

FCC 47 CFR PART 24 SUBPART E

TEST REPORT

For

Computer

Trade Name: ADVANTECH

Model: DMS-SJ03

Issued to

Advantech Co.Ltd.

No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C

Issued by

**Compliance Certification Services Inc.
(Hsinchu Lab)**

**No.989-1, Wenshan Rd., Shangshan Village, Qionglin Township,
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
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APPENDIX 1 - PHOTOGRAPHS OF EUT	

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: DMS-SJ03

Date of Test: August 10 ~ 18, 2017

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

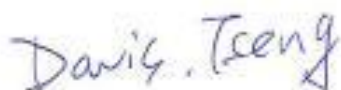
We hereby certify that:

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/EIA-603-C 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:




Davis Tseng
 Sr. Engineer
 Compliance Certification Services Inc.

Kevin Kuo
 Engineer
 Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Computer	
Trade Name	ADVANTECH	
Model	DMS-SJ03	
Model Discrepancy	N/A	
Received Date	August 31, 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
Maximum ERP Power	LTE Band 25 Channel Bandwidth: 1.4MHz	QPSK: 23.40dBm 16QAM: 22.41dBm
	LTE Band 25 Channel Bandwidth: 3MHz	QPSK: 23.41dBm 16QAM: 22.42dBm
	LTE Band 25 Channel Bandwidth: 5MHz	QPSK: 23.42dBm 16QAM: 22.43dBm
	LTE Band 25 Channel Bandwidth: 10MHz	QPSK: 23.45dBm 16QAM: 22.46dBm
	LTE Band 25 Channel Bandwidth: 15MHz	QPSK: 23.47dBm 16QAM: 22.48dBm
	LTE Band 25 Channel Bandwidth: 20MHz	QPSK : 23.52dBm 16QAM: 22.53dBm
Antenna Specification	PIFA Antenna LTE Band 25: Gain: 3.46dBi	

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

3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of TIA/EIA-603-C: 2004 and FCC CFR 47, Part 2 and Part 24 Subpart E.

3.1 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.

3.2 EUT EXERCISE

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

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.4: 2014.

3.4 DESCRIPTION OF TEST MODES

The EUT (Model: DMS-SJ03) 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

3.5 THE WORST MODE OF MEASUREMENT

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	DC 12V
Test Mode	Mode 1: EUT power by DC Source via cable.
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Position	<input type="checkbox"/> Placed in fixed position. <input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> 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 (X-Plane) were recorded in this report.

4. INSTRUMENT CALIBRATION

4.1 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.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Base Station	Anritsu	MT-8820C	6201240043	07/11/2017	07/10/2018
Spectrum Analyzer	R&S	FSV 40	101073	10/05/2016	10/04/2017
Spectrum Analyzer	R&S	FSU 20Hz...26.5GHz	100258	07/27/2017	07/26/2018
Power Meter	Anritsu	ML2495A	1149001	12/06/2016	12/05/2017
Power Sensor	Anritsu	MA2411B	1126148	12/06/2016	12/05/2017

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Base Station	Anritsu	MT-8820C	6201240043	07/10/2017	07/11/2018
Bi-Log Antenna	TESEQ	CBL 6112D	35404	08/07/2017	08/06/2018
Double Ridged BroadBand Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-285	04/25/2017	04/24/2018
Double Ridged Guide Horn Antenna	ETS • LINDGREN	3117	00078732	07/06/2017	07/05/2018
Horn Antenna	COM-POWER	AH-840	03077	12/02/2016	12/01/2017
Pre-Amplifier	EMCI	EMC001625	980243	04/11/2017	04/10/2018
Pre-Amplifier	COM-POWER	PAM-118A	551043	04/11/2017	04/10/2018
PSA Series Spectrum Analyzer	Agilent	E4446A	MY48250064	04/20/2017	04/19/2018

4.3 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 $k=2$.

5. FACILITIES AND ACCREDITATIONS

5.1 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
- No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, Taiwan, R.O.C
- No.989-1, Wenshan Rd., Shangshan Village, Qionglin Township, Hsinchu County 30741, Taiwan, R.O.C

5.2 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.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

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."

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable
1	DC Power Source	Agilent	E3640A	N/A	N/A	DC Cable 1.5m shielding
2	NB(D)	ASUS	A8J	R31018	N/A	N/A

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.*

7. FCC PART 24 REQUIREMENTS

7.1 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)		
Band 25	1.4M	26047	1850.7	QPSK	1	0	0	23.34	0.2158		
					1	2	0	23.06	0.2023		
					1	5	0	22.86	0.1932		
					3	0	1	22.50	0.1778		
					3	1	1	22.18	0.1652		
					3	2	1	22.02	0.1592		
				16QAM	6	0	1	22.44	0.1754		
					1	0	1	22.34	0.1714		
					1	2	1	22.27	0.1687		
					1	5	1	22.01	0.1589		
					3	0	2	21.33	0.1358		
					3	1	2	21.19	0.1315		
		26365	1882.5	QPSK	1882.5	QPSK	3	2	2	21.11	0.1291
							6	0	2	21.04	0.1271
							1	0	0	23.05	0.2018
							1	2	0	23.16	0.2070
							1	5	0	23.02	0.2004
							3	0	1	22.09	0.1618
				16QAM	3	1	1	22.34	0.1714		
					3	2	1	22.13	0.1633		
					6	0	1	22.13	0.1633		
					1	0	1	22.09	0.1618		
					1	2	1	22.22	0.1667		
					1	5	1	22.07	0.1611		
		26683	1914.3	QPSK	1914.3	QPSK	3	0	2	22.06	0.1607
							3	1	2	22.12	0.1629
							3	2	2	21.54	0.1426
							6	0	2	21.39	0.1377
							1	0	0	23.40	0.2188
							1	2	0	23.29	0.2133
16QAM	1			5	0	22.96	0.1977				
	3			0	1	22.51	0.1782				
	3			1	1	22.56	0.1803				
	3			2	1	22.09	0.1618				
	6			0	1	22.38	0.1730				
	1			0	1	22.41	0.1742				
16QAM	1	2	1	22.29	0.1694						
	1	5	1	22.07	0.1611						
	3	0	2	22.36	0.1722						
	3	1	2	22.37	0.1726						
	3	2	2	21.07	0.1279						
	6	0	2	21.09	0.1285						

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
Band 25	3M	26055	1851.5	QPSK	1	0	0	23.35	0.2163
					1	7	0	23.07	0.2028
					1	14	0	22.87	0.1936
					8	0	1	22.51	0.1782
					8	4	1	22.19	0.1656
					8	7	1	22.03	0.1596
				15	0	1	22.45	0.1758	
				16QAM	1	0	1	22.35	0.1718
					1	7	1	22.28	0.1690
					1	14	1	22.02	0.1592
					8	0	2	21.34	0.1361
					8	4	2	21.20	0.1318
		8	7		2	21.12	0.1294		
		26365	1882.5	QPSK	1	0	0	23.06	0.2023
					1	7	0	23.17	0.2075
					1	14	0	23.03	0.2009
					8	0	1	22.10	0.1622
					8	4	1	22.35	0.1718
					8	7	1	22.14	0.1637
				15	0	1	22.14	0.1637	
				16QAM	1	0	1	22.10	0.1622
					1	7	1	22.23	0.1671
					1	14	1	22.08	0.1614
					8	0	2	22.07	0.1611
					8	4	2	22.13	0.1633
		8	7		2	21.55	0.1429		
		26675	1913.5	QPSK	1	0	0	23.41	0.2193
					1	7	0	23.30	0.2138
					1	14	0	22.97	0.1982
					8	0	1	22.52	0.1786
					8	4	1	22.57	0.1807
					8	7	1	22.10	0.1622
				15	0	1	22.39	0.1734	
				16QAM	1	0	1	22.42	0.1746
					1	7	1	22.30	0.1698
					1	14	1	22.08	0.1614
8	0				2	22.37	0.1726		
8	4				2	22.38	0.1730		
8	7	2	21.08		0.1282				
15	0	2	21.10	0.1288					

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)	
Band 25	5M	26065	1852.5	QPSK	1	0	0	23.37	0.2173	
					1	12	0	23.09	0.2037	
					1	24	0	22.89	0.1945	
					12	0	1	22.53	0.1791	
					12	6	1	22.21	0.1663	
					12	11	1	22.05	0.1603	
				25	0	1	22.47	0.1766		
				16QAM	1	0	1	22.37	0.1726	
					1	12	1	22.30	0.1698	
					1	24	1	22.04	0.1600	
					12	0	2	21.36	0.1368	
					12	6	2	21.22	0.1324	
		12	11		2	21.14	0.1300			
		25	0	2	21.07	0.1279				
		26365	1882.5	QPSK	1882.5	1	0	0	23.07	0.2028
						1	12	0	23.18	0.2080
						1	24	0	23.04	0.2014
						12	0	1	22.11	0.1626
						12	6	1	22.36	0.1722
						12	11	1	22.15	0.1641
				25	0	1	22.15	0.1641		
				16QAM	1	0	1	22.11	0.1626	
					1	12	1	22.24	0.1675	
					1	24	1	22.09	0.1618	
					12	0	2	22.08	0.1614	
					12	6	2	22.14	0.1637	
		12	11		2	21.56	0.1432			
		25	0	2	21.41	0.1384				
		26665	1912.5	QPSK	1912.5	1	0	0	23.42	0.2198
						1	12	0	23.31	0.2143
						1	24	0	22.98	0.1986
						12	0	1	22.53	0.1791
						12	6	1	22.58	0.1811
						12	11	1	22.11	0.1626
				25	0	1	22.40	0.1738		
				16QAM	1	0	1	22.43	0.1750	
1	12				1	22.31	0.1702			
1	24				1	22.09	0.1618			
12	0				2	22.38	0.1730			
12	6				2	22.39	0.1734			
12	11	2	21.09		0.1285					
25	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)
Band 25	10M	26090	1855.0	QPSK	1	0	0	23.38	0.2178
					1	24	0	23.10	0.2042
					1	49	0	22.90	0.1950
					25	0	1	22.54	0.1795
					25	12	1	22.22	0.1667
					25	24	1	22.06	0.1607
					50	0	1	22.48	0.1770
				16QAM	1	0	1	22.38	0.1730
					1	24	1	22.31	0.1702
					1	49	1	22.05	0.1603
					25	0	2	21.37	0.1371
					25	12	2	21.23	0.1327
					25	24	2	21.15	0.1303
					50	0	2	21.08	0.1282
		26365	1882.5	QPSK	1	0	0	23.09	0.2037
					1	24	0	23.20	0.2089
					1	49	0	23.06	0.2023
					25	0	1	22.13	0.1633
					25	12	1	22.38	0.1730
					25	24	1	22.17	0.1648
					50	0	1	22.17	0.1648
				16QAM	1	0	1	22.13	0.1633
					1	24	1	22.26	0.1683
					1	49	1	22.11	0.1626
					25	0	2	22.10	0.1622
					25	12	2	22.16	0.1644
					25	24	2	21.58	0.1439
					50	0	2	21.43	0.1390
		26640	1910.0	QPSK	1	0	0	23.45	0.2213
					1	24	0	23.34	0.2158
1	49				0	23.01	0.2000		
25	0				1	22.56	0.1803		
25	12				1	22.61	0.1824		
25	24				1	22.14	0.1637		
50	0				1	22.43	0.1750		
16QAM	1			0	1	22.46	0.1762		
	1			24	1	22.34	0.1714		
	1			49	1	22.12	0.1629		
	25			0	2	22.41	0.1742		
	25			12	2	22.42	0.1746		
	25			24	2	21.12	0.1294		
	50			0	2	21.14	0.1300		

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)		
Band 25	15M	26115	1857.5	QPSK	1	0	0	23.41	0.2193		
					1	37	0	23.13	0.2056		
					1	74	0	22.93	0.1963		
					36	0	1	22.57	0.1807		
					36	18	1	22.25	0.1679		
					36	35	1	22.09	0.1618		
				75	0	1	22.51	0.1782			
				16QAM	1	0	1	22.41	0.1742		
					1	37	1	22.34	0.1714		
					1	74	1	22.08	0.1614		
					36	0	2	21.40	0.1380		
					36	18	2	21.26	0.1337		
		36	35		2	21.18	0.1312				
		26365	1882.5	QPSK	1882.5	QPSK	1	0	0	23.11	0.2046
							1	37	0	23.22	0.2099
							1	74	0	23.08	0.2032
							36	0	1	22.15	0.1641
							36	18	1	22.40	0.1738
							36	35	1	22.19	0.1656
				75	0	1	22.19	0.1656			
				16QAM	1	0	1	22.15	0.1641		
					1	37	1	22.28	0.1690		
					1	74	1	22.13	0.1633		
					36	0	2	22.12	0.1629		
					36	18	2	22.18	0.1652		
		36	35		2	21.60	0.1445				
		26615	1907.5	QPSK	1907.5	QPSK	1	0	0	23.47	0.2223
							1	37	0	23.36	0.2168
							1	74	0	23.03	0.2009
							36	0	1	22.58	0.1811
							36	18	1	22.63	0.1832
							36	35	1	22.16	0.1644
				75	0	1	22.45	0.1758			
				16QAM	1	0	1	22.48	0.1770		
					1	37	1	22.36	0.1722		
					1	74	1	22.14	0.1637		
36	0				2	22.43	0.1750				
36	18				2	22.44	0.1754				
36	35	2	21.14		0.1300						
75	0	2	21.16	0.1306							

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)		
Band 25	20M	26140	1860.0	QPSK	1	0	0	23.49	0.2234		
					1	49	0	23.21	0.2094		
					1	99	0	23.01	0.2000		
					50	0	1	22.65	0.1841		
					50	24	1	22.33	0.1710		
					50	49	1	22.17	0.1648		
				100	0	1	22.59	0.1816			
				16QAM	1	0	1	22.49	0.1774		
					1	49	1	22.42	0.1746		
					1	99	1	22.16	0.1644		
					50	0	2	21.48	0.1406		
					50	24	2	21.34	0.1361		
		50	49		2	21.26	0.1337				
		26365	1882.5	QPSK	1882.5	QPSK	1	0	0	23.17	0.2075
							1	49	0	23.28	0.2128
							1	99	0	23.14	0.2061
							50	0	1	22.21	0.1663
							50	24	1	22.46	0.1762
							50	49	1	22.25	0.1679
				100	0	1	22.25	0.1679			
				16QAM	1	0	1	22.21	0.1663		
					1	49	1	22.34	0.1714		
					1	99	1	22.19	0.1656		
					50	0	2	22.18	0.1652		
					50	24	2	22.24	0.1675		
		50	49		2	21.66	0.1466				
		26590	1905.0	QPSK	1905.0	QPSK	1	0	0	23.52	0.2249
							1	49	0	23.41	0.2193
							1	99	0	23.08	0.2032
							50	0	1	22.63	0.1832
							50	24	1	22.68	0.1854
							50	49	1	22.21	0.1663
				100	0	1	22.50	0.1778			
				16QAM	1	0	1	22.53	0.1791		
					1	49	1	22.41	0.1742		
					1	99	1	22.19	0.1656		
50	0				2	22.48	0.1770				
50	24				2	22.49	0.1774				
50	49	2	21.19		0.1315						
100	0	2	21.21	0.1321							

7.2 ERP & EIRP MEASUREMENT

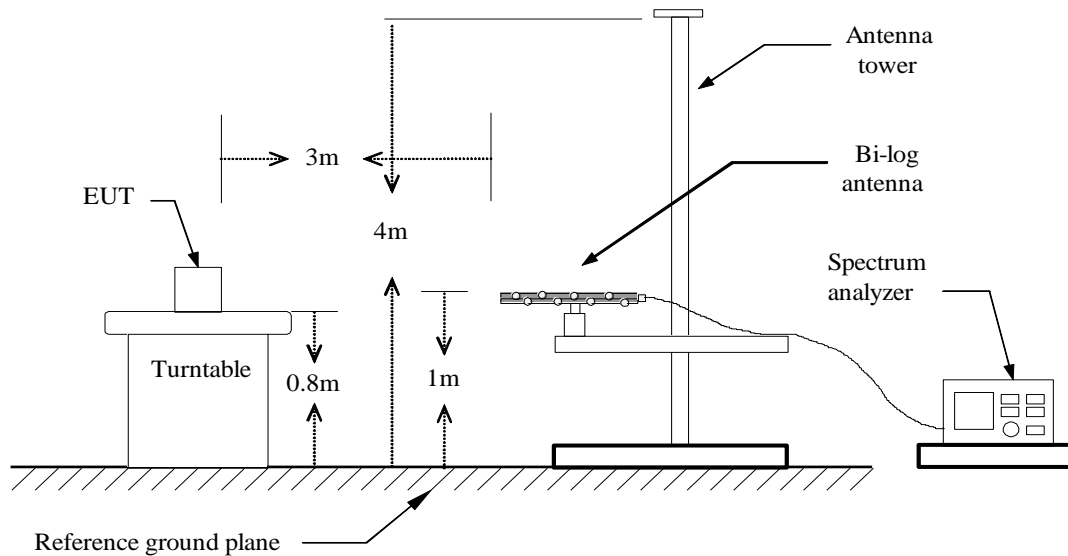
LIMIT

According to FCC §2.1046

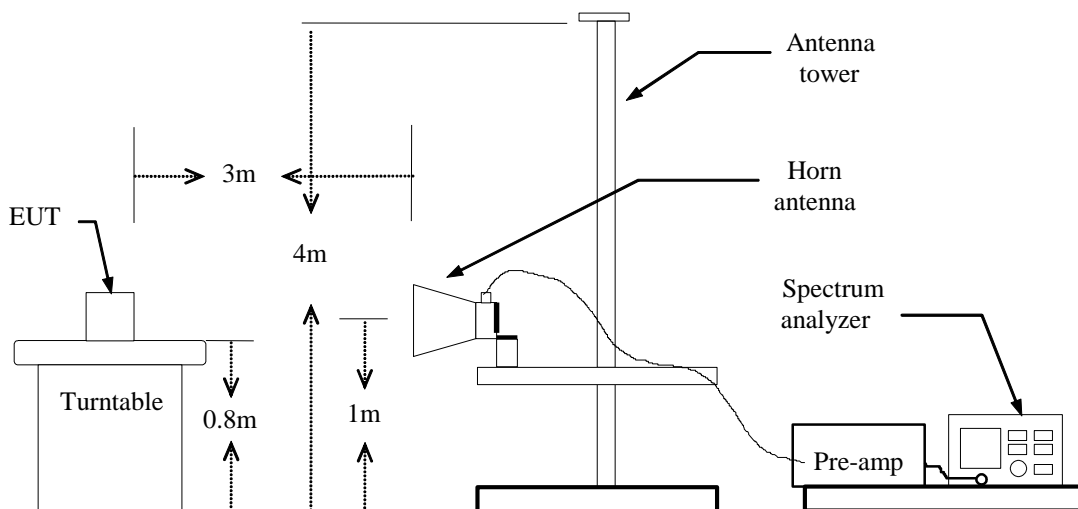
FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

Test Configuration

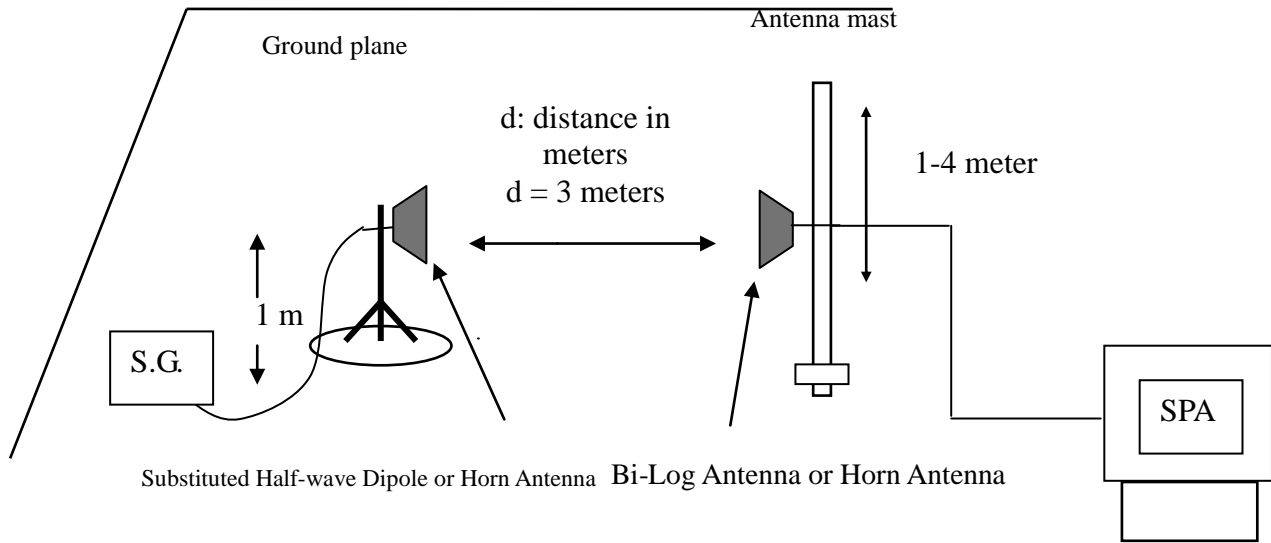
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement of the EUT, the resolution bandwidth was set to 5MHz and the average bandwidth was set to 50MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824-849MHz, and EIRP in frequency band 1851.25 –1910MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824-849MHz) or horn antenna (1851.25-1910MHz) connected to a signal generator. The spectrum analyzer reading was recorded and ERP/EIRP was calculated as follows:

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

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

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	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	1.4	Lowest	QPSK	1	0	23.21	0.209	22.86	0.193
		Middle		1	0	20.76	0.119	30.13	1.030
		Highest		1	0	25.40	0.346	24.48	0.280
		175 MHz	16 QAM	1	0	25.30	0.338	23.76	0.237
		Lowest		1	0	25.73	0.374	22.57	0.180
		Middle		1	0	24.36	0.272	22.55	0.179

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	3	Lowest	QPSK	1	0	20.66	0.116	26.81	0.479
		Middle		1	0	21.86	0.153	30.31	1.073
		Highest		1	0	22.33	0.171	28.63	0.729
		175 MHz	16 QAM	1	0	21.28	0.134	28.79	0.756
		Lowest		1	0	20.72	0.118	28.93	0.781
		Middle		1	0	22.48	0.177	28.47	0.703

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	5	Lowest	QPSK	1	0	21.21	0.132	28.65	0.732
		Middle		1	0	21.65	0.146	28.87	0.770
		Highest		1	0	21.72	0.148	28.87	0.770
		175 MHz	16 QAM	1	0	20.52	0.112	27.50	0.562
		Lowest		1	0	20.94	0.124	29.23	0.837
		Middle		1	0	21.72	0.148	28.79	0.756

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	10	Lowest	QPSK	1	0	21.62	0.145	27.55	0.568
		Middle		1	0	18.82	0.076	28.59	0.722
		Highest		1	0	19.35	0.086	29.09	0.810
		175 MHz	16 QAM	1	0	21.45	0.139	29.01	0.796
		Lowest		1	0	18.98	0.079	28.41	0.693
		Middle		1	0	19.39	0.086	29.10	0.812

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	10	Lowest	QPSK	1	0	20.13	0.103	28.29	0.674
		Middle		1	0	20.46	0.111	28.97	0.788
		Highest		1	0	19.84	0.096	28.39	0.690
		175 MHz	16 QAM	1	0	19.87	0.097	27.42	0.552
		Lowest		1	0	19.94	0.098	28.83	0.763
		Middle		1	0	20.01	0.100	28.39	0.690

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
5	10	Lowest	QPSK	1	0	19.28	0.084	28.94	0.783
		Middle		1	0	19.58	0.090	29.48	0.887
		Highest		1	0	20.69	0.117	29.30	0.851
		175 MHz	16 QAM	1	0	19.23	0.083	28.96	0.787
		Lowest		1	0	19.37	0.086	29.32	0.855
		Middle		1	0	20.19	0.104	28.74	0.748

Remark:

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = S.G Level + Gain of Substitution horn + TX cable loss.
3. The value in bold is the worst.

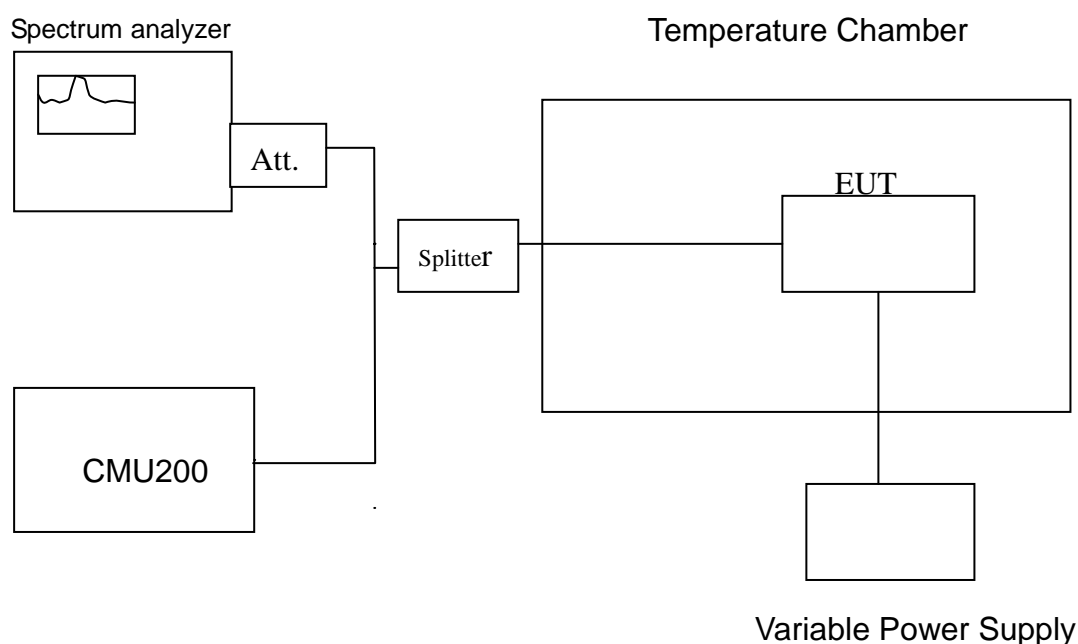
7.3 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §24.235.

Frequency Tolerance: 2.5 ppm

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: ± 2.5 ppm = 4706.25Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
12	50	0.02	0.000011	+/- 2.5
12	40	0.00	0.000000	
12	30	0.03	0.000016	
12	20	0.02	0.000011	
12	10	0.01	0.000005	
12	0	0.04	0.000021	
12	-10	-0.01	-0.000005	
12	-20	0.03	0.000016	

Reference Frequency: LTE Band 25 Max Bandwidth 16QAM 1882.5 MHz @ 20°C				
Limit: ± 2.5 ppm = 4706.25Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
12	50	0.01	0.000005	+/- 2.5
12	40	0.02	0.000011	
12	30	0.01	0.000005	
12	20	0.00	0.000000	
12	10	0.03	0.000016	
12	0	0.01	0.000005	
12	-10	0.02	0.000011	
12	-20	0.03	0.000016	

FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:

LTE Band 25

Reference Frequency: LTE Band 25 Max Bandwidth QPSK 1882.5 MHz @ 20°C				
Limit: ± 2.5 ppm = 4706.25Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
10.2	20	0.00	0.000000	+/- 2.5
12	20	0.02	0.000011	
13.8	20	0.02	0.000011	

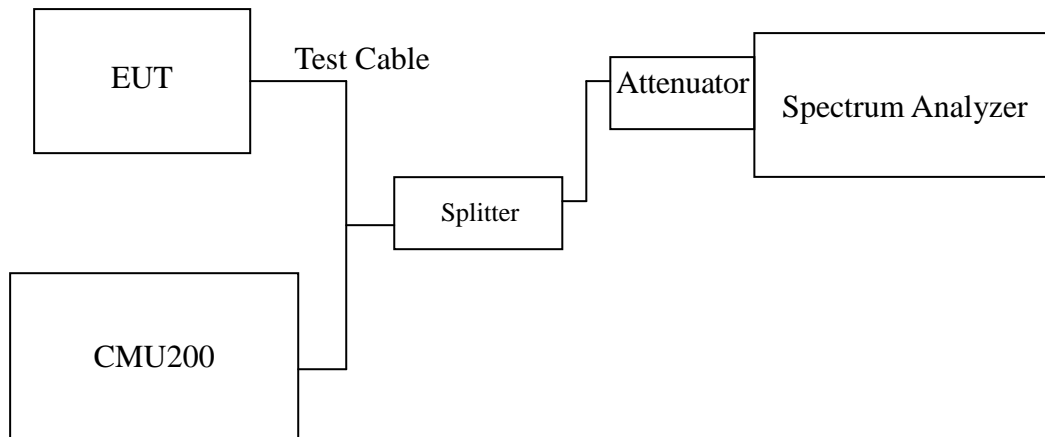
Reference Frequency: LTE Band 25 Max Bandwidth 16QAM 1882.5 MHz @ 20°C				
Limit: ± 2.5 ppm = 4706.25Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
10.2	20	0.00	0.000002	+/- 2.5
12	20	0.00	0.000000	
13.8	20	0.01	0.000005	

7.4 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	1.0984

CHANNEL BANDWIDTH: 1.4MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.5	1.0940

CHANNEL BANDWIDTH: 3MHz / QPSK

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

CHANNEL BANDWIDTH: 3MHz / 16QAM

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

CHANNEL BANDWIDTH: 5MHz / QPSK

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

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

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	13.4587

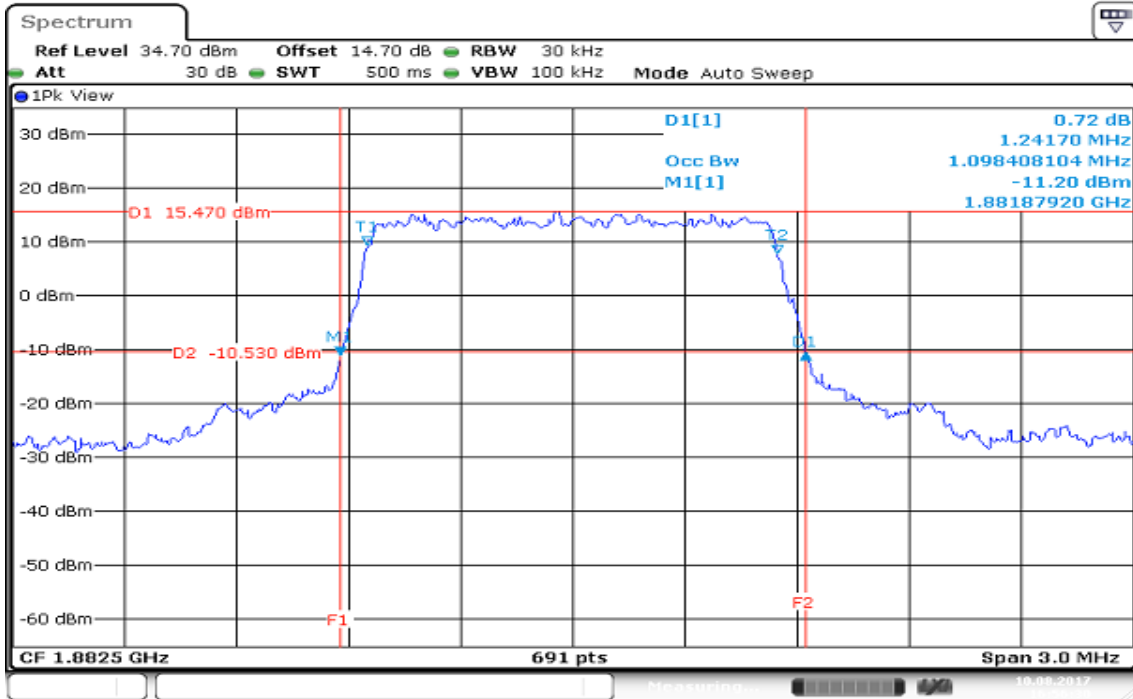
CHANNEL BANDWIDTH: 20MHz / QPSK

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

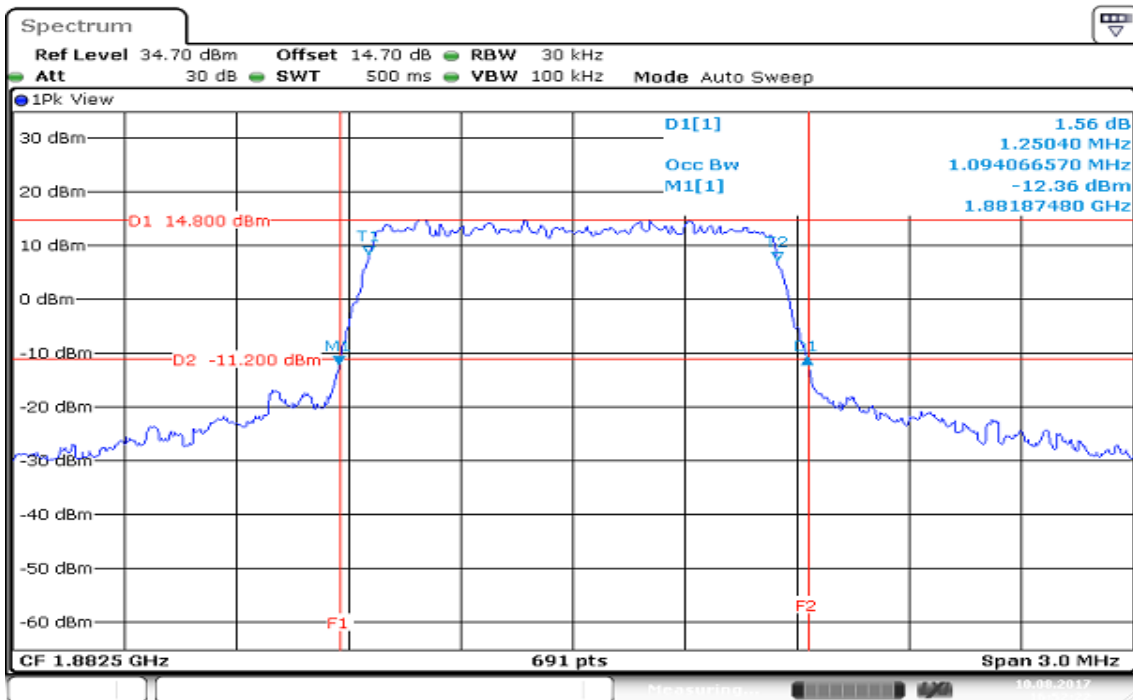
CHANNEL BANDWIDTH: 20MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
26365	1882.50	18.1186

