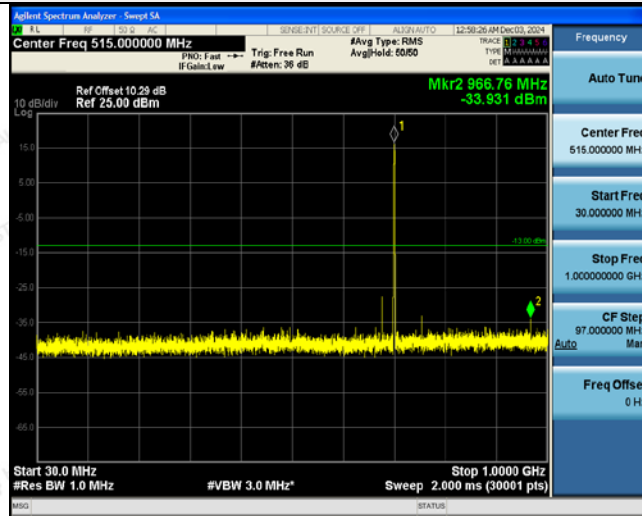
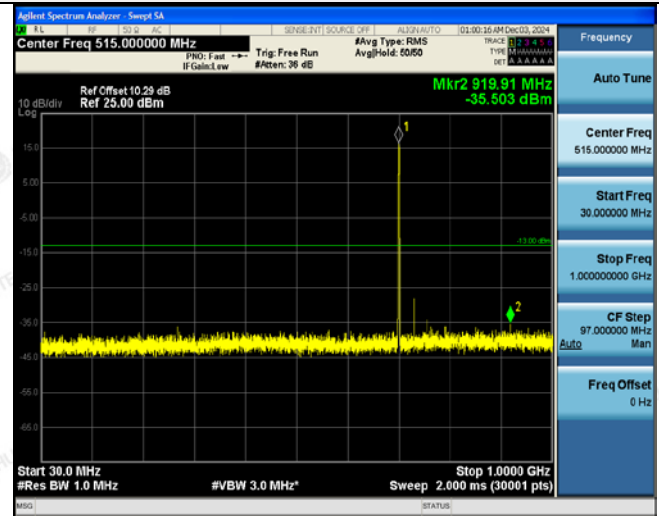


