8.5 Radiated spurious emissions

Test Requirements and limit,§15.247(d), §15.205, §15.209& RSS-210 [A8.5], RSS-Gen [7.2.2]

In any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) and (b), then the 15.209(a) limit in the table below has to be followed

▪ **FCC Part 15.209(a) and (b)**

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

▪ **FCC Part 15.205 (a):** Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	156.52475 ~	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	156.52525	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	156.7 ~ 156.9	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900		
8.291 ~ 8.294	16.69525	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	16.80425 ~	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	16.80475	608 ~ 614	3345.8 ~ 3358		
	25.5 ~ 25.67	960 ~ 1240	3600 ~ 4400		
	37.5 ~ 38.25				
	73 ~ 74.6				
	74.8 ~ 75.2				

▪ **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

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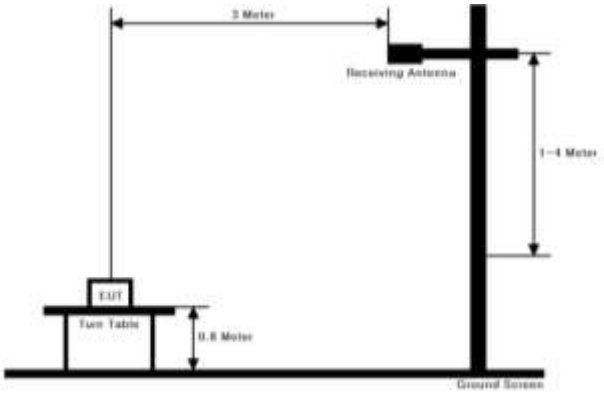
Test Configuration



▣ TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

▣ Measurement Instrument Setting for Radiated Emission Measurements.

Peak Measurement: 12.2.4 of KDB 558074 v03r1

RBW = As specified in below table , VBW ≥ 3 x RBW, Sweep = Auto, Detector = Peak, Trace mode = Max Hold until the trace stabilizes.

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

Average Measurement: 12.2.5.2 of KDB 558074 v03r1

1. RBW = 1MHz(unless otherwise specified)
2. VBW ≥ 3 X RBW
3. Detector = RMS, if span / sweep point ≤ (RBW/2)
4. Averaging type = Power
5. Sweep time = auto
6. Trace average = At least 100 traces
7. A duty cycle correction factor(10log(1/x), where x is the duty cycle) shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.

Test Mode	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
TM 1	94.70	0.24
TM 2	64.62	1.90
TM 3	63.40	1.98
TM 4	50.18	3.00
TM 5	92.77	0.33
TM 6	93.15	0.31
TM 7	87.35	0.59
TM 10	40.89	3.89

Note: Please refer to Appendix I for detailed information.

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Radiated Spurious Emissions data(9kHz ~ 25GHz) : *Test Mode 1(TM 1)*

Tested ANT	Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
ANT 1	Lowest	2329.04	H	X	PK	53.53	-4.75	N/A	N/A	48.78	74.00	25.22
		2334.72	H	X	AV	42.91	-4.71	0.24	N/A	38.44	54.00	15.56
		4824.00	V	Z	PK	51.13	5.20	N/A	N/A	56.33	74.00	17.67
		4818.40	V	Z	AV	41.24	5.18	0.24	N/A	46.66	54.00	7.34
		-	-	-	-	-	-	-	-	-	-	-
	Middle	4873.90	V	Z	PK	47.87	5.38	N/A	N/A	53.25	74.00	20.75
		4879.30	V	Z	AV	38.68	5.40	0.24	N/A	44.32	54.00	9.68
		-	-	-	-	-	-	-	-	-	-	-
	Highest	2486.50	H	X	PK	65.46	-3.95	N/A	N/A	61.51	74.00	12.49
		2492.97	V	Z	AV	47.54	-3.83	0.24	N/A	43.95	54.00	10.05
		4923.80	H	Y	PK	50.07	5.57	N/A	N/A	55.64	74.00	18.36
		4929.10	H	Y	AV	40.59	5.58	0.24	N/A	46.41	54.00	7.59
		-	-	-	-	-	-	-	-	-	-	-
ANT 2	Lowest	2333.12	V	Y	PK	55.94	-4.72	N/A	N/A	51.22	74.00	22.78
		2334.56	V	Y	AV	41.88	-4.71	0.24	N/A	37.41	54.00	16.59
		4823.90	V	Z	PK	52.87	5.20	N/A	N/A	58.07	74.00	15.93
		4829.30	V	Z	AV	43.53	5.22	0.24	N/A	48.99	54.00	5.01
		-	-	-	-	-	-	-	-	-	-	-
	Middle	4873.90	V	Z	PK	50.53	5.38	N/A	N/A	55.91	74.00	18.09
		4868.70	V	Z	AV	41.73	5.36	0.24	N/A	47.33	54.00	6.67
		-	-	-	-	-	-	-	-	-	-	-
	Highest	2491.59	V	Z	PK	62.91	-3.85	N/A	N/A	59.06	74.00	14.94
		2492.99	V	Z	AV	44.73	-3.83	0.24	N/A	41.14	54.00	12.86
		4924.00	V	Z	PK	51.37	5.57	N/A	N/A	56.94	74.00	17.06
		4918.50	V	Z	AV	42.95	5.55	0.24	N/A	48.74	54.00	5.26
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)

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Radiated Spurious Emissions data(9kHz ~ 25GHz) : *Test Mode 2(TM 2)*

Tested ANT	Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
ANT 1	Lowest	2389.92	H	X	PK	63.60	-4.31	N/A	N/A	59.29	74.00	14.71
		2390.00	H	X	AV	46.86	-4.30	1.90	N/A	44.46	54.00	9.54
		4825.80	V	Z	PK	47.06	5.21	N/A	N/A	52.27	74.00	21.73
		4824.80	V	Z	AV	36.02	5.20	1.90	N/A	43.12	54.00	10.88
		-	-	-	-	-	-	-	-	-	-	-
	Middle	4874.70	V	Z	PK	46.51	5.38	N/A	N/A	51.89	74.00	22.11
		4873.90	V	Z	AV	34.86	5.38	1.90	N/A	42.14	54.00	11.86
		-	-	-	-	-	-	-	-	-	-	-
	Highest	2485.83	H	Z	PK	60.84	-3.96	N/A	N/A	56.88	74.00	17.12
		2492.86	H	Z	AV	44.82	-3.83	1.90	N/A	42.89	54.00	11.11
		4929.40	H	Y	PK	47.80	5.59	N/A	N/A	53.39	74.00	20.61
		4925.80	H	Y	AV	34.96	5.57	1.90	N/A	42.43	54.00	11.57
		-	-	-	-	-	-	-	-	-	-	-
ANT 2	Lowest	2389.76	V	Y	PK	58.20	-4.31	N/A	N/A	53.89	74.00	20.11
		2390.00	V	Y	AV	42.46	-4.30	1.90	N/A	40.06	54.00	13.94
		4825.70	V	Z	PK	48.08	5.20	N/A	N/A	53.28	74.00	20.72
		4824.00	V	Z	AV	36.93	5.20	1.90	N/A	44.03	54.00	9.97
		-	-	-	-	-	-	-	-	-	-	-
	Middle	4874.30	V	Z	PK	49.48	5.38	N/A	N/A	54.86	74.00	19.14
		4874.90	V	Z	AV	37.58	5.39	1.90	N/A	44.87	54.00	9.13
		-	-	-	-	-	-	-	-	-	-	-
	Highest	2483.52	V	Z	PK	59.82	-4.00	N/A	N/A	55.82	74.00	18.18
		2483.53	V	Z	AV	47.37	-4.00	1.90	N/A	45.27	54.00	8.73
		4922.70	V	Z	PK	46.36	5.56	N/A	N/A	51.92	74.00	22.08
		4923.40	V	Z	AV	35.16	5.56	1.90	N/A	42.62	54.00	11.38
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)

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Radiated Spurious Emissions data(9kHz ~ 25GHz) : *Test Mode 3(TM 3)*

Tested ANT	Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
ANT 1	Lowest	2389.92	V	Y	PK	68.38	-4.31	N/A	N/A	64.07	74.00	9.93
		2389.76	V	Y	AV	51.88	-4.31	1.98	N/A	49.55	54.00	4.45
		4822.70	V	Z	PK	49.32	5.19	N/A	N/A	54.51	74.00	19.49
		4825.50	V	Z	AV	37.82	5.20	1.98	N/A	45.00	54.00	9.00
		-	-	-	-	-	-	-	-	-	-	-
	Middle	4880.40	H	Y	PK	49.01	5.41	N/A	N/A	54.42	74.00	19.58
		4872.90	H	Y	AV	38.12	5.38	1.98	N/A	45.48	54.00	8.52
		-	-	-	-	-	-	-	-	-	-	-
	Highest	2492.10	H	X	PK	67.75	-3.84	N/A	N/A	63.91	74.00	10.09
		2492.91	H	X	AV	50.97	-3.83	1.98	N/A	49.12	54.00	4.88
		4922.00	V	Z	PK	48.91	5.56	N/A	N/A	54.47	74.00	19.53
		4928.60	H	Y	AV	37.61	5.58	1.98	N/A	45.17	54.00	8.83
		-	-	-	-	-	-	-	-	-	-	-
ANT 2	Lowest	2390.00	V	Y	PK	66.49	-4.30	N/A	N/A	62.19	74.00	11.81
		2390.00	H	X	AV	49.17	-4.30	1.98	N/A	46.85	54.00	7.15
		4821.40	V	Z	PK	50.51	5.19	N/A	N/A	55.70	74.00	18.30
		4822.40	V	Z	AV	38.41	5.19	1.98	N/A	45.58	54.00	8.42
		-	-	-	-	-	-	-	-	-	-	-
	Middle	4874.70	V	Z	PK	50.12	5.38	N/A	N/A	55.50	74.00	18.50
		4874.80	V	Z	AV	38.74	5.39	1.98	N/A	46.11	54.00	7.89
		-	-	-	-	-	-	-	-	-	-	-
	Highest	2484.33	H	X	PK	68.55	-3.99	N/A	N/A	64.56	74.00	9.44
		2483.57	H	X	AV	49.98	-4.00	1.98	N/A	47.96	54.00	6.04
		4929.20	H	Y	PK	49.52	5.59	N/A	N/A	55.11	74.00	18.89
		4925.00	V	Z	AV	37.47	5.57	1.98	N/A	45.02	54.00	8.98
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)

