

6. Spurious Emissions at Antenna Terminal

6.1. Limit

- §22.917(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

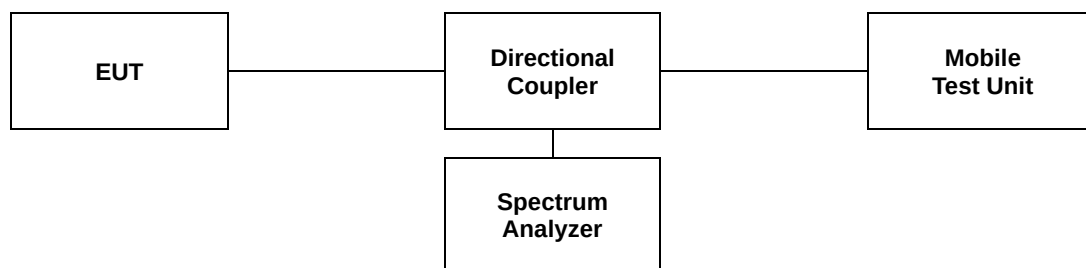
- §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

6.2. Test Procedure

The test follows section 5.7 of ANSI C63.26-2015.

1. Start frequency was set to 9 kHz and stop frequency was set to at least 10* the fundamental frequency.
2. Detector = RMS.
3. Trace mode = Max hold.
4. Sweep time = Auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 9 kHz to 20 GHz, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.



Note;

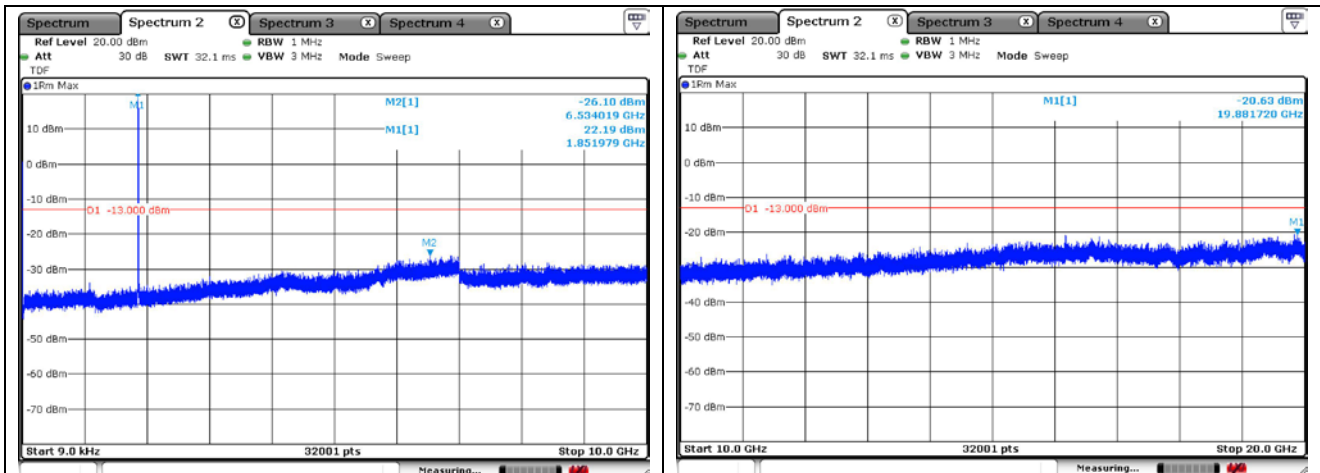
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two point, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

6.3. Test Results

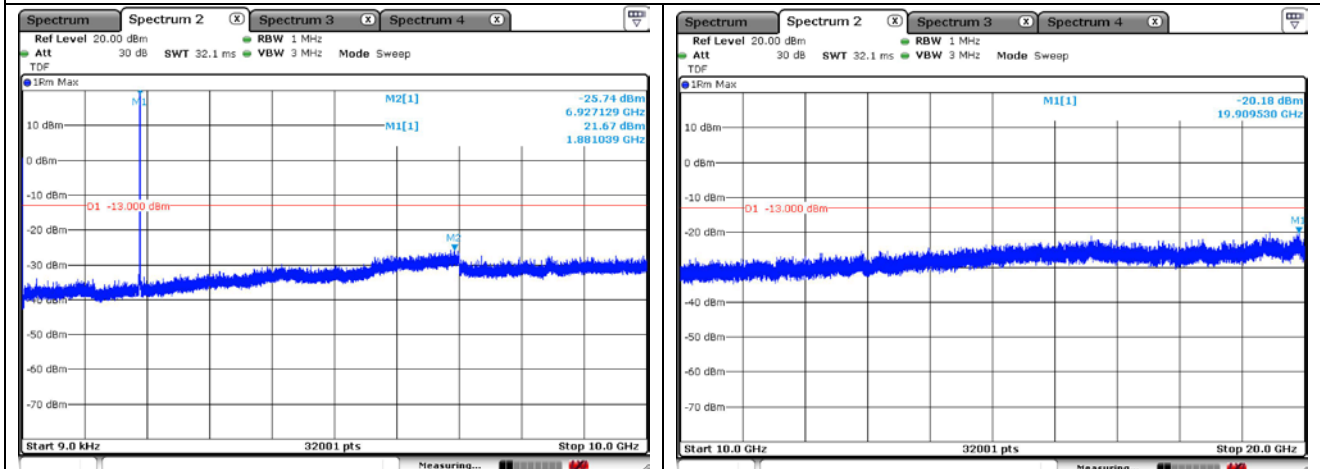
Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

