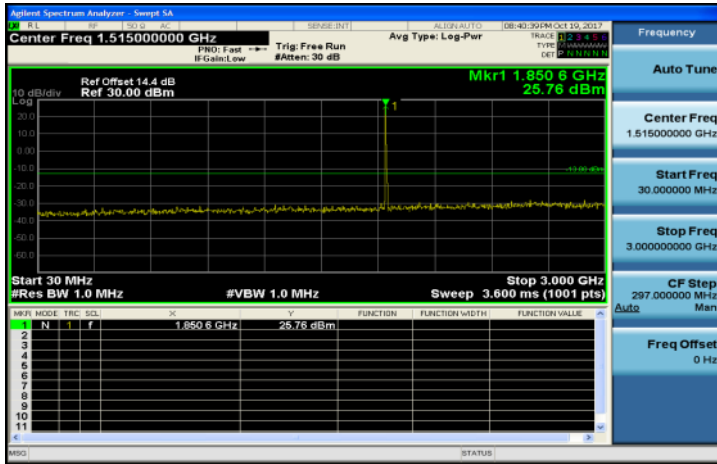
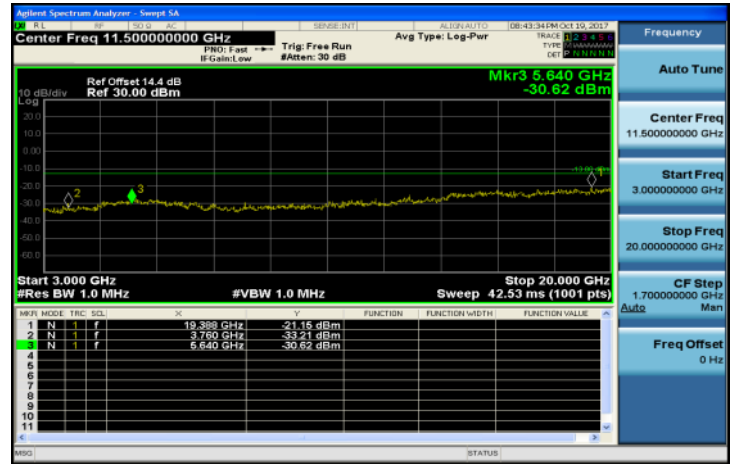


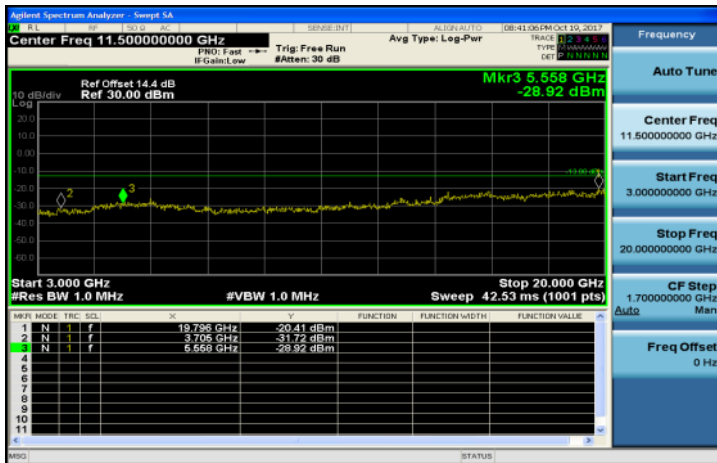
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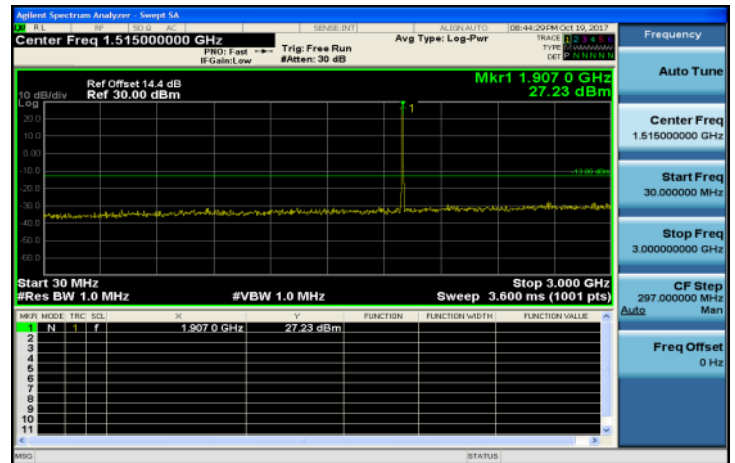
3GHz~10GHz\_Band2\_5MHz\_QPSK\_1\_0\_MidCH18900-1880



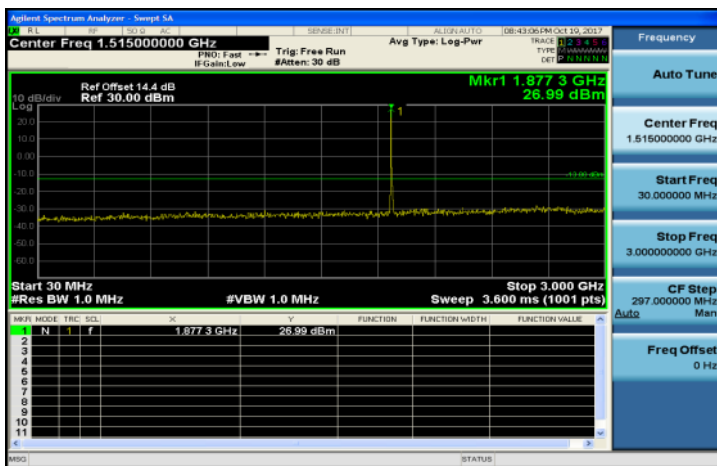
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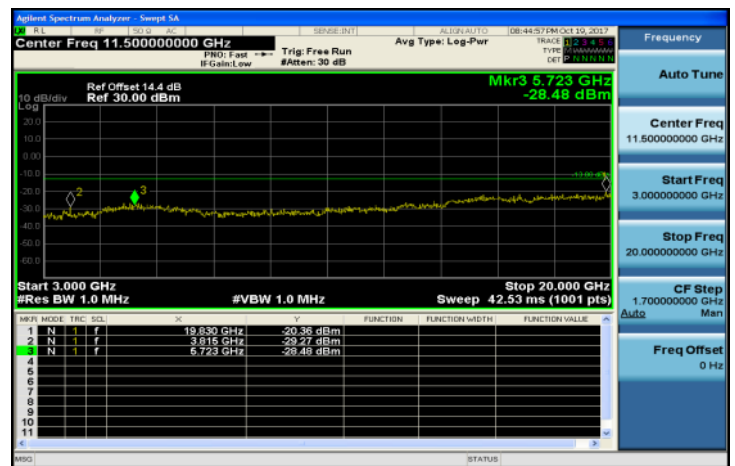
30MHz~3GHz\_Band2\_5MHz\_QPSK\_1\_0\_HighCH19175-1907.5



30MHz~3GHz\_Band2\_5MHz\_QPSK\_1\_0\_MidCH18900-1880



3GHz~10GHz\_Band2\_5MHz\_QPSK\_1\_0\_HighCH19175-1907.5

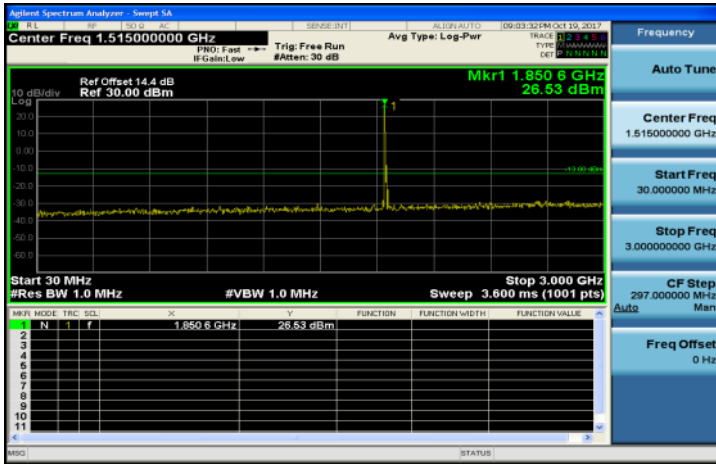


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30MHz~3GHz\_Band2\_10MHz\_QPSK\_1\_0\_LowCH18650-1855



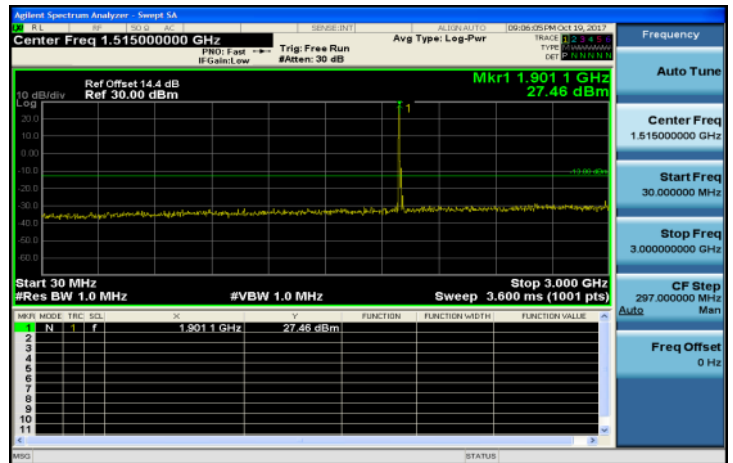
3GHz~10GHz\_Band2\_10MHz\_QPSK\_1\_0\_MidCH18900-1880



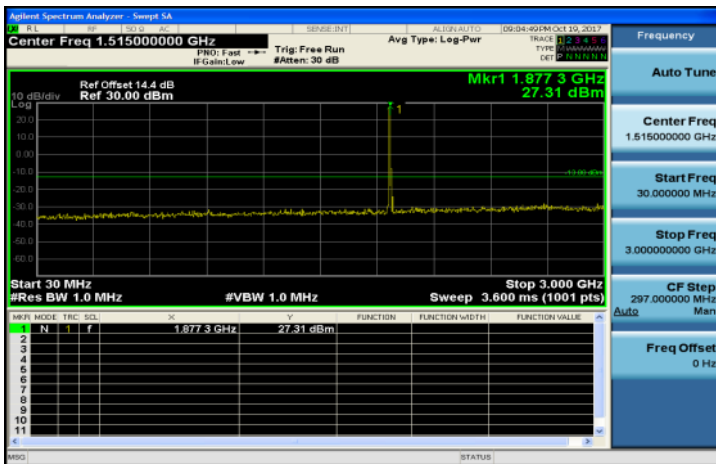
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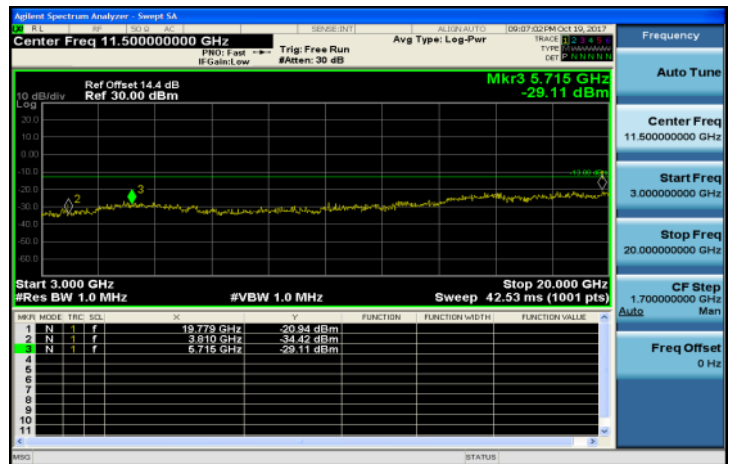
30MHz~3GHz\_Band2\_10MHz\_QPSK\_1\_0\_HighCH19150-1905



30MHz~3GHz\_Band2\_10MHz\_QPSK\_1\_0\_MidCH18900-1880



3GHz~10GHz\_Band2\_10MHz\_QPSK\_1\_0\_HighCH19150-1905

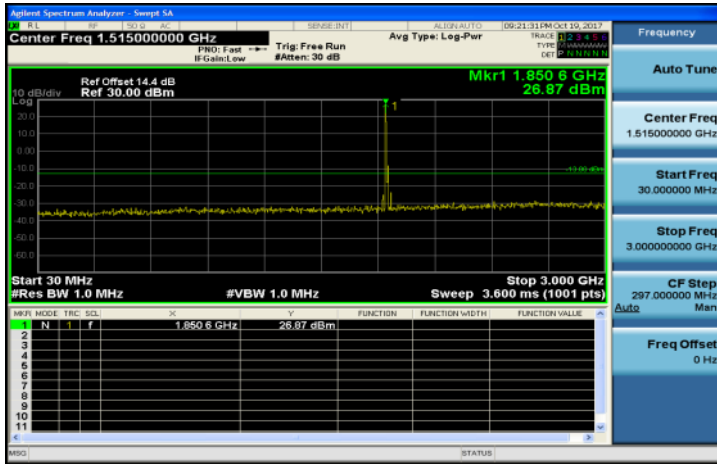


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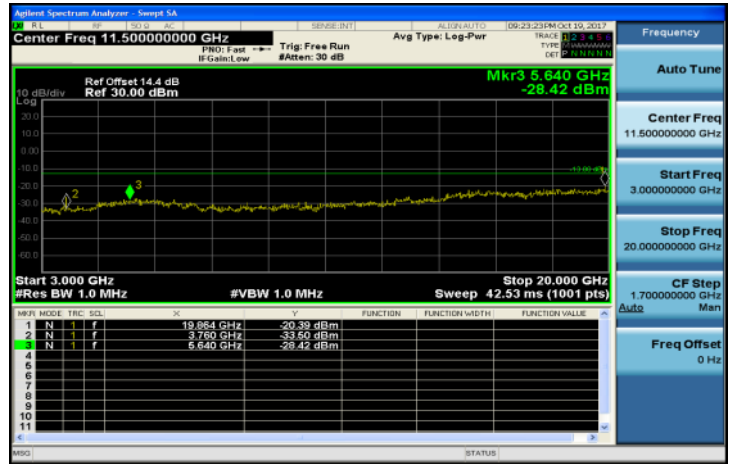
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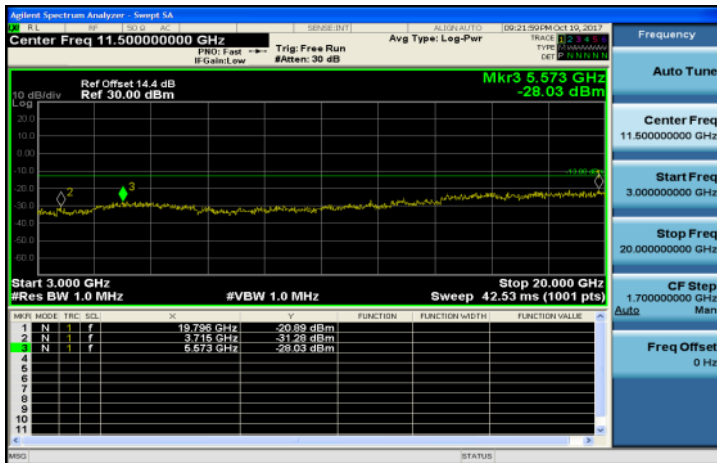
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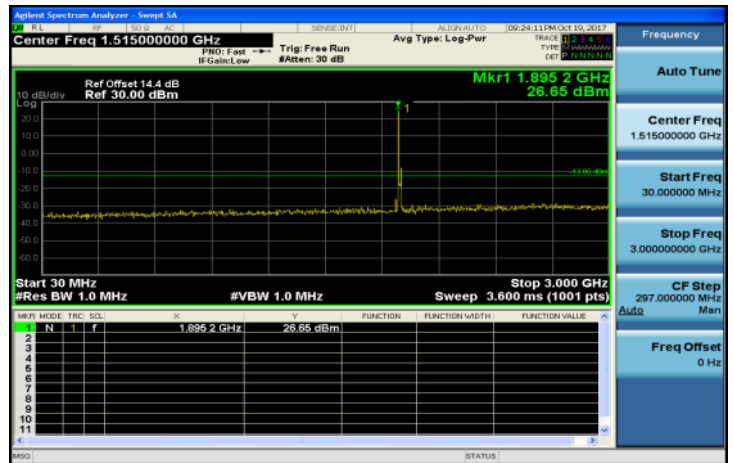
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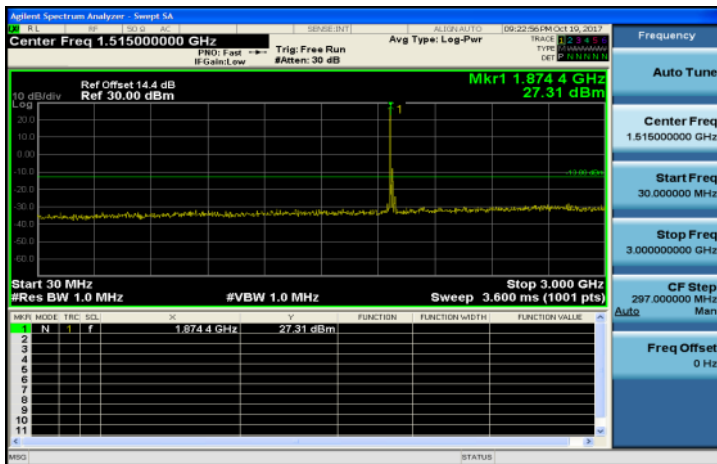
3GHz~10GHz\_Band2\_15MHz\_QPSK\_1\_0\_LowCH18675-1857.5