LTE Band 25
CHANNEL BANDWIDTH: 1.4MHz / QPSK
CH Mid

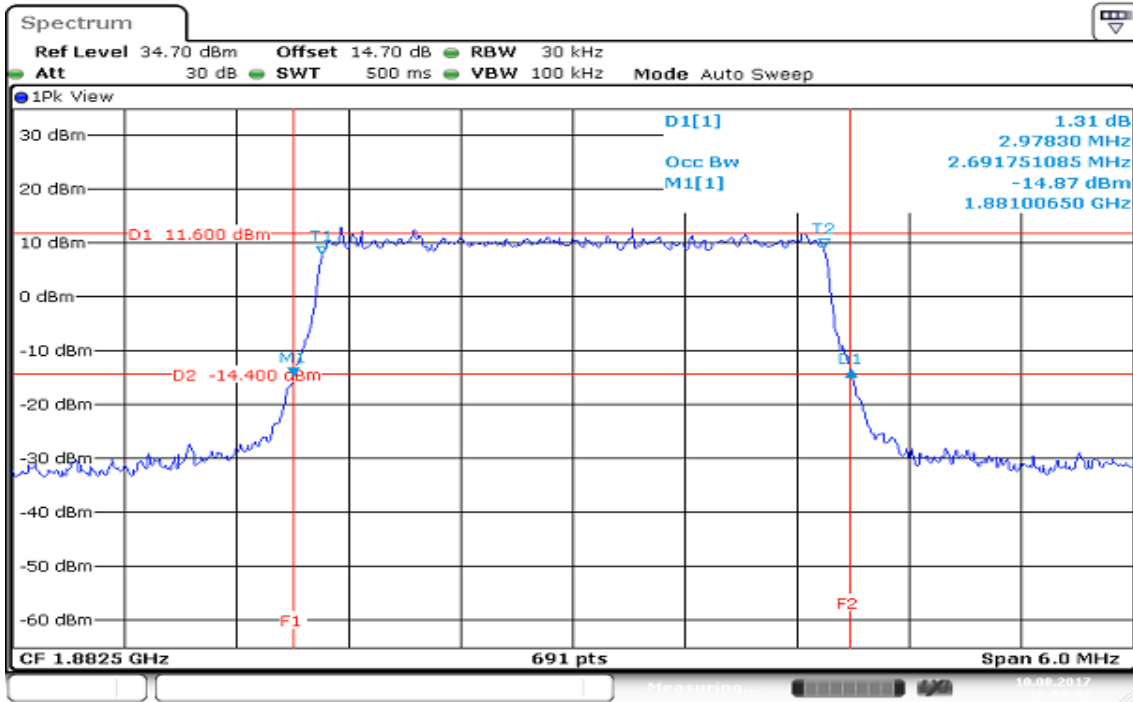


CHANNEL BANDWIDTH: 1.4MHz / 16QAM
CH Mid



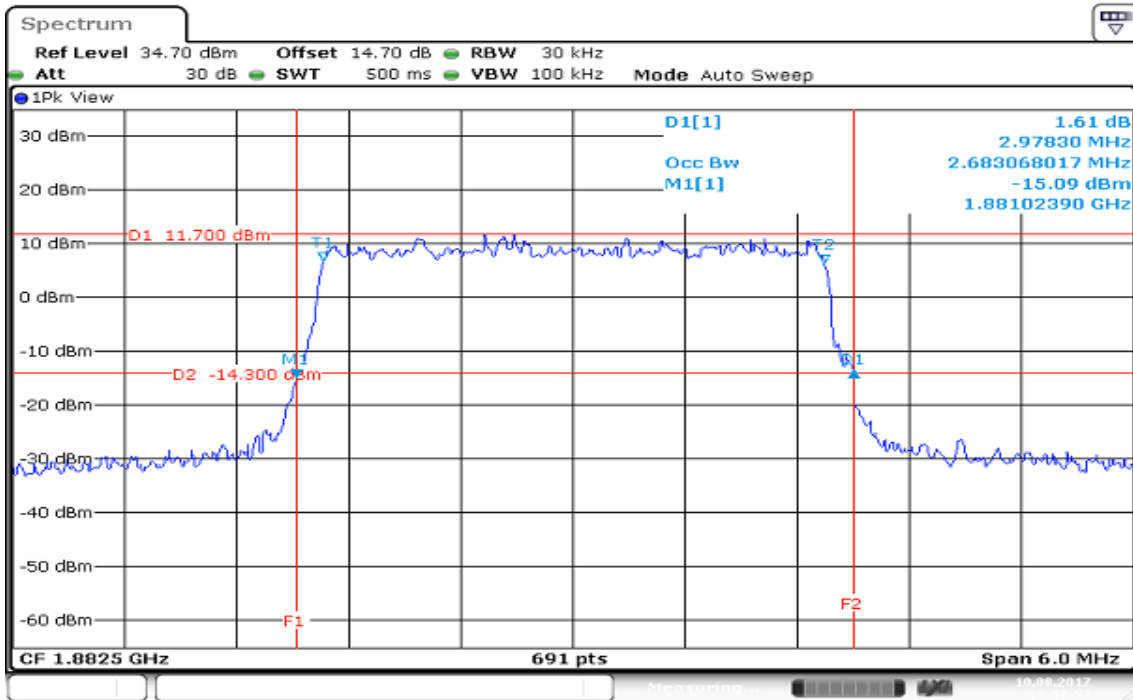
CHANNEL BANDWIDTH:3MHz / QPSK

CH Mid



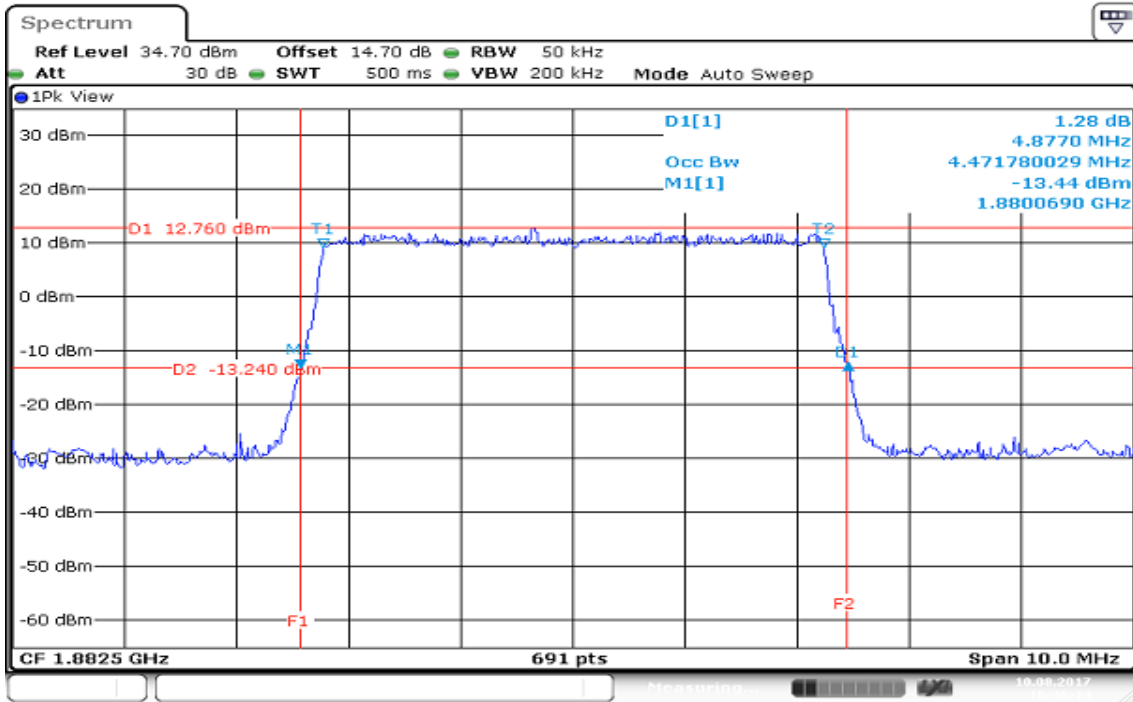
CHANNEL BANDWIDTH: 3MHz / 16QAM

CH Mid



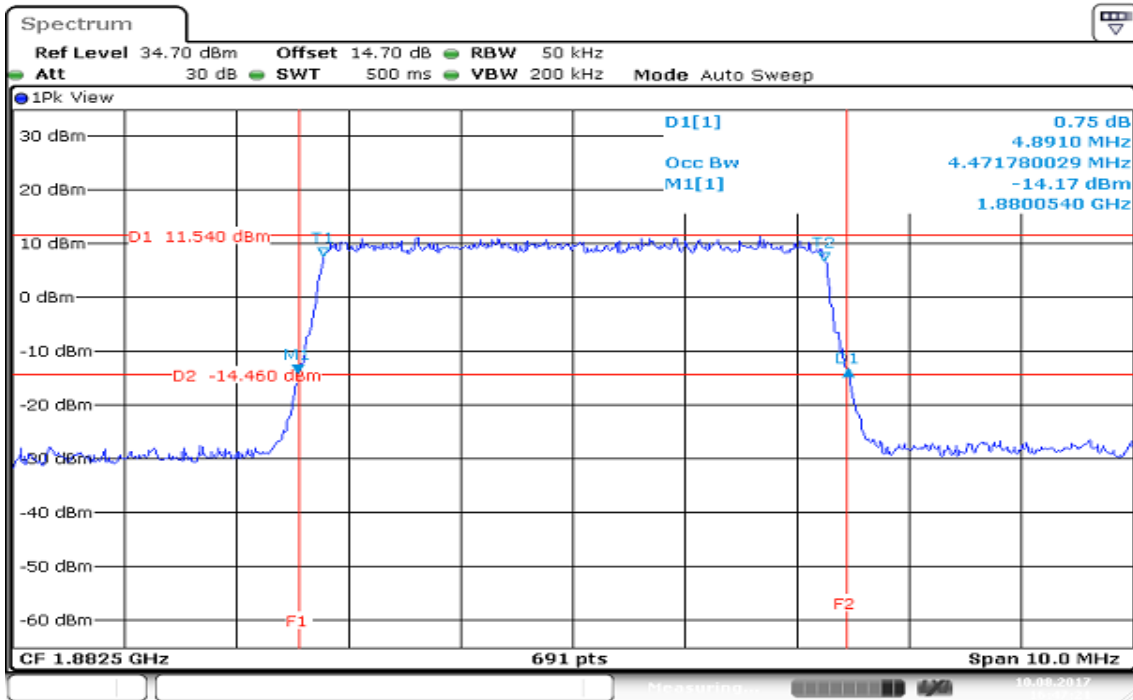
CHANNEL BANDWIDTH: 5MHz / QPSK

CH Mid



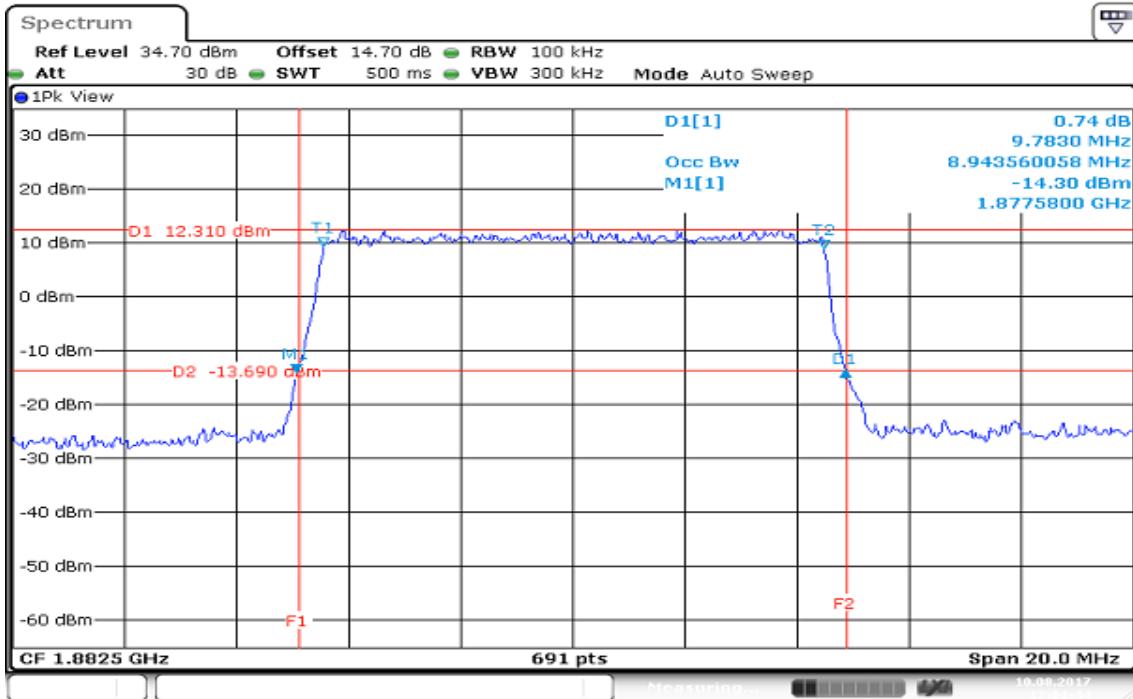
CHANNEL BANDWIDTH: 5MHz / 16QAM

CH Mid



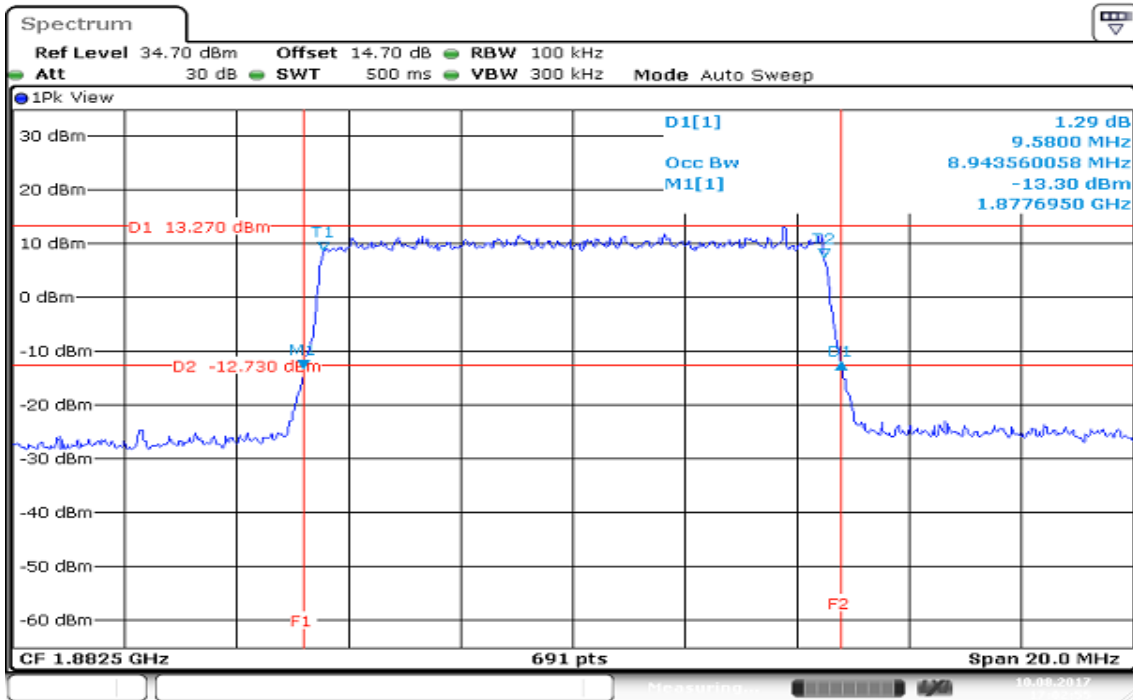
CHANNEL BANDWIDTH: 10MHz / QPSK

CH Mid



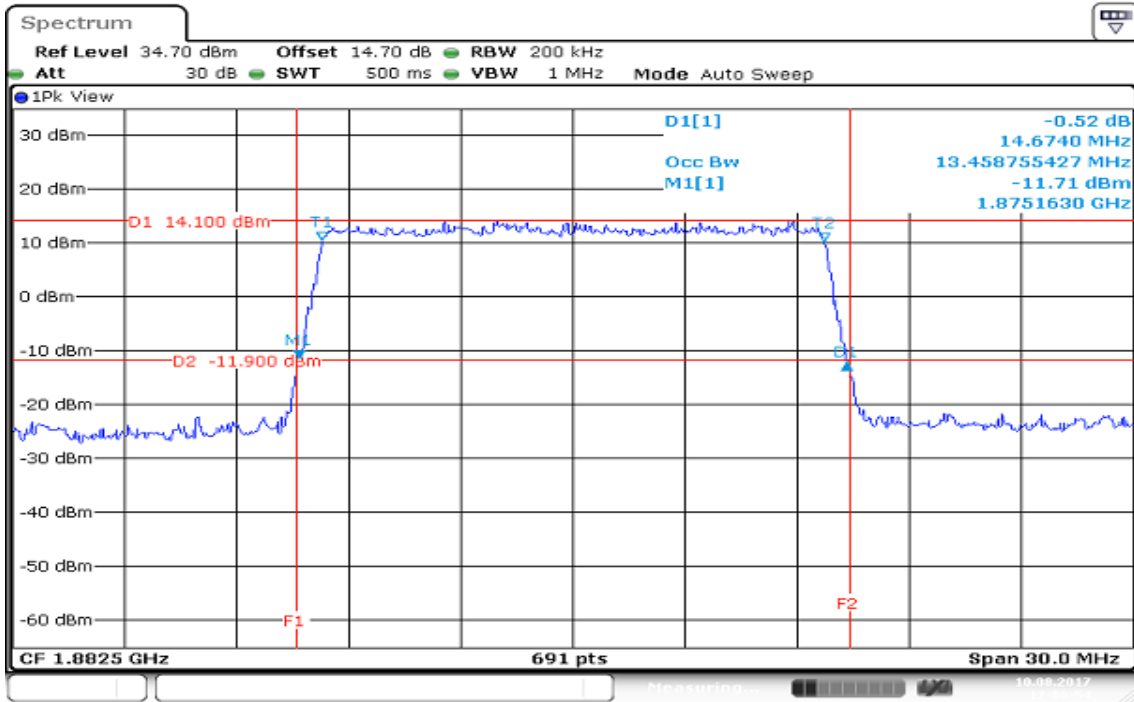
CHANNEL BANDWIDTH: 10MHz / 16QAM

CH Mid



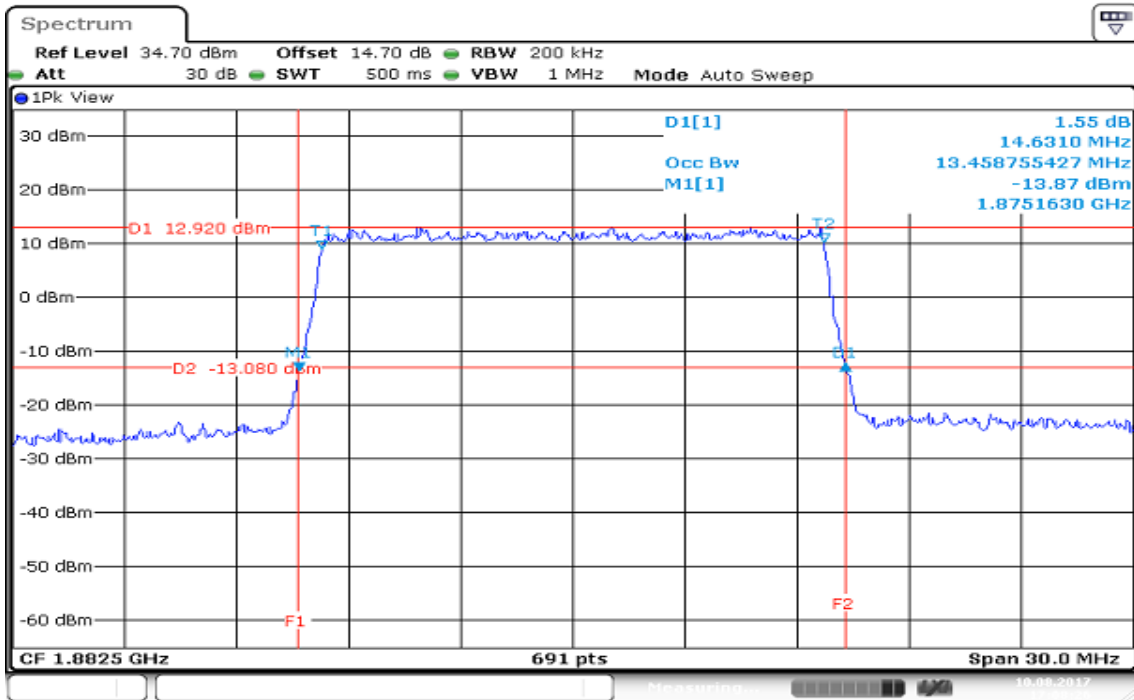
CHANNEL BANDWIDTH: 15MHz / QPSK

CH Mid



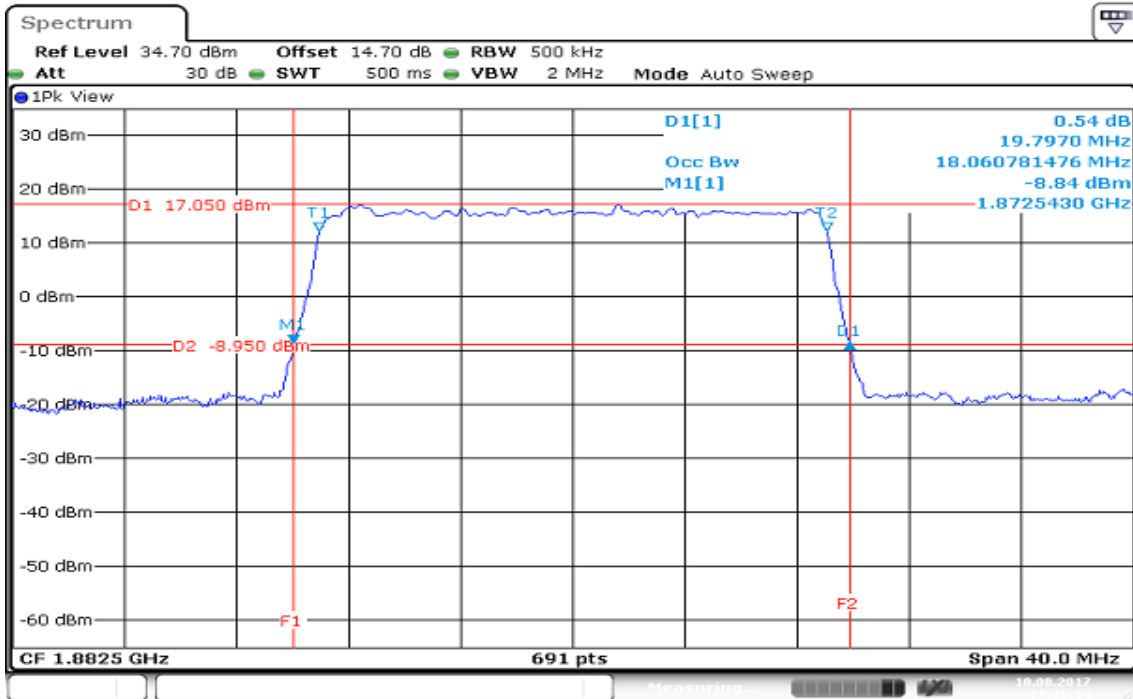
CHANNEL BANDWIDTH: 15MHz / 16QAM

CH Mid



CHANNEL BANDWIDTH: 20MHz / QPSK

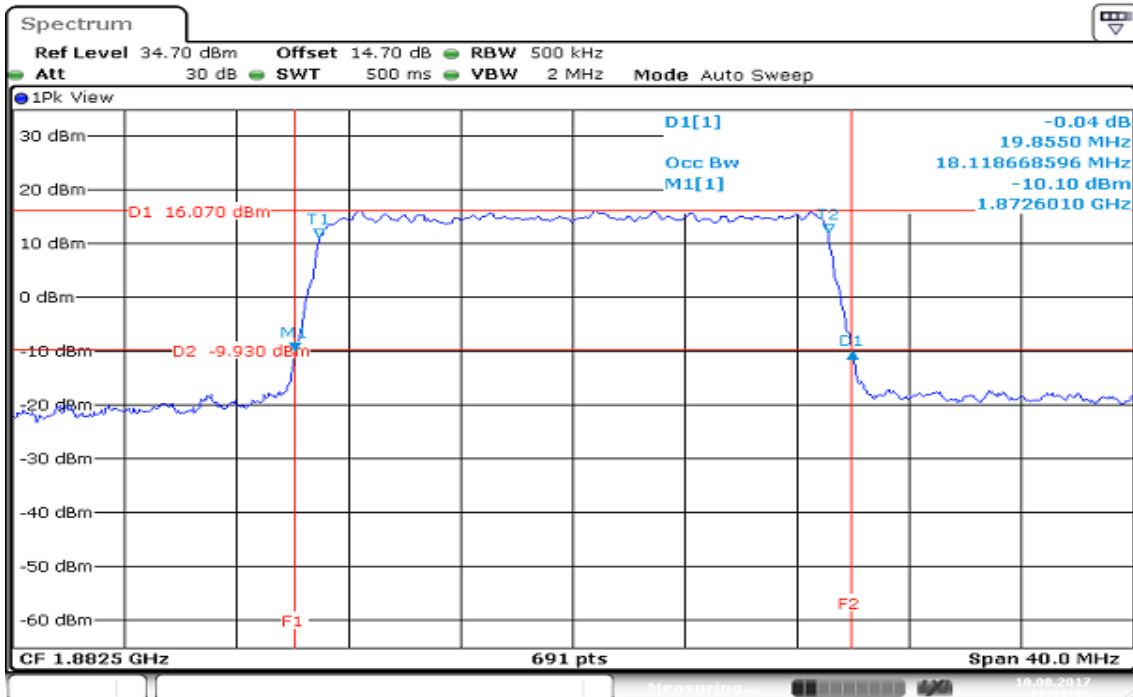
CH Mid



Date: 10.AUG.2017 17:10:14

CHANNEL BANDWIDTH: 20MHz / 16QAM

CH Mid



Date: 10.AUG.2017 17:11:16

7.5 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	5.19

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	6.00

CHANNEL BANDWIDTH: 3MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	4.81

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

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

CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	4.90

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

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

CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	4.75

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	5.74

CHANNEL BANDWIDTH: 15MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	5.01

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.5	5.80

CHANNEL BANDWIDTH: 20MHz / QPSK / 100%RB

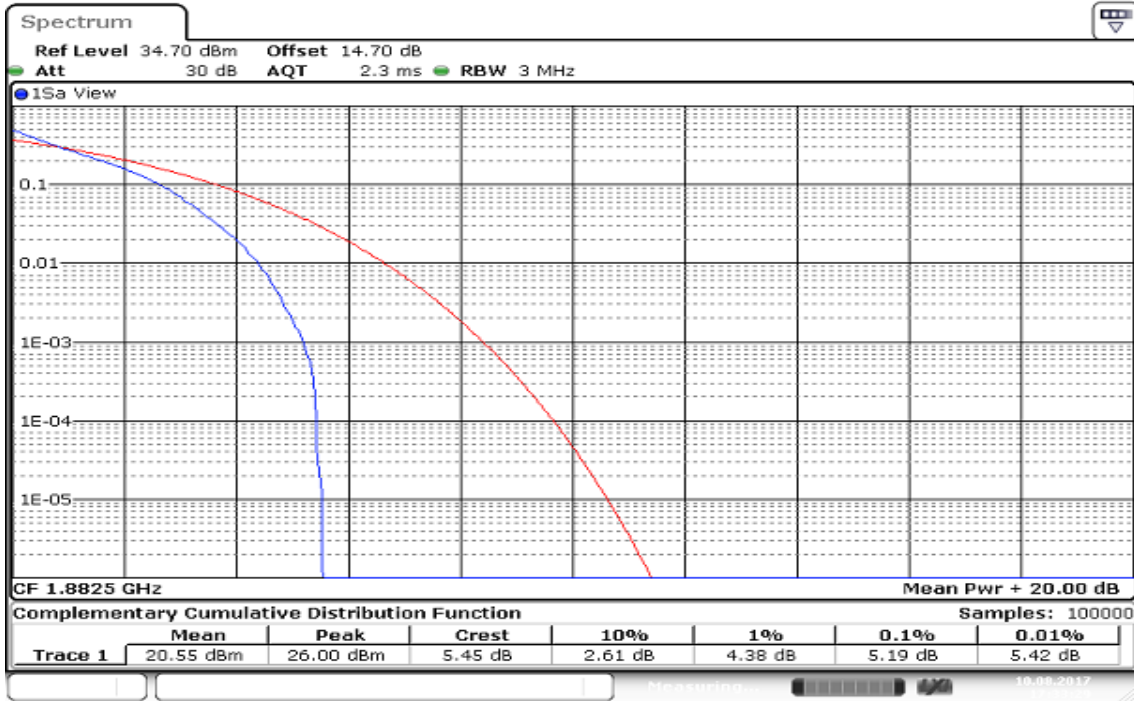
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	4.75

