Appendix B.1

WCDMA BAND II & IV & V

Table of Contents

1. Main Test Instruments

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018/3/13	2021/3/12
Spectrum Analyzer (20Hz-43GHz)	Rohde & Schwarz	FSU43	SEM004-08	2019/3/2	2020/3/1
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017/6/27	2020/6/26
Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/413	2021/412
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017/10/17	2020/10/16
Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2018/9/2	2019/9/2
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2018/9/2	2019/9/2
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	EMC2063	2018/10/20	2019/10/19
Pre-amplifier (26-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2019/3/2	2020/3/1
Band filter	N/A	N/A	N/A	N/A	N/A
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2018/7/12	2019/7/11
Wideband Radio CommunicationTeste	Anristu	MT8821C	6201462742	2019/4/3	2020/4/3
Wideband Radio CommunicationTester	Rohde & Schwarz	CMW500	W005-02	2019/1/13	2020/1/12

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
Dual Output Mobile Communication DC Source	Agilent Technologies Inc	66311B	W009-09	2018/11/2	2019/11/1
Signal Analyzer	Rohde & Schwarz	FSV	W005-02	2019/3/2	2020/3/1
Coaxial Cable	SGS	N/A	SEM031-01	2018/7/12	2019/7/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018/11/2	2019/11/1
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	HTC-1	W006-17	2018/11/2	2019/11/1
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2018/11/2	2019/11/1
Wideband Radio CommunicationTeste	Anristu	MT8821C	6201462742	2019/3/2	2020/3/1
Wideband Radio CommunicationTester	Rohde & Schwarz	CMW500	W005-02	2018/11/2	2019/11/1

2. Measurement Uncertainty

For a 95% confidence level (k = 2), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item	Extended Uncertainty	Data
Transmit Output Power Data	Power [dBm]	U =±0.37 dB
Bandwidth	Magnitude [%]	U =± 0.2%
Band Edge Compliance	Disturbance Power [dBm]	U = ±2.0 dB
Spurious Emissions, Conducted	Disturbance Power [dBm]	U = ±2.0 dB
Frequency Stability	Frequency Accuracy [ppm]	U = ±0.24 ppm

3. Effective (Isotropic) Radiated Power

3.1. Test Result

BAND	Channel	Conducted Power(dBm)	EIRP(dBm)	Limit(dBm)	Verdict
Band II	9262	24.65	25.65	33.00	PASS
Band II	9400	24.64	25.64	33.00	PASS
Band II	9538	24.74	25.74	33.00	PASS
Band IV	1312	24.70	25.70	30.00	PASS
Band IV	1413	24.69	25.69	30.00	PASS
Band IV	1513	24.60	25.60	30.00	PASS

BAND	Channel	Conducted Power(dBm)	ERP(dBm)	Limit(dBm)	Verdict
Band V	4132	23.93	22.78	38.45	PASS
Band V	4182	23.82	22.67	38.45	PASS
Band V	4233	24.02	22.87	38.45	PASS

Remark:

a: For getting the EIRP (Efficient Isotropic Radiated Power), the following formula should be taken to calculate it,

ERP [dBm] = Conducted Power [dBm] + Gain [dBd]

EIRP [dBm] = Conducted Power [dBm] + Gain [dBi]

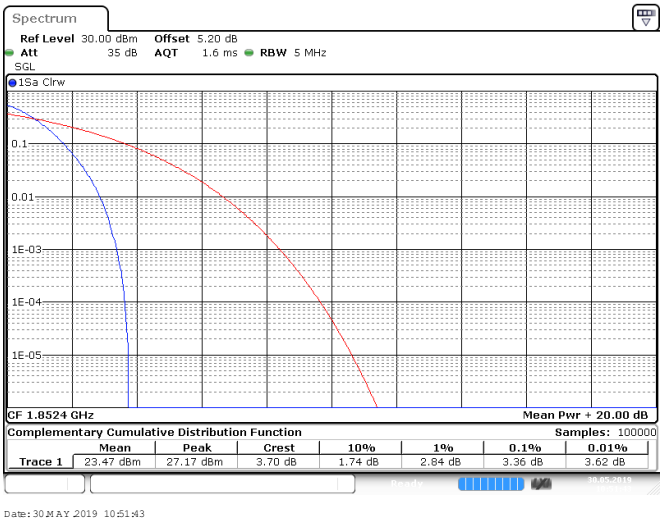
4. Peak-to-Average Ratio(CCDF)

4.1. Test Result

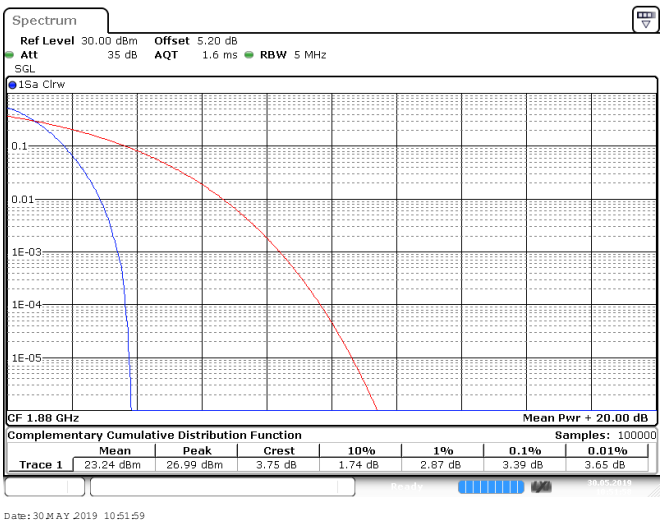
BAND	Channel	Peak-to-Average Ratio(dB)	Limit(dB)	Verdict
Band II	9262	3.36	13	PASS
Band II	9400	3.39	13	PASS
Band II	9538	3.28	13	PASS
Band IV	1312	2.96	13	PASS
Band IV	1413	3.25	13	PASS
Band IV	1513	3.07	13	PASS
Band V	4132	3.22	13	PASS
Band V	4182	3.04	13	PASS
Band V	4233	2.96	13	PASS

