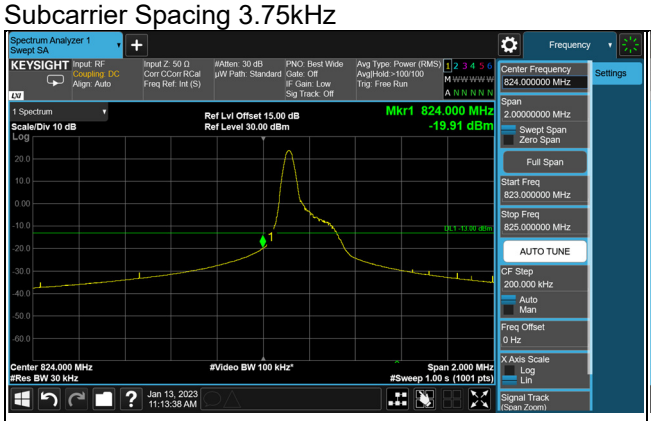
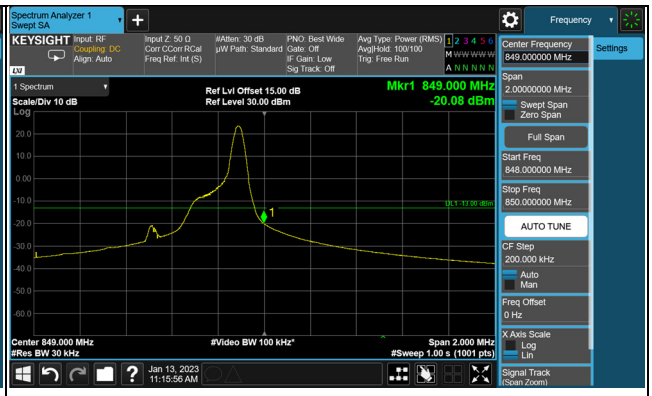
NB-IoT Band 5

Subcarrier Spacing 3.75kHz

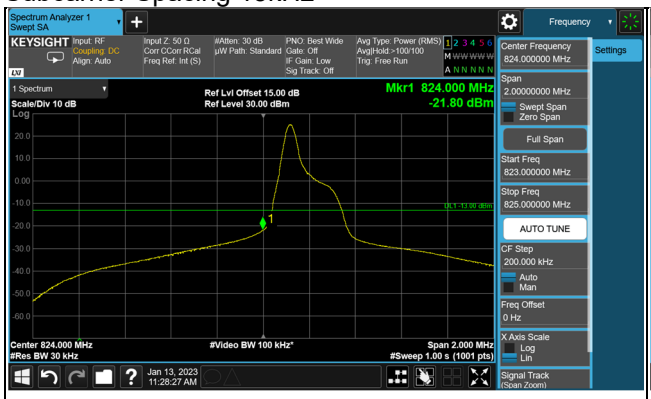


1RB (824.2MHz)



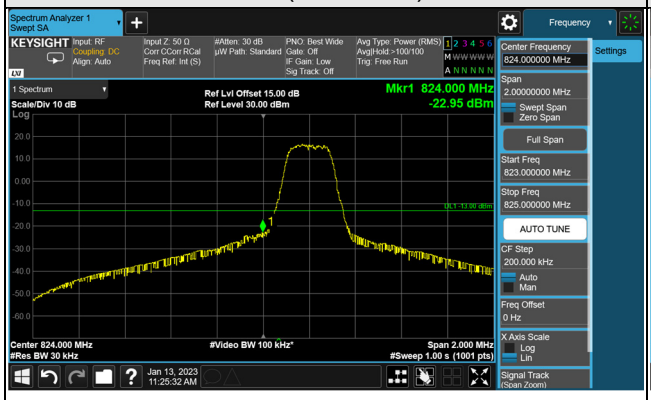
1RB (848.8MHz)