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26365	1882.50	5.68

LTE Band 25
CHANNEL BANDWIDTH: 1.4MHz / QPSK

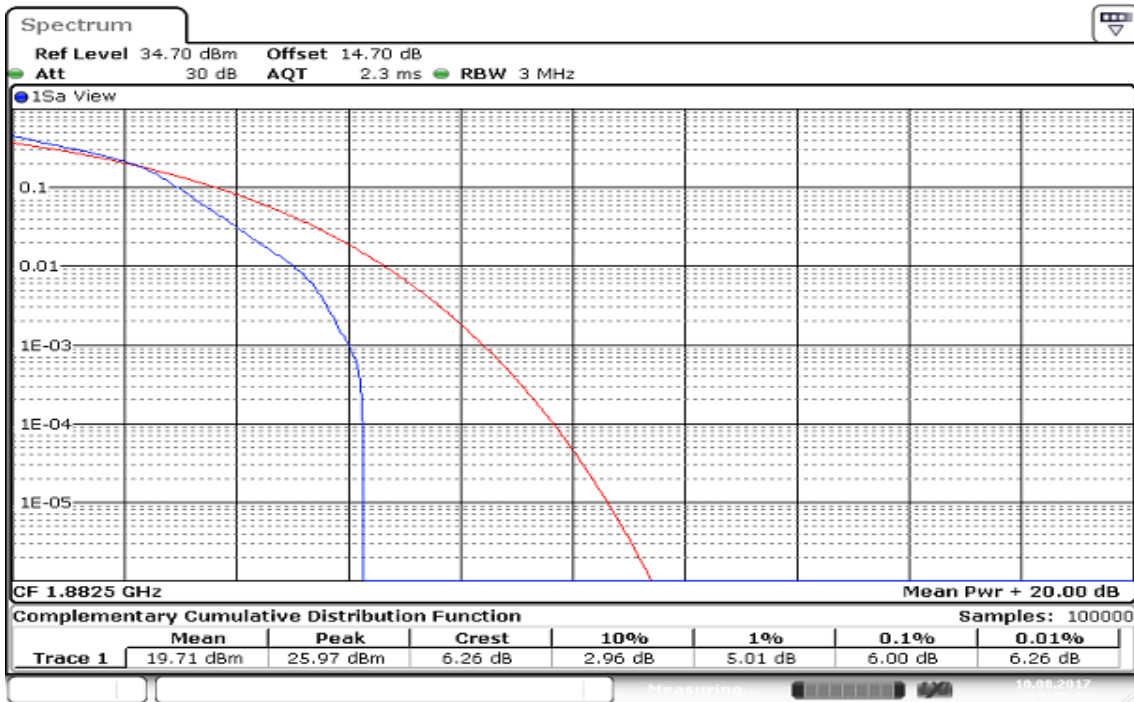
CH Mid



Date: 10 AUG 2017 17:33:29

CHANNEL BANDWIDTH: 1.4MHz / 16QAM

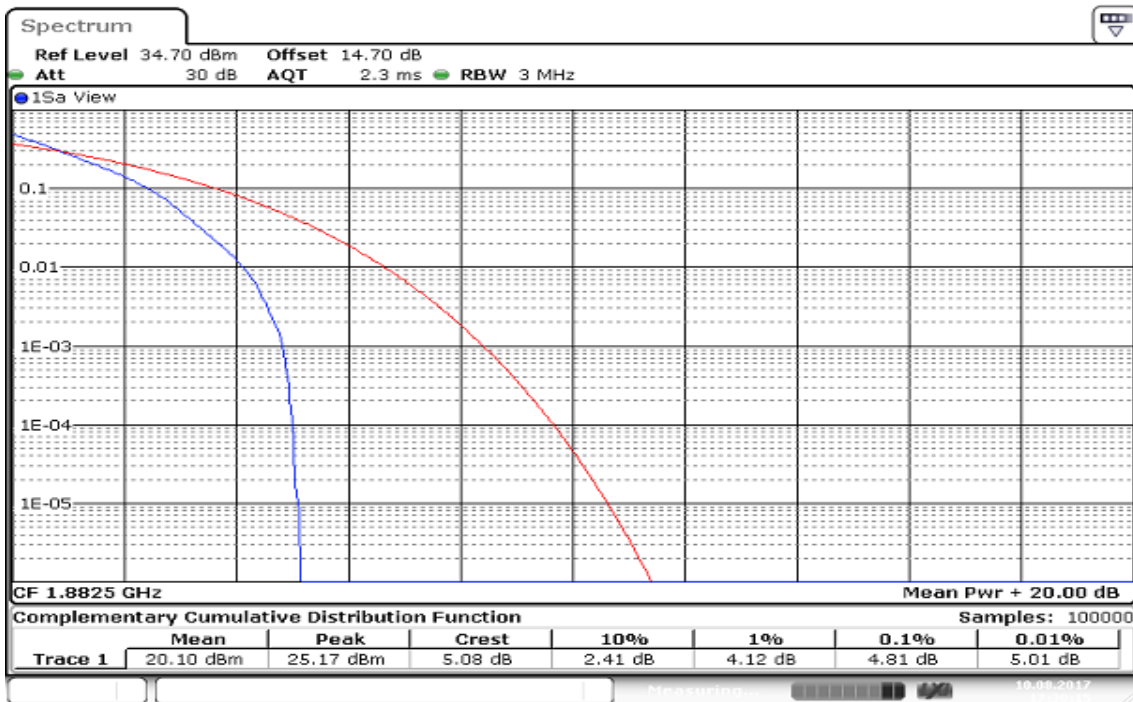
CH Mid



Date: 10 AUG 2017 17:35:27

CHANNEL BANDWIDTH: 3MHz / QPSK

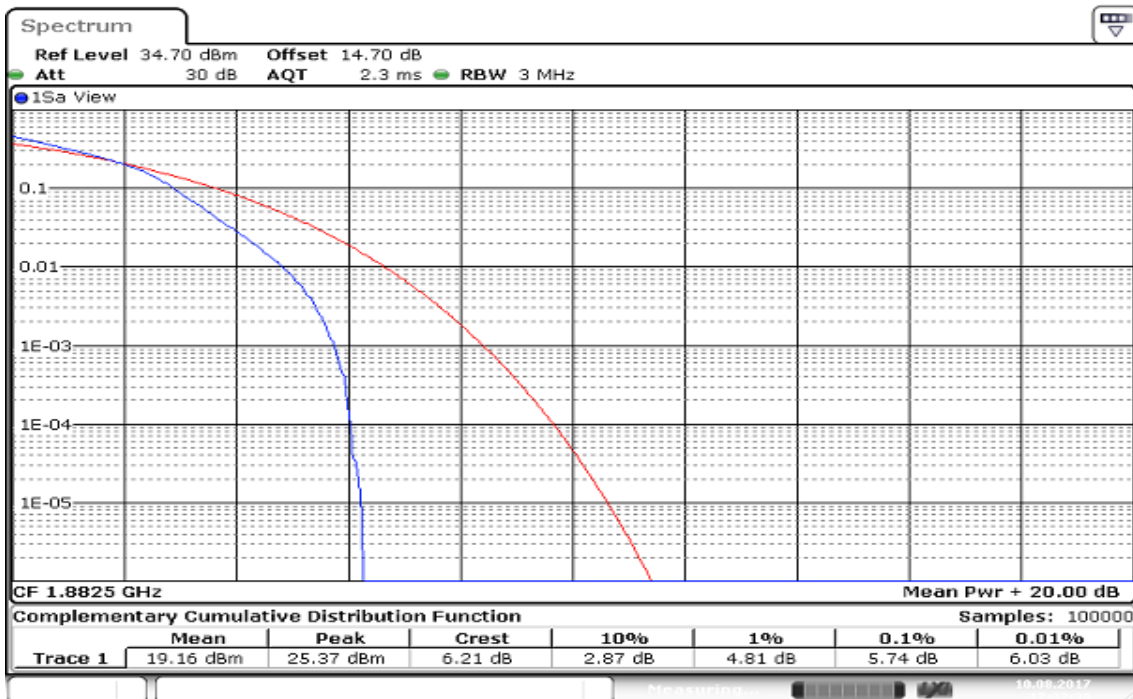
CH Mid



Date: 10 AUG 2017 17:30:16

CHANNEL BANDWIDTH: 3MHz / 16QAM

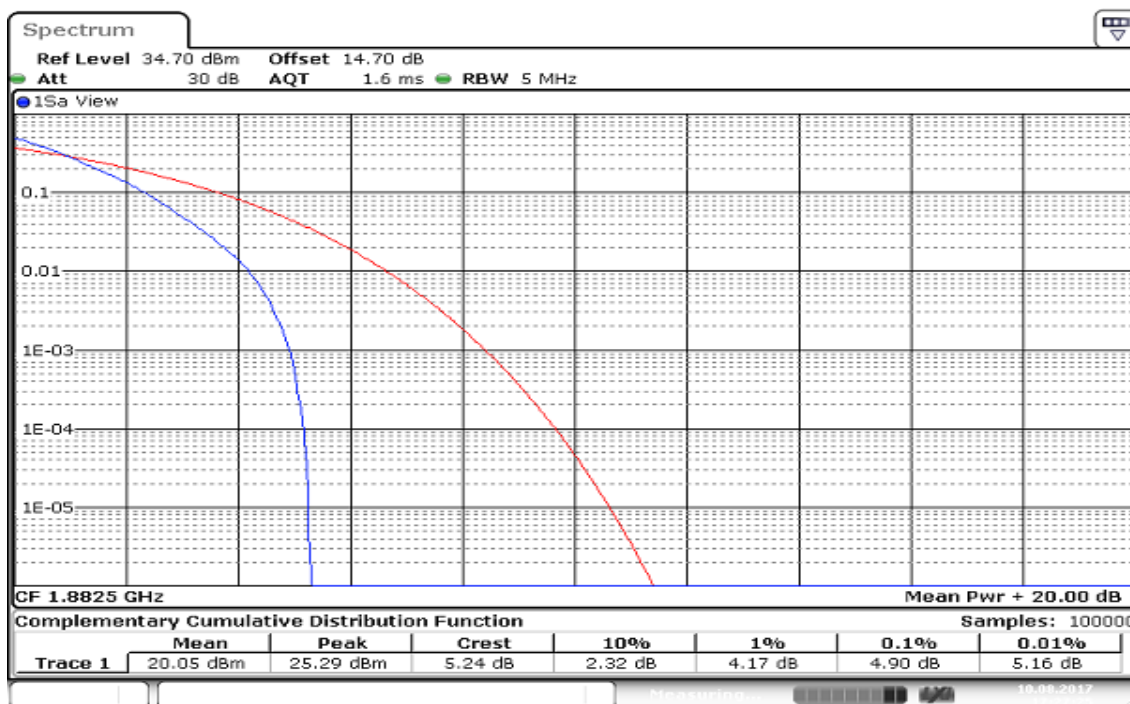
CH Mid



Date: 10 AUG 2017 17:32:38

CHANNEL BANDWIDTH: 5MHz / QPSK

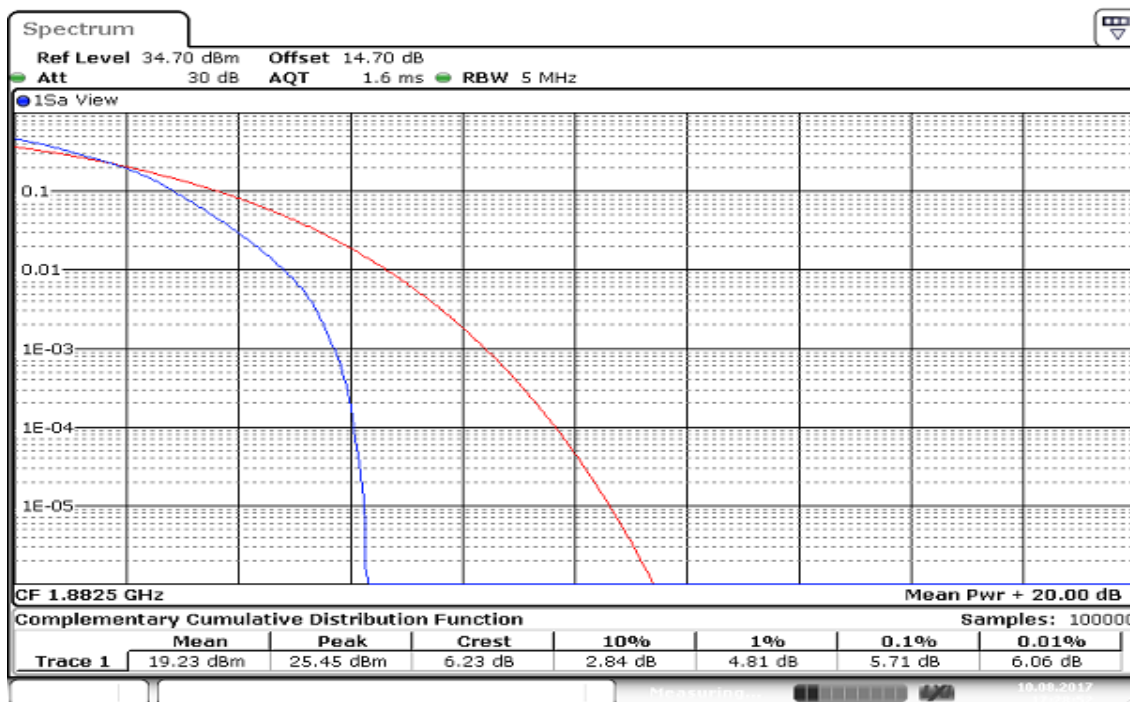
CH Mid



Date: 10.AUG.2017 17:27:25

CHANNEL BANDWIDTH: 5MHz / 16QAM

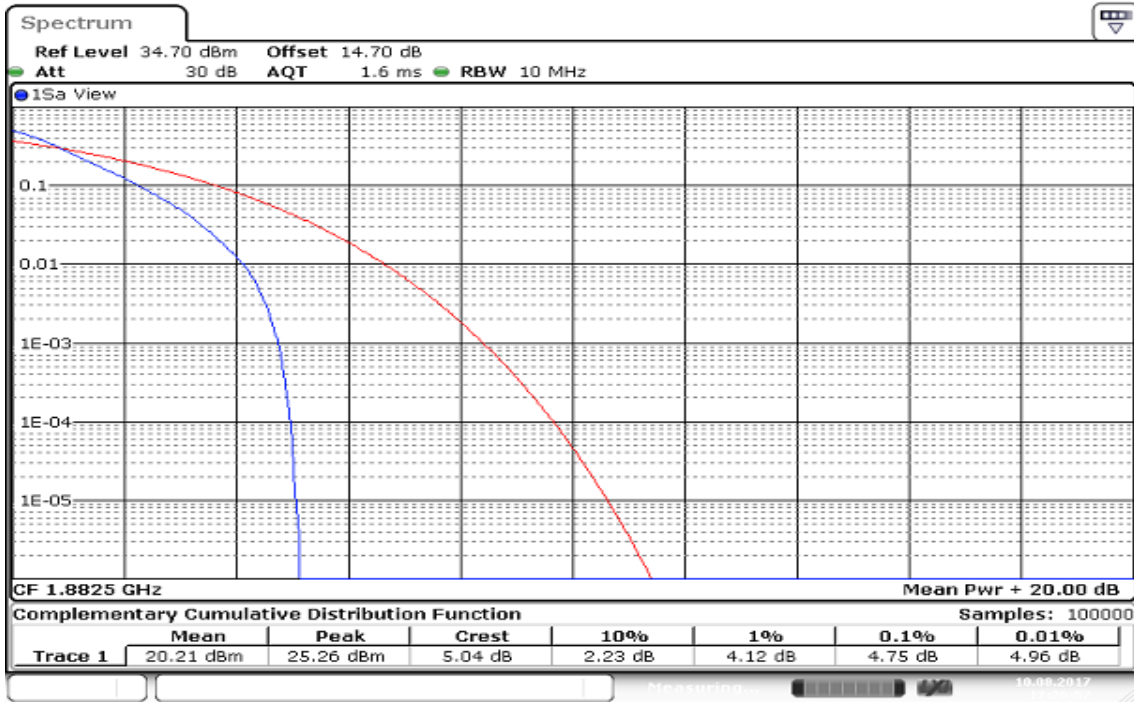
CH Mid



Date: 10.AUG.2017 17:28:52

CHANNEL BANDWIDTH: 10MHz / QPSK

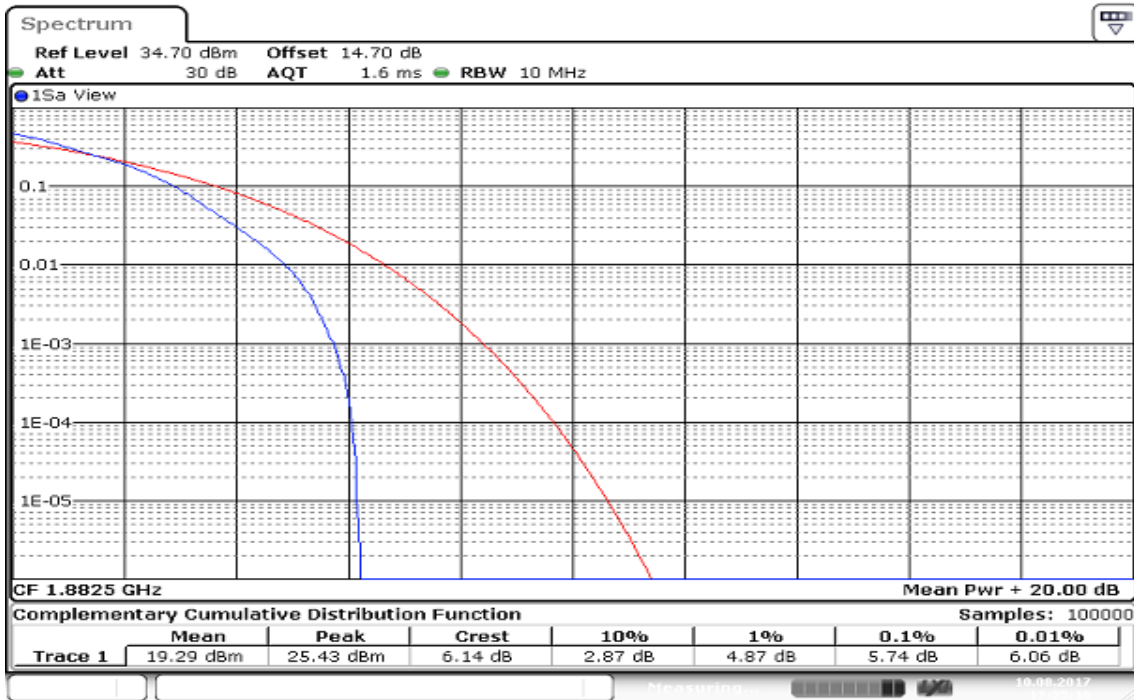
CH Mid



Date: 10.AUG.2017 17:26:53

CHANNEL BANDWIDTH: 10MHz / 16QAM

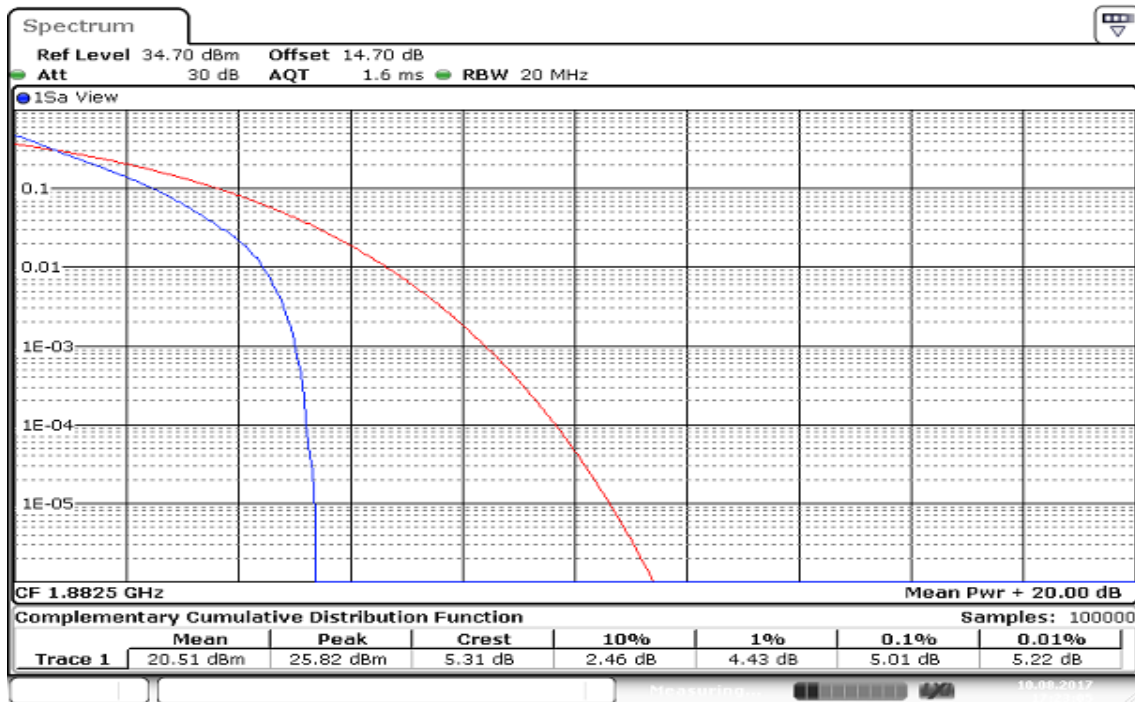
CH Mid



Date: 10.AUG.2017 17:25:16

CHANNEL BANDWIDTH: 15MHz / QPSK

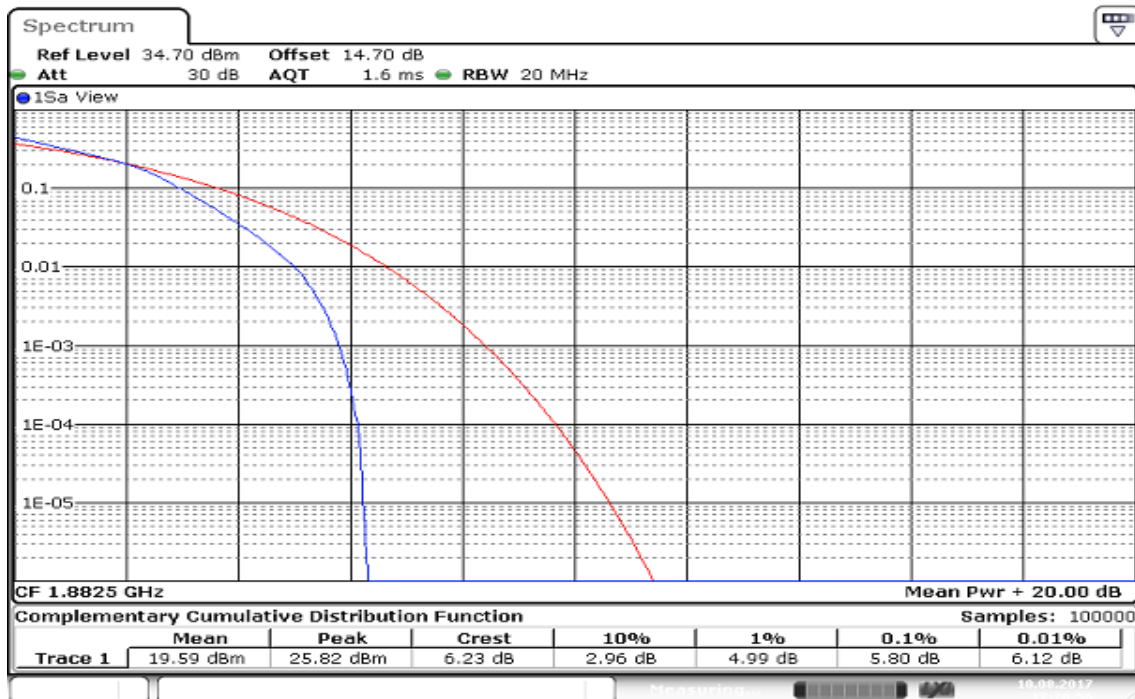
CH Mid



Date: 10.AUG.2017 17:23:06

CHANNEL BANDWIDTH: 15MHz / 16QAM

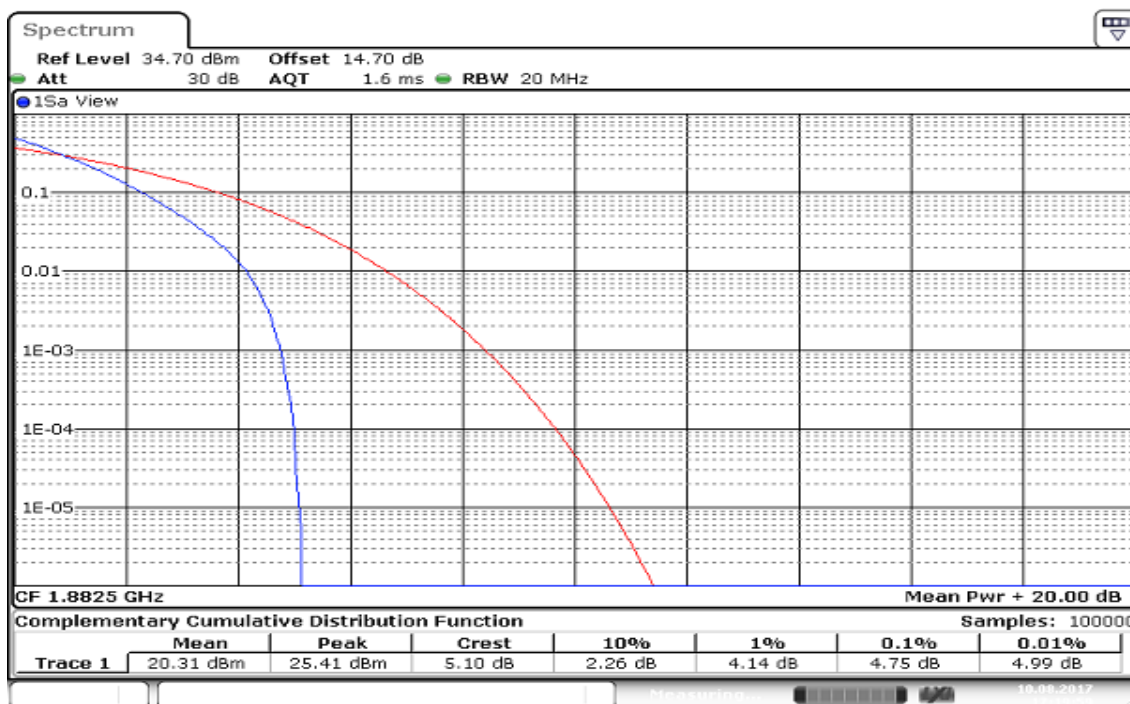
CH Mid



Date: 10.AUG.2017 17:20:56

CHANNEL BANDWIDTH: 20MHz / QPSK

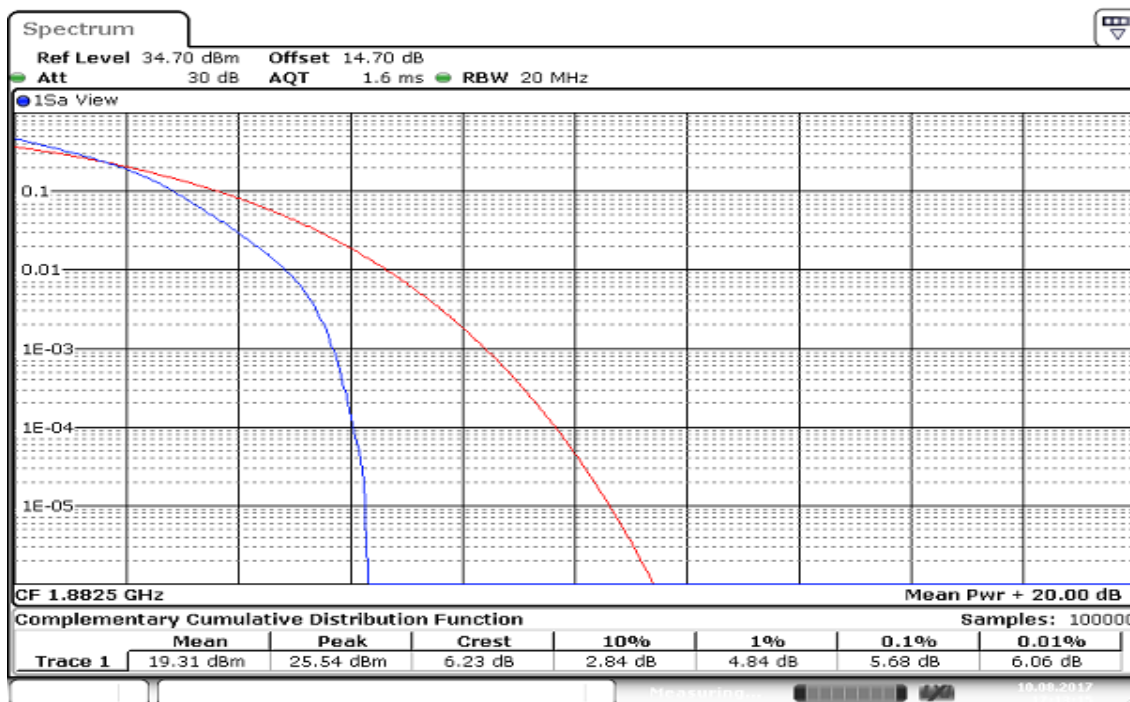
CH Mid



Date: 10.AUG.2017 17:19:59

CHANNEL BANDWIDTH: 20MHz / 16QAM

CH Mid



Date: 10.AUG.2017 17:13:16

7.6 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

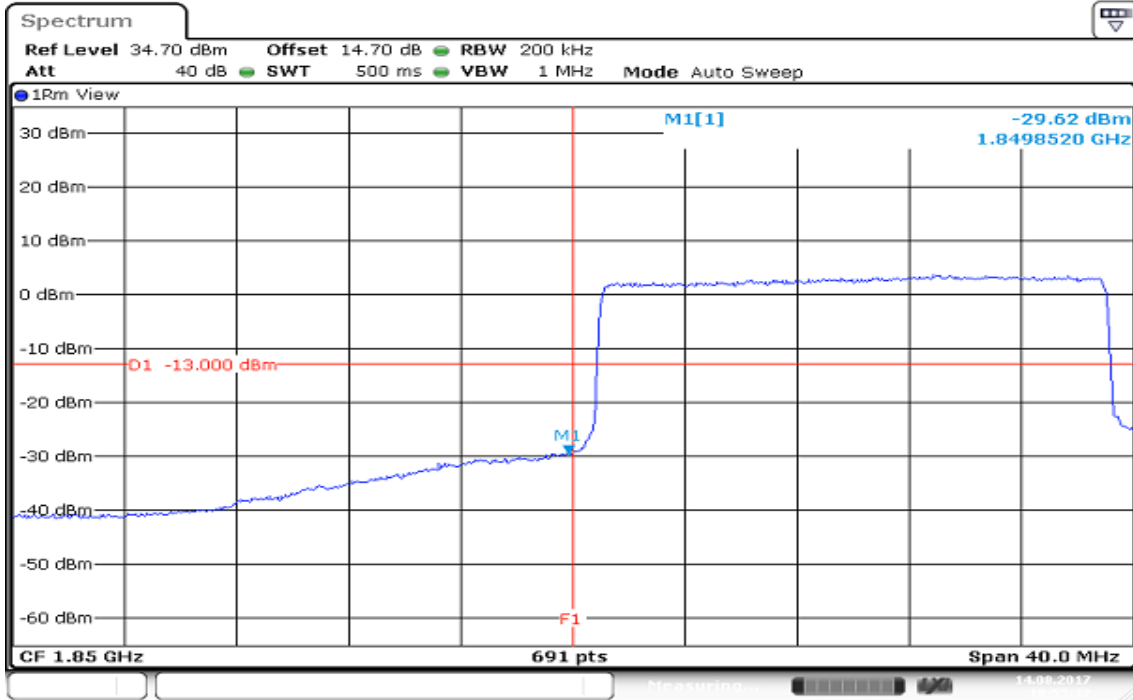
1. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
2. The band edge measurement used the power splitter via EUT RF power connector between 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

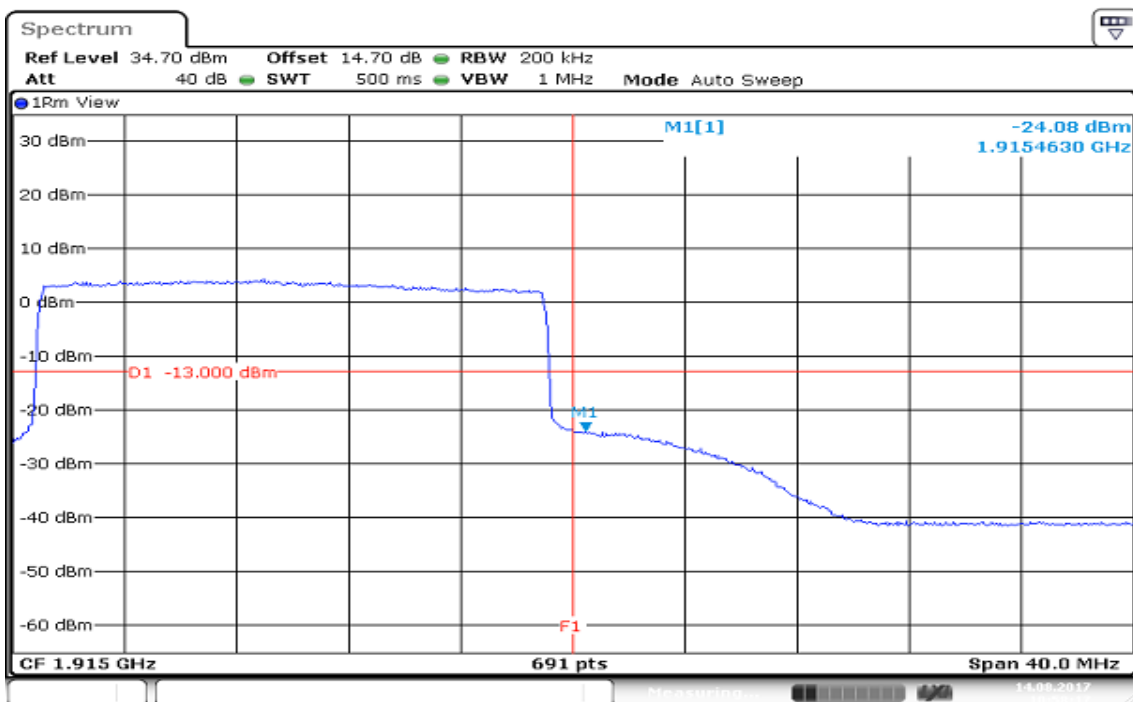
CHANNEL BANDWIDTH: 20MHz / QPSK / FULL RB ALLOCATED

