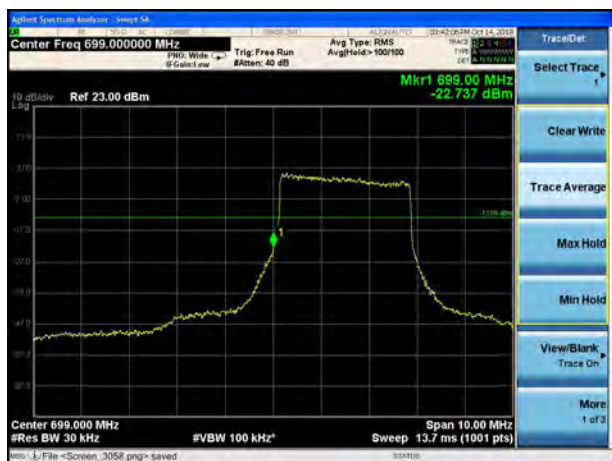
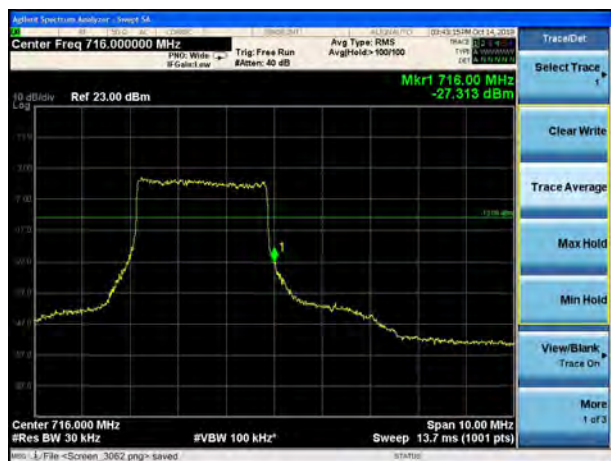


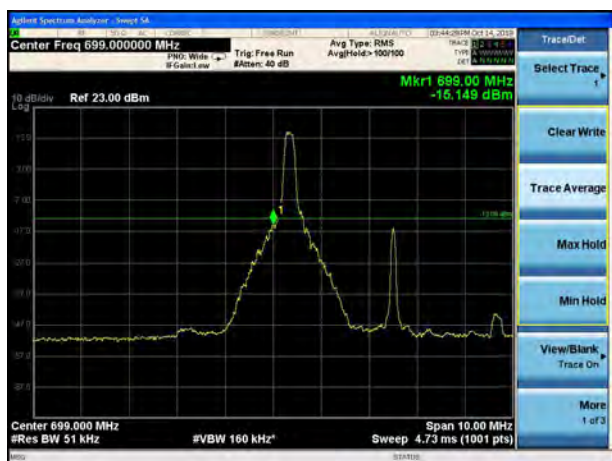
LTE Band 12 QPSK 3MHz CH-Low, 100%RB



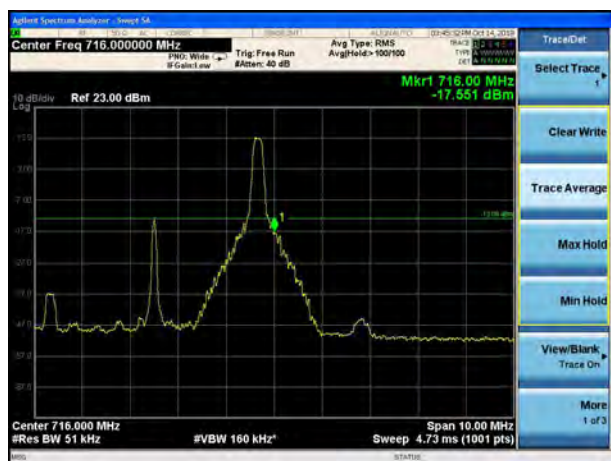
LTE Band 12 QPSK 3MHz CH-High, 100%RB



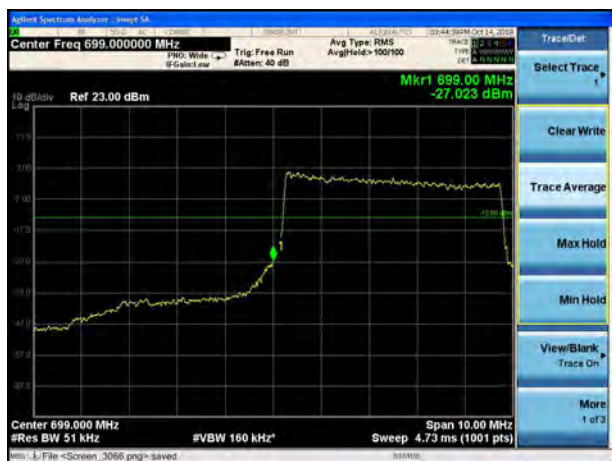
LTE Band 12 QPSK 5MHz CH-Low, 1 RB



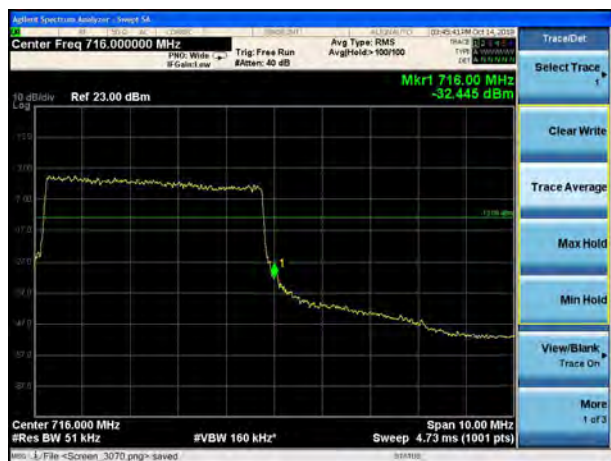
LTE Band 12 QPSK 5MHz CH-High, 1 RB



LTE Band 12 QPSK 5MHz CH-Low, 100%RB

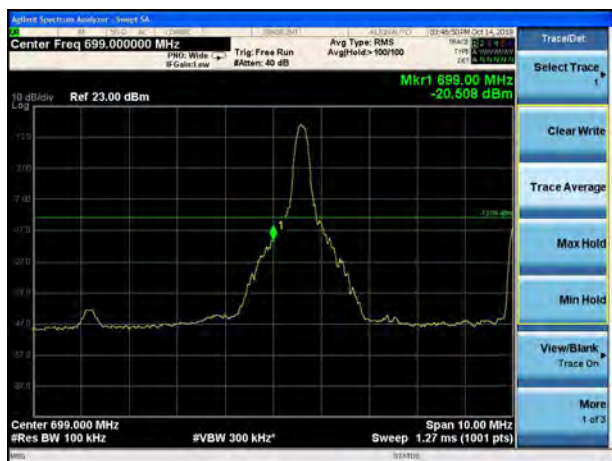


LTE Band 12 QPSK 5MHz CH-High, 100%RB

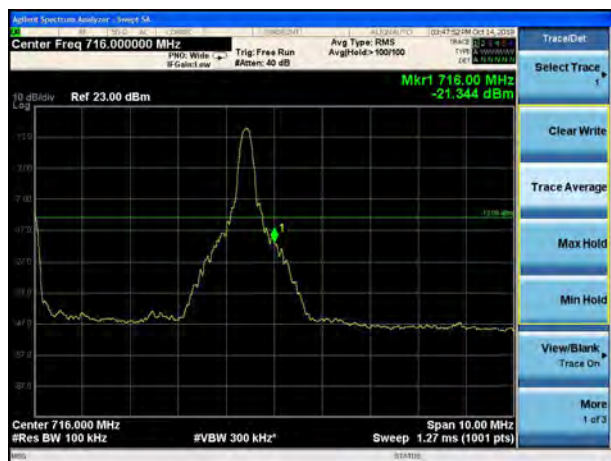




LTE Band 12 QPSK 10MHz CH-Low, 1 RB



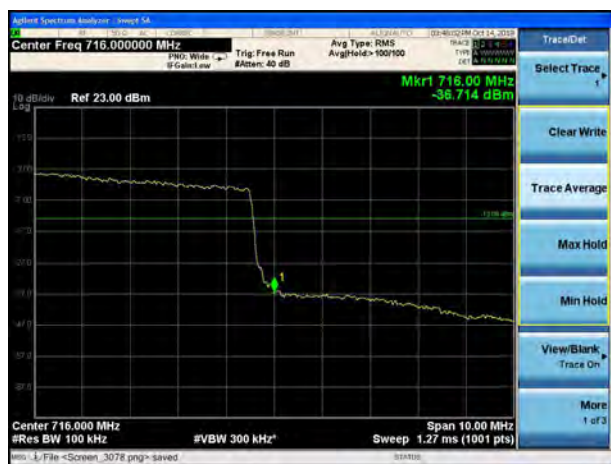
LTE Band 12 QPSK 10MHz CH-High, 1 RB



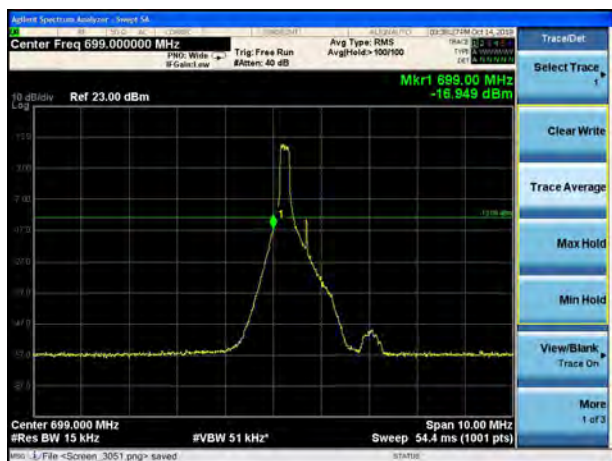
LTE Band 12 QPSK 10MHz CH-Low, 100%RB



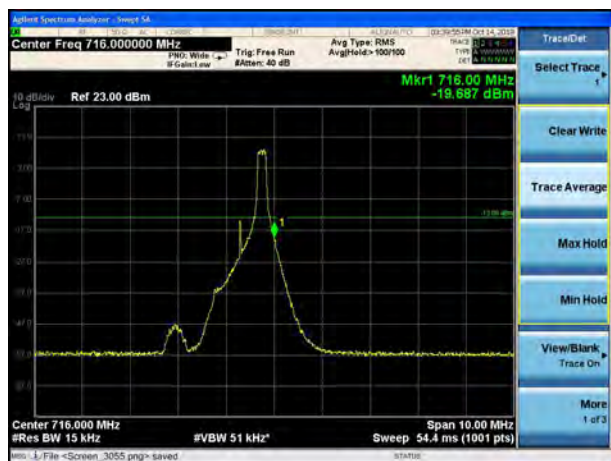
LTE Band 12 QPSK 10MHz CH-High, 100%RB



LTE Band 12 16QAM 1.4MHz CH-Low, 1 RB

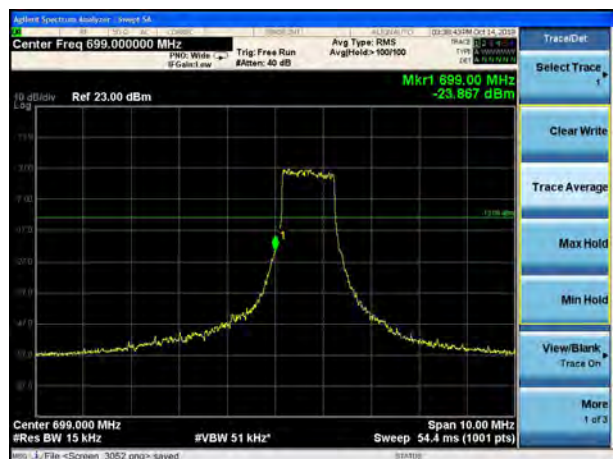


LTE Band 12 16QAM 1.4MHz CH-High, 1 RB

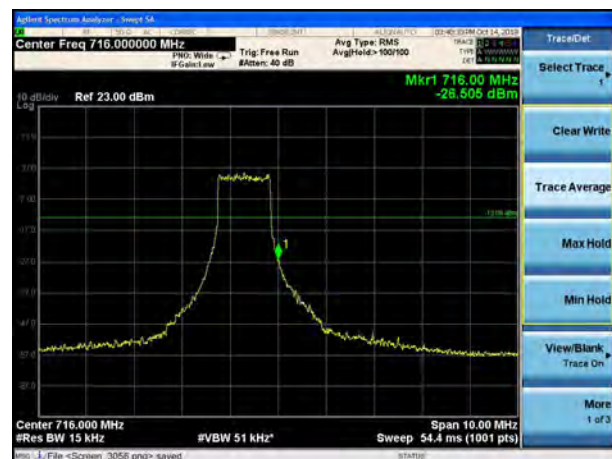




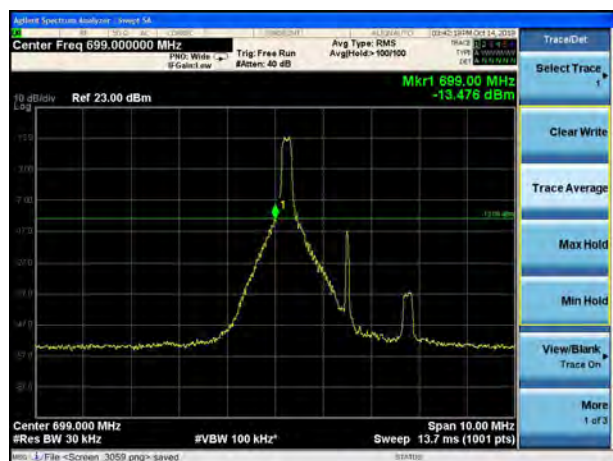
LTE Band 12 16QAM 1.4MHz CH-Low, 100%RB



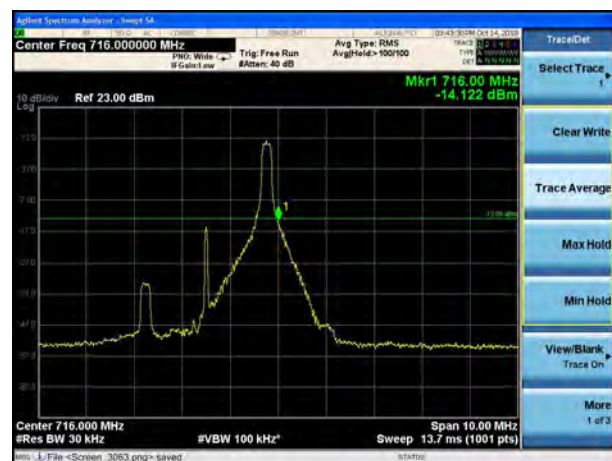
LTE Band 12 16QAM 1.4MHz CH-High, 100%RB



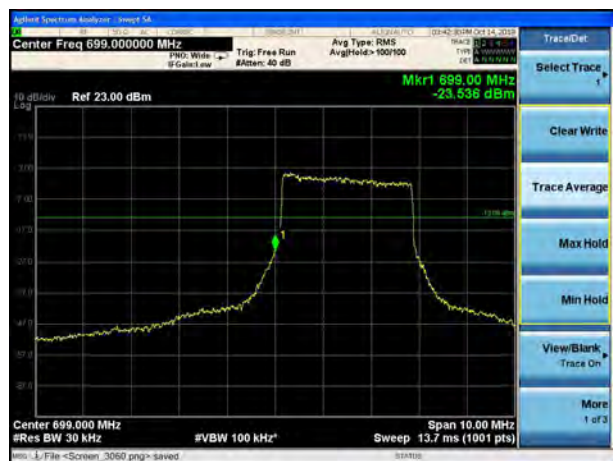
LTE Band 12 16QAM 3MHz CH-Low, 1 RB



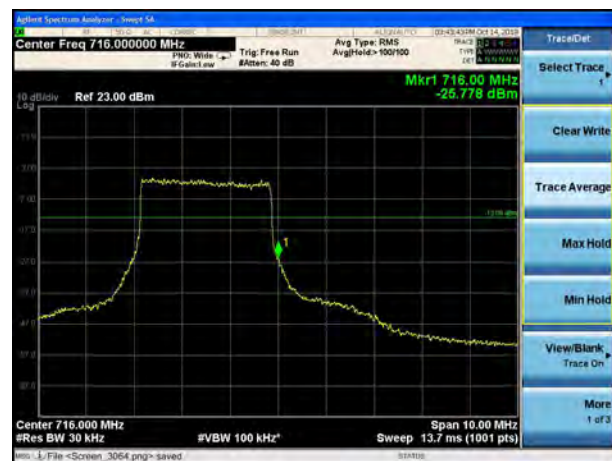
LTE Band 12 16QAM 3MHz CH-High, 1 RB



LTE Band 12 16QAM 3MHz CH-Low, 100%RB

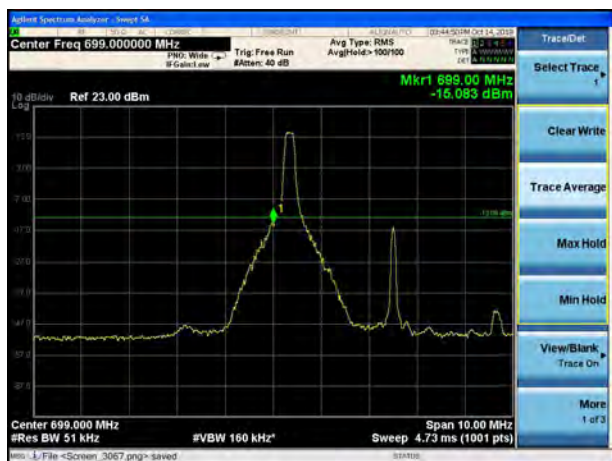


LTE Band 12 16QAM 3MHz CH-High, 100%RB

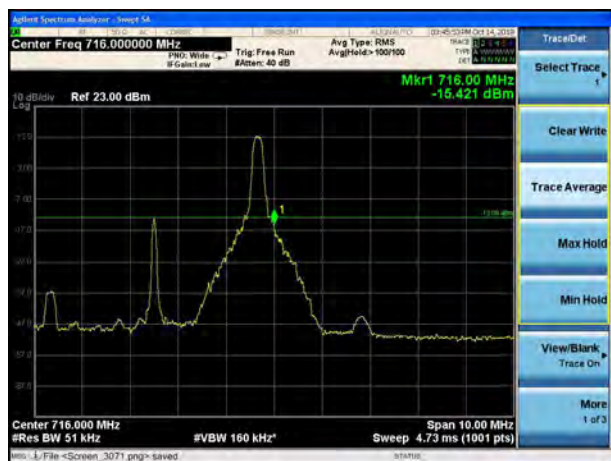




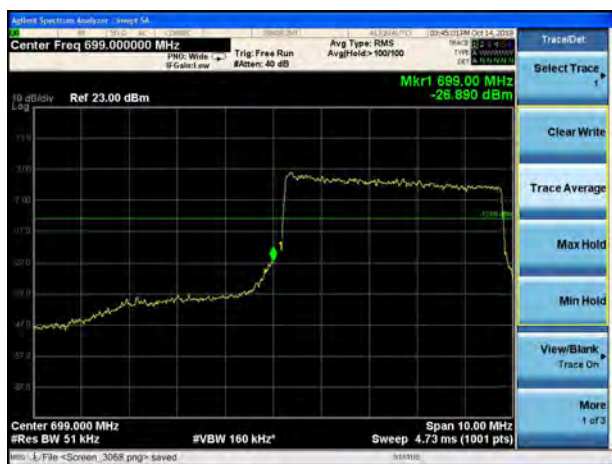
LTE Band 12 16QAM 5MHz CH-Low, 1 RB



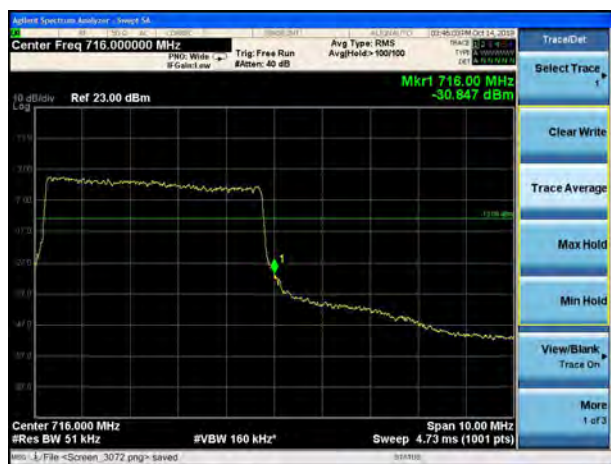
LTE Band 12 16QAM 5MHz CH-High, 1 RB



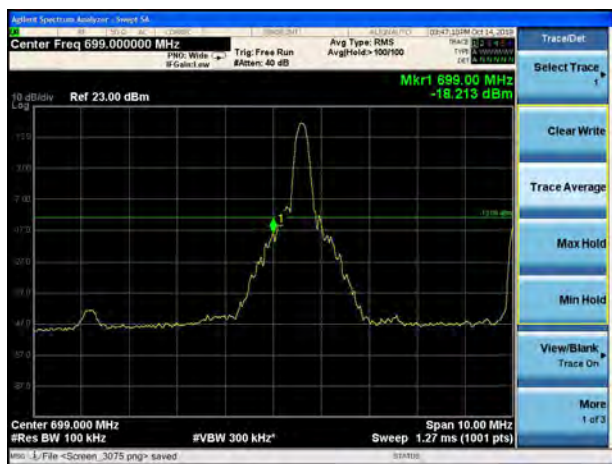
LTE Band 12 16QAM 5MHz CH-Low, 100%RB



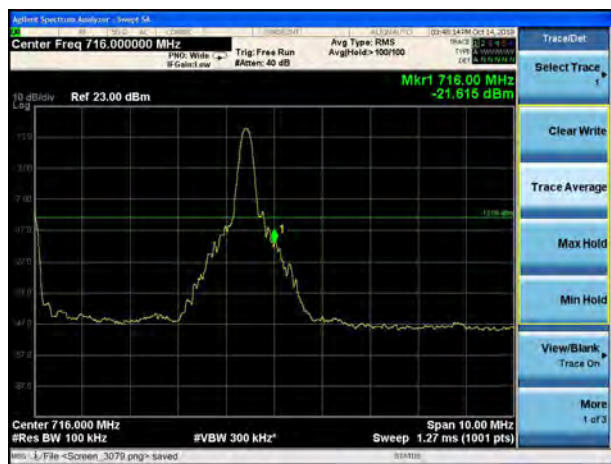
LTE Band 12 16QAM 5MHz CH-High, 100%RB



LTE Band 12 16QAM 10MHz CH-Low, 1 RB

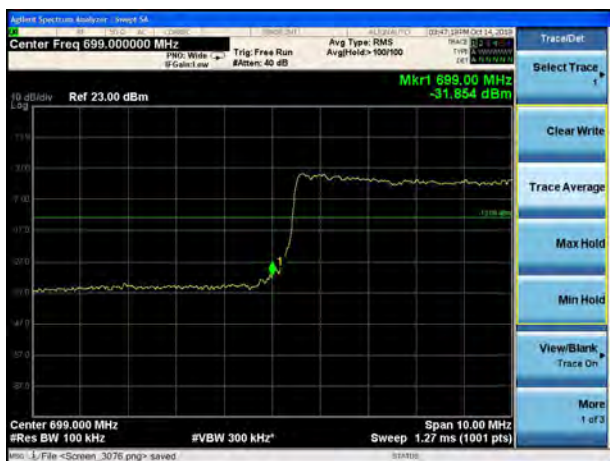


LTE Band 12 16QAM 10MHz CH-High, 1 RB





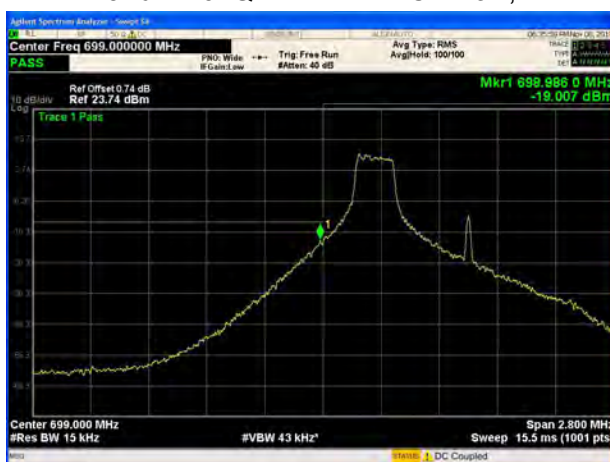
LTE Band 12 16QAM 10MHz CH-Low, 100%RB



LTE Band 12 16QAM 10MHz CH-High, 100%RB



LTE Band 12 64QAM 1.4MHz CH-Low, 1 RB



LTE Band 12 64QAM 1.4MHz CH-High, 1 RB



LTE Band 12 64QAM 1.4MHz CH-Low, 100%RB

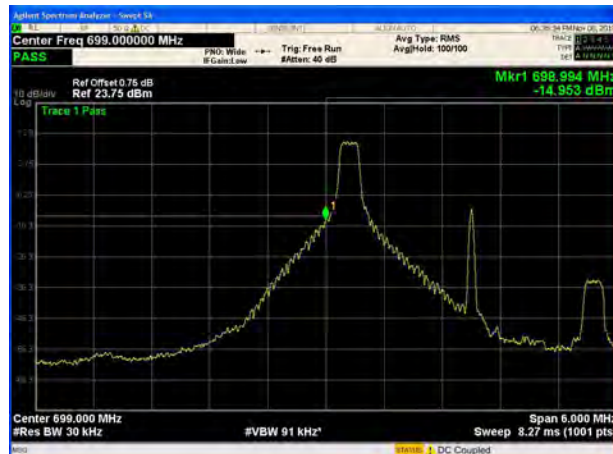


LTE Band 12 64QAM 1.4MHz CH-High, 100%RB





LTE Band 12 64QAM 3MHz CH-Low, 1 RB



LTE Band 12 64QAM 3MHz CH-High, 1 RB



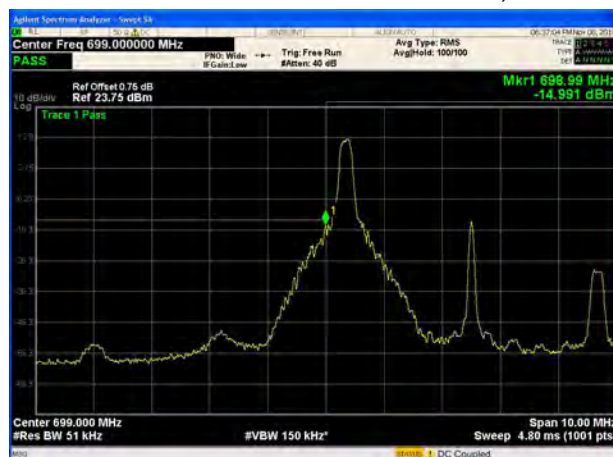
LTE Band 12 64QAM 3MHz CH-Low, 100%RB



LTE Band 12 64QAM 3MHz CH-High, 100%RB



LTE Band 12 64QAM 5MHz CH-Low, 1 RB



LTE Band 12 64QAM 5MHz CH-High, 1 RB





LTE Band 12 64QAM 5MHz CH-Low, 100%RB



LTE Band 12 64QAM 5MHz CH-High, 100%RB



LTE Band 12 64QAM 10MHz CH-Low, 1 RB



LTE Band 12 64QAM 10MHz CH-High, 1 RB



LTE Band 12 64QAM 10MHz CH-Low, 100%RB

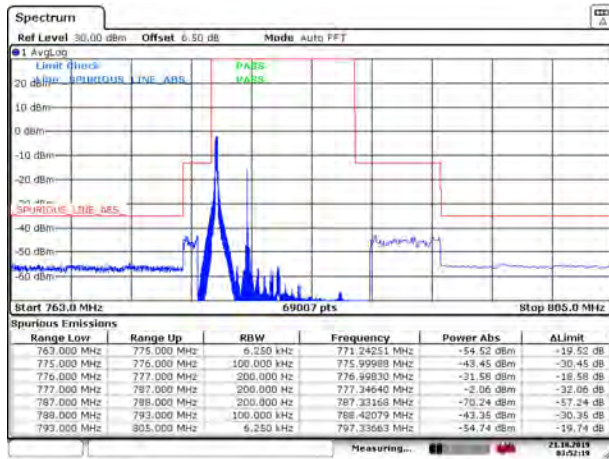


LTE Band 12 64QAM 10MHz CH-High, 100%RB



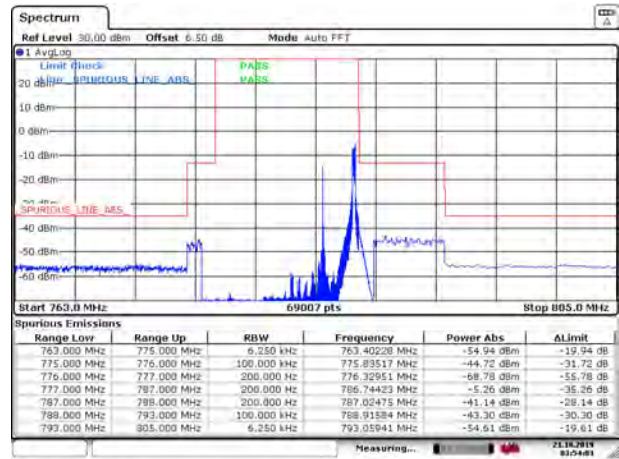


LTE Band 13 QPSK 5MHz CH-Low, 1 RB



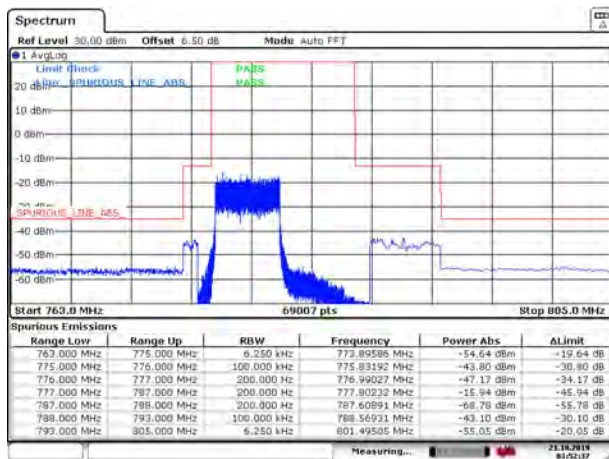
Date: 21 OCT.2019 09:52:19

LTE Band 13 QPSK 5MHz CH-High, 1 RB



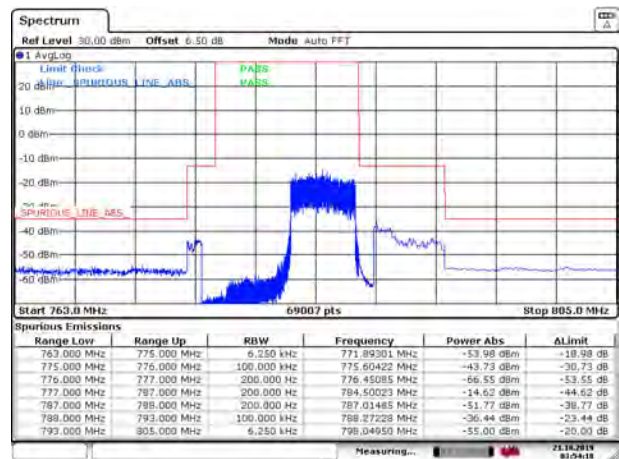
Date: 21 OCT.2019 09:54:03

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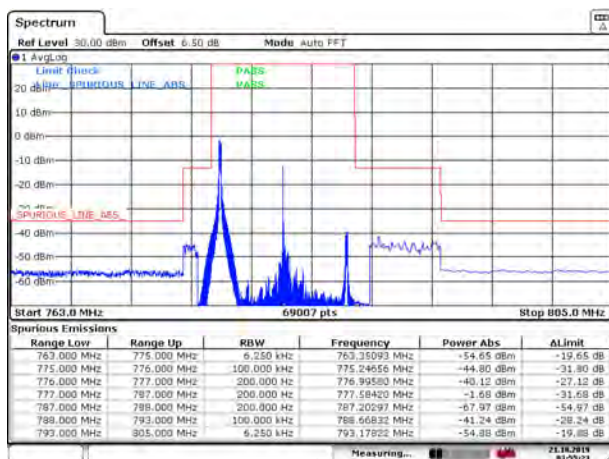
Date: 21 OCT.2019 09:52:38

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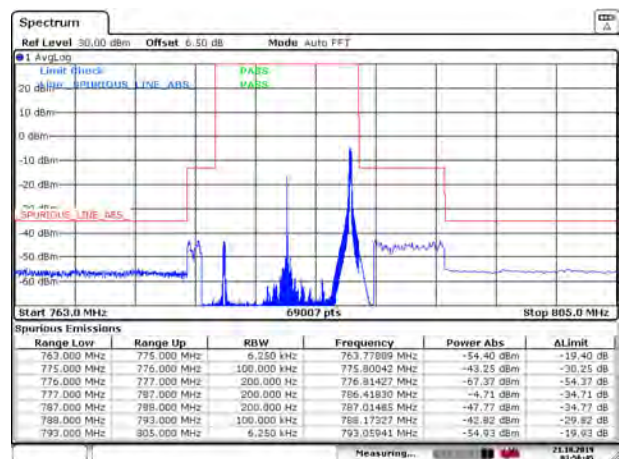
Date: 21 OCT.2019 09:54:18

LTE Band 13 QPSK 10MHz CH-Low, 1 RB



Date: 21 OCT.2019 09:55:22

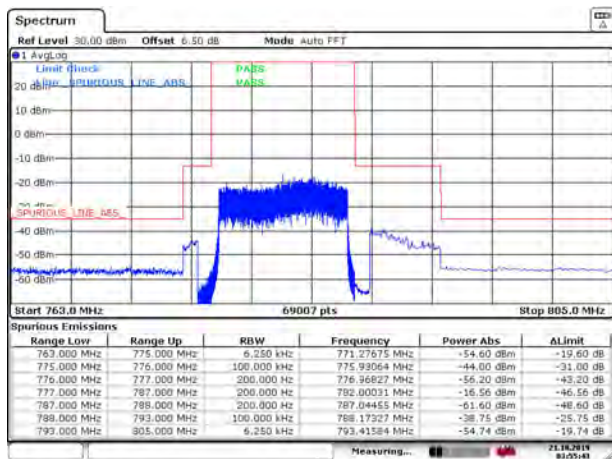
LTE Band 13 QPSK 10MHz CH-High, 1 RB



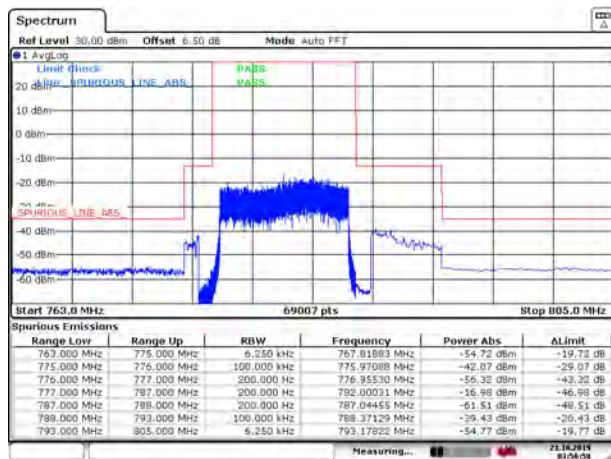
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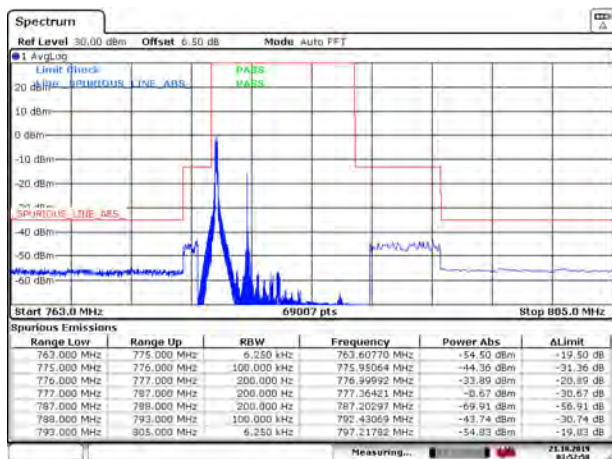
LTE Band 13 QPSK 10MHz CH-Low, 100%RB