- Test plots

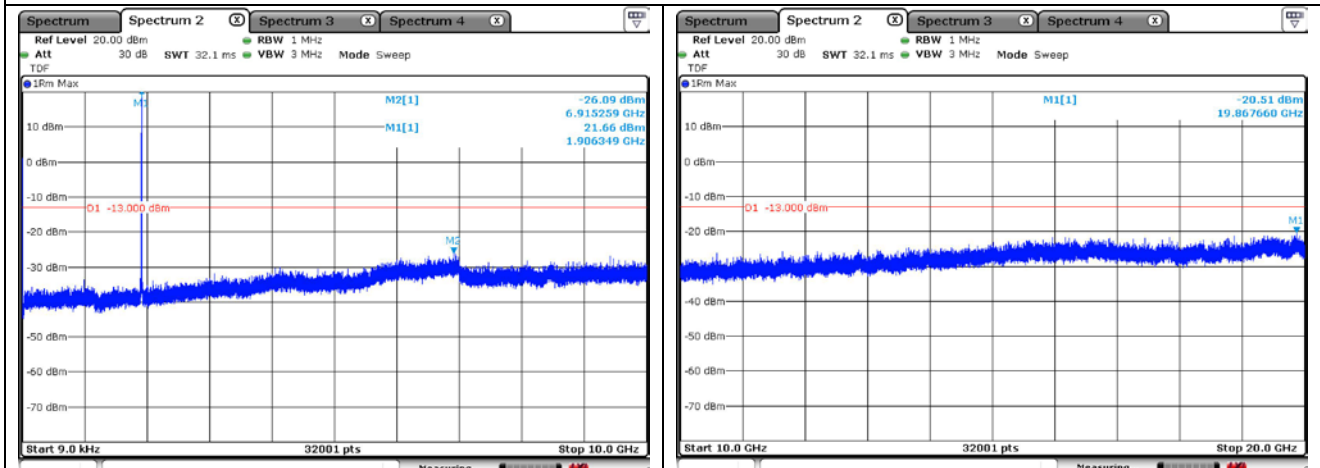
WCDMA II



WCDMA II RMC Low Channel

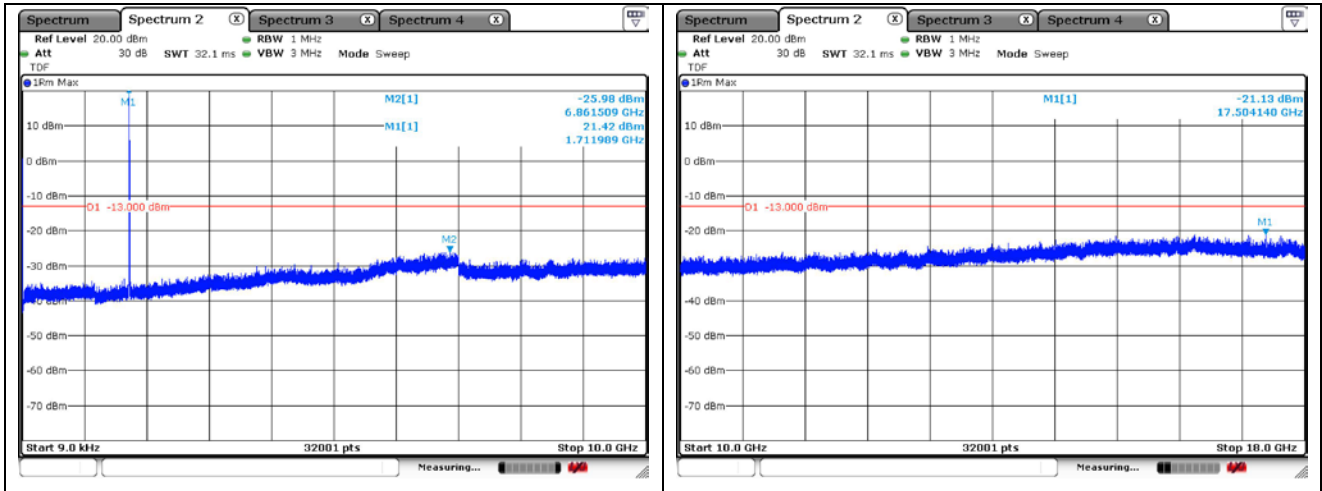


WCDMA II RMC Middle Channel

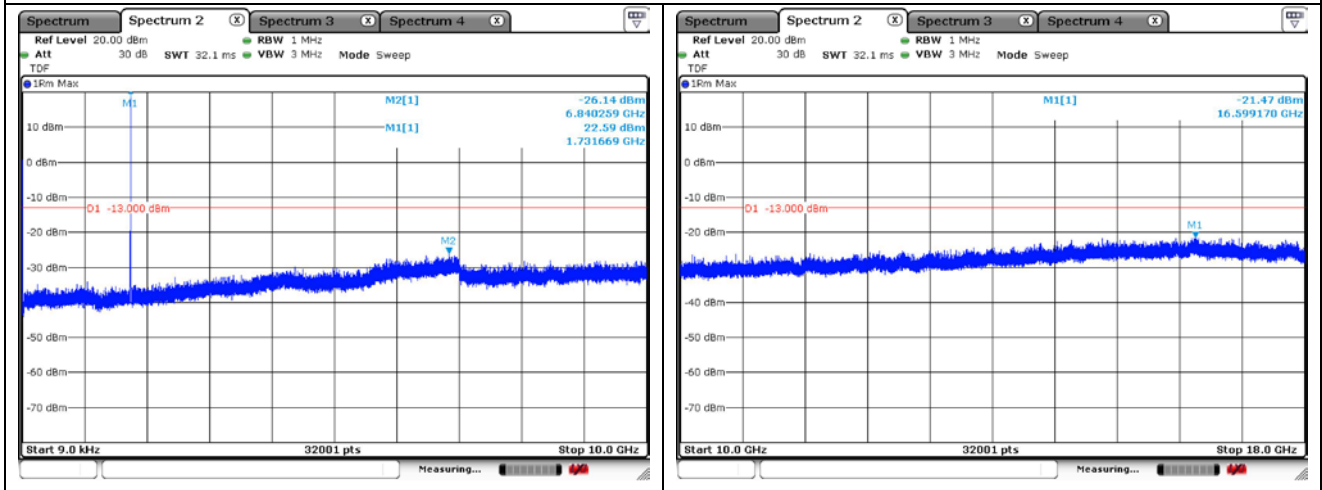


WCDMA II RMC High Channel

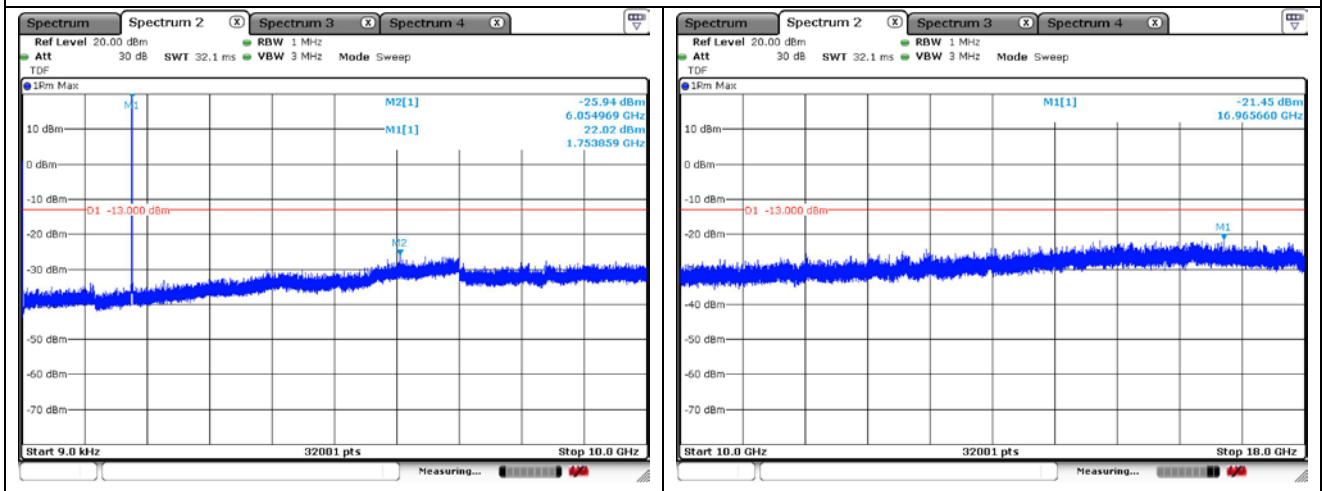
WCDMA IV



WCDMA IV RMC Low Channel

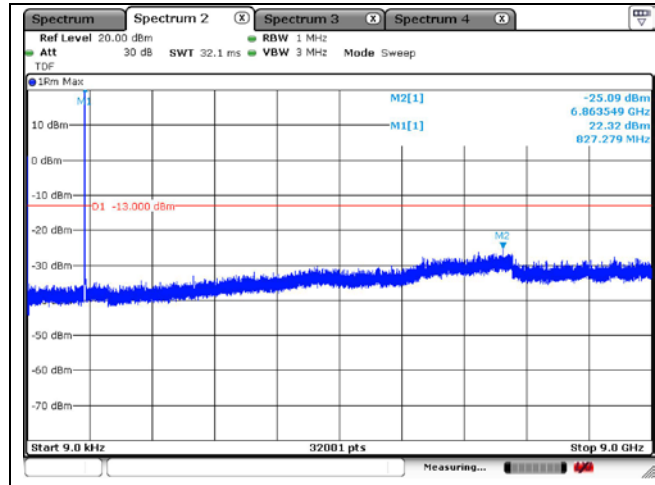


WCDMA IV RMC Middle Channel

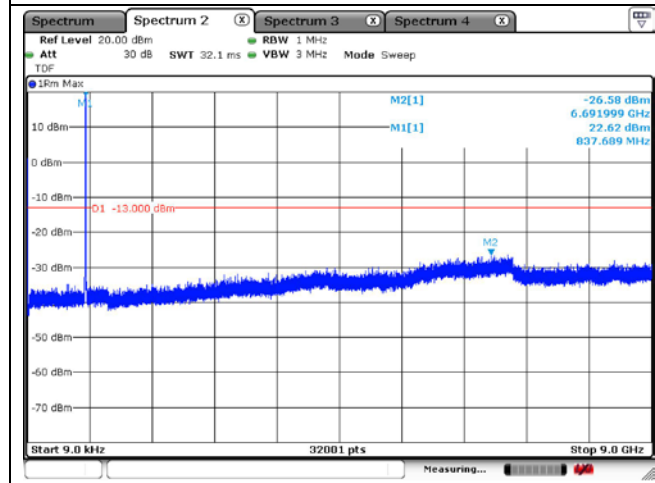


WCDMA IV RMC High Channel

