9. SPURIOUS EMISSION

9.1 CONDUCTED SPURIOUS EMISSION

9.1.1MEASUREMENT METHOD

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. The level of the carrier and the various conducted spurious and harmonic frequency is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the approximate frequencies. All data rates were investigated to determine the worst case configuration.

2. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 9 GHz.

3. Determine EUT transmit frequencies: the following typical channelswere chosen to conducted emissions testing.

Typical Channels for testing of GSM 850	
Channel	Frequency (MHz)
128	824.2
190	836.6
251	848.8

Typical Channels for testing of PCS 1900	
Channel	Frequency (MHz)
512	1850.2
661	1880.0
810	1909.8

Typical Channels for testing of UMTS band II	
Channel	Frequency (MHz)
9262	1852.4
9400	1880
9538	1907.6

Typical Channels for testing of UMTS band V	
Channel	Frequency (MHz)
4132	826.4
4182	836.4
4233	846.6

9.1.2 PROVISIONS APPLICABLE

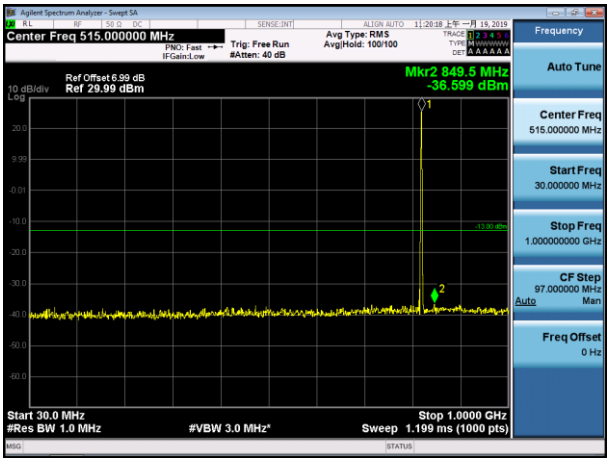
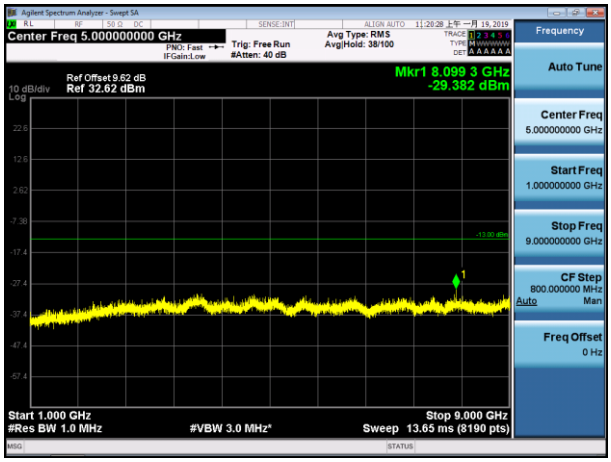
On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

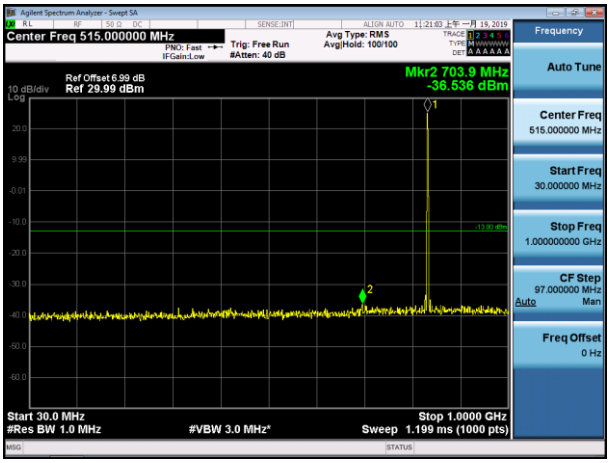
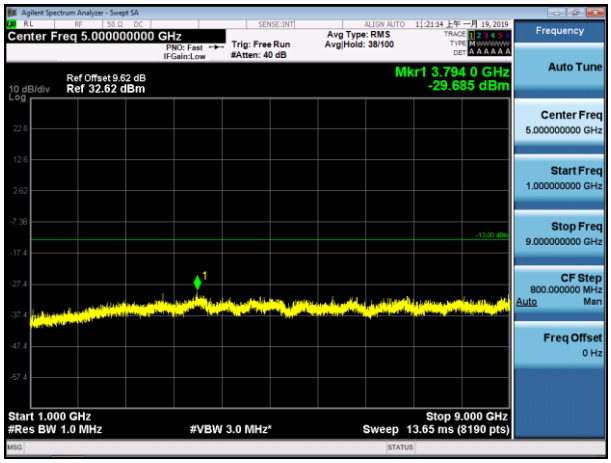
9.1.3MEASUREMENT RESULT

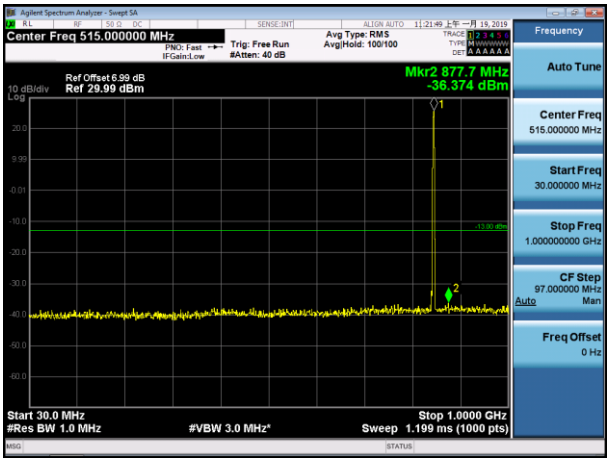
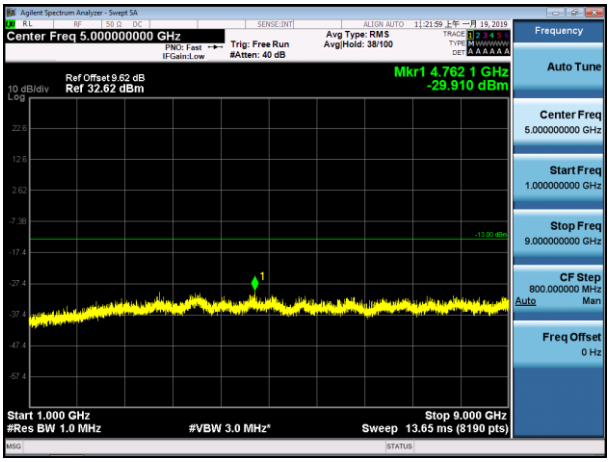
Test Results

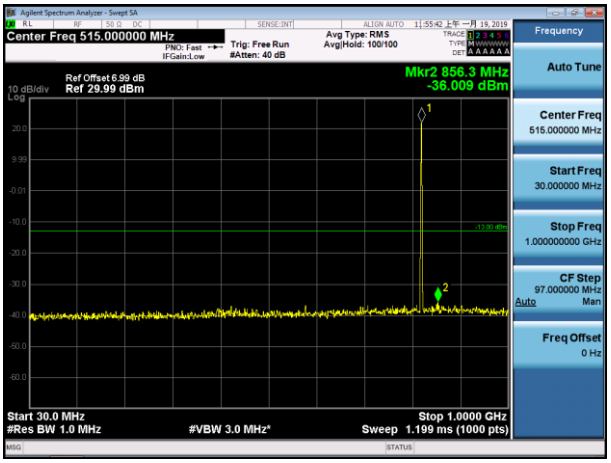
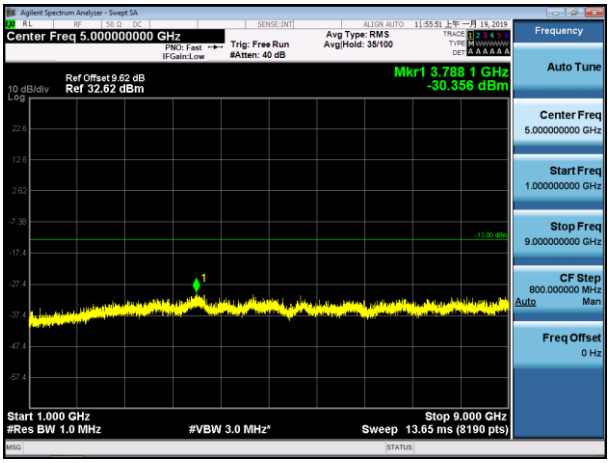
Test Band=GSM850/GSM1900

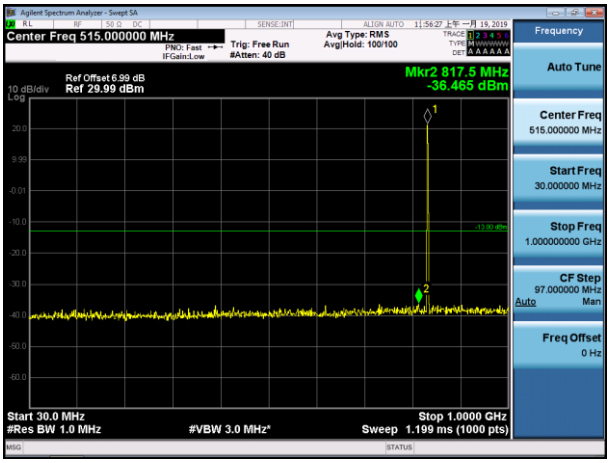
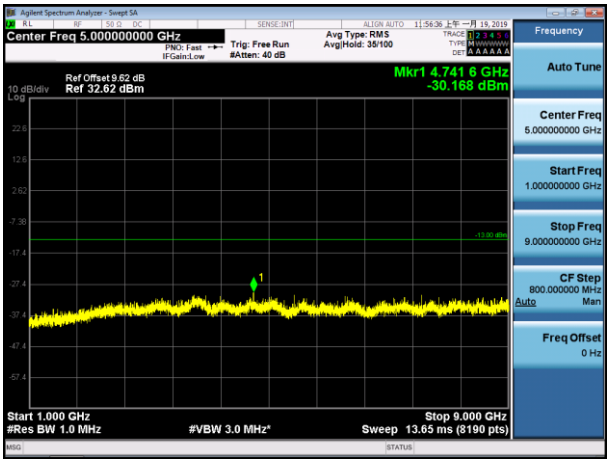
Test Mode=GSM/EDGE