LTE FDD Band 12-QPSK-3.75KHz
Middle Channel

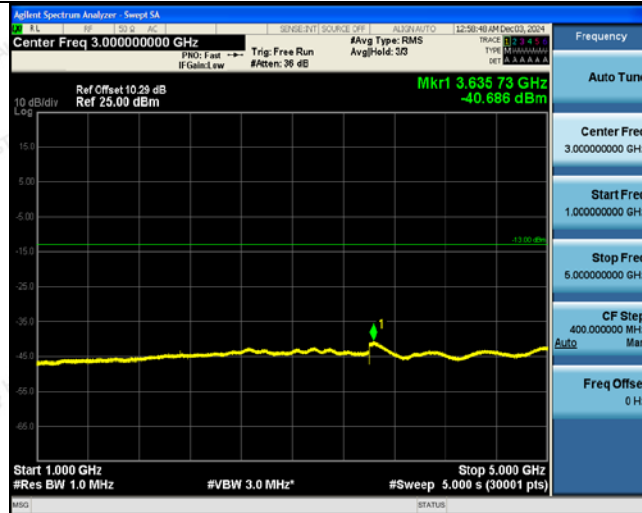
1@0



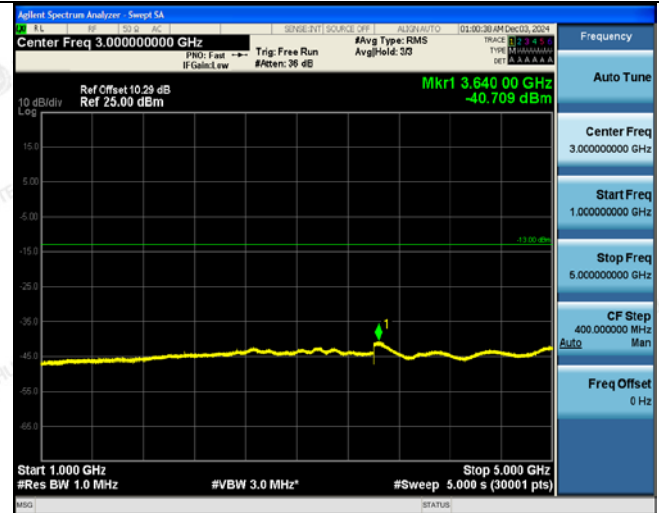
1@47



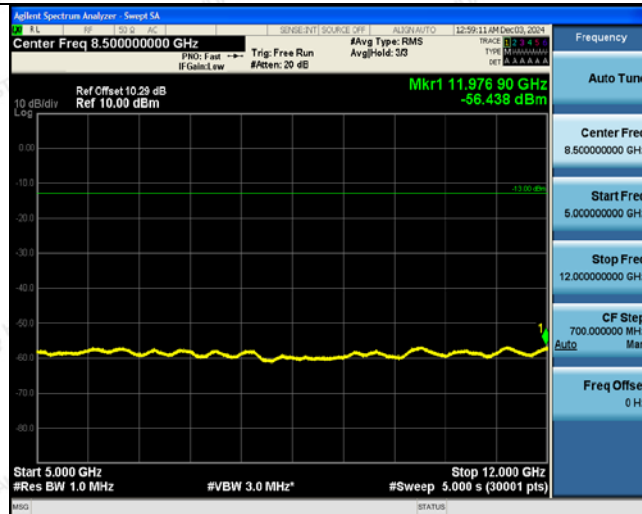
30MHz~1GHz



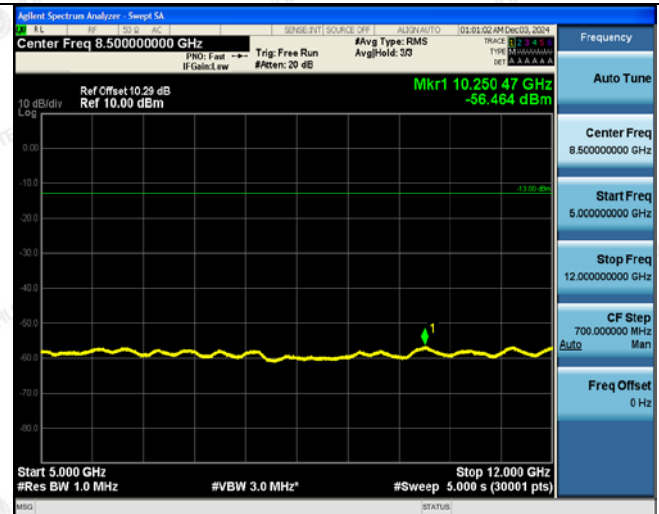
30MHz~1GHz



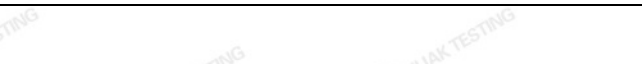
