

Appendix for WCDMA test report

Appendix A: Effective (Isotropic) Radiated Power Output Data

Test Results

Test Band	Test Mode	Test Channel	Conducted power[dBm]	ERP(dBm)	Limit [dBm]	Verdict
WCDMA850	UMTS/TM1	LCH	23.91	21.91	38.5	PASS
		MCH	23.88	21.88	38.5	PASS
		HCH	23.95	21.95	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted power[dBm]	EIRP(dBm)	Limit [dBm]	Verdict
WCDMA1900	UMTS/TM1	LCH	23.55	23.15	33	PASS
		MCH	24.01	23.61	33	PASS
		HCH	24.02	23.62	33	PASS
WCDMA1700	UMTS/TM1	LCH	23.05	22.45	30	PASS
		MCH	23.32	22.72	30	PASS
		HCH	23.72	23.12	30	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,

$$\text{ERP[dBm]} = \text{SGP[dBm]} - \text{Cable Loss[dB]} + \text{Gain[dBd]}$$

$$\text{EIRP[dBm]} = \text{SGP[dBm]} - \text{Cable Loss[dB]} + \text{Gain[dBd]}$$

b, SGP=Signal Generator Level

c, Antenna gain of WCDMA1900 is -0.4dBi; Antenna gain of WCDMA1700 is -0.6dBi; Antenna gain of WCDMA850 is -2.0dBi;

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

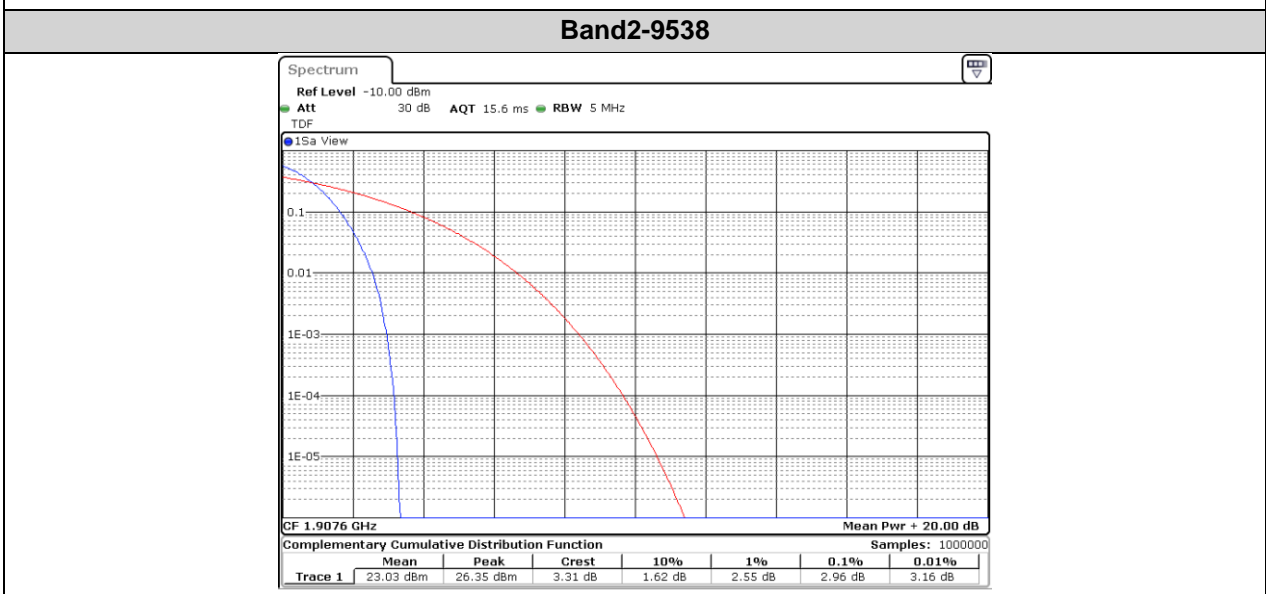
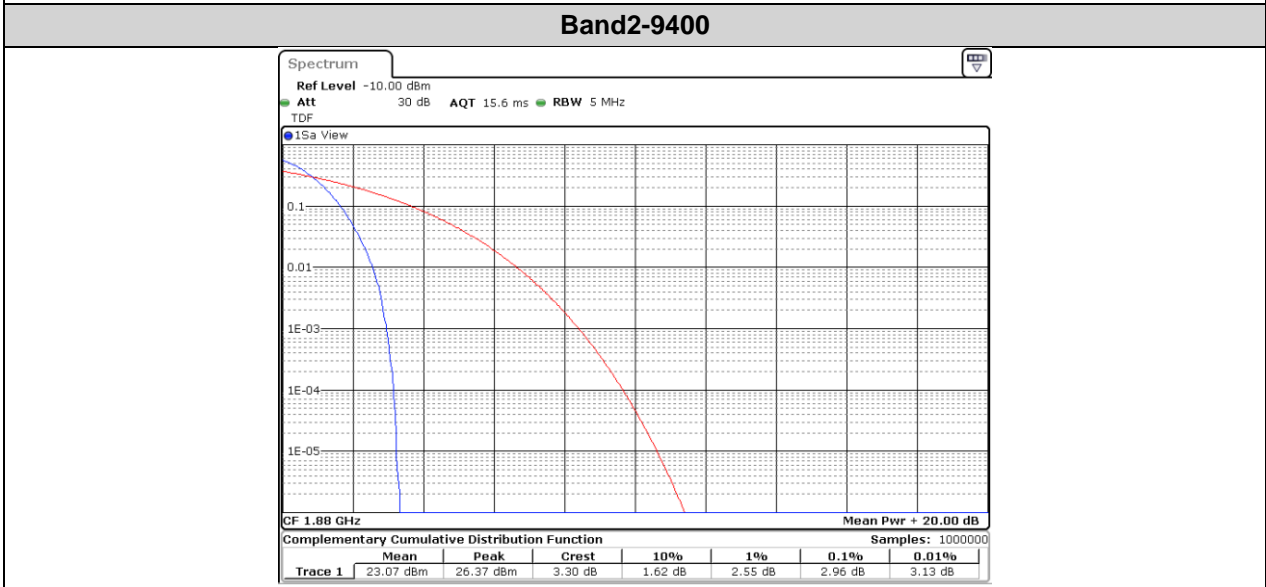
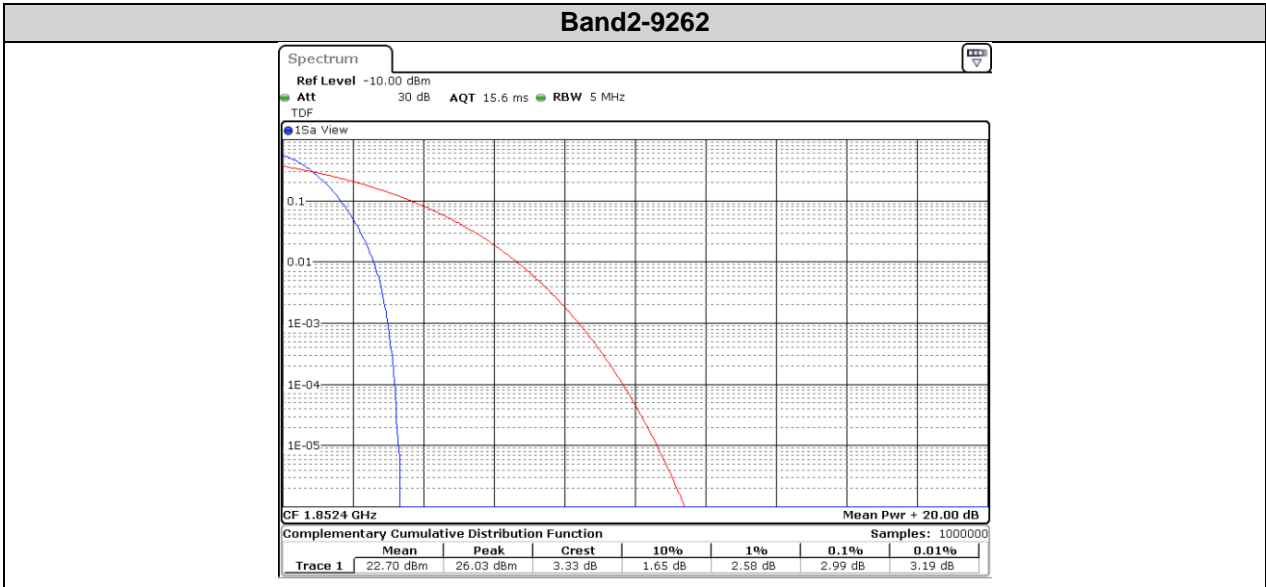
Detector: RMS

Appendix B: Peak-to-Average Ratio

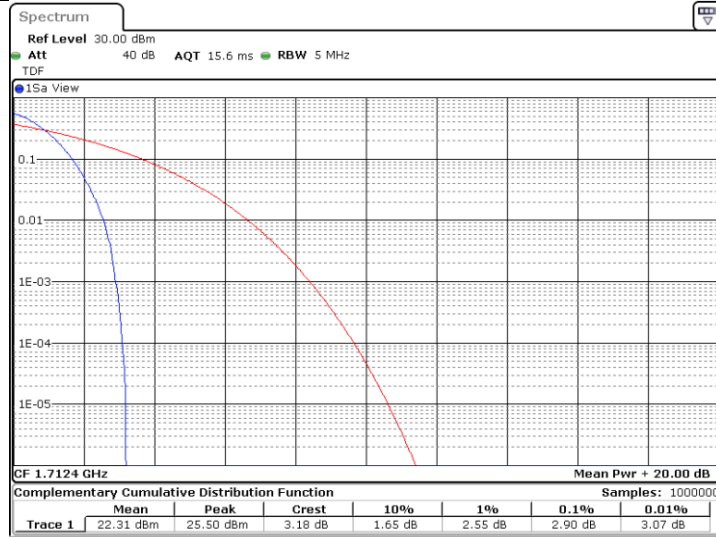
Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	2.99	13	PASS
		MCH	2.96	13	PASS
		HCH	2.96	13	PASS
WCDMA1700	UMTS/TM1	LCH	2.9	13	PASS
		MCH	2.96	13	PASS
		HCH	2.81	13	PASS
WCDMA850	UMTS/TM1	LCH	3.07	13	PASS
		MCH	3.04	13	PASS
		HCH	3.13	13	PASS

