



SPORTON International Inc.

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FCC RADIO TEST REPORT

Applicant's company	Cambium Networks Inc.
Applicant Address	3800 Golf Road, Suite 360 Rolling Meadows, IL 60008, USA
FCC ID	Z8H89FT0038
Manufacturer's company	Cambium Networks Inc.
Manufacturer Address	3800 Golf Road, Suite 360 Rolling Meadows, IL 60008, USA

Product Name	PTP550
Brand Name	Cambium Networks
Model No.	PTP550
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5250 ~ 5350MHz / 5470 ~ 5725 MHz
Received Date	Sep. 28, 2017
Final Test Date	Oct. 20, 2017
Submission Type	Class III Change

Statement

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013, 47 CFR FCC Part 15 Subpart E, KDB789033 D02 v02r01, KDB662911 D01 v02r01, ET Docket No. 13-49; FCC 16-24.**

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR7O1623-01	Rev. 01	Initial issue of report	Jul. 26, 2018

1. VERIFICATION OF COMPLIANCE

Product Name : PTP550
Brand Name : Cambium Networks
Model No. : PTP550
Applicant : Cambium Networks Inc.
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Sep. 28, 2017 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.


Cliff Chang
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E			
Part	Rule Section	Description of Test	Result
4.1	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies
4.2	15.407(e)	6dB Spectrum Bandwidth	Complies
4.3	15.407(a)	Maximum Conducted Output Power	Complies
4.4	15.407(a)	Power Spectral Density	Complies
4.5	15.407(b)	Radiated Emissions	Complies
4.6	15.407(b)	Band Edge Emissions	Complies
4.7	15.407(g)	Frequency Stability	Complies
4.8	15.203	Antenna Requirements	Complies

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	2TX, 2RX
Radio Type	Intentional Transceiver
Power Type	From PoE
Modulation	QPSK
Frequency Range	5250 ~ 5350MHz / 5470 ~ 5725 MHz
Channel Number	For Antenna 1: Band 2: 14 for 20MHz bandwidth Band 3: 32 for 20MHz bandwidth Band 2: 6 for 80MHz bandwidth Band 3: 30 for 80MHz bandwidth For Antenna 2: Band 2: 14 for 20MHz bandwidth Band 3: 32 for 20MHz bandwidth Band 2: 5 for 80MHz bandwidth Band 3: 30 for 80MHz bandwidth
Channel Bandwidth (99%)	For Antenna 1: Band 2: QPSK (20M): 27.61 MHz QPSK (80M): 74.96 MHz Band 3: QPSK (20M): 20.41 MHz QPSK (80M): 76.12 MHz For Antenna 2: Band 2: QPSK (20M): 18.32 MHz QPSK (80M): 73.81 MHz Band 3: QPSK (20M): 17.89 MHz QPSK (80M): 76.41 MHz

Maximum Conducted Output Power	For Antenna 1: Band 2: QPSK (20M): 23.68 dBm QPSK (80M): 20.23 dBm Band 3: QPSK (20M): 23.78 dBm QPSK (80M): 21.55 dBm For Antenna 2: Band 2: QPSK (20M): 7.96 dBm QPSK (80M): 7.96 dBm Band 3: QPSK (20M): 7.85 dBm QPSK (80M): 7.91 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
TPC Function	☒ With TPC	☐ Without TPC
Weather Band (5600~5650MHz)	☒ With 5600~5650MHz	☐ Without 5600~5650MHz
Beamforming Function	☐ With beamforming	☒ Without beamforming

Antenna and Bandwidth

Antenna	Two (TX)	
Bandwidth Mode	20 MHz	80 MHz
QPSK	V	V

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	-	-	Printed Antenna	N/A	2
	2	-	-	Printed Antenna	N/A	2
2	1	-	-	Printed Antenna	N/A	22
	2	-	-	Printed Antenna	N/A	22

Note: Port 1 and Port 2 can be used as transmitting/receiving antenna.
Port 1 and Port 2 could transmit/receive simultaneously.

3.4. Table for Carrier Frequencies

There are two bandwidth systems.

For 20MHz bandwidth systems:

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5250~5350 MHz Band 2	1	5250 MHz	8	5290 MHz
	2	5260 MHz	9	5295 MHz
	3	5265 MHz	10	5300 MHz
	4	5270 MHz	11	5305 MHz
	5	5275 MHz	12	5310 MHz
	6	5280 MHz	13	5315 MHz
	7	5285 MHz	14	5320 MHz
5470~5725 MHz Band 3	1	5500 MHz	17	5580 MHz
	2	5505 MHz	18	5585 MHz
	3	5510 MHz	19	5590 MHz
	4	5515 MHz	20	5595 MHz
	5	5520 MHz	21	5600 MHz
	6	5525 MHz	22	5605 MHz
	7	5530 MHz	23	5610 MHz
	8	5535 MHz	24	5615 MHz
	9	5540 MHz	25	5620 MHz
	10	5545 MHz	26	5625 MHz
	11	5550 MHz	27	5630 MHz
	12	5555 MHz	28	5635 MHz
	13	5560 MHz	29	5640 MHz
	14	5565 MHz	30	5645 MHz
	15	5570 MHz	31	5650 MHz
	16	5575 MHz	32	5720 MHz

For 80MHz bandwidth systems:

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5250~5350 MHz Band 2	1	5250 MHz	4	5300 MHz
	2	5290 MHz	5	5305 MHz
	3	5295 MHz	6	5310 MHz
5470~5725 MHz Band 3	1	5510 MHz	16	5585 MHz
	2	5515 MHz	17	5590 MHz
	3	5520 MHz	18	5595 MHz
	4	5525 MHz	19	5600 MHz
	5	5530 MHz	20	5605 MHz
	6	5535 MHz	21	5610 MHz
	7	5540 MHz	22	5615 MHz
	8	5545 MHz	23	5620 MHz
	9	5550 MHz	24	5625 MHz
	10	5555 MHz	25	5630 MHz
	11	5560 MHz	26	5635 MHz
	12	5565 MHz	27	5640 MHz
	13	5570 MHz	28	5645 MHz
	14	5575 MHz	29	5650 MHz
	15	5580 MHz	30	5720 MHz

Note: The antenna 2 doesn't support 5310MHz in 80MHz.

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. The following table is a list of the test modes shown in this test report.

For Antenna 1:

Test Items	Mode		Channel	Port
Max. Conducted Output Power	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1 + 2
		Band 3	5500 / 5580 / 5650 / 5720	1 + 2
	QPSK, 80M	Band 2	5250 / 5290 / 5300 / 5310	1 + 2
		Band 3	5510 / 5610 / 5650 / 5720	1 + 2
Power Spectral Density	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1 + 2
		Band 3	5500 / 5580 / 5650 / 5720	1 + 2
	QPSK, 80M	Band 2	5250 / 5290 / 5300 / 5310	1 + 2
		Band 3	5510 / 5610 / 5650 / 5720	1 + 2
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1 + 2
		Band 3	5500 / 5580 / 5650 / 5720	1 + 2
	QPSK, 80M	Band 2	5250 / 5290 / 5300 / 5310	1 + 2
		Band 3	5510 / 5610 / 5650 / 5720	1 + 2
6dB Spectrum Bandwidth Measurement	QPSK, 20M	Band 4	5720	1 + 2
	QPSK, 80M	Band 4	5720	1 + 2
Radiated Emission Above 1GHz	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1 + 2
		Band 3	5500 / 5580 / 5650 / 5720	1 + 2
	QPSK, 80M	Band 2	5250 / 5290 / 5300 / 5310	1 + 2
		Band 3	5510 / 5610 / 5650 / 5720	1 + 2
Band Edge Emission	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1 + 2
		Band 3	5500 / 5580 / 5650 / 5720	1 + 2
	QPSK, 80M	Band 2	5250 / 5290 / 5300 / 5310	1 + 2
		Band 3	5510 / 5610 / 5650 / 5720	1 + 2
Frequency Stability	20 MHz	Band 2	5300	2
		Band 3	5580	2
	80 MHz	Band 2	5290	2
		Band 3	5610	2

For Antenna 2:

Test Items	Mode		Channel	Port
Max. Conducted Output Power	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1+2
		Band 3	5500 / 5580 / 5650 / 5720	1+2
	QPSK, 80M	Band 2	5250 / 5290 / 5300	1+2
		Band 3	5510 / 5610 / 5650 / 5720	1+2
Power Spectral Density	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1+2
		Band 3	5500 / 5580 / 5650 / 5720	1+2
	QPSK, 80M	Band 2	5250 / 5290 / 5300	1+2
		Band 3	5510 / 5610 / 5650 / 5720	1+2
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1+2
		Band 3	5500 / 5580 / 5650 / 5720	1+2
	QPSK, 80M	Band 2	5250 / 5290 / 5300	1+2
		Band 3	5510 / 5610 / 5650 / 5720	1+2
6dB Spectrum Bandwidth Measurement	QPSK, 20M	Band 4	5720	1+2
	QPSK, 80M	Band 4	5720	1+2
Radiated Emission Above 1GHz	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1+2
		Band 3	5500 / 5580 / 5650 / 5720	1+2
	QPSK, 80M	Band 2	5250 / 5290 / 5300	1+2
		Band 3	5510 / 5610 / 5650 / 5720	1+2
Band Edge Emission	QPSK, 20M	Band 2	5250 / 5260 / 5300 / 5320	1+2
		Band 3	5500 / 5580 / 5650 / 5720	1+2
	QPSK, 80M	Band 2	5250 / 5290 / 5300	1+2
		Band 3	5510 / 5610 / 5650 / 5720	1+2
Frequency Stability	20 MHz	Band 2	5300	2
		Band 3	5580	2
	80 MHz	Band 2	5290	2
		Band 3	5610	2

Note 1: The EUT was powered by PoE, and the PoE was for measurement only, would not be marketed.

PoE information as below:

Support Unit	Brand	Model
PoE	Cambium Networks	NET-P30-56IN

3.6. Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
Test Site No.	Site Category	Location	FCC Designation No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	TW0006	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

3.7. Table for Class III Change

This product is an extension of original one reported under Sporton project number: FR7O1623

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Adding 5G Band 2 (5250/5260/5265/5270/5275/5280/5285/5290/5295/ 5300/5305/5310/5315/5320) and 5G Band 3 (5500/5505/5510/5515/5520/5525/5530/5535/5540/5545/5550/ 5555/5560/5565/5570/5575/5580/5585/5590/5595/5600/5605/ 5610/5615/5620/5625/5630/5635/5640/5645/5650/5720) only for 20M and 80M.	1. Power Spectral Density 2. 26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement 3. 6dB Spectrum Bandwidth Measurement 4. Radiated Emission Above 1GHz 5. Band Edge Emission 6. Frequency Stability

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB & TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	N/A
PoE	Cambium Networks	NET-P30-56IN	N/A

3.9. Table for Parameters of Test Software Setting

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

For Antenna 1:

Test Software Version	QCARCT Version3.0.250.0					
Mode	Test Frequency (MHz)					
	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5650 MHz
20M	22.5	23	17	26	22.5	23.5
80M	5290 MHz	5530 MHz	5310 MHz	5510 MHz	5610 MHz	5650 MHz
	19	19	6	18	20	17.5

Test Software Version	TELNET	
Mode	Test Frequency (MHz)	
	5250 MHz	5720 MHz
20M	22	23
80M	5250 MHz	5720 MHz
	18	21

For Antenna 2:

Test Software Version	QCARCT Version3.0.250.0					
Mode	Test Frequency (MHz)					
	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5650 MHz
20M	7	7.5	4	5	7	0
80M	5290 MHz	5530 MHz	5510 MHz	5610 MHz	5650 MHz	
	6.5	6.5	5	6.5	0	

Test Software Version	TELNET	
Mode	Test Frequency (MHz)	
	5250 MHz	5720 MHz
20M	6	7
80M	5250 MHz	5720 MHz
	6	0

3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
20M	5.029	5.073	99.14%	0.04	0.01
80M	1.159	1.217	95.24%	0.21	0.86

4. TEST RESULT

4.1. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.1.1. Limit

No restriction limits.

4.1.2. Measuring Instruments and Setting

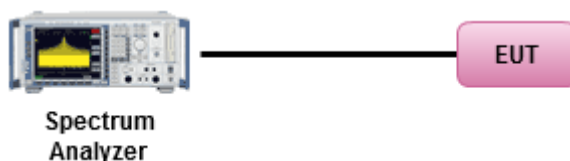
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

26dB Bandwidth	
Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW > RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth	
Spectrum Parameters	Setting
Span	1.5 times to 5.0 times the OBW
RBW	1 % to 5 % of the OBW
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold

4.1.3. Test Procedures

Test Method	
For the emission bandwidth shall be measured using one of the options below:	
☒	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.
☐	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
☒	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.

4.1.4. Test Setup Layout



4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.1.7. Test Result of 26dB Bandwidth and 99% Occupied Bandwidth

Temperature	27.1°C	Humidity	79%
Test Engineer	Ron Huang		

For Antenna 1:

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
		Port 1		Port 2	
20M	5260 MHz	21.13	17.71	21.04	17.71
	5300 MHz	20.00	17.28	20.09	17.19
	5320 MHz	32.78	26.74	39.30	27.61
	5500 MHz	27.91	18.49	24.09	17.97
	5580 MHz	26.69	17.89	20.87	17.71
	5650 MHz	38.43	20.41	21.39	17.71
80M	5290 MHz	79.42	63.97	81.16	70.91
	5300 MHz	80.00	72.07	80.58	73.81
	5310 MHz	80.00	73.81	81.45	74.96
	5510 MHz	80.29	64.83	80.87	63.39
	5610 MHz	83.48	75.83	82.03	75.25
	5650 MHz	83.77	76.12	82.61	75.83

For Straddle Channel

For port 1

Mode	Frequency	26dB BW (MHz)	99% OBW (MHz)	26dB BW F1 (MHz)	99% OBW T1 (MHz)	UNII 1 & 2C 26dB BW (MHz)	UNII 2A & 3 26dB BW (MHz)	UNII 1 & 2C 99% BW (MHz)	UNII 2A & 3 99% BW (MHz)
20M	5250 MHz	21.57	17.71	5239.22	5241.14	10.78	10.78	8.86	8.86
20M	5720 MHz	21.30	17.63	5709.22	5711.14	15.78	5.52	13.86	3.77
80M	5250 MHz	84.93	76.41	5207.68	5211.80	42.32	42.61	38.20	38.21
80M	5720 MHz	118.84	76.12	5677.68	5682.08	47.32	71.52	42.92	33.21

For port 2

Mode	Frequency	26dB BW (MHz)	99% OBW (MHz)	26dB BW F1 (MHz)	99% OBW T1 (MHz)	UNII 1 & 2C 26dB BW (MHz)	UNII 2A & 3 26dB BW (MHz)	UNII 1 & 2C 99% BW (MHz)	UNII 2A & 3 99% BW (MHz)
20M	5250 MHz	31.74	18.32	5231.74	5240.62	18.26	13.48	9.38	8.94
20M	5720 MHz	20.70	17.63	5709.65	5711.14	15.35	5.35	13.86	3.77
80M	5250 MHz	84.06	76.41	5207.10	5211.22	42.90	41.16	38.78	37.63
80M	5720 MHz	83.77	76.12	5677.68	5681.80	47.32	36.45	43.20	32.92

For Antenna 2:

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
		Port 1		Port 2	
20M	5260 MHz	20.96	17.71	21.57	17.71
	5300 MHz	19.91	17.37	19.83	17.19
	5320 MHz	21.30	18.32	21.91	18.15
	5500 MHz	20.35	17.71	20.17	17.63
	5580 MHz	20.69	17.71	20.69	17.71
	5650 MHz	21.22	17.80	20.96	17.89
80M	5290 MHz	80.00	64.54	81.45	71.20
	5300 MHz	80.00	71.49	81.74	73.81
	5510 MHz	80.29	65.41	80.00	63.39
	5610 MHz	82.61	75.54	81.16	74.67
	5650 MHz	83.77	76.12	82.61	76.41

For Straddle Channel

For port 1

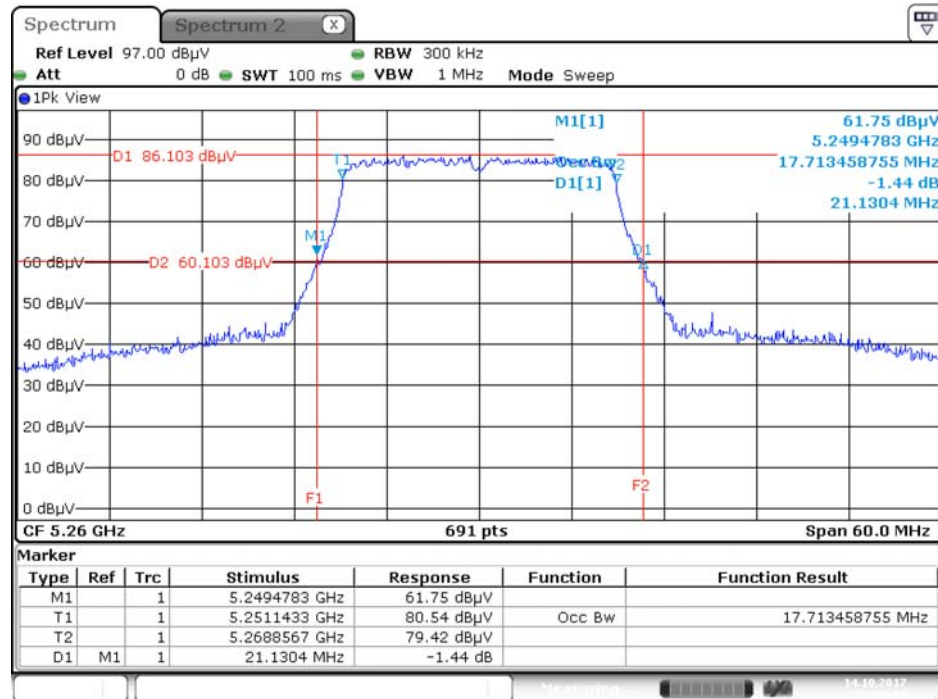
Mode	Frequency	26dB BW (MHz)	99% OBW (MHz)	26dB BW F1 (MHz)	99% OBW T1 (MHz)	UNII 1 & 2C 26dB BW (MHz)	UNII 2A & 3 26dB BW (MHz)	UNII 1 & 2C 99% BW (MHz)	UNII 2A & 3 99% BW (MHz)
20M	5250 MHz	21.22	17.71	5239.57	5241.14	10.43	10.78	8.86	8.86
20M	5720 MHz	20.70	17.71	5709.65	5711.14	15.35	5.35	13.86	3.86
80M	5250 MHz	84.93	76.41	5207.68	5211.80	42.32	42.61	38.20	38.21
80M	5720 MHz	84.64	76.41	5677.39	5681.80	47.61	37.03	43.20	33.21

For port 2

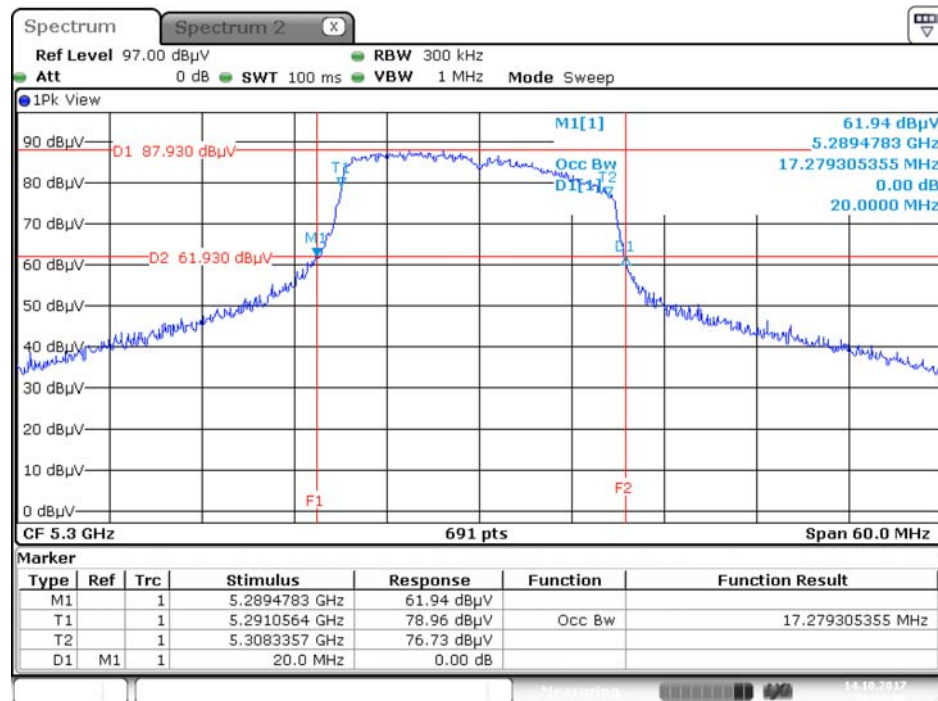
Mode	Frequency	26dB BW (MHz)	99% OBW (MHz)	26dB BW F1 (MHz)	99% OBW T1 (MHz)	UNII 1 & 2C 26dB BW (MHz)	UNII 2A & 3 26dB BW (MHz)	UNII 1 & 2C 99% BW (MHz)	UNII 2A & 3 99% BW (MHz)
20M	5250 MHz	20.87	17.63	5239.39	5241.14	10.61	10.26	8.86	8.77
20M	5720 MHz	21.22	17.63	5709.22	5711.14	15.78	5.43	13.86	3.77
80M	5250 MHz	83.48	76.41	5207.39	5211.22	42.61	40.87	38.78	37.63
80M	5720 MHz	84.06	76.41	5677.68	5681.51	47.32	36.74	43.49	32.92