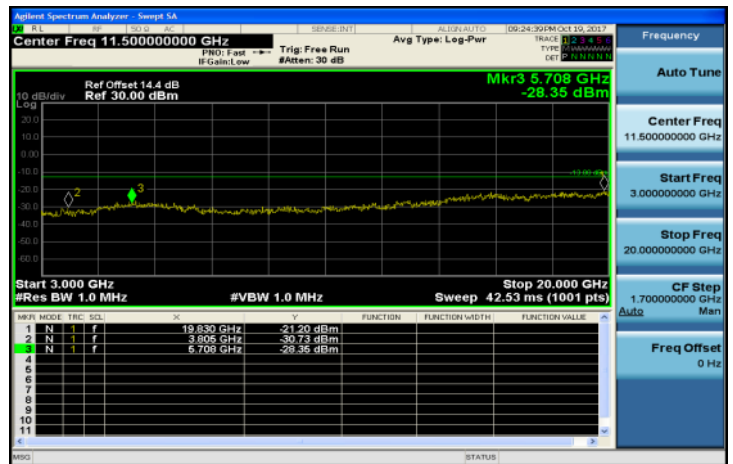
30MHz~3GHz\_Band2\_15MHz\_QPSK\_1\_0\_HighCH19125-1902.5



30MHz~3GHz\_Band2\_15MHz\_QPSK\_1\_0\_MidCH18900-1880



3GHz~10GHz\_Band2\_15MHz\_QPSK\_1\_0\_HighCH19125-1902.5

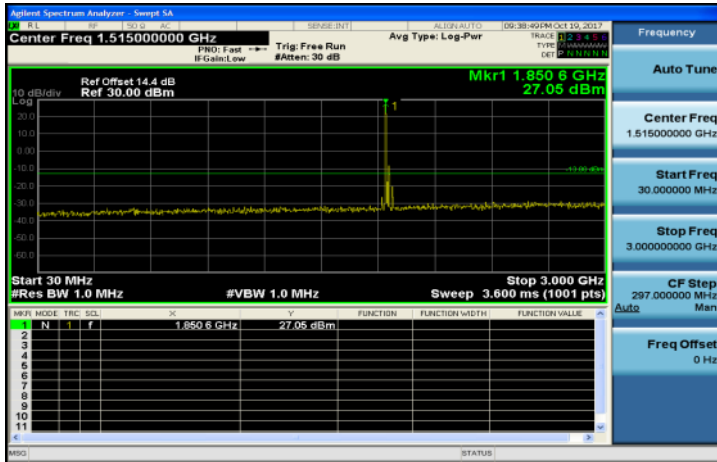


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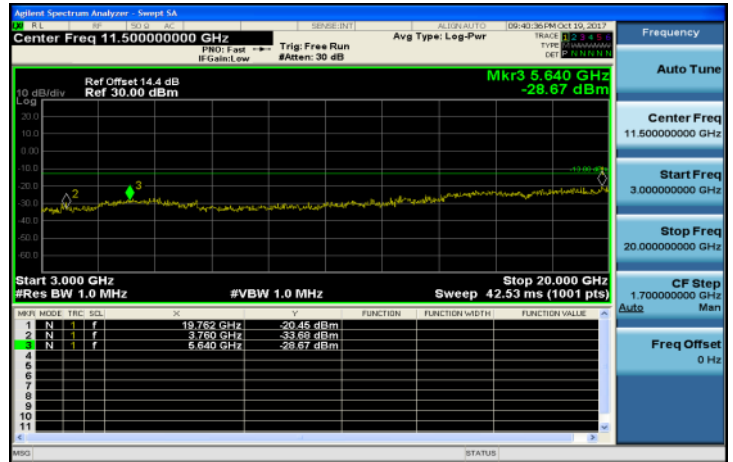
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30MHz~3GHz\_Band2\_20MHz\_QPSK\_1\_0\_LowCH18700-1860



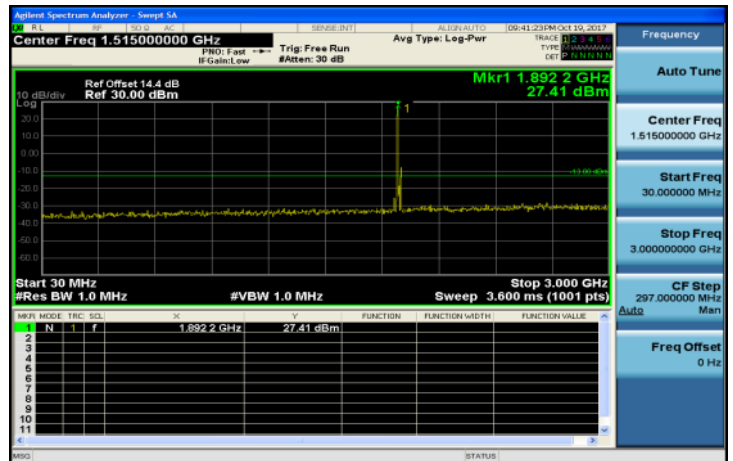
3GHz~10GHz\_Band2\_20MHz\_QPSK\_1\_0\_MidCH18900-1880



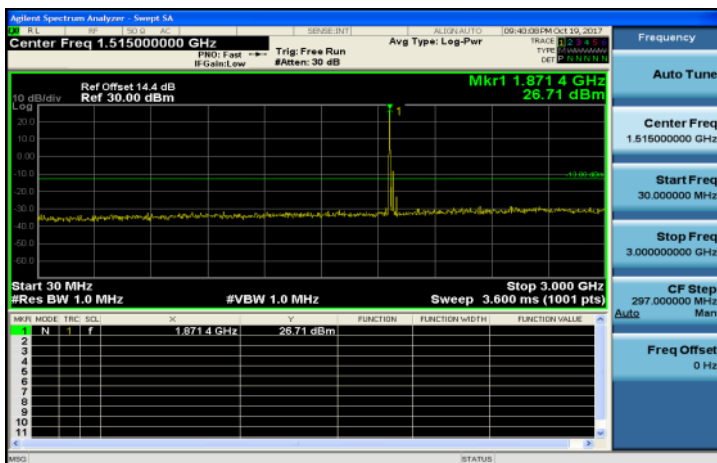
3GHz~10GHz\_Band2\_20MHz\_QPSK\_1\_0\_LowCH18700-1860



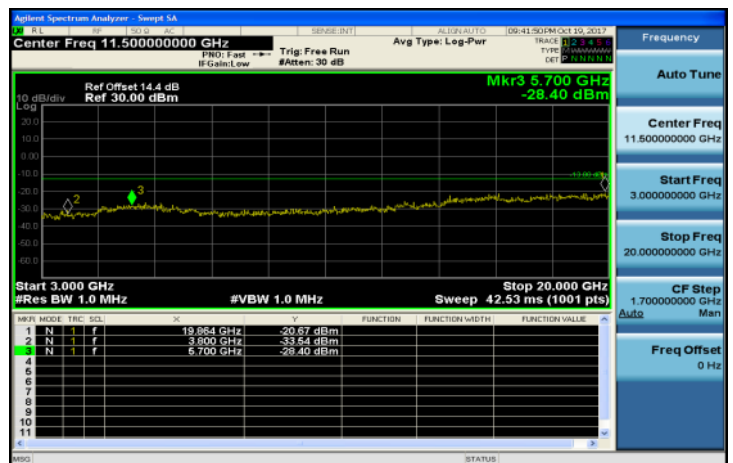
30MHz~3GHz\_Band2\_20MHz\_QPSK\_1\_0\_HighCH19100-1900



30MHz~3GHz\_Band2\_20MHz\_QPSK\_1\_0\_MidCH18900-1880



3GHz~10GHz\_Band2\_20MHz\_QPSK\_1\_0\_HighCH19100-1900

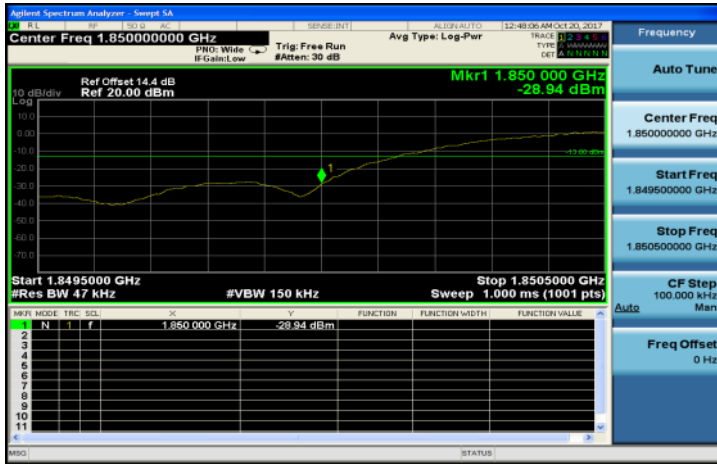


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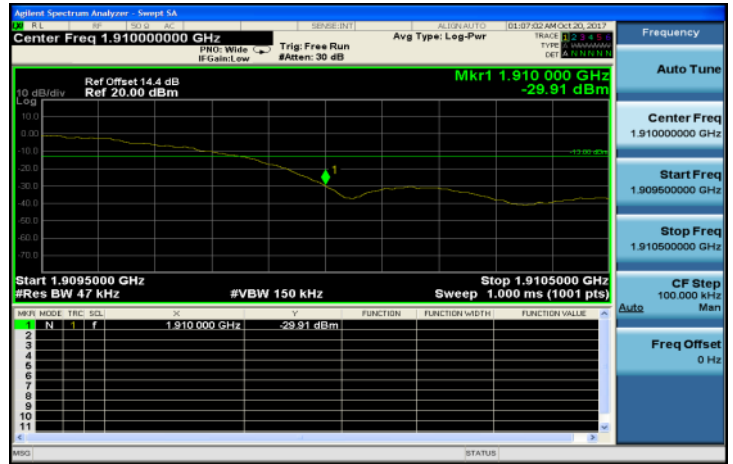
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Band Edge WCDMA\_B2\_LowCH9262-1852.4



HSDPA\_B2\_HighCH9538-1907.6



WCDMA\_B2\_HighCH9538-1907.6



HSUPA\_B2\_LowCH9262-1852.4



HSDPA\_B2\_LowCH9262-1852.4



HSUPA\_B2\_HighCH9538-1907.6



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Band2\_1\_4MHz\_QPSK\_1\_0\_LowCH18607-1850.7



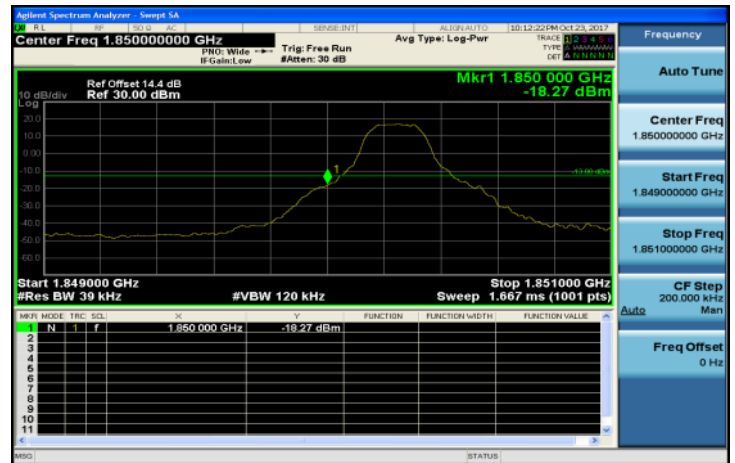
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Band2\_1\_4MHz\_QPSK\_1\_5\_HighCH19193-1909.3



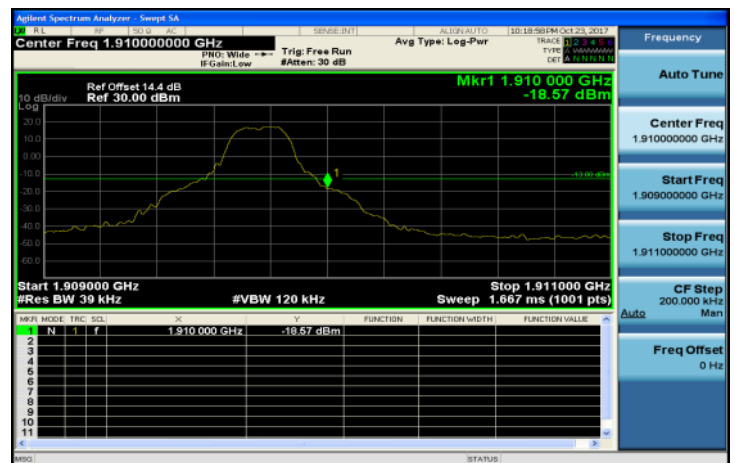
Band2\_3MHz\_QPSK\_1\_0\_LowCH18615-1851.5



Band2\_1\_4MHz\_QPSK\_6\_0\_LowCH18607-1850.7



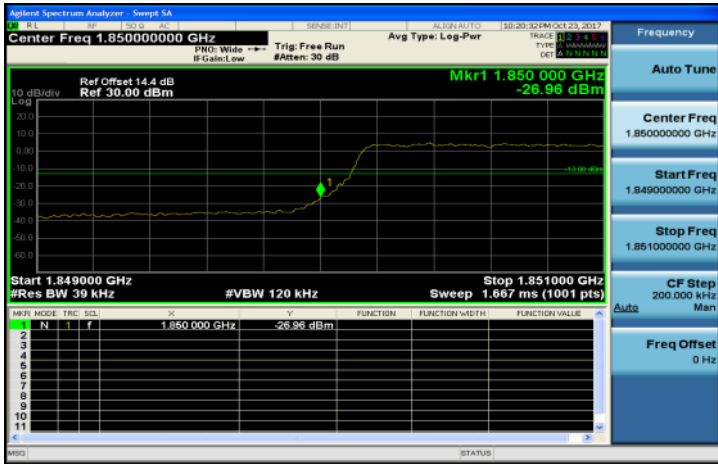
Band2\_3MHz\_QPSK\_1\_14\_HighCH19185-1908.5



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Band2\_3MHz\_QPSK\_15\_0\_LowCH18615-1851.5



Band2\_5MHz\_QPSK\_1\_24\_HighCH19175-1907.5



Band2\_3MHz\_QPSK\_15\_0\_HighCH19185-1908.5



Band2\_5MHz\_QPSK\_25\_0\_LowCH18625-1852.5



Band2\_5MHz\_QPSK\_1\_0\_LowCH18625-1852.5



Band2\_5MHz\_QPSK\_25\_0\_HighCH19175-1907.5



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Band2\_10MHz\_QPSK\_1\_0\_LowCH18650-1855



Band2\_10MHz\_QPSK\_50\_0\_HighCH19150-1905



Band2\_10MHz\_QPSK\_1\_49\_HighCH19150-1905



Band2\_15MHz\_QPSK\_1\_0\_LowCH18675-1857.5



Band2\_10MHz\_QPSK\_50\_0\_LowCH18650-1855



Band2\_15MHz\_QPSK\_1\_74\_HighCH19125-1902.5



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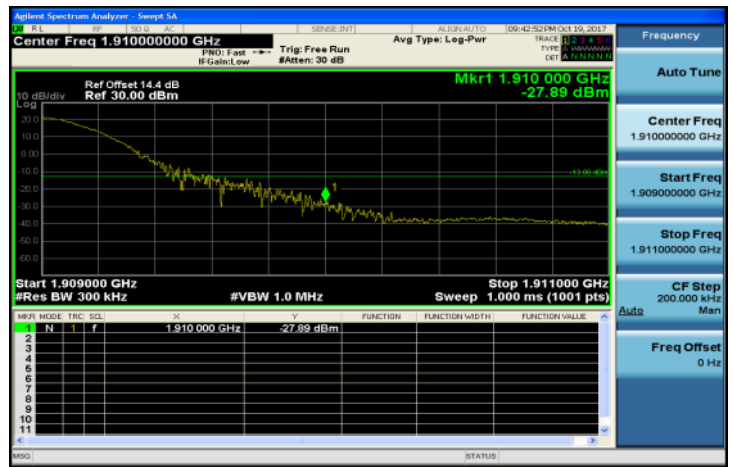
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Band2\_15MHz\_QPSK\_75\_0\_LowCH18675-1857.5



Band2\_20MHz\_QPSK\_1\_99\_HighCH19100-1900



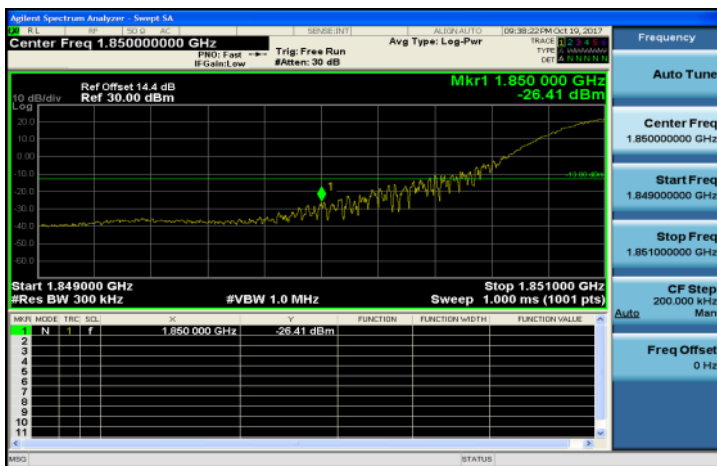
Band2\_15MHz\_QPSK\_75\_0\_HighCH19125-1902.5



Band2\_20MHz\_QPSK\_100\_0\_LowCH18700-1860



Band2\_20MHz\_QPSK\_1\_0\_LowCH18700-1860



Band2\_20MHz\_QPSK\_100\_0\_HighCH19100-1900



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## 10 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

### 10.1 Standard Applicable

According to FCC §2.1053,

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

**Table 2 — Unwanted Emissions for Mobile, Portable and Low-Power Fixed Subscriber Equipment**

Frequency (MHz)	Attenuation (dB)
<2200	$43 + 10 \log_{10}(p)$
2200 - 2288	$70 + 10 \log_{10}(p)$
2288 - 2292	$67 + 10 \log_{10}(p)$
2292 - 2296	$61 + 10 \log_{10}(p)$
2296 - 2300	$55 + 10 \log_{10}(p)$
2300 - 2305	$43 + 10 \log_{10}(p)$
2305 - 2320	$43 + 10 \log_{10}(p)$ <sup>Note</sup>
2320 - 2324	$55 + 10 \log_{10}(p)$
2324 - 2328	$61 + 10 \log_{10}(p)$
2328 - 2337	$67 + 10 \log_{10}(p)$
2337 - 2341	$61 + 10 \log_{10}(p)$
2341 - 2345	$55 + 10 \log_{10}(p)$
2345 - 2360	$43 + 10 \log_{10}(p)$ <sup>Note</sup>
2360 - 2365	$43 + 10 \log_{10}(p)$
2365 - 2395	$70 + 10 \log_{10}(p)$
>2395	$43 + 10 \log_{10}(p)$

**Note:** Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 5.2 for the permitted frequency ranges for various equipment types.

