Appendix B

E-UTRA Band 13

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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	2019/6/12	2020/6/11
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	2019/6/12	2020/6/11
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	Bandwidth	Modulation	Channel	RB Configuration	Conducted Power(dBm)	ERP (dBm)	Limit (dBm)	Verdict
Band13	5MHz	QPSK	23205	1RB#0	23.49	17.39	34.77	PASS
Band13	5MHz	QPSK	23205	1RB#12	23.69	17.59	34.77	PASS
Band13	5MHz	QPSK	23205	1RB#24	23.44	17.34	34.77	PASS
Band13	5MHz	QPSK	23205	12RB#0	22.62	16.52	34.77	PASS
Band13	5MHz	QPSK	23205	12RB#6	22.69	16.59	34.77	PASS
Band13	5MHz	QPSK	23205	12RB#13	22.60	16.50	34.77	PASS
Band13	5MHz	QPSK	23205	25RB#0	22.69	16.59	34.77	PASS
Band13	5MHz	QPSK	23230	1RB#0	23.49	17.39	34.77	PASS
Band13	5MHz	QPSK	23230	1RB#12	23.71	17.61	34.77	PASS
Band13	5MHz	QPSK	23230	1RB#24	23.44	17.34	34.77	PASS
Band13	5MHz	QPSK	23230	12RB#0	22.65	16.55	34.77	PASS
Band13	5MHz	QPSK	23230	12RB#6	22.67	16.57	34.77	PASS
Band13	5MHz	QPSK	23230	12RB#13	22.61	16.51	34.77	PASS
Band13	5MHz	QPSK	23230	25RB#0	22.70	16.60	34.77	PASS
Band13	5MHz	QPSK	23255	1RB#0	23.48	17.38	34.77	PASS
Band13	5MHz	QPSK	23255	1RB#12	23.71	17.61	34.77	PASS
Band13	5MHz	QPSK	23255	1RB#24	23.43	17.33	34.77	PASS
Band13	5MHz	QPSK	23255	12RB#0	22.63	16.53	34.77	PASS
Band13	5MHz	QPSK	23255	12RB#6	22.65	16.55	34.77	PASS
Band13	5MHz	QPSK	23255	12RB#13	22.59	16.49	34.77	PASS
Band13	5MHz	QPSK	23255	25RB#0	22.67	16.57	34.77	PASS
Band13	5MHz	16QAM	23205	1RB#0	22.63	16.53	34.77	PASS
Band13	5MHz	16QAM	23205	1RB#12	22.81	16.71	34.77	PASS
Band13	5MHz	16QAM	23205	1RB#24	22.69	16.59	34.77	PASS
Band13	5MHz	16QAM	23205	12RB#0	21.62	15.52	34.77	PASS
Band13	5MHz	16QAM	23205	12RB#6	21.68	15.58	34.77	PASS
Band13	5MHz	16QAM	23205	12RB#13	21.64	15.54	34.77	PASS
Band13	5MHz	16QAM	23205	25RB#0	21.61	15.51	34.77	PASS
Band13	5MHz	16QAM	23230	1RB#0	22.66	16.56	34.77	PASS
Band13	5MHz	16QAM	23230	1RB#12	22.89	16.79	34.77	PASS
Band13	5MHz	16QAM	23230	1RB#24	22.61	16.51	34.77	PASS
Band13	5MHz	16QAM	23230	12RB#0	21.67	15.57	34.77	PASS
Band13	5MHz	16QAM	23230	12RB#6	21.69	15.59	34.77	PASS
Band13	5MHz	16QAM	23230	12RB#13	21.64	15.54	34.77	PASS
Band13	5MHz	16QAM	23230	25RB#0	21.62	15.52	34.77	PASS
Band13	5MHz	16QAM	23255	1RB#0	22.59	16.49	34.77	PASS
Band13	5MHz	16QAM	23255	1RB#12	22.90	16.80	34.77	PASS

Band13	5MHz	16QAM	23255	1RB#24	22.55	16.45	34.77	PASS
Band13	5MHz	16QAM	23255	12RB#0	21.63	15.53	34.77	PASS
Band13	5MHz	16QAM	23255	12RB#6	21.66	15.56	34.77	PASS
Band13	5MHz	16QAM	23255	12RB#13	21.61	15.51	34.77	PASS
Band13	5MHz	16QAM	23255	25RB#0	21.59	15.49	34.77	PASS
Band13	10MHz	QPSK	23230	1RB#0	23.58	17.48	34.77	PASS
Band13	10MHz	QPSK	23230	1RB#24	23.67	17.57	34.77	PASS
Band13	10MHz	QPSK	23230	1RB#49	23.50	17.40	34.77	PASS
Band13	10MHz	QPSK	23230	25RB#0	22.83	16.73	34.77	PASS
Band13	10MHz	QPSK	23230	25RB#12	22.75	16.65	34.77	PASS
Band13	10MHz	QPSK	23230	25RB#25	22.70	16.60	34.77	PASS
Band13	10MHz	QPSK	23230	50RB#0	22.77	16.67	34.77	PASS
Band13	10MHz	16QAM	23230	1RB#0	22.69	16.59	34.77	PASS
Band13	10MHz	16QAM	23230	1RB#24	22.89	16.79	34.77	PASS
Band13	10MHz	16QAM	23230	1RB#49	22.60	16.50	34.77	PASS
Band13	10MHz	16QAM	23230	25RB#0	21.73	15.63	34.77	PASS
Band13	10MHz	16QAM	23230	25RB#12	21.67	15.57	34.77	PASS
Band13	10MHz	16QAM	23230	25RB#25	21.66	15.56	34.77	PASS
Band13	10MHz	16QAM	23230	50RB#0	21.69	15.59	34.77	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]

