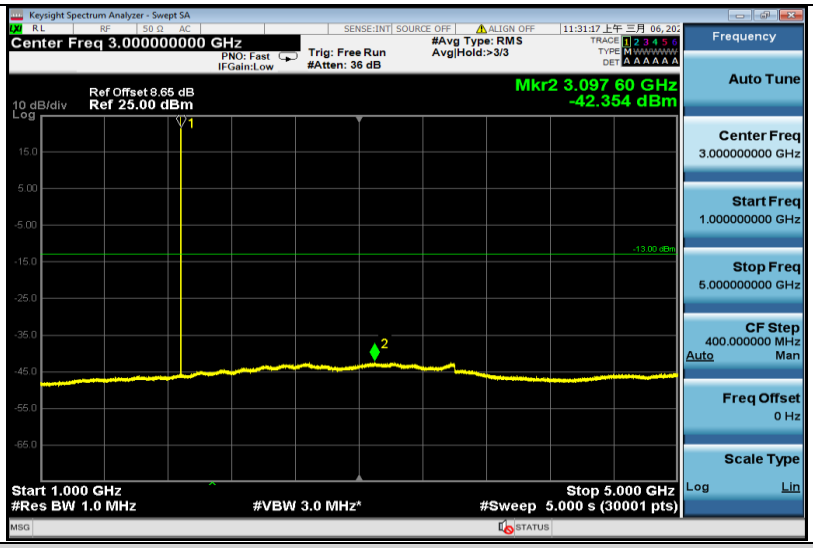
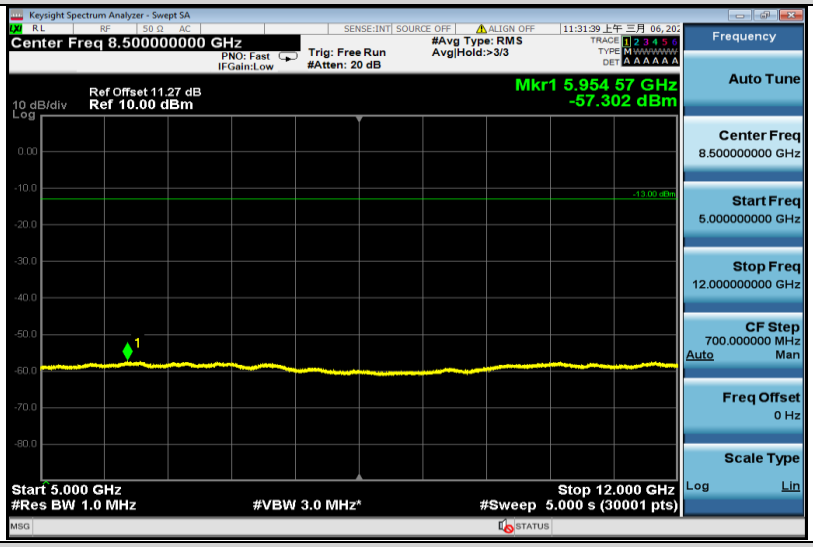


EGPRS1900-661-1000~5000



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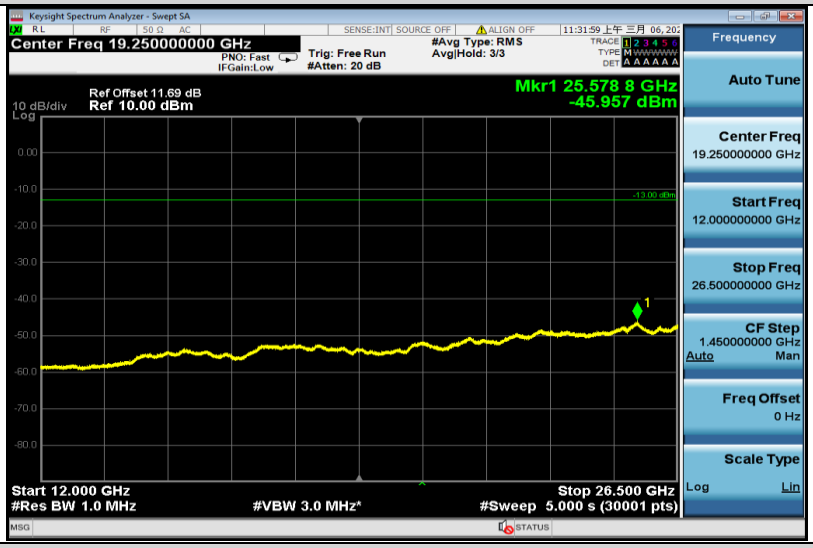

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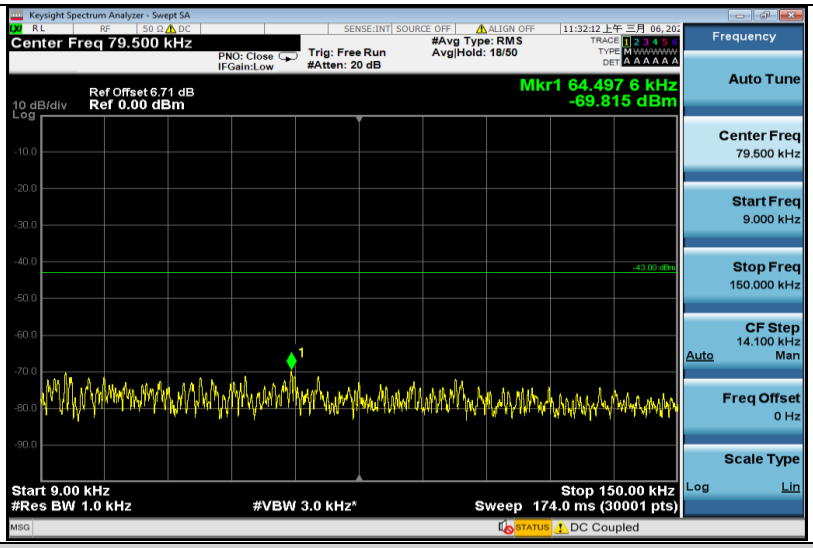

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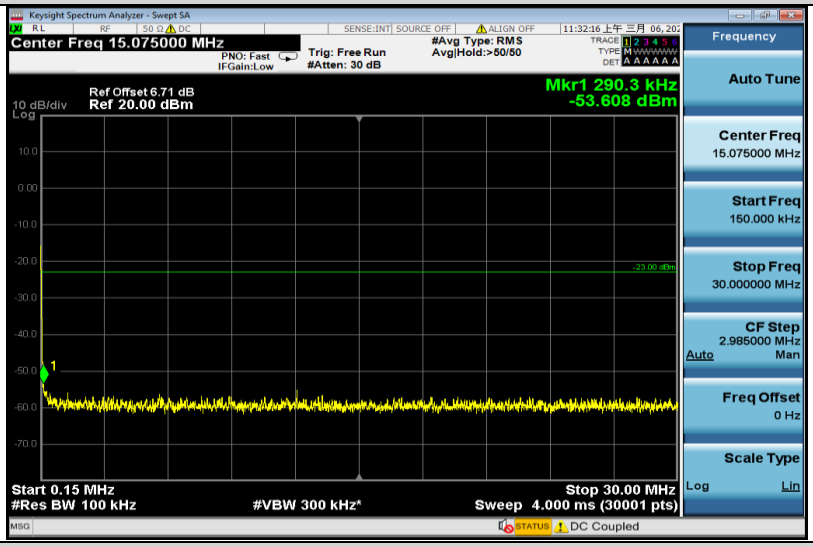