LOWER BAND EDGE



Date: 14 AUG 2017 10:55:11

HIGHER BAND EDGE

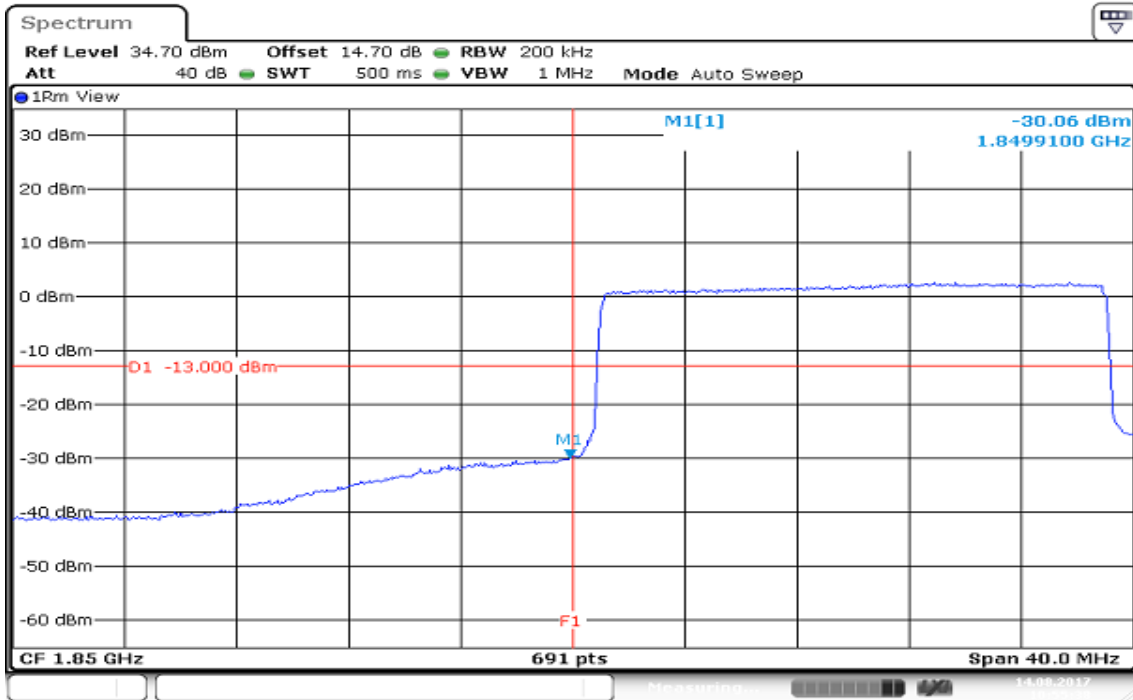


Date: 14 AUG 2017 10:58:18

LTE Band 25

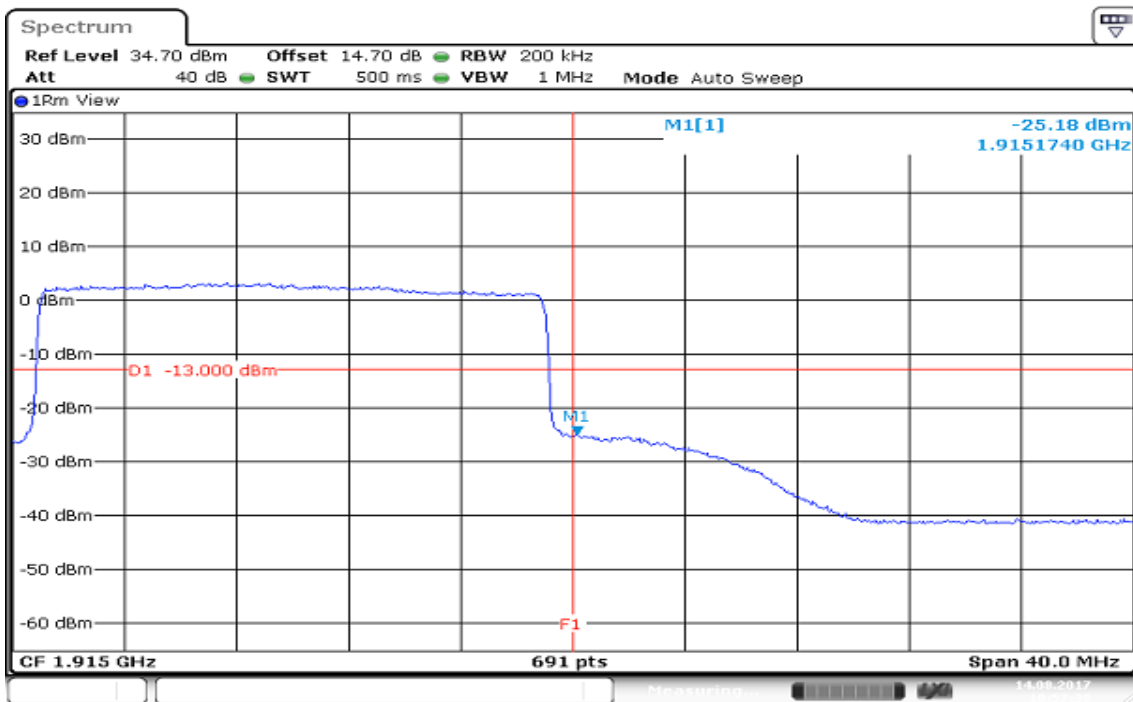
CHANNEL BANDWIDTH: 20MHz / 16QAM / FULL RB ALLOCATED

LOWER BAND EDGE



Date: 14 AUG 2017 10:55:29

HIGHER BAND EDGE



Date: 14 AUG 2017 10:57:28

7.7 CONDUCTED SPURIOUS EMISSIONS

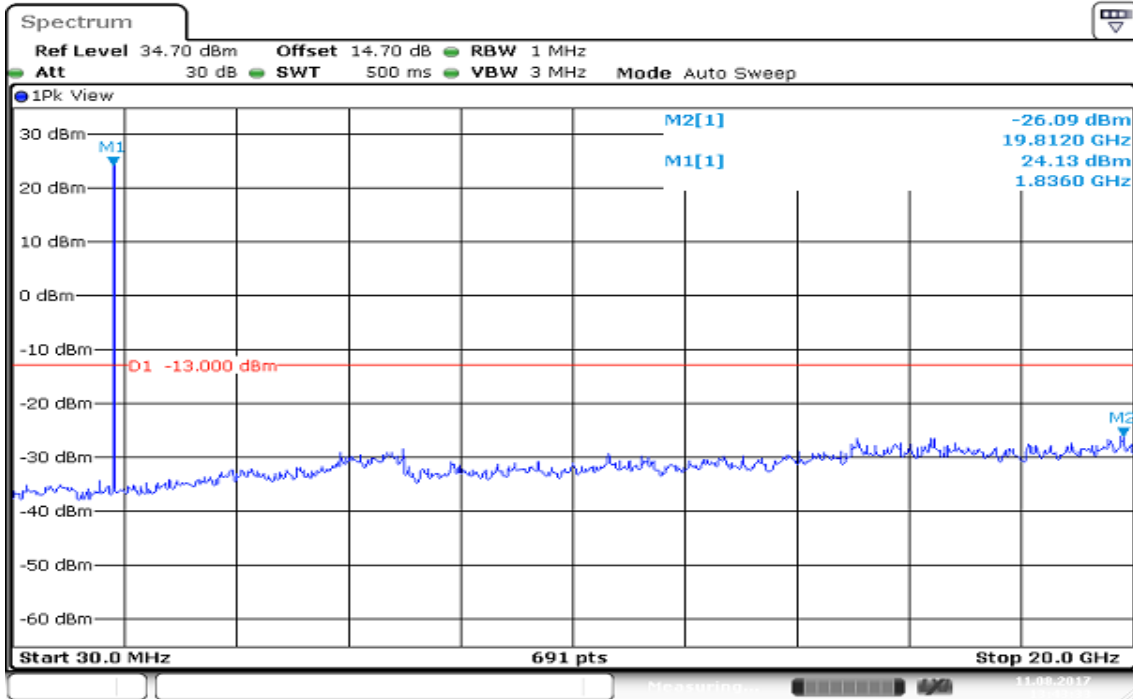
Limits

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

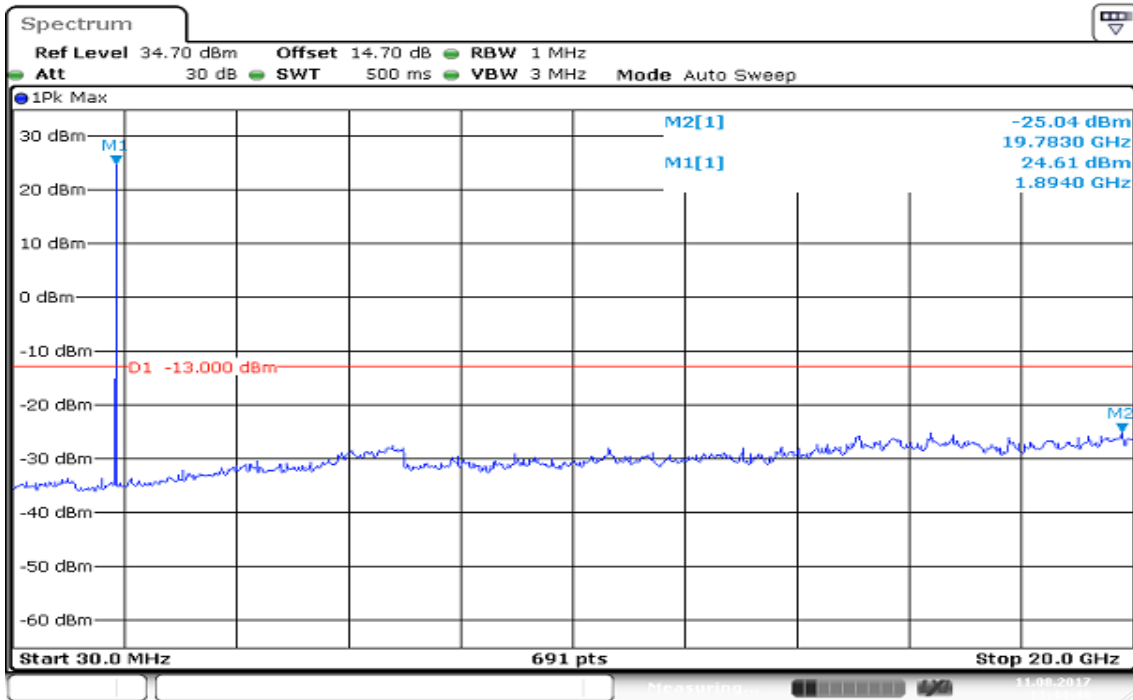
Test Procedures

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 RB=1MHz, VB=3MHz.
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 RB=1MHz, VB=3MHz.

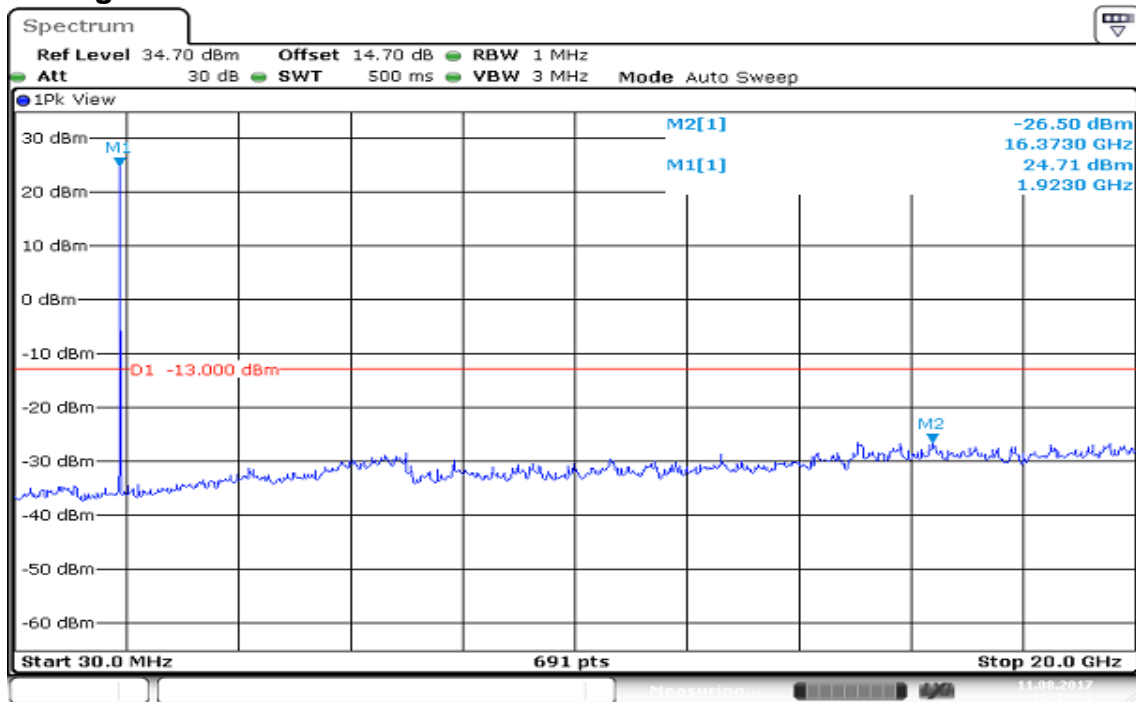
Test Results
LTE Band 25
CHANNEL BANDWIDTH: 1.4MHz / QPSK
CH Low



