6. RF POWER OUTPUT TEST

6.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY53311015	Oct.15,17	1 Year
2.	Power meter	Anritsu	ML2487A	6K00002472	Apr.22,17	1Year
3.	Power sensor	Anritsu	MA2491A	0033005	Apr.22,17	1Year
4.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr.22,17	1 Year
5.	RF Cable	Marvelous Microwave Inc	SFL402105FLEX	NO.1	Oct.15,17	1 Year

6.2.Limit

1. Part 22.913(a) Mobile station are limited to 7W and for Conducted Power we can use antenna Gain to calculate the limit, so the Conducted Power:
   $P_{cod.}$ (dBm)=EIRP(dBm)-Gain(dBi)
   =7W(38.5dBm)-(3.15dBi-2.15dBi)
   =37.5dBm
2. Part 24.232(b) Peak power measurement, Mobile station are limited to 2W and for conducted Power we can use antenna Gain to calculate the limit, so the Conducted Power:
   $P_{cod.}$ (dBm)=EIRP(dBm)-Gain(dBi)
   =2W(33dBm)-3.15(dBi)
   =29.85dBm

6.3.Test Procedure

The transmitter output was connected to calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power in dBm. The power output at the transmitter antenna port was determined by adding the value of attenuator to the power meter reading.

6.4.Test Result

EUT: Gemini		
M/N: Gemini 4G		
Test date: 2017-12-28	Pressure: 102.1±1.0 kpa	Humidity: 53.2±3.0%
Tested by: Alice_Yang	Test site: RF site	Temperature:22.4±0.6 ℃

Band	Channel	WCDMA	HSPA	Limit
2	9262	26.67	26.18	29.85
	9400	26.46	26.10	29.85
	9538	26.49	26.11	29.85
5	4132	27.84	26.94	37.5
	4183	27.77	26.97	37.5
	4233	27.66	26.94	37.5

7. PEAK-TO-AVERAGE POWER RATIO TEST

7.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY53311015	Oct.15,17	1 Year
2.	Power meter	Anritsu	ML2487A	6K00002472	Apr.22,17	1Year
3.	Power sensor	Anritsu	MA2491A	0033005	Apr.22,17	1Year
4.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr.22,17	1 Year
5.	RF Cable	Marvelous Microwave Inc	SFL402105FLEX	NO.1	Oct.15,17	1 Year

7.2.Limit

FCC Part 24.232:

(a) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

(b) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

7.3.Test Procedure

According to KDB 971168:

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1 ms

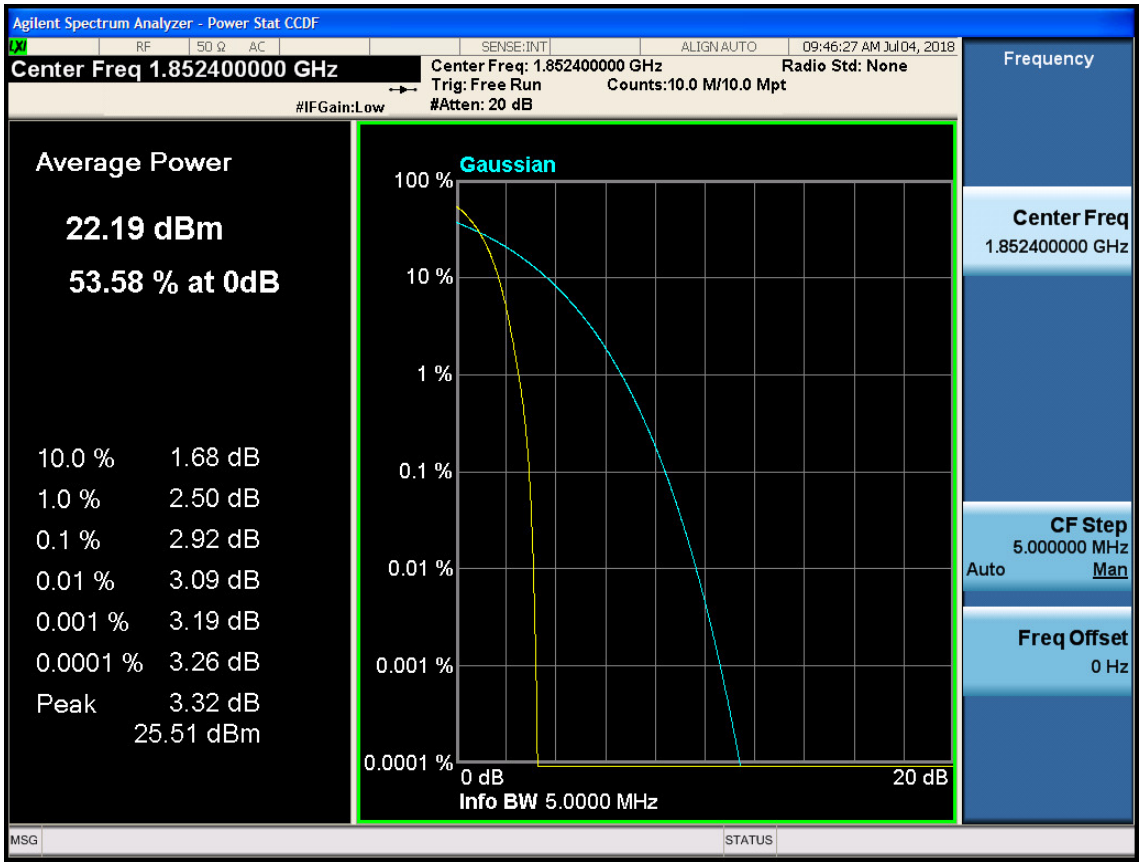
e) Record the maximum PAPR level associated with a probability of 0.1%

