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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	April 30, 2018	Initial Issue	ALL	Allison Chen
01	August 15, 2018	1. Revised antenna type. 2. Revised description of transmit power. 3. Revised test summary. 4. Revised description of KDB 971168 no. 5. Revised Cali. date of power meter in section 5.2. 6. Revised description of limit and test procedure in section in 8.2. 7. Revised description of limit in section 8.3. 8. Added note for test results in section 8.3, 8.4, 8.5 and 8.6.	P.5-6, 9, 20-21, 24-26, 28-29, 37-38, 46-47, 74	Allison Chen
02	August 21, 2018	1. Removed "power meter" in section 5.2. 2. Revised title in section 8.2. 3. Removed remark in section 8.2.	P.9, P.20, P.23	Allison Chen
03	August 29, 2018	1. Revised test procedure in section 8.8.	P.74	Allison Chen



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1. TEST RESULT CERTIFICATION

Applicant: Advantech Co.Ltd.
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Manufacturer: Advantech Co.Ltd.
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Equipment Under Test: Computer

Trade Name: ADVANTECH

Model: TREK-530

Date of Test: December 1, 2017 ~ April 19, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 24 SUBPART E	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA-603-E and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rule FCC PART 24 Subpart E.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Tested by:

Sam Chuang
Manager
Compliance Certification Services Inc.

Ivan Wang
Assistant Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Computer	
Trade Name	ADVANTECH	
Model	TREK-530	
Model Discrepancy	N/A	
Received Date	September 8, 2017	
Power Supply	Powered from host device: DC 12V	
Frequency Range	LTE Band 25 Channel Bandwidth: 1.4MHz	1850.7 MHz ~1914.3 MHz
	LTE Band 25 Channel Bandwidth: 3MHz	1851.5 MHz ~ 1913.5 MHz
	LTE Band 25 Channel Bandwidth: 5MHz	1852.5 MHz ~1912.5 MHz
	LTE Band 25 Channel Bandwidth: 10MHz	1855.0 MHz ~1910.0 MHz
	LTE Band 25 Channel Bandwidth: 15MHz	1857.5 MHz ~ 1907.5 MHz
	LTE Band 25 Channel Bandwidth: 20MHz	1860.0 MHz ~1905.0 MHz
Modulation Technique	LTE Band 25	QPSK, 16QAM
Transmit Power (EIRP Power)	LTE Band 25 Channel Bandwidth: 1.4MHz	QPSK: 27.21 dBm 16QAM: 27.28 dBm
	LTE Band 25 Channel Bandwidth: 3MHz	QPSK: 26.66 dBm 16QAM: 27.46 dBm
	LTE Band 25 Channel Bandwidth: 5MHz	QPSK: 26.25 dBm 16QAM: 27.54 dBm
	LTE Band 25 Channel Bandwidth: 10MHz	QPSK: 26.18 dBm 16QAM: 26.60 dBm
	LTE Band 25 Channel Bandwidth: 15MHz	QPSK: 25.54 dBm 16QAM: 26.36 dBm
	LTE Band 25 Channel Bandwidth: 20MHz	QPSK: 25.83 dBm 16QAM: 26.61 dBm
Antenna Specification	Dipole Antenna LTE Band 25: 1.2dBi	

Remark: The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.



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3. TEST SUMMARY

FCC Standard Section	Report Section	Test Item	Result
-	1.2	Antenna Requirement	Pass
2.1046	8.1	Output Power Measurement	Pass
24.232(c)	8.2	EIRP Measurement	Pass
2.1055, 24.235	8.3	Frequency Stability v.s. temperature measurement	Pass
2.1049	8.4	Occupied Bandwidth Measurement	Pass
24.232(d)	8.5	Peak to Average Ratio	Pass
24.238(a)	8.6	Band edge Measurement	Pass
24.238(a)	8.7	Conducted Spurious Emission	Pass
2.1053	8.8	Spurious Radiation Measurement	Pass



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4. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of TIA-603-E and FCC CFR 47, Part 2 and Part 24 Subpart E, KDB 971168 D01 Power Meas License Digital Systems.

4.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

4.3 DESCRIPTION OF TEST MODES

The EUT had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

LTE Band 25: 1850 MHz ~ 1915MHz

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	1.4MHz		3MHz		5MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low channel (L)	26047	1850.7	26055	1851.5	26065	1852.5
Middle channel (M)	26365	1882.5	26365	1882.5	26365	1882.5
High channel (H)	26683	1914.3	26675	1913.5	26665	1912.5

Channel Bandwidth	10MHz		15MHz		20MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low channel (L)	26090	1855.0	26115	1857.5	26140	1860.0
Middle channel (M)	26365	1882.5	26365	1882.5	26365	1882.5
High channel (H)	26640	1910.0	26615	1907.5	26590	1905.0

4.4 THE WORST MODE OF MEASUREMENT

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
DC Voltage	12V
Test Mode	Mode 1: EUT power by DC Source via cable.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Position	☐ Placed in fixed position. ☐ Placed in fixed position at X-Plane (E2-Plane) ☒ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)

Remark:

1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (Y-Plane) were recorded in this report.

5. INSTRUMENT CALIBRATION

5.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Wugu fully Chamber					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Analyzer	Agilent	E4407B	MY44212686	04/07/2017	04/06/2018
Pre-Amplifier	EMEC	EM01M62G	60570	08/01/2017	07/31/2018
Bilog Antenna	Sunol Sciences	JB1	A052609	03/17/2017	03/16/2018
Horn Antenna	SCHWARZBECK	BBHA 9120D	779	03/08/2017	03/07/2018
Pre-Amplifier	Anritsu	MH648A	M89145	06/27/2017	06/26/2018
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Filter	N/A	800-1G	N/A	07/20/2017	07/19/2018
Filter	N/A	1800-2000	N/A	07/20/2017	07/19/2018
WWAN signal cable	HUBER SUHNER	SUCOFLEX 104PEA	33960	07/31/2017	07/30/2018
Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	116875	04/25/2017	04/24/2018
Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	116875	04/20/2018	04/19/2019

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	116875	04/25/2017	04/24/2018
Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	116875	04/20/2018	04/19/2019
Spectrum Analyzer	R&S	FSV 40	101073	10/02/2017	10/01/2018
Spectrum Analyzer	Keysight	N9010B	MY55460167	06/14/2017	06/13/2018
Thermostatic/Hrgrosatic Chamber	TAICHY	MHG-150LF	930619	10/11/2017	10/10/2018
Directional Coupler	Agilent	87301D	MY44350252	07/25/2017	07/24/2018
SUCOFLEX Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
Divider	Solvang Technology	2-18GHz 4Way	STI08-0015	07/26/2017	07/25/2018



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5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

6. FACILITIES AND ACCREDITATIONS

6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

- ☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
- ☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan, R.O.C

6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



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7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

7.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable
1	DC Power Source	GWINSTEK	SPS-3610	N/A	N/A	DC Cable 1.5m shielding
2	NB	ASUS	M5200AE	N/A	PD9WM3B2100	RS232 to USB Cable 1.5m

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



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8. FCC PART 24 REQUIREMENTS

8.1 OUTPUT POWER MEASUREMENT

Test Procedures

CONDUCTED POWER MEASUREMENT:

1. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
2. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

TEST RESULTS

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
25	1.4M	26047	1850.7	QPSK	1	0	0	23.33	0.2153
					1	2	0	23.40	0.2188
					1	5	0	23.10	0.2042
					3	0	1	22.46	0.1762
					3	1	1	22.48	0.1770
					3	2	1	22.19	0.1656
					6	0	1	22.44	0.1754
				16QAM	1	0	1	22.45	0.1758
					1	2	1	22.48	0.1770
					1	5	1	22.14	0.1637
					3	0	2	21.49	0.1409
					3	1	2	21.53	0.1422
					3	2	2	21.18	0.1312
					6	0	2	21.13	0.1297
		26365	1882.5	QPSK	1	0	0	23.41	0.2193
					1	2	0	23.34	0.2158
					1	5	0	22.80	0.1905
					3	0	1	22.55	0.1799
					3	1	1	22.41	0.1742
					3	2	1	21.87	0.1538
					6	0	1	22.51	0.1782
				16QAM	1	0	1	22.49	0.1774
					1	2	1	22.46	0.1762
					1	5	1	21.94	0.1563
					3	0	2	21.57	0.1435
					3	1	2	21.46	0.1400
					3	2	2	20.85	0.1216
					6	0	2	20.82	0.1208
		26683	1914.3	QPSK	1	0	0	22.98	0.1986
					1	2	0	23.23	0.2104
					1	5	0	22.96	0.1977
					3	0	1	22.23	0.1671
					3	1	1	22.30	0.1698
					3	2	1	22.03	0.1596
					6	0	1	22.24	0.1675
				16QAM	1	0	1	22.15	0.1641
					1	2	1	22.30	0.1698
					1	5	1	22.09	0.1618
					3	0	2	21.13	0.1297
					3	1	2	21.32	0.1355
					3	2	2	21.09	0.1285
					6	0	2	21.06	0.1276

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
25	3M	26055	1851.5	QPSK	1	0	0	23.34	0.2158
					1	7	0	23.41	0.2193
					1	14	0	23.11	0.2046
					8	0	1	22.47	0.1766
					8	4	1	22.49	0.1774
					8	7	1	22.20	0.1660
					15	0	1	22.45	0.1758
				16QAM	1	0	1	22.46	0.1762
					1	7	1	22.49	0.1774
					1	14	1	22.15	0.1641
					8	0	2	21.50	0.1413
					8	4	2	21.54	0.1426
					8	7	2	21.19	0.1315
					15	0	2	21.14	0.1300
		26365	1882.5	QPSK	1	0	0	23.42	0.2198
					1	7	0	23.35	0.2163
					1	14	0	22.81	0.1910
					8	0	1	22.56	0.1803
					8	4	1	22.42	0.1746
					8	7	1	21.88	0.1542
					15	0	1	22.52	0.1786
				16QAM	1	0	1	22.50	0.1778
					1	7	1	22.47	0.1766
					1	14	1	21.95	0.1567
					8	0	2	21.58	0.1439
					8	4	2	21.47	0.1403
					8	7	2	20.86	0.1219
					15	0	2	20.83	0.1211
		26675	1913.5	QPSK	1	0	0	22.99	0.1991
					1	7	0	23.24	0.2109
					1	14	0	22.97	0.1982
					8	0	1	22.24	0.1675
					8	4	1	22.31	0.1702
					8	7	1	22.04	0.1600
					15	0	1	22.25	0.1679
				16QAM	1	0	1	22.16	0.1644
					1	7	1	22.31	0.1702
					1	14	1	22.10	0.1622
					8	0	2	21.14	0.1300
					8	4	2	21.33	0.1358
					8	7	2	21.10	0.1288
					15	0	2	21.07	0.1279

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
25	5M	26065	1852.5	QPSK	1	0	0	23.36	0.2168
					1	12	0	23.43	0.2203
					1	24	0	23.13	0.2056
					12	0	1	22.49	0.1774
					12	6	1	22.51	0.1782
					12	11	1	22.22	0.1667
					25	0	1	22.47	0.1766
				16QAM	1	0	1	22.48	0.1770
					1	12	1	22.51	0.1782
					1	24	1	22.17	0.1648
					12	0	2	21.52	0.1419
					12	6	2	21.56	0.1432
					12	11	2	21.21	0.1321
					25	0	2	21.16	0.1306
		26365	1882.5	QPSK	1	0	0	23.43	0.2203
					1	12	0	23.36	0.2168
					1	24	0	22.82	0.1914
					12	0	1	22.57	0.1807
					12	6	1	22.43	0.1750
					12	11	1	21.89	0.1545
					25	0	1	22.53	0.1791
				16QAM	1	0	1	22.51	0.1782
					1	12	1	22.48	0.1770
					1	24	1	21.96	0.1570
					12	0	2	21.59	0.1442
					12	6	2	21.48	0.1406
					12	11	2	20.87	0.1222
					25	0	2	20.84	0.1213
		26665	1912.5	QPSK	1	0	0	23.00	0.1995
					1	12	0	23.25	0.2113
					1	24	0	22.98	0.1986
					12	0	1	22.25	0.1679
					12	6	1	22.32	0.1706
					12	11	1	22.05	0.1603
					25	0	1	22.26	0.1683
				16QAM	1	0	1	22.17	0.1648
					1	12	1	22.32	0.1706
					1	24	1	22.11	0.1626
					12	0	2	21.15	0.1303
					12	6	2	21.34	0.1361
					12	11	2	21.11	0.1291
					25	0	2	21.08	0.1282

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
25	10M	26090	1855.0	QPSK	1	0	0	23.37	0.2173
					1	24	0	23.44	0.2208
					1	49	0	23.14	0.2061
					25	0	1	22.50	0.1778
					25	12	1	22.52	0.1786
					25	24	1	22.23	0.1671
					50	0	1	22.48	0.1770
				16QAM	1	0	1	22.49	0.1774
					1	24	1	22.52	0.1786
					1	49	1	22.18	0.1652
					25	0	2	21.53	0.1422
					25	12	2	21.57	0.1435
					25	24	2	21.22	0.1324
					50	0	2	21.17	0.1309
		26365	1882.5	QPSK	1	0	0	23.45	0.2213
					1	24	0	23.38	0.2178
					1	49	0	22.84	0.1923
					25	0	1	22.59	0.1816
					25	12	1	22.45	0.1758
					25	24	1	21.91	0.1552
					50	0	1	22.55	0.1799
				16QAM	1	0	1	22.53	0.1791
					1	24	1	22.50	0.1778
					1	49	1	21.98	0.1578
					25	0	2	21.61	0.1449
					25	12	2	21.50	0.1413
					25	24	2	20.89	0.1227
					50	0	2	20.86	0.1219
		26640	1910.0	QPSK	1	0	0	23.03	0.2009
					1	24	0	23.28	0.2128
					1	49	0	23.01	0.2000
					25	0	1	22.28	0.1690
					25	12	1	22.35	0.1718
					25	24	1	22.08	0.1614
					50	0	1	22.29	0.1694
				16QAM	1	0	1	22.20	0.1660
					1	24	1	22.35	0.1718
					1	49	1	22.14	0.1637
					25	0	2	21.18	0.1312
					25	12	2	21.37	0.1371
					25	24	2	21.14	0.1300
					50	0	2	21.11	0.1291

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
25	15M	26115	1857.5	QPSK	1	0	0	23.40	0.2188
					1	37	0	23.47	0.2223
					1	74	0	23.17	0.2075
					36	0	1	22.53	0.1791
					36	18	1	22.55	0.1799
					36	35	1	22.26	0.1683
					75	0	1	22.51	0.1782
				16QAM	1	0	1	22.52	0.1786
					1	37	1	22.55	0.1799
					1	74	1	22.21	0.1663
					36	0	2	21.56	0.1432
					36	18	2	21.60	0.1445
					36	35	2	21.25	0.1334
					75	0	2	21.20	0.1318
		26365	1882.5	QPSK	1	0	0	23.47	0.2223
					1	37	0	23.40	0.2188
					1	74	0	22.86	0.1932
					36	0	1	22.61	0.1824
					36	18	1	22.47	0.1766
					36	35	1	21.93	0.1560
					75	0	1	22.57	0.1807
				16QAM	1	0	1	22.55	0.1799
					1	37	1	22.52	0.1786
					1	74	1	22.00	0.1585
					36	0	2	21.63	0.1455
					36	18	2	21.52	0.1419
					36	35	2	20.91	0.1233
					75	0	2	20.88	0.1225
		26615	1907.5	QPSK	1	0	0	23.05	0.2018
					1	37	0	23.30	0.2138
					1	74	0	23.03	0.2009
					36	0	1	22.30	0.1698
					36	18	1	22.37	0.1726
					36	35	1	22.10	0.1622
					75	0	1	22.31	0.1702
				16QAM	1	0	1	22.22	0.1667
					1	37	1	22.37	0.1726
					1	74	1	22.16	0.1644
					36	0	2	21.20	0.1318
					36	18	2	21.39	0.1377
					36	35	2	21.16	0.1306
					75	0	2	21.13	0.1297

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
25	20M	26140	1860.0	QPSK	1	0	0	23.48	0.2228
					1	49	0	23.55	0.2265
					1	99	0	23.25	0.2113
					50	0	1	22.61	0.1824
					50	24	1	22.63	0.1832
					50	49	1	22.34	0.1714
					100	0	1	22.59	0.1816
				16QAM	1	0	1	22.60	0.1820
					1	49	1	22.63	0.1832
					1	99	1	22.29	0.1694
					50	0	2	21.64	0.1459
					50	24	2	21.68	0.1472
					50	49	2	21.33	0.1358
					100	0	2	21.28	0.1343
		26365	1882.5	QPSK	1	0	0	23.53	0.2254
					1	49	0	23.46	0.2218
					1	99	0	22.92	0.1959
					50	0	1	22.67	0.1849
					50	24	1	22.53	0.1791
					50	49	1	21.99	0.1581
					100	0	1	22.63	0.1832
				16QAM	1	0	1	22.61	0.1824
					1	49	1	22.58	0.1811
					1	99	1	22.06	0.1607
					50	0	2	21.69	0.1476
					50	24	2	21.58	0.1439
					50	49	2	20.97	0.1250
					100	0	2	20.94	0.1242
		26590	1905.0	QPSK	1	0	0	23.10	0.2042
					1	49	0	23.35	0.2163
					1	99	0	23.08	0.2032
					50	0	1	22.35	0.1718
					50	24	1	22.42	0.1746
					50	49	1	22.15	0.1641
					100	0	1	22.36	0.1722
				16QAM	1	0	1	22.27	0.1687
					1	49	1	22.42	0.1746
					1	99	1	22.21	0.1663
					50	0	2	21.25	0.1334
					50	24	2	21.44	0.1393
					50	49	2	21.21	0.1321
					100	0	2	21.18	0.1312

8.2 EIRP MEASUREMENT

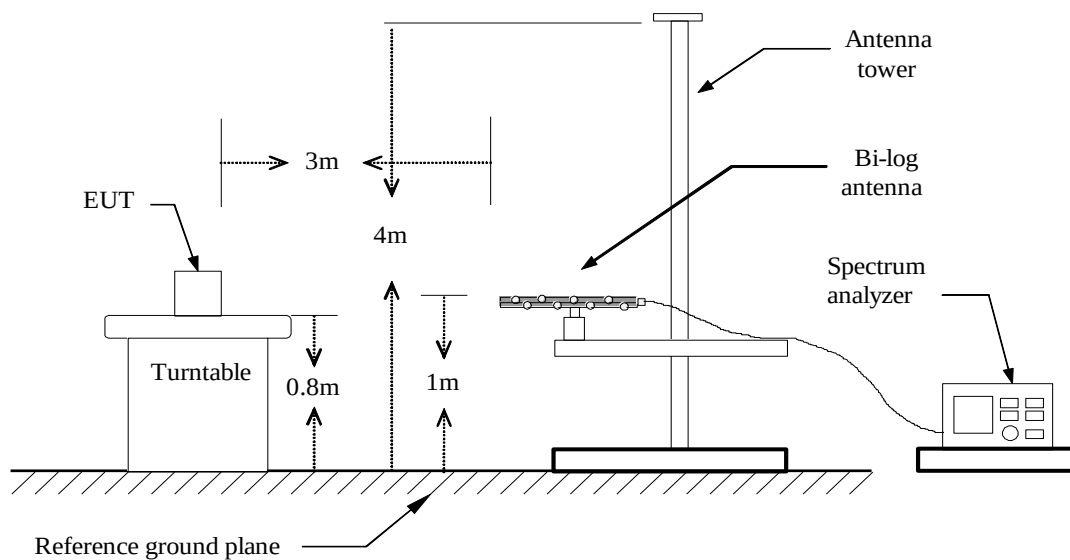
LIMIT

According to FCC §2.1046

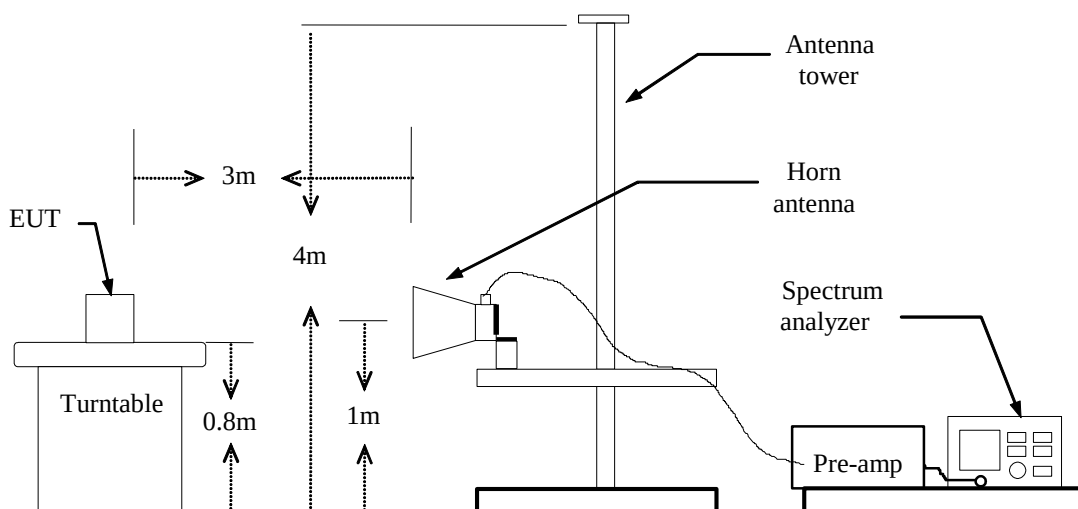
FCC 24.232(c): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

Test Configuration

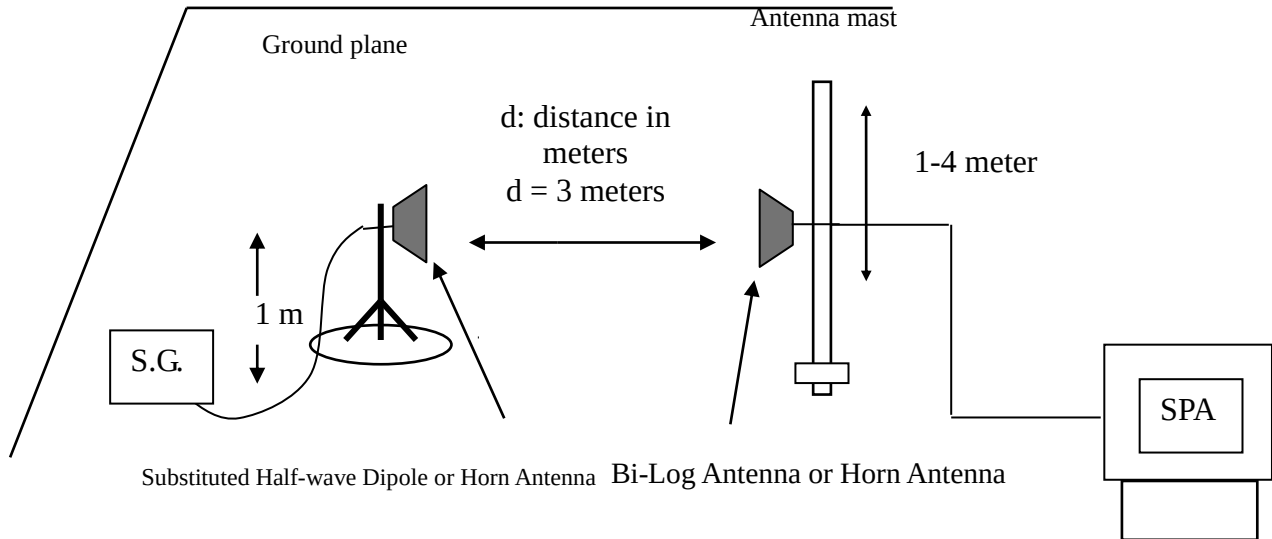
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

1. The EUT was placed on a non-conductive rotating platform (0.8m for below 1G and above 1G) in a semi-chamber. The radiated emission at the fundamental frequency was measured at 3m and SA with RMS detector per section 5, KDB 971168 D01 Power Meas License Digital Systems.
2. During the measurement, the call box parameters were set to get the maximum output power of the EUT. The maximum emission was recorded from spectrum analyzer power level (LVL) from 360 degrees rotation of turntable and the test antenna raised and lowered over a range from 1m to 4m in both horizontally and vertically polarized orientations.
3. EIRP was measured method according to TIA/EIA-603-E. The EUT was replaced by the substitution antenna at same location, and then record the maximum Analyzer reading through raised and lowered the test antenna.

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)} - 2.15$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

TEST RESULTS

No non-compliance noted.

LTE Band 25

BW: 1.4MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
25	1.4	Lowest	QPSK	1	0	25.28	0.337	27.21	0.526
		Middle		1	0	25.32	0.304	26.00	0.398
		Highest		1	0	22.90	0.195	23.24	0.210
		Lowest	16 QAM	1	0	25.85	0.384	26.87	0.486
		Middle		1	0	25.28	0.337	27.28	0.534
		Highest		1	0	23.70	0.234	25.04	0.319

BW: 3MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
25	3	Lowest	QPSK	1	0	24.19	0.262	26.66	0.463
		Middle		1	0	24.30	0.269	26.04	0.401
		Highest		1	0	23.36	0.216	24.85	0.305
		Lowest	16 QAM	1	0	25.74	0.375	27.28	0.534
		Middle		1	0	25.45	0.350	27.46	0.557
		Highest		1	0	23.76	0.237	25.35	0.342

BW: 5MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
25	5	Lowest	QPSK	1	0	24.48	0.280	26.25	0.421
		Middle		1	0	23.98	0.250	25.88	0.387
		Highest		1	0	23.65	0.231	25.38	0.345
		Lowest	16 QAM	1	0	25.57	0.360	27.46	0.557
		Middle		1	0	25.12	0.325	27.54	0.567
		Highest		1	0	24.55	0.285	25.76	0.376

BW: 10MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
25	10	Lowest	QPSK	1	0	24.51	0.347	26.18	0.415
		Middle		1	0	23.85	0.242	26.06	0.403
		Highest		1	0	23.41	0.219	25.34	0.342
		Lowest	16 QAM	1	0	25.07	0.321	26.37	0.433
		Middle		1	0	24.72	0.296	26.60	0.457
		Highest		1	0	24.49	0.281	24.64	0.291

BW: 15MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
25	15	Lowest	QPSK	1	0	24.54	0.284	25.82	0.381
		Middle		1	0	23.22	0.209	25.54	0.358
		Highest		1	0	23.49	0.223	24.91	0.309
		Lowest	16 QAM	1	0	25.30	0.338	24.00	0.251
		Middle		1	0	14.47	0.026	20.11	0.102
		Highest		1	0	23.94	0.247	26.36	0.432

BW: 20MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
25	20	Lowest	QPSK	1	0	23.94	0.247	25.83	0.382
		Middle		1	0	23.65	0.231	25.47	0.352
		Highest		1	0	23.19	0.208	24.97	0.314
		Lowest	16 QAM	1	0	19.68	0.092	26.61	0.458
		Middle		1	0	14.62	0.029	20.84	0.121
		Highest		1	0	14.28	0.026	19.54	0.089

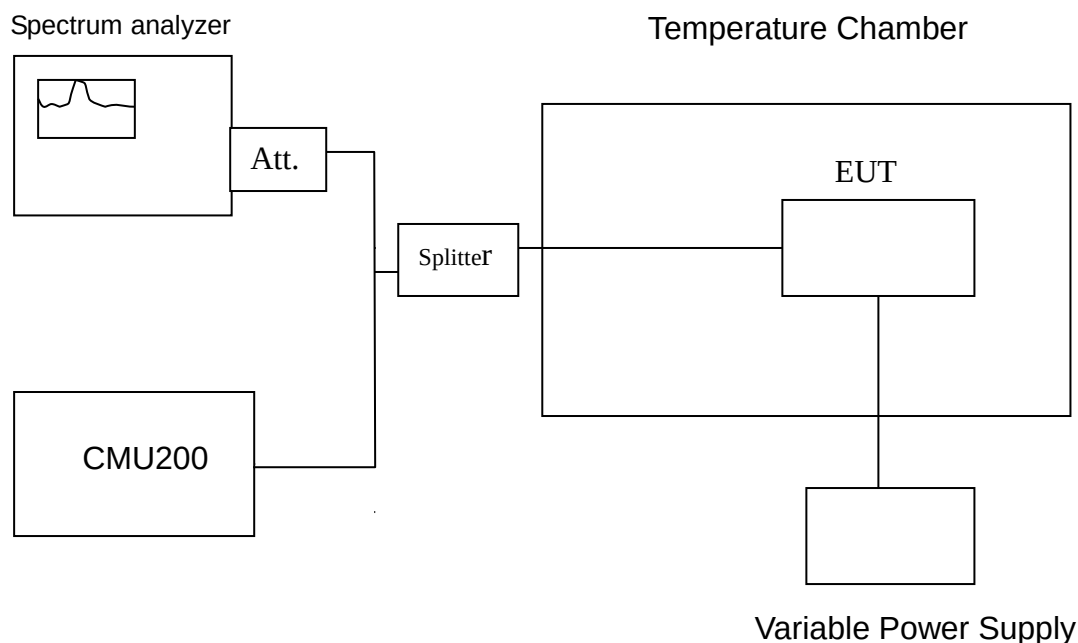
8.3 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §24.235.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Configuration



Remark: Measurement setup for testing on Antenna connector

TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

TEST RESULTS

No non-compliance noted.

Test Results

FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT: LTE Band 25

Reference Frequency: LTE Band 25 Max Bandwidth QPSK 1882.5 MHz @ 20°C		
Limit: 1860.0 MHz ~1905.0 MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
12	50	0.01
12	40	0.00
12	30	0.02
12	20	0.03
12	10	0.04
12	0	0.04
12	-10	-0.01
12	-20	0.02

Reference Frequency: LTE Band 25 Max Bandwidth 16QAM 1882.5 MHz @ 20°C		
Limit: 1860.0 MHz ~1905.0 MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
12	50	0.02
12	40	0.03
12	30	0.02
12	20	0.04
12	10	0.03
12	0	0.02
12	-10	0.03
12	-20	0.01

Note: We selected worst case to performed test in middle channel, The results can be meet other channel.



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**FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:
LTE Band 25**

Reference Frequency: LTE Band 25 Max Bandwidth QPSK 1882.5 MHz @ 20°C		
Limit: 1860.0 MHz ~1905.0 MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
10.2	20	0.01
12	20	0.02
13.8	20	0.02

Reference Frequency: LTE Band 25 Max Bandwidth 16QAM 1882.5 MHz @ 20°C		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
10.2	20	0.02
12	20	0.01
13.8	20	0.01

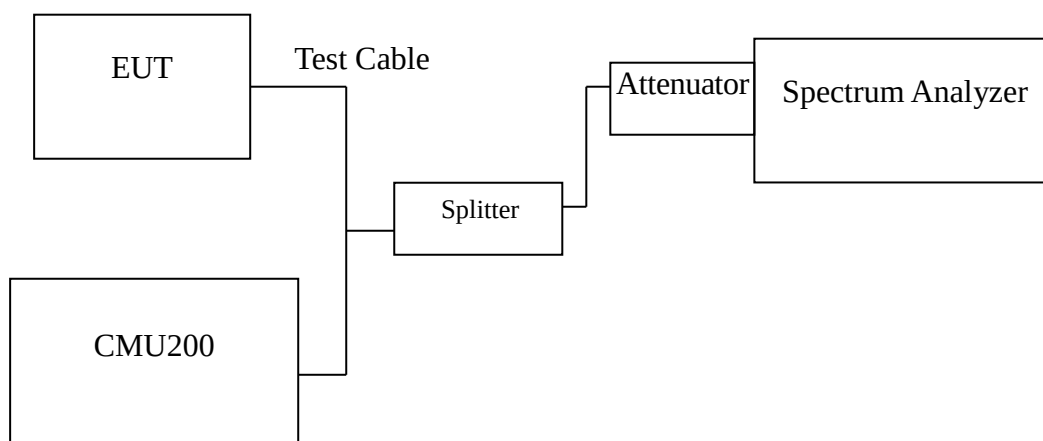
Note: We selected worst case to performed test in middle channel, The results can be meet other channel.

8.4 OCCUPIED BANDWIDTH MEASUREMENT

LIMIT

According to §FCC 2.1049.

Test Configuration



Remark: Measurement setup for testing on Antenna connector

TEST PROCEDURE

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW is set to 3 times the RBW, -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

No non-compliance noted

LTE Band 25

CHANNEL BANDWIDTH: 1.4MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.5	1.1027

CHANNEL BANDWIDTH: 1.4MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.5	1.0984

CHANNEL BANDWIDTH: 3MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.5	2.6830

CHANNEL BANDWIDTH: 3MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.5	2.6917

CHANNEL BANDWIDTH: 5MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.50	4.4862

CHANNEL BANDWIDTH: 5MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.50	4.4717

CHANNEL BANDWIDTH: 10MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.50	8.9435

CHANNEL BANDWIDTH: 10MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.50	8.9435

Note: We selected worst case to performed test in middle channel, The results can be meet other channel.