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Radiated Spurious Emissions data(9kHz ~ 25GHz) : *Test Mode 4(TM 4)*

Tested ANT	Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
ANT 1	Lowest	2389.68	V	Y	PK	66.05	-4.31	N/A	N/A	61.74	74.00	12.26
		2389.92	V	Y	AV	51.00	-4.31	3.00	N/A	49.69	54.00	4.31
		4851.70	H	Y	PK	47.42	5.30	N/A	N/A	52.72	74.00	21.28
		4845.70	V	Z	AV	36.42	5.28	3.00	N/A	44.70	54.00	9.30
		-	-	-	-	-	-	-	-	-	-	-
	Middle	4836.60	V	Z	PK	47.12	5.24	N/A	N/A	52.36	74.00	21.64
		4848.80	H	Y	AV	33.84	5.29	3.00	N/A	42.13	54.00	11.87
		-	-	-	-	-	-	-	-	-	-	-
	Highest	2484.79	H	X	PK	64.48	-3.98	N/A	N/A	60.50	74.00	13.50
		2484.03	H	X	AV	49.42	-3.99	3.00	N/A	48.43	54.00	5.57
		4908.40	V	Z	PK	48.17	5.51	N/A	N/A	53.68	74.00	20.32
		4921.20	V	Z	AV	35.86	5.56	3.00	N/A	44.42	54.00	9.58
		-	-	-	-	-	-	-	-	-	-	-
ANT 2	Lowest	2389.60	V	Y	PK	63.82	-4.31	N/A	N/A	59.51	74.00	14.49
		2389.60	V	Y	AV	50.49	-4.31	3.00	N/A	49.18	54.00	4.82
		4847.10	V	Z	PK	48.63	5.28	N/A	N/A	53.91	74.00	20.09
		4844.60	V	Z	AV	37.23	5.27	3.00	N/A	45.50	54.00	8.50
		-	-	-	-	-	-	-	-	-	-	-
	Middle	4896.50	H	Y	PK	48.35	5.46	N/A	N/A	53.81	74.00	20.19
		4845.60	H	Y	AV	36.64	5.28	3.00	N/A	44.92	54.00	9.08
		-	-	-	-	-	-	-	-	-	-	-
	Highest	2485.37	H	X	PK	68.67	-3.97	N/A	N/A	64.70	74.00	9.30
		2483.72	H	X	AV	49.80	-4.00	3.00	N/A	48.80	54.00	5.20
		4894.20	H	Y	PK	47.46	5.46	N/A	N/A	52.92	74.00	21.08
		4929.70	V	Z	AV	35.91	5.59	3.00	N/A	44.50	54.00	9.50
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)

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Radiated Spurious Emissions data(9kHz ~ 25GHz) : *Test Mode 5(TM 5)*

Tested ANT	Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
ANT 1	Lowest	11488.90	H	Y	PK	47.82	12.98	N/A	-9.54	51.26	74.00	22.75
		11490.10	H	Y	AV	36.55	12.98	0.33	-9.54	40.32	54.00	13.69
		-	-	-	-	-	-	-	-	-	-	-
	Middle	11569.20	V	Z	PK	46.30	13.16	N/A	-9.54	49.92	74.00	24.08
		11569.80	H	Y	AV	36.37	13.16	0.33	-9.54	40.32	54.00	13.69
		-	-	-	-	-	-	-	-	-	-	-
	Highest	11652.60	V	Z	PK	46.10	13.36	N/A	-9.54	49.92	74.00	24.08
		11650.00	H	Y	AV	35.76	13.36	0.33	-9.54	39.91	54.00	14.09
		-	-	-	-	-	-	-	-	-	-	-
ANT 2	Lowest	11492.40	V	Z	PK	45.24	12.98	N/A	-9.54	48.68	74.00	25.32
		11489.90	H	Y	AV	34.61	12.98	0.33	-9.54	38.38	54.00	15.63
		-	-	-	-	-	-	-	-	-	-	-
	Middle	11570.20	V	Z	PK	45.53	13.16	N/A	-9.54	49.15	74.00	24.85
		11571.90	V	Z	AV	34.28	13.17	0.33	-9.54	38.24	54.00	15.76
		-	-	-	-	-	-	-	-	-	-	-
	Highest	11656.40	V	Z	PK	45.64	13.37	N/A	-9.54	49.47	74.00	24.53
		11650.10	H	Y	AV	34.75	13.36	0.33	-9.54	38.90	54.00	15.10
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)

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Radiated Spurious Emissions data(9kHz ~ 25GHz) : *Test Mode 6(TM 6)*

Tested ANT	Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
ANT 1	Lowest	11489.40	H	Y	PK	46.33	12.98	N/A	-9.54	49.77	74.00	24.23
		11489.80	H	Y	AV	36.20	12.98	0.31	-9.54	39.95	54.00	14.05
		-	-	-	-	-	-	-	-	-	-	-
	Middle	11569.20	V	Z	PK	44.90	13.16	N/A	-9.54	48.52	74.00	25.48
		11569.80	H	Y	AV	34.97	13.16	0.31	-9.54	38.90	54.00	15.11
		-	-	-	-	-	-	-	-	-	-	-
	Highest	11648.80	H	Y	PK	47.64	13.35	N/A	-9.54	51.45	74.00	22.55
		11649.80	H	Y	AV	36.45	13.35	0.31	-9.54	40.57	54.00	13.43
		-	-	-	-	-	-	-	-	-	-	-
ANT 2	Lowest	11493.50	V	Z	PK	45.85	12.98	N/A	-9.54	49.29	74.00	24.71
		11489.80	H	Y	AV	34.39	12.98	0.31	-9.54	38.14	54.00	15.86
		-	-	-	-	-	-	-	-	-	-	-
	Middle	11572.60	V	Z	PK	45.41	13.17	N/A	-9.54	49.04	74.00	24.96
		11569.70	H	Y	AV	34.32	13.16	0.31	-9.54	38.25	54.00	15.75
		-	-	-	-	-	-	-	-	-	-	-
	Highest	11651.40	V	Z	PK	46.11	13.36	N/A	-9.54	49.93	74.00	24.07
		11651.30	V	Z	AV	35.34	13.36	0.31	-9.54	39.47	54.00	14.53
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)

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Radiated Spurious Emissions data(9kHz ~ 25GHz) : *Test Mode 7(TM 7)*

Tested ANT	Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
ANT 1	Lowest	11513.90	H	Y	PK	44.79	13.02	N/A	-9.54	48.27	74.00	25.74
		11510.00	H	Y	AV	34.83	13.01	0.59	-9.54	38.89	54.00	15.11
		-	-	-	-	-	-	-	-	-	-	-
	Highest	11588.90	H	Y	PK	45.50	13.21	N/A	-9.54	49.17	74.00	24.83
		11589.80	H	Y	AV	35.41	13.21	0.59	-9.54	39.67	54.00	14.33
		-	-	-	-	-	-	-	-	-	-	-
ANT 2	Lowest	11505.30	V	Z	PK	44.52	13.00	N/A	-9.54	47.98	74.00	26.02
		11510.00	H	Y	AV	33.83	13.01	0.59	-9.54	37.89	54.00	16.11
		-	-	-	-	-	-	-	-	-	-	-
	Highest	11597.70	V	Z	PK	44.55	13.23	N/A	-9.54	48.24	74.00	25.76
		11586.90	V	Z	AV	33.75	13.20	0.59	-9.54	38.00	54.00	16.00
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)

Radiated Spurious Emissions data(9kHz ~ 25GHz) : *Test Mode 10(TM 10)*

Tested ANT	Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
ANT 1	Middle	11541.40	H	Y	PK	44.08	13.09	N/A	-9.54	47.63	74.00	26.37
		11550.00	H	Y	AV	33.29	13.11	3.89	-9.54	40.75	54.00	13.25
		-	-	-	-	-	-	-	-	-	-	-
ANT 2	Middle	11567.60	H	Y	PK	43.47	13.15	N/A	-9.54	47.08	74.00	26.92
		11550.00	H	Y	AV	33.28	13.11	3.89	-9.54	40.74	54.00	13.26
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
   Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)

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8.6 Power-line conducted emissions

Test Requirements and limit, §15.207& RSS-Gen [7.2.2]

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

▣ TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to the test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

▣ Test Results: Comply(Refer to next page.)

The worst data was reported in each bands(2.4GHz and 5.8GHz band).

