

## EMC TEST REPORT

<b>TEST REPORT NUMBER</b>	DBN 1614TEL688-F
<b>TEST REPORT DATE</b>	14-Jun-2016
<b>TEST REPORT VERSION</b>	1.0
<b>MANUFACTURER</b>	Cambium Networks
<b>PRODUCT NAME</b>	ePMP2000
<b>PRODUCT MODEL</b>	C050900P031A
<b>CONDITION OF EUT WHEN RECEIVED</b>	Good and in proper working condition
<b>ISSUED TO</b>	Cambium Networks, 3800 Golf Road, Suite 360, Rolling Meadows, IL, USA 60008
<b>ISSUED BY</b>	<p><b>TARANG Lab</b>          Wipro Technologies, SJP2, Survey#70,77,78/8A,          Doddakannelli, Sarjapur road, Bangalore.          Karnataka. India - 560 035          Tel: +91-80-30292929 Fax: +91-80-30298200          Email: tarang.planet@wipro.com          Web: <a href="http://www.wipro.com">www.wipro.com</a></p>

---

## AMENDMENT HISTORY

Amendment Number	Amendment Date	Author of Amendment	Previous Report Version	Previous Report Date
<b>Amendment Details</b>				

## TABLE OF CONTENTS

<b>1</b>	<b>TEST REPORT SUMMARY .....</b>	<b>9</b>
<b>2</b>	<b>GENERAL INFORMATION .....</b>	<b>10</b>
2.1	ACCREDITATION DETAILS .....	10
2.2	MEASUREMENT UNCERTAINTY .....	10
<b>3</b>	<b>INSTRUMENTATION AND CALIBRATION .....</b>	<b>11</b>
3.1	TEST AND MEASURING EQUIPMENT .....	11
3.2	EQUIPMENTS USED .....	11
<b>4</b>	<b>PRODUCT INFORMATION .....</b>	<b>12</b>
4.1	DESCRIPTION OF THE PRODUCT .....	12
4.2	SOFTWARE AND FIRMWARE DETAILS .....	12
<b>5</b>	<b>TEST DETAILS.....</b>	<b>13</b>
5.1	PRODUCT AND TEST SETUP.....	13
5.1.1	PRODUCT CONFIGURATION.....	13
5.1.2	TEST SETUP DETAILS.....	14
5.1.3	ACCESSORIES .....	14
5.2	APPLICABLE TESTS .....	14
5.3	TEST RESULT .....	15
5.3.1	DUTY CYCLE (X) AND TRANSMISSION DURATION (T).....	15
5.3.2	26 dB EMISSION BANDWIDTH.....	17
5.3.3	99 PERCENT OCCUPIED CHANNEL BANDWIDTH.....	25
5.3.4	MAXIMUM CONDUCTED OUTPUT POWER .....	33
5.3.5	POWER SPECTRAL DENSITY .....	40
5.3.6	TRANSMITTER UNWANTED EMISSIONS (CONDUCTED) .....	52
5.3.7	BAND EDGE EMISSIONS .....	110
	<b>ANNEXURE I: EUT SOFTWARE SETTINGS .....</b>	<b>115</b>
	<b>ANNEXURE II: ACRONYMS .....</b>	<b>119</b>

## LIST OF FIGURES

Figure 1: Block diagram of the EUT test setup.....	14
Figure 2: Typical test setup for Conducted RF Test .....	15
Figure 3: Measured ON time .....	16
Figure 4: Measured Transmission Period (T) .....	16
Figure 5: Typical test setup for Conducted RF Test .....	17
Figure 6: 40 MHz, 17 dBi, Low Channel: 26 dB bandwidth measured at Ch.0 – 5495 MHz .....	18
Figure 7: 40 MHz, 17 dBi, Low Channel: 26 dB bandwidth measured at Ch.1 – 5495 MHz .....	18
Figure 8: 40 MHz, 17 dBi, Mid Channel: 26 dB bandwidth measured at Ch.0 - 5575 MHz.....	19
Figure 9: 40 MHz, 17 dBi, Mid Channel: 26 dB bandwidth measured at Ch.1 - 5575 MHz.....	19
Figure 10: 40 MHz, 17 dBi, High Channel: 26 dB bandwidth measured at Ch.0 - 5700 MHz .....	20
Figure 11: 40 MHz, 17 dBi, High Channel: 26 dB bandwidth: measured at Ch.1 - 5700 MHz .....	20
Figure 12: 10 MHz, 17 dBi, Low Channel: 26 dB bandwidth measured at Ch.0 - 5485 MHz .....	21
Figure 13: 10 MHz, 17 dBi, Low Channel: 26 dB bandwidth measured at Ch.1 - 5485 MHz.....	21
Figure 14: 10 MHz, 17 dBi, Mid Channel: 26 dB bandwidth measured at Ch.0 - 5585 MHz.....	22
Figure 15: 10 MHz, 17 dBi, Mid Channel: 26 dB bandwidth measured at Ch.1 - 5585 MHz.....	22
Figure 16: 10 MHz, 17 dBi, High channel 26 dB bandwidth measured at Ch.0 - 5710 MHz .....	23
Figure 17: 10 MHz, 17 dBi, High channel 26 dB bandwidth measured at Ch.1 - 5710 MHz .....	23
Figure 18: Typical test setup for Conducted RF Test .....	25
Figure 19: 40 MHz, 17 dBi, Low Channel: 99% OBW measured at Ch.0 – 5495 MHz .....	26
Figure 20: 40 MHz, 17 dBi, Low Channel: 99% OBW measured at Ch.1 – 5495 MHz .....	26
Figure 21: 40 MHz, 17 dBi, Mid Channel: 99% OBW measured at Ch.0 – 5575 MHz .....	27
Figure 22: 40 MHz, 17 dBi, Mid Channel: 99% OBW measured at Ch.1 – 5575 MHz .....	27
Figure 23: 40 MHz, 17 dBi, High Channel: 99% OBW measured at Ch.0 – 5700 MHz.....	28
Figure 24: 40 MHz, 17 dBi, High Channel: 99% OBW measured at Ch.1 – 5700 MHz.....	28
Figure 25: 10 MHz, 17 dBi, Low Channel: 99% OBW measured at Ch.0 – 5485 MHz .....	29
Figure 26: 10 MHz, 17 dBi, Low Channel: 99% OBW measured at Ch.1 – 5485 MHz .....	29
Figure 27: 10 MHz, 17 dBi, Mid Channel: 99% OBW measured at Ch.0 – 5585 MHz .....	30
Figure 28: 10 MHz, 17 dBi, Mid Channel: 99% OBW measured at Ch.1 – 5585 MHz .....	30
Figure 29: 10 MHz, 17 dBi, High Channel: 99% OBW measured at Ch.0 – 5710 MHz.....	31
Figure 30: 10 MHz, 17 dBi, High Channel: 99% OBW measured at Ch.1 – 5710 MHz.....	31
Figure 31: Typical test setup for Conducted RF Test .....	33
Figure 32: 40 MHz, 17 dBi, Low Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5495 MHz .....	34
Figure 33: 40 MHz, 17 dBi, Mid Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5575 MHz.....	34
Figure 34: 40 MHz, 17 dBi, High Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5700 MHz.....	35
Figure 35: 40 MHz, 17 dBi, Low Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5490 MHz .....	35
Figure 36: 40 MHz, 17 dBi, High Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5705 MHz.....	36
Figure 37: 10 MHz, 17 dBi, Low Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5485 MHz .....	36
Figure 38: 10 MHz, 17 dBi, Mid Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5585 MHz .....	37
Figure 39: 10 MHz, 17 dBi, High Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5710 MHz.....	37
Figure 40: 10 MHz, 17 dBi, Low Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5475 MHz .....	38
Figure 41: 10 MHz, 17 dBi, High Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5720 MHz.....	38
Figure 42: Typical test setup for Conducted Test .....	40
Figure 43: 40 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 0 – 5495 MHz.....	41
Figure 44: 40 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 1 – 5495 MHz.....	41
Figure 45: 40 MHz, 17 dBi, Mid Channel: Power spectral density measured at Ch. 0 – 5575 MHz.....	42
Figure 46: 40 MHz, 17 dBi, Mid Channel: Power spectral density measured at Ch. 1 – 5575 MHz.....	42
Figure 47: 40 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 0 – 5700 MHz .....	43
Figure 48: 40 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 1 – 5700 MHz .....	43
Figure 49: 40 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch.0 – 5490 MHz.....	44
Figure 50: 40 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch.1 – 5490 MHz.....	44
Figure 51: 40 MHz, 17 dBi, High Channel: Power spectral density measured at Ch.0 – 5705 MHz .....	45
Figure 52: 40 MHz, 17 dBi, High Channel: Power spectral density measured at Ch.1 – 5705 MHz .....	45

Figure 53: 10 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 0 – 5485 MHz.....	46
Figure 54: 10 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 1 – 5485 MHz.....	46
Figure 55: 10 MHz, 17 dBi, Mid Channel: Power spectral density measured at Ch. 0– 5585 MHz.....	47
Figure 56: 10 MHz, 17 dBi, Mid Channel: Power spectral density measured at Ch. 1 – 5585 MHz.....	47
Figure 57: 10 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 0 – 5710 MHz .....	48
Figure 58: 10 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 1 – 5710 MHz .....	48
Figure 59: 10 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 0 – 5475 MHz.....	49
Figure 60: 10 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 1 – 5475 MHz.....	49
Figure 61: 10 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 0 – 5720 MHz .....	50
Figure 62: 10 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 1 – 5720 MHz .....	50
Figure 63: Typical test setup for Conducted Test .....	53
Figure 64: 40 MHz, 17 dBi, Low Channel: Peak emission from 9 kHz to 150 kHz at Ch. 0 – 5495 MHz .....	54
Figure 65: 40 MHz, 17 dBi, Low Channel: Peak emission from 150 kHz to 30 MHz at Ch. 0 –5495 MHz.....	54
Figure 66: 40 MHz, 17 dBi, Low Channel: Peak emission from 30 MHz to 1 GHz at Ch. 0 –5495 MHz.....	55
Figure 67: 40 MHz, 17 dBi, Low Channel: Average emission from 1 GHz to 18 GHz at Ch. 0 –5495 MHz.....	55
Figure 68: 40 MHz, 17 dBi, Low Channel: Average emission from 18 GHz to 26.5 GHz at Ch. 0 –5495 MHz.....	56
Figure 69: 40 MHz, 17 dBi, Low Channel: Average emission from 26.5 GHz to 40 GHz at Ch. 0 –5495 MHz.....	56
Figure 70: 40 MHz, 17 dBi, Low Channel: Peak emission from 1 GHz to 18 GHz at Ch. 0 –5495 MHz.....	57
Figure 71: 40 MHz, 17 dBi, Low Channel: Peak emission from 18 GHz to 26.5 GHz at Ch. 0 –5495 MHz.....	57
Figure 72: 40 MHz, 17 dBi, Low Channel: Peak emission from 26.5 GHz to 40 GHz at Ch. 0 –5495 MHz.....	58
Figure 73: 40 MHz, 17 dBi, Low Channel: Peak emission from 9 kHz to 150 kHz at Ch. 1 –5495 MHz .....	58
Figure 74: 40 MHz, 17 dBi, Low Channel: Peak emission from 150 kHz to 30 MHz at Ch. 1 –5495 MHz.....	59
Figure 75: 40 MHz, 17 dBi, Low Channel: Peak emission from 30 MHz to 1 GHz at Ch. 1 –5495 MHz .....	59
Figure 76: 40 MHz, 17 dBi, Low Channel: Average emission from 1 GHz to 18 GHz at Ch. 1 –5495 MHz.....	60
Figure 77: 40 MHz, 17 dBi, Low Channel: average Emission from 18 GHz to 26.5 GHz at Ch. 1 –5495 MHz .....	60
Figure 78: 40 MHz, 17 dBi, Low Channel: Average emission from 26.5 GHz to 40 GHz at Ch. 1 –5495 MHz.....	61
Figure 79: 40 MHz, 17 dBi, Low Channel: Peak emission from 1 GHz to 18 GHz at Ch. 1 –5495 MHz .....	61
Figure 80: 40 MHz, 17 dBi, Low Channel: Peak emission from 18 GHz to 26.5 GHz at Ch. 1 –5495 MHz.....	62
Figure 81: 40 MHz, 17 dBi, Low Channel: Peak emission from 26.5 GHz to 40 GHz at Ch. 1 –5495 MHz.....	62
Figure 82: 40 MHz, 17 dBi, Mid Channel: Peak emission from 9 kHz to 150 kHz at Ch. 0 –5575 MHz.....	63
Figure 83: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0 –5575 MHz.....	63
Figure 84: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0 –5575 MHz.....	64
Figure 85: 40 MHz, 17 dBi, Mid Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0 –5575 MHz.....	64
Figure 86: 40 MHz, 17 dBi, Mid Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 0 –5575 MHz.....	65
Figure 87: 40 MHz, 17 dBi, Mid Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 0 –5575 MHz.....	65
Figure 88: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 0 –5575 MHz.....	66
Figure 89: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 0 –5575 MHz.....	66
Figure 90: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 0 –5575 MHz.....	67
Figure 91: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 1 –5575 MHz .....	67
Figure 92: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 1 –5575 MHz.....	68
Figure 93: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 1 –5575 MHz.....	68
Figure 94: 40 MHz, 17 dBi, Mid Channel: Average Emission from 1 GHz to 18 GHz at Ch. 1 –5575 MHz.....	69
Figure 95: 40 MHz, 17 dBi, Mid Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 1 –5575 MHz.....	69
Figure 96: 40 MHz, 17 dBi, Mid Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 1 –5575 MHz.....	70
Figure 97: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 1 –5575 MHz .....	70
Figure 98: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 1 –5575 MHz.....	71
Figure 99: 40 MHz, 17 dBi, Mid Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 1 –5575 MHz .....	71
Figure 100: 40 MHz, 17 dBi, High Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 0 –5700 MHz .....	72
Figure 101: 40 MHz, 17 dBi, High Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0 –5700 MHz .....	72
Figure 102: 40 MHz, 17 dBi, High Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0 –5700 MHz .....	73
Figure 103: 40 MHz, 17 dBi, High Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0 –5700 MHz .....	73
Figure 104: 40 MHz, 17 dBi, High Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 0 –5700 MHz .....	74
Figure 105: 40 MHz, 17 dBi, High Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 0 –5700 MHz .....	74

