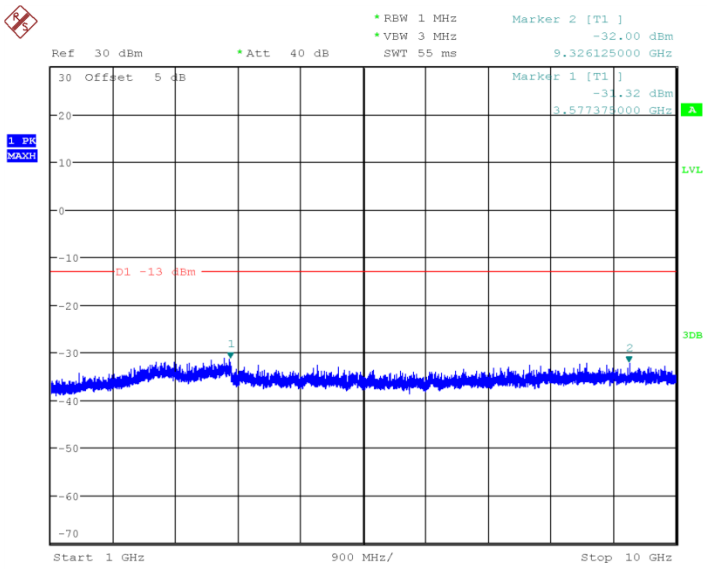
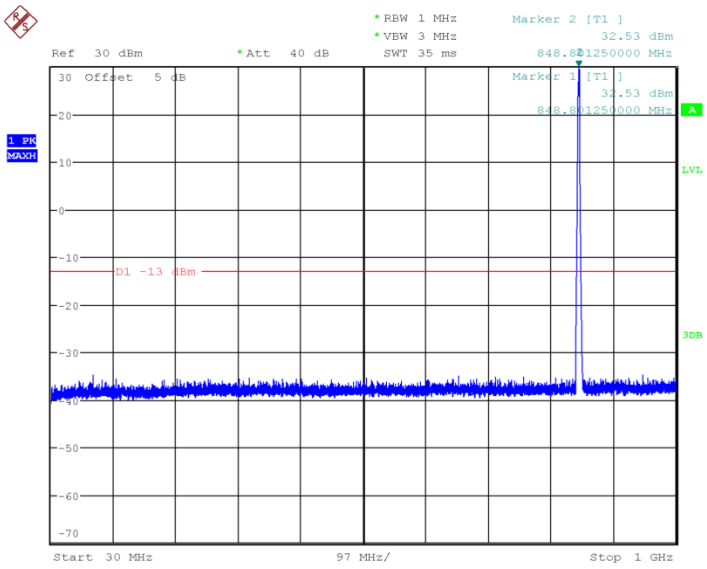
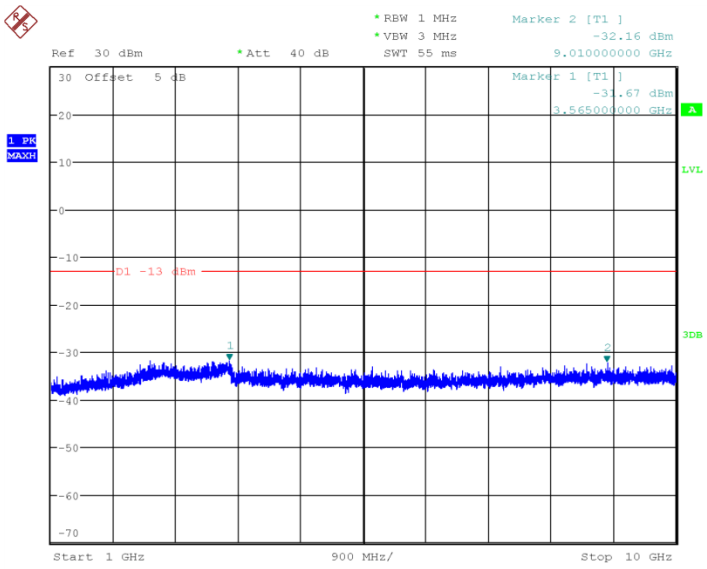