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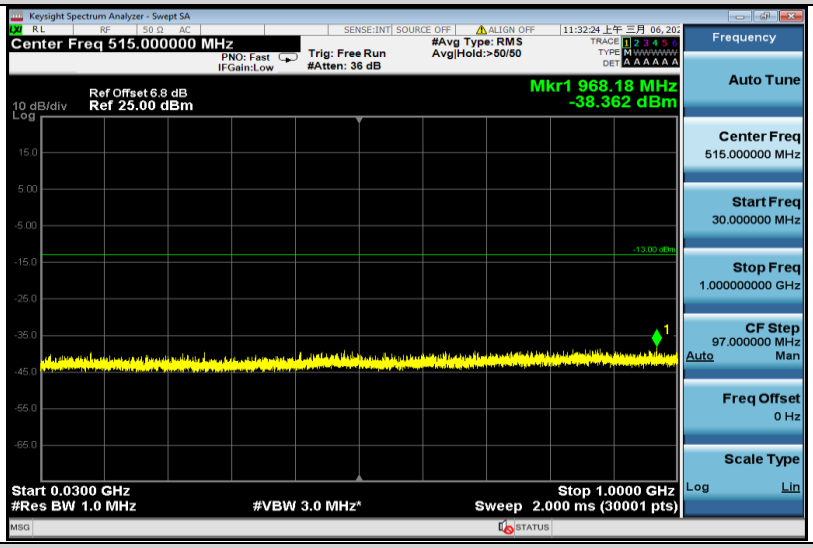

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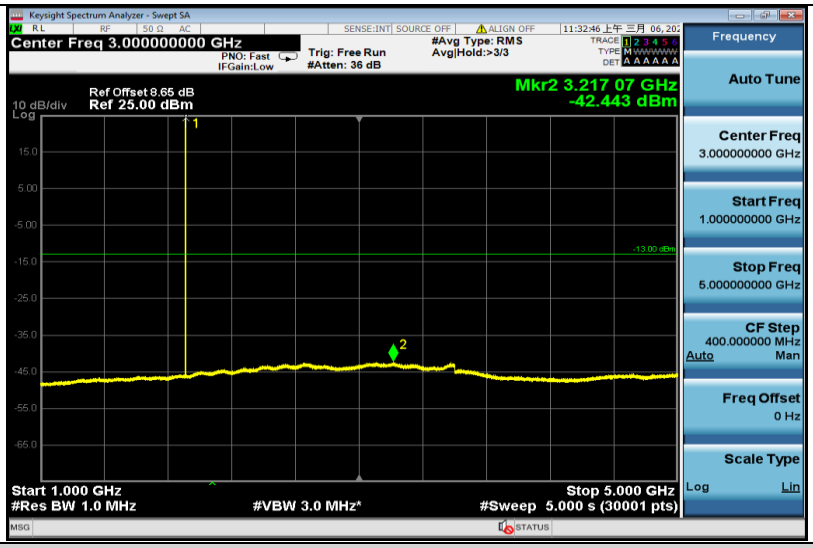

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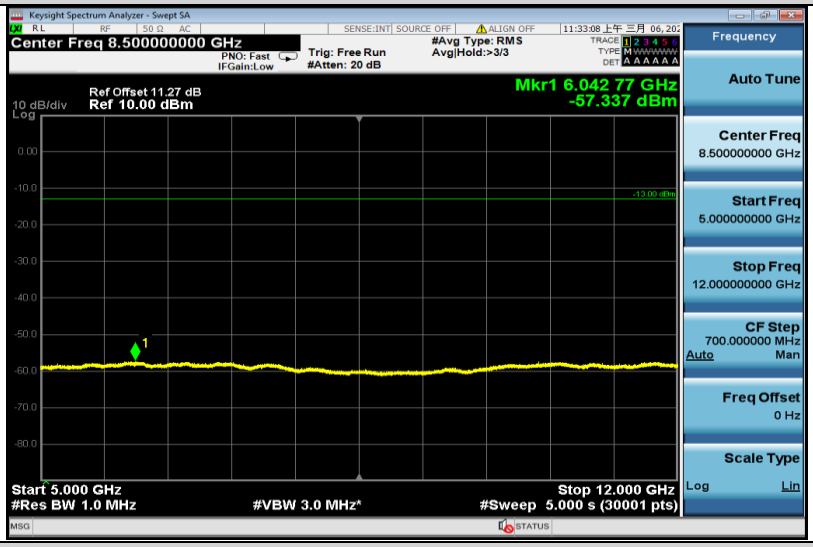

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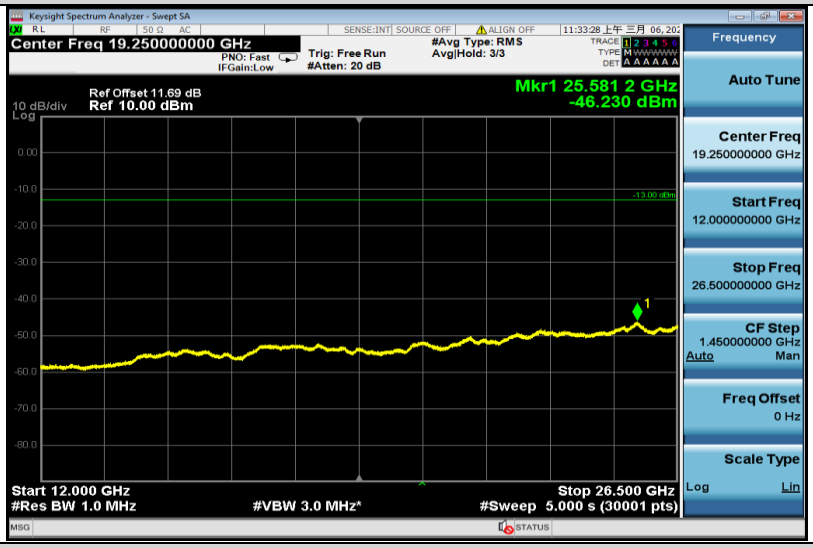
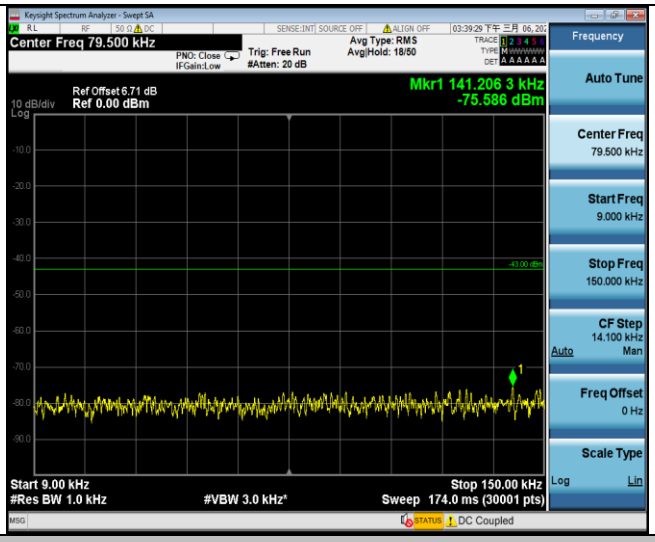
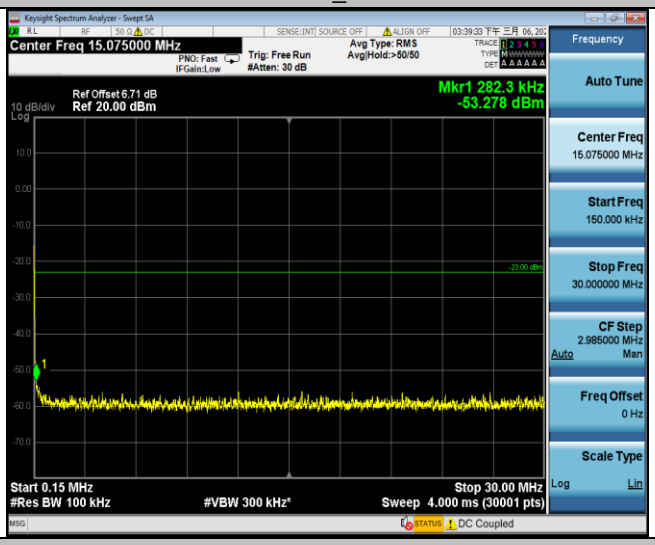


