EMC TEST REPORT	
TEST REPORT NUMBER	DOJ 1517TEL037-A2
TEST REPORT DATE	03rd June 2015
TEST REPORT VERSION	1.0
MANUFACTURER	Gemtek Electronics (ChangSHU) Co.
PRODUCT NAME	5GHz ePMP Integrated Radio and 5GHz ePMP Connectorized Radio
PRODUCT MODEL NO.	C058900P072A, C058900C072A, C058900P062A, C058900C062A
PART NO.	142000001193A
REV	0B
CONDITION OF EUT WHEN RECEIVED	GOOD and in working condition
ISSUED TO	3800 Golf Road, Suite 360 Rolling Meadows, IL 60008. USA +1 888-863-5250
ISSUED BY	**TARANG Lab** Wipro Technologies, SJP2, Survey#70,77,78/8A, DoddaKanelli, Sarjapur road, Bangalore. Karnataka. India - 560 035 Tel: +91-80-30292929Fax: +91-80-30298200 Email: tarang.planet@wipro.com Web: www.wipro.com

AMENDMENT HISTORY

Amendment Number	Amendment Date	Author of Amendment	Previous Report Version	Previous Report Date
Amendment Details				

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1 TEST REPORT SUMMARY

Applicant	Cambium Networks			
Manufacturer	Gemtek Electronics (ChangSHU) Co.			
Equipment Under Test	5GHz ePMP Integrated Radio and 5GHz ePMP Connectorized Radio			
Model	C058900P072A, C058900C072A, C058900P062A, C058900C062A			
Serial number	**Type of test**	**Serial no.**	**Wi-Fi MAC**	**Ethernet MAC**
	Radiated& Conducted	AE50013163	000456F80301	000456F80300
Date of Submission	12th May 2015			
Date of Test	12th May 2015 to 25th May 2015			
Venue of Test	Tarang Lab			

Applicable Standard	**FCC Section**	**Description**	**Results**
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C; RSS-Gen, Issue 4, Nov 2014 RSS-210, Issue 8, Dec 2010	Informative	Duty Cycle	NA
	§15.403 (h) (i)	26 dB Emission Bandwidth measurement	NA
	NA	99 Percent Occupied Bandwidth	NA
	§15.407 (a) (2)	Maximum Conducted Output Power	PASS
	§15.407 (a) (2)	Peak Power Spectral Density	PASS
	§15.407 (b) (3)	Unwanted emission levels-Conducted Band edge	PASS

5GHz ePMP Integrated Radio and 5GHz ePMP Connectorized Radio was tested by Tarang Lab as per the standards that are listed in the table above. Based on the observations during the test and interpretations by Tarang lab, results have been indicated. The test results produced in this report shall apply only to the above sample that have been tested under the specific conditions and modes of testing as described in the report. Other similar equipment may not necessarily reproduce same result due to production tolerances and measurement uncertainties. Any measurement uncertainties listed in this report are for information purpose only.

The results shall stand invalid, in case there are any modifications / additions / removals to the hardware or software or end use atmosphere to the product tested. This report shall not be modified or in any way revised unless it is expressly permitted and endorsed by Tarang lab, through a duly authorized representative. Particulars on Manufacturer / Supplier / Product configuration / performance criteria, given in this report, are based on the information given by the customer, along with test request. Tarang does not assume any responsibility for the correctness of such information for the above mentioned equipment under test.

Customer acknowledges that this is a test report and not a certificate to gain market access for the product. To gain market access, Customer needs appropriate clearance from the Government or authorized agency for the target market. For markets that allow self-declaration, customer needs to follow the procedure defined by the target market.

Prepared by	Reviewed by	Approved by
		
Subhendu	Harsha	Rajneesh R
Test Engineer	Test Engineer	Functional Head

2 GENERAL INFORMATION

2.1 TEST DETAILS

The tests documented in this report are performed according to the following standards:

- ANSI C63.10-2013
- 47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C
- RSS-Gen, Issue 4, Nov 2014
- RSS-210, Issue 8, Dec 2010

2.2 TEST FACILITY DETAILS

All the tests were carried out at Tarang –Product Qualification and Compliance Planet located at Wipro Limited, SJP2, DoddaKanelli, Sarjapur road, Bangalore, Karnataka, India. 560035.

Following are the accreditation and listing details for Tarang.

Accreditation / Listing body	**Registration / Company / Certificate Number**
ISO 17025 Accreditation	Certificate Number :T-1533 and T-1534(NABL) http://www.nabl-india.org
FCC (Federal Communications Commission)	Registration Number: 799247 http://www.fcc.gov/
IC (Industry Canada)	Company Number: 9023A http://www.ic.gc.ca
TEC Approval	Certificate Number: TEC/MRA/CAB/IND-D/3 CAB Identification: IND003
DGAQA Approval	1415/F-15/DGAQA/Aircraft
CEMILAC approval	Certificate Number: F-07-22 Reference Number: CEMILAC/6042/TH-13/TC & S

3 INSTRUMENTATION AND CALIBRATION

3.1 TEST AND MEASURING EQUIPMENT

The list of following measuring equipment used for this testing conforms to the applicable standards. Performance of all test and measuring equipment including any accessories are checked periodically to ensure accuracy.

3.2 EQUIPMENTS USED

Name of Equipment	Manufacturer	Model No	Serial No	Calibration Due
EMI Test Receiver	R&S	ESIB40	100306	07th Oct 2015
Spectrum Analyzer	Agilent Technologies	E4407B	MY45112948	02nd Apr 2016
X-Series USB Peak & Average Power Sensor	Keysight Technologies	U2021XA	MY55050002	08th Feb 2016
X-Series USB Peak & Average Power Sensor	Keysight Technologies	U2021XA	MY55050001	08th Feb 2016
Tunable Band reject/Notch filter	Wainwright Instruments GmbH	WTRCJV8-5150-5850-40-160-50SSK	01	NA

4 PRODUCT INFORMATION

4.1 DESCRIPTION OF THE PRODUCT

EUT is a Point to point & Point to Multipoint Fixed outdoor Transceiver.

Product Category / Type of Equipment	TEL (Telecom)
EUT Operating AC Voltage	120V AC
Max EUT AC Operating Current	0.5A
Max EUT AC Power Rating	60W
EUT Operating DC Voltage	30V DC
Max EUT DC Operating Current	0.5A
Max EUT DC Power Rating	12W

4.2 SOFTWARE AND FIRMWARE DETAILS

The 5GHz ePMP Integrated Radio and 5GHz ePMP Connectorized Radio was configured with test software and configured to have the following settings during the course of testing:

- 40MHz modulation bandwidth for low Channel (CH 0)
  - Rate - HT40,
  - 54Mbps OFDM, MCS15:270Mbps
  - Interframe spacing is tx100
  - Tx gain is 86 for 2.15dBi antenna configuration
  - Tx gain is 55for 17dBi antenna configuration
  - Tx gain is 42 for 24dBi antenna configuration

- 40MHz modulation bandwidth for low Channel (CH 1)
  - Rate - HT40,
  - 54Mbps OFDM, MCS15:270Mbps
  - Interframe spacing is tx100
  - Tx gain is 90 for 2.15dBi antenna configuration
  - Tx gain is 63 for 17dBi antenna configuration
  - Tx gain is 46 for 24dBi antenna configuration

- 40MHz modulation bandwidth for Mid Channel (CH 0)
  - Rate - HT40,
  - 54Mbps OFDM, MCS15:270Mbps
  - Interframe spacing is tx100
  - Tx gain is 103 for 2.15dBi antenna configuration
  - Tx gain is 82 for 17dBi antenna configuration
  - Tx gain is 66 for 24dBi antenna configuration

- 40MHz modulation bandwidth for Mid Channel (CH 1)
    - Rate - HT40,
    - 54Mbps OFDM, MCS15:270Mbps
    - Interframe spacing is tx100
    - Tx gain is 108 for 2.15dBi antenna configuration
    - Tx gain is 88 for 17dBi antenna configuration
    - Tx gain is 68 for 24dBi antenna configuration

- 40MHz modulation bandwidth for High Channel (CH 0)
    - Rate - HT40,
    - 54Mbps OFDM, MCS15:270Mbps
    - Interframe spacing is tx100
    - Tx gain is 79 for 2.15dBi antenna configuration
    - Tx gain is 48 for 17dBi antenna configuration
    - Tx gain is 33 for 24dBi antenna configuration

- 40MHz modulation bandwidth for High Channel (CH 1)
    - Rate - HT40,
    - 54Mbps OFDM, MCS15:270Mbps
    - Interframe spacing is tx100
    - Tx gain is 80 for 2.15dBi antenna configuration
    - Tx gain is 50 for 17dBi antenna configuration
    - Tx gain is 36 for 24dBi antenna configuration

- 5MHz modulation bandwidth for low Channel (CH 0)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 94 for 2.15dBi antenna configuration
    - Tx gain is 73 for 17dBi antenna configuration
    - Tx gain is 55 for 24dBi antenna configuration

- 5MHz modulation bandwidth for low Channel (CH 1)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 98 for 2.15dBi antenna configuration
    - Tx gain is 75 for 17dBi antenna configuration
    - Tx gain is 60 for 24dBi antenna configuration

- 5MHz modulation bandwidth for Mid Channel (CH 0)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 108 for 2.15dBi antenna configuration
    - Tx gain is 80 for 17dBi antenna configuration
    - Tx gain is 66 for 24dBi antenna configuration

- 5MHz modulation bandwidth for Mid Channel (CH 1)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 110 for 2.15dBi antenna configuration
    - Tx gain is 80 for 17dBi antenna configuration
    - Tx gain is 66 for 24dBi antenna configuration

- 5MHz modulation bandwidth for High Channel (CH 0)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 53 for 2.15dBi antenna configuration
    - Tx gain is 30 for 17dBi antenna configuration
    - Tx gain is 17 for 24dBi antenna configuration

- 5MHz modulation bandwidth for High Channel (CH 1)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 62 for 2.15dBi antenna configuration
    - Tx gain is 34 for 17dBi antenna configuration
    - Tx gain is 19 for 24dBi antenna configuration

The unit was continuously monitored for transmission using an auxiliary antenna during the radiated tests

4.3 LIST OF PRODUCT CABLES

Cable No.	Cable Name	Cable Length	Power / Interconnection cable	Shielded / Unshielded
Cable - 1	Cat. 5E_Ethernet cable	0.5 meter	Interconnection	Unshielded
Cable - 2	Cat. 5E_Ethernet cable	2 meter	Interconnection	Unshielded
Cable - 3	RF cable (50 Ω)	0.125 meter	Interconnection	Shielded
Cable - 4	Power Cord	0.8 meter	Power	Unshielded

5 TEST DETAILS

5.1 PRODUCT AND TEST SETUP

5.1.1 PRODUCT CONFIGURATION

The EUT was powered through AC power supply (120VAC / 60Hz). The EUT was connected to Ethernet switch by using RJ45 cable. Figure 1 shows the product configuration during the tests. Following power supply module was used during the test to power ON the EUT.

Name of the Equipment	Manufacturer	Model Number	Serial Number
Switching Power Supply Gigabit Compatible	PHIHONG	PSA15M-300 (AP)	N000900L001A

5.1.2 TEST SETUP DETAILS

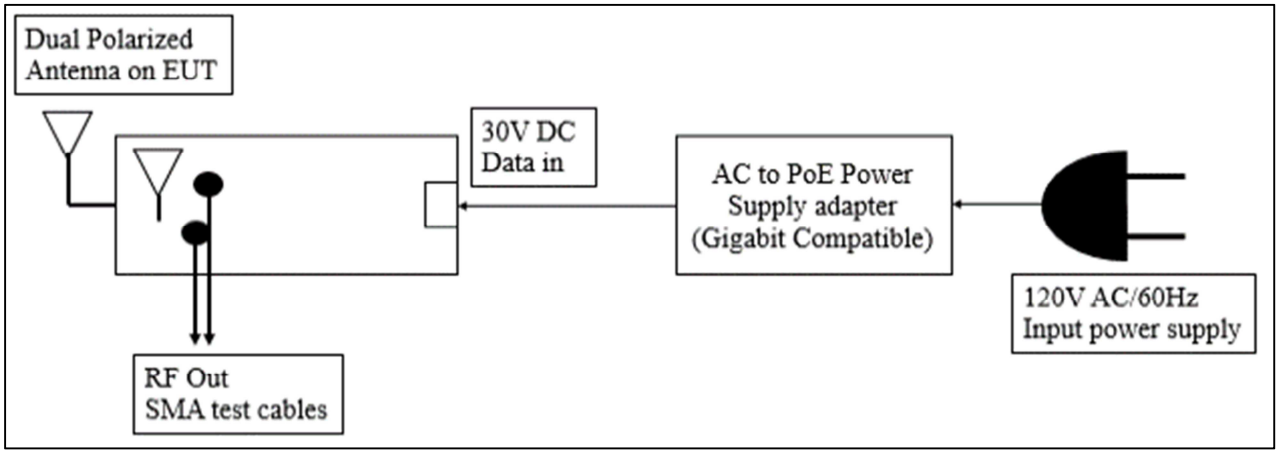


Figure 1: Block Diagram of the EUT test setup during the tests

5.1.3 ACCESSORIES

Name of the Equipment	Manufacturer	Model Number	Serial Number
Laptop	Wipro Technologies Ltd	WLG7E1100	1221

5.2 APPLICABLE TESTS

Applicable Standard	Description	Test level / Test Voltage	Applicability
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C; RSS-Gen, Issue 4, Nov 2014 RSS-210 Issue 8, Dec 2010	Duty Cycle	NA	Antenna port
	26 dB Emission Bandwidth measurement	NA	Antenna port
	99 Percent Occupied Bandwidth	NA	Antenna port
	Maximum Conducted Output Power	Refer Section 5.3.3.2	Antenna port
	Peak Power Spectral Density	Refer Section 5.3.4.2	Antenna port
	Unwanted Emissions levels-Conducted Band edge	EIRP of < -27dBm/MHz	Antenna port

5.3 TEST RESULT

5.3.1 DUTY CYCLE

5.3.1.1 TEST SPECIFICATION

Test Standard	47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014
Test Procedure	ANSI C63.10-2013
Modulation Bandwidth	**40MHz and 5MHz**
Resolution Bandwidth	1 MHz
Video Bandwidth	3 MHz
Sweep Time	10 second
Span	0 Hz
Duty Cycle	100%
Attenuation	Auto
Test Mode	Conducted
Detector	Peak
Input Voltage	120V AC
Input Frequency	60 Hz
Temperature	22.0°C
Humidity	56.0%
Tested By	Subhendu
Test Date	15th May 2015 to25th May 2015

5.3.1.2 LIMITS

Standard	Reference section	Frequency range	Limit
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014	Informative	5150MHz to 5250MHz	NA

5.3.1.3 TEST SETUP

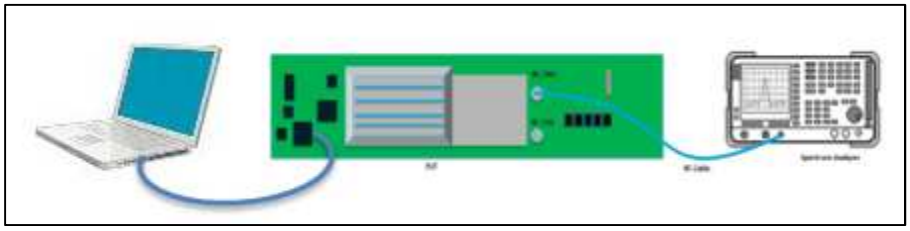


Figure 2: Typical test setup for Conducted RF Test setup

5.3.1.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per Section C of **"789033 D02 General UNII Test Procedures New Rules v01".**The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. Captured the data from spectrum analyzer and compared with the limits specified in the standard.

5.3.1.5 RESULT (SUPPORTING GRAPHS / DATA)

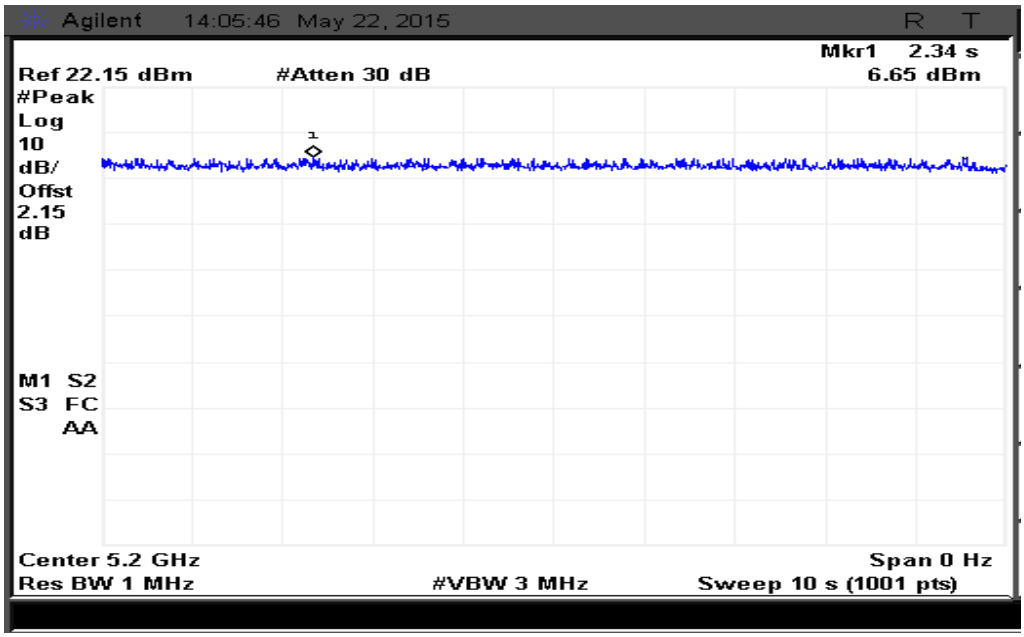


Figure 3: Duty Cycle for 40MHz Bandwidth

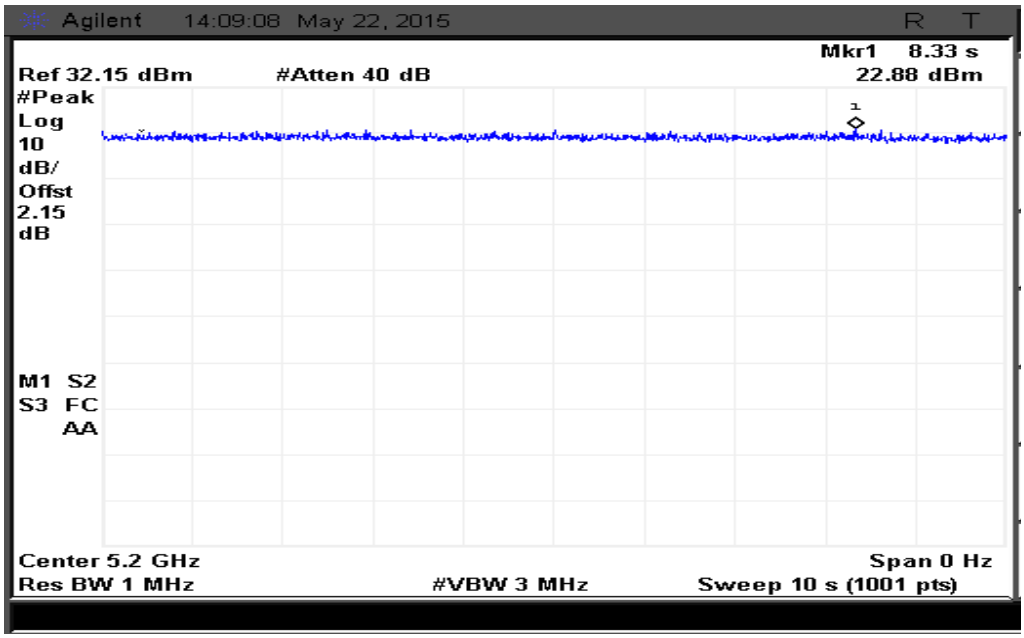


Figure 4: Duty Cycle for 5MHz Bandwidth

5.3.2 26 dB EMISSION BANDWIDTH MEASUREMENT

5.3.2.1 TEST SPECIFICATION

Test Standard	47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014	
Test Procedure	ANSI C63.10-2013	
Modulation Bandwidth	**40MHz**	**5MHz**
Resolution Bandwidth	300 kHz	30 kHz
Video Bandwidth	1MHz	100 kHz
Sweep Time	100ms	
Attenuation	Auto	
Test Mode	Conducted	
Detector	Peak	
Input Voltage	120V AC	
Input Frequency	60 Hz	
Temperature	22.0°C	
Humidity	56.0%	
Tested By	Subhendu	
Test Date	12th May 2015 to 25th May 2015	

5.3.2.2 LIMITS

Standard	Reference section	Frequency range	Limit
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014	15.403 (h) (i)	5150MHz to 5250MHz	NA

5.3.2.3 TEST SETUP

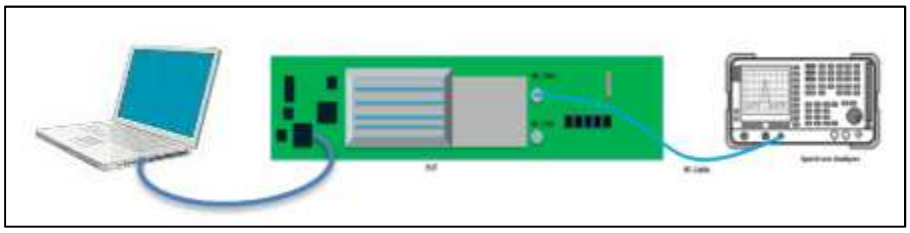


Figure 5: Typical test setup for Conducted RF Test setup

5.3.2.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per Section C of **"789033 D02 General UNII Test Procedures New Rules v01".**The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. Captured the data from spectrum analyzer and compared with the limits specified in the standard.

