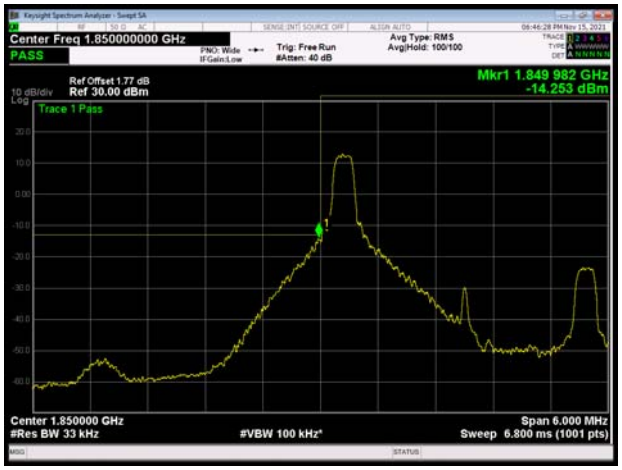
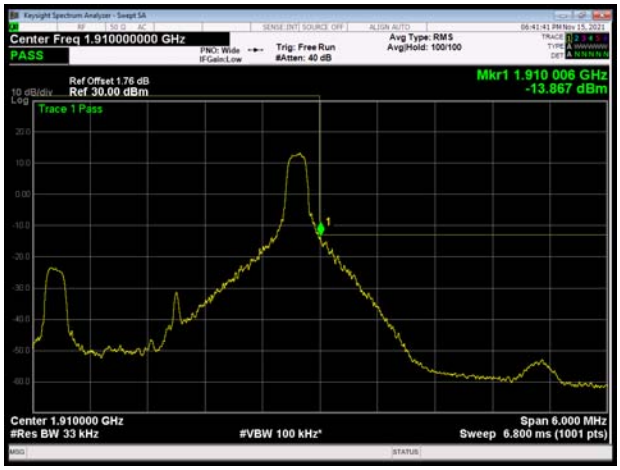
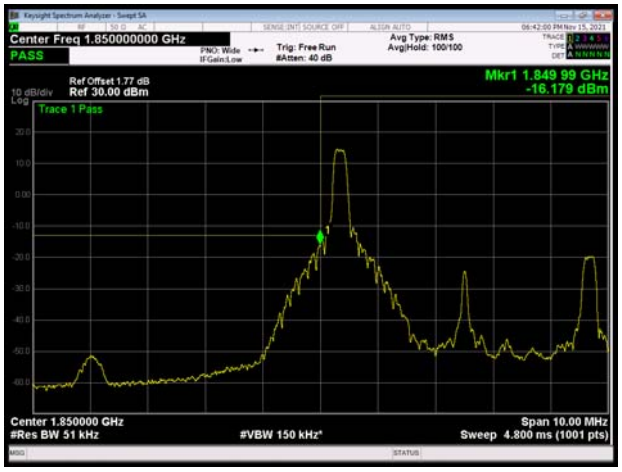
Test Result:

LTE Band 2 1.4MHz QPSK 1RB CH-Low	LTE Band 2 1.4MHz QPSK 1RB CH-High
	
LTE Band 2 1.4MHz QPSK 100%RB CH-Low	LTE Band 2 1.4MHz QPSK 100%RB CH-High
	
LTE Band 2 3MHz QPSK 1RB CH-Low	LTE Band 2 3MHz QPSK 1RB CH-High
	

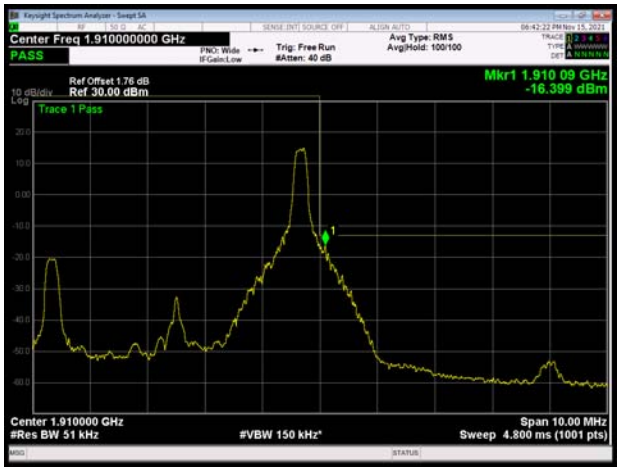
LTE Band 2 3MHz QPSK 100%RB CH-Low

LTE Band 2 3MHz QPSK 100%RB CH-High

LTE Band 2 5MHz QPSK 1RB CH-Low



LTE Band 2 5MHz QPSK 1RB CH-High

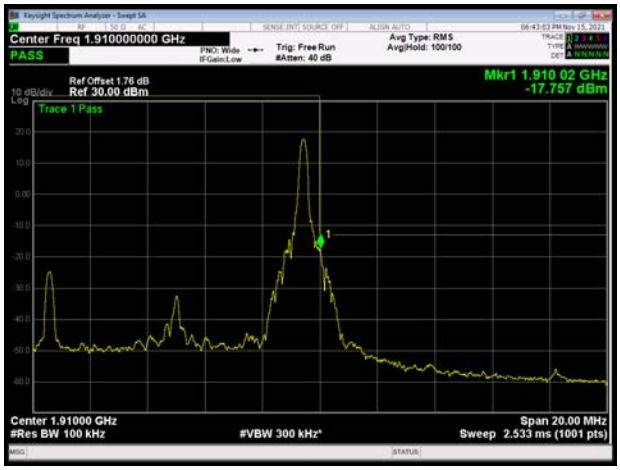


LTE Band 2 5MHz QPSK 100%RB CH-Low

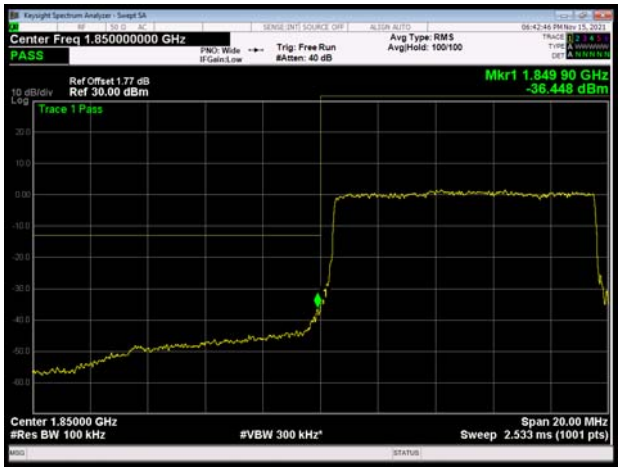
LTE Band 2 5MHz QPSK 100%RB CH-High

LTE Band 2 10MHz QPSK 1RB CH-Low

LTE Band 2 10MHz QPSK 1RB CH-High

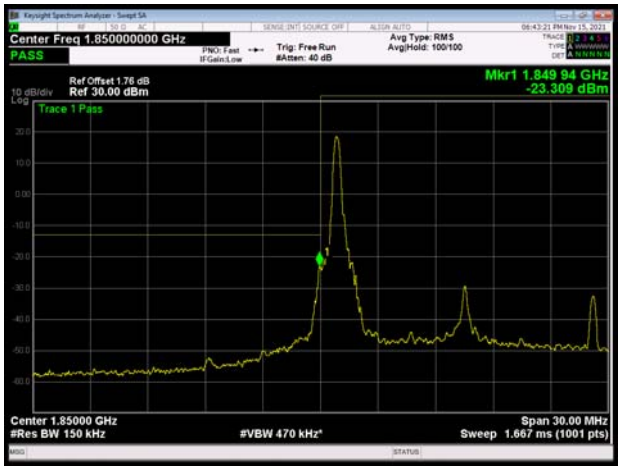


LTE Band 2 10MHz QPSK 100%RB CH-Low

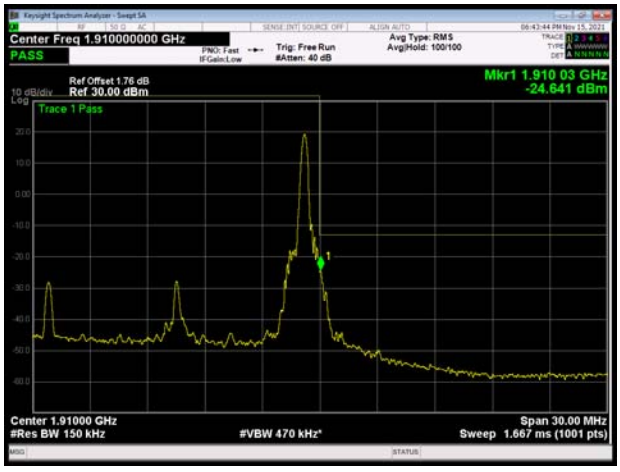


LTE Band 2 10MHz QPSK 100%RB CH-High

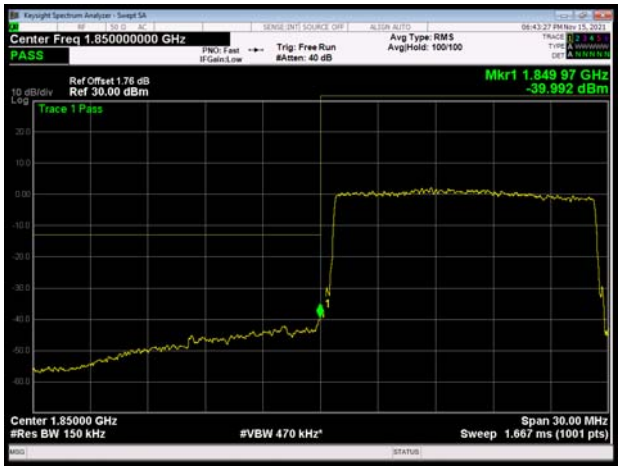
LTE Band 2 15MHz QPSK 1RB CH-Low



LTE Band 2 15MHz QPSK 1RB CH-High

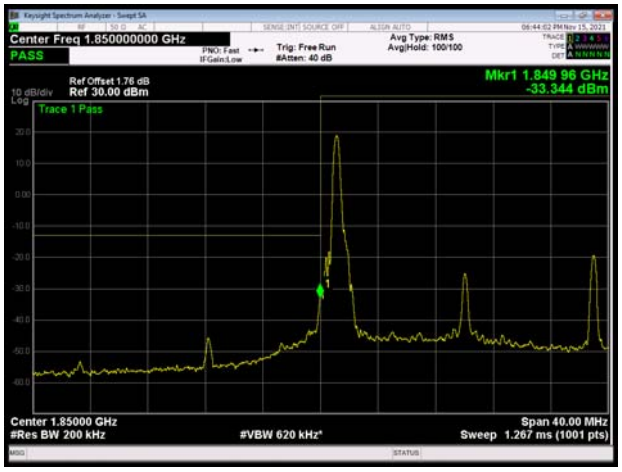


LTE Band 2 15MHz QPSK 100%RB CH-Low

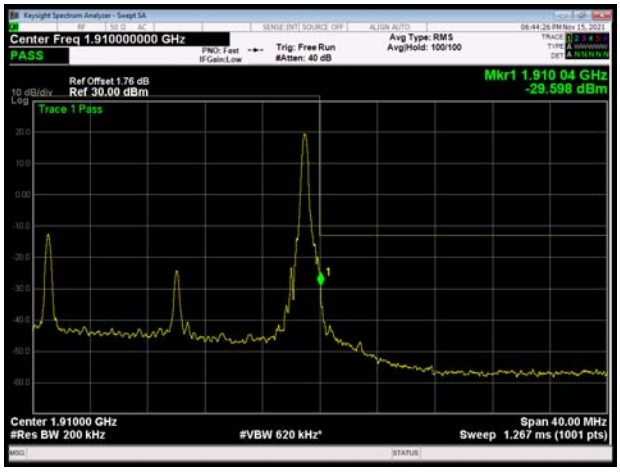


LTE Band 2 15MHz QPSK 100%RB CH-High

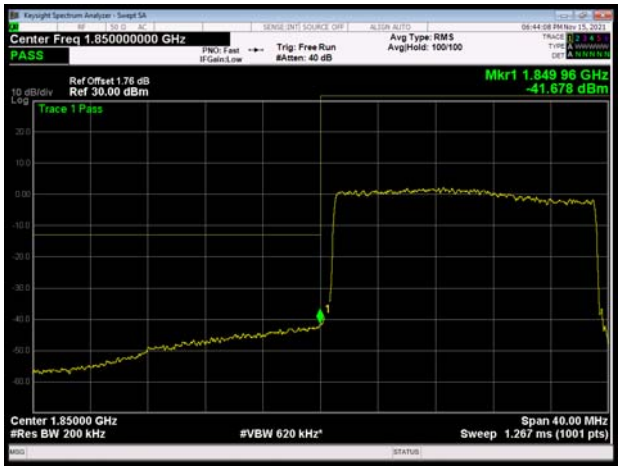
LTE Band 2 20MHz QPSK 1RB CH-Low



LTE Band 2 20MHz QPSK 1RB CH-High



LTE Band 2 20MHz QPSK 100%RB CH-Low



LTE Band 2 20MHz QPSK 100%RB CH-High

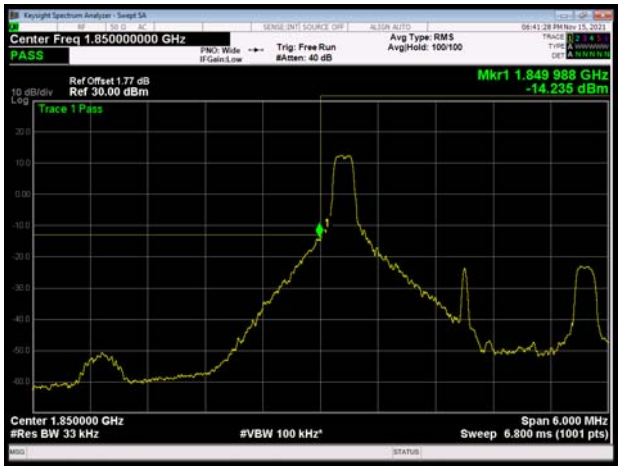
LTE Band 2 1.4MHz 16QAM 1RB CH-Low

LTE Band 2 1.4MHz 16QAM 1RB CH-High

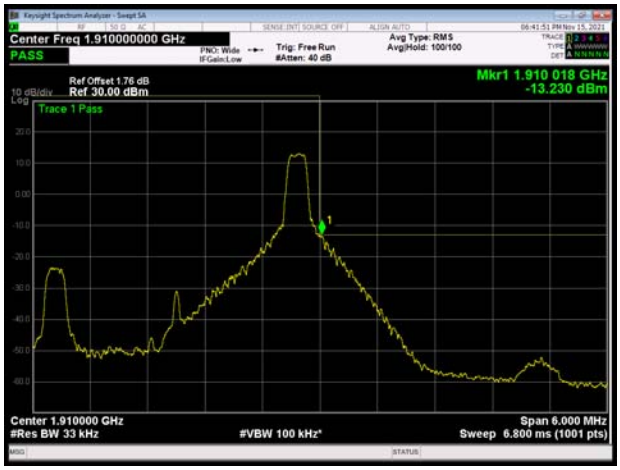
LTE Band 2 1.4MHz 16QAM 100%RB CH-Low

LTE Band 2 1.4MHz 16QAM 100%RB CH-High

