



TEST REPORT

Date: 2012-11-27

Report No.: 68.870.12.067.01F

Applicant: Kobian Canada INC
560 Denison Street, Unit 5, Markham, Ontario, L3R
2M8, Canada

Description of Samples: Model name: 2.4GHz Wireless Mouse
Brand name: HipStreet
Model no.: HS-WMS02
FCCID: YH5HSWMS02

Date Samples Received: 2012-11-21

Date Tested: 2012-11-21 to 2012-11-27

Investigation Requested: FCC Part 15 Subpart C, Section 15.249

Conclusions: The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks: ----

Checked by:

Approved by:-

John Zhi
Project Engineer
Wireless & Telecom department

Jeff Pong
Operation Manager
Wireless & Telecom department



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5.0 **List of Measurement Equipments**

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Appendix A

Photos of Test Setup

Appendix B

External EUT Photos

Appendix C

Internal EUT Photos



1.0 General Details

1.1 Test Laboratory

Neutron Engineering Inc.
B1, No.37, Lane 365, Yang-quang St, Nei-hu Distrist,
Taipei, 114, Taiwan.
Registration Number: 538587

Tested by:

A handwritten signature in black ink, appearing to read 'Ares Liu', written over a horizontal line.

Ares Liu

1.2 Applicant Details

Applicant

Kobian Canada INC
560 Denison Street, Unit 5,Markham, Ontario, L3R 2M8,
Canada

Manufacturer

Shenzhen Maxin Industry Co., Ltd
Block C3,East Xueziwei Industrial Zone, Yabian,
Shajing, Baoan, Shenzhen, China.



1.3 Equipment Under Test [EUT]

Description of EUT

Model Name:	2.4GHz Wireless Mouse
Brand Name:	HipStreet
Model Number:	HS-WMS02
FCCID:	YH5HSWMS02
Rating:	3 VDC (2*AAA Battery)
Operated Frequency:	2405-2476MHz
No. of Channel:	32
Antenna Type:	Integral
Manufacture of Antenna:	---
Antenna Gain:	0 dBi
Accessories and Auxiliary Equipment:	None
EUT Exercising Software:	None

General Operation of EUT

The Equipment Under Test (EUT) is a wireless mouse operated at 2405-2476 MHz which Data transfer to its associated receiver.

1.4 Equipment Modification

No modification was made to the tested unit by TÜV SÜD China Ltd.

1.5 Related Submittal(s) Grants

This is a single application of certification for this transmitter.



2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.4: 2003.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary				
Test Condition	FCC Test Requirement	Test Result		
		Pass	Failed	N/A
Field Strength of Fundamental and Harmonics	Part 15.249 (a),(e)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spurious Radiated Emission	Part 15.249 (d) Part 15.209 Part 15.205	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Out of Band Emissions	Part 15.249 (d)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bandwidth Measurement	Part 15.215 (c)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conducted Emission	Part 15.207	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable



3.0 Test Methodology

3.1 Radiated Emission

The sample was placed 0.8m above the ground plane on a standard emission test site *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

3.2 Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$\begin{aligned} \text{FS} &= \text{R} + \text{System Factor} \\ \text{System Factor} &= \text{AF} + \text{CF} + \text{FA} - \text{PA} \end{aligned}$$

Where FS = Net Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer / Test Receiver in dBuV.

AF = Antenna Factor in dB.

CF = Cable Attenuation Factor in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

3.3 Conducted Emissions

The EUT was placed on a non-metallic table 0.8m above the horizontal metal reference plane and 0.4m from a vertical ground plane which is connected to the horizontal metal ground plane. Meanwhile, the AC main of EUT was connected to the distance of 0.8m line impedance stabilization network (LISN) during measurement.

Initial measurements were performed in quasi-peak and average detection modes by the test receiver, any emissions recorded within 30dB of the relevant limit lines were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