For Antenna 1:

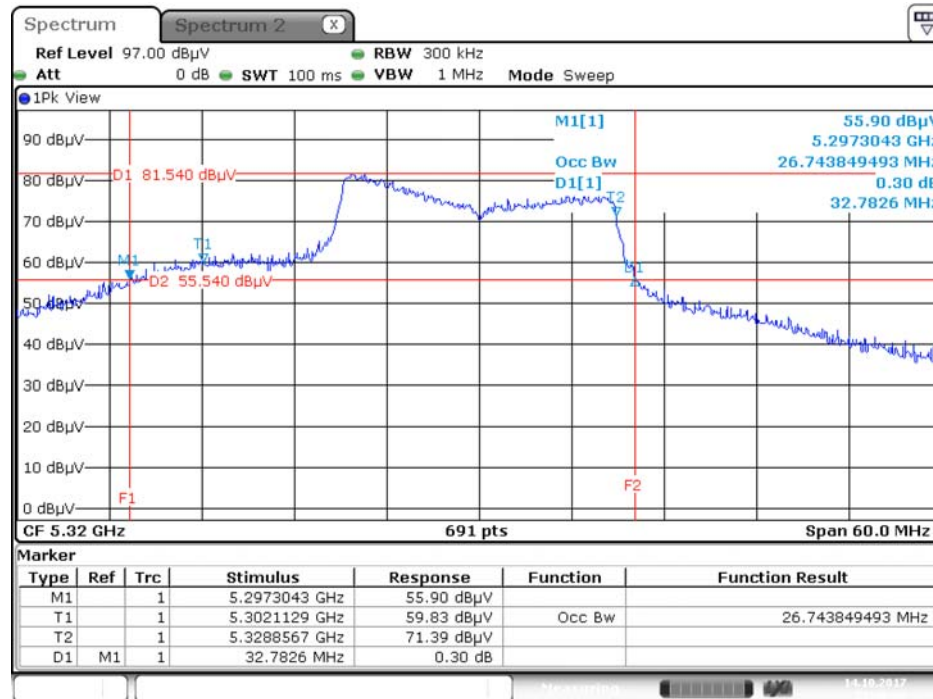
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5260 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5300 MHz

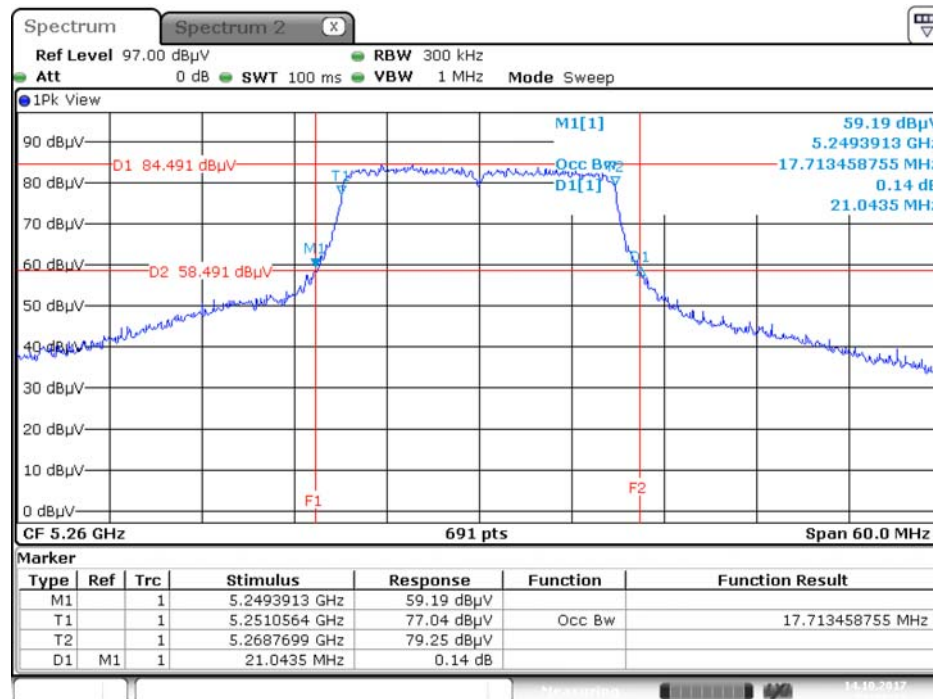


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5320 MHz



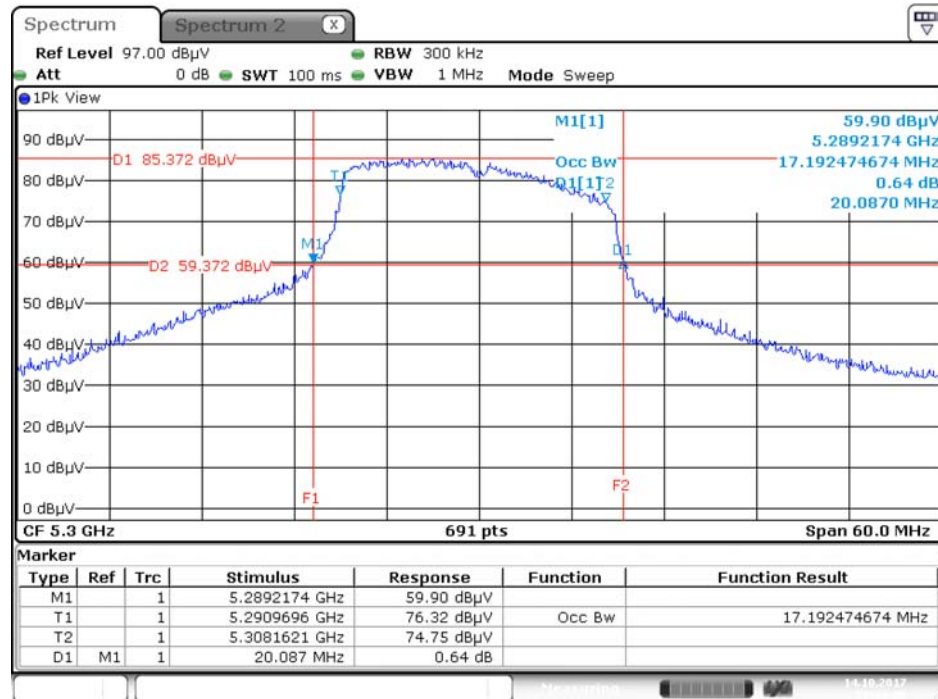
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5260 MHz



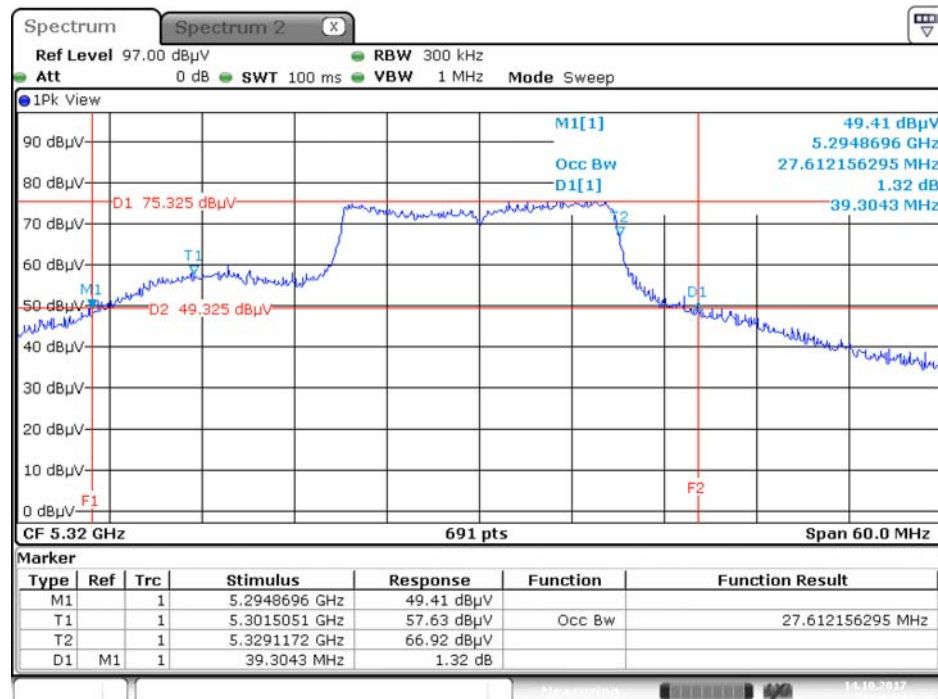
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5300 MHz



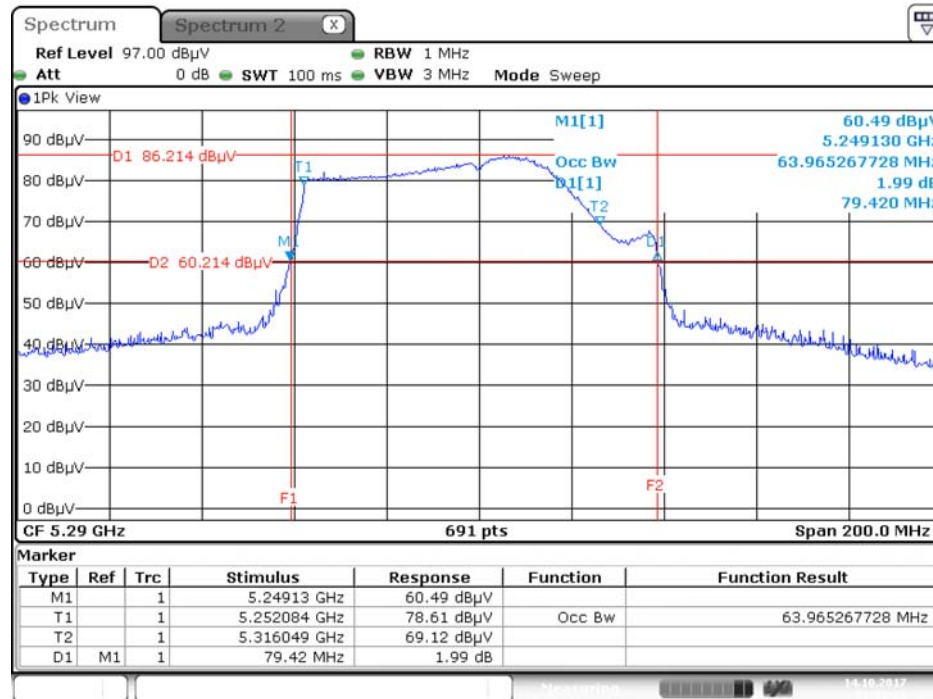
Date: 14.OCT.2017 21:44:07

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5320 MHz

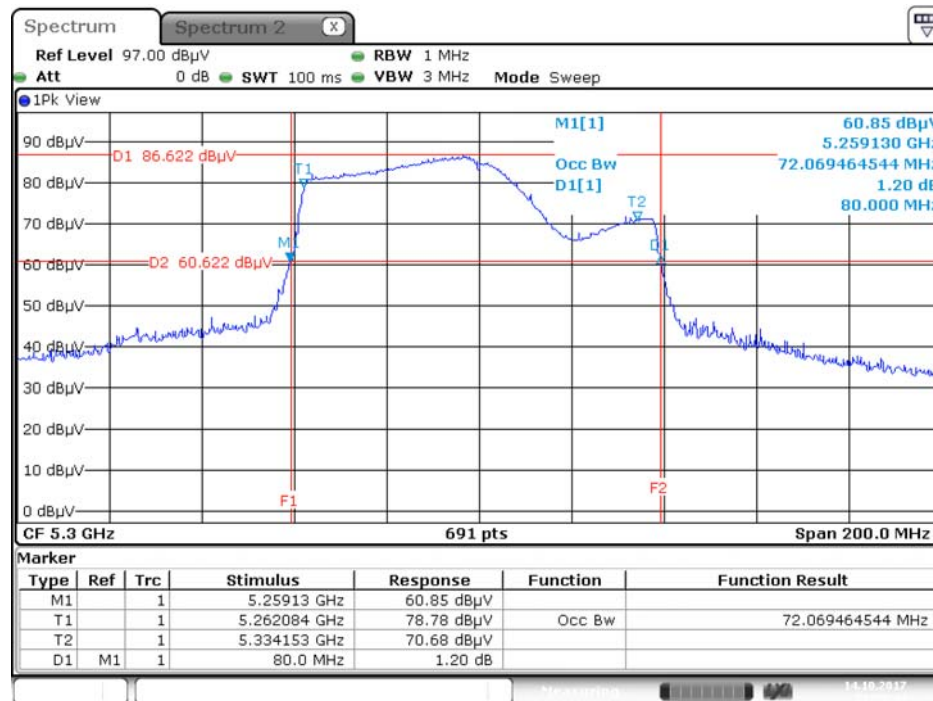


Date: 14.OCT.2017 21:48:05

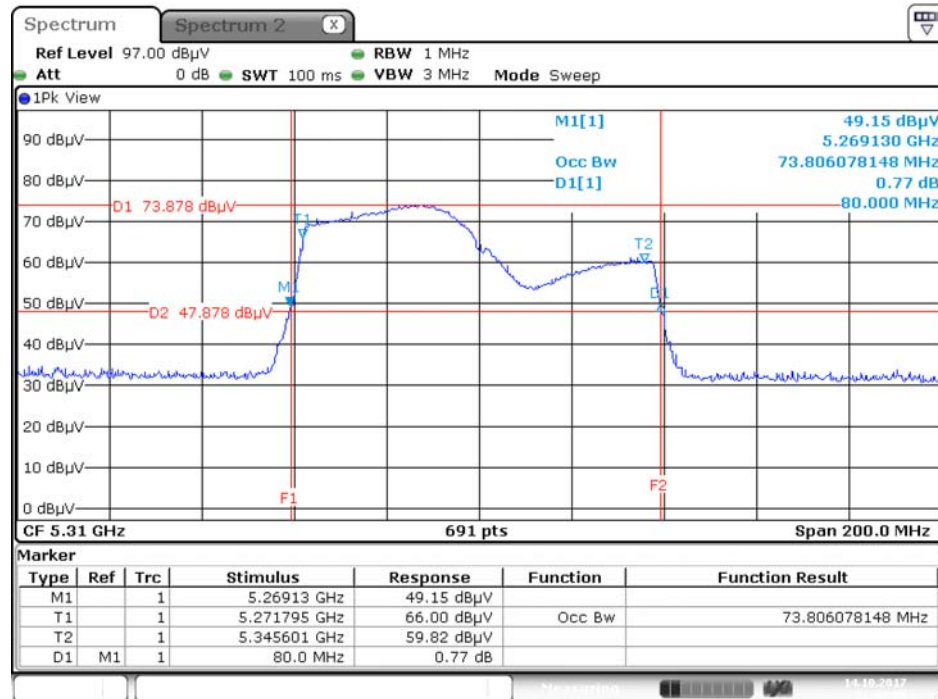
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5290 MHz



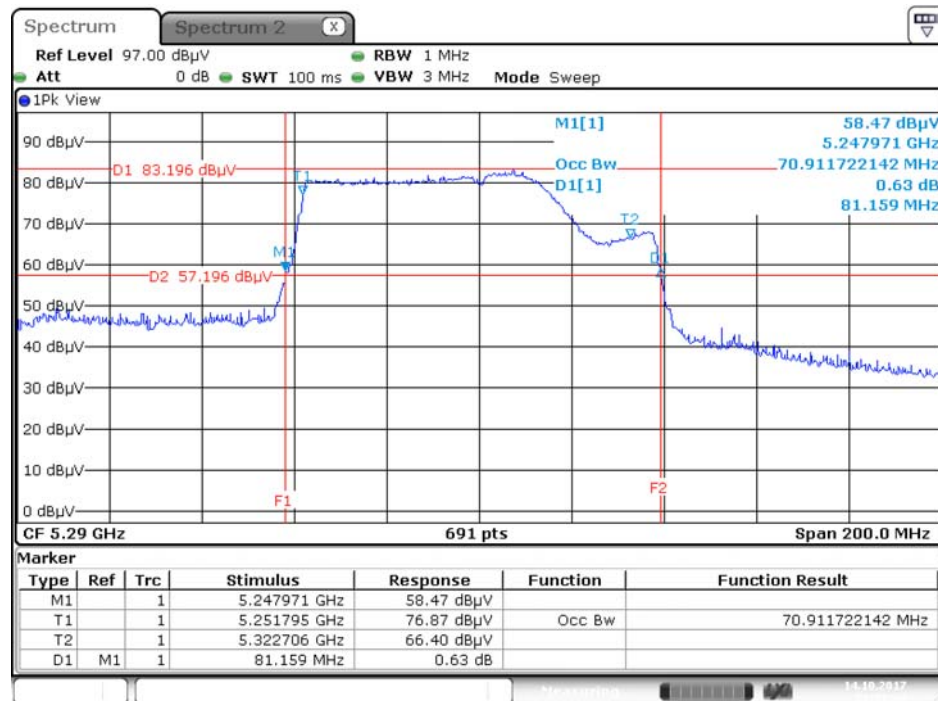
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5300 MHz



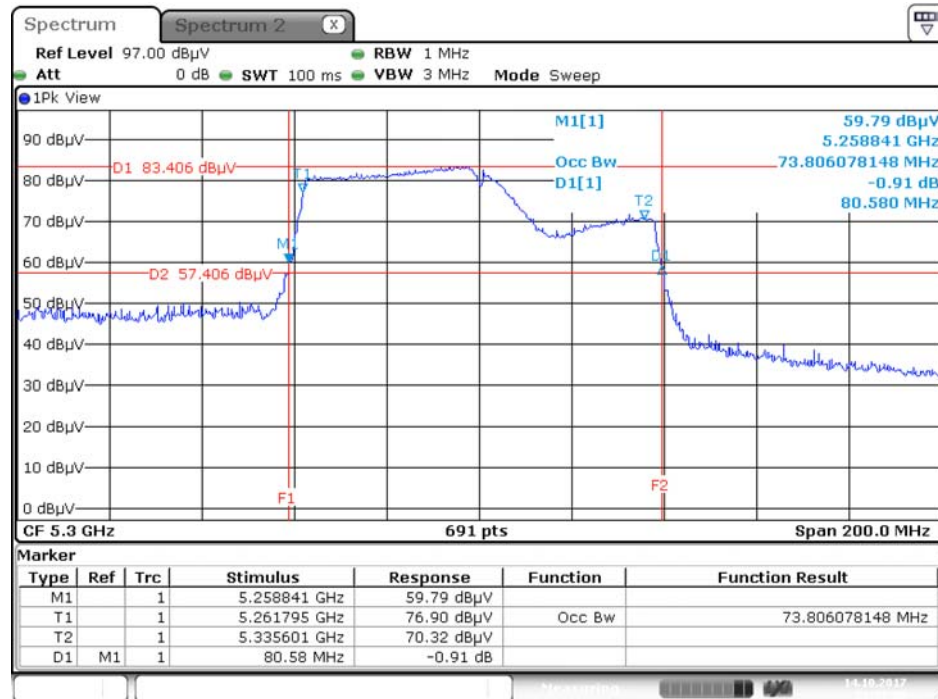
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5310 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5290 MHz