Subcarrier Spacing 15kHz

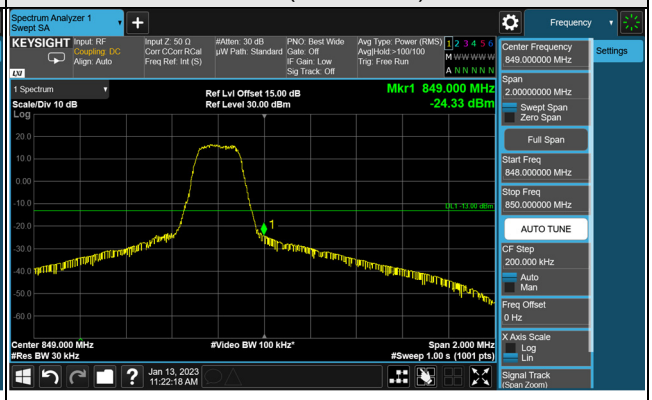


1RB (824.2MHz)

1RB (848.8MHz)



FULL (824.2MHz)



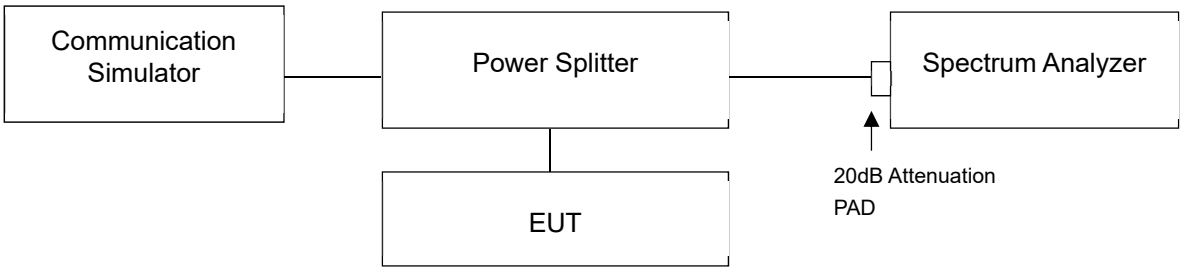
FULL (848.8MHz)

4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

4.6.2 Test Setup



4.6.3 Test Procedures

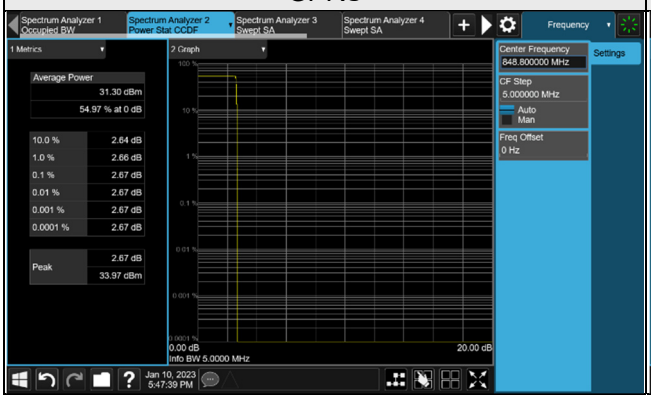
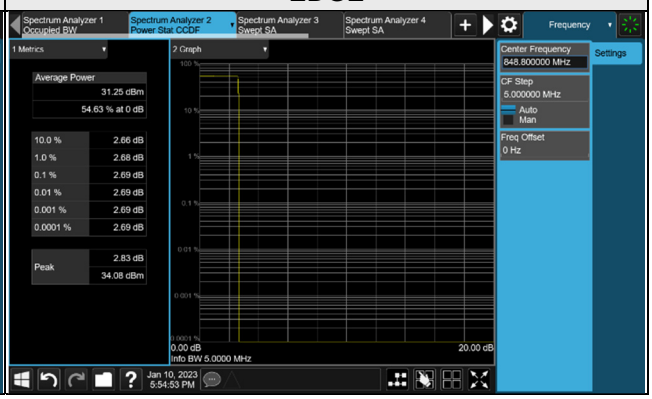
a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

b. Set the number of counts to a value that stabilizes the measured CCDF curve;

c. Record the maximum PAPR level associated with a probability of 0.1%.