EGPRS1900-810-12000~26500



Band II_9262



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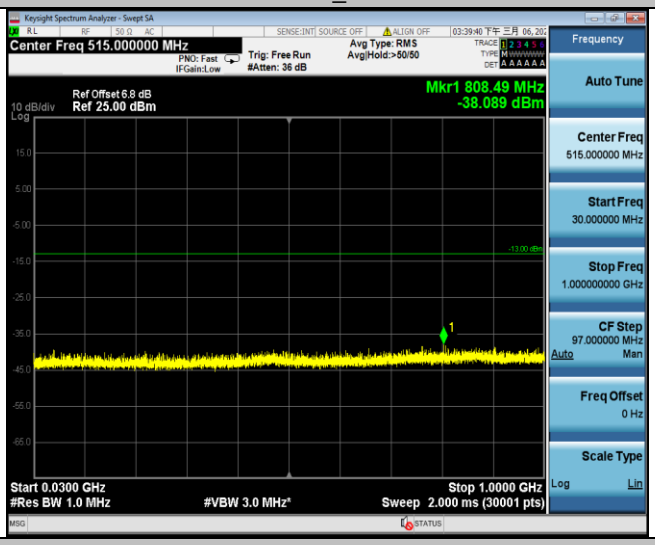

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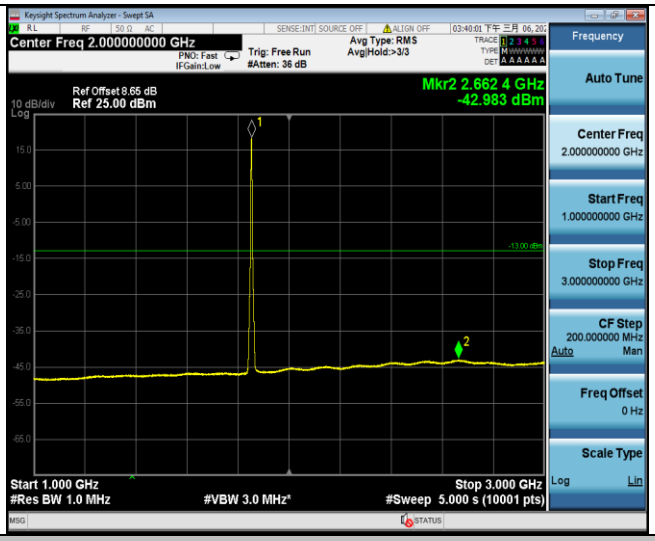

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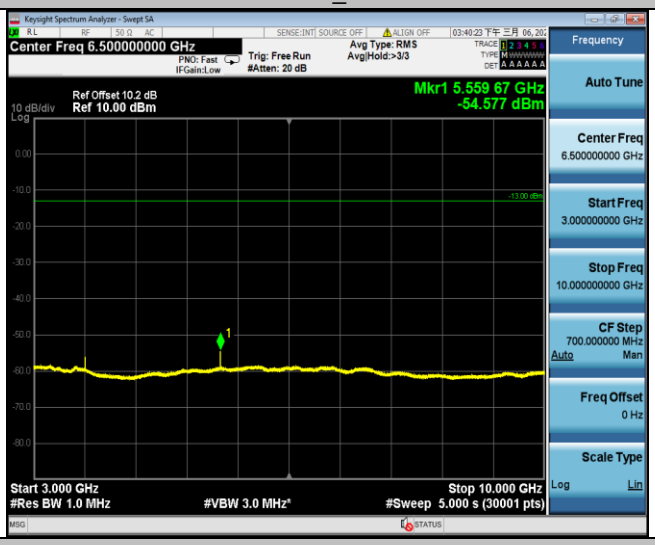

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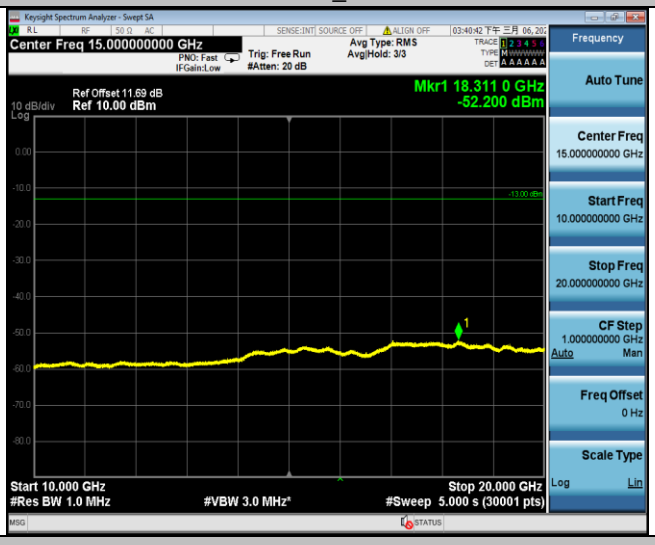

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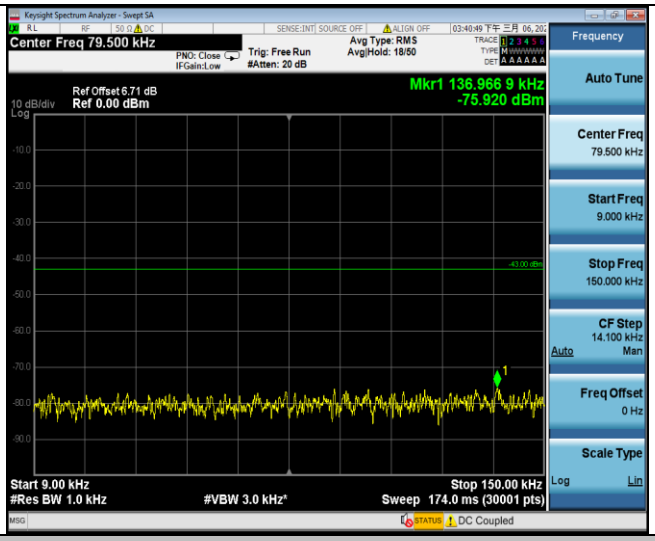

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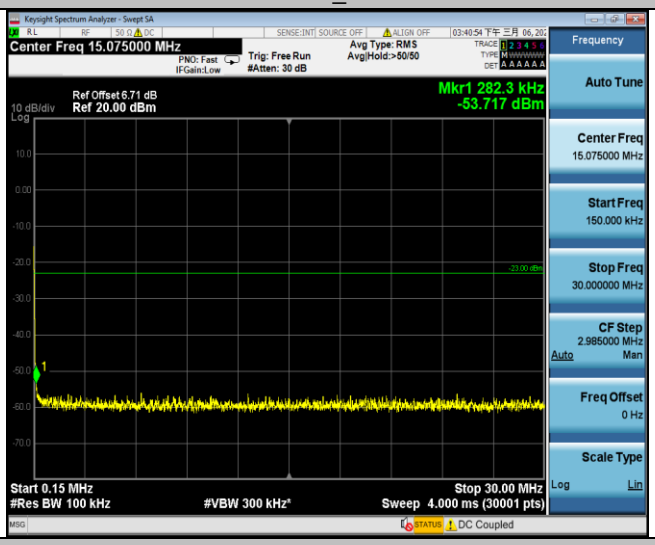

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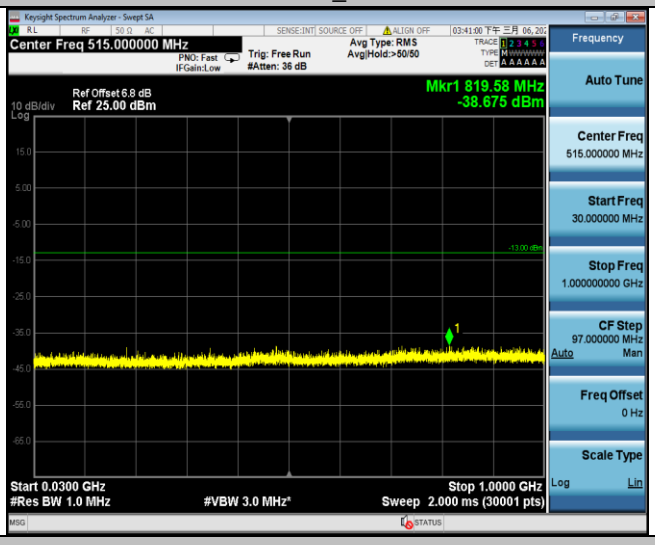