CH Mid



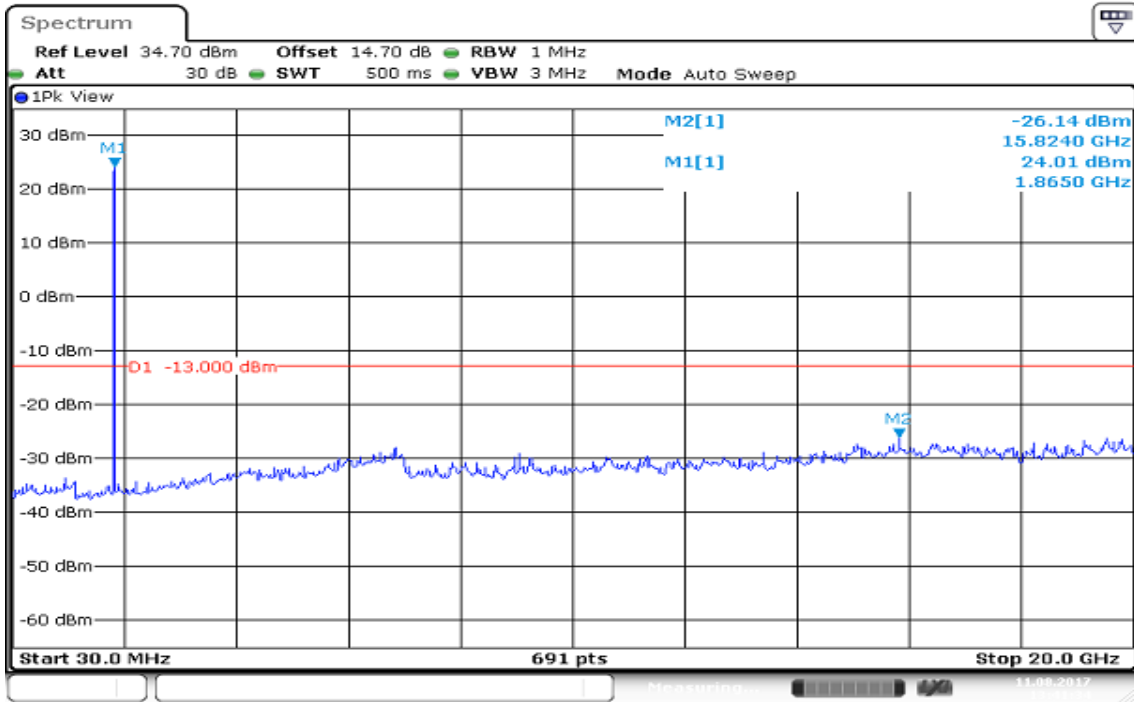
CH High



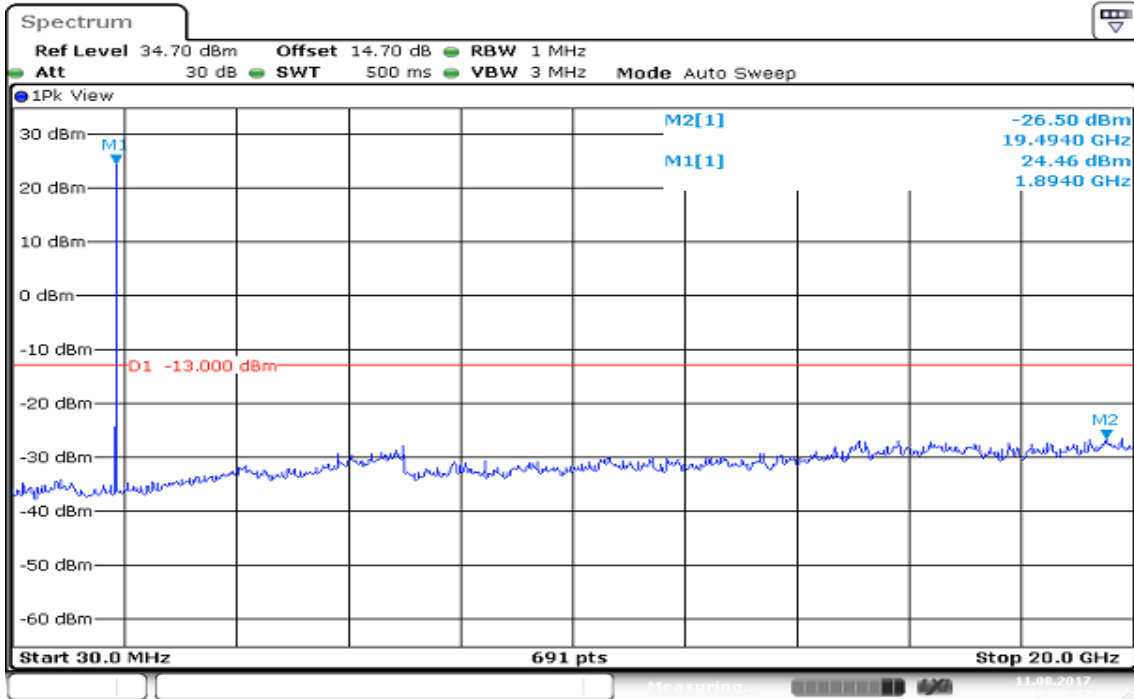
Date: 11 AUG 2017 13:42:29

CHANNEL BANDWIDTH: 1.4MHz / 16QAM

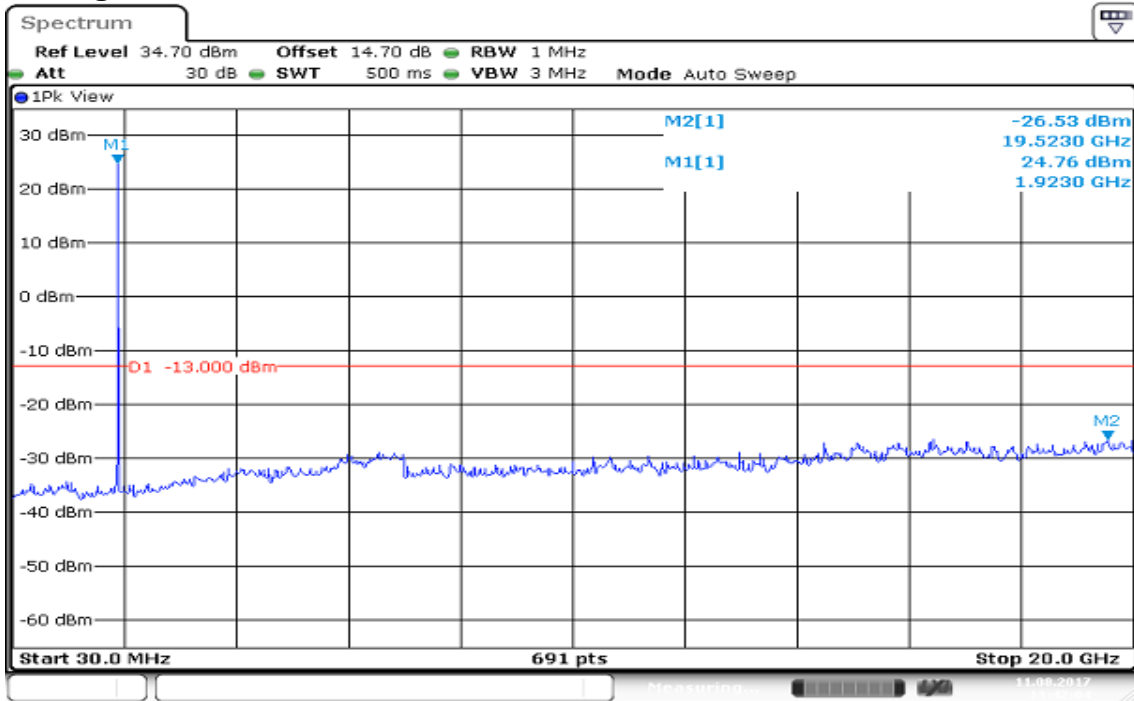
CH Low



CH Mid

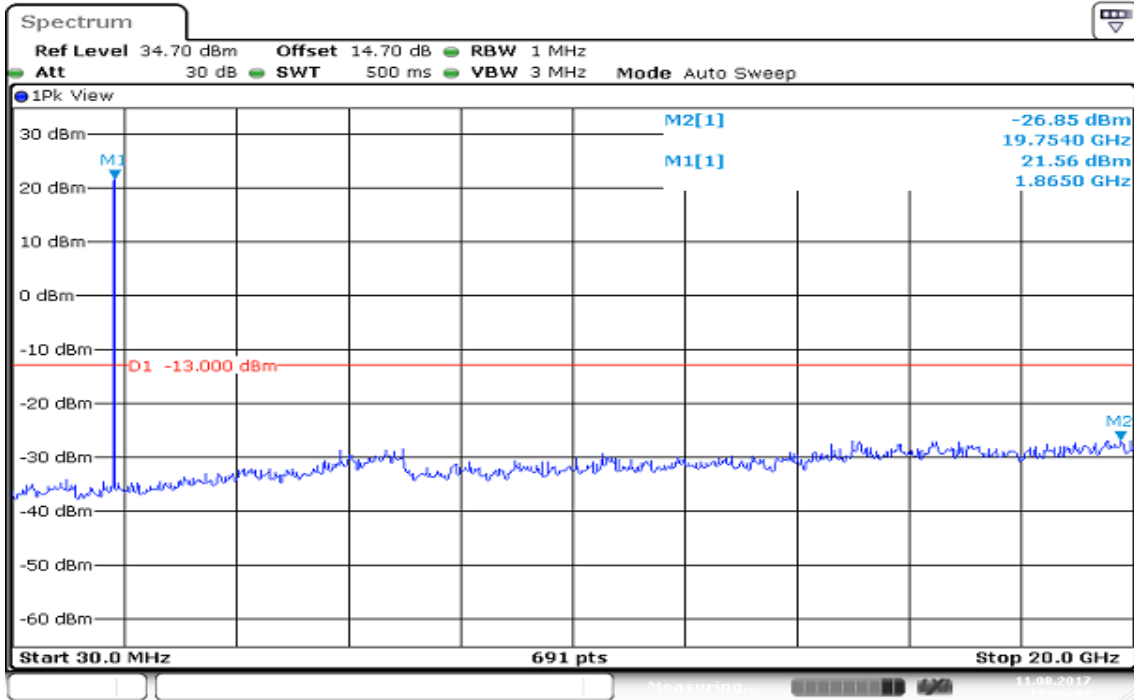


CH High

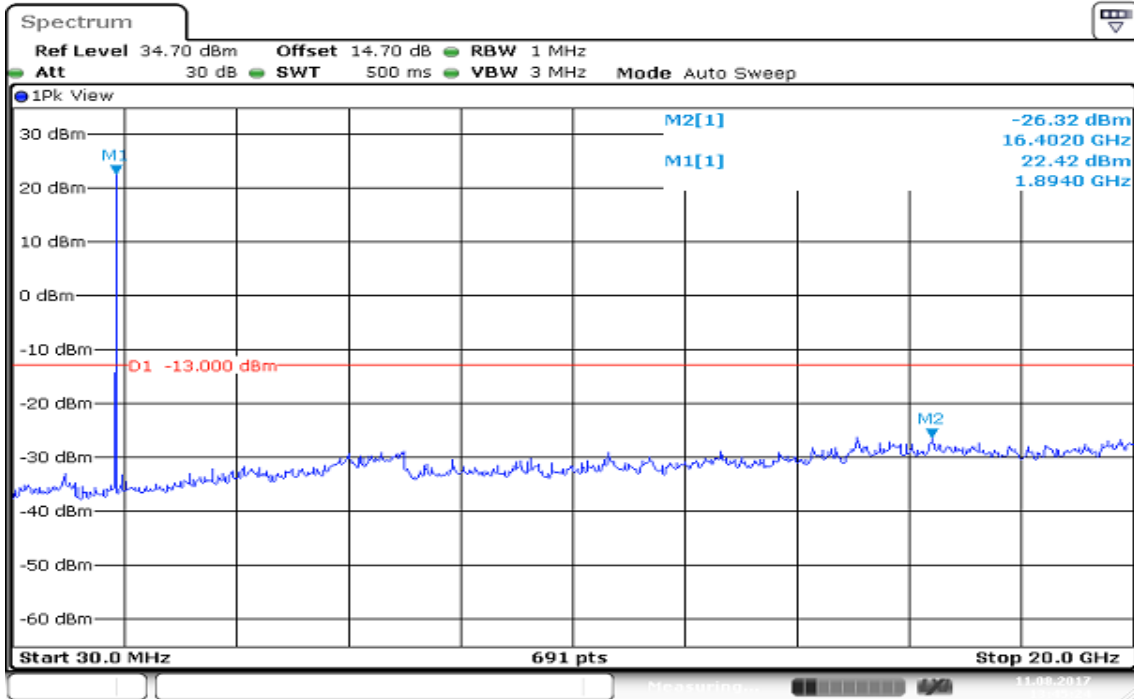


Date: 11 AUG 2017 13:42:04

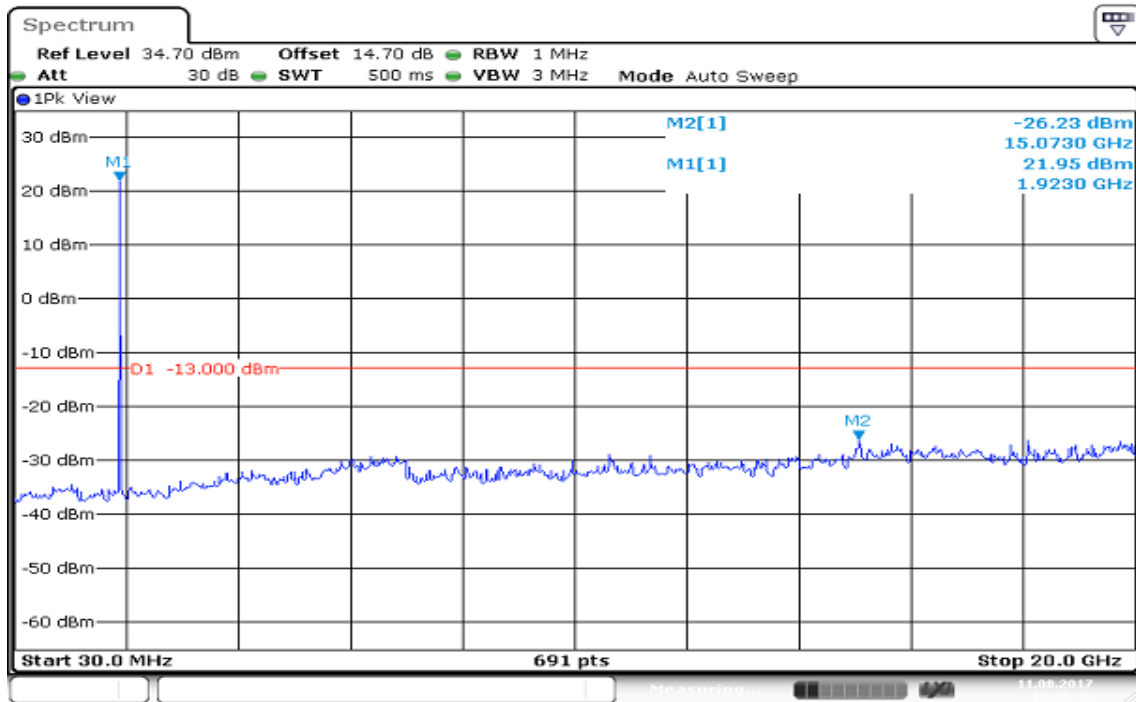
CHANNEL BANDWIDTH: 3MHz / QPSK
CH Low



CH Mid



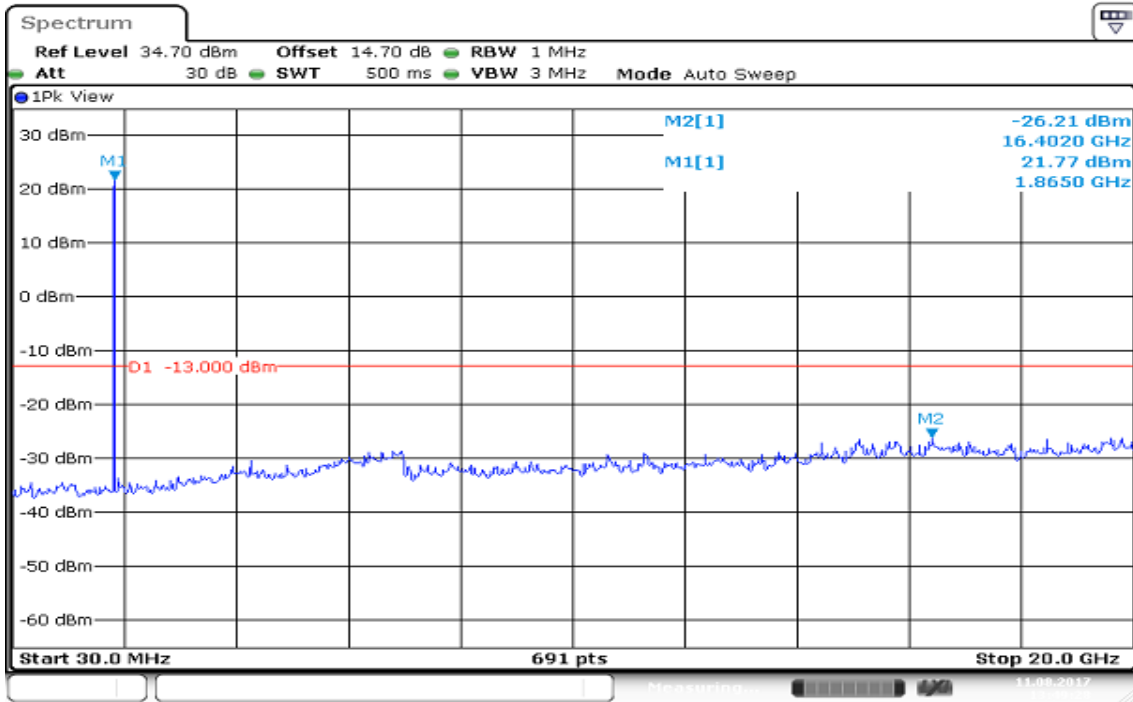
CH High



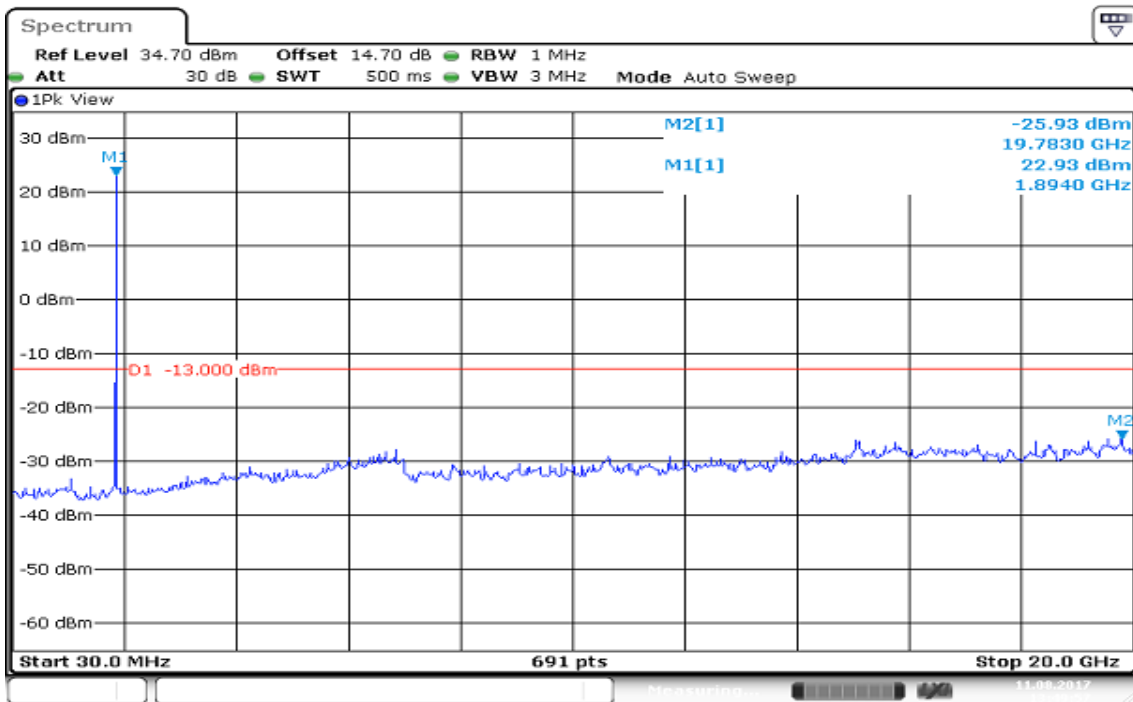
Date: 11 AUG 2017 13:46:20

CHANNEL BANDWIDTH: 3MHz / 16QAM

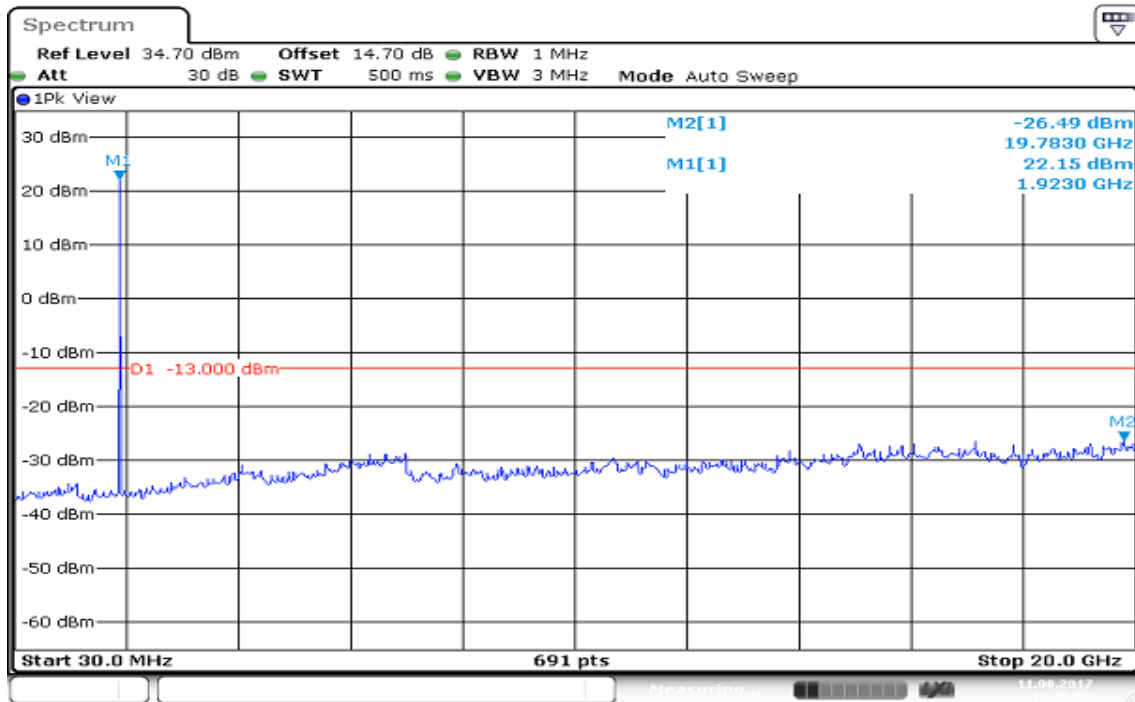
CH Low



CH Mid

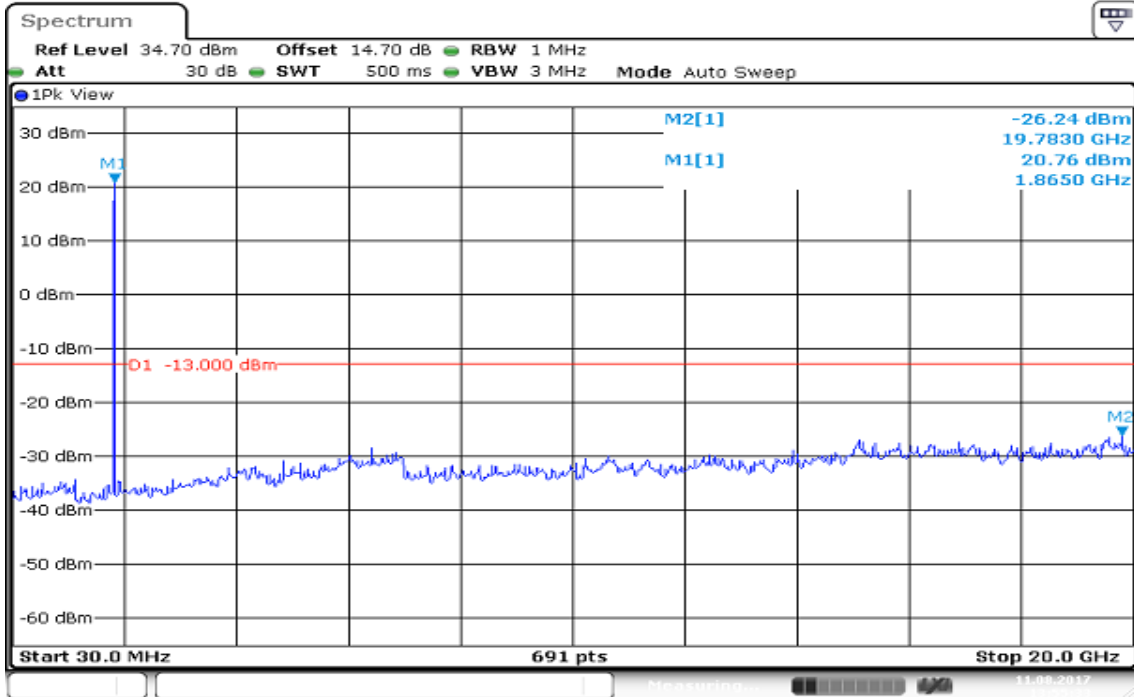


CH High

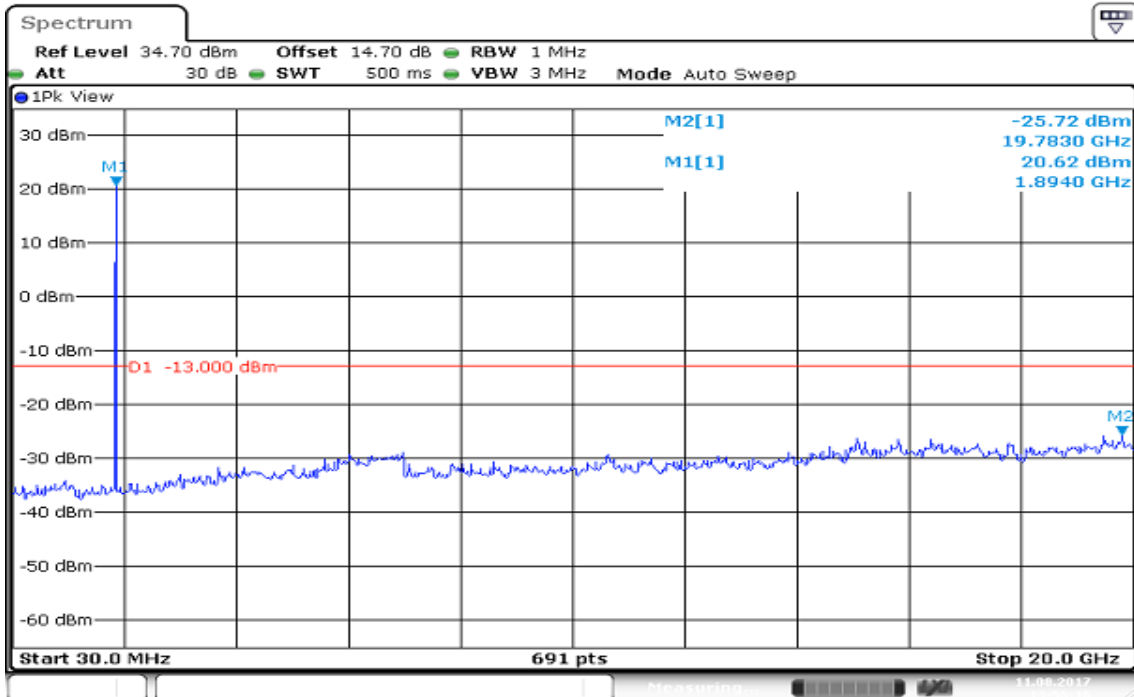


Date: 11.AUG.2017 13:46:53

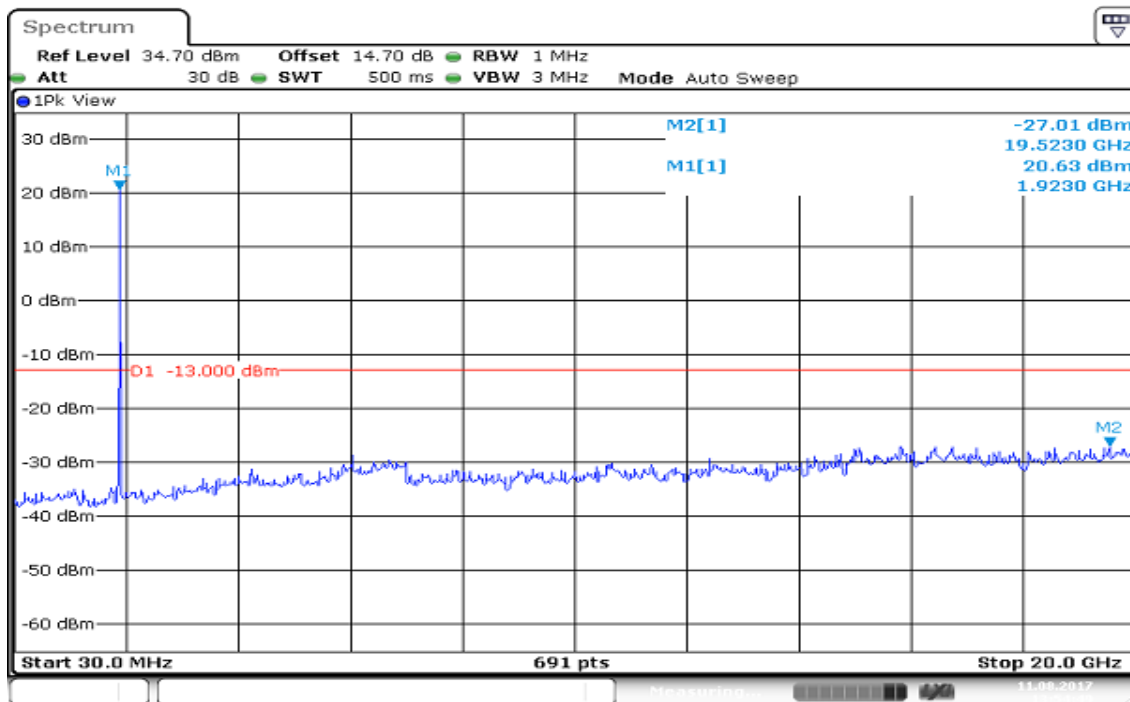
**CHANNEL BANDWIDTH: 5MHz / QPSK
 CH Low**



