

FCC PART 15 SUBPART C MEASUREMENT AND TEST REPORT

For

Measy Electronics Co., Ltd.

Rm1506, Block B, Hai Song Building, Tai Ran 9th Road, Che Gong Miao,
Shen Zhen, China

E.U.T.: Air Mouse

Model Name: RC12

Trade name: Measy

FCC ID: RB8RC12

Report Number: NTC1211019F

Test Date(s): November 01, 2012 to November 15, 2012

Report Date(s): November 15, 2012

Prepared by

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Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Dongguan NTC Co., Ltd.
The test results referenced from this report are relevant only to the sample tested.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

The Measy Electronics Co., Ltd.'s product, model name: RC12 is an Air Mouse. It's power by 3 x1.5 AAA battery. For more details features, please refer to User's Manual.

Manufacturer	: Measy Electronics Co., Ltd.
Address	: Rm1506, Block B, Hai Song Building, Tai Ran 9th Road, Che Gong Miao, Shen Zhen, China
Frequency:	: 2402-2480MHz
Modulation	: FSK
Number of Channel	: 157 Channels (See following page of channel list)
Frequency Separation	: 0.5MHz
Antenna Type	: Integral
Antenna Gain	: 0 dBi
Model name	: RC12
Note	: None

Note: According to section 15.31(m), regards to the operating frequency range over 10MHz, the lowest, middle, and the highest frequency of channel were selected to perform the test. The selected frequency see below:

The lowest frequency: 2402MHz
The middle frequency: 2441MHz
The highest frequency: 2480MHz

Channel List:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	2402	41	2422	81	2442	121	2462
2	2402.5	42	2422.5	82	2442.5	122	2462.5
3	2403	43	2423	83	2443	123	2463
4	2403.5	44	2423.5	84	2443.5	124	2463.5
5	2404	45	2424	85	2444	125	2464
6	2404.5	46	2424.5	86	2444.5	126	2464.5
7	2405	47	2425	87	2445	127	2465
8	2405.5	48	2425.5	88	2445.5	128	2465.5
9	2406	49	2426	89	2446	129	2466
10	2406.5	50	2426.5	90	2446.5	130	2466.5
11	2407	51	2427	91	2447	131	2467
12	2407.5	52	2427.5	92	2447.5	132	2467.5
13	2408	53	2428	93	2448	133	2468
14	2408.5	54	2428.5	94	2448.5	134	2468.5
15	2409	55	2429	95	2449	135	2469
16	2409.5	56	2429.5	96	2449.5	136	2469.5
17	2410	57	2430	97	2450	137	2470
18	2410.5	58	2430.5	98	2450.5	138	2470.5
19	2411	59	2431	99	2451	139	2471
20	2411.5	60	2431.5	100	2451.5	140	2471.5
21	2412	61	2432	101	2452	141	2472
22	2412.5	62	2432.5	102	2452.5	142	2472.5
23	2413	63	2433	103	2453	143	2473
24	2413.5	64	2433.5	104	2453.5	144	2473.5
25	2414	65	2434	105	2454	145	2474
26	2414.5	66	2434.5	106	2454.5	146	2474.5
27	2415	67	2435	107	2455	147	2475
28	2415.5	68	2435.5	108	2455.5	148	2475.5
29	2416	69	2436	109	2456	149	2476
30	2416.5	70	2436.5	110	2456.5	150	2476.5
31	2417	71	2437	111	2457	151	2477
32	2417.5	72	2437.5	112	2457.5	152	2477.5
33	2418	73	2438	113	2458	153	2478
34	2418.5	74	2438.5	114	2458.5	154	2478.5
35	2419	75	2439	115	2459	155	2479
36	2419.5	76	2439.5	116	2459.5	156	2479.5
37	2420	77	2440	117	2460	157	2480
38	2420.5	78	2440.5	118	2460.5		
39	2421	79	2441	119	2461		
40	2421.5	80	2441.5	120	2461.5		

1.2 Related Submittal(s) / Grant (s)

This is an application for certification of a transceiver for the wireless mouse and keyboard unit.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

The EUT has been tested as an independent unit together without and necessary accessory or support unit.

1.6 Test Mode

All test performance in normal operation and transmitting mode (TX), and keep the EUT with modulation in transmitting mode.

1.7 Test Facility and Location

Listed by FCC, August 02, 2011
The Certificate Registration Number is 665078.

