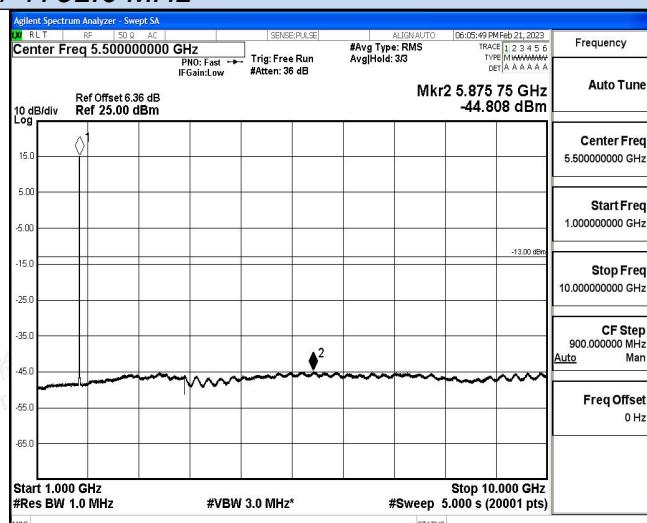
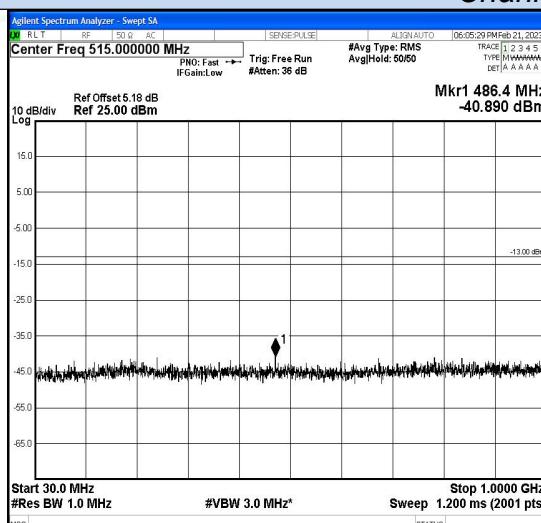
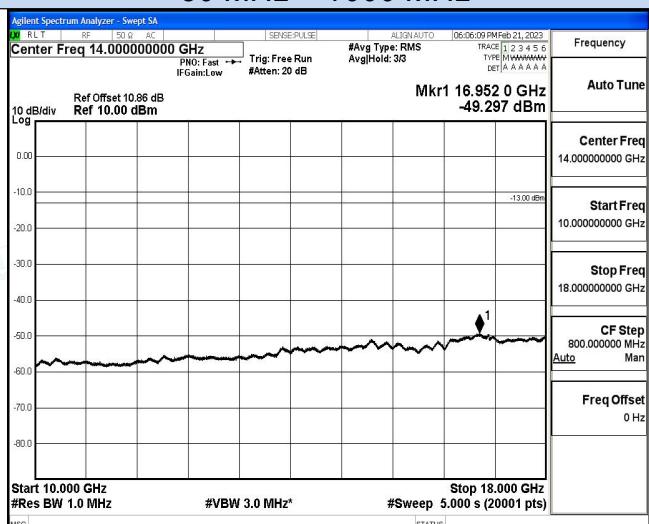