LTE Band 2 3MHz 16QAM 1RB CH-Low



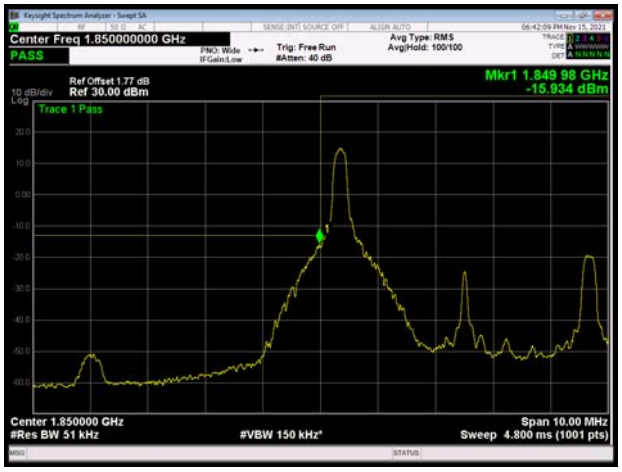
LTE Band 2 3MHz 16QAM 1RB CH-High



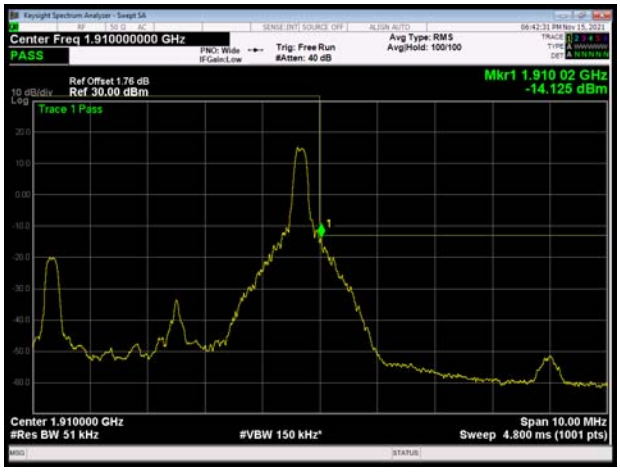
LTE Band 2 3MHz 16QAM 100%RB CH-Low

LTE Band 2 3MHz 16QAM 100%RB CH-High

LTE Band 2 5MHz 16QAM 1RB CH-Low



LTE Band 2 5MHz 16QAM 1RB CH-High

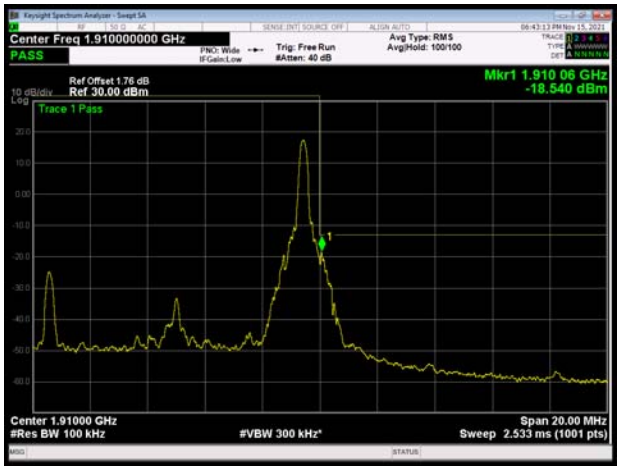


LTE Band 2 5MHz 16QAM 100%RB CH-Low

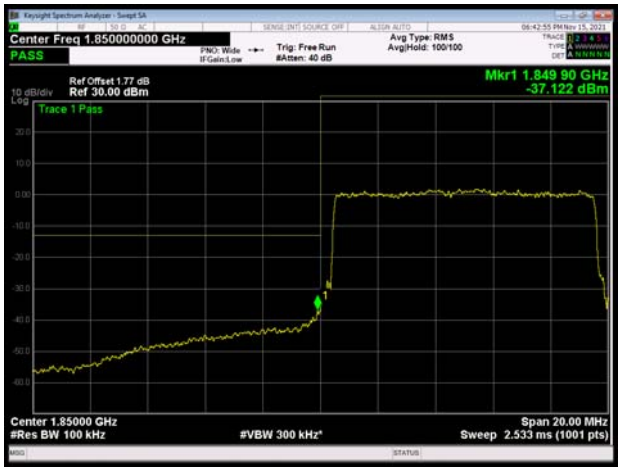
LTE Band 2 5MHz 16QAM 100%RB CH-High

LTE Band 2 10MHz 16QAM 1RB CH-Low

LTE Band 2 10MHz 16QAM 1RB CH-High

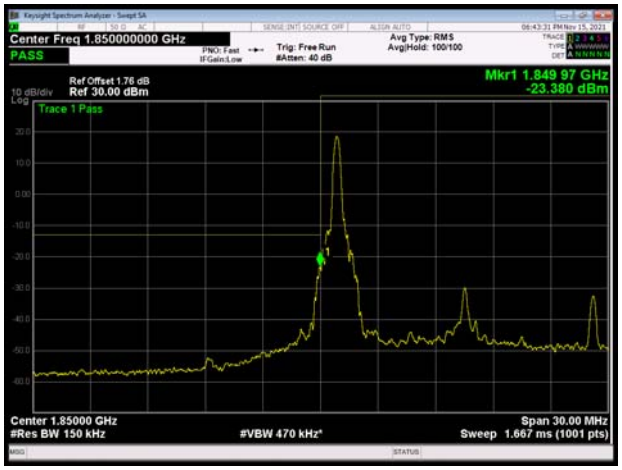


LTE Band 2 10MHz 16QAM 100%RB CH-Low

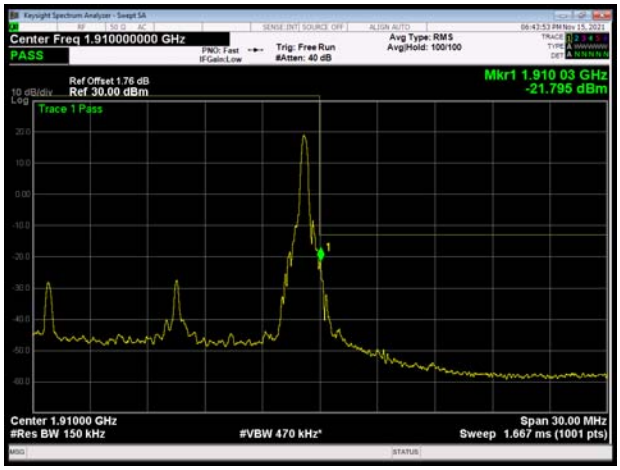


LTE Band 2 10MHz 16QAM 100%RB CH-High

LTE Band 2 15MHz 16QAM 1RB CH-Low



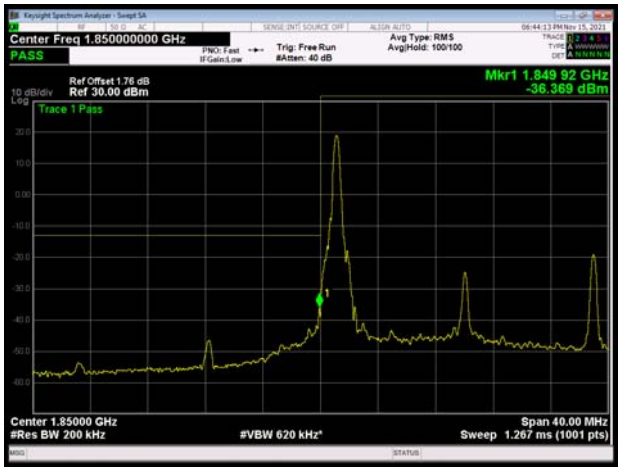
LTE Band 2 15MHz 16QAM 1RB CH-High



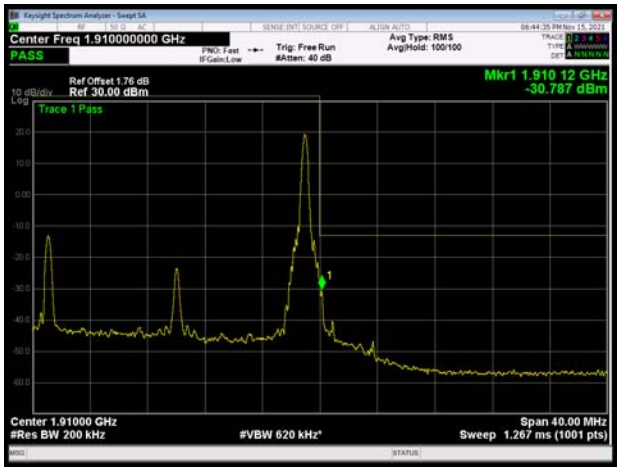
LTE Band 2 15MHz 16QAM 100%RB CH-Low

LTE Band 2 15MHz 16QAM 100%RB CH-High

LTE Band 2 20MHz 16QAM 1RB CH-Low

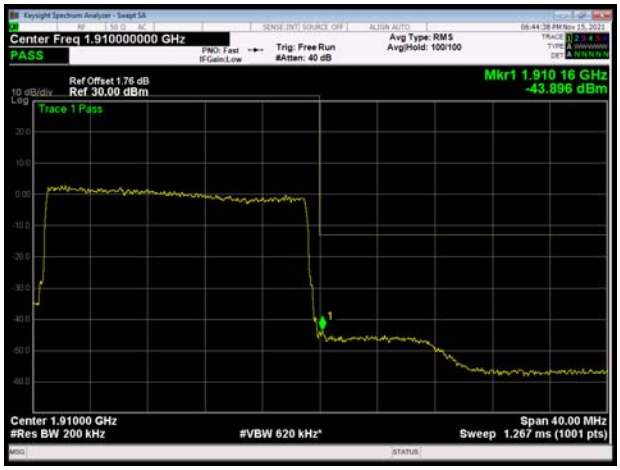


LTE Band 2 20MHz 16QAM 1RB CH-High

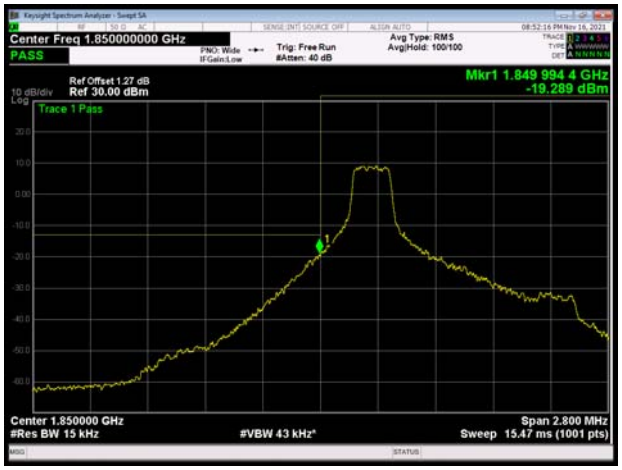


LTE Band 2 20MHz 16QAM 100%RB CH-Low

LTE Band 2 20MHz 16QAM 100%RB CH-High



LTE Band 2 1.4MHz 64QAM 1RB CH-Low

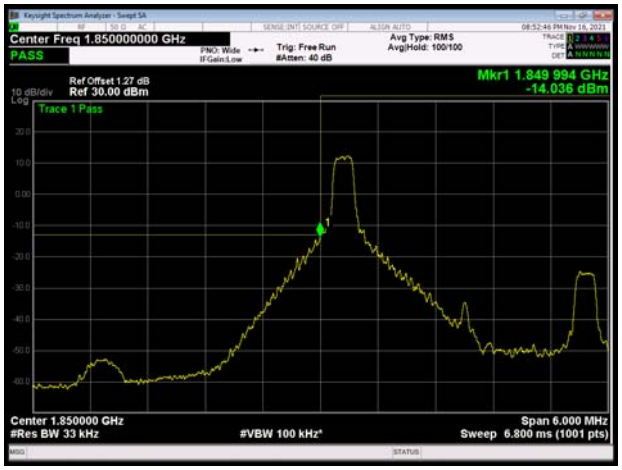


LTE Band 2 1.4MHz 64QAM 1RB CH-High

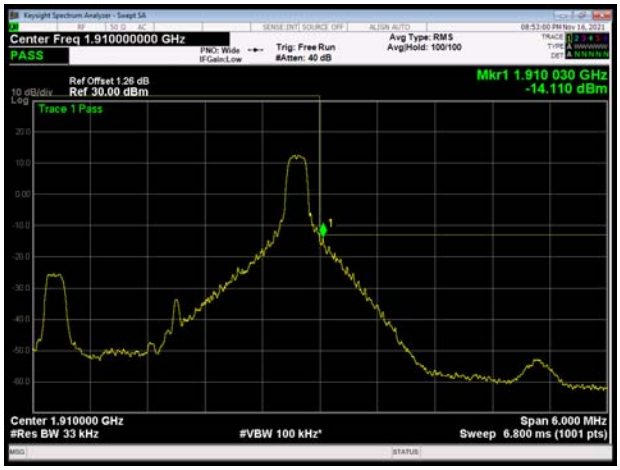
LTE Band 2 1.4MHz 64QAM 100%RB CH-Low

LTE Band 2 1.4MHz 64QAM 100%RB CH-High

LTE Band 2 3MHz 64QAM 1RB CH-Low



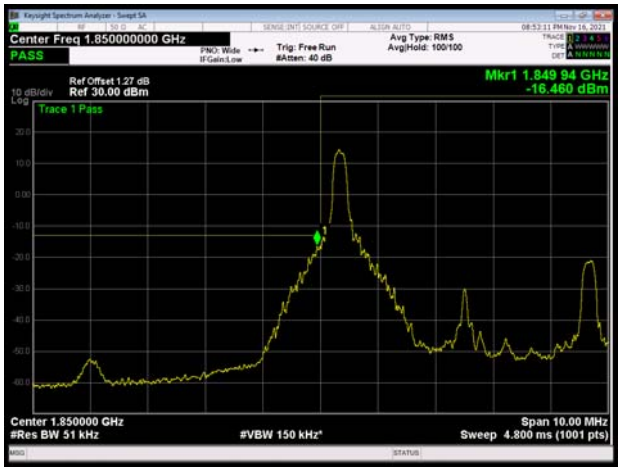