Listed by Industry Canada, July 01, 2011
The Certificate Registration Number is 46405-9743.

Dongguan NTC Co., Ltd.
Building D, Gaosheng Science and Technology Park,
Hongtu Road, Nancheng District, Dongguan City,
Guangdong Province, China

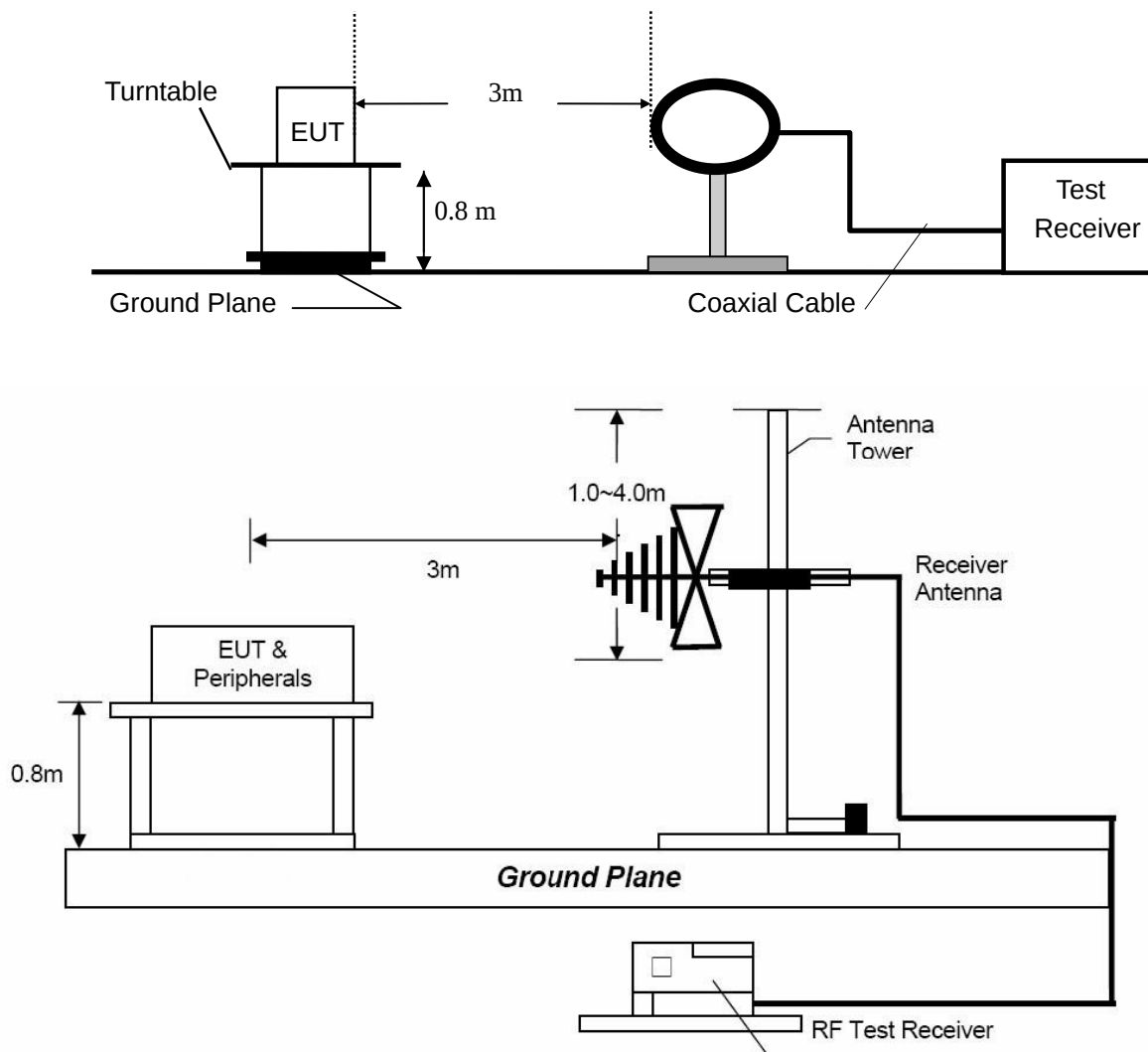
1.8 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.249(a)/15.209	Radiated Emission	Compliant
§15.249(d)/15.205	Band edge	Compliant
§15.215(c)	20dB Occupied Bandwidth	Compliant
§15.203	Antenna Requirement	Compliant