4.2. Test Plots

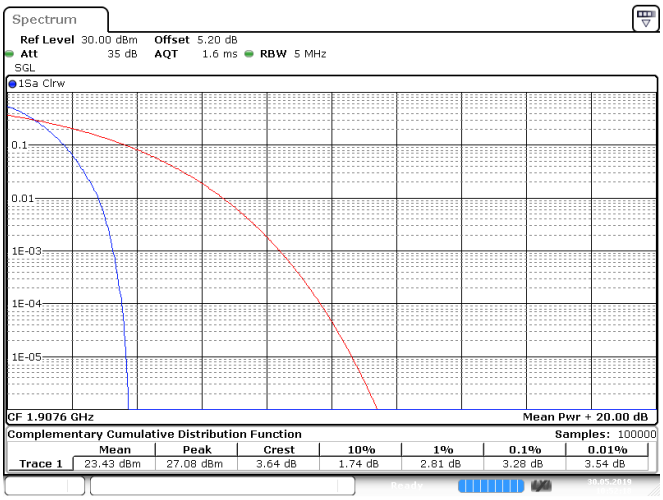
BAND II_9262



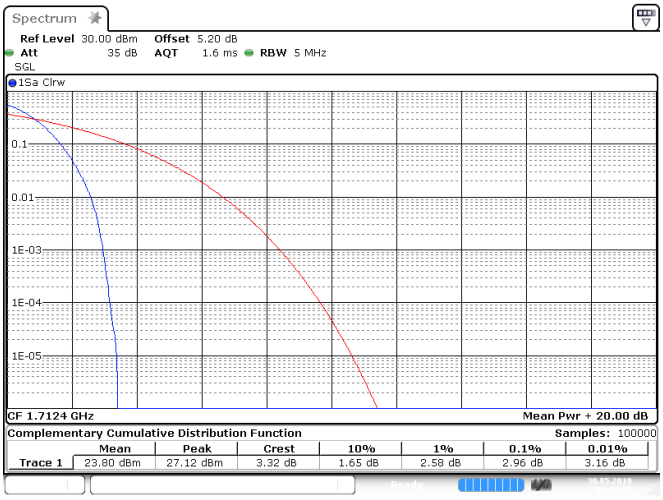
BAND II_9400



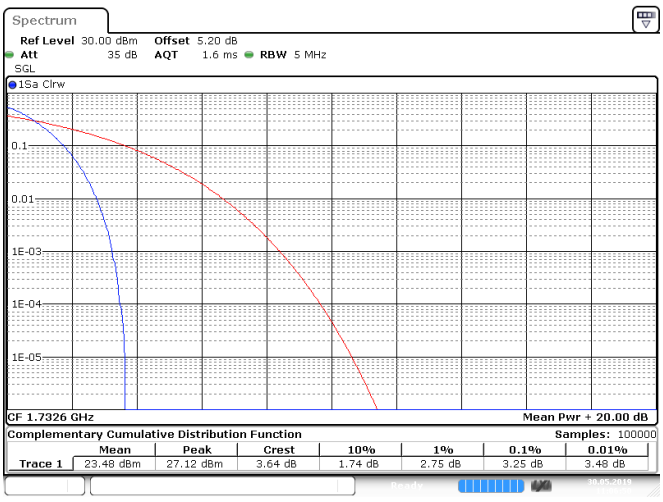
BAND II_9538



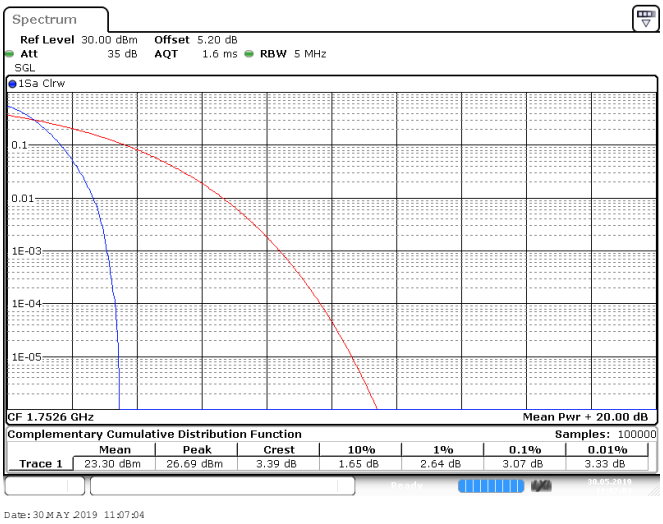
BAND IV_1312



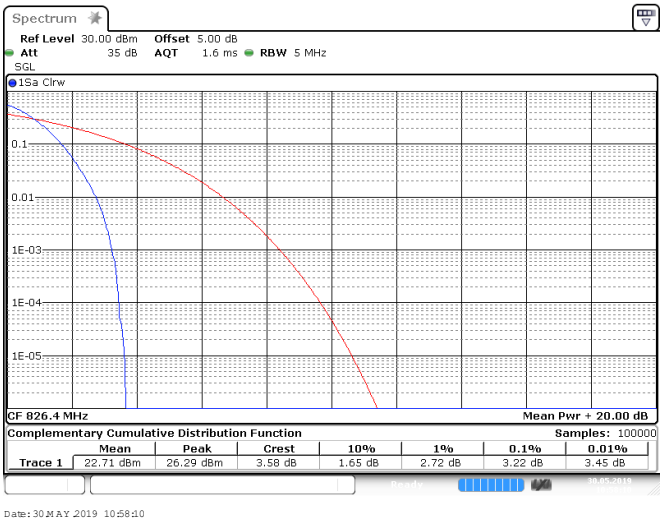
BAND IV_1413



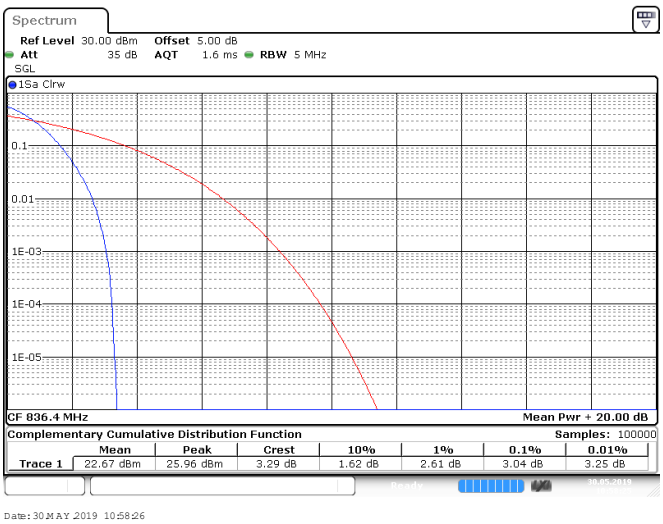
BAND IV_1513



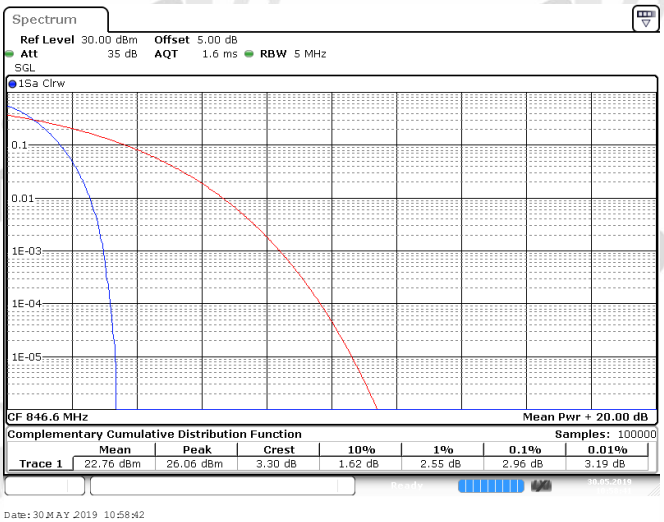
BAND V_4132



BAND V_4182



BAND V_4233


Spectrum
Ref Level 30.00 dBm Offset 5.00 dB
Att 35 dB AQT 1.6 ms RBW 5 MHz
SGL
1Sa Clrw
0.1
0.01
1E-03
1E-04
1E-05
CF 846.6 MHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 100000
Mean Peak Crest 10% 1% 0.1% 0.01%
Trace 1 22.76 dBm 26.06 dBm 3.30 dB 1.62 dB 2.55 dB 2.96 dB 3.19 dB
Date: 30.MAY.2019 10:58:42

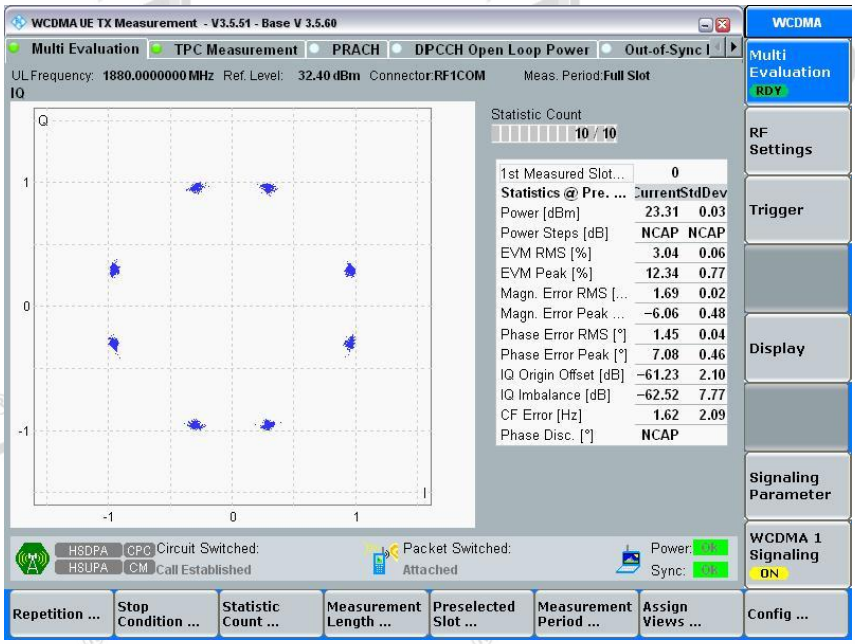
5. Modulation Characteristics

5.1. Test BAND = LTE Band 2

5.2. Test BAND = WCDMA BAND II

5.2.1.Test Mode = UMTS/TM1

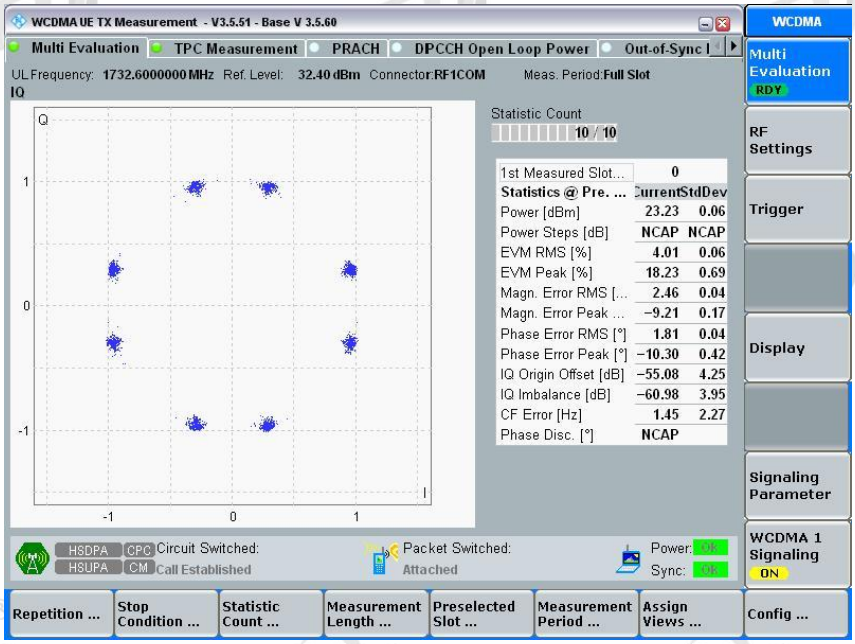
5.2.1.1. Test Channel = MCH



5.3. Test BAND = WCDMA BAND IV

5.3.1.Test Mode = UMTS/TM1

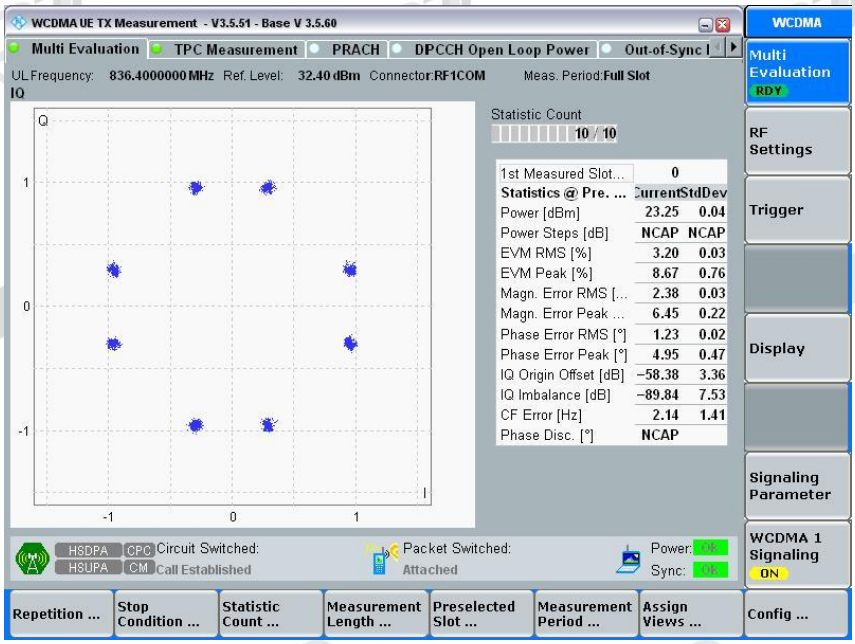
5.3.1.1. Test Channel = MCH



5.4. Test BAND = WCDMA BAND V

5.4.1.Test Mode = UMTS/TM1

5.4.1.1. Test Channel = MCH

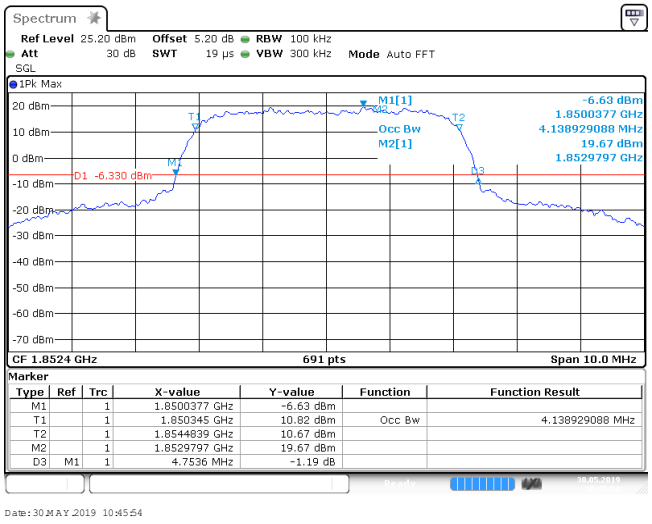


6. 26dB Bandwidth and Occupied Bandwidth

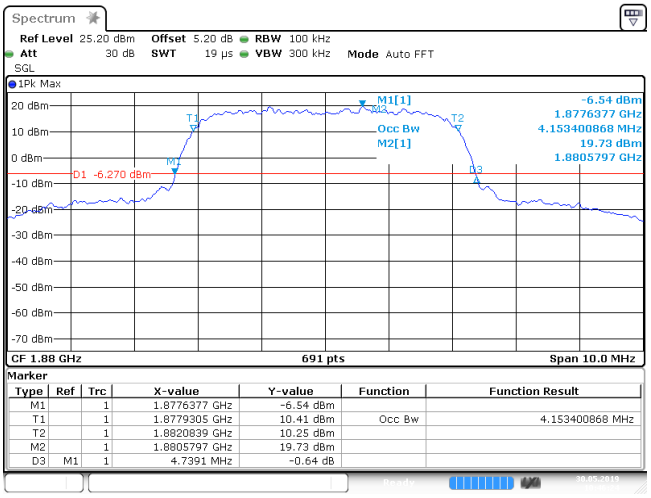
6.1. Test Result

BAND	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
Band II	9262	4138.9	4754	---	PASS
Band II	9400	4153.4	4739	---	PASS
Band II	9538	4138.9	4739	---	PASS
Band IV	1312	4124.5	4754	---	PASS
Band IV	1413	4124.5	4739	---	PASS
Band IV	1513	4124.5	4754	---	PASS
Band V	4132	4138.9	4754	---	PASS
Band V	4182	4124.5	4725	---	PASS
Band V	4233	4110.0	4725	---	PASS

