

RF Output Power Measure Report

References Test Guidance:

FCC Part 15.247 and 15.407

RSS 247 Issue 2

ANSI C63.10-2013

KDB 558074 D01 15.247Meas Guidancev05r02

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

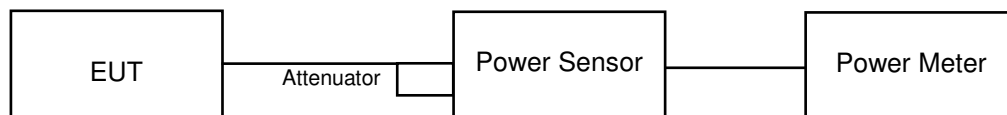
KDB 662911 D01 Multiple Transmitter Output v02r01

1.1 Conducted Output Power Measurement (2.4GHz)

1.1.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

1.1.2 Test Setup



1.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
High Speed Power Meter	ML2495A	1012010	Sep. 07, 2020	Sep. 06, 2021
Power Sensor	MA2411B	1315050	Sep. 07, 2020	Sep. 06, 2021

1.1.4 Test Procedures

For Average Power Measurement

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst and set the detector to AVERAGE. Duty factor is not added to measured value. So, if test was not using gated power meter, then duty factor must be added to adjust average output power result while duty cycle <98%.

Average power measurement used Method PM-G.

1.1.5 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

1.1.6 Test Result

	AV Output Power				PK Output Power			CDD mode FCC Conducted Power Limit(dBm)
	SET	AV Meter AV (dBm) Power(dBm)			PK Meter PK (dBm) Power(dBm)			
2.4G		CHAN 0	CHAN 1	TOTAL	CHAN 0	CHAN 1	TOTAL	
11b								Channel Power
CH01	17	18.36	17.98	21.19	20.74	20.69	23.73	30
CH06	17.5	19.29	19.21	22.26	21.60	21.52	24.57	30
CH11	17	18.40	18.26	21.34	20.77	20.61	23.70	30
CH12	8.5	9.89	9.92	12.92	12.73	12.79	15.77	30
CH13	8	9.45	9.58	12.53	11.90	11.81	14.87	30
11g								Channel Power
CH01	15.5	15.93	15.83	18.89	22.26	22.23	25.26	30
CH06	17	17.93	17.90	20.93	23.63	23.54	26.60	30
CH11	14.5	15.37	15.33	18.36	21.46	21.44	24.46	30
CH12	0	0.49	0.48	3.50	7.46	7.49	10.49	30
CH13	0	0.49	0.46	3.49	6.92	6.81	9.88	30
11ac 20MHz								Channel Power
CH01	15	14.73	15.27	18.02	21.07	20.97	24.03	30
CH06	18	18.30	17.89	21.11	23.50	23.31	26.42	30
CH11	14	14.14	14.05	17.11	20.79	20.61	23.71	30
CH12	1.5	1.81	1.76	4.80	8.31	8.17	11.25	30
CH13	0	-0.64	-0.38	2.51	6.09	5.96	9.04	30
11ac 40MHz								Channel Power
CH03	11	10.89	11.10	14.01	17.77	17.71	20.75	30
CH06	17	16.94	17.09	20.03	23.28	23.17	26.24	30
CH09	9	8.95	9.08	12.03	15.85	15.70	18.79	30
CH10	9.5	9.45	9.11	12.29	16.35	16.21	19.29	30
CH11	0.5	0.57	1.43	4.03	7.59	7.42	10.52	30

	AV Output Power		PK Output Power	CDD mode FCC Conducted Power Limit(dBm)
	SET	Meter AV (dBm)	Meter PK (dBm)	
BT		CHAN 0	CHAN 0	
GFSK				Channel Power
CH00	8	5.55	5.57	30
CH39	8	6.21	6.39	30
CH78	8	6.54	6.73	30
8DPSK				Channel Power
CH00	8	5.03	7.74	30
CH39	8	5.67	8.21	30
CH78	8	6.01	8.44	30
BTLE				Channel Power
CH00	Default	2.13	2.32	30
CH19	Default	2.53	2.56	30
CH39	Default	2.29	2.46	30

