Appendix for WCDMA test report

Appendix A: Effective (Isotropic) Radiated Power Output Data

Test Results

Test Band	Test Mode	Test Channel	Conducted power[dBm]	EIRP(dBm)	Limit [dBm]	Verdict
WCDMA1900	UMTS/TM1	LCH	22.02	25.16	33	PASS
		MCH	21.96	25.1	33	PASS
		HCH	22.06	25.2	33	PASS

Test Band	Test Mode	Test Channel	Conducted power[dBm]	EIRP(dBm)	Limit [dBm]	Verdict
WCDMA1700	UMTS/TM1	LCH	23.29	27.04	30	PASS
		MCH	23.21	26.96	30	PASS
		HCH	22.98	26.73	30	PASS

Test Band	Test Mode	Test Channel	Conducted power[dBm]	ERP(dBm)	Limit [dBm]	Verdict
WCDMA850	UMTS/TM1	LCH	22.94	24.83	38.5	PASS
		MCH	23.08	24.97	38.5	PASS
		HCH	23.42	25.31	38.5	PASS

Note 1:
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[dBd]
b, SGP=Signal Genarator Level
c, Antenna gain of WCDMA1900 is 3.14dBi; Antenna gain of WCDMA1700 is 3.75dBi; Antenna gain of WCDMA850 is 4.04dBi;

Note 2:
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

Appendix B: Peak-to-Average Ratio

Test Results

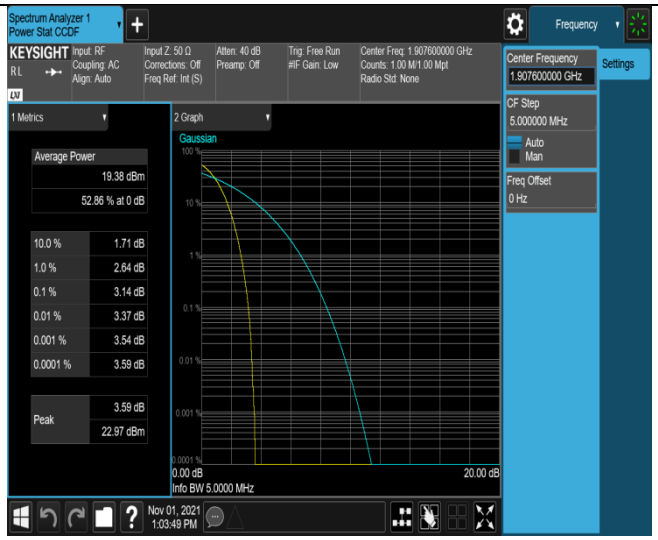
Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	3.11	13	PASS
		MCH	3.07	13	PASS
		HCH	3.14	13	PASS
WCDMA1700	UMTS/TM1	LCH	3.12	13	PASS
		MCH	3.13	13	PASS
		HCH	3.04	13	PASS
WCDMA850	UMTS/TM1	LCH	3.13	13	PASS
		MCH	3.19	13	PASS
		HCH	3.15	13	PASS