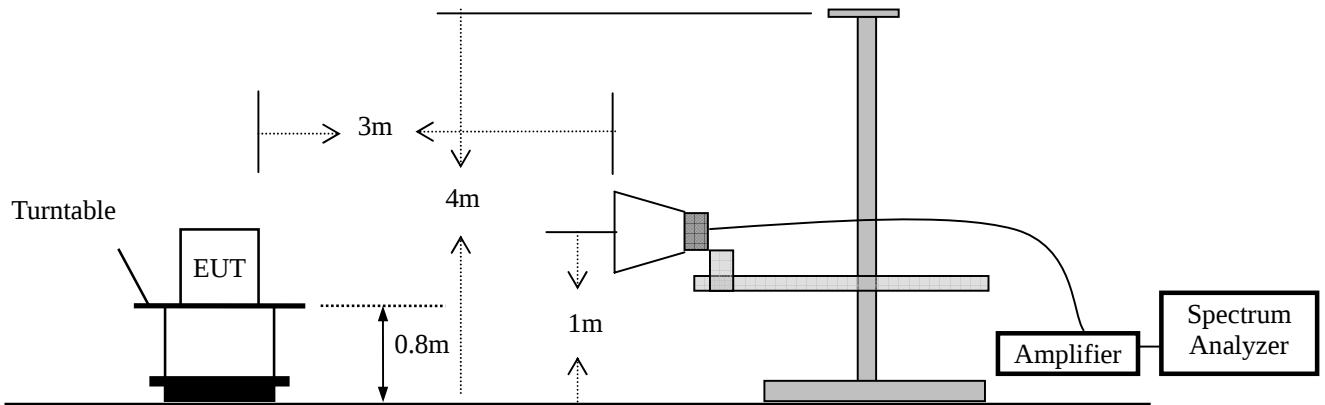
2. Radiated Emission Test

Test SET-UP (Block Diagram of Configuration)

Radiated Emission Test Set-Up, Frequency Below 1GHz



Radiated Emission Test Set-Up, Frequency above 1GHz



Measurement Procedure

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.

Limit

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)	
		$\mu\text{V/m}$	
0.009 ~ 0.490	300	2400/F(kHz)	
0.490 ~ 1.705	30	24000/F(kHz)	
1.705 ~ 30	30	30	
30 ~ 88	3	100	
88 ~ 216	3	150	
216 ~ 960	3	200	
Above 960	3	500	
Frequency range MHz	Distance Meters	Field Strengths Limit (15.249)	
		mV/m (Field strength of fundamental)	$\mu\text{V/m}$ (Field strength of Harmonics)
902 ~ 928	3	50	500
2400 ~ 2483.5	3	50	500
5725 ~ 5875	3	50	500
24000 ~ 2425000	3	250	2500

- Remark:** (1)Emission level (dB) μV =20log Emission level $\mu\text{V/m}$
(2)The smaller limit shall apply at the cross point between two frequency bands.
(3)As shown in 15.35(b), for frequency above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
(4)The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than frequency of 40 GHz, whichever is lower.

Measurement Results

Operation Mode: Normal
Frequency Range: Below 1GHz
Test Result: PASS
Measured Distance: 3m
Test Date : November 14, 2012

Temperature : 25 °C
Humidity : 50 %
Test By: Iori

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
43.5800	V	21.88	40.00	-18.12	QP
127.0000	V	16.12	43.50	-27.38	QP
322.9400	V	16.94	46.00	-29.06	QP
490.7500	V	18.24	46.00	-27.76	QP
737.1300	V	24.95	46.00	-21.05	QP
846.7400	V	27.69	46.00	-18.31	QP
108.5700	H	16.20	43.50	-27.30	QP
296.7500	H	17.13	46.00	-28.87	QP
410.2400	H	18.75	46.00	-27.25	QP
587.7500	H	24.27	46.00	-21.73	QP
755.5600	H	23.75	46.00	-22.25	QP
887.4800	H	27.25	46.00	-18.75	QP

Note: (1) Quasi-Peak detector is used except for others stated.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Measurement uncertainty : $\pm 3.7\text{dB}$
(4) The margin of the other data was larger than 10dB.

