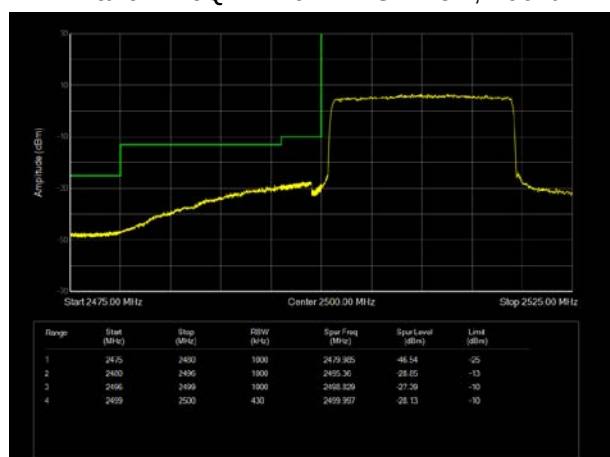
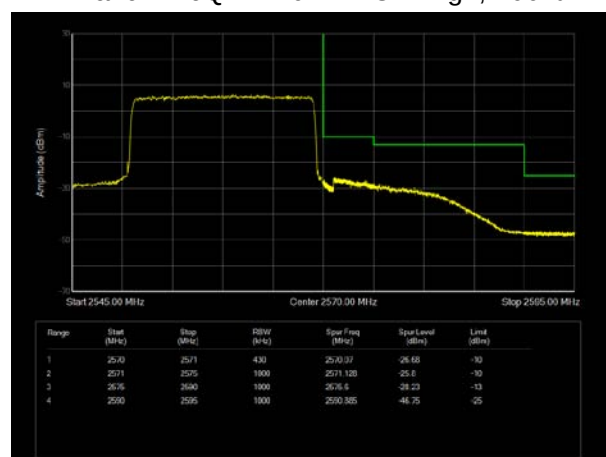