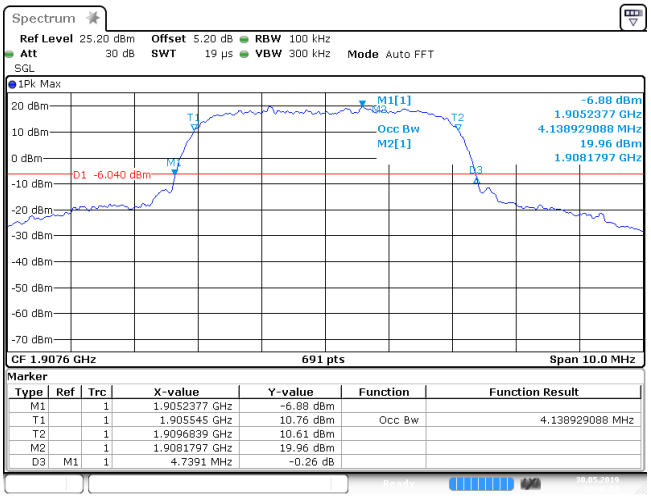
6.2. Test Plots



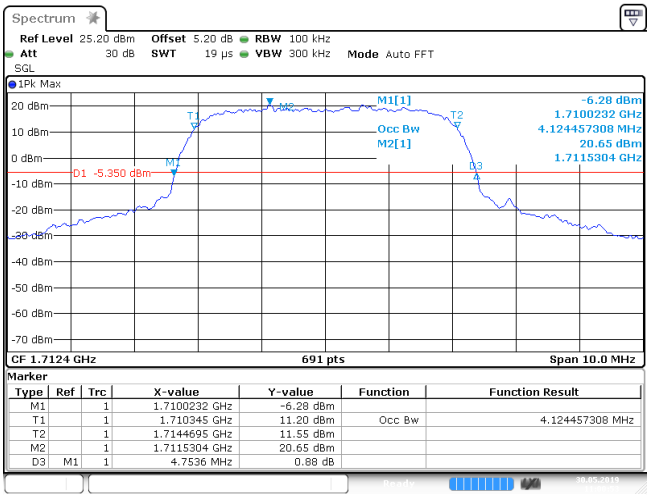
Band II_9262



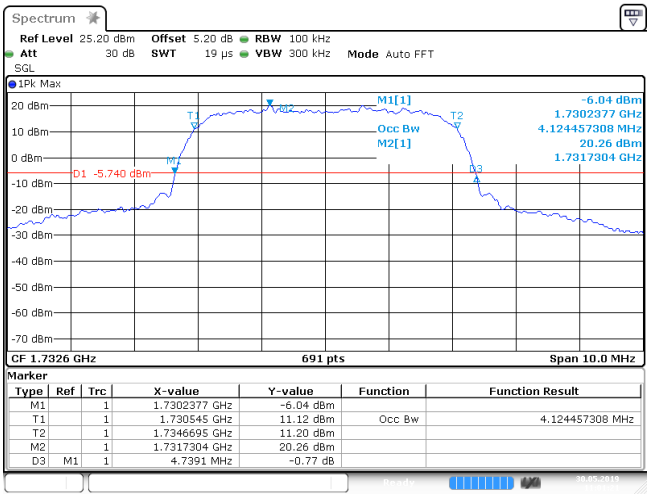
Band II_9400



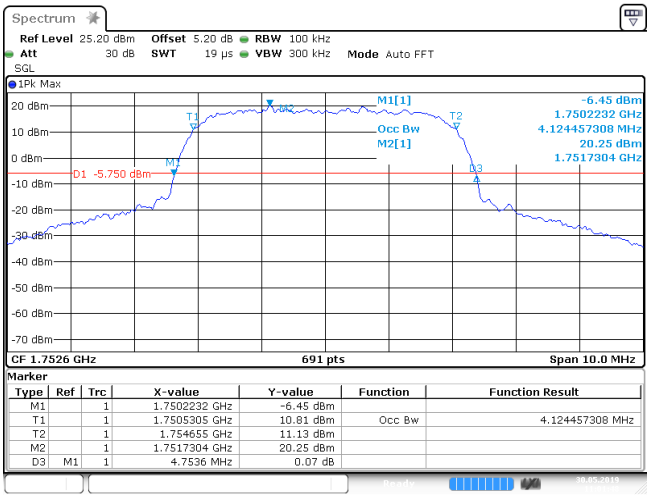
Band II_9538



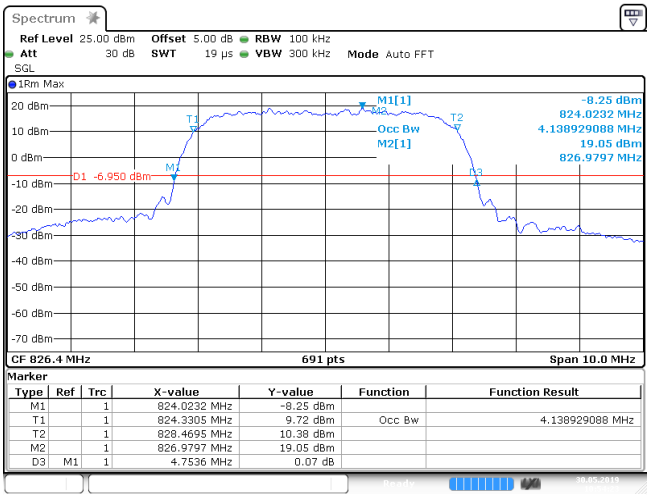
Band IV_1312



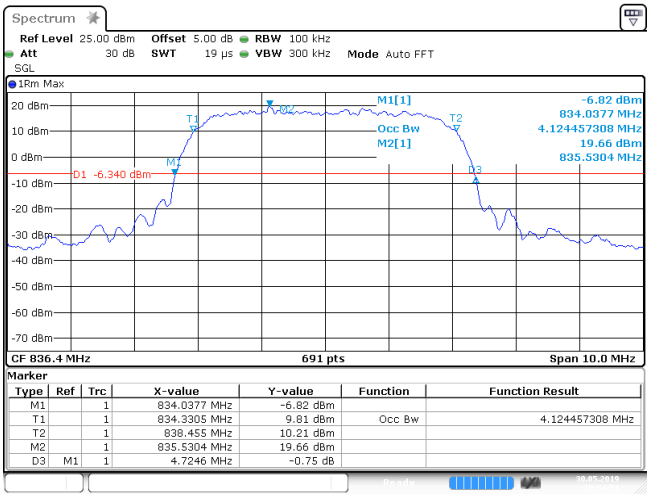
Band IV_1413



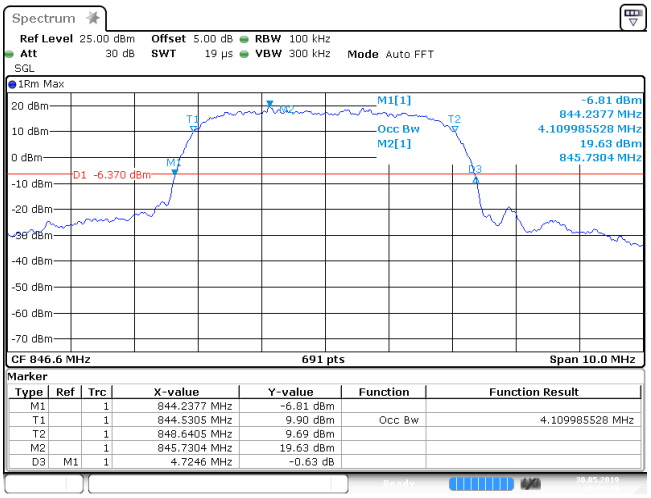
Band IV_1513



Band V_4132



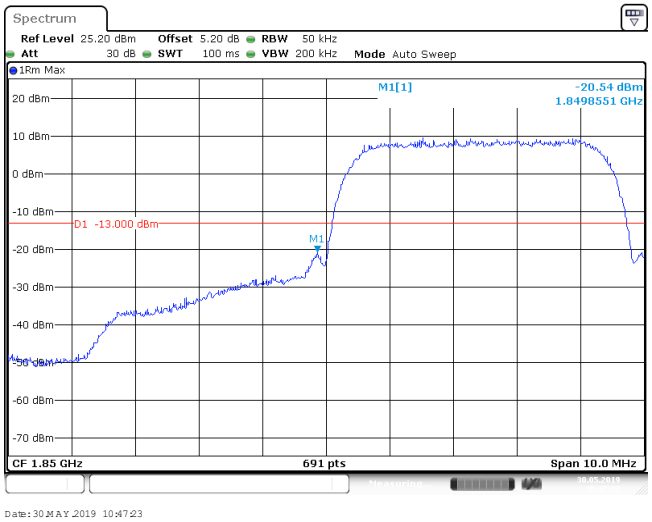
Band V_4182



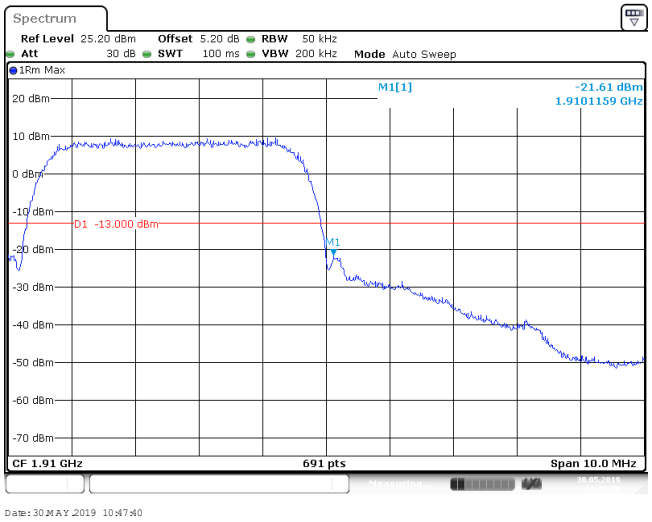
Band V_4233

7. Band Edge Compliance

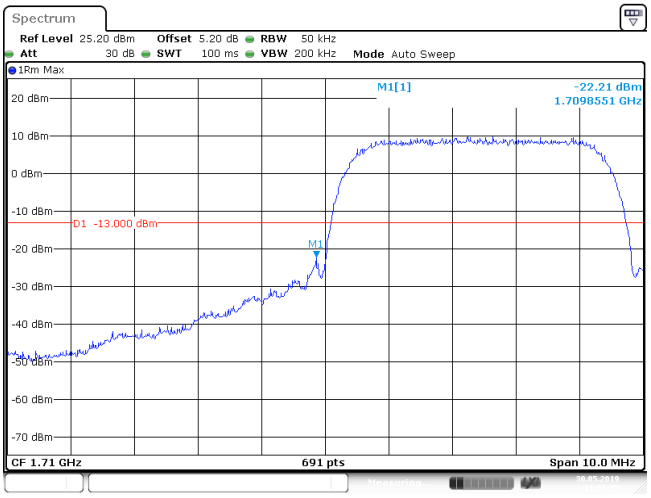
7.1. Test Plots



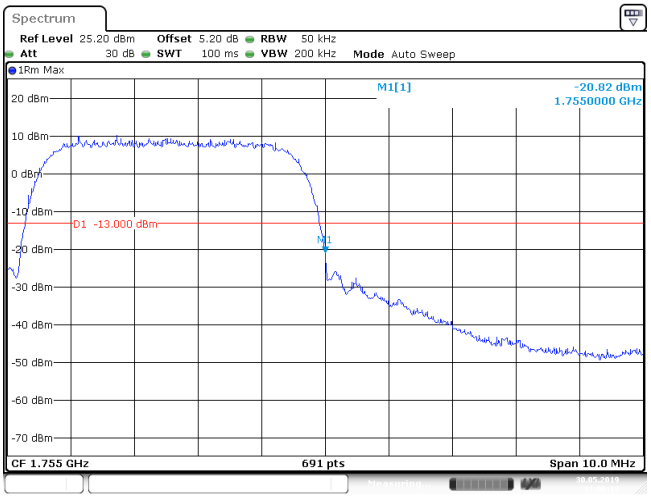
Band II_9262



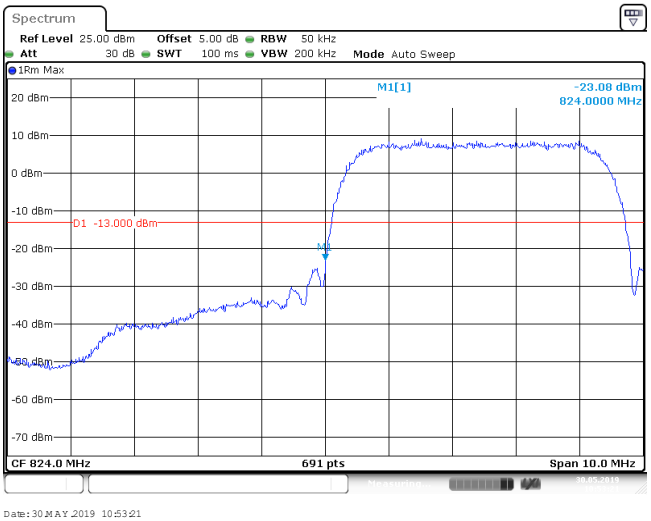
Band II_9538



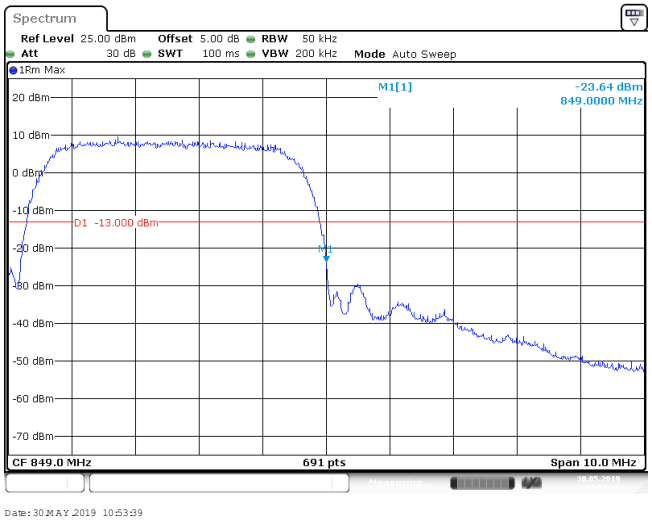
Band IV_1312



Band IV_1513



Band V_4132


Spectrum
Ref Level 25.00 dBm Offset 5.00 dB RBW 50 kHz
Att 30 dB SWT 100 ms VBW 200 kHz Mode Auto Sweep
1Rm Max
M1[1] -23.64 dBm
849.0000 MHz
20 dBm
10 dBm
0 dBm
-10 dBm
D1 -13.000 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 849.0 MHz
691 pts
Span 10.0 MHz
Date: 30.MAY.2019 10:53:39

