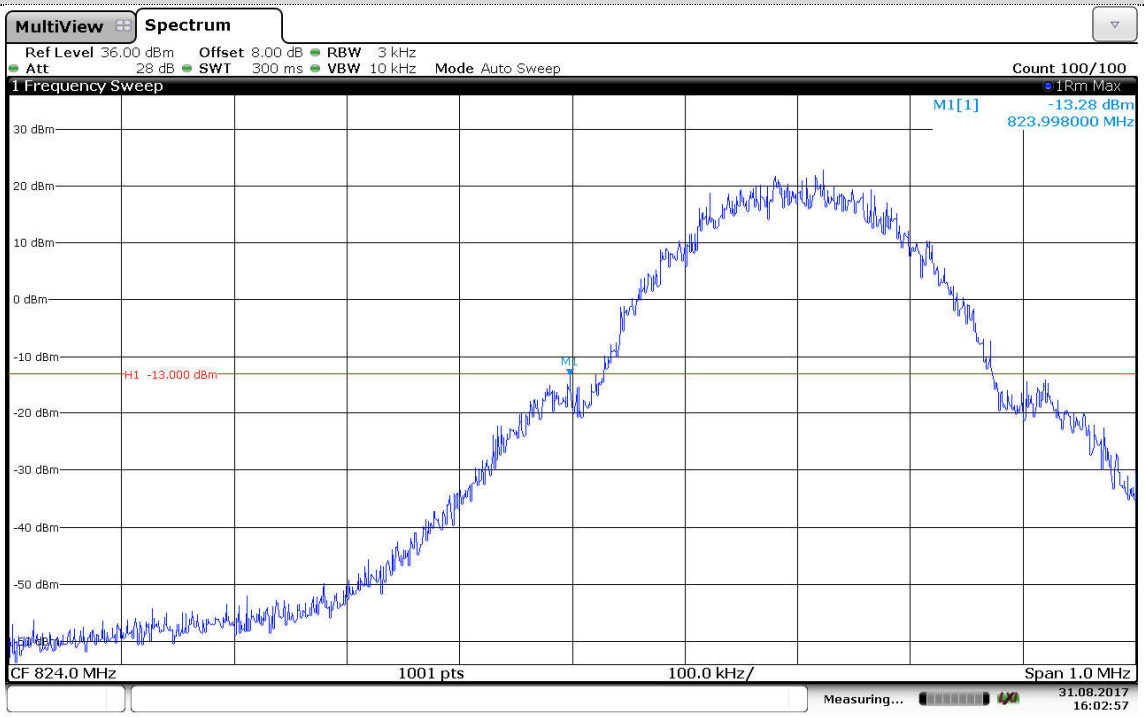
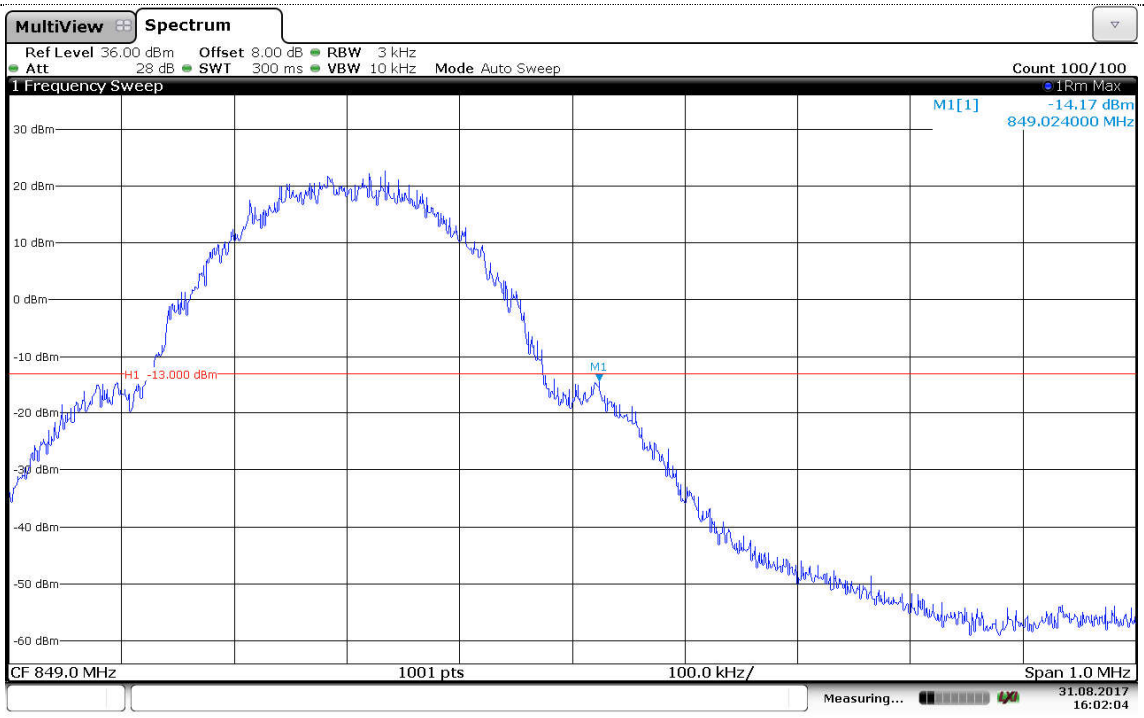
GPRS850