Channel 189: 1GHz~10GHz

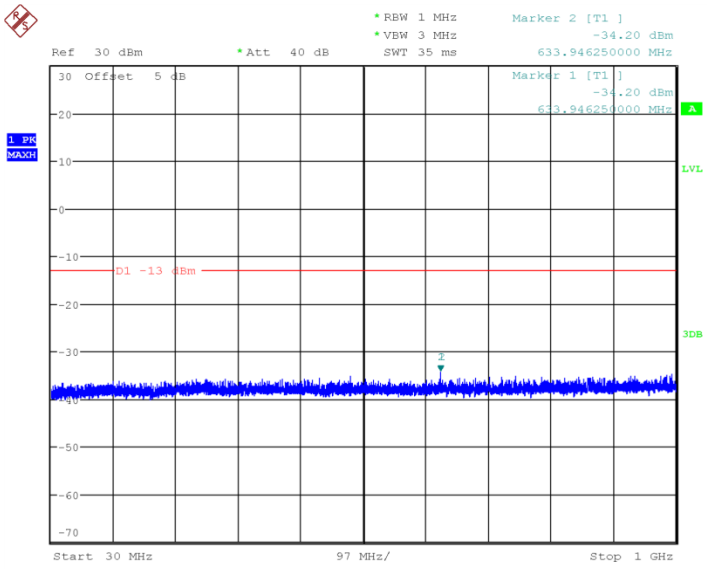


Channel 251: 30MHz~1GHz

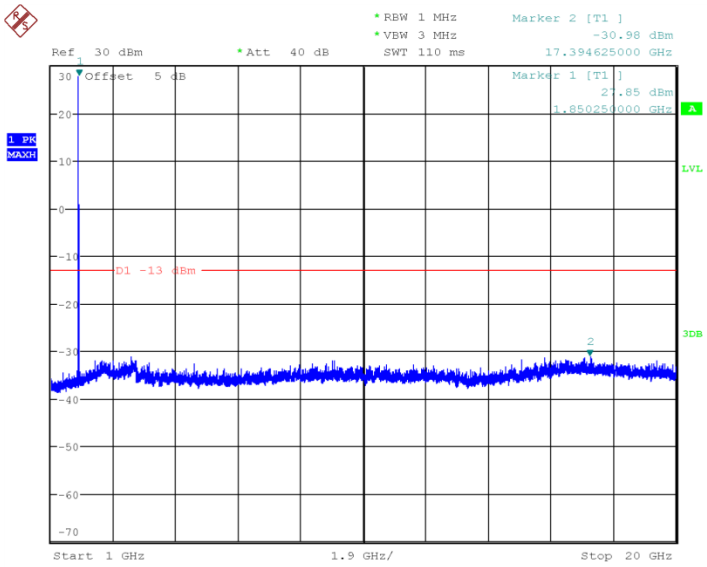


Channel 251: 1GHz~10GHz

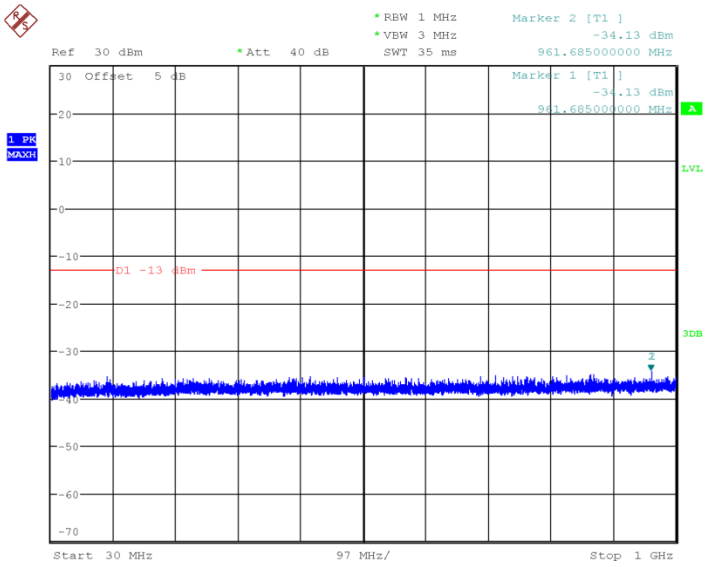
A7.1.2.2. GSM1900



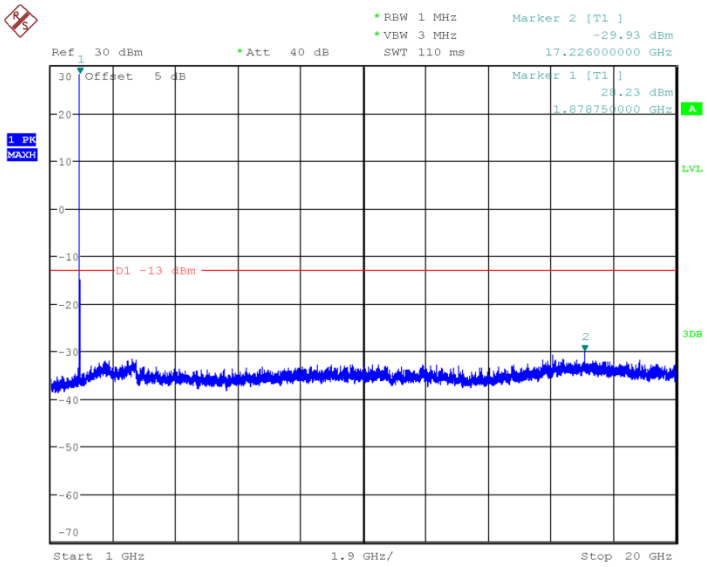
Channel 512: 30MHz~1GHz



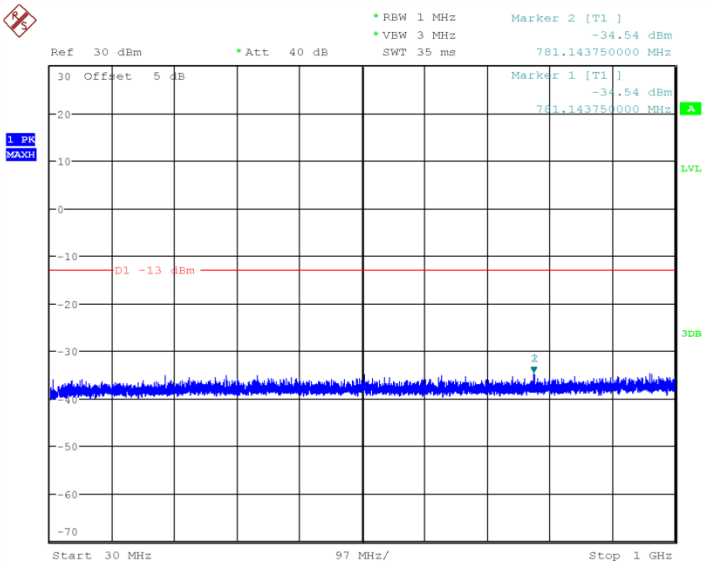
Channel 512: 1GHz~20GHz



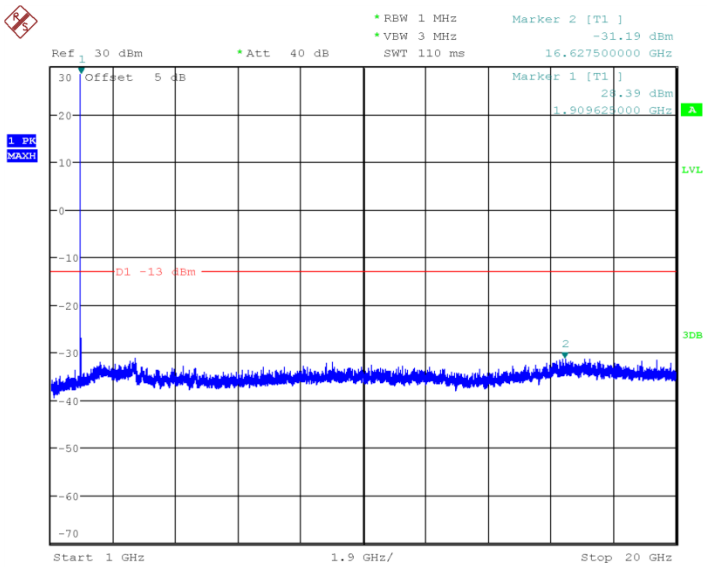
Channel 661: 30MHz~1GHz



Channel 661: 1GHz~20GHz



Channel 810: 30MHz~1GHz



Channel 810: 1GHz~20GHz

Conclusion: PASS

A7.2. WCDMA Measurement Method and test procedures

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

1. 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 WCDMA Band II, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For WCDMA Band V, data taken from 30 MHz to 10GHz.

2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.

3. The procedure to get the conducted spurious emission is as follows:

The trace mode is set to MaxHold to get the highest signal at each frequency;

Wait 25 seconds;

Get the result.

4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

WCDMA Band II Transmitter

Channel	Frequency (MHz)
9262	1852.40
9400	1880.00

9538	1907.60

WCDMA Band V Transmitter

Channel	Frequency (MHz)
4132	826.40
4183	836.60
4233	846.60

A 7.2.1. Measurement Limit

Part 24.238 and Part 22.917 specify that 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.

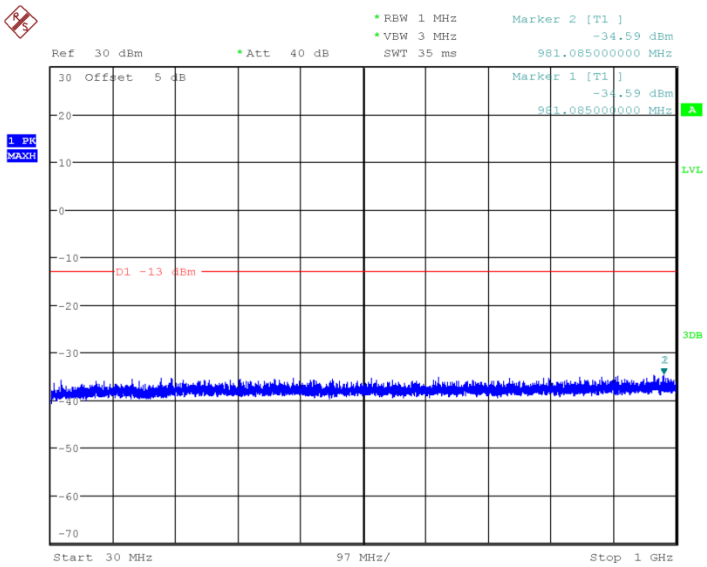
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. 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.

A 7.2.2. Measurement result

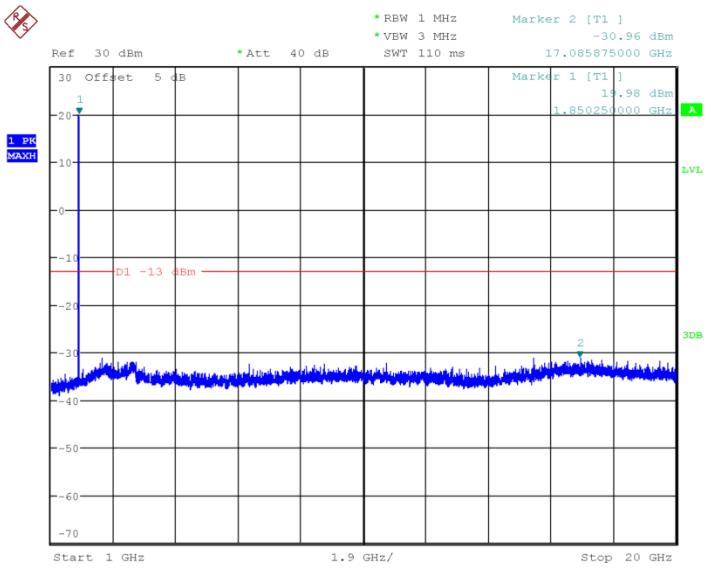
Spurious emission limit -13dBm.

Note: peak above the limit line is the carrier frequency.

