



Test Report

Product Name : 2.4G Wireless Data Transceiver

Model No. : 15-2400RSK, 15-2400RS

FCC ID. : SK2-2400RS

Applicant : COP Security System Corp.

Address : 4-6F, NO.5, Lane 130, Min-Chung Rd, Hsin Tien
City, Taipei Hsien., Taiwan R.O.C. (23141)

Date of Receipt : 2011/03/25

Issued Date : 2011/04/27

Report No. : 113401R-RFUSP37V02

Report Version : V1.0

0The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

Test Report Certification

Issued Date : 2011/04/27

Report No. : 113401R-RFUSP37V02



Product Name : 2.4G Wireless Data Transceiver

Applicant : COP Security System Corp.

Address : 4-6F, NO.5, Lane 130, Min-Chung Rd, Hsin Tien City, Taipei
Hsien., Taiwan R.O.C. (23141)

Manufacturer : COP Security System Corp.

Model No. : 15-2400RSK, 15-2400RS

FCC ID. : SK2-2400RS

EUT Voltage : AC 100~240V, 50/60Hz

Trade Name : 

Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2010

Test Result : Complied

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

Documented By :

(Carol Tsai / Engineering Adm. Specialist)

Reviewed By :

(JuBo Shen / Engineer)

Approved By :

(Roy Wang / Manager)

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1. General Information

1.1. EUT Description

Product Name	2.4G Wireless Data Transceiver
Trade Name	COP COP SECURITY SYSTEM CORP.
Model No.	15-2400RSK, 15-2400RS
Frequency Range	2402~2480MHz
Channel Number	79
Type of Modulation	GFSK
Data Speed	250kbps
Antenna Gain	5dBi
Channel Control	Auto
Antenna Type	Dipole

Component	
Power Adapter	OEM, ADS0128-W 120050 I/P: 100~240V, 50~60Hz 0.5A O/P: 12V $\equiv$ 500mA Cable Out: Non-Shielded, 1.5m

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01	2402 MHz	Channel 21	2422 MHz	Channel 41	2442 MHz	Channel 61	2462 MHz
Channel 02	2403 MHz	Channel 22	2423 MHz	Channel 42	2443 MHz	Channel 62	2463 MHz
Channel 03	2404 MHz	Channel 23	2424 MHz	Channel 43	2444 MHz	Channel 63	2464 MHz
Channel 04	2405 MHz	Channel 24	2425 MHz	Channel 44	2445 MHz	Channel 64	2465 MHz
Channel 05	2406 MHz	Channel 25	2426 MHz	Channel 45	2446 MHz	Channel 65	2466 MHz
Channel 06	2407 MHz	Channel 26	2427 MHz	Channel 46	2447 MHz	Channel 66	2467 MHz
Channel 07	2408 MHz	Channel 27	2428 MHz	Channel 47	2448 MHz	Channel 67	2468 MHz
Channel 08	2409 MHz	Channel 28	2429 MHz	Channel 48	2449 MHz	Channel 68	2469 MHz
Channel 09	2410 MHz	Channel 29	2430 MHz	Channel 49	2450 MHz	Channel 69	2470 MHz
Channel 10	2411 MHz	Channel 30	2431 MHz	Channel 50	2451 MHz	Channel 70	2471 MHz
Channel 11	2412 MHz	Channel 31	2432 MHz	Channel 51	2452 MHz	Channel 71	2472 MHz
Channel 12	2413 MHz	Channel 32	2433 MHz	Channel 52	2453 MHz	Channel 72	2473 MHz
Channel 13	2414 MHz	Channel 33	2434 MHz	Channel 53	2454 MHz	Channel 73	2474 MHz
Channel 14	2415 MHz	Channel 34	2435 MHz	Channel 54	2455 MHz	Channel 74	2475 MHz
Channel 15	2416 MHz	Channel 35	2436 MHz	Channel 55	2456 MHz	Channel 75	2476 MHz
Channel 16	2417 MHz	Channel 36	2437 MHz	Channel 56	2457 MHz	Channel 76	2477 MHz
Channel 17	2418 MHz	Channel 37	2438 MHz	Channel 57	2458 MHz	Channel 77	2478 MHz
Channel 18	2419 MHz	Channel 38	2439 MHz	Channel 58	2459 MHz	Channel 78	2479 MHz
Channel 19	2420 MHz	Channel 39	2440 MHz	Channel 59	2460 MHz	Channel 79	2480 MHz
Channel 20	2421 MHz	Channel 40	2441 MHz	Channel 60	2461 MHz		

Note:

1. This device is a 2.4G Wireless Data Transceiver, which including 2.4GHz transmitting and receiving function.
2. The variation of model number is for different strategy of marketing:
15-2400RSK is for one set with two items; 15-2400RS is for single item. EUT is completely same.
3. These test results on a sample of the device are for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247.
4. Regards to the frequency band operation; the lowest 、middle and highest frequency of channel were selected to perform the test, and then shown on this report.
5. This device is a composite device in accordance with Part 15 regulations. The receiving function receiving was tested and its test report number is 113401R-RFUSP37V02 under Declaration of Conformity.

1.3. Test Mode

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode	
EMI	Mode 1: Transmit
Final Test Mode	
TX	Mode 1: Transmit

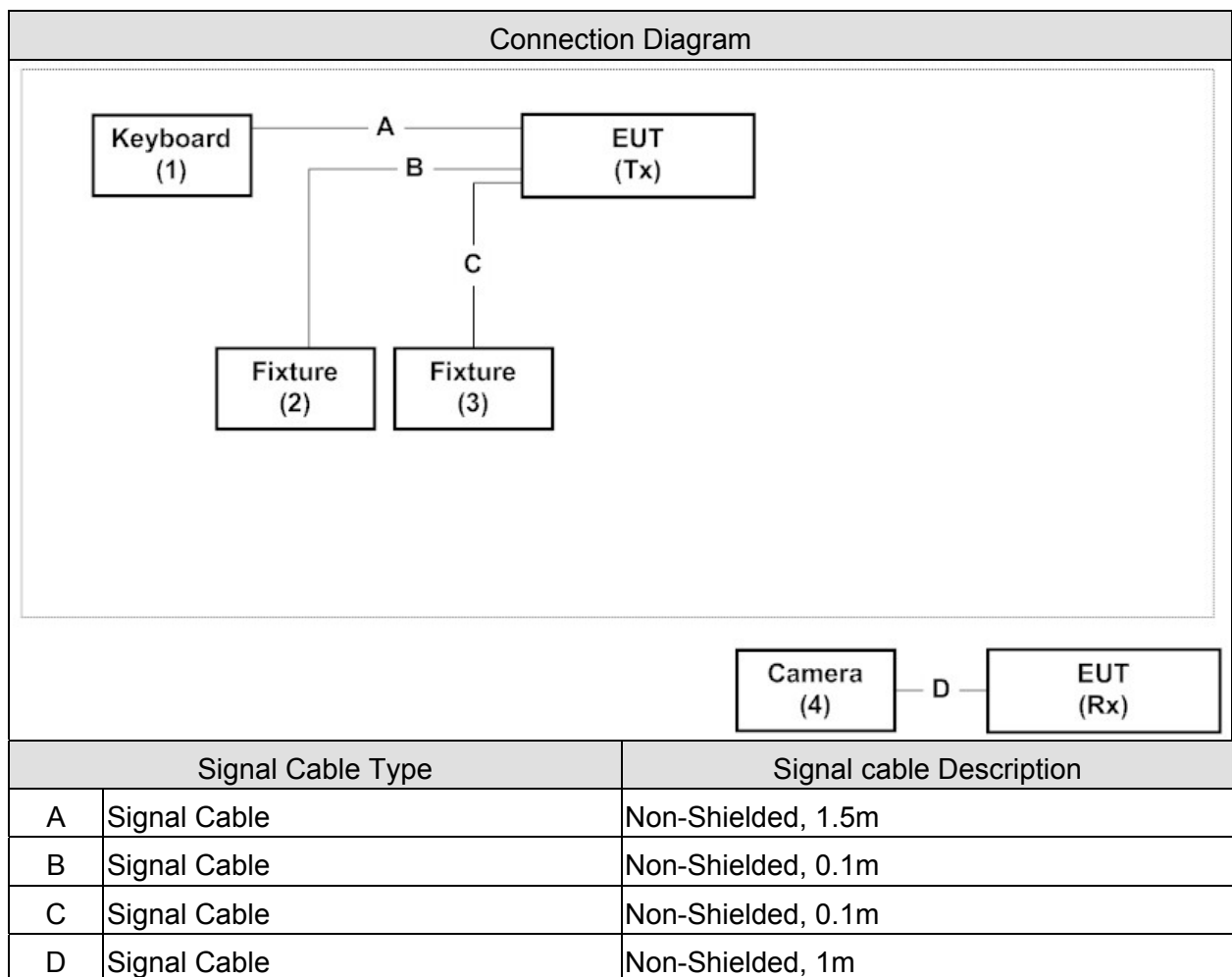
Test Items	Mode	Result
Conducted Emission	1	Complies
Peak Power Output	1	Complies
Radiated Emission	1	Complies
Band Edge	1	Complies
Occupied Bandwidth	1	Complies
Power Density	1	Complies

1.4. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1 Keyboard	COP	15-AU50H	N/A	DoC	--
2 Fixture	COP	N/A	N/A	DoC	--
3 Fixture	COP	N/A	N/A	DoC	--
4 Camera	COP	15-CD51H	N/A	DoC	--

1.5. Configuration of tested System



1.6. EUT Exercise Software

1	Setup the EUT and simulators as shown on 1.4
2	Make sure these two EUT, EUT(TX) is set to "Master" and EUT(RX) is "Slave".
3	Please hold the "Pairing KEY" of the master device until the device connected to DC12V power supply and the "Pairing LED" of master device is flashing.
4	Please do the same procedure as step (3) again for the slave device.
5	When the pairing procedure is complete, the "RF Link LED" of two devices is on.
6	RF function will continue transmit and changes specifications and channels.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.207 Conducted Emission	15 - 35	20
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Peak Power Output (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Radiated Emission (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 RF antenna conducted test (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Band Edge (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Occupied Bandwidth (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Power Density (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description: September 27, 2010 File on
Federal Communications Commission
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 365520



Accredited by TAF
Accreditation Number: 1313
Effective through: December 27, 2013



Accredited by NVLAP
NVLAP Lab Code: 200347-0
Effective through: September 30, 2011



Site Name: Quietek Corporation

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TEL : 886-3-5928858 / FAX : 886-3-5928859
E-Mail : service@quietek.com

2. Conducted Emission

2.1. Test Equipment

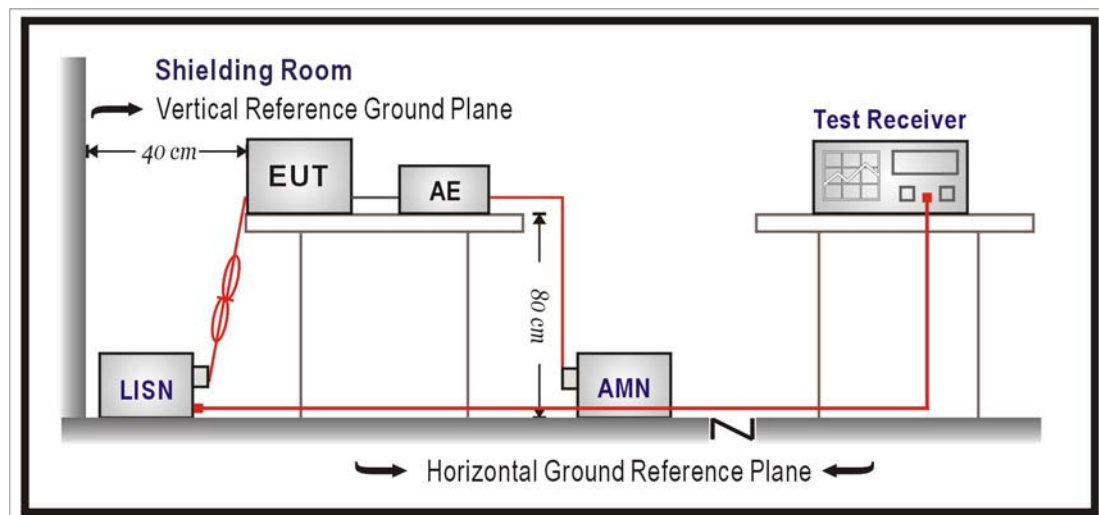
The following test equipments are used during the test:

Conducted Emission / SR2

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2012/02/29
LISN	R&S	ENV216	100092	2011/09/12
Test Receiver	R&S	ESCS 30	825442/014	2011/09/02
Quietek EMI system	Quietek	Version 2.2	SR2	N/A

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66-56	56-46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.5. Test Specification

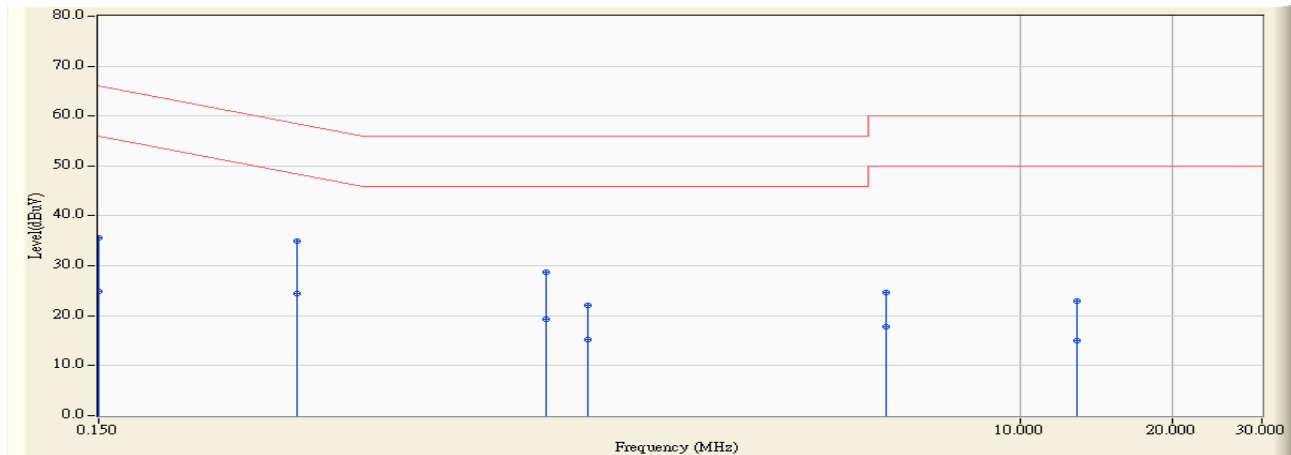
According to FCC Part 15 Subpart C Paragraph 15.207: 2010

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : SR2	Time : 2011/04/15 - 15:23
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A) - Line1	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note :

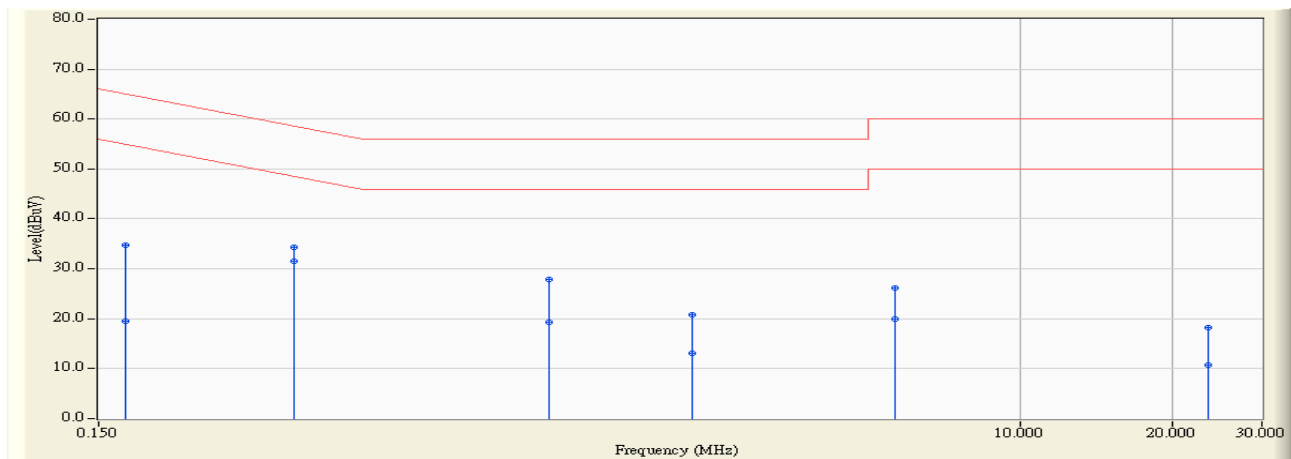


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.150	9.600	25.994	35.594	-30.406	66.000	QUASIPeAK
2		0.150	9.600	15.328	24.928	-31.072	56.000	AVERAGE
3	*	0.370	9.607	25.401	35.008	-23.493	58.501	QUASIPeAK
4		0.370	9.607	14.850	24.457	-24.044	48.501	AVERAGE
5		1.154	9.703	19.047	28.749	-27.251	56.000	QUASIPeAK
6		1.154	9.703	9.519	19.221	-26.779	46.000	AVERAGE
7		1.390	9.752	12.254	22.006	-33.994	56.000	QUASIPeAK
8		1.390	9.752	5.423	15.175	-30.825	46.000	AVERAGE
9		5.402	9.887	14.725	24.611	-35.389	60.000	QUASIPeAK
10		5.402	9.887	7.927	17.814	-32.186	50.000	AVERAGE
11		12.918	10.159	12.872	23.031	-36.969	60.000	QUASIPeAK
12		12.918	10.159	4.830	14.989	-35.011	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2	Time : 2011/04/15 - 15:25
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A) - Line2	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note :



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.170	9.600	25.071	34.671	-30.289	64.960	QUASIPeAK
2		0.170	9.600	9.910	19.510	-35.451	54.960	AVERAGE
3		0.366	9.600	24.715	34.315	-24.276	58.591	QUASIPeAK
4	*	0.366	9.600	21.847	31.447	-17.144	48.591	AVERAGE
5		1.166	9.695	18.148	27.843	-28.157	56.000	QUASIPeAK
6		1.166	9.695	9.711	19.405	-26.595	46.000	AVERAGE
7		2.234	9.788	11.104	20.892	-35.108	56.000	QUASIPeAK
8		2.234	9.788	3.315	13.103	-32.897	46.000	AVERAGE
9		5.638	9.917	16.347	26.263	-33.737	60.000	QUASIPeAK
10		5.638	9.917	10.033	19.949	-30.051	50.000	AVERAGE
11		23.442	10.682	7.537	18.219	-41.781	60.000	QUASIPeAK
12		23.442	10.682	0.000	10.682	-39.318	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. Peak Power Output

3.1. Test Equipment

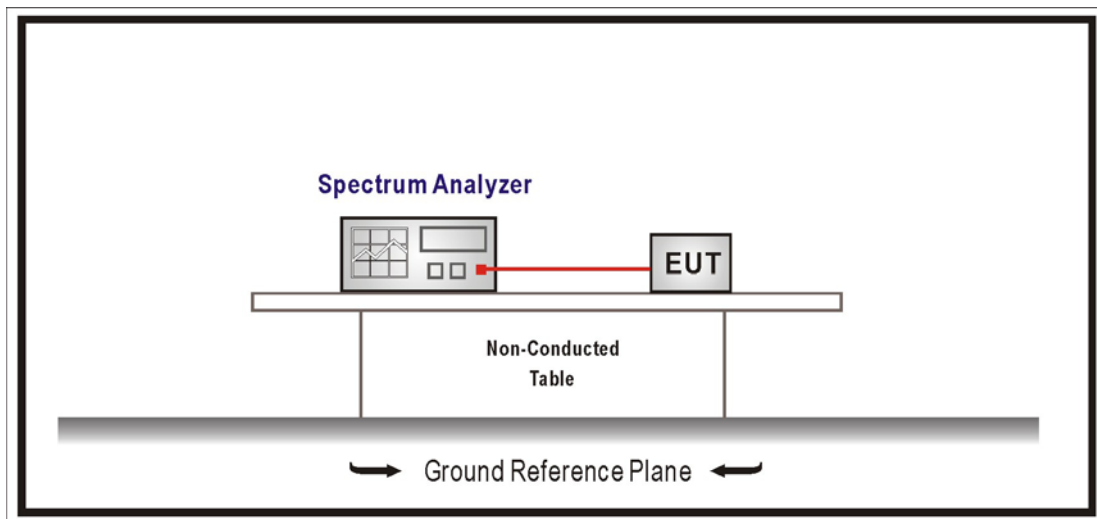
The following test equipment is used during the test:

Peak Power / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2012/01/16

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

3.2. Test Setup



3.3. Test procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements Power Output Option 2: **Method #2**

3.4. Limits

The maximum peak power shall be less 1 Watt.