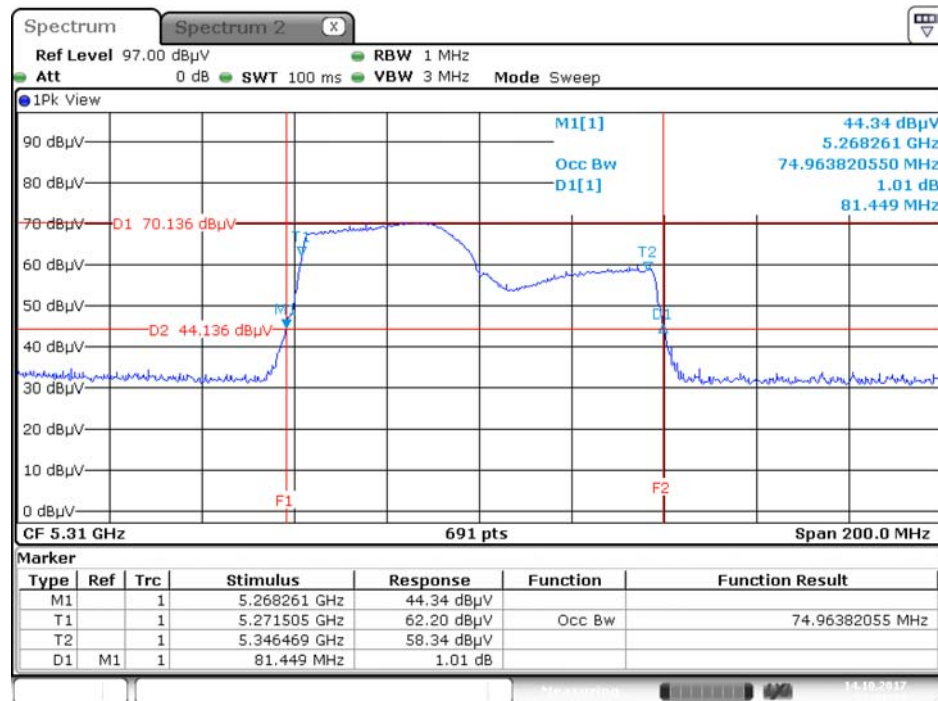


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5300 MHz



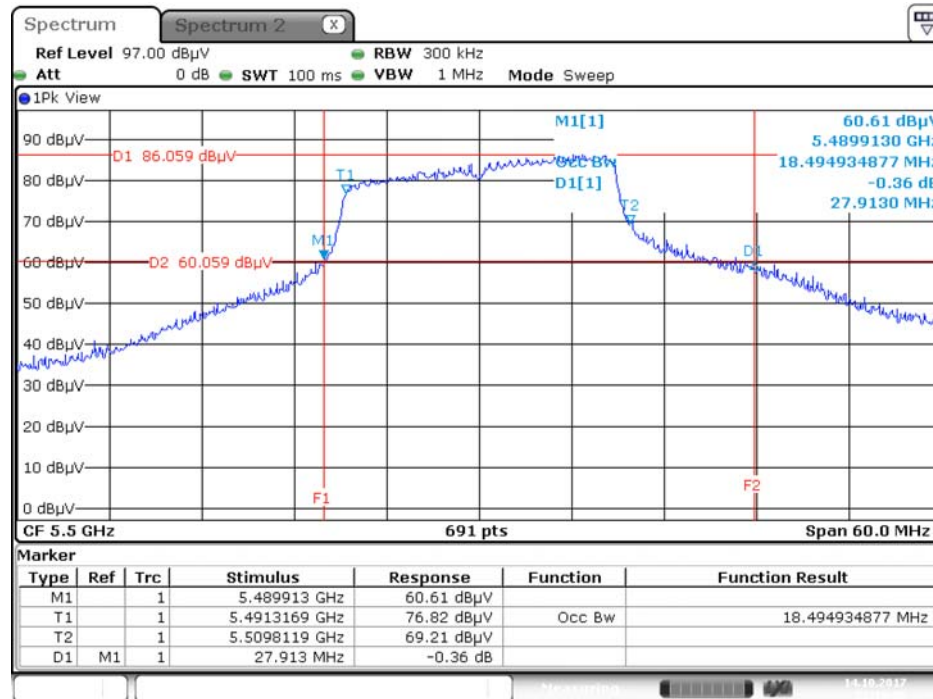
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5310 MHz



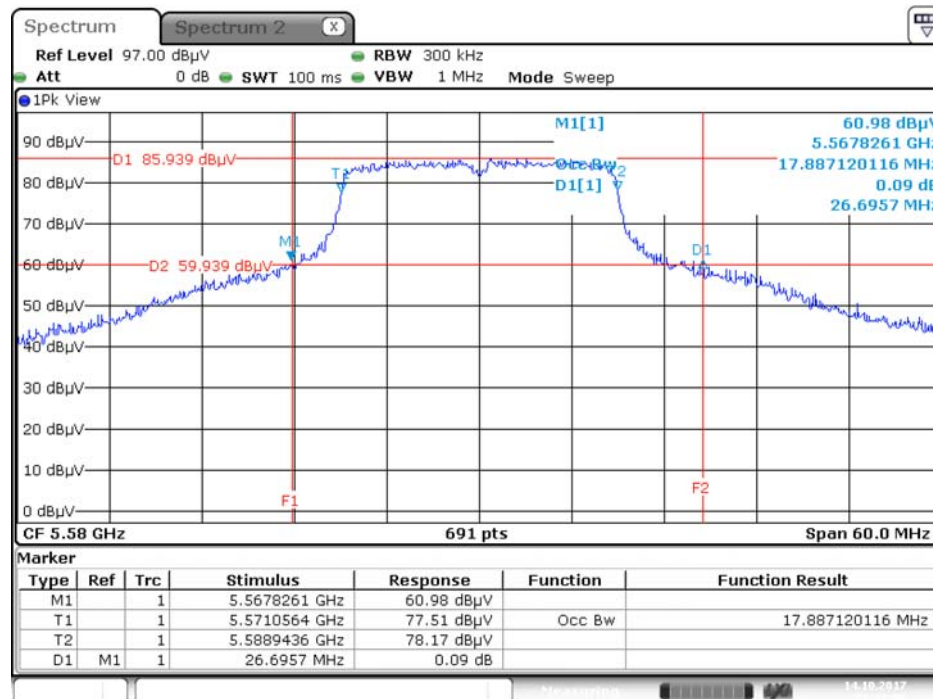
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5500 MHz



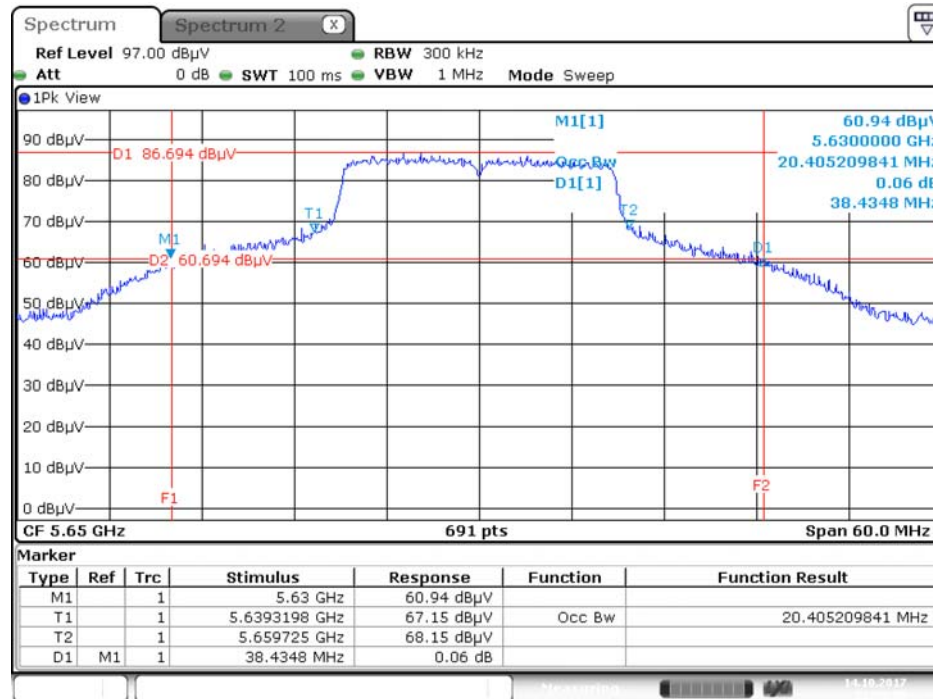
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5580 MHz



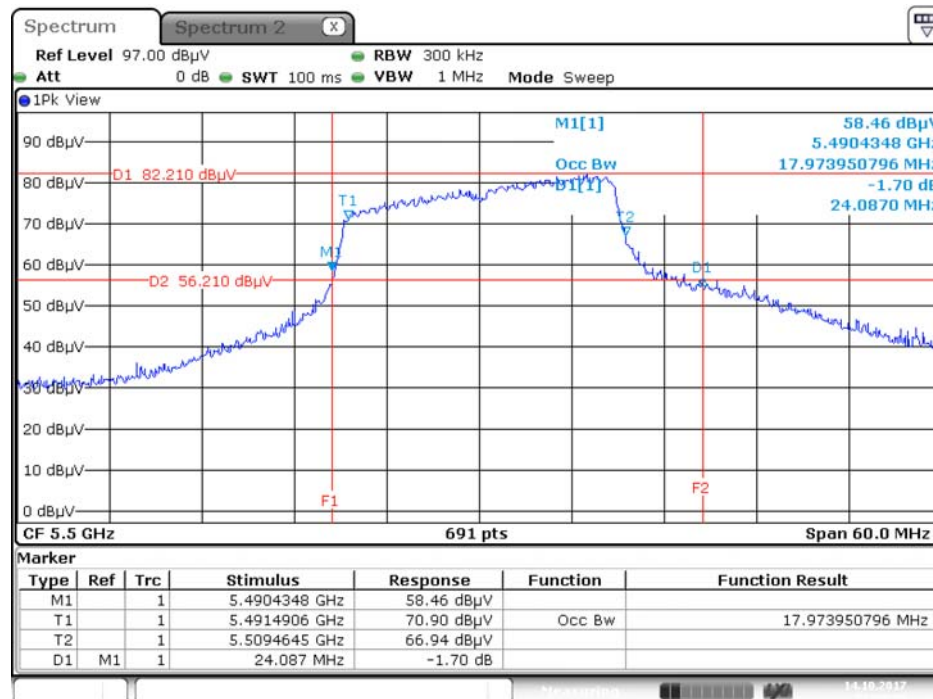
Date: 14.OCT.2017 22:22:36

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5650 MHz



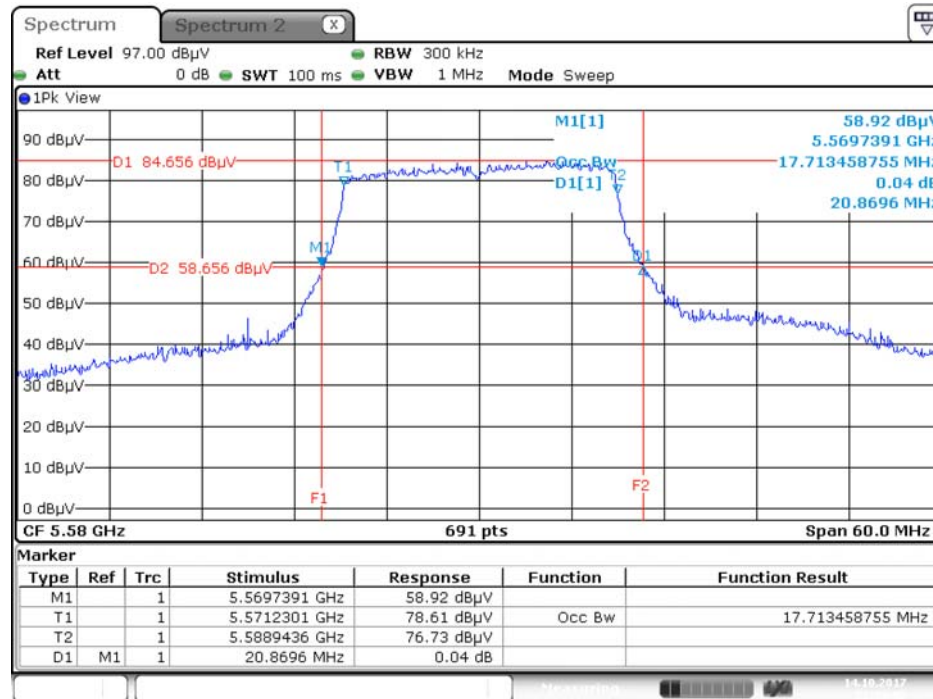
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5500 MHz



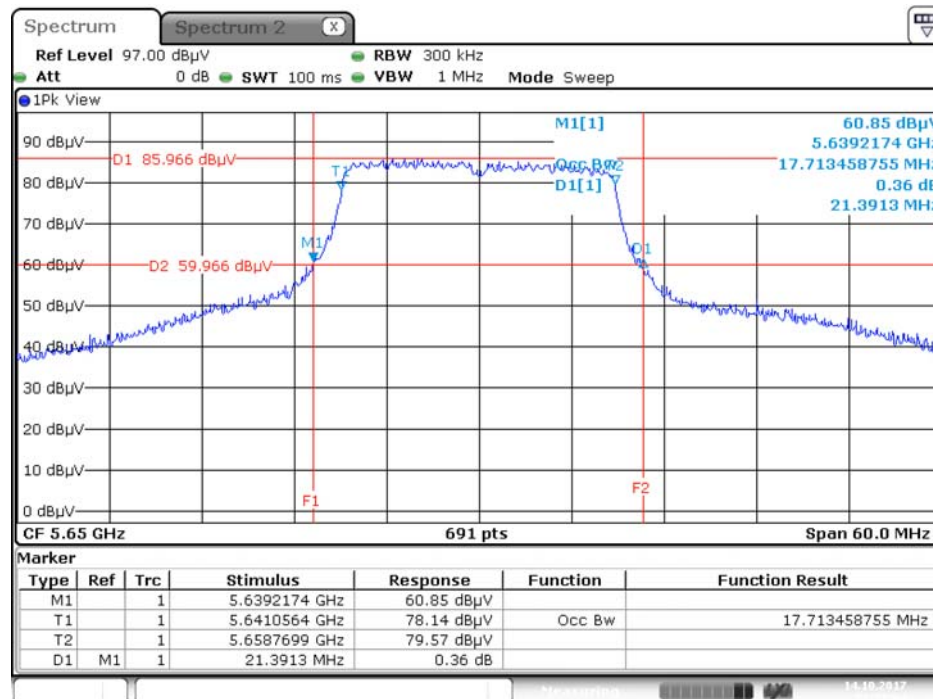
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5580 MHz



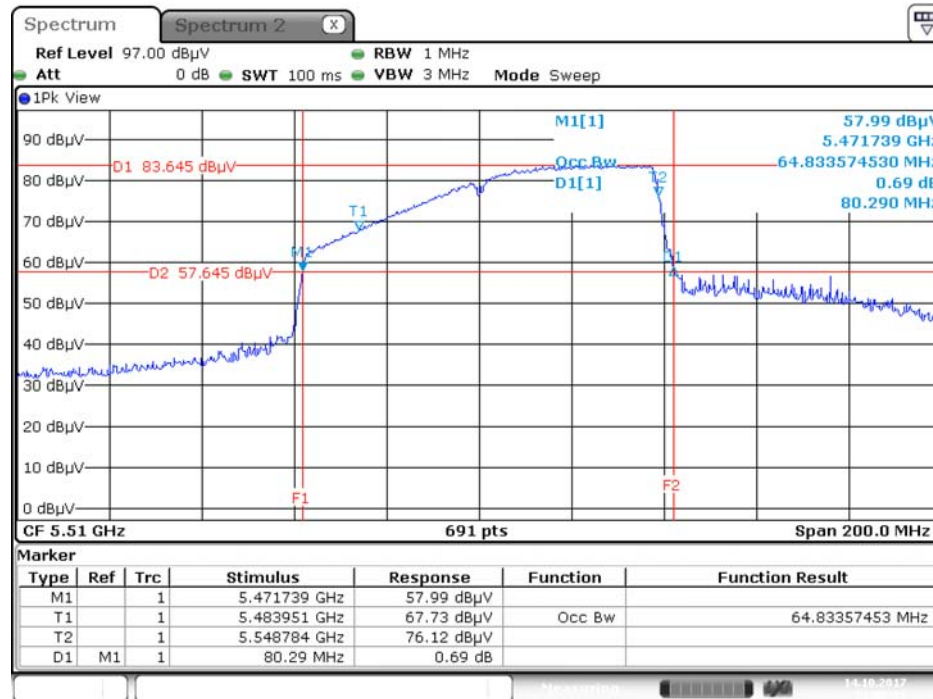
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5650 MHz



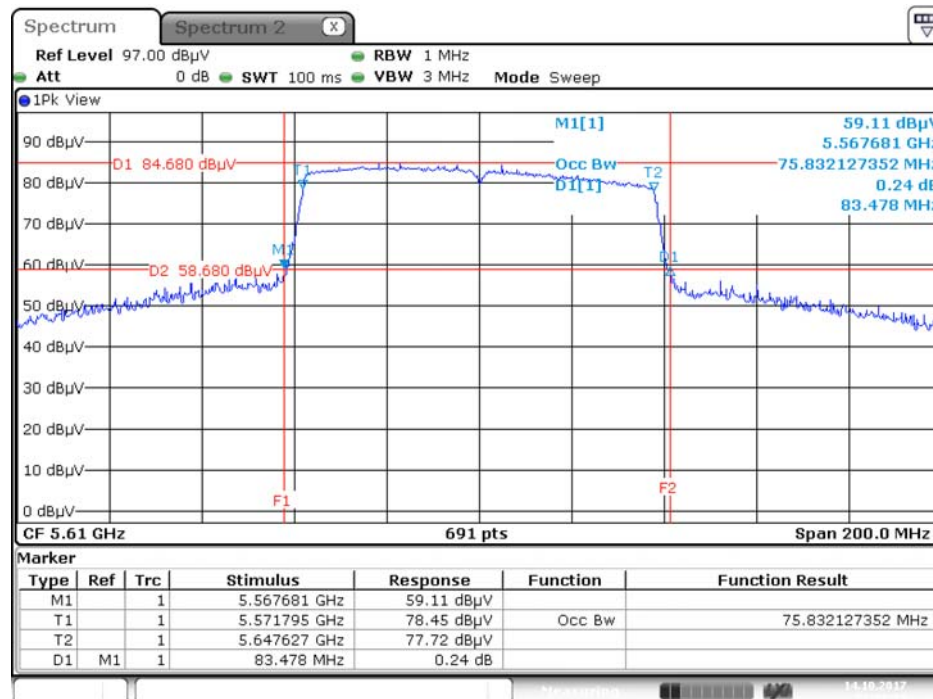
Date: 14.OCT.2017 22:27:05

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5510 MHz



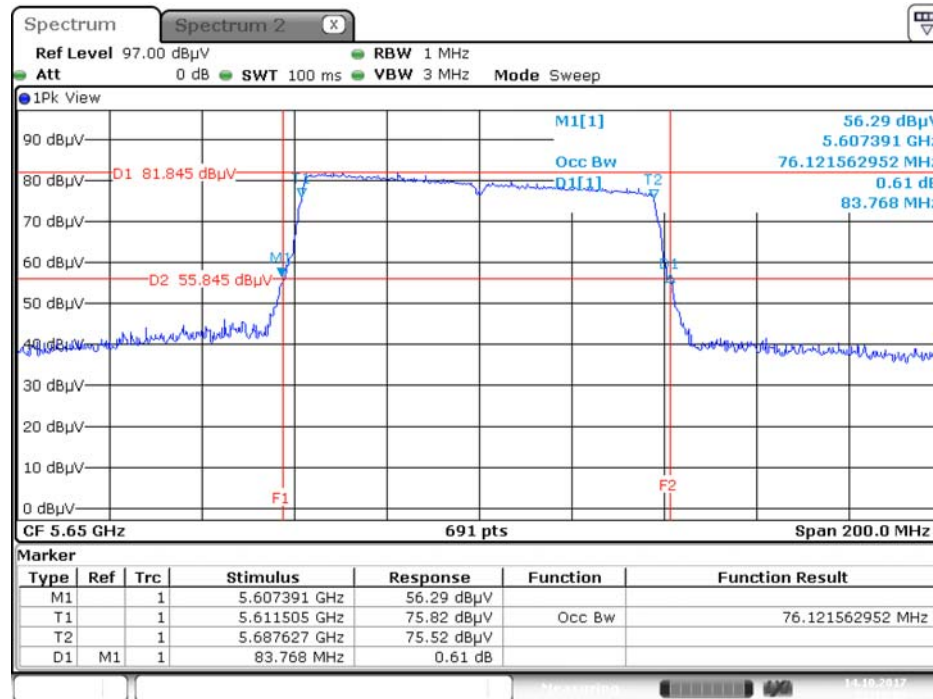
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5610 MHz



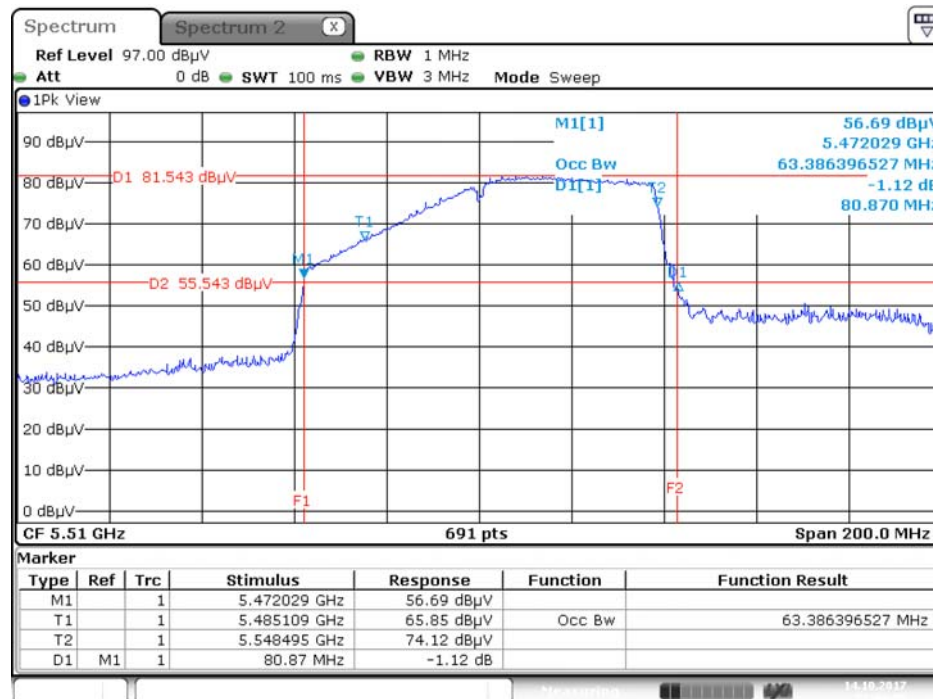
Date: 14.OCT.2017 22:11:39

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5650 MHz



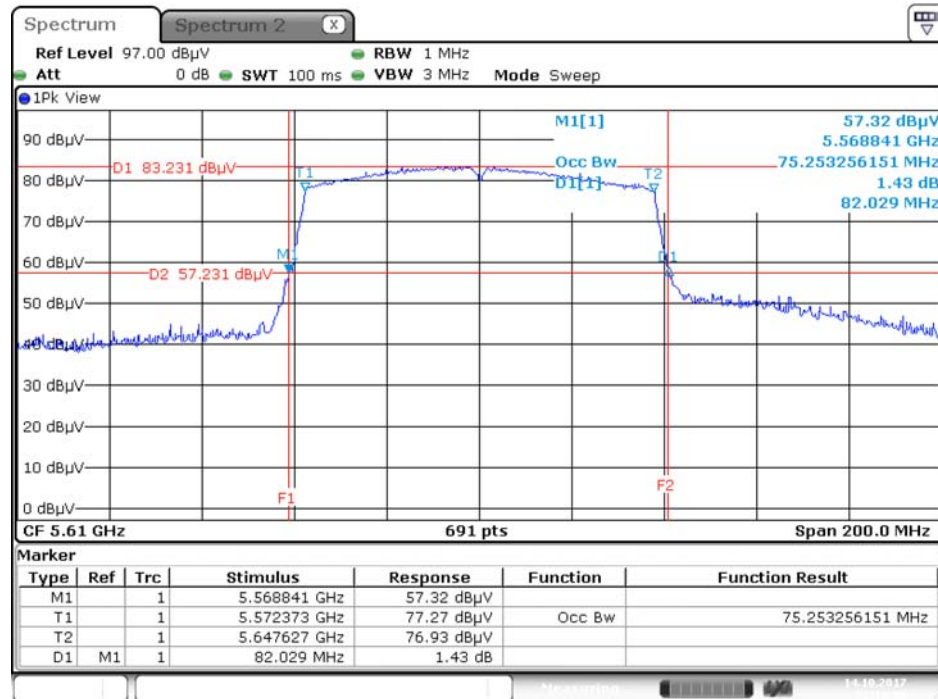
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5510 MHz