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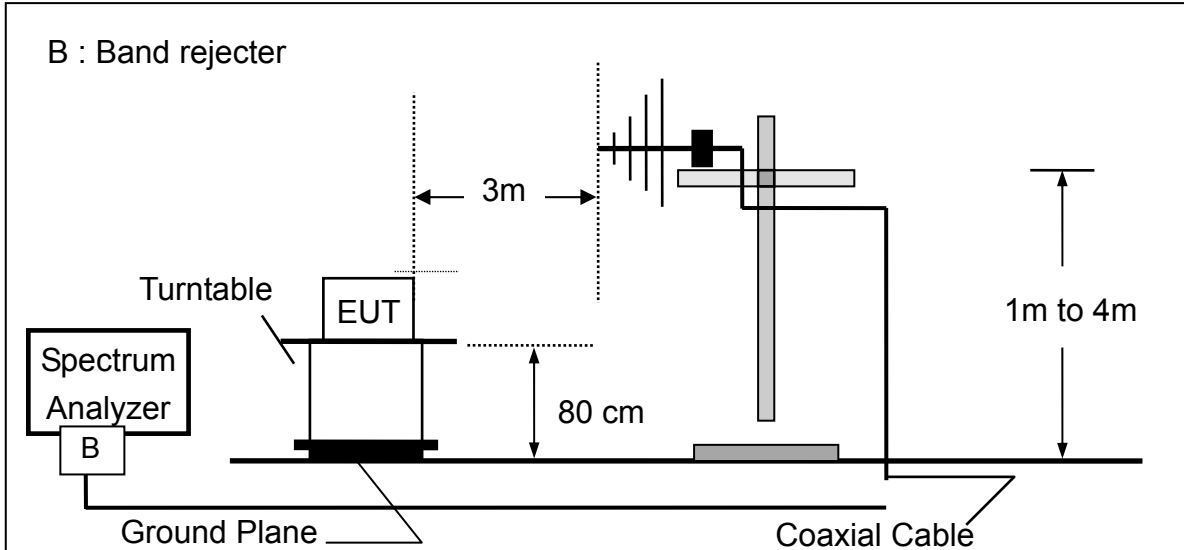
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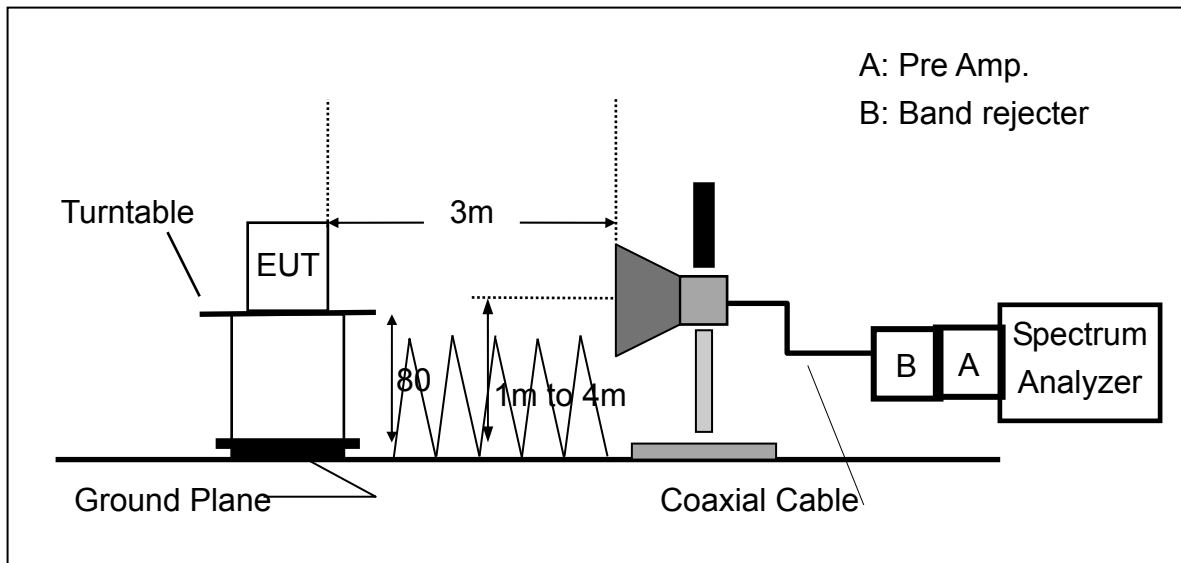
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## 10.2 EUT Setup

### Radiated Emission Test Set-Up, Frequency Below 1000MHz



### Radiated Emission Test Set-UP Frequency Over 1 GHz



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### 10.3 Measurement Procedure:

The EUT was placed on a non-conductive; the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

ERP (dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

EIRP (dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.  
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.  
"---" : denotes Noise Floor.

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#### 10.4 Measurement Equipment Used:

ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/11/2017	05/10/2018
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/25/2017	04/24/2018
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2016	09/19/2017
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/04/2017	08/03/2018
Pre-Amplifier	Agilent	8447D	2944A07676	01/03/2017	01/02/2018
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/03/2017	01/02/2018
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018
3m Site NSA	SGS	966 chamber	N/A	07/01/2017	06/30/2018
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2016	12/11/2017
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/05/2017	01/04/2018
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2017	02/10/2018
Radio Communication Analyzer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

*Remark: Please note that the duration to conduct the test took place in the mean time when the calibration for several equipments is due, and therefore extra tables of equipment calibration is constructed to indicate the calibration work is still maintained.*

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2017	09/19/2018

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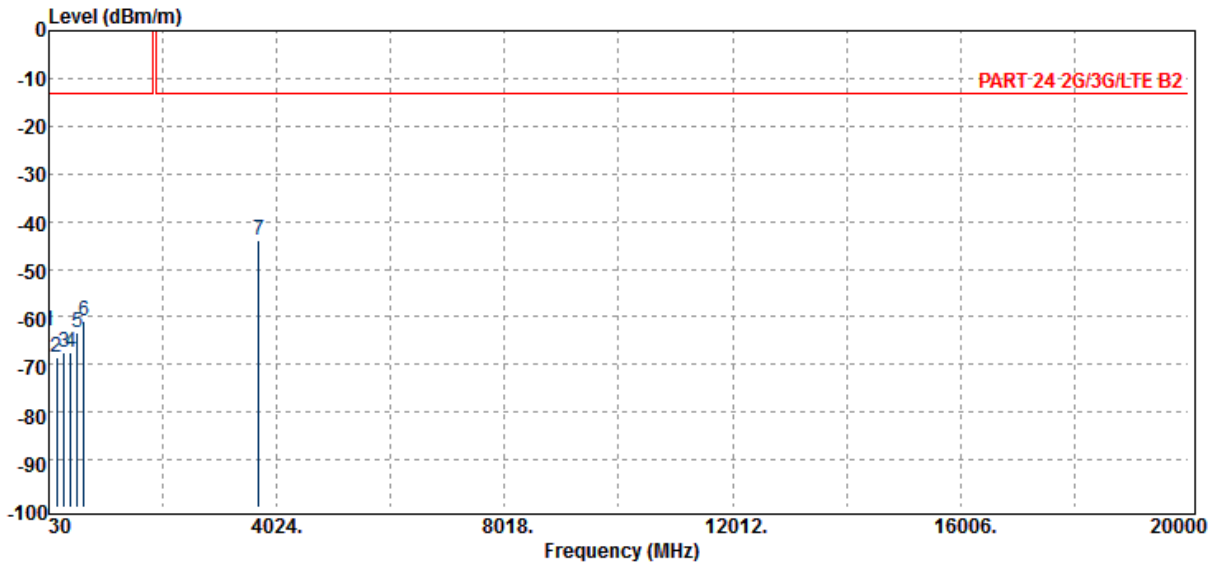
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### 10.5 Measurement Result:

#### Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Band	:GPRS 1900	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1850.2 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
30.00	S	-62.89	8.78	-12.63	-0.96	-13.00	-49.89
168.71	S	-68.59	2.88	1.15	-1.51	-13.00	-55.59
298.69	S	-67.42	-0.73	5.75	-1.95	-13.00	-54.42
419.94	S	-67.32	0.21	5.90	-2.33	-13.00	-54.32
531.49	S	-63.43	3.46	5.84	-2.51	-13.00	-50.43
639.16	S	-60.85	5.79	5.31	-2.44	-13.00	-47.85
3700.40	H	-43.97	6.77	12.44	-6.58	-13.00	-30.97

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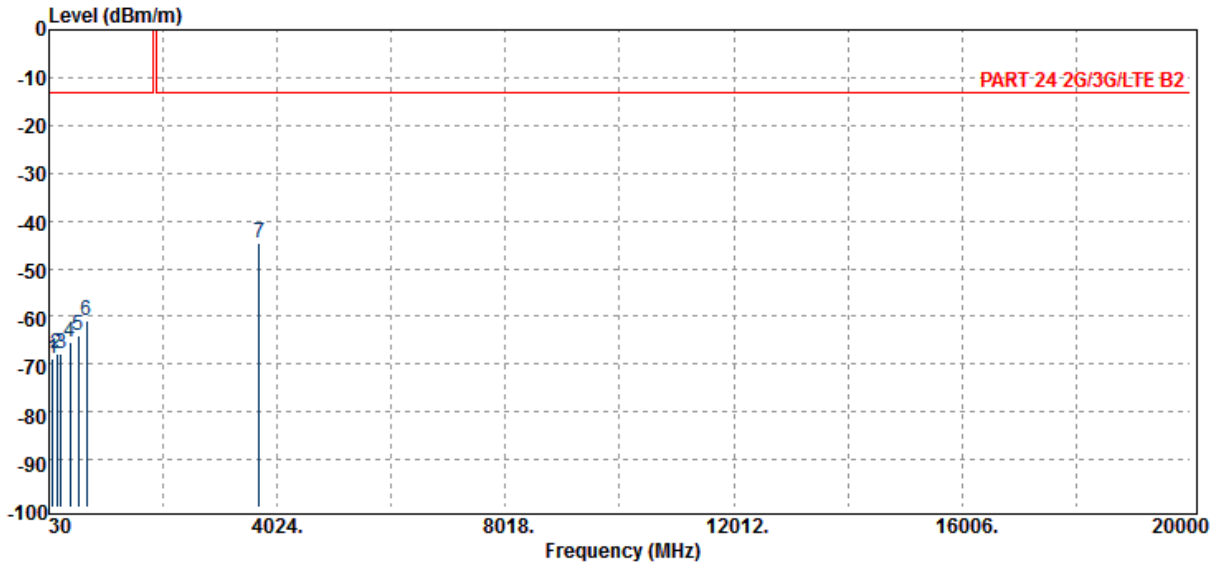
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Operation Band	:GPRS 1900	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1850.2 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
94.99	S	-68.89	1.56	1.11	-1.23	-13.00	-55.89
167.74	S	-67.88	3.43	1.08	-1.51	-13.00	-54.88
243.40	S	-67.68	-0.01	5.49	-1.75	-13.00	-54.68
400.54	S	-65.23	-0.57	5.97	-2.38	-13.00	-52.23
547.01	S	-63.90	3.49	5.75	-2.67	-13.00	-50.90
684.75	S	-60.85	6.74	5.25	-2.70	-13.00	-47.85
3700.40	H	-44.61	6.96	12.44	-6.58	-13.00	-31.61

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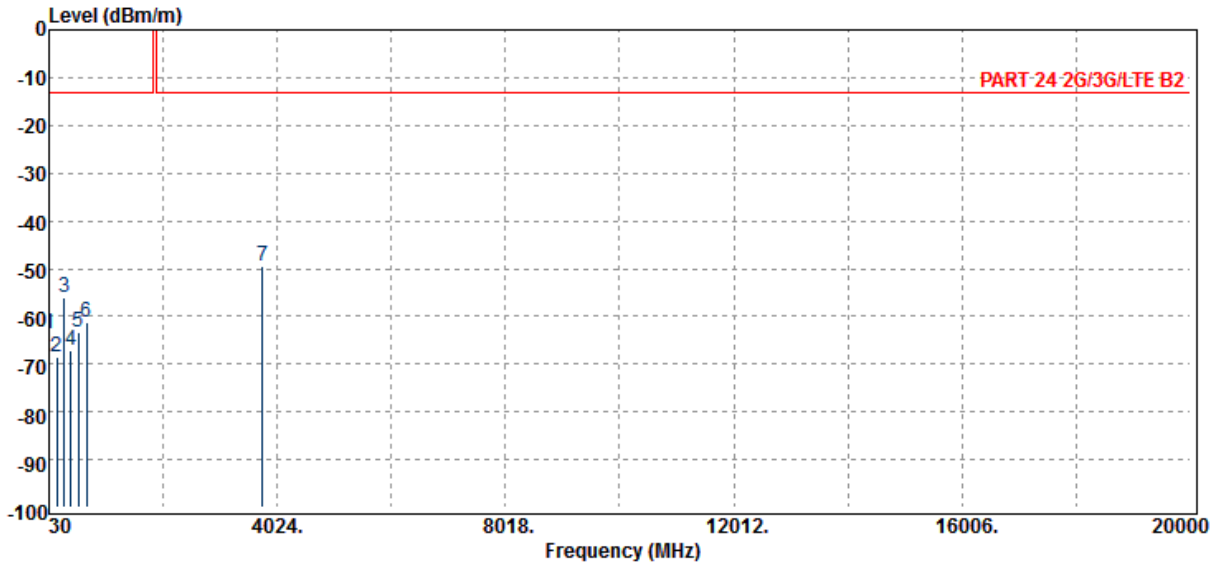
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Operation Band	:GPRS 1900	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:Tx CH MID		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
30.00	S	-63.60	8.78	-12.63	-0.96	-13.00	-50.60
165.80	S	-68.39	3.61	0.94	-1.50	-13.00	-55.39
294.81	S	-55.96	-0.59	5.67	-1.94	-13.00	-42.96
413.15	S	-67.02	0.04	5.92	-2.38	-13.00	-54.02
544.10	S	-63.26	3.49	5.77	-2.64	-13.00	-50.26
684.75	S	-61.32	6.74	5.25	-2.70	-13.00	-48.32
3760.00	H	-49.40	6.77	12.45	-6.60	-13.00	-36.40

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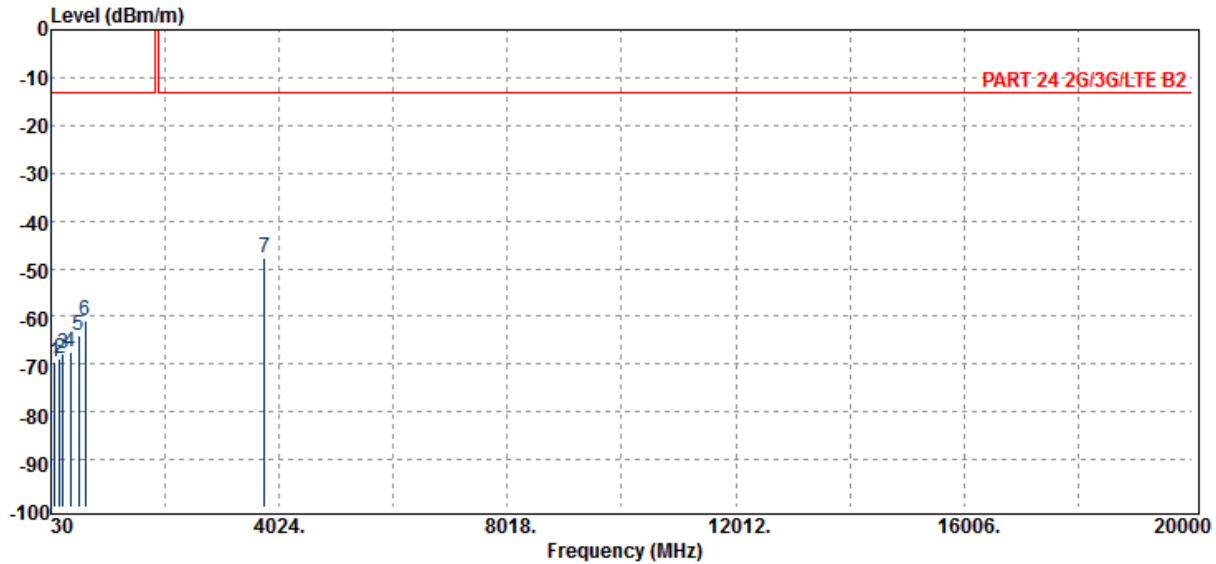
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Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:Tx CH MID		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
95.96	S	-69.68	1.83	0.99	-1.23	-13.00	-56.68
180.35	S	-68.98	1.08	3.10	-1.56	-13.00	-55.98
239.52	S	-67.94	0.24	5.43	-1.74	-13.00	-54.94
372.41	S	-67.44	-0.45	5.99	-2.21	-13.00	-54.44
519.85	S	-63.92	2.94	5.90	-2.39	-13.00	-50.92
628.49	S	-60.95	6.15	5.33	-2.47	-13.00	-47.95
3760.00	H	-47.63	7.06	12.45	-6.60	-13.00	-34.63