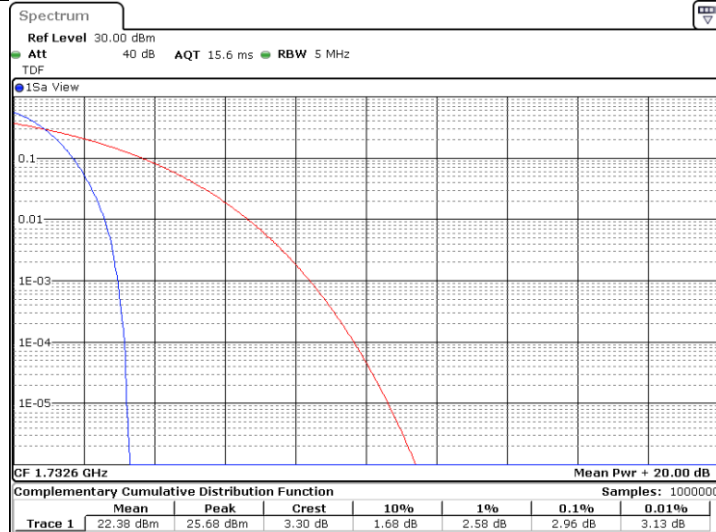
Test Graphs



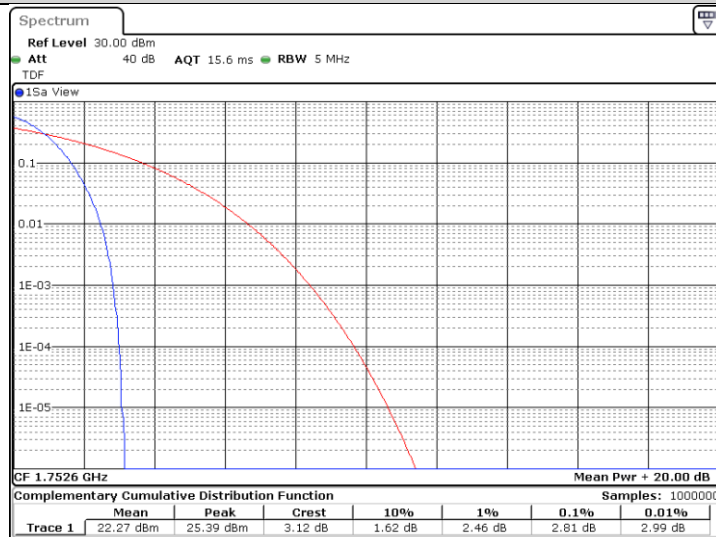
Band4-1312



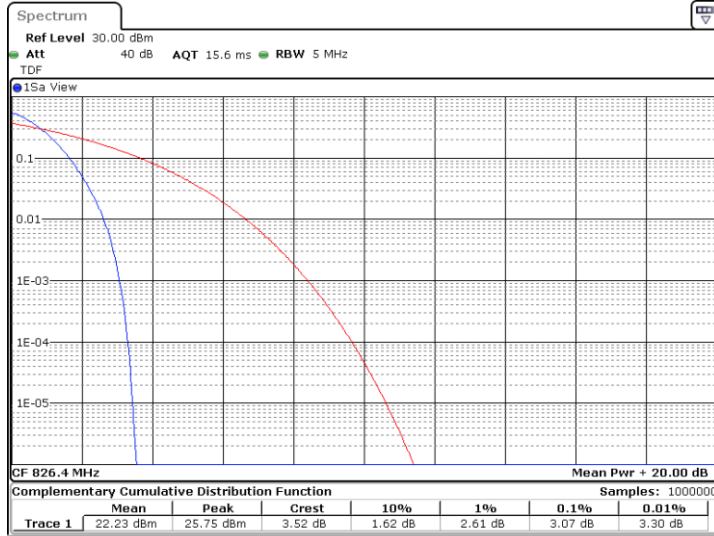
Band4-1413



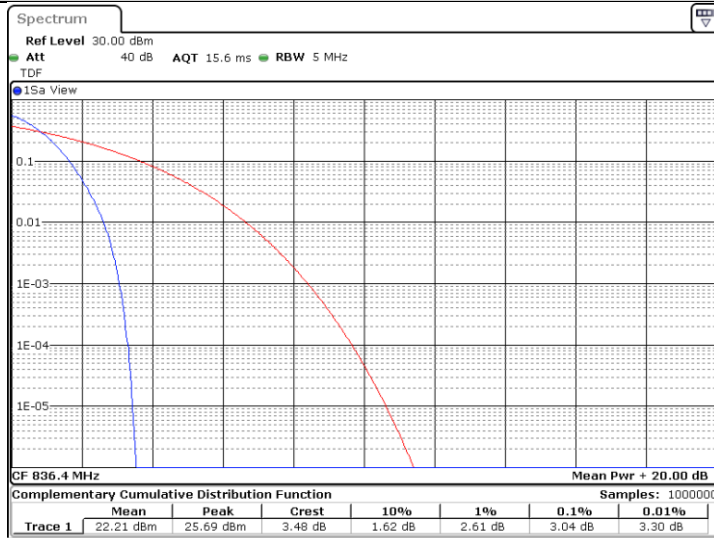
Band4-1513



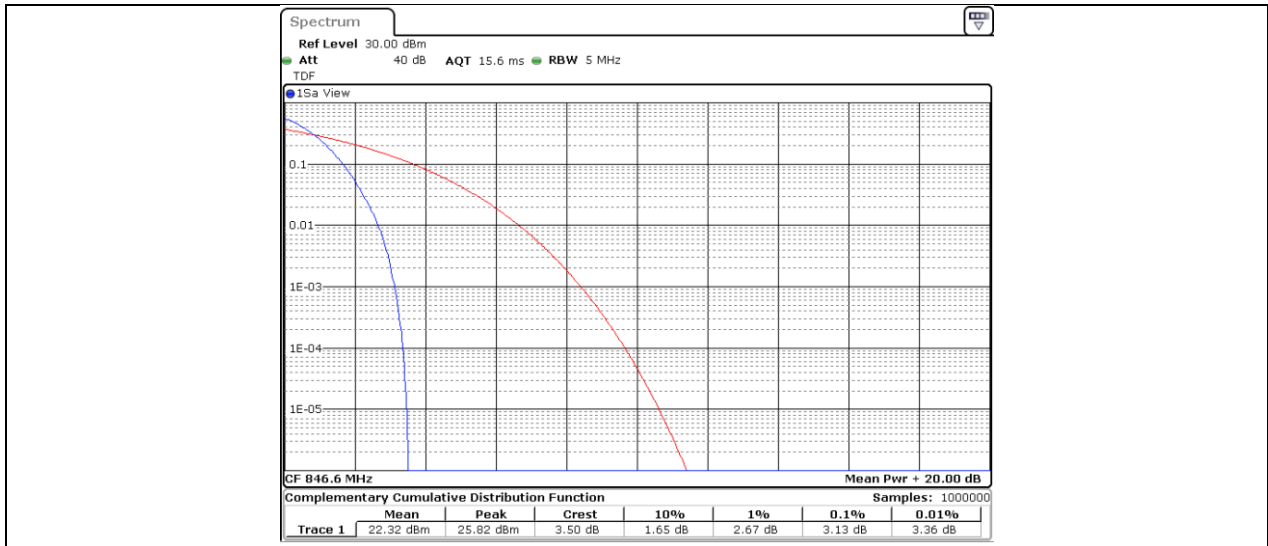
Band5-4132



Band5-4182



Band5-4233



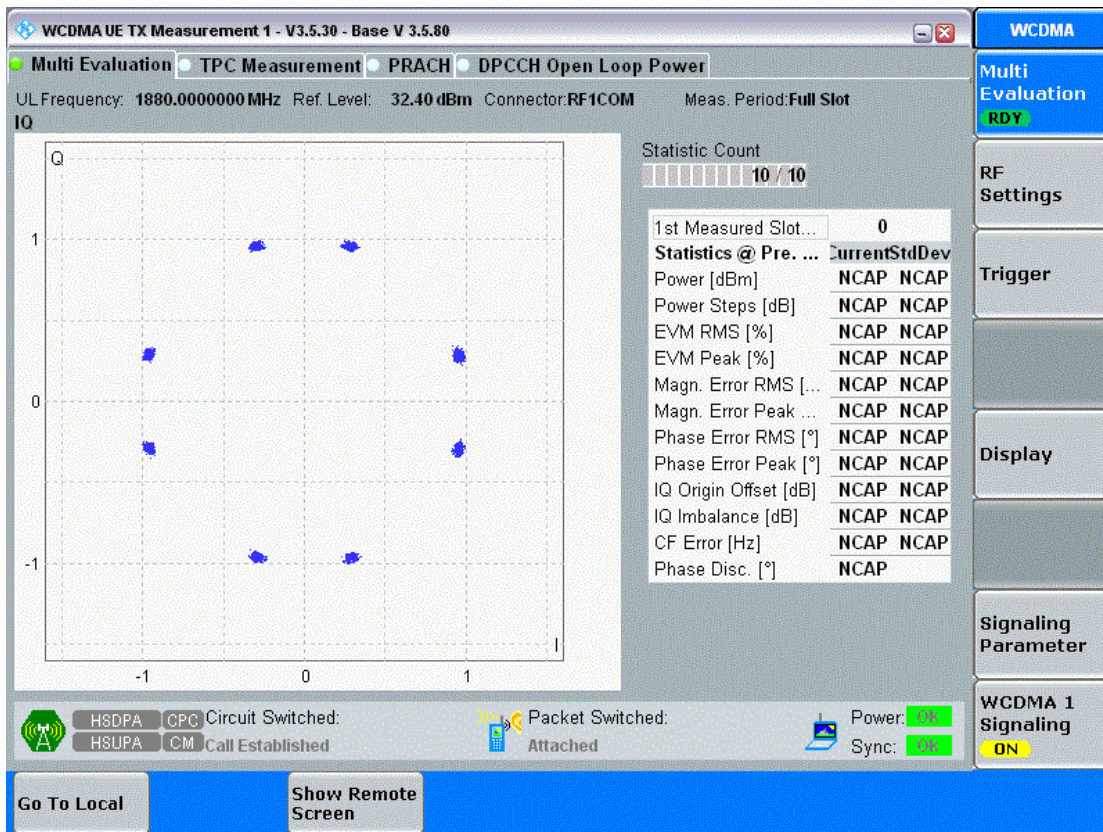
Appendix C: Modulation Characteristics

Test Plots

Test Band = WCDMA1900

Test Mode = UMTS/TM1

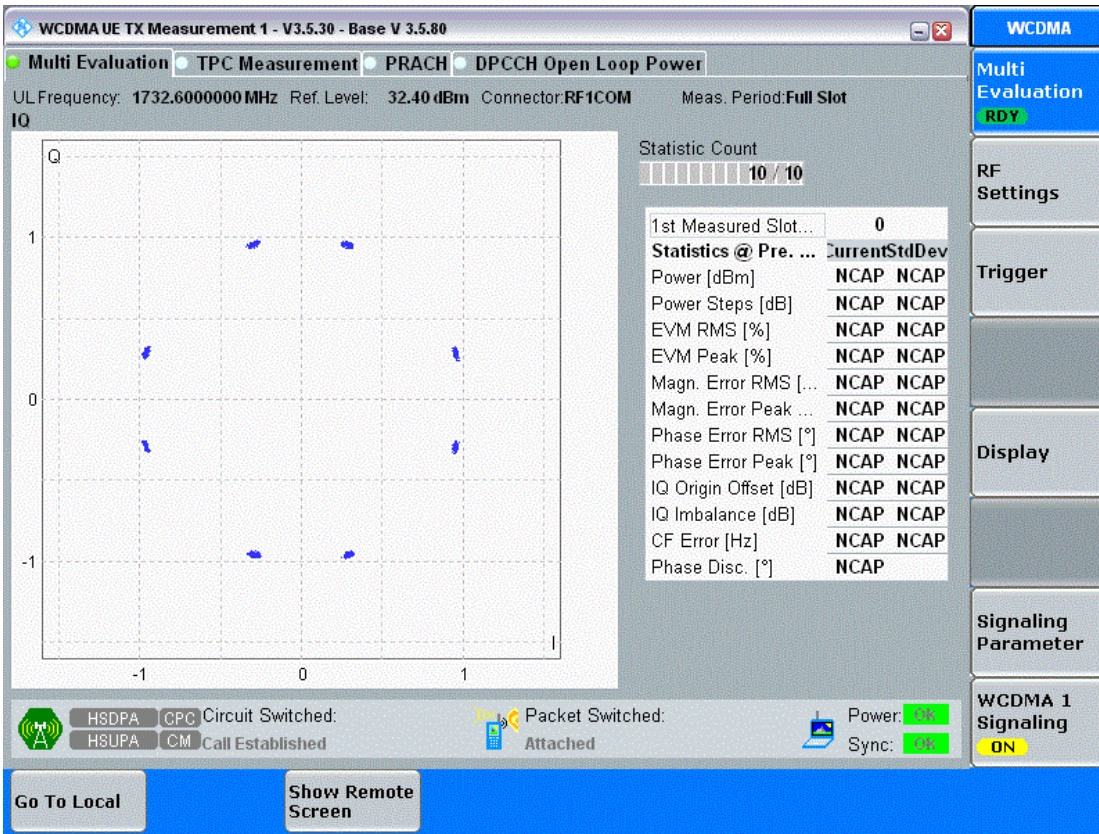
Test Channel = MCH



Test Band = WCDMA1700

Test Mode = UMTS/TM1

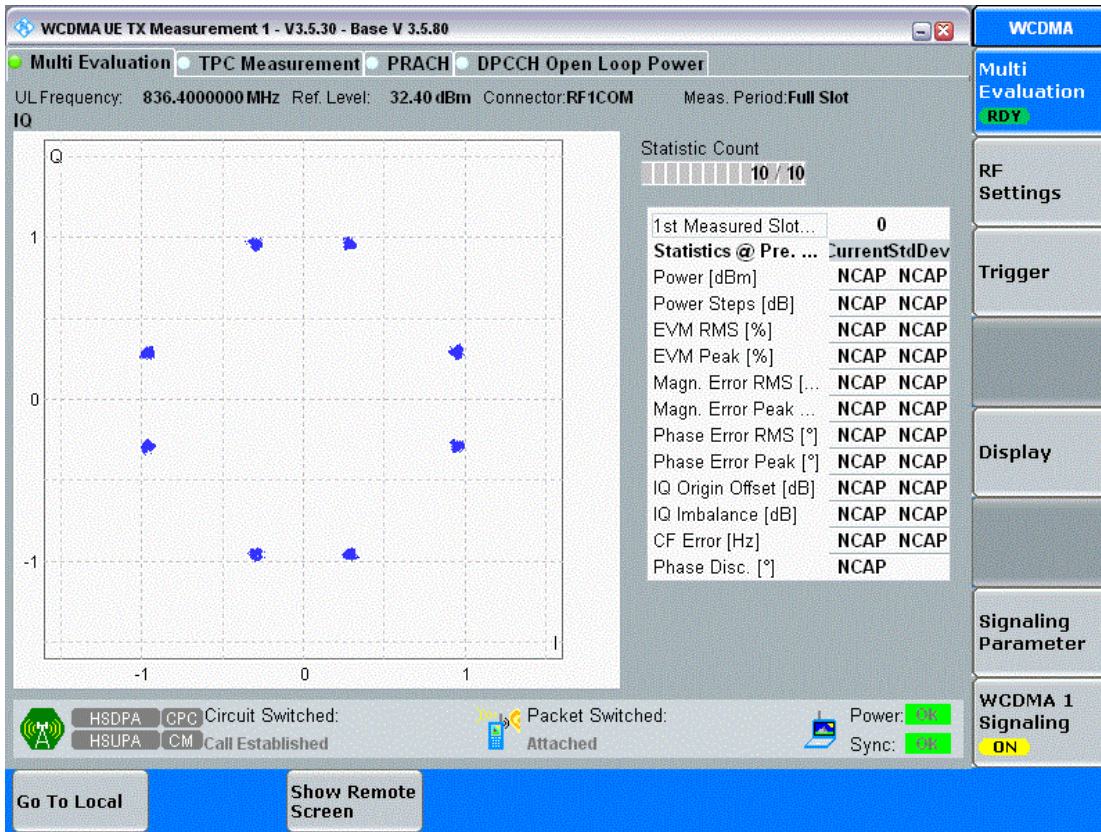
Test Channel = MCH



Test Band = WCDMA850

Test Mode = UMTS/TM1

Test Channel = MCH



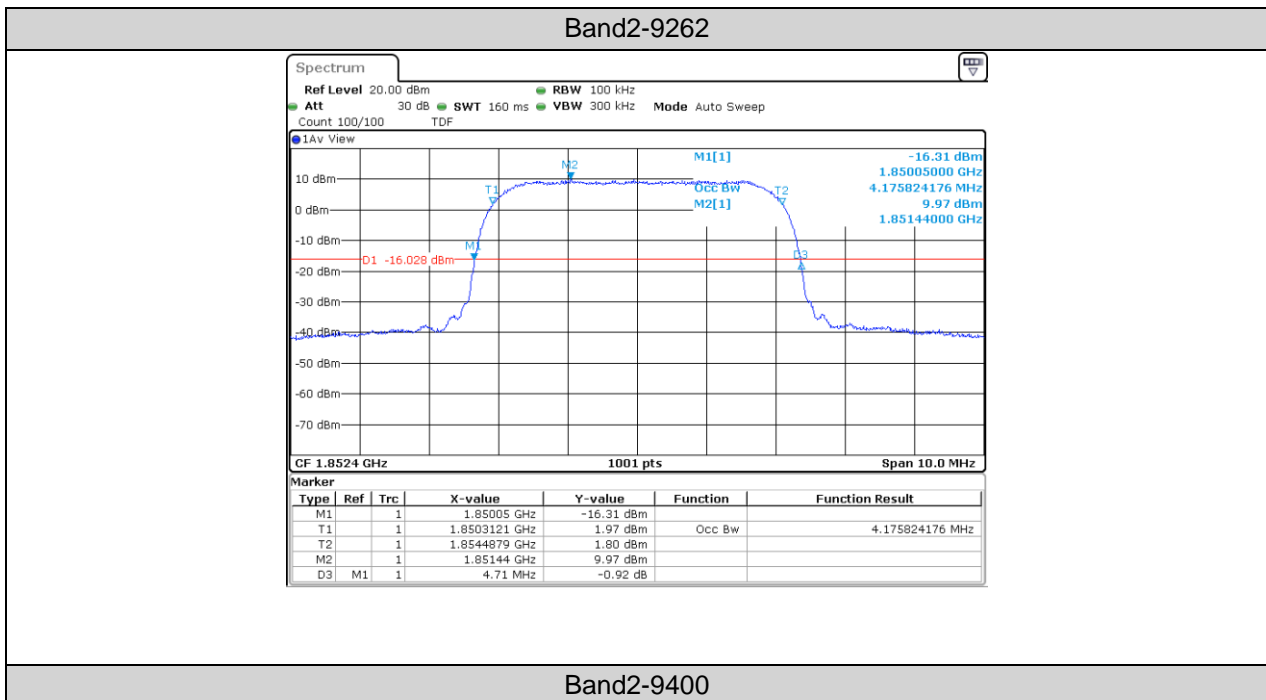
Appendix D: Bandwidth

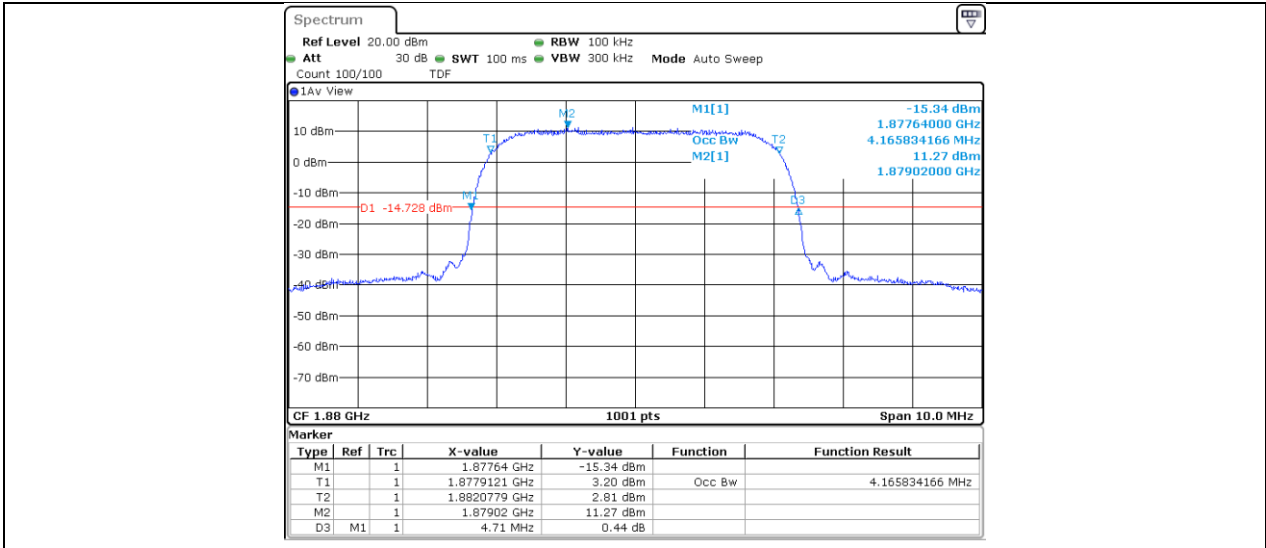
Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA1900	UMTS/TM1	LCH	4.176	4.710	Pass
		MCH	4.166	4.710	Pass
		HCH	4.176	4.710	Pass
WCDMA1700	UMTS/TM1	LCH	4.166	4.710	Pass
		MCH	4.166	4.710	Pass
		HCH	4.166	4.710	Pass
WCDMA850	UMTS/TM1	LCH	4.166	4.710	Pass
		MCH	4.176	4.700	Pass
		HCH	4.166	4.710	Pass