5.3.2.5 RESULT (SUPPORTING GRAPHS / DATA) FOR BASIC CONDITION

5.3.2.5.1 40MHz MODULATION BW-LOW CHANNEL_5180MHz

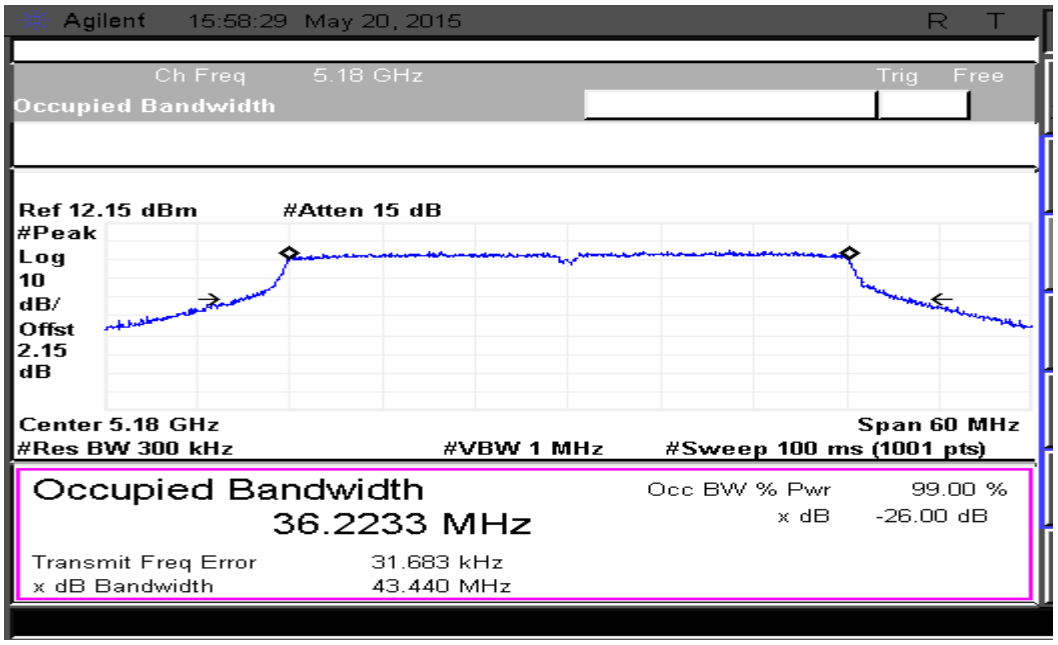


Figure 6: 26dB Bandwidth measured at ch0

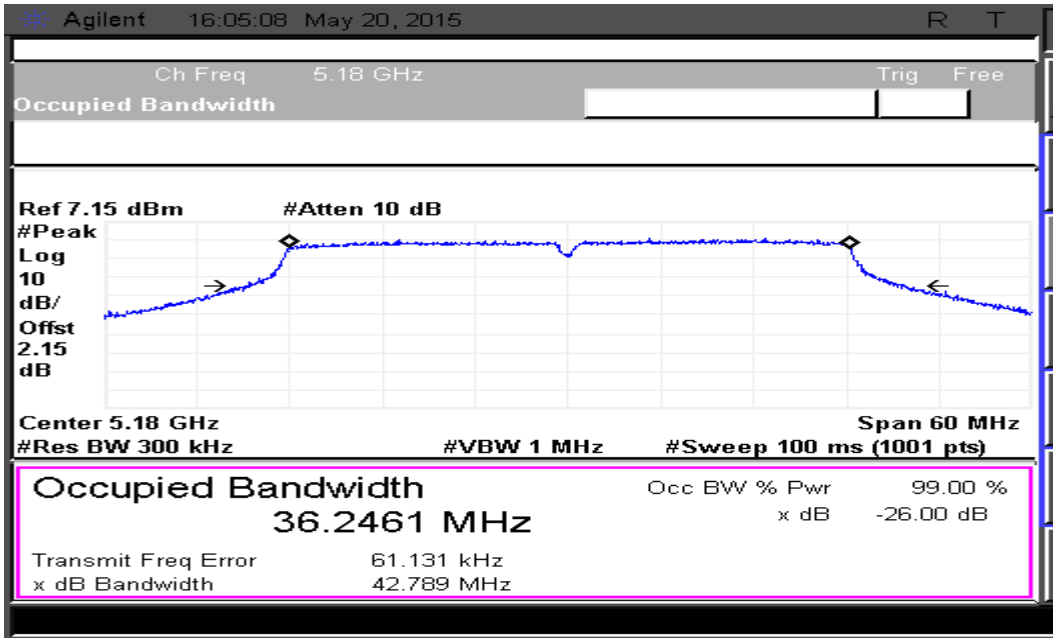


Figure 7: 26dB Bandwidth measured at ch1

5.3.2.5.2 40MHz Modulation BW -Mid channel_5200MHz

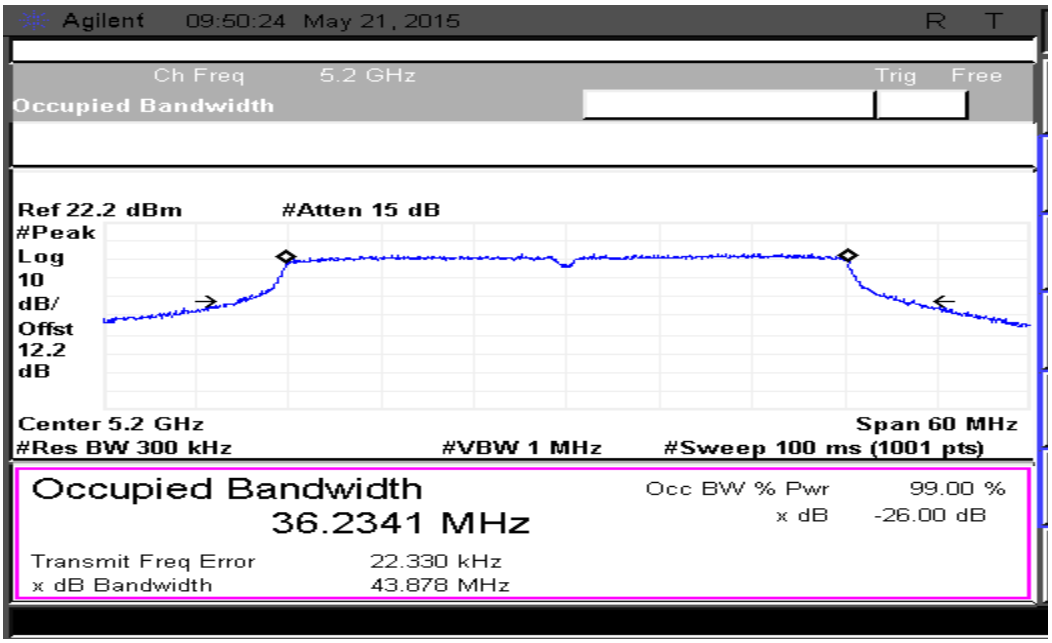


Figure 8: 26dB Bandwidth measured at ch0

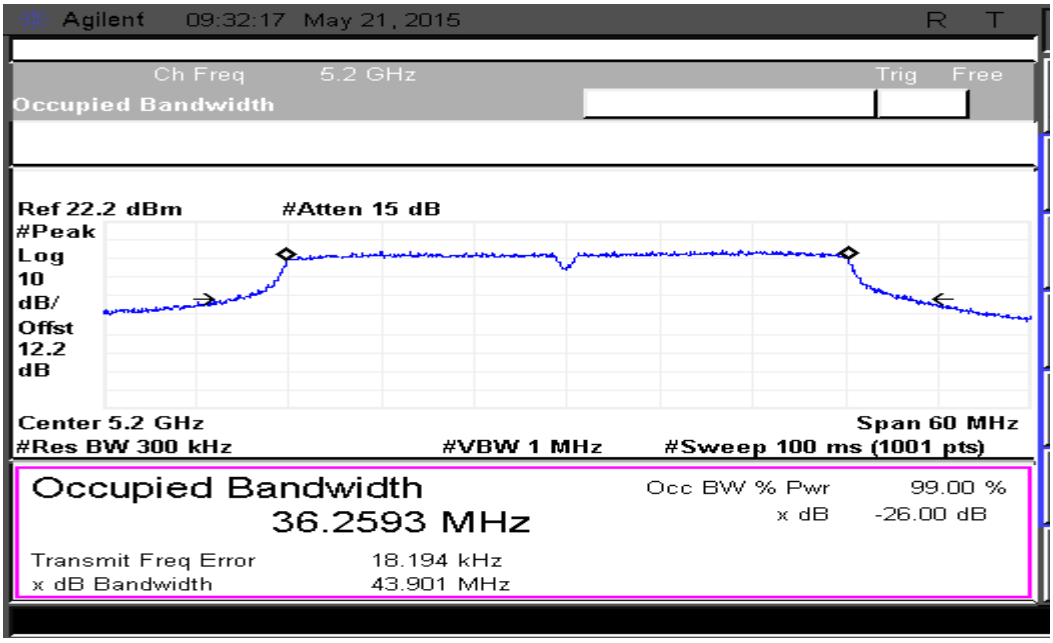


Figure 9: 26dB Bandwidth measured at ch1

5.3.2.5.3 40MHz Modulation BW -High channel_5220MHz

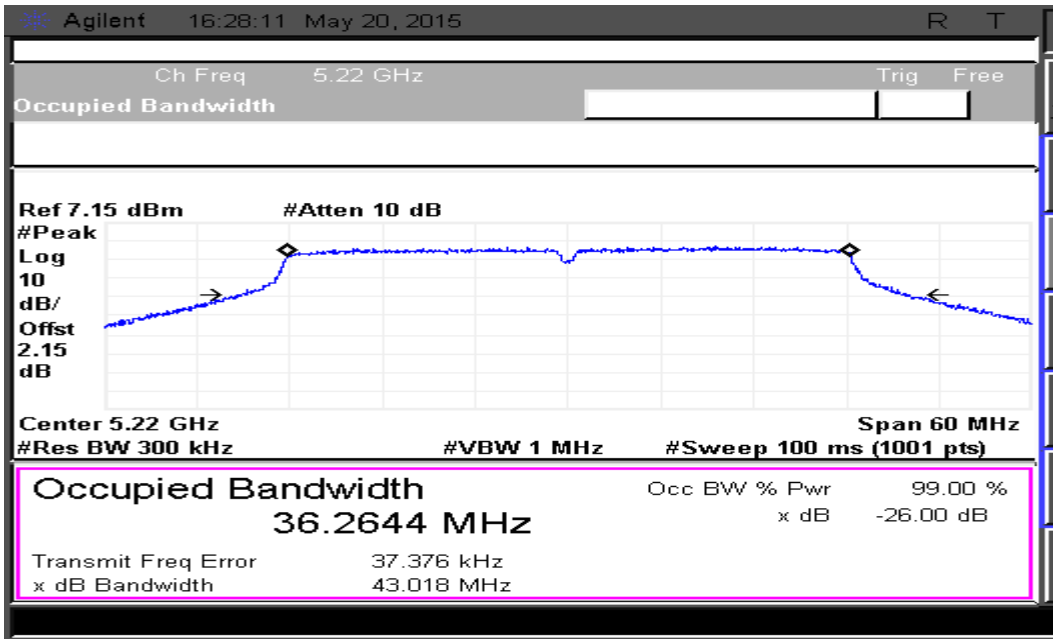


Figure 10: 26dB Bandwidth measured at ch0

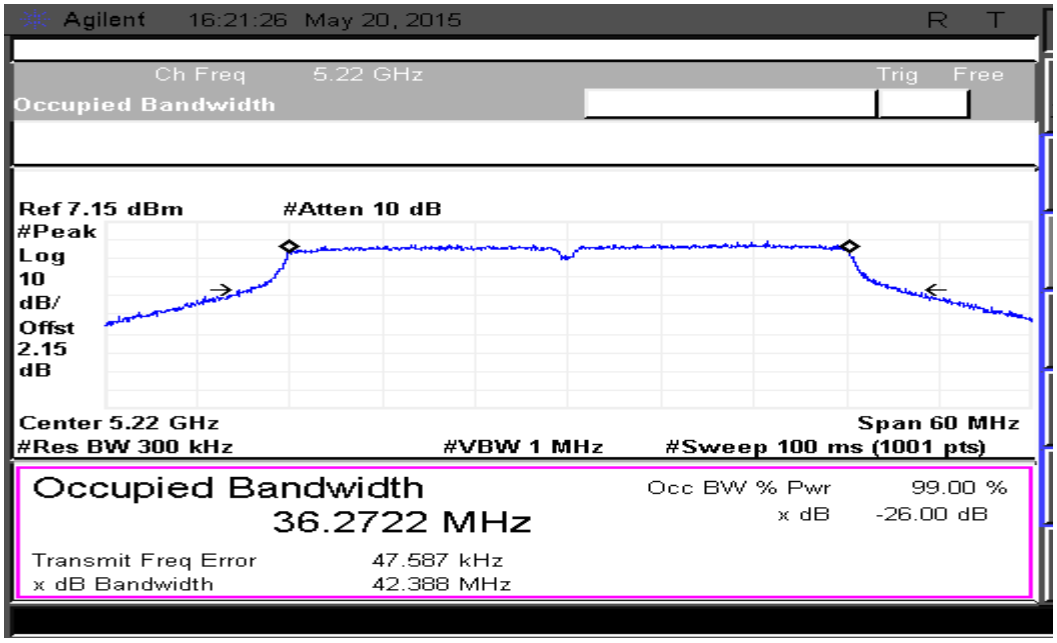


Figure 11: 26dB Bandwidth measured at ch1

5.3.2.5.4 5 MHz MODULATION BW-LOW CHANNEL_5155MHz

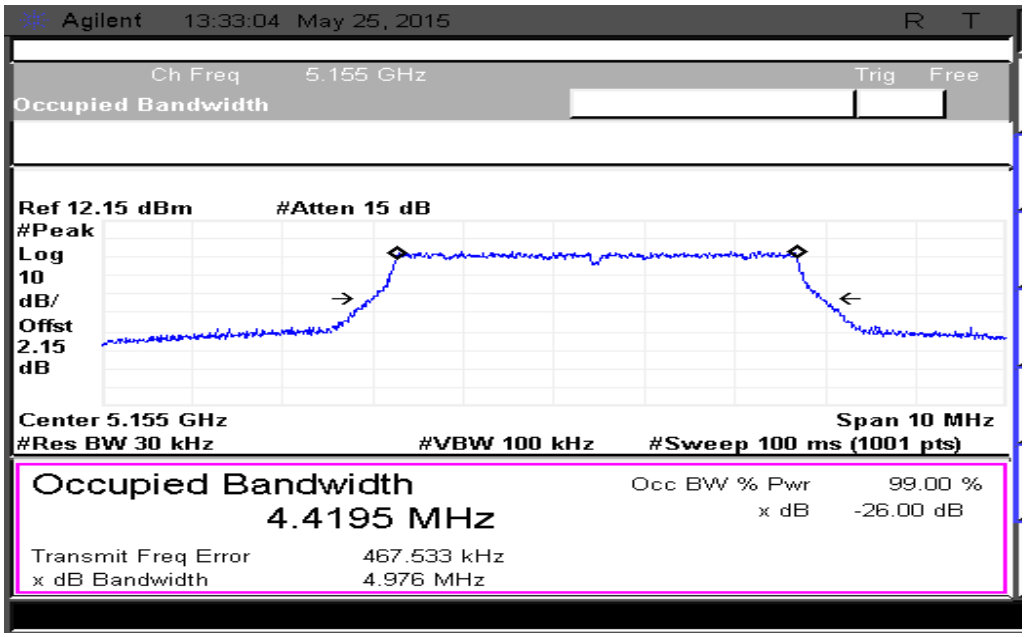


Figure 12: 26dB Bandwidth measured at ch0

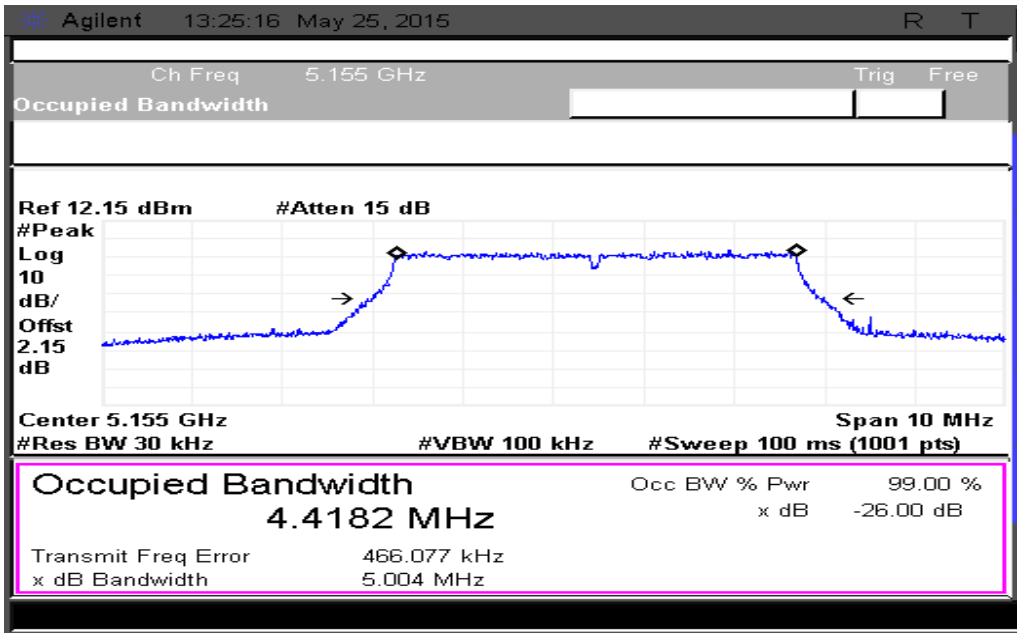


Figure 13: 26dB Bandwidth measured at ch1

5.3.2.5.5 5 MHz MODULATION BW-MID CHANNEL_5200MHz

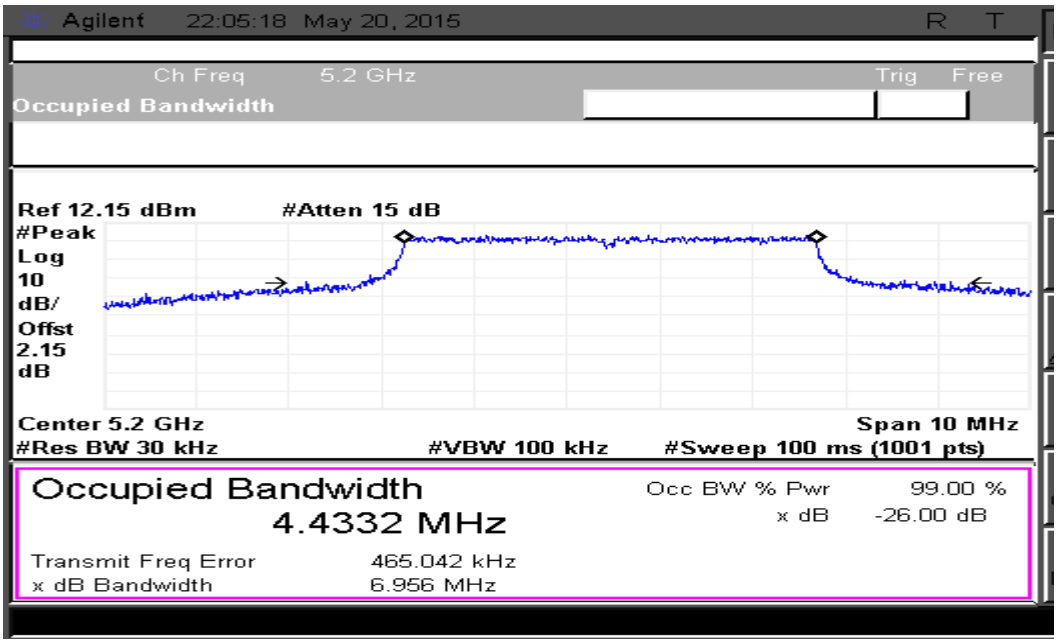


Figure 14: 26dB Bandwidth measured at ch0

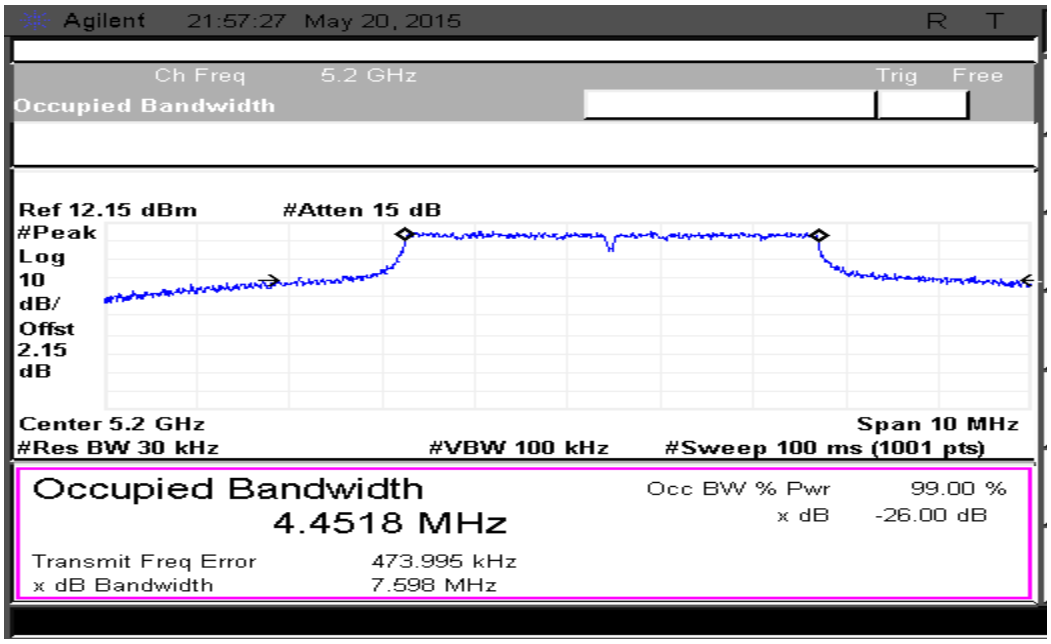


Figure 15: 26dB Bandwidth measured at ch1

5.3.2.5.6 5 MHz MODULATION BW-HIGH CHANNEL_5245MHz

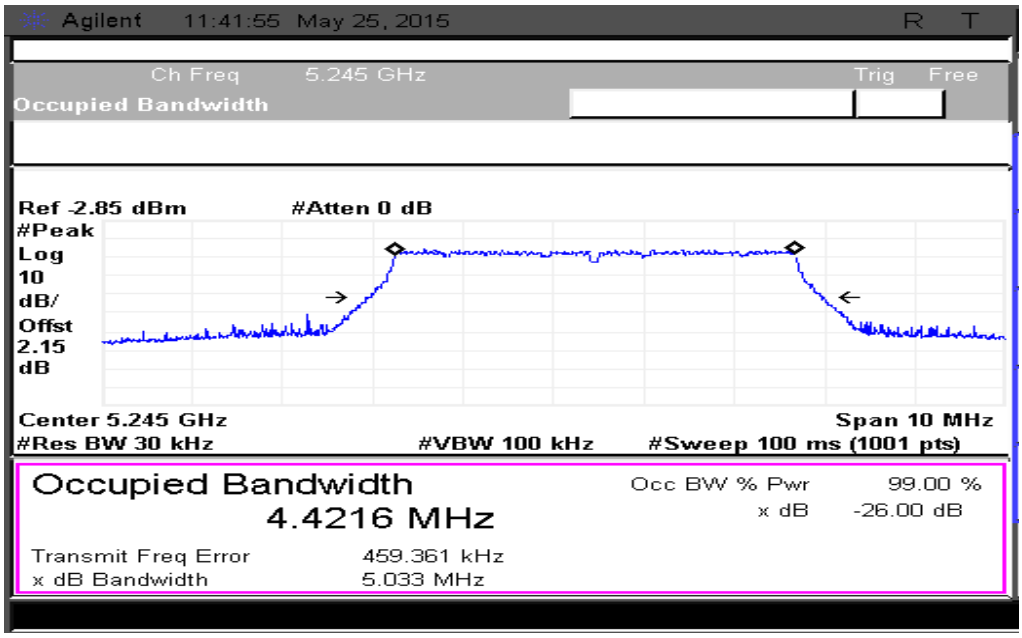


Figure 16: 26dB Bandwidth measured at ch0

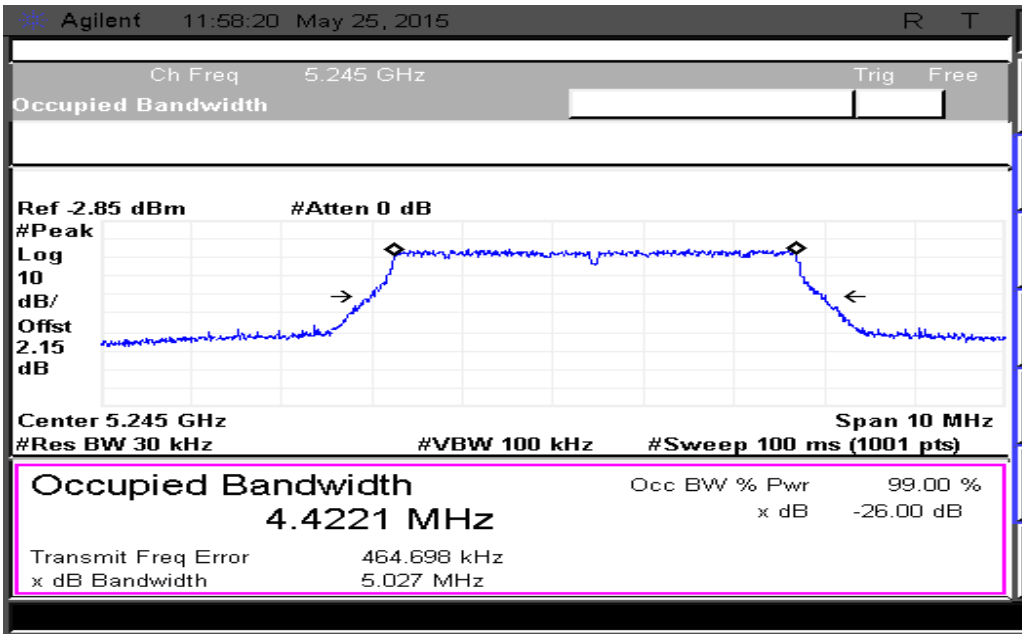


Figure 17: 26dB Bandwidth measured at ch1

5.3.2.6 RESULT (SUPPORTING GRAPHS / DATA) FOR 17DBI ANTENNA CONDITION

5.3.2.6.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

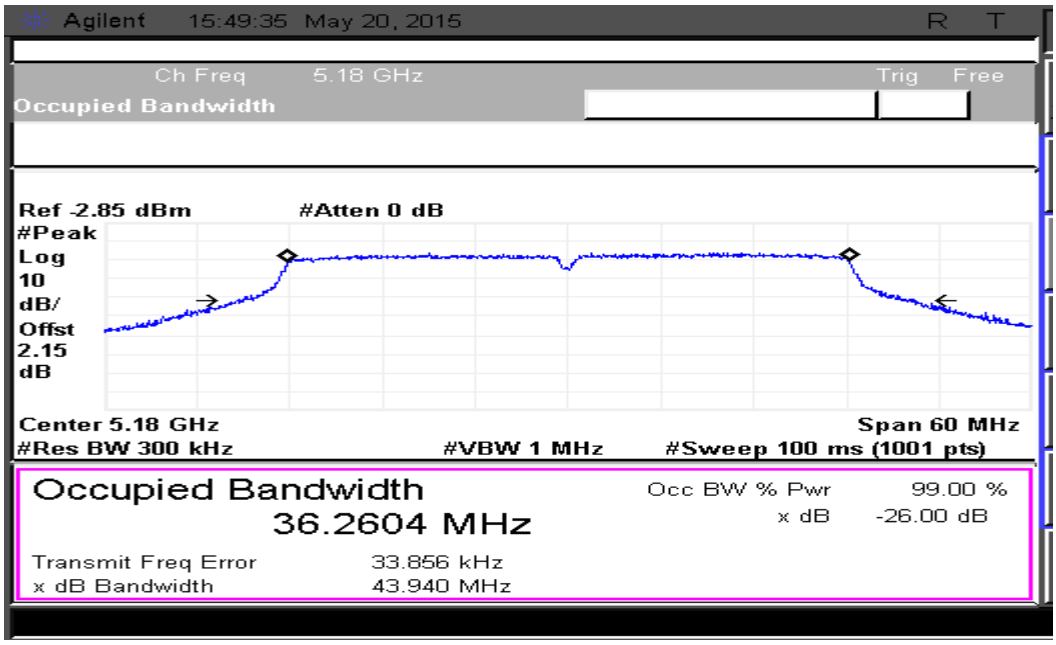


Figure 18: 26dB Bandwidth measured at ch0

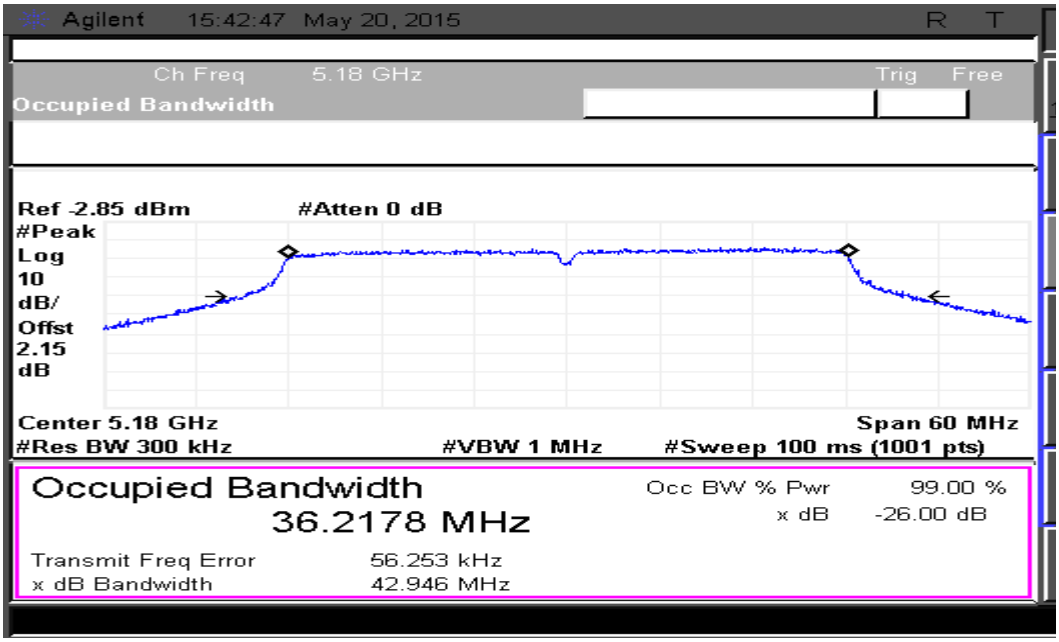


Figure 19: 26dB Bandwidth measured at ch1

5.3.2.6.2 40MHz Modulation BW -Mid channel_5200 MHz

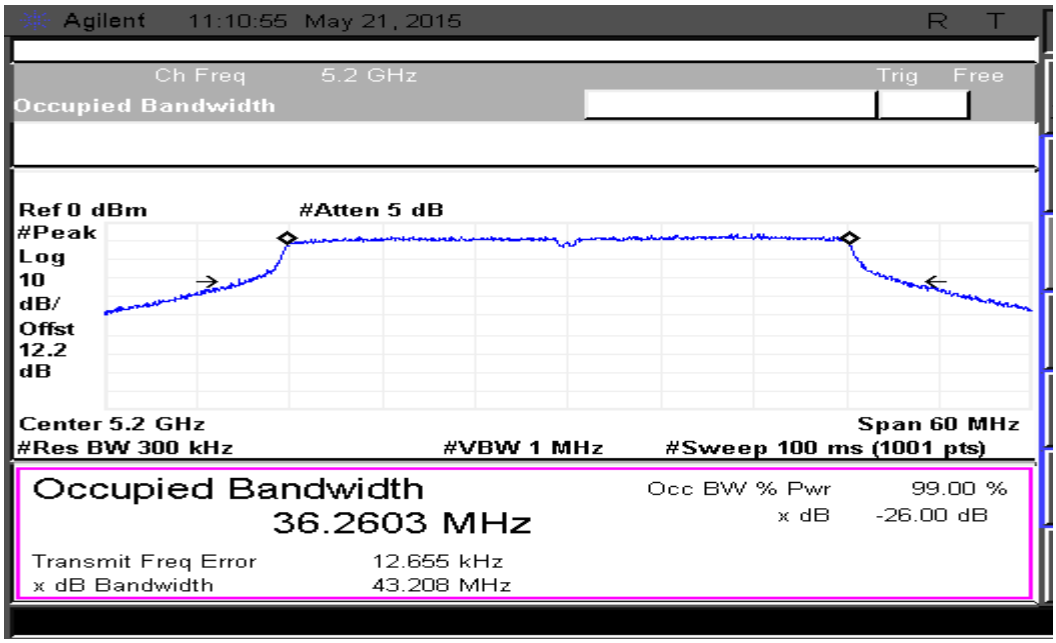


Figure 20: 26dB Bandwidth measured at ch0

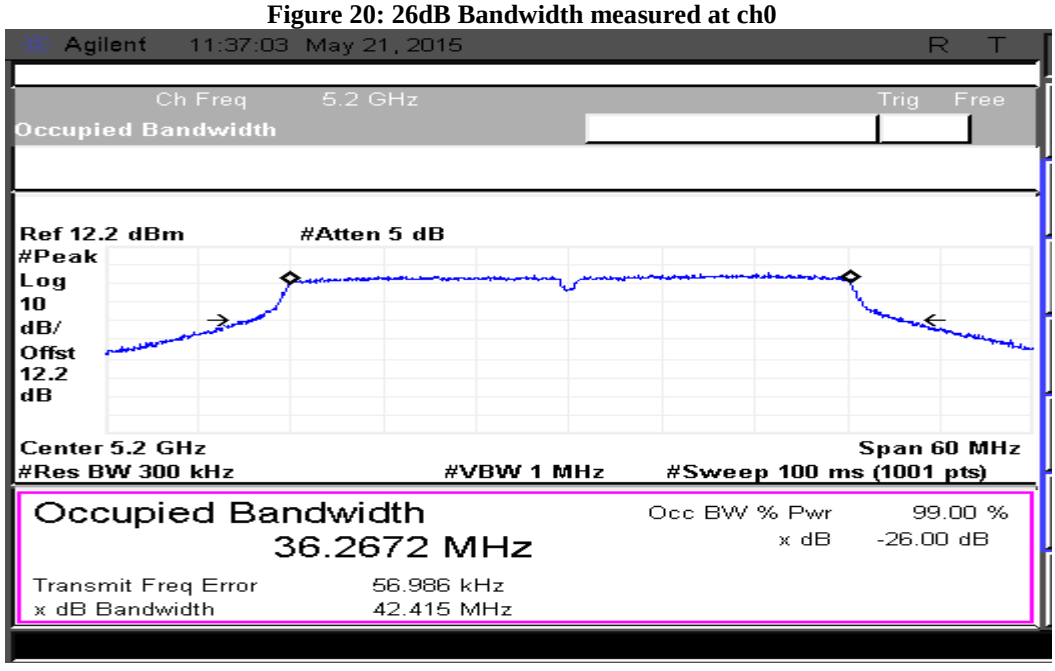


Figure 21: 26dB Bandwidth measured at ch1

5.3.2.6.3 40MHz Modulation BW -High channel_5220MHz

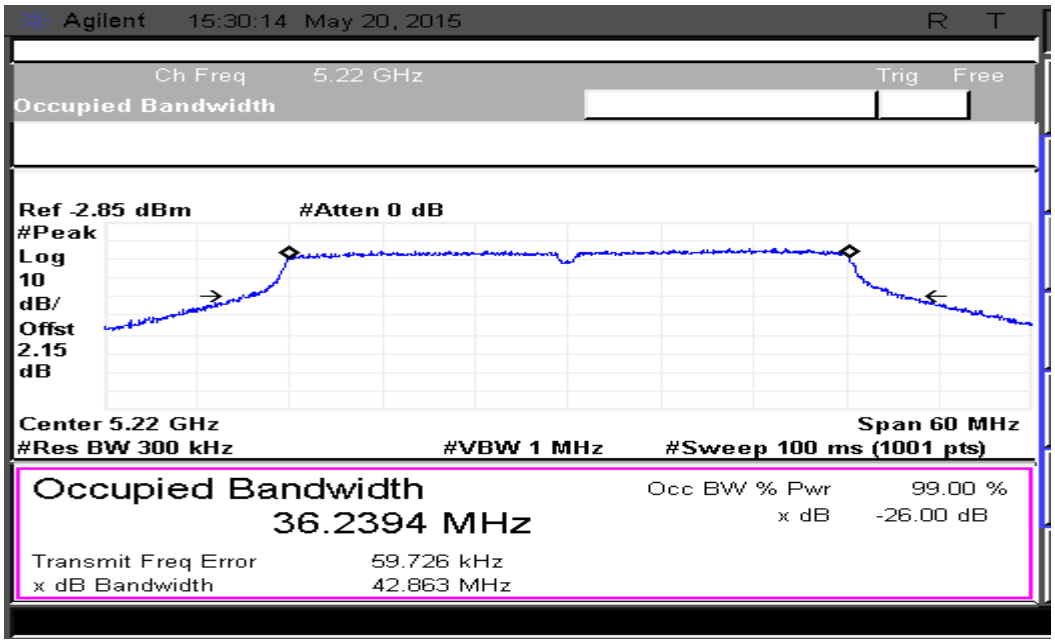


Figure 22: 26dB Bandwidth measured at ch0

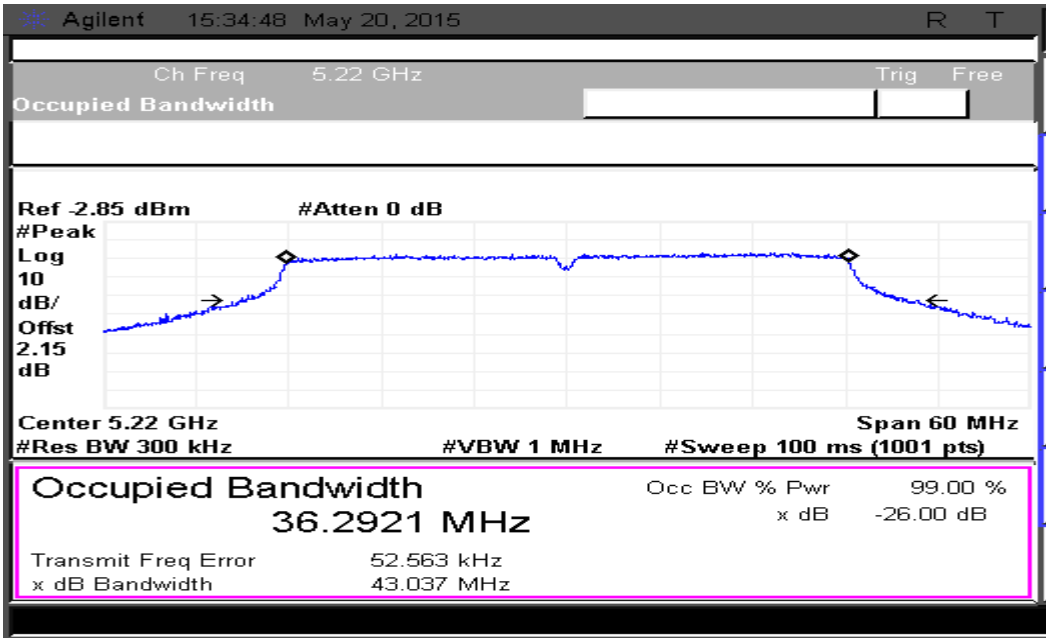


Figure 23: 26dB Bandwidth measured at ch1

5.3.2.6.4 5MHz Modulation BW-Low channel_5155MHz

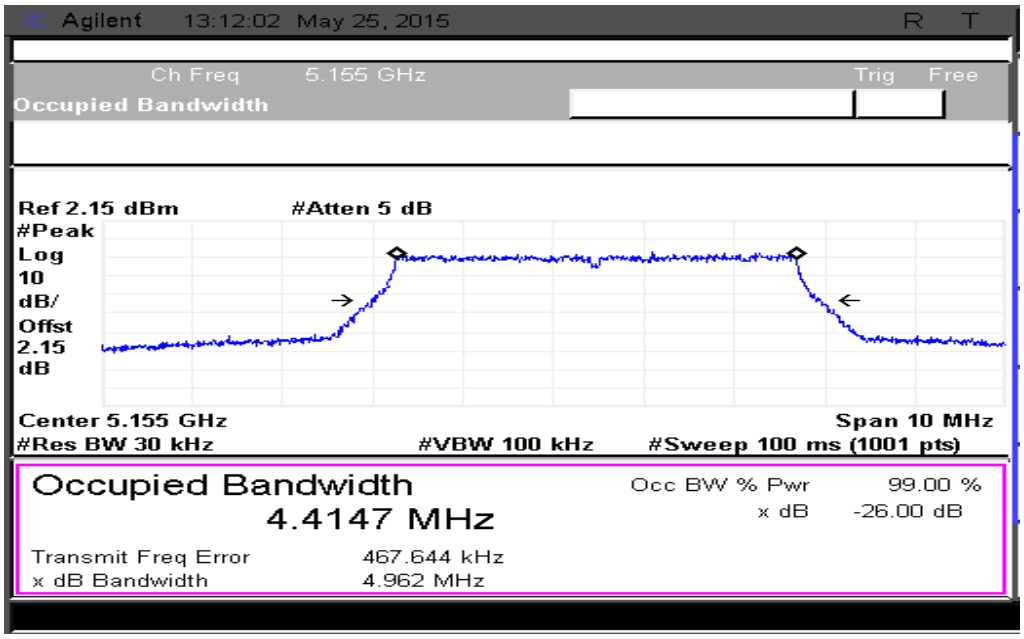


Figure 24: 26dB Bandwidth measured at ch0

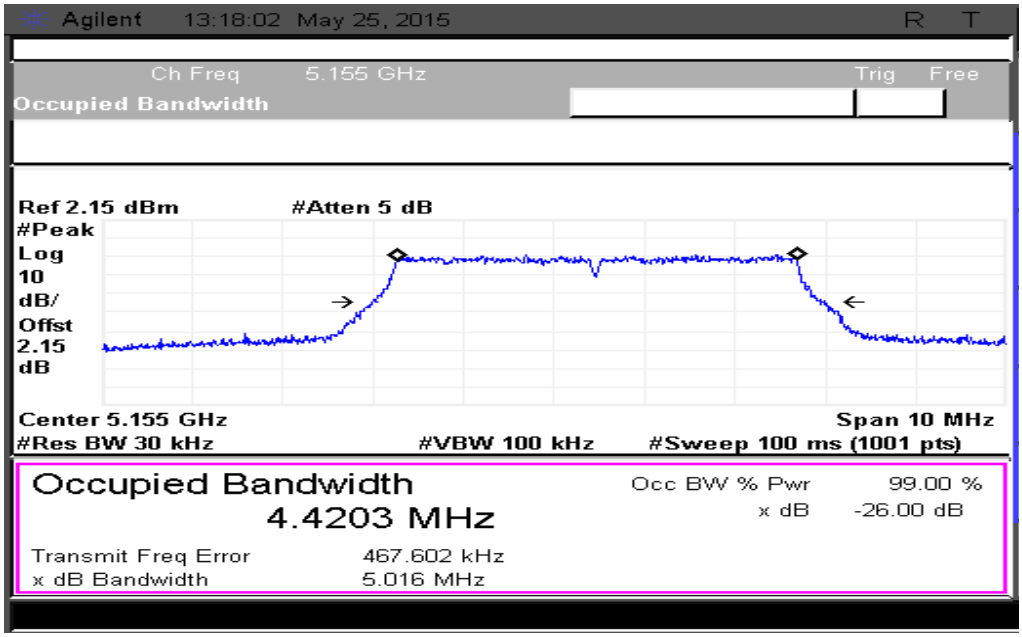


Figure 25: 26dB Bandwidth measured at ch1

5.3.2.6.5 5MHz Modulation BW-Mid channel_5200 MHz

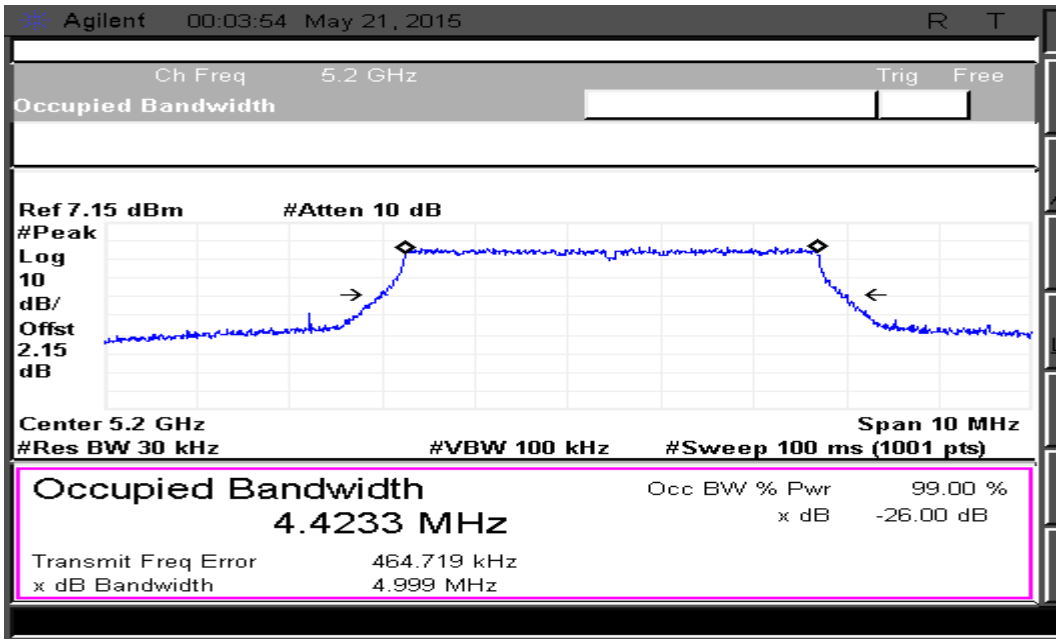


Figure 26: 26dB Bandwidth measured at ch0

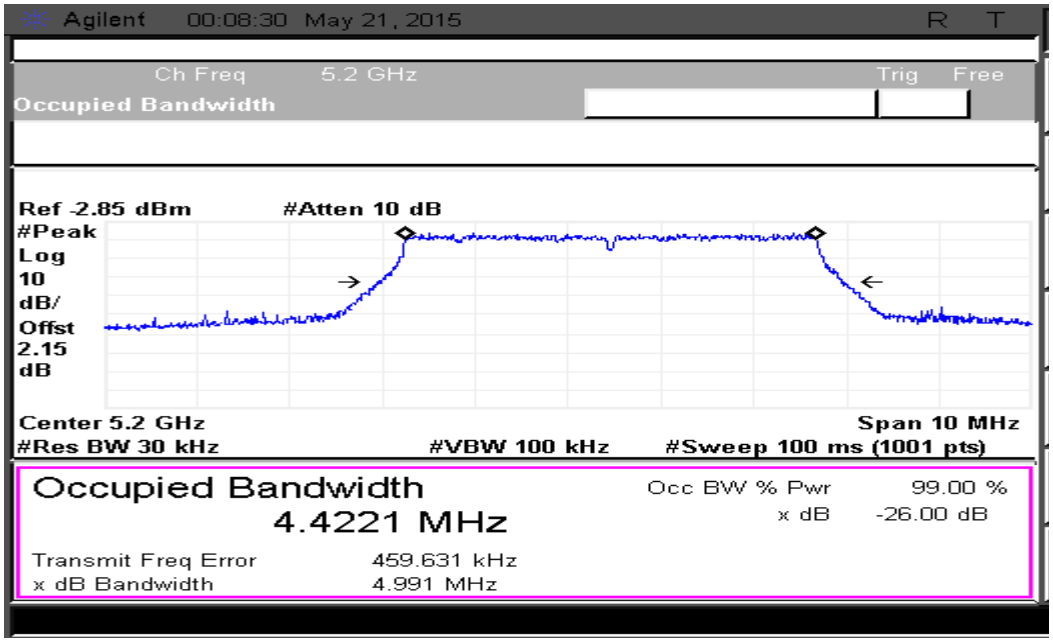


Figure 27: 26dB Bandwidth measured at ch1

5.3.2.6.6 5MHz Modulation BW-High channel_5245MHz

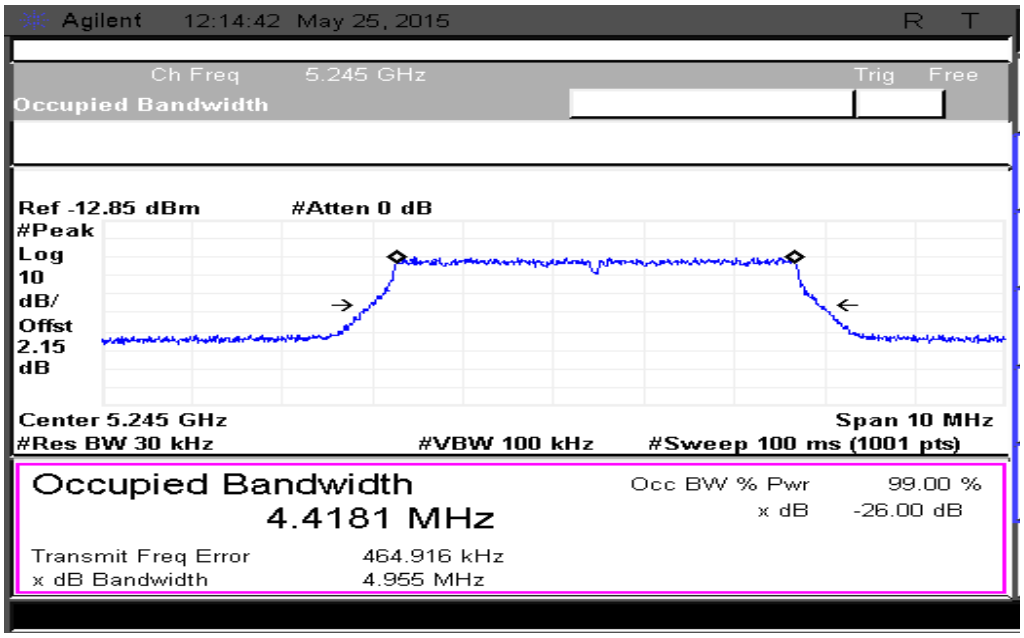


Figure 28: 26dB Bandwidth measured at ch0

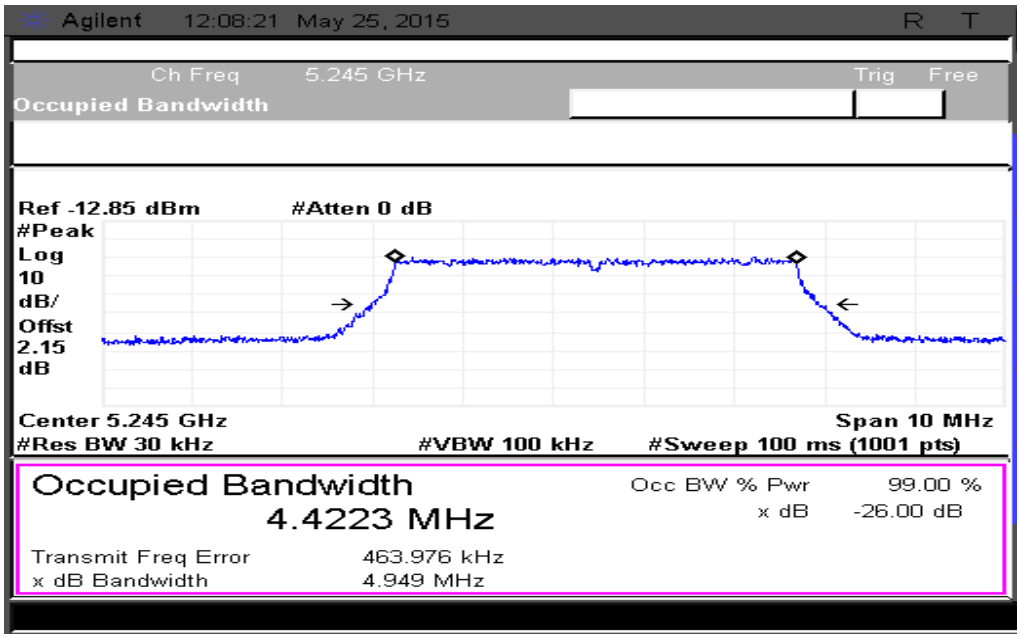


Figure 29: 26dB Bandwidth measured at ch1

5.3.2.7 RESULT (SUPPORTING GRAPHS / DATA) FOR 24DBI DISH CONDITION

5.3.2.7.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

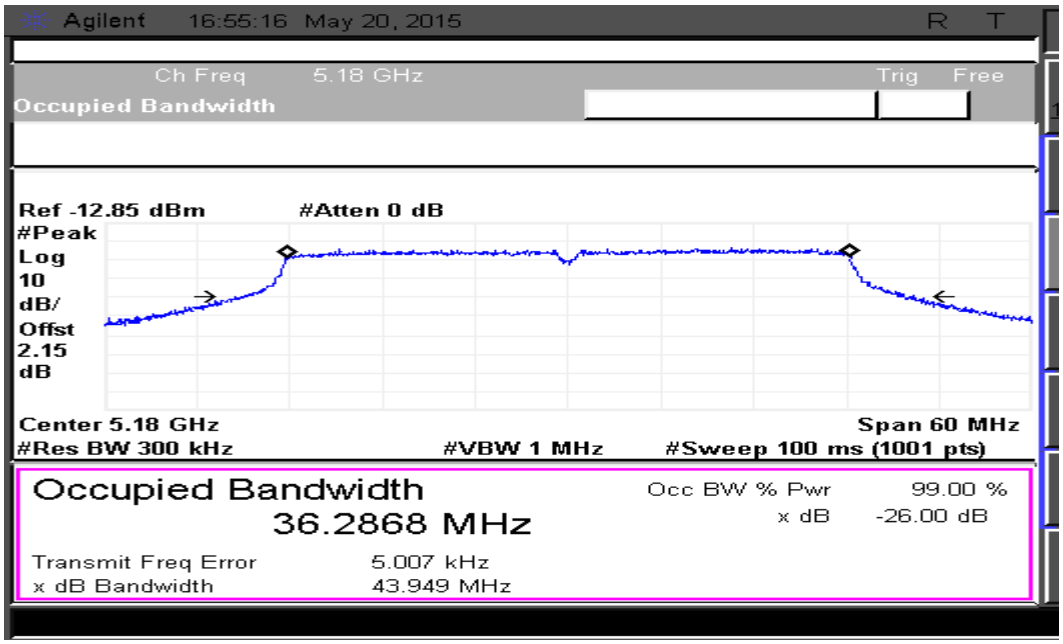


Figure 30: 26dB Bandwidth measured at ch0

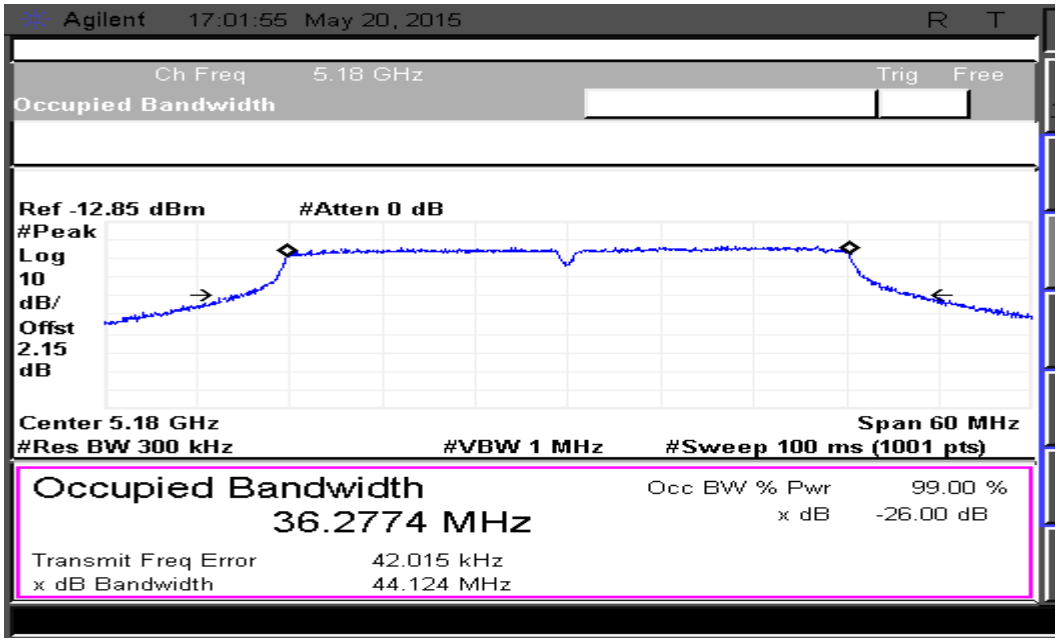


Figure 31: 26dB Bandwidth measured at ch1

5.3.2.7.2 40MHz Modulation BW -Mid channel_5200 MHz

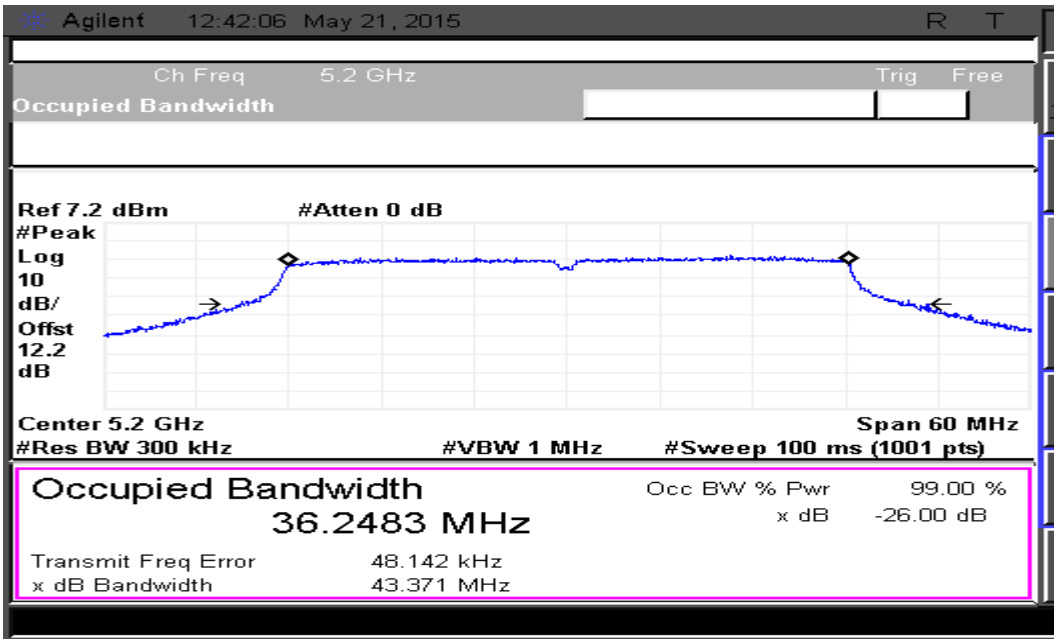


Figure 32: 26dB Bandwidth measured at ch0

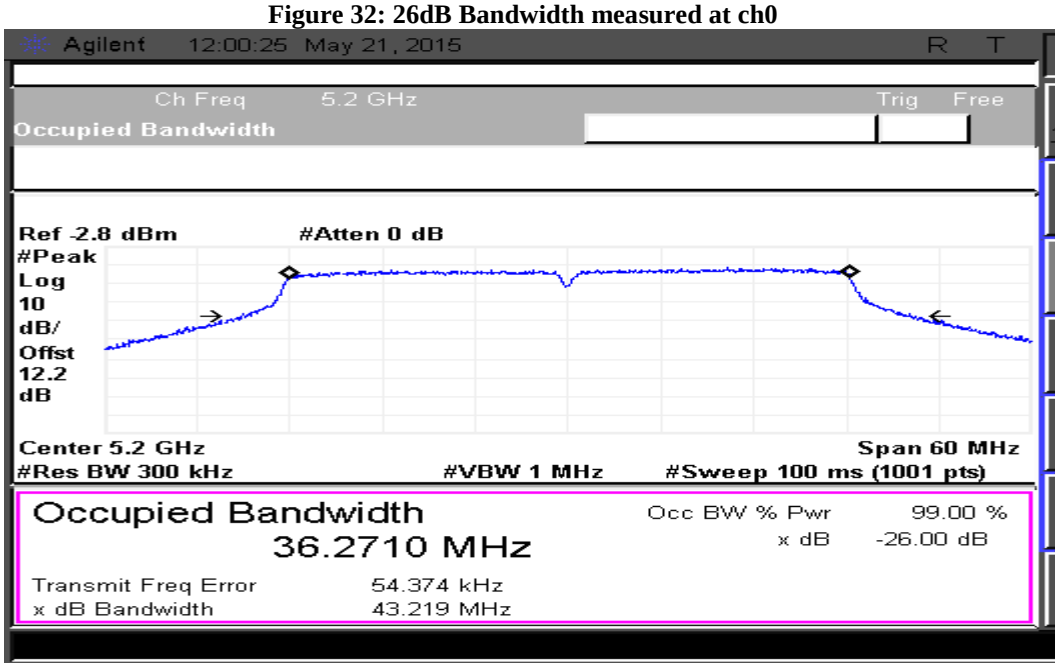


Figure 33: 26dB Bandwidth measured at ch1

5.3.2.7.3 40MHZ MODULATION BW -HIGH CHANNEL_5220MHZ

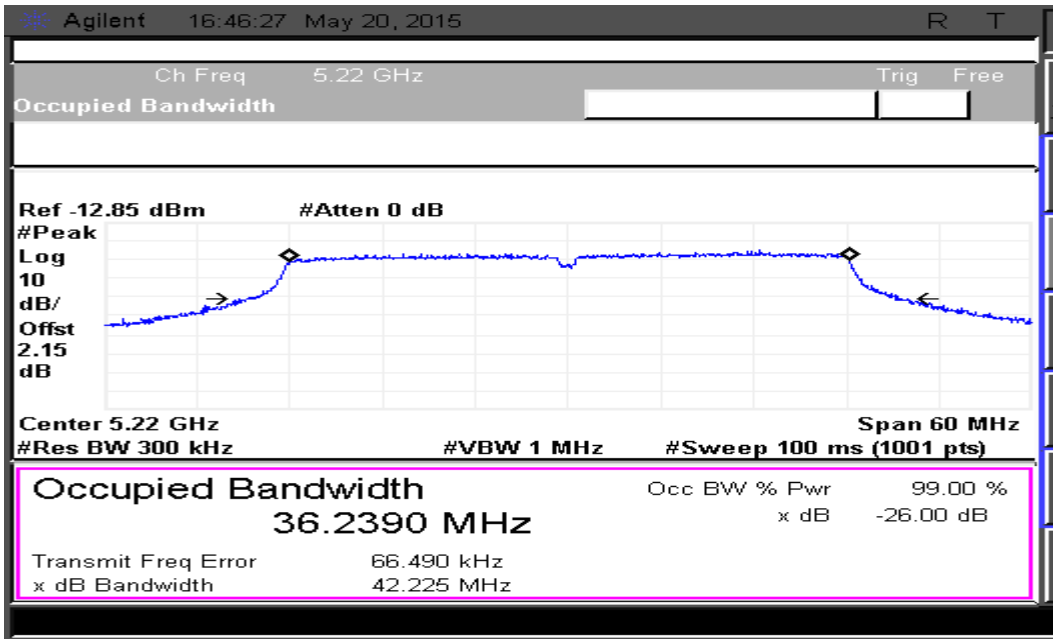


Figure 34: 26dB Bandwidth measured at ch0

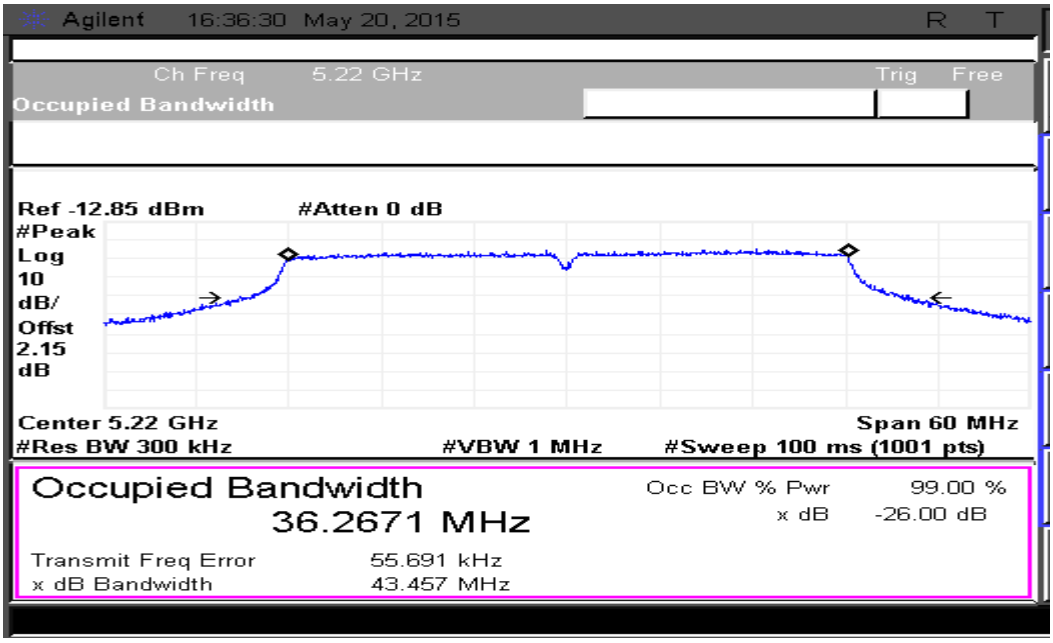


Figure 35: 26dB Bandwidth measured at ch1

5.3.2.7.4 5MHz Modulation BW-Low channel_5155MHz

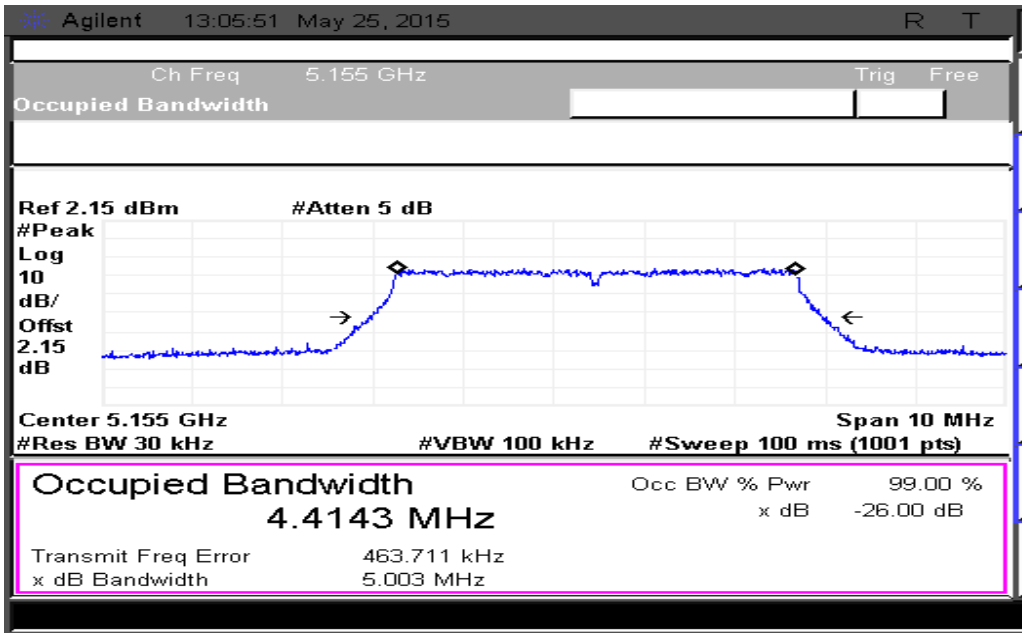


Figure 36: 26dB Bandwidth measured at ch0

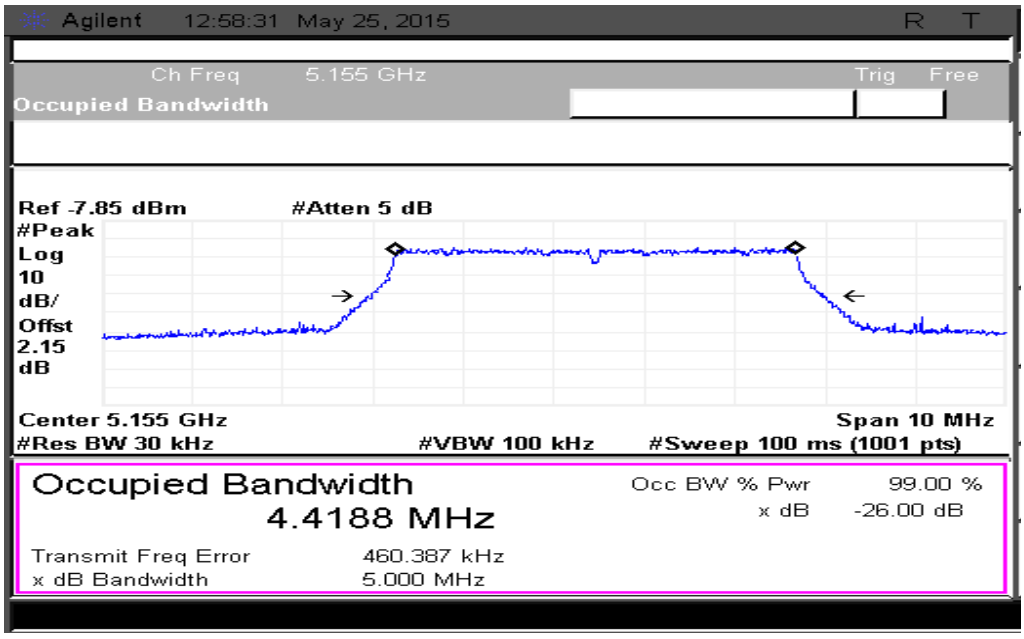


Figure 37: 26dB Bandwidth measured at ch1

5.3.2.7.5 5MHz Modulation BW-Mid channel_5200 MHz

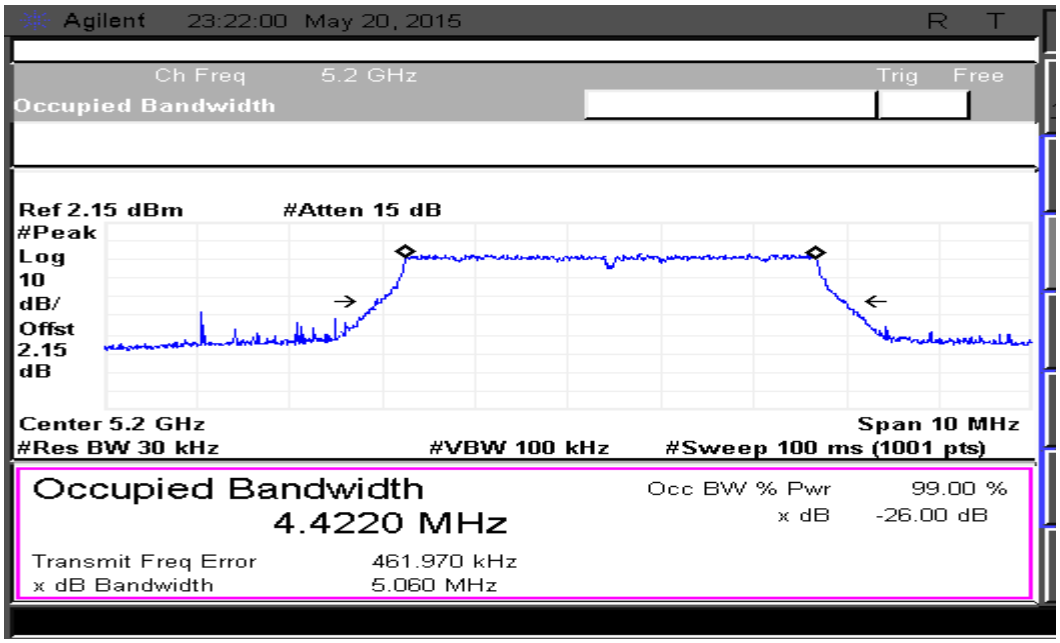


Figure 38: 26dB Bandwidth measured at ch0

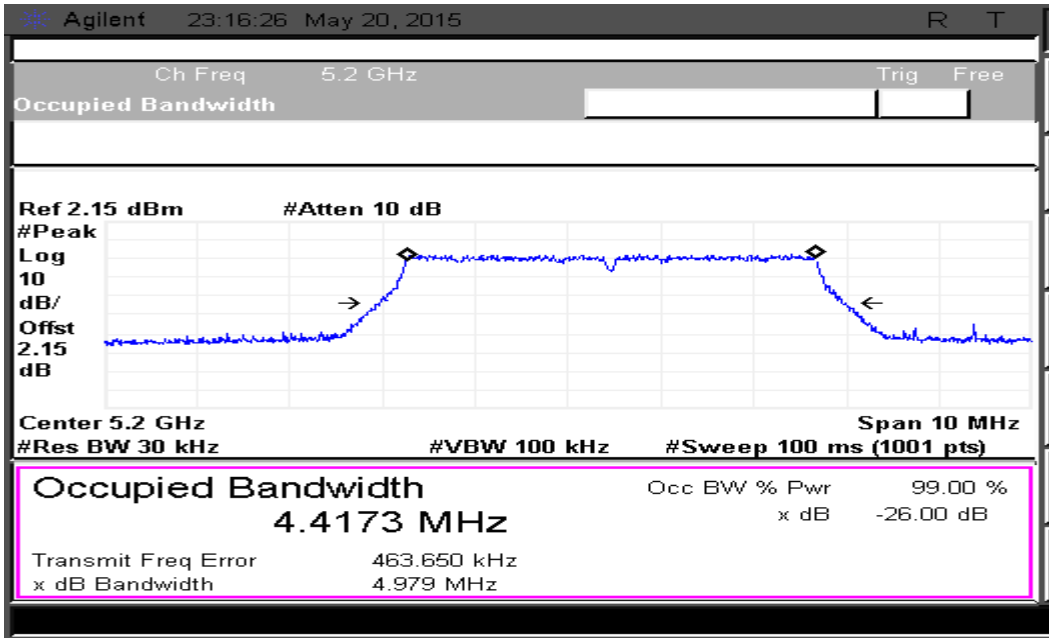


Figure 39: 26dB Bandwidth measured at ch1

5.3.2.7.6 5MHz Modulation BW-High channel_5245MHz

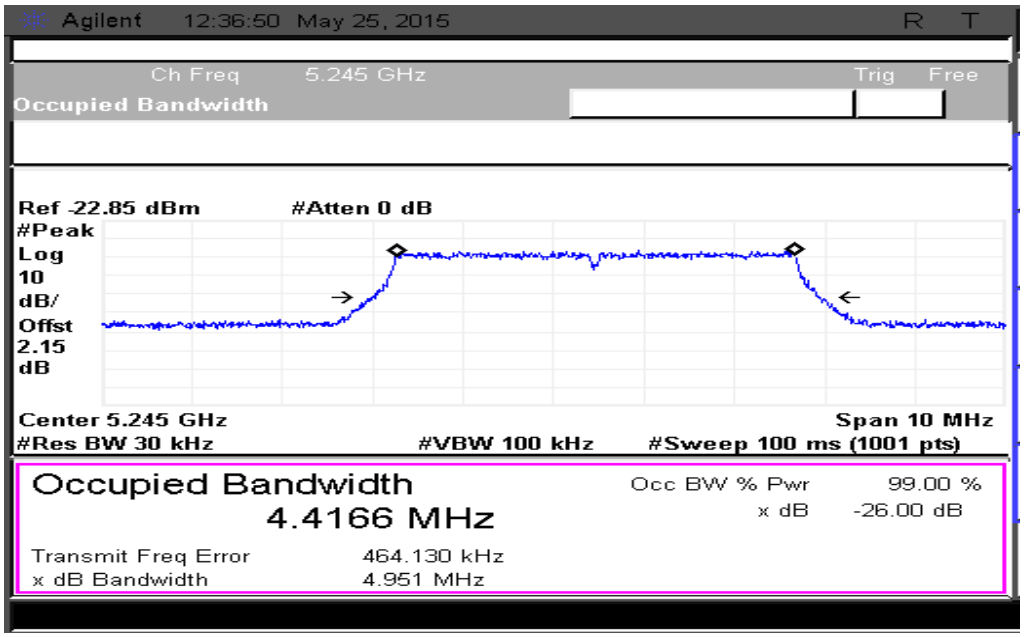


Figure 40: 26dB Bandwidth measured at ch0

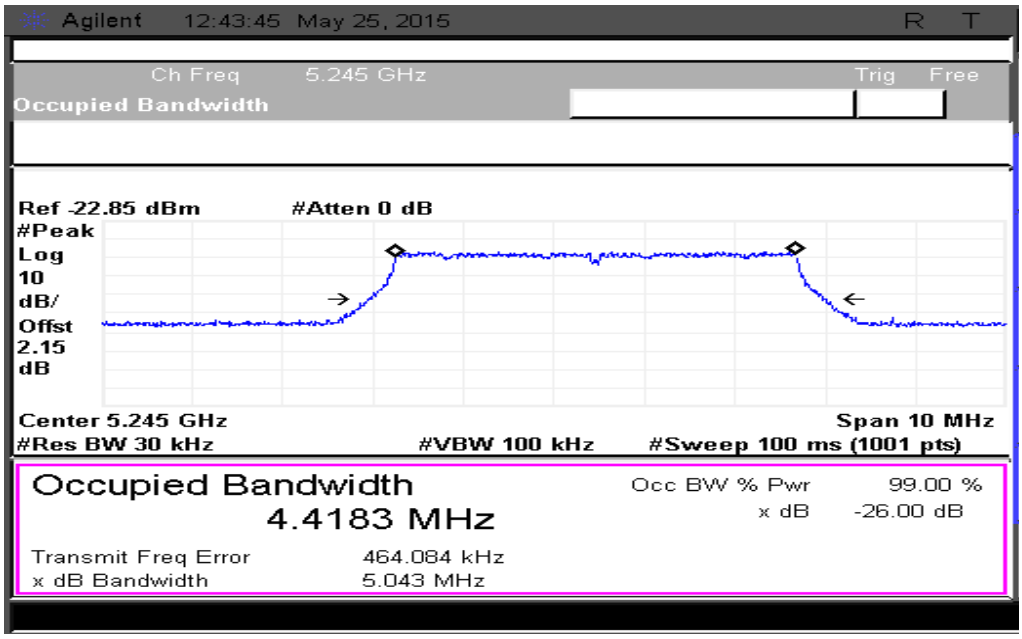


Figure 41: 26dB Bandwidth measured at ch1

5.3.2.8 RESULT

26dB Bandwidth for all channels in both 40MHz & 5MHz Modulation Bandwidths has been measured and tabulated in below table.

Test Condition	Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (MHz)
Basic	40	Ch. 0	5180	43.440
Basic	40	Ch. 0	5200	43.878
Basic	40	Ch. 0	5220	43.018
Basic	40	Ch. 1	5180	42.789
Basic	40	Ch. 1	5200	43.901
Basic	40	Ch. 1	5220	42.388
Basic	5	Ch. 0	5155	4.976
Basic	5	Ch. 0	5200	6.956
Basic	5	Ch. 0	5245	5.033
Basic	5	Ch. 1	5155	5.004
Basic	5	Ch. 1	5200	7.598
Basic	5	Ch. 1	5245	5.027
17dBi Antenna	40	Ch. 0	5180	43.940
17dBi Antenna	40	Ch. 0	5200	43.208
17dBi Antenna	40	Ch. 0	5220	42.863
17dBi Antenna	40	Ch. 1	5180	42.946
17dBi Antenna	40	Ch. 1	5200	42.415
17dBi Antenna	40	Ch. 1	5220	43.037
17dBi Antenna	5	Ch. 0	5155	4.962
17dBi Antenna	5	Ch. 0	5200	4.999
17dBi Antenna	5	Ch. 0	5245	4.955
17dBi Antenna	5	Ch. 1	5155	5.016
17dBi Antenna	5	Ch. 1	5200	4.991
17dBi Antenna	5	Ch. 1	5245	4.949
24dBi Dish	40	Ch. 0	5180	43.949
24dBi Dish	40	Ch. 0	5200	43.371
24dBi Dish	40	Ch. 0	5220	42.225
24dBi Dish	40	Ch. 1	5180	44.124
24dBi Dish	40	Ch. 1	5200	43.219
24dBi Dish	40	Ch. 1	5220	43.457
24dBi Dish	5	Ch. 0	5155	5.003
24dBi Dish	5	Ch. 0	5200	5.060
24dBi Dish	5	Ch. 0	5245	4.951
24dBi Dish	5	Ch. 1	5155	5.000
24dBi Dish	5	Ch. 1	5200	4.979
24dBi Dish	5	Ch. 1	5245	5.043

5.3.3 99 PERCENT OCCUPIED BANDWIDTH MEASUREMENT

5.3.3.1 TEST SPECIFICATION

Test Standard	47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014	
Test Procedure	ANSI C63.10-2013	
Modulation Bandwidth	**40MHz**	**5MHz**
Resolution Bandwidth	1MHz	100 kHz
Video Bandwidth	3MHz	300 kHz
Sweep Time	100ms	
Attenuation	Auto	
Test Mode	Conducted	
Detector	Peak	
Input Voltage	120V AC	
Input Frequency	60 Hz	
Temperature	22.0°C	
Humidity	56.0%	
Tested By	Subhendu	
Test Date	12th May 2015 to 25th May 2015	

5.3.3.2 LIMITS

Standard	**Reference section**	**Frequency range**	**Limit**
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014	NA	5150MHz to 5250MHz	NA

5.3.3.3 TEST SETUP

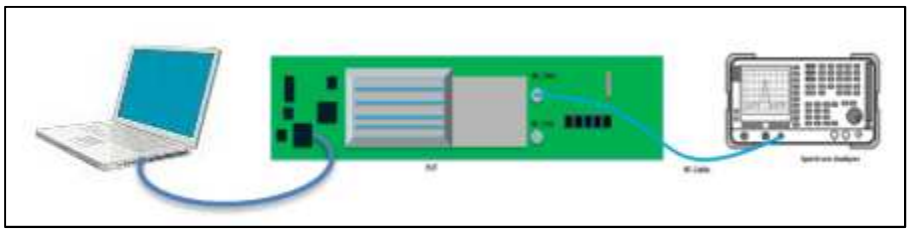


Figure 42: Typical test setup for Conducted RF Test setup

5.3.3.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per Section D of **"789033 D02 General UNII Test Procedures New Rules v01".**The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. Captured the data from spectrum analyzer and compared with the limits specified in the standard.