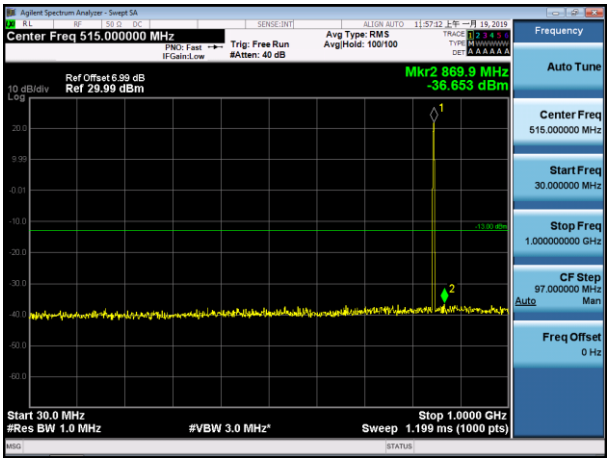
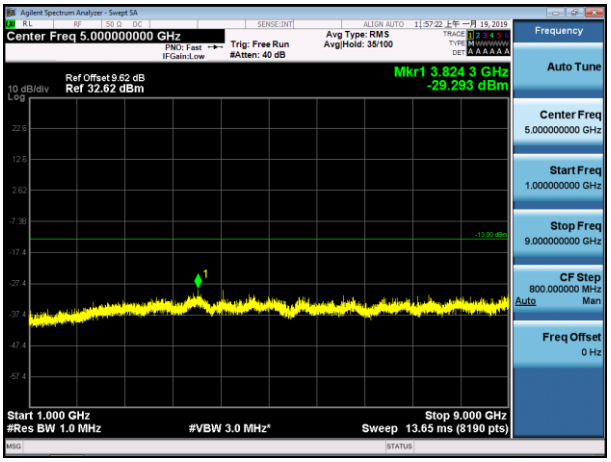
GSM 850-LCH-GSM	GSM 850-LCH-GSM
	

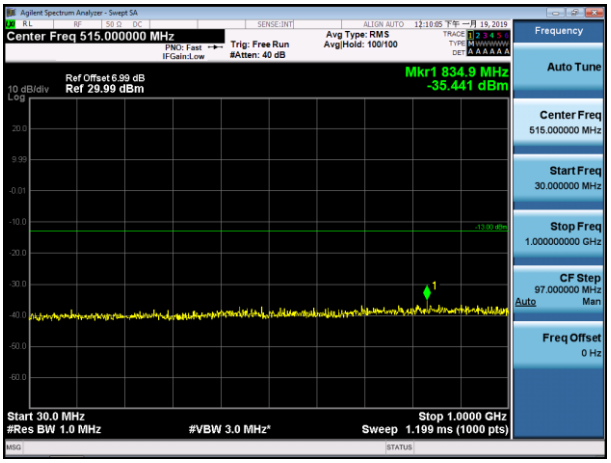
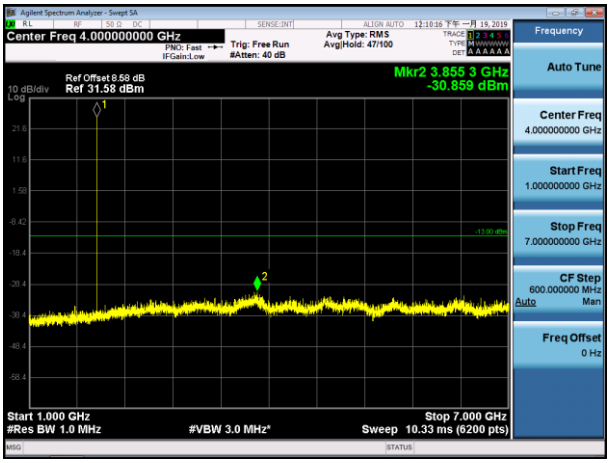
GSM 850-MCH-GSM	GSM 850-MCH-GSM
	

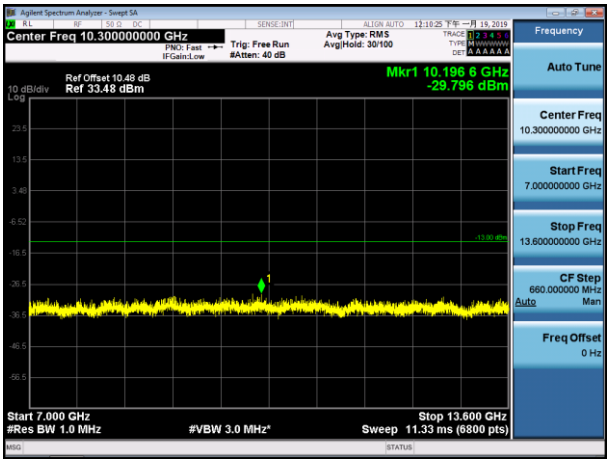
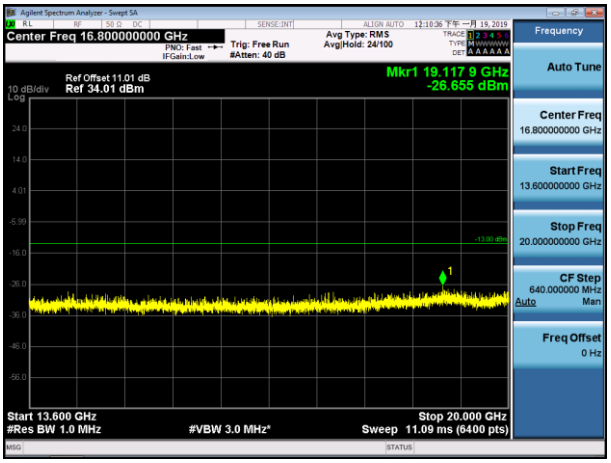
GSM 850-HCH-GSM	GSM 850-HCH-GSM
	

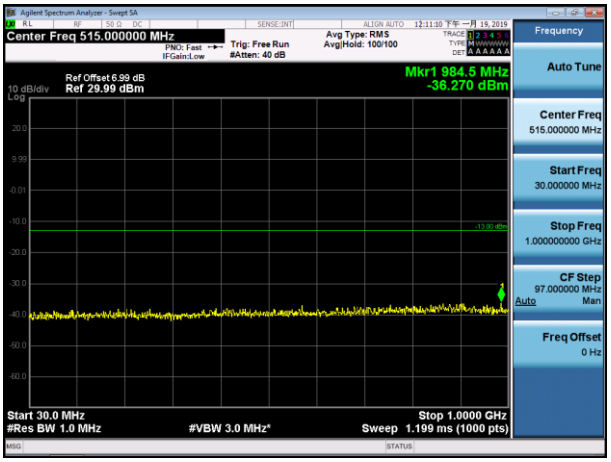
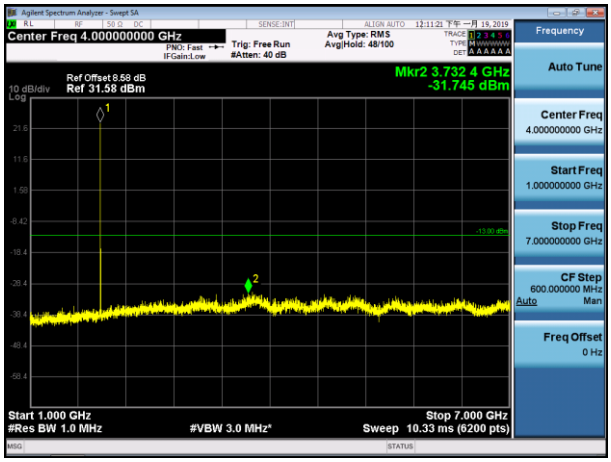
GSM 850-LCH-EDGE	GSM 850-LCH- EDGE
	

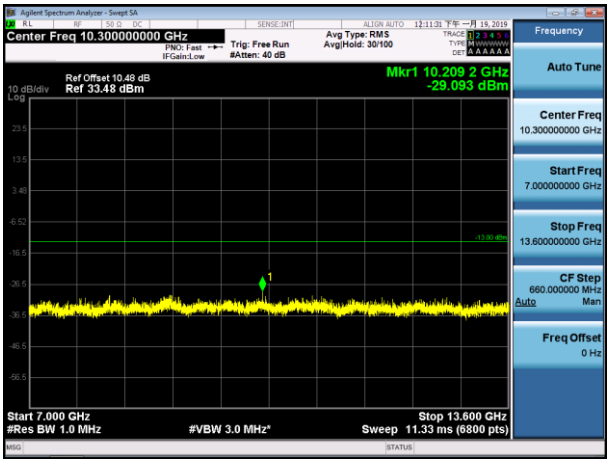
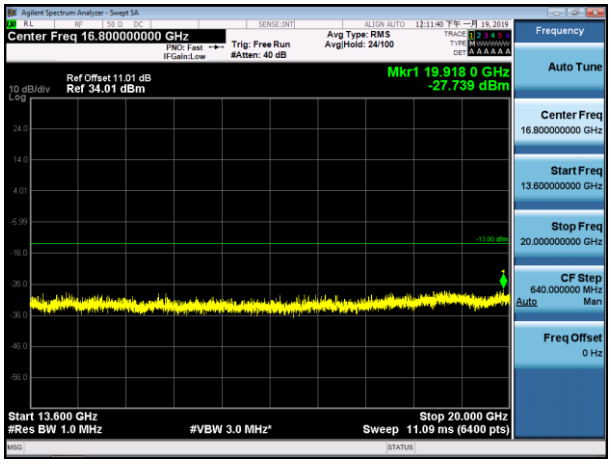
GSM 850-MCH-EDGE	GSM 850-MCH-EDGE
	