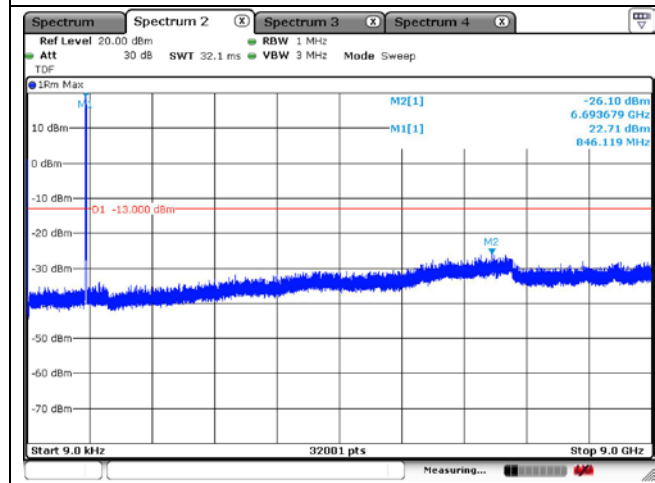
WCDMA V



WCDMA V RMC Low channel

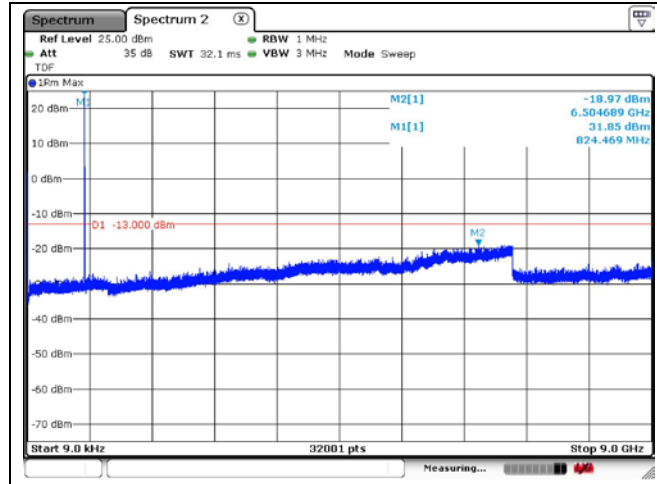


WCDMA V RMC Middle channel

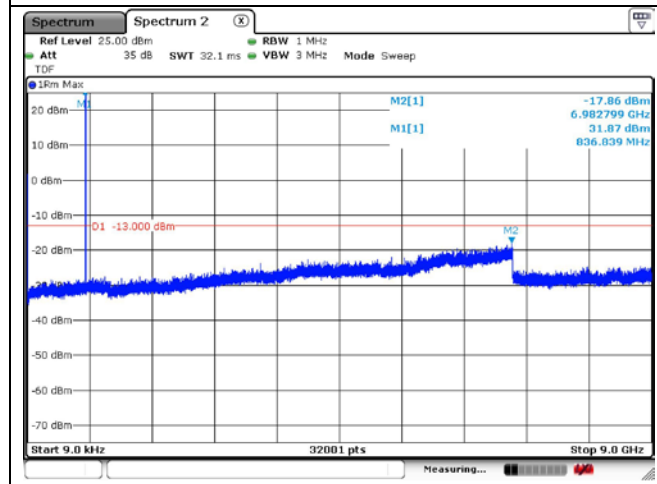


WCDMA V RMC High channel

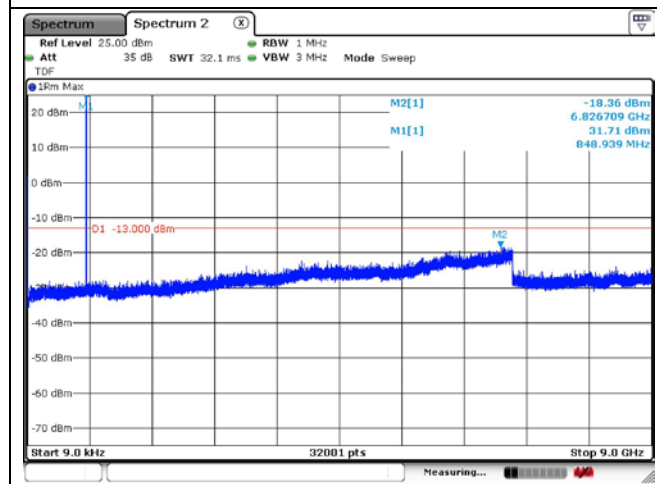
GSM 850



GSM 850 VOICE Low Channel

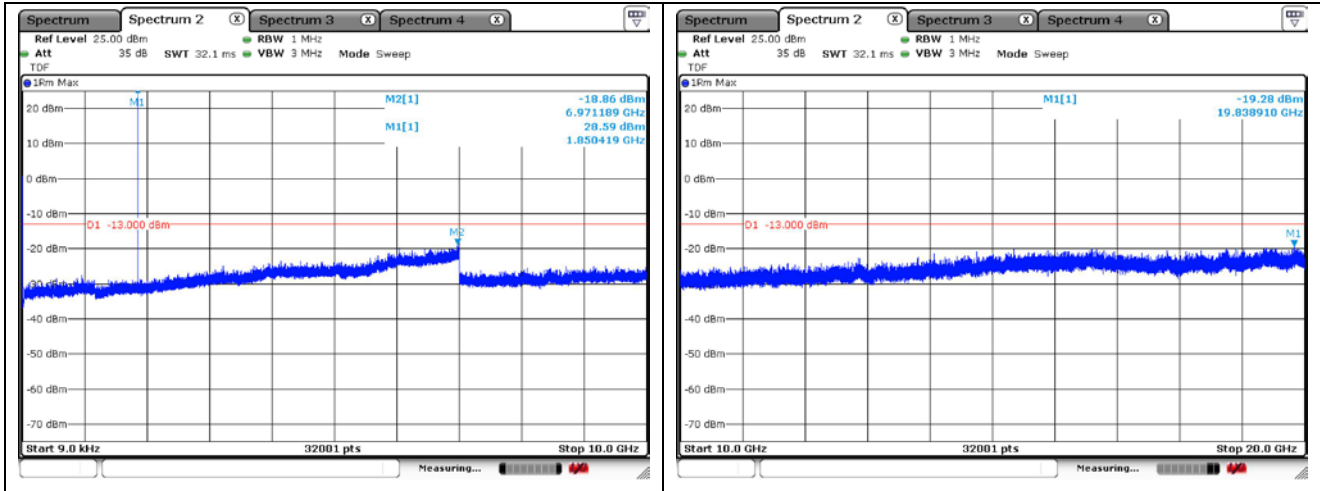


GSM 850 VOICE Middle Channel

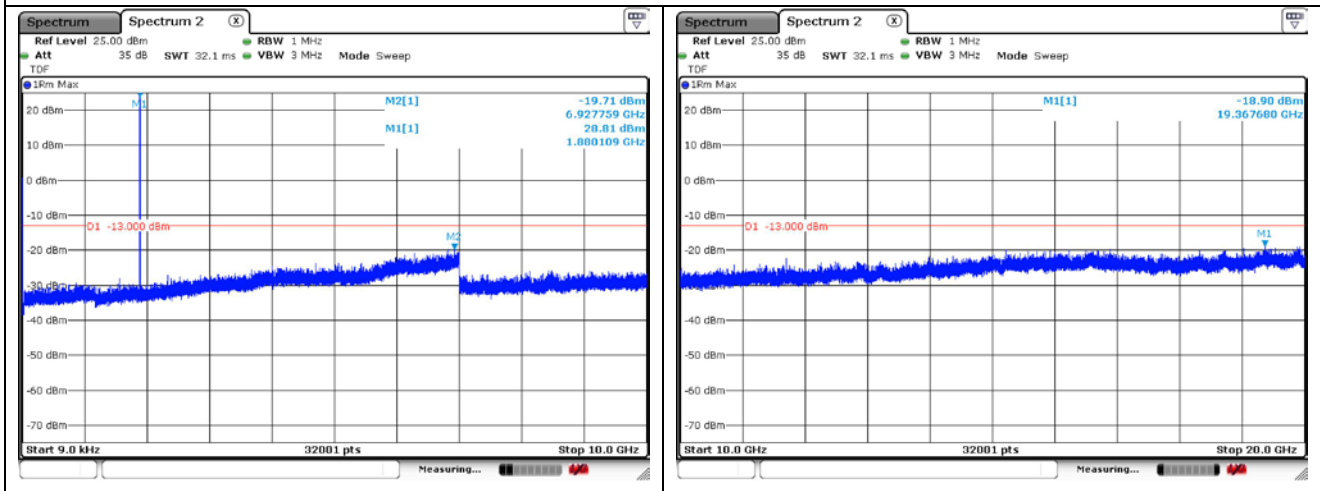


GSM 850 VOICE High Channel