Test Graphs

Band2-9262

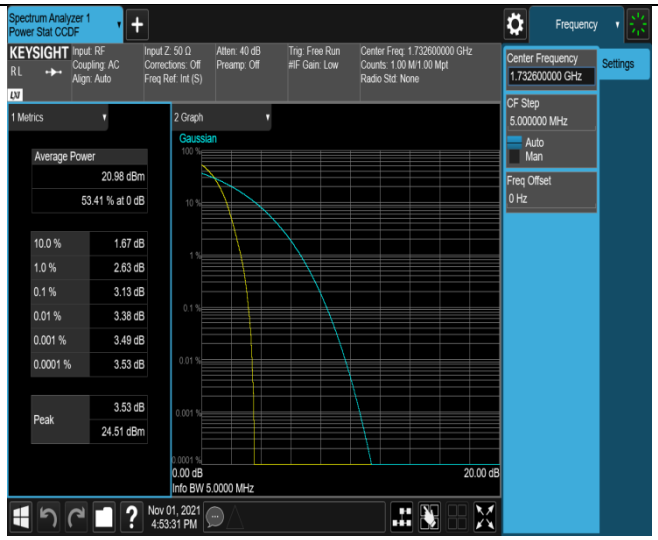
Band2-9400

Band2-9538

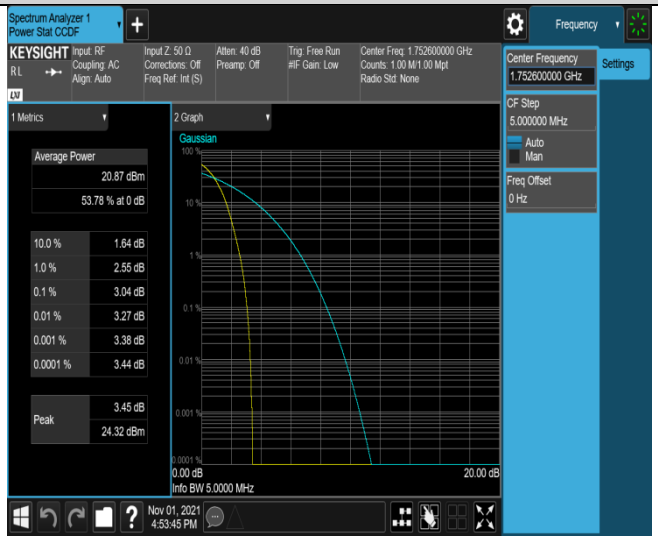


Band4-1312

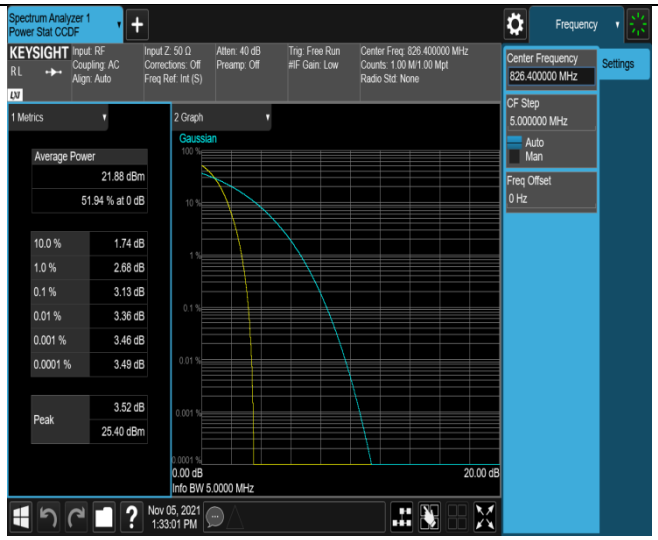
Band4-1413



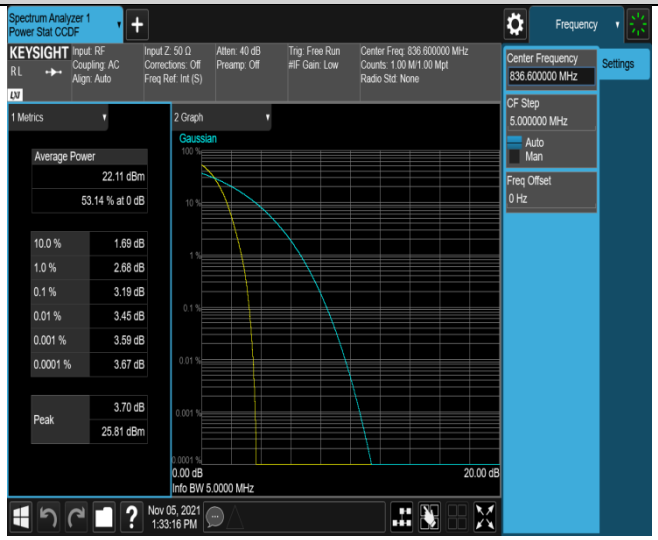
Band4-1513



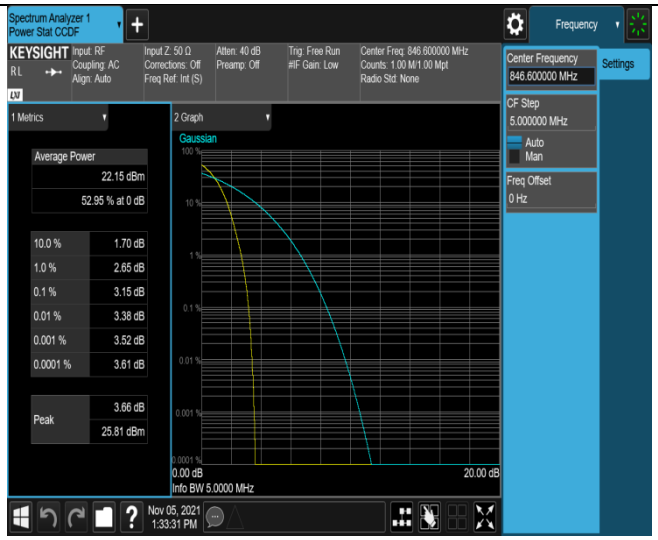
Band5-4132



Band5-4183



Band5-4233


Spectrum Analyzer 1
Power Stat CCDF
KEYSIGHT
Input: RF
Coupling: AC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
Atten: 40 dB
Preamp: Off
Trig: Free Run
#IF Gain: Low
Center Freq: 846.600000 MHz
Counts: 1.00 M/1.00 Mpt
Radio Std: None
Frequency
Center Frequency
846.600000 MHz
Settings
CF Step
5.000000 MHz
Auto
Man
Freq Offset
0 Hz
1 Metrics
Average Power
22.15 dBm
52.95 % at 0 dB
10.0 % 1.70 dB
1.0 % 2.65 dB
0.1 % 3.15 dB
0.01 % 3.38 dB
0.001 % 3.52 dB
0.0001 % 3.61 dB
Peak 3.66 dB
25.81 dBm
2 Graph
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.00 dB
20.00 dB
Info BW 5.0000 MHz
Nov 05, 2021
1:33:31 PM