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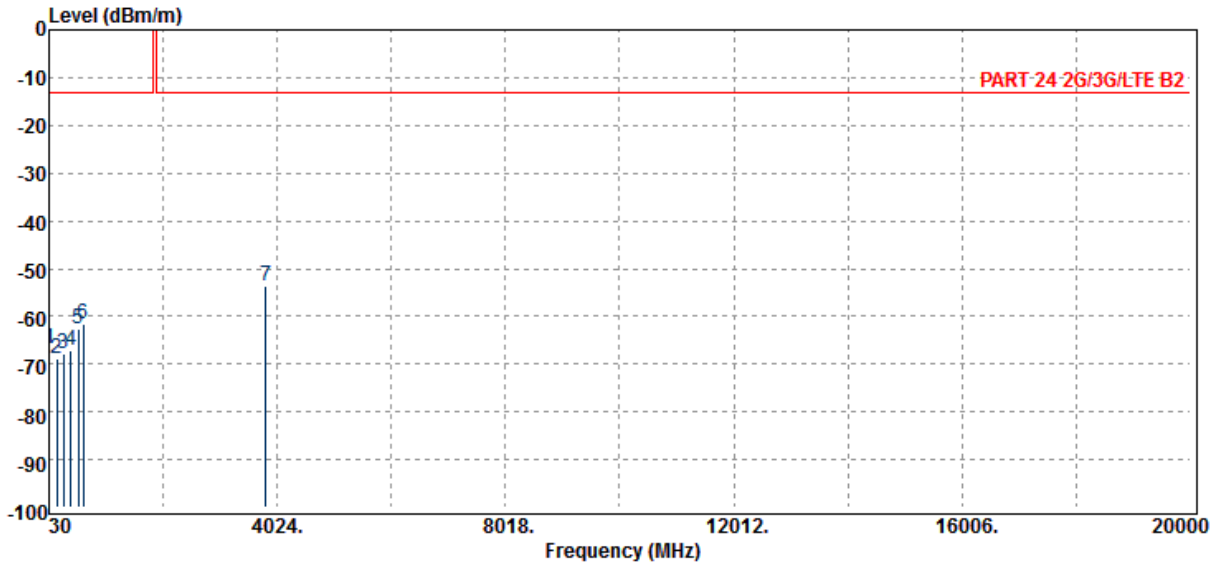
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Operation Band	:GPRS 1900	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1909.8 MHz	Engineer	:Tin
Operation Mode	:Tx CH HIGH		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
37.76	S	-66.80	9.04	-11.17	-0.98	-13.00	-53.80
162.89	S	-68.95	3.10	0.73	-1.49	-13.00	-55.95
287.05	S	-67.73	-0.55	5.58	-1.91	-13.00	-54.73
415.09	S	-67.02	0.07	5.92	-2.37	-13.00	-54.02
544.10	S	-62.70	3.49	5.77	-2.64	-13.00	-49.70
628.49	S	-61.56	6.15	5.33	-2.47	-13.00	-48.56
3819.60	H	-53.80	7.19	12.47	-6.65	-13.00	-40.80

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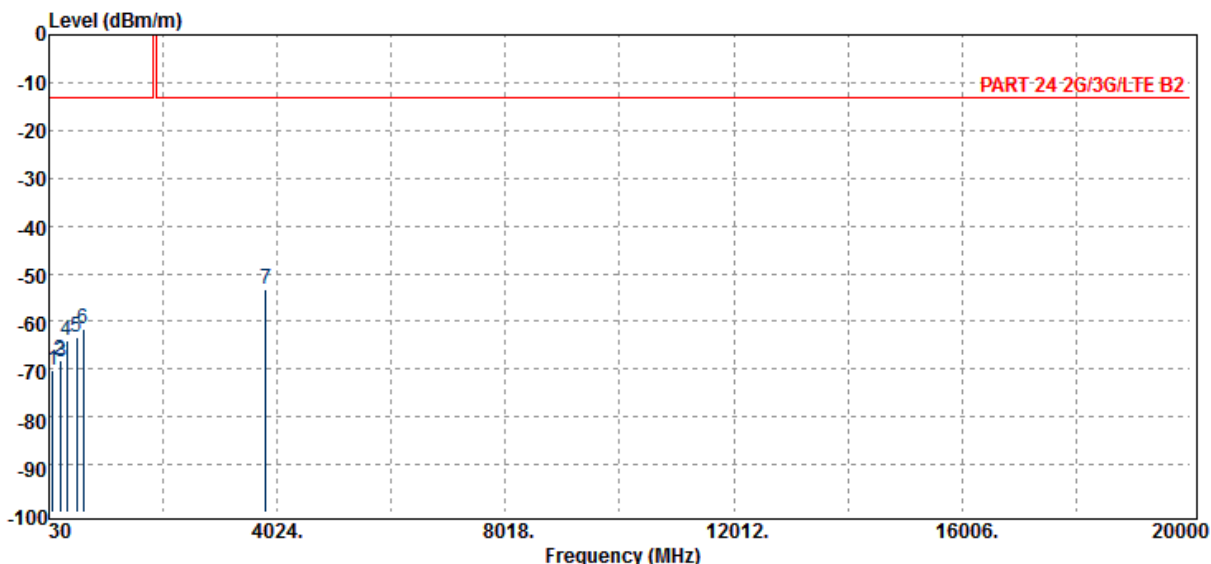
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Fundamental Frequency	:1909.8 MHz	Engineer	:Tin
Operation Mode	:Tx CH HIGH		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
95.96	S	-70.17	1.83	0.99	-1.23	-13.00	-57.17
219.15	S	-68.06	-1.63	5.49	-1.70	-13.00	-55.06
246.31	S	-68.62	-0.33	5.53	-1.75	-13.00	-55.62
347.19	S	-63.95	-0.74	6.00	-2.02	-13.00	-50.95
512.09	S	-63.37	2.29	5.94	-2.35	-13.00	-50.37
624.61	S	-61.68	6.14	5.34	-2.51	-13.00	-48.68
3819.60	H	-53.44	7.51	12.47	-6.65	-13.00	-40.44

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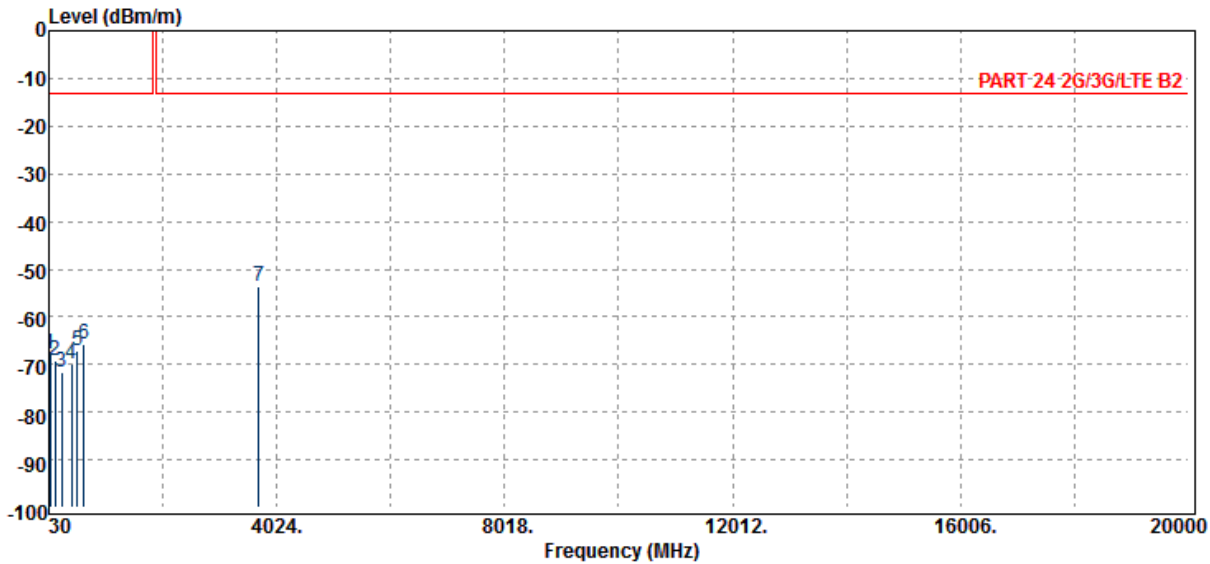
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### Radiated Spurious Emission Measurement Result: HSDPA Band 2 Mode

Operation Band	:HSDPA B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1852.4 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
57.16	S	-67.75	-57.23	-9.44	-1.07	-13.00	-54.75
141.55	S	-69.34	-65.34	-2.60	-1.40	-13.00	-56.34
252.13	S	-71.74	-73.48	3.49	-1.76	-13.00	-58.74
424.79	S	-69.92	-71.35	3.73	-2.30	-13.00	-56.92
528.58	S	-67.09	-68.31	3.70	-2.48	-13.00	-54.09
642.07	S	-65.84	-66.57	3.15	-2.43	-13.00	-52.84
3704.80	H	-53.77	-59.63	12.44	-6.58	-13.00	-40.77

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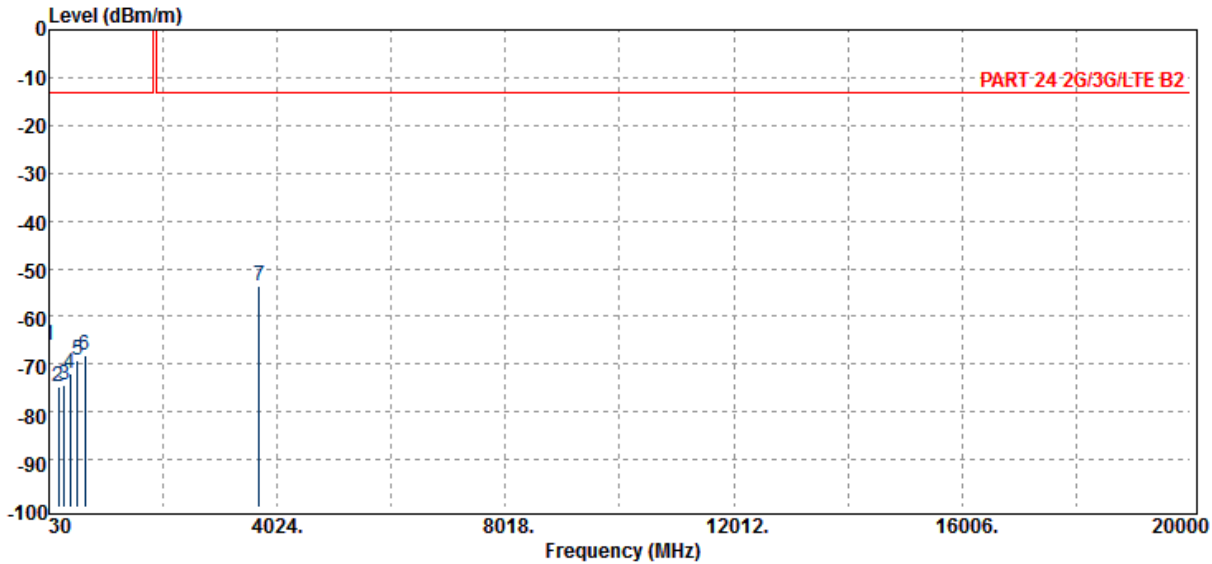
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Operation Band	:HSDPA B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1852.4 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
34.85	S	-66.24	-51.60	-13.67	-0.97	-13.00	-53.24
200.72	S	-74.78	-76.27	3.13	-1.64	-13.00	-61.78
293.84	S	-74.52	-76.09	3.50	-1.94	-13.00	-61.52
394.72	S	-72.08	-73.56	3.83	-2.35	-13.00	-59.08
535.37	S	-69.14	-70.25	3.66	-2.55	-13.00	-56.14
654.68	S	-68.11	-68.85	3.13	-2.39	-13.00	-55.11
3704.80	H	-53.55	-59.41	12.44	-6.58	-13.00	-40.55

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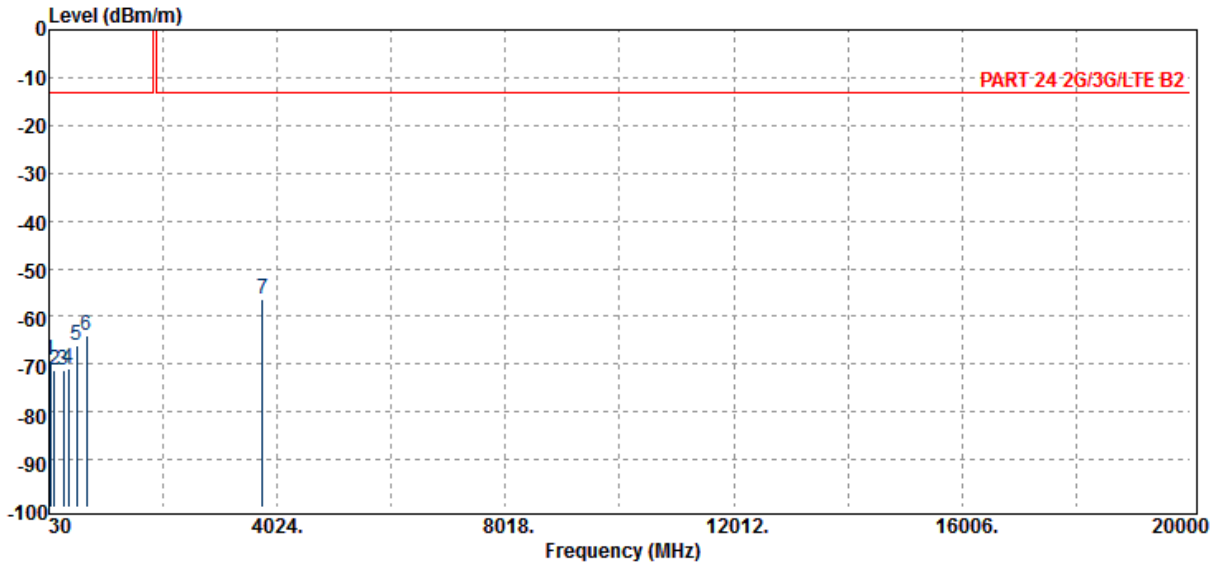
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Operation Band	:HSDPA B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:Tx CH MID		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
54.25	S	-69.33	-58.08	-10.18	-1.06	-13.00	-56.33
128.94	S	-71.28	-67.30	-2.62	-1.36	-13.00	-58.28
276.38	S	-71.26	-72.85	3.45	-1.86	-13.00	-58.26
371.44	S	-70.91	-72.55	3.84	-2.21	-13.00	-57.91
519.85	S	-66.01	-67.37	3.75	-2.39	-13.00	-53.01
687.66	S	-63.87	-64.21	3.10	-2.76	-13.00	-50.87
3760.00	H	-56.40	-62.25	12.45	-6.60	-13.00	-43.40

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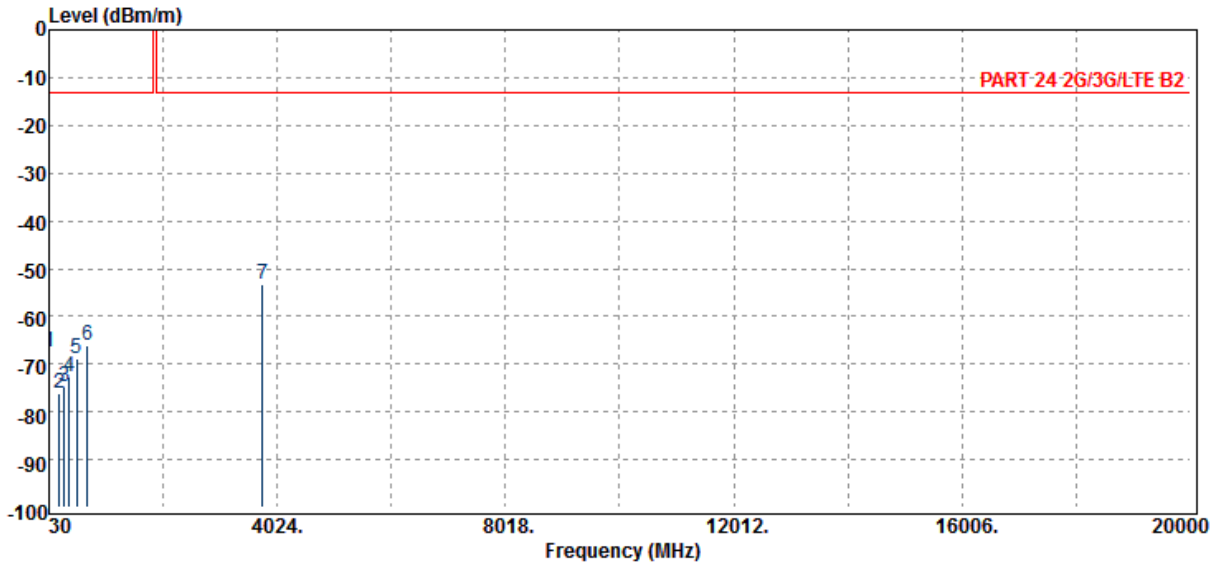
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Operation Band	:HSDPA B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:Tx CH MID		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
36.79	S	-67.34	-52.93	-13.43	-0.98	-13.00	-54.34
214.30	S	-76.04	-77.79	3.44	-1.68	-13.00	-63.04
299.66	S	-74.74	-76.41	3.62	-1.95	-13.00	-61.74
382.11	S	-72.67	-74.23	3.83	-2.27	-13.00	-59.67
519.85	S	-68.95	-70.31	3.75	-2.39	-13.00	-55.95
702.21	S	-66.17	-66.24	3.09	-3.02	-13.00	-53.17
3760.00	H	-53.15	-59.01	12.45	-6.60	-13.00	-40.15