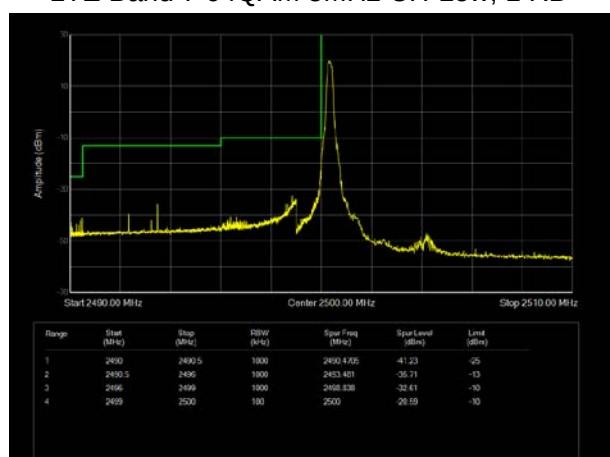
LTE Band 7 16QAM 20MHz CH-Low, 100%RB



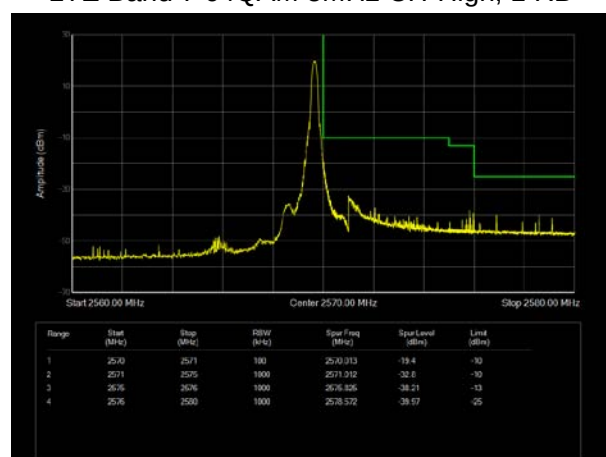
LTE Band 7 16QAM 20MHz CH-High, 100%RB



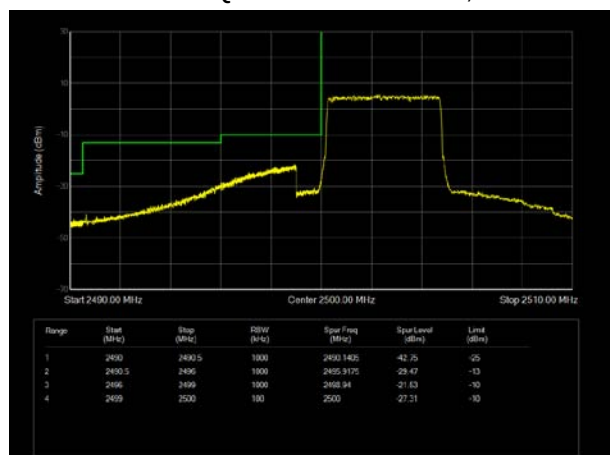
LTE Band 7 64QAM 5MHz CH-Low, 1 RB



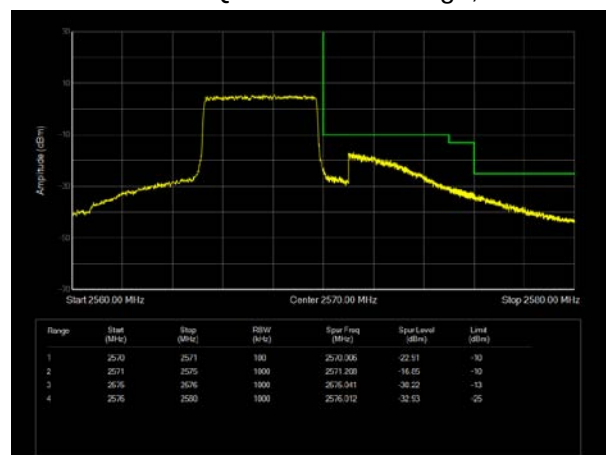
LTE Band 7 64QAM 5MHz CH-High, 1 RB



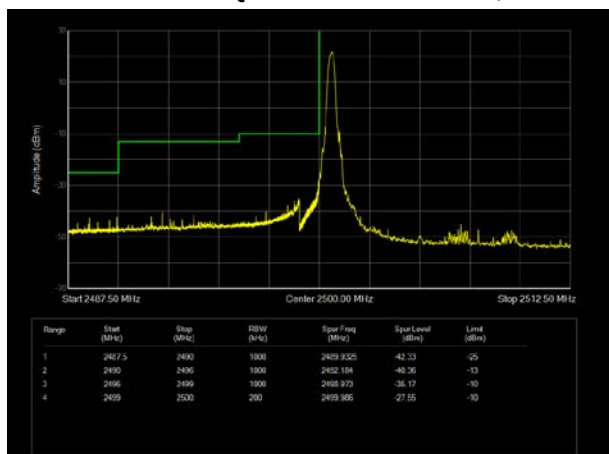
LTE Band 7 64QAM 5MHz CH-Low, 100%RB



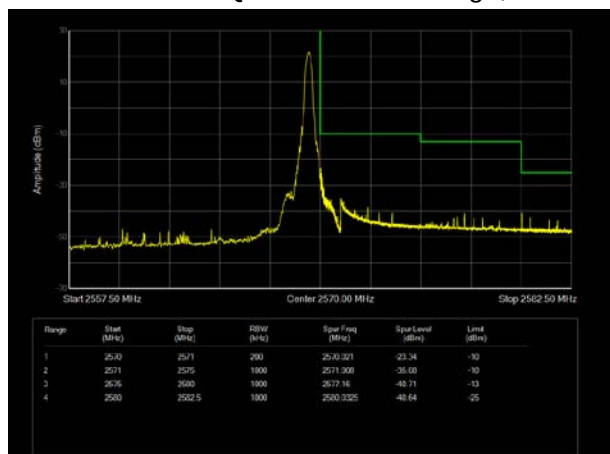
LTE Band 7 64QAM 5MHz CH-High, 100%RB



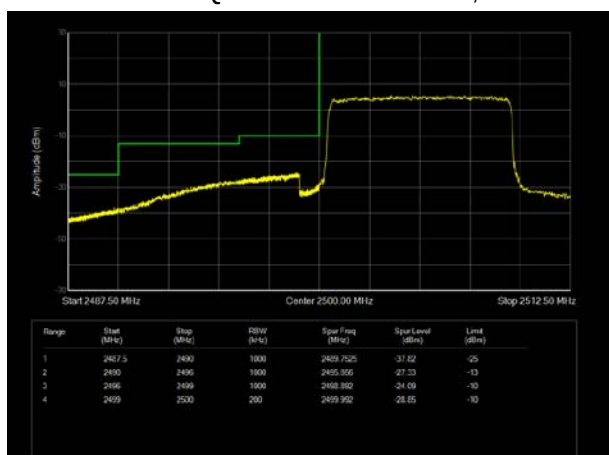
LTE Band 7 64QAM 10MHz CH-Low, 1 RB



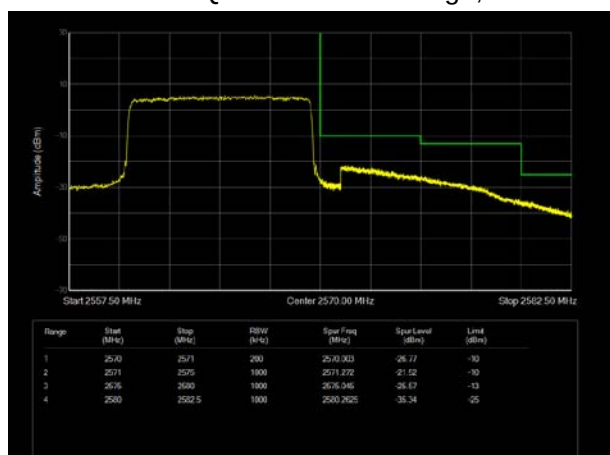
LTE Band 7 64QAM 10MHz CH-High, 1 RB



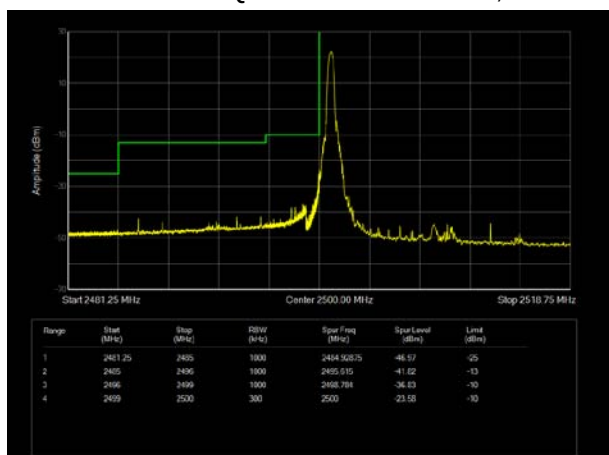
LTE Band 7 64QAM 10MHz CH-Low, 100%RB



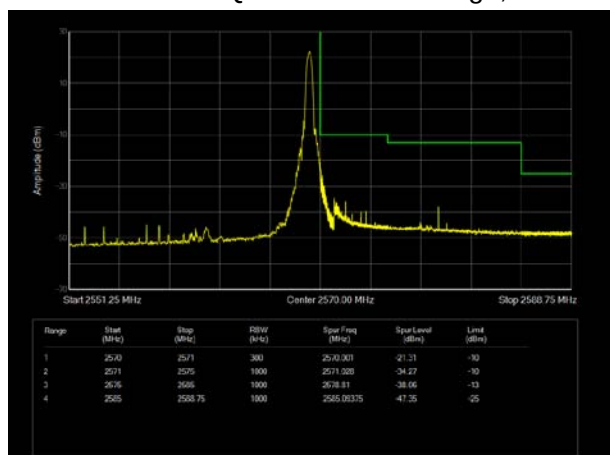
LTE Band 7 64QAM 10MHz CH-High, 100%RB



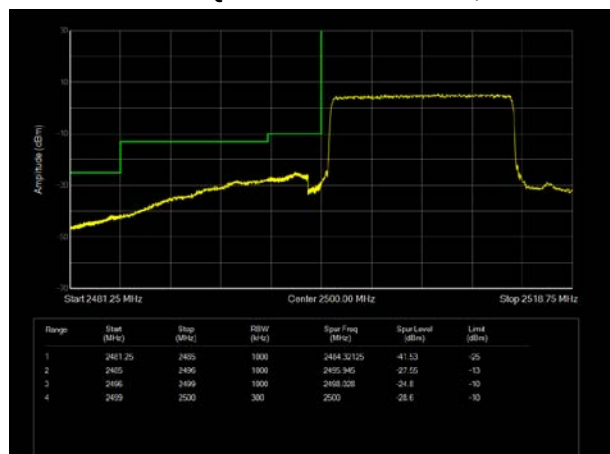
LTE Band 7 64QAM 15MHz CH-Low, 1 RB



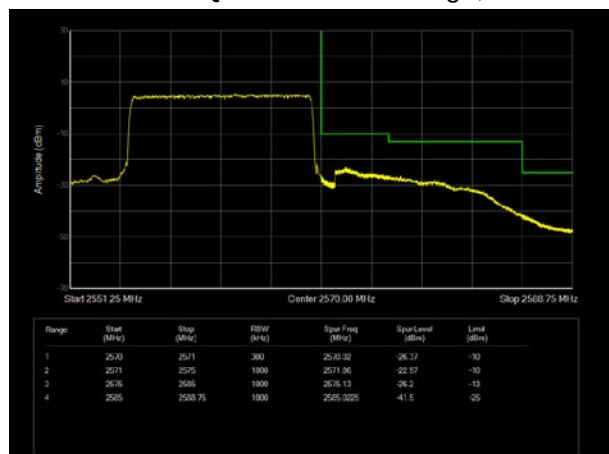
LTE Band 7 64QAM 15MHz CH-High, 1 RB



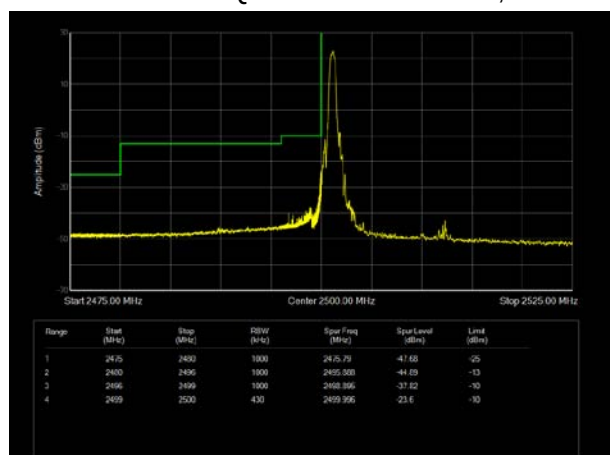
LTE Band 7 64QAM 15MHz CH-Low, 100%RB



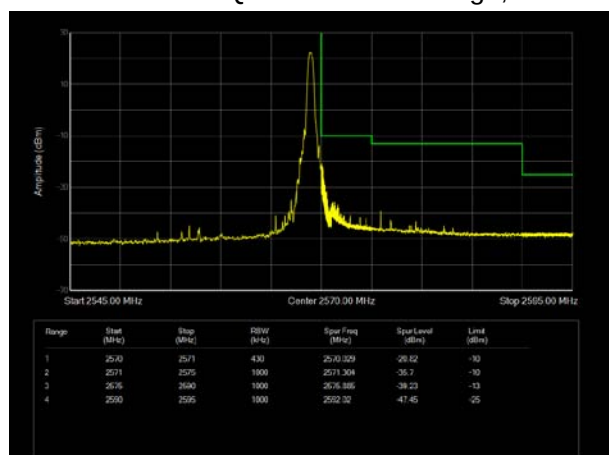
LTE Band 7 64QAM 15MHz CH-High, 100%RB



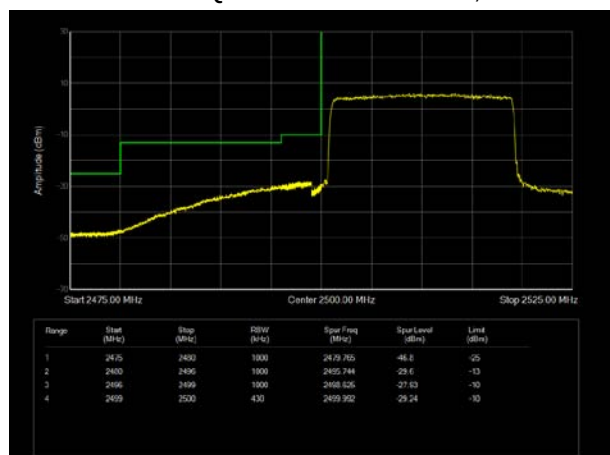
LTE Band 7 64QAM 20MHz CH-Low, 1 RB



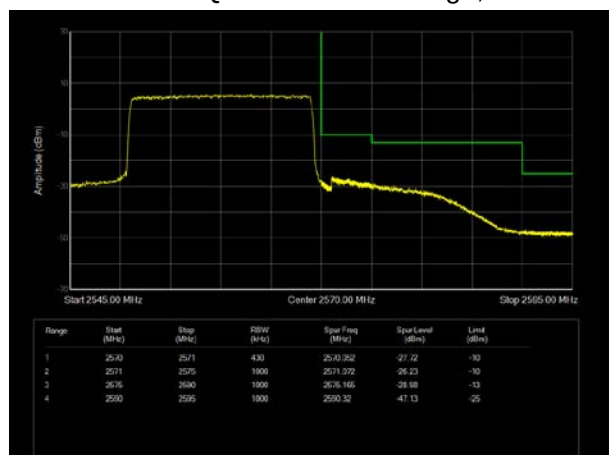
LTE Band 7 64QAM 20MHz CH-High, 1 RB



LTE Band 7 64QAM 20MHz CH-Low, 100%RB

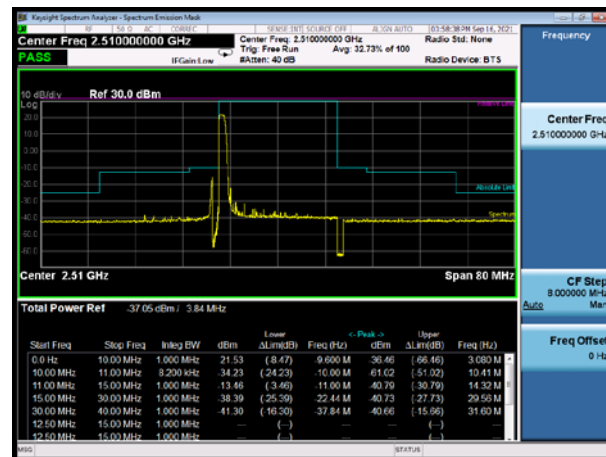


LTE Band 7 64QAM 20MHz CH-High, 100%RB

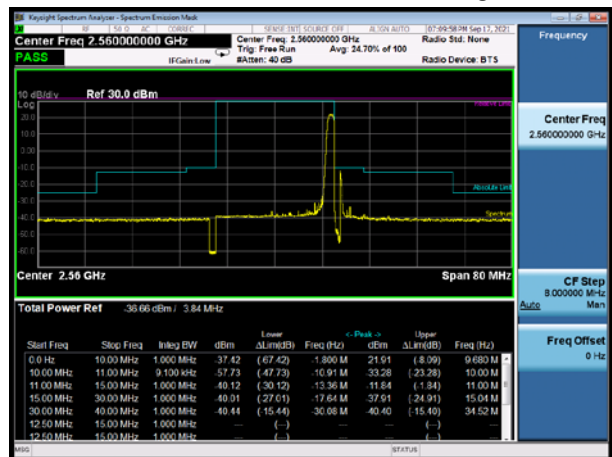




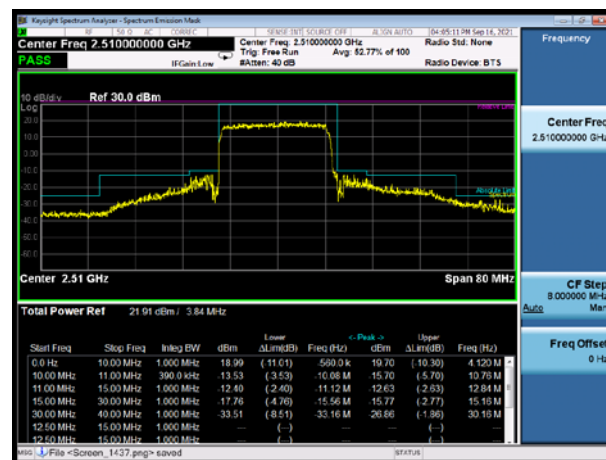
NR n7 PI/2 BPSK 1RB CH-Low



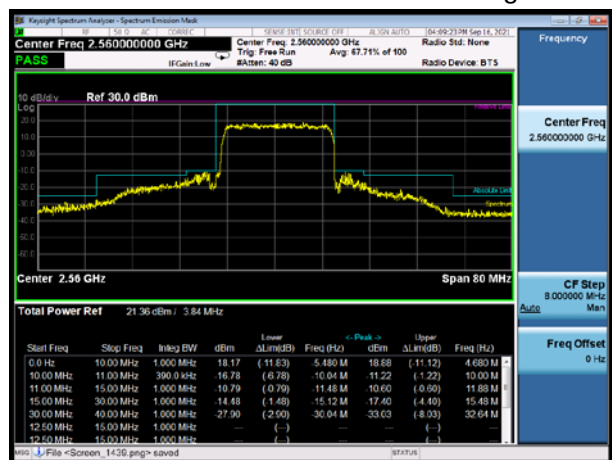
NR n7 PI/2 BPSK 1RB CH-High



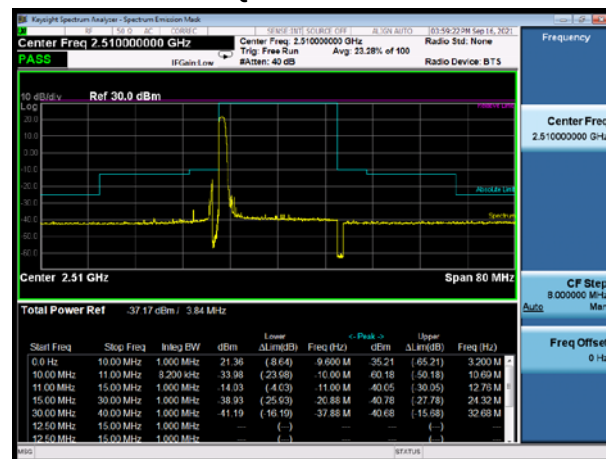
NR n7 PI/2 BPSK 100%RB CH-Low



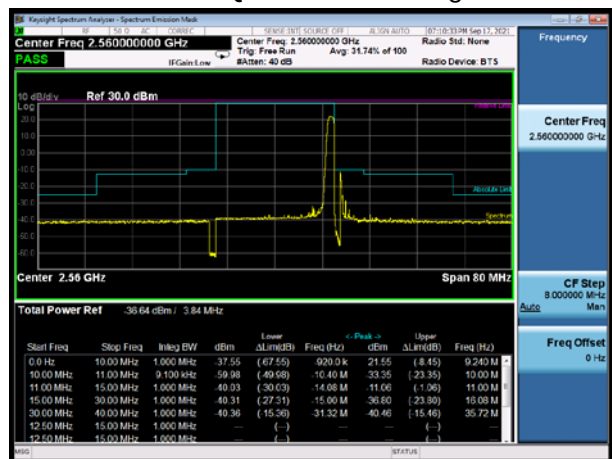
NR n7 PI/2 BPSK 100%RB CH-High



NR n7 QPSK 1RB CH-Low

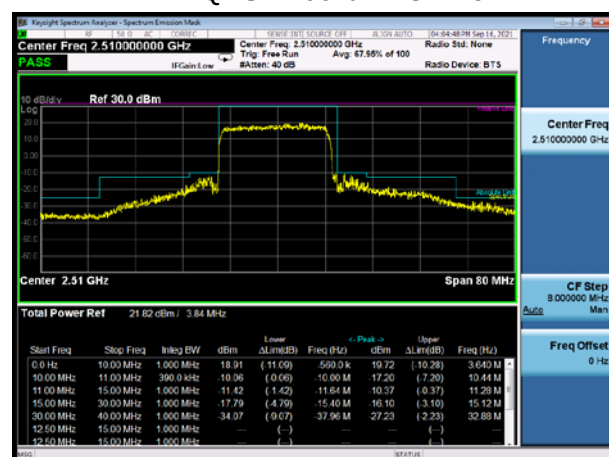


NR n7 QPSK 1RB CH-High

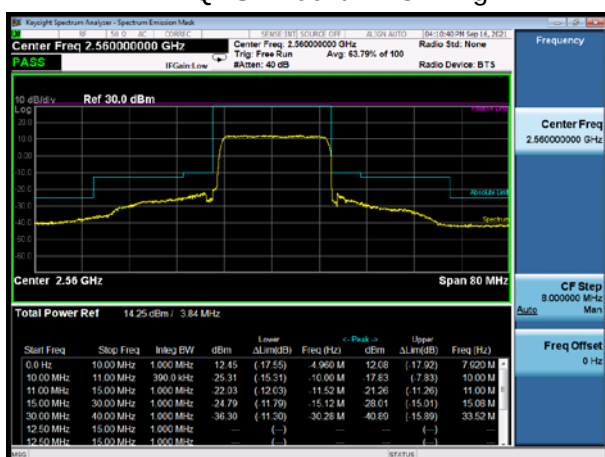




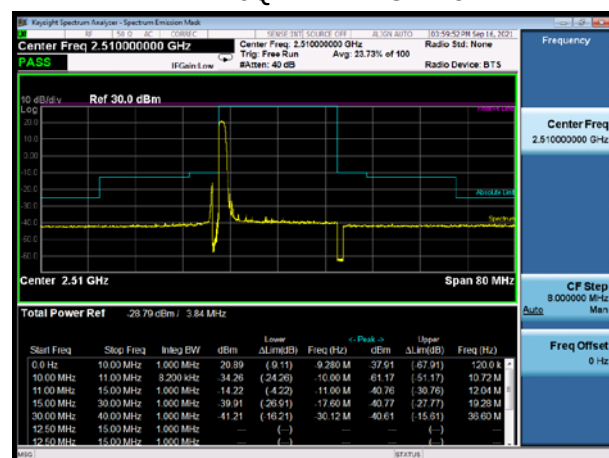
NR n7 QPSK 100%RB CH-Low



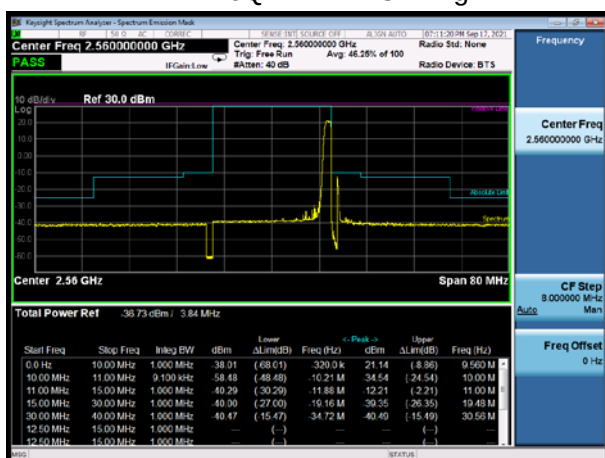
NR n7 QPSK 100%RB CH-High



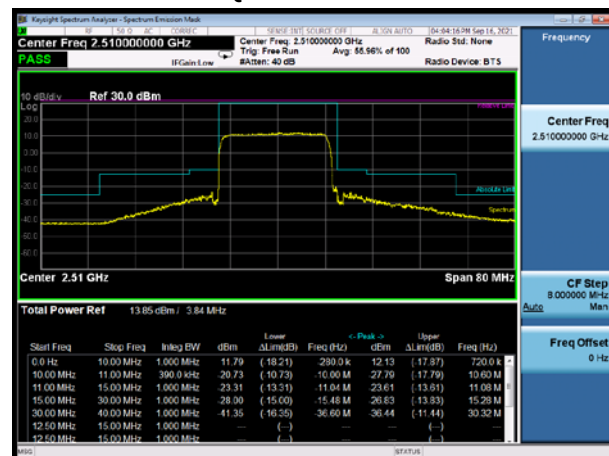
NR n7 16QAM 1RB CH-Low



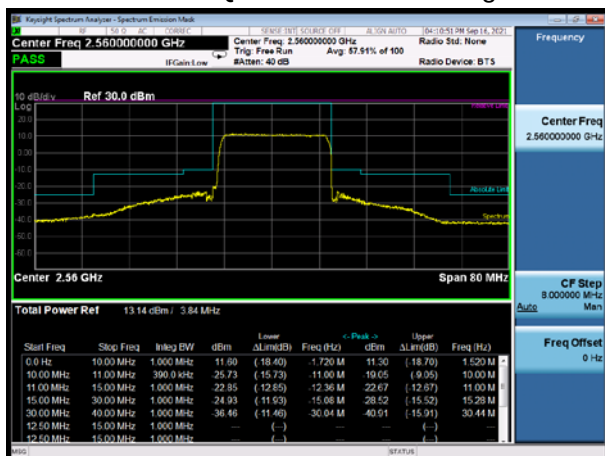
NR n7 16QAM 1RB CH-High



NR n7 16QAM 100%RB CH-Low

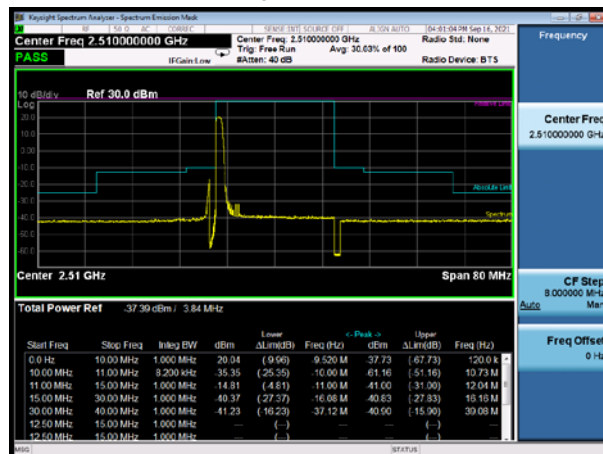


NR n7 16QAM 100%RB CH-High

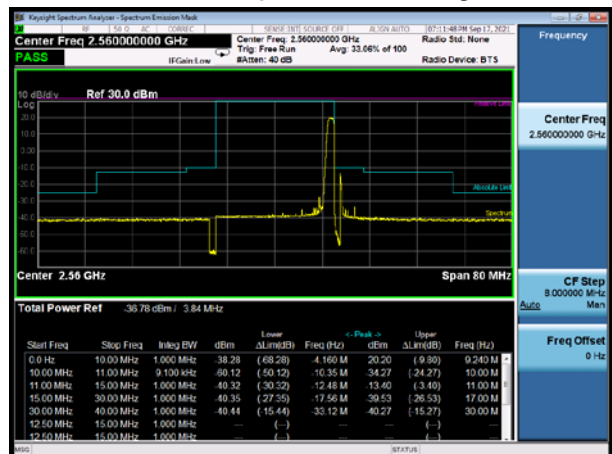




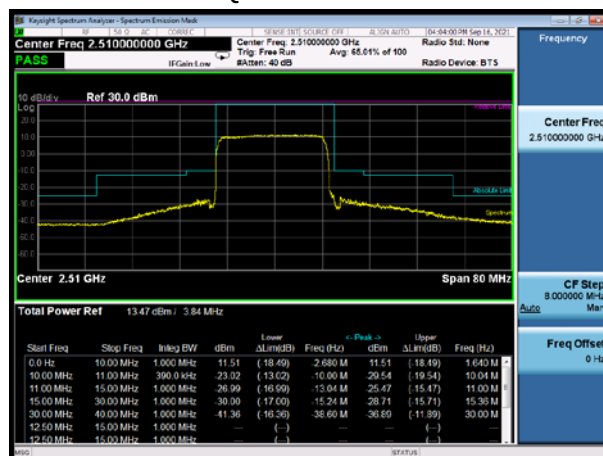
NR n7 64QAM 1RB CH-Low



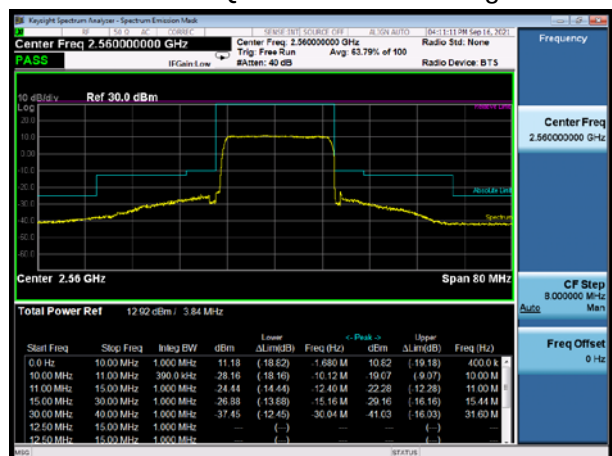
NR n7 64QAM 1RB CH-High



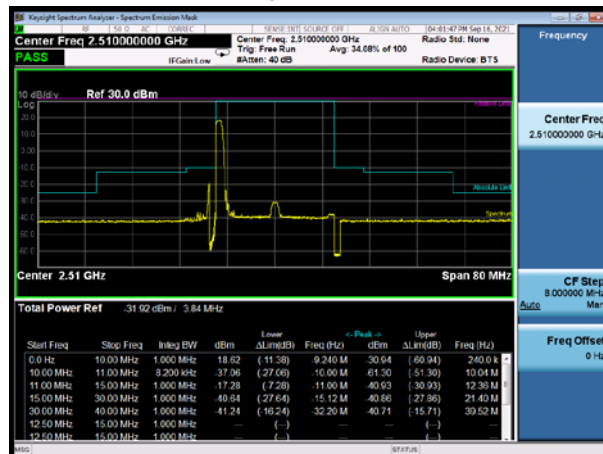
NR n7 64QAM 100%RB CH-Low



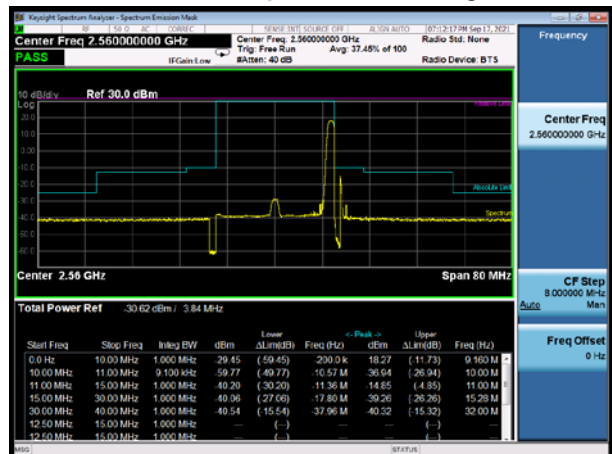
NR n7 64QAM 100%RB CH-High



NR n7 256QAM 1RB CH-Low

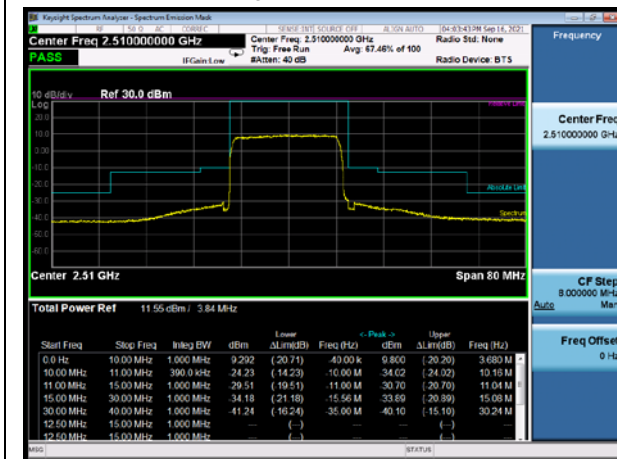


NR n7 256QAM 1RB CH-High