Figure 106: 40 MHz, 17 dBi, High Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 0 –5700 MHz .....	75
Figure 107: 40 MHz, 17 dBi, High Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 0 –5700 MHz .....	75
Figure 108: 40 MHz, 17 dBi, High Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 0 –5700 MHz .....	76
Figure 109: 40 MHz, 17 dBi, High Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 1 –5700 MHz .....	76
Figure 110: 40 MHz, 17 dBi, High Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 1 –5700 MHz .....	77
Figure 111: 40 MHz, 17 dBi, High Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 1 –5700 MHz .....	77
Figure 112: 40 MHz, 17 dBi, High Channel: Average Emission from 1 GHz to 18 GHz at Ch. 1 –5700 MHz .....	78
Figure 113: 40 MHz, 17 dBi, High Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 1 –5700 MHz .....	78
Figure 114: 40 MHz, 17 dBi, High Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 1 –5700 MHz .....	79
Figure 115: 40 MHz, 17 dBi, High Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 1 –5700 MHz .....	79
Figure 116: 40 MHz, 17 dBi, High Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 1 –5700 MHz .....	80
Figure 117: 40 MHz, 17 dBi, High Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 1 –5700 MHz .....	80
Figure 118: 10 MHz, 17 dBi, Low Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 0 –5485 MHz .....	81
Figure 119: 10 MHz, 17 dBi, Low Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0 –5485 MHz .....	81
Figure 120: 10 MHz, 17 dBi, Low Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0 –5485 MHz .....	82
Figure 121: 10 MHz, 17 dBi, Low Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0 –5485 MHz .....	82
Figure 122: 10 MHz, 17 dBi, Low Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 0 –5485 MHz .....	83
Figure 123: 10 MHz, 17 dBi, Low Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 0 –5485 MHz .....	83
Figure 124: 10 MHz, 17 dBi, Low Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 0 –5485 MHz .....	84
Figure 125: 10 MHz, 17 dBi, Low Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 0 –5485 MHz .....	84
Figure 126: 10 MHz, 17 dBi, Low Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 0 –5485 MHz .....	85
Figure 127: 10 MHz, 17 dBi, Low Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 1 –5485 MHz .....	85
Figure 128: 10 MHz, 17 dBi, Low Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 1 –5485 MHz .....	86
Figure 129: 10 MHz, 17 dBi, Low Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 1 –5485 MHz .....	86
Figure 130: 10 MHz, 17 dBi, Low Channel: Average Emission from 1 GHz to 18 GHz at Ch. 1 –5485 MHz .....	87
Figure 131: 10 MHz, 17 dBi, Low Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 1 –5485 MHz .....	87
Figure 132: 10 MHz, 17 dBi, Low Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 1 –5485 MHz .....	88
Figure 133: 10 MHz, 17 dBi, Low Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 1 –5485 MHz .....	88
Figure 134: 10 MHz, 17 dBi, Low Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 1 –5485 MHz .....	89
Figure 135: 10 MHz, 17 dBi, Low Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 1 –5485 MHz .....	89
Figure 136: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 0 –5585 MHz .....	90
Figure 137: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0 –5585 MHz .....	90
Figure 138: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0 –5585 MHz .....	91
Figure 139: 10 MHz, 17 dBi, Mid Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0 –5585 MHz .....	91
Figure 140: 10 MHz, 17 dBi, Mid Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 0 –5585 MHz .....	92
Figure 141: 10 MHz, 17 dBi, Mid Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 0 –5585 MHz .....	92
Figure 142: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 0 –5585 MHz .....	93
Figure 143: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 0 –5585 MHz .....	93
Figure 144: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 0 –5585 MHz .....	94
Figure 145: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 1 –5585 MHz .....	94
Figure 146: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 1 –5585 MHz .....	95
Figure 147: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 1 –5585 MHz .....	95
Figure 148: 10 MHz, 17 dBi, Mid Channel: Average Emission from 1 GHz to 18 GHz at Ch. 1 –5585 MHz .....	96
Figure 149: 10 MHz, 17 dBi, Mid Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 1 –5585 MHz .....	96
Figure 150: 10 MHz, 17 dBi, Mid Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 1 –5585 MHz .....	97
Figure 151: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 1 –5585 MHz .....	97
Figure 152: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 1 –5585 MHz .....	98
Figure 153: 10 MHz, 17 dBi, Mid Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 1 –5585 MHz .....	98
Figure 154: 10 MHz, 17 dBi, High Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 0 –5710 MHz .....	99
Figure 155: 10 MHz, 17 dBi, High Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0 –5710 MHz .....	99
Figure 156: 10 MHz, 17 dBi, High Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0 –5710 MHz .....	100
Figure 157: 10 MHz, 17 dBi, High Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0 –5710 MHz .....	100
Figure 158: 10 MHz, 17 dBi, High Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 0 –5710 MHz .....	101

Figure 159: 10 MHz, 17 dBi, High Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 0 –5710 MHz .....	101
Figure 160: 10 MHz, 17 dBi, High Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 0 –5710 MHz .....	102
Figure 161: 10 MHz, 17 dBi, High Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 0 –5710 MHz .....	102
Figure 162: 10 MHz, 17 dBi, High Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 0 –5710 MHz .....	103
Figure 163: 10 MHz, 17 dBi, High Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 1 –5710 MHz .....	103
Figure 164: 10 MHz, 17 dBi, High Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 1 –5710 MHz .....	104
Figure 165: 10 MHz, 17 dBi, High Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 1 –5710 MHz .....	104
Figure 166: 10 MHz, 17 dBi, High Channel: Average Emission from 1 GHz to 18 GHz at Ch. 1 –5710 MHz .....	105
Figure 167: 10 MHz, 17 dBi, High Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 1 –5710 MHz .....	105
Figure 168: 10 MHz, 17 dBi, High Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 1 –5710 MHz .....	106
Figure 169: 10 MHz, 17 dBi, High Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 1 –5710 MHz .....	106
Figure 170: 10 MHz, 17 dBi, High Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 1 –5710 MHz .....	107
Figure 171: 10 MHz, 17 dBi, High Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 1 –5710 MHz .....	107
Figure 172: Typical test setup for Conducted Test .....	110
Figure 173: 40 MHz, 17 dBi, Low Channel: Band edge measured at Ch.0 –5495 MHz .....	111
Figure 174: 40 MHz, 17 dBi, Low Channel: Band edge measured at Ch.1 –5495 MHz .....	111
Figure 175: 40 MHz, 17 dBi, High Channel: Band edge measured at Ch.0 –5720 MHz .....	112
Figure 176: 40 MHz, 17 dBi, High Channel: Band edge measured at Ch.1 –5720 MHz .....	112
Figure 177: 10 MHz, 17 dBi, Low Channel: Band edge measured at Ch.0 –5475 MHz .....	113
Figure 178: 10 MHz, 17 dBi, Low Channel: Band edge measured at Ch.1 –5475 MHz .....	113
Figure 179: 10 MHz, 17 dBi, High Channel: Band edge measured at Ch.0 –5720 MHz .....	114
Figure 180: 10 MHz, 17 dBi, High Channel: Band edge measured at Ch.1 –5720 MHz .....	114
Figure 181: tftpd32 application screenshot .....	115
Figure 182: tftpd32 application initialization root_ screenshot .....	115
Figure 183: Tera term application screenshot .....	116
Figure 184: Tera term application Login screenshot .....	116
Figure 185: Initializing EUT screenshot .....	117
Figure 186: Atheros Radio Test GUI screenshot-1 .....	117
Figure 187: Atheros Radio Test GUI screenshot -2 .....	118

## LIST OF TABLES

Table 1: List of equipment used for Conducted RF Test .....	11
Table 2: EUT details .....	12
Table 3: List of cables .....	12
Table 4: Result for 26 dB Bandwidth in both 40 MHz and 10 MHz modulation bandwidth.....	24
Table 5 Result for 99% Occupied bandwidth in both 40 MHz and 10 MHz modulation bandwidth .....	32
Table 6: Max RF out power for 17 dBi configuration .....	39
Table 7: Consolidated values across channels and final power for 17 dBi configuration.....	39
Table 8: Result of PSD for 17 dBi configuration for both 40 MHz and 10 MHz modulation bandwidth .....	51
Table 9: Unwanted emission Limit .....	52
Table 10: General Field strength limit below 30 MHz .....	52
Table 11: General Field strength limit above 30 MHz.....	52
Table 12: Result for 17 dBi configuration – 40 MHz modulation bandwidth .....	108
Table 13: Result for 17 dBi configuration - 10 MHz modulation bandwidth .....	109

## 1 TEST REPORT SUMMARY

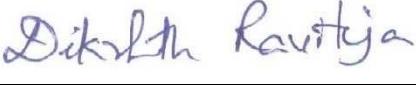
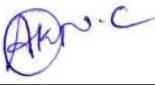
<b>Applicant</b>	Cambium Networks
<b>Manufacturer</b>	Cambium Networks
<b>Product Name</b>	ePMP2000
<b>Product Model</b>	C050900P031A
<b>Product Serial Number</b>	000456D1846A
<b>Date of Test</b>	8 <sup>th</sup> Feb 2016 to 28 <sup>th</sup> Apr 2016
<b>Venue of Test</b>	Tarang Lab

<b>Applicable Standard</b>	<b>Description</b>	<b>Results</b>
RSS GEN, Issue 4, Nov 2014, RSS 247 Issue 1 May 2015	Duty cycle and Transmission Duration	NA
	26 dB Bandwidth measurement	NA
	RSS 247 6.2.3 (1)-99% Occupied channel bandwidth	NA
	RSS 247 6.2.3 (1)-Maximum conducted output power	PASS
	RSS 247 6.2.3 (1)-Power spectral density	PASS
	RSS 247 6.2.3 (2)-Transmission unwanted emission (Conducted)	PASS
	RSS 247 6.2.3 (2)-Band edge emissions	PASS

**ePMP2000** 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 has 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.

<b>Prepared by</b>	<b>Reviewed by</b>	<b>Approved by</b>
		
Dikshit Raviteja	Arun Kumar.N.C	Satheesh I
EMI/EMC Test Engineer	Lead EMI/EMC Test Engineer	Technical Manager

## 2 GENERAL INFORMATION

### 2.1 ACCREDITATION DETAILS

Following are the accreditation and listing details for Tarang.

Accreditation / Listing body	Registration / Company / Certificate Number
NABL, India	Certificate No: T-1533, T-1534 <a href="http://www.nabl-india.org/">http://www.nabl-india.org/</a>
FCC (Federal Communications Commission)	Registration Number: 799247 <a href="http://www.fcc.gov/">http://www.fcc.gov/</a>
IC (Industry Canada)	Company Number: 9023A-1 <a href="http://www.ic.gc.ca">http://www.ic.gc.ca</a>

### 2.2 MEASUREMENT UNCERTAINTY

NA

### 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
Spectrum Analyzer	Keysight Technologies	N9020A	MY54420183	05 <sup>th</sup> Jul 2016
EMI Test Receiver	R&S	ESIB40	100306	04 <sup>th</sup> Jul 2016 / 21 <sup>st</sup> Jan 2017
Peak and Average Power Sensor	Keysight Technologies	U2021XA	MY55050001	05 <sup>th</sup> Jul 2016
Peak and Average Power Sensor	Keysight Technologies	U2021XA	MY55050002	05 <sup>th</sup> Jul 2016

Table 1: List of equipment used for Conducted RF Test

## 4 PRODUCT INFORMATION

### 4.1 DESCRIPTION OF THE PRODUCT

EUT is a point to point & point to multipoint fixed outdoor Transceiver with the following defined channels.

<b>40 MHz channel for 17 dBi antenna</b>	<b>10 MHz channel for 17 dBi antenna</b>
Low – 5495 MHz	Low – 5485 MHz
Mid - 5575 MHz	Mid – 5585 MHz
High - 5700 MHz	High – 5710 MHz

<b>Product</b>	ePMP2000
<b>Model Number</b>	C050900P031A
<b>Serial Number</b>	000456D1846A
<b>Product Category / Type of Equipment</b>	ITE
<b>EUT Operating Voltage</b>	120 V AC
<b>EUT Operating frequency range</b>	60 Hz
<b>Max EUT Operating Current</b>	< 1 A

Table 2: EUT details

<b>Cable No.</b>	<b>Cable Name</b>	<b>Cable Length</b>	<b>Power / Interconnection cable</b>	<b>Shielded / Unshielded</b>
Cable - 1	Power cable	0.8 meter	Power	Unshielded
Cable - 2	Ethernet Cable	1.5 meter	Interconnection	Unshielded
Cable - 3	Ethernet Cable	3.0 meter	Interconnection	Unshielded

Table 3: List of cables

### 4.2 SOFTWARE AND FIRMWARE DETAILS

Atheros Radio Test 2 (ART2-GUI) Version 2.3

## 5 TEST DETAILS

### 5.1 PRODUCT AND TEST SETUP

#### 5.1.1 PRODUCT CONFIGURATION

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

The 5.1 GHz ePMP Integrated Radio was configured with test software and configured to have the following settings during the course of testing:

- 40 MHz modulation bandwidth for low, mid & high channels
  - Rate - HT40,
  - 54 Mbps OFDM, MCS15 / 270 Mbps
  - Tx Power is 10.5 dBm Tx99 for 17 dBi antenna configuration-Low channel
  - Tx Power is 12 dBm Tx99 for 17 dBi antenna configuration-Mid channel
  - Tx Power is 12 dBm Tx99 for 17 dBi antenna configuration-High channel
- 10 MHz modulation bandwidth for low, mid & high channels
  - Rate – Legacy,
  - 54 Mbps OFDM, MCS15 / 130 Mbps
  - Tx Power is 9 dBm Tx99 for 17 dBi antenna configuration-Low channel
  - Tx Power is 9 dBm Tx99 for 17 dBi antenna configuration-Mid channel
  - Tx Power is 9 dBm Tx99 for 17 dBi antenna configuration-High channel
- Additional measurements as requested by the customer at the band edges of the 5.4 GHz band
  - Low Channel (5490 MHz) Tx Power is 13 dBm for 40 MHz modulation bandwidth
  - High Channel (5705 MHz) Tx Power is 14.5 dBm for 40 MHz modulation bandwidth
  - Low Channel (5475 MHz) Tx Power is 8 dBm for 10 MHz modulation bandwidth.
  - High Channel (5720 MHz) Tx Power is 8.5 dBm for 10 MHz modulation bandwidth.

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

### 5.1.2 TEST SETUP DETAILS

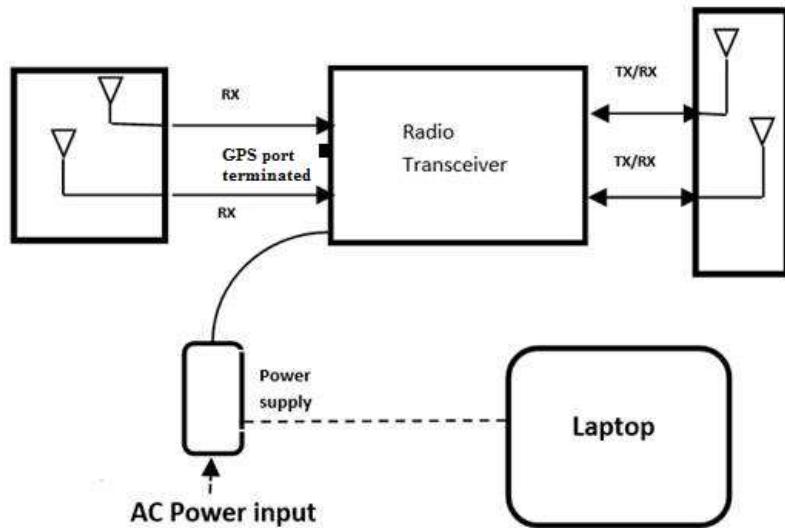


Figure 1: Block diagram of the EUT test setup

### 5.1.3 ACCESSORIES

Name of the Equipment	Manufacturer	Model Number	Serial Number
17 dBi Antenna Beam steer- Rx	Cambium Networks	C050900D020A	NA
17 dBi Antenna sector- Tx	Cambium Networks	C050900D021A	NA
Power Supply	Cambium Networks	NET P30 56	031-326-6719
Switching Power Supply Gigabit Compatible	Cambium Networks	NET-P30-56	N000000L034A

## 5.2 APPLICABLE TESTS

Applicable Standard	Description	Test level / Test Voltage	Applicability
RSS GEN Issue – May 2015	Duty Cycle and transmission duration	NA	Antenna port
	26 dB Emission Bandwidth	NA	Antenna port
	99% Occupied Channel Bandwidth	NA	Antenna port
	Maximum Conducted Output Power	$\leq 250$ mW	Antenna port
	Power Spectral Density	$\leq 11$ dBm in 1 MHz bandwidth	Antenna port
	Transmitter Unwanted emission	9 kHz - 40 GHz	Antenna port
	Band edge measurements	$\leq -27$ dBm/MHz	Antenna port

## 5.3 TEST RESULT

### 5.3.1 DUTY CYCLE (X) AND TRANSMISSION DURATION (T)

#### 5.3.1.1 TEST SPECIFICATION

<b>Test Standard</b>	RSS 247 Issue 1 May 2015
<b>Test Procedure</b>	789033 D2 General U-NII Test Procedures New Rule v01r01
<b>Resolution Bandwidth</b>	8 MHz
<b>Video Bandwidth</b>	8 MHz
<b>Sweep Time</b>	Auto
<b>Attenuation</b>	Auto
<b>Test Mode</b>	Conducted
<b>Detector</b>	RMS
<b>Input Voltage</b>	120 V AC
<b>Input Frequency</b>	60 Hz
<b>Temperature</b>	24.0 °C
<b>Humidity</b>	55.0 %
<b>Tested By</b>	Dikshit Raviteja / Suresh.G.N
<b>Test Date</b>	08 <sup>th</sup> Feb 2016

#### 5.3.1.2 LIMITS

NA

#### 5.3.1.3 TEST SETUP



Figure 2: Typical test setup for Conducted RF Test

#### 5.3.1.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per section II B of **“789033 D2 General U-NII Test Procedures New Rule V01r01”**. The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. The graph and data captured from spectrum analyzer and recorded.