LTE Band 2 3MHz 64QAM 1RB CH-High



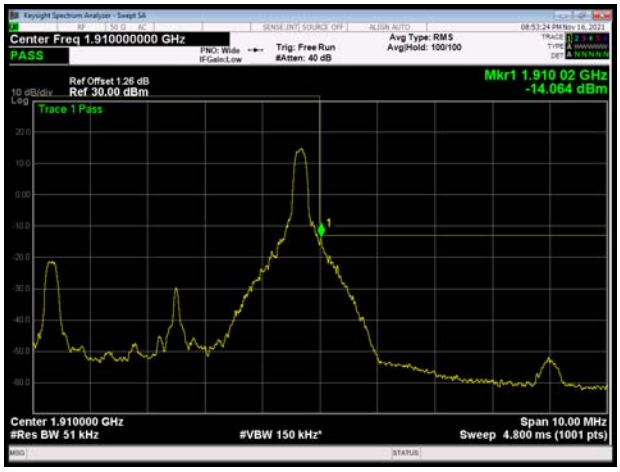
LTE Band 2 3MHz 64QAM 100%RB CH-Low

LTE Band 2 3MHz 64QAM 100%RB CH-High

LTE Band 2 5MHz 64QAM 1RB CH-Low

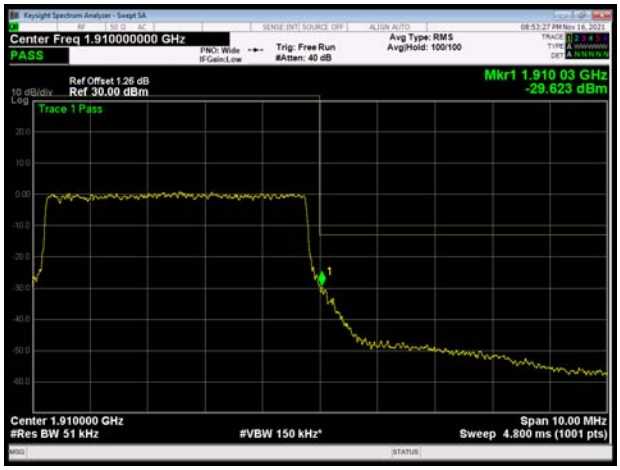


LTE Band 2 5MHz 64QAM 1RB CH-High



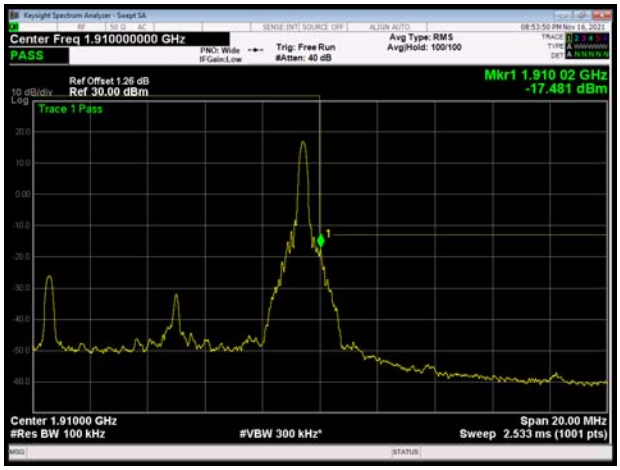
LTE Band 2 5MHz 64QAM 100%RB CH-Low

LTE Band 2 5MHz 64QAM 100%RB CH-High

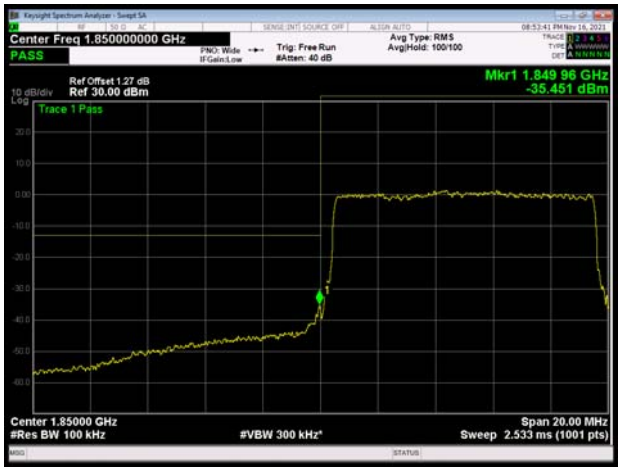


LTE Band 2 10MHz 64QAM 1RB CH-Low

LTE Band 2 10MHz 64QAM 1RB CH-High

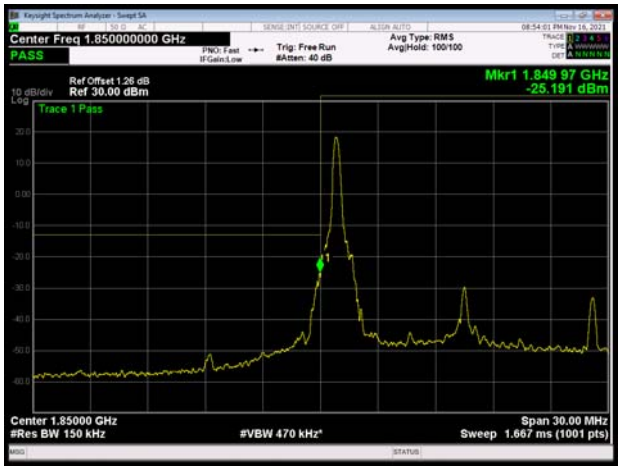


LTE Band 2 10MHz 64QAM 100%RB CH-Low

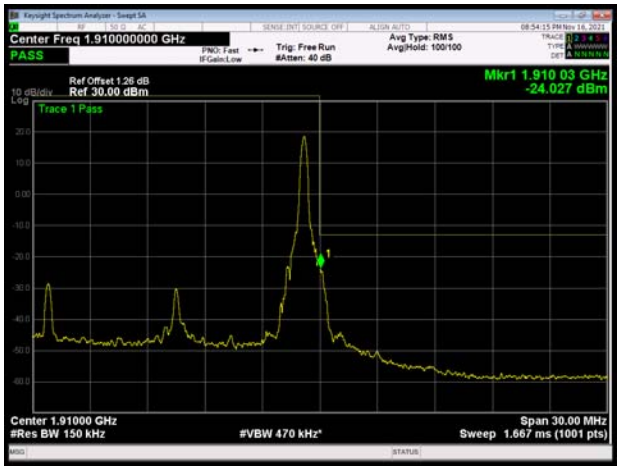


LTE Band 2 10MHz 64QAM 100%RB CH-High

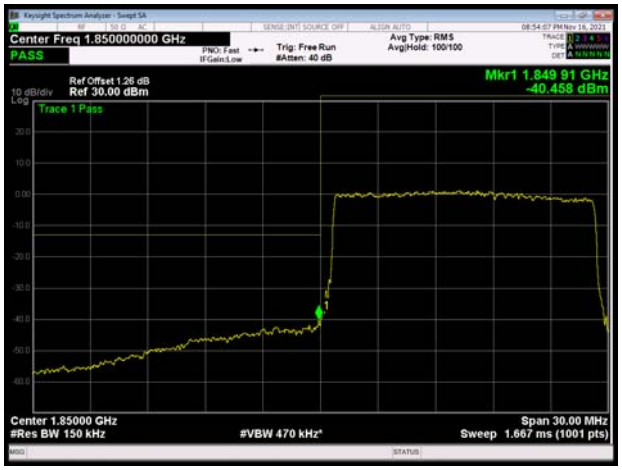
LTE Band 2 15MHz 64QAM 1RB CH-Low



LTE Band 2 15MHz 64QAM 1RB CH-High

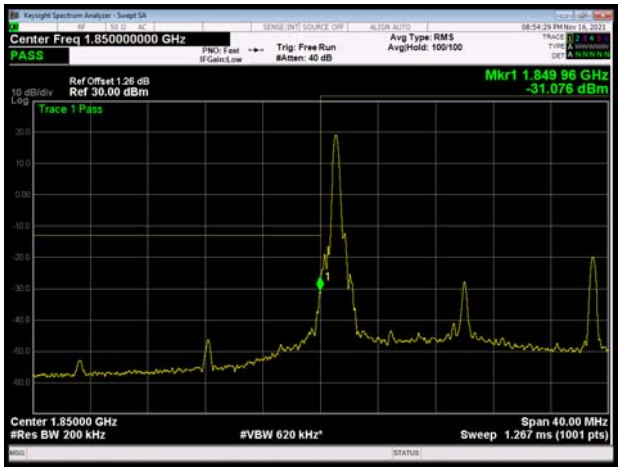


LTE Band 2 15MHz 64QAM 100%RB CH-Low

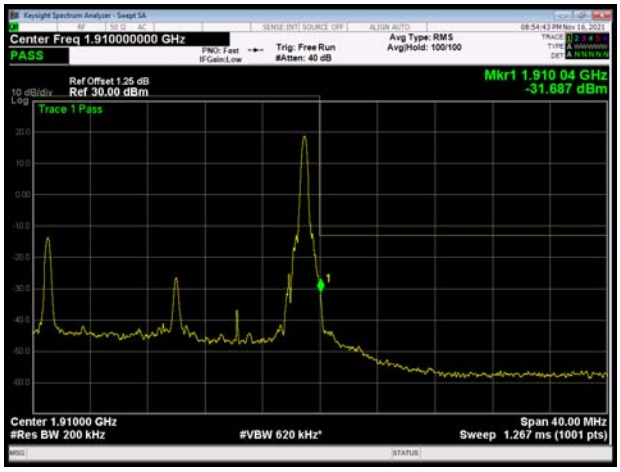


LTE Band 2 15MHz 64QAM 100%RB CH-High

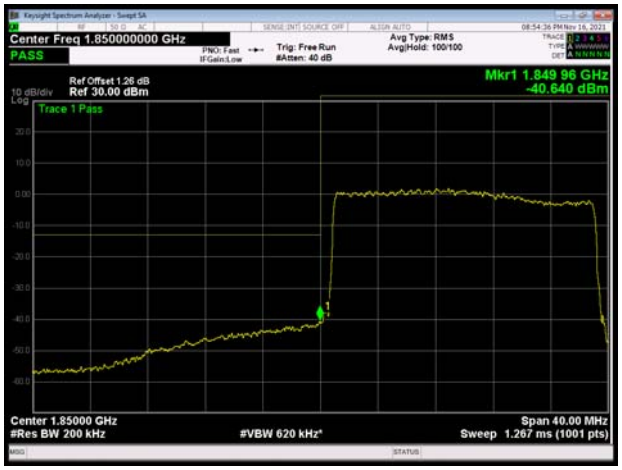
LTE Band 2 20MHz 64QAM 1RB CH-Low



LTE Band 2 20MHz 64QAM 1RB CH-High



LTE Band 2 20MHz 64QAM 100%RB CH-Low



LTE Band 2 20MHz 64QAM 100%RB CH-High

5.4. Peak-to-Average Power Ratio (PAPR)

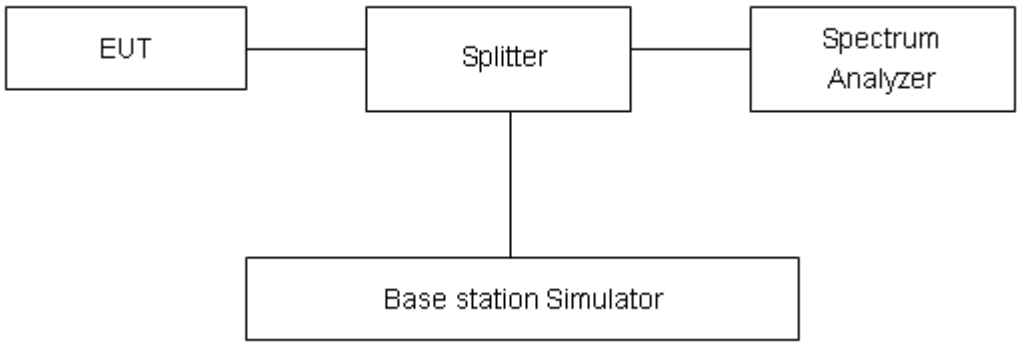
Ambient condition

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:
PAPR (dB) = PPk (dBm) - PAvg (dBm).

Test Setup



Limits

In measuring transmissions in this band using an average power technique, the peakto-average ratio (PAR) of the transmission may not exceed 13 dB in 24.232(d).