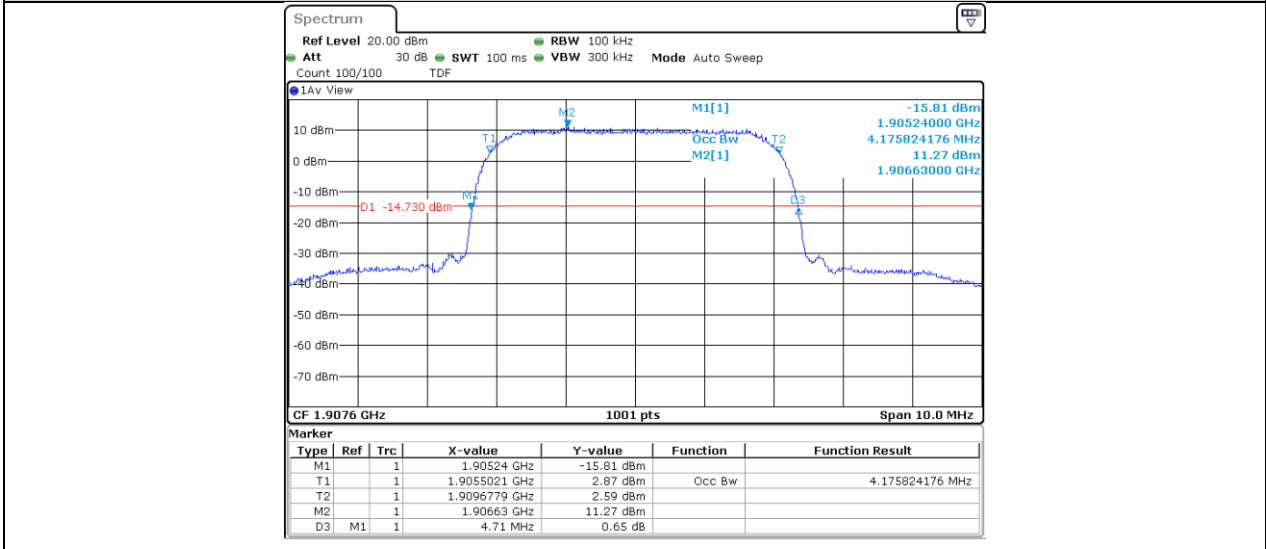
Test Graphs

Test Mode = UMTS/TM1

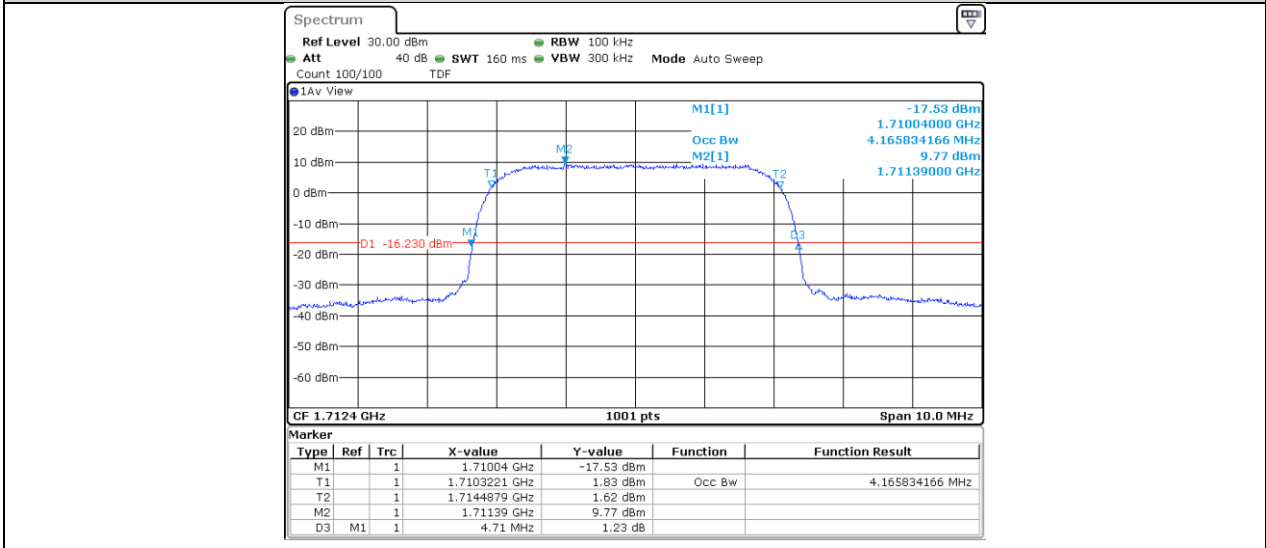




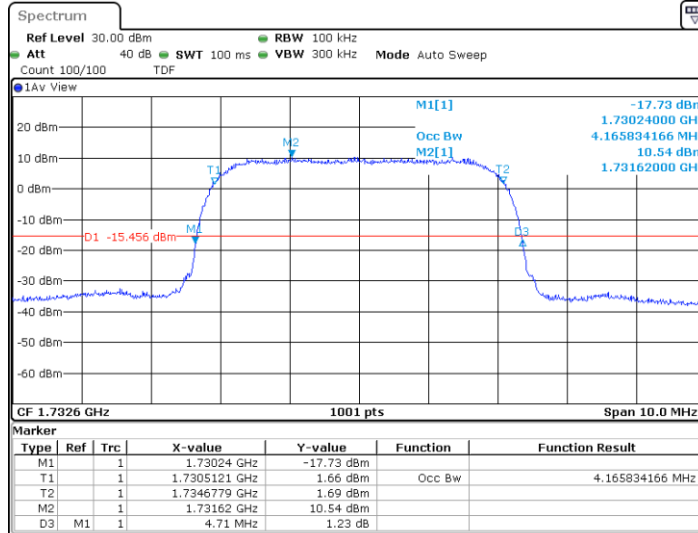
Band2-9538



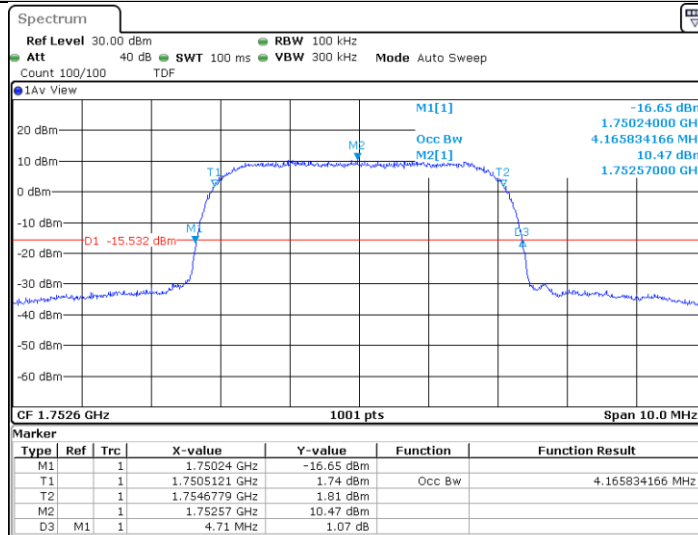
Band4-1312



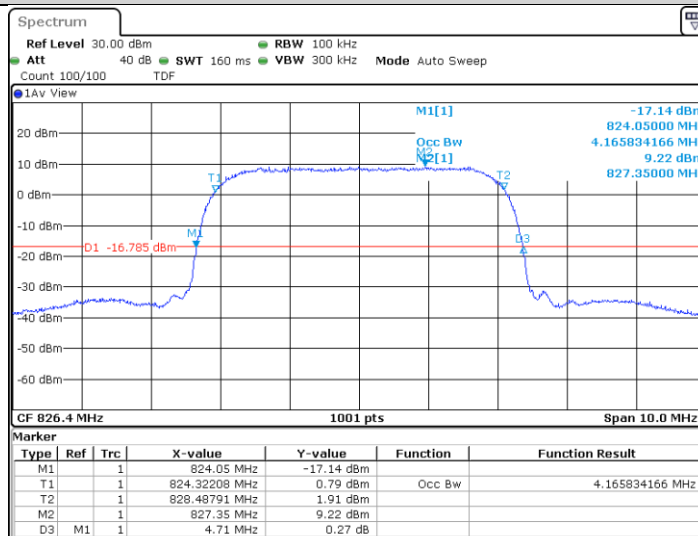
Band4-1413



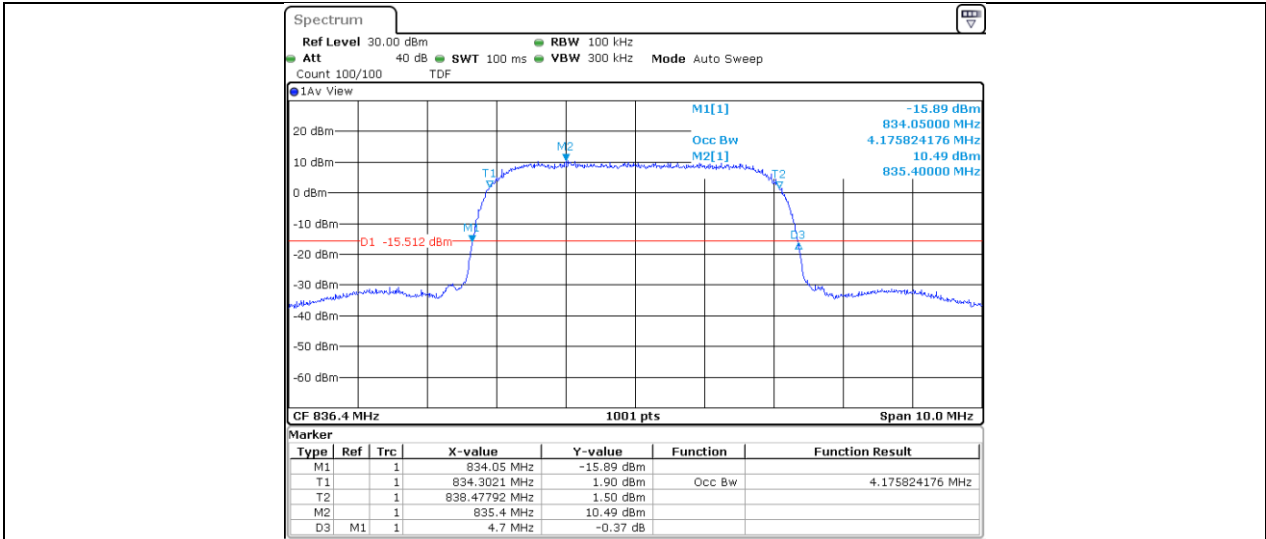
Band4-1513



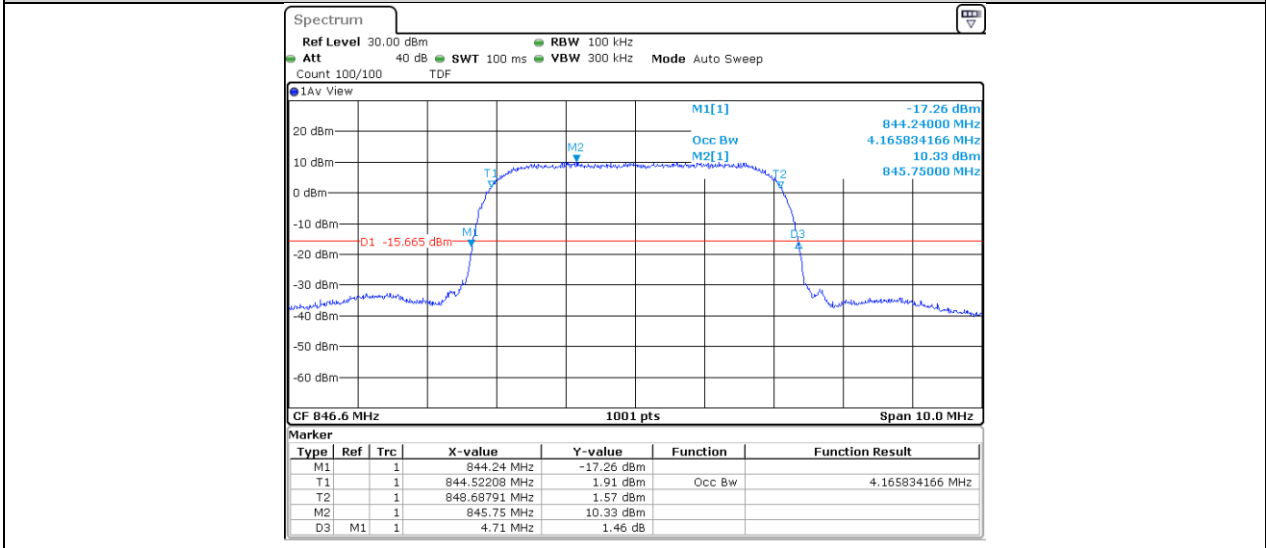
Band5-4132



Band5-4182



Band5-4233

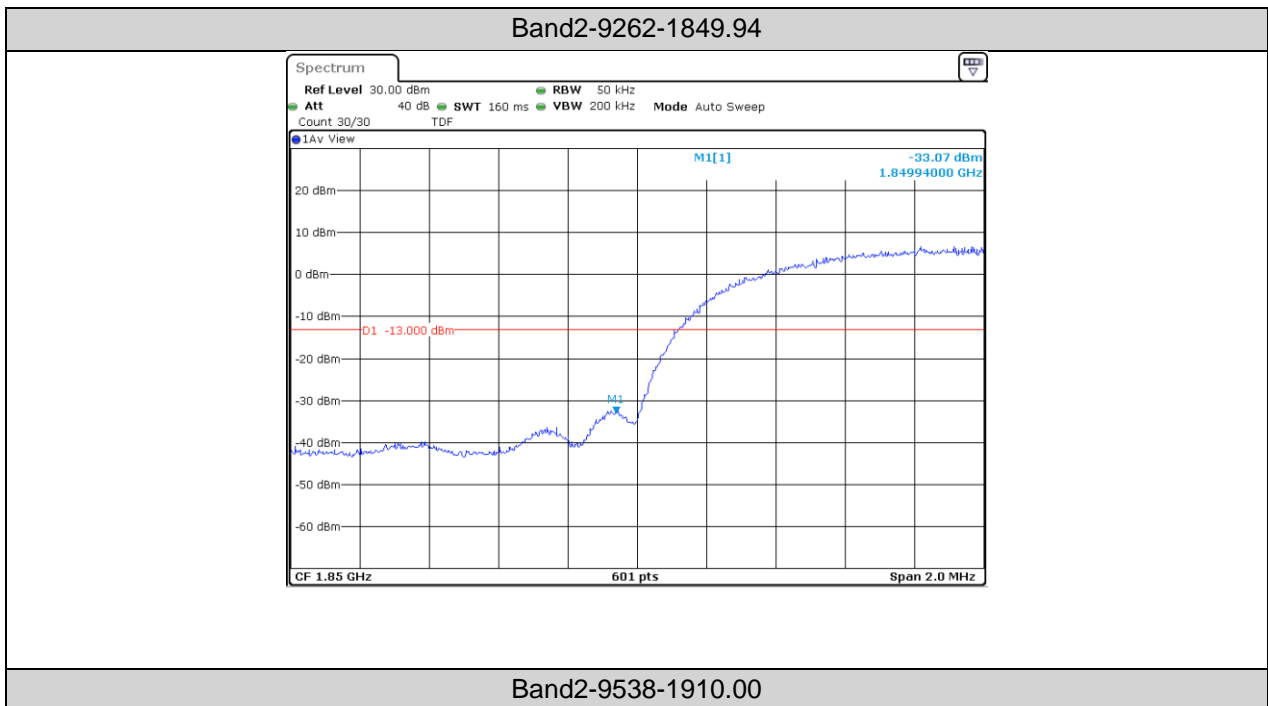


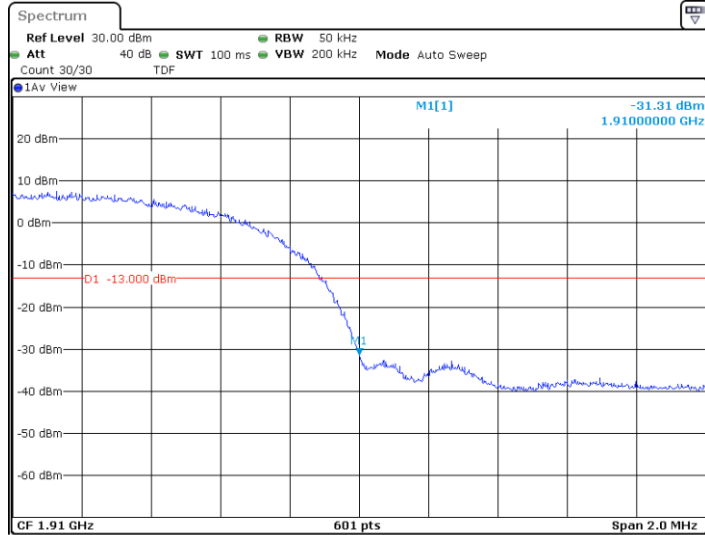
Appendix E: Band Edges Compliance

Test Result

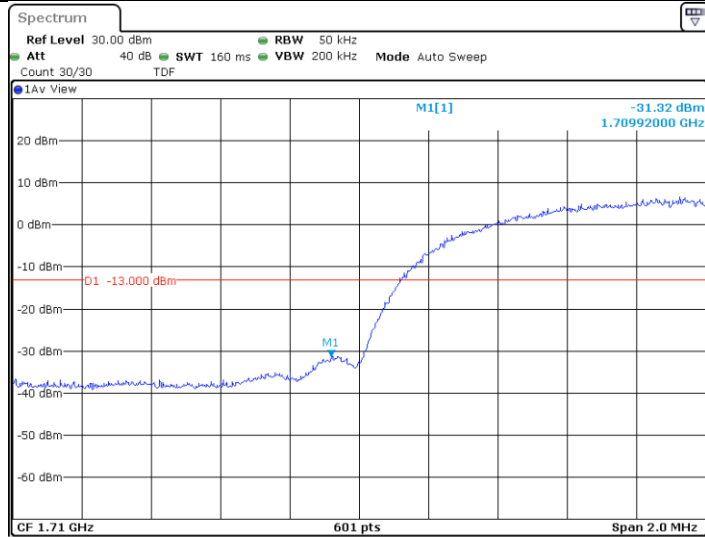
Band	Channel	Frequency (MHz)	Result (dBm)	Limit(dBm)	Verdict
Band2	9262	1849.94	-32.43	-13	PASS
Band2	9538	1910.00	-31.31	-13	PASS
Band4	1312	1709.92	-31.32	-13	PASS
Band4	1513	1755.00	-30.92	-13	PASS
Band5	4132	824.00	-32.50	-13	PASS
Band5	4233	849.06	-32.40	-13	PASS

Test Graphs

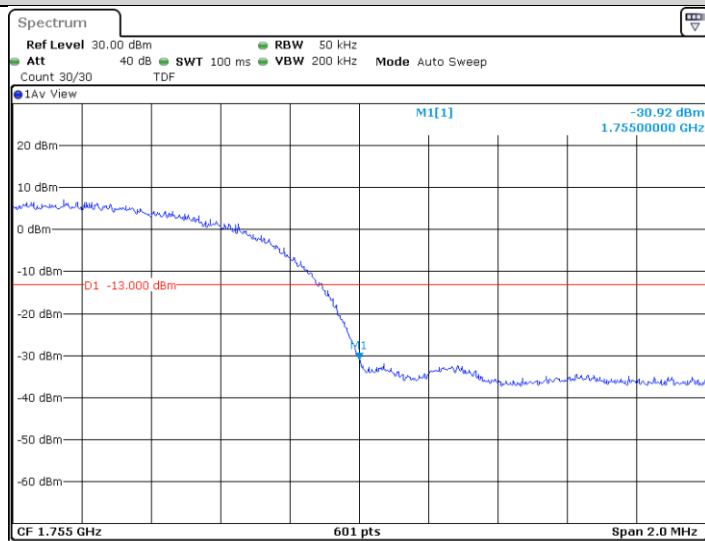




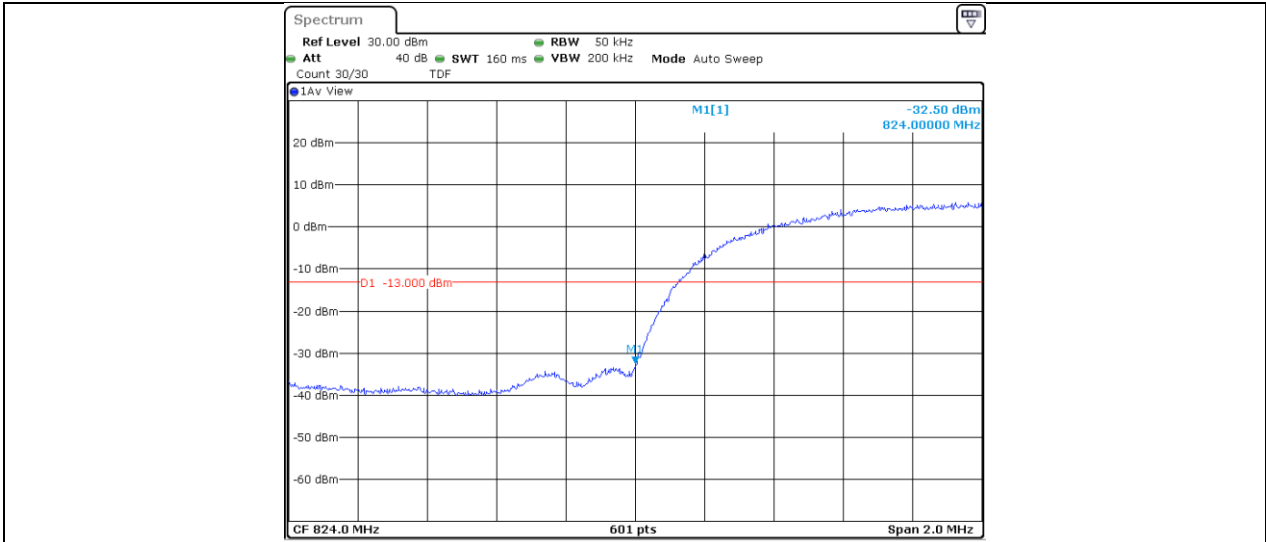
Band4-1312-1709.92



Band4-1513-1755.00



Band5-4132-824.00



Band5-4233-849.06



Appendix F: Spurious Emission at Antenna Terminal

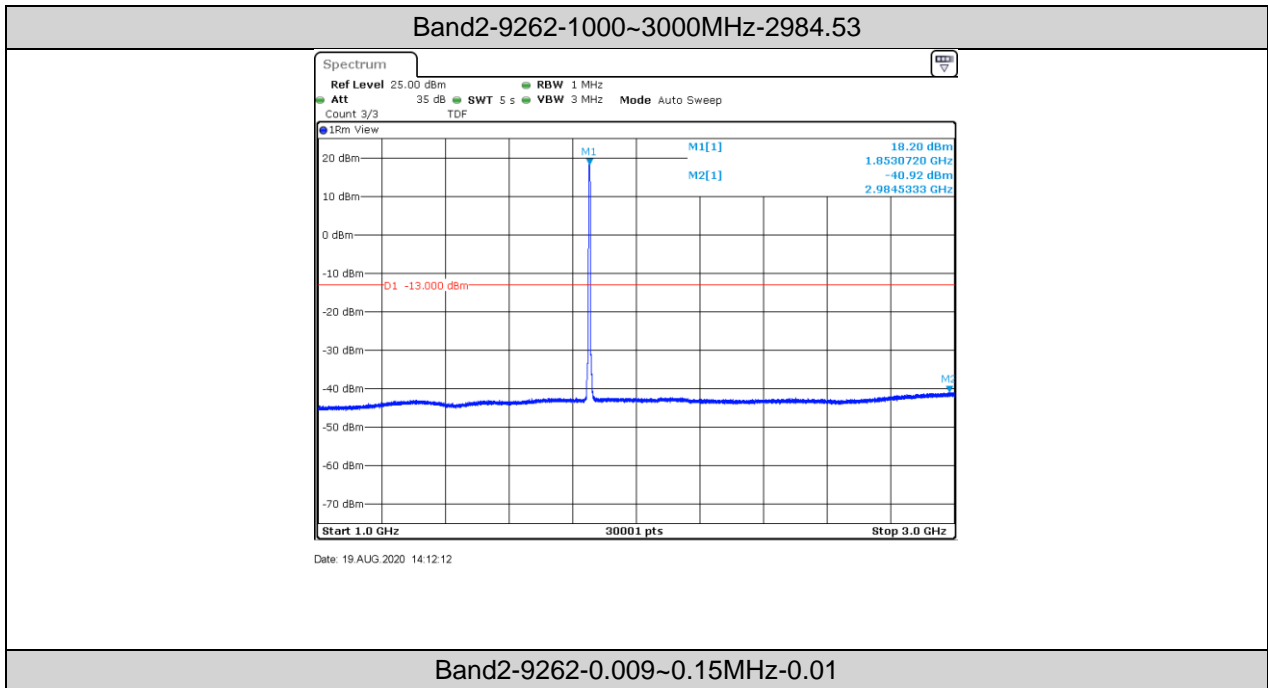
NOTE: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k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

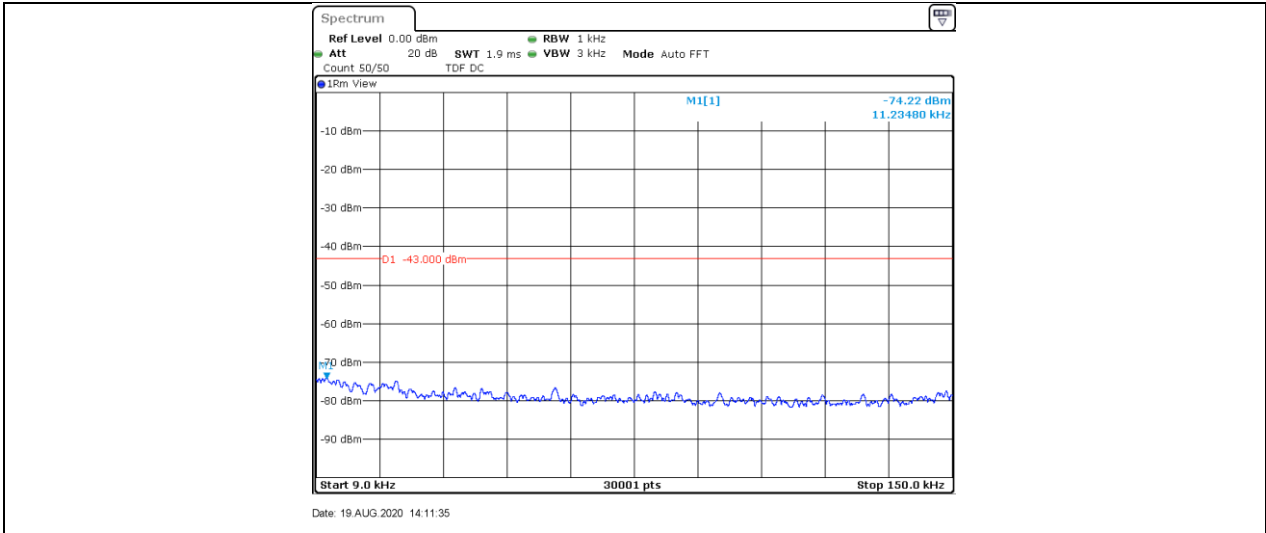
Test Result

Band	Channel	Frequency Range (MHz)	Frequency (dBm)	Result (dBm)	Limit (dBm)	Verdict
Band2	9262	1000~3000MHz	2984.53	-40.92	-13	PASS
Band2	9262	0.009~0.15MHz	0.01	-74.22	-43	PASS
Band2	9262	3000~10000MHz	5973.38	-50.69	-13	PASS
Band2	9262	30~1000MHz	970.69	-33.91	-13	PASS
Band2	9262	0.15~30MHz	23.94	-49.76	-23	PASS
Band2	9262	10000~20000MHz	19905.84	-61.49	-13	PASS
Band2	9400	0.009~0.15MHz	0.01	-74.4	-43	PASS
Band2	9400	3000~10000MHz	5961.95	-50.57	-13	PASS
Band2	9400	1000~3000MHz	2966.6	-41.02	-13	PASS
Band2	9400	0.15~30MHz	22.87	-49.27	-23	PASS
Band2	9400	10000~20000MHz	19899.17	-61.45	-13	PASS
Band2	9400	30~1000MHz	898.27	-34.21	-13	PASS
Band2	9538	0.15~30MHz	23.06	-50.18	-23	PASS
Band2	9538	10000~20000MHz	19899.17	-61.37	-13	PASS
Band2	9538	3000~10000MHz	3817.22	-50.54	-13	PASS
Band2	9538	30~1000MHz	883.17	-34.6	-13	PASS
Band2	9538	0.009~0.15MHz	0.01	-74.26	-43	PASS
Band2	9538	1000~3000MHz	2972.67	-40.92	-13	PASS
Band4	1312	0.009~0.15MHz	0.01	-74.54	-43	PASS
Band4	1312	0.15~30MHz	23.97	-49.31	-23	PASS
Band4	1312	30~1000MHz	955.88	-34.32	-13	PASS
Band4	1312	1000~3000MHz	2976.4	-40.94	-13	PASS
Band4	1312	3000~10000MHz	5833.39	-50.58	-13	PASS
Band4	1312	10000~20000MHz	19893.5	-61.51	-13	PASS
Band4	1413	3000~10000MHz	5910.39	-50.62	-13	PASS
Band4	1413	10000~20000MHz	19897.5	-61.55	-13	PASS
Band4	1413	0.15~30MHz	27.97	-50.04	-23	PASS
Band4	1413	30~1000MHz	986.28	-34.61	-13	PASS
Band4	1413	1000~3000MHz	2971.4	-40.84	-13	PASS
Band4	1413	0.009~0.15MHz	0.01	-74.11	-43	PASS
Band4	1513	10000~20000MHz	19906.5	-61.39	-13	PASS
Band4	1513	0.009~0.15MHz	0.01	-74.21	-43	PASS
Band4	1513	1000~3000MHz	2950.6	-41.11	-13	PASS
Band4	1513	30~1000MHz	990.51	-34.32	-13	PASS
Band4	1513	0.15~30MHz	24.27	-49.77	-23	PASS
Band4	1513	3000~10000MHz	5881.22	-50.61	-13	PASS
Band5	4132	10000~18000MHz	15135.7	-63.52	-13	PASS

