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FCC RADIO TEST REPORT

Applicant's company	Camblum Networks Inc.
Applicant Address	3800 Golf Road, Suite 360 Rolling Meadows, IL 60008, USA
FCC ID	Z8H89FT0038
Manufacturer's company	Camblum 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	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Sep. 28, 2017
Final Test Date	Oct. 16, 2017
Submission Type	Original Equipment

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 v01r04, 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.





Table of Contents

1. VERIFICATION OF COMPLIANCE	1
2. SUMMARY OF THE TEST RESULT	2
3. GENERAL INFORMATION	3
3.1. Product Details.....	3
3.2. Accessories.....	4
3.3. Table for Filed Antenna.....	4
3.4. Table for Carrier Frequencies	5
3.5. Table for Test Modes.....	6
3.6. Table for Testing Locations.....	8
3.7. Table for Supporting Units	8
3.8. Table for Parameters of Test Software Setting	9
3.9. EUT Operation during Test	9
3.10. Duty Cycle.....	9
3.11. Test Configurations	10
4. TEST RESULT	12
4.1. AC Power Line Conducted Emissions Measurement.....	12
4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement.....	16
4.3. 6dB Spectrum Bandwidth Measurement	43
4.4. Maximum Conducted Output Power Measurement.....	57
4.5. Power Spectral Density Measurement	60
4.6. Radiated Emissions Measurement	76
4.7. Band Edge Emissions Measurement	343
4.8. Frequency Stability Measurement	383
4.9. Antenna Requirements	389
5. LIST OF MEASURING EQUIPMENTS	390
6. MEASUREMENT UNCERTAINTY.....	391
APPENDIX A. TEST PHOTOS	A1 ~ A4
PHOTOGRAPHS OF EUT V01	



History of This Test Report

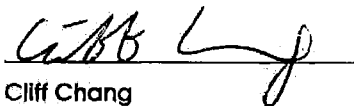
REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR7O1623	Rev. 01	Initial issue of report	Nov. 06, 2017



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	15.207	AC Power Line Conducted Emissions	Complies
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies
4.3	15.407(e)	6dB Spectrum Bandwidth	Complies
4.4	15.407(a)	Maximum Conducted Output Power	Complies
4.5	15.407(a)	Power Spectral Density	Complies
4.6	15.407(b)	Radiated Emissions	Complies
4.7	15.407(b)	Band Edge Emissions	Complies
4.8	15.407(g)	Frequency Stability	Complies
4.9	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	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Channel Number	For Antenna 1: Band 1: 13 for 20MHz bandwidth Band 4: 17 for 20MHz bandwidth Band 1: 5 for 80MHz bandwidth Band 4: 9 for 80MHz bandwidth For Antenna 2: Band 1: 13 for 20MHz bandwidth Band 4: 17 for 20MHz bandwidth Band 1: 3 for 80MHz bandwidth Band 4: 9 for 80MHz bandwidth
Channel Bandwidth (99%)	For Antenna 1: Band 1: QPSK, 20M: 29.70MHz QPSK, 80M: 74.96MHz Band 4: QPSK, 20M: 37.77MHz QPSK, 80M: 76.12MHz For Antenna 2: Band 1: QPSK, 20M: 17.71MHz QPSK, 80M: 75.54MHz Band 4: QPSK, 20M: 17.71MHz QPSK, 80M: 76.41MHz



Maximum Conducted Output Power	For Antenna 1: Band 1: QPSK, 20M: 27.15MHz QPSK, 80M: 18.98MHz Band 4: QPSK, 20M: 26.95MHz QPSK, 80M: 21.86MHz For Antenna 2: Band 1: QPSK, 20M: 20.08MHz QPSK, 80M: 6.85MHz Band 4: QPSK, 20M: 13.00MHz QPSK, 80M: 9.17MHz
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
Beamforming Function	☐ With beamforming	☒ Without beamforming
Operate Condition	☐ Indoor	☒ Outdoor

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
5150~5250 MHz Band 1	1	5180 MHz	8	5215 MHz
	2	5185 MHz	9	5220 MHz
	3	5190 MHz	10	5225 MHz
	4	5195 MHz	11	5230 MHz
	5	5200 MHz	12	5235 MHz
	6	5205 MHz	13	5240 MHz
	7	5210 MHz	-	-
5725~5850 MHz Band 4	1	5745 MHz	10	5790 MHz
	2	5750 MHz	11	5795 MHz
	3	5755 MHz	12	5800 MHz
	4	5760 MHz	13	5805 MHz
	5	5765 MHz	14	5810 MHz
	6	5770 MHz	15	5815 MHz
	7	5775 MHz	16	5820 MHz
	8	5780 MHz	17	5825 MHz
	9	5785 MHz	-	-

For 80MHz bandwidth systems:

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	1	5190 MHz	4	5205 MHz
	2	5195 MHz	5	5210 MHz
	3	5200 MHz	-	-
5725~5850 MHz Band 4	1	5765 MHz	10	5790 MHz
	2	5770 MHz	11	5795 MHz
	3	5775 MHz	12	5800 MHz
	4	5780 MHz	13	5805 MHz
	5	5785 MHz	-	-

Note: Antenna 2 can't support 5190 MHz and 5195 MHz.

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		Frequency	Port
AC Power Conducted Emission	CTX		-	-
Max. Conducted Output Power	QPSK, 20M	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 1	5190 / 5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
Power Spectral Density	QPSK, 20M	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 1	5190 / 5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	QPSK, 20M	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 1	5190 / 5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
6dB Spectrum Bandwidth Measurement	QPSK, 20M	Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 4	5765 / 5785 / 5805	1+2
Radiated Emission Below 1GHz	CTX		-	-
Radiated Emission Above 1GHz	20 MHz	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	80 MHz	Band 1	5190 / 5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
Band Edge Emission	20 MHz	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	80 MHz	Band 1	5190 / 5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
Frequency Stability	20 MHz	Band 1	5200	2
		Band 4	5785	2
	80 MHz	Band 1	5210	2
		Band 4	5765	2



For Antenna 2:

Test Items	Mode		Frequency	Port
AC Power Conducted Emission	CTX		-	-
Max. Conducted Output Power	QPSK, 20M	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 1	5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
Power Spectral Density	QPSK, 20M	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 1	5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	QPSK, 20M	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 1	5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
6dB Spectrum Bandwidth Measurement	QPSK, 20M	Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 4	5765 / 5785 / 5805	1+2
Radiated Emission Below 1GHz	CTX		-	-
Radiated Emission Above 1GHz	QPSK, 20M	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 1	5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
Band Edge Emission	QPSK, 20M	Band 1	5180 / 5200 / 5240	1+2
		Band 4	5745 / 5785 / 5825	1+2
	QPSK, 80M	Band 1	5200 / 5210	1+2
		Band 4	5765 / 5785 / 5805	1+2
Frequency Stability	20 MHz	Band 1	5200	2
		Band 4	5785	2
	80 MHz	Band 1	5210	2
		Band 4	5765	2

The following test modes were performed for all tests:

For Conducted Emission test:

Test Mode : CTX - EUT in Y axis

For Radiated Emission test:

Test Mode : CTX - EUT in Y axis

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., Jhubel 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	-
CO02-CB	Conduction	Hsin Chu	TW0006	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Supporting Units

For Test Site No: CO02-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
PoE	Cambium Networks	NET-P30-56IN	DoC

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

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

3.8. 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	QCA					
Mode	Test Frequency (MHz)					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
20M	24	26	25	26	26	24.5
Mode	5190 MHz	5200 MHz	5210 MHz	5765 MHz	5785 MHz	5805 MHz
80M	12	16.5	16.5	19	19.5	18.5

For Antenna 2:

Test Software Version	QCA					
Mode	Test Frequency (MHz)					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
20M	14.5	19	17	12	9	5
Mode	5200 MHz	5210 MHz	5765 MHz	5785 MHz	5805 MHz	
80M	6	6	7	5.5	0	

3.9. EUT Operation during Test

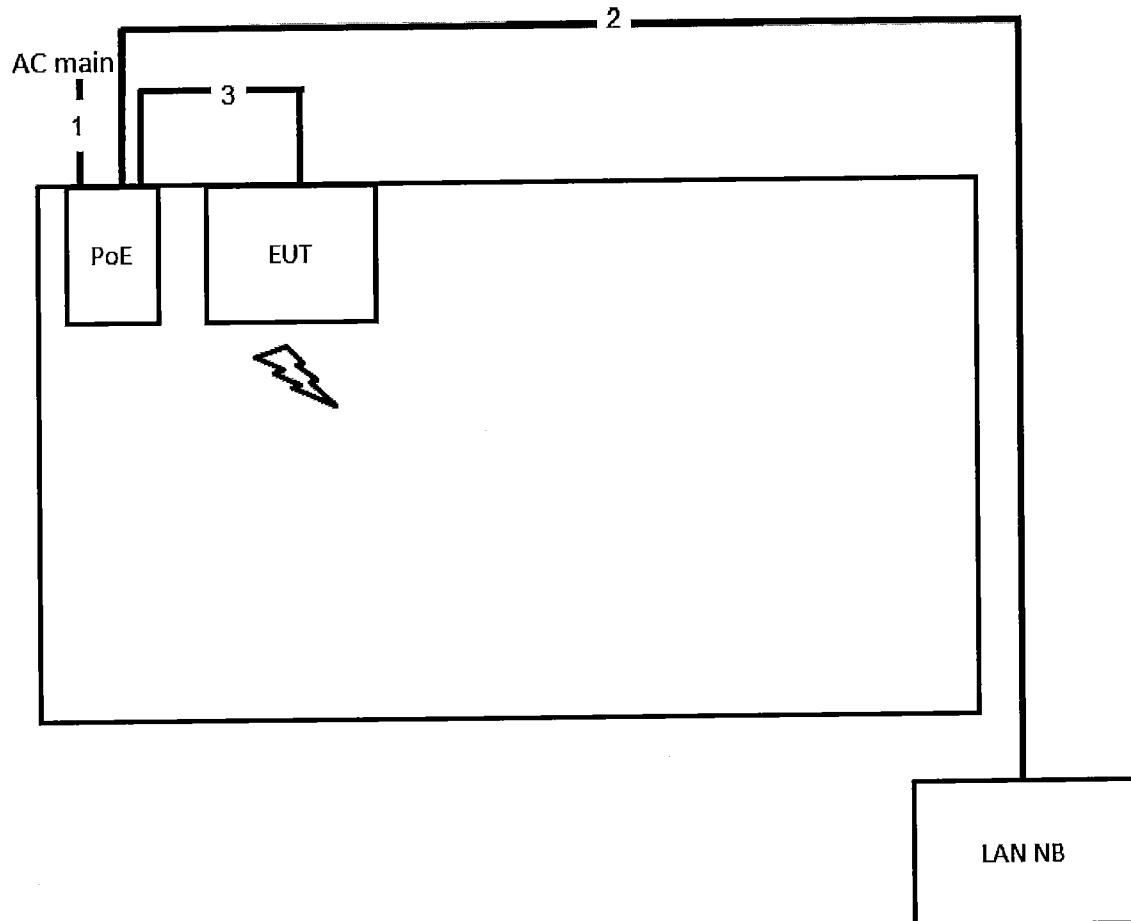
The EUT was programmed to be in continuously transmitting mode.

3.10. 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

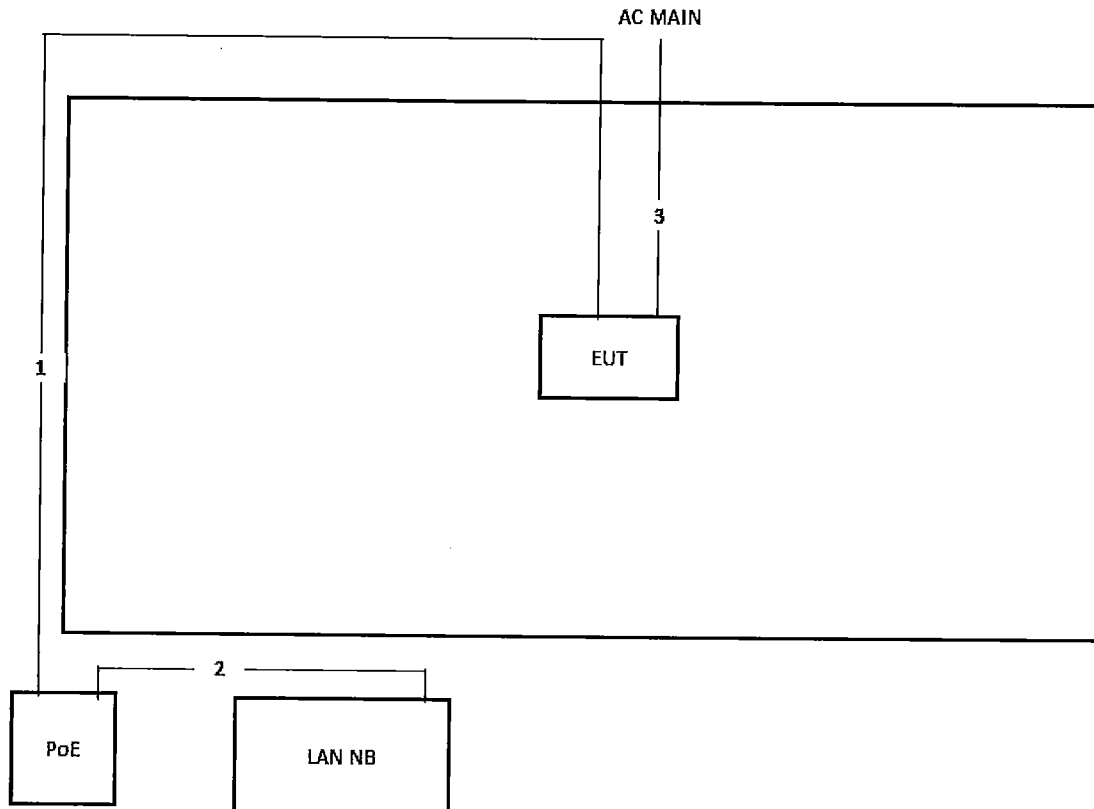
3.11. Test Configurations

3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	0.9m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1m

3.11.2. Radiation Emissions Test Configuration



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	1.5m
3	Power cable	No	1.5m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product that is designed to connect to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

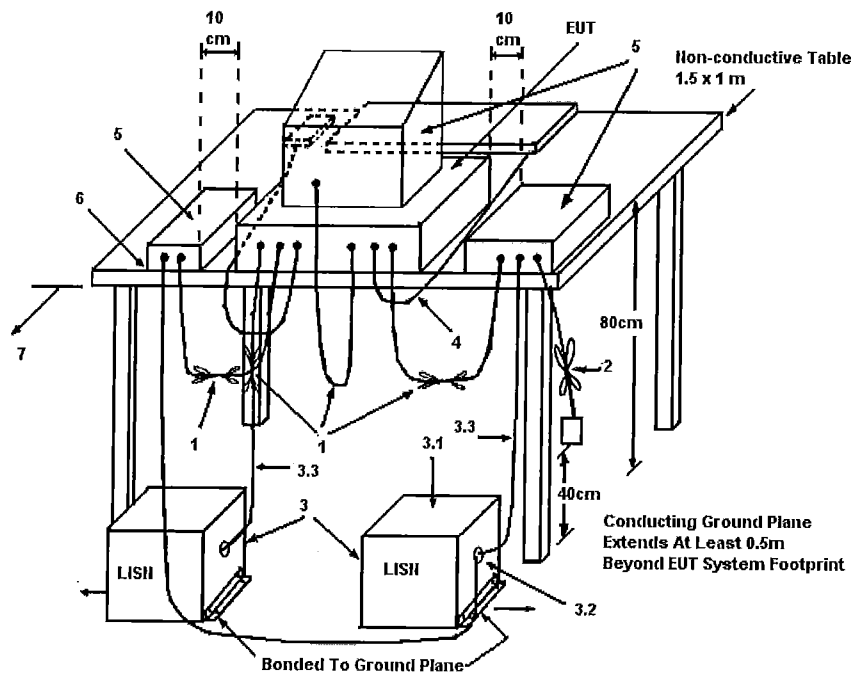
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

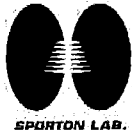
- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
 - (3.1) All other equipment powered from additional LISN(s).
 - (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
 - (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

There is no deviation with the original standard.

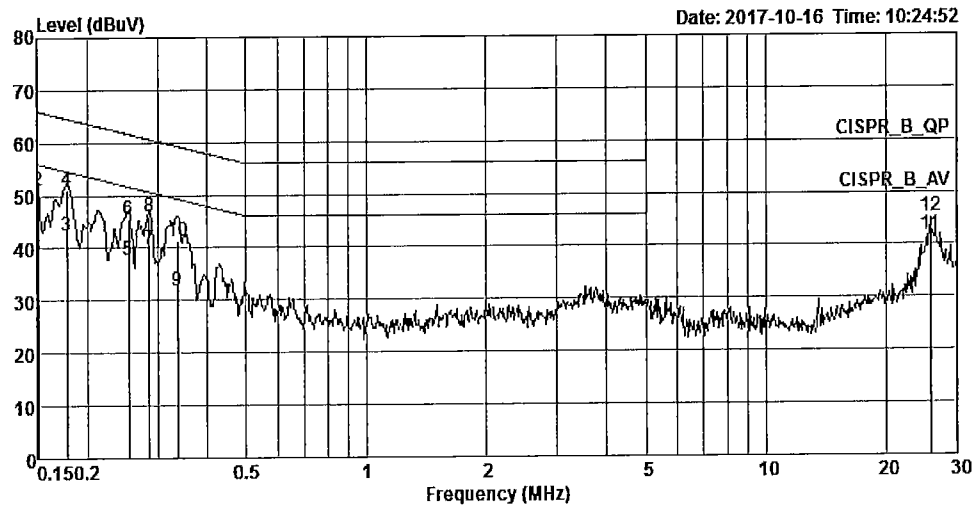
4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.