## Spurious Emission on Antenna Port UMTS/TM1/WCDMA Band IV Channel 1513 / 1752.6 MHz



30 MHz – 1000 MHz



1 GHz – 10 GHz



## 4.6 Frequency Stability Test

### TEST APPLICABLE

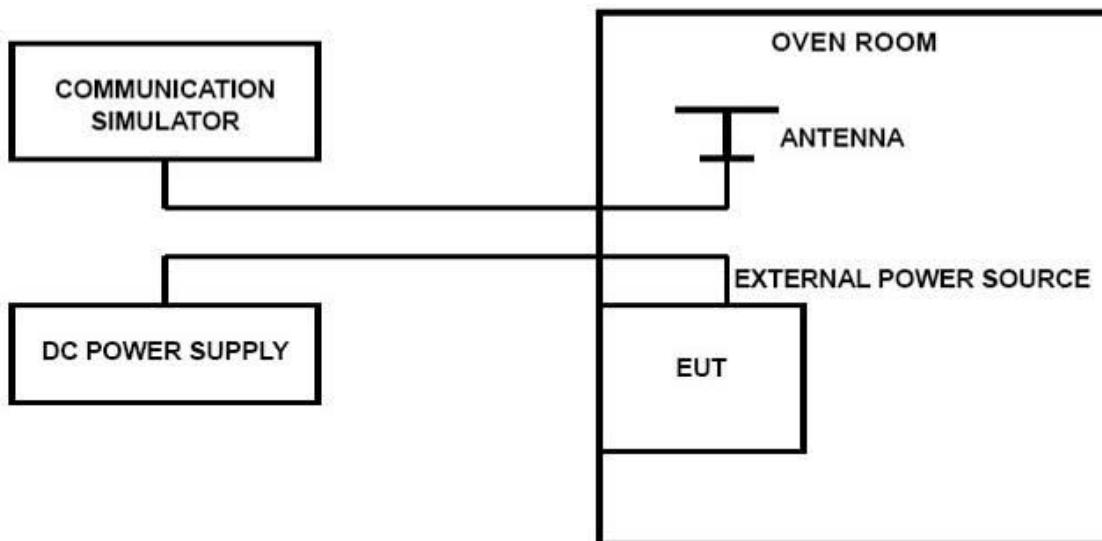
1. According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30°C to +50°C centigrade.
2. According to FCC Part 2 Section 2.1055 (e)(2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacturer.
3. Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried voltage equipment and the end voltage point was 3.3V.

### TEST PROCEDURE

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 WIDEBAND RADIO COMMUNICATION TESTER (CMW 500).

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 CMW 500 and in a simulated call on middle channel of WCDMA band II/IV/V, 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 0.5 hours at each temperature, unpowered, before making measurements;
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1 Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 0.5 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 CMW 500 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 0.5 hours at each temperature, unpowered, before making measurements;
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure;

### TEST CONFIGURATION



## TEST LIMITS

### **For Hand carried battery powered equipment**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. 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 3.40VDC and 4.30VDC, with a nominal voltage of 3.80VDC. 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 overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

### **For equipment powered by primary supply voltage**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

## TEST RESULTS

UMTS/TM1/WCDMA Band II					
DC Power	Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
VL	25	6	0.003	2.50	PASS
VN	25	-13	-0.007	2.50	PASS
VH	25	13	0.007	2.50	PASS
VN	-30	-14	-0.007	2.50	PASS
VN	-20	4	0.002	2.50	PASS
VN	-10	-19	-0.010	2.50	PASS
VN	0	19	0.010	2.50	PASS
VN	10	-18	-0.010	2.50	PASS
VN	20	-17	-0.009	2.50	PASS
VN	30	16	0.009	2.50	PASS
VN	40	11	0.006	2.50	PASS
VN	50	8	0.004	2.50	PASS

UMTS/TM1/WCDMA Band V					
DC Power	Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
VL	25	9	0.011	2.50	PASS
VN	25	-11	-0.013	2.50	PASS
VH	25	10	0.012	2.50	PASS
VN	-30	-15	-0.018	2.50	PASS
VN	-20	-14	-0.017	2.50	PASS
VN	-10	-1	-0.001	2.50	PASS
VN	0	9	0.011	2.50	PASS
VN	10	-9	-0.011	2.50	PASS
VN	20	-2	-0.002	2.50	PASS
VN	30	17	0.021	2.50	PASS
VN	40	17	0.021	2.50	PASS
VN	50	-2	-0.002	2.50	PASS



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UMTS/TM1/WCDMA Band IV					
DC Power	Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
VL	25	-18	-0.010	±2.50	PASS
VN	25	-6	-0.003	±2.50	PASS
VH	25	-2	-0.001	±2.50	PASS
VN	-30	14	0.008	±2.50	PASS
VN	-20	-4	-0.002	±2.50	PASS
VN	-10	16	0.009	±2.50	PASS
VN	0	-15	-0.009	±2.50	PASS
VN	10	-15	-0.009	±2.50	PASS
VN	20	-11	-0.006	±2.50	PASS
VN	30	20	0.011	±2.50	PASS
VN	40	-1	-0.001	±2.50	PASS
VN	50	20	0.011	±2.50	PASS



