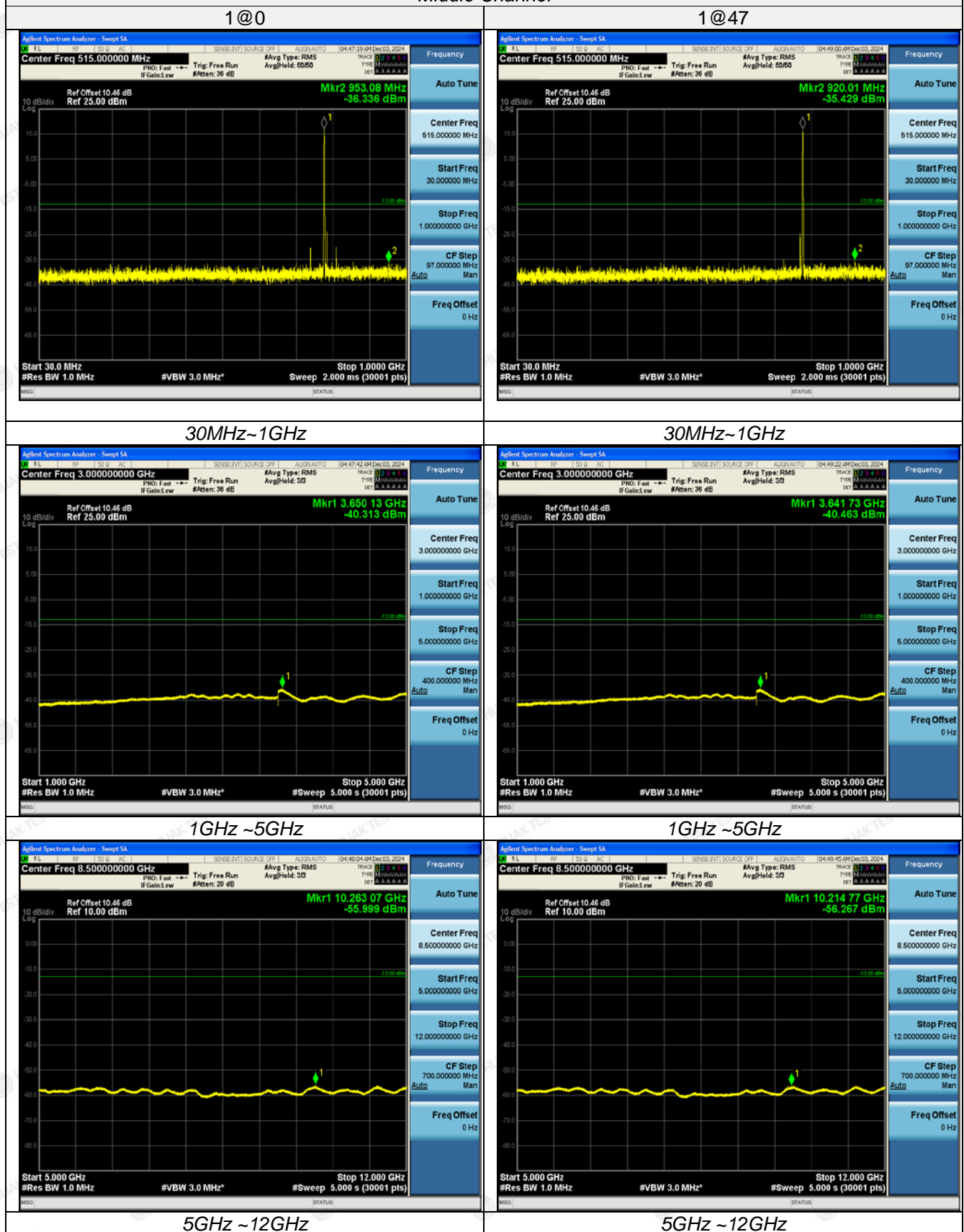