CH Mid



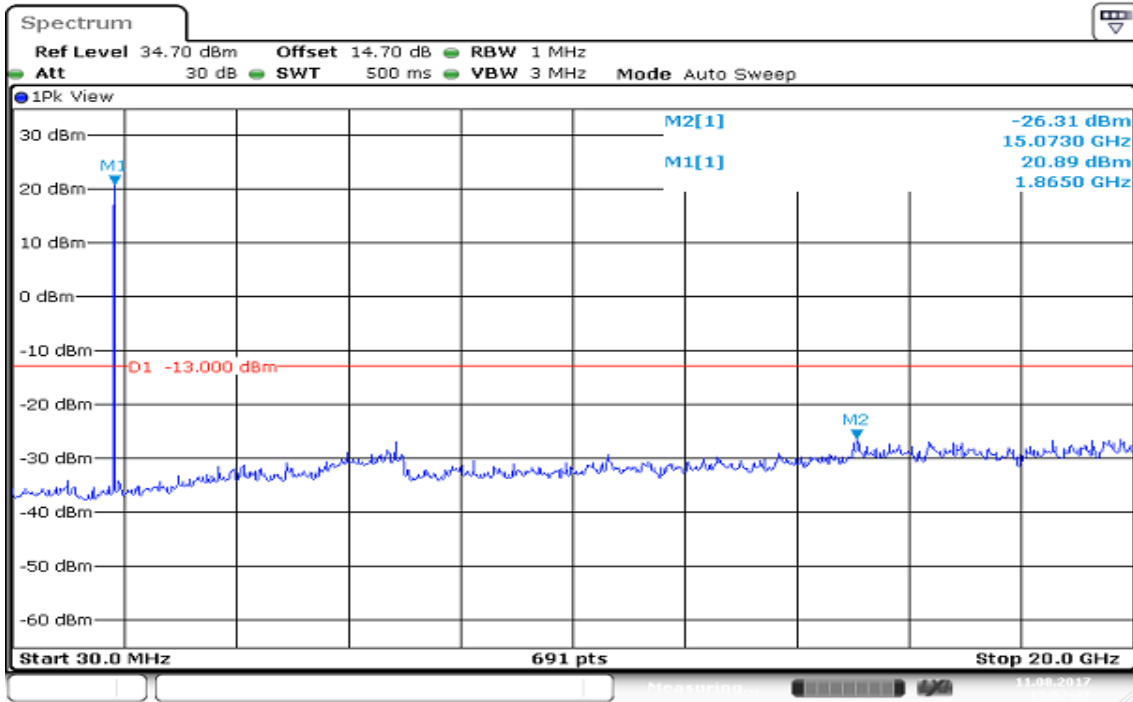
CH High



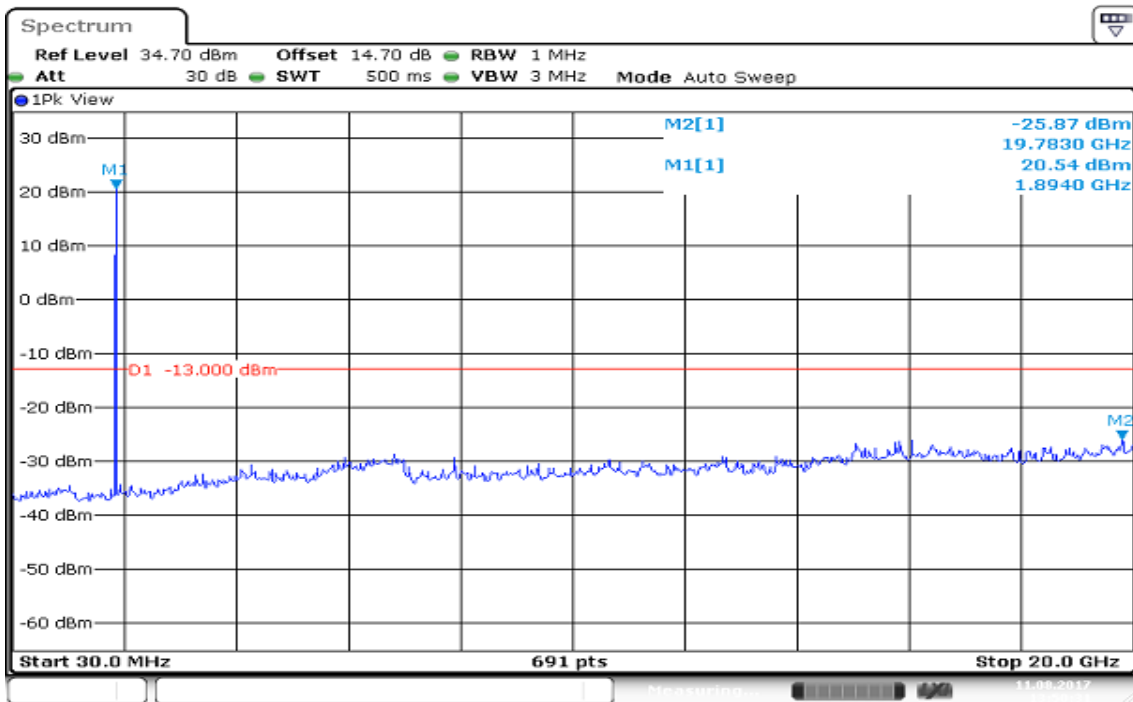
Date: 11.AUG.2017 13:54:49

CHANNEL BANDWIDTH: 5MHz / 16QAM

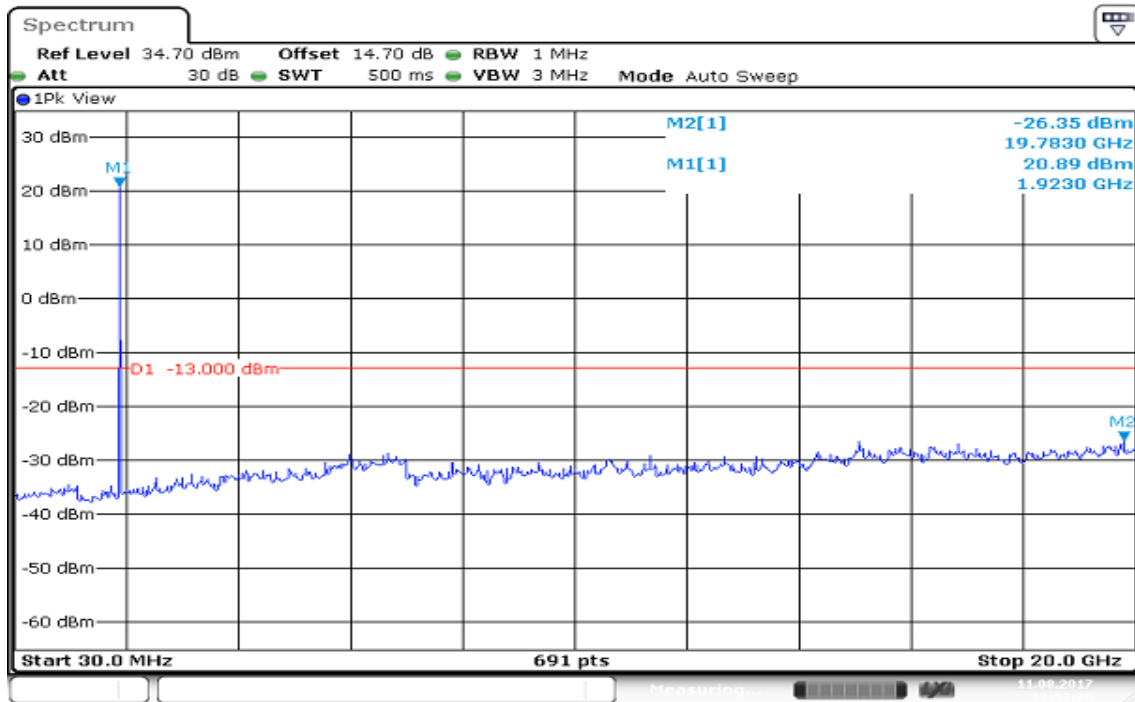
CH Low



CH Mid



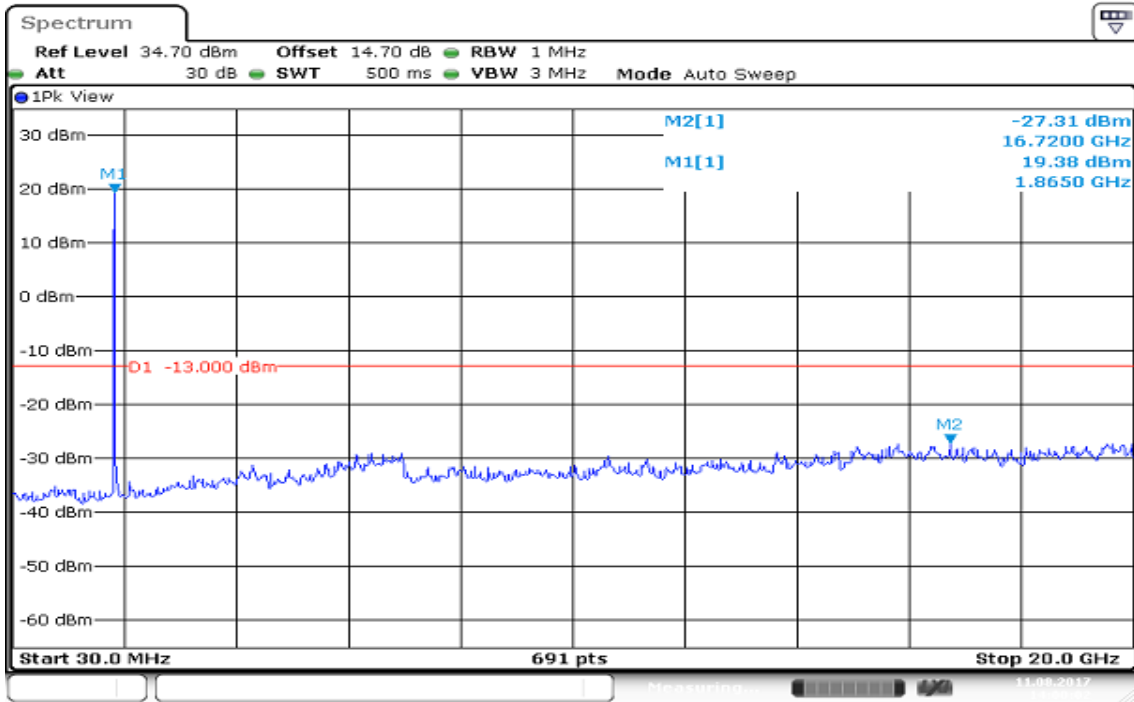
CH High



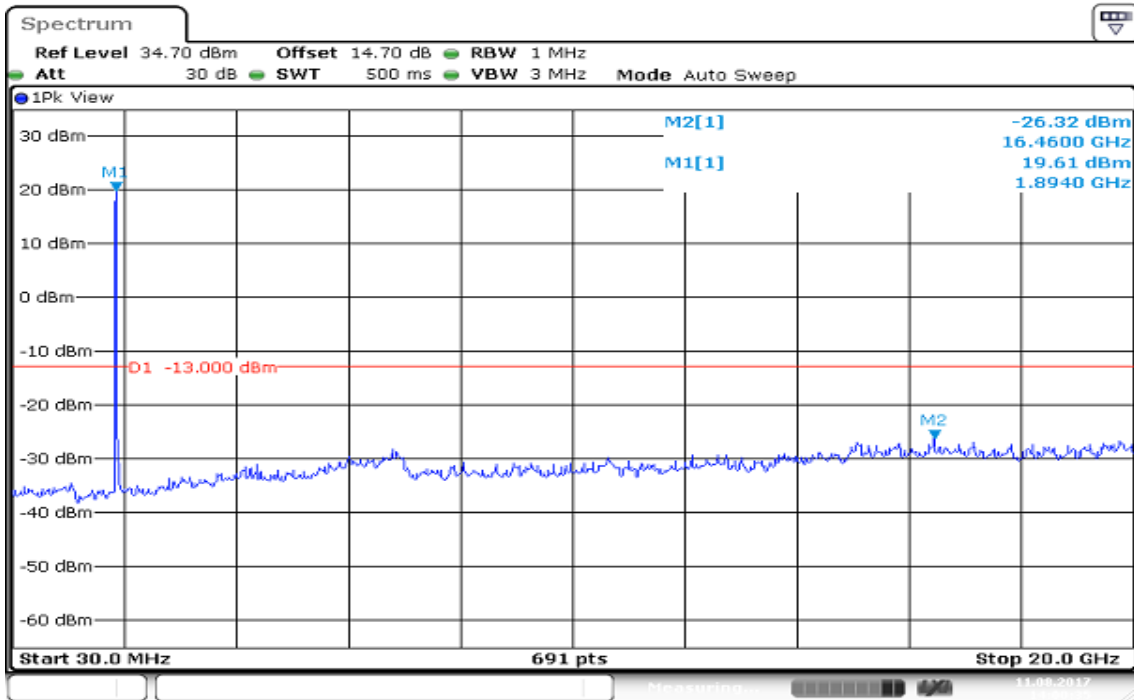
Date: 11.AUG.2017 13:53:20

CHANNEL BANDWIDTH: 10MHz / QPSK

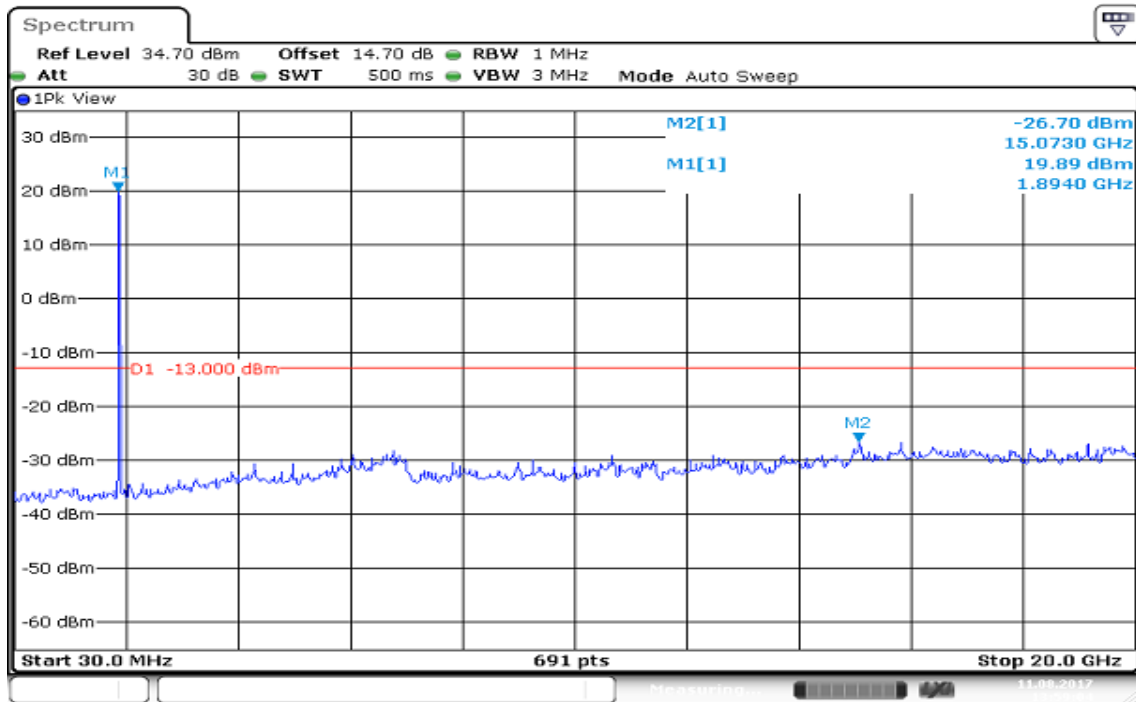
CH Low



CH Mid



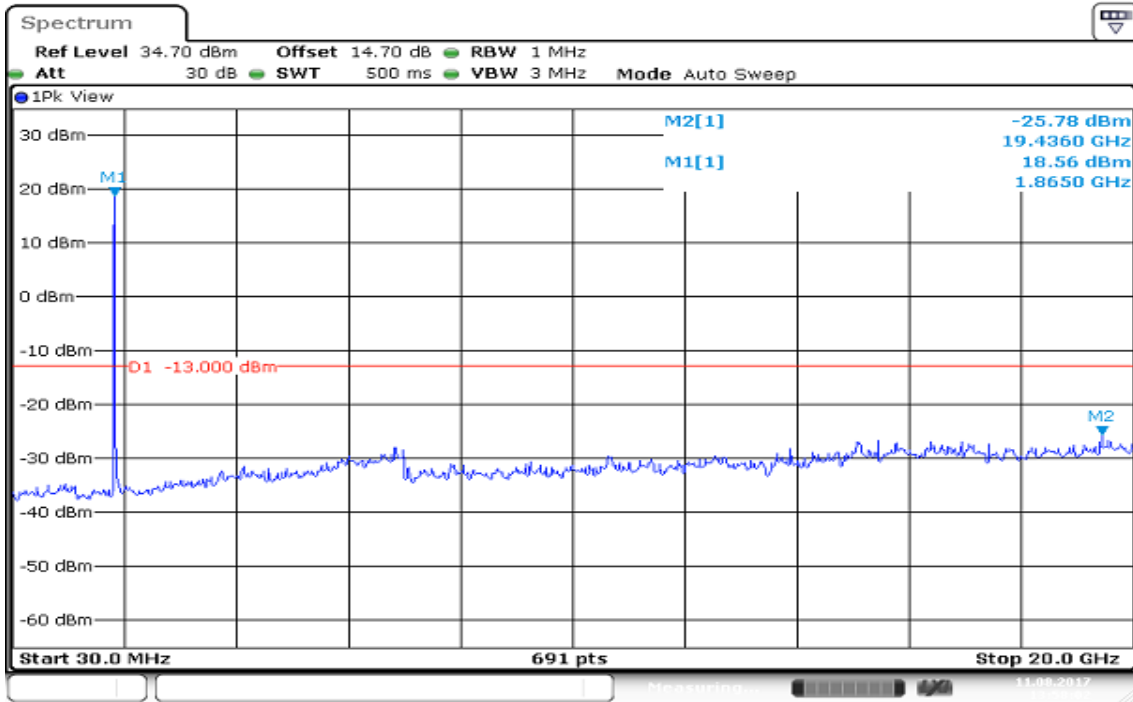
CH High



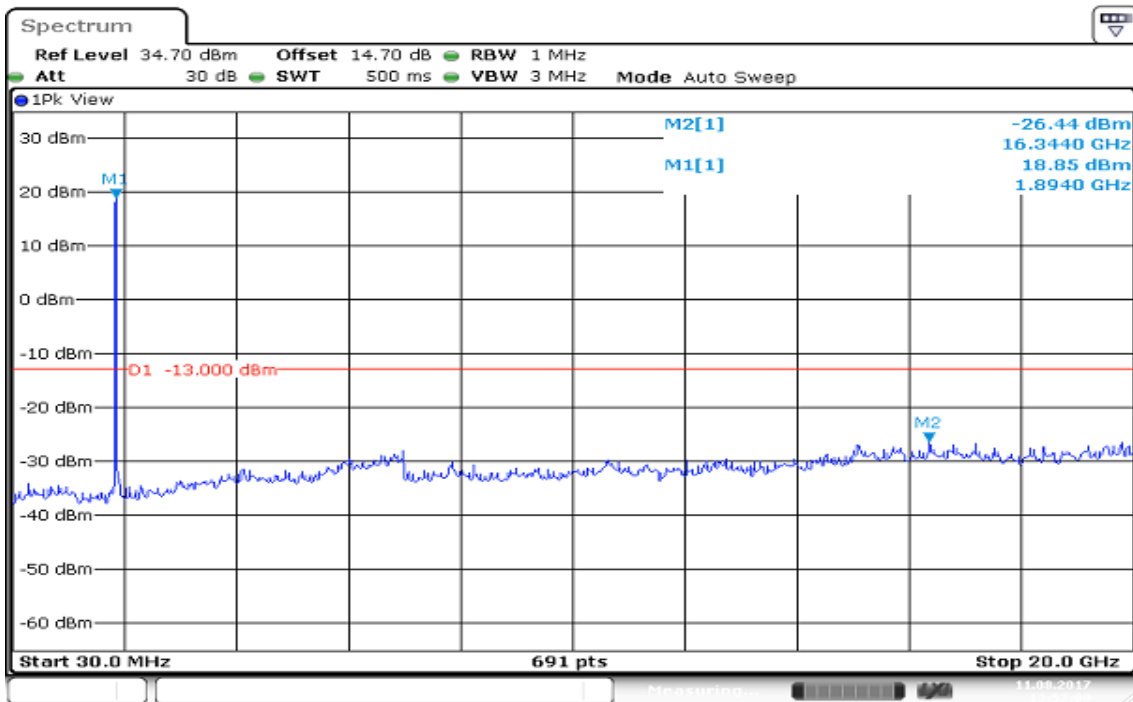
Date: 11.AUG.2017 13:59:05

CHANNEL BANDWIDTH: 10MHz / 16QAM

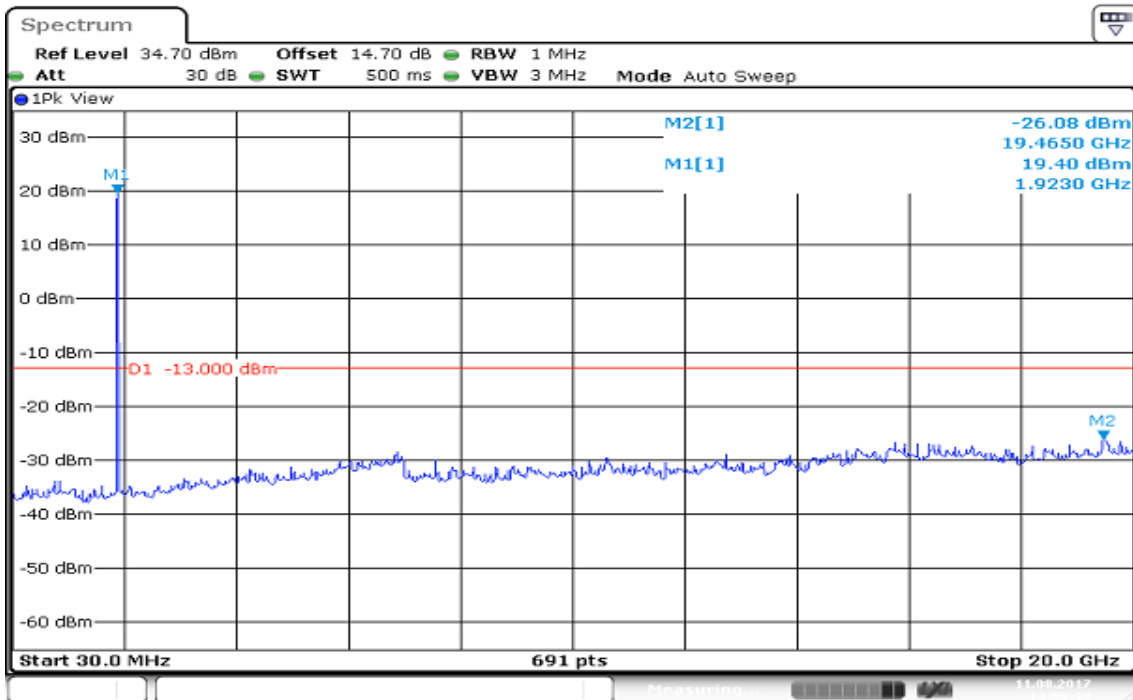
CH Low



CH Mid



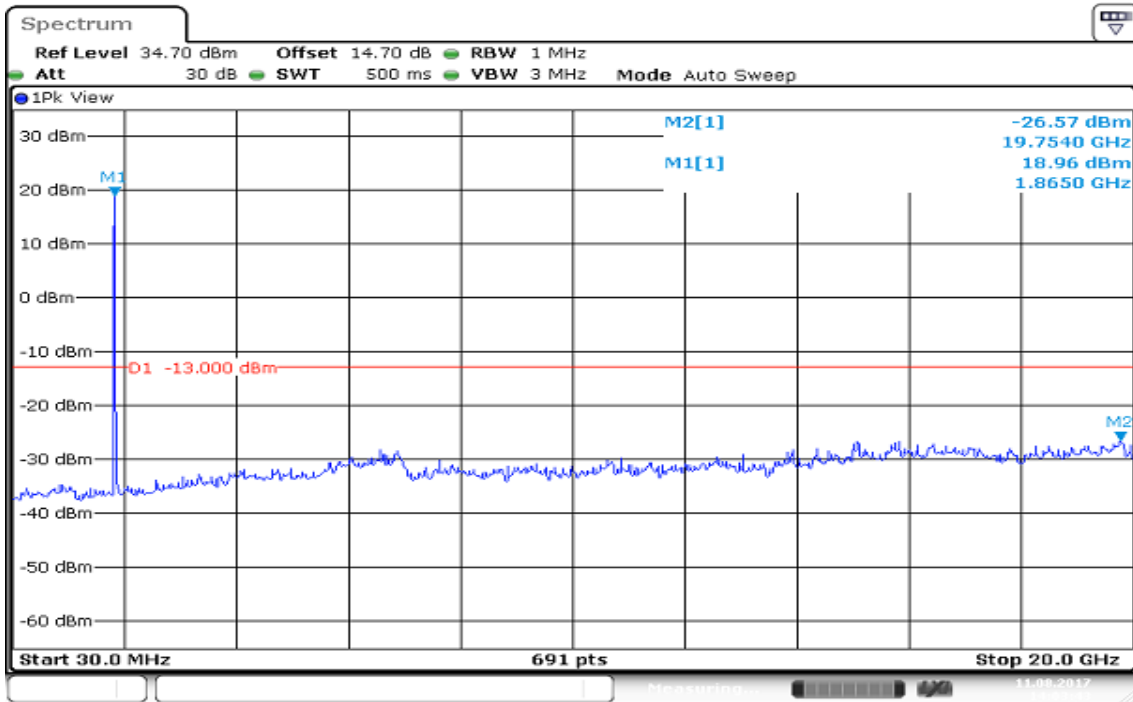
CH High



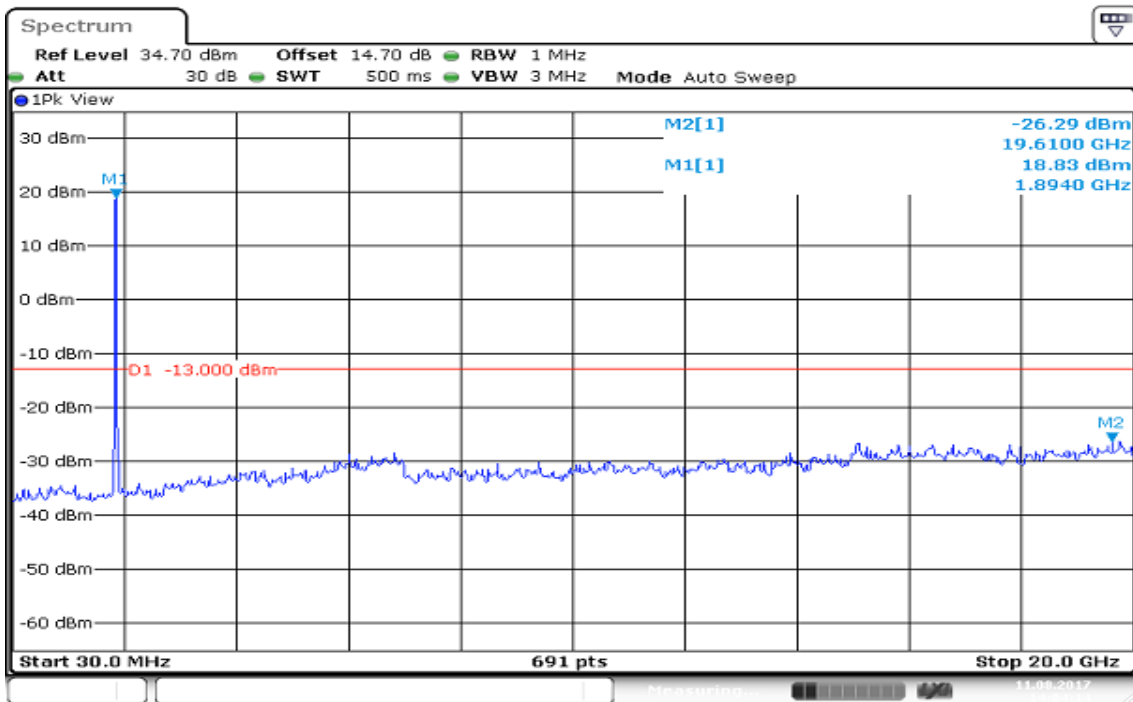
Date: 11.AUG.2017 13:58:29

CHANNEL BANDWIDTH: 15MHz / QPSK

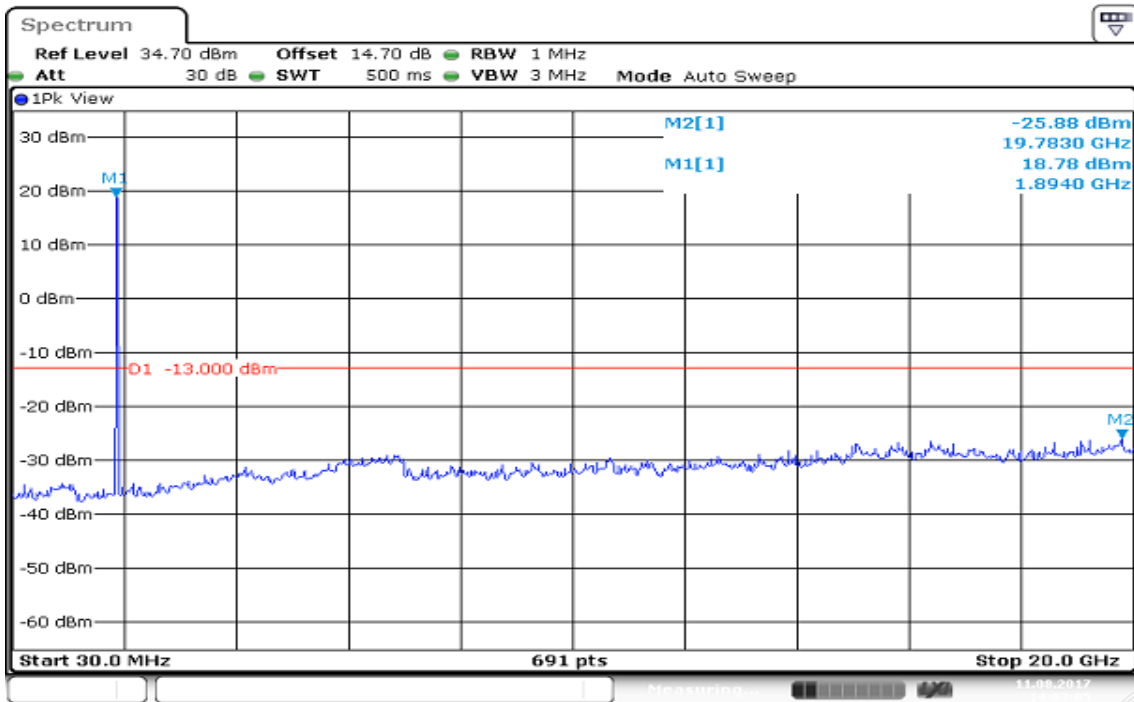
CH Low



CH Mid



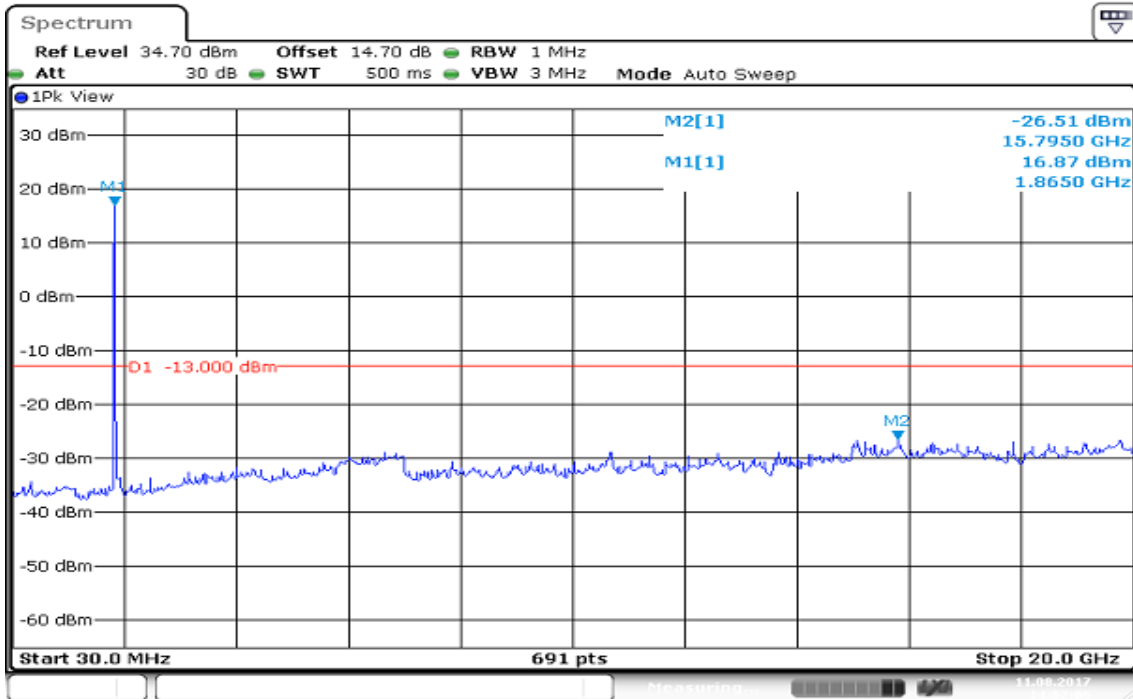
CH High



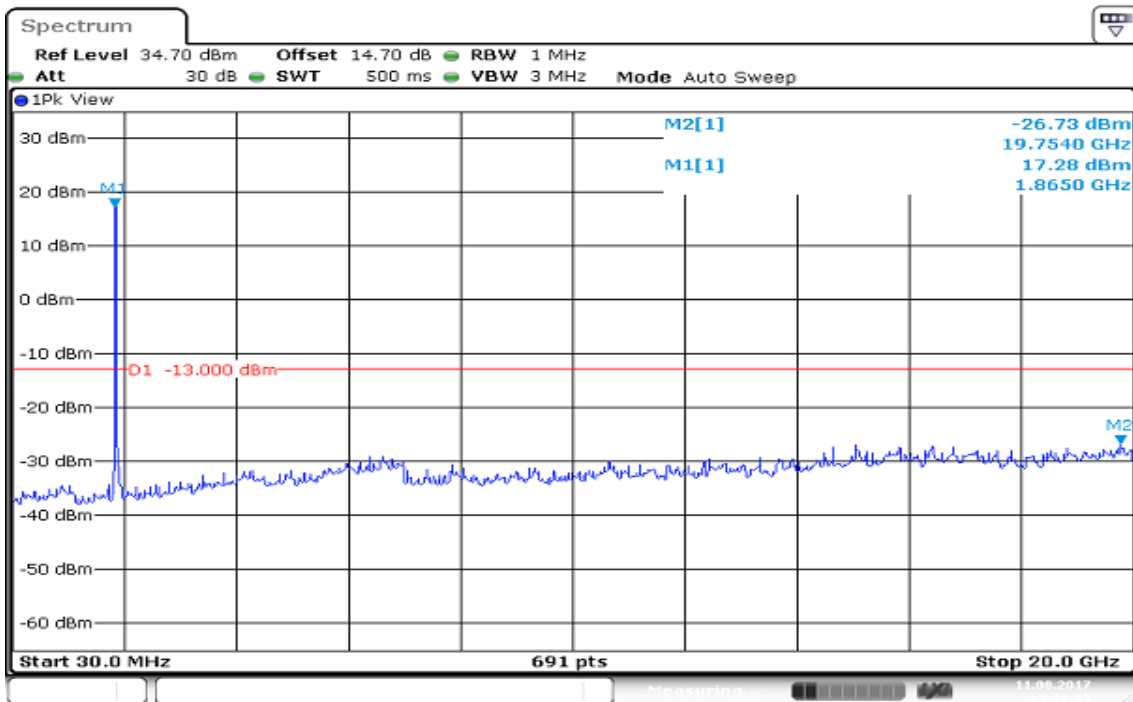
Date: 11.AUG.2017 14:03:05

CHANNEL BANDWIDTH: 15MHz / 16QAM

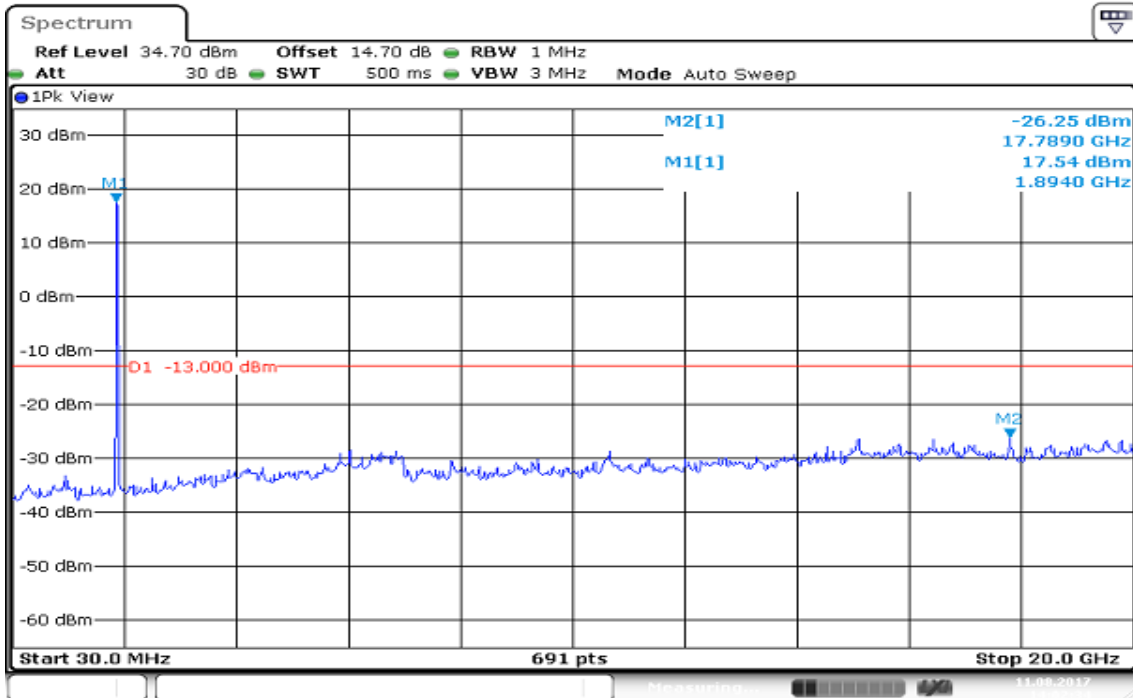
CH Low



CH Mid

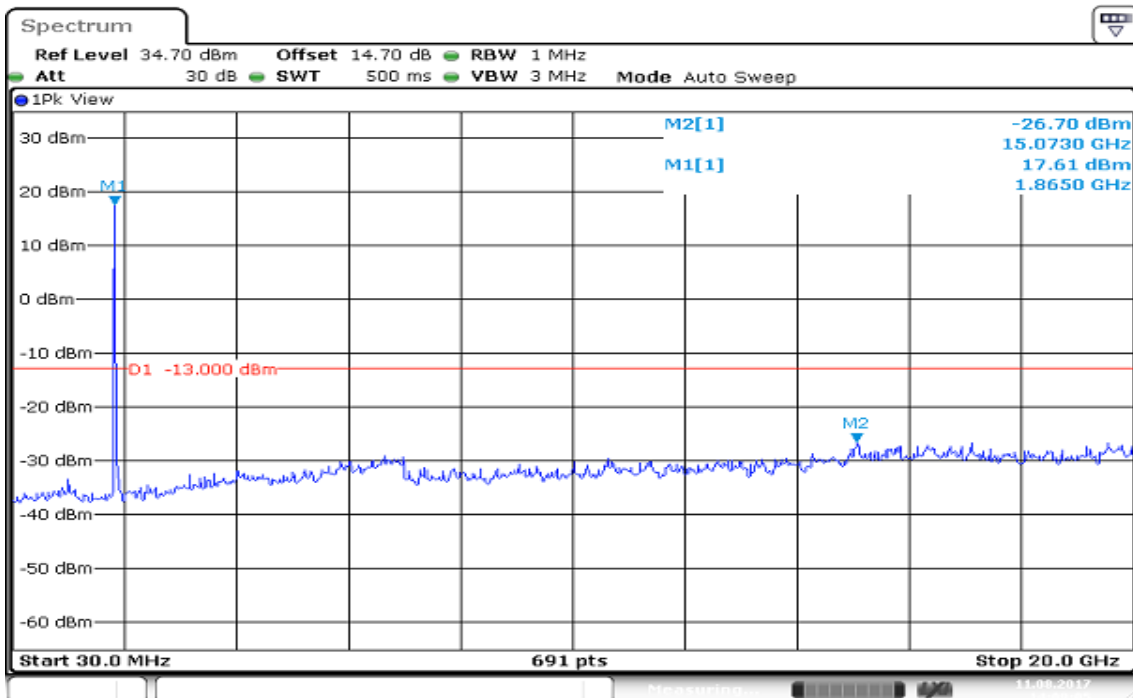


CH High

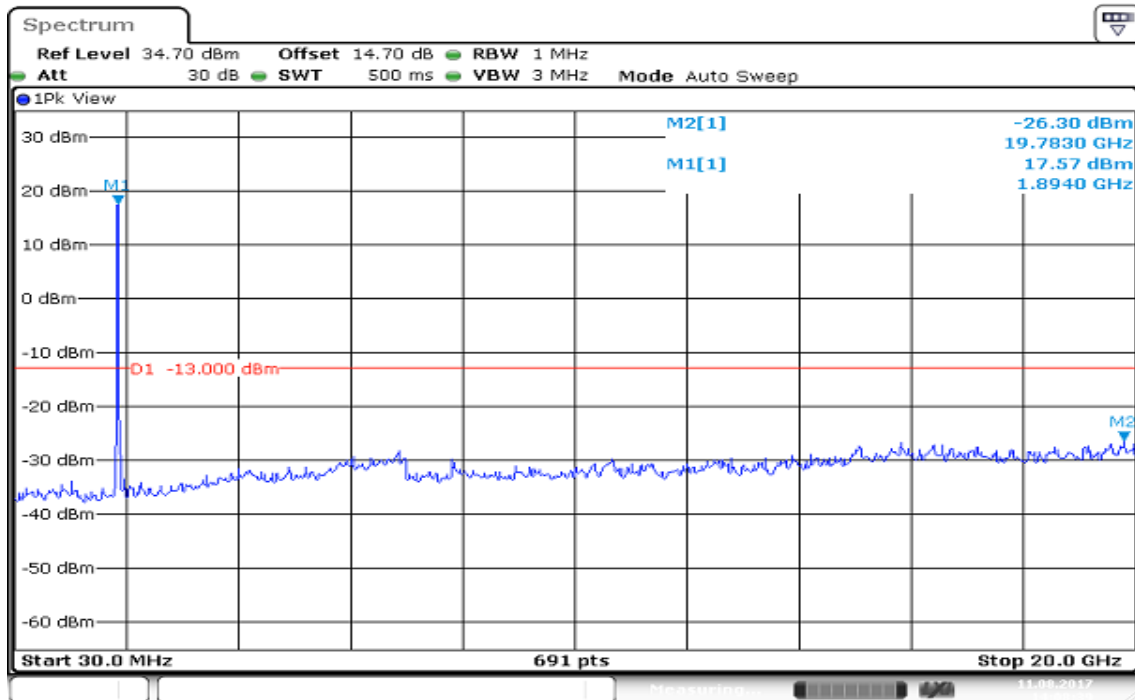


CHANNEL BANDWIDTH: 20MHz / QPSK

CH Low

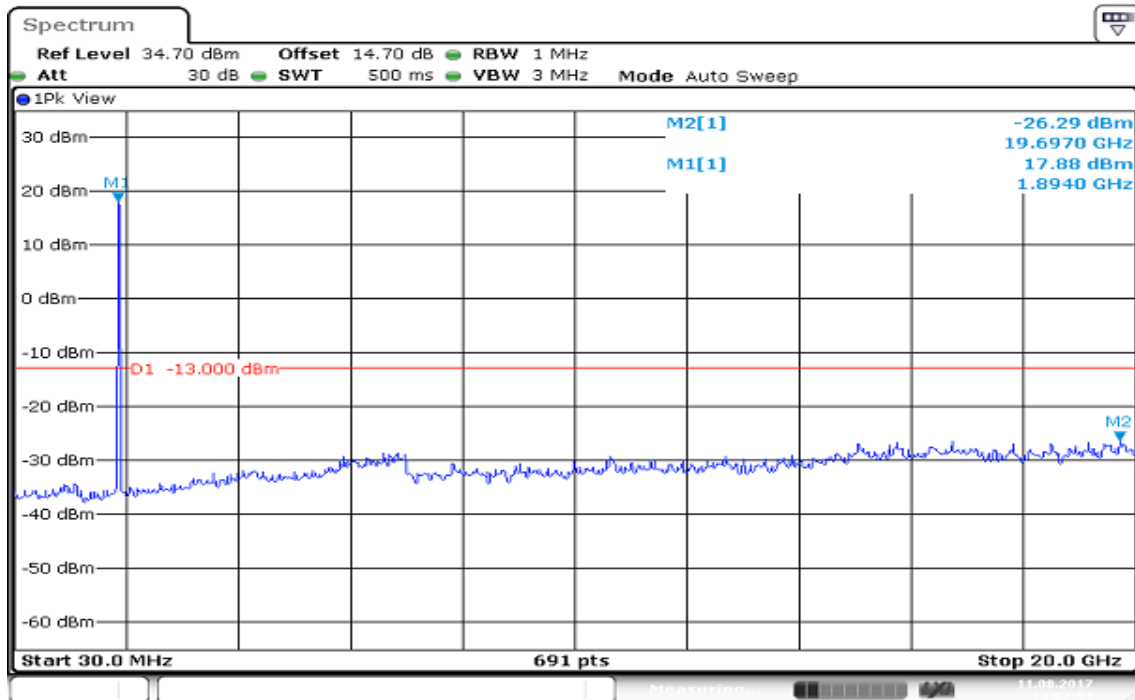


CH Mid



Date: 11.AUG.2017 14:08:40

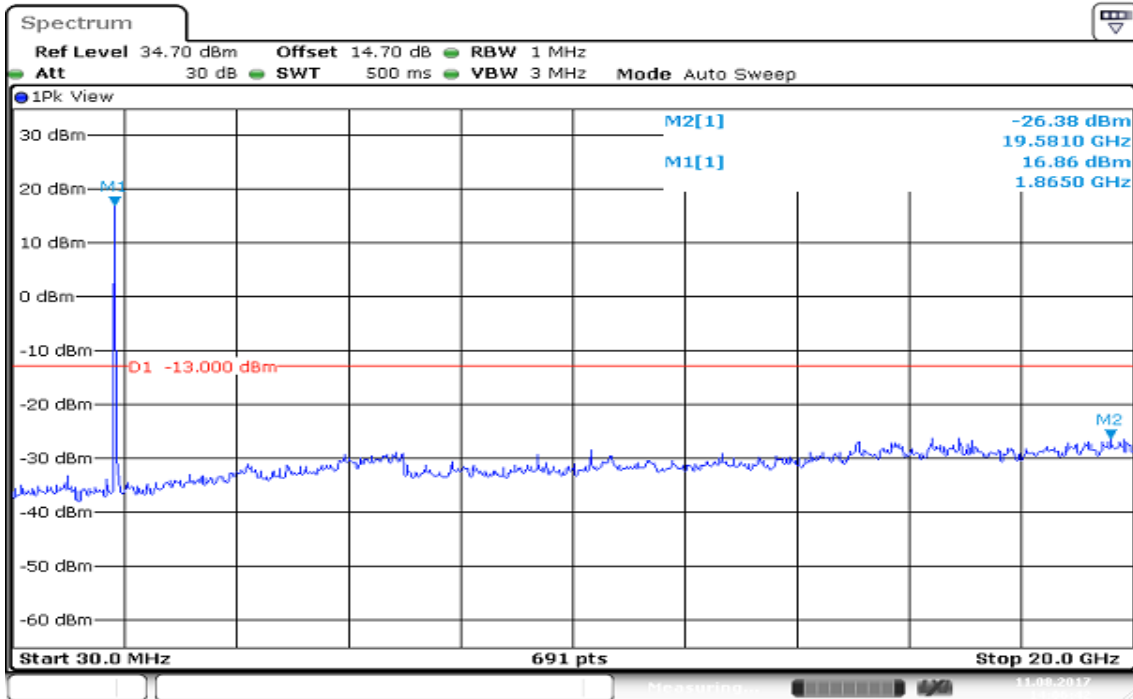
CH High



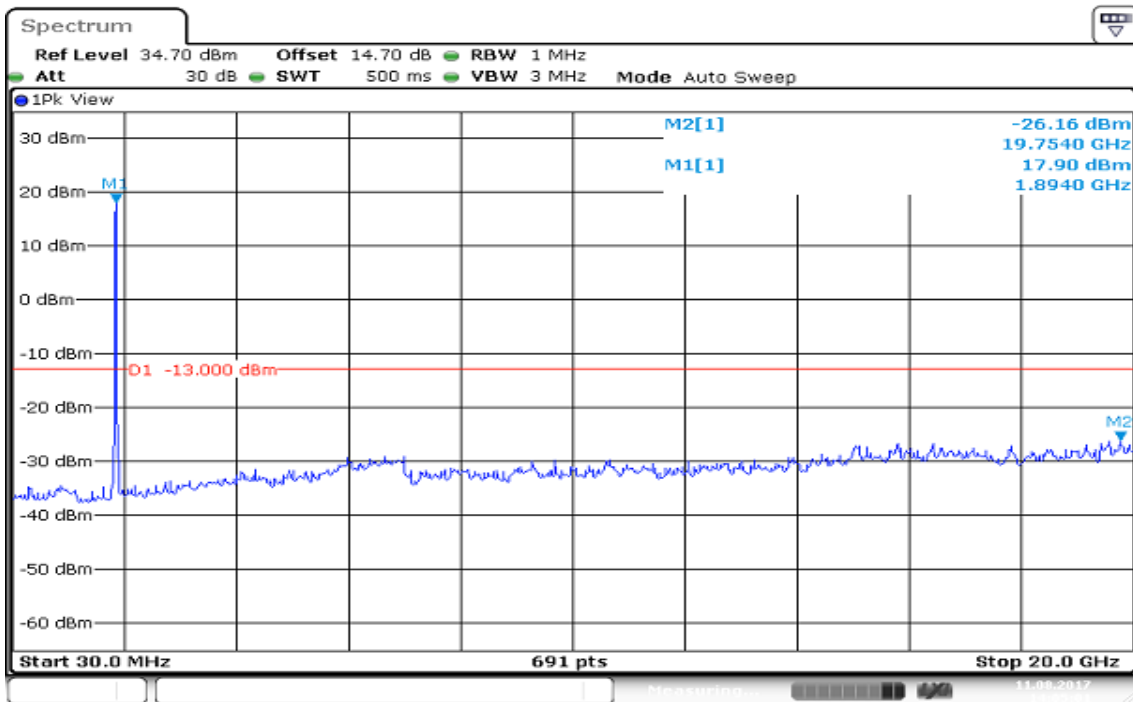
Date: 11.AUG.2017 14:07:51

CHANNEL BANDWIDTH: 20MHz / 16QAM

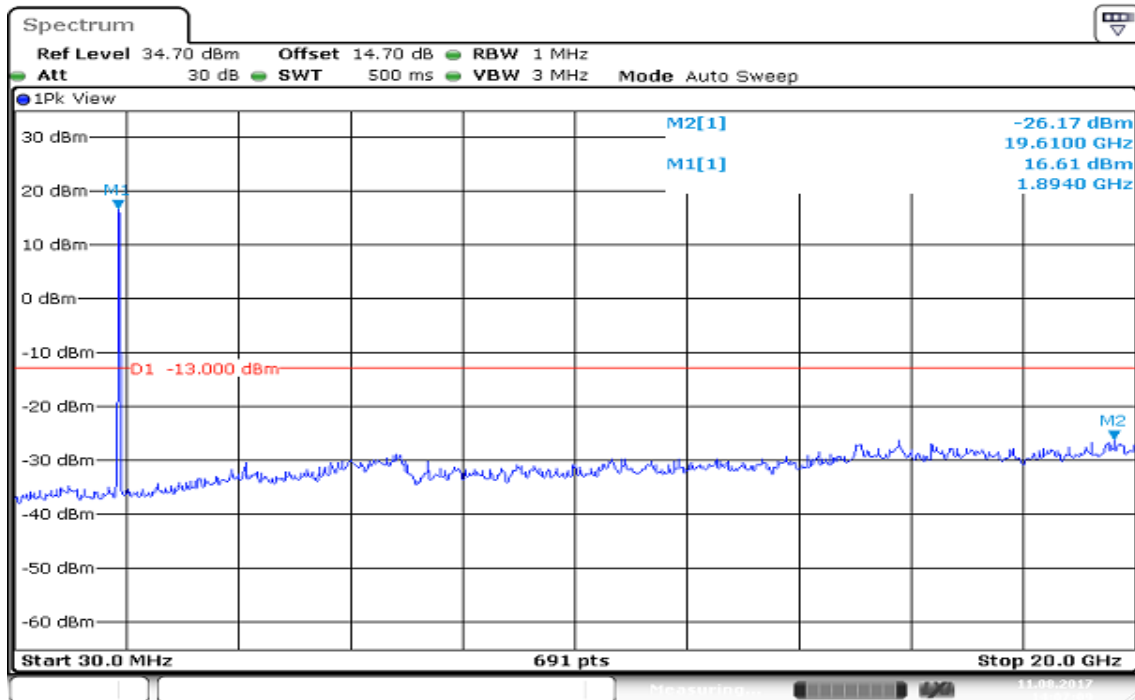
CH Low



CH Mid



CH High



Date: 11.AUG.2017 14:07:09

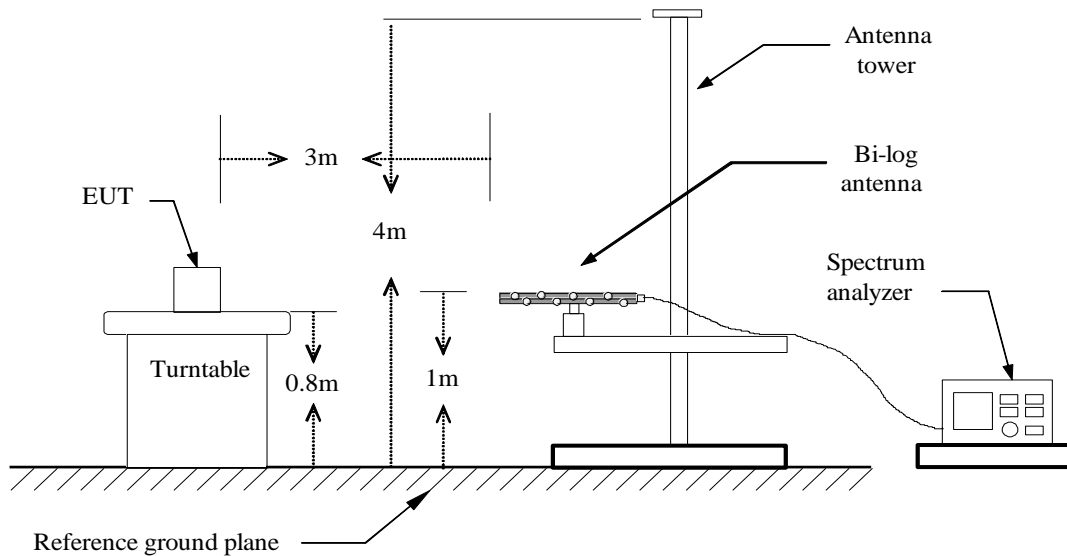
7.8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