4.1.7. Results of AC Power Line Conducted Emissions Measurement

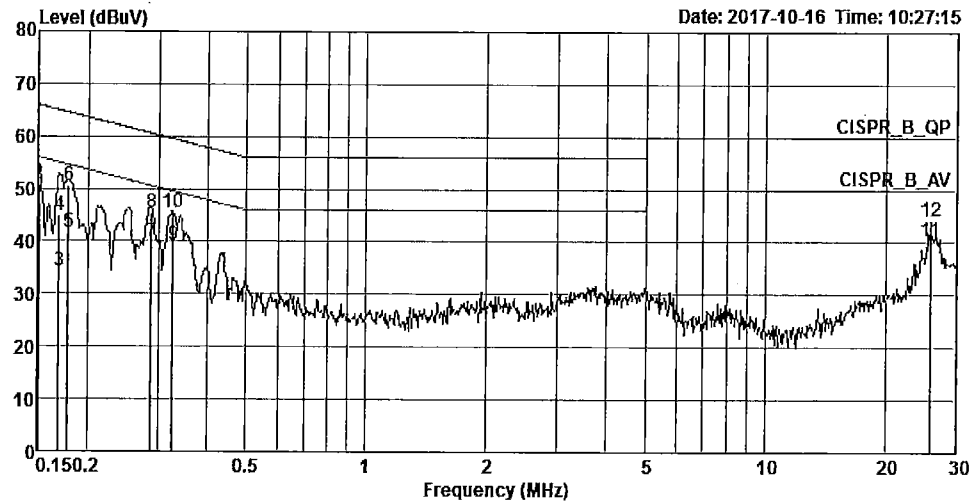
Temperature	24°C	Humidity	55%
Test Engineer	Max Lin	Phase	Line
Configuration	CTX		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1500	38.79	-17.21	56.00	28.80	9.95	0.04	Average	LINE
2	0.1500	51.18	-14.82	66.00	41.19	9.95	0.04	QP	LINE
3	0.1777	42.48	-12.11	54.59	32.49	9.94	0.05	Average	LINE
4	0.1777	50.96	-13.63	64.59	40.97	9.94	0.05	QP	LINE
5	0.2535	37.69	-13.95	51.64	27.72	9.92	0.05	Average	LINE
6	0.2535	45.43	-16.21	61.64	35.46	9.92	0.05	QP	LINE
7	0.2863	39.99	-10.64	50.63	30.03	9.91	0.05	Average	LINE
8	0.2863	45.96	-14.67	60.63	36.00	9.91	0.05	QP	LINE
9	0.3374	32.00	-17.27	49.27	22.06	9.90	0.04	Average	LINE
10	0.3374	41.31	-17.96	59.27	31.37	9.90	0.04	QP	LINE
11	25.8724	41.60	-8.40	50.00	31.00	10.32	0.28	Average	LINE
12	25.8724	45.09	-14.91	60.00	34.49	10.32	0.28	QP	LINE



Temperature	24°C	Humidity	55%
Test Engineer	Max Lin	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over	Limit	Read	LISN	Cable		
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark	Pol/Phase
			dB	dBuV	dBuV	dB	dB		
1	0.1500	39.40	-16.60	56.00	29.42	9.94	0.04	Average	NEUTRAL
2	0.1500	50.82	-15.18	66.00	40.84	9.94	0.04	QP	NEUTRAL
3	0.1694	34.12	-20.87	54.99	24.12	9.96	0.04	Average	NEUTRAL
4	0.1694	44.91	-20.08	64.99	34.91	9.96	0.04	QP	NEUTRAL
5	0.1787	41.64	-12.91	54.55	31.63	9.96	0.05	Average	NEUTRAL
6	0.1787	50.51	-14.04	64.55	40.50	9.96	0.05	QP	NEUTRAL
7	0.2878	39.72	-10.87	50.59	29.70	9.97	0.05	Average	NEUTRAL
8	0.2878	45.55	-15.04	60.59	35.53	9.97	0.05	QP	NEUTRAL
9	0.3268	39.30	-10.23	49.53	29.29	9.97	0.04	Average	NEUTRAL
10	0.3268	45.41	-14.12	59.53	35.40	9.97	0.04	QP	NEUTRAL
11	25.8700	40.58	-9.42	50.00	29.98	10.32	0.28	Average	NEUTRAL
12	25.8700	44.42	-15.58	60.00	33.82	10.32	0.28	QP	NEUTRAL

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

4.2.2. Measuring Instruments and Setting

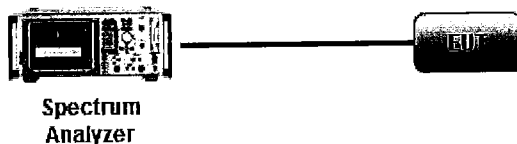
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.2.3. 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 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	5180 MHz	20.17	17.54	21.13	17.71
	5200 MHz	30.17	18.50	35.30	19.71
	5240 MHz	29.91	17.97	45.39	29.70
	5745 MHz	51.48	37.77	47.22	31.69
	5785 MHz	50.70	36.99	48.26	33.34
	5825 MHz	43.83	26.92	48.26	32.91
80M	5190 MHz	78.55	68.02	78.55	65.70
	5200 MHz	79.71	73.52	78.55	70.91
	5210 MHz	80.87	74.96	79.42	73.23
	5765 MHz	84.06	75.83	83.48	75.83
	5785 MHz	83.77	75.83	83.19	76.12
	5805 MHz	83.77	75.83	83.48	76.12

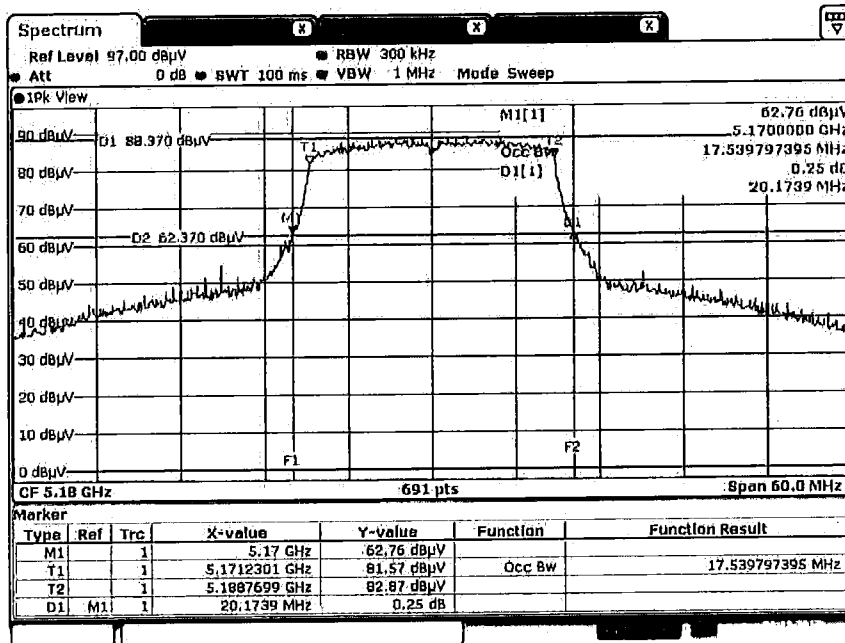
For Antenna 2:

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
		Port 1		Port 2	
20M	5180 MHz	19.65	17.37	20.09	17.54
	5200 MHz	20.70	17.71	20.17	17.54
	5240 MHz	20.70	17.71	20.70	17.63
	5745 MHz	20.78	17.63	20.87	17.63
	5785 MHz	20.70	17.63	20.35	17.63
	5825 MHz	20.52	17.71	20.87	17.71
80M	5200 MHz	79.42	73.81	78.84	71.20
	5210 MHz	80.87	75.54	79.42	72.94
	5765 MHz	83.77	76.12	82.90	75.54
	5785 MHz	83.48	76.12	83.19	76.12
	5805 MHz	84.06	76.12	84.93	76.41



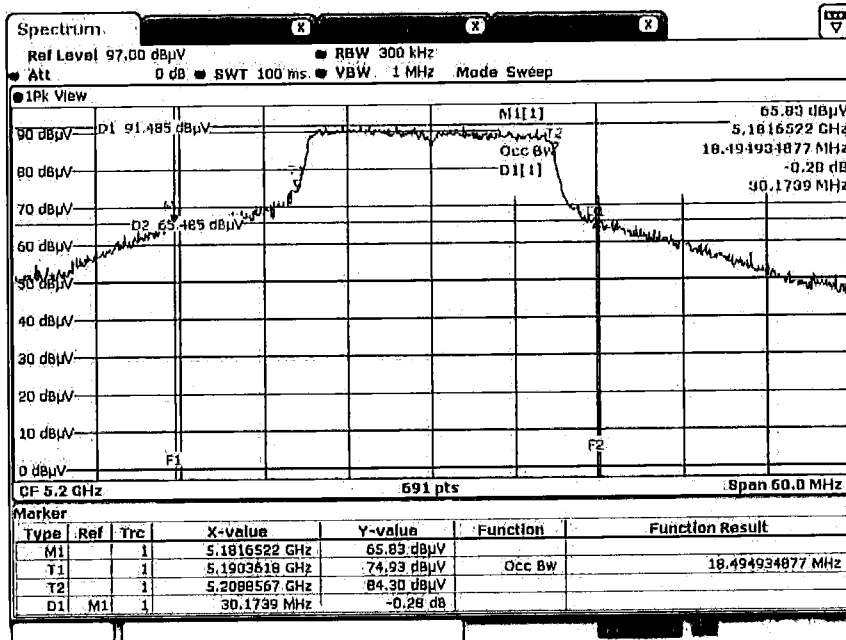
For Antenna 1:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5180 MHz



Date: 6.OCT.2017 17:10:48

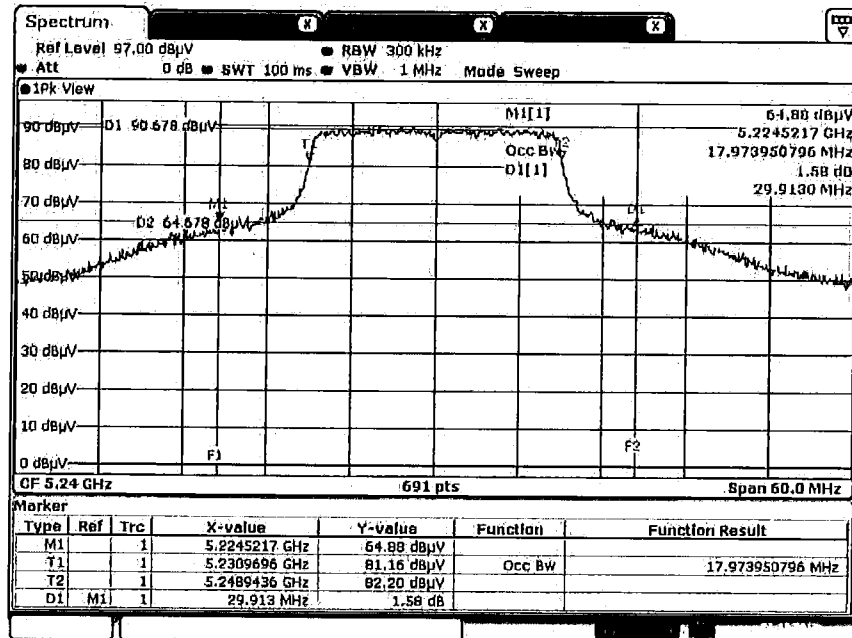
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5200 MHz



Date: 6.OCT.2017 17:10:07

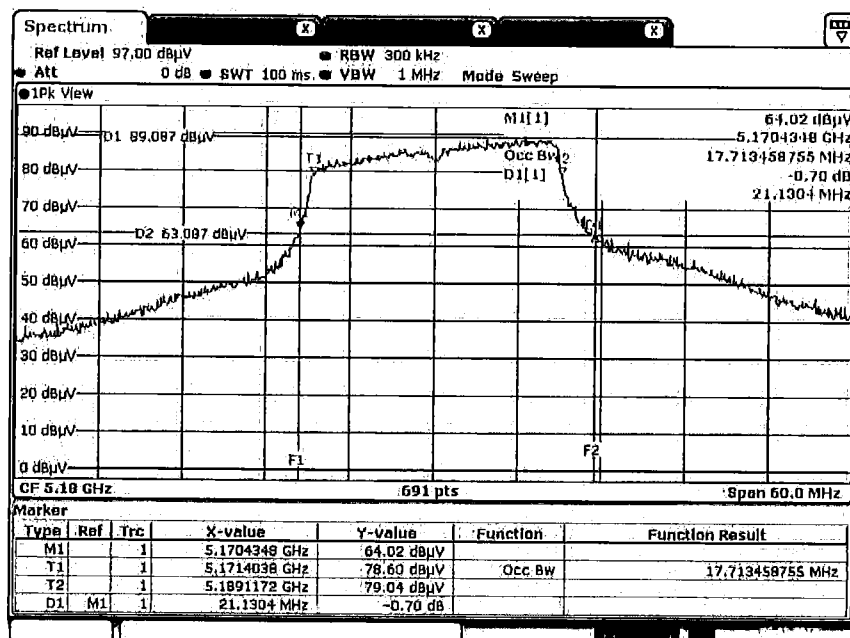


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5240 MHz



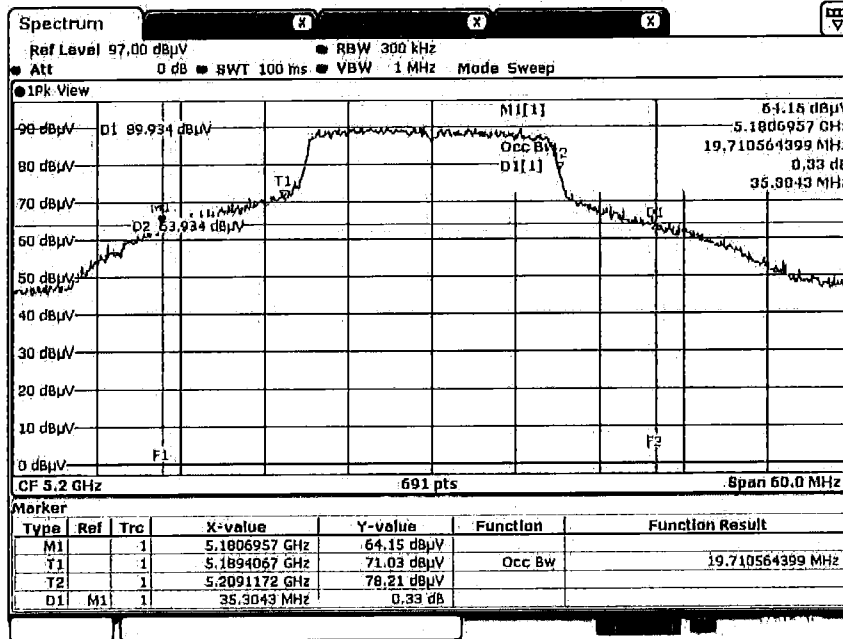
Date: 6.OCT.2017 17:09:12

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5180 MHz



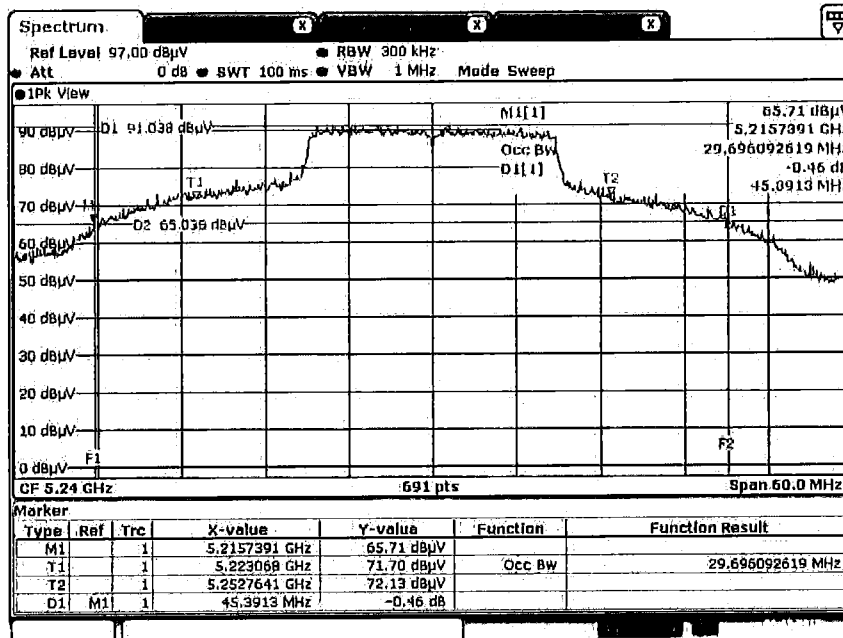
Date: 6.OCT.2017 17:02:28

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5200 MHz



Date: 6.OCT.2017 17:03:16

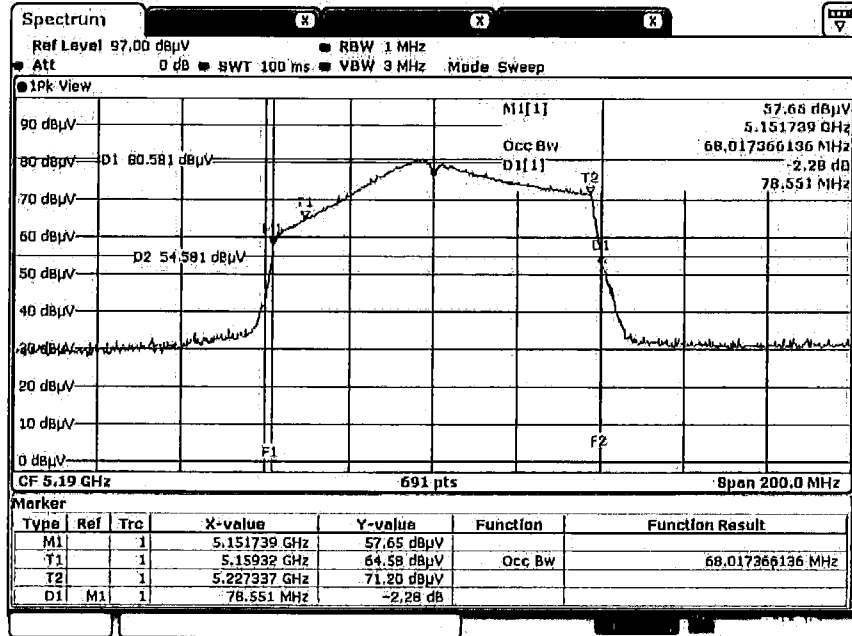
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5240 MHz