### 5.3.1.5 MEASUREMENT GRAPHS / DATA

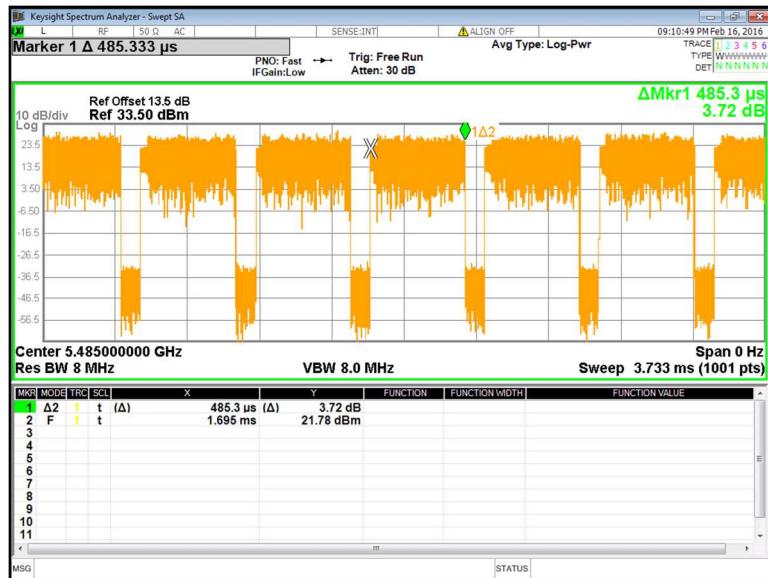


Figure 3: Measured ON time

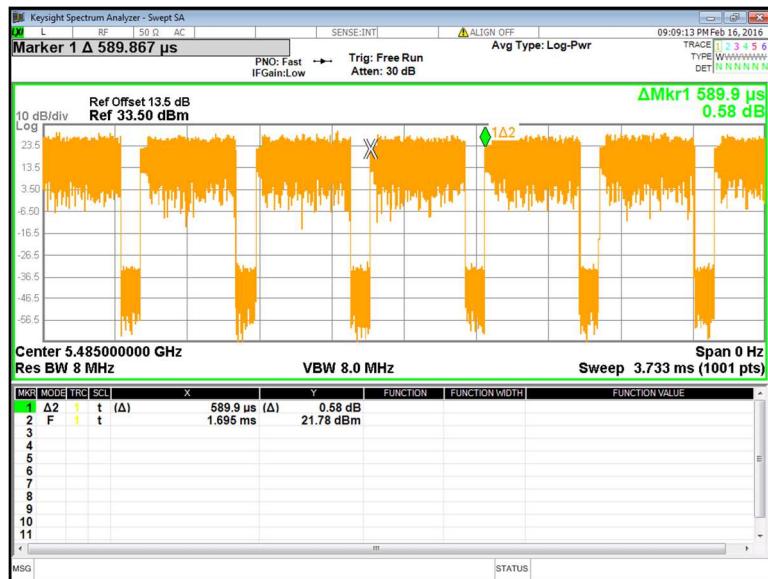


Figure 4: Measured Transmission Period (T)

### 5.3.1.6 RESULT

The Duty cycle and Transmission duration data were recorded.

Mode	ON time (μsec)	T (μsec)	Duty Cycle X (Linear)	Duty Cycle (%)	50/T Minimum RBW and VBW (kHz)
Tx ON	485.3	589.9	0.822	82.2%	847.6

Note: Duty cycle = (ON time / Period)\*100

### 5.3.2 26 dB EMISSION BANDWIDTH

#### 5.3.2.1 TEST SPECIFICATION

<b>Test Standard</b>	RSS 247 Issue 1 May 2015
<b>Test Procedure</b>	789033 D2 General U-NII Test Procedures New Rule V01r01
<b>Resolution Bandwidth</b>	100 kHz, 300 kHz
<b>Video Bandwidth</b>	300 kHz, 1 MHz
<b>Sweep Time</b>	Auto
<b>Attenuation</b>	Auto
<b>Test Mode</b>	Conducted
<b>Detector</b>	Peak
<b>Input Voltage</b>	120 V AC
<b>Input Frequency</b>	60 Hz
<b>Temperature</b>	24.0 °C
<b>Humidity</b>	55.0 %
<b>Tested By</b>	Dikshit Raviteja / Suresh.G.N
<b>Test Date</b>	08 <sup>th</sup> Feb 2016

#### 5.3.2.2 LIMITS

<b>Standard</b>	<b>Reference section</b>	<b>Frequency range</b>	<b>Limit</b>
RSS 247 Issue 1 May 2015	NA	5470 MHz to 5725 MHz	NA

#### 5.3.2.3 TEST SETUP



Figure 5: Typical test setup for Conducted RF Test

#### 5.3.2.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per the **“789033 D2 General U-NII Test Procedures New Rule V01r01”**. The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. The graph and data captured from spectrum analyzer and recorded.

### 5.3.2.5 MEASUREMENT GRAPHS / DATA

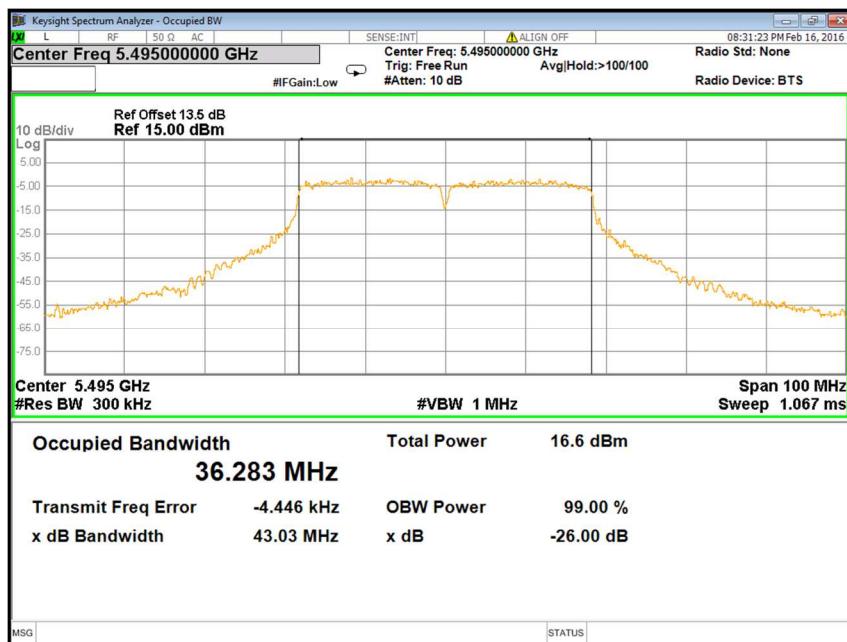


Figure 6: 40 MHz, 17 dBi, Low Channel: 26 dB bandwidth measured at Ch.0 – 5495 MHz

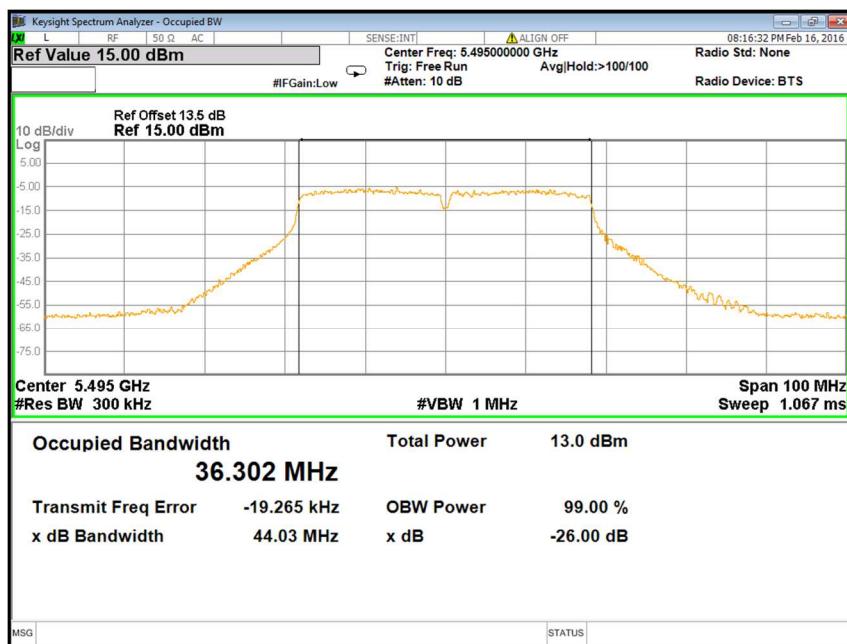


Figure 7: 40 MHz, 17 dBi, Low Channel: 26 dB bandwidth measured at Ch.1 – 5495 MHz

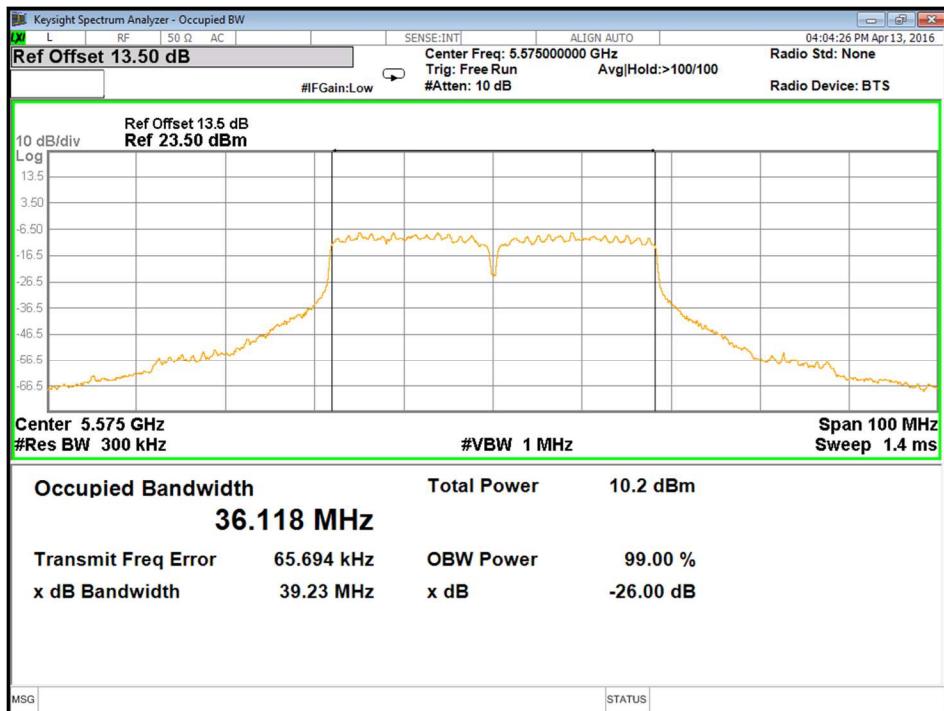


Figure 8: 40 MHz, 17 dBi, Mid Channel: 26 dB bandwidth measured at Ch.0 - 5575 MHz

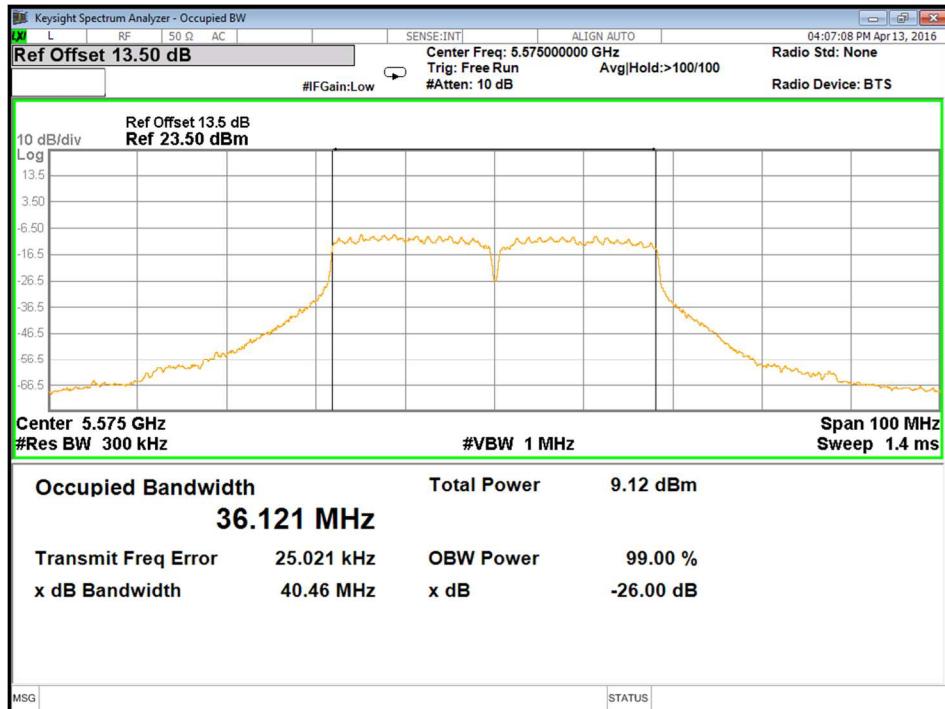


Figure 9: 40 MHz, 17 dBi, Mid Channel: 26 dB bandwidth measured at Ch.1 - 5575 MHz

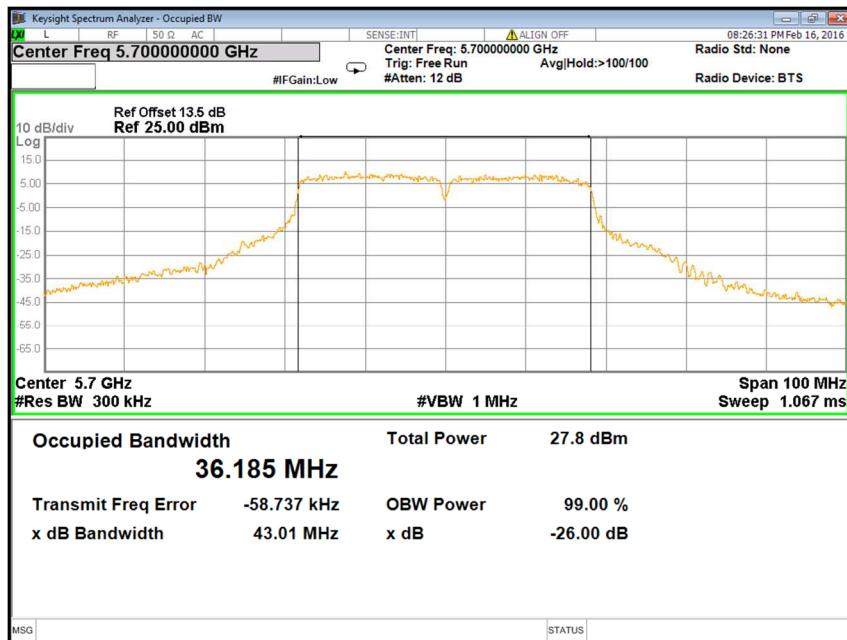


Figure 10: 40 MHz, 17 dBi, High Channel: 26 dB bandwidth measured at Ch.0 - 5700 MHz