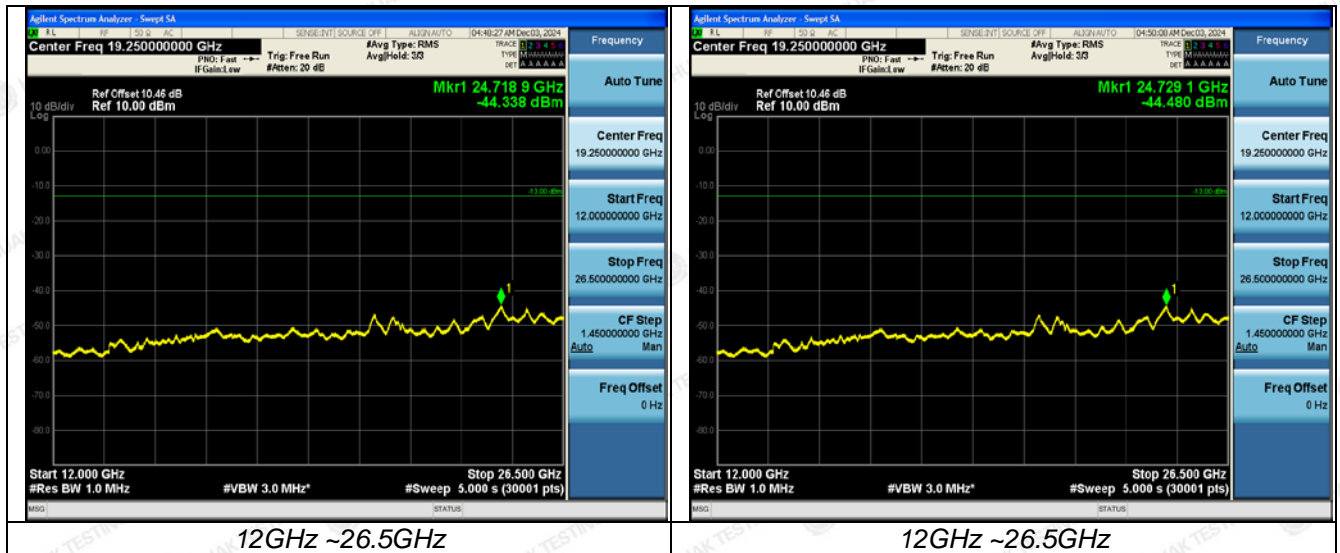