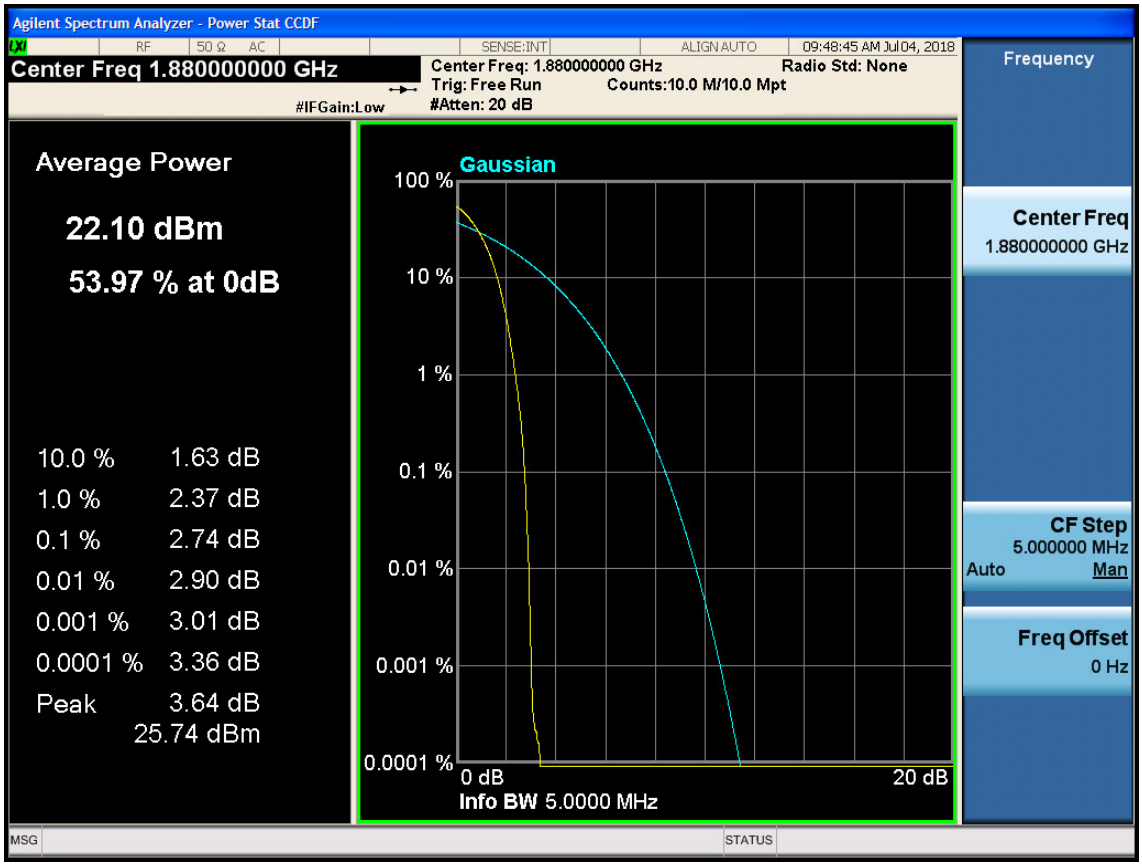
7.4.Test Result

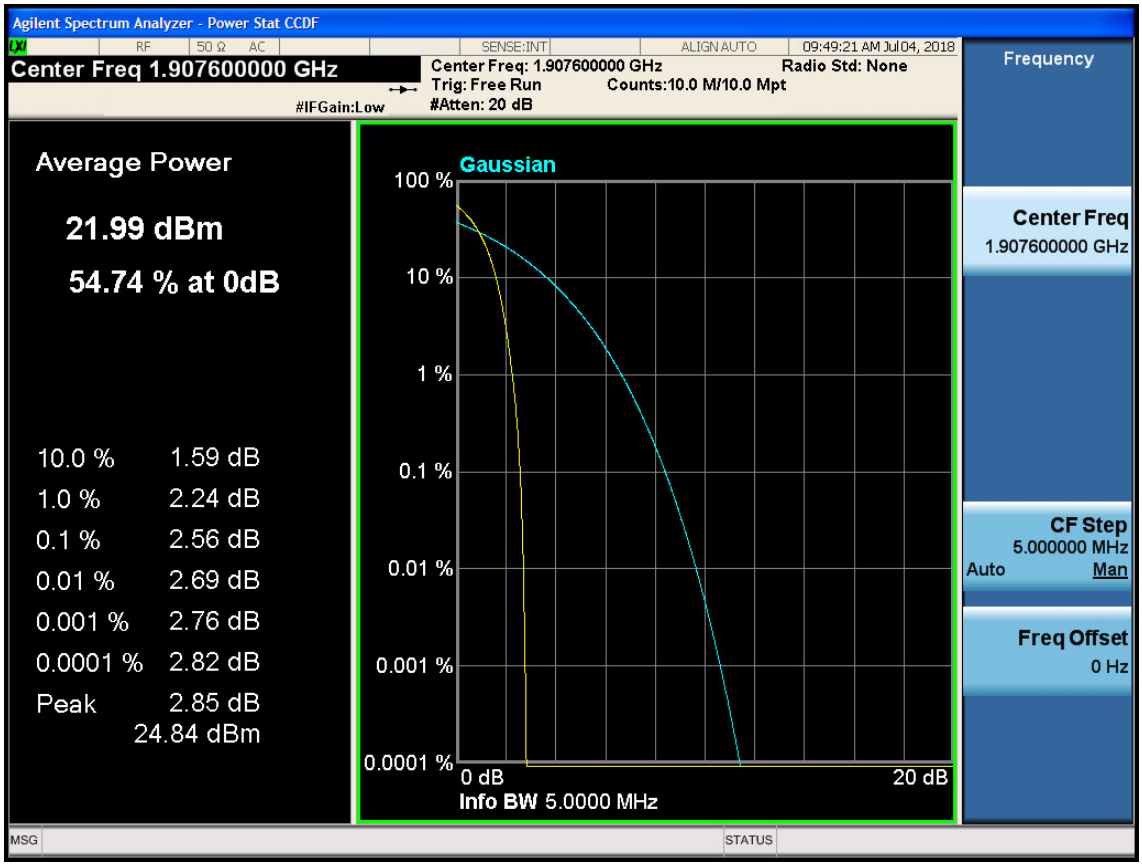
Mode	Modulation	Channel	Peak to Average Ratio (PAR)	Limit (dB)
Band 2	WCDMA	9262	2.92	≤ 13
		9400	2.74	≤ 13
		9538	2.56	≤ 13
	HSPA	9262	4.90	≤ 13
		9400	4.73	≤ 13
		9538	4.61	≤ 13
Band 5	WCDMA	4132	2.79	≤ 13
		4183	2.63	≤ 13
		4233	2.44	≤ 13
	HSPA	4132	4.71	≤ 13
		4183	4.61	≤ 13
		4233	4.45	≤ 13
Conclusion：PASS				