Date: 6.OCT.2017 17:07:40

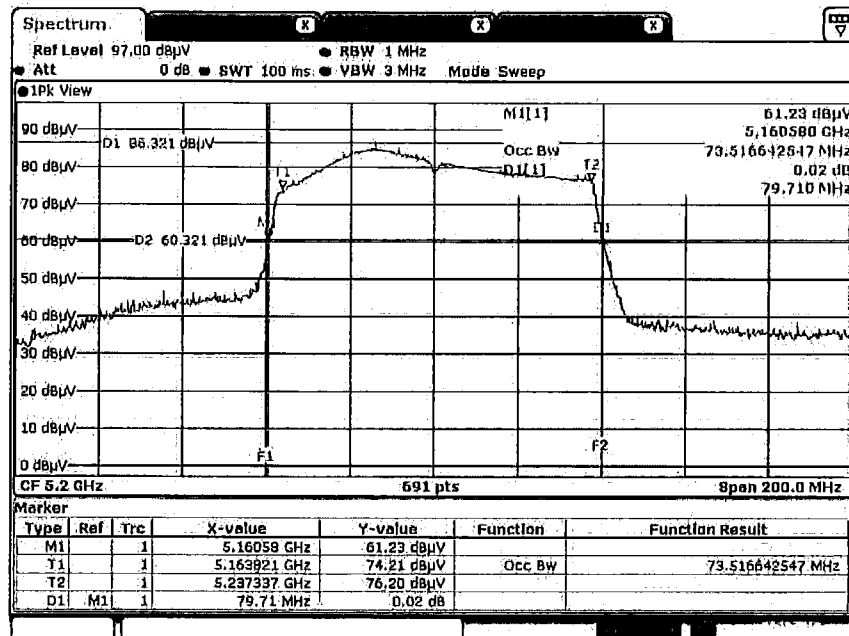


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5190 MHz



Date: 7.OCT.2017 06:49:04

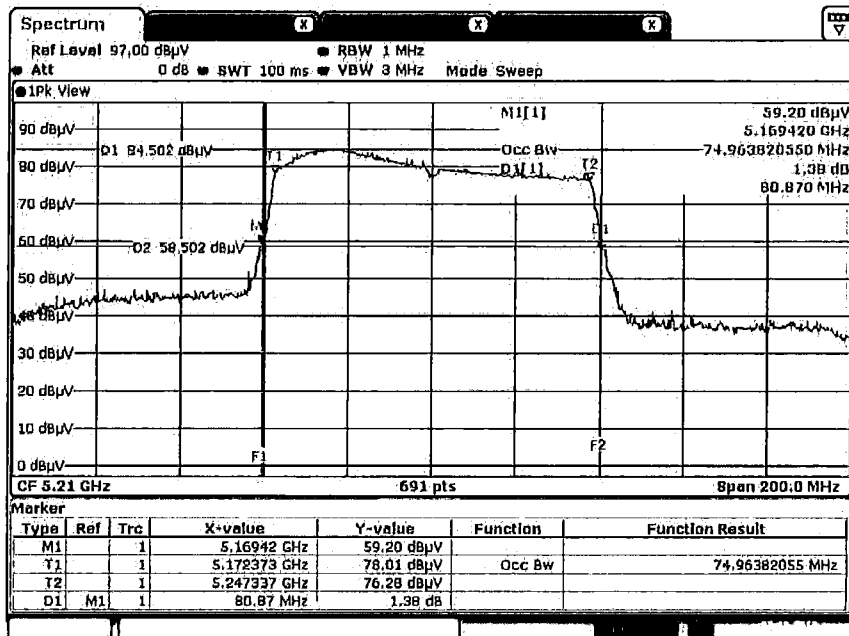
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5200 MHz



Date: 7.OCT.2017 08:51:11

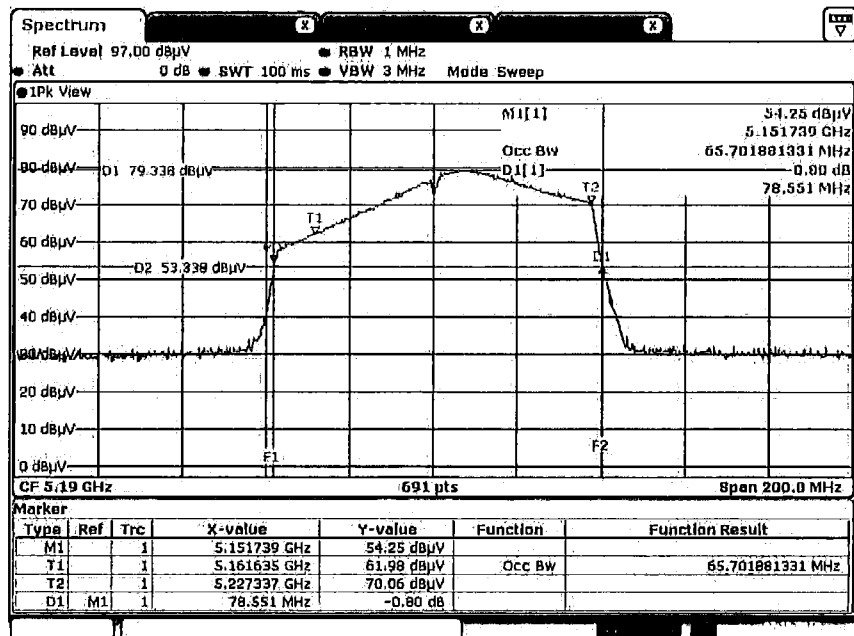


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5210 MHz



Date: 7.OCT.2017 06:52:05

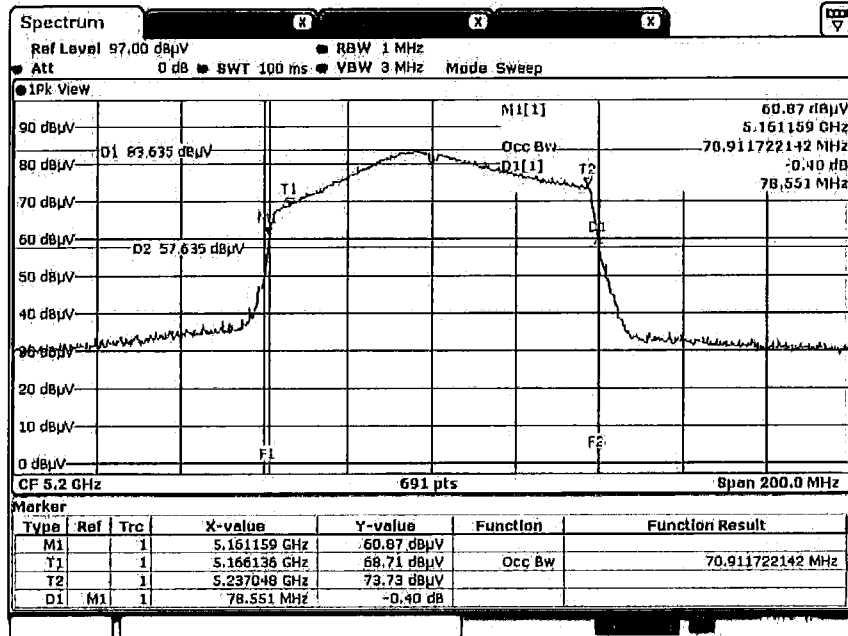
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5190 MHz



Date: 7.OCT.2017 07:20:06

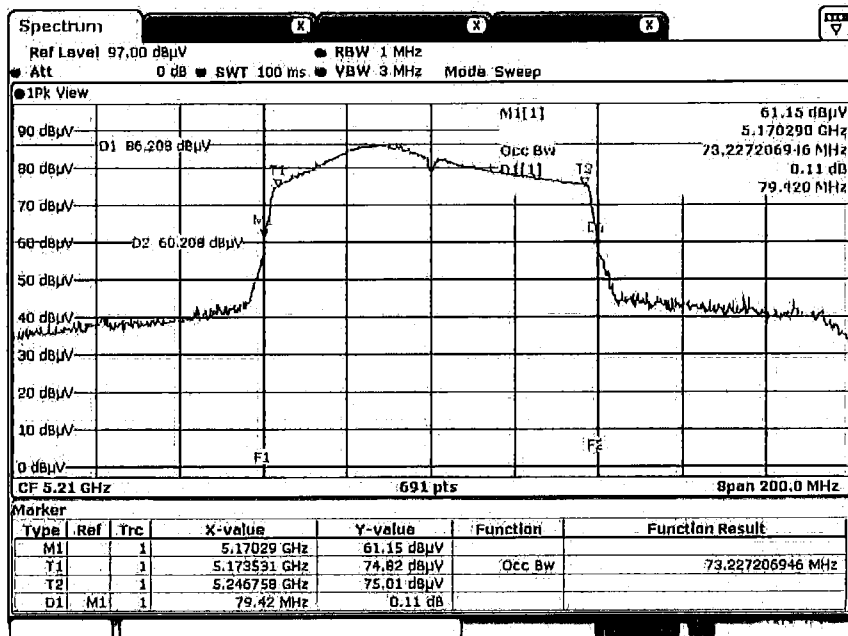


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5200 MHz



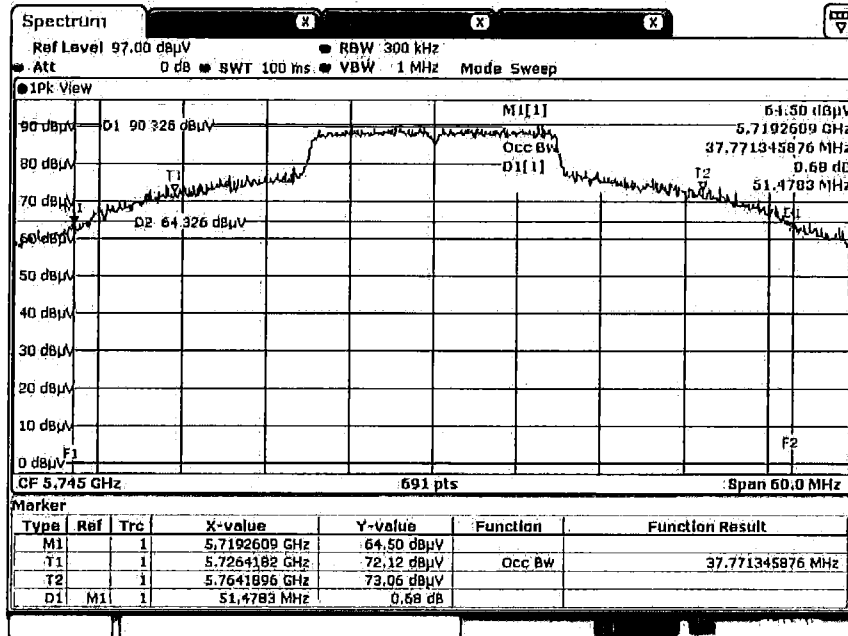
Date: 7.OCT.2017 07:21:43

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5210 MHz



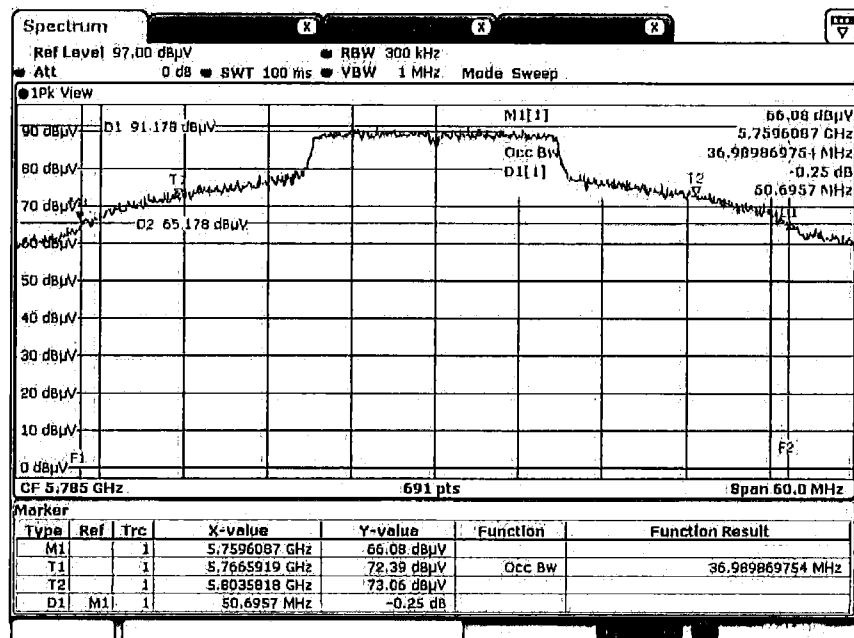
Date: 7.OCT.2017 07:22:13

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5745 MHz



Date: 6.OCT.2017 17:36:49

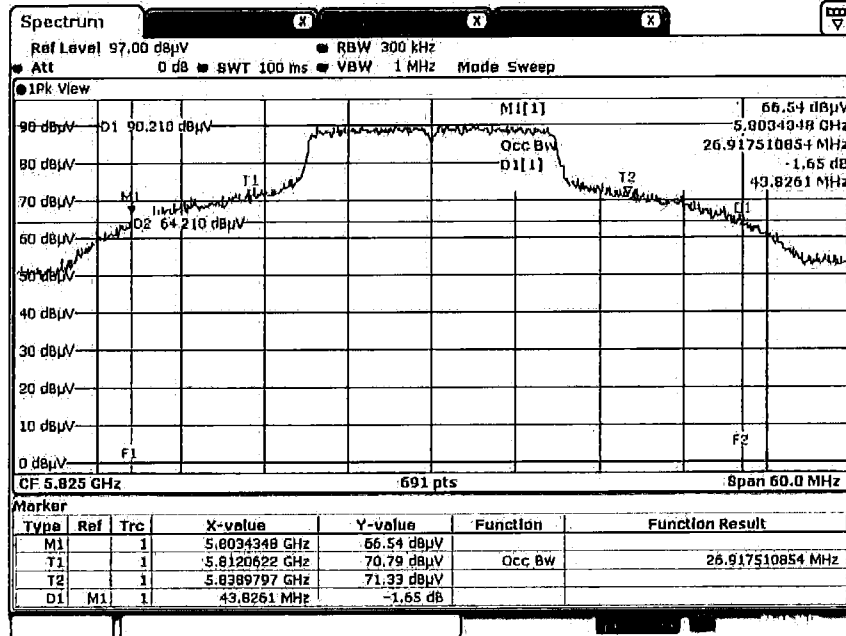
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5785 MHz



Date: 6.OCT.2017 17:37:30

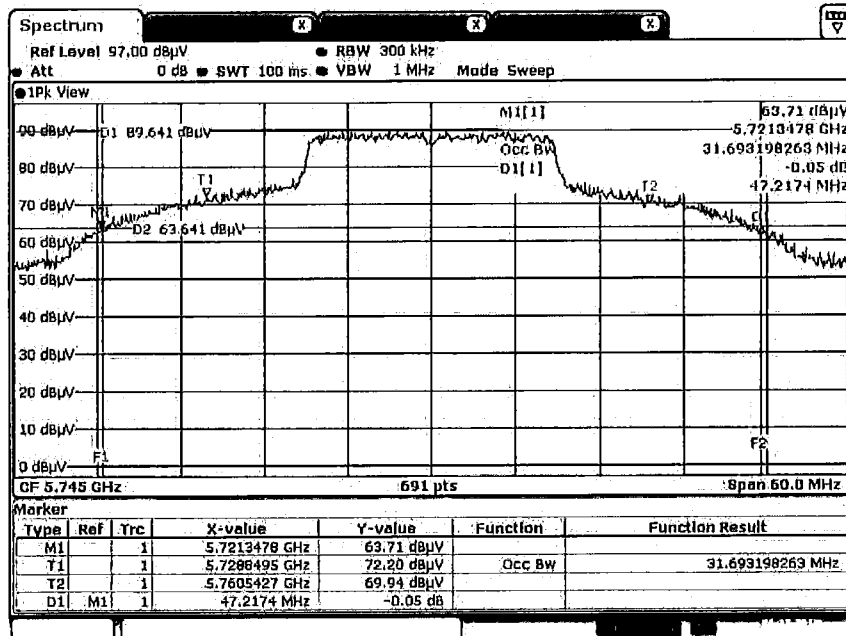


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5825 MHz



Date: 6.OCT.2017 17:38:23

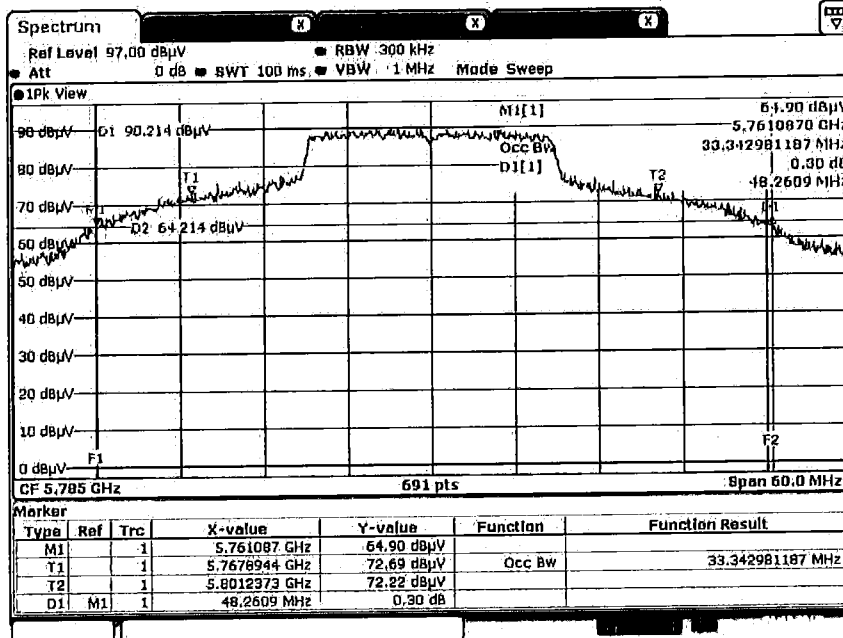
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5745 MHz