1GHz ~5GHz



1GHz ~5GHz

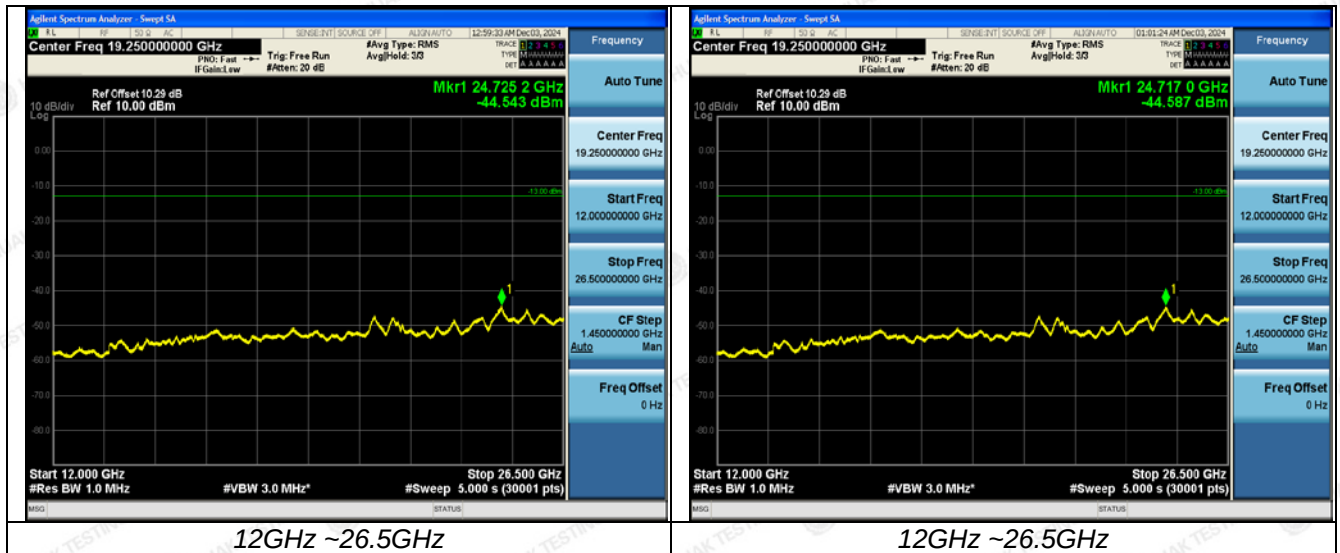


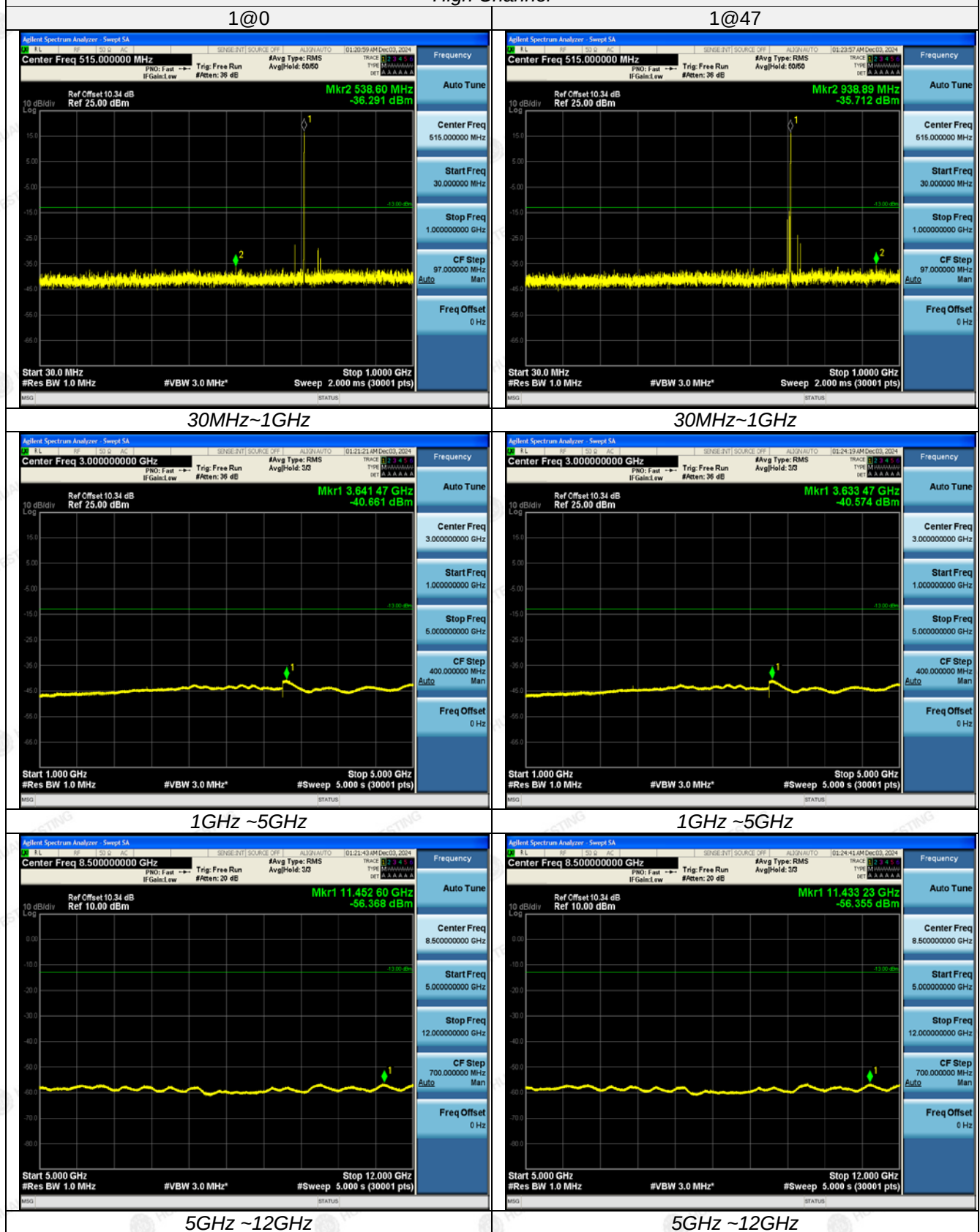
5GHz ~12GHz

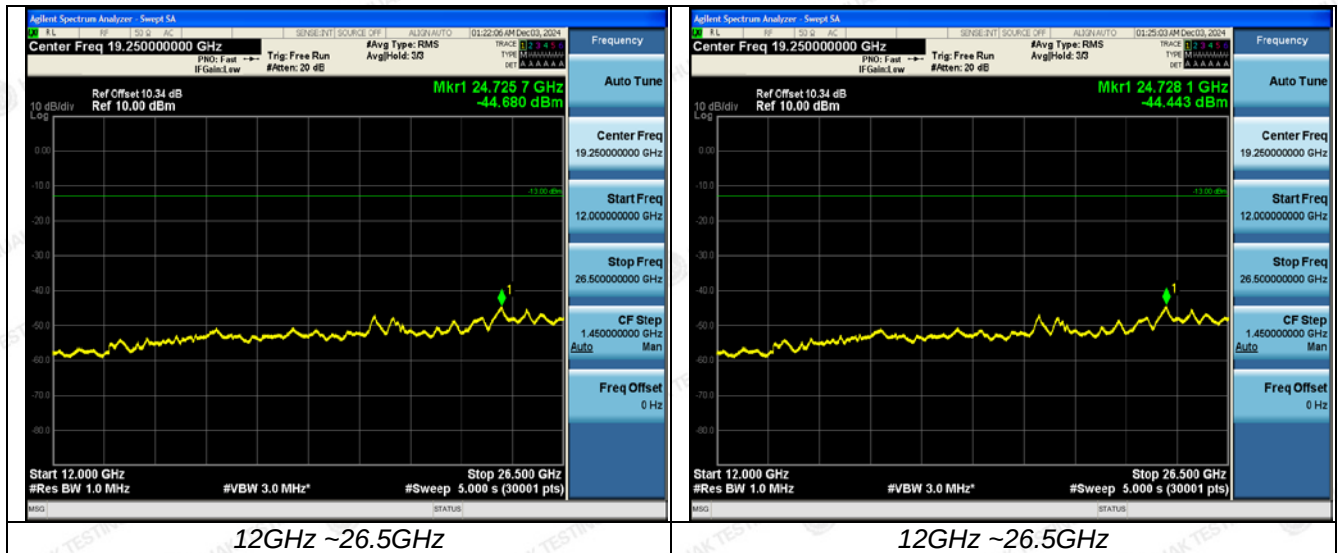


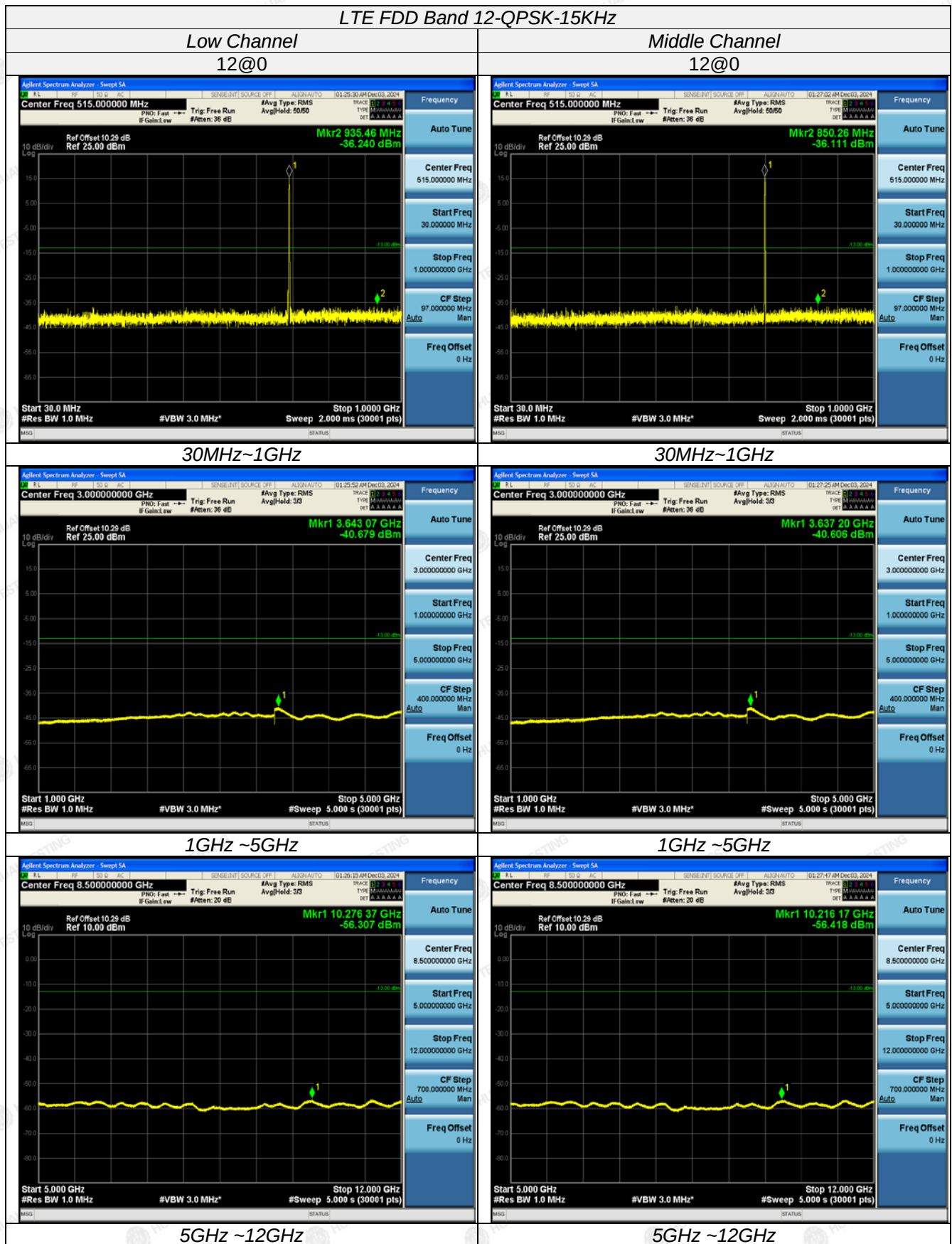
5GHz ~12GHz





LTE FDD Band 12-QPSK-3.75KHz
High Channel

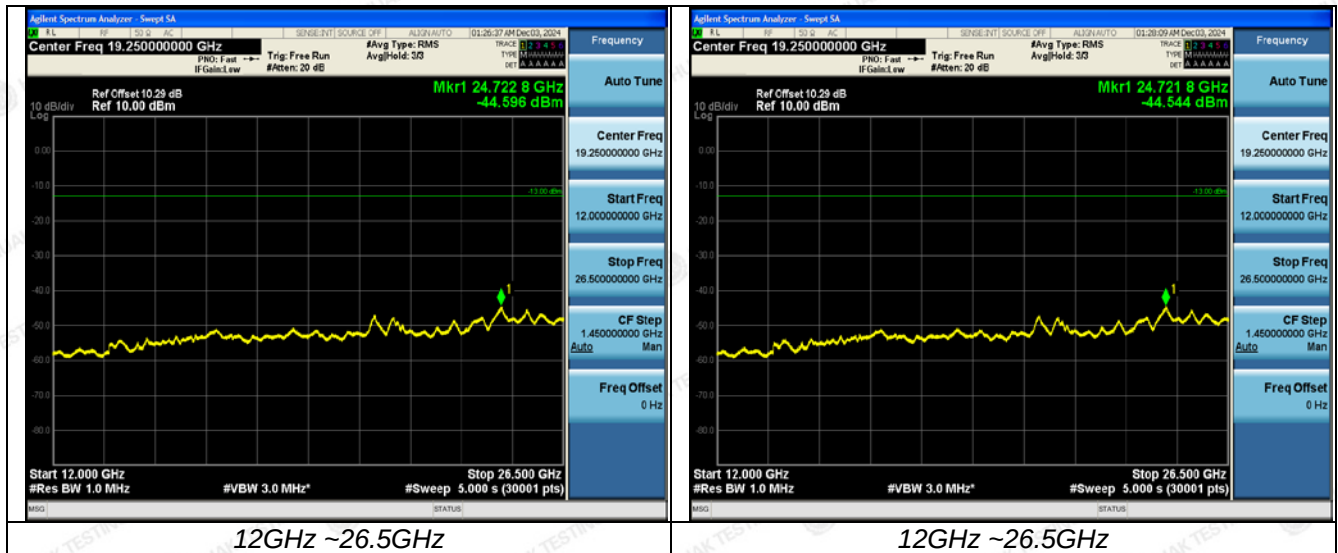