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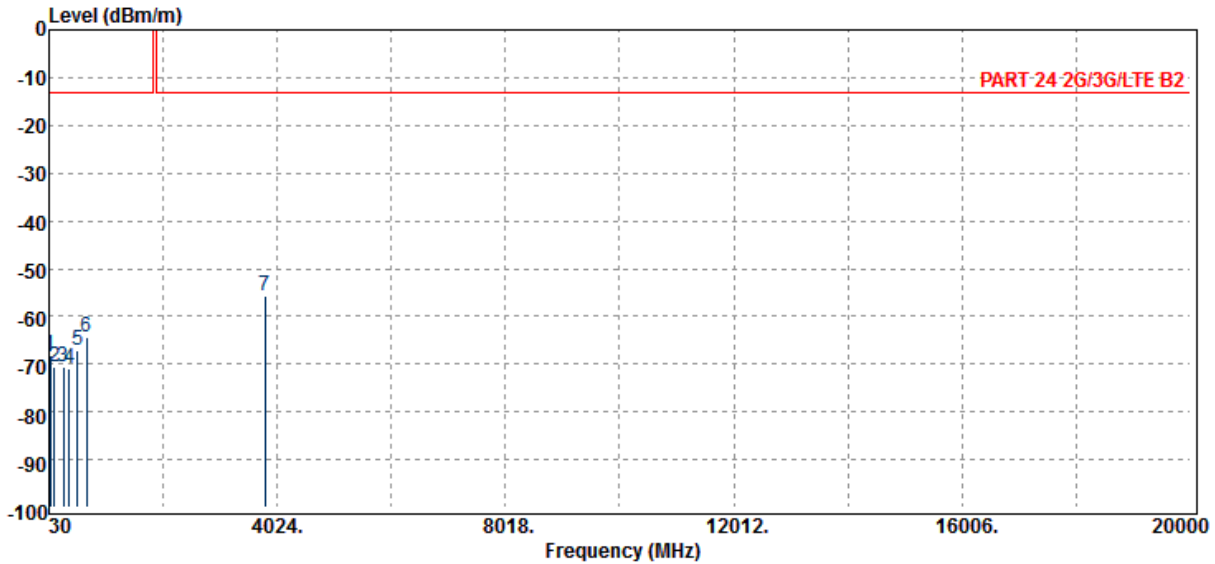
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Operation Band	:HSDPA B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1907.6 MHz	Engineer	:Tin
Operation Mode	:Tx CH HIGH		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
56.19	S	-68.22	-57.46	-9.69	-1.07	-13.00	-55.22
121.18	S	-70.44	-66.65	-2.46	-1.33	-13.00	-57.44
281.23	S	-70.44	-71.99	3.42	-1.88	-13.00	-57.44
390.84	S	-70.87	-72.37	3.83	-2.33	-13.00	-57.87
523.73	S	-66.97	-68.27	3.73	-2.43	-13.00	-53.97
694.45	S	-64.40	-64.61	3.09	-2.88	-13.00	-51.40
3815.20	H	-55.71	-61.54	12.46	-6.63	-13.00	-42.71

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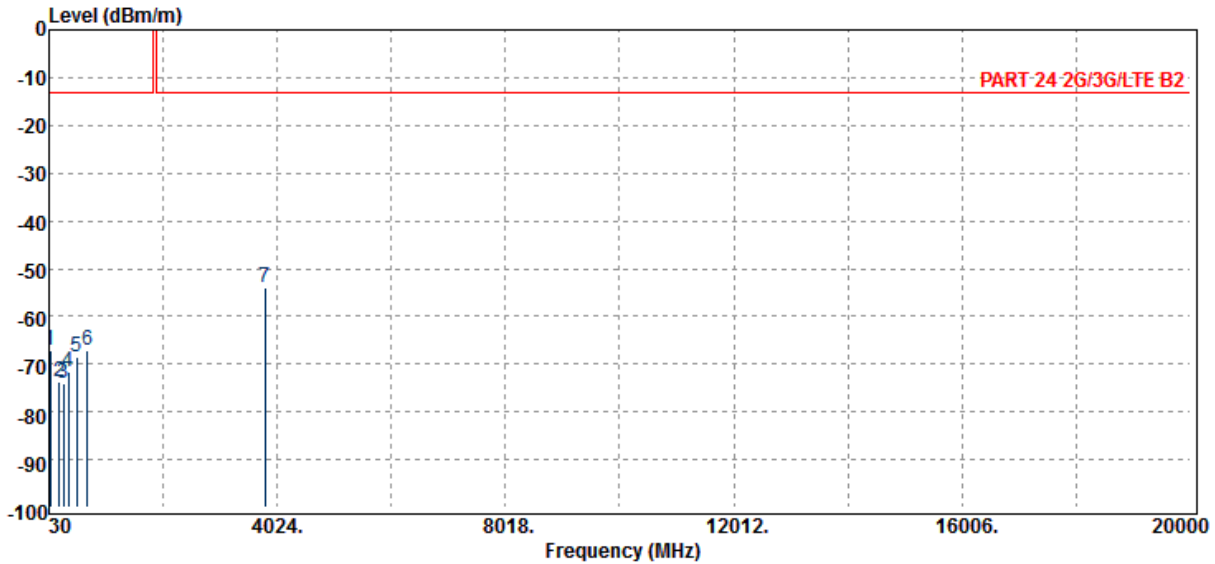
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Operation Band	:HSDPA B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1907.6 MHz	Engineer	:Tin
Operation Mode	:Tx CH HIGH		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
44.55	S	-67.09	-53.66	-12.42	-1.02	-13.00	-54.09
203.63	S	-73.71	-75.32	3.26	-1.65	-13.00	-60.71
289.96	S	-74.00	-75.50	3.43	-1.92	-13.00	-61.00
375.32	S	-71.67	-73.28	3.84	-2.23	-13.00	-58.67
515.97	S	-68.35	-69.76	3.77	-2.36	-13.00	-55.35
701.24	S	-67.28	-67.36	3.08	-3.00	-13.00	-54.28
3815.20	H	-54.04	-59.87	12.46	-6.63	-13.00	-41.04

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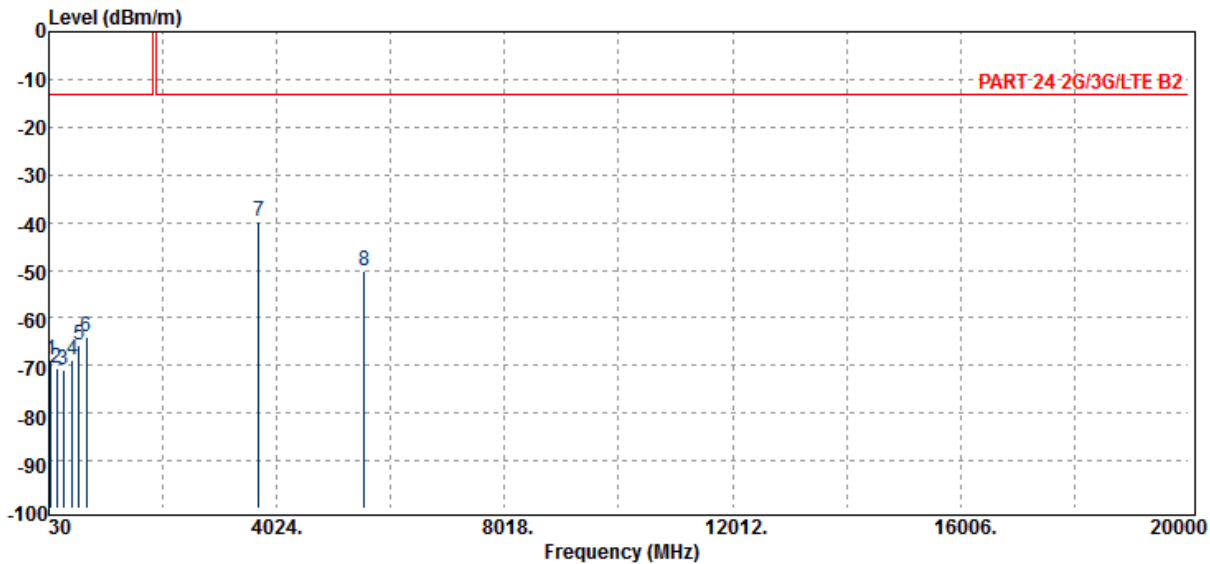
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### Radiated Spurious Emission Measurement Result: LTE-Band 2 (The Worst Case)

Operation Band	:LTE B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1851.5 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:H Plane		



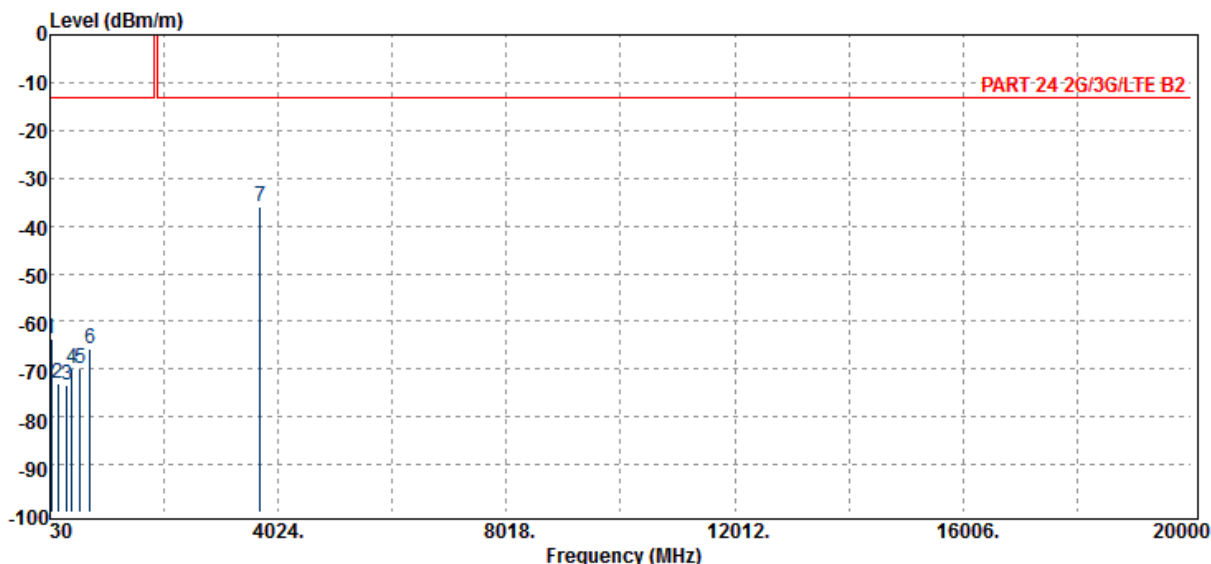
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
70.74	S	-68.93	-62.13	-5.68	-1.12	-13.00	-55.93
172.59	S	-70.74	-68.77	-0.44	-1.53	-13.00	-57.74
279.29	S	-70.80	-72.36	3.43	-1.87	-13.00	-57.80
437.40	S	-68.82	-70.29	3.69	-2.22	-13.00	-55.82
561.56	S	-65.86	-66.61	3.50	-2.76	-13.00	-52.86
681.84	S	-63.86	-64.31	3.10	-2.65	-13.00	-50.86
3703.00	H	-39.90	-45.76	12.44	-6.58	-13.00	-26.90
5554.50	H	-50.03	-54.66	12.90	-8.27	-13.00	-37.03

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Operation Band	:LTE B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1851.5 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
52.31	S	-63.60	-51.84	-10.70	-1.05	-13.00	-50.60
167.74	S	-73.14	-70.56	-1.07	-1.51	-13.00	-60.14
321.00	S	-73.33	-75.14	3.73	-1.92	-13.00	-60.33
416.06	S	-70.06	-71.46	3.76	-2.36	-13.00	-57.06
563.50	S	-69.88	-70.61	3.49	-2.76	-13.00	-56.88
730.34	S	-65.70	-65.73	3.14	-3.11	-13.00	-52.70
3703.00	H	-36.03	-41.90	12.44	-6.58	-13.00	-23.03

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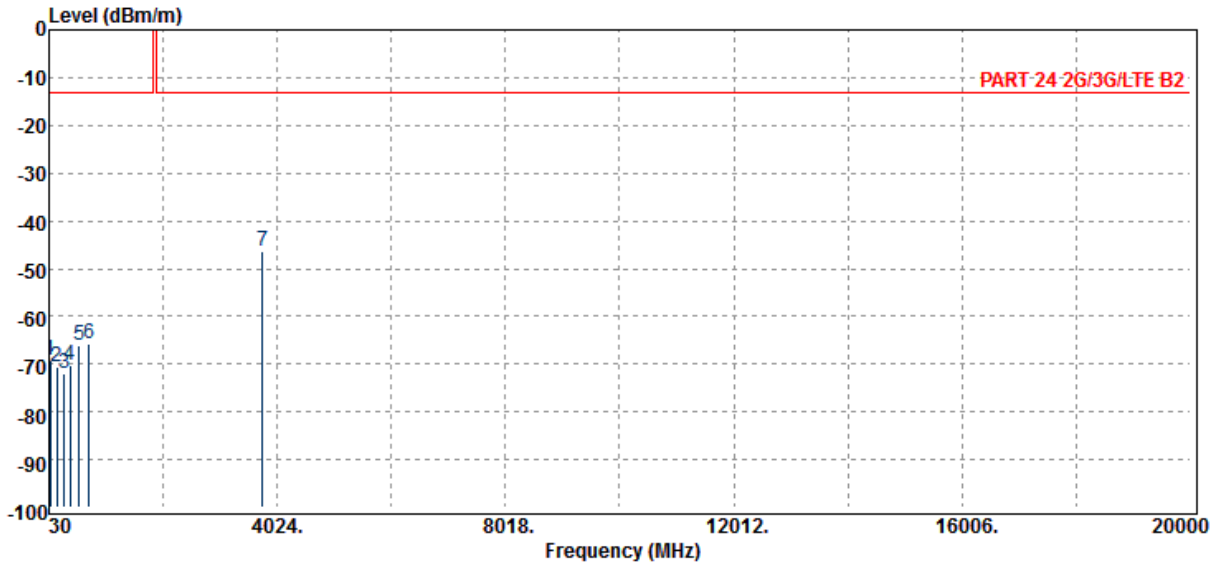
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Operation Band	:LTE B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:Tx CH MID		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



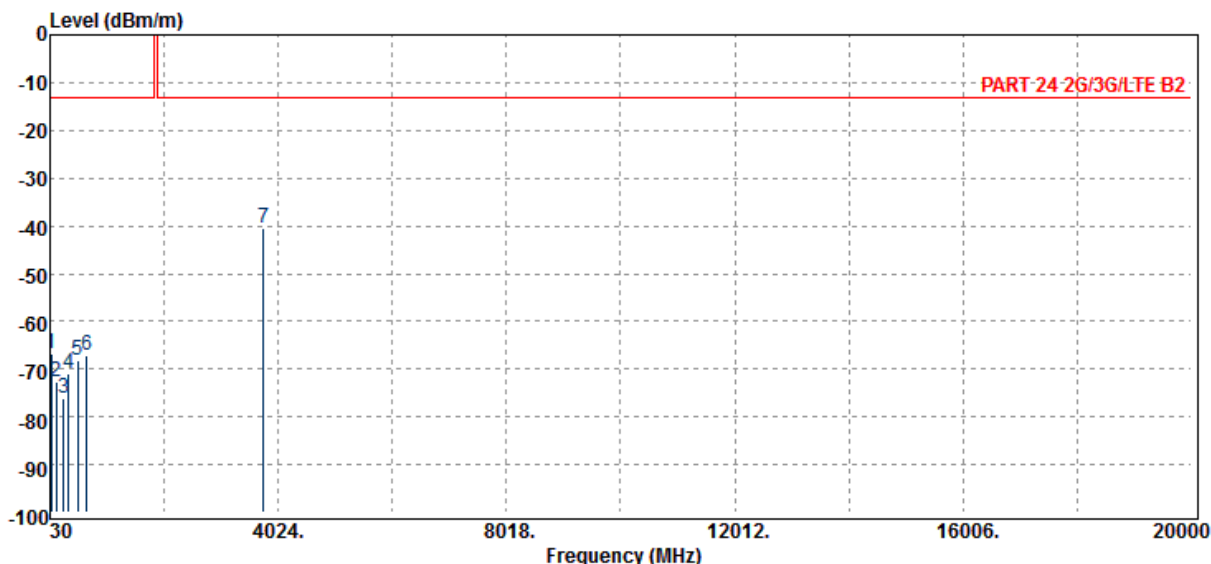
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
54.25	S	-69.33	-58.08	-10.18	-1.06	-13.00	-56.33
162.89	S	-70.70	-67.79	-1.42	-1.49	-13.00	-57.70
296.75	S	-71.89	-73.50	3.56	-1.95	-13.00	-58.89
398.60	S	-70.39	-71.84	3.82	-2.37	-13.00	-57.39
556.71	S	-66.05	-66.84	3.54	-2.75	-13.00	-53.05
729.37	S	-65.84	-65.87	3.14	-3.11	-13.00	-52.84
3760.00	H	-46.39	-52.24	12.45	-6.60	-13.00	-33.39

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Operation Band	:LTE B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:Tx CH MID		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
44.55	S	-66.80	-53.36	-12.42	-1.02	-13.00	-53.80
138.64	S	-72.62	-68.54	-2.69	-1.39	-13.00	-59.62
265.71	S	-76.09	-77.87	3.58	-1.80	-13.00	-63.09
356.89	S	-70.86	-72.61	3.86	-2.10	-13.00	-57.86
513.06	S	-68.17	-69.60	3.79	-2.35	-13.00	-55.17
667.29	S	-67.04	-67.77	3.12	-2.38	-13.00	-54.04
3760.00	H	-40.34	-46.19	12.45	-6.60	-13.00	-27.34

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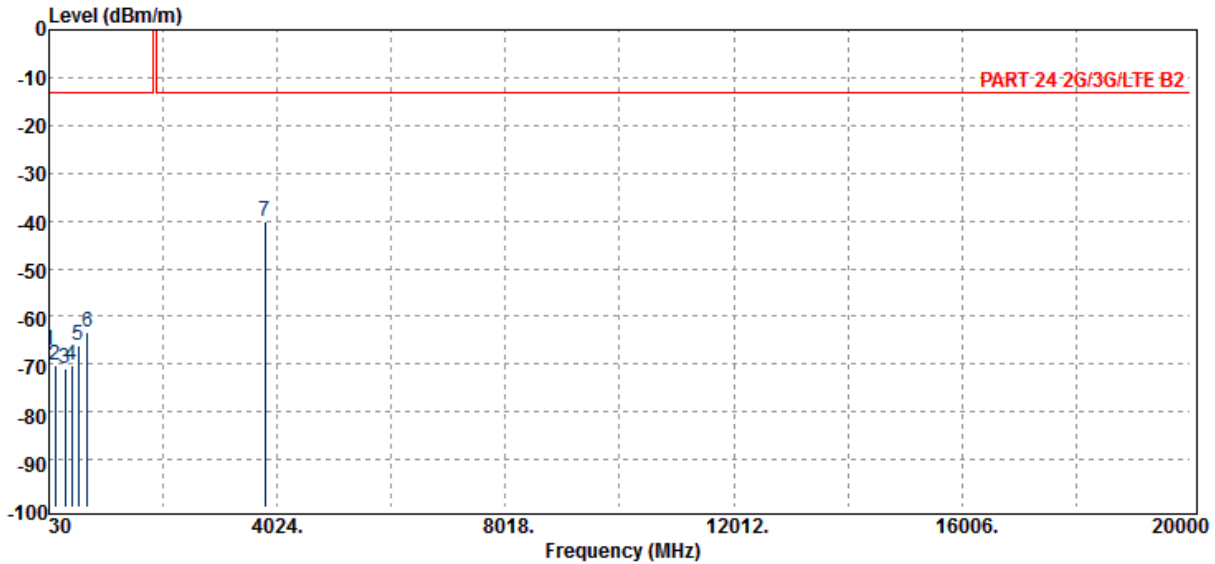
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Operation Band	:LTE B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1908.5 MHz	Engineer	:Tin
Operation Mode	:Tx CH HIGH		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