3.5. Uncertainty

The measurement uncertainty is defined as ± 1.27 dB.

3.6. Test Result

Product	2.4G Wireless Data Transceiver		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmit		
Date of Test	2011/03/31	Test Site	SR7

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2402	18.138	1Watt= 30 dBm	Pass
40	2441	18.363	1Watt= 30 dBm	Pass
79	2480	17.669	1Watt= 30 dBm	Pass

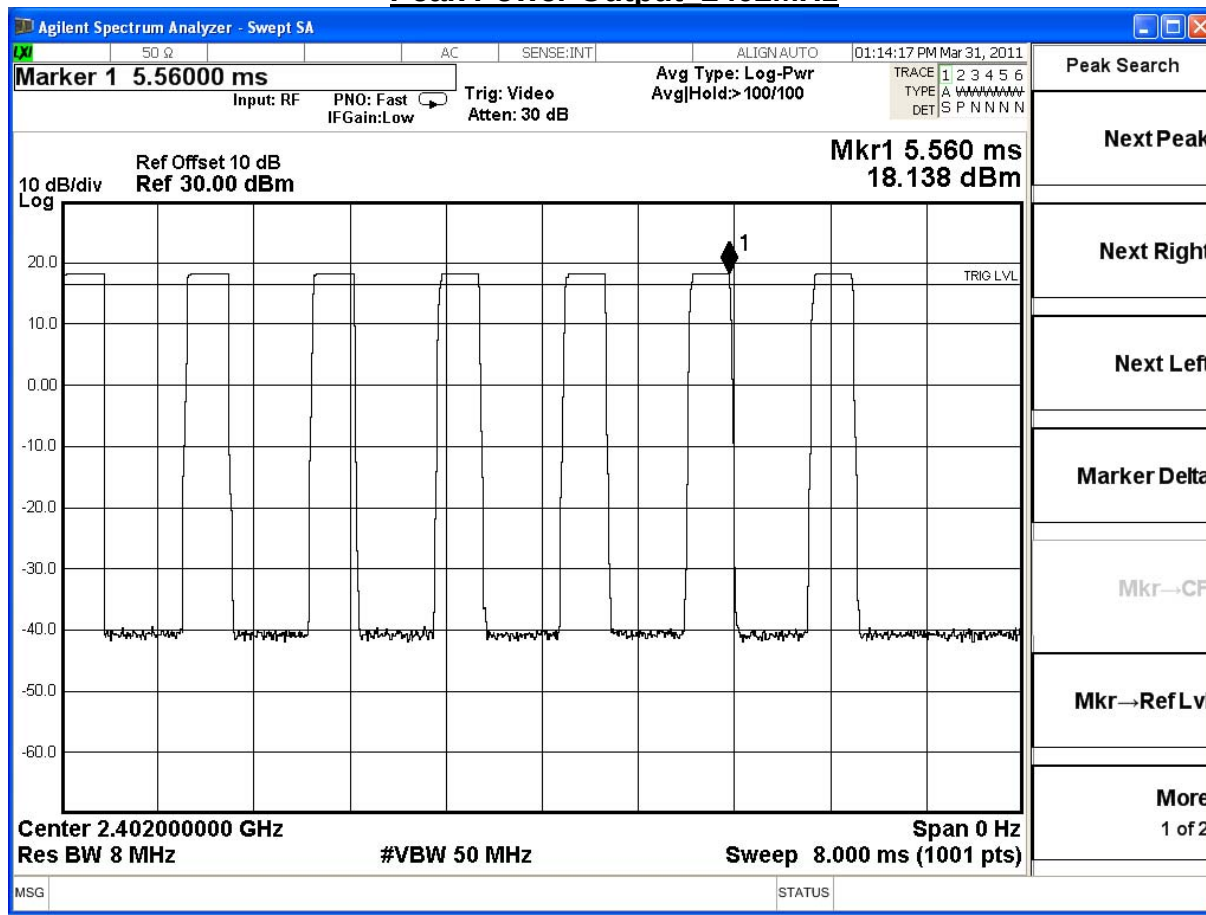
T = the transmission pulse duration
= 368(us) x 7(No. of pulse) = 2576(us) = 2.576(ms)

Emission bandwidth = 1.129(MHz)

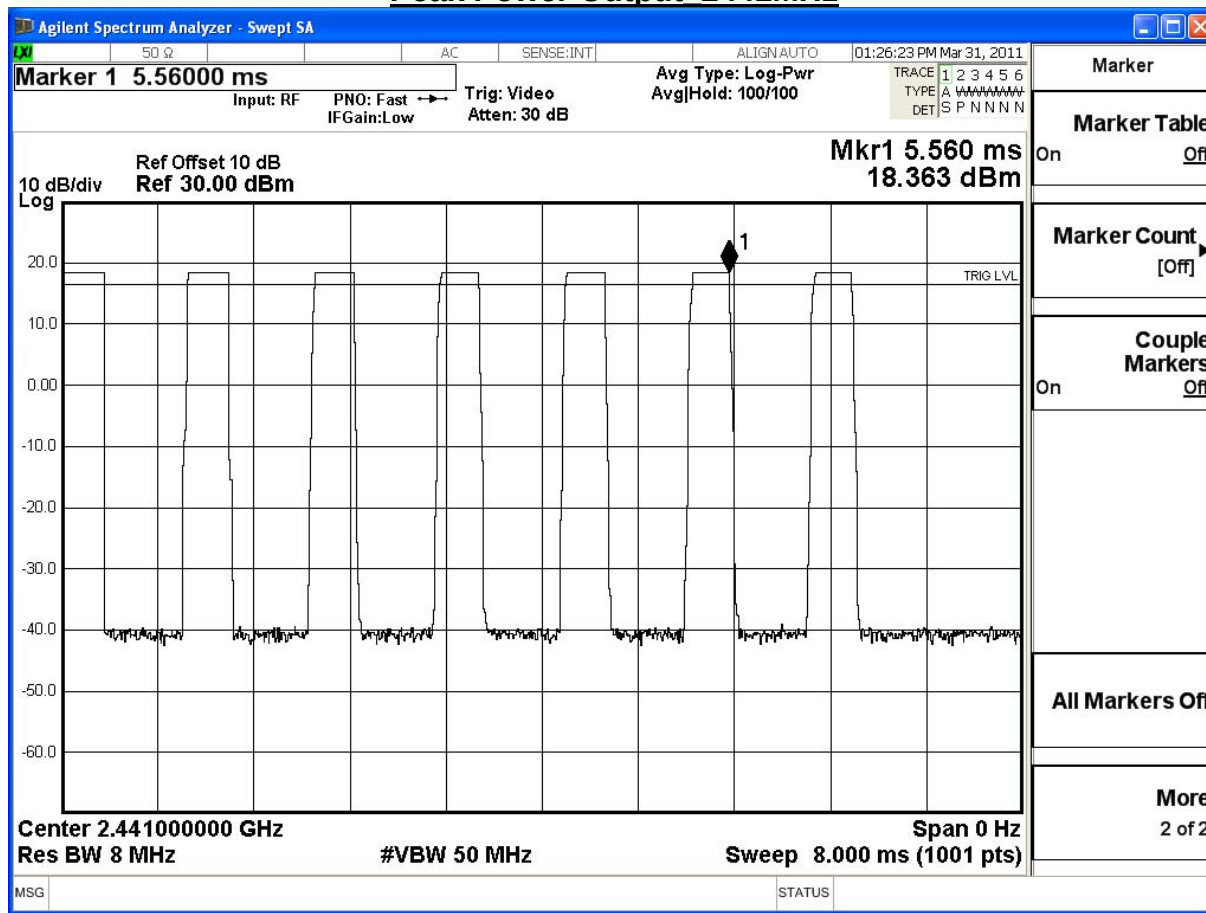
Sweep time > T

- 1.129MHz (EBW) ≤ 8MHz (largest available RBW on the analyzer)
- use Power Output Option 2, Method #2

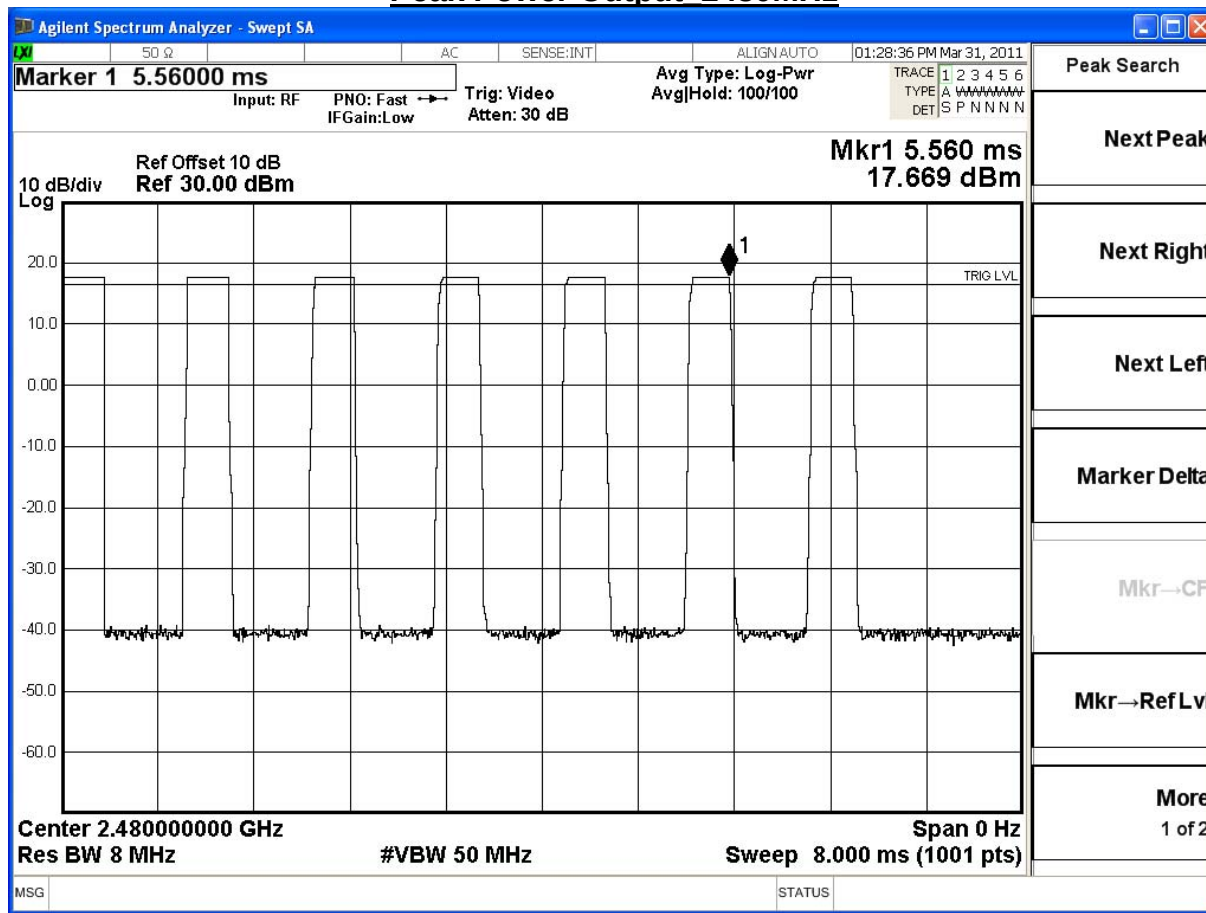
Peak Power Output 2402MHz



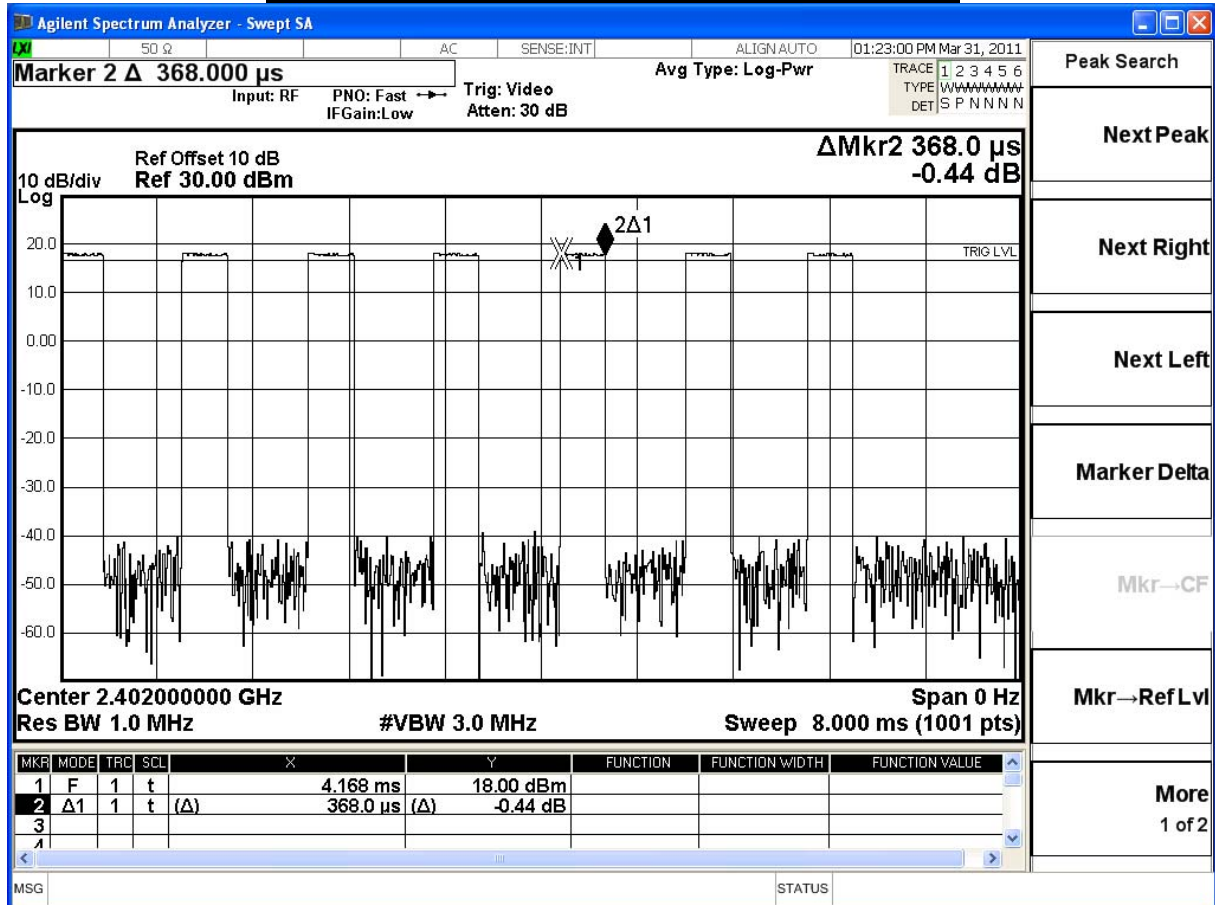
Peak Power Output 2441MHz



Peak Power Output 2480MHz

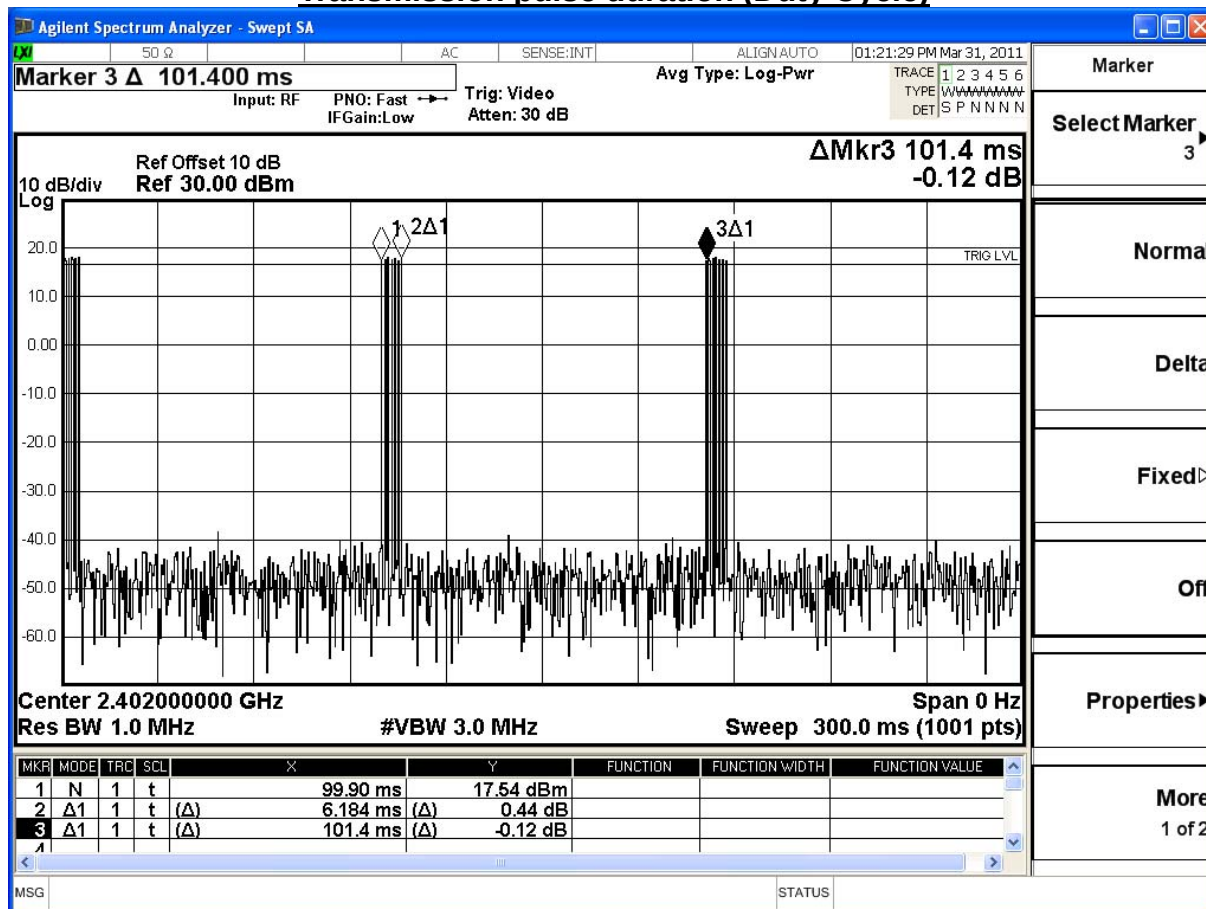


Transmission pulse duration (Power on time)