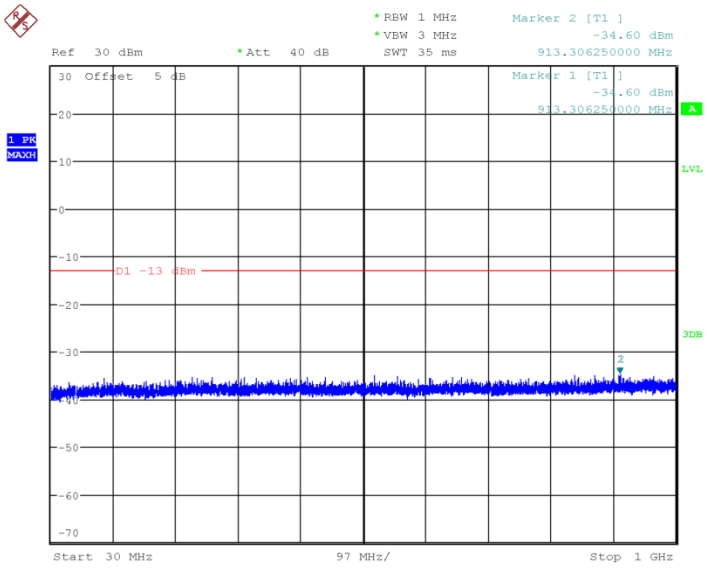
A 7.2.2.1. WCDMA Band II



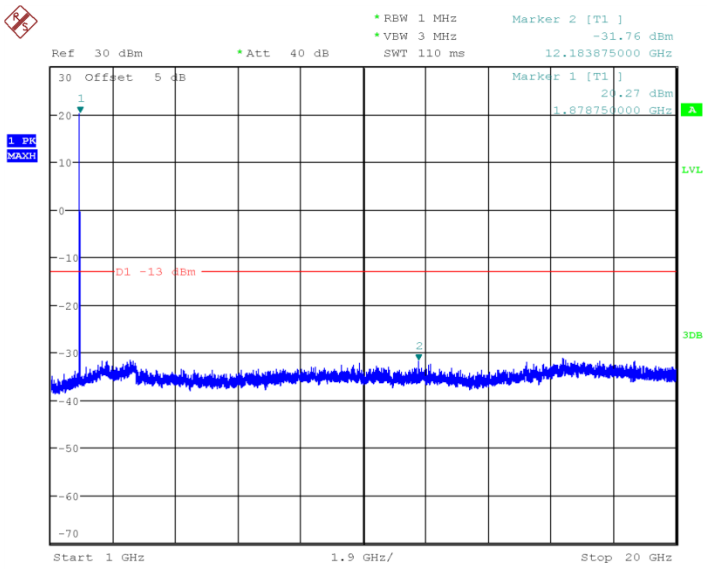
Channel 9262: 30MHz~1GHz



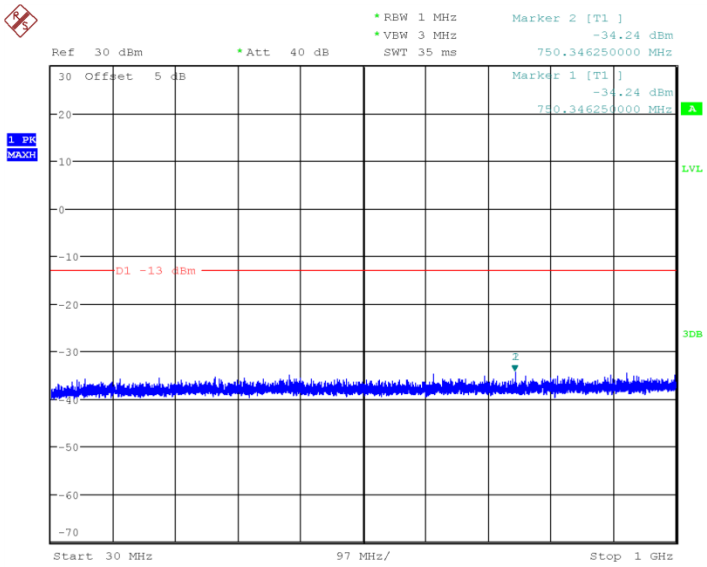
Channel 9262:1GHz~20GHz



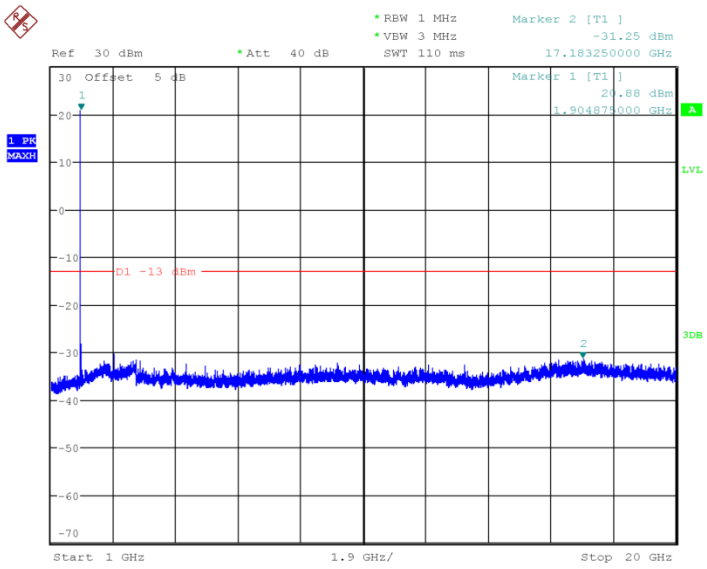
Channel 9400: 30MHz~1GHz



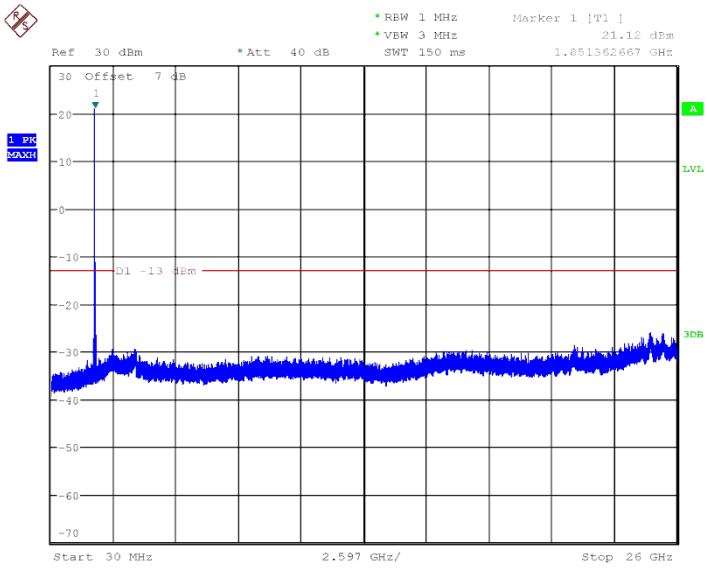
Channel 9400:1GHz~20GHz



Channel 9538: 30MHz~1GHz



Channel 9538:1GHz~20GHz



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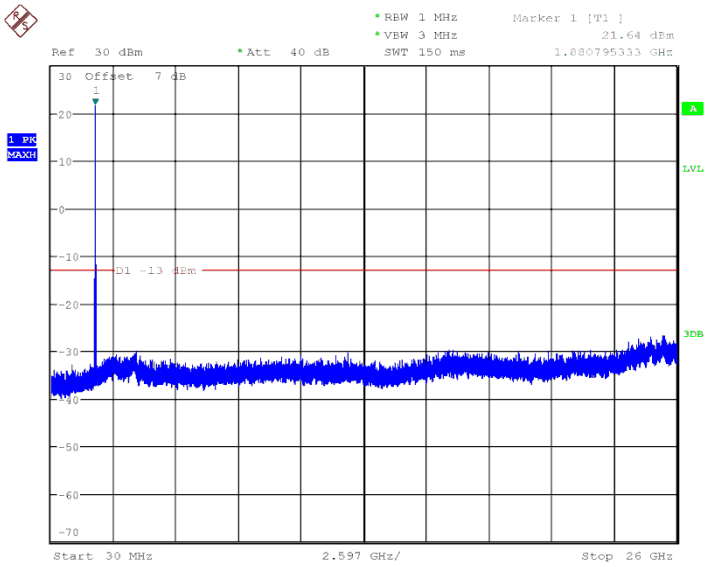
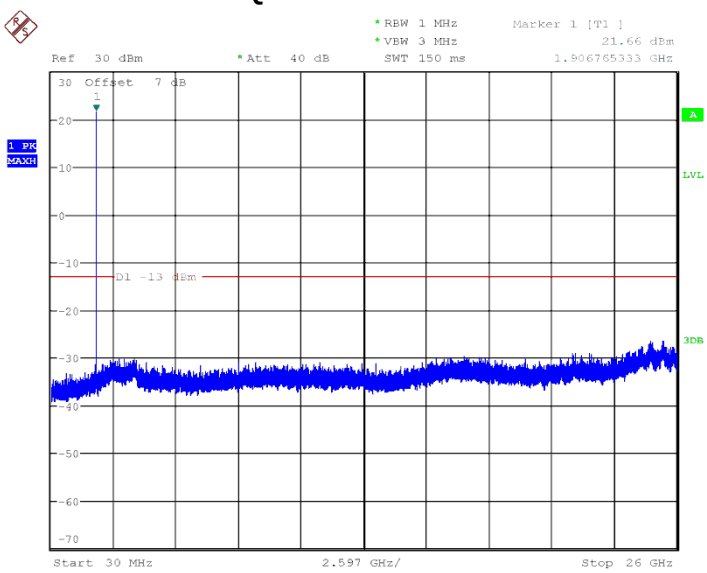
HSUPA 16QAM Channel 9262 30MHz~26GHz