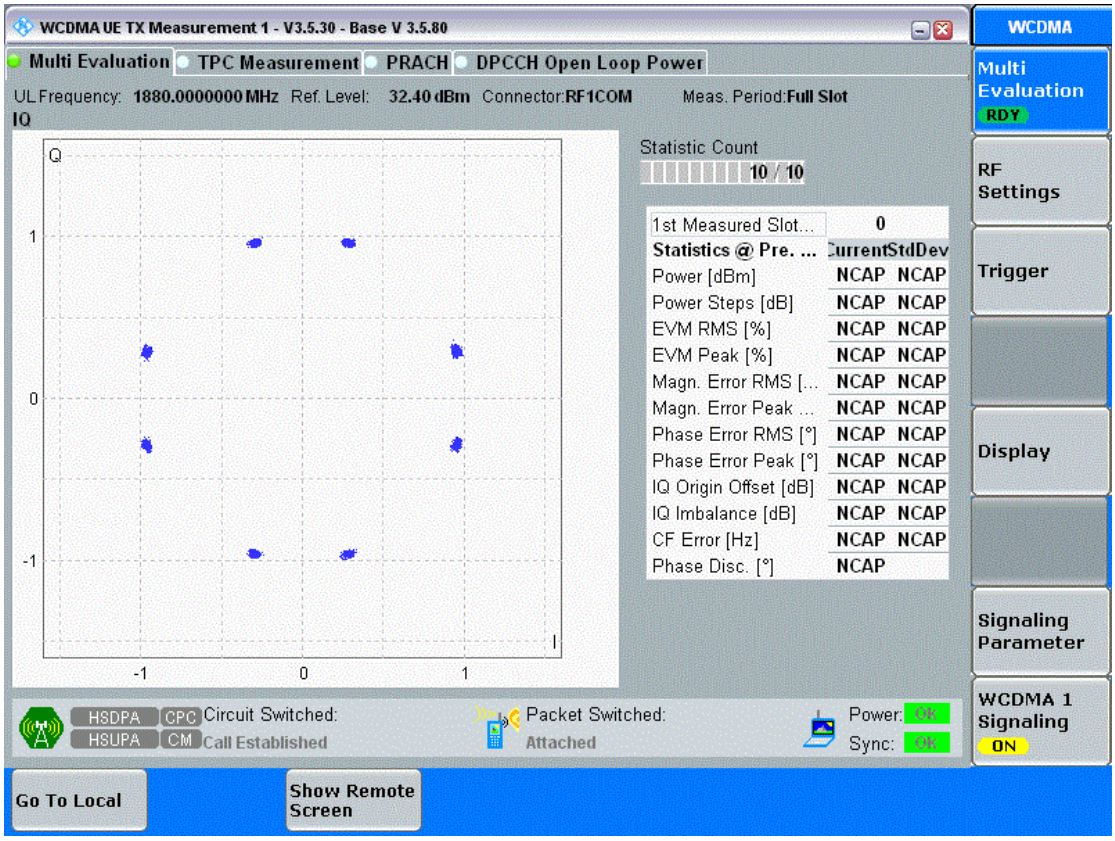
Appendix C: Modulation Characteristics

Test Graphs

Test Band = WCDMA1900

Test Mode = UMTS/TM1

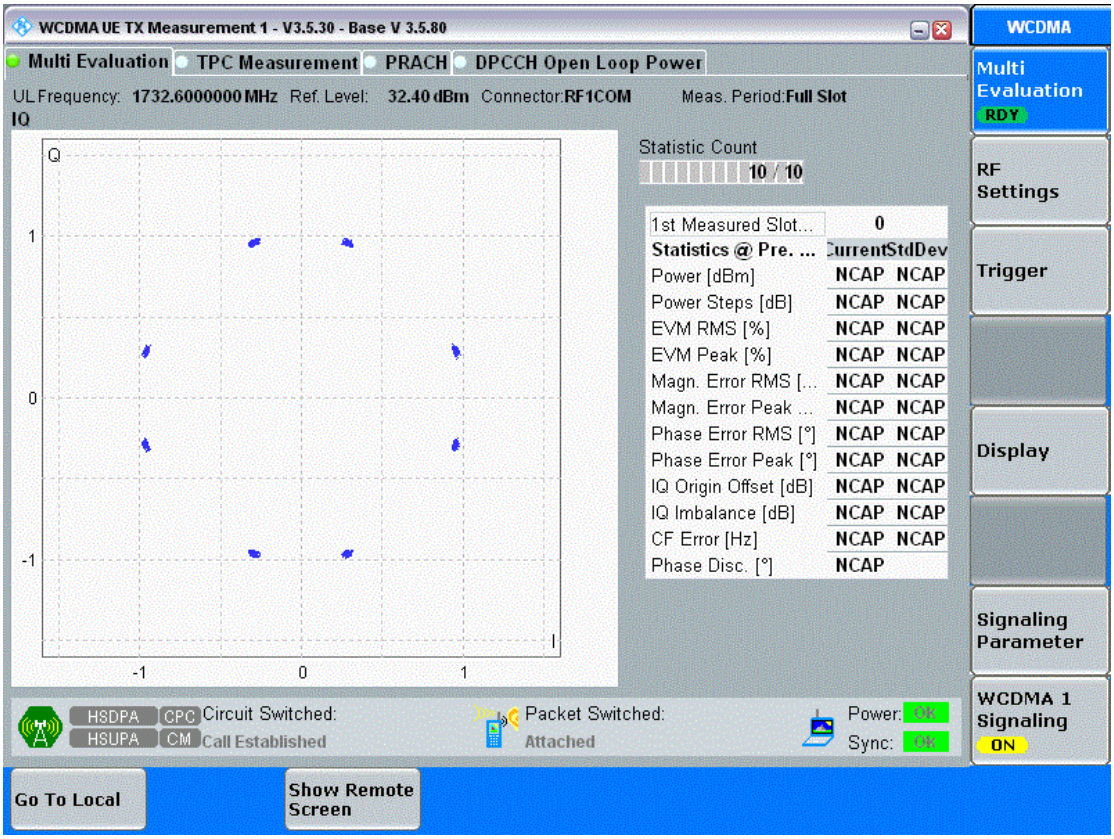
Test Channel = MCH



Test Band = WCDMA1700

Test Mode = UMTS/TM1

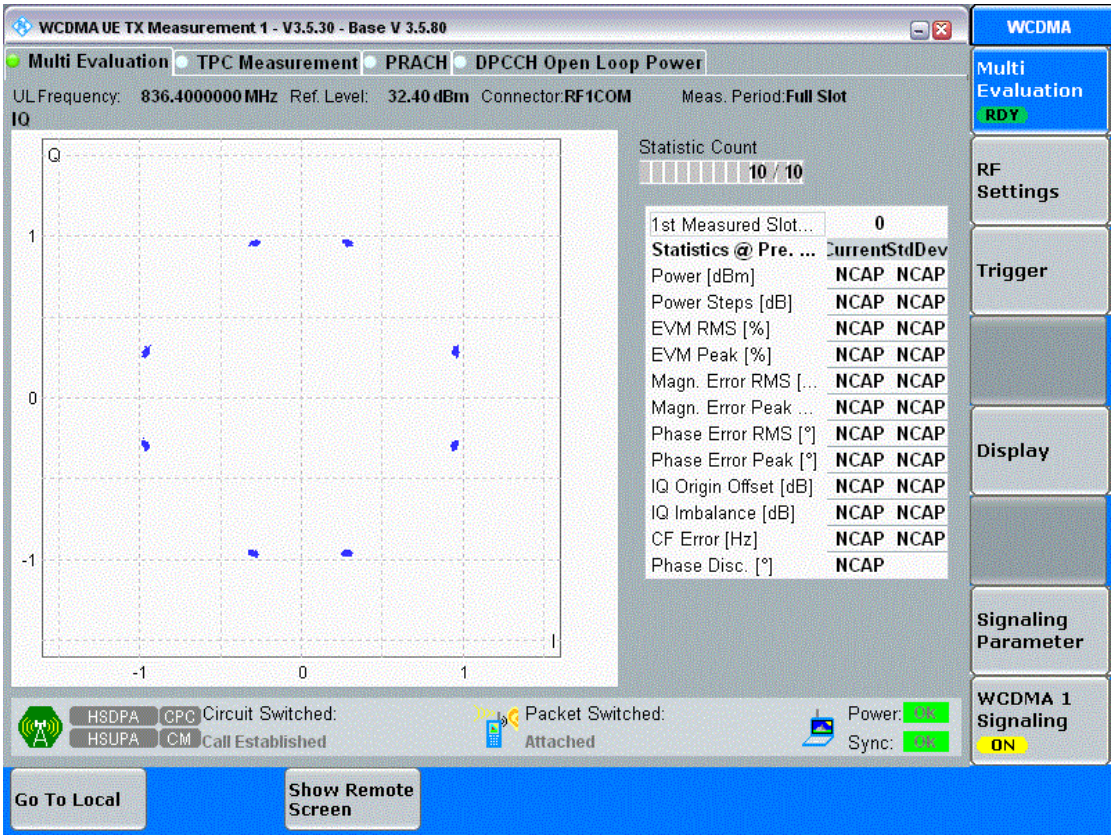
Test Channel = MCH



Test Band = WCDMA850

Test Mode = UMTS/TM1

Test Channel = MCH



Appendix D: Bandwidth

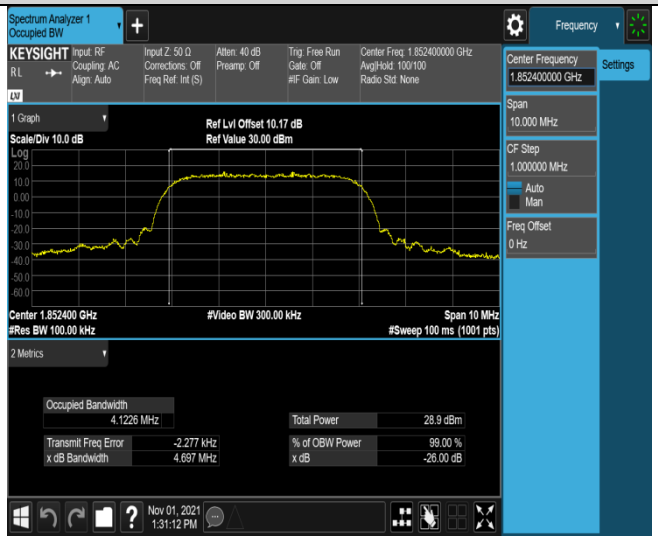
Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA1900	UMTS/TM1	LCH	4.1226	4.697	Pass
		MCH	4.1224	4.699	Pass
		HCH	4.1246	4.692	Pass
WCDMA1700	UMTS/TM1	LCH	4.1235	4.704	Pass
		MCH	4.1254	4.705	Pass
		HCH	4.1233	4.716	Pass
WCDMA850	UMTS/TM1	LCH	4.1352	4.704	Pass
		MCH	4.1163	4.696	Pass
		HCH	4.1318	4.698	Pass