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CHANNEL BANDWIDTH: 15MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.5	13.4587

CHANNEL BANDWIDTH: 15MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.5	13.4153

CHANNEL BANDWIDTH: 20MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.50	18.0607

CHANNEL BANDWIDTH: 20MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.50	18.0607

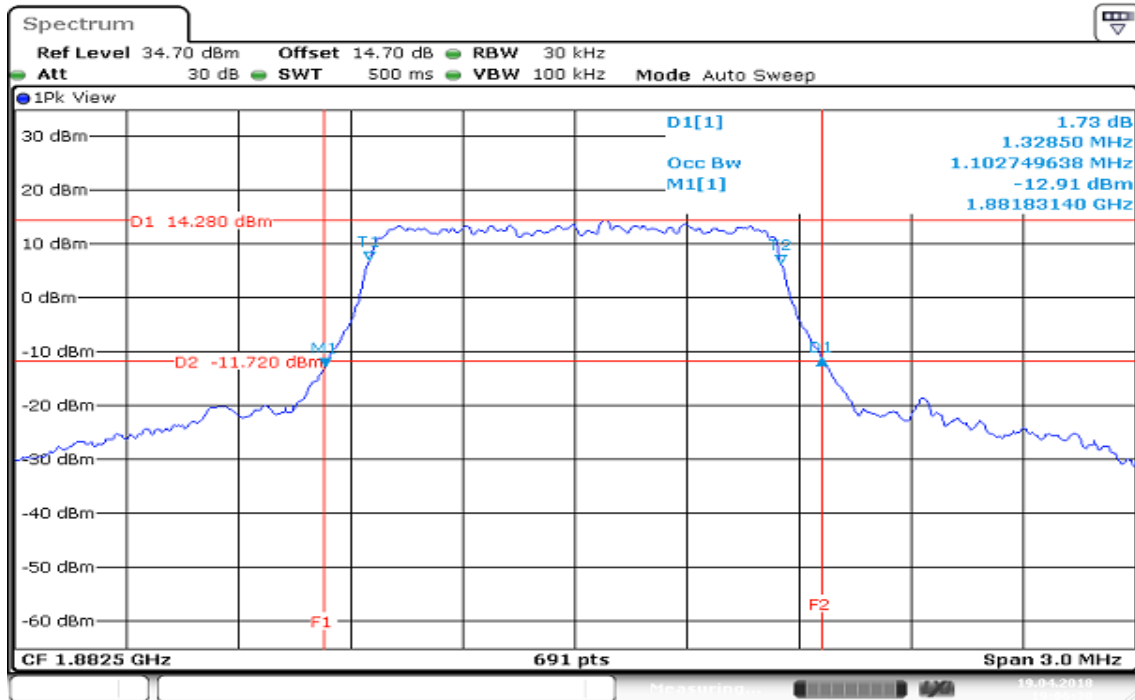
Note: We selected worst case to performed test in middle channel, The results can be meet other channel.

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LTE Band 25

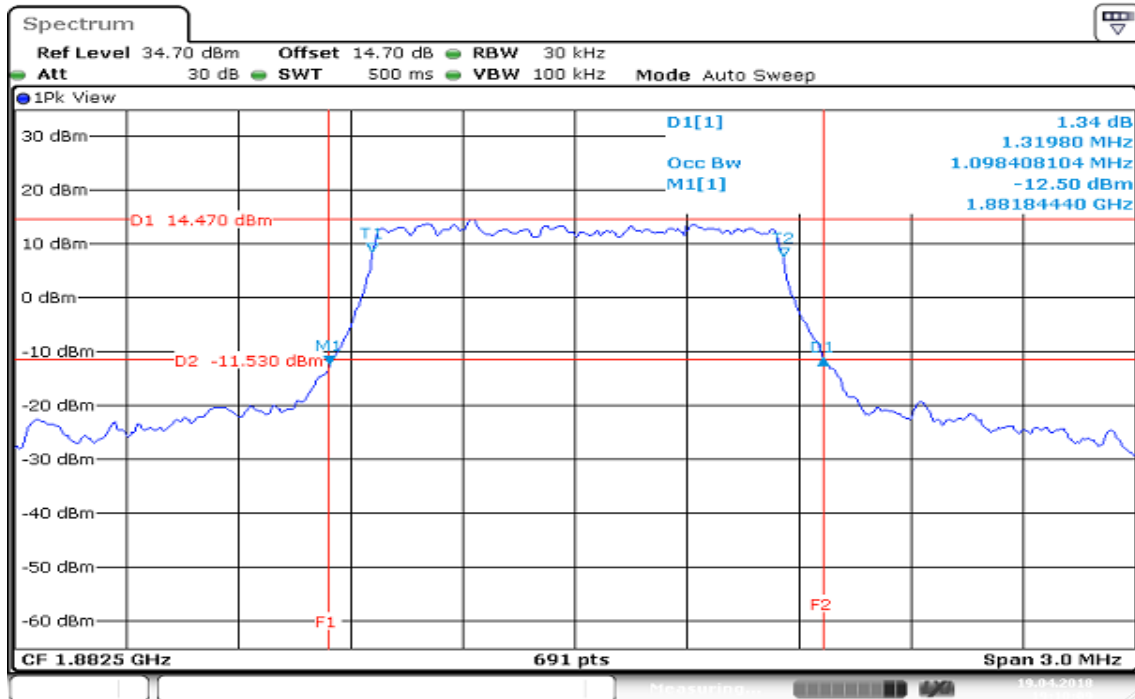
CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH Mid



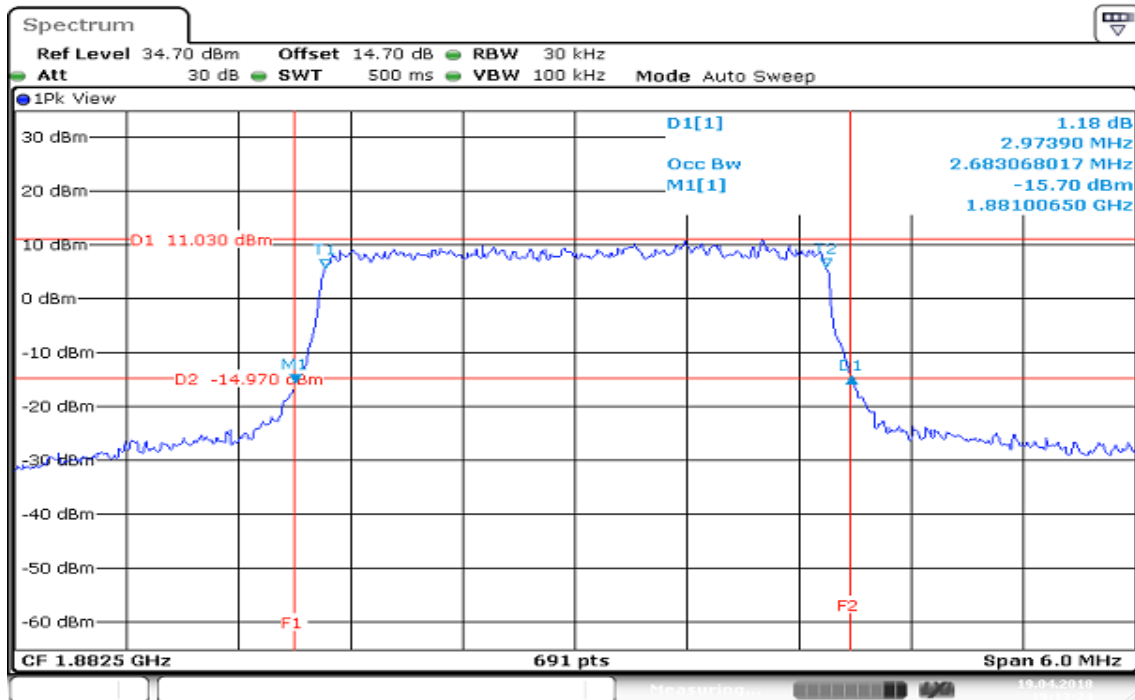
CHANNEL BANDWIDTH: 1.4MHz / 16QAM

CH Mid



CHANNEL BANDWIDTH: 3MHz / QPSK

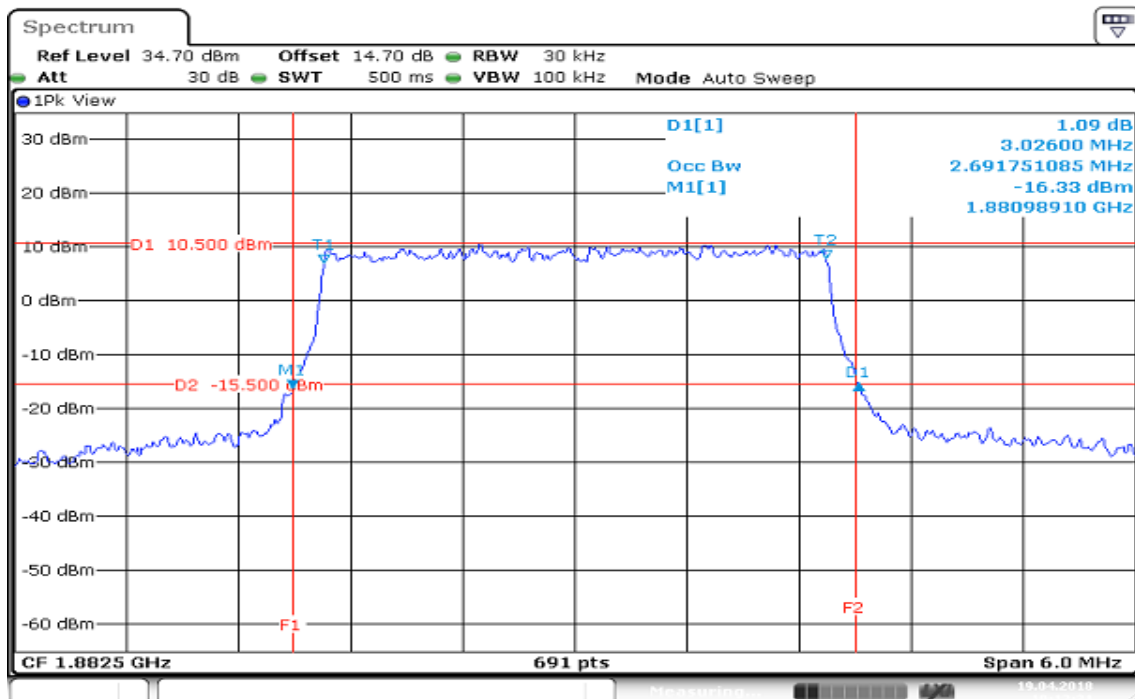
CH Mid



Date: 19 APR 2018 19:13:25

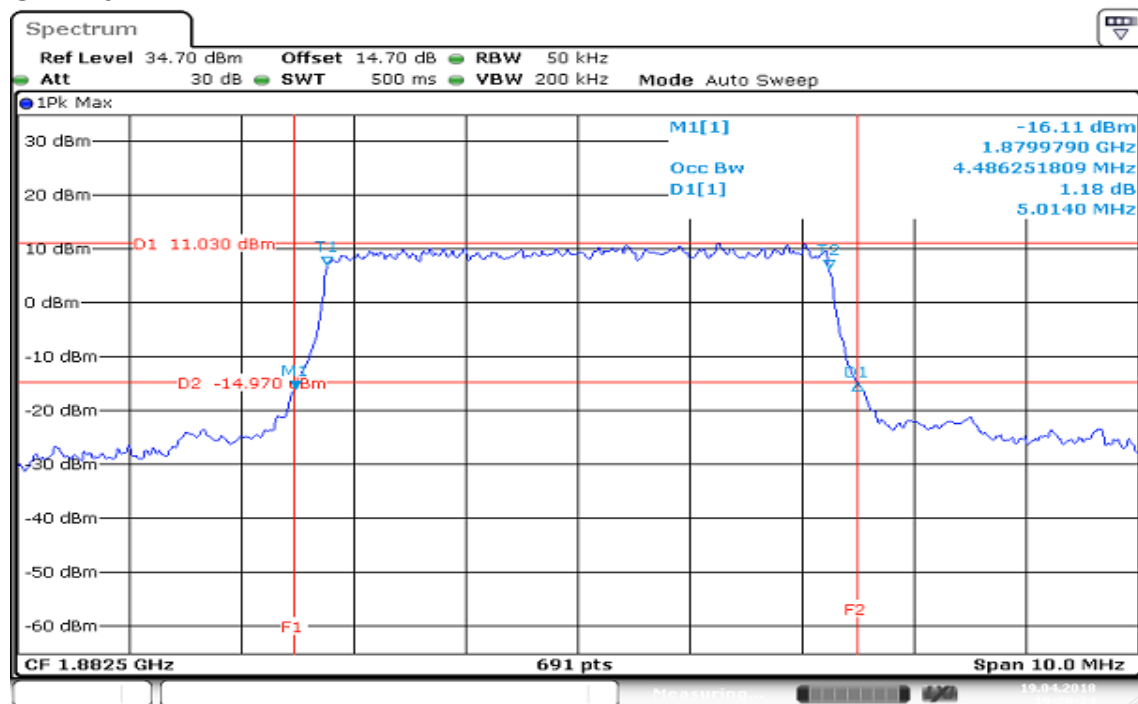
CHANNEL BANDWIDTH: 3MHz / 16QAM

CH Mid



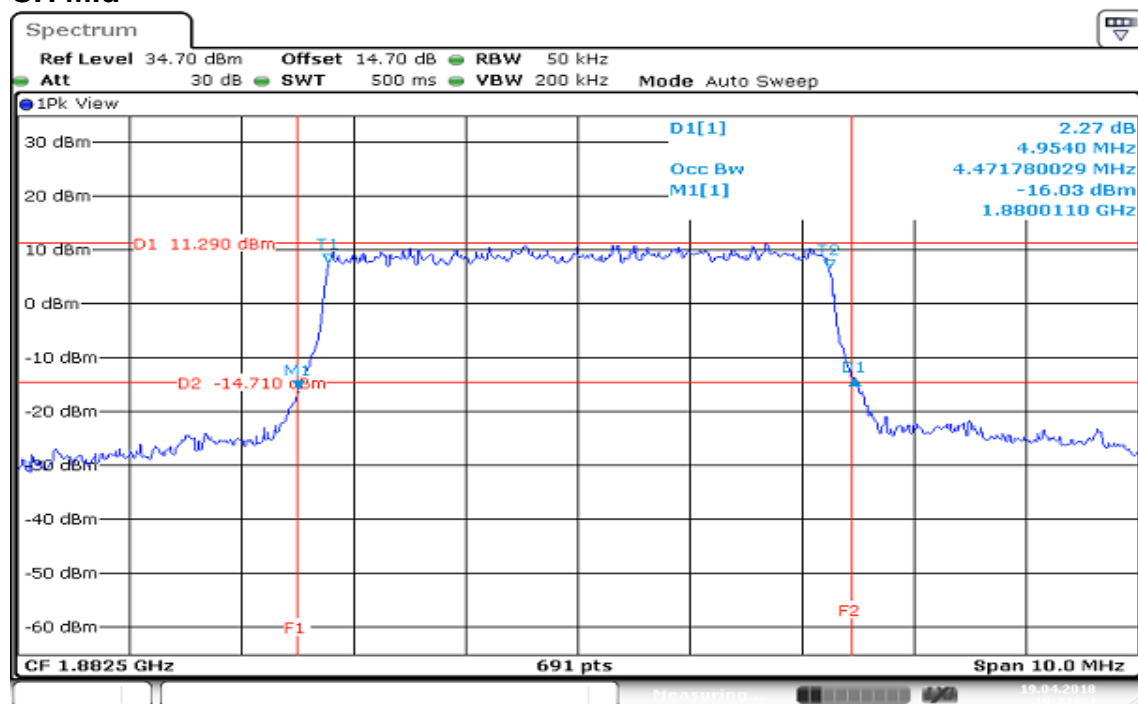
Date: 19 APR 2018 19:12:31

CHANNEL BANDWIDTH: 5MHz / QPSK CH Mid



Date: 19 APR 2018 19:20:25

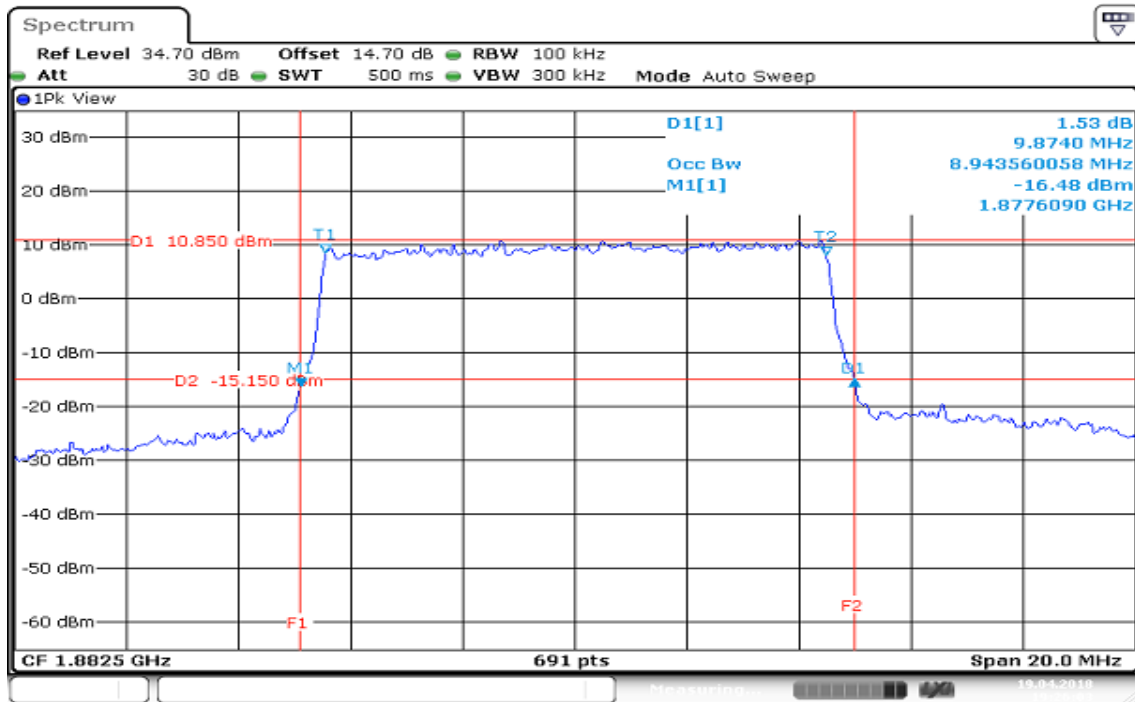
CHANNEL BANDWIDTH: 5MHz / 16QAM CH Mid



Date: 19 APR 2018 19:21:25

CHANNEL BANDWIDTH: 10MHz / QPSK

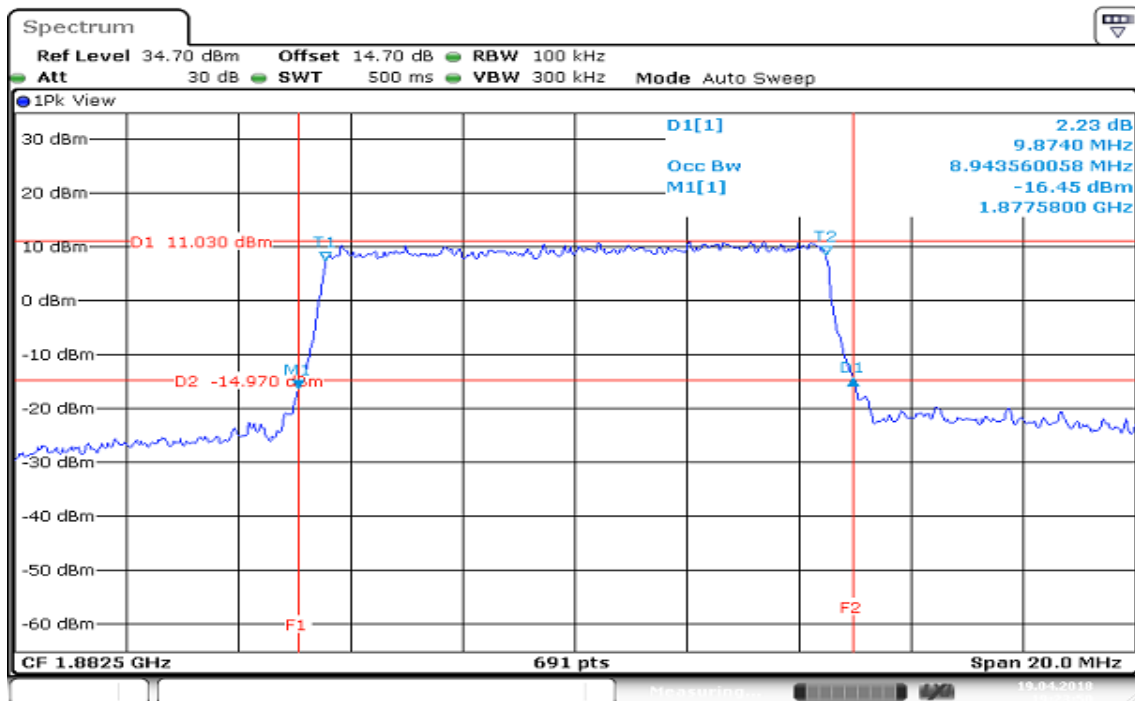
CH Mid



Date: 19 APR 2018 19:26:03

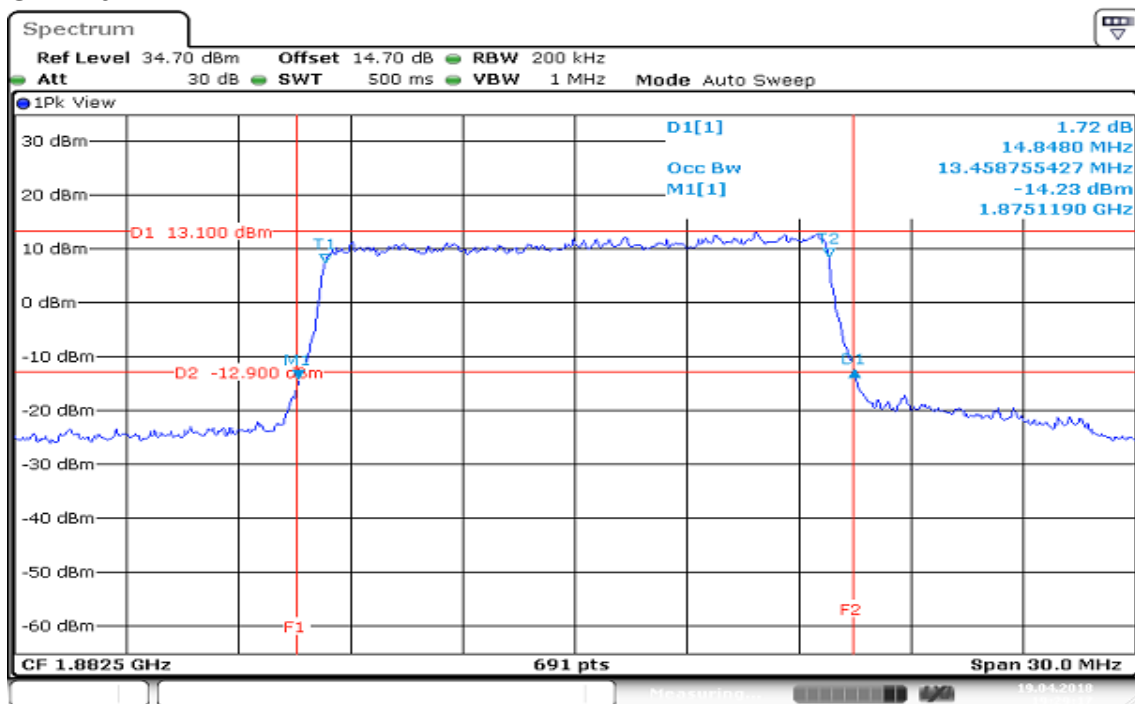
CHANNEL BANDWIDTH: 10MHz / 16QAM

CH Mid



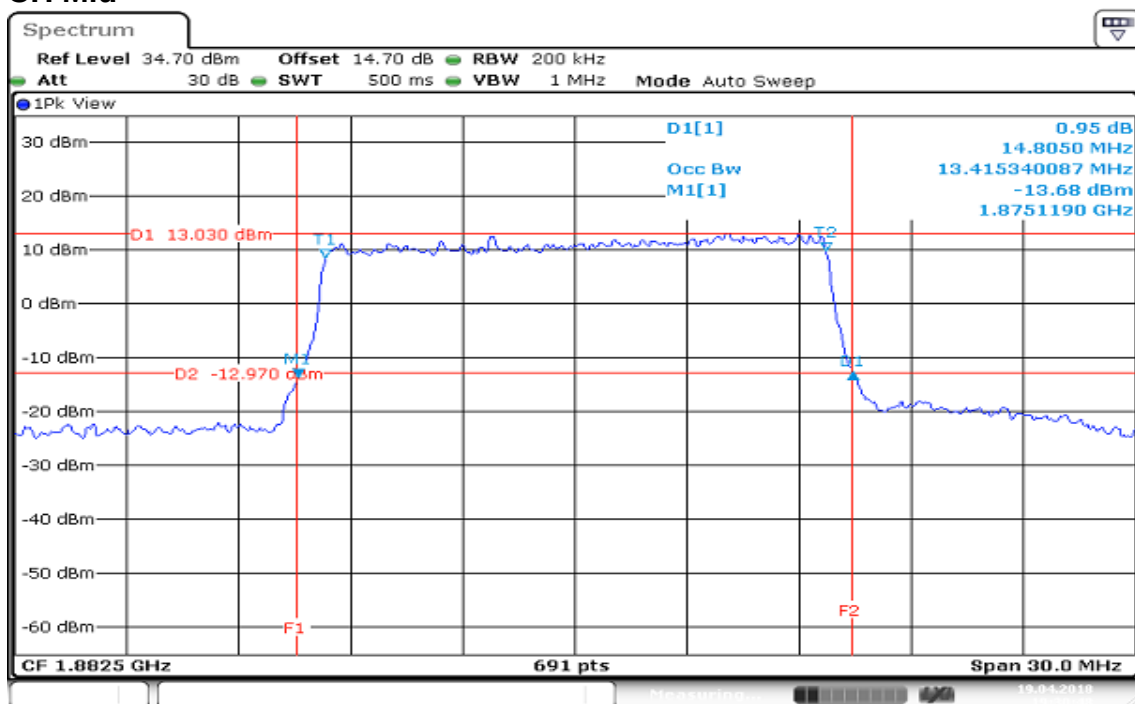
Date: 19 APR 2018 19:23:51

CHANNEL BANDWIDTH: 15MHz / QPSK CH Mid



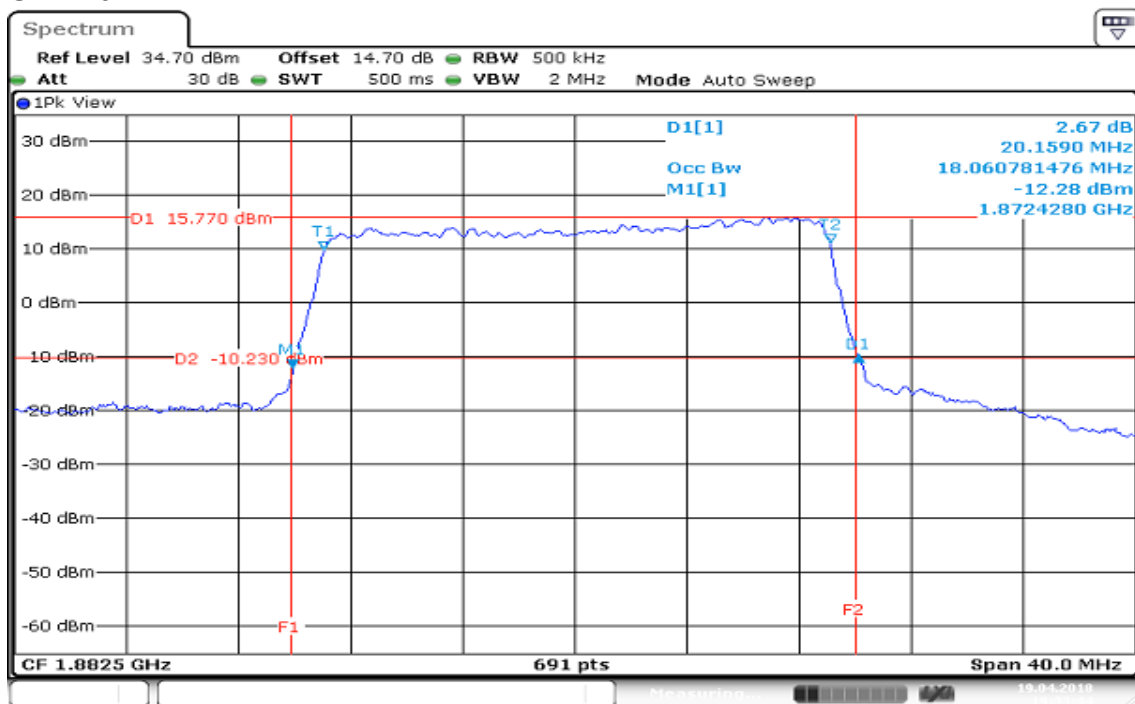
Date: 19 APR 2018 19:29:18

CHANNEL BANDWIDTH: 15MHz / 16QAM CH Mid



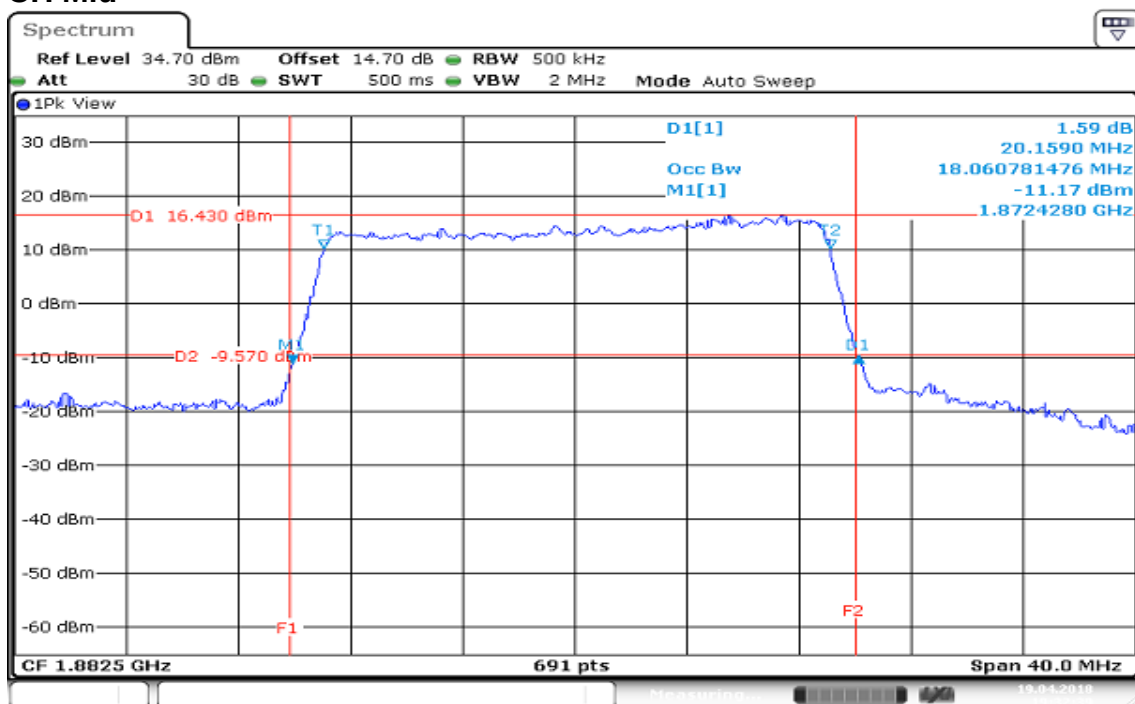
Date: 19 APR 2018 19:30:48

CHANNEL BANDWIDTH: 20MHz / QPSK CH Mid



Date: 19 APR 2018 19:23:44

CHANNEL BANDWIDTH: 20MHz / 16QAM CH Mid



Date: 19 APR 2018 19:22:40



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8.5 PEAK TO AVERAGE RATIO

Limit

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.

