FCC TEST REPORT

According to

FCC Rules and Regulations

Part 15 Subpart E

Applicant	:	Zhejiang shenghui lighting Co., Ltd. Shanghai Branch
Address	:	Rm. 801, 1st Xinye Building,388 Tianlin Rd., Caohejing Development Zone, Shanghai, 200233, China
Equipment	:	LED Lamp
Model No.	:	C01-BR30
FCC ID	:	2ABX8SH-000000001

- The test result refers exclusively to the test presented test model / sample.,
- The test result does not include DFS test for 5250 ~ 5350 MHz.
- Without written approval of **Cerpass Technology Corp.,** the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

CONTENTS

History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

According to

FCC Rules and Regulations

Part 15 Subpart E

Applicant	:	Zhejiang shenghui lighting Co., Ltd. Shanghai Branch
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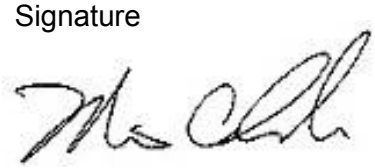
Model No.	:	C01-BR30
FCC ID	:	2ABX8SH-000000001

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4(2009)** The equipment was ***passed*** the test performed according to **FCC Rules and Regulations Part 15 Subpart E (2010) , and KDB789033.**

The test was carried out on Mar. 14, 2014 at Cerpass Technology Corp.

Signature



Miro Chueh/ Technical director

1. Report of Measurements and Examinations

1.1. List of Measurements and Examinations

For Frequency 5150MHz ~ 5250MHZ,5725MHz-5825MHz

Applied Standard : FCC Part 15, Subpart E (Section 15.407)		
FCC Rule	. Description of Test	Result
15.407(b)(5)	. Conducted Emission	Pass
15.407(b/1/2/3)(b)(5)	. Radiated Emission	Pass
15.407(a/1/2/3)	. Peak Transmit Power	Pass
15.407(a)(6)	. Peak Power Excursion	Pass
15.407(a/1/2/3)	. Peak Power Spectral Density	Pass
15.407(g)	. Frequency Stability	Pass

2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Frequency Range	5180-5240MHz, 5736-5814MHz
Type of Modulation	QPSK
Type of Antenna	PCB antenna
Antenna Gain	2dBi (5.2GHz band), 3dBi (5.8GHz band)

2.2. Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	5180	04	5736
02	5210	05	5762
03	5240	06	5814

2.3. Test Mode and Test Software

a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
b. The complete test system included EUT for RF test.
c. The EUT was executed to keep transmitting .
d. The following test mode was performed for conduction and radiation test:
   - QPSK: CH 01 : 5180MHz, CH 02: 5210MHz, CH 03: 5240MHz.
     CH 04 : 5736MHz, CH 05: 5762MHz, CH 06: 5814MHz.

2.4. Description of Test System

There is no supporting system during the test.

2.5. General Information of Test

Test Site:	Cerpass Technology (Suzhou) Co.,Ltd
Test Site Location (OATS2-SD) :	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China
FCC Registration Number :	916572, 331395
IC Registration Number :	7290A-1, 7290A-2
VCCI Registration Number :	T-343 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test below 1GHz G-227 for Radiated emission test above 1GHz
Frequency Range Investigated:	AC Power Conducted Emission : from 150kHz to 30 MHz Radiated and conducted Emission: from 30 MHz to 40 GHz
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.
Laboratory Accreditation	TAF Testing Laboratory 1439

2.6. Measurement Uncertainty

Measurement Item	Uncertainty
Radiated emission	±4.11dB
Peak Output Power(conducted)	±1.38dB
Peak Output Power(Radiated)	±1.70dB
Power Spectral Density	±1.39dB
Radiated emission(3m)	±4.11dB
Radiated emission(10m)	±3.89dB

3. Antenna Requirements

3.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

3.2. Antenna Construction and Directional Gain

Antenna Type: PCB Antenna
Antenna Gain: 2dBi (5.2GHz band),
3dBi (5.8GHz band)

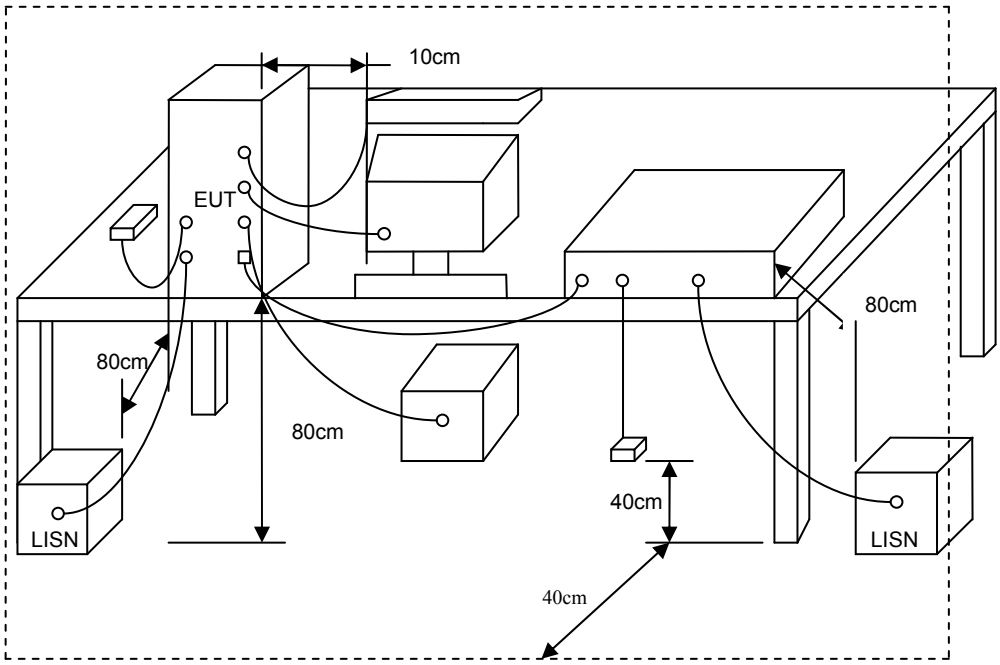
4. Test of Conducted Emission

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2009 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 1.3.1. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

4.1. Test Procedures

a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connecting to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 kHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

4.2. Typical Test Setup Layout of Conducted Emission



4.3. Conducted Emission Requirement

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2003 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	**Quasi Peak (dB μ V)**	**Average (dB μ V)**
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

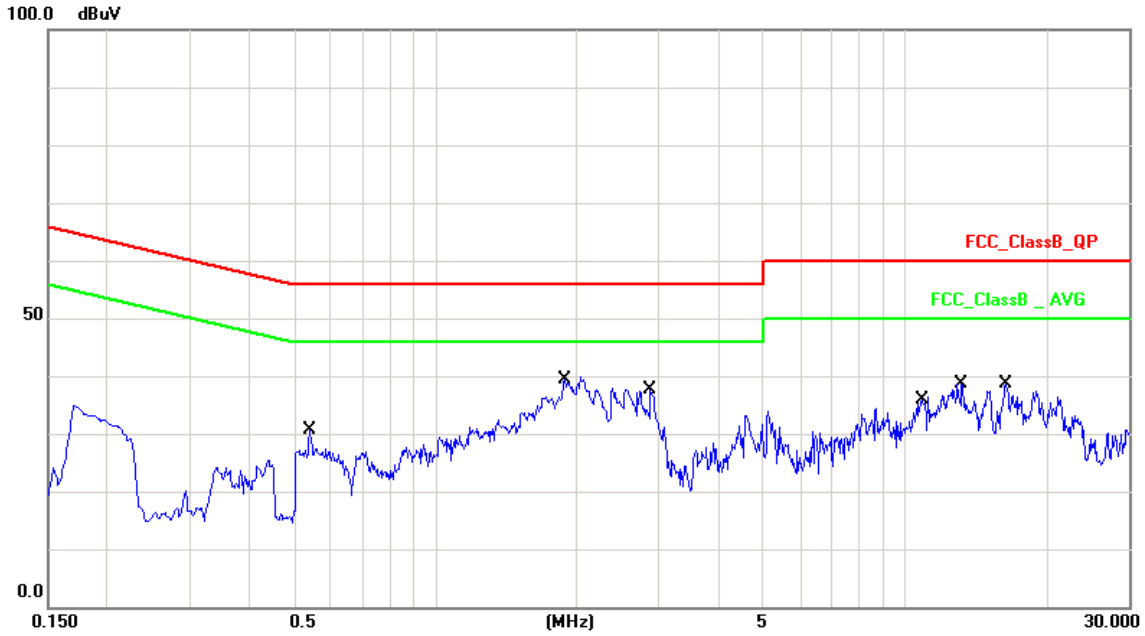
*Decreases with the logarithm of the frequency.