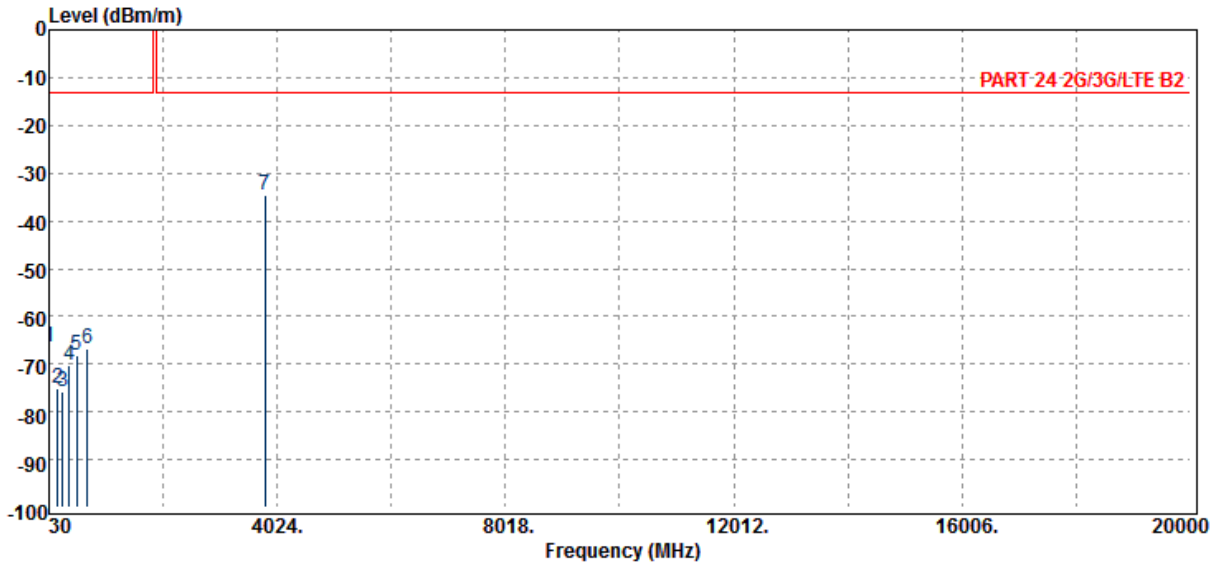
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
30.00	S	-67.27	-51.53	-14.78	-0.96	-13.00	-54.27
145.43	S	-70.41	-66.64	-2.37	-1.41	-13.00	-57.41
306.45	S	-70.79	-72.50	3.66	-1.94	-13.00	-57.79
420.91	S	-70.27	-71.69	3.74	-2.33	-13.00	-57.27
549.92	S	-66.16	-67.05	3.59	-2.70	-13.00	-53.16
697.36	S	-63.49	-63.64	3.08	-2.93	-13.00	-50.49
3817.00	H	-40.27	-46.10	12.46	-6.63	-13.00	-27.27

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Operation Band	:LTE B2	Temp./Humi.	:22 deg_C / 62 RH
Fundamental Frequency	:1908.5 MHz	Engineer	:Tin
Operation Mode	:Tx CH HIGH		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
39.70	S	-66.47	-52.37	-13.11	-0.99	-13.00	-53.47
179.38	S	-75.00	-74.22	0.78	-1.56	-13.00	-62.00
270.56	S	-75.80	-77.47	3.50	-1.83	-13.00	-62.80
382.11	S	-70.31	-71.88	3.83	-2.27	-13.00	-57.31
515.00	S	-68.27	-69.69	3.77	-2.36	-13.00	-55.27
699.30	S	-66.91	-67.03	3.08	-2.96	-13.00	-53.91
3817.00	H	-34.67	-40.50	12.46	-6.63	-13.00	-21.67

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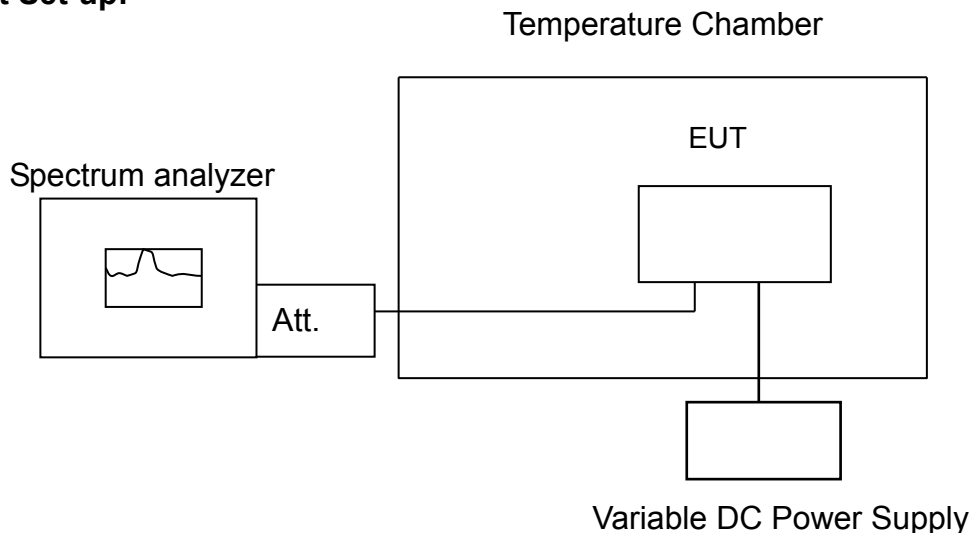
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## 11 FREQUENCY STABILITY MEASUREMENT

### 11.1 Standard Applicable:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### 11.2 Test Set-up:



**Note:** Measurement setup for testing on Antenna connector

### 11.3 Measurement Procedure:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. 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°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Set chamber temperature to 25°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint as declared by the manufacturer, record the maximum frequency change.

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#### 11.4 Measurement Equipment Used:

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HU-BER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	11/21/2016	11/20/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/19/2017	05/18/2018
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2017	02/10/2018
Radio Communication Analyzer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

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## 11.5 Measurement Result:

### FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
4.42	20	1879.999995	1	4700
3.85	20	1879.999994	0	4700
3.27	20	1880.000005	11	4700
2.8 (End point)	20	1880.000003	9	4700

### FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm = Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
3.85	50	1880.000006	12	4700
3.85	40	1879.999998	4	4700
3.85	30	1880.000006	12	4700
3.85	20	1879.999994	0	4700
3.85	10	1879.999989	-5	4700
3.85	0	1880.000015	21	4700
3.85	-10	1880.000022	28	4700
3.85	-20	1880.000014	20	4700
3.85	-30	1880.000006	12	4700

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**FREQUENCY ERROR vs. VOLTAGE**

Reference Frequency: WCDMA II Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
4.42	20	1880.000011	-14	4700
3.85	20	1880.000025	0	4700
3.27	20	1880.000044	19	4700
2.8 (End point)	20	1880.000092	67	4700

**FREQUENCY ERROR vs. TEMPERATURE**

Reference Frequency: WCDMA II Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
3.85	50	1880.000038	1	4700
3.85	40	1880.000027	-10	4700
3.85	30	1880.000029	-8	4700
3.85	20	1880.000037	0	4700
3.85	10	1880.000039	2	4700
3.85	0	1880.000054	17	4700
3.85	-10	1880.000026	-11	4700
3.85	-20	1880.000028	-9	4700
3.85	-30	1880.000051	14	4700

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**FREQUENCY ERROR vs. VOLTAGE**

Reference Frequency:		LTE B2 Mid Channel	1880	MHz 20M QPSK CH 18900
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
4.42	25	1880.000008	-19	4700
3.85	25	1880.000027	0	4700
3.27	25	1880.000018	-9	4700
2.8 (End point)	25	1880.000032	5	4700

**FREQUENCY ERROR vs. TEMPERATURE**

Reference Frequency:		LTE B2 Mid Channel	1880	MHz 20M QPSK CH 18900
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(MHz)		
3.85	-30	1880.000029	-2	4700
3.85	-20	1880.000005	-26	4700
3.85	-10	1880.000017	-14	4700
3.85	0	1880.000023	-8	4700
3.85	10	1880.000026	-5	4700
3.85	20	1880.000031	0	4700
3.85	30	1880.000025	-6	4700
3.85	40	1880.000033	2	4700
3.85	50	1880.000027	-4	4700

**Note: The battery is rated 3.85V dc.**

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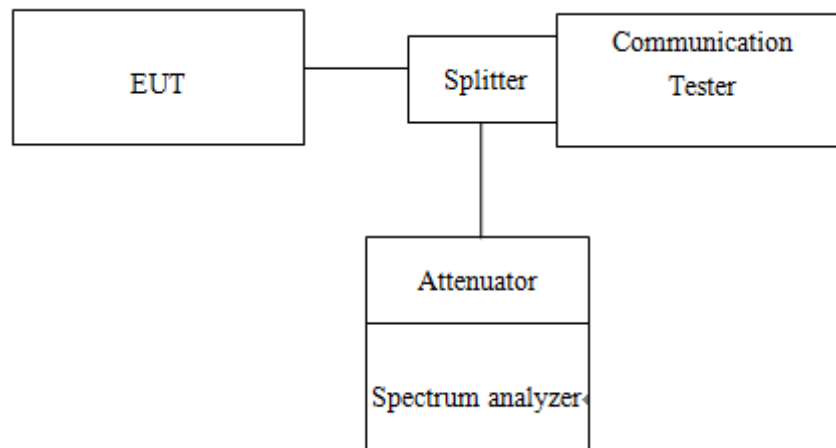
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## 12 PEAK TO AVERAGE RATIO

### 12.1 Standard Applicable

The peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

### 12.2 Test SET-UP



### 12.3 Measurement Procedure

1. KDB 971168 D01 is employed as the following procedure is proper adjusted accordingly:
2. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth; & internal = 1ms
3. Set the number of counts to a value that stabilizes the measured CCDF curve.

### 12.4 Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HU-BER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	11/21/2016	11/20/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/19/2017	05/18/2018
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2017	02/10/2018
Radio Communication Analyzer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

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## 12.5 Measurement Result

### Tabular Results:

Freq. (MHz)	CH	Peak-to-Average Ratio (dB)	
		GSM 1900	GPRS 1900
1850.2	9296	9.38	9.46
1880.0	9400	<b>10.02</b>	9.97
1909.8	9538	9.55	<b>10.00</b>

Freq. (MHz)	CH	Peak-to-Average Ratio (dB)		
		WCDMA II	HSDPA II	HSUPA II
1852.4	9262	3.11	3.92	3.89
1880	9400	<b>3.12</b>	<b>3.83</b>	<b>4.16</b>
1907.6	9538	3.03	3.53	4.27

LTE BAND 2							
Channel bandwidth: 1.4MHz				Channel bandwidth: 3MHz			
Freq. (MHz)	CH	Peak-to-Average Ratio (dB)		Freq. (MHz)	CH	Peak-to-Average Ratio (dB)	
		16QAM	LIMIT			16QAM	LIMIT
1850.7	18607	6.08	13	1851.5	18615	6.21	13
1880.0	18900	<b>6.21</b>	13	1880.0	18900	<b>6.35</b>	13
1909.3	19193	5.84	13	1908.5	19185	6.07	13

LTE BAND 2							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Freq. (MHz)	CH	Peak-to-Average Ratio (dB)		Freq. (MHz)	CH	Peak-to-Average Ratio (dB)	
		16QAM	LIMIT			16QAM	LIMIT
1852.5	18625	6.15	13	1855.0	18650	6.03	13
1880.0	18900	<b>6.22</b>	13	1880.0	18900	<b>6.22</b>	13
1907.5	19175	5.96	13	1905.0	19150	6.04	13

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LTE BAND 2							
Channel bandwidth: 15MHz				Channel bandwidth: 20MHz			
Freq. (MHz)	CH	Peak-to-Average Ratio (dB)		Freq. (MHz)	CH	Peak-to-Average Ratio (dB)	
		16QAM	LIMIT			16QAM	LIMIT
1857.5	18675	6.18	13	1860.0	18700	6.77	13
1880.0	18900	<b>6.29</b>	13	1880.0	18900	6.69	13
1902.5	19125	6.23	13	1900.0	19100	<b>6.79</b>	13

**Measurement Results:**  
Please refer to next page.

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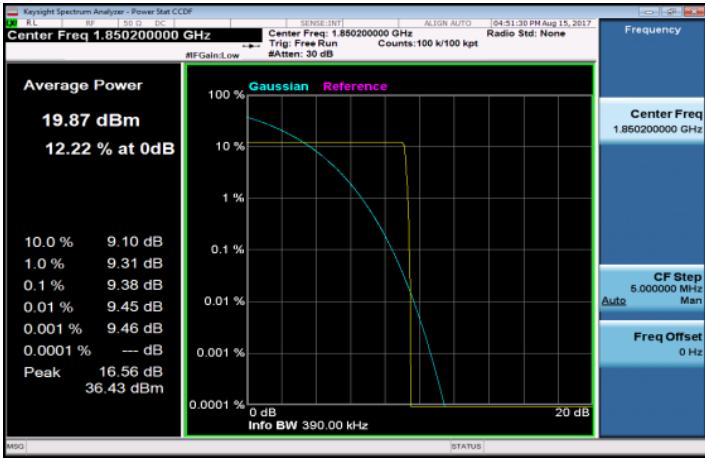
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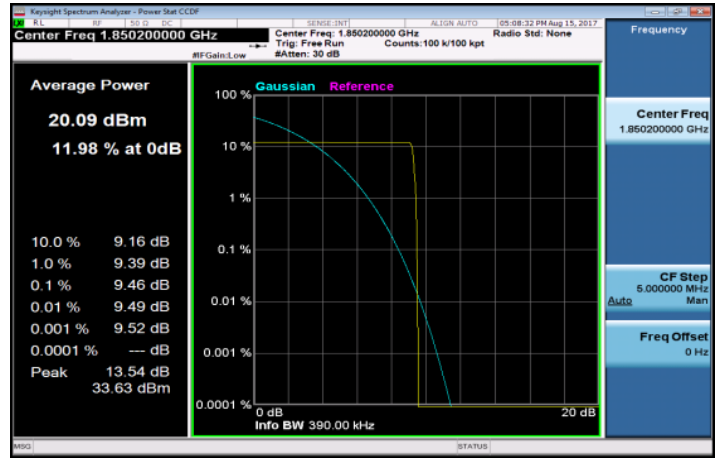
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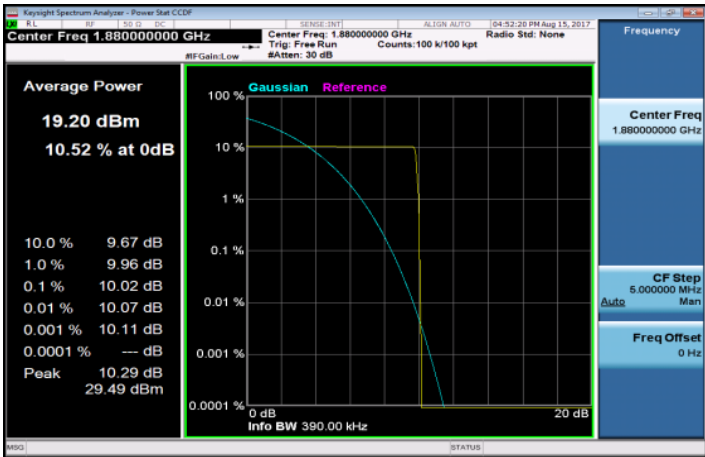
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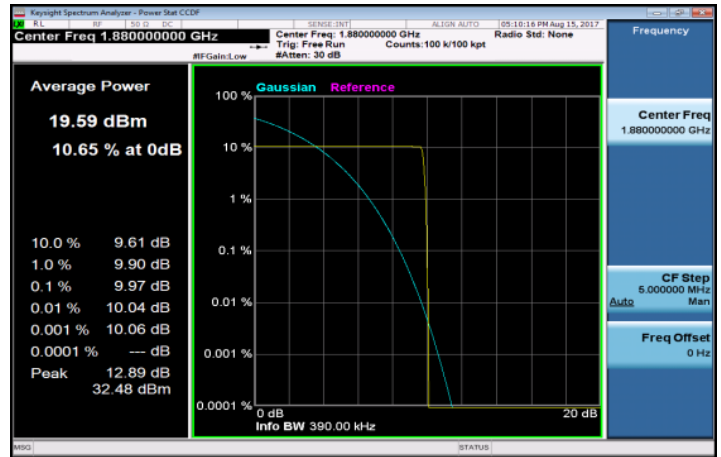
GPRS 1900 Channel Low