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 2								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	18607	1850.7	24.99	19.40	5.59	≤13	PASS
		18900	1880.0	23.68	18.16	5.52	≤13	PASS
		19193	1909.3	25.15	19.68	5.47	≤13	PASS
	3	18615	1851.5	25.03	19.47	5.56	≤13	PASS
		18900	1880	23.43	18.01	5.42	≤13	PASS
		19185	1908.5	24.96	19.44	5.52	≤13	PASS
	5	18625	1852.5	25.03	19.44	5.59	≤13	PASS
		18900	1880	23.51	17.98	5.53	≤13	PASS
		19175	1907.5	24.70	19.07	5.63	≤13	PASS
	10	18650	1855	25.00	19.51	5.49	≤13	PASS
		18900	1880	23.63	18.21	5.42	≤13	PASS
		19150	1905	24.47	18.89	5.58	≤13	PASS
	15	18675	1857.5	25.03	19.36	5.67	≤13	PASS
		18900	1880	24.16	18.31	5.85	≤13	PASS
		19125	1902.5	25.03	19.04	5.99	≤13	PASS
	20	18700	1860	24.66	19.33	5.33	≤13	PASS
		18900	1880	24.36	18.81	5.55	≤13	PASS
		19100	1900	25.17	19.51	5.66	≤13	PASS
16QAM	1.4	18607	1850.7	25.46	19.39	6.07	≤13	PASS
		18900	1880.0	24.31	18.17	6.14	≤13	PASS
		19193	1909.3	25.79	19.67	6.12	≤13	PASS
	3	18615	1851.5	25.60	19.45	6.15	≤13	PASS
		18900	1880	24.30	18.13	6.17	≤13	PASS
		19185	1908.5	25.65	19.46	6.19	≤13	PASS
	5	18625	1852.5	25.53	19.41	6.12	≤13	PASS
		18900	1880	24.05	17.97	6.08	≤13	PASS
		19175	1907.5	25.33	19.06	6.27	≤13	PASS
	10	18650	1855	25.58	19.49	6.09	≤13	PASS
		18900	1880	24.30	18.20	6.10	≤13	PASS
		19150	1905	25.11	18.88	6.23	≤13	PASS
	15	18675	1857.5	25.45	19.33	6.12	≤13	PASS
		18900	1880	24.52	18.28	6.24	≤13	PASS
		19125	1902.5	25.36	19.03	6.33	≤13	PASS
	20	18700	1860	25.44	19.32	6.12	≤13	PASS
		18900	1880	25.00	18.79	6.21	≤13	PASS
		19100	1900	25.76	19.50	6.26	≤13	PASS
64QAM	1.4	18607	1850.7	25.04	18.92	6.12	≤13	PASS
		18900	1880.0	23.84	17.77	6.07	≤13	PASS
		19193	1909.3	25.40	19.20	6.20	≤13	PASS

	3	18615	1851.5	25.12	18.98	6.14	≤13	PASS
		18900	1880	23.75	17.58	6.17	≤13	PASS
		19185	1908.5	25.10	18.88	6.22	≤13	PASS
	5	18625	1852.5	25.02	18.95	6.07	≤13	PASS
		18900	1880	23.66	17.54	6.12	≤13	PASS
		19175	1907.5	24.90	18.65	6.25	≤13	PASS
	10	18650	1855	25.16	19.11	6.05	≤13	PASS
		18900	1880	23.91	17.80	6.11	≤13	PASS
		19150	1905	24.74	18.50	6.24	≤13	PASS
	15	18675	1857.5	25.06	18.90	6.16	≤13	PASS
		18900	1880	24.08	17.87	6.21	≤13	PASS
		19125	1902.5	24.90	18.53	6.37	≤13	PASS
	20	18700	1860	25.06	18.91	6.15	≤13	PASS
		18900	1880	24.61	18.38	6.23	≤13	PASS
		19100	1900	25.34	19.08	6.26	≤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 0°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.

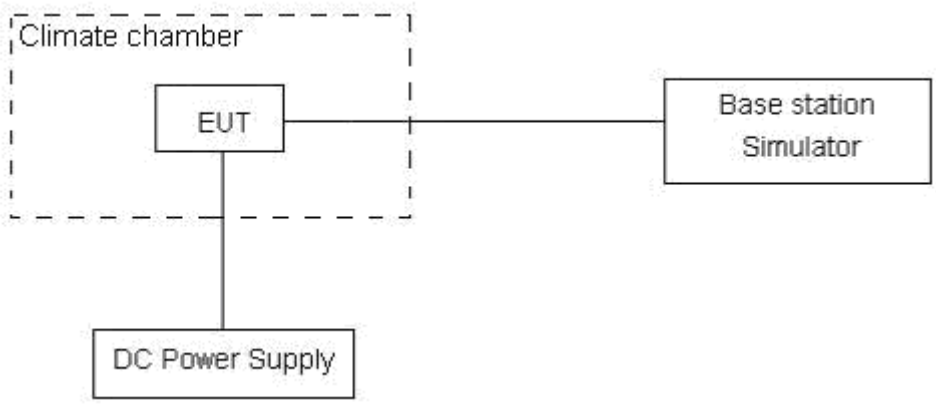
Frequency Stability (Voltage Variation)

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 9 V and 14 V, with a nominal voltage of 12V.

Test setup



Limits

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block

Measurement Uncertainty

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

Test Result

LTE band 2								
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	1.4MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal（25℃）	Normal	17.48	3.41	9.53	0.00930	0.00181	0.00507	PASS
Extreme（50℃）		6.85	4.29	1.88	0.00365	0.00228	0.00100	PASS
Extreme（40℃）		13.20	1.72	3.81	0.00702	0.00091	0.00203	PASS
Extreme（30℃）		4.72	7.51	16.20	0.00251	0.00399	0.00861	PASS
Extreme（20℃）		17.24	8.98	9.44	0.00917	0.00477	0.00502	PASS
Extreme（10℃）		15.61	15.50	10.29	0.00830	0.00825	0.00547	PASS
Extreme（0℃）		16.91	12.02	10.18	0.00899	0.00639	0.00541	PASS
Extreme（-10℃）		16.52	7.96	10.48	0.00879	0.00423	0.00558	PASS
Extreme（-20℃）		12.58	2.85	3.56	0.00669	0.00152	0.00189	PASS
Extreme（-30℃）		6.81	4.67	14.95	0.00362	0.00248	0.00795	PASS
25℃	LV	3.44	7.78	2.76	0.00183	0.00414	0.00147	PASS
	HV	12.56	6.68	17.09	0.00668	0.00355	0.00909	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability（ppm）	Frequency Stability（ppm）	Frequency Stability（ppm）	Verdict
BANDWIDTH	3MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal（25℃）	Normal	16.33	16.40	1.41	0.00869	0.00873	0.00075	PASS
Extreme（50℃）		1.42	11.33	10.65	0.00076	0.00603	0.00567	PASS
Extreme（40℃）		6.23	14.99	10.81	0.00332	0.00797	0.00575	PASS
Extreme（30℃）		4.71	17.38	3.59	0.00250	0.00925	0.00191	PASS
Extreme（20℃）		15.69	16.25	14.76	0.00835	0.00864	0.00785	PASS
Extreme（10℃）		17.36	3.08	5.78	0.00923	0.00164	0.00308	PASS
Extreme（0℃）		8.64	12.24	14.79	0.00459	0.00651	0.00787	PASS
Extreme（-10℃）		17.91	8.59	14.62	0.00953	0.00457	0.00778	PASS
Extreme（-20℃）		3.46	3.94	16.95	0.00184	0.00210	0.00902	PASS
Extreme（-30℃）		4.35	4.00	3.00	0.00231	0.00213	0.00160	PASS
25℃	LV	7.08	7.48	16.73	0.00376	0.00398	0.00890	PASS
	HV	7.46	17.40	14.64	0.00397	0.00926	0.00779	PASS
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℃）	Normal	1.09	1.78	14.88	0.00058	0.00095	0.00792	PASS
Extreme（50℃）		3.99	8.87	15.90	0.00212	0.00472	0.00846	PASS

Extreme（40℃）		1.04	8.40	12.46	0.00055	0.00447	0.00663	PASS
Extreme（30℃）		9.32	3.12	12.35	0.00496	0.00166	0.00657	PASS
Extreme（20℃）		15.32	6.66	17.94	0.00815	0.00354	0.00954	PASS
Extreme（10℃）		4.88	5.70	16.63	0.00260	0.00303	0.00885	PASS
Extreme（0℃）		11.29	17.03	16.85	0.00601	0.00906	0.00896	PASS
Extreme（-10℃）		6.72	11.47	13.30	0.00358	0.00610	0.00708	PASS
Extreme（-20℃）		7.97	11.69	13.68	0.00424	0.00622	0.00728	PASS
Extreme（-30℃）		16.91	7.96	6.23	0.00900	0.00423	0.00331	PASS
25℃	LV	9.30	15.28	9.77	0.00495	0.00813	0.00520	PASS
	HV	5.11	12.31	7.09	0.00272	0.00655	0.00377	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℃）	Normal	14.61	11.29	14.35	0.00777	0.00601	0.00763	PASS
Extreme（50℃）		15.99	14.11	5.25	0.00851	0.00751	0.00279	PASS
Extreme（40℃）		1.62	13.03	14.46	0.00086	0.00693	0.00769	PASS
Extreme（30℃）		13.72	9.07	5.86	0.00730	0.00482	0.00312	PASS
Extreme（20℃）		7.28	8.06	17.38	0.00387	0.00429	0.00925	PASS
Extreme（10℃）		1.35	14.34	10.92	0.00072	0.00763	0.00581	PASS
Extreme（0℃）		10.24	10.90	4.83	0.00545	0.00580	0.00257	PASS
Extreme（-10℃）		7.18	9.71	12.35	0.00382	0.00516	0.00657	PASS
Extreme（-20℃）		10.63	5.73	17.27	0.00566	0.00305	0.00918	PASS
Extreme（-30℃）		6.90	14.46	14.27	0.00367	0.00769	0.00759	PASS
25℃	LV	3.76	17.37	15.47	0.00200	0.00924	0.00823	PASS
	HV	2.82	11.72	17.84	0.00150	0.00624	0.00949	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℃）	Normal	17.20	14.80	11.91	0.00915	0.00787	0.00634	PASS
Extreme（50℃）		14.26	8.44	15.40	0.00759	0.00449	0.00819	PASS
Extreme（40℃）		10.49	7.81	9.56	0.00558	0.00415	0.00509	PASS
Extreme（30℃）		15.88	17.07	17.07	0.00845	0.00908	0.00908	PASS
Extreme（20℃）		16.01	17.96	14.70	0.00852	0.00955	0.00782	PASS
Extreme（10℃）		7.48	8.02	6.90	0.00398	0.00427	0.00367	PASS
Extreme（0℃）		13.59	15.68	17.77	0.00723	0.00834	0.00945	PASS
Extreme（-10℃）		1.13	14.44	4.01	0.00060	0.00768	0.00213	PASS
Extreme（-20℃）		17.20	11.40	11.41	0.00915	0.00607	0.00607	PASS
Extreme（-30℃）		9.60	4.85	2.20	0.00511	0.00258	0.00117	PASS
25℃	LV	2.90	13.46	3.00	0.00154	0.00716	0.00160	PASS

	HV	13.48	1.48	17.25	0.00717	0.00079	0.00917	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℃）	Normal	13.18	13.32	15.75	0.00701	0.00708	0.00838	PASS
Extreme（50℃）		15.10	5.65	17.39	0.00803	0.00300	0.00925	PASS
Extreme（40℃）		8.09	9.60	9.12	0.00431	0.00511	0.00485	PASS
Extreme（30℃）		2.49	3.10	9.74	0.00133	0.00165	0.00518	PASS
Extreme（20℃）		11.57	7.21	11.84	0.00616	0.00384	0.00630	PASS
Extreme（10℃）		2.15	15.21	10.70	0.00115	0.00809	0.00569	PASS
Extreme（0℃）		7.87	15.24	16.40	0.00419	0.00810	0.00872	PASS
Extreme（-10℃）		14.32	5.25	7.68	0.00762	0.00279	0.00408	PASS
Extreme（-20℃）		5.20	15.25	14.45	0.00277	0.00811	0.00769	PASS
Extreme（-30℃）		6.13	9.62	13.03	0.00326	0.00512	0.00693	PASS
25℃	LV	7.06	17.03	9.57	0.00376	0.00906	0.00509	PASS
	HV	13.18	6.79	6.22	0.00701	0.00361	0.00331	PASS

5.6. Spurious Emissions at Antenna Terminals

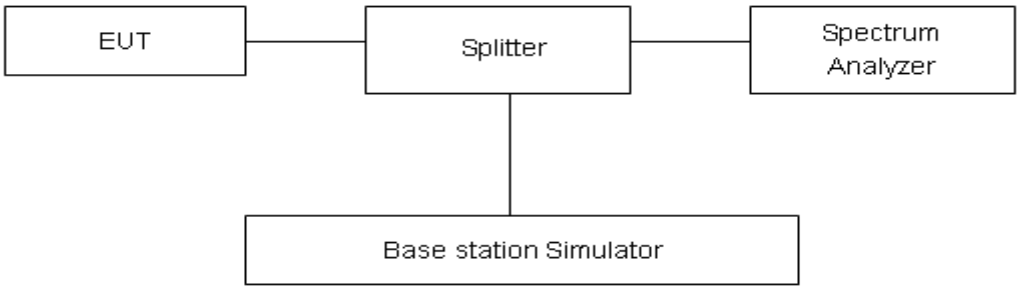
Ambient condition

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

Test setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log10 (P) dB.”