4.4. Measurement Equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2014.03.10	2015.03.09
ISN	FCC	FCC-TLISN-T2-02	20379	2013.06.25	2014.06.24
ISN	FCC	FCC-TLISN-T4-02	20380	2013.06.25	2014.06.24
ISN	FCC	FCC-TLISN-T8-02	20381	2013.07.09	2014.07.08

4.5. Test Result and Data

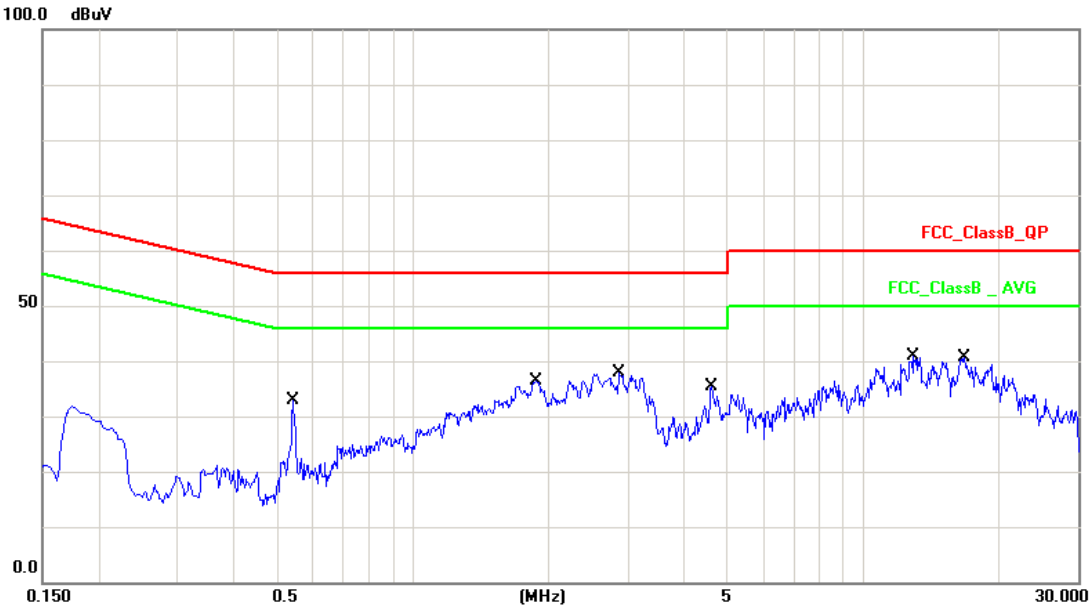
Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 120V/60Hz	Phase :	LINE
Temperature :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date:	2014/03/05



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5420	10.16	16.21	26.37	56.00	-29.63	QP
2	0.5420	10.16	12.68	22.84	46.00	-23.16	AVG
3	1.8900	10.17	25.25	35.42	56.00	-20.58	QP
4	1.8900	10.17	8.35	18.52	46.00	-27.48	AVG
5	2.8780	10.18	22.77	32.95	56.00	-23.05	QP
6	2.8780	10.18	3.89	14.07	46.00	-31.93	AVG
7	10.8660	10.30	15.90	26.20	60.00	-33.80	QP
8	10.8660	10.30	4.23	14.53	50.00	-35.47	AVG
9	13.2340	10.42	17.47	27.89	60.00	-32.11	QP
10	13.2340	10.42	5.89	16.31	50.00	-33.69	AVG
11	16.4420	10.47	17.45	27.92	60.00	-32.08	QP
12	16.4420	10.47	6.34	16.81	50.00	-33.19	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Temperature :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date:	2014/03/05



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5420	10.15	21.15	31.30	56.00	-24.70	QP
2	0.5420	10.15	19.56	29.71	46.00	-16.29	AVG
3	1.8860	10.18	22.14	32.32	56.00	-23.68	QP
4	1.8860	10.18	6.20	16.38	46.00	-29.62	AVG
5	2.8820	10.20	23.45	33.65	56.00	-22.35	QP
6	2.8820	10.20	5.28	15.48	46.00	-30.52	AVG
7	4.6100	10.24	18.27	28.51	56.00	-27.49	QP
8	4.6100	10.24	3.97	14.21	46.00	-31.79	AVG
9	12.9819	10.41	20.32	30.73	60.00	-29.27	QP
10	12.9819	10.41	8.26	18.67	50.00	-31.33	AVG
11	16.7979	10.49	19.29	29.78	60.00	-30.22	QP
12	16.7979	10.49	7.78	18.27	50.00	-31.73	AVG

Note: Measurement Level = Reading Level + Correct Factor

5. Test of Radiated Emission

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

5.1. Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.

b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest radiation.

d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.

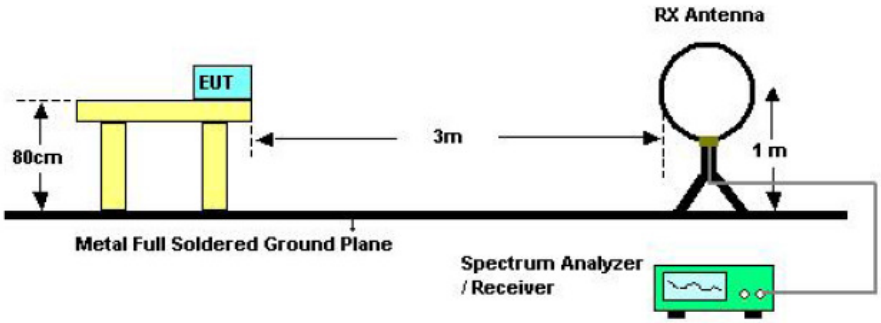
f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

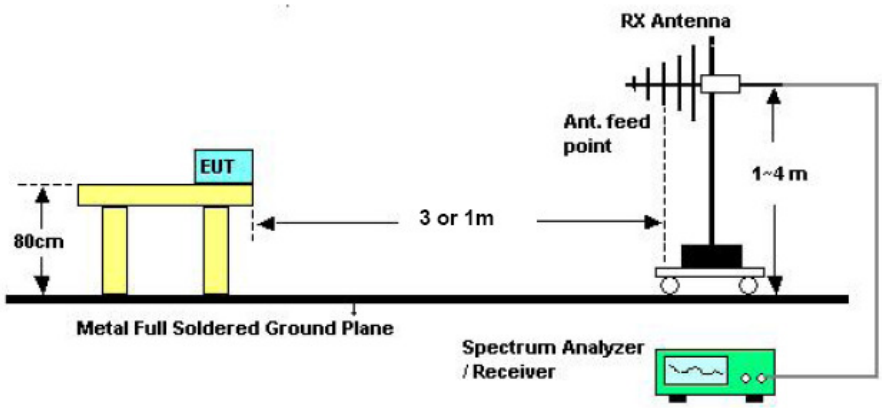
h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured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

5.2. Typical Test Setup Layout of Radiated Emission

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

5.3. Measurement Equipment

Instrument	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
EMI Test Receiver	ESCI	R&S	101183	2014.03.10	2015.03.09
H64 Amplifier	8447F	HP	3113A05582	2014.03.10	2015.03.09
Preamplifier	8449B	Agilent	3008A02342	2014.03.10	2015.03.09
Ultra Broadband Antenna	HL562	R&S	100363	2013.05.02	2014.05.01
Broad-Band Horn Antenna	BBHA9120D	Schwarzbeck	9120D-619	2013.05.02	2014.05.01
Spectrum Analyzer	FSP40	R&S	100324	2014.03.10	2015.03.09
Temperature/ Humidity Meter	ZC1-11	Zhicheng	CEP-TH-002	2014.03.10	2015.03.09

5.4. Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

5.5. Test Result of Radiated Emission (30MHz ~ 1GHz)

Site : EMC Lab AC 102	**Time : 2014-3-3**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: normal link	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant.Pol. H/V	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
33.02	V	41.33	-6.65	34.68	40.00	-5.32	QP
65.15	V	51.52	-17.29	34.23	40.00	-5.77	QP
136.39	V	48.74	-10.74	38	43.50	-5.5	QP
505.77	V	40.16	-2.27	37.89	46.00	-8.11	QP
652.36	V	40.37	-0.42	39.95	46.00	-6.05	QP
910.28	V	35.71	2.89	38.6	46.00	-7.4	QP
111.74	H	45.23	-9.92	35.31	43.50	-8.19	QP
162.96	H	49.74	-13.05	36.69	43.50	-6.81	QP
404.77	H	42.29	-5	37.29	46.00	-8.71	QP
454.35	H	40.36	-3.13	37.23	46.00	-8.77	QP
910.72	H	36.15	2.89	39.04	46.00	-6.96	QP
923.96	H	34.96	3.72	38.68	46.00	-7.32	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

