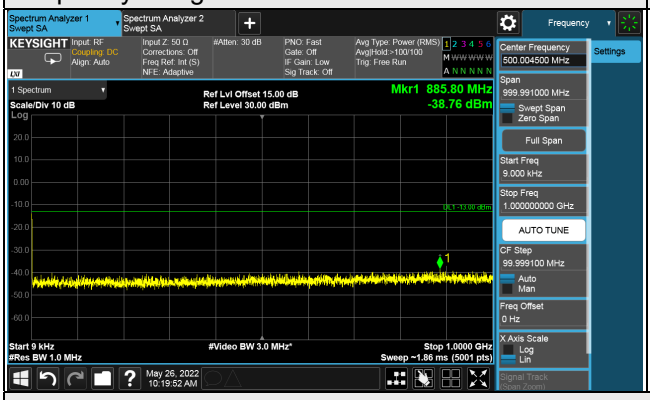
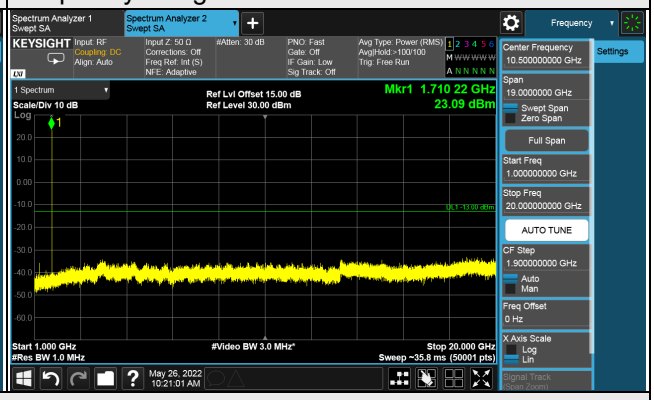
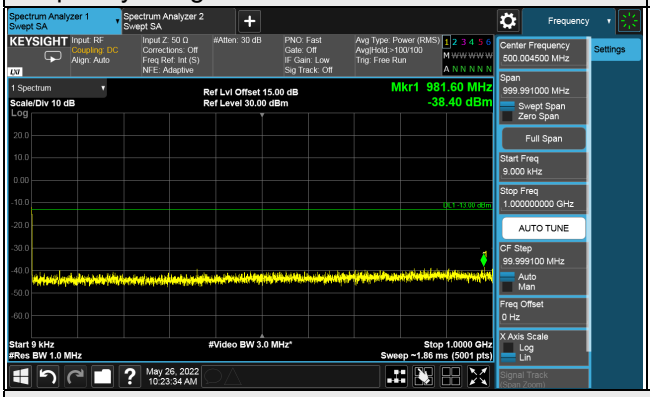
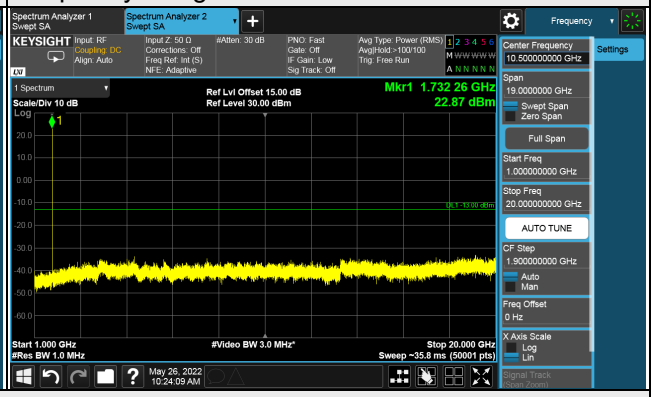
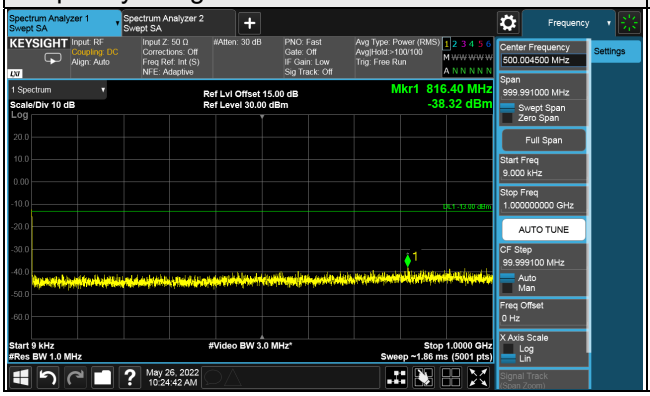
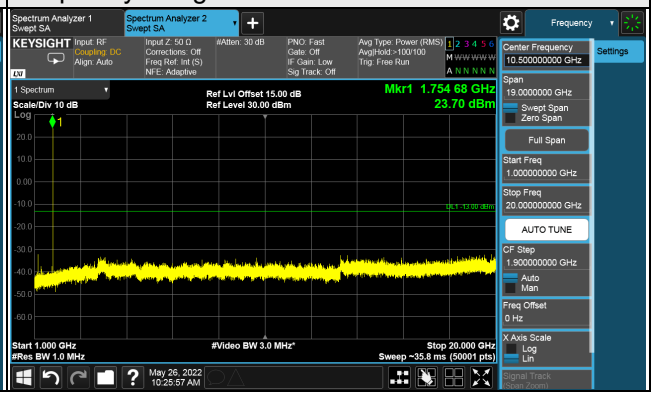
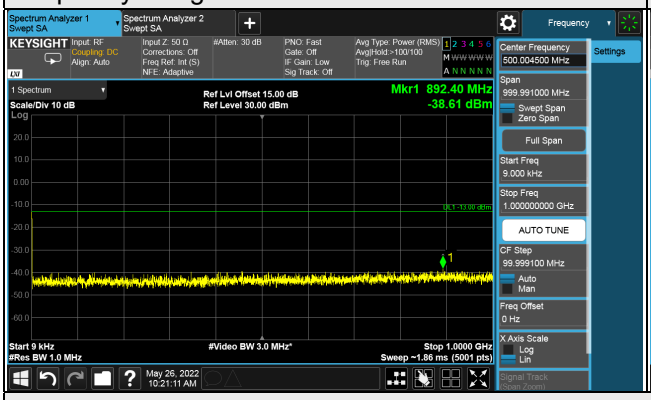
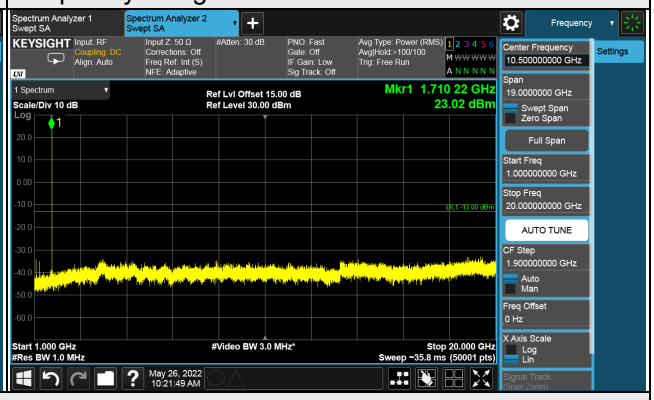
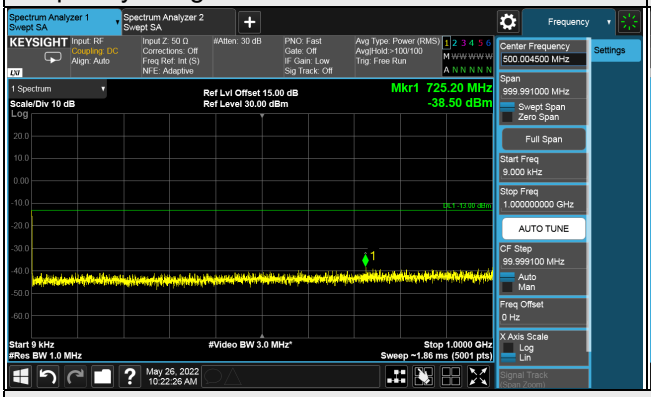