WCDMA

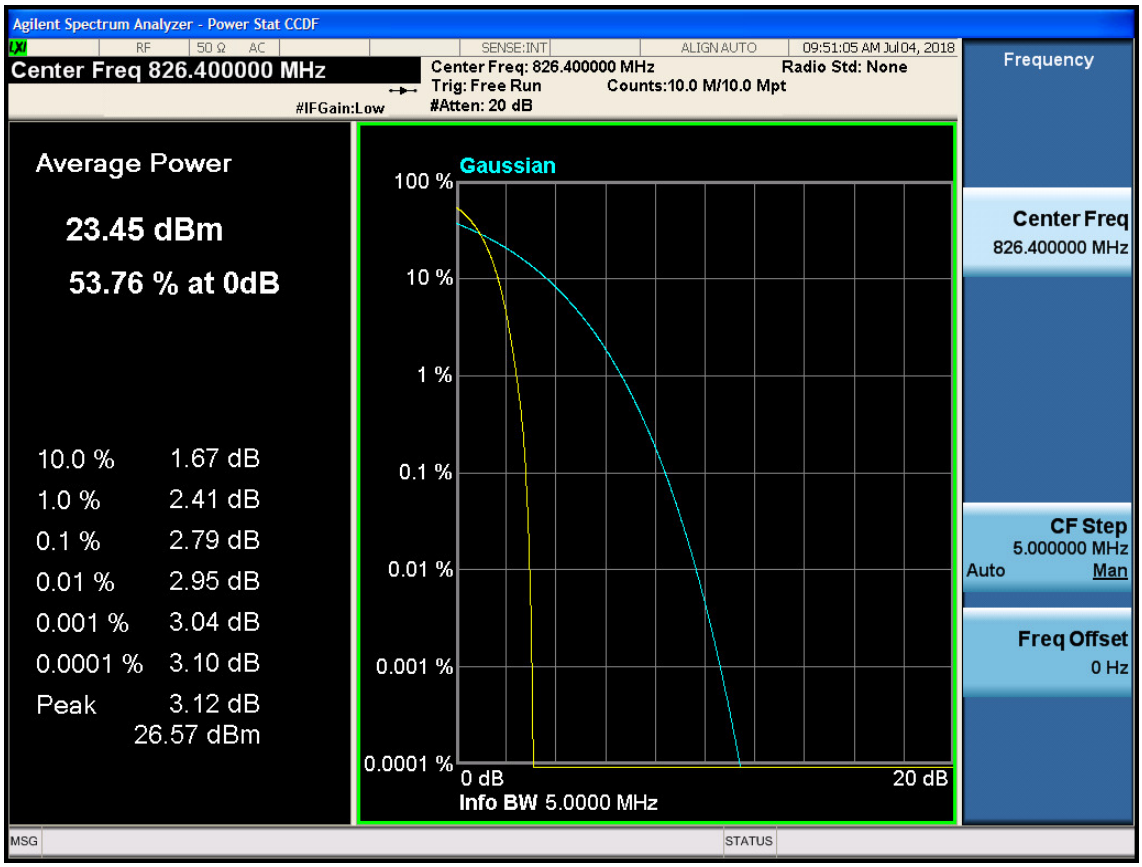
Band 2

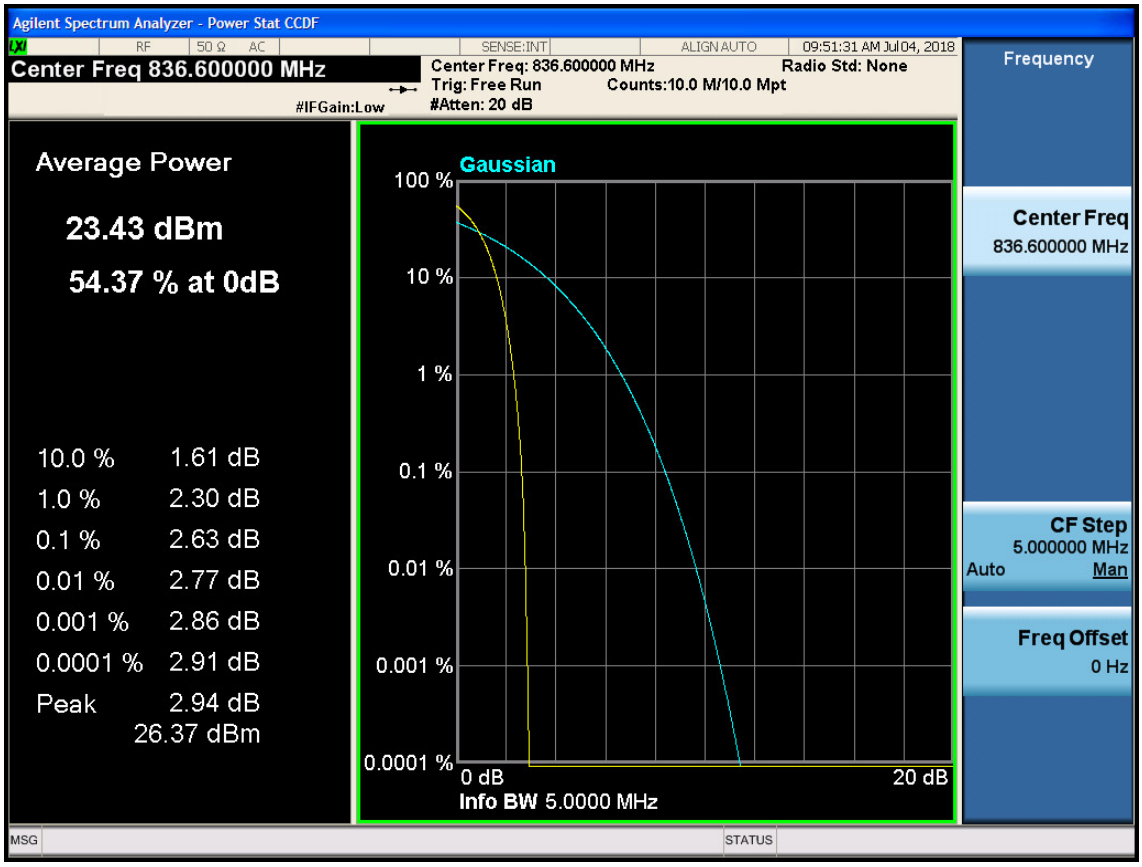

Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:46:27 AM Jul 04, 2018
Center Freq 1.852400000 GHz
Center Freq: 1.852400000 GHz
Trig: Free Run
#Atten: 20 dB
Counts:10.0 M/10.0 Mpt
Radio Std: None
#IFGain:Low
Frequency
Average Power
22.19 dBm
53.58 % at 0dB
10.0 % 1.68 dB
1.0 % 2.50 dB
0.1 % 2.92 dB
0.01 % 3.09 dB
0.001 % 3.19 dB
0.0001 % 3.26 dB
Peak 3.32 dB
25.51 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
1.852400000 GHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

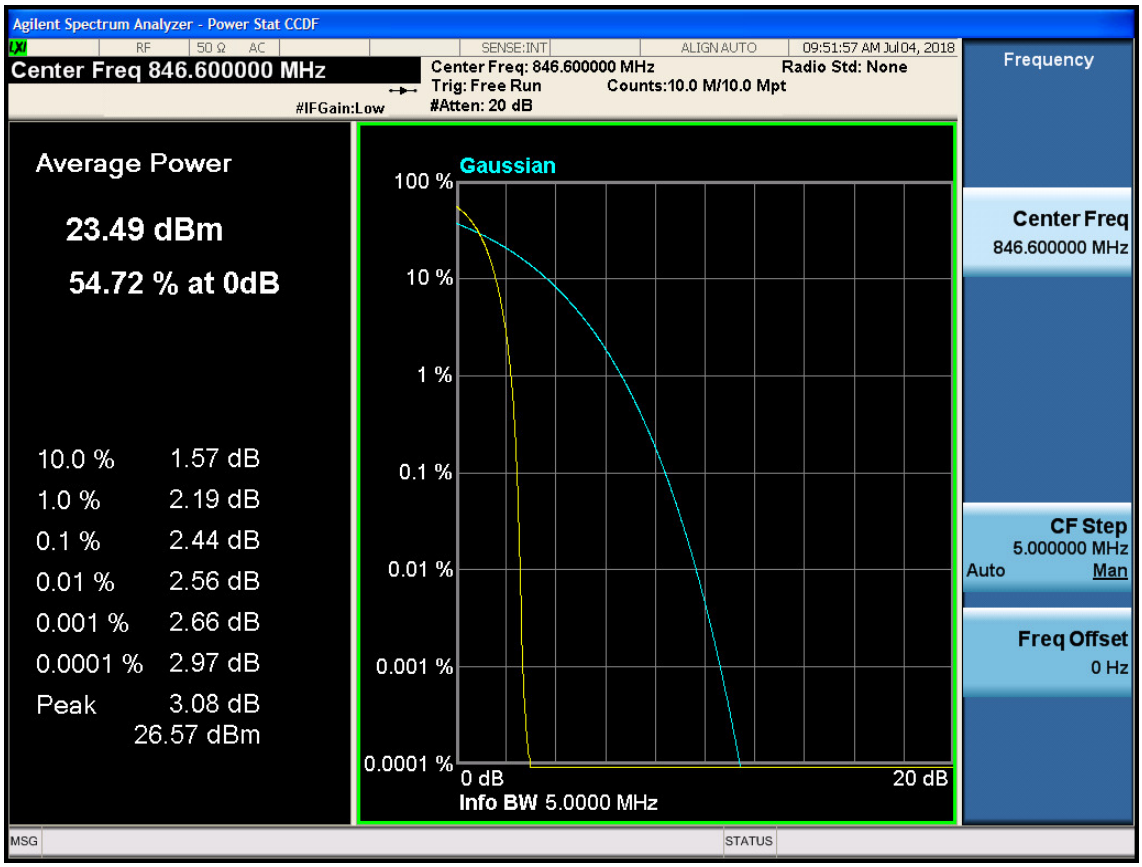

Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:48:45 AM Jul 04, 2018
Center Freq 1.880000000 GHz
Center Freq: 1.880000000 GHz
Trig: Free Run
#Atten: 20 dB
Counts:10.0 M/10.0 Mpt
Radio Std: None
#IFGain:Low
Frequency
Average Power
22.10 dBm
53.97 % at 0dB
10.0 % 1.63 dB
1.0 % 2.37 dB
0.1 % 2.74 dB
0.01 % 2.90 dB
0.001 % 3.01 dB
0.0001 % 3.36 dB
Peak 3.64 dB
25.74 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
1.880000000 GHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS


Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:49:21 AM Jul 04, 2018
Center Freq 1.907600000 GHz
#IFGain:Low
Center Freq: 1.907600000 GHz
Trig: Free Run
#Atten: 20 dB
Counts:10.0 M/10.0 Mpt
Radio Std: None
Frequency
Average Power
21.99 dBm
54.74 % at 0dB
10.0 % 1.59 dB
1.0 % 2.24 dB
0.1 % 2.56 dB
0.01 % 2.69 dB
0.001 % 2.76 dB
0.0001 % 2.82 dB
Peak 2.85 dB
24.84 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
1.907600000 GHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

Band 5

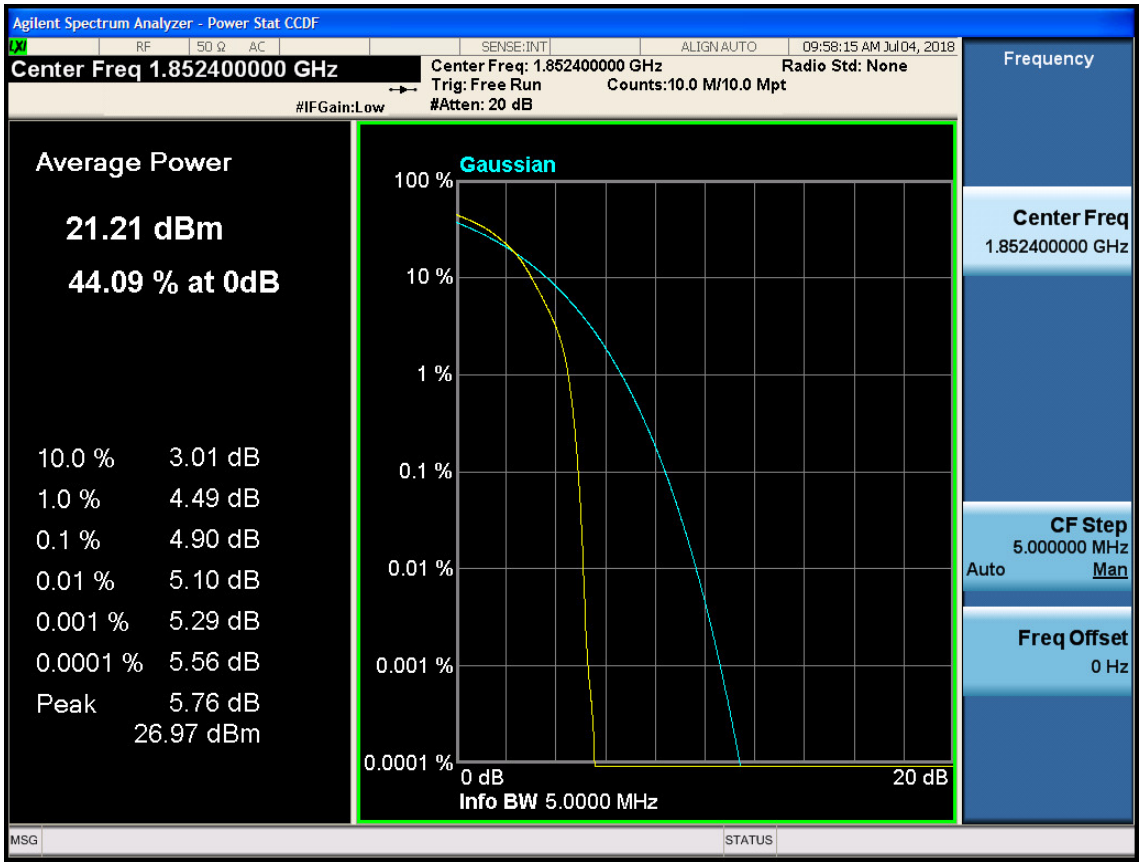

Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:51:05 AM Jul 04, 2018
Center Freq 826.400000 MHz
#IFGain:Low
Center Freq: 826.400000 MHz
Trig: Free Run
#Atten: 20 dB
Counts:10.0 M/10.0 Mpt
Radio Std: None
Frequency
Average Power
23.45 dBm
53.76 % at 0dB
10.0 % 1.67 dB
1.0 % 2.41 dB
0.1 % 2.79 dB
0.01 % 2.95 dB
0.001 % 3.04 dB
0.0001 % 3.10 dB
Peak 3.12 dB
26.57 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
826.400000 MHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