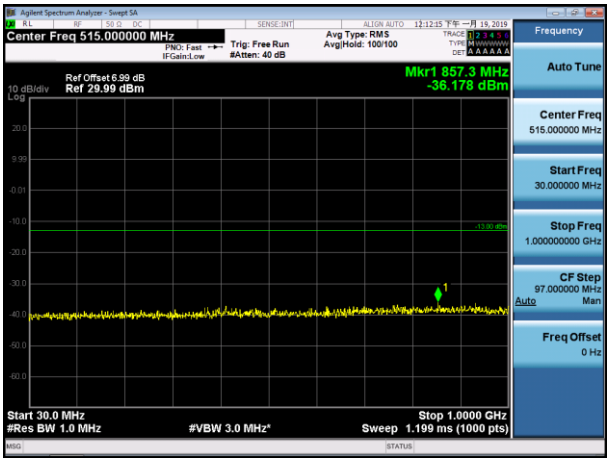
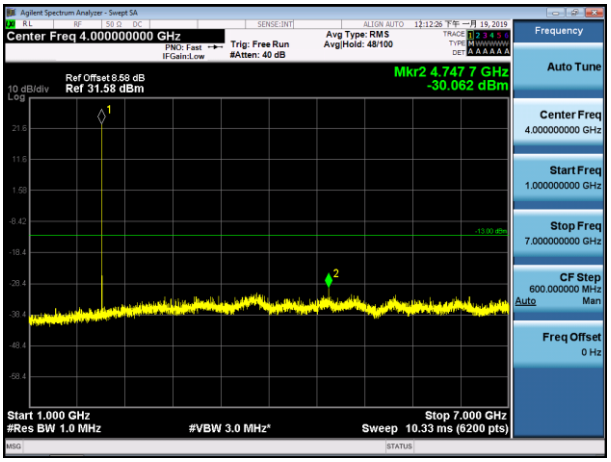
GSM 850-HCH-EDGE	GSM 850-HCH-EDGE
	

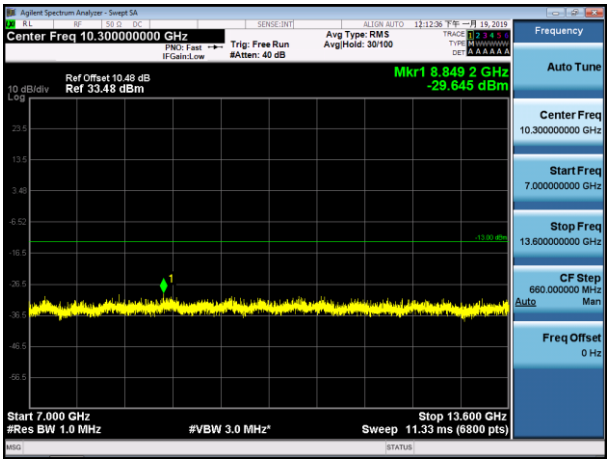
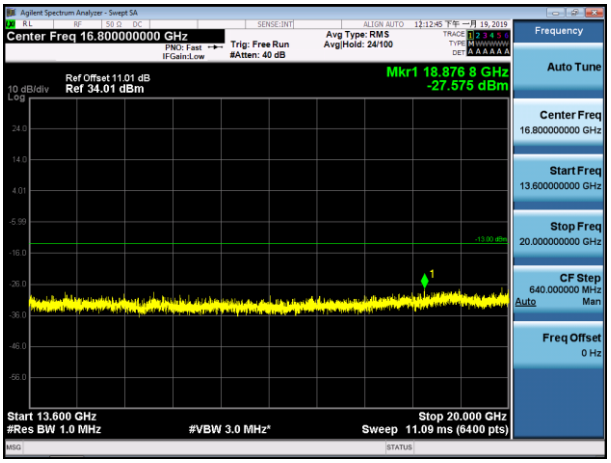
GSM 1900-LCH-GSM	GSM 1900-LCH-GSM
	

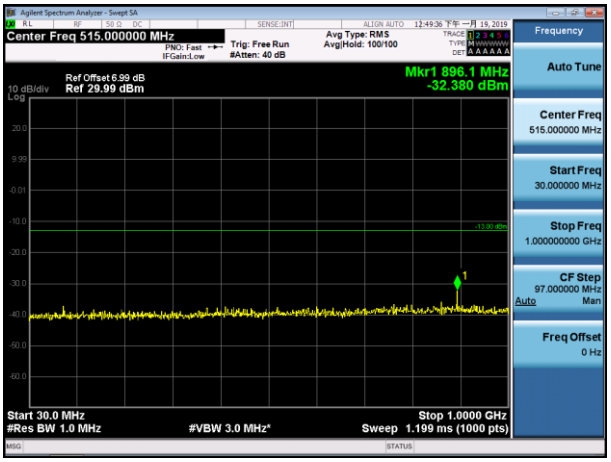
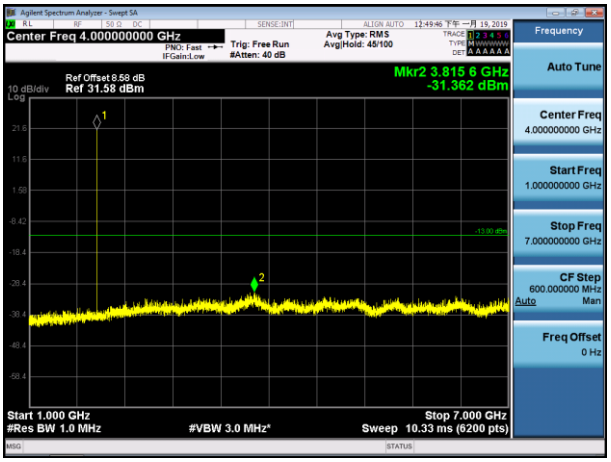
GSM 1900-LCH-GSM	GSM 1900-LCH-GSM
	

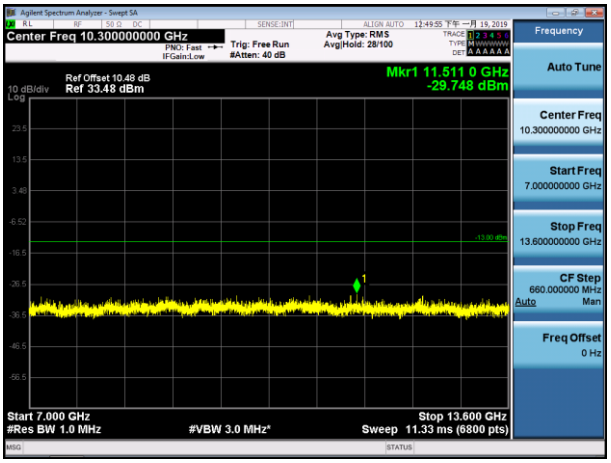
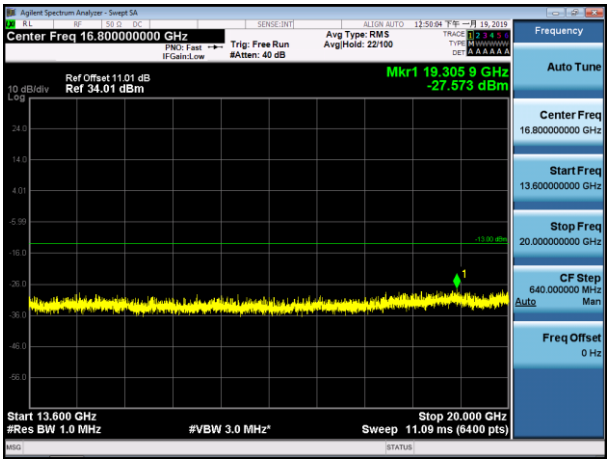
GSM 1900-MCH-GSM	GSM 1900-MCH-GSM
	

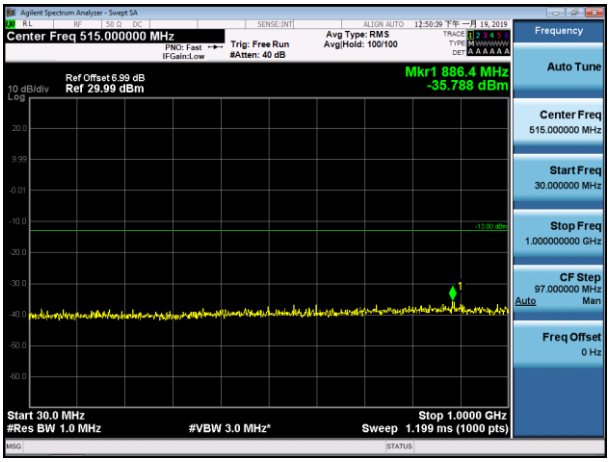
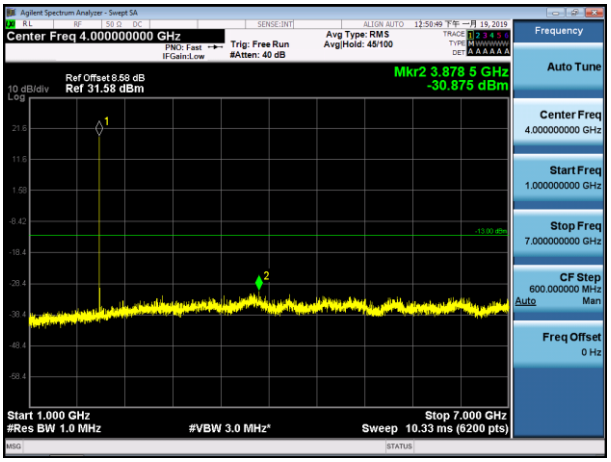
GSM 1900-MCH-GSM	GSM 1900-MCH-GSM
	