5.3.3.5 RESULT (SUPPORTING GRAPHS / DATA) FOR BASIC CONDITION

5.3.3.5.1 40MHz MODULATION BW-LOW CHANNEL_5180MHz

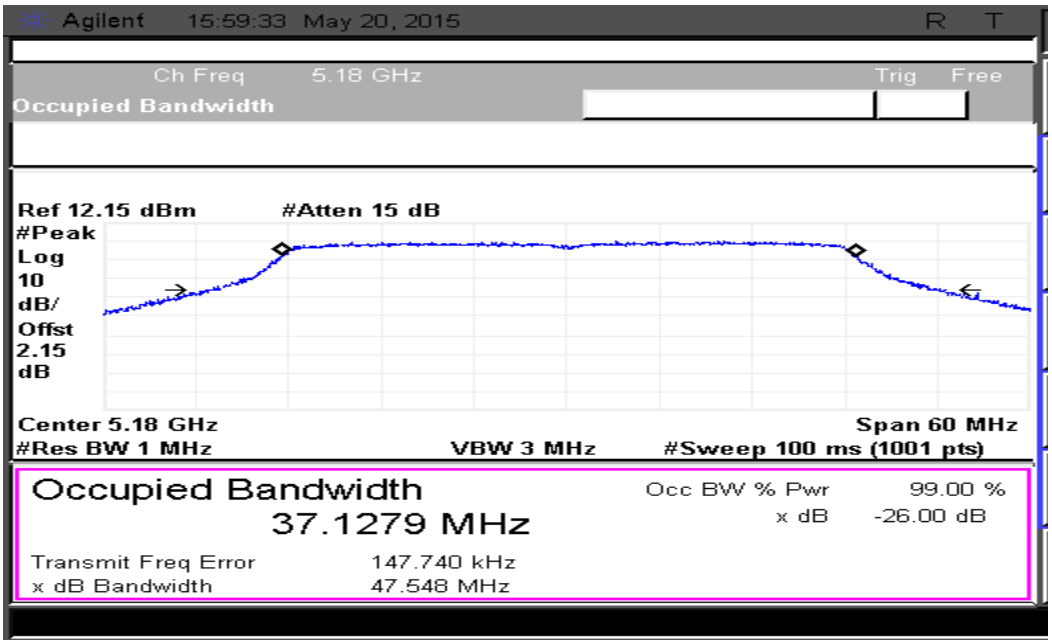


Figure 43: 99 Percent OBW measured at ch.0

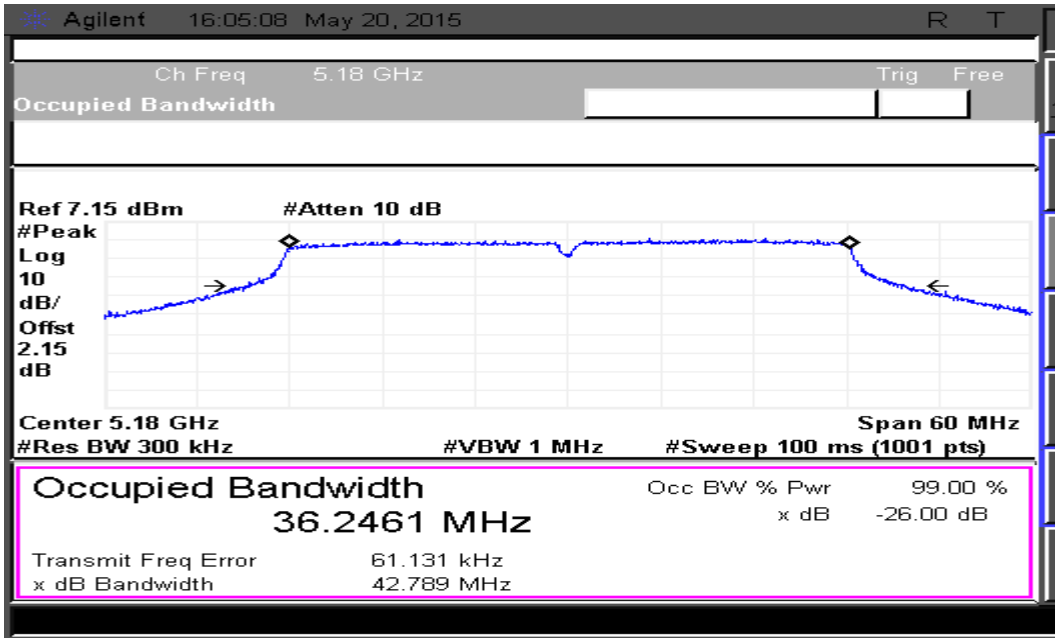


Figure 44: 99 Percent OBW measured at ch.1

5.3.3.5.2 40MHz Modulation BW -Mid channel_5200MHz

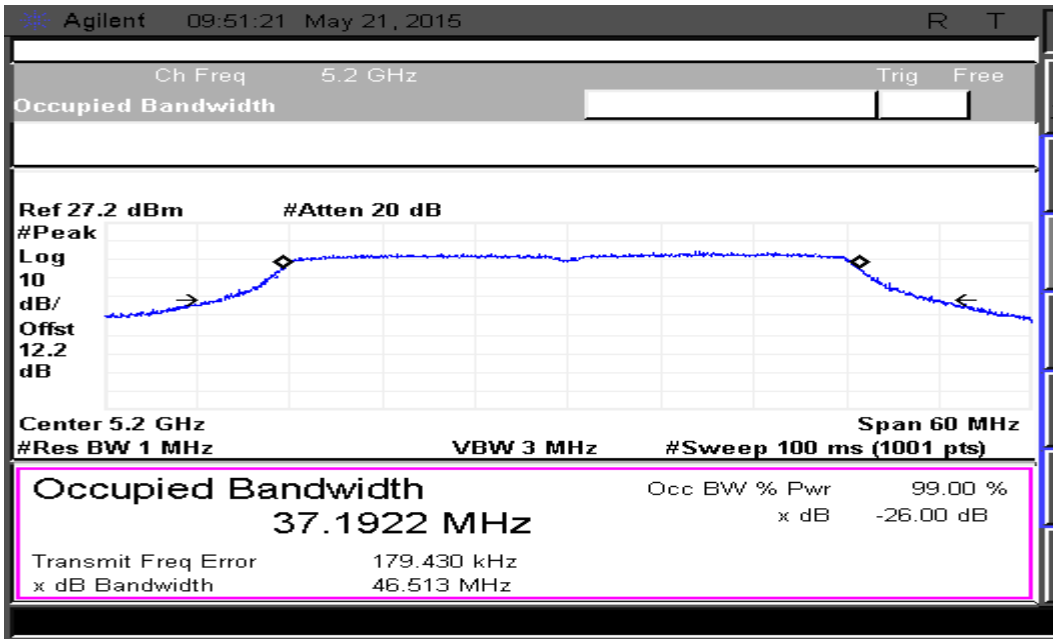


Figure 45: 99 Percent OBW measured at ch.0

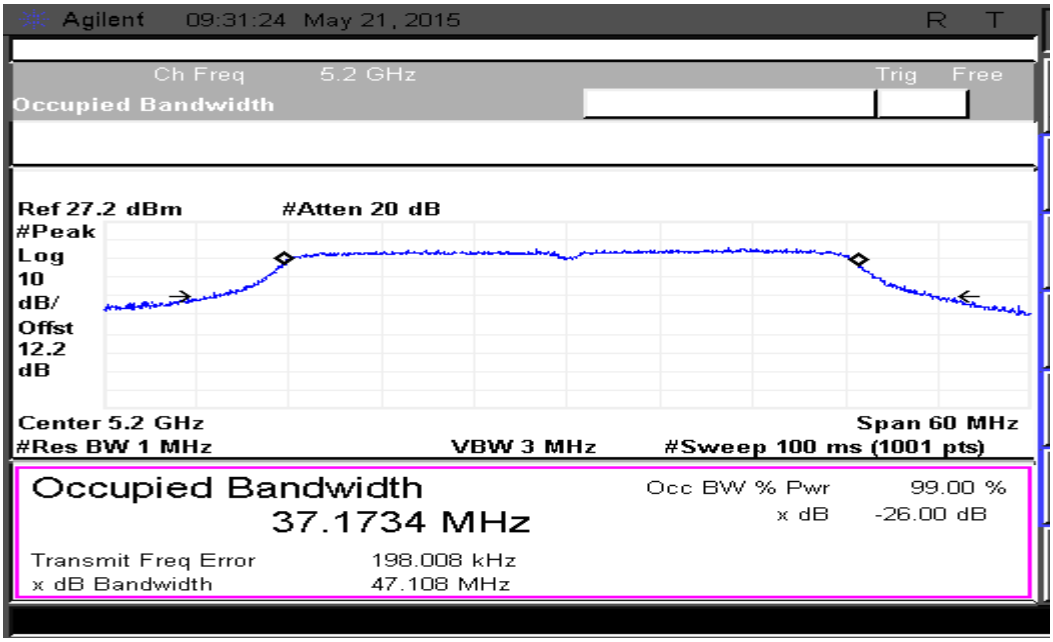


Figure 46: 99 Percent OBW measured at ch.1

5.3.3.5.3 40MHZ MODULATION BW -HIGH CHANNEL_5220MHZ

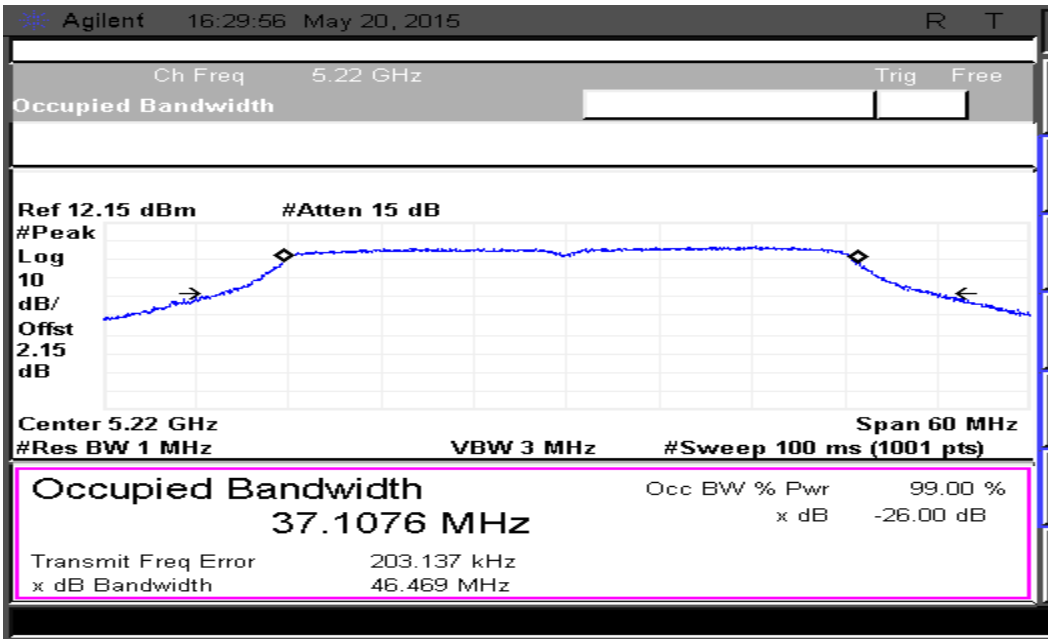


Figure 47: 99 Percent OBW measured at ch.0

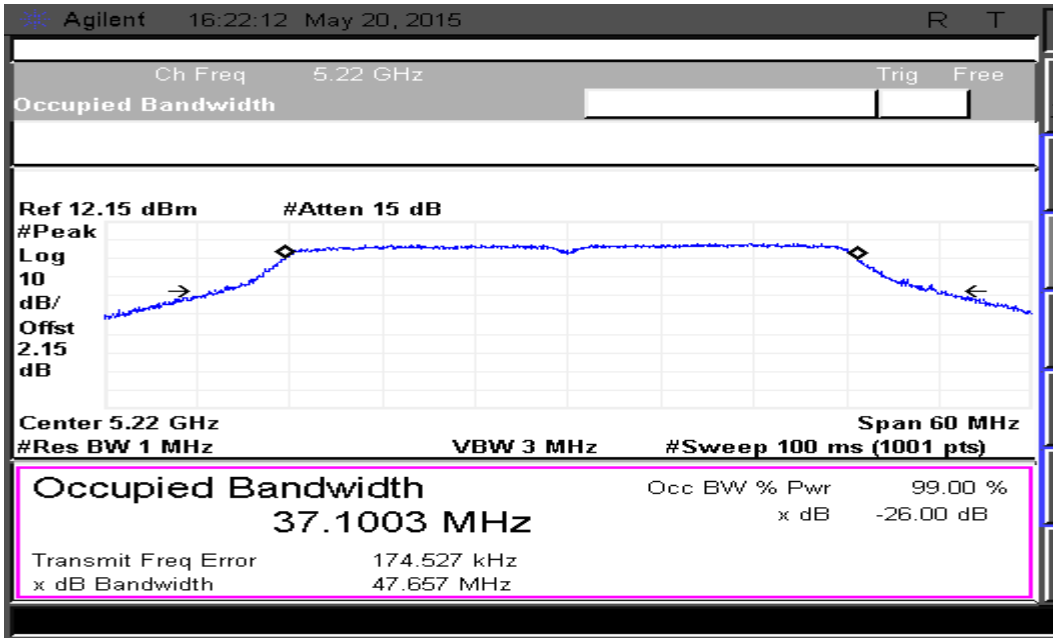


Figure 48: 99 Percent OBW measured at ch.1

5.3.3.5.4 5MHz Modulation BW-Low channel_5155MHz

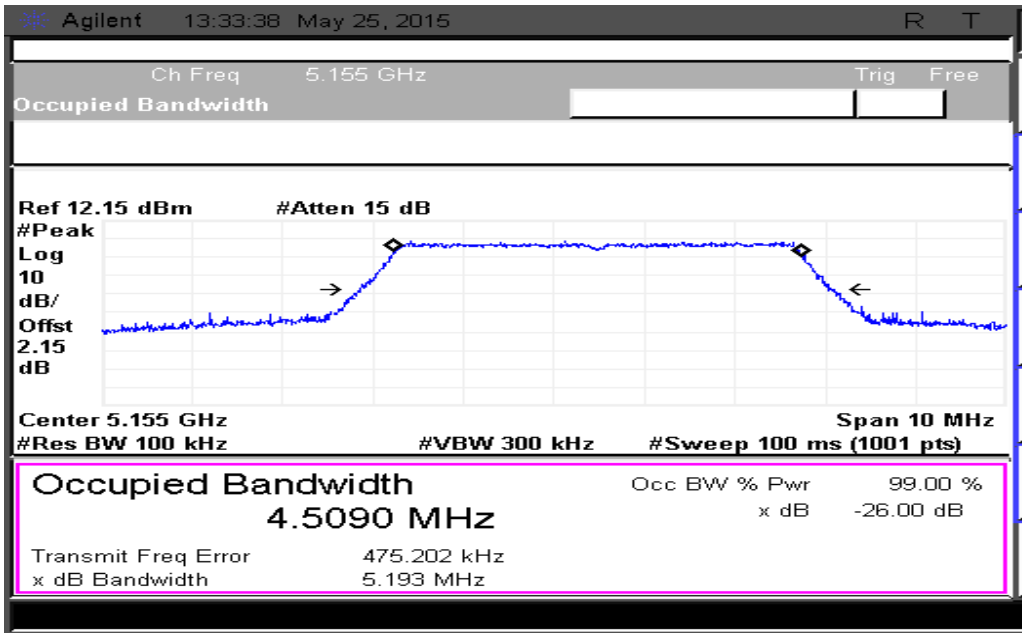


Figure 49: 99 Percent OBW measured at ch.0

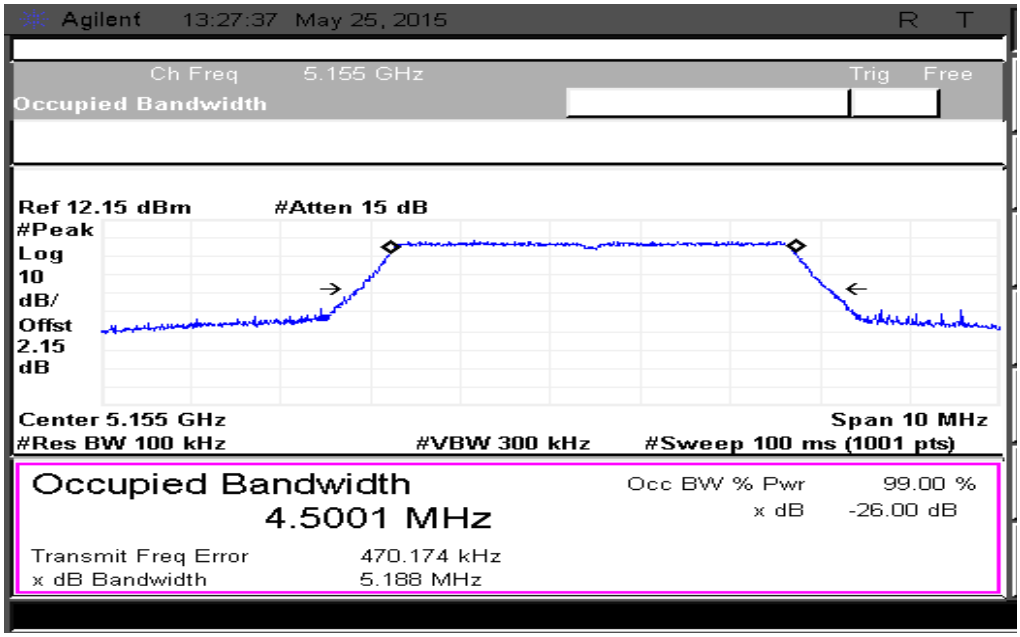


Figure 50: 99 Percent OBW measured at ch.1

5.3.3.5.5 5MHz Modulation BW-Mid channel_5200MHz

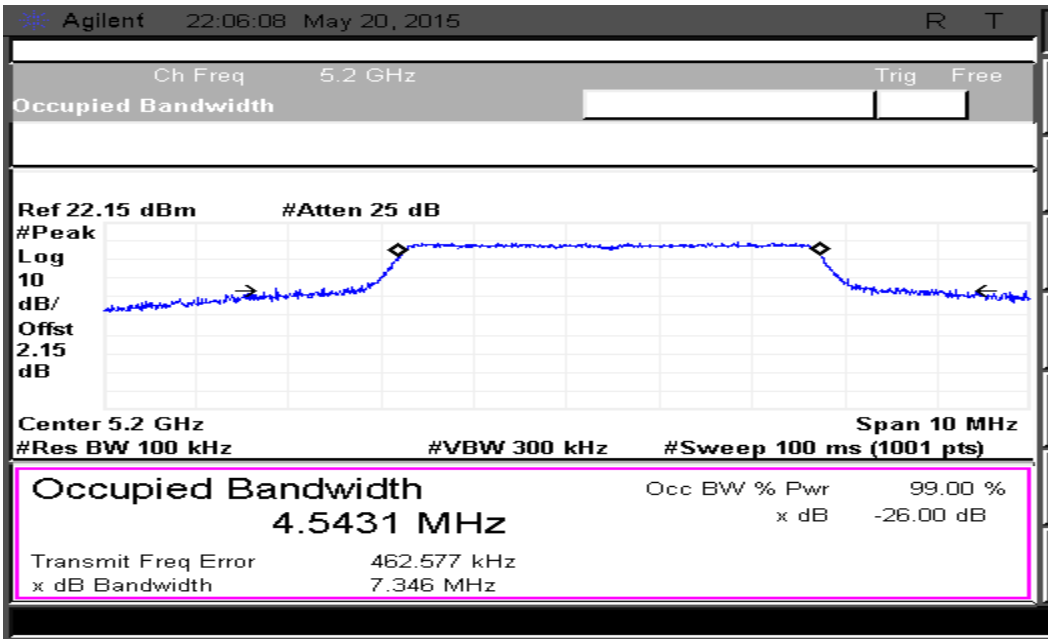


Figure 51: 99 Percent OBW measured at ch.0

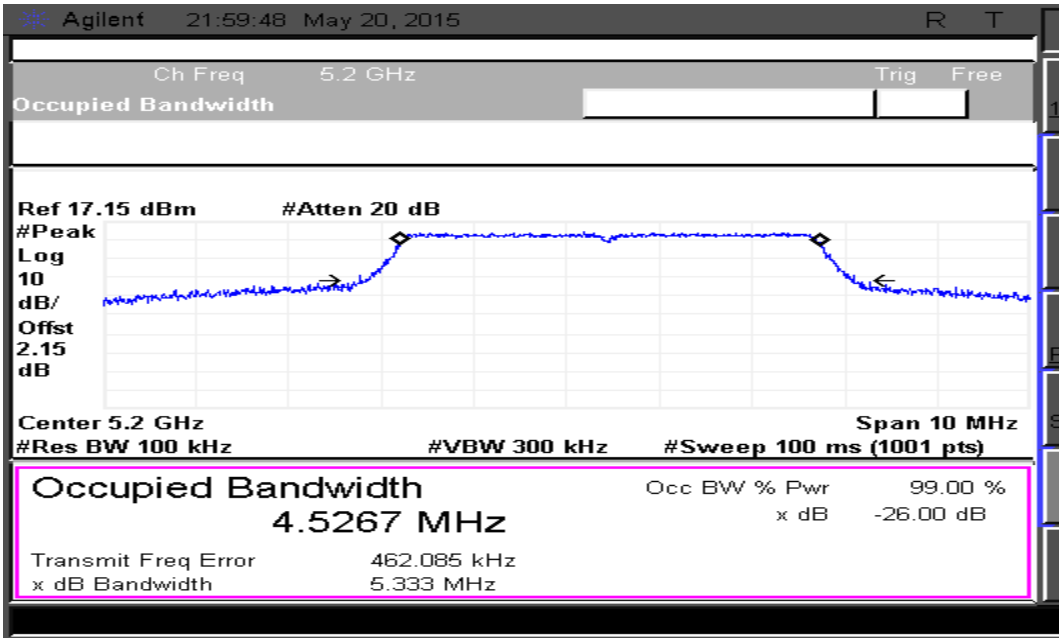


Figure 52: 99 Percent OBW measured at ch.1

5.3.3.5.6 5MHz Modulation BW-High channel_5245MHz

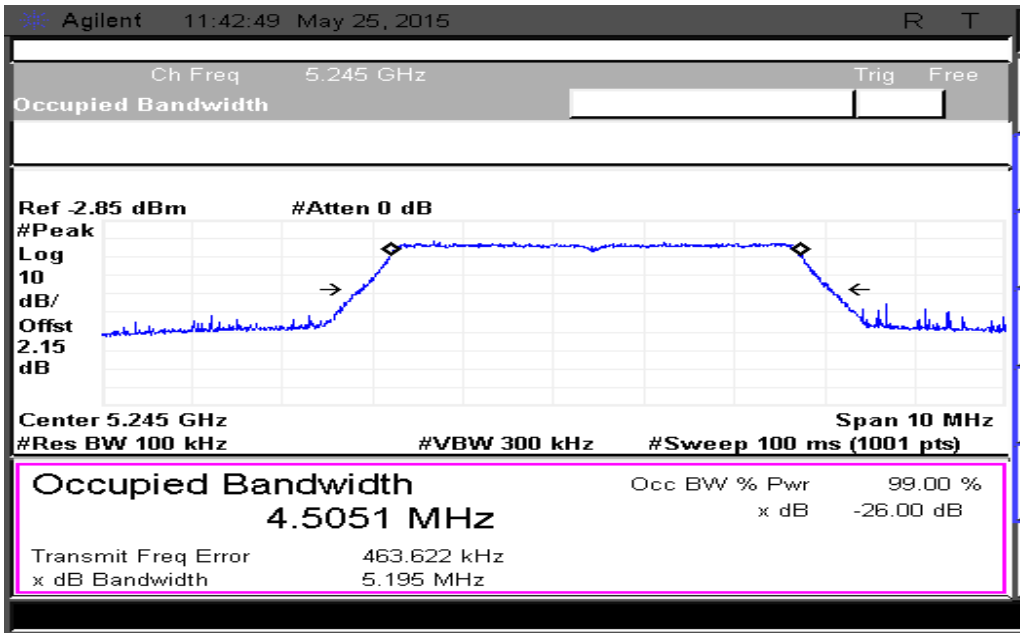


Figure 53: 99 Percent OBW measured at ch.0

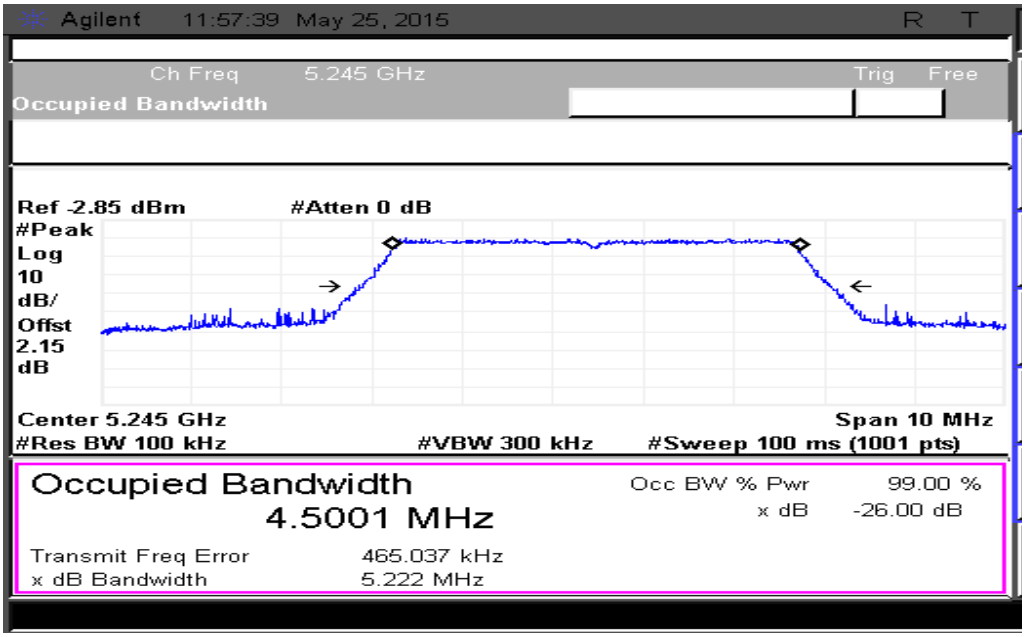


Figure 54: 99 Percent OBW measured at ch.1

5.3.3.6 RESULT (SUPPORTING GRAPHS / DATA) FOR 17DBI ANTENNA CONDITION

5.3.3.6.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

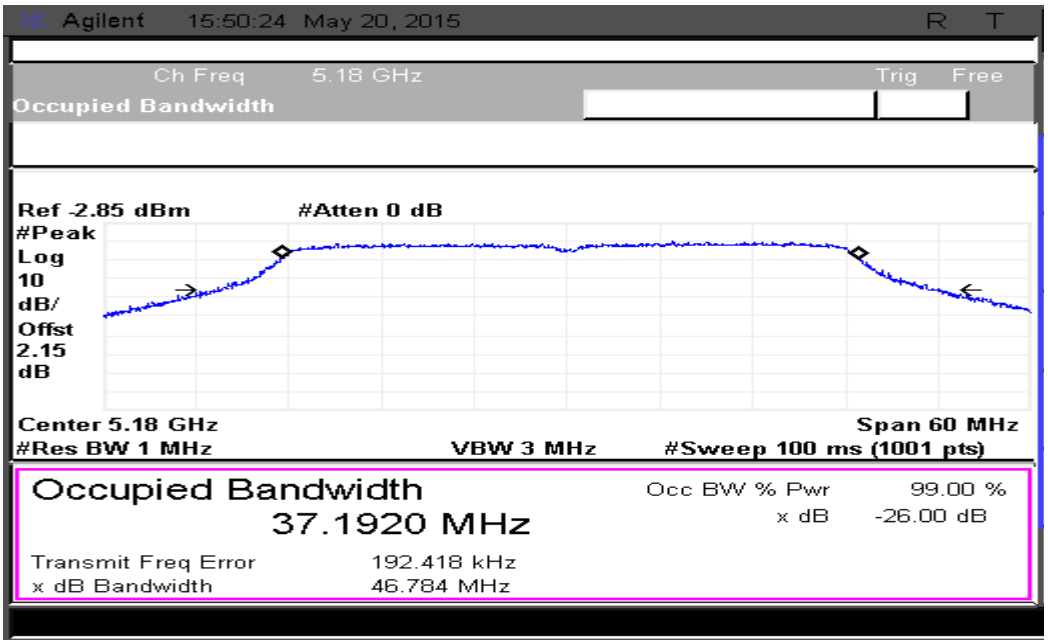


Figure 55: 99 Percent OBW measured at ch.0

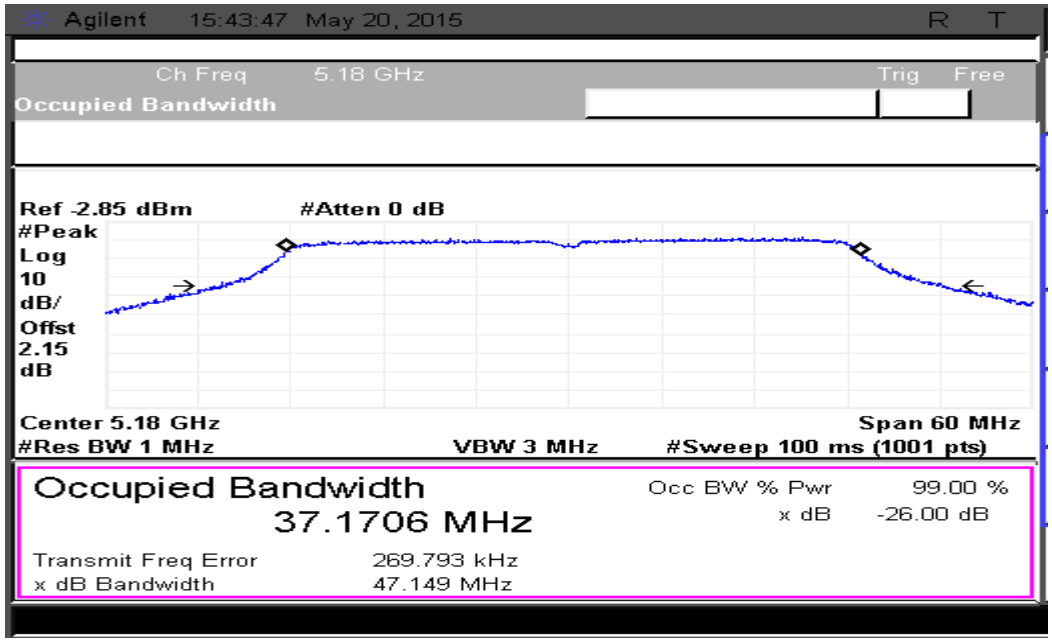


Figure 56: 99 Percent OBW measured at ch.1

5.3.3.6.2 40MHz MODULATION BW -MID CHANNEL_5200 MHz

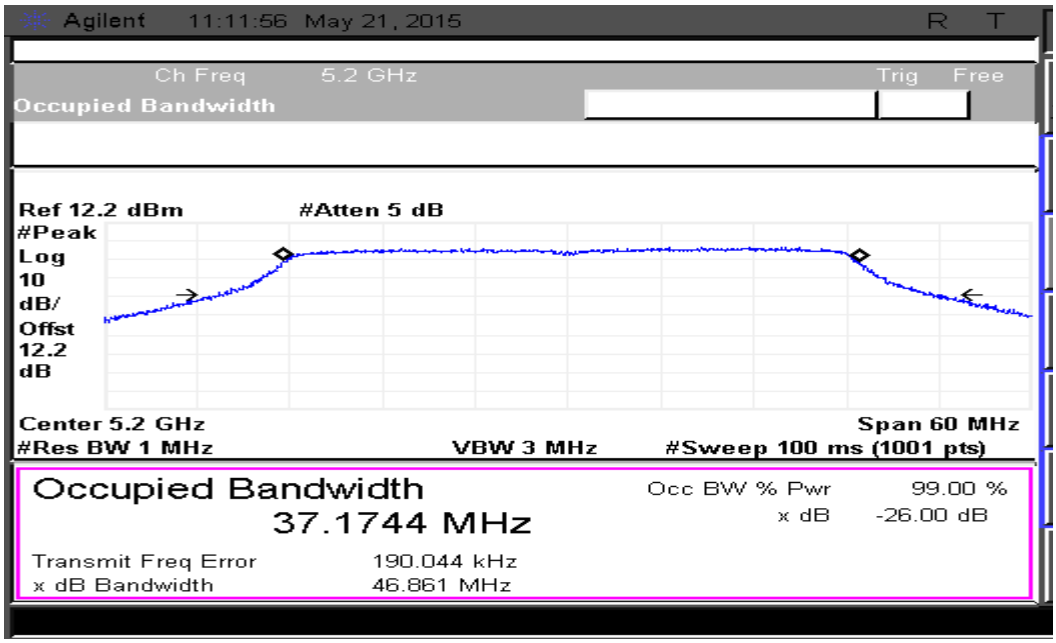


Figure 57: 99 Percent OBW measured at ch.0

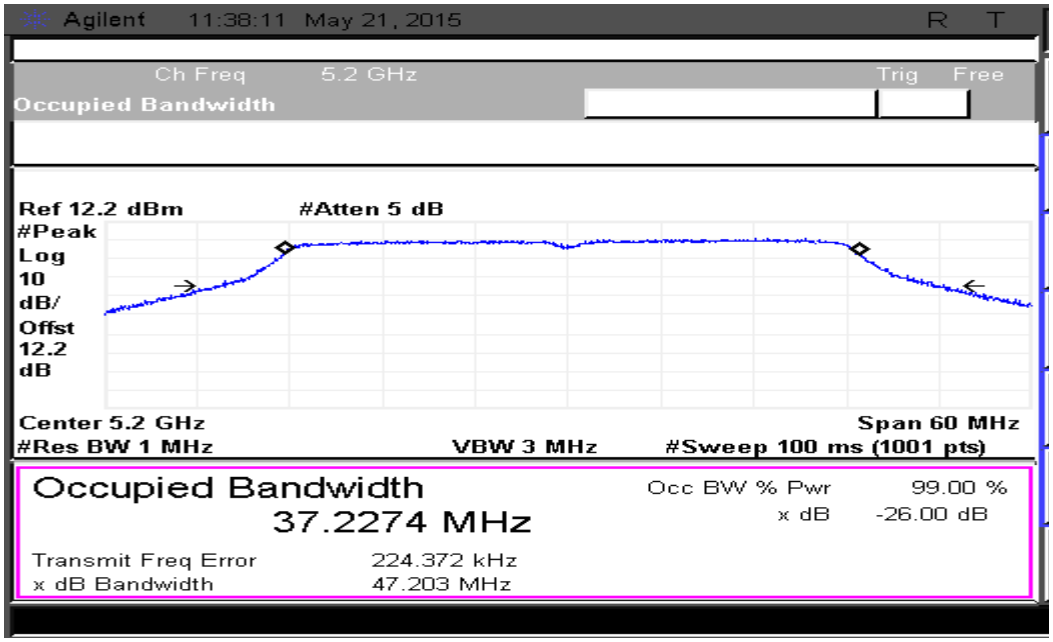


Figure 58: 99 Percent OBW measured at ch.1

5.3.3.6.3 40MHz MODULATION BW -HIGH CHANNEL_5220MHz

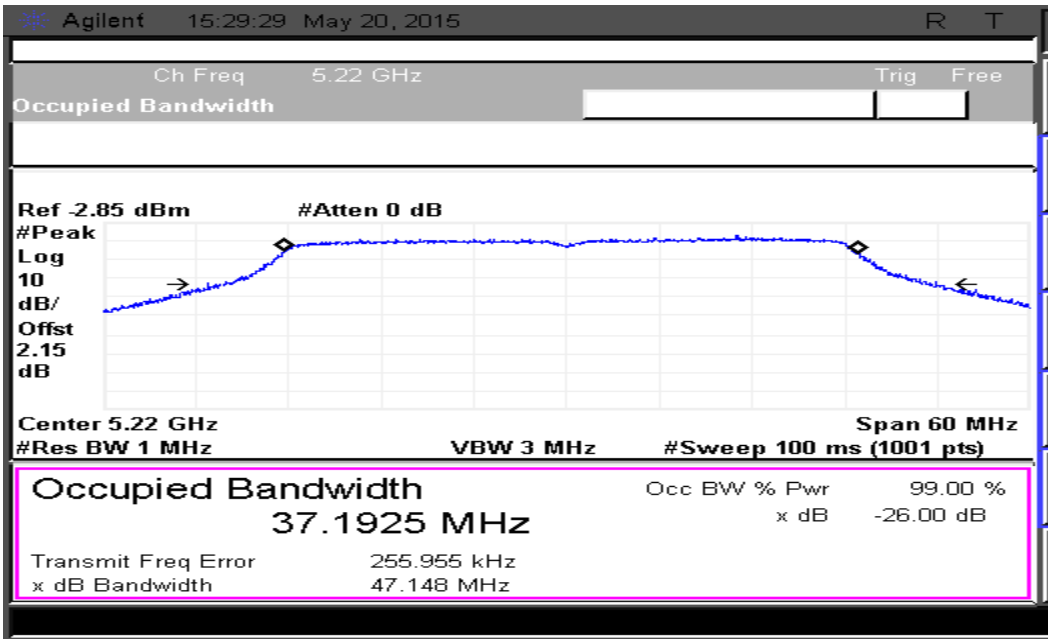


Figure 59: 99 Percent OBW measured at ch.0

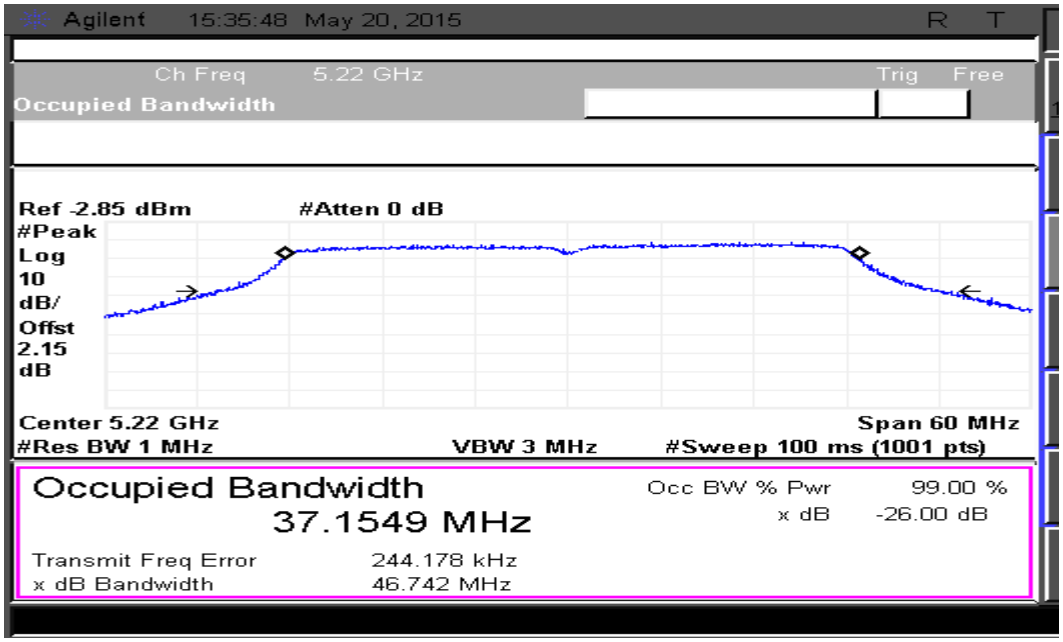


Figure 60: 99 Percent OBW measured at ch.1

5.3.3.6.4 5MHz Modulation BW-Low channel_5155MHz

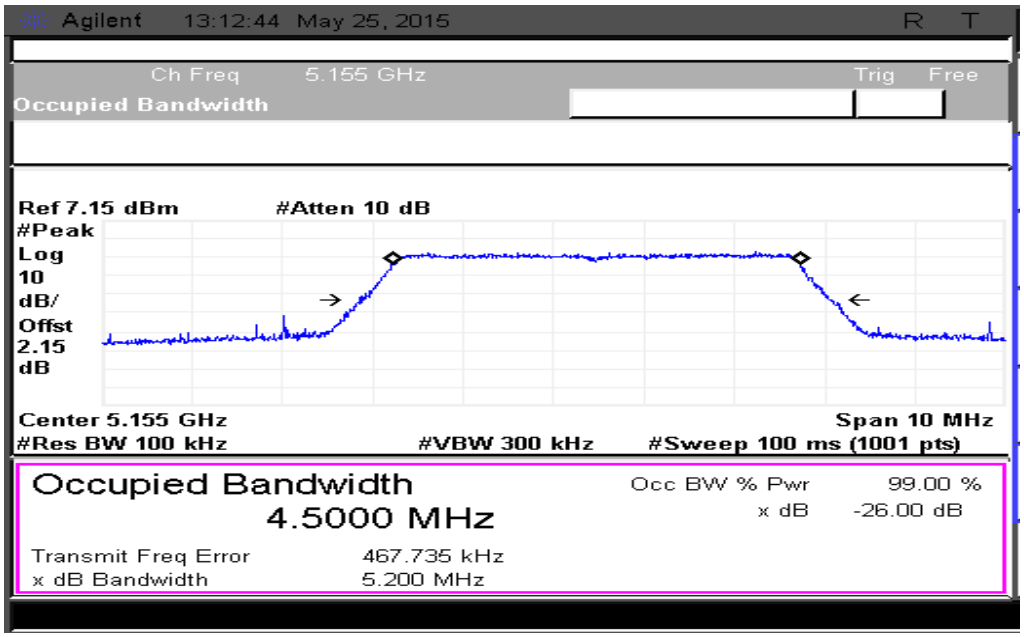


Figure 61: 99 Percent OBW measured at ch.0

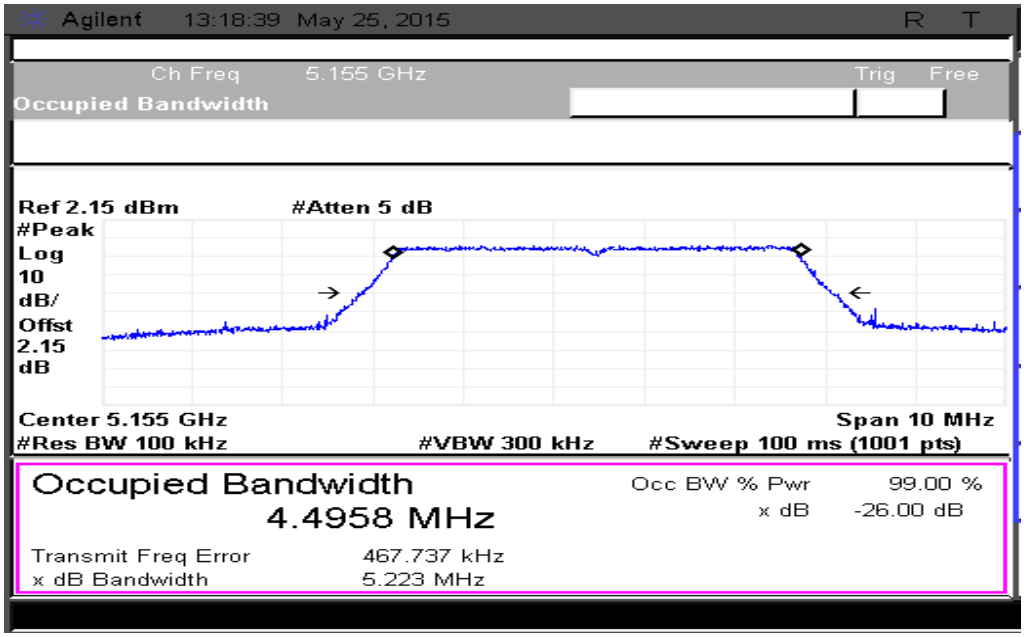


Figure 62: 99 Percent OBW measured at ch.1

5.3.3.6.5 5MHz Modulation BW-Mid channel_5200 MHz

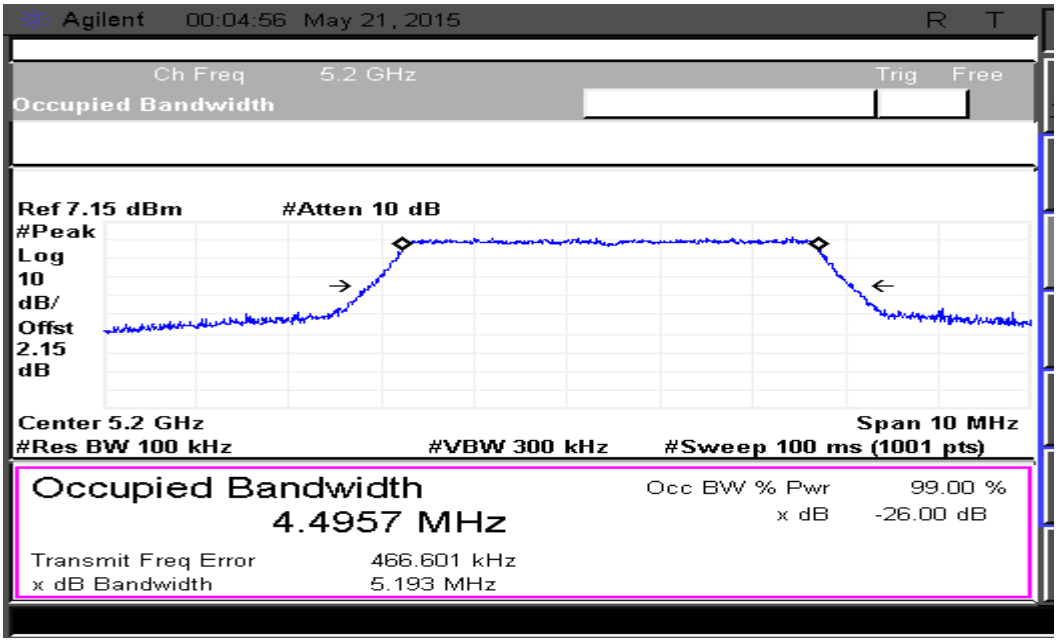


Figure 63: 99 Percent OBW measured at ch.0

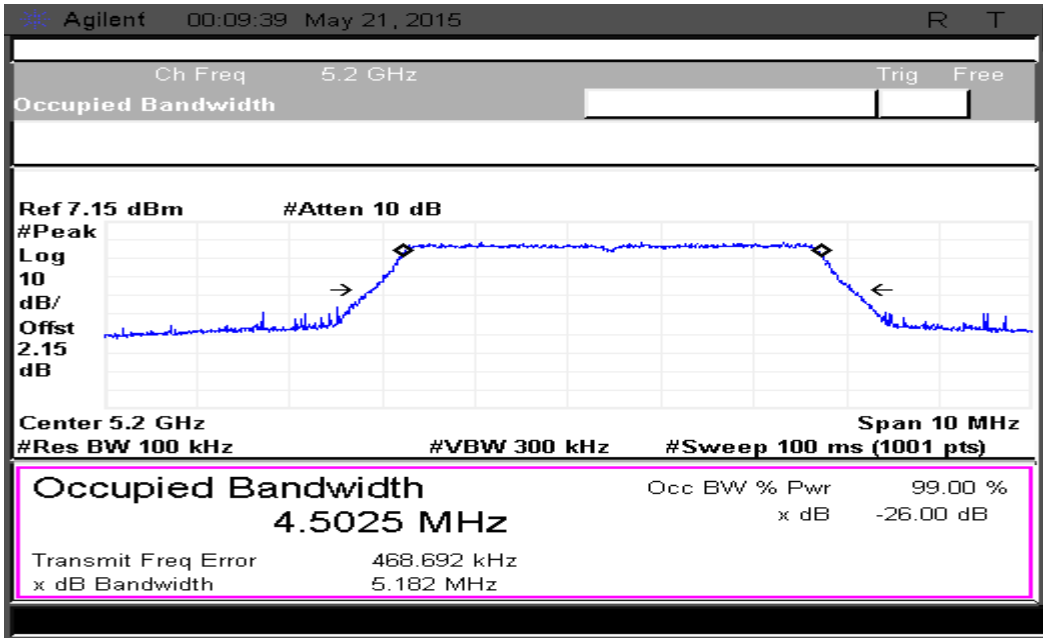


Figure 64: 99 Percent OBW measured at ch.1

5.3.3.6.6 5MHz Modulation BW-High channel_5245MHz

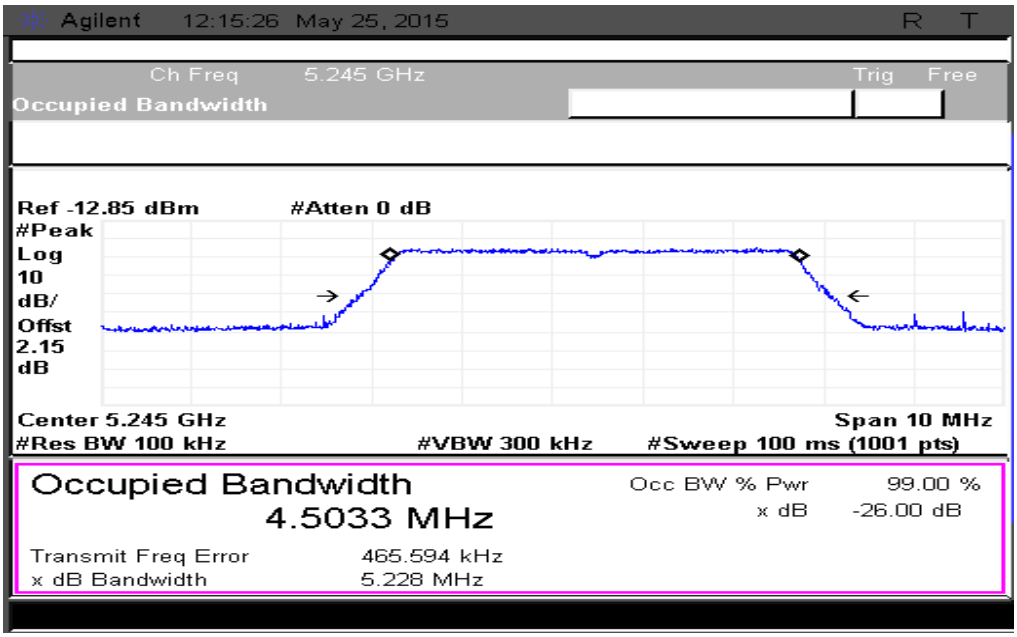


Figure 65: 99 Percent OBW measured at ch.0

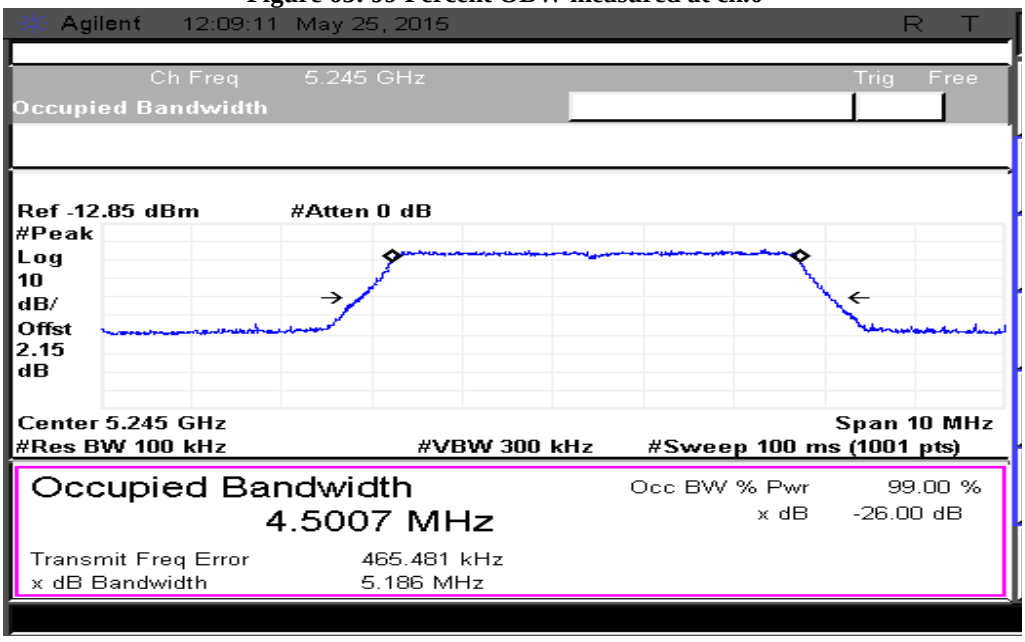


Figure 66: 99 Percent OBW measured at ch.1

5.3.3.7 RESULT (SUPPORTING GRAPHS / DATA) FOR 24DBI DISH CONDITION

5.3.3.7.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

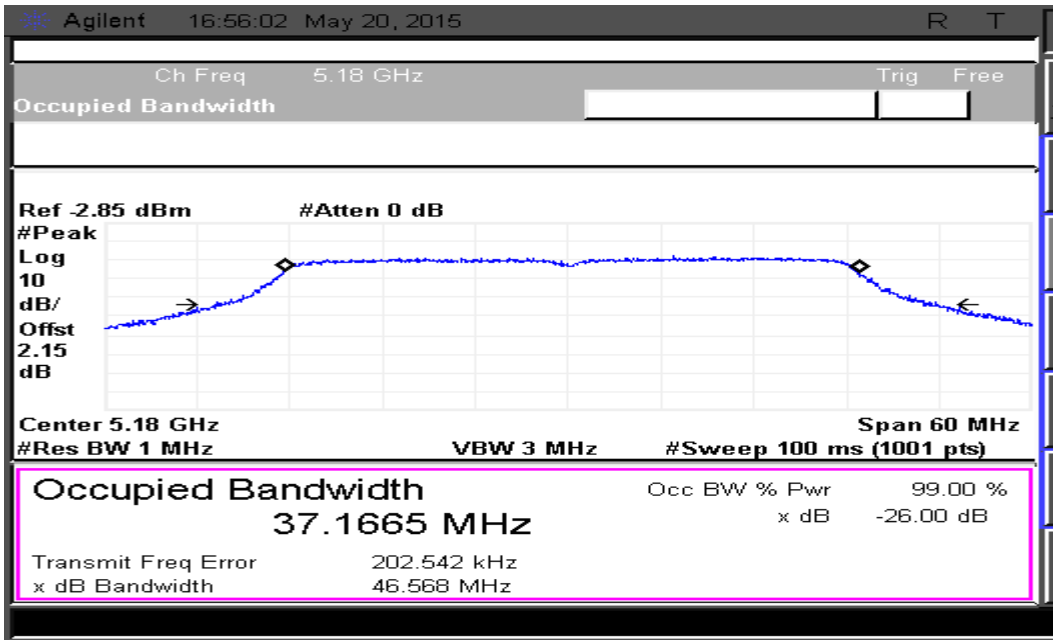


Figure 67: 99 Percent OBW measured at ch.0

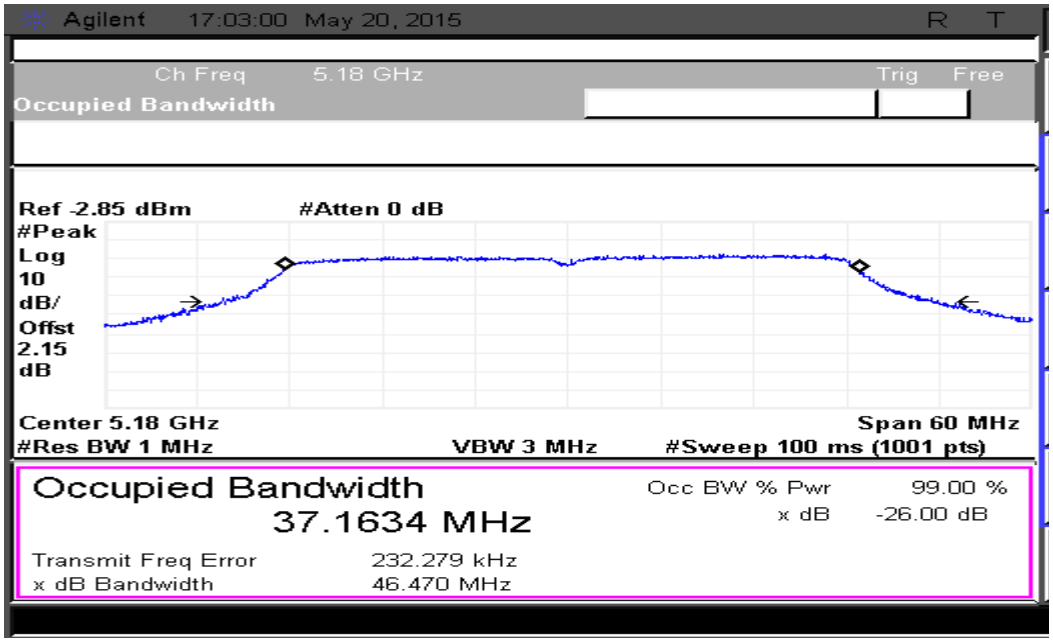


Figure 68: 99 Percent OBW measured at ch.1

5.3.3.7.2 40MHz MODULATION BW -MID CHANNEL_5200 MHz

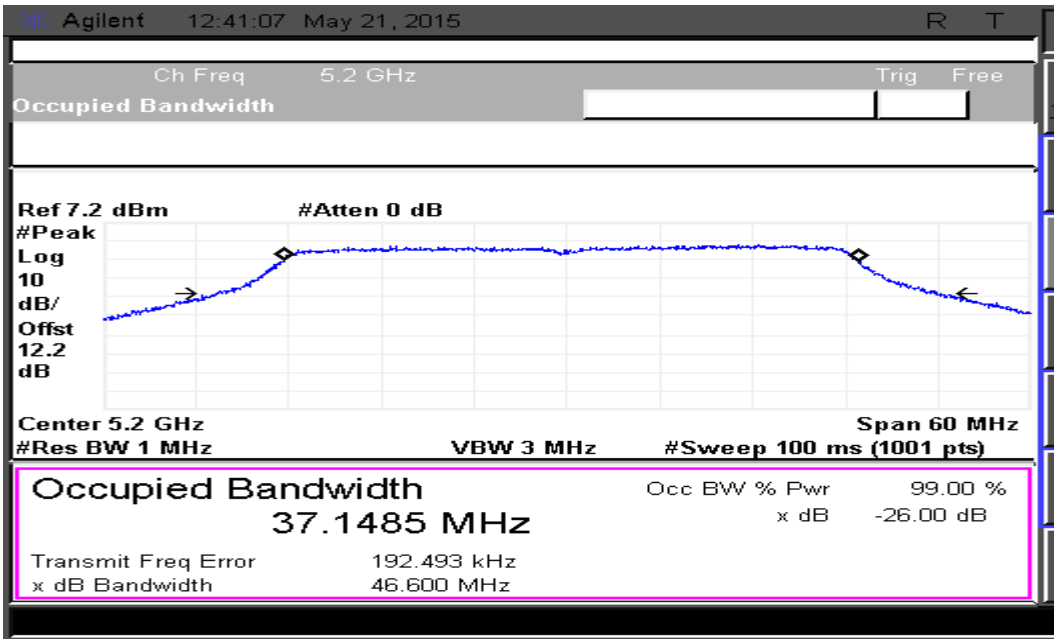


Figure 69: 99 Percent OBW measured at ch.0

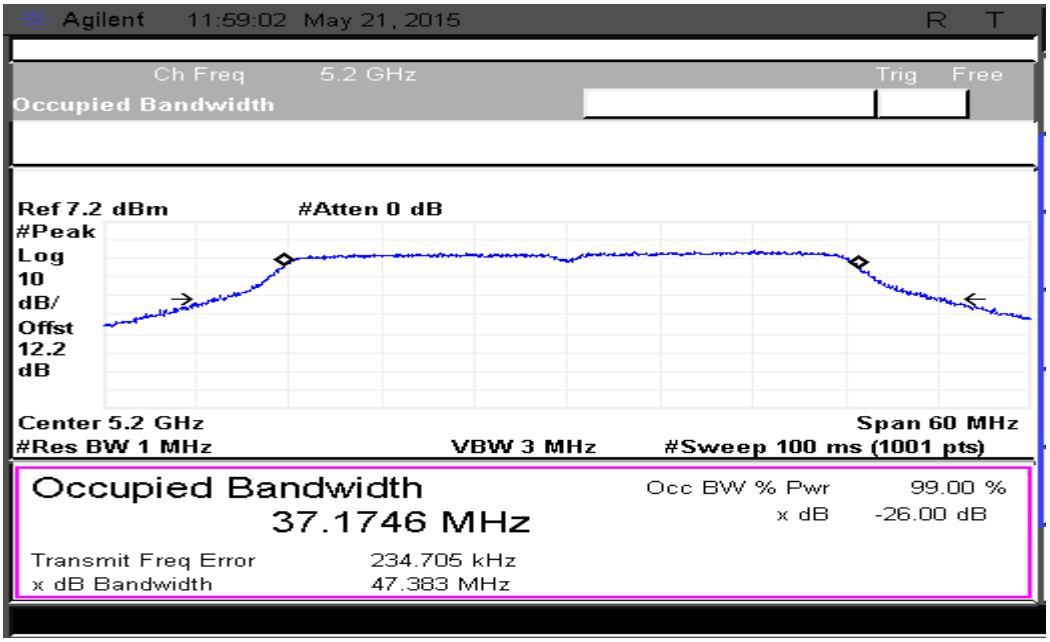


Figure 70: 99 Percent OBW measured at ch.1

5.3.3.7.3 40MHz MODULATION BW -HIGH CHANNEL_5220MHz

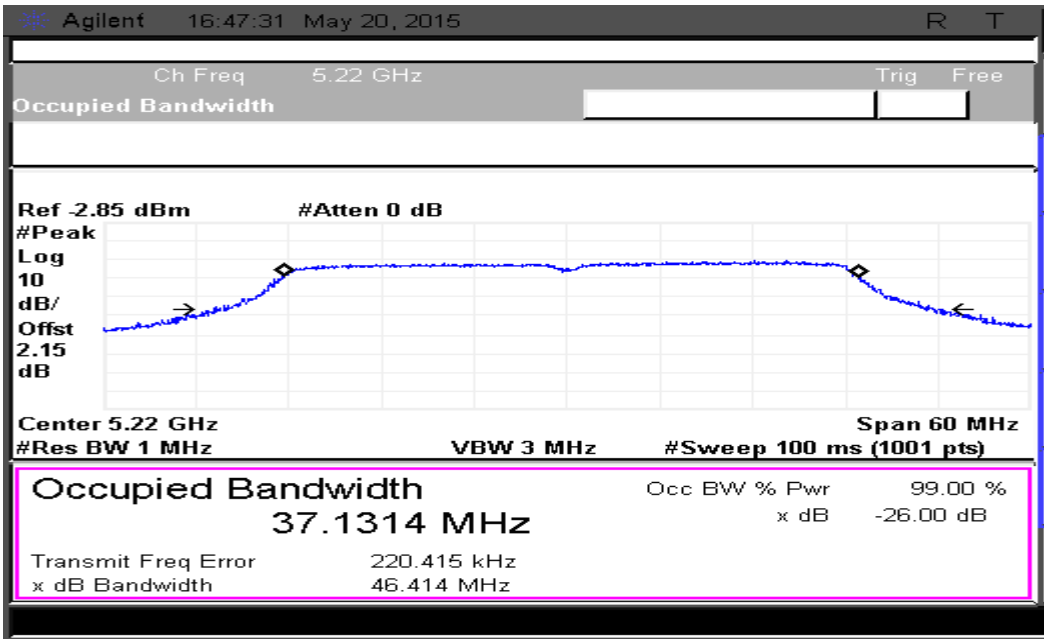


Figure 71: 99 Percent OBW measured at ch.0

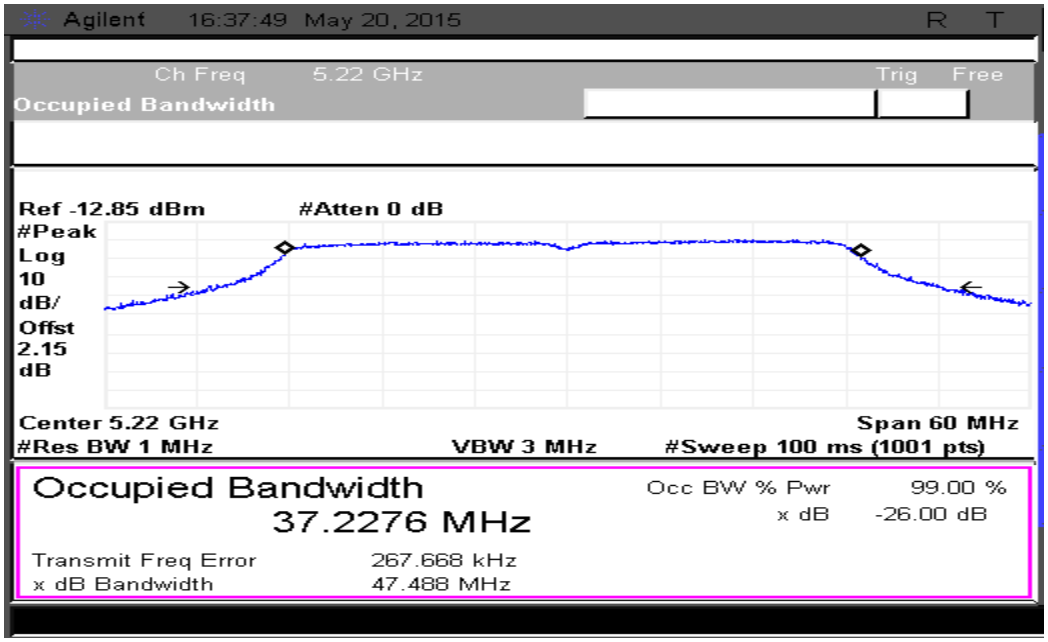


Figure 72: 99 Percent OBW measured at ch.1

5.3.3.7.4 5MHz Modulation BW-Low channel_5155MHz

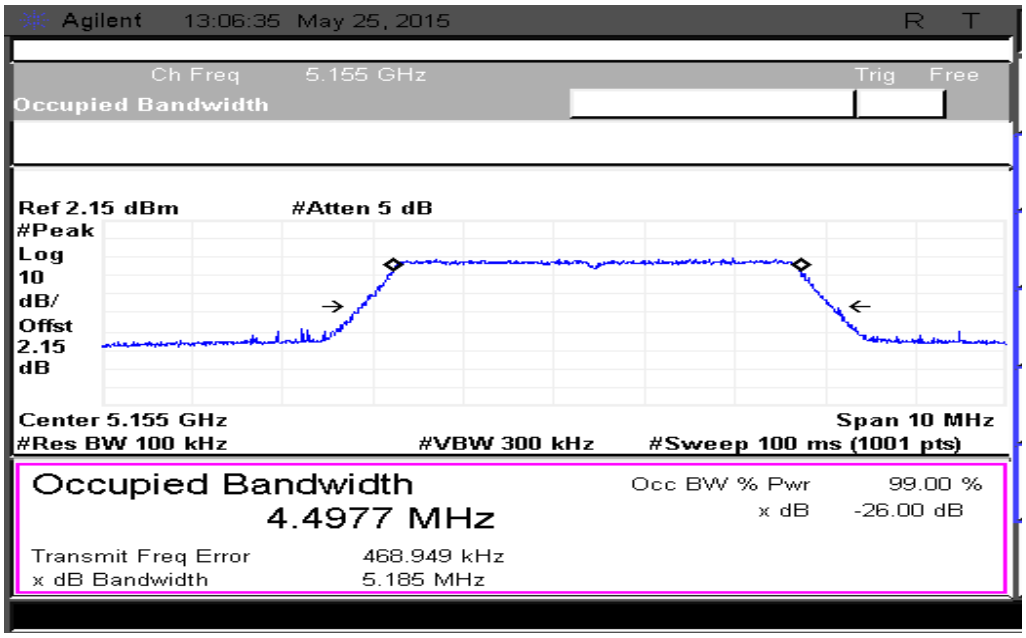


Figure 73: 99 Percent OBW measured at ch.0

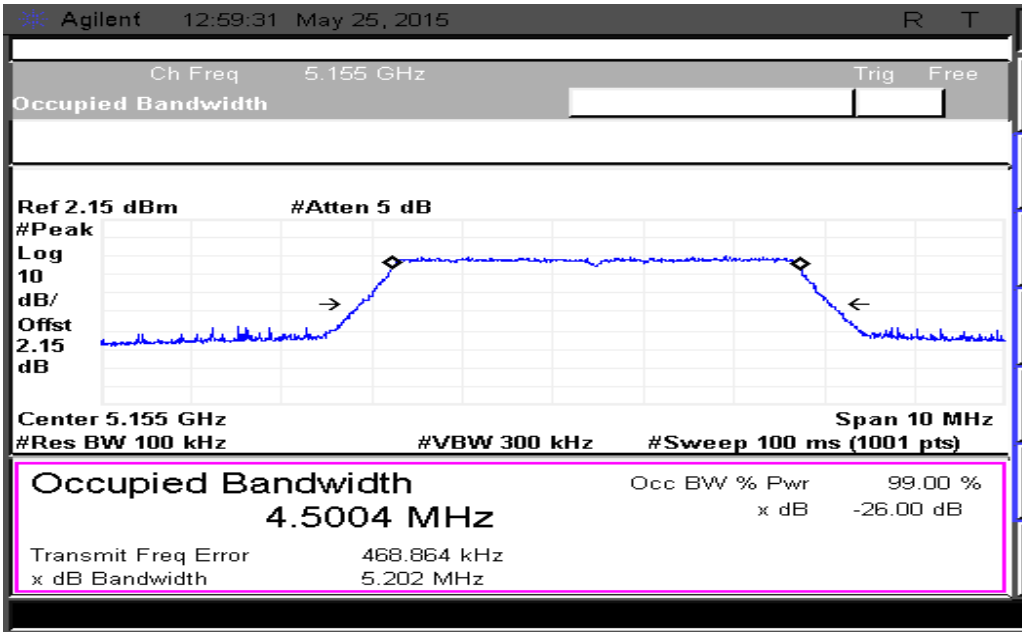


Figure 74: 99 Percent OBW measured at ch.1

5.3.3.7.5 5MHz Modulation BW-Mid channel_5200 MHz