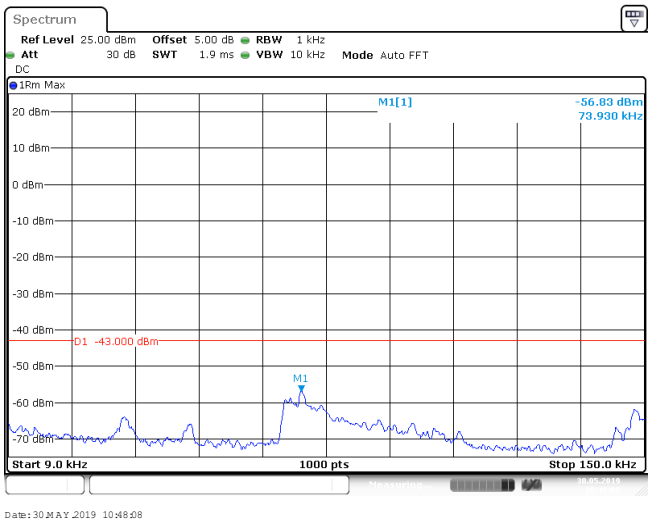
Band V_4233

8. Spurious Emission at Antenna Terminal

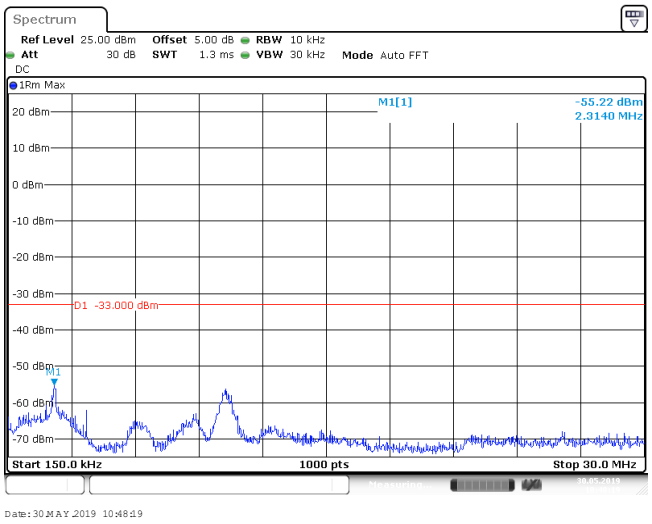
Remark1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of < RBW/2 so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = k * (Span / RBW)" with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Remark2: only the worst case data displayed in this report.