Test Graphs

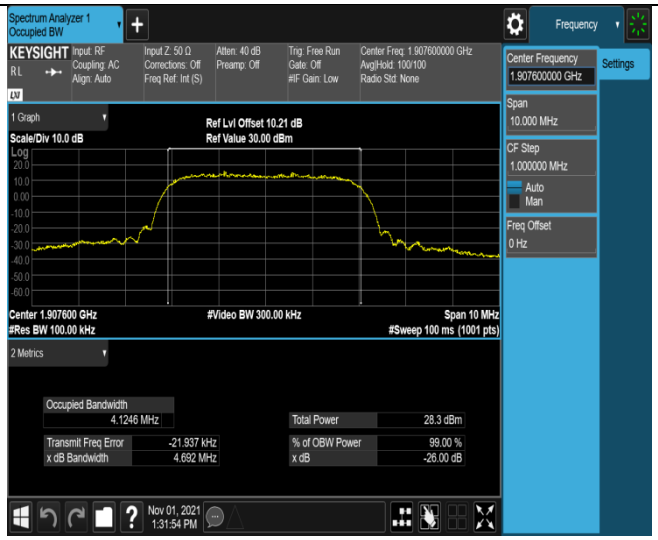
Test Mode = UMTS/TM1

Band2-9262-4.697



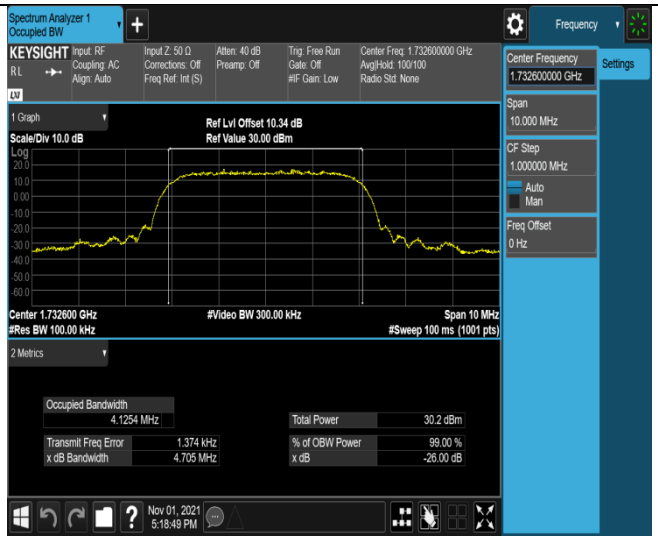
Band2-9400-4.699

Band2-9538-4.692



Band4-1312-4.704

Band4-1413-4.705

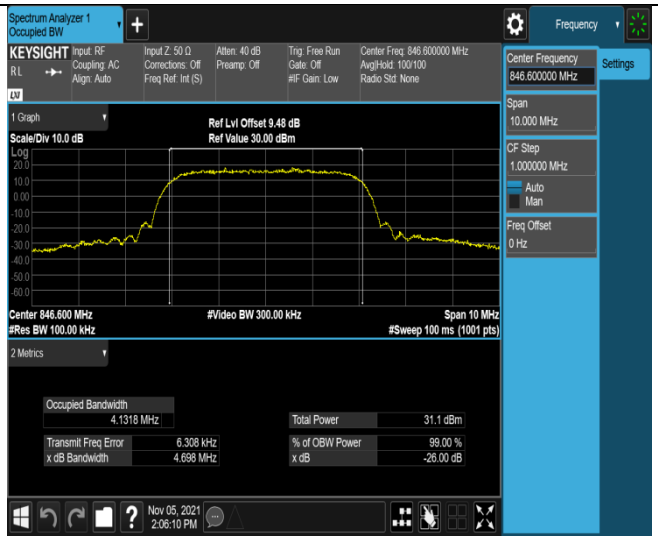


Band4-1513-4.716

Band5-4132-4.704

Band5-4183-4.696

Band5-4233-4.698


Spectrum Analyzer 1
Occupied BW
KEYSIGHT
Input: RF
Coupling: AC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
Atten: 40 dB
Preamp: Off
Trig: Free Run
Gate: Off
#IF Gain: Low
Center Freq: 846.600000 MHz
Avg|Hold: 100/100
Radio Std: None
Frequency
Center Frequency
846.600000 MHz
Settings
Span
10.000 MHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
1 Graph
Ref Lvl Offset 9.48 dB
Ref Value 30.00 dBm
Scale/Div 10.0 dB
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Center 846.600 MHz
#Res BW 100.00 kHz
#Video BW 300.00 kHz
Span 10 MHz
#Sweep 100 ms (1001 pts)
2 Metrics
Occupied Bandwidth
4.1318 MHz
Total Power
31.1 dBm
Transmit Freq Error
6.308 kHz
% of OBW Power
99.00 %
x dB Bandwidth
4.698 MHz
x dB
-26.00 dB
Nov 05, 2021
2:06:10 PM

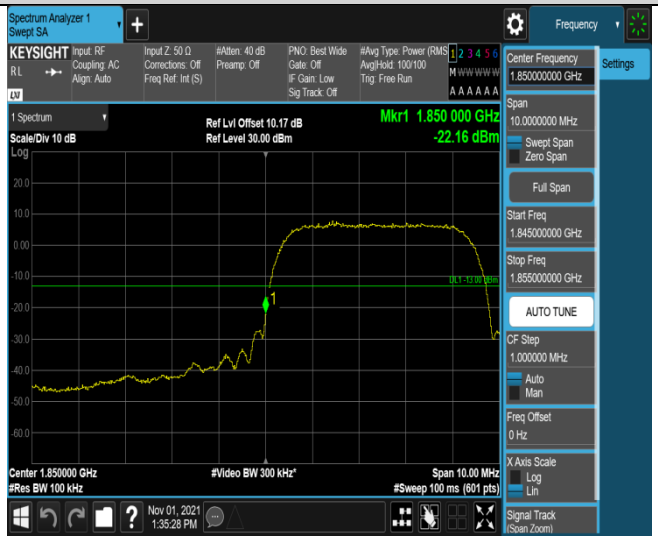
Appendix E: Band Edges Compliance

Test Results

Band	Channel	Frequency (MHz)	Result (dBm)	Limit(dBm)	Verdict
Band2	9262	1850.00	-22.16	-13	PASS
Band2	9538	1910.00	-24.46	-13	PASS
Band4	1312	1710.00	-23.82	-13	PASS
Band4	1513	1755.00	-23.79	-13	PASS
Band5	4132	824.00	-19.95	-13	PASS
Band5	4233	849.00	-20.13	-13	PASS

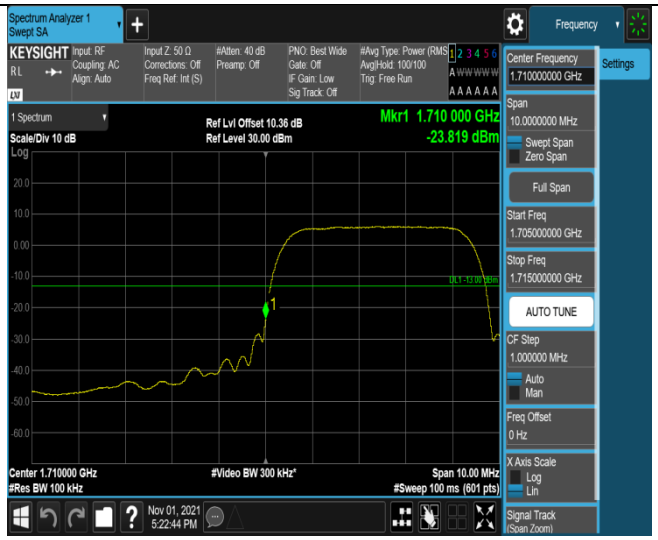
Test Graphs

Band2-9262



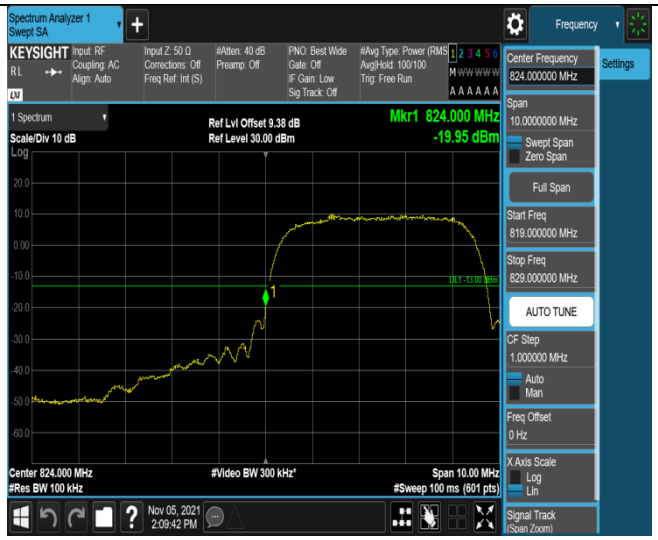
Band2-9538

Band4-1312



Band4-1513

Band5-4132


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Frequency
Center Frequency
824.000000 MHz
Settings
Span
10.0000000 MHz
Swept Span
Zero Span
Full Span
Start Freq
819.000000 MHz
Stop Freq
829.000000 MHz
AUTO TUNE
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 9.38 dB
Ref Level 30.00 dBm
Mkr1 824.000 MHz
-19.95 dBm
Center 824.000 MHz
#Res BW 100 kHz
#Video BW 300 kHz*
Span 10.00 MHz
#Sweep 100 ms (601 pts)
Nov 05, 2021
2:09:42 PM

Band5-4233


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Frequency
Center Frequency
849.000000 MHz
Settings
Span
10.0000000 MHz
Swept Span
Zero Span
Full Span
Start Freq
844.000000 MHz
Stop Freq
854.000000 MHz
AUTO TUNE
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 9.48 dB
Ref Level 30.00 dBm
Mkr1 849.000 MHz
-20.13 dBm
Center 849.000 MHz
#Res BW 100 kHz
#Video BW 300 kHz*
Span 10.00 MHz
#Sweep 100 ms (601 pts)
Nov 05, 2021
2:10:02 PM