Test Procedures

1. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth.
2. Set the number of counts to a value that stabilizes the measured CCDF curve.
3. Record the maximum PAPR level associated with a probability of 0.1%.

Test Results

LTE Band 25

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	6.23

CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	6.61

CHANNEL BANDWIDTH: 3MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	5.74

CHANNEL BANDWIDTH: 3MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	6.32

CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	5.71

CHANNEL BANDWIDTH: 5MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	6.55

Note: We selected worst case to performed test in middle channel, The results can be meet other channel.

CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	6.00

CHANNEL BANDWIDTH: 10MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	6.46

CHANNEL BANDWIDTH: 15MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	6.06

CHANNEL BANDWIDTH: 15MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	6.64

CHANNEL BANDWIDTH: 20MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	5.97

CHANNEL BANDWIDTH: 20MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	6.64

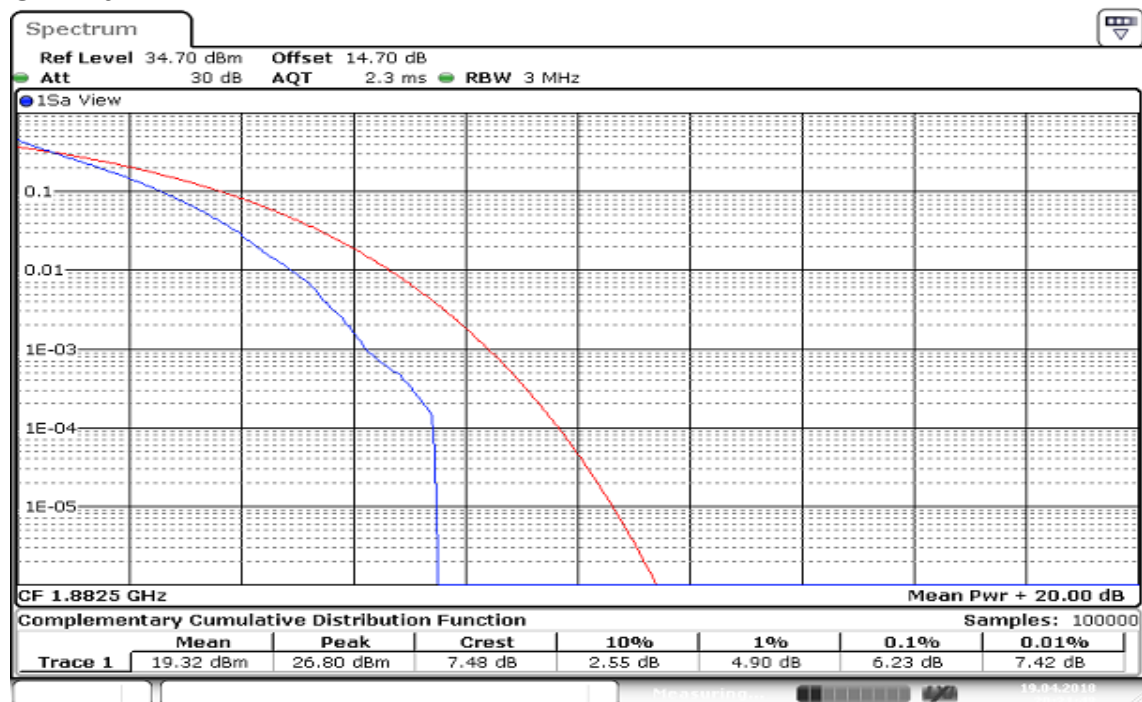
Note: We selected worst case to performed test in middle channel, The results can be meet other channel.

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LTE Band 25

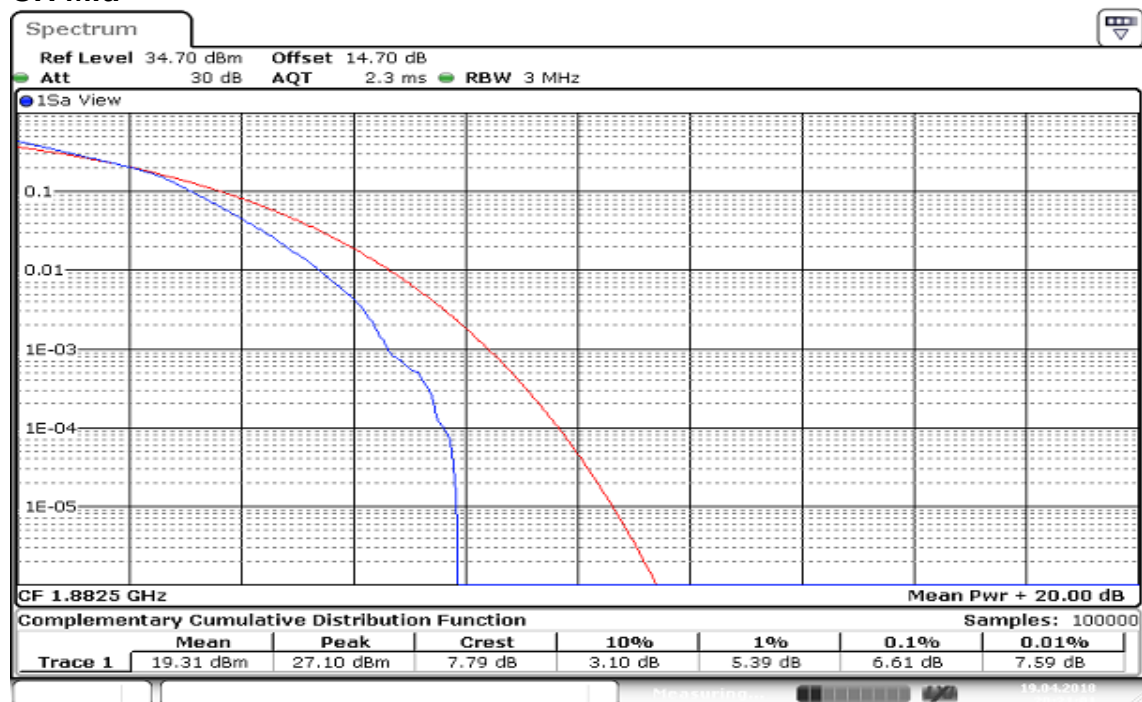
CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH Mid



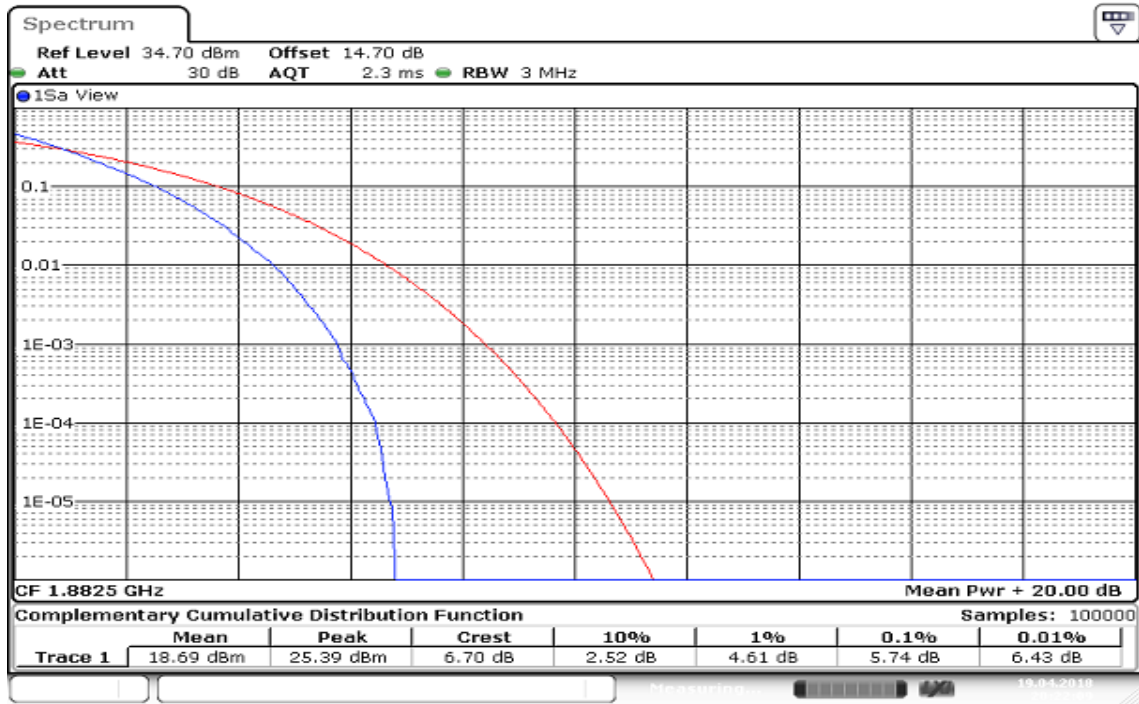
CHANNEL BANDWIDTH: 1.4MHz / 16QAM

CH Mid



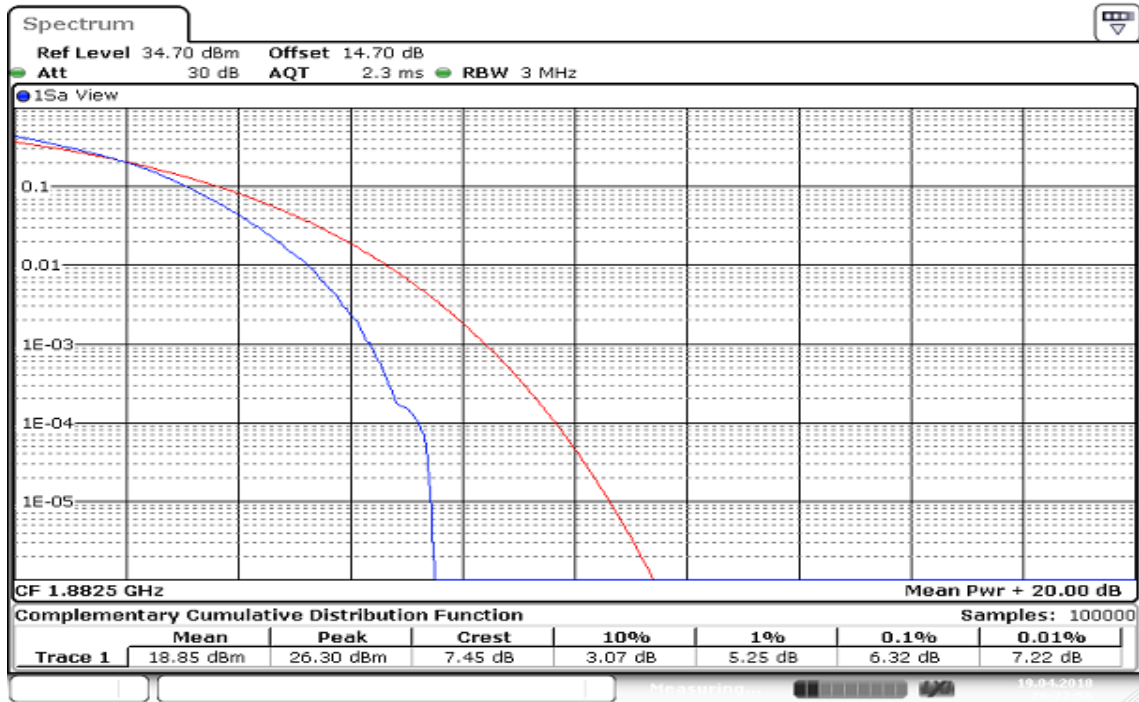
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 3MHz / QPSK
CH Mid



Date: 19 APR 2018 20:22:09

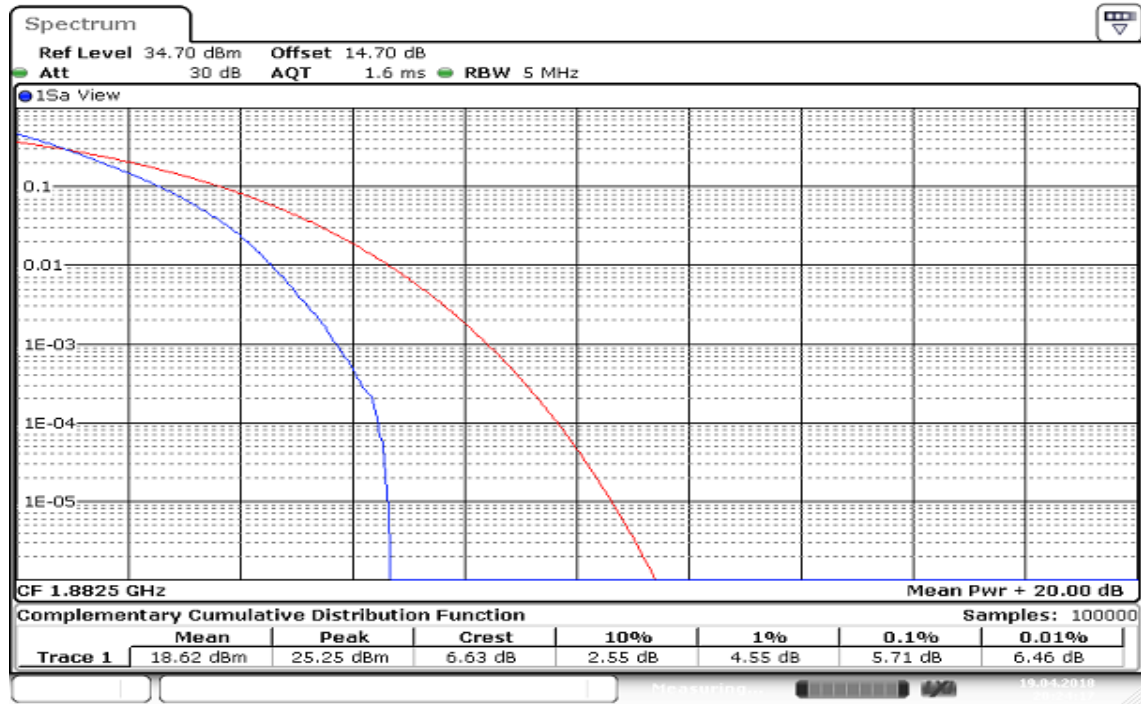
CHANNEL BANDWIDTH: 3MHz / 16QAM
CH Mid



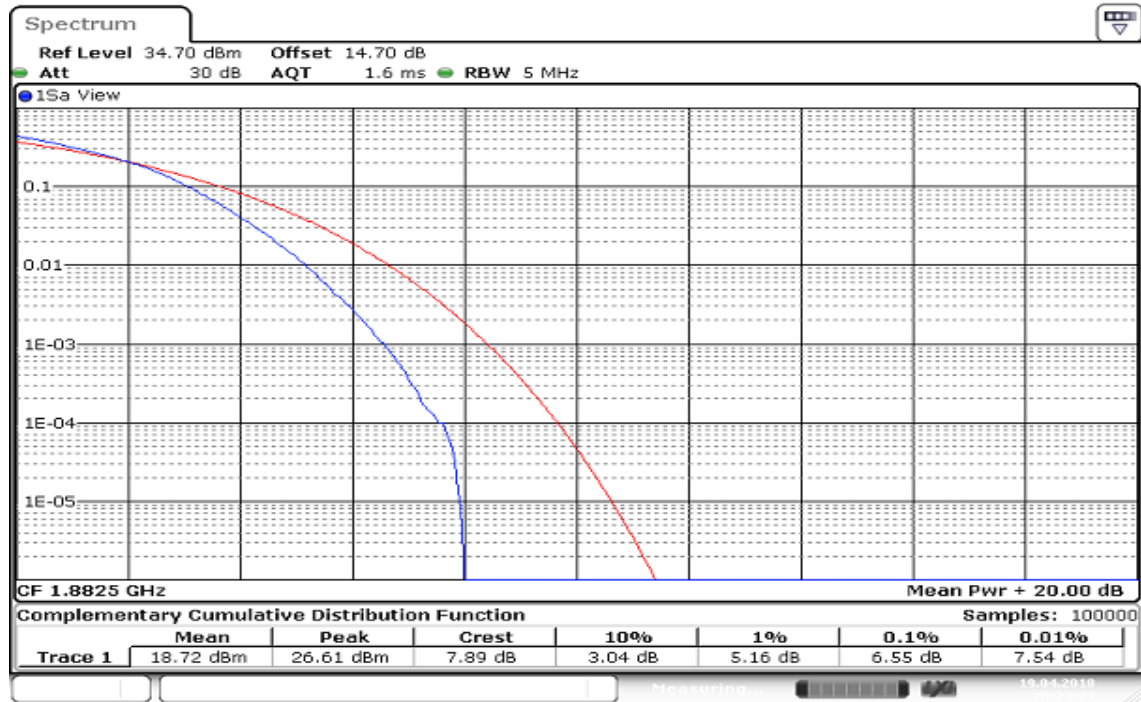
Date: 19 APR 2018 20:22:56

Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 5MHz / QPSK
CH Mid

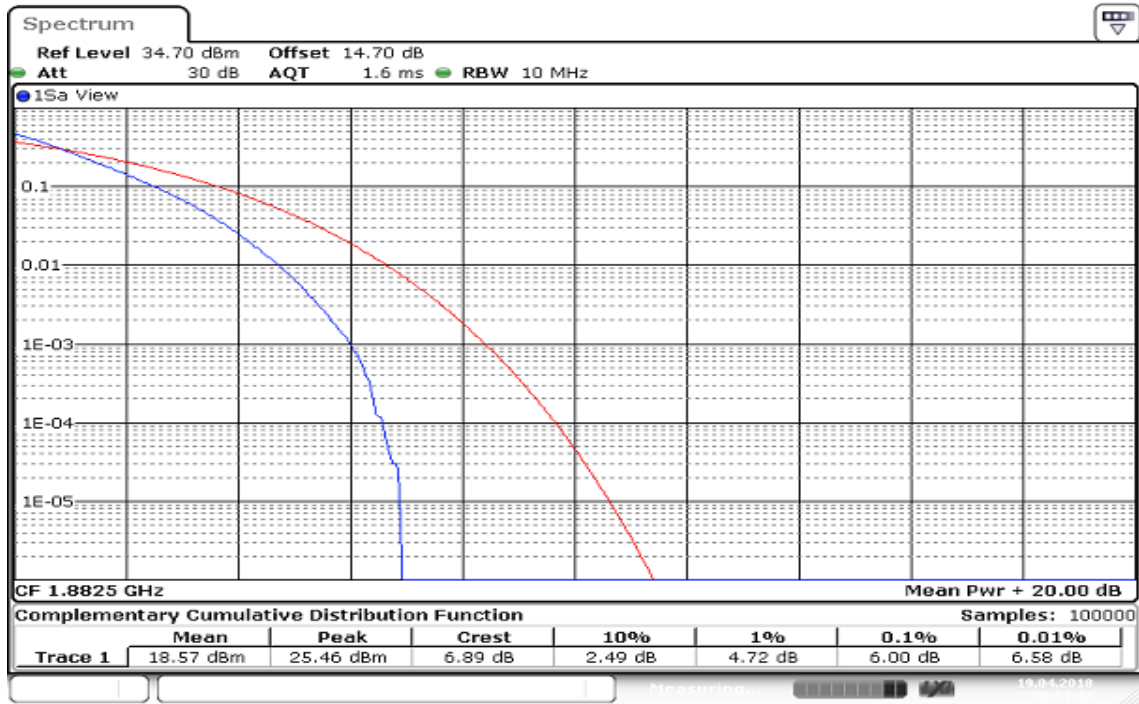


CHANNEL BANDWIDTH: 5MHz / 16QAM
CH Mid



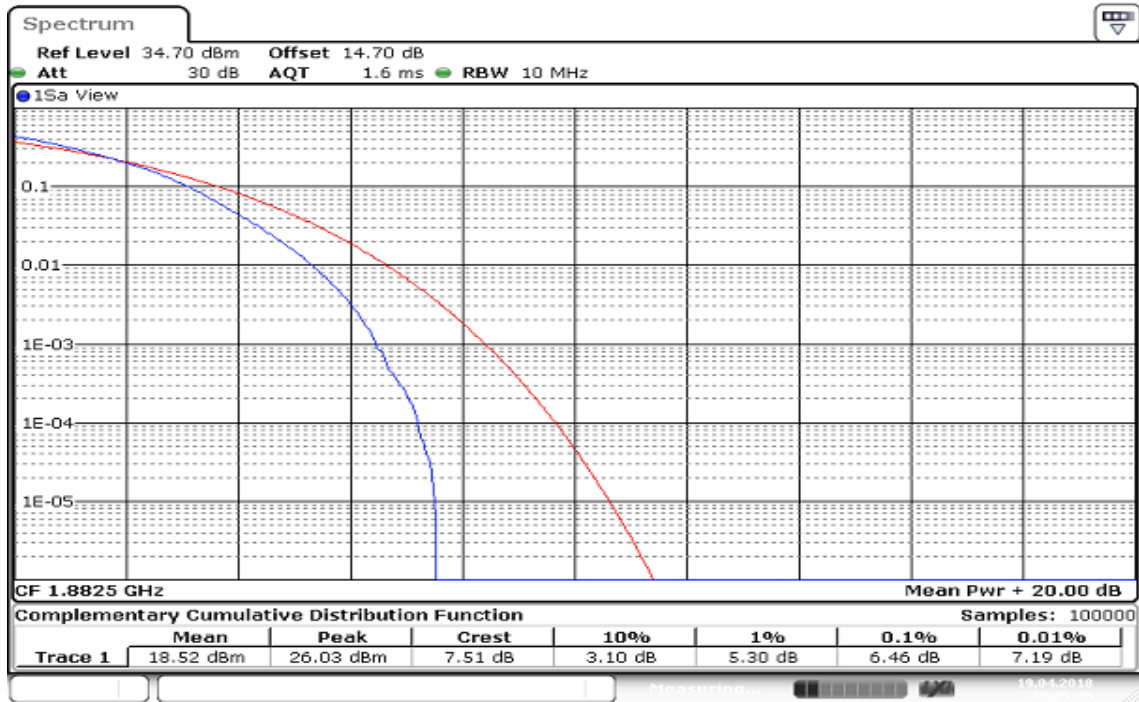
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 10MHz / QPSK
CH Mid



Date: 19 APR 2018 20:24:45

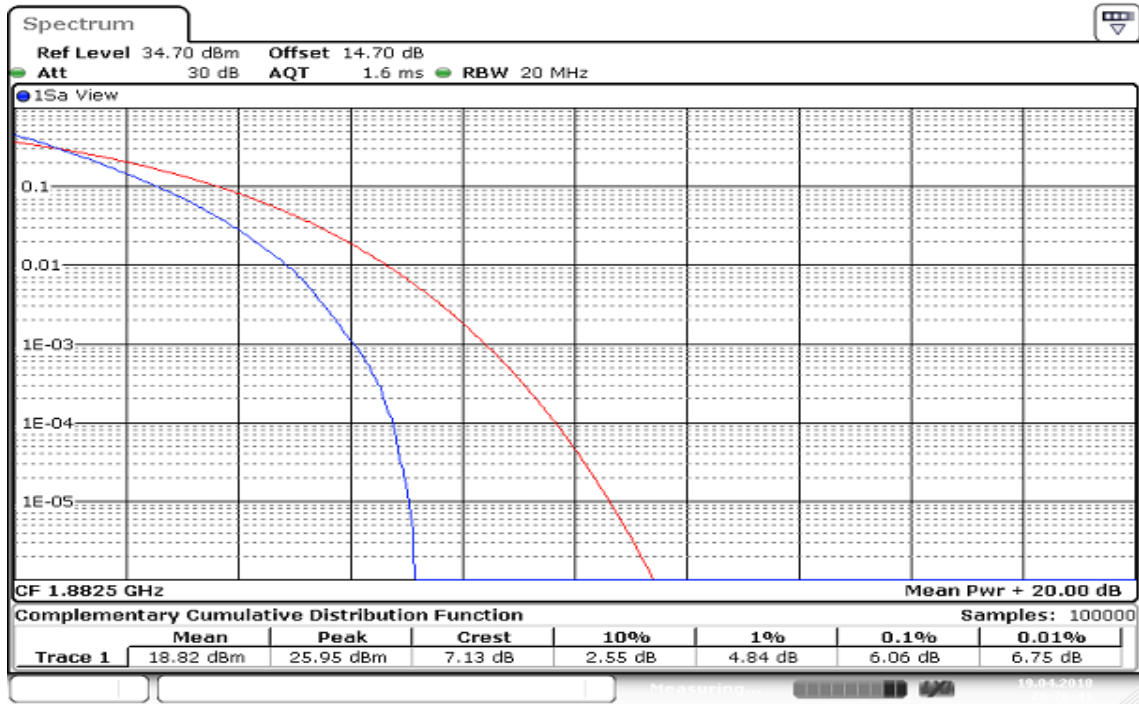
CHANNEL BANDWIDTH: 10MHz / 16QAM
CH Mid



Date: 19 APR 2018 20:25:31

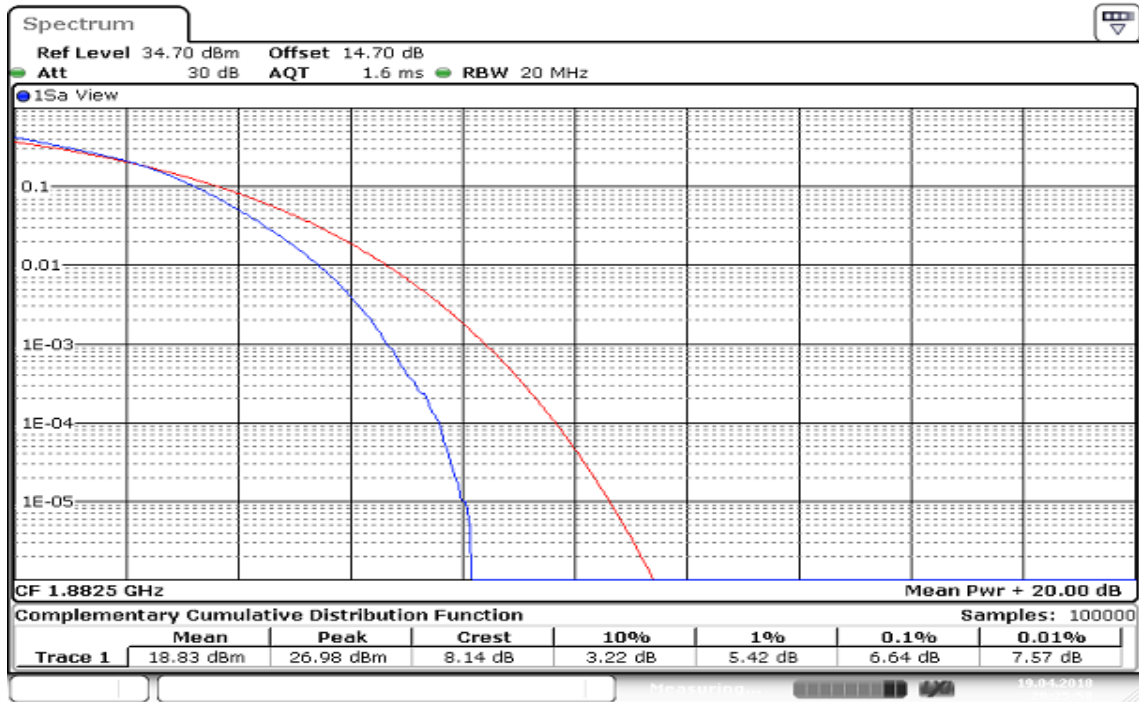
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 15MHz / QPSK CH Mid



Date: 19 APR 2018 20:26:41

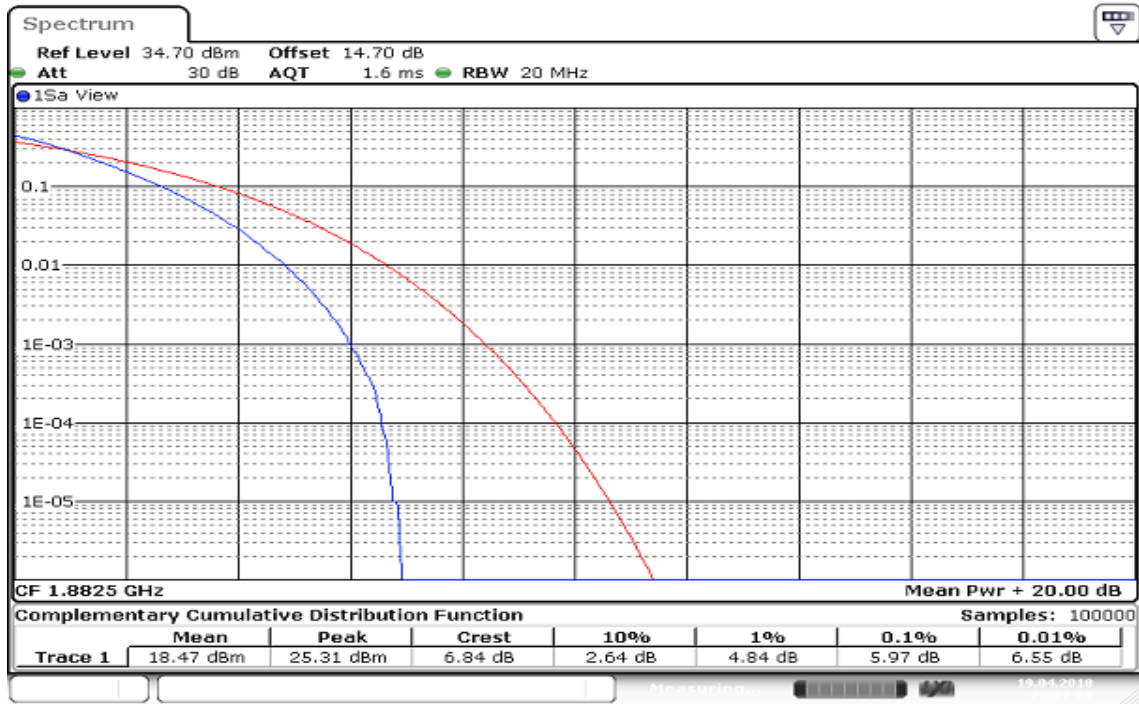
CHANNEL BANDWIDTH: 15MHz / 16QAM CH Mid



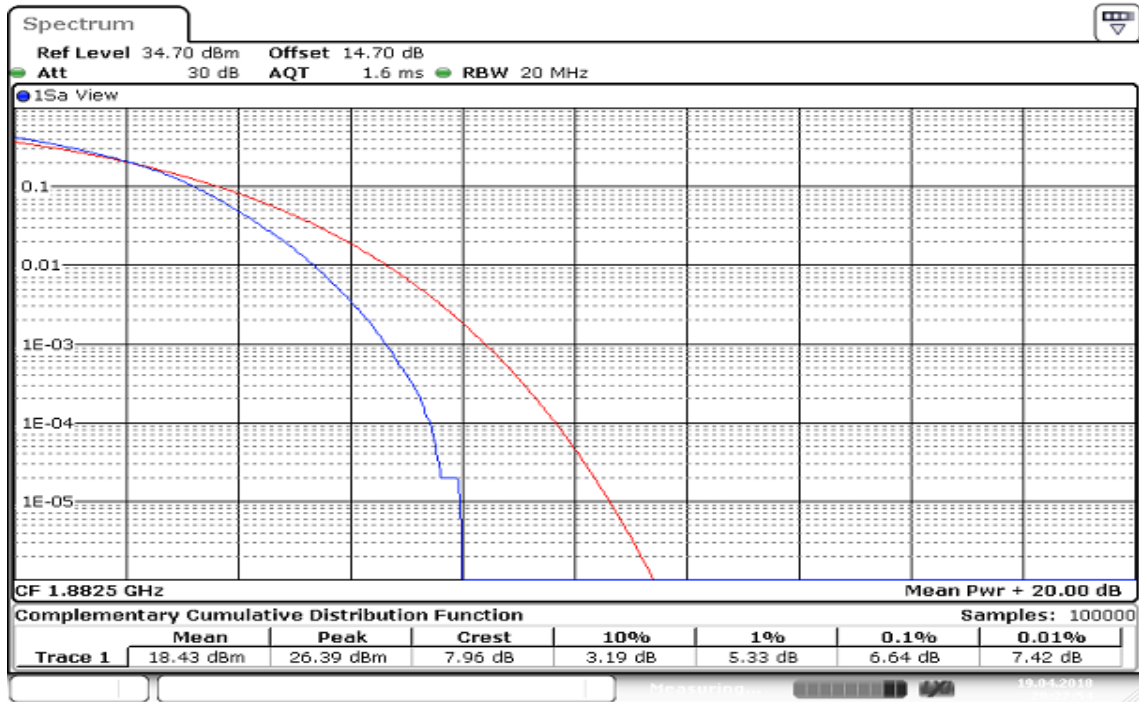
Date: 19 APR 2018 20:25:59

Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 20MHz / QPSK CH Mid



CHANNEL BANDWIDTH: 20MHz / 16QAM CH Mid



8.6 BAND EDGE MEASUREMENT

Limit

For operations in 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. For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any

emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm . In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

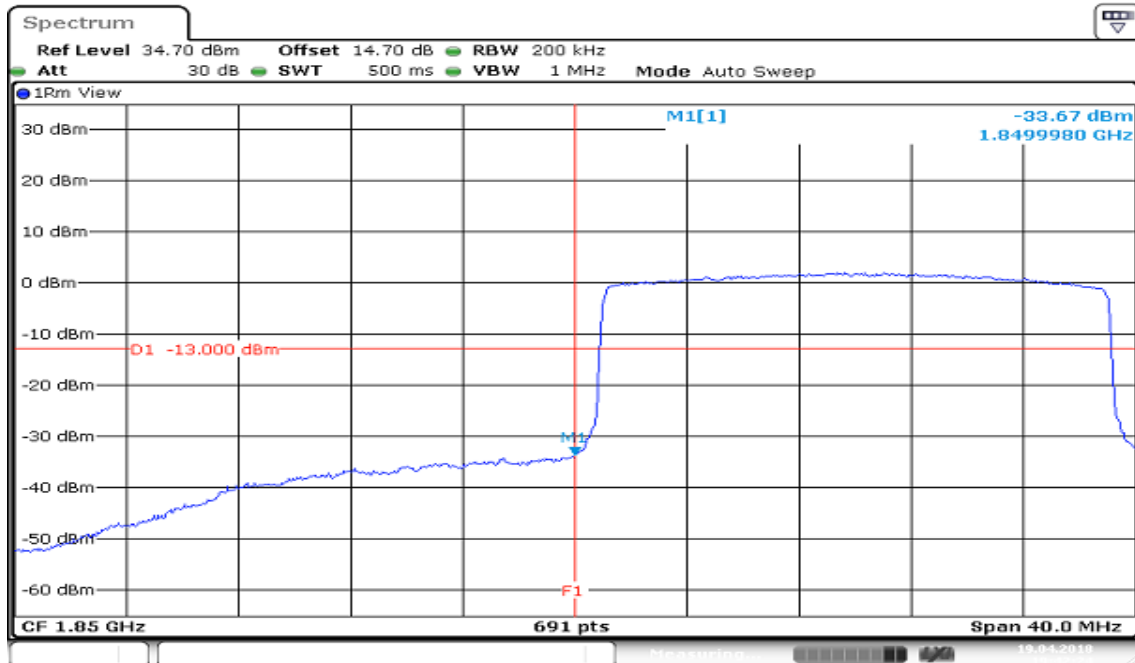
Test Procedures

1. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
2. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter loss and cable loss are the worst loss 7.2 dB in the transmitted path track.
3. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 50kHz and VB of the spectrum is 200kHz.
4. Record the max trace plot into the test report.

