

LTE FDD Band 71 Channel Bandwidth 15MHz 16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
670.50	-20.46	2.31	8.16	2.15	36.6	19.84	34.77	-14.93	V
680.50	-19.52	2.34	8.19	2.15	36.6	20.78	34.77	-13.99	V
690.50	-19.60	2.38	8.23	2.15	36.6	20.70	34.77	-14.07	V

LTE FDD Band 71 Channel Bandwidth 20MHz 16QAM

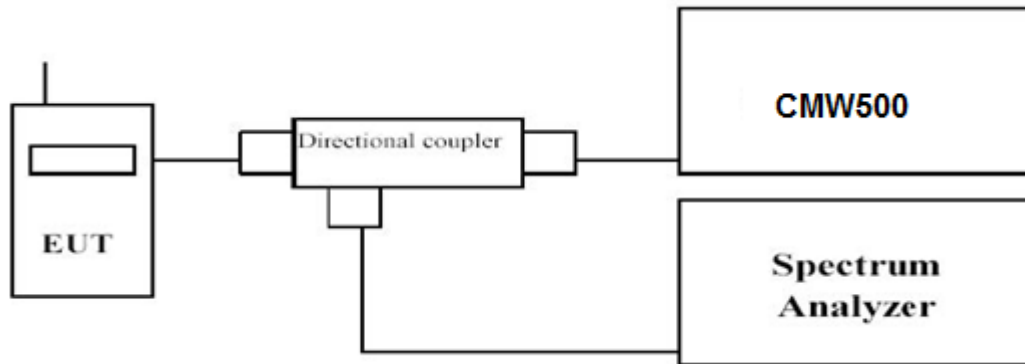
Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
673.00	-19.88	2.31	8.16	2.15	36.6	20.42	34.77	-14.35	V
683.00	-20.03	2.34	8.19	2.15	36.6	20.27	34.77	-14.50	V
688.00	-19.76	2.38	8.23	2.15	36.6	20.54	34.77	-14.23	V

3.2 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as follows:
 - 1). for continuous transmissions, set to 1 ms,
 - 2). for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
5. Record the maximum PAPR level associated with a probability of 0.1%.

TEST RESULTS

-----Passed-----

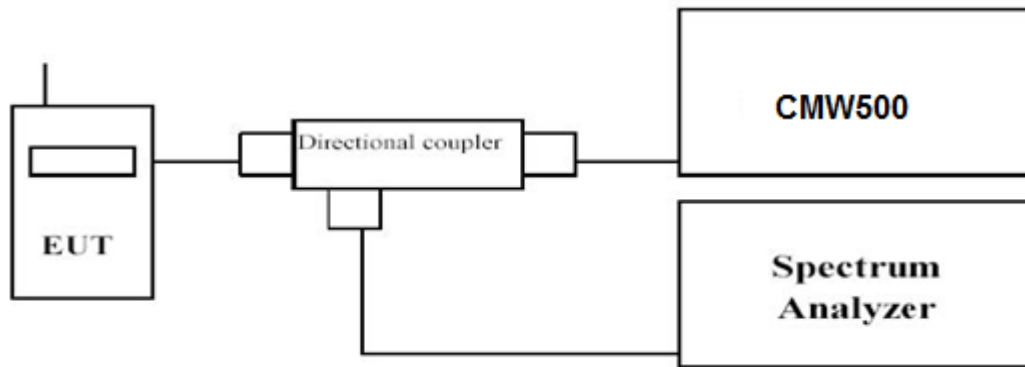
Please refer to the Appendix RF Test Data for LTE Band 71

3.3 Occupied Bandwidth and Emission Bandwidth

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded.

Set RBW was set to about 1% of emission BW, VBW $\geq$ 3 times RBW.

-26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

-----Passed-----

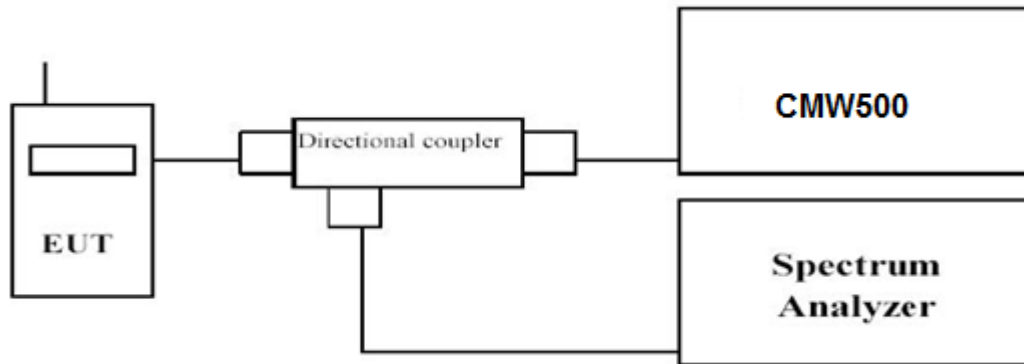
Please refer to the Appendix RF Test Data for LTE Band 71