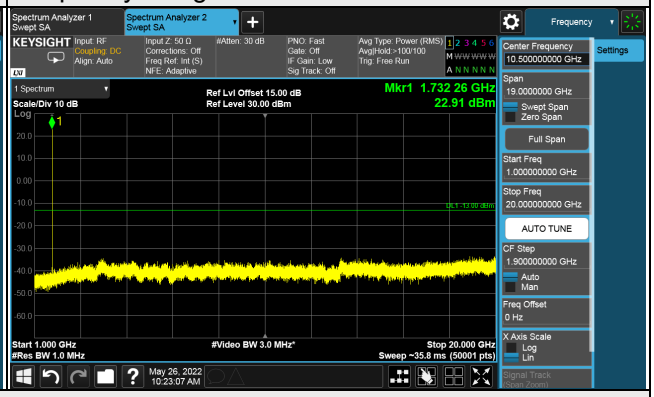
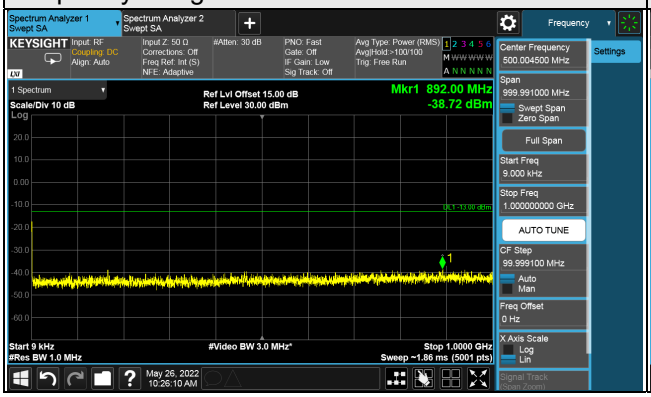
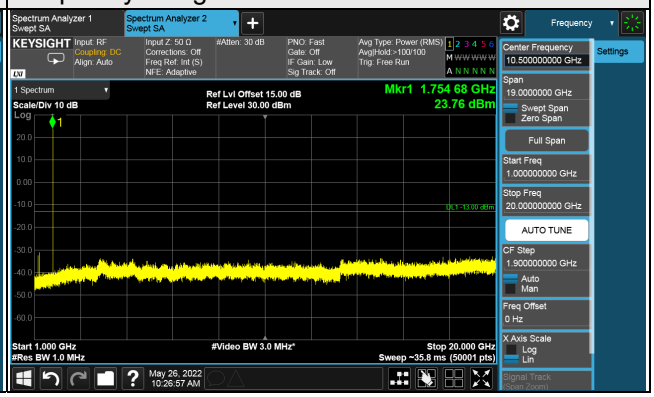
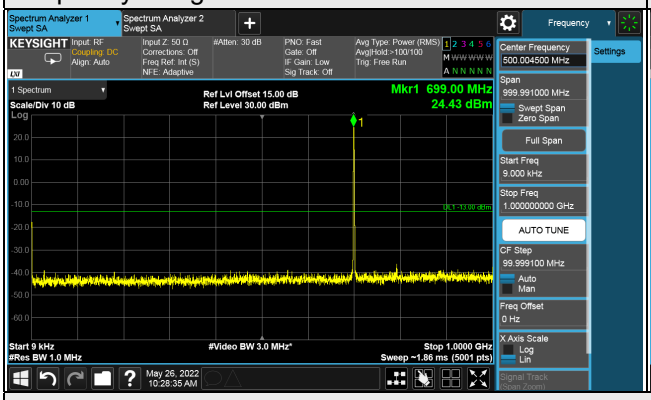
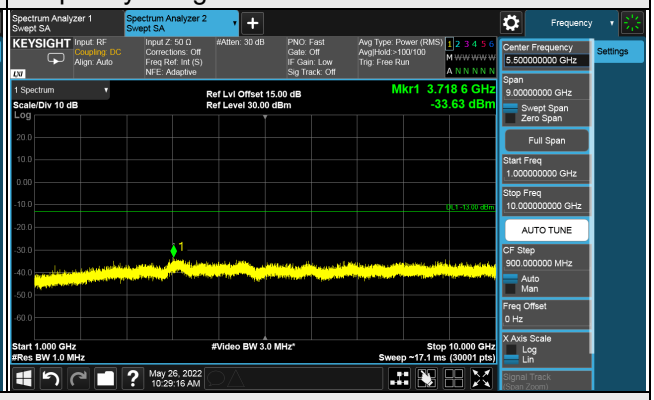
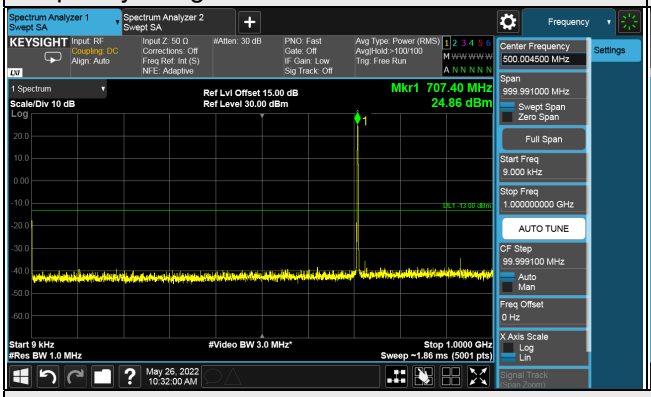
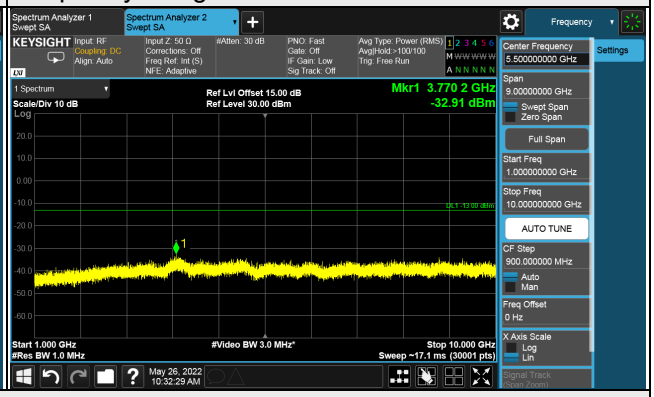
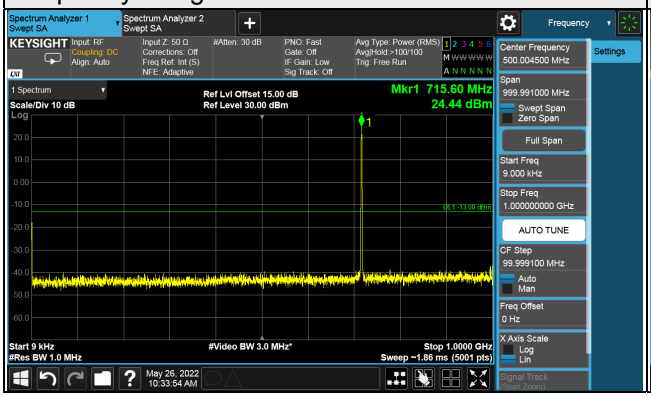
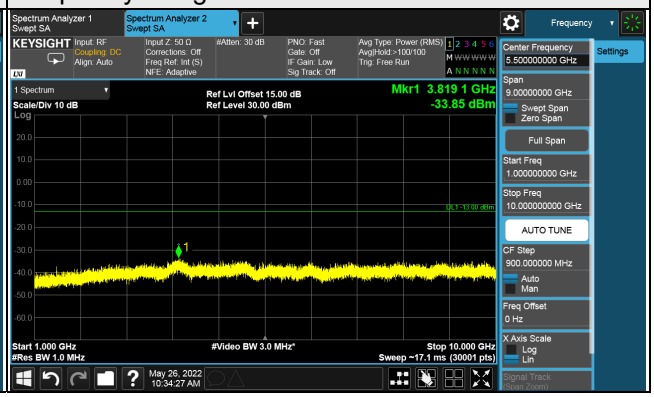
4.7.4 Test Results