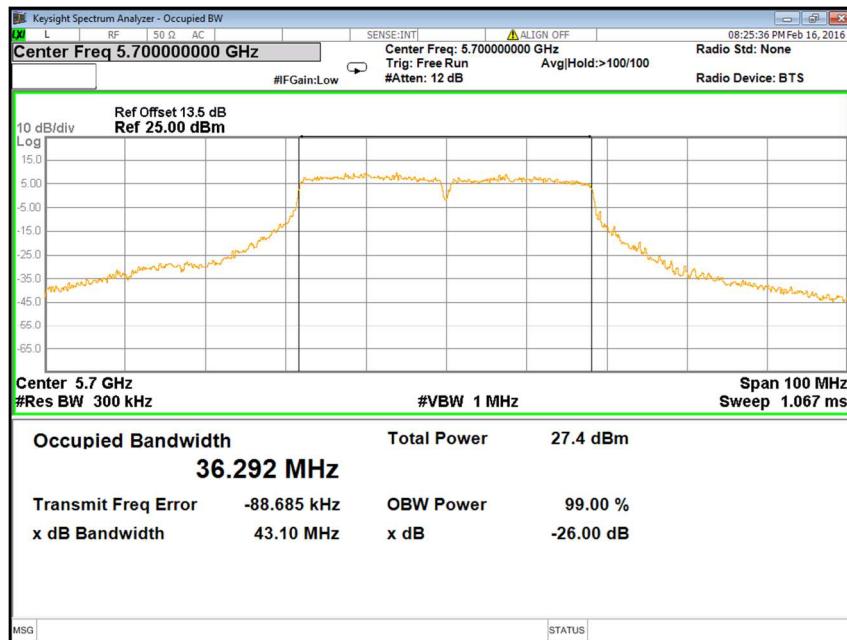


Figure 11: 40 MHz, 17 dBi, High Channel: 26 dB bandwidth: measured at Ch.1 - 5700 MHz

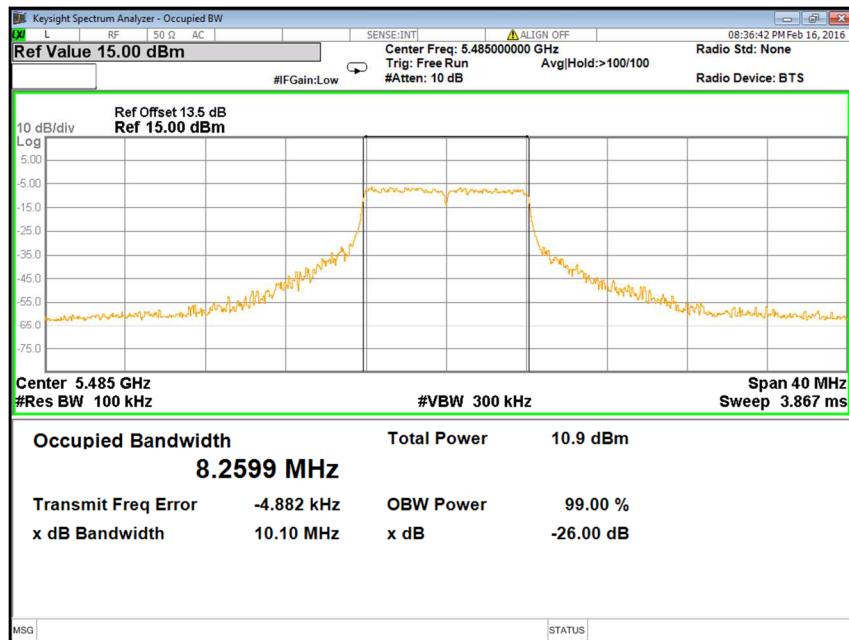


Figure 12: 10 MHz, 17 dBi, Low Channel: 26 dB bandwidth measured at Ch.0 - 5485 MHz

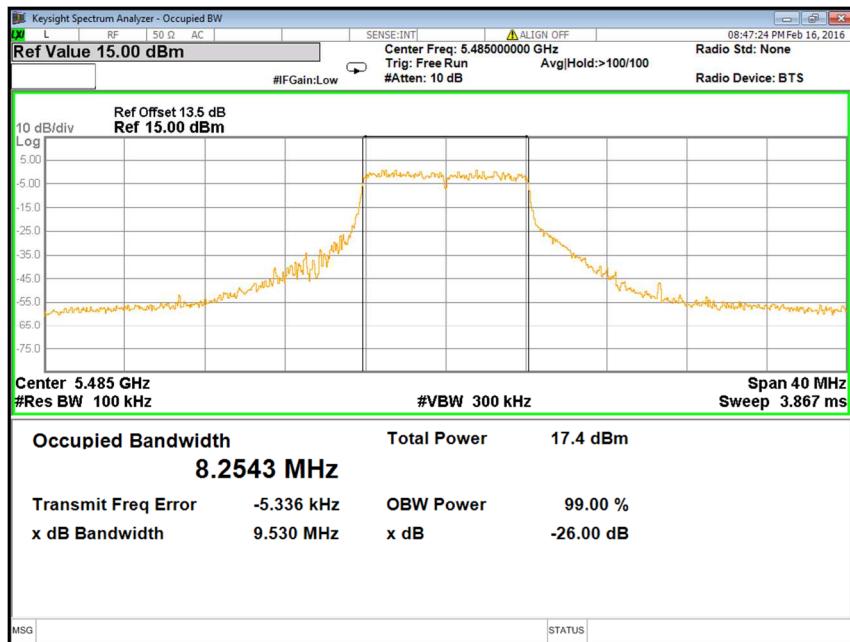


Figure 13: 10 MHz, 17 dBi, Low Channel: 26 dB bandwidth measured at Ch.1 - 5485 MHz

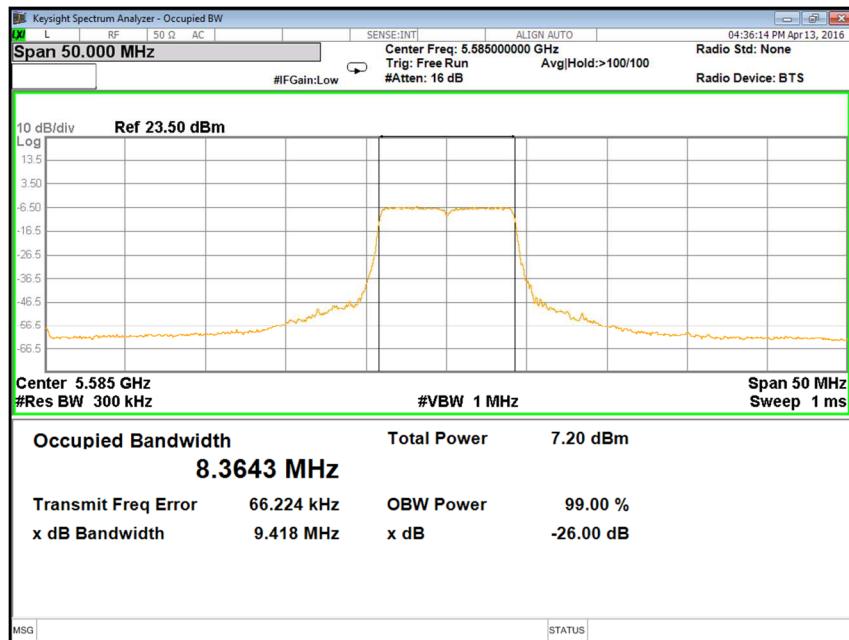


Figure 14: 10 MHz, 17 dBi, Mid Channel: 26 dB bandwidth measured at Ch.0 - 5585 MHz

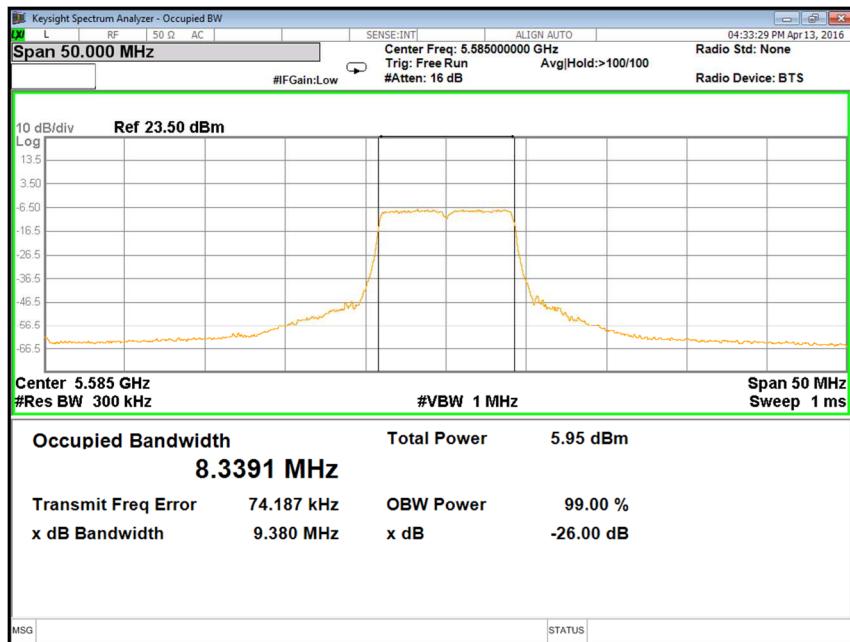


Figure 15: 10 MHz, 17 dBi, Mid Channel: 26 dB bandwidth measured at Ch.1 - 5585 MHz

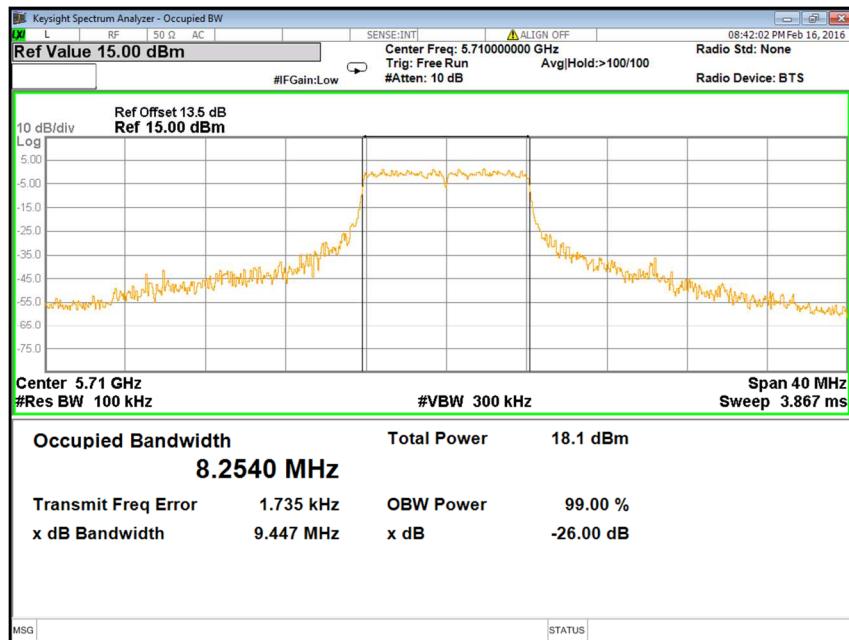


Figure 16: 10 MHz, 17 dBi, High channel 26 dB bandwidth measured at Ch.0 - 5710 MHz

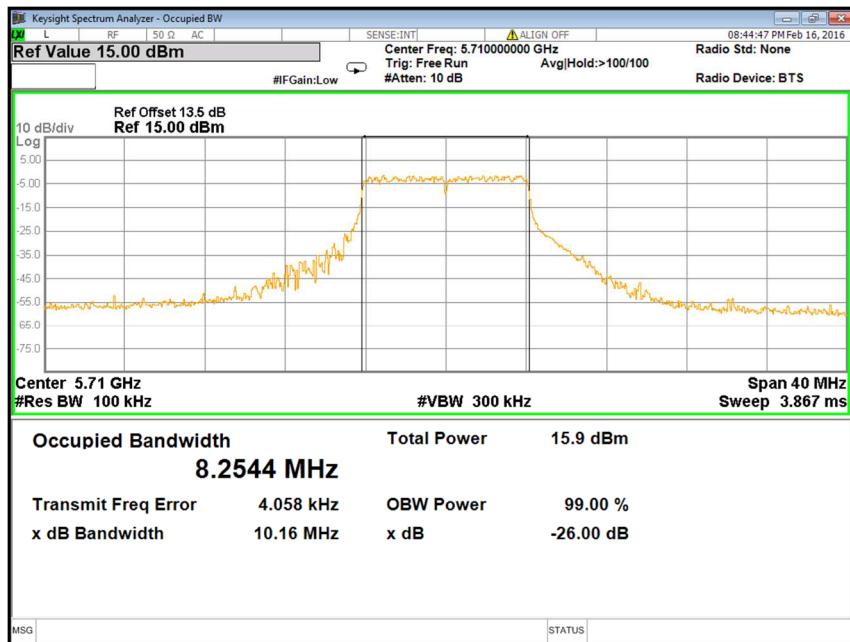


Figure 17: 10 MHz, 17 dBi, High channel 26 dB bandwidth measured at Ch.1 - 5710 MHz

### 5.3.2.6 RESULT

The 26 dB Emission bandwidth is measured for all channels in both 40 MHz & 10 MHz modulation bandwidth. Refer below table for consolidated data.

Configuration	Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (MHz)
17 dBi	40	Ch. 0	5495	43.03
	40	Ch. 0	5575	39.23
	40	Ch. 0	5700	43.01
	40	Ch. 1	5495	44.03
	40	Ch. 1	5575	40.46
	40	Ch. 1	5700	43.10
	10	Ch. 0	5485	10.10
	10	Ch. 0	5585	9.418
	10	Ch. 0	5710	9.447
	10	Ch. 1	5485	9.530
	10	Ch. 1	5585	9.380
	10	Ch. 1	5710	10.16

Table 4: Result for 26 dB Bandwidth in both 40 MHz and 10 MHz modulation bandwidth

### 5.3.3 99 PERCENT OCCUPIED CHANNEL BANDWIDTH

#### 5.3.3.1 TEST SPECIFICATION

<b>Test Standard</b>	RSS 247 Issue 1 May 2015
<b>Test Procedure</b>	789033 D2 General U-NII Test Procedures New Rule V01r01
<b>Resolution Bandwidth</b>	100 kHz, 300 kHz
<b>Video Bandwidth</b>	300 kHz, 1 MHz
<b>Sweep Time</b>	Auto
<b>Attenuation</b>	Auto
<b>Test Mode</b>	Conducted
<b>Detector</b>	Peak
<b>Input Voltage</b>	120 V AC
<b>Input Frequency</b>	60 Hz
<b>Temperature</b>	24.0 °C
<b>Humidity</b>	55.0 %
<b>Tested By</b>	Dikshit Raviteja
<b>Test Date</b>	08 <sup>th</sup> Feb 2016

#### 5.3.3.2 LIMITS

<b>Standard</b>	<b>Reference section</b>	<b>Frequency range</b>	<b>Limit</b>
RSS 247 Issue 1 May 2015	6.2.3(1)	5470 MHz to 5725 MHz	NA

#### 5.3.3.3 TEST SETUP



Figure 18: Typical test setup for Conducted RF Test

#### 5.3.3.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per the “**789033 D2 General U-NII Test Procedures New Rule V01r01**”. The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. The graph and data captured from spectrum analyzer and recorded.