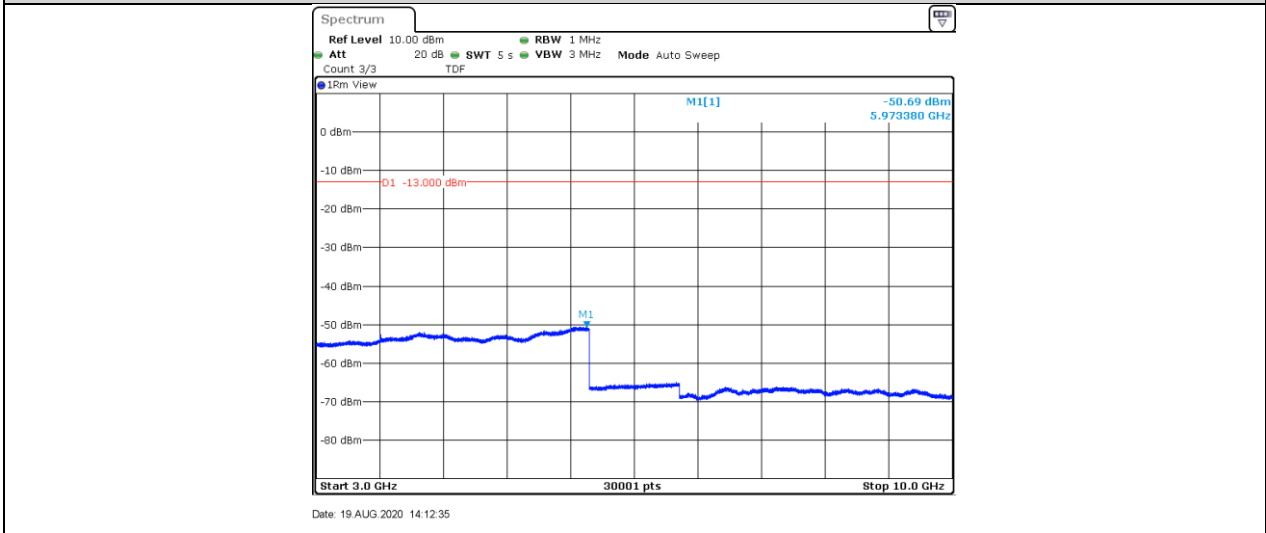
Band5	4132	3000~10000MHz	4136.18	-29.06	-13	PASS
Band5	4132	1000~3000MHz	1654.28	-41.03	-13	PASS
Band5	4132	30~1000MHz	971.39	-34	-13	PASS
Band5	4132	0.15~30MHz	24.15	-49.66	-13	PASS
Band5	4132	0.009~0.15MHz	0.01	-73.39	-33	PASS
Band5	4182	1000~3000MHz	1671.01	-41.34	-13	PASS
Band5	4182	0.009~0.15MHz	0.01	-73.83	-33	PASS
Band5	4182	30~1000MHz	976.2	-34.23	-13	PASS
Band5	4182	3000~10000MHz	4177.48	-31.53	-13	PASS
Band5	4182	10000~18000MHz	15151.96	-63.52	-13	PASS
Band5	4182	0.15~30MHz	26.67	-50.04	-13	PASS
Band5	4233	0.009~0.15MHz	0.01	-74	-33	PASS
Band5	4233	0.15~30MHz	28.38	-49.43	-13	PASS
Band5	4233	30~1000MHz	985.39	-34.17	-13	PASS
Band5	4233	1000~3000MHz	1694.41	-41.33	-13	PASS
Band5	4233	3000~10000MHz	4237.68	-29.91	-13	PASS
Band5	4233	10000~18000MHz	15141.03	-63.42	-13	PASS