3.4 Band Edge compliance

LIMIT

According to Part §27.53(g): For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest and highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

TEST RESULTS

-----Passed-----

Please refer to the Appendix RF Test Data for LTE Band 71

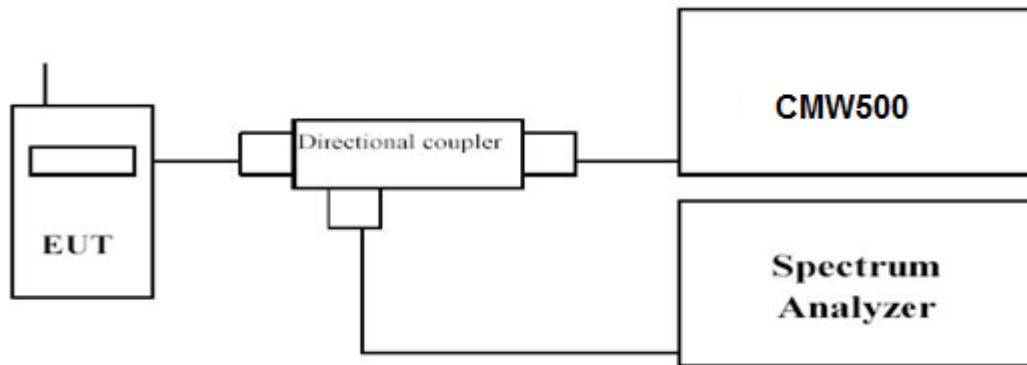
3.5 Spurious Emission

LIMIT

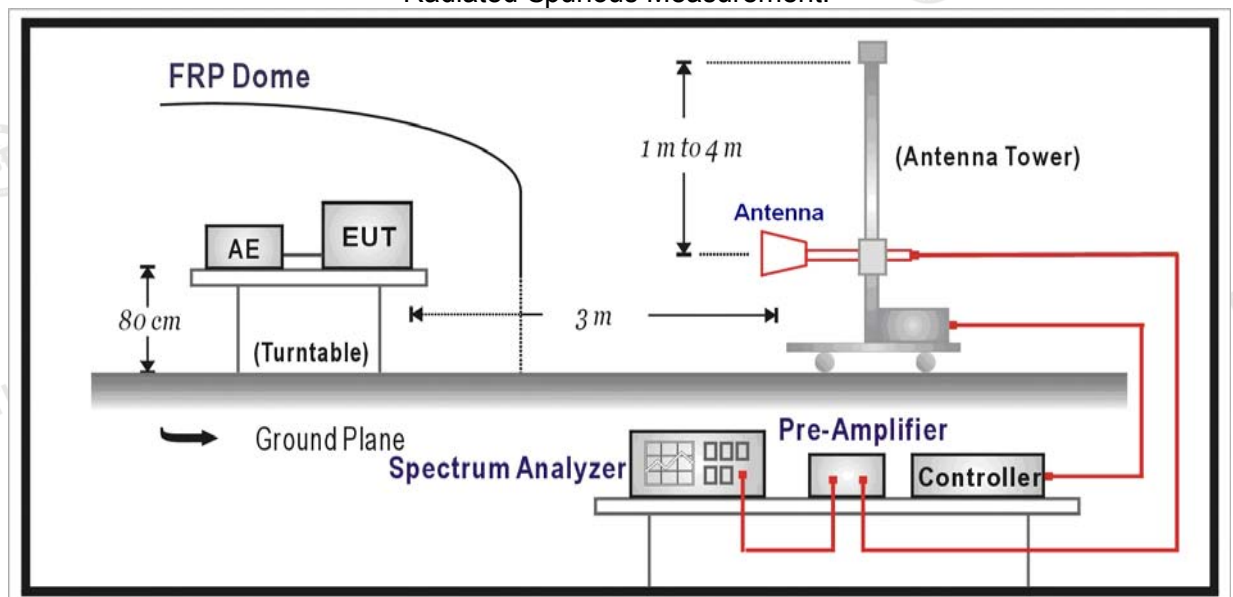
The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB

TEST CONFIGURATION

Conducted Spurious Measurement:

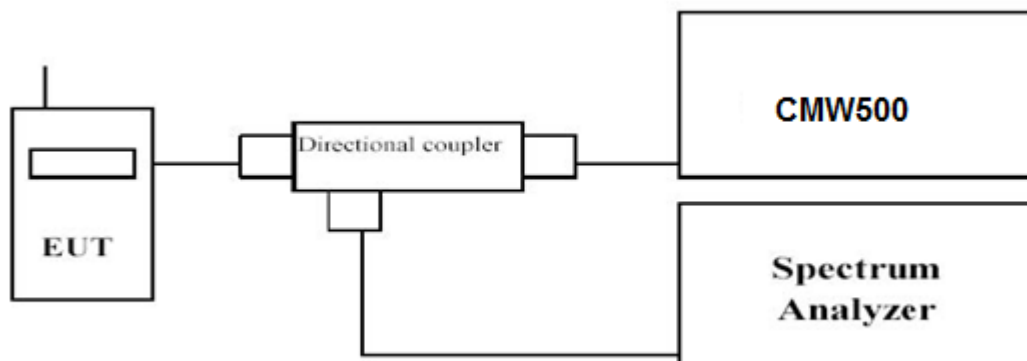


Radiated Spurious Measurement:

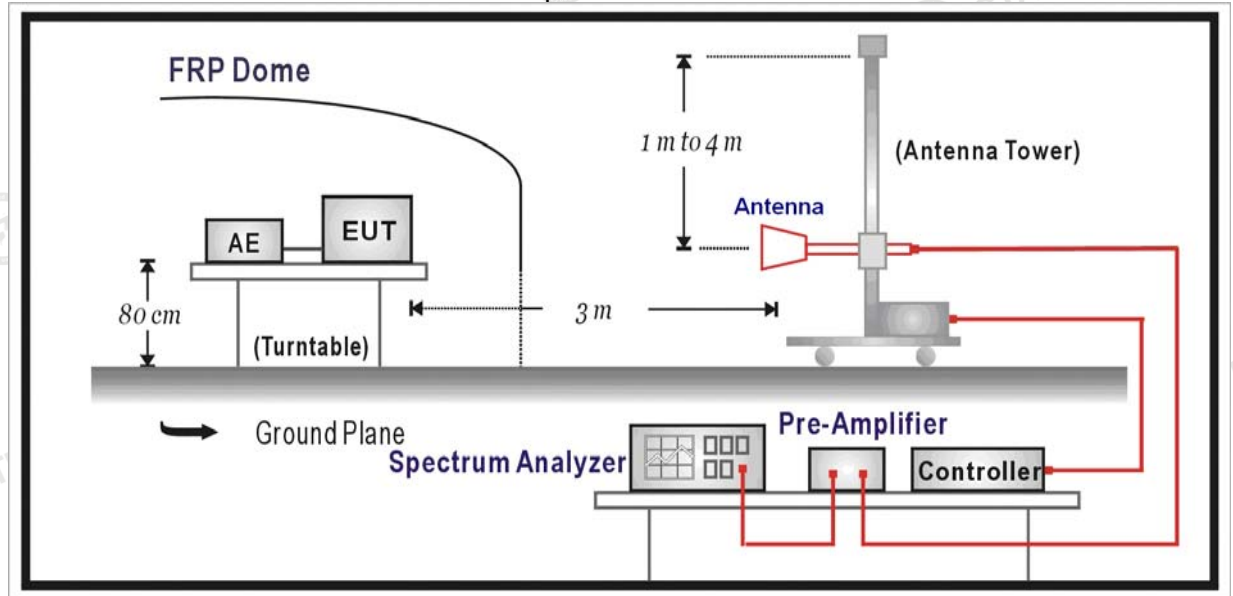


TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:

**TEST PROCEDURE**

The EUT was setup according to ANSI/TIA-603-E-2016

Conducted Spurious Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- EUT Communicate with CMW500 then selects a channel for testing.
- Add a correction factor to the display of spectrum, and then test.
- The resolution bandwidth of the spectrum analyzer was set sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.

Radiated Spurious Measurement:

- a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- c. The output of the test antenna shall be connected to the measuring receiver.
- d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h. The maximum signal level detected by the measuring receiver shall be noted.
- i. The transmitter shall be replaced by a substitution antenna.
- j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k. The substitution antenna shall be connected to a calibrated signal generator.
- l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz and 1MHz for above 1GHz. The frequency range was checked up to 10th harmonic.
- r. Test site anechoic chamber refer to ANSI C63.4.

