



1 CO-LOCATION

1.1 Transmitter Radiated Unwanted Emissions

1.1.1 Transmitter Radiated Unwanted Emissions Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

1.1.2 Measuring Instruments

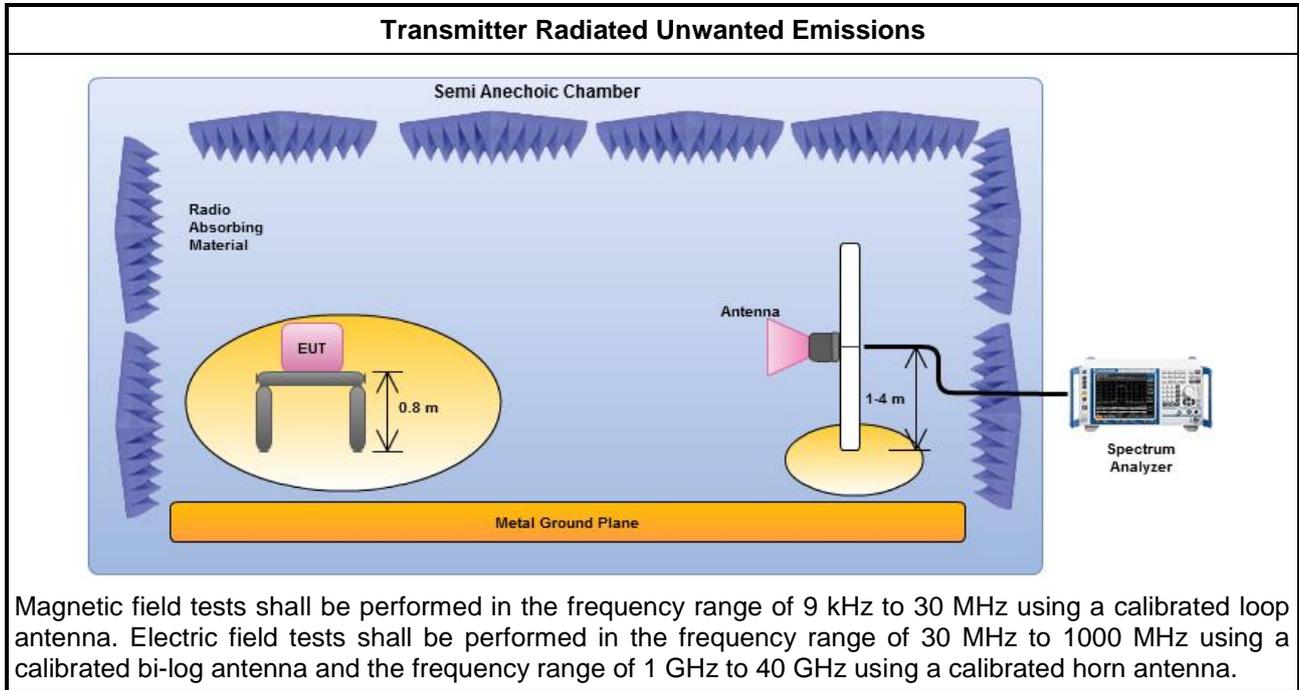
Refer a test equipment and calibration data table in this test report.



1.1.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
<input type="checkbox"/>	Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input type="checkbox"/>	Measurements in the frequency range above 18 GHz - 25GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW \geq 1/T, where T is pulse time.
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 12.2.3 measurement procedure peak limit.
<input checked="" type="checkbox"/>	For radiated measurement, refer as ANSI C63.10,
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.

1.1.4 Test Setup



1.1.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.



1.1.6 Results of Radiated Emissions (30MHz~1GHz)

Transmitter Radiated Unwanted Emissions (Below 1GHz)										
Operating Mode	AC Power & Radio link (WLAN), Adapter 2			Polarization	V					
Operating Function	WLAN 5GHz and 2.4GHz									

The graph plots Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (30 to 1000). A red line represents the FCC CLASS-B limit, which is 45 dBuV/m from 30 MHz to 100 MHz, 43.5 dBuV/m from 100 MHz to 200 MHz, 46 dBuV/m from 200 MHz to 1000 MHz, and 54 dBuV/m from 1000 MHz to 10000 MHz. Six data points are marked with blue vertical lines and numbered 1 through 6, corresponding to the table below.