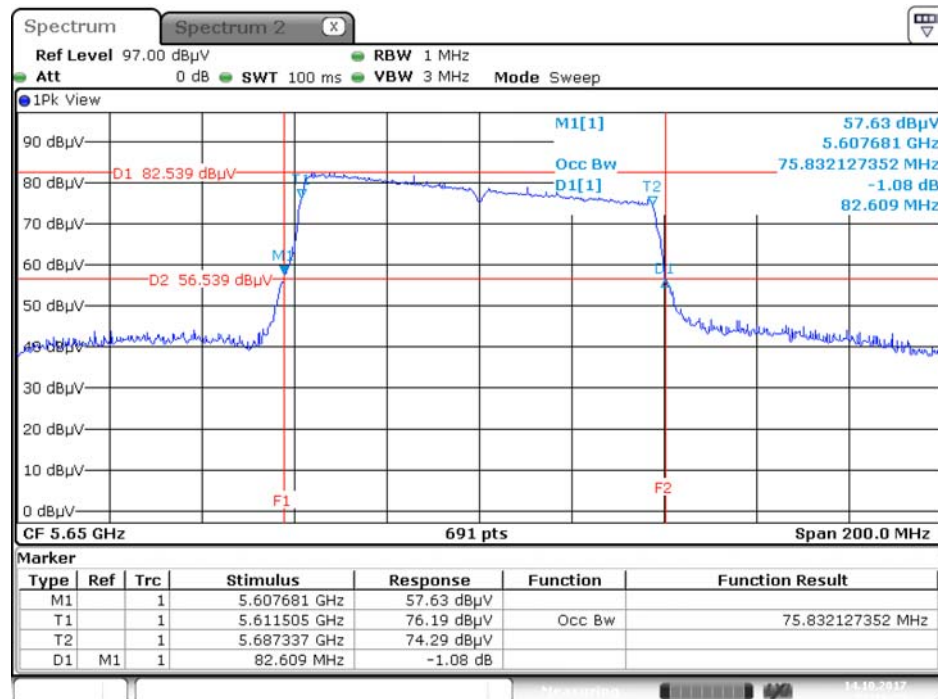
Date: 14.OCT.2017 22:09:06

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5610 MHz



Date: 14.OCT.2017 22:13:09

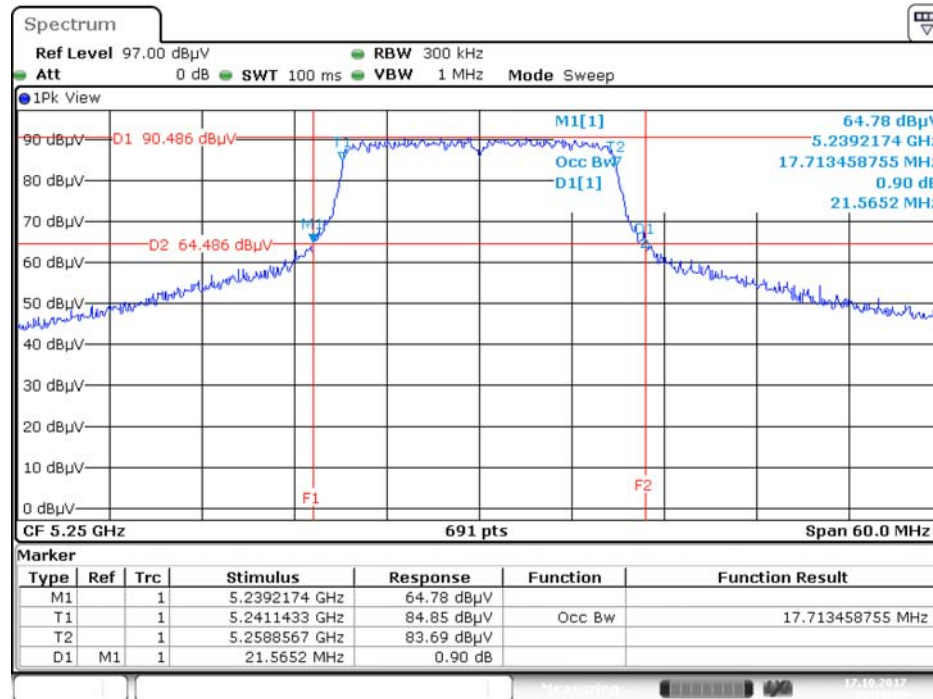
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5650 MHz



Date: 14.OCT.2017 22:16:24

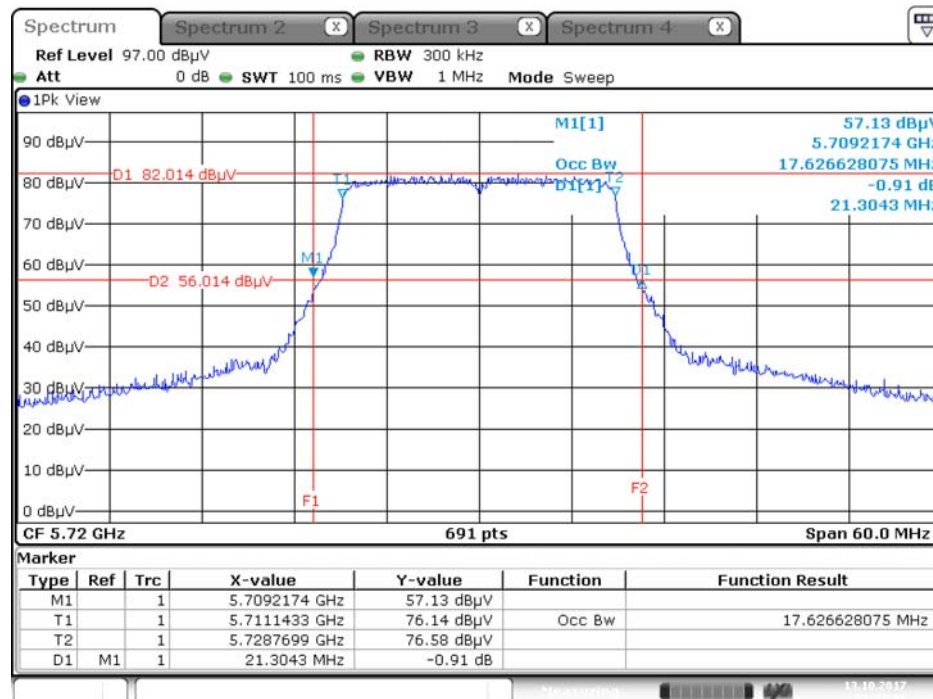
For Straddle Channel

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5250 MHz



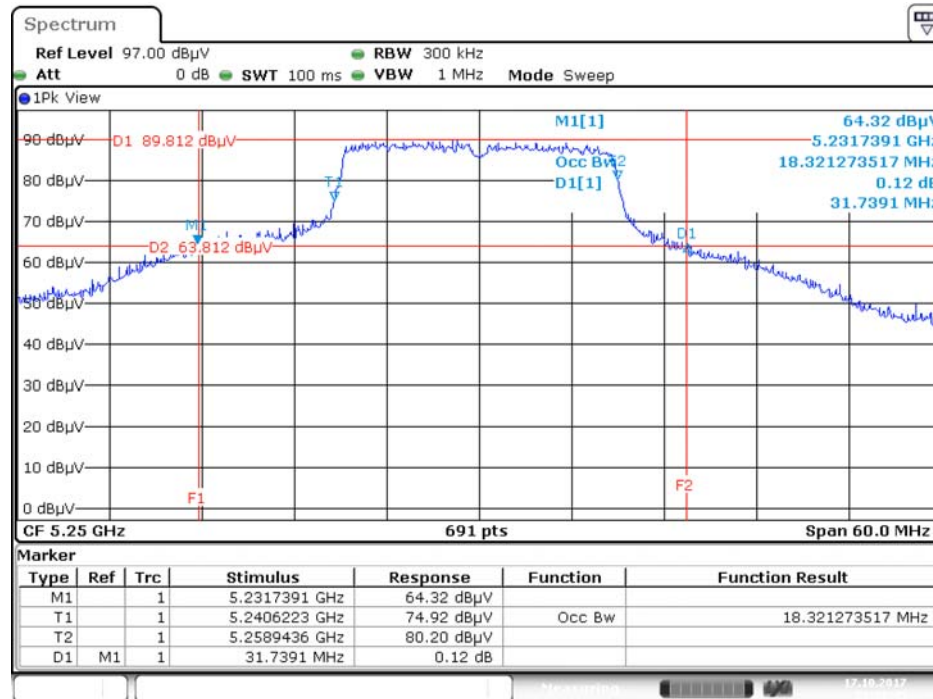
Date: 17.OCT.2017 23:10:23

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5720 MHz



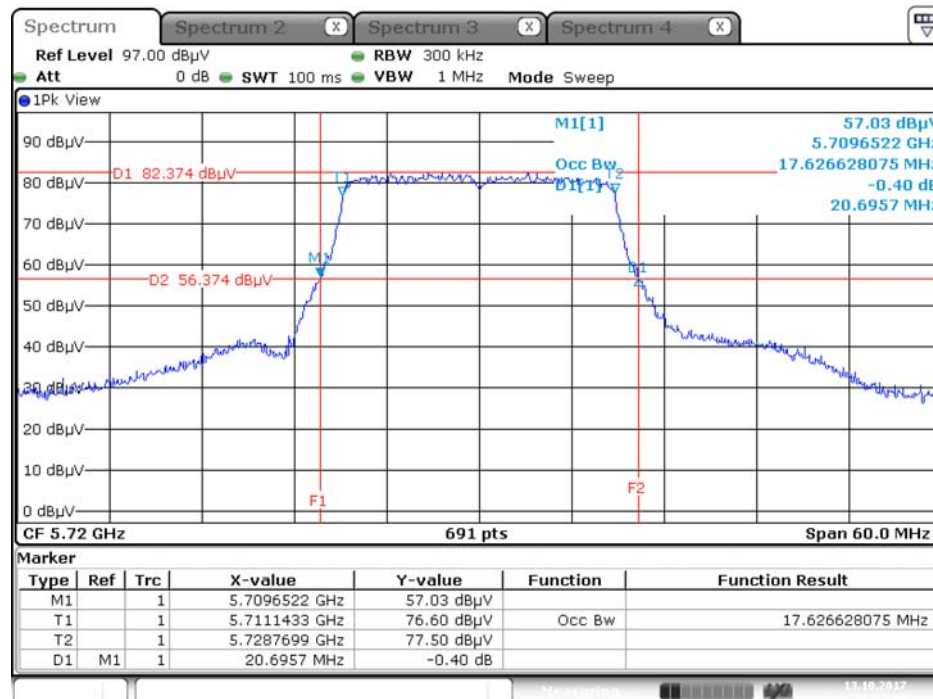
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5250 MHz



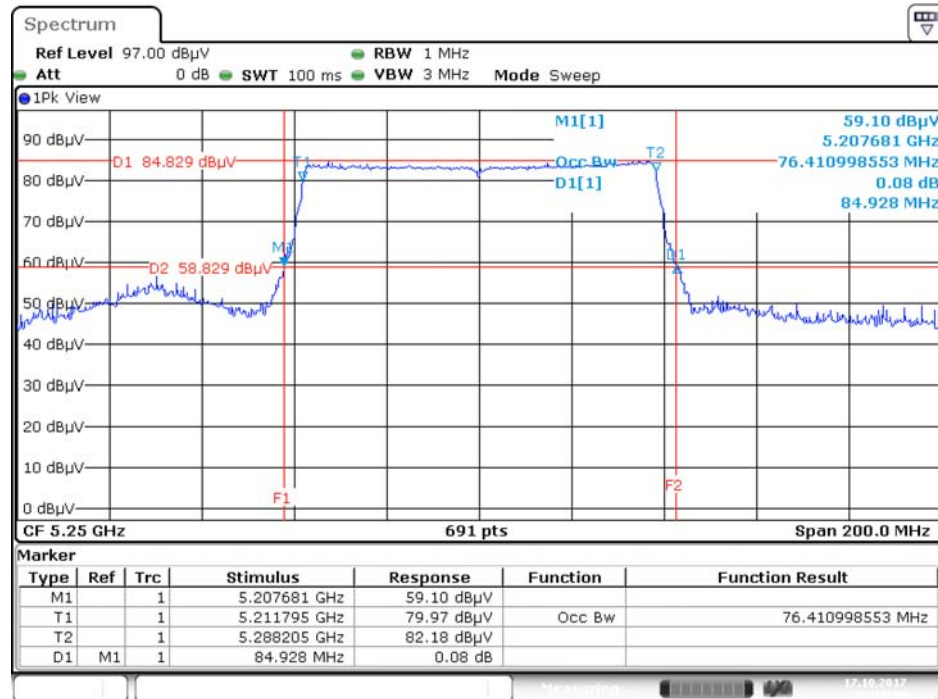
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5720 MHz

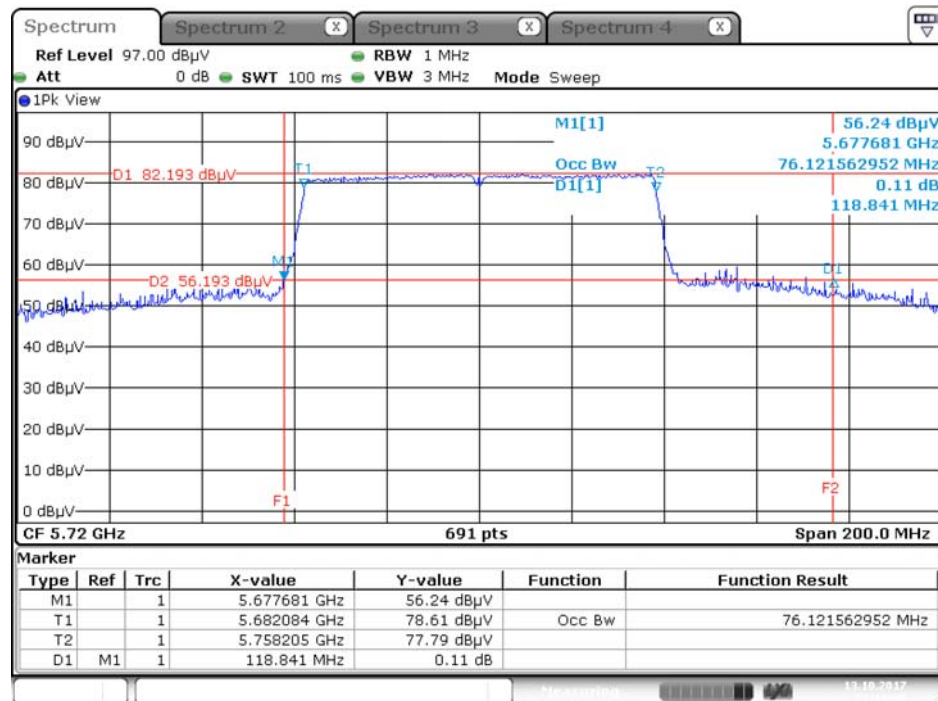


Date: 13.OCT.2017 22:23:48

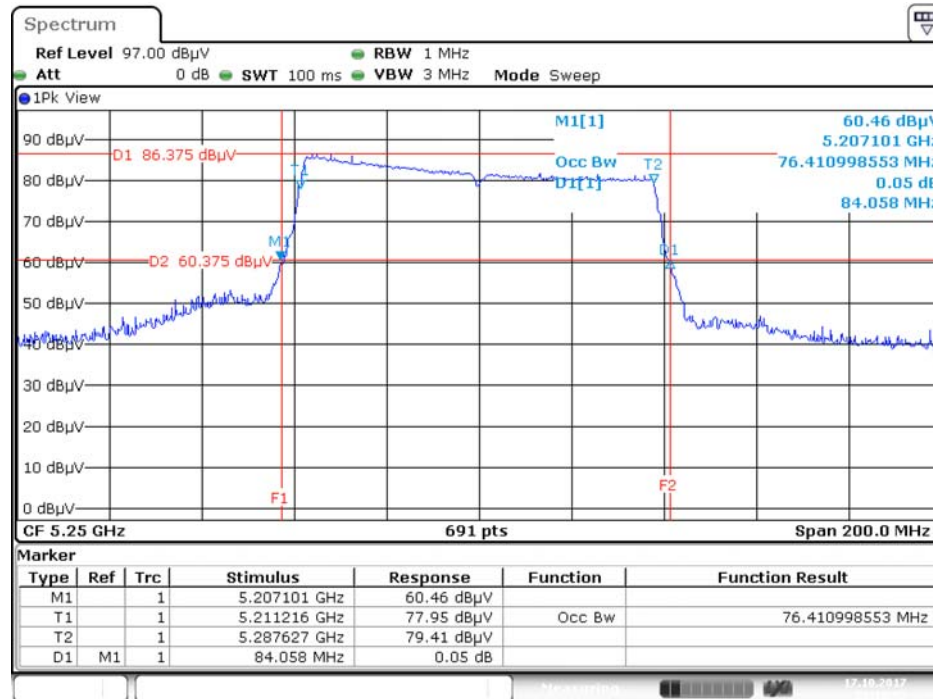
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5250 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5720 MHz

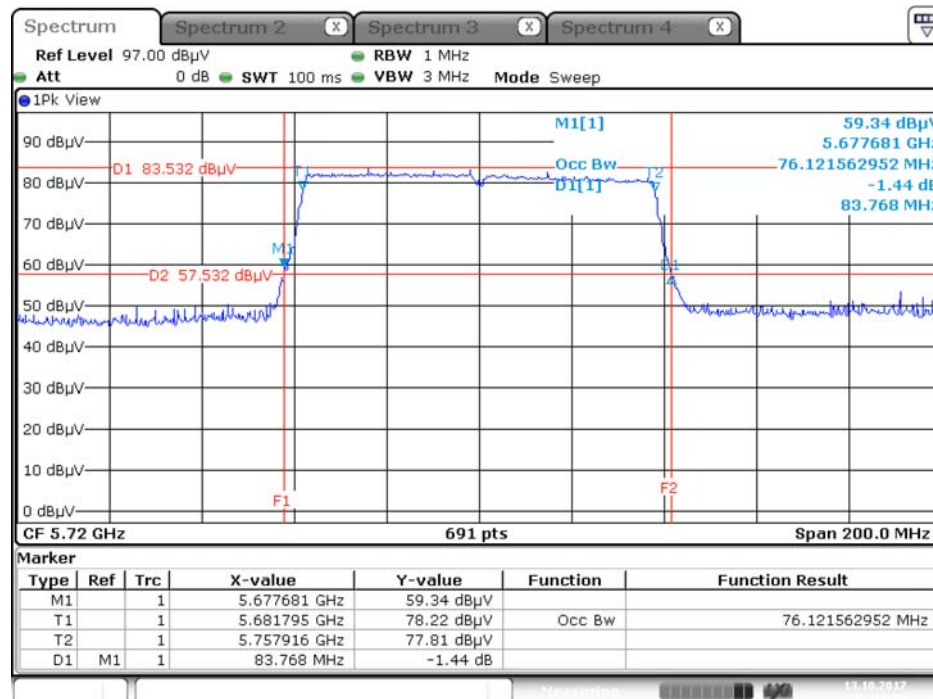


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5250 MHz



Date: 17.OCT.2017 23:13:53

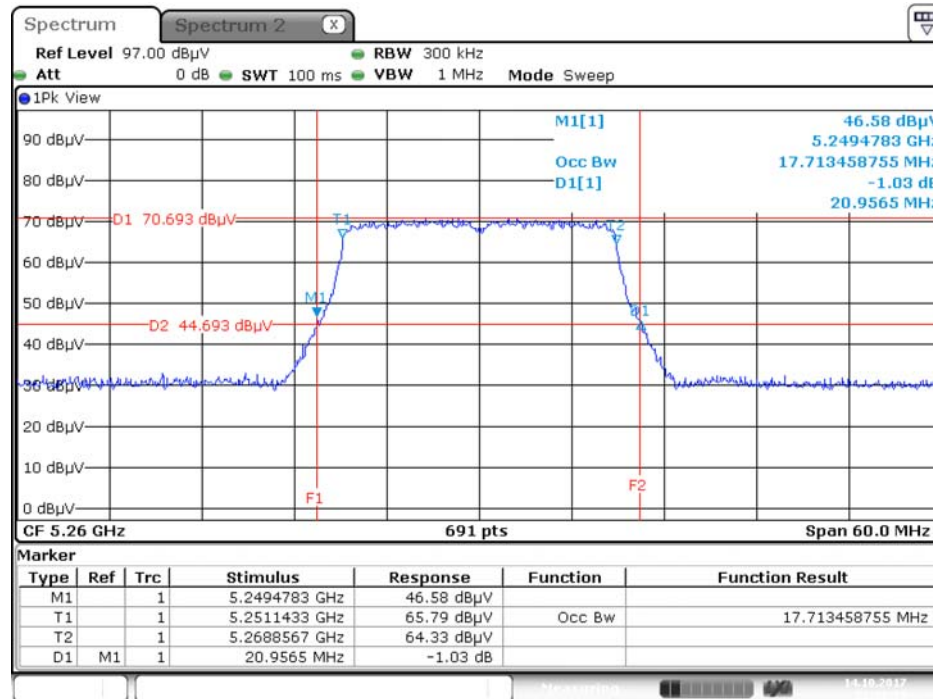
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5720 MHz