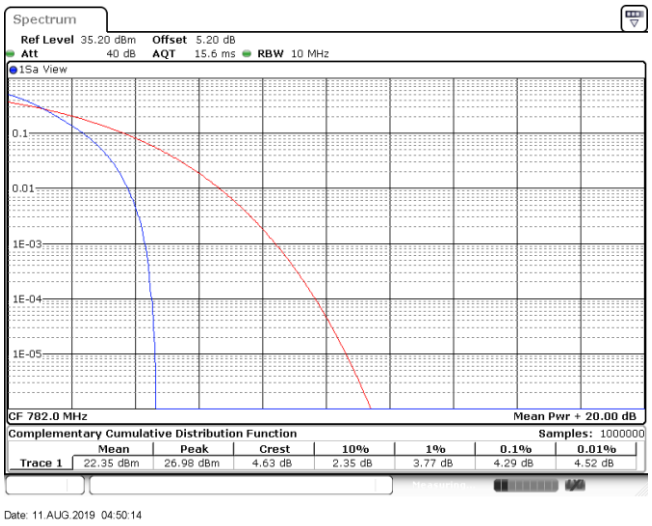
4. Peak-to-Average Ratio (CCDF)

4.1. Test Result

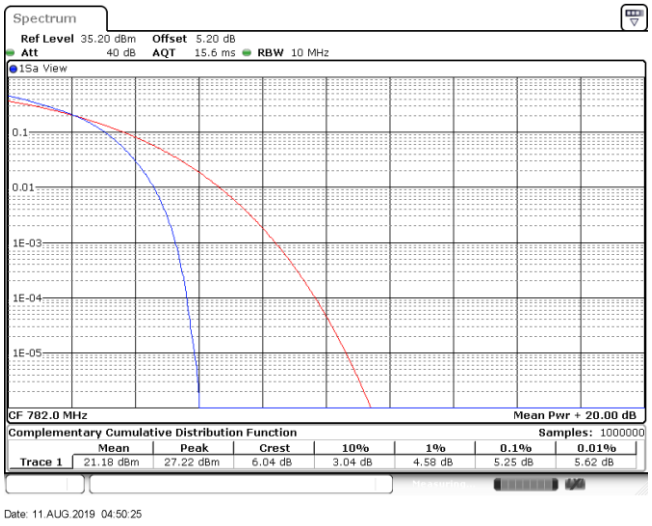
Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
Band13	10MHz	QPSK	23230	50RB#0	4.29	13	PASS
Band13	10MHz	16QAM	23230	50RB#0	5.25	13	PASS