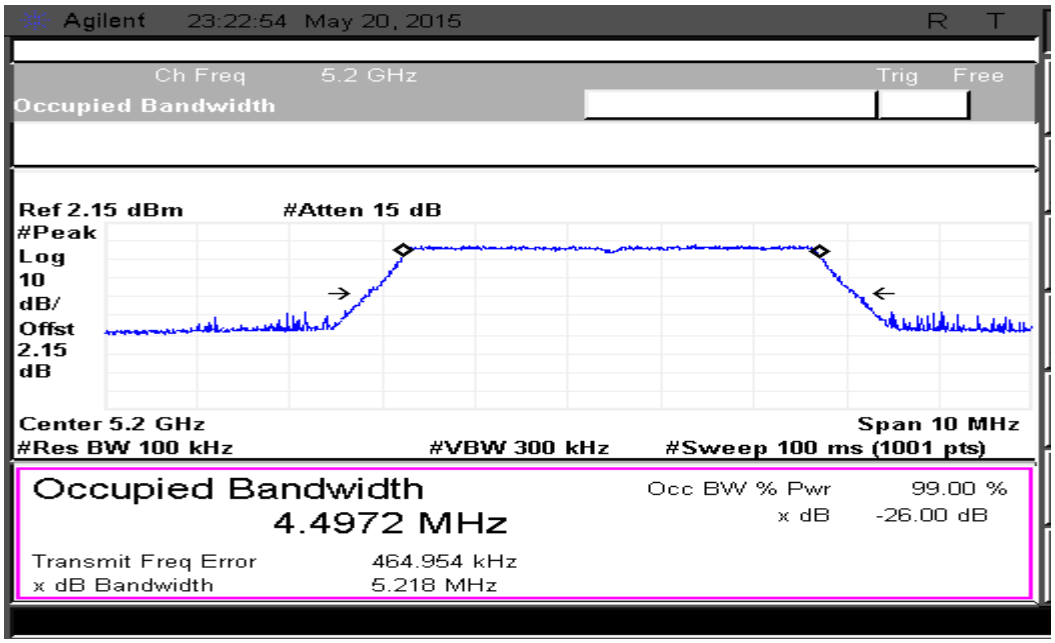


Figure 75: 99 Percent OBW measured at ch.0

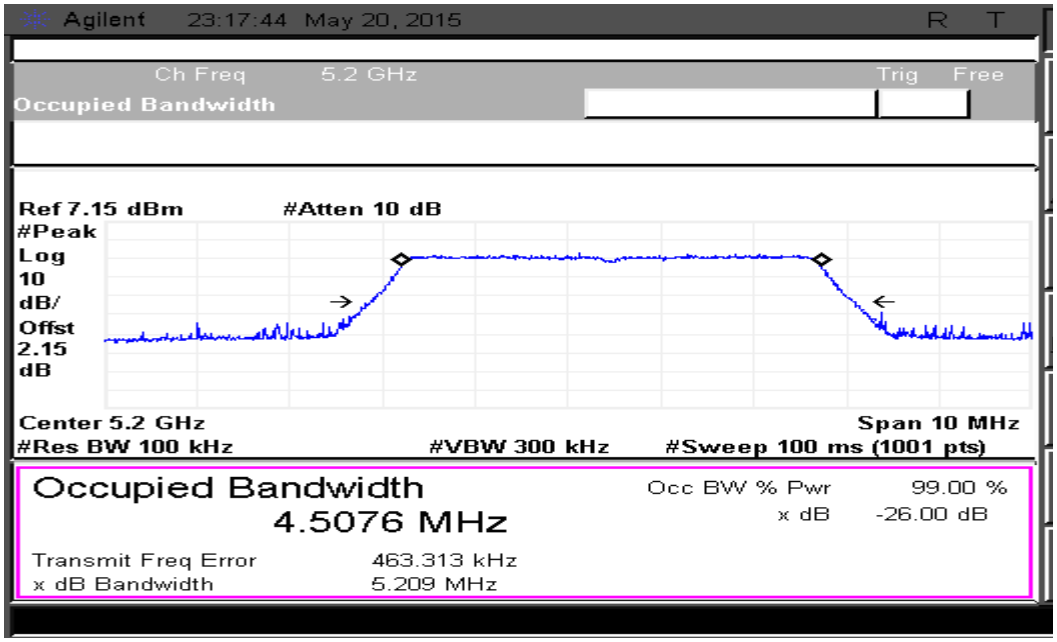


Figure 76: 99 Percent OBW measured at ch.1

5.3.3.7.6 5MHz Modulation BW-High channel_5245MHz

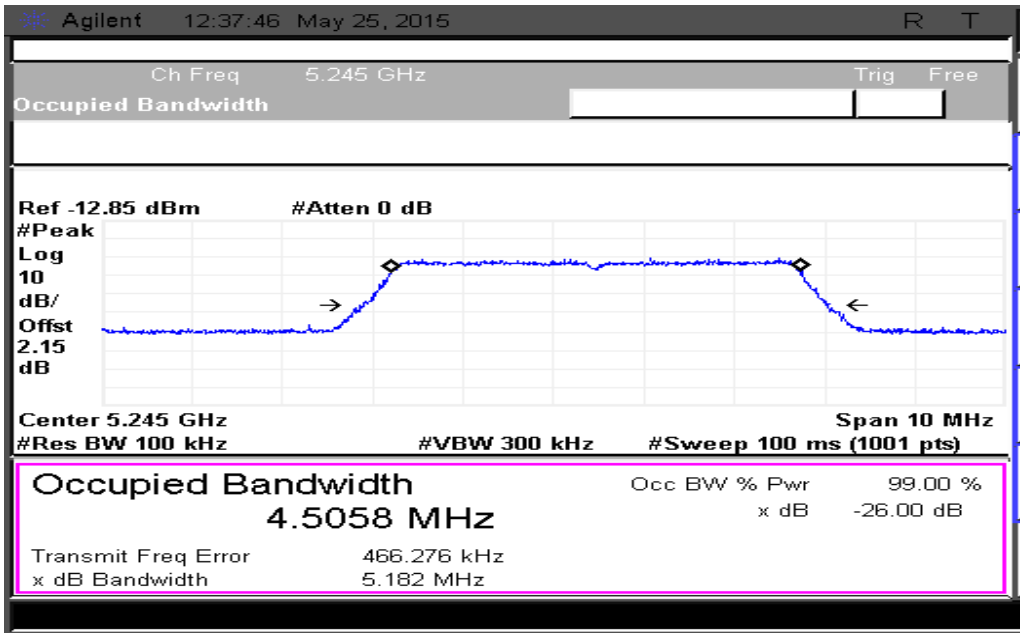


Figure 77: 99 Percent OBW measured at ch.0

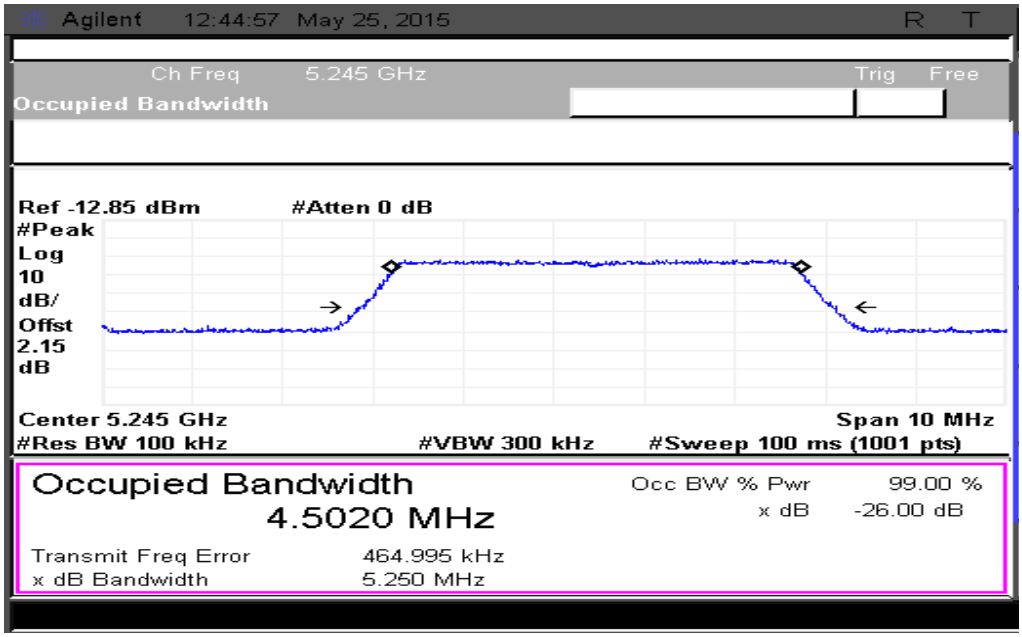


Figure 78: 99 Percent OBW measured at ch.1

5.3.3.8 RESULT

99 Percent Occupied Bandwidth for all channels in both 40MHz & 5MHz Modulation Bandwidths has been measured and tabulated in below table.

Test Condition	Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (MHz)
Basic	40	Ch. 0	5180	37.1279
Basic	40	Ch. 0	5200	37.1922
Basic	40	Ch. 0	5220	37.1076
Basic	40	Ch. 1	5180	36.2461
Basic	40	Ch. 1	5200	37.1734
Basic	40	Ch. 1	5220	37.1003
Basic	5	Ch. 0	5155	4.5090
Basic	5	Ch. 0	5200	4.5431
Basic	5	Ch. 0	5245	4.5051
Basic	5	Ch. 1	5155	4.5001
Basic	5	Ch. 1	5200	4.5267
Basic	5	Ch. 1	5245	4.5001
17dBi Antenna	40	Ch. 0	5180	37.1920
17dBi Antenna	40	Ch. 0	5200	37.1744
17dBi Antenna	40	Ch. 0	5220	37.1925
17dBi Antenna	40	Ch. 1	5180	37.1706
17dBi Antenna	40	Ch. 1	5200	37.2274
17dBi Antenna	40	Ch. 1	5220	37.1549
17dBi Antenna	5	Ch. 0	5155	4.5000
17dBi Antenna	5	Ch. 0	5200	4.4957
17dBi Antenna	5	Ch. 0	5245	4.5033
17dBi Antenna	5	Ch. 1	5155	4.4958
17dBi Antenna	5	Ch. 1	5200	4.5025
17dBi Antenna	5	Ch. 1	5245	4.5007
24dBi Dish	40	Ch. 0	5180	37.1665
24dBi Dish	40	Ch. 0	5200	37.1485
24dBi Dish	40	Ch. 0	5220	37.1314
24dBi Dish	40	Ch. 1	5180	37.1634
24dBi Dish	40	Ch. 1	5200	37.1746
24dBi Dish	40	Ch. 1	5220	37.2276
24dBi Dish	5	Ch. 0	5155	4.4977
24dBi Dish	5	Ch. 0	5200	4.4972
24dBi Dish	5	Ch. 0	5245	4.5058
24dBi Dish	5	Ch. 1	5155	4.5004
24dBi Dish	5	Ch. 1	5200	4.5076
24dBi Dish	5	Ch. 1	5245	4.5020

5.3.4 MAXIMUM CONDUCTED OUTPUT POWER

5.3.4.1 TEST SPECIFICATION

Test Standard	47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014
Test Procedure	ANSI C63.10-2013
Resolution Bandwidth	1 MHz
Video Bandwidth	3 MHz
Sweep Time	100ms
Attenuation	Auto
Test Mode	Conducted
Detector	Average
Input Voltage	120V AC
Input Frequency	60 Hz
Temperature	22.0°C
Humidity	56.0%
Tested By	Subhendu
Test Date	12th May 2015 to 25th May 2015

5.3.4.2 LIMITS

As per 15.407 (a) (2) we need to select 1W (30dBm) limit or 17+10log(B) dBm whichever is lower.
Where, B is 26dB emission bandwidth

Below limit is used if the transmit antenna gain is less than 6dBi

Modulation Bandwidth (MHz)	Fixed Limit as per standard (dBm)	Calculated Limit (dBm)	Limit to be considered (2 chains) (dBm)	Limit to be considered (1 chain) (dBm)
40	30	33.0206	30	27
5	30	23.9897	24	21

For Cambium, we have 17dBi External antenna. So limits to be considered as per below table

Modulation Bandwidth (MHz)	Limit as per above table (dBm)	Limit to be considered (2 chains) (dBm)	Limit to be considered (1 chain) (dBm)
40	30	19	16
5	24	13	10

Here the limit is reduced by 11dBm as per clause given in standard that if antenna gain is more than 6dBi, the limit should be reduced by the amount in dB that the gain of the antenna exceeds 6dBi.

Also we have 24dBi dish. So limits to be considered as per below table

Modulation Bandwidth (MHz)	Limit as per above table (dBm)	Limit to be considered (2 chains) (dBm)	Limit to be considered (1 chain) (dBm)
40	30	12	9
5	24	6	3

Here the limit is reduced by 18dBm as per clause given in standard that if antenna gain is more than 6dBi, the limit should be reduced by the amount in dB that the gain of the antenna exceeds 6dBi.

5.3.4.3 TEST SETUP

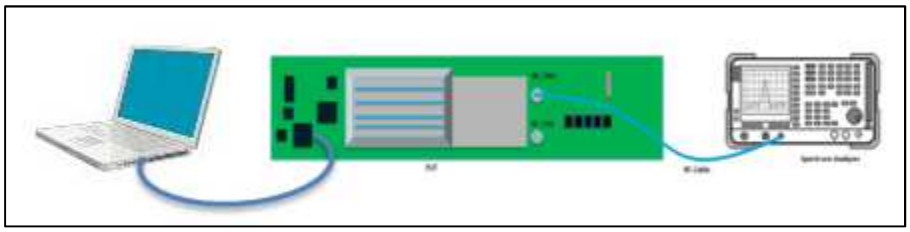


Figure 79: Typical test setup for Conducted RF Test setup

5.3.4.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per the **"789033 D02 General UNII Test Procedures New Rules v01".** The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. Captured the data from spectrum analyzer and compared with the limits specified in the standard.