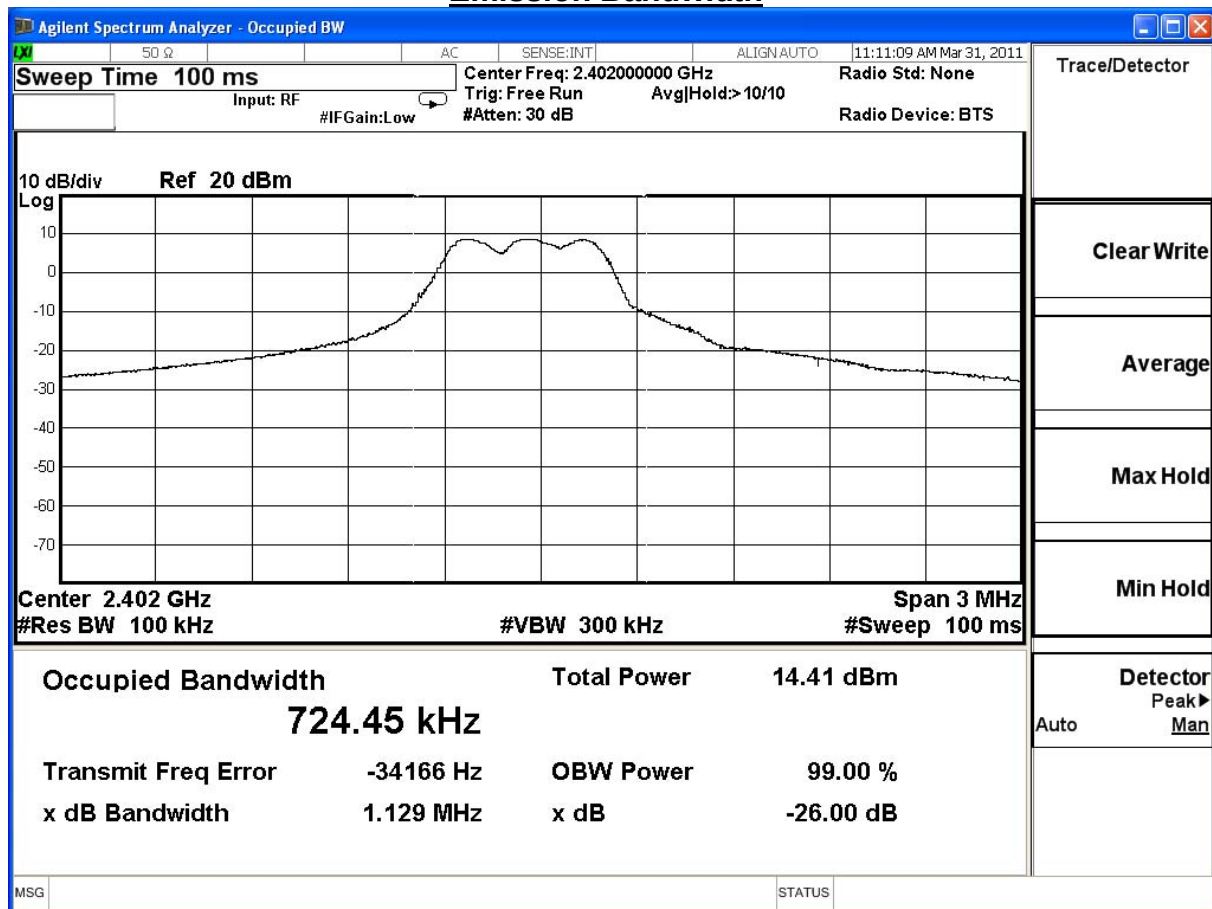
T = the transmission pulse duration
 = 368(us) x 7(No. of pulse) = 2576(us)

Transmission pulse duration (Duty Cycle)



On Time = 6.184(ms)
 On + Off Time = 101.4(ms)
 Duty Cycle = 0.061

Emission Bandwidth



Emission bandwidth = 1.129(MHz)

4. Radiated Emission

4.1. Test Equipment

The following test equipments are used during the test:

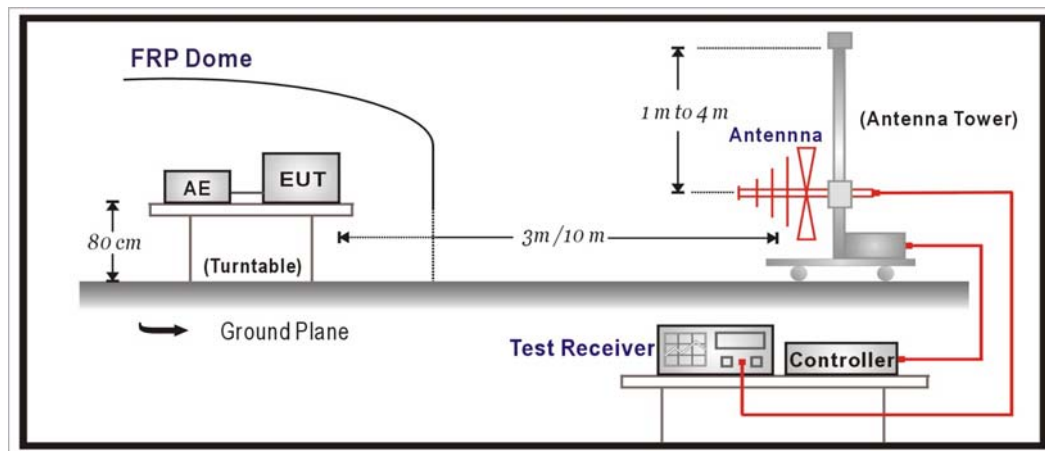
Radiated Emission / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	SCHAFFNER	CBL6112B	2895	2011/08/14
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120D	743	2012/02/24
Pre-Amplifier	MITEQ	AMF-4D-005180-24-10P	888003	2011/12/16
Pre-Amplifier	QuieTek	AP-025C	CHM-0706049	2012/03/10
PSA Series Spectrum analyzer	Agilent	E4440A	MY46187335	2012/01/06
Coaxial Cable	Huber+Suhner AG	Sucoflex 102	25623/2	2012/03/21

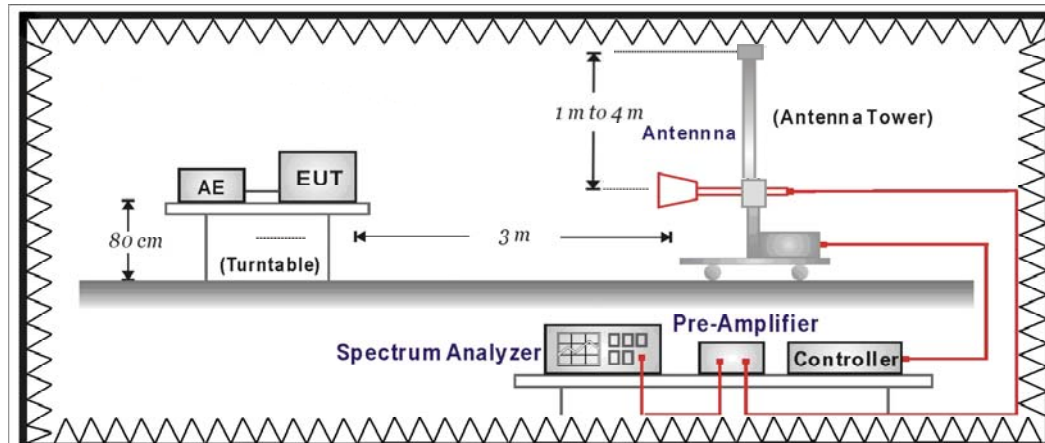
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	dBuV/m	dBuV/m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements. The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2009 on radiated measurement.

On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit. The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

4.5. Uncertainty

The measurement uncertainty

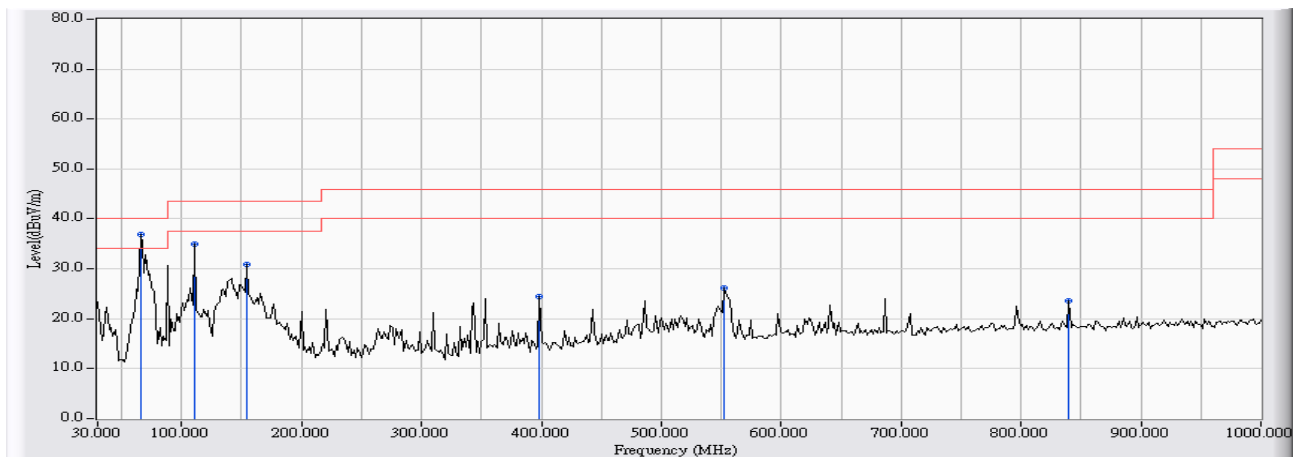
30MHz~1GHz as $\pm 3.19\text{dB}$

1GHz~26.5Ghz as $\pm 3.9\text{dB}$

4.6. Test Result

30MHz-1GHz Spurious:

Site : CB1	Time : 2011/04/17 - 17:26
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : EFS_30-1G(2010-12) - HORIZONTAL	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2441MHz

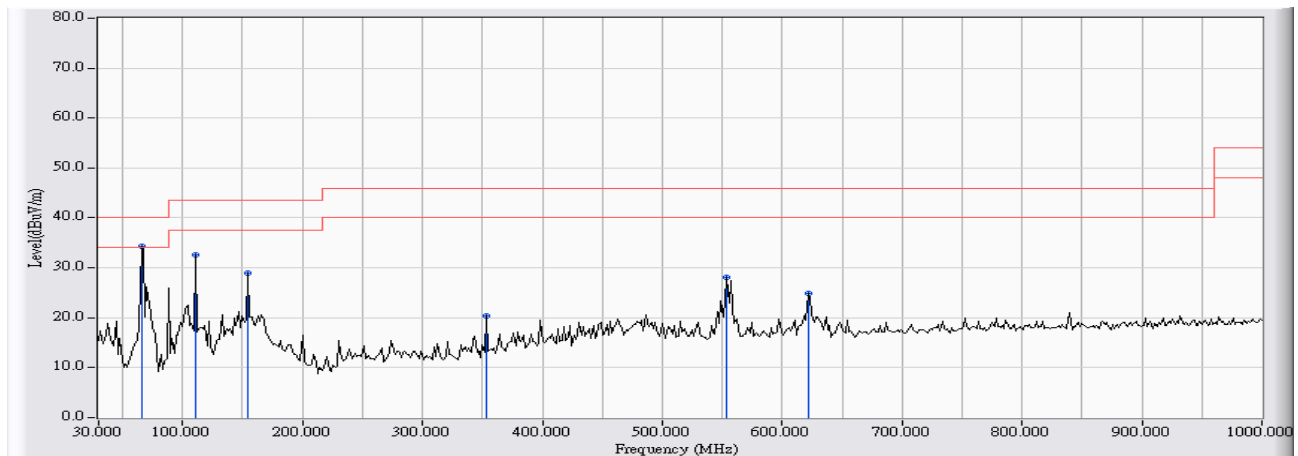


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	65.567	-18.172	55.055	36.883	-3.117	40.000	QUASIPeAK
2		110.833	-12.984	48.046	35.062	-8.438	43.500	QUASIPeAK
3		154.483	-14.067	44.897	30.830	-12.670	43.500	QUASIPeAK
4		398.600	-7.909	32.294	24.385	-21.615	46.000	QUASIPeAK
5		552.183	-5.412	31.678	26.266	-19.734	46.000	QUASIPeAK
6		839.950	-3.169	26.680	23.511	-22.489	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : CB1	Time : 2011/04/17 - 17:26
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : EFS_30-1G(2010-12) - VERTICAL	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2441MHz



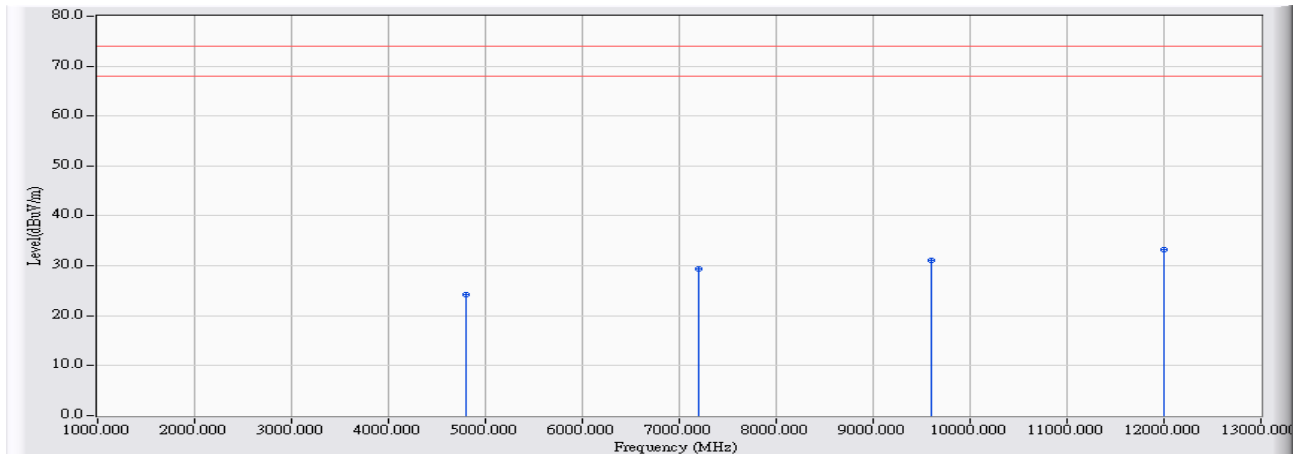
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	65.567	-18.172	52.474	34.302	-5.698	40.000	QUASIPeAK
2		110.833	-12.984	45.492	32.508	-10.992	43.500	QUASIPeAK
3		154.483	-14.067	43.007	28.940	-14.560	43.500	QUASIPeAK
4		353.333	-9.171	29.546	20.375	-25.625	46.000	QUASIPeAK
5		553.800	-5.398	33.428	28.029	-17.971	46.000	QUASIPeAK
6		621.700	-4.901	29.755	24.854	-21.146	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Harmonic & Spurious:

Site : CB1	Time : 2011/04/16 - 14:38
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - HORIZONTAL	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2402MHz

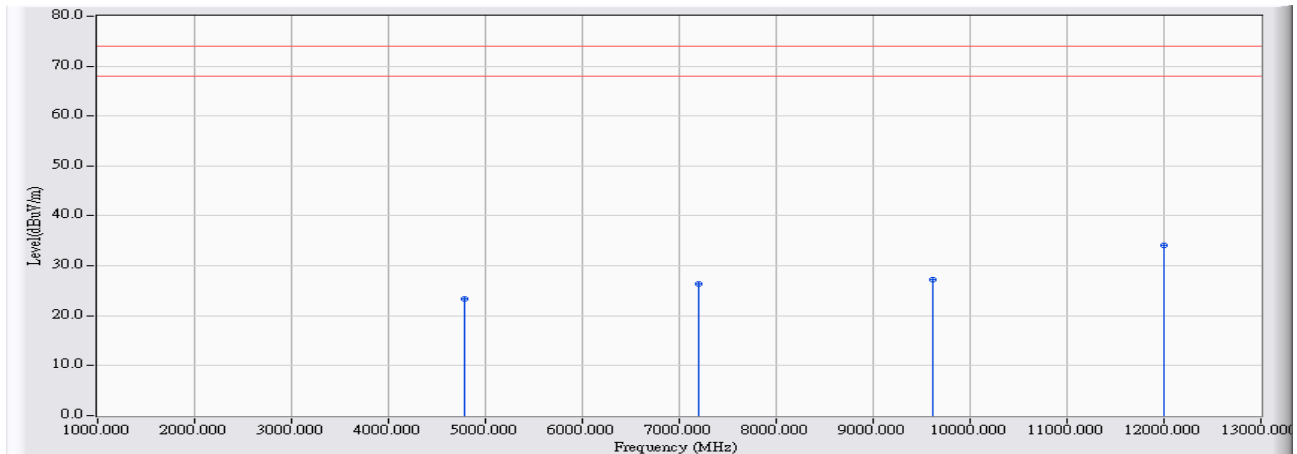


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector Type
1		4806.330	-2.800	27.140	24.341	-49.659	74.000	54.00	PEAK
2		7201.000	4.123	25.230	29.353	-44.647	74.000	54.00	PEAK
3		9603.000	6.902	24.210	31.113	-42.887	74.000	54.00	PEAK
4	*	12005.000	8.508	24.690	33.198	-40.802	74.000	54.00	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/16 - 14:40
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - VERTICAL	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2402MHz

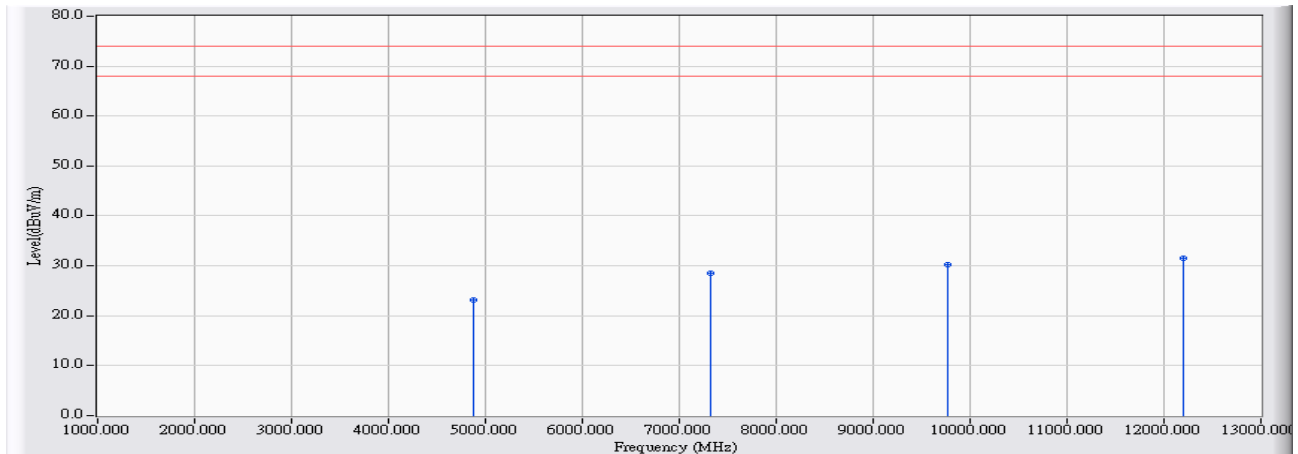


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector Type
1		4790.080	-2.847	26.180	23.333	-50.667	74.000	54.00	PEAK
2		7206.000	4.143	22.290	26.433	-47.567	74.000	54.00	PEAK
3		9608.000	6.906	20.360	27.266	-46.734	74.000	54.00	PEAK
4	*	12005.000	8.508	25.650	34.158	-39.842	74.000	54.00	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/24 - 16:33
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - HORIZONTAL	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2441MHz