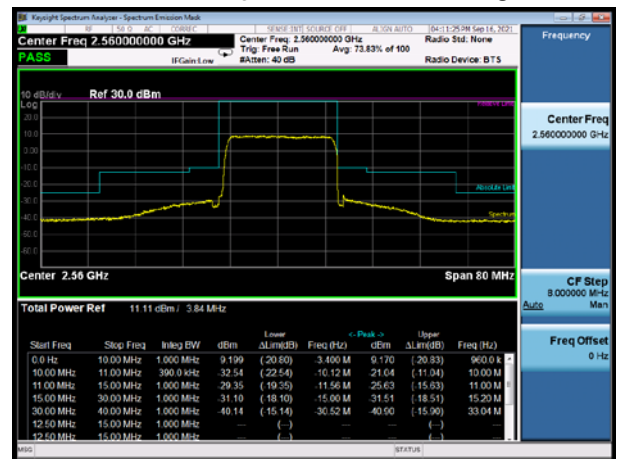




NR n7 256QAM 100%RB CH-Low



NR n7 256QAM 100%RB CH-High



5.4 Peak-to-Average Power Ratio (PAPR)

Ambient condition

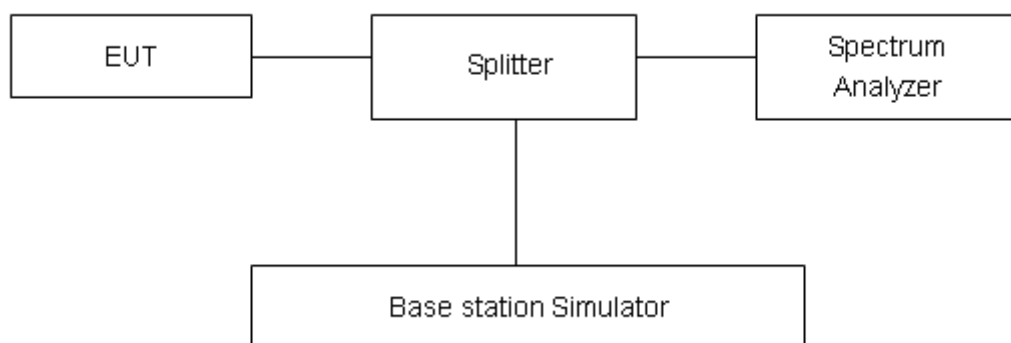
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPK. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

Test Setup



Limits

Rule Part 27.50(d)(5) Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. 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.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.4$ dB.



Test Results

LTE Band 7								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	20775	2502.5	25.80	21.51	4.29	≤13	PASS
		21100	2535	27.32	22.70	4.62	≤13	PASS
		21425	2567.5	26.05	22.58	3.47	≤13	PASS
	10	20800	2505	26.75	22.49	4.26	≤13	PASS
		21100	2535	27.31	22.69	4.62	≤13	PASS
		21400	2565	26.31	22.51	3.80	≤13	PASS
	15	20825	2507.5	27.03	22.51	4.52	≤13	PASS
		21100	2535	27.58	22.67	4.91	≤13	PASS
		21375	2562.5	26.90	22.55	4.35	≤13	PASS
	20	20850	2510	27.08	22.60	4.48	≤13	PASS
		21100	2535	27.50	22.69	4.81	≤13	PASS
		21350	2560	27.06	22.55	4.51	≤13	PASS
16QAM	5	20775	2502.5	26.70	21.51	5.19	≤13	PASS
		21100	2535	27.19	21.75	5.44	≤13	PASS
		21425	2567.5	25.95	21.53	4.42	≤13	PASS
	10	20800	2505	26.63	21.51	5.12	≤13	PASS
		21100	2535	27.19	21.70	5.49	≤13	PASS
		21400	2565	26.23	21.49	4.74	≤13	PASS
	15	20825	2507.5	26.81	21.53	5.28	≤13	PASS
		21100	2535	27.36	21.68	5.68	≤13	PASS
		21375	2562.5	26.74	21.60	5.14	≤13	PASS
	20	20850	2510	26.92	21.63	5.29	≤13	PASS
		21100	2535	27.33	21.73	5.60	≤13	PASS
		21350	2560	26.88	21.55	5.33	≤13	PASS
64QAM	5	20775	2502.5	25.99	20.87	5.12	≤13	PASS
		21100	2535	26.48	21.03	5.45	≤13	PASS
		21425	2567.5	25.28	20.86	4.42	≤13	PASS
	10	20800	2505	25.95	20.83	5.12	≤13	PASS
		21100	2535	26.50	20.99	5.51	≤13	PASS
		21400	2565	25.58	20.82	4.76	≤13	PASS



	15	20825	2507.5	26.17	20.85	5.32	≤13	PASS
		21100	2535	26.68	21.01	5.67	≤13	PASS
		21375	2562.5	26.06	20.91	5.15	≤13	PASS
	20	20850	2510	26.21	20.92	5.29	≤13	PASS
		21100	2535	26.65	21.00	5.65	≤13	PASS
		21350	2560	26.23	20.87	5.36	≤13	PASS

NR n7								
RB	Modulation	Bandwidth (MHz)	Channel	Peak	Avg	PAPR	Limit (dB)	Conclusion
100%	BPSK	20M	502000	26.36	21.56	4.80	≤13	PASS
			507000	26.27	21.12	5.15	≤13	PASS
			512000	26.12	21.19	4.93	≤13	PASS
	QPSK	20M	502000	26.34	21.40	4.94	≤13	PASS
			507000	26.28	21.04	5.24	≤13	PASS
			512000	26.08	21.08	5.00	≤13	PASS
	16QAM	20M	502000	26.36	20.49	5.87	≤13	PASS
			507000	26.32	20.16	6.16	≤13	PASS
			512000	26.19	20.31	5.88	≤13	PASS
	64QAM	20M	502000	26.12	20.02	6.10	≤13	PASS
			507000	26.05	19.65	6.40	≤13	PASS
			512000	25.97	19.59	6.38	≤13	PASS
	256QAM	20M	502000	24.84	18.19	6.65	≤13	PASS