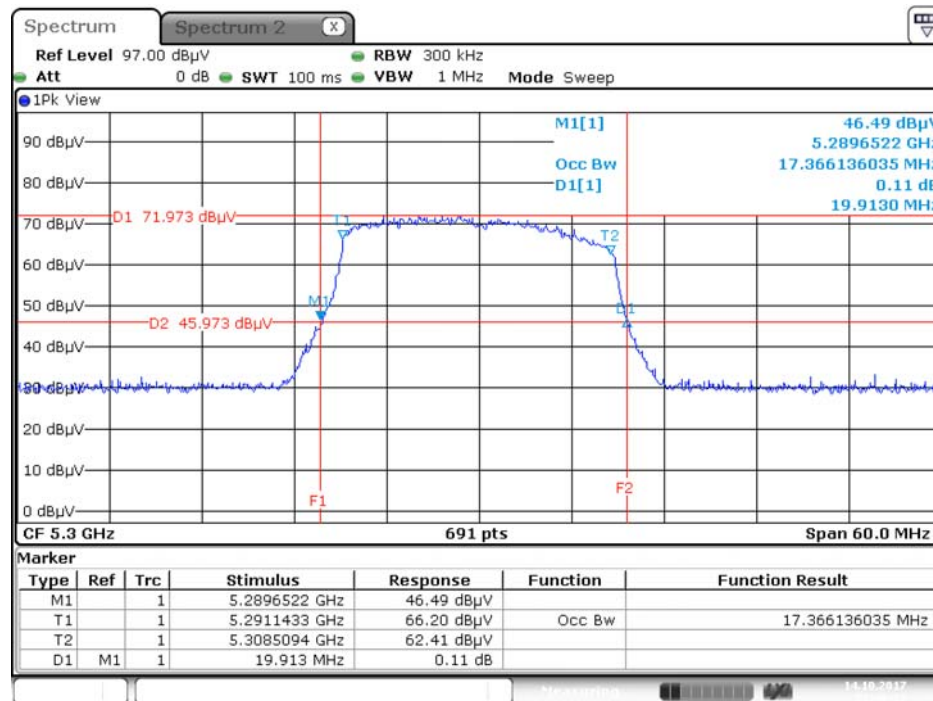
Date: 13.OCT.2017 22:13:59

For Antenna 2:

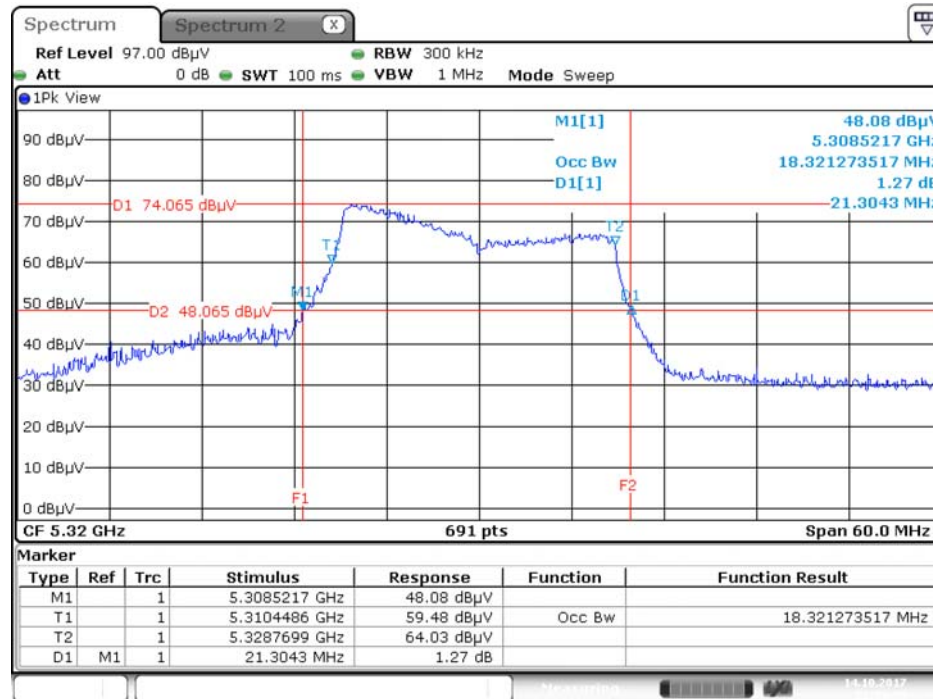
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5260 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5300 MHz

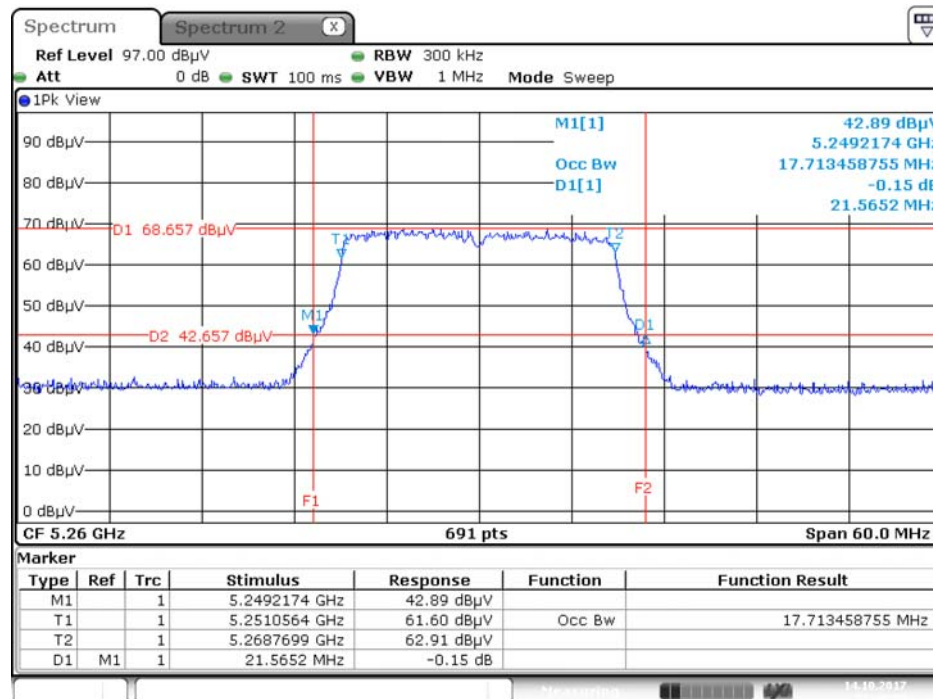


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5320 MHz



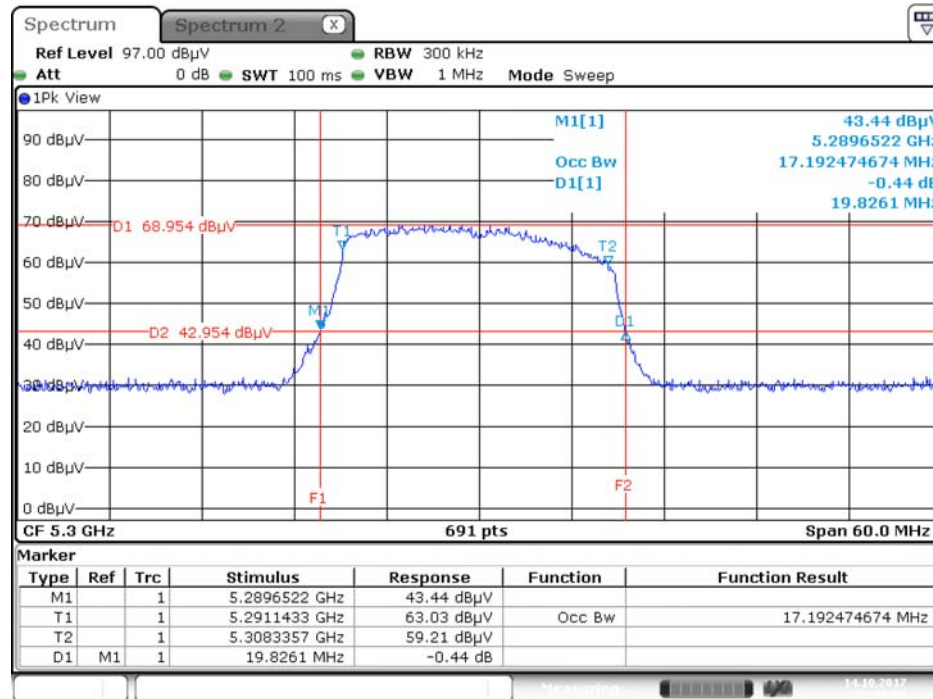
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5260 MHz

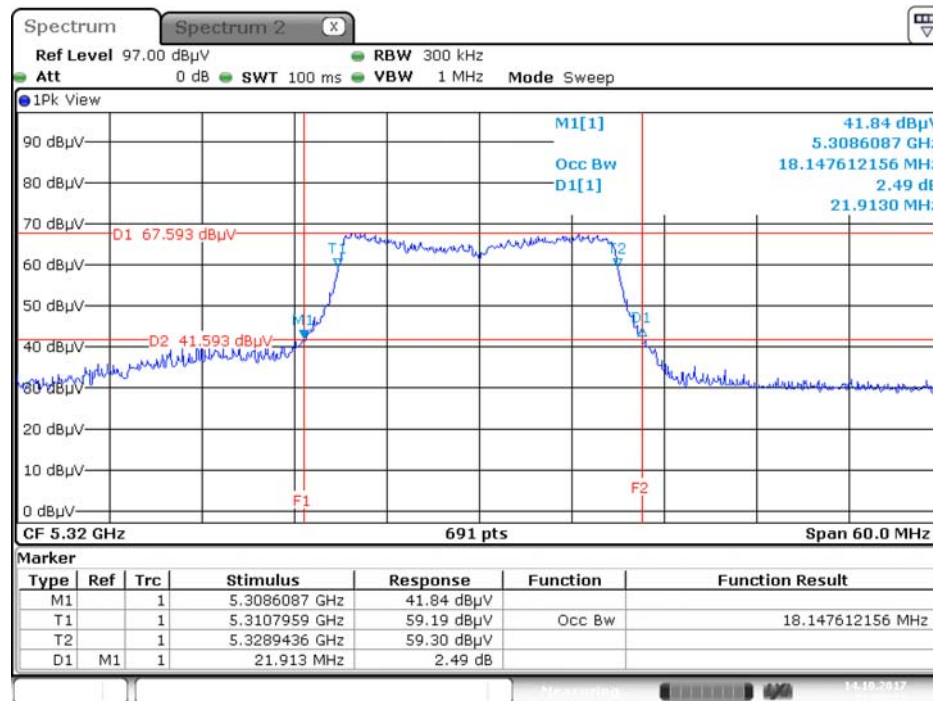


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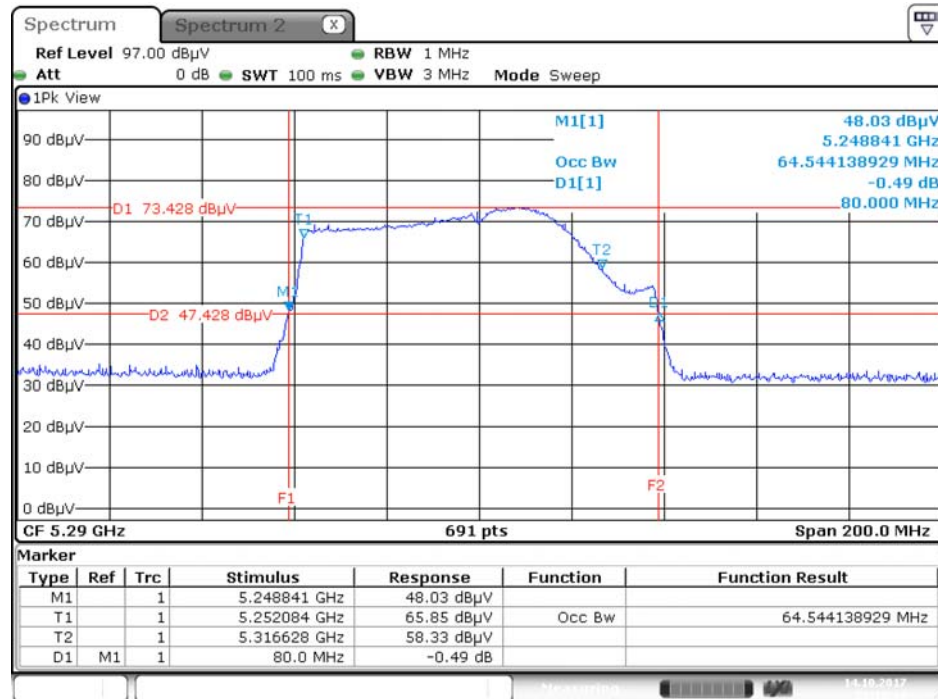
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5300 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5320 MHz

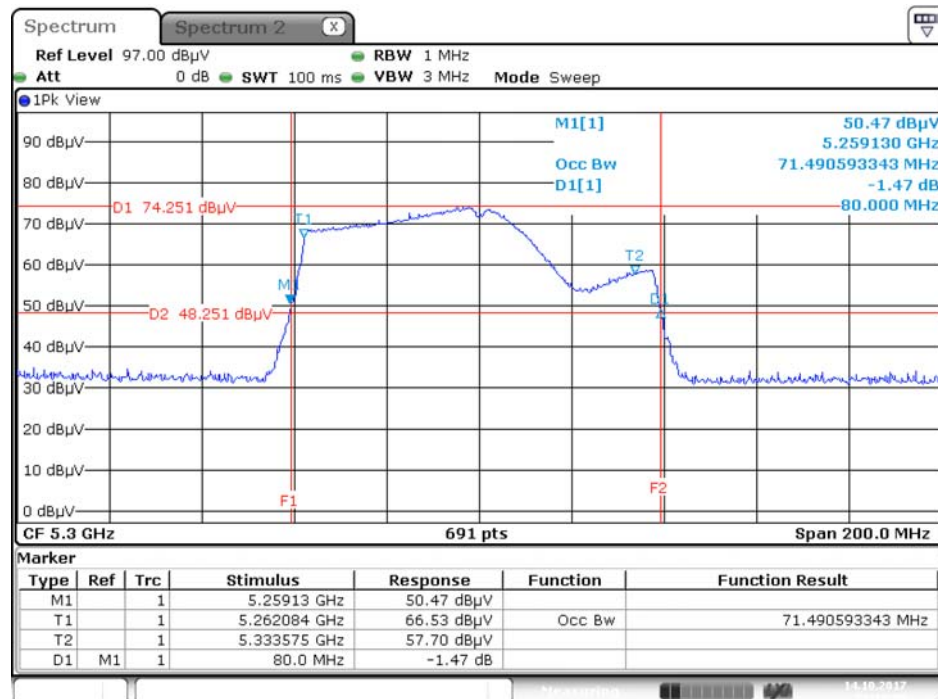


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5290 MHz



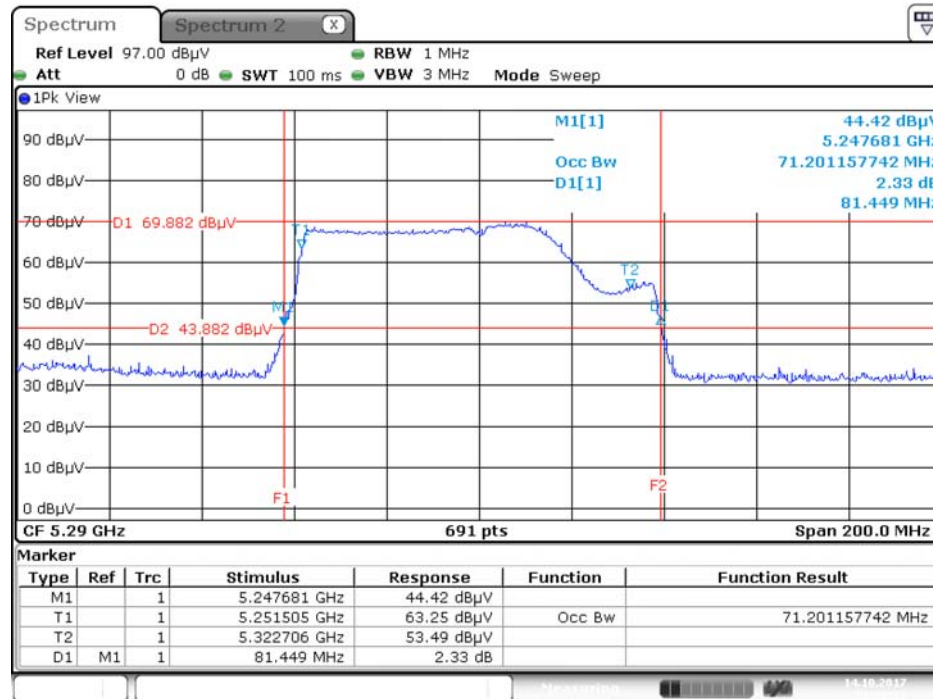
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5300 MHz



