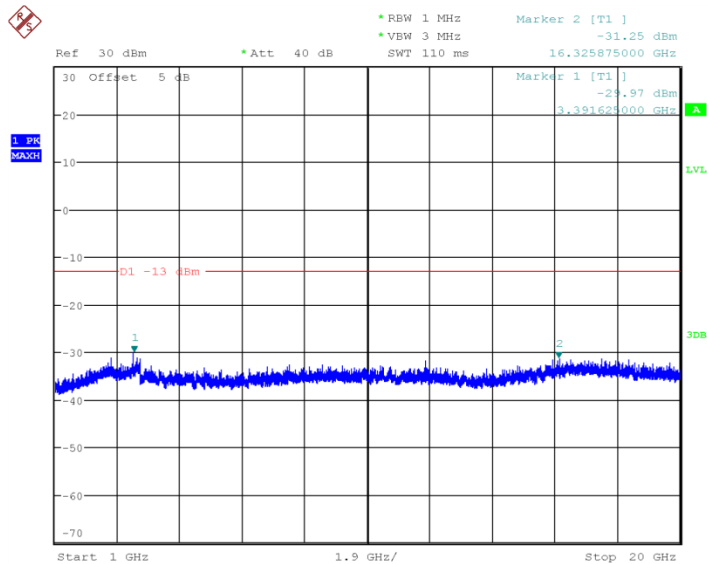
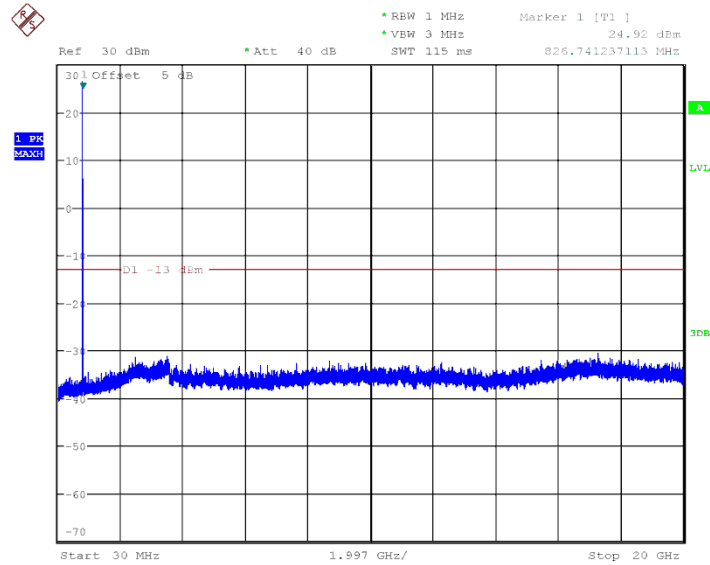


Channel 4233: 30MHz~1GHz



Channel 4233: 1GHz~20GHz

NOTE: We only test the worst case



16QAM 30MHz~20GHz

Conclusion: PASS

ANNEX A.8. RADIATED

A.8.1. ERP

A.8.1.1. GSM ERP

A.8.1.1.1. Description

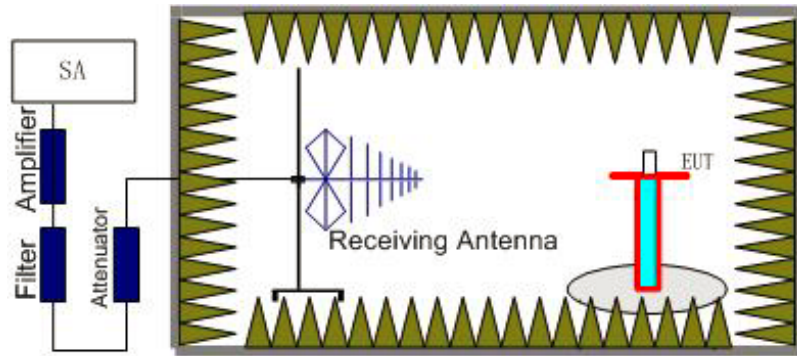
This is the test for the maximum radiated power from the EUT.

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 of continuous 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."