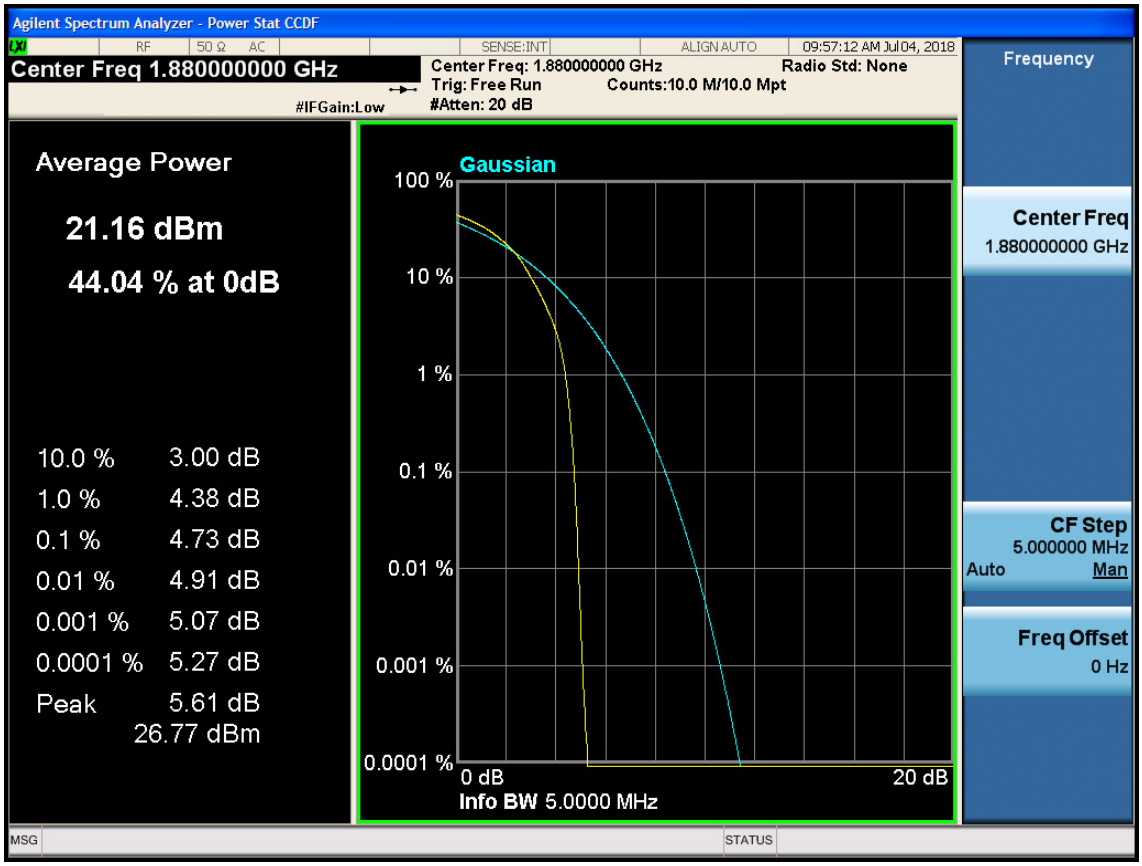

Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:51:31 AM Jul 04, 2018
Center Freq 836.600000 MHz
#IFGain:Low
Center Freq: 836.600000 MHz
Trig: Free Run
#Atten: 20 dB
Radio Std: None
Counts:10.0 M/10.0 Mpt
Frequency
Average Power
23.43 dBm
54.37 % at 0dB
10.0 % 1.61 dB
1.0 % 2.30 dB
0.1 % 2.63 dB
0.01 % 2.77 dB
0.001 % 2.86 dB
0.0001 % 2.91 dB
Peak 2.94 dB
26.37 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
836.600000 MHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

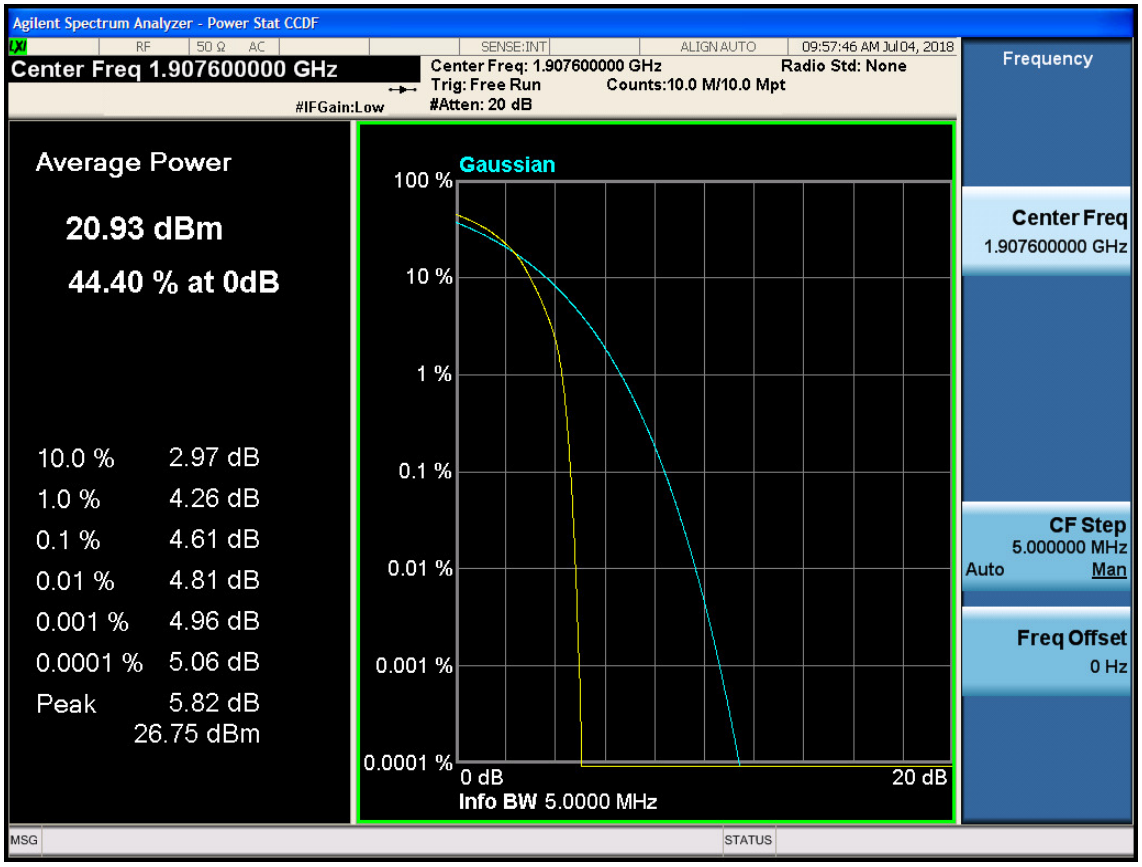

Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:51:57 AM Jul 04, 2018
Center Freq 846.600000 MHz
#IFGain:Low
Center Freq: 846.600000 MHz
Trig: Free Run
#Atten: 20 dB
Radio Std: None
Counts:10.0 M/10.0 Mpt
Frequency
Average Power
23.49 dBm
54.72 % at 0dB
10.0 % 1.57 dB
1.0 % 2.19 dB
0.1 % 2.44 dB
0.01 % 2.56 dB
0.001 % 2.66 dB
0.0001 % 2.97 dB
Peak 3.08 dB
26.57 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
846.600000 MHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