5.3.4.5 RESULT (SUPPORTING GRAPHS / DATA) FOR BASIC CONDITION

5.3.4.5.1 40MHz MODULATION BW-LOW CHANNEL_5180MHz

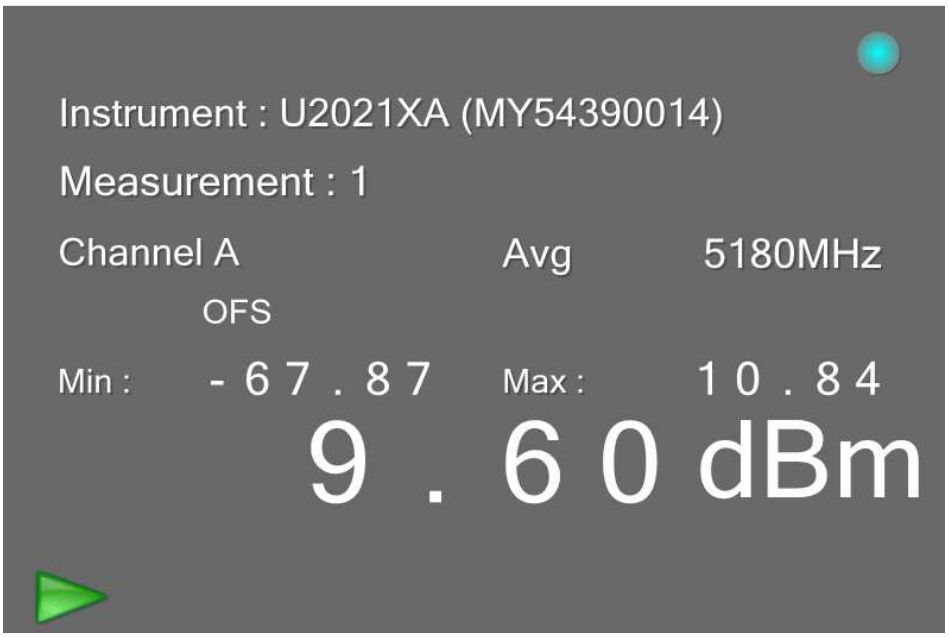


Figure 80: Maximum Conducted Output power measured at ch.0

Figure 81: Maximum Conducted Output power measured at ch.1

5.3.4.5.2 40MHz Modulation BW-Mid channel_5200MHz

Figure 82: Maximum Conducted Output power measured at ch.0

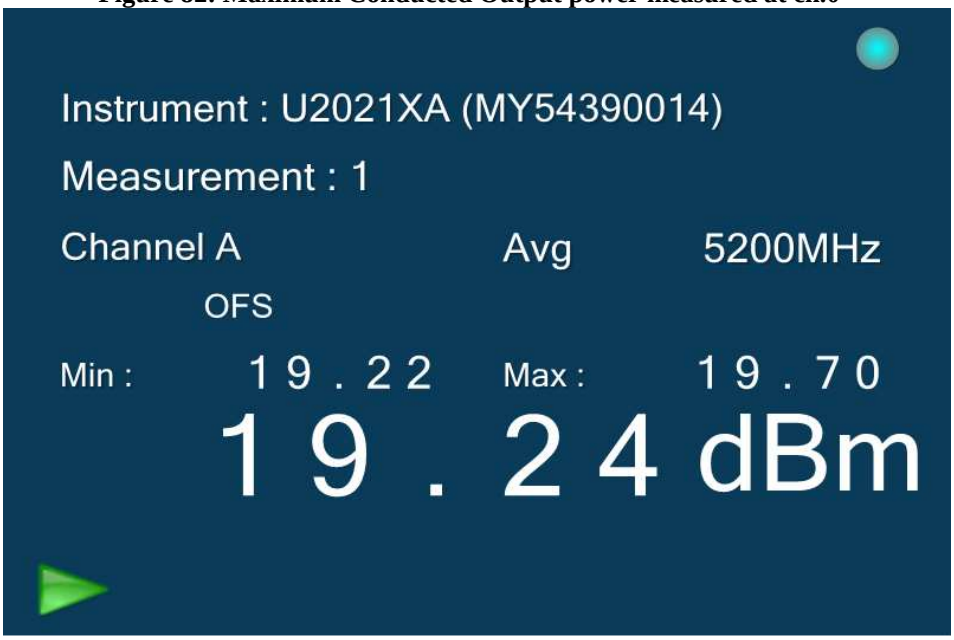


Figure 83: Maximum Conducted Output power measured at ch.1

5.3.4.5.3 40MHz Modulation BW-High channel_5220MHz

Figure 84: Maximum Conducted Output power measured at ch.0

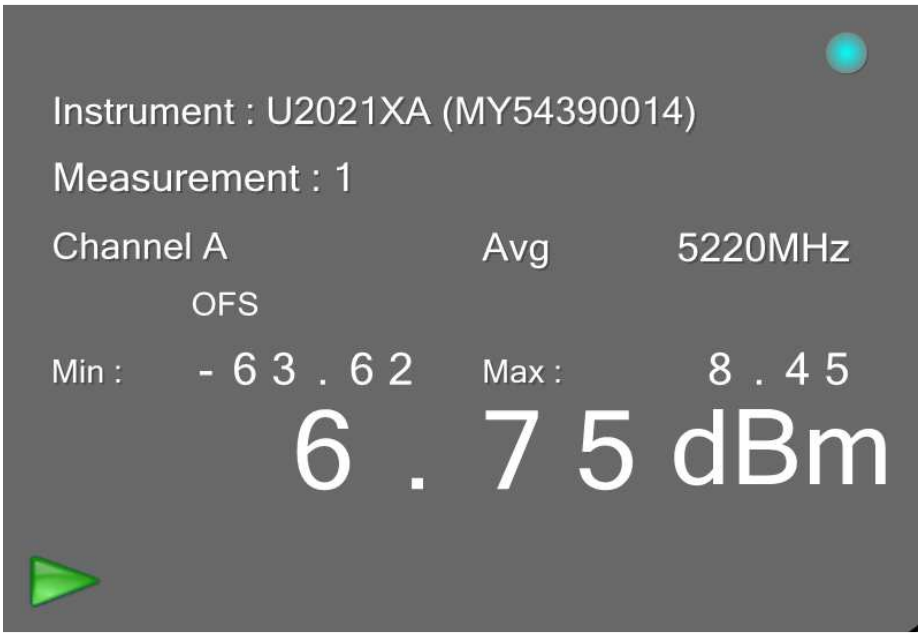


Figure 85: Maximum Conducted Output power measured at ch.1

5.3.4.5.4 5MHz Modulation BW-Low channel_5155MHz

Figure 86: Maximum Conducted Output power measured at ch.0

Figure 87: Maximum Conducted Output power measured at ch.1

5.3.4.5.5 5MHz Modulation BW-Mid channel_5200 MHz

Figure 88: Maximum Conducted Output power measured at ch.0

Figure 89: Maximum Conducted Output power measured at ch.1

5.3.4.5.6 5MHz Modulation BW-High channel_5245MHz

Figure 90: Maximum Conducted Output power measured at ch.0

Figure 91: Maximum Conducted Output power measured at ch.1

5.3.4.6 RESULT (SUPPORTING GRAPHS / DATA) FOR 17DBI ANTENNA CONDITION

5.3.4.6.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

Figure 92: Maximum Conducted Output power measured at ch.0

Figure 93: Maximum Conducted Output power measured at ch.1

5.3.4.6.2 40MHz Modulation BW-Mid channel_5200 MHz

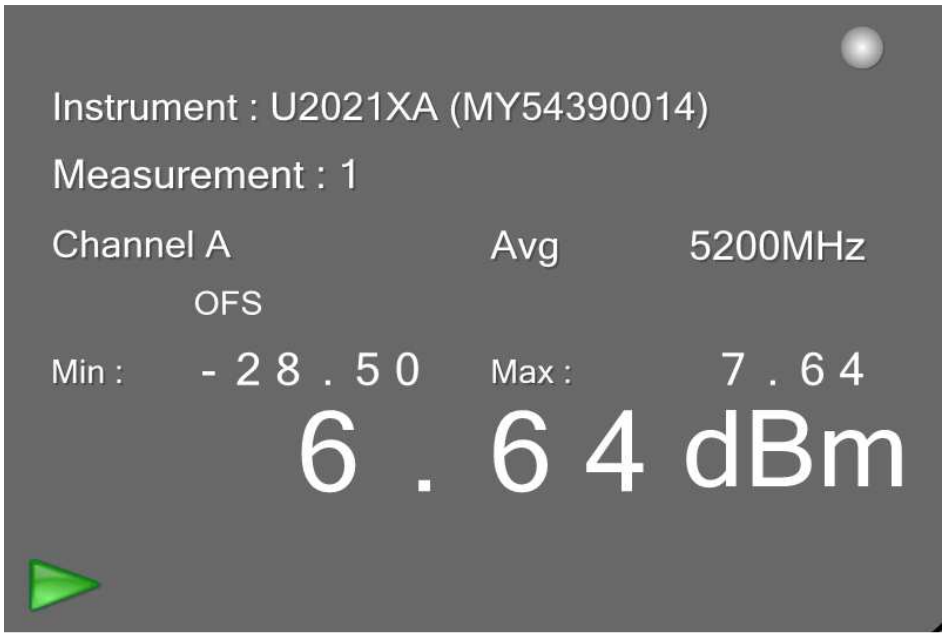


Figure 94: Maximum Conducted Output power measured at ch.0

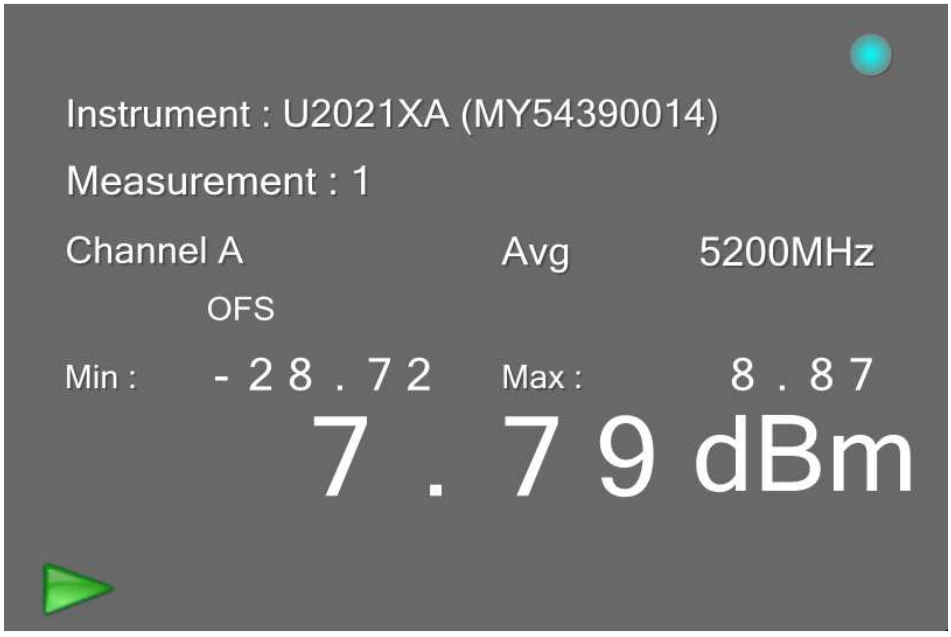


Figure 95: Maximum Conducted Output power measured at ch.1

5.3.4.6.3 40MHz Modulation BW-High channel_5220MHz

Figure 96: Maximum Conducted Output power measured at ch.0

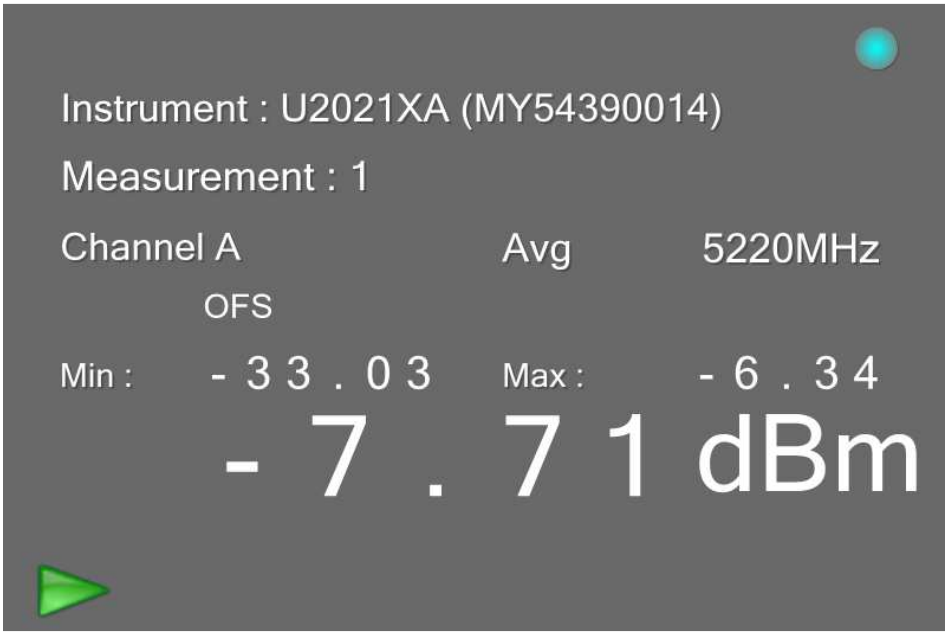


Figure 97: Maximum Conducted Output power measured at ch.1

5.3.4.6.4 5MHz Modulation BW-Low channel_5155MHz

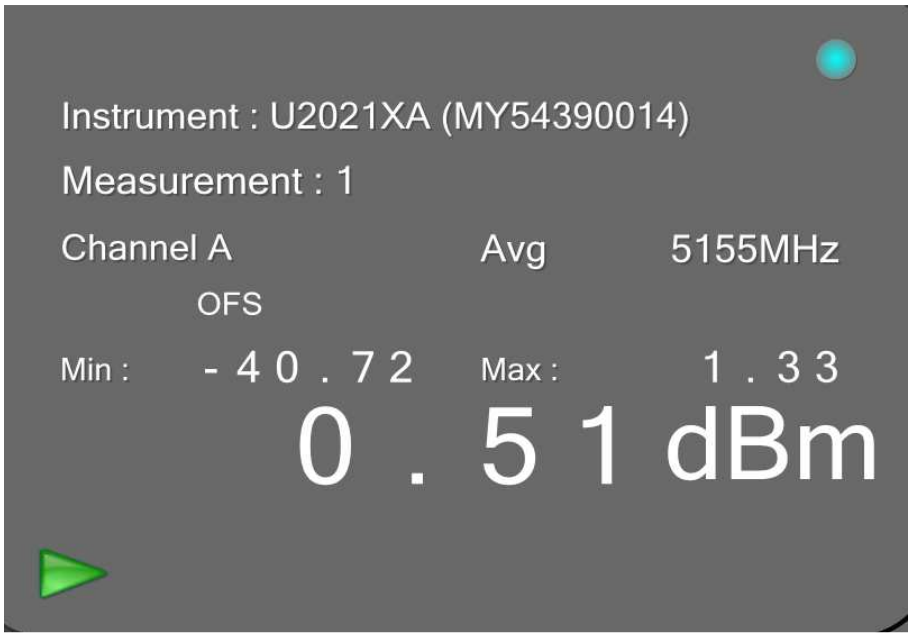


Figure 98: Maximum Conducted Output power measured at ch.0

Figure 99: Maximum Conducted Output power measured at ch.1

5.3.4.6.5 5MHz Modulation BW-Mid channel_5200MHz

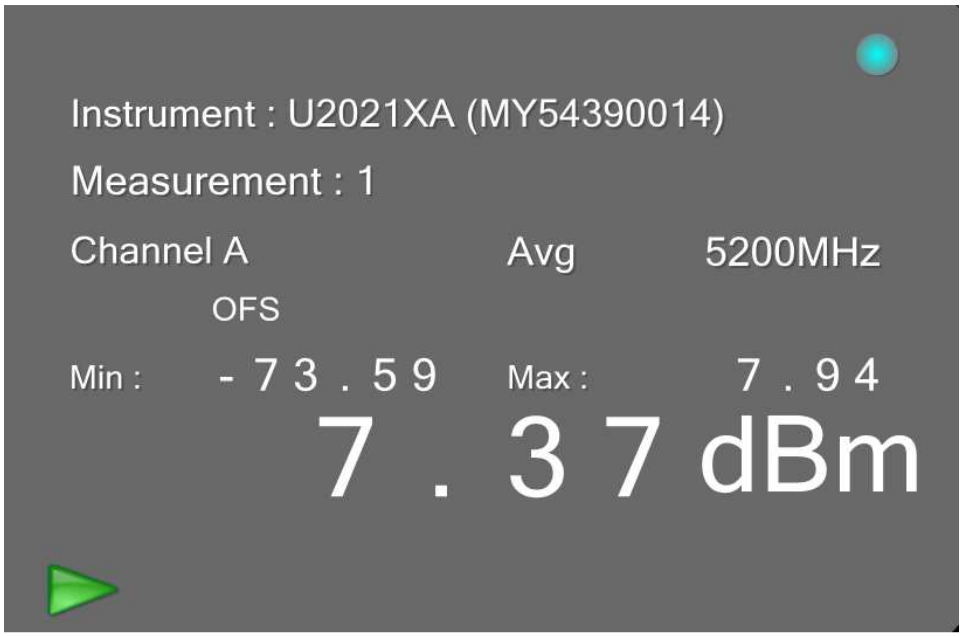


Figure 100: Maximum Conducted Output power measured at ch.0

Figure 101: Maximum Conducted Output power measured at ch.1

5.3.4.6.6 5MHz Modulation BW-High channel_5245MHz

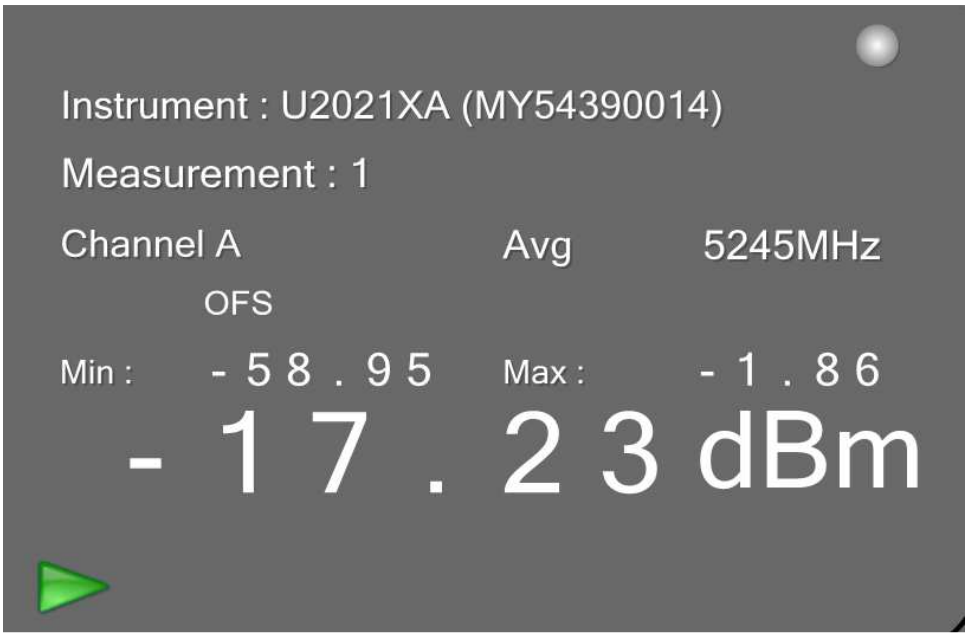


Figure 102: Maximum Conducted Output power measured at ch.0

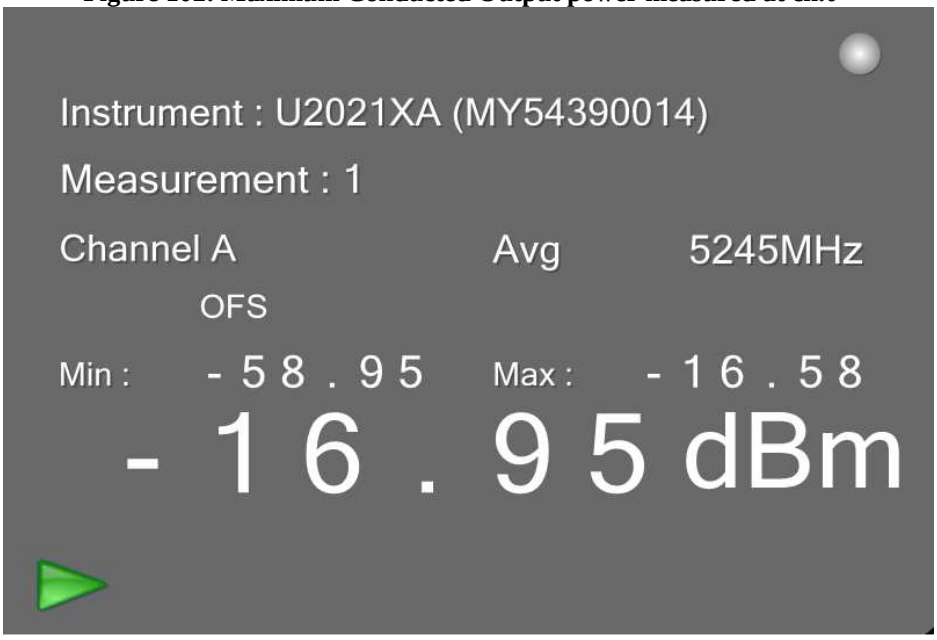


Figure 103: Maximum Conducted Output power measured at ch.1

5.3.4.7 RESULT (SUPPORTING GRAPHS / DATA) FOR 24DBI DISH CONDITION

5.3.4.7.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

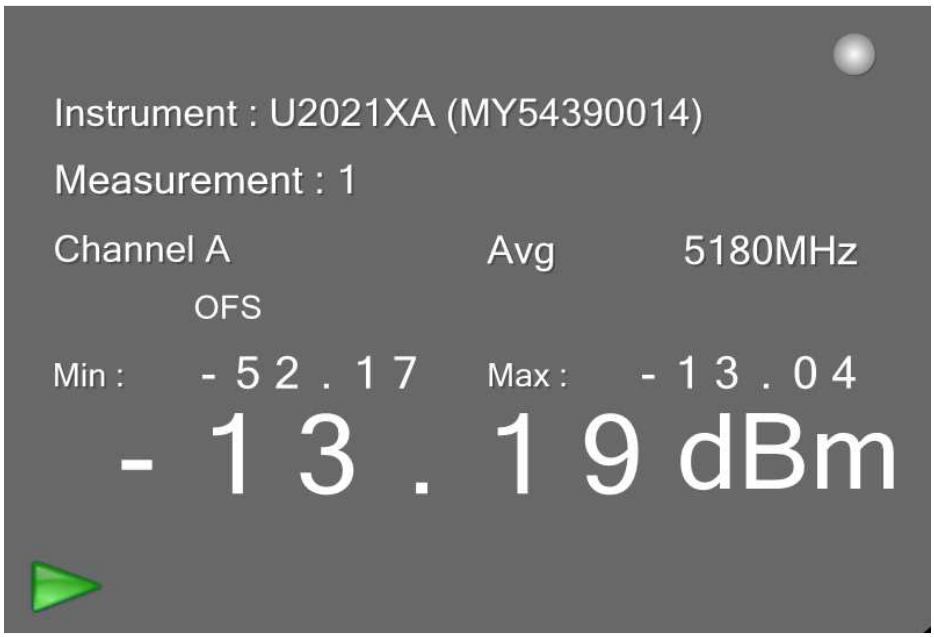


Figure 104: Maximum Conducted Output power measured at ch.0

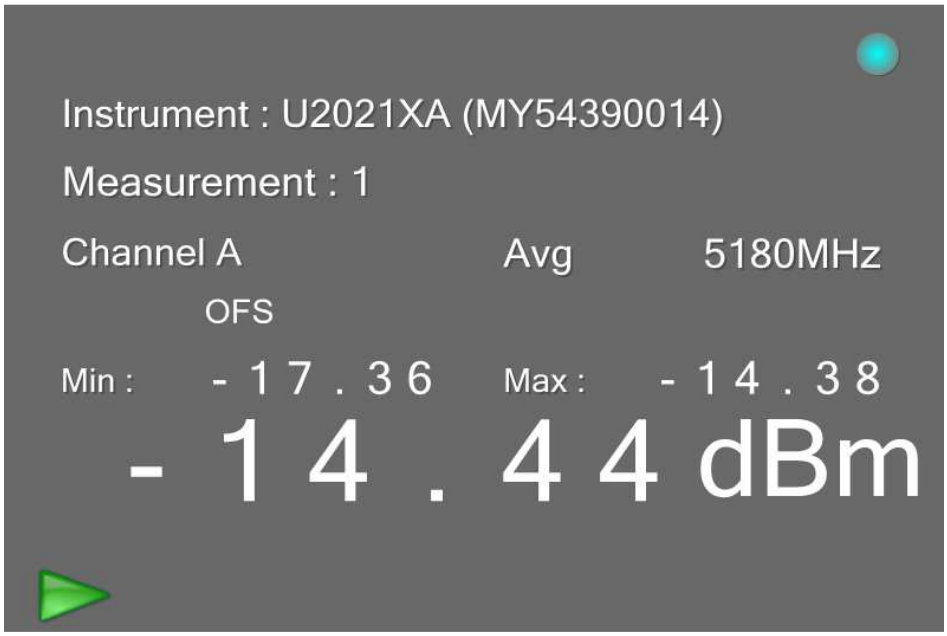


Figure 105: Maximum Conducted Output power measured at ch.1

5.3.4.7.2 40MHz MODULATION BW-MID CHANNEL_5200 MHz

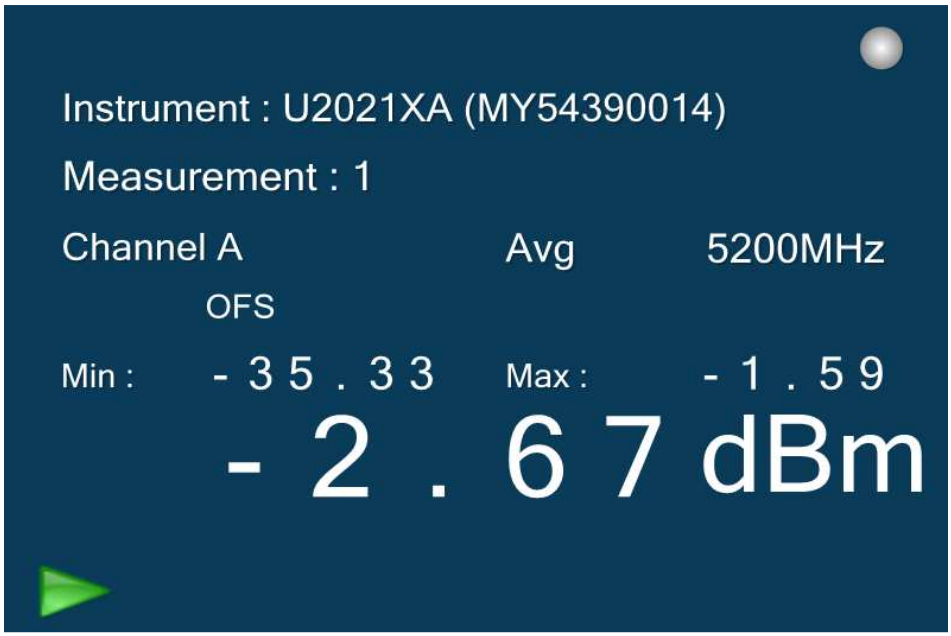


Figure 106: Maximum Conducted Output power measured at ch.0

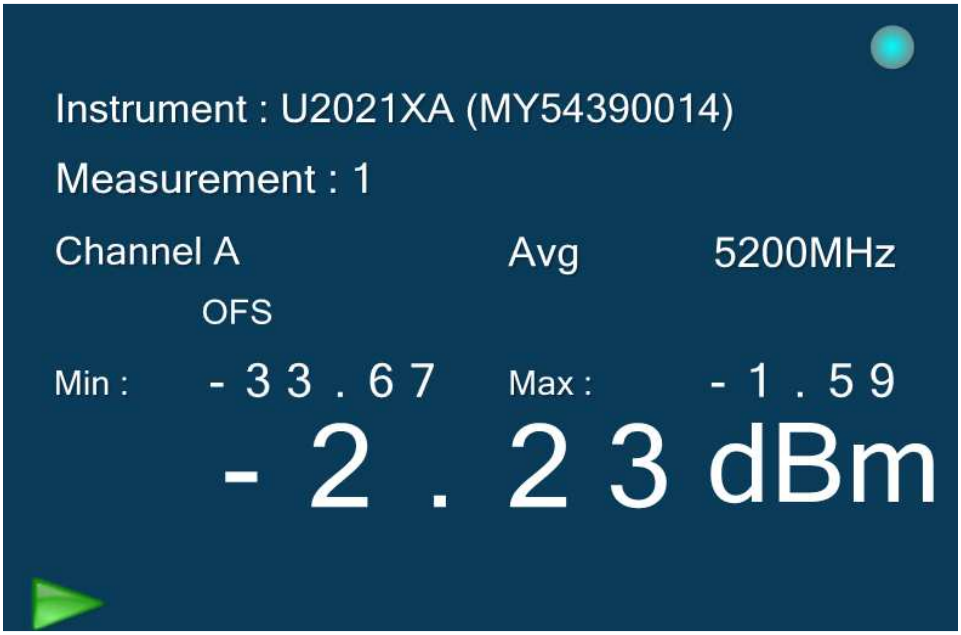


Figure 107: Maximum Conducted Output power measured at ch.1

5.3.4.7.3 40MHz Modulation BW-High channel_5220MHz

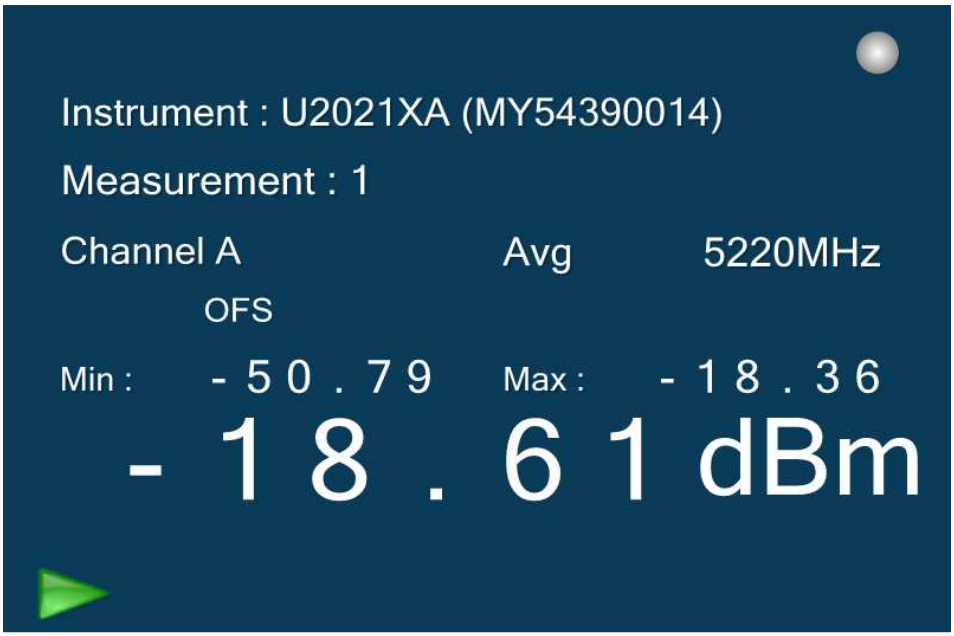


Figure 108: Maximum Conducted Output power measured at ch.0

Figure 109: Maximum Conducted Output power measured at ch.1

5.3.4.7.4 5MHz Modulation BW-Low channel_5155MHz

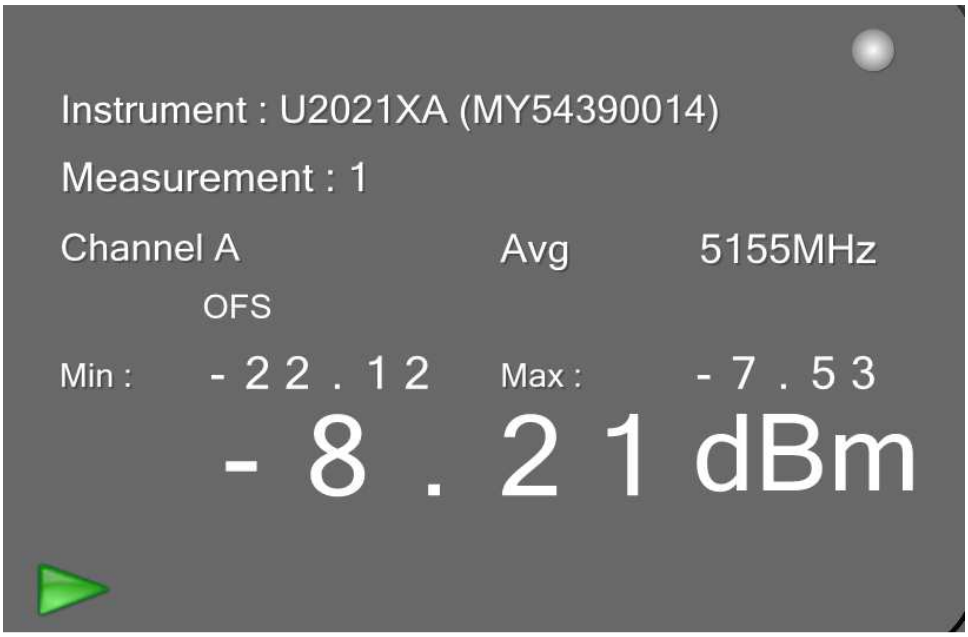


Figure 110: Maximum Conducted Output power measured at ch.0

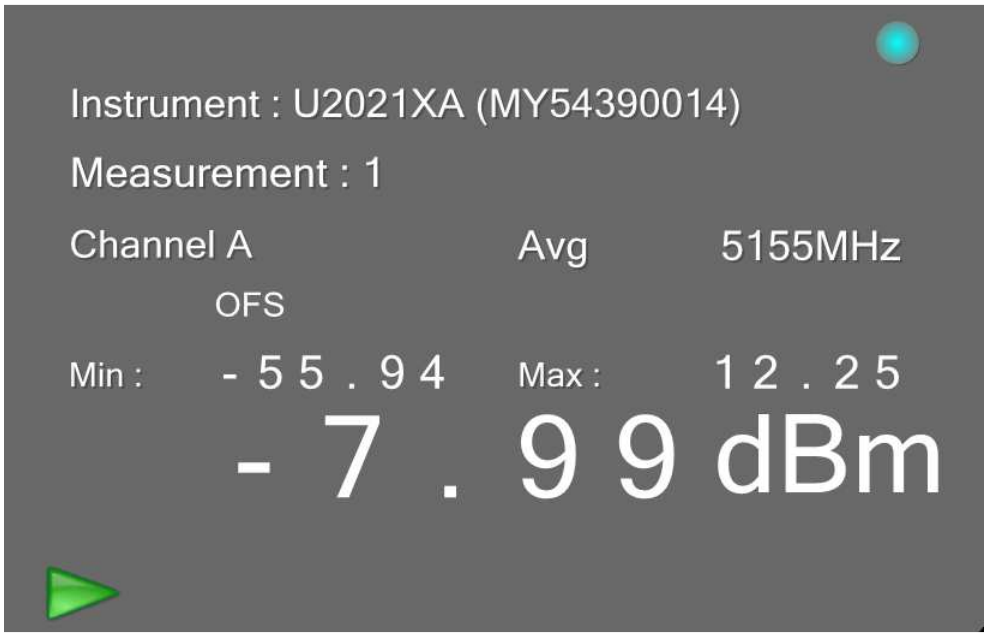


Figure 111: Maximum Conducted Output power measured at ch.1

5.3.4.7.5 5MHz Modulation BW-Mid channel_5200 MHz

Figure 112: Maximum Conducted Output power measured at ch.0

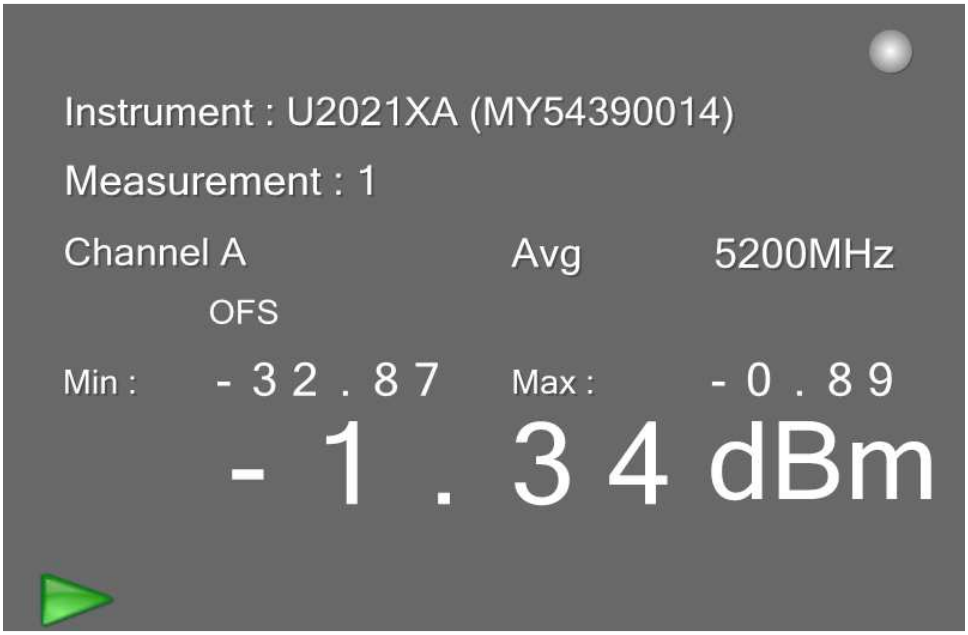


Figure 113: Maximum Conducted Output power measured at ch.1

5.3.4.7.6 5MHz Modulation BW-High channel_5245MHz

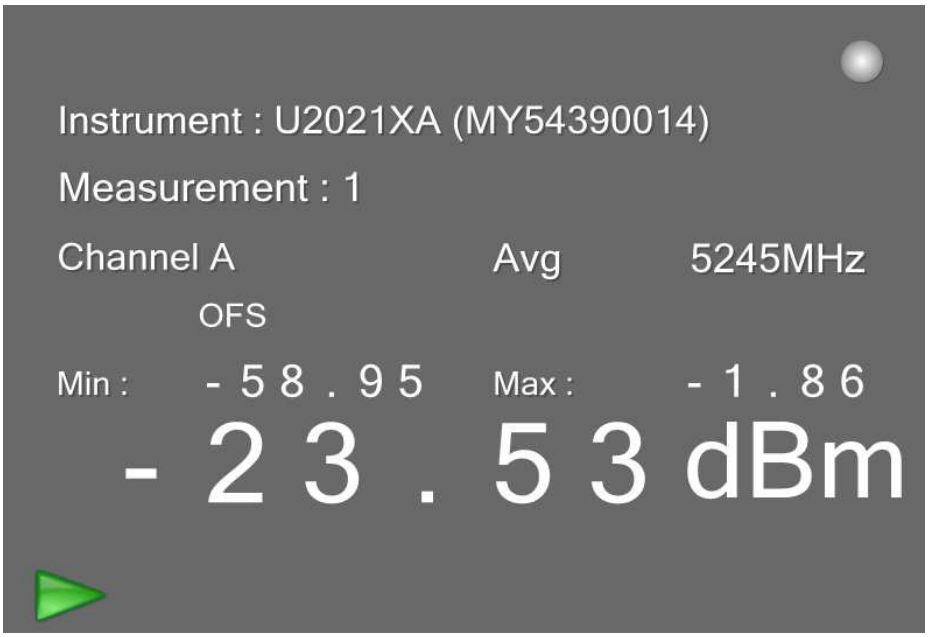


Figure 114: Maximum Conducted Output power measured at ch.0

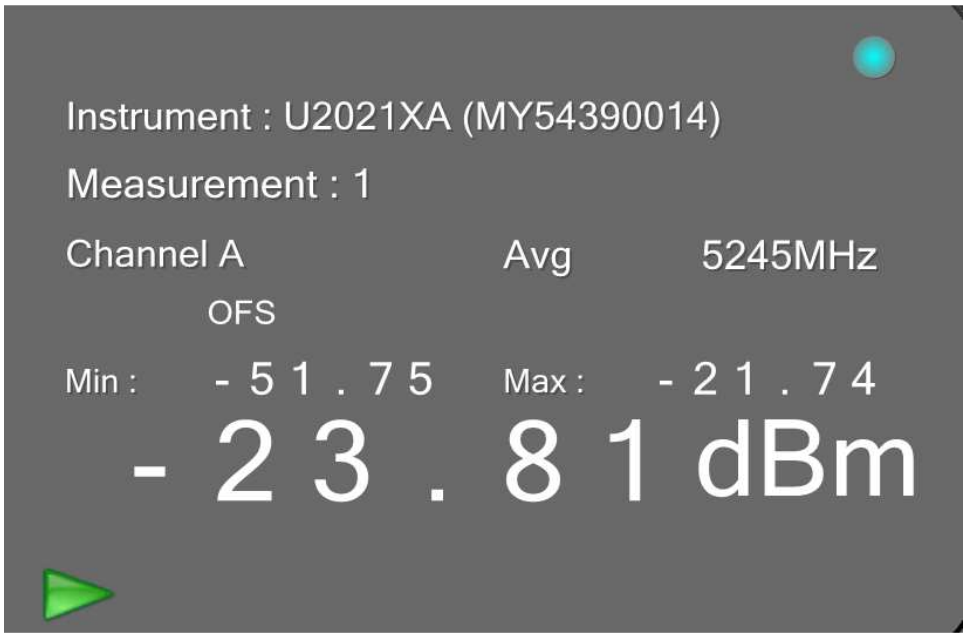


Figure 115: Maximum Conducted Output power measured at ch.1

5.3.4.8 RESULT

Maximum Conducted Output power for all channels in both 40MHz &5MHz Modulation Bandwidths is within the specified limit. Refer below table for consolidated data.

5.3.4.8.1 BASIC CONDITION

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (dBm)
40	Ch. 0	5180	9.60
40	Ch. 0	5200	16.61
40	Ch. 0	5220	8.08
40	Ch. 1	5180	10.47
40	Ch. 1	5200	19.24
40	Ch. 1	5220	6.75
5	Ch. 0	5155	11.10
5	Ch. 0	5200	20.40
5	Ch. 0	5245	-5.04
5	Ch. 1	5155	11.12
5	Ch. 1	5200	20.93
5	Ch. 1	5245	-2.63

Consolidated values across channels and Final Power

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Consolidated Power (dBm)	Limit (dBm)	Result
40	Ch. 0& Ch. 1	5180	13.067	30	PASS
40	Ch. 0 & Ch. 1	5200	21.131	30	PASS
40	Ch. 0 & Ch. 1	5220	10.476	30	PASS
5	Ch. 0 & Ch. 1	5155	14.120	24	PASS
5	Ch. 0 & Ch. 1	5200	23.68	24	PASS
5	Ch. 0 & Ch. 1	5245	-0.659	24	PASS

5.3.4.8.2 17DBI ANTENNA CONDITION

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (dBm)
40	Ch. 0	5180	-4.60
40	Ch. 0	5200	6.64
40	Ch. 0	5220	-4.82
40	Ch. 1	5180	-3.70
40	Ch. 1	5200	7.79
40	Ch. 1	5220	-7.71
5	Ch. 0	5155	0.51
5	Ch. 0	5200	7.37
5	Ch. 0	5245	-17.23
5	Ch. 1	5155	-1.00
5	Ch. 1	5200	5.78
5	Ch. 1	5245	-16.95

Consolidated values across channels and Final Power

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Consolidated Power (dBm)	Limit (dBm)	Result
40	Ch. 0& Ch. 1	5180	-1.116	19	PASS
40	Ch. 0 & Ch. 1	5200	10.263	19	PASS
40	Ch. 0 & Ch. 1	5220	-3.018	19	PASS
5	Ch. 0 & Ch. 1	5155	2.830	13	PASS
5	Ch. 0 & Ch. 1	5200	9.873	13	PASS
5	Ch. 0 & Ch. 1	5245	-14.077	13	PASS

5.3.4.8.3 24DBI DISH CONDITION

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (dBm)
40	Ch. 0	5180	-13.19
40	Ch. 0	5200	-2.67
40	Ch. 0	5220	-18.61
40	Ch. 1	5180	-14.44
40	Ch. 1	5200	-2.23
40	Ch. 1	5220	-19.02
5	Ch. 0	5155	-8.21
5	Ch. 0	5200	0.48
5	Ch. 0	5245	-23.53
5	Ch. 1	5155	-7.99
5	Ch. 1	5200	-1.34
5	Ch. 1	5245	-23.81

Consolidated values across channels and Final Power

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Consolidated Power (dBm)	Limit (dBm)	Result
40	Ch. 0& Ch. 1	5180	-10.760	12	PASS
40	Ch. 0 & Ch. 1	5200	0.566	12	PASS
40	Ch. 0 & Ch. 1	5220	-15.800	12	PASS
10	Ch. 0 & Ch. 1	5155	-5.088	6	PASS
10	Ch. 0 & Ch. 1	5200	2.675	6	PASS
10	Ch. 0 & Ch. 1	5245	-20.657	6	PASS

5.3.5 PEAK POWER SPECTRAL DENSITY

5.3.5.1 TEST SPECIFICATION

Test Standard	47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014
Test Procedure	ANSI C63.10-2013
Frequency Range	5150MHz to 5250MHz
Resolution Bandwidth	1MHz
Video Bandwidth	3MHz
Sweep Time	100msec
Attenuation	Auto
Test Mode	Conducted
Detector	Average
Input Voltage	120V AC
Input Frequency	60 Hz
Temperature	22.0°C
Humidity	56.0%
Tested By	Subhendu
Test Date	12th May to 25th May 2015

5.3.5.2 LIMITS

Test condition	Limit (dBm/MHz) – 2 chains	Limit (dBm/MHz) – 1 chain
Basic limit	17	14
17dBi External antenna limit	6*	3*
24dBi dish	-1*	-4*

*: As per standard if antenna gain is more than 6dBi, then the limit should be reduced by the amount in dB that the gain of the antenna exceeds 6dBi

5.3.5.3 TEST SETUP

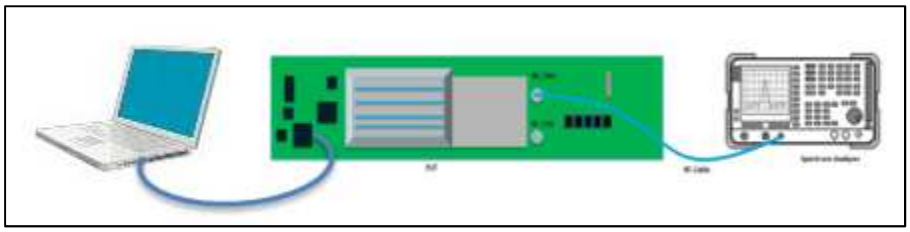


Figure 116: Typical test setup for Conducted Test setup

5.3.5.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per Sections F & E (2) (b) of **"789033 D02 General UNII Test Procedures New Rules v01".** The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. Captured the data from spectrum analyzer and compared with the limits specified in the standard.