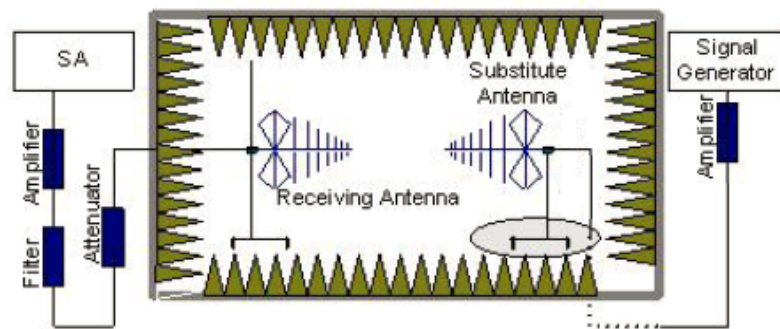
A.8.1.1.2. Method of Measurement

The measurements procedures in TIA-603D-2010 are used.

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 transmit frequencies in three channels (High, Middle, Low) 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 thereceiver 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 Substitute Antenna.

The cable loss (P_{cl}), the Substitute Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{Mea} + P_{Ag} - P_{cl} + G_a$$

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, $ERP = EIRP - 2.15\text{dBi}$.

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
Main supply
GSM(GMSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-5.05	3.1	37	3.11	31.96	H
836.6	-5	3.1	37	3.11	32.01	H
848.8	-4.57	3.1	37	3.11	32.44	H

Secondly supply
GSM(GMSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
848.8	-7.17	3.1	37	3.11	29.84	H

Note: The secondly supply only test the worst case.

Frequency: 824.2MHz

$$\begin{aligned} \text{Peak ERP(dBm)} &= P_{\text{Mea}}(-5.05\text{dBm}) - P_{\text{cl}}(3.1\text{dB}) + P_{\text{Ag}}(37\text{dB}) + G_{\text{a}}(3.11\text{dBd}) \\ &= 31.96\text{dBm} \end{aligned}$$

Main supply
GPRS(GMSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-4.24	3.1	37	3.11	32.77	H
836.6	-5.06	3.1	37	3.11	31.95	H
848.8	-5.13	3.1	37	3.11	31.88	H

Secondly supply
GPRS(GMSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-5.95	3.1	37	3.11	31.06	H

Note: The secondly supply only test the worst case.

Main supply

EDGE(8PSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-11.64	3.1	37	3.11	25.37	H
836.6	-11.22	3.1	37	3.11	25.79	H
848.8	-11.8	3.1	37	3.11	25.21	H

Secondly supply

EDGE(8PSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-11.74	3.1	37	3.11	25.27	H

Note: The secondly supply only test the worst case.

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 EIRP (dBm)
GSM	5	≤33dBm (2W)
GPRS	3	≤33dBm (2W)
EDGE	6	≤33dBm (2W)

A.8.1.1.4.2 Measurement result

Main supply

GSM(GMSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-7.27	4.6	36.8	4.7	29.63	V
1880.0	-6.97	4.6	36.8	4.7	29.93	H
1909.8	-7.44	4.7	36.8	4.7	29.36	V

Secondly supply

GSM(GMSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-8.93	4.6	36.8	4.7	27.97	V

Note: The secondly supply only test the worst case.

Frequency: 1850.2MHz

Peak EIRP(dBm)= P_{Mea}(-7.27dBm) - P_{cl}(4.6dB)+ P_{Ag}(36dB) +G_a(4.7dB)=29.63dBm

Main supply

GPRS (GMSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-14.57	3.54	43.8	4.7	28.59	V
1880.0	-13.88	3.54	43.8	4.7	29.28	H
1909.8	-14.25	3.54	43.8	4.7	28.91	V

Secondly supply

GPRS (GMSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-18.25	3.54	43.8	4.7	26.71	V

Note: The secondly supply only test the worst case.

Main supply

EDGE(8PSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-17.93	3.54	43.8	4.7	25.23	V
1880.0	-18.8	3.54	43.8	4.7	24.36	H
1909.8	-19.93	3.54	43.8	4.7	23.23	V

Secondly supply

EDGE(8PSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-19.33	3.54	43.8	4.7	25.63	V

Note: The secondly supply only test the worst case.

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.