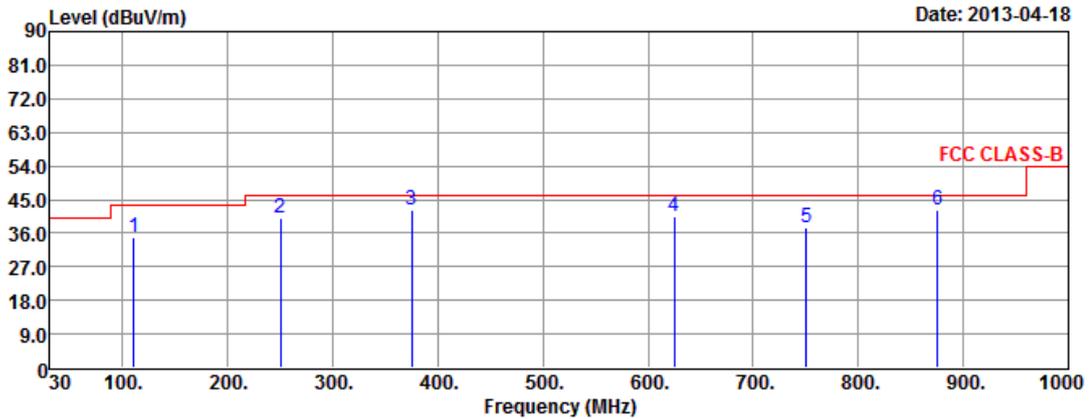
Date: 2013-04-18

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	35.82	36.33	-3.67	40.00	51.39	15.89	0.67	31.62	---	---	QP
2	43.58	36.96	-3.04	40.00	56.58	11.22	0.70	31.54	---	---	QP
3	142.52	38.79	-4.71	43.50	57.58	11.20	1.27	31.26	---	---	Peak
4	375.32	42.03	-3.97	46.00	55.82	15.06	2.16	31.01	---	---	Peak
5	625.58	39.98	-6.02	46.00	47.22	20.56	2.45	30.25	---	---	Peak
6	874.87	40.71	-5.29	46.00	44.50	23.10	2.96	29.85	---	---	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)



Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Operating Mode	AC Power & Radio link (WLAN), Adapter 2	Polarization	H
Operating Function	WLAN 5GHz and 2.4GHz		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	110.51	35.09	-8.41	43.50	54.22	11.26	1.15	31.54	---	---	Peak
2	250.19	39.87	-6.13	46.00	56.54	12.62	1.61	30.90	---	---	Peak
3	375.32	42.41	-3.59	46.00	56.20	15.06	2.16	31.01	---	---	QP
4	624.61	40.29	-5.71	46.00	47.54	20.55	2.45	30.25	---	---	Peak
5	750.71	37.65	-8.35	46.00	42.71	22.39	2.73	30.18	---	---	Peak
6	875.84	42.15	-3.85	46.00	45.93	23.10	2.97	29.85	---	---	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)



1.1.7 Results for Radiated Emissions (1GHz~10th Harmonic)

Transmitter Radiated Unwanted Emissions (Below 1GHz)										
Operating Mode	DC Power & Radio link			Polarization	V					
Operating Function	WLAN 5GHz and 2.4GHz									