Test Graphs

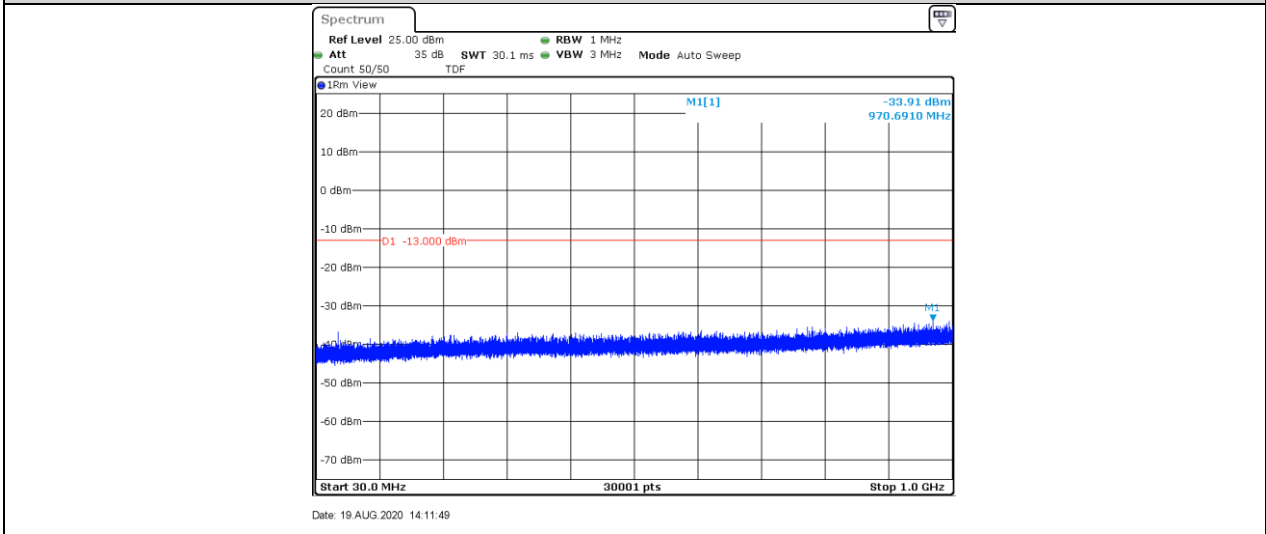




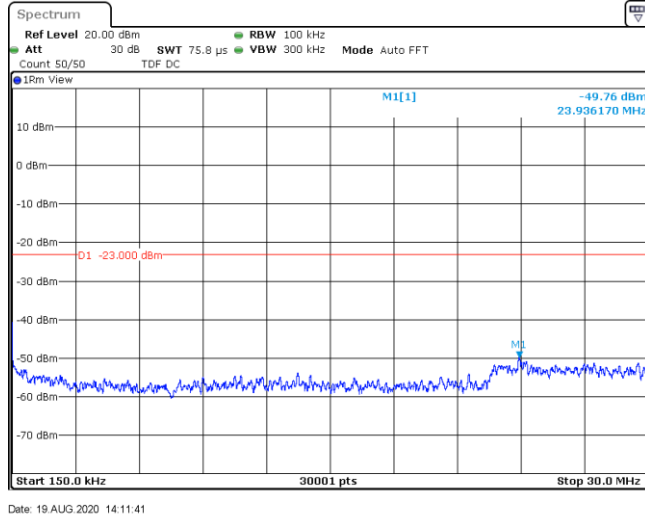
Band2-9262-3000~10000MHz-5973.38



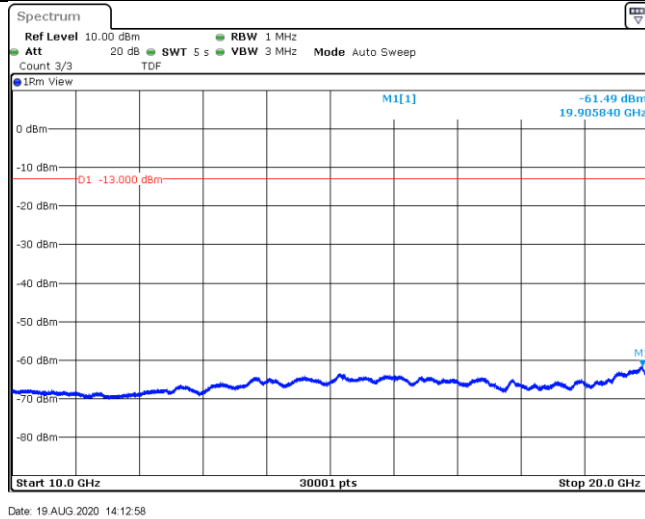
Band2-9262-30~1000MHz-970.69



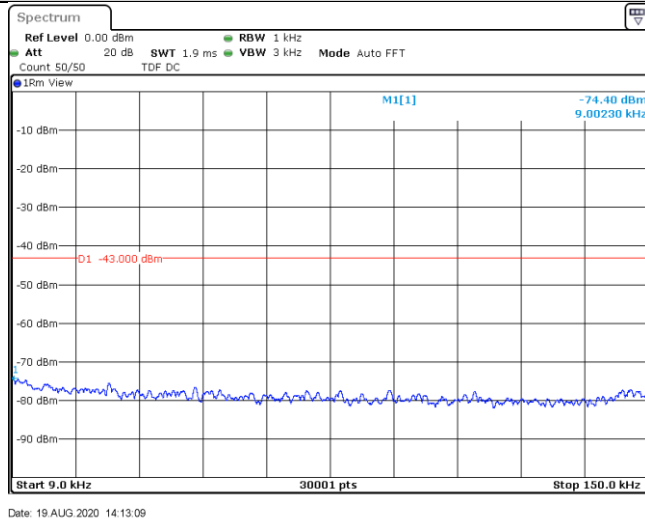
Band2-9262-0.15~30MHz-23.94



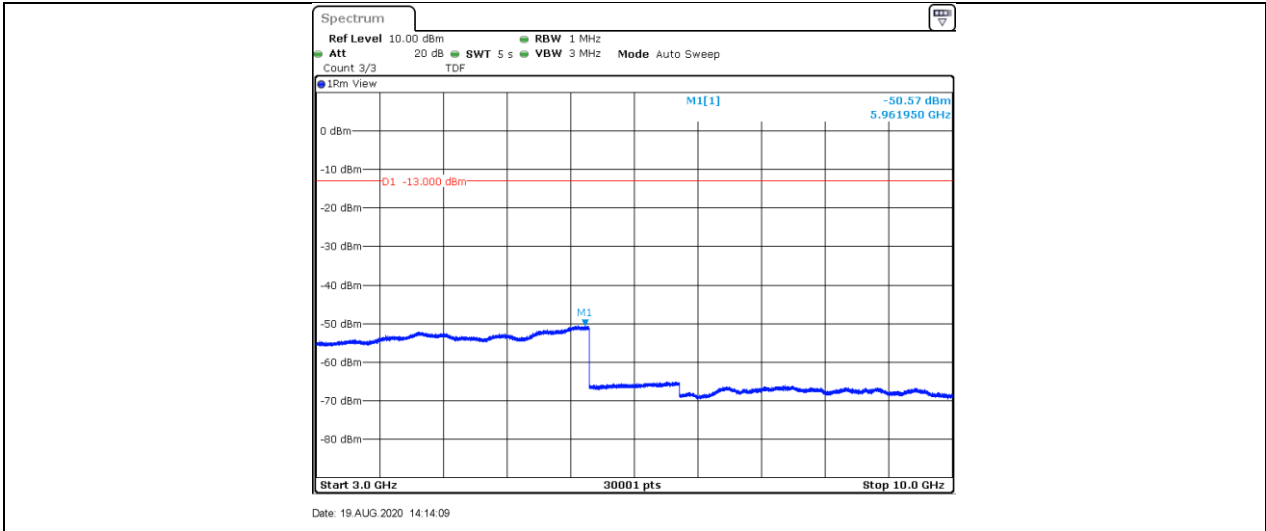
Band2-9262-10000~20000MHz-19905.84



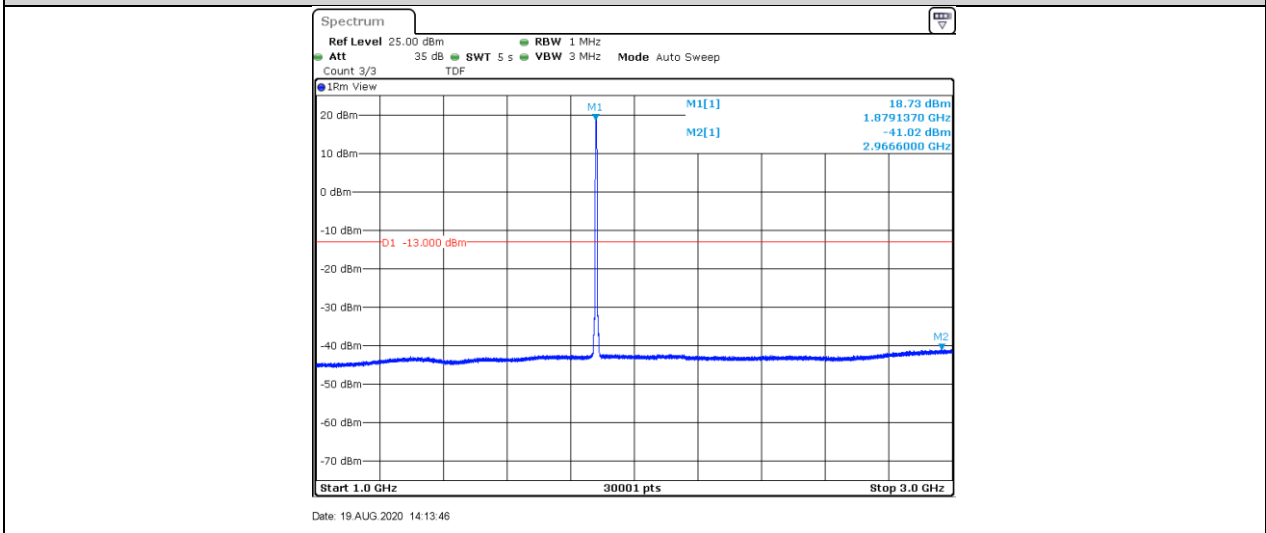
Band2-9400-0.009~0.15MHz-0.01



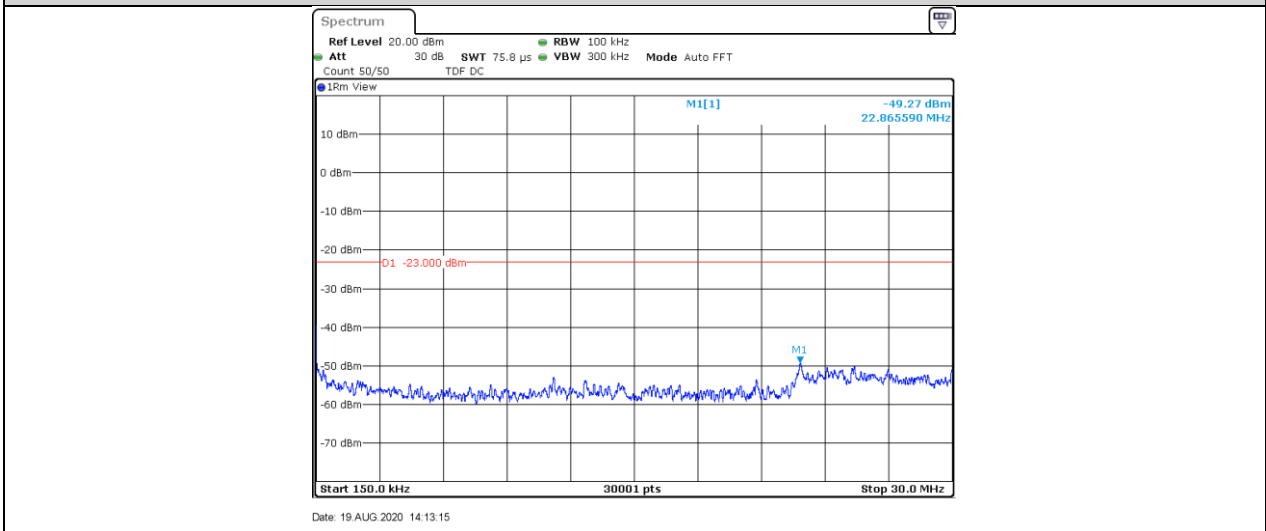
Band2-9400-3000~10000MHz-5961.95



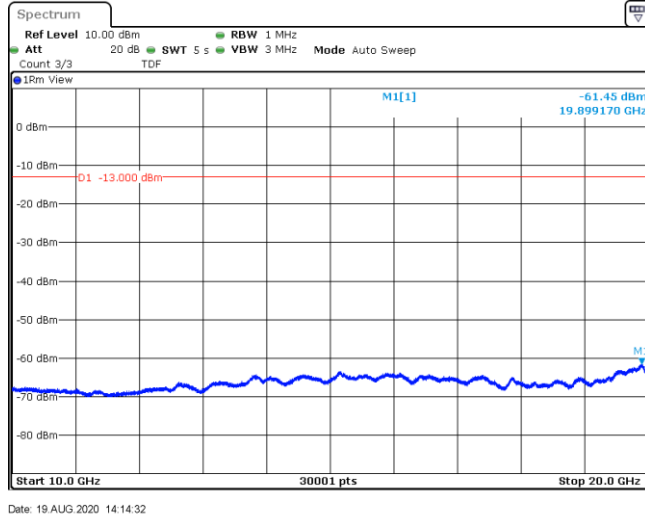
Band2-9400-1000~3000MHz-2966.6



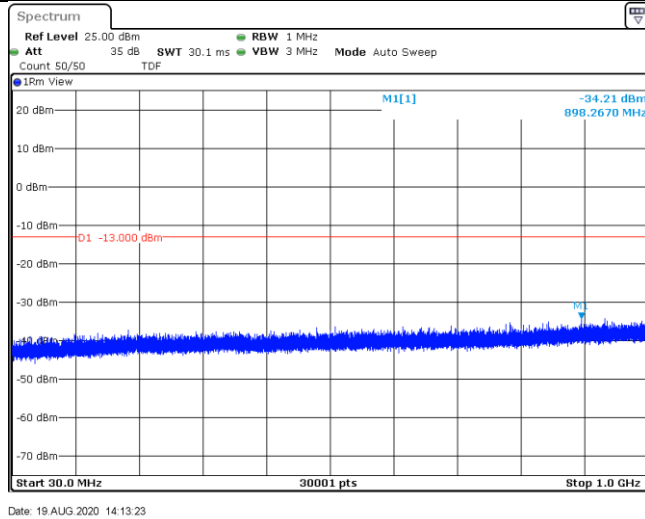
Band2-9400-0.15~30MHz-22.87



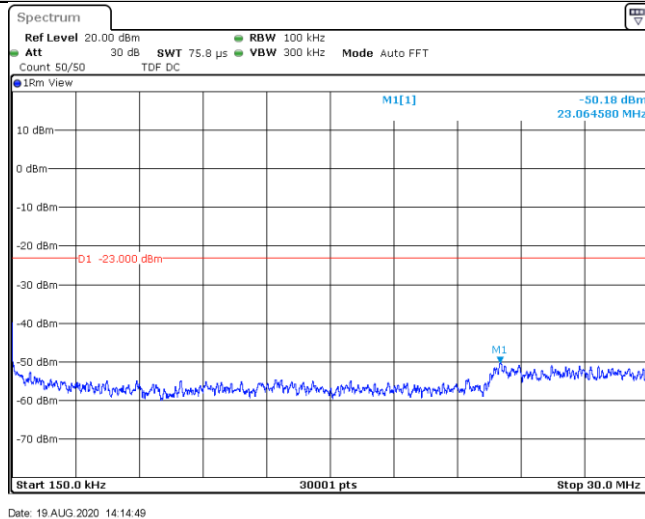
Band2-9400-10000~20000MHz-19899.17



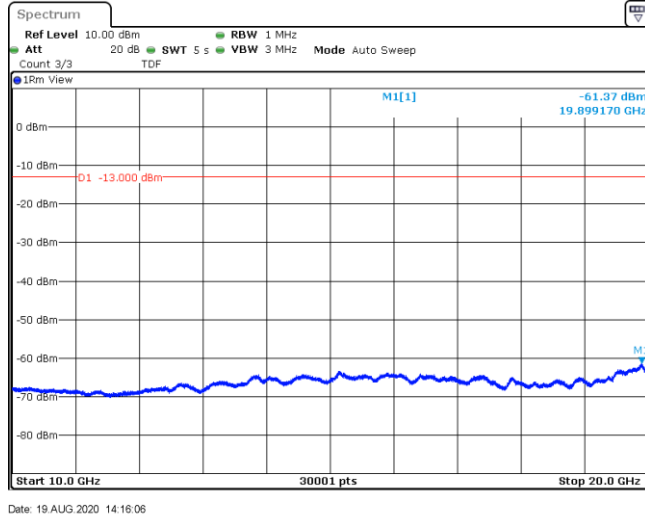
Band2-9400-30~1000MHz-898.27



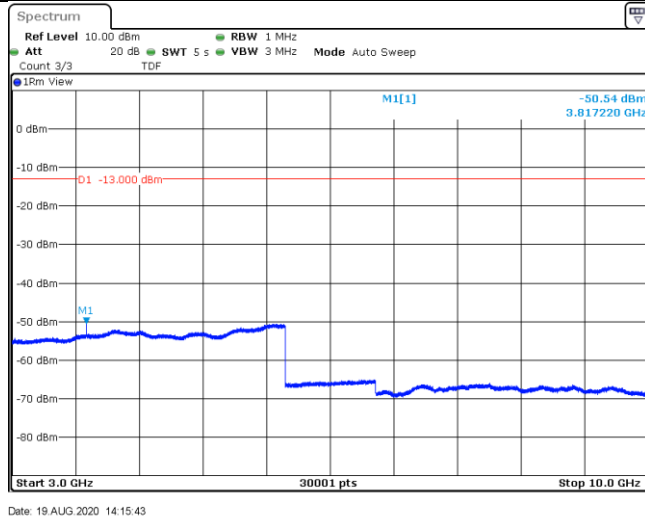
Band2-9538-0.15~30MHz-23.06



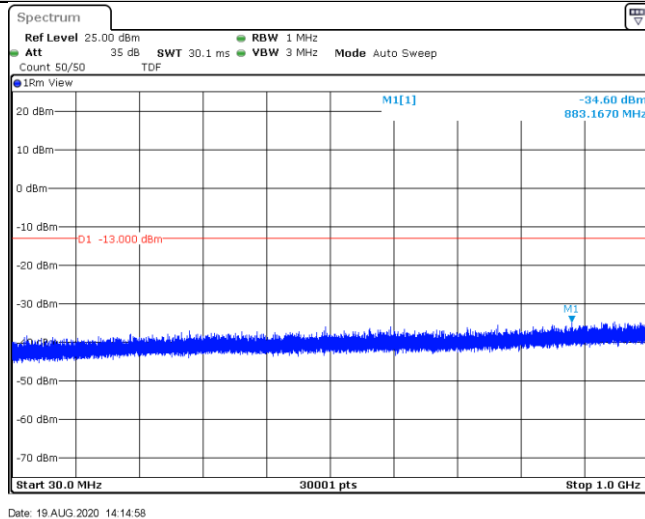
Band2-9538-10000~20000MHz-19899.17



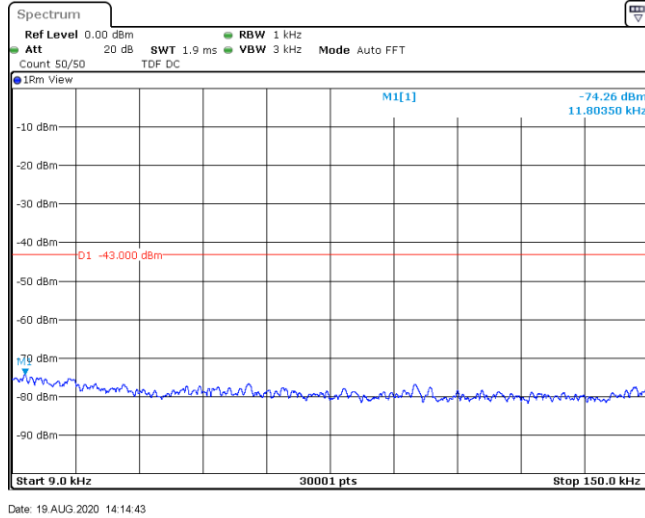
Band2-9538-3000~10000MHz-3817.22



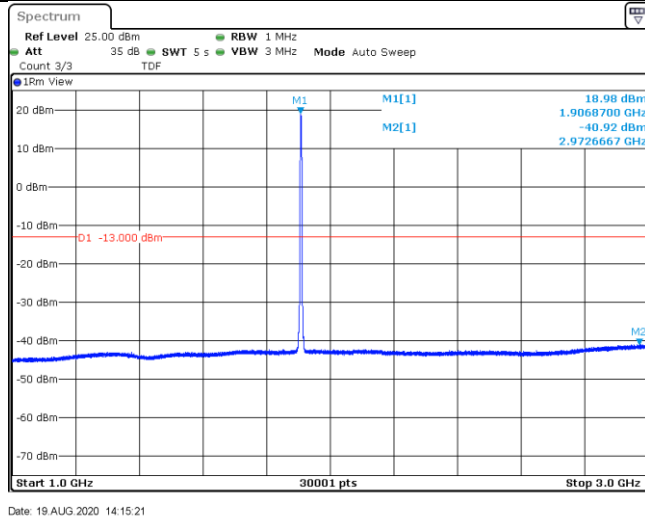
Band2-9538-30~1000MHz-883.17



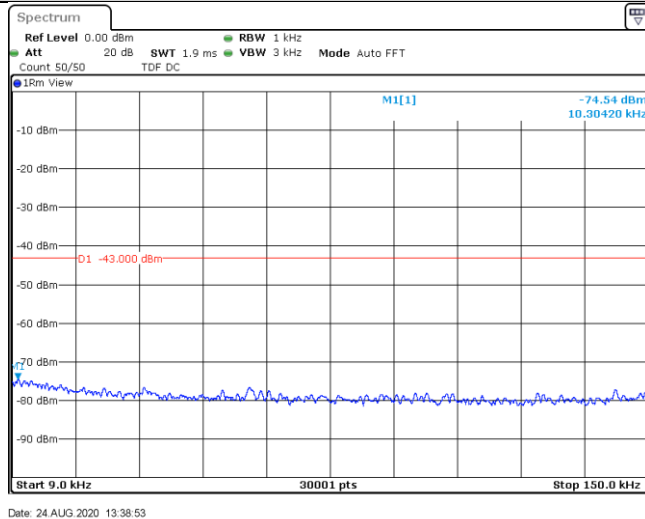
Band2-9538-0.009~0.15MHz-0.01



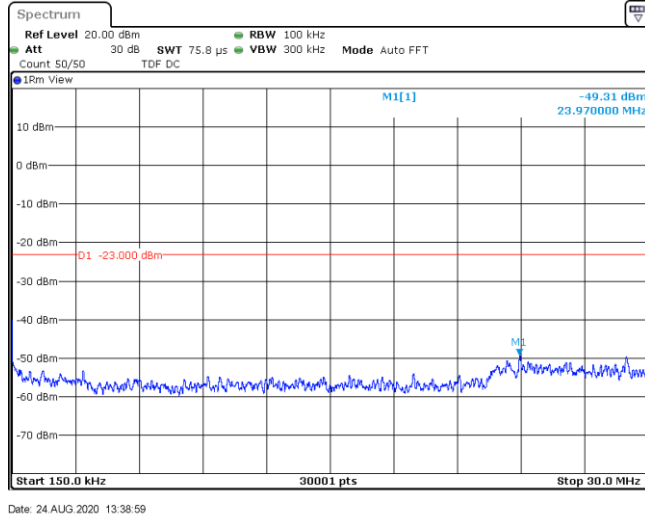
Band2-9538-1000~3000MHz-2972.67



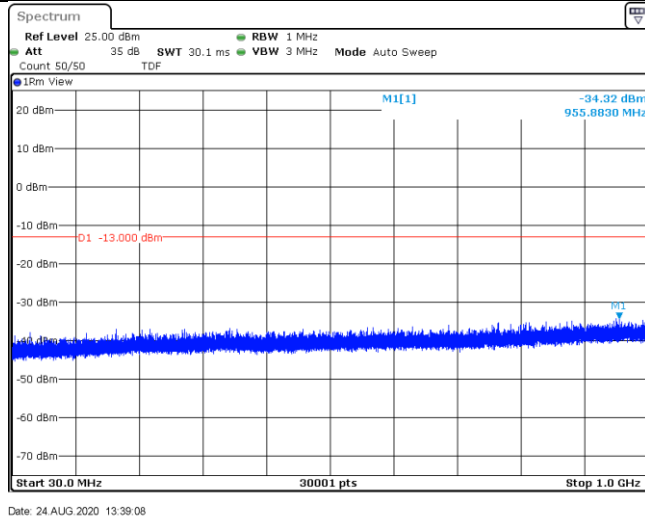
Band4-1312-0.009~0.15MHz-0.01



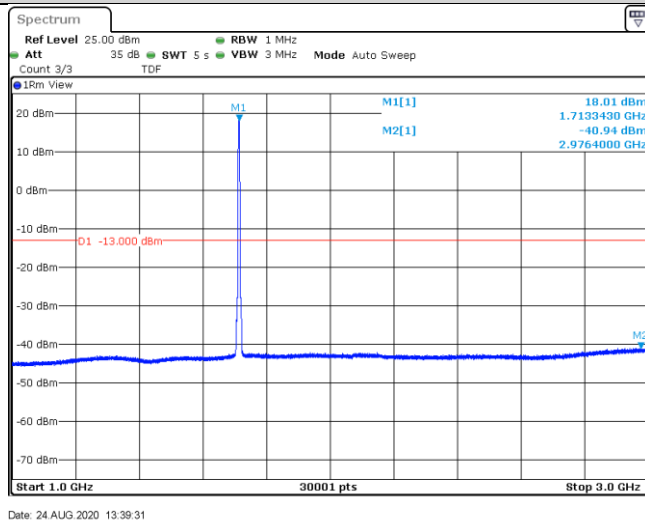
Band4-1312-0.15~30MHz-23.97



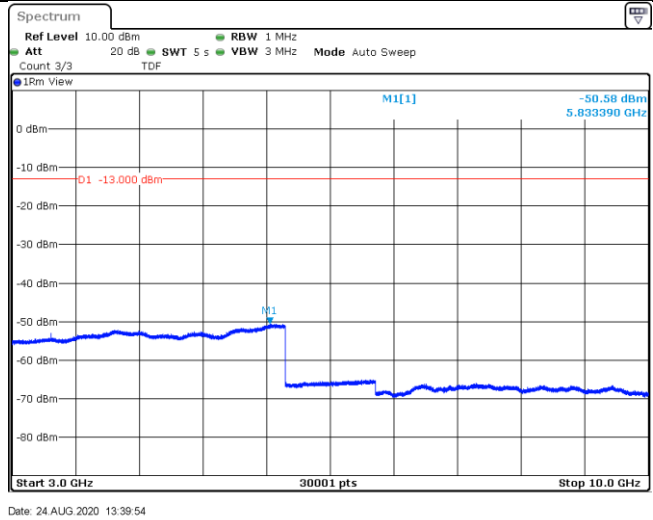