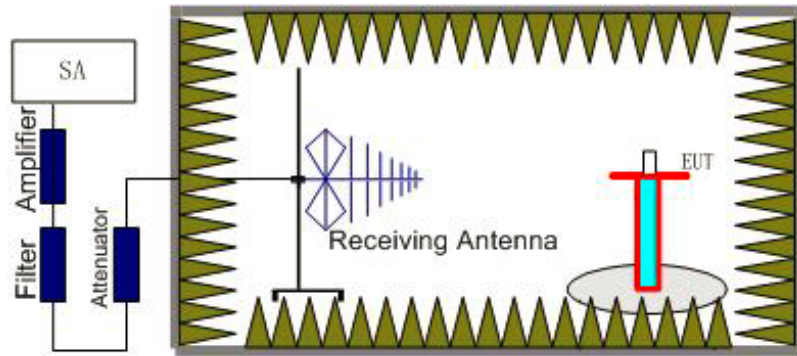
Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Rule Part 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

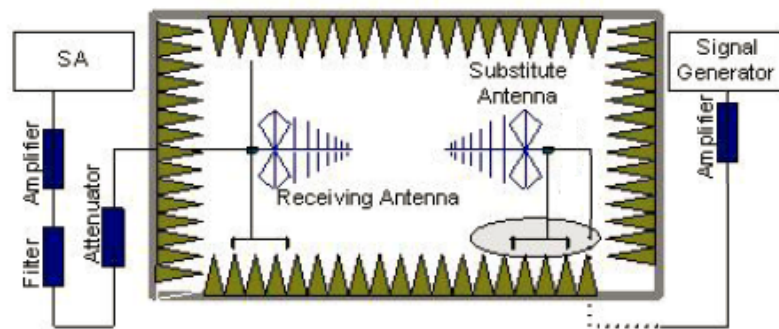
A.8.1.2.2. Method of Measurement

The measurements procedures in TIA-603D-2010 are used.

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 transmit frequencies in three channels (High, Middle, Low) 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 (P_r).
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 Substitute Antenna.

The cable loss (P_{cl}), the Substitute Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{Mea} + P_{Ag} - P_{cl} + G_a$$

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, $ERP = EIRP - 2.15\text{dBi}$.

A.8.1.2.4 WCDMA Band II-EIRP

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

A.8.1.2.3.2 Measurement result

Main supply(QPSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1852.4	-21.1	3.54	43.8	2.9	22.06	V
1880.0	-21.02	3.54	43.8	2.9	22.14	H
1907.6	-22.07	3.54	43.8	2.9	21.09	V

Secondly supply(QPSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1852.4	-20.99	3.54	43.8	2.9	22.17	H

Main supply(16QAM)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1852.4	-22.83	3.54	43.8	2.9	20.33	V
1880.0	-21.85	3.54	43.8	2.9	21.31	H
1907.6	-20.55	3.54	43.8	2.9	22.61	V

Secondly supply(16QAM)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1907.6	-21.82	3.54	43.8	2.9	21.34	H

Note: The secondly supply only test the worst case.

Frequency: 1852.40MHz

Peak EIRP(dBm)= P_{Mea}(-21.1dBm)- P_{cl}(3.54dB)+ P_{Ag}(43.8dB)+G_a(2.9dBi) =22.06dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

A.8.1.2.4.1 WCDMA Band IV-EIRP

	Burst Peak ERP (dBm)
WCDMA Band IV	≤35.45dBm (7W)

A.8.1.2.4.2 Measurement result

Main supply(QPSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
1712.4	-19.68	3.54	43.8	2.9	23.48	H
1732.6	-19.76	3.54	43.8	2.9	23.40	H
1752.6	-19.58	3.54	43.8	2.9	23.58	H

Secondly supply(QPSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
1712.4	-20.22	3.54	43.8	2.9	22.94	H

Main supply(16QAM)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
1712.4	-20.36	3.54	43.8	2.9	22.80	H
1732.6	-19.97	3.54	43.8	2.9	23.19	H
1752.6	-21.27	3.54	43.8	2.9	21.89	H

Secondly supply(16QAM)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
1732.6	-19.3	3.54	43.8	2.9	23.86	H

Note: The secondly supply only test the worst case.