Date: 31.AUG.2017 16:02:58

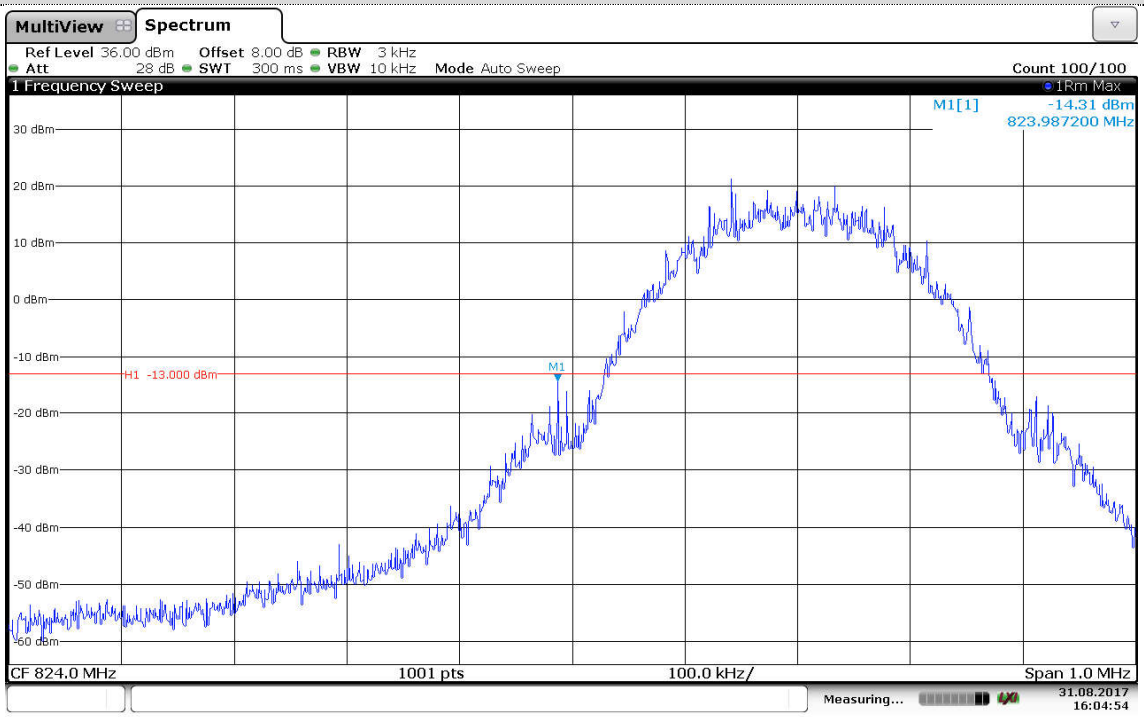
Channel 128



Date: 31.AUG.2017 16:02:04

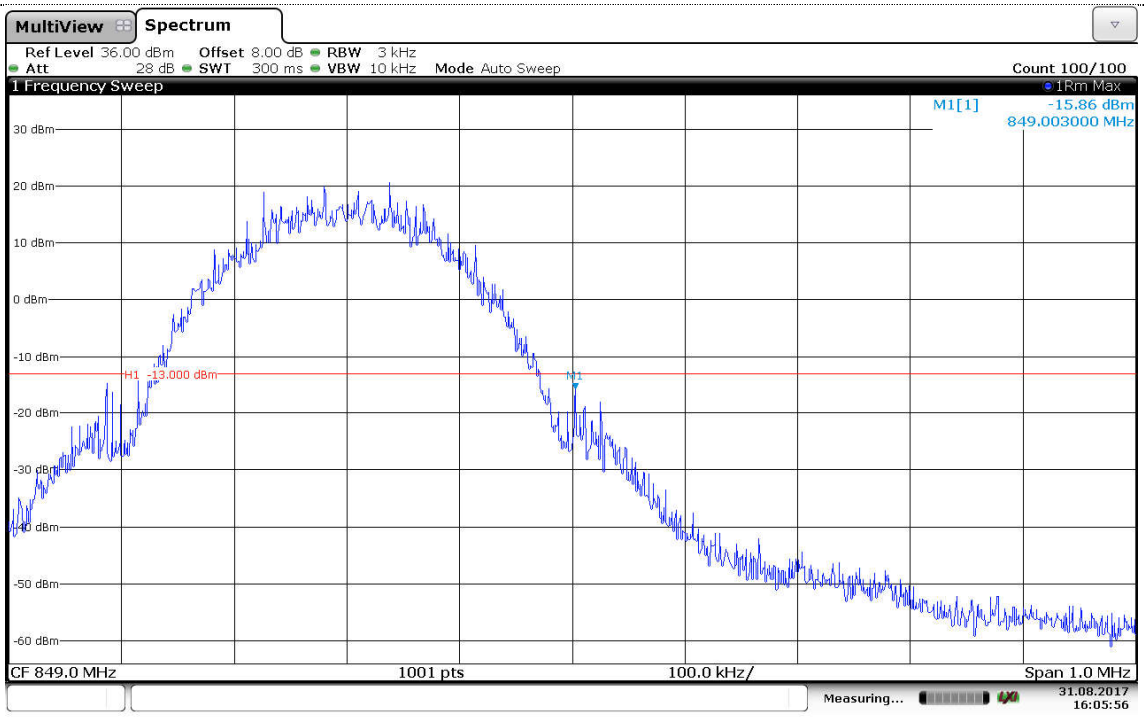
Channel 251

EGPRS850



Date: 31.AUG.2017 16:04:54

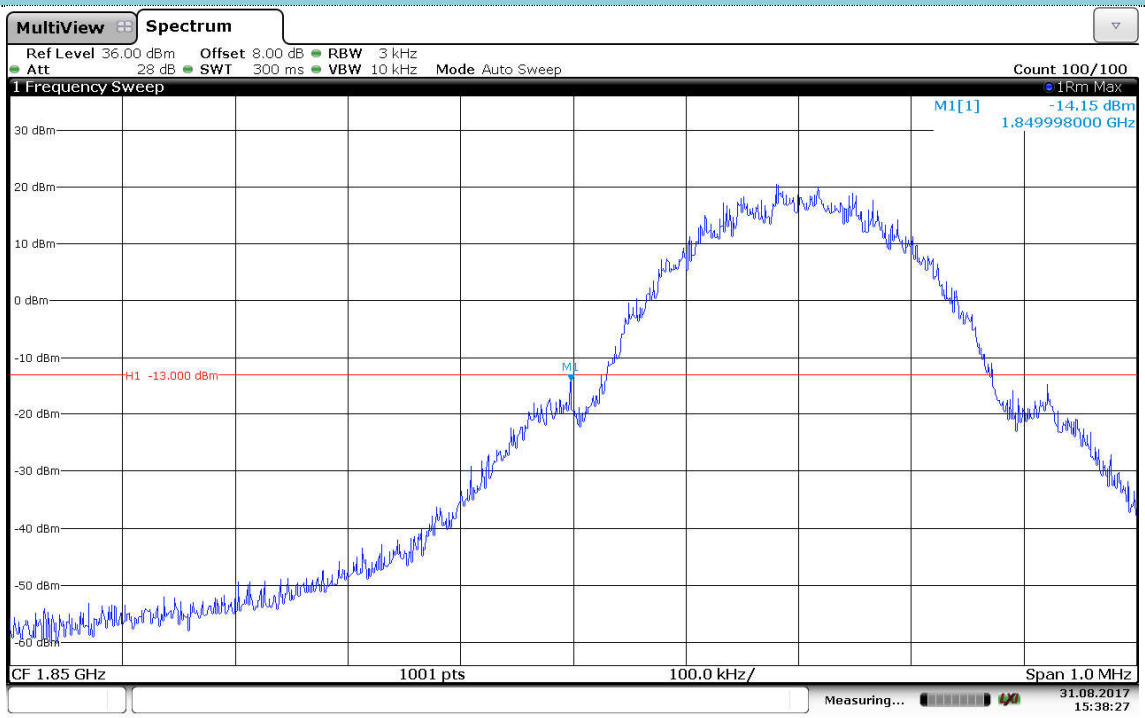
Channel 128



Date: 31.AUG.2017 16:05:56

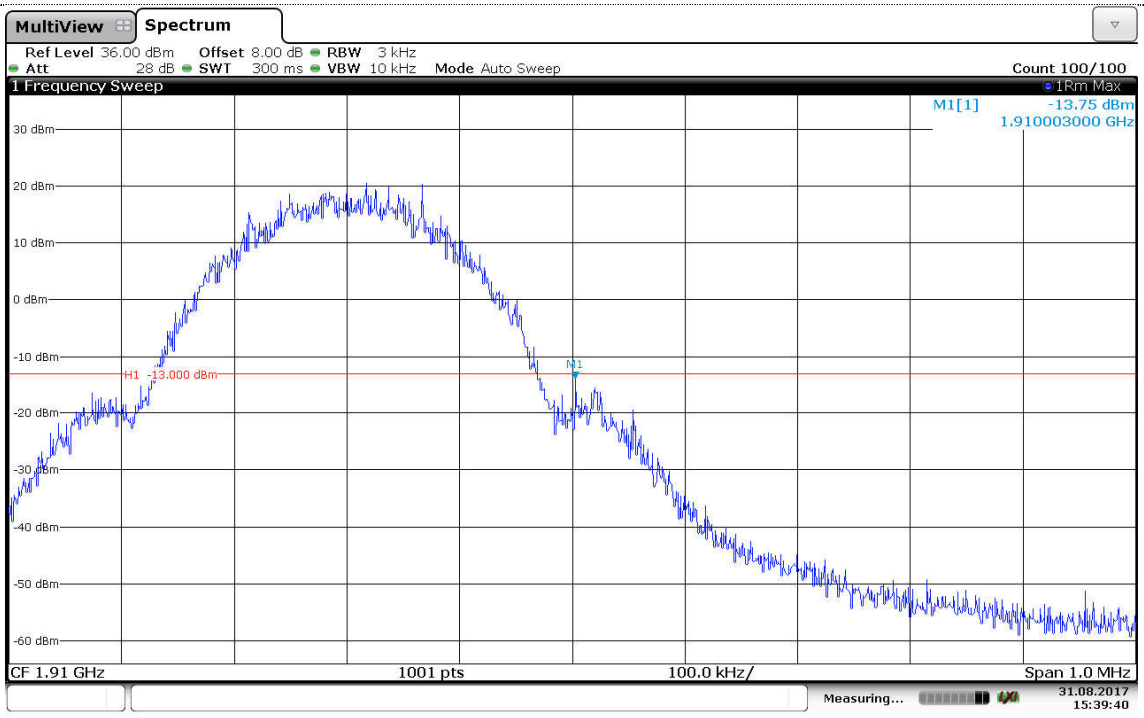
Channel 251

PCS1900



Date: 31.AUG.2017 15:38:27

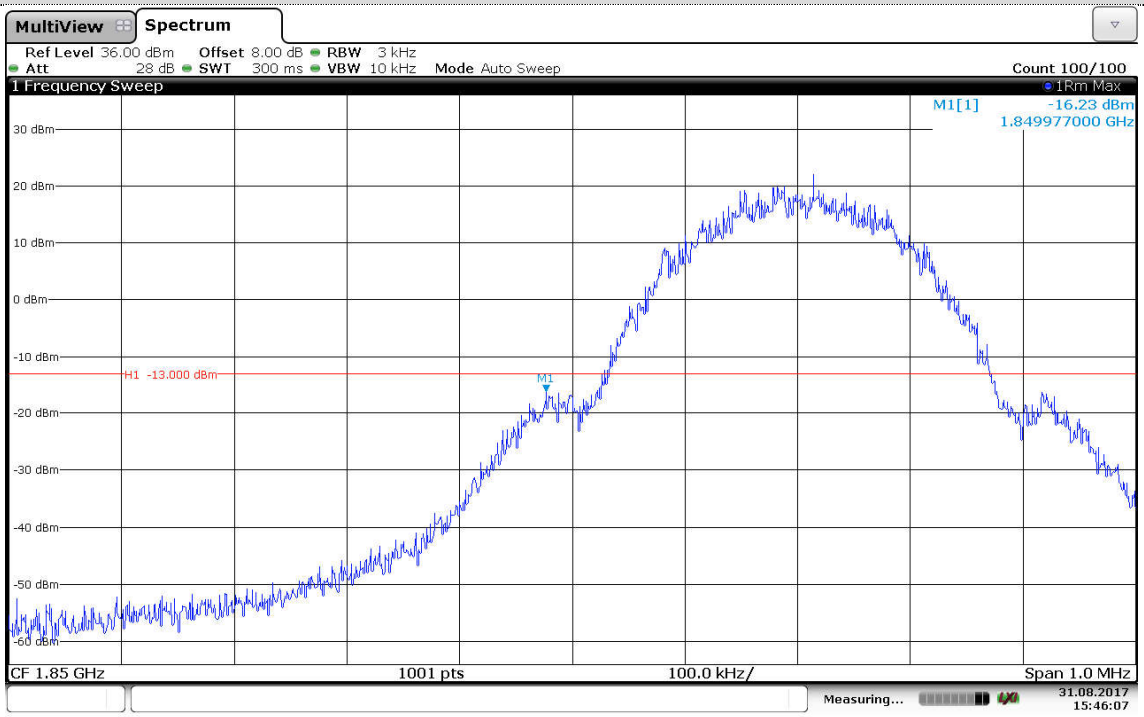
Channel 512



Date: 31.AUG.2017 15:39:40

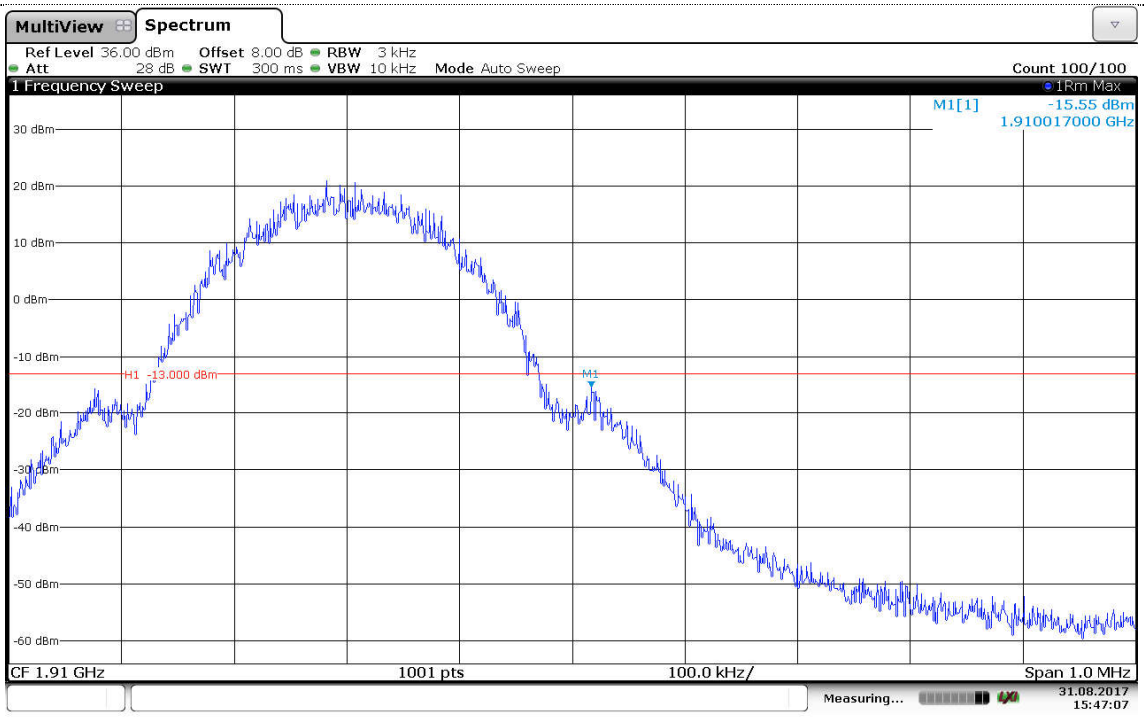
Channel 810

GPRS1900



Date: 31.AUG.2017 15:46:08

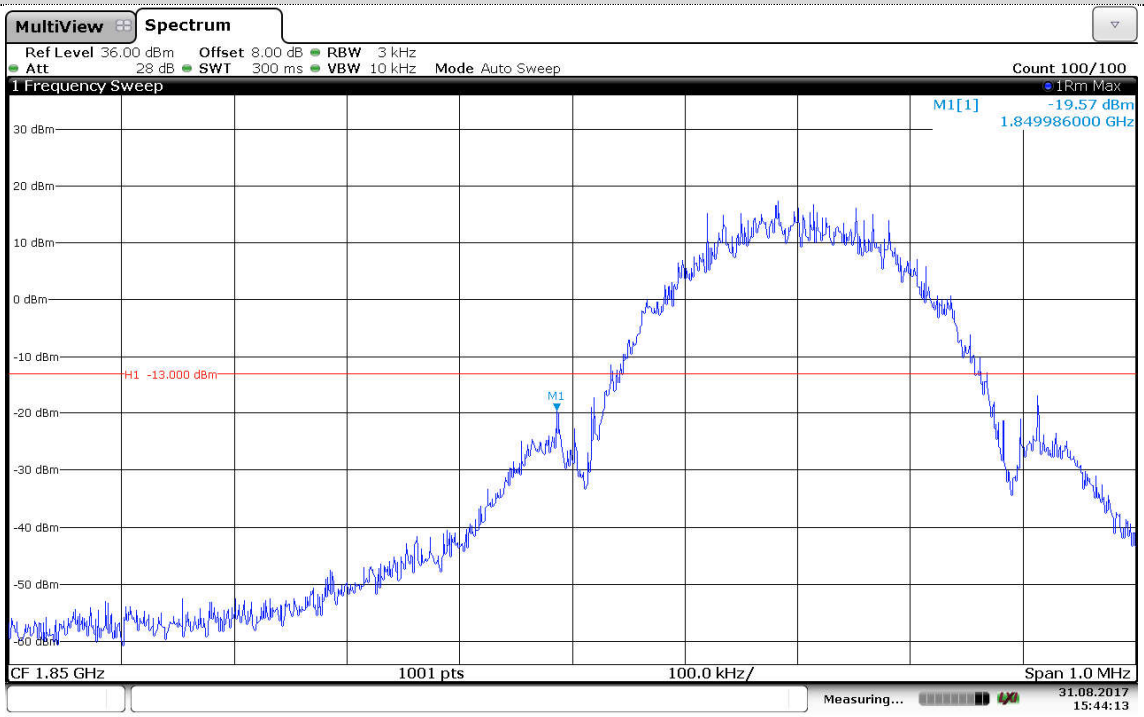
Channel 512



Date: 31.AUG.2017 15:47:07

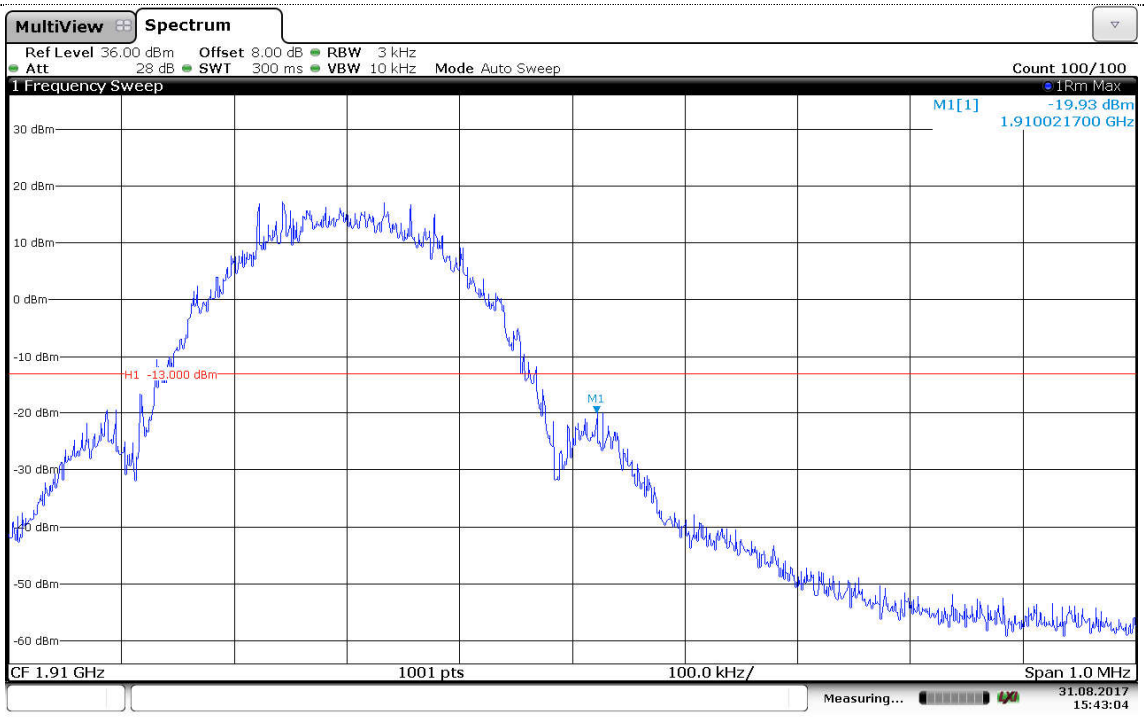
Channel 810

EGPRS1900



Date: 31.AUG.2017 15:44:13

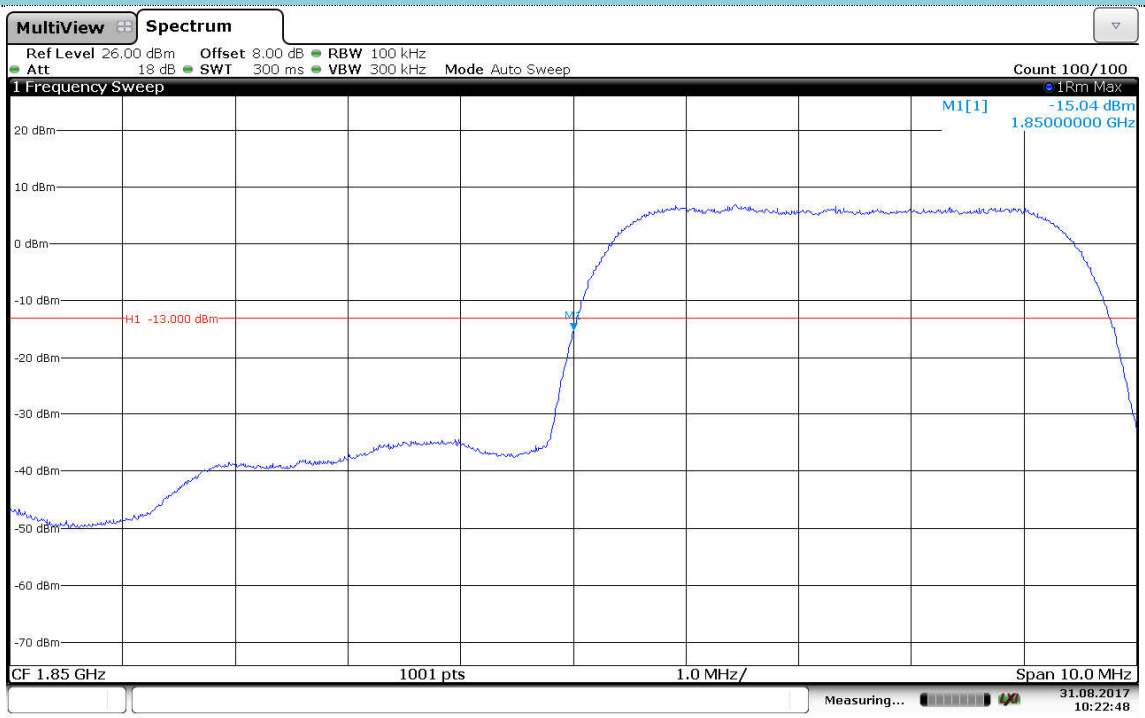
Channel 512



Date: 31.AUG.2017 15:43:04

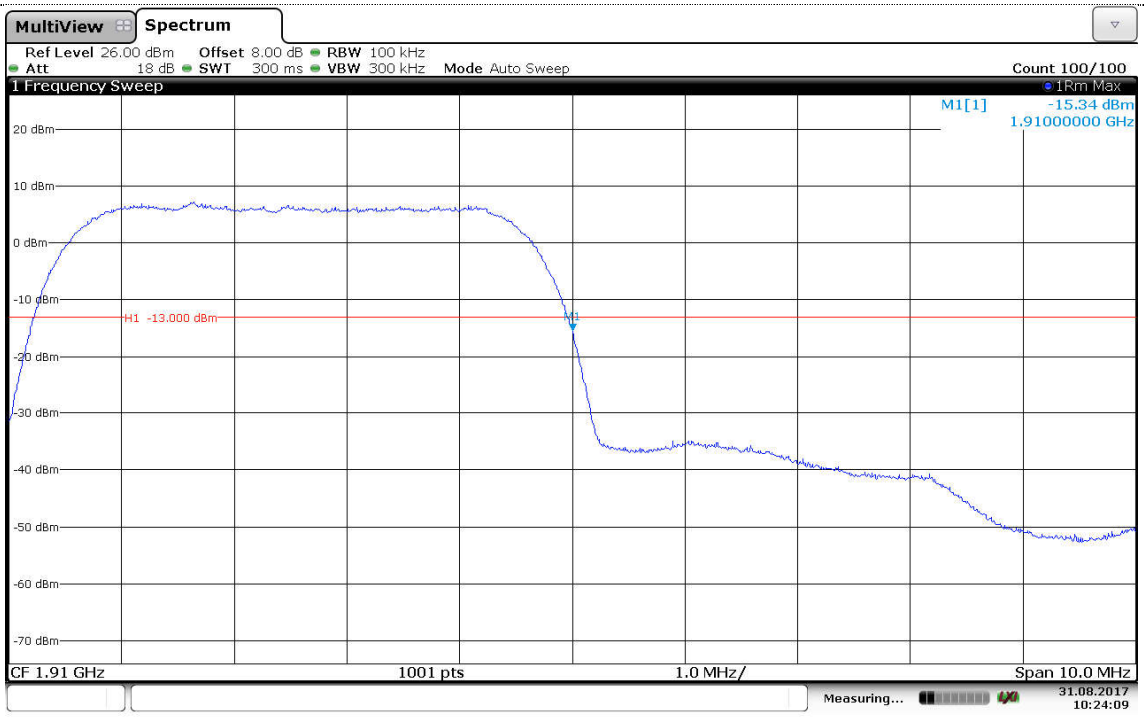
Channel 810

WCDMA Band II



Date: 31.AUG.2017 10:22:49

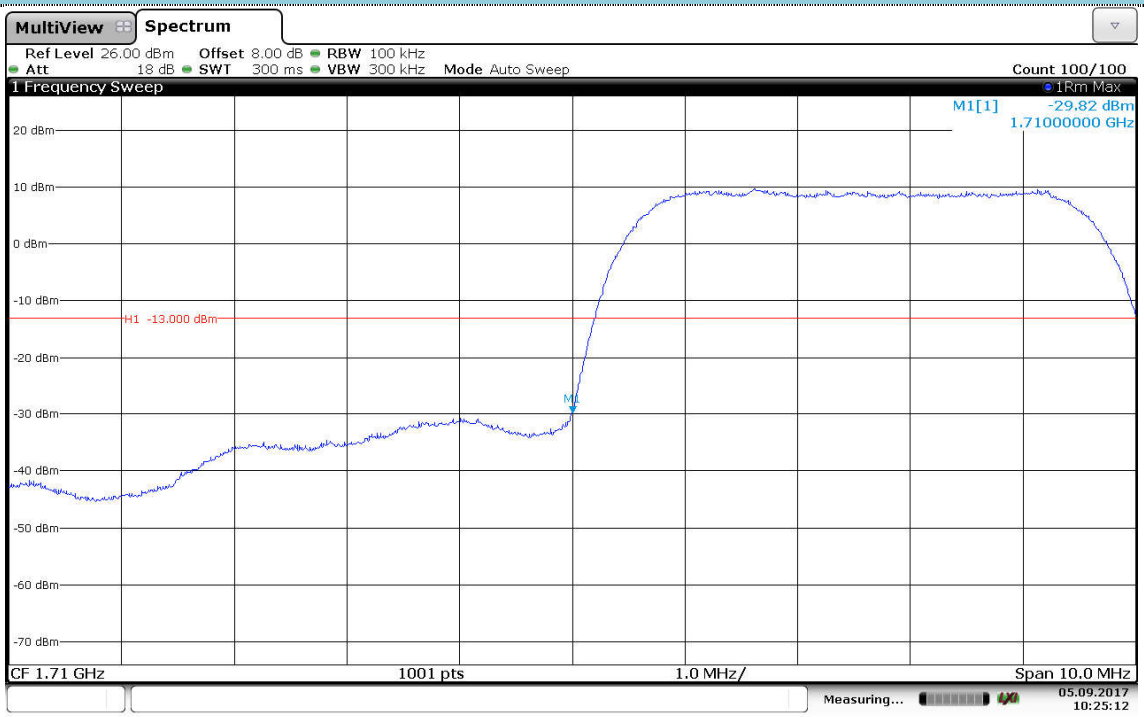
Channel 9262



Date: 31.AUG.2017 10:24:10

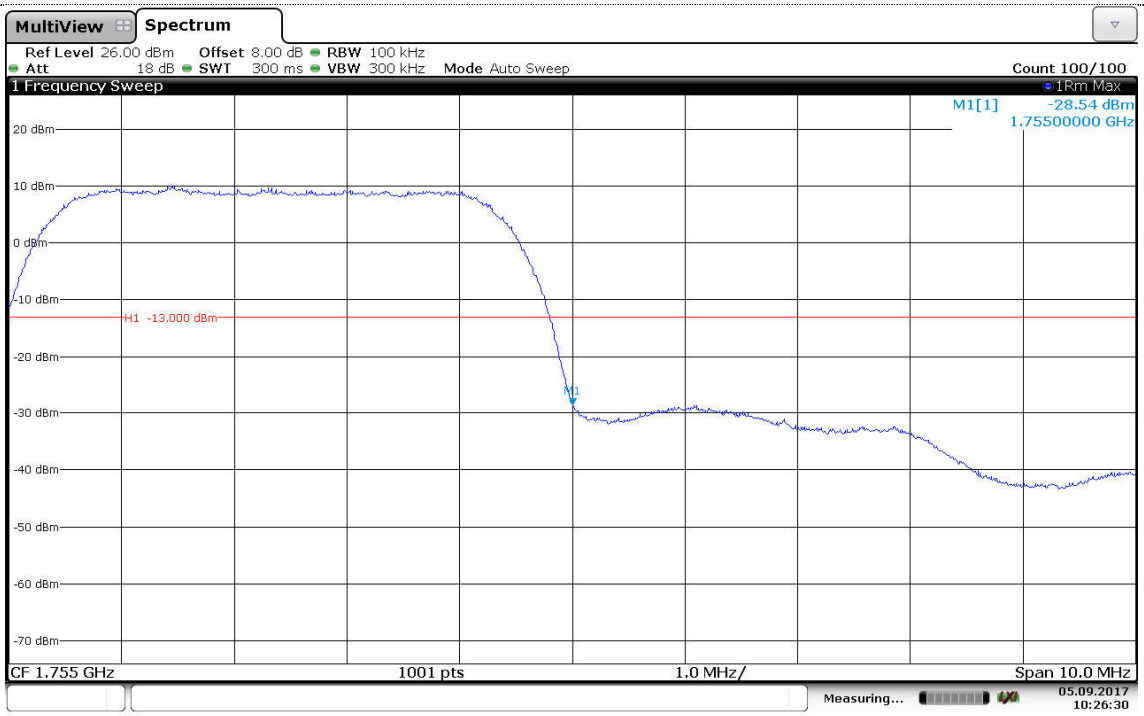