4.2. Test Plots

Band13_10MHz_QPSK_23230_50RB#0



Band13_10MHz_16QAM_23230_50RB#0

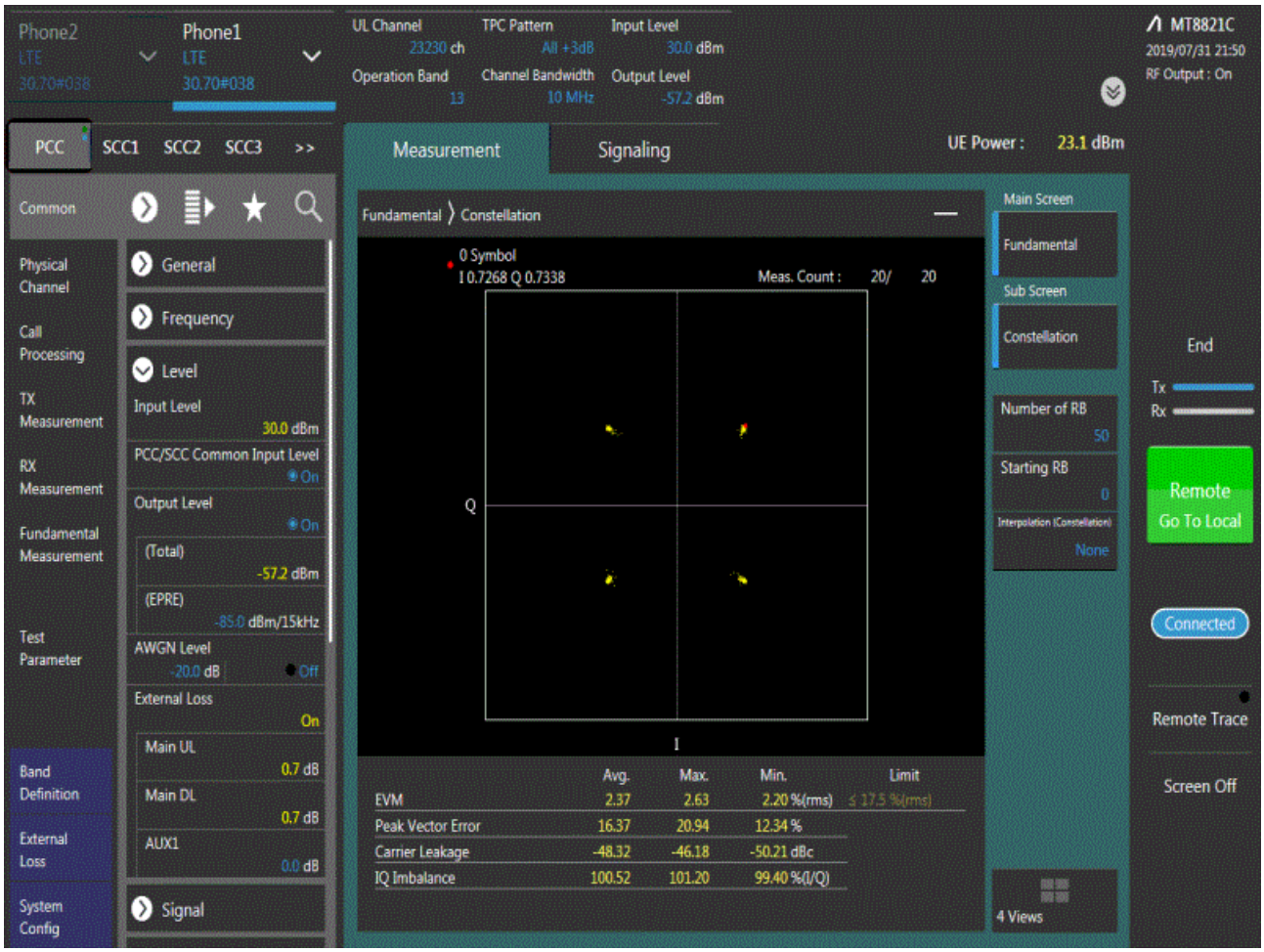


5. Modulation Characteristics

5.1. Test Band = LTE Band 13

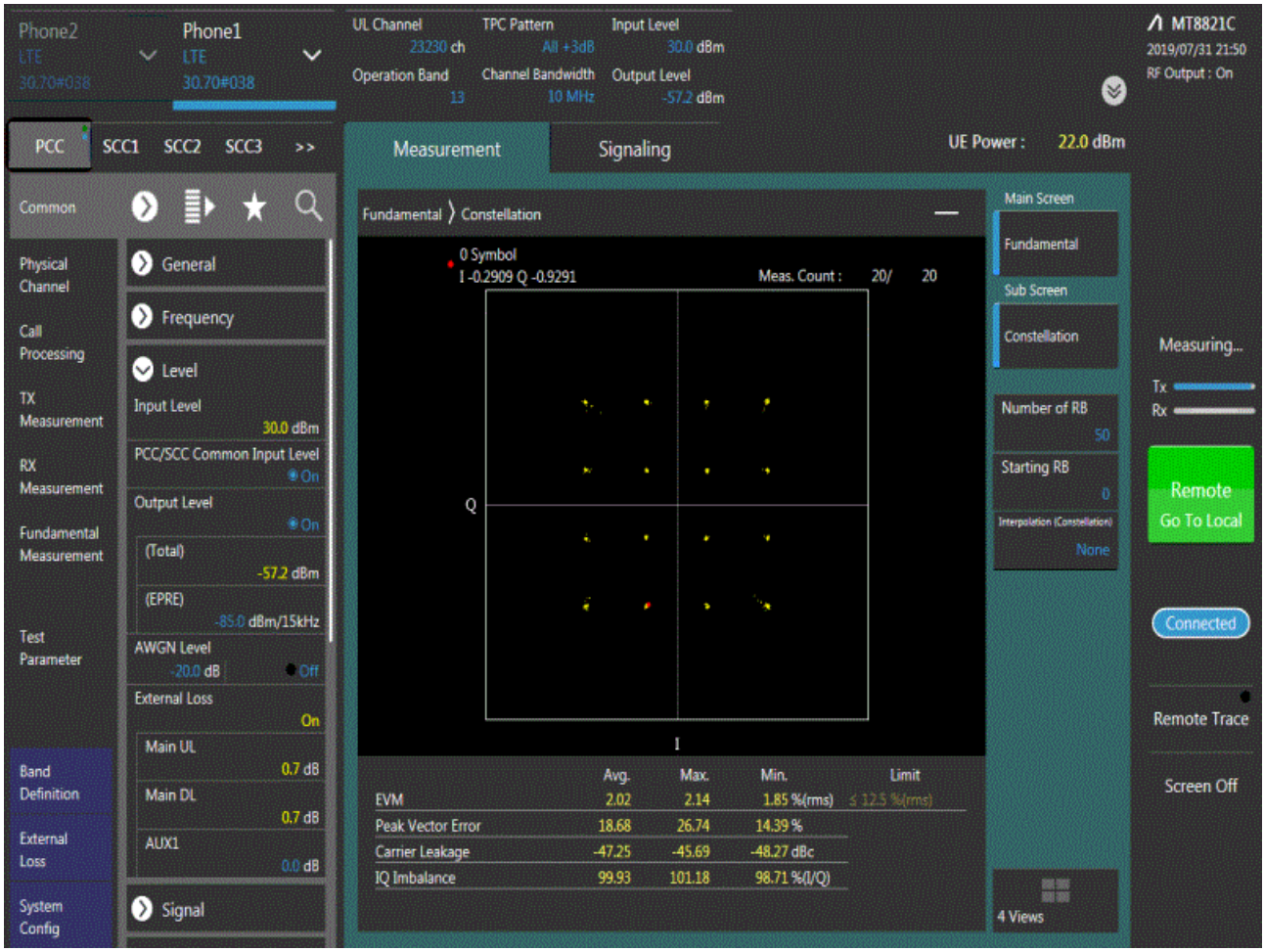
5.2. Test Mode = LTE /TM1 10MHz

5.2.1.Test Channel = MCH



5.3. Test Mode = LTE /TM2 10MHz

5.3.1.Test Channel = MCH



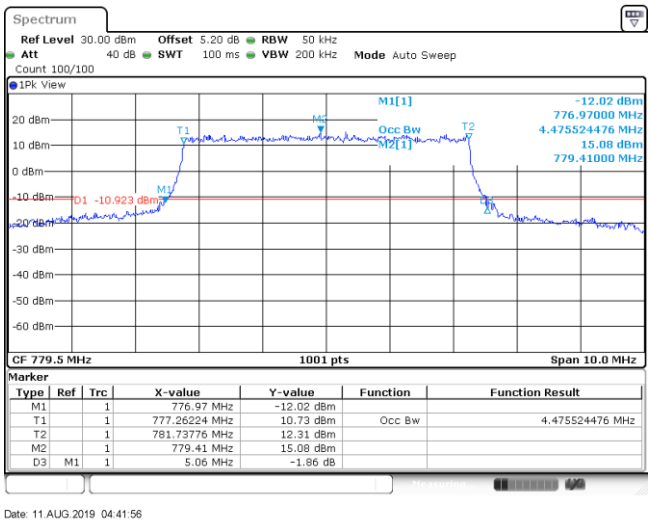
6. 26dB Bandwidth and Occupied Bandwidth