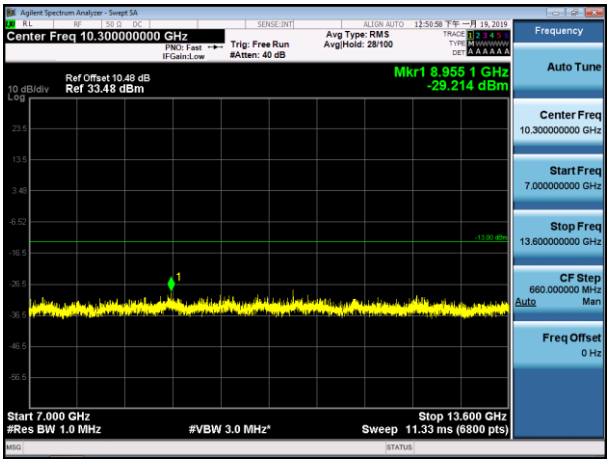
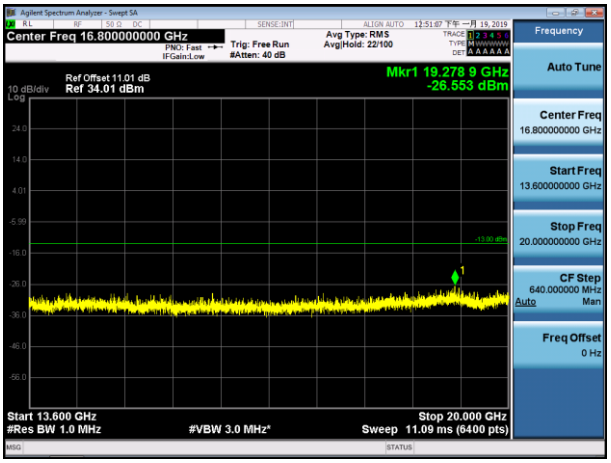
GSM 1900-HCH-GSM	GSM 1900-HCH-GSM
	

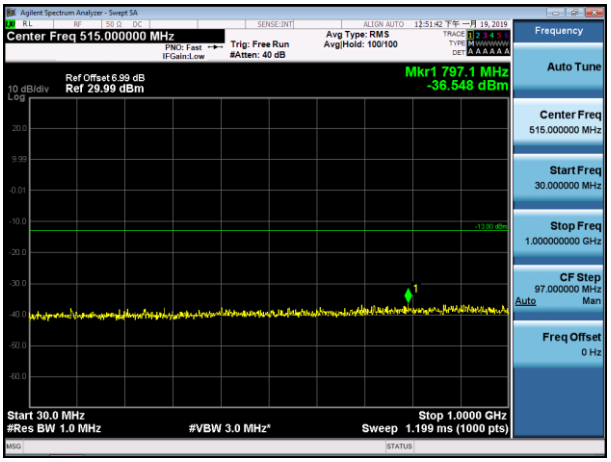
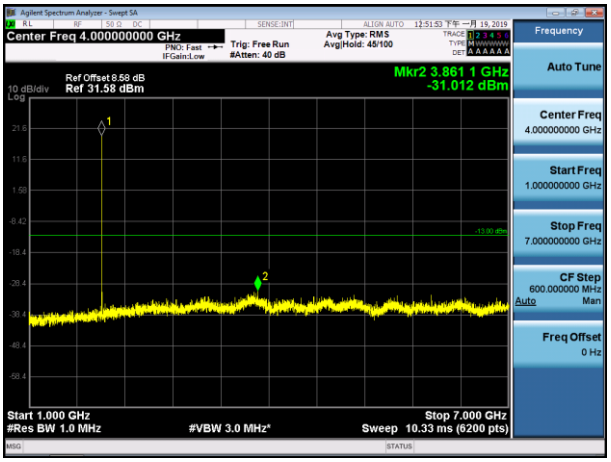
GSM 1900-HCH-GSM	GSM 1900-HCH-GSM
	

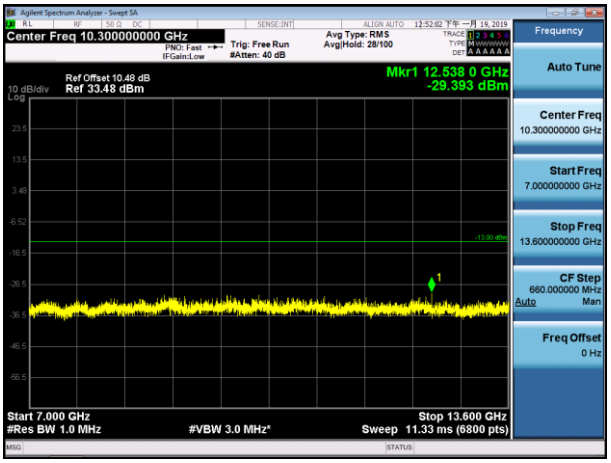
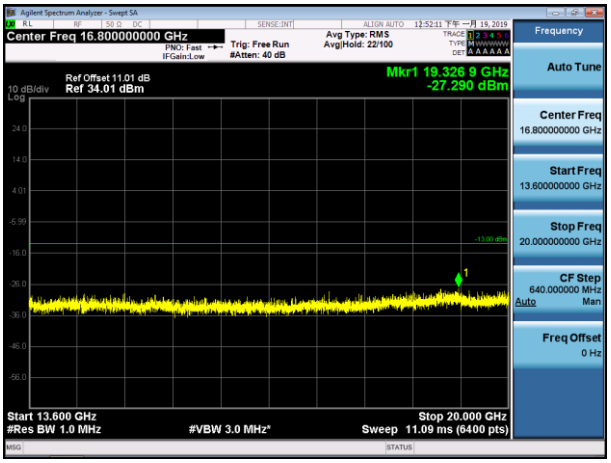
GSM 1900-LCH-EDGE	GSM 1900- LCH-EDGE
	

GSM 1900-LCH-EDGE	GSM 1900- LCH-EDGE
	

GSM 1900-MCH-EDGE	GSM 1900- MCH-EDGE
	

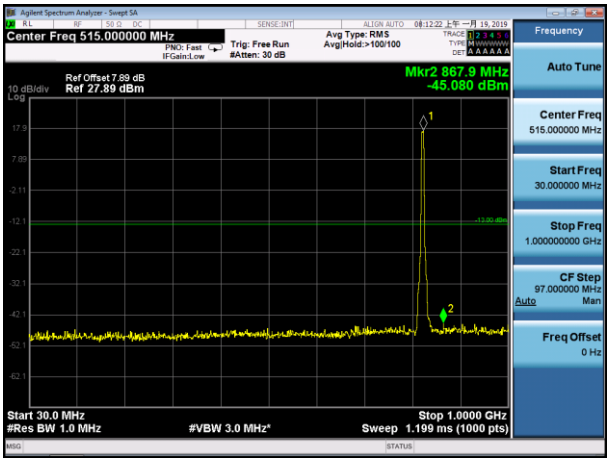
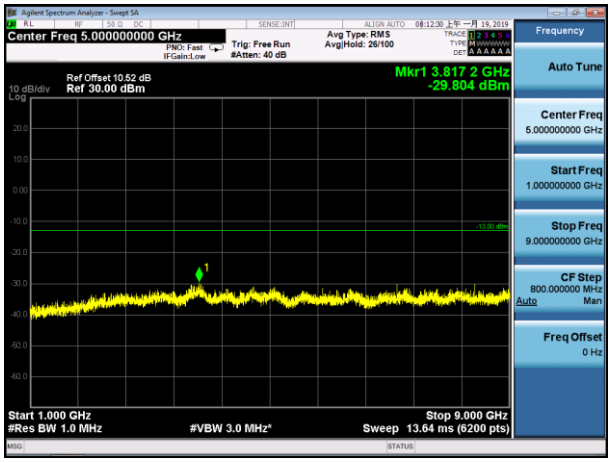
GSM 1900-MCH-EDGE	GSM 1900- MCH-EDGE
	

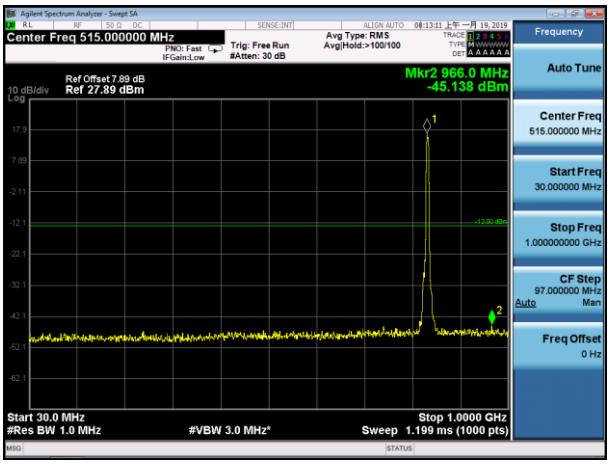
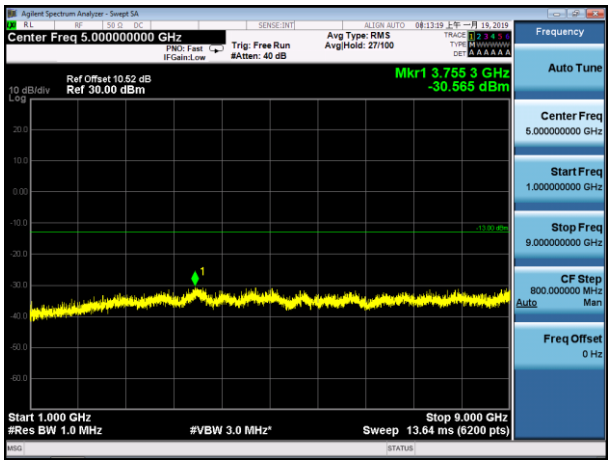
GSM 1900-HCH-EDGE	GSM 1900- HCH-EDGE
	