Channel 9538

WCDMA Band IV



Date: 5.SEP.2017 10:25:12

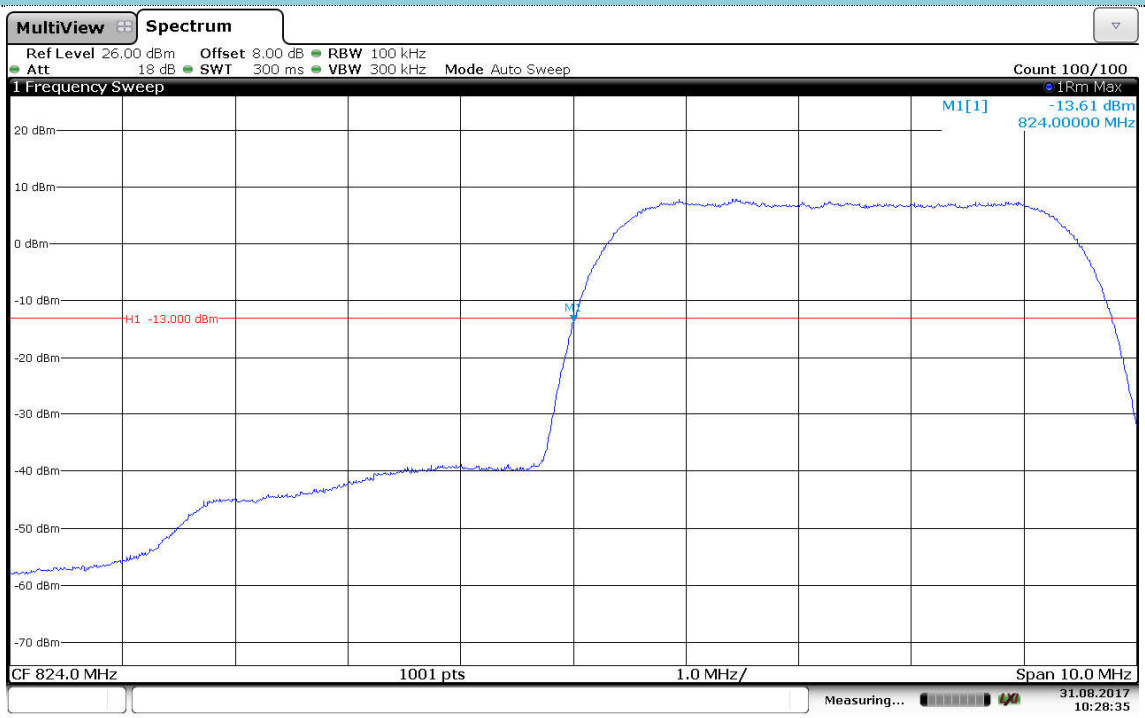
Channel 1313



Date: 5.SEP.2017 10:26:30

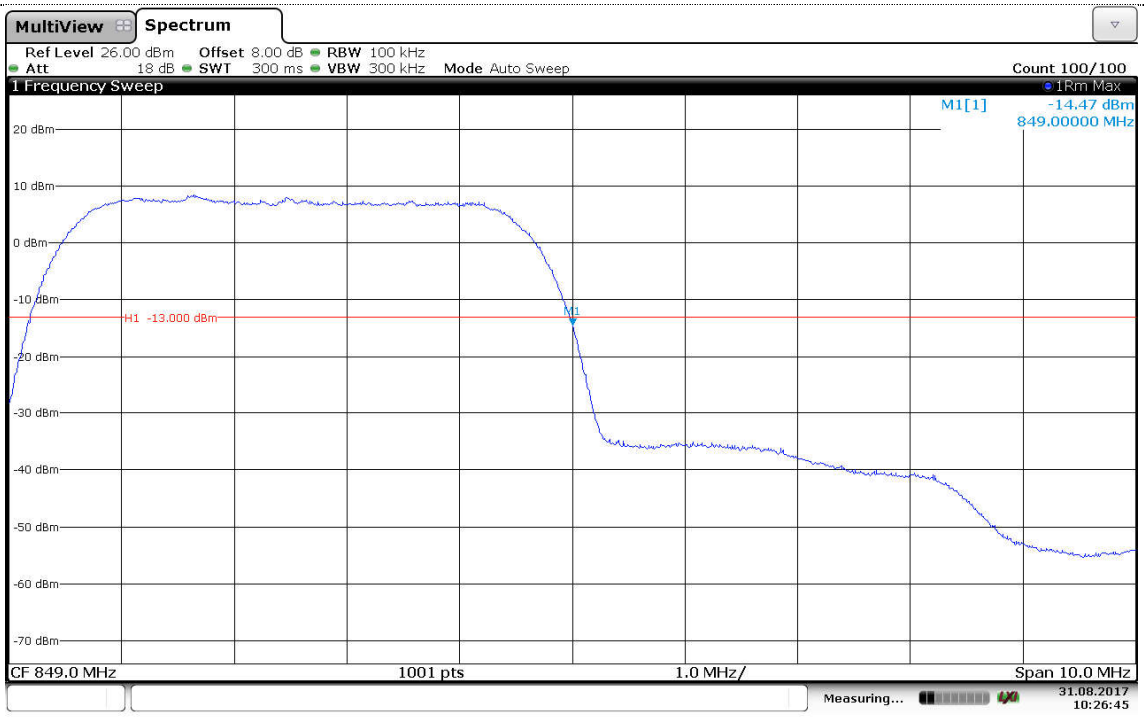
Channel 1512

WCDMA Band V



Date: 31.AUG.2017 10:28:35

Channel 4132



Date: 31.AUG.2017 10:26:46

Channel 4233

5.5. ERP and EIRP

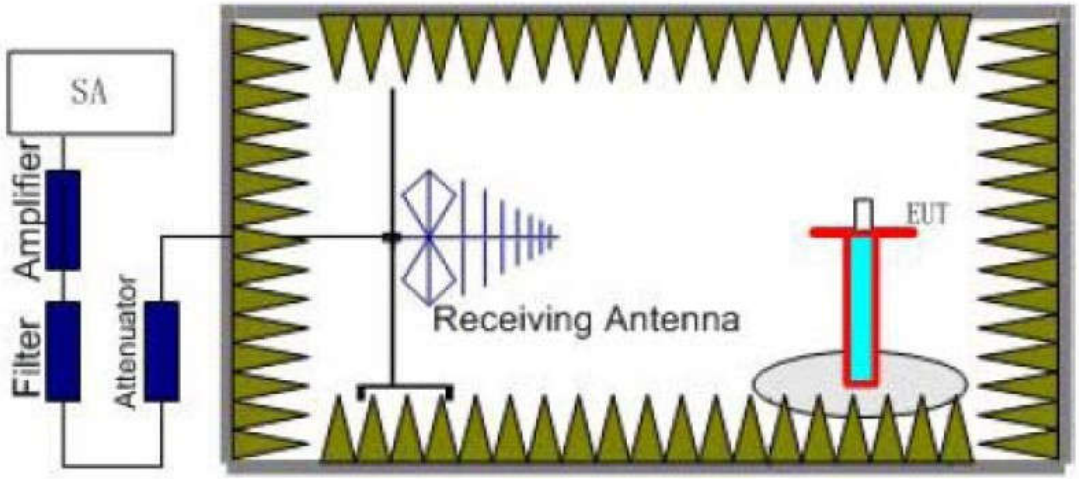
LIMIT

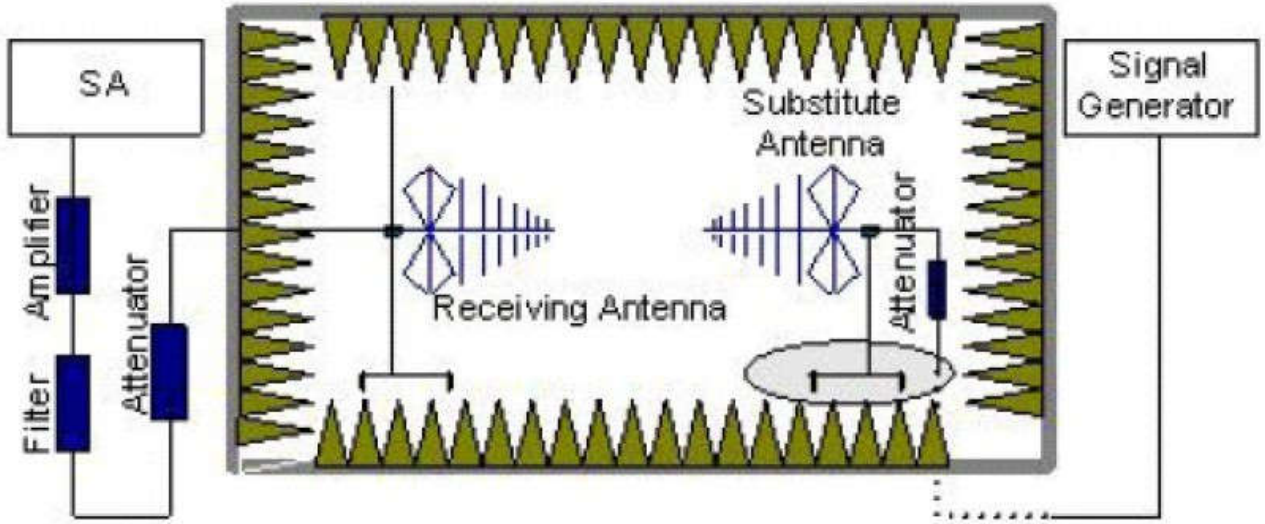
GSM850/WCDMA Band V: 7W ERP

PCS1900/WCDMA Band II: 2W EIRP

WCDMA Band V: 1W EIRP

TEST CONFIGURATION





TEST PROCEDURE

1. EUT was placed on a 0.8 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 1.0m. 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. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz,, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. 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 isconnected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) 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 (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. 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 (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:
   Power(EIRP)=PMea- PAg - Pcl + Ga
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
   ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Mode	Channel	Antenna Pol.	ERP	Limit (dBm)	Result
GSM850	128	V	31.34	38.45	Pass
		H	28.52		
	190	V	31.47		
		H	28.35		
	251	V	31.55		
		H	28.36		
GPRS850	128	V	31.43	38.45	Pass
		H	28.25		
	190	V	31.33		
		H	28.42		
	251	V	31.26		
		H	28.55		
EGPRS850	128	V	26.45	38.45	Pass
		H	23.64		
	190	V	26.52		
		H	23.38		
	251	V	26.33		
		H	23.47		

Mode	Channel	Antenna Pol.	EIRP	Limit (dBm)	Result
PCS1900	512	V	27.34	33.00	Pass
		H	23.22		
	661	V	27.64		
		H	23.64		
	810	V	27.66		
		H	23.34		
GPRS1900	512	V	27.46	33.00	Pass
		H	23.22		
	661	V	27.38		
		H	27.28		
	810	V	27.55		
		H	23.64		
EGPRS1900	512	V	24.58	33.00	Pass
		H	20.65		
	661	V	24.65		
		H	20.36		
	810	V	24.36		
		H	20.66		

Mode	Channel	Antenna Pol.	EIRP	Limit (dBm)	Result
WCDMA Band II	9262	V	20.65	33.00	Pass
		H	18.59		
	9400	V	20.65		
		H	18.74		