### 5.3.3.5 MEASUREMENT GRAPHS / DATA

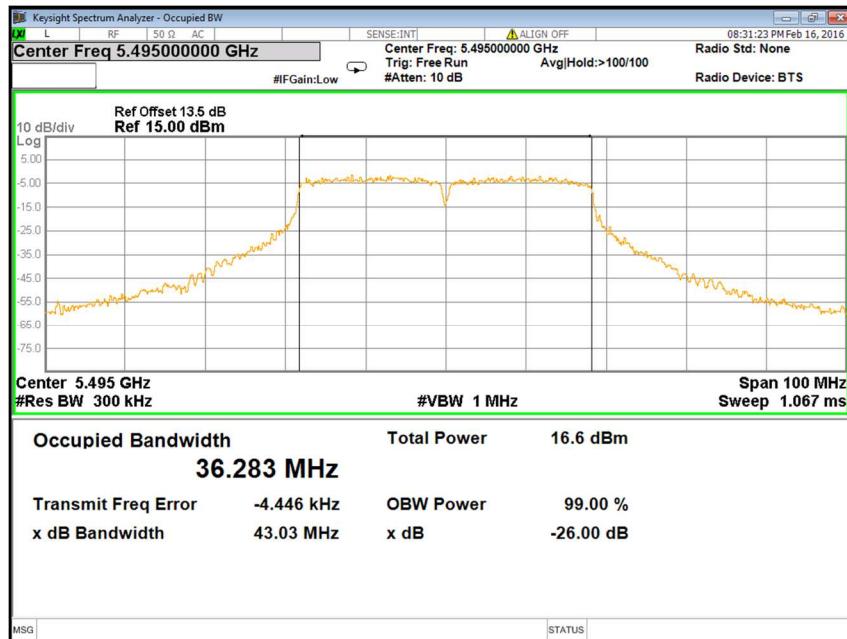


Figure 19: 40 MHz, 17 dBi, Low Channel: 99% OBW measured at Ch.0 – 5495 MHz

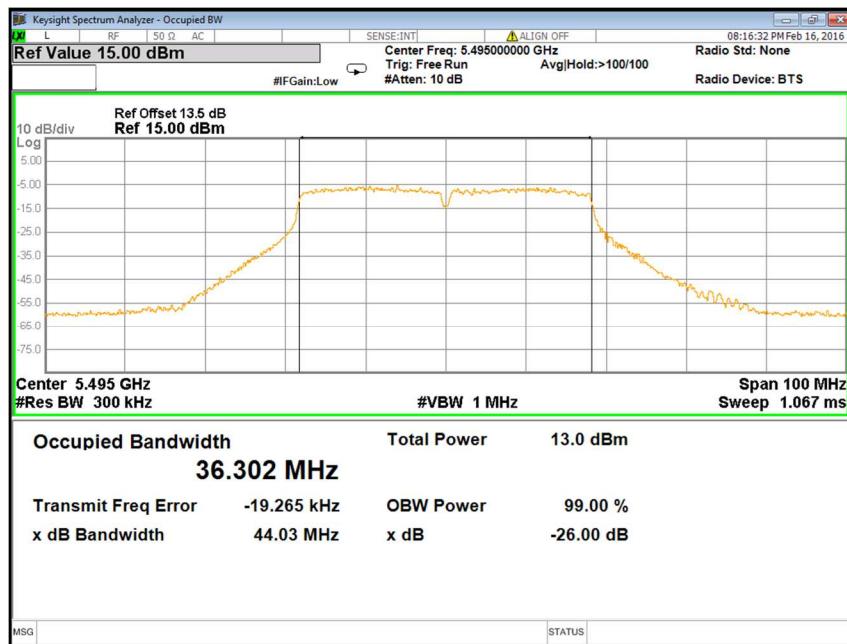


Figure 20: 40 MHz, 17 dBi, Low Channel: 99% OBW measured at Ch.1 – 5495 MHz

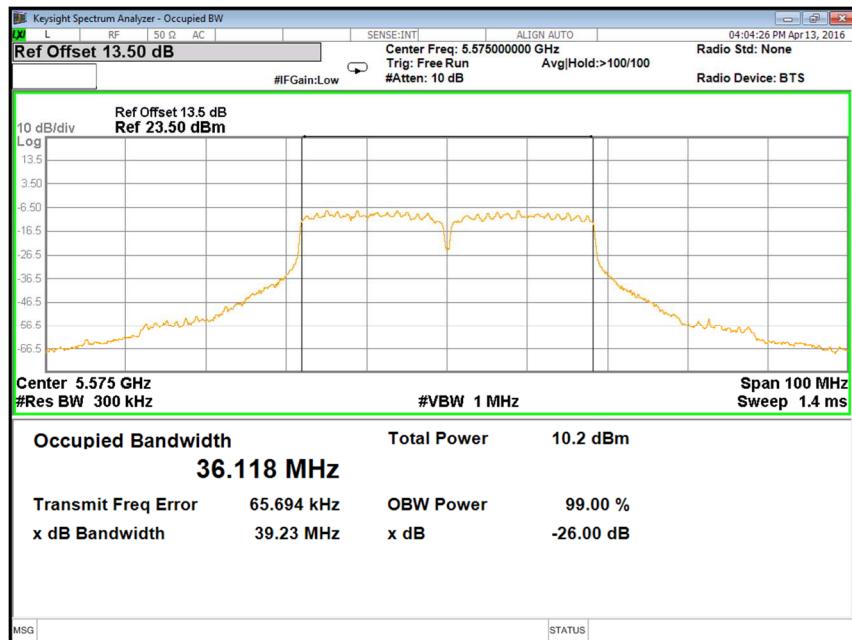


Figure 21: 40 MHz, 17 dBi, Mid Channel: 99% OBW measured at Ch.0 – 5575 MHz

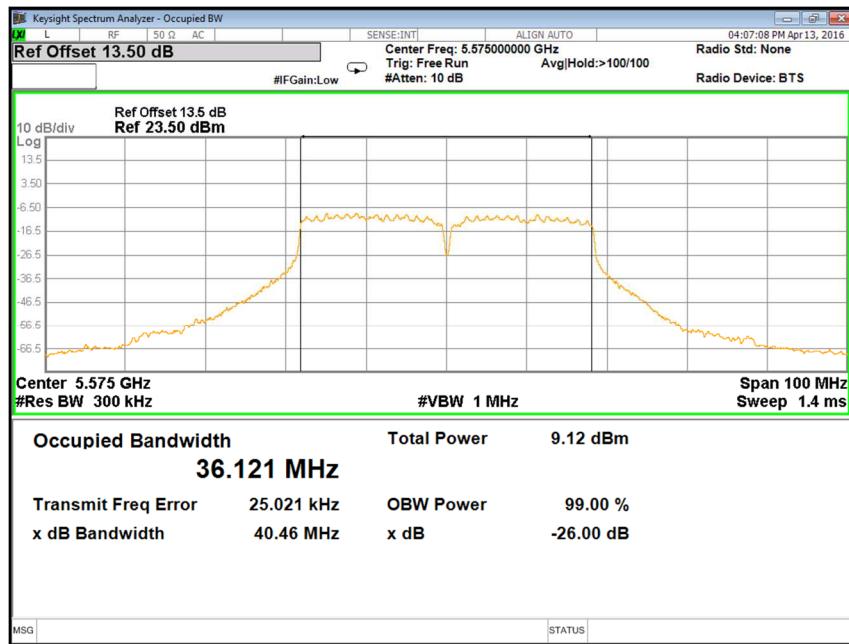


Figure 22: 40 MHz, 17 dBi, Mid Channel: 99% OBW measured at Ch.1 – 5575 MHz

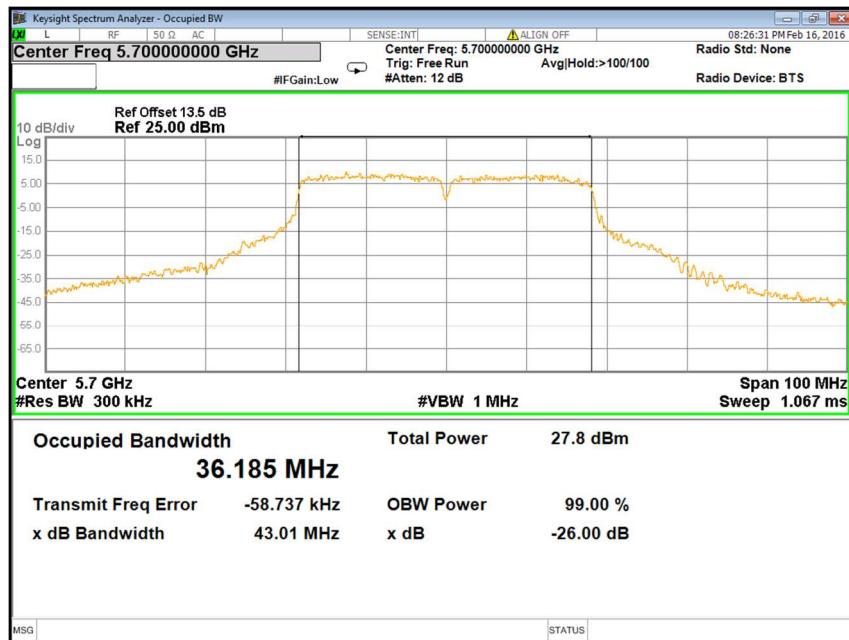


Figure 23: 40 MHz, 17 dBi, High Channel: 99% OBW measured at Ch.0 – 5700 MHz

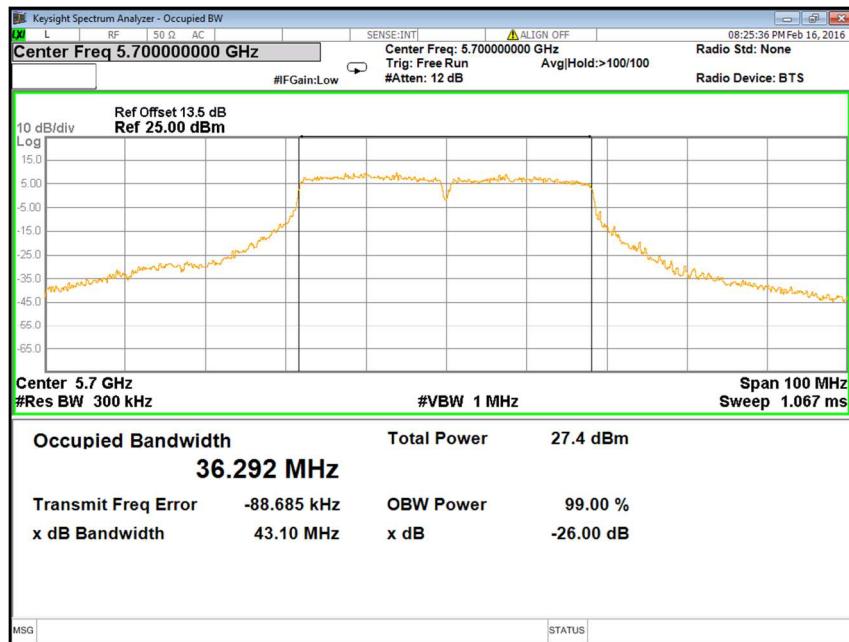


Figure 24: 40 MHz, 17 dBi, High Channel: 99% OBW measured at Ch.1 – 5700 MHz

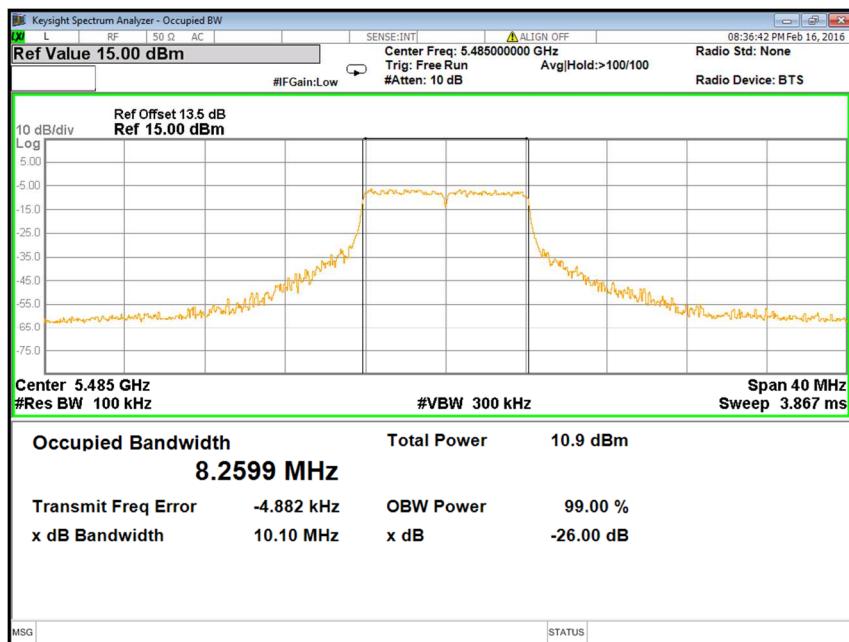


Figure 25: 10 MHz, 17 dBi, Low Channel: 99% OBW measured at Ch.0 – 5485 MHz

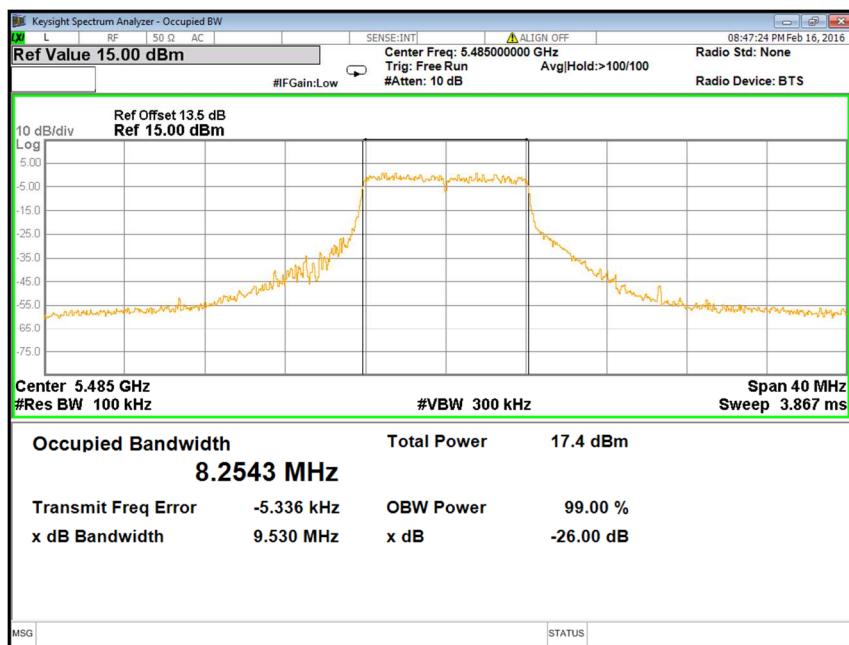


Figure 26: 10 MHz, 17 dBi, Low Channel: 99% OBW measured at Ch.1 – 5485 MHz

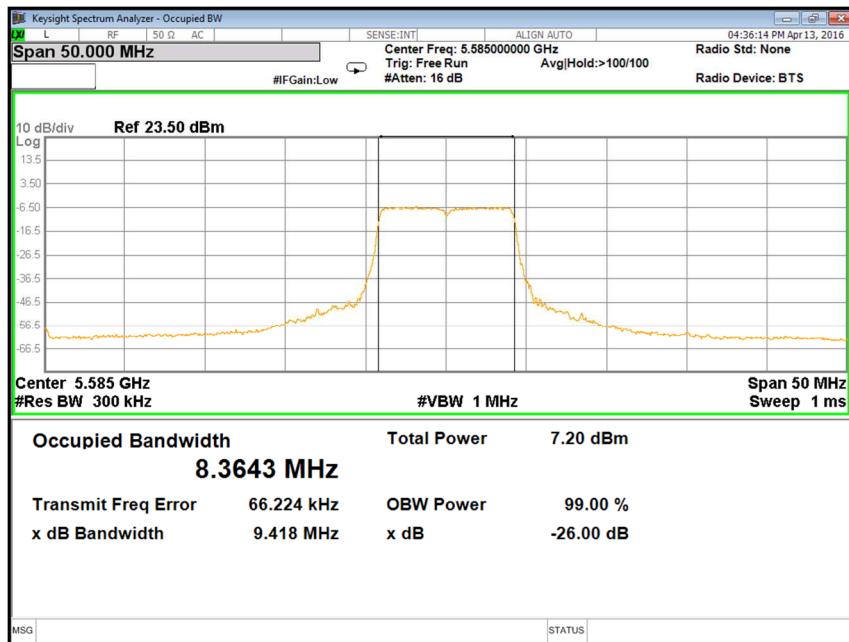


Figure 27: 10 MHz, 17 dBi, Mid Channel: 99% OBW measured at Ch.0 – 5585 MHz

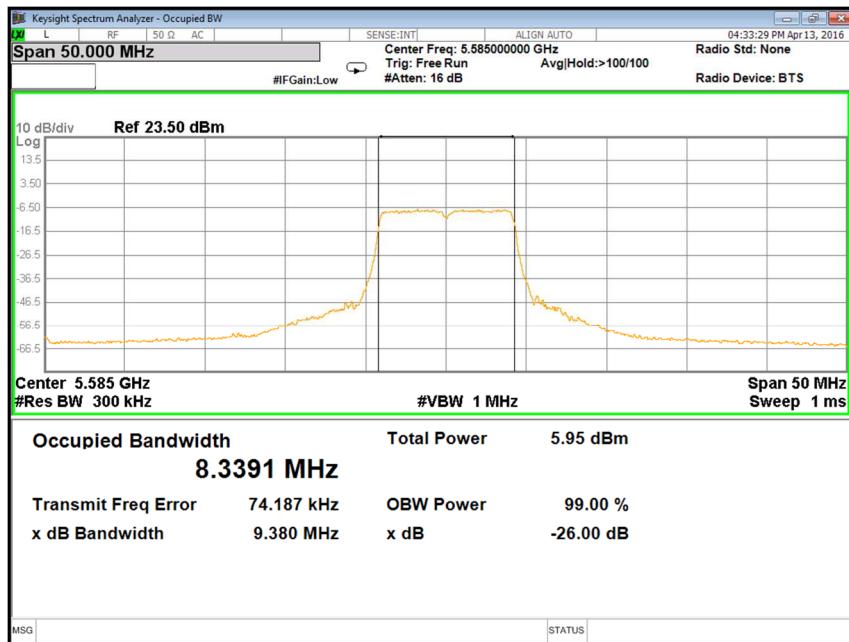


Figure 28: 10 MHz, 17 dBi, Mid Channel: 99% OBW measured at Ch.1 – 5585 MHz

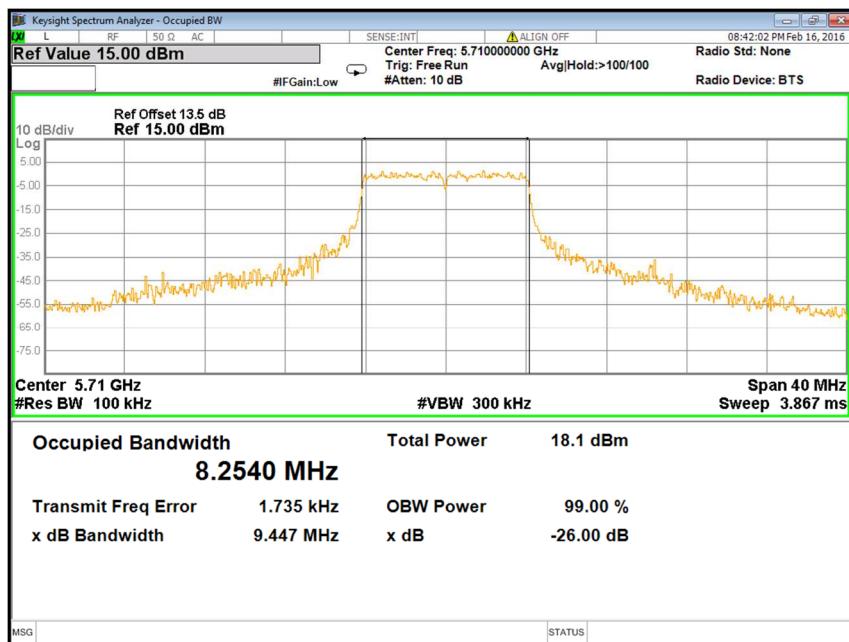


Figure 29: 10 MHz, 17 dBi, High Channel: 99% OBW measured at Ch.0 – 5710 MHz

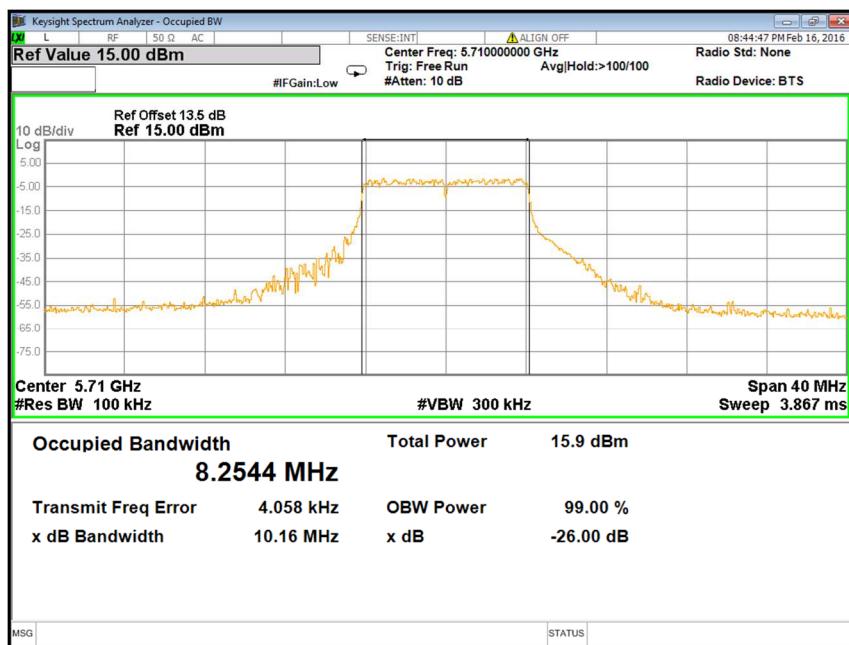


Figure 30: 10 MHz, 17 dBi, High Channel: 99% OBW measured at Ch.1 – 5710 MHz

### 5.3.3.6 RESULT

The 99% Occupied Channel Bandwidth for all channels in both 40 MHz & 10 MHz Modulation Bandwidths has been measured and tabulated in below table.

Configuration	Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (MHz)
17 dBi Antenna Condition	40	Ch. 0	5495	36.293
	40	Ch. 0	5575	36.118
	40	Ch. 0	5700	36.185
	40	Ch. 1	5495	36.302
	40	Ch. 1	5575	36.121
	40	Ch. 1	5700	36.292
	10	Ch. 0	5485	8.2599
	10	Ch. 0	5585	8.3643
	10	Ch. 0	5710	8.254