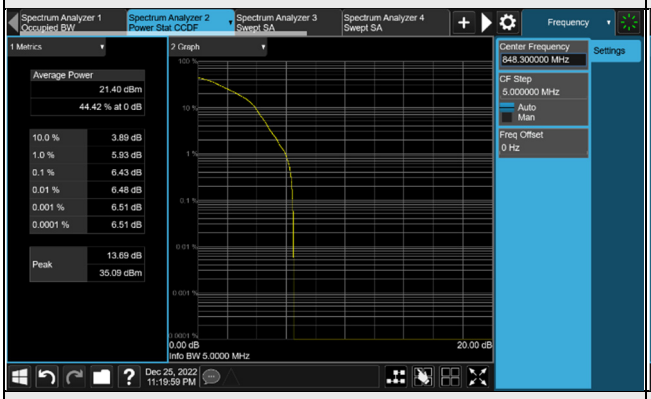
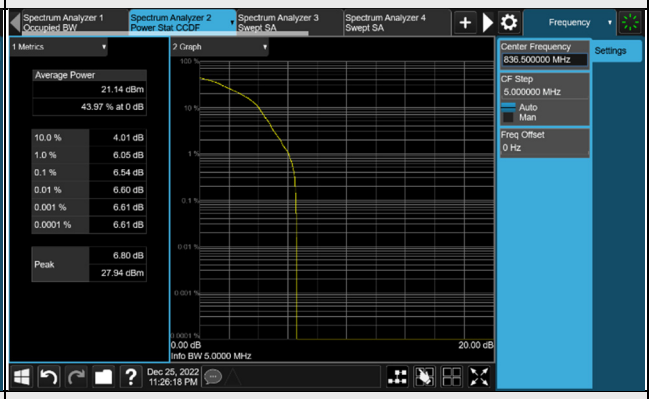
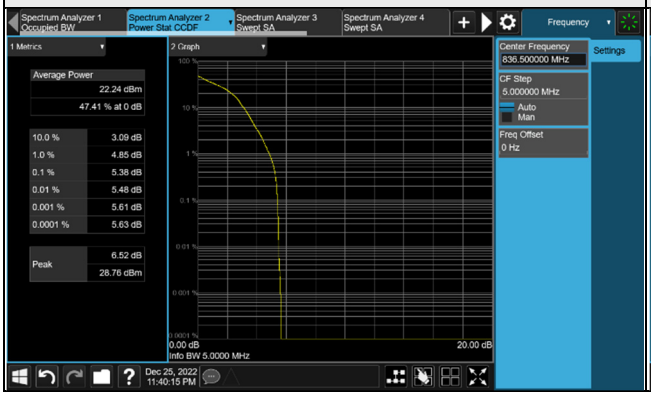
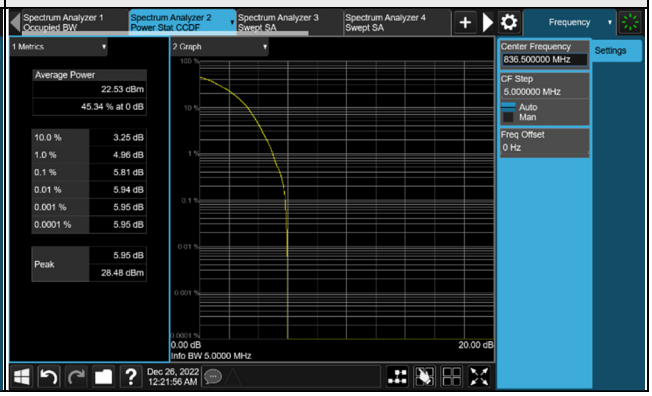
4.6.4 Test Results

Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		GPRS	EDGE
128	824.2	2.63	2.64
189	836.4	2.63	2.63
251	848.8	2.67	2.69