	9538	V	20.64		
		H	18.77		

Mode	Channel	Antenna Pol.	EIRP	Limit (dBm)	Result
WCDMA Band IV	1313	V	20.84	30.00	Pass
		H	18.52		
	1450	V	20.65		
		H	18.64		
	1512	V	20.65		
		H	18.74		

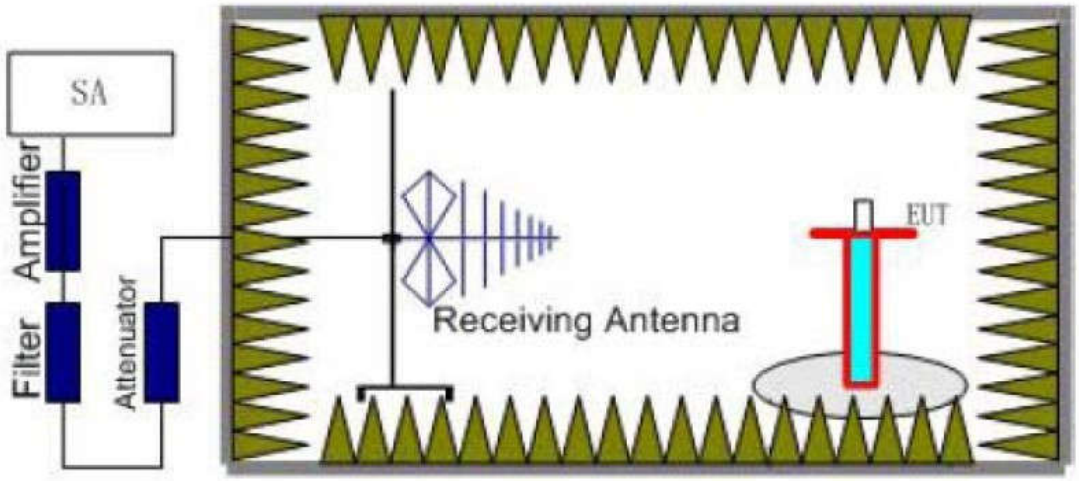
Mode	Channel	Antenna Pol.	ERP	Limit (dBm)	Result
WCDMA Band V	4132	V	22.15	38.45	Pass
		H	20.36		
	4183	V	22.47		
		H	20.58		
	4233	V	22.45		
		H	20.64		

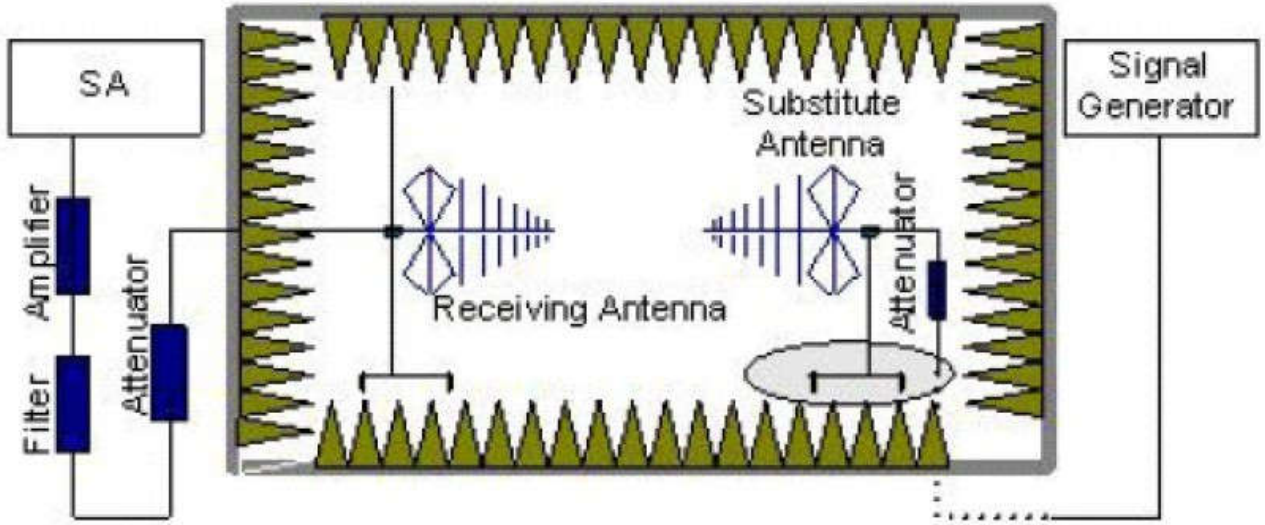
5.6. Radiated Spurious Emission

LIMIT

-13dBm

TEST CONFIGURATION





TEST RESULTS

1. EUT was placed on a 0.8 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 1.0m. 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. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. 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 isconnected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) 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 (Pr). The power of signal source (PMea) is recorded. The test should be

performed by rotating the test item and adjusting the receiving antenna polarization.