Date: 6.OCT.2017 18:06:16

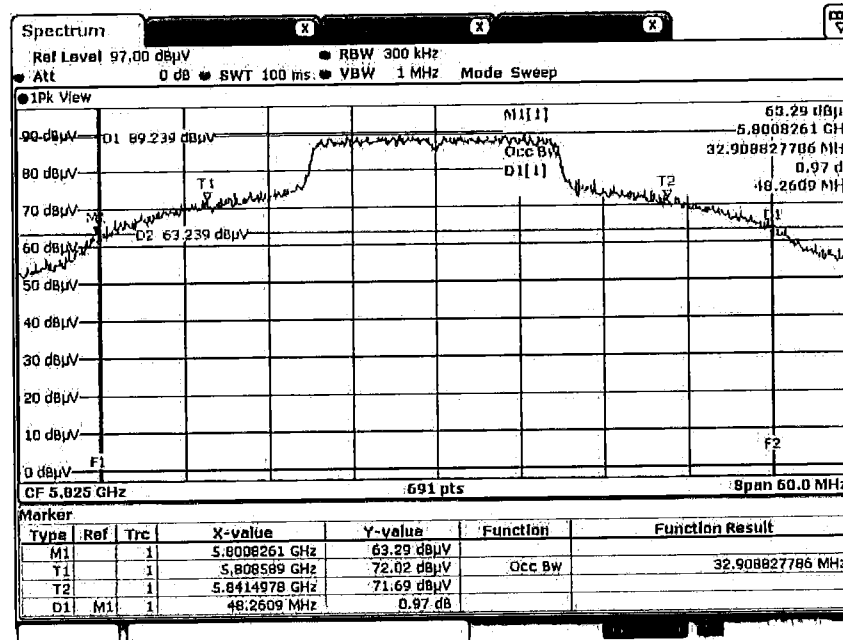


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5785MHz



Date: 6.OCT.2017 18:05:50

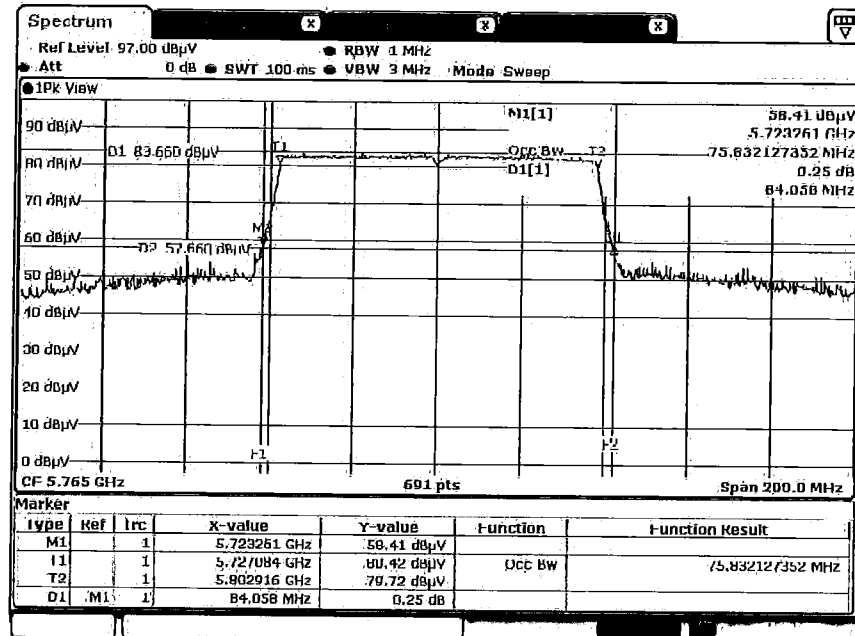
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5825 MHz



Date: 6.OCT.2017 17:57:31

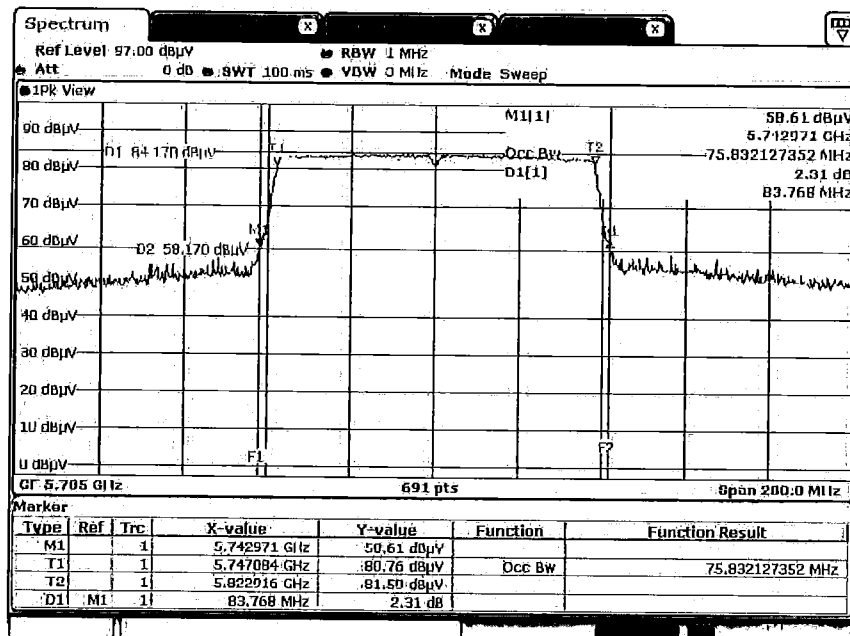


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5765 MHz



Date: 7.OCT.2017 07:04:38

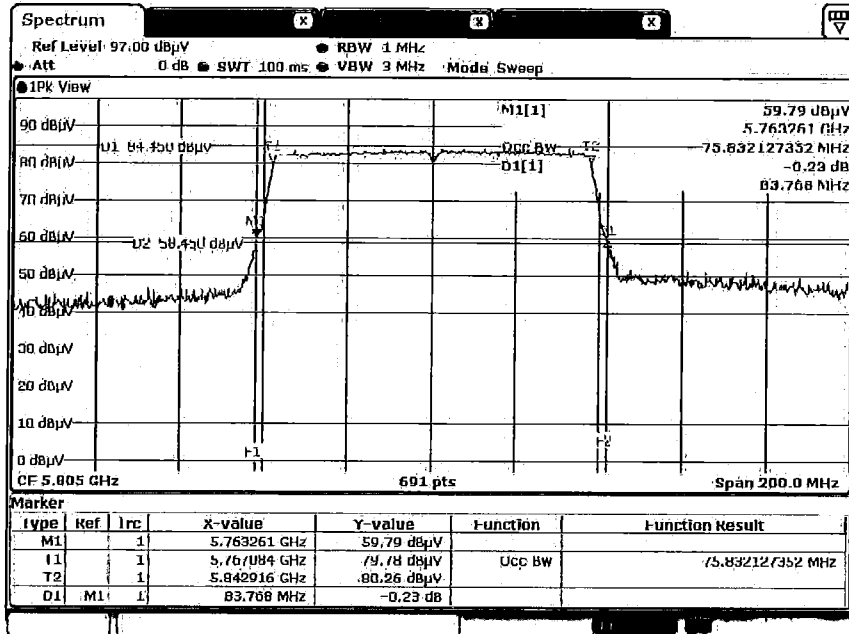
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5785 MHz



Date: 7.OCT.2017 07:10:12

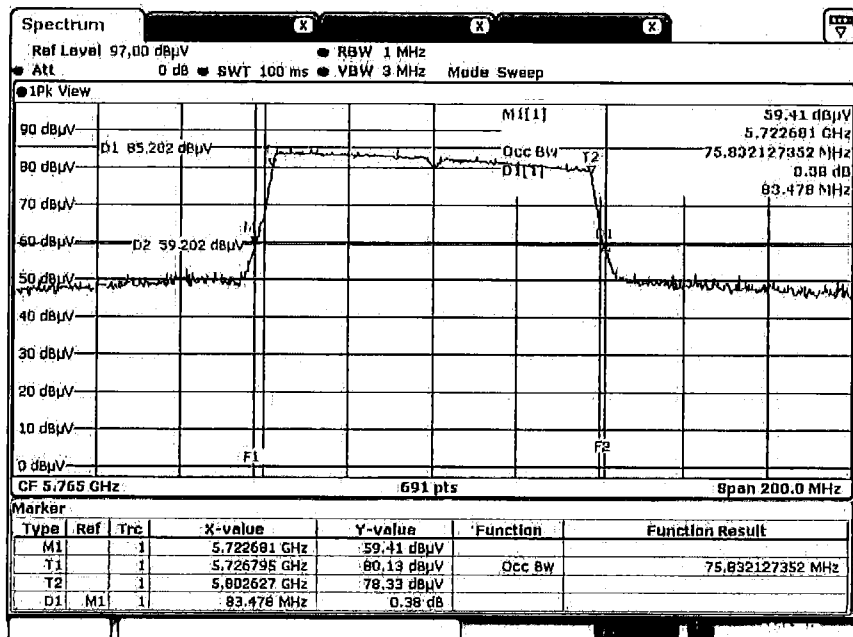


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5805 MHz



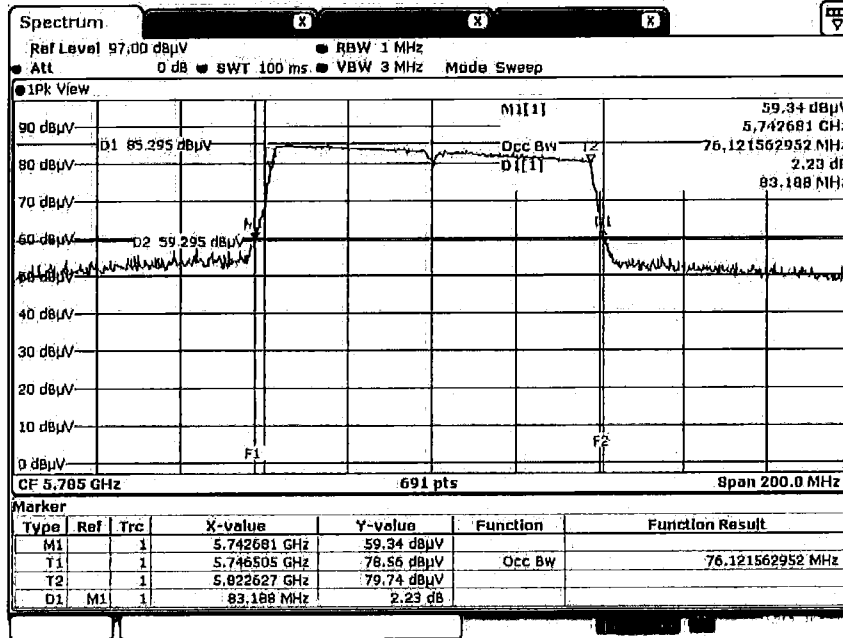
Date: 7.OCT.2017 07:09:34

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5765 MHz



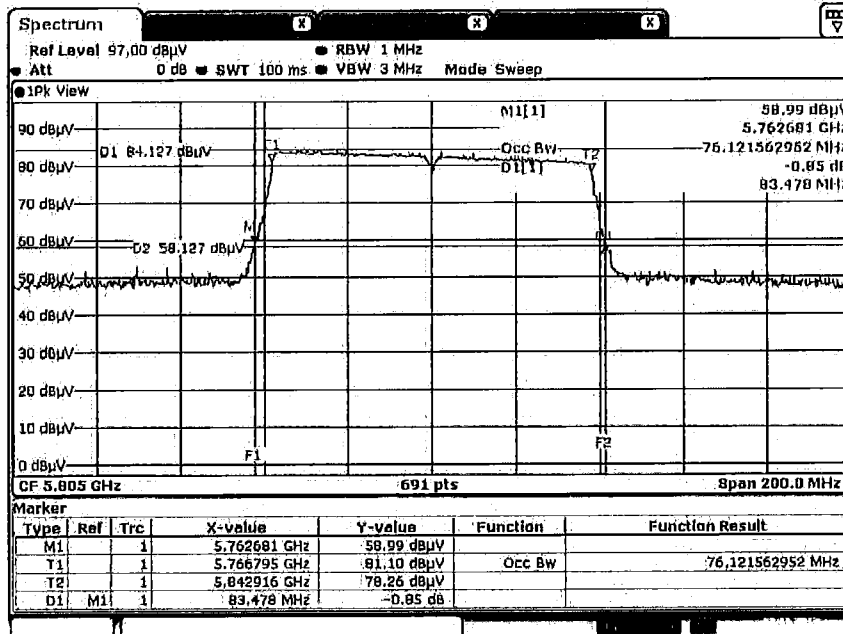
Date: 7.OCT.2017 07:14:08

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5785MHz



Date: 7.OCT.2017 07:12:26

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5805 MHz

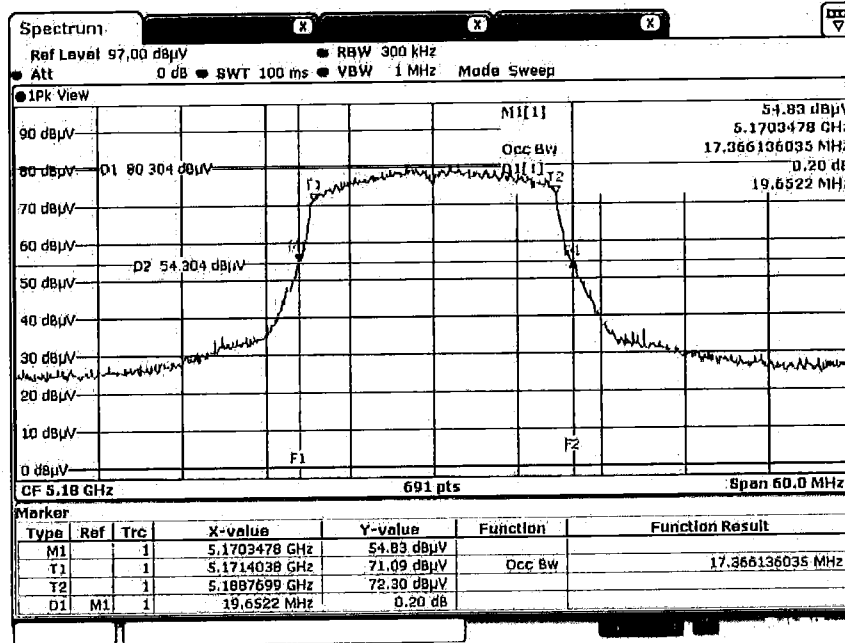


Date: 7.OCT.2017 07:13:42



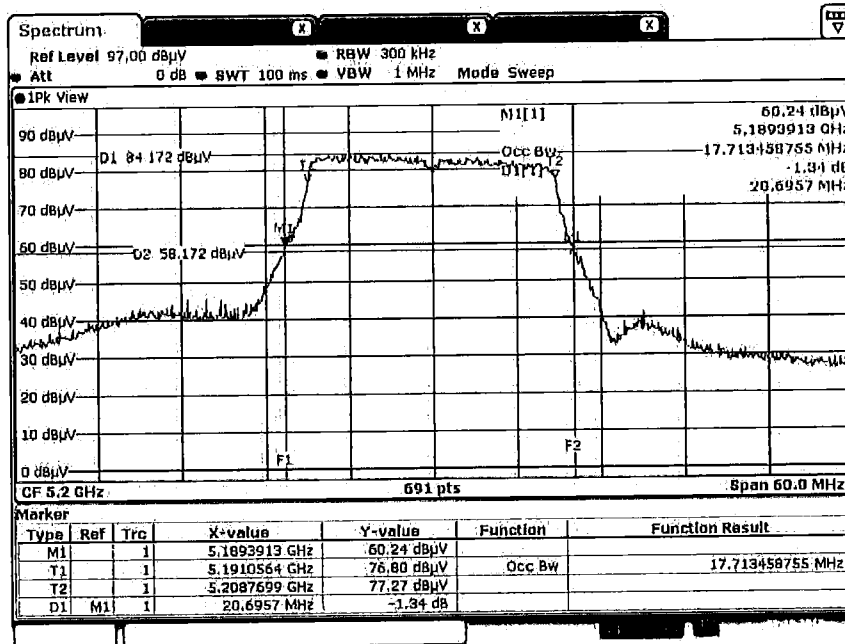
For Antenna 2:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5180 MHz



Date: 5.OCT.2017 16:21:17

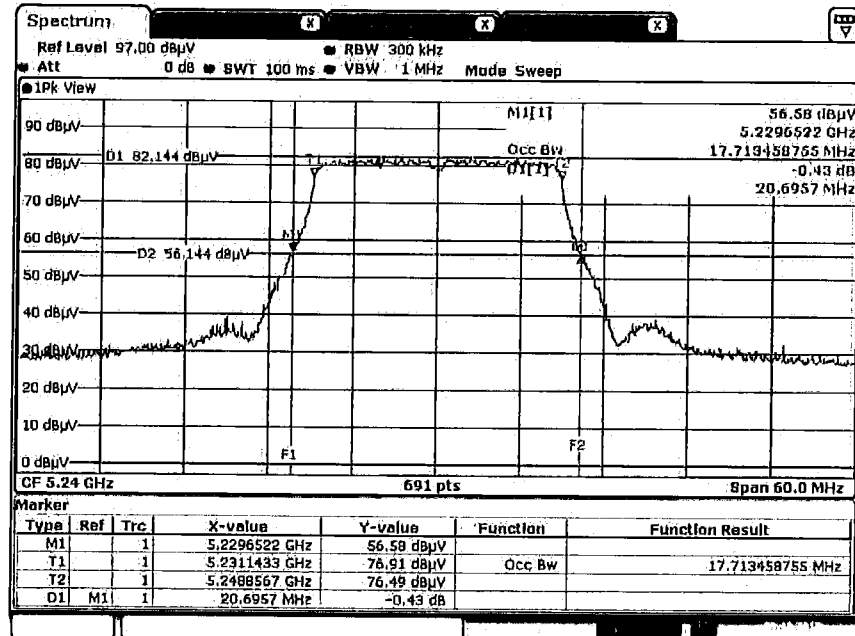
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5200 MHz