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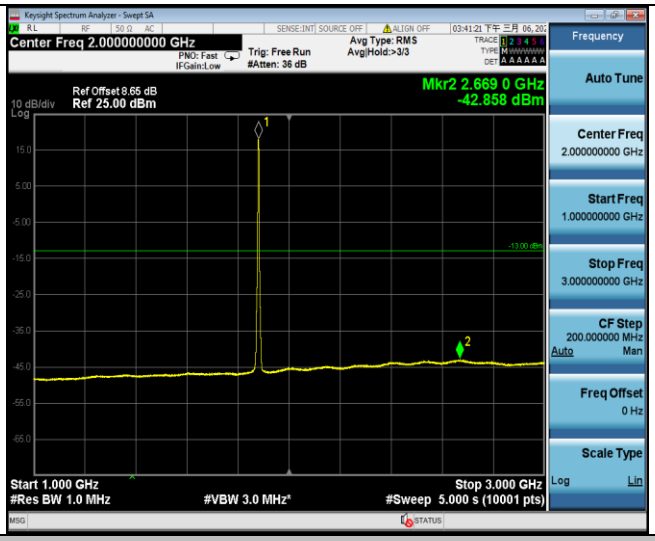

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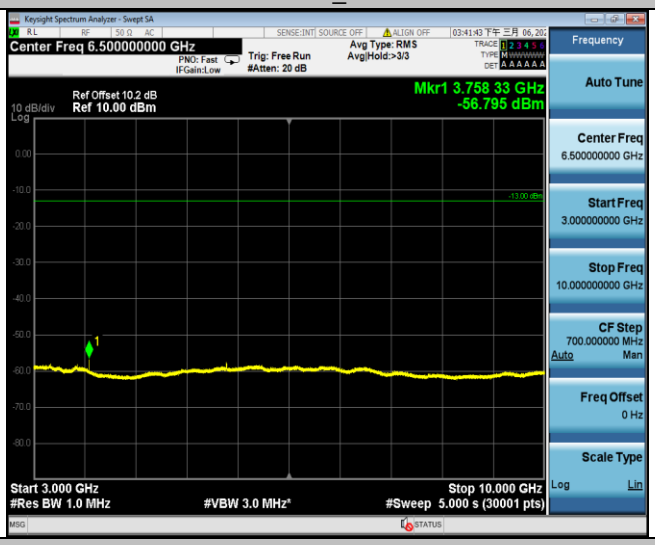

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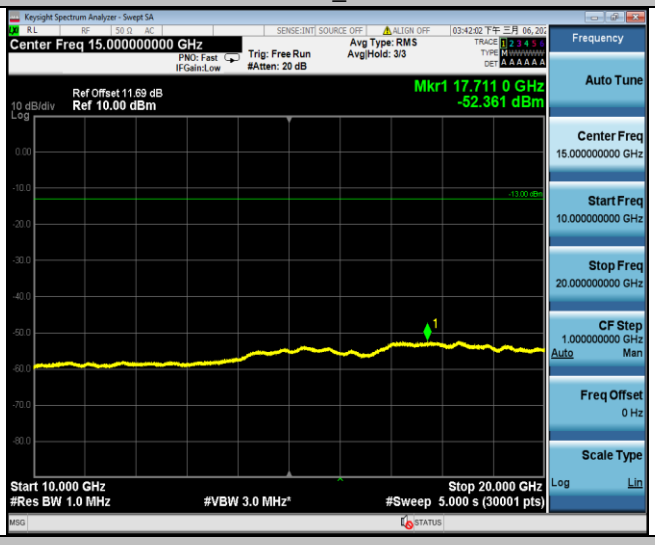

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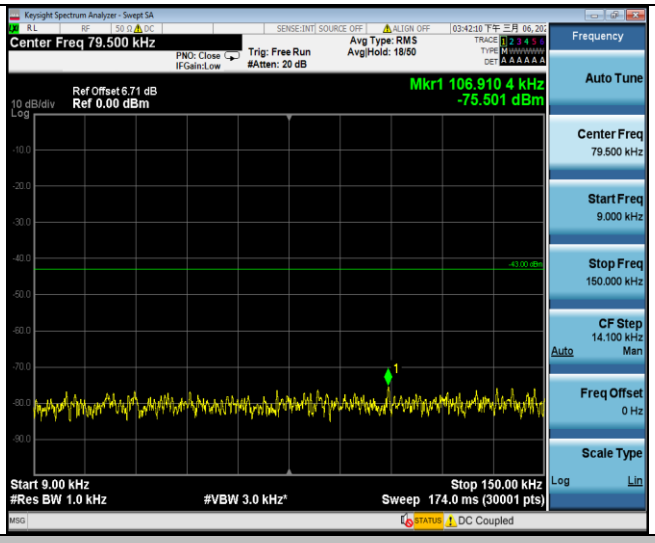

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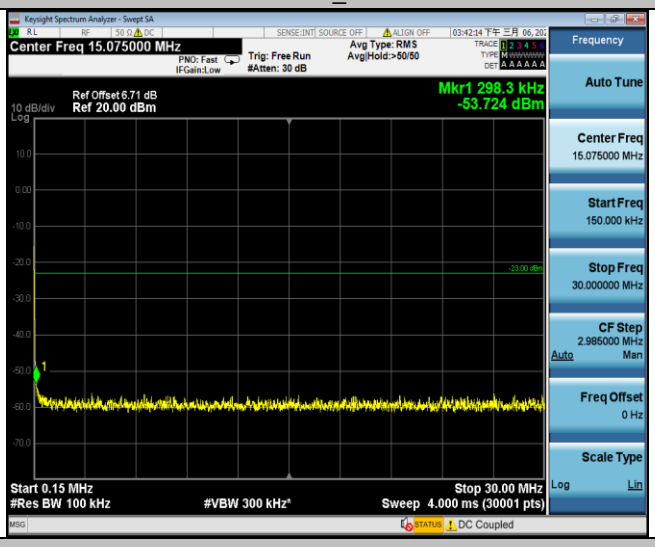

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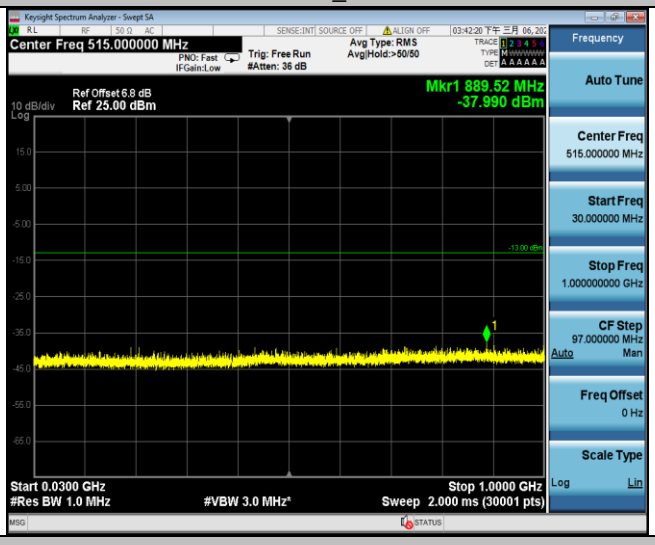

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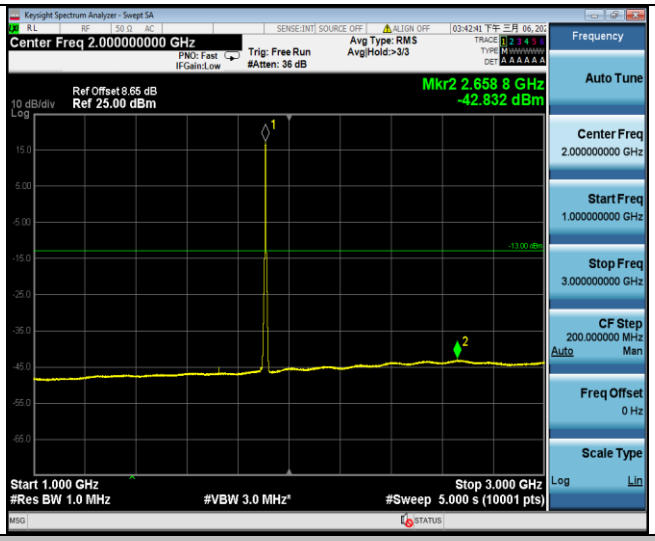

