Band38-10MHz-QPSK-38200-50RB#0

Band38-10MHz-16QAM-37800-50RB#0

Band38-10MHz-16QAM-38200-50RB#0

Band38-15MHz-QPSK-37825-75RB#0

Band38-15MHz-QPSK-38175-75RB#0

Band38-15MHz-16QAM-37825-75RB#0

Band38-15MHz-16QAM-38175-75RB#0

Band38-20MHz-QPSK-37850-100RB#0

Band38-20MHz-QPSK-38150-100RB#0

Band38-20MHz-16QAM-37850-100RB#0

Band38-20MHz-16QAM-38150-100RB#0

Band41-5MHz-QPSK-40265-25RB#0

Band41-5MHz-QPSK-41215-25RB#0

Band41-5MHz-16QAM-40265-25RB#0

Band41-5MHz-16QAM-41215-25RB#0

Band41-10MHz-QPSK-40290-50RB#0

Band41-10MHz-QPSK-41190-50RB#0

Band41-10MHz-16QAM-40290-50RB#0

Band41-10MHz-16QAM-41190-50RB#0

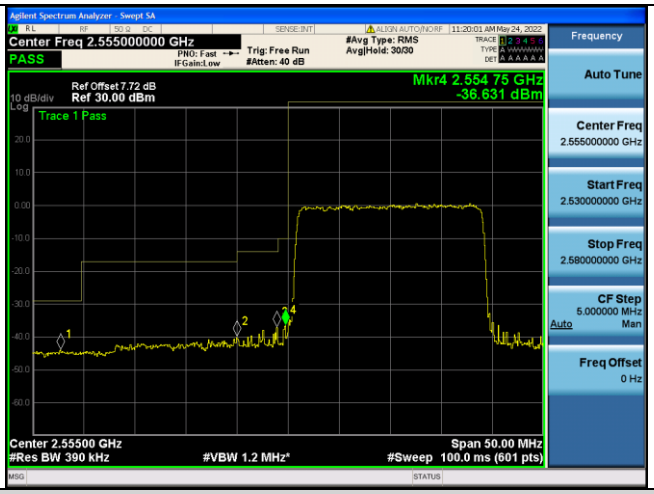
Band41-15MHz-QPSK-40315-75RB#0

Band41-15MHz-QPSK-41165-75RB#0

Band41-15MHz-16QAM-40315-75RB#0

Band41-15MHz-16QAM-41165-75RB#0

Band41-20MHz-QPSK-40340-100RB#0



Band41-20MHz-QPSK-41140-100RB#0

Band41-20MHz-16QAM-40340-100RB#0

Band41-20MHz-16QAM-41140-100RB#0

Note: All schemas are tested, showing only the worst data

5.7 Field strength of spurious radiation measurement

5.7.1 Limit

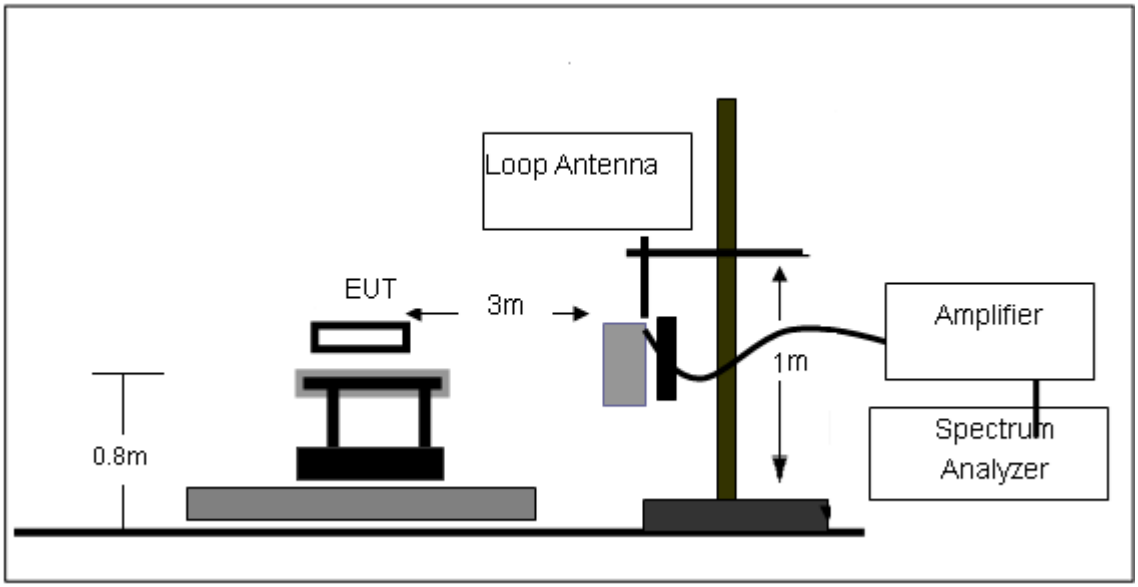
LTE Band 2, LTE Band 4, LTE Band 5, LTE Band7, LTE Band 12, LTE Band 13, LTE Band 38, LTE Band 41: -13dBm