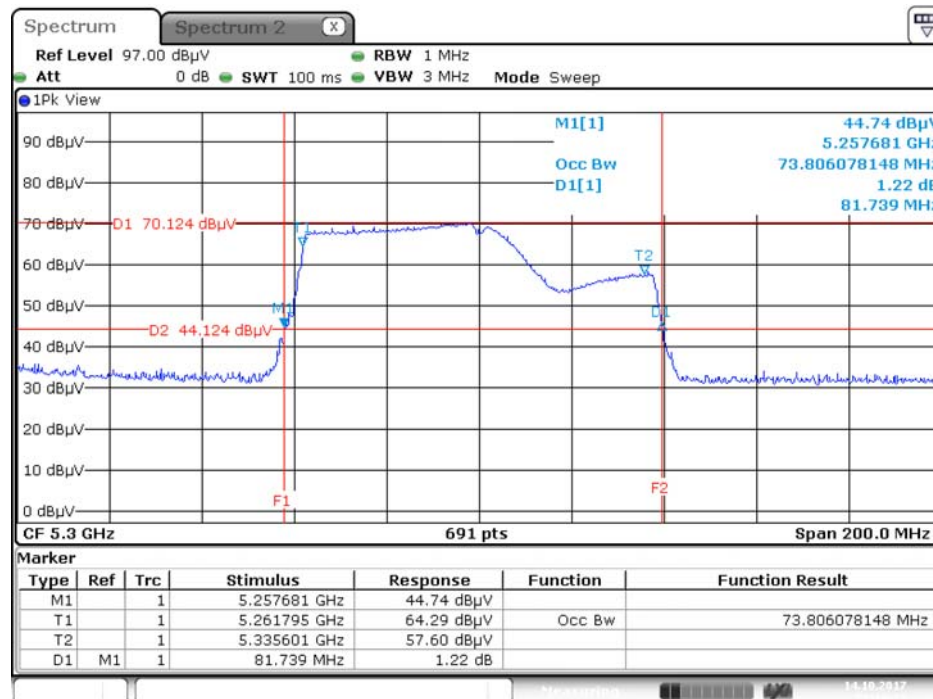
Date: 14.OCT.2017 23:13:09

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5290 MHz



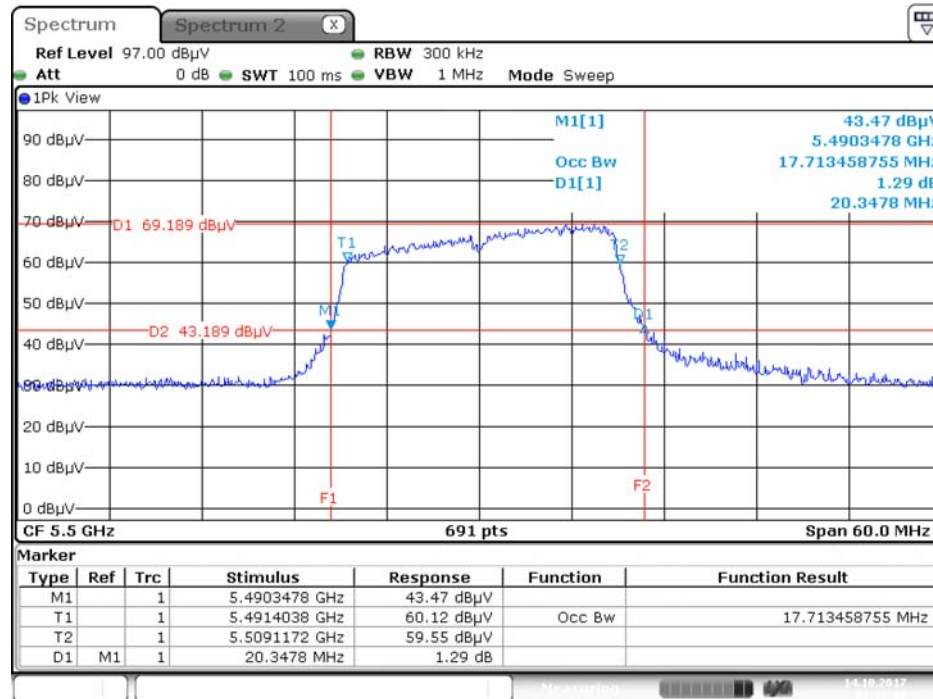
Date: 14.OCT.2017 23:11:33

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5300 MHz



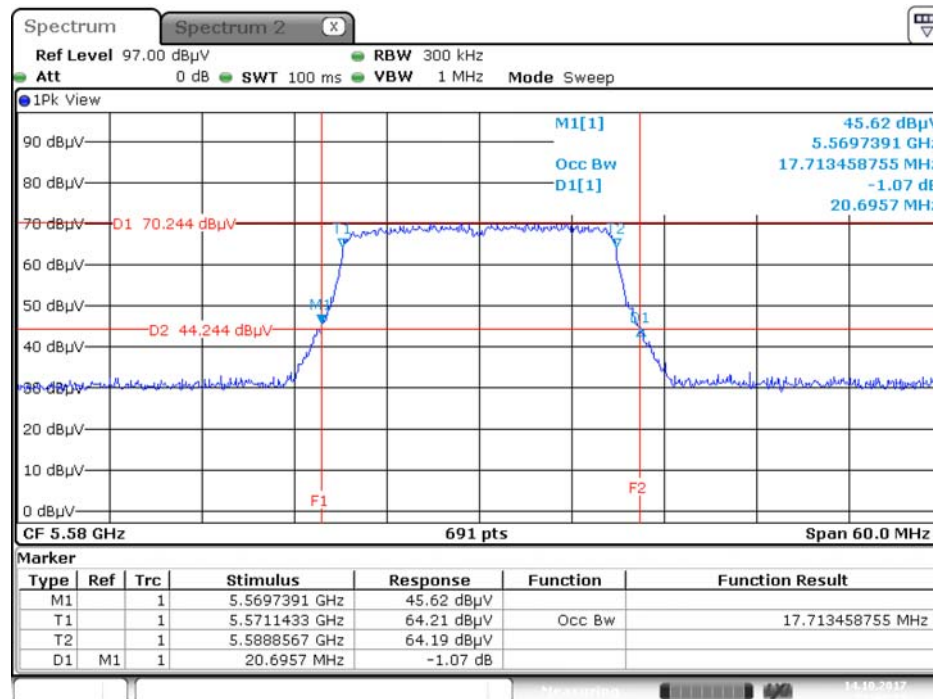
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5500 MHz



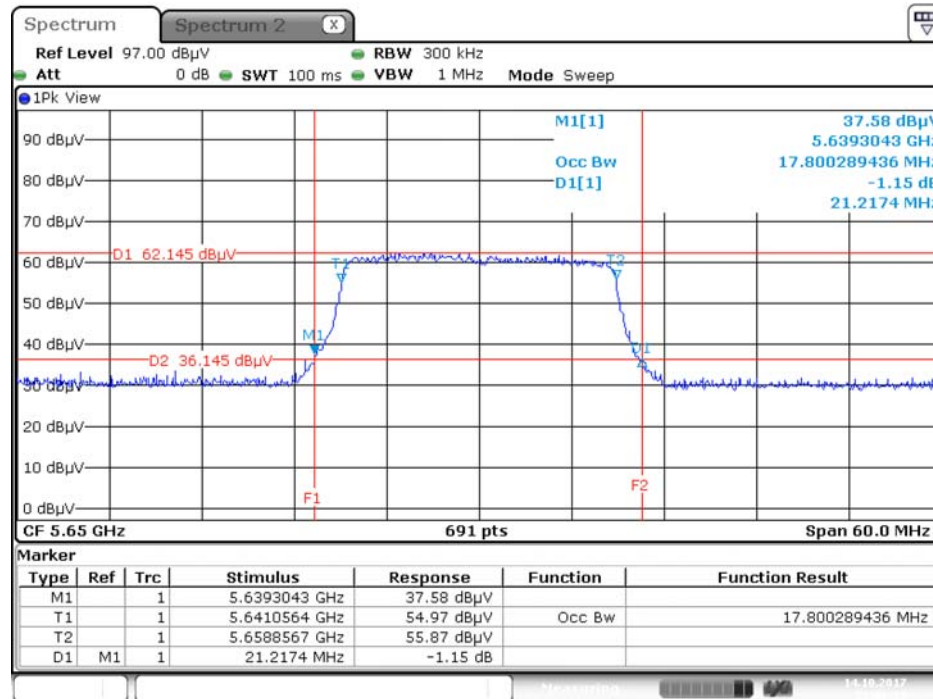
Date: 14.OCT.2017 22:57:39

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5580 MHz



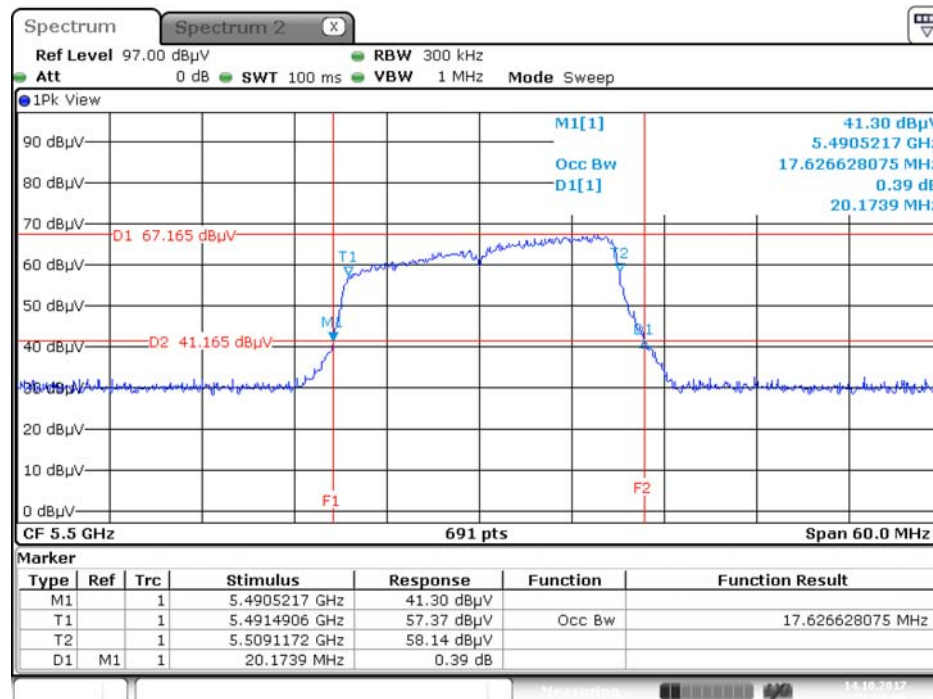
Date: 14.OCT.2017 23:00:33

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5650 MHz



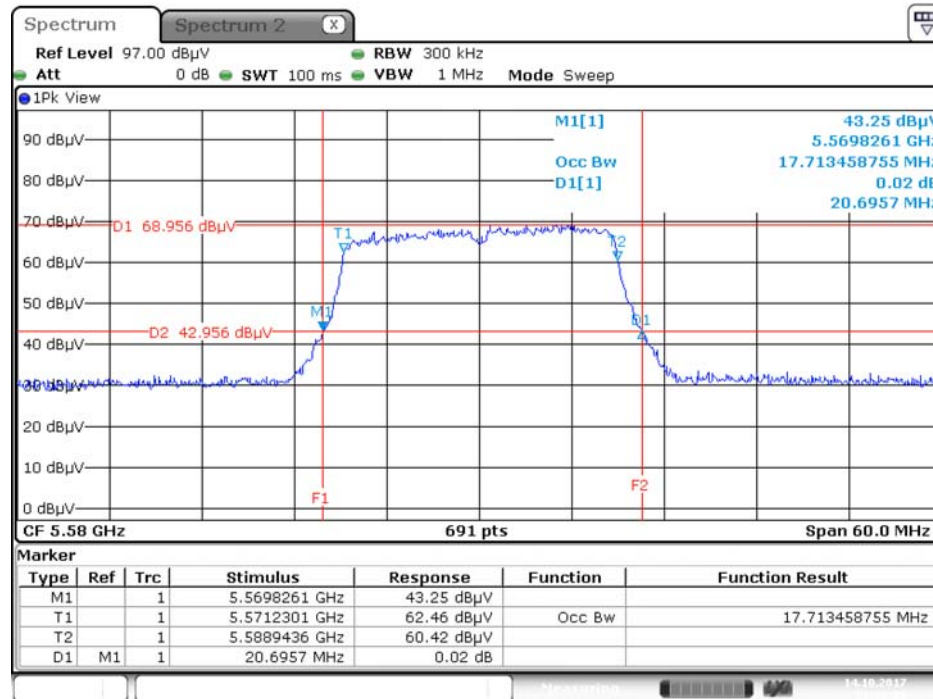
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5500 MHz

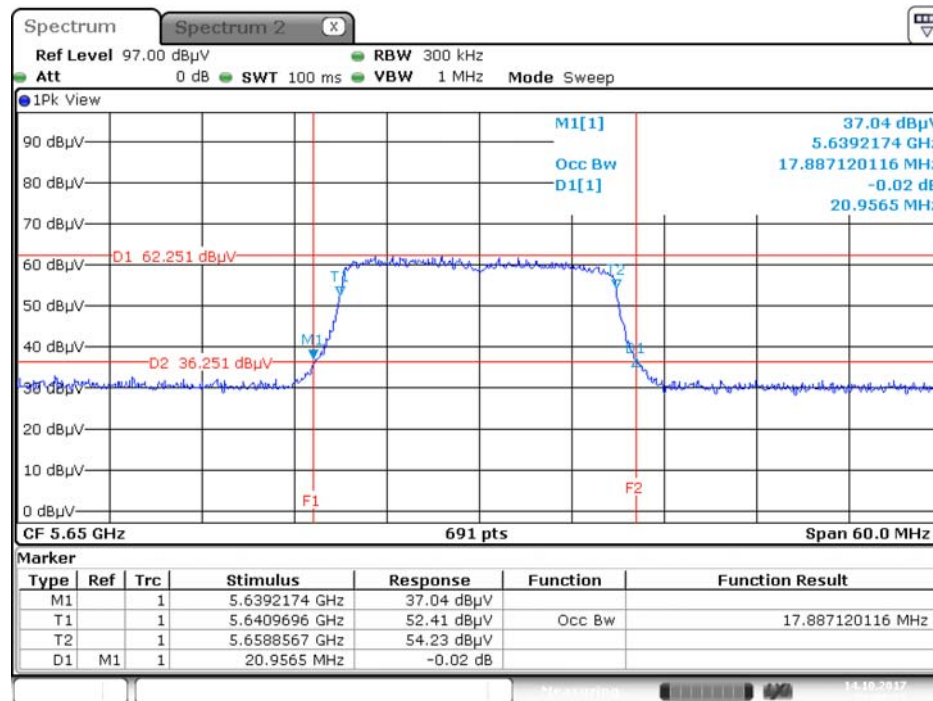


Date: 14.OCT.2017 22:58:47

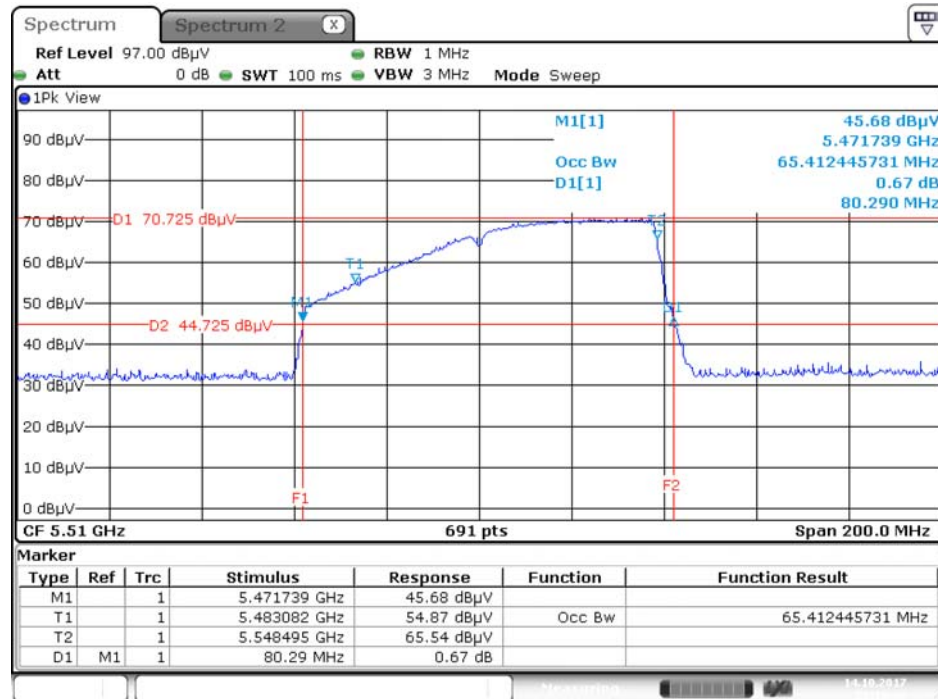
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5580 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5650 MHz