6.1. Test Result

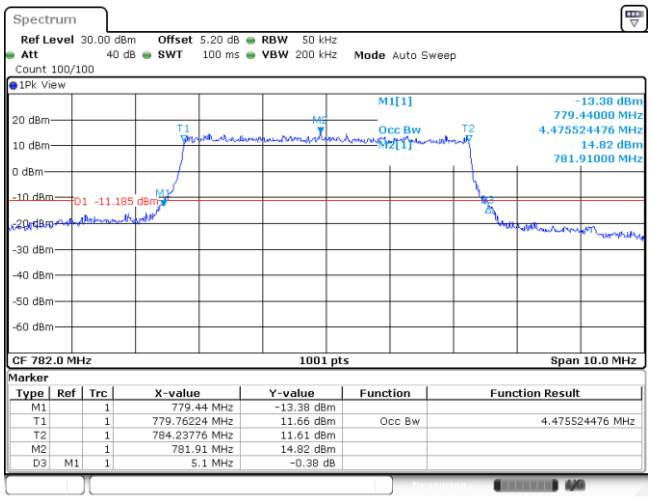
Band	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band13	5MHz	QPSK	23205	25RB#0	4.476	5.060	PASS
Band13	5MHz	QPSK	23230	25RB#0	4.476	5.100	PASS
Band13	5MHz	QPSK	23255	25RB#0	4.486	5.090	PASS
Band13	5MHz	16QAM	23205	25RB#0	4.486	5.100	PASS
Band13	5MHz	16QAM	23230	25RB#0	4.496	5.100	PASS
Band13	5MHz	16QAM	23255	25RB#0	4.496	5.120	PASS
Band13	10MHz	QPSK	23230	50RB#0	8.951	9.880	PASS
Band13	10MHz	16QAM	23230	50RB#0	8.951	9.920	PASS

6.2. Test Plots

Band13_5MHz_QPSK_23205_25RB#0

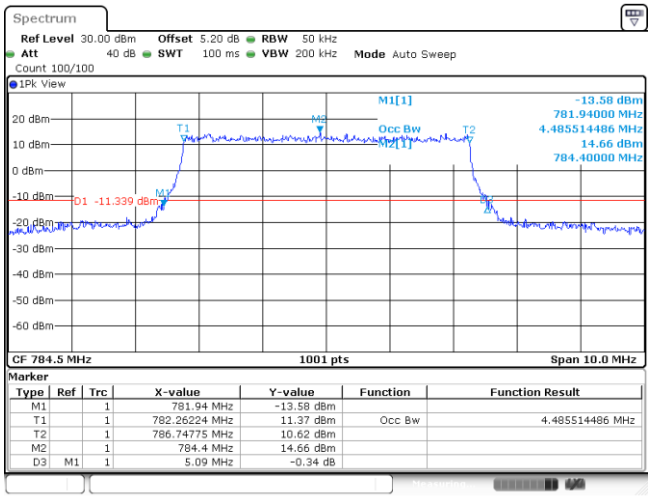


Band13_5MHz_QPSK_23230_25RB#0



Date: 11.AUG.2019 04:42:36

Band13_5MHz_QPSK_23255_25RB#0



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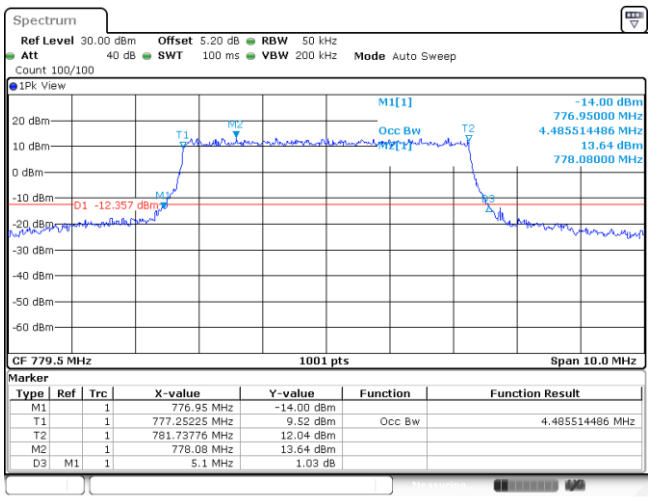
Band13_5MHz_16QAM_23205_25RB#0



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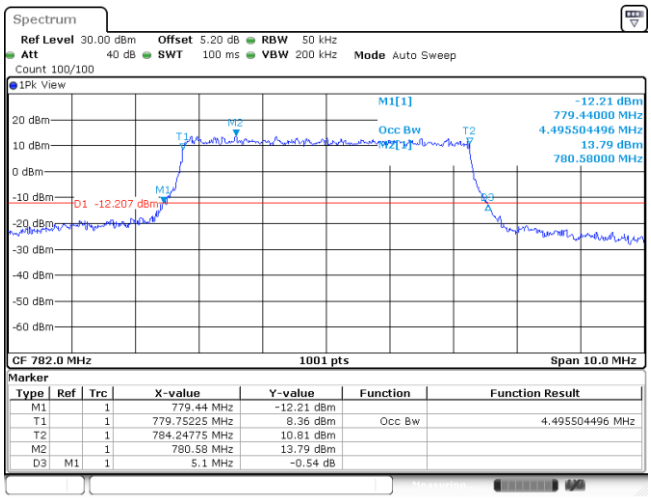
Band13_5MHz_16QAM_23230_25RB#0



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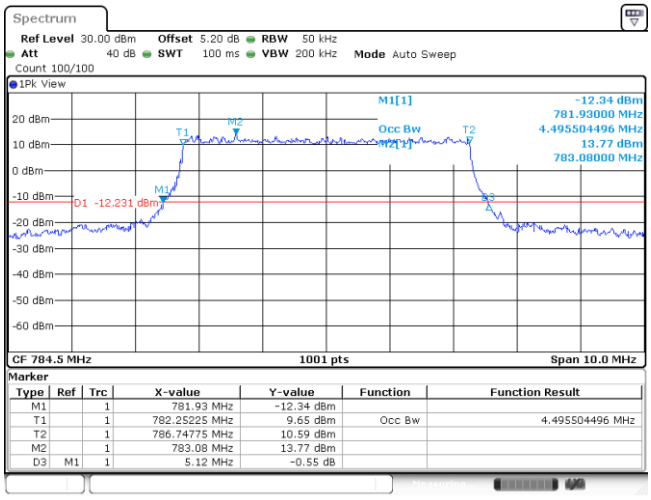
Band13_5MHz_16QAM_23255_25RB#0