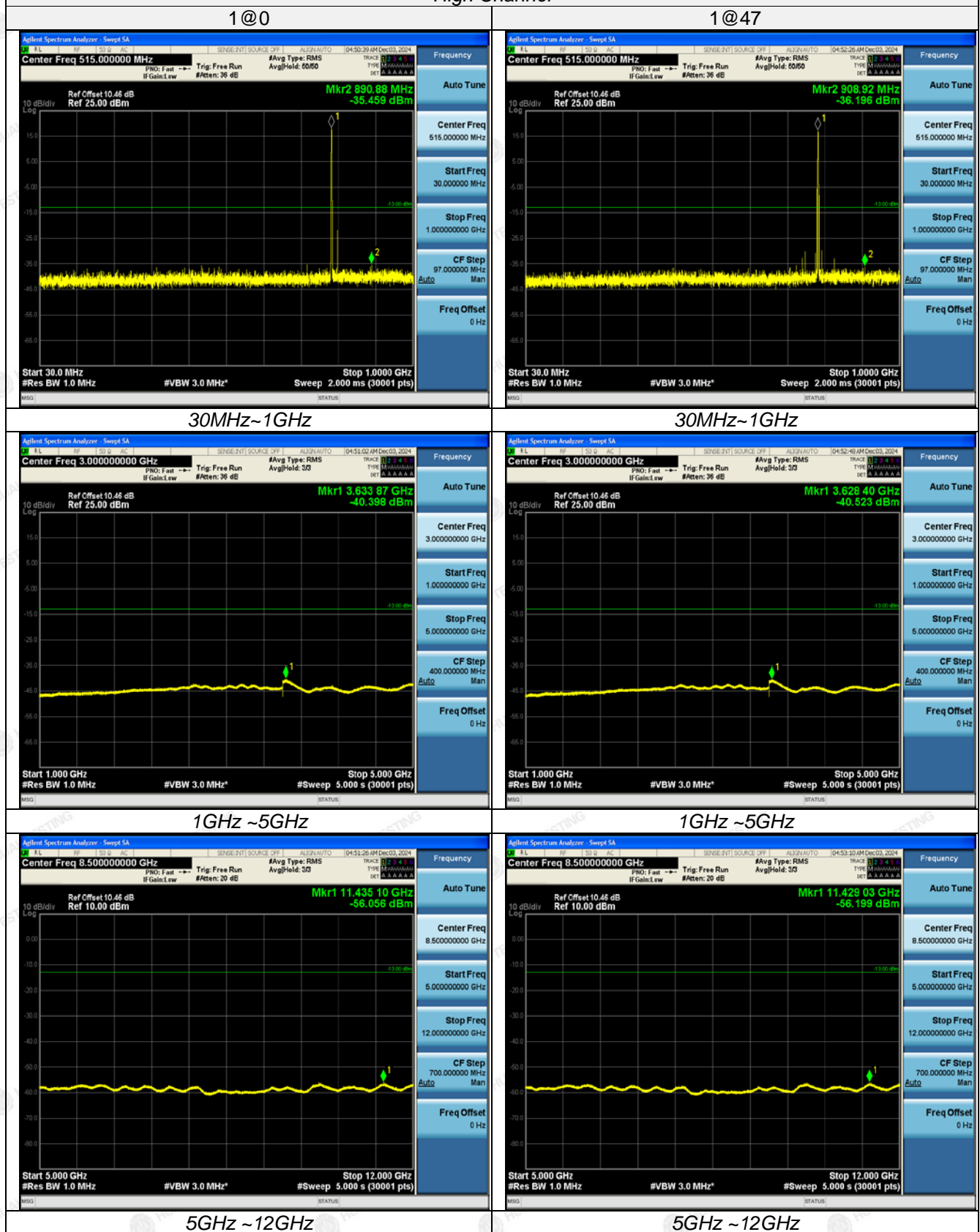
LTE FDD Band 13-QPSK-3.75KHz
Middle Channel