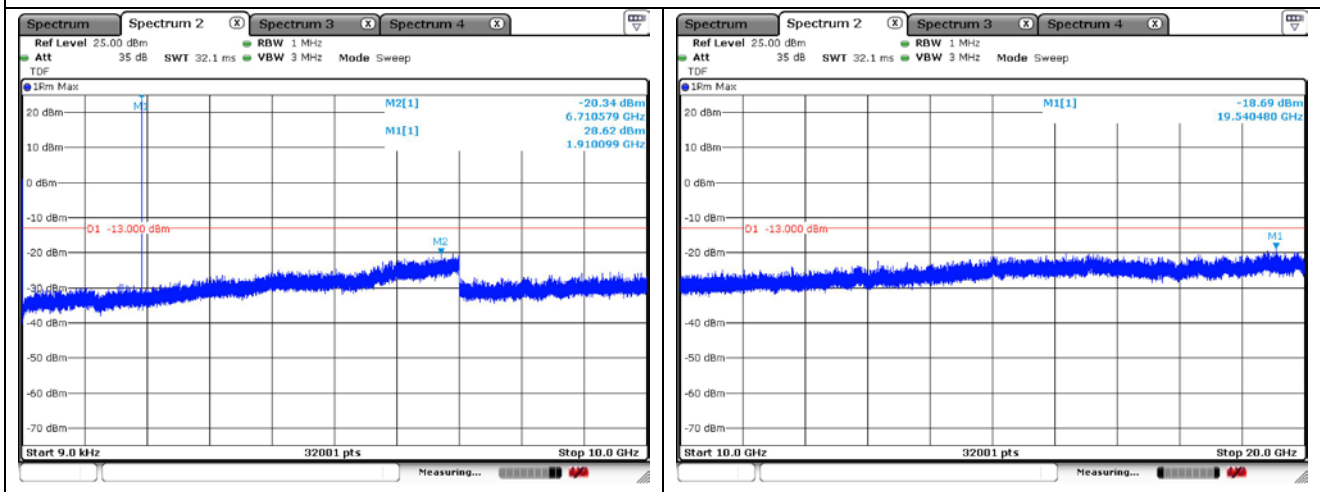
GSM 1900



GSM 1900 VOICE Low Channel



GSM 1900 VOICE Middle Channel



GSM 1900 VOICE High Channel

7. Band Edge

7.1. Limit

- §22.917(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

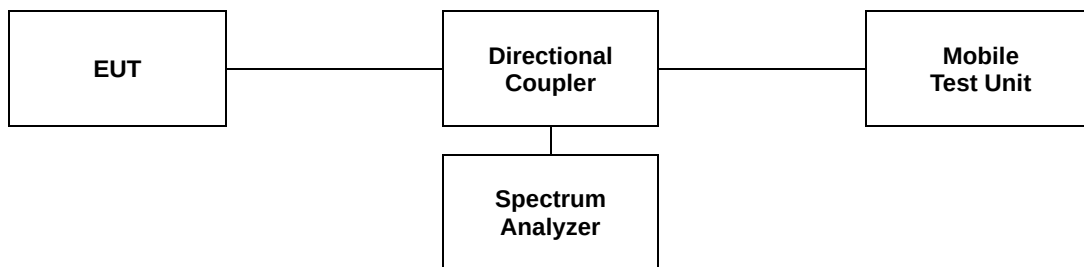
- §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

7.2. Test Procedure

The test follows section 5.7 of ANSI C63.26-2015.