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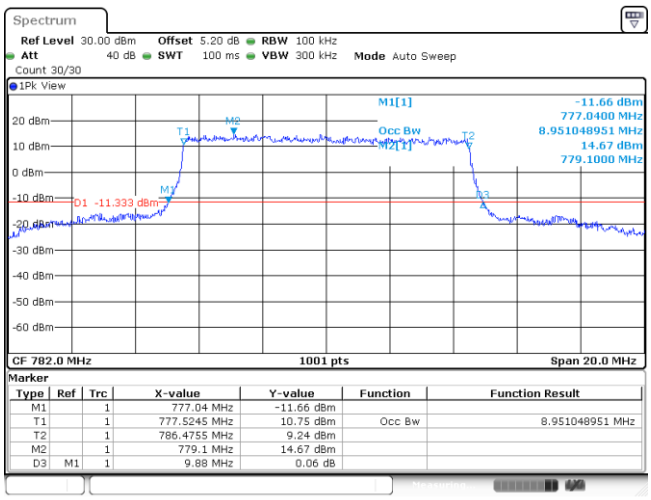
Band13_10MHz_QPSK_23230_50RB#0



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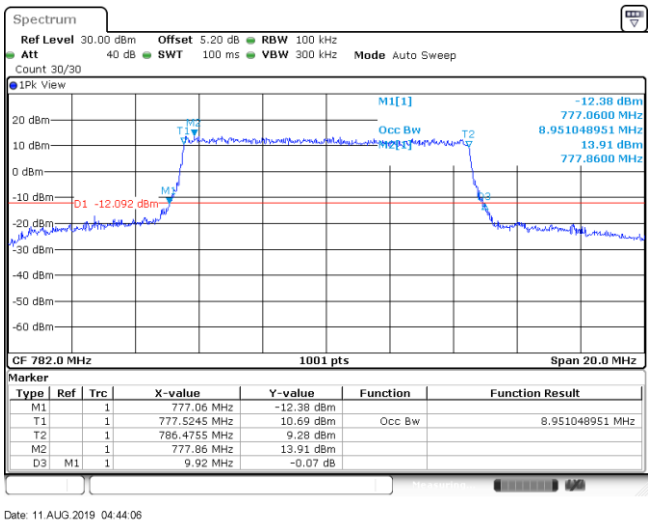

7. Band Edge Compliance

7.1. Test Plots

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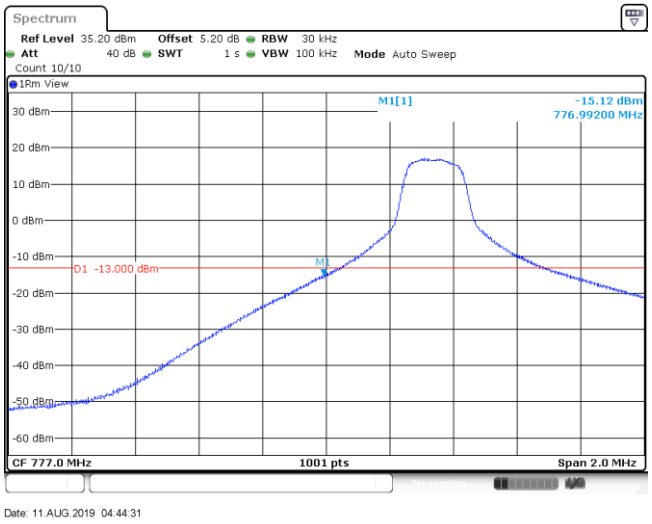
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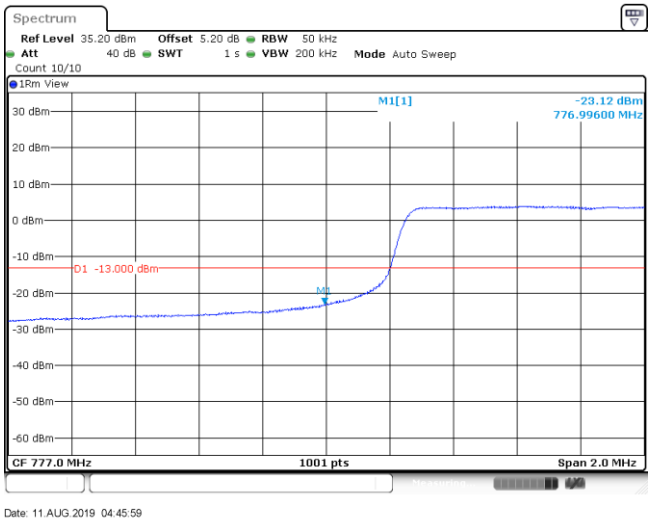