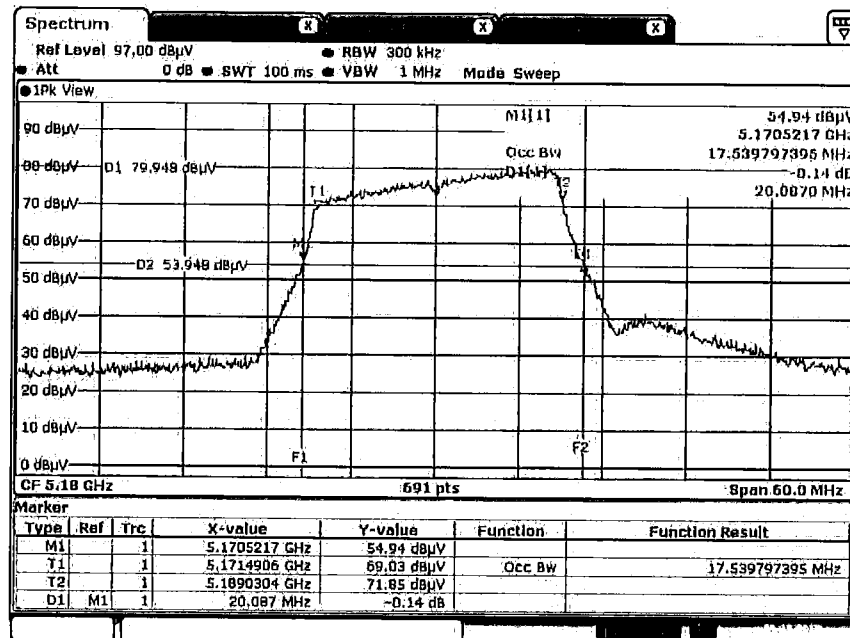
Date: 5.OCT.2017 16:22:15



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5240 MHz

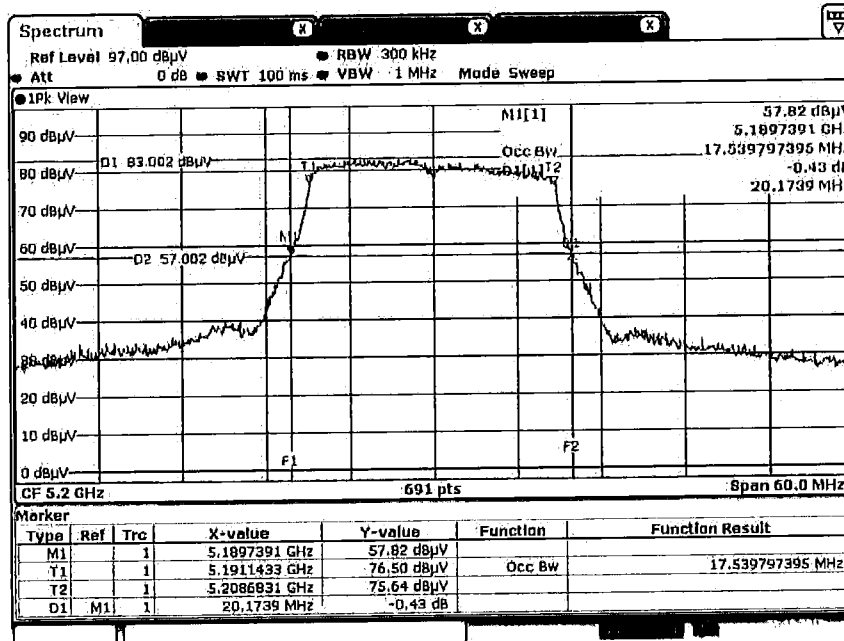


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5180 MHz



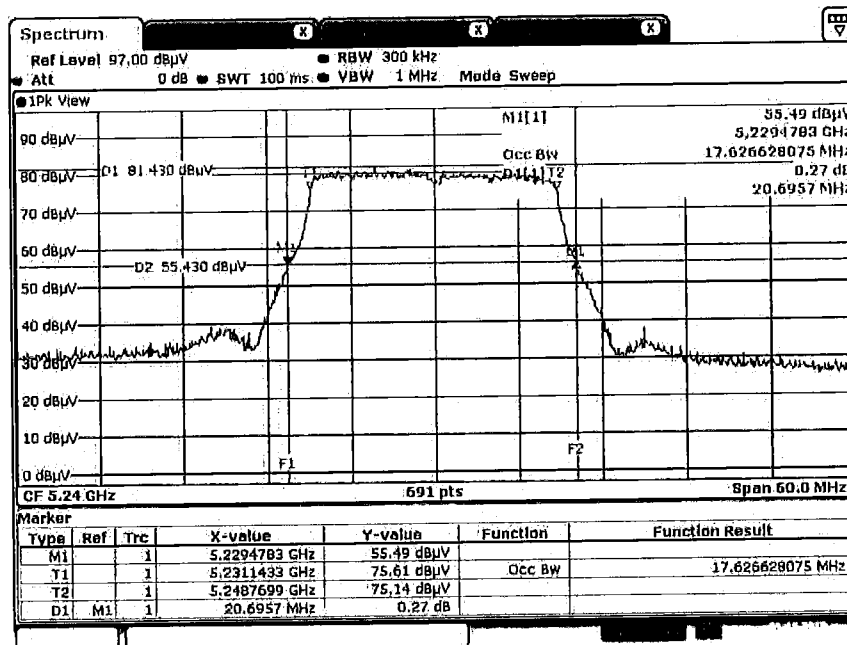


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5200 MHz



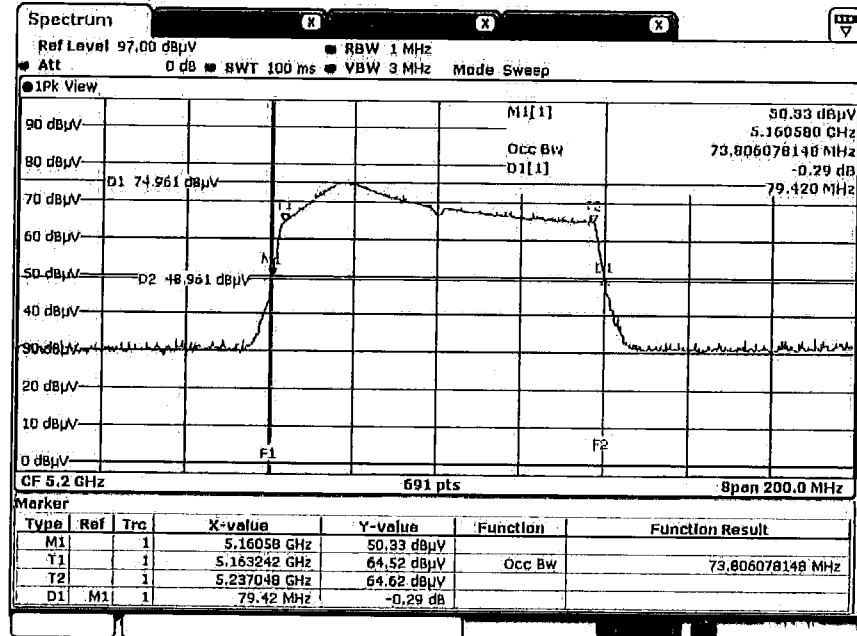
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5240 MHz



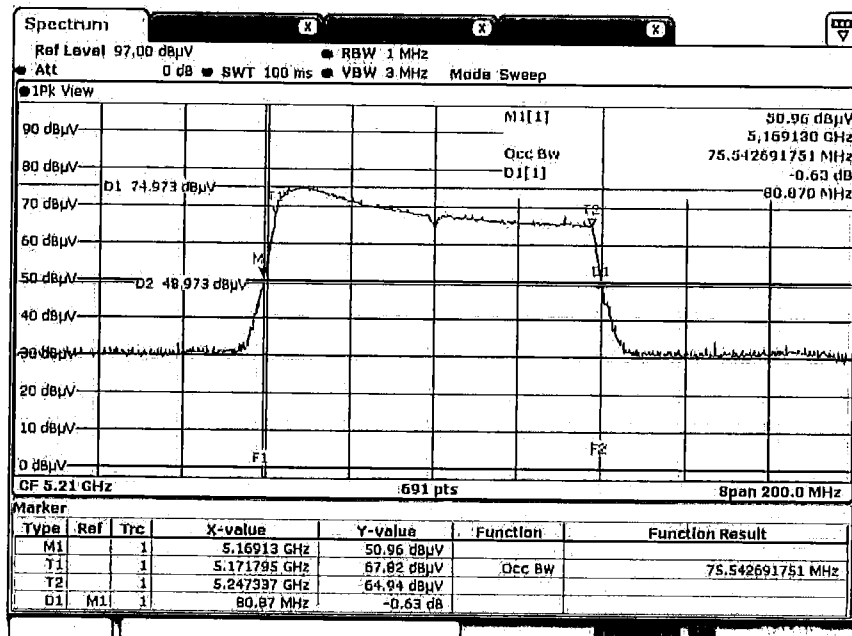
Date: 5.OCT.2017 16:23:50

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5200 MHz



Date: 5.OCT.2017 17:04:33

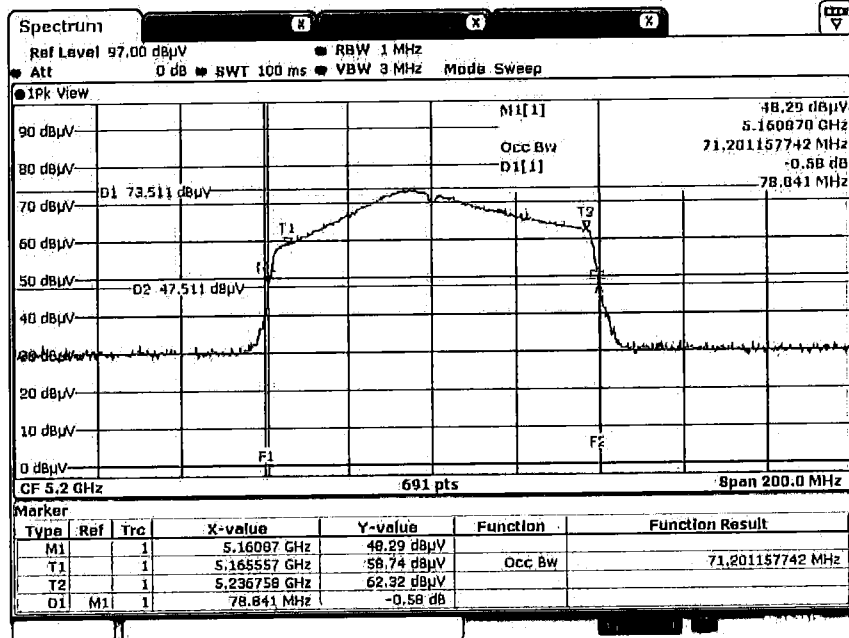
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5210 MHz



Date: 5.OCT.2017 17:05:24

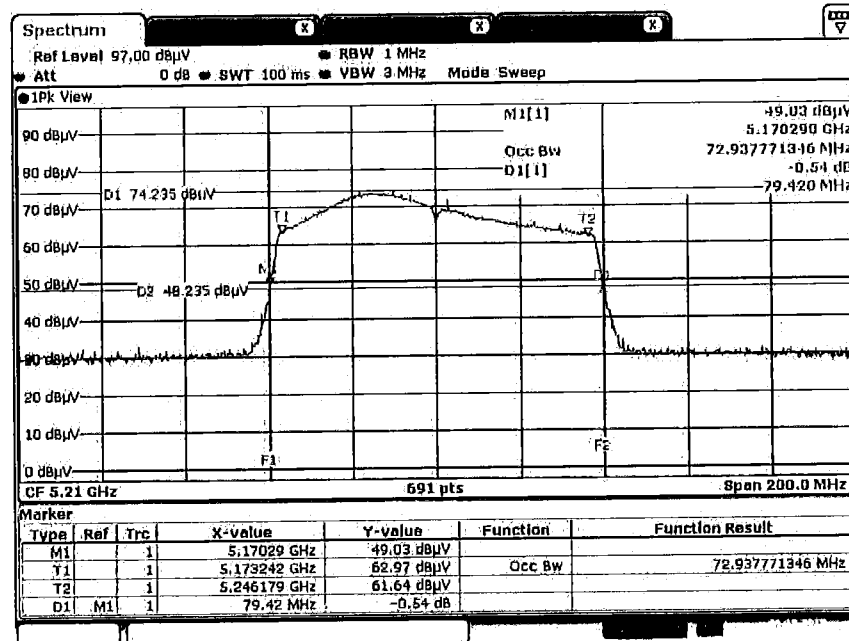


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5200 MHz



Date: 5.OCT.2017 17:39:20

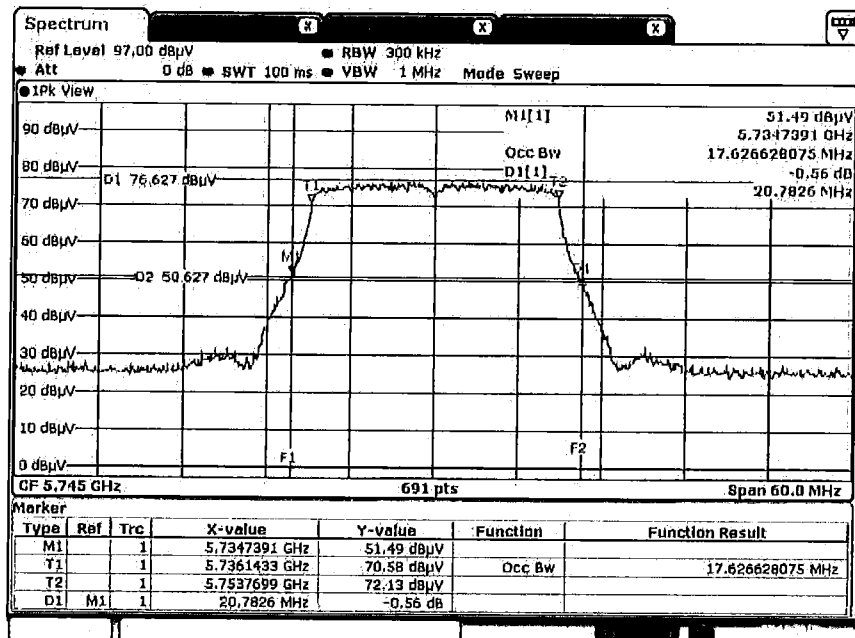
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5210 MHz



Date: 5.OCT.2017 17:39:08

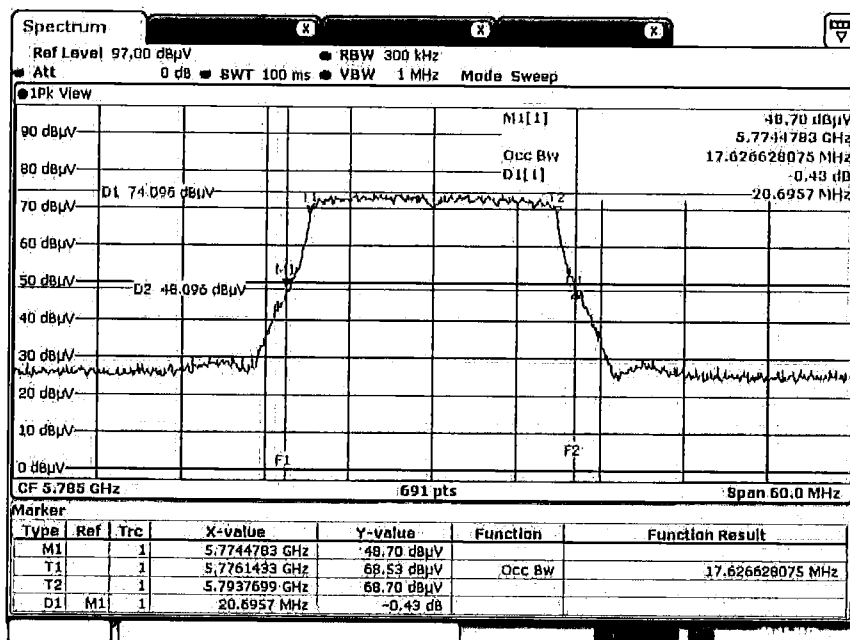


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5745 MHz



Date: 5.OCT.2017 16:27:42

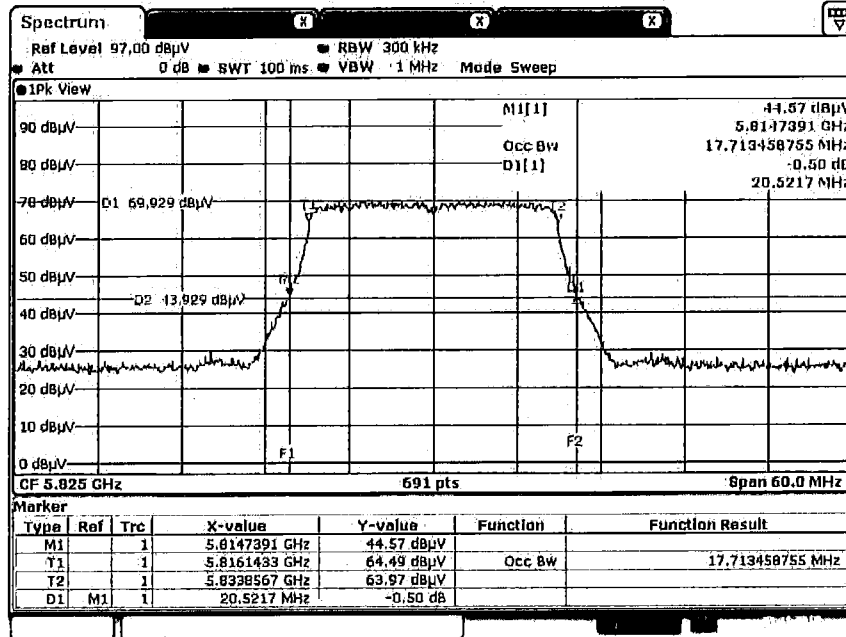
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5785 MHz



Date: 5.OCT.2017 16:28:18

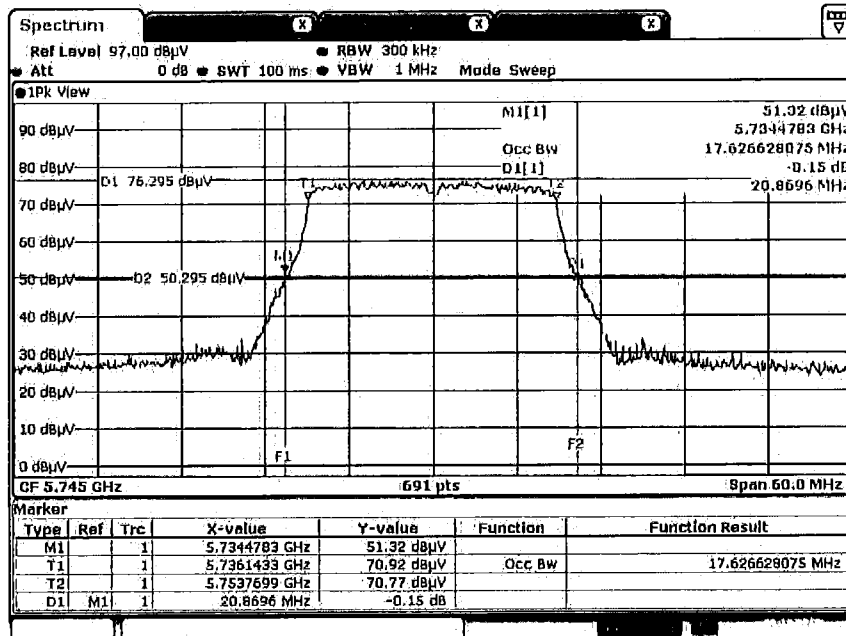


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5825 MHz



Date: 5.OCT.2017 16:29:15

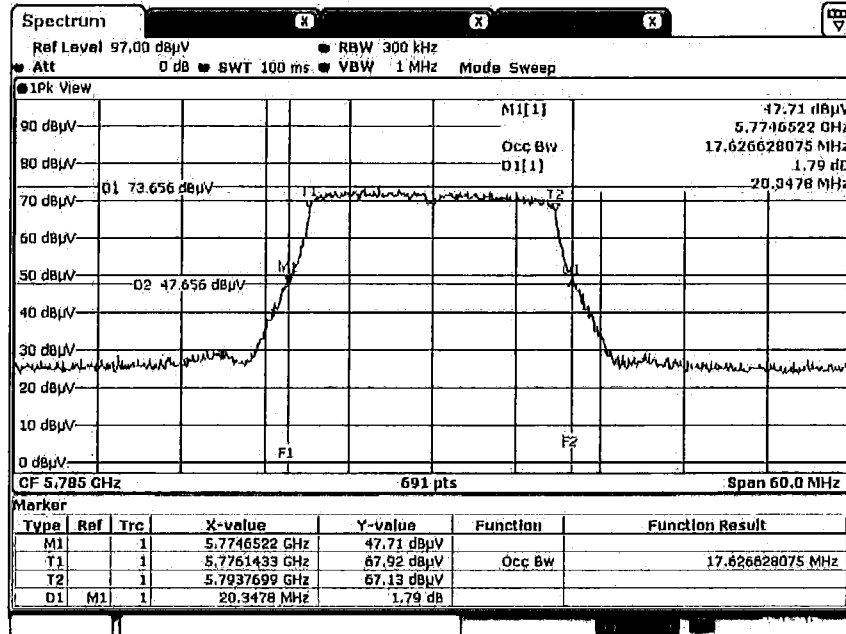
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5745 MHz