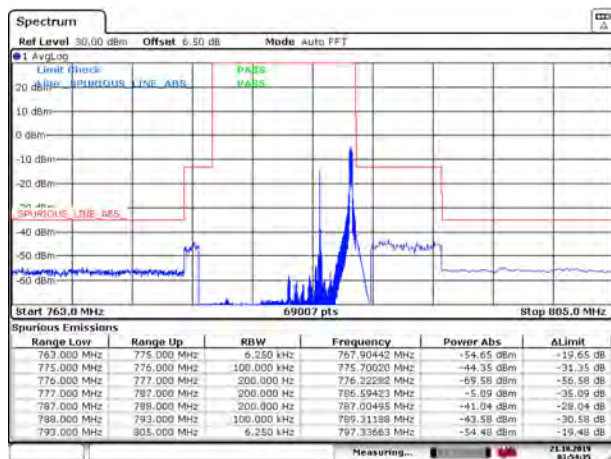
LTE Band 13 QPSK 10MHz CH-High, 100%RB



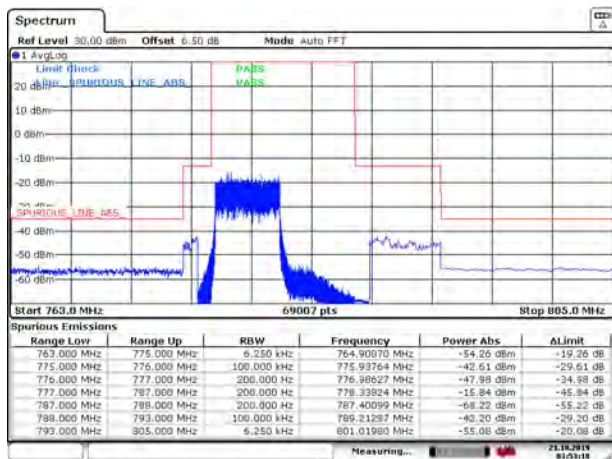
LTE Band 13 16QAM 5MHz CH-Low, 1 RB



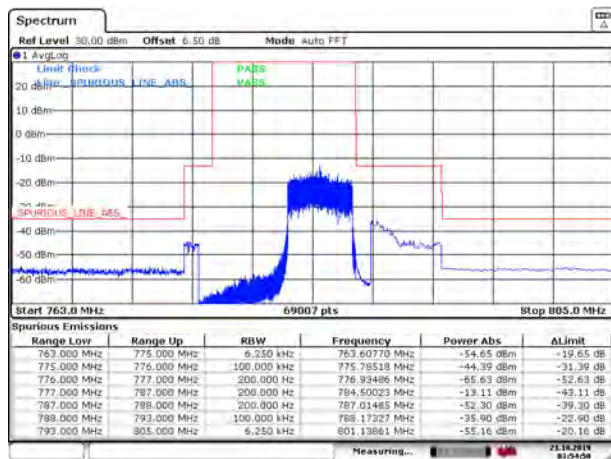
LTE Band 13 16QAM 5MHz CH-High, 1 RB



LTE Band 13 16QAM 5MHz CH-Low, 100%RB

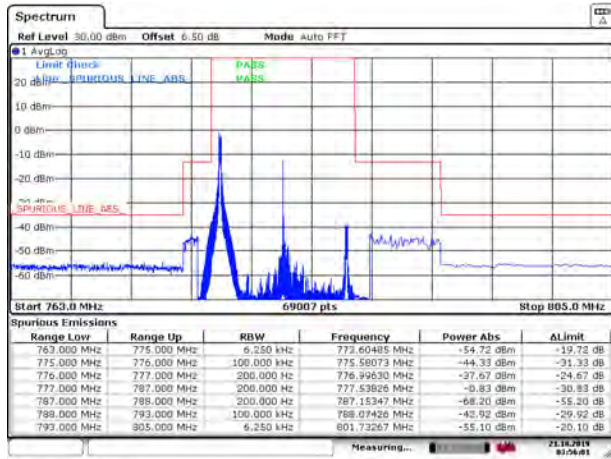


LTE Band 13 16QAM 5MHz CH-High, 100%RB



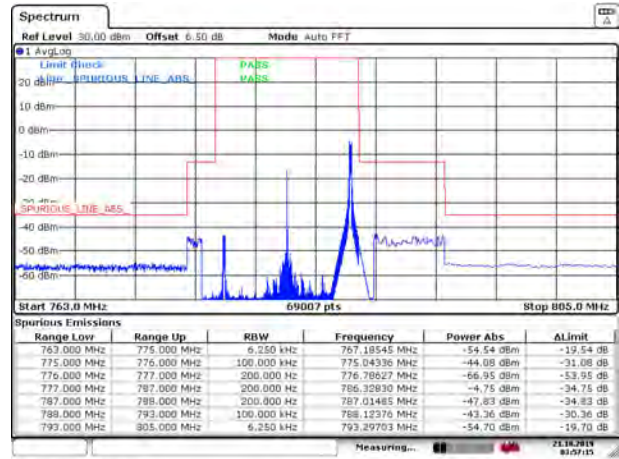


LTE Band 13 16QAM 10MHz CH-Low, 1 RB



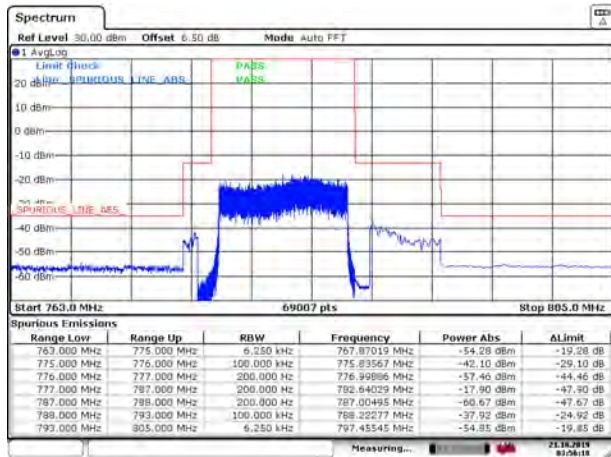
Date: 21 OCT.2019 03:56:01

LTE Band 13 16QAM 10MHz CH-High, 1 RB



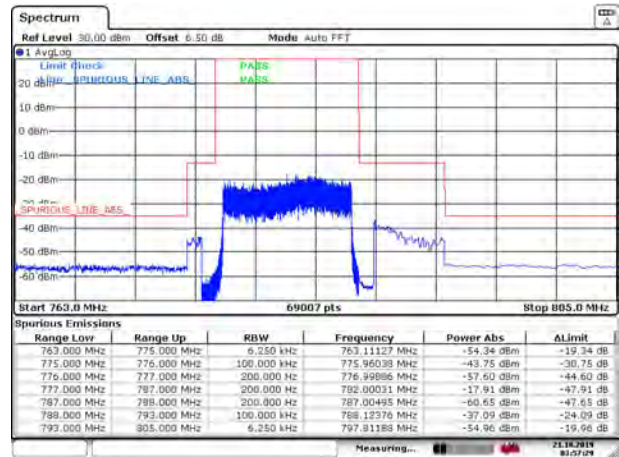
Date: 21 OCT.2019 03:57:15

LTE Band 13 16QAM 10MHz CH-Low, 100%RB



Date: 21 OCT.2019 03:56:18

LTE Band 13 16QAM 10MHz CH-High, 100%RB



Date: 21 OCT.2019 03:57:29



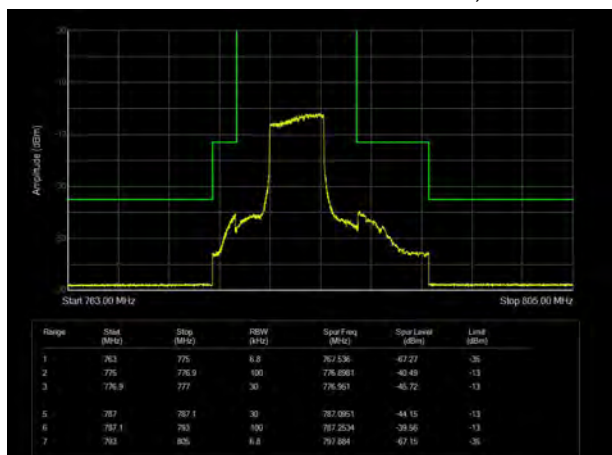
LTE Band 13 64QAM 5MHz CH-Low, 1 RB



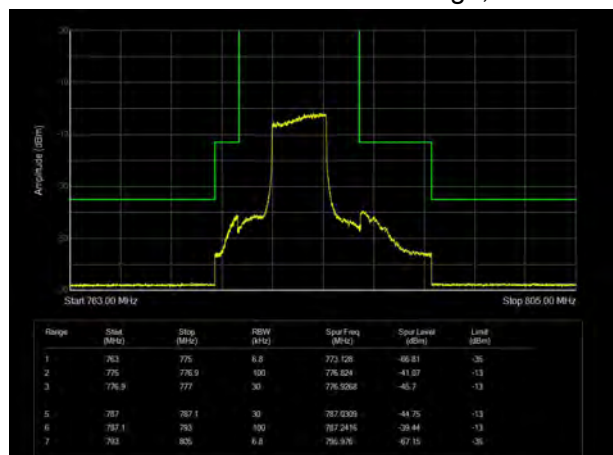
LTE Band 13 64QAM 5MHz CH-High, 1 RB



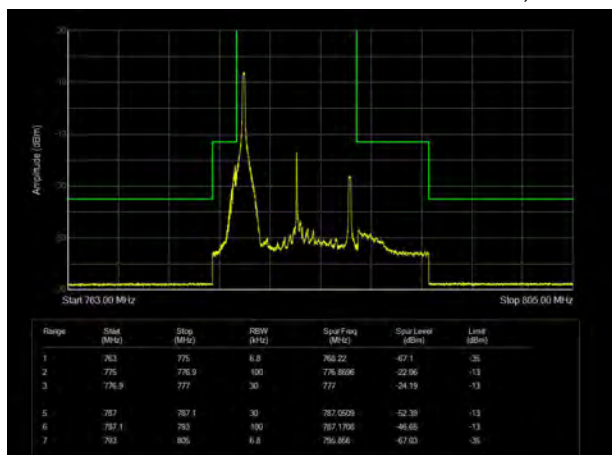
LTE Band 13 64QAM 5MHz CH-Low, 100%RB



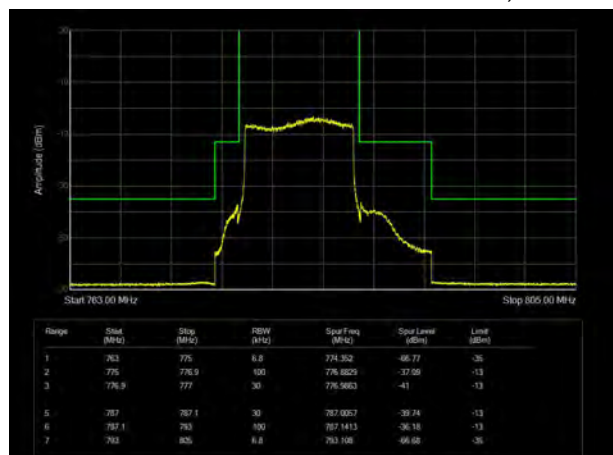
LTE Band 13 64QAM 5MHz CH-High, 100%RB



LTE Band 13 64QAM 10MHz CH-Middle, 1 RB

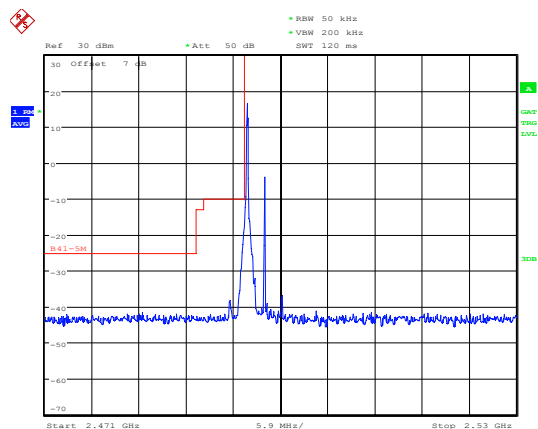


LTE Band 13 64QAM 10MHz CH-Middle, 100%RB



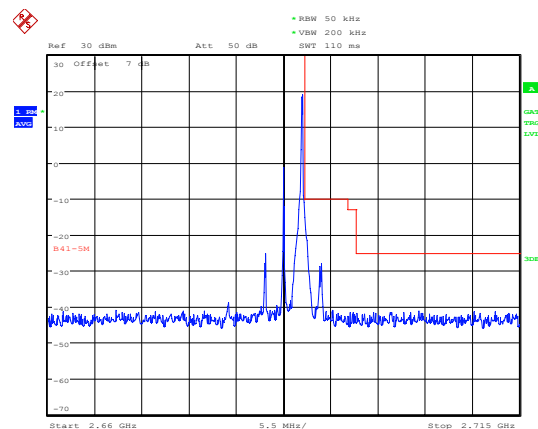


LTE Band 41 QPSK 5MHz CH-Low, 1 RB



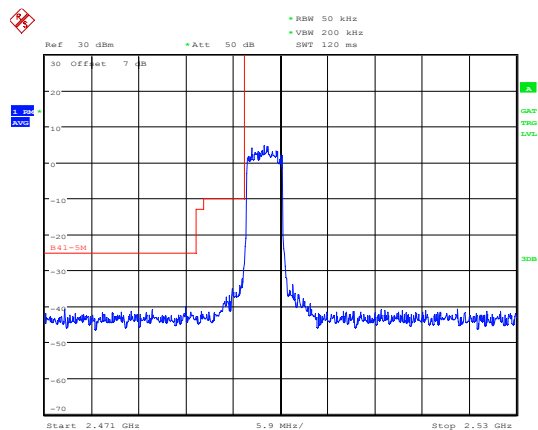
Date: 15.OCT.2019 11:08:24

LTE Band 41 QPSK 5MHz CH-High, 1 RB



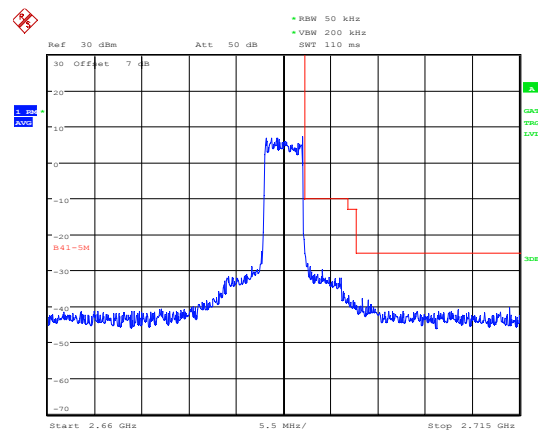
Date: 15.OCT.2019 12:05:47

LTE Band 41 QPSK 5MHz CH-Low, 100%RB



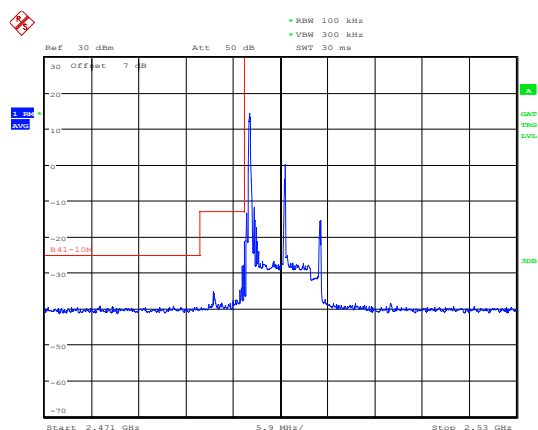
Date: 15.OCT.2019 11:08:39

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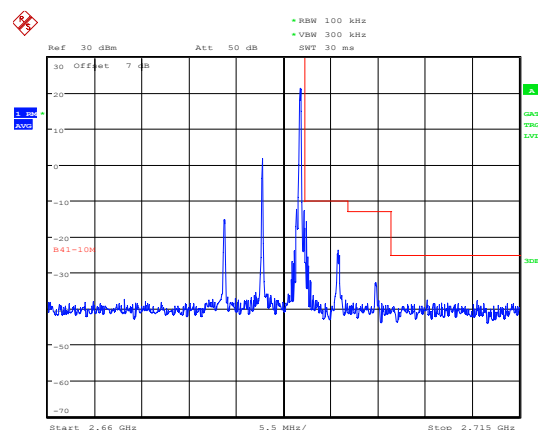
Date: 15.OCT.2019 12:05:58

LTE Band 41 QPSK 10MHz CH-Low, 1 RB



Date: 15.OCT.2019 11:57:10

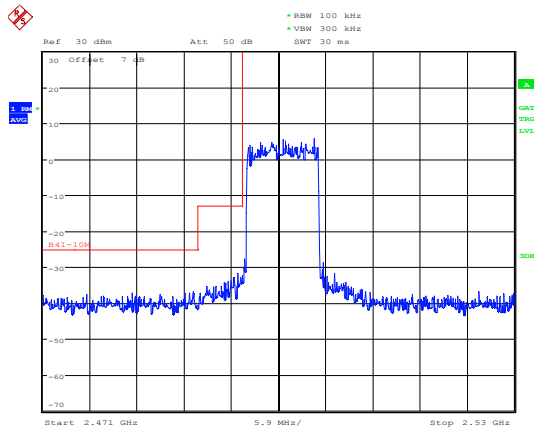
LTE Band 41 QPSK 10MHz CH-High, 1 RB



Date: 15.OCT.2019 12:06:54

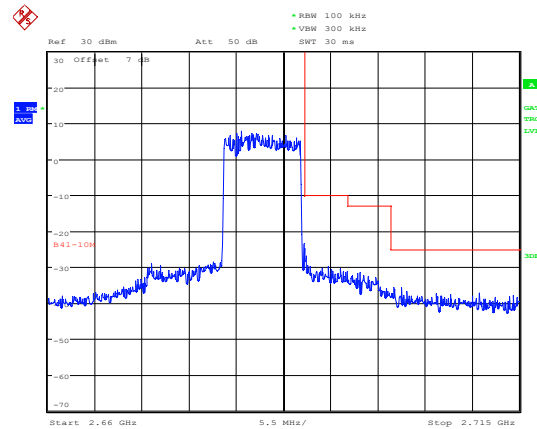


LTE Band 41 QPSK 10MHz CH-Low, 100%RB



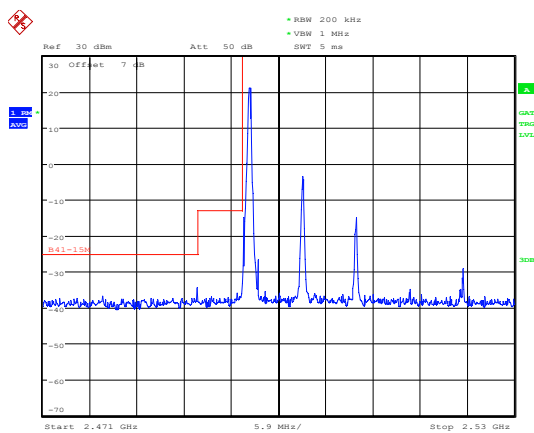
Date: 15.OCT.2019 11:57:17

LTE Band 41 QPSK 10MHz CH-High, 100%RB



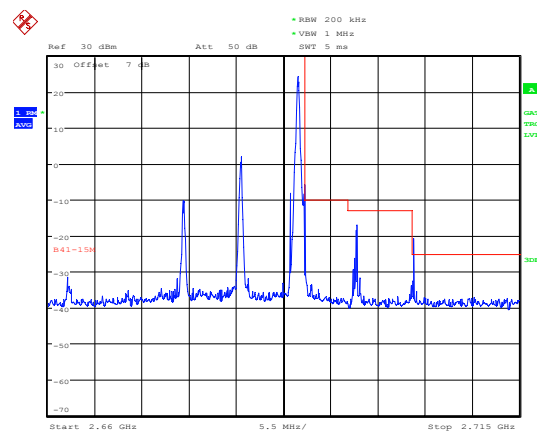
Date: 15.OCT.2019 12:07:04

LTE Band 41 QPSK 15MHz CH-Low, 1 RB



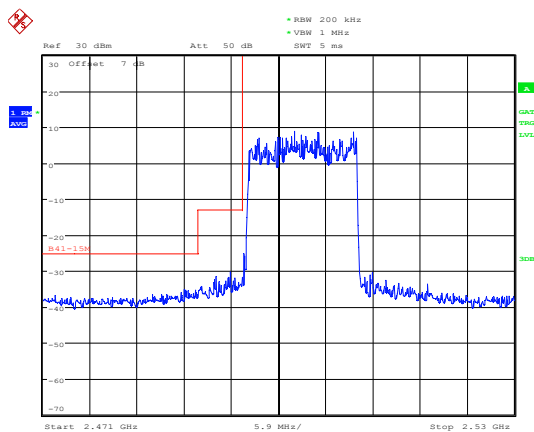
Date: 15.OCT.2019 11:59:13

LTE Band 41 QPSK 15MHz CH-High, 1 RB



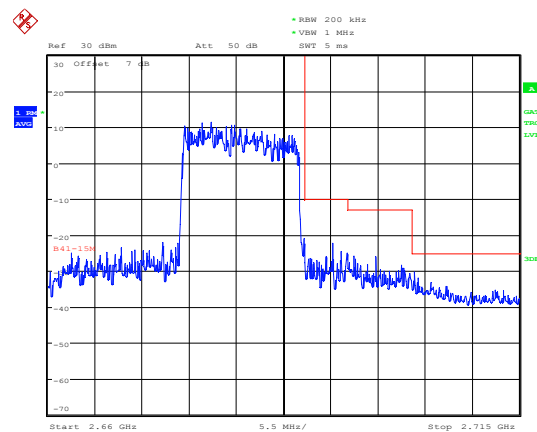
Date: 15.OCT.2019 12:08:07

LTE Band 41 QPSK 15MHz CH-Low, 100%RB



Date: 15.OCT.2019 11:59:32

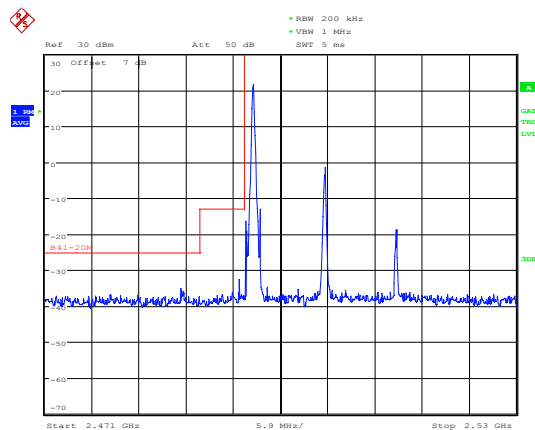
LTE Band 41 QPSK 15MHz CH-High, 100%RB



Date: 15.OCT.2019 12:08:16

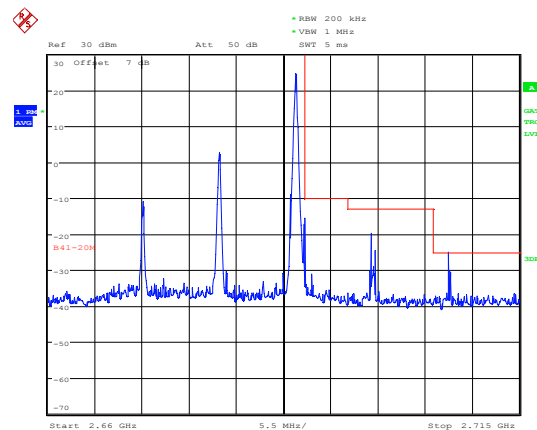


LTE Band 41 QPSK 20MHz CH-Low, 1 RB



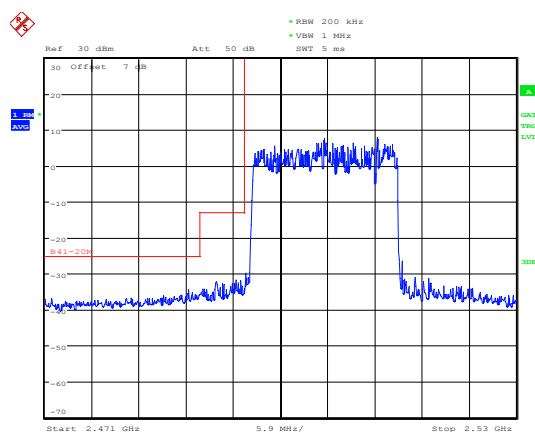
Date: 15.OCT.2019 12:00:50

LTE Band 41 QPSK 20MHz CH-High, 1 RB



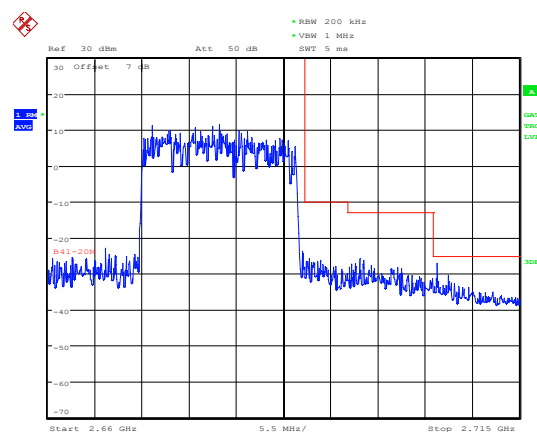
Date: 15.OCT.2019 12:08:52

LTE Band 41 QPSK 20MHz CH-Low, 100%RB



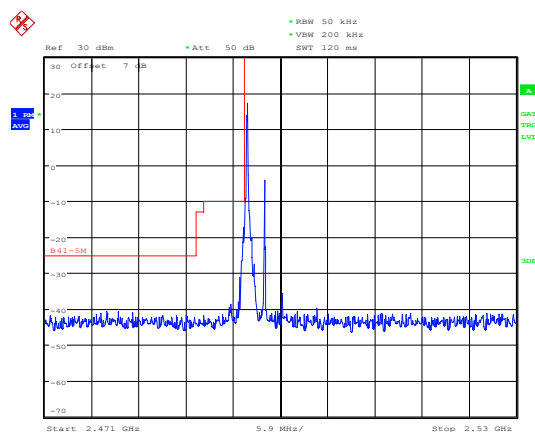
Date: 15.OCT.2019 12:01:21

LTE Band 41 QPSK 20MHz CH-High, 100%RB



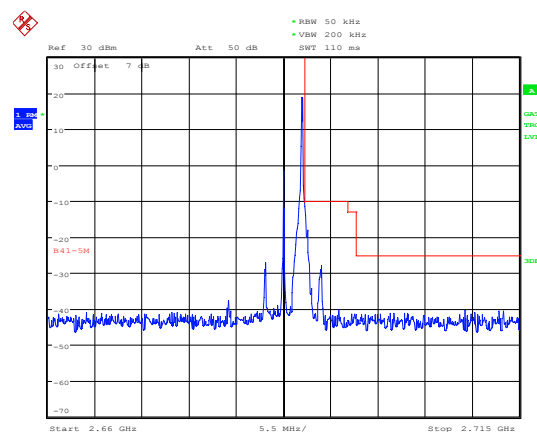
Date: 15.OCT.2019 12:09:00

LTE Band 41 16QAM 5MHz CH-Low, 1 RB



Date: 15.OCT.2019 11:08:52

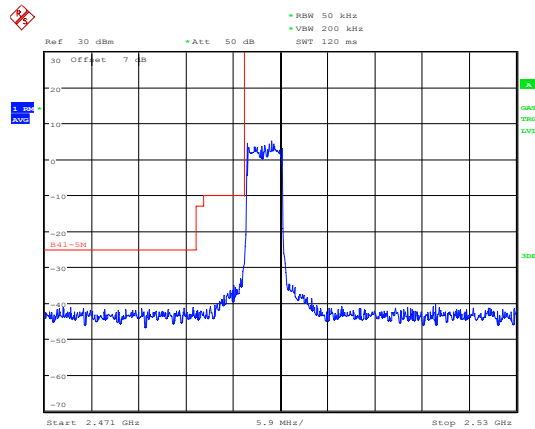
LTE Band 41 16QAM 5MHz CH-High, 1 RB



Date: 15.OCT.2019 12:06:10

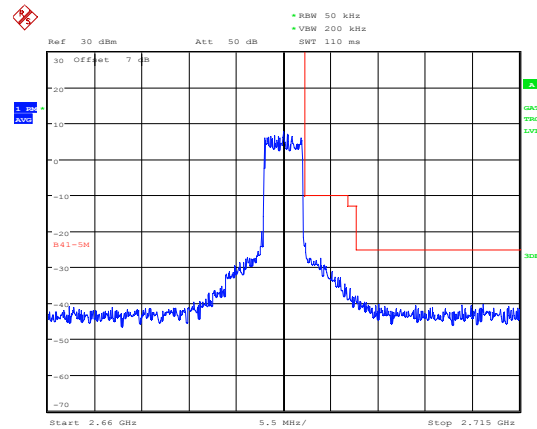


LTE Band 41 16QAM 5MHz CH-Low, 100%RB



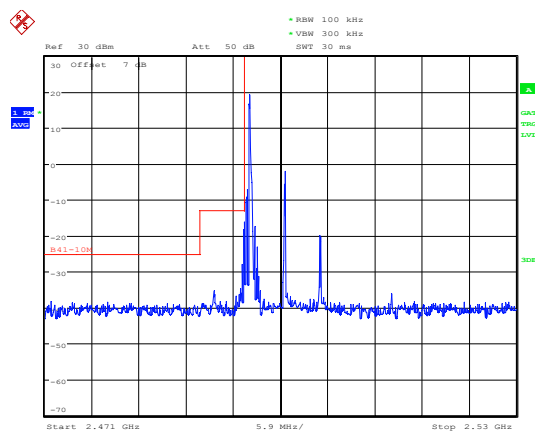
Date: 15.OCT.2019 11:09:05

LTE Band 41 16QAM 5MHz CH-High, 100%RB



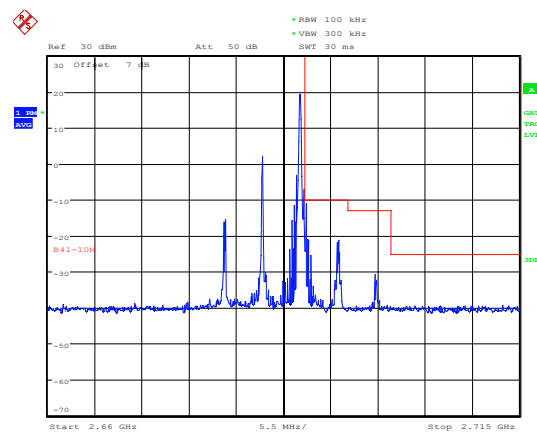
Date: 15.OCT.2019 12:06:20

LTE Band 41 16QAM 10MHz CH-Low, 1 RB



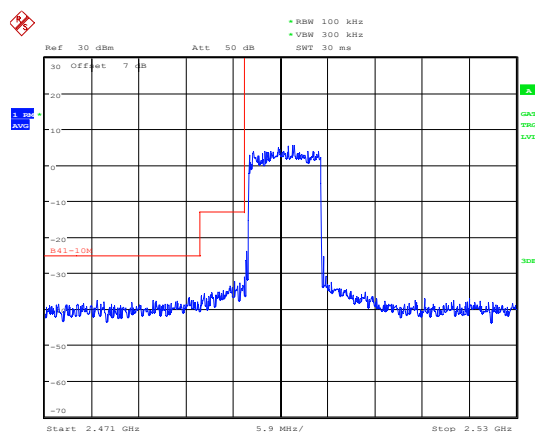
Date: 15.OCT.2019 11:57:37

LTE Band 41 16QAM 10MHz CH-High, 1 RB



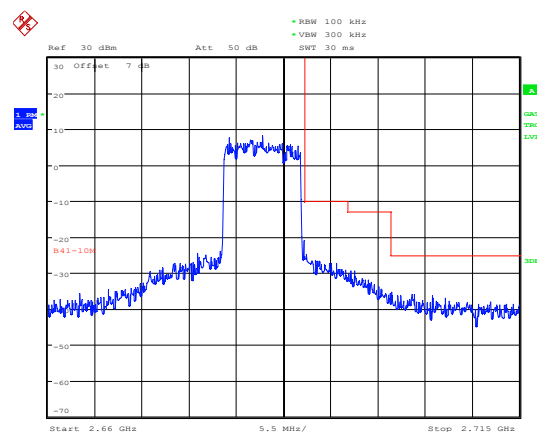
Date: 15.OCT.2019 12:07:29

LTE Band 41 16QAM 10MHz CH-Low, 100%RB



Date: 15.OCT.2019 11:57:57

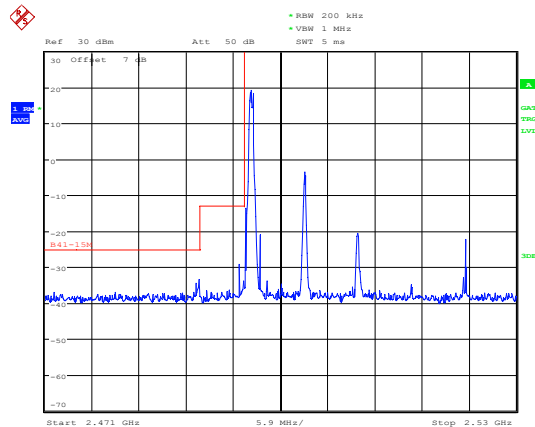
LTE Band 41 16QAM 10MHz CH-High, 100%RB



Date: 15.OCT.2019 12:07:37

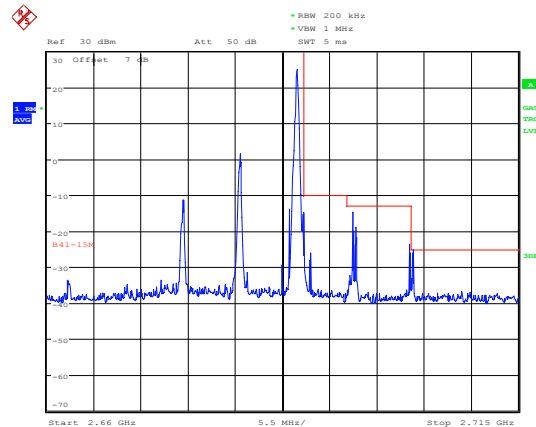


LTE Band 41 16QAM 15MHz CH-Low, 1 RB



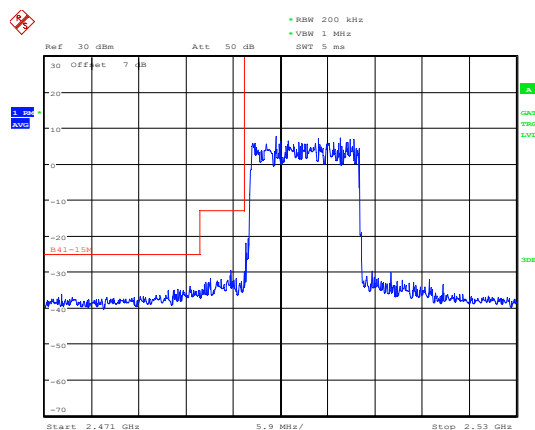
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LTE Band 41 16QAM 15MHz CH-High, 1 RB