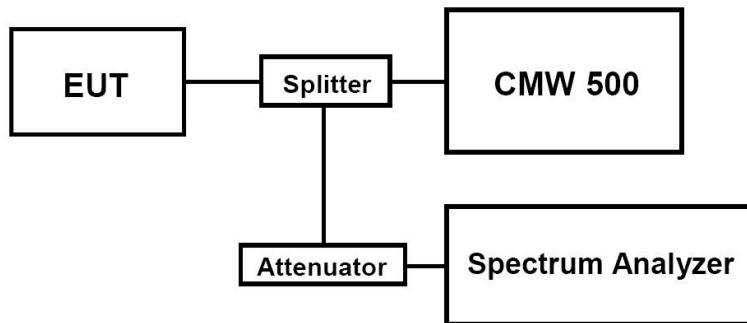
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## 4.7 Peak-to-Average Ratio (PAR)

### 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

Test Mode	Channel	Frequency (MHz)	PAPR Value (dB)	Limits (dB)	Verdict
UMTS/TM1/ WCDMA Band II	9262	1852.4	2.78	13.0	PASS
	9400	1880.0	2.82	13.0	PASS
	9538	1907.6	2.77	13.0	PASS
UMTS/TM1/ WCDMA Band V	4132	826.4	2.92	13.0	PASS
	4182	836.4	2.95	13.0	PASS
	4233	846.6	2.92	13.0	PASS
UMTS/TM1/ WCDMA Band IV	1312	1712.4	2.71	13.0	PASS
	1413	1732.6	2.99	13.0	PASS
	1513	1752.6	2.73	13.0	PASS

#### Remark:

1. Test results including cable loss;
2. Please refer to following plots;



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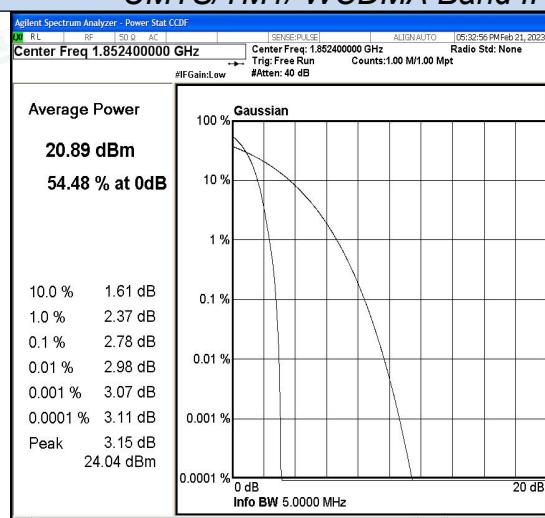
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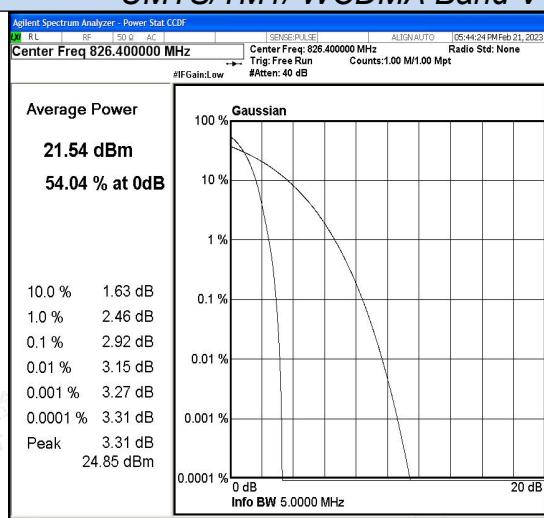