Frequency: 1712.4 MHz

Peak ERP(dBm)= P_{Mea}(-19.68dBm)- P_{cl}(3.54dB)+P_{Ag}(43.8dB)+G_a(2.9dBd)=23.48dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

A.8.1.2.4.1 WCDMA Band V-EIRP

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

A.8.1.2.4.2 Measurement result

Main supply(QPSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
826.4	-14.06	3.2	37	2.9	22.64	H
836.6	-14.35	3.2	37	2.9	22.35	H
846.6	-14.31	3.2	37	2.9	22.39	H

Secondly supply(QPSK)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
826.4	-15.93	3.2	37	2.9	20.77	H

Main supply(16QAM)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
826.4	-14.31	3.2	37	2.9	22.39	H
836.6	-14.78	3.2	37	2.9	21.92	H
846.6	-14.29	3.2	37	2.9	22.41	H

Secondly supply(16QAM)

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBd)	PeakERP(dBm)	Polarization
826.4	-13.79	3.2	37	2.9	22.91	H

Note: The secondly supply only test the worst case.

Frequency: 826.4 MHz

Peak ERP(dBm)= P_{Mea}(-14.06dBm)- P_{cl}(3.2dB)+P_{Ag}(37dB)+G_a(2.9dBd)=22.64dBm

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)

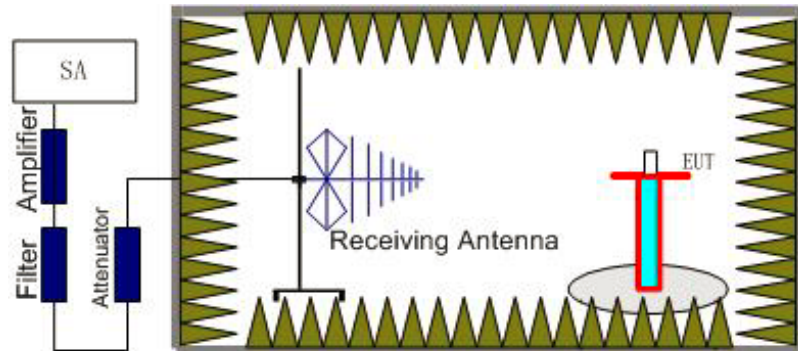
A.8.2.1 GSM Measurement Method

The measurement procedures in TIA-603D-2010 are 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.

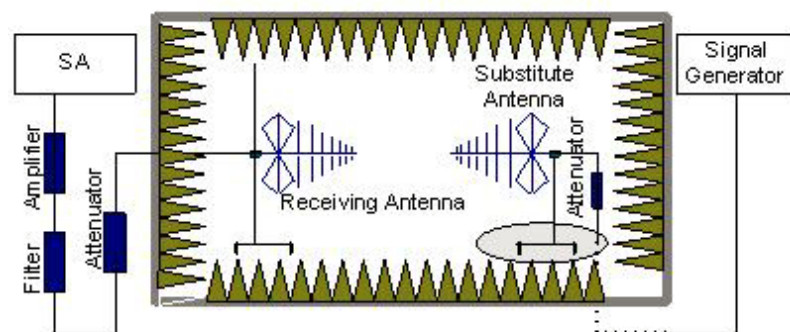
A.8.2.2 The procedure of radiated spurious emissions is as follows:

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 10th harmonic 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 (P_r).

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:

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

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, $ERP = EIRP - 2.15\text{dBi}$

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

GSM850

Main supply

GSM Mode Channel 128

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
2961.428571	-36.3	5.8	4.6	-37.5	-13	V
2975.357143	-36.53	5.9	4.7	-37.73	-13	H
3395.769231	-46.34	6.3	5.5	-47.14	-13	V
4245	-38.12	7.1	7.7	-37.52	-13	H
6012.307692	-48.62	8.6	10.4	-46.82	-13	H
8616.923077	-53.26	10.3	18.3	-45.26	-13	V

Note:

GSM 850, CH128

Power(ERP)= Pmea-Pcl+Ga=-36.3-5.8+4.6=-37.5dbm

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
2510.357143	-37.15	5.4	3.7	-38.85	-13	H
3346.153846	-45.36	6.2	5.3	-46.26	-13	H
4183.846154	-41.77	7	7.5	-41.27	-13	H
5019.230769	-46.93	7.8	9	-45.73	-13	H
6004.615385	-47.99	8.6	10.4	-46.19	-13	V
6904.615385	-48.57	9.3	12.7	-45.17	-13	H

GSM Mode Channel 251

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
2886.428571	-36.82	5.8	4.5	-38.12	-13	V
3296.538462	-44.84	6.2	5	-46.04	-13	H
4121.538462	-41.18	7	7.3	-40.88	-13	V
4946.538462	-43.87	7.7	8.9	-42.67	-13	V
6075.384615	-49.41	8.6	10.5	-47.51	-13	H
7612.307692	-50.4	9.7	14.9	-45.2	-13	V