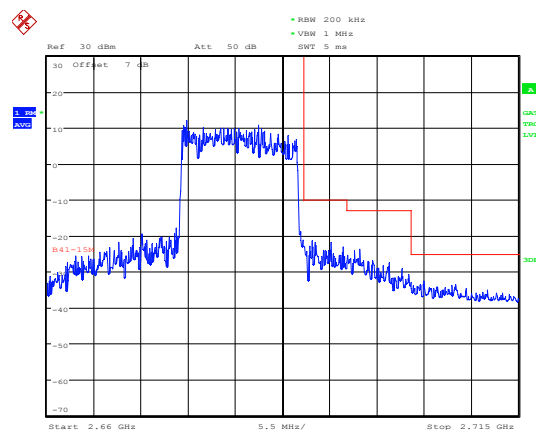
Date: 15.OCT.2019 12:08:25

LTE Band 41 16QAM 15MHz CH-Low, 100%RB



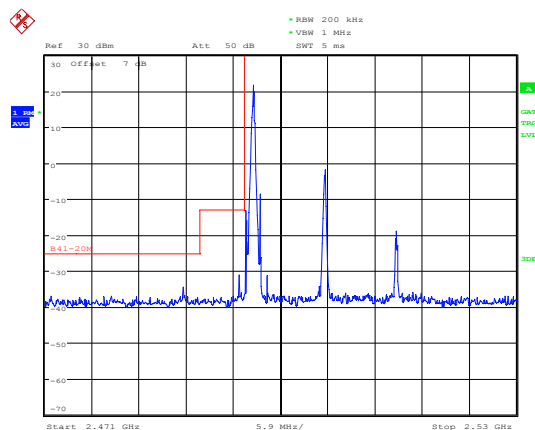
Date: 15.OCT.2019 12:00:04

LTE Band 41 16QAM 15MHz CH-High, 100%RB



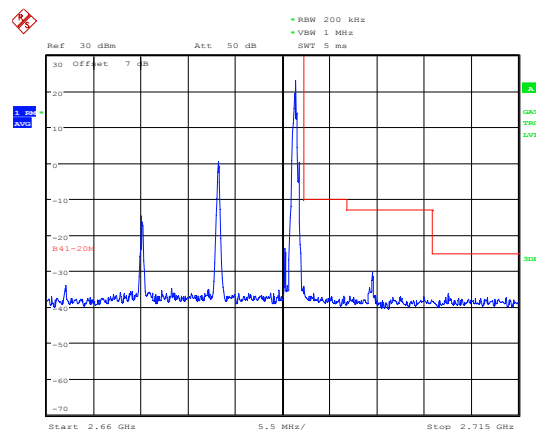
Date: 15.OCT.2019 12:08:33

LTE Band 41 16QAM 20MHz CH-Low, RB 1



Date: 15.OCT.2019 12:01:33

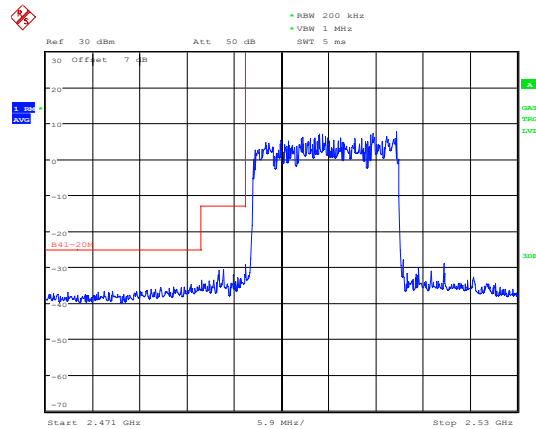
LTE Band 41 16QAM 20MHz CH-High, RB 1



Date: 15.OCT.2019 12:16:31

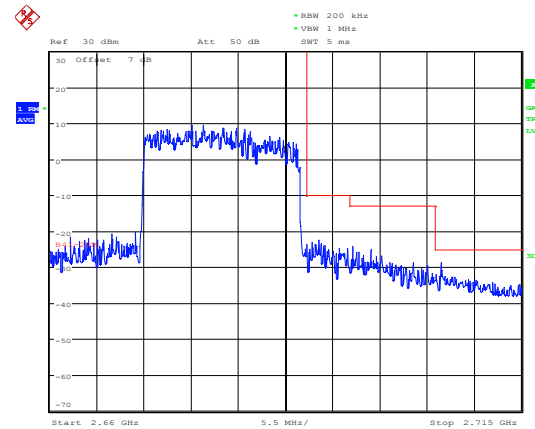


LTE Band 41 16QAM 20MHz CH-Low, 100%RB



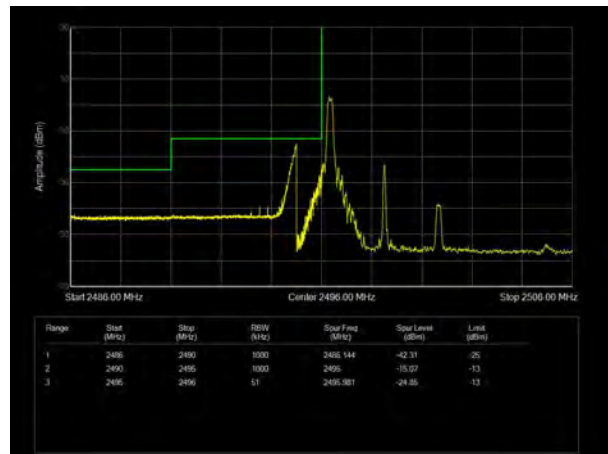
Date: 15.OCT.2019 12:03:21

LTE Band 41 16QAM 20MHz CH-High, 100%RB

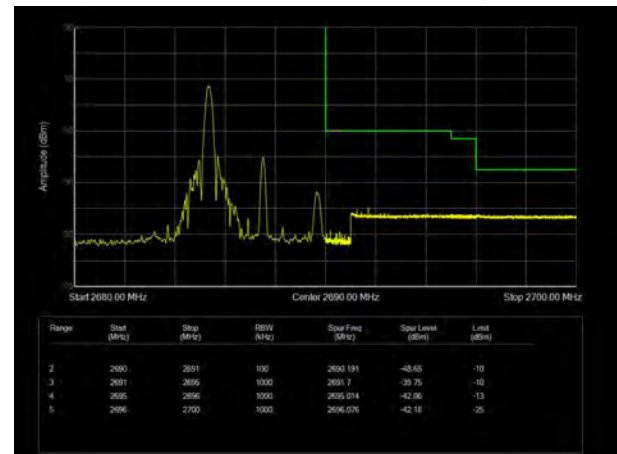


Date: 15.OCT.2019 12:09:23

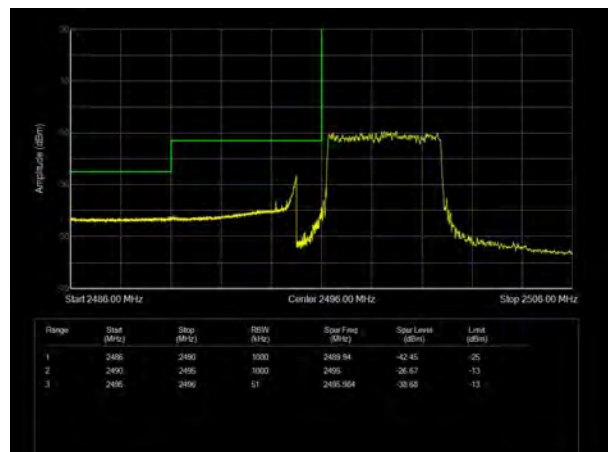
LTE Band 41 64QAM 5MHz CH-Low, 1 RB



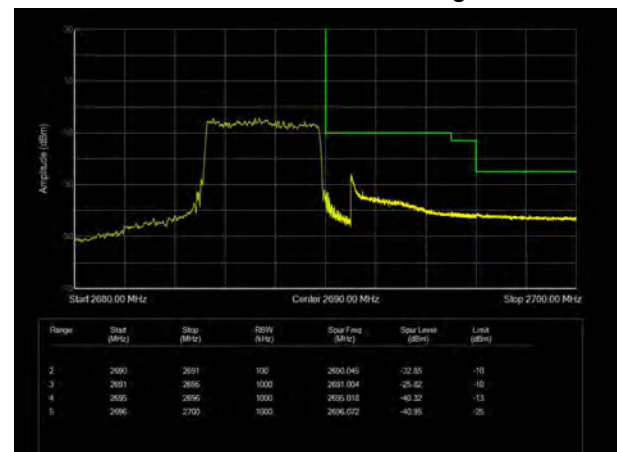
LTE Band 41 64QAM 5MHz CH-High, 1 RB



LTE Band 41 64QAM 5MHz CH-Low, 100%RB

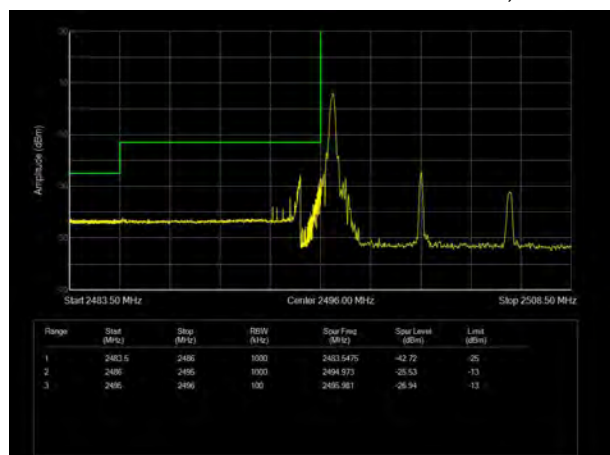


LTE Band 41 64QAM 5MHz CH-High, 100%RB





LTE Band 41 64QAM 10MHz CH-Low, 1 RB



LTE Band 41 64QAM 10MHz CH-High, 1 RB



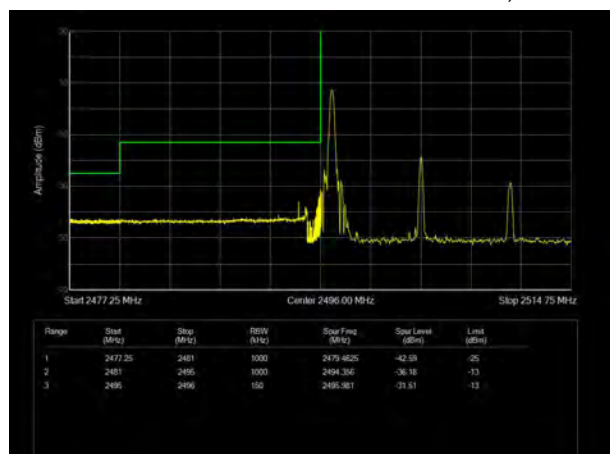
LTE Band 41 64QAM 10MHz CH-Low, 100%RB



LTE Band 41 64QAM 10MHz CH-High, 100%RB



LTE Band 41 64QAM 15MHz CH-Low, 1 RB

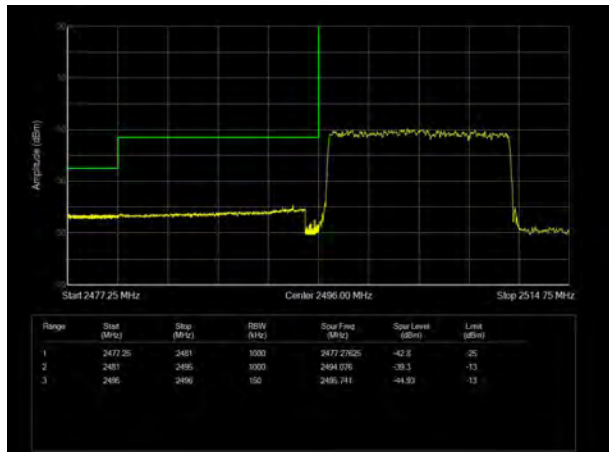


LTE Band 41 64QAM 15MHz CH-High, 1 RB

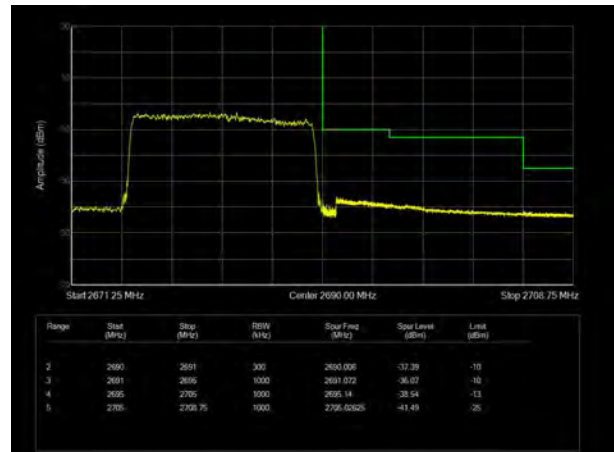




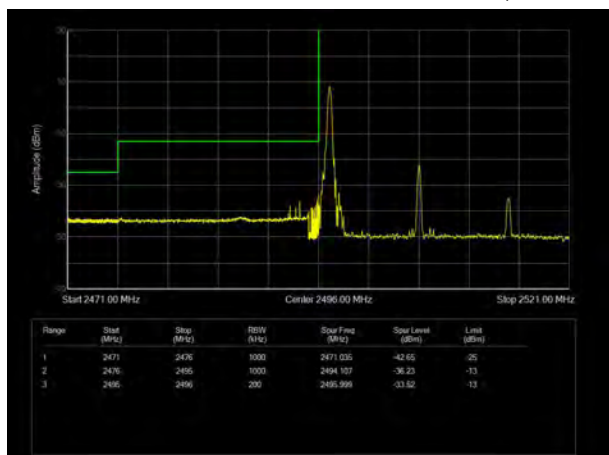
LTE Band 41 64QAM 15MHz CH-Low, 100%RB



LTE Band 41 64QAM 15MHz CH-High, 100%RB



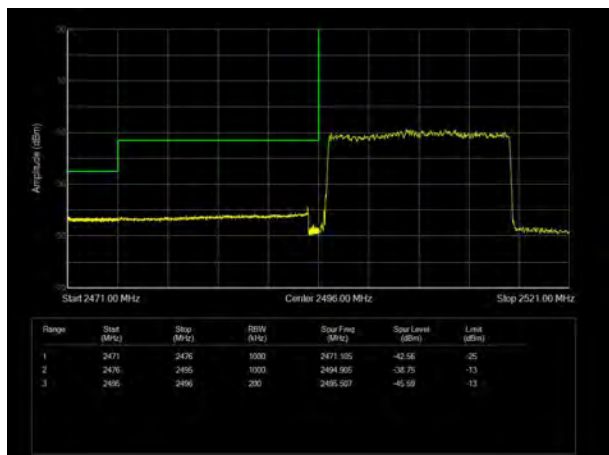
LTE Band 41 64QAM 20MHz CH-Low, 1 RB



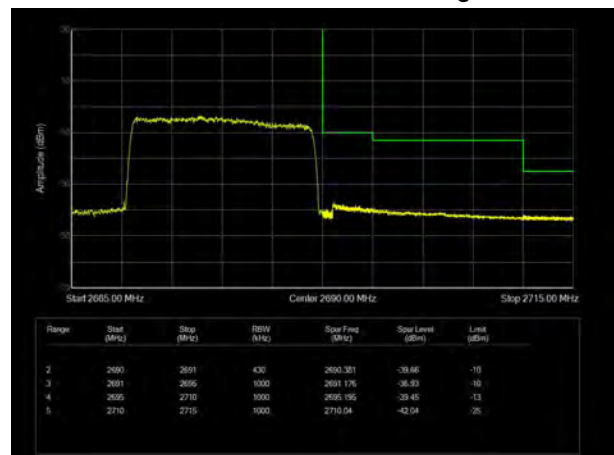
LTE Band 41 64QAM 20MHz CH-High, 1 RB



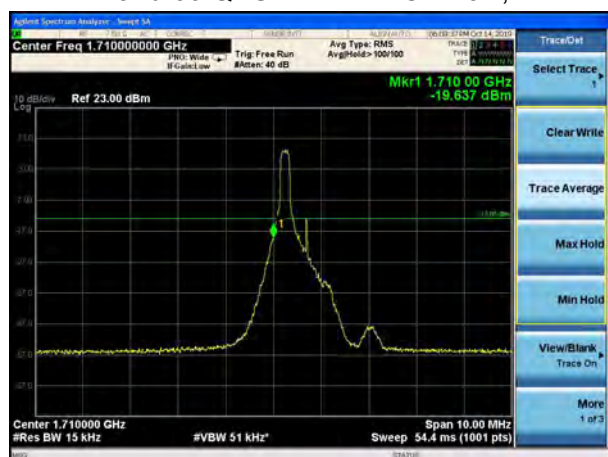
LTE Band 41 64QAM 20MHz CH-Low, 100%RB



LTE Band 41 64QAM 20MHz CH-High, 100%RB



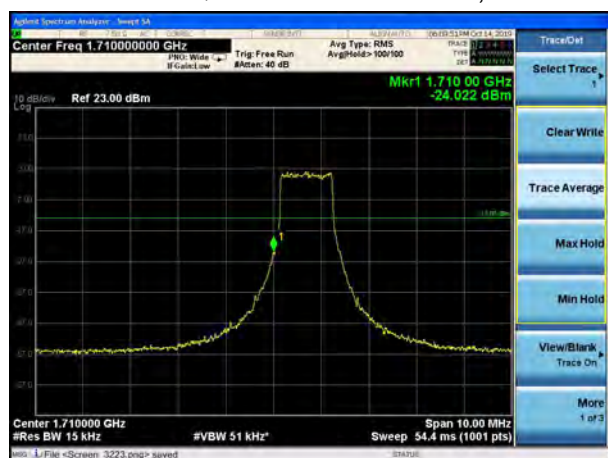
LTE Band 66 QPSK 1.4MHz CH-Low, 1 RB



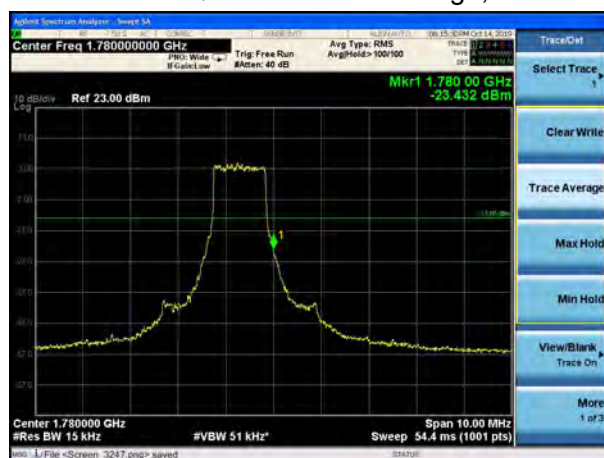
LTE Band 66 QPSK 1.4MHz CH-High, 1 RB



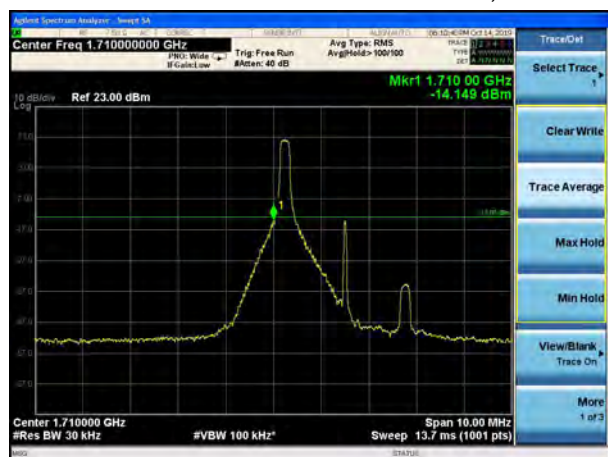
LTE Band 66 QPSK 1.4MHz CH-Low, 100%RB



LTE Band 66 QPSK 1.4MHz CH-High, 100%RB



LTE Band 66 QPSK 3MHz CH-Low, 1 RB



LTE Band 66 QPSK 3MHz CH-High, 1 RB





LTE Band 66 QPSK 3MHz CH-Low, 100%RB



LTE Band 66 QPSK 3MHz CH-High, 100%RB



LTE Band 66 QPSK 5MHz CH-Low, 1 RB



LTE Band 66 QPSK 5MHz CH-High, 1 RB



LTE Band 66 QPSK 5MHz CH-Low, 100%RB

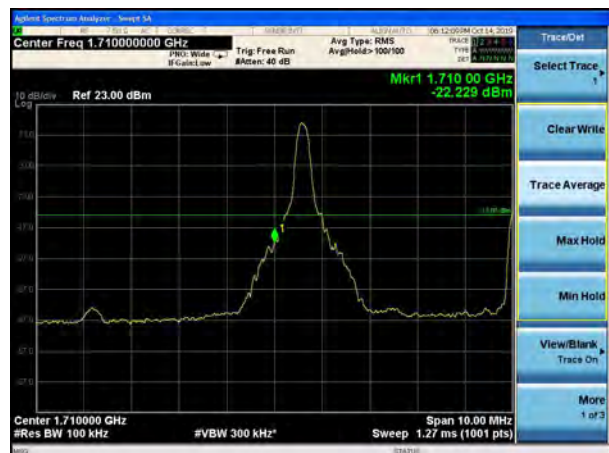


LTE Band 66 QPSK 5MHz CH-High, 100%RB

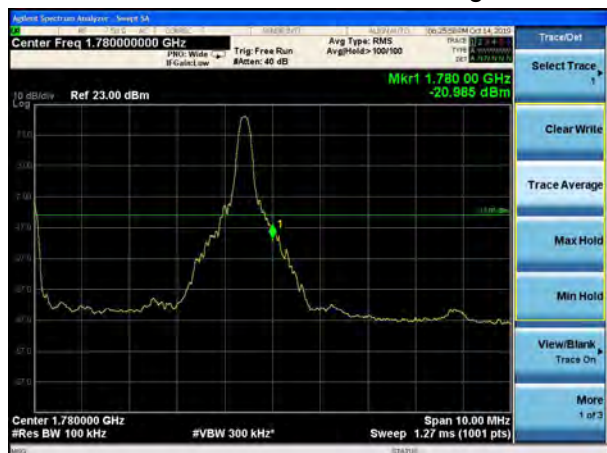




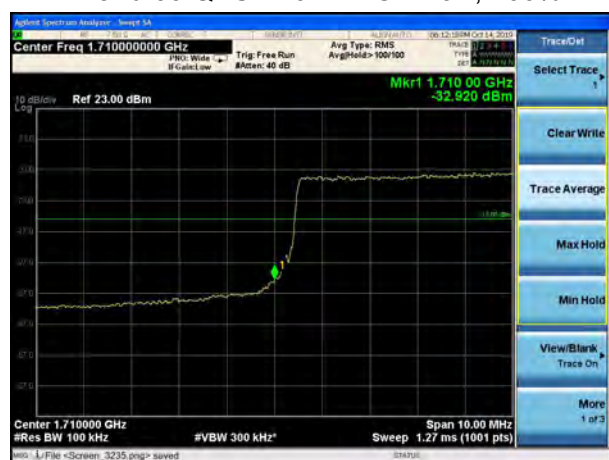
LTE Band 66 QPSK 10MHz CH-Low, 1 RB



LTE Band 66 QPSK 10MHz CH-High, 1 RB



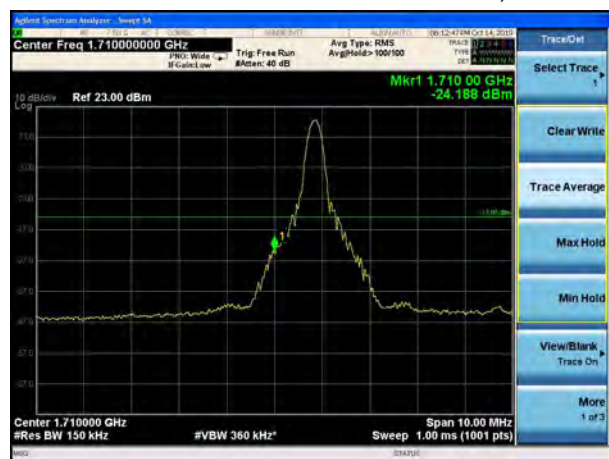
LTE Band 66 QPSK 10MHz CH-Low, 100%RB



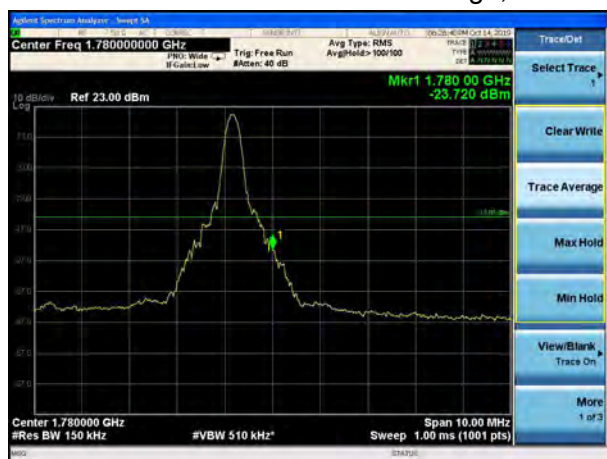
LTE Band 66 QPSK 10MHz CH-High, 100%RB



LTE Band 66 QPSK 15MHz CH-Low, 1 RB



LTE Band 66 QPSK 15MHz CH-High, 1 RB





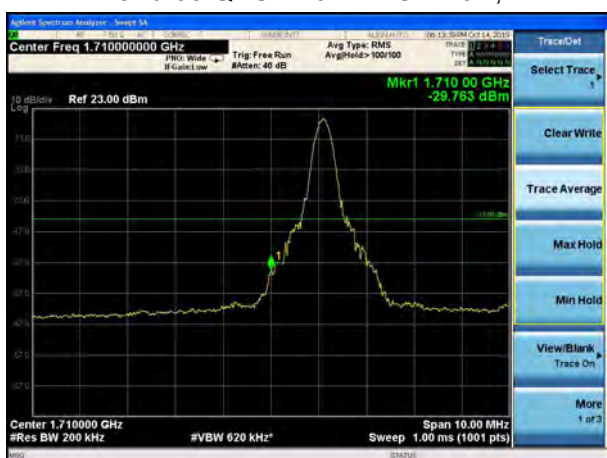
LTE Band 66 QPSK 15MHz CH-Low, 100%RB



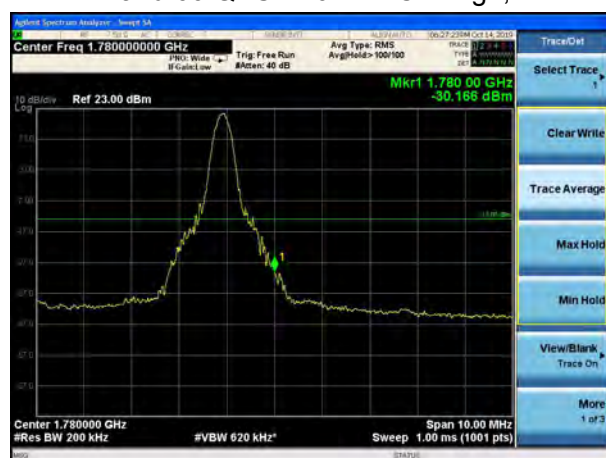
LTE Band 66 QPSK 15MHz CH-High, 100%RB



LTE Band 66 QPSK 20MHz CH-Low, 1 RB



LTE Band 66 QPSK 20MHz CH-High, 1 RB



LTE Band 66 QPSK 20MHz CH-Low, 100%RB

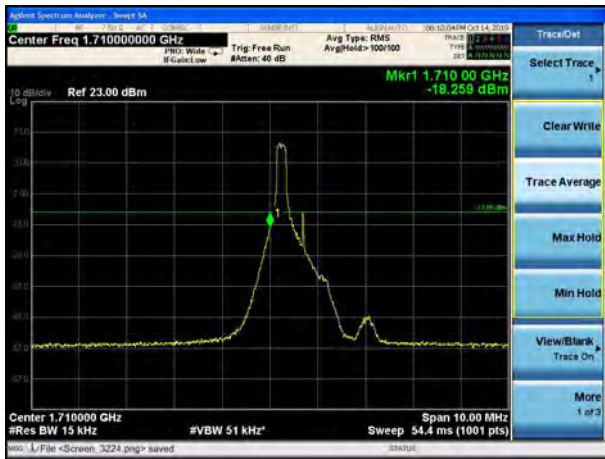


LTE Band 66 QPSK 20MHz CH-High, 100%RB

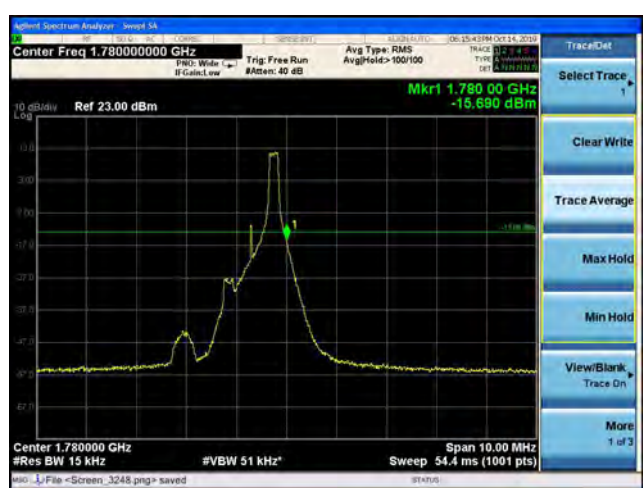




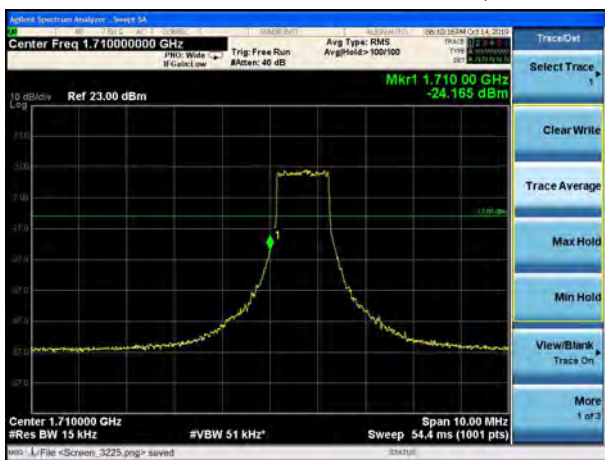
LTE Band 66 16QAM 1.4MHz CH-Low, 1 RB



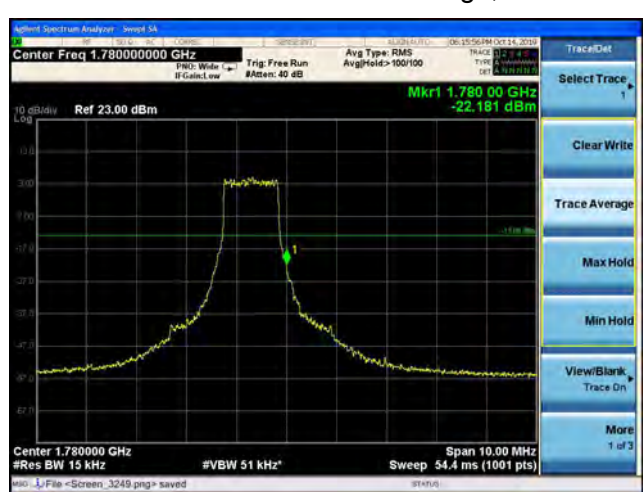
LTE Band 66 16QAM 1.4MHz CH-High, 1 RB



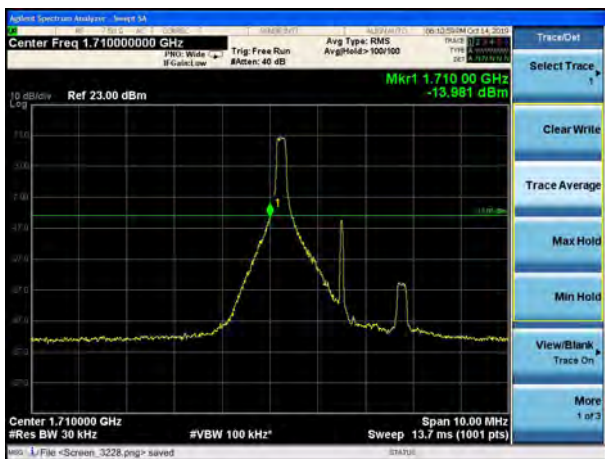
LTE Band 66 16QAM 1.4MHz CH-Low, 100%RB



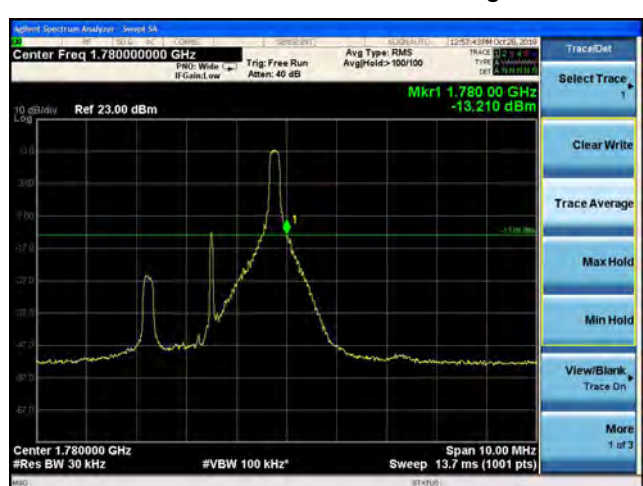
LTE Band 66 16QAM 1.4MHz CH-High, 100%RB



LTE Band 66 16QAM 3MHz CH-Low, 1 RB



LTE Band 66 16QAM 3MHz CH-High, 1 RB

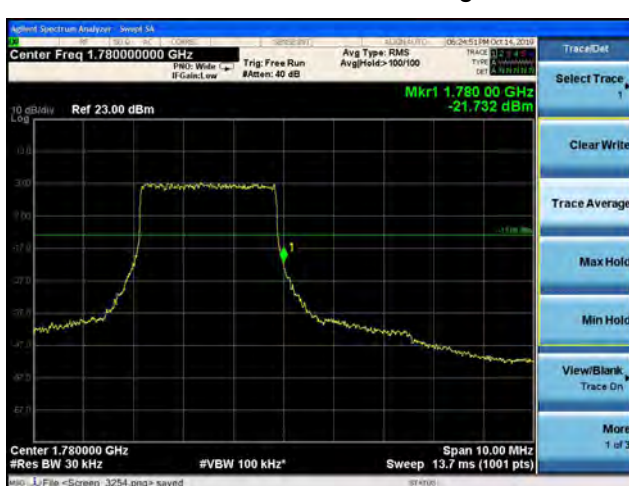




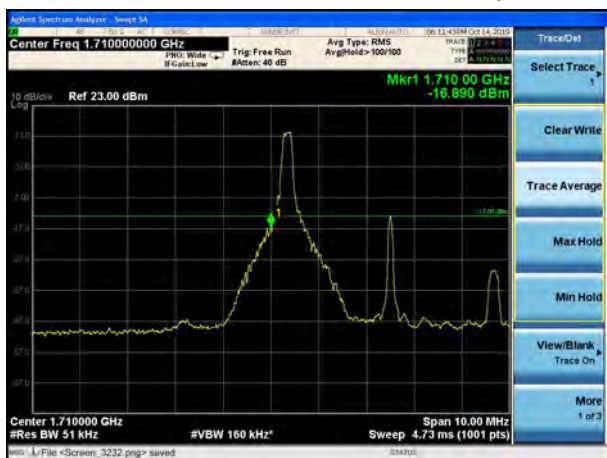
LTE Band 66 16QAM 3MHz CH-Low, 100%RB



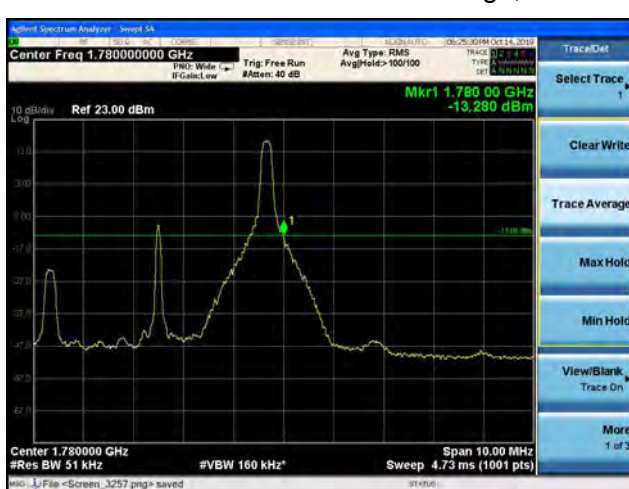
LTE Band 66 16QAM 3MHz CH-High, 100%RB



LTE Band 66 16QAM 5MHz CH-Low, 1 RB



LTE Band 66 16QAM 5MHz CH-High, 1 RB



LTE Band 66 16QAM 5MHz CH-Low, 100%RB

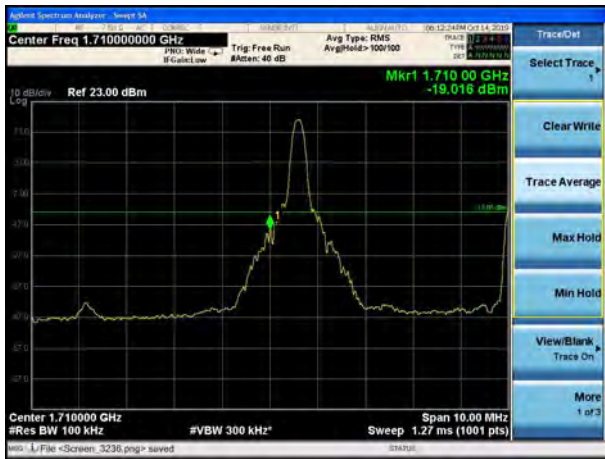


LTE Band 66 16QAM 5MHz CH-High, 100%RB

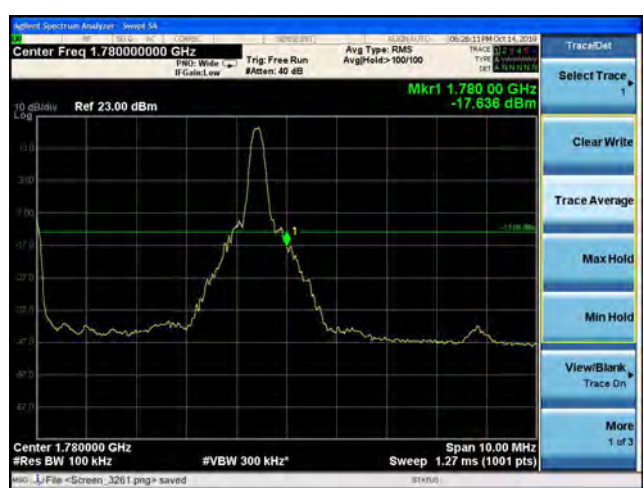




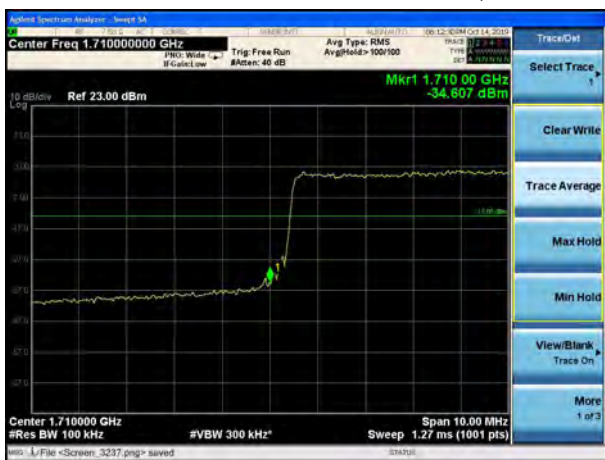
LTE Band 66 16QAM 10MHz CH-Low, 1 RB



LTE Band 66 16QAM 10MHz CH-High, 1 RB



LTE Band 66 16QAM 10MHz CH-Low, 100%RB



LTE Band 66 16QAM 10MHz CH-High, 100%RB



LTE Band 66 16QAM 15MHz CH-Low, 1 RB



LTE Band 66 16QAM 15MHz CH-High, 1 RB





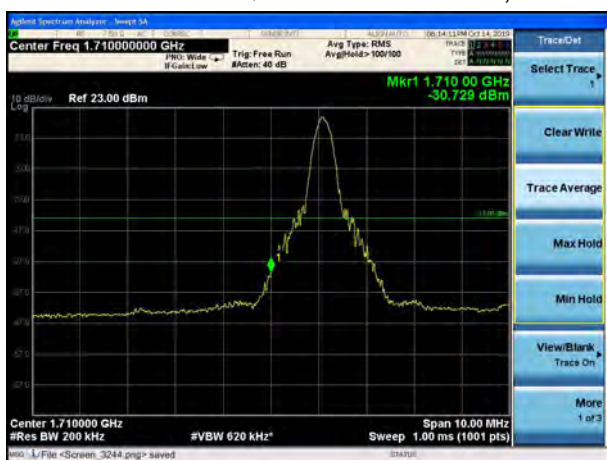
LTE Band 66 16QAM 15MHz CH-Low, 100%RB



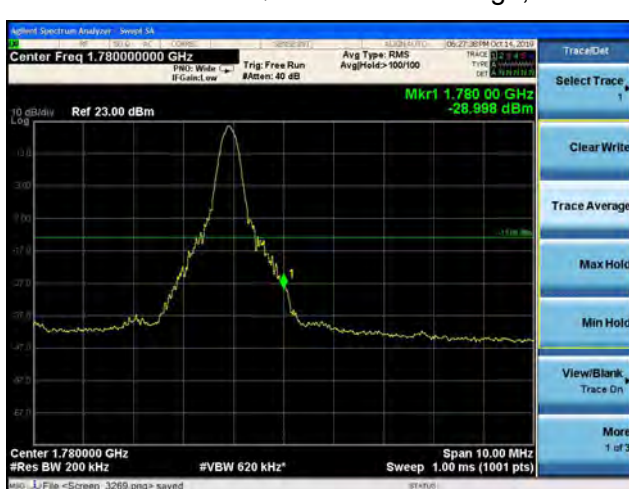
LTE Band 66 16QAM 15MHz CH-High, 100%RB



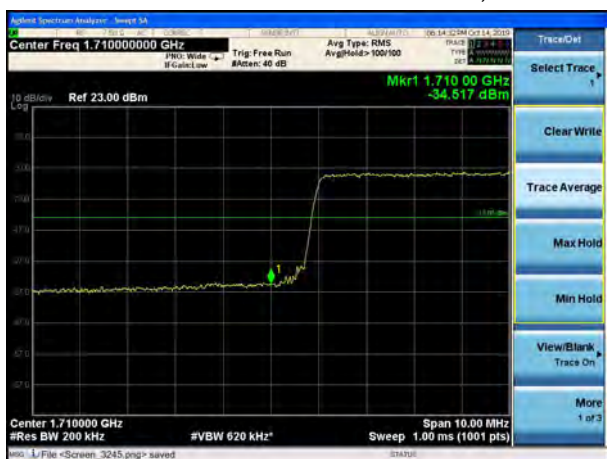
LTE Band 66 16QAM 20MHz CH-Low, 1 RB



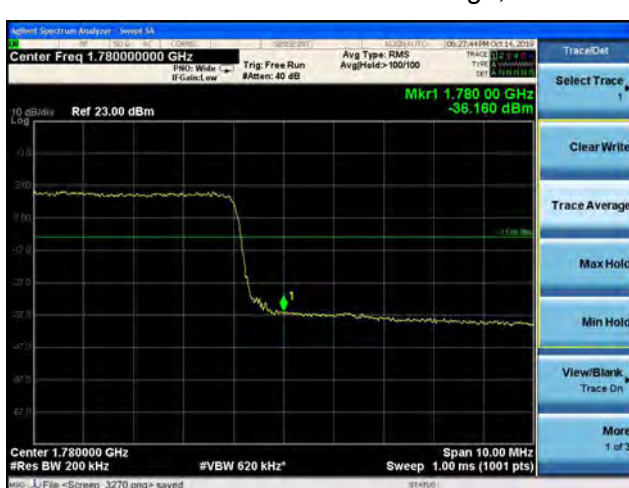
LTE Band 66 16QAM 20MHz CH-High, 1 RB



LTE Band 66 16QAM 20MHz CH-Low, 100%RB

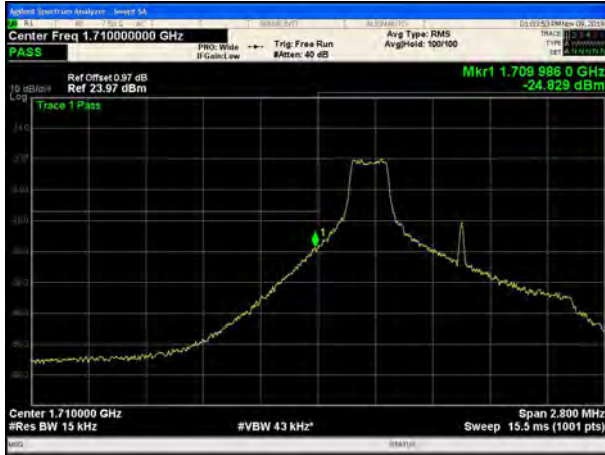


LTE Band 66 16QAM 20MHz CH-High, 100%RB

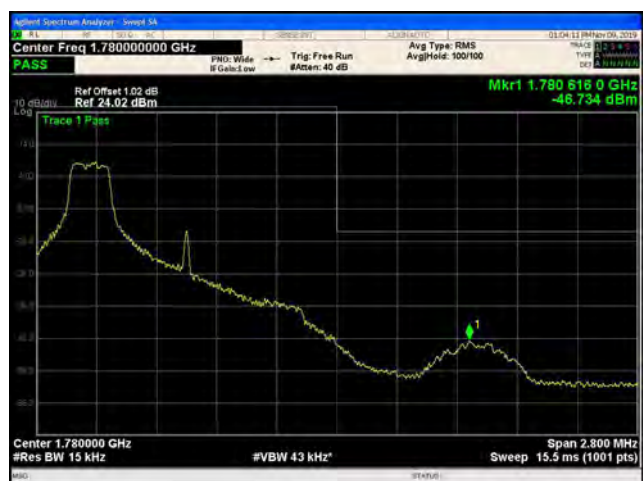




LTE Band 66 64QAM 1.4MHz CH-Low, 1 RB



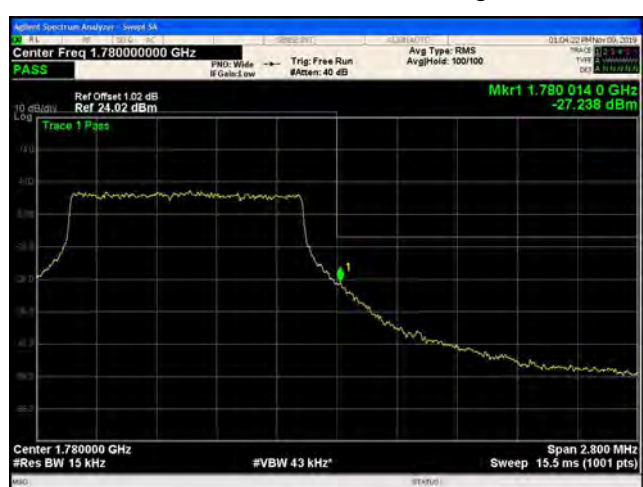
LTE Band 66 64QAM 1.4MHz CH-High, 1 RB



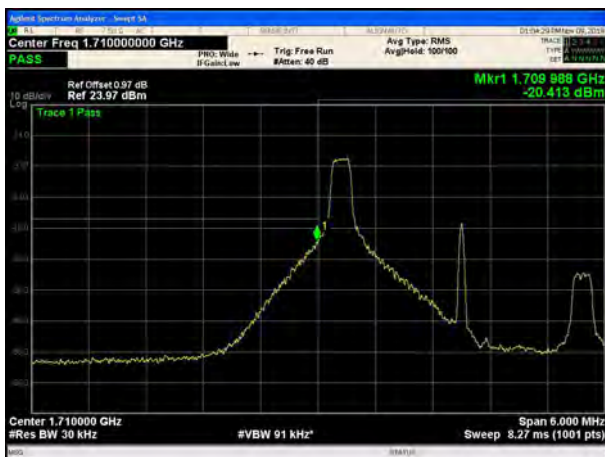
LTE Band 66 64QAM 1.4MHz CH-Low, 100%RB



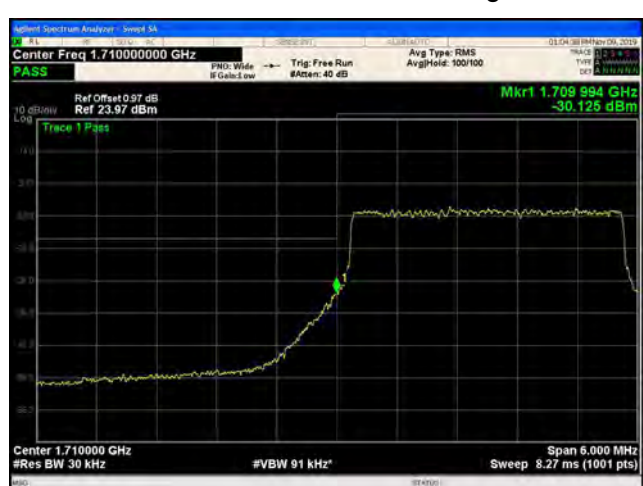
LTE Band 66 64QAM 1.4MHz CH-High, 100%RB