Band4-1312-30~1000MHz-955.88



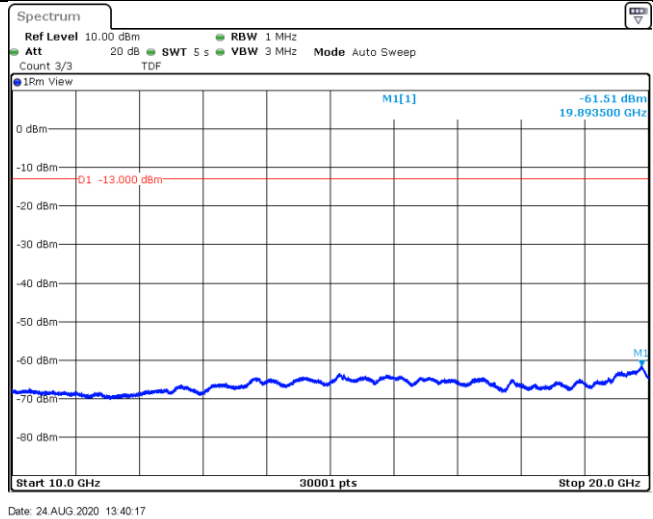
Band4-1312-1000~3000MHz-2976.4



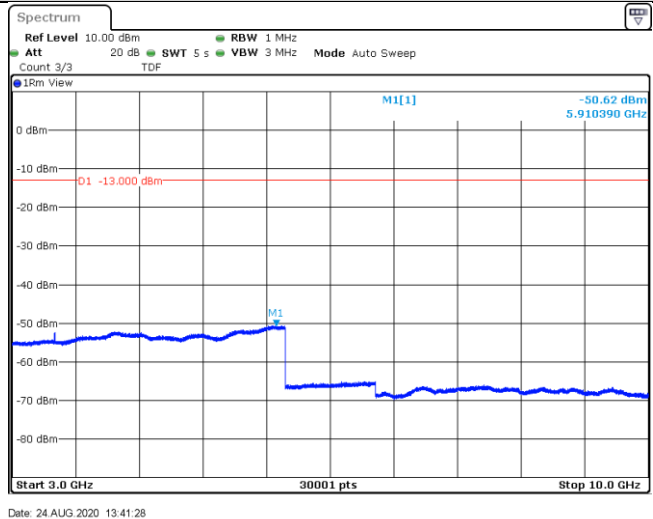
Band4-1312-3000~10000MHz-5833.39



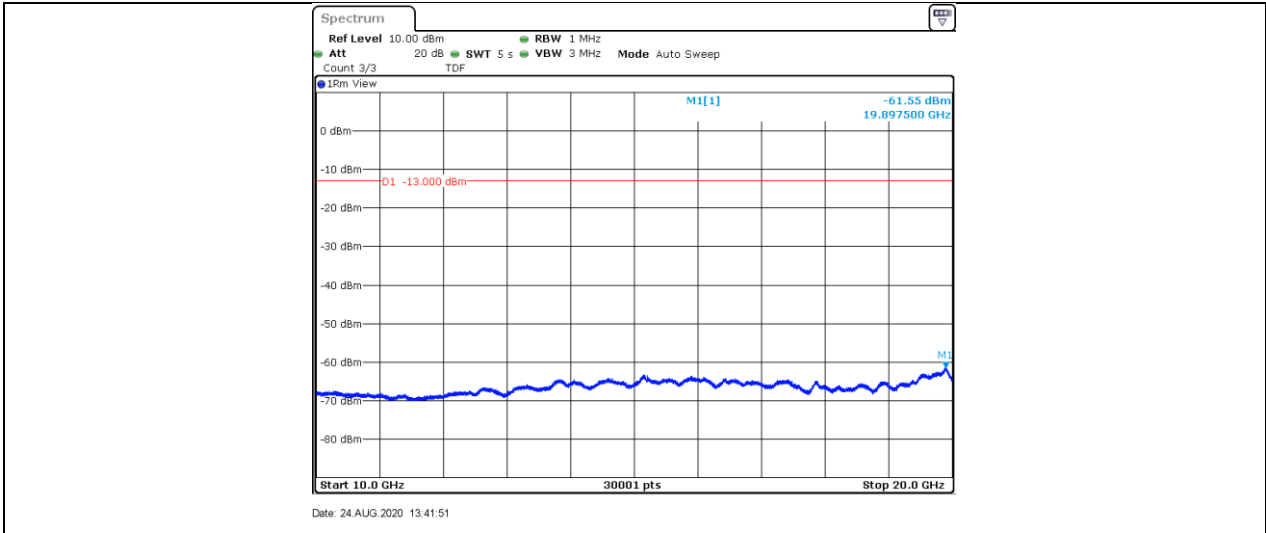
Band4-1312-10000~20000MHz-19893.5



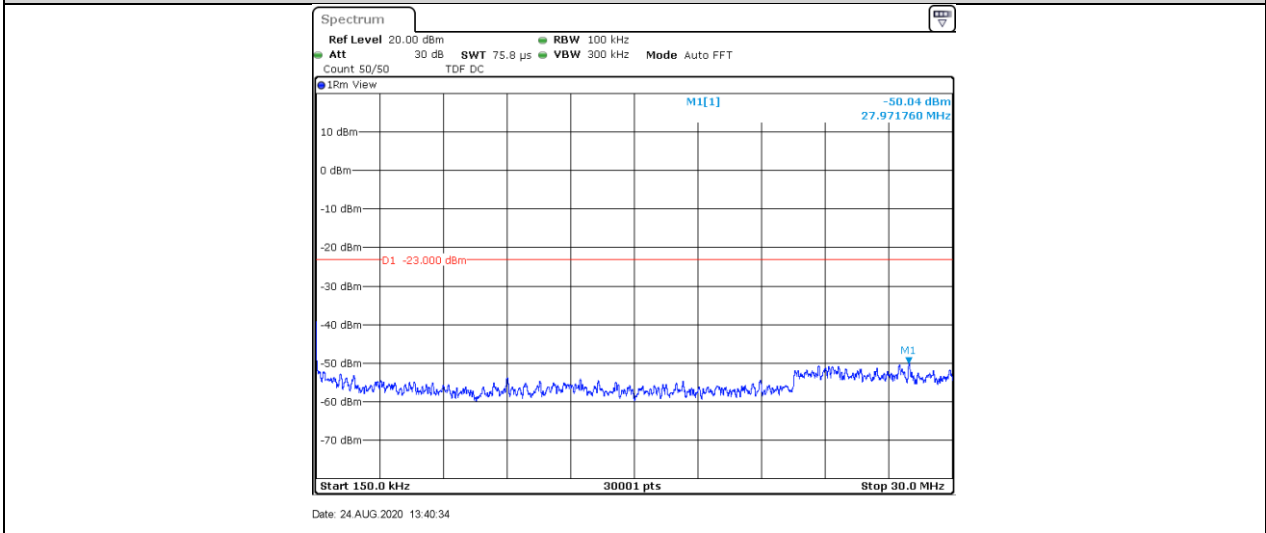
Band4-1413-3000~10000MHz-5910.39



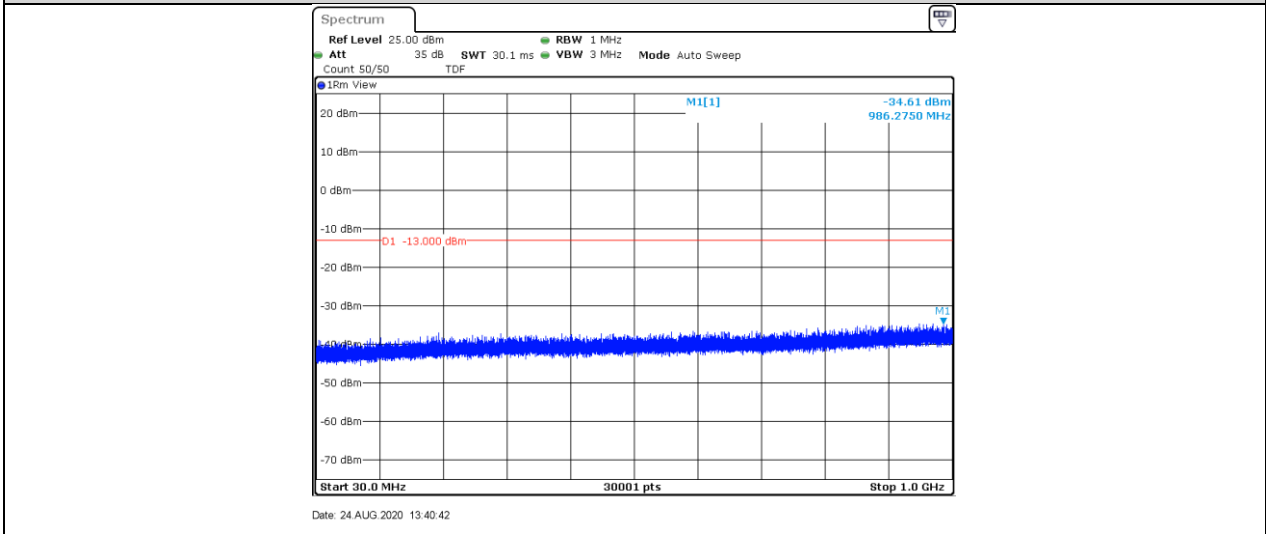
Band4-1413-10000~20000MHz-19897.5



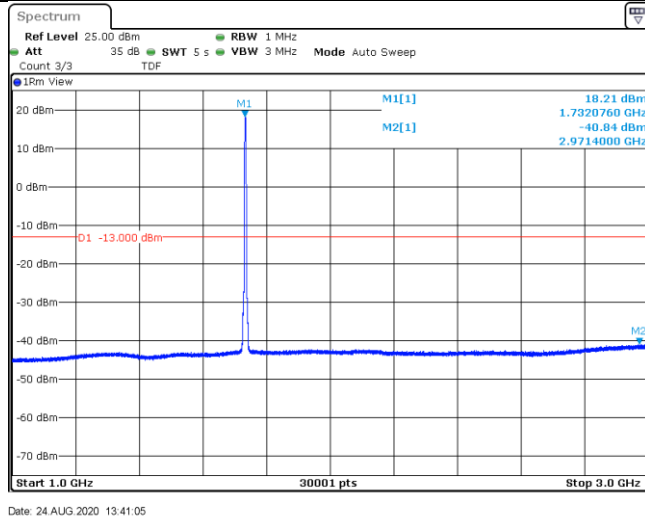
Band4-1413-0.15~30MHz-27.97



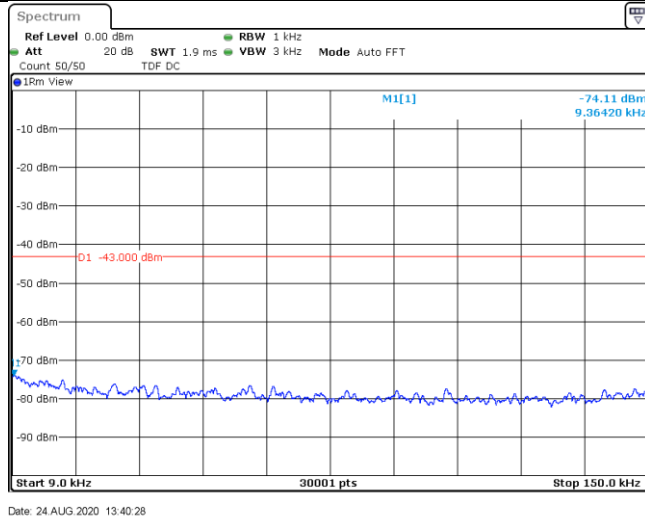
Band4-1413-30~1000MHz-986.28



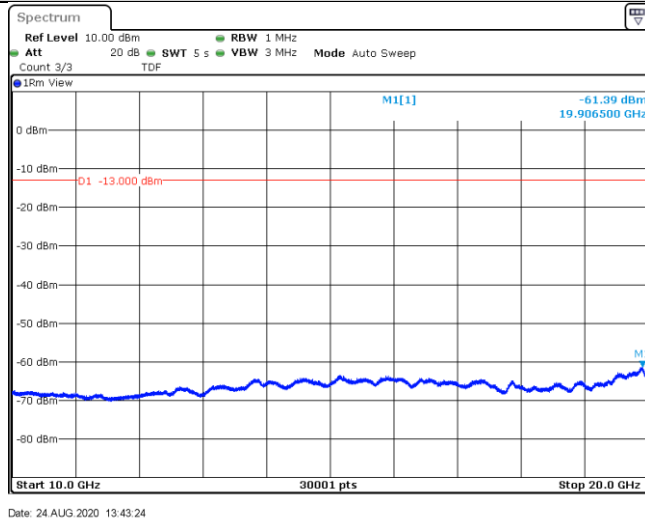
Band4-1413-1000~3000MHz-2971.4



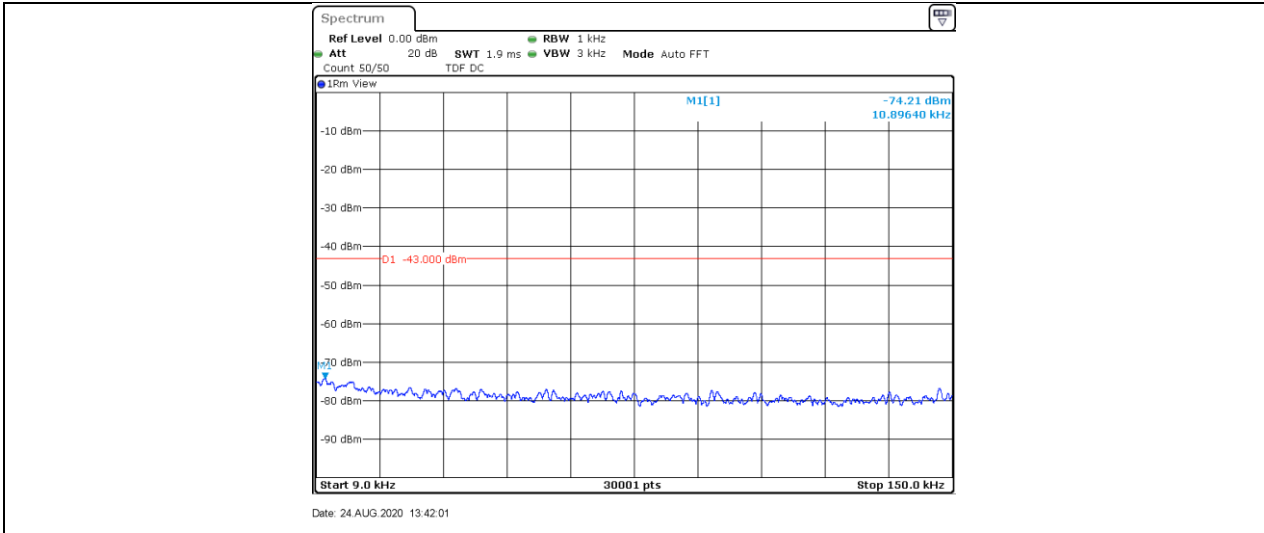
Band4-1413-0.009~0.15MHz-0.01



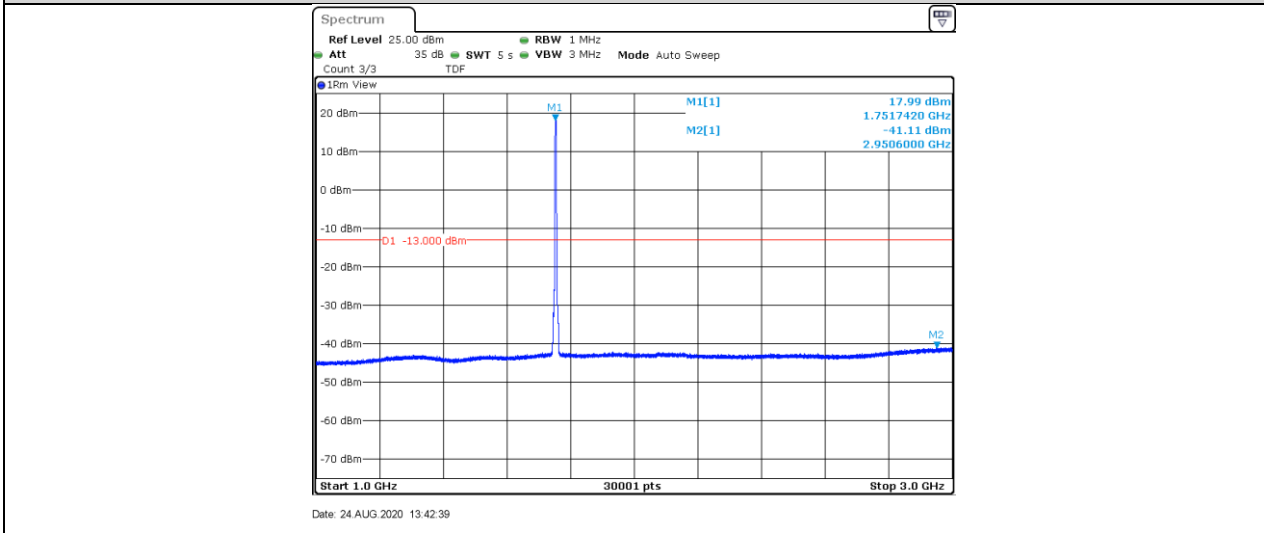
Band4-1513-10000~20000MHz-19906.5



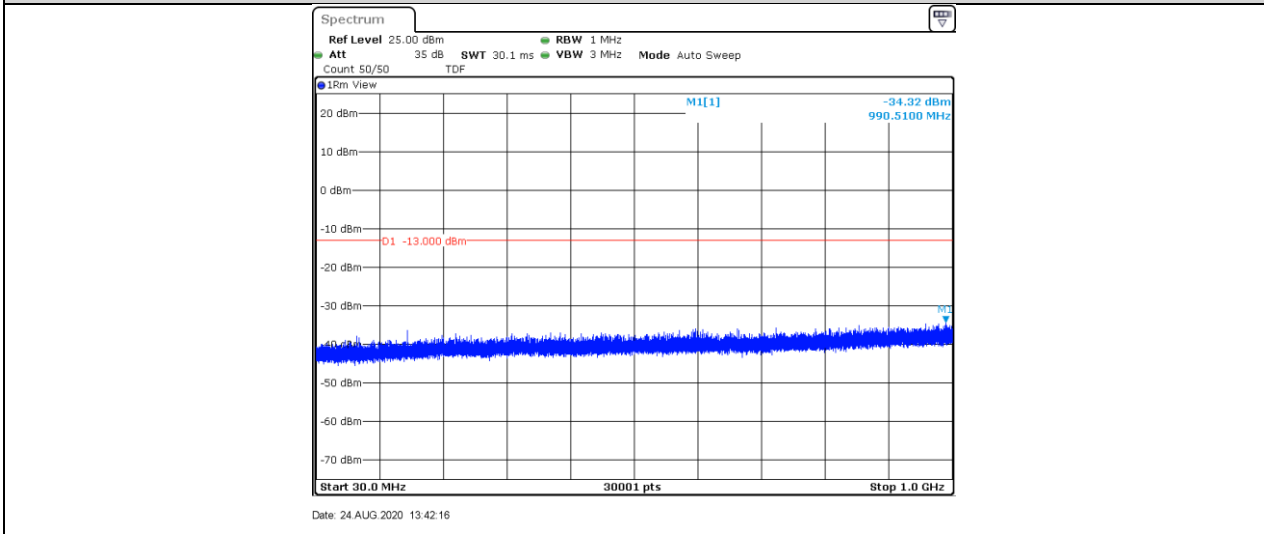
Band4-1513-0.009~0.15MHz-0.01



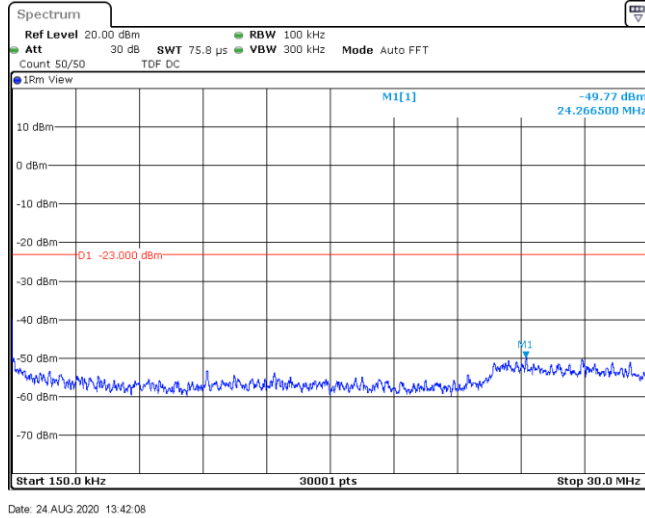
Band4-1513-1000~3000MHz-2950.6



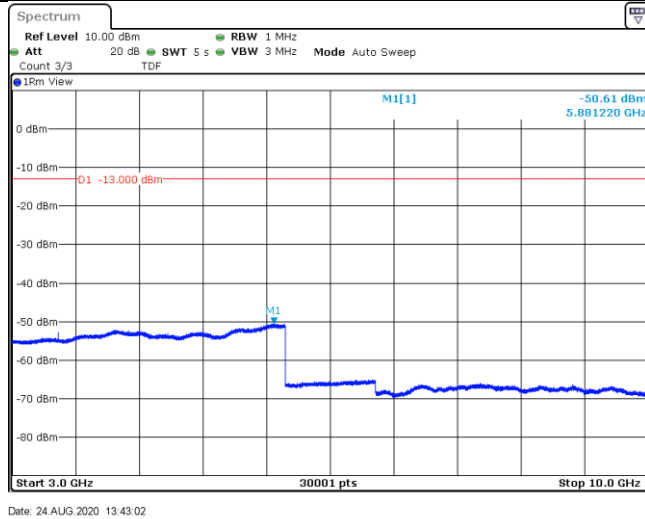
Band4-1513-30~1000MHz-990.51



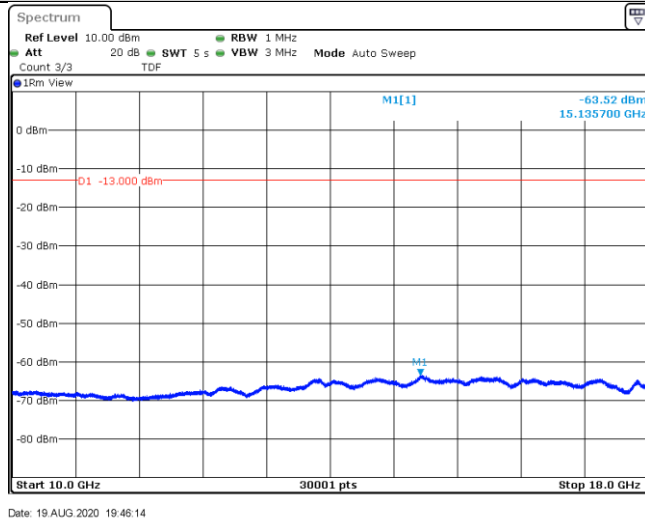
Band4-1513-0.15~30MHz-24.27



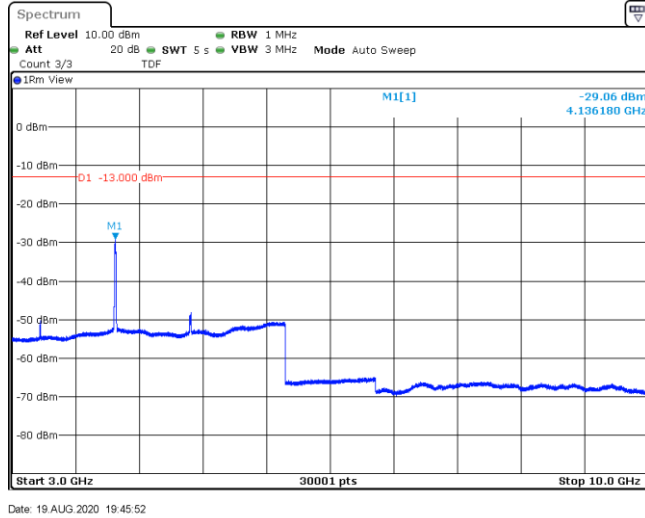
Band4-1513-3000~10000MHz-5881.22



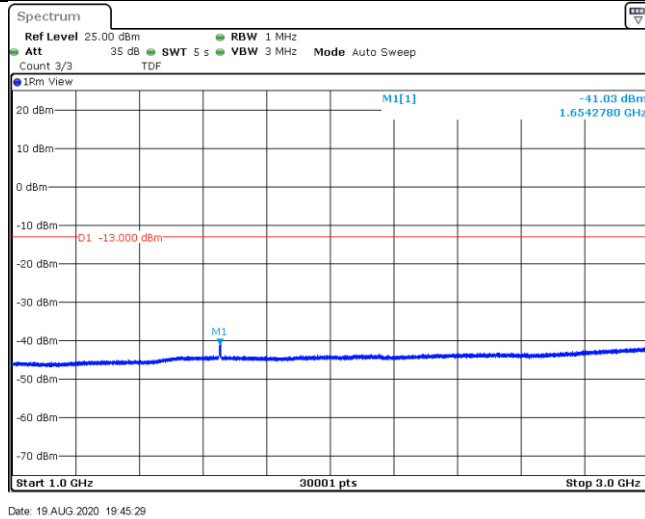
Band5-4132-10000~18000MHz-15135.7



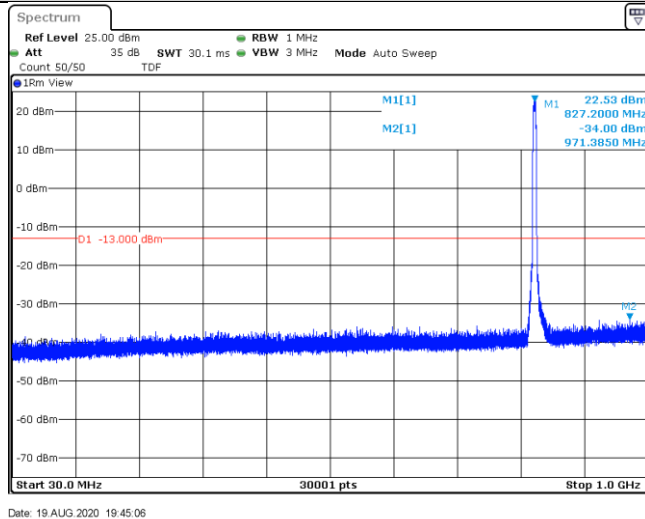
Band5-4132-3000~10000MHz-4136.18



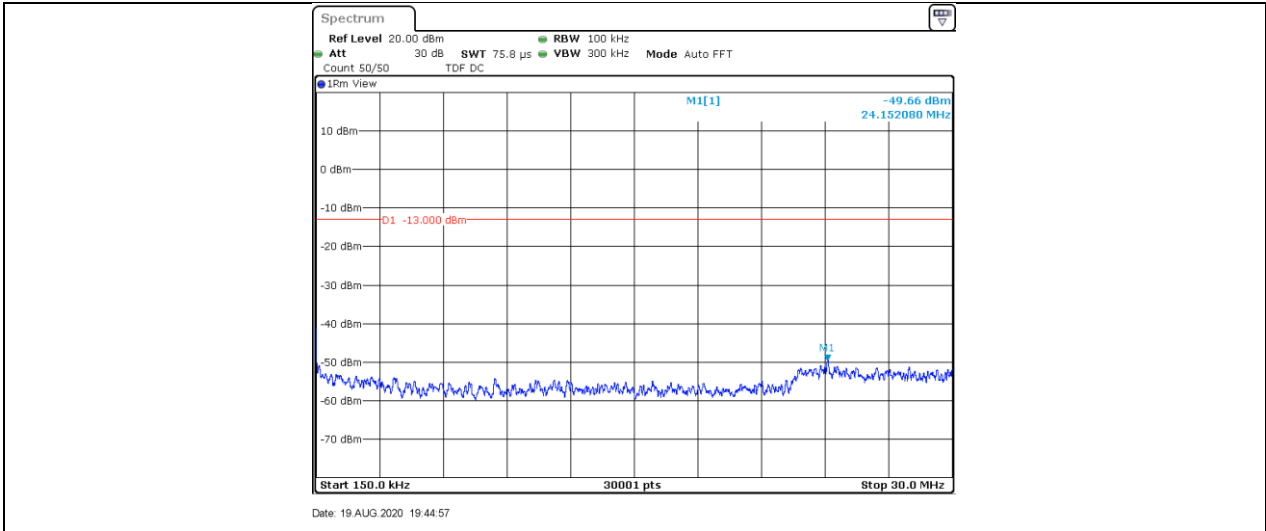
Band5-4132-1000~3000MHz-1654.28



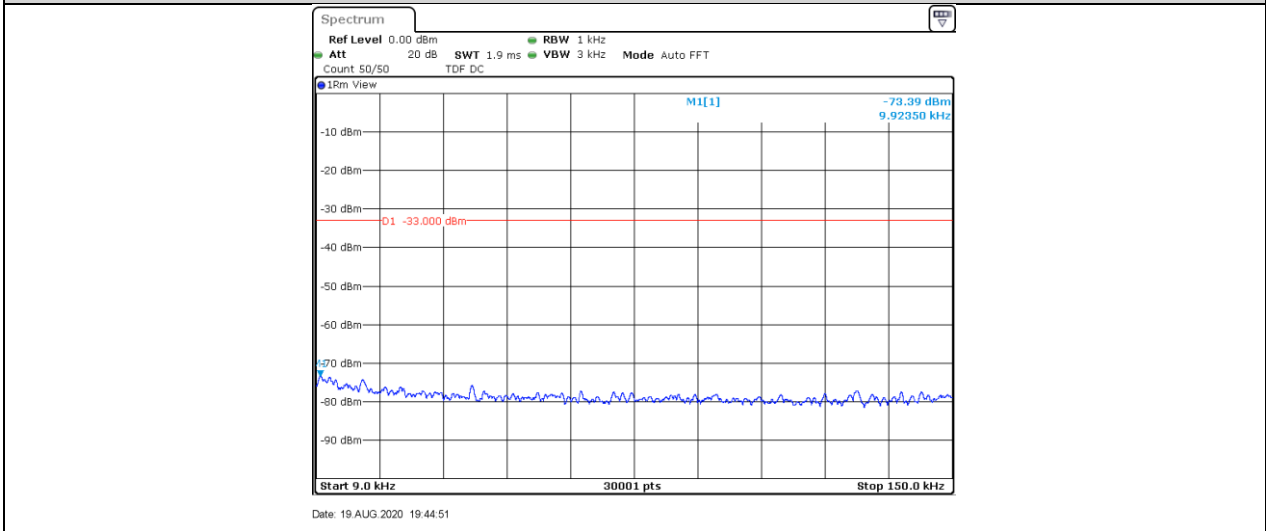
Band5-4132-30~1000MHz-971.39



