



Hong Kong

FCC / IC – Test report

Report Number : **60/790.14.001.02** Date of Issue: March 5, 2014

Model : **DJControlWave**

Product Type : **DJ Control Player**

Applicant : **GUILLEMOT CORPORATION S.A.**

Address : **Place Du Granier - B.P. 97143,35571 CHANTEPIE CEDEX, FRANCE**

Production Facility : **---**

Address : **---**

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : **56**

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2. Details about the Test Laboratory

Details about the Test Laboratory

Test site 1

Company name: TÜV SÜD HONG KONG LTD.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin
HK.

Telephone: 852 2776 1323

Fax: 852 2776 1372

Test site 2

Company name: TMC-Telecommunication Metrology Center of M.I.I.T
No 52 Hua Yuanbei Road, Haidian District, Beijing, P.R.China

3. Description of the Equipment Under Test

Description of the Equipment Under Test

Product:	DJ Control Player
Model no.:	DJControlWave
Serial number:	NIL
Options and accessories:	NIL
FCC ID:	NAM5091215
Rated Voltage:	3.7 VDC rechargeable battery
Rated Current:	NIL
Rated Power:	NIL
Frequency:	2402-2480MHz
RF Transmission Frequency:	2402-2480MHz
Antenna gain:	1 dBi
No. of Operated Channel:	79
Modulation:	GFSK, $\pi/4$ -DQPSK, 8DPSK
Description of the EUT:	Battery operated – 1x 3.7V rechargeable battery Adapter operated – Input AC 100-240V~50/60Hz 0.2A MAX Output DC 5.0V/1.0A

4. Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C, Intentional Radiators, 10-1-12 Edition	PART 15 – RADIO FREQUENCY DEVICES Subpart C – Intentional Radiators

5. Mode of Operation

Decision of Test ATL 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:

Test Mode
Mode 1: GFSK Link Mode
Mode 2: $\pi/4$ -DQPSK Link Mode
Mode 3: 8DPSK Link Mode

By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “X axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

6. Summary of Test Standards and Results

Emission Tests					
Test Condition	Pages	Test site	Test Result		
			Pass	Fail	N/A
Maximum Conducted Output Power	9	Site 2	☒	☐	☐
Conducted Emission Measurement	12	Site 2	☒	☐	☐
Radiated Interference Measurement	16	Site 2	☒	☐	☐
20dB RF Bandwidth	24	Site 2	☒	☐	☐
Carrier Frequency Separation	28	Site 2	☒	☐	☐
Number of Hopping	30	Site 2	☒	☐	☐
Time of Occupancy (Dwell Time)	32	Site 2	☒	☐	☐
Out of Band Conducted Spurious Emission	41	Site 2	☒	☐	☐
Band Edge Measurement	52	Site 2	☒	☐	☐
Antenna Requirement	62	Site 2	☒	☐	☐

7. General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: NAM5091215 complies with the FCC Part 15, Subpart C Rules.

All the configurations of the product were tested and only the worst test results are listed in the report.

SUMMARY:

All tests according to the regulations cited on page 7 were

- - Performed
- - **Not** Performed

The Equipment Under Test

- - **Fulfills** the general approval requirements.
- - **Does not** fulfill the general approval requirements.

Sample Received Date: 18th February 2014

Testing Start Date: 19th February 2014

Testing End Date: 28th February 2014

- TÜV SÜD HONG KONG LTD. -

Reviewed by:


Edmond FUNG

Prepared by:


CHAN Kwong Ngai

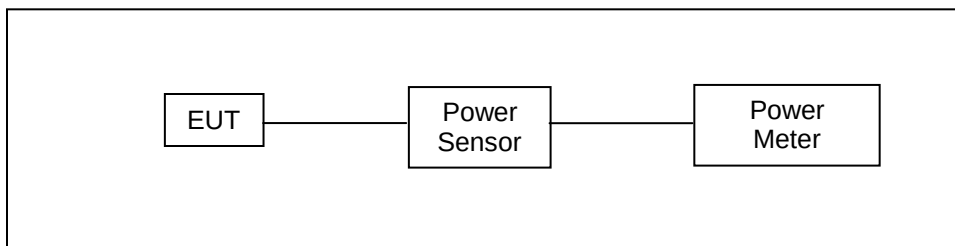


8. Test Results

8.1 Maximum Conducted Output Power Measurement Limit

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels < 1 watt.

Test Setup



Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Single Channel PK Power Sensor	Agilent	N1911A	MY45101619	12/19/2013	(1)
Wideband Power Meter	Agilent	N1921A	MY45241957	12/19/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The tests below are run with the EUT's transmitter set at high power in TX mode. The EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to power sensor. The maximum peak output power shall not exceed 1 watt.

Use a direct connection between the antenna port of transmitter and the power sensor, for prevent the power sensor input attenuation 40-50 dB. Set the RBW Bandwidth of the emission or use a channel power meter mode.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm). For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6)/3 dBm.

The antenna port of the EUT was connected to the input of a power sensor. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

Test Result

Model Number	DJControlWave			
Test Item	Maximum Conducted Output Power			
Test Mode	Mode 1: GFSK Link Mode			
Date of Test	2014/02/20			
Frequency (MHz)	Packet Type	Peak Power		Limit (mW)
		(dBm)	(mW)	
2402	DH1	-5.39	0.29	< 1000
	DH3	-5.24	0.30	
	DH5	-5.16	0.30	
2441	DH1	-4.95	0.32	
	DH3	-4.90	0.32	
	DH5	-4.75	0.33	
2480	DH1	-5.58	0.28	
	DH3	-5.48	0.28	
	DH5	-5.34	0.29	

Model Number	DJControlWave			
Test Item	Maximum Conducted Output Power			
Test Mode	Mode 2: $\pi/4$ -DQPSK Mode			
Date of Test	2014/02/20			
Frequency (MHz)	Packet Type	Peak Power		Limit (mW)
		(dBm)	(mW)	
2402	DH1	-5.21	0.30	< 1000
	DH3	-5.15	0.31	
	DH5	-5.03	0.31	
2441	DH1	-4.95	0.32	
	DH3	-4.92	0.32	
	DH5	-4.75	0.33	
2480	DH1	-5.51	0.28	
	DH3	-5.35	0.29	
	DH5	-5.22	0.30	

Model Number	DJControlWave			
Test Item	Maximum Conducted Output Power			
Test Mode	Mode 3: 8DPSK Link Mode			
Date of Test	2014/02/20			
Frequency (MHz)	Packet Type	Peak Power		Limit (mW)
		(dBm)	(mW)	
2402	DH1	-4.77	0.33	< 1000
	DH3	-4.69	0.34	
	DH5	-4.58	0.35	
2441	DH1	-4.70	0.34	
	DH3	-4.61	0.35	
	DH5	-4.50	0.35	
2480	DH1	-5.34	0.29	
	DH3	-5.24	0.30	
	DH5	-5.11	0.31	

8.2 Conducted Emission Measurement Limit

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

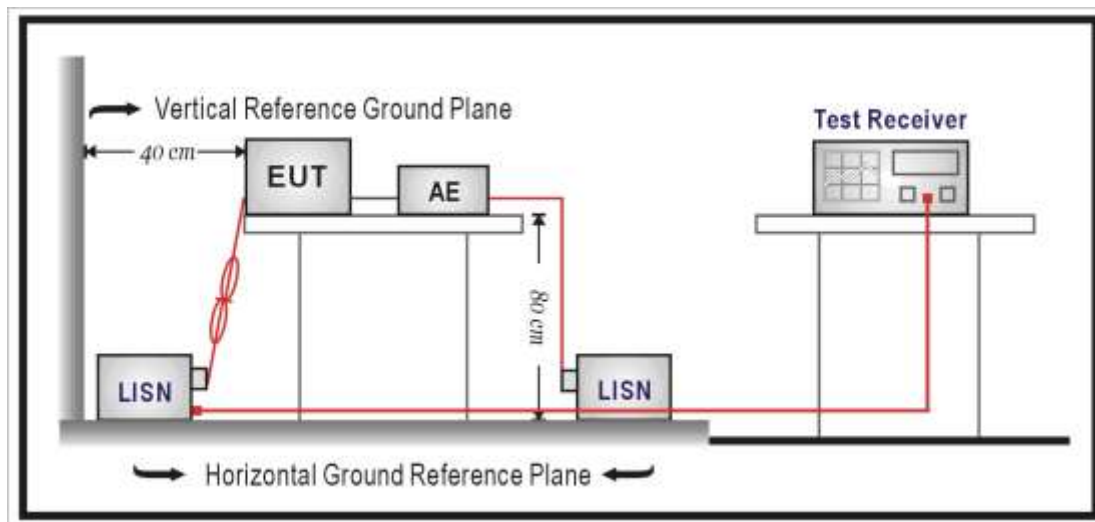
Test Instruments

Describe	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	06/06/2013	(1)
LISN	R&S	ENV216	101040	03/04/2013	(1)
LISN	R&S	ENV216	101041	03/04/2013	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

Test Setup



Test Procedure

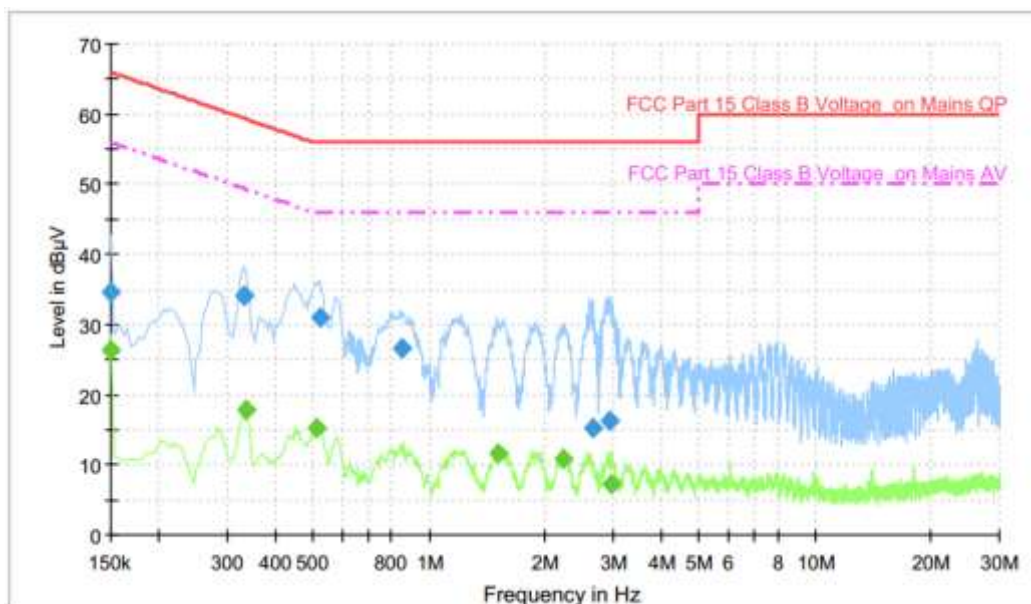
The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and EMCO Model 3162/2 SH Line Impedance Stabilization Networks (LISN). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 4.1.