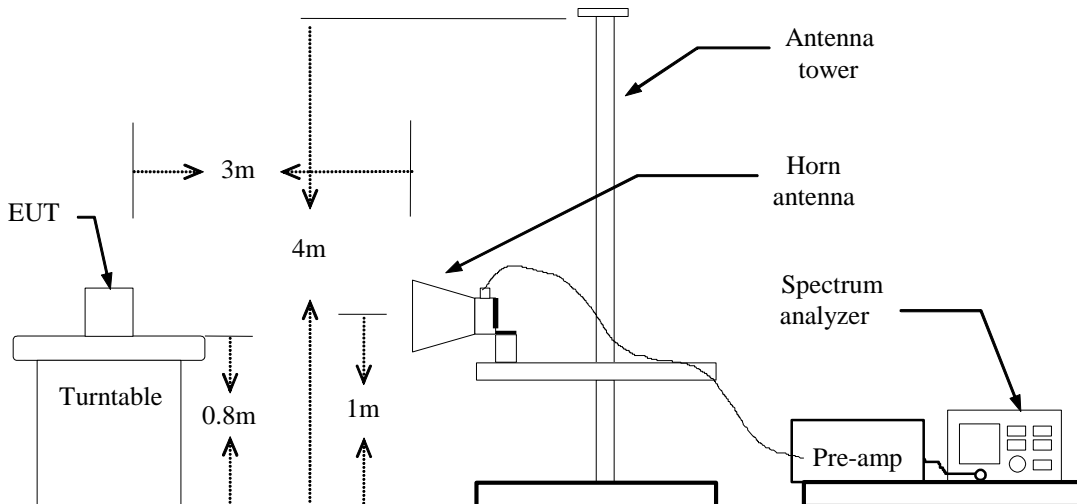
According to FCC §2.1053

Test Configuration

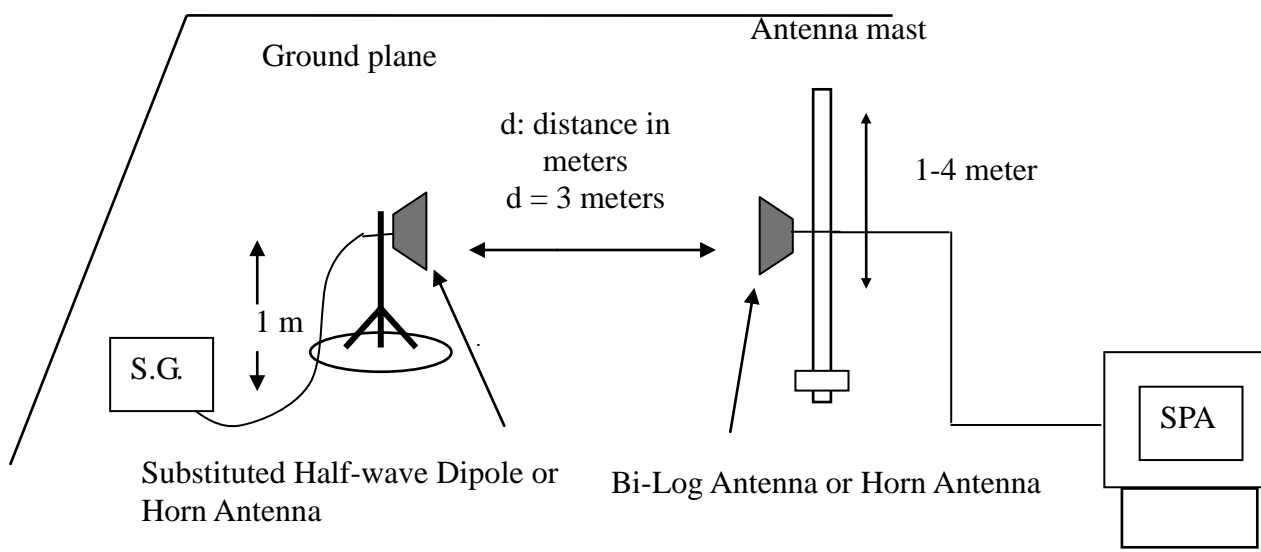
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

The EUT was placed on a non-conductive, the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission were identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

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

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

TEST RESULTS

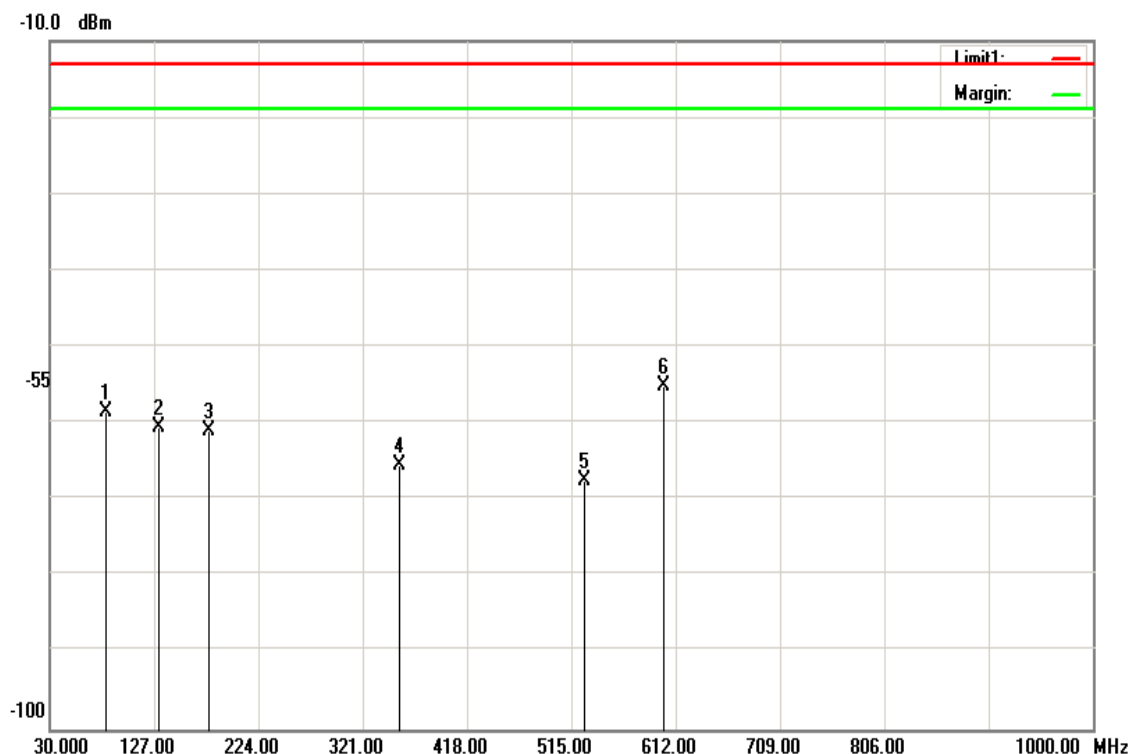
Refer to the attached tabular data sheets.

Test Results

Below 1GHz

LTE Band 25 / CHANNEL BANDWIDTH: 20MHz / QPSK

Operation Mode: Tx / Mid CH **Test Date:** August 16, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Ver.

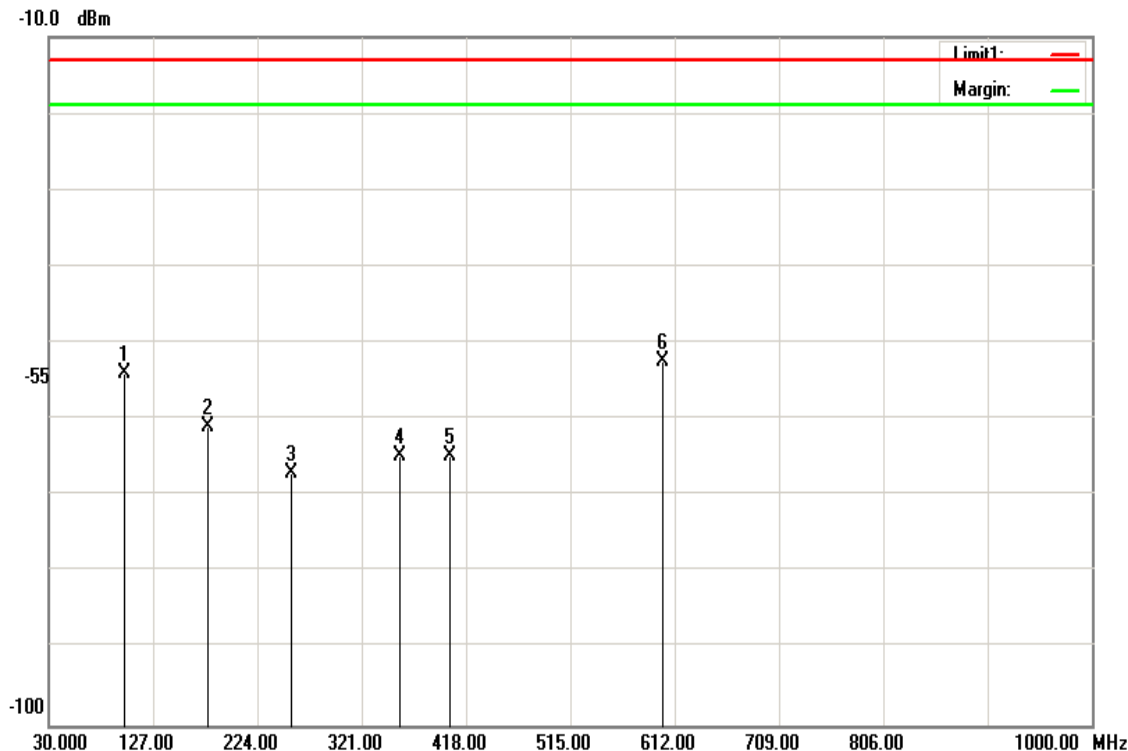


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
82.3800	-58.92	0.45	-58.47	-13.00	-45.47	V
131.8500	-61.66	1.08	-60.58	-13.00	-47.58	V
178.4100	-64.64	3.73	-60.91	-13.00	-47.91	V
354.9500	-72.68	7.12	-65.56	-13.00	-52.56	V
527.6100	-74.42	6.83	-67.59	-13.00	-54.59	V
600.3600	-53.51	-1.56	-55.07	-13.00	-42.07	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:** August 16, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Hor.



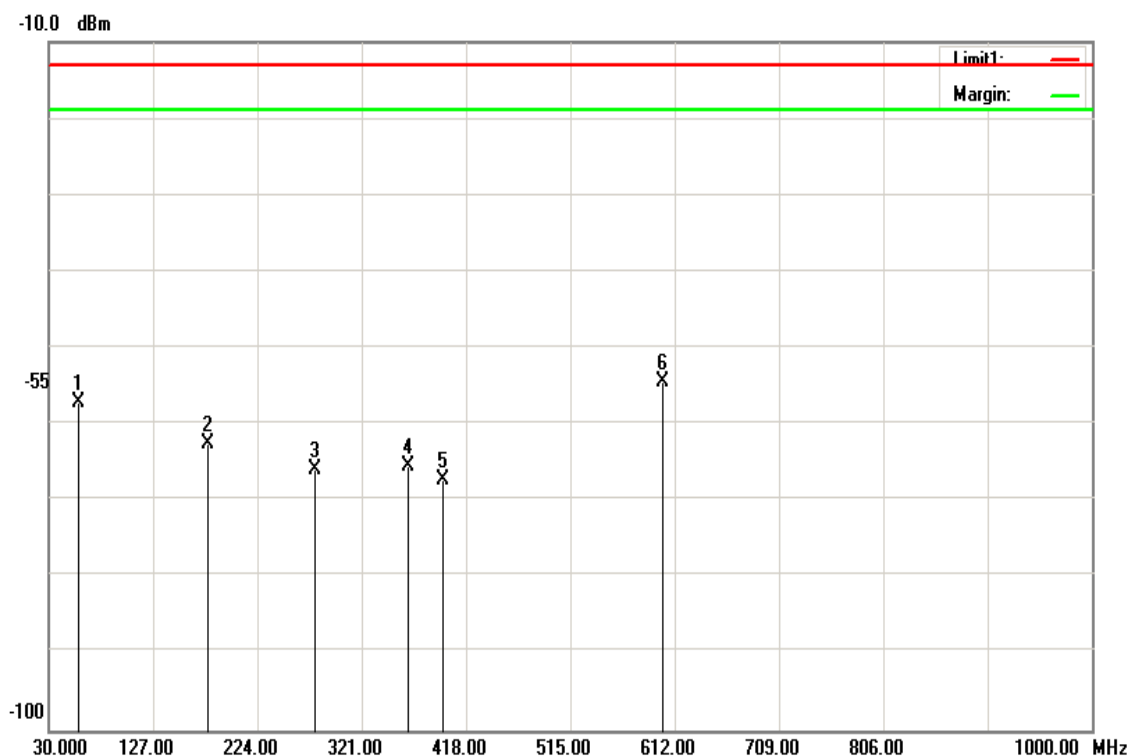
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
100.8100	-54.02	0.13	-53.89	-13.00	-40.89	H
177.4400	-64.38	3.5	-60.88	-13.00	-47.88	H
256.0100	-74.47	7.34	-67.13	-13.00	-54.13	H
355.9200	-71.87	7.12	-64.75	-13.00	-51.75	H
402.4800	-72.11	7.29	-64.82	-13.00	-51.82	H
600.3600	-50.77	-1.56	-52.33	-13.00	-39.33	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.

LTE Band 25 / CHANNEL BANDWIDTH: 20MHz / 16QAM

Operation Mode: Tx / Mid CH **Test Date:** August 16, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Ver.

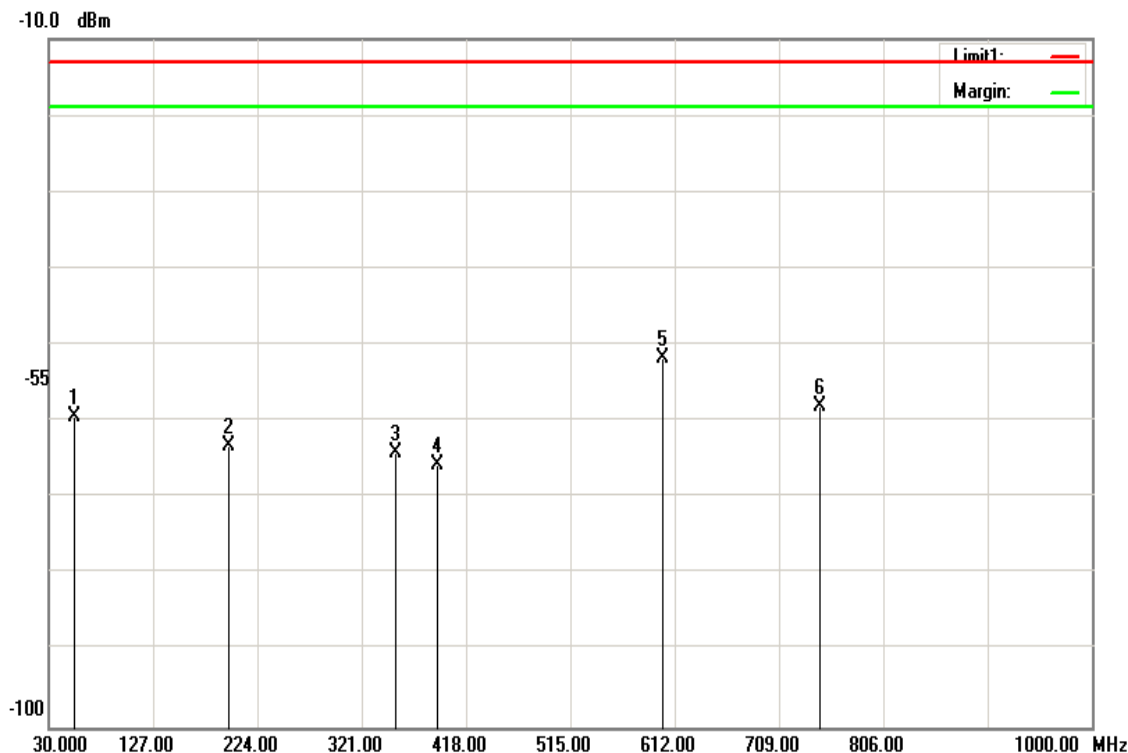


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
57.1600	-55.49	-1.58	-57.07	-13.00	-44.07	V
177.4400	-66.03	3.5	-62.53	-13.00	-49.53	V
277.3500	-73.01	7.13	-65.88	-13.00	-52.88	V
364.6500	-72.54	7.16	-65.38	-13.00	-52.38	V
396.6600	-74.57	7.29	-67.28	-13.00	-54.28	V
600.3600	-52.84	-1.56	-54.40	-13.00	-41.40	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:** August 16, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
53.2800	-57.32	-1.97	-59.29	-13.00	-46.29	H
197.8100	-67.41	4.1	-63.31	-13.00	-50.31	H
352.0400	-71.25	7.11	-64.14	-13.00	-51.14	H
390.8400	-72.87	7.26	-65.61	-13.00	-52.61	H
600.3600	-50.23	-1.56	-51.79	-13.00	-38.79	H
746.8300	-59.62	1.69	-57.93	-13.00	-44.93	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.

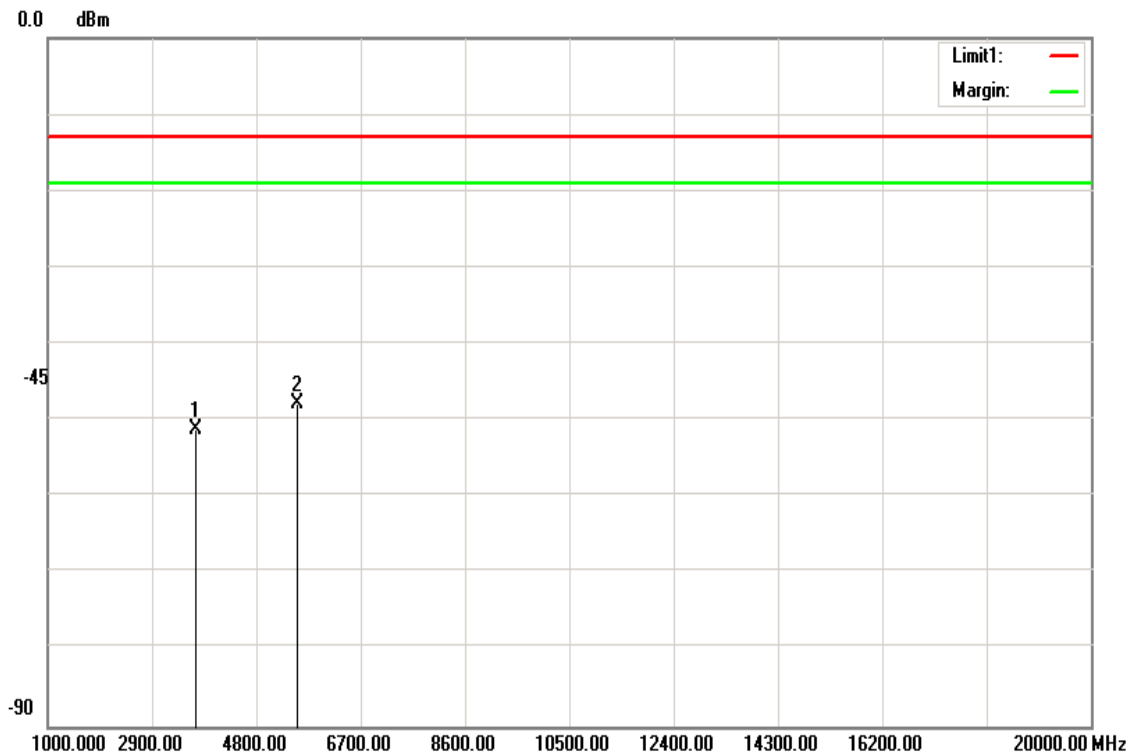
Above 1GHz

LTE Band 25 / BW: 20 MHz / QPSK / RB =1, RB Offset = 0

Operation Mode: Tx / Low channel **Test Date:** August 18, 2017

Temperature: 21°C **Tested by:** Kevin Kuo

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

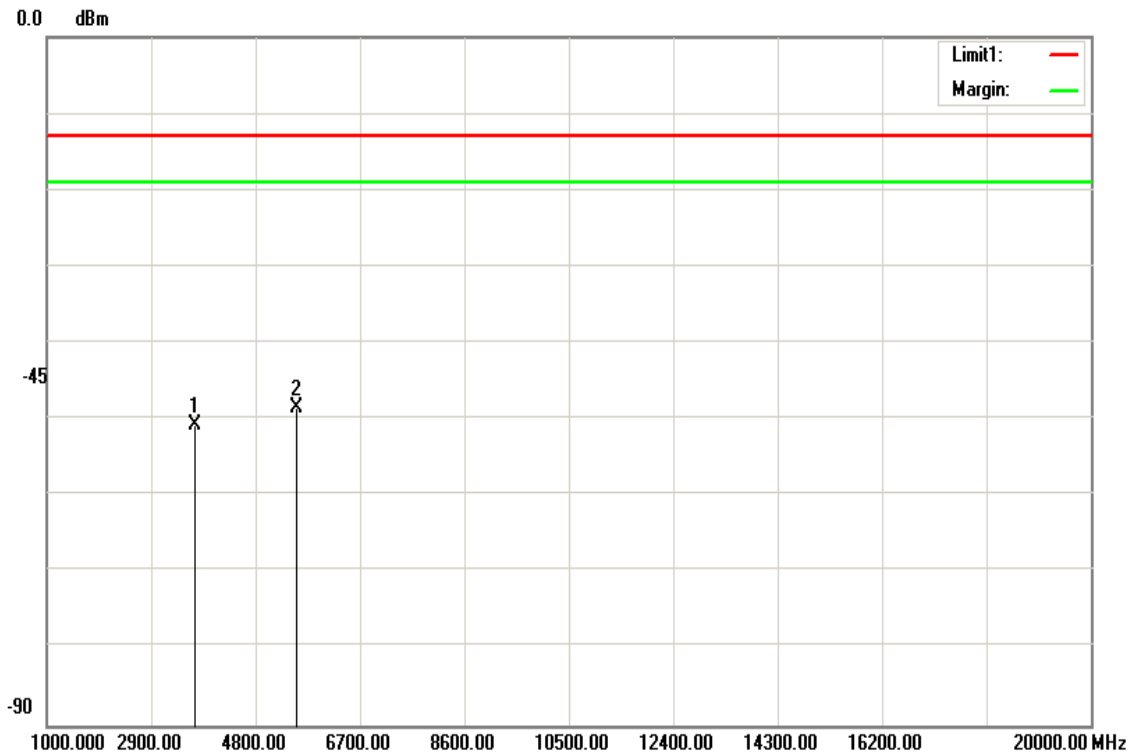


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-63.66	12.54	-51.12	-13.00	-38.12	V
5550.000	-60.67	12.88	-47.79	-13.00	-34.79	V
N/A						

Remark:

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

Operation Mode: Tx / Low channel **Test Date:** August 18, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Hor.

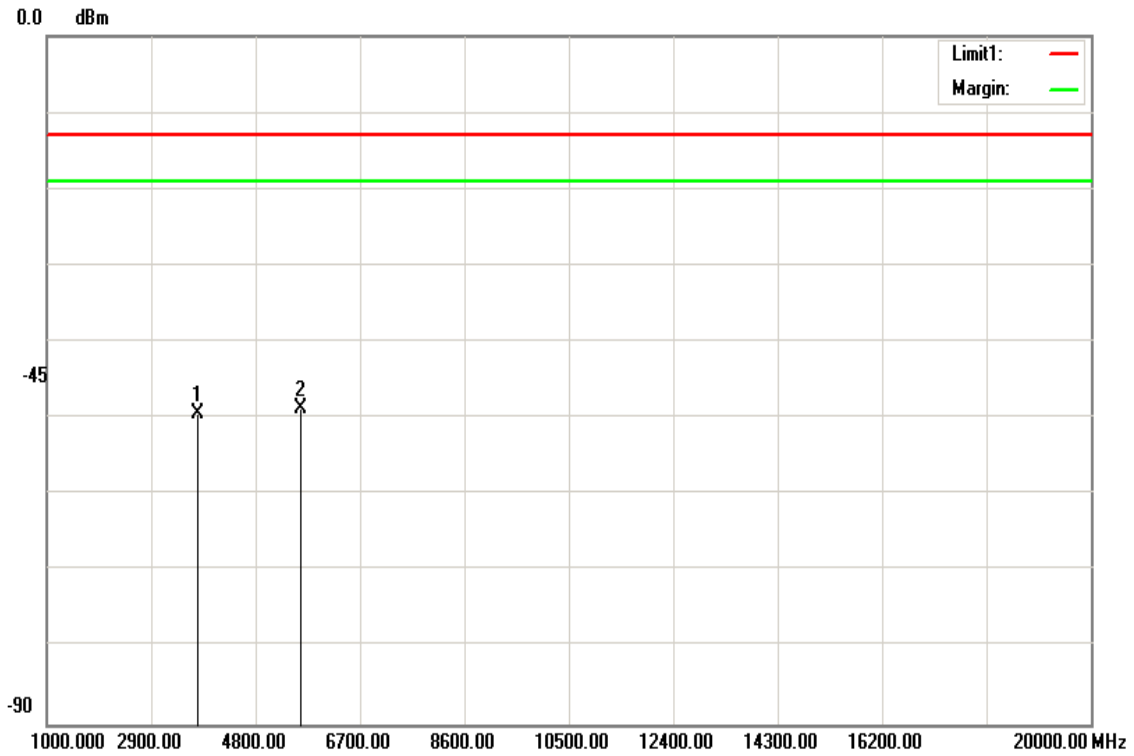


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-63.35	12.54	-50.81	-13.00	-37.81	H
5550.000	-61.44	12.88	-48.56	-13.00	-35.56	H
N/A						

Remark:

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

Operation Mode: Tx / Mid CH **Test Date:** August 18, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
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	-61.98	12.55	-49.43	-13.00	-36.43	V
5619.000	-61.61	12.85	-48.76	-13.00	-35.76	V
N/A						

Remark:

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

Operation Mode: Tx / Mid CH

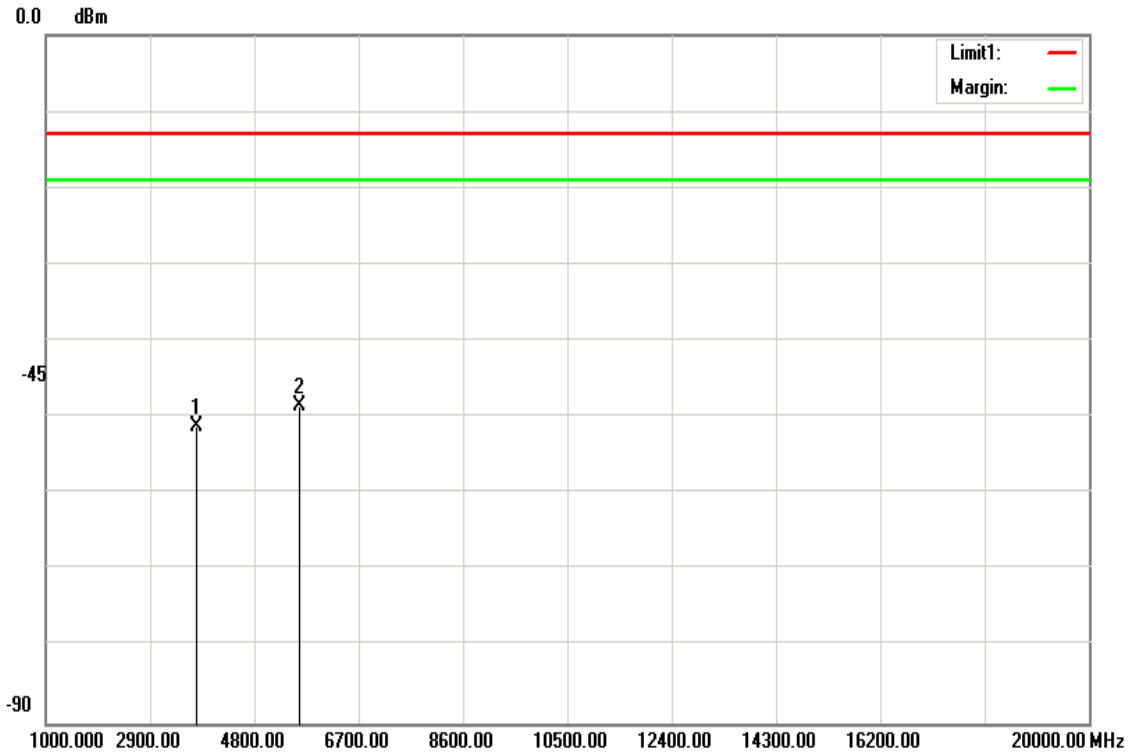
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Hor.