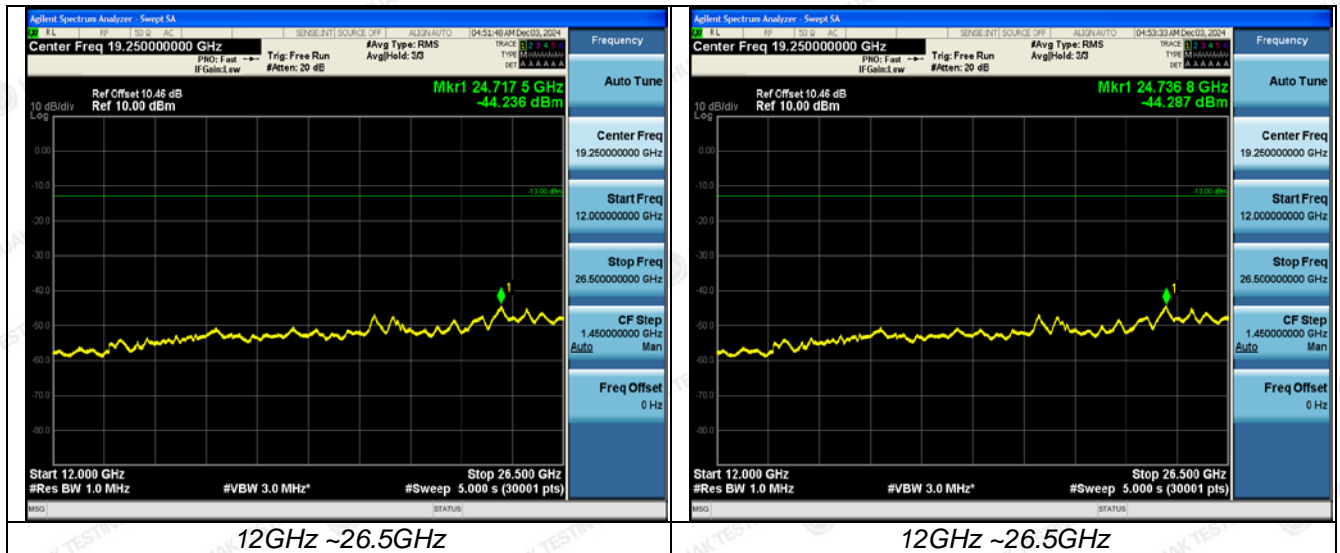
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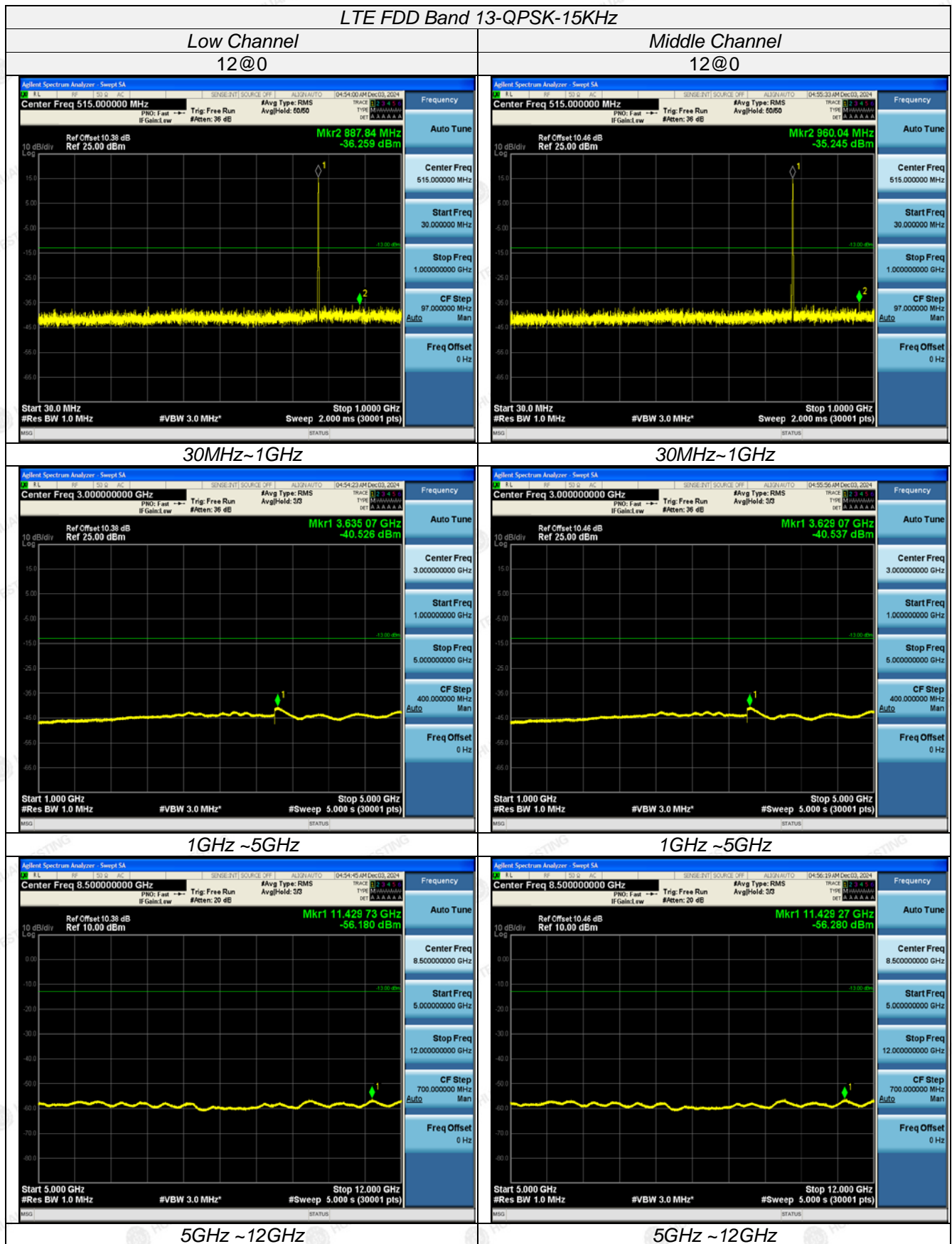
TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