## Peak-to-Average Ratio (PAR)

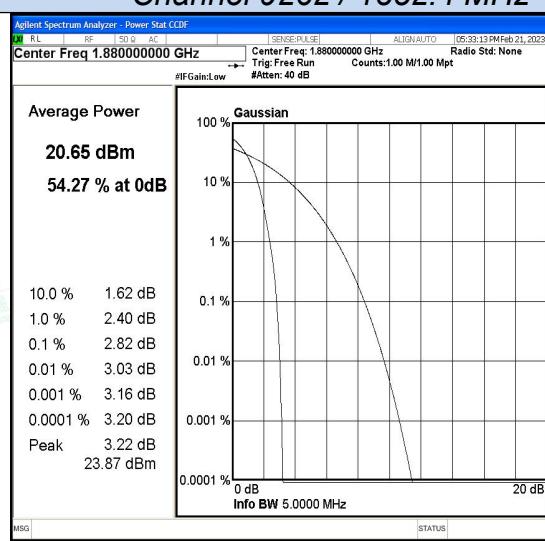
## UMTS/TM1/ WCDMA Band II



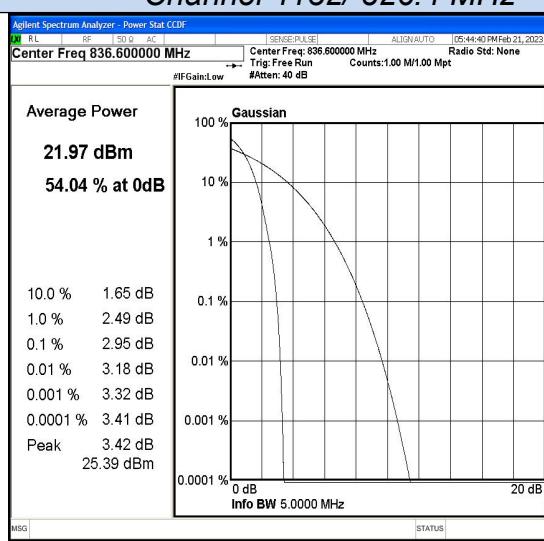
## UMTS/TM1/ WCDMA Band V



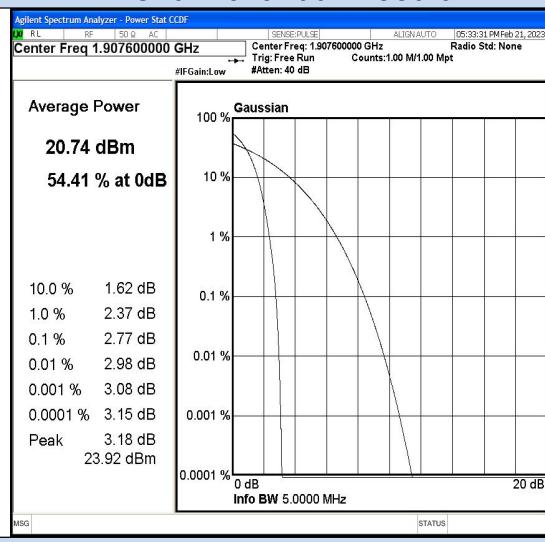
## Channel 9262 / 1852.4 MHz



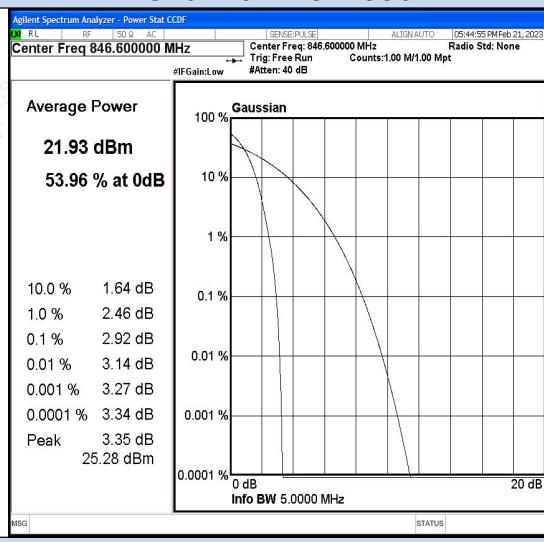
## Channel 4132/ 826.4 MHz



## Channel 9400 / 1880.0 MHz



## Channel 4182/ 836.4 MHz

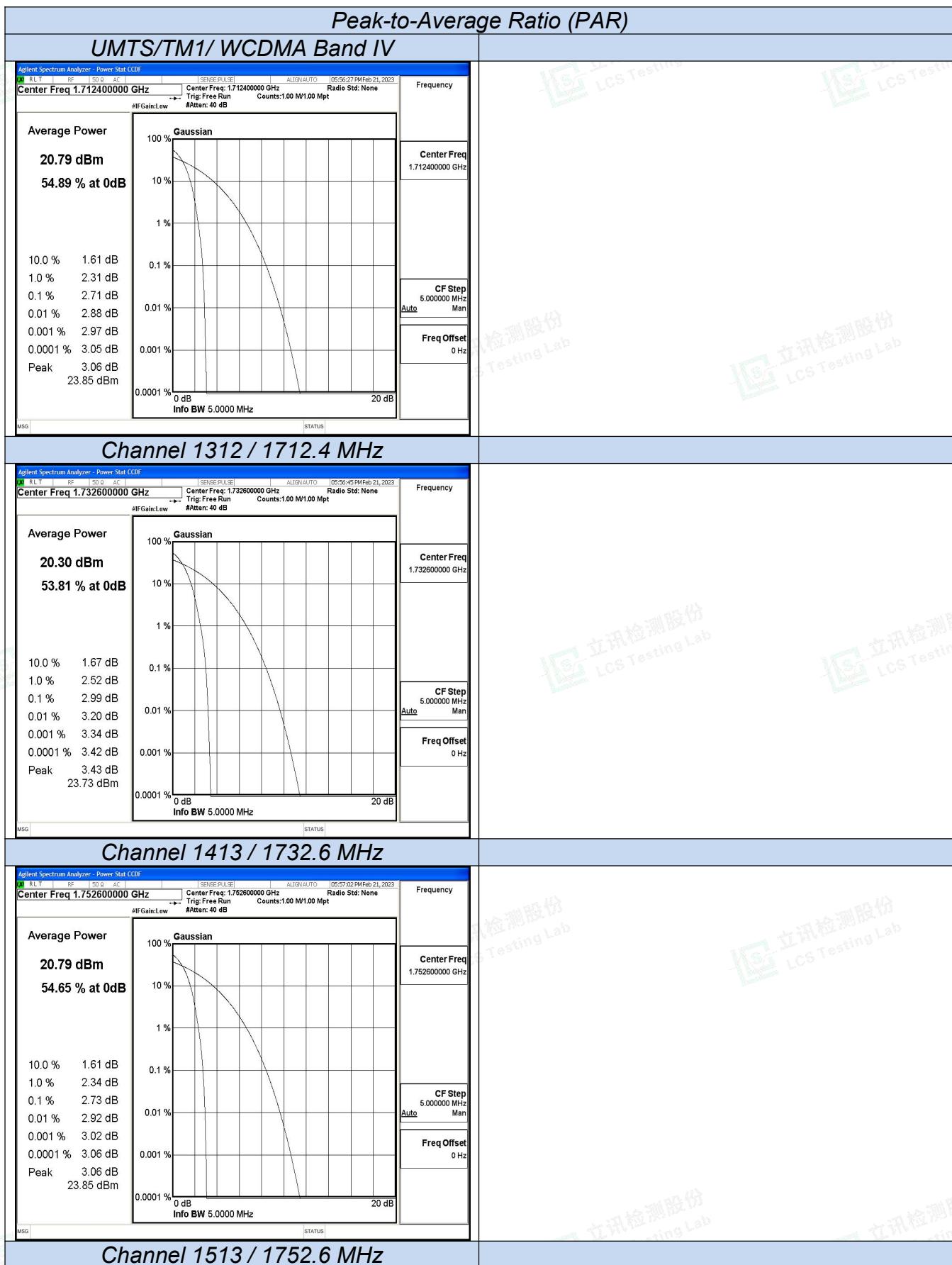


## Channel 9538 / 1907.6 MHz



## Channel 4233/ 846.6 MHz





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## 5 Test Setup Photos of the EUT

Please refer to separated files for Test Setup Photos of the EUT.

## 6 External Photos of the EUT

Please refer to separated files for External Photos of the EUT.

## 7 Internal Photos of the EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF TEST REPORT-----



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