NB-IoT Band 4, Subcarrier Spacing 3.5kHz	
Channel 19952 (1710.2MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 20175 (1732.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 20398 (1754.8MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

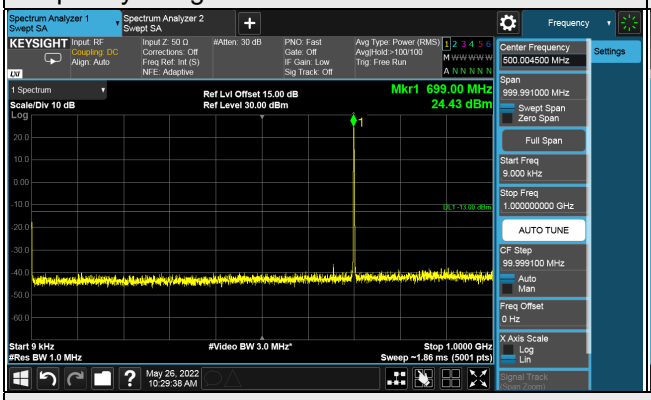
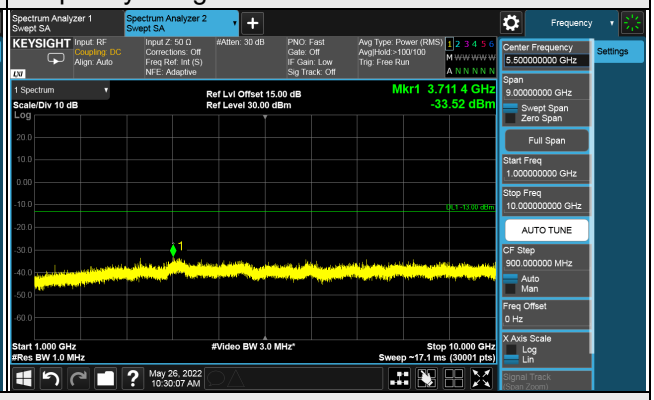
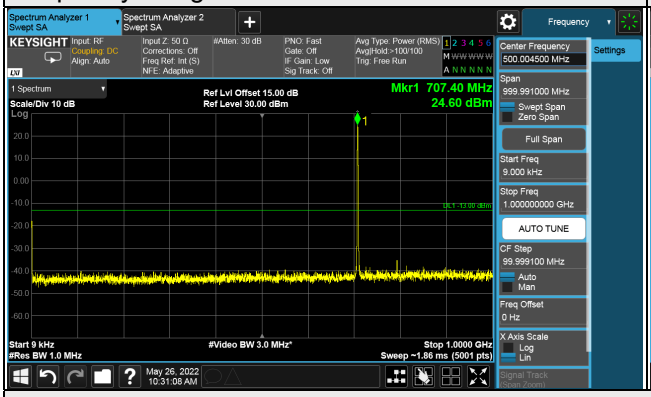
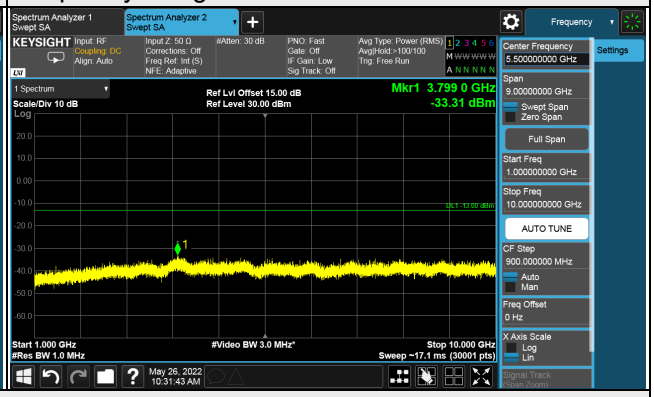
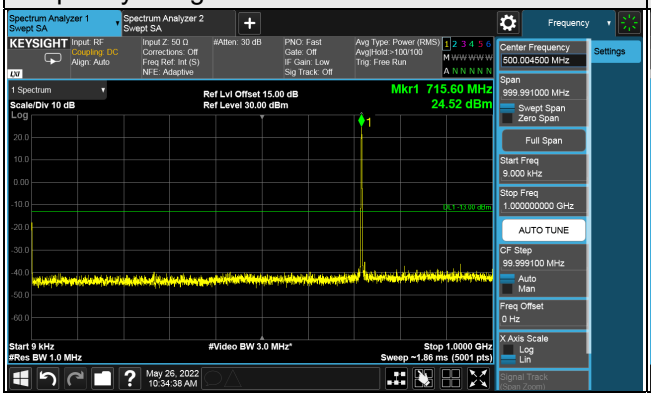
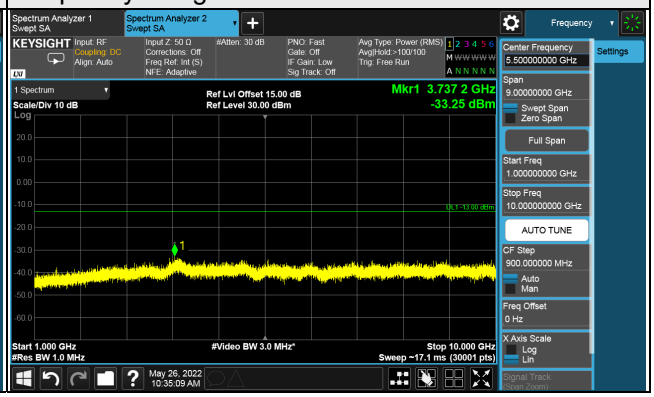
*The 9kHz signal over the limit is from Spectrum.

NB-IoT Band 4, Subcarrier Spacing 15kHz	
Channel 19952 (1710.2MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 20175 (1732.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Channel 20398 (1754.8MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	