HSPA

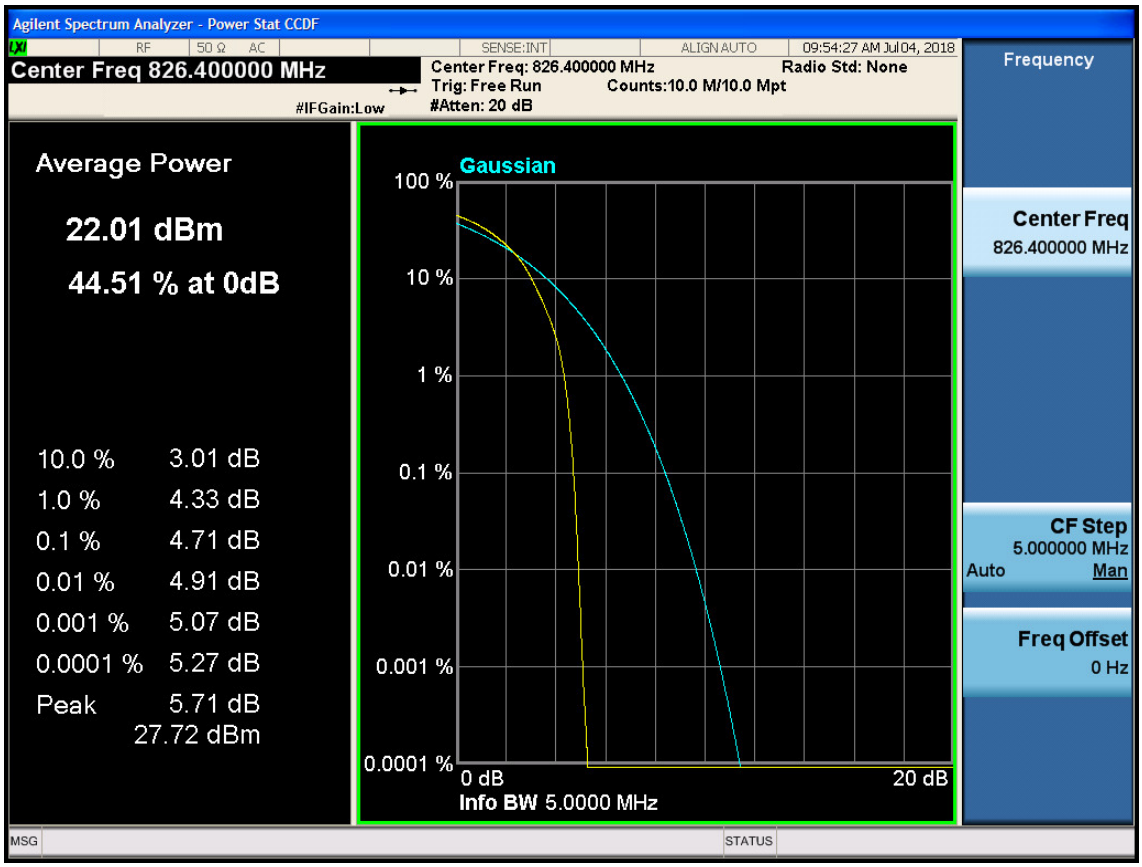
Band 2

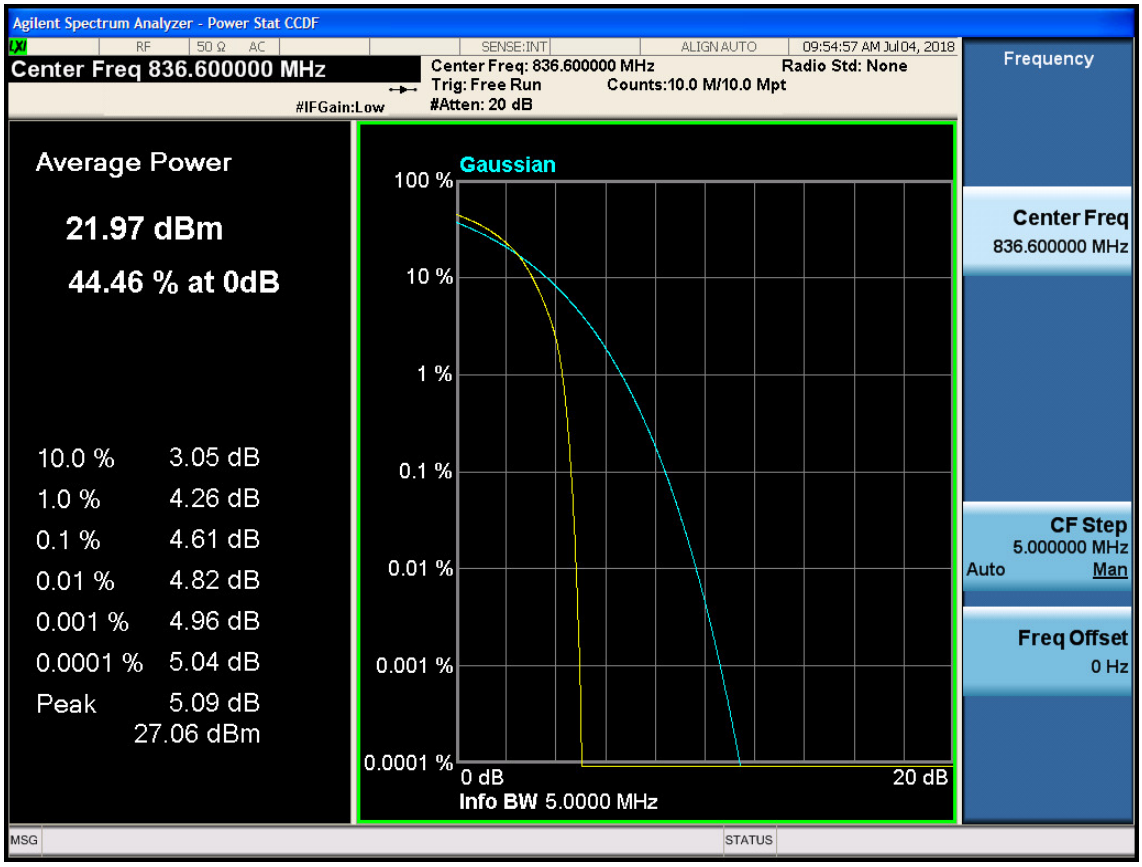

Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:58:15 AM Jul 04, 2018
Center Freq 1.852400000 GHz
Center Freq: 1.852400000 GHz
Trig: Free Run
#Atten: 20 dB
Counts:10.0 M/10.0 Mpt
Radio Std: None
#IFGain:Low
Frequency
Average Power
21.21 dBm
44.09 % at 0dB
10.0 % 3.01 dB
1.0 % 4.49 dB
0.1 % 4.90 dB
0.01 % 5.10 dB
0.001 % 5.29 dB
0.0001 % 5.56 dB
Peak 5.76 dB
26.97 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
1.852400000 GHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

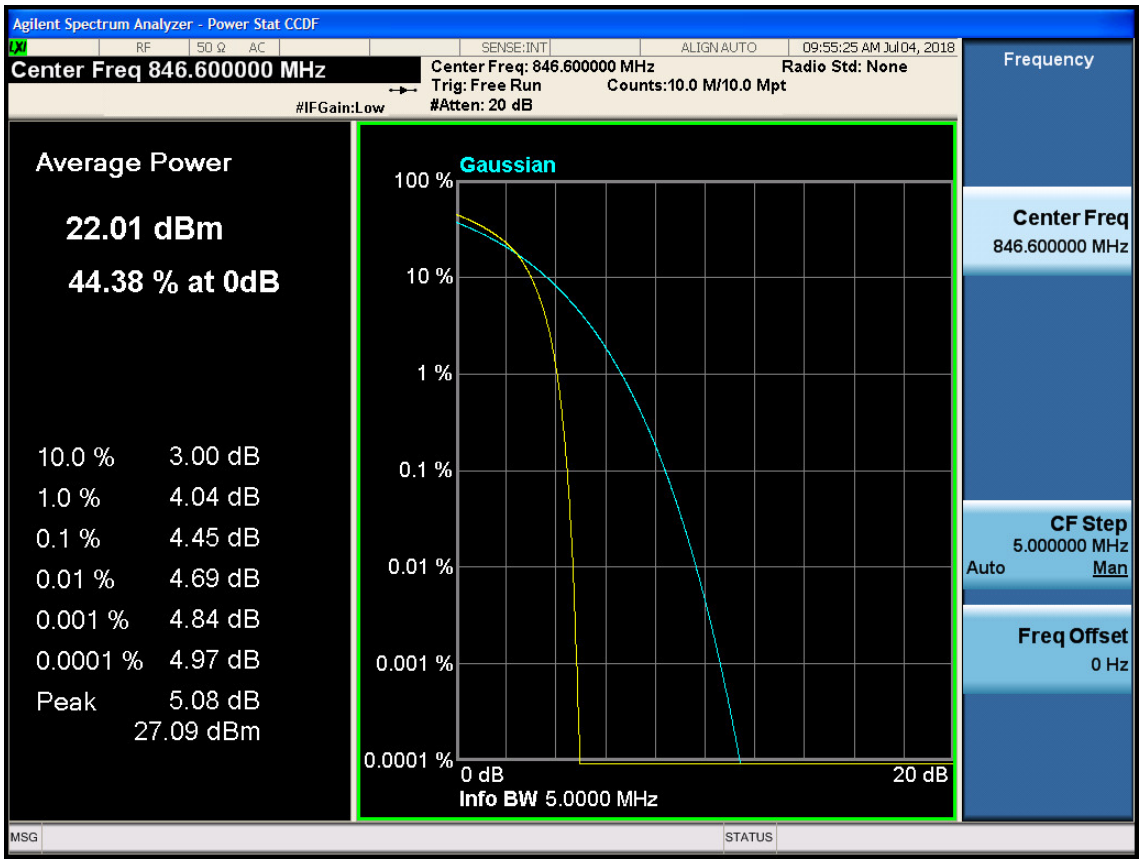

Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:57:12 AM Jul 04, 2018
Center Freq 1.880000000 GHz
Center Freq: 1.880000000 GHz
Trig: Free Run
#Atten: 20 dB
Counts:10.0 M/10.0 Mpt
Radio Std: None
#IFGain:Low
Frequency
Average Power
21.16 dBm
44.04 % at 0dB
10.0 % 3.00 dB
1.0 % 4.38 dB
0.1 % 4.73 dB
0.01 % 4.91 dB
0.001 % 5.07 dB
0.0001 % 5.27 dB
Peak 5.61 dB
26.77 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
1.880000000 GHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS


Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:57:46 AM Jul 04, 2018
Center Freq 1.907600000 GHz
Center Freq: 1.907600000 GHz
Trig: Free Run
Counts:10.0 M/10.0 Mpt
#Atten: 20 dB
Radio Std: None
#IFGain:Low
Frequency
Average Power
20.93 dBm
44.40 % at 0dB
10.0 % 2.97 dB
1.0 % 4.26 dB
0.1 % 4.61 dB
0.01 % 4.81 dB
0.001 % 4.96 dB
0.0001 % 5.06 dB
Peak 5.82 dB
26.75 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
1.907600000 GHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

Band 5


Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:54:27 AM Jul 04, 2018
Center Freq 826.400000 MHz
Center Freq: 826.400000 MHz
Trig: Free Run
Counts:10.0 M/10.0 Mpt
#Atten: 20 dB
Radio Std: None
#IFGain:Low
Frequency
Average Power
22.01 dBm
44.51 % at 0dB
10.0 % 3.01 dB
1.0 % 4.33 dB
0.1 % 4.71 dB
0.01 % 4.91 dB
0.001 % 5.07 dB
0.0001 % 5.27 dB
Peak 5.71 dB
27.72 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
826.400000 MHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS


Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:54:57 AM Jul 04, 2018
Center Freq 836.600000 MHz
Center Freq: 836.600000 MHz
Trig: Free Run
Counts:10.0 M/10.0 Mpt
#Atten: 20 dB
Radio Std: None
#IFGain:Low
Frequency
Average Power
21.97 dBm
44.46 % at 0dB
10.0 % 3.05 dB
1.0 % 4.26 dB
0.1 % 4.61 dB
0.01 % 4.82 dB
0.001 % 4.96 dB
0.0001 % 5.04 dB
Peak 5.09 dB
27.06 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
836.600000 MHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS


Agilent Spectrum Analyzer - Power Stat CCDF
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
09:55:25 AM Jul 04, 2018
Center Freq 846.600000 MHz
Center Freq: 846.600000 MHz
Trig: Free Run
Counts:10.0 M/10.0 Mpt
#Atten: 20 dB
Radio Std: None
#IFGain:Low
Frequency
Average Power
22.01 dBm
44.38 % at 0dB
10.0 % 3.00 dB
1.0 % 4.04 dB
0.1 % 4.45 dB
0.01 % 4.69 dB
0.001 % 4.84 dB
0.0001 % 4.97 dB
Peak 5.08 dB
27.09 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz
Center Freq
846.600000 MHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

8. FIELD STRENGTH OF RADIATED SPURIOUS EMISSIONS

8.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY53311015	Oct.15,17	1 Year
2.	Preamplifier	HP	8449B	3008A02495	Apr.22.17	1 Year
3.	Preamplifier	Agilent	8447D	2944A11159	Apr.22,17	1Year
4.	Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	493	Jun.27.17	1 Year
5.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	May.15,17	1 Year
6.	Horn Antenna	EMCO	3116	0062643	Oct.10,17	1 Year
7.	Antenna and turn table controller	CT	SC100	CT-0091	N/A	N/A
8.	RF Cable	Hubersuhner	SUCOFLEX104	274094/4	Apr.22,17	1 Year
9.	Test Software	AUDIX	e3	6.2009-5-21a(n)	N/A	N/A
Note: N/A means Not applicable.						

8.2.Limit

FCC part 22.917(a), 24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specification in the instruction manual and/or alignment procedure, shall not be less than 43+10log(Mean power in watts) dBc below the mean power output outside a license's frequency block(-13dBm).

8.3.Test Procedure

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and lowering of the test antenna from 4m to 1m.

ERP in frequency band 824.2-848.8MHz were measured using substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follow: EIRP in frequency band 1850.5-1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:
ERP=S.G. output (dBm) + Antenna Gain (dBd)-Cable Loss (dB)
EIRP=S.G. output (dBm) + Antenna Gain (dBi)-Cable Loss (dB)

8.4.Test Result

Spurious emissions		
EUT: Gemini		
M/N: Gemini 4G		
Test Date: 2018-02-28	Test site: RF Chamber	Tested by: Alice_yang
Temperature: 22.1±0.6℃	Humidity: 52.9±3.0%	Pressure: 102.5±1.0kpa

Test result

Test Mode：WCDMA Band 2 TX CH Low Mode 1852.4MHz

Frequency (MHz)	Antenna polarization	S.G Output (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
199.16	H	-60.25	2.7	1.33	-58.88	-13	45.88	PASS
626.69	H	-60.11	5.2	3.06	-57.97	-13	44.97	PASS
878.79	H	-61.21	5.7	3.87	-59.38	-13	46.38	PASS
966.14	H	-62.07	5.9	4.21	-60.38	-13	47.38	PASS
2479	H	-51.51	9.5	7.47	-49.48	-13	36.48	PASS
3704.8	H	-43.56	9.5	8.93	-42.99	-13	29.99	PASS
5556	H	-42.26	10.5	9.81	-41.57	-13	28.57	PASS
185.82	V	-67.34	2.6	1.34	-66.08	-13	53.08	PASS
226.24	V	-68.12	3.2	1.52	-66.44	-13	53.44	PASS
876.51	V	-66.52	5.7	3.86	-64.68	-13	51.68	PASS
956.85	V	-67.37	5.9	4.11	-65.58	-13	52.58	PASS
2479	V	-50.84	9.5	7.47	-48.81	-13	35.81	PASS
3704.8	V	-42.64	9.5	8.93	-42.07	-13	29.07	PASS
5556	V	-42.67	10.5	9.81	-41.98	-13	28.98	PASS

Test Mode：WCDMA Band 2 TX CH Mid Mode 1880MHz								
198.03	H	-61.06	2.7	1.33	-59.69	-13	46.69	PASS
632.15	H	-59.02	5.2	3.16	-56.98	-13	43.98	PASS
876.27	H	-60.37	5.7	3.86	-58.53	-13	45.53	PASS
962.02	H	-61.11	5.9	4.20	-59.41	-13	46.41	PASS
2581	H	-51.27	9.6	7.70	-49.37	-13	36.37	PASS
3760	H	-46.56	9.5	8.96	-46.02	-13	33.02	PASS
5640	H	-41.57	10.6	9.85	-40.82	-13	27.82	PASS
186.79	V	-64.59	2.6	1.36	-63.35	-13	50.35	PASS
629.77	V	-65.82	5.2	3.05	-63.67	-13	50.67	PASS
877.38	V	-65.94	5.7	3.86	-64.1	-13	51.1	PASS
962.94	V	-69.26	5.9	4.11	-67.47	-13	54.47	PASS
2581	V	-47.02	9.6	7.70	-45.12	-13	32.12	PASS
3760	V	-44.11	9.5	8.96	-43.57	-13	30.57	PASS
5640	V	-41.92	10.6	9.85	-41.17	-13	28.17	PASS
Test Mode：WCDMA Band 2 TX CH High Mode 1907.6MHz								
198.2	H	-61.52	2.7	1.31	-60.13	-13	47.13	PASS
624.88	H	-60.83	5.2	3.04	-58.67	-13	45.67	PASS
879.32	H	-62.68	5.7	3.87	-60.85	-13	47.85	PASS
959.9	H	-63.33	5.9	4.17	-61.6	-13	48.6	PASS
3040	H	-47.75	9.6	8.63	-46.78	-13	33.78	PASS
3815.2	H	-43.92	9.5	8.99	-43.41	-13	30.41	PASS
5722.8	H	-42.17	10.7	9.89	-41.36	-13	28.36	PASS
188.67	V	-66.02	2.7	1.33	-64.65	-13	51.65	PASS
624.88	V	-63.80	5.2	3.04	-61.64	-13	48.64	PASS
879.32	V	-64.81	5.7	3.87	-62.98	-13	49.98	PASS
959.9	V	-65.62	5.9	4.17	-63.89	-13	50.89	PASS
3040	V	-48.45	9.6	8.63	-47.48	-13	34.48	PASS
3815.2	V	-44.98	9.5	8.99	-44.47	-13	31.47	PASS
5722.8	V	-42.61	10.7	9.89	-41.8	-13	28.8	PASS
Remark: All the emission were detected belong to narrowband spurious emission								