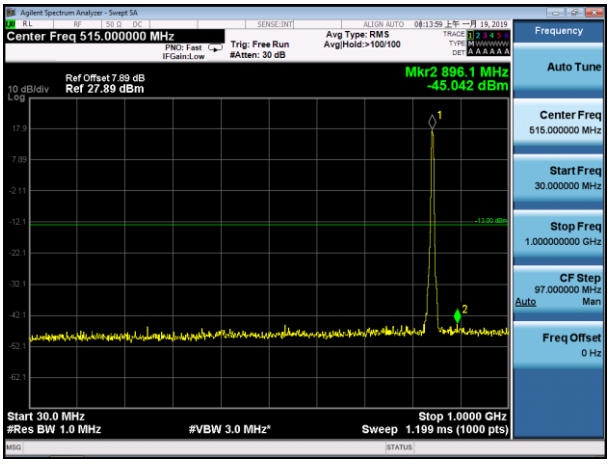
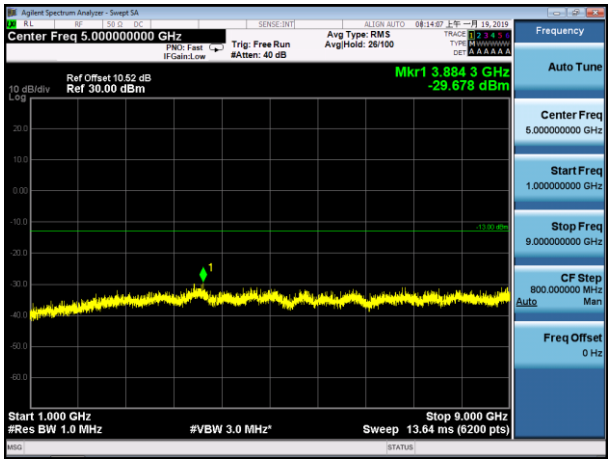
GSM 1900- HCH-EDGE	GSM 1900- HCH-EDGE
	

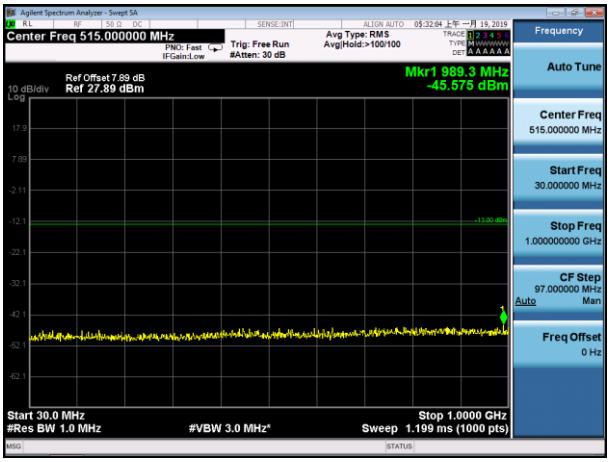
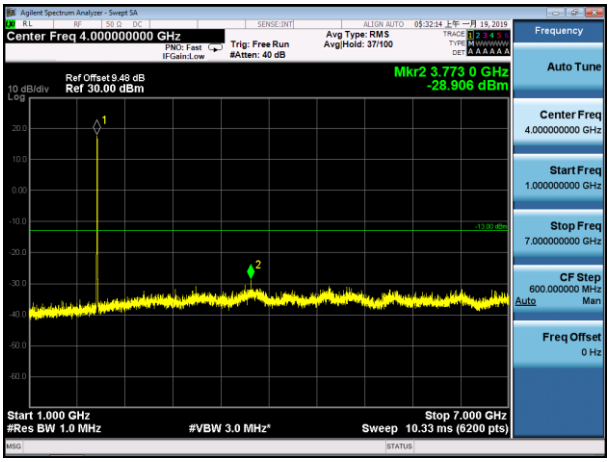
Test Band=WCDMA850/WCDMA1900

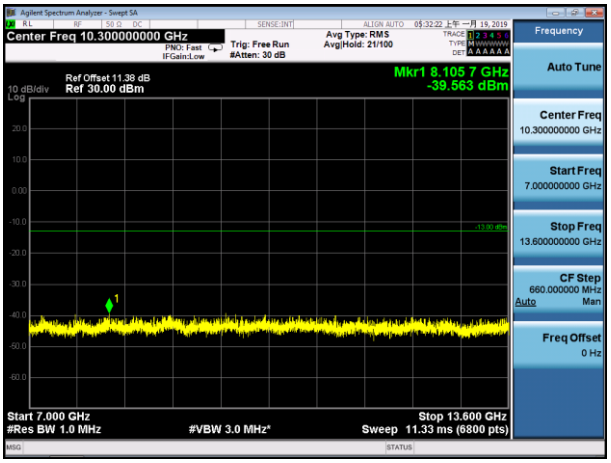
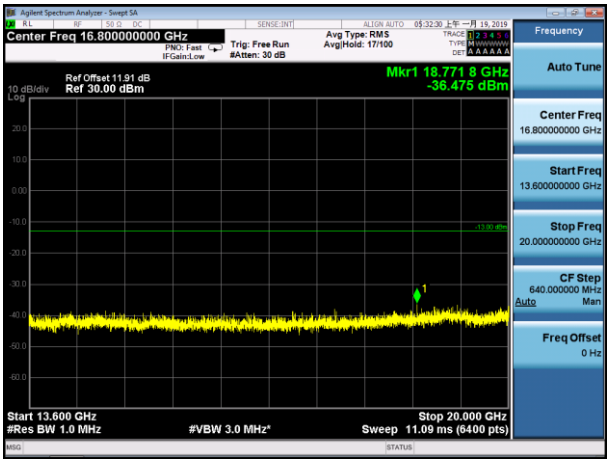
Test Mode=UMTS

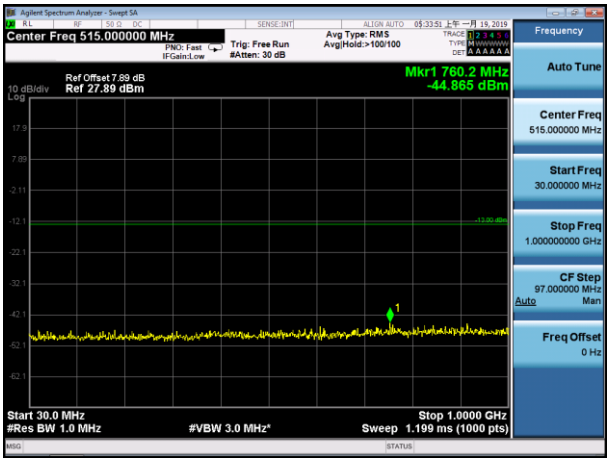
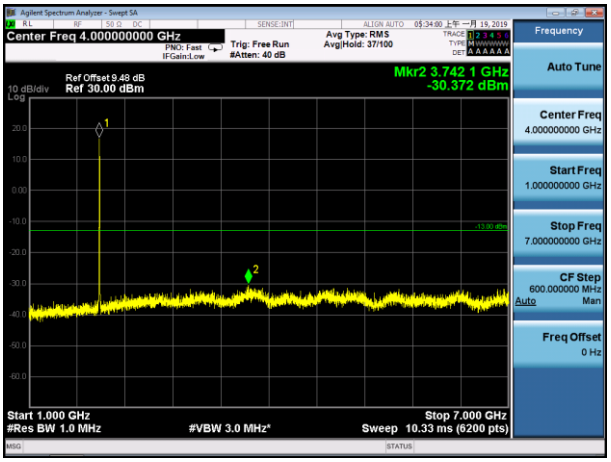
WCDMA 850-LCH	WCDMA 850-LCH
	

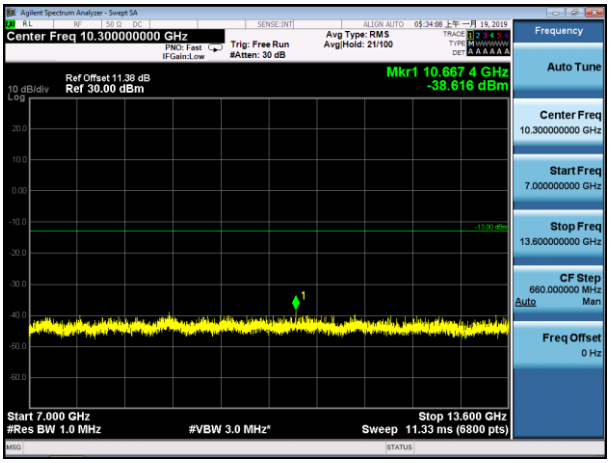
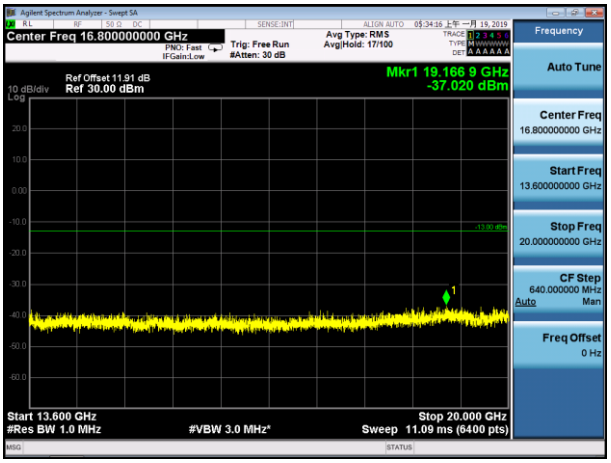
WCDMA 850-MCH	WCDMA 850-MCH
	