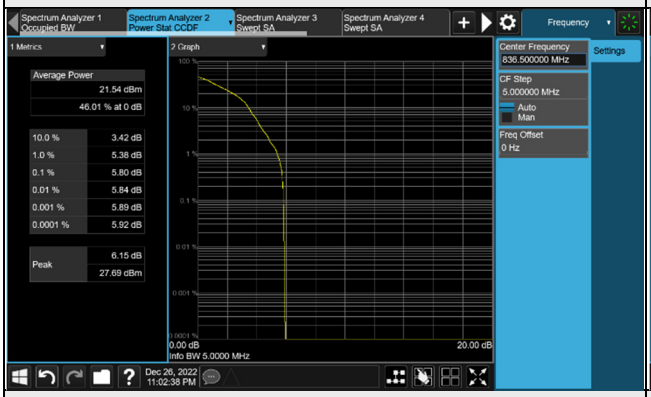
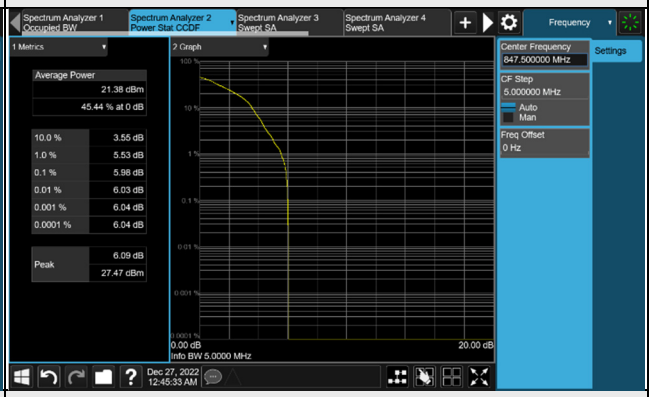
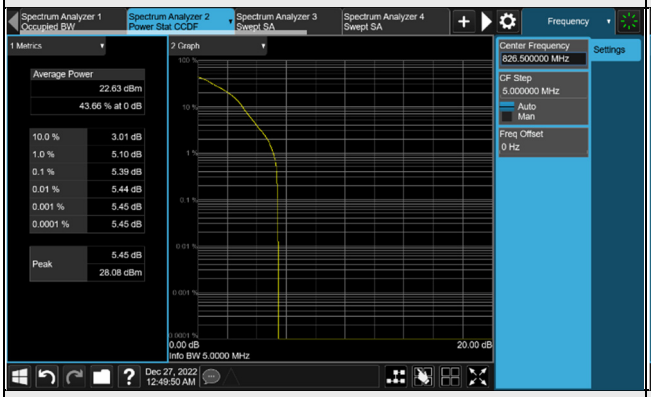
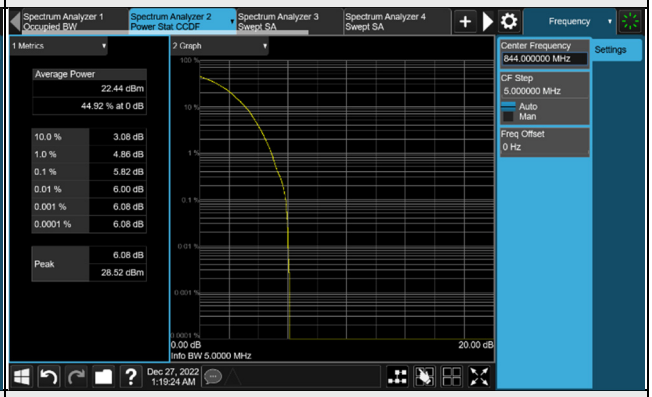
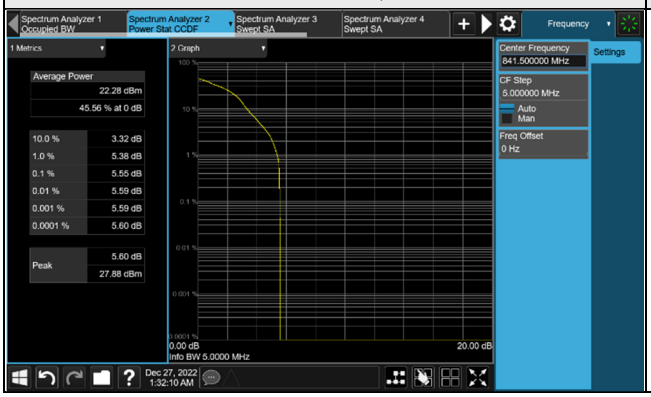
Spectrum Plot of Worst Value	
GPRS	EDGE
	