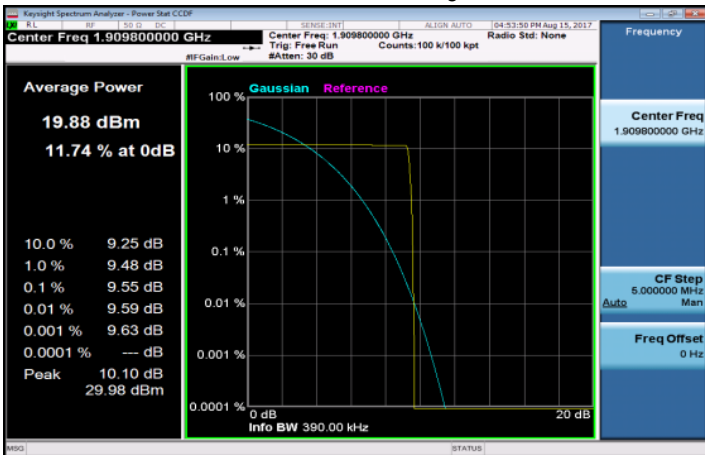
GSM 1900 Channel Mid



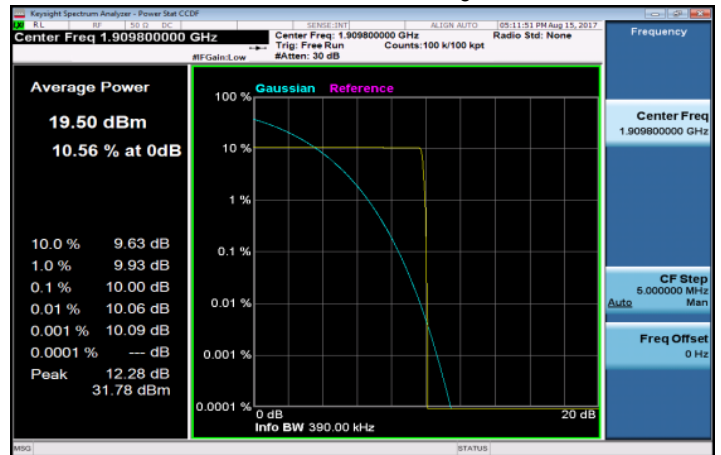
GPRS 1900 Channel Mid



GSM 1900 Channel High



GPRS 1900 Channel High



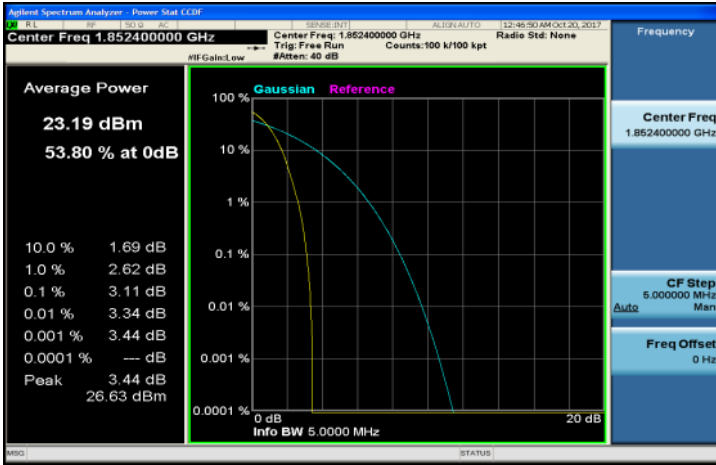
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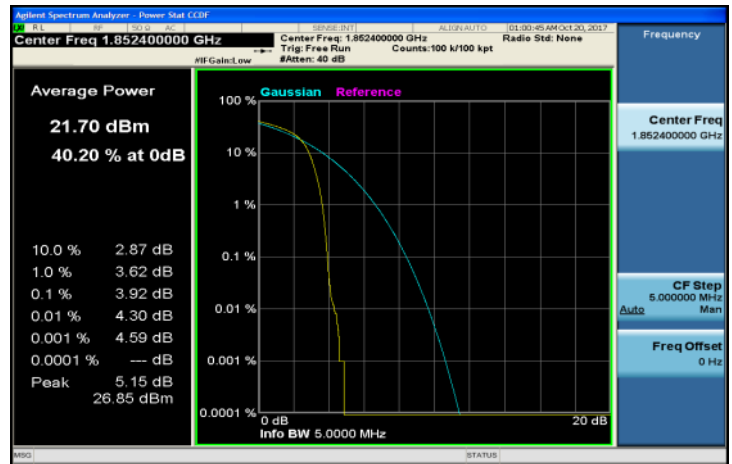
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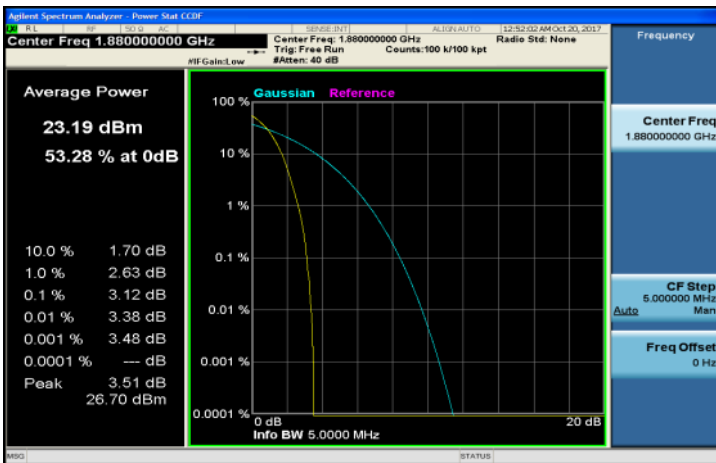
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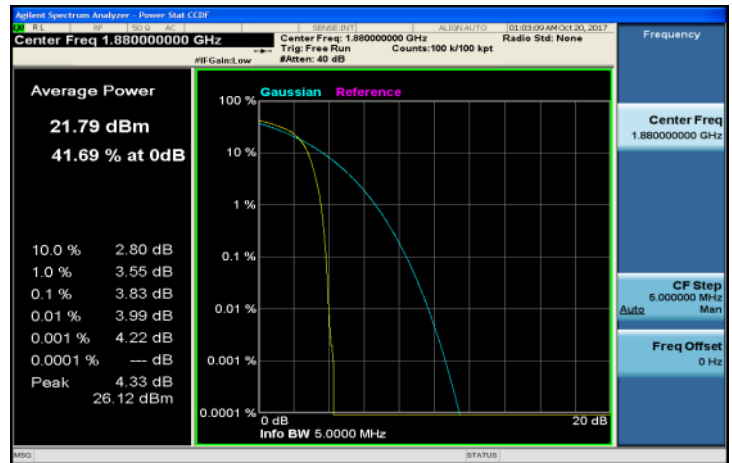
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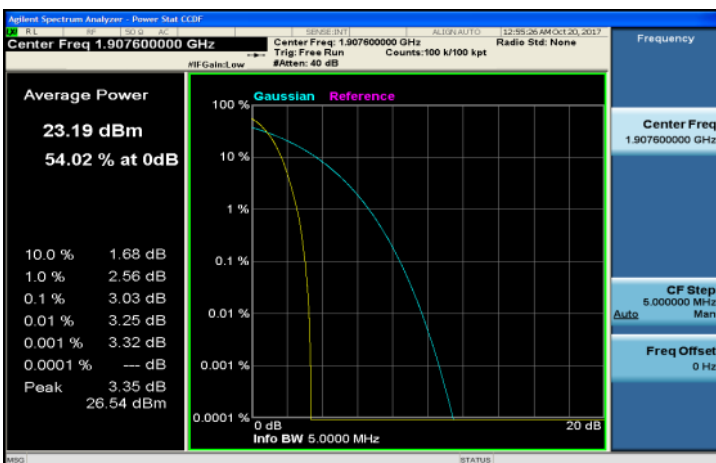
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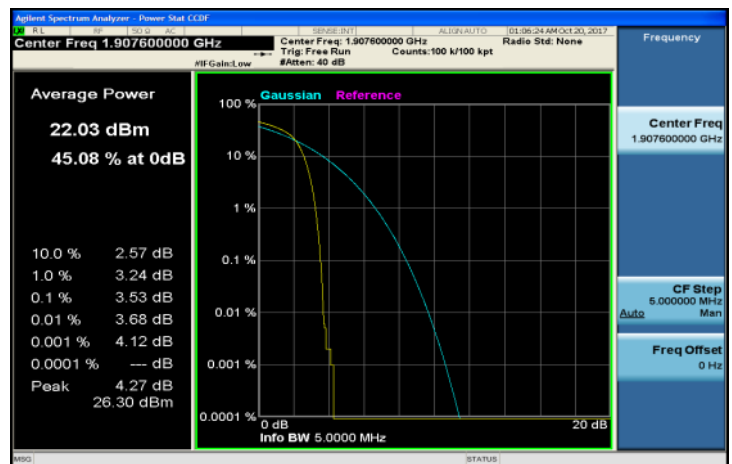
HSDPA\_B2\_MidCH9400-1880



WCDMA\_B2\_HighCH9538-1907.6



HSDPA\_B2\_HighCH9538-1907.6



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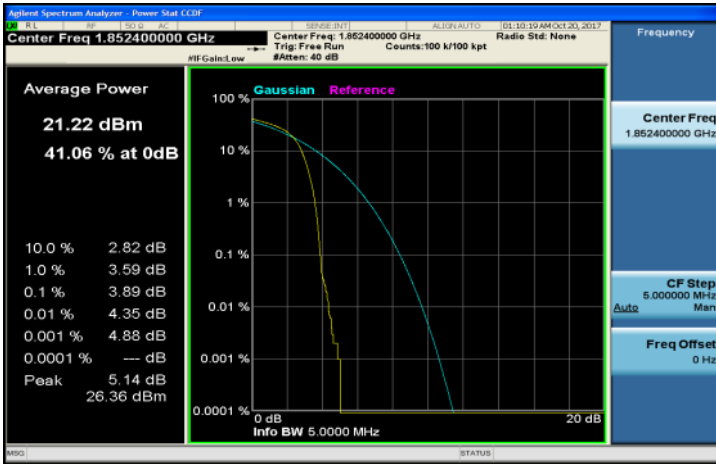
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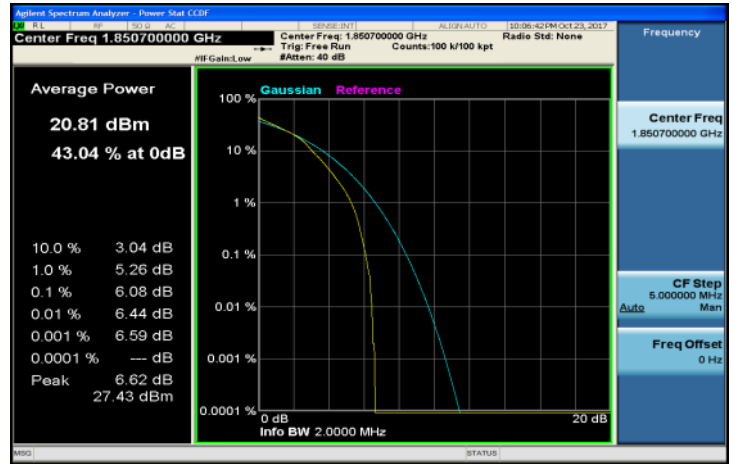
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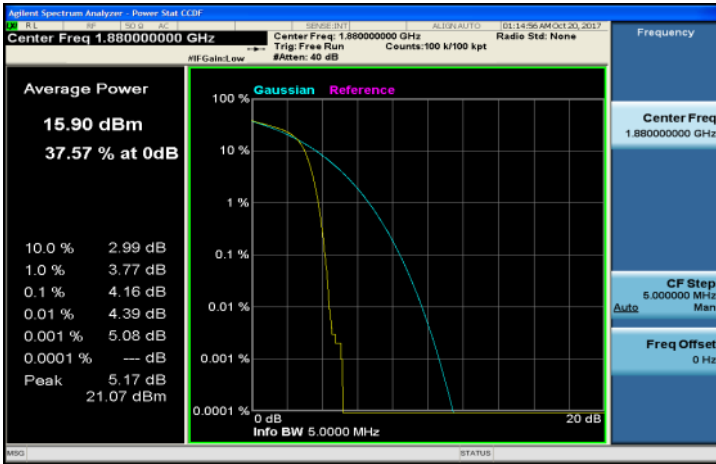
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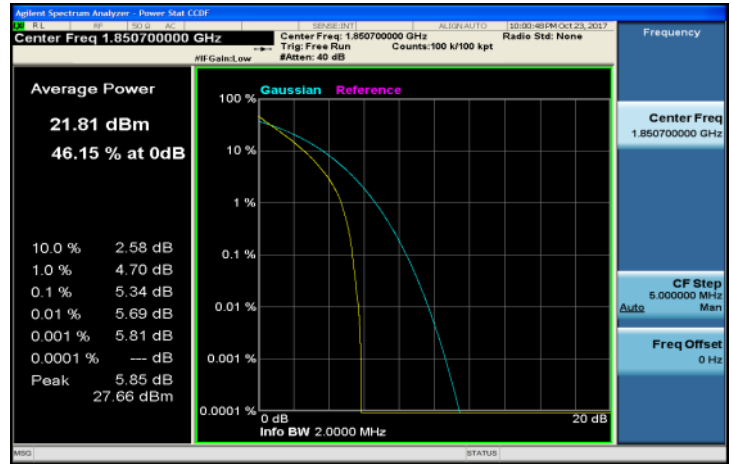
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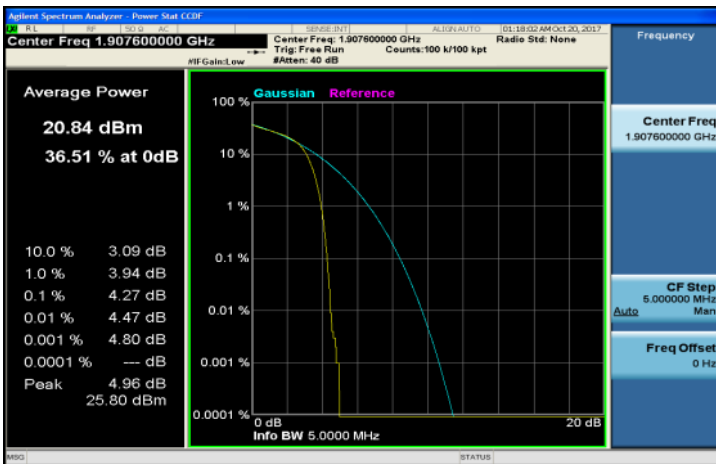
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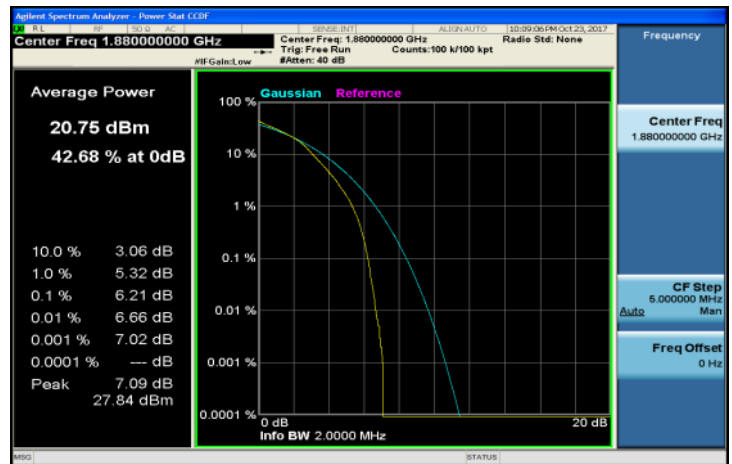
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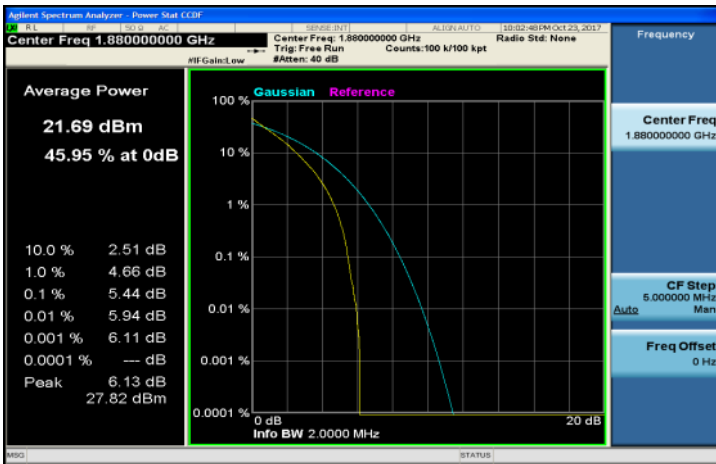