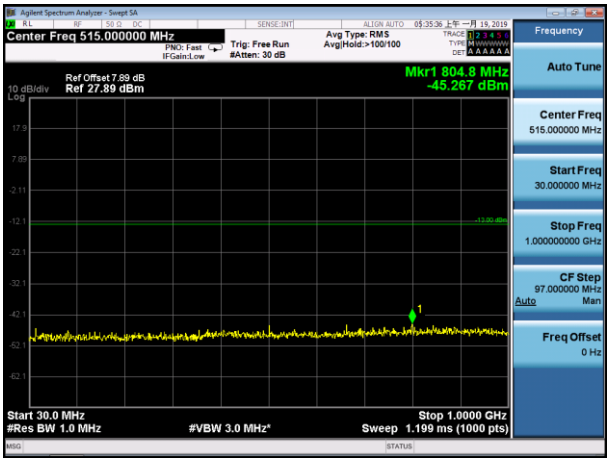
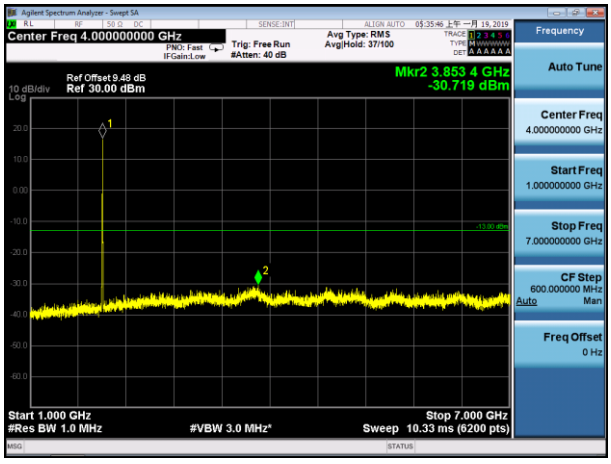
WCDMA 850-HCH	WCDMA 850-HCH
	

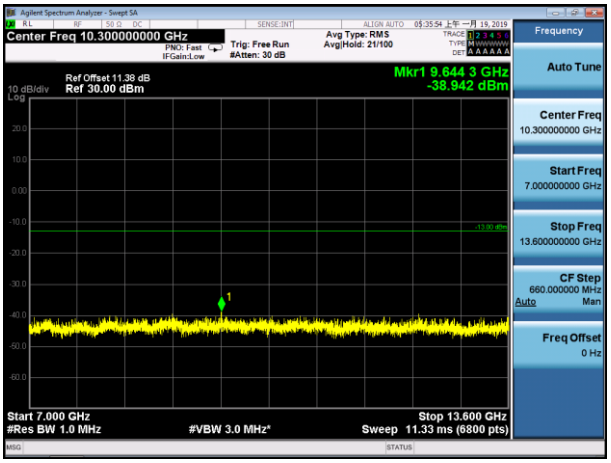
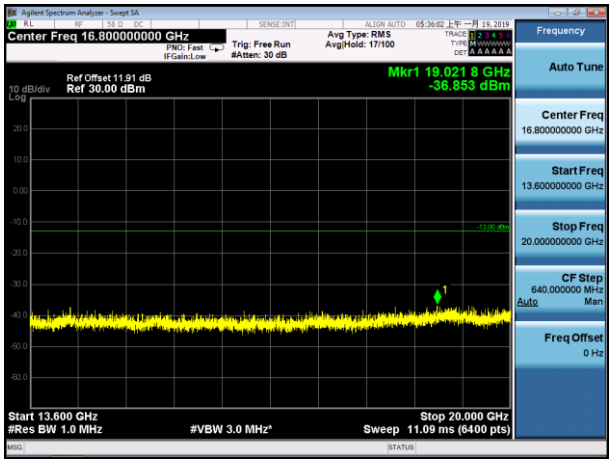
WCDMA 1900-LCH	WCDMA 1900-LCH
	

WCDMA 1900-LCH	WCDMA 1900-LCH
	

WCDMA 1900-MCH	WCDMA 1900-MCH
	

WCDMA 1900-MCH	WCDMA 1900-MCH
	

WCDMA 1900-HCH	WCDMA 1900-HCH
	

WCDMA 1900-HCH	WCDMA 1900-HCH
	

Note:1. Below 30MHZ no Spurious found and Above is the worst mode data.

2. As no emission found in standby or receive mode, no recording in this report.

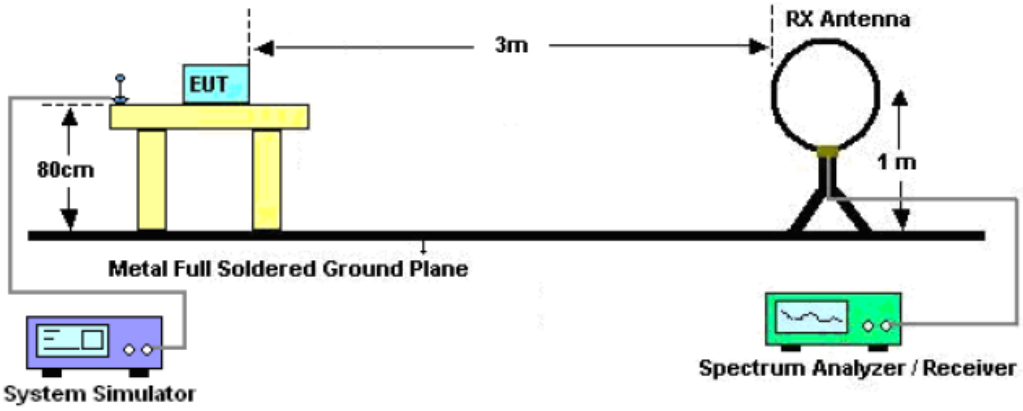
9.2 RADIATED SPURIOUS EMISSION

9.2.1MEASUREMENT METHOD

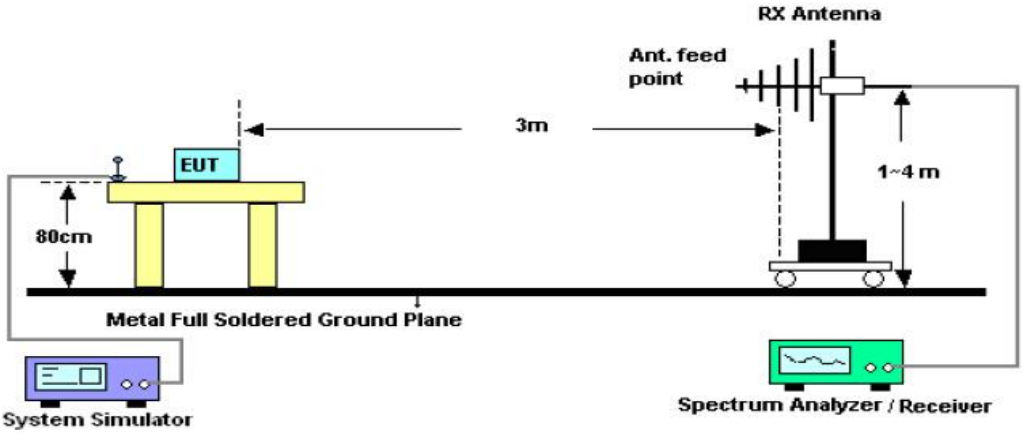
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated 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.

9.2.2 TEST SETUP

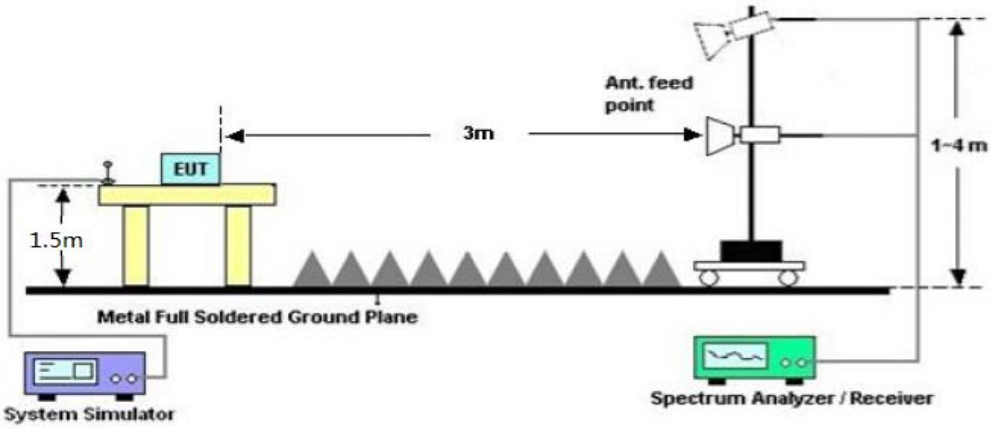
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



9.2.3 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:

9.2.4 MEASUREMENT RESULT

GSM 850:

The Worst Test Results for Channel 251/848.8 MHz				
Frequency (MHz)	Emission Level (dBm)	Limits (dBm)	Margin (dB)	Comment
1967.60	-49.20	-13	-36.20	Horizontal
3456.47	-34.15	-13	-21.15	Horizontal
6722.25	-46.15	-13	-33.15	Horizontal
1967.60	-38.97	-13	-25.97	Vertical
3399.54	-50.92	-13	-37.92	Vertical
6749.64	-32.44	-13	-19.44	Vertical