Test Results:

LTE Band 25

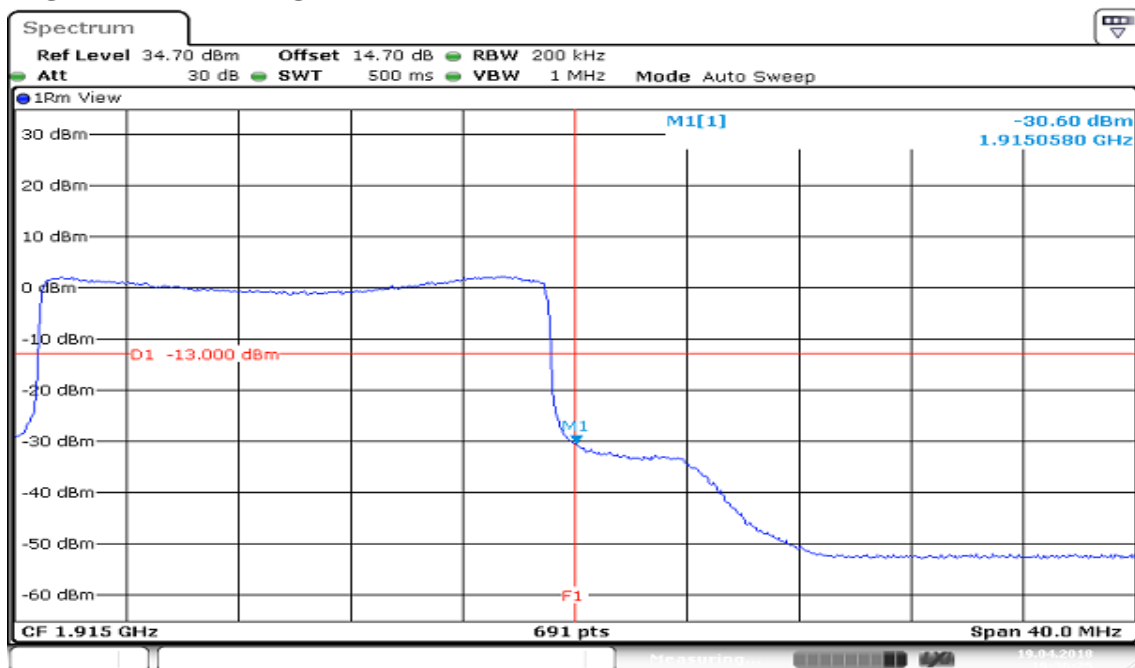
CHANNEL BANDWIDTH: 20MHz / QPSK / FULL RB ALLOCATED
LOWER BAND EDGE



Date: 19 APR 2018 19:42:25

Note: We selected worst case to performed test, The results can be meet other mode.

HIGHER BAND EDGE

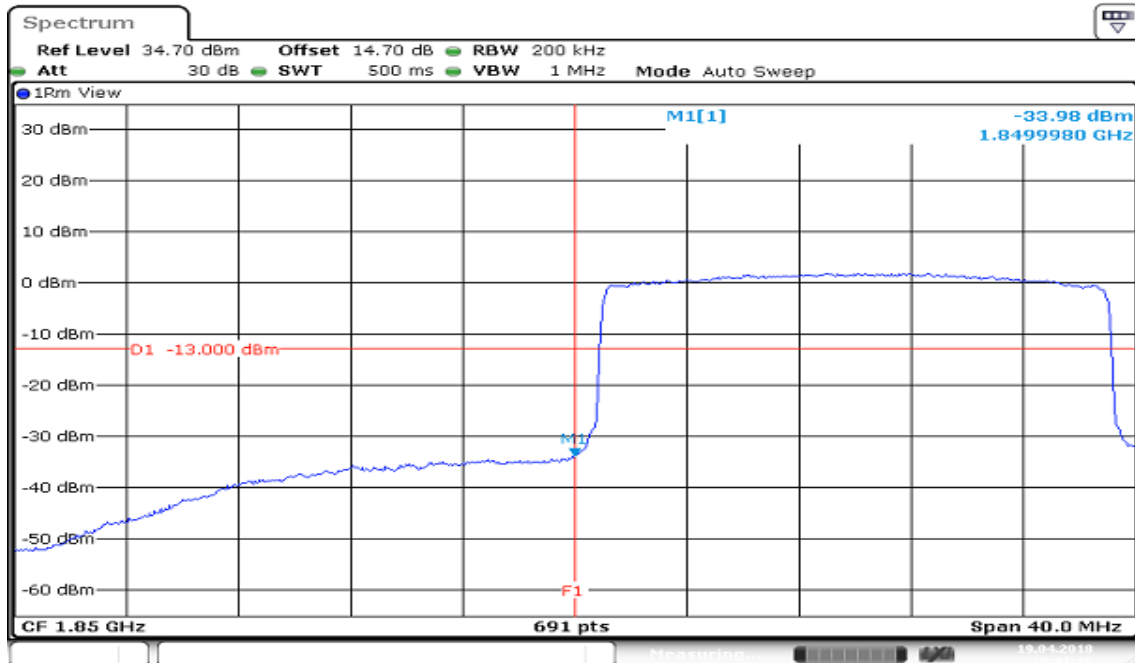


Date: 19 APR 2018 19:46:26

Note: We selected worst case to performed test, The results can be meet other mode.

LTE Band 25

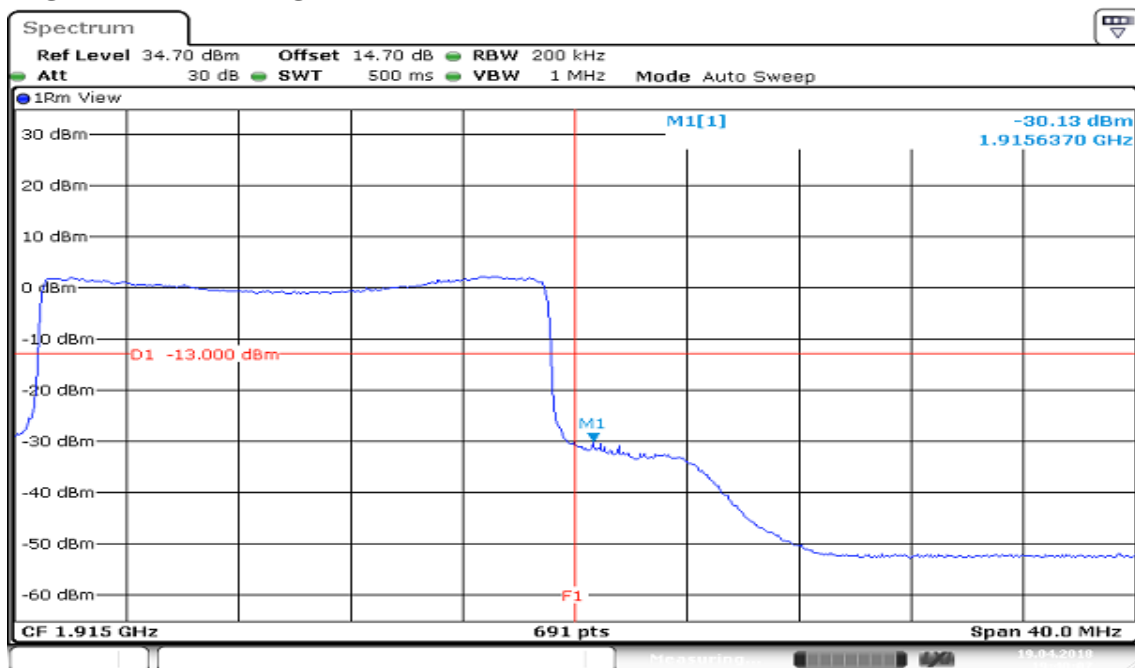
CHANNEL BANDWIDTH: 20MHz / 16QAM / FULL RB ALLOCATED LOWER BAND EDGE



Date: 19 APR 2018 19:41:19

Note: We selected worst case to performed test, The results can be meet other mode.

HIGHER BAND EDGE



Date: 19 APR 2018 19:40:08

Note: We selected worst case to performed test, The results can be meet other mode.

8.7 CONDUCTED SPURIOUS EMISSIONS

Limits

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm

Test Procedures

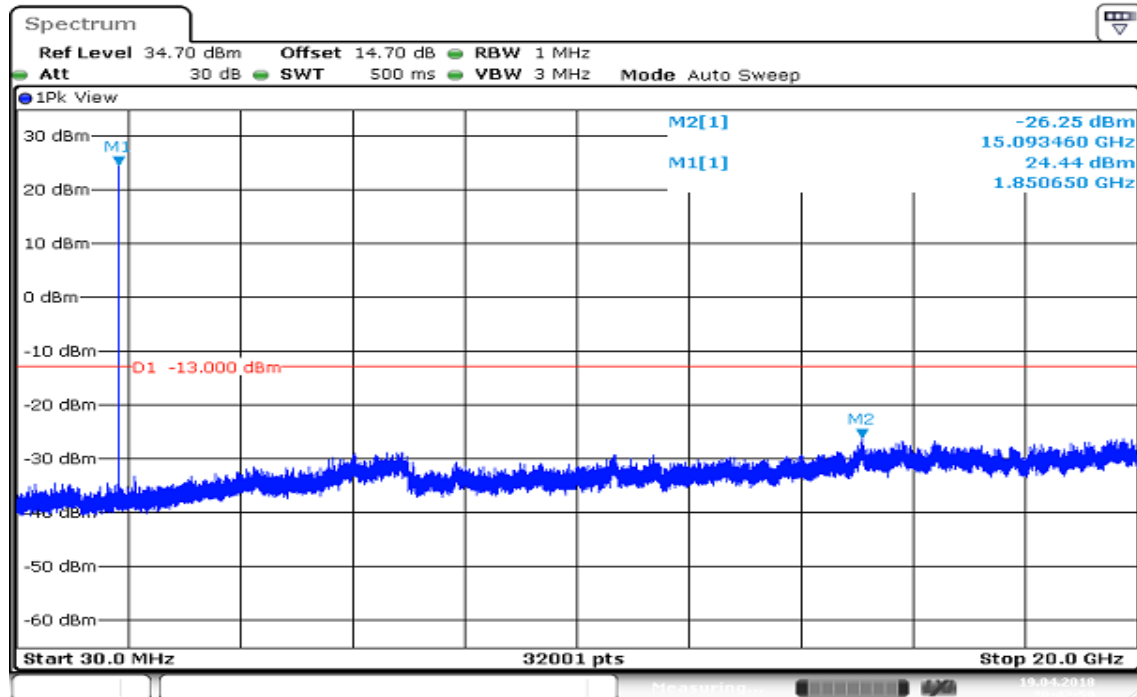
1. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range.).
2. The conducted spurious emission used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
3. When the spectrum scanned from 30MHz to 3GHz, it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set $\text{RB}=1\text{MHz}$, $\text{VB}=3\text{MHz}$.
4. When the spectrum scanned from 3GHz to 20GHz, it shall be connected to the high pass filter attenuated the carried frequency. The spectrum set $\text{RB}=1\text{MHz}$, $\text{VB}=3\text{MHz}$.

Test Results

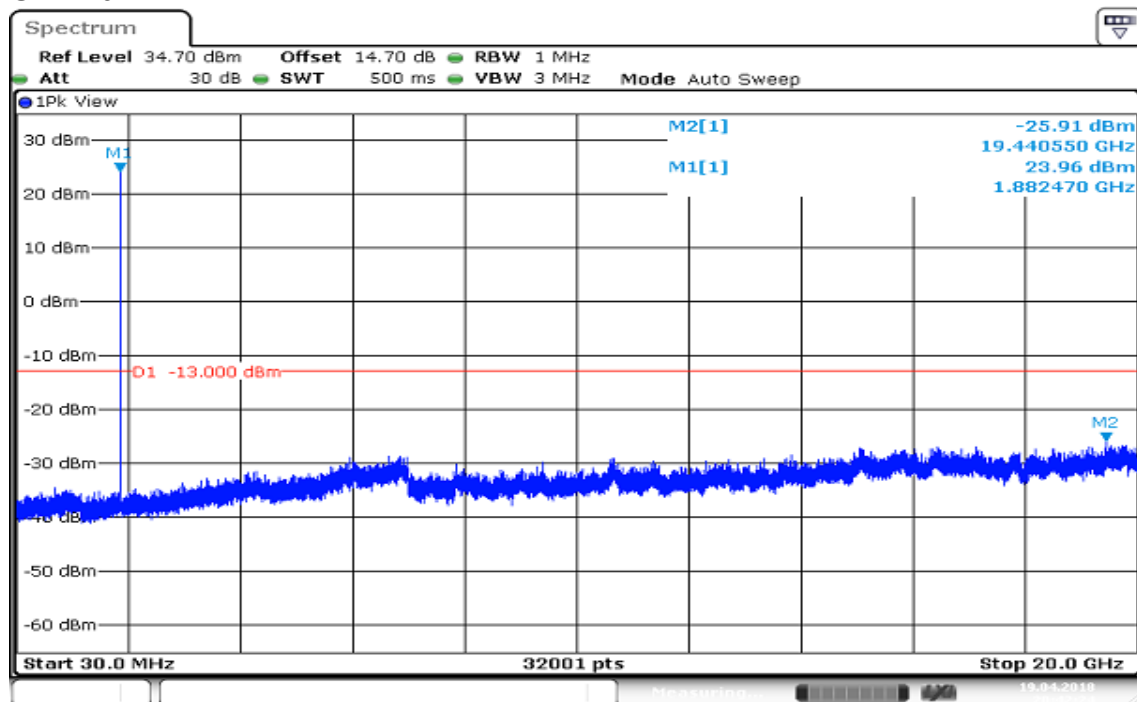
LTE Band 25

CHANNEL BANDWIDTH: 1.4MHz / QPSK

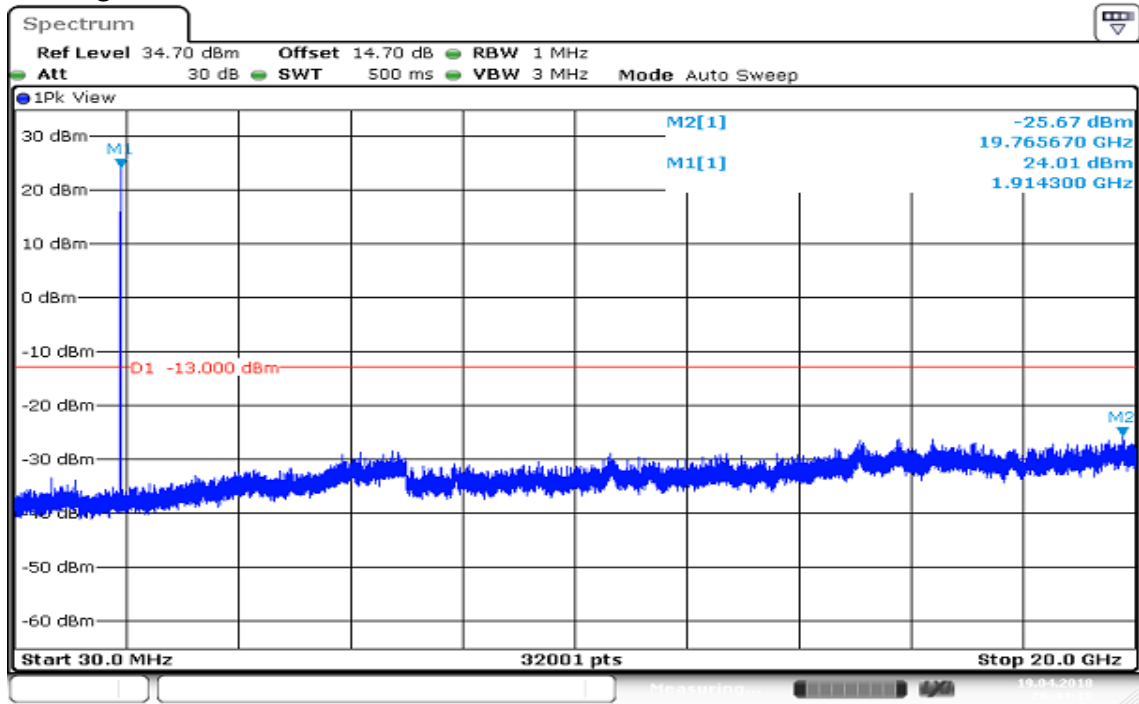
CH Low



CH Mid



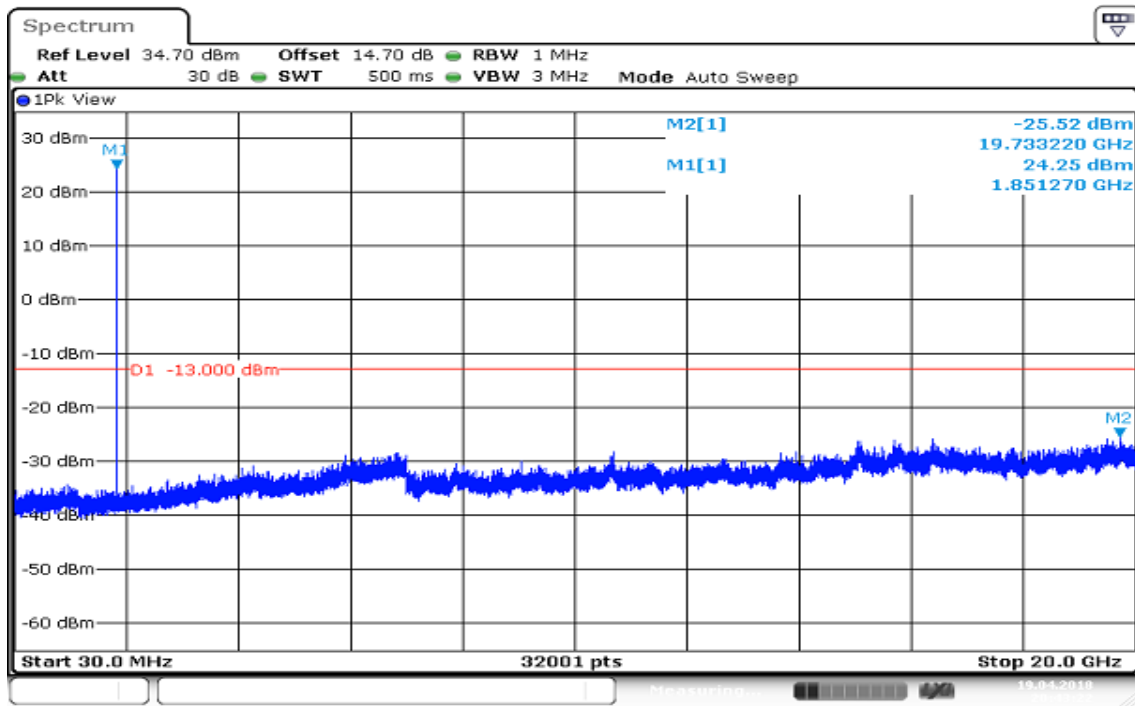
CH High



Date: 19 APR 2018 20:44:18

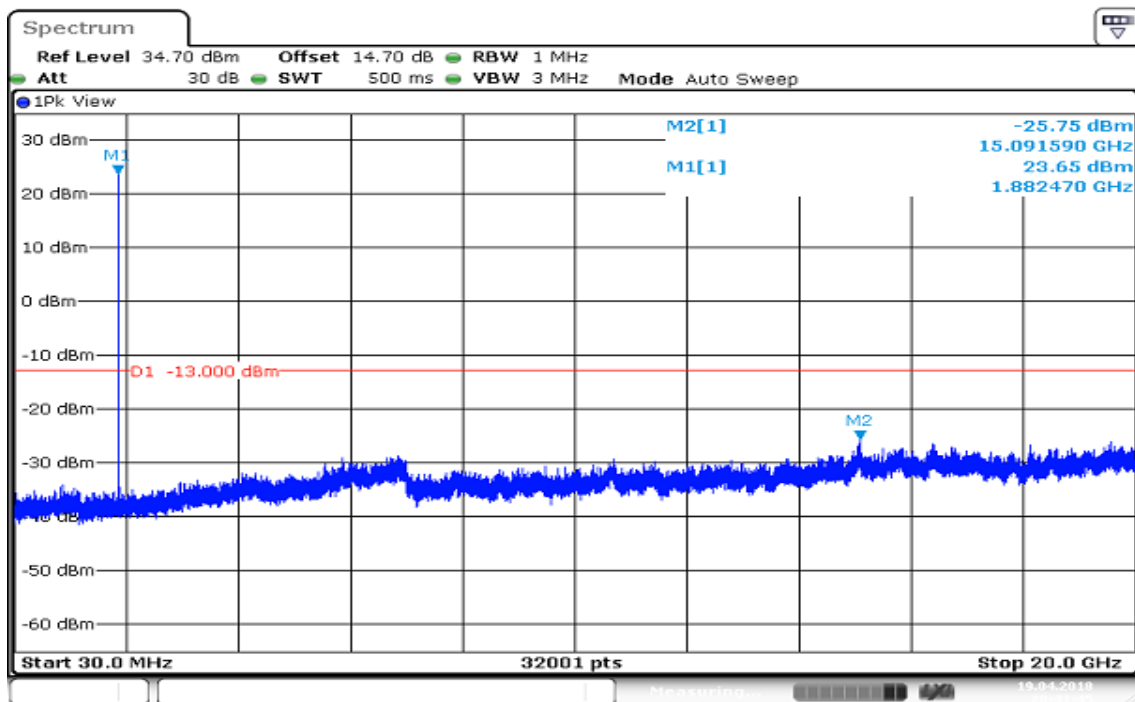
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 1.4MHz / 16QAM CH Low



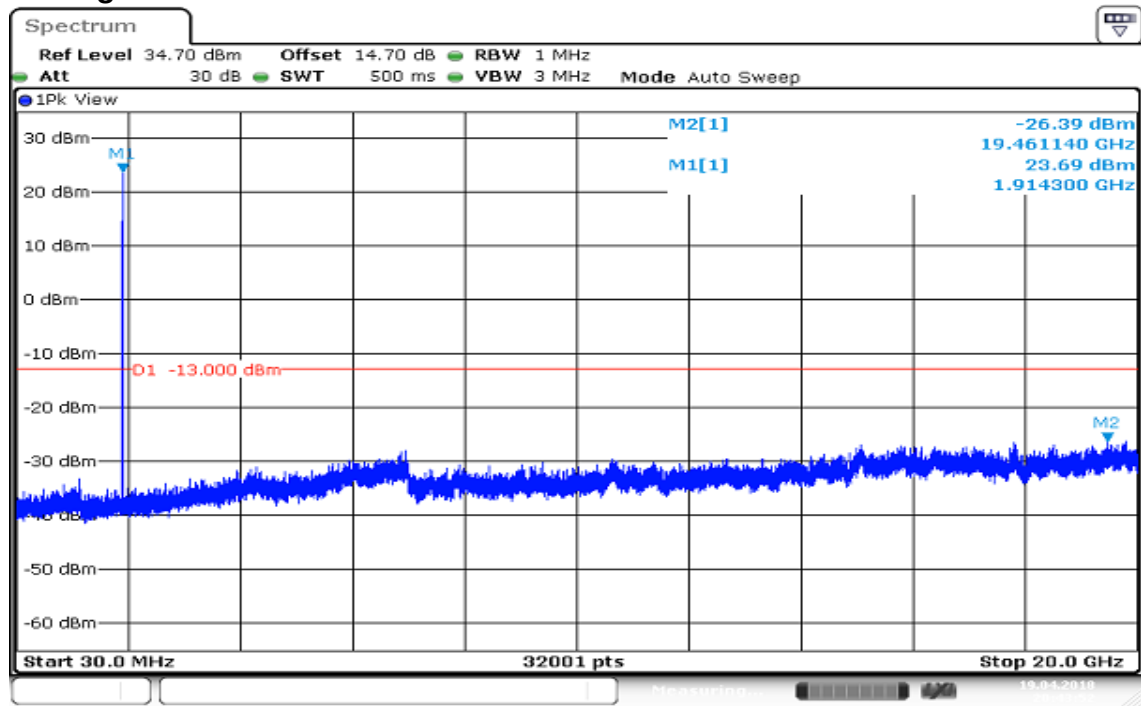
Date: 19 APR 2018 20:43:22

CH Mid



Date: 19 APR 2018 20:41:45

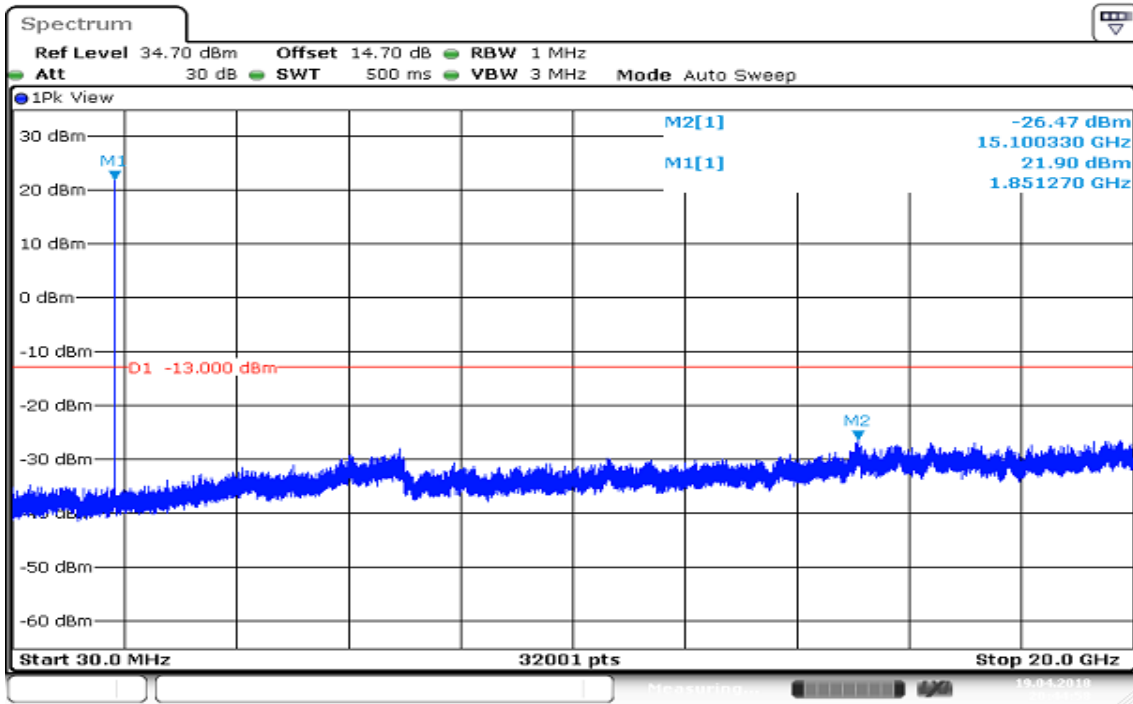
CH High



Date: 19 APR 2018 20:43:53

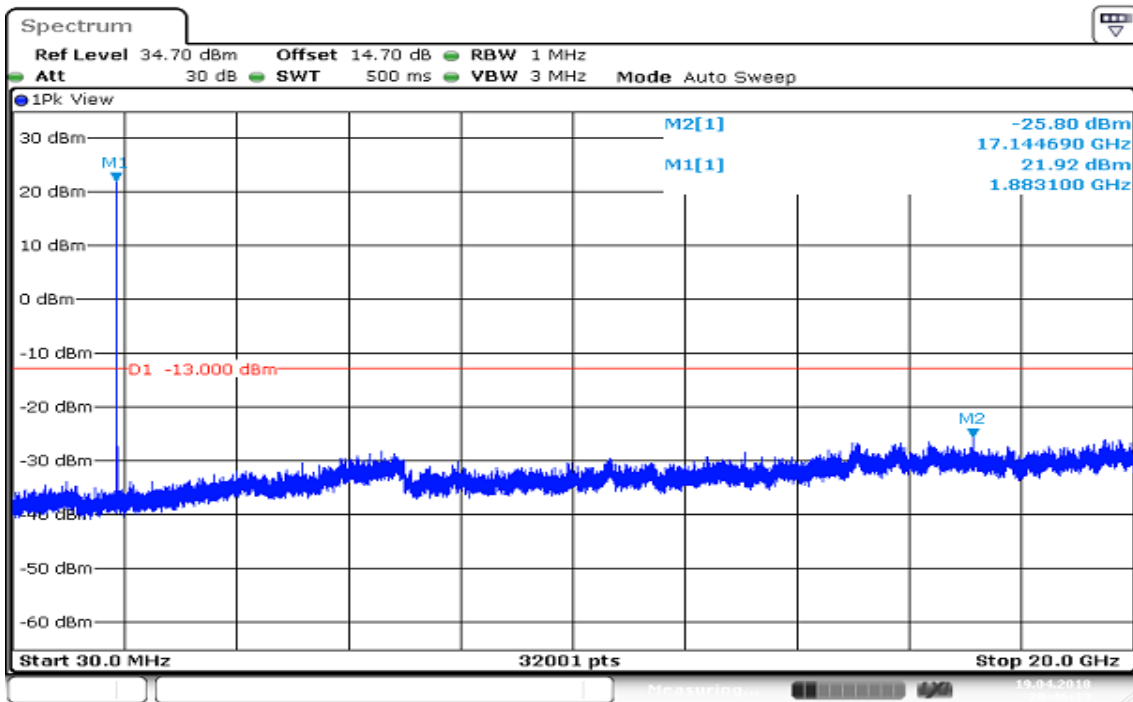
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 3MHz / QPSK CH Low