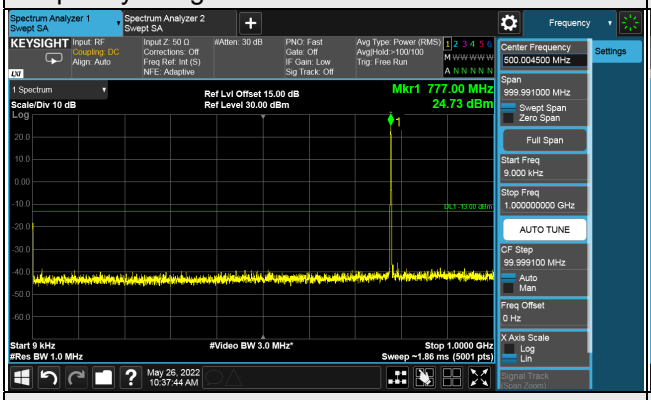
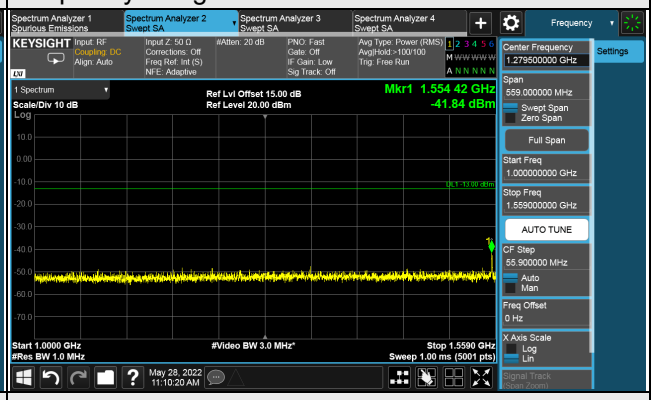
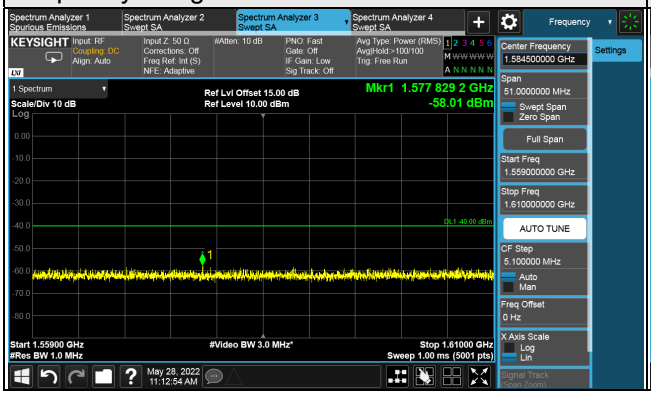
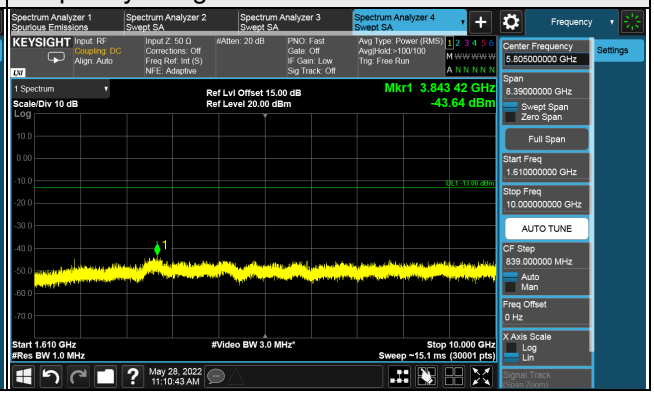
*The 9kHz signal over the limit is from Spectrum.

NB-IoT Band 12, Subcarrier Spacing 3.5kHz	
Channel 23012 (699.2MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Channel 23095 (707.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Channel 23178 (715.8MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	

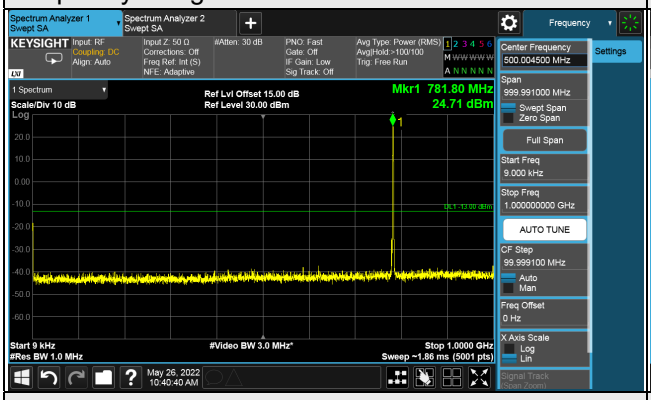
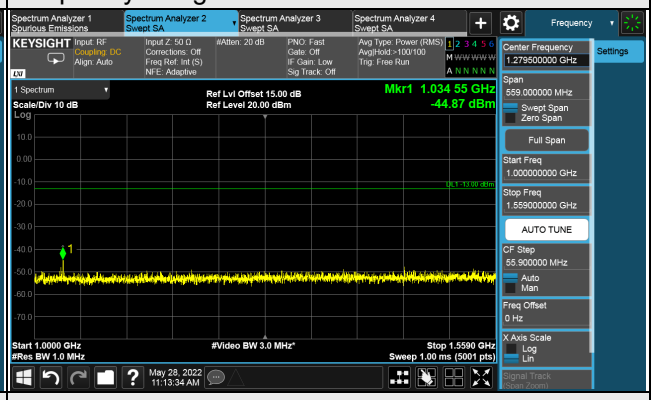
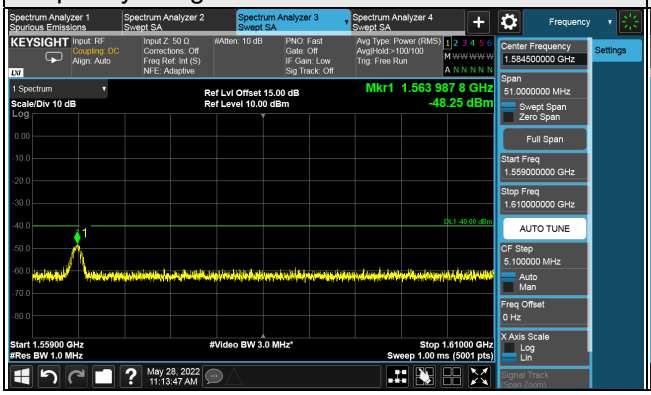
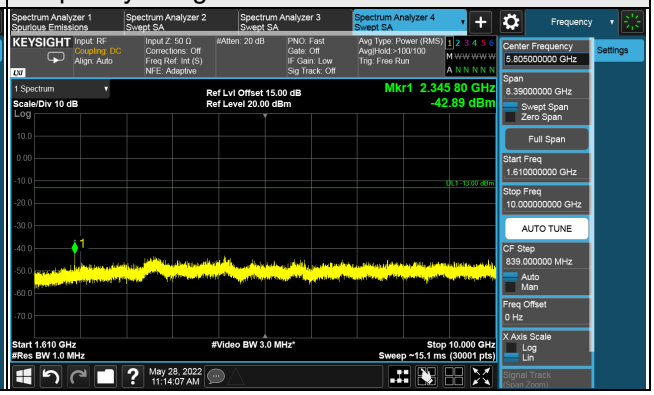
*The 9kHz signal over the limit is from Spectrum.

NB-IoT Band 12, Subcarrier Spacing 15kHz	
Channel 23012 (699.2MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Channel 23095 (707.5MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Channel 23178 (715.8MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	