5.3.5.5 RESULT (SUPPORTING GRAPHS / DATA) FOR BASIC CONDITION

5.3.5.5.1 40MHz MODULATION BW-LOW CHANNEL_5180MHz

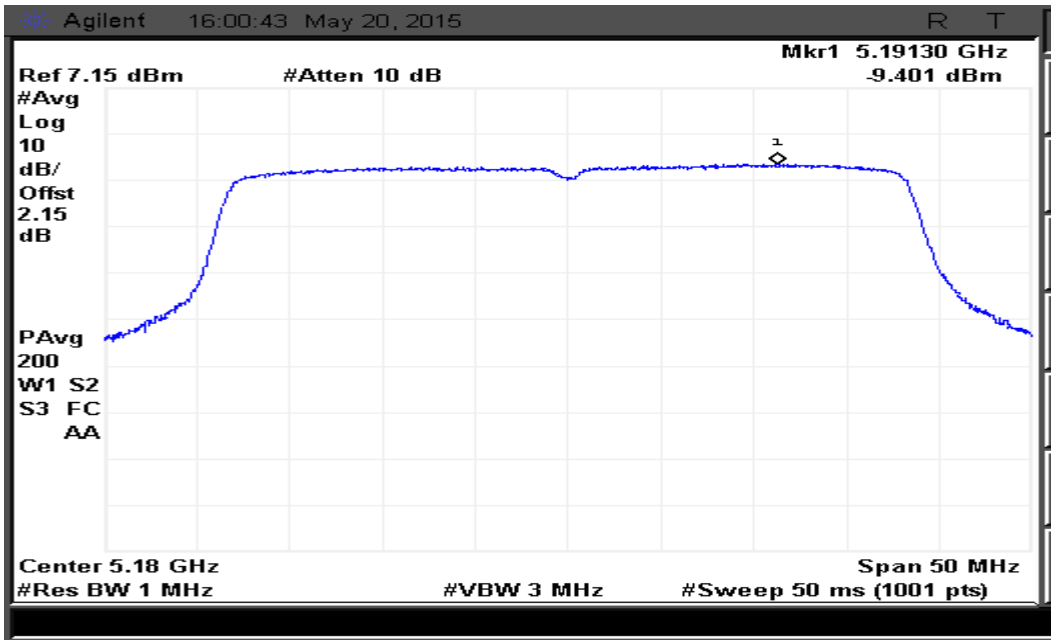


Figure 117: Power Spectral density measured at Ch. 0

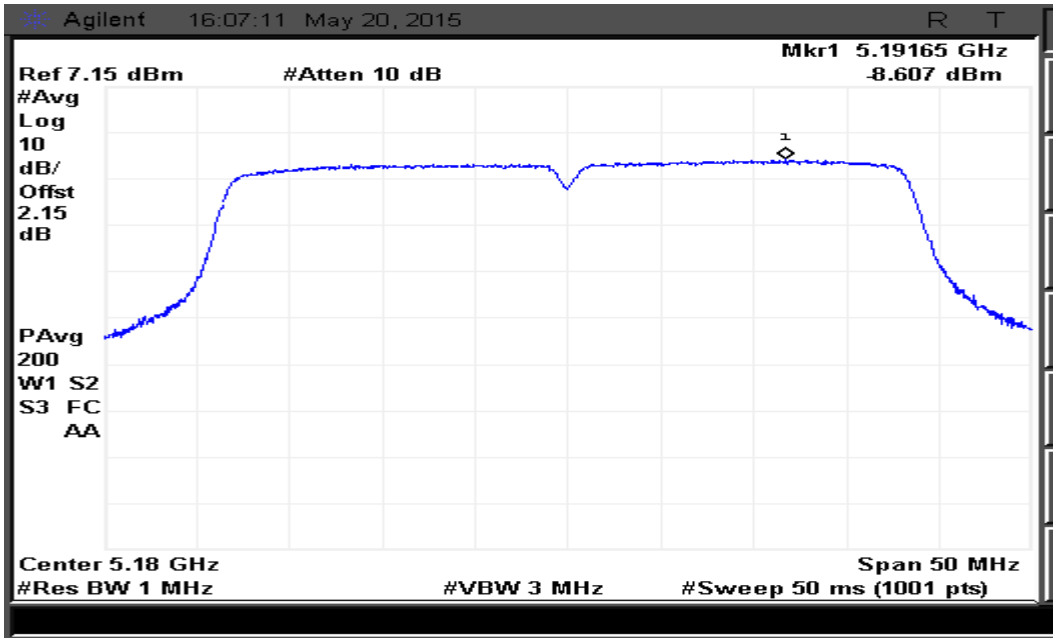


Figure 118: Power Spectral density measured at Ch. 1

5.3.5.5.2 40MHz Modulation BW-Mid channel_5200MHz

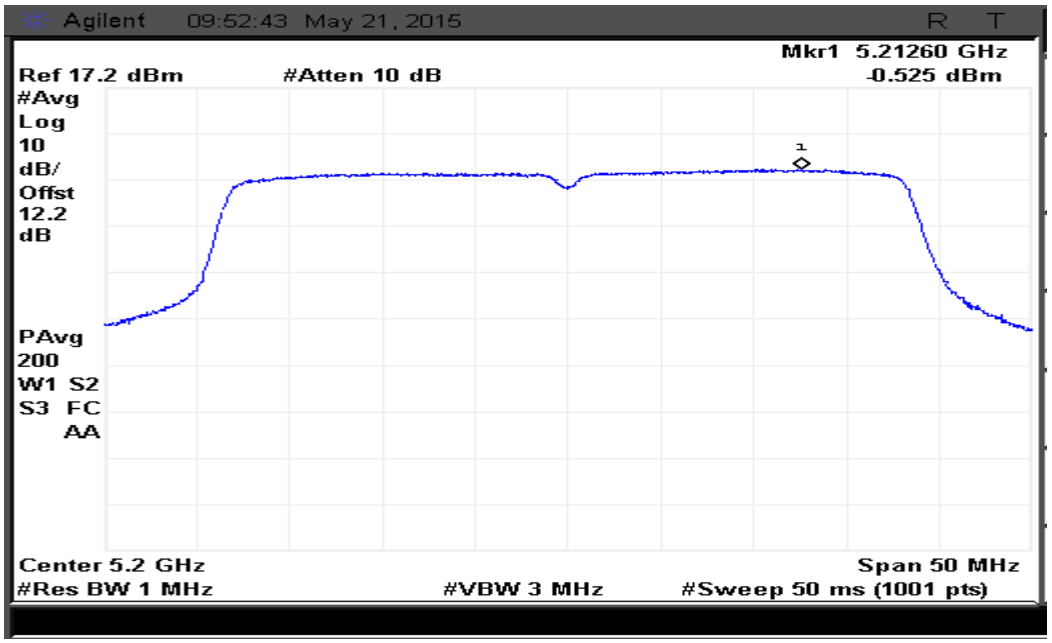


Figure 119: Power Spectral density measured at Ch. 0

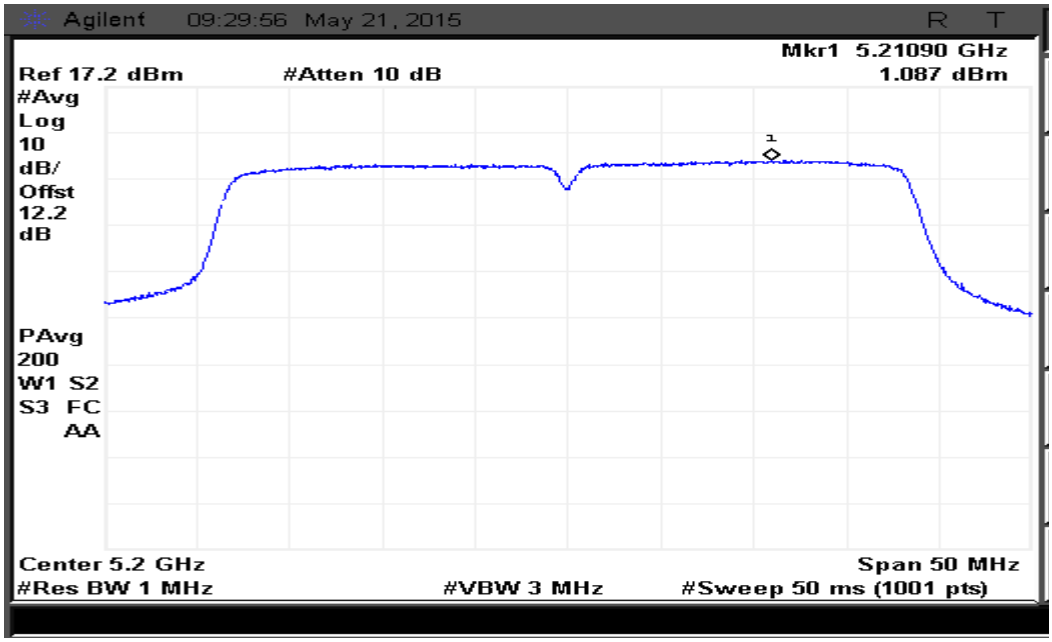


Figure 120: Power Spectral density measured at Ch. 1

5.3.5.5.3 40MHz Modulation BW-High channel_5220MHz

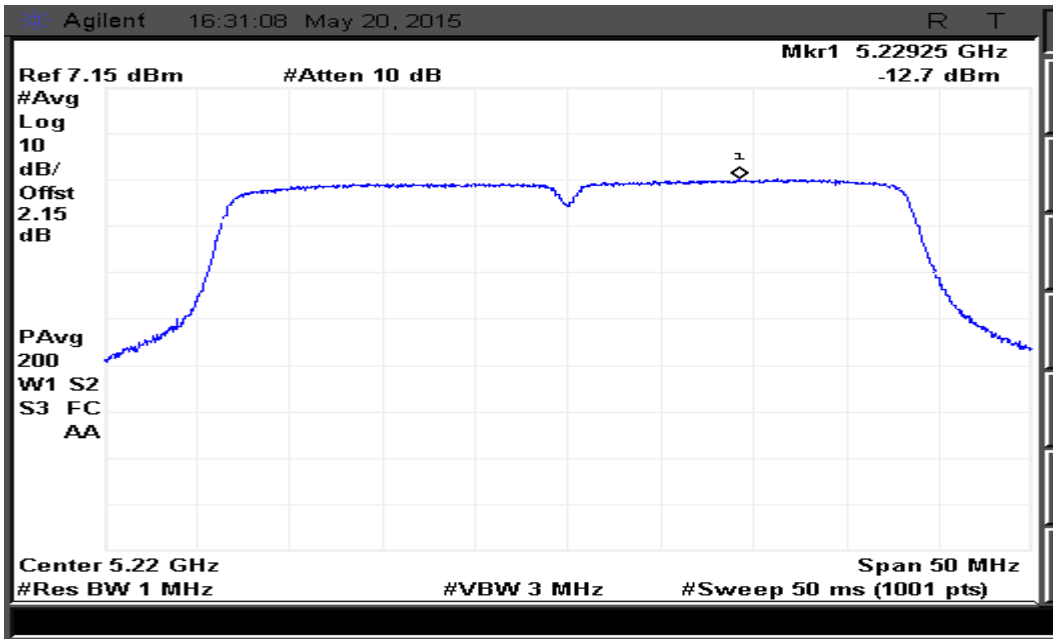


Figure 121: Power Spectral density measured at Ch. 0

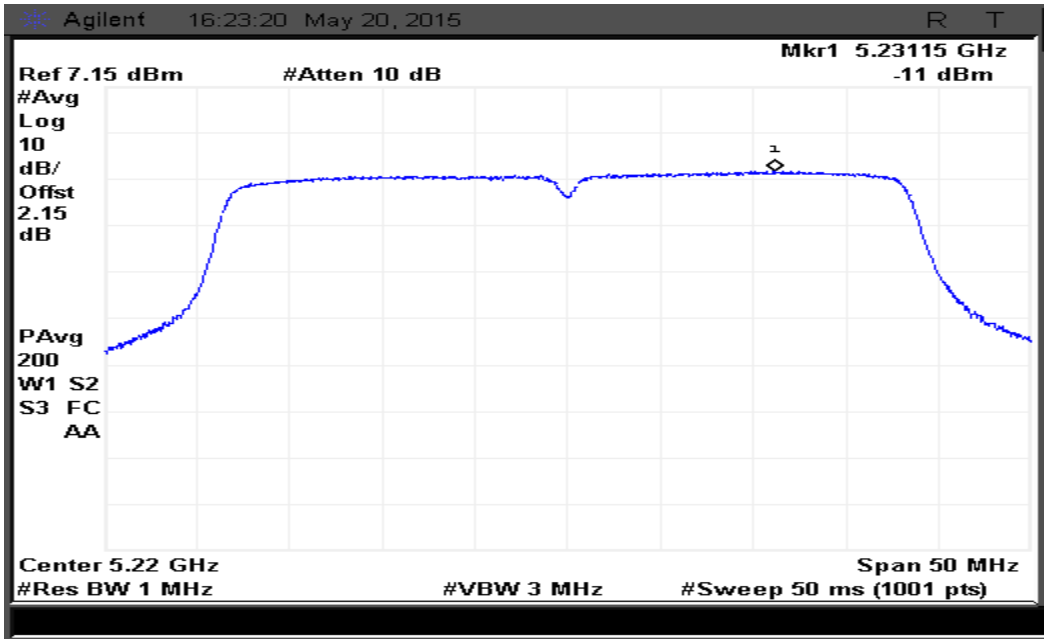


Figure 122: Power Spectral density measured at Ch. 1

5.3.5.5.4 5MHz Modulation BW-Low channel_5155MHz

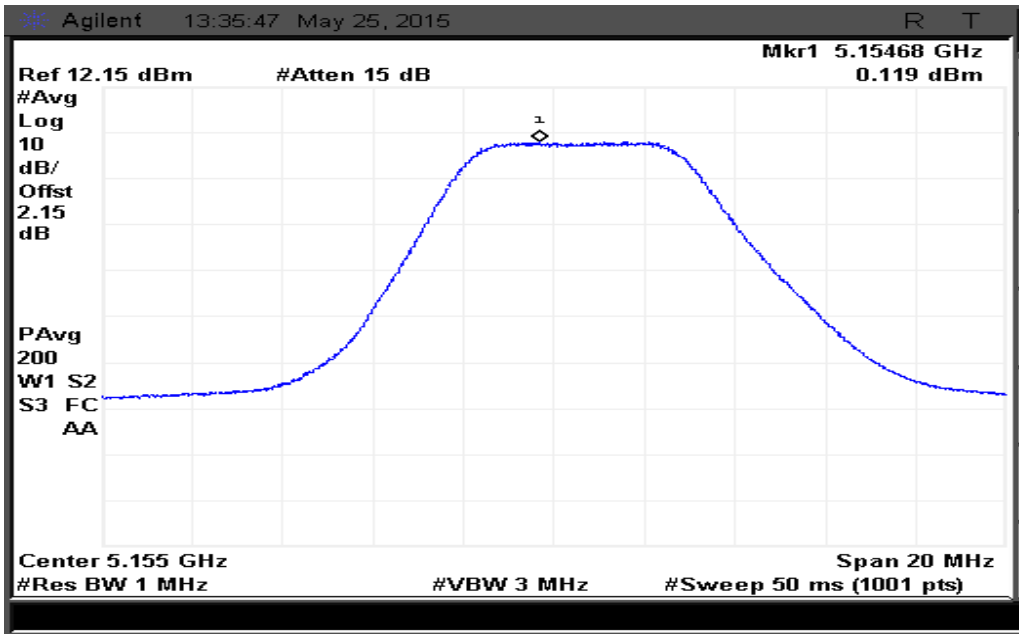


Figure 123: Power Spectral density measured at Ch. 0

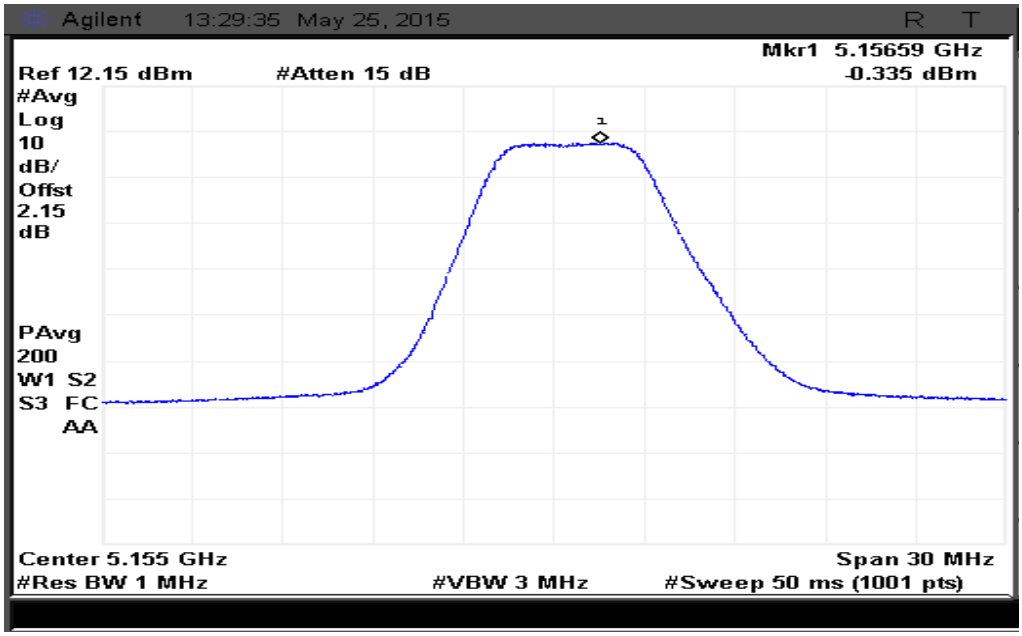


Figure 124: Power Spectral density measured at Ch. 1

5.3.5.5.5 5MHz Modulation BW-Mid channel_5200 MHz

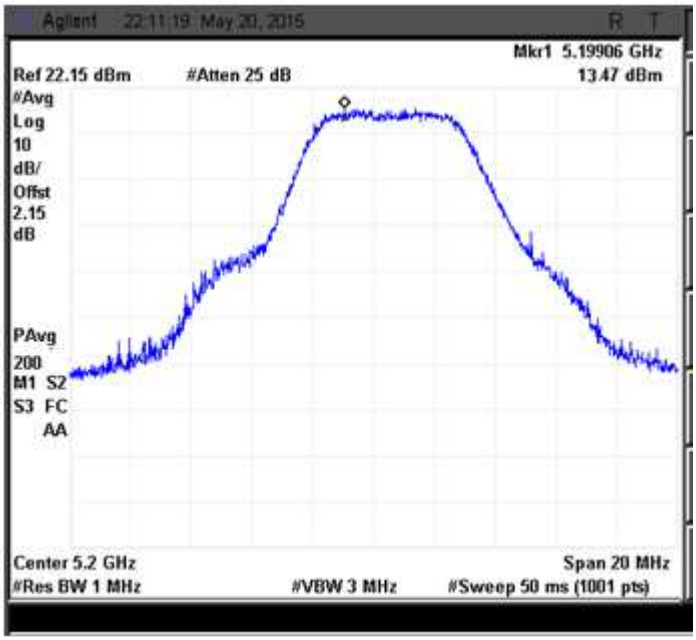


Figure 125: Power Spectral density measured at Ch. 0

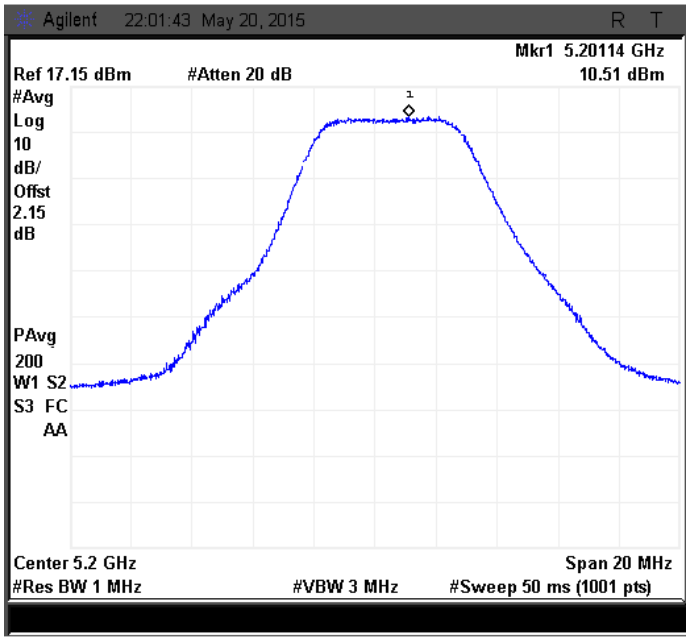


Figure 126: Power Spectral density measured at Ch. 1

5.3.5.5.6 5MHz Modulation BW-High channel_5245MHz

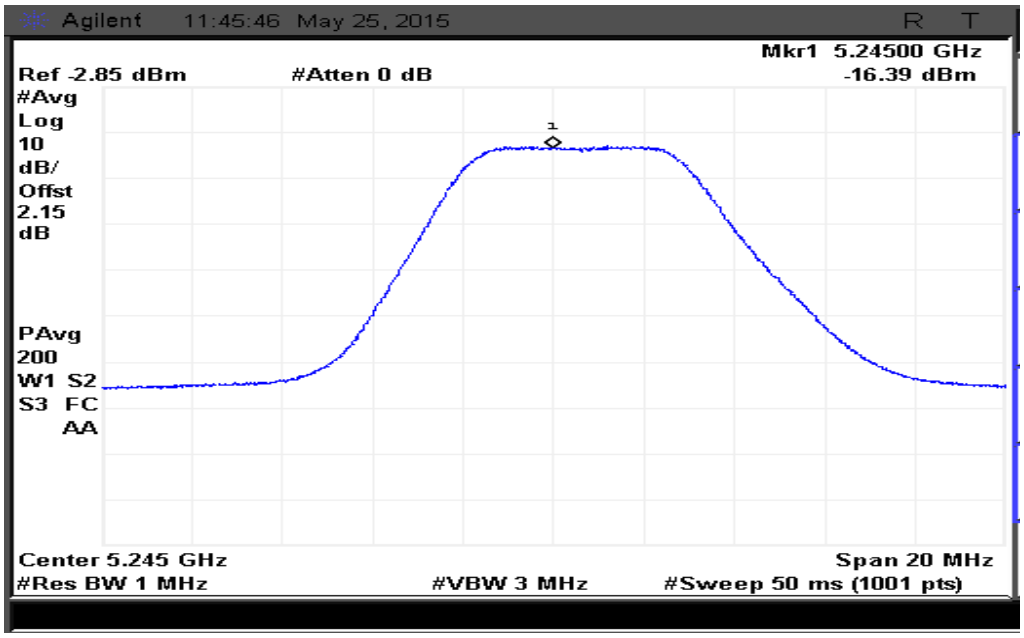


Figure 127: Power Spectral density measured at Ch. 0

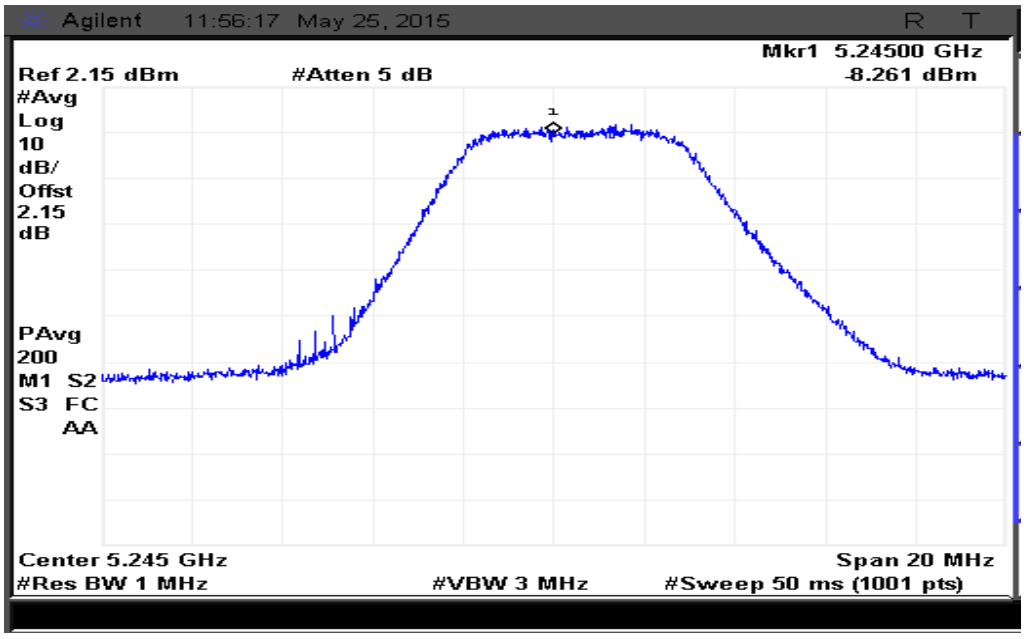


Figure 128: Power Spectral density measured at Ch. 1

5.3.5.6 RESULT (SUPPORTING GRAPHS / DATA) FOR 17DBI ANTENNA CONDITION

5.3.5.6.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

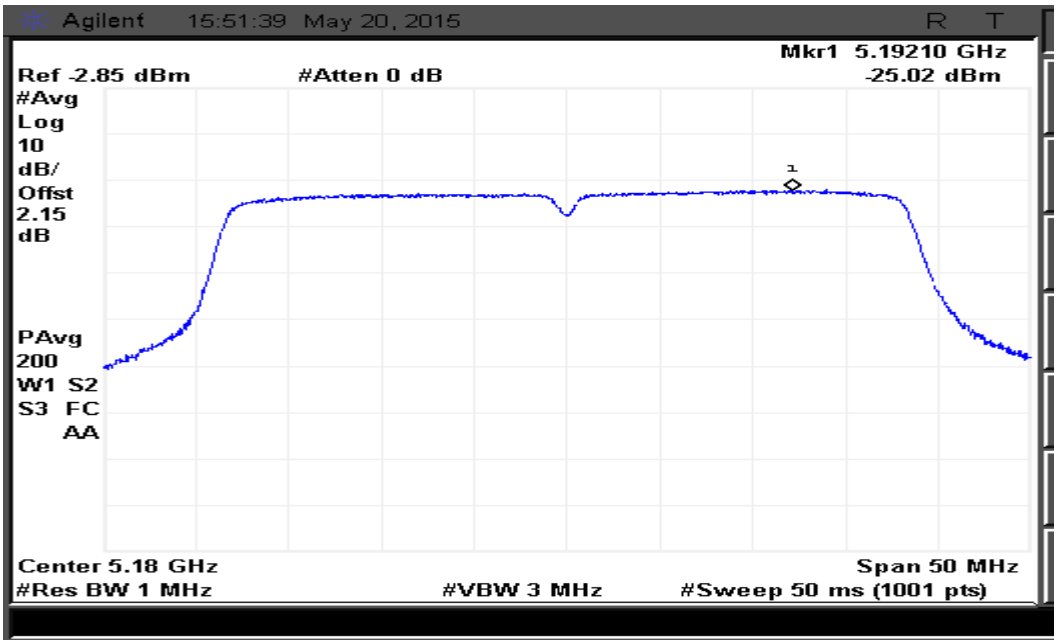


Figure 129: Power Spectral density measured at Ch. 0

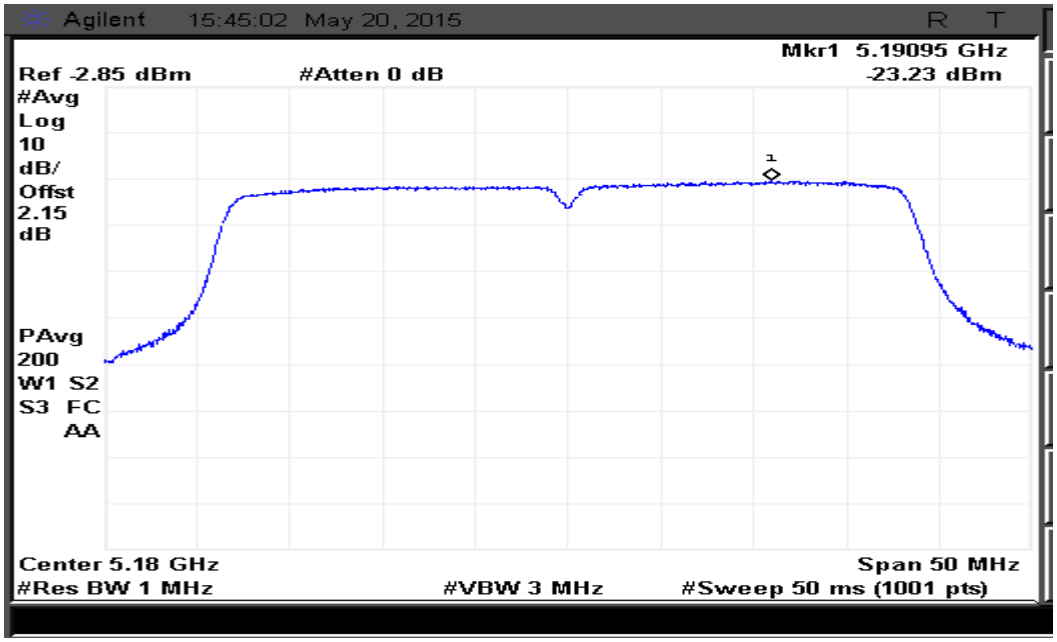


Figure 130: Power Spectral density measured at Ch. 1

5.3.5.6.2 40MHz Modulation BW-Mid channel_5200 MHz

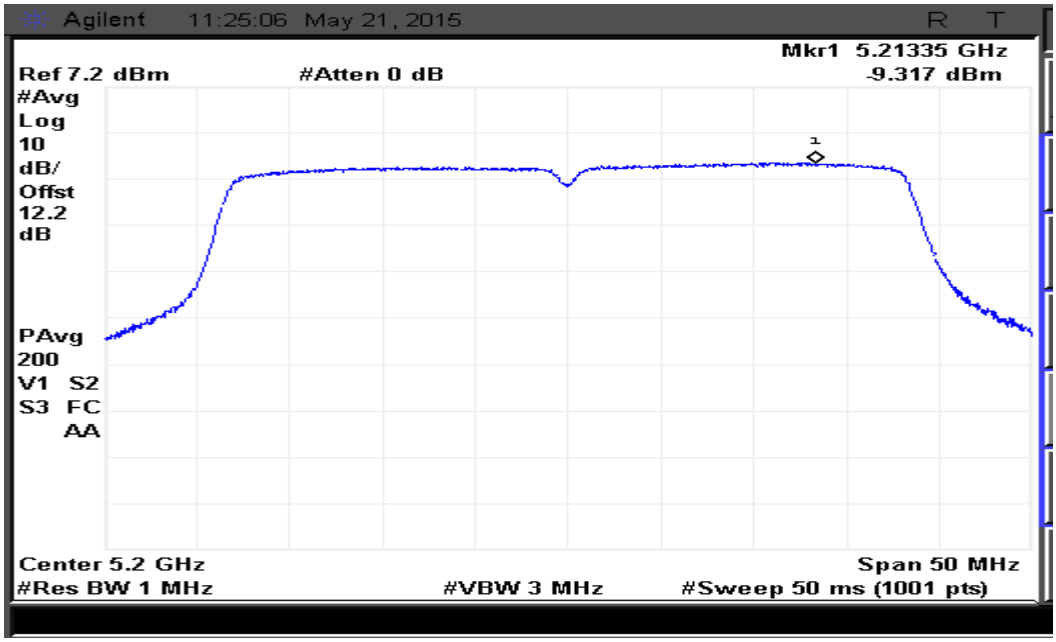


Figure 131: Power Spectral density measured at Ch. 0

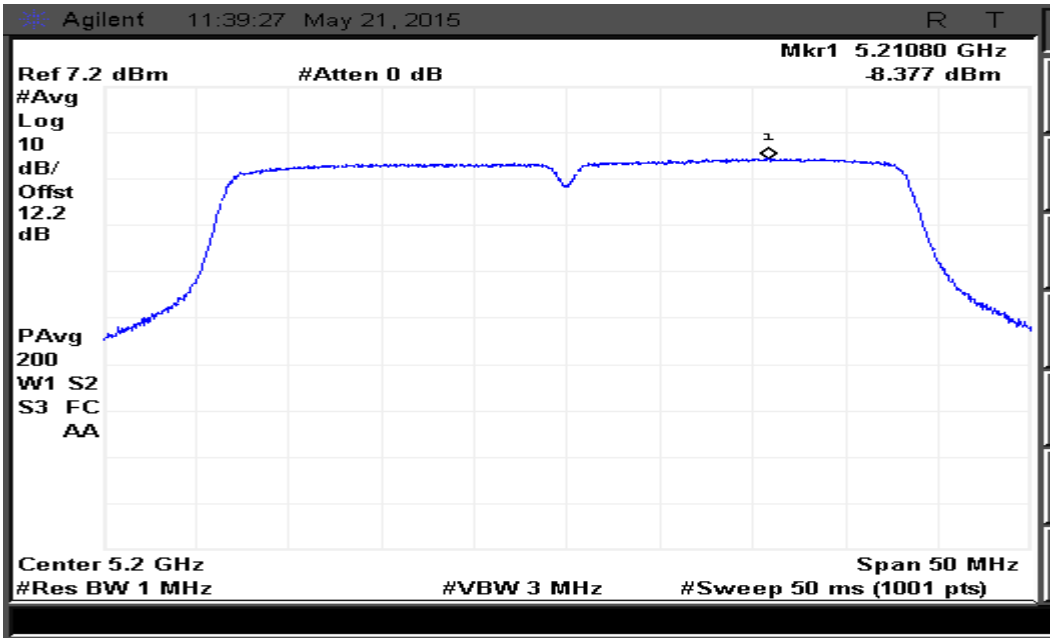


Figure 132: Power Spectral density measured at Ch. 1

5.3.5.6.3 40MHz Modulation BW-High channel_5220MHz

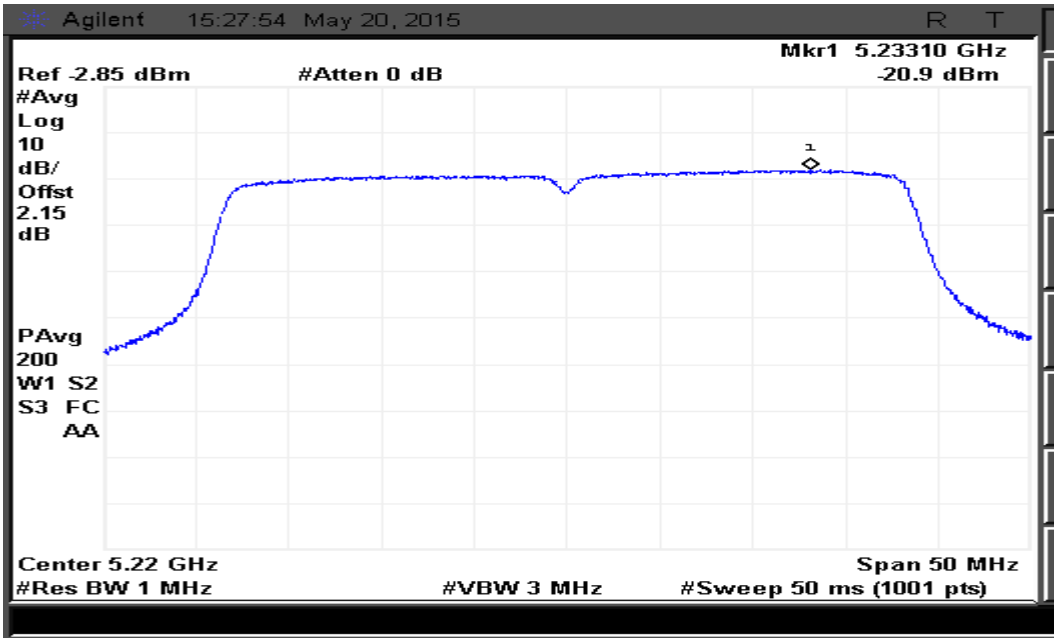


Figure 133: Power Spectral density measured at Ch. 0

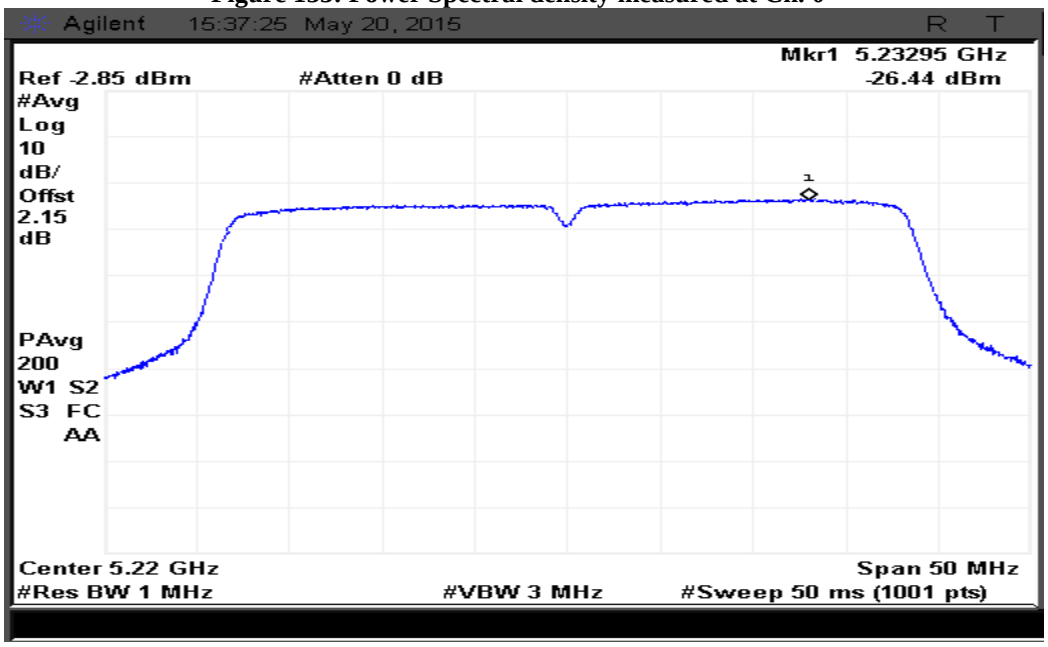


Figure 134: Power Spectral density measured at Ch. 1

5.3.5.6.4 5MHz Modulation BW-Low hannel_5155MHz

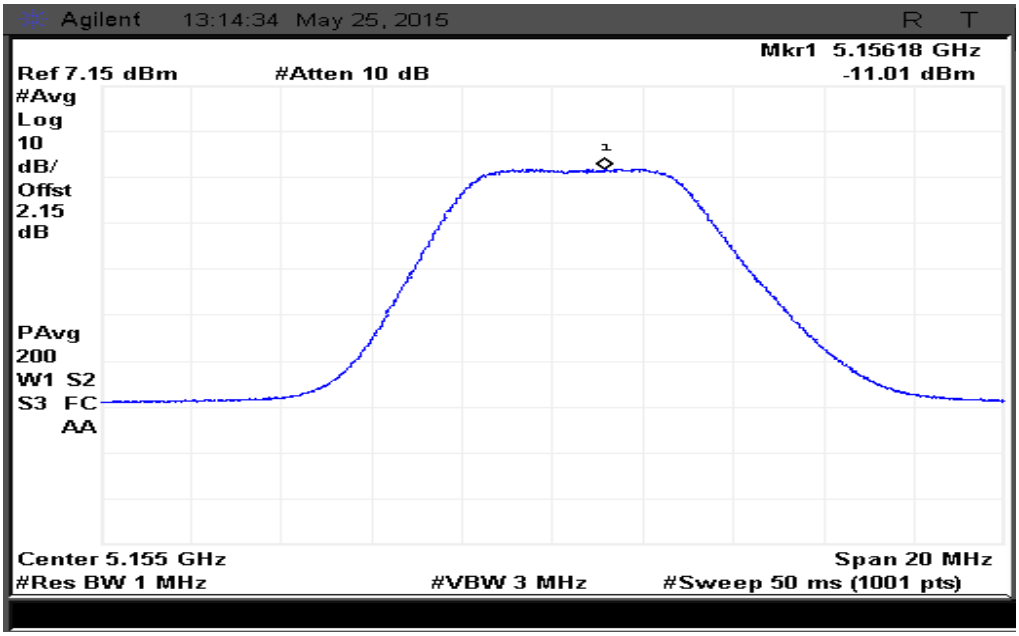


Figure 135: Power Spectral density measured at Ch. 0

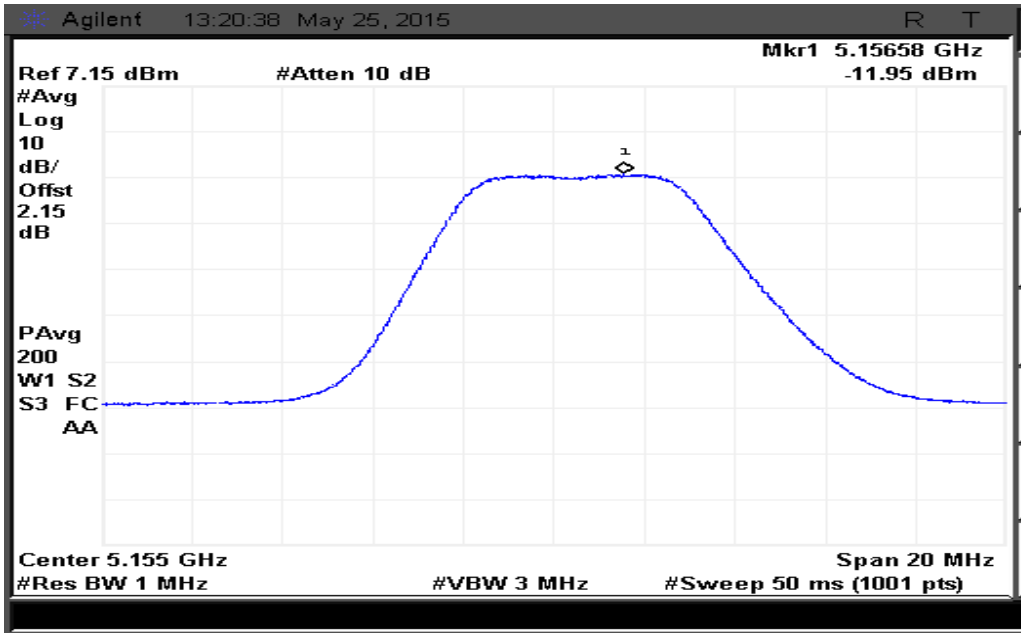


Figure 136: Power Spectral density measured at Ch. 1

5.3.5.6.5 5MHz Modulation BW-Mid channel_5200MHz

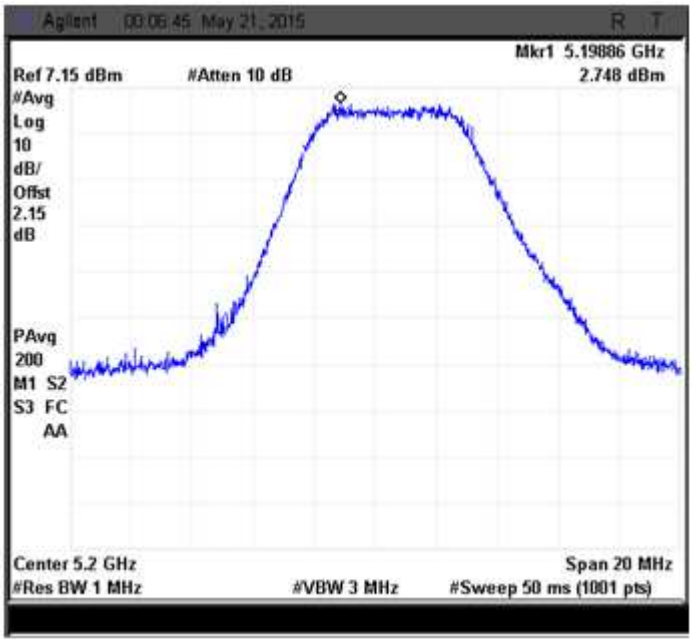


Figure 137: Power Spectral density measured at Ch. 0

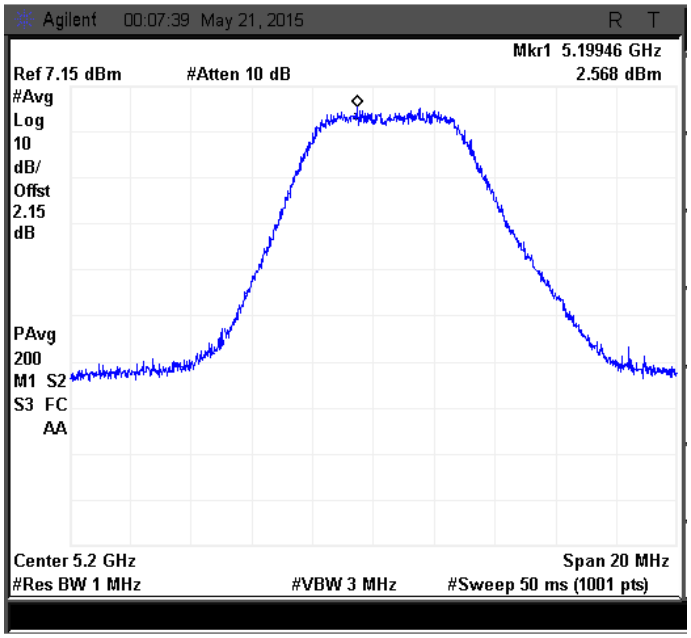


Figure 138: Power Spectral density measured at Ch. 1

5.3.5.6.6 5MHz Modulation BW-High channel_5245MHz

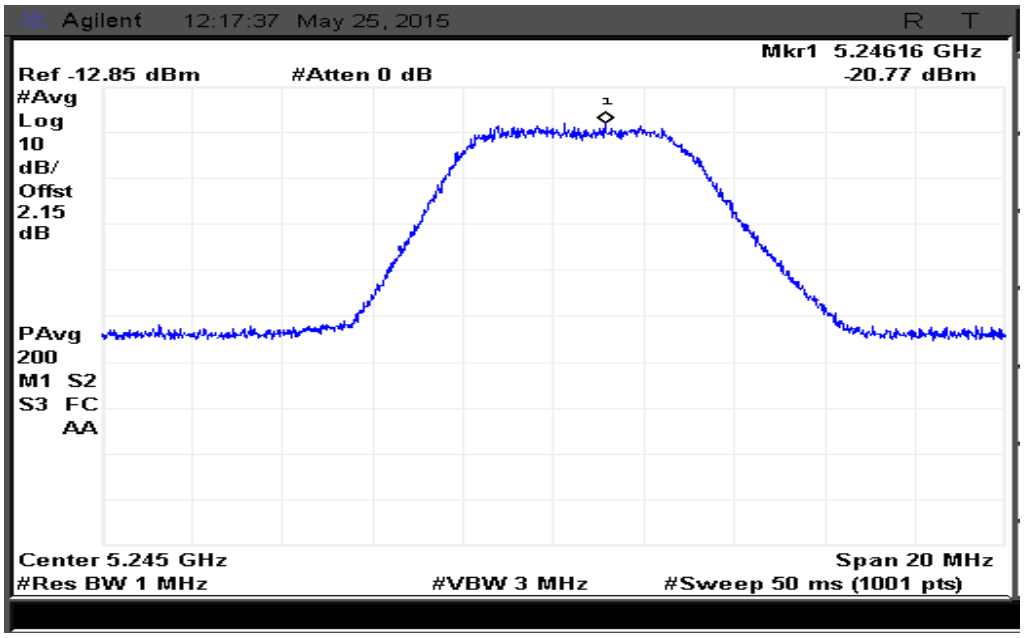


Figure 139: Power Spectral density measured at Ch. 0

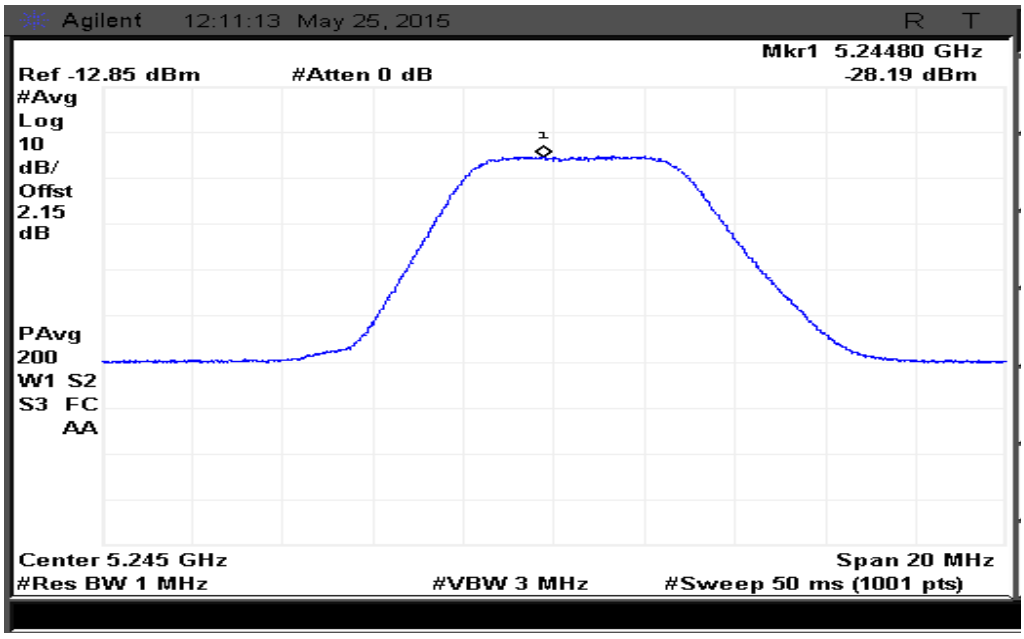


Figure 140: Power Spectral density measured at Ch. 1

5.3.5.7 RESULT (SUPPORTING GRAPHS / DATA) FOR 24DBI ANTENNA CONDITION

5.3.5.7.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

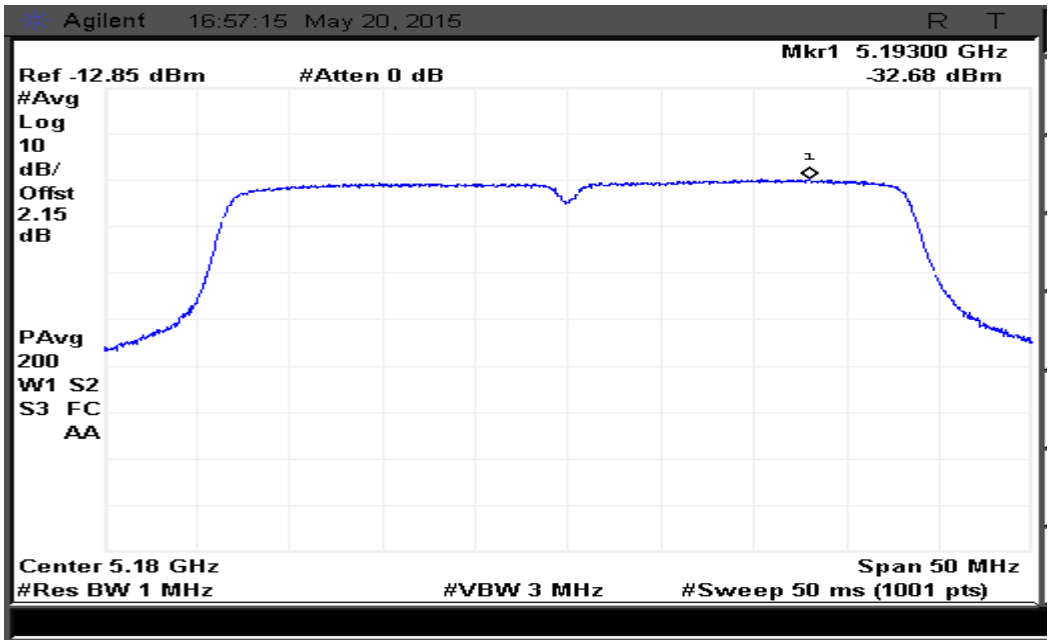


Figure 141: Power Spectral density measured at Ch. 0

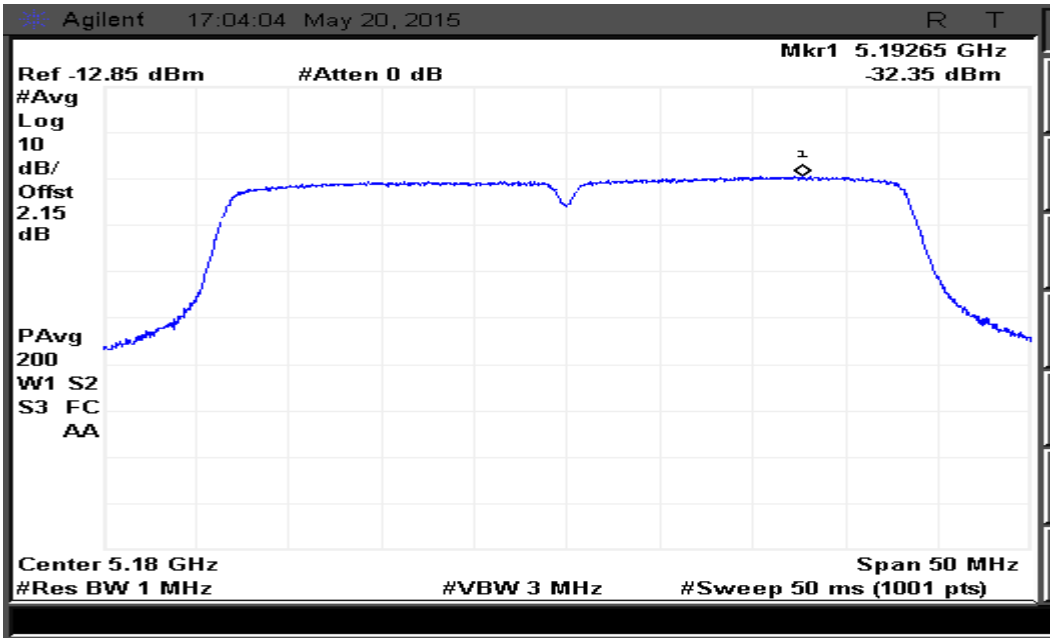
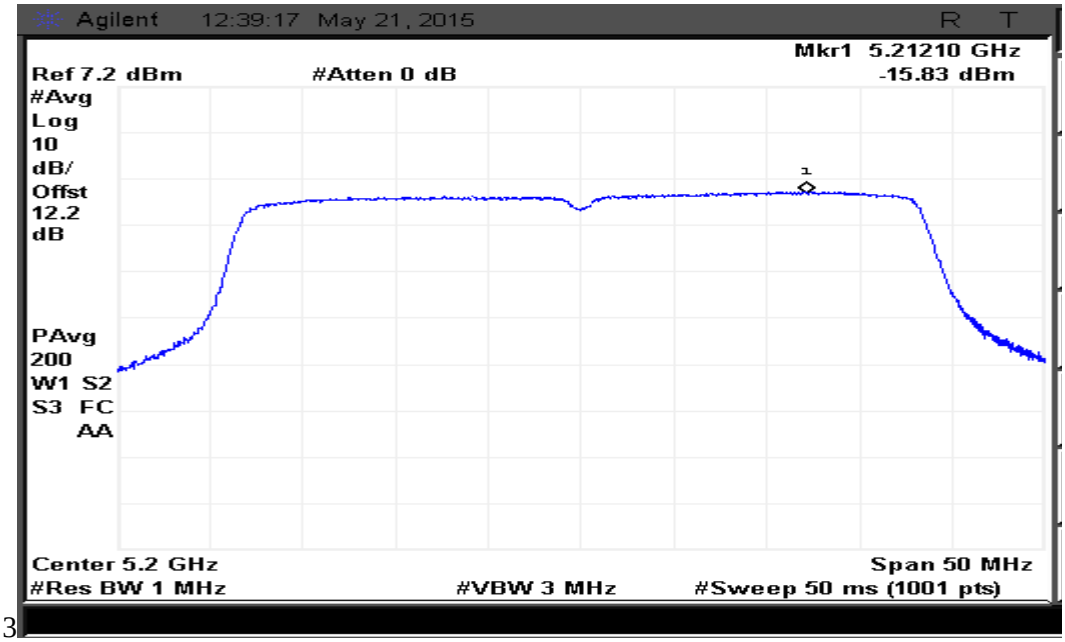


Figure 142: Power Spectral density measured at Ch. 1

5.3.5.7.2 40MHz Modulation BW-Mid channel_5200 MHz



3

Figure 143: Power Spectral density measured at Ch. 0

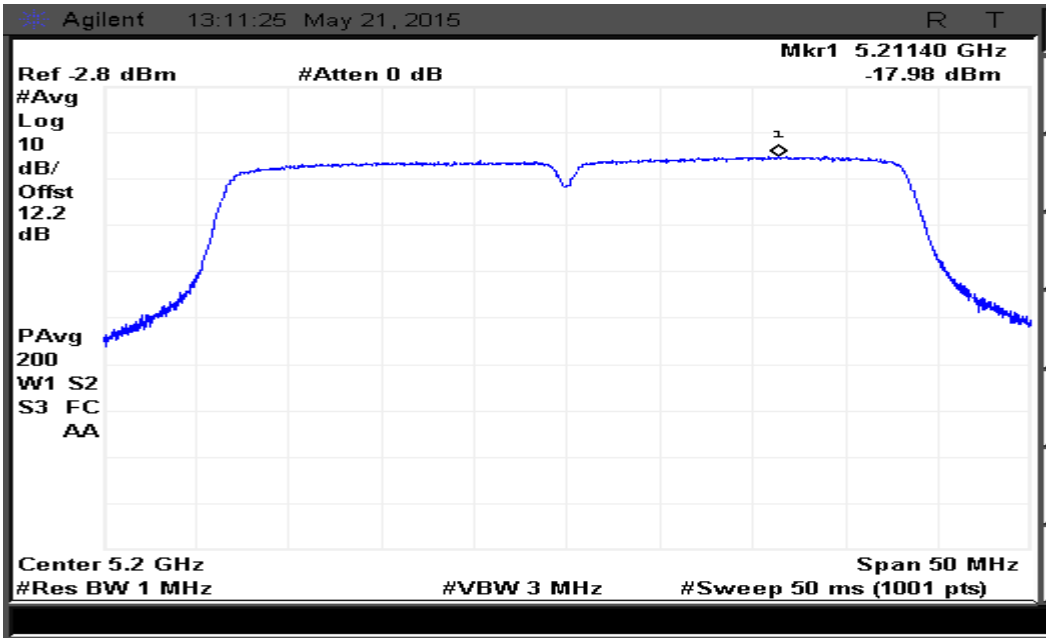


Figure 144: Power Spectral density measured at Ch. 1

5.3.5.7.3 40MHz Modulation BW-High channel_5220MHz

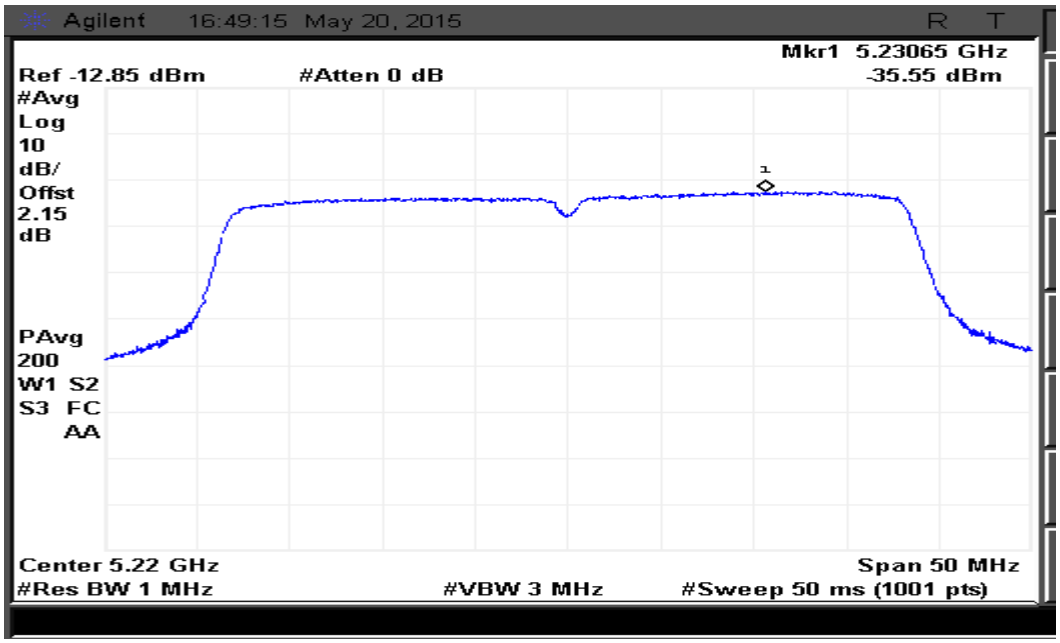


Figure 145: Power Spectral density measured at Ch. 0

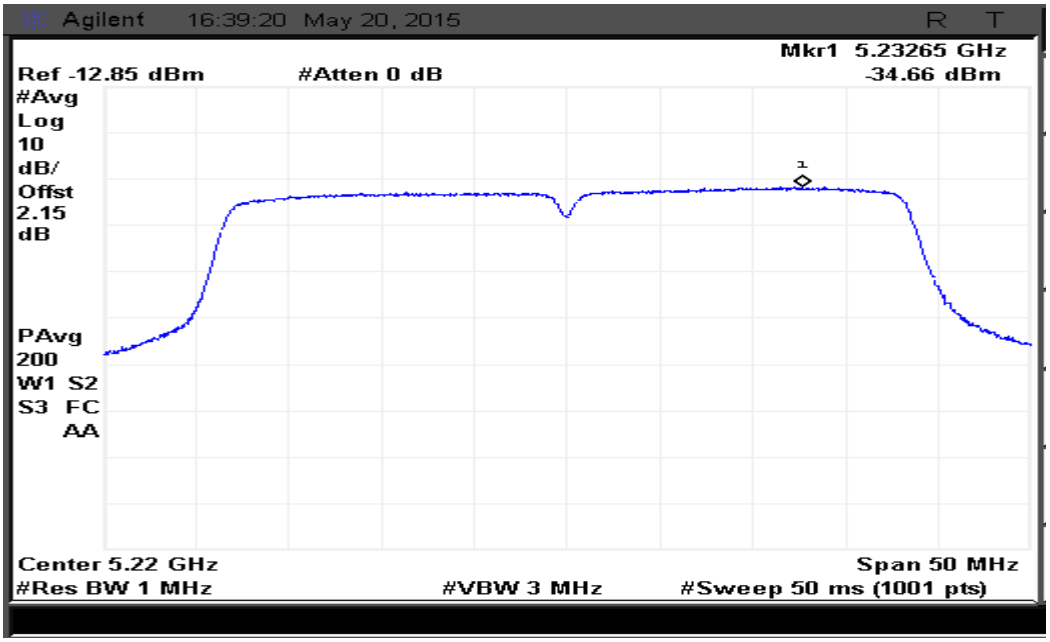


Figure 146: Power Spectral density measured at Ch. 1

5.3.5.7.4 5MHz Modulation BW-Low channel_5155MHz

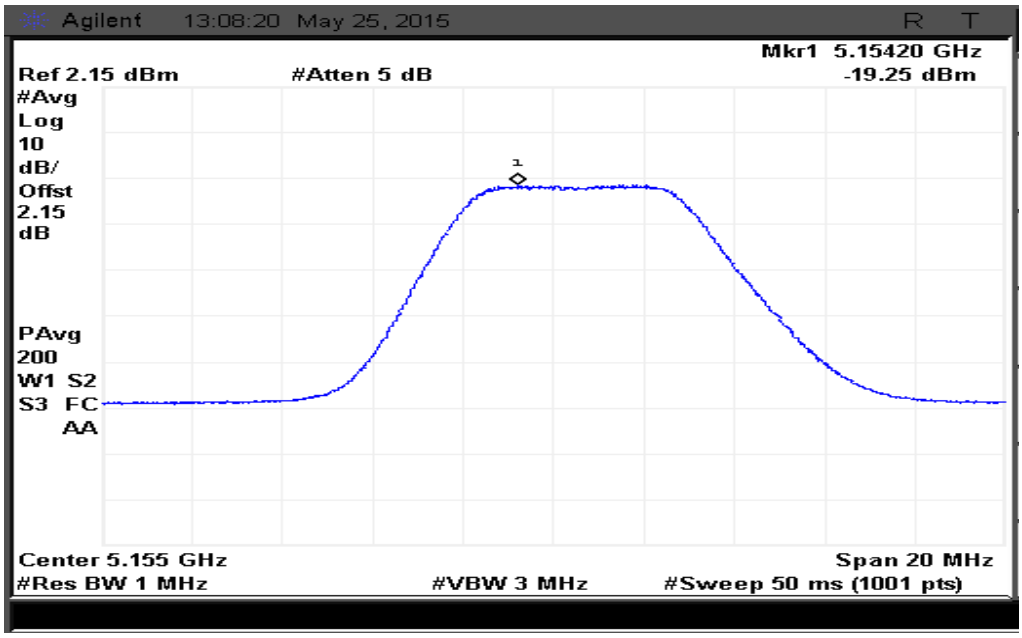


Figure 147: Power Spectral density measured at Ch. 0

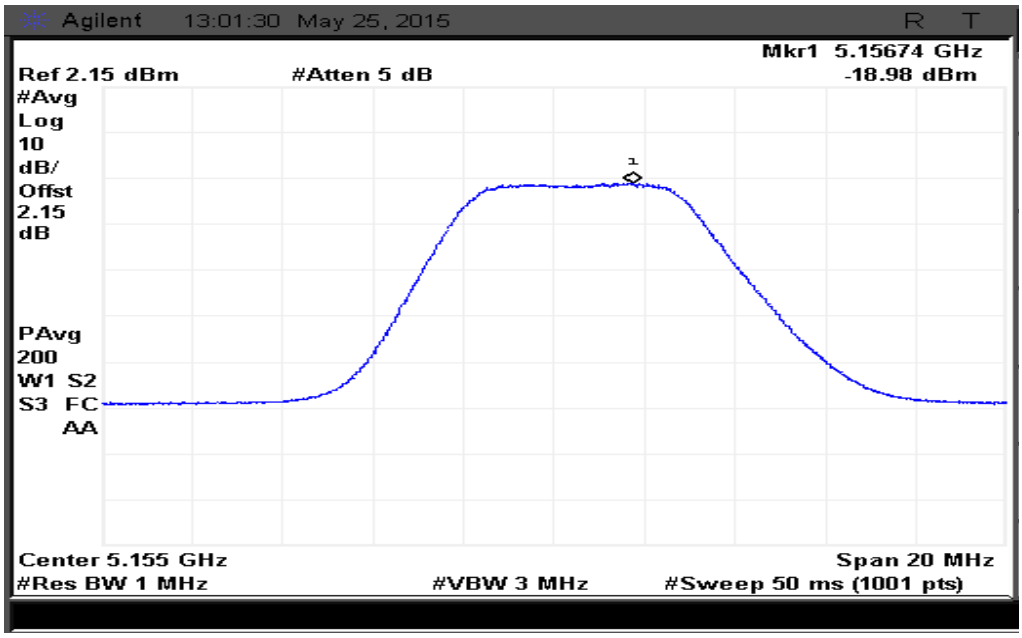


Figure 148: Power Spectral density measured at Ch. 1

5.3.5.7.5 5MHz Modulation BW-Mid channel_5200 MHz

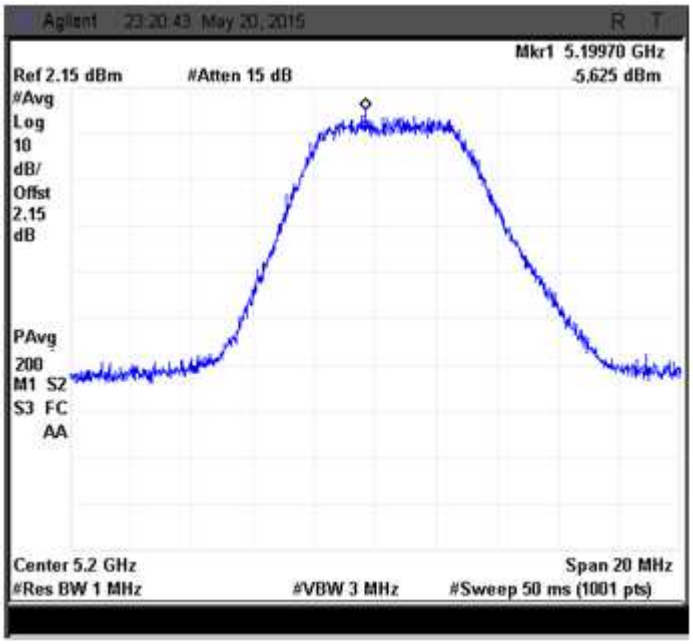


Figure 149: Power Spectral density measured at Ch. 0

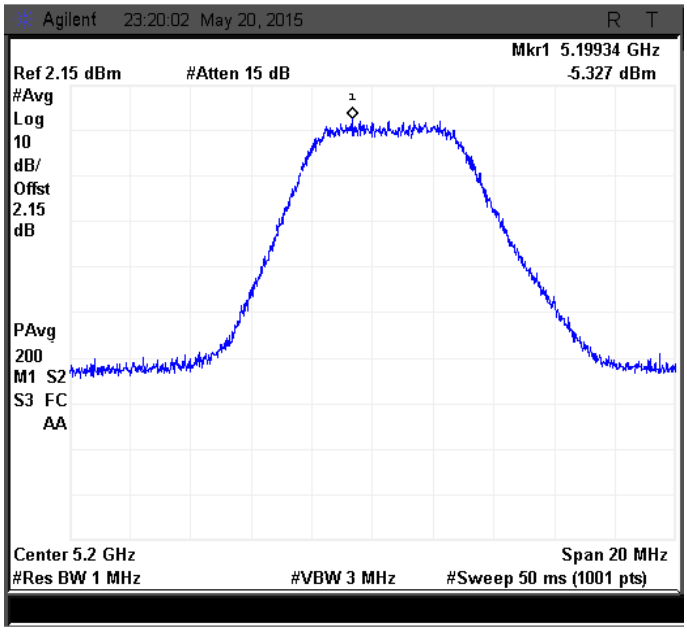


Figure 150: Power Spectral density measured at Ch. 1

5.3.5.7.6 5MHz Modulation BW-High channel_5245MHz

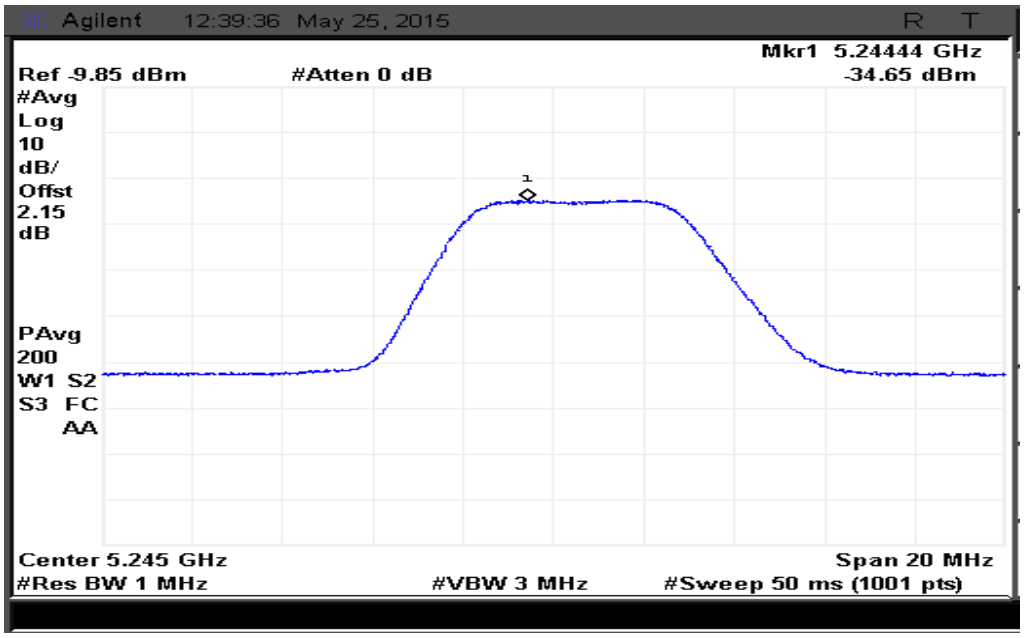


Figure 151: Power Spectral density measured at Ch. 0

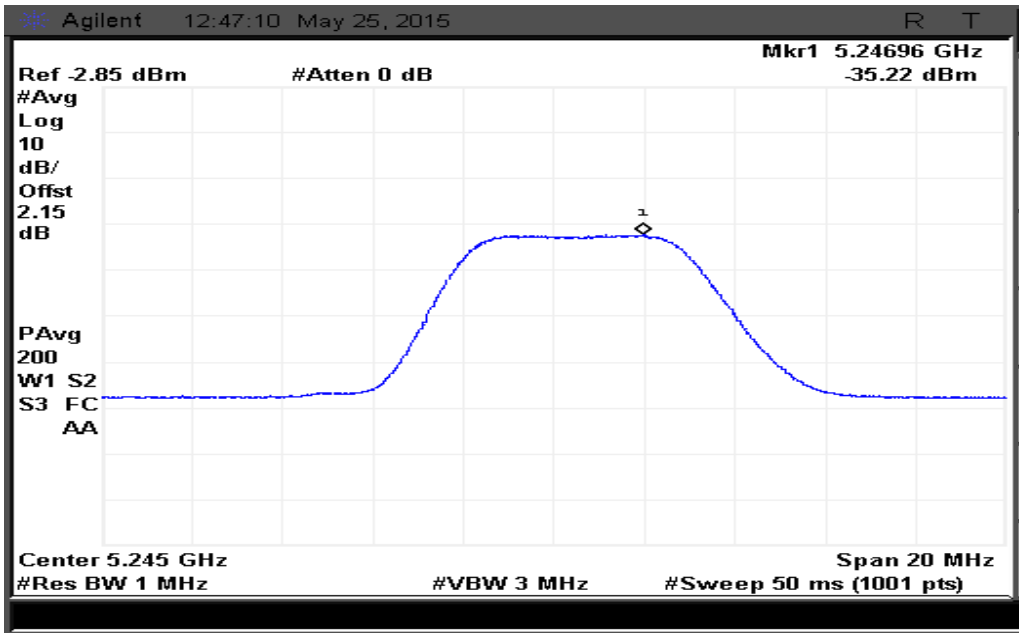


Figure 152: Power Spectral density measured at Ch. 1

5.3.5.8 RESULT

Peak Power Spectral Density for all channels in both 40MHz &5MHz Modulation Bandwidths is within the Specified limit. Refer below table for consolidated result.

Condition	Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (dBm/MHz)	Limit (dBm/MHz)	Result
Basic	40	Ch. 0	5180	-9.401	14	Pass
Basic	40	Ch. 0	5200	-0.525	14	Pass
Basic	40	Ch. 0	5220	-12.7	14	Pass
Basic	40	Ch. 1	5180	-8.607	14	Pass
Basic	40	Ch. 1	5200	1.087	14	Pass
Basic	5	Ch. 1	5220	-11	14	Pass
Basic	5	Ch. 0	5155	0.119	14	Pass
Basic	5	Ch. 0	5200	13.47	14	Pass
Basic	5	Ch. 0	5245	-16.39	14	Pass
Basic	5	Ch. 1	5155	-0.335	14	Pass
Basic	5	Ch. 1	5200	10.51	14	Pass
Basic	5	Ch. 1	5245	-8.261	14	Pass
17dBi	40	Ch. 0	5180	-25.02	3	Pass
17dBi	40	Ch. 0	5200	-9.317	3	Pass
17dBi	40	Ch. 0	5220	-20.9	3	Pass
17dBi	40	Ch. 1	5180	-23.23	3	Pass
17dBi	40	Ch. 1	5200	-8.377	3	Pass
17dBi	40	Ch. 1	5220	-26.44	3	Pass
17dBi	5	Ch. 0	5155	-11.01	3	Pass
17dBi	5	Ch. 0	5200	2.748	3	Pass
17dBi	5	Ch. 0	5245	-20.77	3	Pass
17dBi	5	Ch. 1	5155	-11.95	3	Pass
17dBi	5	Ch. 1	5200	2.568	3	Pass
17dBi	5	Ch. 1	5245	-28.19	3	Pass
24dBi	40	Ch. 0	5180	-32.68	-4	Pass
24dBi	40	Ch. 0	5200	-15.83	-4	Pass
24dBi	40	Ch. 0	5220	-35.55	-4	Pass
24dBi	40	Ch. 1	5180	-32.35	-4	Pass
24dBi	40	Ch. 1	5200	-17.98	-4	Pass
24dBi	40	Ch. 1	5220	-34.66	-4	Pass
24dBi	5	Ch. 0	5155	-19.25	-4	Pass
24dBi	5	Ch. 0	5200	-4.625	-4	Pass
24dBi	5	Ch. 0	5245	-34.65	-4	Pass
24dBi	5	Ch. 1	5155	-18.98	-4	Pass
24dBi	5	Ch. 1	5200	-5.327	-4	Pass
24dBi	5	Ch. 1	5245	-35.22	-4	Pass

5.3.6 UNWANTED EMISSIONS LEVELS-CONDUCTED BAND EDGE

5.3.6.1 TEST SPECIFICATION

Test Standard	47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014
Test Procedure	ANSI C63.10-2013
Frequency Range	5150 MHz to 5250 MHz
Resolution Bandwidth	1MHz
Video Bandwidth	3MHz
Sweep Time	Auto
Attenuation	Auto
Test Mode	Conducted
Detector	Peak & Average
Input Voltage	120V AC
Input Frequency	60 Hz
Temperature	22.0°C
Humidity	56.0%
Tested By	Subhendu
Test Date	12th May to 25th May 2015

5.3.6.2 LIMITS

Standard	**FCC Section**	**Antenna condition**	**Calculated Limit**
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014	15.407 (b) (3)	2.15dBi Antenna	-32.15dBm/MHz
		17dBi Antenna	-47dBm/MHz
		24dBi dish	-54dBm/MHz

Limit as per standard is -27dBm/MHz. In this condition we have to consider MIMO condition & take 3dB Factor and also the antenna gain needs to be considered.
Calculated limit = -27dBm/MHz – 3 – Antenna gain

5.3.6.3 TEST SETUP

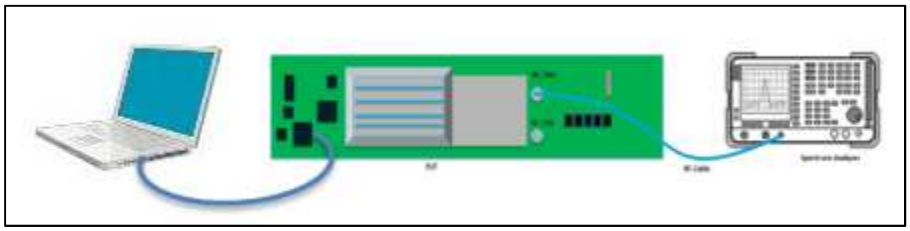


Figure 153: Typical test setup for Conducted Test setup

5.3.6.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per SectionsH(1), H(2), H(3), H(5) & H(6) of **"789033 D02 General UNII Test Procedures New Rules v01".** The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. Captured the data from spectrum analyzer and compared with the limits specified in the standard.