Spurious emissions		
EUT: Gemini		
M/N: Gemini 4G		
Test Date: 2018-02-28	Test site: RF Chamber	Tested by: Alice_yang
Temperature: 22.1±0.6℃	Humidity: 52.9±3.0%	Pressure: 102.5±1.0kpa

Test result

Test Mode：WCDMA Band 5 TX CH Low Mode 826.4MHz

Frequency (MHz)	Antenna polarization	S.G Output (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
192.29	H	-61.03	2.6	1.31	-59.74	-13	46.74	PASS
624.65	H	-58.36	5.2	3.04	-56.2	-13	43.2	PASS
876.79	H	-33.35	5.7	3.87	-31.52	-13	18.52	PASS
972.51	H	-60.78	5.9	4.20	-59.08	-13	46.08	PASS
1652.8	H	-51.52	7.9	5.68	-49.3	-13	36.3	PASS
2479.2	H	-50.82	9.5	7.47	-48.79	-13	35.79	PASS
3669	H	-42.1	9.7	8.92	-41.32	-13	28.32	PASS
189.18	V	-67.56	2.6	1.33	-66.29	-13	53.29	PASS
624.65	V	-63.45	5.2	3.04	-61.29	-13	48.29	PASS
784.95	V	-60.26	5.5	3.56	-58.32	-13	45.32	PASS
879.03	V	-37.58	5.8	3.87	-35.65	-13	22.65	PASS
1652.8	V	-48.12	7.9	5.68	-45.9	-13	32.9	PASS
2479.2	V	-50.05	9.5	7.47	-48.02	-13	35.02	PASS
3669	V	-44.19	9.7	8.92	-43.41	-13	30.41	PASS

Test Mode：WCDMA Band 5 TX CH Mid Mode 836.6MHz								
195.25	H	-61.37	2.8	1.31	-59.88	-13	46.88	PASS
624.65	H	-59.02	5.2	3.04	-56.86	-13	43.86	PASS
889.51	H	-32.06	5.7	3.86	-30.22	-13	17.22	PASS
959.68	H	-60.94	5.9	4.17	-59.21	-13	46.21	PASS
1673.2	H	-45.26	7.9	5.72	-43.08	-13	30.08	PASS
2509.8	H	-44.75	9.6	7.55	-42.7	-13	29.7	PASS
3351	H	-43.3	9.6	8.77	-42.47	-13	29.47	PASS
206.64	V	-62.75	2.8	1.38	-61.33	-13	48.33	PASS
792.17	V	-54.34	5.5	3.58	-52.42	-13	39.42	PASS
881.62	V	-39.08	5.7	3.87	-37.25	-13	24.25	PASS
952.67	V	-58.32	5.8	4.13	-56.65	-13	43.65	PASS
1673.2	V	-50.3	7.9	5.72	-48.12	-13	35.12	PASS
2509.8	V	-50.62	9.6	7.55	-48.57	-13	35.57	PASS
3351	V	-42.21	9.6	8.77	-41.38	-13	28.38	PASS
Test Mode：WCDMA Band 5 TX CH High Mode 846.6MHz								
199.29	H	-60.72	2.7	1.32	-59.34	-13	46.34	PASS
629.15	H	-59.06	5.2	3.05	-56.91	-13	43.91	PASS
809.16	H	-56.55	5.5	3.63	-54.68	-13	41.68	PASS
895.02	H	-30.51	5.7	3.92	-28.73	-13	15.73	PASS
1693.2	H	-50.28	7.9	5.80	-48.18	-13	35.18	PASS
2539.8	H	-49.22	9.6	7.63	-47.25	-13	34.25	PASS
3383	H	-44.35	9.6	8.79	-43.54	-13	30.54	PASS
189.91	V	-67.65	2.6	1.32	-66.37	-13	53.37	PASS
622.31	V	-66.12	5.2	3.02	-63.94	-13	50.94	PASS
797.22	V	-56.31	5.5	3.60	-54.41	-13	41.41	PASS
890.06	V	-41.61	5.7	3.92	-39.83	-13	26.83	PASS
1693.2	V	-51.03	7.9	5.80	-48.93	-13	35.93	PASS
2539.8	V	-50.66	9.6	7.63	-48.69	-13	35.69	PASS
3383	V	-41.34	9.6	8.79	-40.53	-13	27.53	PASS
Remark: All the emission were detected belong to narrowband spurious emission								

Spurious emissions		
EUT: Gemini		
M/N: Gemini 4G		
Test Date: 2018-02-28	Test site: RF Chamber	Tested by: Alice_yang
Temperature: 22.1±0.6℃	Humidity: 52.9±3.0%	Pressure: 102.5±1.0kpa

Test result

Test Mode：HSPA Band 2 TX CH Low Mode 1852.4MHz

Frequency (MHz)	Antenna polarization	S.G Output (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
194.21	H	-60.23	2.7	1.32	-58.85	-13	45.85	PASS
625.32	H	-59.37	5.2	3.05	-57.22	-13	44.22	PASS
878.62	H	-61.95	5.7	3.87	-60.12	-13	47.12	PASS
963.57	H	-63.16	5.9	4.19	-61.45	-13	48.45	PASS
2479	H	-41.38	9.5	7.47	-39.35	-13	26.35	PASS
3704.8	H	-43.16	9.5	8.93	-42.59	-13	29.59	PASS
5556	H	-42.25	10.5	9.81	-41.56	-13	28.56	PASS
185.11	V	-66.31	2.6	1.30	-65.01	-13	52.01	PASS
625.32	V	-67.61	5.2	3.05	-65.46	-13	52.46	PASS
882.09	V	-71.36	5.7	3.87	-69.53	-13	56.53	PASS
955.69	V	-75.2	5.9	4.12	-73.42	-13	60.42	PASS
2479	V	-41.39	9.5	7.47	-39.36	-13	26.36	PASS
3704.8	V	-43.51	9.5	8.93	-42.94	-13	29.94	PASS
5556	V	-42.66	10.5	9.81	-41.97	-13	28.97	PASS

Test Mode：HSPA Band 2 TX CH Mid Mode 1880MHz								
200.21	H	-62.57	2.8	1.41	-61.18	-13	48.18	PASS
626.68	H	-60.05	5.2	3.05	-57.9	-13	44.9	PASS
879.17	H	-61.16	5.7	3.87	-59.33	-13	46.33	PASS
972.51	H	-64.59	5.9	4.19	-62.88	-13	49.88	PASS
2581	H	-40.24	9.6	7.70	-38.34	-13	25.34	PASS
3760	H	-44.11	9.5	8.96	-43.57	-13	30.57	PASS
5641	H	-42.84	10.6	9.85	-42.09	-13	29.09	PASS
188.3	V	-65.67	2.6	1.33	-64.4	-13	51.4	PASS
629.82	V	-64.16	5.2	3.05	-62.01	-13	49.01	PASS
873.38	V	-64.1	5.7	3.85	-62.25	-13	49.25	PASS
956.64	V	-67.84	5.9	4.11	-66.05	-13	53.05	PASS
2581	V	-41.55	9.6	7.70	-39.65	-13	26.65	PASS
3760	V	-43.16	9.5	8.96	-42.62	-13	29.62	PASS
5641	V	-42.21	10.6	9.85	-41.46	-13	28.46	PASS
Test Mode：HSPA Band 2 TX CH High Mode 1907.6MHz								
198.59	H	-59.51	2.7	1.32	-58.13	-13	45.13	PASS
625.25	H	-60.89	5.2	3.04	-58.73	-13	45.73	PASS
879.52	H	-61.31	5.7	3.87	-59.48	-13	46.48	PASS
963.13	H	-62.29	5.9	4.18	-60.57	-13	47.57	PASS
3040	H	-40.59	9.6	8.63	-39.62	-13	26.62	PASS
3815.2	H	-43.84	9.5	8.99	-43.33	-13	30.33	PASS
5720	H	-41.59	10.7	9.89	-40.78	-13	27.78	PASS
193.67	V	-65.34	2.6	1.32	-64.06	-13	51.06	PASS
628.29	V	-69.08	5.2	3.04	-66.92	-13	53.92	PASS
878.18	V	-71.04	5.7	3.86	-69.2	-13	56.2	PASS
963.84	V	-75.25	5.9	4.17	-73.52	-13	60.52	PASS
3040	V	-40.97	9.6	8.63	-40	-13	27	PASS
3815.2	V	-43.81	9.5	8.99	-43.3	-13	30.3	PASS
5720	V	-41.78	10.7	9.89	-40.97	-13	27.97	PASS
Remark: All the emission were detected belong to narrowband spurious emission								

Spurious emissions		
EUT: Gemini		
M/N: Gemini 4G		
Test Date: 2018-02-28	Test site: RF Chamber	Tested by: Alice_yang
Temperature: 22.1±0.6℃	Humidity: 52.9±3.0%	Pressure: 102.5±1.0kpa