LTE FDD Band 13-QPSK-3.75KHz
High Channel

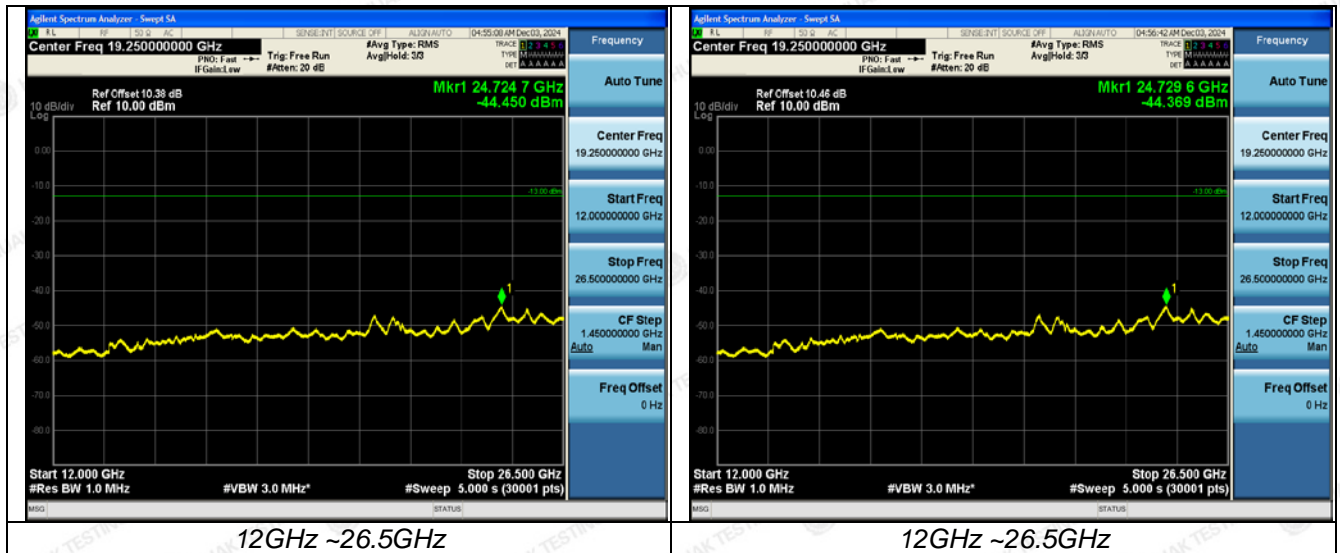




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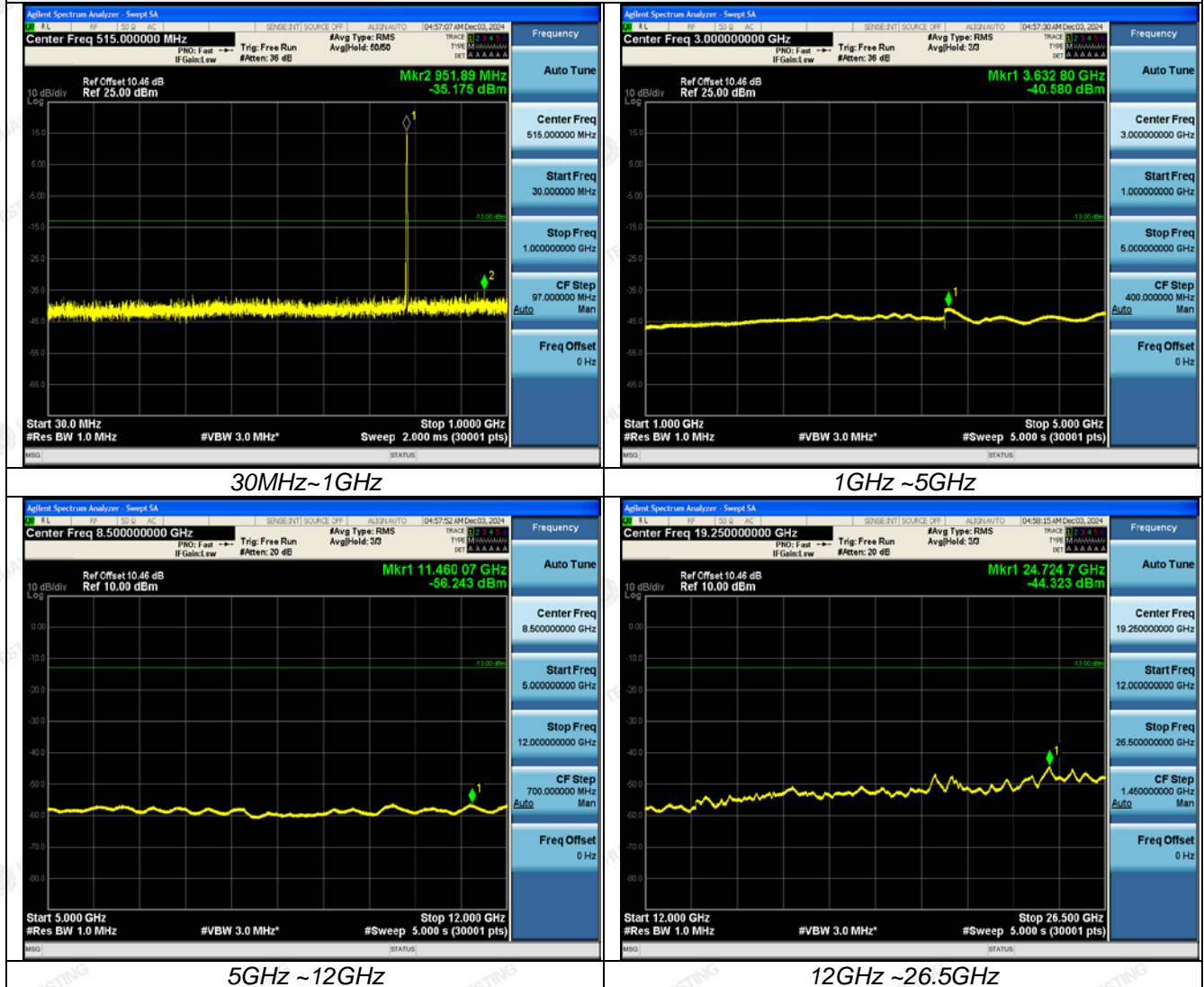




LTE FDD Band 13-QPSK-15KHz

High Channel

12@0



**Radiated Measurement:****Remark:**

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 13; recorded worst case for each Channel Bandwidth of LTE FDD Band 13.
2. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + G_a(dBi)$
3. We were not recorded other points as values lower than limits.
4. $Margin = Limit - EIRP$

Radiated Measurement:**Remark:**

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 13; recorded worst case for each Channel Bandwidth of LTE FDD Band 13.
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 13-15KHz-BPSK-Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1554.2	-55.63	4.02	3	12.21	-47.44	-40.00	7.44	H
2331.3	-48.04	5.11	3	13.26	-39.89	-13.00	26.89	H
1554.2	-57.84	4.02	3	12.21	-49.65	-40.00	9.65	V
2331.3	-54.88	5.11	3	13.26	-46.73	-13.00	33.73	V

LTE FDD Band 13-15KHz-BPSK-Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1564.0	-53.02	4.02	3	12.21	-44.83	-40.00	4.83	H
2346.0	-47.19	5.11	3	13.26	-39.04	-13.00	26.04	H
1564.0	-59.02	4.02	3	12.21	-50.83	-40.00	10.83	V
2346.0	-54.11	5.11	3	13.26	-45.96	-13.00	32.96	V

LTE FDD Band 13-15KHz-BPSK-High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1573.8	-53.82	4.02	3	12.21	-45.63	-40.00	5.63	H
2360.7	-46.96	5.11	3	13.26	-38.81	-13.00	25.81	H
1573.8	-58.48	4.02	3	12.21	-50.29	-40.00	10.29	V
2360.7	-53.62	5.11	3	13.26	-45.47	-13.00	32.47	V