Appendix F: Spurious Emission at Antenna Terminal

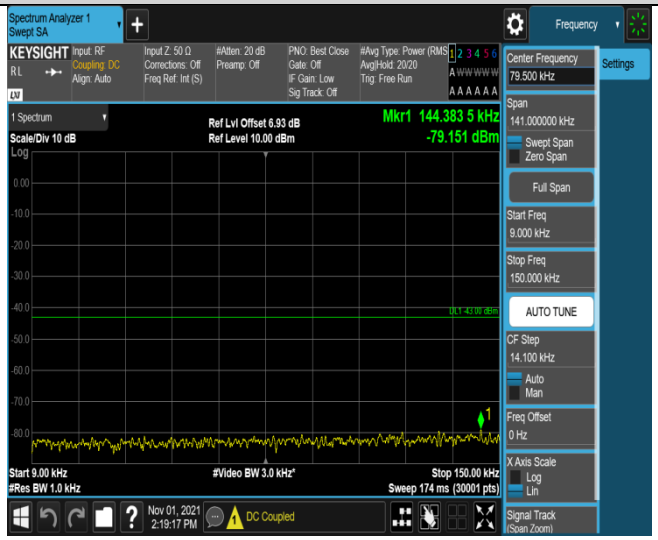
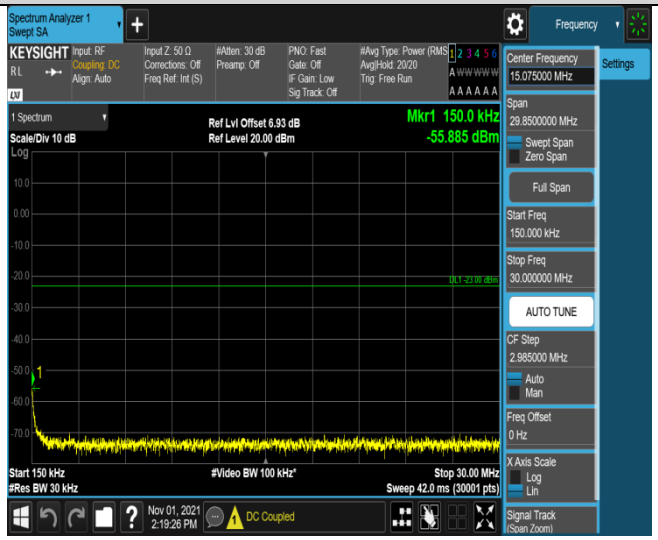
NOTE: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of < RBW/2 so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = k * (Span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

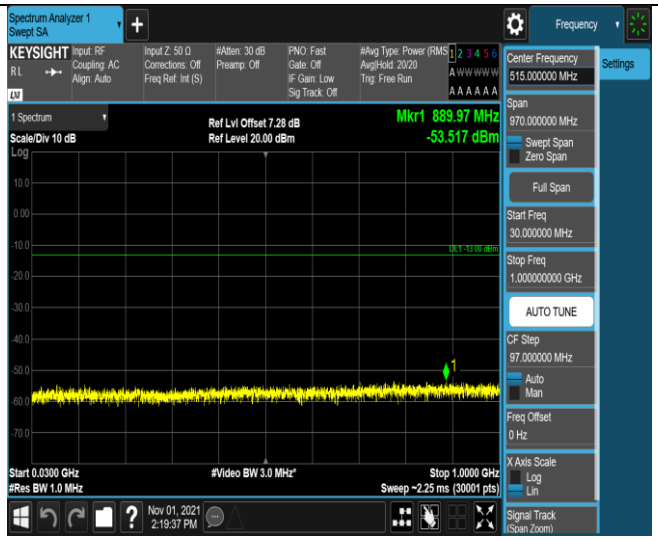
Test Results

Band	Channel	Frequency Range (Mhz)	Frequency (dBm)	Result (dBm)	Limit (dBm)	Verdict
Band2	9262	0.009~0.15MHz	0.14	-79.15	-43	PASS
Band2	9262	0.15~30MHz	0.15	-55.89	-23	PASS
Band2	9262	30~1000MHz	889.97	-53.52	-13	PASS
Band2	9262	1000~3000MHz	2676.13	-50.32	-13	PASS
Band2	9262	3000~20000MHz	18275.07	-39.04	-13	PASS
Band2	9400	0.009~0.15MHz	0.12	-80.09	-43	PASS
Band2	9400	0.15~30MHz	0.15	-55.04	-23	PASS
Band2	9400	30~1000MHz	882.76	-53.19	-13	PASS
Band2	9400	1000~3000MHz	2670.27	-50.43	-13	PASS
Band2	9400	3000~20000MHz	18293.2	-39.03	-13	PASS
Band2	9538	0.009~0.15MHz	0.11	-79.62	-43	PASS
Band2	9538	0.15~30MHz	0.16	-57.05	-23	PASS
Band2	9538	30~1000MHz	853.27	-53.56	-13	PASS
Band2	9538	1000~3000MHz	2677.93	-50.43	-13	PASS
Band2	9538	3000~20000MHz	18263.17	-38.99	-13	PASS
Band4	1312	0.009~0.15MHz	0.15	-79.88	-43	PASS
Band4	1312	0.15~30MHz	0.15	-56.94	-23	PASS
Band4	1312	30~1000MHz	741.5	-53.36	-13	PASS
Band4	1312	1000~3000MHz	2671.8	-50.53	-13	PASS
Band4	1312	3000~20000MHz	18289.23	-39.15	-13	PASS
Band4	1413	0.009~0.15MHz	0.14	-79.81	-43	PASS
Band4	1413	0.15~30MHz	0.15	-56.27	-23	PASS
Band4	1413	30~1000MHz	857.83	-53.85	-13	PASS
Band4	1413	1000~3000MHz	2668.93	-50.47	-13	PASS
Band4	1413	3000~20000MHz	18288.67	-39.14	-13	PASS
Band4	1513	0.009~0.15MHz	0.14	-79.73	-43	PASS
Band4	1513	0.15~30MHz	0.15	-56.7	-23	PASS
Band4	1513	30~1000MHz	898.02	-53.56	-13	PASS
Band4	1513	1000~3000MHz	2680	-50.52	-13	PASS
Band4	1513	3000~20000MHz	18256.93	-39.18	-13	PASS
Band5	4132	0.009~0.15MHz	0.11	-79.87	-33	PASS
Band5	4132	0.15~30MHz	0.15	-57	-13	PASS
Band5	4132	30~1000MHz	963.17	-63.93	-13	PASS
Band5	4132	1000~10000MHz	3685.3	-46.08	-13	PASS
Band5	4183	0.009~0.15MHz	0.08	-79.79	-33	PASS
Band5	4183	0.15~30MHz	0.16	-58.2	-13	PASS
Band5	4183	30~1000MHz	683.75	-63.99	-13	PASS