			507000	24.74	17.92	6.82	≤13	PASS
			512000	24.61	17.82	6.79	≤13	PASS

5.5 Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -30°C to +50°C in 10°C step size.

(1)With all power removed, the temperature was decreased to -10°C and permitted to stabilize for three hours.

(2)Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

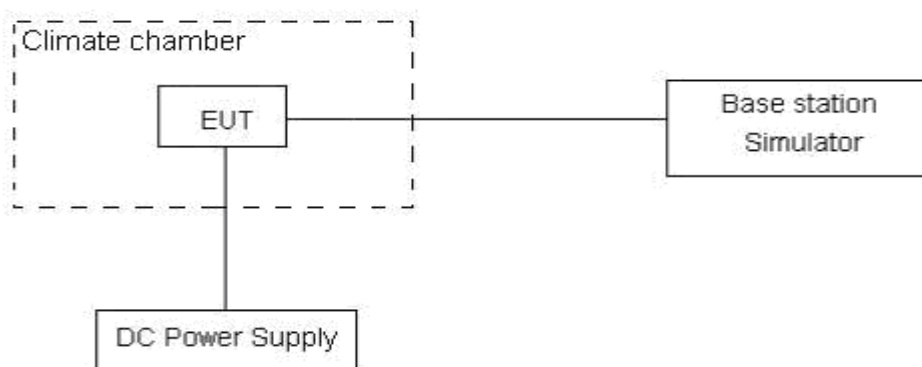
Frequency Stability (Voltage Variation)

The frequency stability shall be measured with variation of primary supply voltage as follows:

Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 44 V and 57 V, with a nominal voltage of 48V.

Test setup



Limits

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 3, U=0.01\text{ppm}$.



Test Result

LTE Band 7								
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal (25°C)	Normal	11.30	2.89	4.32	0.00446	0.00114	0.00171	PASS
Extreme (50°C)		3.27	8.44	9.60	0.00129	0.00333	0.00379	PASS
Extreme (40°C)		17.98	8.44	12.21	0.00709	0.00333	0.00481	PASS
Extreme (30°C)		14.09	7.64	12.88	0.00556	0.00302	0.00508	PASS
Extreme (20°C)		8.01	17.59	7.67	0.00316	0.00694	0.00302	PASS
Extreme (10°C)		4.20	11.16	6.37	0.00166	0.00440	0.00251	PASS
Extreme (0°C)		5.48	11.50	16.75	0.00216	0.00454	0.00661	PASS
Extreme (-10°C)		16.53	17.07	4.68	0.00652	0.00673	0.00185	PASS
Extreme (-20°C)		4.95	17.46	7.93	0.00195	0.00689	0.00313	PASS
Extreme (-30°C)		14.33	17.01	13.56	0.00565	0.00671	0.00535	PASS
25°C	LV	8.44	13.26	8.00	0.00333	0.00523	0.00316	PASS
	HV	11.80	17.35	9.57	0.00465	0.00684	0.00378	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal (25°C)	Normal	1.44	6.90	11.41	0.00057	0.00272	0.00450	PASS
Extreme (50°C)		8.76	2.70	16.18	0.00345	0.00107	0.00638	PASS
Extreme (40°C)		10.76	3.84	2.21	0.00425	0.00151	0.00087	PASS
Extreme (30°C)		14.91	12.72	12.75	0.00588	0.00502	0.00503	PASS
Extreme (20°C)		10.06	11.15	15.75	0.00397	0.00440	0.00621	PASS
Extreme (10°C)		3.73	9.98	17.70	0.00147	0.00394	0.00698	PASS
Extreme (0°C)		8.42	11.37	6.62	0.00332	0.00449	0.00261	PASS
Extreme (-10°C)		6.79	9.12	6.42	0.00268	0.00360	0.00253	PASS
Extreme (-20°C)		11.73	11.97	17.95	0.00463	0.00472	0.00708	PASS
Extreme (-30°C)		3.17	16.52	11.22	0.00125	0.00652	0.00443	PASS
25°C	LV	1.37	6.91	9.03	0.00054	0.00273	0.00356	PASS
	HV	2.01	1.89	6.10	0.00079	0.00075	0.00241	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	15MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal (25°C)	Normal	15.20	12.77	12.02	0.00600	0.00504	0.00474	PASS
Extreme (50°C)		11.85	3.21	9.42	0.00468	0.00127	0.00372	PASS
Extreme (40°C)		15.33	11.38	12.91	0.00605	0.00449	0.00509	PASS
Extreme (30°C)		9.28	3.11	16.94	0.00366	0.00123	0.00668	PASS
Extreme (20°C)		2.65	1.83	6.53	0.00104	0.00072	0.00258	PASS