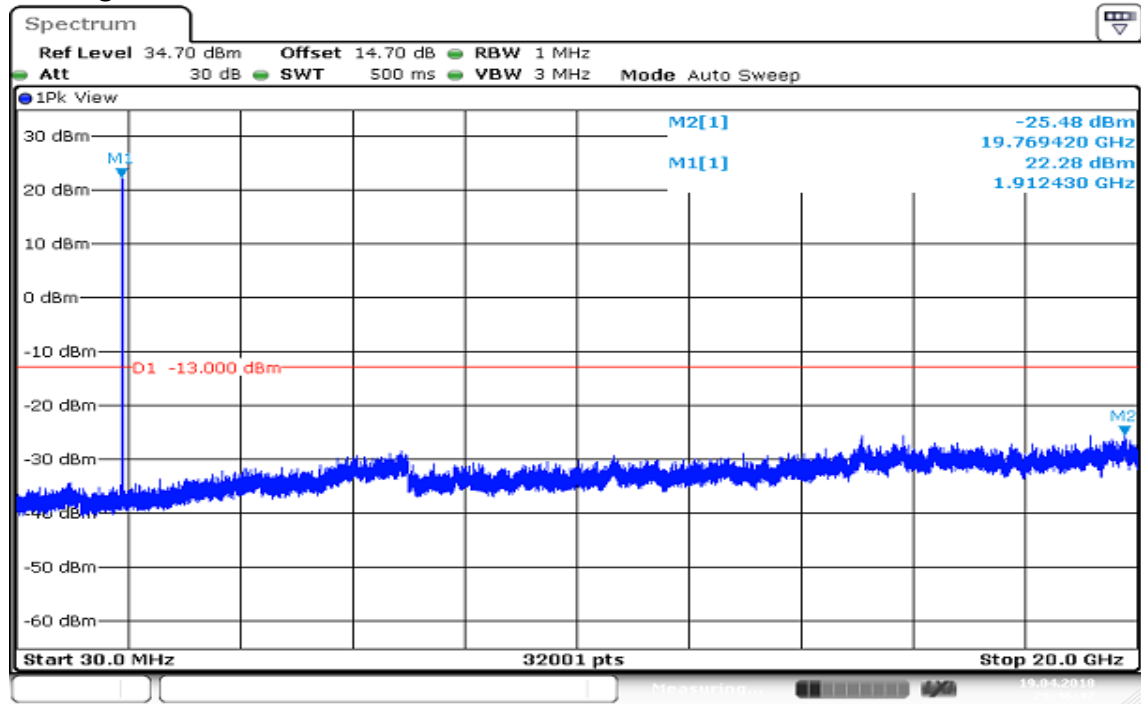
Date: 19 APR 2018 20:44:59

CH Mid



Date: 19 APR 2018 20:46:14

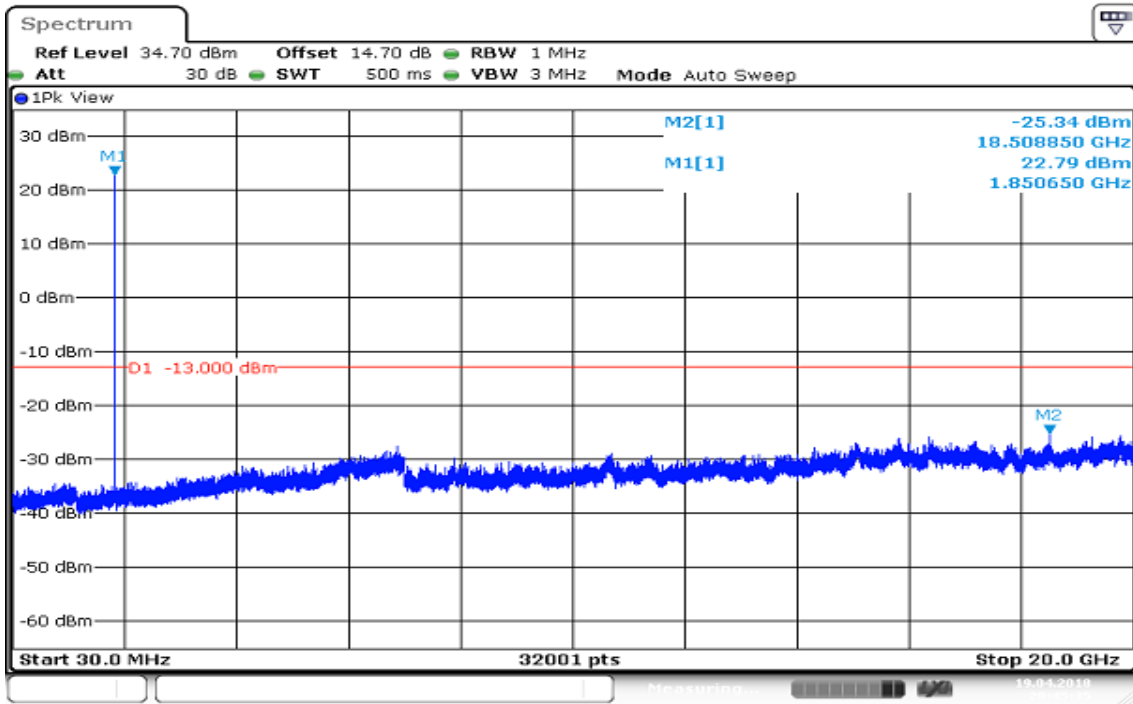
CH High



Date: 19 APR 2018 20:46:47

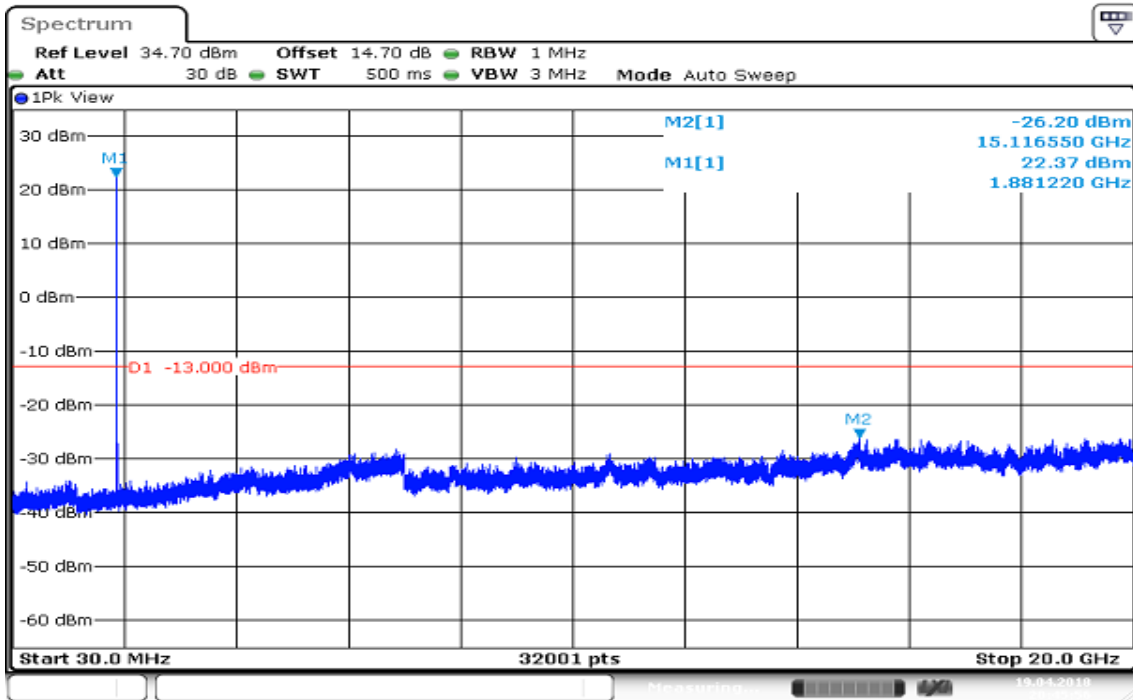
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 3MHz / 16QAM CH Low



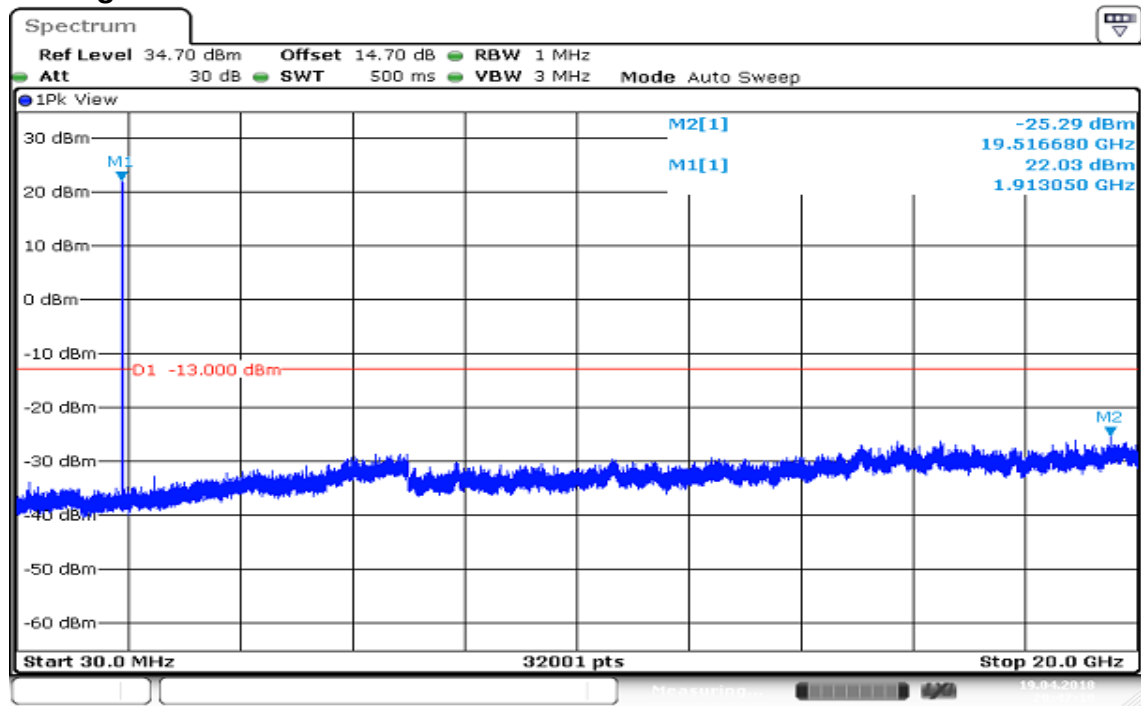
Date: 19 APR 2018 20:45:35

CH Mid



Date: 19 APR 2018 20:45:57

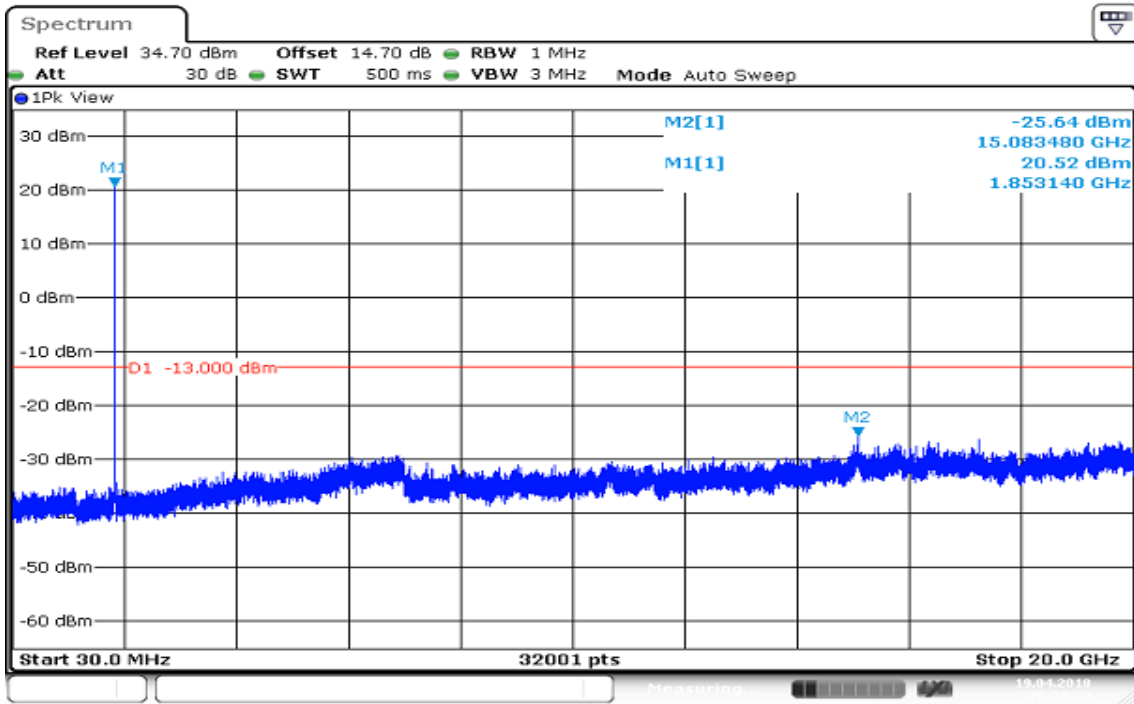
CH High



Date: 19 APR 2018 20:47:18

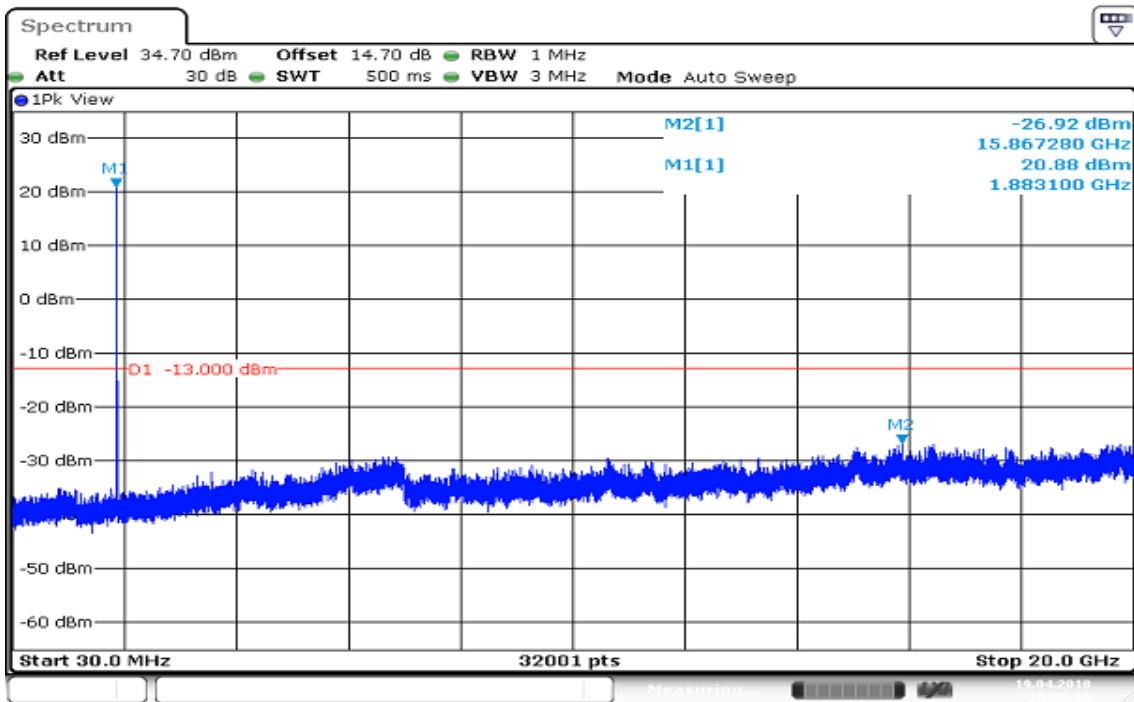
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 5MHz / QPSK CH Low



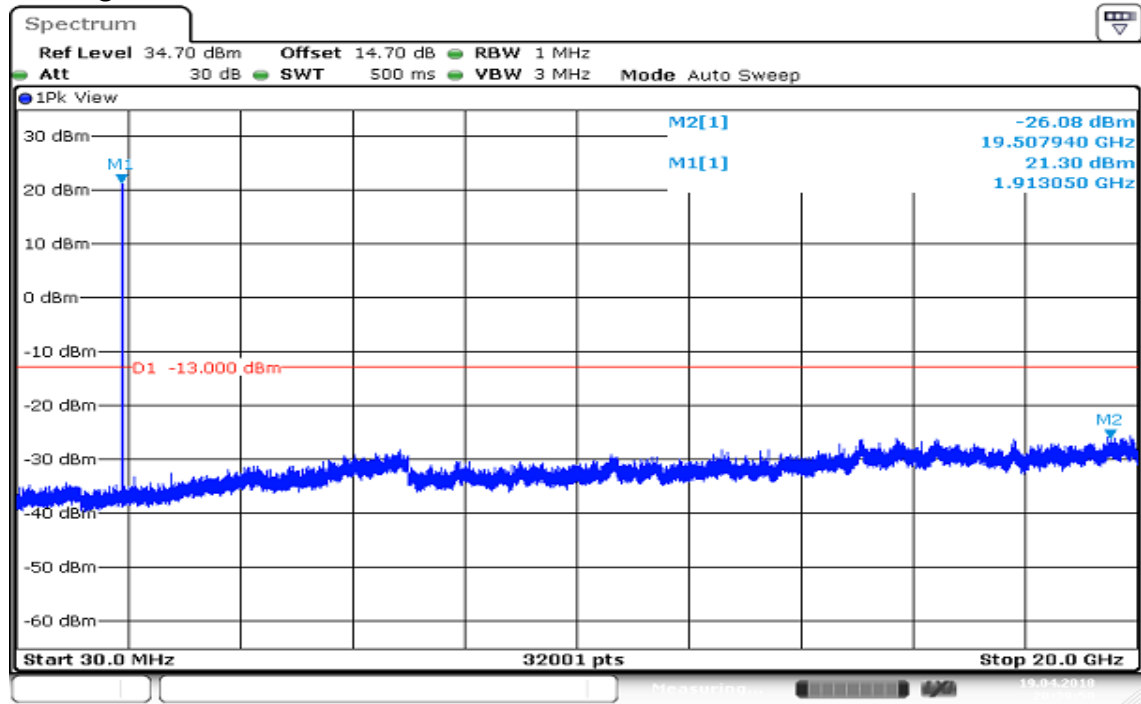
Date: 19 APR 2018 20:28:33

CH Mid



Date: 19 APR 2018 20:28:56

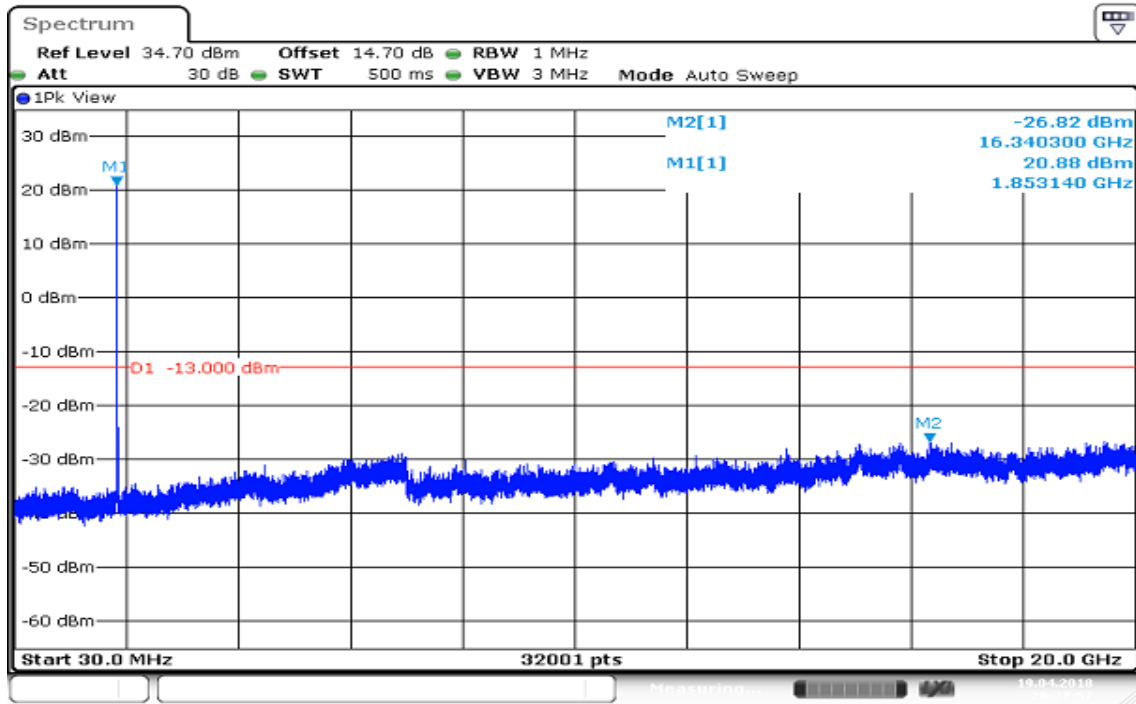
CH High



Date: 19 APR 2018 20:39:50

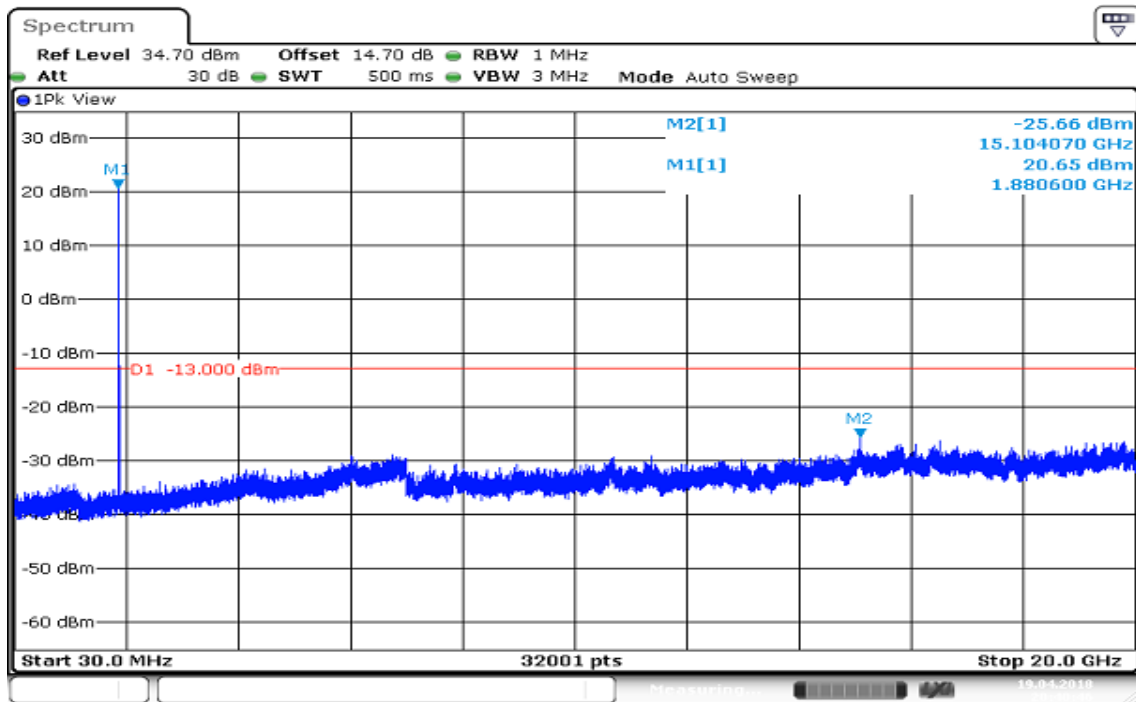
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 5MHz / 16QAM CH Low



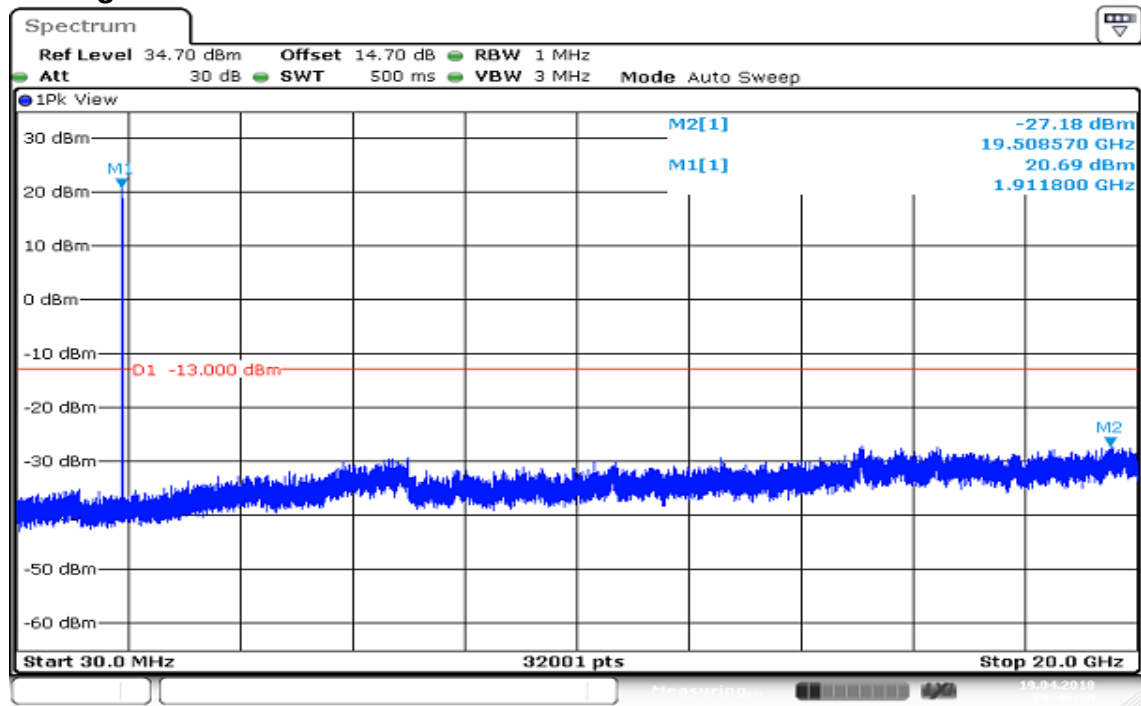
Date: 19 APR 2018 20:37:58

CH Mid



Date: 19 APR 2018 20:40:46

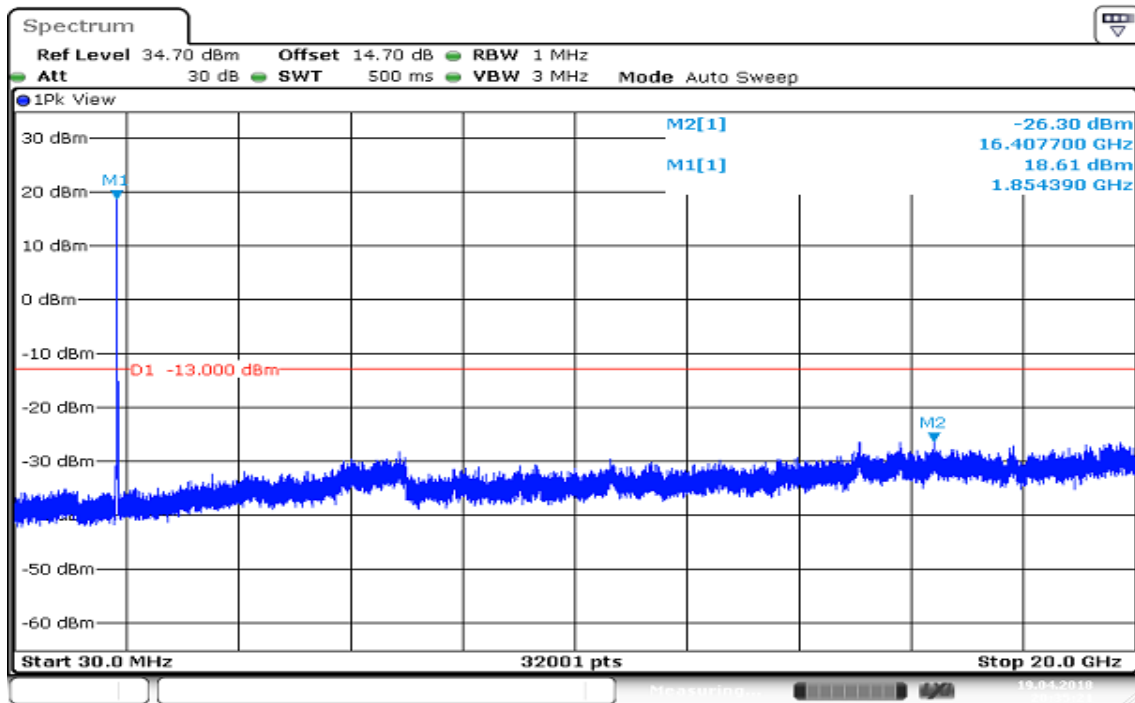
CH High



Date: 19 APR 2018 20:40:20

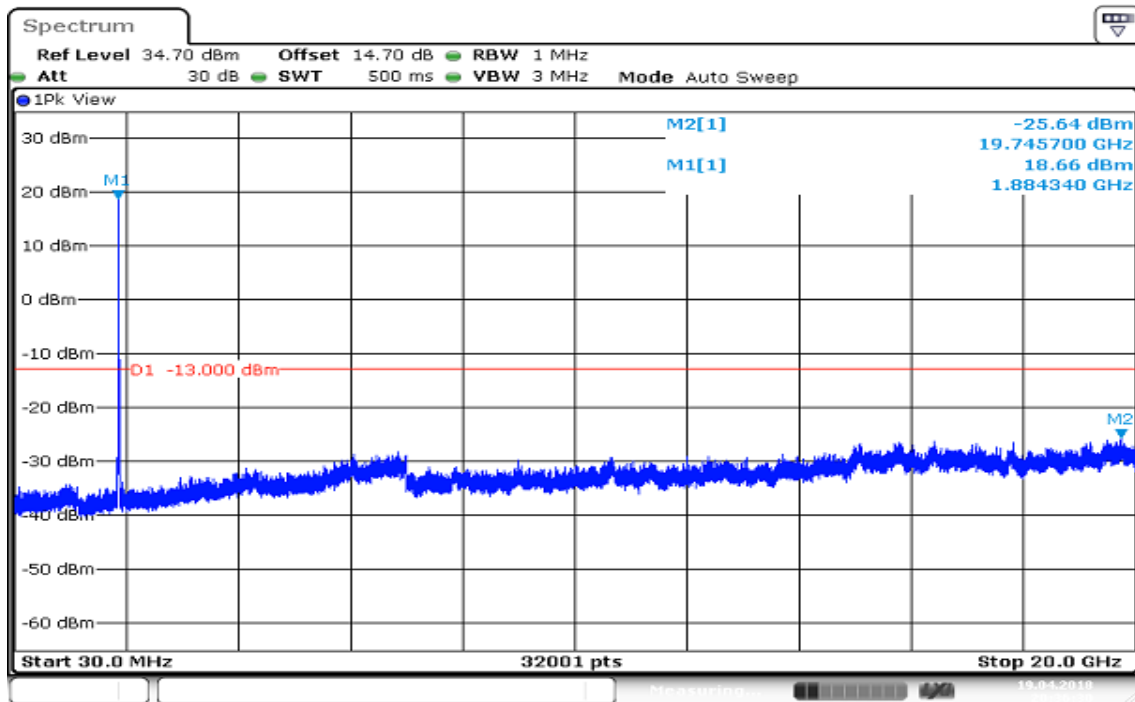
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 10MHz / QPSK CH Low