Date: 5.OCT.2017 16:31:25

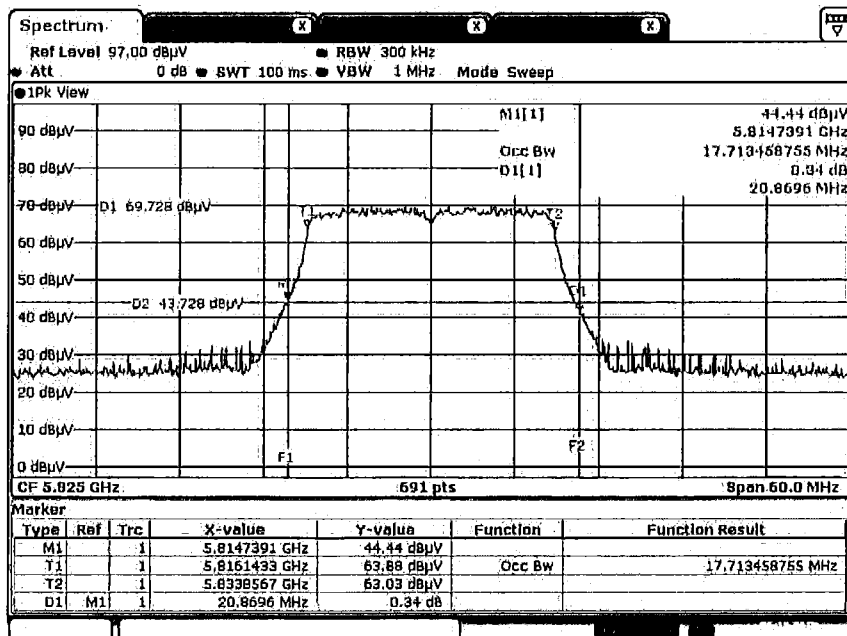


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5785MHz



Date: 5.OCT.2017 16:30:53

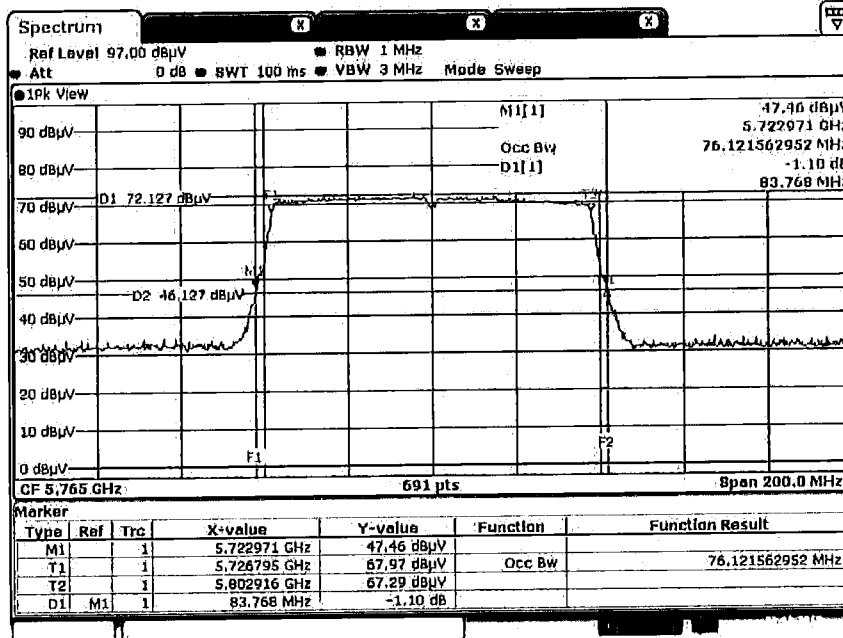
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5825 MHz



Date: 5.OCT.2017 18:30:11

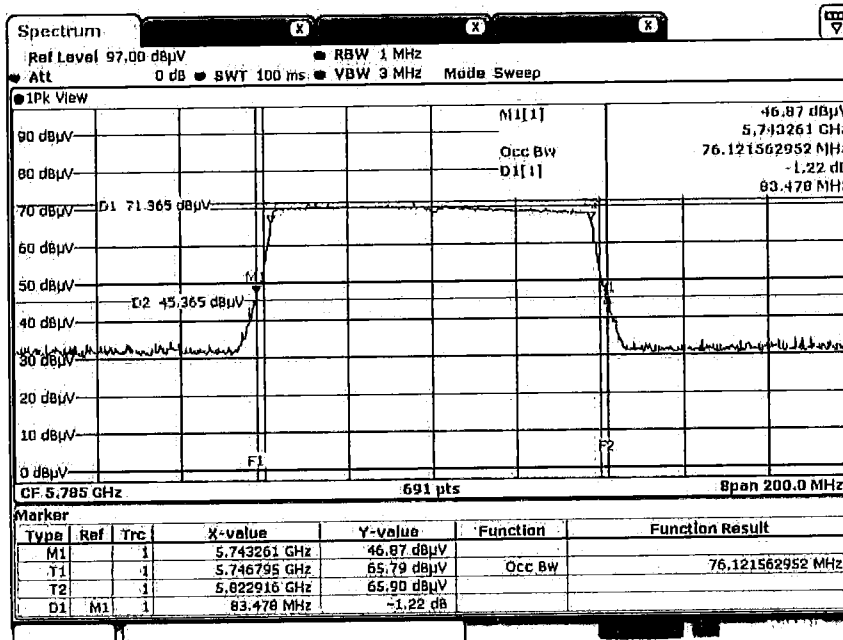


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5765 MHz



Date: 5.OCT.2017 17:15:26

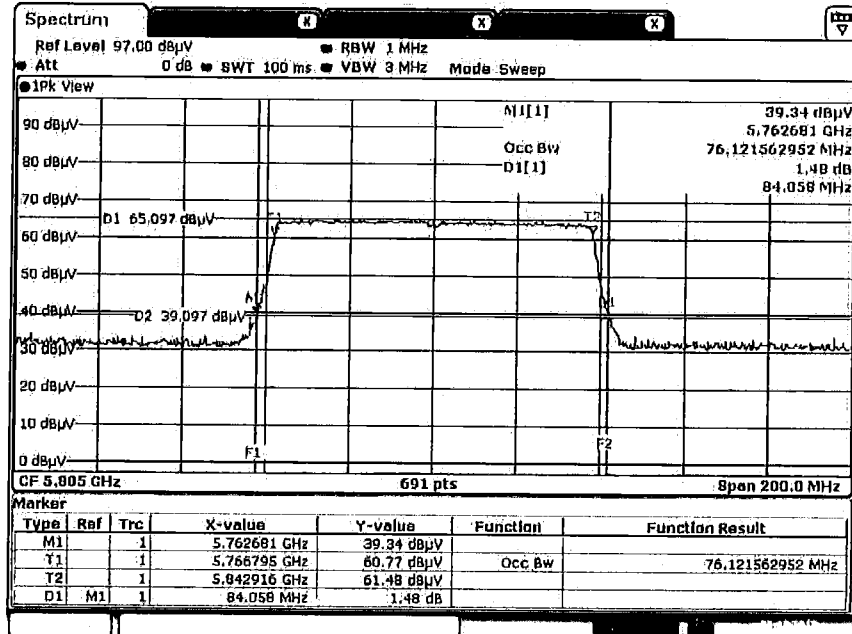
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5785 MHz



Date: 5.OCT.2017 17:16:09

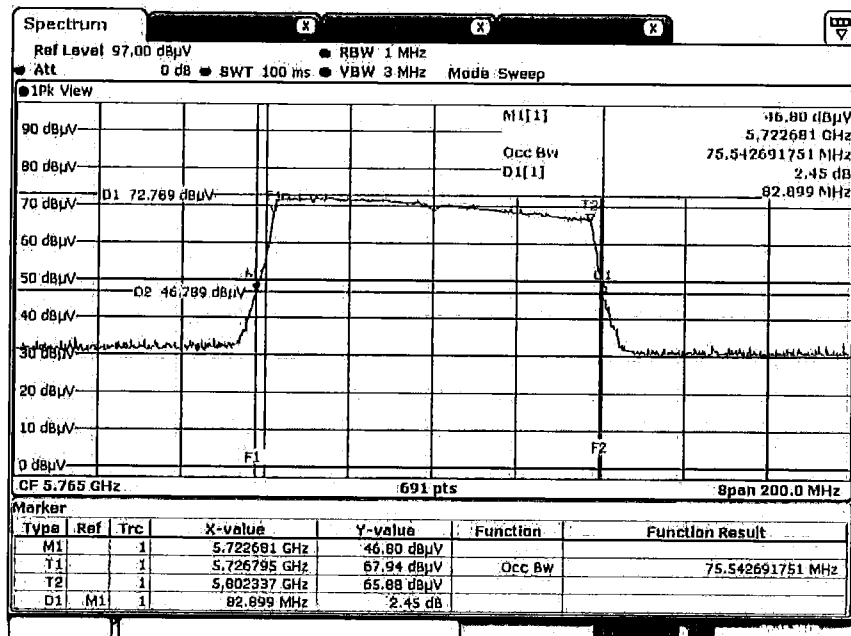


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5805 MHz



Date: 5.OCT.2017 17:13:02

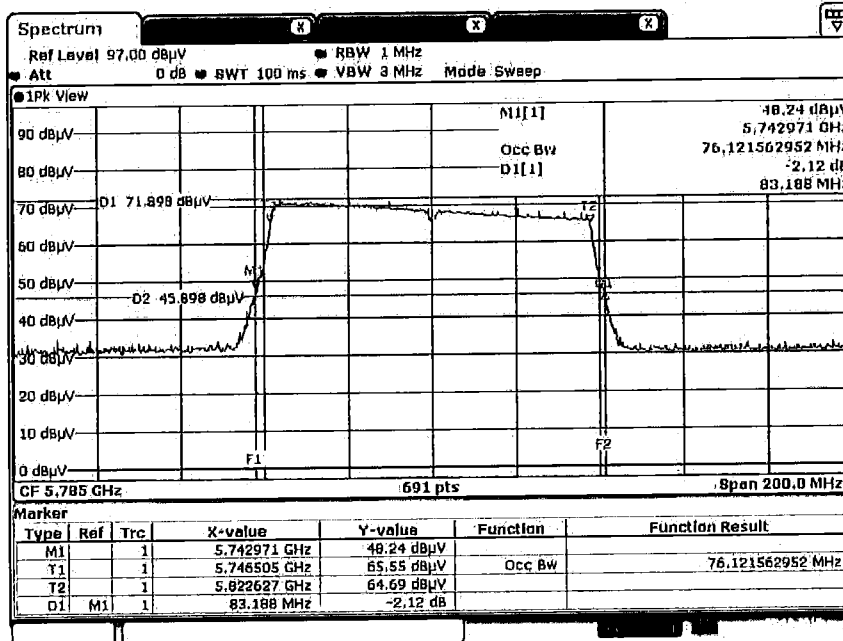
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5765 MHz



Date: 5.OCT.2017 17:35:23

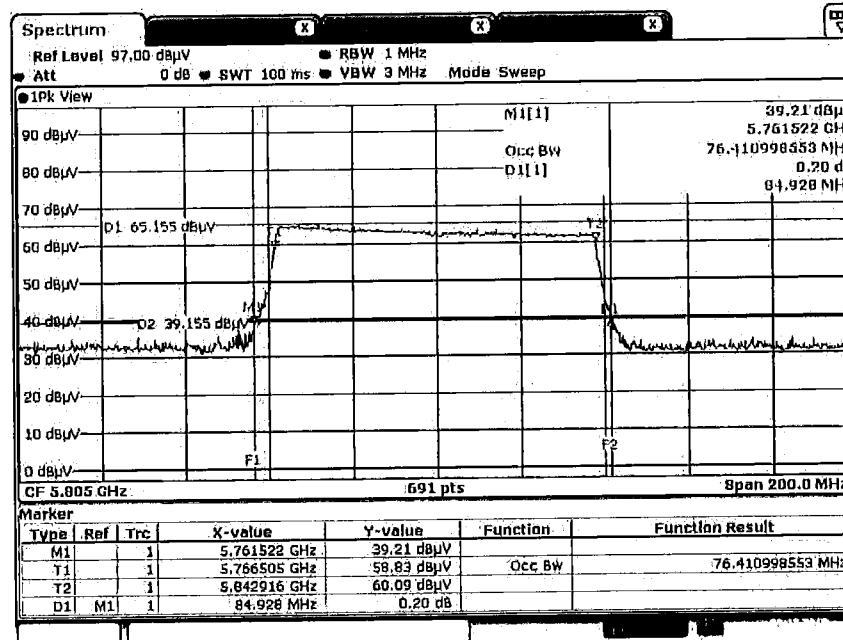


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5785MHz



Date: 5.OCT.2017 17:23:21

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5805 MHz



Date: 5.OCT.2017 17:24:02

4.3. 6dB Spectrum Bandwidth Measurement

4.3.1. Limit

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

4.3.2. 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

4.3.3. 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.

4.3.4. Test Setup Layout



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 6dB Spectrum Bandwidth

Temperature	27.1°C	Humidity	79%
Test Engineer	Ron Huang		

For Antenna 1:

Mode	Frequency	6dB Bandwidth (MHz)		Min. Limit (kHz)	Test Result
		Port 1	Port 2		
20M	5745 MHz	17.57	17.57	500	Complies
	5785 MHz	17.57	17.62	500	Complies
	5825 MHz	17.57	17.62	500	Complies
80M	5765 MHz	75.94	70.73	500	Complies
	5790 MHz	76.52	75.94	500	Complies
	5805 MHz	75.65	74.49	500	Complies

For Antenna 2:

Mode	Frequency	6dB Bandwidth (MHz)		Min. Limit (kHz)	Test Result
		Port 1	Port 2		
20M	5745 MHz	16.75	17.57	500	Complies
	5785 MHz	17.16	17.57	500	Complies
	5825 MHz	17.57	17.57	500	Complies
80M	5765 MHz	75.94	73.33	500	Complies
	5790 MHz	74.78	75.94	500	Complies
	5805 MHz	76.52	75.94	500	Complies

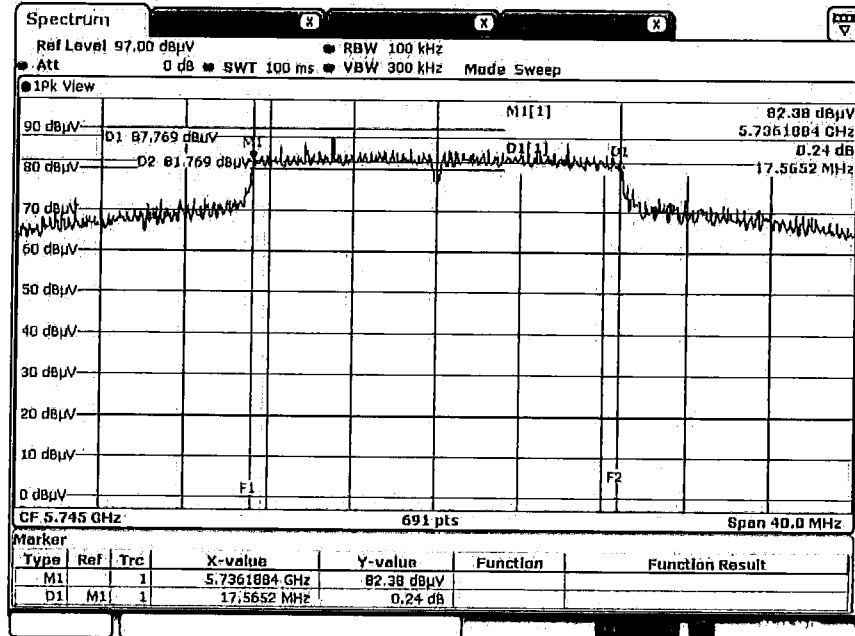
Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.