5.6. Test Result of Radiated Emission (Above 1GHz)

Site : EMC Lab AC 102	**Time : 2014-3-3**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by QPSK 5180MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
10361.4	V	34.85	21.45	17.64	52.49	39.09	74	54	-14.91	average
10360.2	H	35.25	21.46	17.71	52.96	39.17	74	54	-14.83	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2014-3-3**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by QPSK 5210MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
10420.7	V	34.15	24.87	17.89	52.04	42.76	74	54	-11.24	average
10420.8	H	33.87	23.75	17.96	51.83	41.71	74	54	-12.29	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2014-3-3**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by QPSK 5240MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
10480.6	V	33.55	23.45	18.23	51.78	41.68	74	54	-12.32	average
10481.8	H	33.56	23.65	18.35	51.91	42	74	54	-12	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2014-3-3**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by QPSK 5736MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11472.2	V	34.16	22.24	19.12	53.28	41.36	74	54	-12.64	average
11471.9	H	36.28	23.17	19.23	55.51	42.4	74	54	-11.6	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2014-3-3**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by QPSK 5762MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11524.2	V	33.39	25.33	19.45	52.84	44.78	74	54	-9.22	average
11524.9	H	33.59	24.18	19.51	53.1	43.69	74	54	-10.31	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2014-3-3**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by QPSK 5814MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
11627.1	V	34.18	22.49	22.34	56.52	44.83	74	54	-9.17	average
11628	H	35.39	23.36	20.45	55.84	43.81	74	54	-10.19	average

Note:

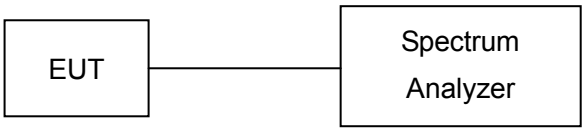
1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

6. Peak Transmit Power

6.1. Test Procedure

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.
3. Set detector mode to RMS, trace average 100 traces in power averaging mode.
4. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges.
5. The peak transmit power was measured and recorded.

6.2. Test Setup Layout



6.3. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	Agilent	N9010A	MY53400169	2013.09.28	2014.09.27

6.4. Test Result and Data

Test Date: Mar. 11, 2014 Temperature: 22℃

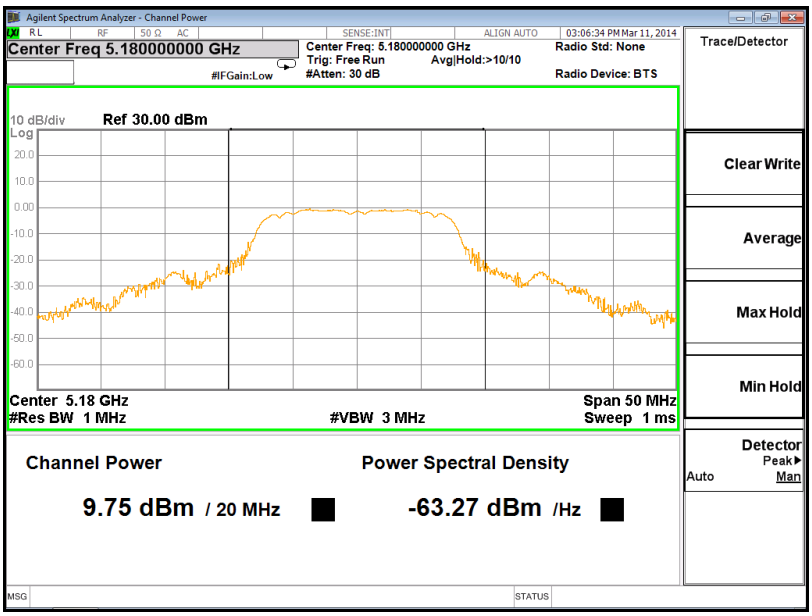
Atmospheric pressure: 1020 hPa Humidity: 65%

Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)
1	5180	9.75	9.44
2	5210	9.35	8.61
3	5240	9.28	8.47
4	5736	13.14	20.61
5	5762	13.12	20.51
6	5814	14.05	25.41

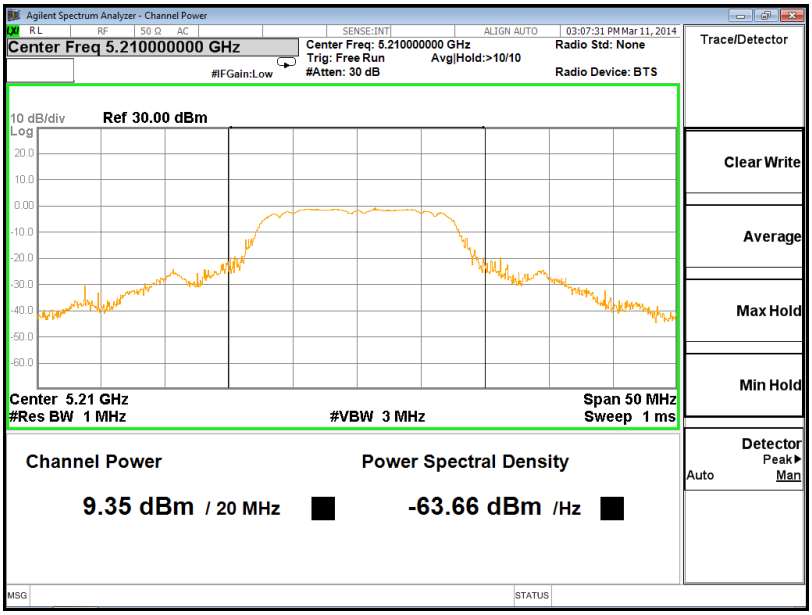
Channel	Frequency (MHz)	26dB Occupied Bandwidth (MHz)
1	5180	29.08
2	5210	29.24
3	5240	29.09
4	5736	18.64
5	5762	20.08
6	5814	17.98