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▣ RESULT PLOTS

AC Line Conducted Emissions (Graph)

Test mode 2(TM2) & Middle

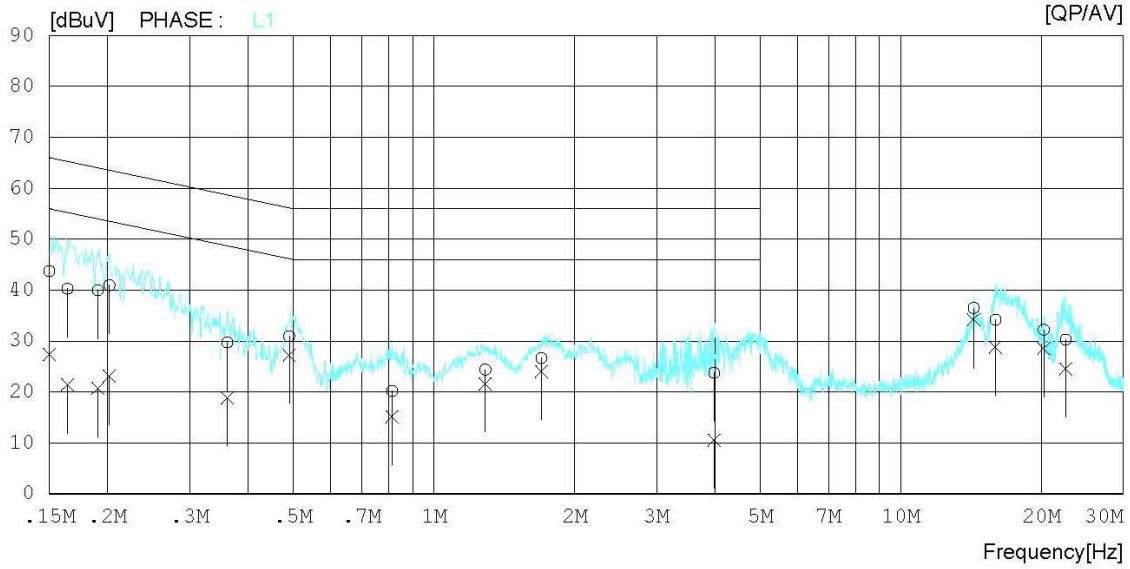
Results of Conducted Emission

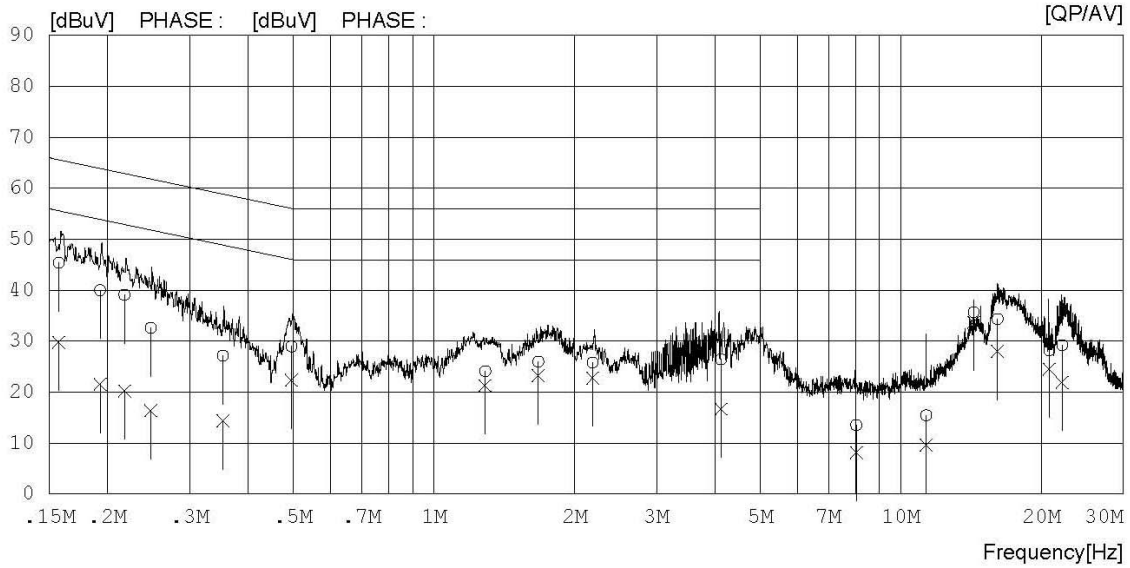
Digital EMC
Date : 2014-02-17 22:31:27

Model No.	:	WEG720B	Referrence No.	:	
Type	:	WiFi Transmitter	Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	21 'C 39 % R.H.
Test Condition	:	802.11g	Operator	:	HyunSu Son

Memo :

LIMIT : FCC P15.207 QP
FCC P15.207 AV





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AC Line Conducted Emissions (List)

Test mode 2(TM2) & Middle

Results of Conducted Emission

Digital EMC
Date : 2014-02-17 22:31:27

Model No.	:	WEG720B	Referrence No.	:	
Type	:	WiFi Transmitter	Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	21 'C 39 % R.H.
Test Condition	:	802.11g	Operator	:	HyunSu Son

Memo :

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.15000	33.4	17.0	10.3	43.7	27.3	66.0	56.0	22.3	28.7	L1
2	0.16396	30.0	11.1	10.3	40.3	21.4	65.3	55.3	25.0	33.9	L1
3	0.19054	29.6	10.3	10.4	40.0	20.7	64.0	54.0	24.0	33.3	L1
4	0.20176	30.6	12.7	10.4	41.0	23.1	63.5	53.5	22.5	30.4	L1
5	0.36096	19.4	8.6	10.3	29.7	18.9	58.7	48.7	29.0	29.8	L1
6	0.48950	20.7	17.0	10.2	30.9	27.2	56.2	46.2	25.3	19.0	L1
7	0.81370	10.0	4.9	10.2	20.2	15.1	56.0	46.0	35.8	30.9	L1
8	1.28800	14.2	11.4	10.2	24.4	21.6	56.0	46.0	31.6	24.4	L1
9	1.69900	16.4	13.8	10.2	26.6	24.0	56.0	46.0	29.4	22.0	L1
10	3.98150	13.5	0.3	10.3	23.8	10.6	56.0	46.0	32.2	35.4	L1
11	14.33700	25.8	23.5	10.7	36.5	34.2	60.0	50.0	23.5	15.8	L1
12	15.96700	23.5	18.1	10.7	34.2	28.8	60.0	50.0	25.8	21.2	L1
13	20.25700	21.5	17.8	10.7	32.2	28.5	60.0	50.0	27.8	21.5	L1
14	22.57450	19.5	13.7	10.8	30.3	24.5	60.0	50.0	29.7	25.5	L1
15	0.15709	35.1	19.5	10.3	45.4	29.8	65.6	55.6	20.2	25.8	N
16	0.19255	29.6	11.1	10.4	40.0	21.5	63.9	53.9	23.9	32.4	N
17	0.21720	28.8	9.9	10.3	39.1	20.2	62.9	52.9	23.8	32.7	N
18	0.24720	22.3	6.1	10.3	32.6	16.4	61.9	51.9	29.3	35.5	N
19	0.35313	16.9	4.1	10.3	27.2	14.4	58.9	48.9	31.7	34.5	N
20	0.49514	18.8	12.1	10.2	29.0	22.3	56.1	46.1	27.1	23.8	N
21	1.28850	13.9	11.1	10.2	24.1	21.3	56.0	46.0	31.9	24.7	N
22	1.67250	15.8	13.0	10.2	26.0	23.2	56.0	46.0	30.0	22.8	N
23	2.18750	15.5	12.4	10.3	25.8	22.7	56.0	46.0	30.2	23.3	N
24	4.12000	16.1	6.4	10.3	26.4	16.7	56.0	46.0	29.6	29.3	N
25	8.03150	3.1	-2.3	10.4	13.5	8.1	60.0	50.0	46.5	41.9	N
26	11.34700	4.8	-1.0	10.6	15.4	9.6	60.0	50.0	44.6	40.4	N
27	14.33600	25.0	23.0	10.7	35.7	33.7	60.0	50.0	24.3	16.3	N
28	16.12600	23.6	17.3	10.7	34.3	28.0	60.0	50.0	25.7	22.0	N
29	20.80500	17.5	13.8	10.7	28.2	24.5	60.0	50.0	31.8	25.5	N
30	22.16950	18.4	11.1	10.8	29.2	21.9	60.0	50.0	30.8	28.1	N

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AC Line Conducted Emissions (Graph)