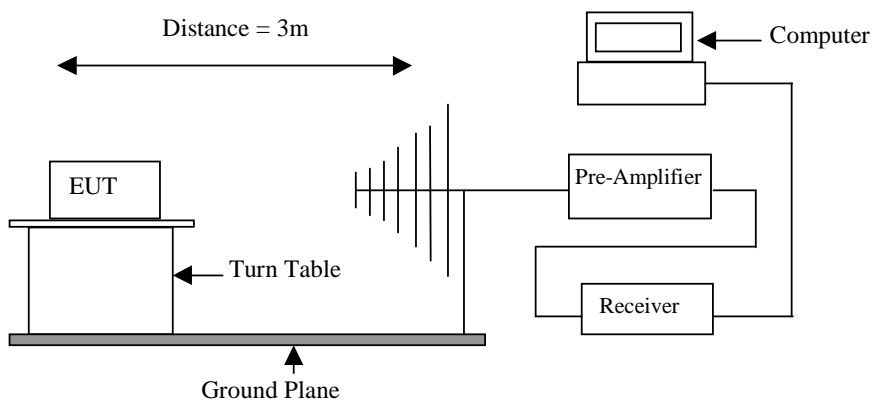


4.0 Test Results

4.1 Field Strength of Fundamental and Harmonics

Test Requirement:	FCC part 15 section 15.249(a)(e)
Test Method:	ANSI C63.4:2003
Test Date:	2012-11-22
Mode of Operation:	Transmitting mode.
Detector Function:	Quasi-peak (Below 1000 MHz) Average and Peak (Above 1000 MHz)
Measurement BW:	120 kHz (Below 1000 MHz) 1 MHz (Above 1000 MHz)

Test Setup:





Results: PASS

Field Strength of Fundamental and Harmonics									
Channel	Value	Emissions Frequency	E-Field Polarity	Reading	System Factor	Field Strength at 3m	Limit	Delta to Limit	Remarks
		MHz		dBµV/m	dB	dBµV/m	dBµV/m	dBµV/m	
1	PK	2405.00	V	52.91	31.56	84.47	114	-29.53	Fund.
	AV	2405.00		13.11	31.56	44.67	94	-49.33	Fund.
1	PK	2405.00	H	55.07	31.56	86.63	114	-27.37	Fund.
	AV	2405.00		15.27	31.56	46.83	94	-47.17	Fund.
16	PK	2439.00	V	55.06	31.62	86.68	114	-27.32	Fund.
	AV	2439.00		15.26	31.62	46.88	94	-47.12	Fund.
16	PK	2439.00	H	56.85	31.62	88.47	114	-25.53	Fund.
	AV	2439.00		17.05	31.62	48.67	94	-45.33	Fund.
32	PK	2476.00	V	54.69	31.69	86.38	114	-27.62	Fund.
	AV	2476.00		14.89	31.69	46.58	94	-47.42	Fund.
32	PK	2476.00	H	57.42	31.69	89.11	114	-24.89	Fund.
	AV	2476.00		17.62	31.69	49.31	94	-44.69	Fund.
1	PK	*4810.00	V	51.35	5.79	57.14	74	-16.86	Harmonic
	AV	*4810.00		11.55	5.79	17.34	54	-36.66	Harmonic
1	PK	*4810.00	H	49.23	5.79	55.02	74	-18.98	Harmonic
	AV	*4810.00		9.43	5.79	15.22	54	-38.78	Harmonic
16	PK	*4878.00	V	51.82	6.16	57.98	74	-16.02	Harmonic
	AV	*4878.00		12.02	6.16	18.18	54	-35.82	Harmonic
16	PK	*4878.00	H	49.02	6.16	55.18	74	-18.82	Harmonic
	AV	*4878.00		9.22	6.16	15.38	54	-38.62	Harmonic
32	PK	*4952.00	V	51.67	-5.05	46.62	74	-27.38	Harmonic
	AV	*4952.00		11.87	-5.05	6.82	54	-47.18	Harmonic
32	PK	*4952.00	H	49.85	-1.71	48.14	74	-25.86	Harmonic
	AV	*4952.00		10.05	-1.71	8.34	54	-45.66	Harmonic

Note : Result data graphs are shown at P.13 - 18 for reference.

Remark : - (*) Radiated emissions which fall in the restricted bands as defined in Section 15.205(a).

- Average factor is applied, where AV Value = Peak Value + Average Factor
- Refer to section 4.5 for Average Factor Calculation.
- Calculated measurement uncertainty: ±5.0dB



Limits of Field Strength for Fundamental and Harmonics Frequency [Section 15.249 (a)]:

Fundamental Frequency [MHz]	Field Strength of Fundamental		Field Strength of Harmonics	
	[mV/m]	[dB μ V/m]	[μ V/m]	[dB μ V/m]
2400 – 2483.5	50	94(Average)	500	54(Average)

Compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

Limit Requirement under Section 15.249 (e) :

According to section 15.249 (e), for frequencies above 1000MHz, the above field strength limits is based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

Limit for Radiated Emission [Section 15.209]:

Frequency (MHz)	Field Strength [μ V/m]	Field Strength [dB μ V/m]
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

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.