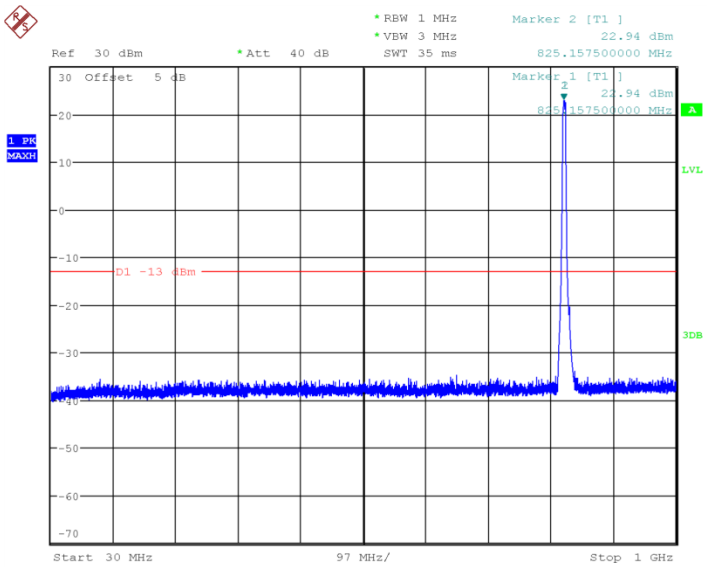
HSUPA 16QAM Channel 9400 30MHz~26GHz



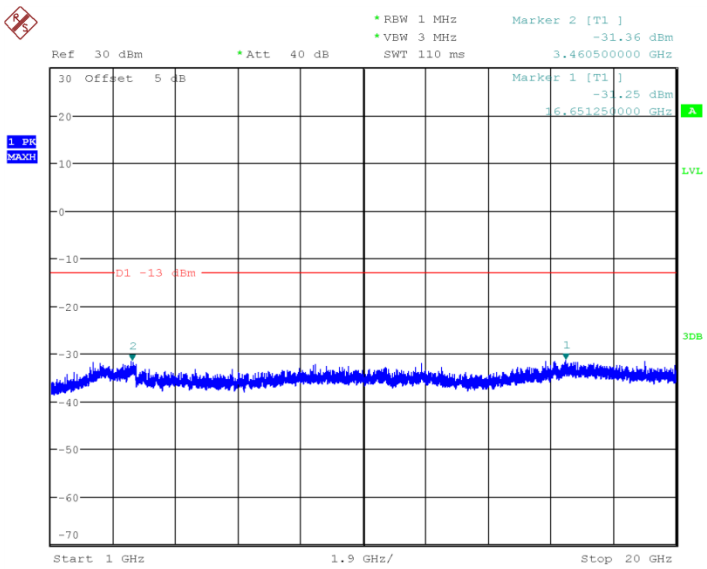
HSUPA 16QAM Channel 9538 30MHz~26GHz

Conclusion: PASS

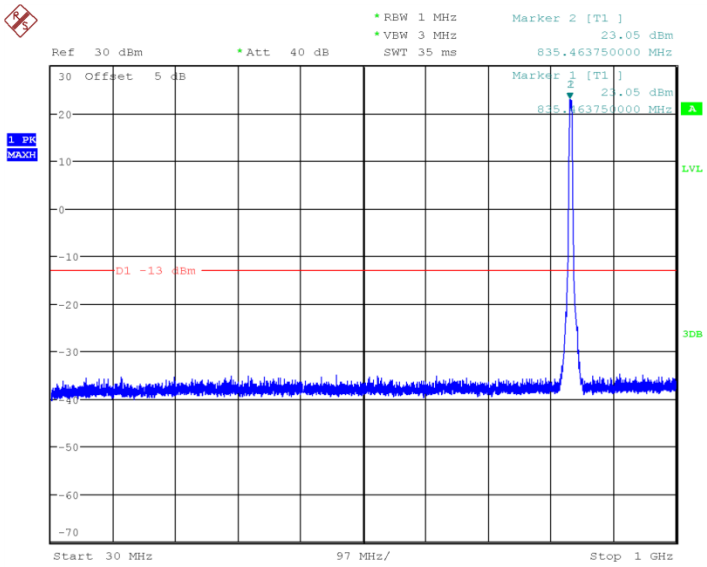
A 7.2.2.1. WCDMA Band V



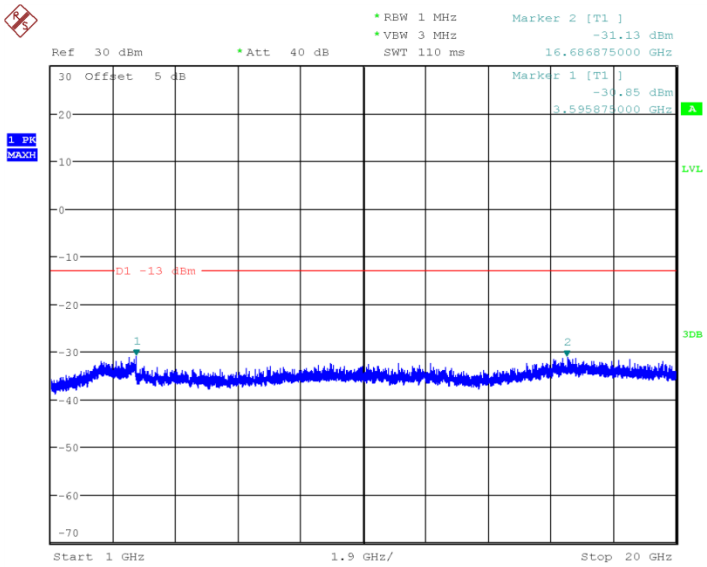
Channel 4132: 30MHz~1GHz



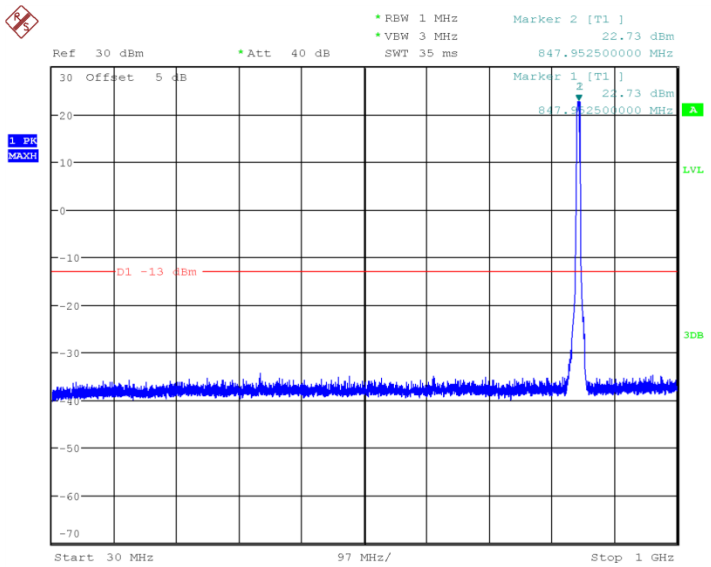
Channel 4132:1GHz~20GHz



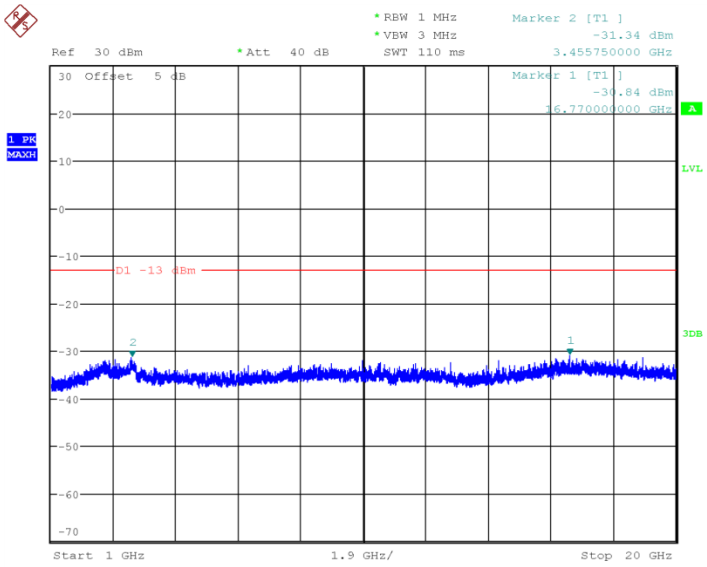
Channel 4183: 30MHz~1GHz



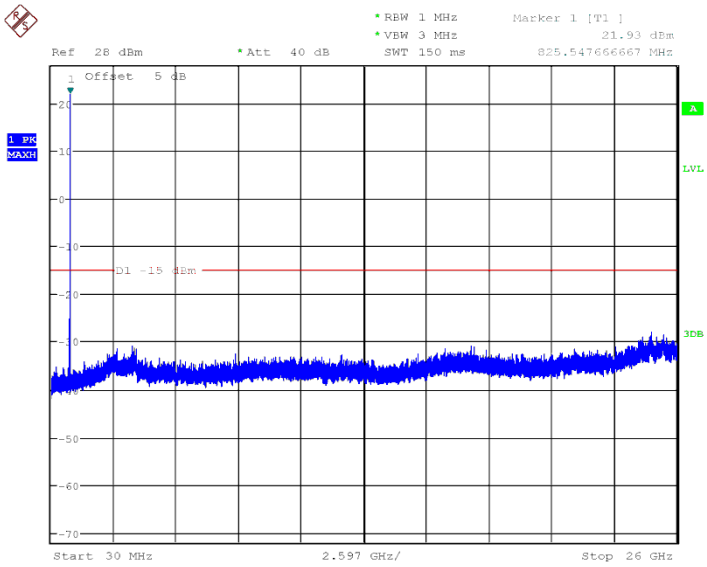
Channel 4183:1GHz~20GHz



Channel 4233: 30MHz~1GHz



Channel 4233:1GHz~20GHz



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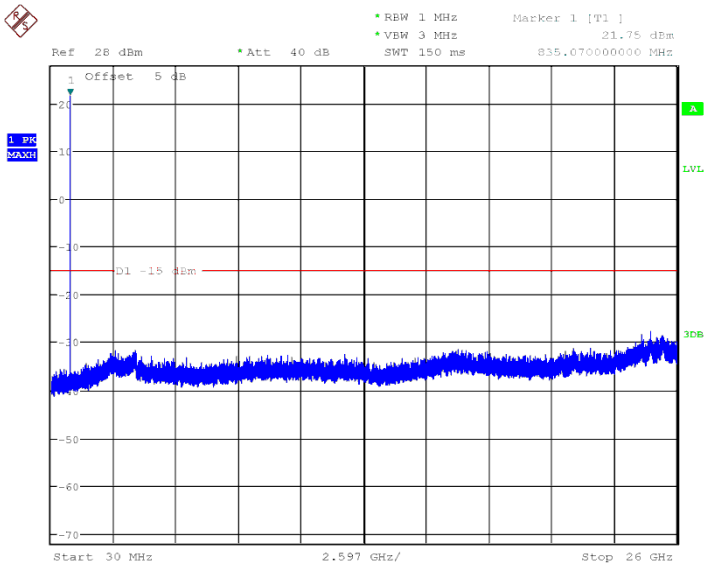
HSUPA 16QAM Channel 4132 30MHz~26GHz



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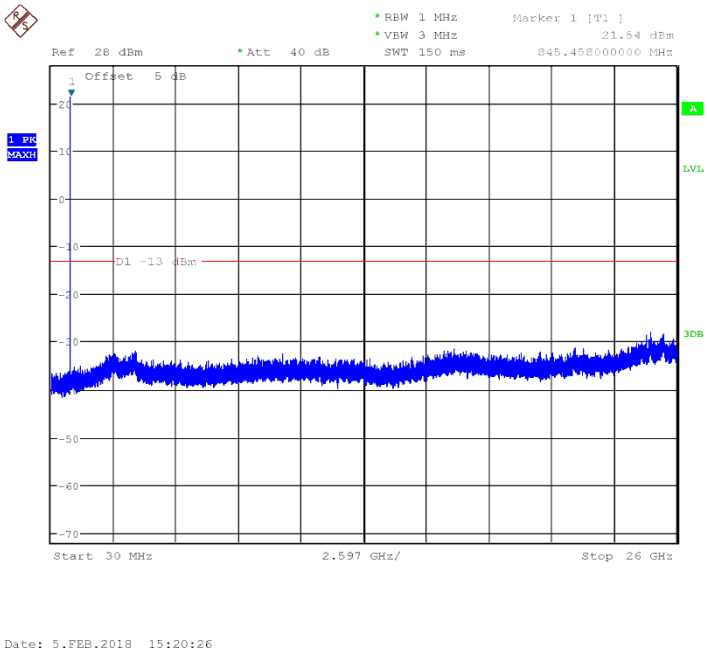
HSUPA 16QAM Channel 4180 30MHz~26GHz



HSUPA 16QAM Channel 4233 30MHz~26GHz

Conclusion: PASS

ANNEX A.8. RADIATED

A.8.1. ERP

A.8.1.1. GSM ERP

A.8.1.1.1. Description

This is the test for the maximum radiated power from the EUT.

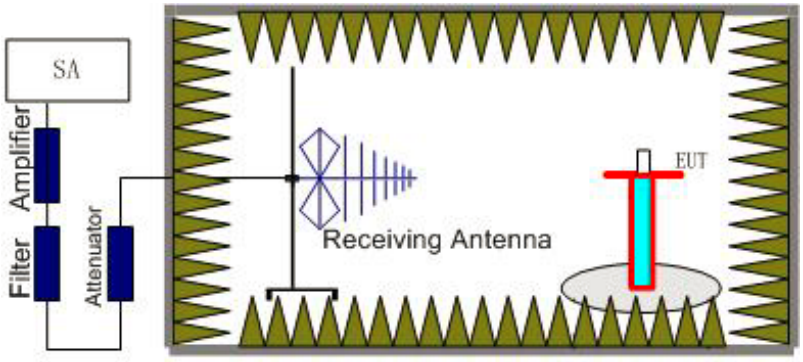
Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power"and 24.232(c) specifies that "Peak transmit power must be measured over any interval ofcontinuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."Rule Part 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters must

not exceed 7 Watts.”

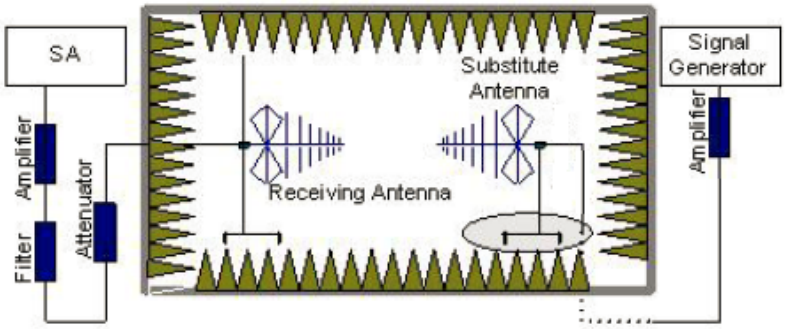
A.8.1.1.2. Method of Measurement

The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from thereceive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUTfor emission measurements. The height of receiving antenna is 1.5m. The test setup refers tofigure below. Detected emissions were maximized at each frequency by rotating the EUTthrough 360° and adjusting the receiving antenna polarization. The radiated emissionmeasurements of all transmit frequencies in three channels (High, Middle, Low) weremeasured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level duringthe test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at thereference point of the chamber. An RF Signal source for the frequency band of interest isconnected to the substitution antenna with a cable that has been constructed to not interferewith the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of thesubstitution antenna, and adjust the level of the signal generator output until the value of thereceiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. Thetest should be performed by rotating the test item and adjusting the receiving antennapolarization.
4. A amplifier should be connected to the Signal Source output port. And the cable should beconnect between the Amplifier and the Substitution Antenna.
The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should berecorded after test.
The measurement results are obtained as described below:
Power(EIRP)=P_{Mea}+ P_{Ag}- P_{cl}+ G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

A.8.1.1.3 GSM 850-ERP 22.913(a)

A.8.1.1.3.1 Limits

	Power Step	Burst Peak ERP (dBm)