Peak Output Power

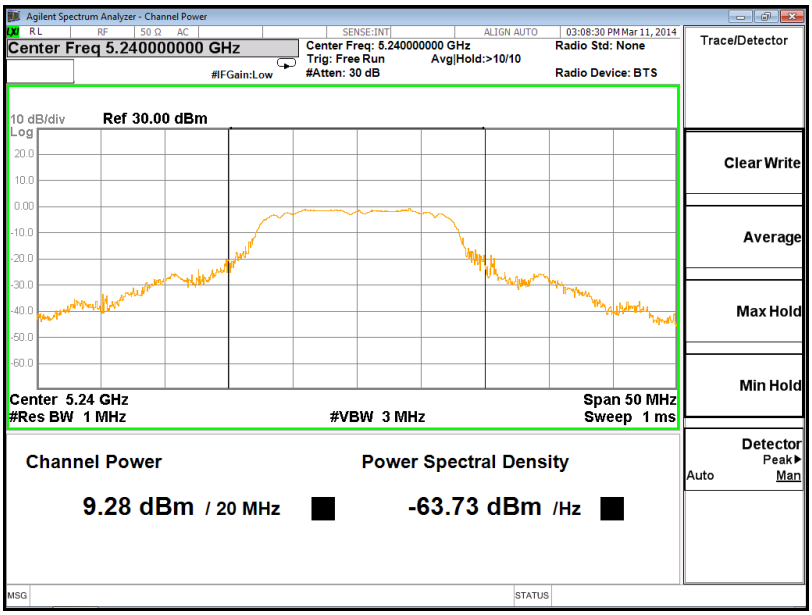
Channel: 1



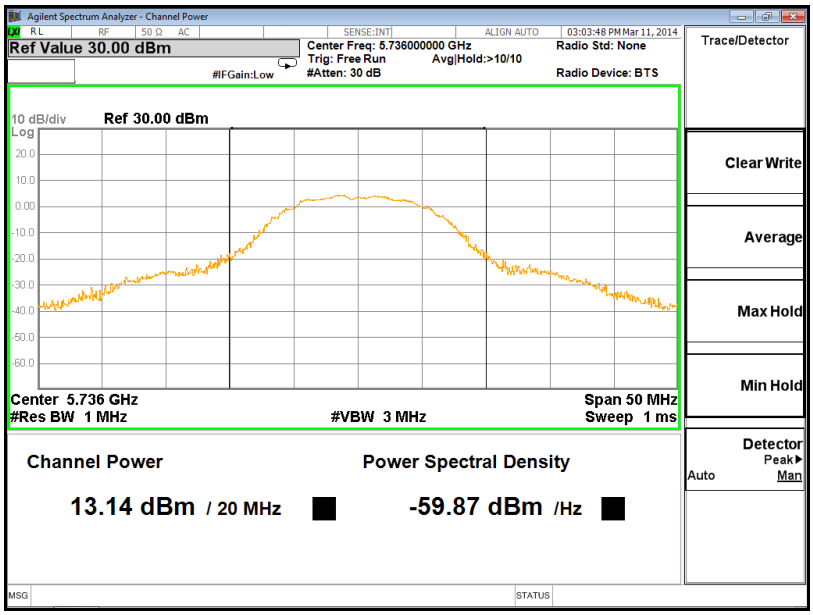
Channel: 2



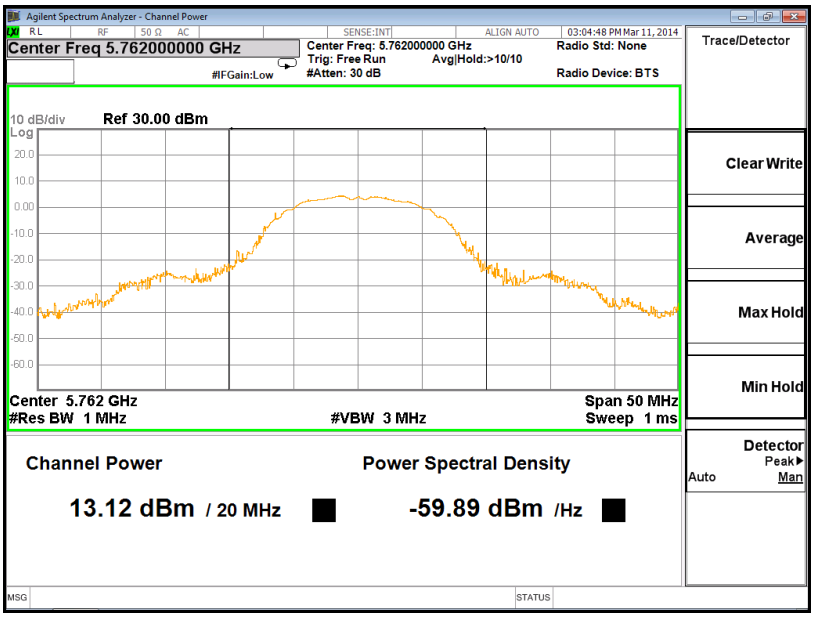
Channel: 3



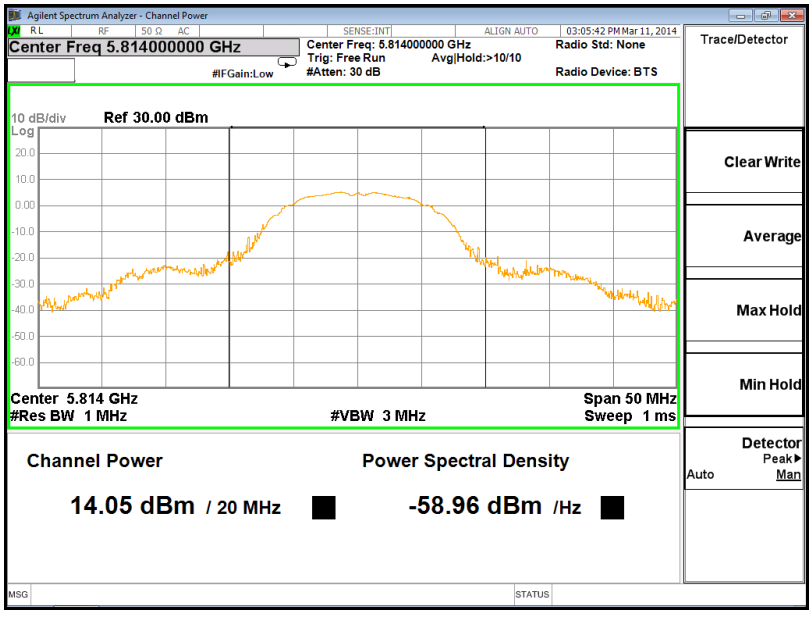
Channel: 4



Channel: 5

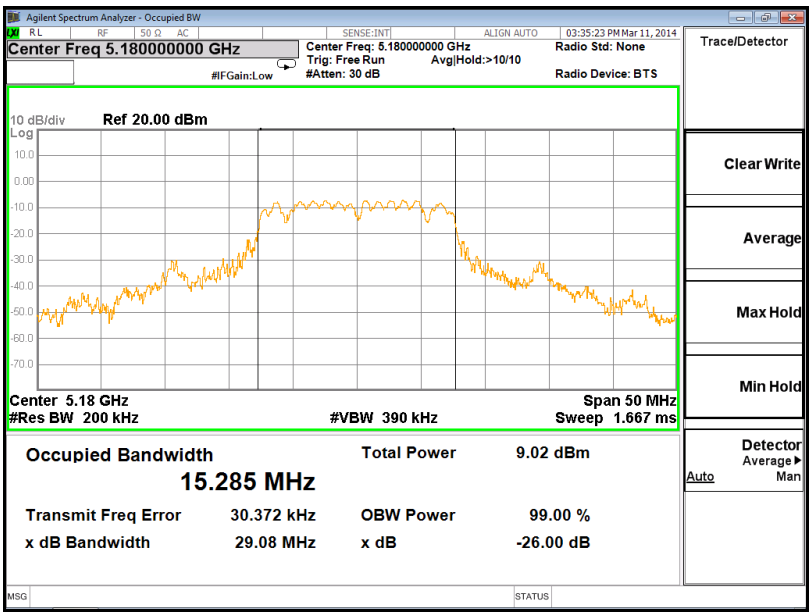


Channel: 6

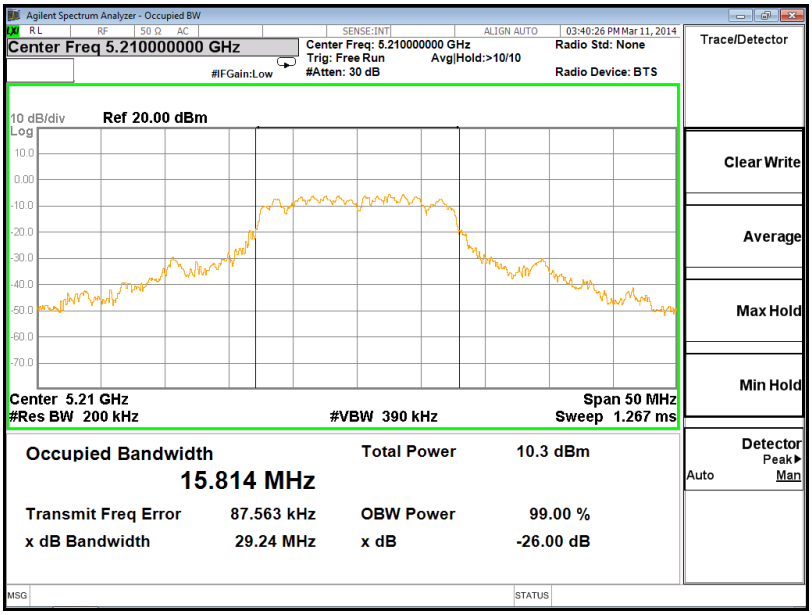


26dB Occupied Bandwidth

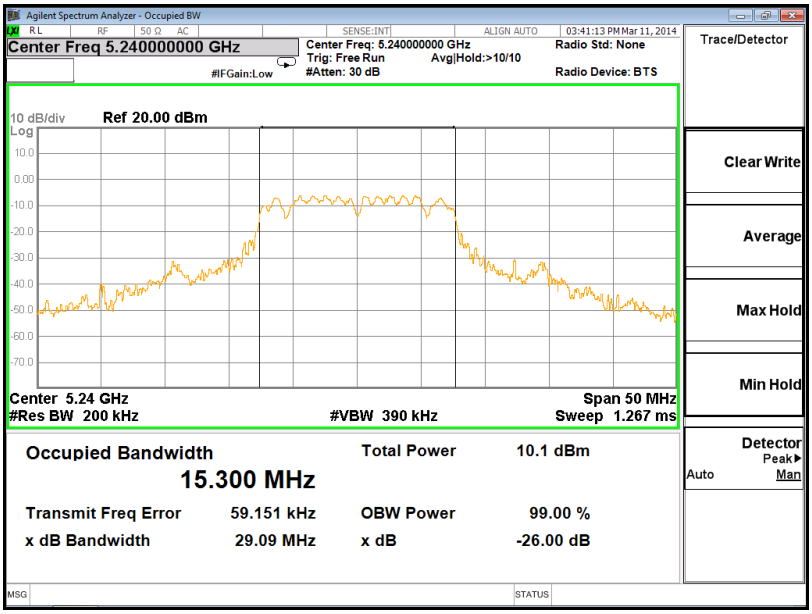
Channel: 1



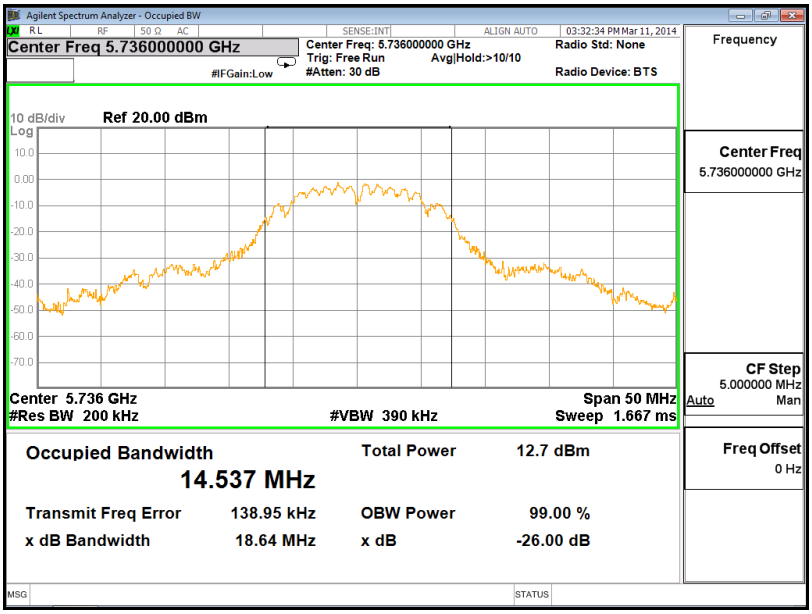
Channel: 2



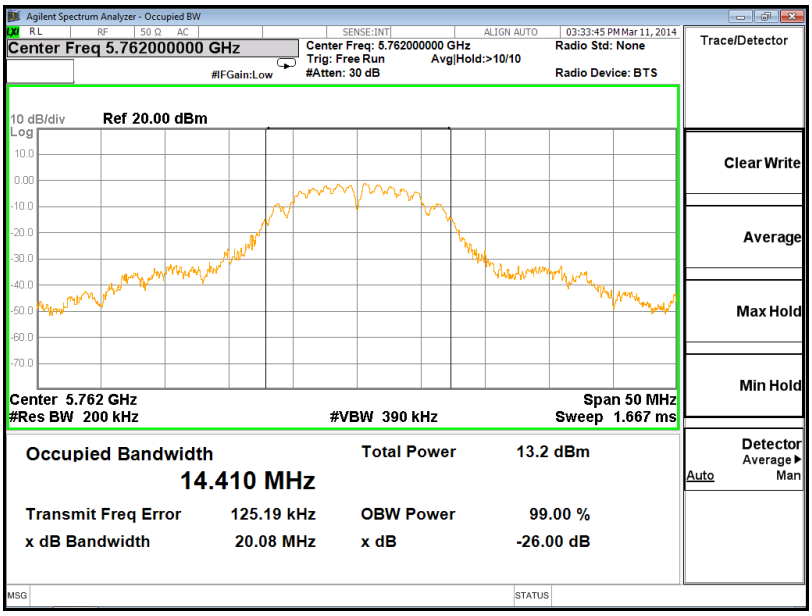
Channel: 3



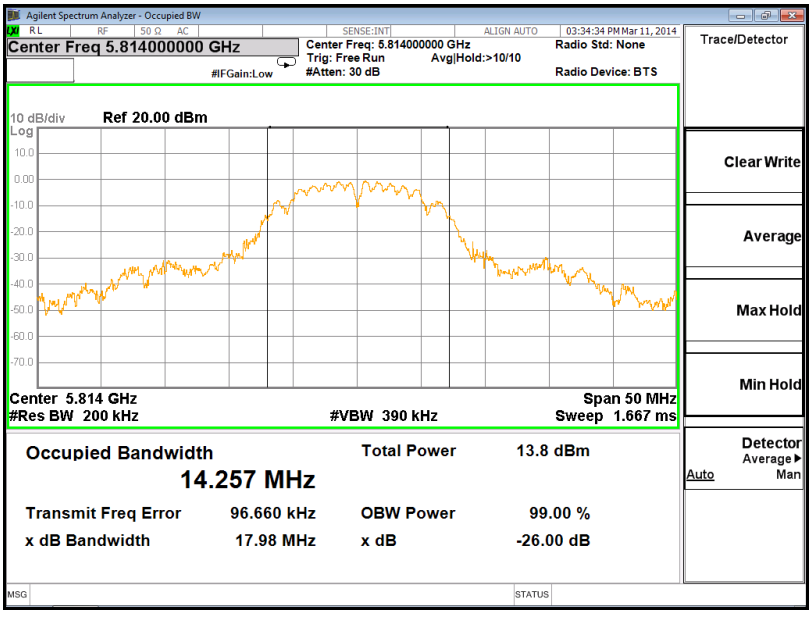
Channel: 4



Channel: 5



Channel: 6

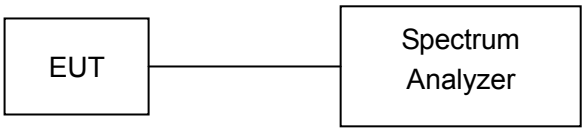