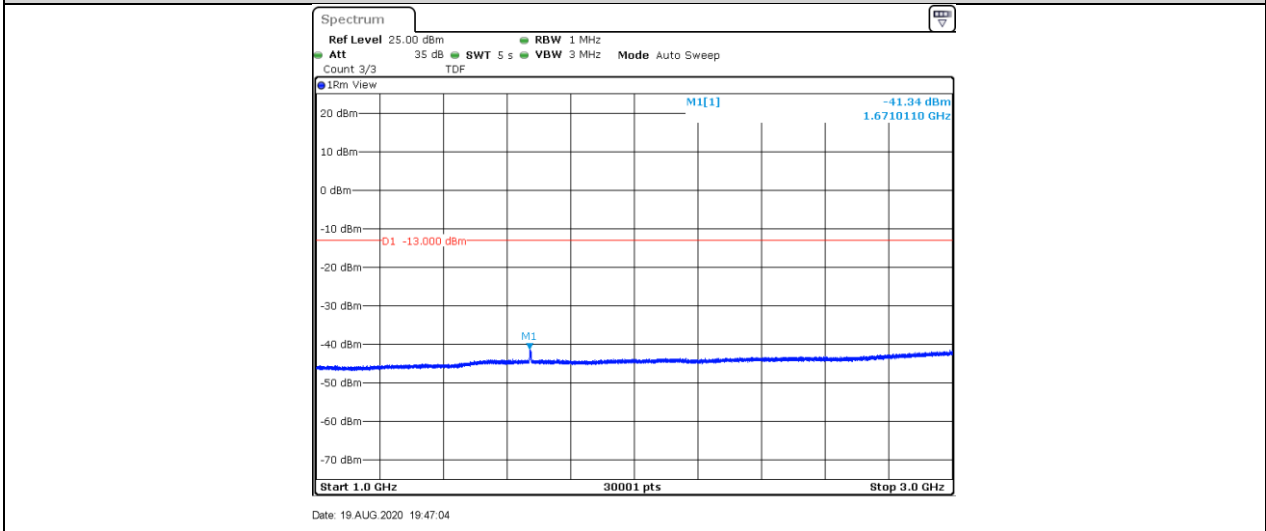
Band5-4132-0.15~30MHz-24.15



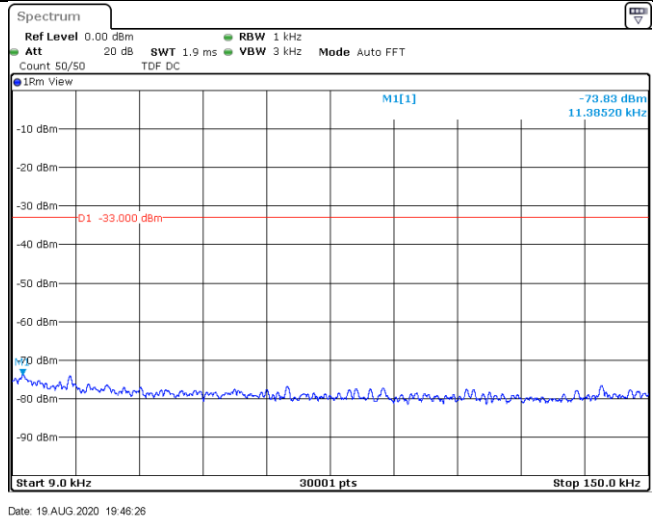
Band5-4132-0.009~0.15MHz-0.01



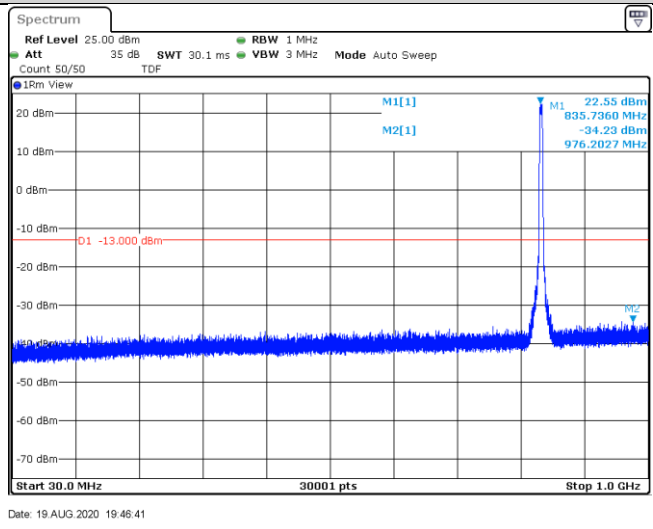
Band5-4182-1000~3000MHz-1671.01



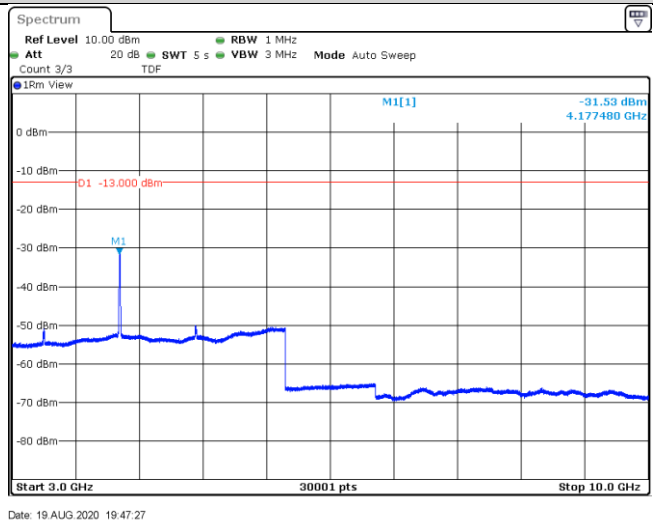
Band5-4182-0.009~0.15MHz-0.01



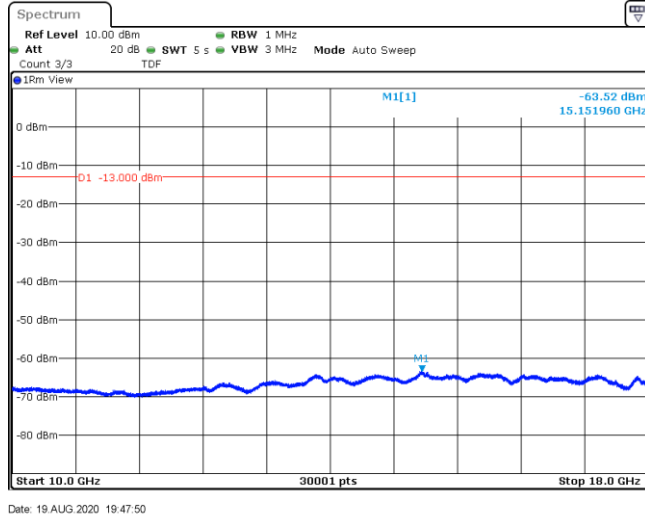
Band5-4182-30~1000MHz-976.2



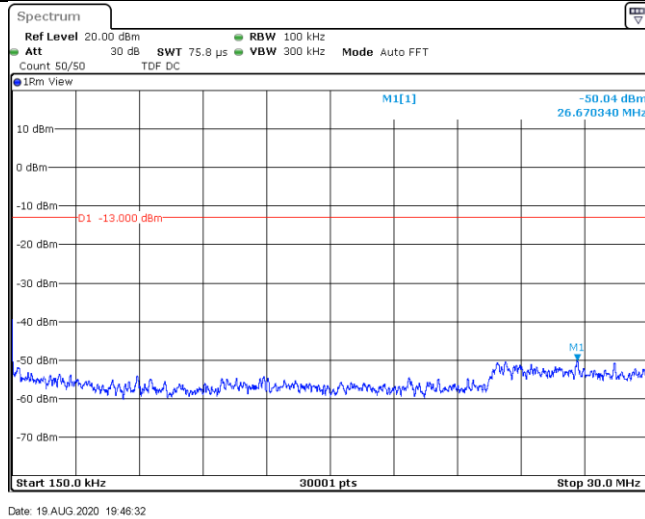
Band5-4182-3000~10000MHz-4177.48



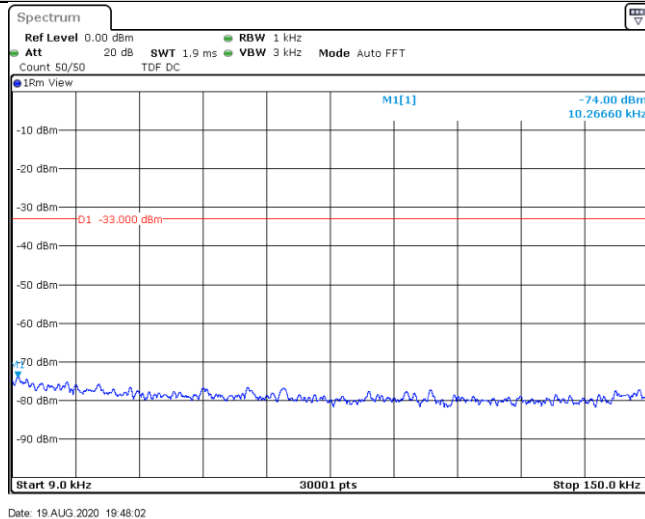
Band5-4182-10000~18000MHz-15151.96



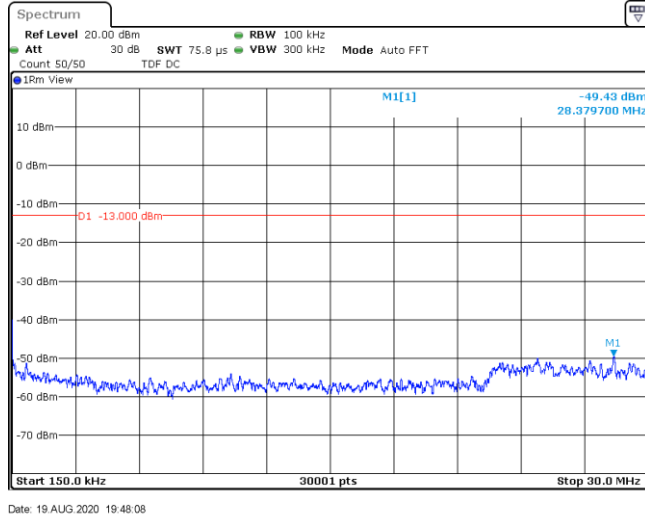
Band5-4182-0.15~30MHz-26.67



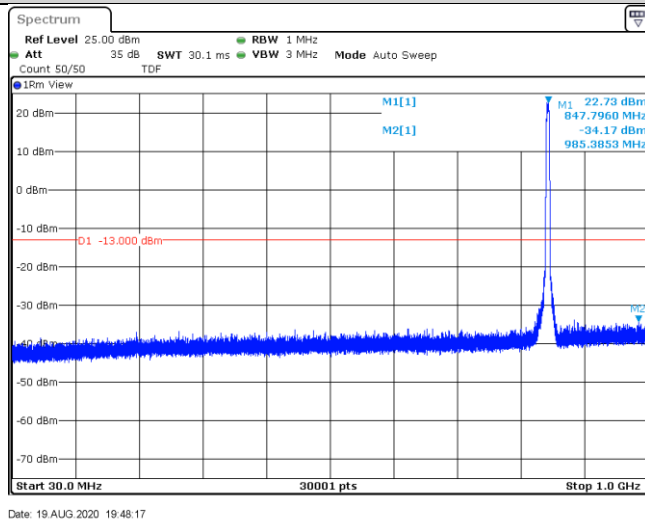
Band5-4233-0.009~0.15MHz-0.01



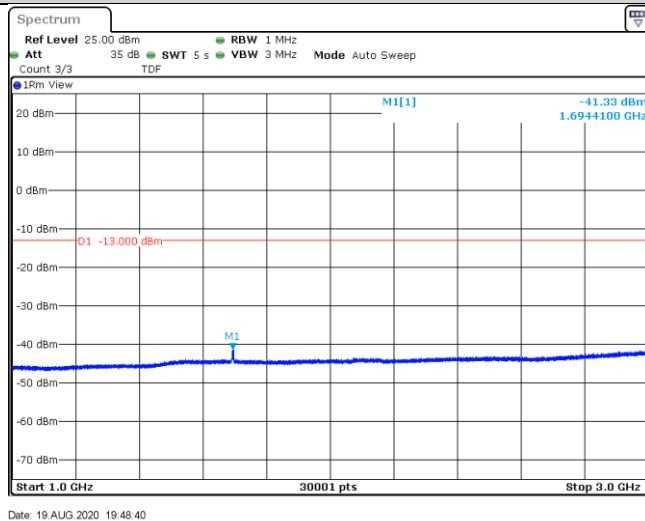
Band5-4233-0.15~30MHz-28.38



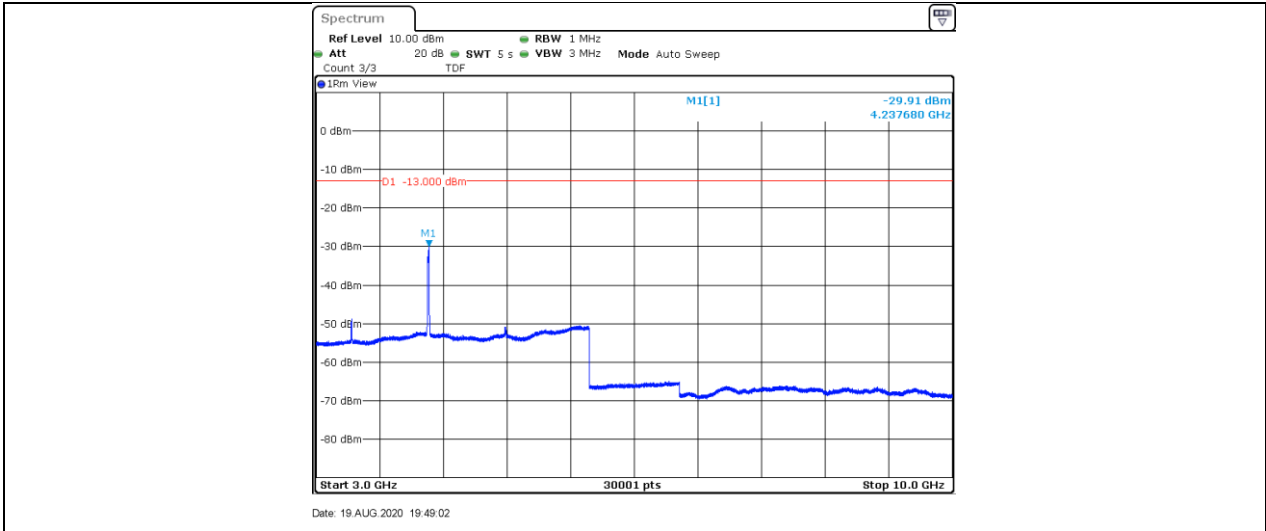
Band5-4233-30~1000MHz-985.39



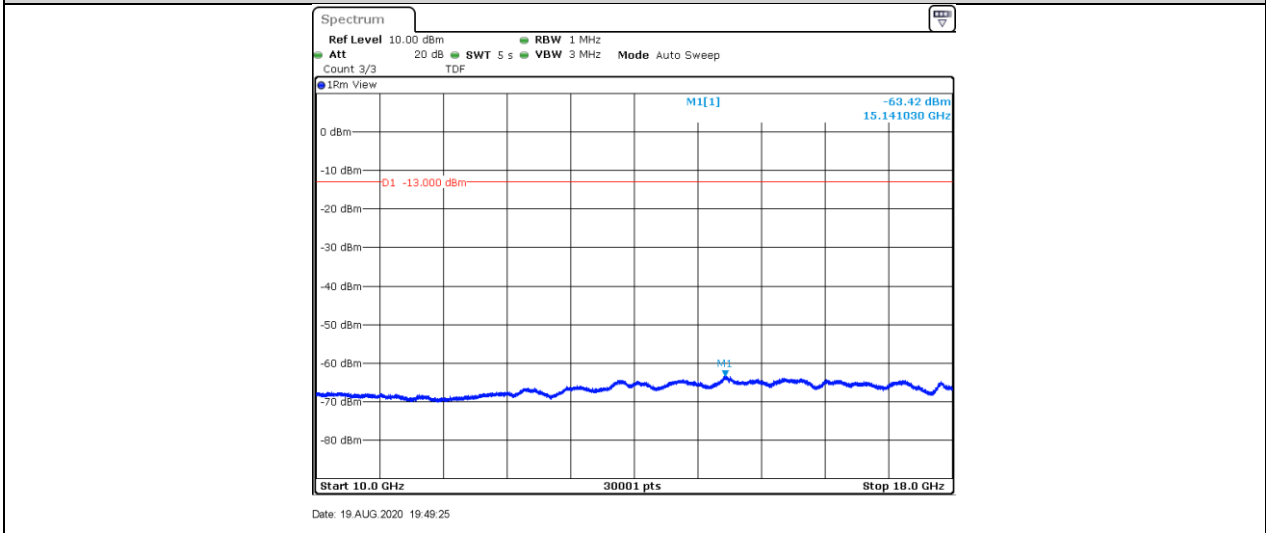
Band5-4233-1000~3000MHz-1694.41



Band5-4233-3000~10000MHz-4237.68



Band5-4233-10000~18000MHz-15141.03



7Appendix_G: Field Strength of Spurious Radiation

The transmitting equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter and approximately 0.8 meter up to 1GHz and 1.5 meter above 1GHz in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. The emissions were very low against the limit in the frequency range 9kHz to 30MHz and 18 GHz ~ 20 GHz.

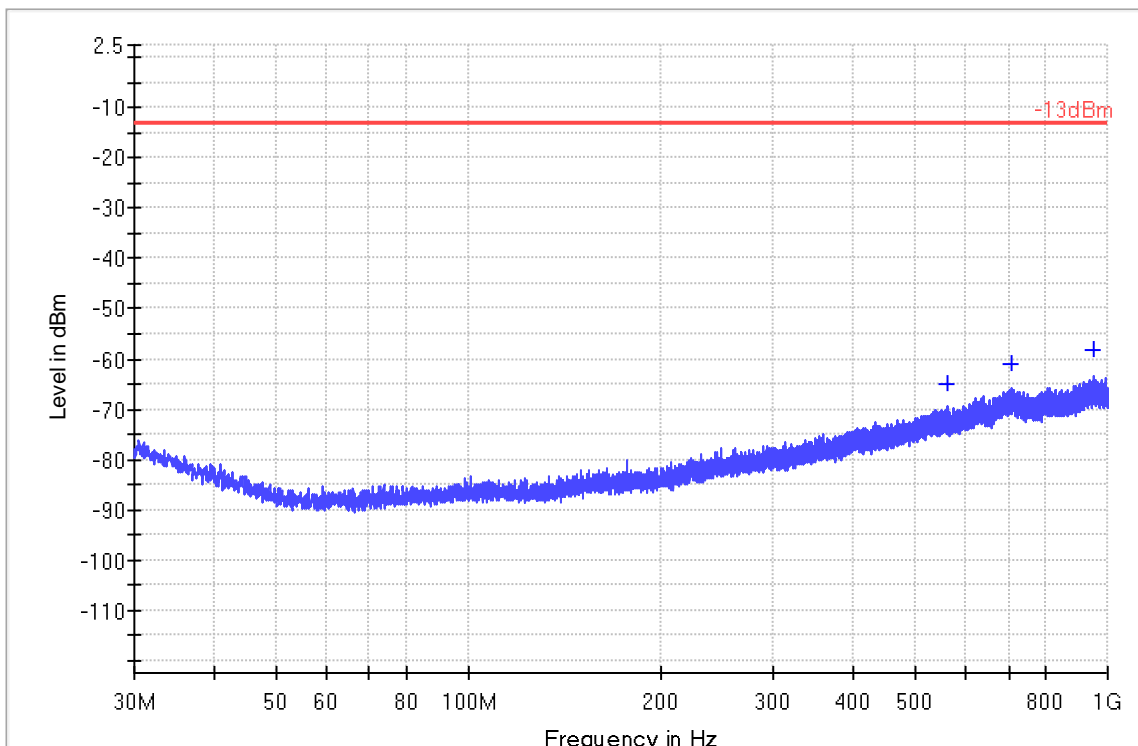
Note: We tested all modes, but the data presented below is the worst case.