GSM	5	≤38.45dBm (7W)
GPRS	3	≤38.45dBm (7W)
EDGE	6	≤38.45dBm (7W)

A.8.1.1.3.2 Measurement result

GSM(GMSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-4.48	3.1	37	3.11	32.53	H
836.6	-3.94	3.1	37	3.11	33.07	H
848.8	-3.62	3.1	37	3.11	33.39	H

GPRS(GMSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-4.44	3.1	37	3.11	32.57	H
836.6	-3.86	3.1	37	3.11	33.15	H
848.8	-3.54	3.1	37	3.11	33.47	H

EDGE(8PSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-10.88	3.1	37	3.11	26.13	H
836.6	-10.26	3.1	37	3.11	26.75	H
848.8	-10.27	3.1	37	3.11	26.74	H

Frequency: 824.2MHz

Peak ERP(dBm)= P_{Mea}(-4.48dBm) - P_{cl}(3.1dB) +P_{Ag}(37dB) + G_a(3.11dBd)

= 32.53dBm

Note: ANALYZER SETTINGS: RBW = VBW = 3MHz

A.8.1.1.4 PCS 1900-EIRP 24.232(c)

A.8.1.1.4.1 Limits

	Power Step	**Burst Peak ERP (dBm)**

GSM	5	≤38.45dBm (7W)
GPRS	3	≤38.45dBm (7W)
EDGE	6	≤38.45dBm (7W)

A.8.1.1.4.2 Measurement result

GSM(GMSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-6.98	4.6	36.8	4.7	32.07	V
1880.0	-4.62	4.6	36.8	4.7	32.28	H
1909.8	-7.12	4.7	36.8	4.7	31.83	V

GPRS(GMSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-6.13	4.6	36	4.7	32.12	V
1880.0	-3.44	4.6	35.6	4.7	32.26	H
1909.8	-6.37	4.7	36	4.7	31.78	V

EDGE(8PSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-10.7	4.6	36	4.7	27.55	V
1880.0	-8.19	4.6	35.6	4.7	27.51	H
1909.8	-11.39	4.7	36	4.7	26.76	V

Frequency: 1850.2MHz

Peak EIRP(dBm)= P_{Mea}(-6.98dBm) - P_{cl}(4.6dB)+ P_{Ag}(36dB) +G_a(4.7dB)+2.15=32.07dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

A.8.1.2. WCDMA ERP

A.8.1.2.1. Description

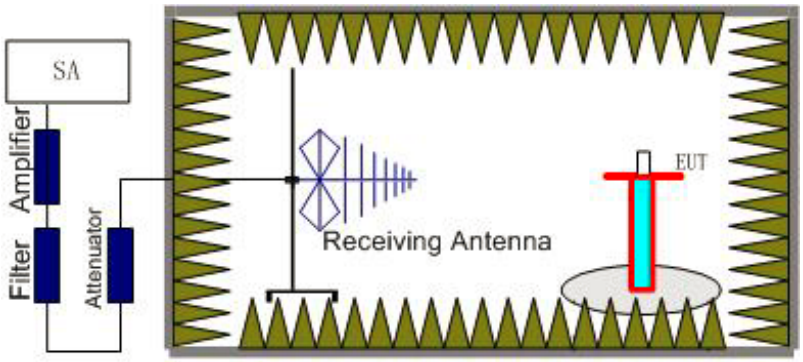
This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power"and 24.232(c) specifies that "Peak transmit power must be measured over any interval ofcontinuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."Rule Part 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters mustnot exceed 7 Watts.”

A.8.1.2.2. Method of Measurement

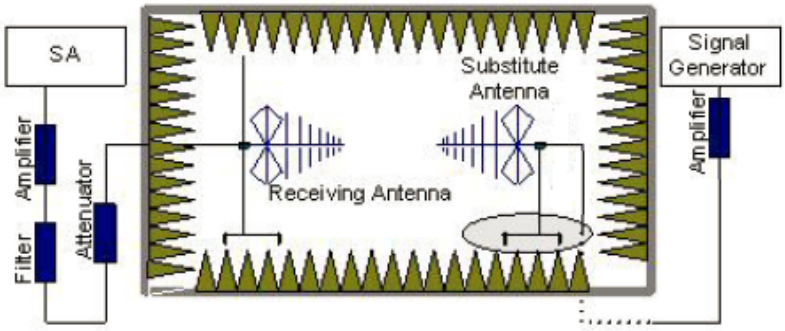
The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from thereceive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUTfor emission measurements. The height of receiving antenna is 1.5m. The test setup refers tofigure below. Detected emissions were maximized at each frequency by rotating the EUTthrough 360° and adjusting the receiving antenna polarization. The radiated emissionmeasurements of all transmit frequencies in three channels (High, Middle, Low) weremeasured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should be

connect between the Amplifier and the Substitution Antenna.
The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
The measurement results are obtained as described below:
Power(EIRP)=P_{Mea}+ P_{Ag} -P_{cl}+ G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

A.8.1.2.3.1 WCDMA Band II-ERP

	Burst Peak EIRP (dBm)
WCDMA Band II	≤33dBm (2W)

A.8.1.2.3.2 Measurement result

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1852.4	-21.47	3.54	43.8	2.9	21.69	V
1880.0	-21.11	3.54	43.8	2.9	22.05	H
1907.6	-20.28	3.54	43.8	2.9	22.88	V

Frequency: 1852.40MHz
Peak EIRP(dBm)= P_{Mea}(-21.47dBm)- P_{cl}(3.54dB)+ P_{Ag}(43.8dB)+G_a(2.9dBi) =21.69dBm
ANALYZER SETTINGS: RBW = VBW = 5MHz

A.8.1.2.4.1 Limits

	Burst Peak EIRP (dBm)
WCDMA Band V	≤38.45dBm (7W)

A.8.1.2.4.2 Measurement result

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBd)	PeakERP(dBm)	Polarization
826.4	-16.15	3.1	37	2.9	22.80	H
836.6	-13.74	3.1	37	2.9	23.06	H
846.6	-15.17	3.1	37	2.9	23.78	H

Frequency: 826.4 MHz
Peak ERP(dBm)= P_{Mea}(-16.15dBm)- P_{cl}(3.1dB)+P_{Ag}(37dB)+G_a(2.9dBd)=22.80dBm
ANALYZER SETTINGS: RBW = VBW = 5MHz

A.8.1.2.5.1 HSUPA 16QAM Band II-ERP

	Burst Peak EIRP (dBm)
HSUPA 16QAM Band II	≤33dBm (2W)

A.8.1.2.5.2 Measurement result

Frequency (MHz)	P_{Mea}(dBm)	P_{Cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1852.4	-25.39	3.54	43.8	2.9	19.92	V
1880.0	-22.29	3.54	43.8	2.9	20.87	H
1907.6	-24.02	3.54	43.8	2.9	21.29	V

Frequency: 1852.40MHz

Peak EIRP(dBm)= P_{Mea}(-25.39.06dBm)- P_{Cl}(3.54dB)+ P_{Ag}(43.8dB)+G_a(2.9dBi) =19.92dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

A.8.1.2.6.1 Limits

	Burst Peak EIRP (dBm)
HSUPA 16QAM Band V	≤38.45dBm (7W)

A.8.1.2.6.2 Measurement result

Frequency (MHz)	P_{Mea}(dBm)	P_{Cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBd)	PeakERP(dBm)	Polarization
826.4	-16.04	3.1	37	2.9	20.76	H
836.6	-15.25	3.1	37	2.9	21.55	H
846.6	-14.38	3.1	37	2.9	22.42	H

Frequency: 826.4 MHz

Peak ERP(dBm)= P_{Mea}(-16.04dBm)- P_{Cl}(3.1dB)+P_{Ag}(37dB)+G_a(2.9dBd)=20.76dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

Note: the EUT was displayed in several different direction, the worst cases were shown.

