Appendix for test report

1Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	ERP [dBm]	Limit [dBm]	Verdict
WCDMA850	UMTS/TM1	LCH	24.24	19.99	38.5	PASS
		MCH	24.21	19.96	38.5	PASS
		HCH	24.20	19.95	38.5	PASS
Test Band	**Test Mode**	**Test Channel**	**Conducted Power [dBm]**	**EIRP [dBm]**	**Limit [dBm]**	**Verdict**
WCDMA1900	UMTS/TM1	LCH	23.63	24.73	33	PASS
		MCH	23.70	24.80	33	PASS
		HCH	23.58	24.68	33	PASS

Note1:

a, For getting the ERP (Efficient Radiated Power) or EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

ERP [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBd]

EIRP [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBi]

b, SGP = Signal Generator Level

Note2:

SET Span = 1.5 * OBW

SET RBW = 1% of the OBW,not to exceed 1MHz

SET VBW >= 3 * RBW

SET Sweep time = auto - couple.

Detector: RMS

2Appendix_B: Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA850	UMTS/TM1	LCH	4.500	13	PASS
		MCH	2.690	13	PASS
		HCH	2.920	13	PASS
WCDMA1900	UMTS/TM1	LCH	2.710	13	PASS
		MCH	2.750	13	PASS
		HCH	2.560	13	PASS

3Appendix_C: Modulation Characteristics

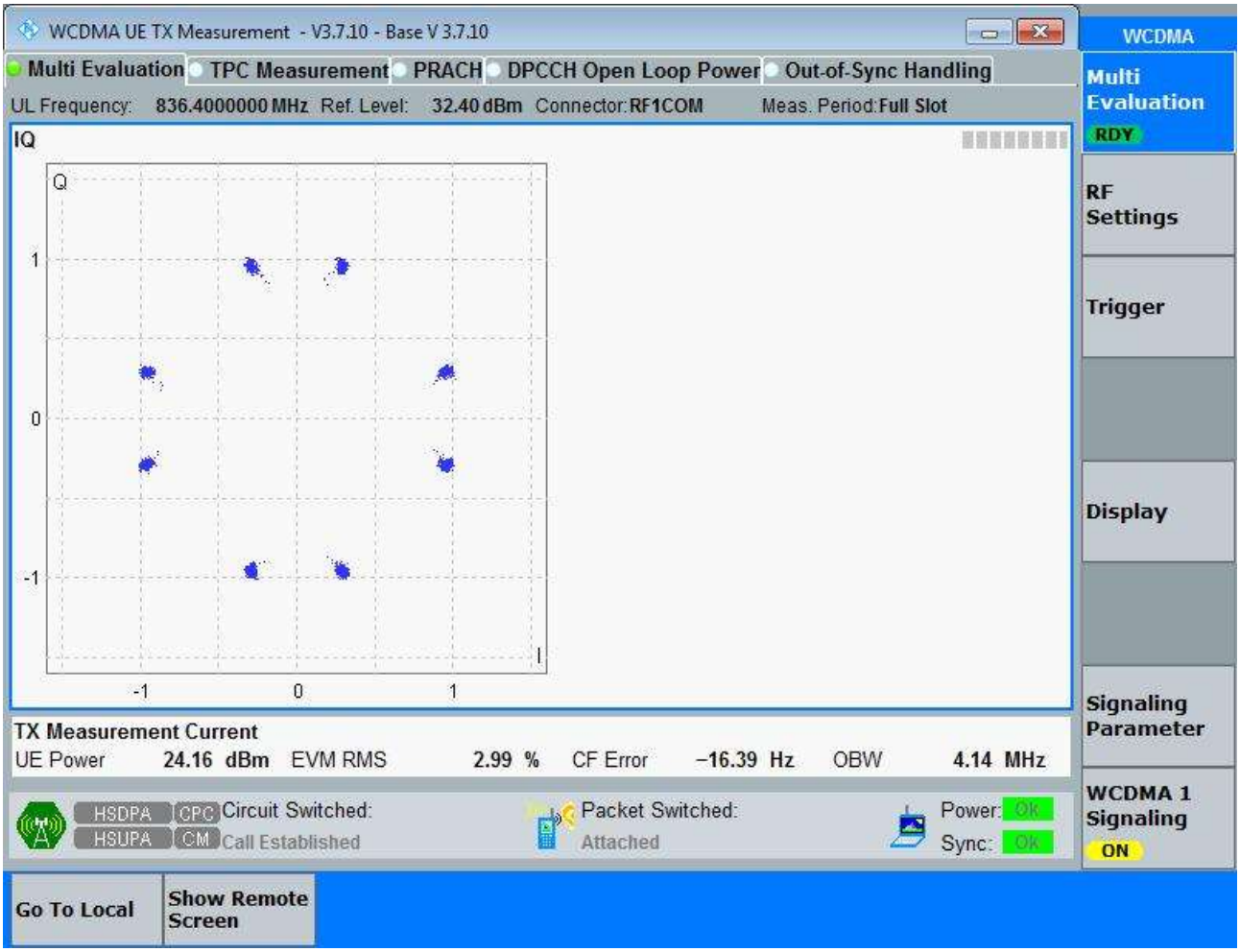
Part I - Test Plots

3.1 For UMTS

3.1.1 Test Band = WCDMA850

3.1.1.1 Test Mode = UMTS/TM1

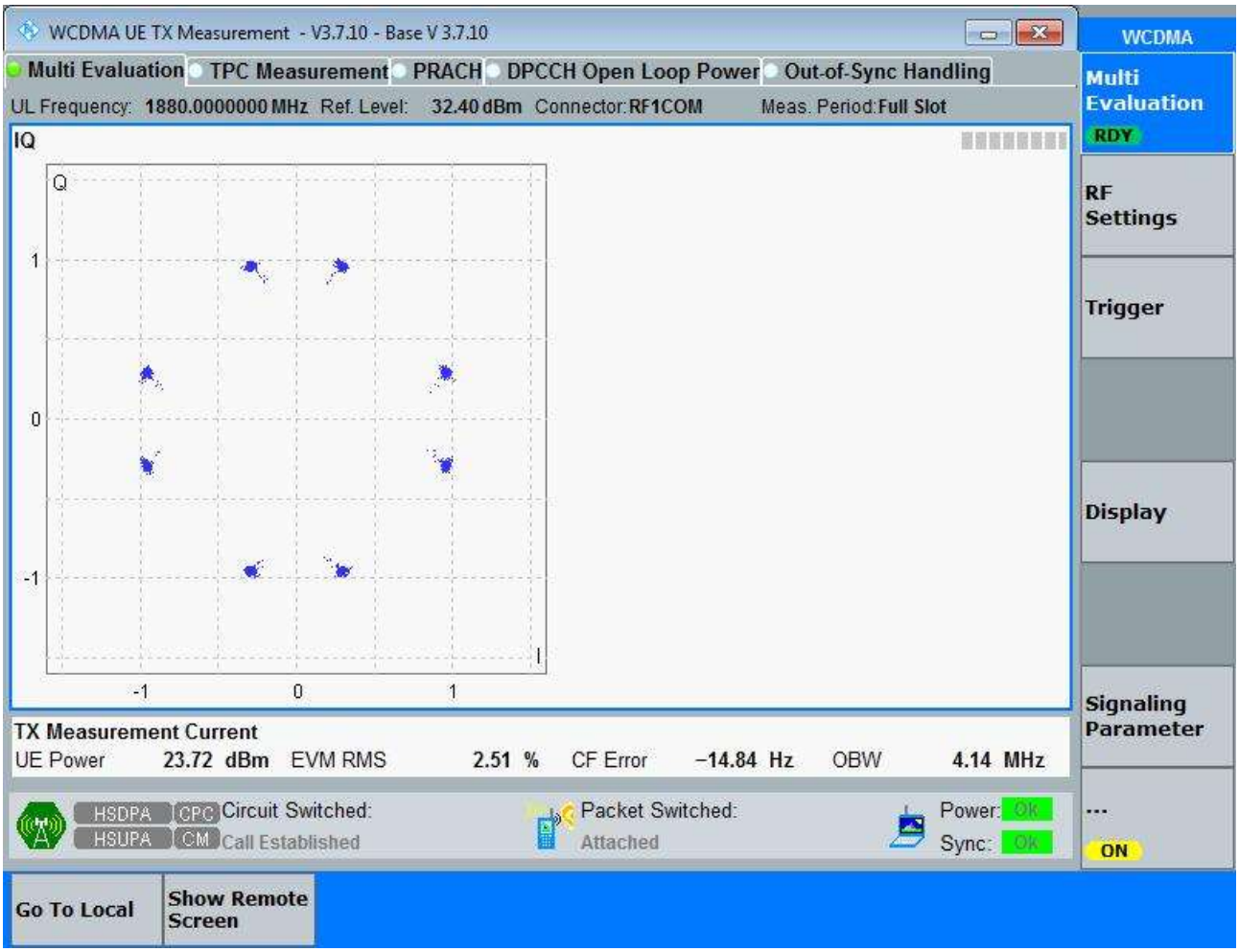
3.1.1.1.1 Test Channel = MCH



3.1.2 Test Band = WCDMA1900

3.1.2.1 Test Mode = UMTS/TM1

3.1.2.1.1 Test Channel = MCH



4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA850	UMTS/TM1	LCH	4.19	4.72	Pass
		MCH	4.18	4.71	Pass
		HCH	4.17	4.71	Pass
WCDMA1900	UMTS/TM1	LCH	4.18	4.70	Pass
		MCH	4.17	4.72	Pass
		HCH	4.19	4.73	Pass