Limit	-13 dBm

Measurement Uncertainty

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

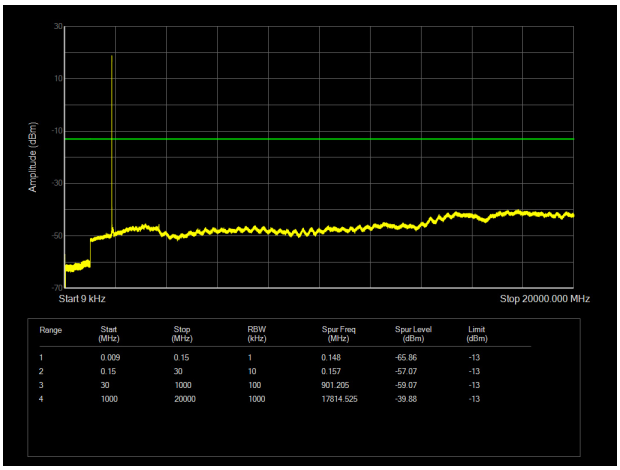
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB

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.

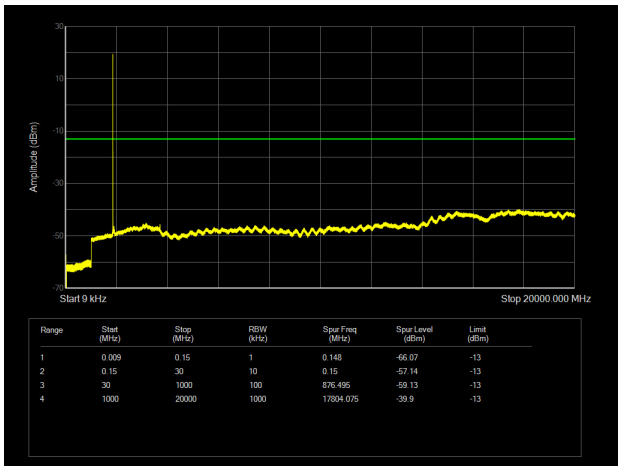
The signal beyond the limit is carrier.

LTE Band 2 1.4MHz CH-Low 9kHz~20GHz



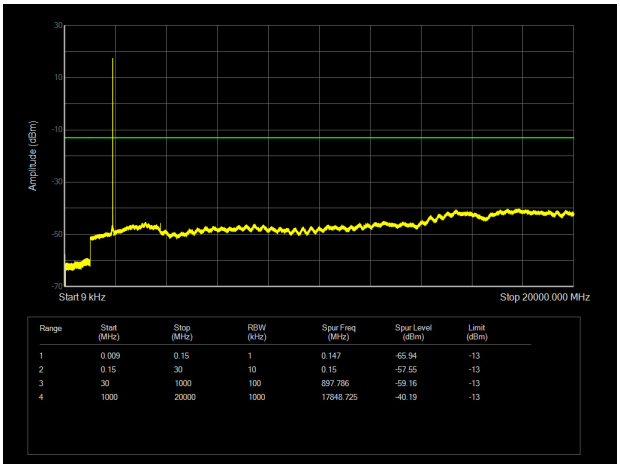
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.148	-65.86	-13
2	0.15	30	10	0.157	-57.07	-13
3	30	1000	100	901.205	-59.07	-13
4	1000	20000	1000	17814.525	-39.88	-13

LTE Band 2 3MHz CH-Low 9kHz~20GHz



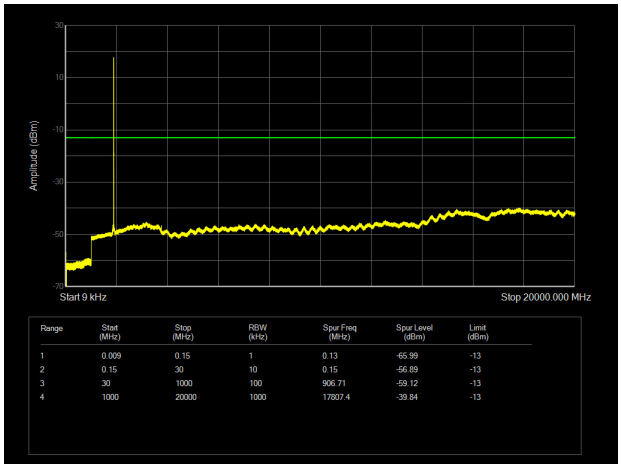
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.148	-66.07	-13
2	0.15	30	10	0.15	-57.14	-13
3	30	1000	100	876.495	-59.13	-13
4	1000	20000	1000	17804.075	-39.9	-13

LTE Band 2 1.4MHz CH-Middle 9kHz~20GHz



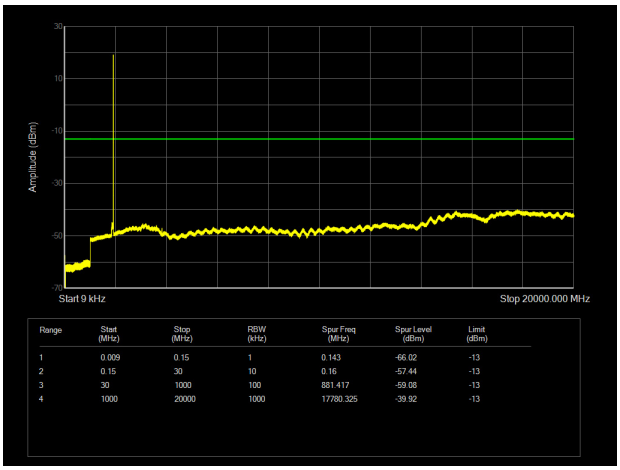
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.147	-65.94	-13
2	0.15	30	10	0.15	-57.55	-13
3	30	1000	100	897.786	-59.16	-13
4	1000	20000	1000	17848.725	-40.19	-13

LTE Band 2 3MHz CH-Middle 9kHz~20GHz



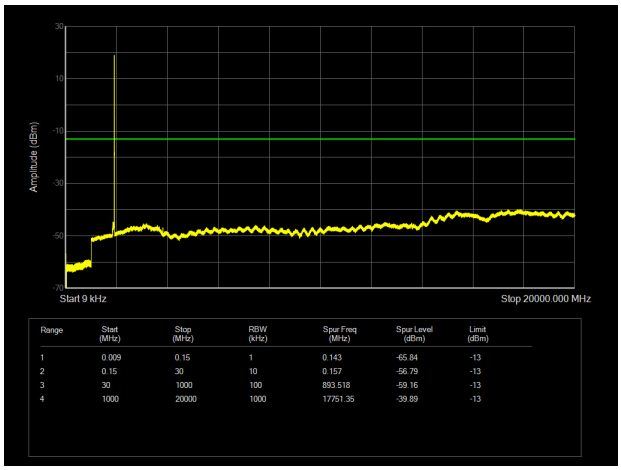
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.13	-65.99	-13
2	0.15	30	10	0.15	-56.89	-13
3	30	1000	100	906.71	-59.12	-13
4	1000	20000	1000	17807.4	-39.84	-13

LTE Band 2 1.4MHz CH-High 9kHz~20GHz



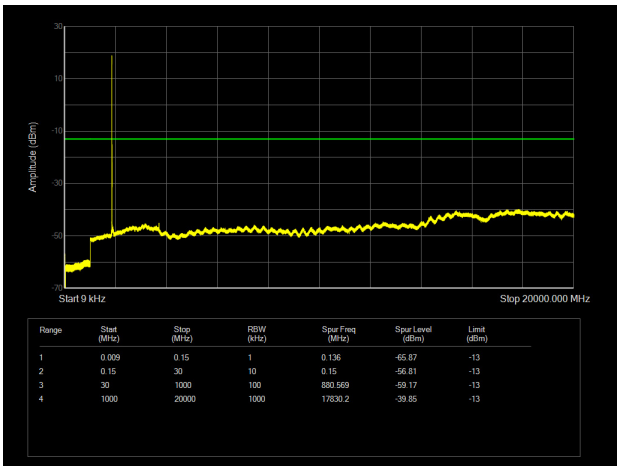
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.143	-66.02	-13
2	0.15	30	10	0.16	-57.44	-13
3	30	1000	100	881.417	-59.08	-13
4	1000	20000	1000	17780.325	-39.92	-13

LTE Band 2 3MHz CH-High 9kHz~20GHz



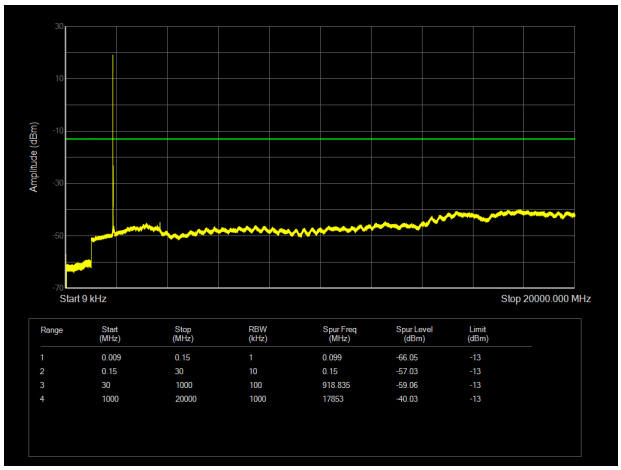
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.143	-65.84	-13
2	0.15	30	10	0.157	-56.79	-13
3	30	1000	100	893.518	-59.16	-13
4	1000	20000	1000	17751.35	-39.89	-13