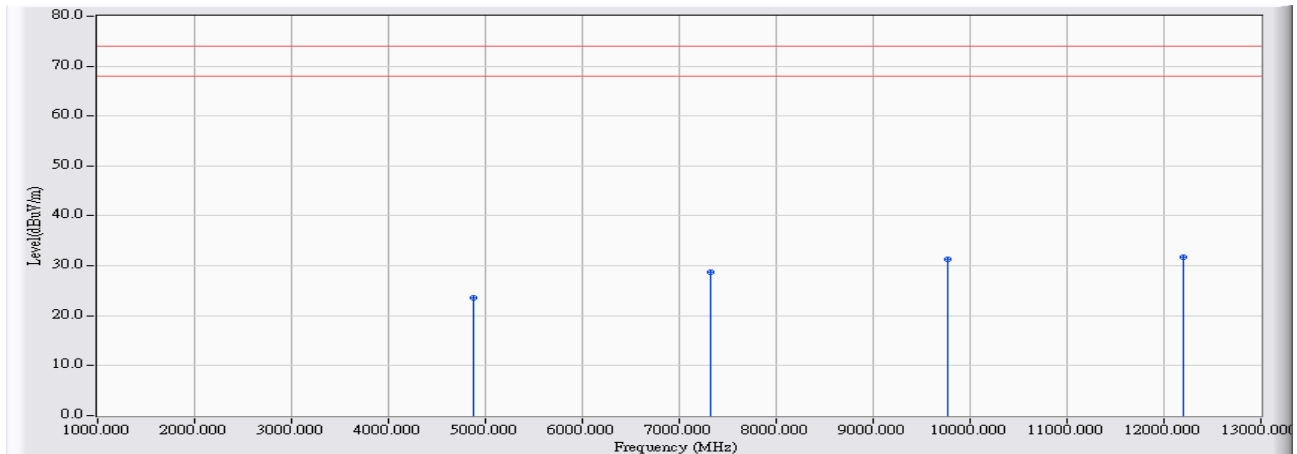


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector Type
1		4882.050	-2.577	25.782	23.205	-50.795	74.000	54.00	PEAK
2		7323.925	4.624	23.940	28.563	-45.437	74.000	54.00	PEAK
3		9762.400	7.001	23.234	30.234	-43.766	74.000	54.00	PEAK
4	*	12203.908	8.696	22.849	31.544	-42.456	74.000	54.00	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/24 - 16:33
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - VERTICAL	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2441MHz

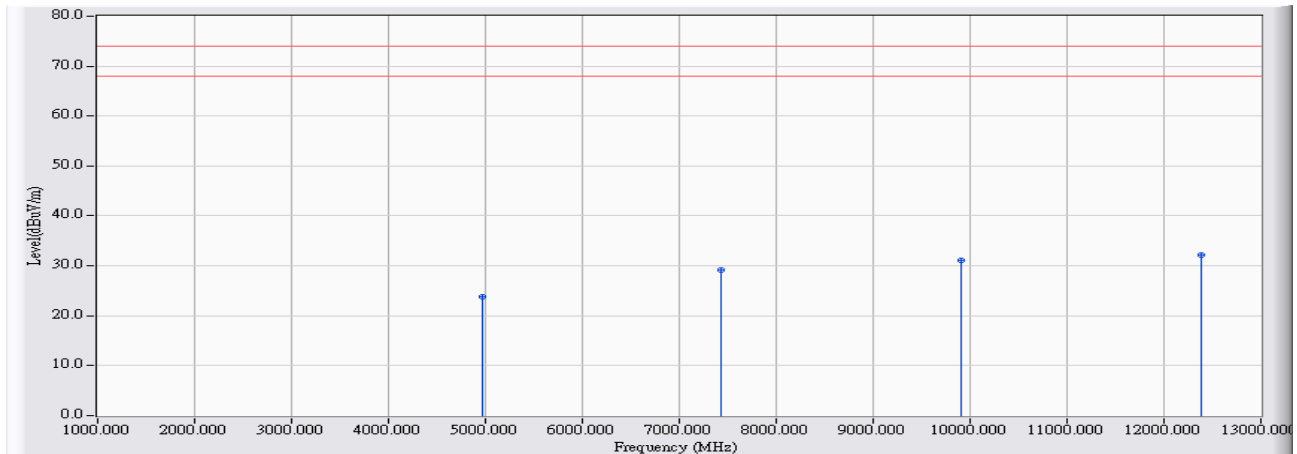


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector Type
1		4882.250	-2.577	26.130	23.554	-50.446	74.000	54.00	PEAK
2		7321.325	4.613	24.176	28.789	-45.211	74.000	54.00	PEAK
3		9764.417	7.002	24.244	31.245	-42.755	74.000	54.00	PEAK
4	*	12206.433	8.698	23.058	31.756	-42.244	74.000	54.00	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/16 - 14:43
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - HORIZONTAL	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2480MHz

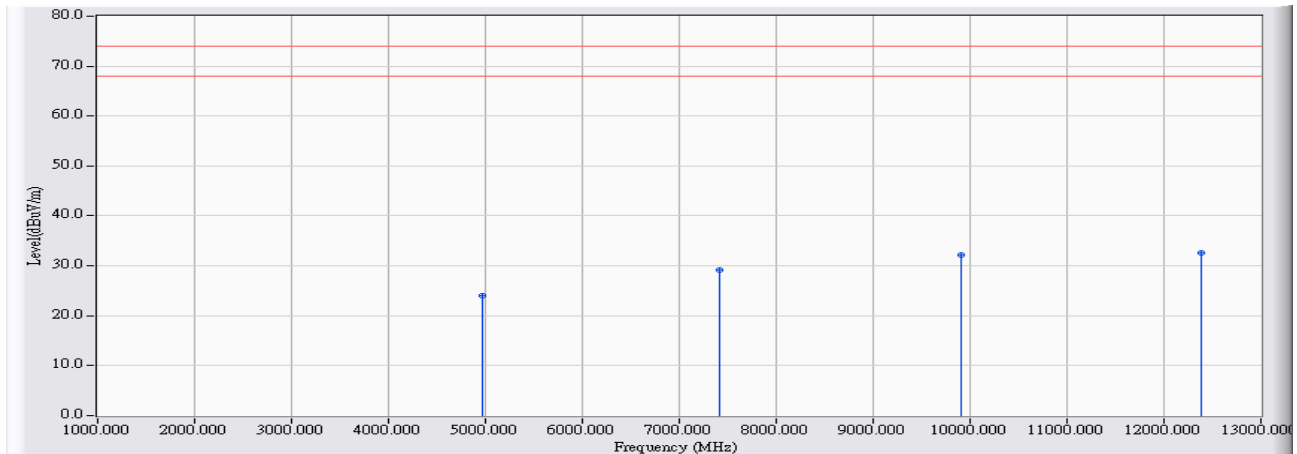


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector Type
1		4963.330	-2.339	26.190	23.851	-50.149	74.000	54.00	PEAK
2		7424.170	5.032	24.100	29.131	-44.869	74.000	54.00	PEAK
3		9913.420	7.092	24.070	31.162	-42.838	74.000	54.00	PEAK
4	*	12378.000	8.860	23.400	32.260	-41.740	74.000	54.00	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/16 - 14:44
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - VERTICAL	Power : AC120V / 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2480MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector Type
1		4969.750	-2.320	26.340	24.020	-49.980	74.000	54.00	PEAK
2		7419.670	5.013	24.100	29.113	-44.887	74.000	54.00	PEAK
3		9911.250	7.092	25.050	32.141	-41.859	74.000	54.00	PEAK
4	*	12377.170	8.859	23.800	32.659	-41.341	74.000	54.00	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

5. RF antenna conducted test

5.1. Test Equipment

The following test equipment is used during the test:

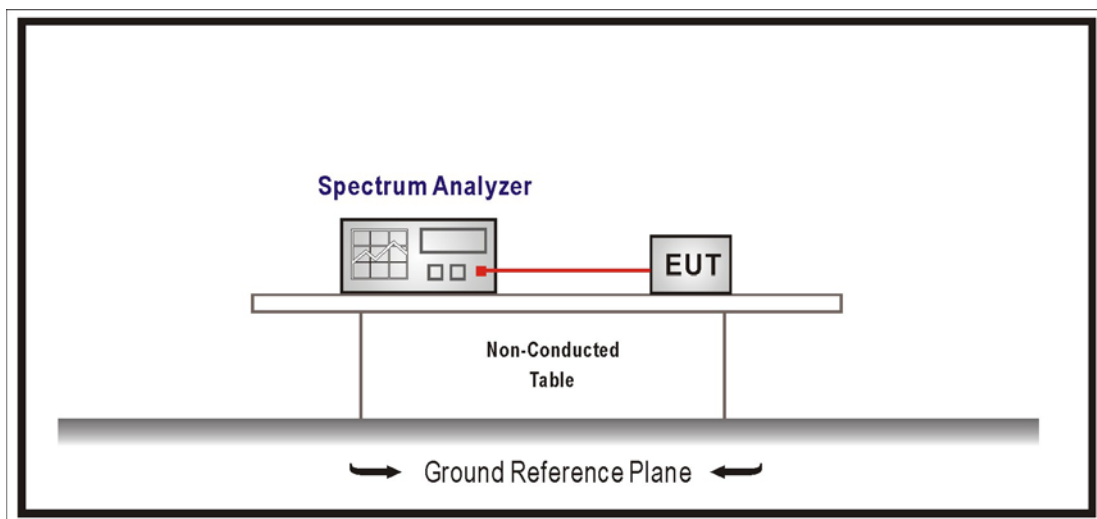
RF antenna conducted test / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2012/01/16

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

5.2. Test Setup

RF Antenna Conducted Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on an RF conducted or radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements
Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

5.5. Uncertainty

The measurement uncertainty

Conducted is defined as $\pm 1.27\text{dB}$

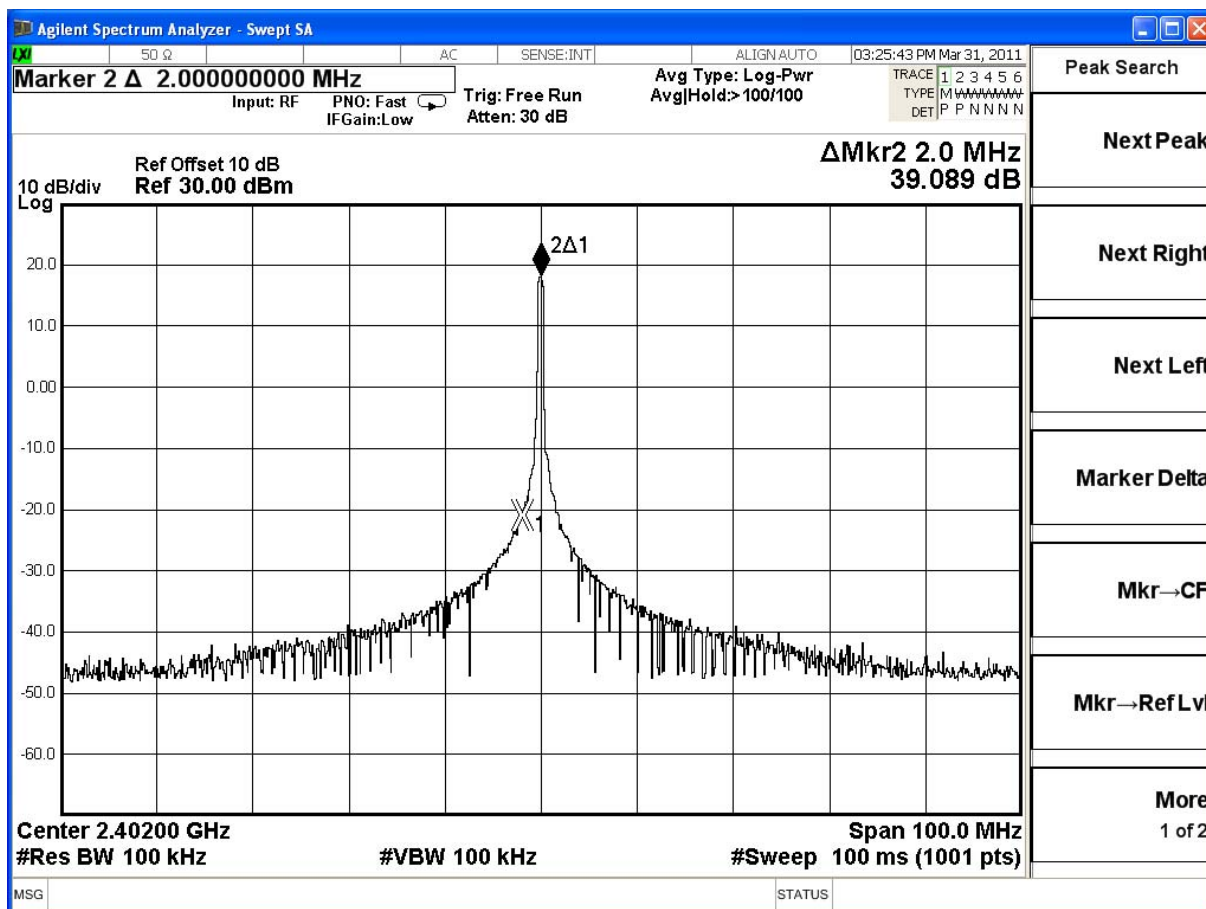
Radiated is defined as $\pm 3.9\text{dB}$

5.6. Test Result

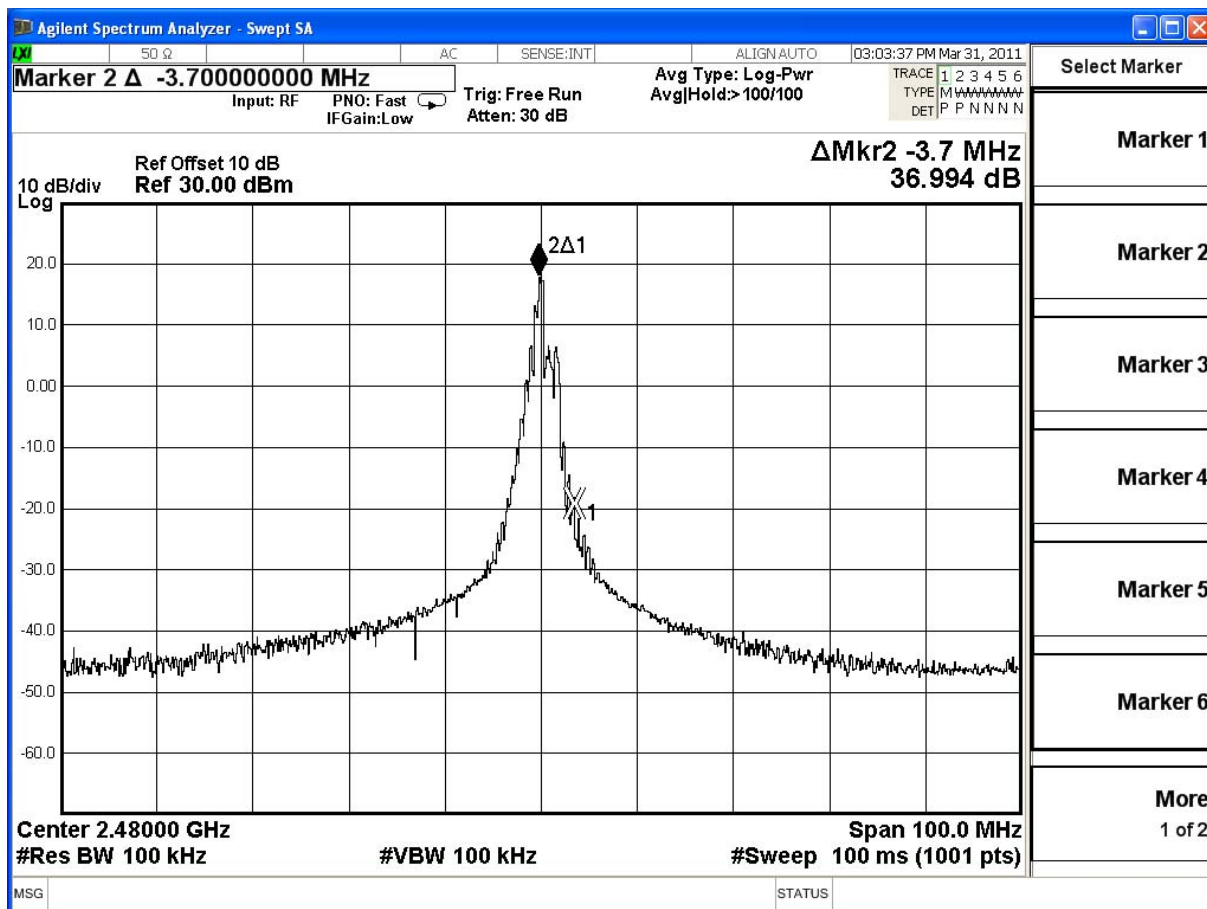
Product	2.4G Wireless Data Transceiver		
Test Item	RF antenna conducted test		
Test Mode	Transmit		
Date of Test	2011/03/31	Test Site	SR7

Channel No.	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
1	2402	39.089	≥30	Pass
79	2480	36.994	≥30	Pass