Test Result

Standard:	FCC Part 15C	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 1	Date:	2014/02/25
Description:		Test By:	



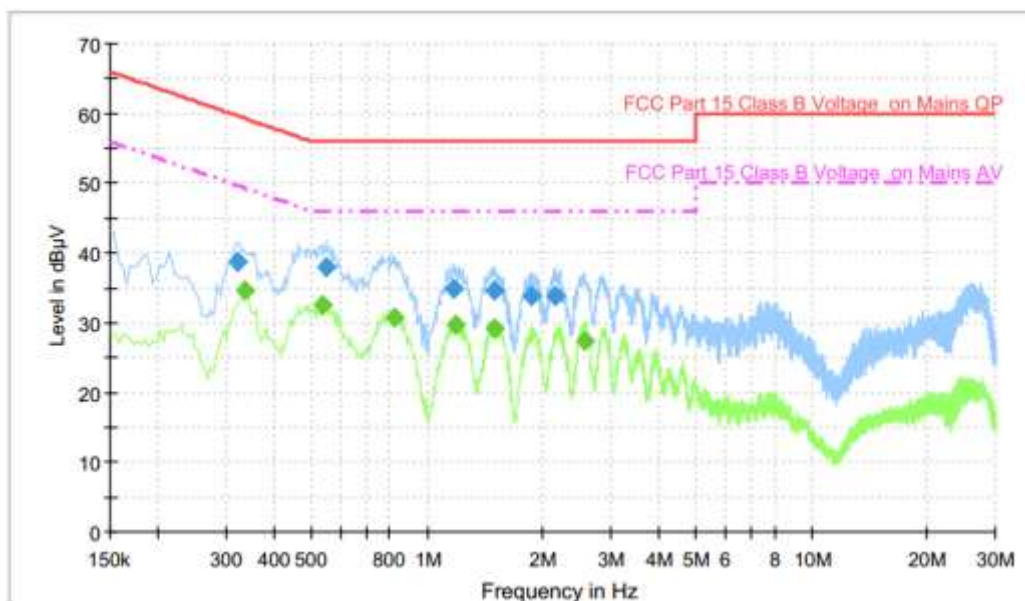
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	34.6	FLO	L1	10.0	31.4	66.0
0.334000	34.1	FLO	L1	10.0	25.3	59.4
0.522000	30.9	FLO	L1	10.1	25.1	56.0
0.854000	26.7	FLO	L1	10.0	29.3	56.0
2.654000	15.2	FLO	L1	10.2	40.8	56.0
2.950000	16.2	FLO	L1	10.1	39.8	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	26.3	FLO	L1	10.0	29.7	56.0
0.338000	17.8	FLO	L1	10.0	31.5	49.3
0.510000	15.3	FLO	L1	10.1	30.7	46.0
1.518000	11.7	FLO	L1	10.1	34.3	46.0
2.238000	10.9	FLO	L1	10.2	35.1	46.0
2.966000	7.2	FLO	L1	10.2	38.8	46.0

Standard:	FCC Part 15C	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 1	Date:	2014/02/25
Description:		Test By:	



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.322000	38.7	FLO	N	10.0	20.9	59.7
0.546000	38.0	FLO	N	10.1	18.0	56.0
1.170000	34.8	FLO	N	10.1	21.2	56.0
1.494000	34.7	FLO	N	10.1	21.3	56.0
1.874000	33.8	FLO	N	10.1	22.2	56.0
2.146000	33.8	FLO	N	10.2	22.2	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.338000	34.6	FLO	N	10.0	14.7	49.3
0.534000	32.6	FLO	N	10.1	13.4	46.0
0.826000	30.8	FLO	N	10.0	15.2	46.0
1.186000	29.6	FLO	N	10.1	16.4	46.0
1.498000	29.3	FLO	N	10.1	16.7	46.0
2.570000	27.3	FLO	N	10.2	18.7	46.0

8.3 Radiated Interference Measurement Limit

According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at meter)	Measurement Distance (meters)
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 paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

Test Instruments

3 Meter Chamber (966-A)					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/21/2014	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/21/2014	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/21/2014	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/21/2014	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	07/01/2013	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/10/2013	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/13/2013	(1)
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	08/14/2013	(3)
Test Site	ATL	TE01	888001	08/28/2013	(1)

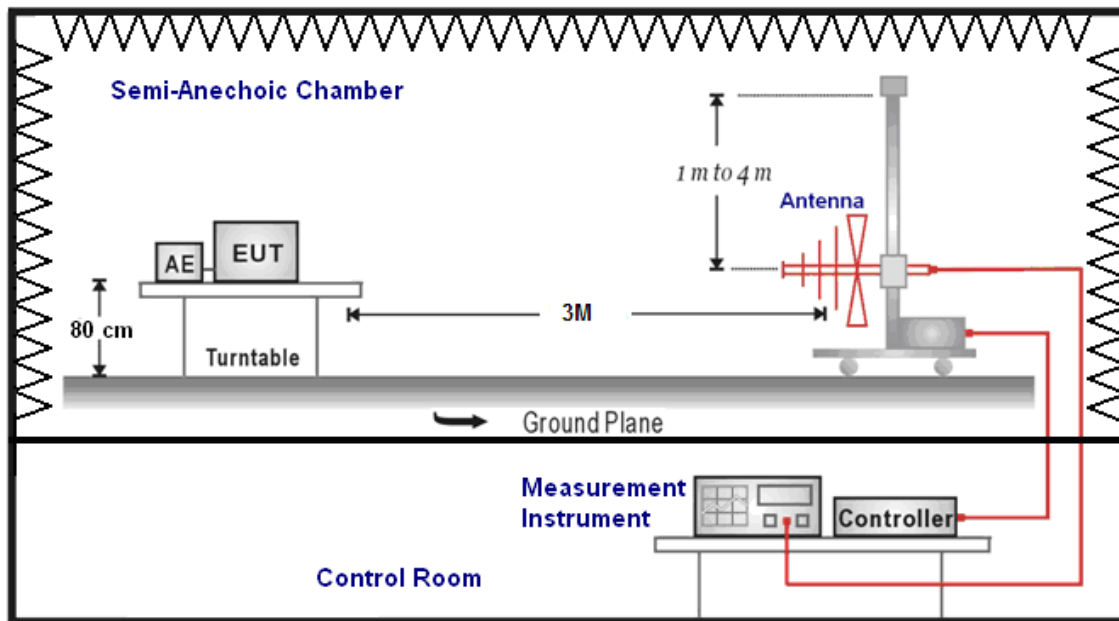
3 Meter Chamber (966-B)					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/10/2013	(1)
Amplifier	Mini-Circuits	ZKL-1R5+	072010	05/29/2013	(1)
Amplifier	Mini-Circuits	ZVA-213-S+	467900926	05/29/2013	(1)
RF Pre-selector	Agilent	N9039A	MY46520255	01/21/2013	(1)
Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00128055	08/24/2013	(1)
Trilog-Broadband Antenna	Schwarzbeck Mess-Elektronik	SB AC VULB	9168-419	05/10/2013	(1)
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	08/14/2013	(3)
Test Site	ATL	TE09	TE09	05/10/2013	(1)

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

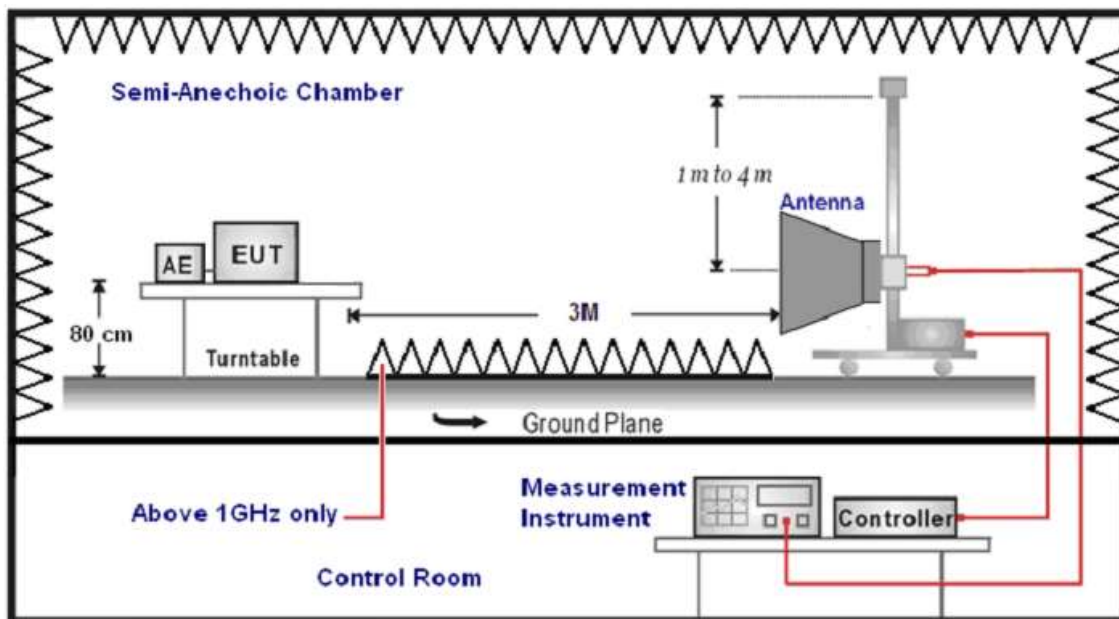
NOTE: N.C.R. = No Calibration Request.

Setup

Below 1GHz



Above 1GHz



Test Procedure

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

A nonconductive material surrounded the EUT to supporting the EUT for standing on three orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna (model VULB9163) at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna (model BBHA9120D&9170) was used in frequencies 1 – 26.5 GHz at a distance of 1 meter. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20dB/decade).

For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts per meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro volts per meter (dBuV/m).

The actual field intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

$$(1) \quad \text{Amplitude (dBuV/m)} = \text{FI (dBuV)} + \text{AF (dBuV)} + \text{CL (dBuV)} - \text{Gain (dB)}$$

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

$$(2) \quad \text{Actual Amplitude (dBuV/m)} = \text{Amplitude (dBuV)} - \text{Dis(dB)}$$

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

(a) For fundamental frequency : Transmitter Output < +30dBm

(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Test Result

Below 1GHz

Standard:

FCC Part 15C

Test item:

Radiated Emission

Model Number:

DJControlWave

Mode:

Mode 1

Test Distance:

3m

Power:

AC 120V/60Hz

Temp.(°C)/Hum.(%RH):

26(°C)/60%RH

Date:

2014/02/25

Test By:

Frequency (MHz)	Correct Factor (dB/m)	Result (dB)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
53.13	-34.1	22.94	40.0	17.06	QP	H
134.56	-38.9	31.10	43.5	12.40	QP	H
143.83	-39.7	40.52	43.5	2.98	QP	H
159.78	-39.4	38.07	43.5	5.43	QP	H
176.27	-38.4	37.13	43.5	6.37	QP	H
239.99	-34.6	28.53	46.0	17.47	QP	H
32.75	-36.8	37.34	40.0	2.66	QP	V
66.97	-37.2	28.57	40.0	11.43	QP	V
96.10	-34.2	29.09	43.5	14.41	QP	V
119.86	-36.9	29.29	43.5	14.21	QP	V
143.83	-39.5	34.38	43.5	9.12	QP	V
176.27	-38.1	31.20	43.5	12.30	QP	V

Note: No emission found between lowest internal used/generated frequencies to 30MHz (9 kHz~30MHz).