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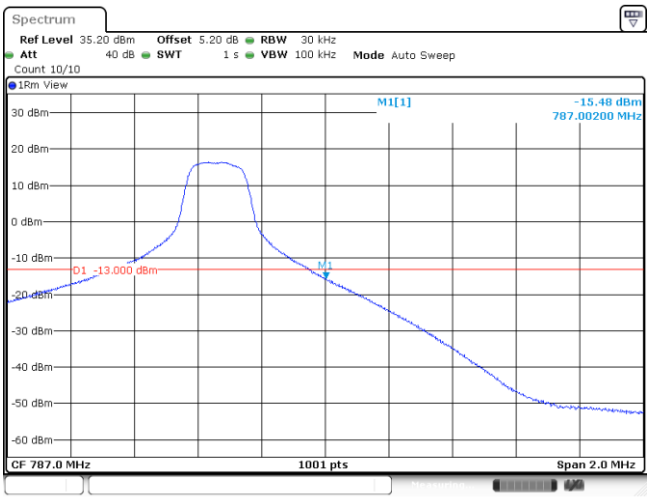
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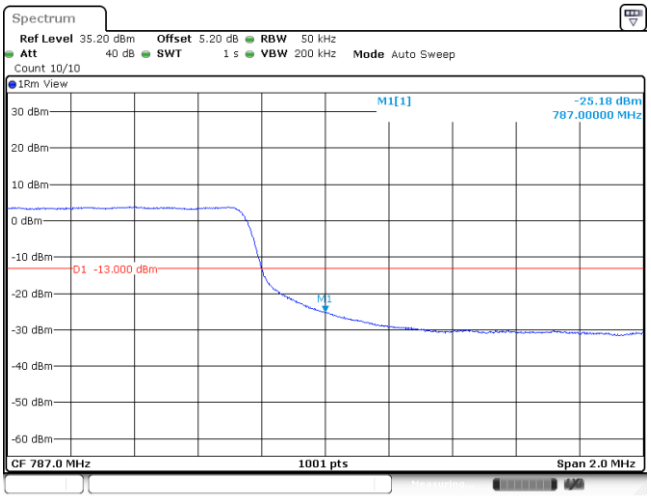
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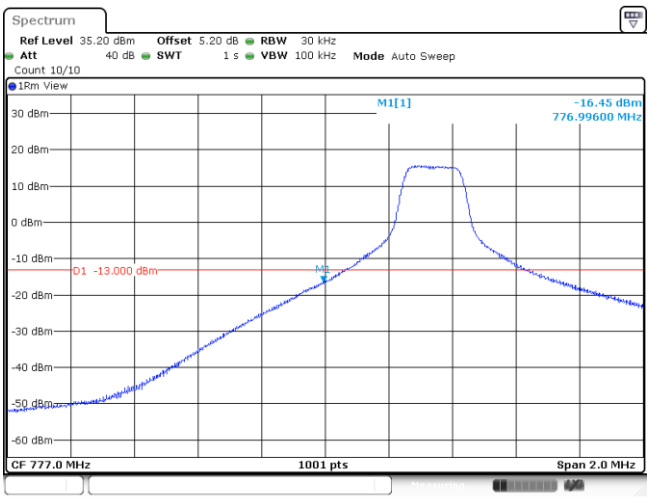

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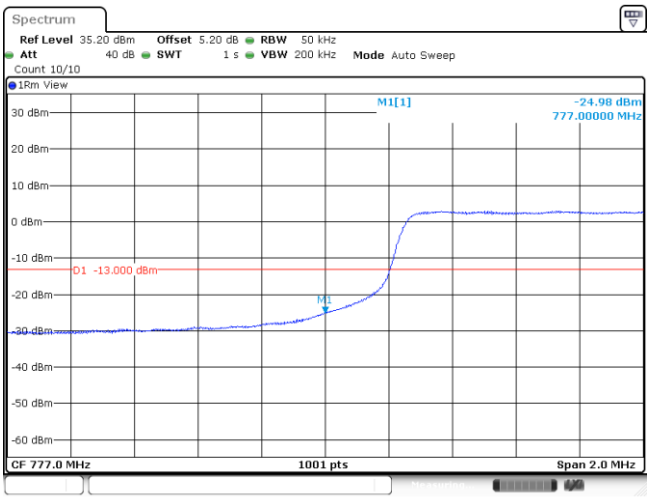

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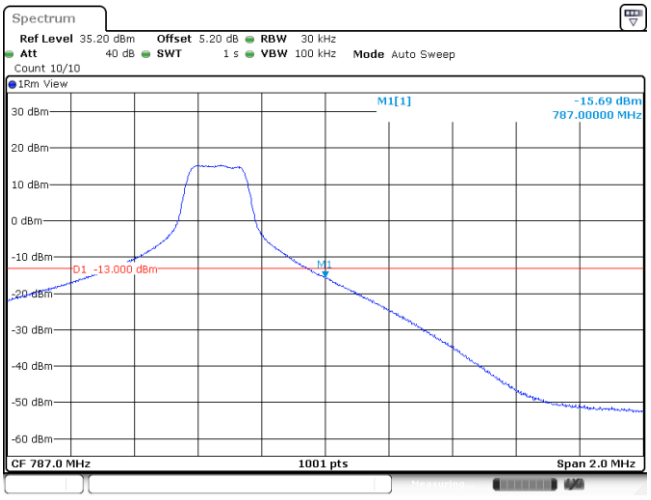

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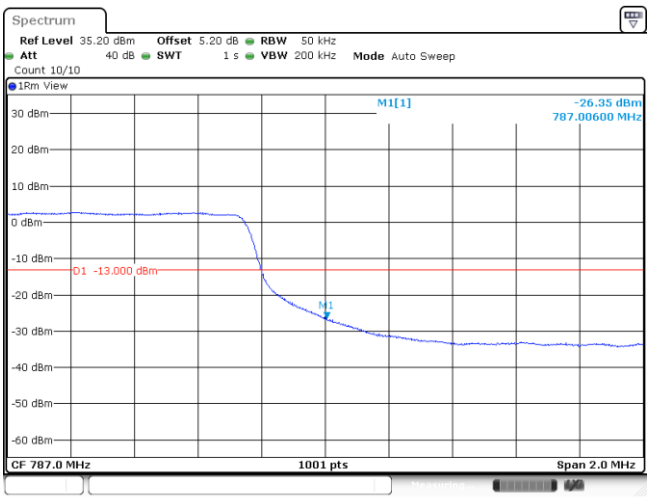
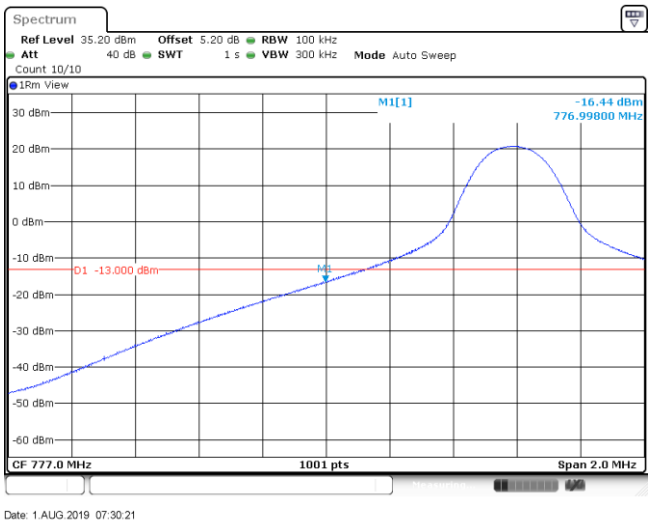
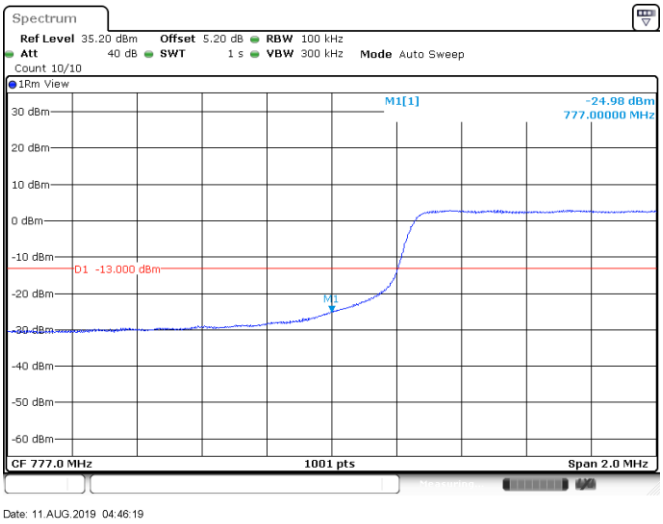