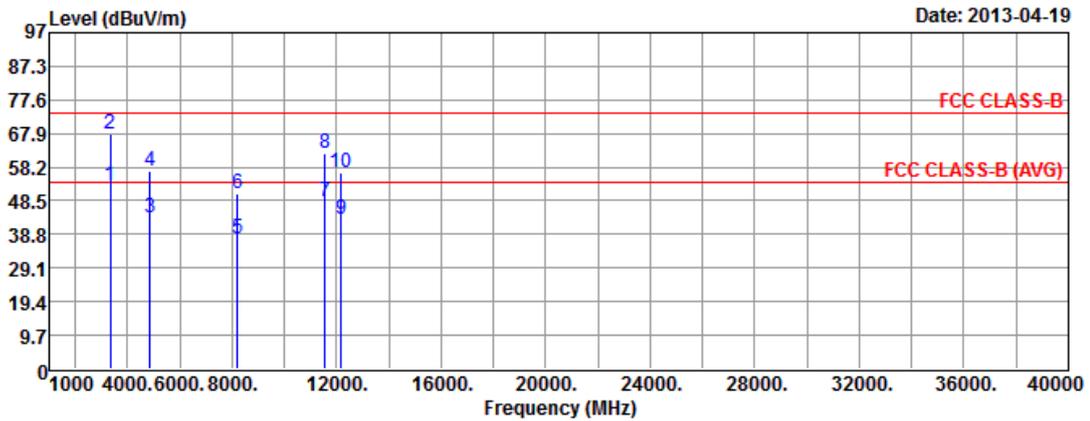
Date: 2013-04-16

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	3348.00	50.17	-3.83	54.00	47.54	32.73	5.62	35.72	---	---	Average
2	3348.00	64.92	-9.08	74.00	62.29	32.73	5.62	35.72	---	---	Peak
3	4874.00	43.58	-10.42	54.00	37.75	34.27	6.53	34.97	---	---	Average
4	4874.00	56.68	-17.32	74.00	50.85	34.27	6.53	34.97	---	---	Peak
5	8222.00	39.83	-14.17	54.00	29.69	36.14	9.09	35.09	---	---	Average
6	8222.00	52.83	-21.17	74.00	42.69	36.14	9.09	35.09	---	---	Peak
7	11570.00	47.09	-6.91	54.00	33.04	38.56	10.39	34.90	---	---	Average
8	11570.00	60.54	-13.46	74.00	46.49	38.56	10.39	34.90	---	---	Peak
9	12185.00	42.71	-11.29	54.00	27.68	39.05	10.70	34.72	---	---	Average
10	12185.00	55.82	-18.18	74.00	40.79	39.05	10.70	34.72	---	---	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions (items 3 ~5) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.



Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Operating Mode	DC Power & Radio link	Polarization	H
Operating Function	WLAN 5GHz and 2.4GHz		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	3348.00	52.87	-1.13	54.00	49.16	32.73	6.70	35.72	---	---	Average
2	3348.00	67.84	-6.16	74.00	64.13	32.73	6.70	35.72	---	---	Peak
3	4874.00	43.78	-10.22	54.00	36.76	34.27	7.72	34.97	---	---	Average
4	4874.00	56.92	-17.08	74.00	49.90	34.27	7.72	34.97	---	---	Peak
5	8222.00	37.74	-16.26	54.00	26.61	36.14	10.08	35.09	---	---	Average
6	8222.00	50.72	-23.28	74.00	39.59	36.14	10.08	35.09	---	---	Peak
7	11570.00	48.44	-5.56	54.00	31.94	38.56	12.84	34.90	---	---	Average
8	11570.00	62.03	-11.97	74.00	45.53	38.56	12.84	34.90	---	---	Peak
9	12185.00	43.01	-10.99	54.00	26.92	39.05	11.76	34.72	---	---	Average
10	12185.00	56.43	-17.57	74.00	40.34	39.05	11.76	34.72	---	---	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions (items 3 ~5) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

2 TEST EQUIPMENT AND CALIBRATION DATA

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9 kHz ~ 2.75 GHz	Mar. 26, 2013	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRO NIK	NSLK 8127	8127-477	9kHz – 30MHz	Jan. 21, 2013	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9 kHz ~ 30 MHz	Apr. 16, 2013	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	CB049	9 kHz ~ 30 MHz	Apr. 25, 2012	Conduction (CO04-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP	100055	9Kz – 40GHz	Jun. 06, 2012	Radiation (03CH05-HY)
Receiver	R&S	ESIB26	100337	20Hz – 26.5GHz	Jun.21, 2012	Radiation (03CH05-HY)
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH05-HY	30 MHz - 1 GHz 3m	N/A	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161241	1 MHz ~ 1 GHz	Feb. 26, 2013	Radiation (03CH05-HY)
Amplifier	Agilent	8449B	3008A02665	1GHz – 26.5 GHz	Aug. 28, 2012	Radiation (03CH05-HY)
Horn Antenna	ETS-LINDGREN	3117	66584	1GHz~18GHz	Aug. 09, 2012	Radiation (03CH05-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 08, 2013	Radiation (03CH05-HY)
RF Cable-R03m	Jye Bao	RG142	03CH05-HY	30 MHz - 1 GHz	Oct. 14, 2012	Radiation (03CH05-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX104	03CH05-HY	1GHz~40GHz	Oct. 14, 2012	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30 MHz - 1 GHz	Oct. 06, 2012	Radiation (03CH05-HY)
Turn Table	HD	HD100	420/611	0 - 360 degree	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	HD100	240/666	1 m - 4 m	N/A	Radiation (03CH05-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5GHz ~ 40GHz	Apr. 19, 2011	Radiation (03CH05-HY)
Loop Antenna *(note 1)	R&S	HFH2-Z2	860004/0001	9 kHz - 30 MHz	Jul. 03, 2012	Radiation (03CH05-HY)

Note: Calibration Interval of instruments listed above is two year.