Secondly supply

GSM Mode Channel 128

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1645.714286	-46.24	4.3	3.2	-47.34	-13	V
2473.928571	-39.61	5.3	3.7	-41.21	-13	H
4121.538462	-42.41	7	7.4	-42.01	-13	V
4945.384615	-47.18	7.7	8.9	-45.98	-13	V
6072.307692	-48.34	8.6	10.5	-46.44	-13	H
8506.153846	-52.78	10.3	18.1	-44.98	-13	H

Note:

GSM 850, CH128

Power(ERP)= Pmea-Pcl+Ga=-52.78-10.3+18.1=-44.98dbm

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
1673.571429	-45.48	4.3	3.1	-46.68	-13	H
3348.461539	-45.16	6.2	5.5	-45.86	-13	H
4185	-44.65	7	7.5	-44.15	-13	H
5022.692308	-47.03	7.8	9	-45.83	-13	V
8300	-52.4	10.1	17.7	-44.8	-13	V
9563.076923	-50.8	10.8	18.6	-43	-13	H

GSM Mode Channel 251

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1697.142857	-45.21	4.4	3	-46.61	-13	H
2656.071429	-38.48	5.5	3.9	-40.08	-13	H
3394.615385	-44.81	6.3	5.7	-45.41	-13	H
4243.846154	-40.94	7.1	7.7	-40.34	-13	H
6498.461539	-48.68	9	11.5	-46.18	-13	H
8803.076923	-52.79	10.4	18.4	-44.79	-13	V

Note: The secondly supply only test the worst case.

GSM1900

GSM Mode Channel 512

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
5550.6	-48.06	8.2	9.6	-46.66	-13	V
11102.4	-43.39	12.1	18.3	-37.19	-13	V
12952.8	-43.98	13.1	20.1	-36.98	-13	V
14776.8	-46.49	14.2	23.3	-37.39	-13	H
16526.4	-40.19	14.7	20.1	-34.79	-13	V
17204.4	-37.34	16	19.7	-33.64	-13	V

GSM Mode Channel 661
Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3759.6	-46.68	6.6	6.2	-47.08	-13	H
5640.6	-48.63	8.3	10	-46.93	-13	V
9400.8	-31.85	10.7	18.6	-23.95	-13	V
11280	-45.39	12.1	18.4	-39.09	-13	H
13159.2	-45.42	13	20	-38.42	-13	V
17562	-38.43	15.3	20.1	-33.63	-13	V

GSM Mode Channel 810
Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3820.2	-47.27	6.7	6.8	-47.17	-13	H
5729.4	-49.13	8.5	10.5	-47.13	-13	V
9548.4	-41.91	10.7	18.6	-34.01	-13	V
11458.8	-41.97	12.2	18.1	-36.07	-13	V
16508.4	-39.61	14.6	20.1	-34.11	-13	H
17578.8	-39.04	15.3	20.2	-34.14	-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-603D-2010 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 IV	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
16QAM Band II	Low	30MHz~20GHz	P
	Middle	30MHz~20GHz	P
	High	30MHz~20GHz	P
16QAM Band IV	Low	30MHz~20GHz	P
	Middle	30MHz~20GHz	P
	High	30MHz~20GHz	P
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
3575.6	-62	6.4	6	-62.4	-13	H
4267.2	-60.3	7.1	7.7	-59.7	-13	H
4845.2	-59.4	7.6	8.5	-58.5	-13	V
6078.8	-60	8.7	10.5	-58.2	-13	V
7243.2	-61.1	9.6	13.7	-57	-13	H
7412.4	-59.2	9.7	14.2	-54.7	-13	H
10405.2	-57.5	11.6	17.2	-51.9	-13	H
12346.45	-54.1	12.6	18.1	-48.6	-13	V
14888.85	-56.3	14.3	23.9	-46.7	-13	H
17609.4	-47.6	15.5	20.3	-42.8	-13	V

WCDMA BAND II Mode Channel 9400

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3180.8	-61.1	6.1	4.8	-62.4	-13	H
3766.8	-59.1	6.6	6.2	-59.5	-13	V
4814	-59.1	7.6	8.5	-58.2	-13	H
5468.4	-58.5	8.1	9.4	-57.2	-13	H
5655.2	-58.8	8.3	10	-57.1	-13	H
6882.8	-60.1	9.3	12.6	-56.8	-13	V
7538.8	-60	9.7	14.6	-55.1	-13	H