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Calculate the transmitter's peak power using the following equation:

$$P = (E \times d)^2 / (30 \times G)$$

P = Transmitter output power in watts.

G = The numeric gain of the transmitting antenna with reference to an isotropic radiator.

d = The distance in meters from which the field strength was measured.

E = The measured maximum fundamental field strength in V/m.

According to the above test data, Emax = 89.11dB μ V/m = 0.0285V/m, d = 3m, G = 1

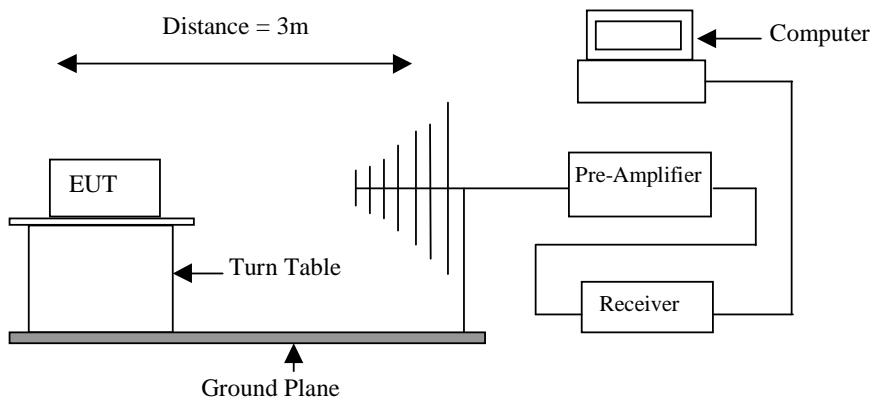
$$\begin{aligned} P &= (E \times d)^2 / (30 \times G) \\ &= (0.0285 \times 3)^2 / (30 \times 1) \\ &= 0.000244 \text{ W} \end{aligned}$$



4.2 Spurious Radiated Emission

Test Requirement:	FCC part 15 section 15.249(d),15.209
Test Method:	ANSI C63.4:2003
Test Date:	2012-11-22
Mode of Operation:	Transmitting Mode
Detector Function:	Quasi-peak (Below 1000 MHz) Average and Peak (Above 1000 MHz)
Measurement BW:	120 kHz (Below 1000 MHz) 1 MHz (Above 1000 MHz)

Test Setup:





Results: PASS

Spurious Radiated Emissions								
Channel	Value	Emissions Frequency	E-Field Polarity	Reading	System Factor	Field Strength at 3m	Limit	Delta to Limit
		MHz		dB μ V/m	dB	dB μ V/m	dB μ V/m	dB μ V/m
32	QP	37.76*	H	43.40	-14.36	29.04	40.00	-10.96
32	QP	108.57*	H	36.80	-23.98	10.75	43.50	-32.75
32	QP	255.04*	H	34.16	-21.13	13.03	46.00	-32.97
32	QP	387.93	H	37.07	-14.87	22.20	46.00	-23.80
32	QP	510.15	H	30.56	-12.11	18.45	46.00	-27.55
32	QP	797.27	H	30.77	-6.23	24.54	46.00	-21.46
32	QP	38.73	V	36.91	-15.05	21.86	40.00	-18.14
32	QP	108.57*	V	40.74	-23.98	16.76	43.50	-26.74
32	QP	164.83*	V	32.17	-21.07	11.10	43.50	-32.40
32	QP	298.69	V	29.58	-17.16	12.42	46.00	-33.58
32	QP	715.79	V	31.23	-7.66	23.57	46.00	-22.43
32	QP	940.83	V	29.70	-3.55	26.15	46.00	-19.85

Note: - No further spurious emissions found between 30MHz and lowest internal used / generated frequency.
 - Result data graph is shown at the following pages for reference.

Remark : - (*) Radiated emissions which fall in the restricted bands as defined in Section 15.205(a).
 - Calculated measurement uncertainty: ± 5.0 dB.