Test mode 10(TM 10) & Middle

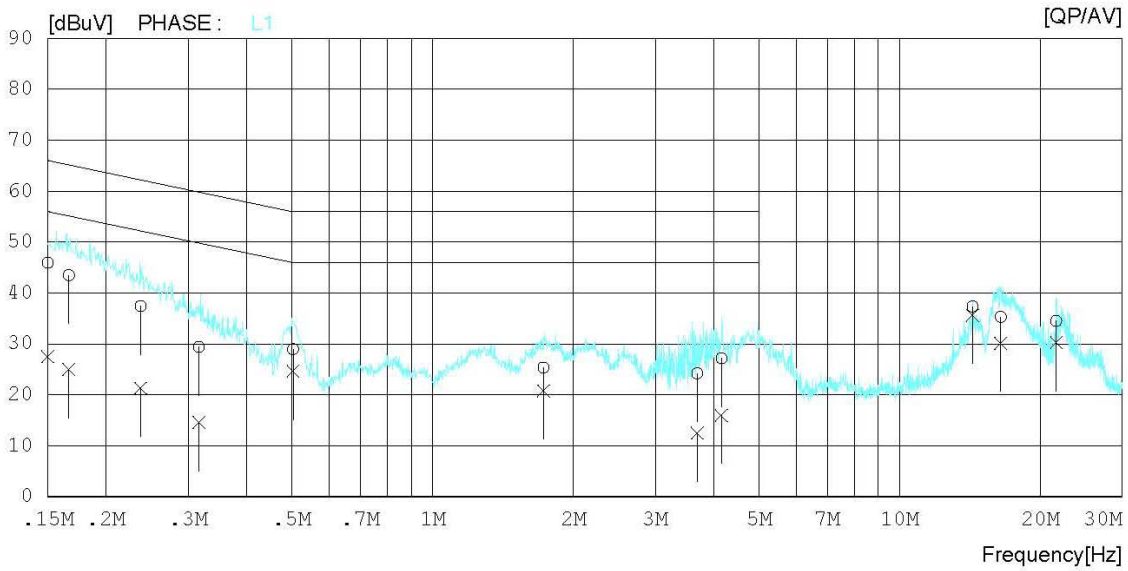
Results of Conducted Emission

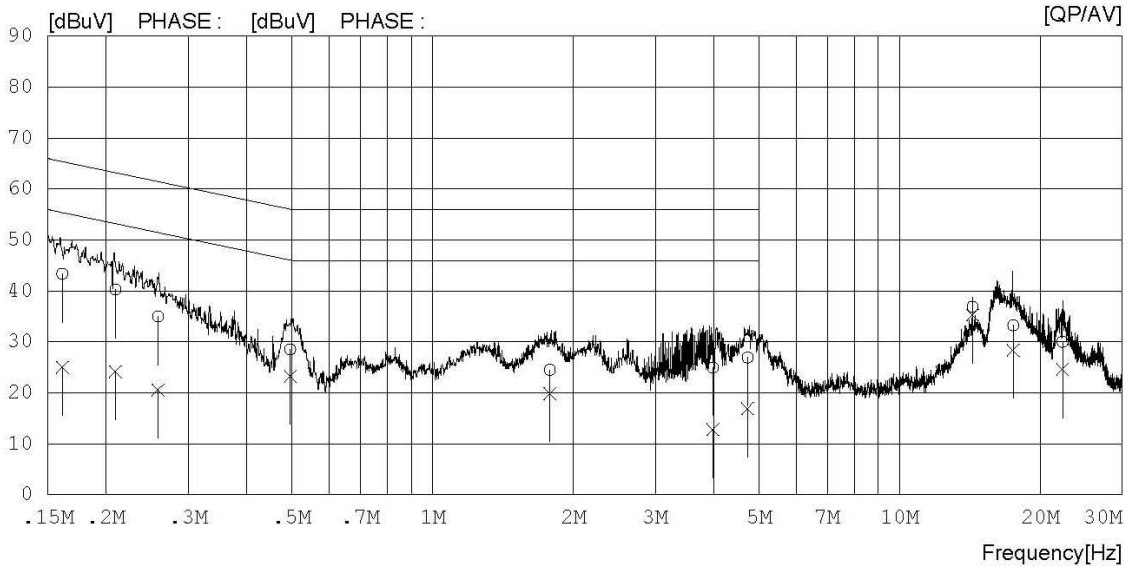
Digital EMC
Date : 2014-02-18 03:12:23

Model No.	:	WEG720B	Referrence No.	:	
Type	:	WiFi Transmitter	Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	21 'C 39 % R.H.
Test Condition	:	802.11AC80	Operator	:	HyunSu Son

Memo :

LIMIT : FCC P15.207 QP
FCC P15.207 AV





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AC Line Conducted Emissions (List)

Test mode 10(TM 10) & Middle

Results of Conducted Emission

Digital EMC
Date : 2014-02-18 03:12:23

Model No.	:	WEG720B	Referrence No.	:	
Type	:	WiFi Transmitter	Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	21 'C 39 % R.H.
Test Condition	:	802.11AC80	Operator	:	HyunSu Son

Memo :

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.15001	35.6	17.2	10.3	45.9	27.5	66.0	56.0	20.1	28.5	L1
2	0.16633	33.2	14.7	10.3	43.5	25.0	65.1	55.1	21.6	30.1	L1
3	0.23688	27.1	11.0	10.3	37.4	21.3	62.2	52.2	24.8	30.9	L1
4	0.31579	19.1	4.3	10.3	29.4	14.6	59.8	49.8	30.4	35.2	L1
5	0.50230	18.8	14.4	10.2	29.0	24.6	56.0	46.0	27.0	21.4	L1
6	1.72800	15.1	10.6	10.2	25.3	20.8	56.0	46.0	30.7	25.2	L1
7	3.68750	13.9	2.2	10.3	24.2	12.5	56.0	46.0	31.8	33.5	L1
8	4.15650	16.9	5.7	10.3	27.2	16.0	56.0	46.0	28.8	30.0	L1
9	14.33500	26.7	24.9	10.7	37.4	35.6	60.0	50.0	22.6	14.4	L1
10	16.47500	24.6	19.4	10.7	35.3	30.1	60.0	50.0	24.7	19.9	L1
11	21.66250	23.7	19.4	10.8	34.5	30.2	60.0	50.0	25.5	19.8	L1
12	0.16104	33.1	14.7	10.3	43.4	25.0	65.4	55.4	22.0	30.4	N
13	0.20934	29.8	13.7	10.4	40.2	24.1	63.2	53.2	23.0	29.1	N
14	0.25824	24.7	10.2	10.3	35.0	20.5	61.5	51.5	26.5	31.0	N
15	0.49578	18.3	13.0	10.2	28.5	23.2	56.1	46.1	27.6	22.9	N
16	1.78300	14.2	9.6	10.3	24.5	19.9	56.0	46.0	31.5	26.1	N
17	3.98300	14.7	2.5	10.3	25.0	12.8	56.0	46.0	31.0	33.2	N
18	4.72900	16.6	6.6	10.3	26.9	16.9	56.0	46.0	29.1	29.1	N
19	14.33500	26.2	24.6	10.7	36.9	35.3	60.0	50.0	23.1	14.7	N
20	17.52100	22.5	17.7	10.7	33.2	28.4	60.0	50.0	26.8	21.6	N
21	22.33500	19.2	13.8	10.8	30.0	24.6	60.0	50.0	30.0	25.4	N

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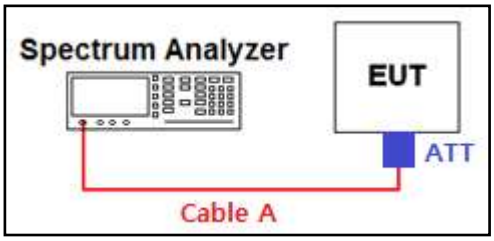
8.7 Occupied bandwidth

Test Requirements, RSS-Gen [4.6.1]

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%.
The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted.
Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual.

▣ TEST RESULTS: Comply

Test Mode	Frequency	Test Results[MHz]	
		ANT 1	ANT 2
TM 1	Lowest	13.071	12.953
	Middle	13.054	13.167
	Highest	13.122	13.042
TM 2	Lowest	16.702	16.673
	Middle	16.762	16.722
	Highest	16.736	16.716
TM 3	Lowest	17.919	17.925
	Middle	17.897	17.882
	Highest	17.929	17.904
TM 4	Lowest	36.534	36.471
	Middle	36.540	36.454
	Highest	36.564	36.393
TM 5	Lowest	17.068	17.088
	Middle	17.040	17.103
	Highest	17.081	17.086
TM 6	Lowest	17.987	17.862
	Middle	17.982	17.918
	Highest	18.011	17.880
TM 7	Lowest	36.443	36.374
	Highest	36.458	36.433
TM 10	Middle	76.077	75.951

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▣ RESULT PLOTS

Occupied Bandwidth TM 1 & ANT 1 & Lowest

Occupied Bandwidth TM 1 & ANT 1 & Middle

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Occupied Bandwidth

TM 1 & ANT 1 & Highest

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Occupied Bandwidth TM 1 & ANT 2 & Lowest

Occupied Bandwidth TM 1 & ANT 2 & Middle

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Occupied Bandwidth

TM 1 & ANT 2 & Highest

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Occupied Bandwidth TM 2 & ANT 1 & Lowest

Occupied Bandwidth TM 2 & ANT 1 & Middle

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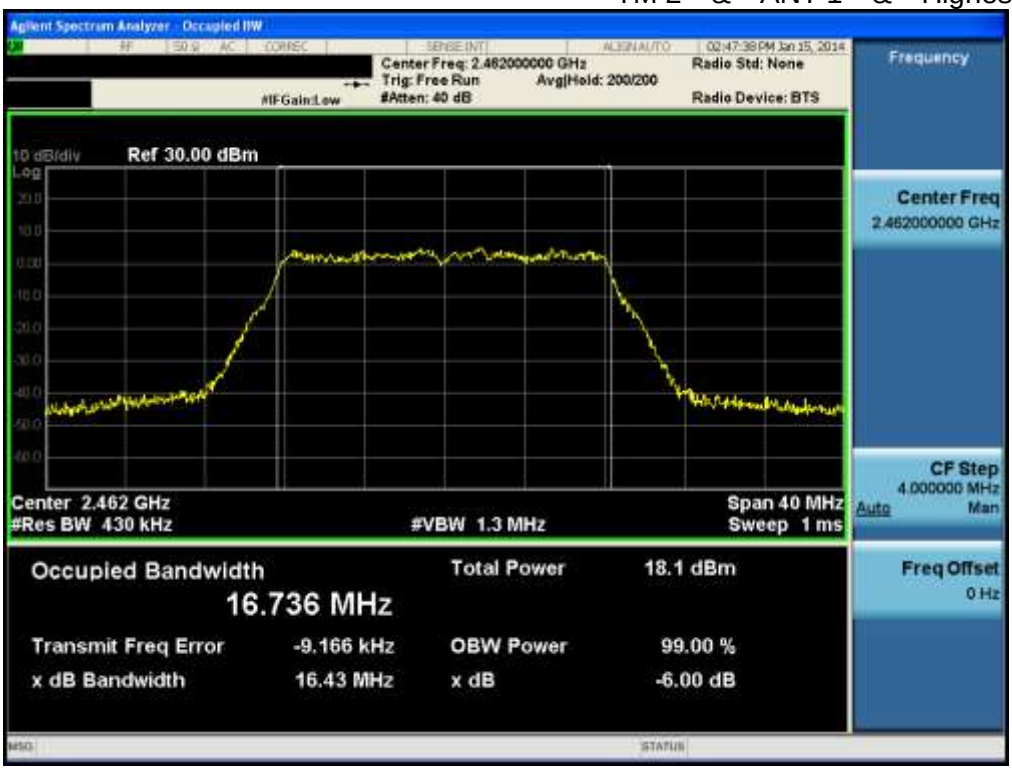
Occupied Bandwidth