5.7.2 Test procedure

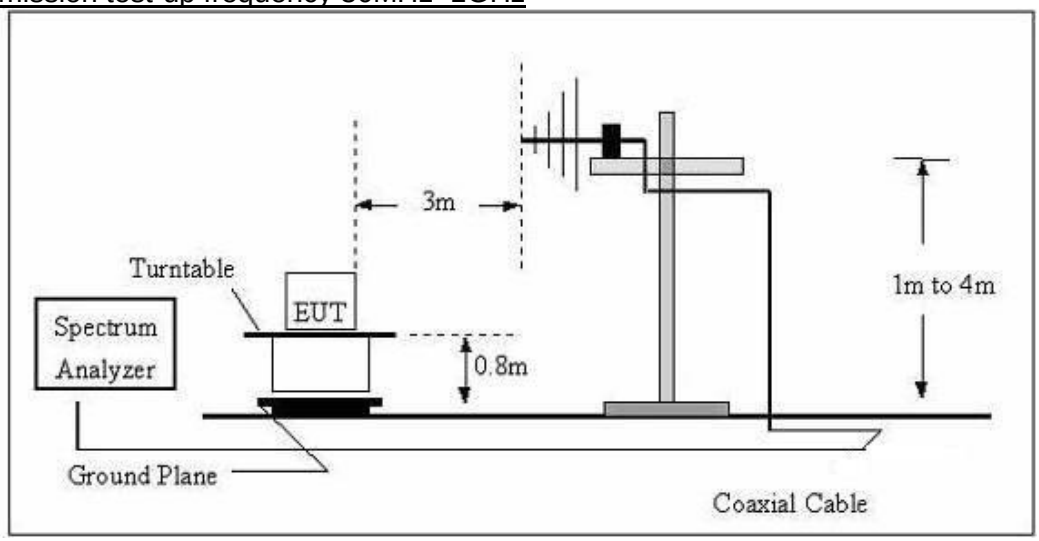
1. The EUT was placed on an non-conductive turntable using a nonconductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.
3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.
4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB).

5.7.3 Test setup

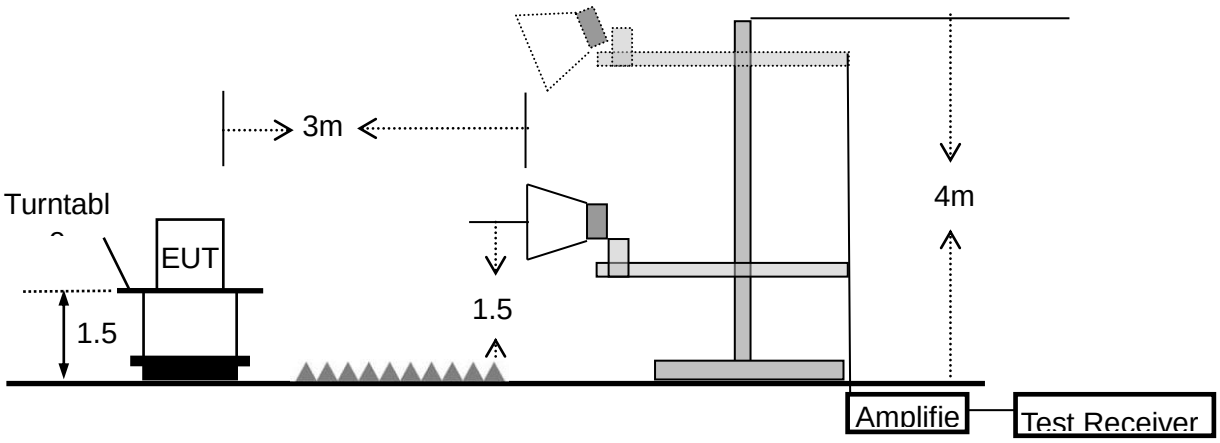
Radiated emission test-up frequency below 30MHz