TEST RESULTS

Conducted Measurement:

-----Passed-----

Please refer to the Appendix RF Test Data for LTE Band 71

Radiated Measurement:**Remark:**

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 71; recorded worst case for each Channel Bandwidth of LTE FDD Band 71 @ QPSK
2. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + G_a(dBi)$
3. We were not recorded other points as values lower than limits.
4. $Margin = Limit - EIRP$

LTE FDD Band 71 Channel Bandwidth 20MHz QPSK Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Distance (m)	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1346.00	-40.37	2.83	3.00	7.24	-35.96	-13.00	-22.96	H
2019.00	-47.28	2.91	3.00	9.51	-40.68	-13.00	-27.68	H
1346.00	-42.89	2.83	3.00	7.24	-38.48	-13.00	-25.48	V
2019.00	-48.93	2.91	3.00	9.51	-42.33	-13.00	-29.33	V

LTE FDD Band 71 Channel Bandwidth 20MHz QPSK Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Distance (m)	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1366.00	-40.90	2.83	3.00	7.24	-36.49	-13.00	-23.49	H
2049.00	-47.16	2.91	3.00	9.51	-40.56	-13.00	-27.56	H
1366.00	-42.60	2.83	3.00	7.24	-38.19	-13.00	-25.19	V
2049.00	-49.18	2.91	3.00	9.51	-42.58	-13.00	-29.58	V

LTE FDD 71 Channel Bandwidth 20MHz QPSK High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Distance (m)	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1376.00	-40.61	2.83	3.00	7.24	-36.20	-13.00	-23.20	H
2064.00	-47.48	2.91	3.00	9.51	-40.88	-13.00	-27.88	H
1376.00	-44.55	2.83	3.00	7.24	-40.14	-13.00	-27.14	V
2064.00	-49.88	2.91	3.00	9.51	-43.28	-13.00	-30.28	V

Notes:

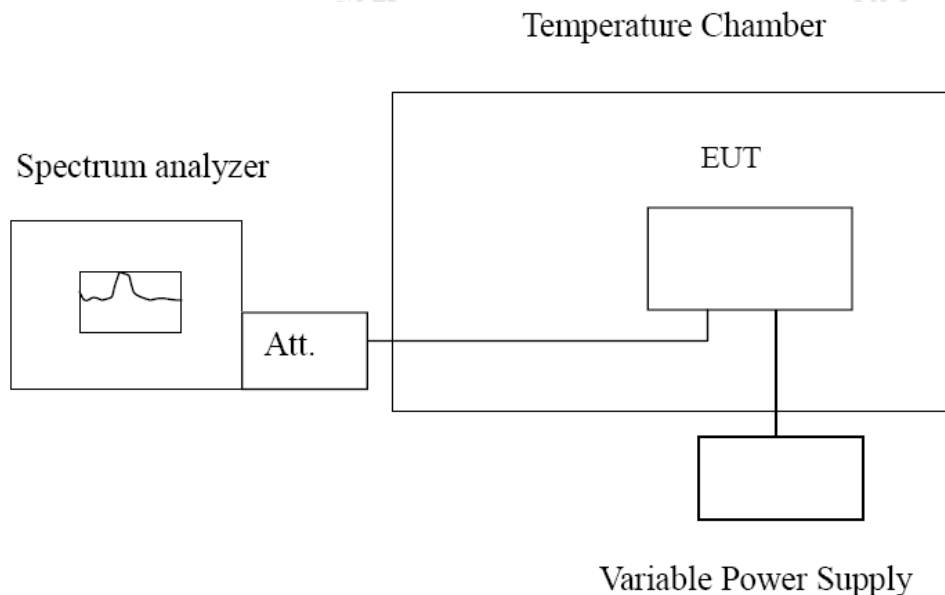
1. All channel bandwidth were tested, the report recorded the worst data.
2. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + P_{Ag}(dB) + G_a(dBi)$
3. $ERP = EIRP - 2.15dBi$ as EIRP by subtracting the gain of the dipole.
4. $Margin = EIRP - Limit$
5. We measured all modes and only recorded the worst case.

3.6 Frequency Stability under Temperature & Voltage Variations

LIMIT

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

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to ANSI/TIA-603-E-2016

Frequency Stability under Temperature Variations:

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE Band 71, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

-----Passed-----

Please refer to the Appendix RF Test Data for LTE Band 71

4 Test Setup Photos of the EUT