TM 2 & ANT 1 & Highest



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Occupied Bandwidth TM 2 & ANT 2 & Lowest

Occupied Bandwidth TM 2 & ANT 2 & Middle

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Occupied Bandwidth

TM 2 & ANT 2 & Highest

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Occupied Bandwidth TM 3 & ANT 1 & Lowest

Occupied Bandwidth TM 3 & ANT 1 & Middle

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Occupied Bandwidth

TM 3 & ANT 1 & Highest

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Occupied Bandwidth TM 3 & ANT 2 & Lowest

Occupied Bandwidth TM 3 & ANT 2 & Middle

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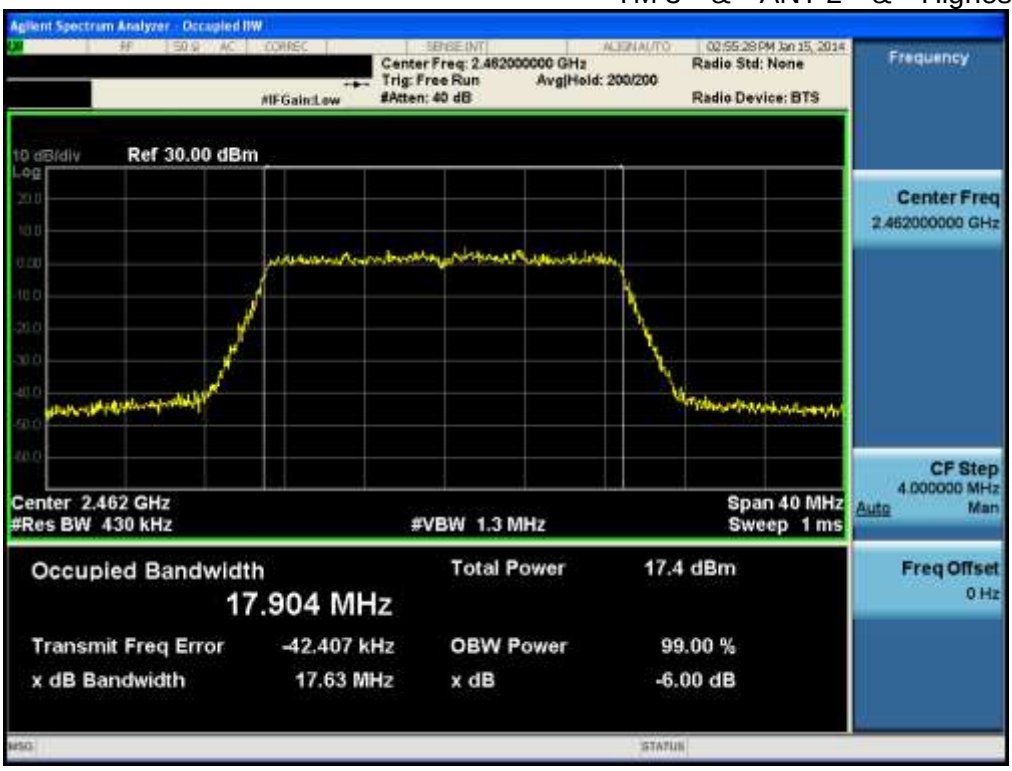
Occupied Bandwidth

TM 3 & ANT 2 & Highest



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Occupied Bandwidth TM 4 & ANT 1 & Lowest

Occupied Bandwidth TM 4 & ANT 1 & Middle

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Occupied Bandwidth

TM 4 & ANT 1 & Highest

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Occupied Bandwidth TM 4 & ANT 2 & Lowest

Occupied Bandwidth TM 4 & ANT 2 & Middle

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Occupied Bandwidth

TM 4 & ANT 2 & Highest

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Occupied Bandwidth TM 5 & ANT 1 & Lowest

Occupied Bandwidth TM 5 & ANT 1 & Middle

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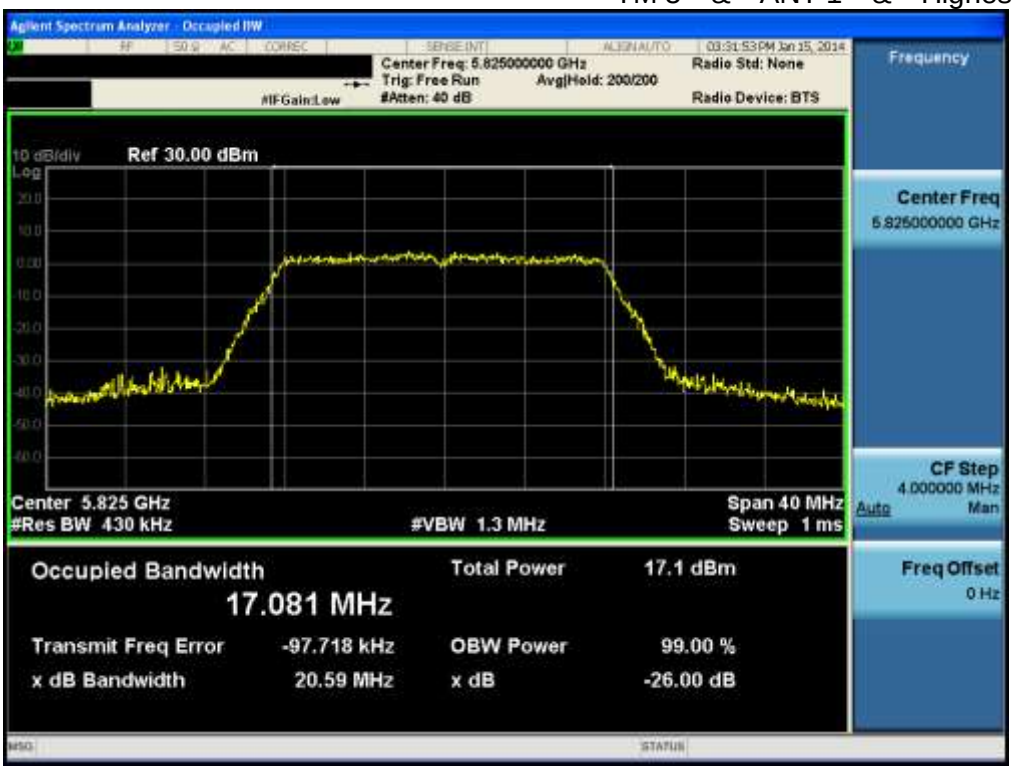
Occupied Bandwidth

TM 5 & ANT 1 & Highest



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Occupied Bandwidth TM 5 & ANT 2 & Lowest

Occupied Bandwidth TM 5 & ANT 2 & Middle

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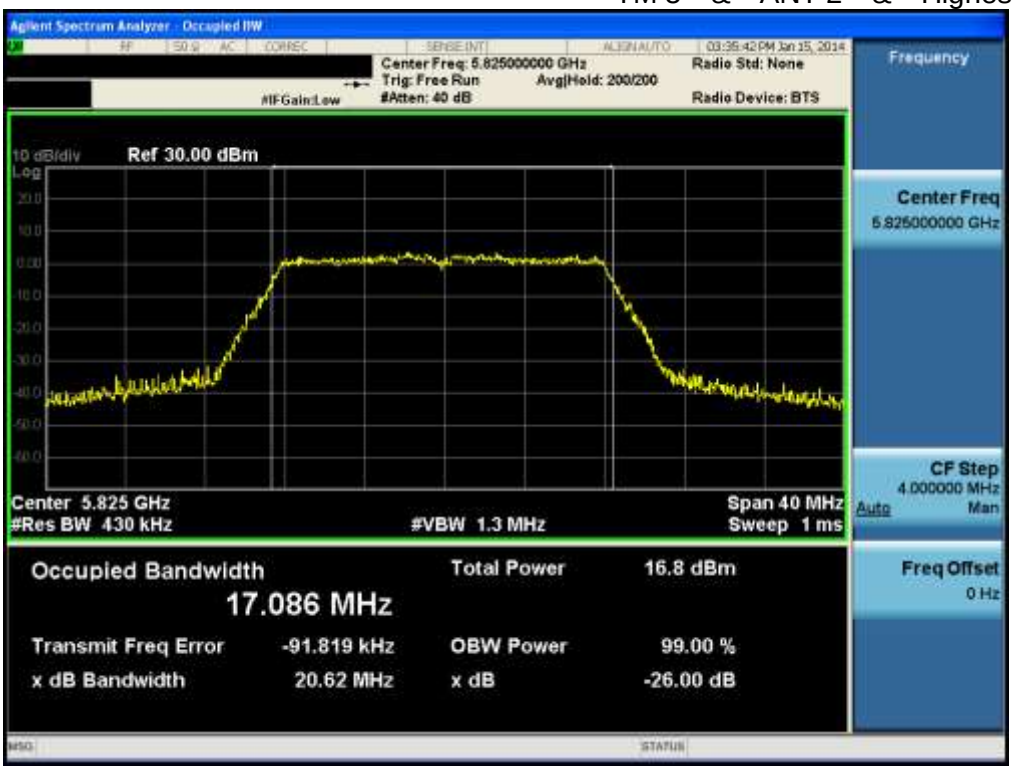
Occupied Bandwidth