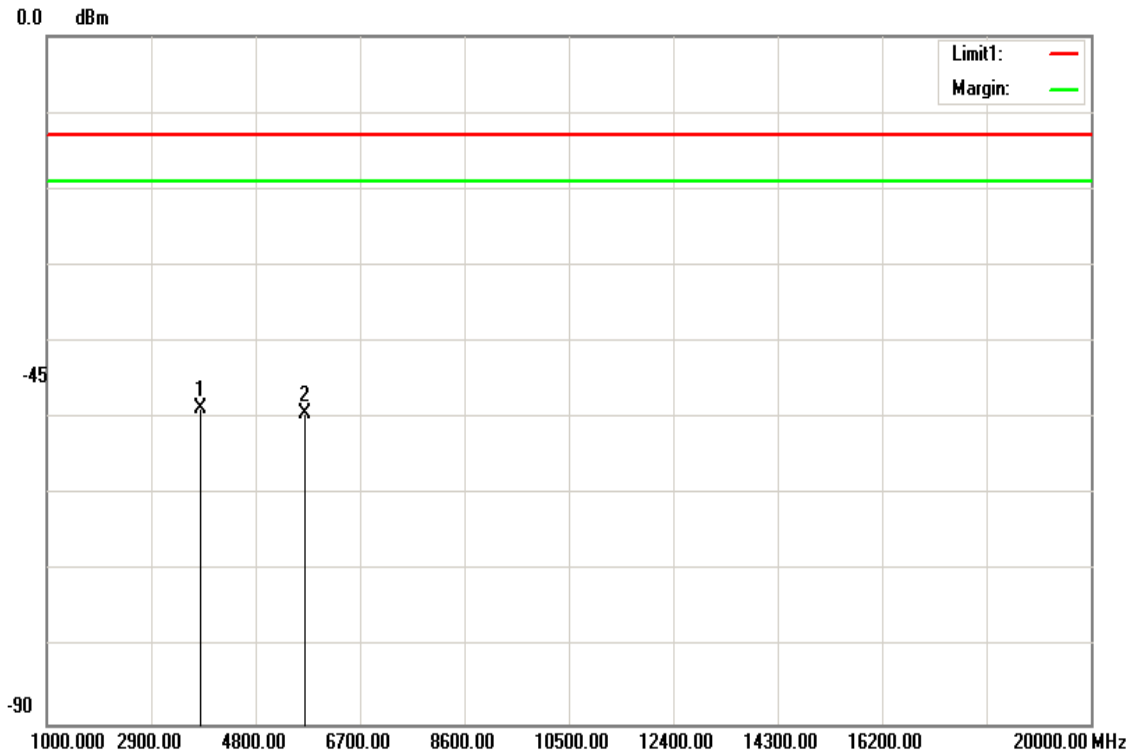


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3746.000	-63.81	12.55	-51.26	-13.00	-38.26	H
5619.000	-61.28	12.85	-48.43	-13.00	-35.43	H
N/A						

Remark:

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

Operation Mode: Tx / High channel **Test Date:** August 18, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Ver.

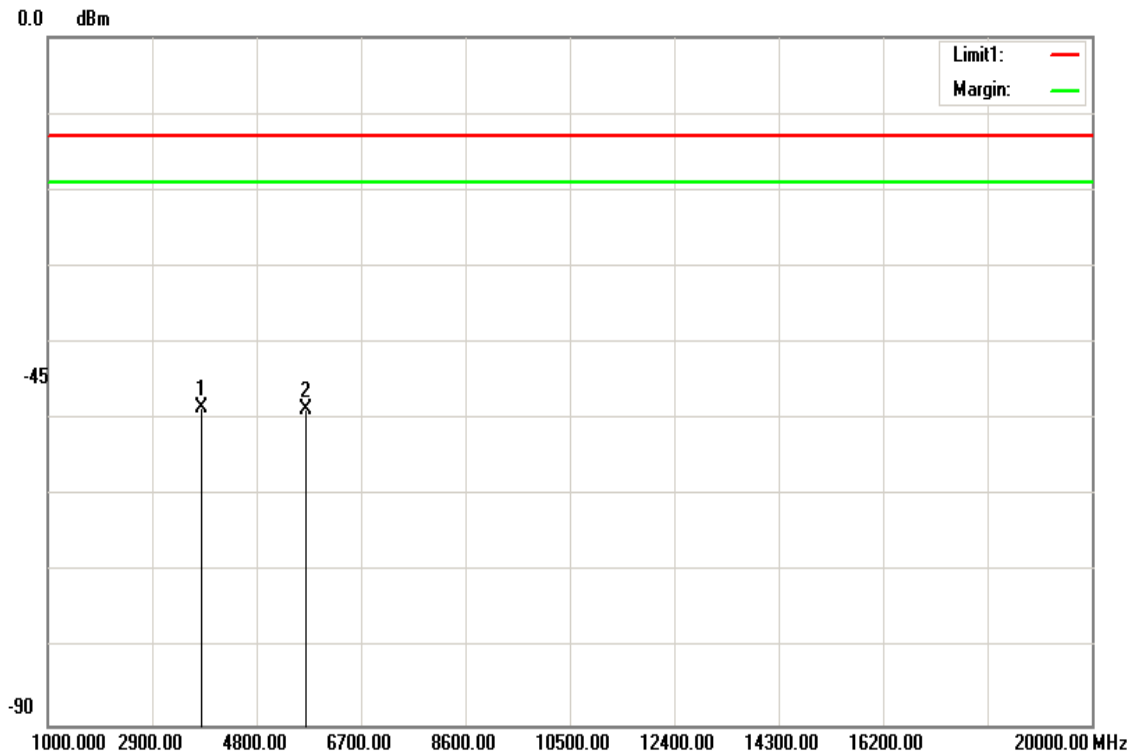


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3793.000	-61.17	12.56	-48.61	-13.00	-35.61	V
5688.000	-62.12	12.82	-49.30	-13.00	-36.30	V
N/A						

Remark:

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

Operation Mode: Tx / High channel **Test Date:** August 18, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3793.000	-60.99	12.56	-48.43	-13.00	-35.43	H
5688.000	-61.6	12.82	-48.78	-13.00	-35.78	H
N/A						

Remark:

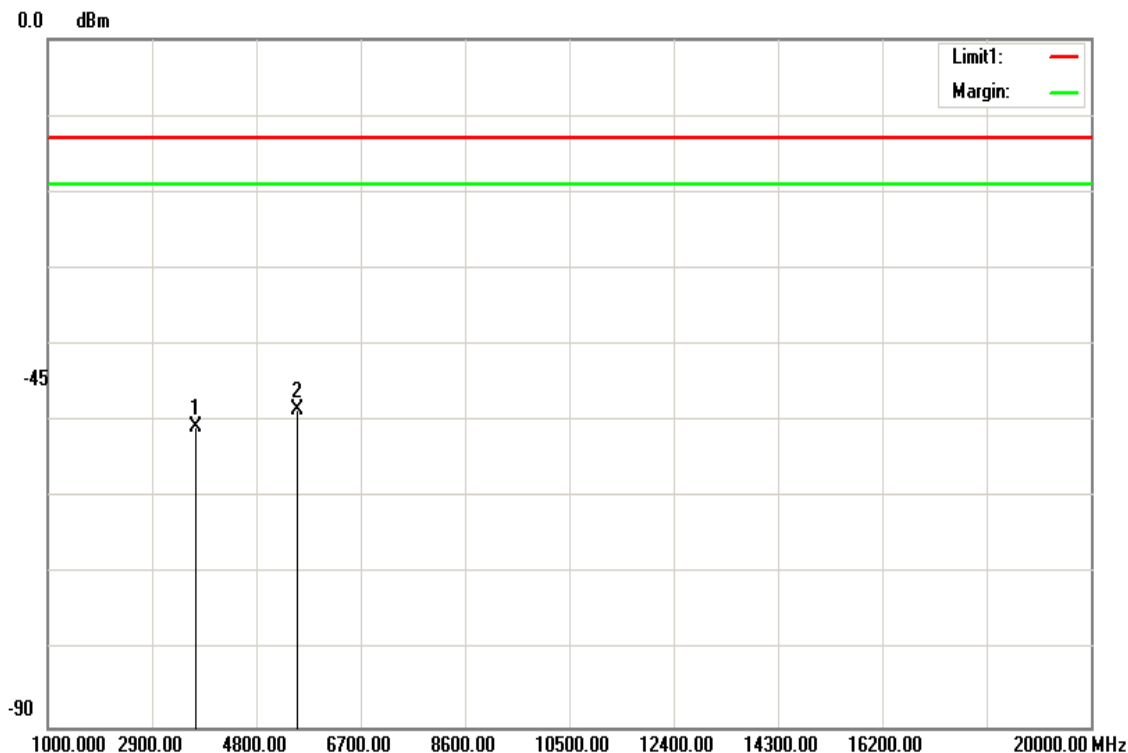
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

LTE Band 25 / BW: 20MHz / 16QAM / RB =1, RB Offset = 0

Operation Mode: Tx / Low channel **Test Date:** August 18, 2017

Temperature: 21°C **Tested by:** Kevin Kuo

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

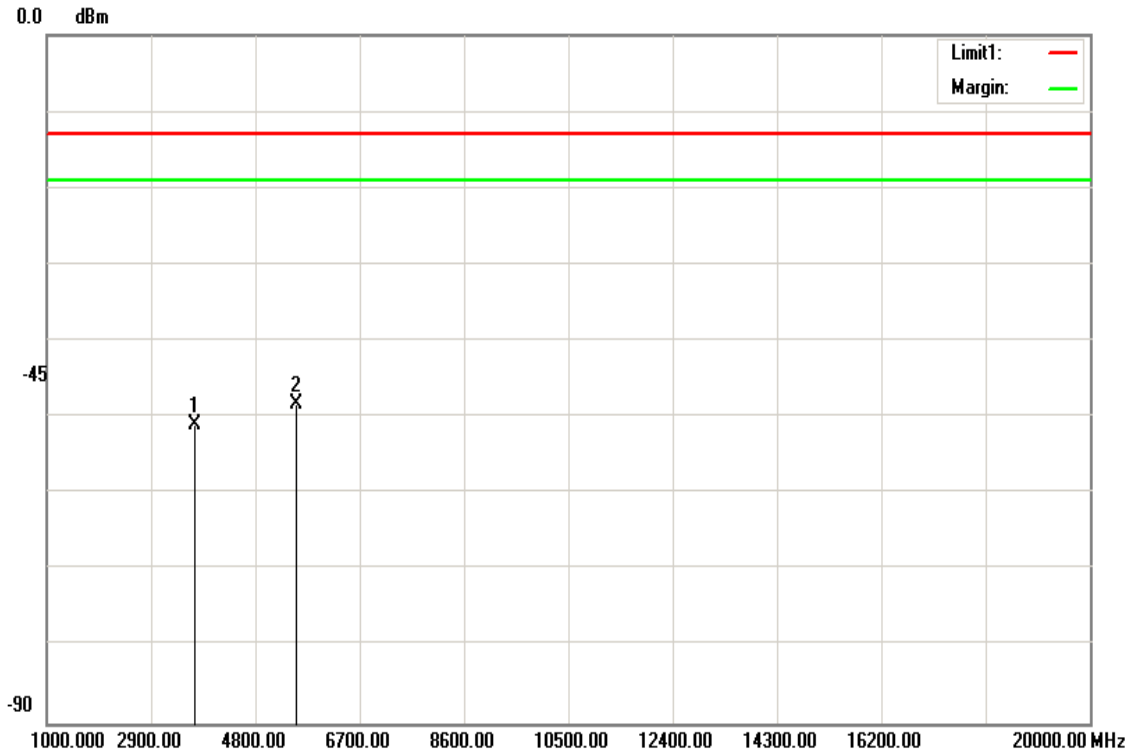


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-63.28	12.54	-50.74	-13.00	-37.74	V
5550.000	-61.38	12.88	-48.50	-13.00	-35.50	V
N/A						

Remark:

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

Operation Mode: Tx / Low channel **Test Date:** August 18, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Hor.

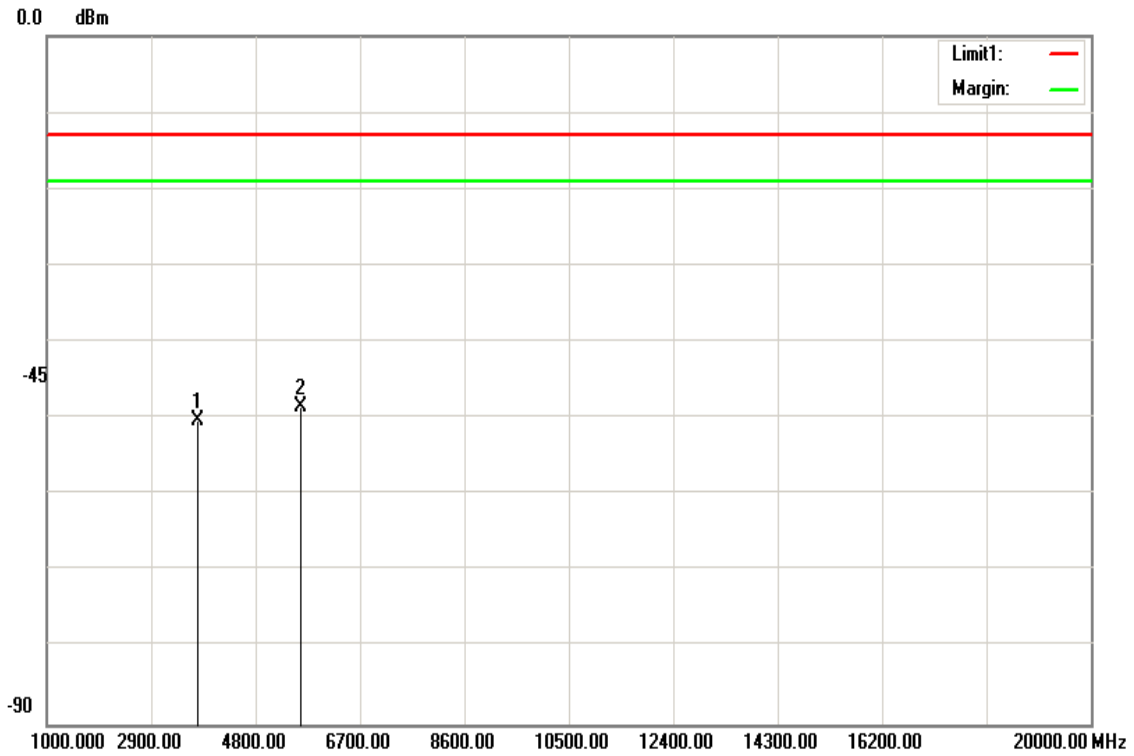


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-63.47	12.54	-50.93	-13.00	-37.93	H
5550.000	-61.16	12.88	-48.28	-13.00	-35.28	H
N/A						

Remark:

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

Operation Mode: Tx / Mid CH **Test Date:** August 18, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Ver.

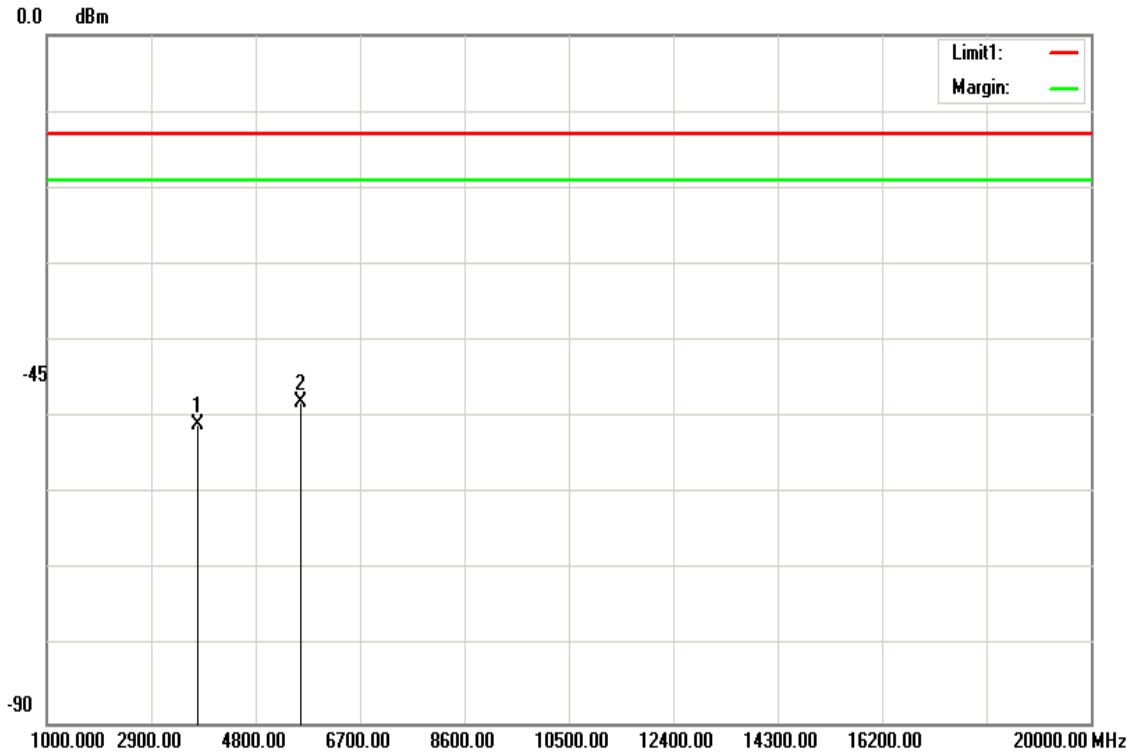


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3746.000	-62.85	12.55	-50.30	-13.00	-37.30	V
5619.000	-61.23	12.85	-48.38	-13.00	-35.38	V
N/A						

Remark:

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

Operation Mode: Tx / Mid CH **Test Date:** August 18, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Hor.

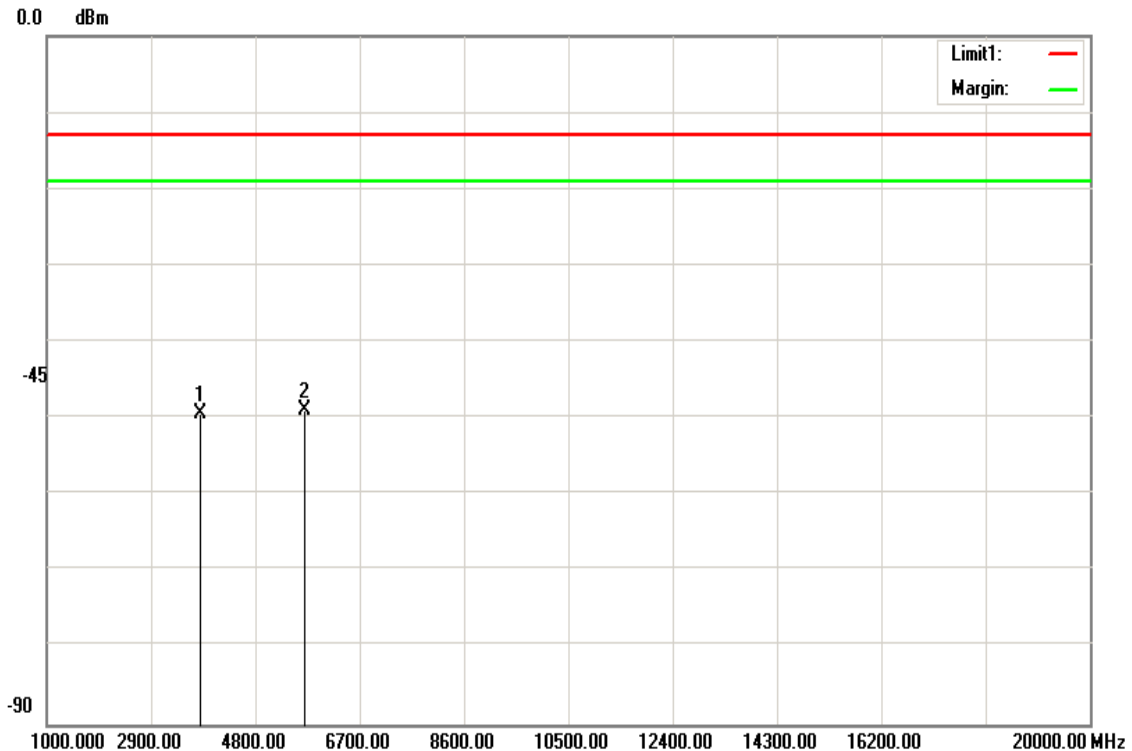


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3746.000	-63.48	12.55	-50.93	-13.00	-37.93	H
5619.000	-60.98	12.85	-48.13	-13.00	-35.13	H
N/A						

Remark:

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

Operation Mode: Tx / High channel **Test Date:** August 18, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Ver.

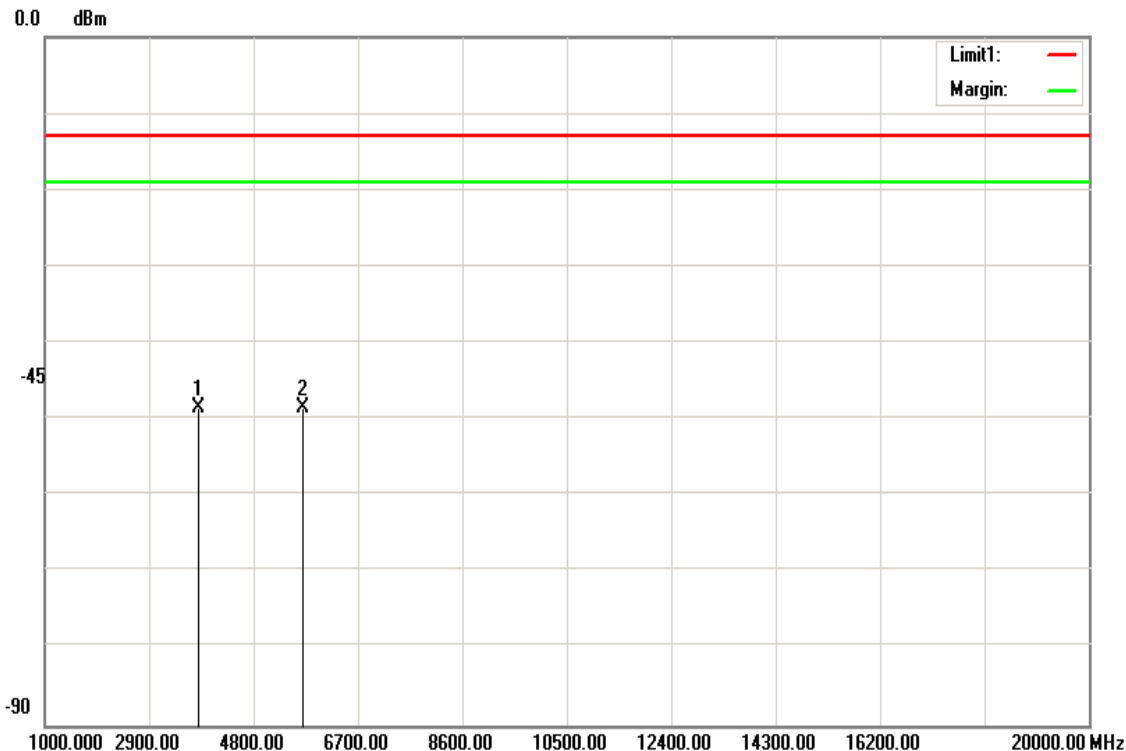


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3792.000	-61.9	12.56	-49.34	-13.00	-36.34	V
5688.000	-61.71	12.82	-48.89	-13.00	-35.89	V
N/A						

Remark:

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

Operation Mode: Tx / High channel **Test Date:** August 18, 2017
Temperature: 21°C **Tested by:** Kevin Kuo
Humidity: 52% RH **Polarity:** Hor.



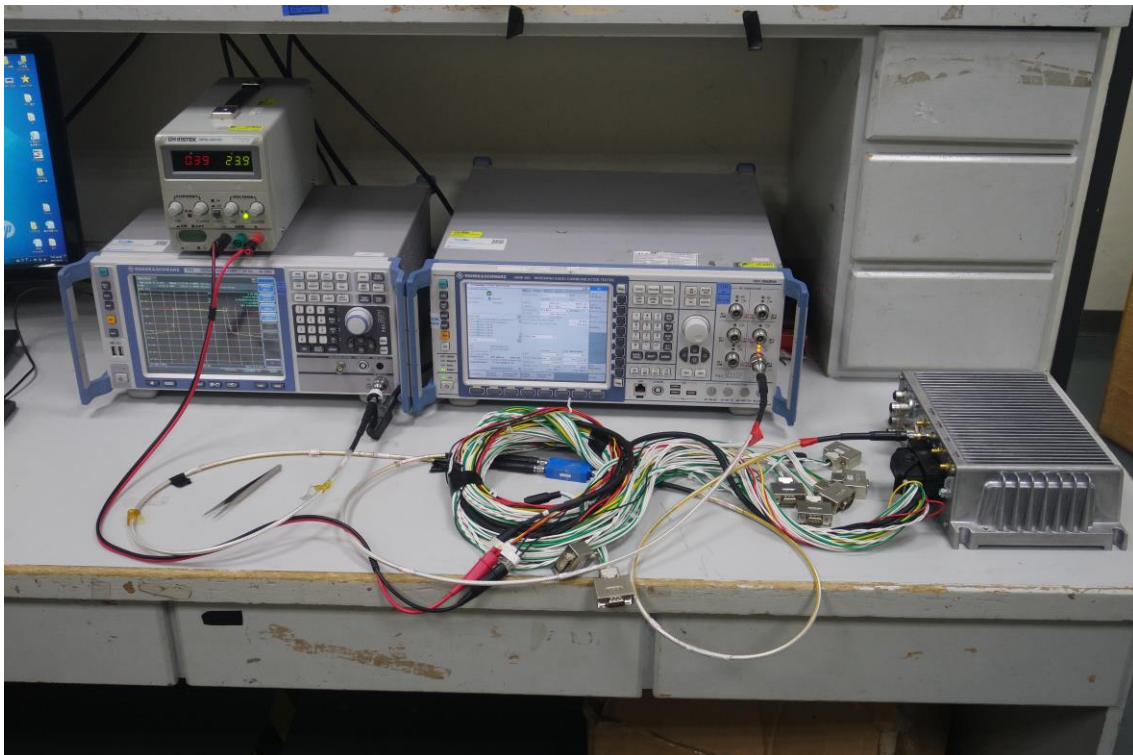
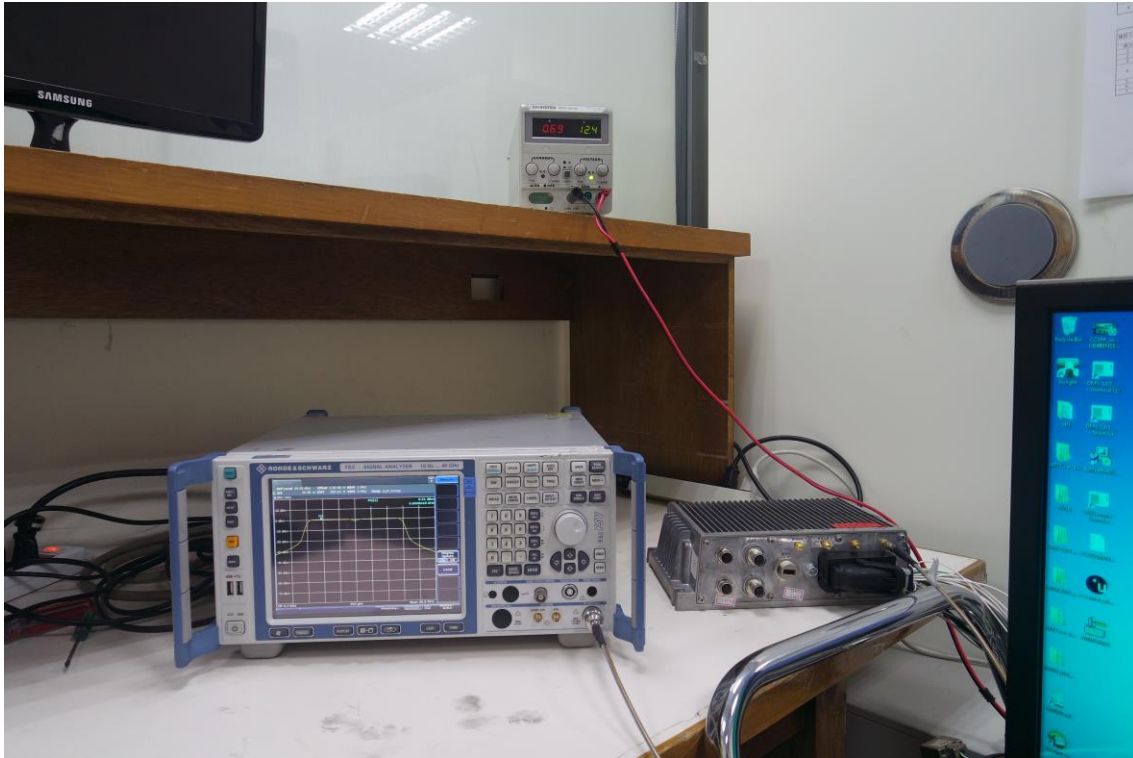
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3792.000	-60.95	12.56	-48.39	-13.00	-35.39	H
5688.000	-61.2	12.82	-48.38	-13.00	-35.38	H
N/A						

Remark:

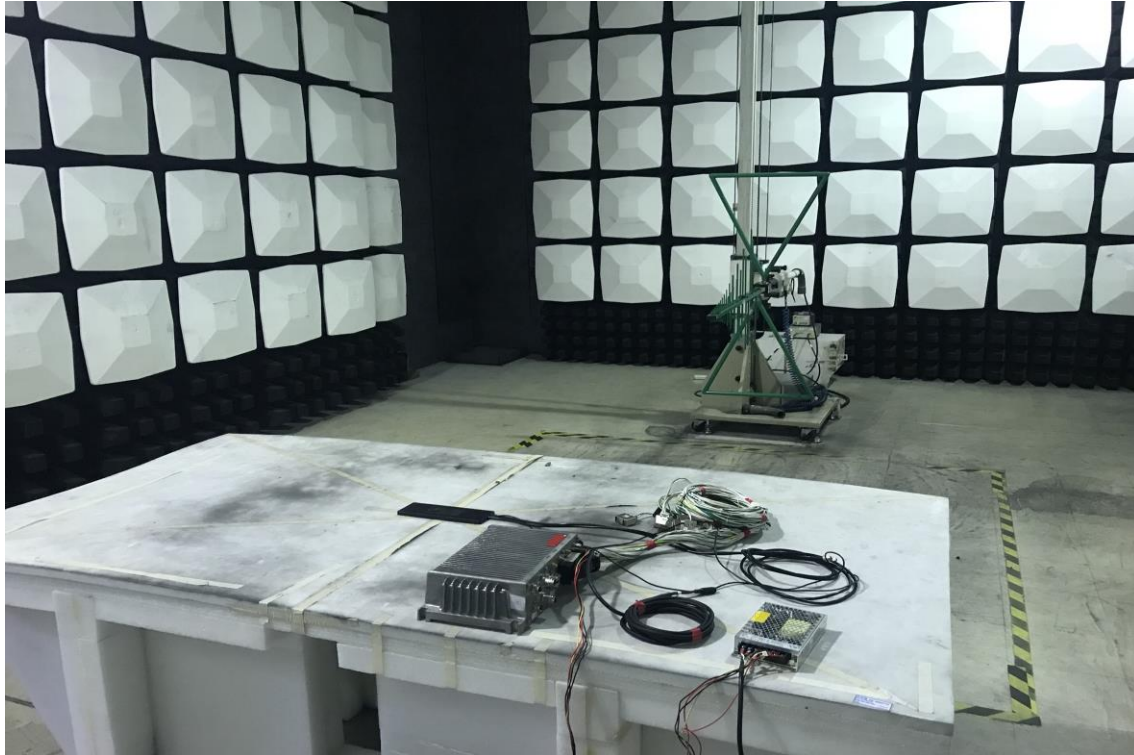
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

8. APPENDIX I PHOTOGRAPHS OF TEST SETUP

Conducted Emission Set Up Photo



Radiated Emission Set up Photos Below 1GHz



Above 1GHz