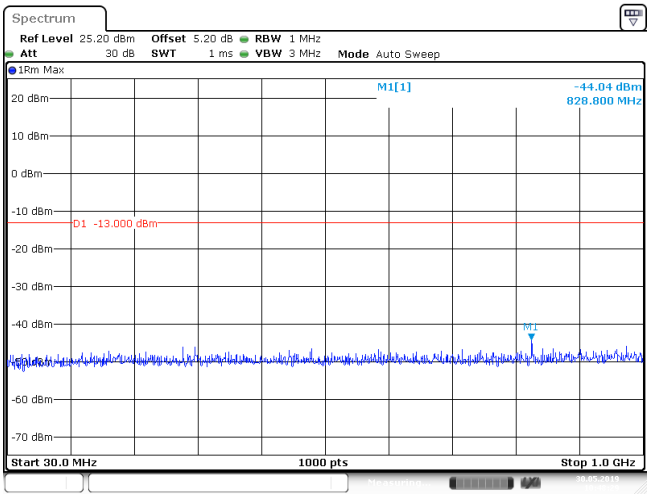
8.1. Test Plots



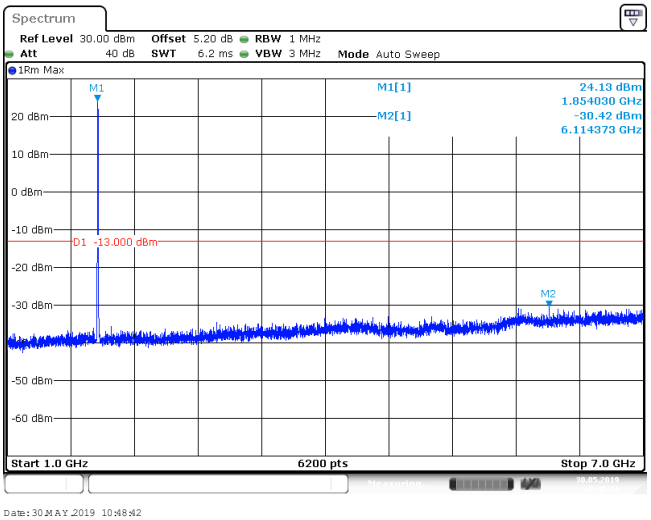
Band II_9262



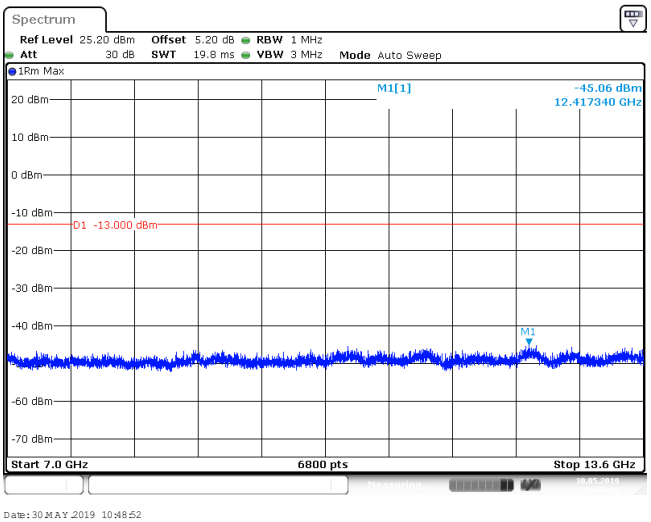
Band II_9262



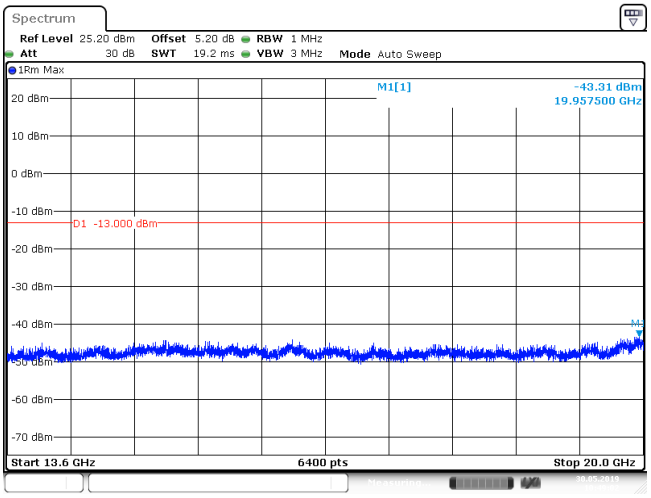
Band II_9262



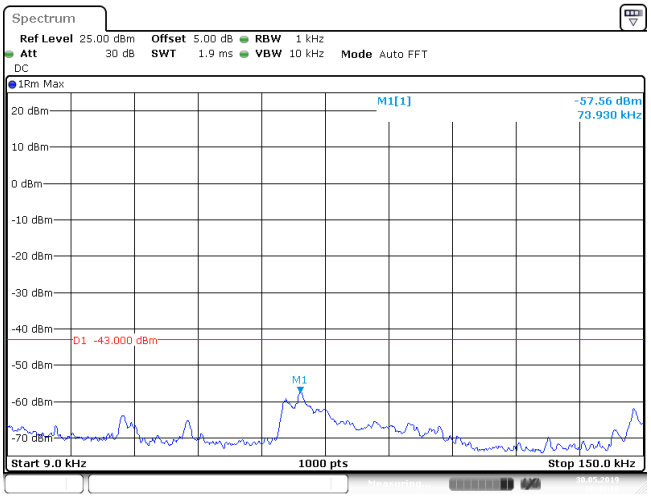
Band II_9262



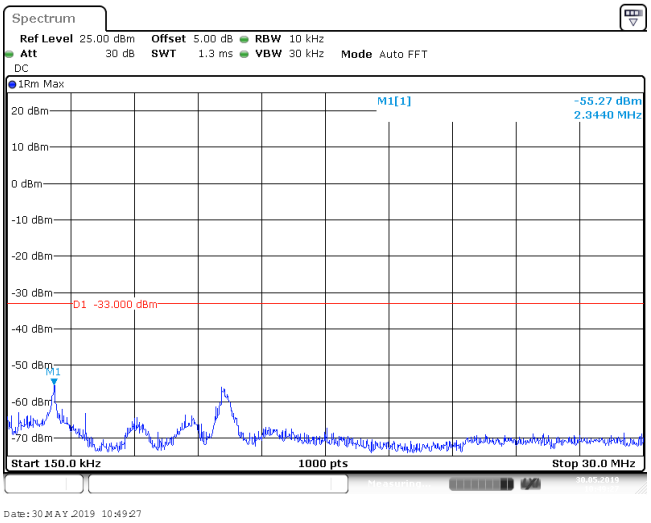
Band II_9262



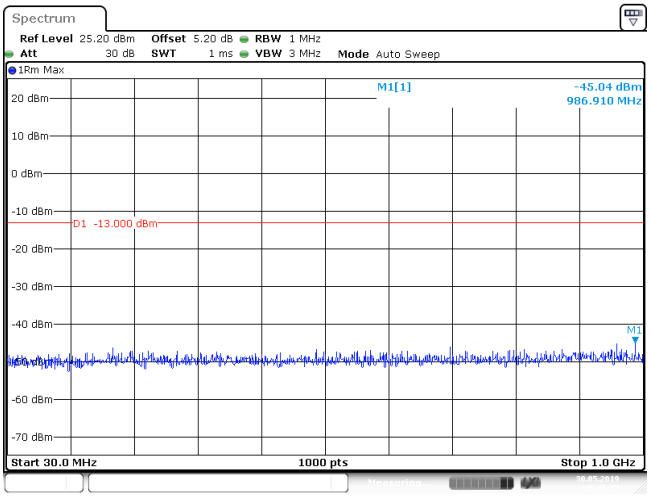
Band II_9262



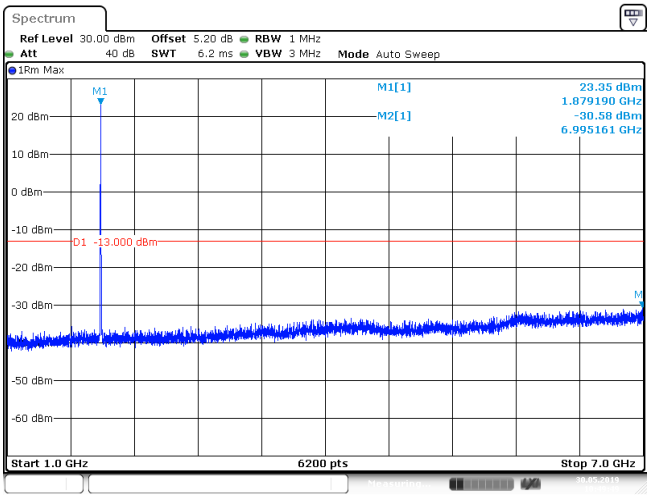
Band II_9400



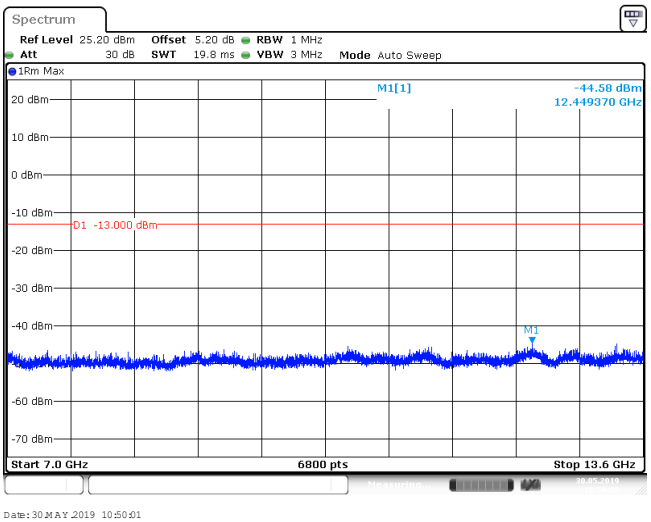
Band II_9400



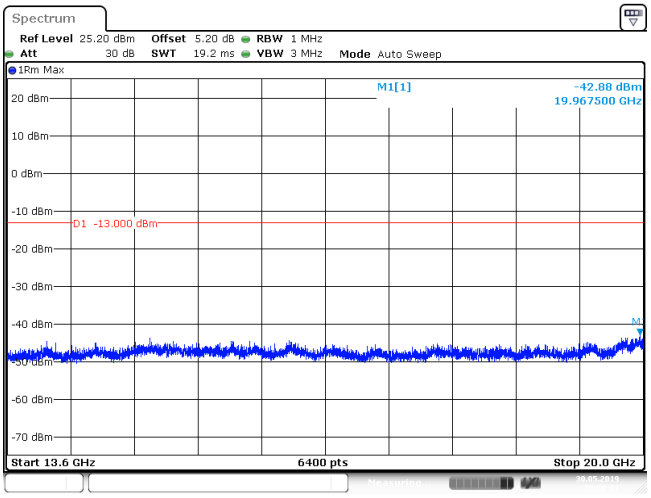
Band II_9400



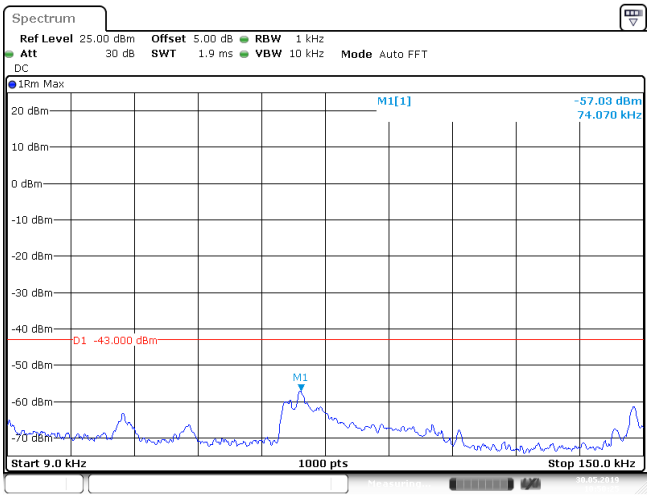
Band II_9400



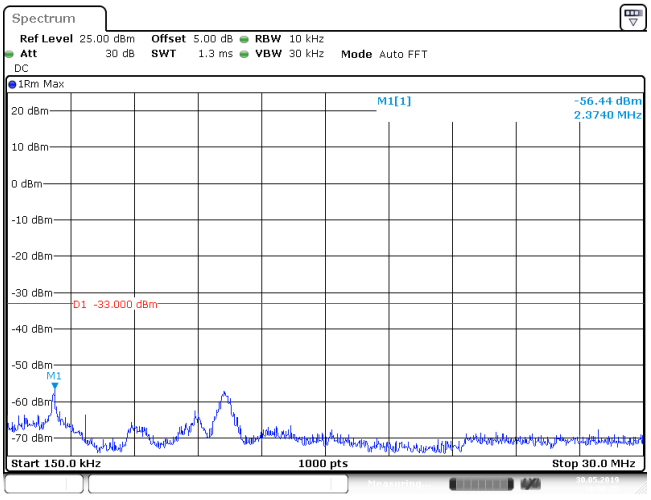
Band II_9400



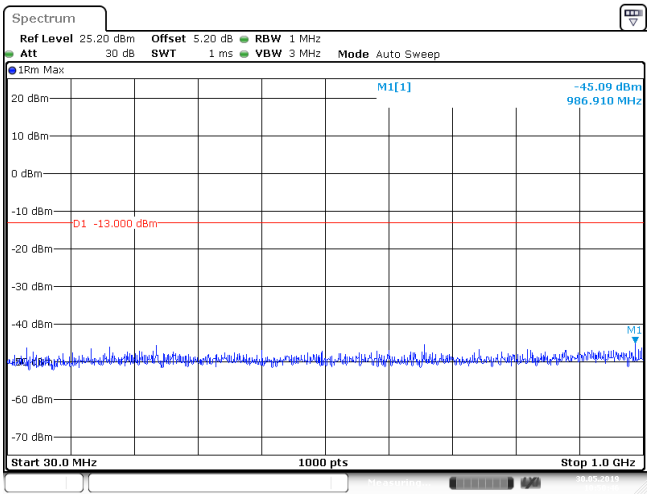
Band II_9400



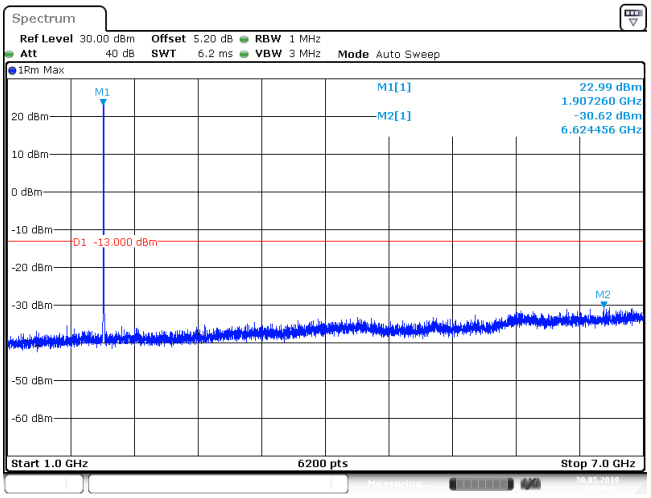
Band II_9538



Band II_9538



Band II_9538



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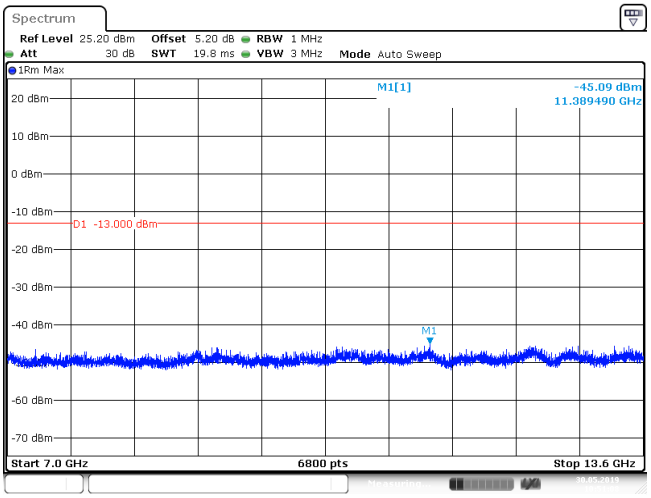

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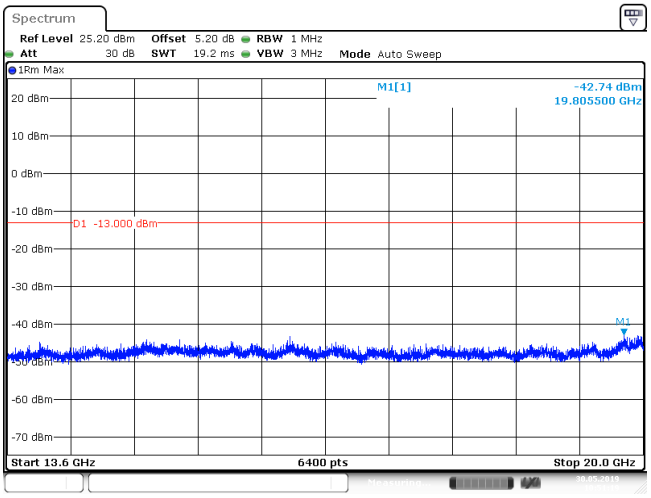

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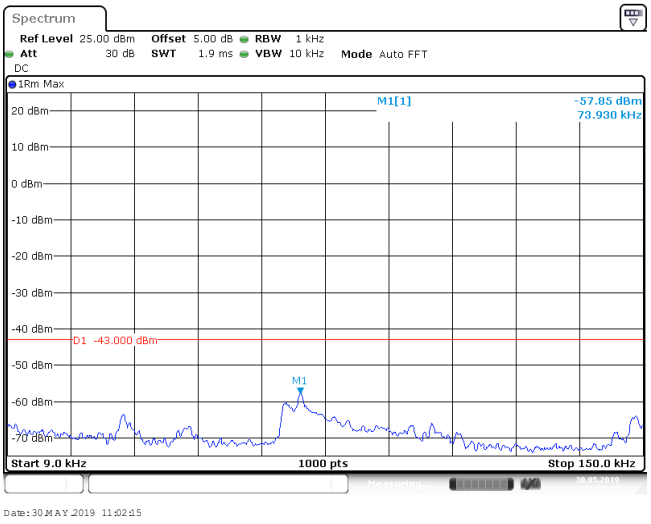
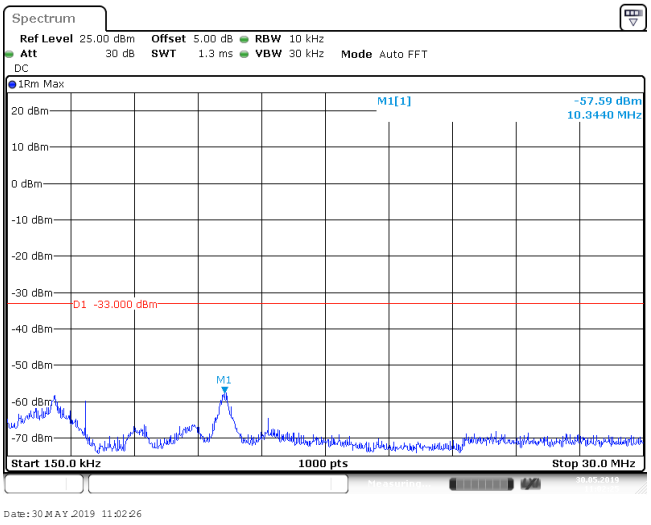


Band IV_1312



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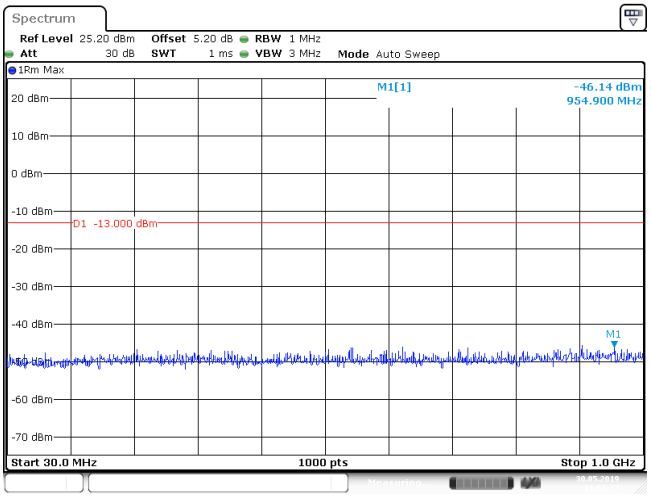

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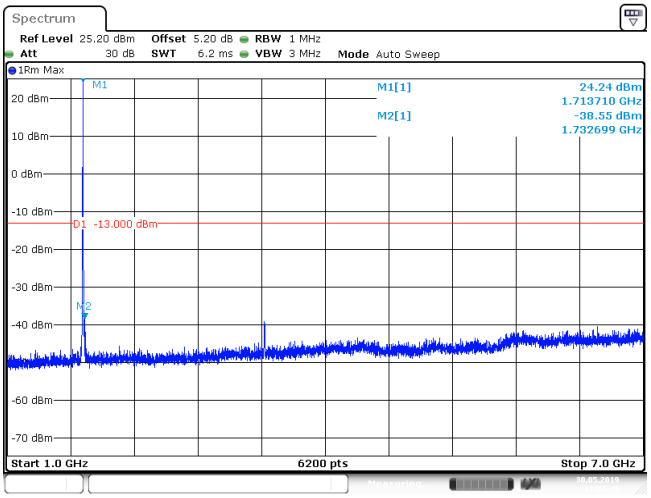