5. 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 (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:
   Power(EIRP)=PMea- PAg - Pcl + Ga
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
   ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note: Worst case at GSM850/PCS1900

GSM850					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
128	55.32	Vertical	-62.90	-13.00	Pass
	259.91	V	-53.91		
	1648.51	V	-39.45		
	2472.57	V	-35.94		
	3295.11	V	-42.75		
	4945.67	V	-45.55		
	55.12	Horizontal	-70.75	-13.00	Pass
	259.91	H	-63.25		
	1648.51	H	-43.73		
	2472.57	H	-40.92		
	3295.11	H	-45.25		
	4945.67	H	-48.18		
190	55.12	Vertical	-64.16	-13.00	Pass
	259.91	V	-53.59		
	1674.06	V	-41.72		
	1903.68	V	-38.82		
	3343.25	V	-47.48		
	5017.92	V	-45.18		
	55.32	Horizontal	-64.84	-13.00	Pass
	259.91	H	-53.59		
	1674.06	H	-43.25		
	2510.89	H	-43.54		
	3343.25	H	-45.86		
	7412.26	H	-46.89		
251	54.54	Vertical	-63.15	-13.00	Pass
	259.91	V	-52.89		
	1698.14	V	-50.36		
	2547.01	V	-40.02		
	4179.88	V	-52.39		
	7820.86	V	-44.80		
	55.12	Horizontal	-65.76	-13.00	Pass
	259.91	H	-57.43		
	1698.14	H	-41.19		
	2547.01	H	-37.15		
	4179.88	H	-52.00		
	7466.20	H	-46.90		

Remark:
1. The emission behaviour belongs to narrowband spurious emission.
2. The emission levels of not record in the report are very lower than the limit and not show in test report.

PCS1900					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
512	156.09	Vertical	-63.63	-13.00	Pass
	259.91	V	-62.82		
	1429.11	V	-54.65		
	2402.94	V	-50.34		
	3700.48	V	-24.95		
	5554.08	V	-37.65		
	156.09	Horizontal	-63.63	-13.00	Pass
	233.89	H	-61.33		
	1408.84	H	-53.76		
	2124.74	H	-51.09		
	3700.48	H	-27.38		
	5554.08	H	-37.23		
661	156.09	Vertical	-63.63	-13.00	Pass
	442.01	V	-69.16		
	1360.17	V	-54.31		
	2294.58	V	-50.47		
	3759.98	V	-23.72		
	5635.22	V	-35.52		
	54.54	Horizontal	-70.65	-13.00	Pass
	259.91	H	-62.82		
	1524.81	H	-53.73		
	2259.56	H	-51.13		
	3759.98	H	-23.51		
	5643.40	H	-43.21		
810	58.31	Vertical	-70.60	-13.00	Pass
	233.89	V	-58.39		
	1138.41	V	-56.19		
	2440.18	V	-42.23		
	3820.45	V	-17.23		
	5725.84	V	-29.47		
	85.85	Horizontal	-69.60	-13.00	Pass
	279.83	H	-67.37		
	1572.44	H	-52.19		
	2350.72	H	-50.74		
	3820.45	H	-26.89		
	11469.17	H	-31.13		

Remark:
1. The emission behaviour belongs to narrowband spurious emission.
2. The emission levels of not record in the report are very lower than the limit and not show in test report.

WCDMA Band II					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
9262	59.56	Vertical	-62.11	-13.00	Pass
	266.39	V	-56.34		
	1229.42	V	-54.43		
	1933.18	V	-45.22		
	3700.48	V	-49.70		
	5150.64	V	-49.38		
	59.56	Horizontal	-63.54	-13.00	Pass
	266.39	H	-56.81		
	1776.37	H	-45.91		
	2580.81	H	-46.84		
	3700.48	H	-49.70		
	7969.71	H	-44.99		
9400	59.56	Vertical	-62.11	-13.00	Pass
	266.39	V	-60.34		
	1229.42	V	-54.43		
	1933.18	V	-45.22		
	3754.53	V	-49.22		
	7531.45	V	-45.63		
	266.39	Horizontal	-59.81	-13.00	Pass
	328.96	H	-62.93		
	1776.37	H	-45.91		
	2519.18	H	-47.39		
	3765.44	H	-48.70		
	6804.40	H	-48.05		
9538	54.35	Vertical	-63.87	-13.00	Pass
	429.75	V	-64.74		
	1421.28	V	-55.18		
	1933.18	V	-45.22		
	3814.91	V	-47.20		
	7630.40	V	-46.08		
	59.56	Horizontal	-63.54	-13.00	Pass
	328.96	H	-62.93		
	1776.37	H	-45.91		
	2580.81	H	-46.84		
	3814.91	H	-47.29		
	7630.40	H	-45.84		

Remark:
1. The emission behaviour belongs to narrowband spurious emission.
2. The emission levels of not record in the report are very lower than the limit and not show in test report.

WCDMA Band IV					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
1313	59.56	Vertical	-62.11	-13.00	Pass
	266.39	V	-56.34		
	1229.42	V	-54.43		
	1933.18	V	-45.22		
	3421.73	V	-47.25		
	5150.64	V	-49.38		
	59.56	Horizontal	-63.54	-13.00	Pass
	266.39	H	-56.81		
	1933.18	H	-43.98		
	2519.18	H	-47.39		
	3421.73	H	-47.56		
	5150.64	H	-49.38		
1450	159.98	Vertical	-71.42	-13.00	Pass
	429.75	V	-64.74		
	1076.38	V	-55.79		
	2580.81	V	-48.58		
	3481.80	V	-46.37		
	6393.03	V	-49.43		
	62.78	Horizontal	-65.02	-13.00	Pass
	245.69	H	-62.00		
	1895.33	H	-45.68		
	2580.81	H	-46.84		
	3481.80	H	-49.37		
	7531.45	H	-45.63		
1512	54.35	Vertical	-63.87	-13.00	Pass
	429.75	V	-64.74		
	1290.30	V	-53.61		
	1933.18	V	-43.98		
	3502.06	V	-46.45		
	5128.28	V	-50.34		
	62.78	Horizontal	-65.02	-13.00	Pass
	266.39	H	-59.81		
	1229.42	H	-54.43		
	1907.86	H	-45.61		
	3502.06	H	-44.34		
	5717.54	H	-48.86		

Remark:
1. The emission behaviour belongs to narrowband spurious emission.
2. The emission levels of not record in the report are very lower than the limit and not show in test report.

WCDMA Band V					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
4132	62.56	Vertical	-65.42	-13.00	Pass
	266.39	V	-58.29		
	1780.28	V	-34.60		
	2055.85	V	-49.90		
	3309.48	V	-51.81		
	4137.66	V	-51.14		
	62.56	Horizontal	-65.42	-13.00	Pass
	340.74	H	-58.47		
	1776.37	H	-30.19		
	2055.85	H	-49.86		
	3309.48	H	-51.81		
	4137.66	H	-51.14		
4183	62.56	Vertical	-65.42	-13.00	Pass
	266.39	V	-58.29		
	1672.22	V	-44.19		
	1780.28	V	-34.60		
	3309.48	V	-51.81		
	4137.66	V	-51.14		
	62.56	Horizontal	-65.42	-13.00	Pass
	340.74	H	-58.47		
	1672.22	H	-43.77		
	2055.85	H	-49.86		
	3309.48	H	-51.81		
	4137.66	H	-51.14		
4233	59.35	Vertical	-64.62	-13.00	Pass
	245.69	V	-61.69		
	1524.81	V	-53.65		
	2124.74	V	-50.84		
	3382.26	V	-52.27		
	4107.77	V	-50.94		
	59.35	Horizontal	-65.58	-13.00	Pass
	266.39	H	-58.34		
	1696.27	H	-52.07		
	2335.27	H	-49.18		
	3382.26	H	-52.27		
	4107.77	H	-50.94		

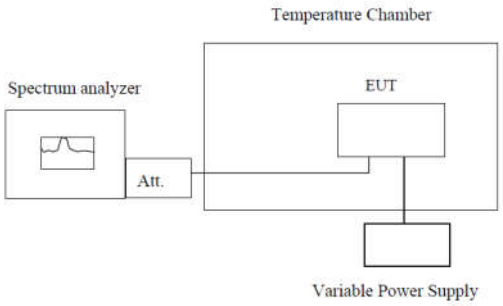
Remark:
3. The emission behaviour belongs to narrowband spurious emission.
4. The emission levels of not record in the report are very lower than the limit and not show in test report.