Limit of Outside of the Specified Bands [Section 15.249 (d)]

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

Limit for Radiated Emission [Section 15.209]:

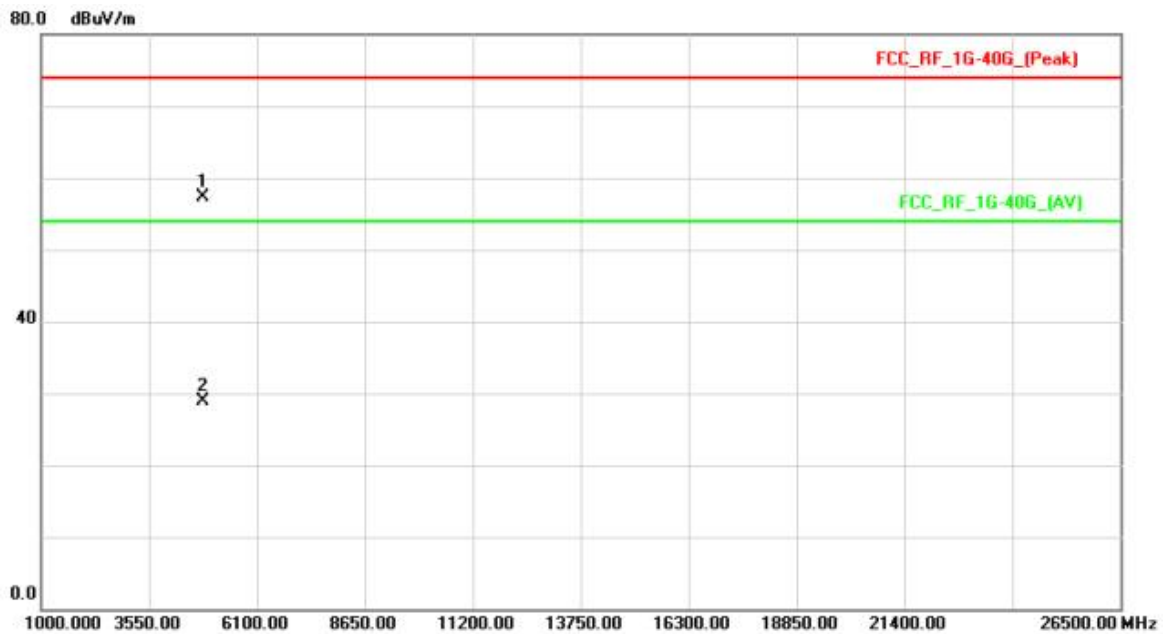
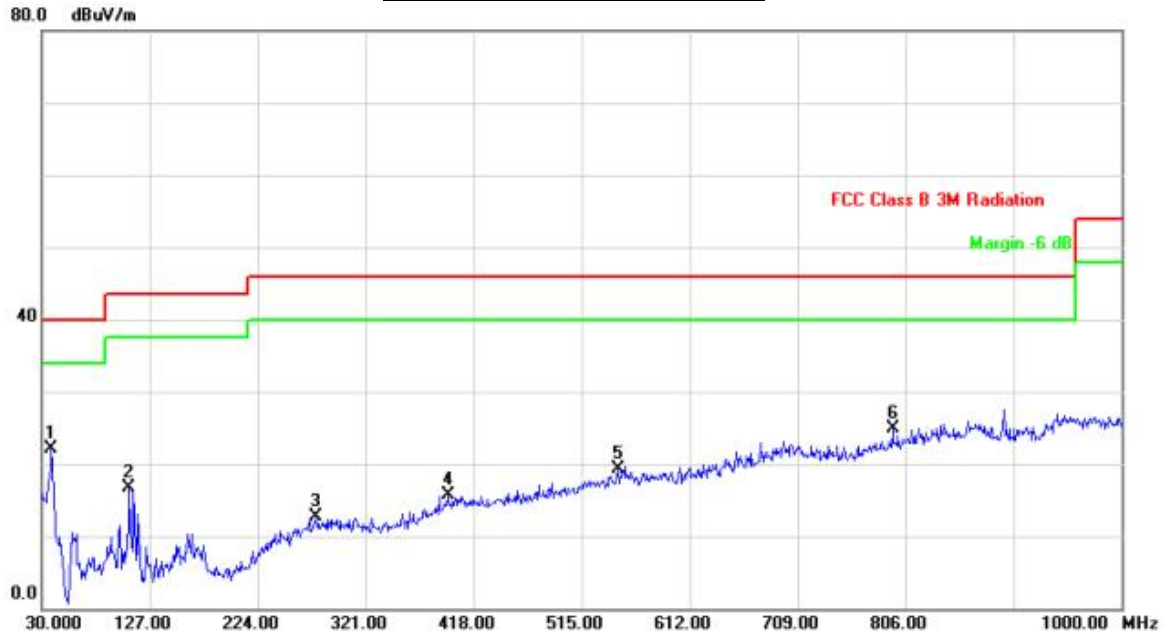
Frequency (MHz)	Field Strength [μ V/m]	Field Strength [dB μ V/m]
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

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.