5.3.6.5 RESULT (SUPPORTING GRAPHS / DATA) FOR BASIC CONDITION

5.3.6.5.1 40MHz MODULATION BW-LOW CHANNEL_5180MHz

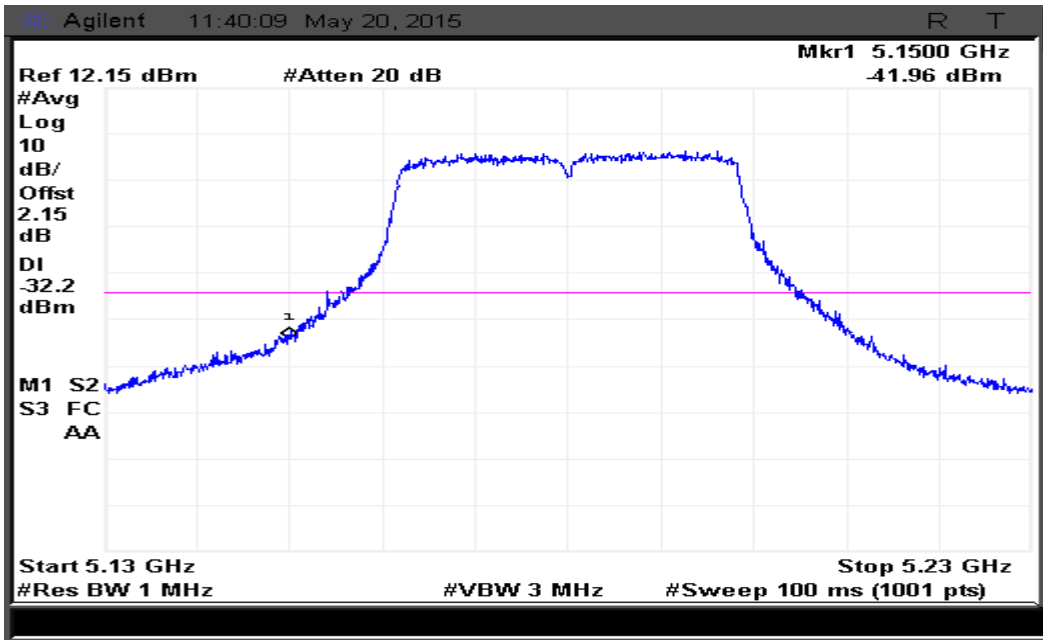


Figure 154: Band edge measured at Ch. 0-Avg

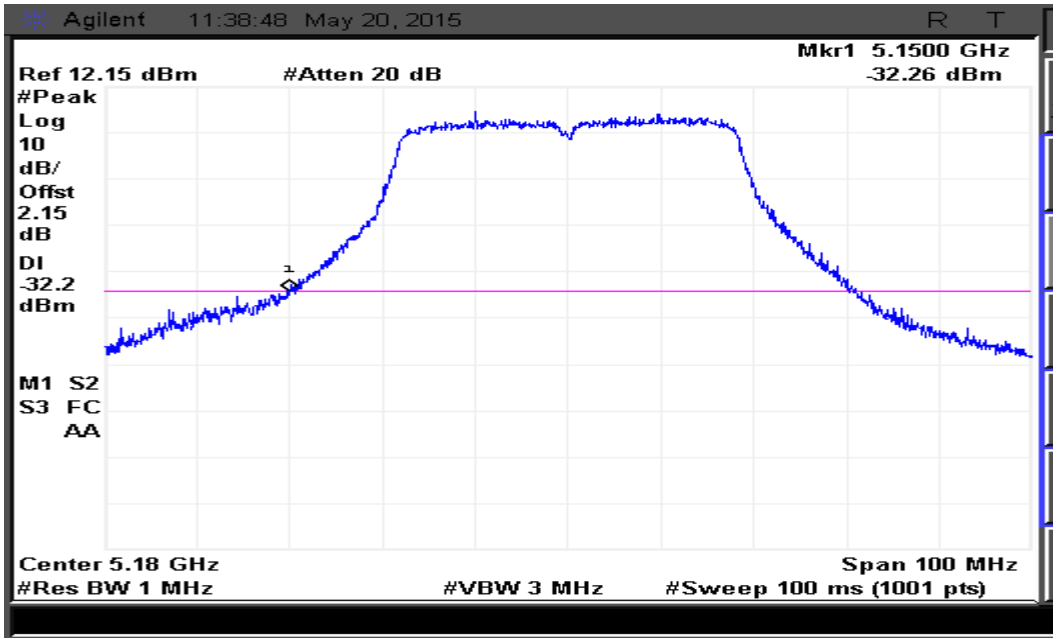


Figure 155: Band edge measured at Ch. 0-Peak

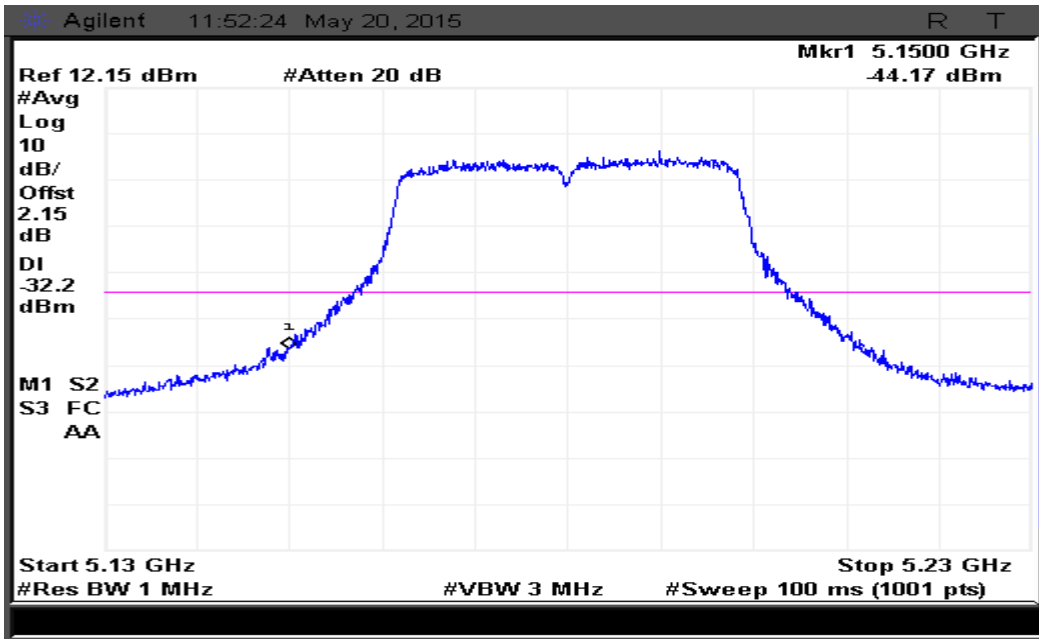


Figure 156: Band edge measured at Ch. 1-Avg

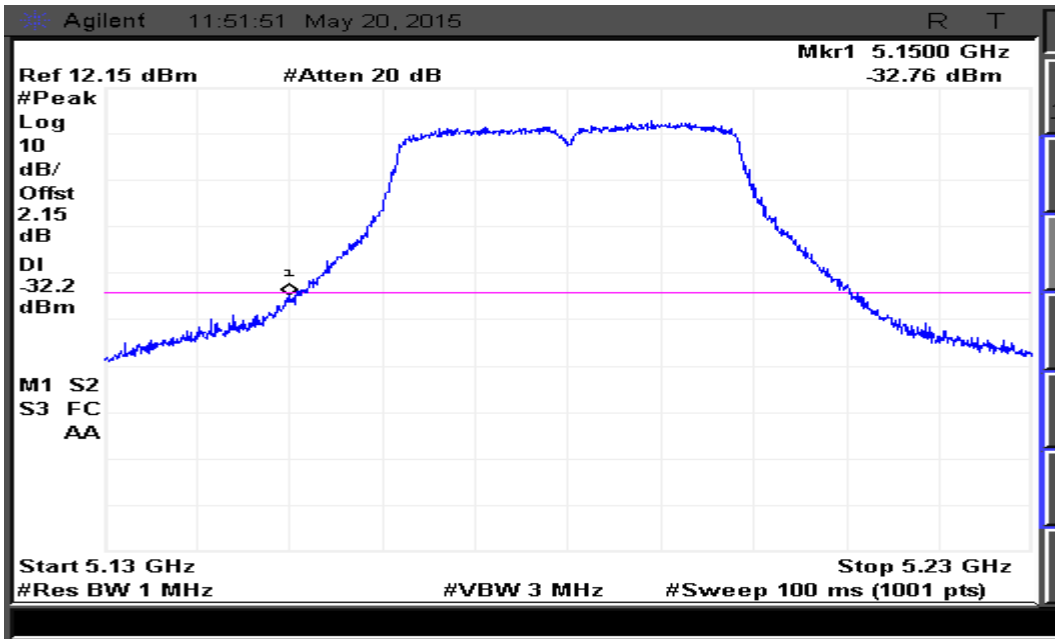


Figure 157: Band edge measured at Ch. 1-Peak

5.3.6.5.2 40MHz Modulation BW-High channel_5220MHz

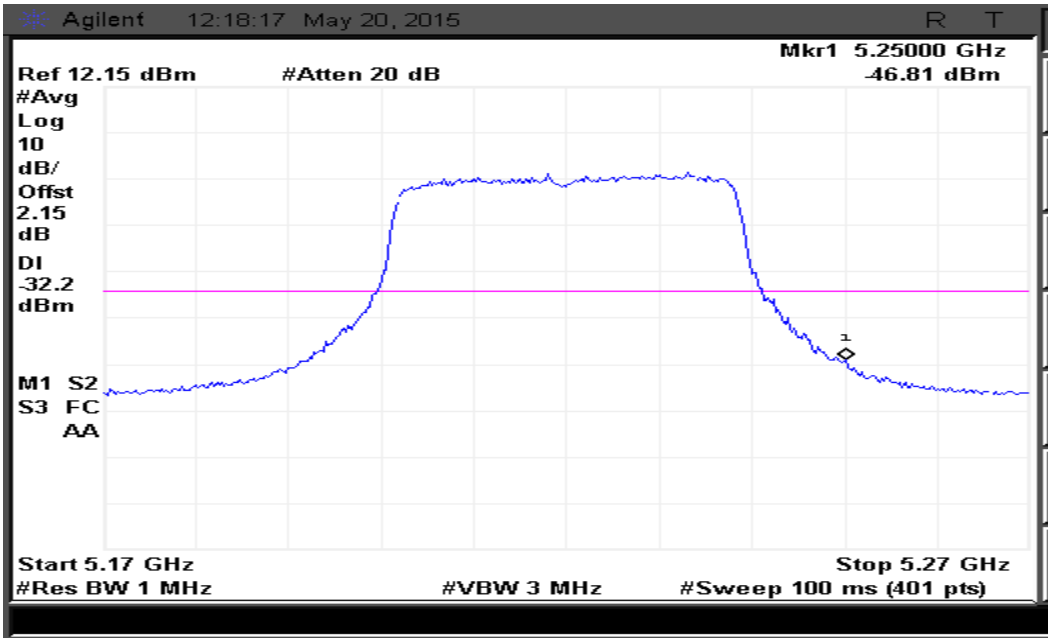


Figure 158: Band edge measured at Ch. 0-Avg

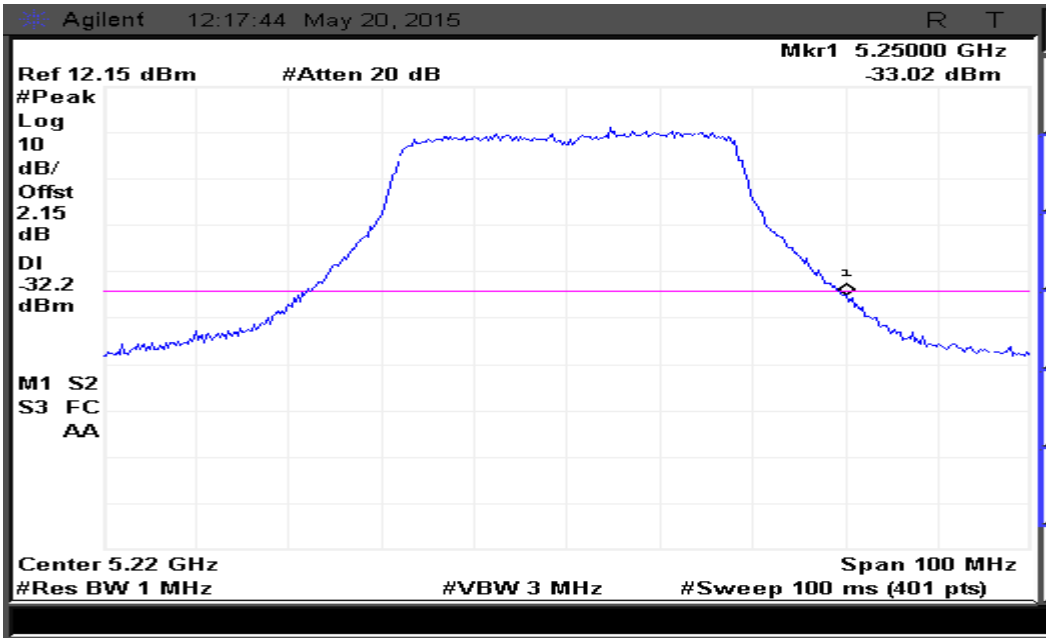


Figure 159: Band edge measured at Ch. 0-Peak

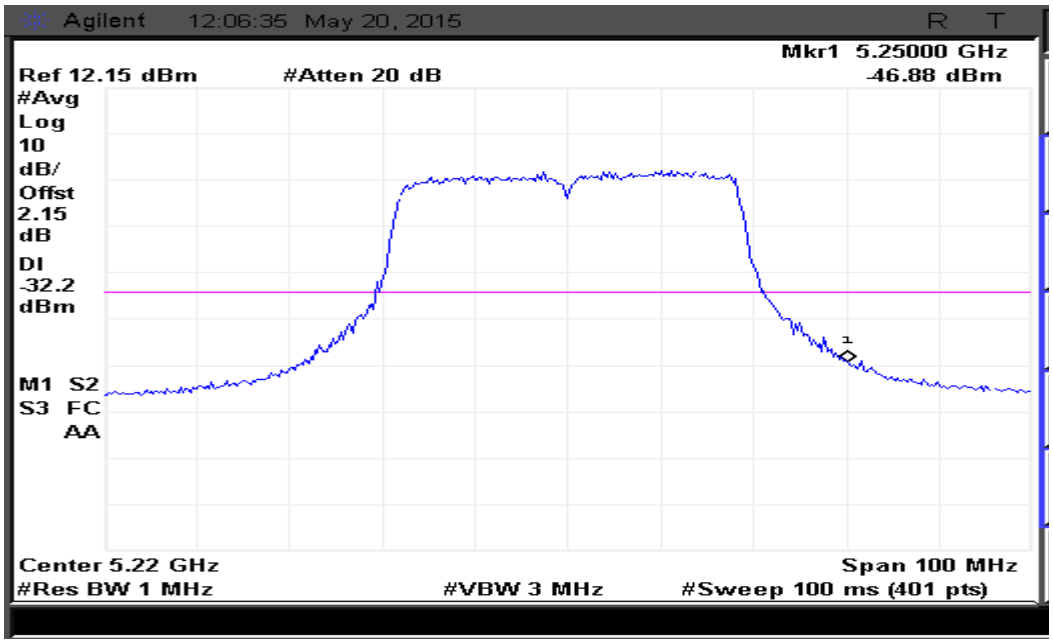


Figure 160: Band edge measured at Ch. 1-Avg

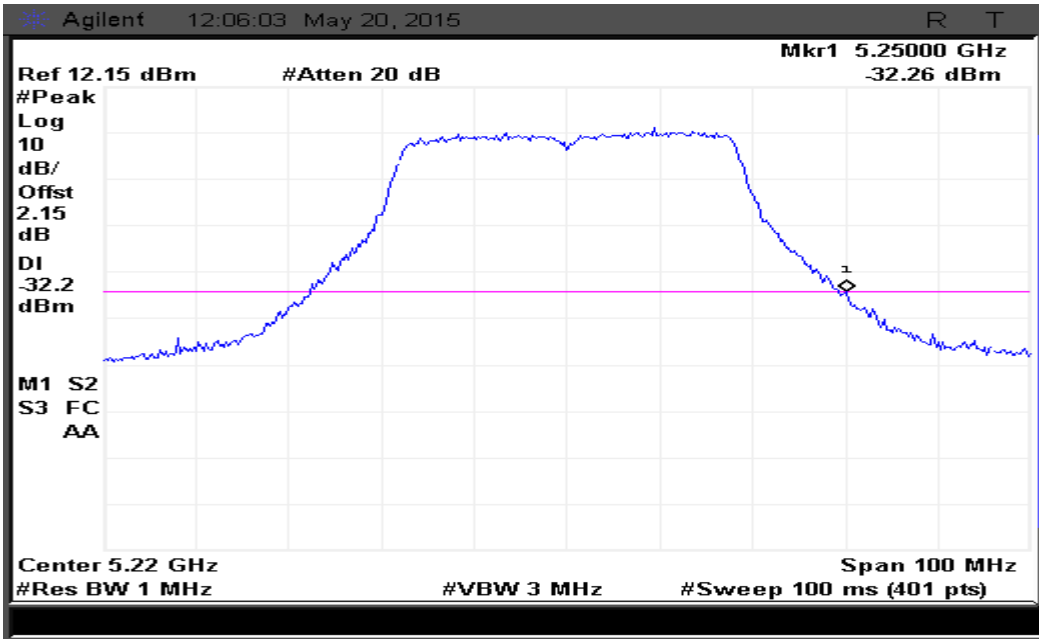


Figure 161: Band edge measured at Ch. 1-Peak

5.3.6.5.3 5MHz Modulation BW-Low channel_5155MHz

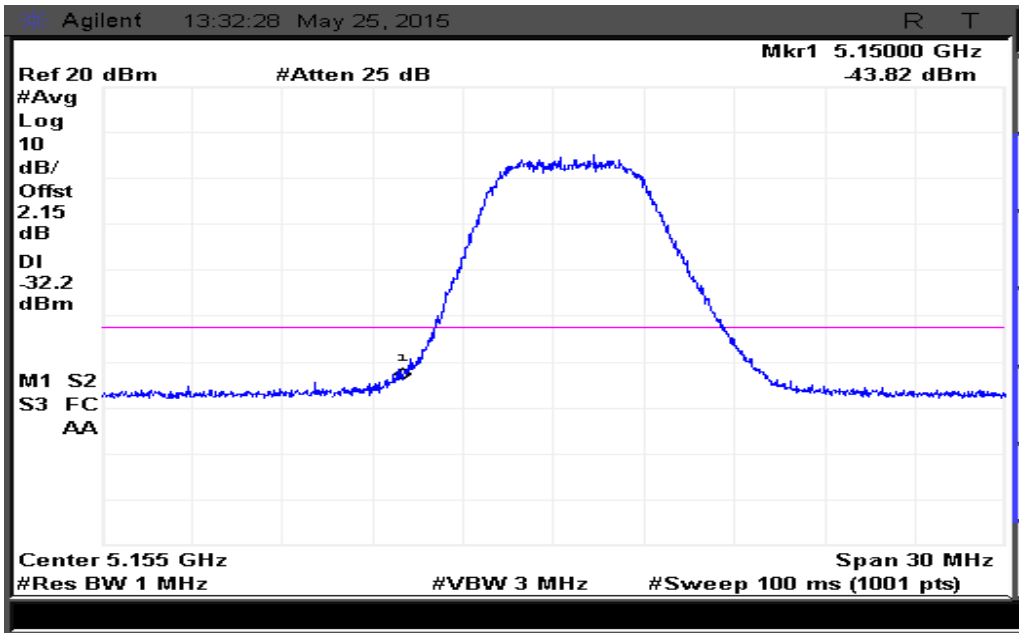


Figure 162: Band edge measured at Ch. 0-Avg

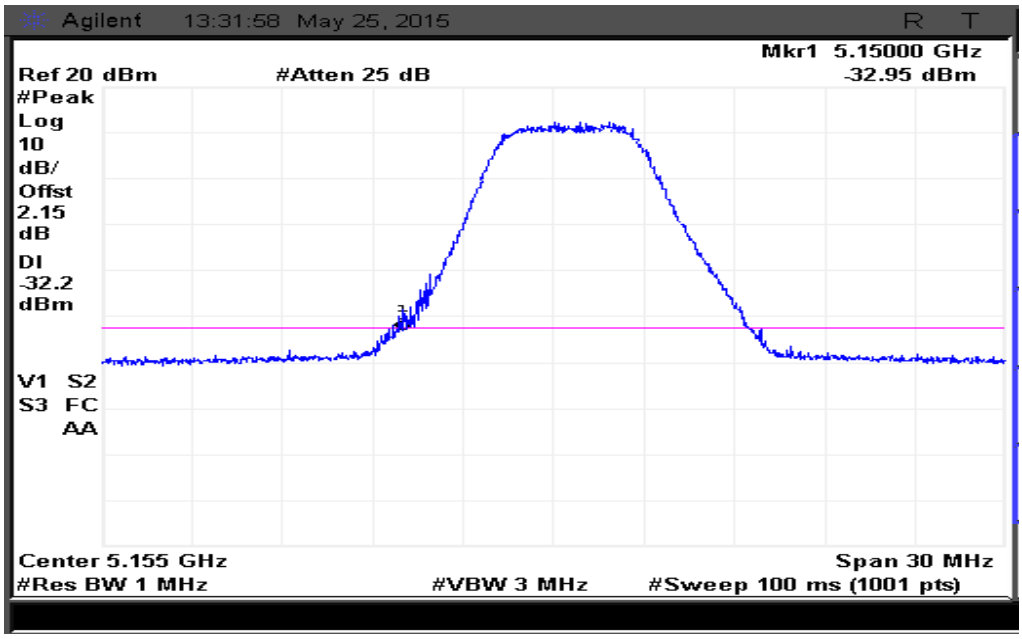


Figure 163: Band edge measured at Ch. 0-Peak

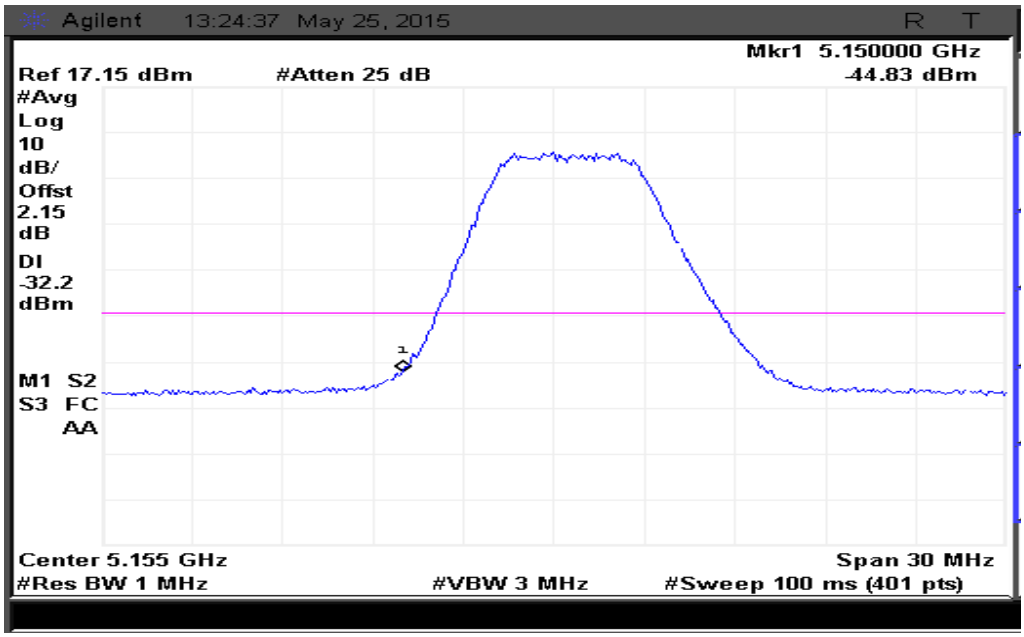


Figure 164: Band edge measured at Ch. 1-Avg

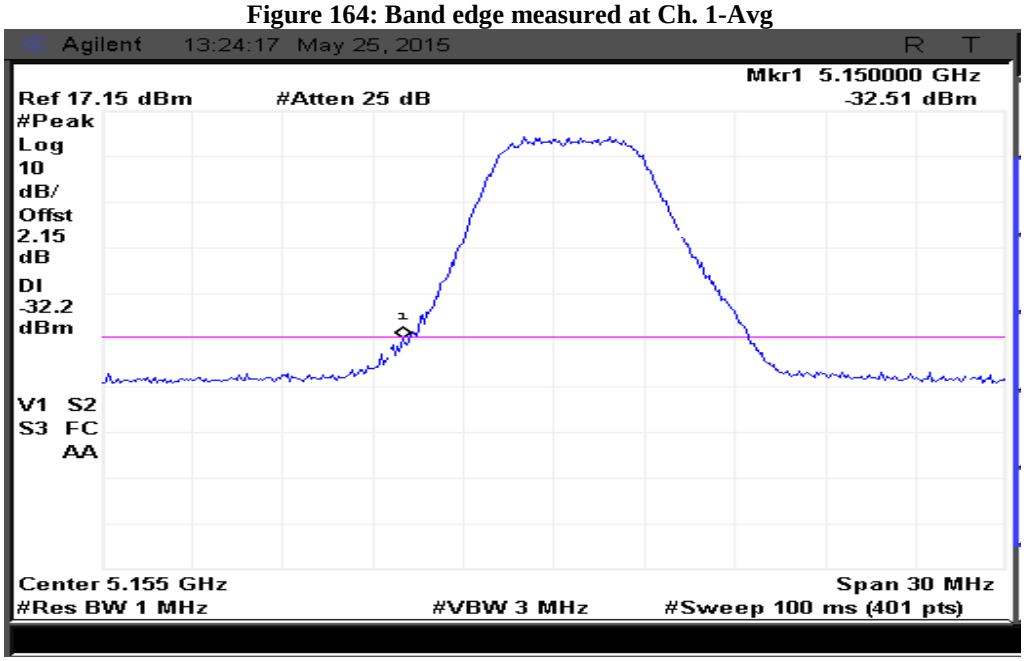


Figure 165: Band edge measured at Ch. 1-Peak

5.3.6.5.4 5MHz Modulation BW-High channel_5245MHz

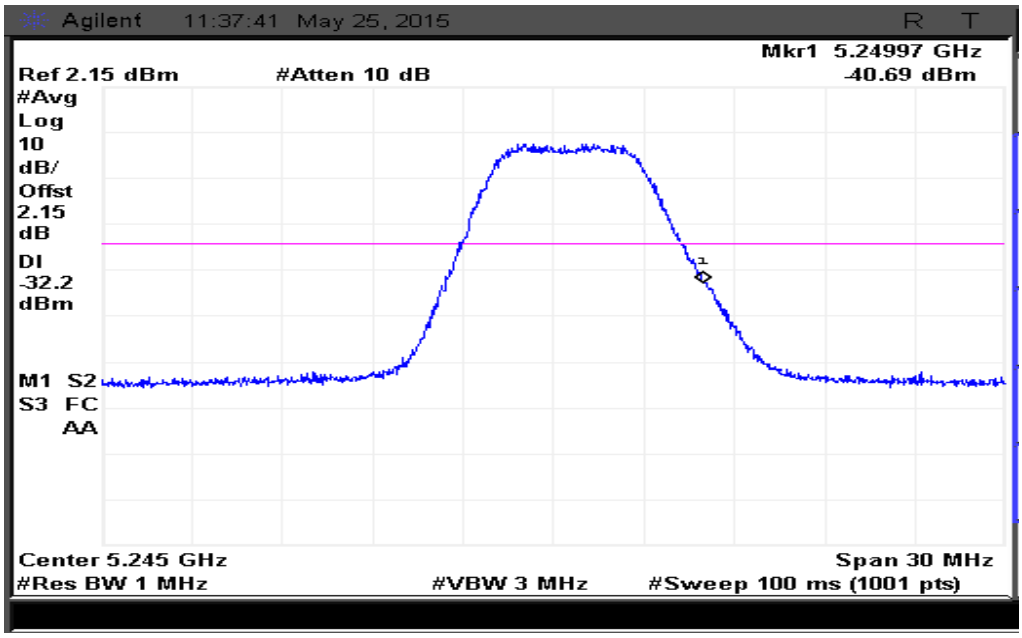


Figure 166: Band edge measured at Ch. 0-Avg

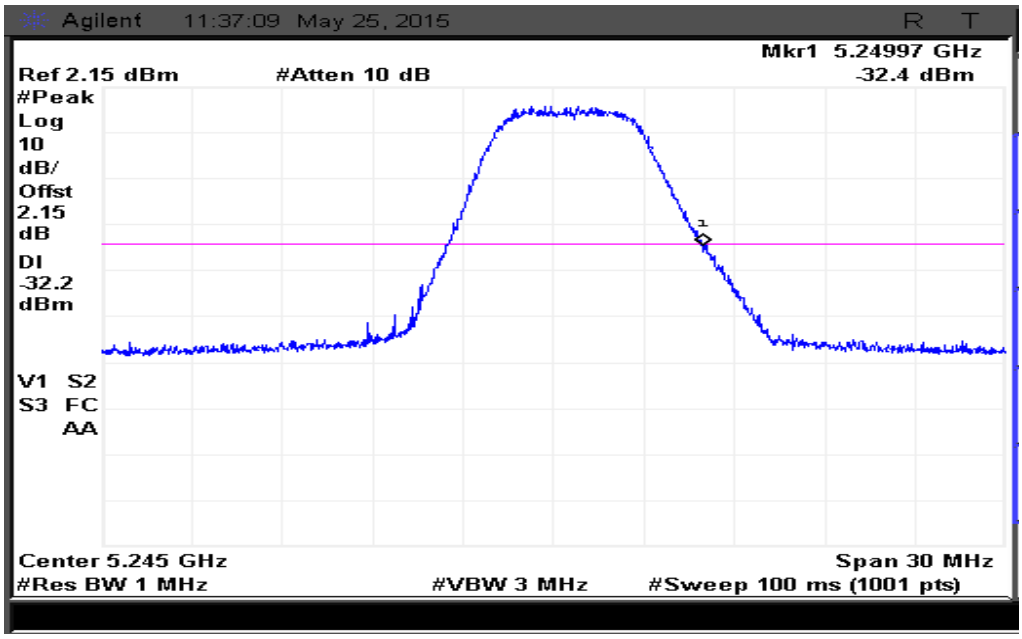


Figure 167: Band edge measured at Ch. 0-Peak

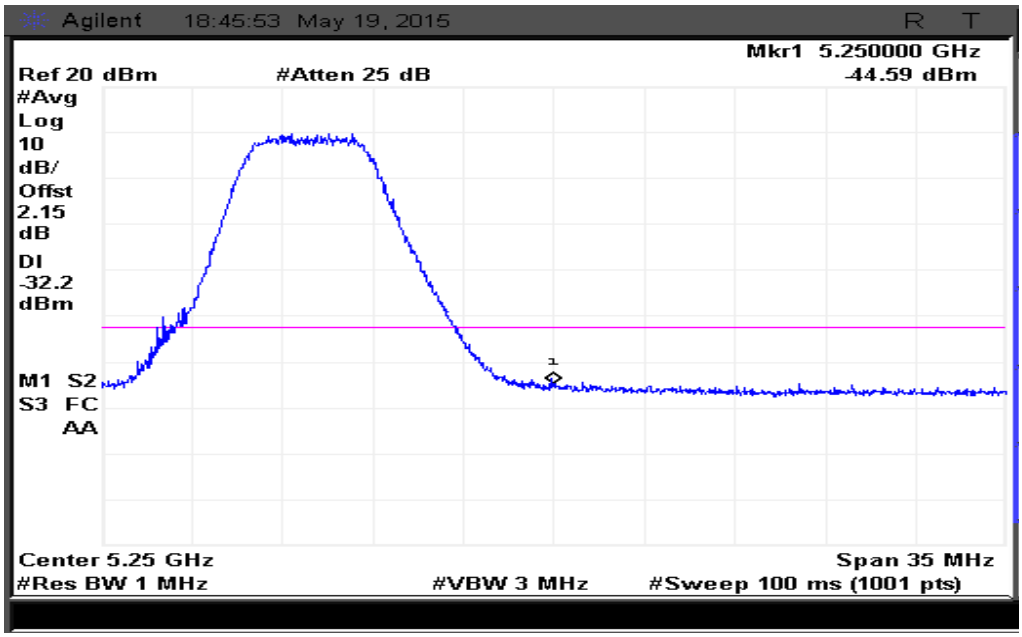


Figure 168: Band edge measured at Ch. 1-Avg

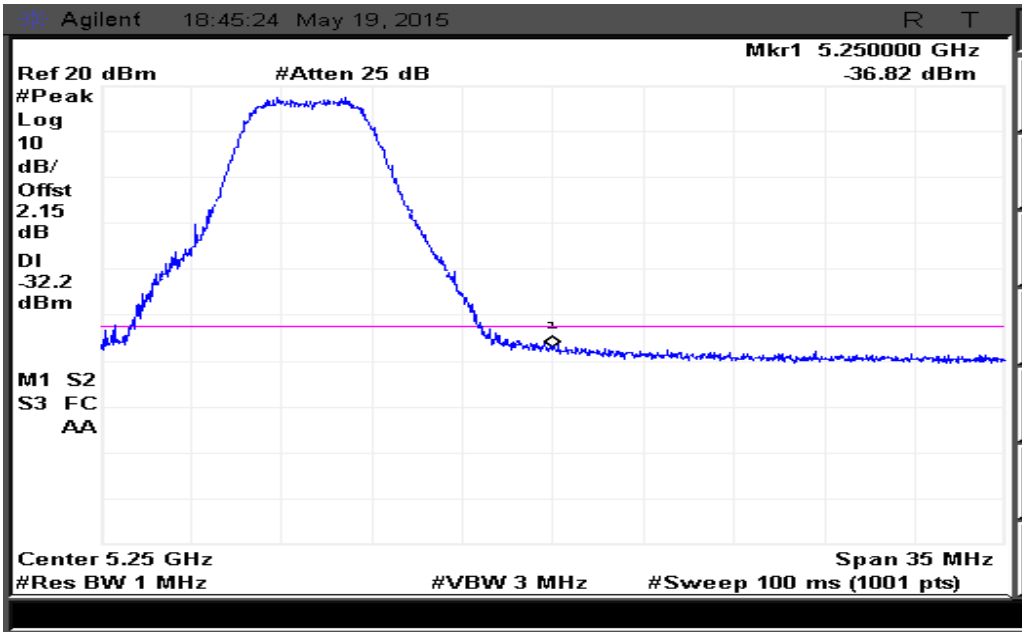


Figure 169: Band edge measured at Ch. 1-Peak

5.3.6.6 RESULT (SUPPORTING GRAPHS / DATA) FOR 17DBI ANTENNA CONDITION

5.3.6.6.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

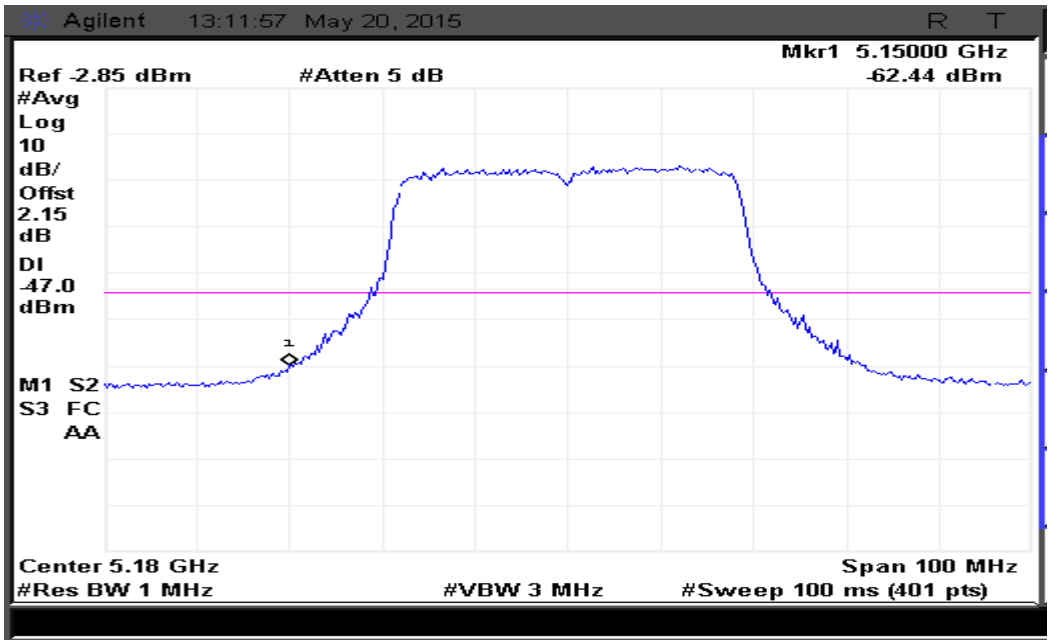


Figure 170: Band edge measured at Ch. 0-Avg

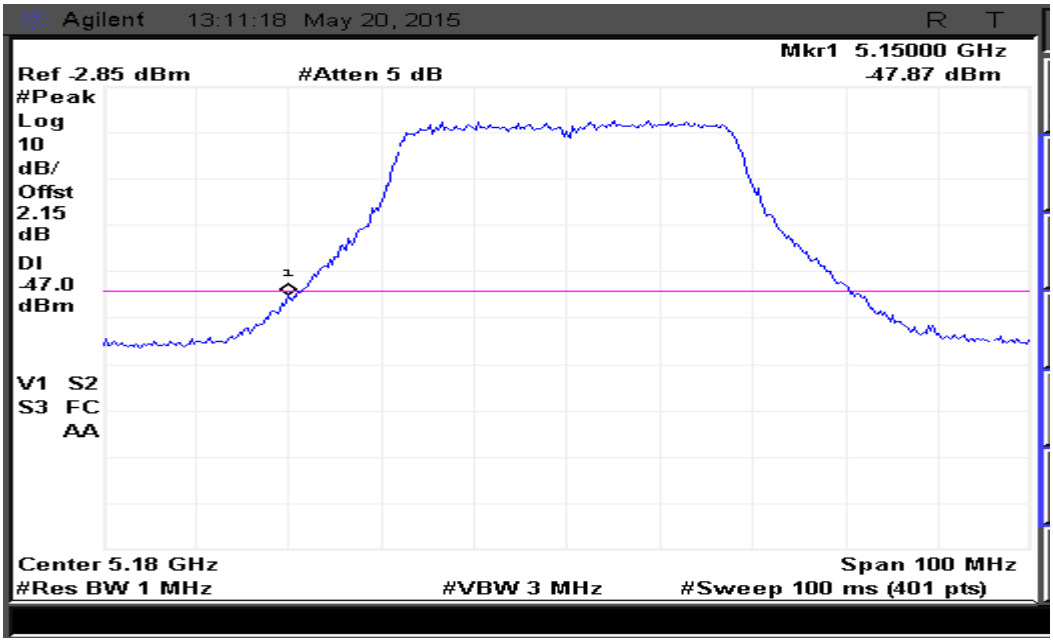


Figure 171: Band edge measured at Ch. 0-Peak.