Extreme (10°C)		7.77	12.18	8.88	0.00306	0.00480	0.00350	PASS
Extreme (0°C)		11.53	4.49	8.20	0.00455	0.00177	0.00323	PASS
Extreme (-10°C)		14.35	9.51	10.41	0.00566	0.00375	0.00411	PASS
Extreme (-20°C)		5.11	17.97	12.35	0.00202	0.00709	0.00487	PASS
Extreme (-30°C)		17.69	2.40	11.78	0.00698	0.00095	0.00465	PASS
25°C	LV	3.70	11.89	17.05	0.00146	0.00469	0.00673	PASS
	HV	5.48	6.87	12.22	0.00216	0.00271	0.00482	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal (25°C)	Normal	7.12	8.15	8.06	0.00281	0.00321	0.00318	PASS
Extreme (50°C)		14.00	4.61	10.08	0.00552	0.00182	0.00398	PASS
Extreme (40°C)		4.38	16.13	7.55	0.00173	0.00636	0.00298	PASS
Extreme (30°C)		2.79	5.30	7.90	0.00110	0.00209	0.00312	PASS
Extreme (20°C)		12.70	17.10	17.10	0.00501	0.00674	0.00675	PASS
Extreme (10°C)		4.40	12.01	6.02	0.00174	0.00474	0.00237	PASS
Extreme (0°C)		9.29	13.45	13.13	0.00367	0.00530	0.00518	PASS
Extreme (-10°C)		16.95	4.28	12.51	0.00668	0.00169	0.00494	PASS
Extreme (-20°C)		9.70	15.92	7.55	0.00383	0.00628	0.00298	PASS
Extreme (-30°C)		1.87	13.13	6.40	0.00074	0.00518	0.00253	PASS
25°C	LV	7.52	13.07	8.25	0.00297	0.00515	0.00326	PASS
	HV	3.42	3.61	4.63	0.00135	0.00142	0.00183	PASS

NR Band NR n7												
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz											
Temperature	Voltage	256QAM	64QAM	16QAM	QPSK	BPSK	256QAM	64QAM	16QAM	QPSK	BPSK	
Normal (25°C)	Normal	12.85	8.99	17.04	5.85	2.99	0.00507	0.00354	0.00672	0.00231	0.00118	PASS
Extreme (50°C)		13.33	4.95	17.64	13.33	11.95	0.00526	0.00195	0.00696	0.00526	0.00471	PASS
Extreme (40°C)		7.12	8.63	4.39	4.12	10.63	0.00281	0.00340	0.00173	0.00162	0.00419	PASS
Extreme (30°C)		1.47	14.47	7.55	7.47	10.47	0.00058	0.00571	0.00298	0.00295	0.00413	PASS
Extreme (20°C)		6.40	17.46	11.79	9.40	7.46	0.00253	0.00689	0.00465	0.00371	0.00294	PASS



Extreme (10°C)		1.75	1.90	2.33	6.75	5.90	0.00069	0.00075	0.00092	0.00266	0.00233	PASS
Extreme (0°C)		5.95	12.71	5.87	12.95	1.71	0.00235	0.00502	0.00231	0.00511	0.00068	PASS
Extreme (-10°C)		7.54	15.73	11.18	17.54	12.73	0.00297	0.00620	0.00441	0.00692	0.00502	PASS
Extreme (-20°C)		10.28	11.08	12.14	11.28	3.08	0.00406	0.00437	0.00479	0.00445	0.00121	PASS
Extreme (-30°C)		13.87	5.39	7.54	8.87	11.39	0.00547	0.00213	0.00297	0.00350	0.00449	PASS
25°C	LV	4.41	8.75	11.72	7.41	4.75	0.00174	0.00345	0.00462	0.00292	0.00187	PASS
	HV	6.68	1.01	7.58	1.68	16.01	0.00264	0.00040	0.00299	0.00066	0.00631	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz											
Temperature	Voltage	256QAM	64QAM	16QAM	QPSK	BPSK	256QAM	64QAM	16QAM	QPSK	BPSK	
Normal (25°C)	Normal	6.69	11.70	7.98	6.69	2.70	0.00264	0.00461	0.00315	0.00264	0.00106	PASS
Extreme (50°C)		3.44	16.03	2.71	5.44	6.03	0.00136	0.00632	0.00107	0.00215	0.00238	PASS
Extreme (40°C)		4.88	14.68	16.08	4.88	11.68	0.00192	0.00579	0.00634	0.00192	0.00461	PASS
Extreme (30°C)		1.34	4.24	12.49	5.34	5.24	0.00053	0.00167	0.00493	0.00211	0.00207	PASS
Extreme (20°C)		11.18	1.26	11.07	5.18	5.26	0.00441	0.00050	0.00437	0.00205	0.00207	PASS
Extreme		10.31	13.35	16.97	10.31	13.35	0.00407	0.00527	0.00669	0.00407	0.00527	PASS



(10°C)												
Extreme (0°C)		10.82	11.05	1.75	5.82	4.05	0.00427	0.00436	0.00069	0.00229	0.00160	PASS
Extreme (-10°C)		7.63	1.81	12.33	5.63	10.81	0.00301	0.00071	0.00486	0.00222	0.00426	PASS
Extreme (-20°C)		16.28	16.30	10.64	10.28	4.30	0.00642	0.00643	0.00420	0.00406	0.00170	PASS
Extreme (-30°C)		7.20	17.95	7.60	14.20	5.95	0.00284	0.00708	0.00300	0.00560	0.00235	PASS
25°C	LV	16.49	2.73	12.26	15.49	17.73	0.00651	0.00108	0.00484	0.00611	0.00699	PASS
	HV	11.04	16.72	9.77	6.04	2.72	0.00436	0.00660	0.00385	0.00238	0.00107	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BAND WIDTH	15MHz											
Temperature	Voltage	256QAM	64QAM	16QAM	QPSK	BPSK	256QAM	64QAM	16QAM	QPSK	BPSK	
Normal (25°C)	Normal	14.39	15.58	6.13	3.39	2.58	0.00568	0.00615	0.00242	0.00134	0.00102	PASS
Extreme (50°C)		16.02	7.19	5.52	9.02	13.19	0.00632	0.00284	0.00218	0.00356	0.00520	PASS
Extreme (40°C)		17.45	17.42	4.86	14.45	5.42	0.00688	0.00687	0.00192	0.00570	0.00214	PASS
Extreme (30°C)		11.70	14.74	16.29	17.70	5.74	0.00461	0.00581	0.00642	0.00698	0.00226	PASS



)												
Extreme (20°C)		13.73	12.73	14.92	12.73	16.73	0.00542	0.00502	0.00588	0.00502	0.00660	PASS
Extreme (10°C)		1.86	10.80	4.35	2.86	10.80	0.00074	0.00426	0.00172	0.00113	0.00426	PASS
Extreme (0°C)		3.97	1.68	12.54	4.97	10.68	0.00156	0.00066	0.00495	0.00196	0.00421	PASS
Extreme (-10°C)		10.20	9.33	6.32	7.20	10.33	0.00402	0.00368	0.00249	0.00284	0.00407	PASS
Extreme (-20°C)		1.82	11.89	13.20	4.82	15.89	0.00072	0.00469	0.00521	0.00190	0.00627	PASS
Extreme (-30°C)		2.67	4.21	12.99	10.67	6.21	0.00105	0.00166	0.00512	0.00421	0.00245	PASS
25°C	LV	7.68	14.84	3.85	7.68	3.84	0.00303	0.00585	0.00152	0.00303	0.00152	PASS
	HV	14.08	5.71	1.49	12.08	11.71	0.00555	0.00225	0.00059	0.00476	0.00462	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz											
Temperature	Voltage	256QAM	64QAM	16QAM	QPSK	BPSK	256QAM	64QAM	16QAM	QPSK	BPSK	
Normal (25°C)	Normal	14.44	8.23	3.20	5.44	15.23	0.00569	0.00325	0.00126	0.00214	0.00601	PASS
Extreme (50°C)		17.03	5.04	1.51	9.03	17.04	0.00672	0.00199	0.00059	0.00356	0.00672	PASS



Extreme (40°C)		9.91	6.58	11.94	14.91	10.58	0.00391	0.00260	0.00471	0.00588	0.00417	PASS
Extreme (30°C)		4.18	7.57	3.13	2.18	10.57	0.00165	0.00299	0.00123	0.00086	0.00417	PASS
Extreme (20°C)		11.56	3.60	15.86	10.56	5.60	0.00456	0.00142	0.00626	0.00417	0.00221	PASS
Extreme (10°C)		13.33	1.99	3.54	1.33	15.99	0.00526	0.00078	0.00140	0.00052	0.00631	PASS
Extreme (0°C)		16.87	1.72	8.29	2.87	12.72	0.00665	0.00068	0.00327	0.00113	0.00502	PASS
Extreme (-10°C)		7.00	8.98	4.17	15.00	10.98	0.00276	0.00354	0.00164	0.00592	0.00433	PASS
Extreme (-20°C)		2.30	3.03	8.03	15.30	5.03	0.00091	0.00120	0.00317	0.00603	0.00199	PASS
Extreme (-30°C)		1.89	7.81	7.99	3.89	14.81	0.00075	0.00308	0.00315	0.00153	0.00584	PASS
25°C	LV	6.31	3.30	7.68	4.31	5.30	0.00249	0.00130	0.00303	0.00170	0.00209	PASS
	HV	2.09	3.31	4.12	8.09	1.31	0.00082	0.00131	0.00162	0.00319	0.00052	PASS

5.6 Spurious Emissions at Antenna Terminals

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.

RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.

RBW is set to 1 kHz (0.009MHz~ 0.15 MHz),

RBW is set to 10 kHz (0.15 MHz~ 30 MHz)

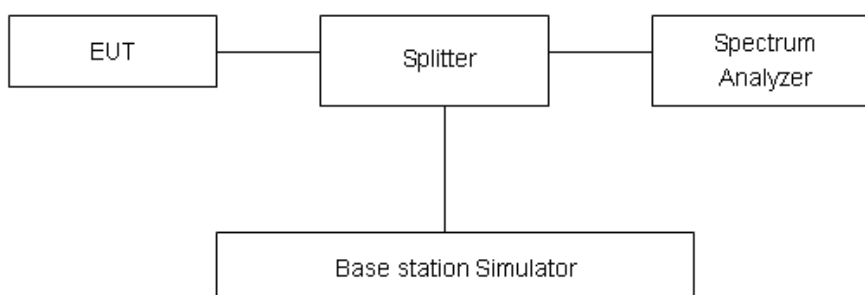
RBW is set to 100 kHz (30MHz~1000 MHz)

RBW is set to 1000 kHz (above 1000MHz)

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup



Limits

Rule Part 27.53(m) $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section.