7. Peak Power Excursion

7.1. Test Procedure

1. The transmitter output was connected to the spectrum analyzer
2. Using Peak detector and max-hold function.
3. Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz
4. Allow the sweeps to continue until the trace stabilizes.
5. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

7.2. Test Setup Layout



7.3. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	Agilent	N9010A	MY53400169	2013.09.28	2014.09.27

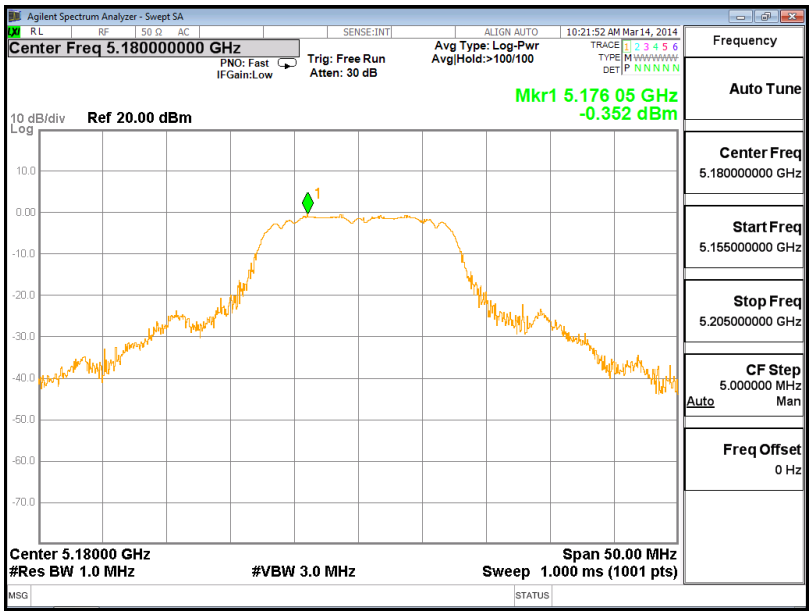
7.4. Test Result and Data

Test Date: Mar. 14, 2014 Temperature: 22℃

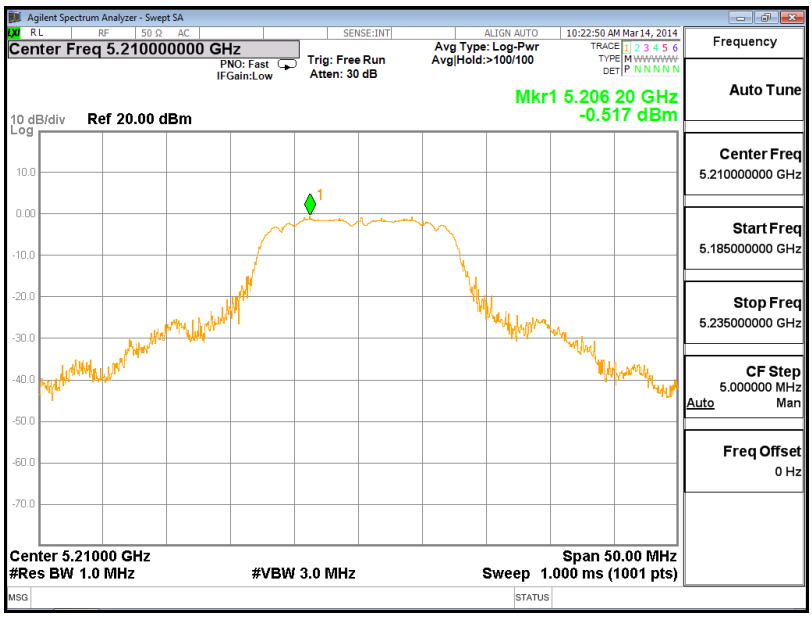
Atmospheric pressure: 1020 hPa Humidity: 65%