LTE Band 66 64QAM 3MHz CH-Low, 1 RB

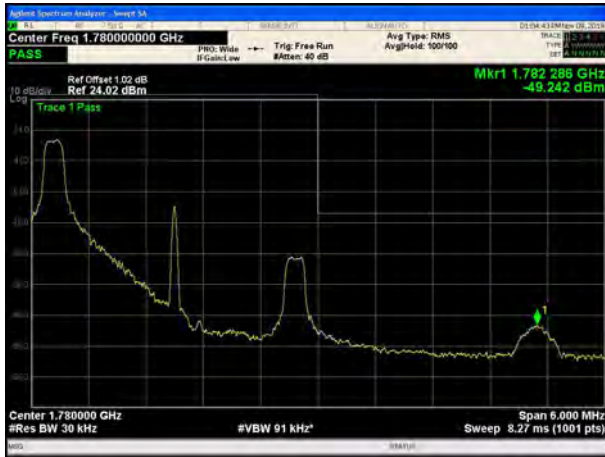


LTE Band 66 64QAM 3MHz CH-High, 1 RB

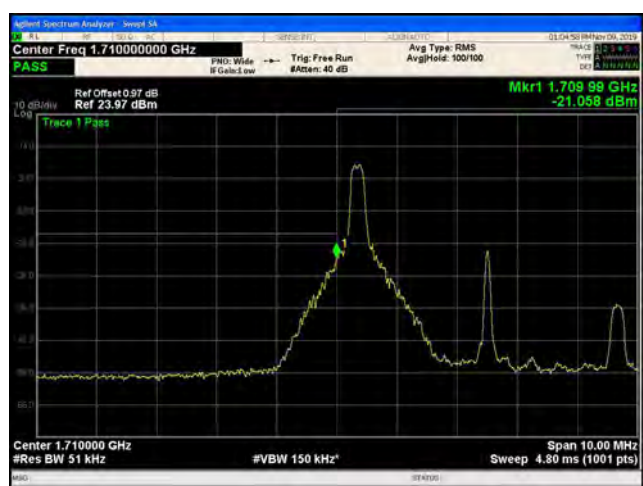




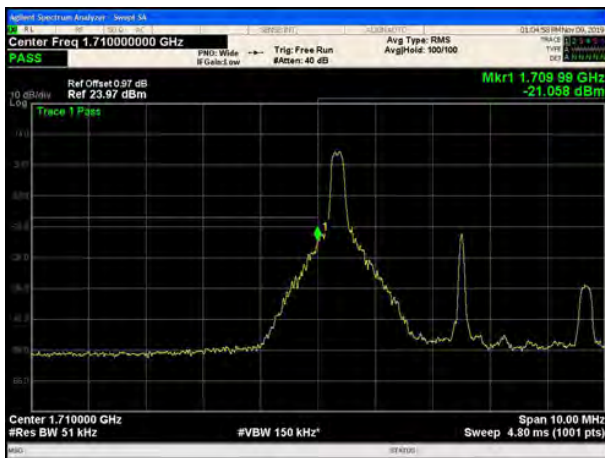
LTE Band 66 64QAM 3MHz CH-Low, 100%RB



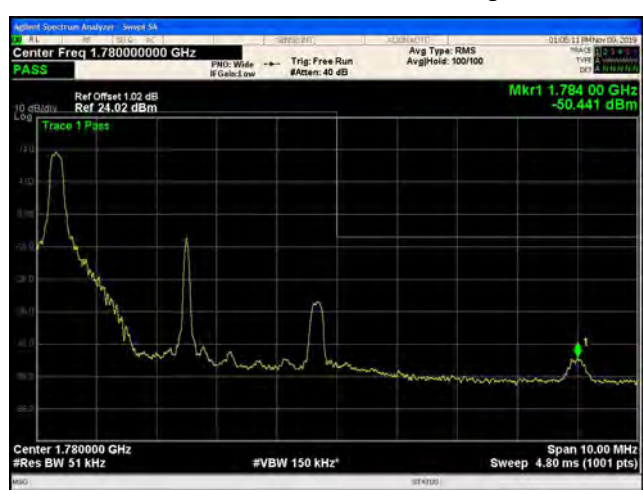
LTE Band 66 64QAM 3MHz CH-High, 100%RB



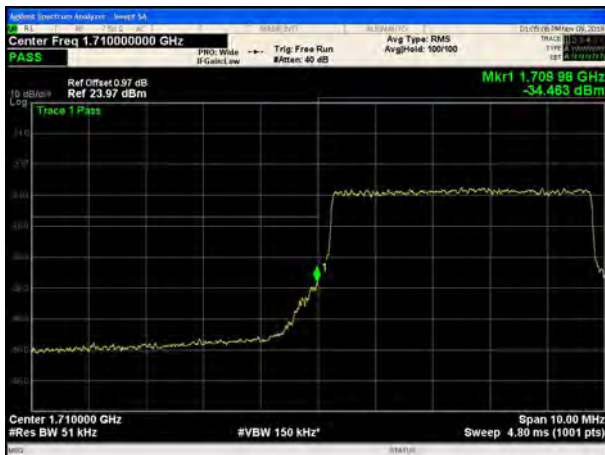
LTE Band 66 64QAM 5MHz CH-Low, 1 RB



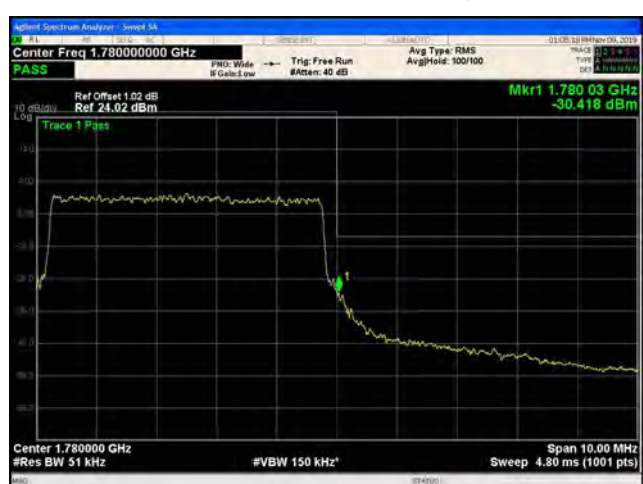
LTE Band 66 64QAM 5MHz CH-High, 1 RB



LTE Band 66 64QAM 5MHz CH-Low, 100%RB

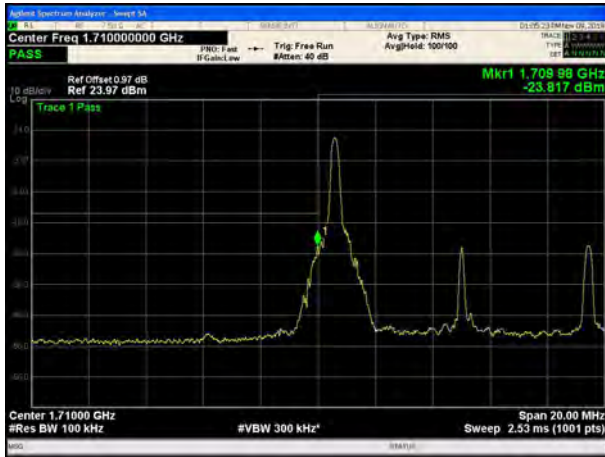


LTE Band 66 64QAM 5MHz CH-High, 100%RB

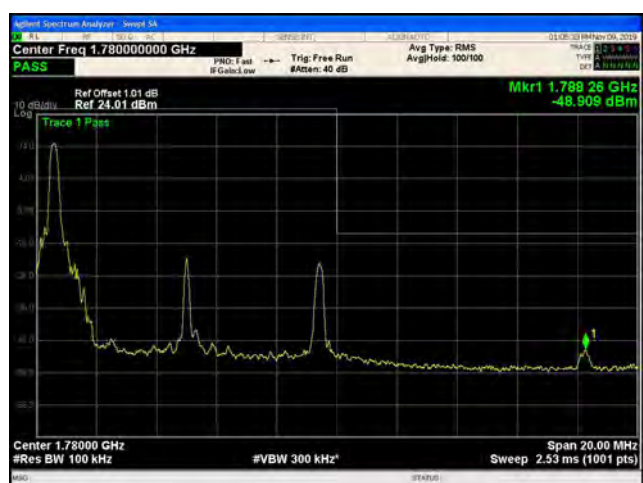




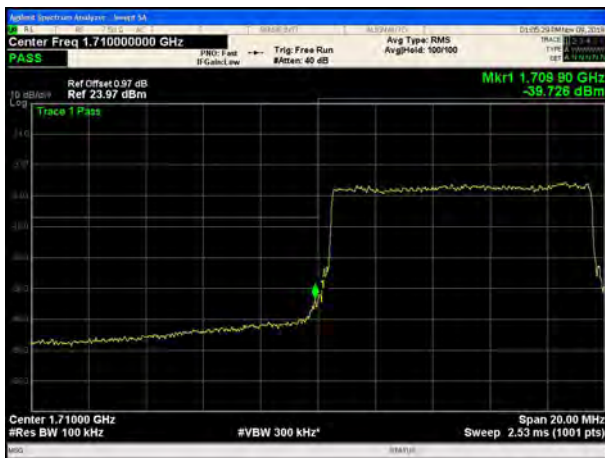
LTE Band 66 64QAM 10MHz CH-Low, 1 RB



LTE Band 66 64QAM 10MHz CH-High, 1 RB



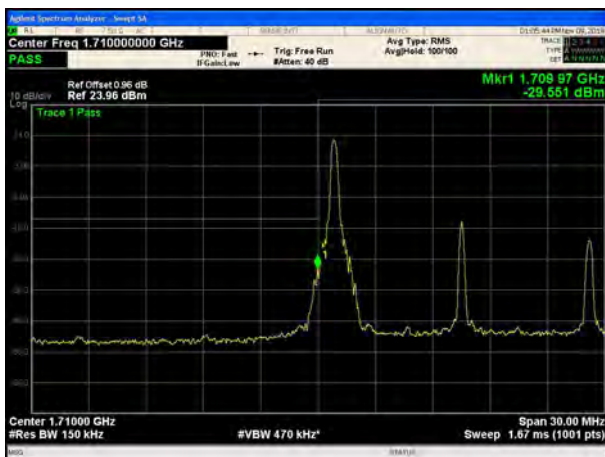
LTE Band 66 64QAM 10MHz CH-Low, 100%RB



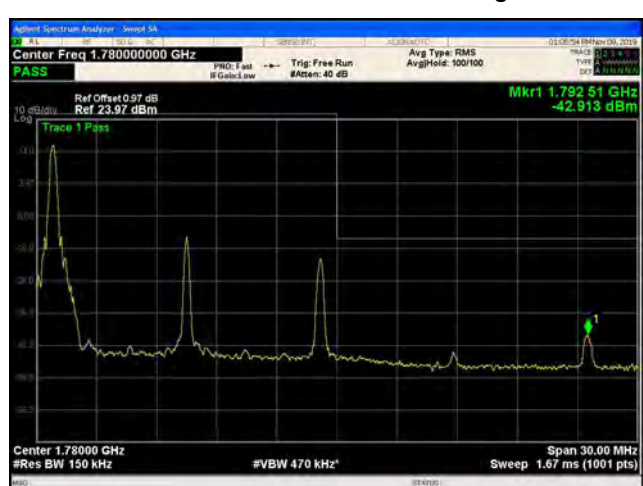
LTE Band 66 64QAM 10MHz CH-High, 100%RB



LTE Band 66 64QAM 15MHz CH-Low, 1 RB



LTE Band 66 64QAM 15MHz CH-High, 1 RB

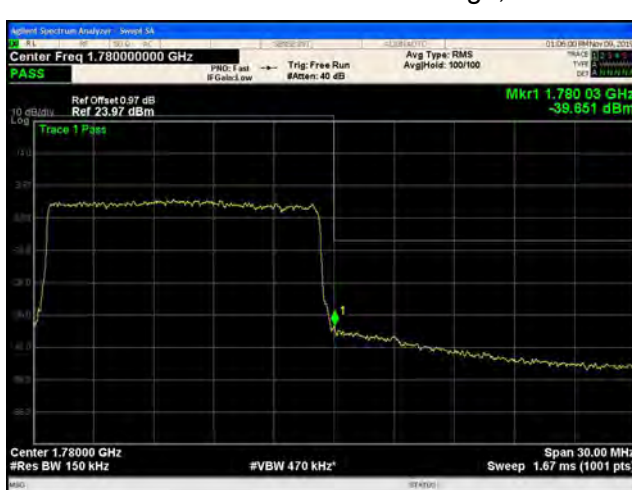




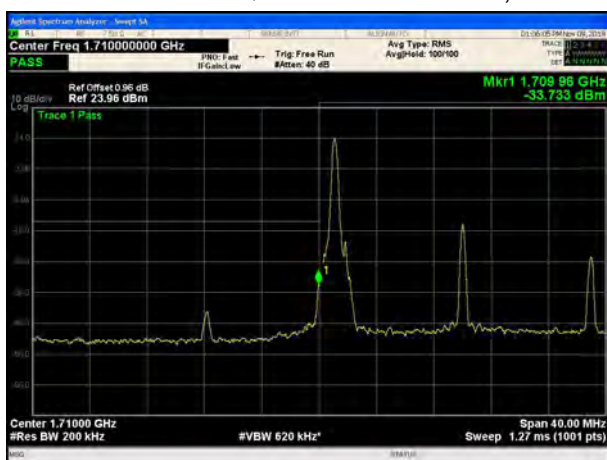
LTE Band 66 64QAM 15MHz CH-Low, 100%RB



LTE Band 66 64QAM 15MHz CH-High, 100%RB



LTE Band 66 64QAM 20MHz CH-Low, 1 RB



LTE Band 66 64QAM 20MHz CH-High, 1 RB



LTE Band 66 64QAM 20MHz CH-Low, 100%RB



LTE Band 66 64QAM 20MHz CH-High, 100%RB



5.4 Peak-to-Average Power Ratio (PAPR)

Ambient condition

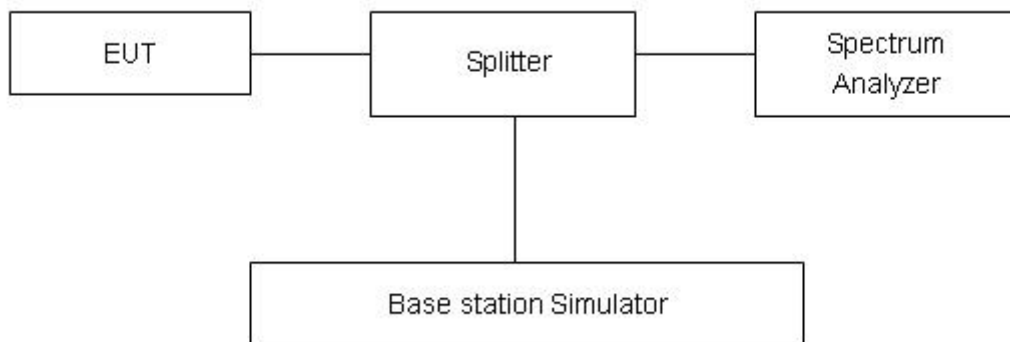
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$PAPR (dB) = PPk (dBm) - PAvg (dBm)$.

Test Setup



Limits

Rule Part 27.50(d)(5) Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.4$ dB.



Test Results

LTE Band 4								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	19957	1710.7	28.51	24.12	4.39	≤13	PASS
		20175	1732.5	29.82	25.52	4.30	≤13	PASS
		20393	1754.3	28.34	22.98	5.36	≤13	PASS
	3	19965	1711.5	28.85	24.35	4.50	≤13	PASS
		20175	1732.5	30.08	25.59	4.49	≤13	PASS
		20385	1753.5	28.36	23.02	5.34	≤13	PASS
	5	19975	1712.5	28.65	24.04	4.61	≤13	PASS
		20175	1732.5	29.86	25.18	4.68	≤13	PASS
		20375	1752.5	28.17	22.77	5.40	≤13	PASS
	10	20000	1715	28.86	24.29	4.57	≤13	PASS
		20175	1732.5	29.89	25.24	4.65	≤13	PASS
		20350	1750	28.51	23.18	5.33	≤13	PASS
	15	20025	1717.5	28.87	24.71	4.16	≤13	PASS
		20175	1732.5	29.60	25.16	4.44	≤13	PASS
		20325	1747.5	28.90	23.59	5.31	≤13	PASS
	20	20050	1720	29.10	24.90	4.20	≤13	PASS
		20175	1732.5	29.69	25.15	4.54	≤13	PASS
		20300	1745	29.00	23.81	5.19	≤13	PASS
16QAM	1.4	19957	1710.7	28.63	24.09	4.54	≤13	PASS
		20175	1732.5	29.94	25.48	4.46	≤13	PASS
		20393	1754.3	28.73	22.99	5.74	≤13	PASS
	3	19965	1711.5	29.02	24.24	4.78	≤13	PASS
		20175	1732.5	30.25	25.46	4.79	≤13	PASS
		20385	1753.5	28.82	22.95	5.87	≤13	PASS
	5	19975	1712.5	28.74	23.90	4.84	≤13	PASS
		20175	1732.5	30.03	25.13	4.90	≤13	PASS
		20375	1752.5	28.57	22.66	5.91	≤13	PASS
	10	20000	1715	29.06	24.22	4.84	≤13	PASS
		20175	1732.5	30.09	25.11	4.98	≤13	PASS
		20350	1750	29.02	23.19	5.83	≤13	PASS
	15	20025	1717.5	28.92	24.60	4.32	≤13	PASS
		20175	1732.5	29.69	25.15	4.54	≤13	PASS
		20325	1747.5	29.14	23.57	5.57	≤13	PASS
	20	20050	1720	29.31	24.76	4.55	≤13	PASS
		20175	1732.5	29.89	25.05	4.84	≤13	PASS
		20300	1745	29.40	23.81	5.59	≤13	PASS



64QAM	1.4	19957	1710.7	23.22	16.73	6.49	≤13	PASS
		20175	1732.5	27.03	20.76	6.27	≤13	PASS
		20393	1754.3	24.74	18.14	6.60	≤13	PASS
	3	19965	1711.5	23.74	17.06	6.68	≤13	PASS
		20175	1732.5	27.08	20.71	6.37	≤13	PASS
		20385	1753.5	24.66	17.97	6.69	≤13	PASS
	5	19975	1712.5	23.47	16.96	6.51	≤13	PASS
		20175	1732.5	26.84	20.39	6.45	≤13	PASS
		20375	1752.5	24.38	17.69	6.69	≤13	PASS
	10	20000	1715	25.19	18.61	6.58	≤13	PASS
		20175	1732.5	26.84	20.47	6.37	≤13	PASS
		20350	1750	24.82	18.22	6.60	≤13	PASS
	15	20025	1717.5	25.80	19.23	6.57	≤13	PASS
		20175	1732.5	16.92	10.48	6.44	≤13	PASS
		20325	1747.5	25.37	18.78	6.59	≤13	PASS
	20	20050	1720	26.06	19.70	6.36	≤13	PASS
		20175	1732.5	26.87	20.54	6.33	≤13	PASS
		20300	1745	25.78	19.35	6.43	≤13	PASS

LTE Band 12								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	23017	699.7	27.59	22.47	5.12	≤13	PASS
		23095	707.5	29.17	25.36	3.81	≤13	PASS
		23173	715.3	27.71	22.24	5.47	≤13	PASS
	3	23025	700.5	27.42	21.89	5.53	≤13	PASS
		23095	707.5	29.38	25.28	4.10	≤13	PASS
		23165	714.5	26.80	21.16	5.64	≤13	PASS
	5	23035	701.5	27.06	21.35	5.71	≤13	PASS
		23095	707.5	28.97	24.54	4.43	≤13	PASS
		23155	713.5	26.68	20.90	5.78	≤13	PASS
	10	23060	704	28.36	22.85	5.51	≤13	PASS
		23095	707.5	28.42	23.83	4.59	≤13	PASS
		23130	711	27.65	22.70	4.95	≤13	PASS
16QAM	1.4	23017	699.7	27.81	22.44	5.37	≤13	PASS
		23095	707.5	29.22	25.24	3.98	≤13	PASS
		23173	715.3	28.03	22.21	5.82	≤13	PASS
	3	23025	700.5	27.82	21.89	5.93	≤13	PASS
		23095	707.5	29.50	25.14	4.36	≤13	PASS



	5	23165	714.5	27.43	21.18	6.25	≤13	PASS
		23035	701.5	27.59	21.42	6.17	≤13	PASS
		23095	707.5	29.12	24.55	4.57	≤13	PASS
		23155	713.5	27.19	20.93	6.26	≤13	PASS
	10	23060	704	28.70	22.90	5.80	≤13	PASS
		23095	707.5	28.72	23.85	4.87	≤13	PASS
		23130	711	28.13	22.69	5.44	≤13	PASS
64QAM	1.4	23017	699.7	24.38	17.80	6.58	≤13	PASS
		23095	707.5	26.05	19.63	6.42	≤13	PASS
		23173	715.3	22.53	16.01	6.52	≤13	PASS
	3	23025	700.5	23.74	17.05	6.69	≤13	PASS
		23095	707.5	25.93	19.53	6.40	≤13	PASS
		23165	714.5	22.40	15.75	6.65	≤13	PASS
	5	23035	701.5	22.76	16.16	6.60	≤13	PASS
		23095	707.5	25.47	19.06	6.41	≤13	PASS
		23155	713.5	22.62	15.93	6.69	≤13	PASS
	10	23060	704	24.06	17.19	6.87	≤13	PASS
		23095	707.5	25.02	18.63	6.39	≤13	PASS
		23130	711	24.09	17.88	6.21	≤13	PASS

LTE Band 13								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	23205	779.5	28.31	22.83	5.48	≤13	PASS
		23230	782	28.15	22.90	5.25	≤13	PASS
		23255	784.5	28.36	23.59	4.77	≤13	PASS
	10	23230	782	28.48	23.58	4.90	≤13	PASS
16QAM	5	23205	779.5	28.71	22.86	5.85	≤13	PASS
		23230	782	28.50	22.86	5.64	≤13	PASS
		23255	784.5	28.62	23.62	5.00	≤13	PASS
	10	23230	782	28.92	23.62	5.30	≤13	PASS
6QAM	5	23205	779.5	26.48	19.66	6.82	≤13	PASS
		23230	782	27.38	21.13	6.25	≤13	PASS
		23255	784.5	27.25	21.14	6.11	≤13	PASS
	10	23230	782	27.65	20.57	7.08	≤13	PASS



LTE Band 41								
Modulation	Bandwidth ((MHz))	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	39675	2498.5	27.69	18.36	9.33	≤13	PASS
		40620	2593	29.87	20.98	8.89	≤13	PASS
		41565	2687.5	29.64	21.13	8.51	≤13	PASS
	10	39700	2501	27.66	18.44	9.22	≤13	PASS
		40620	2593	29.92	21.34	8.58	≤13	PASS
		41540	2685	29.81	21.73	8.08	≤13	PASS
	15	39725	2503.5	28.17	18.45	9.72	≤13	PASS
		40620	2593	30.11	21.35	8.76	≤13	PASS
		41515	2682.5	29.76	21.59	8.17	≤13	PASS
	20	39750	2506	28.01	18.39	9.62	≤13	PASS
		40620	2593	29.89	20.84	9.05	≤13	PASS
		41490	2680	29.87	22.10	7.77	≤13	PASS
16QAM	5	39675	2498.5	28.15	18.29	9.86	≤13	PASS
		40620	2593	30.27	21.17	9.10	≤13	PASS
		41565	2687.5	29.81	21.13	8.68	≤13	PASS
	10	39700	2501	28.36	18.63	9.73	≤13	PASS
		40620	2593	30.31	21.09	9.22	≤13	PASS
		41540	2685	29.98	21.45	8.53	≤13	PASS
	15	39725	2503.5	28.72	18.81	9.91	≤13	PASS
		40620	2593	30.33	21.06	9.27	≤13	PASS
		41515	2682.5	30.82	21.52	9.30	≤13	PASS
	20	39750	2506	28.70	18.90	9.80	≤13	PASS
		40620	2593	30.34	21.00	9.34	≤13	PASS
		41490	2680	30.06	22.07	7.99	≤13	PASS
64QAM	5	39675	2498.5	25.46	15.12	10.34	≤13	PASS
		40620	2593	27.68	16.55	11.13	≤13	PASS
		41565	2687.5	28.02	17.44	10.58	≤13	PASS
	10	39700	2501	25.79	15.41	10.38	≤13	PASS
		40620	2593	28.23	18.44	9.79	≤13	PASS
		41540	2685	28.08	16.77	11.31	≤13	PASS
	15	39725	2503.5	26.20	16.62	9.58	≤13	PASS



		40620	2593	28.23	17.06	11.17	≤13	PASS
		41515	2682.5	28.56	19.03	9.53	≤13	PASS
	20	39750	2506	26.26	16.80	9.46	≤13	PASS
		40620	2593	28.36	18.99	9.37	≤13	PASS
		41490	2680	28.27	17.52	10.75	≤13	PASS

LTE Band 66								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	131979	1710.7	27.35	21.77	5.58	≤13	PASS
		132322	1745	28.21	22.76	5.45	≤13	PASS
		132665	1779.3	29.20	23.90	5.30	≤13	PASS
	3	131987	1711.5	27.72	22.24	5.48	≤13	PASS
		132322	1745	28.25	22.79	5.46	≤13	PASS
		132657	1778.5	29.20	23.83	5.37	≤13	PASS
	5	131997	1712.5	27.53	21.95	5.58	≤13	PASS
		132322	1745	27.98	22.36	5.62	≤13	PASS
		132647	1777.5	28.86	23.39	5.47	≤13	PASS
	10	132022	1715	27.90	22.50	5.40	≤13	PASS
		132322	1745	27.90	22.36	5.54	≤13	PASS
		132622	1775	28.74	23.38	5.36	≤13	PASS
	15	132047	1717.5	28.47	23.18	5.29	≤13	PASS
		132322	1745	28.33	22.59	5.74	≤13	PASS
		132597	1772.5	28.77	23.22	5.55	≤13	PASS
	20	132072	1720	28.37	23.37	5.00	≤13	PASS
		132322	1745	28.02	22.48	5.54	≤13	PASS
		132572	1770	28.24	22.92	5.32	≤13	PASS
16QAM	1.4	131979	1710.7	27.80	21.78	6.02	≤13	PASS
		132322	1745	28.87	22.77	6.10	≤13	PASS
		132665	1779.3	29.52	23.84	5.68	≤13	PASS
	3	131987	1711.5	28.22	22.24	5.98	≤13	PASS
		132322	1745	28.89	22.77	6.12	≤13	PASS
		132657	1778.5	29.66	23.80	5.86	≤13	PASS
	5	131997	1712.5	27.95	21.95	6.00	≤13	PASS
		132322	1745	28.50	22.37	6.13	≤13	PASS
		132647	1777.5	29.32	23.36	5.96	≤13	PASS
	10	132022	1715	28.42	22.59	5.83	≤13	PASS
		132322	1745	28.53	22.36	6.17	≤13	PASS
		132622	1775	29.30	23.35	5.95	≤13	PASS



	15	132047	1717.5	28.73	23.23	5.50	≤13	PASS
		132322	1745	28.57	22.46	6.11	≤13	PASS
		132597	1772.5	29.07	23.20	5.87	≤13	PASS
	20	132072	1720	28.87	23.33	5.54	≤13	PASS
		132322	1745	28.60	22.49	6.11	≤13	PASS
		132572	1770	28.86	22.93	5.93	≤13	PASS
6QAM	1.4	131979	1710.7	26.10	19.85	6.25	≤13	PASS
		132322	1745	27.53	21.26	6.27	≤13	PASS
		132665	1779.3	28.23	22.11	6.12	≤13	PASS
	3	131987	1711.5	26.40	20.14	6.26	≤13	PASS
		132322	1745	27.58	21.25	6.33	≤13	PASS
		132657	1778.5	28.23	22.06	6.17	≤13	PASS
	5	131997	1712.5	26.27	20.06	6.21	≤13	PASS
		132322	1745	27.25	20.93	6.32	≤13	PASS
		132647	1777.5	27.91	21.64	6.27	≤13	PASS
	10	132022	1715	27.07	20.94	6.13	≤13	PASS
		132322	1745	27.31	21.00	6.31	≤13	PASS
		132622	1775	27.89	21.74	6.15	≤13	PASS
	15	132047	1717.5	27.64	21.52	6.12	≤13	PASS
		132322	1745	27.43	21.02	6.41	≤13	PASS
		132597	1772.5	27.73	21.61	6.12	≤13	PASS
	20	132072	1720	27.93	21.99	5.94	≤13	PASS
		132322	1745	27.59	21.25	6.34	≤13	PASS
		132572	1770	27.65	21.60	6.05	≤13	PASS

5.5 Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -40°C to +70°C in 10°C step size.

(1) With all power removed, the temperature was decreased to -10°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -40°C to +70°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

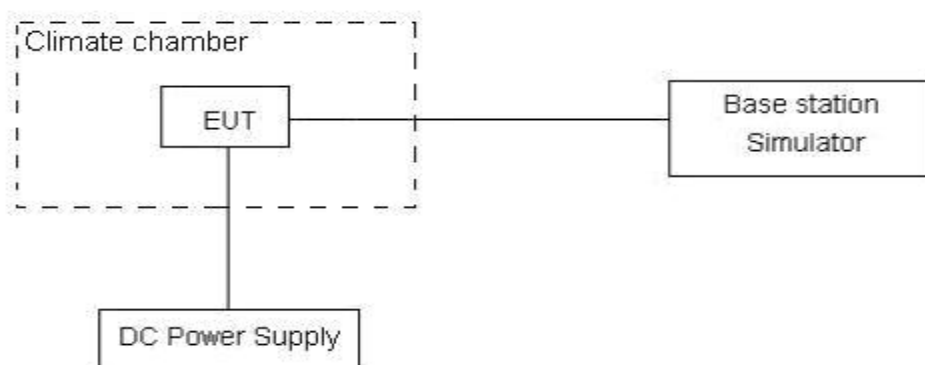
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 9V and 24V, with a nominal voltage of 12V.

Test setup



Limits

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 3$, $U = 0.01$ ppm.



Test Result

LTE Band 4								
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	1.4MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	8.77	9.67	5.40	0.00467	0.00514	0.00287	PASS
Extreme (70℃)		10.99	4.02	6.10	0.00584	0.00214	0.00324	PASS
Extreme (60℃)		4.19	1.01	5.41	0.00223	0.00054	0.00288	PASS
Extreme (50℃)		14.28	13.35	13.65	0.00759	0.00710	0.00726	PASS
Extreme (40℃)		1.69	12.46	5.68	0.00090	0.00663	0.00302	PASS
Extreme (30℃)		10.83	15.92	2.82	0.00576	0.00847	0.00150	PASS
Extreme (20℃)		13.74	5.38	8.88	0.00731	0.00286	0.00472	PASS
Extreme (10℃)		2.84	16.00	2.14	0.00151	0.00851	0.00114	PASS
Extreme (0℃)		7.26	9.20	17.44	0.00386	0.00489	0.00928	PASS
Extreme (-10℃)		15.11	12.73	1.15	0.00804	0.00677	0.00061	PASS
Extreme (-20℃)		7.20	3.40	15.16	0.00383	0.00181	0.00807	PASS
Extreme (-30℃)		13.04	5.02	17.29	0.00694	0.00267	0.00920	PASS
Extreme (-40℃)		1.89	4.75	16.08	0.00100	0.00253	0.00855	PASS
25℃	LV	10.45	13.86	7.11	0.00556	0.00737	0.00378	PASS
	HV	5.05	13.89	12.54	0.00269	0.00739	0.00667	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	3MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	5.16	2.56	1.41	0.00274	0.00136	0.00075	PASS
Extreme (70℃)		6.04	11.12	2.70	0.00321	0.00592	0.00144	PASS
Extreme (60℃)		2.96	9.83	15.78	0.00158	0.00523	0.00839	PASS
Extreme (50℃)		11.85	5.99	9.26	0.00631	0.00319	0.00493	PASS
Extreme (40℃)		2.30	12.09	17.73	0.00122	0.00643	0.00943	PASS
Extreme (30℃)		16.02	5.15	4.70	0.00852	0.00274	0.00250	PASS
Extreme (20℃)		10.31	1.11	16.50	0.00548	0.00059	0.00878	PASS
Extreme (10℃)		10.87	10.61	9.90	0.00578	0.00564	0.00526	PASS
Extreme (0℃)		10.39	13.90	11.95	0.00553	0.00739	0.00635	PASS
Extreme (-10℃)		6.57	1.31	16.99	0.00349	0.00070	0.00904	PASS
Extreme (-20℃)		3.76	15.58	5.60	0.00200	0.00829	0.00298	PASS
Extreme (-30℃)		15.28	10.04	11.83	0.00813	0.00534	0.00629	PASS
Extreme (-40℃)		12.93	7.77	10.46	0.00688	0.00413	0.00556	PASS
25℃	LV	17.68	5.60	1.90	0.00940	0.00298	0.00101	PASS
	HV	4.67	13.53	5.37	0.00249	0.00720	0.00286	PASS



Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	4.52	12.44	6.34	0.00240	0.00662	0.00337	PASS
Extreme (70℃)		8.64	14.78	9.36	0.00460	0.00786	0.00498	PASS
Extreme (60℃)		7.10	9.55	15.66	0.00378	0.00508	0.00833	PASS
Extreme (50℃)		5.38	6.25	5.04	0.00286	0.00332	0.00268	PASS
Extreme (40℃)		14.27	2.90	3.02	0.00759	0.00154	0.00161	PASS
Extreme (30℃)		10.87	14.19	7.49	0.00578	0.00755	0.00399	PASS
Extreme (20℃)		3.72	7.04	12.01	0.00198	0.00374	0.00639	PASS
Extreme (10℃)		8.37	3.65	15.30	0.00445	0.00194	0.00814	PASS
Extreme (0℃)		5.34	3.72	13.19	0.00284	0.00198	0.00701	PASS
Extreme (-10℃)		14.82	6.22	5.92	0.00788	0.00331	0.00315	PASS
Extreme (-20℃)		8.72	3.45	15.21	0.00464	0.00184	0.00809	PASS
Extreme (-30℃)		8.27	4.74	8.65	0.00440	0.00252	0.00460	PASS
Extreme (-40℃)		6.65	14.75	4.64	0.00354	0.00785	0.00247	PASS
25℃	LV	12.22	2.81	17.48	0.00650	0.00149	0.00930	PASS
	HV	5.12	15.06	4.09	0.00273	0.00801	0.00217	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	11.01	10.26	2.22	0.00585	0.00546	0.00118	PASS
Extreme (70℃)		6.48	11.86	17.33	0.00345	0.00631	0.00922	PASS
Extreme (60℃)		10.61	4.21	17.37	0.00565	0.00224	0.00924	PASS
Extreme (50℃)		15.67	5.42	1.25	0.00833	0.00288	0.00067	PASS
Extreme (40℃)		9.49	11.52	6.08	0.00505	0.00613	0.00323	PASS
Extreme (30℃)		2.14	12.10	6.87	0.00114	0.00644	0.00366	PASS
Extreme (20℃)		9.13	15.57	9.62	0.00485	0.00828	0.00512	PASS
Extreme (10℃)		3.55	7.99	4.17	0.00189	0.00425	0.00222	PASS
Extreme (0℃)		8.19	17.48	8.44	0.00436	0.00930	0.00449	PASS
Extreme (-10℃)		5.03	5.55	8.05	0.00268	0.00295	0.00428	PASS
Extreme (-20℃)		10.96	12.85	1.30	0.00583	0.00684	0.00069	PASS
Extreme (-30℃)		4.82	13.12	14.38	0.00256	0.00698	0.00765	PASS
Extreme (-40℃)		6.90	17.32	2.37	0.00367	0.00921	0.00126	PASS
25℃	LV	17.78	10.44	13.02	0.00946	0.00555	0.00693	PASS
	HV	10.09	13.43	17.02	0.00537	0.00714	0.00905	PASS



Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	15MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	4.20	8.08	1.58	0.00223	0.00430	0.00084	PASS
Extreme (70℃)		7.04	3.24	16.86	0.00375	0.00173	0.00897	PASS
Extreme (60℃)		13.39	8.08	1.76	0.00712	0.00430	0.00094	PASS
Extreme (50℃)		16.74	16.21	7.40	0.00890	0.00862	0.00394	PASS
Extreme (40℃)		1.62	16.71	17.92	0.00086	0.00889	0.00953	PASS
Extreme (30℃)		1.89	9.87	4.91	0.00101	0.00525	0.00261	PASS
Extreme (20℃)		7.83	2.42	7.00	0.00416	0.00129	0.00372	PASS
Extreme (10℃)		7.46	6.51	17.40	0.00397	0.00347	0.00926	PASS
Extreme (0℃)		16.89	11.92	13.91	0.00898	0.00634	0.00740	PASS
Extreme (-10℃)		5.11	7.01	5.87	0.00272	0.00373	0.00312	PASS
Extreme (-20℃)		6.95	11.25	3.01	0.00370	0.00599	0.00160	PASS
Extreme (-30℃)		6.62	7.18	15.67	0.00352	0.00382	0.00834	PASS
Extreme (-40℃)		4.97	5.02	7.13	0.00264	0.00267	0.00379	PASS
25℃	LV	5.74	7.44	13.57	0.00305	0.00396	0.00722	PASS
	HV	3.34	14.16	16.58	0.00178	0.00753	0.00882	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	9.59	7.46	16.40	0.00510	0.00397	0.00872	PASS
Extreme (70℃)		10.52	9.76	17.23	0.00559	0.00519	0.00916	PASS
Extreme (60℃)		1.53	14.83	10.88	0.00081	0.00789	0.00579	PASS
Extreme (50℃)		7.91	11.83	9.33	0.00421	0.00629	0.00497	PASS
Extreme (40℃)		3.97	10.16	16.35	0.00211	0.00540	0.00870	PASS
Extreme (30℃)		7.51	12.22	17.93	0.00399	0.00650	0.00954	PASS
Extreme (20℃)		10.33	1.06	10.96	0.00549	0.00056	0.00583	PASS
Extreme (10℃)		14.31	5.03	13.43	0.00761	0.00268	0.00714	PASS
Extreme (0℃)		14.96	6.60	2.83	0.00796	0.00351	0.00150	PASS
Extreme (-10℃)		5.43	6.82	10.99	0.00289	0.00363	0.00585	PASS
Extreme (-20℃)		16.68	2.87	2.53	0.00887	0.00152	0.00135	PASS
Extreme (-30℃)		3.76	14.31	10.94	0.00200	0.00761	0.00582	PASS
Extreme (-40℃)		15.49	7.04	4.66	0.00824	0.00374	0.00248	PASS
25℃	LV	8.59	15.63	2.84	0.00457	0.00832	0.00151	PASS
	HV	9.66	14.00	17.45	0.00514	0.00745	0.00928	PASS



LTE Band 12								
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	1.4MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	16.95	3.83	14.16	0.00902	0.00204	0.00753	PASS
Extreme (70℃)		13.10	14.57	10.47	0.00697	0.00775	0.00557	PASS
Extreme (60℃)		5.59	6.15	9.96	0.00298	0.00327	0.00530	PASS
Extreme (50℃)		13.97	15.38	6.20	0.00743	0.00818	0.00330	PASS
Extreme (40℃)		8.72	14.36	9.86	0.00464	0.00764	0.00524	PASS
Extreme (30℃)		17.36	8.69	5.67	0.00923	0.00462	0.00302	PASS
Extreme (20℃)		9.74	4.17	13.77	0.00518	0.00222	0.00733	PASS
Extreme (10℃)		10.62	1.27	15.42	0.00565	0.00068	0.00820	PASS
Extreme (0℃)		1.66	10.39	3.77	0.00088	0.00553	0.00200	PASS
Extreme (-10℃)		11.62	2.43	7.37	0.00618	0.00129	0.00392	PASS
Extreme (-20℃)		13.82	8.23	4.89	0.00735	0.00438	0.00260	PASS
Extreme (-30℃)		3.79	11.11	11.33	0.00202	0.00591	0.00603	PASS
Extreme (-40℃)		17.90	7.97	11.08	0.00952	0.00424	0.00589	PASS
25℃	LV	11.35	7.06	9.29	0.00604	0.00375	0.00494	PASS
	HV	14.10	3.26	9.73	0.00750	0.00173	0.00518	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	3MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	12.90	12.01	16.86	0.00686	0.00639	0.00897	PASS
Extreme (70℃)		5.23	11.12	11.13	0.00278	0.00591	0.00592	PASS
Extreme (60℃)		17.86	13.04	4.03	0.00950	0.00693	0.00214	PASS
Extreme (50℃)		14.97	13.35	5.43	0.00796	0.00710	0.00289	PASS
Extreme (40℃)		16.93	17.61	3.85	0.00900	0.00937	0.00205	PASS
Extreme (30℃)		8.39	12.29	17.03	0.00446	0.00654	0.00906	PASS
Extreme (20℃)		5.96	12.71	3.85	0.00317	0.00676	0.00205	PASS
Extreme (10℃)		17.35	3.65	12.62	0.00923	0.00194	0.00671	PASS
Extreme (0℃)		6.27	15.62	5.87	0.00333	0.00831	0.00312	PASS
Extreme (-10℃)		14.95	9.46	5.98	0.00795	0.00503	0.00318	PASS
Extreme (-20℃)		1.53	15.60	5.21	0.00082	0.00830	0.00277	PASS
Extreme (-30℃)		4.97	12.78	2.30	0.00265	0.00680	0.00122	PASS
Extreme (-40℃)		10.17	12.31	1.36	0.00541	0.00655	0.00073	PASS
25℃	LV	6.27	8.11	14.72	0.00334	0.00431	0.00783	PASS
	HV	10.65	8.66	1.54	0.00566	0.00460	0.00082	PASS



Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	7.70	10.32	1.96	0.00409	0.00549	0.00104	PASS
Extreme (70℃)		15.88	8.28	13.96	0.00844	0.00440	0.00742	PASS
Extreme (60℃)		11.57	1.74	2.30	0.00615	0.00092	0.00122	PASS
Extreme (50℃)		4.90	7.43	7.34	0.00260	0.00395	0.00390	PASS
Extreme (40℃)		16.55	10.14	10.69	0.00880	0.00539	0.00568	PASS
Extreme (30℃)		15.52	4.86	1.23	0.00826	0.00258	0.00066	PASS
Extreme (20℃)		13.39	13.01	11.89	0.00712	0.00692	0.00632	PASS
Extreme (10℃)		7.23	9.81	10.30	0.00385	0.00522	0.00548	PASS
Extreme (0℃)		16.63	5.87	6.97	0.00884	0.00312	0.00371	PASS
Extreme (-10℃)		12.74	15.10	11.41	0.00677	0.00803	0.00607	PASS
Extreme (-20℃)		6.12	7.30	5.68	0.00325	0.00388	0.00302	PASS
Extreme (-30℃)		3.60	17.96	14.75	0.00192	0.00956	0.00785	PASS
Extreme (-40℃)		6.23	11.98	5.51	0.00331	0.00637	0.00293	PASS
25℃	LV	15.62	14.89	3.14	0.00831	0.00792	0.00167	PASS
	HV	8.48	11.06	12.15	0.00451	0.00588	0.00646	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	16.25	15.92	10.70	0.00865	0.00847	0.00569	PASS
Extreme (70℃)		7.30	15.83	14.07	0.00388	0.00842	0.00749	PASS
Extreme (60℃)		14.01	2.05	10.21	0.00745	0.00109	0.00543	PASS
Extreme (50℃)		11.24	9.75	15.09	0.00598	0.00519	0.00803	PASS
Extreme (40℃)		4.69	16.69	1.39	0.00250	0.00888	0.00074	PASS
Extreme (30℃)		5.50	5.69	14.82	0.00293	0.00303	0.00788	PASS
Extreme (20℃)		14.59	1.36	5.43	0.00776	0.00072	0.00289	PASS
Extreme (10℃)		10.98	6.17	17.27	0.00584	0.00328	0.00919	PASS
Extreme (0℃)		7.63	3.38	5.48	0.00406	0.00180	0.00292	PASS
Extreme (-10℃)		2.07	11.16	4.23	0.00110	0.00594	0.00225	PASS
Extreme (-20℃)		9.85	14.57	5.20	0.00524	0.00775	0.00277	PASS
Extreme (-30℃)		8.18	11.58	17.80	0.00435	0.00616	0.00947	PASS
Extreme (-40℃)		16.19	12.83	7.20	0.00861	0.00682	0.00383	PASS
25℃	LV	6.11	16.29	1.17	0.00325	0.00867	0.00062	PASS
	HV	2.00	4.19	4.02	0.00106	0.00223	0.00214	PASS



LTE Band 13								
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	15.19	10.18	3.12	0.00808	0.00542	0.00166	PASS
Extreme (70℃)		2.20	2.61	1.48	0.00117	0.00139	0.00079	PASS
Extreme (60℃)		12.51	14.00	5.87	0.00666	0.00745	0.00312	PASS
Extreme (50℃)		17.31	15.75	9.24	0.00921	0.00838	0.00491	PASS
Extreme (40℃)		14.83	15.34	3.04	0.00789	0.00816	0.00162	PASS
Extreme (30℃)		15.05	2.49	14.88	0.00801	0.00132	0.00792	PASS
Extreme (20℃)		8.58	11.84	2.98	0.00457	0.00630	0.00159	PASS
Extreme (10℃)		3.41	5.10	13.56	0.00181	0.00271	0.00721	PASS
Extreme (0℃)		9.89	4.91	4.77	0.00526	0.00261	0.00254	PASS
Extreme (-10℃)		14.15	9.77	7.55	0.00753	0.00519	0.00402	PASS
Extreme (-20℃)		4.19	5.30	17.23	0.00223	0.00282	0.00917	PASS
Extreme (-30℃)		3.51	10.44	9.09	0.00187	0.00555	0.00484	PASS
Extreme (-40℃)		12.21	6.98	14.71	0.00649	0.00371	0.00782	PASS
25℃	LV	17.25	17.60	9.99	0.00918	0.00936	0.00532	PASS
	HV	6.95	5.06	3.10	0.00370	0.00269	0.00165	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	3.95	12.54	6.04	0.00210	0.00667	0.00321	PASS
Extreme (70℃)		1.50	6.84	16.14	0.00080	0.00364	0.00859	PASS
Extreme (60℃)		9.06	9.27	6.84	0.00482	0.00493	0.00364	PASS
Extreme (50℃)		12.47	1.75	11.65	0.00663	0.00093	0.00620	PASS
Extreme (40℃)		6.26	13.93	6.27	0.00333	0.00741	0.00334	PASS
Extreme (30℃)		14.61	16.24	13.80	0.00777	0.00864	0.00734	PASS
Extreme (20℃)		11.57	3.47	14.67	0.00615	0.00185	0.00781	PASS
Extreme (10℃)		14.25	5.42	13.97	0.00758	0.00288	0.00743	PASS
Extreme (0℃)		15.52	11.81	3.21	0.00825	0.00628	0.00171	PASS
Extreme (-10℃)		14.77	16.50	11.76	0.00786	0.00878	0.00625	PASS
Extreme (-20℃)		10.97	12.37	10.06	0.00583	0.00658	0.00535	PASS
Extreme (-30℃)		4.45	6.29	5.49	0.00237	0.00334	0.00292	PASS
Extreme (-40℃)		9.01	12.70	11.74	0.00479	0.00675	0.00624	PASS
25℃	LV	5.72	3.59	8.42	0.00305	0.00191	0.00448	PASS
	HV	17.62	5.85	7.88	0.00937	0.00311	0.00419	PASS



LTE Band 41								
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	10.75	17.14	11.02	0.00572	0.00911	0.00586	PASS
Extreme (70℃)		4.27	3.96	15.44	0.00227	0.00211	0.00821	PASS
Extreme (60℃)		17.12	15.77	1.78	0.00911	0.00839	0.00094	PASS
Extreme (50℃)		17.24	15.49	7.28	0.00917	0.00824	0.00387	PASS
Extreme (40℃)		6.95	8.17	16.82	0.00369	0.00435	0.00895	PASS
Extreme (30℃)		1.37	9.85	5.83	0.00073	0.00524	0.00310	PASS
Extreme (20℃)		9.76	8.39	17.76	0.00519	0.00446	0.00945	PASS
Extreme (10℃)		10.03	16.98	12.59	0.00534	0.00903	0.00670	PASS
Extreme (0℃)		10.29	5.21	15.17	0.00547	0.00277	0.00807	PASS
Extreme (-10℃)		13.51	15.17	15.21	0.00718	0.00807	0.00809	PASS
Extreme (-20℃)		13.41	9.83	8.65	0.00713	0.00523	0.00460	PASS
Extreme (-30℃)		6.40	6.49	2.48	0.00340	0.00345	0.00132	PASS
Extreme (-40℃)		3.42	8.26	2.87	0.00182	0.00439	0.00153	PASS
25℃	LV	6.61	4.44	14.25	0.00352	0.00236	0.00758	PASS
	HV	2.95	17.45	16.47	0.00157	0.00928	0.00876	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	11.56	12.19	16.02	0.00615	0.00648	0.00852	PASS
Extreme (70℃)		3.56	4.23	8.04	0.00190	0.00225	0.00428	PASS
Extreme (60℃)		2.61	12.10	13.43	0.00139	0.00644	0.00715	PASS
Extreme (50℃)		4.24	10.09	13.45	0.00225	0.00537	0.00715	PASS
Extreme (40℃)		5.48	6.96	9.47	0.00291	0.00370	0.00504	PASS
Extreme (30℃)		3.94	7.42	8.78	0.00210	0.00395	0.00467	PASS
Extreme (20℃)		12.95	10.34	10.04	0.00689	0.00550	0.00534	PASS
Extreme (10℃)		3.62	15.16	6.24	0.00193	0.00806	0.00332	PASS
Extreme (0℃)		13.78	9.99	14.88	0.00733	0.00531	0.00791	PASS
Extreme (-10℃)		9.85	7.66	16.64	0.00524	0.00408	0.00885	PASS
Extreme (-20℃)		13.65	2.20	6.72	0.00726	0.00117	0.00357	PASS
Extreme (-30℃)		7.80	8.13	13.00	0.00415	0.00433	0.00692	PASS
Extreme (-40℃)		15.00	1.55	12.65	0.00798	0.00082	0.00673	PASS
25℃	LV	7.99	2.82	6.33	0.00425	0.00150	0.00336	PASS
	HV	9.36	3.36	2.67	0.00498	0.00179	0.00142	PASS



Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	15MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	1.93	6.88	16.27	0.00103	0.00366	0.00865	PASS
Extreme (70℃)		4.03	14.91	16.64	0.00214	0.00793	0.00885	PASS
Extreme (60℃)		16.98	11.36	6.75	0.00903	0.00604	0.00359	PASS
Extreme (50℃)		3.80	13.66	5.28	0.00202	0.00727	0.00281	PASS
Extreme (40℃)		4.30	3.56	13.97	0.00229	0.00189	0.00743	PASS
Extreme (30℃)		17.15	17.12	5.92	0.00912	0.00911	0.00315	PASS
Extreme (20℃)		10.98	14.45	10.70	0.00584	0.00769	0.00569	PASS
Extreme (10℃)		12.19	1.38	14.54	0.00648	0.00074	0.00773	PASS
Extreme (0℃)		4.59	17.72	17.65	0.00244	0.00943	0.00939	PASS
Extreme (-10℃)		10.92	17.64	9.60	0.00581	0.00938	0.00511	PASS
Extreme (-20℃)		9.35	2.42	15.69	0.00498	0.00129	0.00834	PASS
Extreme (-30℃)		4.22	9.41	6.84	0.00225	0.00501	0.00364	PASS
Extreme (-40℃)		1.06	3.79	16.85	0.00057	0.00202	0.00897	PASS
25℃	LV	1.45	12.42	4.07	0.00077	0.00660	0.00217	PASS
	HV	10.12	13.22	1.67	0.00538	0.00703	0.00089	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	10.47	6.05	5.29	0.00557	0.00322	0.00281	PASS
Extreme (70℃)		4.18	7.18	1.61	0.00223	0.00382	0.00086	PASS
Extreme (60℃)		1.92	13.21	14.61	0.00102	0.00702	0.00777	PASS
Extreme (50℃)		2.92	16.75	10.66	0.00155	0.00891	0.00567	PASS
Extreme (40℃)		4.33	12.23	8.00	0.00230	0.00650	0.00425	PASS
Extreme (30℃)		8.21	15.23	5.78	0.00437	0.00810	0.00307	PASS
Extreme (20℃)		4.24	5.01	11.74	0.00226	0.00267	0.00624	PASS
Extreme (10℃)		13.02	1.37	9.26	0.00693	0.00073	0.00493	PASS
Extreme (0℃)		15.77	6.77	12.94	0.00839	0.00360	0.00688	PASS
Extreme (-10℃)		17.35	7.46	9.01	0.00923	0.00397	0.00479	PASS
Extreme (-20℃)		1.49	2.70	17.22	0.00079	0.00144	0.00916	PASS
Extreme (-30℃)		10.85	9.65	12.75	0.00577	0.00513	0.00678	PASS
Extreme (-40℃)		1.48	14.97	13.95	0.00079	0.00796	0.00742	PASS
25℃	LV	13.86	11.75	3.64	0.00737	0.00625	0.00194	PASS
	HV	1.26	15.61	17.87	0.00067	0.00830	0.00951	PASS



LTE Band 66								
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	1.4MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	9.01	6.72	6.01	0.00479	0.00357	0.00320	PASS
Extreme (70℃)		3.94	10.65	13.41	0.00210	0.00567	0.00713	PASS
Extreme (60℃)		13.98	9.20	12.99	0.00744	0.00489	0.00691	PASS
Extreme (50℃)		5.45	17.88	7.35	0.00290	0.00951	0.00391	PASS
Extreme (40℃)		2.03	7.25	17.23	0.00108	0.00386	0.00916	PASS
Extreme (30℃)		11.35	10.99	16.02	0.00604	0.00584	0.00852	PASS
Extreme (20℃)		3.71	11.13	15.71	0.00197	0.00592	0.00835	PASS
Extreme (10℃)		1.19	4.73	11.21	0.00063	0.00251	0.00596	PASS
Extreme (0℃)		3.98	4.87	2.71	0.00212	0.00259	0.00144	PASS
Extreme (-10℃)		4.87	4.77	17.86	0.00259	0.00254	0.00950	PASS
Extreme (-20℃)		3.87	6.18	11.26	0.00206	0.00329	0.00599	PASS
Extreme (-30℃)		1.55	1.80	12.34	0.00082	0.00096	0.00656	PASS
Extreme (-40℃)		17.49	7.15	8.77	0.00930	0.00380	0.00466	PASS
25℃	LV	5.30	16.77	2.62	0.00282	0.00892	0.00139	PASS
	HV	11.40	14.36	6.28	0.00606	0.00764	0.00334	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	3MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	10.30	3.22	11.76	0.00548	0.00171	0.00625	PASS
Extreme (70℃)		16.16	8.25	16.40	0.00860	0.00439	0.00873	PASS
Extreme (60℃)		7.39	15.96	16.85	0.00393	0.00849	0.00896	PASS
Extreme (50℃)		2.58	16.24	12.52	0.00137	0.00864	0.00666	PASS
Extreme (40℃)		16.87	3.71	5.45	0.00897	0.00197	0.00290	PASS
Extreme (30℃)		15.54	16.09	2.83	0.00827	0.00856	0.00151	PASS
Extreme (20℃)		14.53	9.35	9.72	0.00773	0.00498	0.00517	PASS
Extreme (10℃)		7.03	16.82	4.07	0.00374	0.00895	0.00217	PASS
Extreme (0℃)		12.19	3.60	7.33	0.00648	0.00192	0.00390	PASS
Extreme (-10℃)		12.15	16.66	13.00	0.00646	0.00886	0.00691	PASS
Extreme (-20℃)		1.36	5.07	16.52	0.00072	0.00270	0.00879	PASS
Extreme (-30℃)		4.70	4.58	1.56	0.00250	0.00244	0.00083	PASS
Extreme (-40℃)		8.39	10.42	11.43	0.00446	0.00554	0.00608	PASS
25℃	LV	8.34	10.68	10.75	0.00444	0.00568	0.00572	PASS
	HV	6.00	12.73	16.12	0.00319	0.00677	0.00858	PASS



Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	13.35	2.41	9.87	0.00710	0.00128	0.00525	PASS
Extreme (70℃)		9.06	2.14	3.25	0.00482	0.00114	0.00173	PASS
Extreme (60℃)		3.33	16.93	4.20	0.00177	0.00901	0.00223	PASS
Extreme (50℃)		13.93	11.60	10.39	0.00741	0.00617	0.00553	PASS
Extreme (40℃)		17.73	3.66	13.60	0.00943	0.00195	0.00724	PASS
Extreme (30℃)		16.01	1.05	13.80	0.00852	0.00056	0.00734	PASS
Extreme (20℃)		11.60	8.96	14.96	0.00617	0.00477	0.00796	PASS
Extreme (10℃)		16.65	1.32	1.04	0.00886	0.00070	0.00055	PASS
Extreme (0℃)		13.01	1.10	12.58	0.00692	0.00059	0.00669	PASS
Extreme (-10℃)		12.23	9.37	10.80	0.00651	0.00498	0.00574	PASS
Extreme (-20℃)		2.38	3.69	13.71	0.00127	0.00197	0.00729	PASS
Extreme (-30℃)		7.39	10.32	13.66	0.00393	0.00549	0.00727	PASS
Extreme (-40℃)		10.82	4.91	7.15	0.00576	0.00261	0.00380	PASS
25℃	LV	2.31	5.93	4.97	0.00123	0.00315	0.00264	PASS
	HV	9.95	7.74	14.50	0.00529	0.00412	0.00771	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	3.90	16.99	4.13	0.00207	0.00904	0.00220	PASS
Extreme (70℃)		15.25	10.00	11.93	0.00811	0.00532	0.00635	PASS
Extreme (60℃)		5.92	15.01	1.13	0.00315	0.00798	0.00060	PASS
Extreme (50℃)		1.00	12.85	16.12	0.00053	0.00684	0.00857	PASS
Extreme (40℃)		16.70	10.06	13.99	0.00888	0.00535	0.00744	PASS
Extreme (30℃)		15.47	3.63	6.95	0.00823	0.00193	0.00370	PASS
Extreme (20℃)		14.13	14.89	2.32	0.00752	0.00792	0.00123	PASS
Extreme (10℃)		15.27	2.90	9.81	0.00812	0.00154	0.00522	PASS
Extreme (0℃)		1.37	7.48	6.96	0.00073	0.00398	0.00370	PASS
Extreme (-10℃)		12.82	4.70	16.95	0.00682	0.00250	0.00901	PASS
Extreme (-20℃)		11.71	3.77	14.98	0.00623	0.00200	0.00797	PASS
Extreme (-30℃)		8.17	8.03	1.83	0.00435	0.00427	0.00097	PASS
Extreme (-40℃)		10.63	4.64	3.87	0.00566	0.00247	0.00206	PASS
25℃	LV	6.86	2.12	9.82	0.00365	0.00113	0.00522	PASS
	HV	6.12	12.24	13.25	0.00325	0.00651	0.00705	PASS



Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	15MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	1.04	6.51	8.28	0.00055	0.00346	0.00441	PASS
Extreme (70℃)		11.59	5.58	3.77	0.00616	0.00297	0.00201	PASS
Extreme (60℃)		15.09	2.77	14.64	0.00803	0.00148	0.00779	PASS
Extreme (50℃)		3.67	14.46	5.90	0.00195	0.00769	0.00314	PASS
Extreme (40℃)		11.52	7.16	17.60	0.00613	0.00381	0.00936	PASS
Extreme (30℃)		15.42	14.59	1.53	0.00820	0.00776	0.00081	PASS
Extreme (20℃)		16.53	6.03	6.96	0.00879	0.00321	0.00370	PASS
Extreme (10℃)		14.85	12.15	4.29	0.00790	0.00646	0.00228	PASS
Extreme (0℃)		12.30	17.23	10.27	0.00654	0.00917	0.00546	PASS
Extreme (-10℃)		16.86	1.57	10.00	0.00897	0.00084	0.00532	PASS
Extreme (-20℃)		1.29	17.40	12.55	0.00069	0.00926	0.00668	PASS
Extreme (-30℃)		3.42	9.17	10.73	0.00182	0.00488	0.00571	PASS
Extreme (-40℃)		10.53	8.82	3.59	0.00560	0.00469	0.00191	PASS
25℃	LV	5.74	8.77	6.64	0.00305	0.00466	0.00353	PASS
	HV	16.76	15.97	7.27	0.00892	0.00849	0.00387	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz							
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	16.58	6.57	2.23	0.00882	0.00350	0.00119	PASS
Extreme (70℃)		8.12	8.63	5.52	0.00432	0.00459	0.00294	PASS
Extreme (60℃)		9.07	9.02	16.56	0.00483	0.00480	0.00881	PASS
Extreme (50℃)		3.27	13.08	5.05	0.00174	0.00696	0.00269	PASS
Extreme (40℃)		2.80	15.80	14.90	0.00149	0.00840	0.00792	PASS
Extreme (30℃)		14.69	17.24	9.33	0.00781	0.00917	0.00496	PASS
Extreme (20℃)		6.41	15.17	11.44	0.00341	0.00807	0.00608	PASS
Extreme (10℃)		9.36	6.83	4.30	0.00498	0.00363	0.00229	PASS
Extreme (0℃)		4.20	12.43	11.53	0.00223	0.00661	0.00613	PASS
Extreme (-10℃)		2.38	1.73	9.94	0.00127	0.00092	0.00529	PASS
Extreme (-20℃)		8.70	8.79	15.19	0.00463	0.00468	0.00808	PASS
Extreme (-30℃)		11.65	17.33	12.13	0.00619	0.00922	0.00645	PASS
Extreme (-40℃)		17.87	12.87	2.49	0.00950	0.00684	0.00133	PASS
25℃	LV	3.65	15.34	9.89	0.00194	0.00816	0.00526	PASS
	HV	2.12	2.40	10.48	0.00113	0.00128	0.00557	PASS

5.6 Spurious Emissions at Antenna Terminals

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.

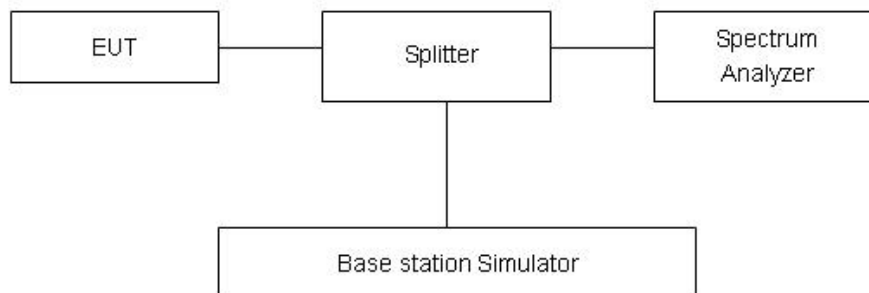
RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup



Limits

LTE -4 Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB..”

LTE -12 Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

LTE -13 Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to –70 dBW/MHz equivalent



isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

LTE 41 Rule Part 27.53(m) $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section.

LTE 13- Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

Part 27.53(a)/(h)/(g) Limit		-13 dBm
Part 27.53(f) Limit	Limit out of the band 1559-1610 MHz	-13 dBm
	Limit in the band 1559-1610 MHz	-40 dBm
Part 27.53(m) Limit		-25 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-27GHz	1.407 dB

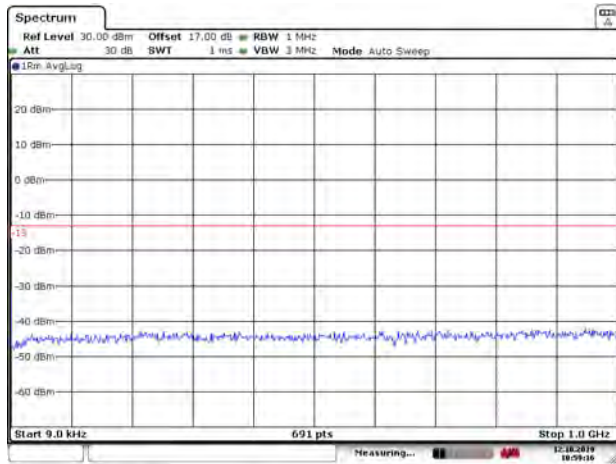


Test Result

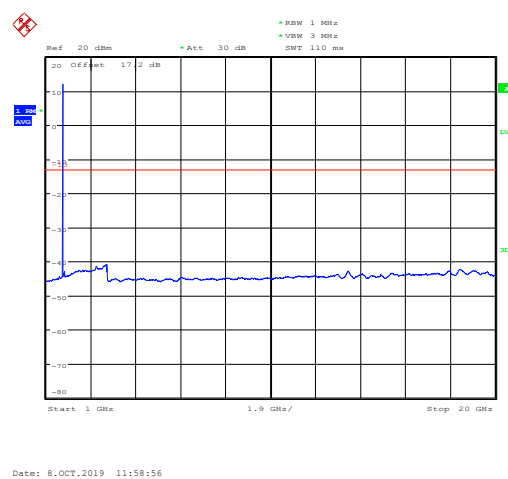
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

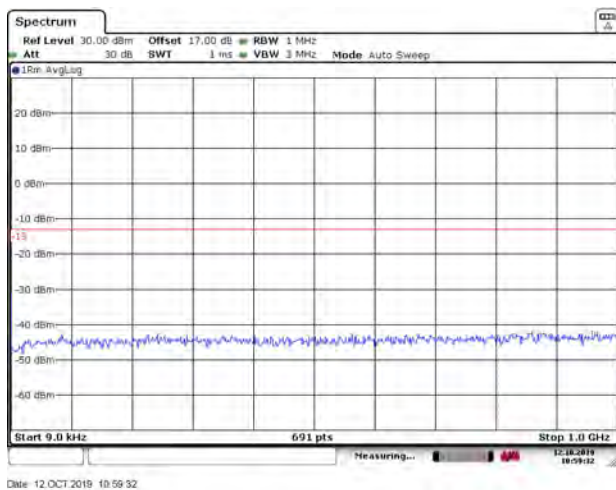
LTE Band 4 1.4MHz CH-Low 9kHz~1GHz



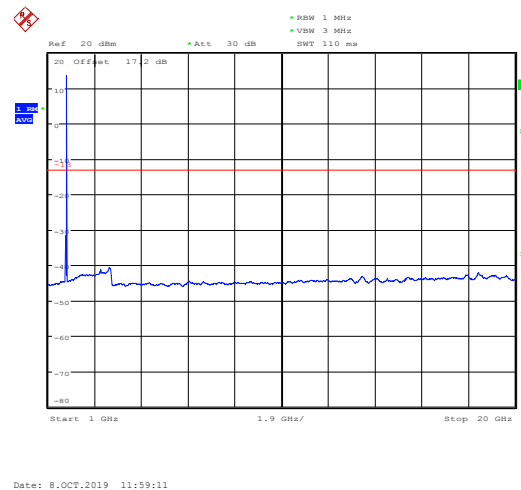
LTE Band 4 1.4MHz CH-Low 1GHz~20GHz



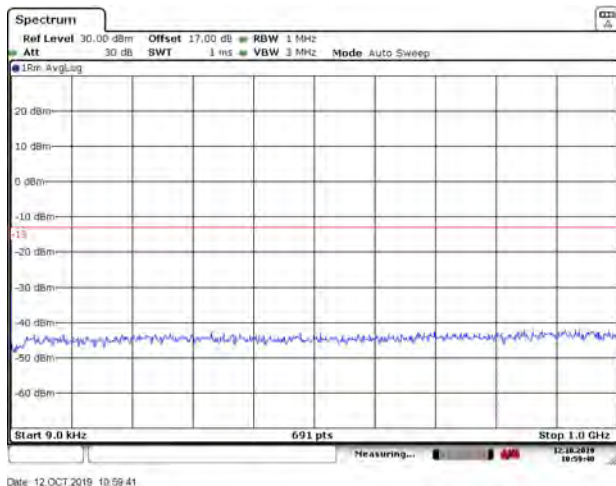
LTE Band 4 1.4MHz CH-Middle 9kHz~1GHz



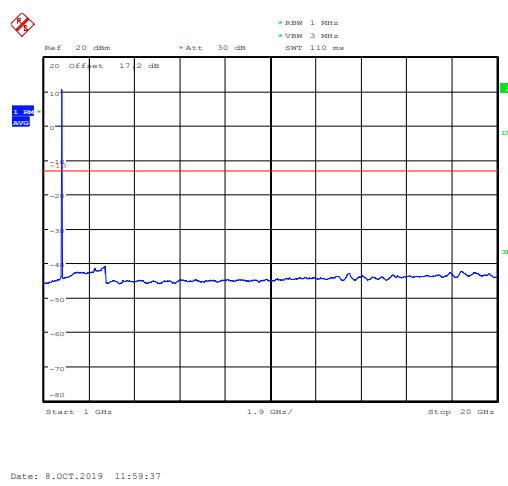
LTE Band 4 1.4MHz CH-Middle 1GHz~20GHz



LTE Band 4 1.4MHz CH-High 9kHz~1GHz

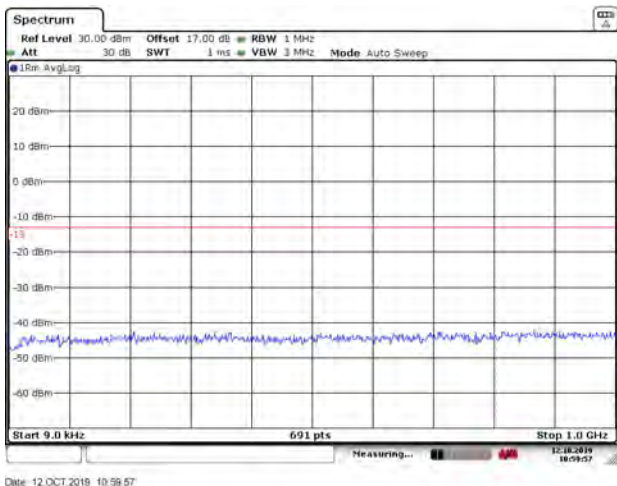


LTE Band 4 1.4MHz CH-High 1GHz~20GHz



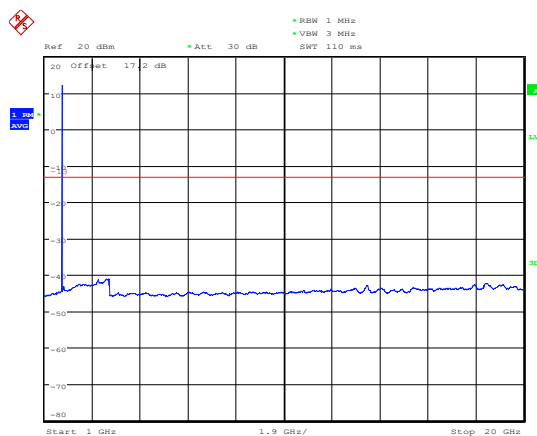


LTE Band 4 3MHz CH-Low 9kHz~1GHz



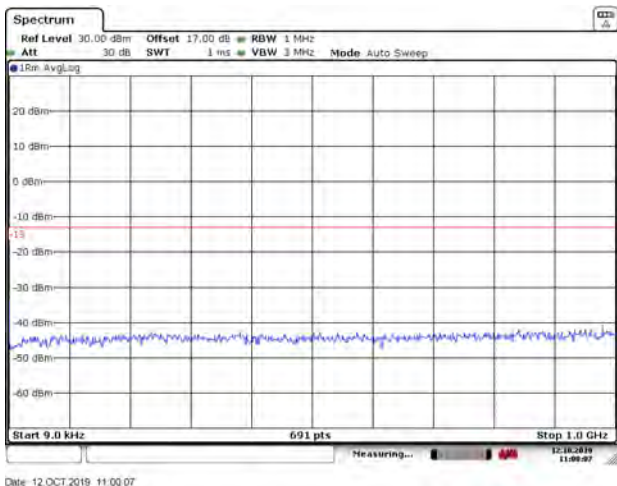
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LTE Band 4 3MHz CH-Low 1GHz~20GHz



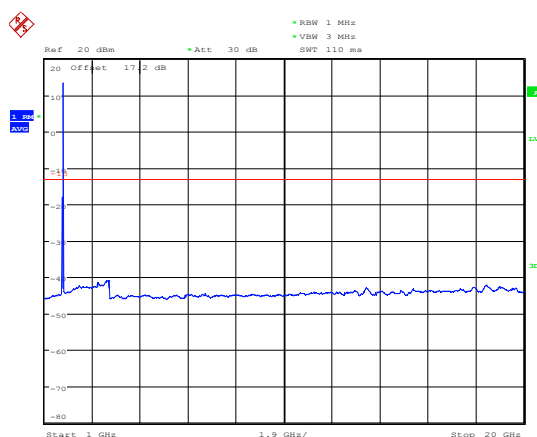
Date: 8.OCT.2019 11:59:59

LTE Band 4 3MHz CH-Middle 9kHz~1GHz



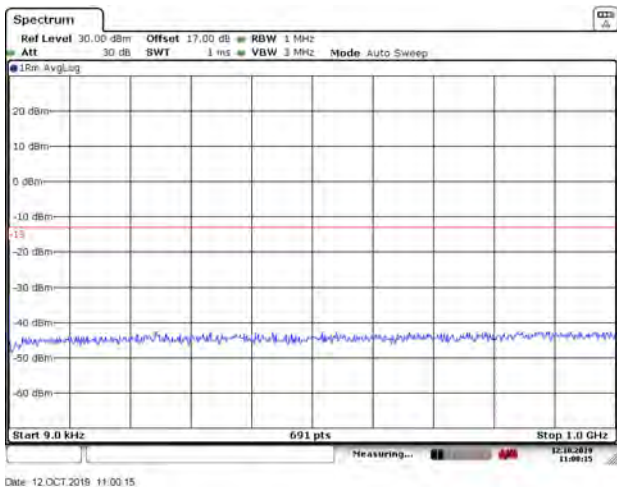
Date: 12.OCT.2019 11:00:07

LTE Band 4 3MHz CH-Middle 1GHz~20GHz



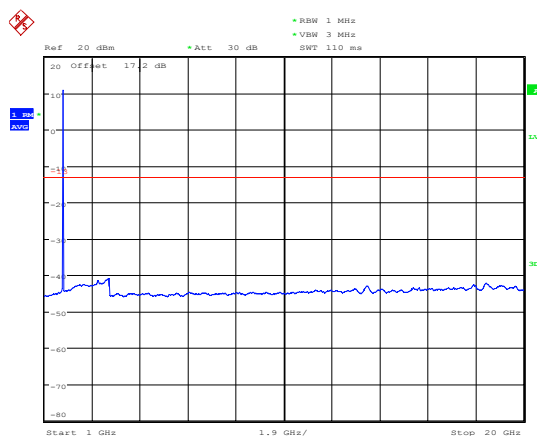
Date: 8.OCT.2019 12:00:12

LTE Band 4 3MHz CH-High 9kHz~1GHz



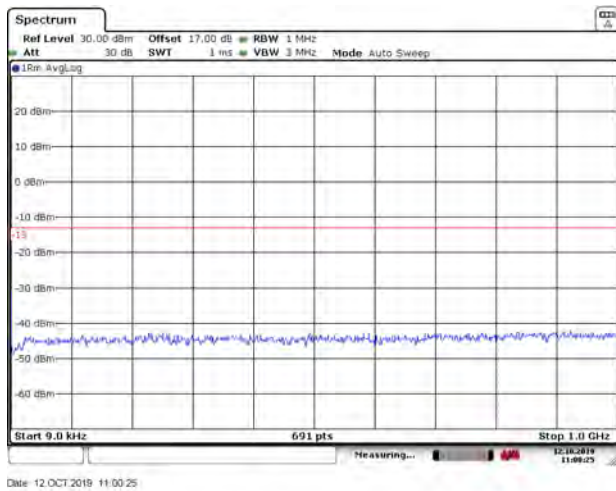
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LTE Band 4 3MHz CH-High 1GHz~20GHz