	10	Ch. 1	5485	8.2543
	10	Ch. 1	5585	8.3391
	10	Ch. 1	5710	8.2544

Table 5 Result for 99% Occupied bandwidth in both 40 MHz and 10 MHz modulation bandwidth

## 5.3.4 MAXIMUM CONDUCTED OUTPUT POWER

### 5.3.4.1 TEST SPECIFICATION

<b>Test Standard</b>	RSS 247 Issue 1 May 2015
<b>Test Procedure</b>	789033 D2 General U-NII Test Procedures New Rule V01r01
<b>Test Mode</b>	Conducted
<b>Detector</b>	Average
<b>Input Voltage</b>	120 V AC
<b>Input Frequency</b>	60 Hz
<b>Temperature</b>	24.0 °C
<b>Humidity</b>	55.0 %
<b>Tested By</b>	Dikshit Raviteja / Suresh GN
<b>Test Date</b>	08 <sup>th</sup> Feb 2016

### 5.3.4.2 LIMITS

<b>Standard</b>	<b>Reference section</b>	<b>Frequency range</b>	<b>Limit</b>
RSS 247 Issue 1 May 2015	6.2.3(1)	5470 MHz to 5725 MHz	max conducted Tx power $\leq 23.97 \text{ dBm}$ (250 mW) max Limit (for 17 dBi antenna) : $\leq 12.97 \text{ dBm}$

### 5.3.4.3 TEST SETUP



Figure 31: Typical test setup for Conducted RF Test

### 5.3.4.4 TEST PROCEDURE

The Conducted test was performed using the power meter. Measurements were done as per Section II E 3.b (Method PM-G) of KDB “**789033 DO2 General UNII Test Procedures New Rules v01r01**”. The RF output of the EUT was connected to the input port of Power meter using an attenuator. The graph and data captured from power meter and compared with the limits specified in the standard.

### 5.3.4.5 MEASUREMENT GRAPHS / DATA

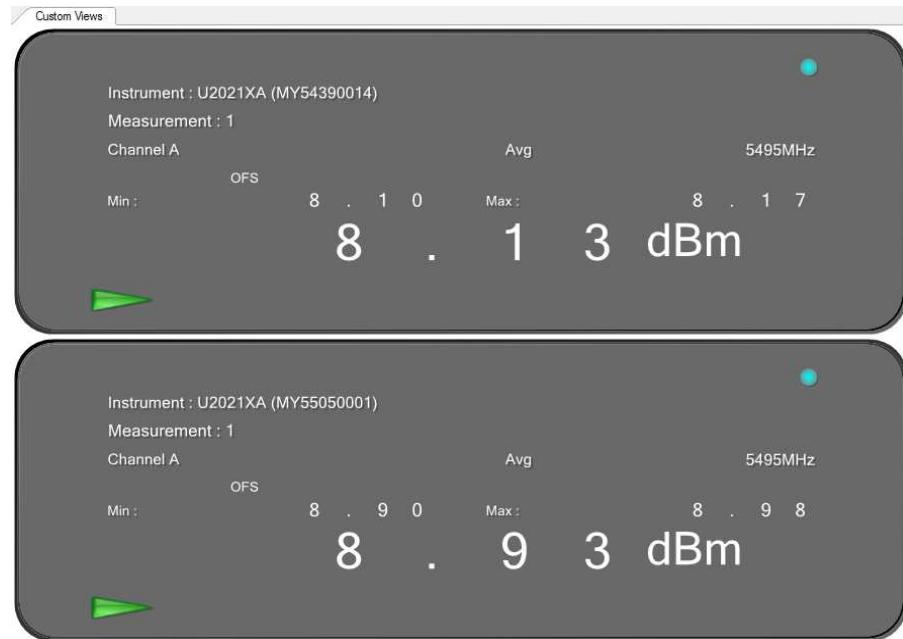


Figure 32: 40 MHz, 17 dBi, Low Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5495 MHz



Figure 33: 40 MHz, 17 dBi, Mid Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5575 MHz

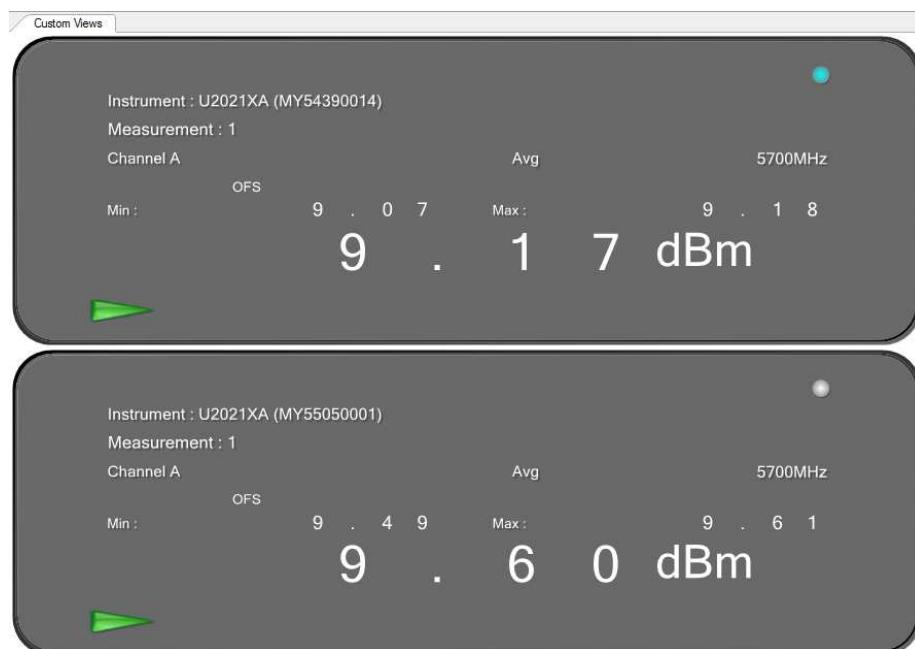


Figure 34: 40 MHz, 17 dBi, High Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5700 MHz



Figure 35: 40 MHz, 17 dBi, Low Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5490 MHz



Figure 36: 40 MHz, 17 dBi, High Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5705 MHz