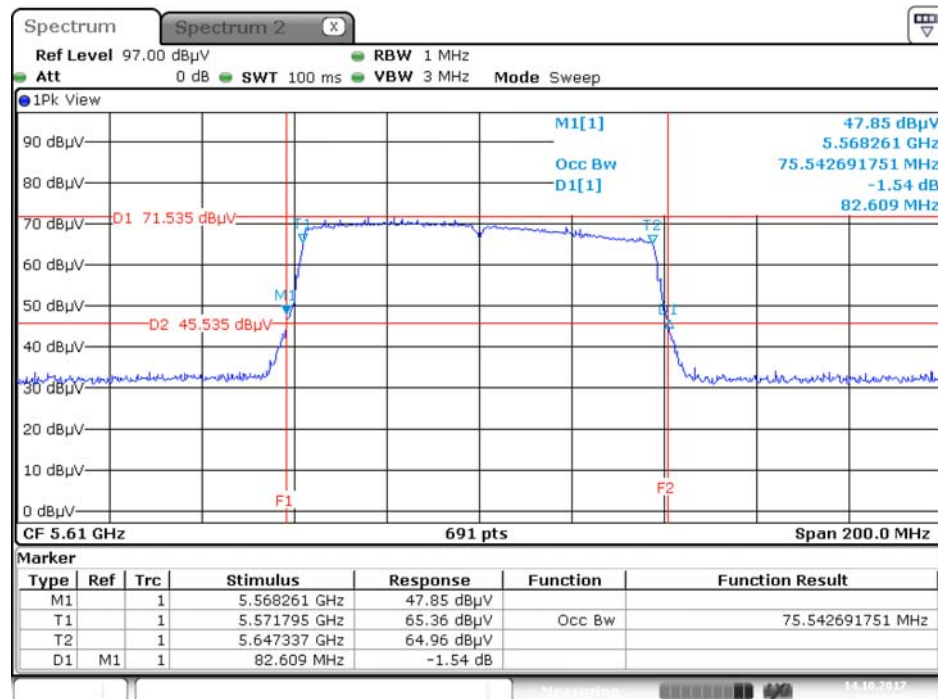


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5510 MHz



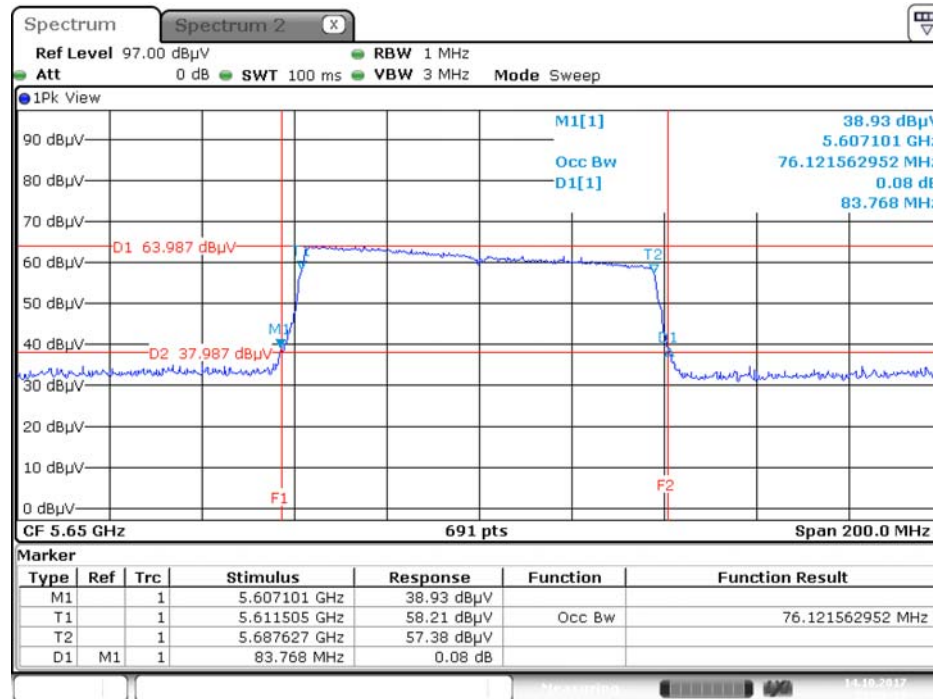
Date: 14.OCT.2017 23:19:47

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5610 MHz



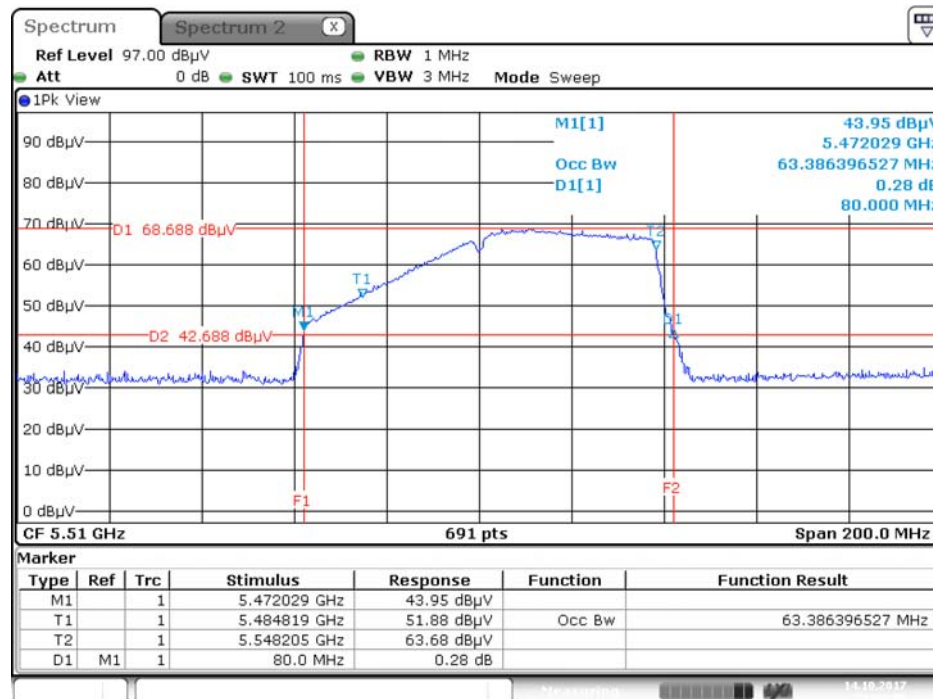
Date: 14.OCT.2017 23:22:20

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5650 MHz



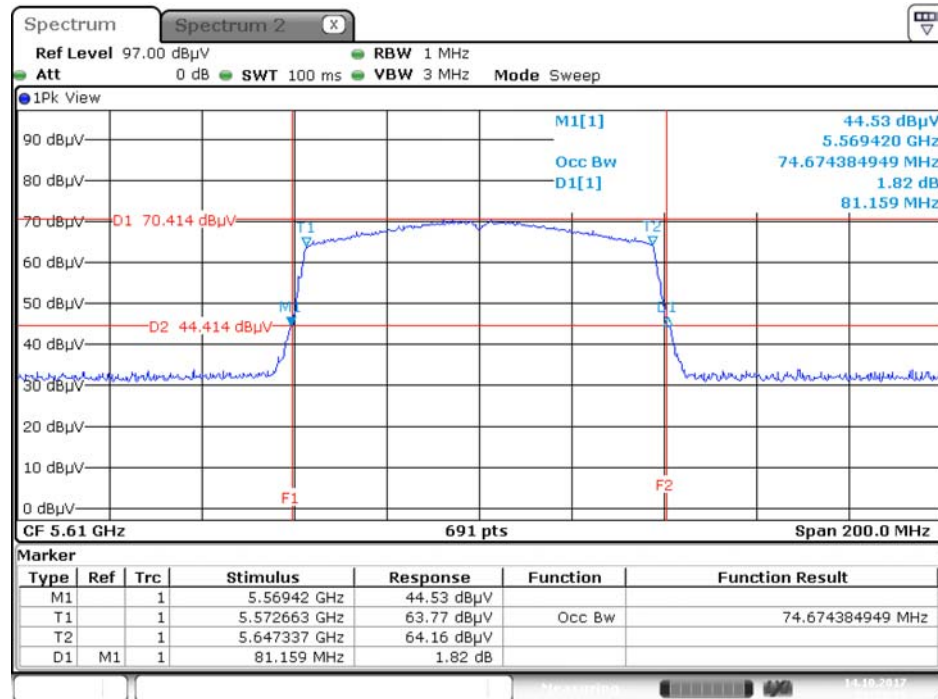
Date: 14.OCT.2017 23:26:10

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5510 MHz

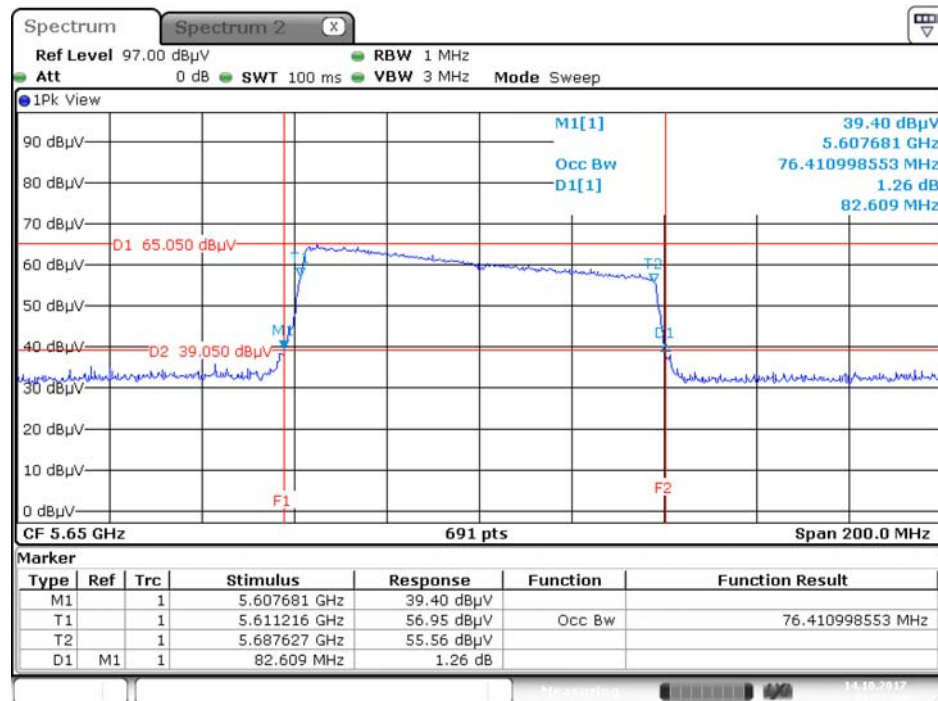


Date: 14.OCT.2017 23:20:57

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5610 MHz

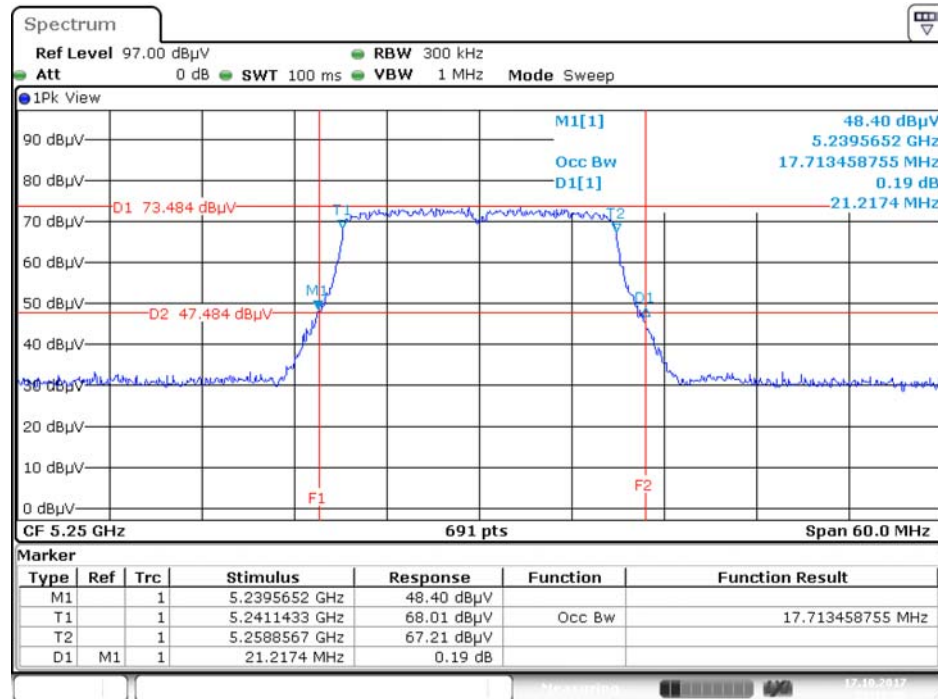


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5650 MHz



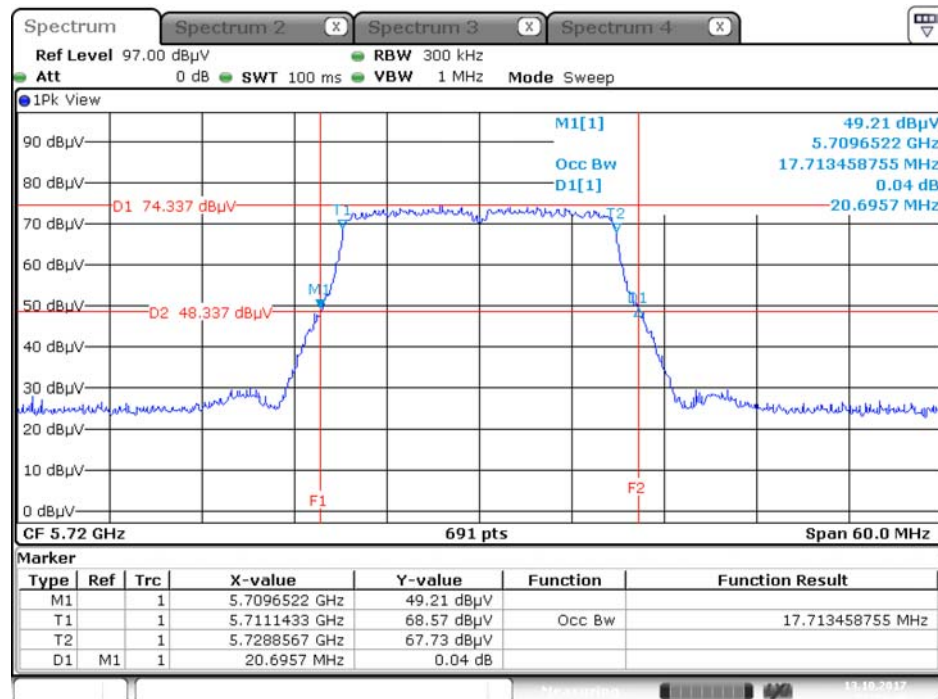
For Straddle Channel

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5250 MHz



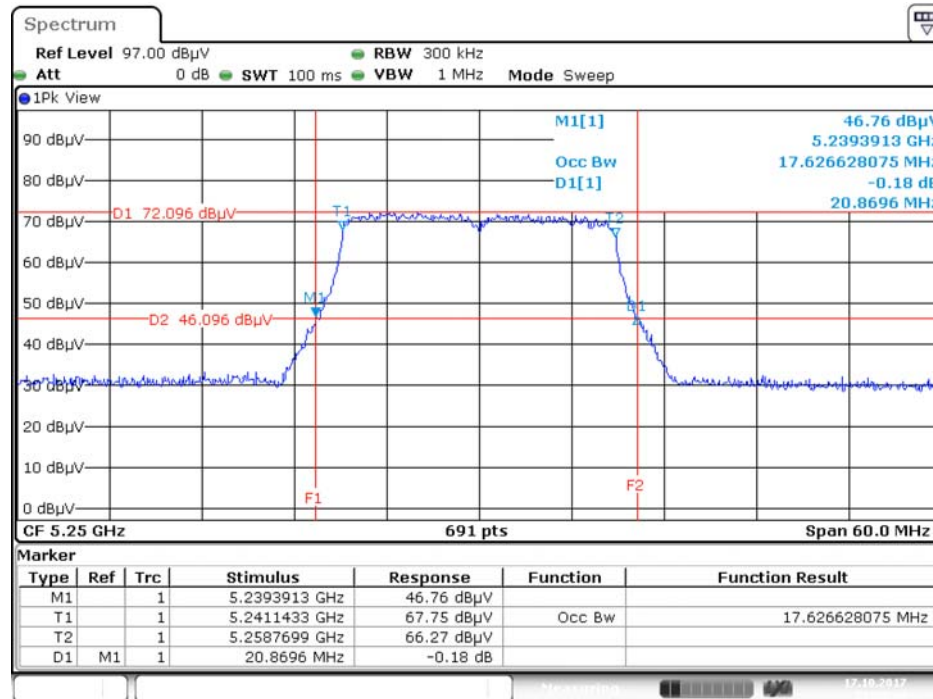
Date: 17.OCT.2017 23:18:37

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5720 MHz



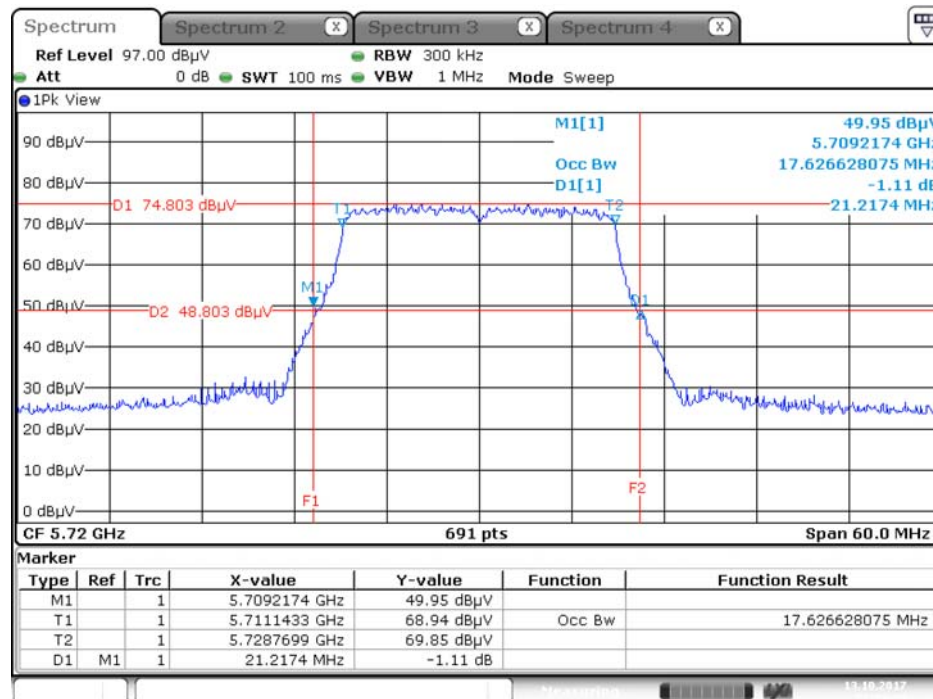
Date: 13.OCT.2017 22:24:40

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5250 MHz



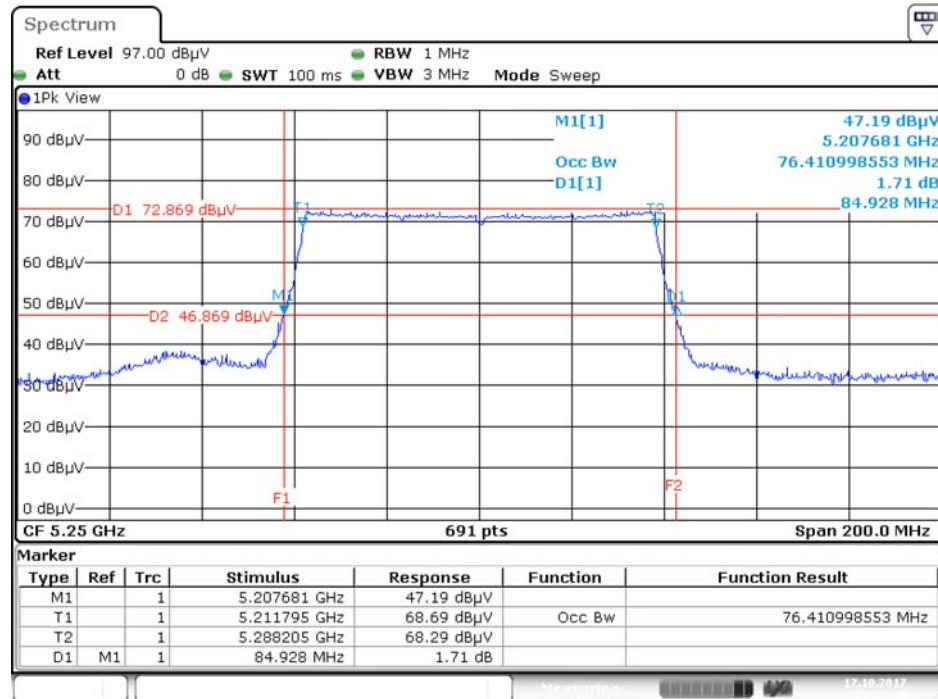
Date: 17.OCT.2017 23:20:35

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5720 MHz

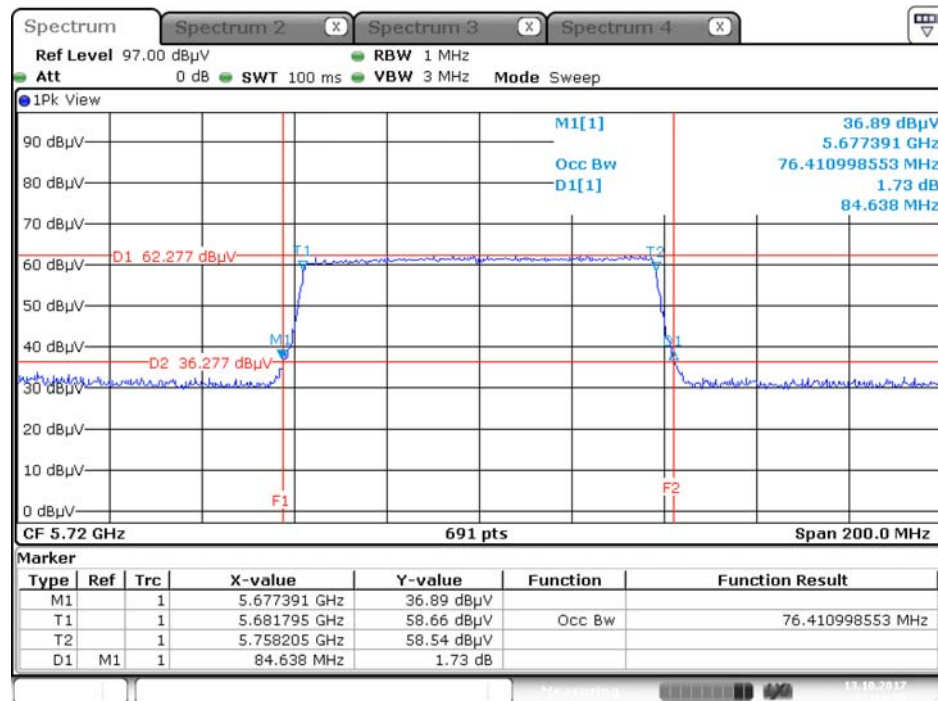


Date: 13.OCT.2017 22:24:24

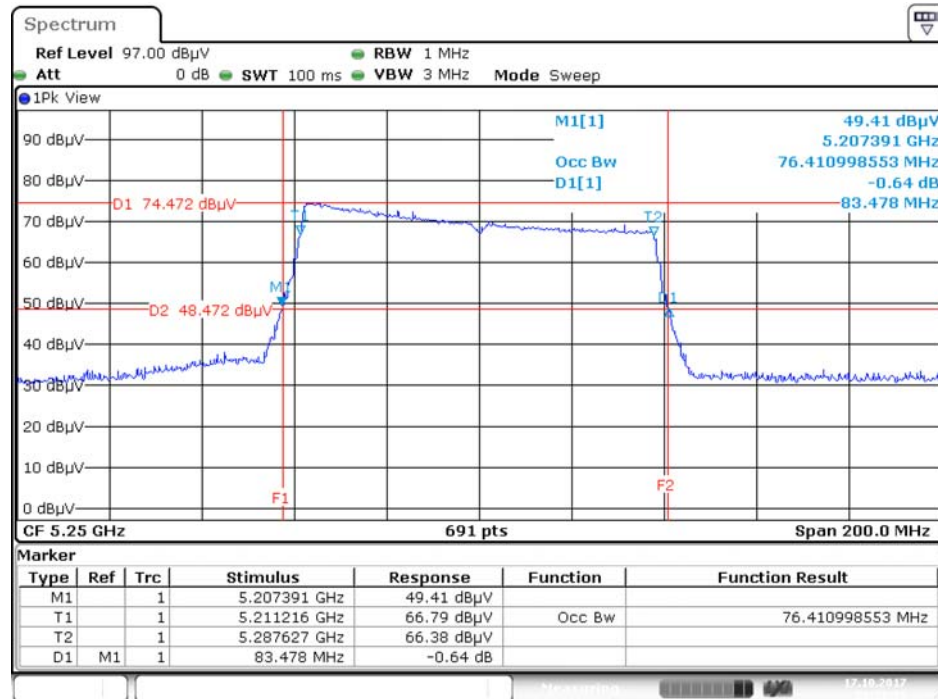
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5250 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5720 MHz

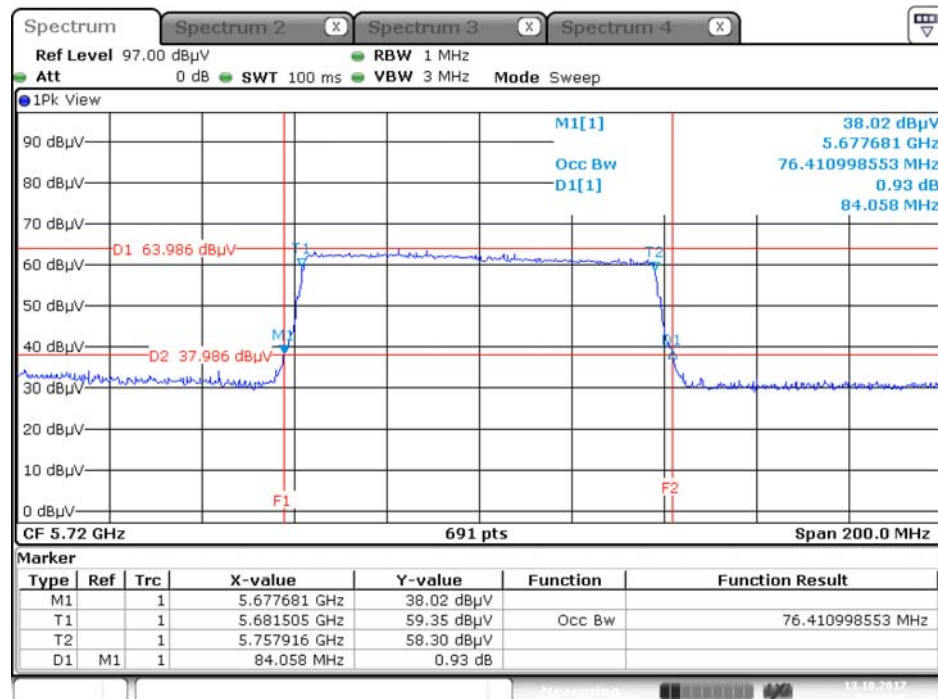


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5250 MHz



Date: 17.OCT.2017 23:21:32

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5720 MHz



Date: 13.OCT.2017 22:11:46

4.2. 6dB Spectrum Bandwidth Measurement

4.2.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

4.2.2. Measuring Instruments and Setting

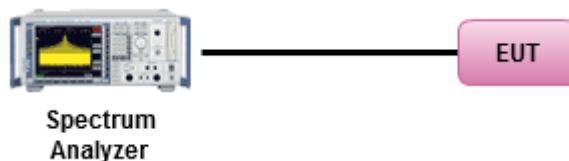
Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

6dB Spectrum Bandwidth	
Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

Test Method	
For the emission bandwidth shall be measured using one of the options below:	
☒	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.
☐	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
☒	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 6dB Spectrum Bandwidth

Temperature	27.1°C	Humidity	79%
Test Engineer	Ron Huang		

For Antenna 1:

Straddle Channel / Port 1

Mode	Frequency	6dB BW (MHz)	6dB BW M1 (MHz)	UNII 3 BW (MHz)	Min. Limit (kHz)	Test Result
20M	5720 MHz	17.28	5711.48	3.75	500	Complies
80M	5720 MHz	75.94	5682.32	33.26	500	Complies