eMTC

LTE Band 5, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20407	824.7	4.12	5.92
20525	836.5	4.26	6.08
20643	848.3	4.22	6.43
LTE Band 5, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20415	825.5	4.14	6.38
20525	836.5	4.16	6.54
20635	847.5	4.21	6.45
LTE Band 5, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20425	826.5	4.14	5.31
20525	836.5	4.17	5.38
20625	846.5	4.22	5.25
LTE Band 5, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20450	829.0	4.34	5.38
20525	836.5	4.45	5.81
20600	844.0	4.25	5.66

Spectrum Plot of Worst Value	
1.4MHz / 16QAM	3MHz / 16QAM
	
5MHz / 16QAM	10MHz / 16QAM
	

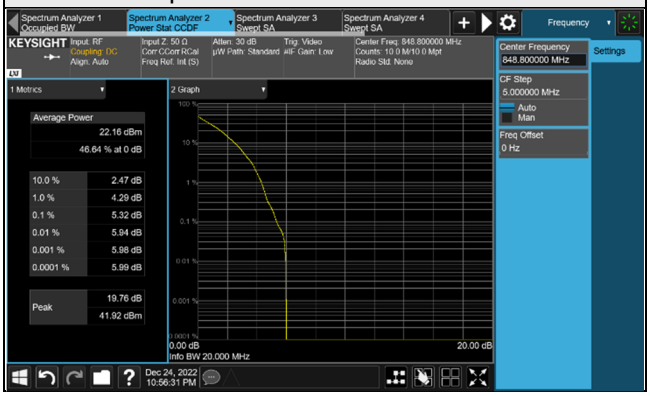
LTE Band 26, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26797	824.7	4.05	5.67
26915	836.5	4.12	5.80
27033	848.3	4.16	5.77
LTE Band 26, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26805	825.5	4.03	5.96
26915	836.5	4.07	5.92
27025	847.5	4.13	5.98
LTE Band 26, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26815	826.5	4.07	5.39
26915	836.5	4.12	5.16
27015	846.5	4.20	5.01
LTE Band 26, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26840	829.0	4.08	5.69
26915	836.5	4.18	5.70
26990	844.0	4.23	5.82
LTE Band 26, Channel Bandwidth 15MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26865	831.5	4.08	5.35
26915	836.5	4.09	5.46
26965	841.5	4.14	5.55

Spectrum Plot of Worst Value	
1.4MHz / 16QAM	3MHz / 16QAM
	
5MHz / 16QAM	10MHz / 16QAM
	
15MHz / 16QAM	
	

NB-IoT Band 5

NB-IoT Band 5					
Channel	Frequency (MHz)	Subcarrier Spacing (kHz)	Number of Subcarrier / Starting Subcarrier	Modulation	Peak To Average Ratio (dB)
20402	824.2	3.75	1@0	BPSK	1.13
		15	12@0	QPSK	5.21
20525	836.5	3.75	1@0	BPSK	1.14
		15	12@0	QPSK	5.29
20648	848.8	3.75	1@47	BPSK	1.17
		15	12@0	QPSK	5.32