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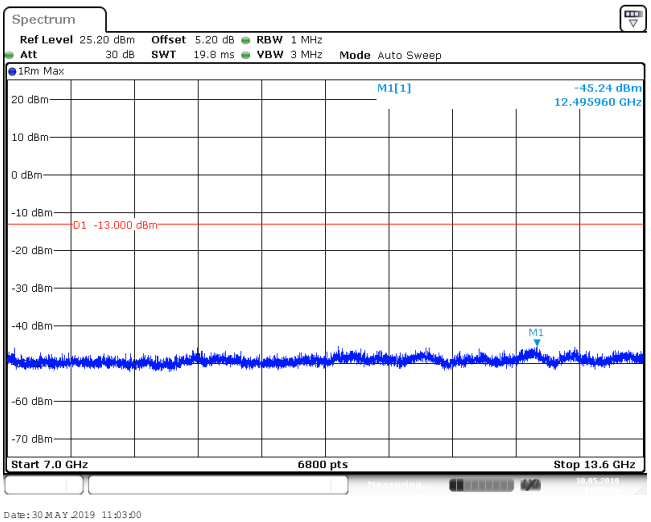

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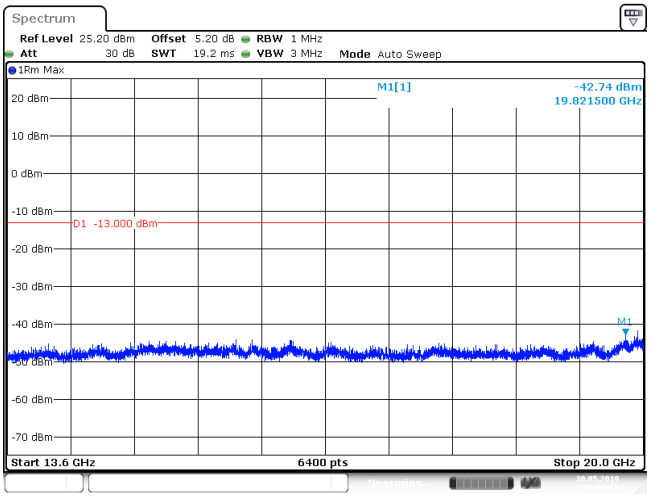

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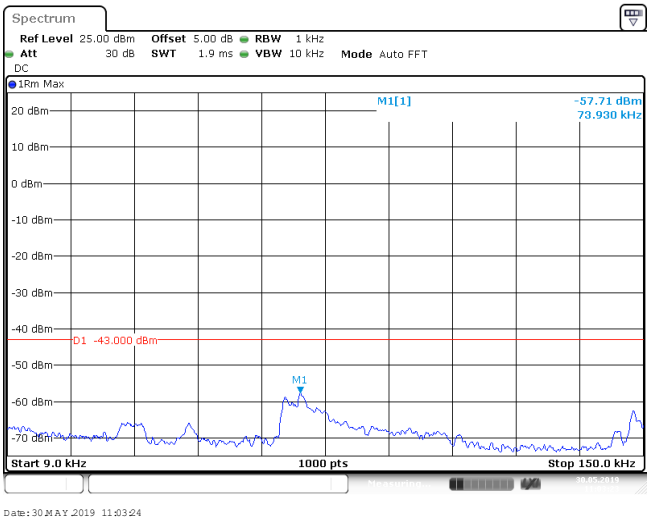
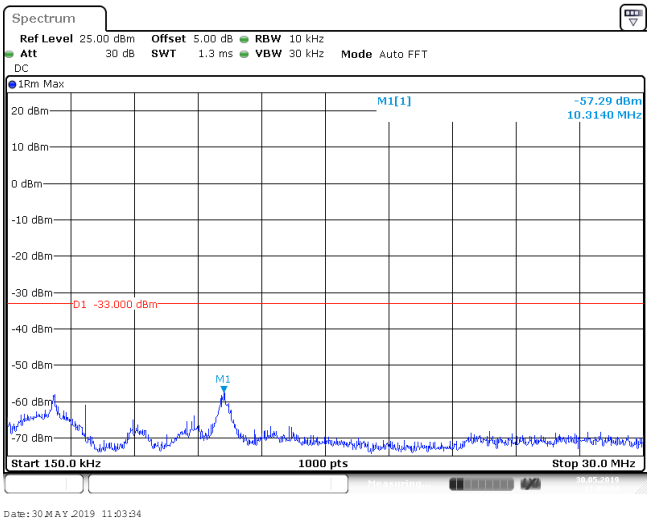


Band IV_1413



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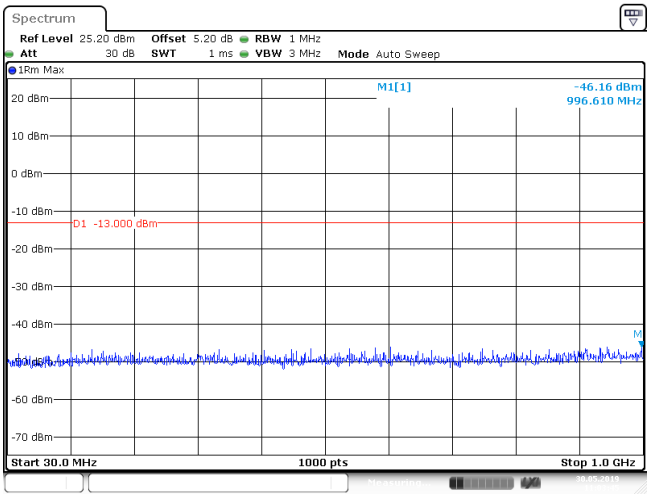

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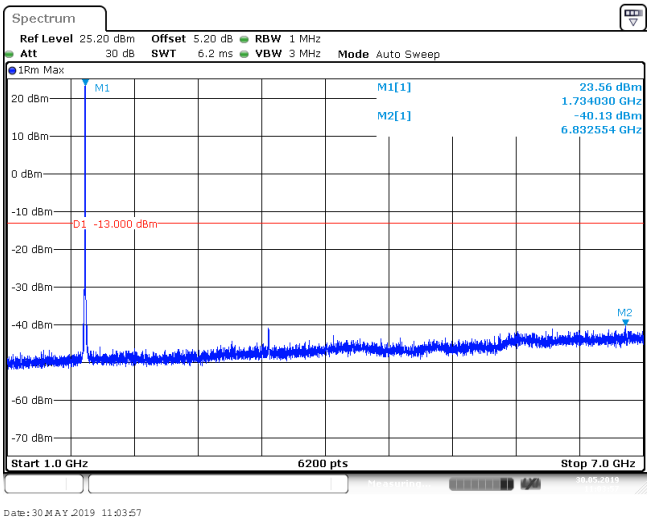

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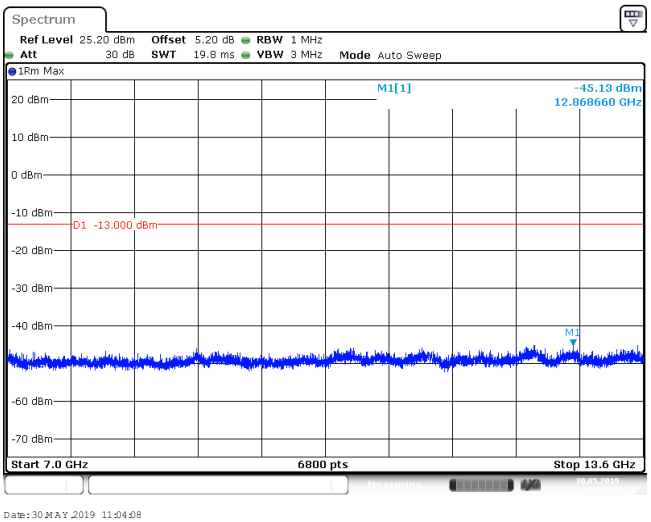

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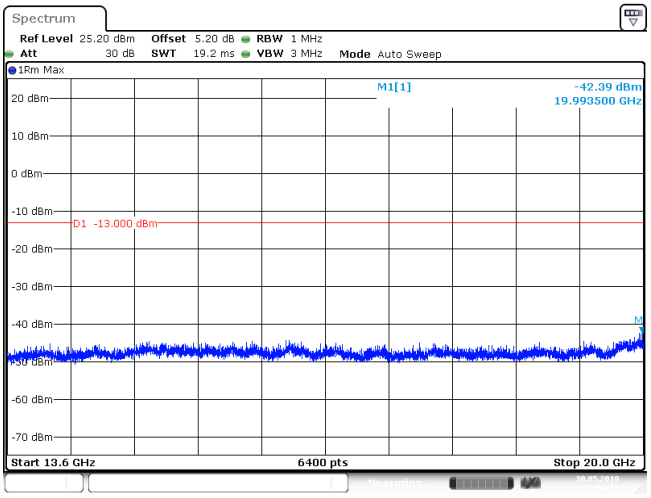
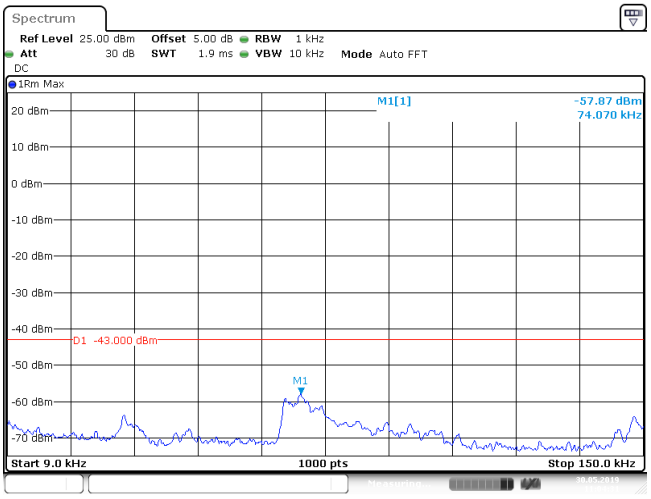


Band IV_1413



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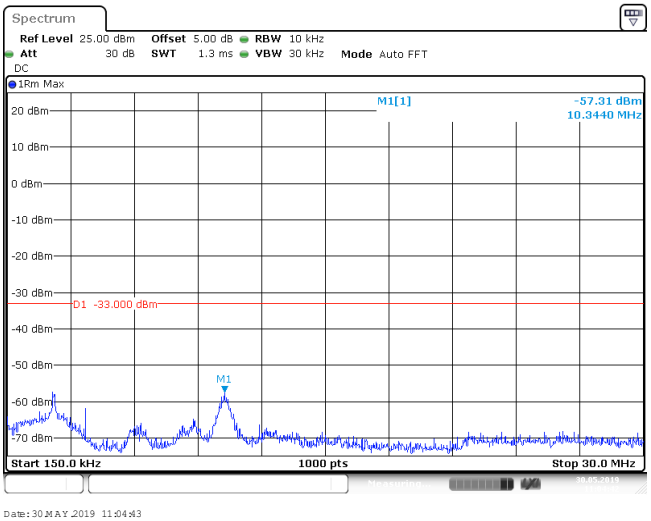

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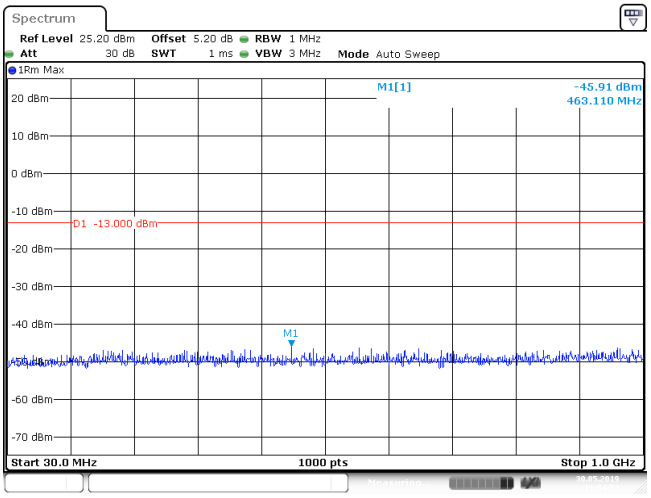