Radiated emission test-up frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz



5.7.4 Test results

LTE Band 5 (30MHz – 18GHz)：Middle:836.5MHz-10MHz-QPSK

Frequency	Reading Level	Cable Loss	Antenna Gain	Measurement	Limit	Margin	Polarization	Result
(MHz)	(dBm)	(dB)	(dB)	(dBm)	(dBm)			
278.016	-68.14	0.44	0.76	-67.82	-13	-54.82	H	Pass
278.522	-68.32	0.45	0.76	-68.01	-13	-55.01	V	Pass
1674.541	-52.48	7.99	0.76	-59.71	-13	-46.71	H	Pass
1674.272	-52.53	7.99	0.76	-59.76	-13	-46.76	V	Pass
2510.214	-62.40	8.64	0.76	-70.28	-13	-57.28	H	Pass
2510.316	-62.07	8.64	0.76	-69.95	-13	-56.95	V	Pass
3347.004	-64.58	9.92	0.76	-73.74	-13	-60.74	H	Pass
3347.168	-64.12	9.92	0.76	-73.28	-13	-60.28	V	Pass

LTE Band 7 (30MHz – 26.5GHz)：Middle:2535MHz-20MHz-QPSK

Frequency	Reading Level	Cable Loss	Antenna Gain	Measurement	Limit	Margin	Polarization	Result
(MHz)	(dBm)	(dB)	(dB)	(dBm)	(dBm)			
277.730	-66.27	0.44	2.2	-64.51	-25	-39.51	H	Pass
277.736	-66.38	0.45	2.2	-64.63	-25	-39.63	V	Pass
5070.586	-67.13	3.65	2.2	-68.58	-25	-43.58	H	Pass
5070.353	-67.92	3.65	2.2	-69.37	-25	-44.37	V	Pass
7606.070	-65.53	4.34	2.2	-67.67	-25	-42.67	H	Pass
7605.925	-64.97	4.34	2.2	-67.11	-25	-42.11	V	Pass
10141.104	-66.79	6.02	2.2	-70.61	-25	-45.61	H	Pass
10140.712	-66.55	6.02	2.2	-70.37	-25	-45.37	V	Pass

LTE Band 38 (30MHz – 26.5GHz)：Middle:2595MHz-20MHz-QPSK

Frequency	Reading Level	Cable Loss	Antenna Gain	Measurement	Limit	Margin	Polarization	Result
(MHz)	(dBm)	(dB)	(dB)	(dBm)	(dBm)			
278.943	-68.93	0.44	2.2	-67.17	-25	-42.17	H	Pass
278.387	-68.89	0.45	2.2	-67.14	-25	-42.14	V	Pass
5190.701	-62.70	3.65	2.2	-64.15	-25	-39.15	H	Pass
5190.966	-62.80	3.65	2.2	-64.25	-25	-39.25	V	Pass
7785.430	-64.92	4.34	2.2	-67.06	-25	-42.06	H	Pass
7786.266	-65.20	4.34	2.2	-67.34	-25	-42.34	V	Pass
10381.318	-66.32	6.02	2.2	-70.14	-25	-45.14	H	Pass
10380.981	-66.27	6.02	2.2	-70.09	-25	-45.09	V	Pass

LTE Band 41 (30MHz – 26.5GHz)：Middle:2605MHz-20MHz-QPSK

Frequency	Reading Level	Cable Loss	Antenna Gain	Measurement	Limit	Margin	Polarization	Result
(MHz)	(dBm)	(dB)	(dB)	(dBm)	(dBm)			
Frequency:2605MHz								
279.252	-67.53	0.44	2.11	-65.86	-25	-40.86	H	Pass
278.576	-67.22	0.45	2.11	-65.56	-25	-40.56	V	Pass
4620.400	-65.17	3.65	2.11	-66.71	-25	-41.71	H	Pass
4620.672	-65.19	3.65	2.11	-66.73	-25	-41.73	V	Pass
6930.960	-69.67	4.34	2.11	-71.90	-25	-46.90	H	Pass
6930.930	-68.76	4.34	2.11	-70.99	-25	-45.99	V	Pass
9241.364	-66.77	6.02	2.11	-70.68	-25	-45.68	H	Pass
9241.665	-67.68	6.02	2.11	-71.59	-25	-46.59	V	Pass

Note: All the configuration was tested and only the worse case was reported.