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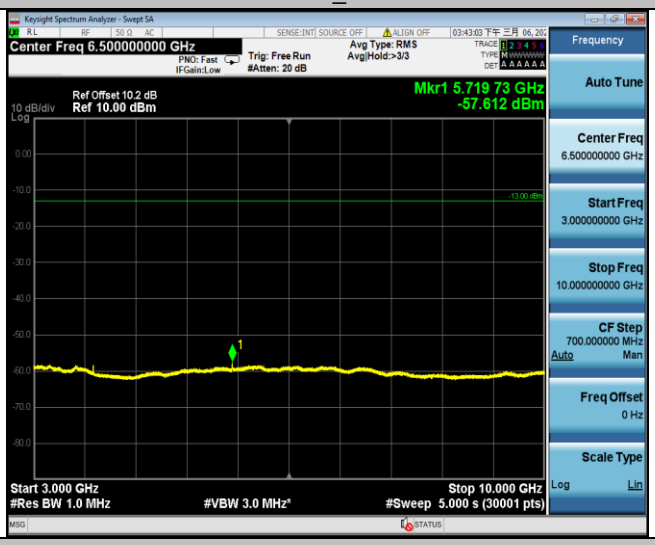

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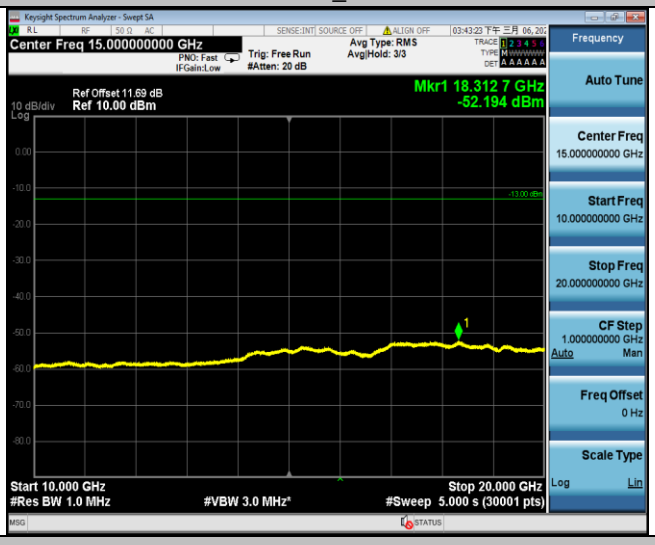

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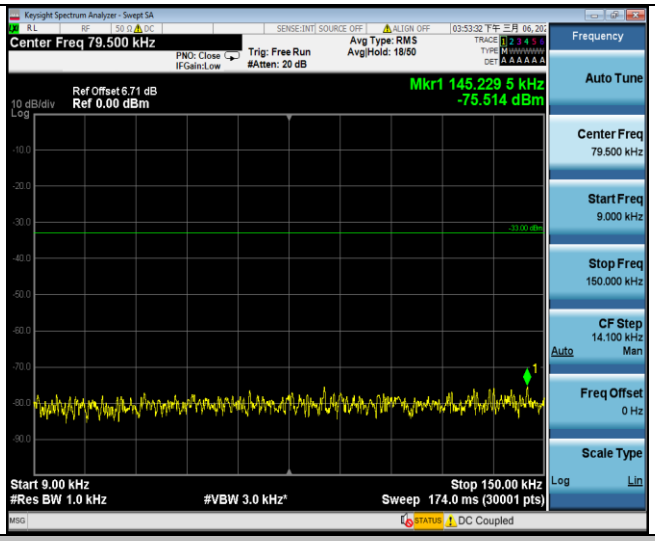

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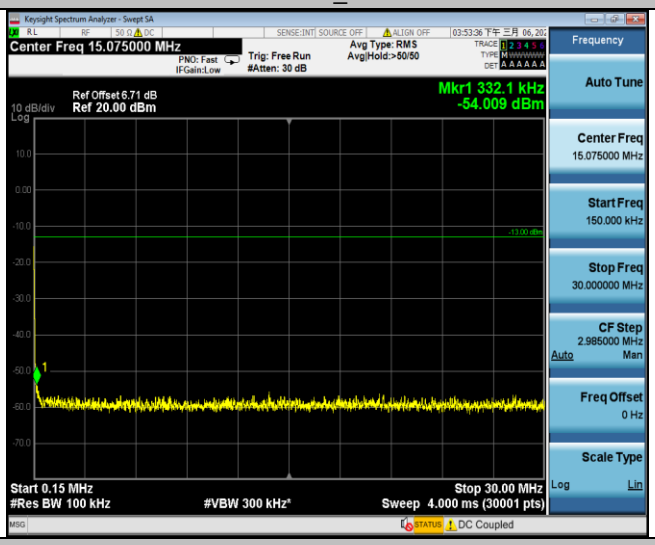
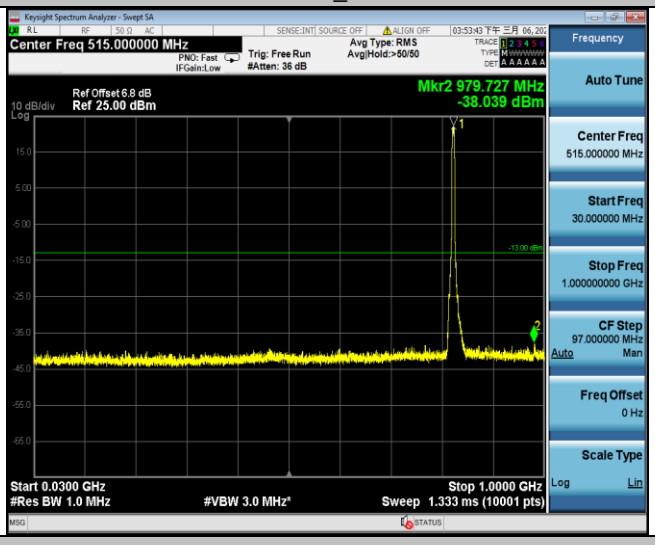


Band V_4132

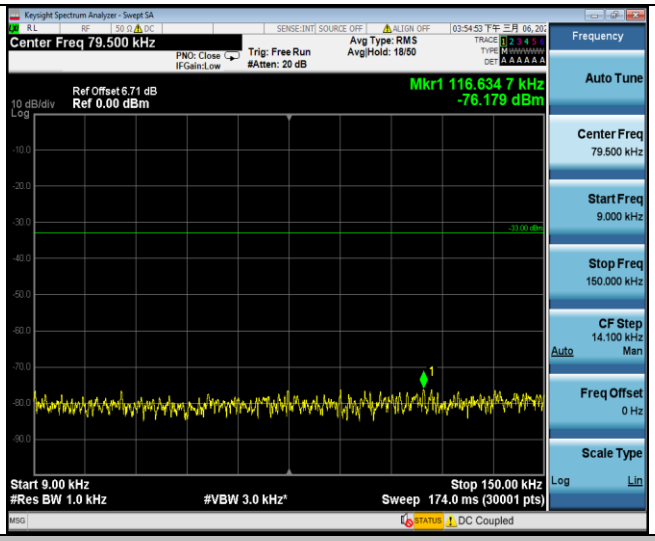


Band V_4132

Band V_4132

Band V_4132

Band V_4132



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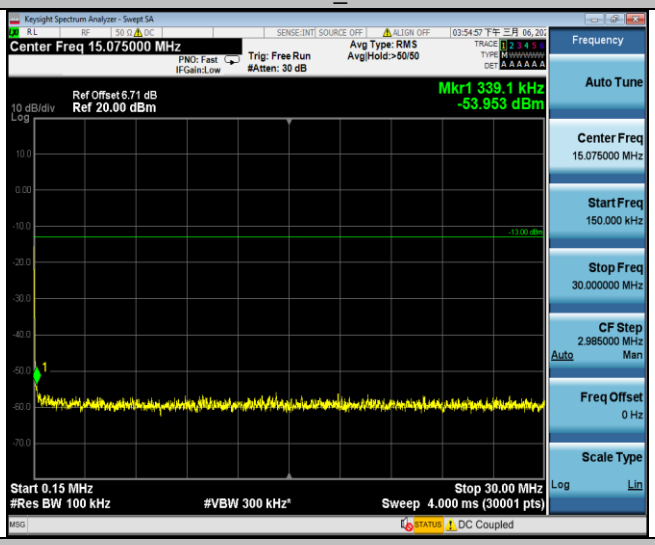