GSM 850(EDGE 8):

The Worst Test Results for Channel 251/848.8 MHz				
Frequency (MHz)	Emission Level (dBm)	Limits (dBm)	Margin (dB)	Comment
1967.60	-51.55	-13	-38.55	Horizontal
3485.45	-40.55	-13	-27.55	Horizontal
6799.64	-49.17	-13	-36.17	Horizontal
1967.60	-37.42	-13	-24.42	Vertical
3464.47	-50.60	-13	-37.60	Vertical
6846.25	-32.80	-13	-19.80	Vertical

PCS 1900:

The Worst Test Results for Channel 810/1909.8MHz				
Frequency (MHz)	Emission Level (dBm)	Limits (dBm)	Margin (dB)	Comment
1847.52	-49.88	-13	-36.88	Horizontal
3819.60	-36.08	-13	-23.08	Horizontal
7569.22	-47.68	-13	-34.68	Horizontal
1845.48	-36.77	-13	-23.77	Vertical
3845.12	-48.35	-13	-35.35	Vertical
7644.23	-35.84	-13	-22.84	Vertical

PCS 1900(EDGE):

The Worst Test Results for Channel 810/1909.8MHz				
Frequency (MHz)	Emission Level (dBm)	Limits (dBm)	Margin (dB)	Comment
1800.12	-52.67	-13	-39.67	Horizontal
3819.60	-40.55	-13	-27.55	Horizontal
7635.22	-49.54	-13	-36.54	Horizontal
1814.21	-39.32	-13	-26.32	Vertical
3819.60	-48.33	-13	-35.33	Vertical
7631.47	-34.58	-13	-21.58	Vertical

HSPA band II:

The Worst Test Results for Channel 9538/1907.6MHz				
Frequency	Emission Level	Limits	Margin	Comment
(MHz)	(dBm)	(dBm)	(dB)	
1489.55	-46.50	-13	-33.50	Horizontal
3815.20	-30.92	-13	-17.92	Horizontal
7621.02	-50.08	-13	-37.08	Horizontal
1815.42	-32.66	-13	-19.66	Vertical
3815.20	-46.63	-13	-33.63	Vertical
7633.53	-30.48	-13	-17.48	Vertical

HSPA band V:

The Worst Test Results for Channel 4233/846.6MHz				
Frequency	Emission Level	Limits	Margin	Comment
(MHz)	(dBm)	(dBm)	(dB)	
1693.20	-49.65	-13	-36.65	Horizontal
3025.46	-33.60	-13	-20.60	Horizontal
6643.97	-48.30	-13	-35.30	Horizontal
1693.20	-31.06	-13	-18.06	Vertical
315.23	-45.99	-13	-32.99	Vertical
6513.18	-32.50	-13	-19.50	Vertical

RESULT: PASS

Note:

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

10. FREQUENCY STABILITY

10.1 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 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.

10.2 PROVISIONS APPLICABLE

10.2.1 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 3.4VDC and 4.2VDC, with a nominal voltage of 3.7VDC. 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.

10.2.2 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.

10.3 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	GSM	LCH	TN	VL	10.85	0.013164	±2.5	PASS
			TN	VN	12.98	0.015749	±2.5	PASS
			TN	VH	10.53	0.012776	±2.5	PASS
		MCH	TN	VL	11.62	0.013890	±2.5	PASS
			TN	VN	12.07	0.014427	±2.5	PASS
			TN	VH	14.46	0.017284	±2.5	PASS
		HCH	TN	VL	15.30	0.018025	±2.5	PASS
			TN	VN	11.56	0.013619	±2.5	PASS
			TN	VH	14.79	0.017425	±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	EDGE	LCH	TN	VL	15.98	0.019388	±2.5	PASS
			TN	VN	18.02	0.021864	±2.5	PASS
			TN	VH	14.53	0.017629	±2.5	PASS
		MCH	TN	VL	13.62	0.016280	±2.5	PASS
			TN	VN	13.62	0.016280	±2.5	PASS
			TN	VH	13.92	0.016639	±2.5	PASS
		HCH	TN	VL	11.27	0.013278	±2.5	PASS
			TN	VN	11.69	0.013772	±2.5	PASS
			TN	VH	11.56	0.013619	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt. (V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Verdict
PCS 1900	GSM	LCH	TN	VL	90.08	0.048687	PASS
			TN	VN	93.11	0.050324	PASS
			TN	VH	93.82	0.050708	PASS
		MCH	TN	VL	96.73	0.051452	PASS
			TN	VN	94.86	0.050457	PASS
			TN	VH	92.34	0.049117	PASS
		HCH	TN	VL	96.53	0.050545	PASS
			TN	VN	95.63	0.050073	PASS
			TN	VH	95.76	0.050141	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt. (V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Verdict
PCS 1900	EDGE	LCH	TN	VL	91.40	0.049400	PASS
			TN	VN	92.05	0.049751	PASS
			TN	VH	86.30	0.046644	PASS
		MCH	TN	VL	84.56	0.044979	PASS
			TN	VN	81.75	0.043484	PASS
			TN	VH	84.27	0.044824	PASS
		HCH	TN	VL	85.88	0.044968	PASS
			TN	VN	83.46	0.043701	PASS
			TN	VH	81.88	0.042874	PASS

Note: Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very samll. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted duing the frequency stability tests is applied. Therefore the device is detemined to remain operating in band over the temperture and voltage range as tested.

Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM850	GSM	LCH	VN	-10	12.66	0.015360	±2.5	PASS
			VN	0	10.20	0.012376	±2.5	PASS
			VN	10	12.91	0.015664	±2.5	PASS
			VN	20	10.53	0.012776	±2.5	PASS
			VN	30	12.59	0.015275	±2.5	PASS
			VN	40	14.59	0.017702	±2.5	PASS
			VN	50	14.98	0.018175	±2.5	PASS
GSM850	GSM	MCH	VN	-10	13.88	0.016591	±2.5	PASS
			VN	0	12.98	0.015515	±2.5	PASS
			VN	10	15.50	0.018527	±2.5	PASS
			VN	20	13.75	0.016436	±2.5	PASS
			VN	30	14.21	0.016985	±2.5	PASS
			VN	40	10.01	0.011965	±2.5	PASS
			VN	50	11.43	0.013662	±2.5	PASS
GSM850	GSM	HCH	VN	-10	14.59	0.017189	±2.5	PASS
			VN	0	12.59	0.014833	±2.5	PASS
			VN	10	13.17	0.015516	±2.5	PASS
			VN	20	13.37	0.015752	±2.5	PASS
			VN	30	12.79	0.015068	±2.5	PASS
			VN	40	11.75	0.013843	±2.5	PASS
			VN	50	11.95	0.014079	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM850	EDGE	LCH	VN	-10	17.60	0.021354	±2.5	PASS
			VN	0	27.25	0.033062	±2.5	PASS
			VN	10	21.73	0.026365	±2.5	PASS
			VN	20	21.21	0.025734	±2.5	PASS
			VN	30	19.18	0.023271	±2.5	PASS
			VN	40	13.88	0.016841	±2.5	PASS
			VN	50	17.08	0.020723	±2.5	PASS
GSM850	EDGE	MCH	VN	-10	12.98	0.015515	±2.5	PASS
			VN	0	16.50	0.019723	±2.5	PASS
			VN	10	16.18	0.019340	±2.5	PASS
			VN	20	14.66	0.017523	±2.5	PASS
			VN	30	15.37	0.018372	±2.5	PASS
			VN	40	15.63	0.018683	±2.5	PASS
			VN	50	15.50	0.018527	±2.5	PASS
GSM850	EDGE	HCH	VN	-10	14.33	0.016883	±2.5	PASS
			VN	0	14.24	0.016777	±2.5	PASS
			VN	10	14.33	0.016883	±2.5	PASS
			VN	20	14.24	0.016777	±2.5	PASS
			VN	30	10.94	0.012889	±2.5	PASS
			VN	40	14.79	0.017425	±2.5	PASS
			VN	50	16.47	0.019404	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Verdict
PCS 1900	GSM	LCH	VN	-10	90.27	0.048789	PASS
			VN	0	91.95	0.049697	PASS
			VN	10	92.40	0.049941	PASS
			VN	20	90.34	0.048827	PASS
			VN	30	93.82	0.050708	PASS
			VN	40	90.79	0.049070	PASS
			VN	50	91.56	0.049487	PASS
PCS 1900	GSM	MCH	VN	-10	95.24	0.050660	PASS
			VN	0	93.31	0.049633	PASS
			VN	10	96.92	0.051553	PASS
			VN	20	95.70	0.050904	PASS
			VN	30	90.79	0.048293	PASS
			VN	40	93.05	0.049495	PASS
			VN	50	94.08	0.050043	PASS
PCS 1900	GSM	HCH	VN	-10	94.86	0.049670	PASS
			VN	0	98.60	0.051628	PASS
			VN	10	97.44	0.051021	PASS
			VN	20	97.89	0.051257	PASS
			VN	30	100.28	0.052508	PASS
			VN	40	96.34	0.050445	PASS
			VN	50	101.70	0.053252	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Verdict
GSM1900	EDGE	LCH	VN	-10	109.74	0.059313	PASS
			VN	0	95.57	0.051654	PASS
			VN	10	98.70	0.053346	PASS
			VN	20	93.50	0.050535	PASS
			VN	30	89.17	0.048195	PASS
			VN	40	88.14	0.047638	PASS
			VN	50	86.78	0.046903	PASS
GSM1900	EDGE	MCH	VN	-10	88.27	0.046952	PASS
			VN	0	77.62	0.041287	PASS
			VN	10	90.34	0.048053	PASS
			VN	20	83.98	0.044670	PASS
			VN	30	73.42	0.039053	PASS
			VN	40	89.14	0.047415	PASS
			VN	50	77.32	0.041128	PASS
			VN	-10	84.40	0.044193	PASS
			VN	0	80.29	0.042041	PASS
			VN	10	85.98	0.045020	PASS
			VN	20	86.33	0.045204	PASS
			VN	30	90.27	0.047267	PASS
			VN	40	80.78	0.042298	PASS
			VN	50	87.24	0.045680	PASS

Note: Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very samll. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted duing the frequency stability tests is applied. Therefore the device is detemined to remain operating in band over the temperture and voltage range as tested.