Part 27.53(m) Limit	-25 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

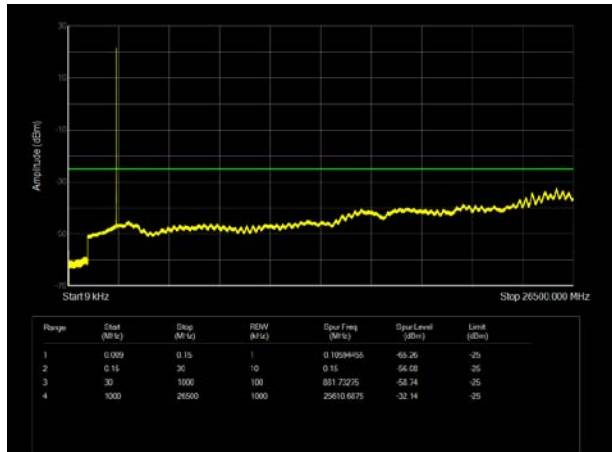
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-27GHz	1.407 dB

Test Result

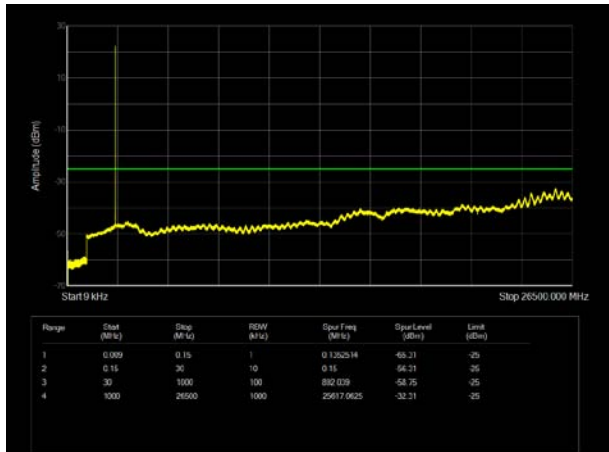
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

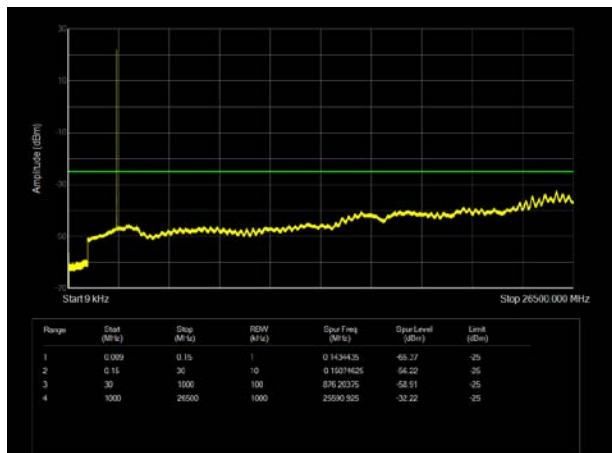
LTE Band 7 5MHz CH- Low 9kHz~26.5GHz



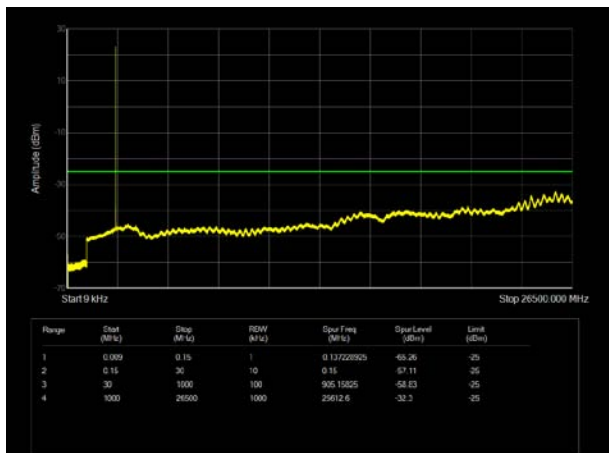
LTE Band 7 10MHz CH-Low 9kHz~26.5GHz



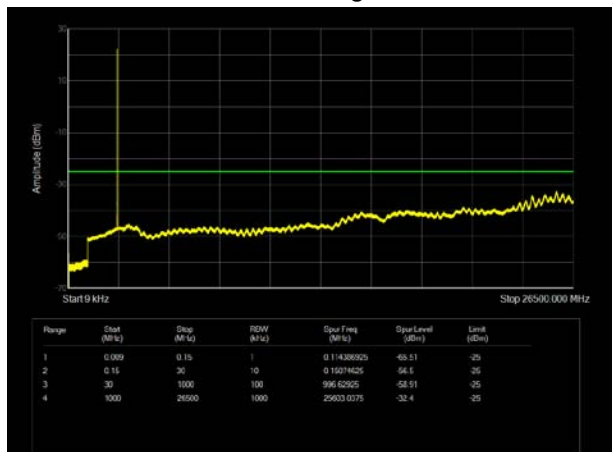
LTE Band 7 5MHz CH- Middle 9kHz~26.5GHz



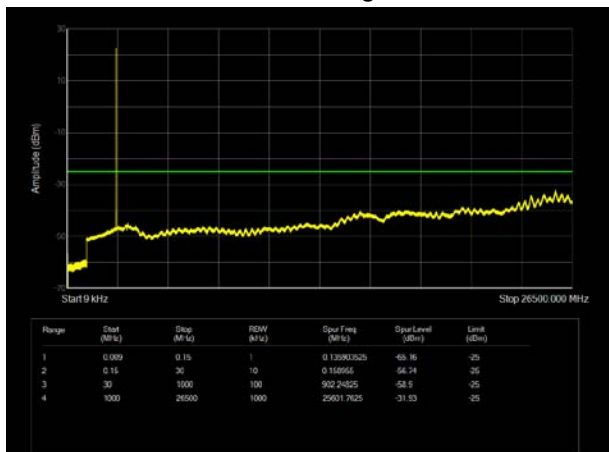
LTE Band 7 10MHz CH- Middle 9kHz~26.5GHz



LTE Band 7 5MHz CH-High 9kHz~26.5GHz

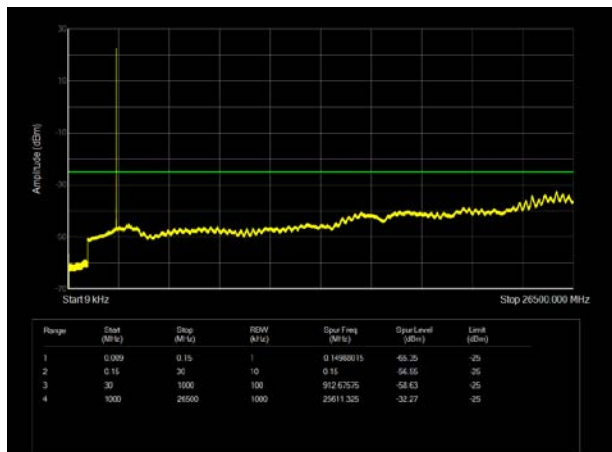


LTE Band 7 10MHz CH- High 9kHz~26.5GHz

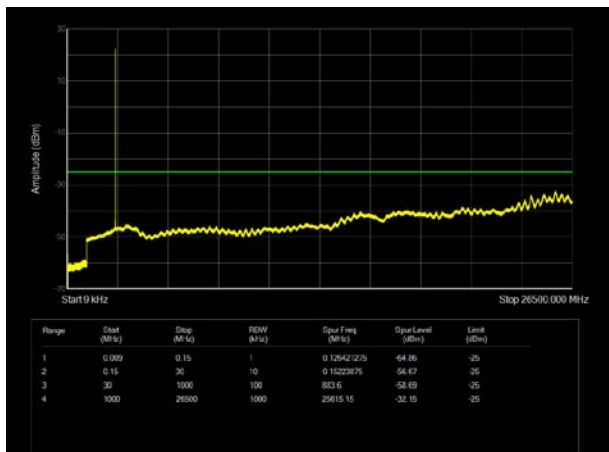




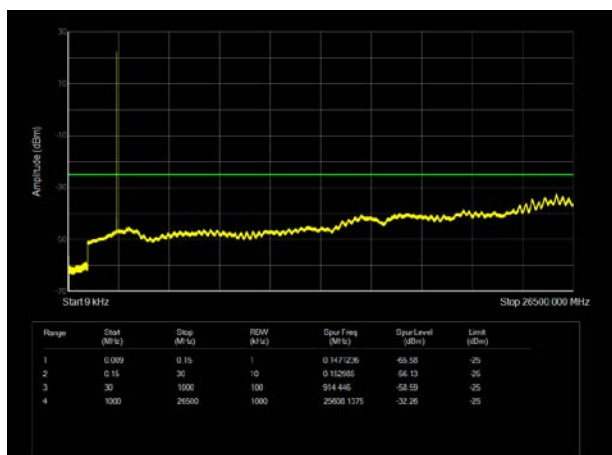
LTE Band 7 15MHz CH- Low 9kHz~26.5GHz



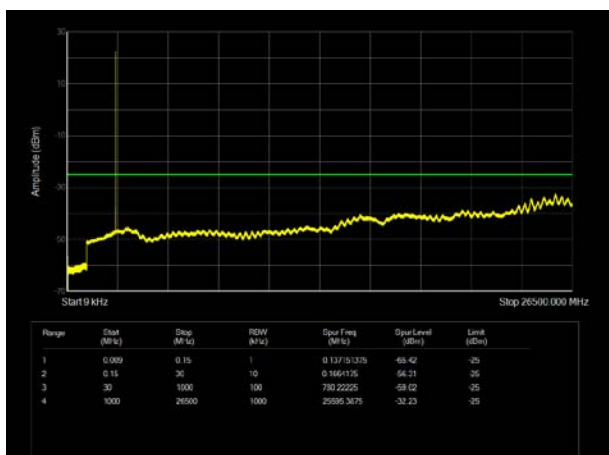
LTE Band 7 20MHz CH-Low 9kHz~26.5GHz



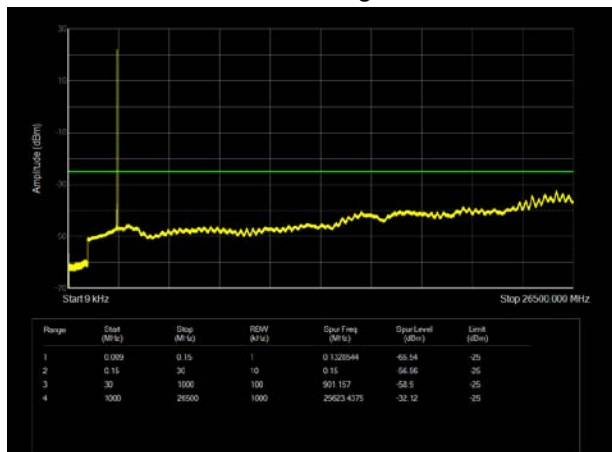
LTE Band 7 15MHz CH- Middle 9kHz~26.5GHz



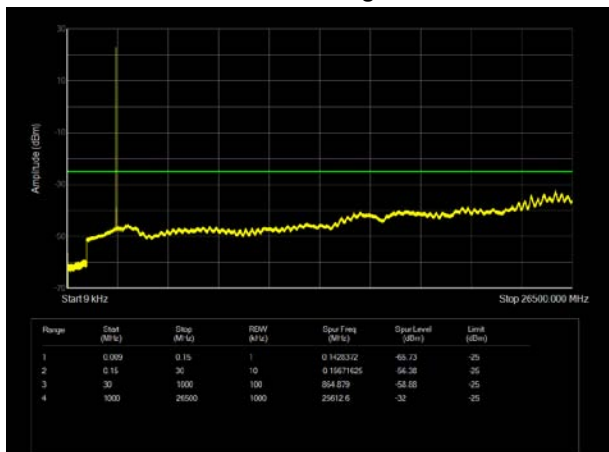
LTE Band 7 20MHz CH- Middle 9kHz~26.5GHz