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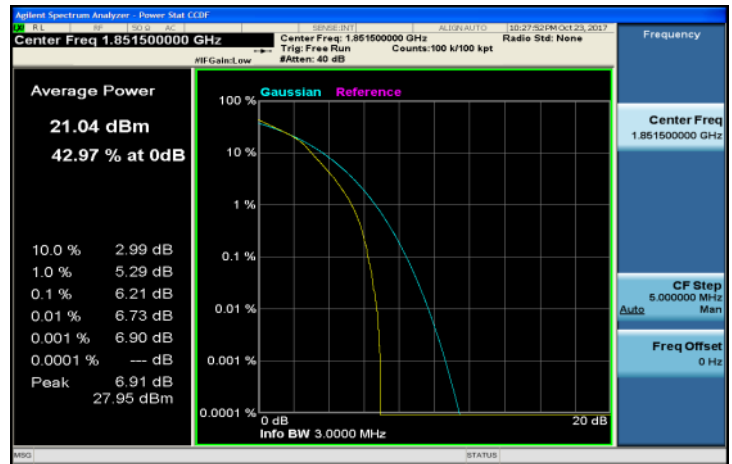
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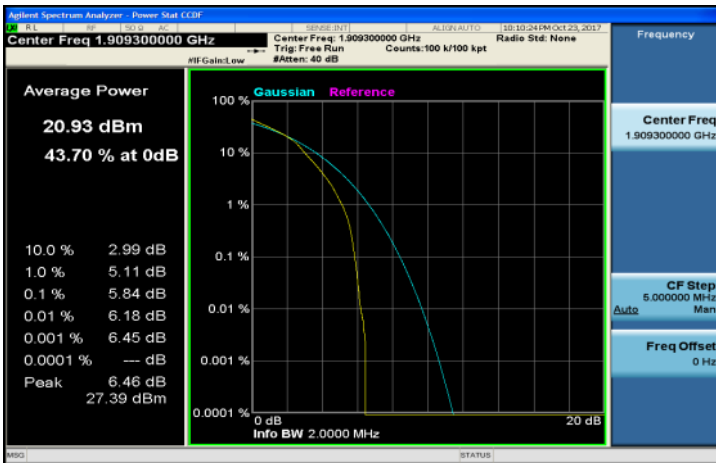
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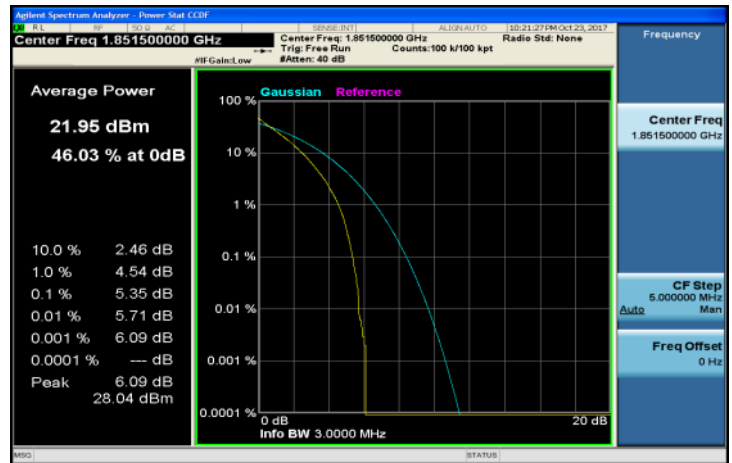
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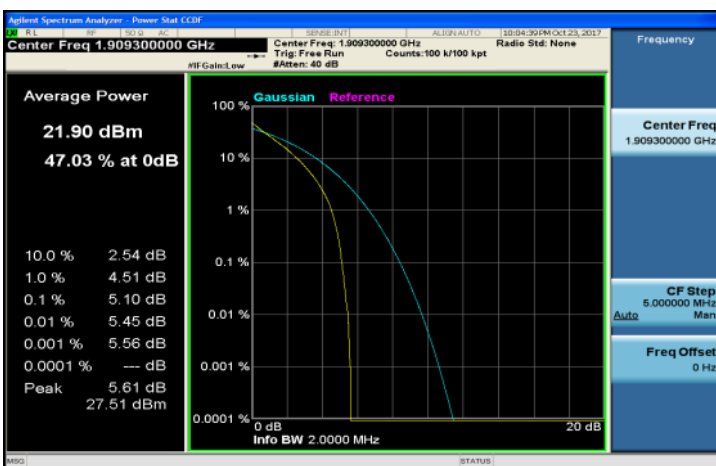
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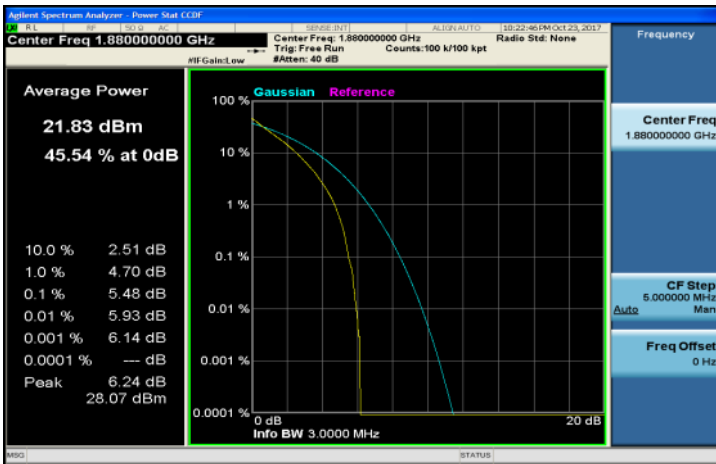


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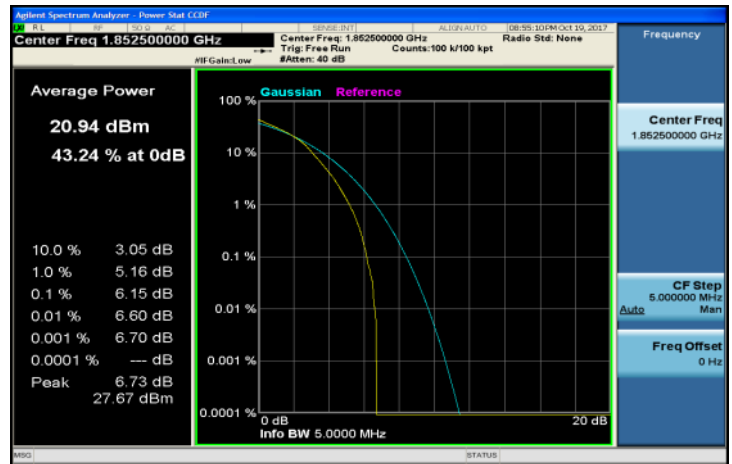
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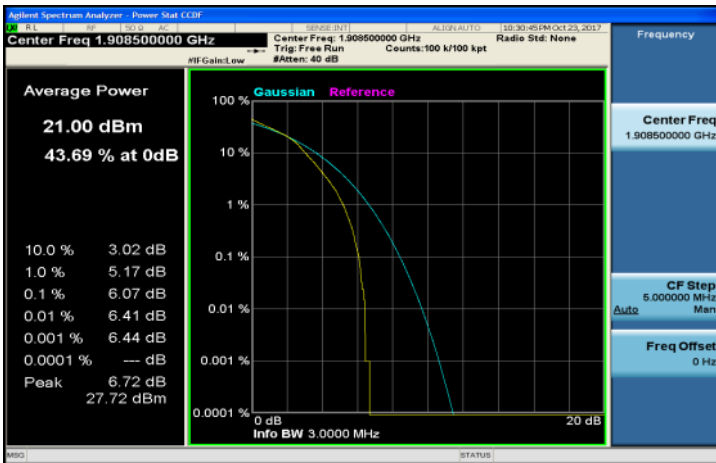
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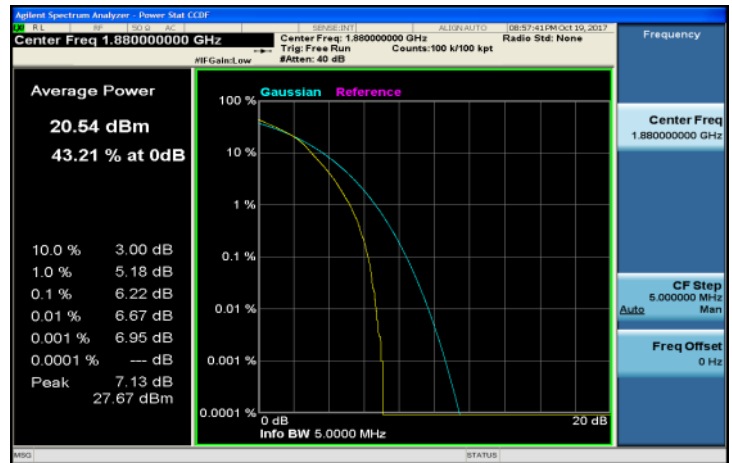
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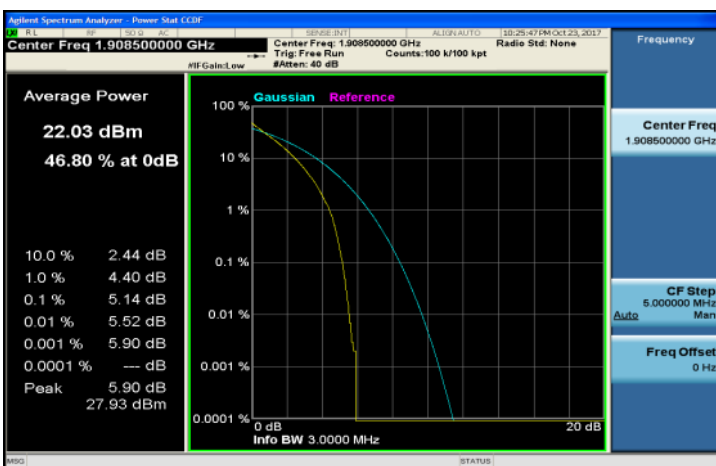
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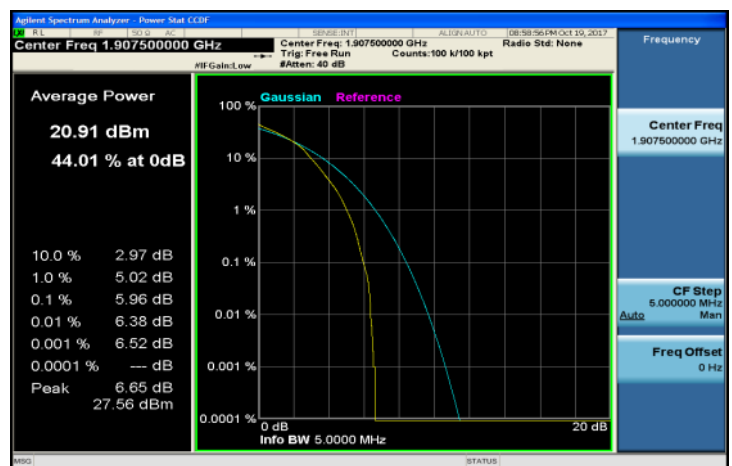
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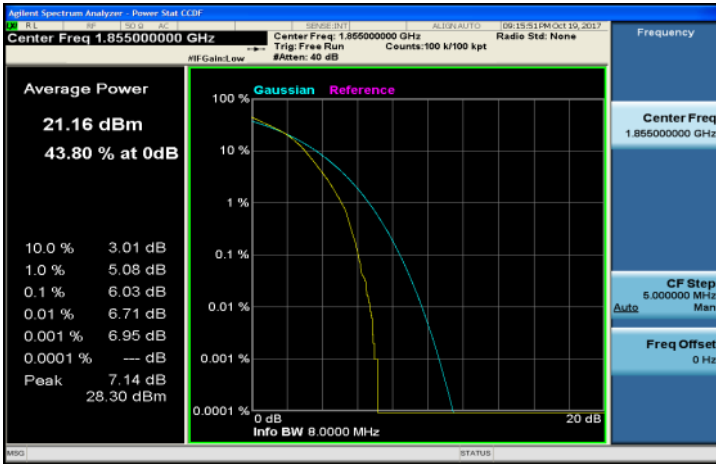


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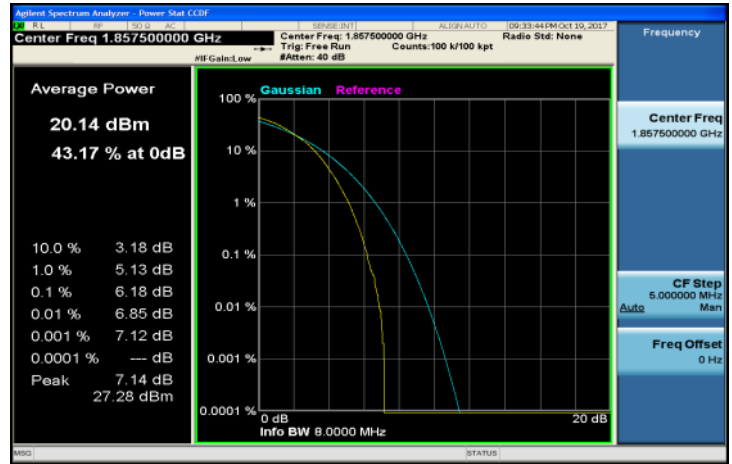
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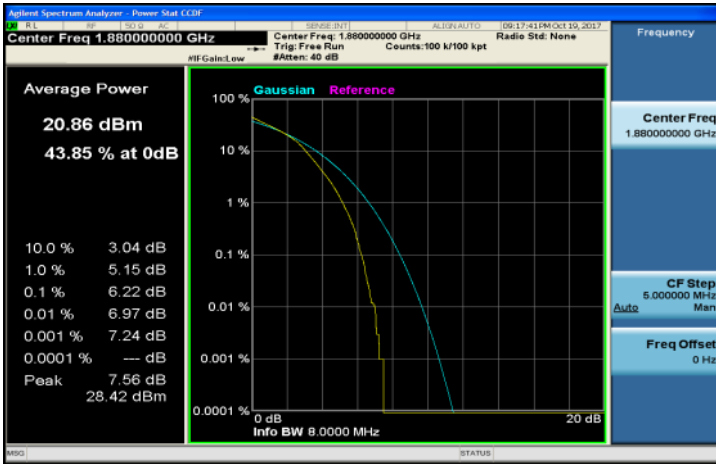
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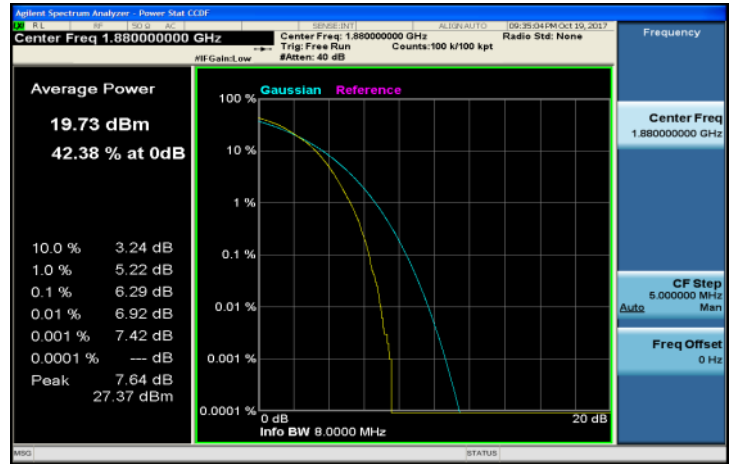
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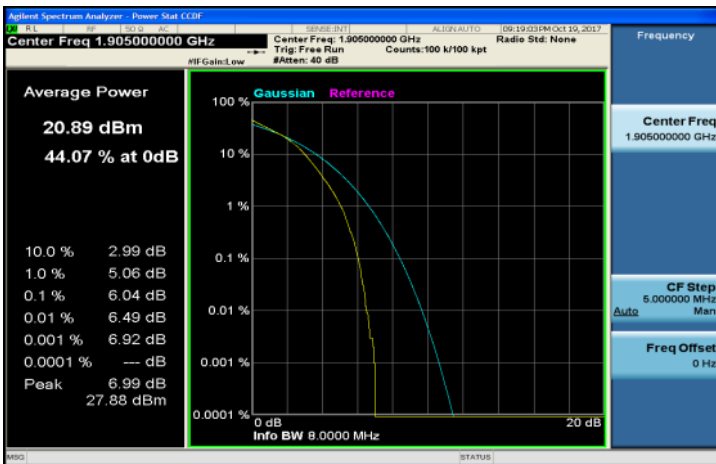
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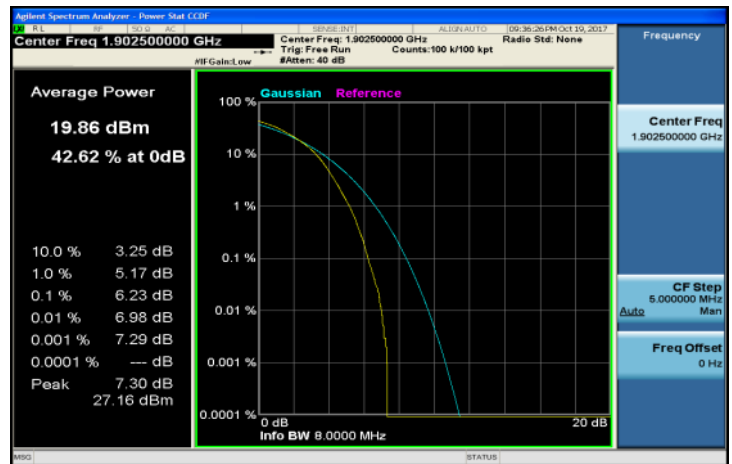
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LTE\_Band2\_10MHz\_16QAM\_50\_0\_HighCH19150-1905



LTE\_Band2\_15MHz\_16QAM\_75\_0\_HighCH19125-1902.5



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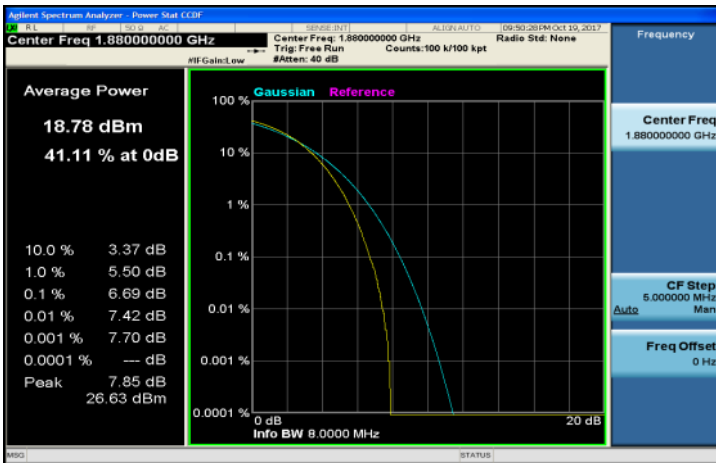
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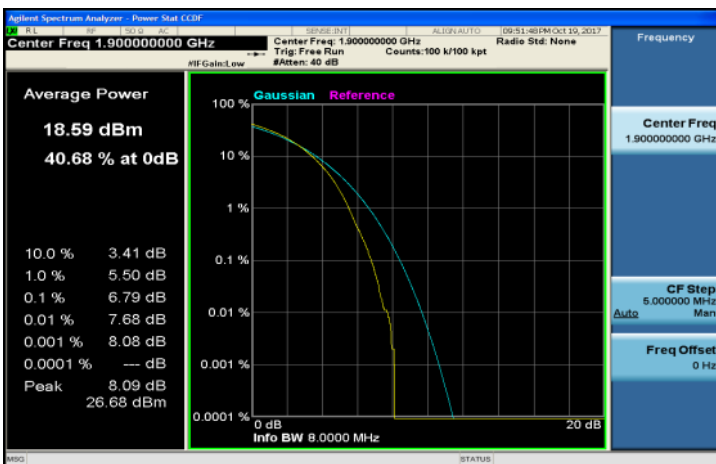
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LTE\_Band2\_20MHz\_16QAM\_100\_0\_MidCH18900-1880



LTE\_Band2\_20MHz\_16QAM\_100\_0\_HighCH19100-1900



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~ End of Report ~

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