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

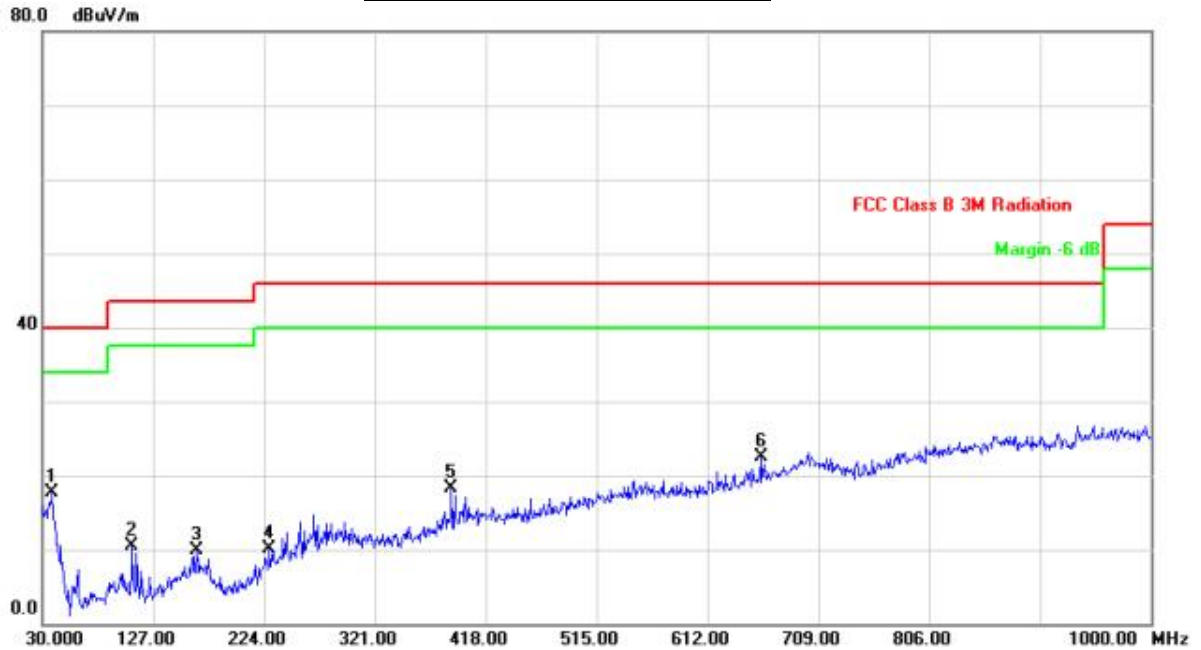