The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

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

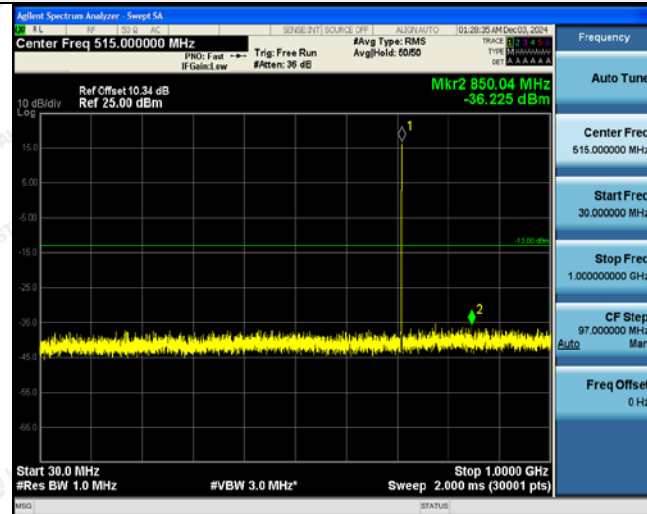




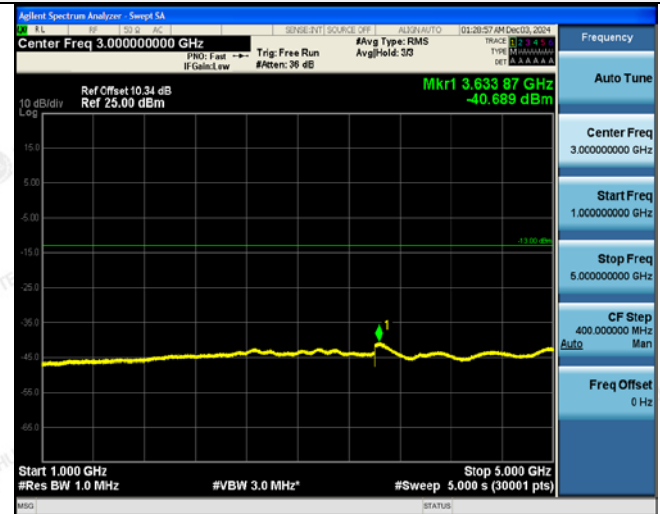
LTE FDD Band 12-QPSK-15KHz

High Channel

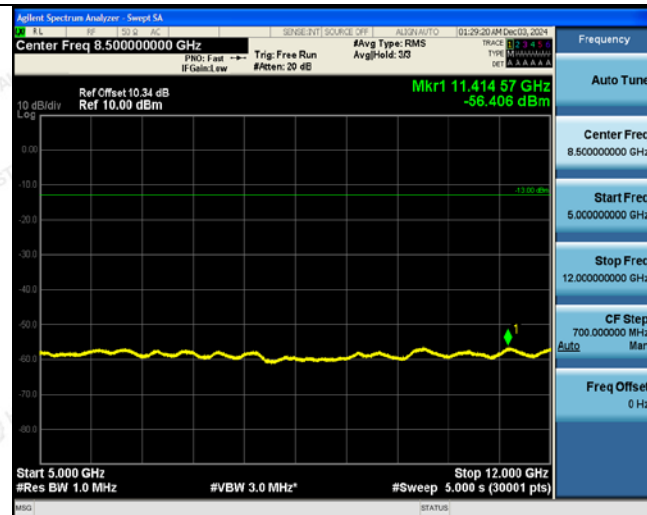
12@0