5.8 Frequency Stablity

5.8.1 Limit

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d) (2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.42VDC and 4.18VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from over stress. These voltages represent a tolerance from -5.4% to 10.8%. For the purposes of measuring frequency stability these voltage limits are to be used.

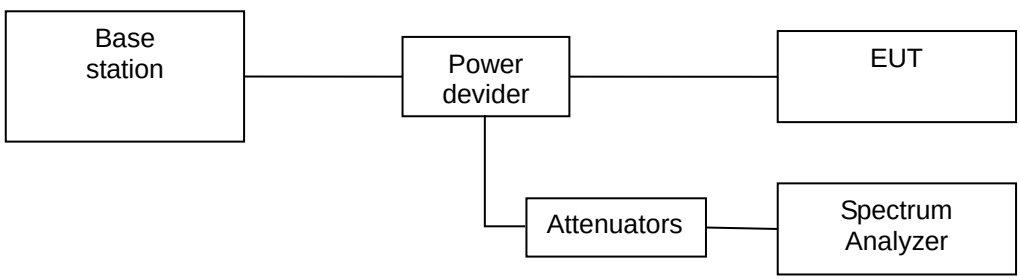
5.8.2 Test procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

5.8.3 Test setup



5.8.4 Test results

LTE Band 5

QPSK, Channel Bandwidth:10MHz					
Temperature(°C)	Test channels (MHz)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	836.5	5	4.25	0.0051	Pass
-20			4.56	0.0055	Pass
-10			4.94	0.0059	Pass
0			5.44	0.0065	Pass
10			5.70	0.0068	Pass
20			8.2	0.0098	Pass
30			8.27	0.0099	Pass
40			8.32	0.0099	Pass
50			4.28	0.0051	Pass
20		4.5	4.55	0.0054	Pass
20		5.5	4.70	0.0056	Pass

16QAM, Channel Bandwidth:10MHz					
Temperature(°C)	Test channels (MHz)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	836.5	5	3.88	0.0046	Pass
-20			4.12	0.0049	Pass
-10			4.49	0.0054	Pass
0			4.94	0.0059	Pass
10			5.29	0.0063	Pass
20			13.86	0.0166	Pass
30			14.09	0.0168	Pass
40			14.11	0.0169	Pass
50			4.48	0.0054	Pass
20		4.5	4.77	0.0057	Pass
20		5.5	5.24	0.0063	Pass

LTE Band 7

QPSK, Channel Bandwidth:20MHz					
Temperature(°C)	Test channels (MHz)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	2535	5	-11.6	-0.0046	Pass
-20			-11.57	-0.0046	Pass
-10			-11.34	-0.0045	Pass
0			-11.07	-0.0044	Pass
10			-11.06	-0.0044	Pass
20			-11.46	-0.0045	Pass
30			-11.09	-0.0044	Pass
40			-10.60	-0.0042	Pass
50			-11.7	-0.0046	Pass
20		4.5	-11.59	-0.0046	Pass
20		5.5	-11.36	-0.0045	Pass

16QAM, Channel Bandwidth:20MHz					
Temperature(°C)	Test channels (MHz)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	2535	5	-12.19	-0.0048	Pass
-20			-11.89	-0.0047	Pass
-10			-11.76	-0.0046	Pass
0			-11.34	-0.0045	Pass
10			-11.18	-0.0044	Pass
20			-15.89	-0.0063	Pass
30			-15.53	-0.0061	Pass
40			-15.44	-0.0061	Pass
50			-14.68	-0.0058	Pass
20		4.5	-14.21	-0.0056	Pass
20		5.5	-13.80	-0.0054	Pass