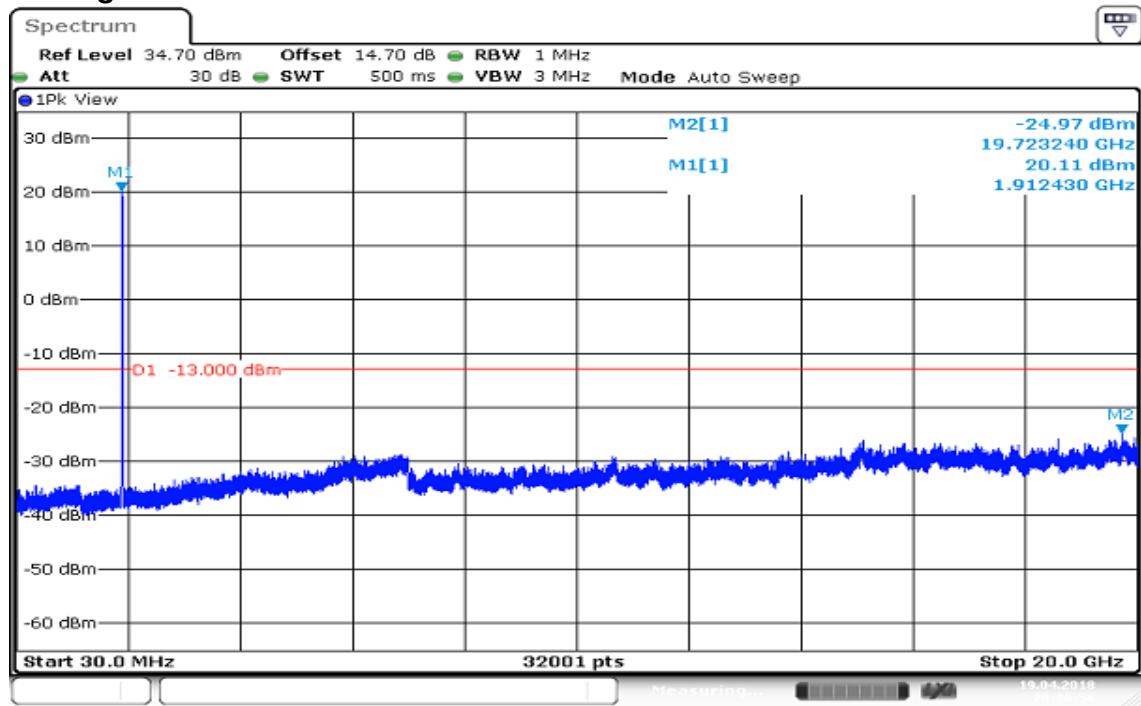
Date: 19 APR 2018 20:25:21

CH Mid



Date: 19 APR 2018 20:26:30

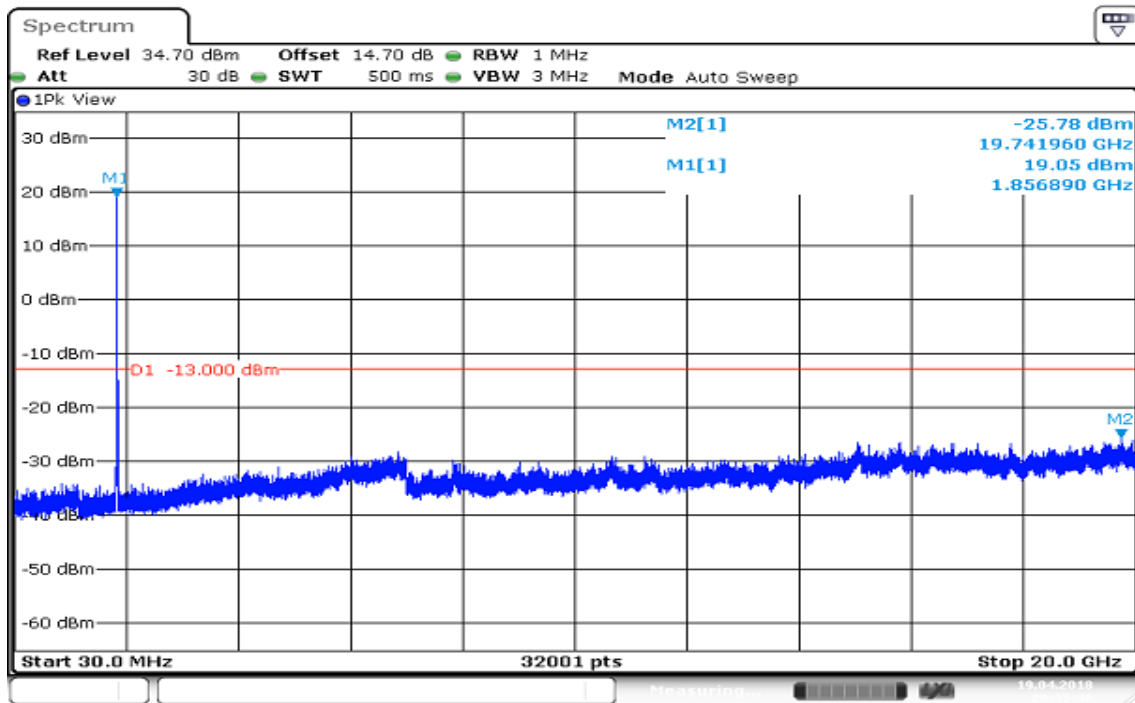
CH High



Date: 19 APR 2018 20:26:56

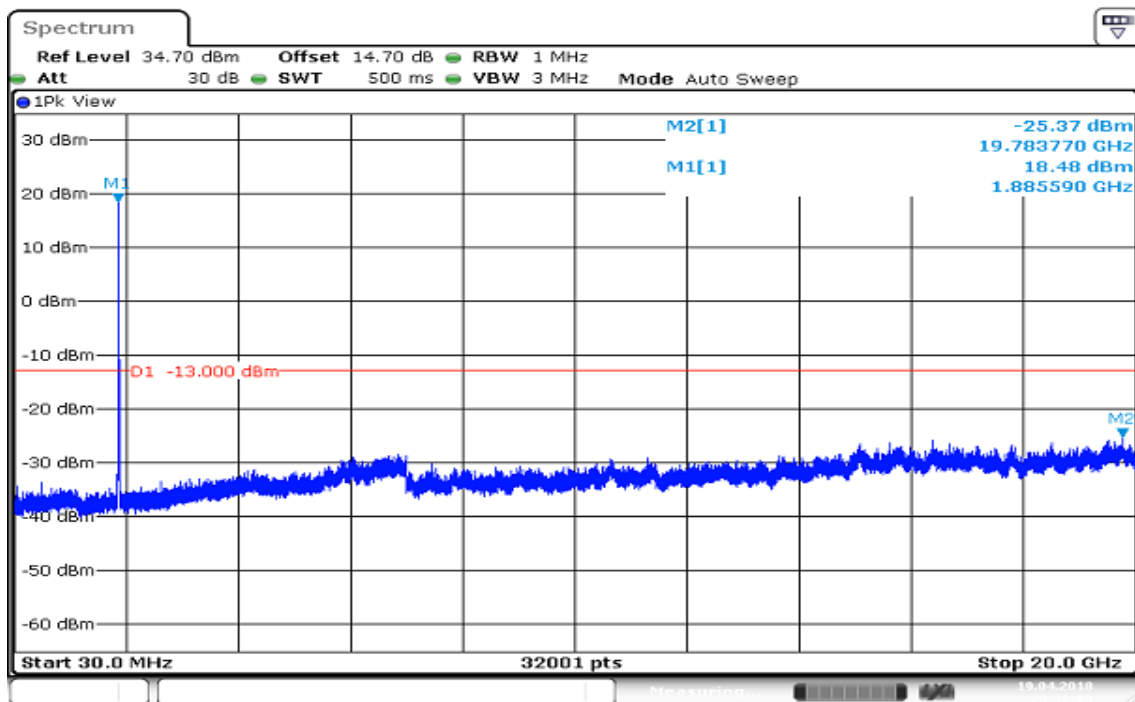
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 10MHz / 16QAM CH Low



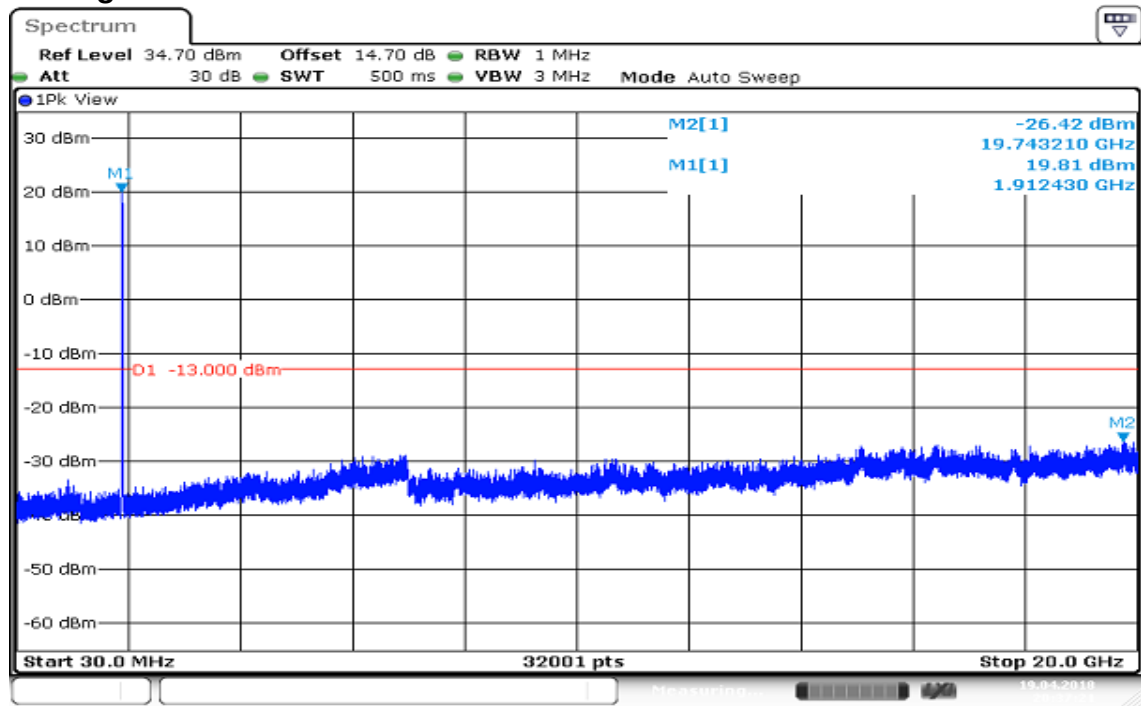
Date: 19 APR 2018 20:25:46

CH Mid



Date: 19 APR 2018 20:26:10

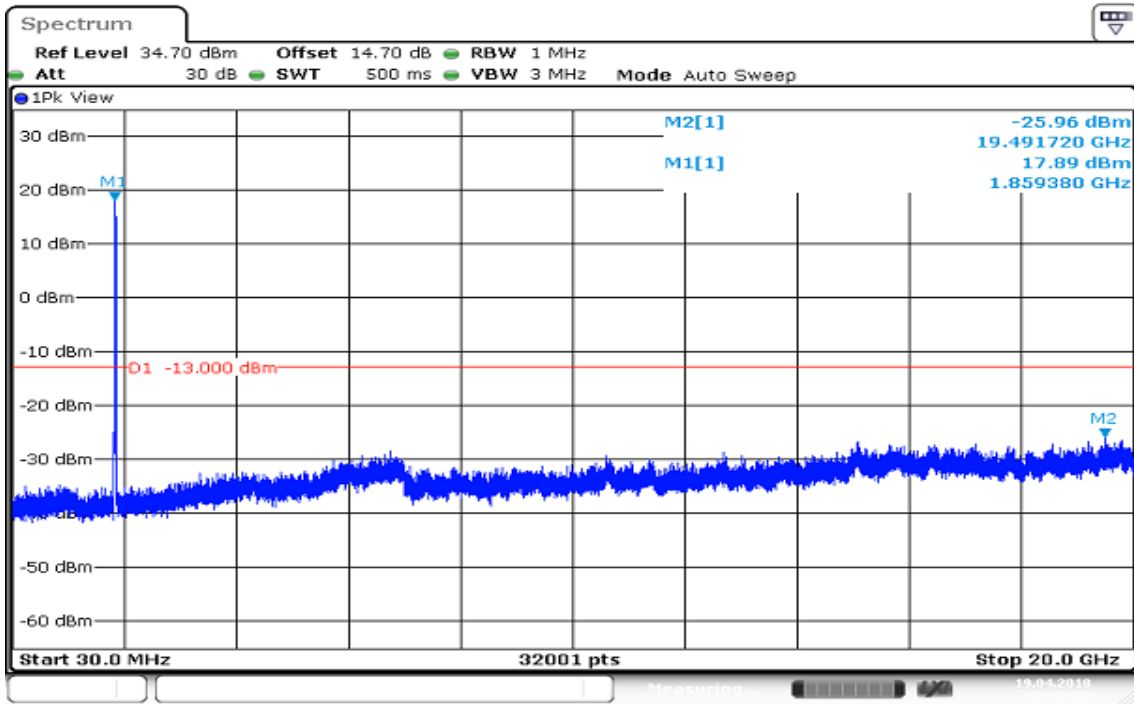
CH High



Date: 19 APR 2016 20:27:21

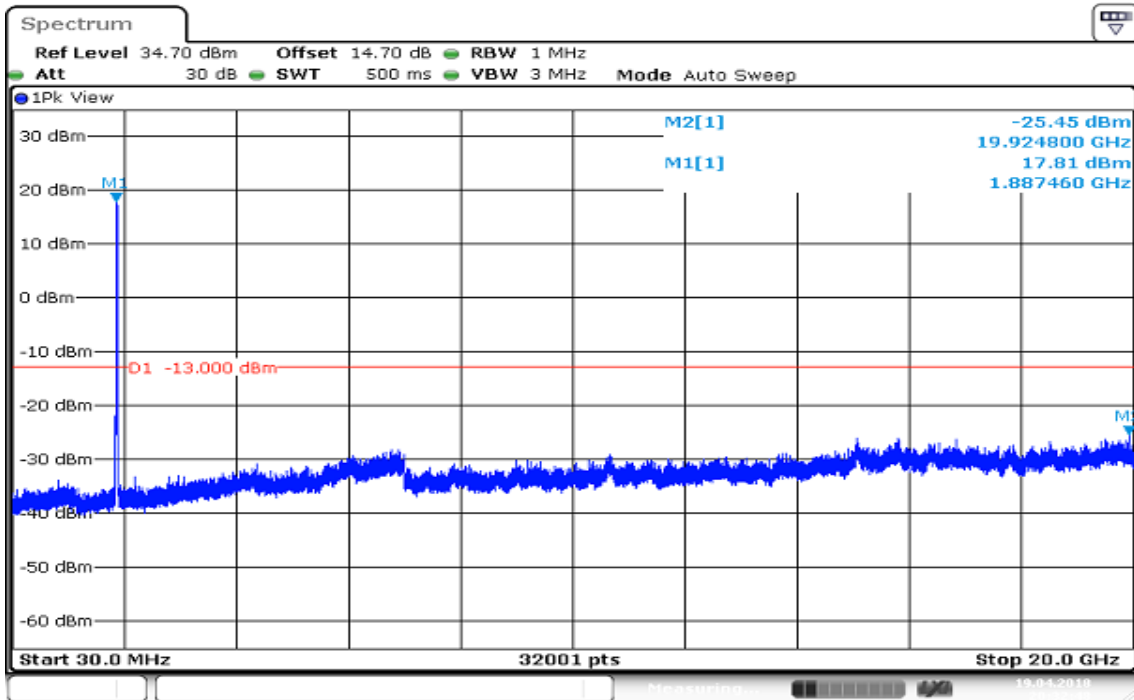
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 15MHz / QPSK CH Low



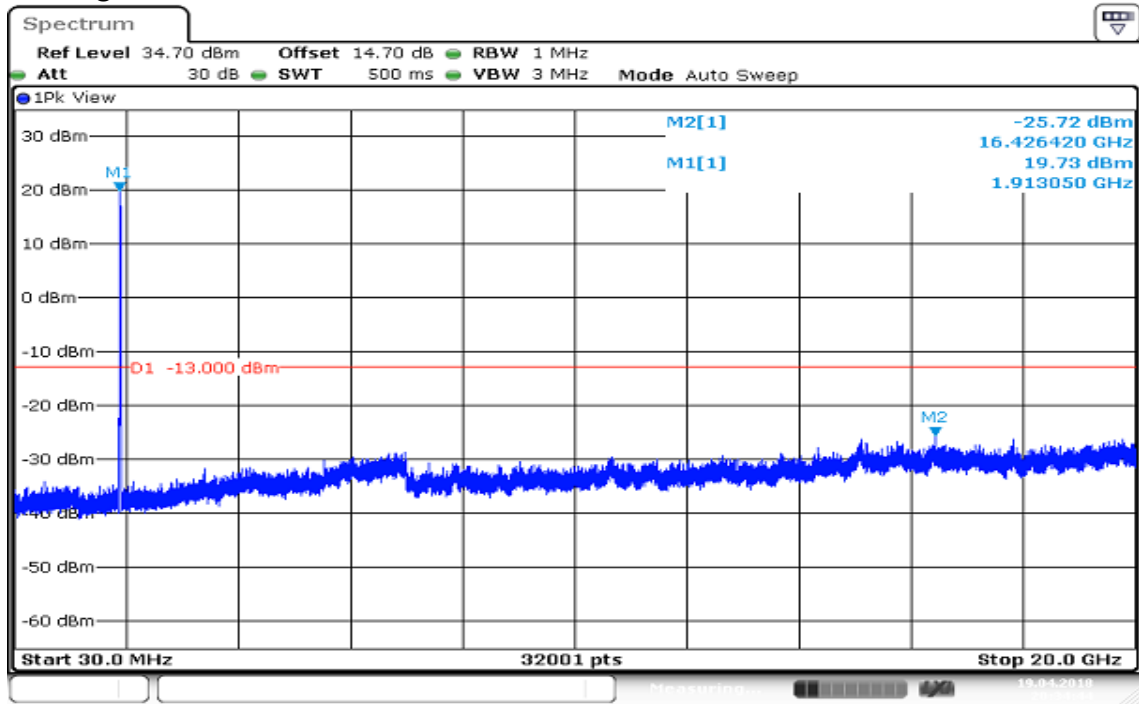
Date: 19 APR 2018 20:22:28

CH Mid



Date: 19 APR 2018 20:22:49

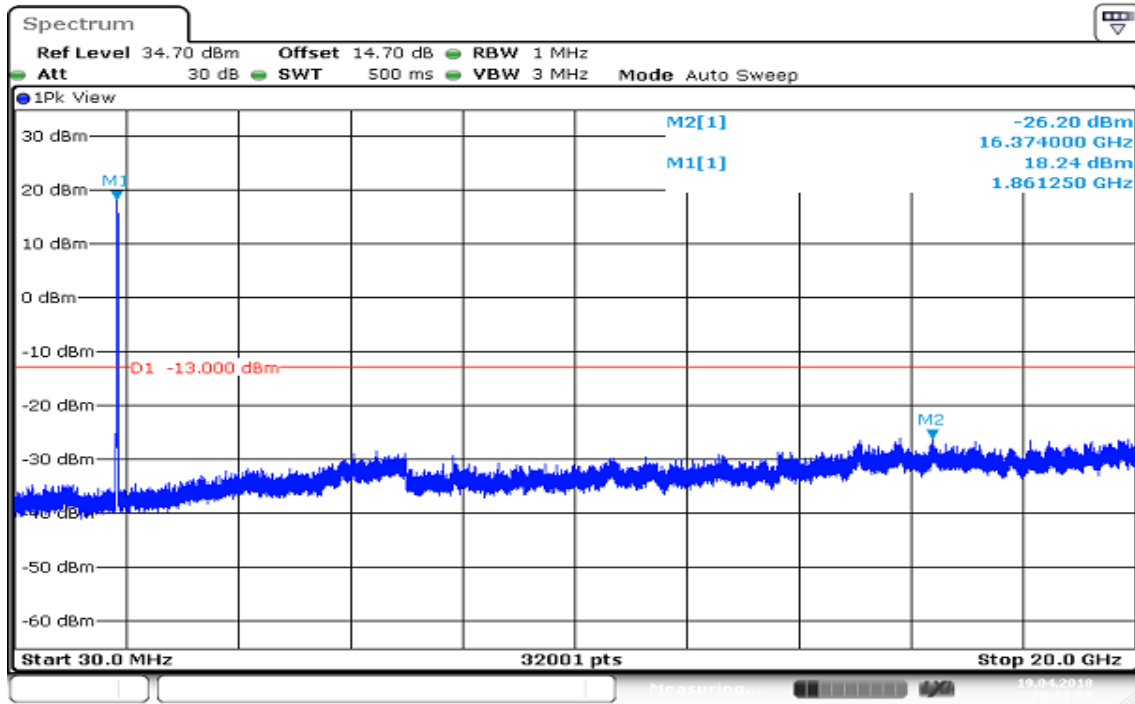
CH High



Date: 19 APR 2018 20:34:44

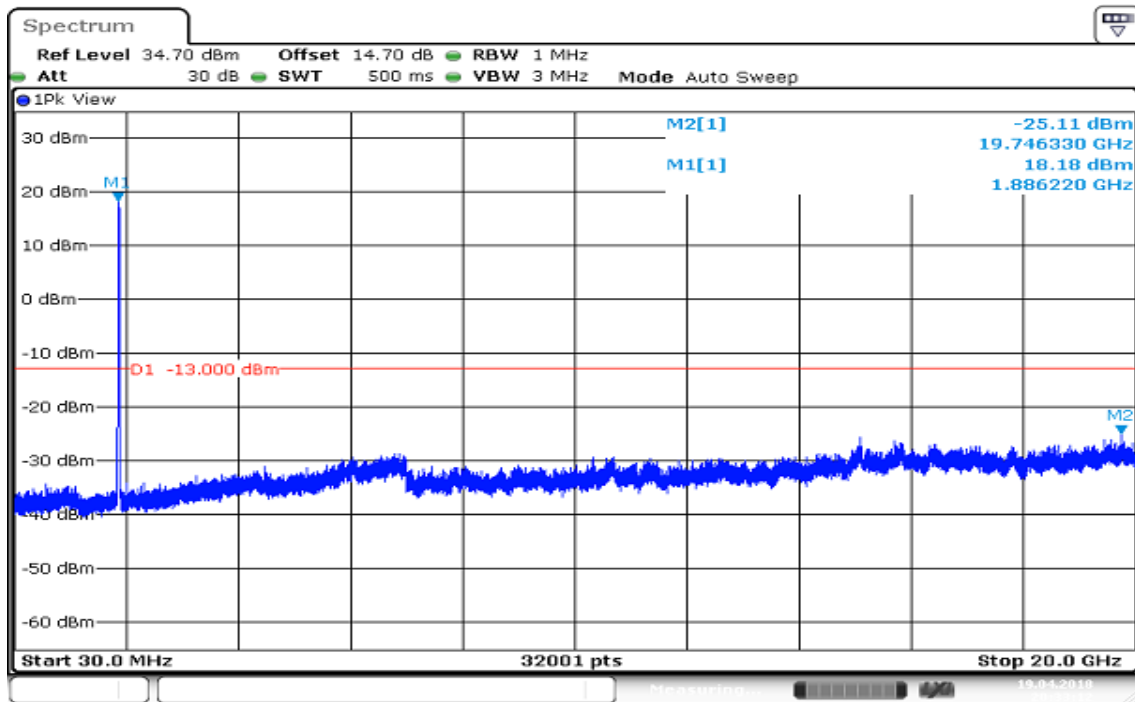
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 15MHz / 16QAM CH Low