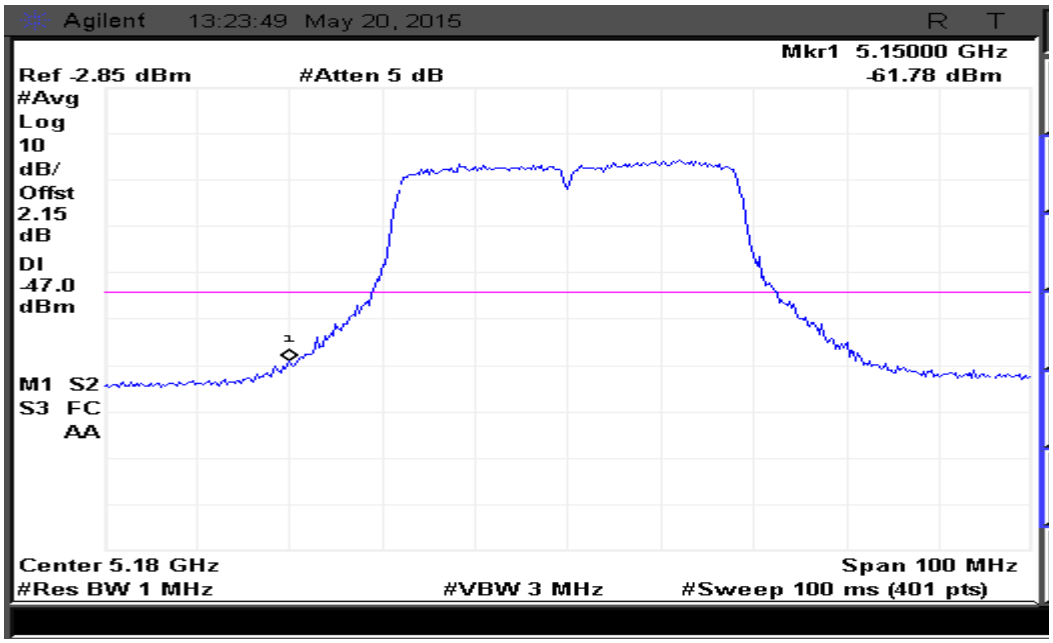


Figure 172: Band edge measured at Ch. 1-Avg

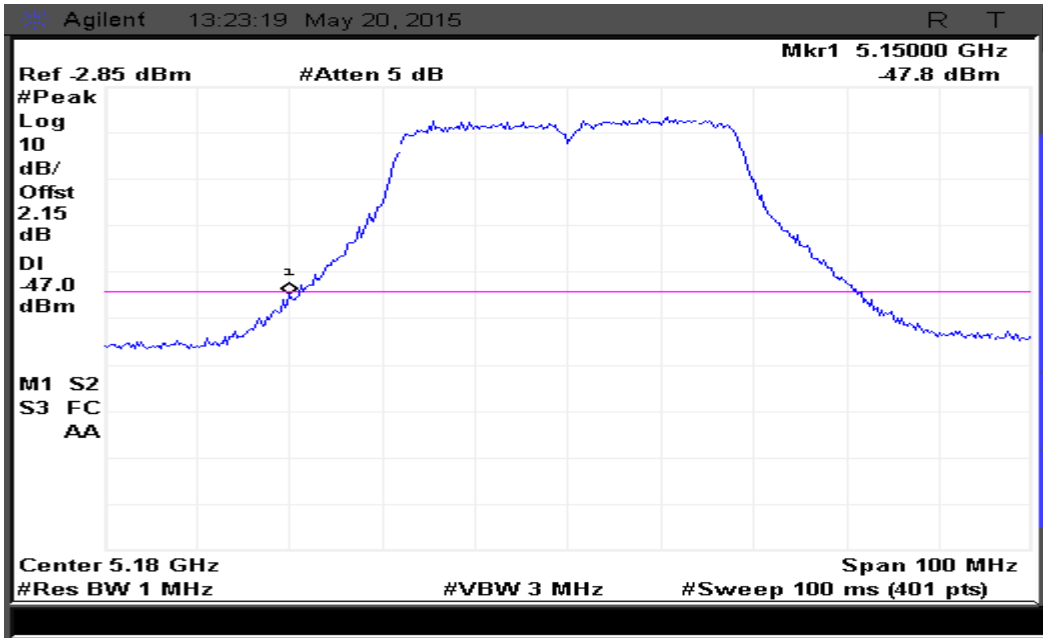


Figure 173: Band edge measured at Ch. 1-Peak

5.3.6.6.2 40MHz Modulation BW-High channel_5220MHz

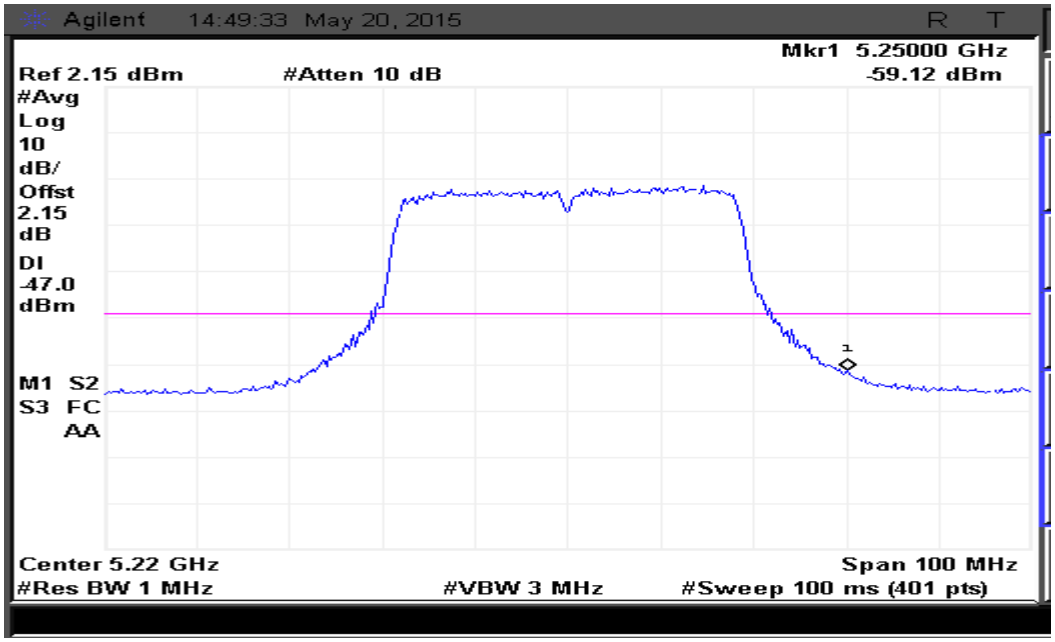


Figure 174: Band edge measured at Ch. 0-Avg

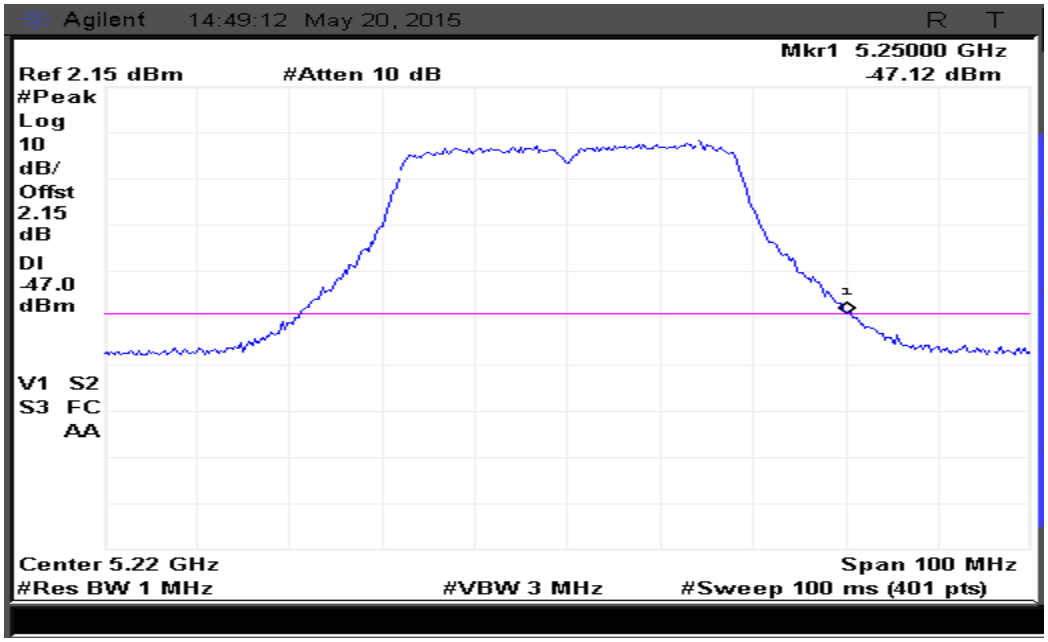


Figure 175: Band edge measured at Ch. 0-Peak

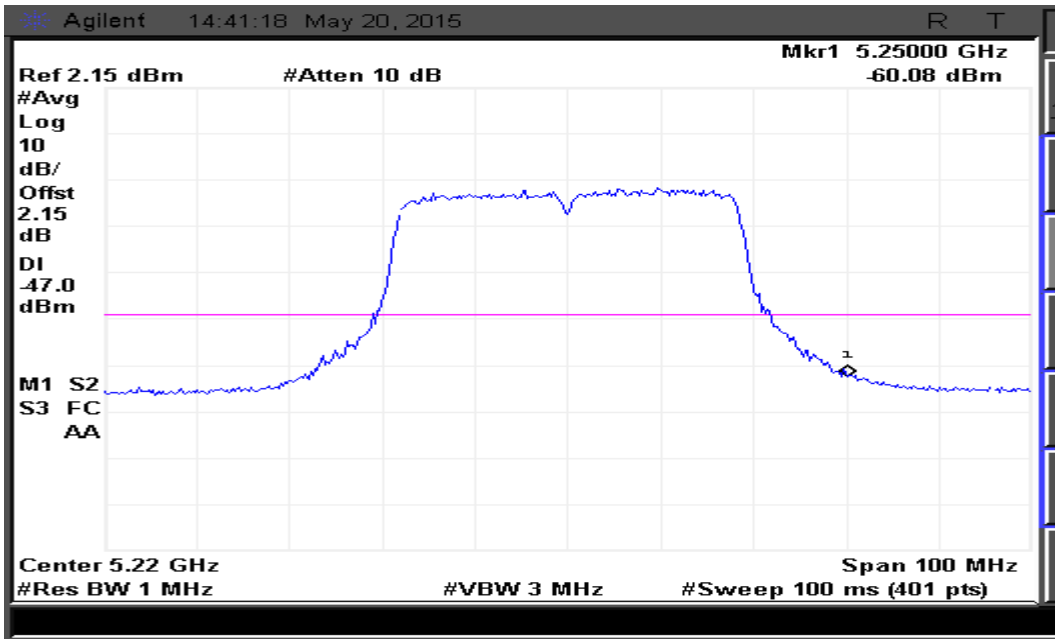


Figure 176: Band edge measured at Ch. 1-Avg

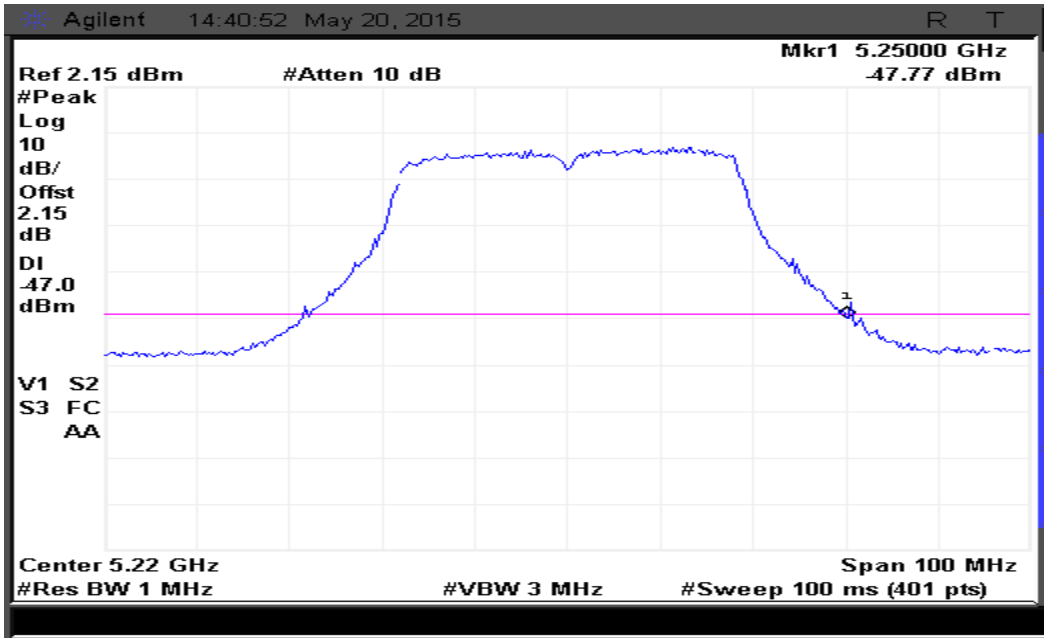


Figure 177: Band edge measured at Ch. 1-Peak

5.3.6.6.3 5MHz Modulation BW-Low channel_5155MHz

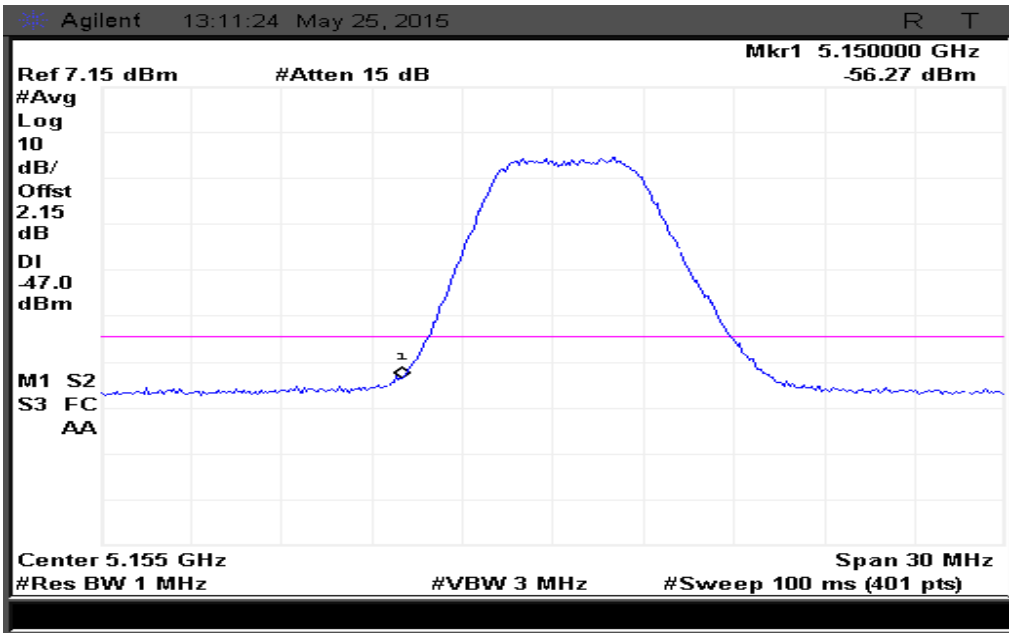


Figure 178: Band edge measured at Ch. 0-Avg

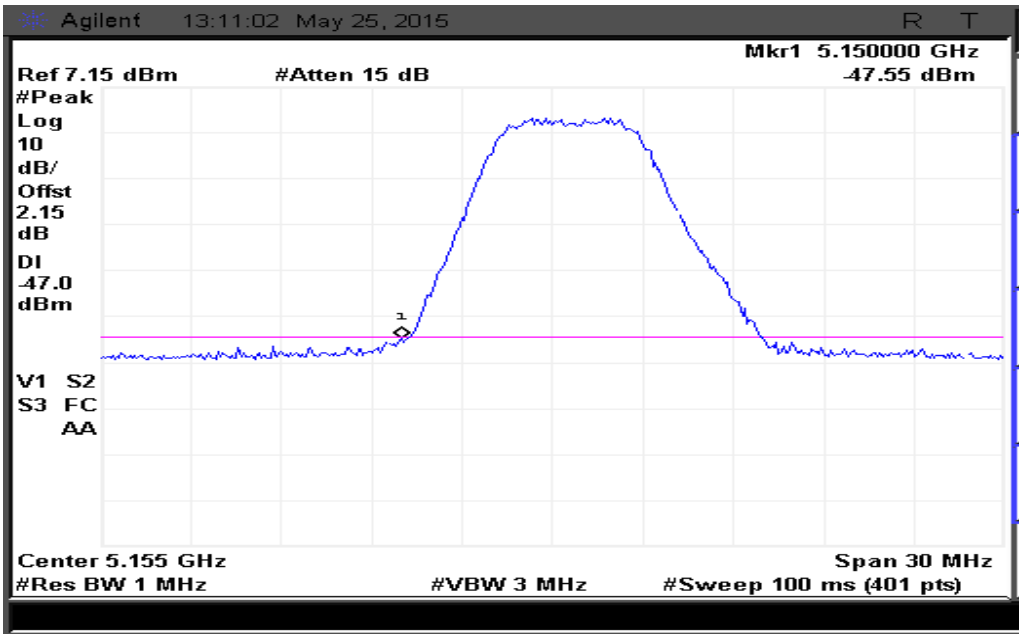


Figure 179: Band edge measured at Ch. 0-Peak

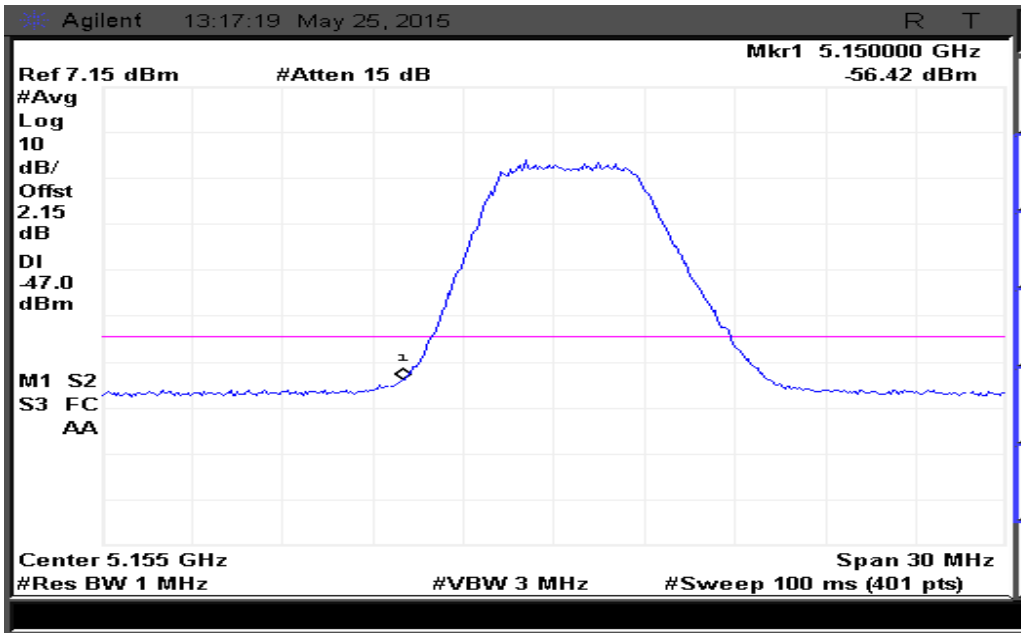


Figure 180: Band edge measured at Ch. 1-Avg

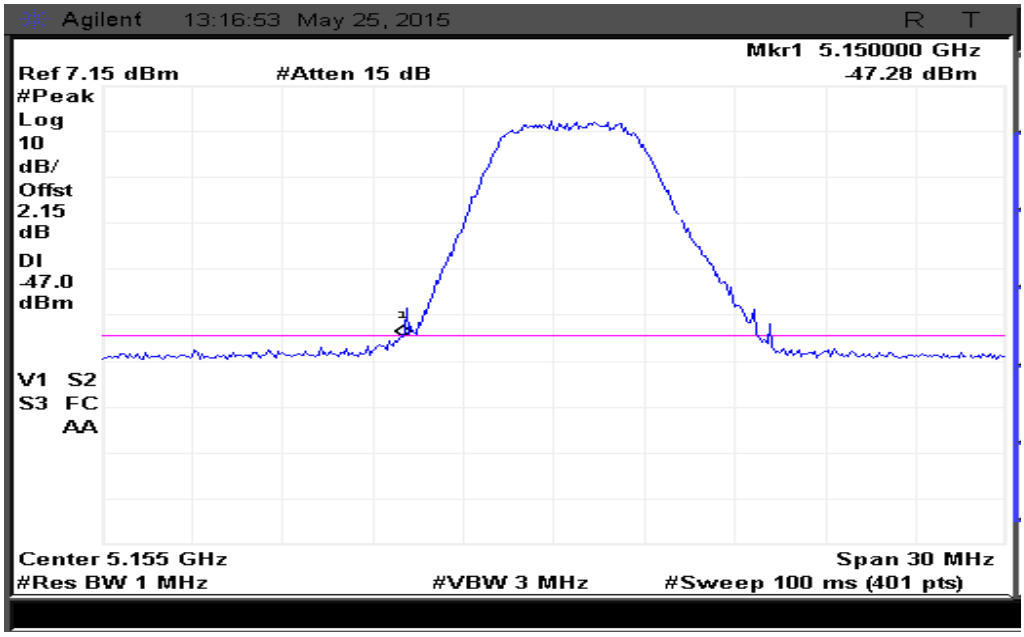


Figure 181: Band edge measured at Ch. 1-Peak

5.3.6.6.4 5MHz Modulation BW-High channel_5245MHz

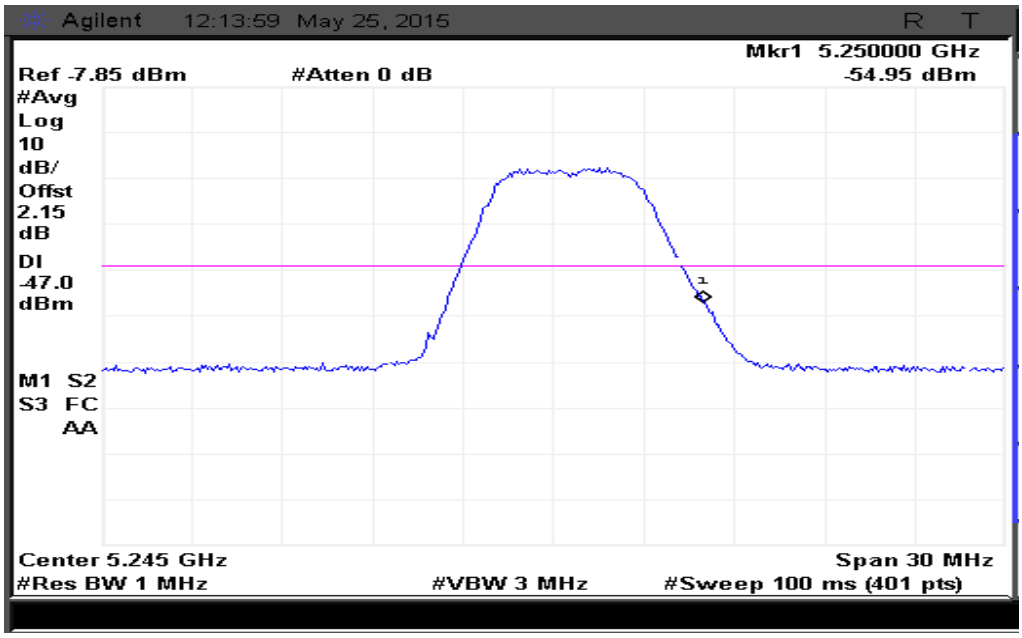


Figure 182: Band edge measured at Ch. 0-Avg

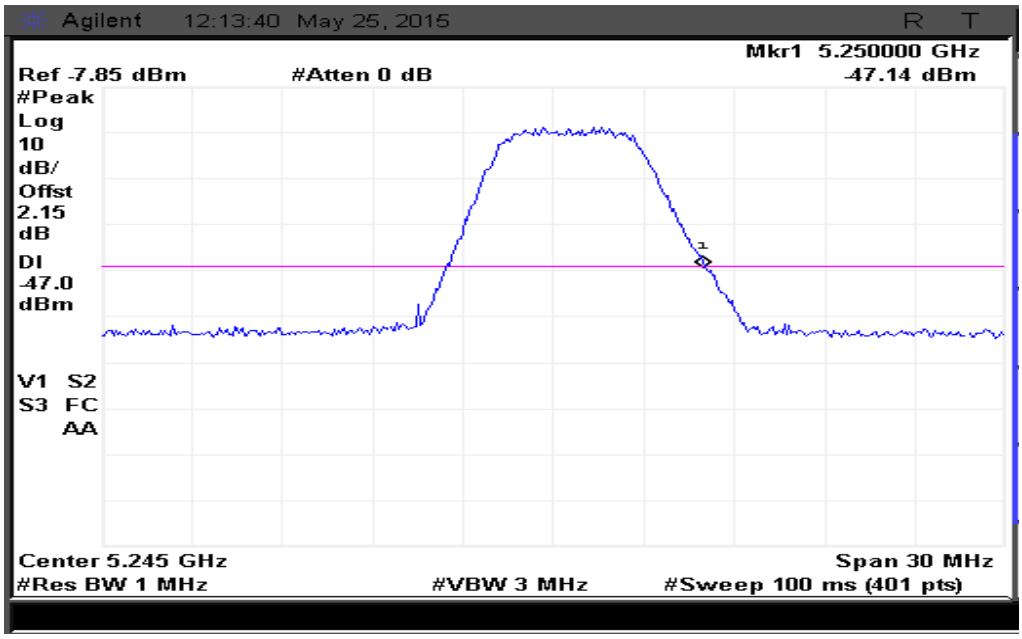


Figure 183: Band edge measured at Ch. 0-Peak

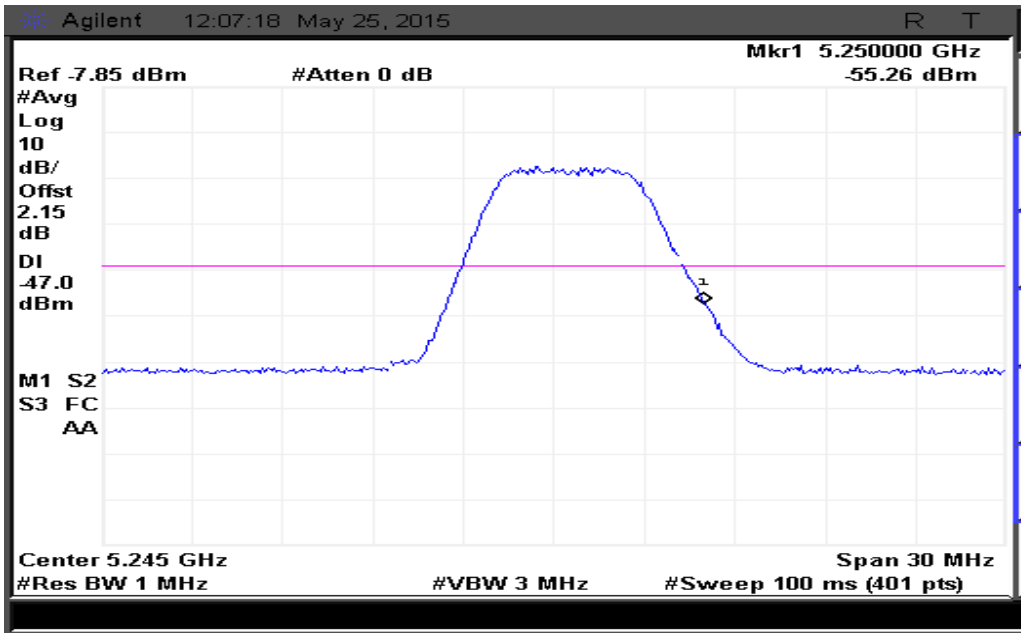


Figure 184: Band edge measured at Ch. 1-Avg

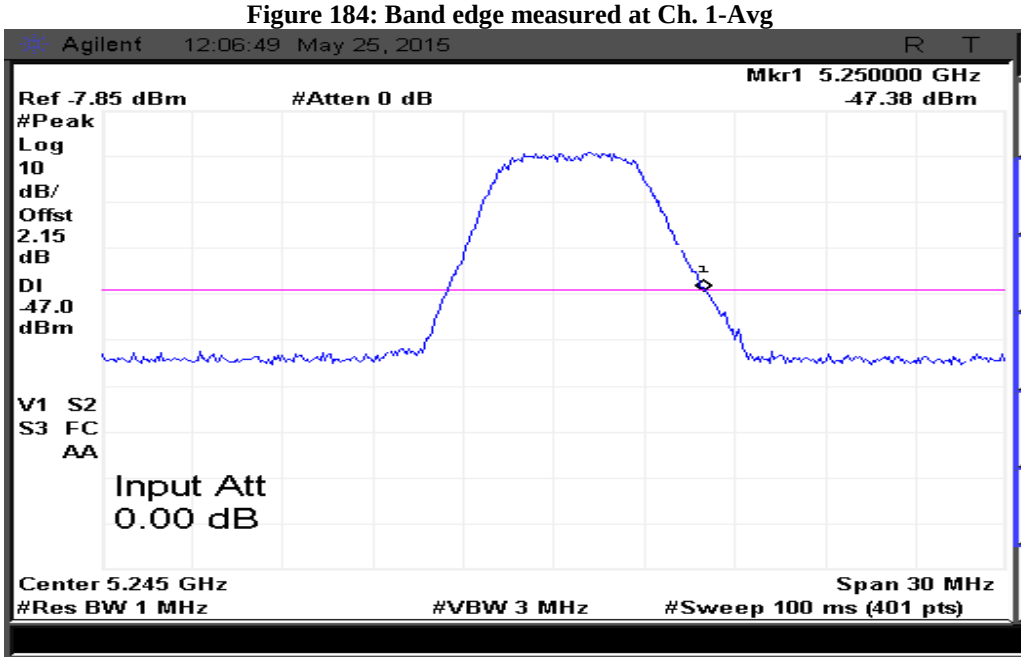


Figure 185: Band edge measured at Ch. 1-Peak

5.3.6.7 RESULT (SUPPORTING GRAPHS / DATA) FOR 24DBI ANTENNA CONDITION

5.3.6.7.1 40MHZ MODULATION BW-LOW CHANNEL_5180MHZ

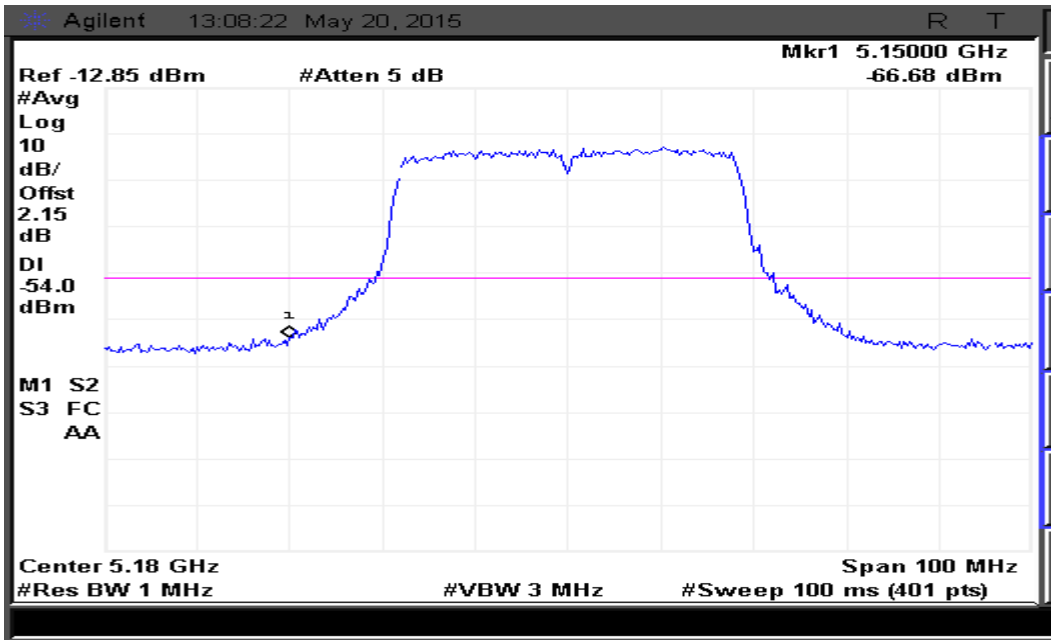


Figure 186: Band edge measured at Ch. 0-Avg

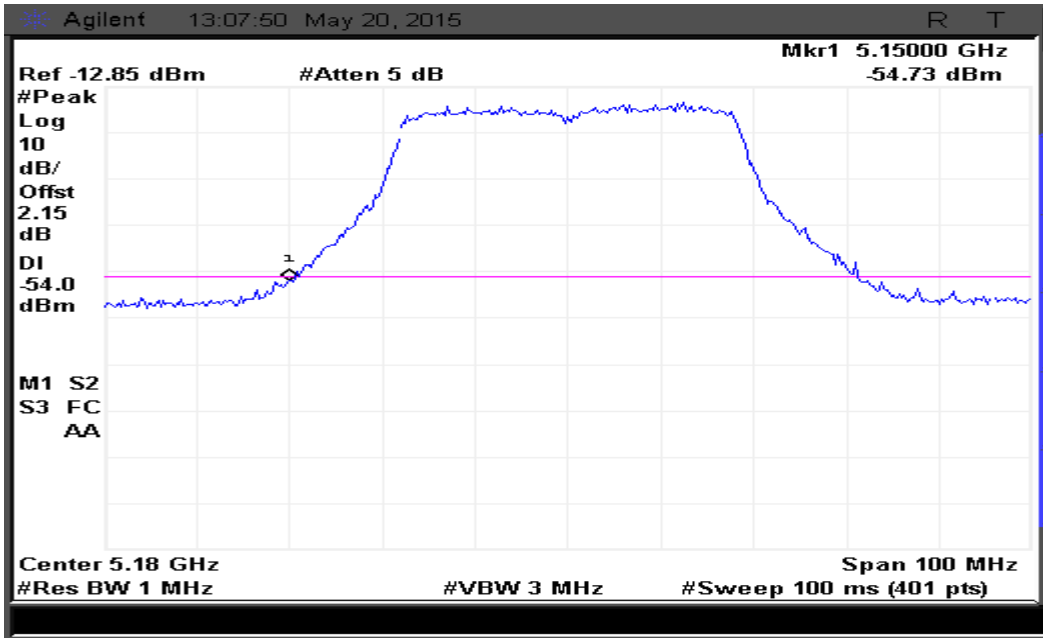


Figure 187: Band edge measured at Ch. 0-Peak

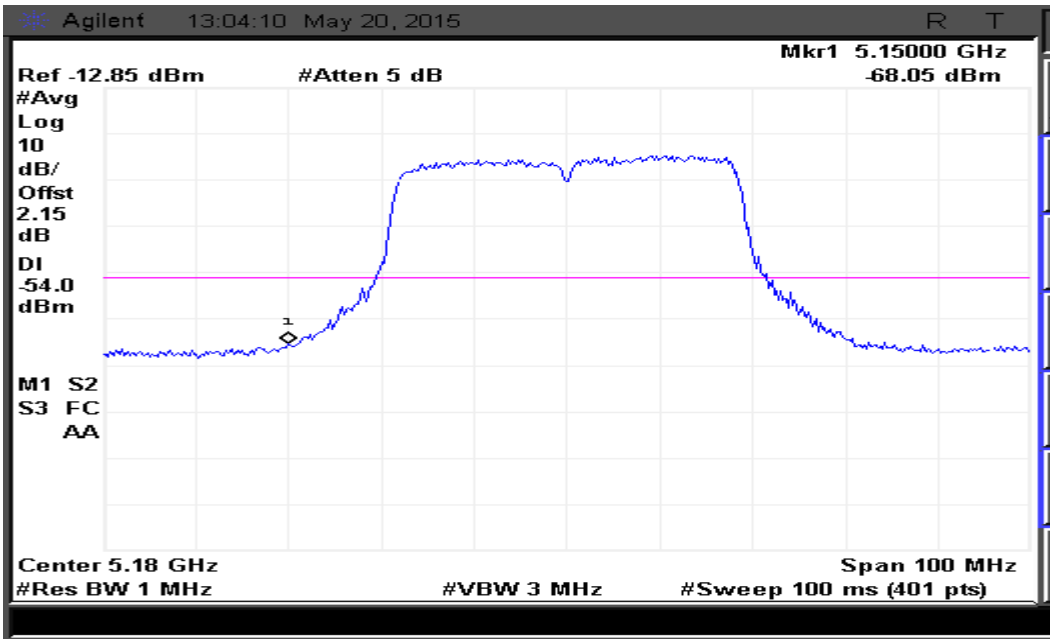


Figure 188: Band edge measured at Ch. 1-Avg

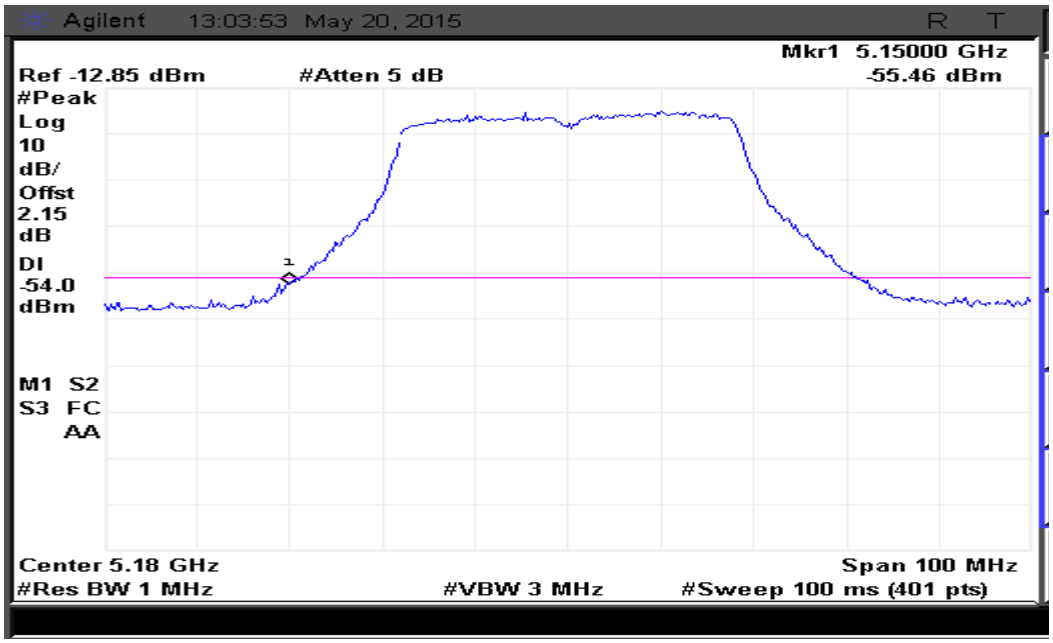


Figure 189: Band edge measured at Ch. 1-Peak

5.3.6.7.2 40MHz Modulation BW-High channel_5220MHz

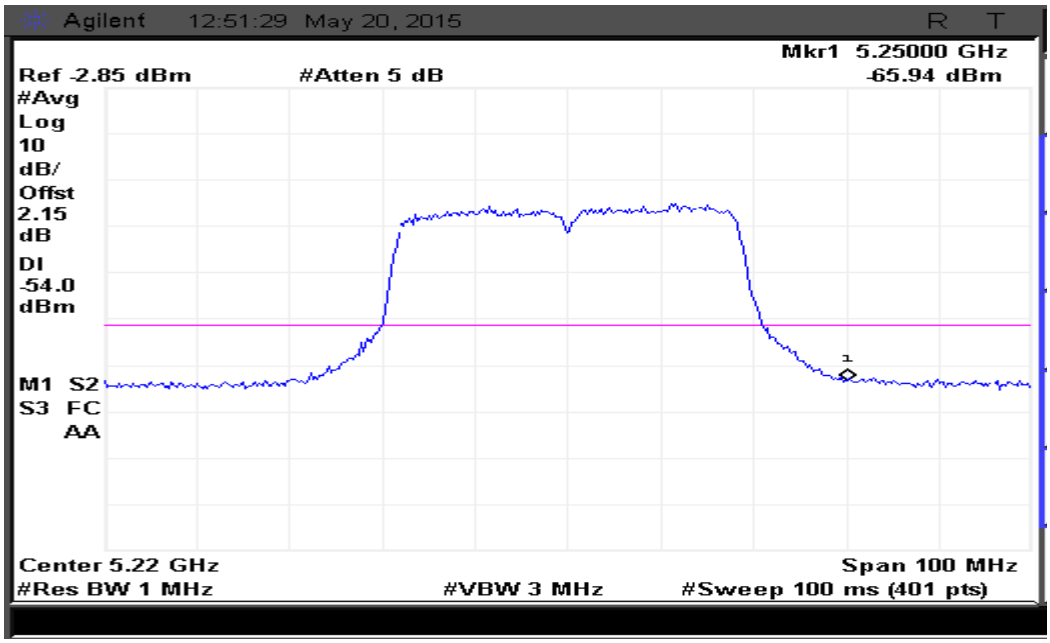


Figure 190: Band edge measured at Ch. 0-Avg

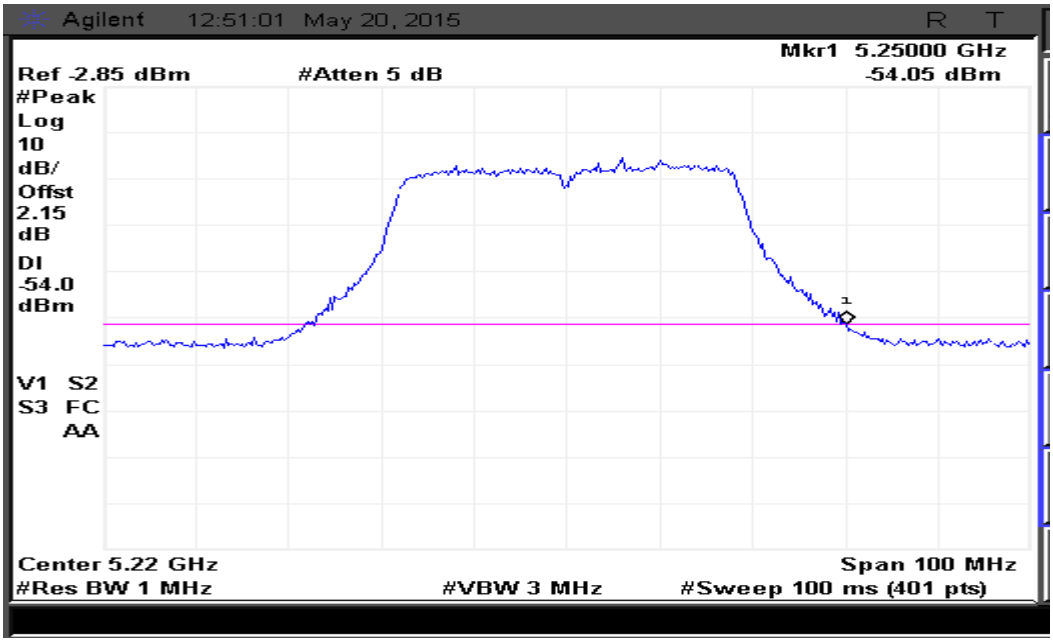


Figure 191: Band edge measured at Ch. 0-Peak

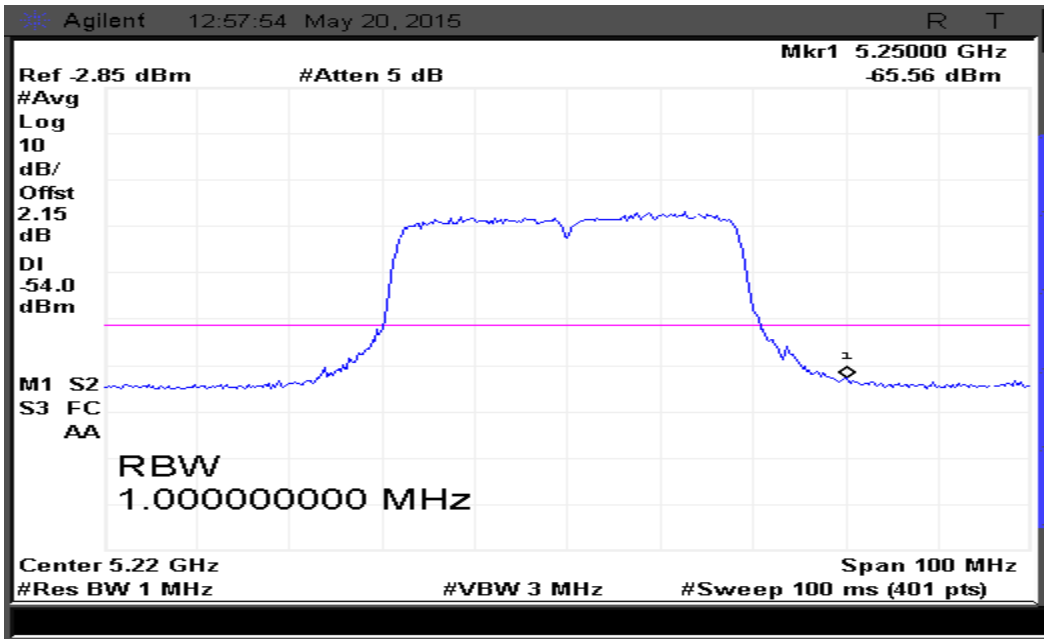


Figure 192: Band edge measured at Ch. 1-Avg

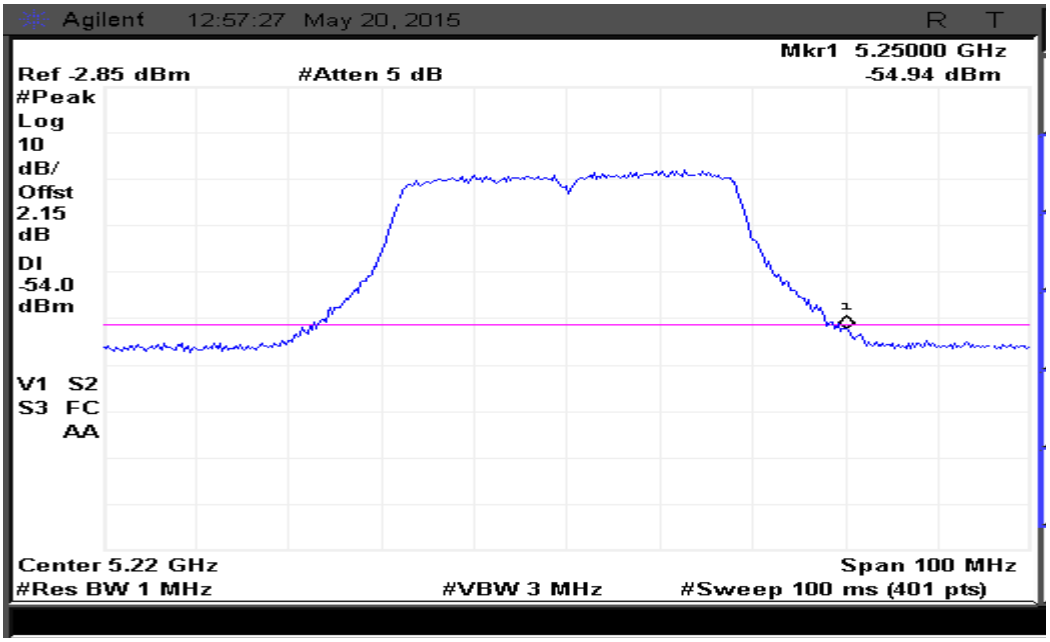


Figure 193: Band edge measured at Ch. 1-Peak

5.3.6.7.3 5MHz Modulation BW-Low channel_5155MHz

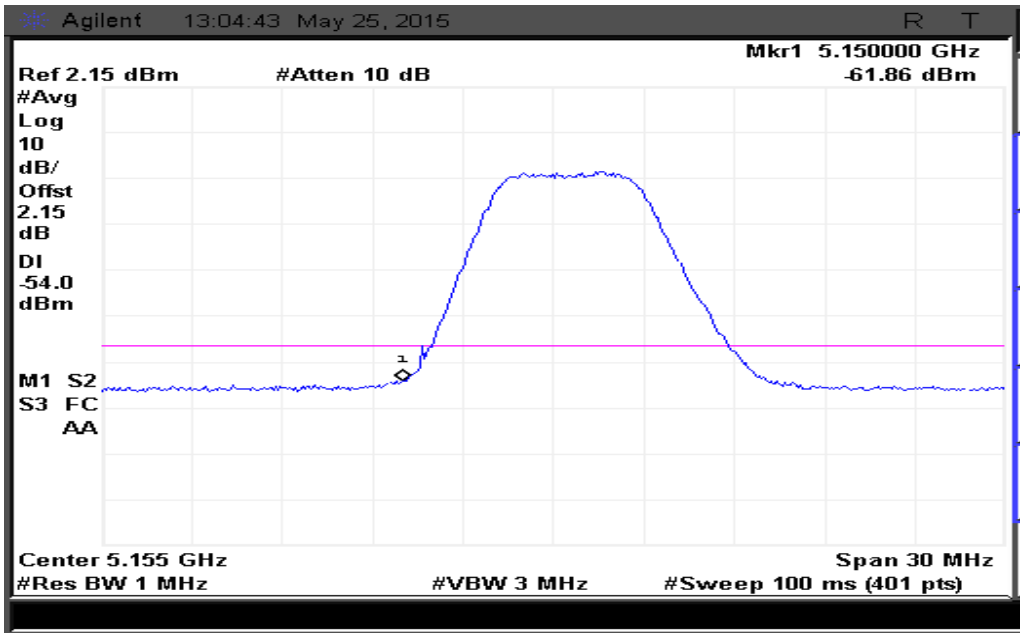


Figure 194: Band edge measured at Ch. 0-Avg

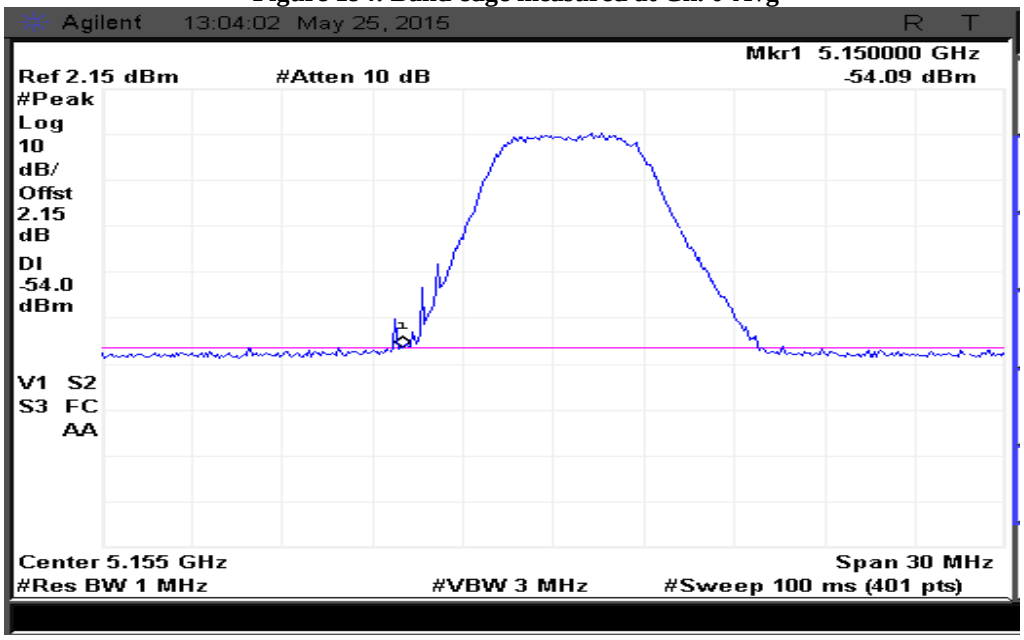


Figure 195: Band edge measured at Ch. 0-Peak

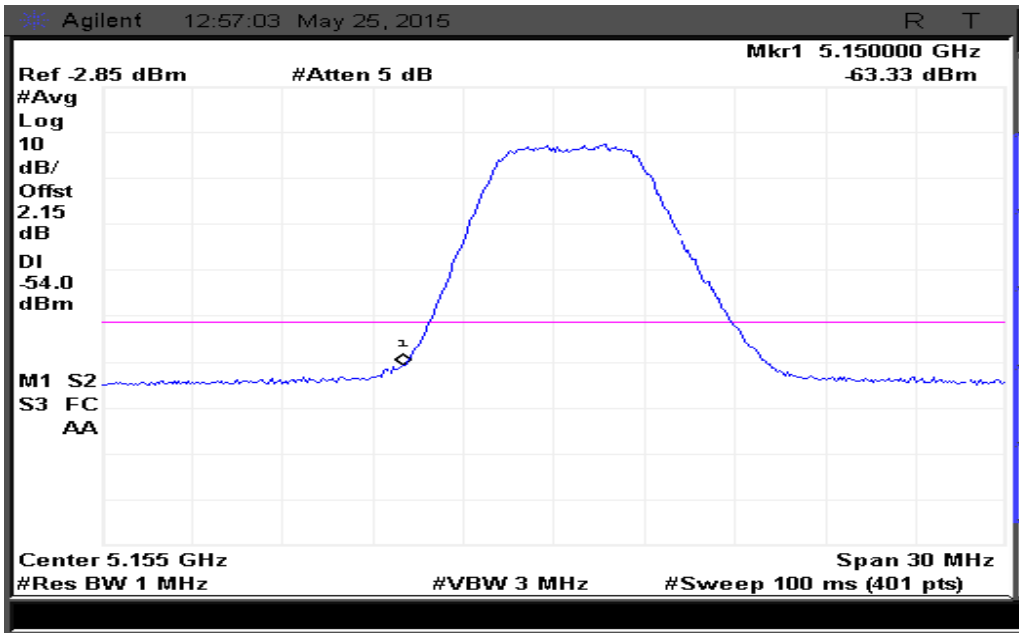


Figure 196: Band edge measured at Ch. 1-Avg

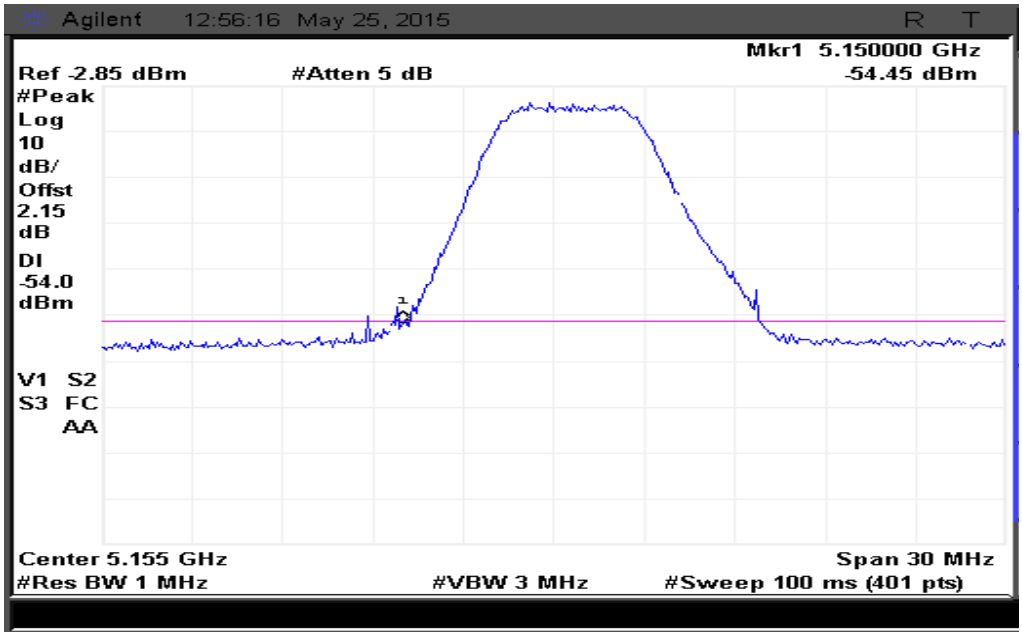


Figure 197: Band edge measured at Ch. 1-Peak

5.3.6.7.4 5MHz Modulation BW-High channel_5245MHz

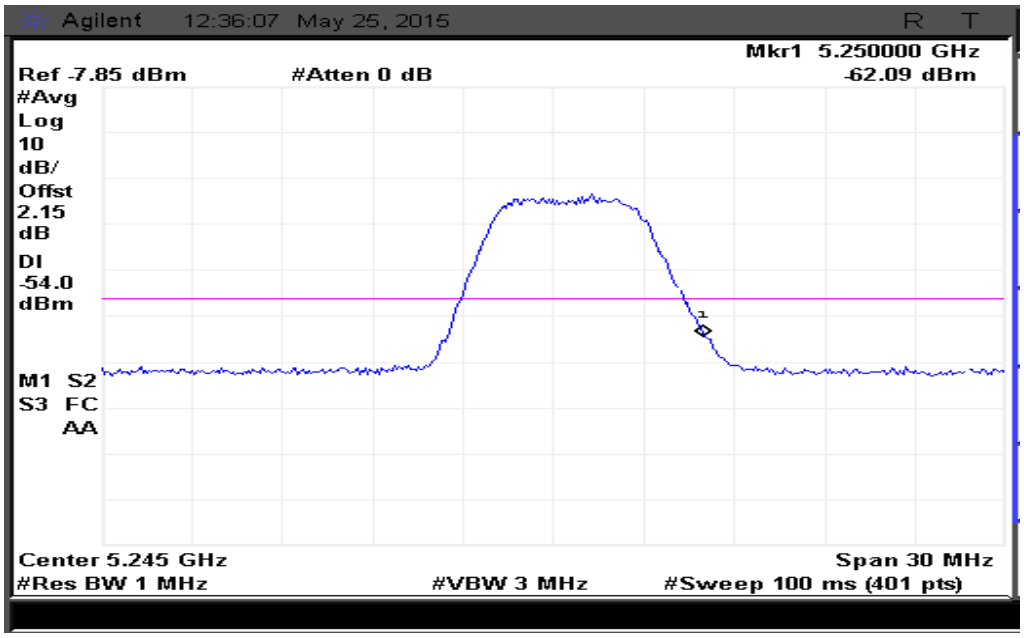


Figure 198: Band edge measured at Ch. 0-Avg

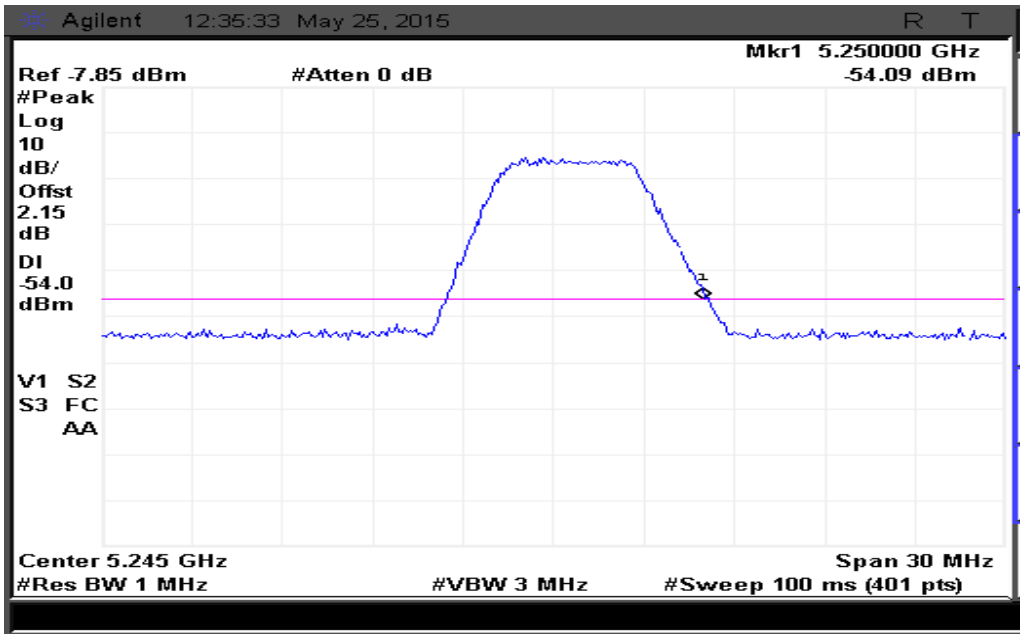


Figure 199: Band edge measured at Ch. 0-Peak

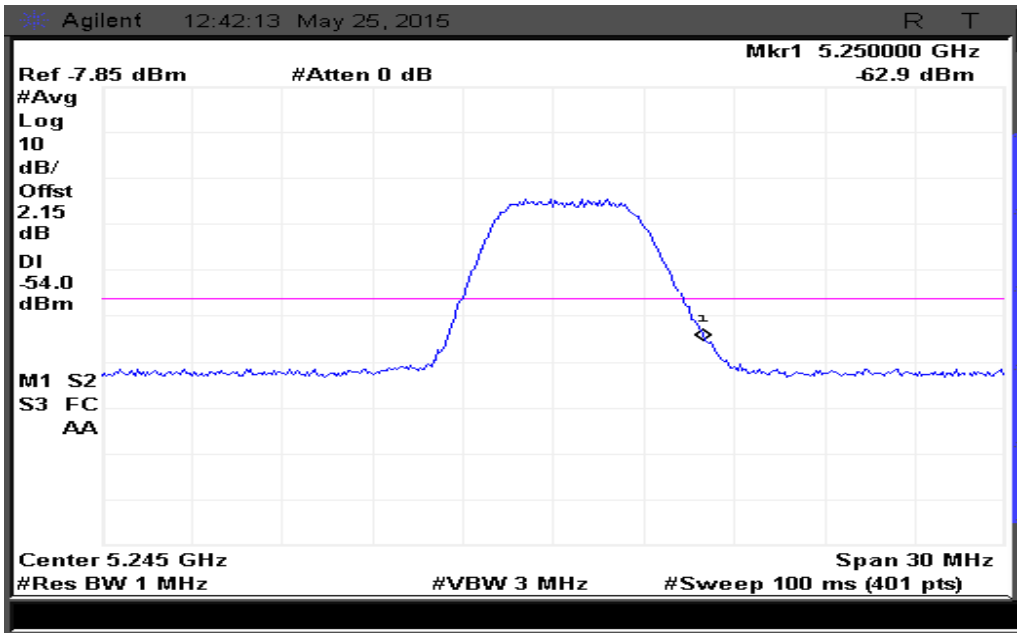


Figure 200: Band edge measured at Ch. 1-Avg

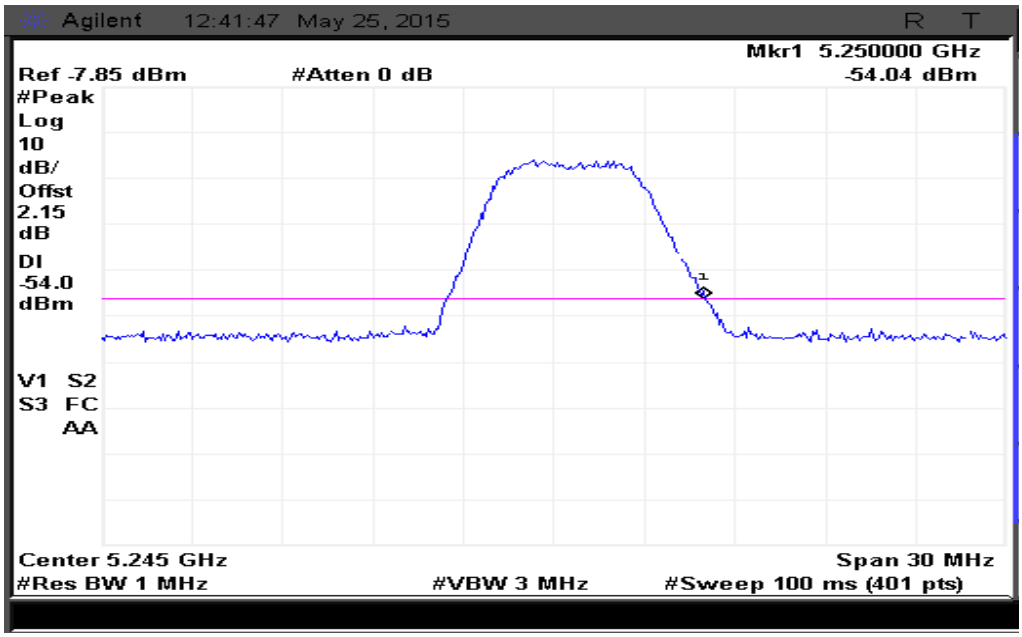


Figure 201: Band edge measured at Ch. 1-Peak

APPENDIX I – ACRONYMS

dBm	Power in dB with reference to 1mW
dBµV	Decibel micro Volts
EUT	Equipment Under Test
FCC	Federal Communications Commission
GHz	Giga Hertz
kHz	Kilo Hertz
LISN	Line Impedance Stabilization Network
MHz	Mega Hertz
QP	Quasi Peak

END OF REPORT