- Span was set large enough so as to capture all out of band emissions near the band edge.
- $RBW \geq 1\%$ of OBW
- $VBW \geq 3 \times RBW$.
- Detector = RMS.
- Trace mode = Average.
- Sweep time = Auto.
- The trace was allowed to stabilize.
- All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function.

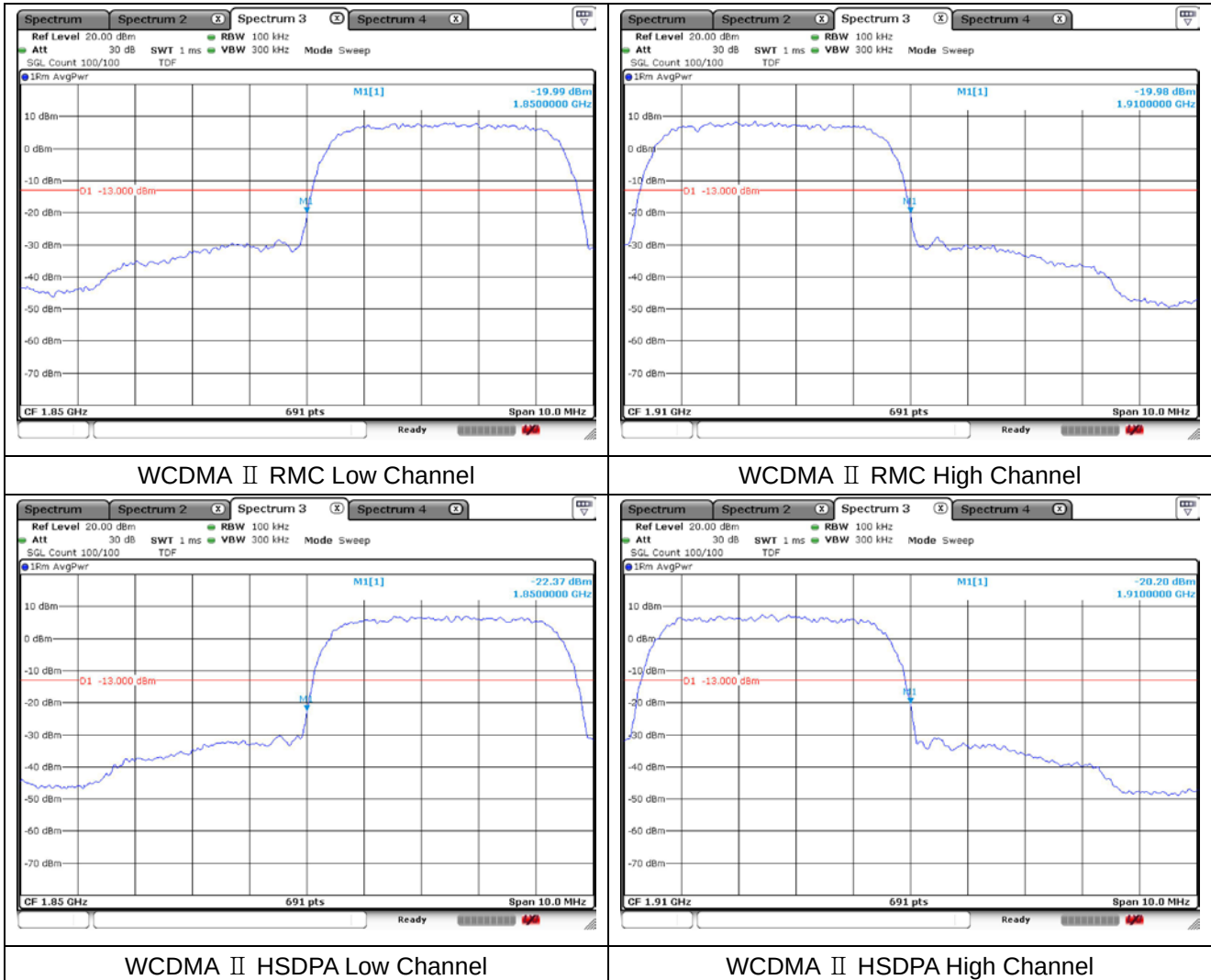


7.3. Test Results

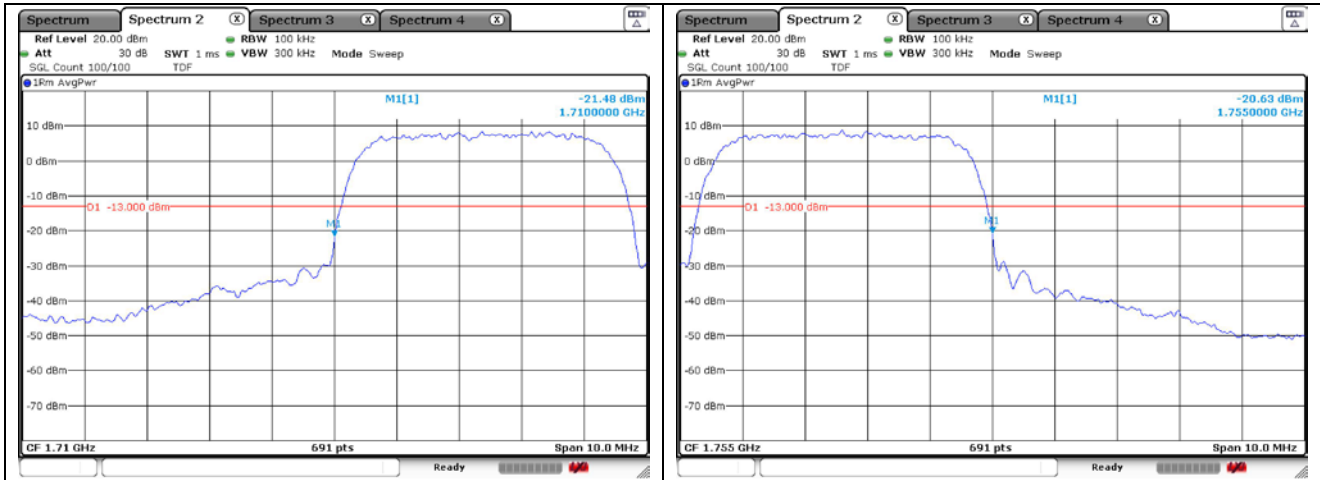
Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