9833.2	-58.3	11	17.9	-51.4	-13	H
12553.65	-54.1	12.8	18.8	-48.1	-13	V
14730.3	-55.4	14.1	23.3	-46.2	-13	H

WCDMA BAND II Mode Channel 9538

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3574.8	-61.9	6.4	6	-62.3	-13	H
3812.8	-58.8	6.7	6.7	-58.8	-13	H
4510.4	-58.3	7.3	7.3	-58.3	-13	H
5726.4	-57.6	8.5	10.5	-55.6	-13	H
7090.8	-60	9.4	13.1	-56.3	-13	H
7634.8	-59.1	9.7	14.9	-53.9	-13	H
10432	-57.6	11.6	17.2	-52	-13	H
12526.35	-54.5	12.7	18.7	-48.5	-13	V
14825.85	-56.1	14.3	23.8	-46.6	-13	H
17571.6	-47.9	15.3	20.2	-43	-13	V

Main supply

WCDMA BAND IV Mode Channel 1312

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3200	-61.3	6.1	4.9	-62.5	-13	V
3935.6	-59.2	6.8	7.1	-58.9	-13	H

4678.8	-57.4	7.5	7.6	-57.3	-13	V
5780.4	-59.7	8.4	10.5	-57.6	-13	H
7144.4	-60.4	9.4	13.4	-56.4	-13	V
8566.8	-63.1	10.3	18.1	-55.3	-13	V
10423.6	-57.8	11.6	17.1	-52.3	-13	H
12317.05	-53.8	12.7	18	-48.5	-13	H
14739.75	-54.8	14.1	23.3	-45.6	-13	H
17891.85	-48.1	16.2	21.6	-42.7	-13	H

WCDMA BAND IV Mode Channel 1413
Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1650.357143	-60.81	4.3	3.1	-62.01	-13	V
2630.384615	-51.82	5.5	3.9	-53.42	-13	H
4257.6	-60.41	7.1	7.7	-59.81	-13	V
5876	-60.69	8.4	10.5	-58.59	-13	V
7629.4	-61.52	9.7	14.9	-56.32	-13	H
8457.4	-64.01	10.2	18	-56.21	-13	H

WCDMA BAND IV Mode Channel 1513
Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3506.8	-61	6.4	6	-61.4	-13	V

3836.4	-60.8	6.7	6.8	-60.7	-13	V
4474.8	-58.9	7.3	7.3	-58.9	-13	H
6010.8	-59.2	8.6	10.4	-57.4	-13	V
7062.4	-60	9.4	13	-56.4	-13	V
8756.8	-60.2	10.4	18.5	-52.1	-13	H
8767.6	-60	10.4	18.5	-51.9	-13	H
10354	-57.9	11.6	17.2	-52.3	-13	V
12489.25	-55.6	12.7	18.7	-49.6	-13	V
14882.55	-55.8	14.3	23.8	-46.3	-13	V

Secondly supply

WCDMA BAND IV Mode Channel 1312

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3426.4	-60	6.4	5.8	-60.6	-13	H
5234	-59.87	8	8.7	-59.17	-13	H
6964.4	-61.07	9.3	12.9	-57.47	-13	V
8577.6	-63.55	10.3	18.1	-55.75	-13	V
9846.8	-59.79	11	18	-52.79	-13	V
15202.8	-55.35	14.5	25	-44.85	-13	H

WCDMA BAND IV Mode Channel 1413

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
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5292.8	-59.72	8	8.8	-58.92	-13	H
6975.2	-60.65	9.3	12.9	-57.05	-13	H
8561.6	-62.97	10.3	18.1	-55.17	-13	V
10416.8	-57.39	11.6	17.2	-51.79	-13	H
13366.35	-55.99	13.7	22.5	-47.19	-13	V
16506.9	-49.48	14.6	20.1	-43.98	-13	H

WCDMA BAND IV Mode Channel 1513

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3181.6	-60.58	6.1	4.8	-61.88	-13	V
5048.4	-59.08	7.8	9	-57.88	-13	H
7225.6	-60.49	9.5	13.7	-56.29	-13	H
8638.8	-63.46	10.3	18.3	-55.46	-13	V
10403.6	-58.28	11.6	17.2	-52.68	-13	V
13196.25	-55.98	13	21.6	-47.38	-13	V

Note: The secondly supply only test the worst case.