Above 1GHz

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		DJControlWave		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 1		Date:		2014/02/25	
Frequency:		2402 MHz		Test By:			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
4804	42.67	5.71	48.38	74.0	25.62	peak	H
4804	31.47	5.71	37.18	54.0	16.82	Average	H
7206	41.35	12.12	53.47	74.0	20.53	peak	H
7206	30.14	12.12	42.26	54.0	11.74	Average	H
4804	41.39	5.71	47.10	74.0	26.90	peak	V
4804	29.58	5.71	35.29	54.0	18.71	Average	V
7206	41.32	12.12	53.44	74.0	20.56	peak	V
7206	29.14	12.12	41.26	54.0	12.74	Average	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	DJControlWave			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 1			Date:	2014/02/25		
Frequency:	2441 MHz			Test By:			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
4882	44.37	5.93	50.30	74.0	23.70	peak	H
4882	31.66	5.93	37.59	54.0	16.41	Average	H
7323	43.02	12.45	55.47	74.0	18.53	peak	H
7323	32.03	12.45	44.48	54.0	9.52	Average	H
4882	45.00	5.93	50.93	74.0	23.07	peak	V
4882	32.22	5.93	38.15	54.0	15.85	Average	V
7323	43.04	12.45	55.49	74.0	18.51	peak	V
7323	32.03	12.45	44.48	54.0	9.52	Average	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		DJControlWave		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 1		Date:		2014/02/25	
Frequency:		2480 MHz		Test By:			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
4960	50.22	6.15	56.37	74.0	17.63	peak	H
4960	35.15	6.15	41.30	54.0	12.70	Average	H
7440	47.65	12.15	59.80	74.0	14.20	peak	H
7440	34.31	12.15	46.46	54.0	7.54	Average	H
4960	44.08	6.15	50.23	74.0	23.77	peak	V
4960	33.24	6.15	39.39	54.0	14.61	Average	V
7440	43.77	12.15	55.92	74.0	18.08	peak	V
7440	33.62	12.15	45.77	54.0	8.23	Average	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		DJControlWave		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 3		Date:		2014/02/25	
Frequency:		2402 MHz		Test By:			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
4804	41.36	5.71	47.07	74.0	26.93	peak	H
4804	31.25	5.71	36.96	54.0	17.04	Average	H
7206	41.31	12.12	53.43	74.0	20.57	peak	H
7206	30.58	12.12	42.70	54.0	11.3	Average	H
4804	42.69	5.71	48.40	74.0	25.60	peak	V
4804	29.69	5.71	35.40	54.0	18.60	Average	V
7206	40.24	12.12	52.36	74.0	21.64	peak	V
7206	28.14	12.12	40.26	54.0	13.74	Average	V

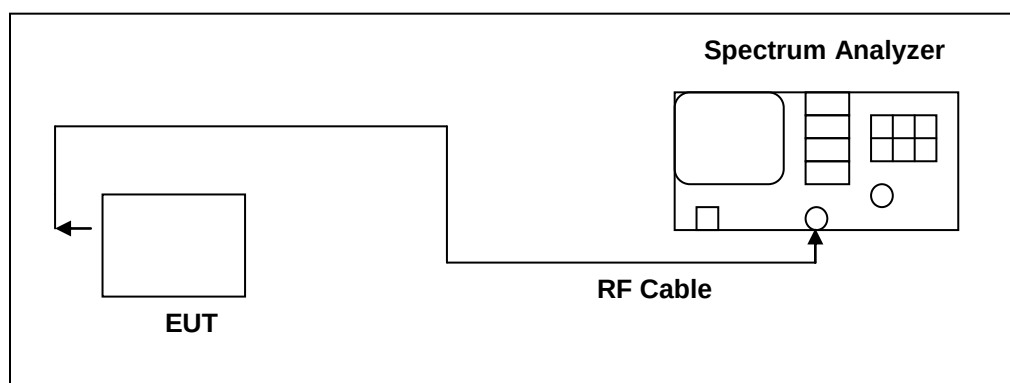
Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		DJControlWave		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 3		Date:		2014/02/25	
Frequency:		2441 MHz		Test By:			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
4882	45.34	5.93	51.27	74.0	22.73	peak	H
4882	31.27	5.93	37.20	54.0	16.80	Average	H
7323	42.68	12.45	55.13	74.0	18.87	peak	H
7323	33.28	12.45	45.73	54.0	8.27	Average	H
4882	44.76	5.93	50.69	74.0	23.31	peak	V
4882	32.43	5.93	38.36	54.0	15.64	Average	V
7323	43.02	12.45	55.47	74.0	18.53	peak	V
7323	32.38	12.45	44.83	54.0	9.17	Average	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		DJControlWave		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 3		Date:		2014/02/25	
Frequency:		2480 MHz		Test By:			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
4960	43.99	6.15	50.14	74.0	23.86	peak	H
4960	33.13	6.15	39.28	54.0	14.72	Average	H
7440	43.77	12.15	55.92	74.0	18.08	peak	H
7440	31.96	12.15	44.11	54.0	9.89	Average	H
4960	45.67	6.15	51.82	74.0	22.18	peak	V
4960	32.28	6.15	38.43	54.0	15.57	Average	V
7440	42.20	12.15	54.35	74.0	19.65	peak	V
7440	31.73	12.15	43.88	54.0	10.12	Average	V

8.4 20dB RF Bandwidth Measurement Limit

N/A

Test Setup



Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

Test Procedure

20dB RF Bandwidth

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = approx. 2 to 3 times the 20dB bandwidth, centered on a hopping frequency
2. RBW $\geq$ 1% of the 20dB span
3. VBW $\geq$ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

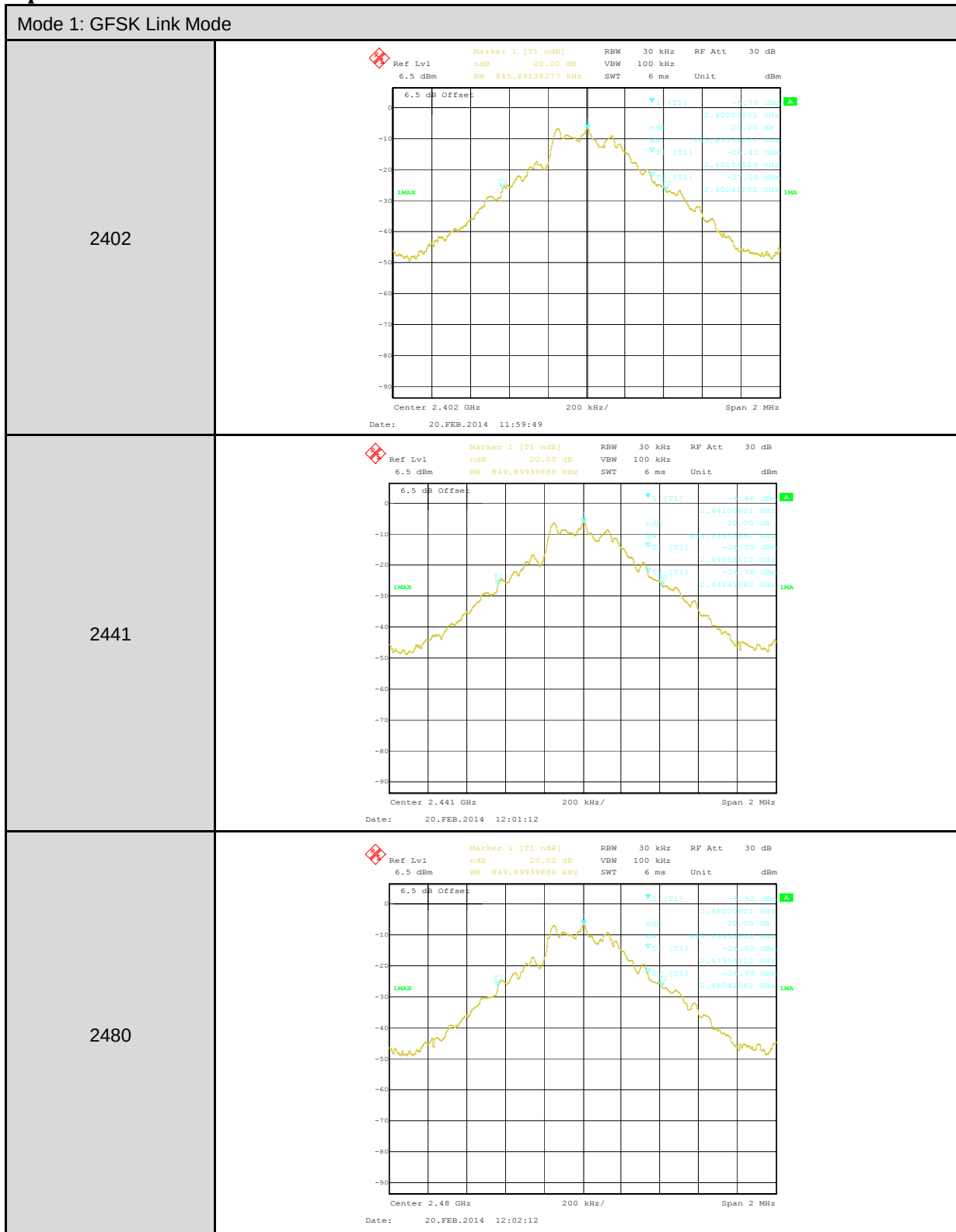
The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 20dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 20dB bandwidth of the emission.

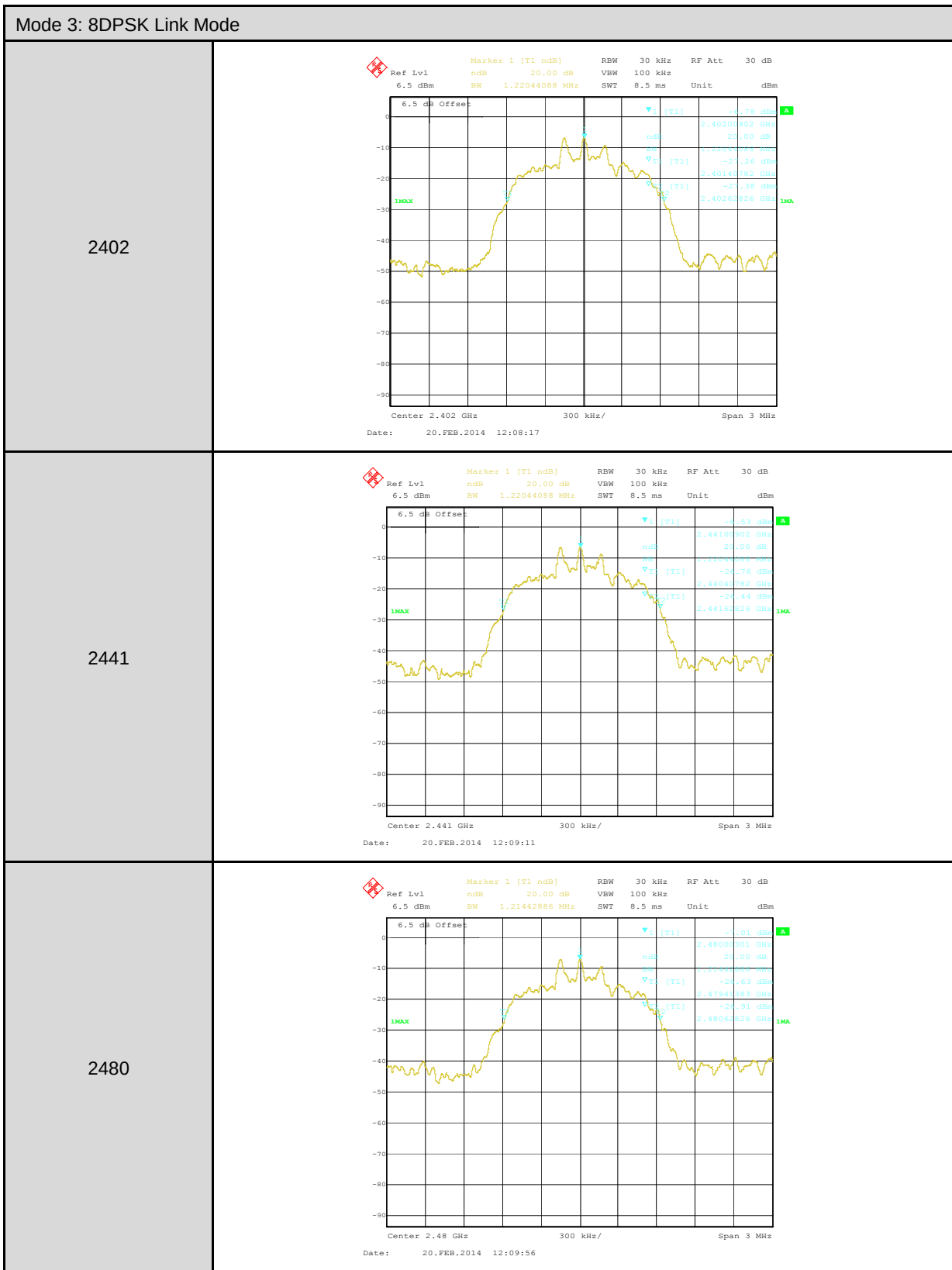
Test Result

Model Number	DJControlWave		
Test Item	20dB RF Bandwidth		
Test Mode	Mode 1: GFSK Link Mode		
Date of Test	2014/02/20	Test Site	TE02
Frequency (MHz)	20dB RF Bandwidth (MHz)	Limit (MHz)	
2402	0.846	-----	
2441	0.850	-----	
2480	0.850	-----	