TM 5 & ANT 2 & Highest



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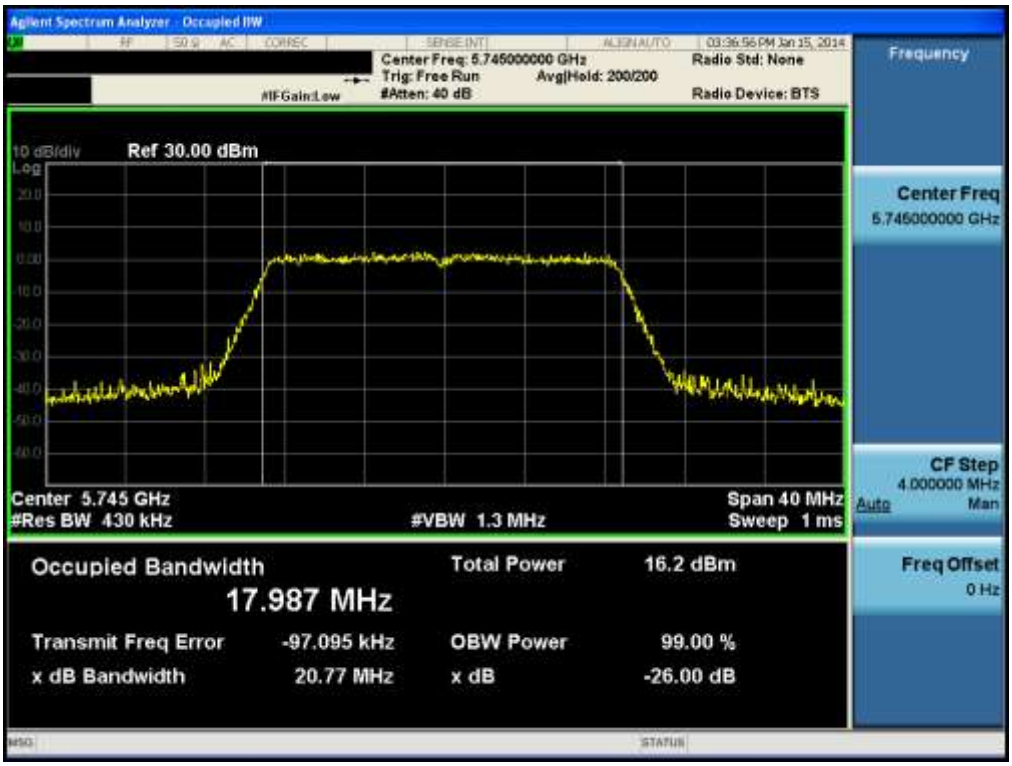
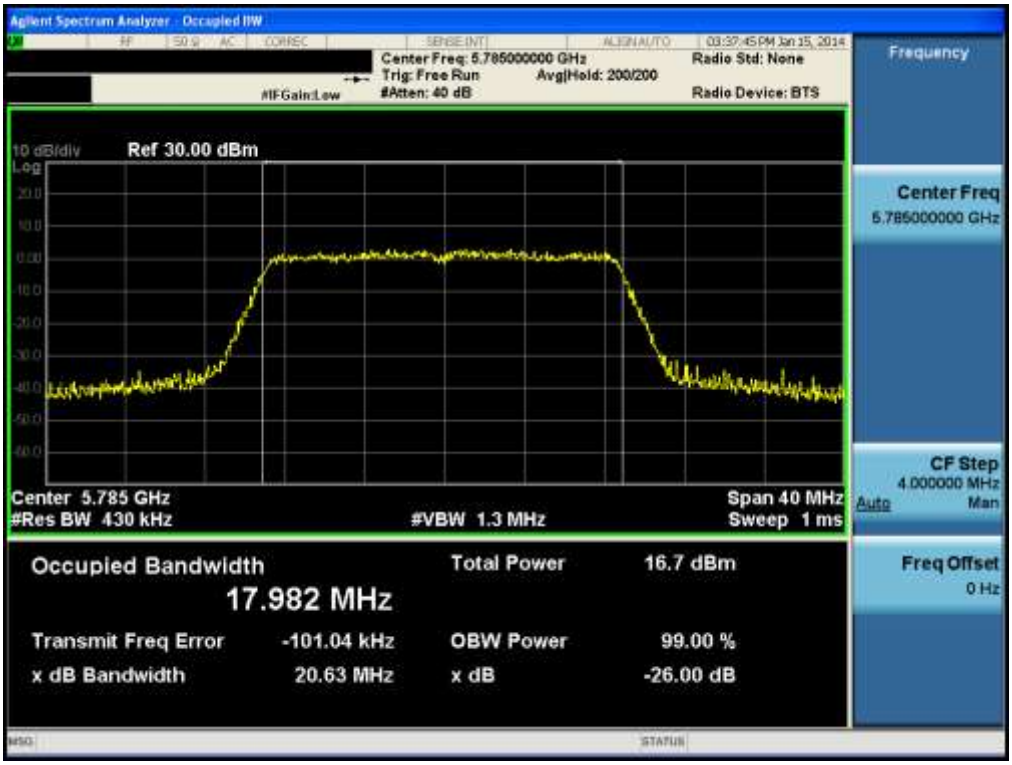
Occupied Bandwidth TM 6 & ANT 1 & Lowest



Occupied Bandwidth TM 6 & ANT 1 & Middle



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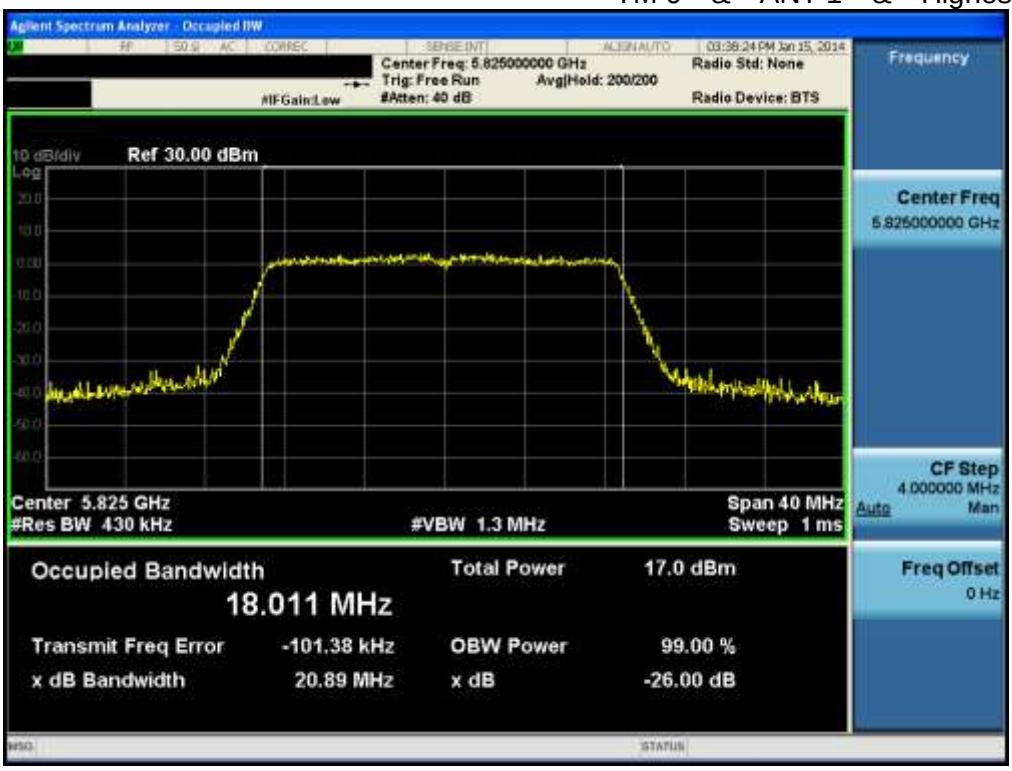
Occupied Bandwidth