LTE Band 2 5MHz CH-Low 9kHz~20GHz



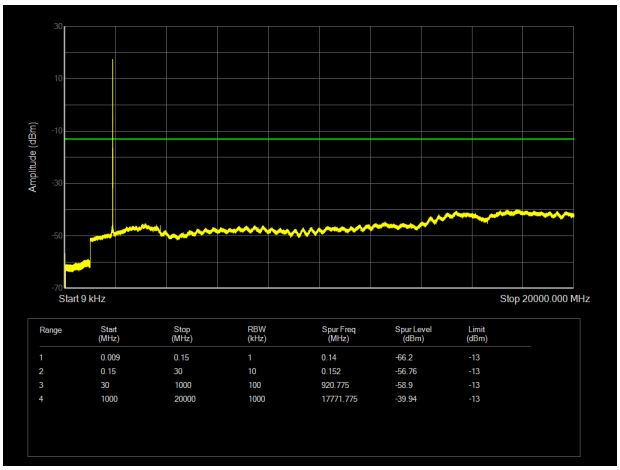
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.136	-65.87	-13
2	0.15	30	10	0.15	-56.81	-13
3	30	1000	100	880.569	-59.17	-13
4	1000	20000	1000	17830.2	-39.85	-13

LTE Band 2 10MHz CH-Low 9kHz~20GHz



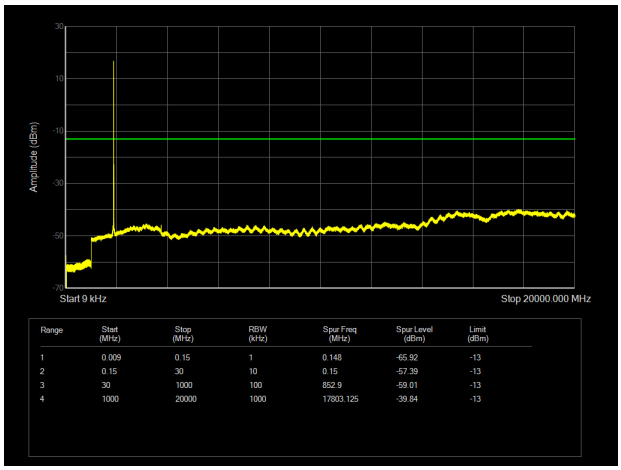
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.099	-66.05	-13
2	0.15	30	10	0.15	-57.03	-13
3	30	1000	100	918.835	-59.06	-13
4	1000	20000	1000	17853	-40.03	-13

LTE Band 2 5MHz CH-Middle 9kHz~20GHz



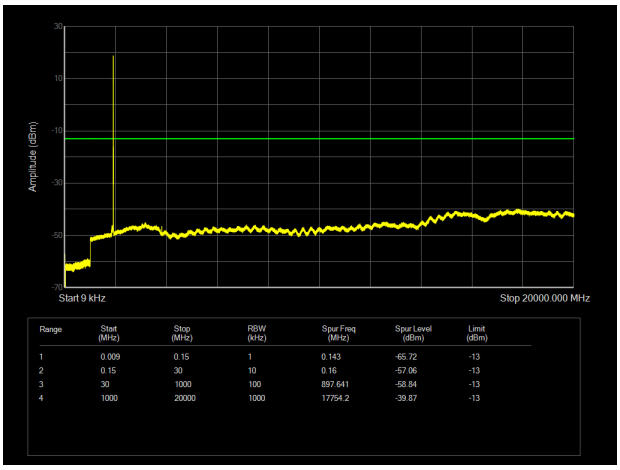
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.14	-66.2	-13
2	0.15	30	10	0.152	-56.76	-13
3	30	1000	100	920.775	-58.9	-13
4	1000	20000	1000	17771.775	-39.94	-13

LTE Band 2 10MHz CH-Middle 9kHz~20GHz



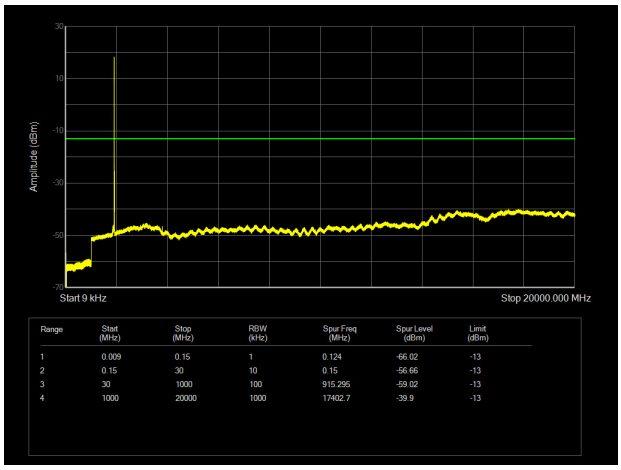
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.148	-65.92	-13
2	0.15	30	10	0.15	-57.39	-13
3	30	1000	100	852.9	-59.01	-13
4	1000	20000	1000	17803.125	-39.84	-13

LTE Band 2 5MHz CH-High 9kHz~20GHz



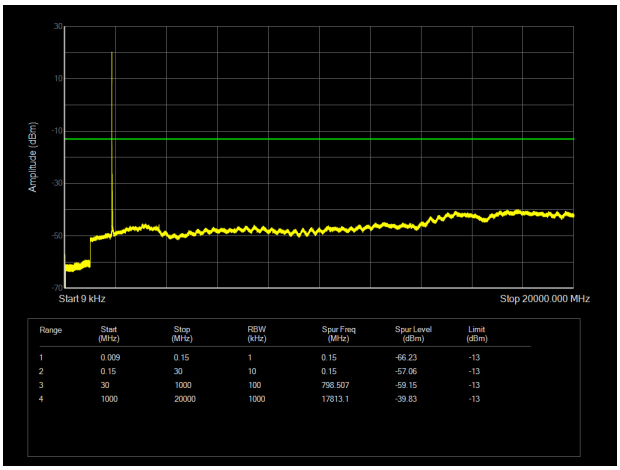
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.143	-65.72	-13
2	0.15	30	10	0.16	-57.06	-13
3	30	1000	100	897.641	-58.84	-13
4	1000	20000	1000	17754.2	-39.87	-13

LTE Band 2 10MHz CH-High 9kHz~20GHz



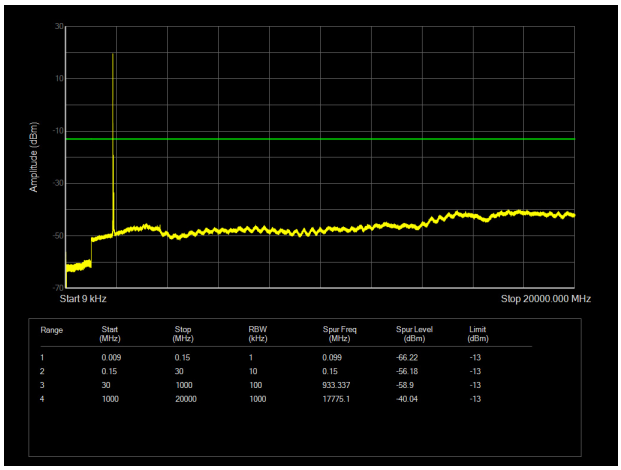
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.124	-66.02	-13
2	0.15	30	10	0.15	-56.66	-13
3	30	1000	100	915.295	-59.02	-13
4	1000	20000	1000	17402.7	-39.9	-13

LTE Band 2 15MHz CH-Low 9kHz~20GHz



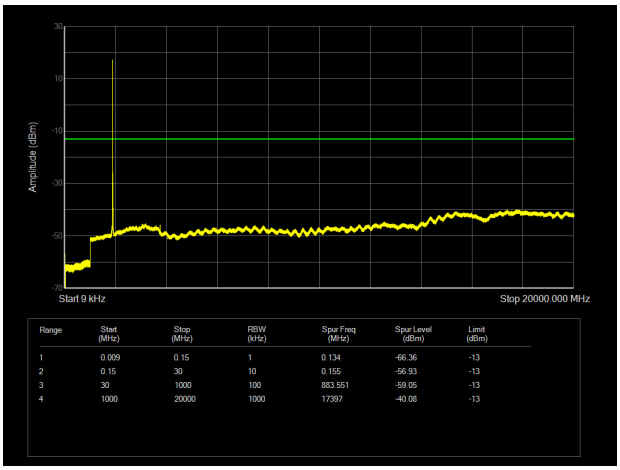
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.15	-66.23	-13
2	0.15	30	10	0.15	-57.06	-13
3	30	1000	100	798.507	-59.15	-13
4	1000	20000	1000	17813.1	-39.83	-13

LTE Band 2 20MHz CH-Low 9kHz~20GHz



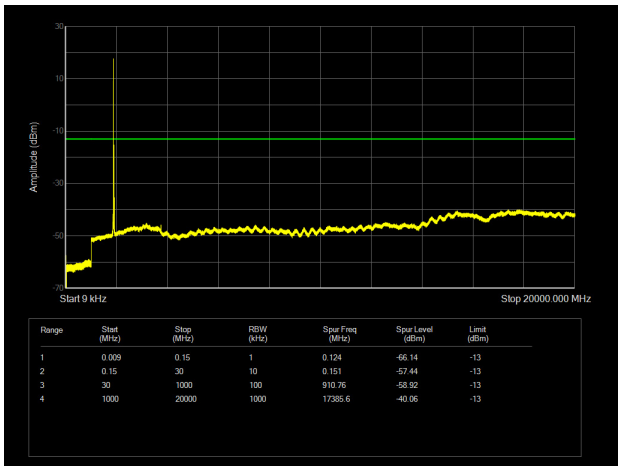
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.099	-66.22	-13
2	0.15	30	10	0.15	-56.18	-13
3	30	1000	100	933.337	-58.9	-13
4	1000	20000	1000	17775.1	-40.04	-13

LTE Band 2 15MHz CH-Middle 9kHz~20GHz



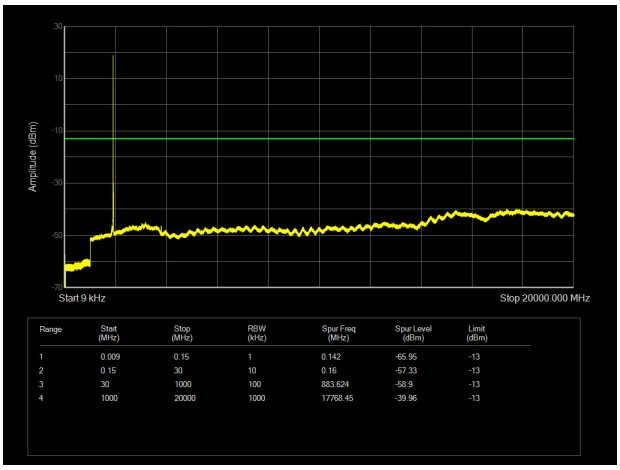
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.134	-66.36	-13
2	0.15	30	10	0.155	-56.93	-13
3	30	1000	100	883.551	-59.05	-13
4	1000	20000	1000	17397	-40.08	-13