Model Number	DJControlWave		
Test Item	20dB RF Bandwidth		
Test Mode	Mode 3: 8DPSK Link Mode		
Date of Test	2014/02/20	Test Site	TE02
Frequency (MHz)	20dB RF Bandwidth (MHz)		Limit (MHz)
2402	1.220		-----
2441	1.220		-----
2480	1.214		-----

Test Graphs

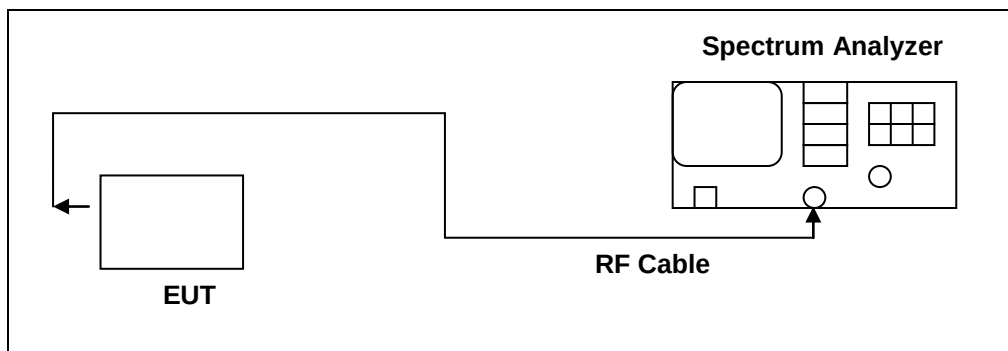




8.5 Carrier Frequency Separation Measurement Limit

Title 47 of the CFR, Part 15 Subpart (c) 15.247(a)(1)(i) requires the measurement of the bandwidth of the transmission between the -20 dB points on the transmitted spectrum. The results of this test determine the limits for channel spacing. The channel spacing shall be a minimum of 25 kHz or the 20 dB bandwidth.

Test Setup



Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth transmitter of the V6 had its hopping function enabled. The following spectrum analyzer settings were used:

1. Span = wide enough to capture the peaks of two adjacent channels
2. Resolution (or IF) Bandwidth (RBW) $\geq$ 1% of the span
3. Video (or Average) Bandwidth (VBW) $\geq$ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

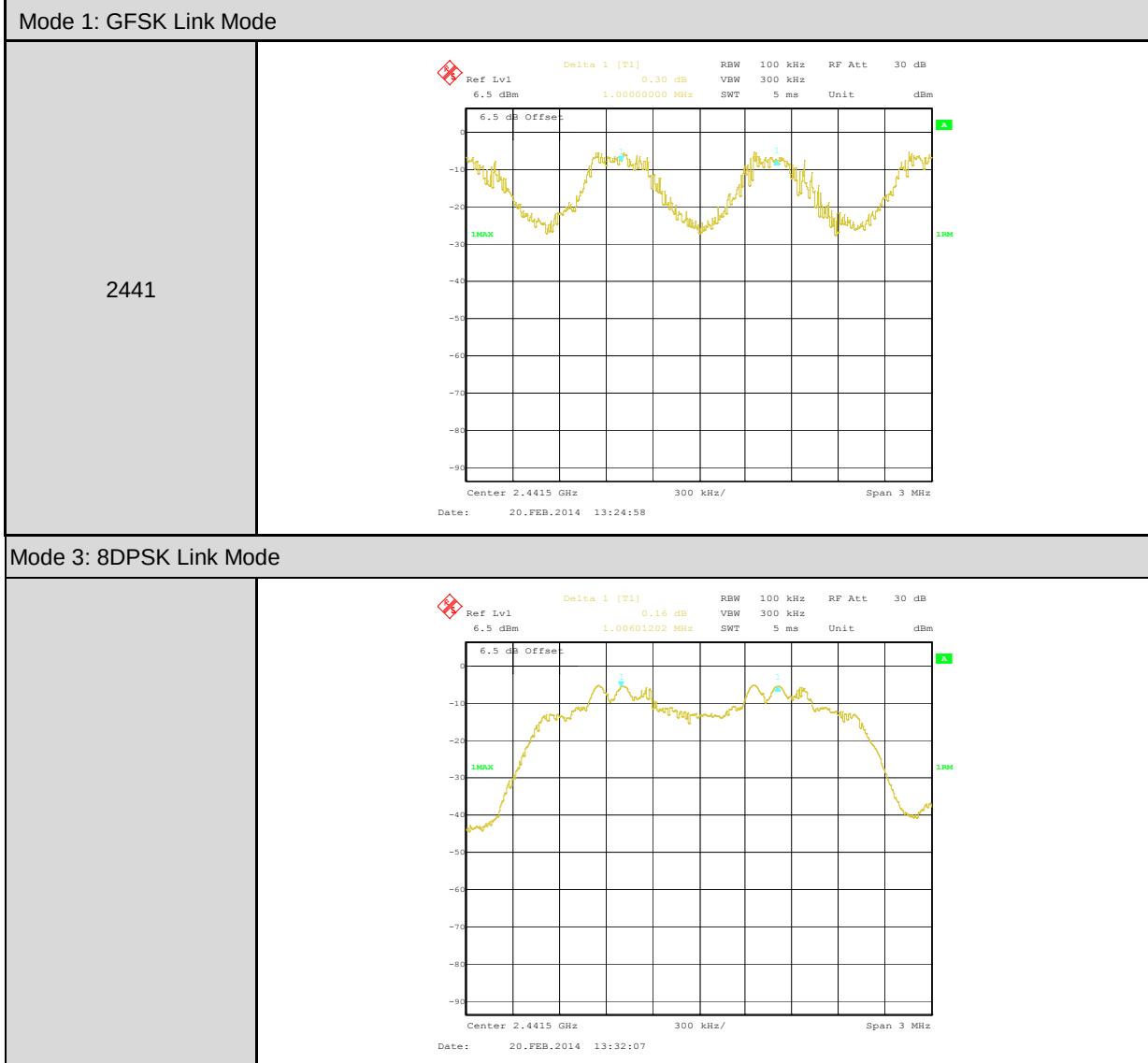
The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

Test Result

Model Number	DJControlWave		
Test Item	Carrier Frequency Separation		
Test Mode	Mode 1: GFSK Link Mode		
Date of Test	2014/02/20	Test Site	TE02
Frequency (MHz)	Measurement (MHz)	Limit (MHz)	
2441	1.000	> 0.567	

Model Number	DJControlWave		
Test Item	Carrier Frequency Separation		
Test Mode	Mode 3: 8DPSK Link Mode		
Date of Test	2014/02/20	Test Site	TE02
Frequency (MHz)	Measurement (MHz)	Limit (MHz)	
2441	1.006	> 0.813	

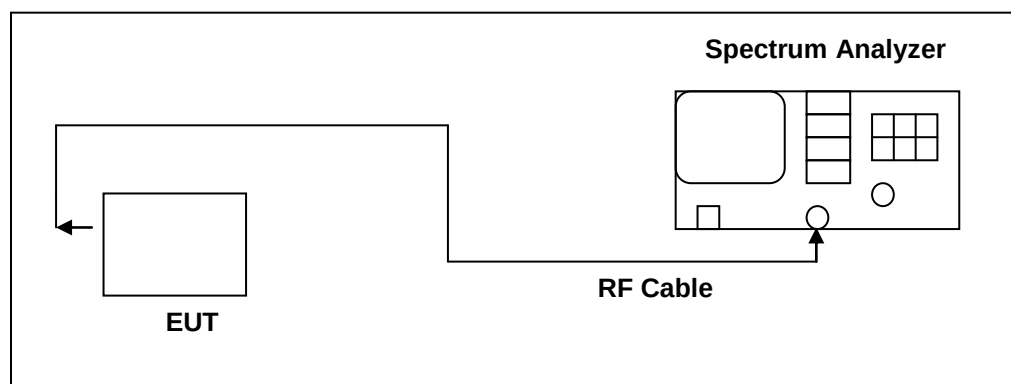
Test Graphs



8.6 Number of Hopping Measurement Limit

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

Test Setup



Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

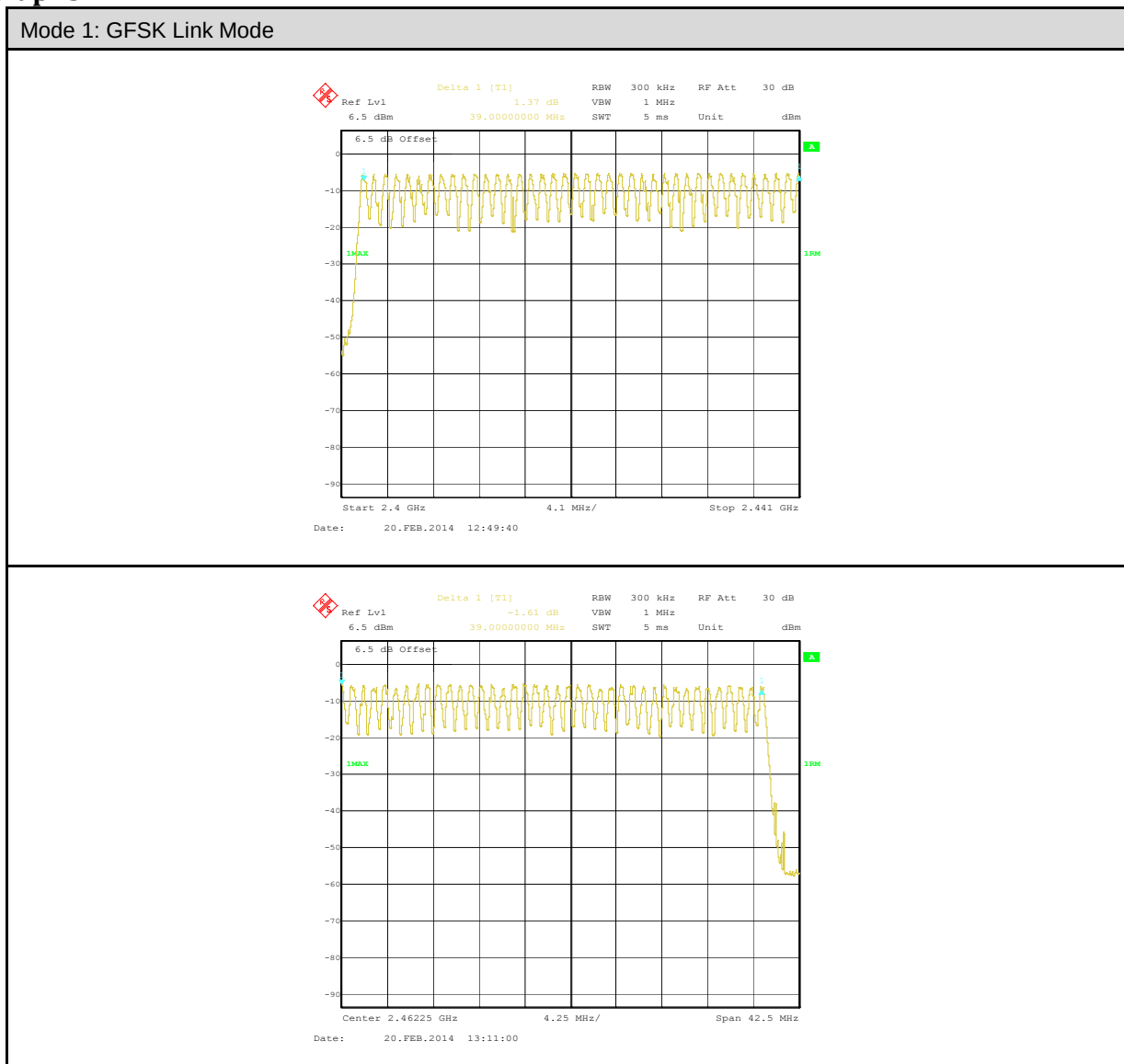
1. Span = the frequency band of operation
2. RBW $\geq$ 1% of the span
3. VBW $\geq$ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize.