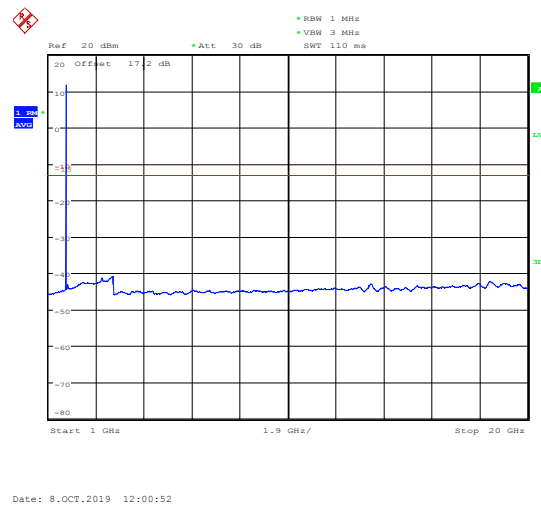


Date: 8.OCT.2019 12:00:29

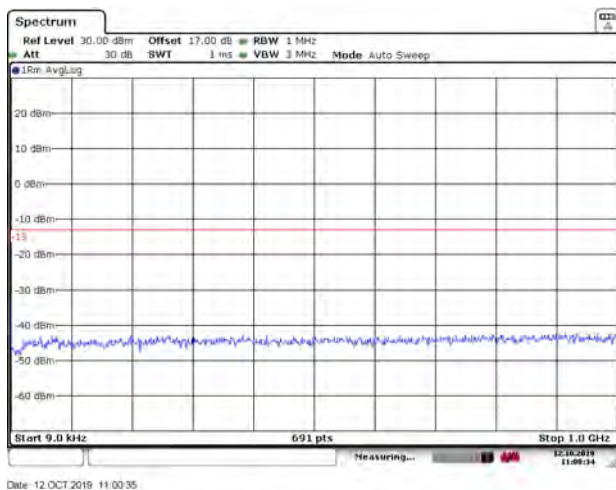
LTE Band 4 5MHz CH-Low 9kHz~1GHz



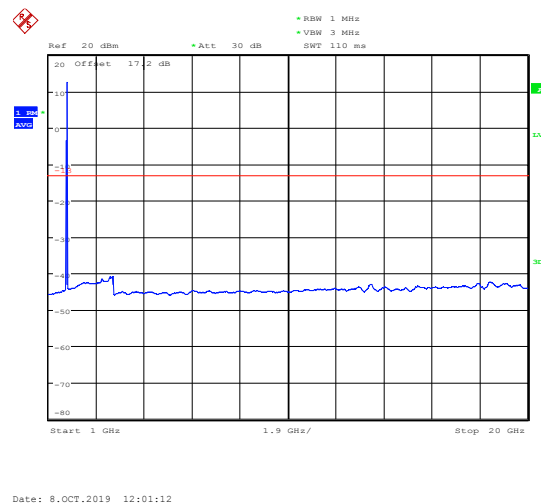
LTE Band 4 5MHz CH-Low 1GHz~20GHz



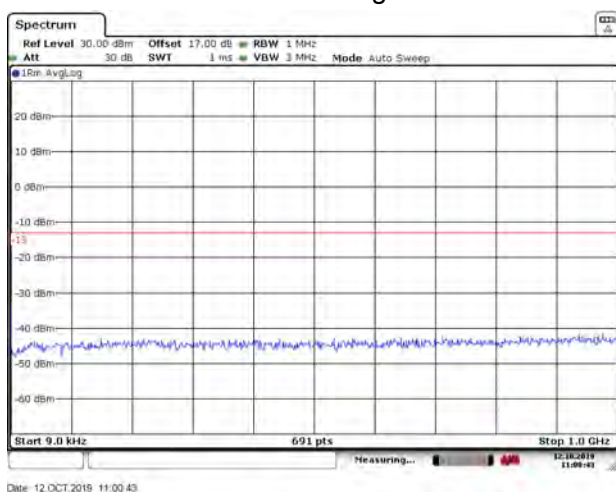
LTE Band 4 5MHz CH-Middle 9kHz~1GHz



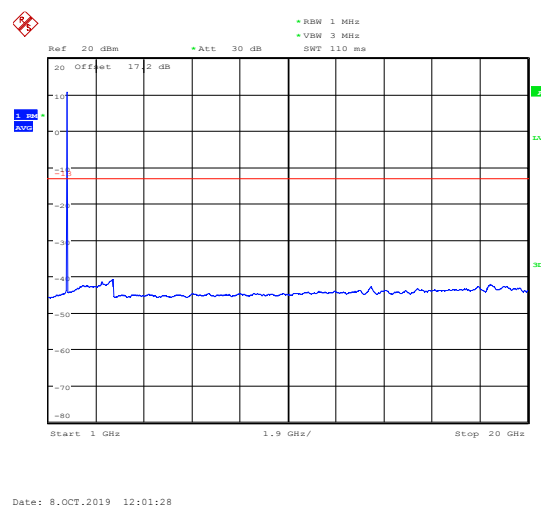
LTE Band 4 5MHz CH-Middle 1GHz~20GHz



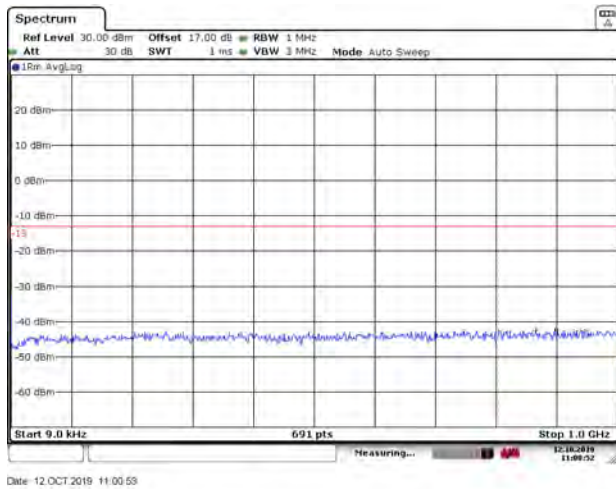
LTE Band 4 5MHz CH-High 9kHz~1GHz



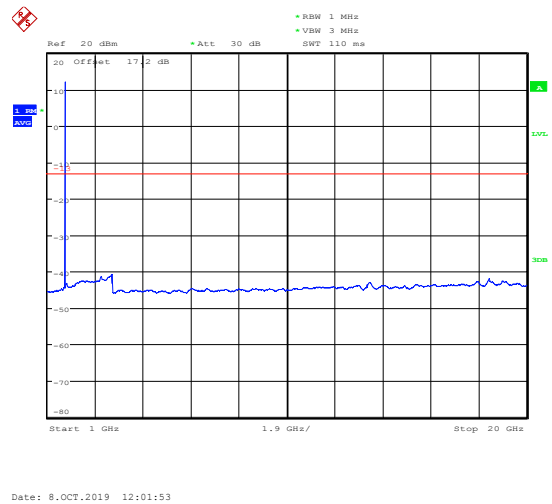
LTE Band 4 5MHz CH-High 1GHz~20GHz



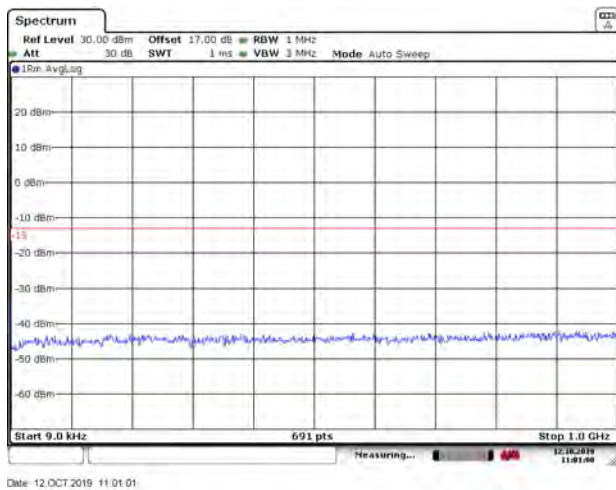
LTE Band 4 10MHz CH-Low 9kHz~1GHz



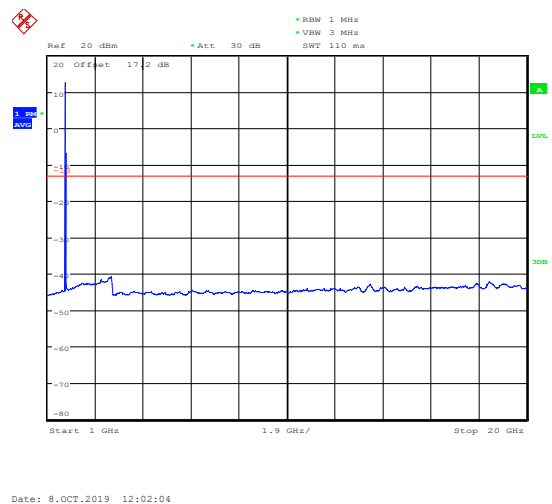
LTE Band 4 10MHz CH-Low 1GHz~20GHz



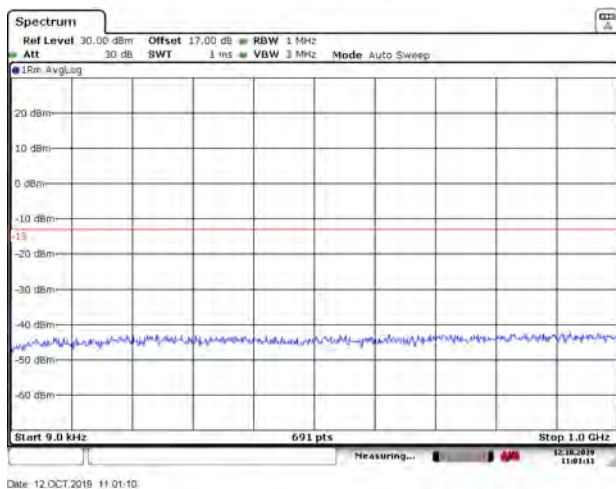
LTE Band 4 10MHz CH-Middle 9kHz~1GHz



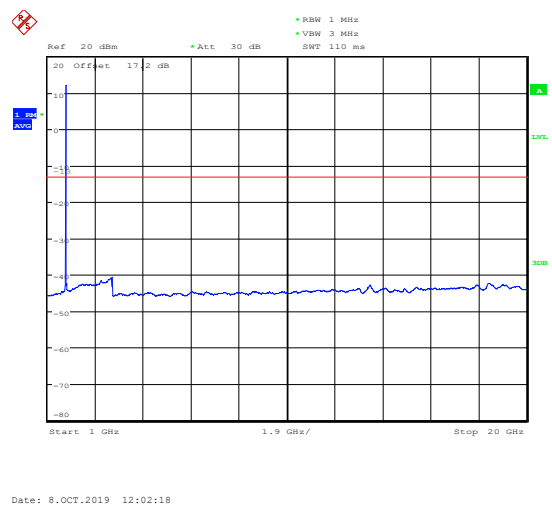
LTE Band 4 10MHz CH-Middle 1GHz~20GHz



LTE Band 4 10MHz CH-High 9kHz~1GHz

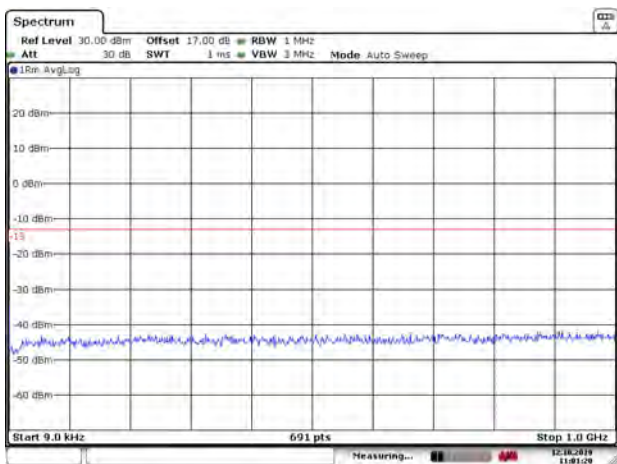


LTE Band 4 10MHz CH-High 1GHz~20GHz



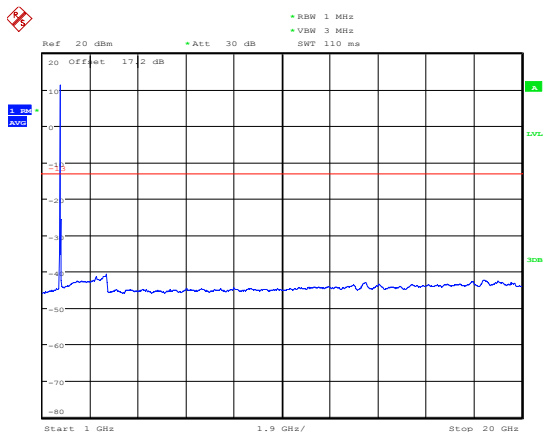


LTE Band 4 15MHz CH-Low 9kHz~1GHz



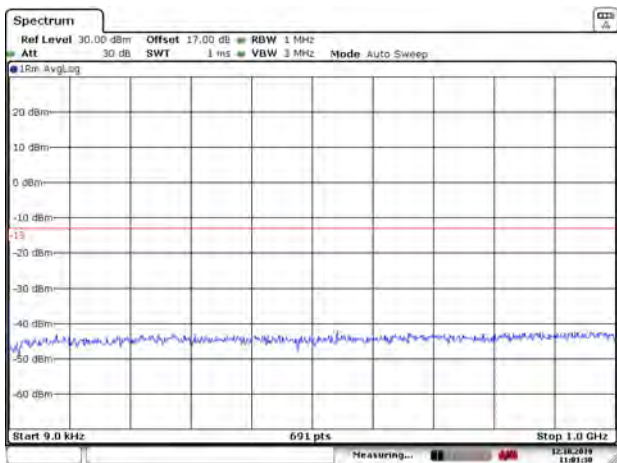
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LTE Band 4 15MHz CH-Low 1GHz~20GHz



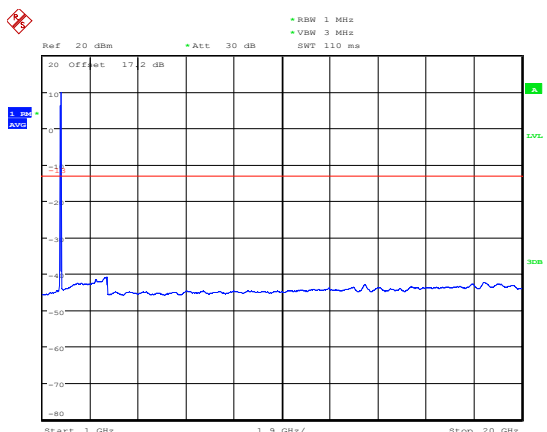
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LTE Band 4 15MHz CH-Middle 9kHz~1GHz



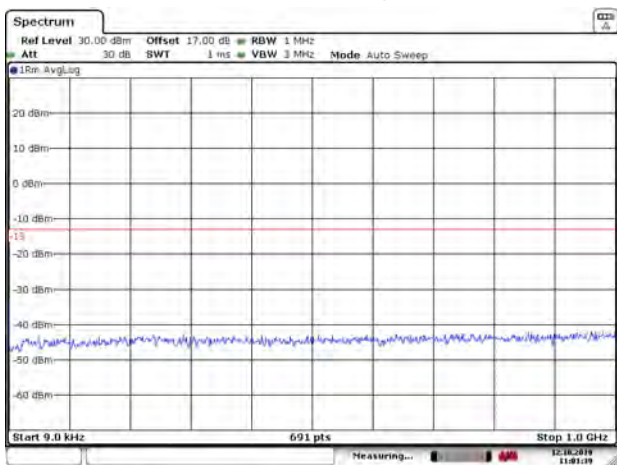
Date: 12.OCT.2019 11:01:31

LTE Band 4 15MHz CH-Middle 1GHz~20GHz



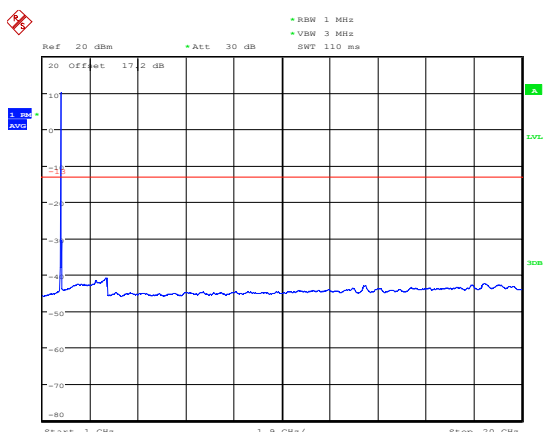
Date: 8.OCT.2019 12:04:12

LTE Band 4 15MHz CH-High 9kHz~1GHz



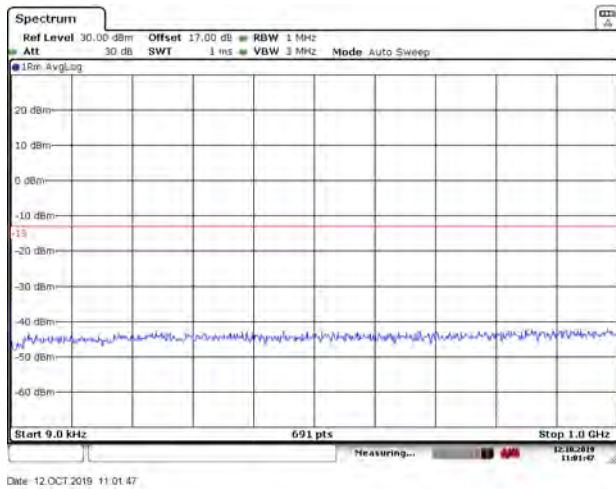
Date: 12.OCT.2019 11:01:39

LTE Band 4 15MHz CH-High 1GHz~20GHz

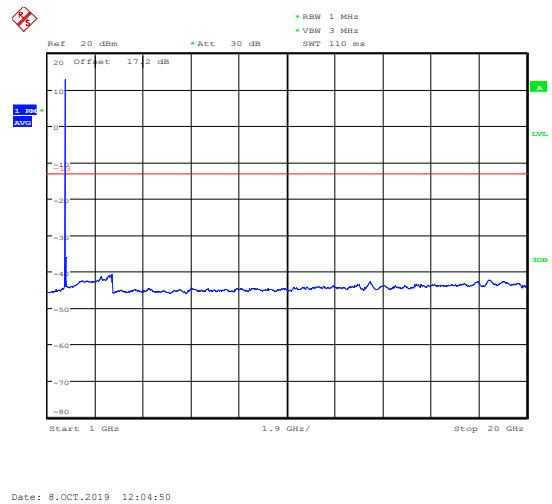


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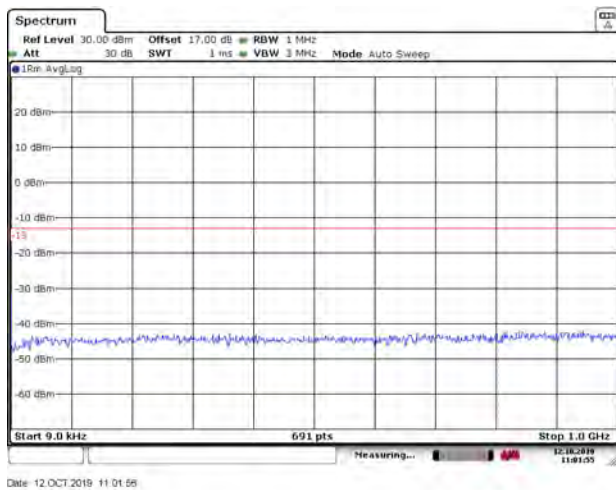
LTE Band 4 20MHz CH-Low 9kHz~1GHz



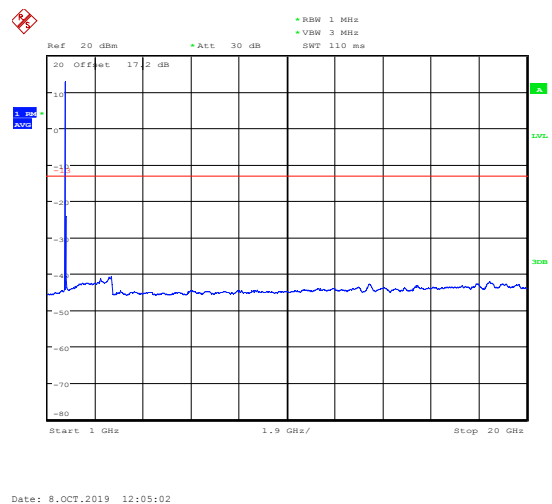
LTE Band 4 20MHz CH-Low 1GHz~20GHz



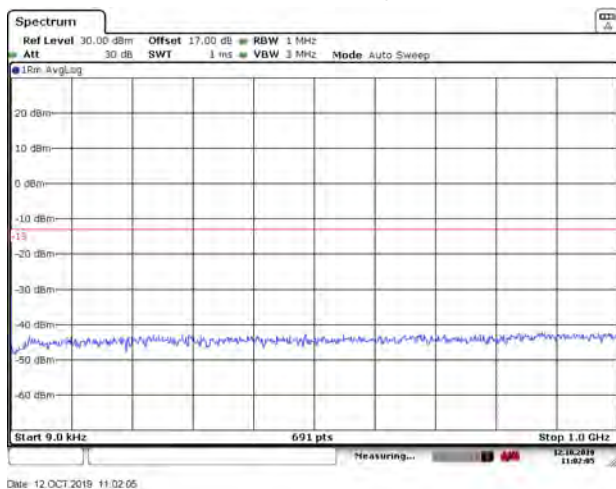
LTE Band 4 20MHz CH-Middle 9kHz~1GHz



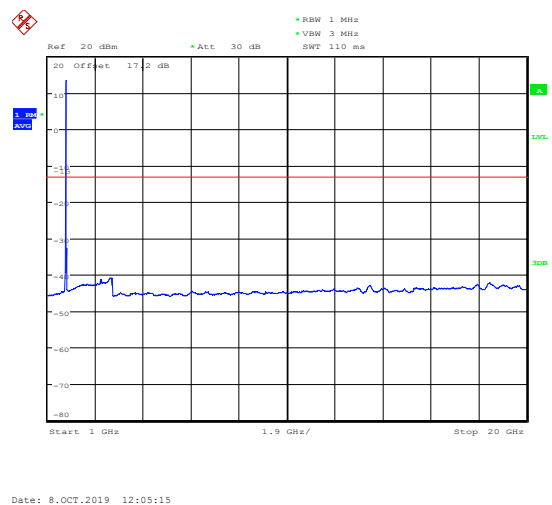
LTE Band 4 20MHz CH-Middle 1GHz~20GHz



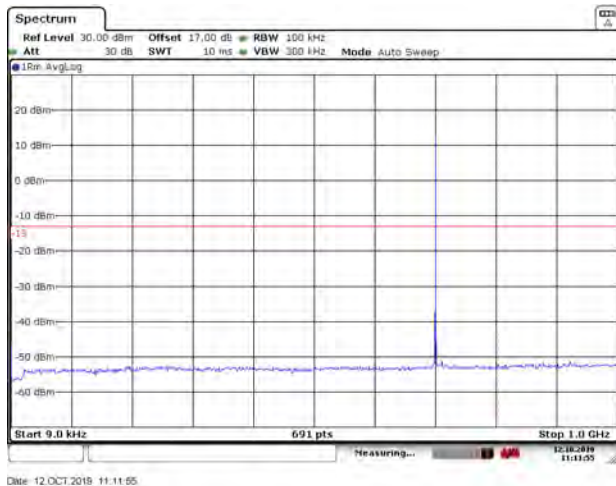
LTE Band 4 20MHz CH-High 9kHz~1GHz



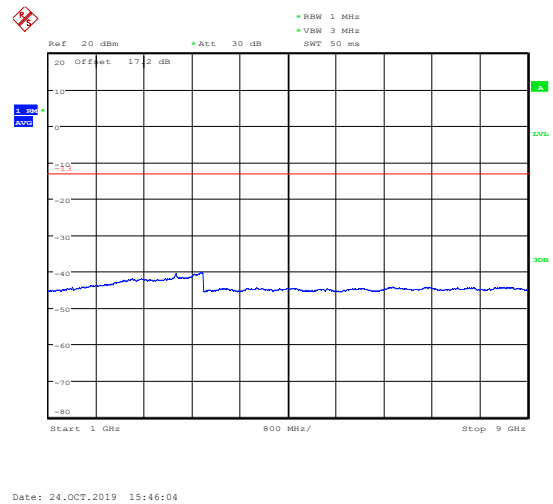
LTE Band 4 20MHz CH-High 1GHz~20GHz



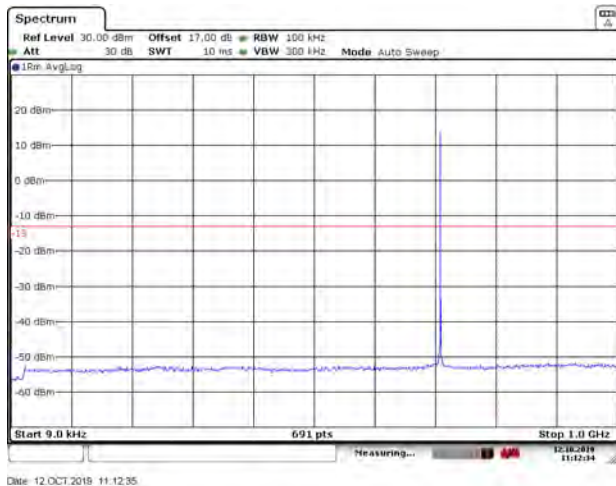
LTE Band 12 1.4MHz CH-Low 9kHz~1GHz



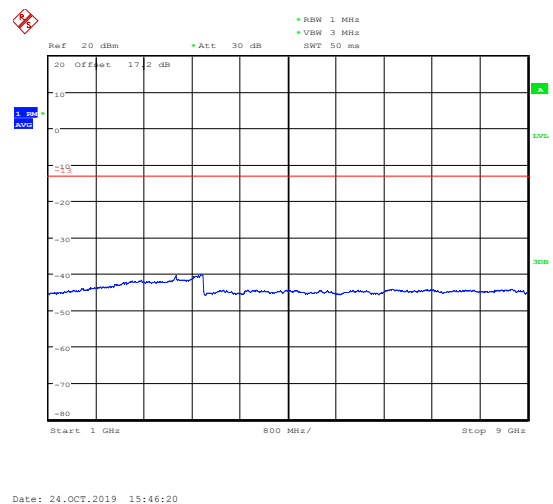
LTE Band 12 1.4MHz CH-Low 1GHz~9GHz



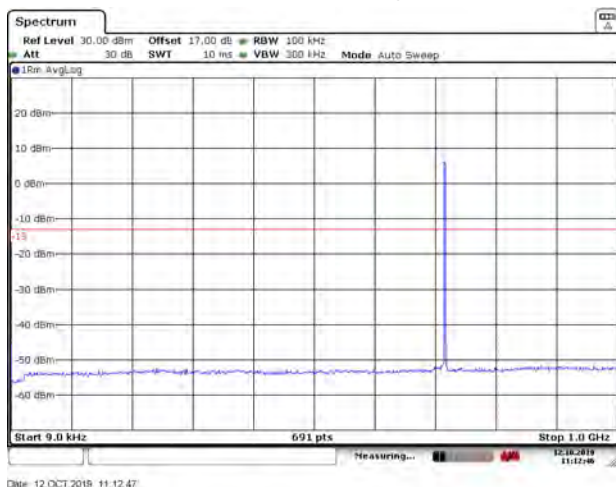
LTE Band 12 1.4MHz CH-Middle 9kHz~1GHz



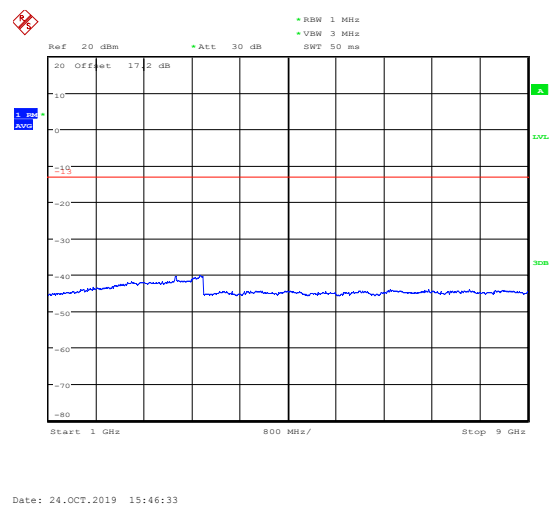
LTE Band 12 1.4MHz CH-Middle 1GHz~9GHz



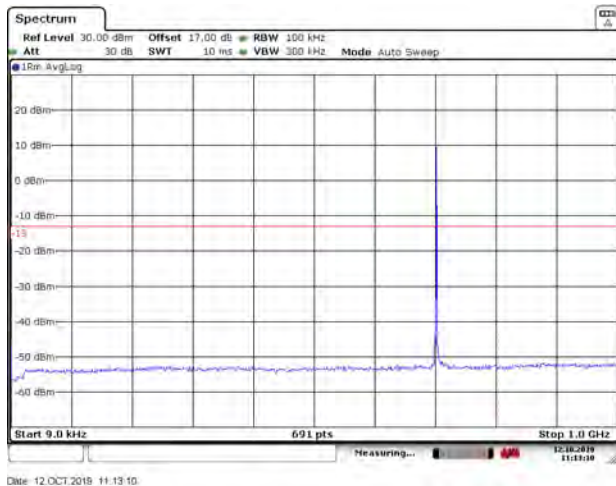
LTE Band 12 1.4MHz CH-High 9kHz~1GHz



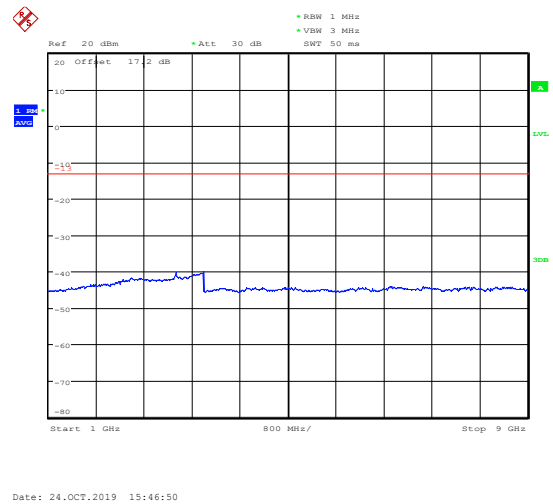
LTE Band 12 1.4MHz CH-High 1GHz~9GHz



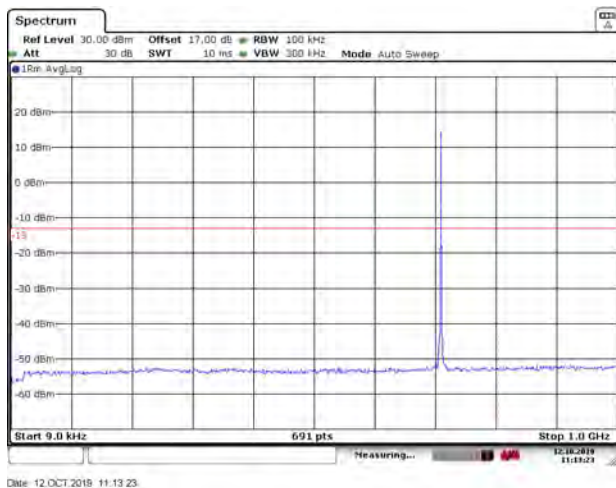
LTE Band 12 3MHz CH-Low 9kHz~1GHz



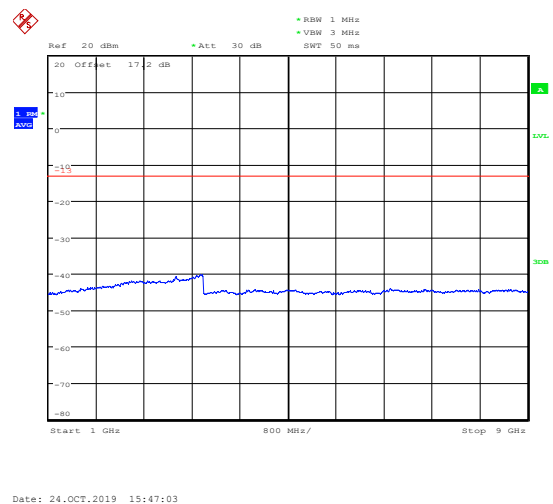
LTE Band 12 3MHz CH-Low 1GHz~9GHz



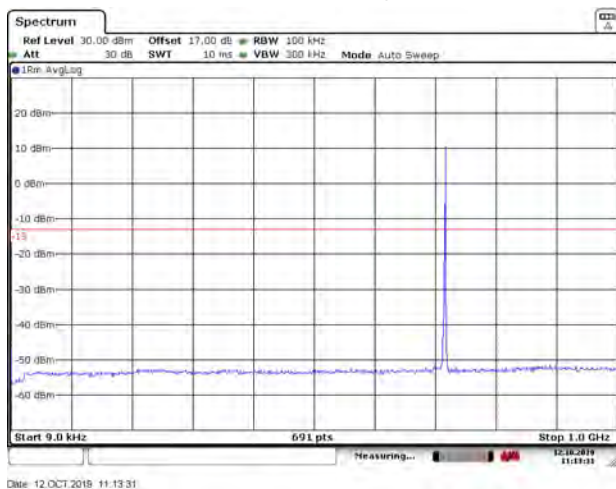
LTE Band 12 3MHz CH-Middle 9kHz~1GHz



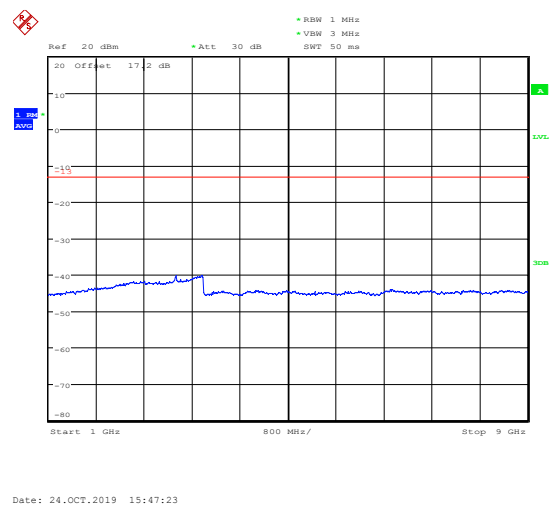
LTE Band 12 3MHz CH-Middle 1GHz~9GHz



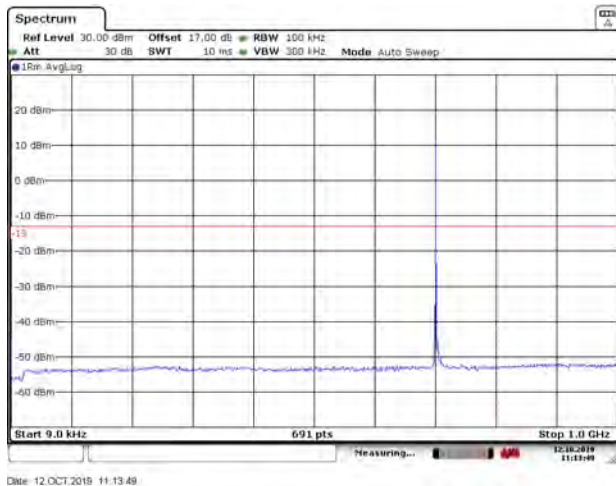
LTE Band 12 3MHz CH-High 9kHz~1GHz



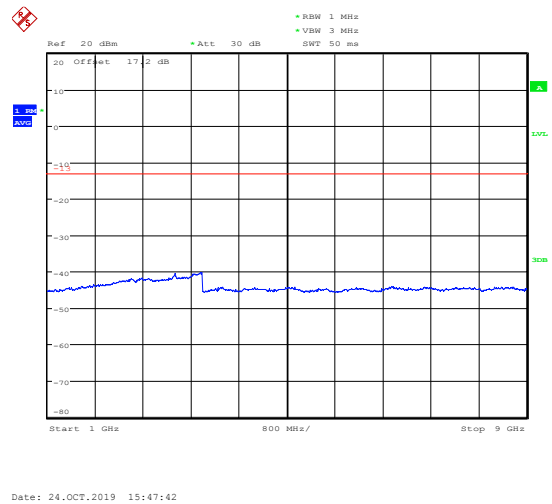
LTE Band 12 3MHz CH-High 1GHz~9GHz



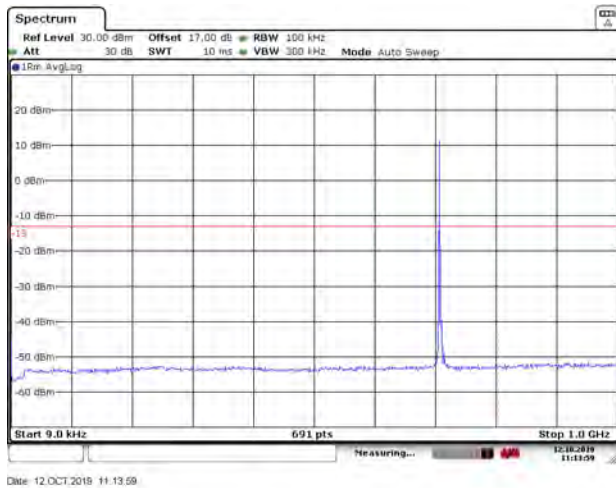
LTE Band 12 5MHz CH-Low 9kHz~1GHz



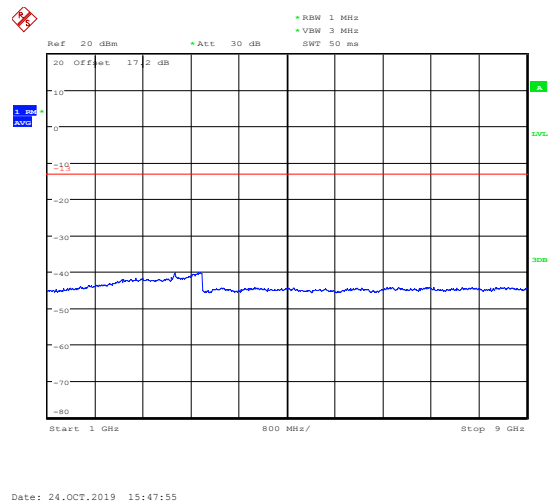
LTE Band 12 5MHz CH-Low 1GHz~9GHz



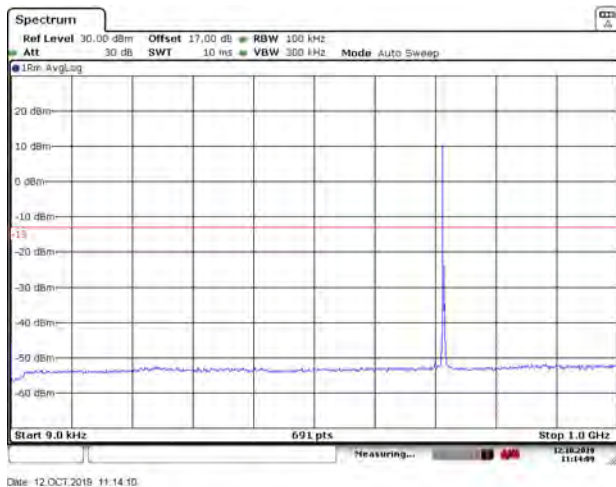
LTE Band 12 5MHz CH-Middle 9kHz~1GHz



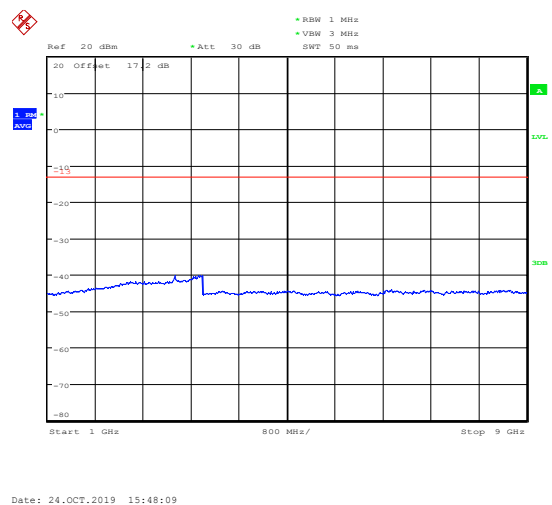
LTE Band 12 5MHz CH-Middle 1GHz~9GHz



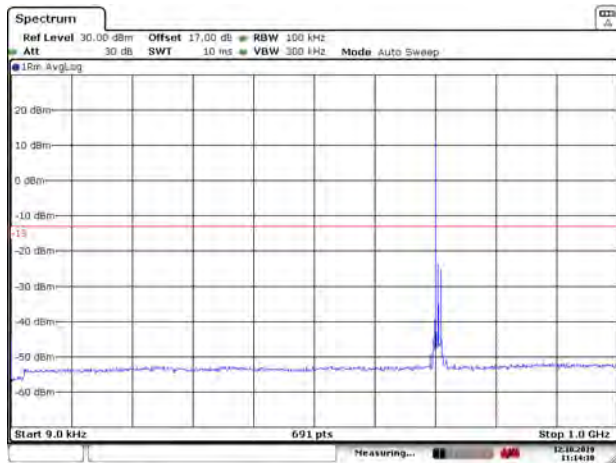
LTE Band 12 5MHz CH-High 9kHz~1GHz



LTE Band 12 5MHz CH-High 1GHz~9GHz

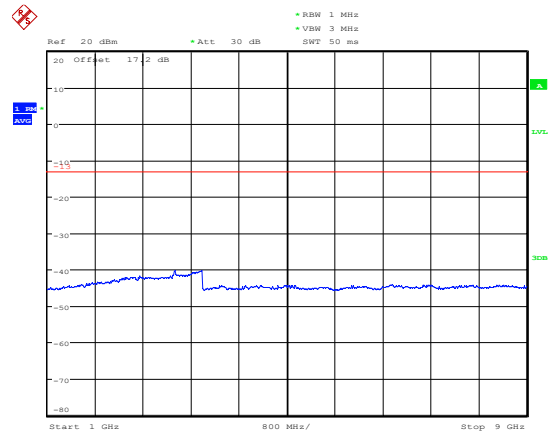


LTE Band 12 10MHz CH-Low 9kHz~1GHz



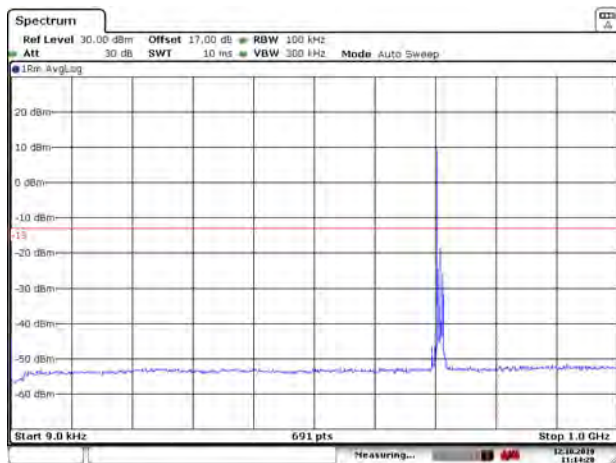
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LTE Band 12 10MHz CH-Low 1GHz~9GHz



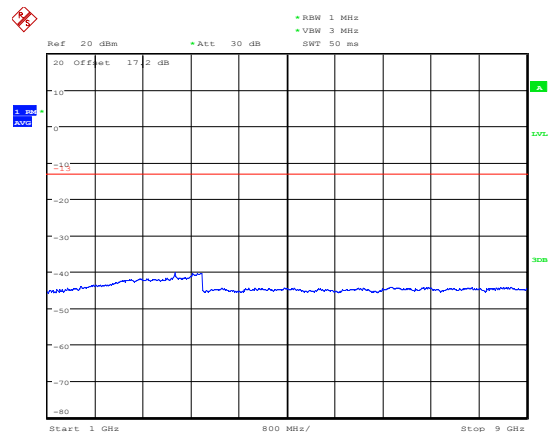
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LTE Band 12 10MHz CH-Middle 9kHz~1GHz



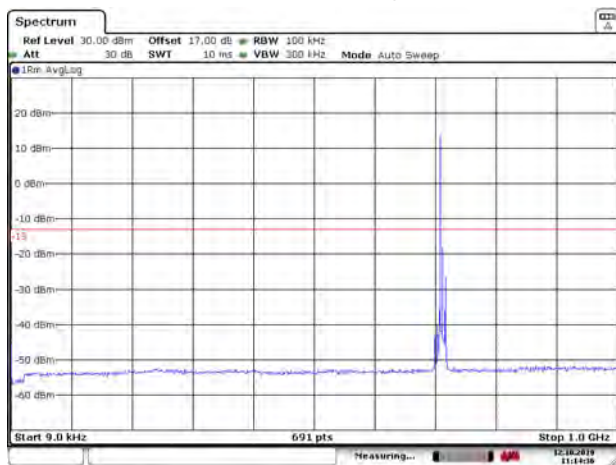
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LTE Band 12 10MHz CH-Middle 1GHz~9GHz



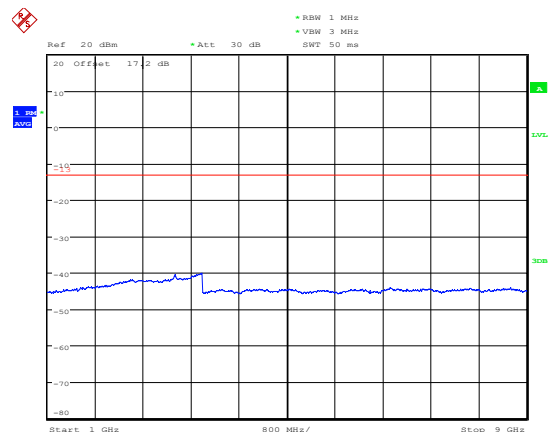
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LTE Band 12 10MHz CH-High 9kHz~1GHz



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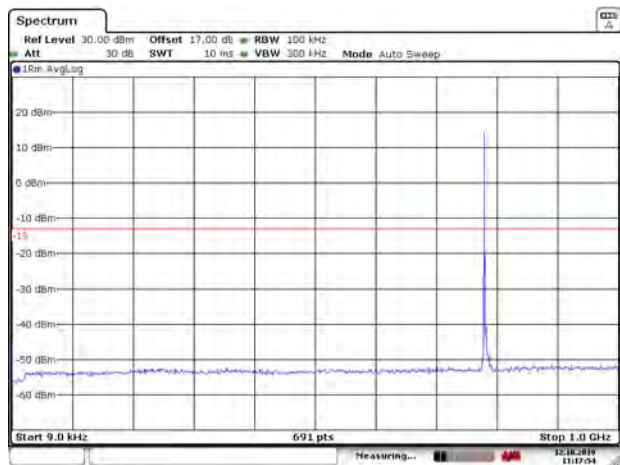
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Date: 24.OCT.2019 15:48:48

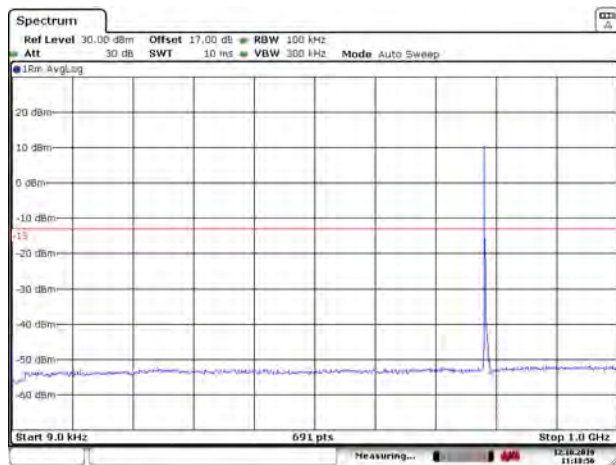


LTE Band 13 5MHz CH-Low 9kHz~1GHz



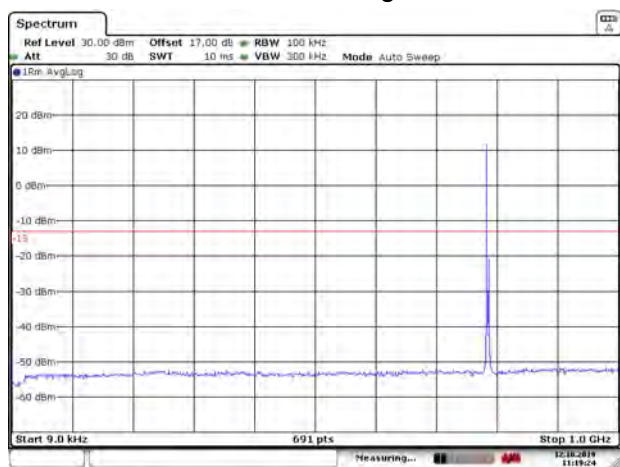
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LTE Band 13 5MHz CH-Middle 9kHz~1GHz