Vertical Polarization - Channel 1



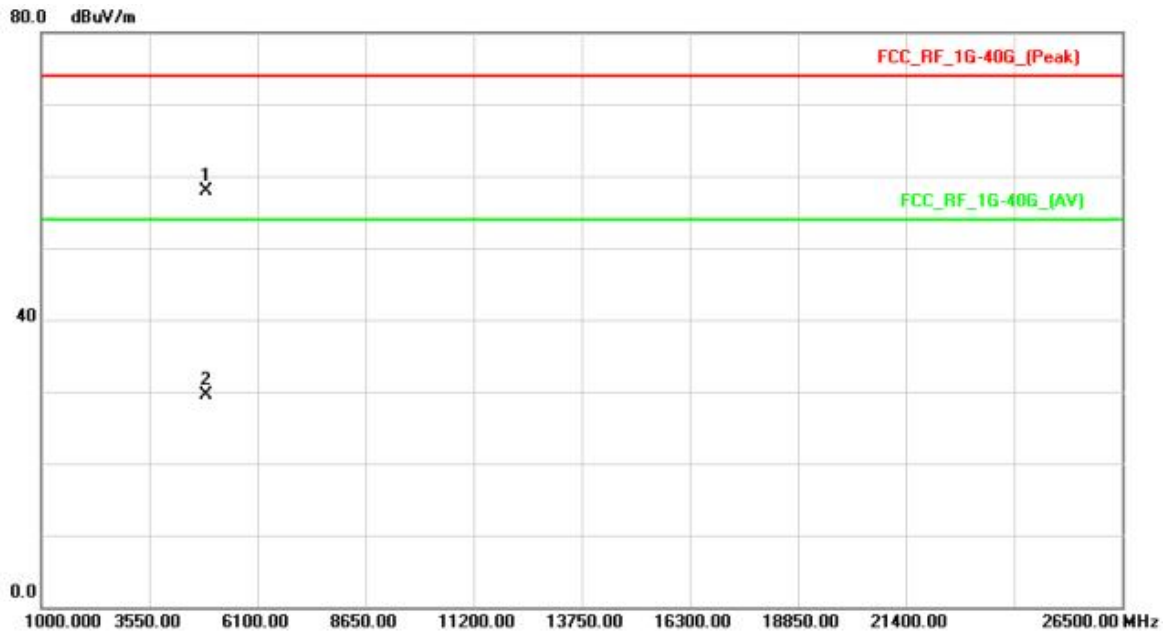
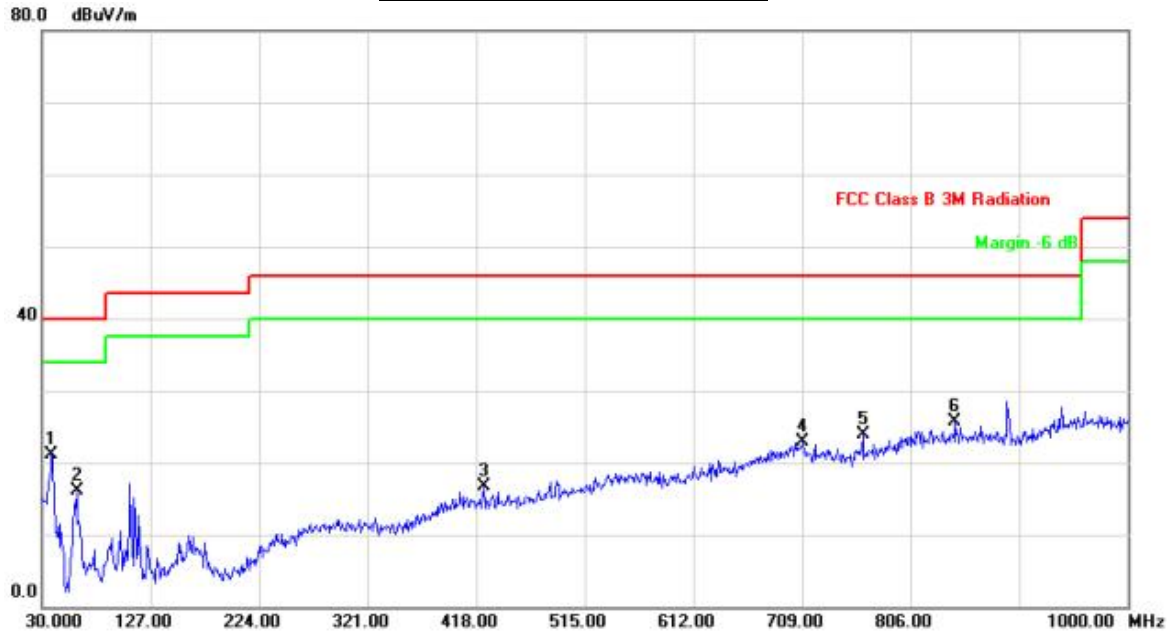