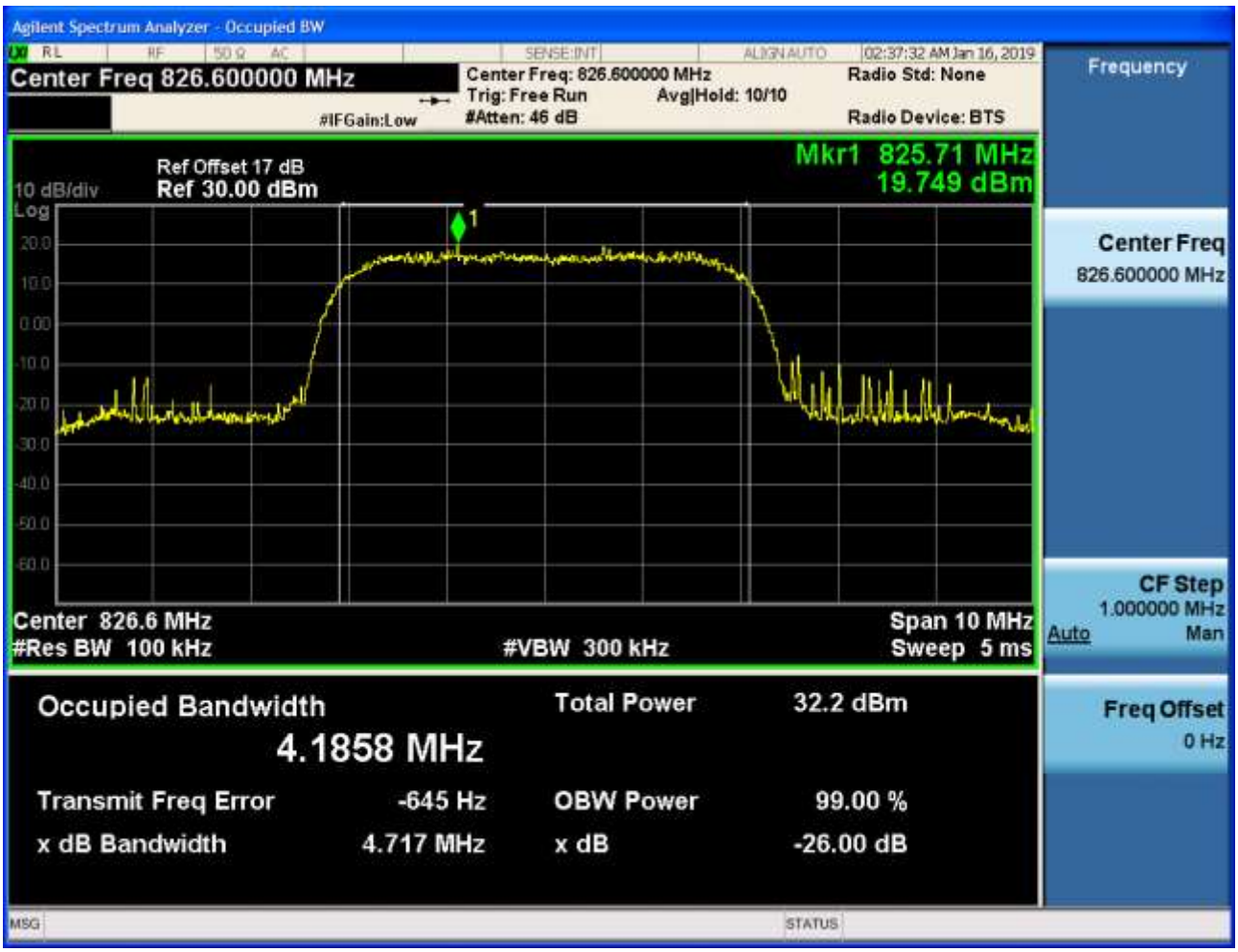
Part II - Test Plots

4.1 For UMTS

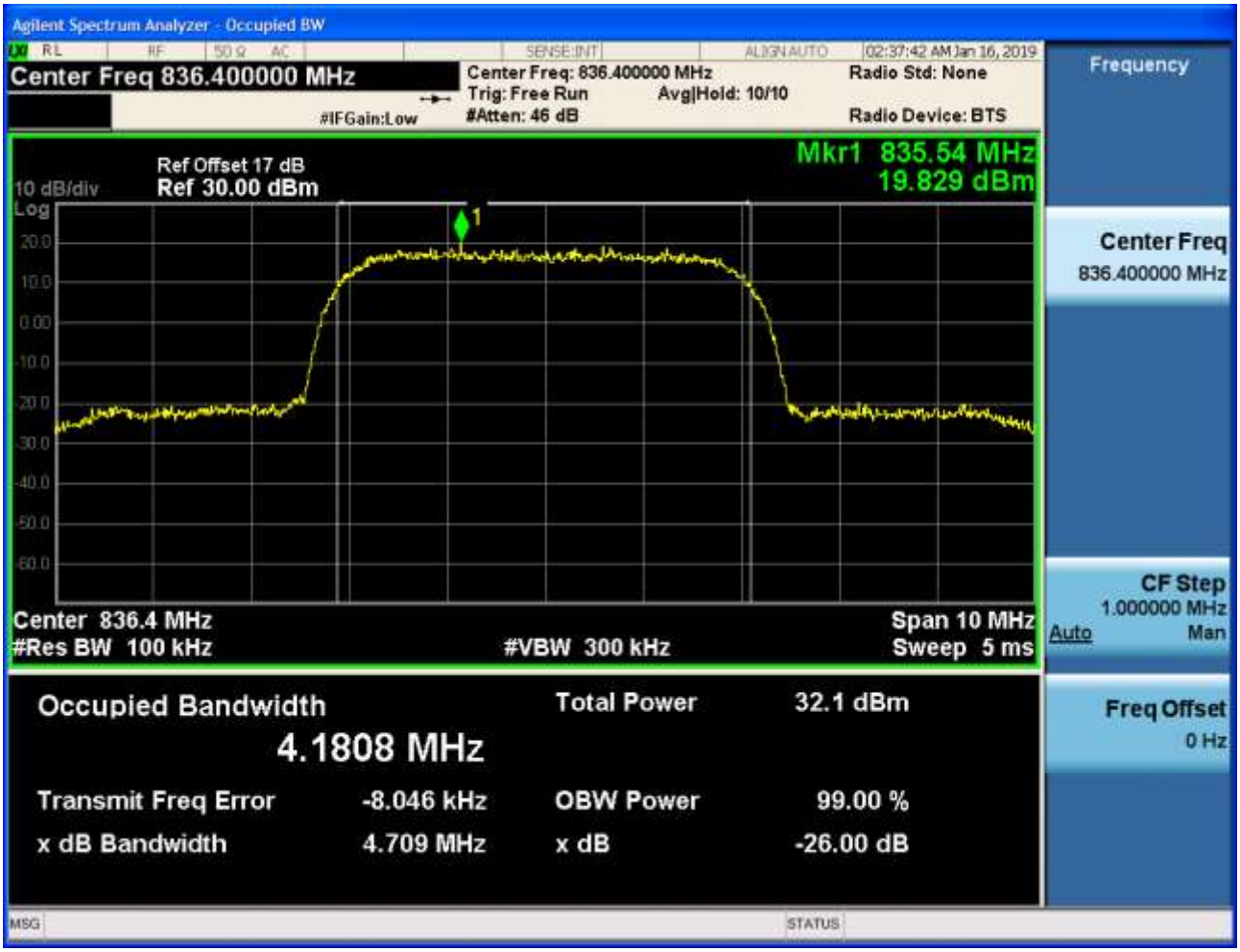
4.1.1 Test Band = WCDMA850

4.1.1.1 Test Mode = UMTS/TM1

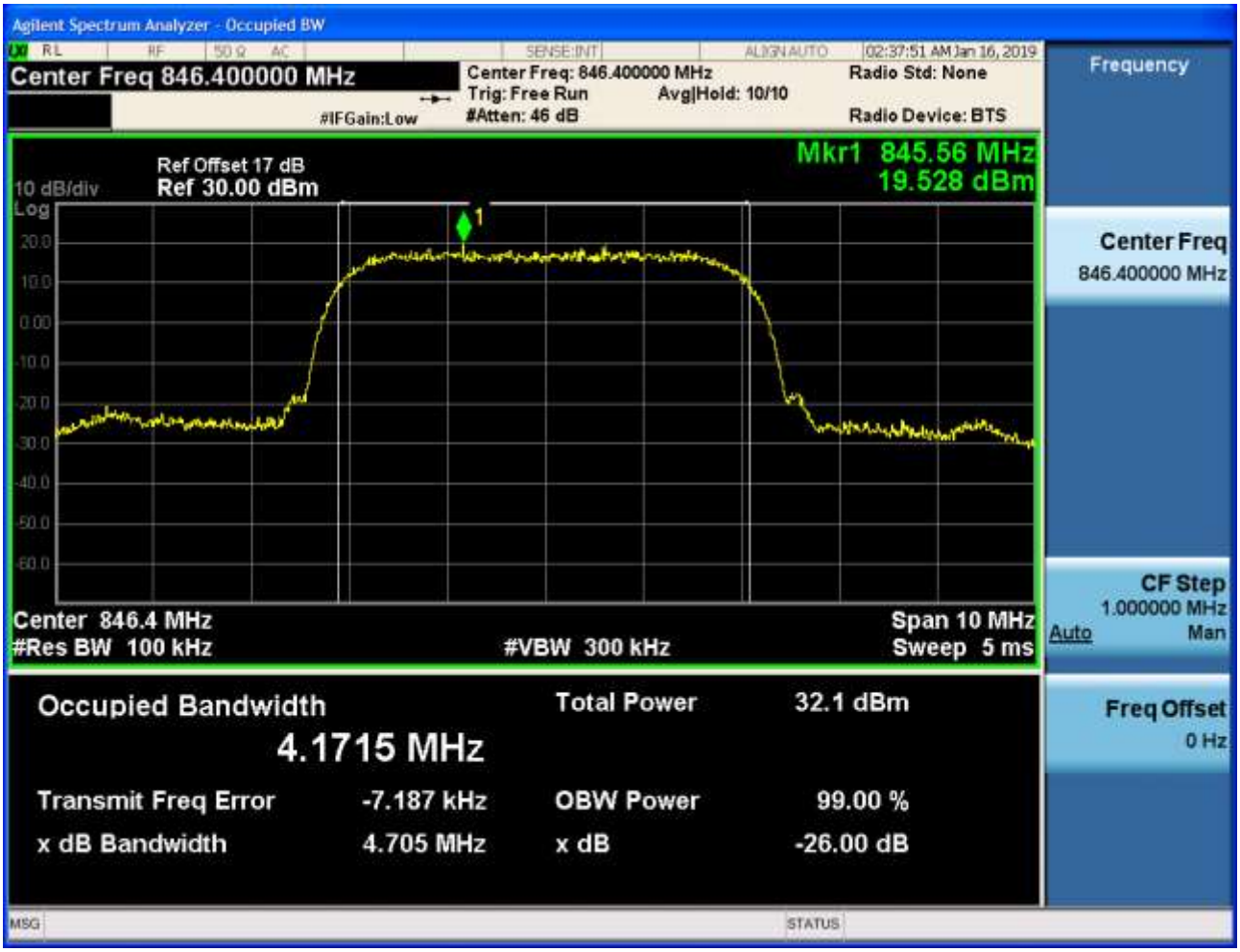
4.1.1.1.1 Test Channel = LCH



4.1.1.1.2 Test Channel = MCH



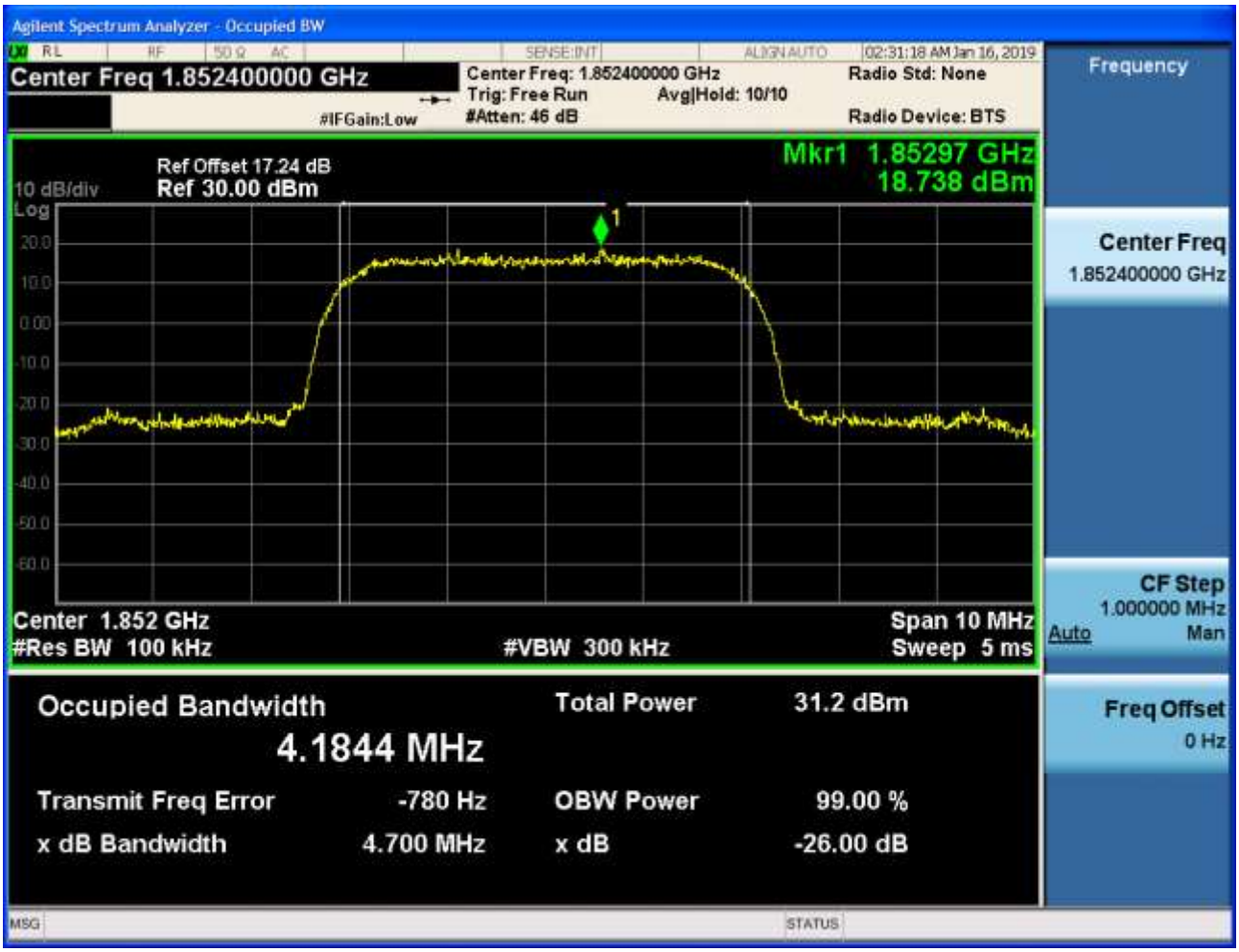
4.1.1.1.3 Test Channel = HCH



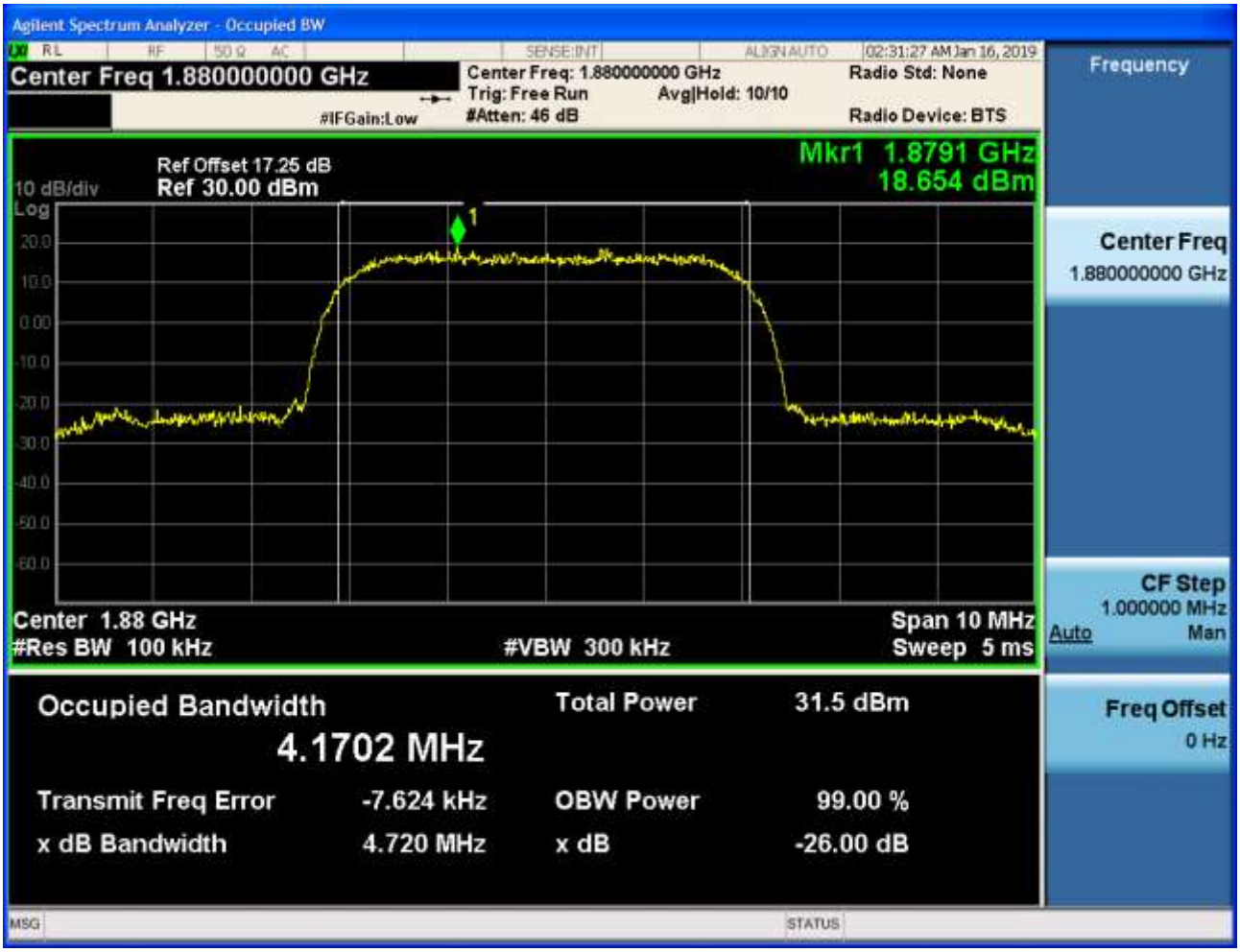
4.1.2 Test Band = WCDMA1900

4.1.2.1 Test Mode = UMTS/TM1

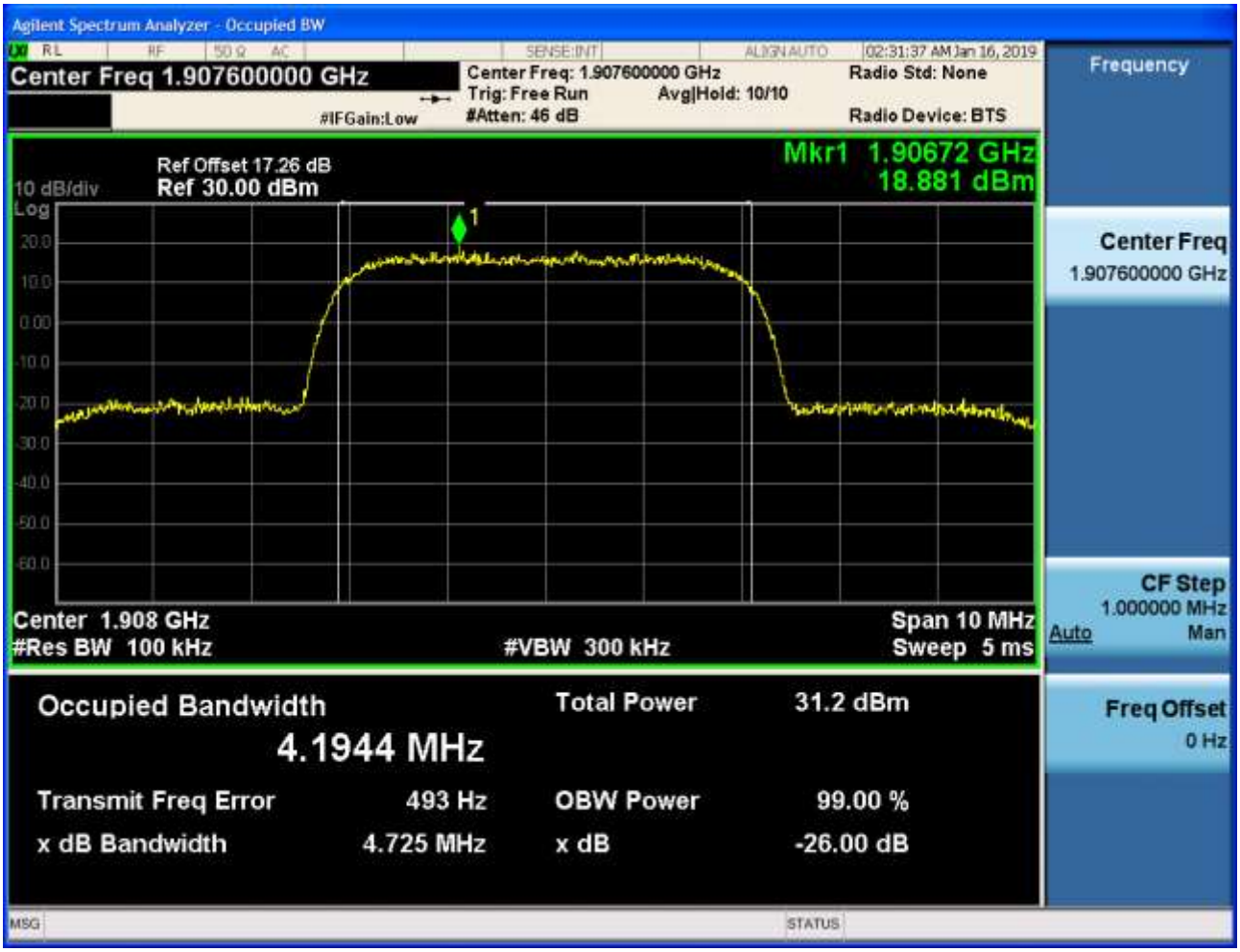
4.1.2.1.1 Test Channel = LCH



4.1.2.1.2 Test Channel = MCH



4.1.2.1.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

Part I - Test Plots

5.1 For UMTS

5.1.1 Test Band = WCDMA850

5.1.1.1 Test Mode = UMTS/TM1

5.1.1.1.1 Test Channel = LCH

5.1.1.1.2 Test Channel = HCH

5.1.2 Test Band = WCDMA1900

5.1.2.1 Test Mode = UMTS/TM1

5.1.2.1.1 Test Channel = LCH

5.1.2.1.2 Test Channel = HCH

6Appendix_F: Spurious Emission at Antenna Terminal

NOTE: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of < RBW/2 so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = k * (Span / RBW)" with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