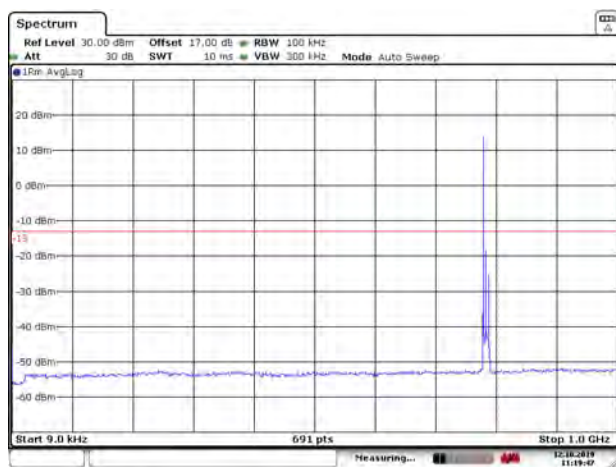
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LTE Band 13 5MHz CH-High 9kHz~1GHz



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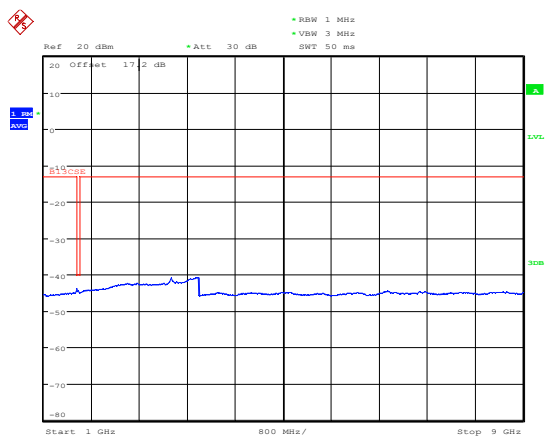
LTE Band 13 10MHz CH-Middle 9kHz~1GHz



Date: 12.OCT.2019 11:19:48

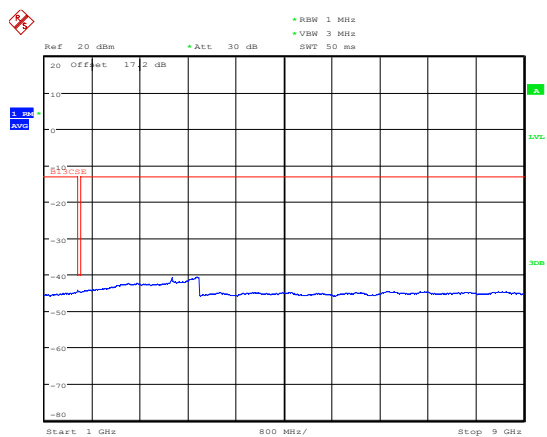


LTE Band 13 5MHz CH-Low 1GHz~9GHz



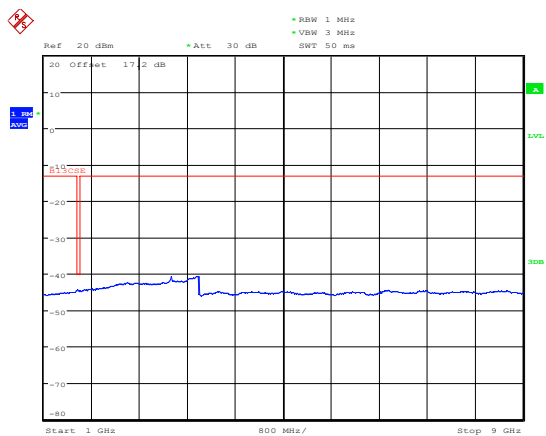
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LTE Band 13 5MHz CH-Middle 1GHz~9GHz



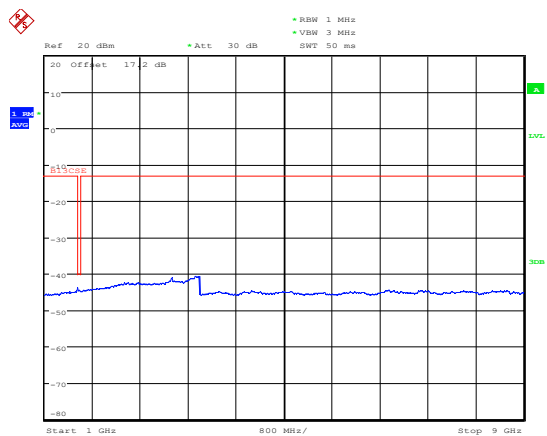
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LTE Band 13 5MHz CH-High 1GHz~9GHz



Date: 8.OCT.2019 12:22:46

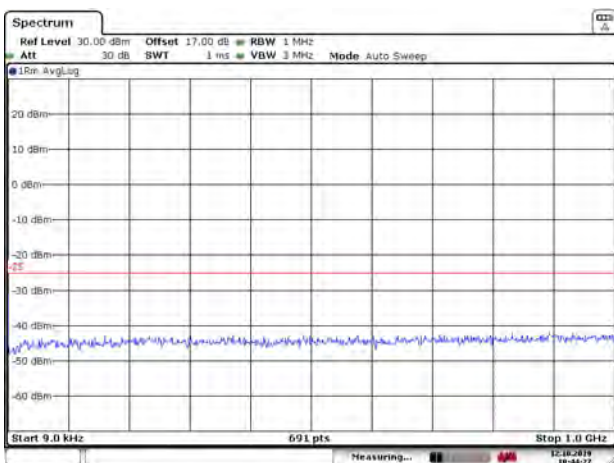
LTE Band 13 10MHz CH-Middle 1GHz~9GHz



Date: 8.OCT.2019 12:23:01

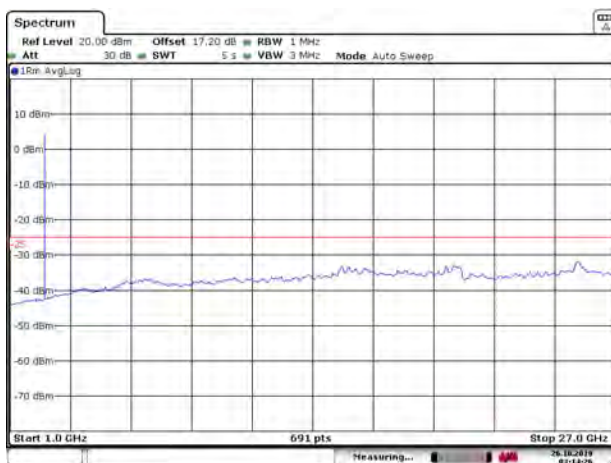


LTE Band 41 5MHz CH-Low 9kHz~1GHz



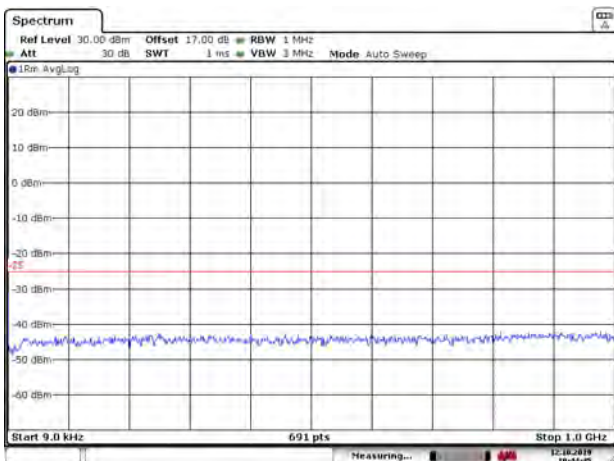
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LTE Band 41 5MHz CH-Low 1GHz~27GHz



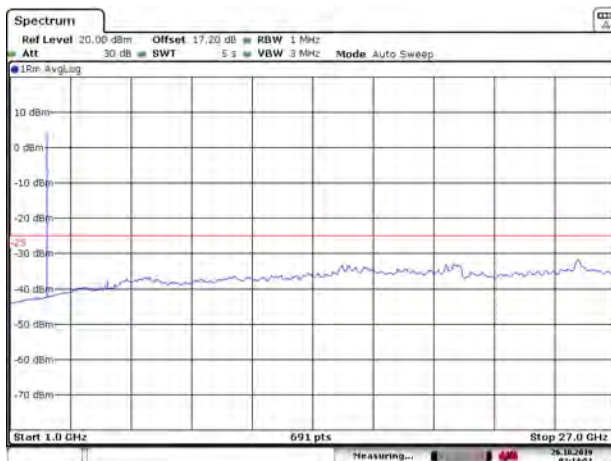
Date: 26.OCT.2019 03:14:26

LTE Band 41 5MHz CH-Middle 9kHz~1GHz



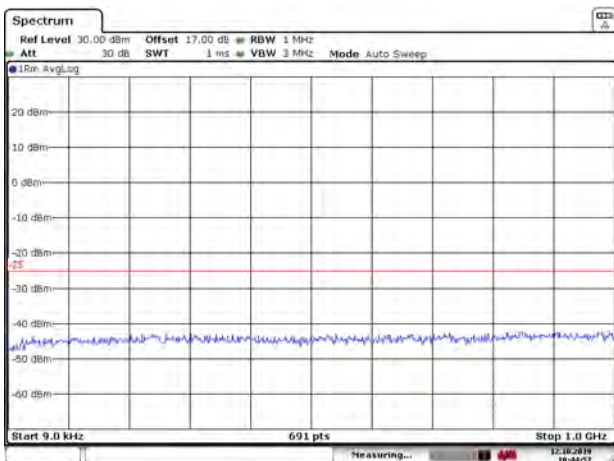
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LTE Band 41 5MHz CH-Middle 1GHz~27GHz



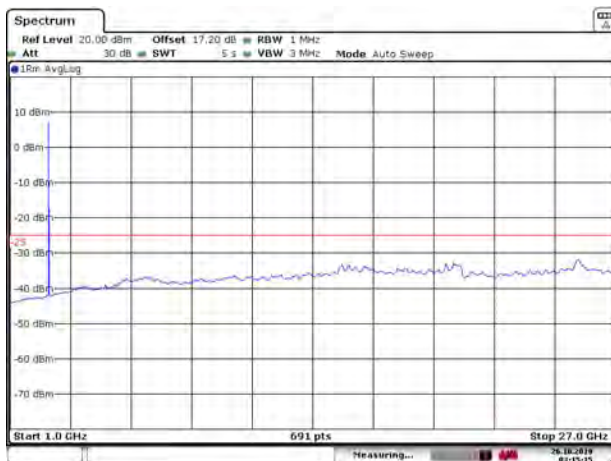
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LTE Band 41 5MHz CH-High 9kHz~1GHz



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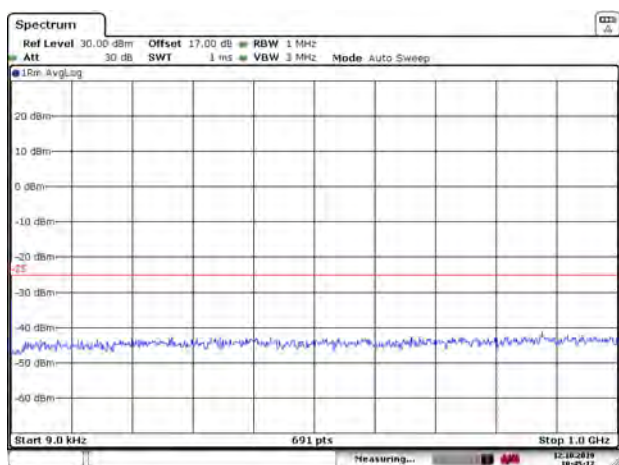
LTE Band 41 5MHz CH-High 1GHz~27GHz



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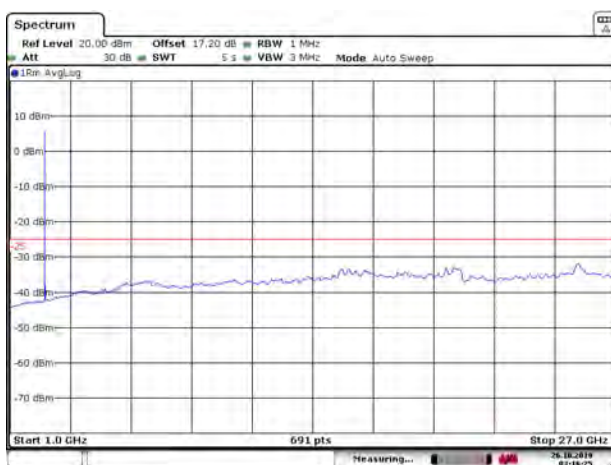


LTE Band 41 10MHz CH-Low 9kHz~1GHz



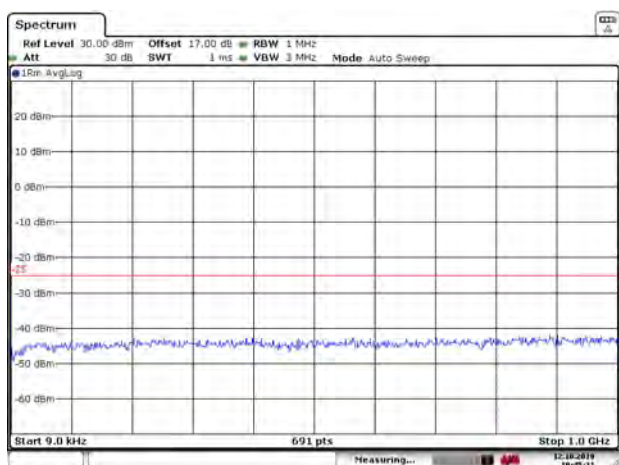
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LTE Band 41 10MHz CH-Low 1GHz~27GHz



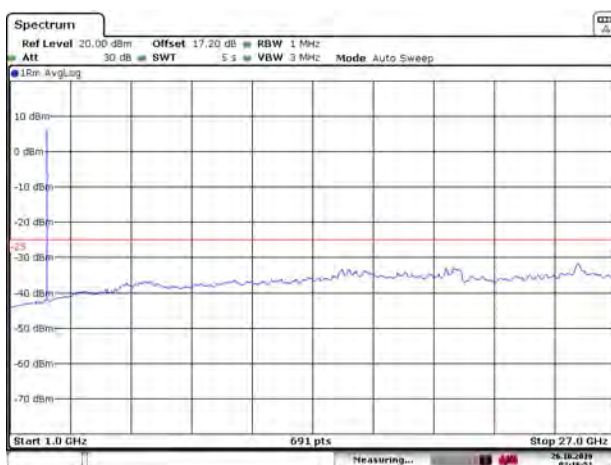
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LTE Band 41 10MHz CH-Middle 9kHz~1GHz



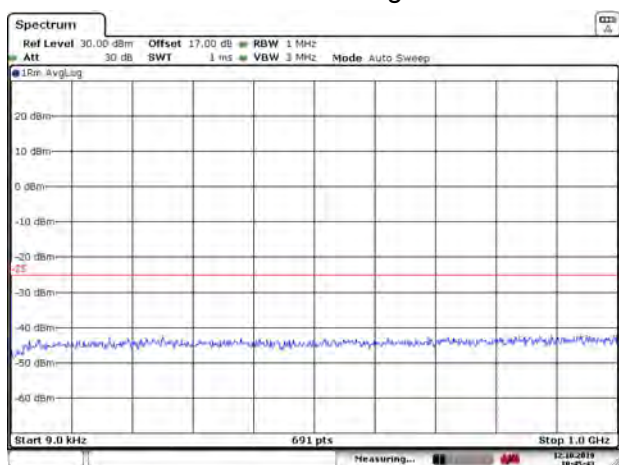
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LTE Band 41 10MHz CH-Middle 1GHz~27GHz



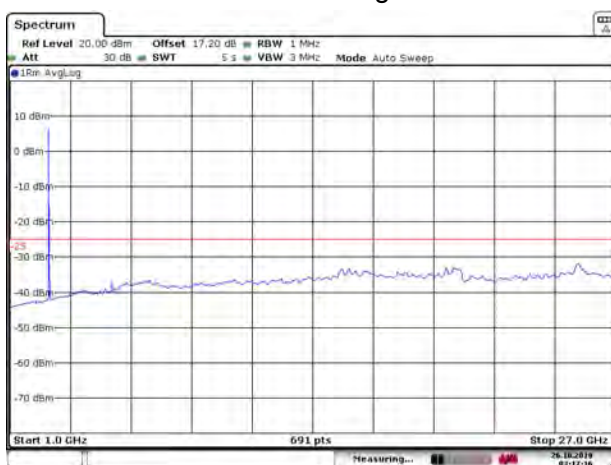
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LTE Band 41 10MHz CH-High 9kHz~1GHz



Date: 12.OCT.2019 10:45:43

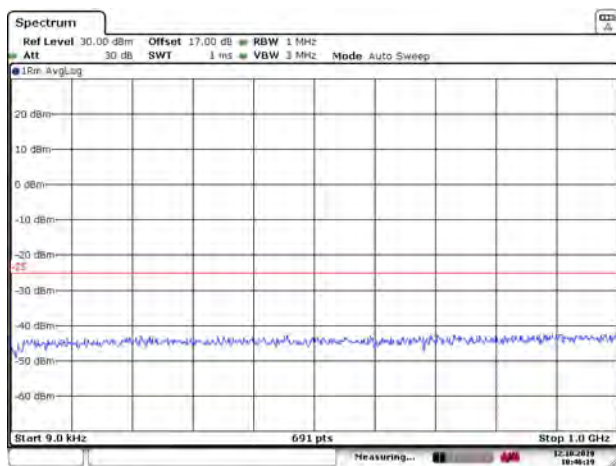
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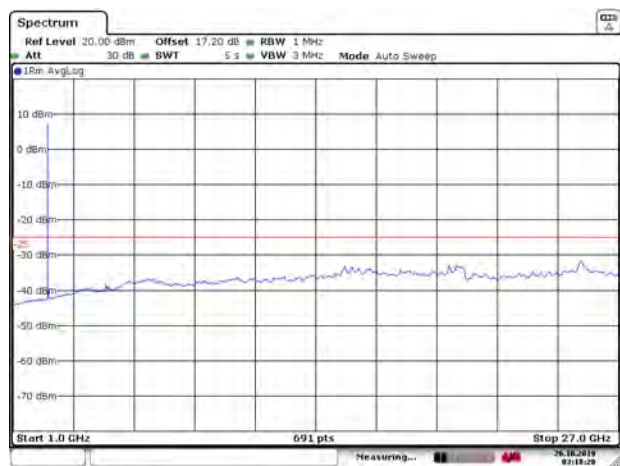


LTE Band 41 15MHz CH-Low 9kHz~1GHz



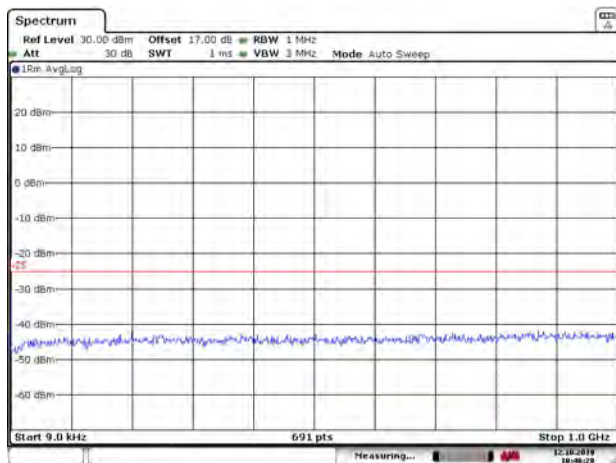
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LTE Band 41 15MHz CH-Low 1GHz~27GHz



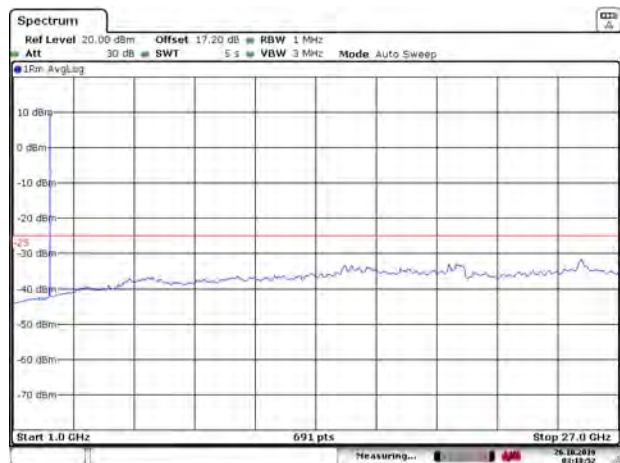
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LTE Band 41 15MHz CH-Middle 9kHz~1GHz



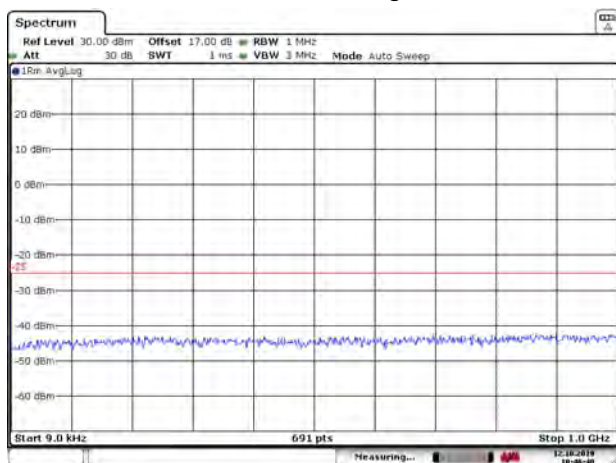
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LTE Band 41 15MHz CH-Middle 1GHz~27GHz



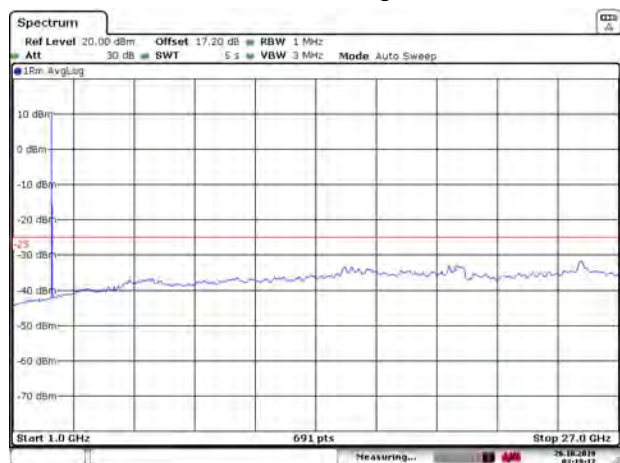
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LTE Band 41 15MHz CH-High 9kHz~1GHz



Date: 12.OCT.2019 10:48:39

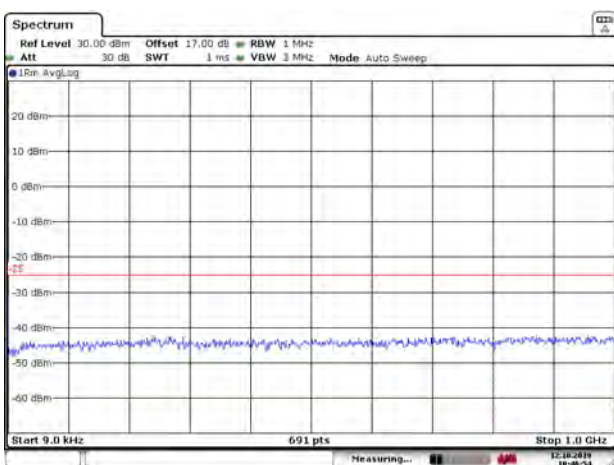
LTE Band 41 15MHz CH-High 1GHz~27GHz



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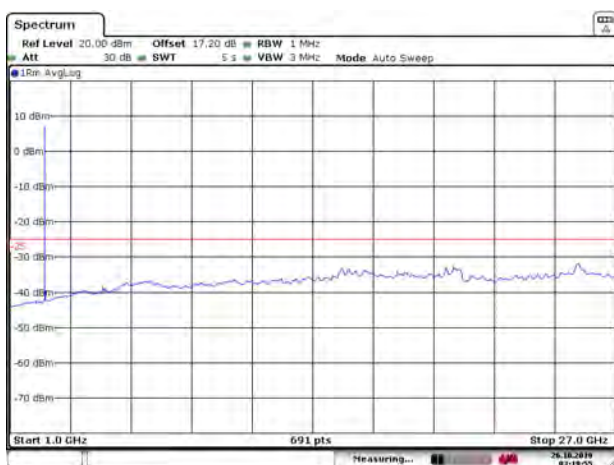


LTE Band 41 20MHz CH-Low 9kHz~1GHz



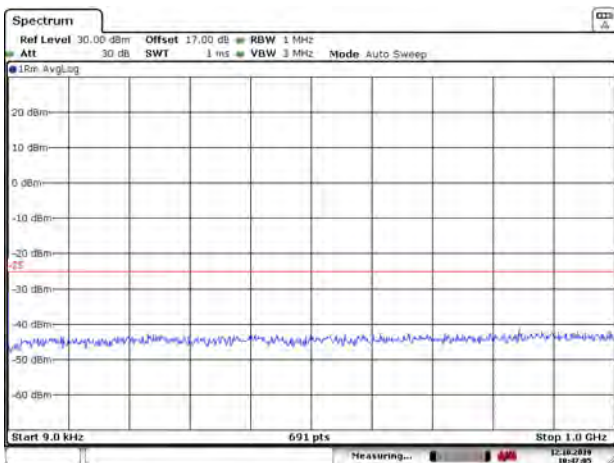
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LTE Band 41 20MHz CH-Low 1GHz~27GHz



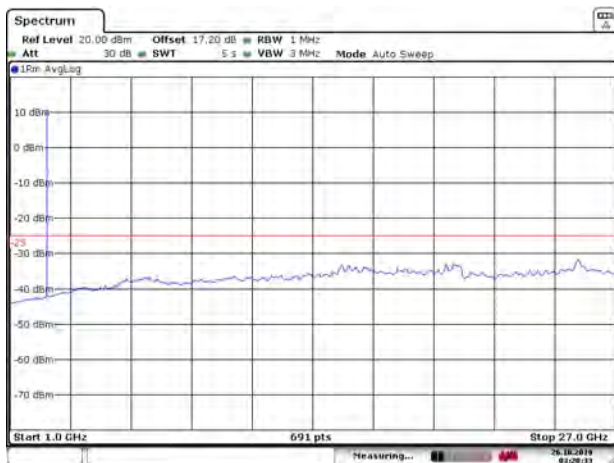
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LTE Band 41 20MHz CH-Middle 9kHz~1GHz



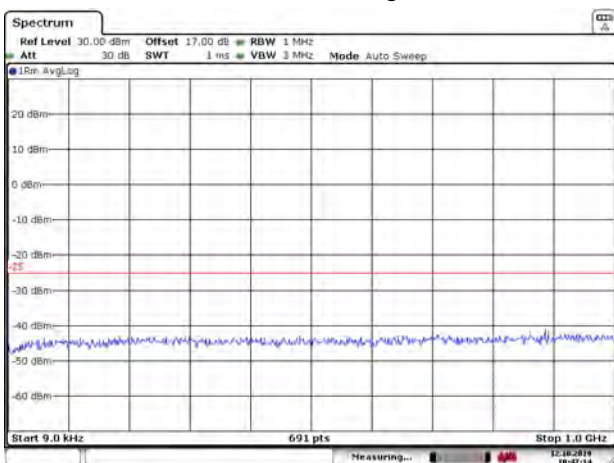
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LTE Band 41 20MHz CH-Middle 1GHz~27GHz



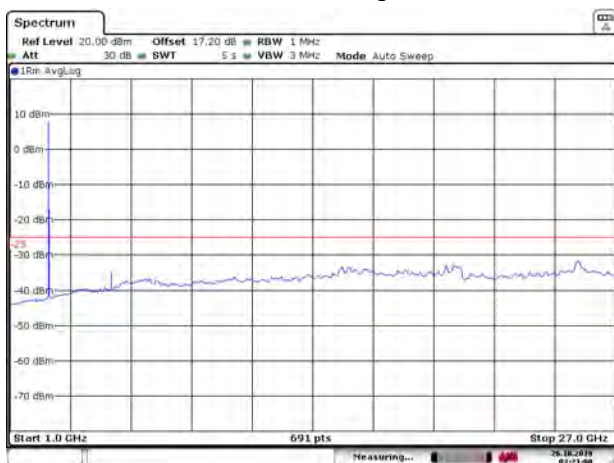
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LTE Band 41 20MHz CH-High 9kHz~1GHz



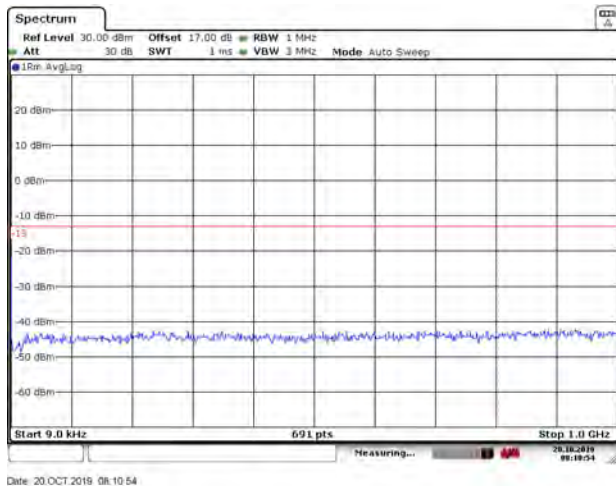
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LTE Band 41 20MHz CH-High 1GHz~27GHz

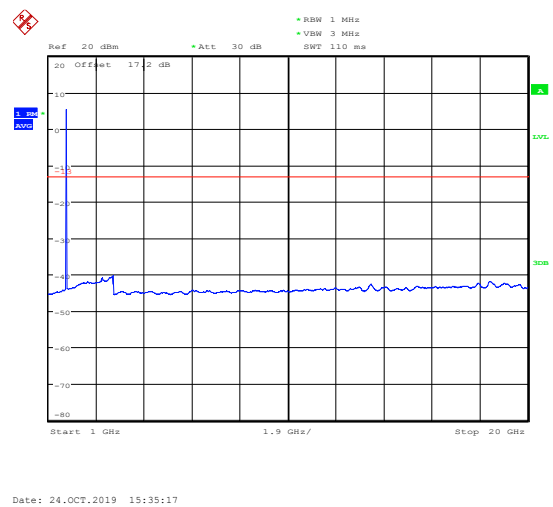


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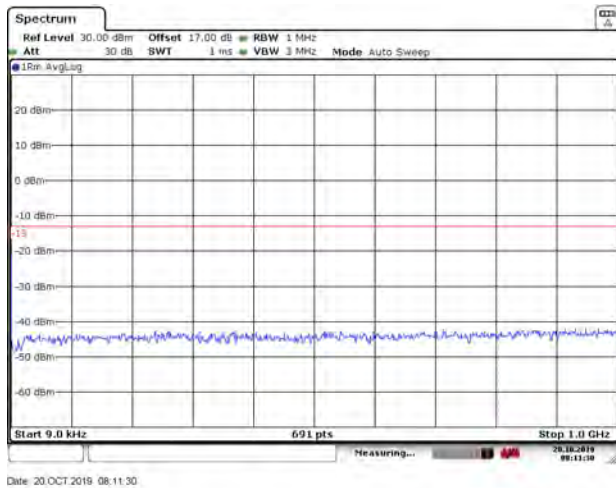
LTE Band 66 1.4MHz CH-Low 9kHz~1GHz



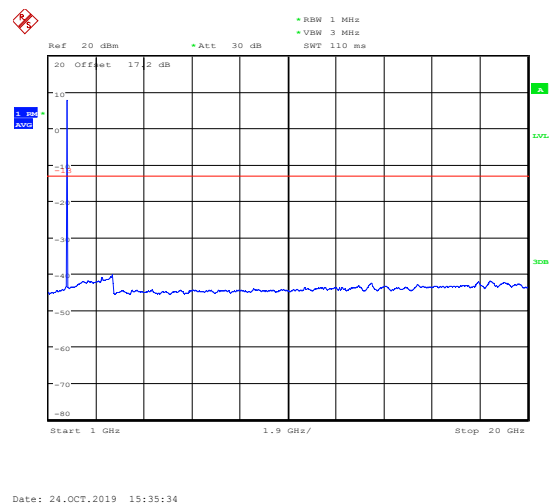
LTE Band 66 1.4MHz CH-Low 1GHz~20GHz



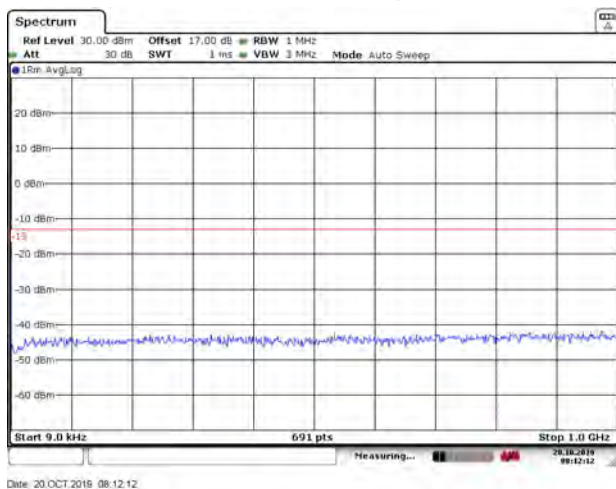
LTE Band 66 1.4MHz CH-Middle 9kHz~1GHz



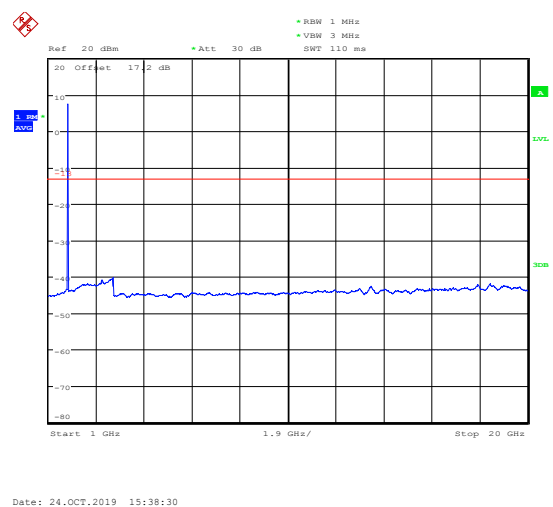
LTE Band 66 1.4MHz CH-Middle 1GHz~20GHz



LTE Band 66 1.4MHz CH-High 9kHz~1GHz

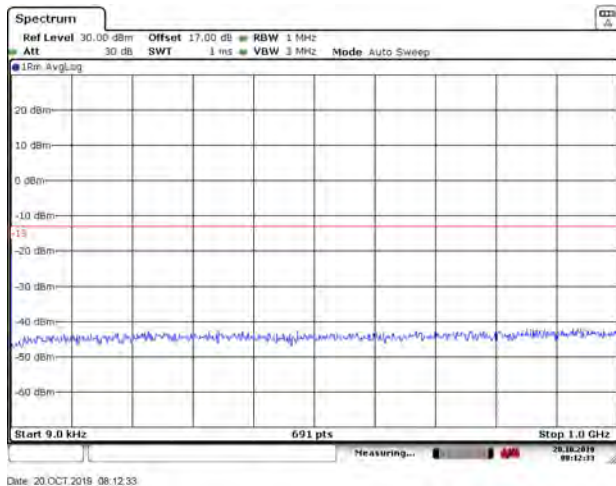


LTE Band 66 1.4MHz CH-High 1GHz~20GHz



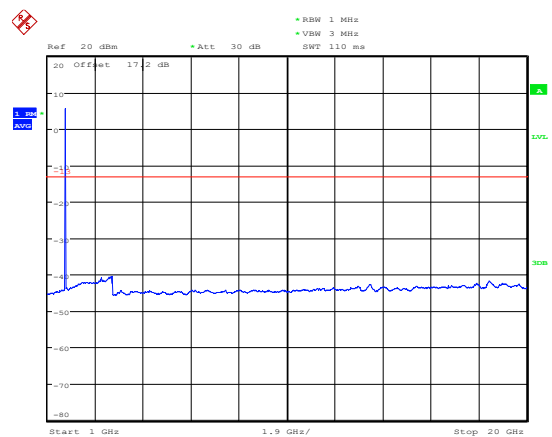


LTE Band 66 3MHz CH-Low 9kHz~1GHz



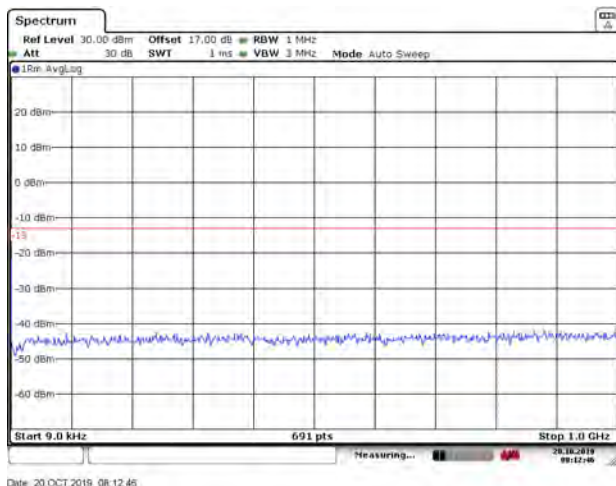
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LTE Band 66 3MHz CH-Low 1GHz~20GHz



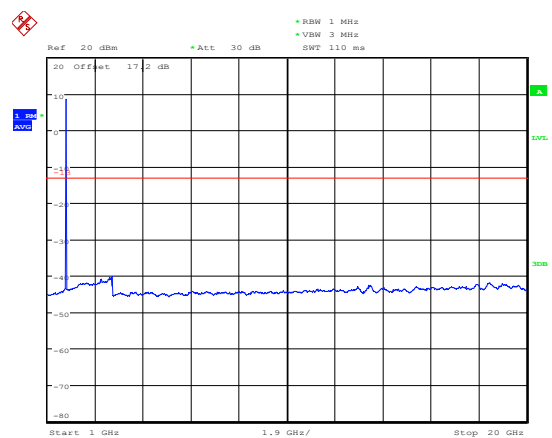
Date: 24.OCT.2019 15:39:12

LTE Band 66 3MHz CH-Middle 9kHz~1GHz



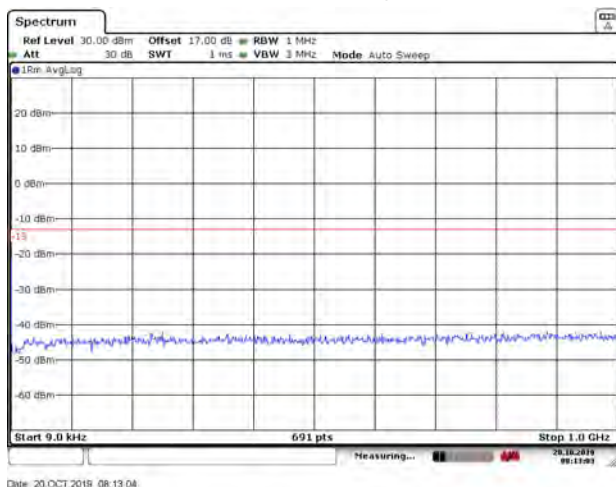
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LTE Band 66 3MHz CH-Middle 1GHz~20GHz