5.7. Frequency stability V.S. Temperature measurement

LIMIT

2.5ppm

TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

TEST PROCEDURE

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°Coperating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note:Worst case at GSM850/PCS1900/WCDMA B2/B4/B5 mid channel

Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.80	-30	1.29	0.002	2.50	Pass
	-20	1.9	0.002		
	-10	1.49	0.002		
	0	3.78	0.005		
	10	2.07	0.002		
	20	6.3	0.008		
	30	5.55	0.007		
	40	9.56	0.011		
	50	6.65	0.008		
Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.80	-30	7.59	0.004	2.50	Pass
	-20	1.07	0.001		
	-10	6.39	0.003		
	0	7.14	0.004		
	10	2.94	0.002		
	20	6.52	0.003		
	30	1.9	0.001		
	40	10.72	0.006		
	50	18.53	0.010		

Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.80	-30	6.29	0.003	2.50	Pass
	-20	11.9	0.006		
	-10	13.49	0.007		
	0	5.78	0.003		
	10	2.07	0.001		
	20	5.64	0.003		
	30	4.91	0.003		
	40	7.27	0.004		
	50	12.26	0.007		
Reference Frequency: WCDMA Band IV Middle channel=1450 channel=1740MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.80	-30	17.36	0.010	2.50	Pass
	-20	13.17	0.008		
	-10	14.43	0.008		
	0	17.16	0.010		
	10	16.48	0.009		
	20	15.59	0.009		
	30	14.64	0.008		
	40	14.59	0.008		
	50	15.97	0.009		

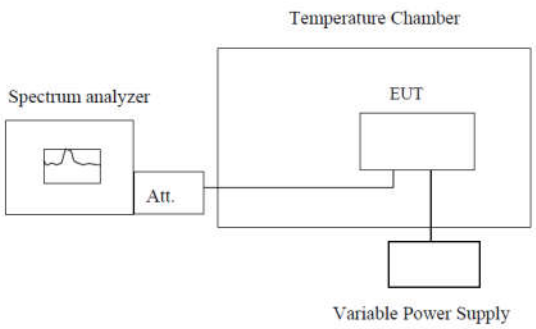
Reference Frequency: WCDMA Band V Middle channel=4182 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.80	-30	7.56	0.009	2.50	Pass
	-20	3.07	0.004		
	-10	4.93	0.006		
	0	7.16	0.009		
	10	6.48	0.008		
	20	5.59	0.007		
	30	4.64	0.006		
	40	4.59	0.005		
	50	5.77	0.007		

5.8. Frequency stability V.S. Voltage measurement

LIMIT

2.5ppm

TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

TEST PROCEDURE

1. Set chamber temperature to 25°C. Use a variable DC power source topower the EUT and set the voltage to rated voltage.
2. Set the spectrum analyzer RBW lowenough to obtain the desired frequency resolution and recorded the frequency.
3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, recordthe maximum frequency change.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note:Worst case at GSM850/PCS1900/WCDMA B2/B4/B5 mid channel

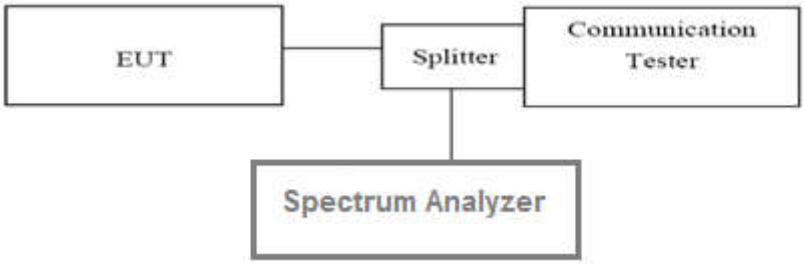
Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.35	6.3	0.008	2.50	Pass
	3.80	5.55	0.007		
	3.60	9.56	0.011		
Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.35	6.52	0.003	2.50	Pass
	3.80	1.9	0.001		
	3.60	10.72	0.006		
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm) Result	
		Hz	ppm		
25	4.35	5.64	0.003	2.50	Pass
	3.80	4.91	0.003		
	3.60	7.27	0.004		
Reference Frequency: WCDMA Band IV Middle channel=1450 channel=1740MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.35	15.59	0.009	2.50	Pass
	3.80	14.64	0.008		
	3.60	14.59	0.008		
Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.35	5.59	0.007	2.50	Pass
	3.80	4.64	0.006		
	3.60	4.59	0.005		

5.9. Peak-Average Ratio

LIMIT

13dB

TEST CONFIGURATION



TEST PROCEDURE

According with KDB 971168
1. The signal analyzer' s CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. Forcontinuoussignals(>98% duty cycle), the measurement interval was set to 1ms. For bursttransmissions, the spectrum analyzer is set to use an internal " RF Burst" trigger that issynced with an incoming pulse and the measurement interval is set to less than the durationof the " on time" of one burst to ensure that energy is only captured during a time in whichthetransmitter is operating at maximum power

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note:Worst case PCS1900,WCDMA BAND1900, WCDMA BAND1700

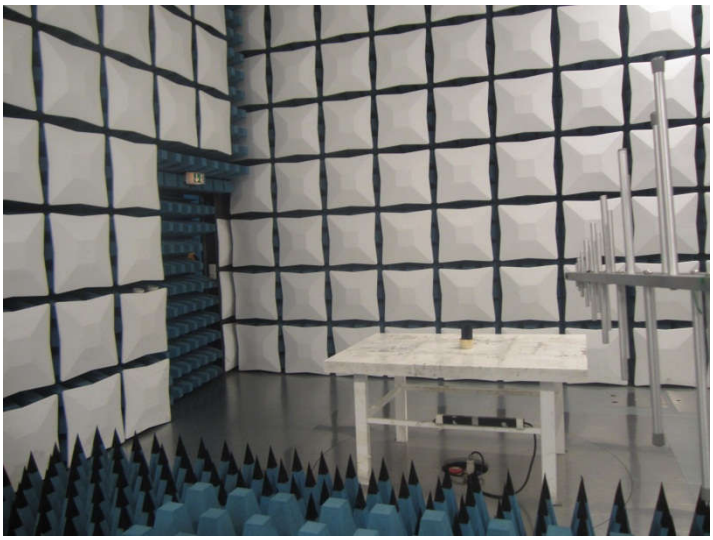
Band	Channel	Frequency(MHz)	PAR	Limit(dB)	Result
PCS1900	512	1850.2	2.52	13.00	Pass
	661	1880.0	2.47	13.00	Pass
	810	1909.8	2.35	13.00	Pass

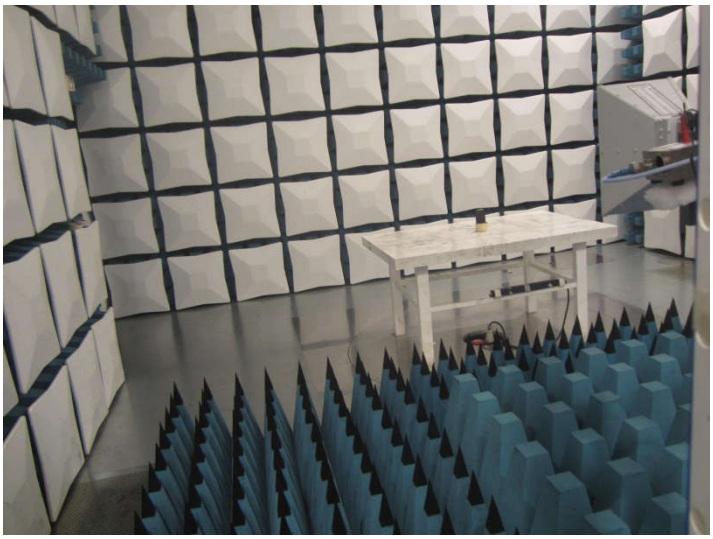
Band	Channel	Frequency(MHz)	PAR	Limit(dB)	Result
WCDMA BAND II	9262	1852.4	2.72	13.00	Pass
	9400	1880.0	2.8	13.00	Pass
	9538	1907.6	2.62	13.00	Pass

Band	Channel	Frequency(MHz)	PAR	Limit(dB)	Result
WCDMA BAND IV	1313	1712.6	2.88	13.00	Pass
	1450	1740.0	2.86	13.00	Pass
	1512	1752.4	2.82	13.00	Pass

6. Test Setup Photos of the EUT

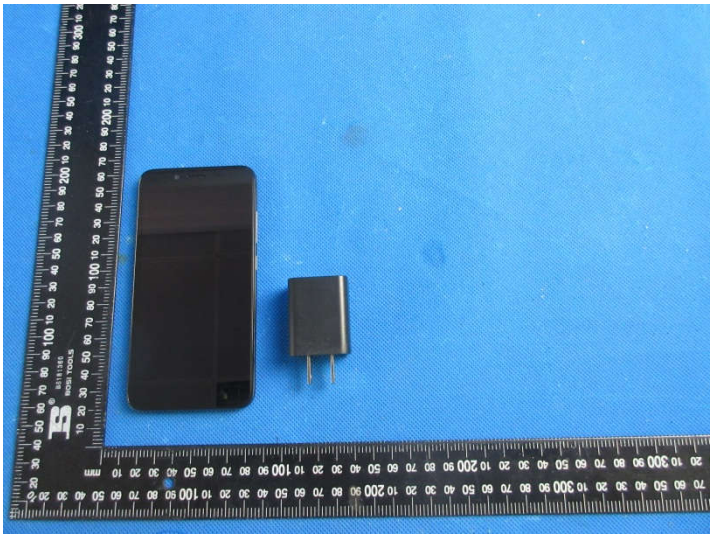
Radiated emission:

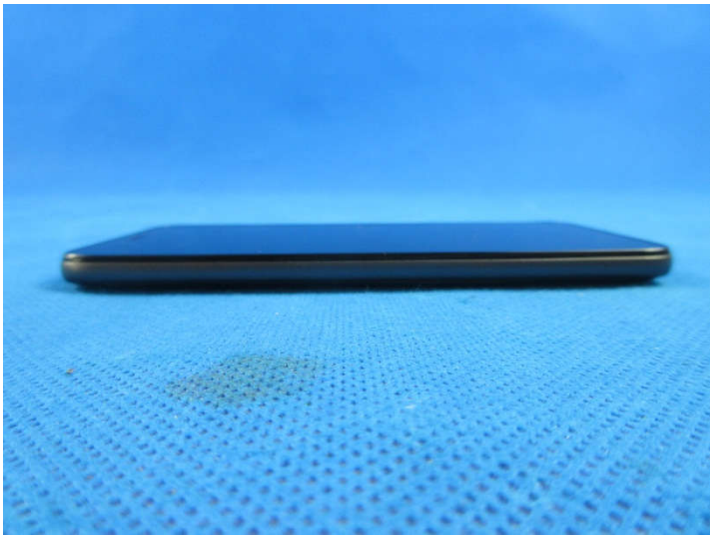


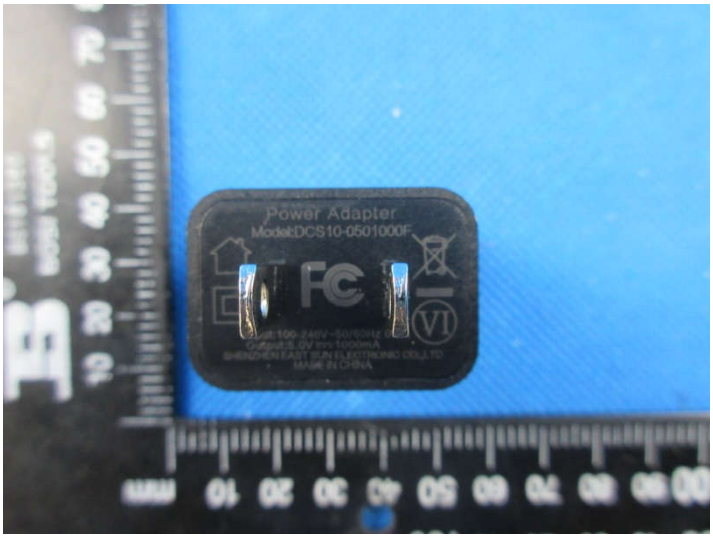


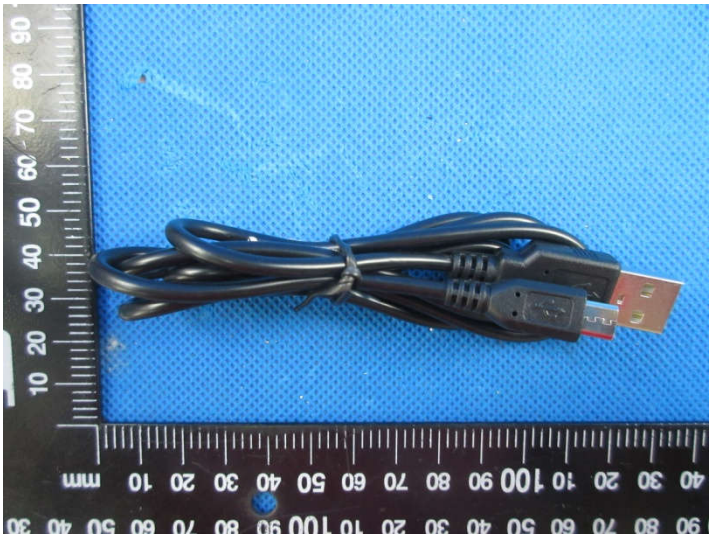
7. External and Internal Photos of the EUT