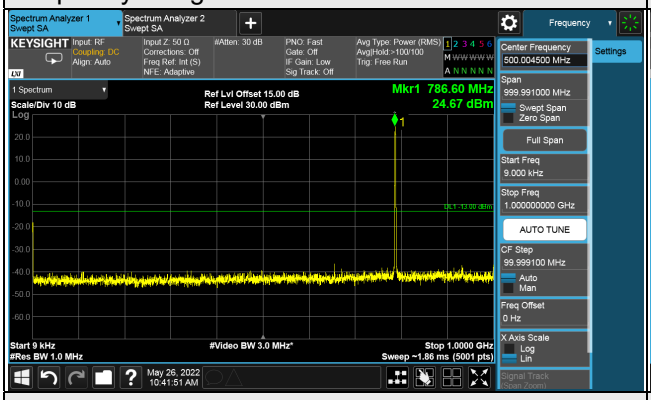
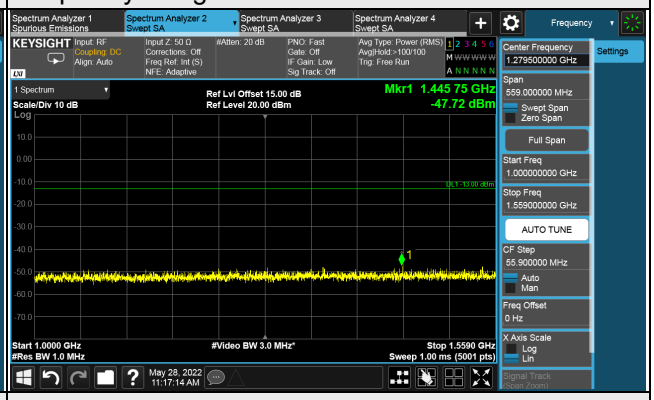
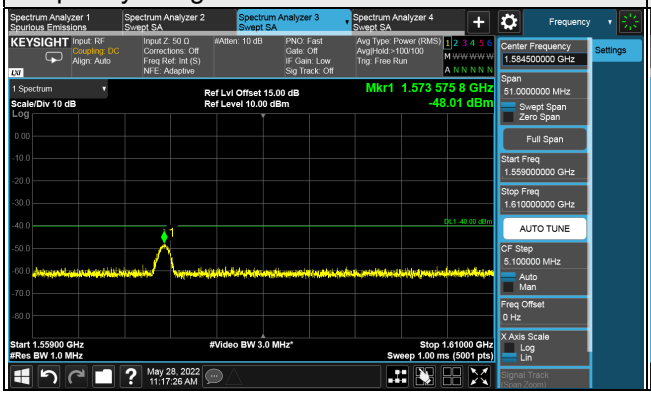
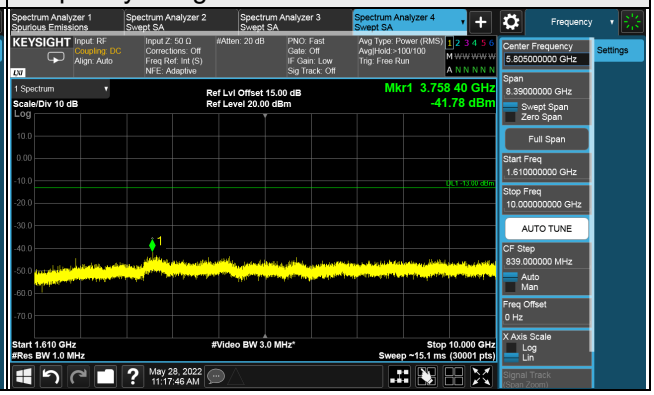
*The 9kHz signal over the limit is from Spectrum.

NB-IoT Band 13, Subcarrier Spacing 3.5kHz	
Channel 23182 (777.2MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 1.559GHz
	
Frequency Range : 1.559GHz ~ 1.61GHz	Frequency Range : 1.61GHz ~ 8GHz
	

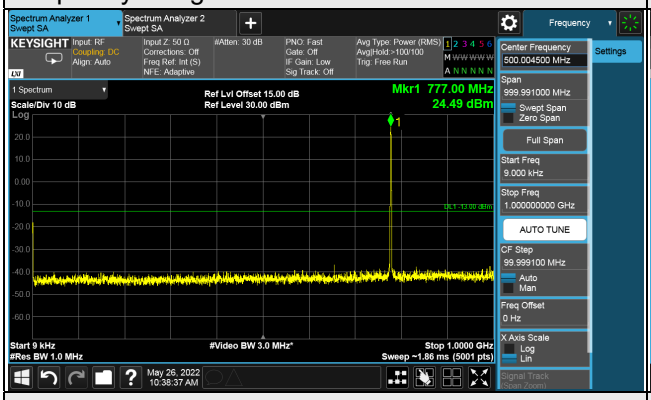
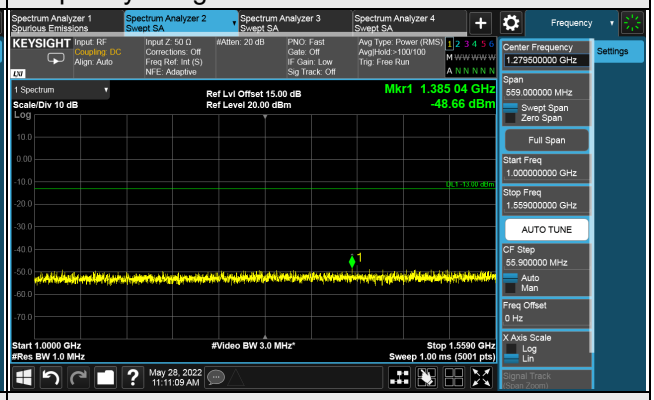
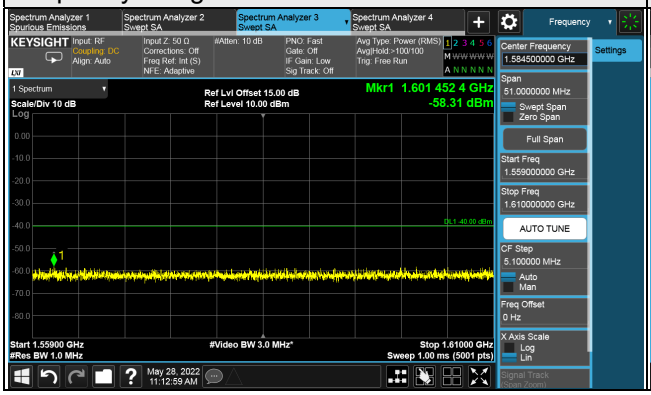
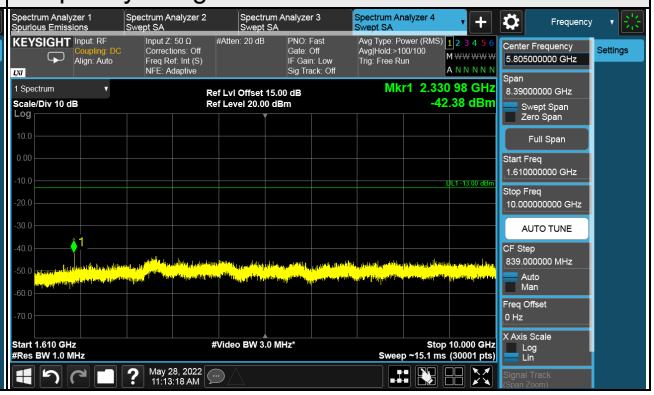
*The 9kHz signal over the limit is from Spectrum.

NB-IoT Band 13, Subcarrier Spacing 3.5kHz	
Channel 23230 (782.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 1.559GHz
	