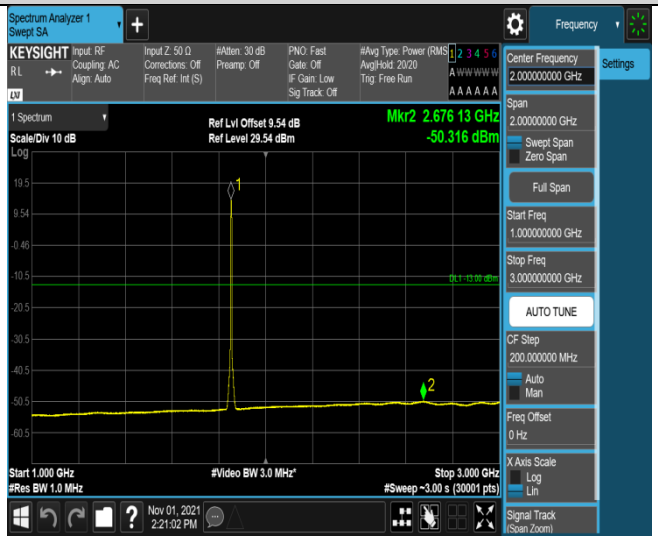
Band5	4183	1000~10000MHz	3696.7	-46.1	-13	PASS
Band5	4233	0.009~0.15MHz	0.15	-79.42	-33	PASS
Band5	4233	0.15~30MHz	0.17	-57.03	-13	PASS
Band5	4233	30~1000MHz	994.24	-63.95	-13	PASS
Band5	4233	1000~10000MHz	3691.6	-46.08	-13	PASS