LTE FDD Band 13-15KHz-QPSK-Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1554.2	-55.84	4.02	3	12.21	-47.65	-40.00	7.65	H
2331.3	-48.16	5.11	3	13.26	-40.01	-13.00	27.01	H
1554.2	-59.04	4.02	3	12.21	-50.85	-40.00	10.85	V
2331.3	-54.81	5.11	3	13.26	-46.66	-13.00	33.66	V



LTE FDD Band 13-15KHz-QPSK-Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1564.0	-54.09	4.02	3	12.21	-45.9	-40.00	5.9	H
2346.0	-47.96	5.11	3	13.26	-39.81	-13.00	26.81	H
1564.0	-58.08	4.02	3	12.21	-49.89	-40.00	9.89	V
2346.0	-55.11	5.11	3	13.26	-46.96	-13.00	33.96	V

LTE FDD Band 13-15KHz-QPSK-High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1573.8	-54.41	4.02	3	12.21	-46.22	-40.00	6.22	H
2360.7	-46.29	5.11	3	13.26	-38.14	-13.00	25.14	H
1573.8	-58.93	4.02	3	12.21	-50.74	-40.00	10.74	V
2360.7	-53.72	5.11	3	13.26	-45.57	-13.00	32.57	V

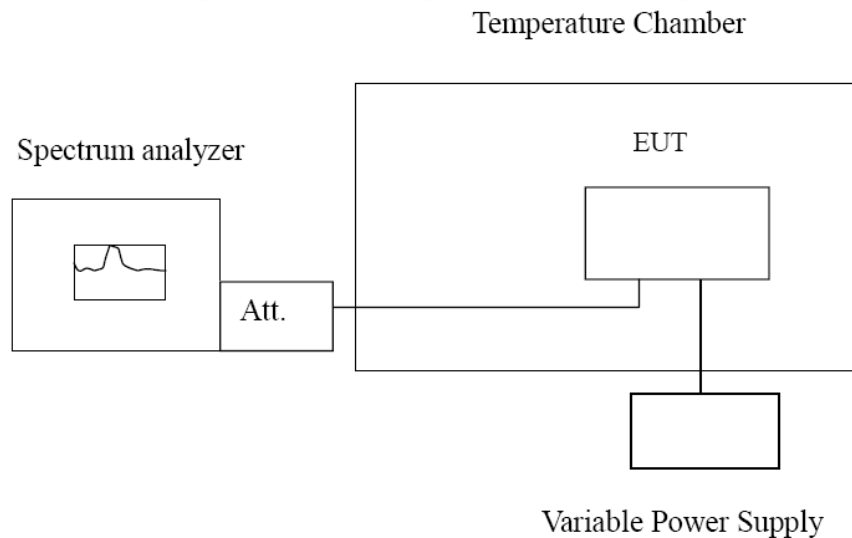


3.7 Frequency Stability Under Temperature & Voltage Variations

LIMIT

According to §27.54, §2.1055 requirement, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation and should not exceed 2.5ppm.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D.

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 13, 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 0.1V 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**

Remark:

1. We tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 13; recorded worst case.

LTE Band 13, 15KHz (worst case of all bandwidths)