- Test plots

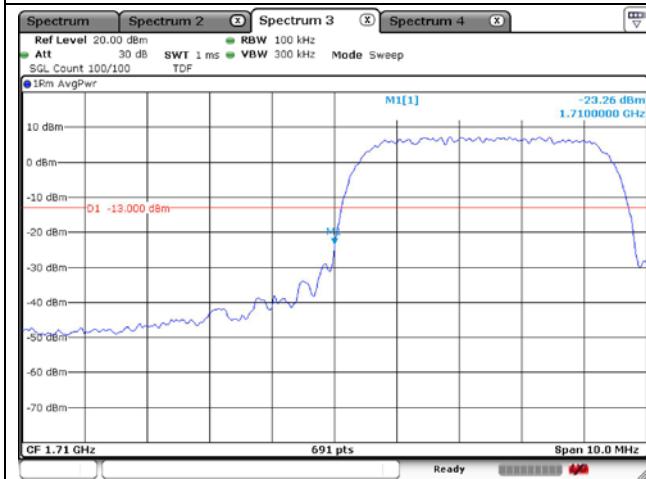
WCDMA II



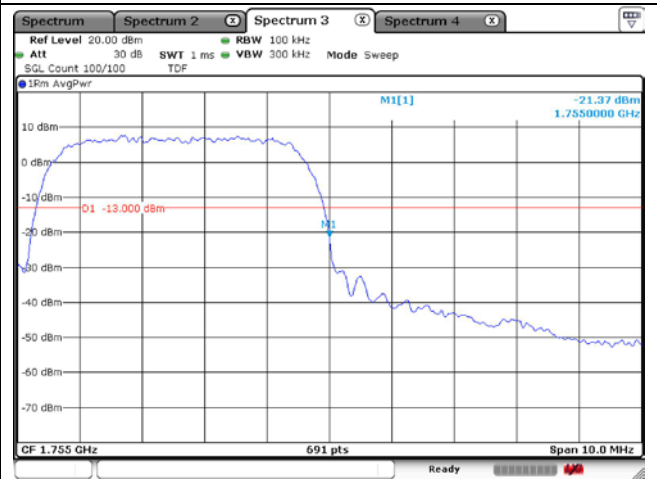
WCDMA IV



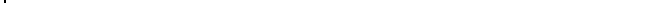
WCDMA IV RMC Low Channel



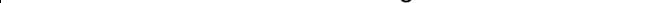
WCDMA IV RMC High Channel



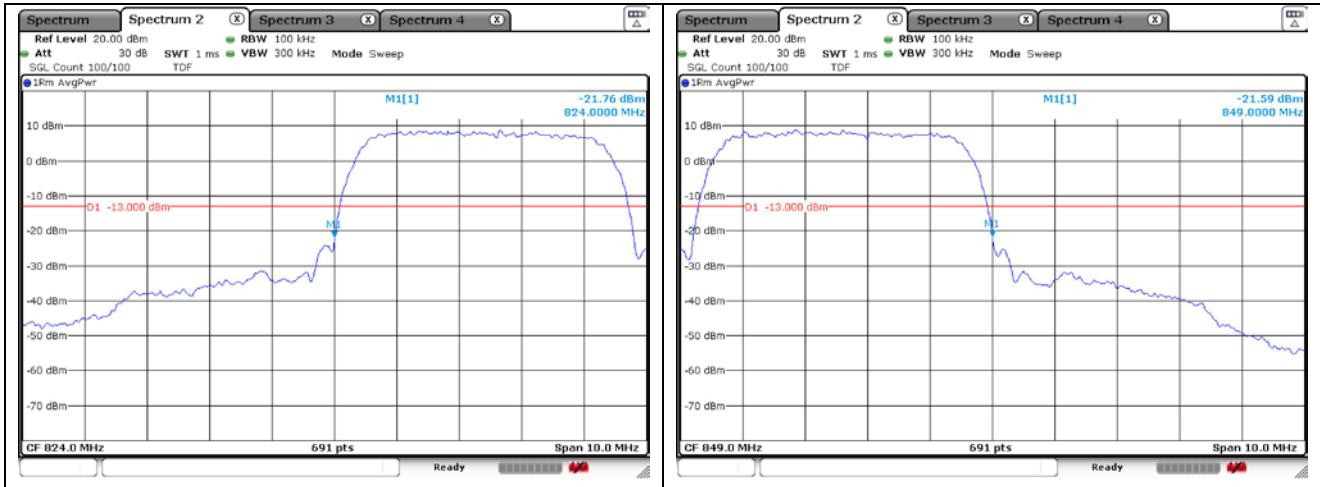
WCDMA IV HSDPA Low Channel



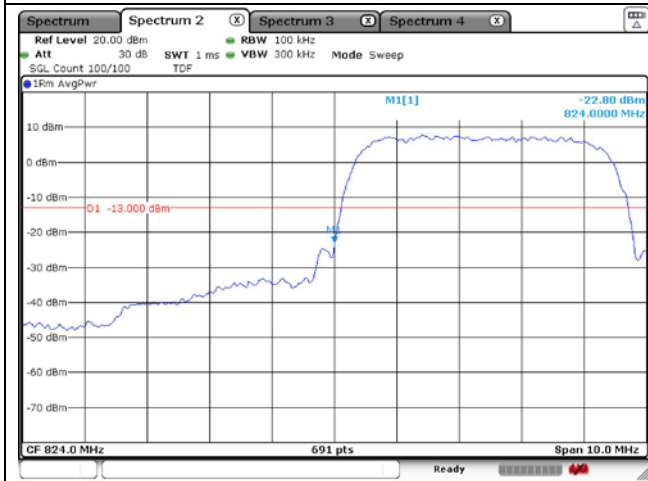
WCDMA IV HSDPA High Channel



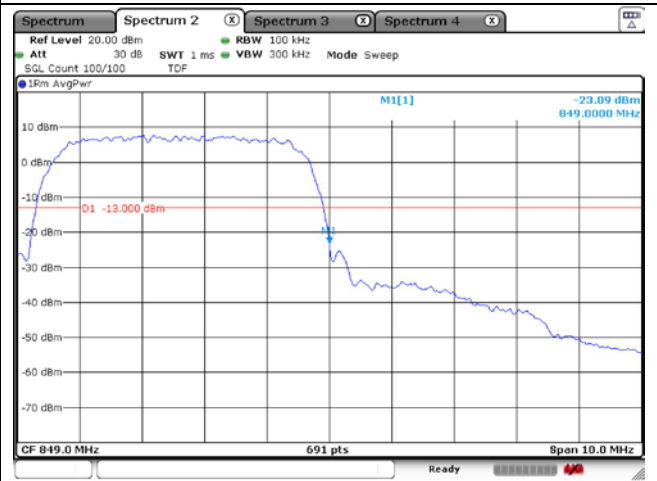
WCDMA V



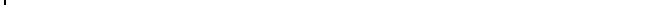