WCDMA BAND V Mode Channel 4132

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1256.0714 29	-64.3	3.8	2	-66.1	-13	H
1534.6428 57	-62.5	4.2	3.4	-63.3	-13	V

1869.6428 57	-58.3	4.6	2.8	-60.1	-13	H
2468.4615 39	-54.3	5.3	3.7	-55.9	-13	H
2980.3846 15	-50.9	5.9	4.7	-52.1	-13	V
3308.4	-51.3	6.2	5.6	-51.9	-13	H
4136.4	-59.4	7	7.5	-58.9	-13	V
4572.8	-58.1	7.4	7.4	-58.1	-13	H
5935.2	-59.3	8.5	10.4	-57.4	-13	V
7883.8	-62.5	9.9	16	-56.4	-13	V

WCDMA BAND V Mode Channel 4183

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1253.9285 71	-63.8	3.8	2	-65.6	-13	H
1535	-62.7	4.2	3.4	-63.5	-13	V
1871.7857 14	-58.4	4.6	2.8	-60.2	-13	H
2485.3846 15	-54	5.4	3.7	-55.7	-13	H
2988.8461 54	-50.4	5.9	4.7	-51.6	-13	V
3342	-52.1	6.2	5.5	-52.8	-13	H
4534.4	-58.8	7.4	7.3	-58.9	-13	H
6185.6	-59.8	8.7	10.6	-57.9	-13	V
7693	-61.9	9.8	15	-56.7	-13	H
9905.2	-59.4	11	17.3	-53.1	-13	V

WCDMA BAND V Mode Channel 4233

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1249.642857	-64.1	3.8	2	-65.9	-13	H
1529.642857	-62.5	4.2	3.4	-63.3	-13	V
1862.142857	-58.7	4.6	2.8	-60.5	-13	H
2480.384615	-54.2	5.3	3.7	-55.8	-13	V
2984.615385	-50.8	5.9	4.7	-52	-13	V
3635.6	-59.2	6.6	6.1	-59.7	-13	V
4772	-58.5	7.5	7.9	-58.1	-13	H
5547.2	-59.3	8.2	9.6	-57.9	-13	H
7748.2	-62.1	9.8	15.3	-56.6	-13	V
9858.4	-59.6	11	17	-53.6	-13	V

16QAM BAND II Mode Channel 9262
Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
5560.800000	-58.59	8.2	9.8	-56.99	-13	H
7406.000000	-58.16	9.7	11.6	-56.26	-13	H
9215.200000	-56.84	10.5	12.7	-54.64	-13	H
10903.600000	-51.45	11.8	12.6	-50.65	-13	H
15204.900000	-44.87	14.5	14.0	-45.37	-13	V
17226.150000	-39.29	16.0	12.9	-42.39	-13	H

16QAM BAND II Mode Channel 9400

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
5643.200000	-57.85	8.3	9.8	-56.35	-13	H
7533.600000	-56.91	9.7	11.6	-55.01	-13	H
9397.200000	-55.38	10.7	12.7	-53.38	-13	V
11218.400000	-51.03	12.1	12.7	-50.43	-13	V
12342.950000	-47.82	12.7	12.7	-47.82	-13	V
14834.250000	-46.26	14.3	13.7	-46.86	-13	H

16QAM BAND II Mode Channel 9538

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3864.000000	-61.44	6.7	7.9	-60.24	-13	V
5726.800000	-54.48	8.5	10.2	-52.78	-13	H
7633.200000	-56.9	9.7	11.6	-55.00	-13	V
9744.800000	-54.39	10.9	12.6	-52.69	-13	H
11617.750000	-49.72	12.2	12.4	-49.52	-13	V
16503.750000	-42.07	14.6	13.0	-43.67	-13	V

16QAM BAND IV Mode Channel 1312

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3426.000000	-62.37	6.3	7.8	-60.87	-13	H

5071.2000 00	-60.64	7.8	9.6	-58.84	-13	V
8566.4000 00	-56.86	10.3	12.6	-54.56	-13	H
10376.000 000	-52.55	11.5	12.4	-51.65	-13	V
13196.250 000	-48.35	13.0	13.4	-47.95	-13	V
15149.250 000	-45.33	14.4	13.9	-45.83	-13	H