LTE Band 2 20MHz CH-Middle 9kHz~20GHz



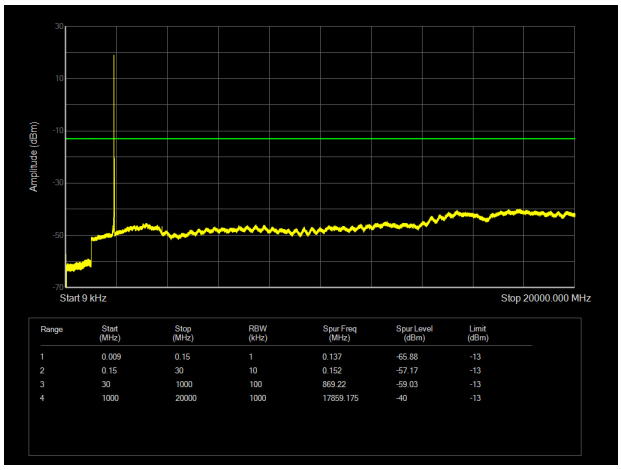
Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.124	-66.14	-13
2	0.15	30	10	0.151	-57.44	-13
3	30	1000	100	910.76	-58.92	-13
4	1000	20000	1000	17385.6	-40.06	-13

LTE Band 2 15MHz CH-High 9kHz~20GHz



Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.142	-65.95	-13
2	0.15	30	10	0.16	-57.33	-13
3	30	1000	100	883.624	-58.9	-13
4	1000	20000	1000	17768.45	-39.96	-13

LTE Band 2 20MHz CH-High 9kHz~20GHz



Range	Start (MHz)	Stop (MHz)	RBW (kHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)
1	0.009	0.15	1	0.137	-65.88	-13
2	0.15	30	10	0.152	-57.17	-13
3	30	1000	100	869.22	-59.03	-13
4	1000	20000	1000	17859.175	-40	-13

5.7. Radiates Spurious Emission

Ambient condition

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

Method of Measurement

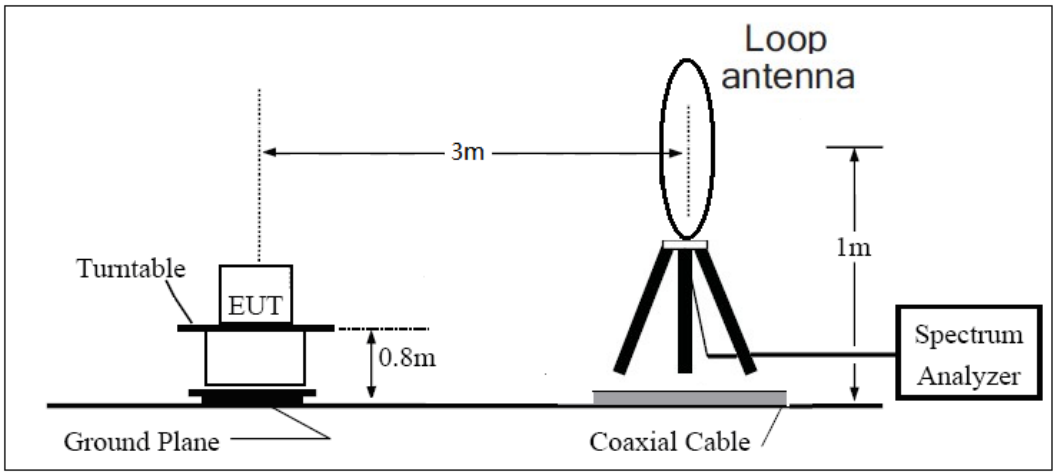
1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable 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=1MHz, VBW=3MHz, 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:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP

= EIRP-2.15dB.

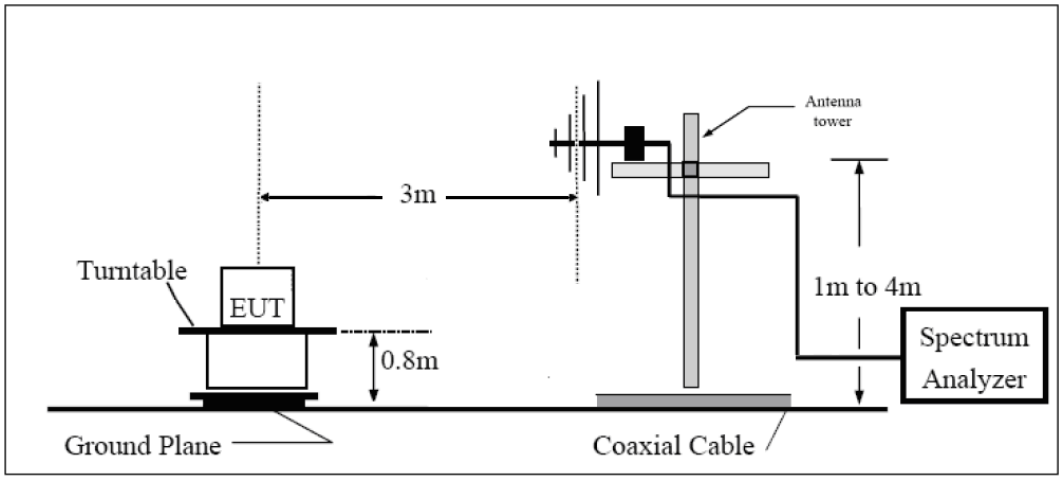
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

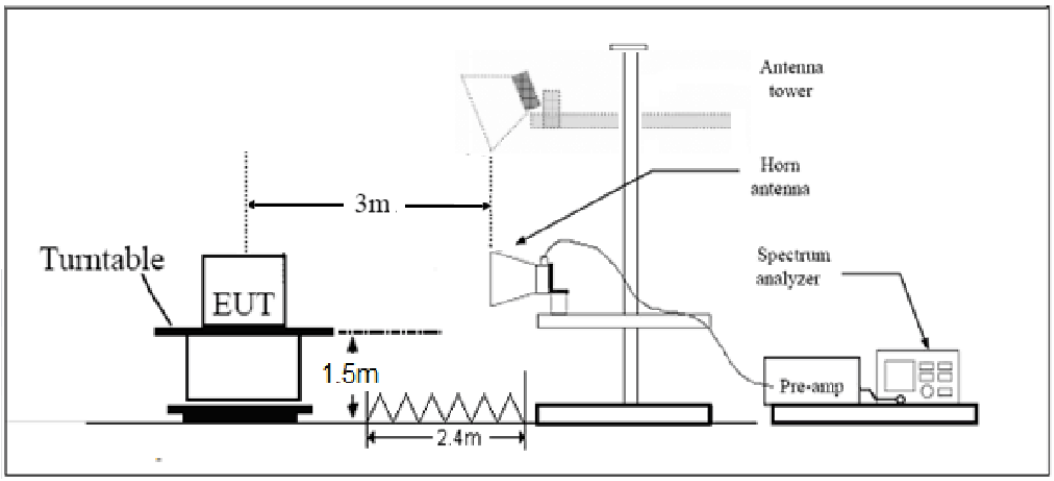
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side: 2.4mX3.6m

Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log10 (P) dB.”

Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95％ confidence level for the normal distribution is with the coverage factor k = 1.96, U= 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 2 1.4MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3759.00	-46.53	2.60	12.50	Horizontal	-36.63	-13.00	23.63	315
3	5638.88	-47.62	3.30	12.50	Horizontal	-38.42	-13.00	25.42	135
4	7520.00	-48.62	4.20	12.20	Horizontal	-40.62	-13.00	27.62	45
5	9400.00	-47.67	4.30	11.10	Horizontal	-40.87	-13.00	27.87	180
6	11280.00	-49.86	5.90	11.90	Horizontal	-43.86	-13.00	30.86	0
7	13160.00	-49.23	5.70	14.00	Horizontal	-40.93	-13.00	27.93	225
8	15040.00	-53.58	5.80	13.10	Horizontal	-46.28	-13.00	33.28	90
9	16920.00	-50.21	6.10	14.60	Horizontal	-41.71	-13.00	28.71	135
10	18800.00	-	-	-	-	-	-	-	-
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 2 5MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3755.63	-48.98	2.60	12.50	Horizontal	-39.08	-13.00	26.08	45
3	5633.63	-54.54	3.30	12.50	Horizontal	-45.34	-13.00	32.34	225
4	7520.00	-59.39	4.20	12.20	Horizontal	-51.39	-13.00	38.39	0
5	9400.00	-54.72	4.30	11.10	Horizontal	-47.92	-13.00	34.92	180
6	11280.00	-50.72	5.90	11.90	Horizontal	-44.72	-13.00	31.72	270
7	13160.00	-53.97	5.70	14.00	Horizontal	-45.67	-13.00	32.67	315
8	15040.00	-53.53	5.80	13.10	Horizontal	-46.23	-13.00	33.23	90
9	16920.00	-51.38	6.10	14.60	Horizontal	-42.88	-13.00	29.88	135
10	18800.00	-	-	-	-	-	-	-	-
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 2 20MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3740.00	-51.23	2.60	12.50	Horizontal	-41.33	-13.00	28.33	135
3	5610.00	-51.10	3.30	12.50	Horizontal	-41.90	-13.00	28.90	180
4	7480.00	-51.76	4.20	12.20	Horizontal	-43.76	-13.00	30.76	45
5	9350.00	-52.63	4.30	11.10	Horizontal	-45.83	-13.00	32.83	315
6	11220.00	-50.96	5.90	11.90	Horizontal	-44.96	-13.00	31.96	90
7	13090.00	-53.19	5.70	14.00	Horizontal	-44.89	-13.00	31.89	270
8	14960.00	-51.91	5.80	13.10	Horizontal	-44.61	-13.00	31.61	0
9	16830.00	-49.44	6.10	14.60	Horizontal	-40.94	-13.00	27.94	180
10	18700.00	-	-	-	-	-	-	-	-
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
Climate Chamber	Weiss	VT4002	58226119450010	2021-05-15	2022-05-14
Base Station Simulator	R&S	CMW500	113824	2021-05-15	2022-05-14
Spectrum Analyzer	Keysight	N9020A	MY52330084	2021-05-15	2022-05-14
Spectrum Analyzer	R&S	FSV3030	101411	2020-12-13	2021-12-12
Signal Analyzer	R&S	FSV30	104028	2021-05-15	2022-05-14
Horn Antenna	Schwarzbeck	BBHA 9120D	1594	2020-12-17	2021-12-16
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.