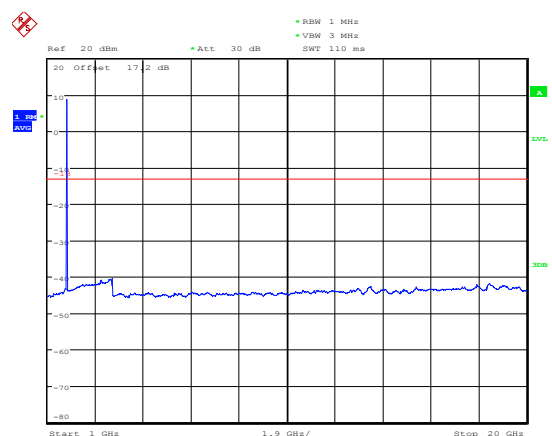
Date: 24.OCT.2019 15:39:26

LTE Band 66 3MHz CH-High 9kHz~1GHz



Date: 20.OCT.2019 08:13:04

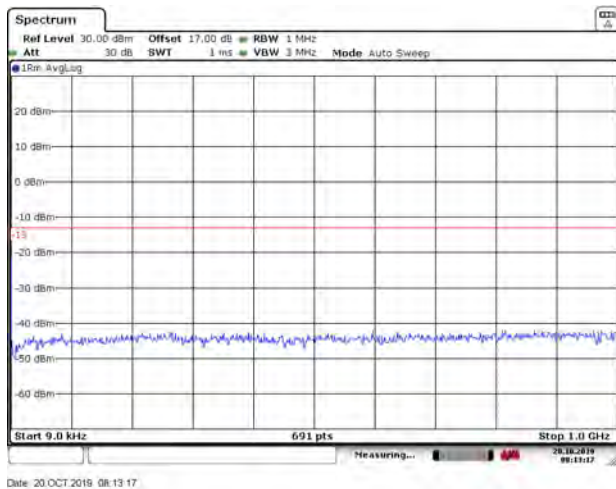
LTE Band 66 3MHz CH-High 1GHz~20GHz



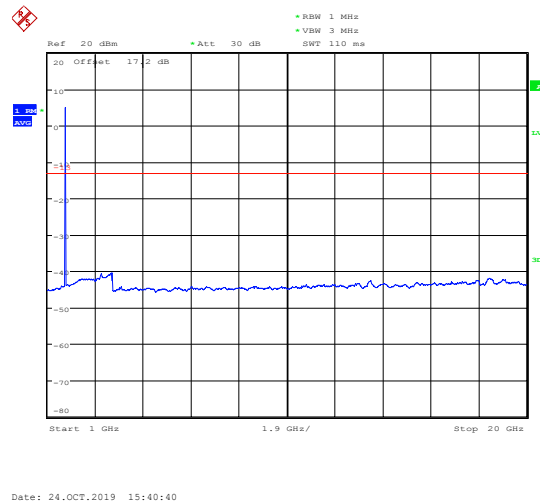
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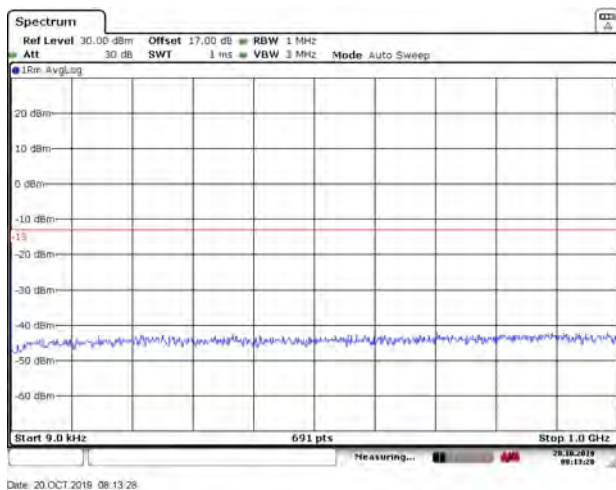
LTE Band 66 5MHz CH-Low 9kHz~1GHz



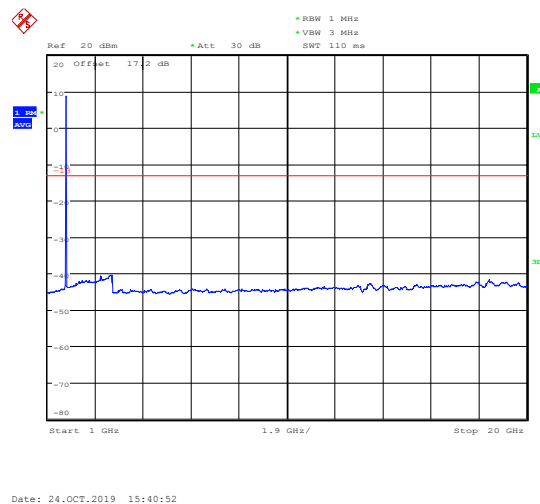
LTE Band 66 5MHz CH-Low 1GHz~20GHz



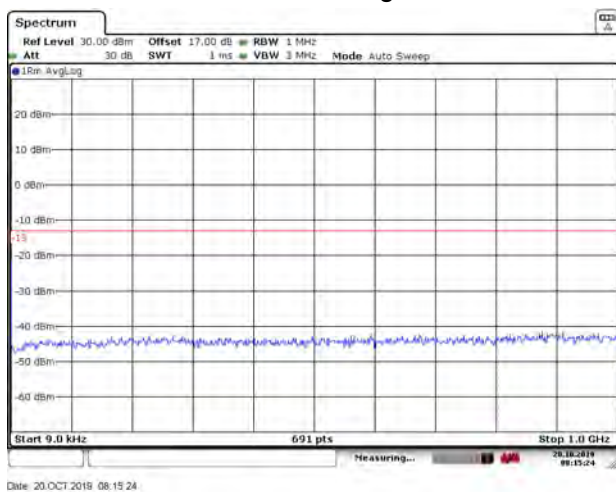
LTE Band 66 5MHz CH-Middle 9kHz~1GHz



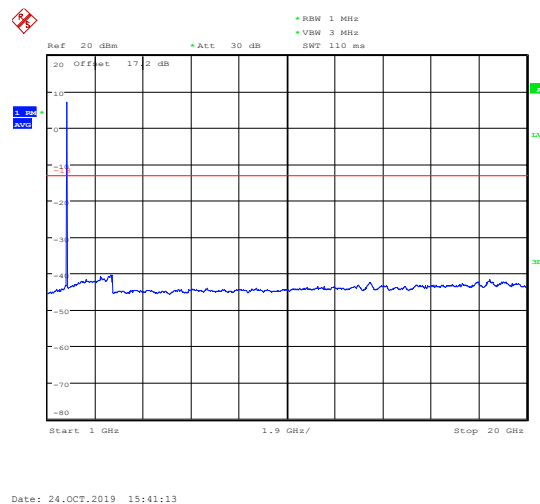
LTE Band 66 5MHz CH-Middle 1GHz~20GHz



LTE Band 66 5MHz CH-High 9kHz~1GHz

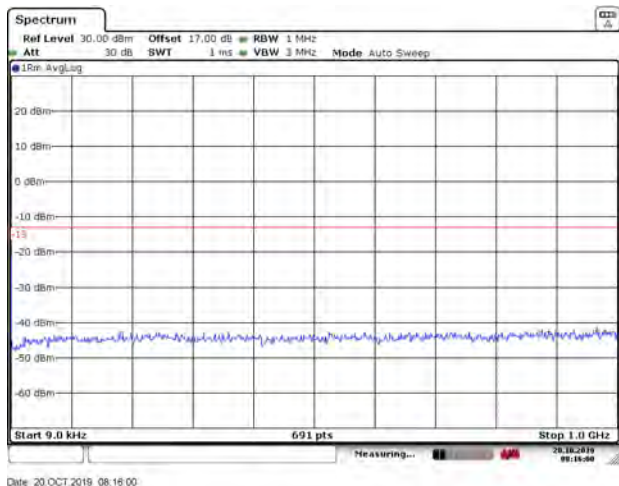


LTE Band 66 5MHz CH-High 1GHz~20GHz

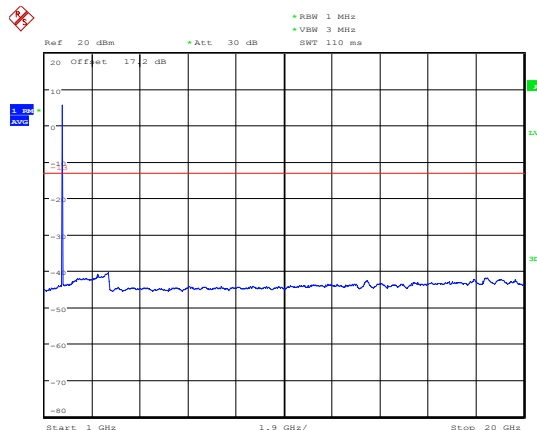




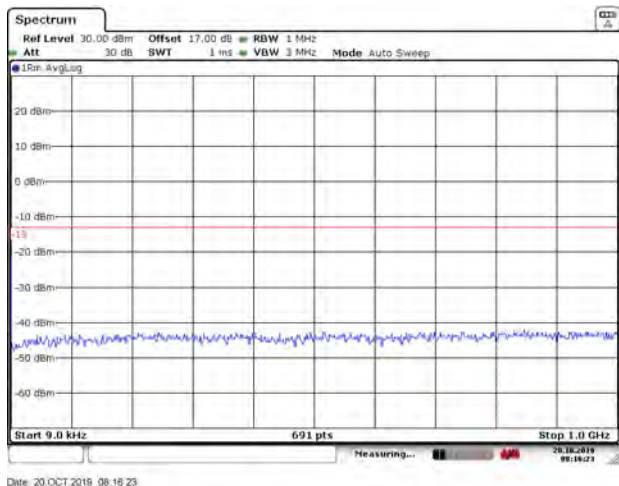
LTE Band 66 10MHz CH-Low 9kHz~1GHz



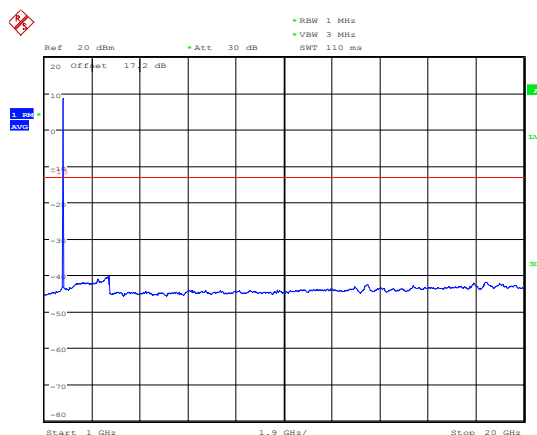
LTE Band 66 10MHz CH-Low 1GHz~20GHz



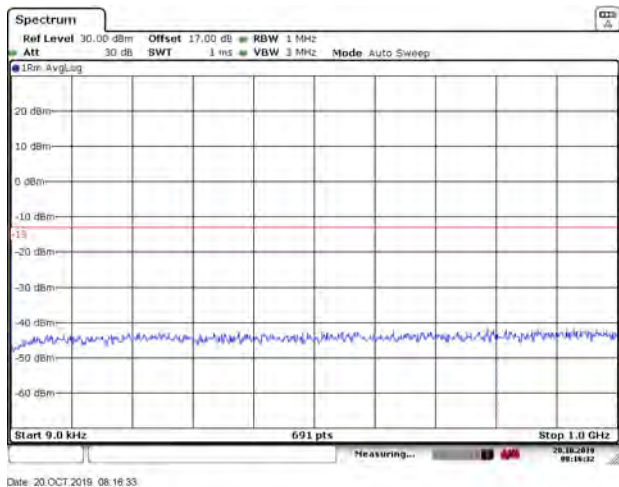
LTE Band 66 10MHz CH-Middle 9kHz~1GHz



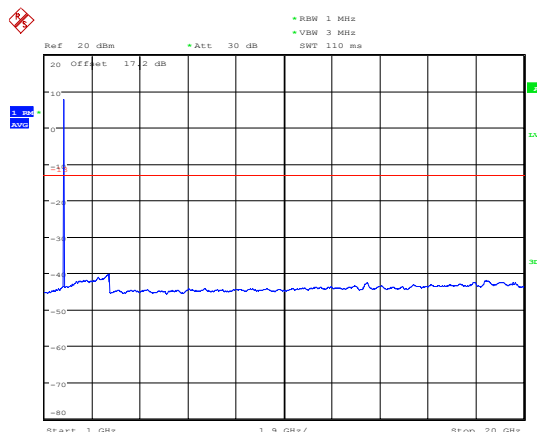
LTE Band 66 10MHz CH-Middle 1GHz~20GHz



LTE Band 66 10MHz CH-High 9kHz~1GHz

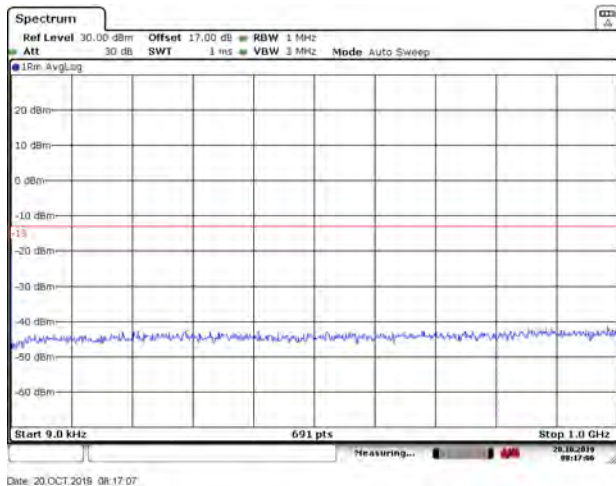


LTE Band 66 10MHz CH-High 1GHz~20GHz

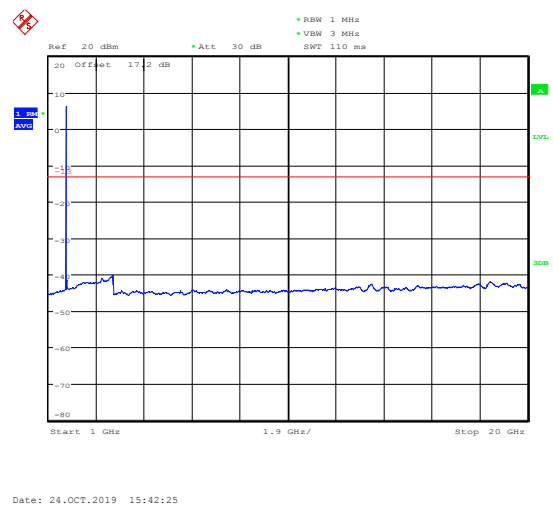




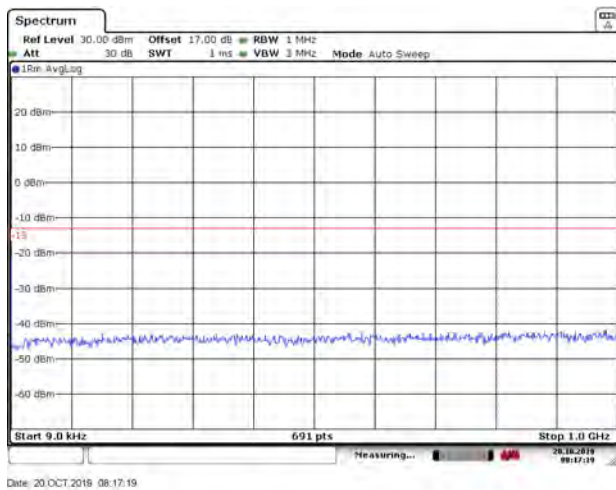
LTE Band 66 15MHz CH-Low 9kHz~1GHz



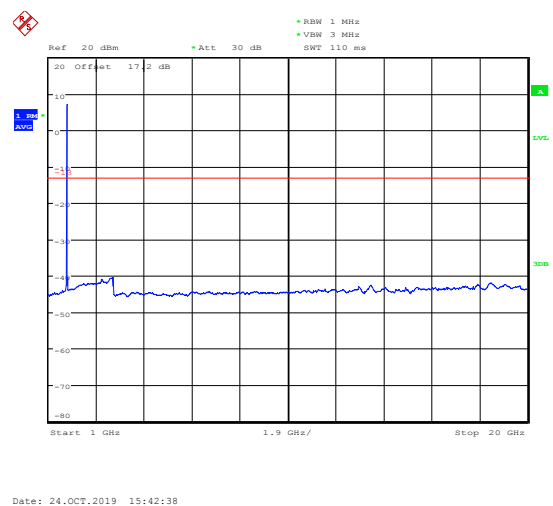
LTE Band 66 15MHz CH-Low 1GHz~20GHz



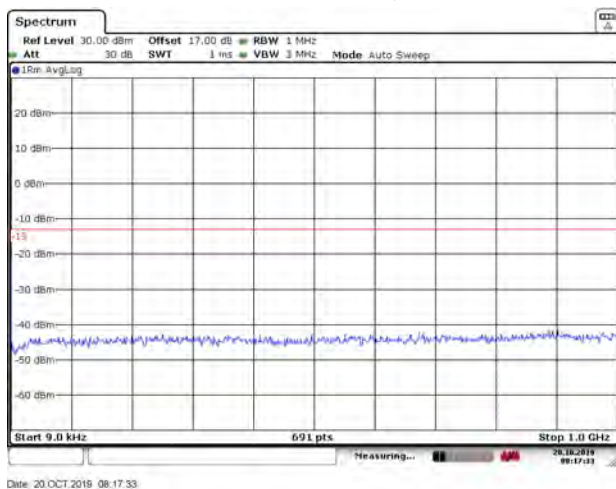
LTE Band 66 15MHz CH-Middle 9kHz~1GHz



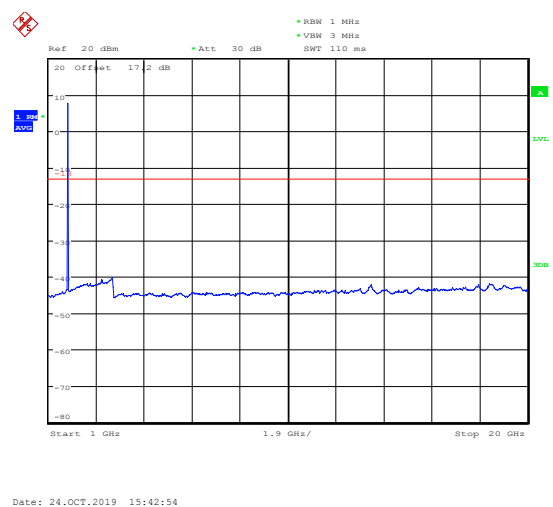
LTE Band 66 15MHz CH-Middle 1GHz~20GHz



LTE Band 66 15MHz CH-High 9kHz~1GHz

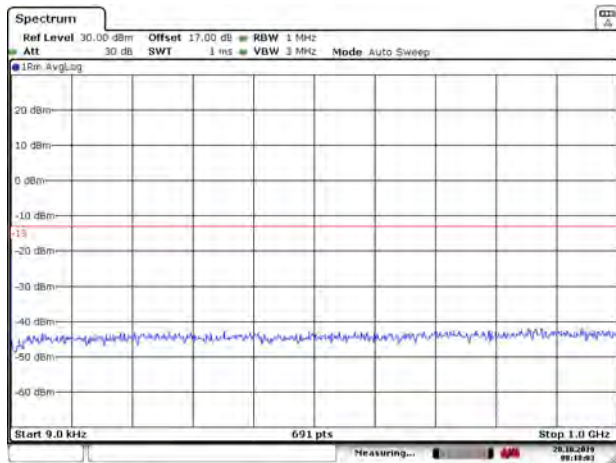


LTE Band 66 15MHz CH-High 1GHz~20GHz



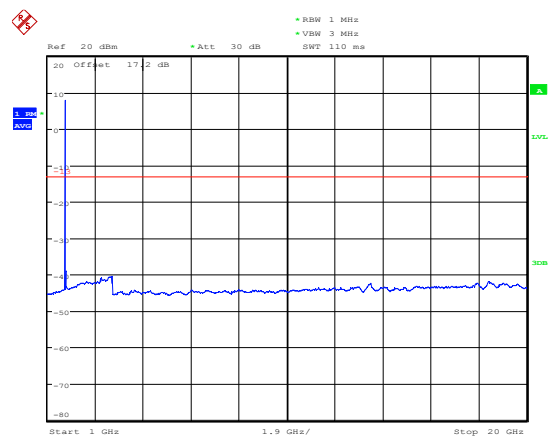


LTE Band 66 20MHz CH-Low 9kHz~1GHz



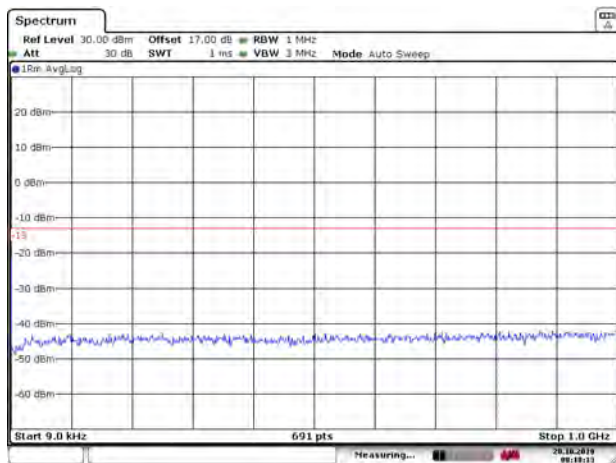
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LTE Band 66 20MHz CH-Low 1GHz~20GHz



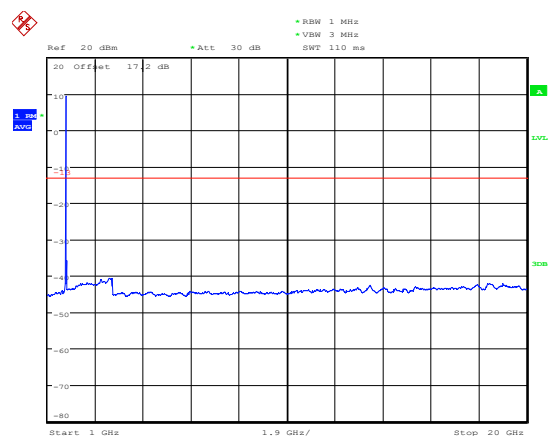
Date: 24.OCT.2019 15:43:13

LTE Band 66 20MHz CH-Middle 9kHz~1GHz



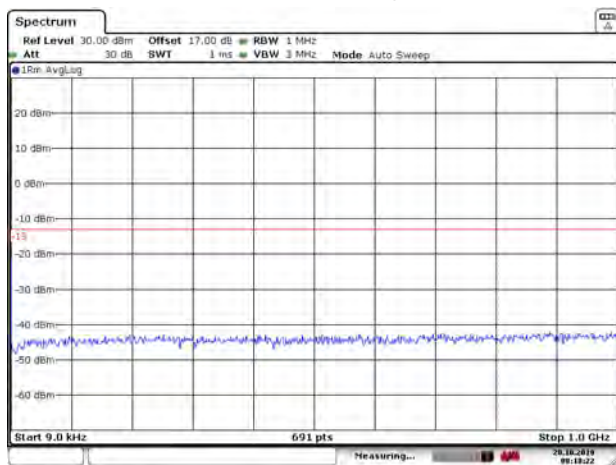
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LTE Band 66 20MHz CH-Middle 1GHz~20GHz



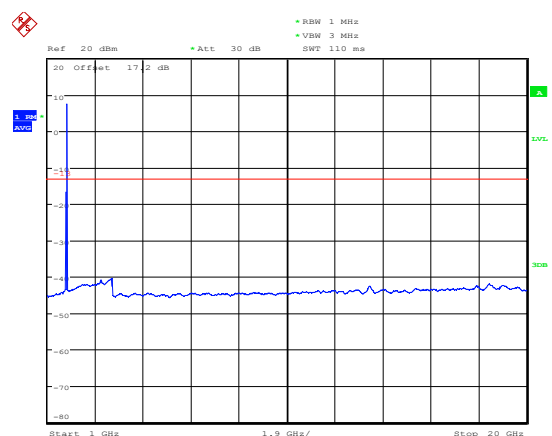
Date: 24.OCT.2019 15:43:28

LTE Band 66 20MHz CH-High 9kHz~1GHz



Date: 20.OCT.2019 08:18:22

LTE Band 66 20MHz CH-High 1GHz~20GHz



Date: 24.OCT.2019 15:43:43



5.7 Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=200Hz,VBW=600Hz for 9kHz150kHz , RBW=10kHz, VBW=30kHz 150kHz-30MHz ,RBW=100kHz,VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl), the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAG) should be recorded after test.
7. The measurement results are obtained as described below:
$$\text{Power(EIRP)} = \text{PMea} - \text{PAG} - \text{Pcl} + \text{Ga}$$

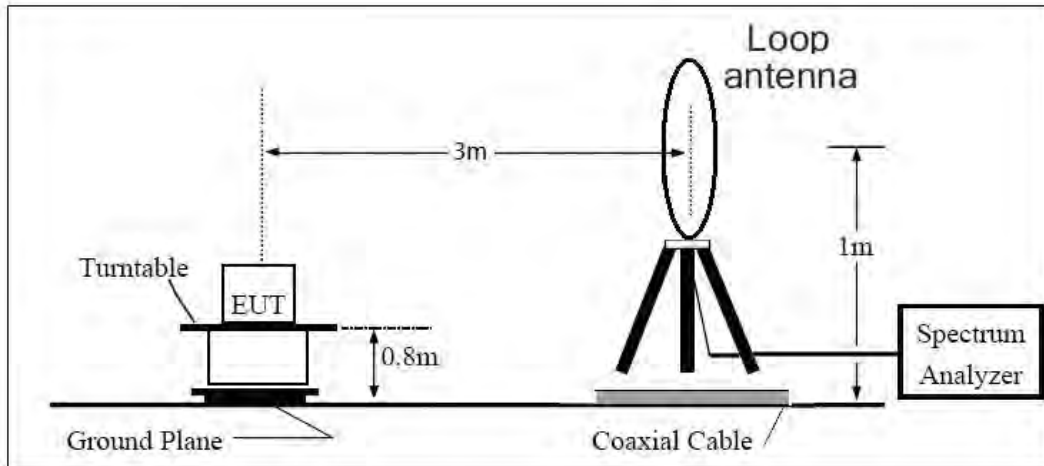
The measurement results are amend as described below:
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP

= EIRP-2.15dBi.

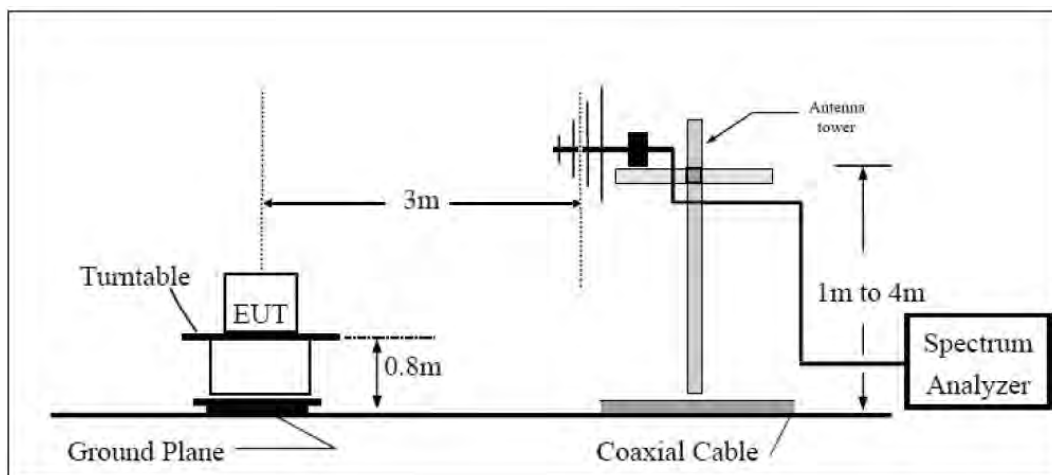
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

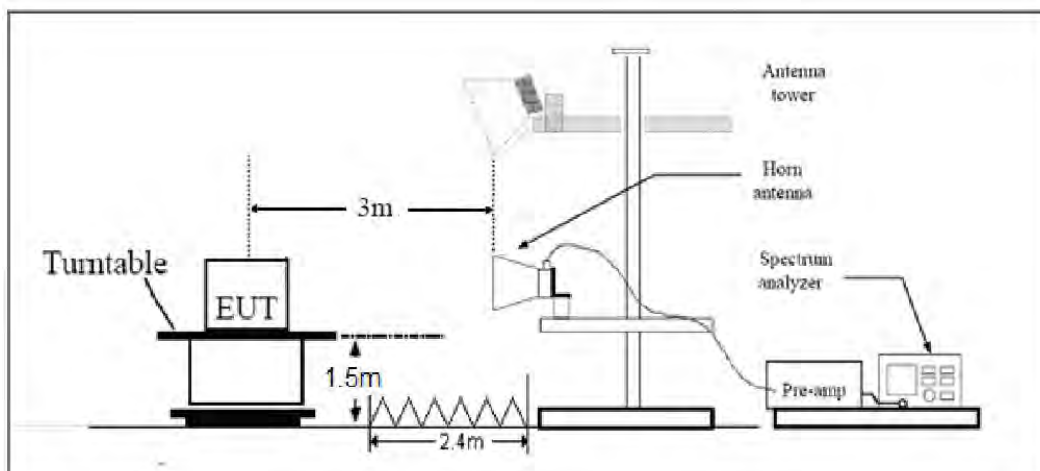
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m



Limits

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.”

Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Rule Part 27.53(m) $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section.

Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

Part 27.53(a)/(h)/(g) Limit		-13 dBm
Part 27.53(f) Limit	Limit out of the band 1559-1610 MHz	-13 dBm



	Limit in the band 1559-1610 MHz	-40 dBm
Part 27.53(m) Limit		-25 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = \pm 1.96$, $U = \pm 3.55$ dB.

Test Result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

LTE Band 4 QPSK 1.4MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3463.9	-53.25	2.6	10.75	Horizontal	-45.10	-13.00	32.10	90
3	5197.5	-53.45	2.4	11.05	Horizontal	-44.80	-13.00	31.80	45
4	6930.0	-53.45	4.5	11.15	Horizontal	-46.80	-13.00	33.80	135
5	8662.5	-49.95	5.1	11.35	Horizontal	-43.70	-13.00	30.70	0
6	10395.0	-50.15	5.3	11.95	Horizontal	-43.50	-13.00	30.50	270
7	12127.5	-49.95	5.5	13.55	Horizontal	-41.90	-13.00	28.90	225
8	13860.0	-50.15	6.3	13.75	Horizontal	-42.70	-13.00	29.70	315
9	15592.5	-53.65	6.7	13.85	Horizontal	-46.50	-13.00	33.50	90
10	17325.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

LTE Band 4 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3460.5	-53.65	2.6	10.75	Horizontal	-45.50	-13.00	32.50	45
3	5191.5	-55.35	2.4	11.05	Horizontal	-46.70	-13.00	33.70	270
4	6930.0	-54.05	4.5	11.15	Horizontal	-47.40	-13.00	34.40	225
5	8662.5	-51.75	5.1	11.35	Horizontal	-45.50	-13.00	32.50	135
6	10395.0	-52.85	5.3	11.95	Horizontal	-46.20	-13.00	33.20	180
7	12127.5	-46.95	5.5	13.55	Horizontal	-38.90	-13.00	25.90	90
8	13860.0	-52.35	6.3	13.75	Horizontal	-44.90	-13.00	31.90	45
9	15592.5	-52.95	6.7	13.85	Horizontal	-45.80	-13.00	32.80	315
10	17325.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.



LTE Band 4 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-52.33	2.6	10.75	Horizontal	-44.18	-13.00	31.18	315
3	5170.9	-53.95	2.4	11.05	Horizontal	-45.30	-13.00	32.30	90
4	6930.0	-56.45	4.5	11.15	Horizontal	-49.80	-13.00	36.80	45
5	8662.5	-52.45	5.1	11.35	Horizontal	-46.20	-13.00	33.20	180
6	10395.0	-53.45	5.3	11.95	Horizontal	-46.80	-13.00	33.80	45
7	12127.5	-53.95	5.5	13.55	Horizontal	-45.90	-13.00	32.90	135
8	13860.0	-51.25	6.3	13.75	Horizontal	-43.80	-13.00	30.80	225
9	15592.5	-53.05	6.7	13.85	Horizontal	-45.90	-13.00	32.90	90
10	17325.0	--	--	--	--	--	--	--	--
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 12 QPSK 1.4MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.0	-62.56	2.00	10.75	Horizontal	-55.96	-13.00	42.96	225
3	2122.5	-62.62	2.51	11.05	Horizontal	-56.23	-13.00	43.23	315
4	2830.0	-59.82	4.20	11.15	Horizontal	-55.02	-13.00	42.02	45
5	3537.5	-42.97	5.20	11.15	Horizontal	-39.17	-13.00	26.17	45
6	4245.0	-56.23	5.50	11.95	Horizontal	-51.93	-13.00	38.93	0
7	4952.5	-62.21	5.70	13.55	Horizontal	-56.51	-13.00	43.51	315
8	5660.0	-60.33	6.30	13.75	Horizontal	-55.03	-13.00	42.03	90
9	6367.5	-59.05	6.80	13.85	Horizontal	-54.15	-13.00	41.15	225
10	7075.0	-55.06	6.90	14.25	Horizontal	-49.86	-13.00	36.86	135
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									



LTE Band 12 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.0	-62.56	2.00	10.75	Horizontal	-55.96	-13.00	42.96	225
3	2122.5	-62.62	2.51	11.05	Horizontal	-56.23	-13.00	43.23	315
4	2830.0	-59.82	4.20	11.15	Horizontal	-55.02	-13.00	42.02	45
5	3537.5	-42.97	5.20	11.15	Horizontal	-39.17	-13.00	26.17	45
6	4245.0	-56.23	5.50	11.95	Horizontal	-51.93	-13.00	38.93	0
7	4952.5	-62.21	5.70	13.55	Horizontal	-56.51	-13.00	43.51	315
8	5660.0	-60.33	6.30	13.75	Horizontal	-55.03	-13.00	42.03	90
9	6367.5	-59.05	6.80	13.85	Horizontal	-54.15	-13.00	41.15	225
10	7075.0	-55.06	6.90	14.25	Horizontal	-49.86	-13.00	36.86	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

LTE Band 12 QPSK 10MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.0	-60.56	2.00	10.75	Horizontal	-53.96	-13.00	40.96	0
3	2122.5	-63.81	2.51	11.05	Horizontal	-57.42	-13.00	44.42	90
4	3537.5	-60.30	4.20	11.15	Horizontal	-55.50	-13.00	42.50	315
5	4245.0	-55.28	5.20	11.15	Horizontal	-51.48	-13.00	38.48	0
6	4952.5	-61.11	5.50	11.95	Horizontal	-56.81	-13.00	43.81	90
7	5660.0	-61.72	5.70	13.55	Horizontal	-56.02	-13.00	43.02	225
8	6367.5	-60.14	6.30	13.75	Horizontal	-54.84	-13.00	41.84	45
9	7075.0	-58.16	6.80	13.85	Horizontal	-53.26	-13.00	40.26	315
10	3537.5	-55.60	6.90	14.25	Horizontal	-50.40	-13.00	37.40	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



LTE Band 13 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-68.05	2.00	10.75	Horizontal	-52.34	-40.00	12.34	225
Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
3	2346.0	-61.26	2.51	11.05	Horizontal	-52.34	-40.00	12.34	225
4	3128.0	-61.75	4.20	11.15	Horizontal	-53.50	-13.00	40.50	315
5	3910.0	-60.78	5.20	11.15	Horizontal	-52.80	-13.00	39.80	90
6	4692.0	-61.68	5.50	11.95	Horizontal	-54.40	-13.00	41.40	0
7	5474.0	-62.08	5.70	13.55	Horizontal	-55.96	-13.00	42.96	0
8	6256.0	-59.81	6.30	13.75	Horizontal	-52.60	-13.00	39.60	90
9	7038.0	-56.62	6.80	13.85	Horizontal	-49.80	-13.00	36.80	45
10	7820.0	-55.69	6.90	14.25	Horizontal	-48.90	-13.00	35.90	315
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 13 QPSK 10MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1555.3	-64.81	2.00	10.75	Horizontal	-58.21	-40.00	18.21	45
3	2346.0	-57.62	2.51	11.05	Horizontal	-51.23	-13.00	38.23	180
4	3128.0	-54.24	4.20	11.15	Horizontal	-49.44	-13.00	36.44	180
5	3910.0	-50.30	5.20	11.15	Horizontal	-46.50	-13.00	33.50	225
6	4692.0	-56.30	5.50	11.95	Horizontal	-52.00	-13.00	39.00	0
7	5474.0	-49.50	5.70	13.55	Horizontal	-43.80	-13.00	30.80	0
8	6256.0	-56.50	6.30	13.75	Horizontal	-51.20	-13.00	38.20	90
9	7038.0	-53.50	6.80	13.85	Horizontal	-48.60	-13.00	35.60	45
10	7820.0	-54.80	6.90	14.25	Horizontal	-49.60	-13.00	36.60	315
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 41 QPSK 5MHz CH-Middle, RB 1



Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5186.0	-34.12	2.00	9.15	Horizontal	-26.97	-25.00	1.97	135
3	7779.0	-49.72	2.50	11.35	Horizontal	-40.87	-25.00	15.87	90
4	10372.0	-51.58	4.20	12.05	Horizontal	-43.73	-25.00	18.73	315
5	12965.0	-50.77	5.20	12.85	Horizontal	-43.12	-25.00	18.12	0
6	15558.0	-55.66	5.50	14.23	Horizontal	-46.93	-25.00	21.93	45
7	18151.0	--	--	--	--	--	--	--	--
8	20744.0	--	--	--	--	--	--	--	--
9	23337.0	--	--	--	--	--	--	--	--
10	25930.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

LTE Band 41 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5186.0	-36.17	2.00	10.15	Horizontal	-28.02	-25.00	3.02	315
3	7779.0	-49.25	2.50	11.35	Horizontal	-40.40	-25.00	15.40	0
4	10372.0	-51.55	4.20	12.05	Horizontal	-43.70	-25.00	18.70	45
5	12965.0	-54.75	5.20	14.85	Horizontal	-45.10	-25.00	20.10	90
6	15558.0	-51.93	5.50	13.23	Horizontal	-44.20	-25.00	19.20	225
7	18151.0	--	--	--	--	--	--	--	--
8	20744.0	--	--	--	--	--	--	--	--
9	23337.0	--	--	--	--	--	--	--	--
10	25930.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



LTE Band 66 QPSK 1.4MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3472.1	-54.63	2.6	10.75	Horizontal	-46.48	-13.00	33.48	90
3	5208.4	-54.68	2.4	11.05	Horizontal	-46.03	-13.00	33.03	135
4	6980	-58.67	4.5	11.15	Horizontal	-52.02	-13.00	39.02	45
5	8725	-56.09	5.1	11.35	Horizontal	-49.84	-13.00	36.84	0
6	10470	-54.29	5.3	11.95	Horizontal	-47.64	-13.00	34.64	225
7	12215	-47.28	5.5	13.55	Horizontal	-39.23	-13.00	26.23	315
8	13960	-51.01	6.3	13.75	Horizontal	-43.56	-13.00	30.56	90
9	15705	-53.75	6.7	13.85	Horizontal	-46.60	-13.00	33.60	0
10	17450	-50.91	6.8	14.25	Horizontal	-43.46	-13.00	30.46	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

LTE Band 66 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3472.1	-56.93	2.6	10.75	Horizontal	-48.78	-13.00	35.78	135
3	5208.4	-60.12	2.4	11.05	Horizontal	-51.47	-13.00	38.47	90
4	6980	-57.06	4.5	11.15	Horizontal	-50.41	-13.00	37.41	315
5	8725	-51.97	5.1	11.35	Horizontal	-45.72	-13.00	32.72	135
6	10470	-53.80	5.3	11.95	Horizontal	-47.15	-13.00	34.15	225
7	12215	-47.19	5.5	13.55	Horizontal	-39.14	-13.00	26.14	0
8	13960	-51.61	6.3	13.75	Horizontal	-44.16	-13.00	31.16	90
9	15705	-52.71	6.7	13.85	Horizontal	-45.56	-13.00	32.56	225
10	17450	-49.35	6.8	14.25	Horizontal	-41.90	-13.00	28.90	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3472.1	-56.93	2.6	10.75	Horizontal	-48.78	-13.00	35.78	135
3	5208.4	-60.12	2.4	11.05	Horizontal	-51.47	-13.00	38.47	90
4	6980	-57.06	4.5	11.15	Horizontal	-50.41	-13.00	37.41	315
5	8725	-51.97	5.1	11.35	Horizontal	-45.72	-13.00	32.72	135
6	10470	-53.80	5.3	11.95	Horizontal	-47.15	-13.00	34.15	225
7	12215	-47.19	5.5	13.55	Horizontal	-39.14	-13.00	26.14	0
8	13960	-51.61	6.3	13.75	Horizontal	-44.16	-13.00	31.16	90
9	15705	-52.71	6.7	13.85	Horizontal	-45.56	-13.00	32.56	225
10	17450	-49.35	6.8	14.25	Horizontal	-41.90	-13.00	28.90	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



6 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2019-05-19	2020-05-18
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2019-05-19	2020-05-18
Signal Analyzer	R&S	FSV30	100815	2019-12-16	2020-12-15
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2020-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	01111	2019-09-12	2021-09-11
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Horn Antenna	STEATITE	QSH-SL-26-40-K-15	16779	2017-07-20	2020-07-19
Signal generator	R&S	SMB 100A	102594	2019-05-19	2020-05-18
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preamplifier	R&S	SCU18	102327	2019-05-19	2020-05-18
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2019-05-19	2020-05-18
RF Cable	Agilent	SMA 15cm	0001	2019-12-13	2020-03-14
Software	R&S	EMC32	9.26.0	/	/

*****END OF REPORT *****