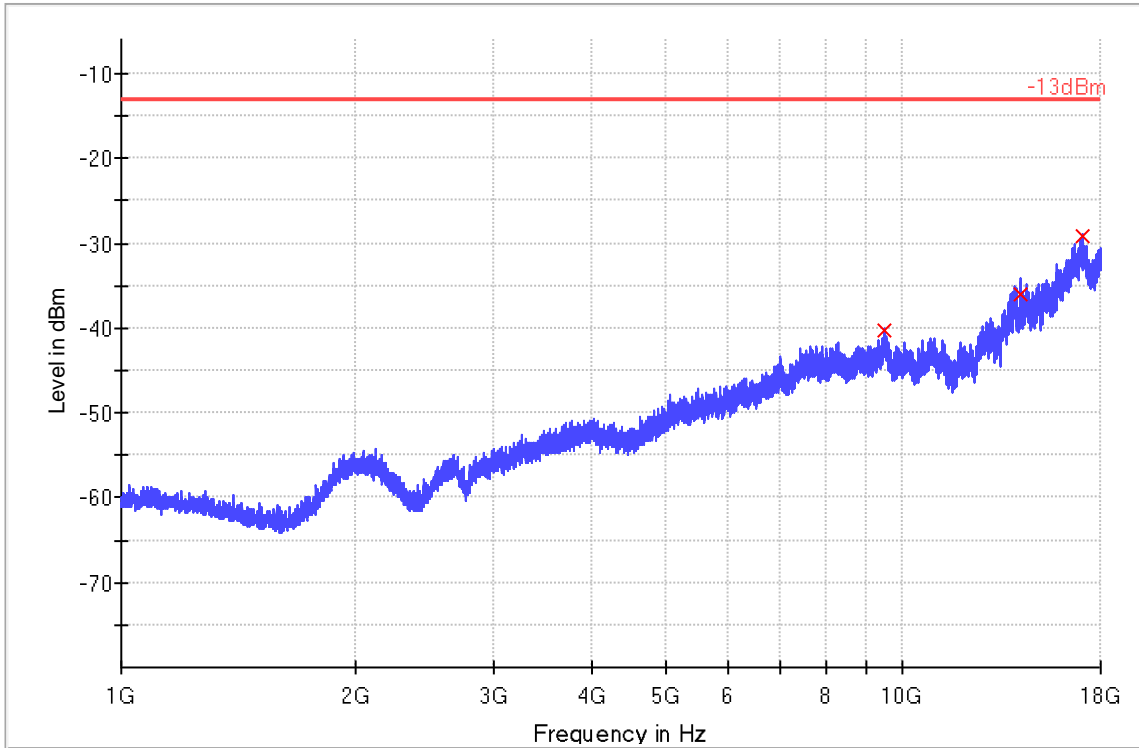
9kHz~150kHz, VBW = 200Hz, VBW = 600 Hz, Detector: PK
 150kHz~30MHz, VBW = 9kHz, VBW = 30k Hz, Detector: PK
 30MHz~1GHz, RBW = 100 kHz, VBW = 300 kHz. Detector: PK
 Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Test Plots

Test Band = WCDMA1900

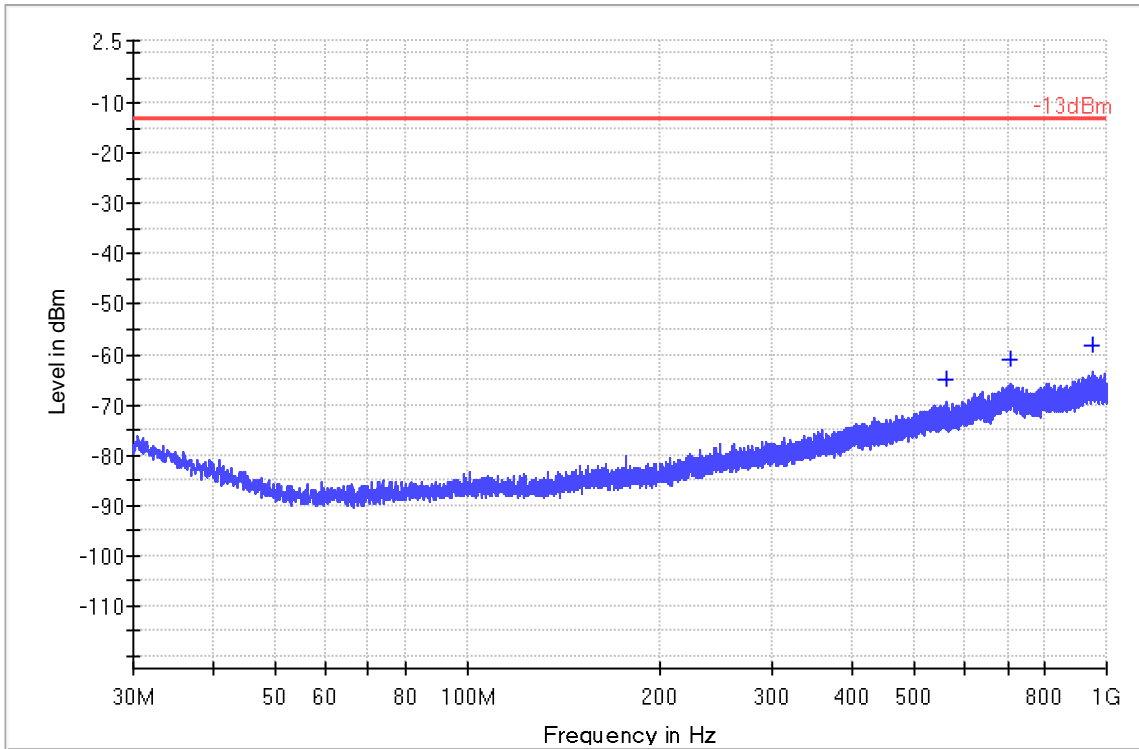
Test Mode = UMTS/TM1

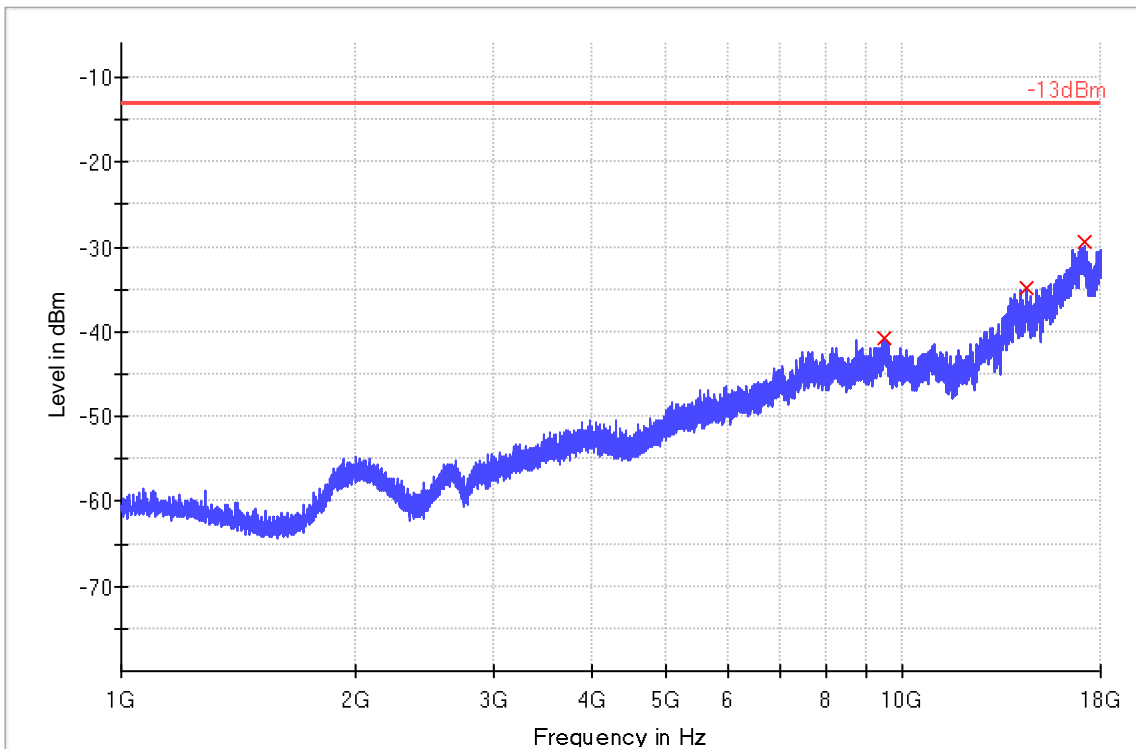




Test Band = WCDMA1700

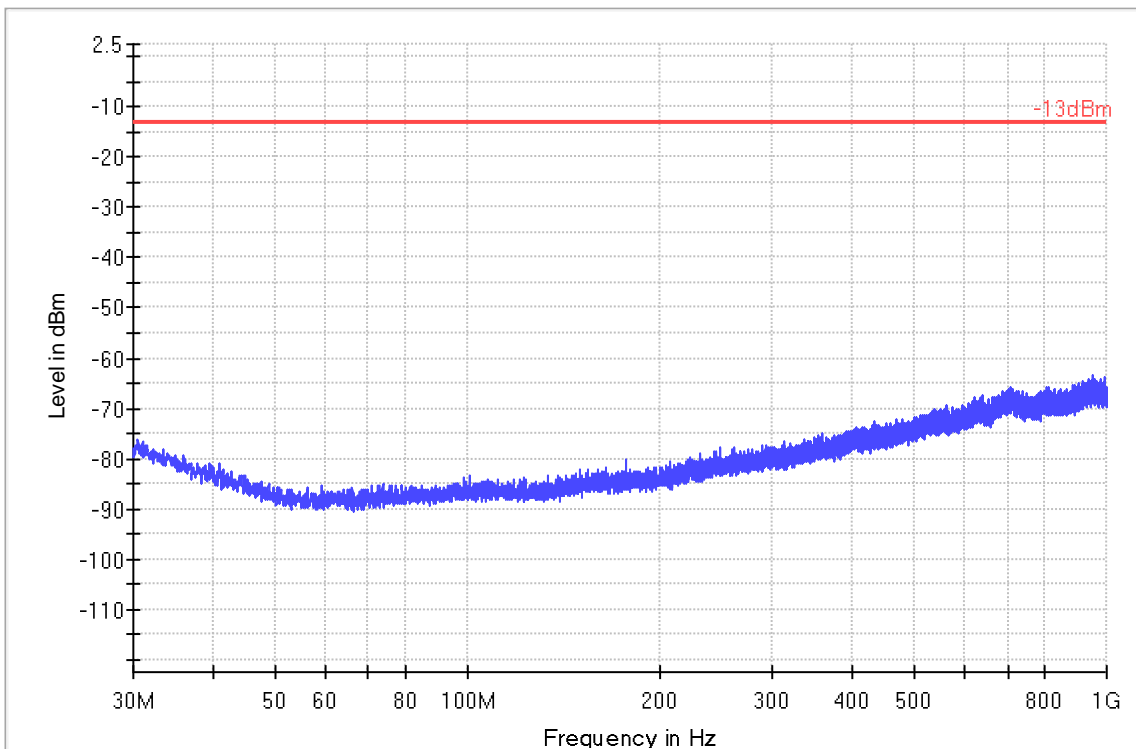
Test Mode = UMTS/TM1

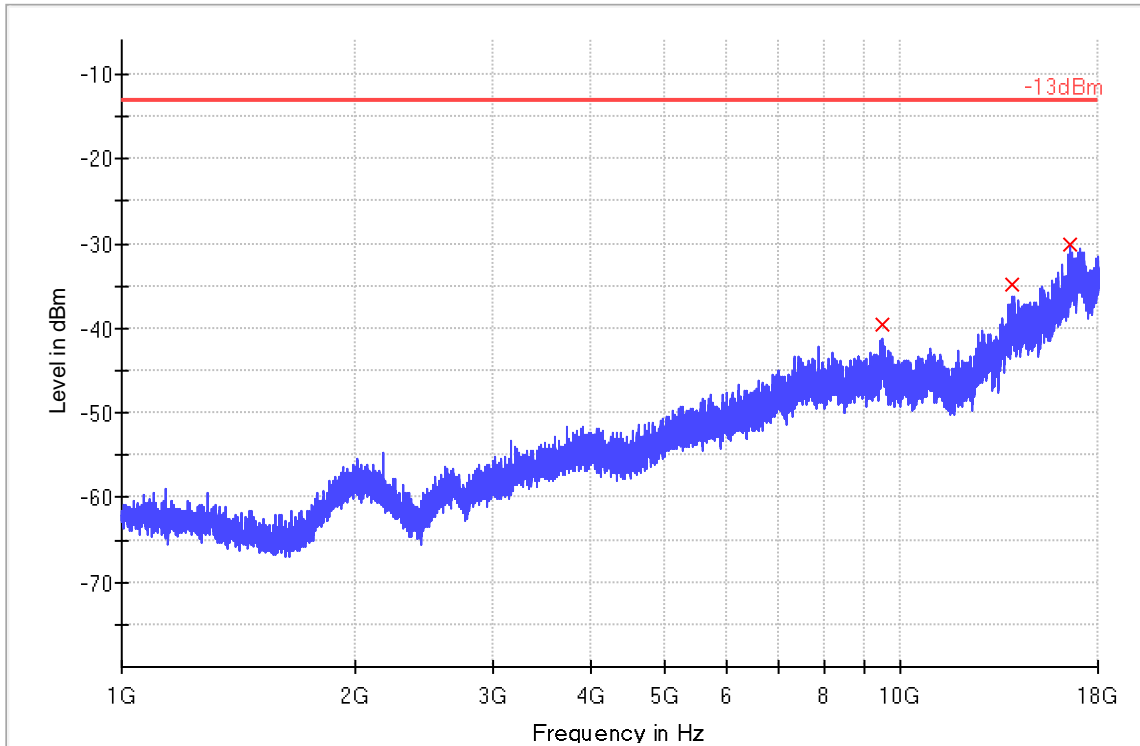




Test Band = WCDMA850

Test Mode = UMTS/TM1





Appendix H: Frequency Stability

Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA1900	UMTS/TM1	LCH	TN	VL	5.54	0.00299	PASS
				VN	-3.31	-0.00179	PASS
				VH	0.87	0.00047	PASS
		MCH	TN	VL	1.13	0.0006	PASS
				VN	-2.09	-0.00111	PASS
				VH	-0.56	-0.0003	PASS
		HCH	TN	VL	2.27	0.00119	PASS
				VN	-1.34	-0.0007	PASS
				VH	2.47	0.00129	PASS
WCDMA1700	UMTS/TM1	LCH	TN	VL	-0.43	-0.00025	PASS
				VN	2.87	0.00168	PASS
				VH	3.89	0.00227	PASS
		MCH	TN	VL	-1.77	-0.00102	PASS
				VN	0.11	0.00006	PASS
				VH	-2.4	-0.00139	PASS
		HCH	TN	VL	2.62	0.00149	PASS
				VN	2.03	0.00116	PASS
				VH	1.21	0.00069	PASS
WCDMA850	UMTS/TM1	LCH	TN	VL	-4	-0.00484	PASS
				VN	-2.14	-0.00259	PASS
				VH	4.44	0.00537	PASS
		MCH	TN	VL	-8.79	-0.01051	PASS
				VN	-11.41	-0.01364	PASS
				VH	-3.17	-0.00379	PASS
		HCH	TN	VL	0.27	0.00032	PASS
				VN	1.63	0.00193	PASS
				VH	9.32	0.01101	PASS

Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA1900	UMTS/TM1	LCH	VN	-20	2.75	0.00148	PASS
				-10	-0.53	-0.00029	PASS
				0	0.89	0.00048	PASS
				10	3.74	0.00202	PASS
				20	-0.92	-0.0005	PASS
				30	-1.88	-0.00101	PASS
				40	2.03	0.0011	PASS
				50	-4.58	-0.00247	PASS
				60	1.22	0.00066	PASS
		MCH	VN	-20	2.62	0.00139	PASS
				-10	1.21	0.00064	PASS
				0	2.26	0.0012	PASS
				10	-0.78	-0.00041	PASS
				20	-2.94	-0.00156	PASS
				30	0.98	0.00052	PASS
				40	-0.63	-0.00034	PASS
				50	-0.60	-0.00032	PASS
				60	4.23	0.00225	PASS
		HCH	VN	-20	1.39	0.00073	PASS
				-10	-0.56	-0.00029	PASS
				0	3.30	0.00173	PASS
				10	-7.28	-0.00382	PASS
				20	-2.40	-0.00126	PASS
				30	4.79	0.00251	PASS
				40	-0.06	-0.00003	PASS
				50	-0.78	-0.00041	PASS
				60	-2.49	-0.00131	PASS
WCDMA1700	UMTS/TM1	LCH	VN	-20	1.19	0.00069	PASS
				-10	-0.49	-0.00029	PASS
				0	1.85	0.00108	PASS
				10	-1.11	-0.00065	PASS
				20	-1.17	-0.00068	PASS
				30	4	0.00234	PASS

				40	1.79	0.00105	PASS						
				50	-3.19	-0.00186	PASS						
				60	-5.39	-0.00315	PASS						
		MCH	VN			-20	1.89	0.00109	PASS				
						-10	0.26	0.00015	PASS				
						0	2.17	0.00125	PASS				
						10	-0.43	-0.00025	PASS				
						20	0.09	0.00005	PASS				
						30	-0.12	-0.00007	PASS				
						40	1.22	0.0007	PASS				
						50	0.41	0.00024	PASS				
						60	1.21	0.0007	PASS				
						HCH	VN			-20	-0.95	-0.00054	PASS
										-10	1.28	0.00073	PASS
										0	-4.59	-0.00262	PASS
		10	4.9	0.0028	PASS								
		20	-0.95	-0.00054	PASS								
		30	-1.91	-0.00109	PASS								
		40	-1.13	-0.00064	PASS								
		50	2.35	0.00134	PASS								
60	1.07	0.00061	PASS										
WCDMA850	UMTS/TM1	LCH	VN					-20	-3.46	-0.00419	PASS		
								-10	-5.19	-0.00628	PASS		
								0	3.52	0.00426	PASS		
								10	-6.2	-0.0075	PASS		
								20	-1.25	-0.00151	PASS		
								30	10.22	0.01237	PASS		
								40	-8.13	-0.00984	PASS		
								50	-6.62	-0.00801	PASS		
								60	-1.92	-0.00232	PASS		
		MCH	VN							-20	-11.72	-0.01401	PASS
										-10	1.59	0.0019	PASS
										0	-1.83	-0.00219	PASS
										10	-1.28	-0.00153	PASS
										20	-5.04	-0.00603	PASS
										30	5.57	0.00666	PASS
										40	-8.24	-0.00985	PASS
										50	-6.87	-0.00821	PASS
		60	-1.85	-0.00221	PASS								
		HCH	VN							-20	3.14	0.00371	PASS

				-10	-4.47	-0.00528	PASS
				0	-14.47	-0.01709	PASS
				10	1.59	0.00188	PASS
				20	-5.69	-0.00672	PASS
				30	-8.51	-0.01005	PASS
				40	-3.14	-0.00371	PASS
				50	-8.91	-0.01052	PASS
				60	-0.47	-0.00056	PASS

END