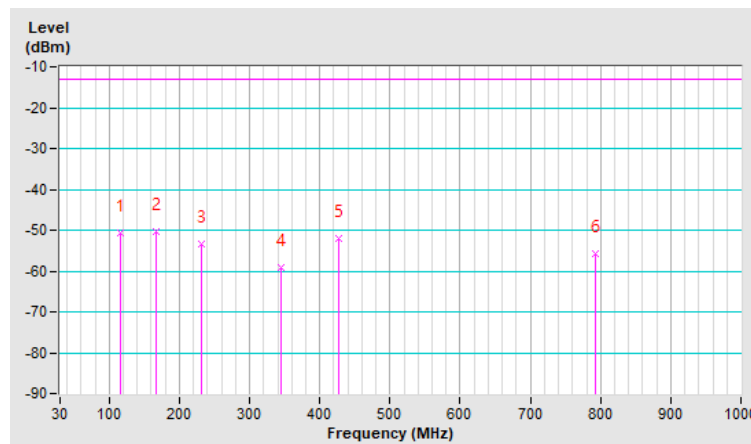


RF Mode	NB-IoT Band 4	Channel	CH 20175 : 1732.5 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	115.36	-50.77	-13.00	-37.77	2.43 V	101	59.90	-110.67
2	167.74	-50.37	-13.00	-37.37	1.96 V	241	57.83	-108.20
3	231.76	-53.55	-13.00	-40.55	2.28 V	104	56.68	-110.23
4	344.28	-59.00	-13.00	-46.00	1.91 V	204	47.27	-106.27
5	426.73	-52.12	-13.00	-39.12	2.55 V	276	51.87	-103.99
6	793.39	-55.64	-13.00	-42.64	1.88 V	153	41.06	-96.70

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



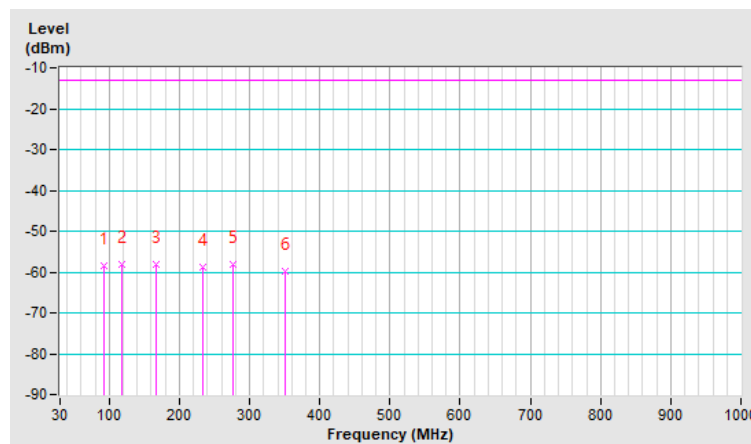
7.6.3 NB-IoT Band 5

RF Mode	NB-IoT Band 5	Channel	CH 20525 : 836.5 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	92.08	-58.58	-13.00	-45.58	1.82 H	226	57.42	-116.00
2	117.30	-58.28	-13.00	-45.28	1.74 H	163	54.33	-112.61
3	167.74	-58.26	-13.00	-45.26	2.85 H	214	52.09	-110.35
4	233.70	-58.85	-13.00	-45.85	1.03 H	283	53.31	-112.16
5	277.35	-58.12	-13.00	-45.12	1.85 H	12	52.05	-110.17
6	351.07	-59.85	-13.00	-46.85	2.71 H	183	48.48	-108.33

Remarks:

- ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + $20\log(D) - 104.8 - 2.15$
- Margin value = ERP – Limit value
- The other ERP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
- The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

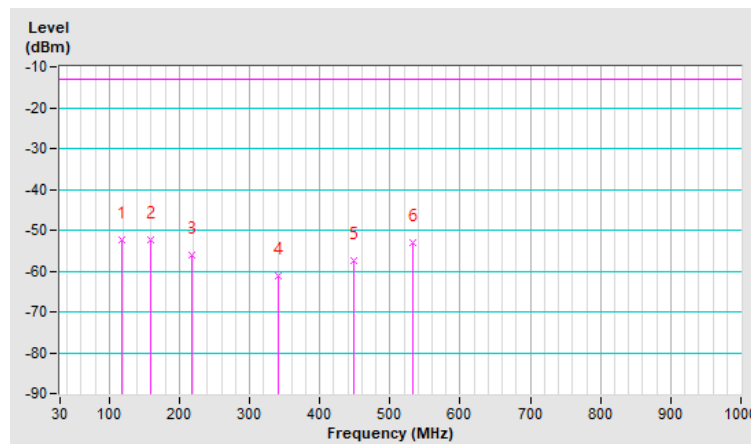


RF Mode	NB-IoT Band 5	Channel	CH 20525 : 836.5 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	117.30	-52.52	-13.00	-39.52	1.83 V	332	60.09	-112.61
2	159.98	-52.50	-13.00	-39.50	1.94 V	150	57.47	-109.97
3	218.18	-55.98	-13.00	-42.98	1.22 V	258	57.66	-113.64
4	341.37	-61.18	-13.00	-48.18	1.64 V	283	47.26	-108.44
5	448.07	-57.47	-13.00	-44.47	2.22 V	207	47.89	-105.36
6	533.43	-53.14	-13.00	-40.14	1.94 V	287	50.93	-104.07

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.6.4 NB-IoT Band 8

RF Mode	NB-IoT Band 8	Channel	CH 21640 : 899 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	92.08	-58.75	-13.00	-45.75	2.33 H	108	57.25	-116.00
2	116.33	-58.39	-13.00	-45.39	1.40 H	58	54.35	-112.74
3	159.98	-58.66	-13.00	-45.66	2.36 H	209	51.31	-109.97
4	273.47	-57.06	-13.00	-44.06	1.71 H	154	53.31	-110.37
5	355.92	-60.47	-13.00	-47.47	1.88 H	209	47.69	-108.16
6	427.70	-55.36	-13.00	-42.36	2.28 H	161	50.74	-106.10

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