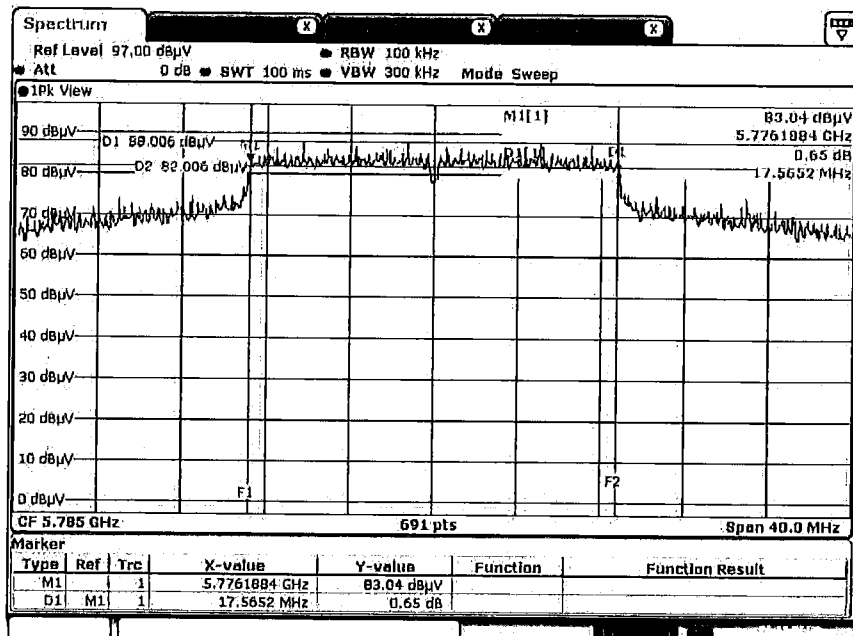
For Antenna 1:

6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5745 MHz



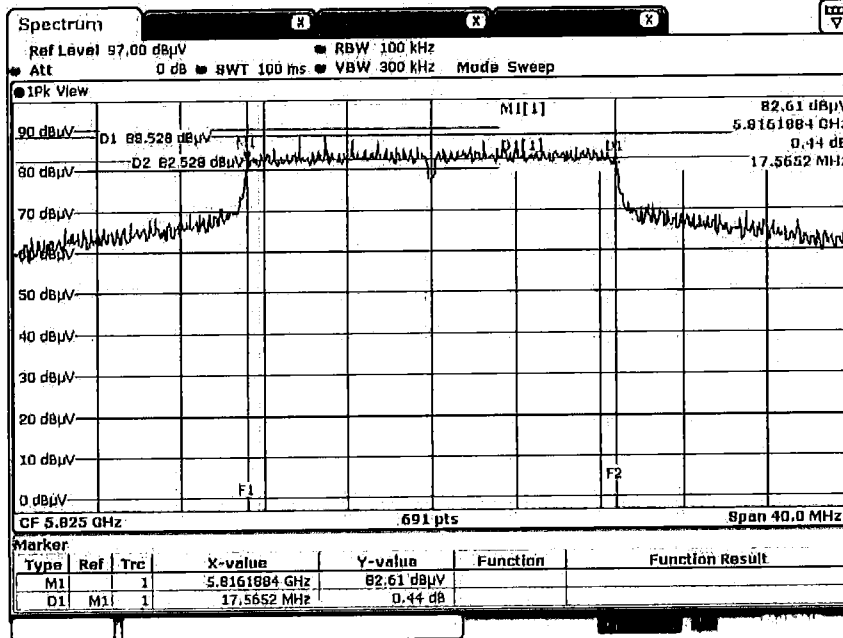
Date: 6.OCT.2017 17:54:27

6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5785 MHz



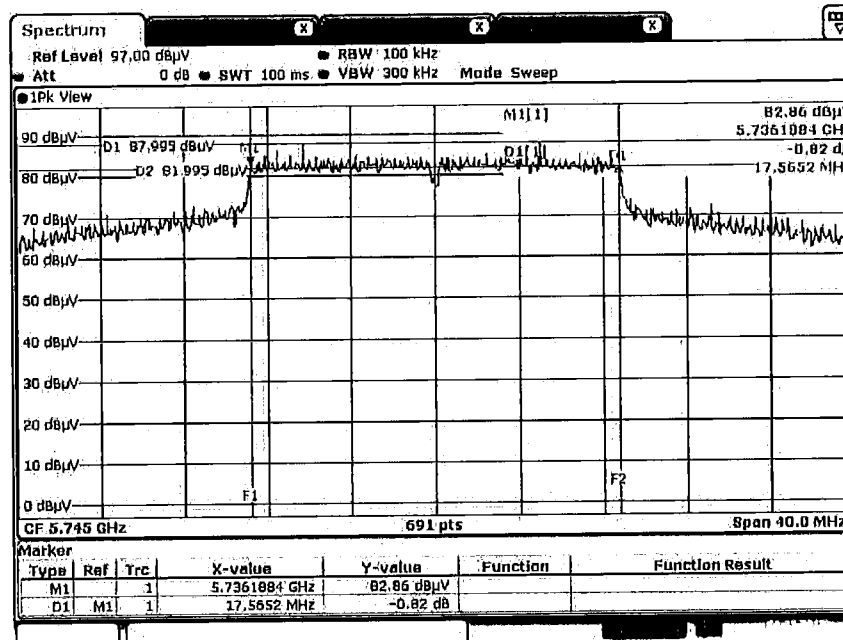
Date: 6.OCT.2017 17:54:02

6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5825 MHz



Date: 6.OCT.2017 17:53:19

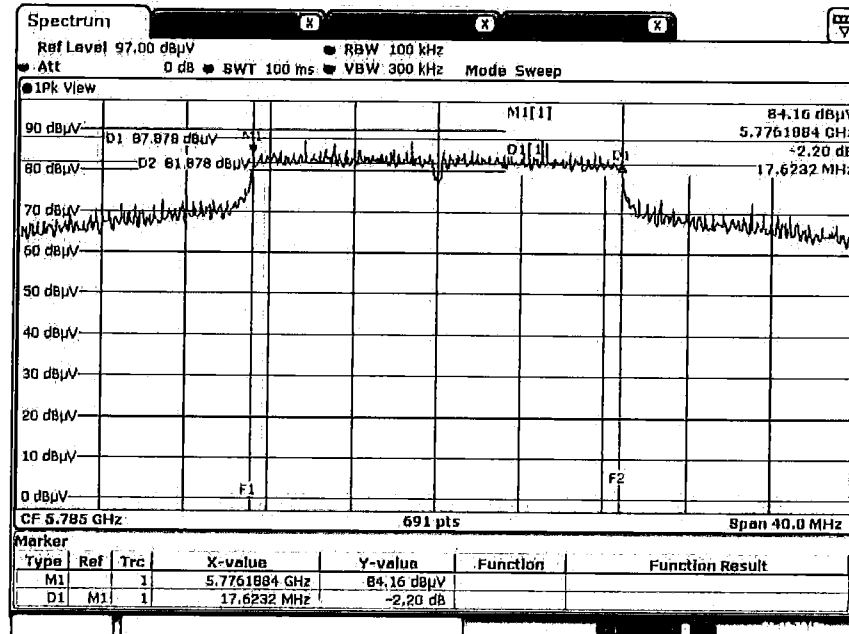
6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5745MHz



Date: 6.OCT.2017 17:55:35

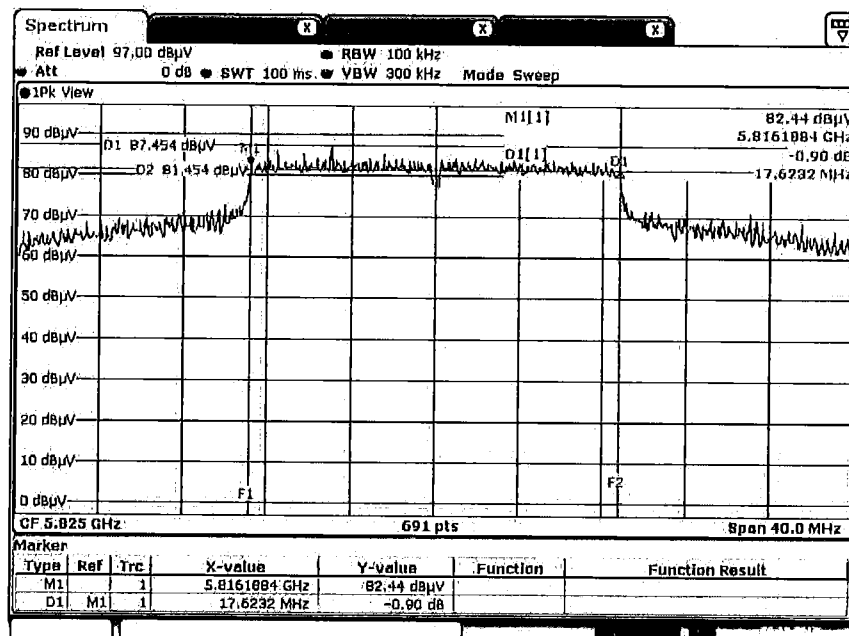


6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5785MHz



Date: 6.OCT.2017 17:56:10

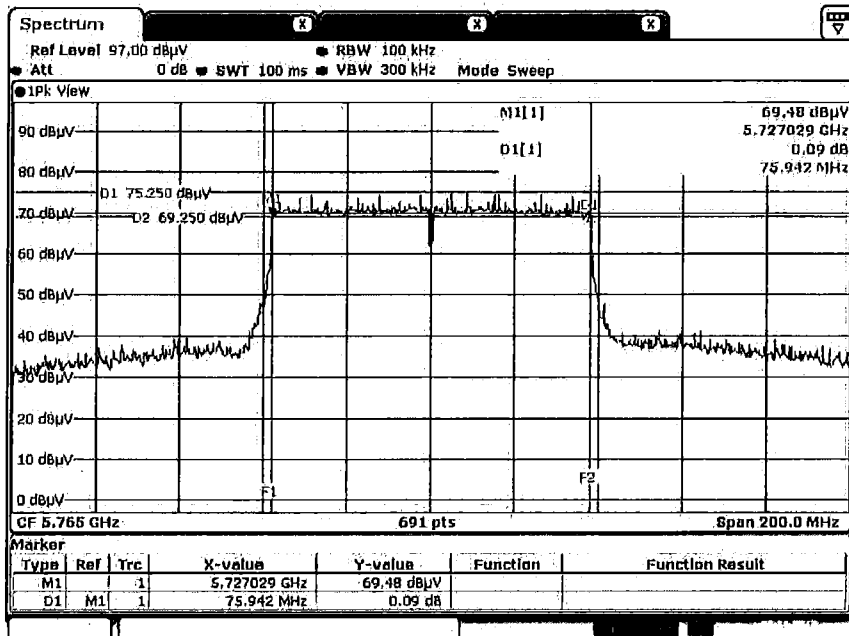
6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5825MHz



Date: 6.OCT.2017 17:56:39

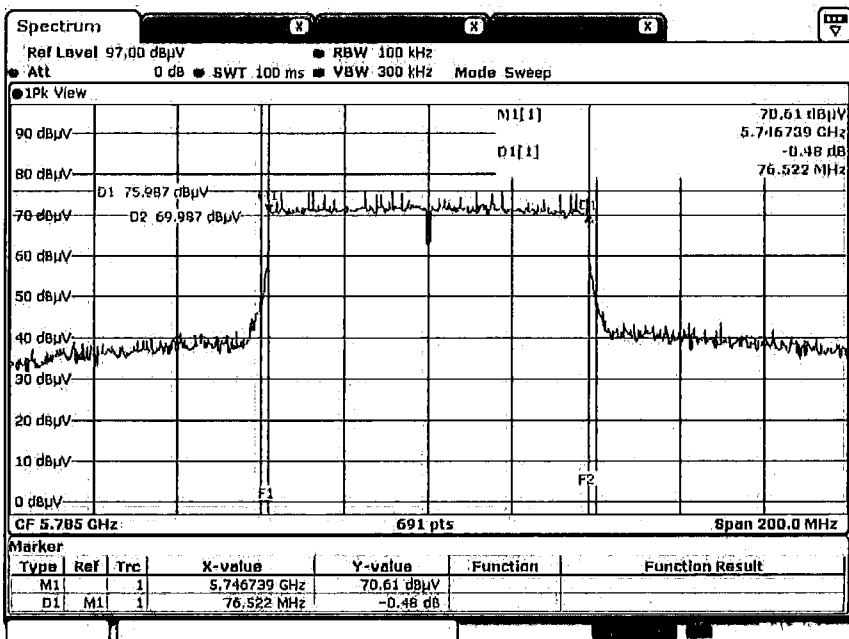


6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5765 MHz



Date: 7.OCT.2017 07:05:41

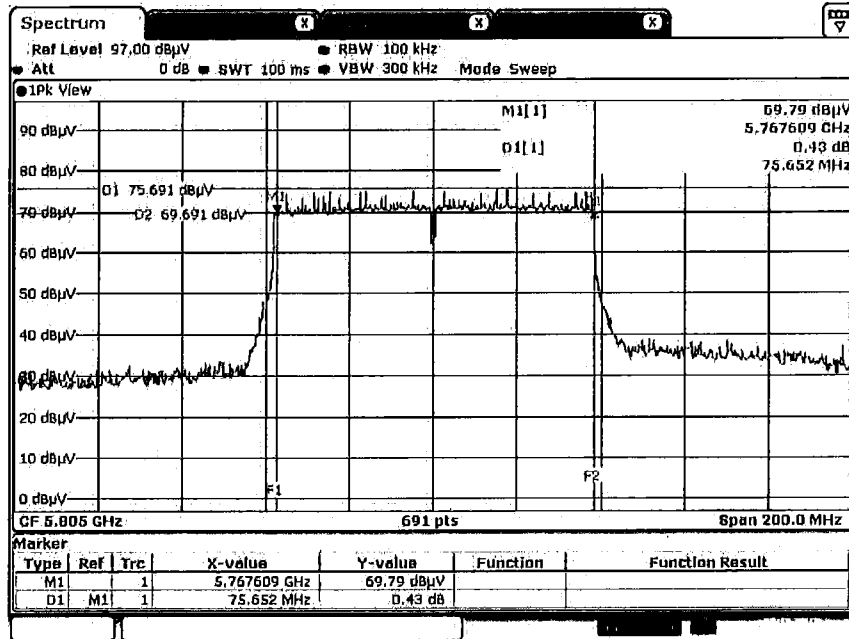
6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5785 MHz



Date: 7.OCT.2017 07:06:21

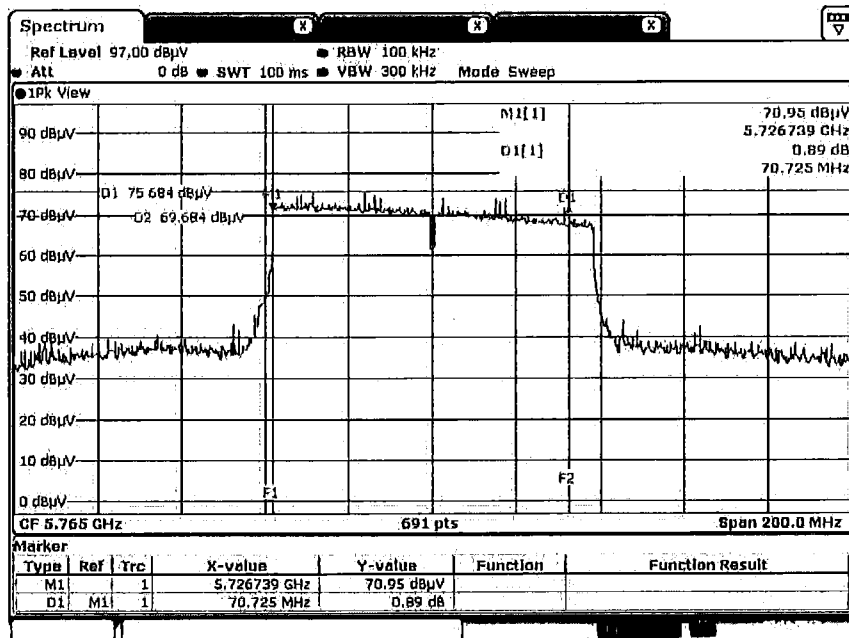


6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5805 MHz



Date: 7.OCT.2017 07:06:58

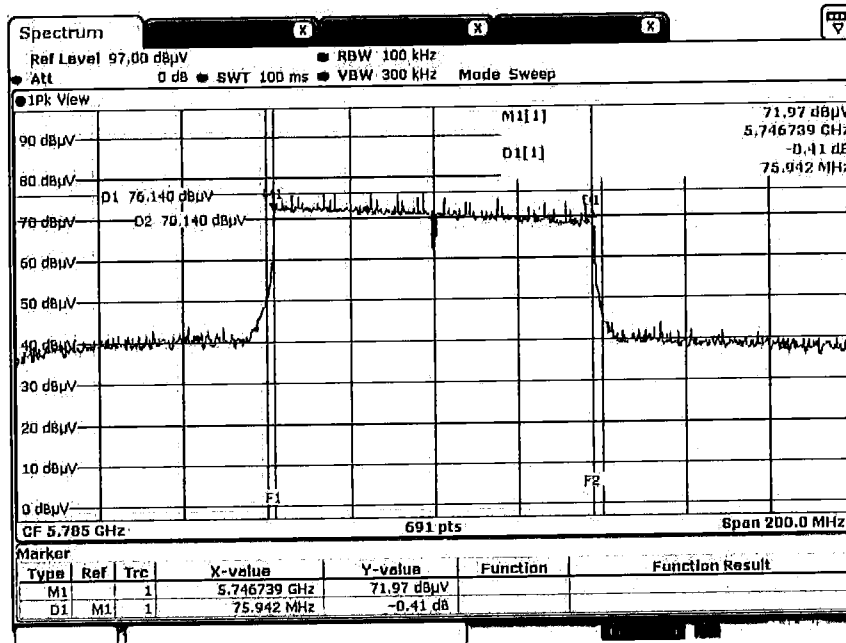
6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5765MHz



Date: 7.OCT.2017 07:16:15

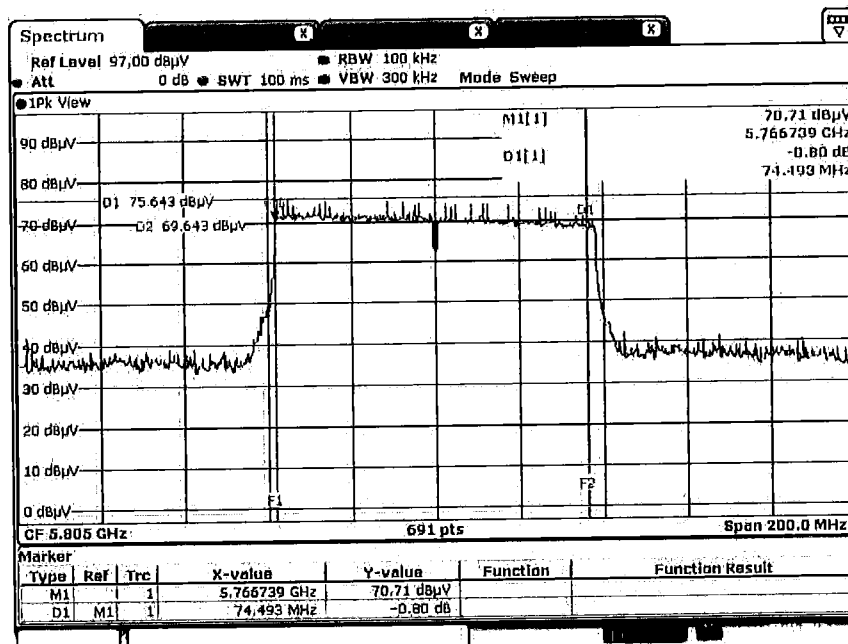


6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5785MHz

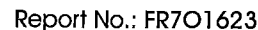


Date: 7.OCT.2017 07:16:40

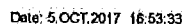
6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5805MHz