Frequency Error vs Voltage

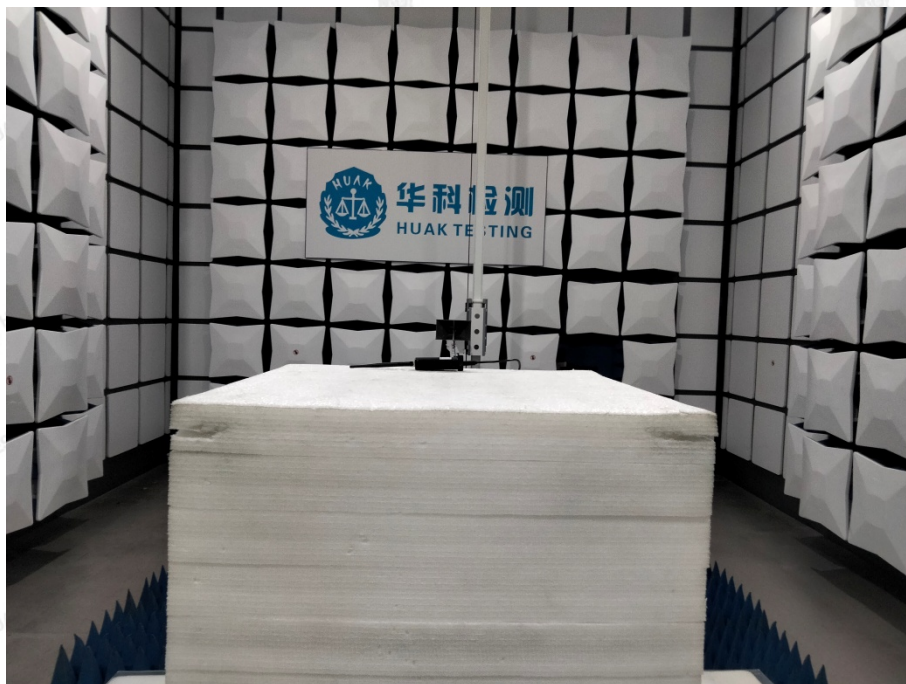
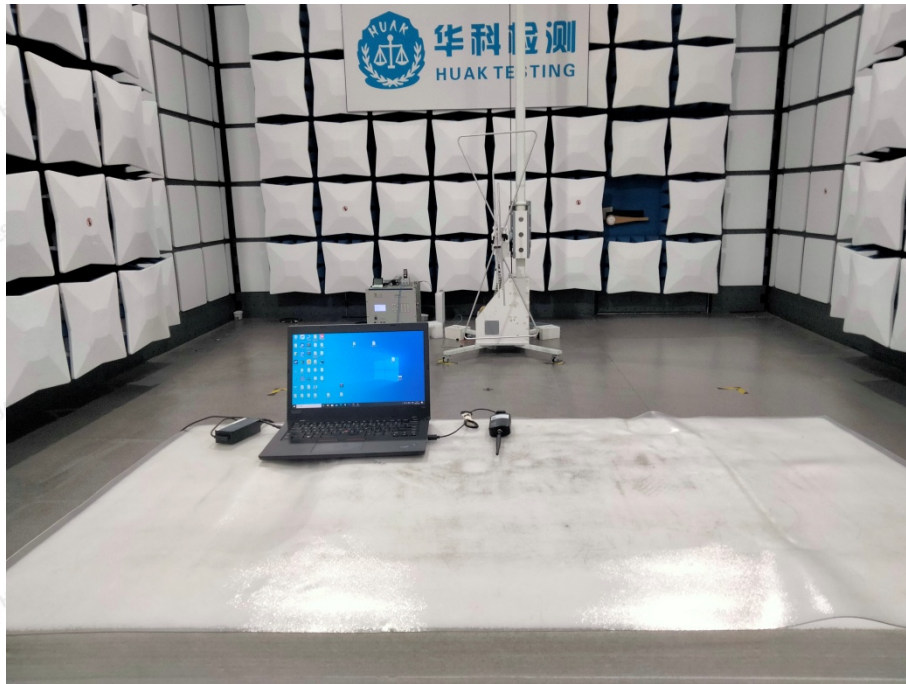
Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	BPSK	QPSK	BPSK	QPSK
4.25V	-14.43	-12.46	-0.018569	-0.016034
5.0V	-15.95	-11.84	-0.020525	-0.015236
5.75V	-16.21	-10.46	-0.020860	-0.013460

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	BPSK	QPSK	BPSK	QPSK
-30°	-14.32	-13.95	-0.018427	-0.017951
-20°	-13.60	-11.67	-0.017501	-0.015017
-10°	-15.35	-13.35	-0.019753	-0.017179
0°	-11.19	-9.37	-0.014309	-0.011982
10°	-11.19	-9.71	-0.014309	-0.012417
20°	-11.63	-8.88	-0.014872	-0.011355
30°	-10.34	-9.24	-0.013223	-0.011816
40°	-12.12	-9.63	-0.015499	-0.012315
50°	-10.90	-9.30	-0.013939	-0.011893



4 Test Setup Photos of the EUT





5 Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos.

.....End of Report.....