WCDMA V RMC Low Channel



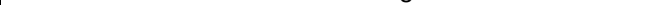
WCDMA V RMC High Channel



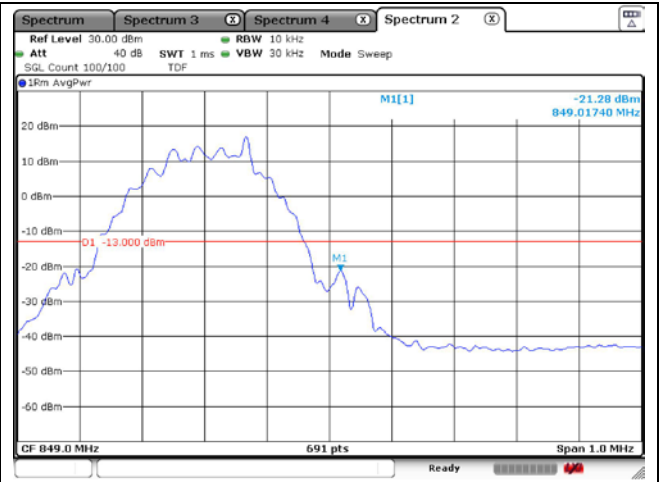
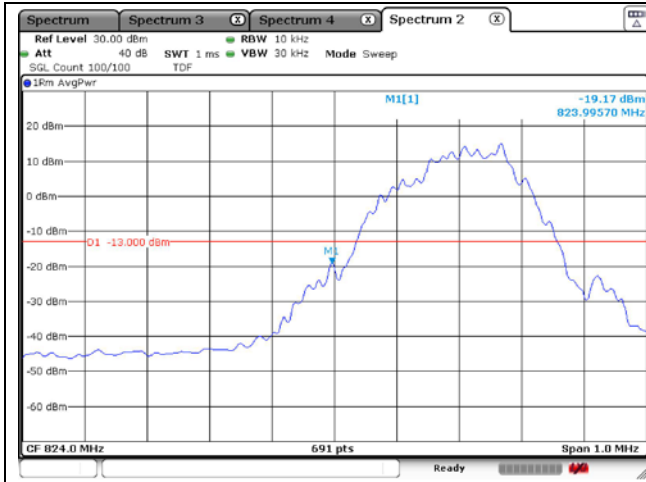
WCDMA V HSDPA Low Channel



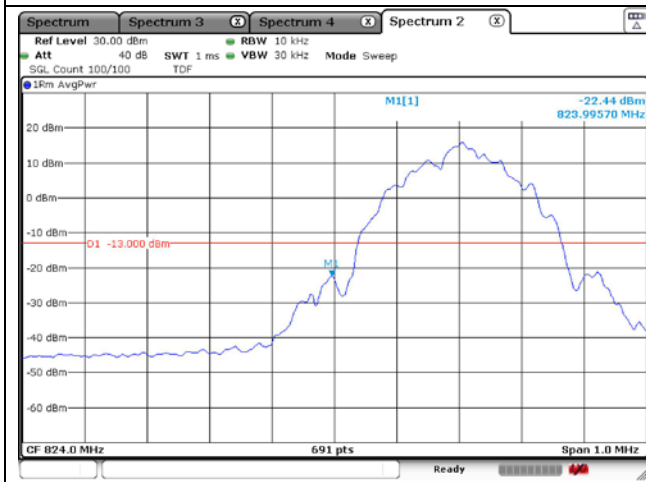
WCDMA V HSDPA High Channel



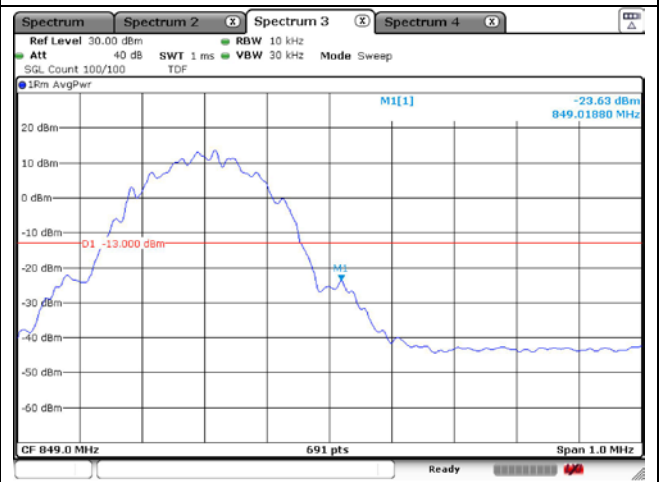
GSM 850



GSM 850 VOICE Low Channel



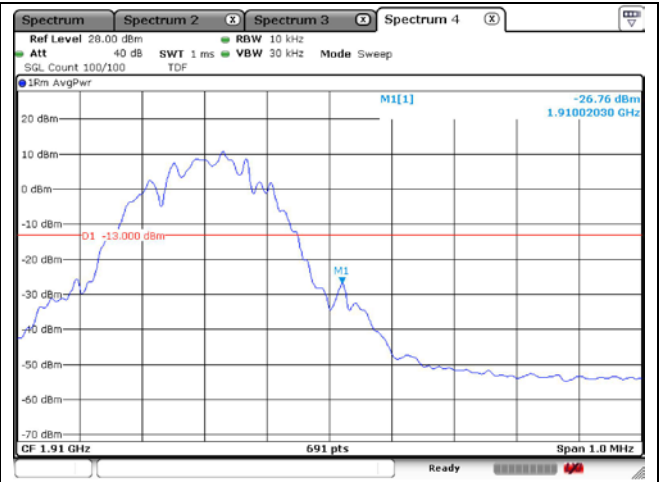
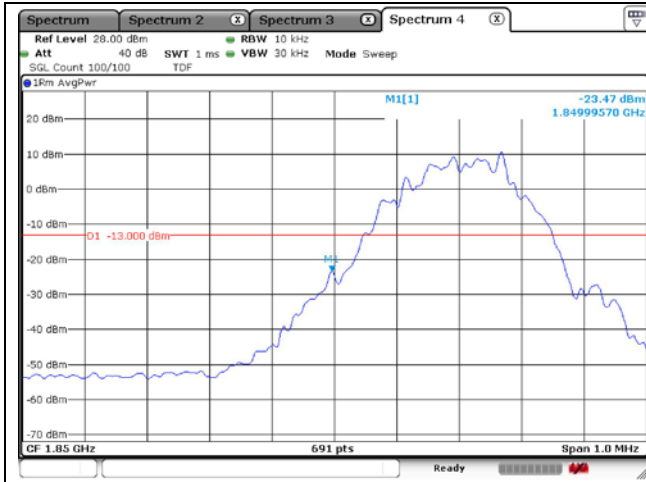
GSM 850 VOICE High Channel