Test Result

Model Number	DJControlWave		
Test Item	Number of Hopping		
Test Mode	Mode 1: GFSK Link Mode		
Date of Test	2014/02/20	Test Site	TE02
Frequency Range (MHz)	Measurement (ch)		Limit (ch)
2402 - 2480	79		> 15

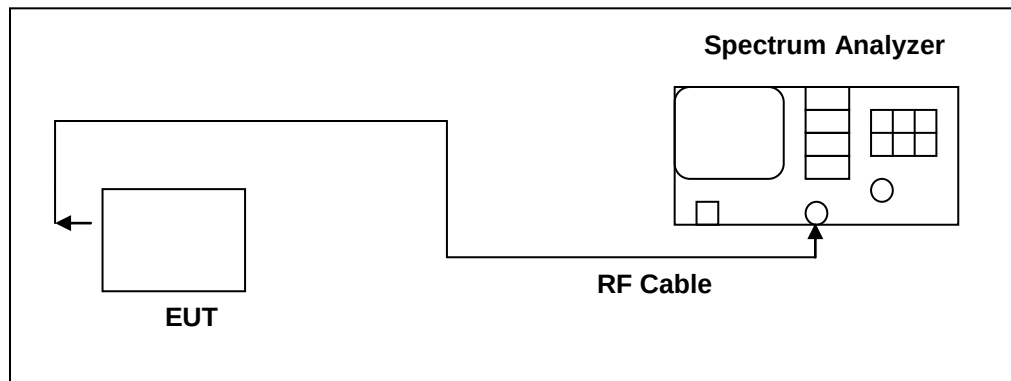
Test Graphs



8.7 Time of Occupancy (Dwell Time) Measurement Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Test Setup



Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

1. Span = zero span, centered on a hopping channel
2. RBW = 1 MHz
3. VBW $\geq$ RBW
4. Sweep = as necessary to capture the entire dwell time per hopping channel
5. Detector function = peak
6. Trace = max hold

The marker-delta function was used to determine the dwell time.

Test Result

Result

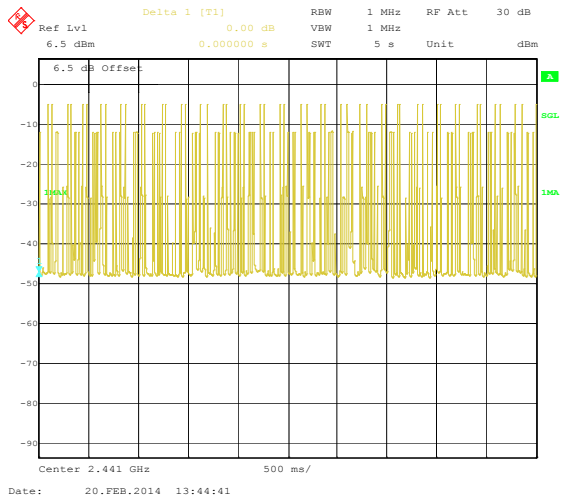
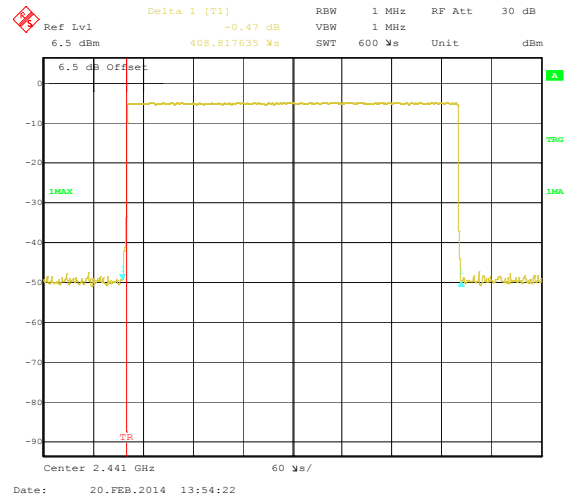
Model Number	DJControlWave		
Test Item	Time of Occupancy (Dwell Time)		
Test Mode	Mode 1: GFSK Link Mode		
Date of Test	2014/02/20	Test Site	TE02
DH1			
Length of per burst(ms)	0.409 ms		
Number of burst in 5 seconds	51		
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
Dwell Times	31.6/5*51*0.409 =131.829		
LIMIT(msec)	< = 400		
DH3			
Length of per burst(ms)	1.680		
Number of burst in 5 seconds	25		
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
Dwell Times	31.6/5*25*1.680 =265.440		
LIMIT(msec)	< = 400		
DH5			
Length of per burst(ms)	2.932		
Number of burst in 5 seconds	19		
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
Dwell Times	31.6/5*19*2.932 =352.075		
LIMIT(msec)	< = 400		

Model Number	DJControlWave		
Test Item	Time of Occupancy (Dwell Time)		
Test Mode	Mode 3: 8DPSK Link Mode		
Date of Test	2014/02/20	Test Site	TE02
DH1			
Length of per burst(ms)	0.420		
Number of burst in 5 seconds	50		
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
Dwell Times	31.6/5*50*0.420 =132.720		
LIMIT(msec)	< = 400		
DH3			
Length of per burst(ms)	1.684		
Number of burst in 5 seconds	24		
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
Dwell Times	31.6/5*24*1.684 =255.429		
LIMIT(msec)	< = 400		
DH5			
Length of per burst(ms)	2.939		
Number of burst in 5 seconds	16		
Cycle Calculate	79CH * 0.4 = 31.6 (sec)		
Dwell Times	31.6/5*16*2.939 =297.192		
LIMIT(msec)	< = 400		

Test Graphs

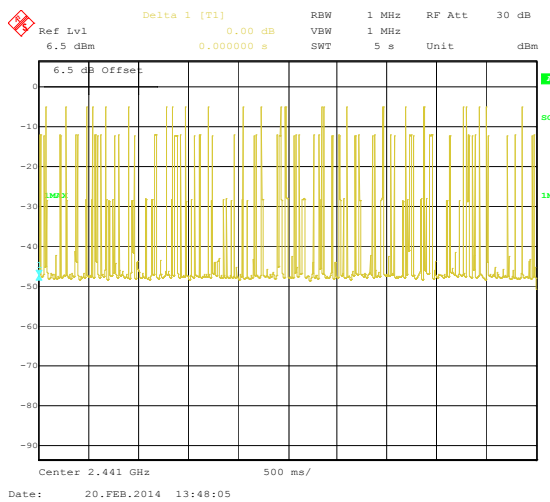
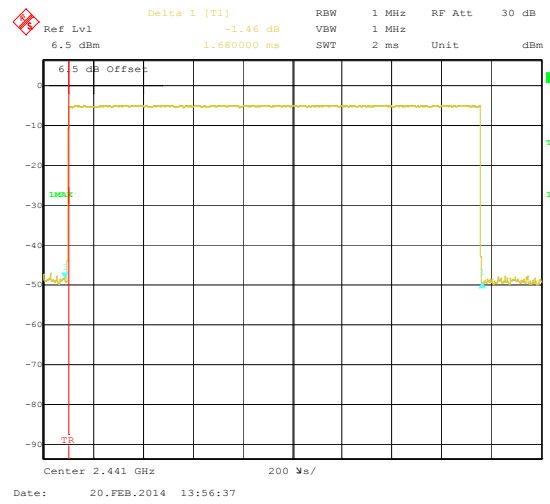
Mode 1: GFSK Link Mode

DH1



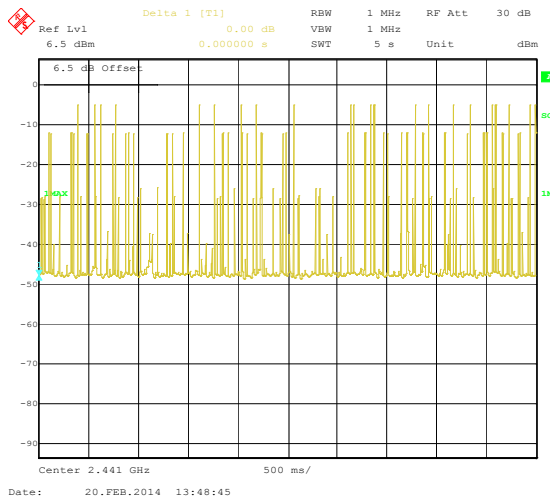
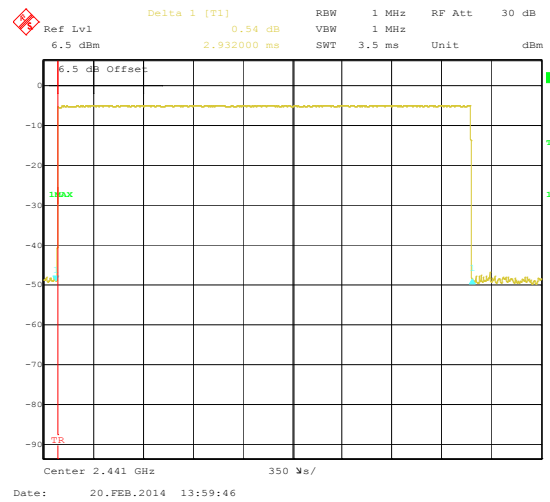
Mode 1: GFSK Link Mode