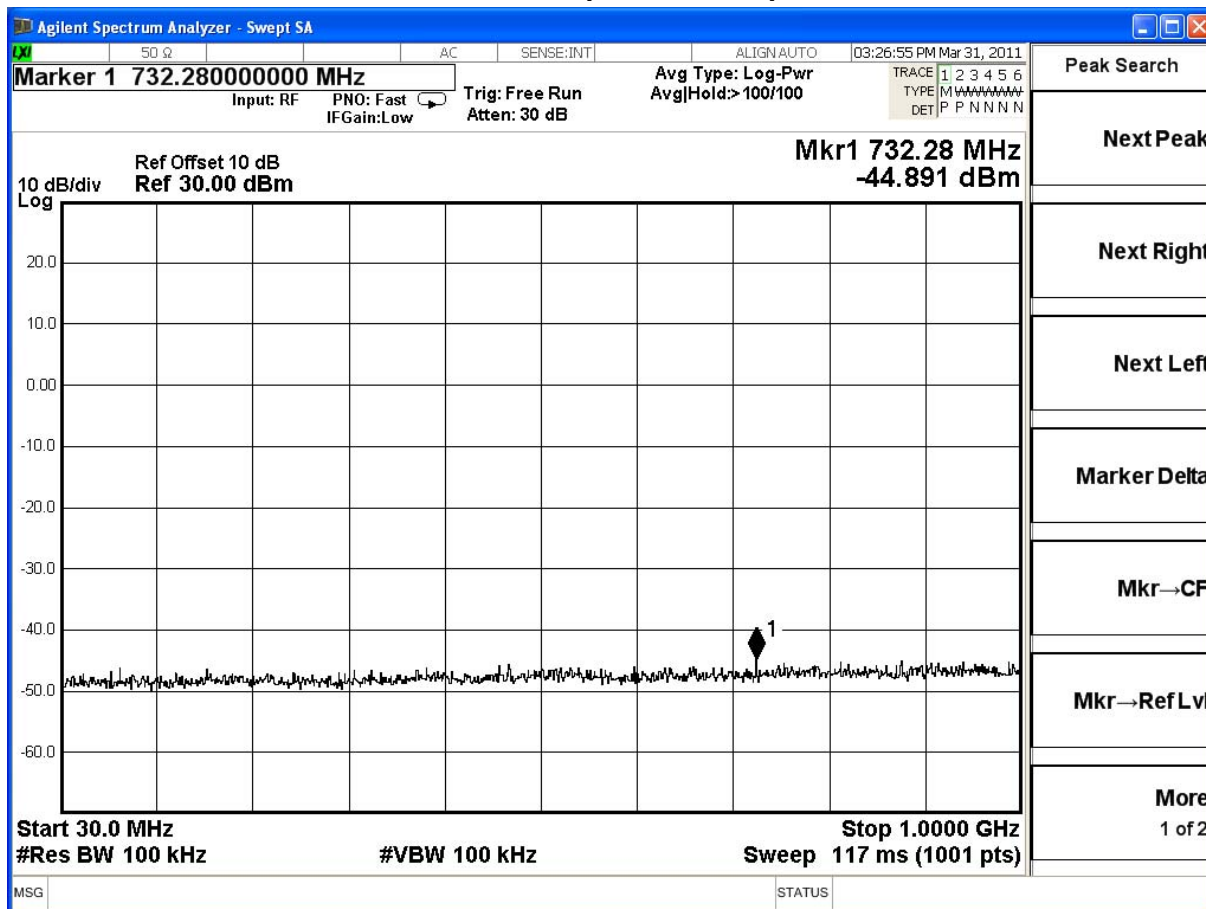
Channel 01-Bandedge



Channel 79-Bandedge



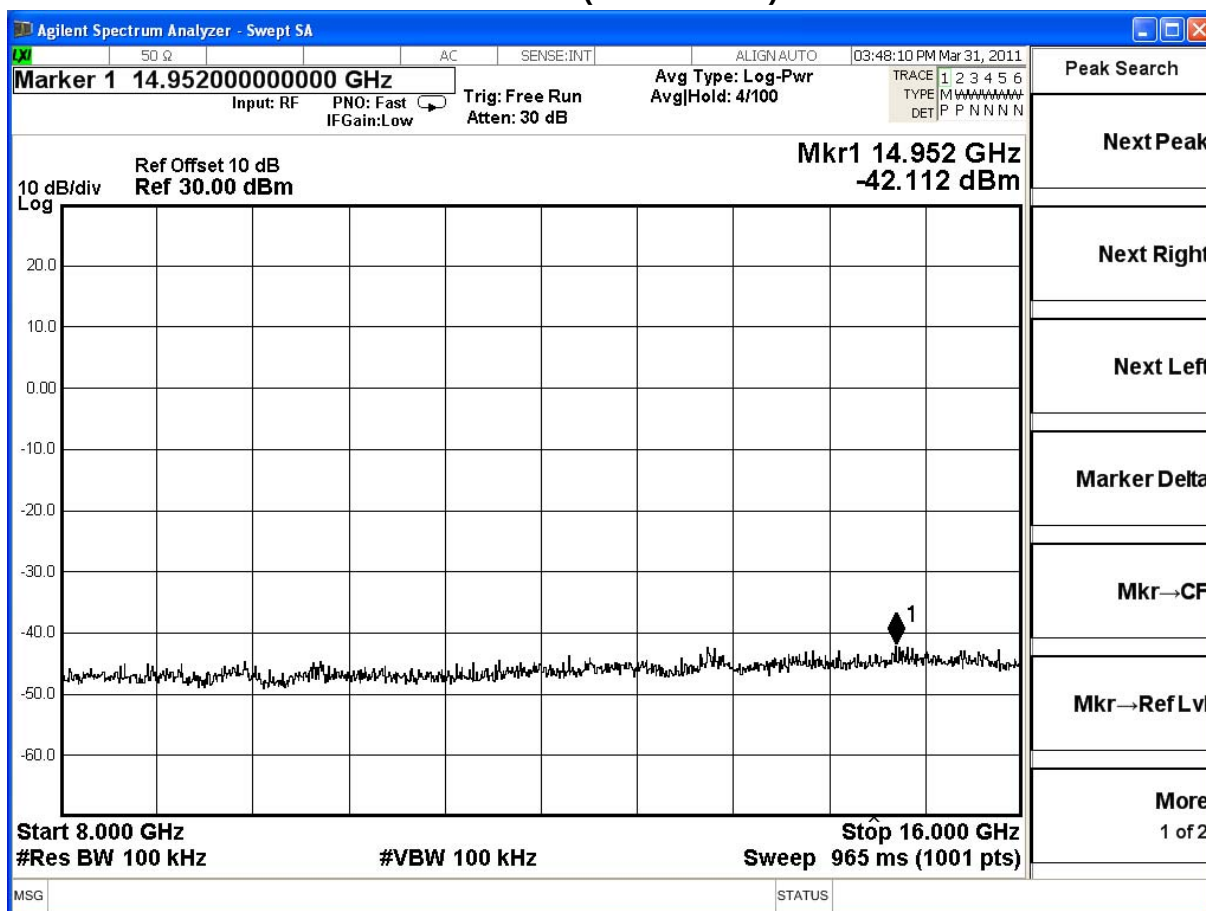
2402MHz (30MHz-1GHz)



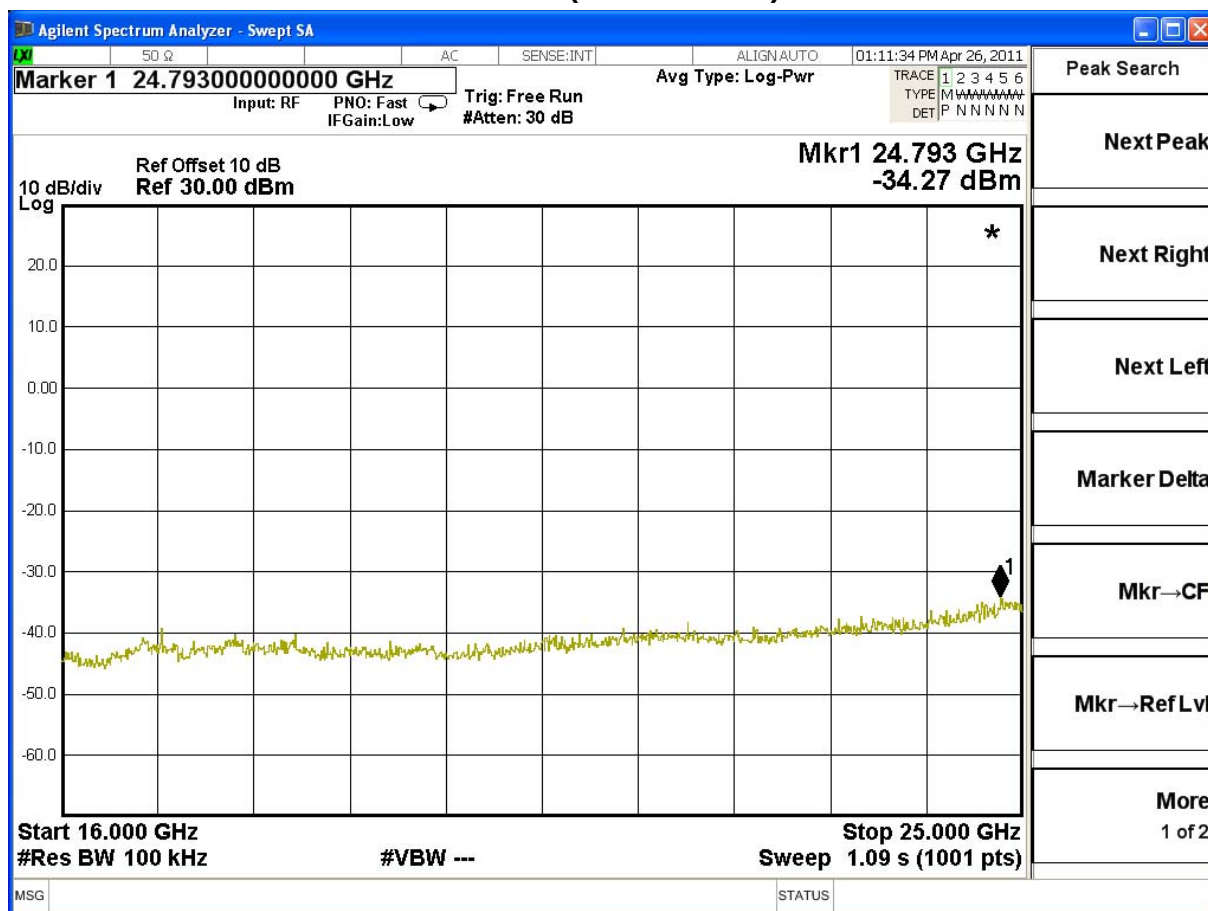
2402MHz (1GHz-8GHz)



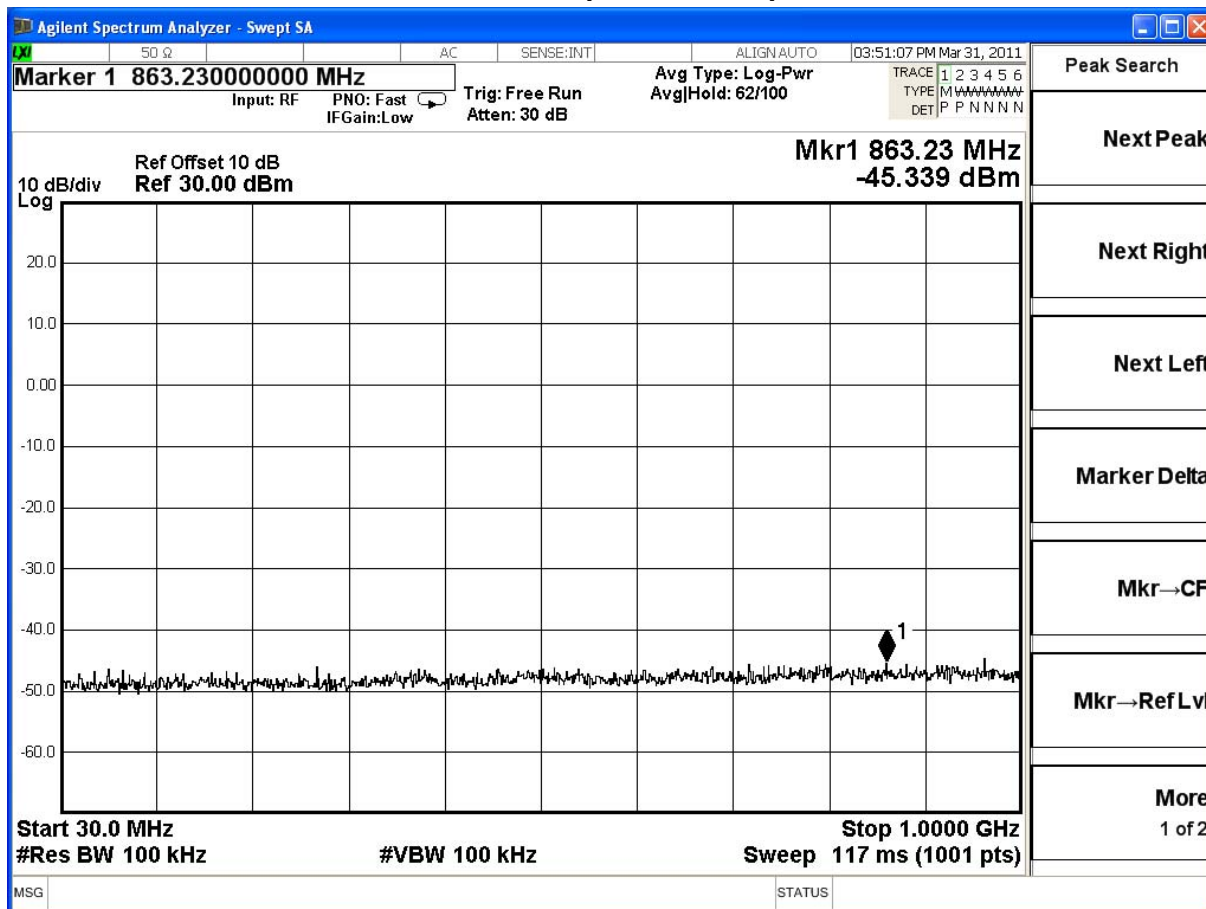
2402MHz (8GHz-16GHz)



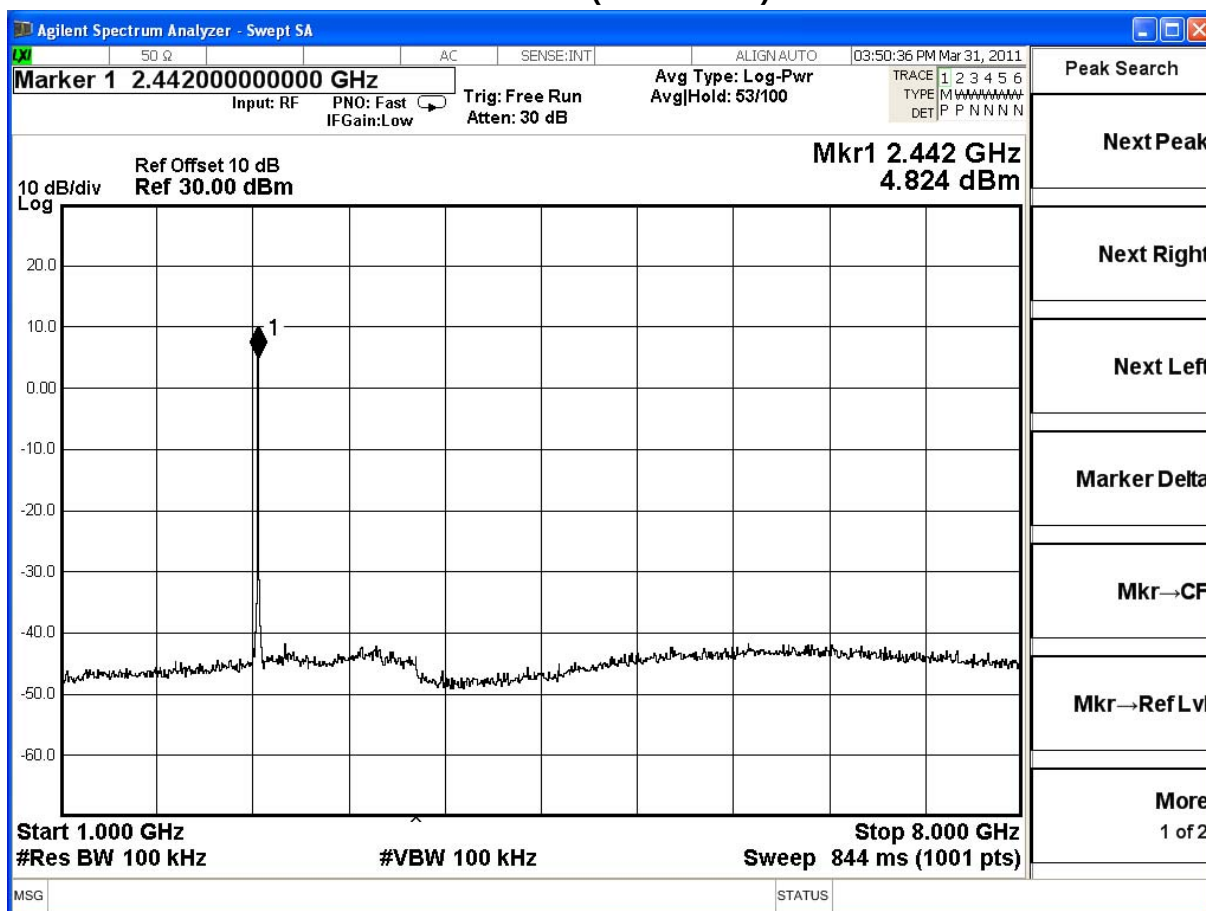
2402MHz (16GHz-25GHz)-



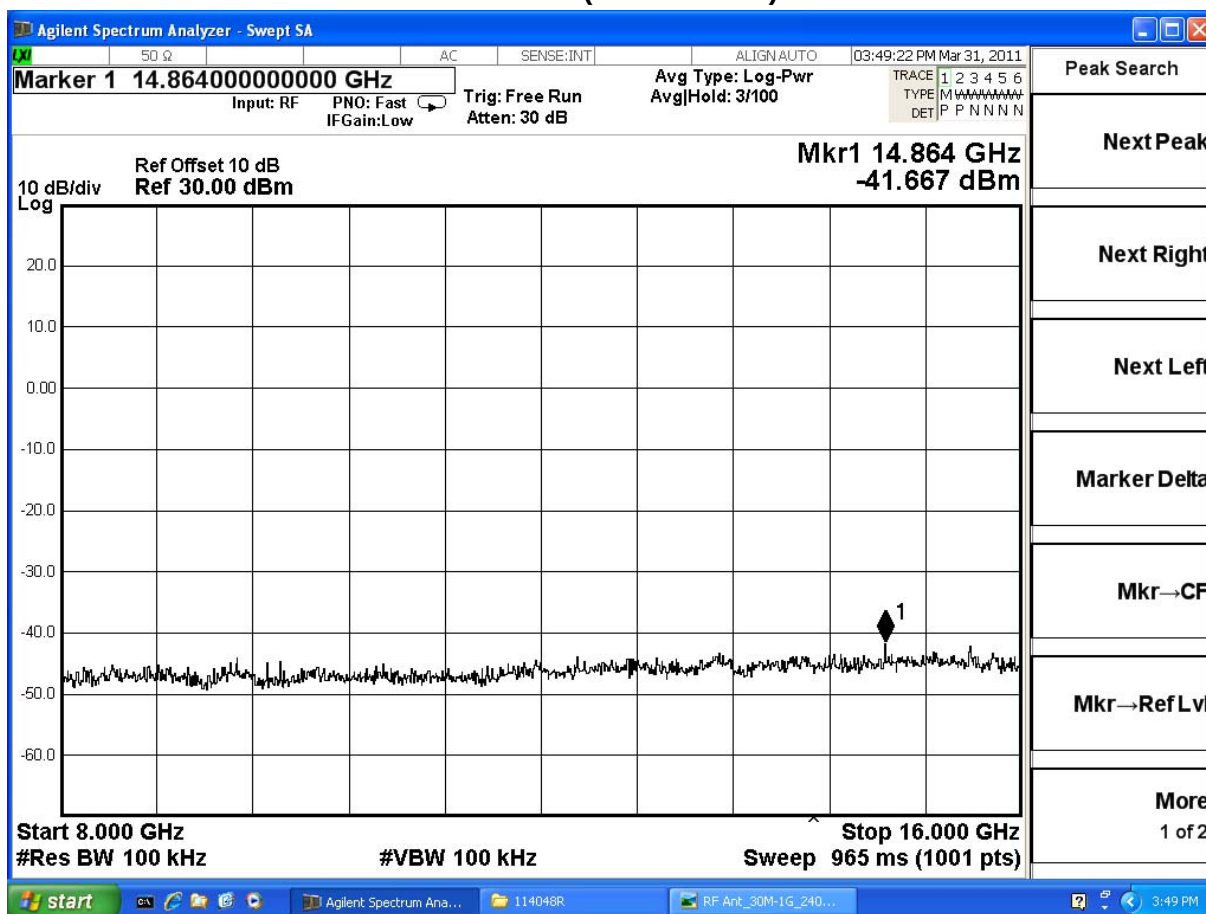
2441MHz (30MHz-1GHz)