LTE Band 38

QPSK, Channel Bandwidth:20MHz					
Temperature(°C)	Test channels (MHz)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	2595	5	-55.9	-0.0221	Pass
-20			-55.51	-0.0219	Pass
-10			-55.12	-0.0217	Pass
0			-54.69	-0.0216	Pass
10			-54.68	-0.0216	Pass
20			-53.37	-0.0211	Pass
30			-53.00	-0.0209	Pass
40			-52.65	-0.0208	Pass
50			-52.77	-0.0208	Pass
20		4.5	-52.47	-0.0207	Pass
20		5.5	-52.17	-0.0206	Pass

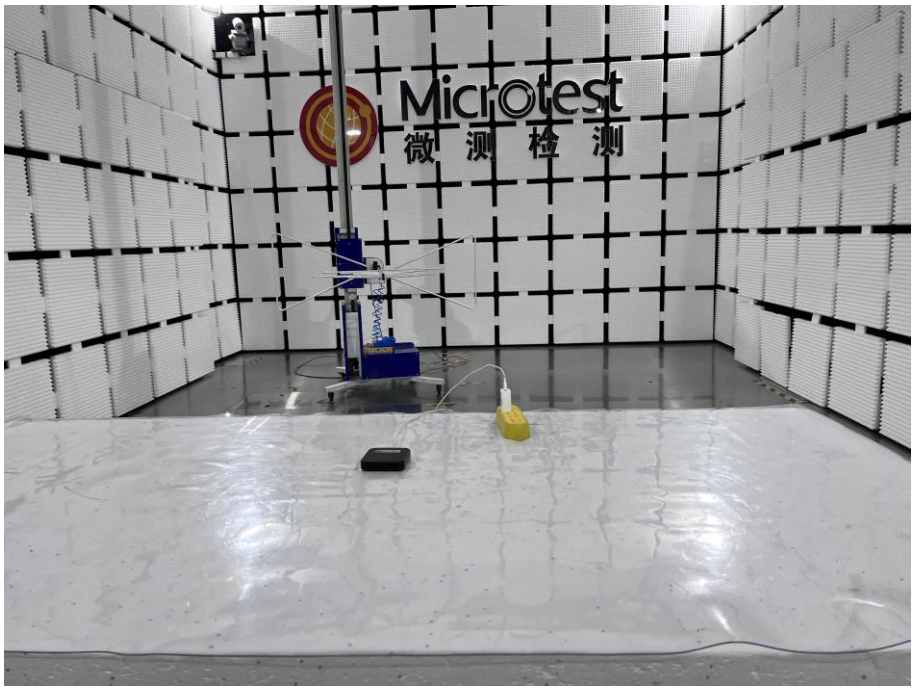
16QAM, Channel Bandwidth:20MHz					
Temperature(°C)	Test channels (MHz)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	2595	5	-61.84	-0.0244	Pass
-20			-61.82	-0.0244	Pass
-10			-61.82	-0.0244	Pass
0			-61.76	-0.0244	Pass
10			-61.70	-0.0243	Pass
20			-55.65	-0.0220	Pass
30			-55.29	-0.0218	Pass
40			-54.99	-0.0217	Pass
50			-42.5	-0.0168	Pass
20		4.5	-42.32	-0.0167	Pass
20		5.5	-41.87	-0.0165	Pass

LTE Band 41

QPSK, Channel Bandwidth:20MHz					
Temperature(°C)	Test channels (MHz)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	2605	5	-7.48	-0.009	Pass
-20			-5.29	-0.006	Pass
-10			-4.51	-0.005	Pass
0			3.55	0.004	Pass
10			-5.18	-0.006	Pass
20			-4.72	-0.006	Pass
30			4.22	0.005	Pass
40			3.3	0.004	Pass
50			4.45	0.005	Pass
20		4.5	-4.69	-0.006	Pass
20		5.5	-4.49	-0.005	Pass

16QAM, Channel Bandwidth:20MHz					
Temperature(°C)	Test channels (MHz)	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	2605	5	-5.72	-0.007	Pass
-20			-6.59	-0.008	Pass
-10			-4.35	-0.005	Pass
0			-3.46	-0.004	Pass
10			-4.73	-0.006	Pass
20			-3.96	-0.005	Pass
30			-4.46	-0.005	Pass
40			-3.48	-0.004	Pass
50			-4.99	-0.006	Pass
20		4.5	-3.89	-0.005	Pass
20		5.5	-5.34	-0.006	Pass

Photographs of the Test Setup

Radiated emission



Photographs of the EUT

See the APPENDIX 1- EUT PHOTO.

----END OF REPORT----