Band13_10MHz_QPSK_23230_Left_1RB#0



Band13_10MHz_QPSK_23230_Left_50RB#0



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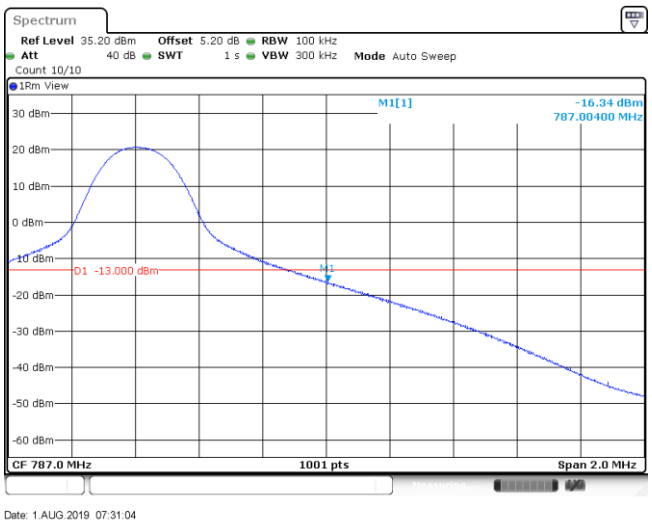

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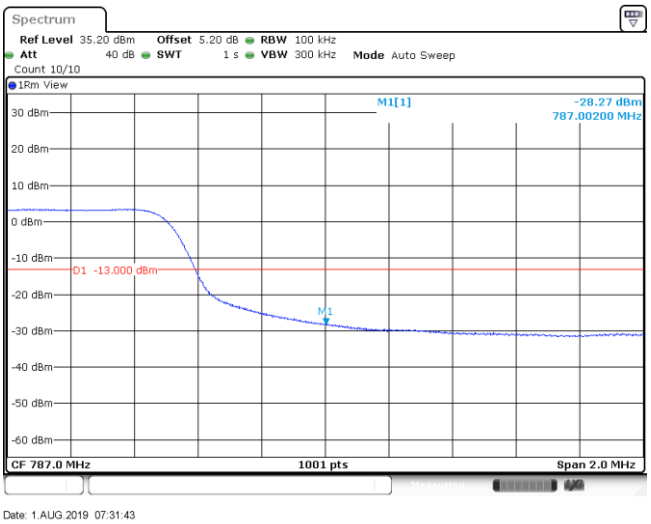
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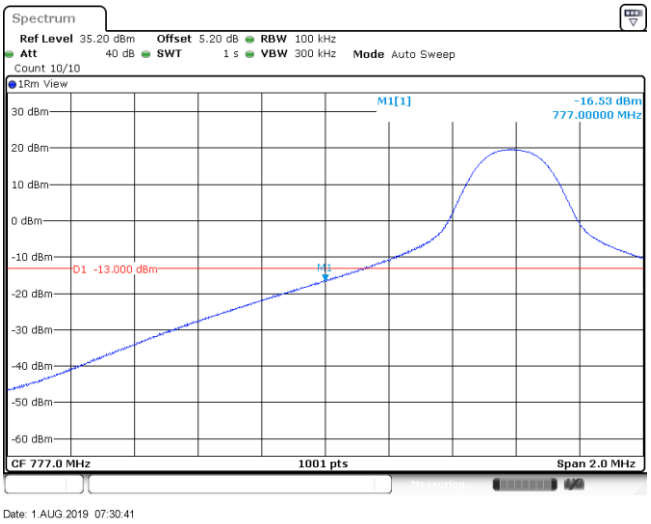
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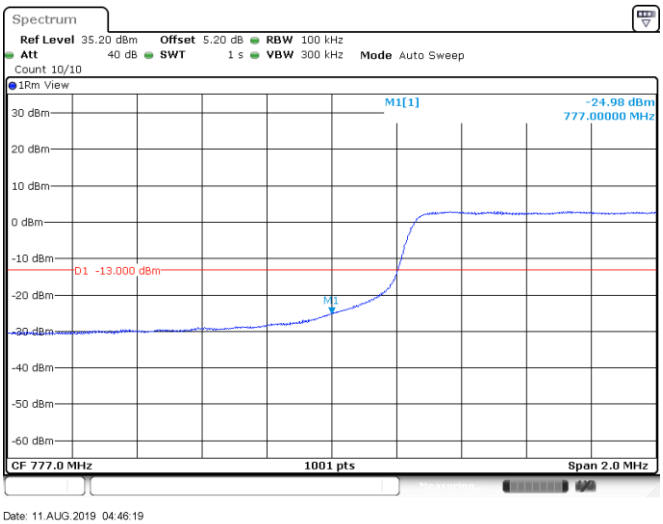