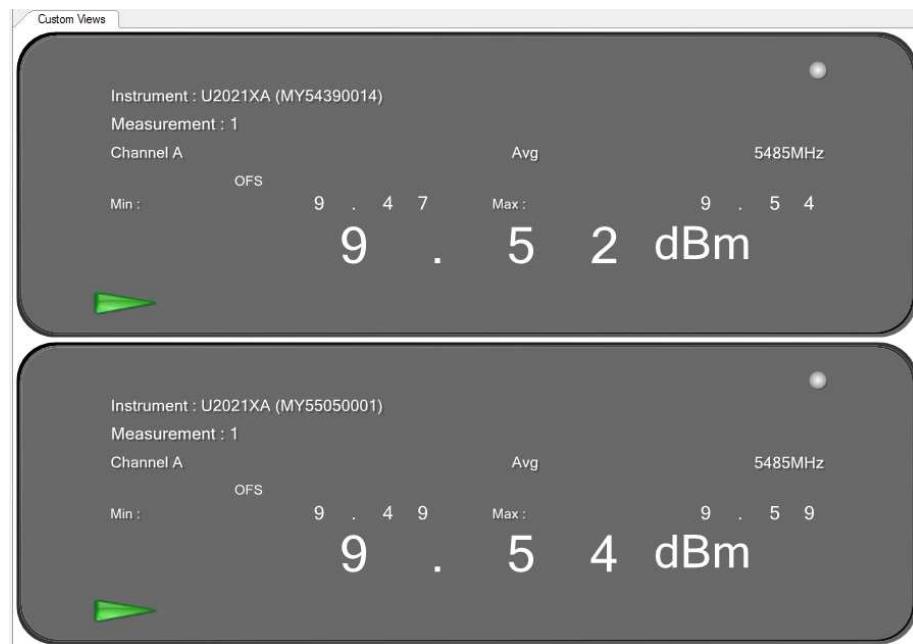
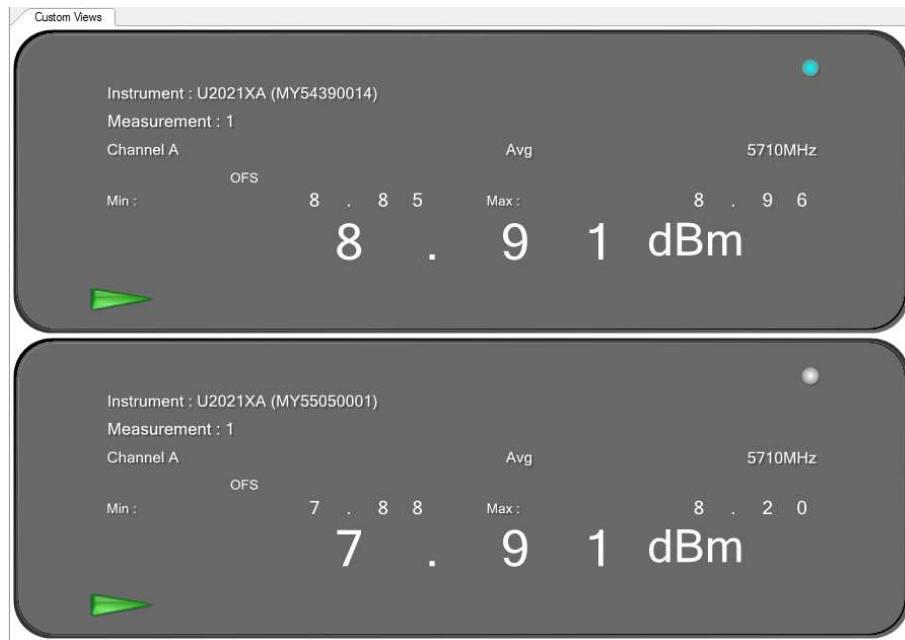


Figure 37: 10 MHz, 17 dBi, Low Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5485 MHz



**Figure 38: 10 MHz, 17 dBi, Mid Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5585 MHz**



**Figure 39: 10 MHz, 17 dBi, High Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5710 MHz**



Figure 40: 10 MHz, 17 dBi, Low Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5475 MHz



Figure 41: 10 MHz, 17 dBi, High Channel: Maximum conducted output power measured at Ch.0 & Ch.1 – 5720 MHz

### 5.3.4.6 RESULT

Maximum Conducted Output Power for all channels in both 40 MHz & 5 MHz modulation bandwidth is within the specified limits. Refer below table for consolidated data.

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (dBm)
40	Ch. 0	5495	8.13
40	Ch. 1	5495	8.93
40	Ch. 0	5575	8.99
40	Ch. 1	5575	7.93
40	Ch. 0	5700	9.17
40	Ch. 1	5700	9.60
40	Ch. 0	5490	9.55
40	Ch. 1	5490	7.75
40	Ch. 0	5705	9.64
40	Ch. 1	5705	8.4
10	Ch. 0	5485	9.52
10	Ch. 1	5485	9.54
10	Ch. 0	5585	6.11
10	Ch. 1	5585	4.7
10	Ch. 0	5710	8.91
10	Ch. 1	5710	7.91
10	Ch. 0	5475	4.64
10	Ch. 1	5475	6.76
10	Ch. 0	5720	5.27
10	Ch. 1	5720	5.20

Table 6: Max RF out power for 17 dBi configuration

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Consolidated Power (dBm)	Limit (dBm)	Result
40	Ch. 0 & Ch. 1	5495	11.55	12.97	PASS
40	Ch. 0 & Ch. 1	5595	11.49	12.97	PASS
40	Ch. 0 & Ch. 1	5700	12.38	12.97	PASS
40	Ch. 0 & Ch. 1	5490	11.76	12.97	PASS
40	Ch. 0 & Ch. 1	5705	12.06	12.97	PASS
10	Ch. 0 & Ch. 1	5485	12.50	12.97	PASS
10	Ch. 0 & Ch. 1	5585	8.388	12.97	PASS
10	Ch. 0 & Ch. 1	5710	11.39	12.97	PASS
10	Ch. 0 & Ch. 1	5475	8.808	12.97	PASS
10	Ch. 0 & Ch. 1	5720	8.26	12.97	PASS

Table 7: Consolidated values across channels and final power for 17 dBi configuration

The recorded power in dBm was converted into Watt, and then added and convert the result back to dBm  
 dBm to mW =  $\log(mW) * 10$   
 mW to dBm =  $10^{\log(mW) / 10}$

## 5.3.5 POWER SPECTRAL DENSITY

### 5.3.5.1 TEST SPECIFICATION

<b>Test Standard</b>	RSS 247 Issue 1 May 2015
<b>Test Procedure</b>	789033 D2 General U-NII Test Procedures New Rule V01r01
<b>Frequency Range</b>	5470 MHz to 5725 MHz
<b>Resolution Bandwidth</b>	1 MHz
<b>Video Bandwidth</b>	3 MHz
<b>Sweep Time</b>	1 ms
<b>Attenuation</b>	Auto
<b>Test Mode</b>	Conducted
<b>Detector</b>	RMS
<b>Input Voltage</b>	120 V AC
<b>Input Frequency</b>	60 Hz
<b>Temperature</b>	24.0 °C
<b>Humidity</b>	55.0 %
<b>Tested By</b>	Dikshit Raviteja
<b>Test Date</b>	08 <sup>th</sup> Feb 2016

### 5.3.5.2 LIMITS

<b>Standard</b>	<b>Reference section</b>	<b>Frequency range</b>	<b>Limit</b>
RSS 247 Issue 1 May 2015	6.2.3(1)	5470 MHz to 5725 MHz	≤ 11 dBm in any 1MHz band Limit (for 17 dBi antenna configuration) : ≤ 0 dBm

### 5.3.5.3 TEST SETUP



Figure 42: Typical test setup for Conducted Test

### 5.3.5.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer. Measurements were done as per Section II F (PSD) of KDB ‘789033 D02 General UNII Test Procedures New Rules v01r01’. The RF output of the EUT was connected to the input port of Spectrum analyzer using an attenuator. The graph and data captured from spectrum analyzer and compared with the limits specified in the standard.

### 5.3.5.5 MEASUREMENT GRAPHS / DATA

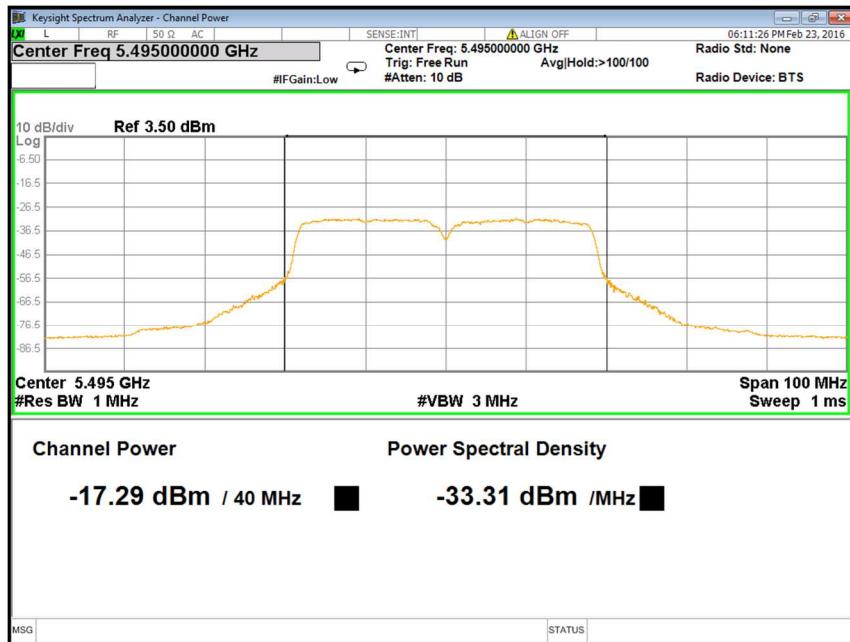


Figure 43: 40 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 0 – 5495 MHz



Figure 44: 40 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 1 – 5495 MHz

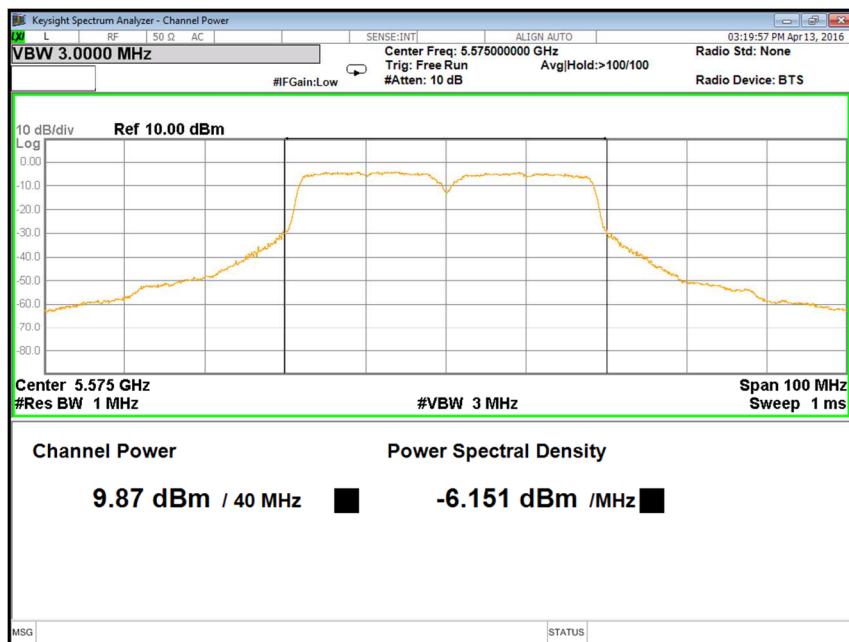


Figure 45: 40 MHz, 17 dBi, Mid Channel: Power spectral density measured at Ch. 0 – 5575 MHz

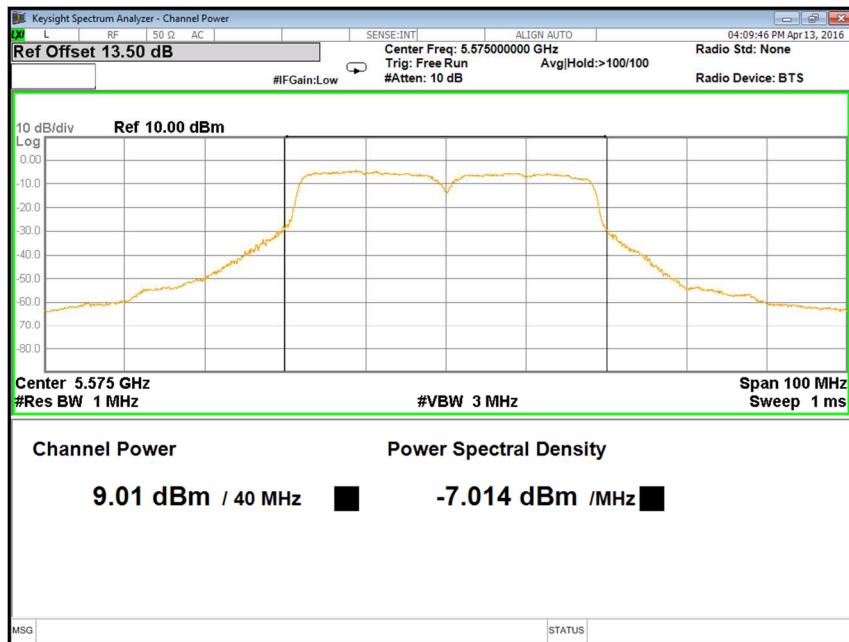


Figure 46: 40 MHz, 17 dBi, Mid Channel: Power spectral density measured at Ch. 1 – 5575 MHz



Figure 47: 40 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 0 – 5700 MHz

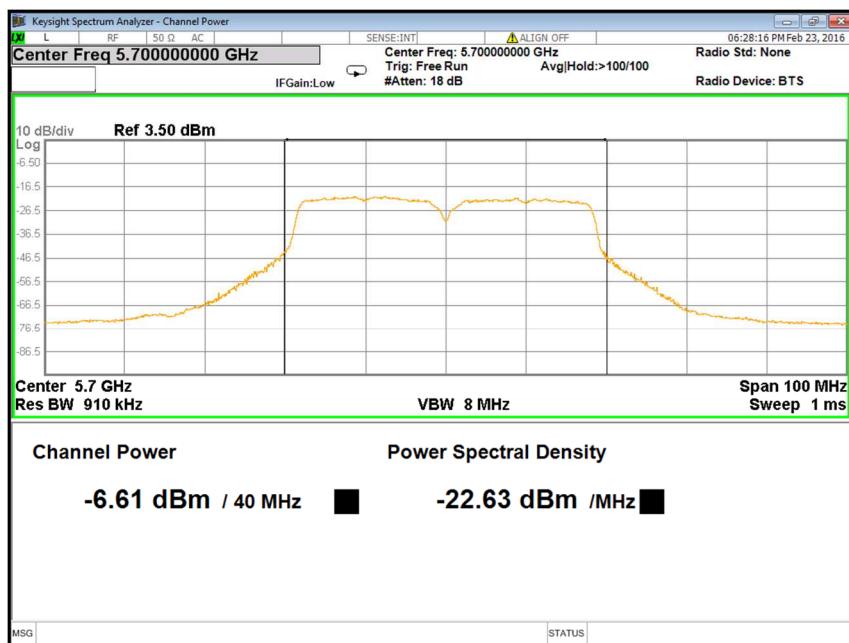


Figure 48: 40 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 1 – 5700 MHz

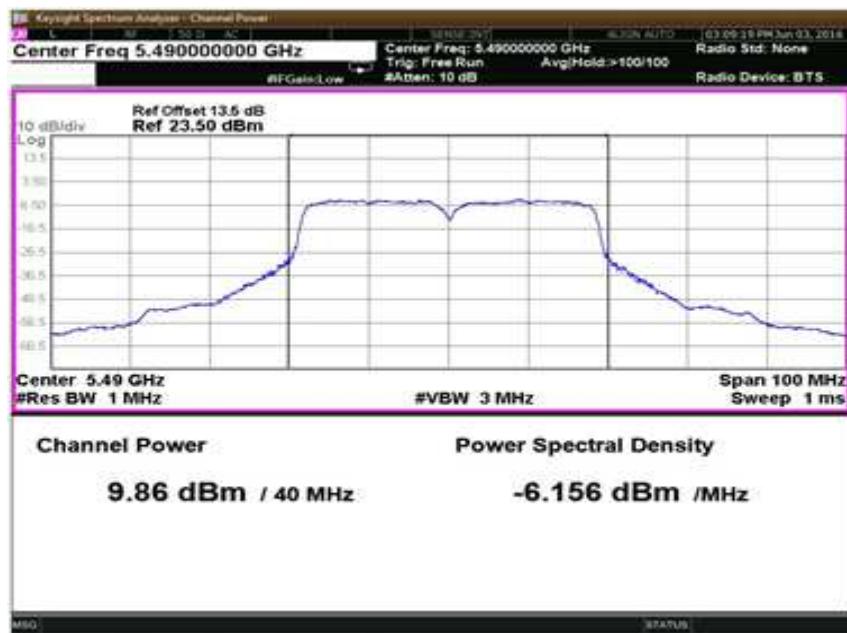


Figure 49: 40 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch.0 – 5490 MHz