TM 6 & ANT 1 & Highest



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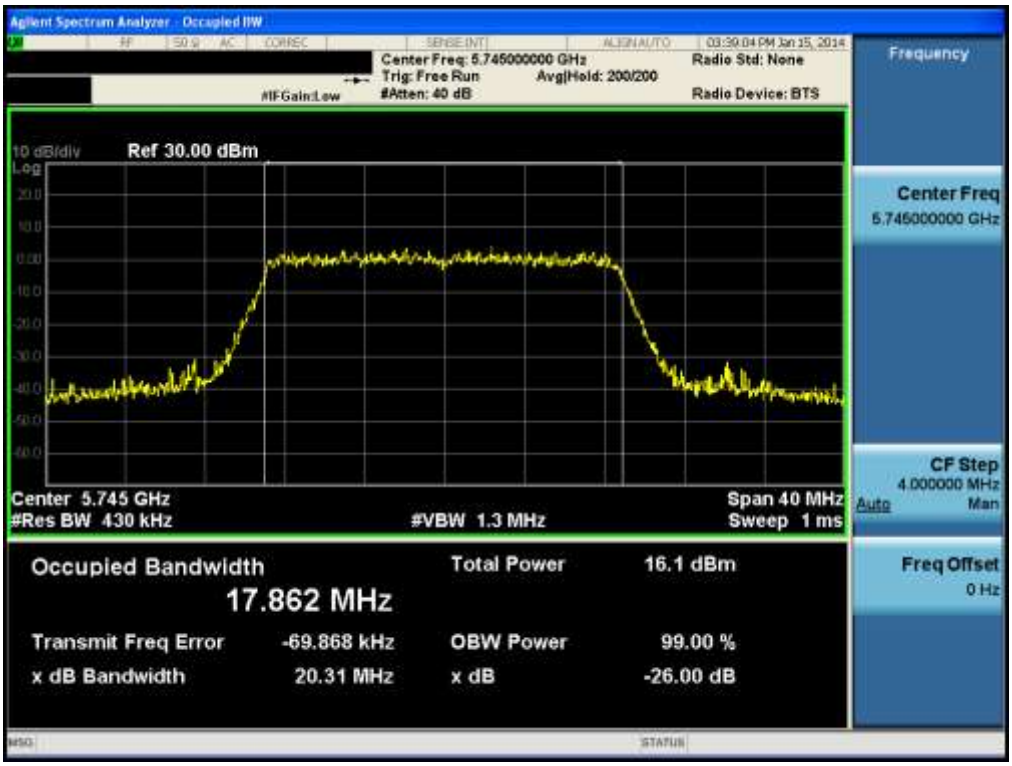
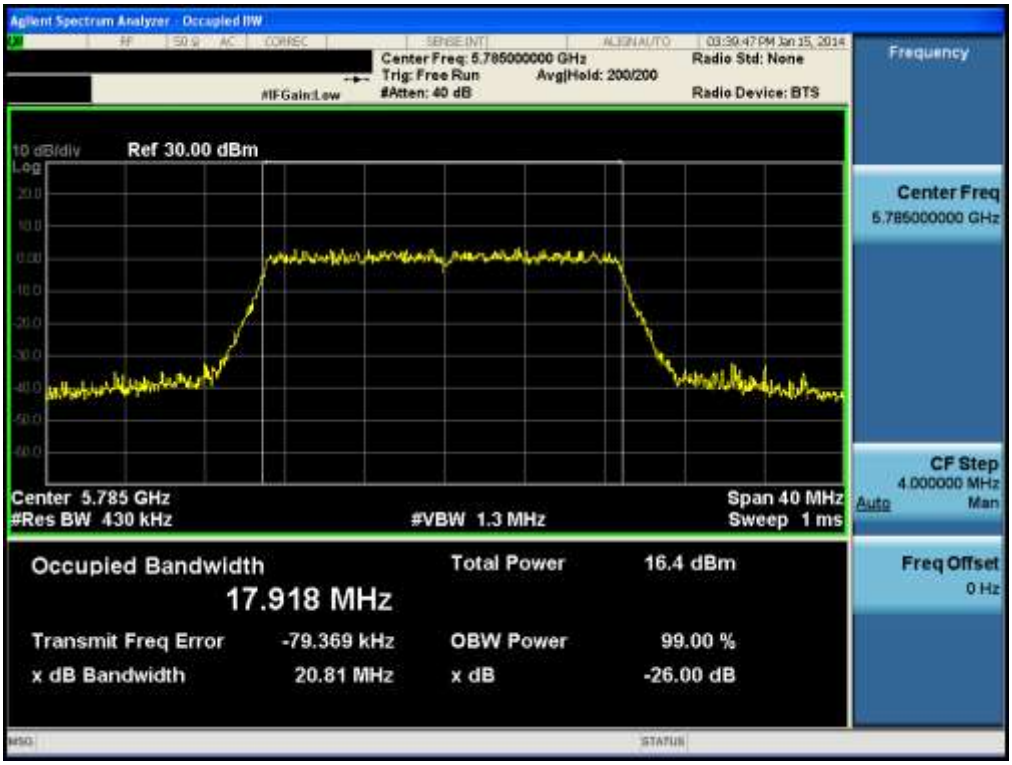
Occupied Bandwidth TM 6 & ANT 2 & Lowest



Occupied Bandwidth TM 6 & ANT 2 & Middle



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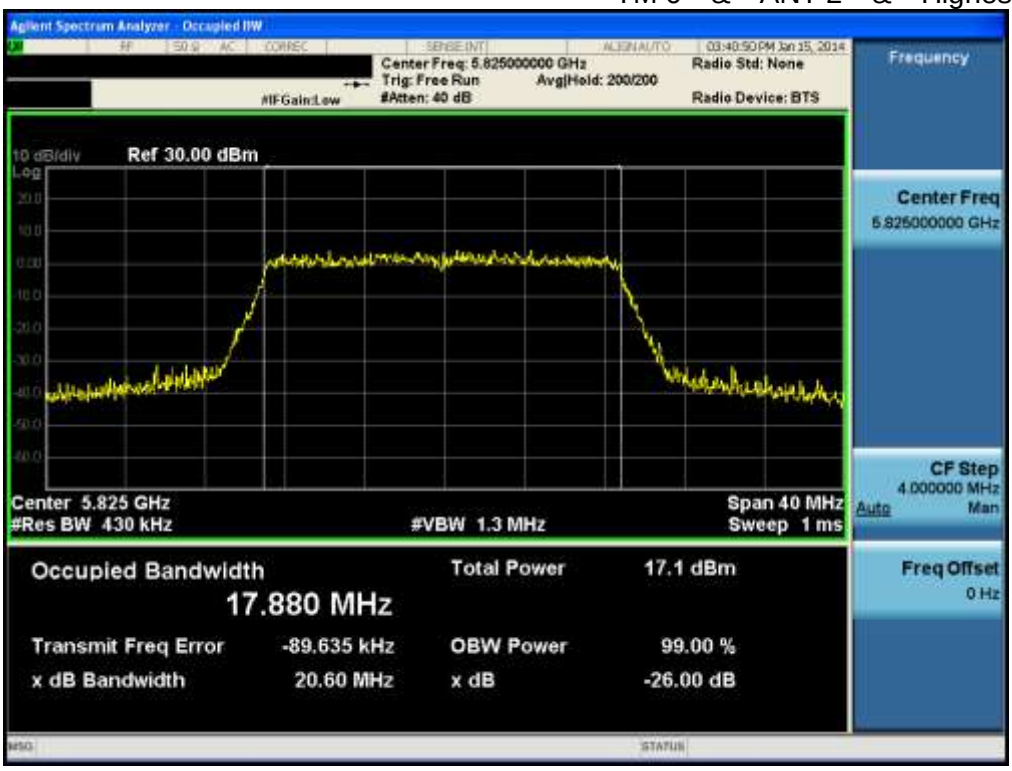
Occupied Bandwidth

TM 6 & ANT 2 & Highest



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Occupied Bandwidth TM 7 & ANT 1 & Lowest

Occupied Bandwidth TM 7 & ANT 1 & Highest

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Occupied Bandwidth TM 7 & ANT 2 & Lowest

Occupied Bandwidth TM 7 & ANT 2 & Highest

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Occupied Bandwidth

TM 10 & ANT 1 & Middle

Occupied Bandwidth

Test Mode: TM 10 & ANT 2 & Middle

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9. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent	N9030A	13/10/29	14/10/29	MY53310140
Spectrum Analyzer	Agilent	N9020A	14/01/07	15/01/07	MY49100833
Spectrum Analyzer	R&S	FSQ26	13/02/14	14/02/14	200445
Harmonic Mixer	OML	WR28	14/02/07	15/02/07	KA100224-1
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2496A	13/10/29	14/10/29	1338004
		MA2411B			1306053
		MA2490A			1249303
Vector Signal Generator	Rohde Schwarz	SMJ100A	14/01/07	15/01/07	100148
Signal Generator	Rohde Schwarz	SMF100A	13/07/22	14/07/22	102341
Digital Multimeter	H.P	34401A	13/02/27	14/02/27	3146A13475
DC Power Supply	Agilent	66332A	13/10/21	14/10/21	US37474353
Thermo hygrometer	BODYCOM	BJ5478	13/06/01	14/06/01	120612-1
Attenuator(3dB)	SMAJK	SMAJK-2-3	13/10/22	14/10/22	3
High-pass filter	Wainwright	WHKX3.0	13/09/12	14/09/12	9
High-pass filter	Wainwright	WHNX8.5	13/09/12	14/09/12	1
Amplifier (22dB)	H.P	8447E	14/01/07	15/01/07	2945A02865
Amplifier (30dB)	Agilent	8449B	13/02/27	14/02/27	3008A00370
LOOP Antenna	Schwarzbeck	FMZB1513	12/09/24	14/09/24	1513-128
BILOG ANTENNA	SCHAFFNER	CBL6112B	12/11/06	14/11/06	2737
Horn Antenna	ETS	3115	13/02/28	15/02/28	00021097
Horn Antenna	ETS	3117	13/06/14	15/06/14	00140394
HORN ANT	A.H.Systems	SAS-574	13/03/20	15/03/20	154
EMI TEST RECEIVER	R&S	ESU	14/01/07	15/01/07	100014
LISN	SCHWARZBECK	NNLK8121	13/08/12	14/08/12	NNLK8121-580

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APPENDIX I

Duty cycle information

TEST PROCEDURE

Duty cycle measured using **section 6.0 b) of KDB558074 v03r1 :**

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

TEST DATA

Test Mode	Tested frequency	T_{ON} (ms)	T_{ON+OFF} (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
TM 1	Lowest	1.627	1.718	94.70	0.24
TM 2	Lowest	0.179	0.277	64.62	1.90
TM 3	Lowest	0.168	0.265	63.40	1.98
TM 4	Lowest	0.099	0.1973	50.18	3.00
TM 5	Lowest	1.424	1.535	92.77	0.33
TM 6	Lowest	1.333	1.431	93.15	0.31
TM 7	Lowest	0.663	0.759	87.35	0.59
TM 10	Middle	0.06747	0.165	40.89	3.89

Please refer to next page for actual test plot.