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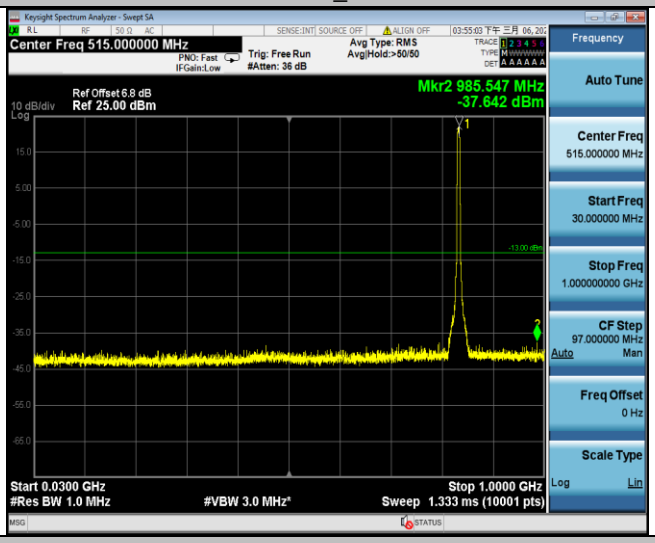
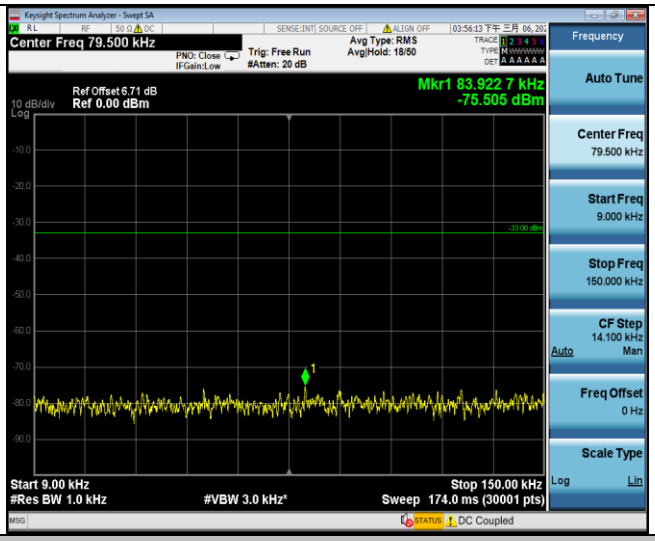


Band V_4182

Band V_4182

Band V_4182

Band V_4182



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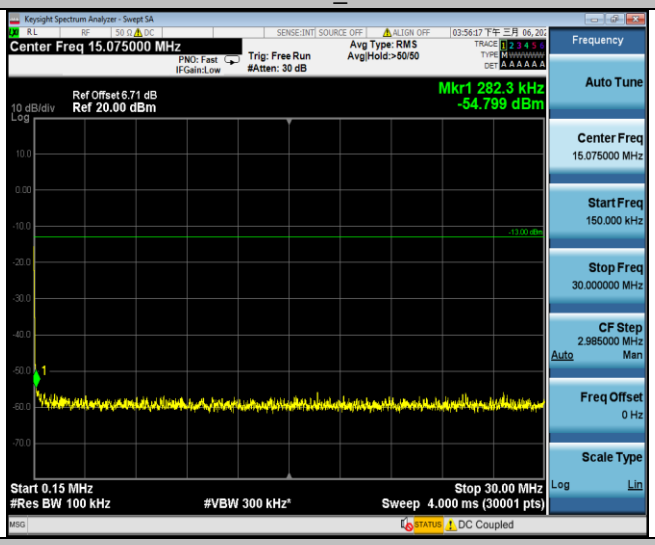
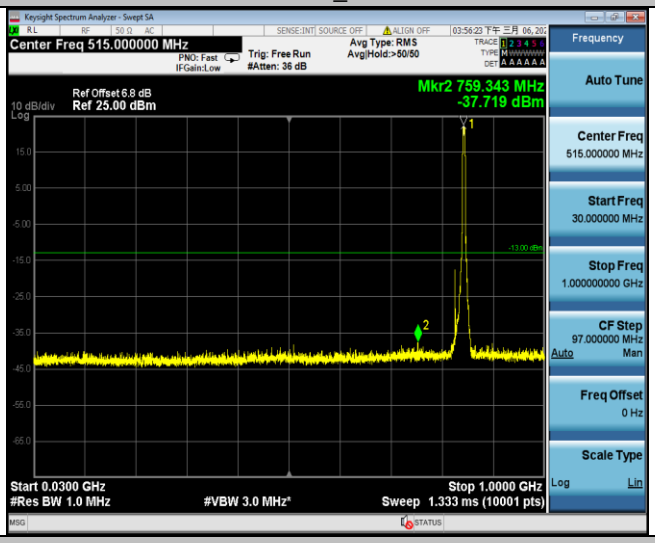


Band V_4233



Band V_4233

Band V_4233

Band V_4233

Band V_4233

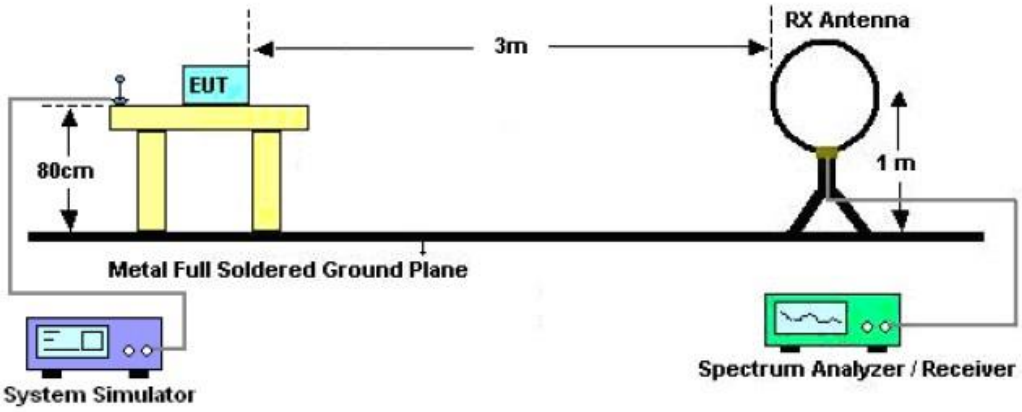
5.5.2 RADIATED SPURIOUS EMISSION

5.5.2.1 MEASUREMENT METHOD

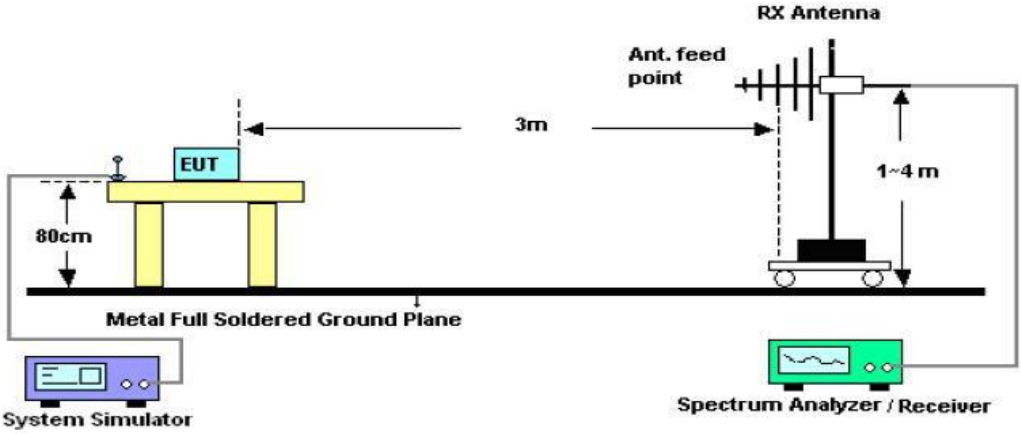
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