LTE Band 7 15MHz CH-High 9kHz~26.5GHz

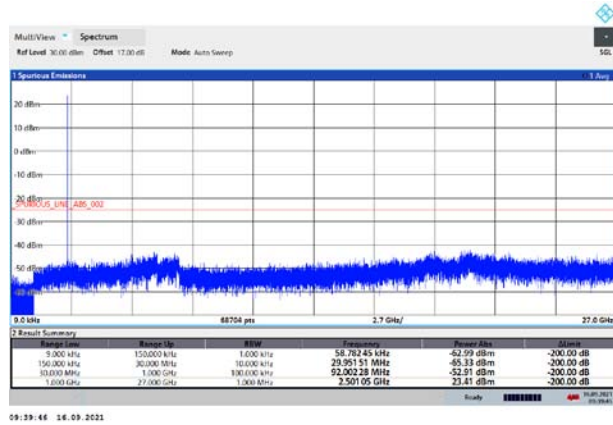


LTE Band 7 20MHz CH- High 9kHz~26.5GHz

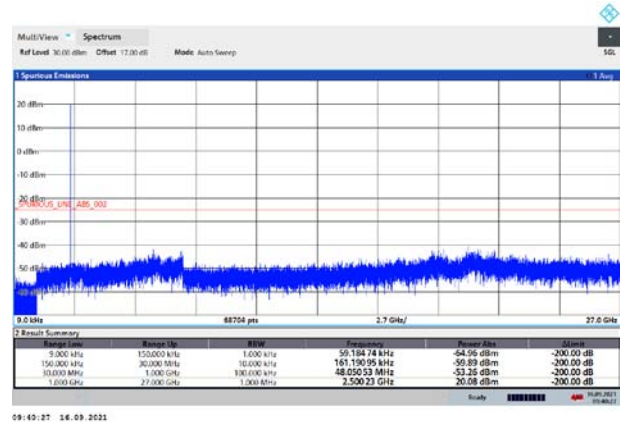




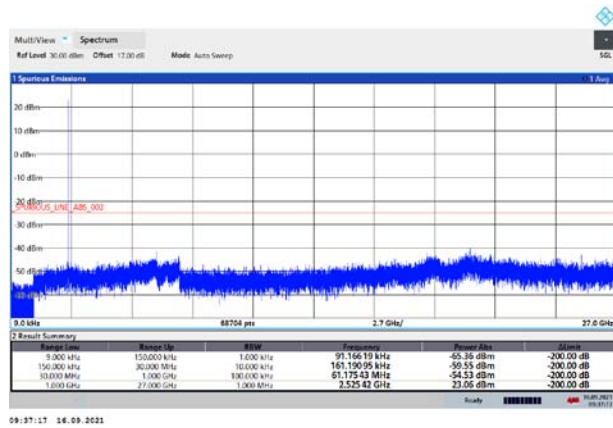
NR n7 P1/2 BPSK CH-Low 9kHz~27GHz



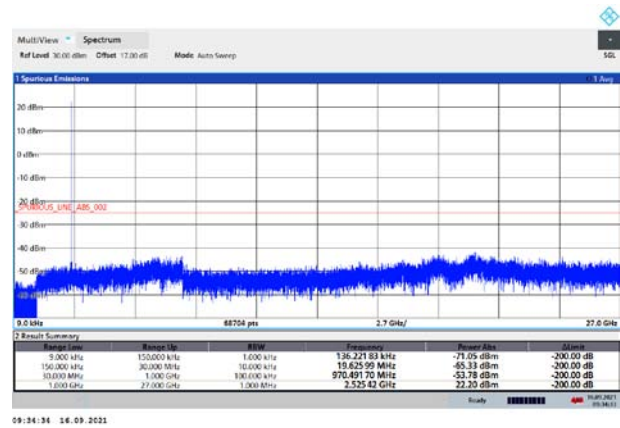
NR n7 QPSK CH-Low 9kHz~27GHz



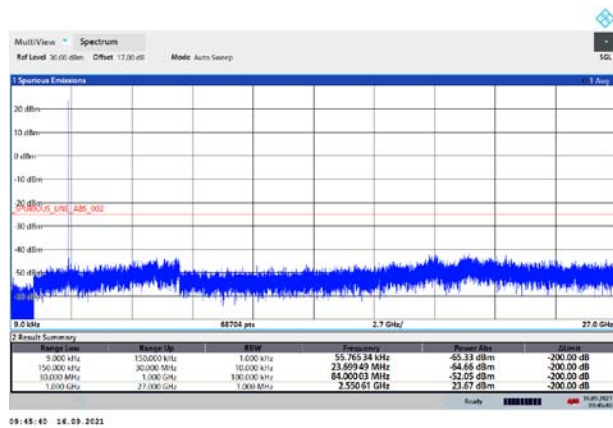
NR n7 P1/2 BPSK CH-Middle 9kHz~27GHz



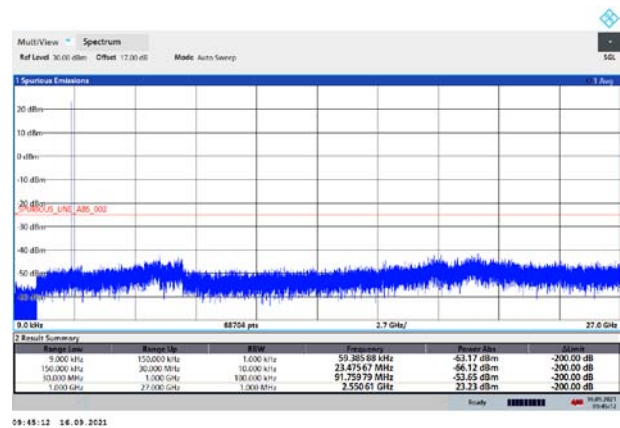
NR n7 QPSK CH-Middle 9kHz~27GHz



NR n7 P1/2 BPSK CH-High 9kHz~27GHz

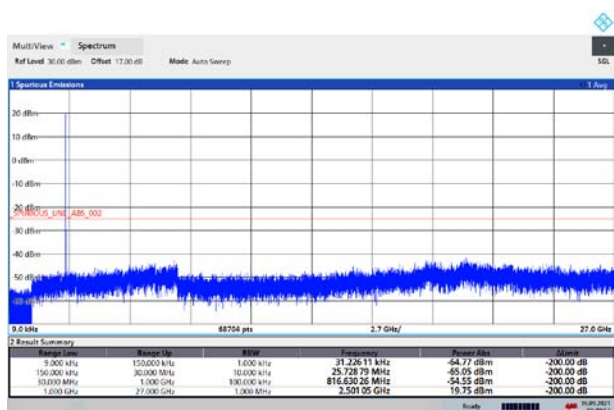


NR n7 QPSK CH-High 9kHz~27GHz



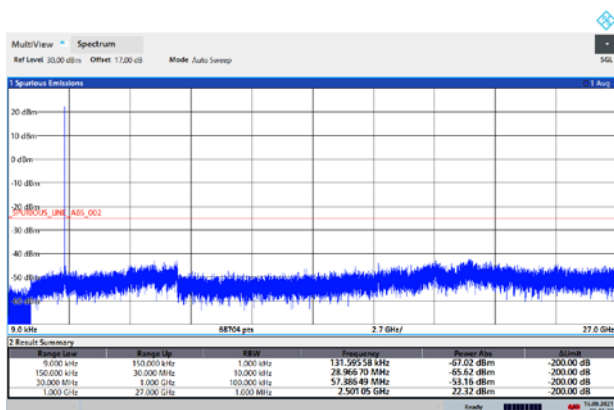


NR n7 16QAM CH-Low 9kHz~27GHz



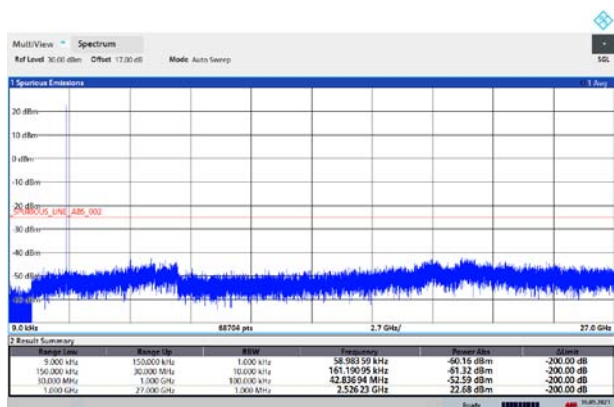
09:40:53 16.09.2021

NR n7 64QAM CH-Low 9kHz~27GHz



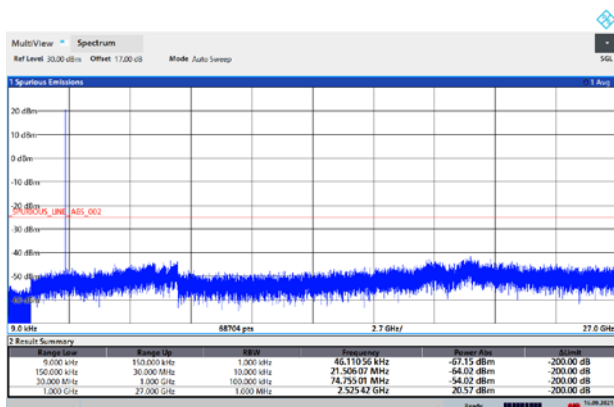
09:41:21 16.09.2021

NR n7 16QAM CH-Middle 9kHz~27GHz



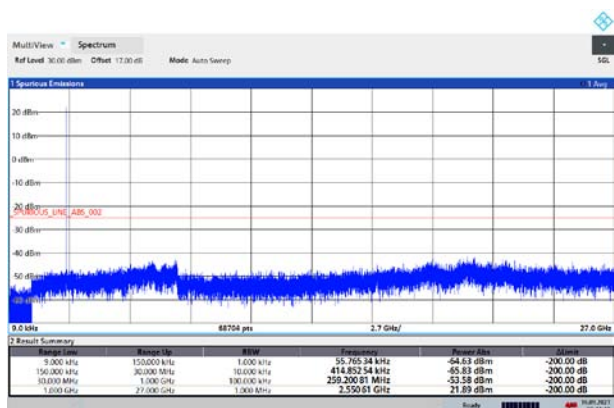
09:41:46 16.09.2021

NR n7 64QAM CH-Middle 9kHz~27GHz



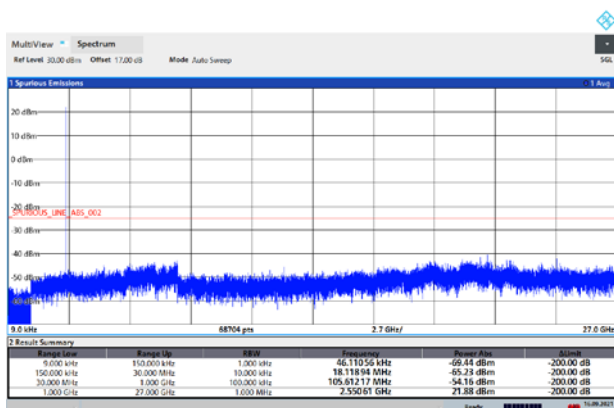
09:41:08 16.09.2021

NR n7 16QAM CH-High 9kHz~27GHz



09:44:49 16.09.2021

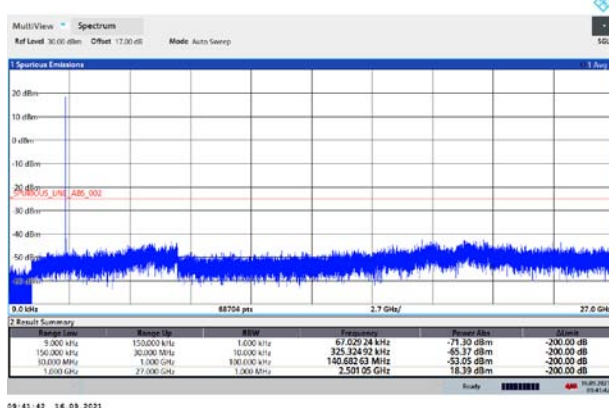
NR n7 64QAM CH-High 9kHz~27GHz



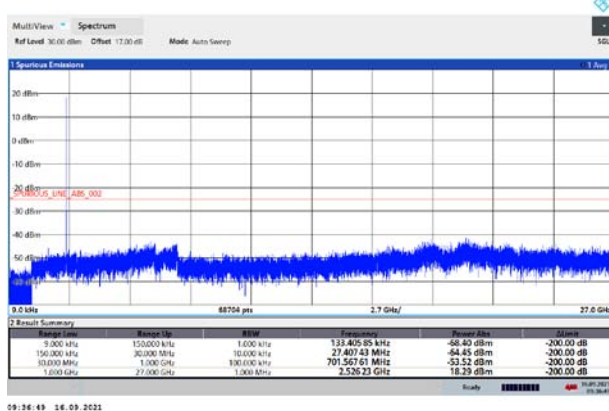
09:44:29 16.09.2021



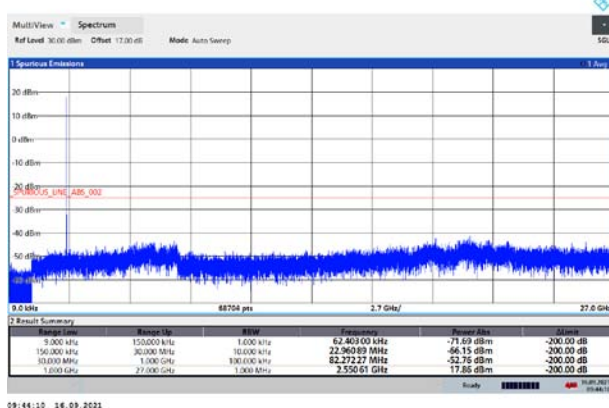
NR n7 256QAM CH-Low 9kHz~27GHz



NR n7 256QAM CH-Middle 9kHz~27GHz



NR n7 256QAM CH-High 9kHz~27GHz



5.7 Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=100kHz, VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, and the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAG) should be recorded after test.
7. The measurement results are obtained as described below:

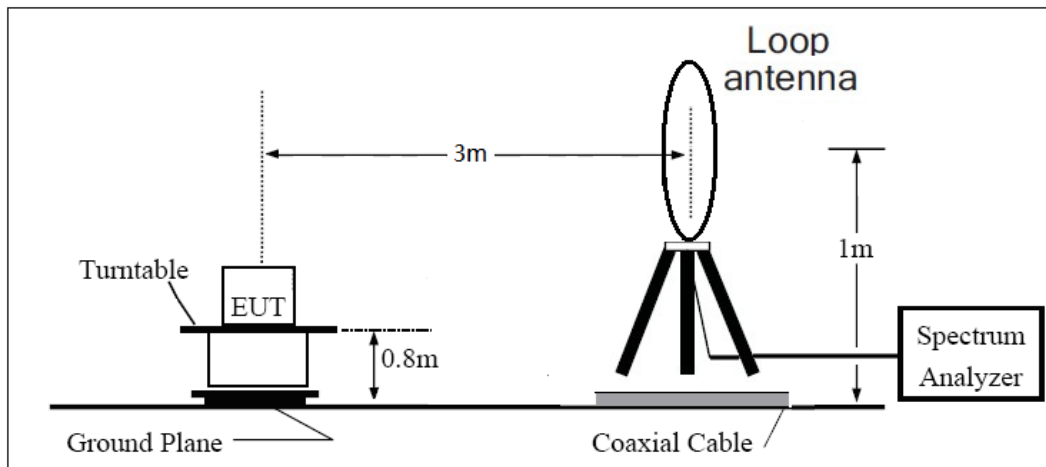
$$\text{Power(EIRP)} = \text{PMea} - \text{PAG} - \text{Pcl} + \text{Ga}$$
The measurement results are amend as described below:

$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$.

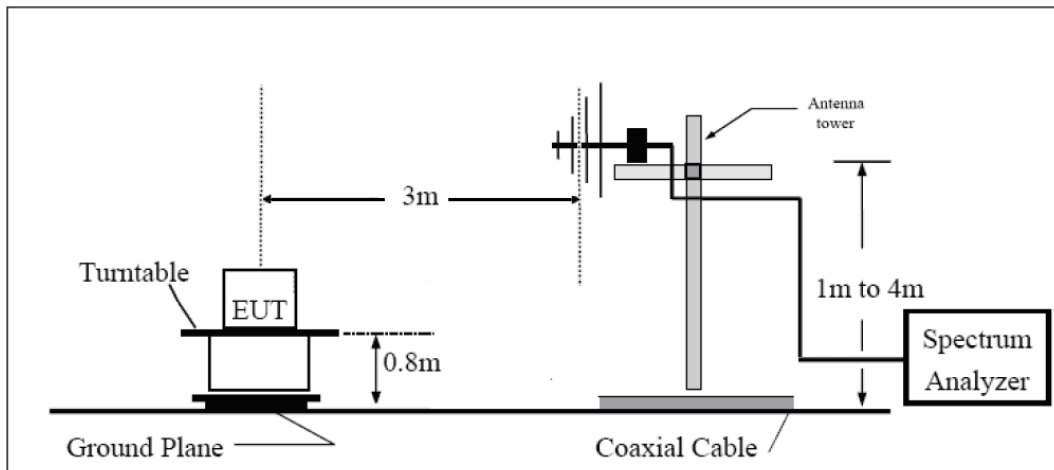
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

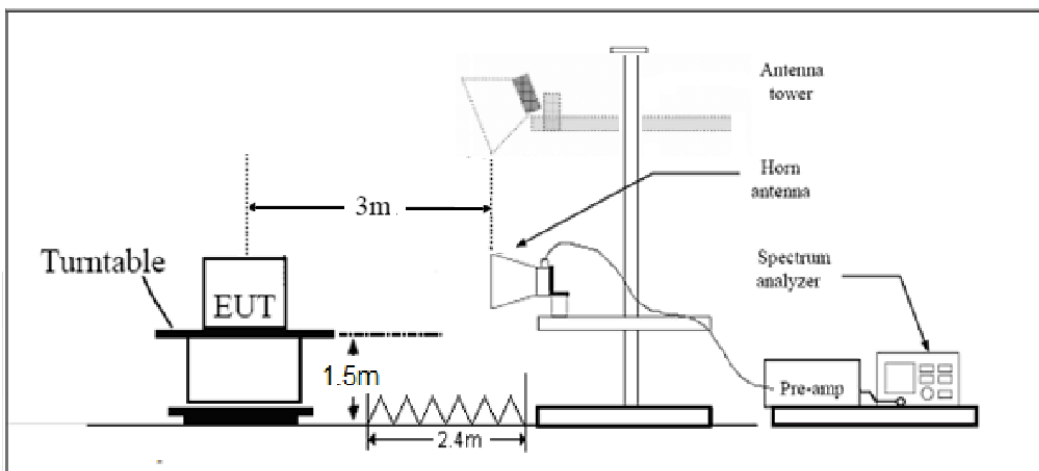
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Limits



Rule Part 27.53(m) $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section.

Part 27.53(m) Limit	-25 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = \pm 1.96$, $U = \pm 3.55$ dB.

**Test Result**

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

LTE Band 7 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5065.80	-60.76	3.40	12.50	Horizontal	-51.66	-25.0	26.66	45
3	7598.60	-56.91	4.40	12.20	Horizontal	-49.11	-25.0	24.11	90
4	10130.63	-45.86	4.70	11.30	Horizontal	-39.26	-25.0	14.26	135
5	12675.00	-53.27	5.40	13.20	Horizontal	-45.47	-25.0	20.47	225
6	15210.00	-53.95	6.10	13.10	Horizontal	-46.95	-25.0	21.95	90