Test result

Test Mode：HSPA Band 5 TX CH Low Mode 826.4MHz

Frequency (MHz)	Antenna polarization	S.G Output (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
196.88	H	-60.51	2.7	1.33	-59.14	-13	46.14	PASS
650.42	H	-57.24	5.3	3.14	-55.08	-13	42.08	PASS
786.95	H	-62.06	5.5	3.57	-60.13	-13	47.13	PASS
882.16	H	-34.57	5.7	3.87	-32.74	-13	19.74	PASS
1652.8	H	-47.51	7.9	5.68	-45.29	-13	32.29	PASS
2479.2	H	-51.37	9.5	7.47	-49.34	-13	36.34	PASS
3669	H	-44.29	9.7	8.92	-43.51	-13	30.51	PASS
190.57	V	-65.21	2.6	1.34	-63.95	-13	50.95	PASS
636.29	V	-63.14	5.2	3.09	-61.03	-13	48.03	PASS
789.16	V	-56.03	5.5	3.57	-54.1	-13	41.1	PASS
875.19	V	-36.27	5.7	3.86	-34.43	-13	21.43	PASS
1652.8	V	-47.26	7.9	5.68	-45.04	-13	32.04	PASS
2479.2	V	-48.94	9.5	7.47	-46.91	-13	33.91	PASS
3669	V	-43.26	9.7	8.92	-42.48	-13	29.48	PASS

Test Mode：HSPA Band 5 TX CH Mid Mode 836.6MHz								
196.73	H	-61.16	2.7	1.34	-59.8	-13	46.8	PASS
645.72	H	-58.19	5.2	3.10	-56.09	-13	43.09	PASS
795.62	H	-59.08	5.5	3.56	-57.14	-13	44.14	PASS
882.64	H	-33.85	5.7	3.87	-32.02	-13	19.02	PASS
1673.2	H	-50.94	7.9	5.72	-48.76	-13	35.76	PASS
2509.8	H	-49.64	9.6	7.55	-47.59	-13	34.59	PASS
3351	H	-43.29	9.6	8.77	-42.46	-13	29.46	PASS
186.67	V	-63.83	2.6	1.33	-62.56	-13	49.56	PASS
785.21	V	-53.87	5.5	3.55	-51.92	-13	38.92	PASS
883.54	V	-36.08	5.7	3.86	-34.24	-13	21.24	PASS
934.27	V	-61.22	5.8	4.10	-59.52	-13	46.52	PASS
1673.2	V	-50.94	7.9	5.72	-48.76	-13	35.76	PASS
2509.8	V	-50.18	9.6	7.55	-48.13	-13	35.13	PASS
3351	V	-45.64	9.6	8.77	-44.81	-13	31.81	PASS
Test Mode：HSPA Band 5 TX CH High Mode 846.6MHz								
192.18	H	-60.13	2.7	1.31	-58.74	-13	45.74	PASS
626.16	H	-59.16	5.2	3.04	-57	-13	44	PASS
802.12	H	-60.09	5.5	3.62	-58.21	-13	45.21	PASS
896.86	H	-29.97	5.7	3.92	-28.19	-13	15.19	PASS
1693.2	H	-50.21	7.9	5.80	-48.11	-13	35.11	PASS
2539.8	H	-48.94	9.6	7.63	-46.97	-13	33.97	PASS
3383	H	-45.85	9.6	8.79	-45.04	-13	32.04	PASS
189.38	V	-66.02	2.6	1.33	-64.75	-13	51.75	PASS
748.71	V	-58.22	5.4	3.46	-56.28	-13	43.28	PASS
802.12	V	-55.14	5.5	3.62	-53.26	-13	40.26	PASS
896.86	V	-46.88	5.7	3.92	-45.1	-13	32.1	PASS
1693.2	V	-50.26	7.9	5.80	-48.16	-13	35.16	PASS
2539.8	V	-49.71	9.6	7.63	-47.74	-13	34.74	PASS
3383	V	-47.54	9.6	8.79	-46.73	-13	33.73	PASS
Remark: All the emission were detected belong to narrowband spurious emission								

9. FREQUENCY STABILITY V.S. TEMPERATURE AND VOLTAGE

9.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY53311015	Oct.15,17	1 Year
2.	HF Cable	Hubersuhner	Sucoflex104	274094/4	Apr.22,17	1 Year
3.	Attenuator (10dB)	Mini-Circuits	VAT-10+	NO.1	NCR	NCR
4.	Temperature controller	Terchy	MHQ-120cluB	A60223	Apr.23,17	1 Year
Note: NCR means no calibration required(calibrated with system).						

9.1.Limit

Frequency Tolerance:
+/-2.5ppm for 850MHz band
+/-2.5ppm for 1900MHz band

9.2.Test procedure

The equipment under test was connected to an external DC power supply and input rated voltage. Reference power supply voltage for these tests is DC 12V. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the Spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25 degree operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -20 degree. After the temperature stabilized for approximately 30 minutes record the frequency. Repeat step measure with 10 degree per stage until the highest temperature of 50 degree reached.

9.3.Test Result

EUT: Gemini		
M/N: Gemini 4G		
Test date: 2017-12-29	Pressure: 102.5±1.0 kpa	Humidity: 52.2±3.0%
Tested by: Alice_Yang	Test site: RF site	Temperature:23.1±0.6 ℃

Frequency Error vs.Voltage

Test Band	Test Channel	Test Temp	Test Volt	Freq Error (Hz)	Freq .vs.rated (ppm)	Verdict
WCDMA Band 2	LCH	TN	VL	-6	-0.003	Pass
			VN	10	0.005	Pass
			VH	5	0.003	Pass
	MCH	TN	VL	-7	-0.004	Pass
			VN	-3	-0.002	Pass
			VH	3	0.002	Pass
	HCH	TN	VL	6	0.003	Pass
			VN	10	0.005	Pass
			VH	16	0.008	Pass

Frequency Error vs ,Temperature

Test Band	Test Channel	Test Volt	Test Temp	Freq Error (Hz)	Freq .vs.rated (ppm)	Verdict
WCDMA Band 2	LCH	VN	-30	11	0.006	Pass
			-20	-8	-0.004	Pass
			-10	7	0.004	Pass
			0	6	0.003	Pass
			10	-15	-0.008	Pass
			20	-6	-0.003	Pass
			30	-13	-0.007	Pass
			40	-16	-0.009	Pass
			50	-14	-0.008	Pass
	MCH	VN	-30	-8	-0.004	Pass
			-20	-12	-0.006	Pass
			-10	7	0.004	Pass
			0	-11	-0.006	Pass
			10	-2	-0.001	Pass
			20	8	0.004	Pass
			30	-6	-0.003	Pass
			40	-12	-0.006	Pass
			50	-15	-0.008	Pass
	HCH	VN	-30	7	0.004	Pass
			-20	16	0.008	Pass
			-10	-9	-0.005	Pass
			0	7	0.004	Pass
			10	12	0.006	Pass
			20	-9	-0.005	Pass
			30	-7	-0.004	Pass
			40	13	0.007	Pass
			50	6	0.003	Pass

Frequency Error vs ,Voltage

Test Band	Test Channel	Test Temp	Test Volt	Freq Error (Hz)	Freq .vs.rated (ppm)	Verdict
WCDMA Band 5	LCH	TN	VL	6	0.007	Pass
			VN	-5	-0.006	Pass
			VH	10	0.012	Pass
	MCH	TN	VL	-6	-0.007	Pass
			VN	11	0.013	Pass
			VH	-2	-0.002	Pass
	HCH	TN	VL	3	0.004	Pass
			VN	9	0.011	Pass
			VH	-2	-0.002	Pass

Frequency Error vs ,Temperature

Test Band	Test Channel	Test Volt	Test Temp	Freq Error (Hz)	Freq .vs.rated (ppm)	Verdict
WCDMA Band 5	LCH	VN	-30	16	0.019	Pass
			-20	-9	-0.011	Pass
			-10	-13	-0.016	Pass
			0	10	0.012	Pass
			10	-5	-0.006	Pass
			20	8	0.010	Pass
			30	16	0.019	Pass
			40	18	0.022	Pass
			50	-6	-0.007	Pass
	MCH	VN	-30	6	0.007	Pass
			-20	15	0.018	Pass
			-10	20	0.024	Pass
			0	9	0.011	Pass
			10	-15	-0.018	Pass
			20	-8	-0.010	Pass
			30	-12	-0.014	Pass
			40	-5	-0.006	Pass
			50	-3	-0.004	Pass
	HCH	VN	-30	14	0.017	Pass
			-20	8	0.009	Pass
			-10	15	0.018	Pass
			0	-11	-0.013	Pass
			10	8	0.009	Pass
			20	-6	-0.007	Pass
			30	-17	-0.020	Pass
			40	-5	-0.006	Pass
			50	-16	-0.019	Pass

10. DEVIATION TO TEST SPECIFICATIONS

[NONE]