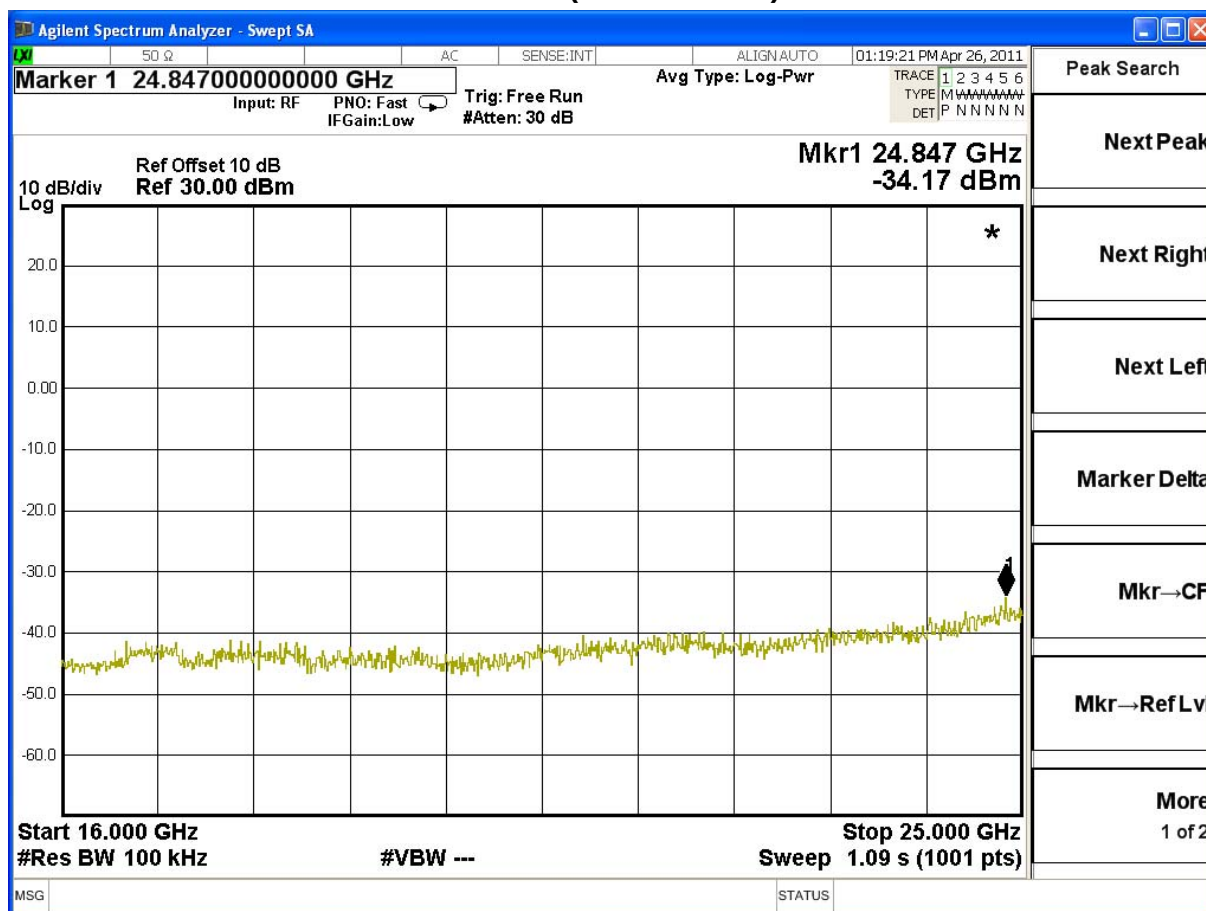
2441MHz (1GHz-8GHz)



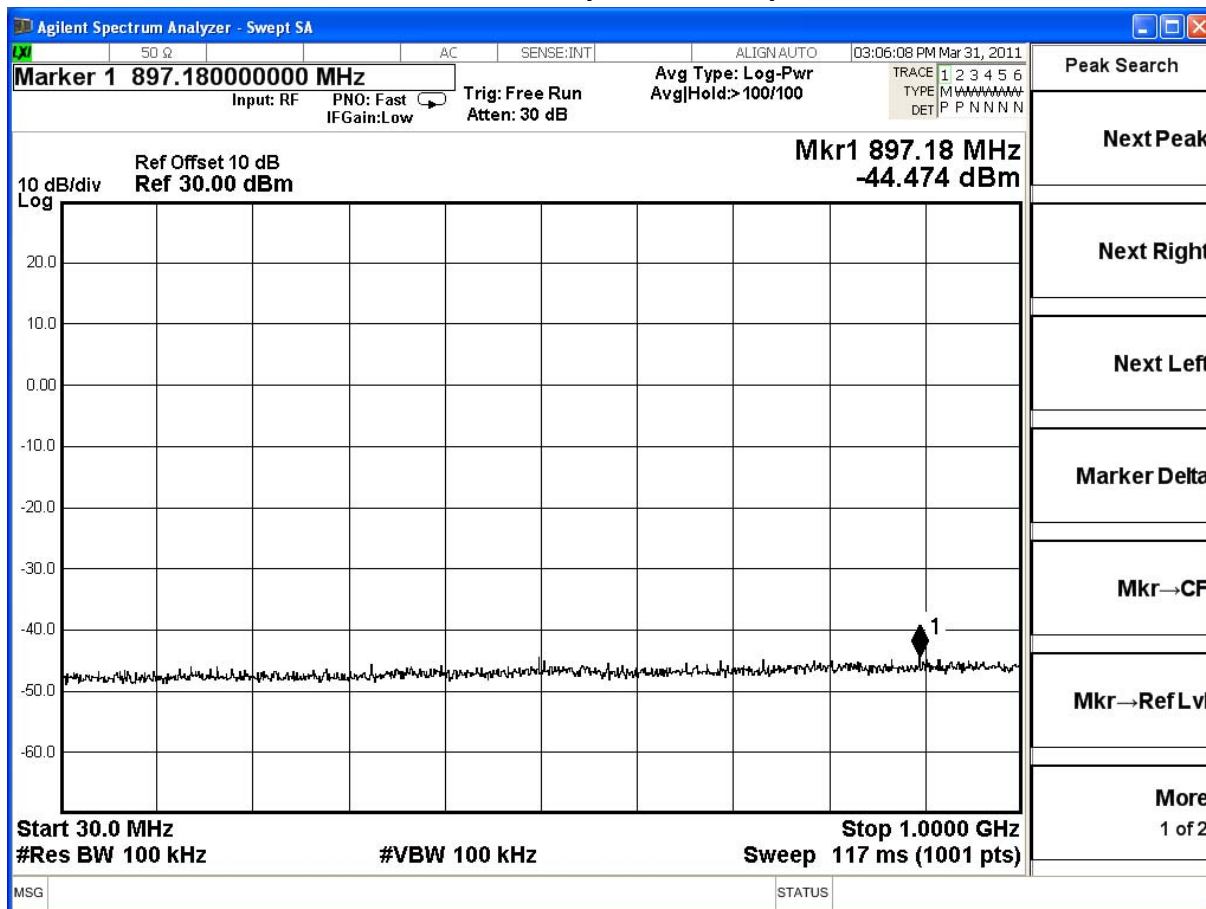
2441MHz (8GHz-16GHz)



2441MHz (16GHz-25GHz)-



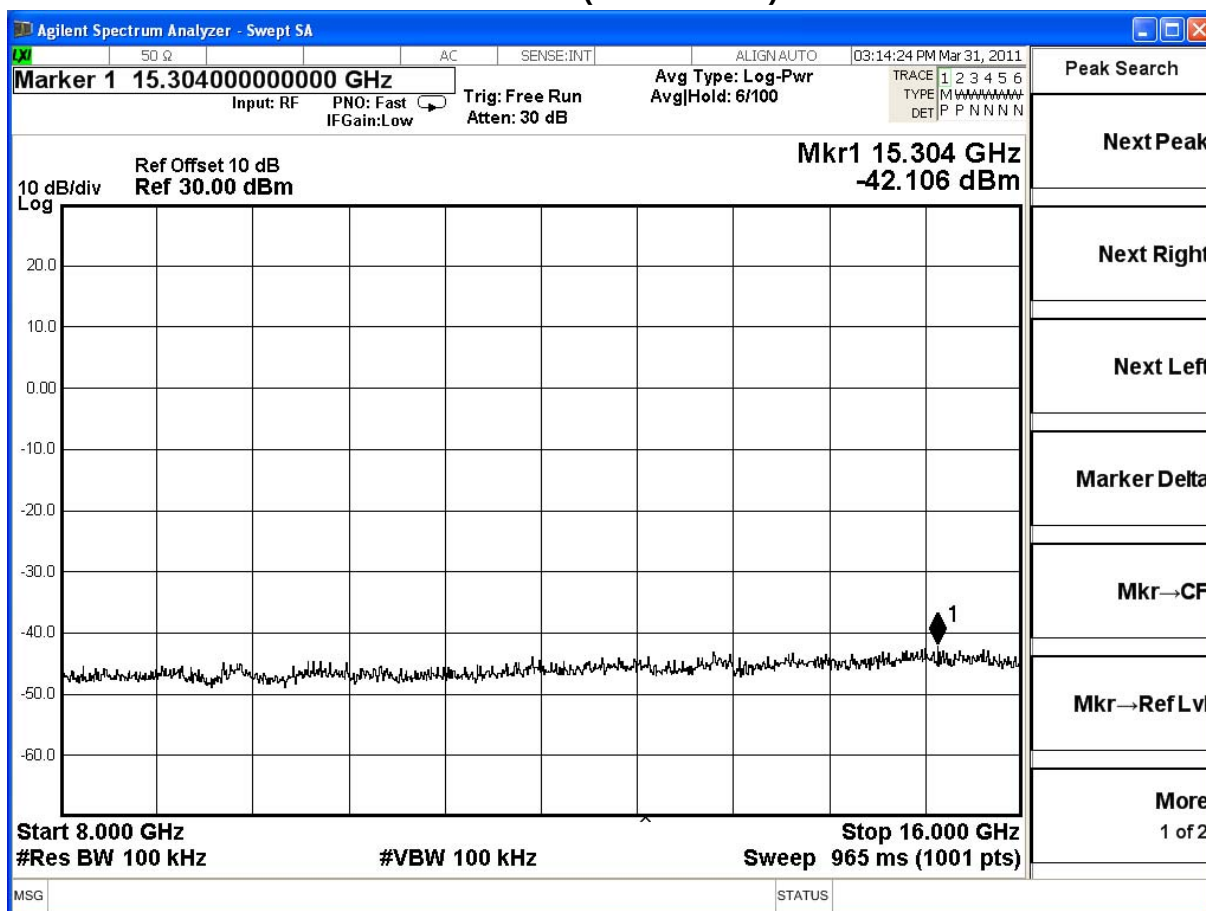
2480MHz (30MHz-1GHz)



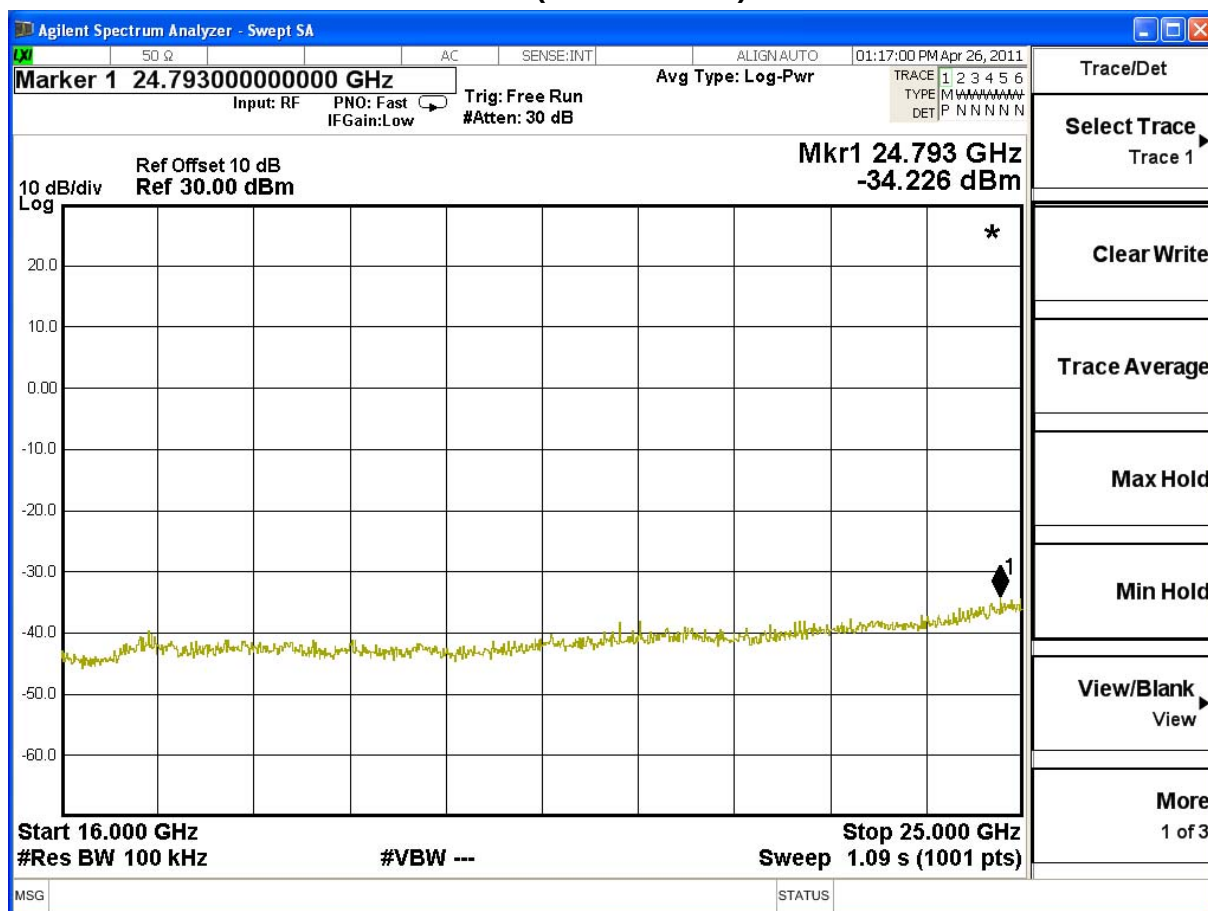
2480MHz (1GHz-8GHz)



2480MHz (8GHz-16GHz)



2480MHz (16GHz-25GHz)-



6. Radiated Emission Band Edge

6.1. Test Equipment

The following test equipments are used during the test:

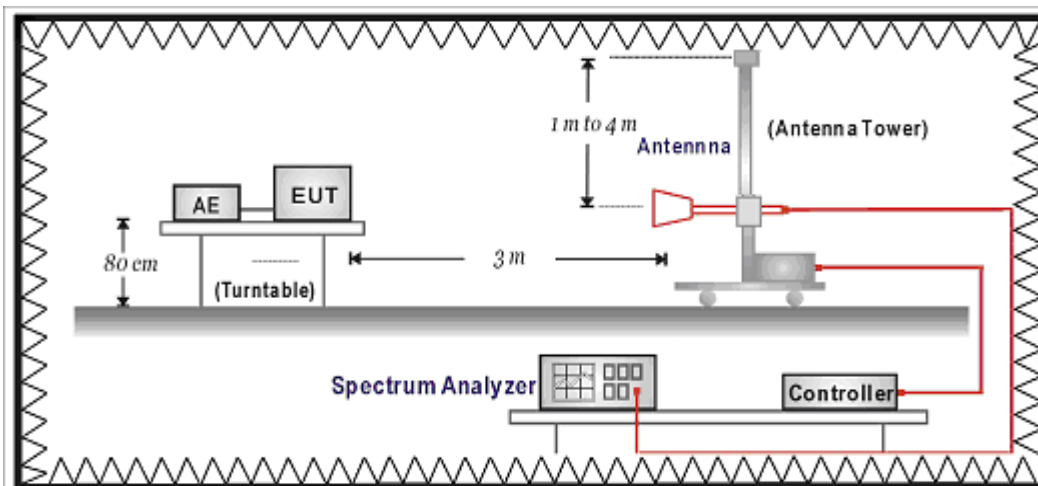
Band Edge / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120D	743	2012/02/24
PSA Series Spectrum analyzer	Agilent	E4440A	MY46187335	2012/01/06
Coaxial Cable	Huber+Suhner AG	Sucoflex 102	25623/2	2012/03/21

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

6.2. Test Setup

RF Radiated Measurement:



6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements. The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2009 on radiated measurement.