16QAM BAND IV Mode Channel 1413

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3466.8000 00	-63.91	6.4	7.8	-62.51	-13	H
9453.6000 00	-54.25	10.7	12.7	-52.25	-13	V
10603.600 000	-52.16	11.6	12.3	-51.46	-13	V
13210.950 000	-48.86	13.0	13.4	-48.46	-13	V
15890.550 000	-42.43	15.0	13.1	-44.33	-13	V
17198.850 000	-40.03	16.0	12.9	-43.13	-13	H

16QAM BAND IV Mode Channel 1513

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
3507.2000 00	-62.9	6.4	7.8	-61.50	-13	H
7061.6000 00	-57.92	9.4	11.1	-56.22	-13	V
8758.8000 00	-51.23	10.4	12.7	-48.93	-13	H
13121.700 000	-48.18	13.0	13.1	-48.08	-13	V

15887.400 000	-42.68	15.0	13.5	-44.18	-13	H
17204.100 000	-40.69	16.0	12.9	-43.79	-13	H

Main supply

16QAM BAND V Mode Channel 4132

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1688.9285 71	-67.55	4.3	4.7	-67.15	-13	H
3308.8000 00	-52.03	6.2	6.9	-51.33	-13	H
4134.8000 00	-63.39	7.0	8.9	-61.49	-13	H
5973.6000 00	-59.66	8.5	10.2	-57.96	-13	V
7042.0000 00	-58.45	9.4	11.1	-56.75	-13	V
8077.0000 00	-57.81	9.9	12.2	-55.51	-13	H

16QAM BAND V Mode Channel 4183

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1650.7142 86	-67.95	4.2	4.7	-67.45	-13	H
3349.2000 00	-56.51	6.2	6.9	-55.81	-13	V
4177.2000 00	-60.88	7.0	8.6	-59.28	-13	H
5212.4000 00	-59.56	8.5	9.4	-58.66	-13	V
6708.0000 00	-58.52	9.4	10.9	-57.02	-13	V
8588.8000 00	-58.52	9.9	12.6	-55.82	-13	V

16QAM BAND V Mode Channel 4233

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1644.642857	-68.29	4.2	5.3	-67.19	-13	H
2550.384615	-59.43	5.4	5.6	-59.23	-13	V
3382.400000	-53.37	6.2	6.9	-52.67	-13	H
4239.200000	-60.5	7.2	8.9	-58.80	-13	V
5981.200000	-60.04	8.5	10.2	-58.34	-13	V
7609.600000	-56.86	9.7	11.6	-54.96	-13	V

Secondly supply

16QAM BAND V Mode Channel 4132

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1848.214286	-64.92	4.2	4.7	-64.42	-13	H
3308.400000	-45.11	6.2	6.9	-44.41	-13	H
4135.600000	-58.38	7.0	8.6	-56.78	-13	H
4808.000000	-59.2	7.6	9.0	-57.80	-13	H
6426.400000	-59.04	8.9	10.6	-57.34	-13	V
7271.200000	-58.18	9.6	11.4	-56.38	-13	H

16QAM BAND V Mode Channel 4183

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1674.642857	-66.34	4.3	5.3	-65.34	-13	H
3343.200000	-47.44	6.2	7.8	-45.84	-13	V

4178.8000 00	-59.93	7.0	8.9	-58.03	-13	H
5262.4000 00	-59.07	8.0	9.4	-57.67	-13	V
7262.8000 00	-58.06	9.6	11.4	-56.26	-13	V
9767.8000 00	-54.62	10.9	12.6	-52.92	-13	V

16QAM BAND V Mode Channel 4233

Final result:

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit (dBm)	Polarization
1863.5714 29	-64.41	4.6	4.7	-64.31	-13	H
2986.5384 62	-56.81	5.8	6.7	-55.91	-13	V
3389.2000 00	-45.53	6.3	7.8	-44.03	-13	V
4239.6000 00	-57.07	7.1	8.9	-55.27	-13	H
7589.8000 00	-58.03	9.7	11.6	-56.13	-13	V
9815.8000 00	-55.15	11.0	12.6	-53.55	-13	V

Conclusion: PASS

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

ANNEX B. Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

*******End The Report*******