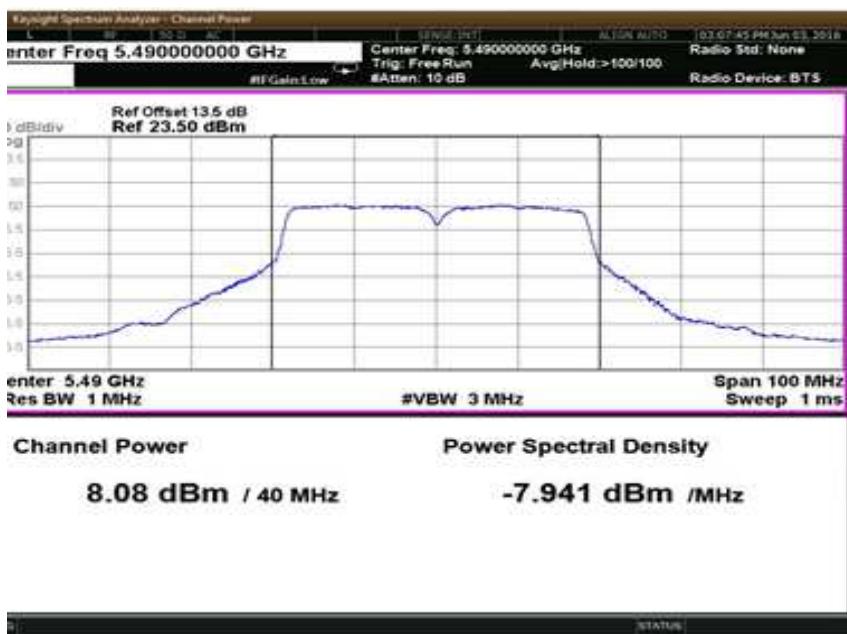


Figure 50: 40 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch.1 – 5490 MHz

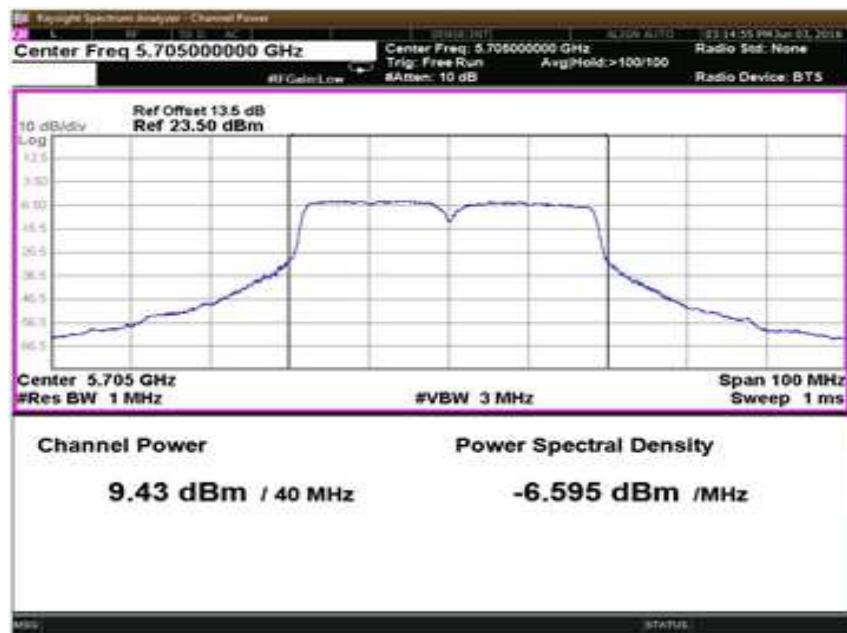


Figure 51: 40 MHz, 17 dBi, High Channel: Power spectral density measured at Ch.0 – 5705 MHz

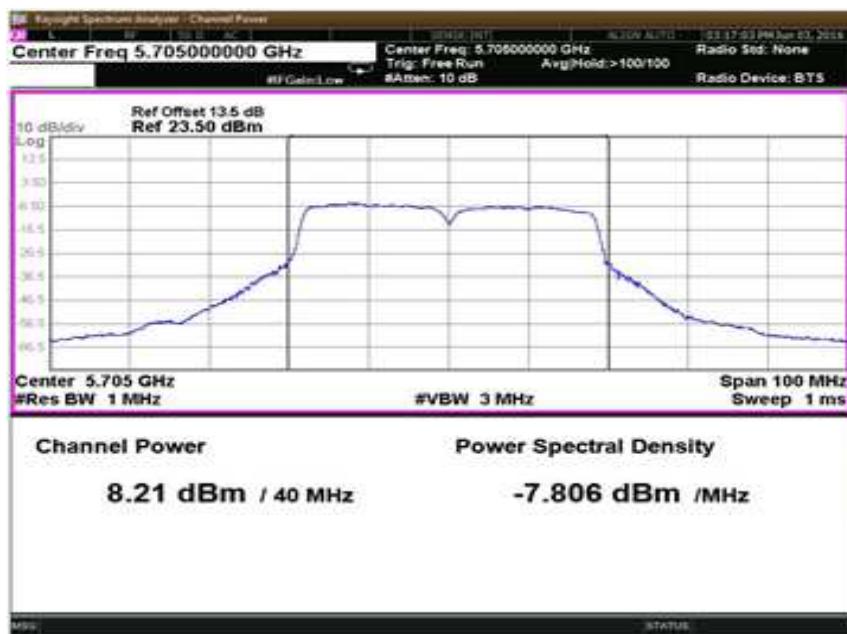


Figure 52: 40 MHz, 17 dBi, High Channel: Power spectral density measured at Ch.1 – 5705 MHz



Figure 53: 10 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 0 – 5485 MHz

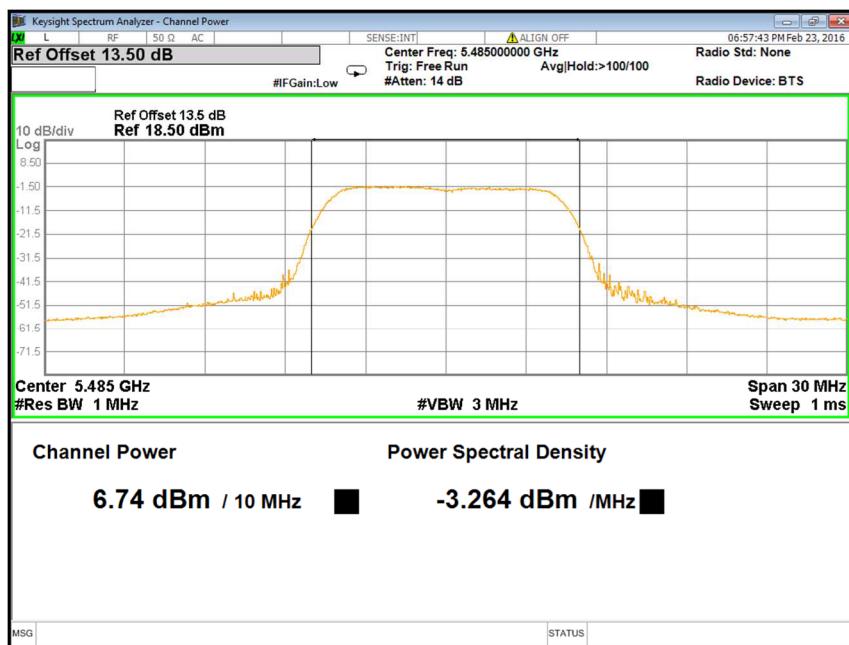


Figure 54: 10 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 1 – 5485 MHz

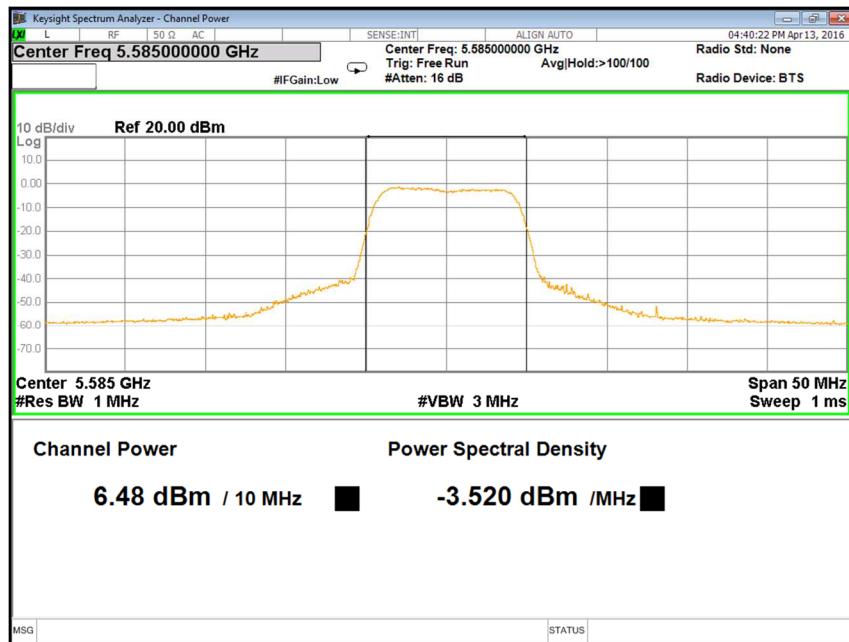


Figure 55: 10 MHz, 17 dBi, Mid Channel: Power spectral density measured at Ch. 0 – 5585 MHz



Figure 56: 10 MHz, 17 dBi, Mid Channel: Power spectral density measured at Ch. 1 – 5585 MHz



Figure 57: 10 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 0 – 5710 MHz



Figure 58: 10 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 1 – 5710 MHz

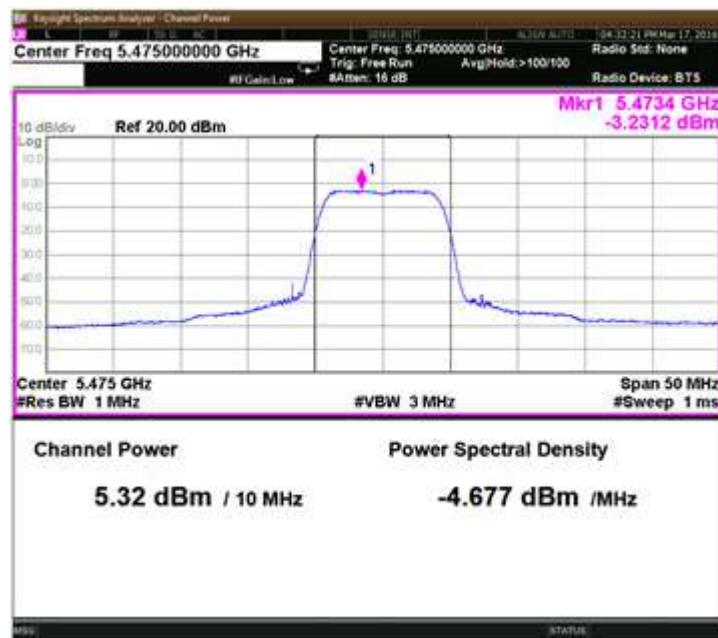


Figure 59: 10 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 0 – 5475 MHz

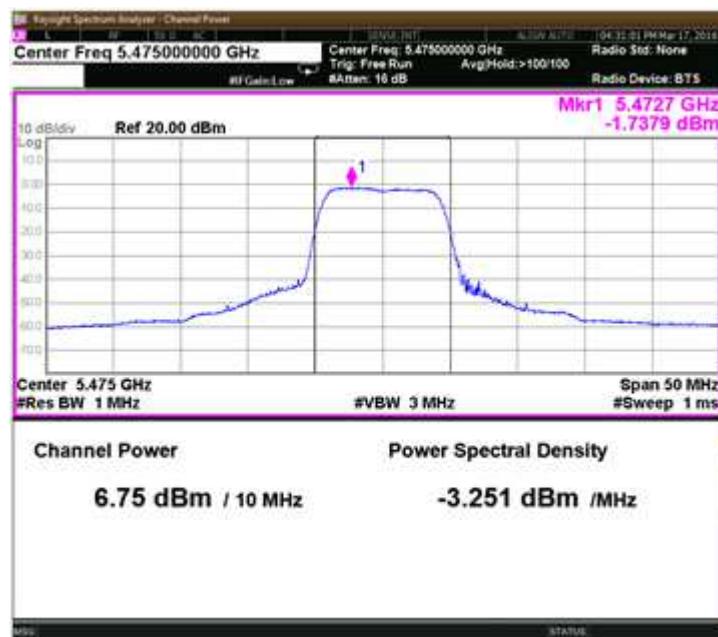


Figure 60: 10 MHz, 17 dBi, Low Channel: Power spectral density measured at Ch. 1 – 5475 MHz

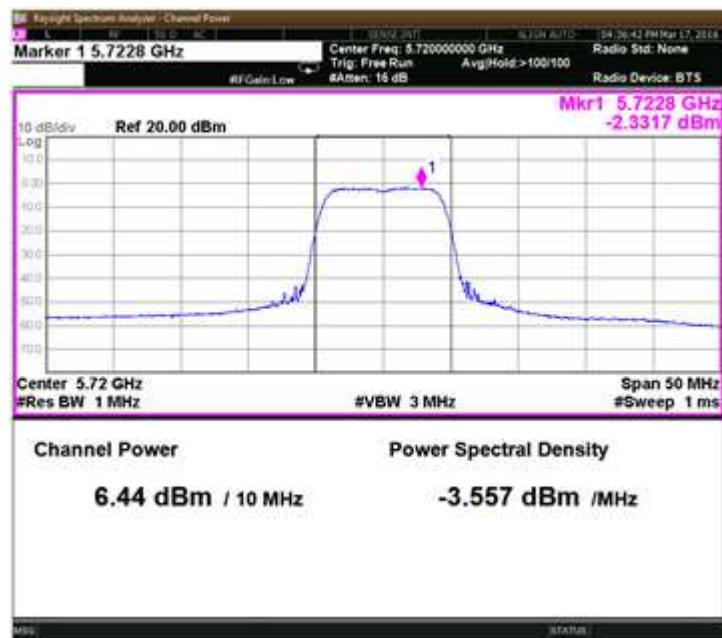


Figure 61: 10 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 0 – 5720 MHz

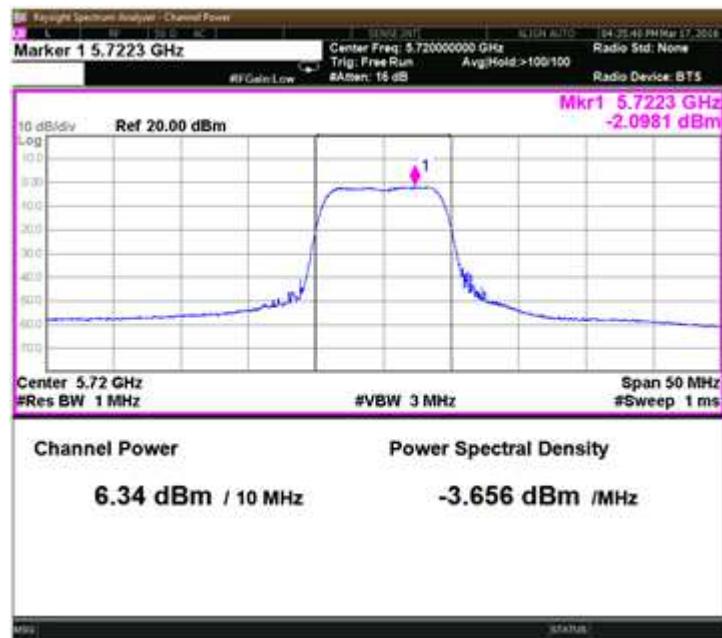


Figure 62: 10 MHz, 17 dBi, High Channel: Power spectral density measured at Ch. 1 – 5720 MHz