5.5.2.2 TEST SETUP

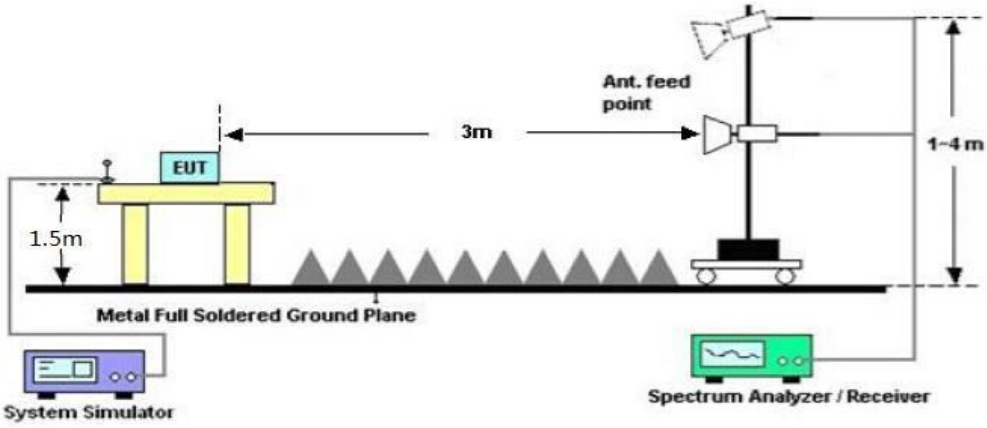
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



5.5.2.3 PROVISIONS APPLICABLE

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at

least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Note: only result the worst condition of each test mode:

5.5.2.4 MEASUREMENT RESULT

GSM 850:

The Worst Test Results for Channel 190/836.6 MHz				
Frequency (MHz)	Emission Level (dBm)	Limits (dBm)	Margin (dB)	Comment
1672.86	-56.13	-13	43.13	Horizontal
3346.13	-38.72	-13	25.72	Horizontal
5019.21	-50.87	-13	37.87	Horizontal
1672.88	-42.44	-13	29.44	Vertical
3346.02	-48.69	-13	35.69	Vertical
5019.37	-48.55	-13	35.55	Vertical

PCS 1900:

The Worst Test Results for Channel 661/1880 MHz				
Frequency (MHz)	Emission Level (dBm)	Limits (dBm)	Margin (dB)	Comment
3759.71	-56.54	-13	43.54	Horizontal
7519.77	-38.63	-13	25.63	Horizontal
11279.74	-51.73	-13	38.73	Horizontal
3759.64	-39.21	-13	26.21	Vertical
7519.74	-49.64	-13	36.64	Vertical
11279.78	-43.87	-13	30.87	Vertical

WCDMA BAND II:

The Worst Test Results for Channel 9400/1880 MHz				
Frequency (MHz)	Emission Level (dBm)	Limits (dBm)	Margin (dB)	Comment
3759.67	-55.62	-13	42.62	Horizontal
7519.68	-41.73	-13	28.73	Horizontal
11279.74	-51.18	-13	38.18	Horizontal
3759.77	-41.39	-13	28.39	Vertical
7519.72	-50.70	-13	37.70	Vertical
11279.74	-44.99	-13	31.99	Vertical

WCDMA BAND V:

The Worst Test Results for Channel 4233/846.6MHz				
Frequency	Emission Level	Limits	Margin	Comment
(MHz)	(dBm)	(dBm)	(dB)	
1692.92	-55.79	-13	42.79	Horizontal
3386.19	-40.17	-13	27.17	Horizontal
5079.35	-51.88	-13	38.88	Horizontal
1692.85	-42.93	-13	29.93	Vertical
3386.13	-52.39	-13	39.39	Vertical
5079.22	-46.71	-13	33.71	Vertical

RESULT: PASS

Note:

11. Margin = Limit - Emission Level
12. Below 30MHZ no Spurious found and Above is the worst mode data.

5.6 FREQUENCY STABILITY

5.6.1 MEASUREMENT METHOD

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 CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1 Measure the carrier frequency at room temperature.

2 Subject the EUT to overnight soak at -10℃.

3 With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 661 for PCS 1900 band , channel 190 for GSM 850 band, channel 9400 for UMTS band II, channel 1412 for UMTS band IV and channel 4175 for UMTS band 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℃ increments from -10℃ to +50℃. Allow at least 1 1/2 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 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.

6 Subject the EUT to overnight soak at +50℃.

7 With the EUT, powered via nominal voltage, connected to the CMU200 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℃ increments from +50℃ to -10℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

9 At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

5.6.2 PROVISIONS APPLICABLE

5.6.2.1 FOR HAND CARRIED BATTERY POWERED EQUIPMENT

According to the ANSI/TIA-603-E-2016, 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 3.5VDC and 4.35VDC, 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 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.

5.6.2.2 FOR EQUIPMENT POWERED BY PRIMARY SUPPLY VOLTAGE

According to the ANSI/TIA-603-E-2016, 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, the normal environment temperature is 20°C.

5.6.3 MEASUREMENT RESULT

Test Results

Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.(V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM850	GPRS	LCH	TN	VL	-13.07	-0.02	±2.5	PASS
			TN	VN	-5.37	-0.01	±2.5	PASS
			TN	VH	14.87	0.02	±2.5	PASS
		MCH	TN	VL	13.13	0.02	±2.5	PASS
			TN	VN	-18.43	-0.02	±2.5	PASS
			TN	VH	-15.57	-0.02	±2.5	PASS
		HCH	TN	VL	9.14	0.01	±2.5	PASS
			TN	VN	10.48	0.01	±2.5	PASS
			TN	VH	18.68	0.02	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.(V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM850	EGPRS	LCH	TN	VL	-21.25	-0.03	±2.5	PASS
			TN	VN	-9.38	-0.01	±2.5	PASS
			TN	VH	13.93	0.02	±2.5	PASS
		MCH	TN	VL	-17.82	-0.02	±2.5	PASS
			TN	VN	-13.72	-0.02	±2.5	PASS
			TN	VH	-15.01	-0.02	±2.5	PASS
		HCH	TN	VL	27.66	0.03	±2.5	PASS
			TN	VN	-26.43	-0.03	±2.5	PASS
			TN	VH	26.49	0.03	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt. (V)	Freq. Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
PCS 1900	GPRS	LCH	TN	VL	12.26	0.01	±2.5	PASS
			TN	VN	-14.94	-0.01	±2.5	PASS
			TN	VH	-7.86	0.00	±2.5	PASS
		MCH	TN	VL	11.55	0.01	±2.5	PASS
			TN	VN	-13.96	-0.01	±2.5	PASS
			TN	VH	-11.40	-0.01	±2.5	PASS
		HCH	TN	VL	-24.61	-0.01	±2.5	PASS
			TN	VN	26.12	0.01	±2.5	PASS
			TN	VH	-26.11	-0.01	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt. (V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
PCS 1900	EGPRS	LCH	TN	VL	12.08	0.01	±2.5	PASS
			TN	VN	17.62	0.01	±2.5	PASS
			TN	VH	16.98	0.01	±2.5	PASS
		MCH	TN	VL	16.42	0.01	±2.5	PASS
			TN	VN	11.19	0.01	±2.5	PASS
			TN	VH	19.34	0.01	±2.5	PASS
		HCH	TN	VL	-26.22	-0.01	±2.5	PASS
			TN	VN	25.15	0.01	±2.5	PASS
			TN	VH	29.95	0.02	±2.5	PASS

Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Volt. (V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM850	GPRS	LCH	VN	-10	16.65	0.02	±2.5	PASS
			VN	0	3.13	0.00	±2.5	PASS
			VN	10	-6.53	-0.01	±2.5	PASS
			VN	20	10.57	0.01	±2.5	PASS
			VN	30	29.41	0.04	±2.5	PASS
			VN	40	18.55	0.02	±2.5	PASS
			VN	50	30.54	0.04	±2.5	PASS
GSM850	GPRS	MCH	VN	-10	-9.48	-0.01	±2.5	PASS
			VN	0	-13.76	-0.02	±2.5	PASS
			VN	10	7.34	0.01	±2.5	PASS
			VN	20	-17.39	-0.02	±2.5	PASS
			VN	30	-36.11	-0.04	±2.5	PASS
			VN	40	-11.49	-0.01	±2.5	PASS
			VN	50	-24.36	-0.03	±2.5	PASS
GSM850	GPRS	HCH	VN	-10	-37.60	-0.04	±2.5	PASS
			VN	0	-35.64	-0.04	±2.5	PASS
			VN	10	-8.40	-0.01	±2.5	PASS
			VN	20	-11.64	-0.01	±2.5	PASS
			VN	30	28.18	0.03	±2.5	PASS
			VN	40	12.99	0.02	±2.5	PASS
			VN	50	-30.36	-0.04	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Volt. (V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM850	EGPRS	LCH	VN	-10	20.99	0.03	±2.5	PASS
			VN	0	-1.56	0.00	±2.5	PASS
			VN	10	-12.09	-0.01	±2.5	PASS
			VN	20	-10.81	-0.01	±2.5	PASS
			VN	30	-30.17	-0.04	±2.5	PASS
			VN	40	-10.03	-0.01	±2.5	PASS
			VN	50	-31.90	-0.04	±2.5	PASS
GSM850	EGPRS	MCH	VN	-10	-12.84	-0.02	±2.5	PASS
			VN	0	-7.83	-0.01	±2.5	PASS
			VN	10	-10.92	-0.01	±2.5	PASS
			VN	20	18.35	0.02	±2.5	PASS
			VN	30	-36.94	-0.04	±2.5	PASS
			VN	40	10.46	0.01	±2.5	PASS
			VN	50	-31.92	-0.04	±2.5	PASS
GSM850	EGPRS	HCH	VN	-10	-37.31	-0.04	±2.5	PASS
			VN	0	-37.28	-0.04	±2.5	PASS
			VN	10	9.77	0.01	±2.5	PASS
			VN	20	12.29	0.01	±2.5	PASS
			VN	30	-30.47	-0.04	±2.5	PASS
			VN	40	6.84	0.01	±2.5	PASS
			VN	50	-28.28	-0.03	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
PCS 1900	GPRS	LCH	VN	-10	-9.25	0.00	±2.5	PASS
			VN	0	1.08	0.00	±2.5	PASS
			VN	10	-38.16	-0.02	±2.5	PASS
			VN	20	26.00	0.01	±2.5	PASS
			VN	30	10.90	0.01	±2.5	PASS
			VN	40	-13.01	-0.01	±2.5	PASS
			VN	50	-35.18	-0.02	±2.5	PASS
PCS 1900	GPRS	MCH	VN	-10	-11.52	-0.01	±2.5	PASS
			VN	0	0.65	0.00	±2.5	PASS
			VN	10	38.39	0.02	±2.5	PASS
			VN	20	-32.91	-0.02	±2.5	PASS
			VN	30	-26.03	-0.01	±2.5	PASS
			VN	40	-42.99	-0.02	±2.5	PASS
			VN	50	-36.95	-0.02	±2.5	PASS
PCS 1900	GPRS	HCH	VN	-10	30.17	0.02	±2.5	PASS
			VN	0	-4.39	0.00	±2.5	PASS
			VN	10	17.30	0.01	±2.5	PASS
			VN	20	-27.17	-0.01	±2.5	PASS
			VN	30	-39.04	-0.02	±2.5	PASS
			VN	40	11.95	0.01	±2.5	PASS
			VN	50	34.31	0.02	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
PCS 1900	EGPRS	LCH	VN	-10	10.73	0.01	±2.5	PASS
			VN	0	1.81	0.00	±2.5	PASS
			VN	10	-41.23	-0.02	±2.5	PASS
			VN	20	-29.50	-0.02	±2.5	PASS
			VN	30	10.38	0.01	±2.5	PASS
			VN	40	13.30	0.01	±2.5	PASS
			VN	50	31.64	0.02	±2.5	PASS
PCS 1900	EGPRS	MCH	VN	-10	-13.62	-0.01	±2.5	PASS
			VN	0	2.00	0.00	±2.5	PASS
			VN	10	-32.16	-0.02	±2.5	PASS
			VN	20	-29.37	-0.02	±2.5	PASS
			VN	30	-27.08	-0.01	±2.5	PASS
			VN	40	-42.51	-0.02	±2.5	PASS
			VN	50	31.11	0.02	±2.5	PASS
PCS 1900	EGPRS	HCH	VN	-10	-31.83	-0.02	±2.5	PASS
			VN	0	-4.67	0.00	±2.5	PASS
			VN	10	14.24	0.01	±2.5	PASS
			VN	20	-24.33	-0.01	±2.5	PASS
			VN	30	33.29	0.02	±2.5	PASS
			VN	40	-14.86	-0.01	±2.5	PASS
			VN	50	30.56	0.02	±2.5	PASS

Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.(V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA850	UMTS	LCH	TN	VL	13.47	0.02	±2.5	PASS
			TN	VN	-12.66	-0.02	±2.5	PASS
			TN	VH	-10.95	-0.01	±2.5	PASS
		MCH	TN	VL	14.92	0.02	±2.5	PASS
			TN	VN	12.66	0.02	±2.5	PASS
			TN	VH	-9.40	-0.01	±2.5	PASS
		HCH	TN	VL	12.80	0.02	±2.5	PASS
			TN	VN	15.03	0.02	±2.5	PASS
			TN	VH	11.09	0.01	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.(V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA1900	UMTS	LCH	TN	VL	-22.06	-0.03	±2.5	PASS
			TN	VN	15.52	0.02	±2.5	PASS
			TN	VH	-8.45	-0.01	±2.5	PASS
		MCH	TN	VL	15.80	0.02	±2.5	PASS
			TN	VN	20.33	0.02	±2.5	PASS
			TN	VH	14.70	0.02	±2.5	PASS
		HCH	TN	VL	-24.61	-0.03	±2.5	PASS
			TN	VN	29.10	0.03	±2.5	PASS
			TN	VH	-28.77	-0.03	±2.5	PASS

Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA850	UMTS	LCH	VN	-10	-14.80	-0.02	±2.5	PASS
			VN	0	-3.27	0.00	±2.5	PASS
			VN	10	-6.79	-0.01	±2.5	PASS
			VN	20	-6.44	-0.01	±2.5	PASS
			VN	30	31.58	0.04	±2.5	PASS
			VN	40	15.38	0.02	±2.5	PASS
			VN	50	34.78	0.04	±2.5	PASS
WCDMA850	UMTS	MCH	VN	-10	14.62	0.02	±2.5	PASS
			VN	0	7.41	0.01	±2.5	PASS
			VN	10	-8.42	-0.01	±2.5	PASS
			VN	20	-10.76	-0.01	±2.5	PASS
			VN	30	-33.36	-0.04	±2.5	PASS
			VN	40	-15.27	-0.02	±2.5	PASS
			VN	50	23.98	0.03	±2.5	PASS
WCDMA850	UMTS	HCH	VN	-10	30.22	0.04	±2.5	PASS
			VN	0	37.50	0.04	±2.5	PASS
			VN	10	8.57	0.01	±2.5	PASS
			VN	20	-5.41	-0.01	±2.5	PASS
			VN	30	-32.08	-0.04	±2.5	PASS
			VN	40	7.72	0.01	±2.5	PASS
			VN	50	-30.77	-0.04	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA1900	UMTS	LCH	VN	-10	12.83	0.01	±2.5	PASS
			VN	0	-3.77	0.00	±2.5	PASS
			VN	10	-35.10	-0.02	±2.5	PASS
			VN	20	28.12	0.01	±2.5	PASS
			VN	30	-13.18	-0.01	±2.5	PASS
			VN	40	-20.00	-0.01	±2.5	PASS
			VN	50	-26.58	-0.01	±2.5	PASS
WCDMA1900	UMTS	MCH	VN	-10	-10.82	-0.01	±2.5	PASS
			VN	0	-1.01	0.00	±2.5	PASS
			VN	10	37.74	0.02	±2.5	PASS
			VN	20	-29.23	-0.02	±2.5	PASS
			VN	30	-24.97	-0.01	±2.5	PASS
			VN	40	41.61	0.02	±2.5	PASS
			VN	50	37.19	0.02	±2.5	PASS
WCDMA1900	UMTS	HCH	VN	-10	35.00	0.02	±2.5	PASS
			VN	0	-4.75	0.00	±2.5	PASS
			VN	10	-20.26	-0.01	±2.5	PASS
			VN	20	24.73	0.01	±2.5	PASS
			VN	30	29.57	0.02	±2.5	PASS
			VN	40	18.20	0.01	±2.5	PASS
			VN	50	31.61	0.02	±2.5	PASS

5 Test Set up 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.

**********End of Report **********