7	17745.00	-59.76	6.10	14.20	Horizontal	-51.66	-25.0	26.66	45
8	20280.00	--	--	--	--	--	--	--	--
9	22815.00	--	--	--	--	--	--	--	--
10	25350.00	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

LTE Band 7 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5052.38	-62.06	3.40	12.50	Horizontal	-52.96	-25.0	27.96	45
3	7605.00	-58.54	4.40	12.20	Horizontal	-50.74	-25.0	25.74	0
4	10140.00	-48.70	4.70	11.30	Horizontal	-42.10	-25.0	17.10	0
5	12675.00	-52.90	5.40	13.20	Horizontal	-45.10	-25.0	20.10	225
6	15210.00	-52.50	6.10	13.10	Horizontal	-45.50	-25.0	20.50	135
7	17745.00	-61.06	6.10	14.20	Horizontal	-52.96	-25.0	27.96	45
8	20280.00	--	--	--	--	--	--	--	--
9	22815.00	--	--	--	--	--	--	--	--
10	25350.00	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.



NR n7 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5070.00	-65.36	3.20	12.50	Horizontal	-56.06	-25.0	31.06	45
3	7605.00	-56.78	4.40	12.20	Horizontal	-48.98	-25.0	23.98	0
4	10140.00	-51.61	4.70	11.80	Horizontal	-44.51	-25.0	19.51	225
5	12675.00	-52.91	5.40	14.00	Horizontal	-44.31	-25.0	19.31	315
6	15210.00	-58.32	6.10	16.80	Horizontal	-47.62	-25.0	22.62	90
7	17745.00	-51.00	6.10	14.20	Horizontal	-42.90	-25.0	17.90	0
8	20663.92	--	--	--	--	--	--	--	--
9	23246.91	--	--	--	--	--	--	--	--
10	25829.90	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

NR n7 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5070.00	-61.38	3.20	12.50	Horizontal	-52.08	-25.0	27.08	45
3	7605.00	-55.06	4.40	12.20	Horizontal	-47.26	-25.0	22.26	0
4	10140.00	-51.89	4.70	11.80	Horizontal	-44.79	-25.0	19.79	135
5	12675.00	-54.36	5.40	14.00	Horizontal	-45.76	-25.0	20.76	225
6	15210.00	-56.78	6.10	16.80	Horizontal	-46.08	-25.0	21.08	45
7	17745.00	-50.33	6.10	14.20	Horizontal	-42.23	-25.0	17.23	45
8	20576.00	--	--	--	--	--	--	--	--
9	23148.00	--	--	--	--	--	--	--	--
10	25720.00	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



6 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2021-05-15	2022-05-14
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2021-05-15	2022-05-14
Signal Analyzer	R&S	FSV3030	101411	2020-12-13	2021-12-12
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2020-04-02	2023-04-01
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	391	2019-12-16	2022-12-15
Horn Antenna	R&S	HF907	102723	2020-08-11	2023-08-10
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2023-06-19
Signal generator	R&S	SMB 100A	102594	2021-05-15	2022-05-14
Climatic Chamber	ESPEC	SU-242	93000506	2020-12-13	2021-12-12
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2021-06-09	2021-12-08
RF Cable	Agilent	SMA 15cm	0001	2021-06-09	2021-12-08
Software	R&S	EMC32	9.26.0	/	/

*****END OF REPORT *****



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.