A.8.2 EMISSION LIMIT (§2.1051/§22.917§24.238)

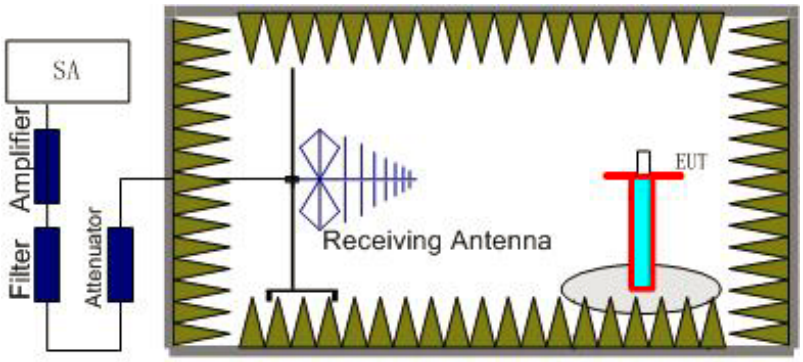
A.8.2.1 GSM Measurement Method

The measurement procedures in TIA-603E-2016are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

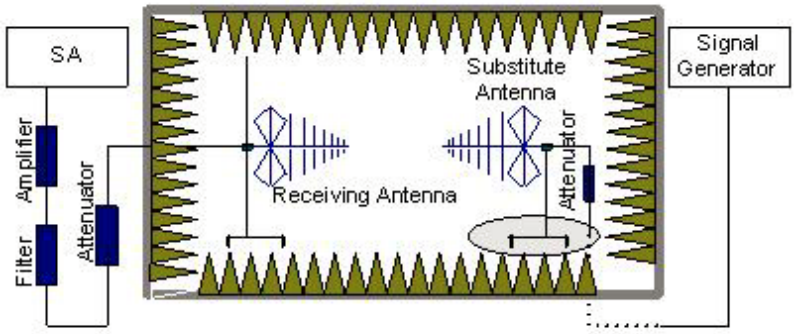
A.8.2.2 The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10thharmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.

A amplifier should be connected in for the test.

The Path loss (P_{pl}) is the summation of the cable loss .

The measurement results are obtained as described below:

Power(EIRP)=P_{Mea}- P_{pl}+ G_a

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi

A.8.2.3 Measurement Limit

Part 24.238 and Part 22.917 specify that 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.

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.

A.8.2.4 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) and GSM850 band (824.2MHz, 836.6MHz, 848.8MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS1900 ,GSM850 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

A.8.2.5 Measurement Results

Measurements results:

Frequency	Channel	Frequency Range	Result
GSM850	Low	30MHz~10GHz	P
	Middle	30MHz~10GHz	P
	High	30MHz~10GHz	P
GSM1900	Low	30MHz~20GHz	P
	Middle	30MHz~20GHz	P
	High	30MHz~20GHz	P
	High	30MHz~20GHz	P

GSM850

GSM Mode Channel 128

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1712.142857	-44.55	4.4	5	-43.95	-13	V
3182.307692	-48.66	6.1	6.8	-47.96	-13	V
4858.846154	-48.88	7.6	9.3	-47.18	-13	V
6504.615385	-47.88	9	10.6	-46.28	-13	V
7524.615385	-47.03	9.7	11.6	-45.13	-13	V
8296.923077	-47.51	10.1	12.4	-45.21	-13	H

Note:

GSM 850, CH128

Power(ERP)= Pmea-Pcl+Ga=-44.55-4.4+5=-43.95dbm

This method Applicable to the following table.

GSM Mode Channel 189

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1831.071429	-41.87	4.6	4.6	-41.87	-13	H
3211.153846	-48.7	6.1	6.8	-48	-13	V
4440	-49.06	7.3	8.8	-47.56	-13	V
6723.076923	-47.49	9.1	10.9	-45.69	-13	H
8483.076923	-46.34	10.3	12.5	-44.14	-13	V
9370.769231	-45.26	10.7	12.7	-43.26	-13	H

GSM Mode Channel 251

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1817.142857	-42.58	4.6	4.6	-42.58	-13	H
2623.928571	-37.22	5.5	5.8	-36.92	-13	V
4226.538462	-50.08	7.1	8.9	-48.28	-13	V
6632.307692	-47.34	9.1	10.9	-45.54	-13	H
8593.846154	-47.4	10.3	12.5	-45.2	-13	V
9390.769231	-45.54	10.7	12.7	-43.54	-13	V

GSM850

GPRS Mode Channel 128

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1858.928572	-40.78	4.6	2.8	-42.58	-13	V
2723.571429	-34.74	5.6	4	-36.34	-13	V
3581.538462	-47.93	6.5	6.1	-48.33	-13	V
4534.615385	-47.03	7.4	7.4	-47.03	-13	H
5401.153846	-48.51	8.1	9.2	-47.41	-13	V
6383.076923	-48.68	8.9	11.2	-46.38	-13	V

Note:

GPRS 850, CH128

Power(ERP)= Pmea-Pcl+Ga=-48.68-8.9+11.2=-46.38dbm

This method Applicable to the following table.

GPRS Mode Channel 189

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
2704.285714	-34.91	5.6	4	-36.51	-13	H
3574.615385	-47.65	6.4	6	-48.05	-13	H
4576.153846	-47.23	7.4	7.5	-47.13	-13	H
5833.846154	-49.64	8.4	10.5	-47.54	-13	H
6715.384615	-47.92	9.1	12.1	-44.92	-13	V
7583.076923	-49.15	9.7	14.9	-43.95	-13	V

GPRS Mode Channel 251

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
2786.785714	-34.49	5.7	4.2	-35.99	-13	V
3574.615385	-47.62	6.4	6	-48.02	-13	V
4500	-47.41	7.3	7.3	-47.41	-13	V
5335.384615	-47.85	8.1	9	-46.95	-13	V
6735.384615	-48.32	9.2	12.2	-45.32	-13	H
8292.307692	-51.99	10.1	17.5	-44.59	-13	V

EGPRS Mode Channel 128

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization

1815	-41.89	4.6	2.9	-43.59	-13	V
2741.785714	-35.01	5.7	4.1	-36.61	-13	H
3567.692308	-47.38	6.4	6	-47.78	-13	H
4516.153846	-47.88	7.3	7.3	-47.88	-13	H
5461.153846	-48.47	8.1	9.3	-47.27	-13	V
6343.076923	-48.97	8.8	11.1	-46.67	-13	V

Note:

EGPRS 850, CH128

Power(ERP)= Pmea-Pcl+Ga=-48.97-8.8+11.1=-46.67dbm

This method Applicable to the following table.

EGPRS Mode Channel 189

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1850.357143	-40.95	4.6	2.8	-42.75	-13	H
2700	-35.24	5.6	4	-36.84	-13	V
3593.076923	-47.96	6.5	6.1	-48.36	-13	H
4547.307692	-47.74	7.4	7.4	-47.74	-13	V
5431.153846	-48.49	8.1	9.3	-47.29	-13	V
6220	-49.54	8.7	10.7	-47.54	-13	H

EGPRS Mode Channel 251

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization

1681.071429	-42.5	4.4	3	-43.9	-13	H
3176.538462	-46.18	6.1	4.8	-47.48	-13	V
4451.538462	-48.03	7.3	7.4	-47.93	-13	H
5171.538462	-48.1	7.9	8.8	-47.2	-13	V
6975.384615	-49.38	9.3	12.9	-45.78	-13	H
8680	-52.83	10.4	18.4	-44.83	-13	H

GSM1900

GSM Mode Channel 512

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3699.6	-51.54	6.6	7.9	-50.24	-13	H
5731.2	-51.97	8.5	10.2	-50.27	-13	V
7548	-50.57	9.7	11.6	-48.67	-13	H
9418.8	-48.86	10.7	12.7	-46.86	-13	V
11515.2	-42.98	12.3	12.7	-42.58	-13	H
13198.8	-38.97	13.2	13.4	-38.77	-13	V

GSM Mode Channel 661

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3760.2	-50.01	6.6	7.9	-48.71	-13	H

5746.2	-52.38	8.5	10.2	-50.68	-13	H
7636.8	-50.52	9.7	11.6	-48.62	-13	V
8871.6	-49.44	10.4	12.6	-47.24	-13	V
11652	-41.82	12.3	12.7	-41.42	-13	H
16504.8	-32.88	14.6	13	-34.48	-13	V

GSM Mode Channel 810

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3819.6	-52.04	6.7	8	-50.74	-13	H
5822.4	-52.28	8.6	10.3	-50.58	-13	H
7582.8	-50.39	9.7	11.6	-48.49	-13	V
9584.4	-47.23	10.7	12.7	-45.23	-13	V
11629.2	-44.56	12.3	12.7	-44.16	-13	H
13200	-38.98	13	13.1	-38.88	-13	V

Conclusion: PASS

Note: the EUT was displayed in several different direction, the worst cases were shown.