6.5. Uncertainty

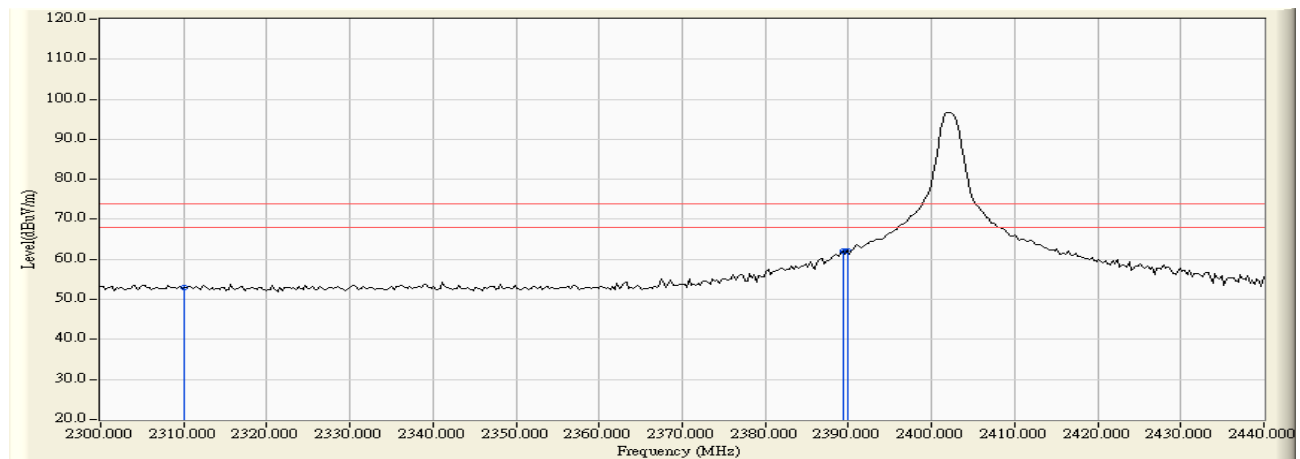
The measurement uncertainty

± 3.9 dB above 1GHz

6.6. Test Result

Radiated is defined as

Site : CB1	Time : 2011/04/22 - 11:11
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - HORIZONTAL	Power : AC 120V/ 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2402MHz

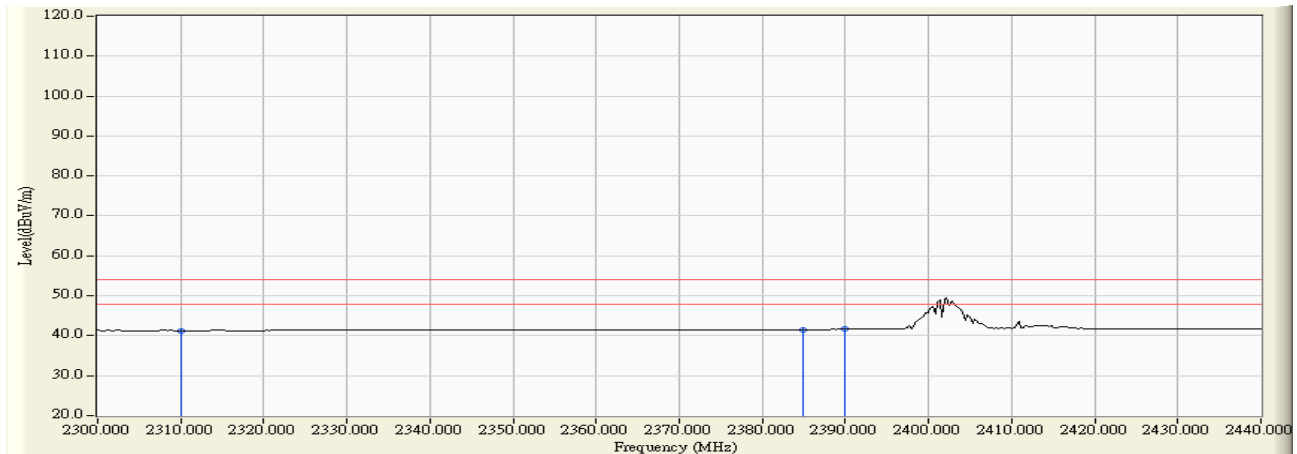


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	27.265	25.593	52.858	-21.142	74.000	PEAK
2	*	2389.320	27.597	34.440	62.037	-11.963	74.000	PEAK
3		2390.000	27.600	34.396	61.996	-12.004	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/22 - 11:30
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : EFS_1-18G(2010-12) - HORIZONTAL	Power : AC 120V/ 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2402MHz

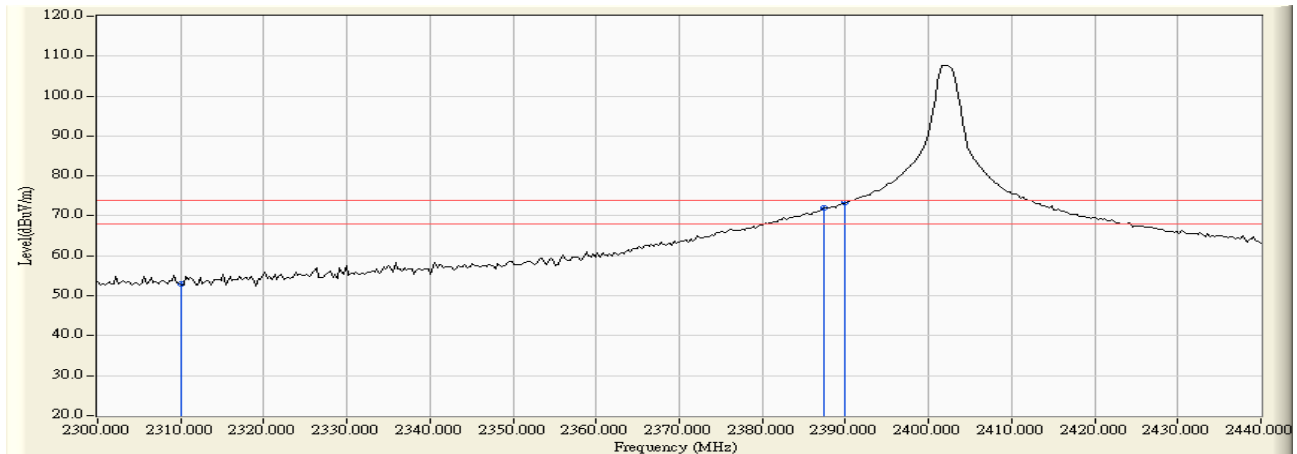


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	27.265	14.022	41.287	-12.713	54.000	AVERAGE
2	2384.840	27.578	13.978	41.556	-12.444	54.000	AVERAGE
3	* 2390.000	27.600	13.994	41.594	-12.406	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/22 - 11:33
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - VERTICAL	Power : AC 120V/ 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2402MHz

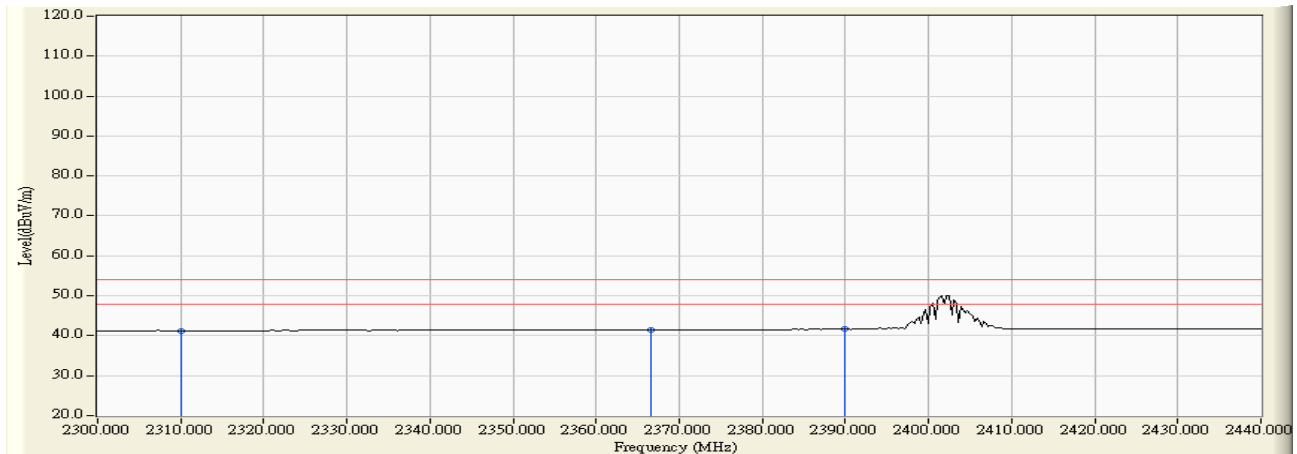


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	27.265	25.597	52.862	-21.138	74.000	PEAK
2	2387.360	27.589	44.293	71.882	-2.118	74.000	PEAK
3	* 2390.000	27.600	45.654	73.254	-0.746	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/22 - 11:34
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : EFS_1-18G(2010-12) - VERTICAL	Power : AC 120V/ 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2402MHz

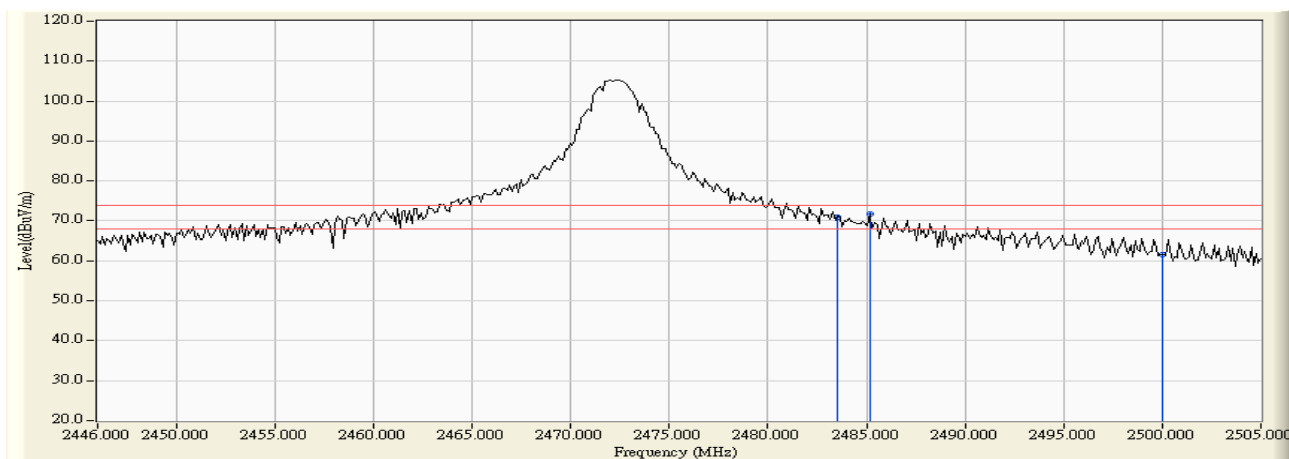


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	27.265	14.003	41.268	-12.732	54.000	AVERAGE
2		2366.640	27.502	13.923	41.425	-12.575	54.000	AVERAGE
3	*	2390.000	27.600	14.034	41.634	-12.366	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/22 - 11:41
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - HORIZONTAL	Power : AC 120V/ 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2480MHz

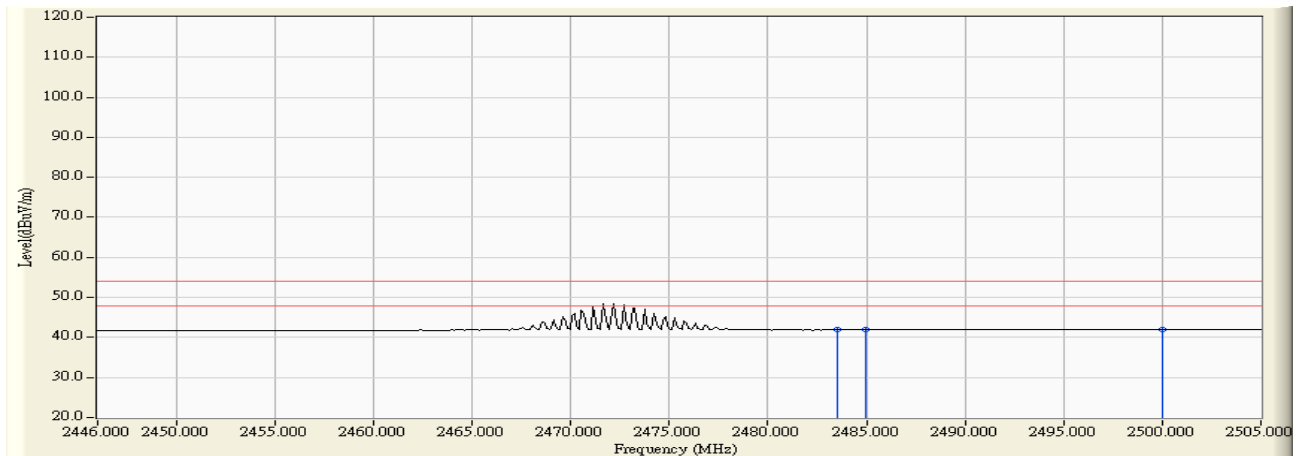


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2483.500	27.991	42.974	70.965	-3.035	74.000	PEAK
2	*	2485.176	27.999	43.652	71.650	-2.350	74.000	PEAK
3		2500.000	28.057	33.517	61.574	-12.426	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/22 - 11:43
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : EFS_1-18G(2010-12) - HORIZONTAL	Power : AC 120V/ 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2480MHz

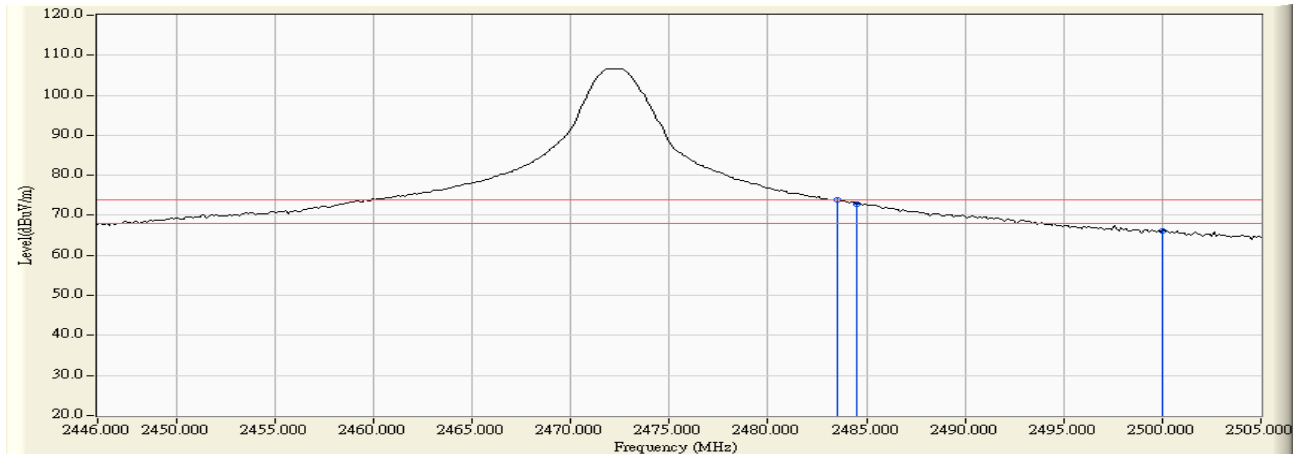


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2483.500	27.991	13.864	41.855	-12.145	54.000	PEAK
2		2484.940	27.997	13.890	41.887	-12.113	54.000	PEAK
3	*	2500.000	28.057	13.849	41.906	-12.094	54.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/22 - 11:48
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : EFS_1-18G(2010-12) - VERTICAL	Power : AC 120V/ 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2480MHz

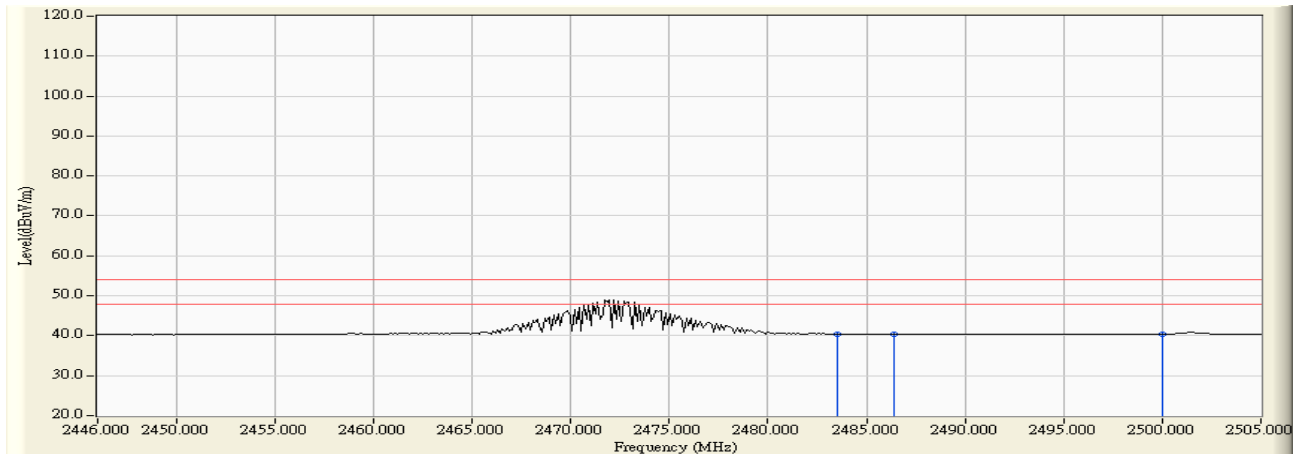


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2483.500	27.991	45.916	73.907	-0.093	74.000	PEAK
2		2484.468	27.995	44.936	72.931	-1.069	74.000	PEAK
3		2500.000	28.057	38.095	66.152	-7.848	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2011/04/22 - 11:51
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : EFS_1-18G(2010-12) - VERTICAL	Power : AC 120V/ 60Hz
EUT : 2.4G Wireless Data Transceiver	Note : 2480MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2483.500	27.991	12.390	40.381	-13.619	54.000	AVERAGE
2	*	2486.356	28.003	12.463	40.466	-13.534	54.000	AVERAGE
3		2500.000	28.057	12.379	40.436	-13.564	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

7. Occupied Bandwidth

7.1. Test Equipment

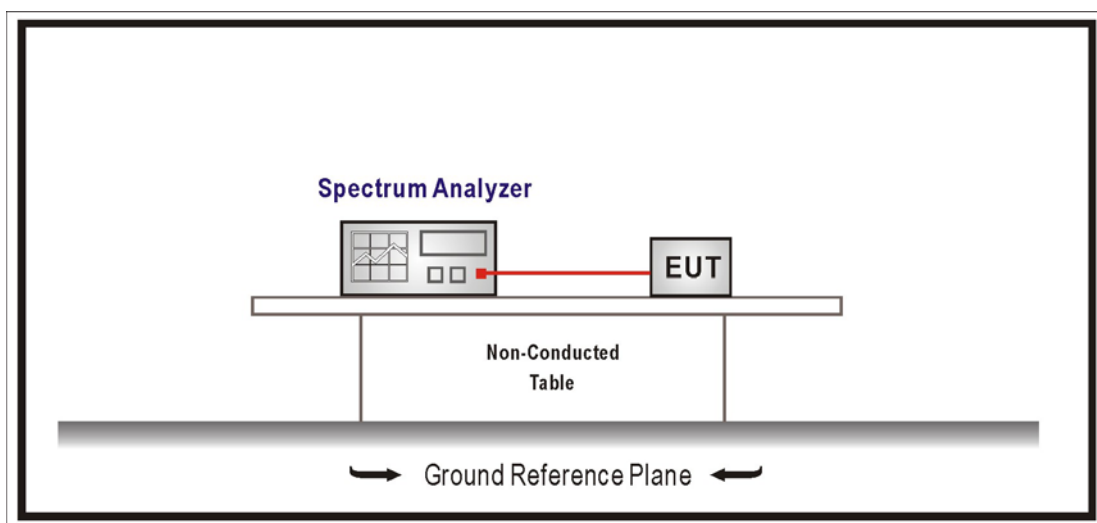
The following test equipment is used during the test:

Occupied Bandwidth / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2012/01/16

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

7.2. Test Setup



7.3. Test Procedures

The EUT was setup according to ANSI C63.4, 2009; tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Span greater than RBW.

7.4. Limits

The 6 dB bandwidth must be greater than 500 kHz.