Modulation: FSK
Operation Mode: TX Mode (Low) Test Date : November 14, 2012
Frequency Range: Above 1GHz Temperature : 25 °C
Test Result: PASS Humidity : 50 %
Measured Distance: 3m Test By: Think

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2402	V	91.14	71.86	114.00	94.00	-22.86	-22.14
4804	V	55.87	36.26	74.00	54.00	-18.13	-17.74
7206	V	54.28	35.23	74.00	54.00	-19.72	-18.77
9608	V	54.19	33.95	74.00	54.00	-19.81	-20.05
2402	H	91.23	70.20	114.00	94.00	-22.77	-23.80
4804	H	54.80	34.33	74.00	54.00	-19.20	-19.67
7206	H	53.26	33.5	74.00	54.00	-20.74	-20.50
9608	H	54.32	33.02	74.00	54.00	-19.68	-20.98

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) Peak Detector Data unless otherwise stated.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Measurement uncertainty : $\pm 3.7\text{dB}$

Modulation: The worst case: GFSK
Operation Mode: TX Mode (Mid) Test Date : November 14, 2012
Frequency Range: Above 1GHz Temperature : 25 °C
Test Result: PASS Humidity : 50 %
Measured Distance: 3m Test By: Think

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2441	V	90.31	71.28	114.00	94.00	-23.69	-22.72
4882	V	53.94	34.43	74.00	54.00	-20.06	-19.57
7323	V	54.19	34.35	74.00	54.00	-19.81	-19.65
9764	V	51.28	32.69	74.00	54.00	-22.72	-21.31
2441	H	51.54	31.31	114.00	94.00	-22.46	-22.69
4882	H	54.15	34.27	74.00	54.00	-19.85	-19.73
7323	H	54.77	34.48	74.00	54.00	-19.23	-19.52
9764	H	53.65	33.55	74.00	54.00	-20.35	-20.45

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) Peak Detector Data unless otherwise stated.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Measurement uncertainty : $\pm 3.7\text{dB}$

Modulation: The worst case: GFSK
Operation Mode: TX Mode (High) Test Date : November 14, 2012
Frequency Range: Above 1GHz Temperature : 25 °C
Test Result: PASS Humidity : 50 %
Measured Distance: 3m Test By: Think

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2480	V	91.19	70.84	114.00	94.00	-22.81	-23.16
4960	V	52.23	33.13	74.00	54.00	-21.77	-20.87
7440	V	54.67	34.70	74.00	54.00	-19.33	-19.30
9920	V	53.16	33.25	74.00	54.00	-20.84	-20.75
2480	H	51.47	32.14	114.00	94.00	-22.53	-21.86
4960	H	54.28	34.38	74.00	54.00	-19.72	-19.62
7440	H	54.63	34.42	74.00	54.00	-19.37	-19.58
9920	H	52.27	33.50	74.00	54.00	-21.73	-20.50

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) Peak Detector Data unless otherwise stated.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Measurement uncertainty : $\pm 3.7\text{dB}$

3. 20dB Bandwidth

Measurement Procedure

The 20dB bandwidth of the emission was contained within the frequency band designated which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered, FCC Rule 15.215(c):

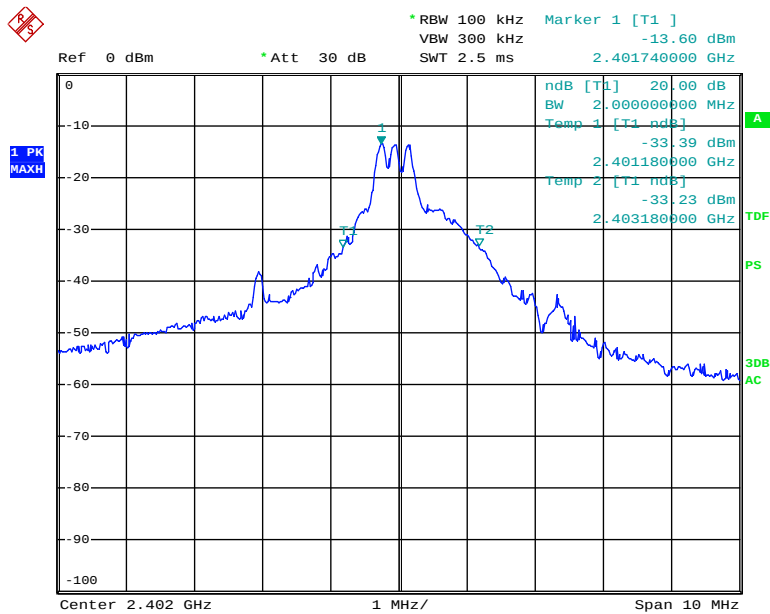
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