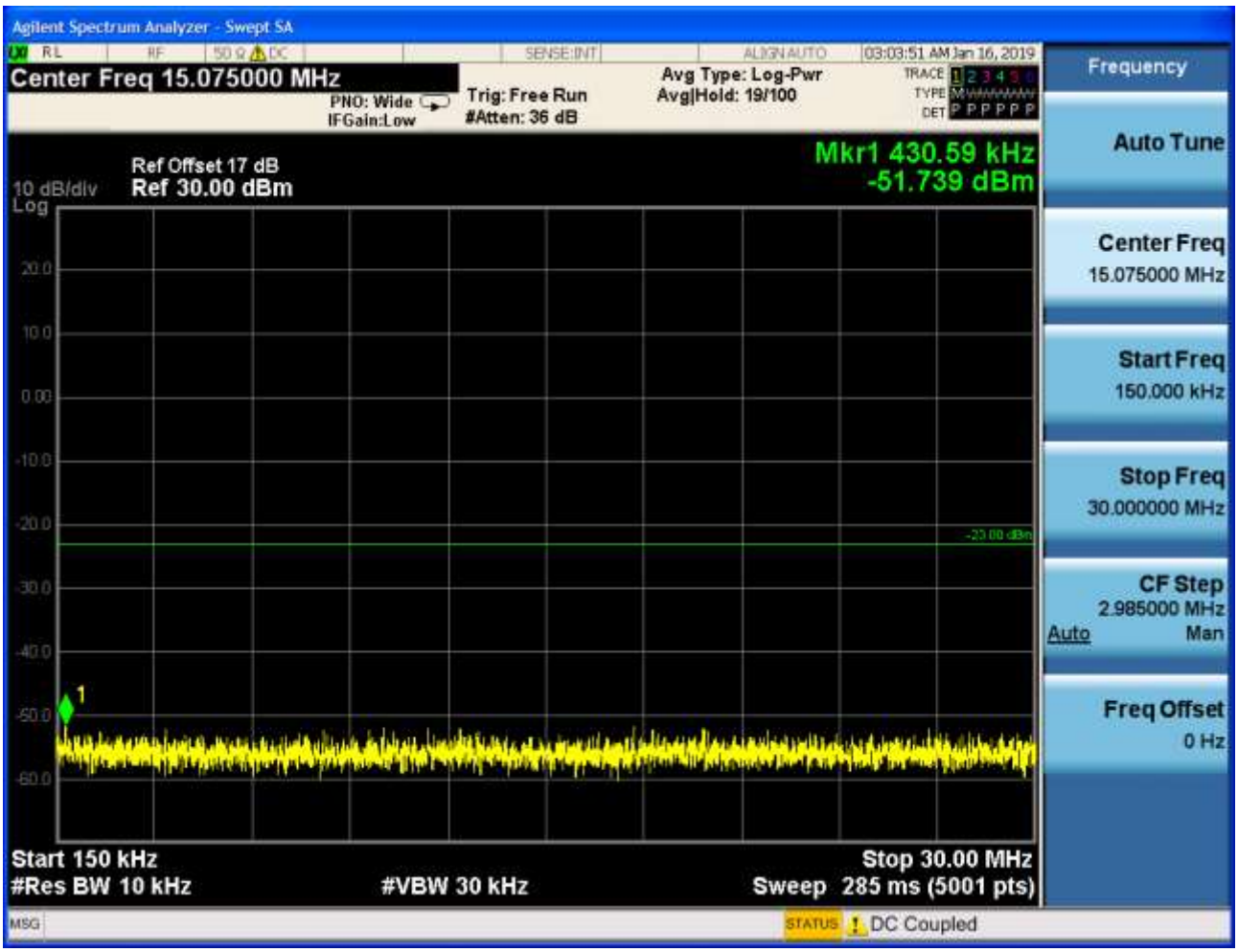
Part I - Test Plots

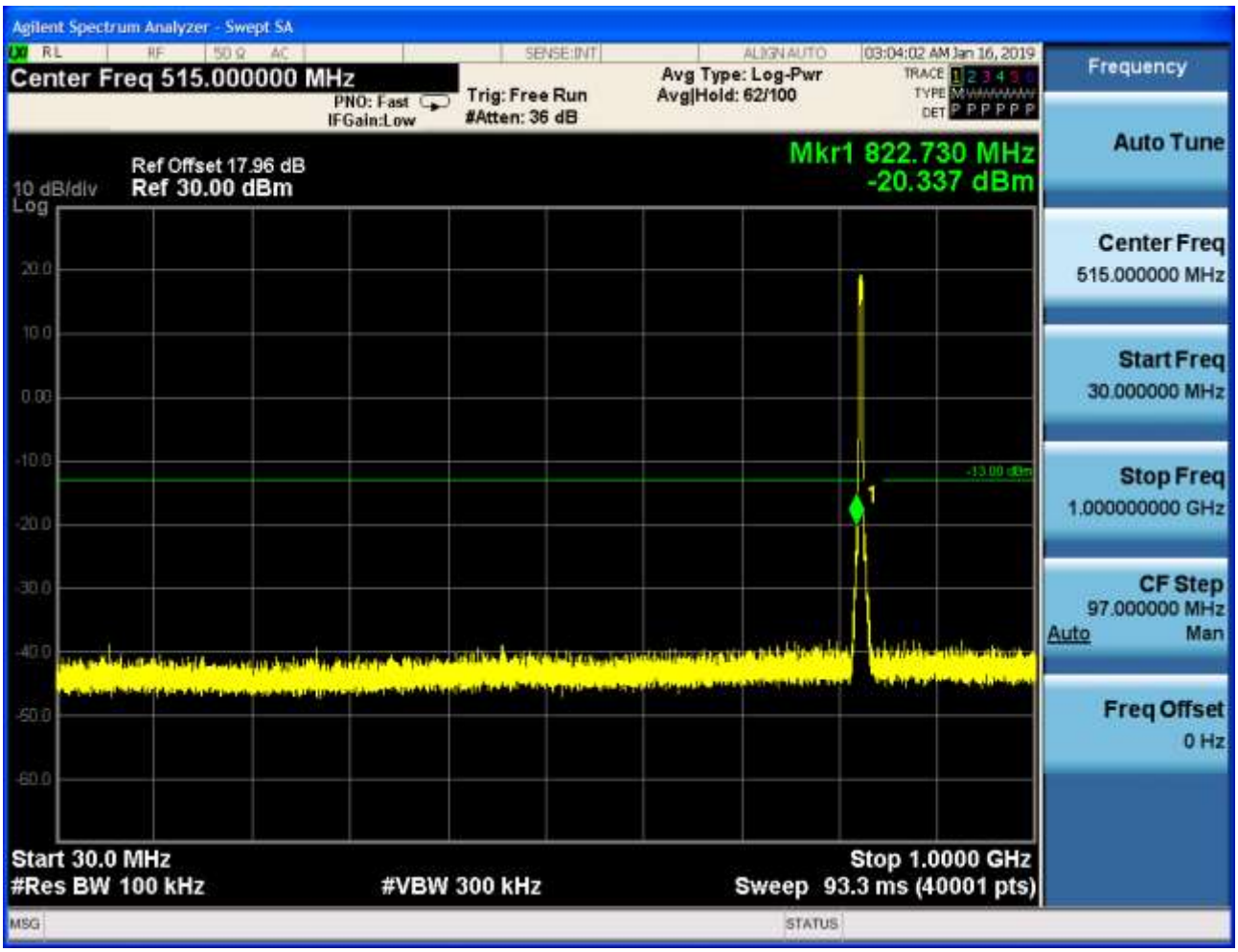
6.1 For UMTS

6.1.1 Test Band = WCDMA850

6.1.1.1 Test Mode = UMTS/TM1

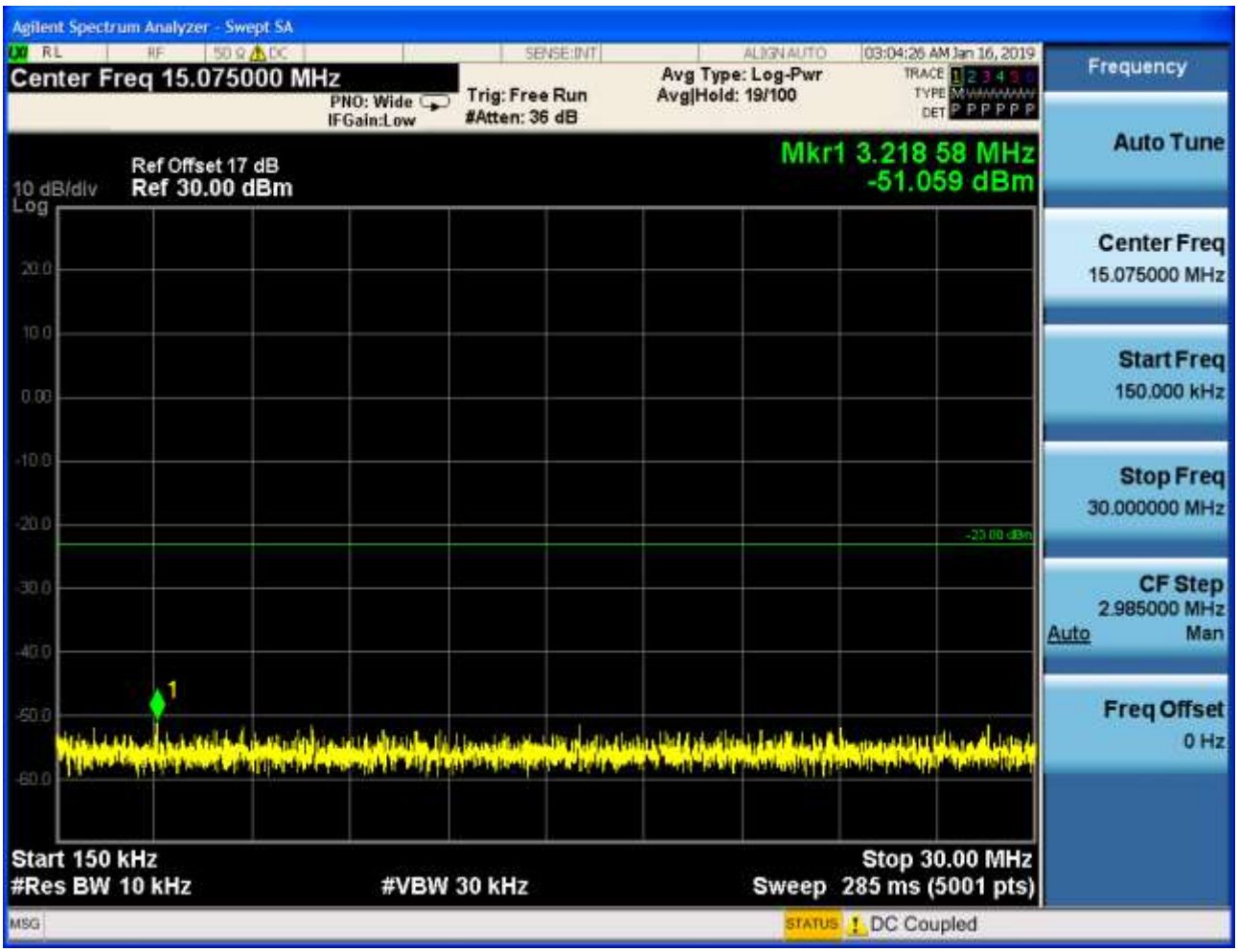
6.1.1.1.1 Test Channel = LCH

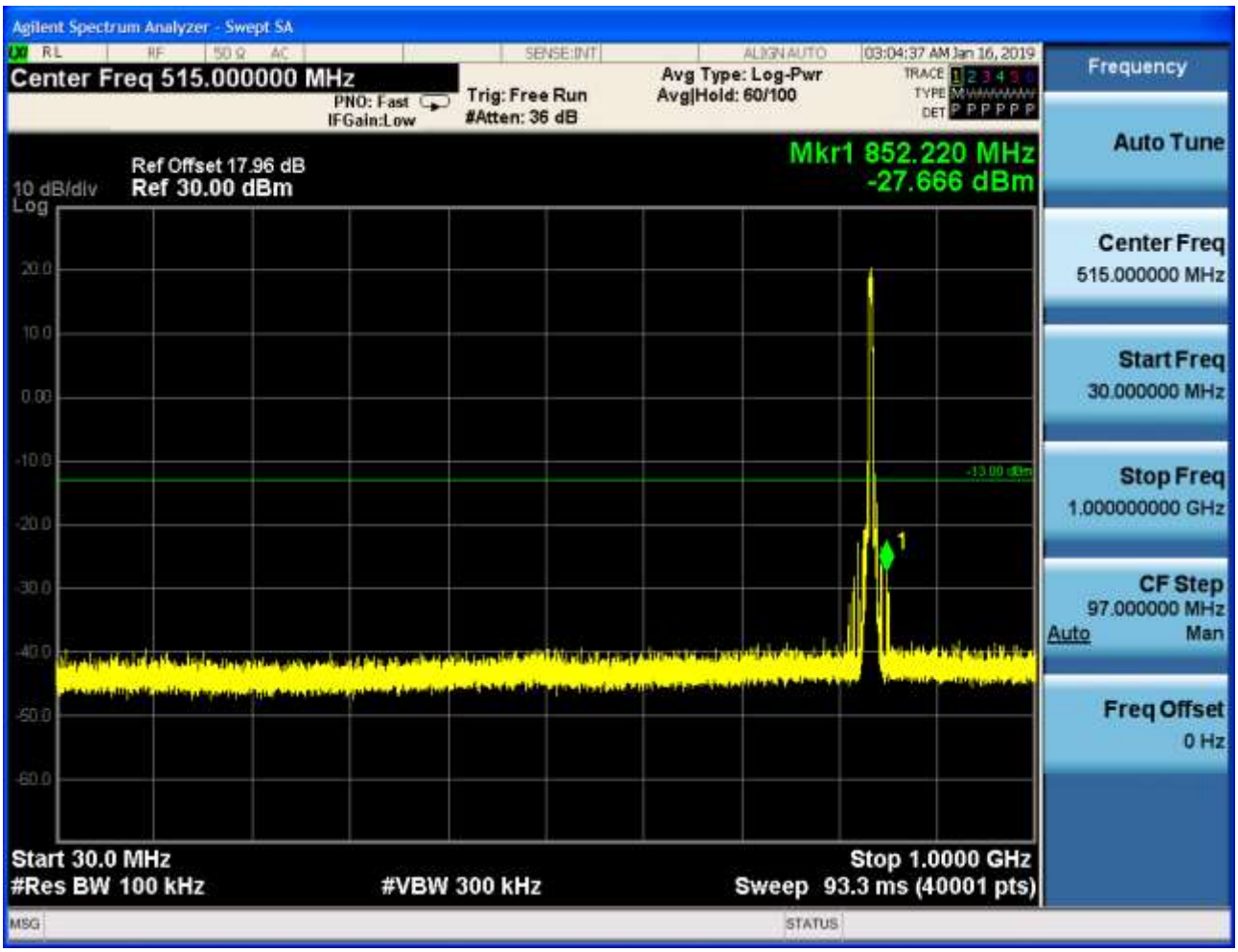

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
03:03:51 AM Jan 16, 2019
Center Freq 15.075000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 19/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 430.59 kHz
-51.739 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-20.00 dBm
1
Start 150 kHz
#Res BW 10 kHz
#VBW 30 kHz
Stop 30.00 MHz
Sweep 285 ms (5001 pts)
MSG
STATUS
DC Coupled
Frequency
Auto Tune
Center Freq
15.075000 MHz
Start Freq
150.000 kHz
Stop Freq
30.000000 MHz
CF Step
2.985000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:04:02 AM Jan 16, 2019
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 62/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17.96 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 822.730 MHz
-20.337 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 93.3 ms (40001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:04:09 AM Jan 16, 2019
Center Freq 6.875000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 58/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 3.646 69 GHz
-23.574 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
1
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 12.750 GHz
Sweep 21.3 ms (40001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
6.875000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
12.750000000 GHz
CF Step
1.175000000 GHz
Auto
Man
Freq Offset
0 Hz