Channel	Frequency (MHz)	Peak Power (dBm/MHz)	PPSD Value(dBm/MHz)	Peak excursion(dB)	Limit (dB)
1	5180	-0.352	-2.601	2.249	13
2	5210	-0.517	-2.691	2.174	13
3	5240	-0.799	-3.030	2.231	13
4	5736	4.238	2.471	1.767	13
5	5762	4.411	3.263	1.148	13
6	5814	5.324	3.658	1.666	13

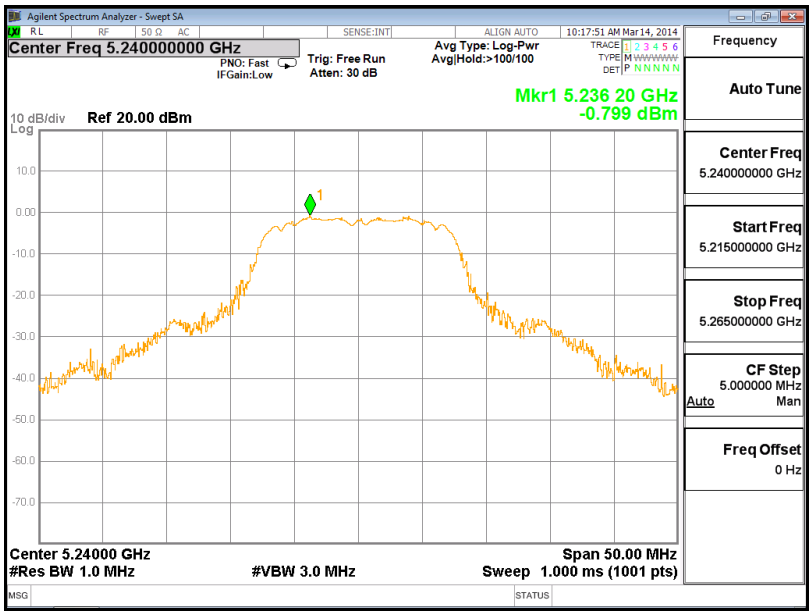
Channel: 1



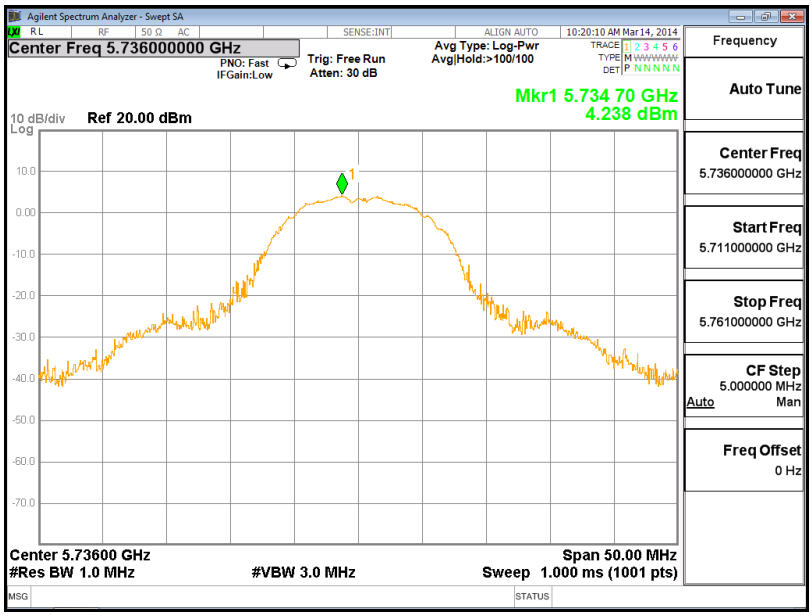
Channel: 2



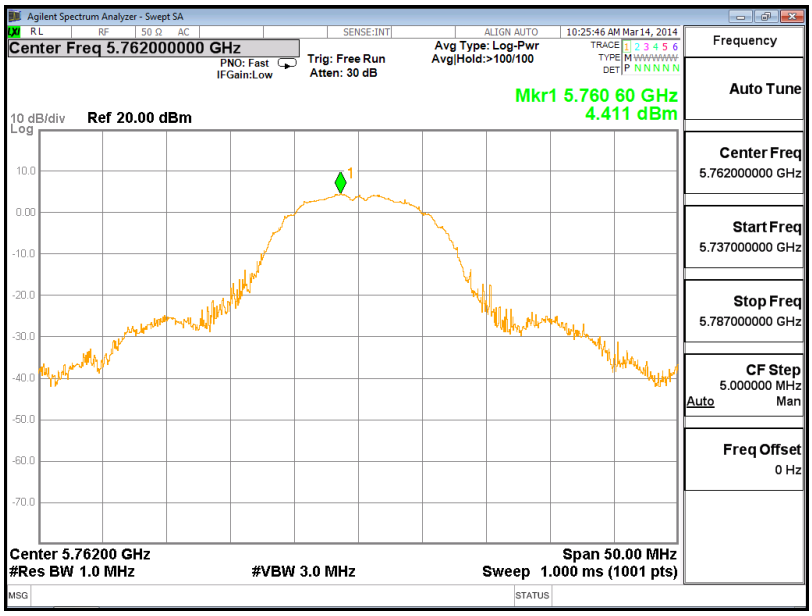
Channel: 3



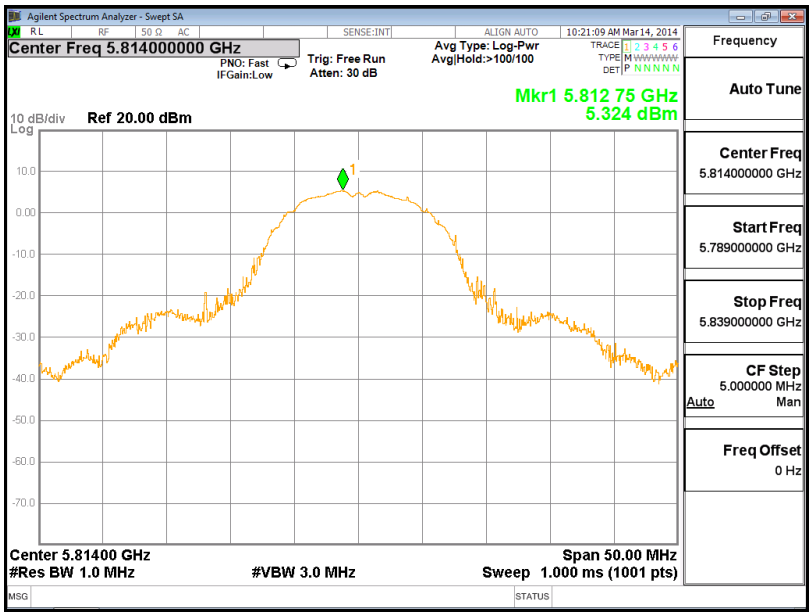
Channel: 4



Channel: 5



Channel: 6

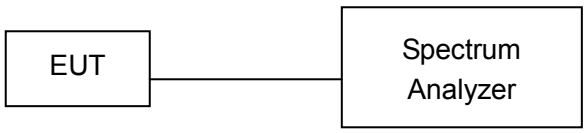


8. Peak Power Spectral Density

8.1. Test Procedure

1. The transmitter output was connected to spectrum analyzer.
2. Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz, Set detector mode to RMS, trace average 100 traces in power averaging mode.
3. The Peak Power Spectral Density is the highest level found across the emission in any 1MHz Band

8.2. Test Setup Layout



8.3. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	Agilent	N9010A	MY53400169	2013.09.28	2014.09.27