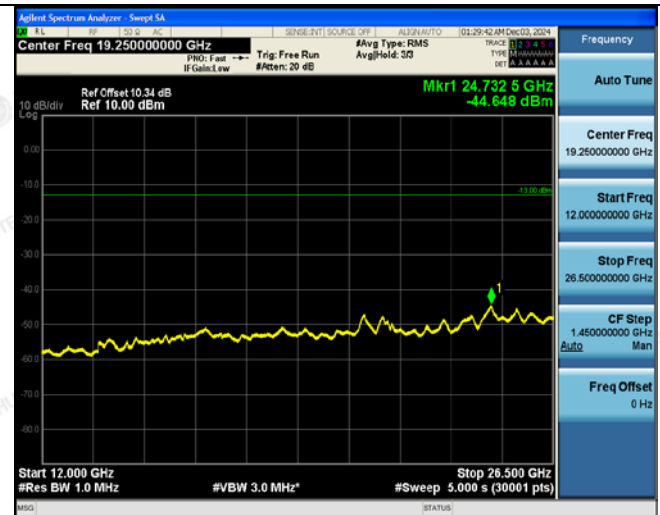
30MHz~1GHz



1GHz~5GHz



5GHz~12GHz



12GHz~26.5GHz

**Radiated Measurement:**

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 12; recorded worst case for each Channel Bandwidth of LTE FDD Band 12.
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 12_Channel Bandwidth 15KHz_BPSK_Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1398.2	-34.23	2.86	3.00	7.25	-31.99	-13.00	18.99	H
2097.3	-43.05	2.94	3.00	9.53	-38.61	-13.00	25.61	H
1398.2	-42.59	2.86	3.00	7.25	-40.35	-13.00	27.35	V
2097.3	-48.01	2.94	3.00	9.53	-43.57	-13.00	30.57	V