7.5. Uncertainty

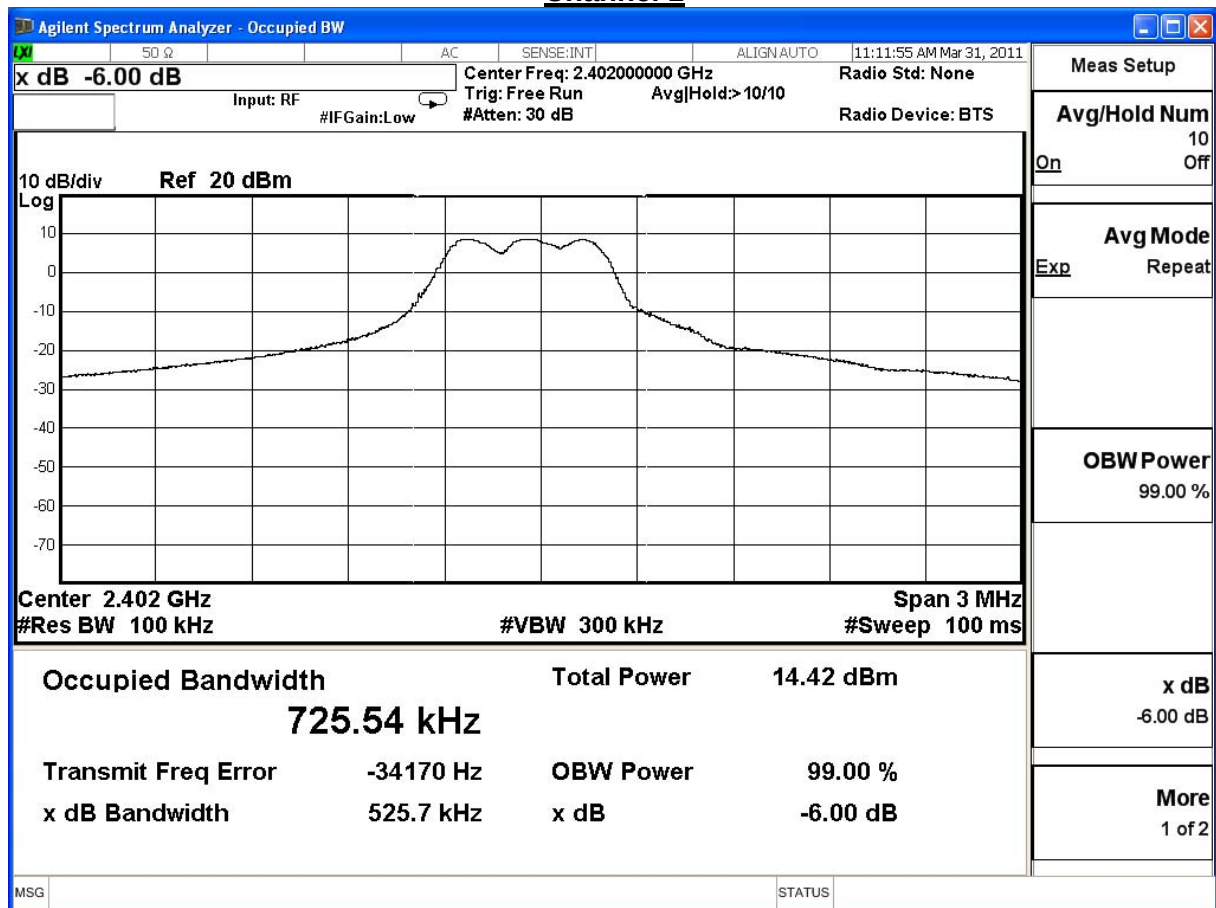
The measurement uncertainty is defined as $\pm 150\text{Hz}$

7.6. Test Result

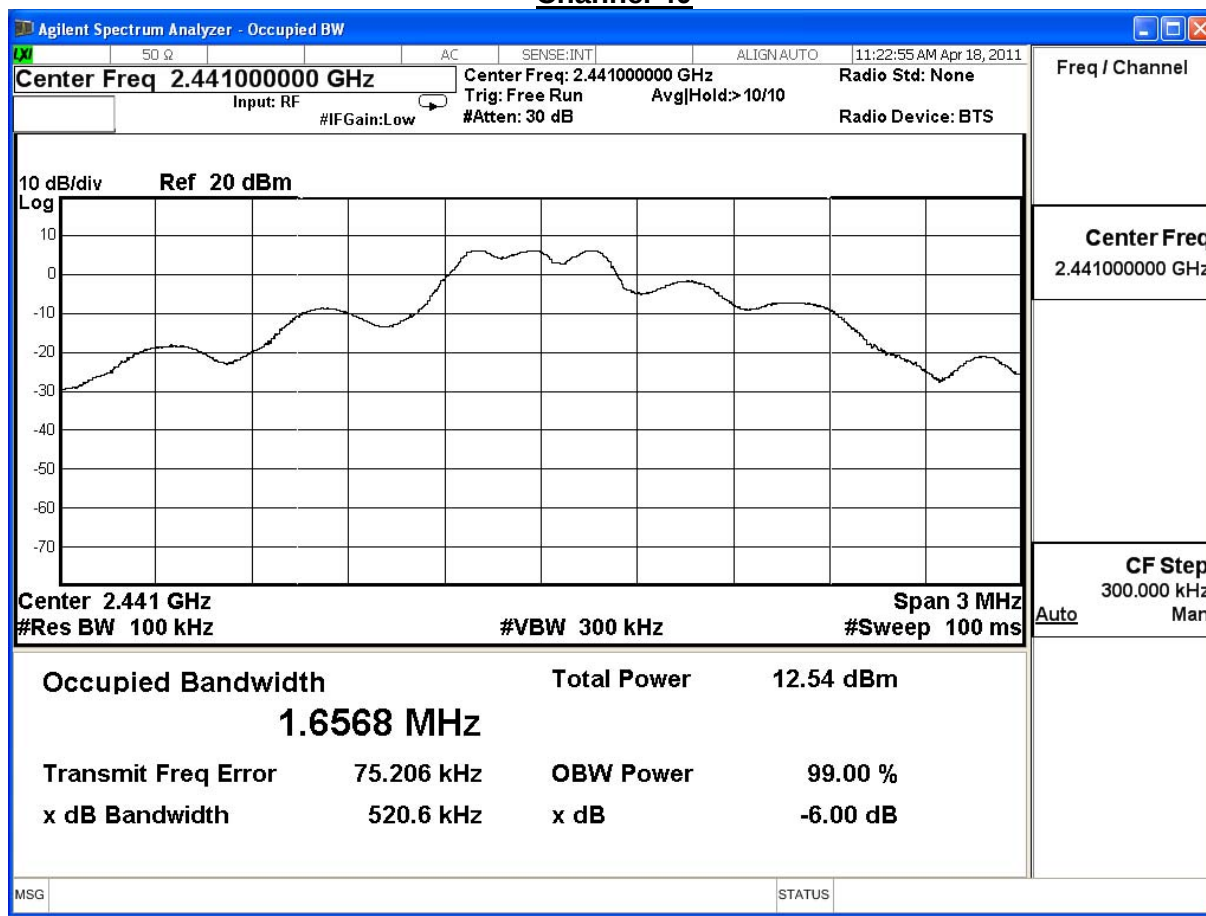
Product	2.4G Wireless Data Transceiver		
Test Item	Occupied Bandwidth		
Test Mode	Transmit		
Date of Test	2011/03/31	Test Site	SR7

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2402	525.7	≥500	Pass
40	2441	520.6	≥500	Pass
79	2480	628.6	≥500	Pass

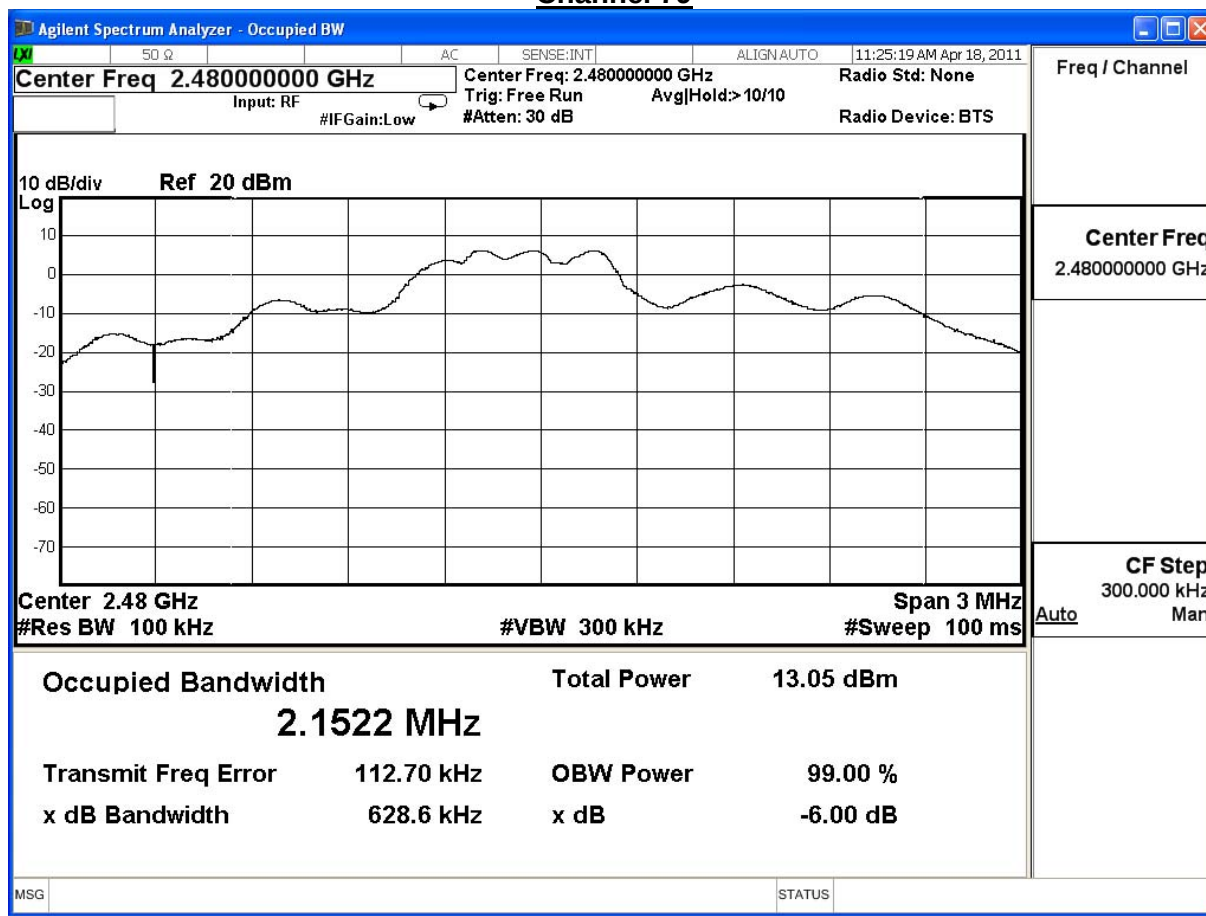
Channel 1



Channel 40



Channel 79



8. Power Density

8.1. Test Equipment

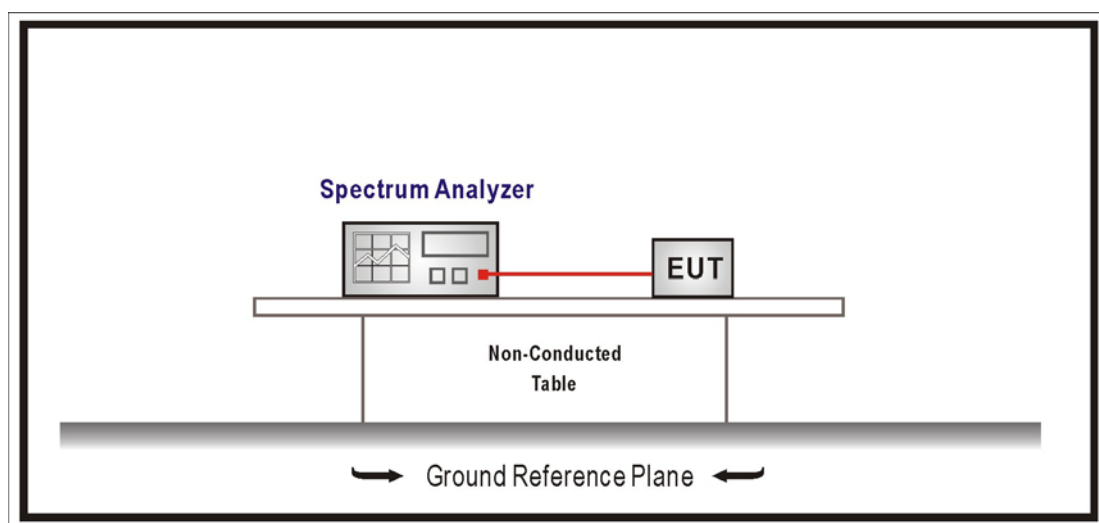
The following test equipment is used during the test:

Occupied Bandwidth / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2012/01/16

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

8.2. Test Setup



8.3. Limits

The peak power spectral density conducted from the intentional radiated to the antenna shall not be greater than +8dBm in any 3kHz band during any time interval of continuous transmission.

8.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2009; tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

PSD Option 2:

Set RBW= 3 kHz, Set VBW $\geq$ 9 kHz, Sweep time=Auto, Set detector=Peak detector. Use a video trigger. Trace average 100 traces in power averaging mode.

8.5. Uncertainty

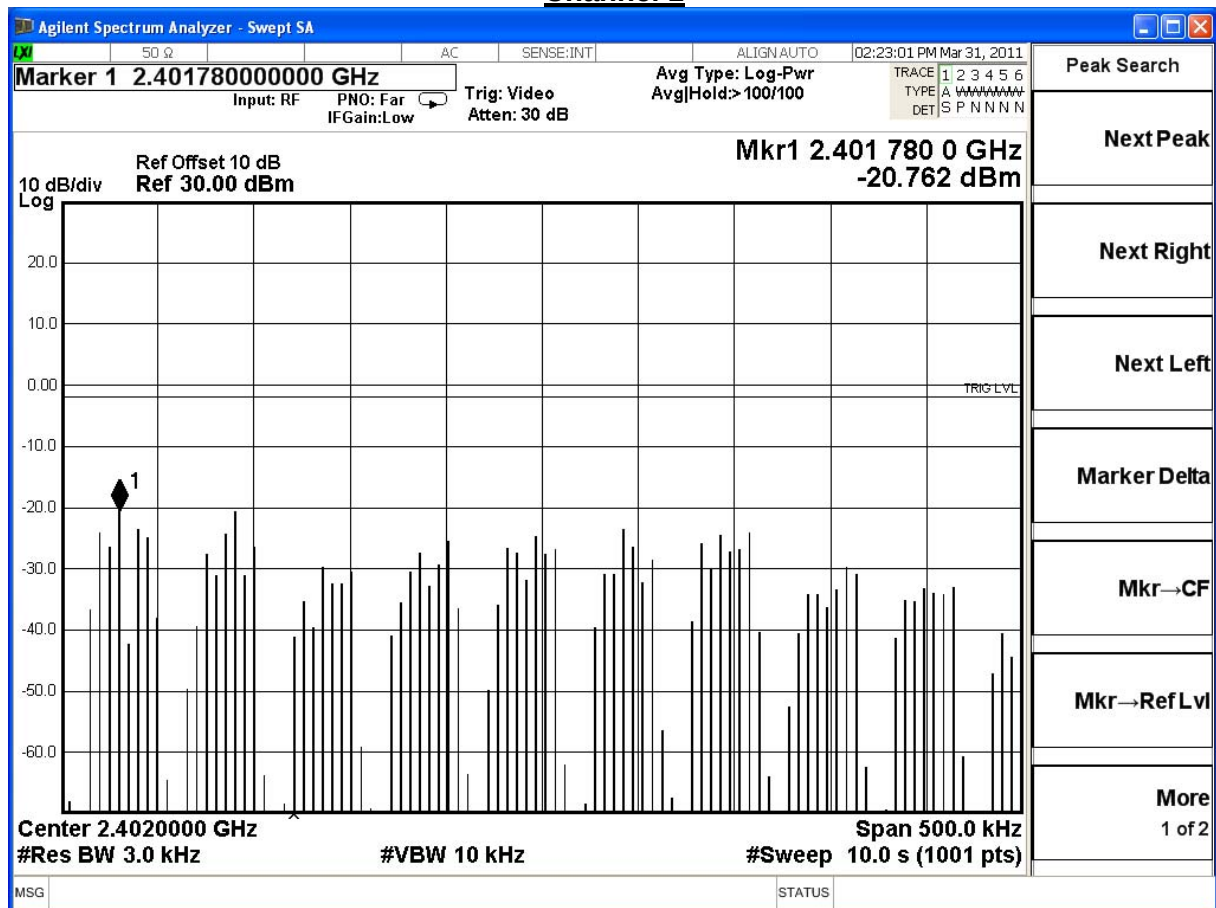
The measurement uncertainty is defined as ± 1.27 dB.

8.6. Test Result

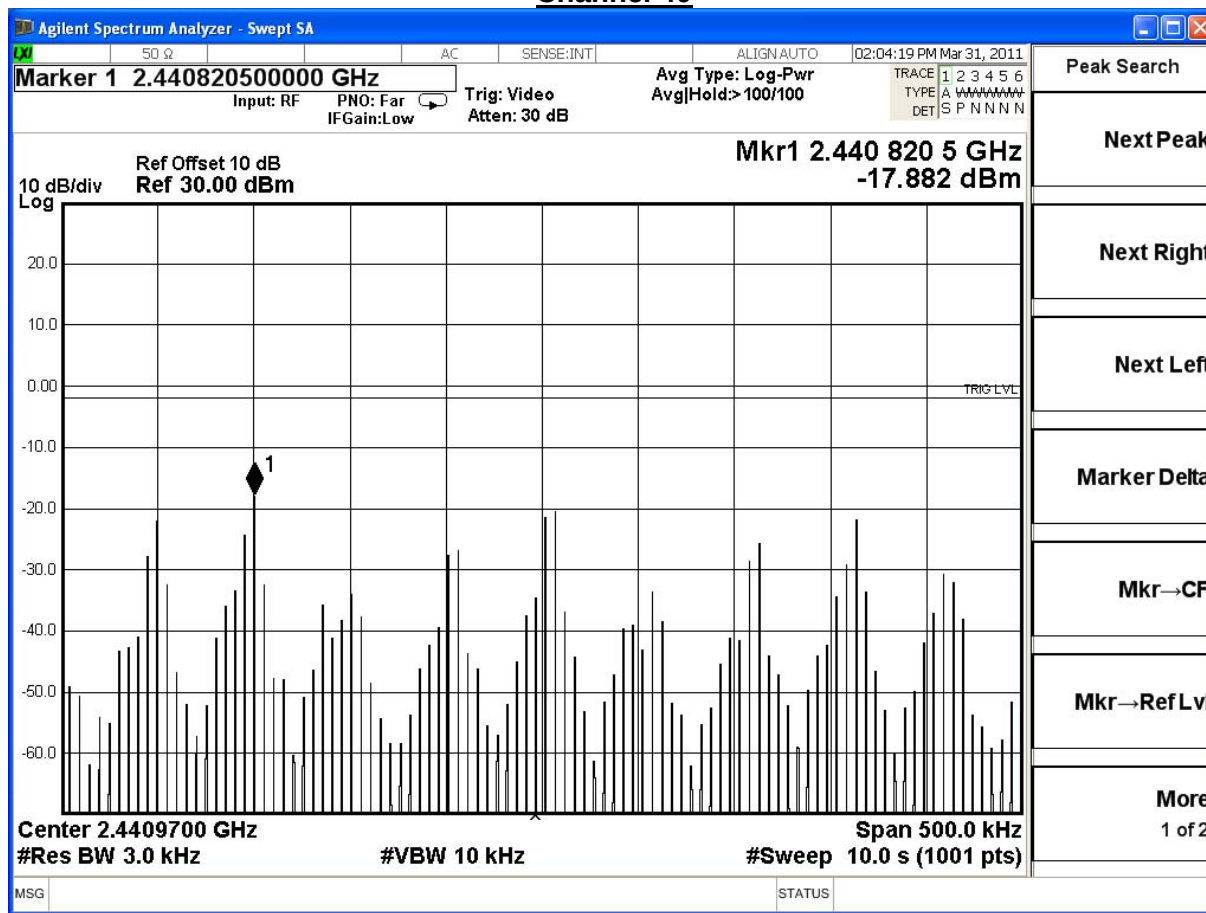
Product	2.4G Wireless Data Transceiver		
Test Item	Power Density		
Test Mode	Transmit		
Date of Test	2011/03/31	Test Site	SR7

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2402	-20.762	≤8	Pass
40	2441	-17.882	≤8	Pass
79	2480	-22.367	≤8	Pass

Channel 1



Channel 40



Channel 79