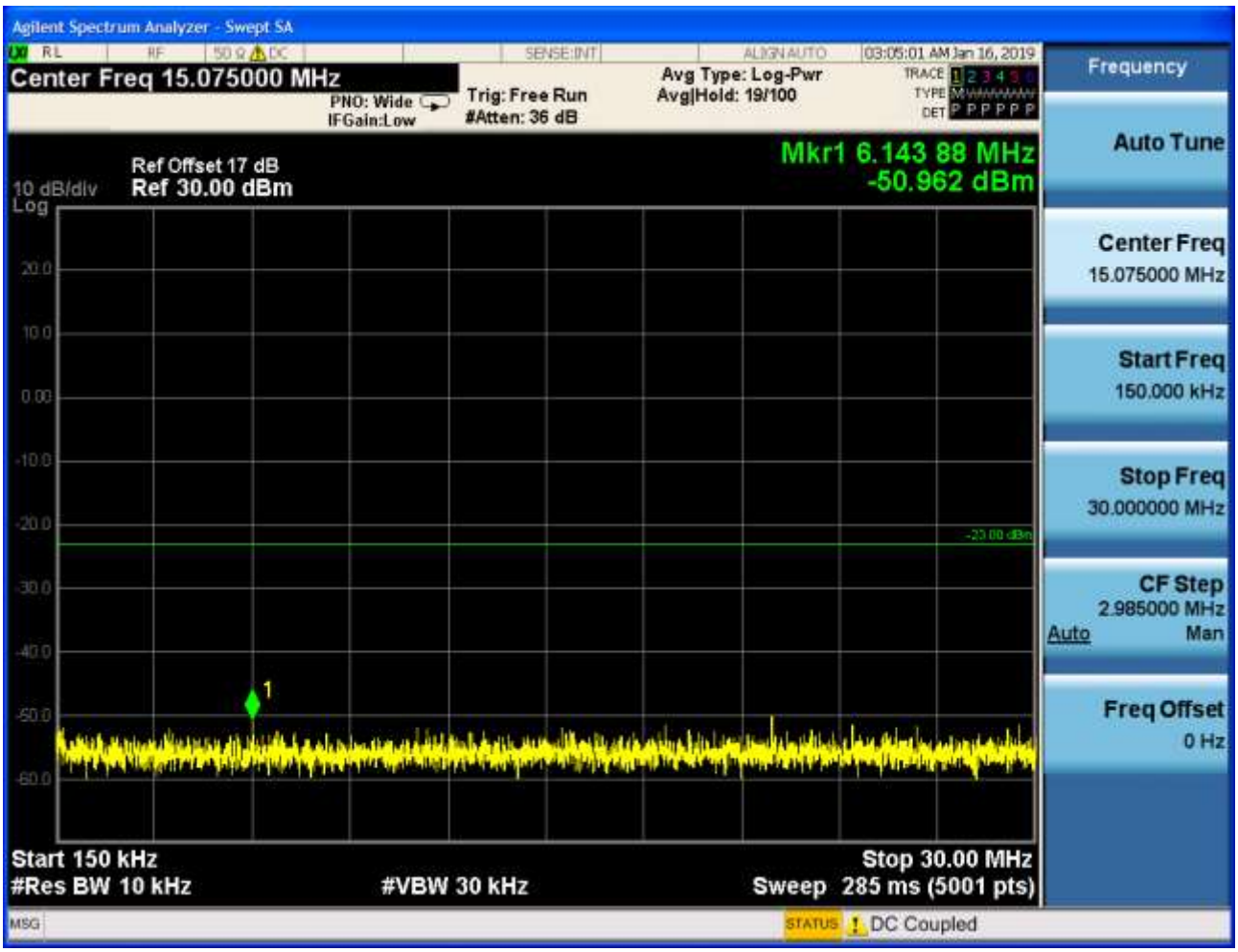
6.1.1.1.2 Test Channel = MCH

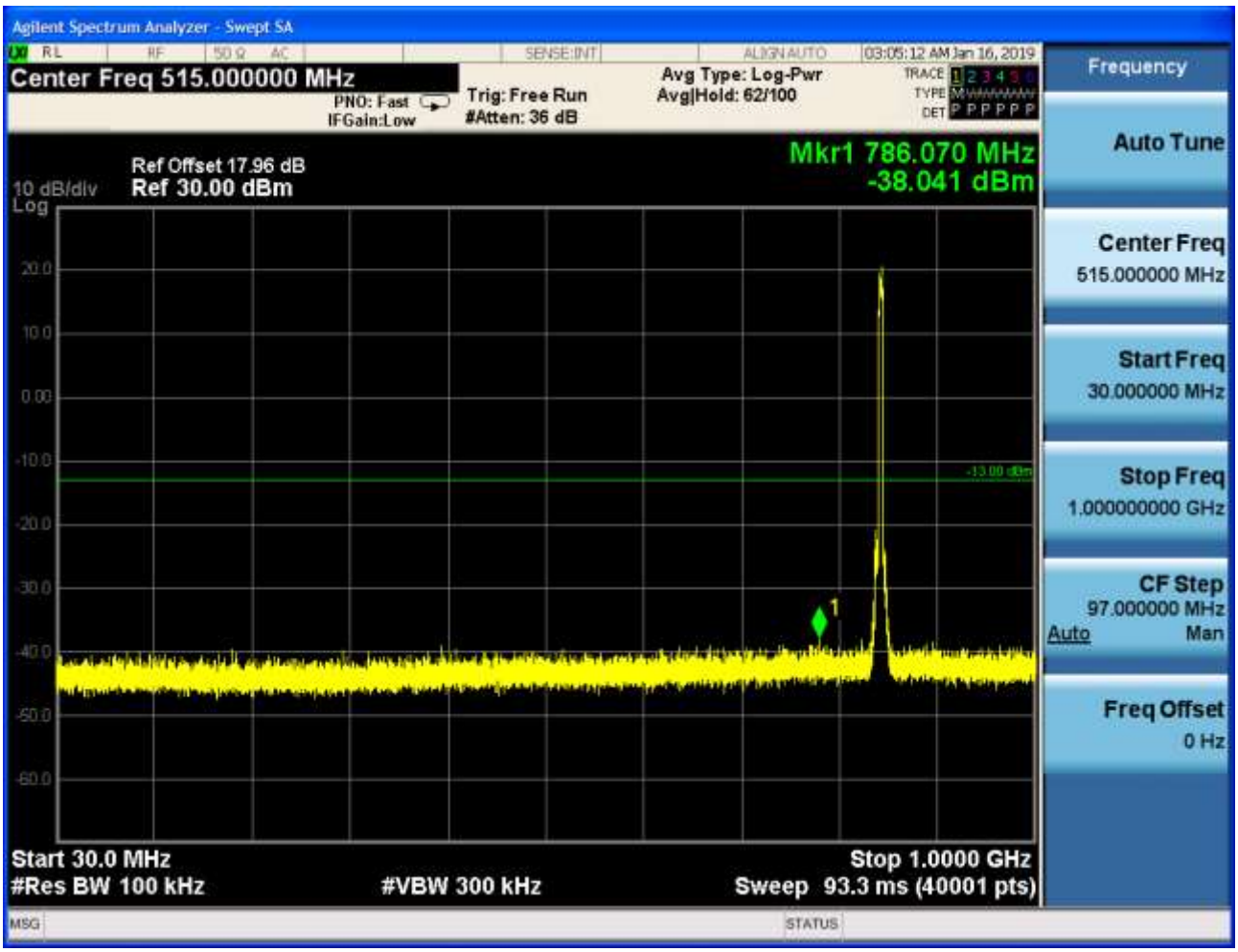

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
03:04:26 AM Jan 16, 2019
Center Freq 15.075000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 19/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 3.218 58 MHz
-51.059 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-20.00 dBm
1
Start 150 kHz
#Res BW 10 kHz
#VBW 30 kHz
Stop 30.00 MHz
Sweep 285 ms (5001 pts)
MSG
STATUS
DC Coupled
Frequency
Auto Tune
Center Freq
15.075000 MHz
Start Freq
150.000 kHz
Stop Freq
30.000000 MHz
CF Step
2.985000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:04:37 AM Jan 16, 2019
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 60/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17.96 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 852.220 MHz
-27.666 dBm
20.0
10.0
0.00
-10.0
-13.00 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
1
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 93.3 ms (40001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:04:44 AM Jan 16, 2019
Center Freq 6.875000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 59/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 12.324 94 GHz
-24.040 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 12.750 GHz
Sweep 21.3 ms (40001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
6.875000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
12.750000000 GHz
CF Step
1.175000000 GHz
Auto
Man
Freq Offset
0 Hz

6.1.1.1.3 Test Channel = HCH



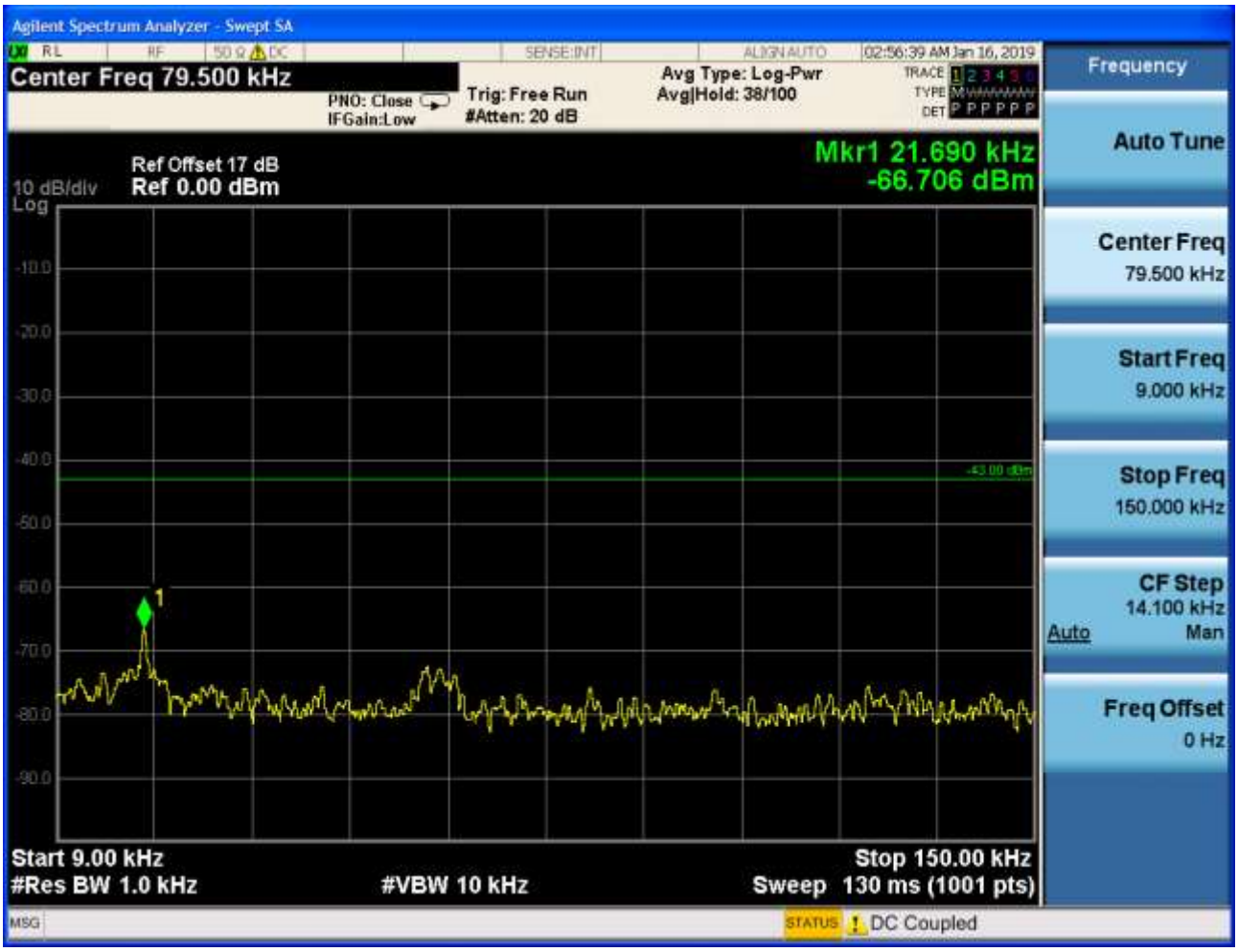

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:05:12 AM Jan 16, 2019
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 62/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17.96 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 786.070 MHz
-38.041 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 93.3 ms (40001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz

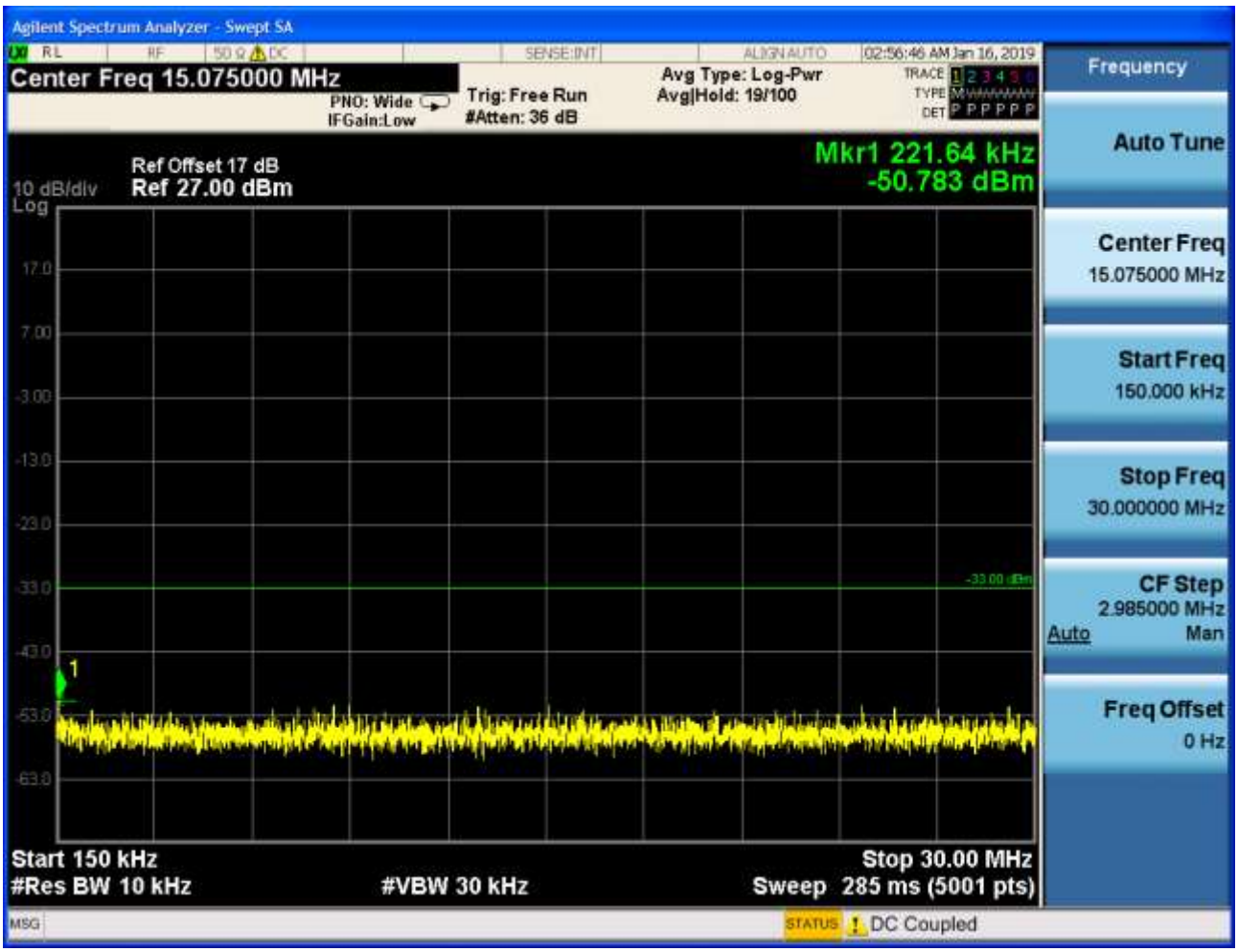

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:05:20 AM Jan 16, 2019
Center Freq 6.875000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 59/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 3.685 46 GHz
-24.152 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 1.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 12.750 GHz
Sweep 21.3 ms (40001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
6.875000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
12.750000000 GHz
CF Step
1.175000000 GHz
Auto
Man
Freq Offset
0 Hz