External photos of the EUT

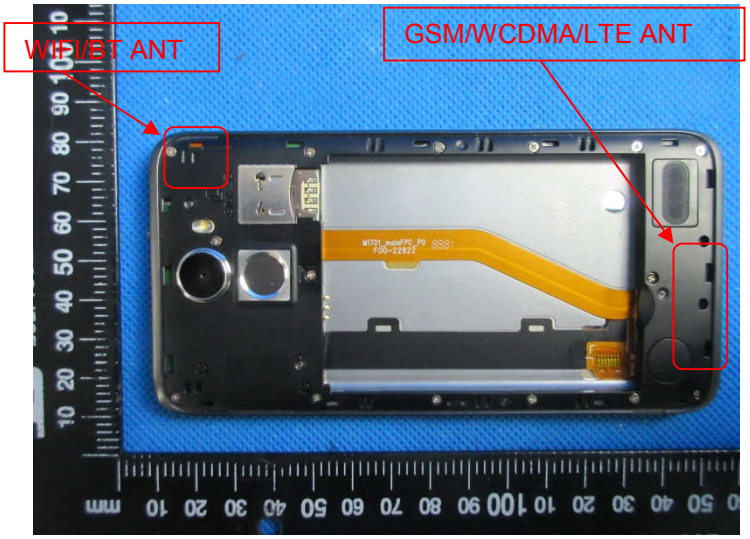


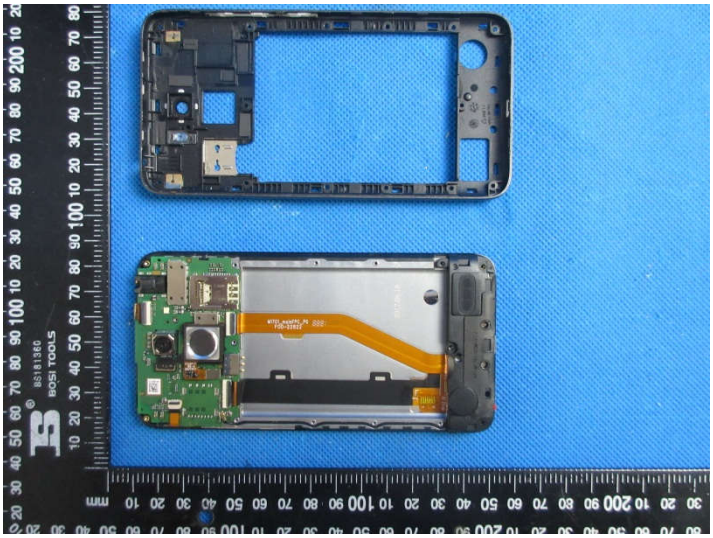


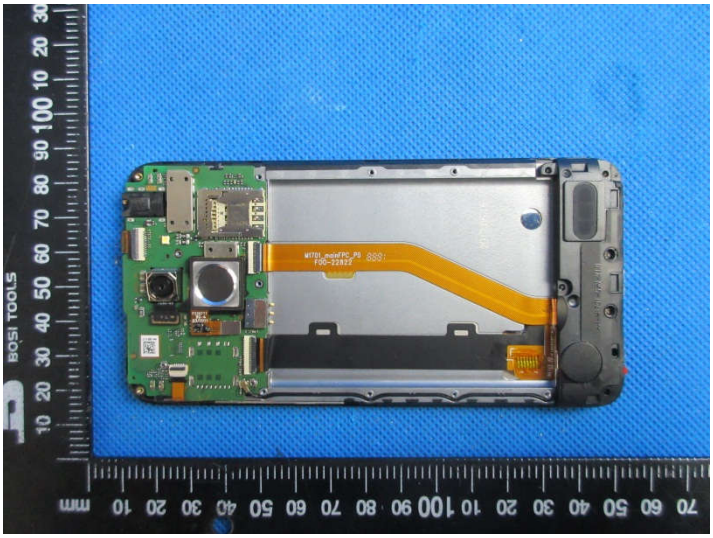

Power Adapter
Model:DCS10-0501000F

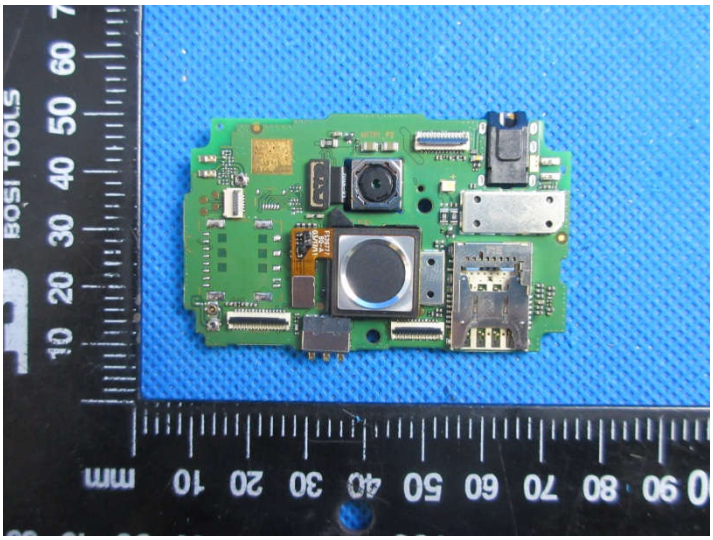


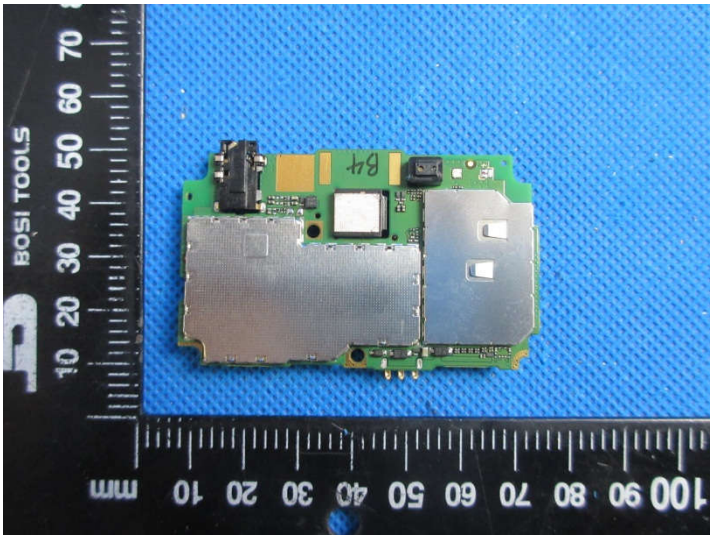
Internal photos of the EUT

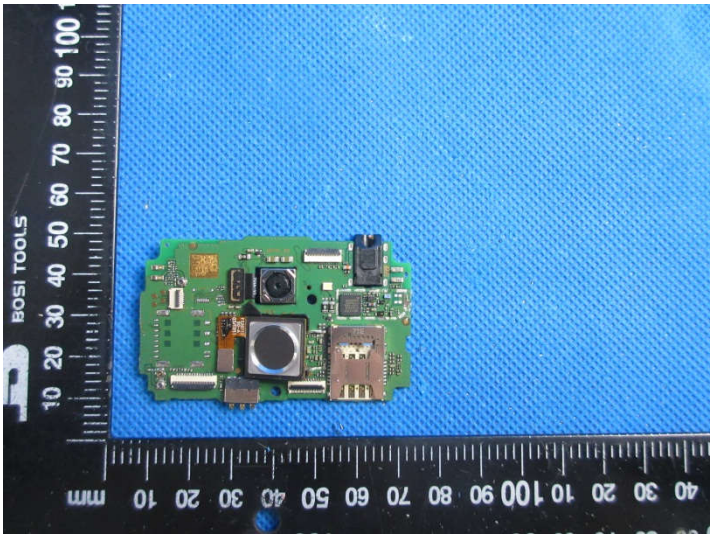


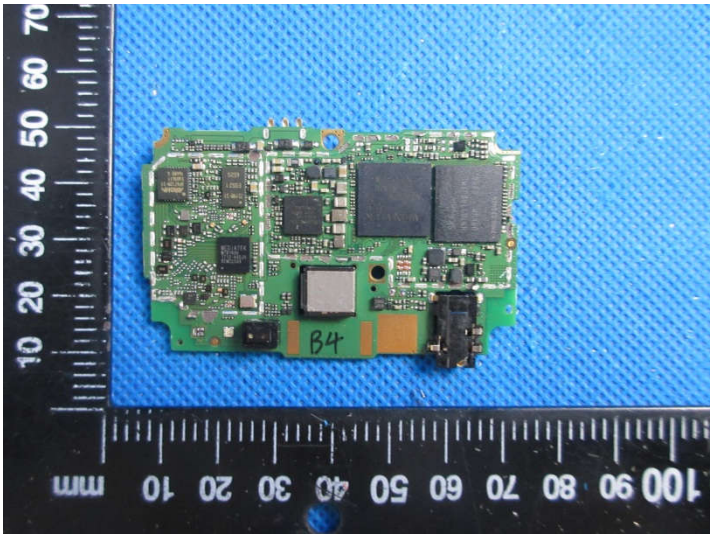

BOSI TOOLS
mm


BOSI TOOLS
mm


BOSI TOOLS
mm







.....End of Report.....