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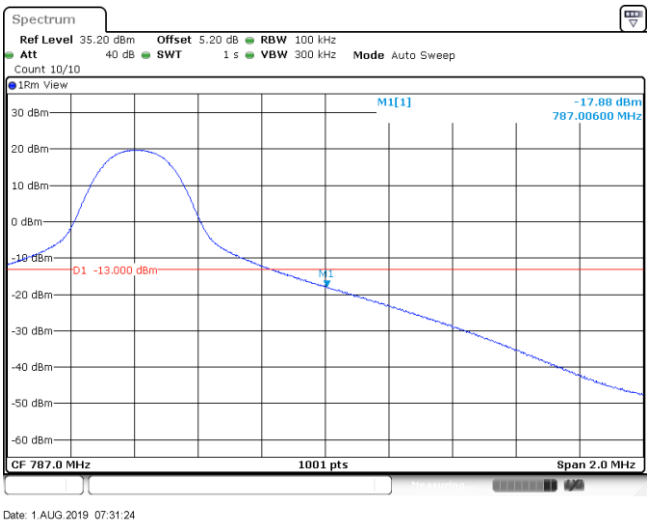
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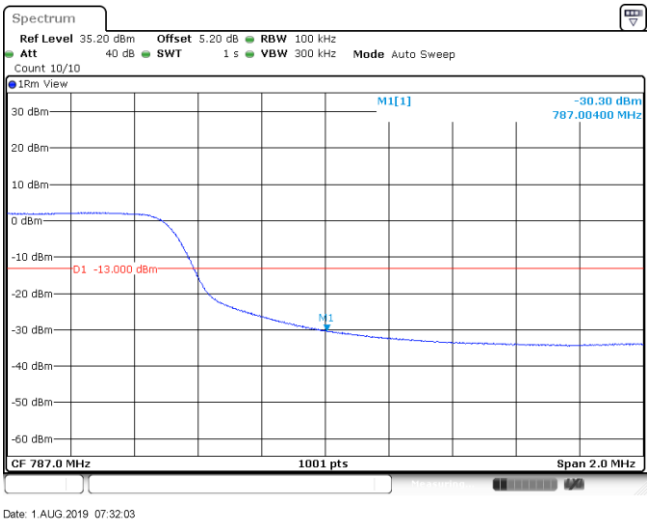


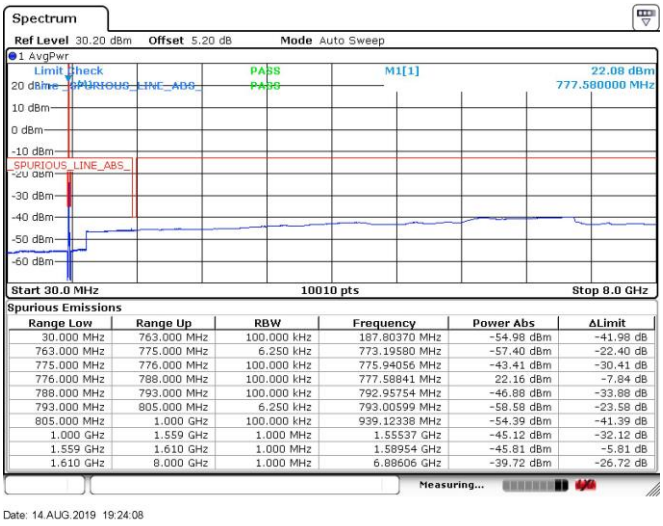
8. Spurious Emission at Antenna Terminal

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.

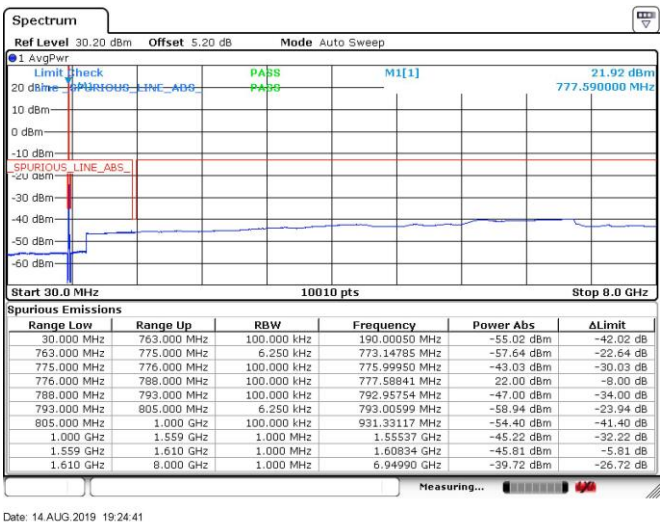
Remark2: only the worst case data displayed in this report.

8.1. Test Plots

Band13_10MHz_QPSK_23230_1RB#0



Band13_10MHz_16QAM_23230_1RB#0



9. Frequency Stability

9.1. Frequency Vs Voltage

Voltage										
Band	Bandwidth	Modulation	Channel	RB Configure	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band13	10MHz	QPSK	23230	50RB#0	VL	NT	-6.20	-0.007928	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VN	NT	-4.00	-0.005115	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VH	NT	-5.80	-0.007417	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VL	NT	-10.50	-0.013427	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VN	NT	-9.10	-0.011637	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VH	NT	-3.70	-0.004731	±2.5	PASS

9.2. Frequency Vs Temperature

Temperature										
Band	Bandwidth	Modulation	Channel	RB Configure	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band13	10MHz	QPSK	23230	50RB#0	NV	-30	-2.30	-0.002941	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	-20	-8.50	-0.010870	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	0	-5.30	-0.006777	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	10	-6.30	-0.008056	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	20	-5.50	-0.007033	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	30	-8.60	-0.010997	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	40	-5.50	-0.007033	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	50	-8.90	-0.011381	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-30	-3.40	-0.004348	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-20	-7.50	-0.009591	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	0	-7.10	-0.009079	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	10	-2.40	-0.003069	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	20	-2.00	-0.002558	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	30	-2.10	-0.002685	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	40	-4.90	-0.006266	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	50	-3.00	-0.003836	±2.5	PASS