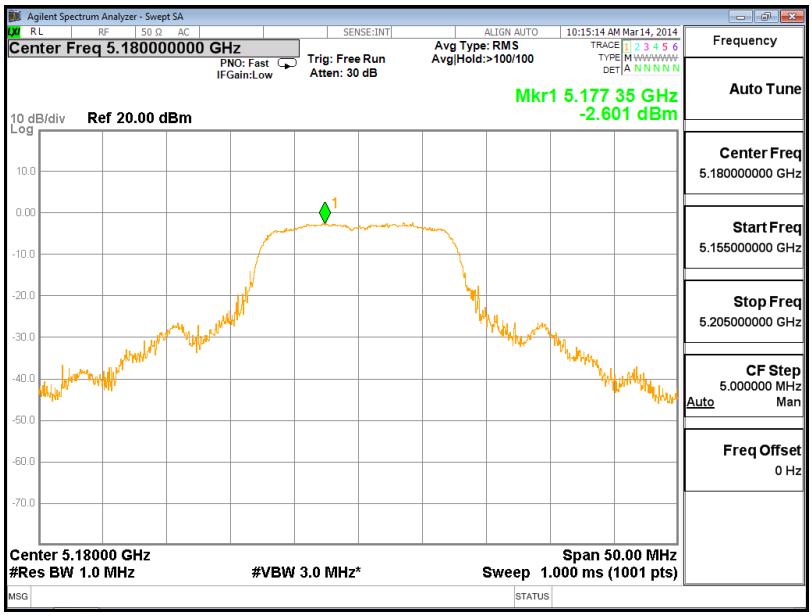
8.4. Test Result and Data

Test Date: Mar. 14, 2014 Temperature: 22℃

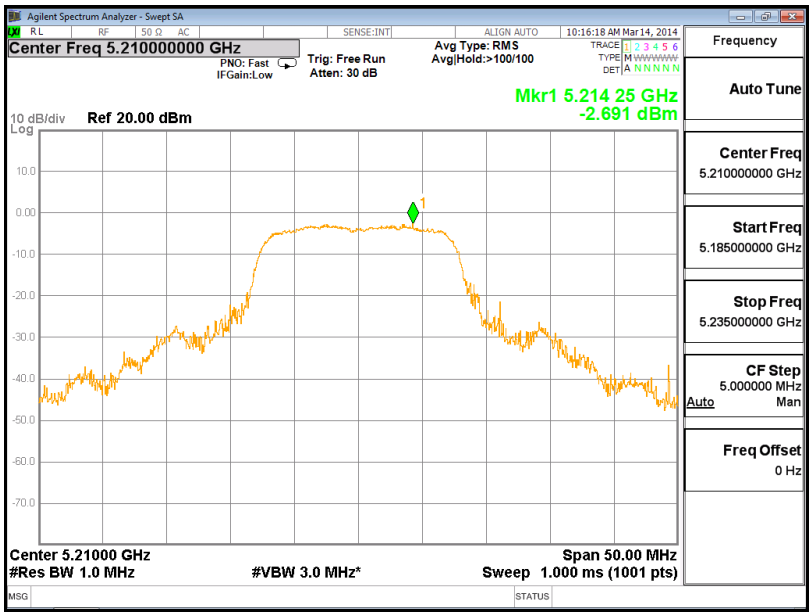
Atmospheric pressure: 1020 hPa Humidity: 65%

Channel	Frequency (MHz)	RF Power Level In 1MHz BW (dBm)	Limit (dB)
1	5180	-2.601	4
2	5210	-2.691	4
3	5240	-3.030	4
4	5736	2.471	17
5	5762	3.263	17
6	5814	3.658	17