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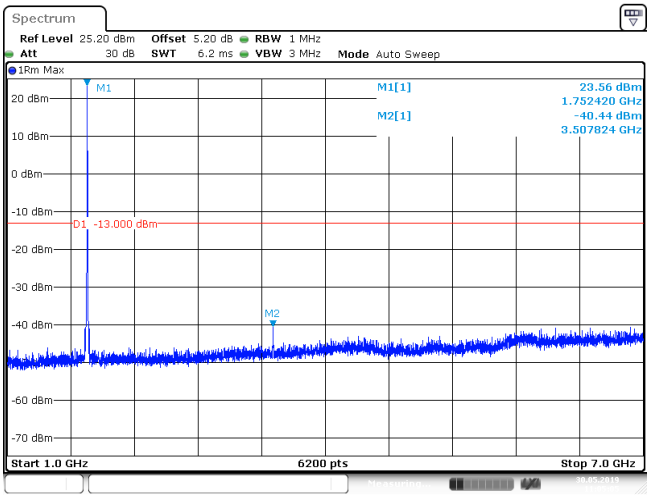

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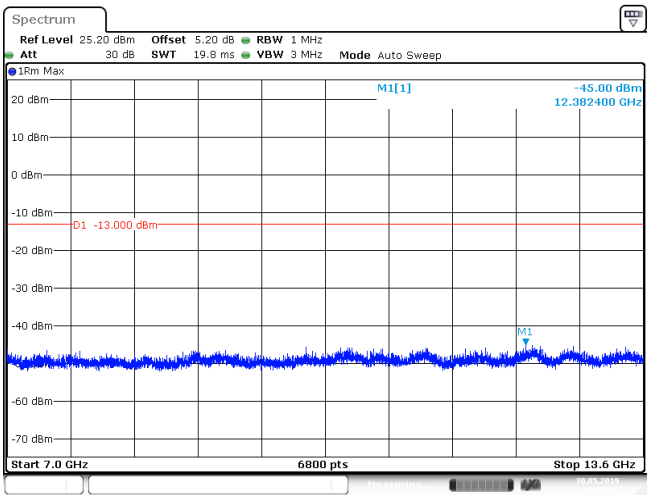

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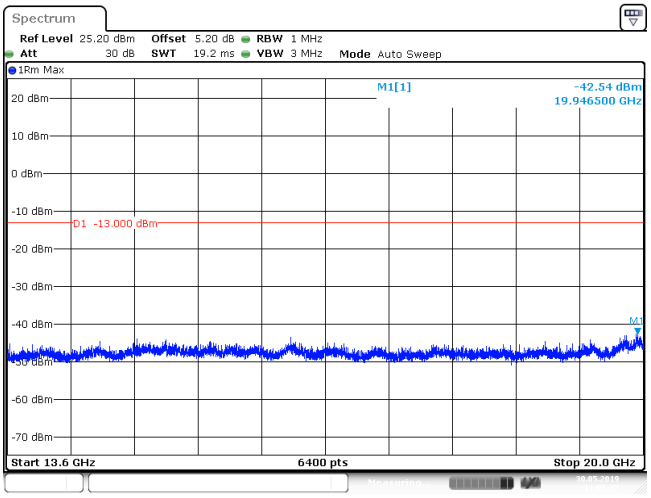

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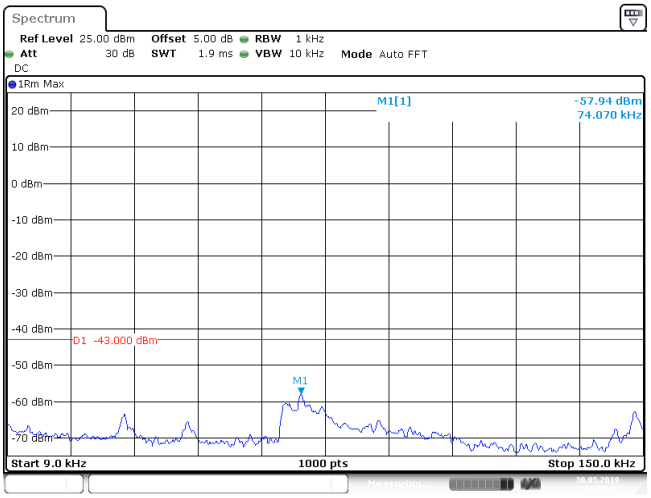

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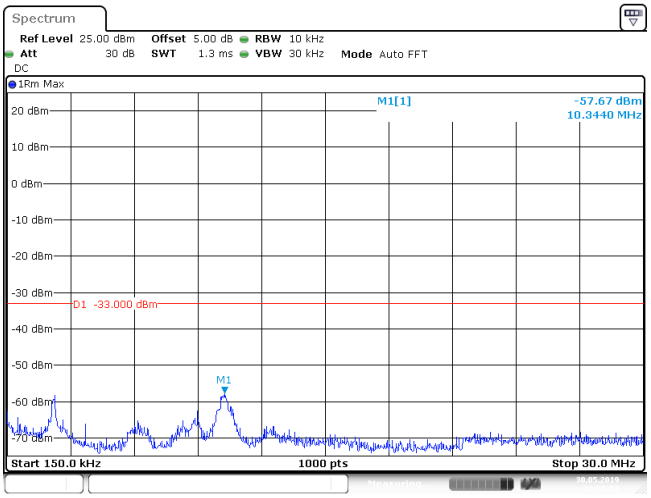

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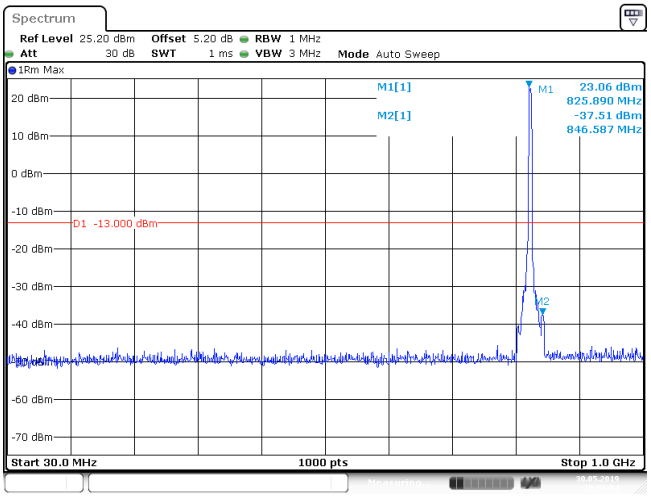

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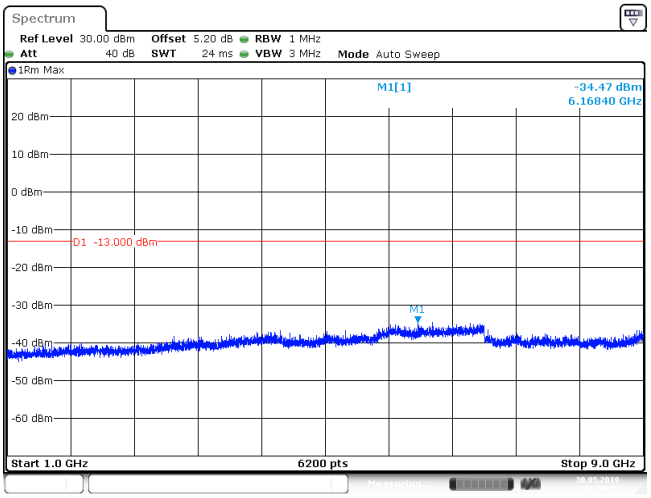

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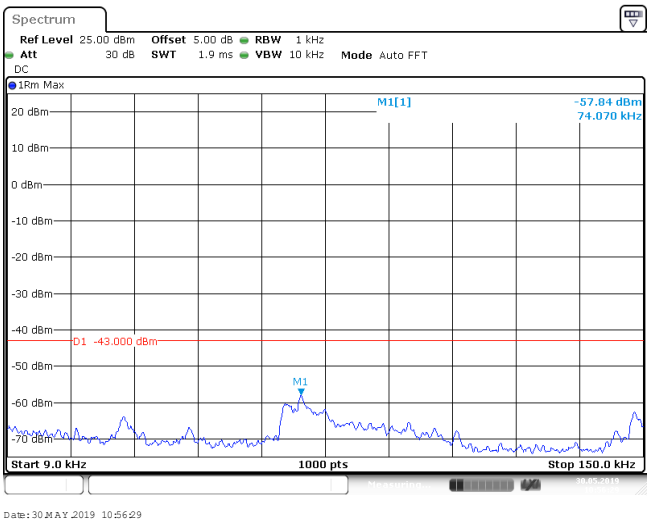

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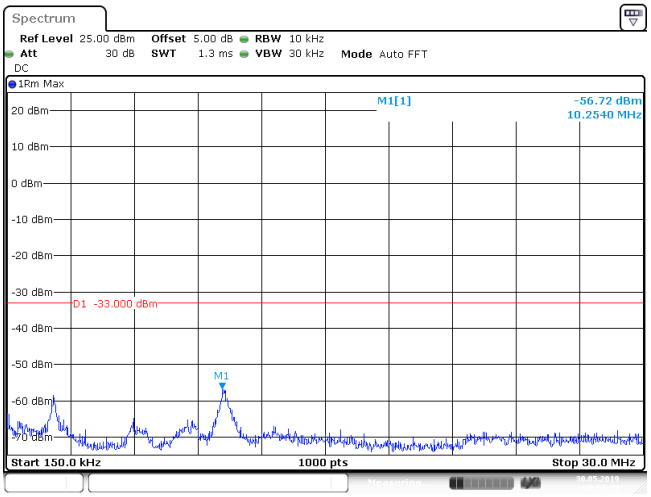

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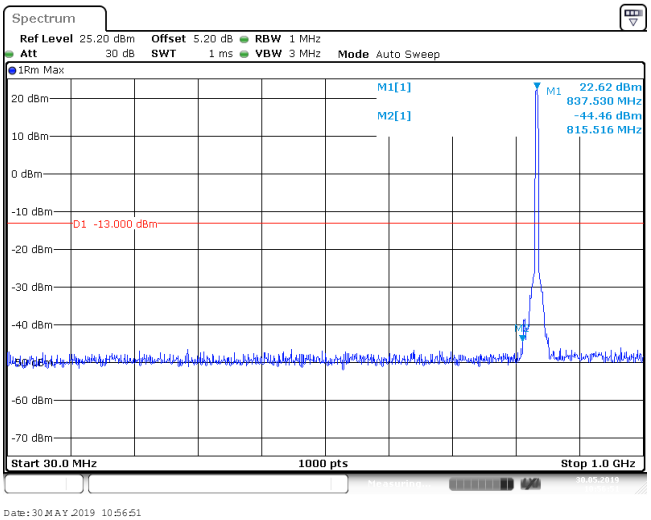

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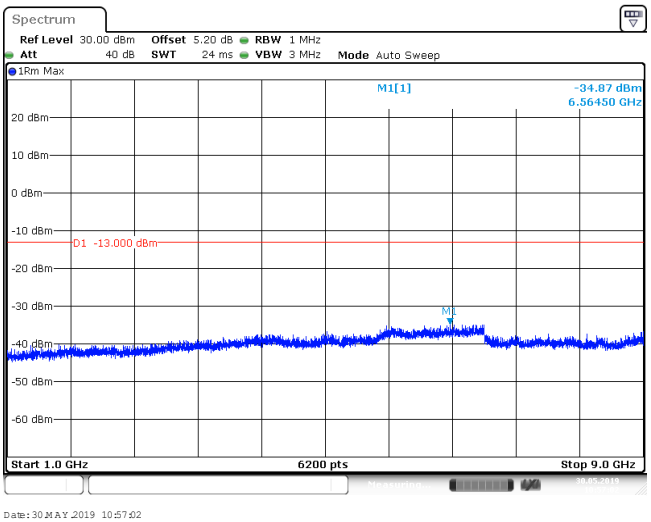

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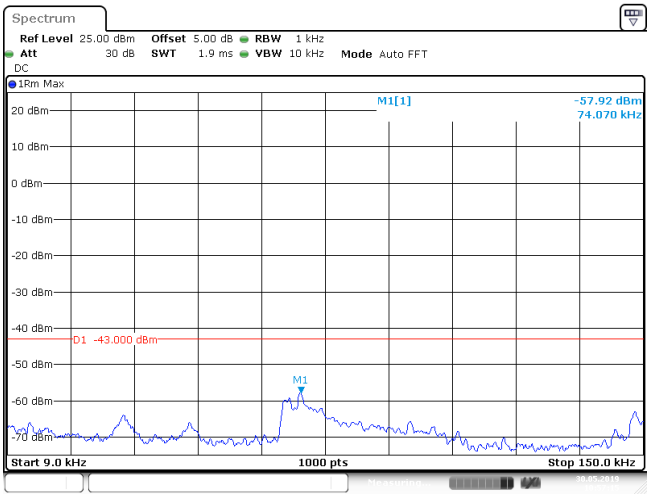