Frequency Range : 1.559GHz ~ 1.61GHz	Frequency Range : 1.61GHz ~ 8GHz
	

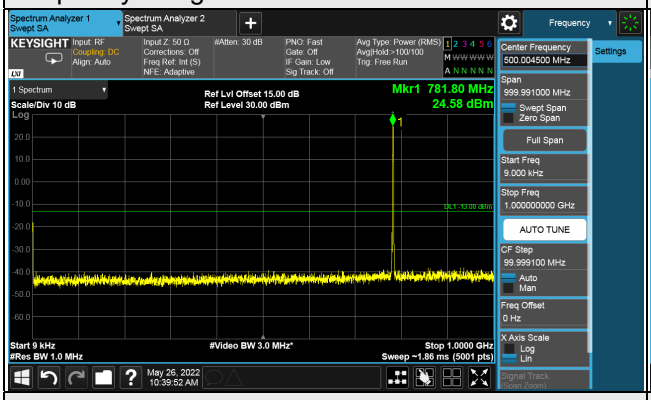
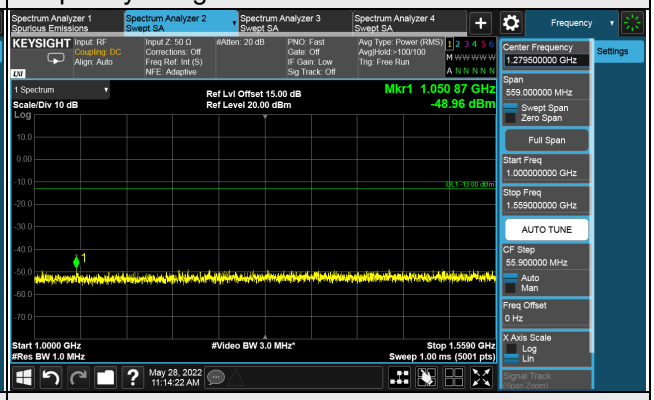
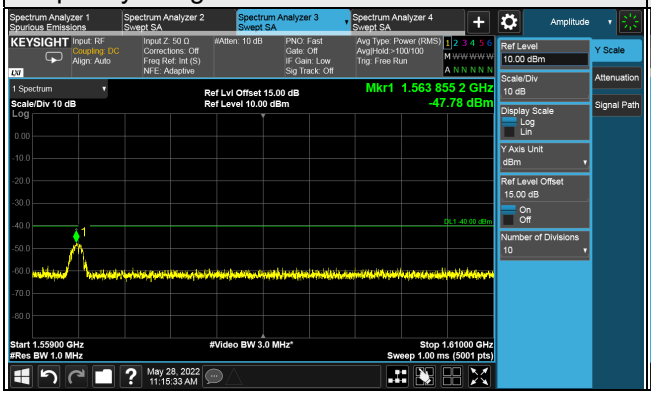
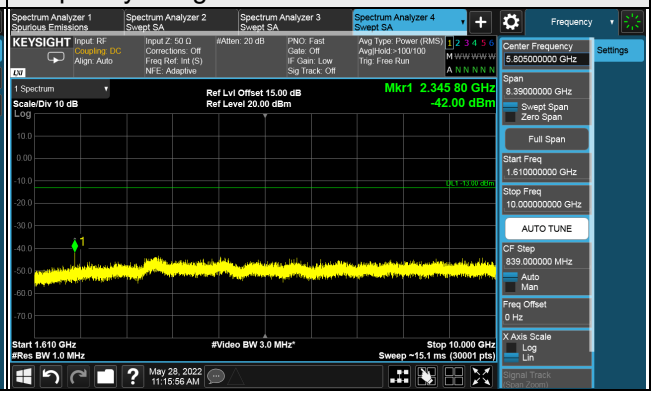
*The 9kHz signal over the limit is from Spectrum.

NB-IoT Band 13, Subcarrier Spacing 3.5kHz	
Channel 23278 (786.8MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 1.559GHz
	
Frequency Range : 1.559GHz ~ 1.61GHz	Frequency Range : 1.61GHz ~ 8GHz
	

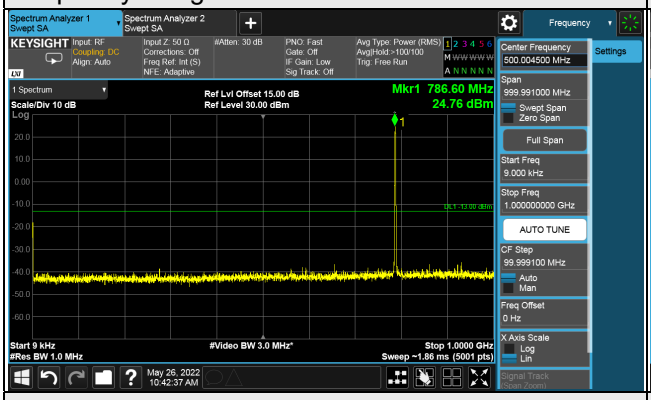
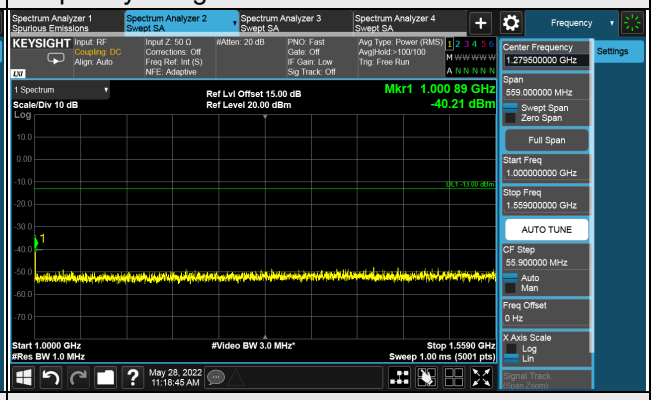
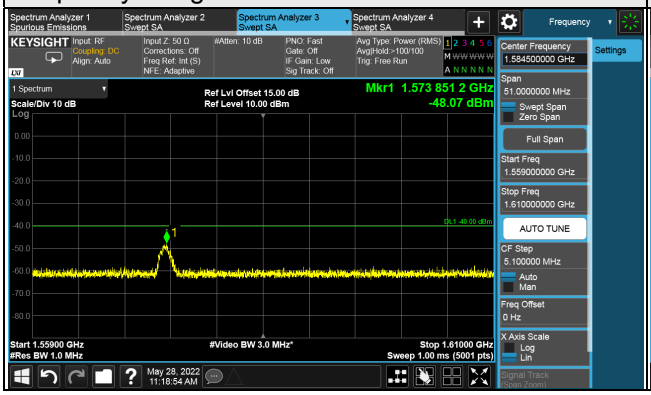
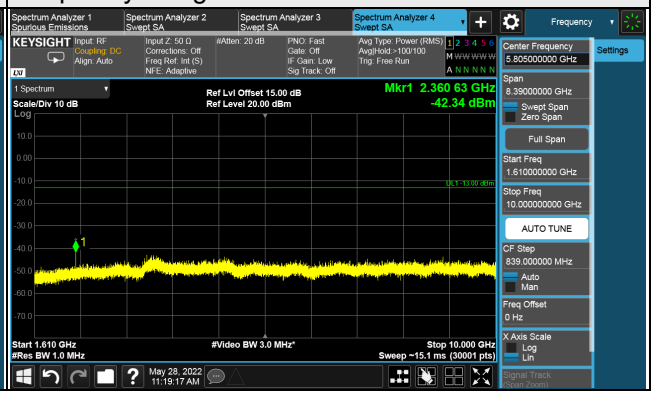
*The 9kHz signal over the limit is from Spectrum.

NB-IoT Band 13, Subcarrier Spacing 15kHz	
Channel 23182 (777.2MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 1.559GHz
	
Frequency Range : 1.559GHz ~ 1.61GHz	Frequency Range : 1.61GHz ~ 8GHz
	

*The 9kHz signal over the limit is from Spectrum.

NB-IoT Band 13, Subcarrier Spacing 15kHz	
Channel 23230 (782.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 1.559GHz
	
Frequency Range : 1.559GHz ~ 1.61GHz	Frequency Range : 1.61GHz ~ 8GHz
	

*The 9kHz signal over the limit is from Spectrum.

NB-IoT Band 13, Subcarrier Spacing 15kHz	
Channel 23278 (786.8MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 1.559GHz
	
Frequency Range : 1.559GHz ~ 1.61GHz	Frequency Range : 1.61GHz ~ 8GHz
	

*The 9kHz signal over the limit is from Spectrum.

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

For NB-IoT Band 4:
According to FCC 27.53(h), for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log (P) dB.

For NB-IoT Band 12:
According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. The limit of emissions is equal to -13 dBm.

For NB-IoT Band 13:
According to FCC 27.53(c)(2), for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB. The limit of emissions is equal to -13 dBm.

According to FCC 27.53(f), for operations in the 775-788 MHz, emissions in the band 1559-1610MHz shall be limited to -70 dBW/MHz (EIRP). The limit of emissions is equal to -40 dBm.