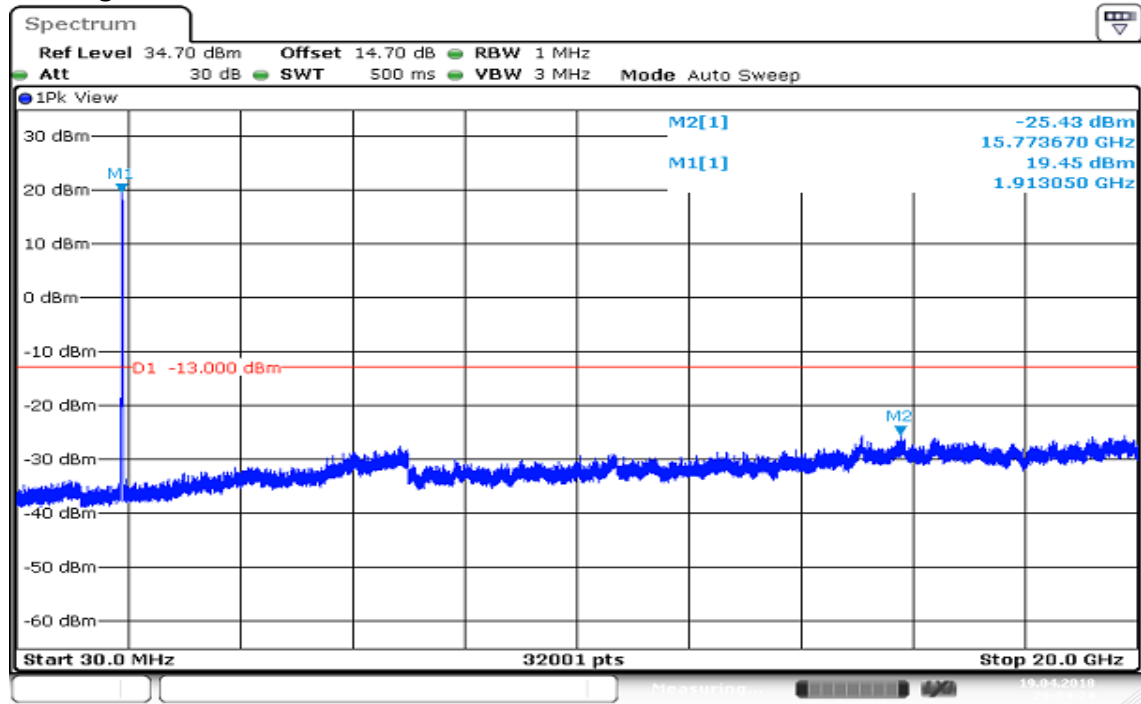
Date: 19 APR 2018 20:21:55

CH Mid



Date: 19 APR 2018 20:23:13

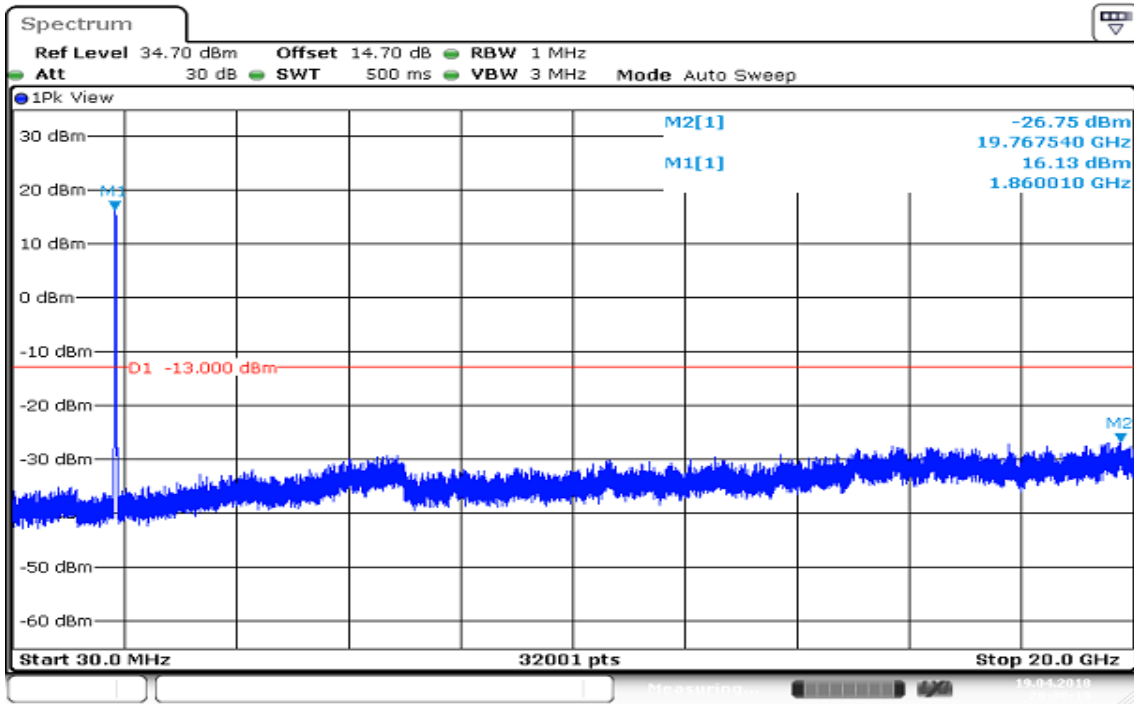
CH High



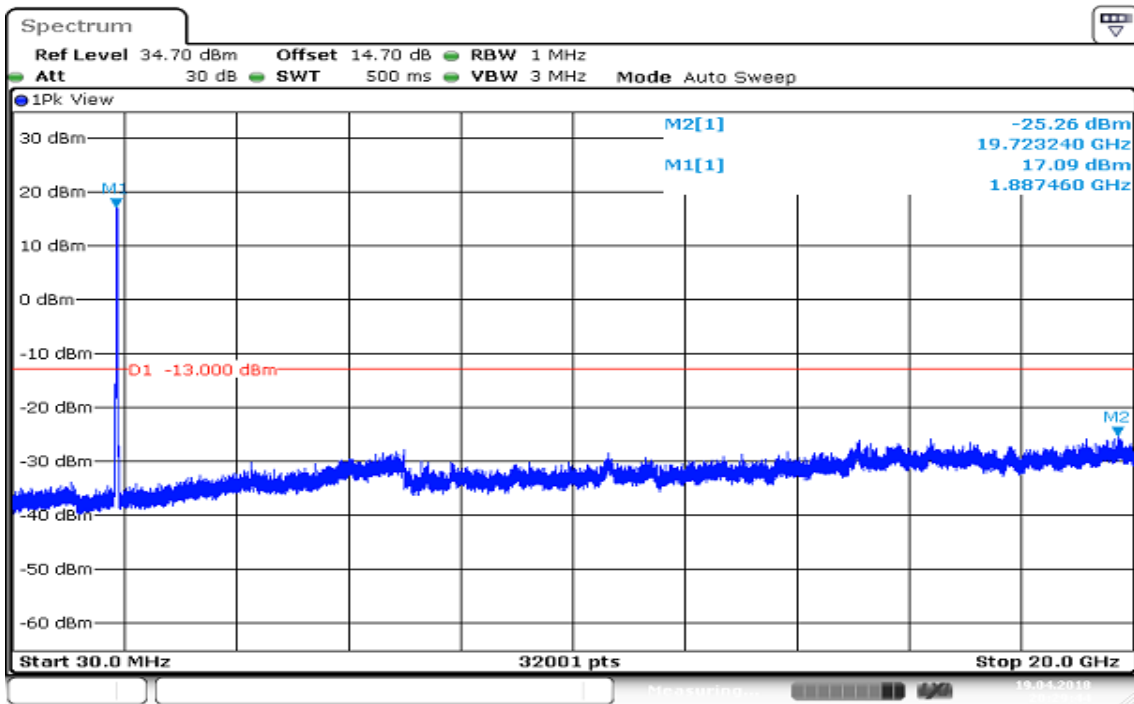
Date: 19 APR 2018 20:24:25

Report No.: T170908D07-A-RP7

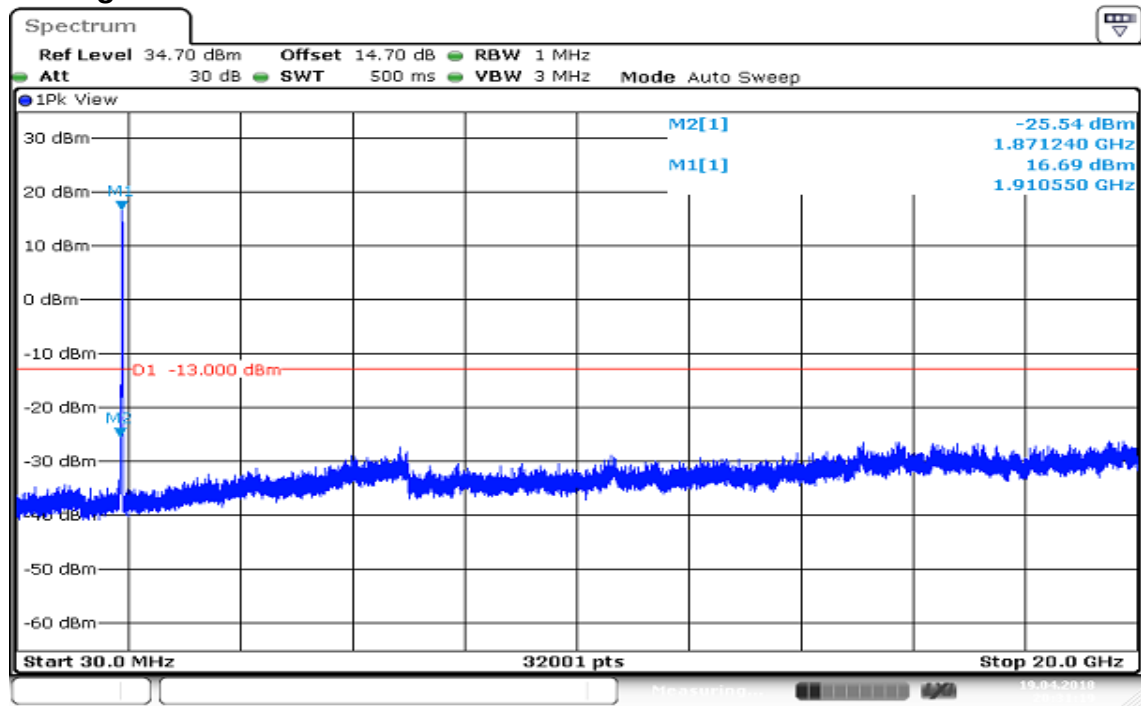
CHANNEL BANDWIDTH: 20MHz / QPSK CH Low



CH Mid



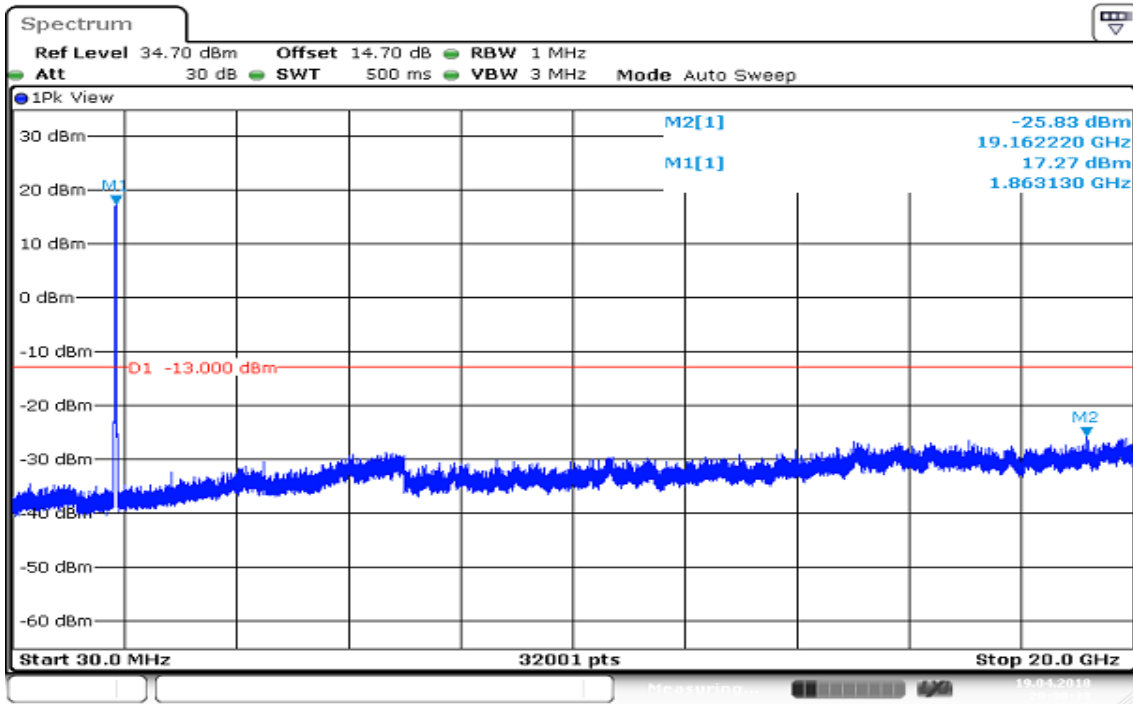
CH High



Date: 19 APR 2018 20:21:19

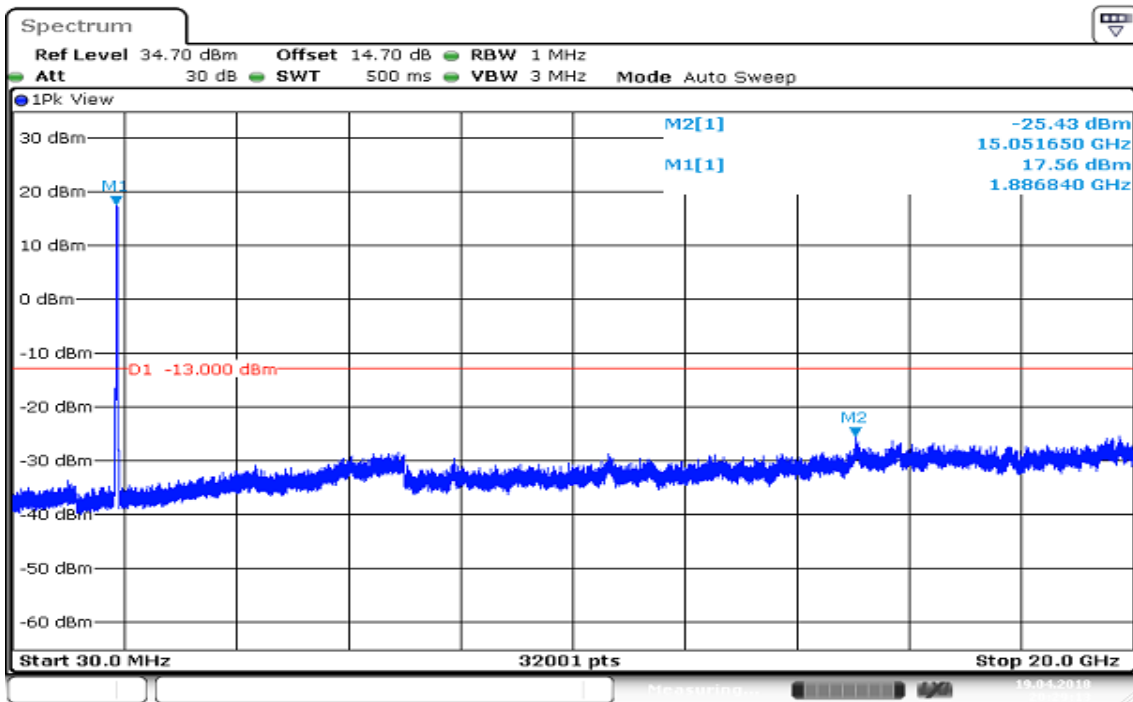
Report No.: T170908D07-A-RP7

CHANNEL BANDWIDTH: 20MHz / 16QAM CH Low



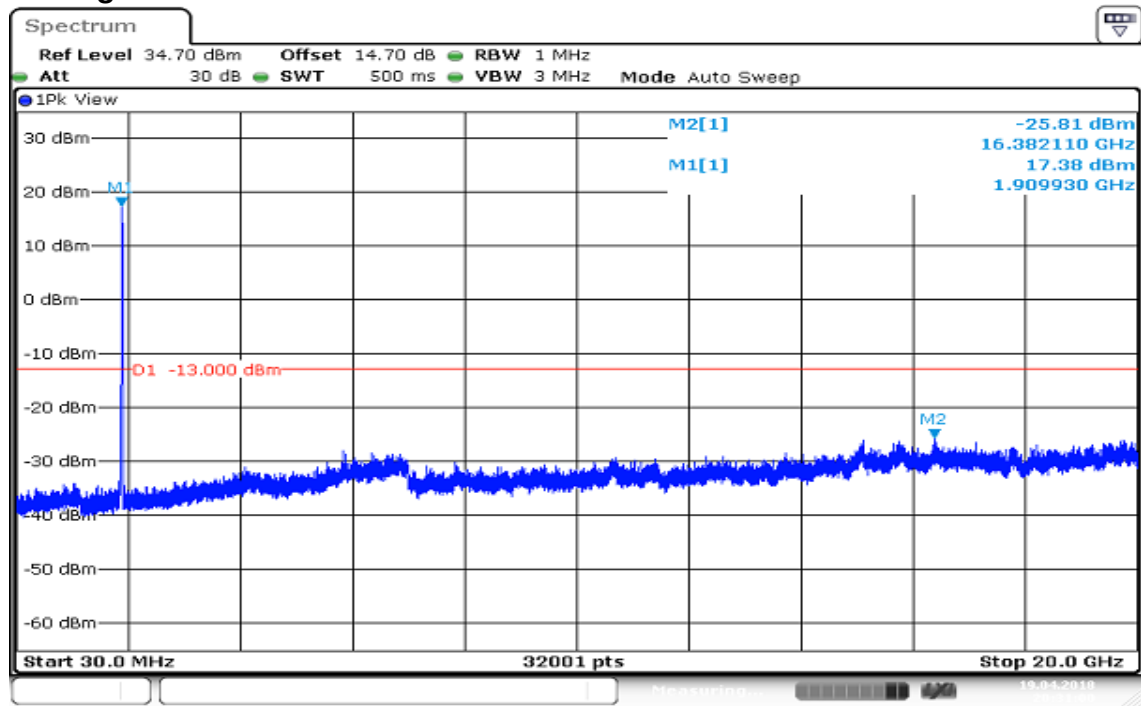
Date: 19 APR 2018 20:20:38

CH Mid



Date: 19 APR 2018 20:29:13

CH High



Date: 19 APR 2016 20:21:00

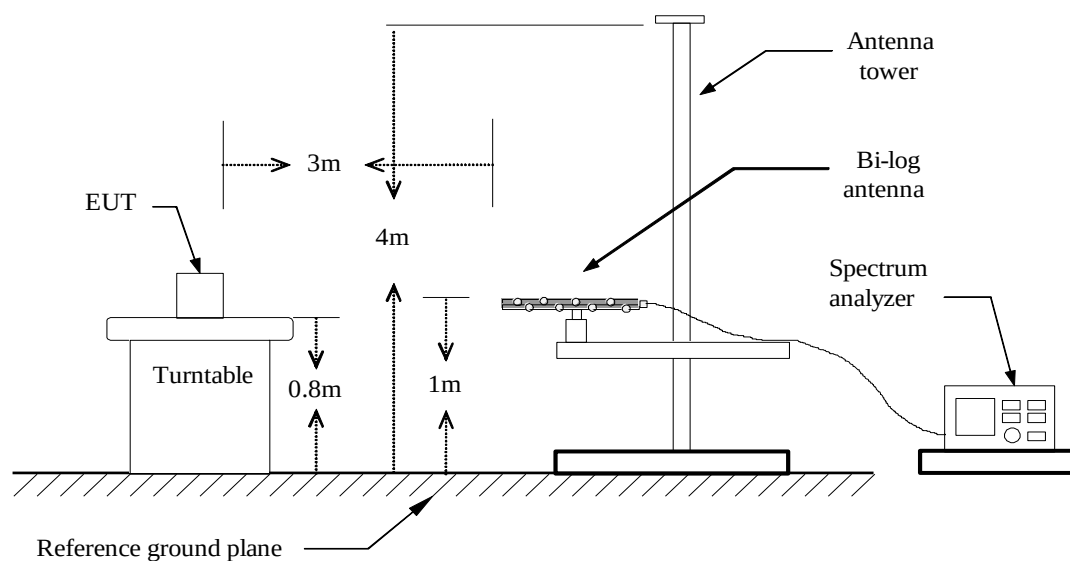
8.8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

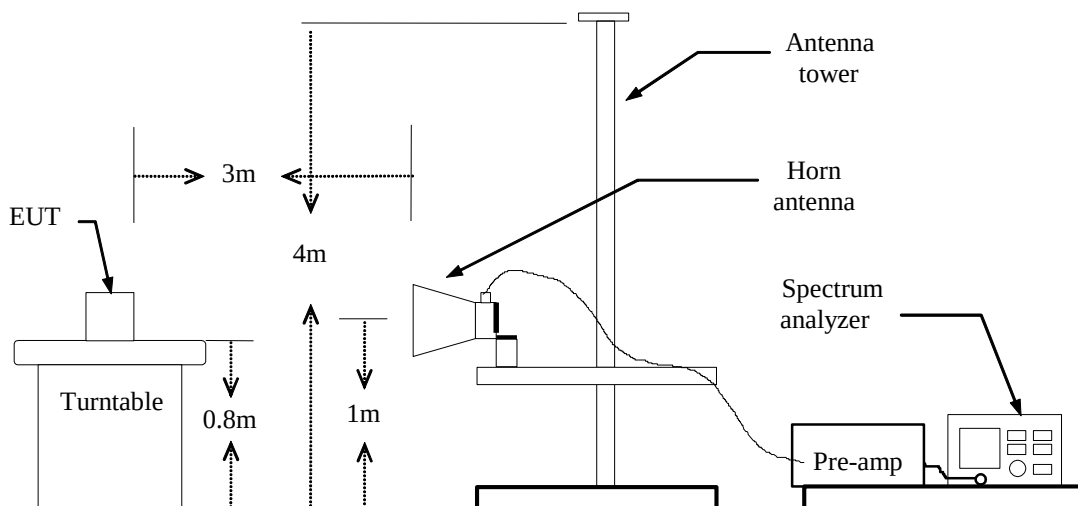
According to FCC §2.1053

Test Configuration

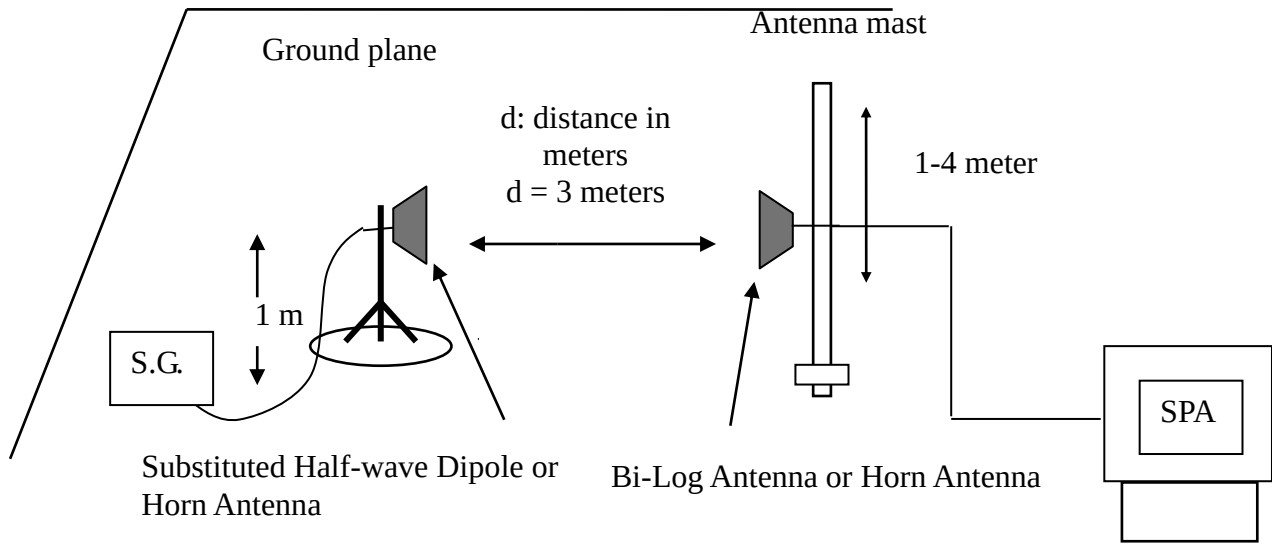
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

1. According to KDB 971168 D01 Power Meas License Digital Systems. Section 5.8 and TIA-603-E Section 2.2.12.
2. The EUT was placed on a turntable
 - (1) Below 1G : 0.8m
 - (2) Above 1G : 0.8m
 - (3) EUT set 3m from the receiving antenna
 - (4) The table was rotated 360 degrees of the highest spurious emission to determine the position.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. A horn antenna was driven by a signal generator.
5. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)} - 2.15$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

For test result, the S.G. value is including antenna gain and cable loss.

TEST RESULTS

Refer to the attached tabular data sheets.

Test Results**Below 1GHz****LTE Band 25 / CHANNEL BANDWIDTH: 20MHz / QPSK****Operation Mode:** Tx / Mid CH**Test Date:**

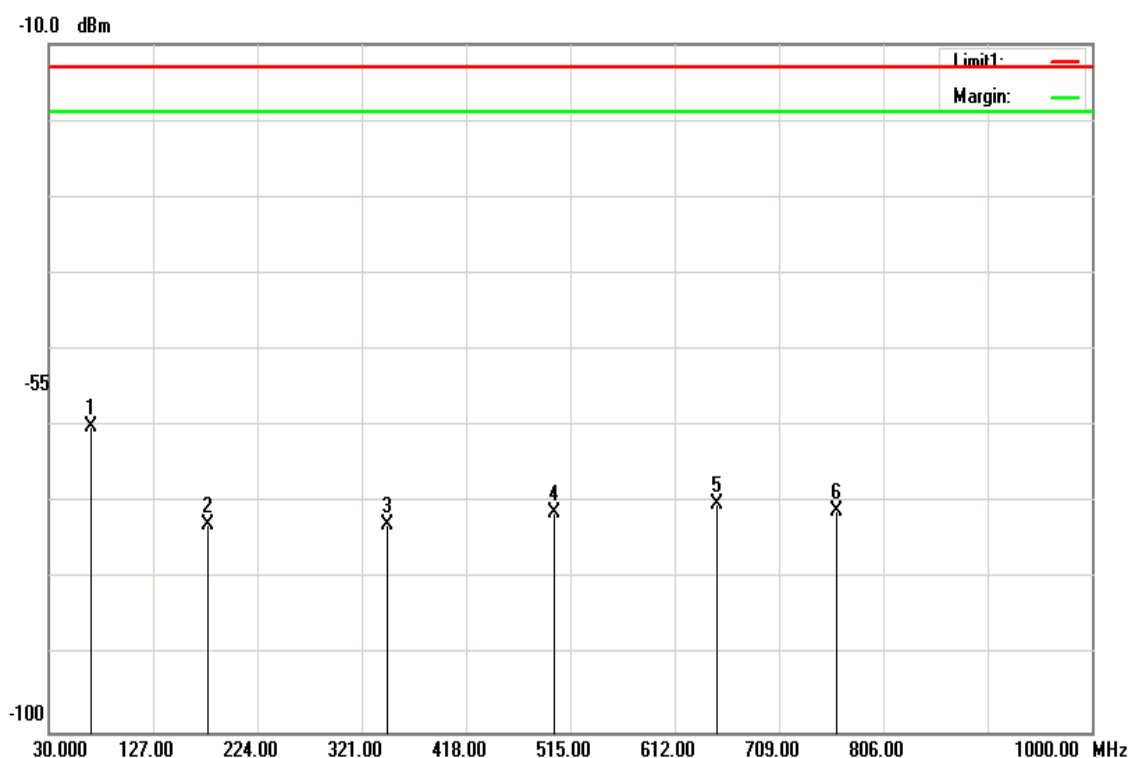
December 5, 2017

Temperature: 21°C**Tested by:**

Ivan Wang

Humidity: 52% RH**Polarity:**

Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
68.8000	-60.59	0.46	-60.13	-13.00	-47.13	V
177.9250	-76.39	3.61	-72.78	-13.00	-59.78	V
345.2500	-80.06	7.08	-72.98	-13.00	-59.98	V
500.4500	-78.12	6.8	-71.32	-13.00	-58.32	V
650.8000	-71.44	1.3	-70.14	-13.00	-57.14	V
762.3500	-72.65	1.58	-71.07	-13.00	-58.07	V

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

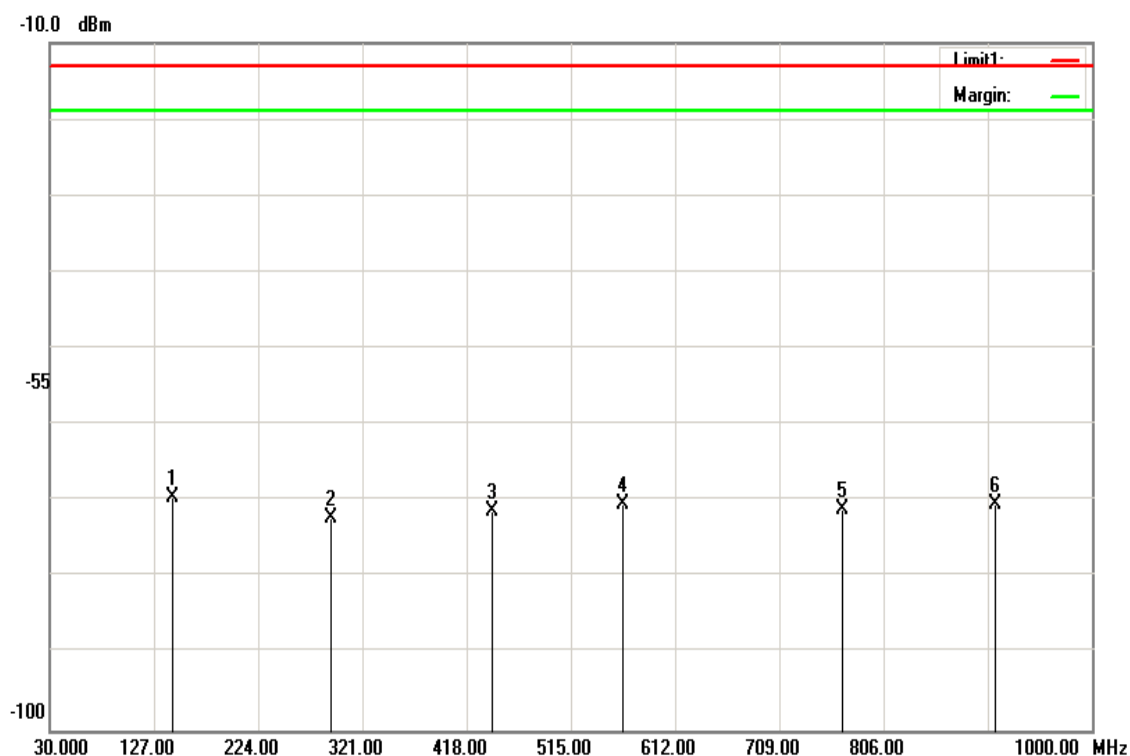
Operation Mode: Tx / Mid CH

Test Date: December 5, 2017

Temperature: 21°C

Tested by: Ivan Wang

Humidity: 52% RH

Polarity: Hor.


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
143.9750	-70.24	0.84	-69.40	-13.00	-56.40	H
291.9000	-79.18	6.98	-72.20	-13.00	-59.20	H
442.2500	-78.51	7.09	-71.42	-13.00	-58.42	H
563.5000	-75.02	4.57	-70.45	-13.00	-57.45	H
767.2000	-72.55	1.54	-71.01	-13.00	-58.01	H
910.2750	-71.82	1.42	-70.40	-13.00	-57.40	H

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Report No.: T170908D07-A-RP7

LTE Band 25 / BW: 20MHz / 16QAM / RB =1, RB Offset = 0
Operation Mode: Tx / Mid CH

Test Date:

December 5, 2017

Temperature: 21°C

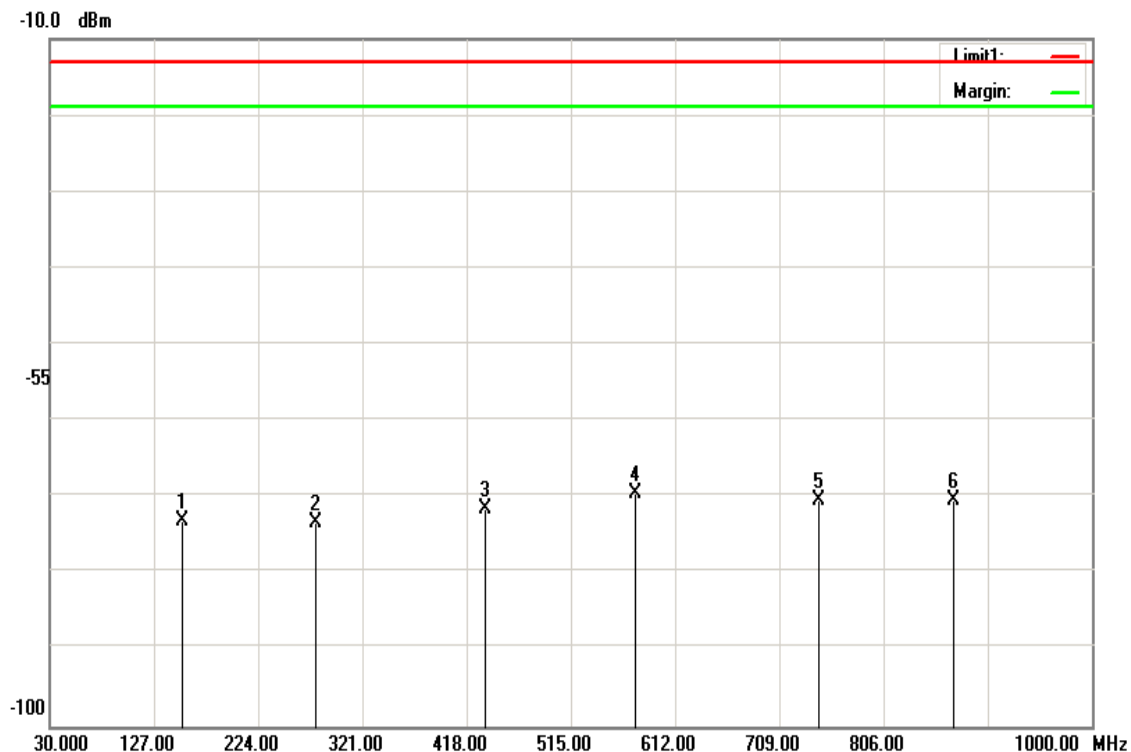
Tested by:

Ivan Wang

Humidity: 52% RH

Polarity:

Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
153.6750	-73.18	-0.03	-73.21	-13.00	-60.21	V
277.3500	-80.45	7.13	-73.32	-13.00	-60.32	V
434.9750	-78.59	7.13	-71.46	-13.00	-58.46	V
575.6250	-72.1	2.53	-69.57	-13.00	-56.57	V
745.3750	-72.16	1.71	-70.45	-13.00	-57.45	V
871.4750	-71.68	1.29	-70.39	-13.00	-57.39	V

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

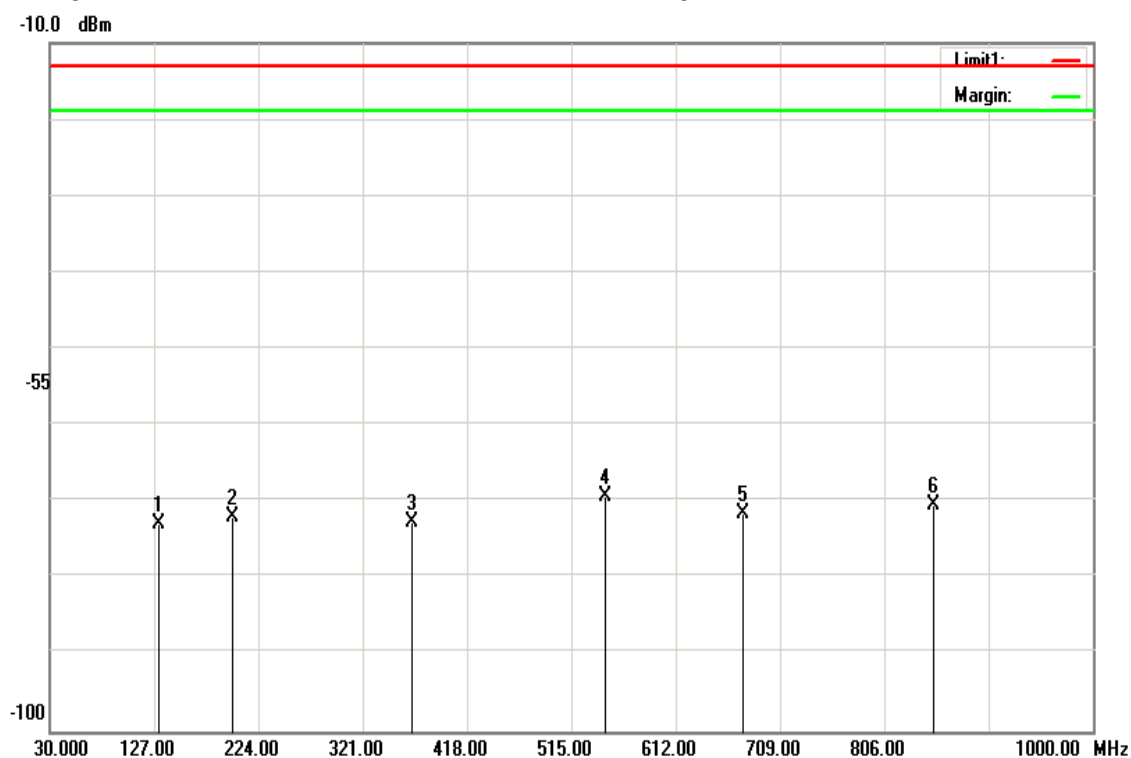
Operation Mode: Tx / Mid CH I

Test Date: December 5, 2017

Temperature: 21°C

Tested by: Ivan Wang

Humidity: 52% RH

Polarity: Hor.