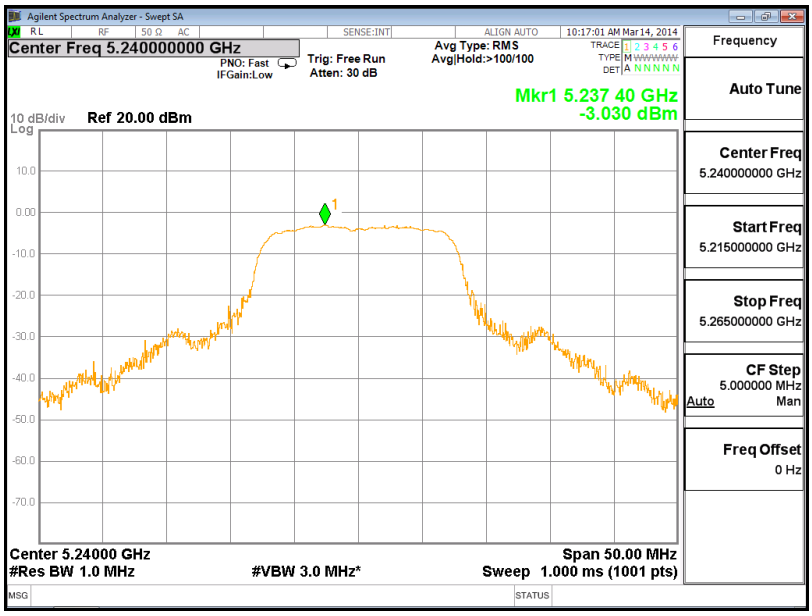
Channel: 1



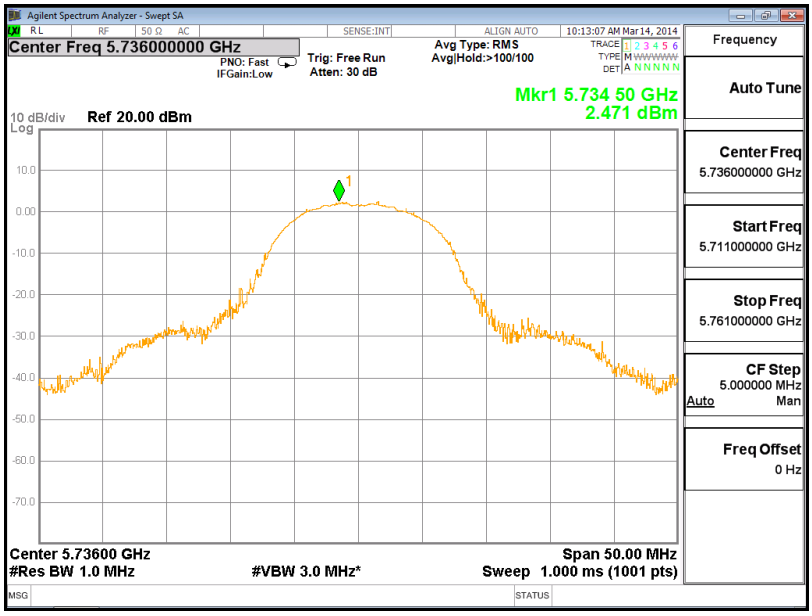
Channel: 2



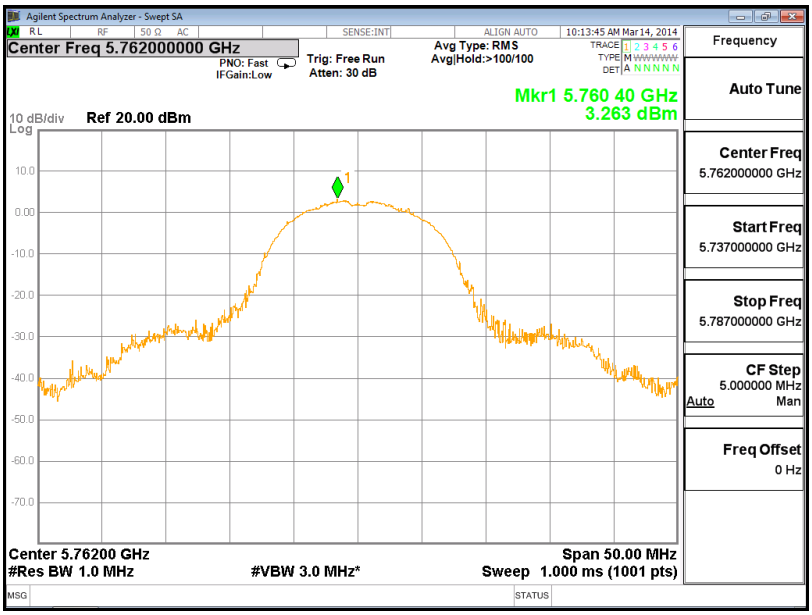
Channel: 3



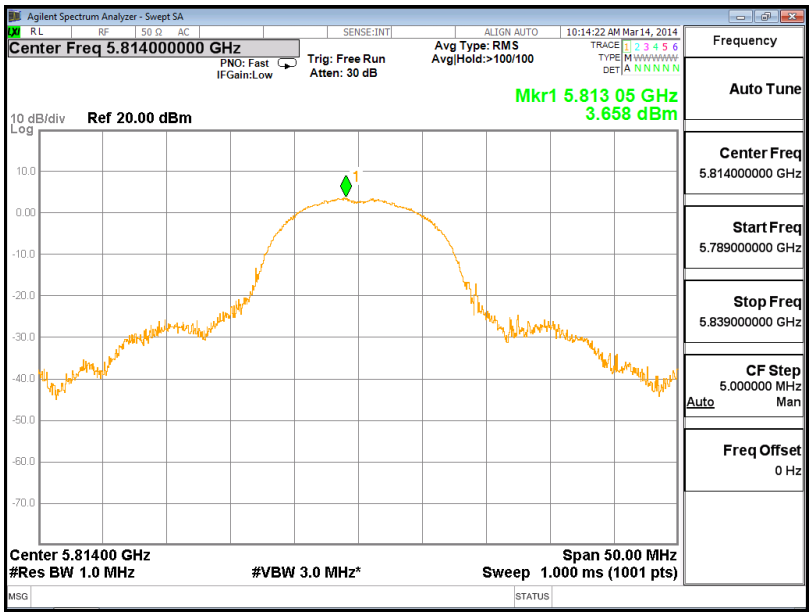
Channel: 4



Channel: 5



Channel: 6

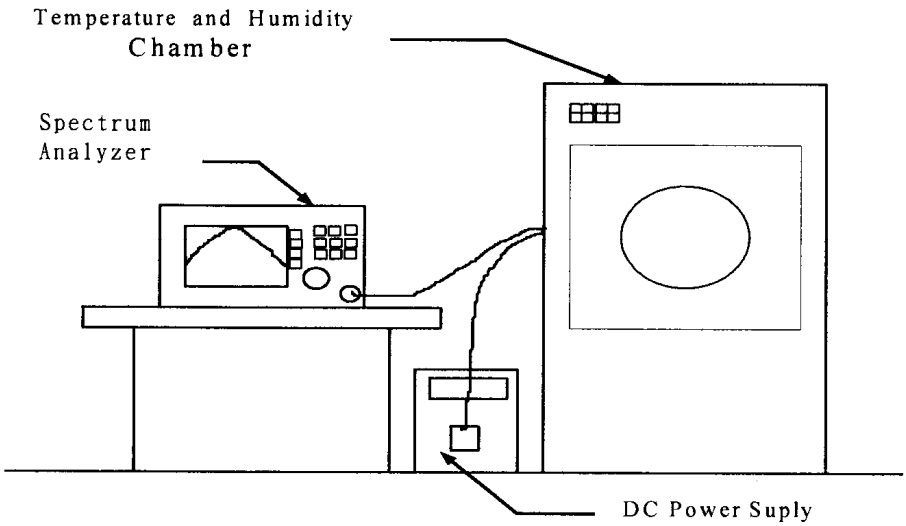


9. Frequency Stability

9.1. Test Procedure

1. The EUT was placed inside the Temperature and Humidity chamber.
2. The transmitter output was connected to spectrum analyzer.
3. Turn the EUT on and couple its output to a spectrum analyzer.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
6. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
7. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

9.2. Test Setup Layout



9.3. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	Agilent	N9010A	MY53400169	2013.09.28	2014.09.27

9.4. Test Result and Data

Test Date: Mar. 11, 2014 Temperature: 22℃

Atmospheric pressure: 1020 hPa Humidity: 65%

Operating frequency: 5180 MHz							
Temp (°C)	Power supply (V)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	102	5179.9824	-0.000340	5179.9808	-0.000371	5179.9802	-0.000382
	120	5179.9888	-0.000216	5179.9850	-0.000290	5179.9826	-0.000336
	138	5179.9892	-0.000208	5179.9902	-0.000189	5179.9882	-0.000228
40	102	5179.9886	-0.000220	5179.9878	-0.000236	5179.9884	-0.000224
	120	5179.9882	-0.000228	5179.9886	-0.000220	5179.9884	-0.000224
	138	5179.9898	-0.000197	5179.9884	-0.000224	5179.9888	-0.000216
30	102	5179.9484	-0.000996	5179.9482	-0.001000	5179.9484	-0.000996
	120	5179.9490	-0.000985	5179.9495	-0.000975	5179.9484	-0.000996
	138	5179.9484	-0.000996	5179.9488	-0.000988	5179.9494	-0.000977
20	102	5179.9384	-0.001189	5179.9392	-0.001174	5179.9388	-0.001181
	120	5179.9392	-0.001174	5179.9386	-0.001185	5179.9394	-0.001170
	138	5179.9388	-0.001181	5179.9388	-0.001181	5179.9396	-0.001166
10	102	5179.9502	-0.000961	5179.9492	-0.000981	5179.9502	-0.000961
	120	5179.9500	-0.000965	5179.9496	-0.000973	5179.9490	-0.000985
	138	5179.9498	-0.000969	5179.9490	-0.000985	5179.9494	-0.000977
0	102	5179.9776	-0.000432	5179.9760	-0.000463	5179.9734	-0.000514
	120	5179.9706	-0.000568	5179.9706	-0.000568	5179.9690	-0.000598
	138	5179.9674	-0.000629	5179.9672	-0.000633	5179.9664	-0.000649
-10	102	5179.9778	-0.000429	5179.9774	-0.000436	5179.9776	-0.000432
	120	5179.9780	-0.000425	5179.9780	-0.000425	5179.9774	-0.000436
	138	5179.9790	-0.000405	5179.9792	-0.000402	5179.9806	-0.000375
-20	102	5179.9828	-0.000332	5179.9820	-0.000347	5179.9822	-0.000344
	120	5179.9826	-0.000336	5179.9812	-0.000363	5179.9808	-0.000371
	138	5179.9838	-0.000313	5179.9240	-0.001467	5179.9838	-0.000313
-30	102	5179.9848	-0.000293	5179.9890	-0.000212	5179.9852	-0.000286
	120	5179.9844	-0.000301	5179.9844	-0.000301	5179.9842	-0.000305
	138	5179.9826	-0.000336	5179.9842	-0.000305	5179.9846	-0.000297

Limit : ±20ppm

10. Band Edges Measurement

10.1. Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz with convenient frequency span including 100 MHz bandwidth from band edge.
3. The band edges was measured and recorded.

10.2. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	Agilent	N9010A	MY53400169	2013.09.28	2014.09.27

10.3. Restrict Band Emission Measurement Data

Test Date : 2014-3-3
Temperature : 23℃
Humidity : 65%
Atmospheric Pressure : 1020 hPa
Modulation Standard : QPSK

Channel 01						Fundamental Frequency: 5180 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
5150.56	H	58.61	-1.13	57.48	Peak	74	54	-16.52	213	1.0
5150.56	H	51.56	-1.13	50.43	Ave	74	54	-3.57	125	1.0
5150.72	V	56.92	-1.13	55.79	Peak	74	54	-18.21	124	1.0
5150.72	V	50.21	-1.13	49.08	Ave	74	54	-4.92	231	1.0
Channel 03						Fundamental Frequency: 5240 MHz				
5815.11	H	59.56	-1.08	58.48	Peak	74	54	-15.52	124	1.0
5815.11	H	50.21	-1.08	49.13	Ave	74	54	-4.87	212	1.0
5815.11	V	61.26	-1.08	60.18	Peak	74	54	-13.82	45	1.0
5815.11	V	49.67	-1.08	48.59	Ave	74	54	-5.41	65	1.0

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz

Channel 04										Fundamental Frequency: 5736 MHz
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
5700.15	H	59.18	-1.42	57.76	Peak	74	54	-16.24	241	1.0
5700.15	H	50.05	-1.42	48.63	Ave	74	54	-5.37	241	1.0
5700.15	V	57.26	-1.42	55.84	Peak	74	54	-18.16	325	1.0
5700.15	V	46.65	-1.42	45.23	Ave	74	54	-8.77	302	1.0
Channel 06										Fundamental Frequency: 5814 MHz
5815.11	H	61.11	-1.08	60.03	Peak	74	54	-13.97	186	1.0
5815.11	H	50.35	-1.08	49.27	Ave	74	54	-4.73	186	1.0
5815.11	V	65.22	-1.08	64.14	Peak	74	54	-9.86	33	1.0
5815.11	V	51.84	-1.08	50.76	Ave	74	54	-3.24	33	1.0

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz

11. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.150
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

**: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

11.1. Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.