LTE FDD Band 12_Channel Bandwidth 15KHz_BPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-35.72	2.86	3.00	7.25	-33.48	-13.00	20.48	H
2122.5	-42.32	2.94	3.00	9.53	-37.88	-13.00	24.88	H
1415.0	-44.93	2.86	3.00	7.25	-42.69	-13.00	29.69	V
2122.5	-46.63	2.94	3.00	9.53	-42.19	-13.00	29.19	V

LTE FDD Band 12_Channel Bandwidth 15KHz_BPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1431.8	-34.53	2.86	3.00	7.25	-30.14	-13.00	17.14	H
2147.7	-42.48	2.94	3.00	9.53	-35.89	-13.00	22.89	H
1431.8	-44.34	2.86	3.00	7.25	-39.95	-13.00	26.95	V
2147.7	-47.48	2.94	3.00	9.53	-40.89	-13.00	27.89	V

LTE FDD Band 12_Channel Bandwidth 15KHz_QPSK_Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1398.2	-34.65	2.86	3.00	7.25	-32.41	-13.00	19.41	H
2097.3	-43.74	2.94	3.00	9.53	-39.3	-13.00	26.3	H
1398.2	-44.08	2.86	3.00	7.25	-41.84	-13.00	28.84	V
2097.3	-46.27	2.94	3.00	9.53	-41.83	-13.00	28.83	V

LTE FDD Band 12_Channel Bandwidth 15KHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-35.1	2.86	3.00	7.25	-32.86	-13.00	19.86	H
2122.5	-43.25	2.94	3.00	9.53	-38.81	-13.00	25.81	H
1415.0	-42.29	2.86	3.00	7.25	-40.05	-13.00	27.05	V
2122.5	-47.41	2.94	3.00	9.53	-42.97	-13.00	29.97	V

*LTE FDD Band 12 Channel Bandwidth 15KHz QPSK High Channel*

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1431.8	-35.76	2.86	3.00	7.25	-31.37	-13.00	18.37	H
2147.7	-42.61	2.94	3.00	9.53	-36.02	-13.00	23.02	H
1431.8	-44.92	2.86	3.00	7.25	-40.53	-13.00	27.53	V
2147.7	-46.8	2.94	3.00	9.53	-40.21	-13.00	27.21	V

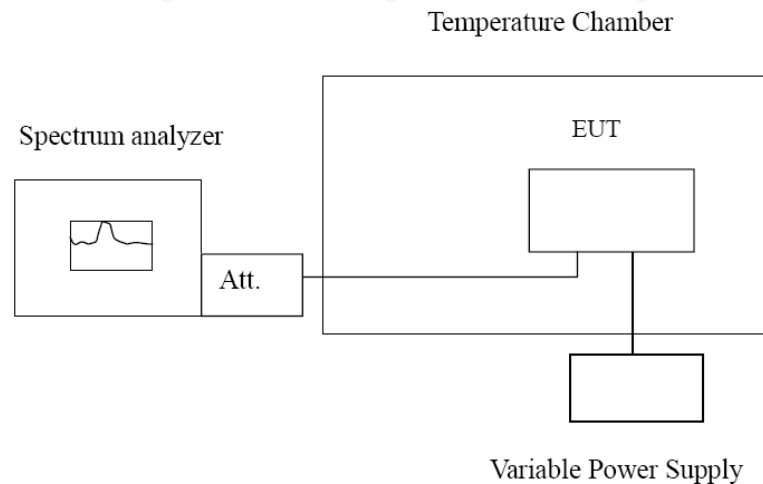


3.6 Frequency Stability Under Temperature & Voltage Variations

LIMIT

the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation 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 12, 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**

Remark:

1. We tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 12; recorded worst case.

LTE Band 12, 15KHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

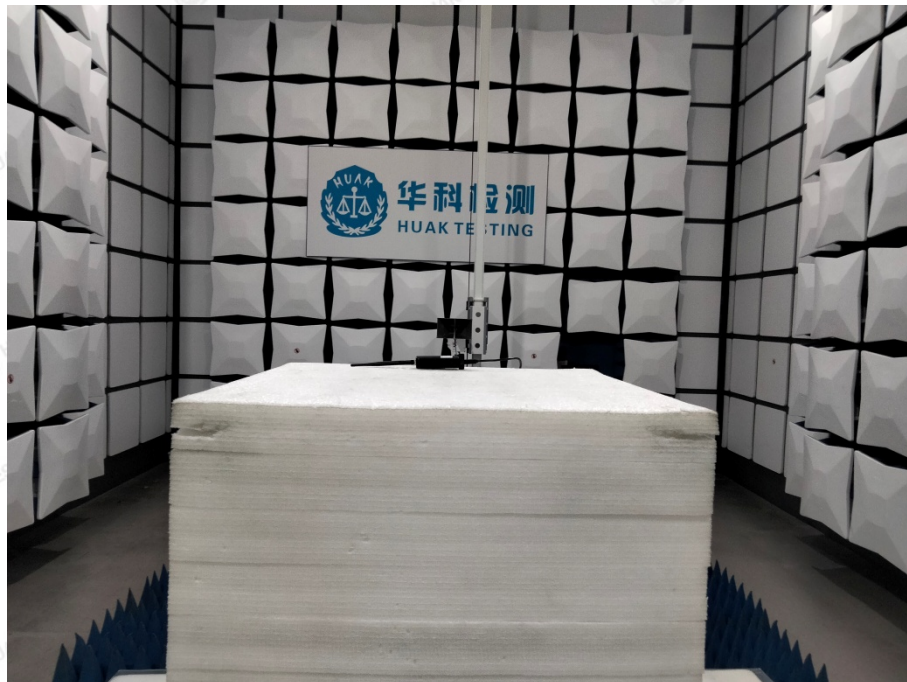
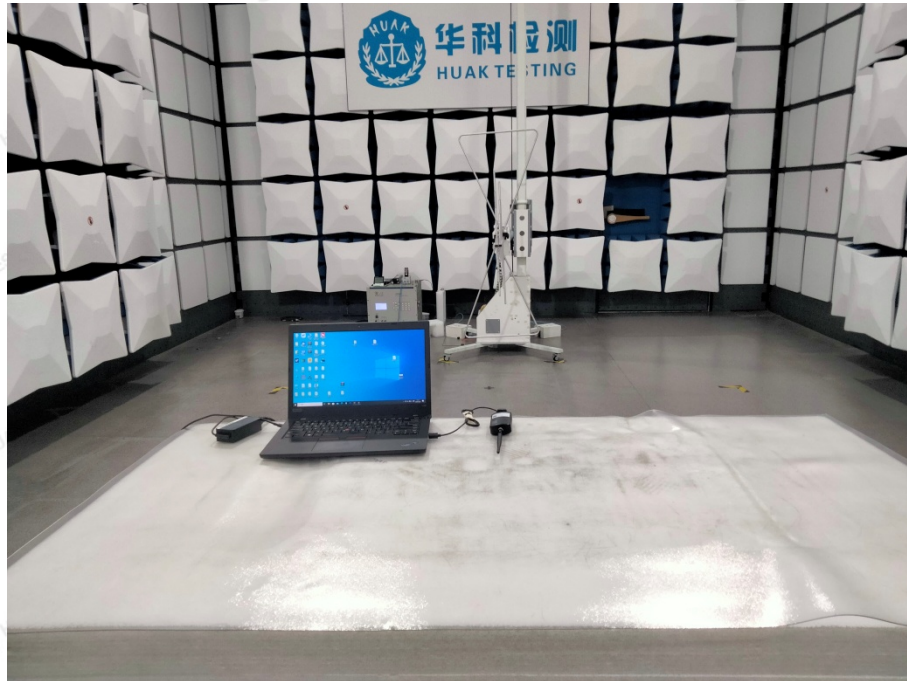
Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	BPSK	QPSK	BPSK	QPSK
4.25V	-8.60	7.34	-0.012302	0.010499
5.0V	-6.59	9.44	-0.009426	0.013503
5.75V	-7.22	-6.24	-0.010328	-0.008926

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	BPSK	QPSK	BPSK	QPSK
-30°	-8.21	-6.67	-0.011744	-0.009541
-20°	9.03	8.27	0.012917	0.011829
-10°	8.04	8.54	0.011501	0.012216
0°	-8.96	8.73	-0.012664	0.012339
10°	-9.06	-6.07	-0.012806	-0.008580
20°	-7.05	8.11	-0.009965	0.011463
30°	7.24	6.94	0.010233	0.009809
40°	6.71	6.82	0.009484	0.009640
50°	7.28	6.64	0.010290	0.009385



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.....