DH3



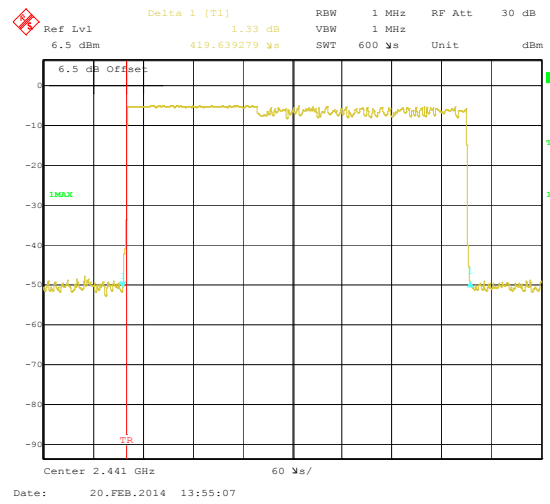
Mode 1: GFSK Link Mode

DH5

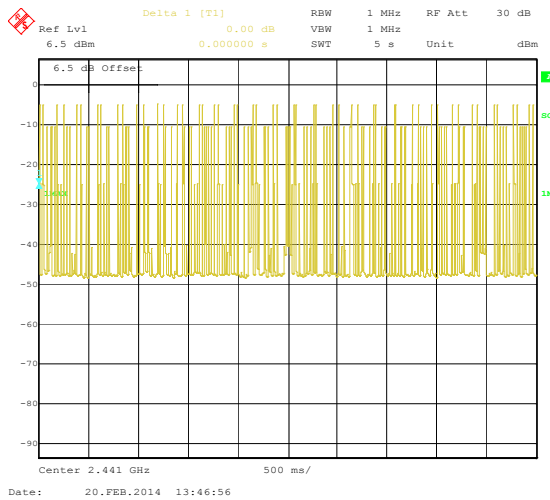


Mode 3: 8DPSK Link Mode

3DH1

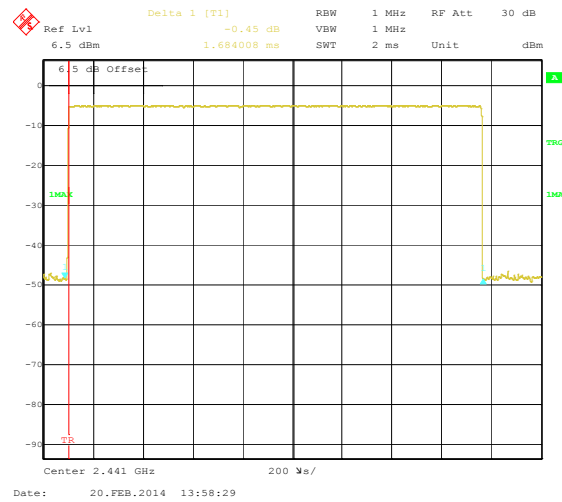


3DH1

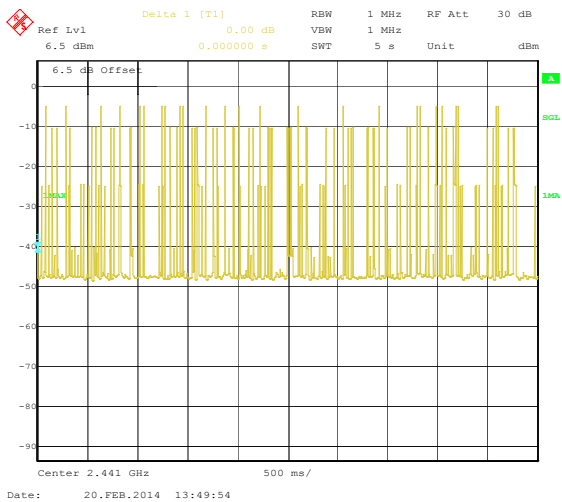


Mode 3: 8DPSK Link Mode

3DH3

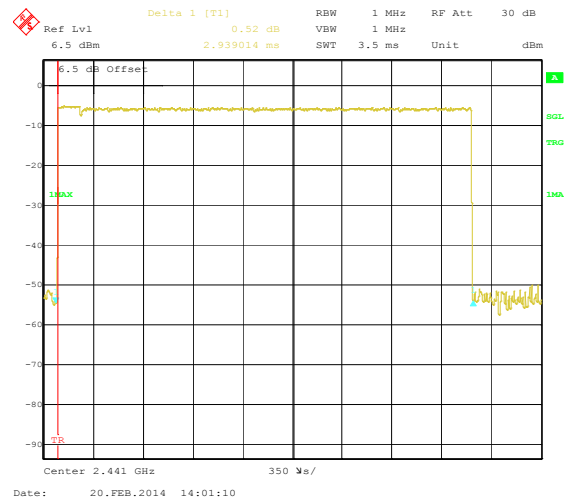


3DH3

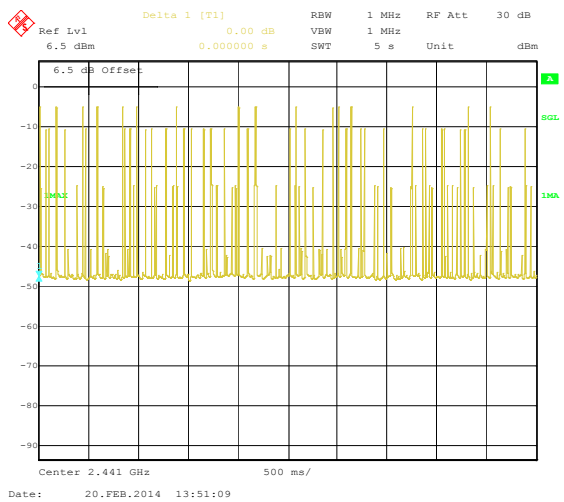


Mode 3: 8DPSK Link Mode

3DH3



3DH3

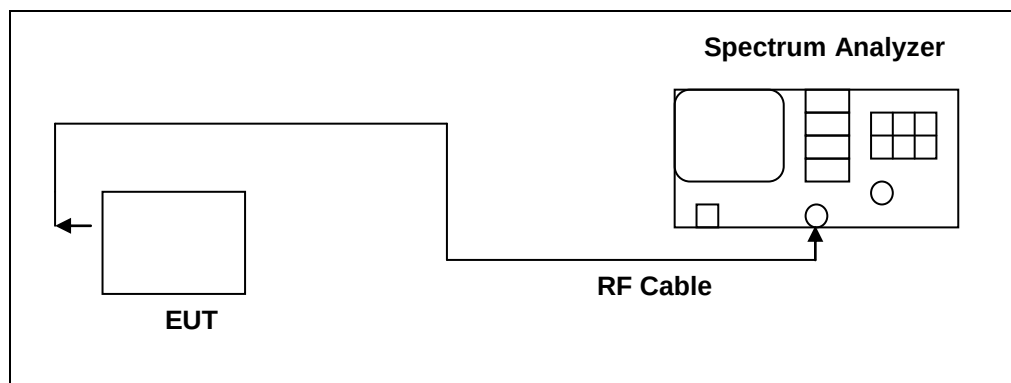


8.8 Out of Band Conducted Emissions Measurement

Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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

Test Setup



Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2013	(1)
Spectrum Analyzer	Agilent	E4408B	MY45107753	07/09/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

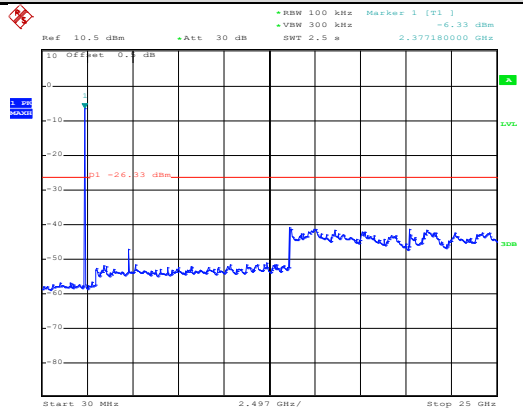
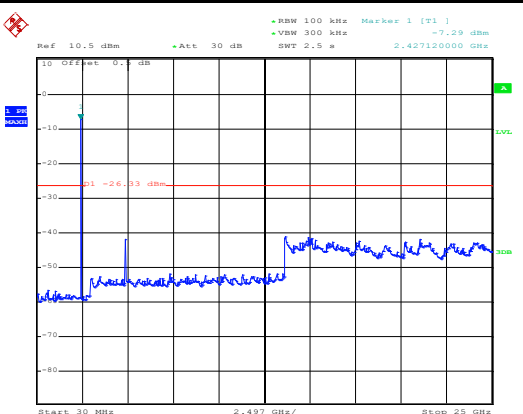
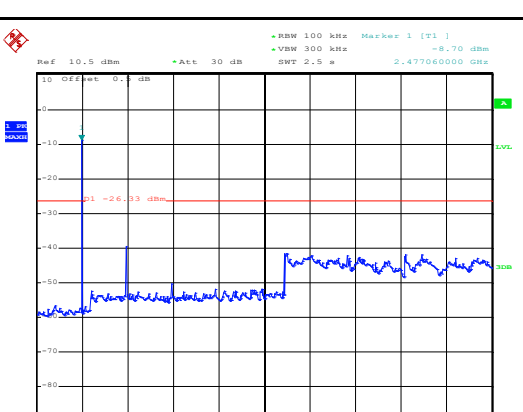
NOTE: N.C.R. = No Calibration Request.

Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

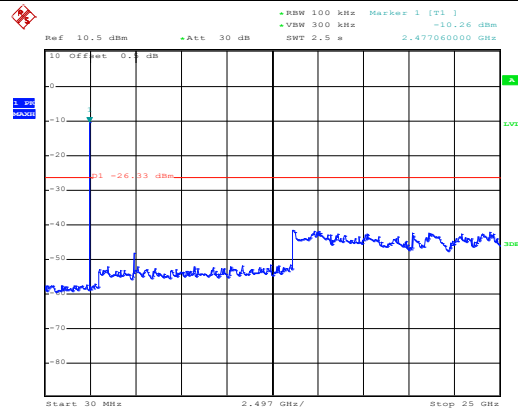
All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band. The test was performed at 3 channels (Channel 0, 39, 78)

Test Graphs

Mode 1: GFSK Link Mode(continuous)	
2402	 Date: 20.FEB.2014 18:39:52
2441	 Date: 20.FEB.2014 18:40:54
2480	 Date: 20.FEB.2014 18:41:28

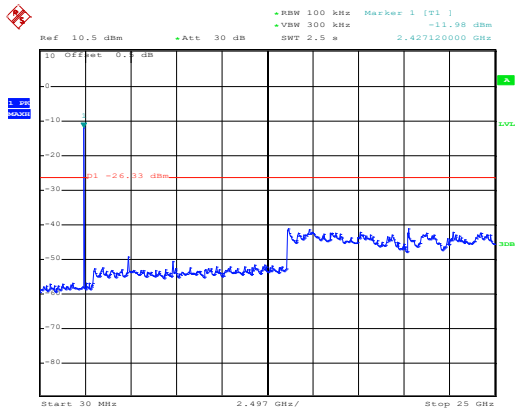
Mode 2: $\pi/4$ -DQPSK Link Mode(continuous)

2402



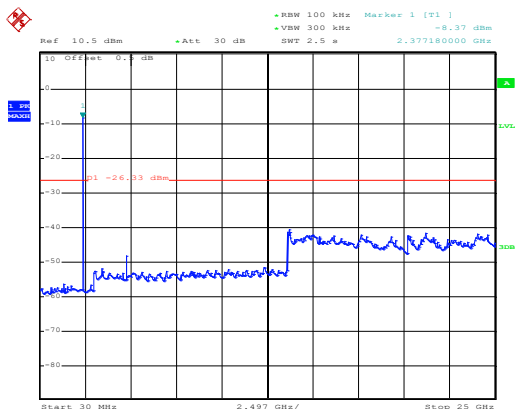
Date: 20.FEB.2014 18:42:13

2441

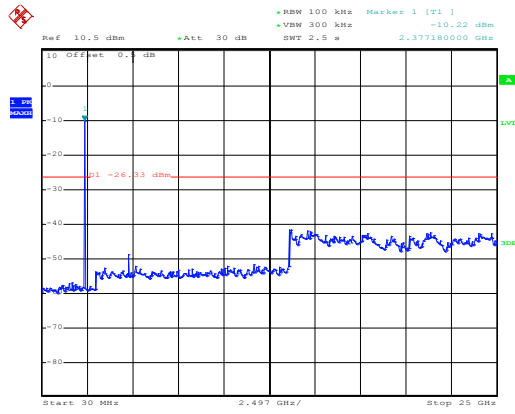
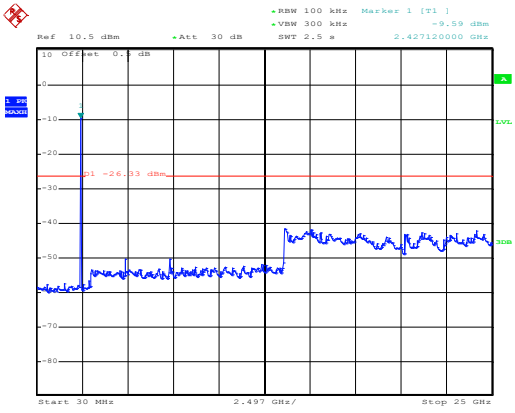
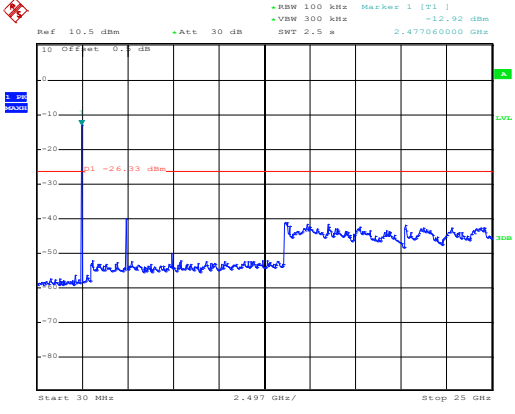