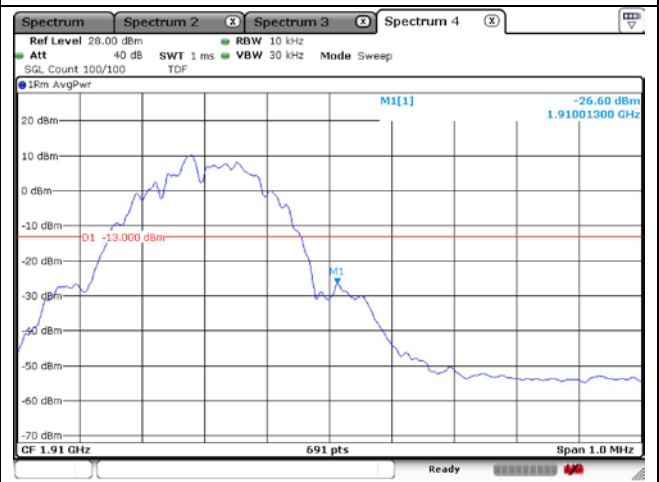
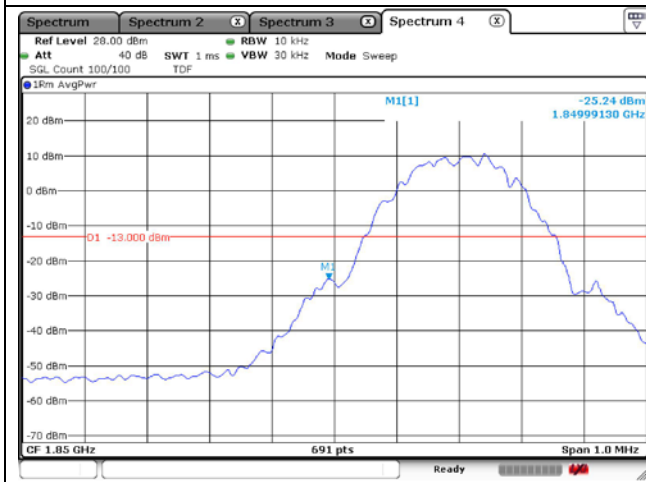
GSM 850 EDGE Low Channel

GSM 850 EDGE High Channel

GSM 1900



GSM 1900 VOICE Low Channel



GSM 1900 EDGE Low Channel

GSM 1900 EDGE High Channel

8. Frequency Stability

8.1. Limit

- § 2.1055 (a), § 2.1055 (d) & following:

- §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.

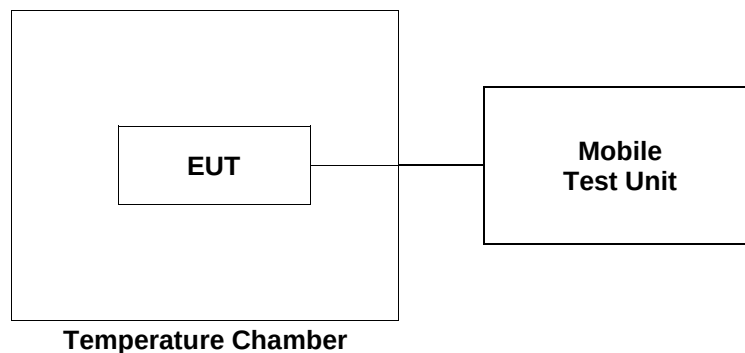
For Mobile devices operating in the 824 to 849 MHz band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.

- §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

- §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

8.2. Test Procedure

1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
2. The EUT was placed inside the temperature chamber.
3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.



8.3. Test Results

Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

WCDMA II mode at middle channel

Reference Frequency: 1 880.0 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	12.5	15.64	0.001 00
40		-11.47	-0.013 42
30		16.82	0.001 63
20(Ref.)		13.76	-
10		15.81	0.001 09
0		-14.90	-0.015 24
-10		16.51	0.001 46
-20		11.62	-0.001 14
-30		-16.20	-0.015 94
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	10.63 (85%)	-13.82	-0.014 67
	14.38 (115%)	16.72	0.001 57

WCDMA IV mode at middle channel

Reference Frequency: 1 732.6 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	12.5	13.97	0.000 43
40		-12.04	-0.014 58
30		10.50	-0.001 57
20(Ref.)		13.22	-
10		14.74	0.000 88
0		10.89	-0.001 34
-10		14.95	0.001 00
-20		-12.82	-0.015 03
-30		14.82	0.000 92
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	10.63 (85%)	-12.89	-0.015 07
	14.38 (115%)	15.66	0.001 41

WCDMA V mode at middle channel

Reference Frequency: 836.6 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	12.5	-10.93	-0.028 15
40		11.84	-0.000 93
30		11.99	-0.000 75
20(Ref.)		12.62	-
10		11.27	-0.001 61
0		-16.28	-0.034 54
-10		12.47	-0.000 18
-20		13.63	0.001 21
-30		13.66	0.001 24
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	10.63 (85%)	11.43	-0.001 42
	14.38 (115%)	12.54	-0.000 10

GSM 850 mode at middle channel

Reference Frequency: 836.6 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	12.5	13.47	0.001 45
40		-10.09	-0.026 72
30		14.37	0.002 52
20(Ref.)		12.26	-
10		10.35	-0.002 28
0		16.02	0.004 49
-10		14.16	0.002 27
-20		11.23	-0.001 23
-30		-10.62	-0.027 35
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	10.63 (85%)	-4.67	-0.020 24
	14.38 (115%)	11.43	-0.000 99

GSM 1900 mode at middle channel

Reference Frequency: 1 880.0 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	12.5	11.23	-0.000 24
40		14.13	0.001 30
30		-14.97	-0.014 18
20(Ref.)		11.68	-
10		10.51	-0.000 62
0		16.73	0.002 69
-10		-14.74	-0.014 05
-20		11.35	-0.000 18
-30		11.36	-0.000 17
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	10.63 (85%)	14.19	0.001 34
	14.38 (115%)	-15.26	-0.014 33

- End of the Test Report -