Measurement Results

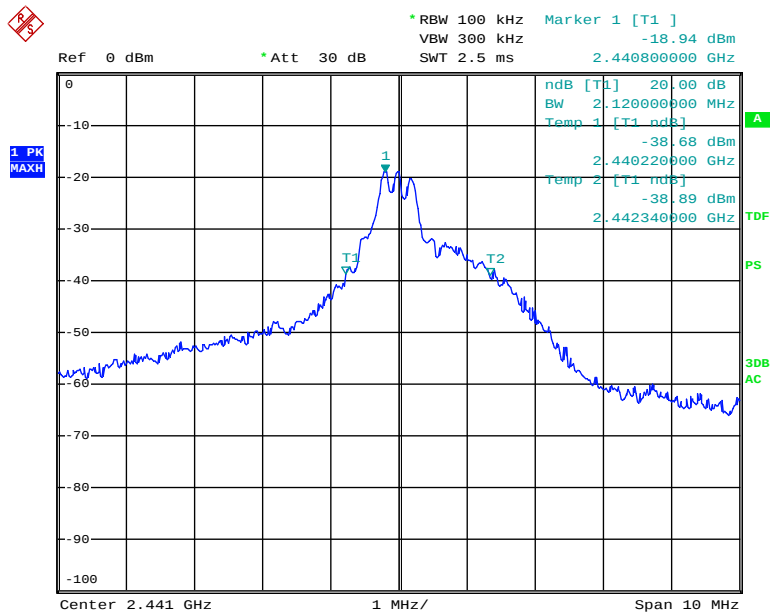
The worst case: GFSK

RBW:	100KHz	VBW:	300KHz
Spectrum Detector:	PK	Test Date :	November 01, 2012
Temperature :	25 °C	Humidity :	50 %
Test By:	Think		
Channel frequency (MHz)		20dB Down BW(kHz)	
2402		2000	
2441		2120	
2480		2200	

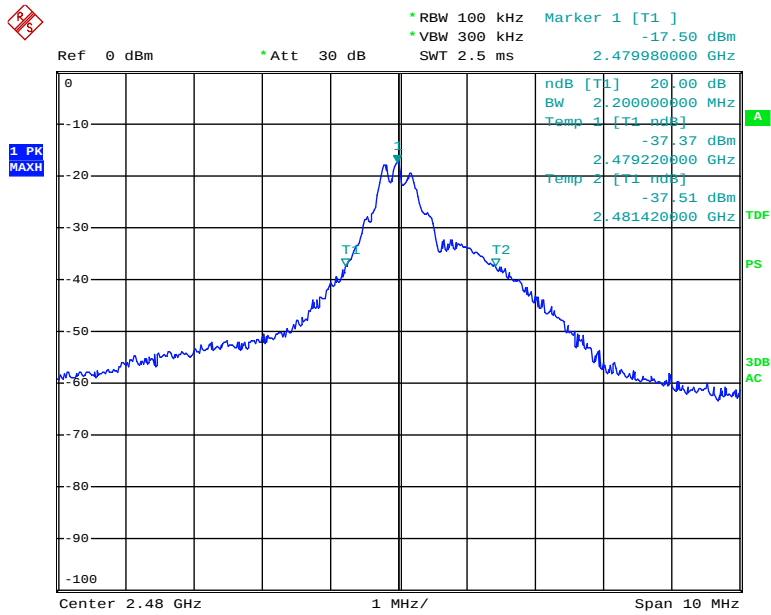
Please see below the plots.