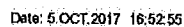
Date: 7.OCT.2017 07:17:03



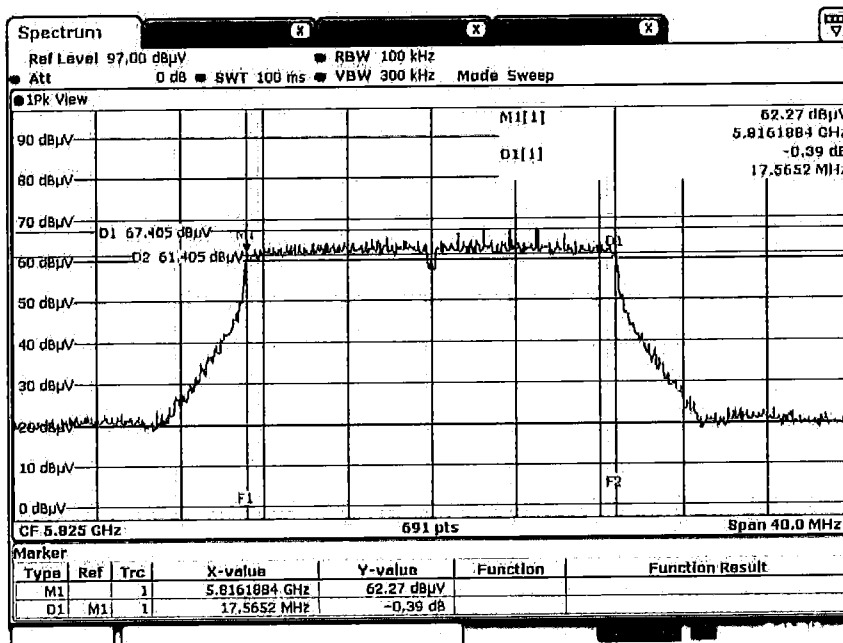
6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5745 MHz



6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5785 MHz

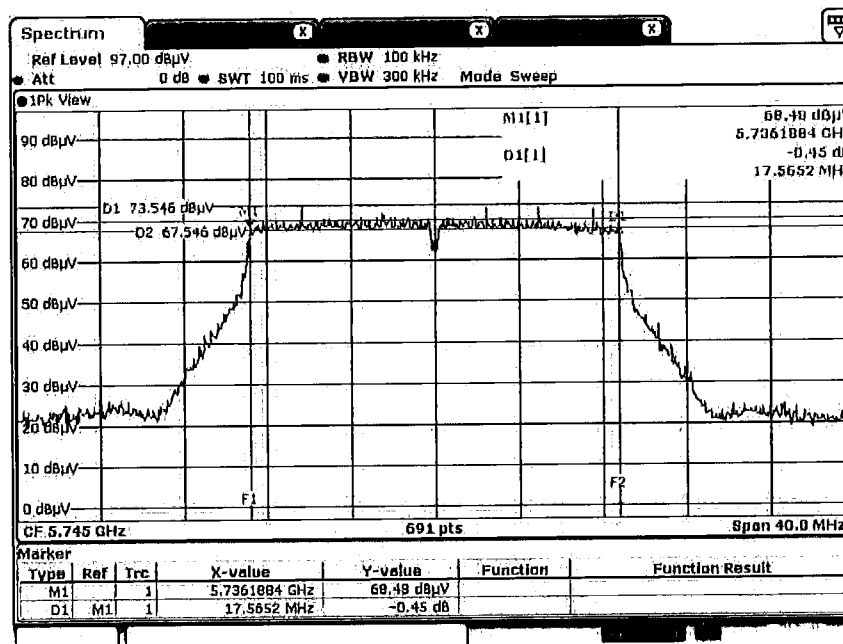


6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 1 / 5825 MHz



Date: 5.OCT.2017 16:43:14

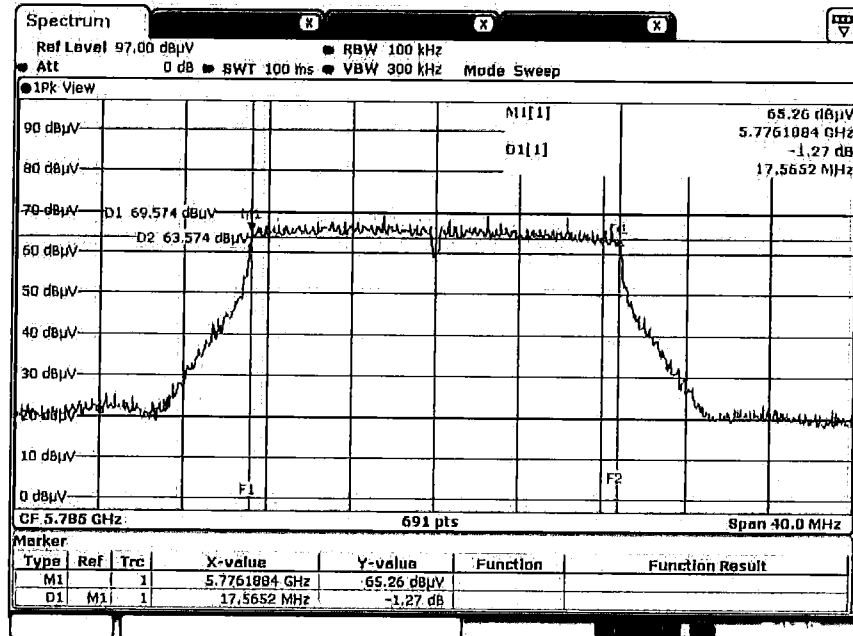
6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5745MHz



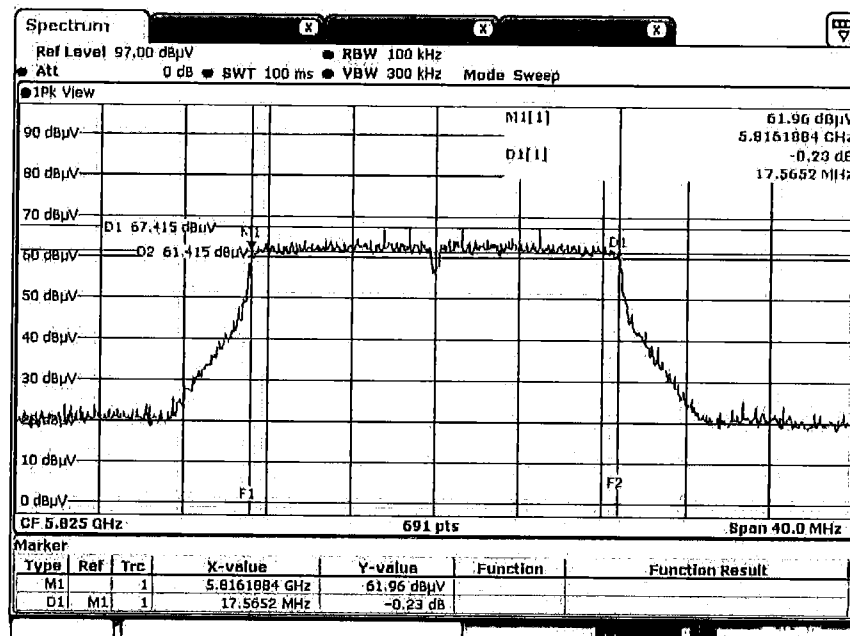
Date: 5.OCT.2017 16:32:54



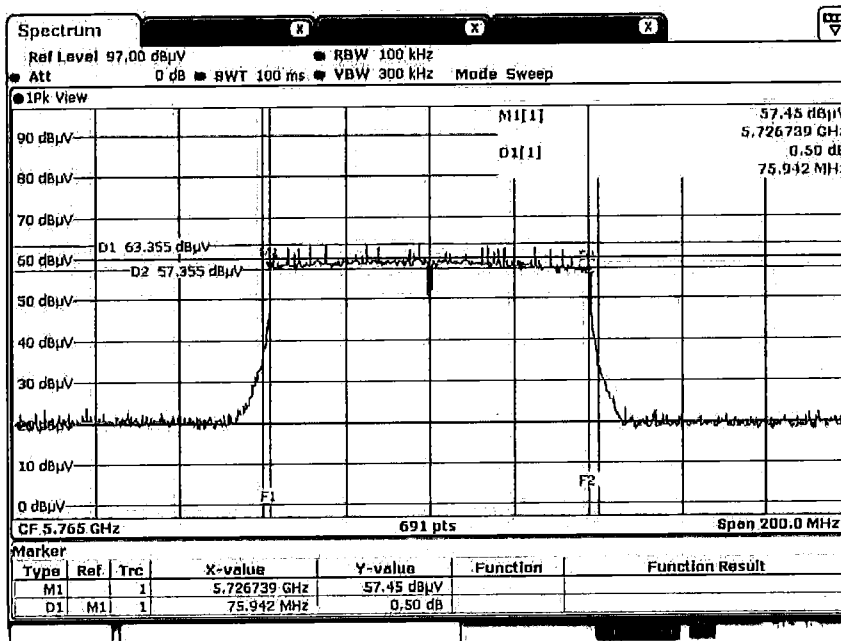
6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5785MHz



6 dB Bandwidth Plot on Configuration QPSK, 20M / Port 2 / 5825MHz

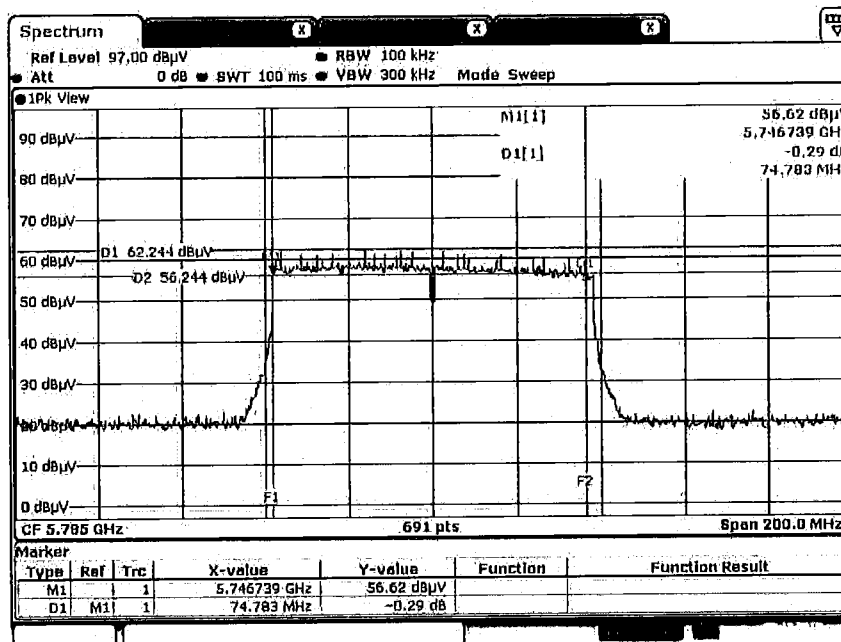


6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5765 MHz



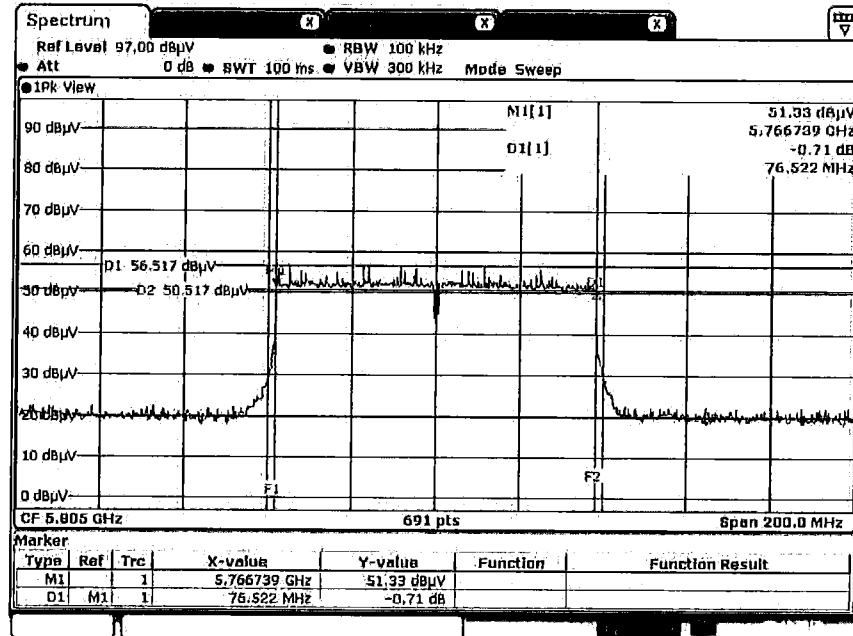
Date: 5.OCT.2017 17:09:22

6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5785 MHz



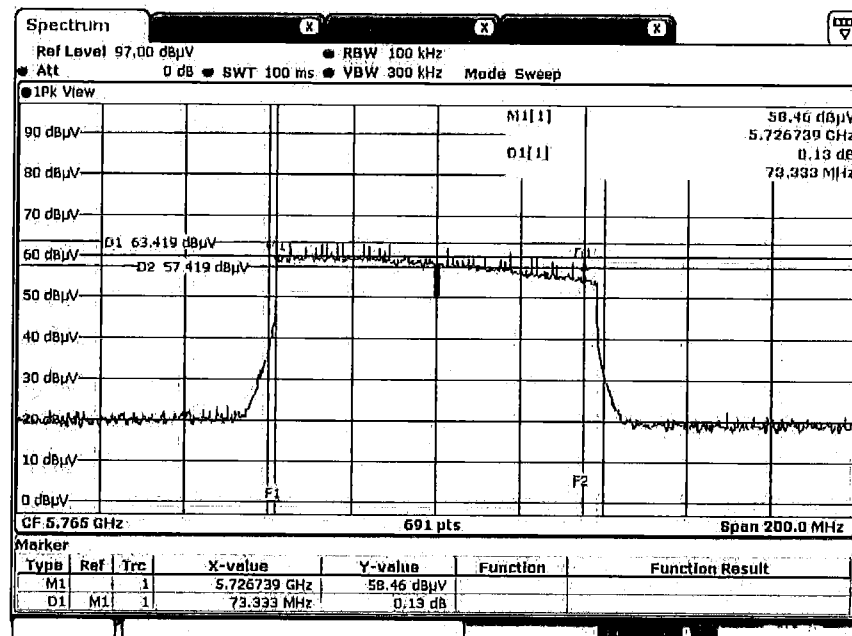
Date: 5.OCT.2017 17:10:34

6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 1 / 5805 MHz



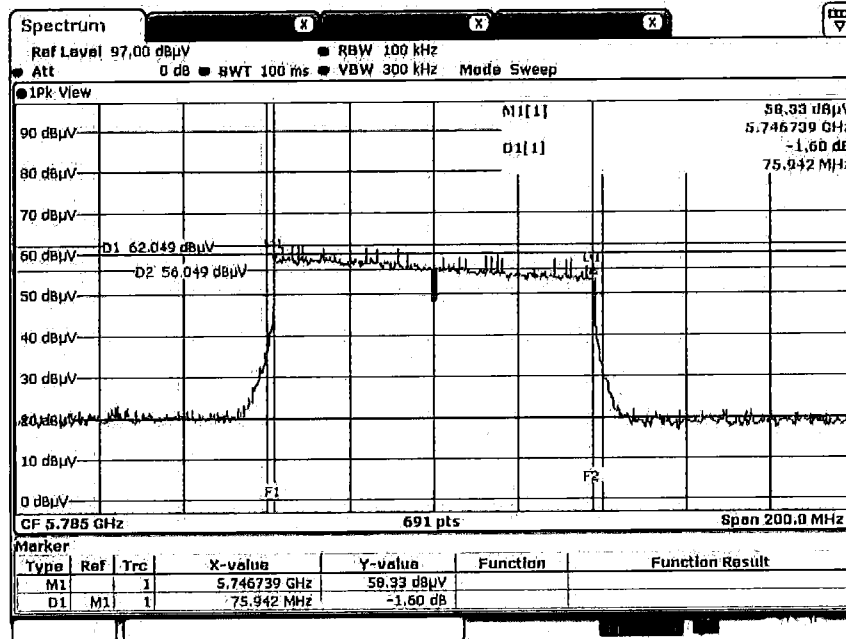
Date: 5.OCT.2017 17:11:15

6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5765MHz



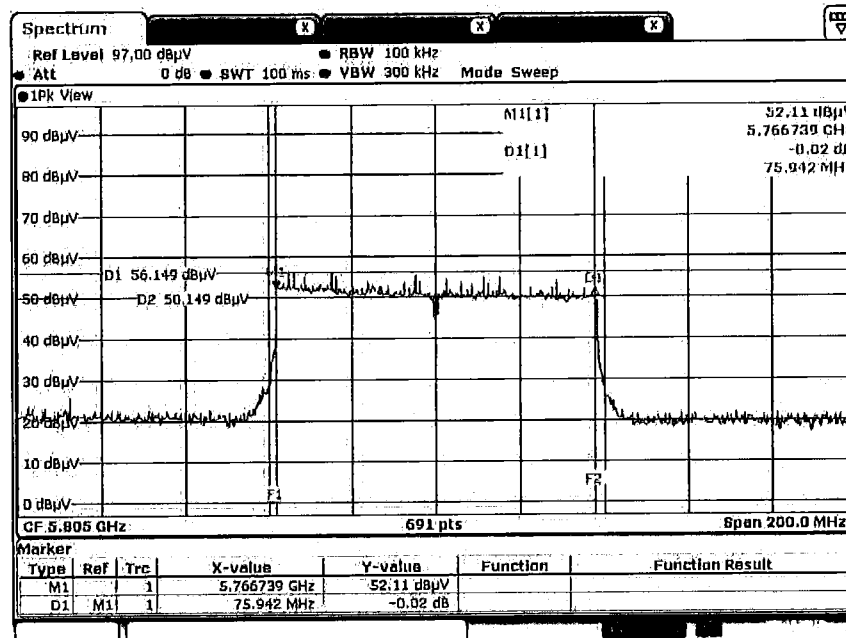
Date: 5.OCT.2017 17:36:17

6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5785MHz



Date: 5.OCT.2017 17:37:00

6 dB Bandwidth Plot on Configuration QPSK, 80M / Port 2 / 5805MHz



Date: 5.OCT.2017 17:37:31



4.4. Maximum Conducted Output Power Measurement

4.4.1. 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.