6.1.2 Test Band = WCDMA1900

6.1.2.1 Test Mode = UMTS/TM1

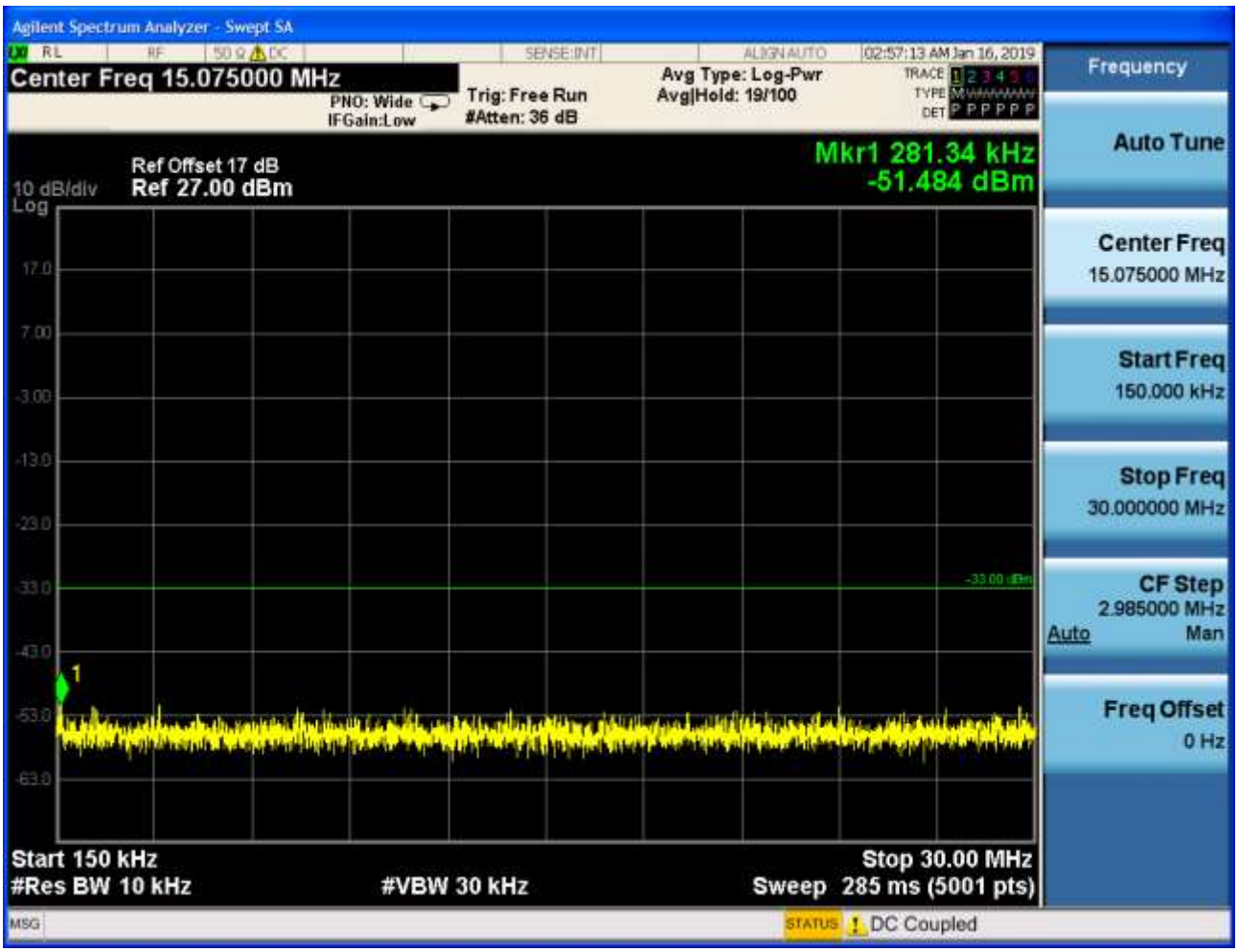
6.1.2.1.1 Test Channel = LCH





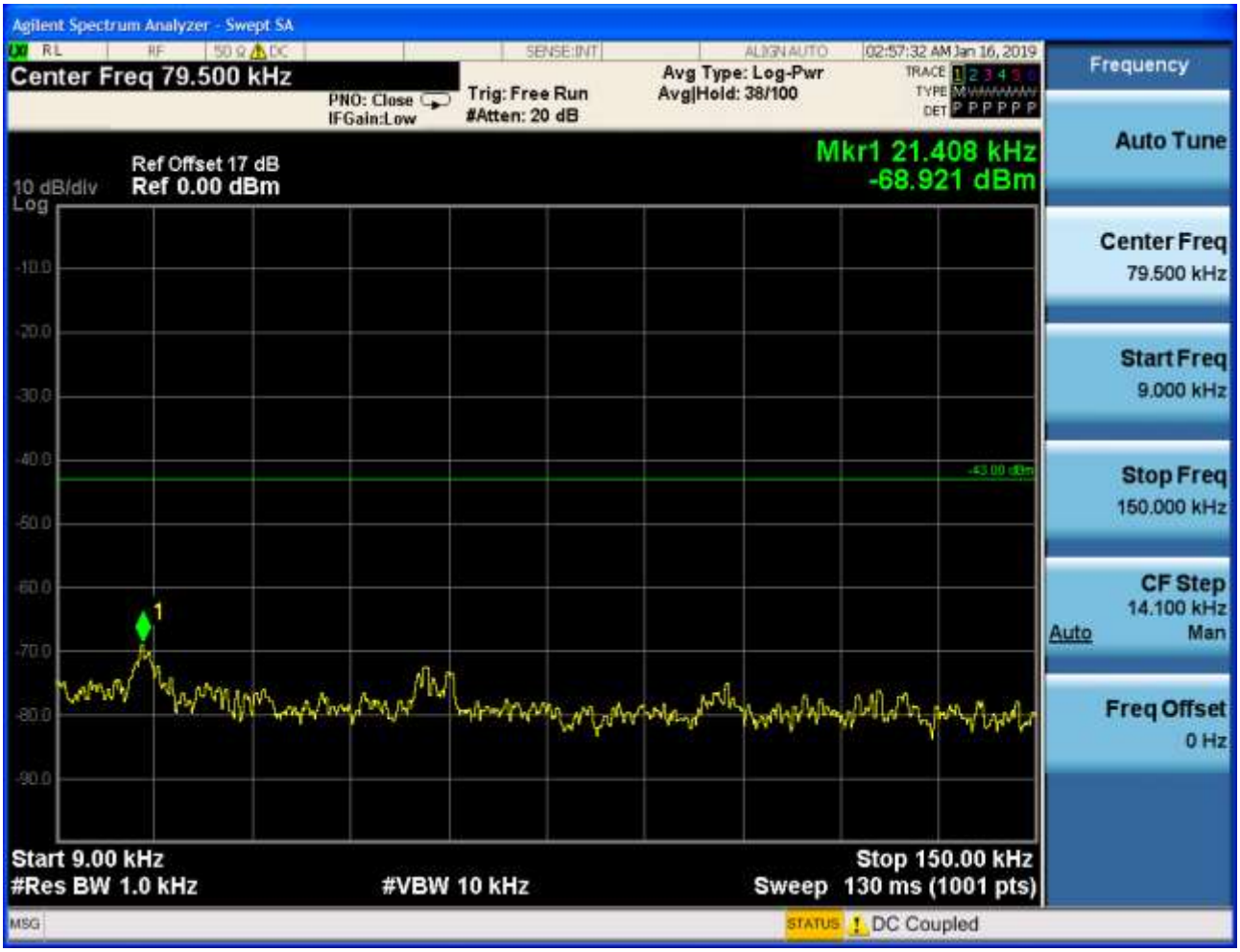

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
02:56:56 AM Jan 16, 2019
Center Freq 10.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 49/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17.96 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 17.625 1 GHz
-17.956 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-13.00 dBm
1
Start 30 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 20.000 GHz
Sweep 50.7 ms (40001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
10.015000000 GHz
Start Freq
30.000000 MHz
Stop Freq
20.000000000 GHz
CF Step
1.997000000 GHz
Auto
Man
Freq Offset
0 Hz

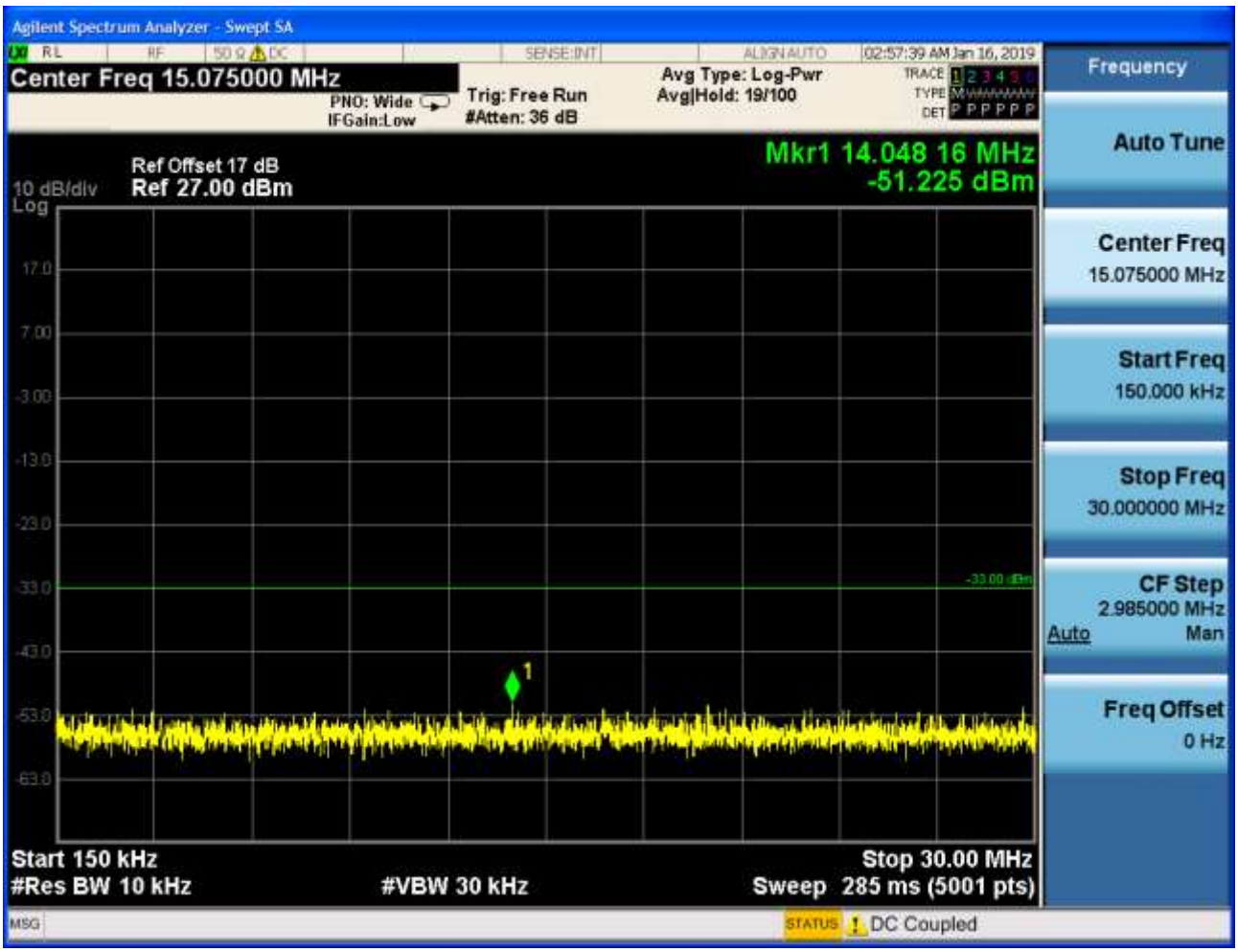
6.1.2.1.2 Test Channel = MCH




Agilent Spectrum Analyzer - Swept SA
Center Freq 10.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 44/100
02:57:22 AM Jan 16, 2019
Ref Offset 17.96 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 18.389 4 GHz
-18.764 dBm
Start 30 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 20.000 GHz
Sweep 50.7 ms (40001 pts)
Frequency
Auto Tune
Center Freq
10.015000000 GHz
Start Freq
30.000000 MHz
Stop Freq
20.000000000 GHz
CF Step
1.997000000 GHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

6.1.2.1.3 Test Channel = HCH






Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
02:57:49 AM Jan 16, 2019
Center Freq 10.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 48/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 17.96 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 18.611 6 GHz
-18.511 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Start 30 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 20.000 GHz
Sweep 50.7 ms (40001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
10.015000000 GHz
Start Freq
30.000000 MHz
Stop Freq
20.000000000 GHz
CF Step
1.997000000 GHz
Auto
Man
Freq Offset
0 Hz

7Appendix_H: Frequency Stability

7.1 For UMTS

7.1.1Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA850	UMTS/TM1	LCH	TN	VL	-15.82861	-0.01915	PASS
				VN	-14.87017	-0.01799	PASS
				VH	-15.78569	-0.01910	PASS
		MCH	TN	VL	-17.32349	-0.02071	PASS
				VN	-15.13481	-0.01810	PASS