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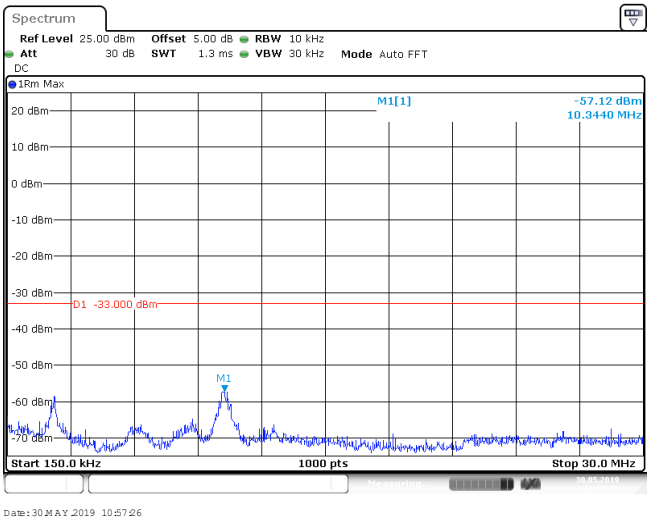

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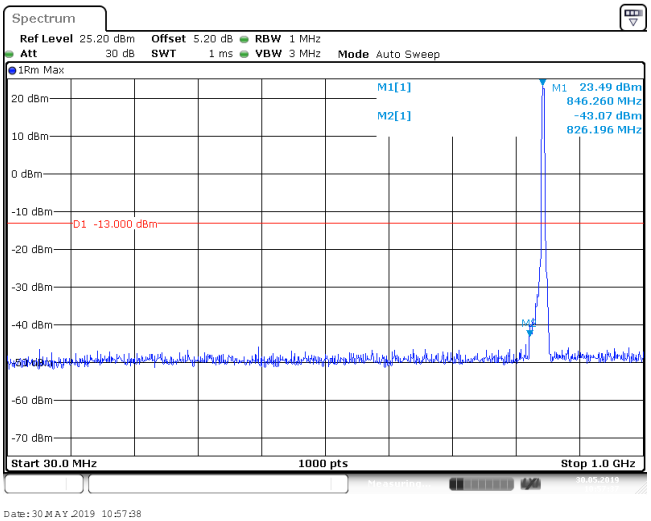
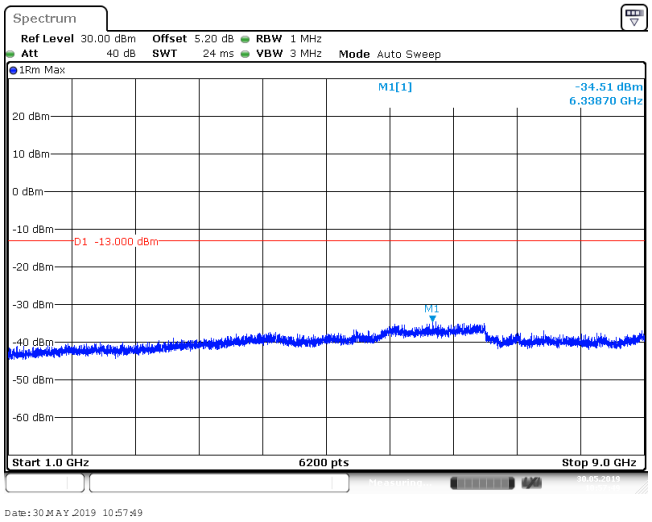


Band V_4233


Spectrum
Ref Level 30.00 dBm Offset 5.20 dB RBW 1 MHz
Att 40 dB SWT 24 ms VBW 3 MHz Mode Auto Sweep
1Rm Max
M1[1] -34.51 dBm
6.33870 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
D1 -13.000 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
M1
Start 1.0 GHz
6200 pts
Stop 9.0 GHz
Date: 30.MAY.2019 10:57:49

Band V_4233

9. Frequency Stability

9.1. Frequency Vs Voltage

Voltage							
BAND	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band II	9262	VL	TN	1.59	0.000857	±2.5	PASS
Band II	9262	VN	TN	2.27	0.001224	±2.5	PASS
Band II	9262	VH	TN	1.69	0.000911	±2.5	PASS
Band II	9400	VL	TN	-2.35	-0.001248	±2.5	PASS
Band II	9400	VN	TN	-1.73	-0.000921	±2.5	PASS
Band II	9400	VH	TN	-2.02	-0.001073	±2.5	PASS
Band II	9538	VL	TN	-5.86	-0.003071	±2.5	PASS
Band II	9538	VN	TN	-5.79	-0.003037	±2.5	PASS
Band II	9538	VH	TN	-6.76	-0.003543	±2.5	PASS
Band IV	1312	VL	TN	13.73	0.008016	±2.5	PASS
Band IV	1312	VN	TN	14.03	0.008195	±2.5	PASS
Band IV	1312	VH	TN	15.27	0.008918	±2.5	PASS
Band IV	1413	VL	TN	-2.50	-0.001441	±2.5	PASS
Band IV	1413	VN	TN	-1.86	-0.001073	±2.5	PASS
Band IV	1413	VH	TN	-2.70	-0.001556	±2.5	PASS
Band IV	1513	VL	TN	-13.75	-0.007844	±2.5	PASS
Band IV	1513	VN	TN	-13.17	-0.007513	±2.5	PASS
Band IV	1513	VH	TN	-12.75	-0.007273	±2.5	PASS
Band V	4132	VL	TN	-0.18	-0.000216	±2.5	PASS
Band V	4132	VN	TN	0.71	0.000857	±2.5	PASS
Band V	4132	VH	TN	0.09	0.000113	±2.5	PASS
Band V	4182	VL	TN	-0.72	-0.000864	±2.5	PASS
Band V	4182	VN	TN	0.26	0.000308	±2.5	PASS
Band V	4182	VH	TN	-0.04	-0.000051	±2.5	PASS
Band V	4233	VL	TN	-1.09	-0.001284	±2.5	PASS
Band V	4233	VN	TN	-1.97	-0.002332	±2.5	PASS
Band V	4233	VH	TN	-2.12	-0.002501	±2.5	PASS

9.2. Frequency Vs Temperature

Temperature							
BAND	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band II	9262	VN	-30	1.66	0.000896	±2.5	PASS
Band II	9262	VN	-20	2.01	0.001085	±2.5	PASS
Band II	9262	VN	-10	1.77	0.000958	±2.5	PASS
Band II	9262	VN	0	1.24	0.000668	±2.5	PASS
Band II	9262	VN	10	1.39	0.000753	±2.5	PASS
Band II	9262	VN	20	1.34	0.000726	±2.5	PASS
Band II	9262	VN	30	1.95	0.001050	±2.5	PASS
Band II	9262	VN	40	2.00	0.001077	±2.5	PASS
Band II	9262	VN	50	0.98	0.000529	±2.5	PASS
Band II	9400	VN	-30	-1.46	-0.000776	±2.5	PASS
Band II	9400	VN	-20	-1.64	-0.000871	±2.5	PASS
Band II	9400	VN	-10	-2.27	-0.001206	±2.5	PASS
Band II	9400	VN	0	-2.17	-0.001157	±2.5	PASS
Band II	9400	VN	10	-2.73	-0.001450	±2.5	PASS
Band II	9400	VN	20	-2.60	-0.001381	±2.5	PASS
Band II	9400	VN	30	-2.41	-0.001282	±2.5	PASS
Band II	9400	VN	40	-1.97	-0.001046	±2.5	PASS
Band II	9400	VN	50	-2.37	-0.001259	±2.5	PASS
Band II	9538	VN	-30	-5.88	-0.003082	±2.5	PASS
Band II	9538	VN	-20	-6.01	-0.003150	±2.5	PASS
Band II	9538	VN	-10	-5.69	-0.002985	±2.5	PASS
Band II	9538	VN	0	-6.27	-0.003285	±2.5	PASS
Band II	9538	VN	10	-5.04	-0.002640	±2.5	PASS
Band II	9538	VN	20	-4.14	-0.002171	±2.5	PASS
Band II	9538	VN	30	-6.29	-0.003296	±2.5	PASS
Band II	9538	VN	40	-5.91	-0.003097	±2.5	PASS
Band II	9538	VN	50	-6.22	-0.003258	±2.5	PASS
Band IV	1312	VN	-30	12.86	0.007510	±2.5	PASS
Band IV	1312	VN	-20	14.08	0.008220	±2.5	PASS
Band IV	1312	VN	-10	14.10	0.008233	±2.5	PASS
Band IV	1312	VN	0	14.26	0.008329	±2.5	PASS
Band IV	1312	VN	10	13.98	0.008162	±2.5	PASS
Band IV	1312	VN	20	14.46	0.008442	±2.5	PASS
Band IV	1312	VN	30	14.24	0.008316	±2.5	PASS
Band IV	1312	VN	40	15.69	0.009164	±2.5	PASS
Band IV	1312	VN	50	15.19	0.008872	±2.5	PASS
Band IV	1413	VN	-30	-1.21	-0.000698	±2.5	PASS
Band IV	1413	VN	-20	-0.70	-0.000405	±2.5	PASS
Band IV	1413	VN	-10	-2.94	-0.001697	±2.5	PASS

Band IV	1413	VN	0	-6.72	-0.003881	±2.5	PASS
Band IV	1413	VN	10	-2.11	-0.001218	±2.5	PASS
Band IV	1413	VN	20	-1.02	-0.000590	±2.5	PASS
Band IV	1413	VN	30	-1.14	-0.000656	±2.5	PASS
Band IV	1413	VN	40	-2.00	-0.001152	±2.5	PASS
Band IV	1413	VN	50	-5.59	-0.003224	±2.5	PASS
Band IV	1513	VN	-30	-14.85	-0.008472	±2.5	PASS
Band IV	1513	VN	-20	-13.89	-0.007926	±2.5	PASS
Band IV	1513	VN	-10	-13.83	-0.007893	±2.5	PASS
Band IV	1513	VN	0	-13.86	-0.007909	±2.5	PASS
Band IV	1513	VN	10	-14.32	-0.008170	±2.5	PASS
Band IV	1513	VN	20	-13.24	-0.007554	±2.5	PASS
Band IV	1513	VN	30	-13.93	-0.007950	±2.5	PASS
Band IV	1513	VN	40	-14.08	-0.008036	±2.5	PASS
Band IV	1513	VN	50	-13.10	-0.007473	±2.5	PASS
Band V	4132	VN	-30	0.12	0.000147	±2.5	PASS
Band V	4132	VN	-20	1.12	0.001350	±2.5	PASS
Band V	4132	VN	-10	0.21	0.000251	±2.5	PASS
Band V	4132	VN	0	0.56	0.000675	±2.5	PASS
Band V	4132	VN	10	0.36	0.000433	±2.5	PASS
Band V	4132	VN	20	0.76	0.000917	±2.5	PASS
Band V	4132	VN	30	0.48	0.000580	±2.5	PASS
Band V	4132	VN	40	0.13	0.000156	±2.5	PASS
Band V	4132	VN	50	0.59	0.000710	±2.5	PASS
Band V	4182	VN	-30	-0.41	-0.000487	±2.5	PASS
Band V	4182	VN	-20	0.30	0.000359	±2.5	PASS
Band V	4182	VN	-10	0.02	0.000026	±2.5	PASS
Band V	4182	VN	0	-0.36	-0.000428	±2.5	PASS
Band V	4182	VN	10	0.11	0.000128	±2.5	PASS
Band V	4182	VN	20	-0.17	-0.000205	±2.5	PASS
Band V	4182	VN	30	-0.18	-0.000214	±2.5	PASS
Band V	4182	VN	40	0.03	0.000034	±2.5	PASS
Band V	4182	VN	50	-0.04	-0.000051	±2.5	PASS
Band V	4233	VN	-30	-1.57	-0.001850	±2.5	PASS
Band V	4233	VN	-20	-1.60	-0.001884	±2.5	PASS
Band V	4233	VN	-10	-1.33	-0.001571	±2.5	PASS
Band V	4233	VN	0	-2.11	-0.002492	±2.5	PASS
Band V	4233	VN	10	-2.27	-0.002678	±2.5	PASS
Band V	4233	VN	20	-1.57	-0.001859	±2.5	PASS
Band V	4233	VN	30	-1.60	-0.001884	±2.5	PASS
Band V	4233	VN	40	-2.30	-0.002712	±2.5	PASS
Band V	4233	VN	50	-1.97	-0.002332	±2.5	PASS

The End