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	-0.58	-0.000702	±2.5	PASS
			TN	VN	-1.02	-0.001234	±2.5	PASS
			TN	VH	0.32	0.000387	±2.5	PASS
		MCH	TN	VL	1.56	0.001865	±2.5	PASS
			TN	VN	1.37	0.001638	±2.5	PASS
			TN	VH	3.46	0.004137	±2.5	PASS
		HCH	TN	VL	1.14	0.001347	±2.5	PASS
			TN	VN	3.02	0.003567	±2.5	PASS
			TN	VH	3.98	0.004701	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.(V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Verdict
WCDMA1900	UMTS	LCH	TN	VL	-3.11	-0.001679	PASS
			TN	VN	3.43	0.001852	PASS
			TN	VH	1.24	0.000669	PASS
		MCH	TN	VL	123.11	0.065484	PASS
			TN	VN	197.77	0.105197	PASS
			TN	VH	1.86	0.000989	PASS
		HCH	TN	VL	1228.56	0.644034	PASS
			TN	VN	1822.63	0.955457	PASS
			TN	VH	1599.95	0.838724	PASS

Note: Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very samll. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted duing the frequency stability tests is applied. Therefore the device is detemined to remain operating in band over the temperture and voltage range as tested.

Frequency Error vs. Temperature:

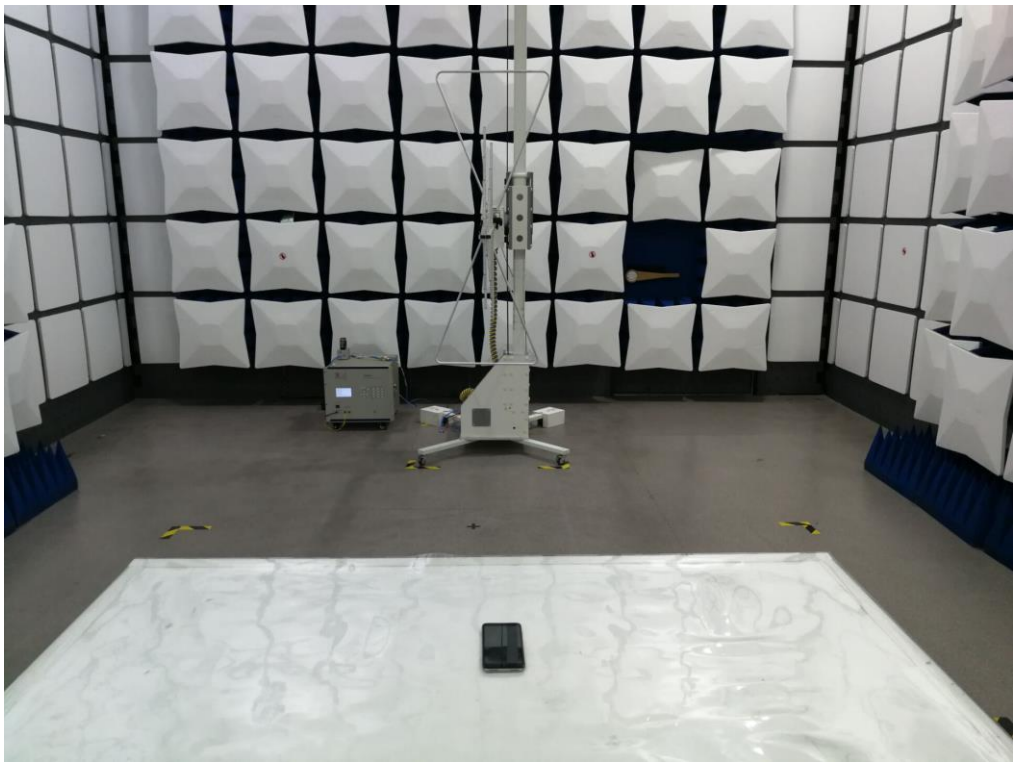
Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA850	UMTS	LCH	VN	-10	0.95	0.001150	±2.5	PASS
			VN	0	1.31	0.001585	±2.5	PASS
			VN	10	4.14	0.005010	±2.5	PASS
			VN	20	-2.20	-0.002630	±2.5	PASS
			VN	30	0.24	0.000290	±2.5	PASS
			VN	40	3.63	0.004393	±2.5	PASS
			VN	50	-0.87	-0.001053	±2.5	PASS
WCDMA850	UMTS	MCH	VN	-10	4.39	0.005249	±2.5	PASS
			VN	0	0.21	0.000251	±2.5	PASS
			VN	10	3.43	0.004101	±2.5	PASS
			VN	20	0.60	0.000717	±2.5	PASS
			VN	30	3.14	0.003754	±2.5	PASS
			VN	40	3.75	0.004484	±2.5	PASS
			VN	50	2.12	0.002535	±2.5	PASS
WCDMA850	UMTS	HCH	VN	-10	6.07	0.007170	±2.5	PASS
			VN	0	1.27	0.001500	±2.5	PASS
			VN	10	4.49	0.005304	±2.5	PASS
			VN	20	1.24	0.001465	±2.5	PASS
			VN	30	6.04	0.007134	±2.5	PASS
			VN	40	0.81	0.000957	±2.5	PASS
			VN	50	5.66	0.006686	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Tem. (℃)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Verdict
WCDMA1900	UMTS	LCH	VN	-10	5.31	0.002867	PASS
			VN	0	0.23	0.000124	PASS
			VN	10	3.43	0.001852	PASS
			VN	20	1.51	0.000815	PASS
			VN	30	5.29	0.002856	PASS
			VN	40	3.22	0.001738	PASS
			VN	50	0.81	0.000437	PASS
WCDMA1900	UMTS	MCH	VN	-10	2.15	0.001144	PASS
			VN	0	2.84	0.001511	PASS
			VN	10	121.44	0.064596	PASS
			VN	20	9.38	0.004989	PASS
			VN	30	345.70	0.183883	PASS
			VN	40	117.14	0.062309	PASS
			VN	50	319.44	0.169915	PASS
WCDMA1900	UMTS	HCH	VN	-10	1921.84	1.022255	PASS
			VN	0	1503.30	0.799628	PASS
			VN	10	1974.90	1.050479	PASS
			VN	20	1959.18	1.042117	PASS
			VN	30	1450.68	0.771638	PASS
			VN	40	2104.26	1.119287	PASS
			VN	50	1088.99	0.579250	PASS

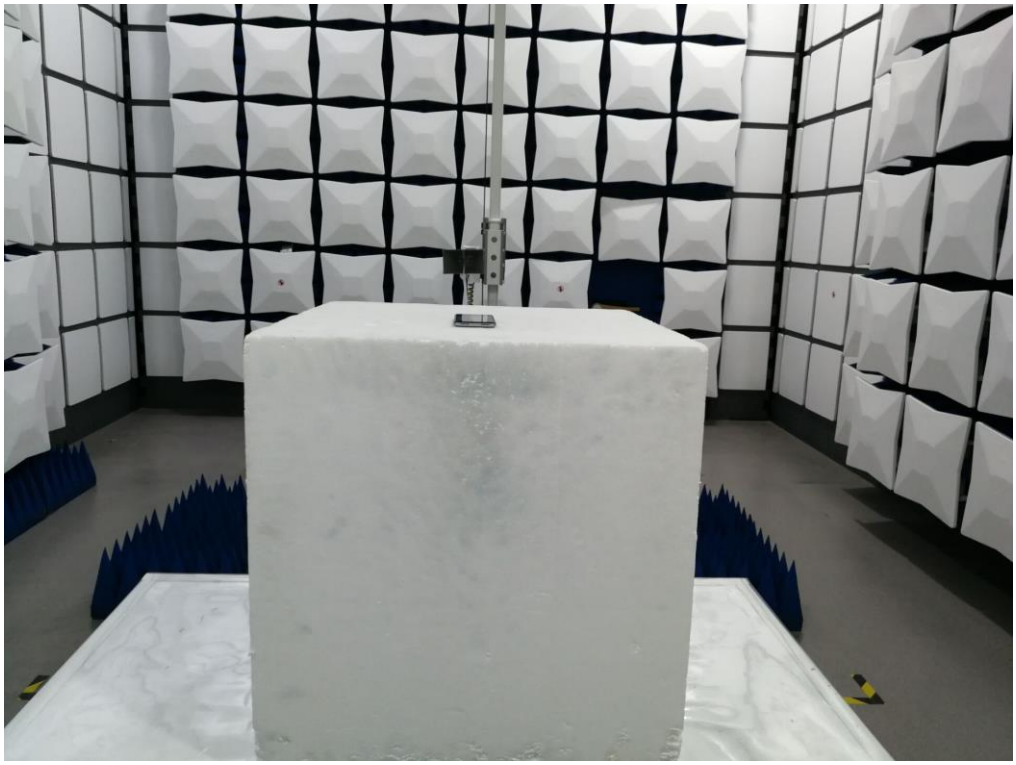
Note: Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very samll. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted duing the frequency stability tests is applied. Therefore the device is detemined to remain operating in band over the temperture and voltage range as tested.

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED SPURIOUS EMISSION



RADIATED SPURIOUS ABOVE 1G EMISSION



----END OF REPORT----