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
131.8500	-73.86	1.08	-72.78	-13.00	-59.78	H
199.7500	-75.99	4.1	-71.89	-13.00	-58.89	H
367.0750	-79.91	7.17	-72.74	-13.00	-59.74	H
546.5250	-76.21	6.85	-69.36	-13.00	-56.36	H
675.0500	-73.19	1.67	-71.52	-13.00	-58.52	H
852.0750	-71.64	1.18	-70.46	-13.00	-57.46	H

Remark:

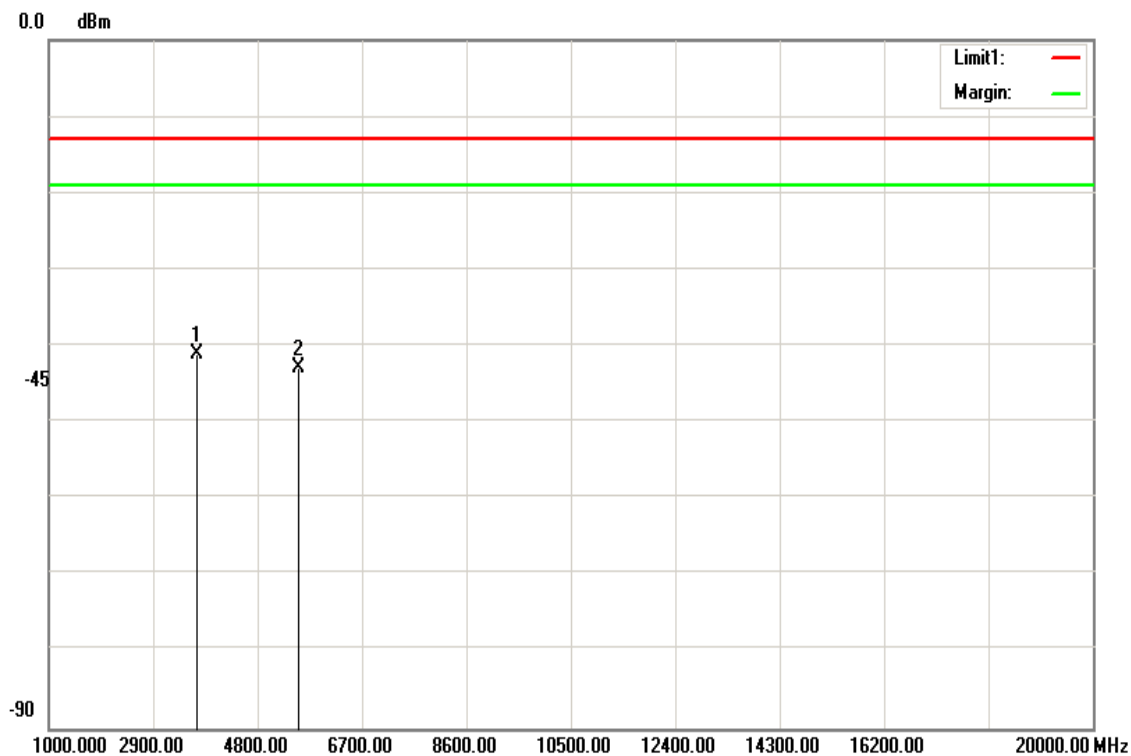
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Above 1GHz**LTE Band 25 / BW: 20 MHz / QPSK / RB =1, RB Offset = 0****Operation Mode:** Tx / Low CH**Test Date:**

December 5, 2017

Temperature: 21°C**Tested by:**

Ivan Wang

Humidity: 52% RH**Polarity:****Ver.**

Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-63.66	12.54	-51.12	-13.00	-38.12	V
5550.000	-60.67	12.88	-47.79	-13.00	-34.79	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / Low CH

Test Date:

December 5, 2017

Temperature: 21°C

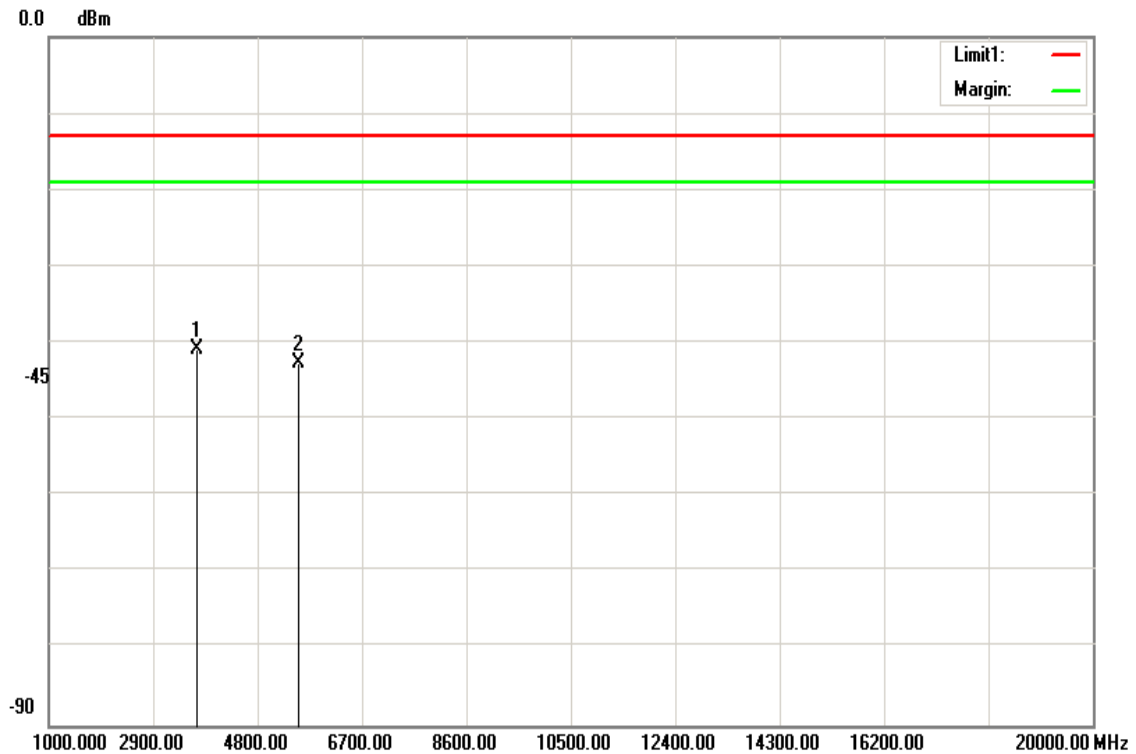
Tested by:

Ivan Wang

Humidity: 52% RH

Polarity:

Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-53.28	12.54	-40.74	-13.00	-27.74	H
5550.000	-55.62	12.88	-42.74	-13.00	-29.74	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

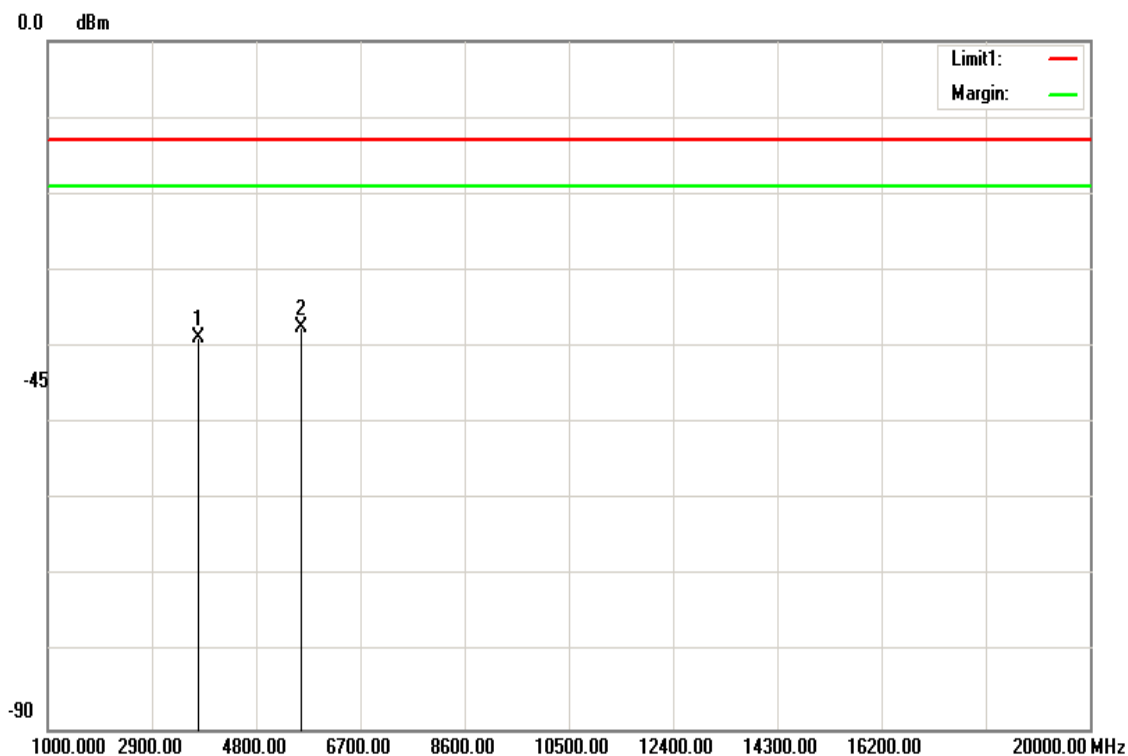
Operation Mode: Tx / Mid CH

Test Date: December 5, 2017

Temperature: 21°C

Tested by: Ivan Wang

Humidity: 52% RH

Polarity: Ver.


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3746.000	-51.35	12.55	-38.80	-13.00	-25.80	V
5619.000	-50.28	12.85	-37.43	-13.00	-24.43	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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Operation Mode: Tx / Mid CH

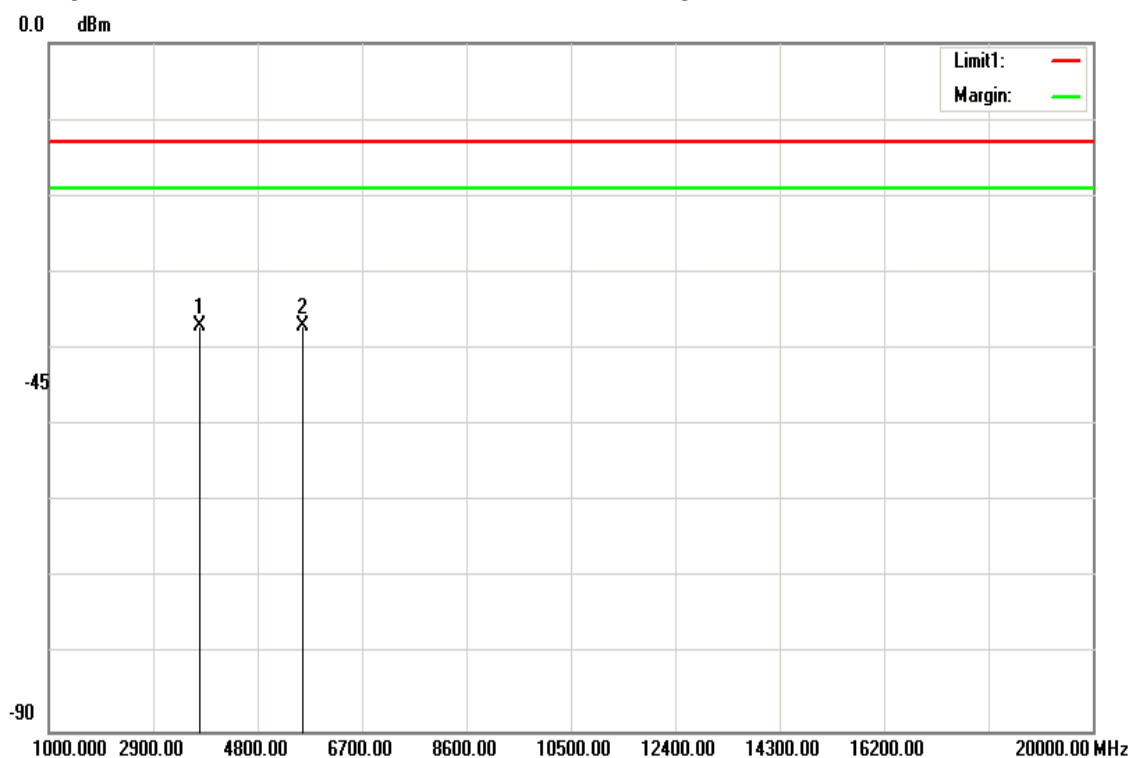
Test Date: December 5, 2017

Temperature: 21°C

Tested by: Ivan Wang

Humidity: 52% RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3746.000	-49.57	12.55	-37.02	-13.00	-24.02	H
5619.000	-49.8	12.85	-36.95	-13.00	-23.95	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

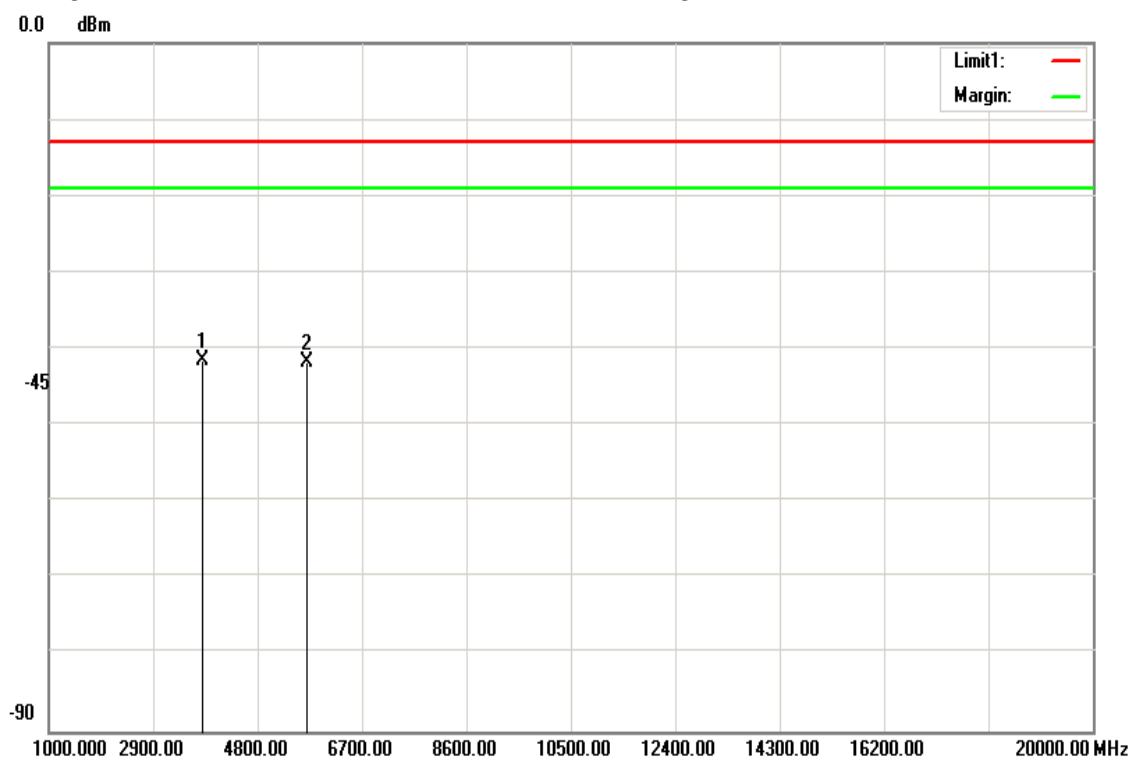
Operation Mode: Tx / High CH

Test Date: December 5, 2017

Temperature: 21°C

Tested by: Ivan Wang

Humidity: 52% RH

Polarity: Ver.


Frequency (MHz)	S.G. (dBm)	Ant. Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3792.000	-54.01	12.56	-41.45	-13.00	-28.45	V
5688.000	-54.53	12.82	-41.71	-13.00	-28.71	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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Operation Mode: Tx / High CH

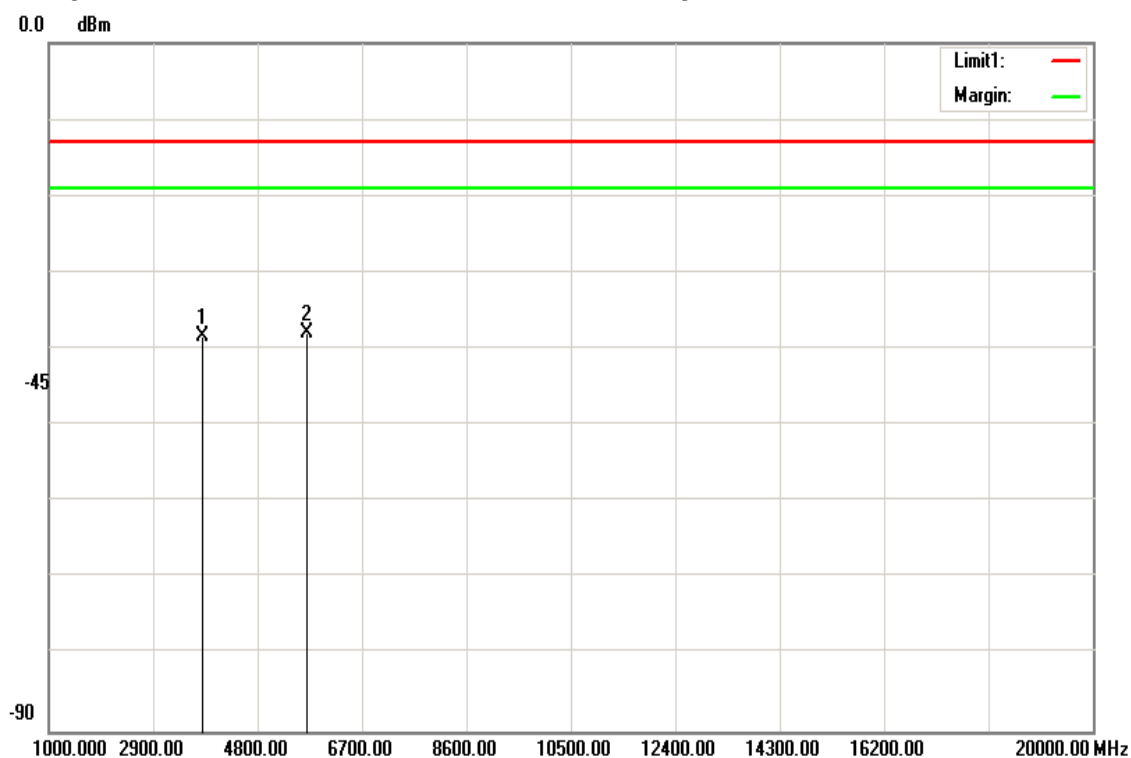
Test Date: December 5, 2017

Temperature: 21°C

Tested by: Ivan Wang

Humidity: 52% RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3792.000	-51.03	12.56	-38.47	-13.00	-25.47	H
5688.000	-50.63	12.82	-37.81	-13.00	-24.81	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

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LTE Band 25 / BW: 20MHz / 16QAM / RB =1, RB Offset = 0
Operation Mode: Tx / Low CH

Test Date:

December 5, 2017

Temperature: 21°C

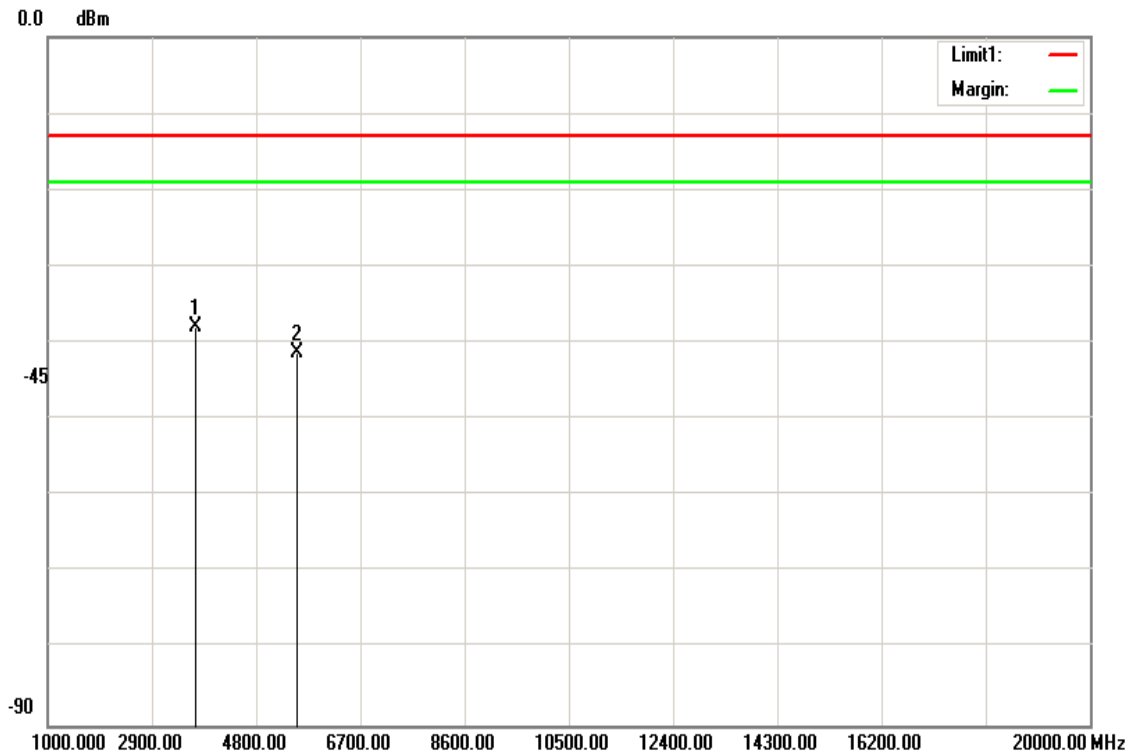
Tested by:

Ivan Wang

Humidity: 52% RH

Polarity:

Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-50.47	12.54	-37.93	-13.00	-24.93	V
5550.000	-54.2	12.88	-41.32	-13.00	-28.32	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

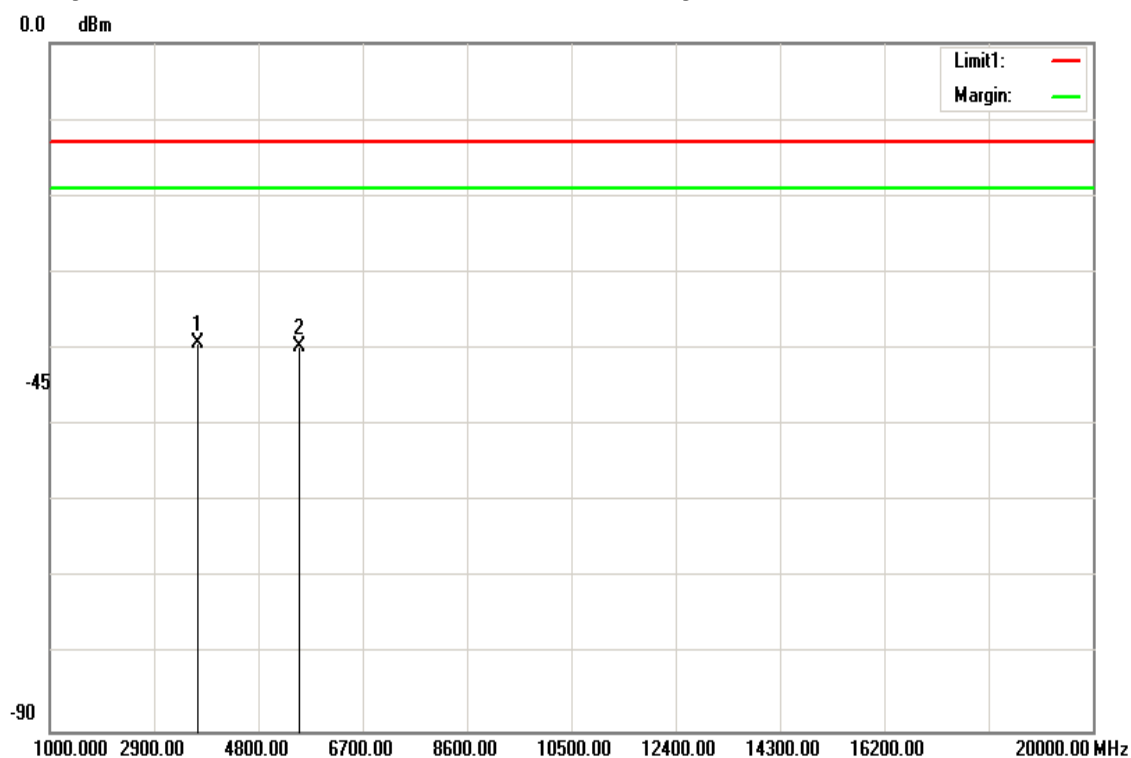
Operation Mode: Tx / Low CH

Test Date: December 5, 2017

Temperature: 21°C

Tested by: Ivan Wang

Humidity: 52% RH

Polarity: Hor.


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-51.76	12.54	-39.22	-13.00	-26.22	H
5550.000	-52.52	12.88	-39.64	-13.00	-26.64	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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Operation Mode: Tx / Mid CH

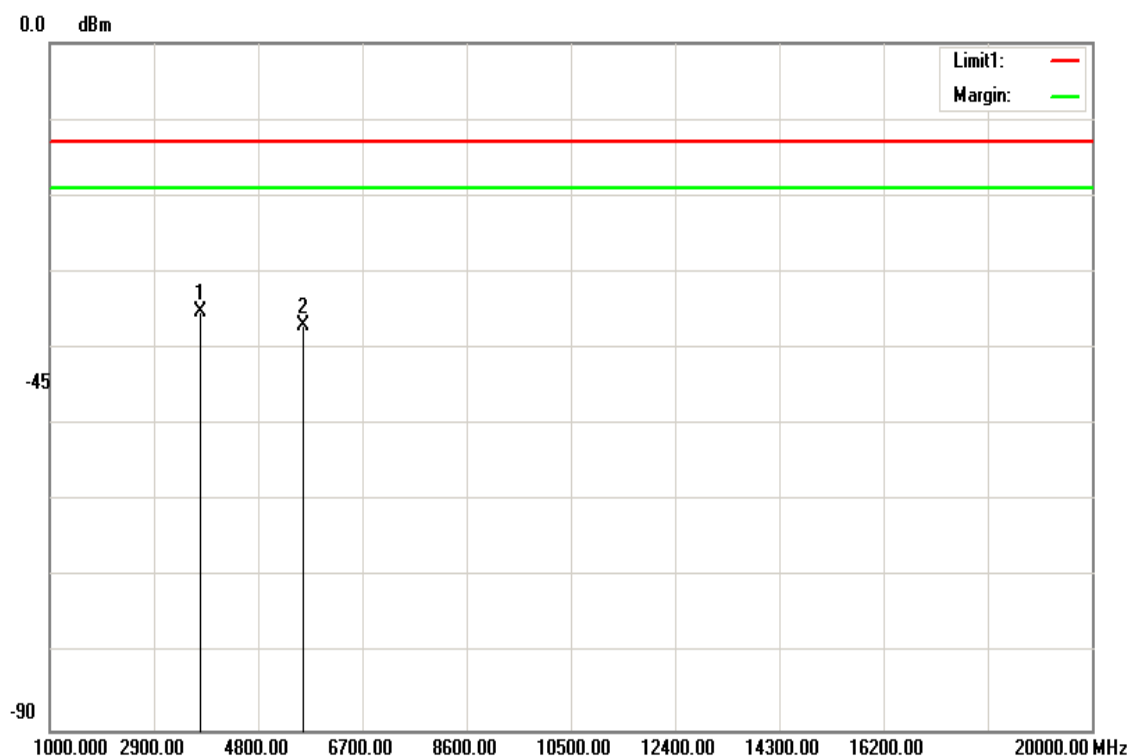
Temperature: 21°C

Humidity: 52% RH

Test Date: December 5, 2017

Tested by: Ivan Wang

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3746.000	-47.71	12.55	-35.16	-13.00	-22.16	V
5619.000	-49.91	12.85	-37.06	-13.00	-24.06	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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Operation Mode: Tx / Mid CH

Temperature: 21°C

Humidity: 52% RH

Test Date:

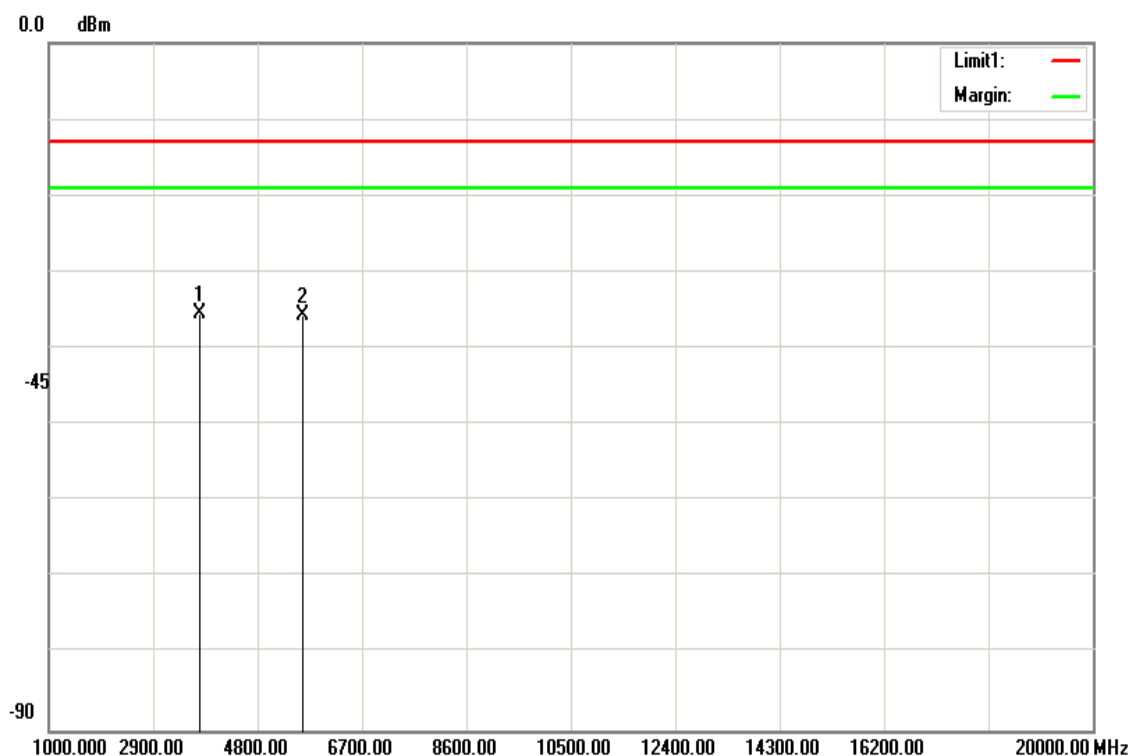
December 5, 2017

Tested by:

Ivan Wang

Polarity:

Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3746.000	-48	12.55	-35.45	-13.00	-22.45	H
5619.000	-48.46	12.85	-35.61	-13.00	-22.61	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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Operation Mode: Tx / High CH

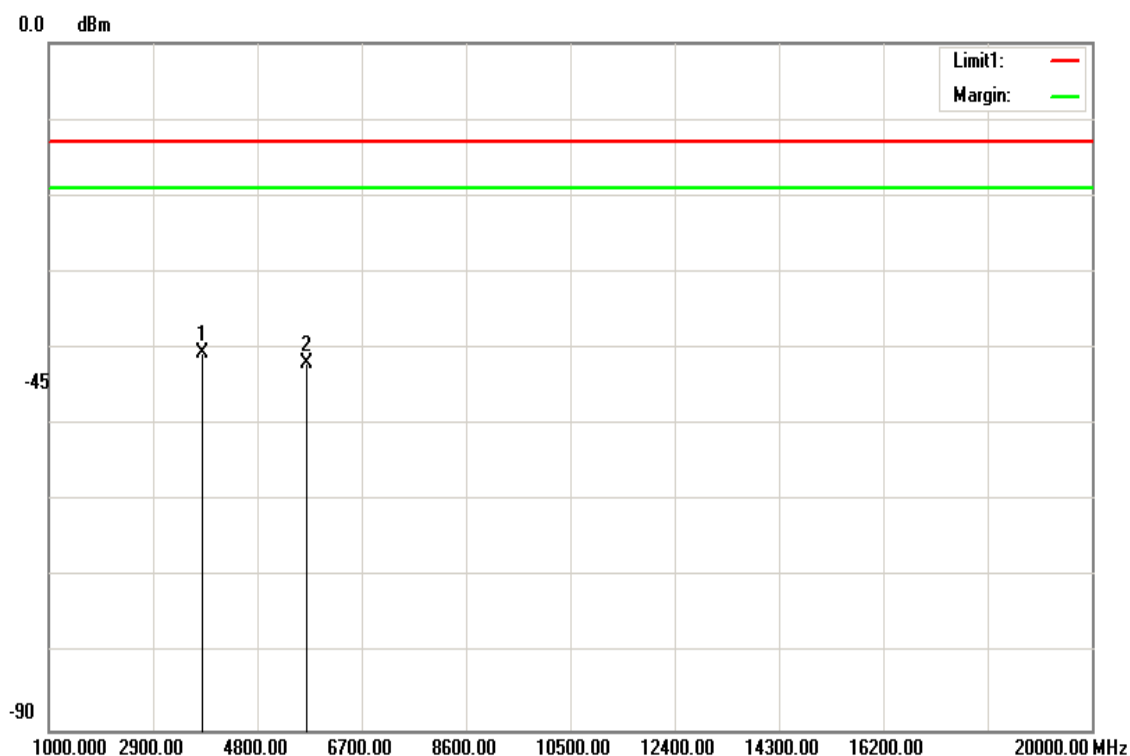
Temperature: 21°C

Humidity: 52% RH

Test Date: December 5, 2017

Tested by: Ivan Wang

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant. Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3792.000	-53.18	12.56	-40.62	-13.00	-27.62	V
5688.000	-54.88	12.82	-42.06	-13.00	-29.06	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.



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Operation Mode: Tx / High CH

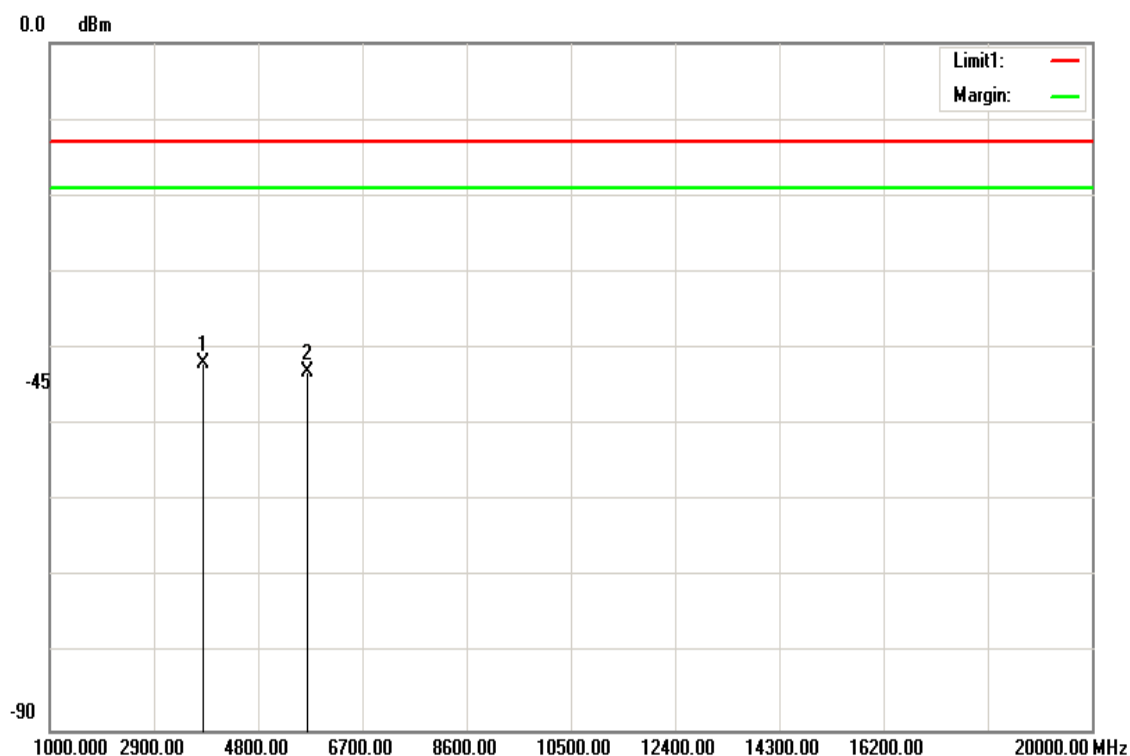
Temperature: 21°C

Humidity: 52% RH

Test Date: December 5, 2017

Tested by: Ivan Wang

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3792.000	-54.42	12.56	-41.86	-13.00	-28.86	H
5688.000	-55.97	12.82	-43.15	-13.00	-30.15	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

-- End of Test Report --