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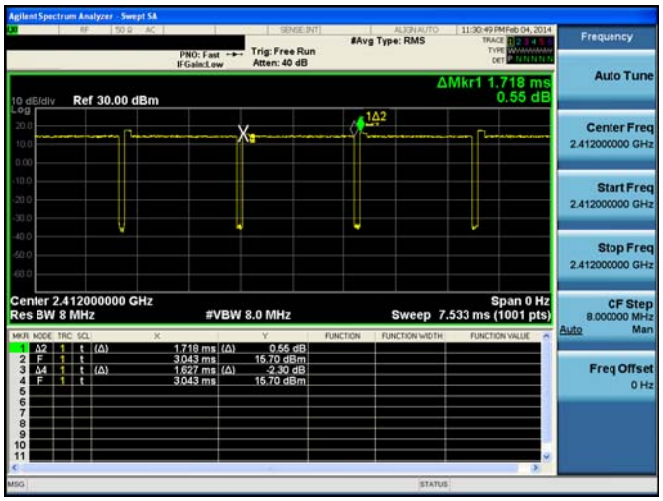
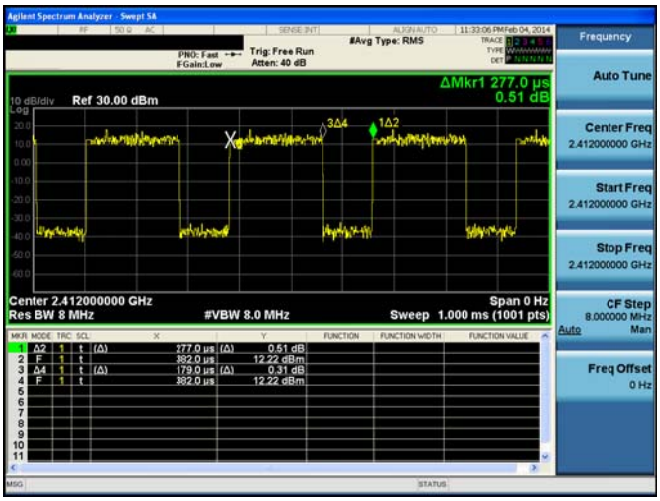
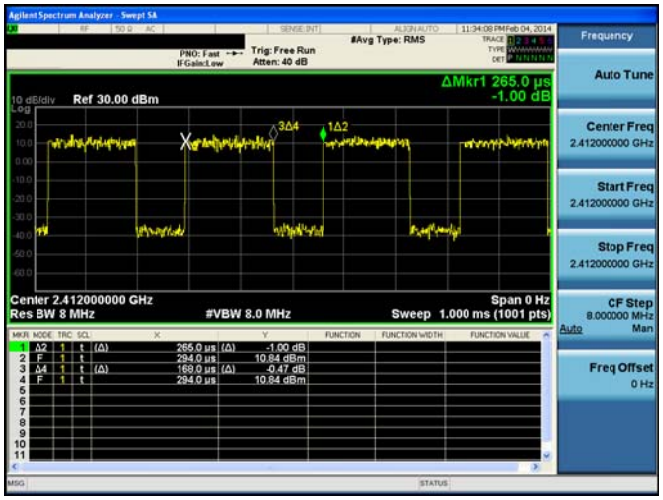
Duty cycle data : **TM 1** & **Lowest**



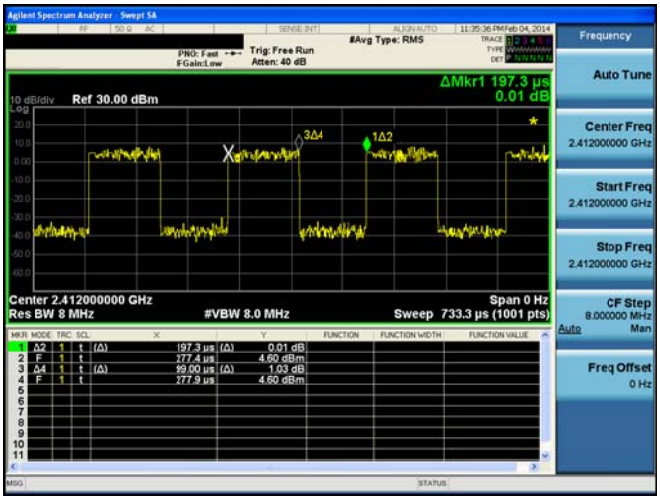
Duty cycle data : **TM 2** & **Lowest**



Duty cycle data : **TM 3** & **Lowest**



Duty cycle data : **TM 4** & **Lowest**



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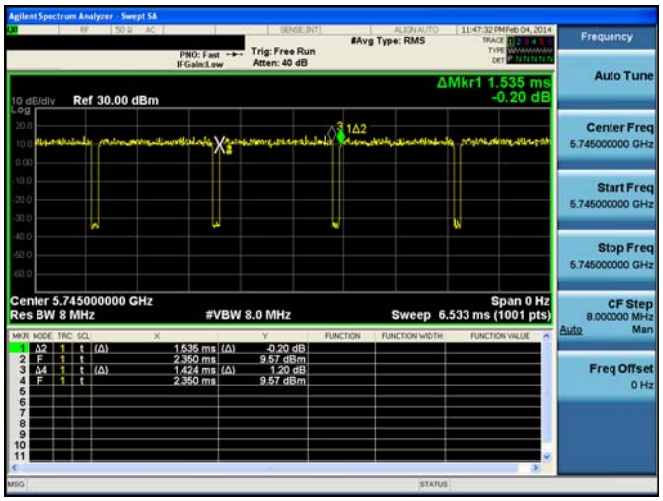
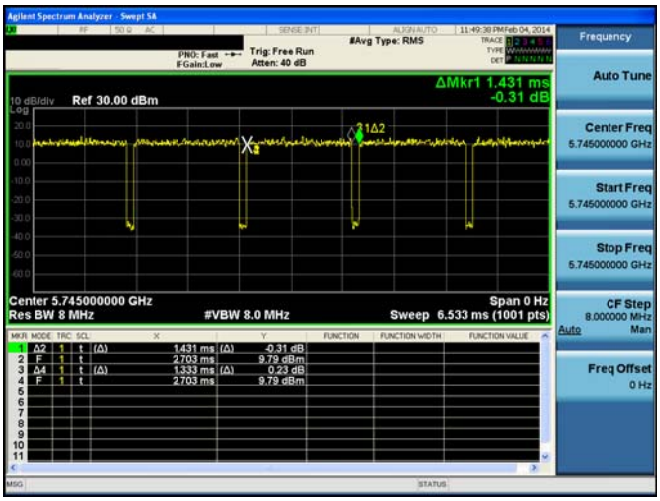
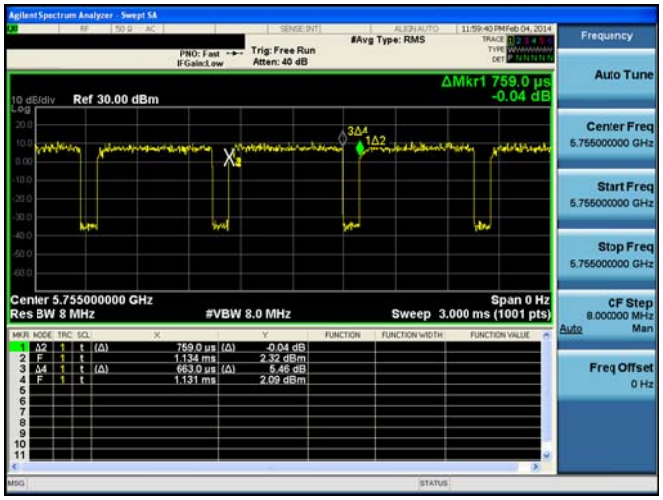
Duty cycle data : **TM 5** & **Lowest**



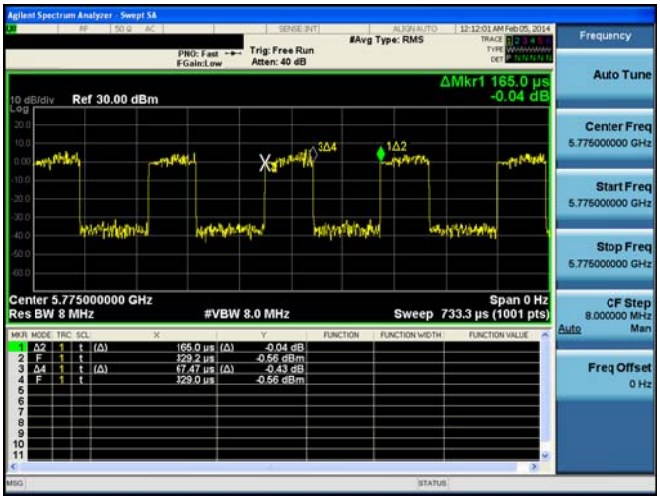
Duty cycle data : **TM 6** & **Lowest**



Duty cycle data : **TM 7** & **Lowest**



Duty cycle data : **TM 10** & **Lowest**



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