Test Graphs

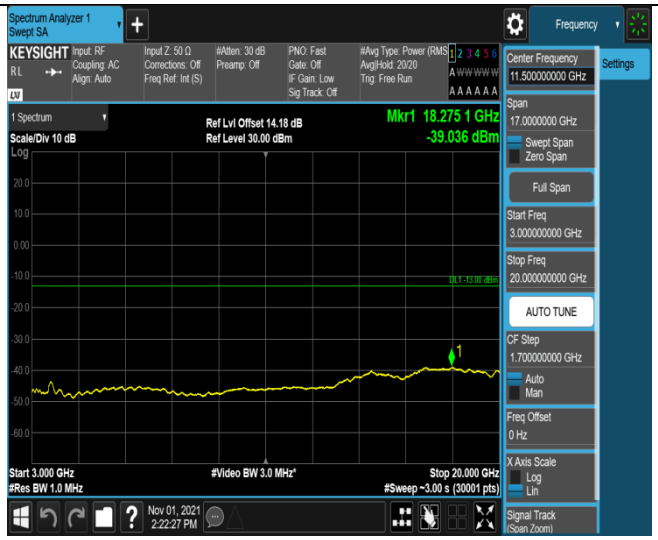
Band2-9262-0.009~0.15MHz

Band2-9262-0.15~30MHz

Band2-9262-30~1000MHz



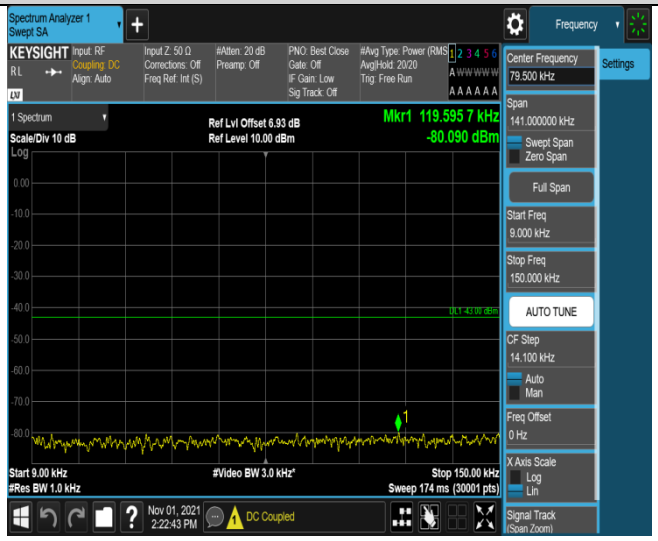
Band2-9262-1000~3000MHz



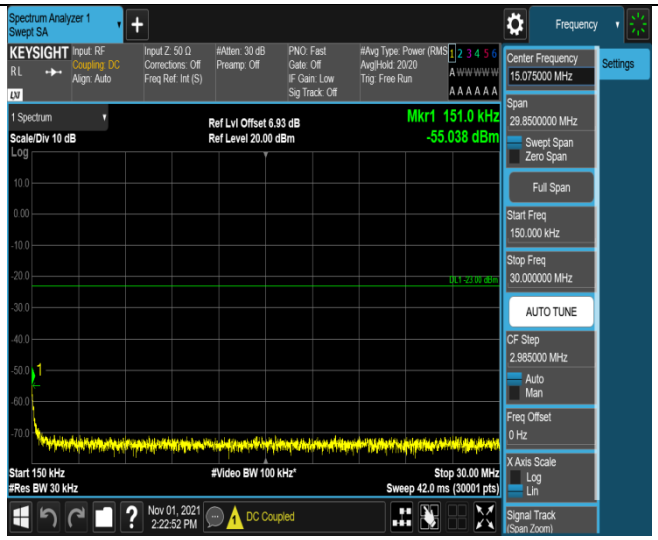
Band2-9262-3000~20000MHz



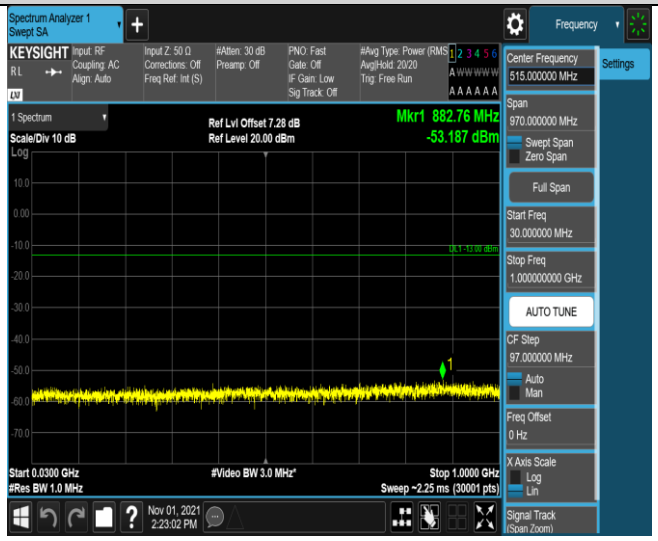
Band2-9400-0.009~0.15MHz



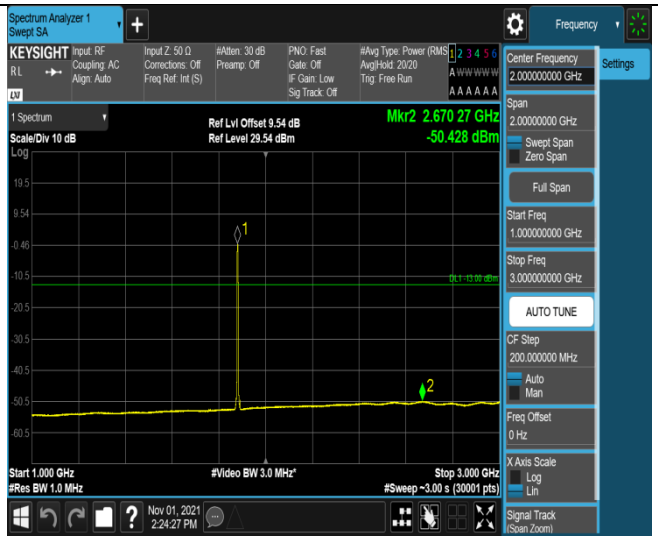
Band2-9400-0.15~30MHz



Band2-9400-30~1000MHz

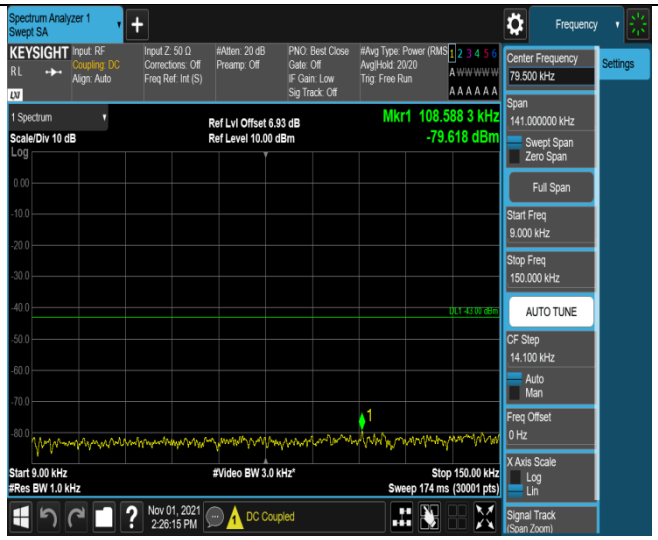


Band2-9400-1000~3000MHz

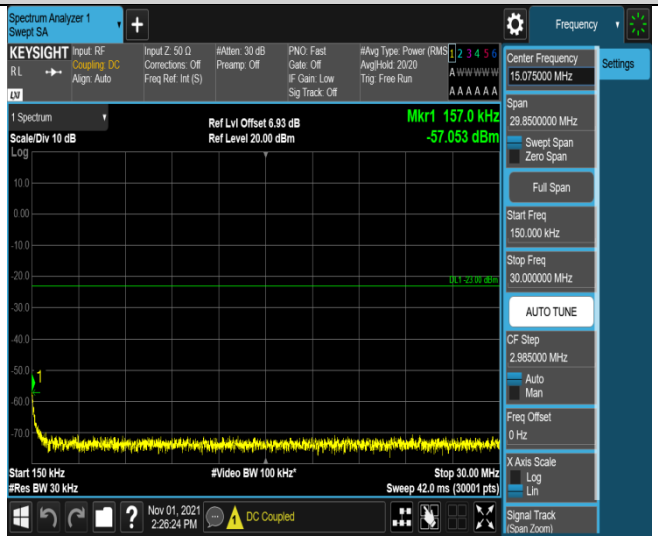


Band2-9400-3000~20000MHz

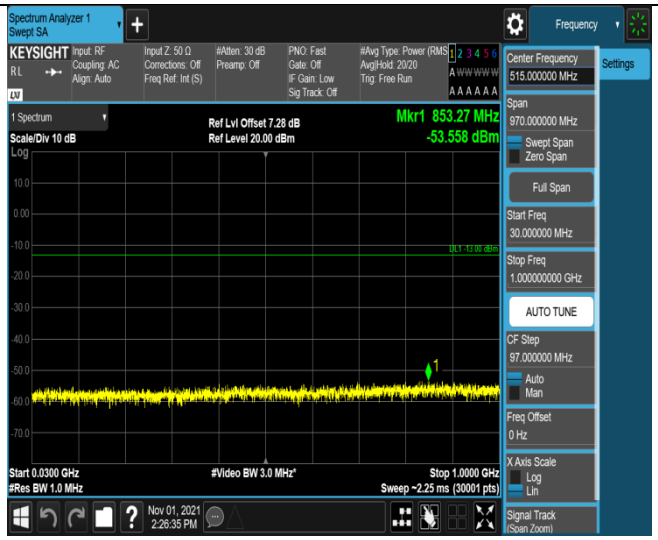
Band2-9538-0.009~0.15MHz



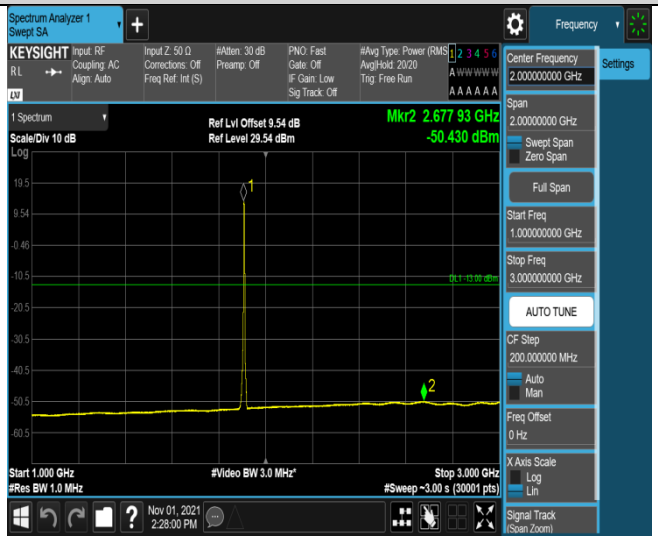
Band2-9538-0.15~30MHz