Spectrum Plot of Worst Value

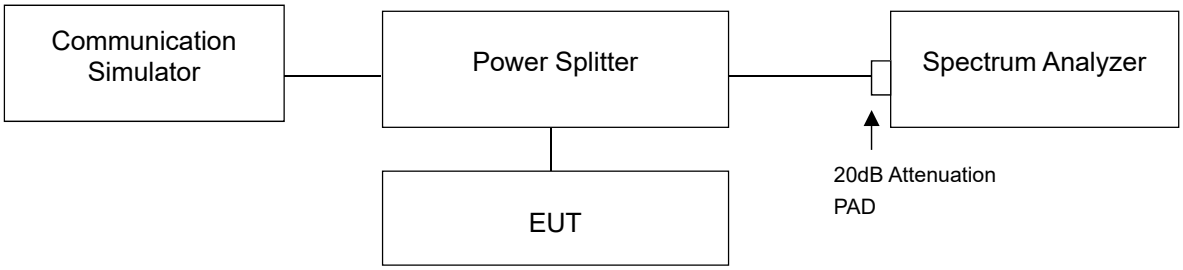


4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

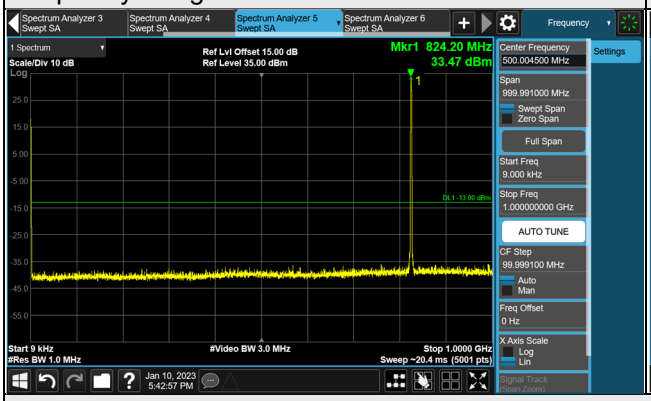
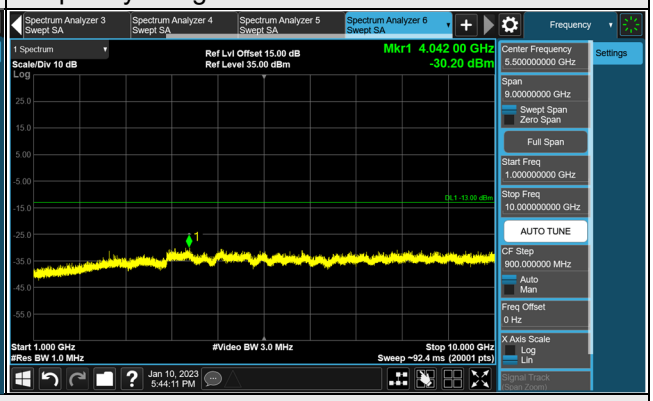