Date: 20.FEB.2014 18:43:05

2480



Date: 20.FEB.2014 18:43:56

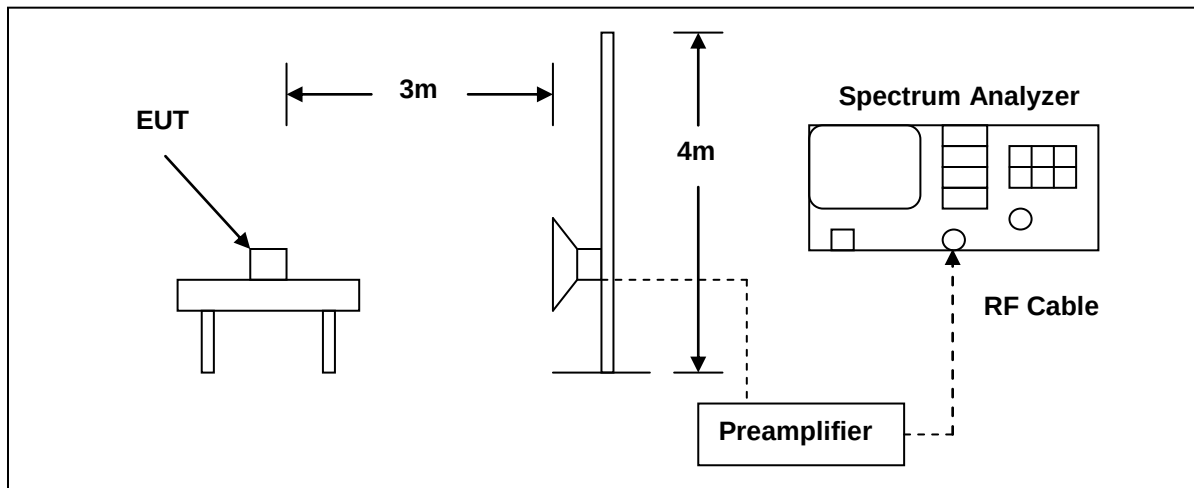
Mode 3: 8DPSK Link Mode(continuous)	
2402	 Date: 20.FEB.2014 18:44:27
2441	 Date: 20.FEB.2014 18:44:57
2480	 Date: 20.FEB.2014 18:45:37

8.9 Band Edges Measurement

Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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

Test Setup



Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4408B	MY45107753	07/09/2013	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/21/2013	(1)
Horn Antenna	SCHWARZBECK MESS-ELEKTRONIK	9120D	9120D-550	06/15/2013	(1)
Test Site	ATL	TE01	888001	08/28/2013	(1)

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The emissions on the harmonics frequencies, the limits, and the margin of compliance are presented. These tests were made when the transmitter was in full radiated power. The additional test was performed to show compliance with the requirement at the band-edge frequency 2483.5 MHz and up to 2500 MHz and at 2390.0 MHz.

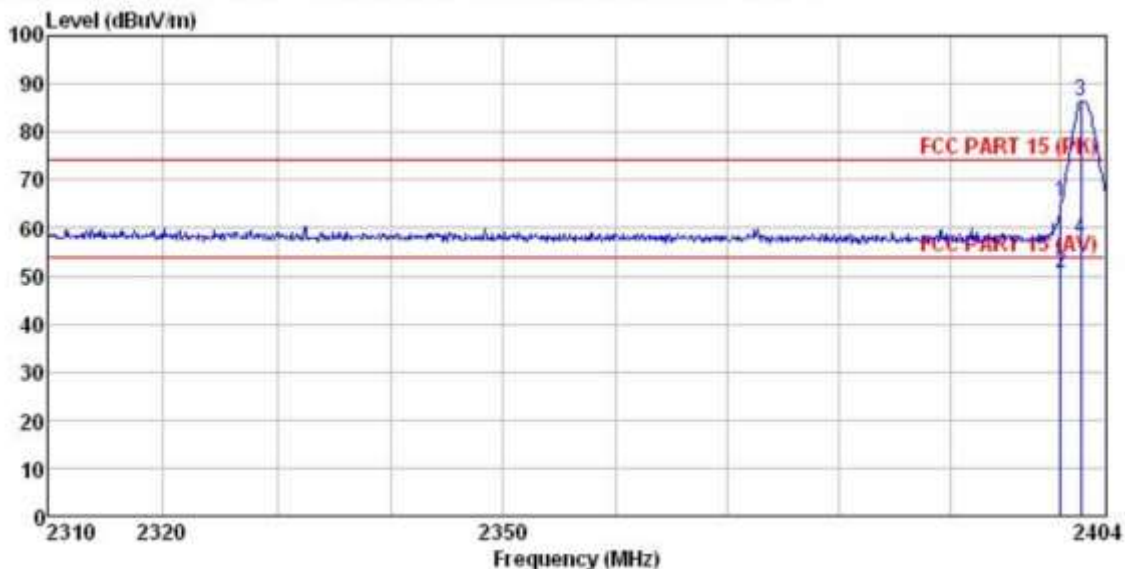
The transmitter was configured with the worst case antenna and setup to transmit at the highest channel. Then the field strength was measured at 2483.5 MHz.

The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel. Then the field strength was measured at 2390.0 MHz. These tests were performed at 4 different bit rates.

For measurements the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

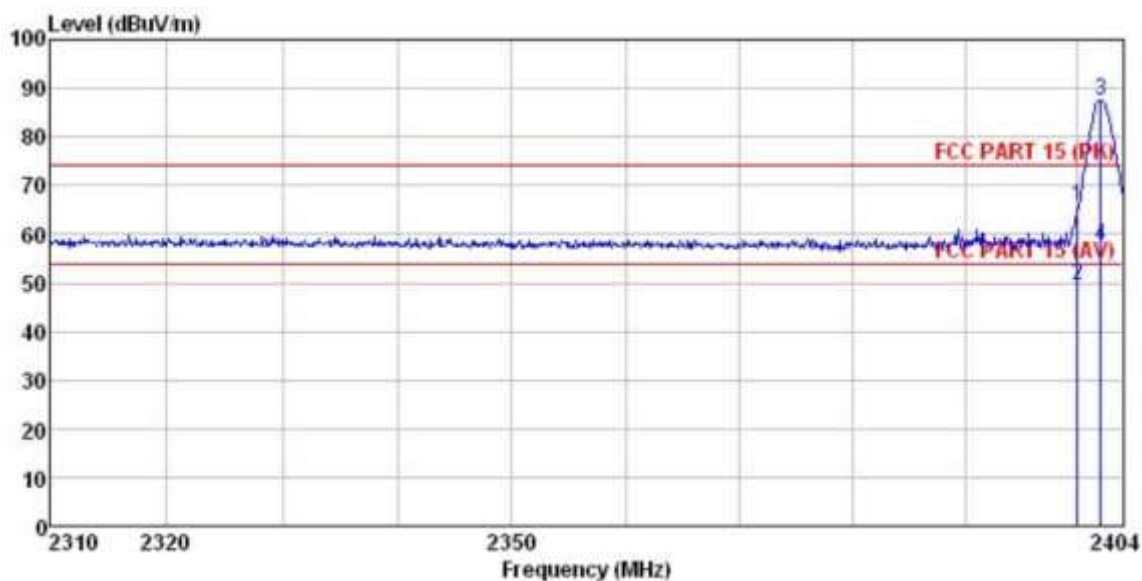
Test Result

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 3	Date:	2014/02/25
Frequency:	2402 MHz	Test By:	
Ant.Polar.:	Horizontal		



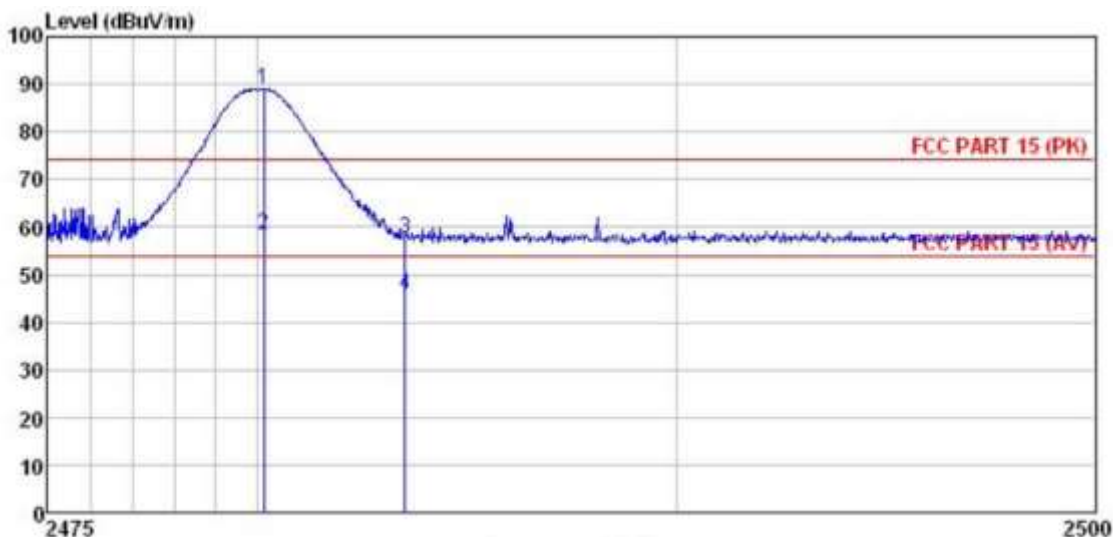
	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2400.000	31.90	27.58	5.67	0.00	65.15	74.00	-8.85	Peak
2	2400.000	17.13	27.58	5.67	0.00	50.38	54.00	-3.62	Average
3 *	2401.796	53.23	27.58	5.67	0.00	86.48	74.00	12.48	Peak
4 *	2401.796	24.42	27.58	5.67	0.00	57.67	54.00	3.67	Average

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 3	Date:	2014/02/25
Frequency:	2402 MHz	Test By:	
Ant.Polar.:	Vertical		



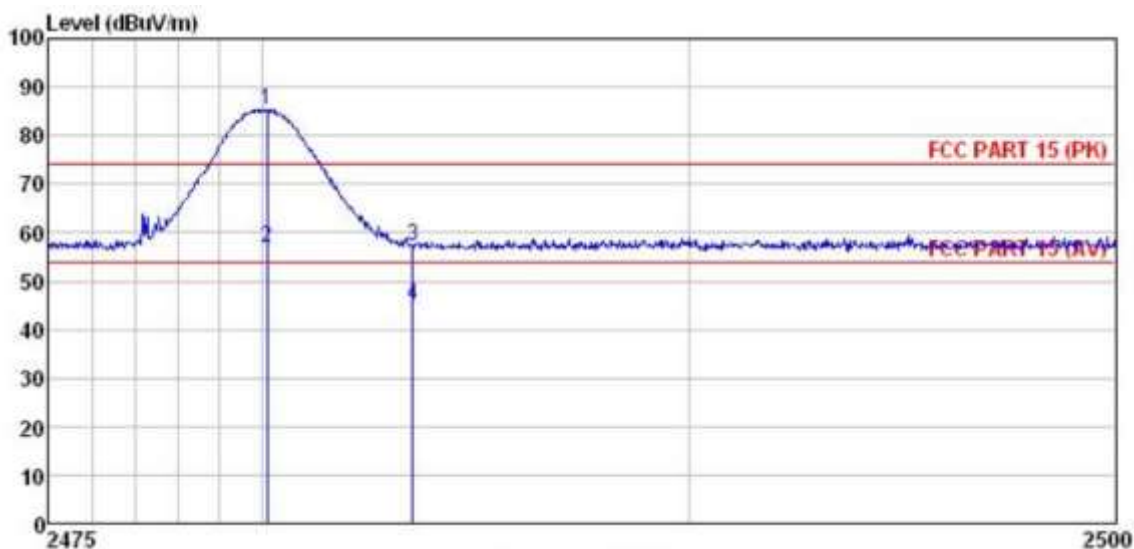
	Freq	ReadAntenna	Cable Preamp		Limit	Over		
	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2400.000	32.60	27.58	5.67	0.00	65.85	74.00	-8.15 Peak
2	2400.000	16.05	27.58	5.67	0.00	49.30	54.00	-4.70 Average
3 *	2402.083	54.35	27.54	5.67	0.00	87.56	74.00	13.56 Peak
4 *	2402.083	24.29	27.54	5.67	0.00	57.50	54.00	3.50 Average