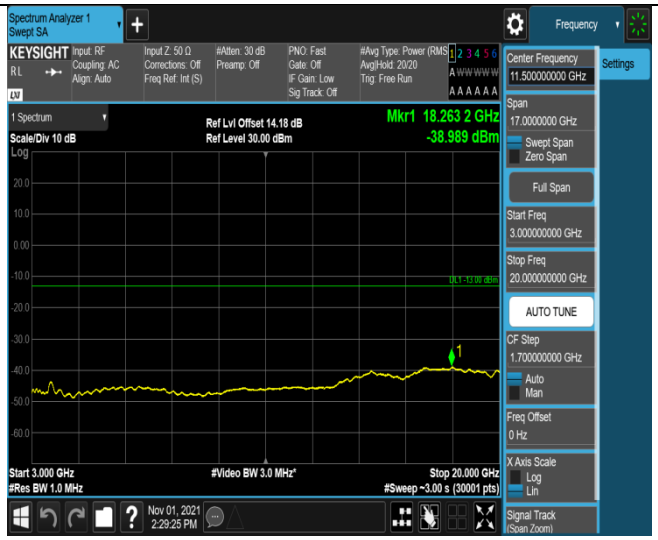
Band2-9538-30~1000MHz



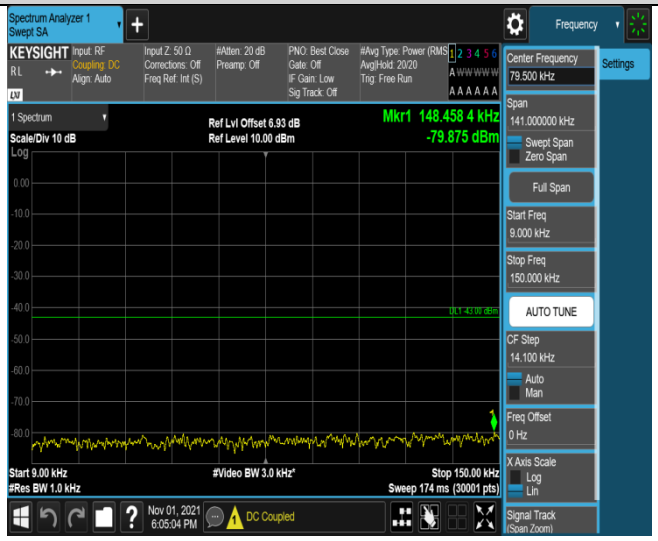
Band2-9538-1000~3000MHz



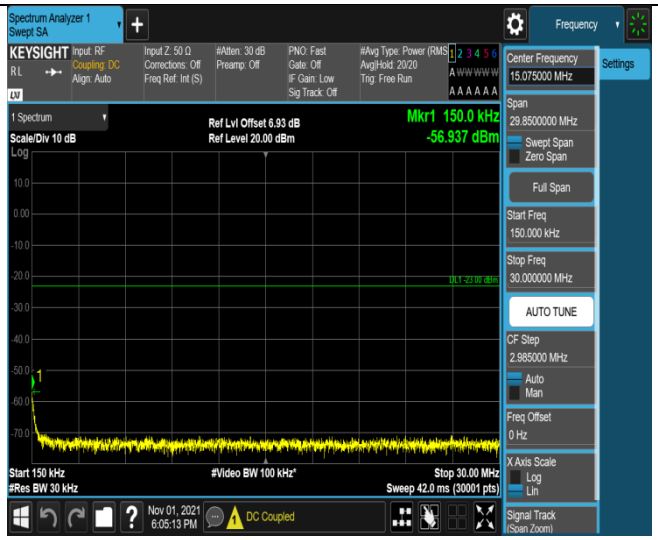
Band2-9538-3000~20000MHz



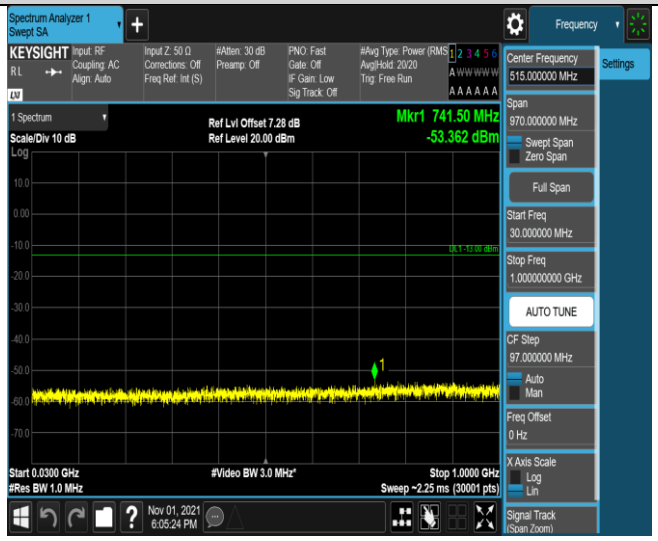
Band4-1312-0.009~0.15MHz



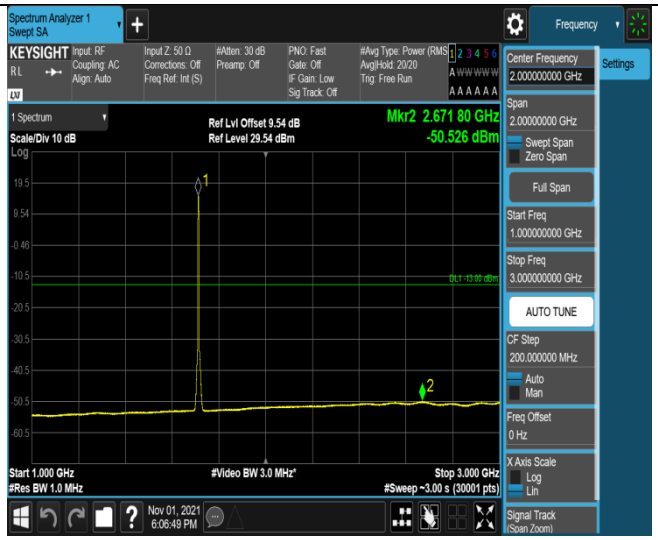
Band4-1312-0.15~30MHz



Band4-1312-30~1000MHz

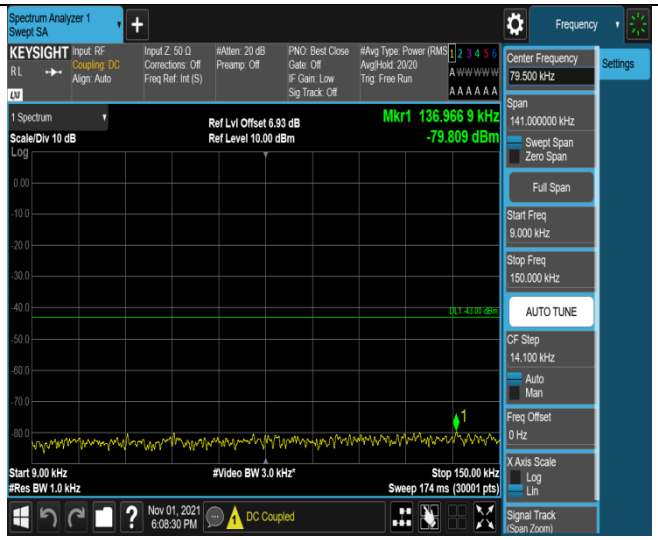


Band4-1312-1000~3000MHz

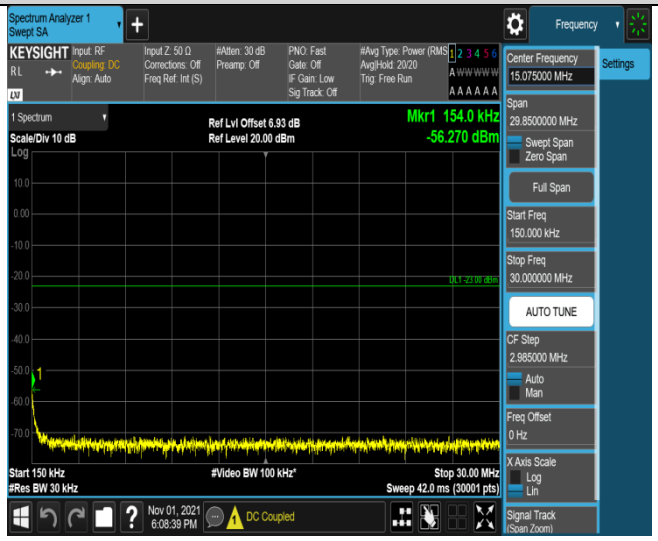


Band4-1312-3000~20000MHz

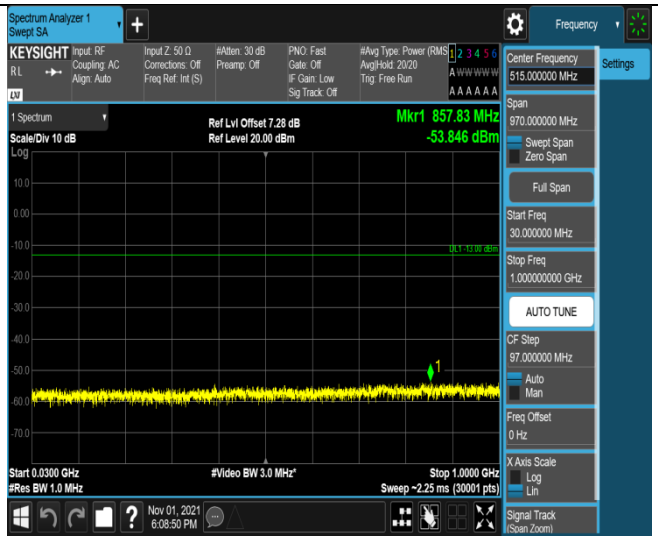
Band4-1413-0.009~0.15MHz



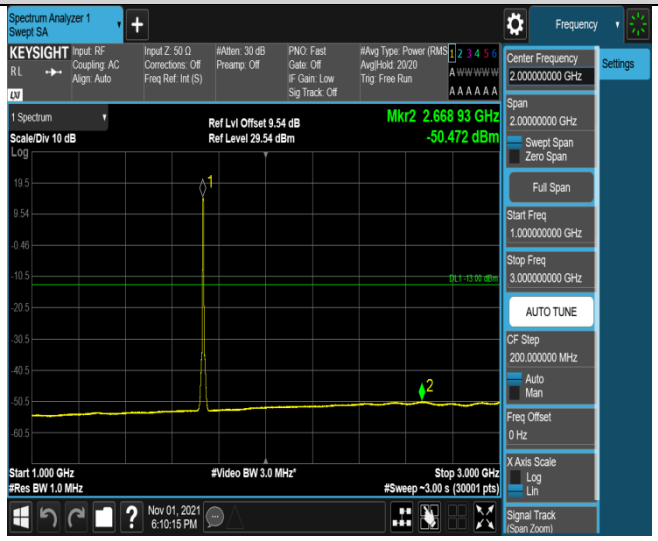
Band4-1413-0.15~30MHz



Band4-1413-30~1000MHz



Band4-1413-1000~3000MHz



Band4-1413-3000~20000MHz