4.8.2 Test Procedure

a. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
d. Following C63.26 section 5.5 and 5.2.7
   - EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
   - ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

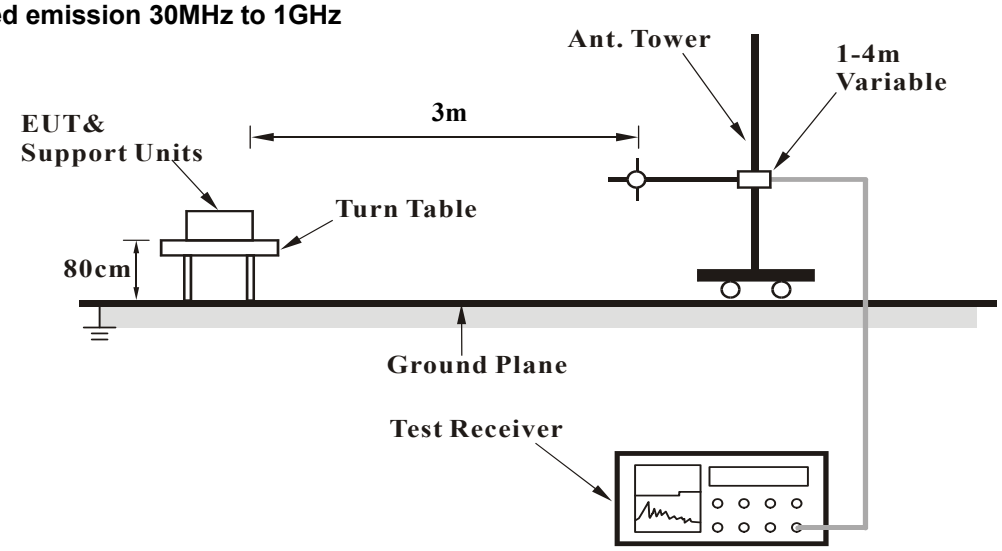
Note:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

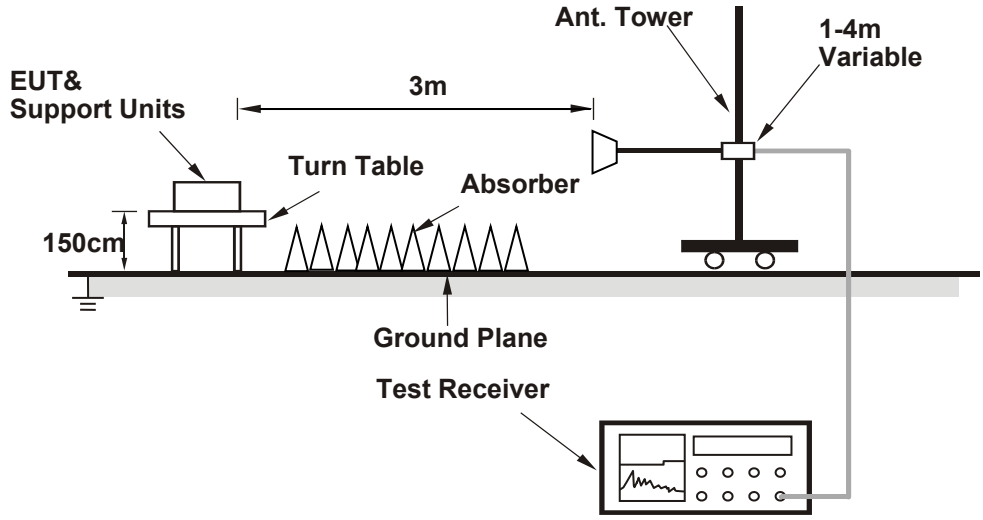
No deviation.

4.8.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.8.5 Test Results

Below 1GHz

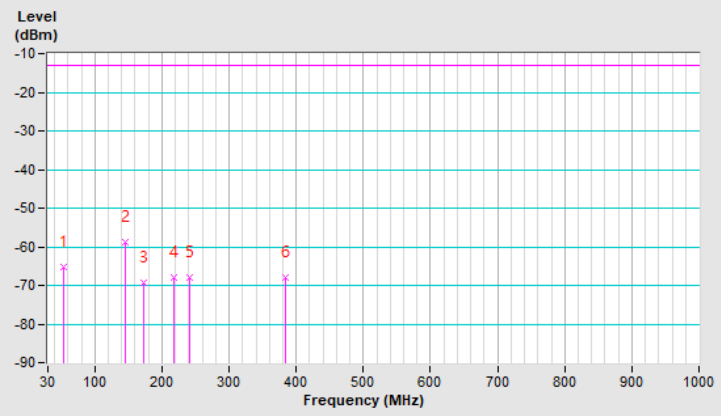
NB-IoT Band 4, Subcarrier Spacing 3.5kHz

Mode	TX channel 20175 (1732.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	54.25	-65.40	-13.00	-52.40	1.01 H	82	48.78	-114.18
2	144.46	-58.96	-13.00	-45.96	1.01 H	102	54.69	-113.65
3	173.56	-69.22	-13.00	-56.22	2.00 H	162	45.17	-114.39
4	218.18	-67.88	-13.00	-54.88	1.50 H	196	49.39	-117.27
5	241.46	-67.94	-13.00	-54.94	1.01 H	143	47.39	-115.33
6	383.08	-68.13	-13.00	-55.13	1.50 H	262	43.14	-111.27

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) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

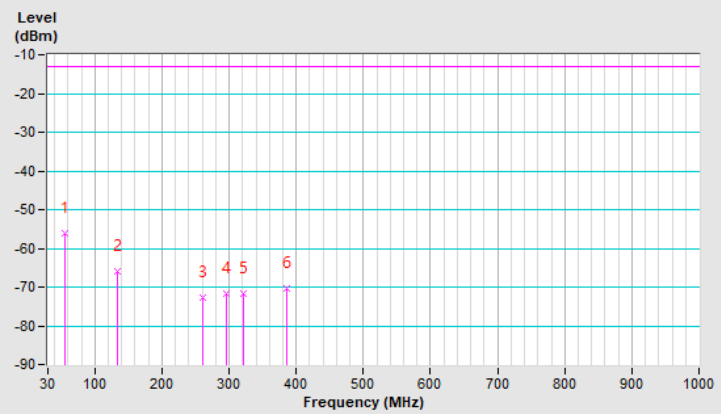


Mode	TX channel 20175 (1732.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	55.22	-56.09	-13.00	-43.09	1.01 V	97	58.14	-114.23
2	132.82	-65.91	-13.00	-52.91	1.01 V	192	48.68	-114.59
3	260.86	-72.67	-13.00	-59.67	1.50 V	314	42.14	-114.81
4	296.75	-71.53	-13.00	-58.53	2.00 V	24	42.00	-113.53
5	321.00	-71.74	-13.00	-58.74	1.01 V	258	41.02	-112.76
6	385.02	-70.49	-13.00	-57.49	1.50 V	257	40.69	-111.18

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) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



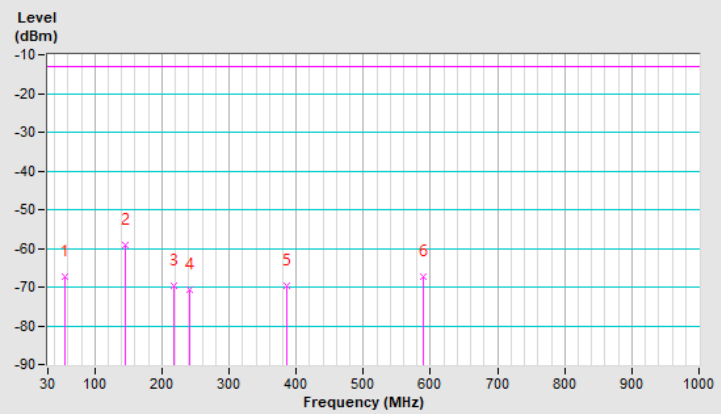
NB-IoT Band 12, Subcarrier Spacing 3.5kHz