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 3	Date:	2014/02/25
Frequency:	2480 MHz	Test By:	
Ant.Polar.:	Horizontal		



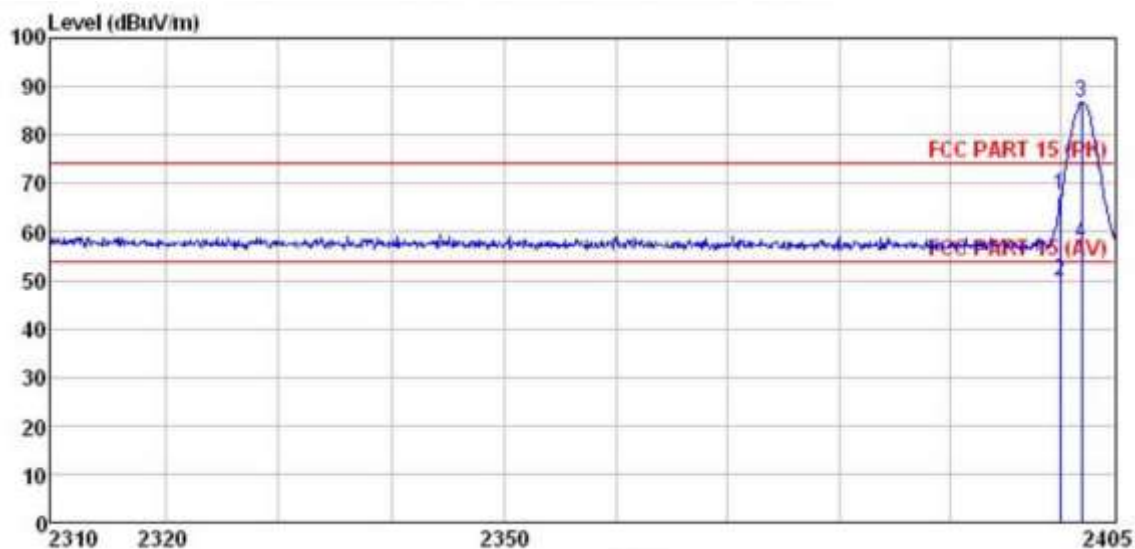
	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1 *	2480.129	55.81	27.52	5.70	0.00	89.03	74.00	15.03 Peak
2 *	2480.129	25.08	27.52	5.70	0.00	58.30	54.00	4.30 Average
3	2483.500	24.45	27.52	5.70	0.00	57.67	74.00	-16.33 Peak
4	2483.500	12.45	27.52	5.70	0.00	45.67	54.00	-8.33 Average

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 3	Date:	2014/02/25
Frequency:	2480 MHz	Test By:	
Ant.Polar.:	Vertical		



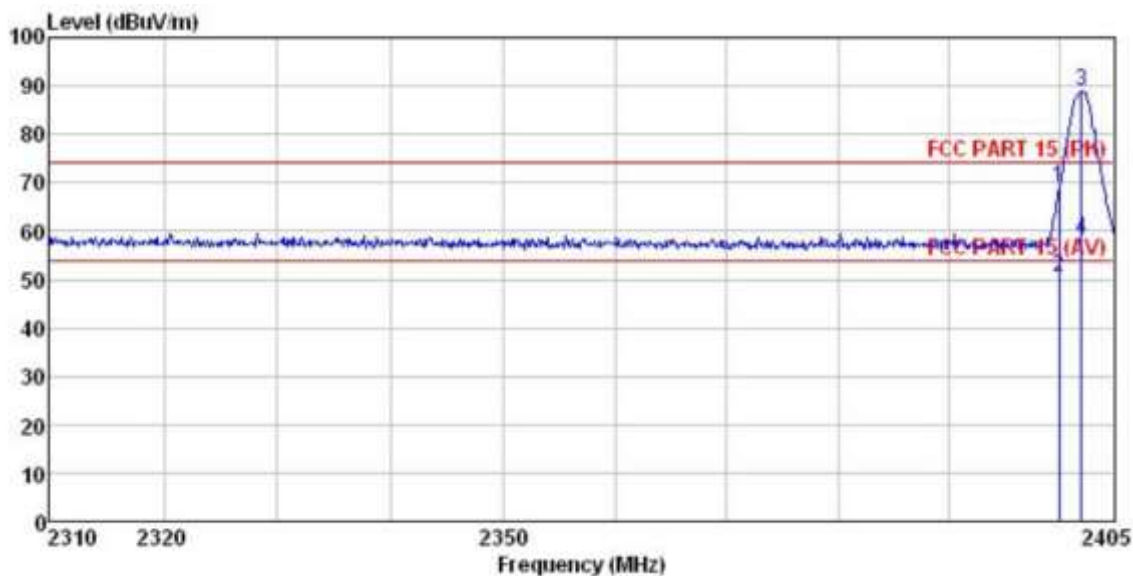
	Freq	ReadAntenna	Cable Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	* 2480.104	52.05	27.52	5.70	0.00	85.27	74.00	11.27	Peak
2	* 2480.104	23.70	27.52	5.70	0.00	56.92	54.00	2.92	Average
3	2483.497	24.00	27.52	5.70	0.00	57.22	74.00	-16.78	Peak
4	2483.500	11.84	27.52	5.70	0.00	45.06	54.00	-8.94	Average

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 3	Date:	2014/02/25
Frequency:	2402 MHz	Test By:	
Ant.Polar.:	Horizontal		



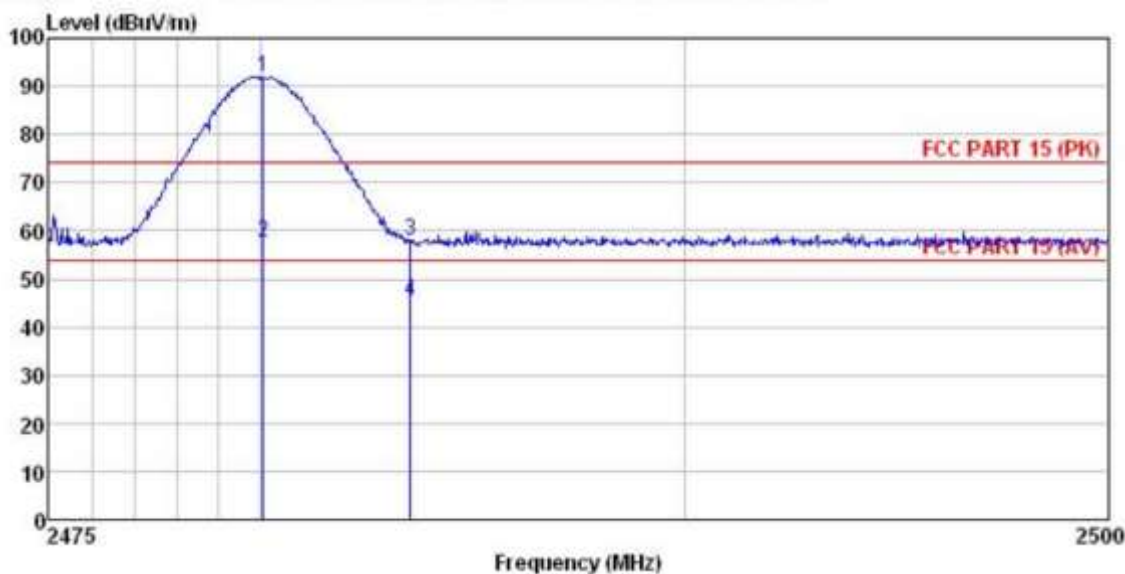
	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2400.000	34.24	27.58	5.67	0.00	67.49	74.00	-6.51	Peak
2	2400.000	16.44	27.58	5.67	0.00	49.69	54.00	-4.31	Average
3 *	2401.997	53.59	27.54	5.67	0.00	86.80	74.00	12.80	Peak
4 *	2401.997	24.37	27.54	5.67	0.00	57.58	54.00	3.58	Average

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 3	Date:	2014/02/25
Frequency:	2402 MHz	Test By:	
Ant.Polar.:	Vertical		



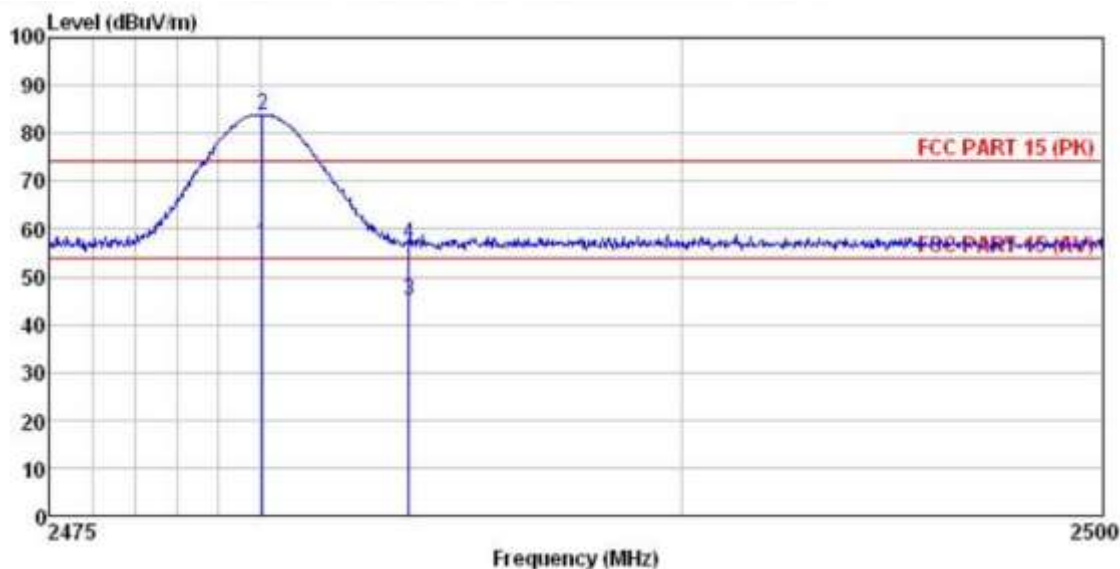
	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2400.000	35.79	27.58	5.67	0.00	69.04	74.00	-4.96	Peak
2	2400.000	17.20	27.58	5.67	0.00	50.45	54.00	-3.55	Average
3 *	2402.094	55.84	27.54	5.67	0.00	89.05	74.00	15.05	Peak
4 *	2402.094	25.20	27.54	5.67	0.00	58.41	54.00	4.41	Average

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 3	Date:	2014/02/25
Frequency:	2480 MHz	Test By:	
Ant.Polar.:	Horizontal		



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 *	2480.030	58.56	27.52	5.70	0.00	91.78	74.00	17.78	Peak
2 *	2480.030	24.47	27.52	5.70	0.00	57.69	54.00	3.69	Average
3	2483.497	24.86	27.52	5.70	0.00	58.08	74.00	-15.92	Peak
4	2483.497	12.21	27.52	5.70	0.00	45.43	54.00	-8.57	Average

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DJControlWave	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 3	Date:	2014/02/25
Frequency:	2480 MHz	Test By:	
Ant.Polar.:	Vertical		



	Freq	ReadAntenna	Cable Preamp		Limit	Over		
	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1 *	2480.030	23.43	27.52	5.70	0.00	56.65	54.00	2.65
2 *	2480.030	50.61	27.52	5.70	0.00	83.83	74.00	9.83
3	2483.497	11.79	27.52	5.70	0.00	45.01	54.00	-8.99
4	2483.497	23.47	27.52	5.70	0.00	56.69	74.00	-17.31

8.10 Antenna Measurement Limit

For intentional device, according to 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.

And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Antenna Connector Construction

The antenna used in this product is an integrated PCB monopole antenna. And the maximum Gain of this antenna is 1.0 dBi.