Port 2

Mode	Frequency	6dB BW (MHz)	6dB BW M1 (MHz)	UNII 3 BW (MHz)	Min. Limit (kHz)	Test Result
20M	5720 MHz	17.51	5711.25	3.75	500	Complies
80M	5720 MHz	76.52	5681.74	33.26	500	Complies

For Antenna 2:

Straddle Channel / Port 1

Mode	Frequency	6dB BW (MHz)	6dB BW M1 (MHz)	UNII 3 BW (MHz)	Min. Limit (kHz)	Test Result
20M	5720 MHz	17.51	5711.25	3.75	500	Complies
80M	5720 MHz	75.94	5682.32	33.26	500	Complies

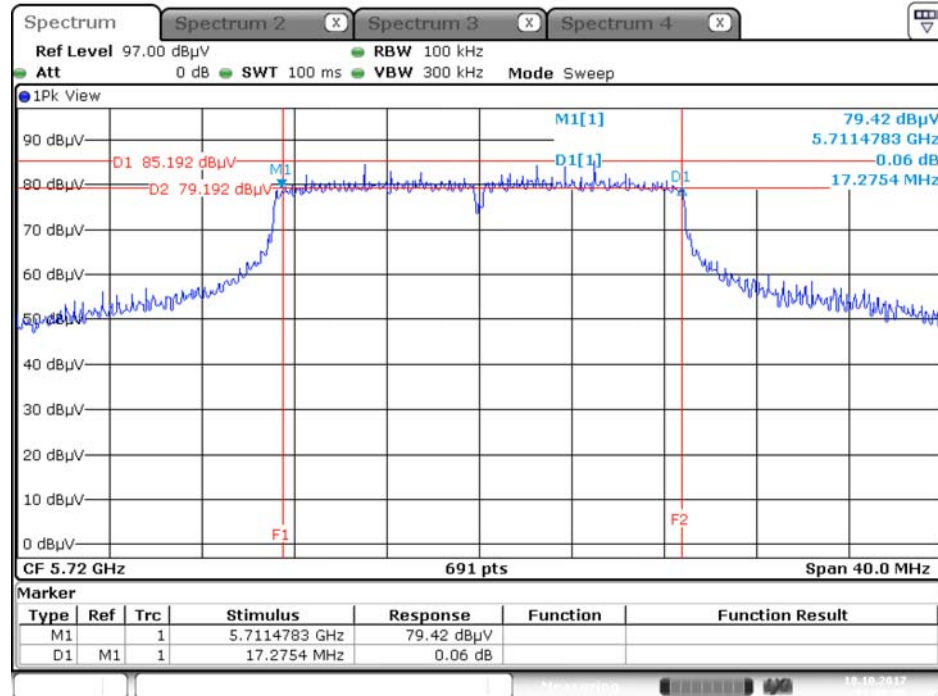
Port 2

Mode	Frequency	6dB BW (MHz)	6dB BW M1 (MHz)	UNII 3 BW (MHz)	Min. Limit (kHz)	Test Result
20M	5720 MHz	17.57	5711.19	3.75	500	Complies
80M	5720 MHz	75.94	5681.74	32.68	500	Complies

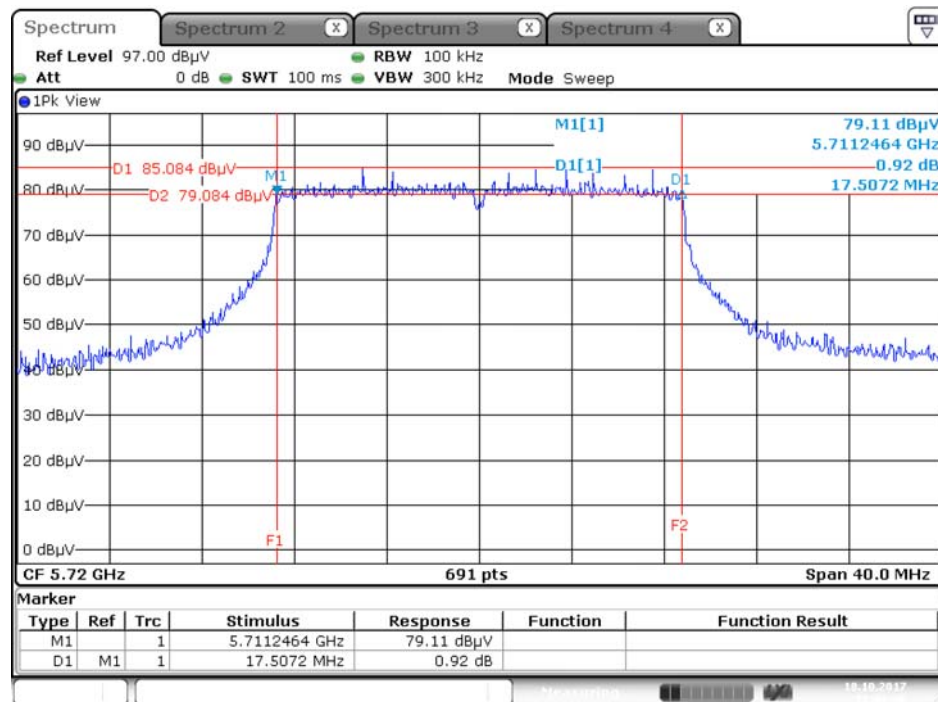
For Antenna 1:

Straddle Channel

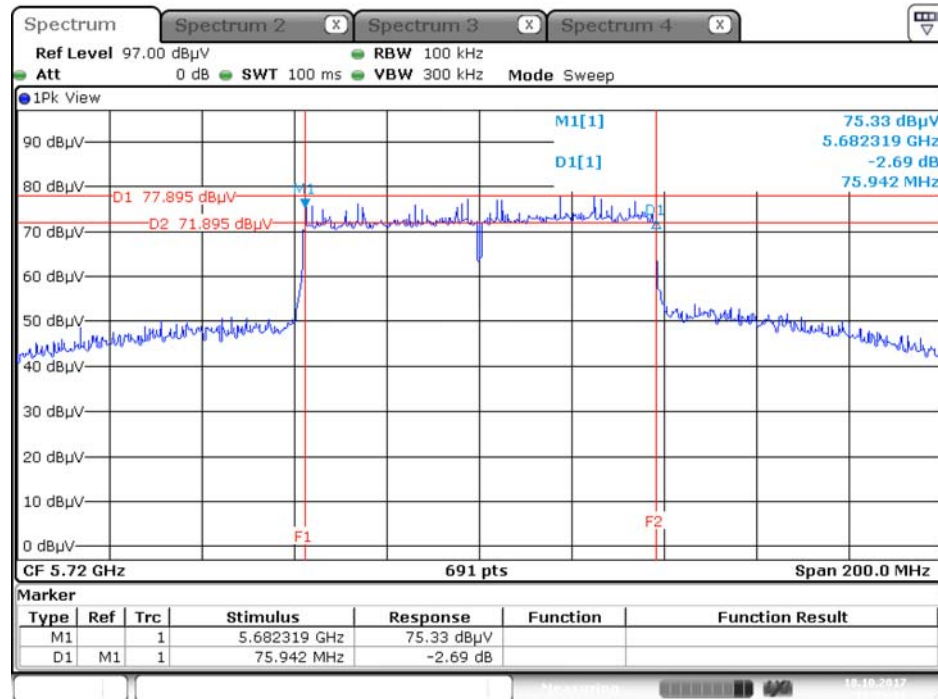
6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5720 MHz



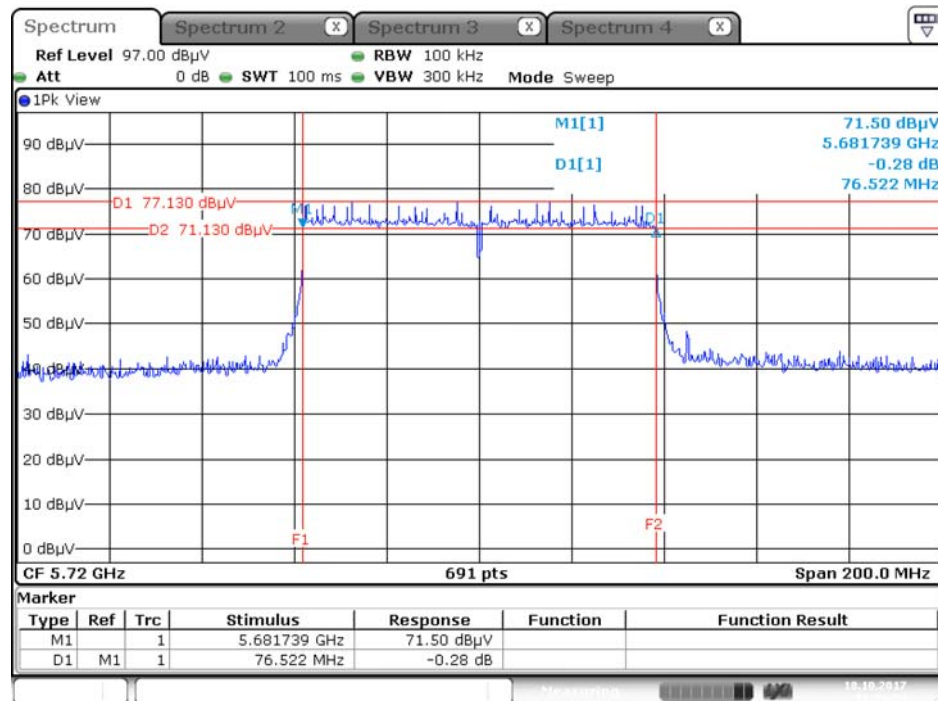
6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5720 MHz



6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5720 MHz



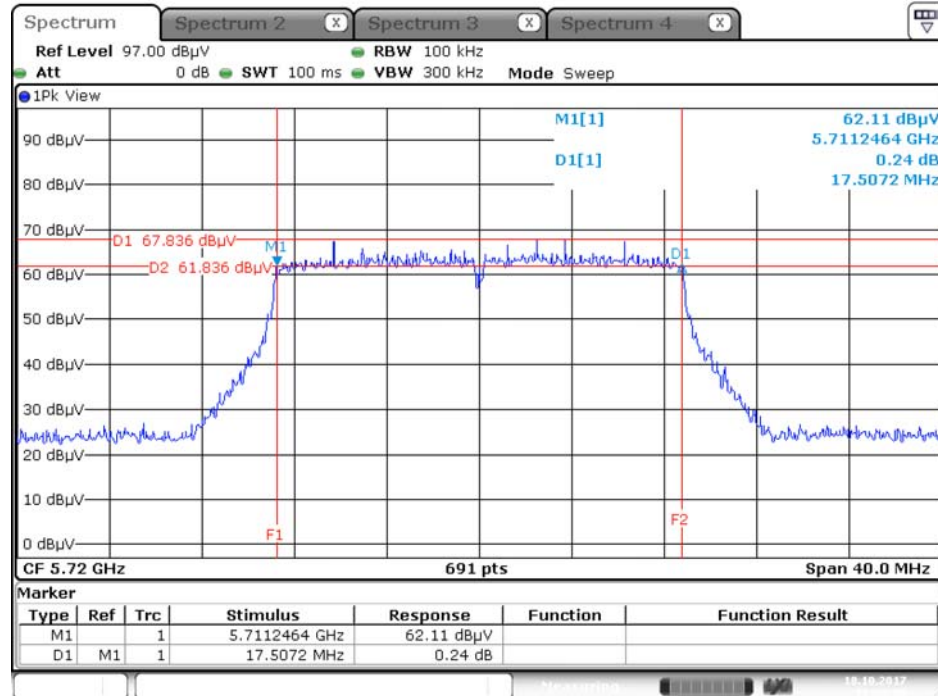
6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5720 MHz



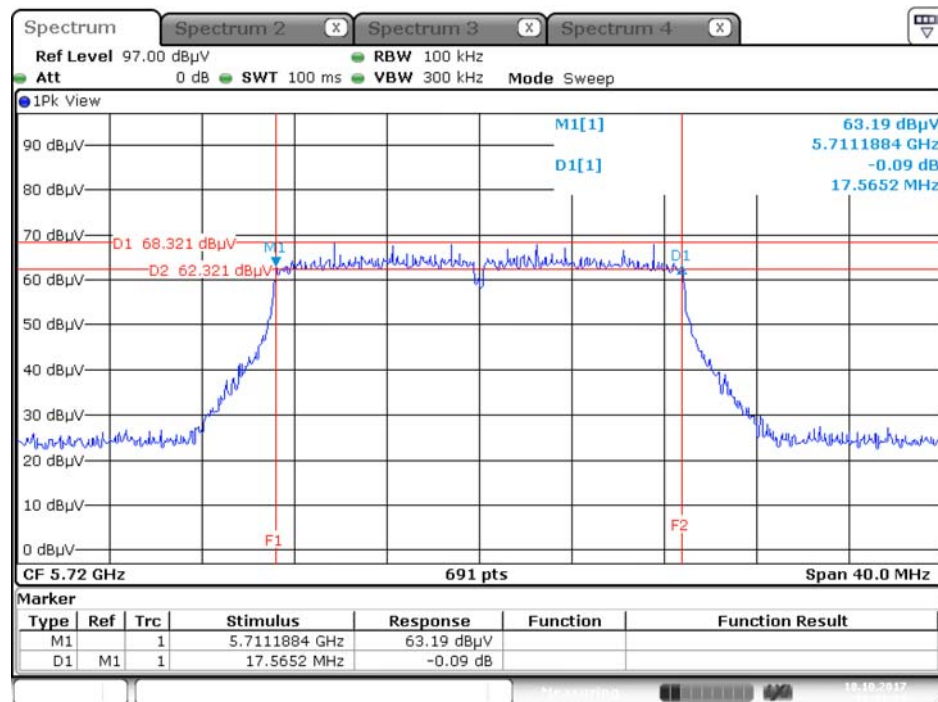
For Antenna 2:

Straddle Channel

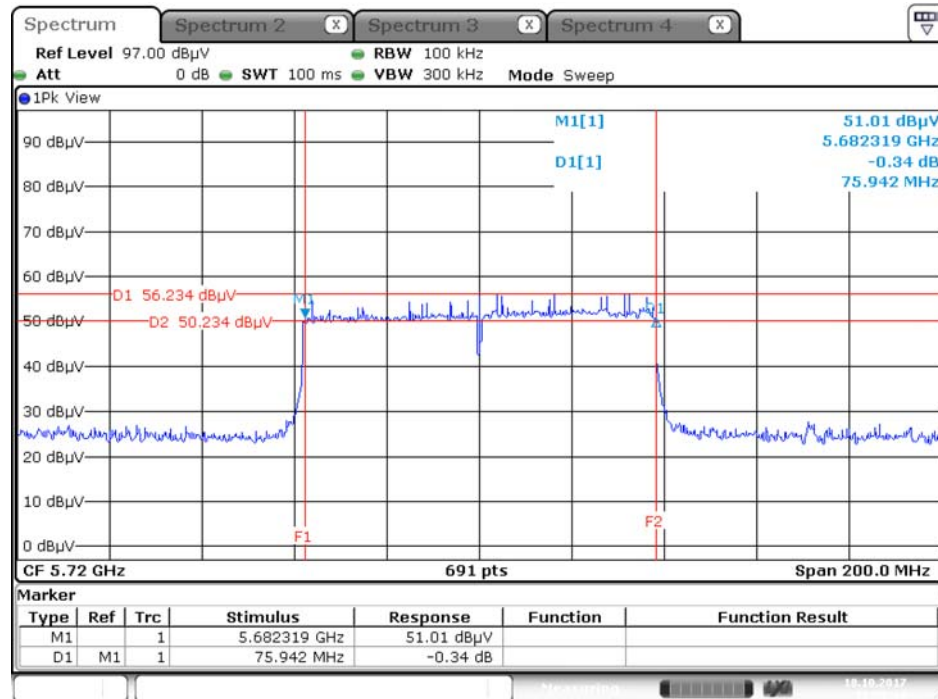
6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5720 MHz



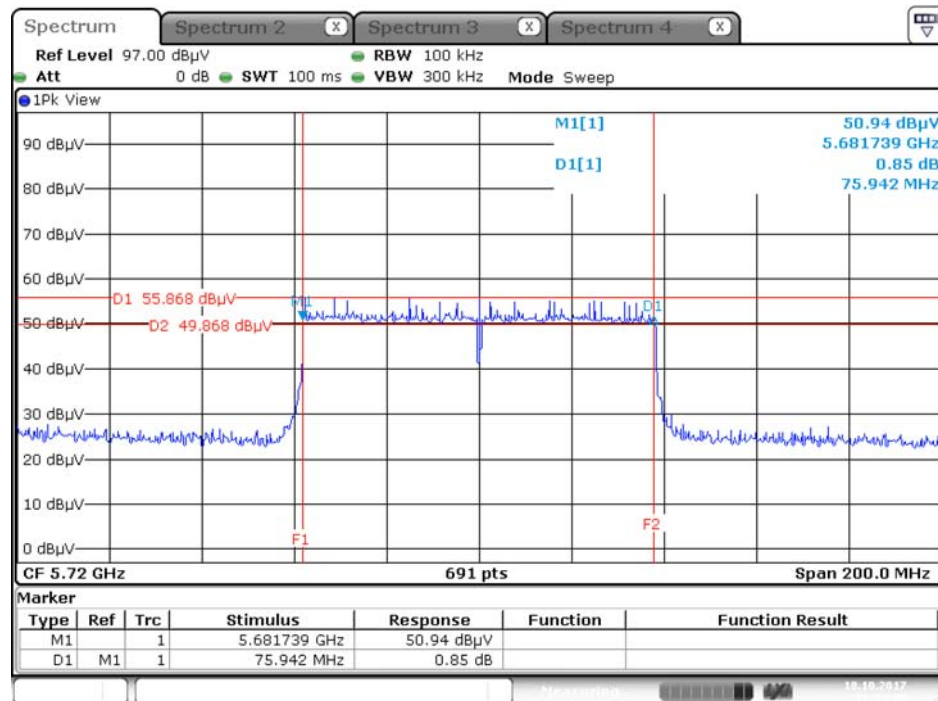
6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5720 MHz



6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5720 MHz



6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5720 MHz



4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

Frequency Band		Limit
☒	5.15~5.25 GHz	
	Operating Mode	
	☒ Outdoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
	☐ Indoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
	☐ Fixed point-to-point access points	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.
	☐ Client devices	The maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

☒	5.25-5.35 GHz	The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
☒	5.470-5.725 GHz	
☒	5.725~5.85 GHz	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

4.3.2. Measuring Instruments and Setting

For Other Channel

Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

For Straddle Channel

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1000 kHz
VBW	3000 kHz
Detector	RMS
Trace	Average Sweep count 100
Sweep Time	Auto

4.3.3. Test Procedures

For Other Channel

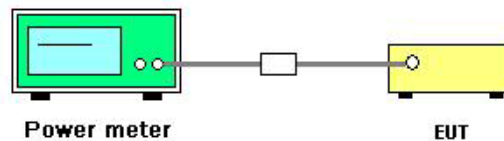
1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v02r01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

For Straddle Channel

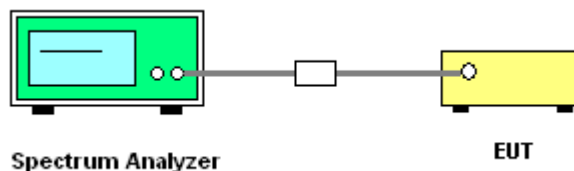
1. The transmitter output (antenna port) was connected to the spectrum analyzer.

4.3.4. Test Setup Layout

For Other Channel



For Straddle Channel



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

Temperature	27.1°C	Humidity	79%
Test Engineer	Ron Huang		

For Antenna 1:

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Port 1	Port 2	Total		
20M	5260 MHz	21.06	20.09	23.61	23.98	Complies
	5300 MHz	21.15	20.12	23.68	23.98	Complies
	5320 MHz	13.09	11.51	15.38	23.98	Complies
	5500 MHz	20.18	16.89	21.85	23.98	Complies
	5580 MHz	21.02	20.51	23.78	23.98	Complies
	5650 MHz	20.45	21.02	23.75	23.98	Complies
80M	5290 MHz	17.82	16.52	20.23	23.98	Complies
	5300 MHz	17.83	16.46	20.21	23.98	Complies
	5310 MHz	4.96	3.05	7.12	23.98	Complies
	5510 MHz	17.62	16.81	20.24	23.98	Complies
	5610 MHz	18.55	18.52	21.55	23.98	Complies
	5650 MHz	15.07	15.91	18.52	23.98	Complies

Straddle Channel

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Port 1	Port 2	Total		
20M	5250 MHz (UNII 1)	17.99	16.52	20.33	30.00	Complies
	5250 MHz (UNII 2A)	17.63	16.00	19.90	21.33	Complies
	5720 MHz (UNII 2C)	19.51	19.81	22.67	22.98	Complies
	5720 MHz (UNII 3)	13.44	13.62	16.54	30.00	Complies
80M	5250 MHz (UNII 1)	14.56	14.93	17.76	30.00	Complies
	5250 MHz (UNII 2A)	15.30	11.92	16.94	23.98	Complies
	5720 MHz (UNII 2C)	16.63	17.74	20.23	23.98	Complies
	5720 MHz (UNII 3)	15.70	15.55	18.64	30.00	Complies