Date: 1.NOV.2012 20:36:44



Date: 1.NOV.2012 20:30:06



Date: 1.NOV.2012 20:51:24

4. Band Edge

Measurement Procedure

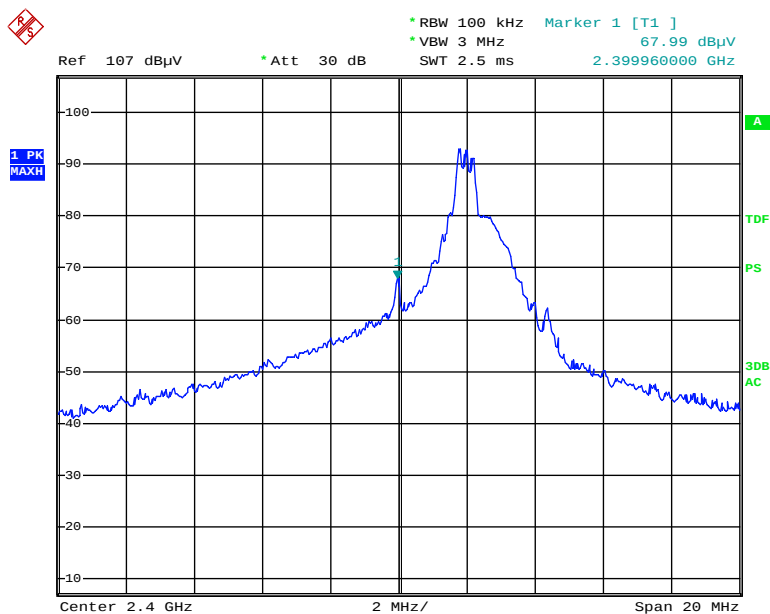
Same as Radiated Emission Test

Limit

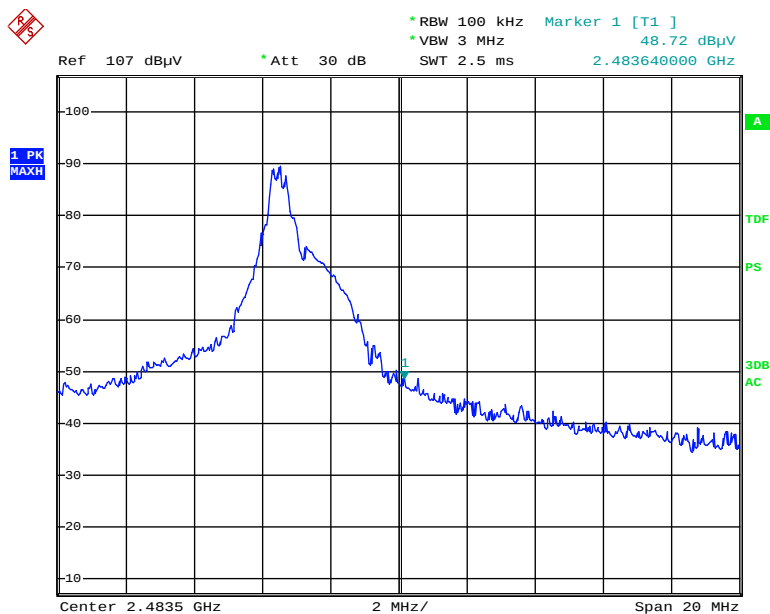
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

Measurement Results

Please see below the plots.



Note: The Peak Value is 67.99dBuV; Average Value is 47.52dBuV



Note: The Peak Value is 48.72dBuV; Average Value is 26.05dBuV

5. Antenna Application

Antenna requirement

According to of FCC part 15C section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Measurement Results

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

6. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	Nov. 06, 2012	Nov. 05, 2013
Antenna	Schwarzbeck	VULB9162	9162-010	Nov. 28, 2011	Nov. 27, 2012
Positioning Controller	UC	UC 3000	N/A	N/A	N/A
Color Monitor	SUNSP0	SP-140A	N/A	N/A	N/A
Single Phase Power Line Filter	SAEMC	PF201A-32	110210	N/A	N/A
3 Phase Power Line Filter	SAEMC	PF401A-200	110318	N/A	N/A
DC Power Filter	SAEMC	PF301A-200	110245	N/A	N/A
Cable	Huber+Suhner	CBL2-NN-1M	22320001	Nov. 06, 2012	Nov. 05, 2013
Cable	Huber+Suhner	CIL02	N/A	Nov. 06, 2012	Nov. 05, 2013
Power Amplifier	HP	HP 8447D	1145A00203	Nov. 06, 2012	Nov. 05, 2013
Horn Antenna	EMCO	3117	00062558	Oct. 19, 2012	Oct. 18, 2013
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	Oct. 24, 2012	Oct. 23, 2013
Loop antenna	Daze	ZA30900A	0708	Oct.16, 2012	Oct.15, 2013
Spectrum Analyzer	Rohde&Schwarz	ESU	100005	May 25, 2012	May 24, 2013
Power Amplifier	HP	HP 8447D	1145A00203	Nov. 06, 2012	Nov. 05, 2013
Pre-Amplifier	Agilent	8449B	3008A02964	Dec. 19, 2011	Dec. 18, 2012