GPRS Mode Channel 512

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3700.2	-39.84	6.6	6.2	-40.24	-13	H
5550.6	-47.68	8.2	9.7	-46.18	-13	V

7411.2	-52.75	9.7	14.2	-48.25	-13	V
9444	-53.82	10.7	18.6	-45.92	-13	H
11611.2	-48.1	12.2	17.9	-42.4	-13	H
13434	-48.97	13.7	23.1	-39.57	-13	H

GPRS Mode Channel 661

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3759.6	-41.86	6.6	6.2	-42.26	-13	H
5640	-49.44	8.3	10.1	-47.64	-13	H
7272	-52.5	9.6	13.8	-48.3	-13	V
9806.4	-52	11	18	-45	-13	H
13400.4	-46.22	13.1	20.5	-38.82	-13	V
16502.4	-40.29	14.6	20.1	-34.79	-13	H

GPRS Mode Channel 810

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3819	-45.94	6.7	6.4	-46.24	-13	H
5730	-49.56	8.5	10.4	-47.66	-13	H
7608	-53.84	9.7	14.9	-48.64	-13	V

9498	-55.12	10.7	18.6	-47.22	-13	V
11498.4	-48.84	12.3	18.1	-43.04	-13	H
13860	-50.36	13.6	24.7	-39.26	-13	V

Conclusion: PASS

Note: the EUT was displayed in several different direction, the worst cases were shown.

EGPRS Mode Channel 512

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3700.8	-50.63	6.6	6.2	-51.03	-13	V
5550.6	-50.59	8.2	9.7	-49.09	-13	V
7554	-52.89	9.7	14.7	-47.89	-13	H
9418.8	-54.4	10.7	18.6	-46.5	-13	H
10892.4	-49.44	11.8	17.8	-43.44	-13	H
13212	-45.87	13.2	20.2	-38.87	-13	H

EGPRS Mode Channel 661

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3726.6	-51.48	6.6	6.2	-51.88	-13	H
5640	-48.55	8.3	10.1	-46.75	-13	H
7494	-52.91	9.7	14.6	-48.01	-13	V

9446.4	-53.78	10.7	18.6	-45.88	-13	H
10789.2	-49.36	11.7	17.5	-43.56	-13	H
14356.8	-50.82	13.8	23.3	-41.32	-13	V

EGPRS Mode Channel 810

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3819.6	-44.62	6.7	6.4	-44.92	-13	H
5729.4	-44.52	8.5	10.5	-42.52	-13	H
7821.6	-53.96	9.9	15.6	-48.26	-13	V
8901.6	-54.08	10.4	18.4	-46.08	-13	V
11517.6	-47.63	12.3	18.1	-41.83	-13	V
13417.2	-47.56	13.7	22.8	-38.46	-13	V

Conclusion: PASS

Note: the EUT was displayed in several different direction, the worst cases were shown.

A.7.2.2. WCDMA Measurement Method

The measurements procedures in TIA-603E-2016 are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 24.238 and Part 24.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band V.

The procedure of radiated spurious emissions is the same like GSM.

A.7.2.2.1. Measurement Limit

Part 24.238 and Part 22.917 specify that 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.

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.

A.7.2.2.2. Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the WCDMA Band V (826.4MHz, 836.6MHz and 846.6MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the WCDMA Band V into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

A.7.2.2.3. Measurement Results Table

Frequency	Channel	Frequency Range	Result
WCDMA Band II	Low	30MHz~20GHz	P
	Middle	30MHz~20GHz	P
	High	30MHz~20GHz	P
WCDMA Band V	Low	30MHz~20GHz	P
	Middle	30MHz~20GHz	P
	High	30MHz~20GHz	P

Frequency	Channel	Frequency Range	Result
HSUPA 16QAM Band II	Low	30MHz~20GHz	P
	Middle	30MHz~20GHz	P
	High	30MHz~20GHz	P
HSUPA 16QAM Band V	Low	30MHz~20GHz	P
	Middle	30MHz~20GHz	P
	High	30MHz~20GHz	P

WCDMA BAND II Mode Channel 9262

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3706	-59.36	6.6	7.9	-58.06	-13	H
5609.6	-59.91	8.4	10.1	-58.21	-13	V
7500.8	-58	9.7	11.6	-56.1	-13	V
9380	-54.8	10.6	12.6	-52.8	-13	V
11140	-51.05	12.3	12.7	-50.65	-13	H
13224.6	-48.17	13	13.1	-48.07	-13	V

WCDMA BAND II Mode Channel 9400

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3761.6	-54.56	6.6	7.9	-53.26	-13	V
5632	-60.03	8.4	10.1	-58.33	-13	V
7418.8	-58.25	9.7	11.6	-56.35	-13	V
9363.2	-55.81	10.6	12.6	-53.81	-13	V
11723.45	-49.95	12.3	12.7	-49.55	-13	V
13405.2	-47.68	13	13.1	-47.58	-13	V

WCDMA BAND II Mode Channel 9538

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3814	-53.74	6.7	8	-52.44	-13	H

5770.4	-59.09	8.4	10.1	-57.39	-13	V
7745.6	-58.23	9.7	11.6	-56.33	-13	H
9702.8	-55.3	10.8	12.7	-53.4	-13	V
11756.7	-50.38	12.3	12.7	-49.98	-13	V
15882.15	-41.96	14.9	13.4	-43.46	-13	V

WCDMA BAND V Mode Channel 4132

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1654.285714	-57.61	4.3	5	-56.91	-13	H
2369.615385	-52.97	5.2	5.3	-52.87	-13	V
4216	-60.83	7	8.9	-58.93	-13	V
5919.6	-59.15	8.6	10.2	-57.55	-13	H
7255	-58.02	9.6	11.4	-56.22	-13	V
8320	-58.35	10.1	12.5	-55.95	-13	H

WCDMA BAND V Mode Channel 4183

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization

1674.642857	-59.02	4.3	5	-58.32	-13	H
2550.769231	-52.32	5.4	5.6	-52.12	-13	V
4028	-61.18	6.9	8.6	-59.48	-13	H
4872	-60.29	7.6	9.3	-58.59	-13	V
6818.8	-58.94	9.2	10.9	-57.24	-13	H
8434.6	-57.97	10.2	12.5	-55.67	-13	H

WCDMA BAND V Mode Channel 4233

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1859.642857	-55.59	4.6	4.6	-55.59	-13	H
2455	-51.73	5.3	5	-52.03	-13	H
4179.2	-61.61	7	8.9	-59.71	-13	H
5426.4	-59.32	8.1	9.6	-57.82	-13	V
7492	-58.66	9.7	11.7	-56.66	-13	H
8612.2	-57.91	10.3	12.5	-55.71	-13	H

Conclusion: PASS

HSUPA 16QAM BAND II Mode Channel 9262

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3706.8	-49.18	6.6	7.9	-47.88	-13	H

5560	-51.78	8.4	10.1	-50.08	-13	V
7405.2	-48.33	9.7	11.6	-46.43	-13	V
9259.2	-56.34	10.6	12.6	-54.34	-13	V
11063.35	-52.75	12.3	12.7	-52.35	-13	H
12872.85	-47.54	12.5	12.8	-47.24	-13	V

HSUPA 16QAM BAND II Mode Channel 9400

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3758.8	-47.8	6.6	7.9	-46.5	-13	H
5640.4	-52.58	8.4	10.1	-50.88	-13	H
7519.6	-53.6	9.7	11.6	-51.7	-13	V
9329.2	-56.49	10.6	12.6	-54.49	-13	H
11368.9	-51.18	12.3	12.7	-50.78	-13	H
14309.25	-46.17	13.6	13.7	-46.07	-13	H

HSUPA 16QAM BAND II Mode Channel 9538

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3816.4	-49.41	6.7	8	-48.11	-13	H
5725.6	-46.33	8.4	10.1	-44.63	-13	H
7635.6	-54.2	9.7	11.6	-52.3	-13	V

10759.6	-50.95	12.3	12.7	-50.55	-13	H
12716.4	-48.21	12.5	12.8	-47.91	-13	V
14902.5	-46.56	14.3	13.7	-47.16	-13	H

HSUPA 16QAM BAND V Mode Channel 4132

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
5216.4	-56.14	8	9.6	-57.74	-13	H
3899.6	-58.53	6.7	8.3	-60.13	-13	V
1867.857143	-55.47	4.6	4.9	-55.77	-13	H
4534	-56.03	7.3	8.7	-57.43	-13	H
2473.461539	-51.53	5.3	5.6	-51.83	-13	V
7643.8	-53.91	9.7	11.6	-55.81	-13	V

HSUPA 16QAM BAND V Mode Channel 4183

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1675	-56.82	4.3	4.7	-57.22	-13	H
2488.076923	-51.96	5.3	5.6	-52.26	-13	V