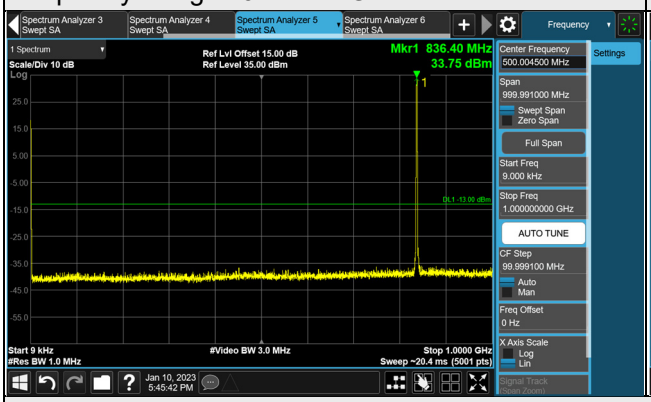
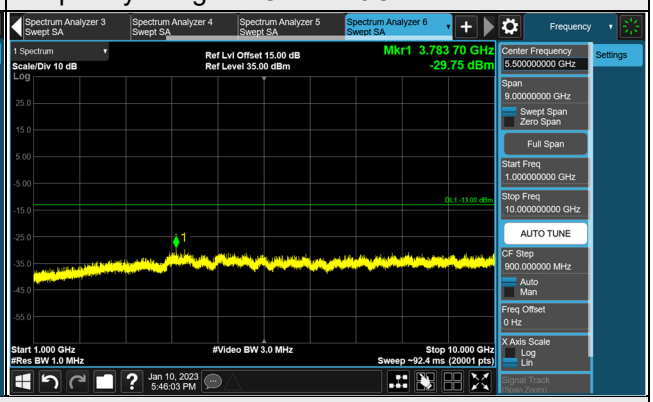
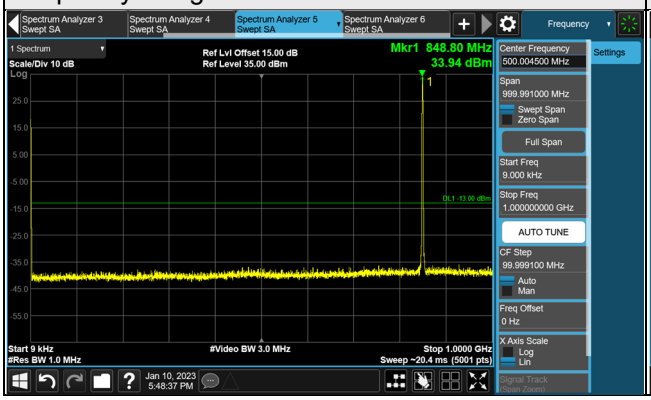
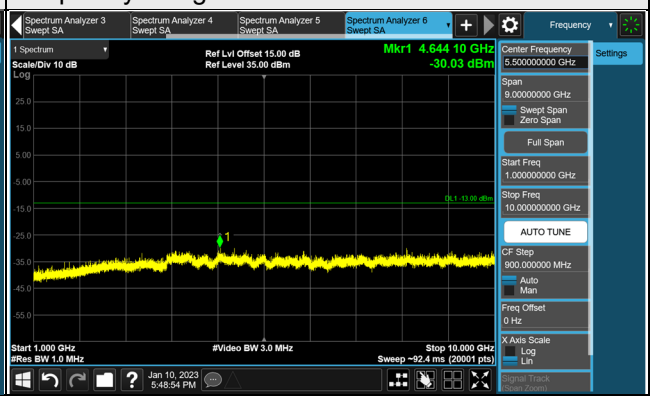
4.7.2 Test Setup