				VH	-17.47370	-0.02089	PASS
		HCH	TN	VL	-15.95020	-0.01884	PASS
				VN	-17.43793	-0.02060	PASS
				VH	-14.84871	-0.01754	PASS
WCDMA1900	UMTS/TM1	LCH	TN	VL	-19.24038	-0.01039	PASS
				VN	-16.27922	-0.00879	PASS
				VH	-12.22372	-0.00660	PASS
		MCH	TN	VL	-18.43929	-0.00981	PASS
				VN	-18.61811	-0.00990	PASS
				VH	-22.65215	-0.01205	PASS
		HCH	TN	VL	-20.66374	-0.01039	PASS
				VN	-22.73083	-0.00879	PASS
				VH	-15.93590	-0.00660	PASS

7.1.2Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA850	UMTS/TM1	LCH	VN	-30	-12.35247	-0.01494	PASS
				-20	-16.46519	-0.01992	PASS
				-10	-13.91172	-0.01683	PASS
				0	-16.99448	-0.02056	PASS
				10	-14.60552	-0.01767	PASS
				20	-14.87017	-0.01799	PASS
				30	-13.89027	-0.01680	PASS
				40	-15.69986	-0.01899	PASS
				50	-13.75437	-0.01664	PASS
		MCH	VN	-30	-14.83440	-0.01774	PASS
				-20	-15.36369	-0.01837	PASS
				-10	-14.31227	-0.01711	PASS
				0	-15.87868	-0.01898	PASS
				10	-14.88447	-0.01780	PASS
				20	-15.13481	-0.01810	PASS
				30	-15.36369	-0.01837	PASS
				40	-13.26084	-0.01585	PASS
				50	-15.42807	-0.01845	PASS
		HCH	VN	-30	-16.48664	-0.01948	PASS
				-20	-16.01458	-0.01892	PASS
				-10	-15.80715	-0.01868	PASS
				0	-13.19647	-0.01559	PASS
				10	-14.88447	-0.01759	PASS
				20	-17.43793	-0.02060	PASS
				30	-17.56668	-0.02075	PASS
				40	-17.82417	-0.02106	PASS
				50	-15.12766	-0.01787	PASS
WCDMA1900	UMTS/TM1	LCH	VN	-30	-16.02888	-0.00865	PASS
				-20	-14.41240	-0.00778	PASS
				-10	-14.30511	-0.00772	PASS
				0	-13.79728	-0.00745	PASS
				10	-10.97202	-0.00592	PASS
				20	-16.27922	-0.00879	PASS
				30	-16.95156	-0.00915	PASS
				40	-14.31227	-0.00773	PASS
				50	-16.52241	-0.00892	PASS
		MCH	VN	-30	-18.43214	-0.00980	PASS
				-20	-15.50674	-0.00825	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	-20.84970	-0.01109	PASS
				0	-19.42635	-0.01033	PASS
				10	-20.37048	-0.01084	PASS
				20	-18.61811	-0.00990	PASS
				30	-16.37936	-0.00871	PASS
				40	-22.05849	-0.01173	PASS
				50	-18.64672	-0.00992	PASS
		HCH	VN	-30	-22.73083	-0.01192	PASS
				-20	-23.96107	-0.01256	PASS
				-10	-21.40045	-0.01122	PASS
				0	-20.41340	-0.01070	PASS
				10	-21.15726	-0.01109	PASS
				20	-22.73083	-0.01192	PASS
				30	-20.97845	-0.01100	PASS
				40	-22.50910	-0.01180	PASS
				50	-21.95835	-0.01151	PASS

END