Mode	TX channel 23012 (699.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	55.22	-67.35	-13.00	-54.35	1.49 H	70	49.03	-116.38
2	145.43	-59.18	-13.00	-46.18	1.99 H	283	56.60	-115.78
3	218.18	-69.60	-13.00	-56.60	1.49 H	3	49.82	-119.42
4	241.46	-70.76	-13.00	-57.76	1.00 H	345	46.72	-117.48
5	385.99	-69.76	-13.00	-56.76	1.00 H	248	43.55	-113.31
6	589.69	-67.28	-13.00	-54.28	1.99 H	352	41.45	-108.73

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) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

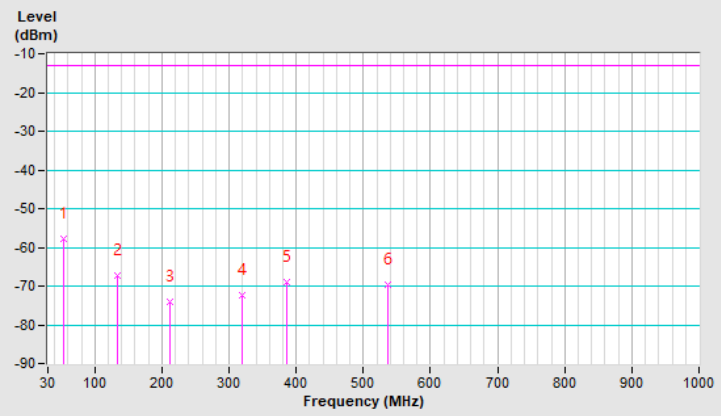


Mode	TX channel 23012 (699.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	54.25	-57.79	-13.00	-44.79	1.01 V	115	58.54	-116.33
2	133.79	-67.28	-13.00	-54.28	1.51 V	186	49.30	-116.58
3	211.39	-73.97	-13.00	-60.97	1.01 V	262	45.49	-119.46
4	320.03	-72.42	-13.00	-59.42	1.01 V	199	42.52	-114.94
5	385.02	-69.11	-13.00	-56.11	1.51 V	18	44.22	-113.33
6	536.34	-69.59	-13.00	-56.59	1.99 V	158	40.67	-110.26

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) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



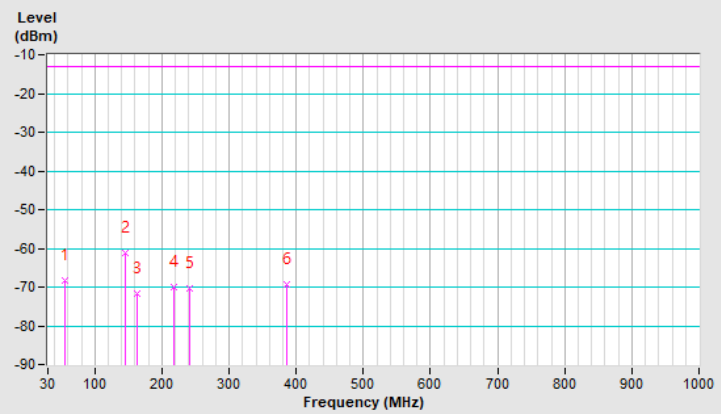
NB-IoT Band 13, Subcarrier Spacing 3.5kHz

Mode	TX channel 23230 (782.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	55.22	-68.41	-13.00	-55.41	1.50 H	82	47.97	-116.38
2	145.43	-61.19	-13.00	-48.19	2.00 H	294	54.59	-115.78
3	162.89	-71.63	-13.00	-58.63	1.01 H	162	44.12	-115.75
4	218.18	-69.93	-13.00	-56.93	1.01 H	183	49.49	-119.42
5	241.46	-70.43	-13.00	-57.43	1.01 H	154	47.05	-117.48
6	385.99	-69.43	-13.00	-56.43	1.50 H	255	43.88	-113.31

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) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

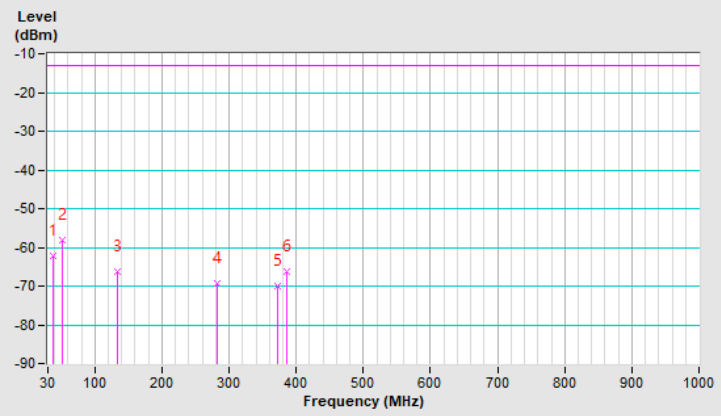


Mode	TX channel 23230 (782.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	38.73	-62.19	-13.00	-49.19	1.01 V	115	54.49	-116.68
2	52.31	-58.19	-13.00	-45.19	1.01 V	132	57.97	-116.16
3	133.79	-66.35	-13.00	-53.35	1.50 V	172	50.23	-116.58
4	283.17	-69.20	-13.00	-56.20	1.50 V	22	46.72	-115.92
5	371.44	-70.12	-13.00	-57.12	2.00 V	27	43.59	-113.71
6	385.02	-66.28	-13.00	-53.28	1.01 V	76	47.05	-113.33

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) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



Above 1GHz

NB-IoT Band 4, Subcarrier Spacing 3.5kHz

Mode	TX channel 19952 (1710.2MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	3420.40	-40.13	-13.00	-27.13	2.79 H	79	57.03	-97.16
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	3420.40	-40.66	-13.00	-27.66	2.55 V	20	56.50	-97.16

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) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 20175 (1732.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	**3465.00**	**-37.52**	**-13.00**	**-24.52**	**1.25 H**	**77**	**59.53**	**-97.05**
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	3465.00	-46.75	-13.00	-33.75	1.55 V	120	50.30	-97.05

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) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 20398 (1754.8MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	3509.60	-43.87	-13.00	-30.87	1.44 H	66	53.03	-96.90
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	3509.60	-48.40	-13.00	-35.40	2.12 V	313	48.50	-96.90

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) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

NB-IoT Band 12, Subcarrier Spacing 3.5kHz

Mode	TX channel 23012 (699.2MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	**1398.40**	**-44.51**	**-13.00**	**-31.51**	**2.87 H**	**5**	**60.03**	**-104.54**
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	1398.40	-46.64	-13.00	-33.64	3.10 V	258	57.90	-104.54

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) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 23095 (707.5MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	1415.00	-44.63	-13.00	-31.63	1.23 H	0	59.90	-104.53
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	1415.00	-47.52	-13.00	-34.52	1.53 V	180	57.01	-104.53

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) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 23178 (715.8MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	1431.60	-45.08	-13.00	-32.08	1.85 H	240	59.43	-104.51
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	1431.60	-50.21	-13.00	-37.21	2.80 V	170	54.30	-104.51

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) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

NB-IoT Band 13, Subcarrier Spacing 3.5kHz

Mode	TX channel 23182 (777.2MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	1554.40	-45.16	-13.00	-32.16	1.60 H	322	59.23	-104.39
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	1554.40	-48.99	-13.00	-35.99	1.00 V	32	55.40	-104.39

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) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 23230 (782.0MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	**1564.00**	**-43.10**	**-40.00**	**-3.10**	**2.44 H**	**289**	**59.10**	**-102.20**
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	1564.00	-49.18	-40.00	-9.18	1.20 V	33	53.02	-102.20

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) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 23278 (786.8MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	17deg. C, 62%RH	Input Power	3.6Vdc
Tested By	Wade Huang		

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	1573.60	-43.66	-40.00	-3.66	1.28 H	1	58.50	-102.16
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	1573.60	-50.41	-40.00	-10.41	1.77 V	278	51.75	-102.16

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) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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