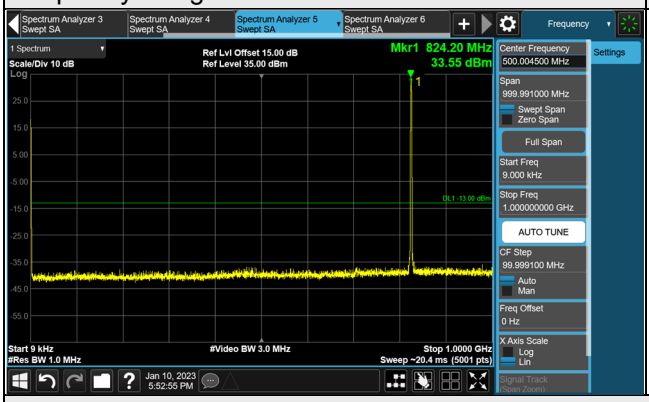
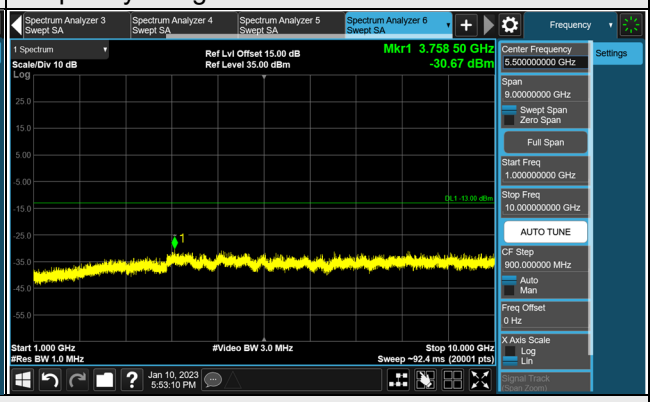
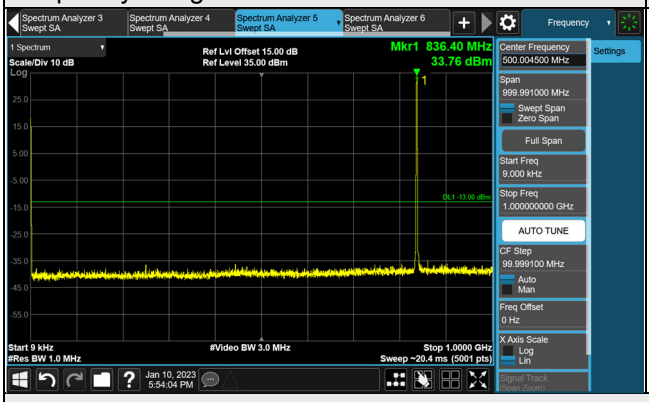
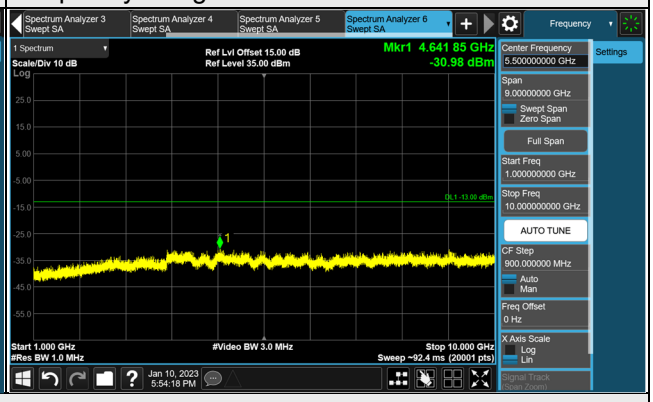
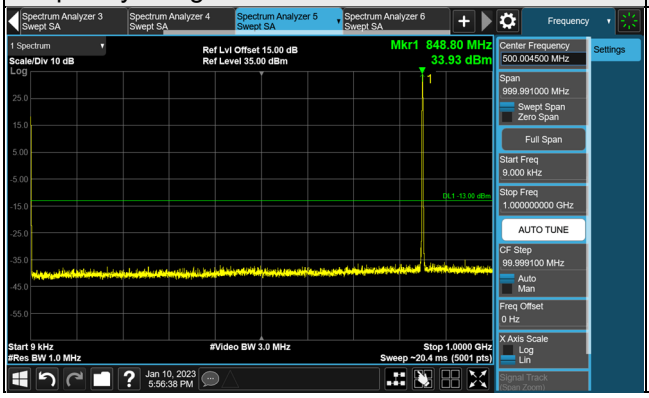
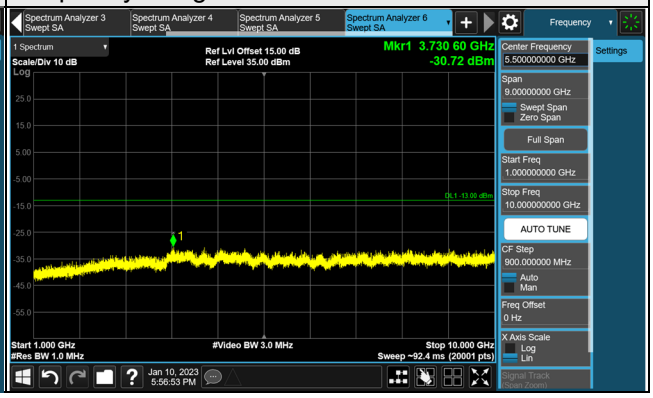
4.7.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measurement refer to ANSI C63.26 section 5.7.
c. Measuring frequency range is from 9kHz to 10GHz. 20dB attenuation pad is connected with spectrum. Detector = Average, RBW=1MHz and VBW=3MHz are used for GSM band conducted emission measurement.
d. Measuring frequency range is from 9kHz to 10GHz. 20dB attenuation pad is connected with spectrum. Detector = Average, RBW=1MHz and VBW=3MHz are used for eMTC and NB-IoT band conducted emission measurement.

4.7.4 Test Results

GPRS	
Channel 128 (824.2MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Channel 189 (836.4MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Channel 251 (848.8MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	

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

EDGE	
Channel 128 (824.2MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Channel 189 (836.4MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	
Channel 251 (848.8MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 10GHz
	

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