1.2 Transmit Power Measurement (5GHz)

1.2.1 Limits of Transmit Power Measurement

Frequency Band	EUT Category		Limit
5.150 ~ 5.250GHz	☐	OEM devices installed in Vehicles	Maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm Transmitter power control (TPC) capability: 3 dB below the maximum permitted e.i.r.p. of 30 mW
	☒	Other devices	Maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm
5.250 ~ 5.350GHz	☐	OEM devices installed in Vehicles	Maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm Transmitter power control (TPC) capability: 3 dB below the maximum permitted e.i.r.p. of 30 mW
	☒	Other devices	Conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm EIRP shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm
5.470 ~ 5.600GHz 5.650 ~ 5.725GHz	☒		Conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm EIRP shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm
5.725 ~ 5.850GHz	☒		Conducted output power shall not exceed 1 W.

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

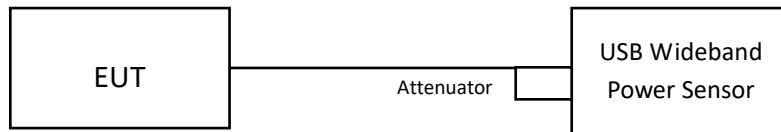
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

1.2.2 Test Setup



1.2.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
USB Wideband Power Sensor	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 13, 2020	Jul. 12, 2021

1.2.4 Test Procedure

For Average Power Measurement

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst and set the detector to AVERAGE. Duty factor is not added to measured value. So, if test was not using gated power meter, then duty factor must be added to adjust average output power result while duty cycle <98%.

1.2.5 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

1.2.6 Test Result

	SET	Meter AV (dBm)		AV Power(dBm)
		CHAN 0	CHAN 1	TOTAL
5G 15.407				
11a				
CH36 5180	15	13.23	13.00	16.13
CH40 5200	16	14.78	14.71	17.76
CH48 5240	16	14.68	14.64	17.67
CH52 5260	16.5	14.43	14.29	17.37
CH60 5300	15.5	14.55	14.46	17.52
CH64 5320	15	13.53	13.36	16.46
CH100 5500	15	13.11	12.90	16.02
CH116 5580	16	14.67	14.66	17.68
CH140 5700	14	13.51	13.28	16.41
CH144 5720	14.5	14.48	14.41	17.46
5G 11 ac 20MHz				
CH36 5180	15.5	13.30	13.12	16.22
CH40 5200	16.5	14.57	14.55	17.57
CH48 5240	16	14.55	14.47	17.52
CH52 5260	17	14.75	14.44	17.61
CH60 5300	15.5	14.57	14.56	17.58
CH64 5320	15	13.70	13.46	16.59
CH100 5500	14.5	12.66	12.60	15.64
CH116 5580	17	14.92	14.81	17.88
CH140 5700	13.5	13.20	13.04	16.13
CH144 5720	15.5	14.69	14.59	17.65
5G 11 ac 40MHz				
CH38 5190	11	8.72	8.61	11.68
CH46 5230	15	13.90	13.81	16.87
CH54 5270	15	13.91	13.86	16.90
CH62 5310	13.5	11.42	11.10	14.28
CH102 5510	11	8.96	8.72	11.85
CH118 5590	16.5	13.85	13.64	16.76
CH134 5670	13	13.03	12.65	15.86
CH142 5710	14.5	14.32	14.3	17.32
5G 11n AC 80MHz				
CH42 5210	11	7.88	7.65	10.78
CH58 5290	11	9.37	9.23	12.31
CH106 5530	11.5	9.38	9.21	12.31
CH122 5610	15.5	13.18	13.02	16.11
CH138 5690	14	13.73	13.61	16.68

	SET	Meter AV (dBm)		AV Power(dBm)
		CHAN 0	CHAN 1	TOTAL
5G 15.407				
11a				
CH149 5745	14	13.16	12.94	16.06
CH157 5785	16.5	15.44	15.16	18.31
CH165 5825	16	14.67	14.35	17.53
5G 11 ac 20MHz				
CH149 5745	12.5	12.03	11.78	14.92
CH157 5785	16.5	15.40	15.14	18.28
CH165 5825	15.5	14.39	14.10	17.26
5G 11 ac 40MHz				
CH151 5755	10	9.33	8.88	12.12
CH159 5795	15	14.62	14.30	17.47
5G 11 AC 80MHz				
CH155 5775	9	7.85	7.61	10.74