Horizontal Polarization -Channel 1



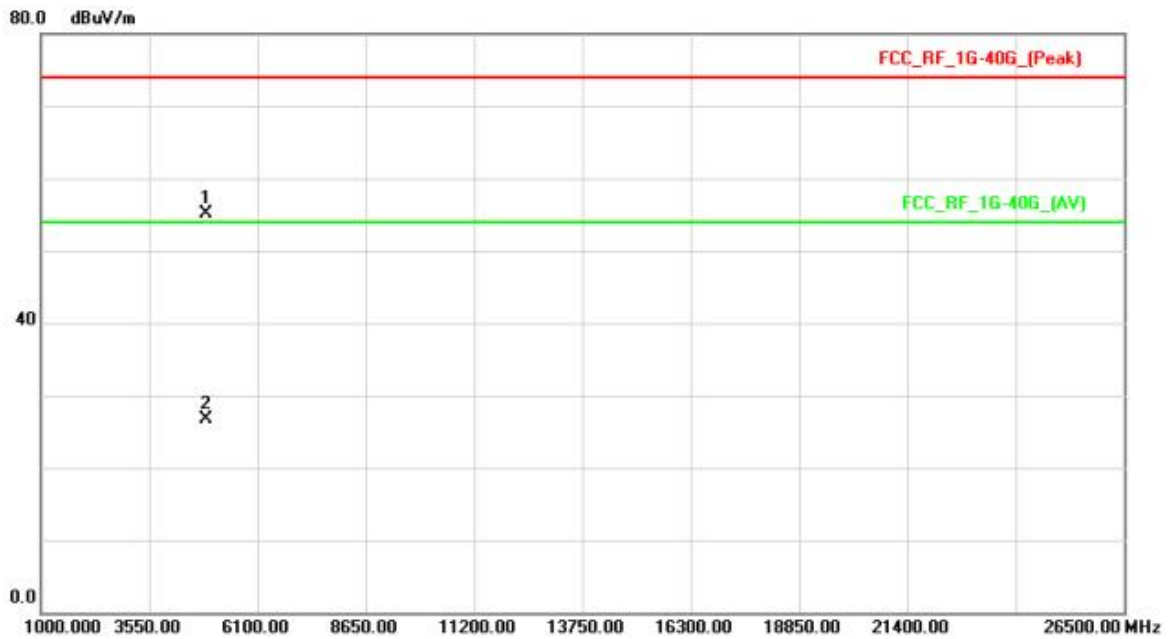
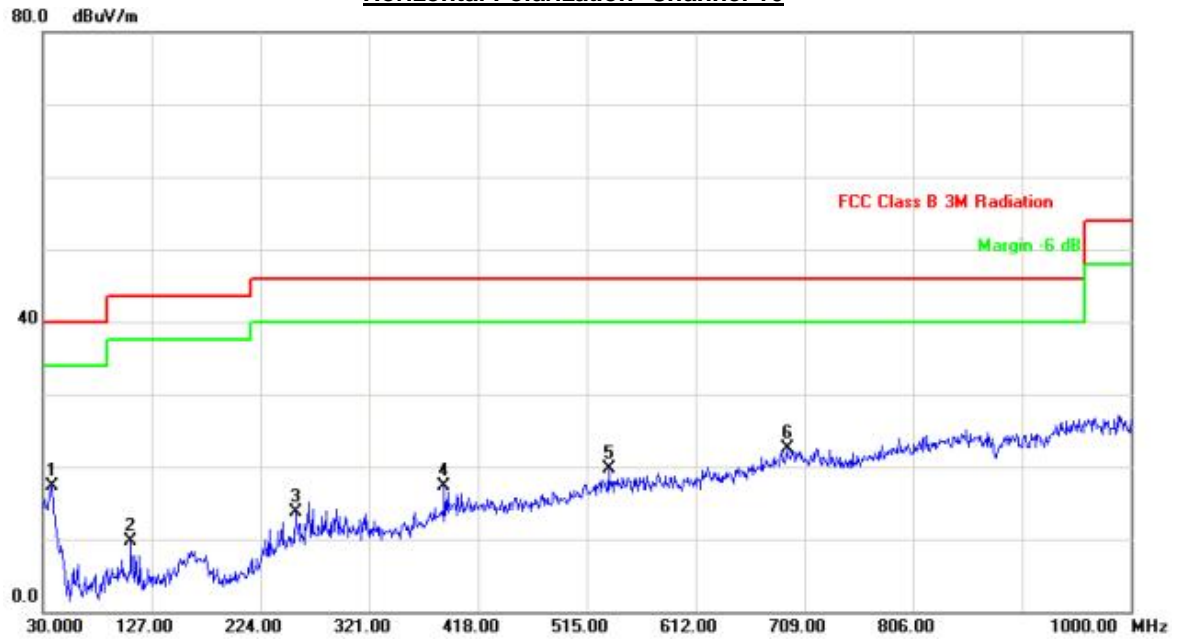


Vertical Polarization -Channel 16



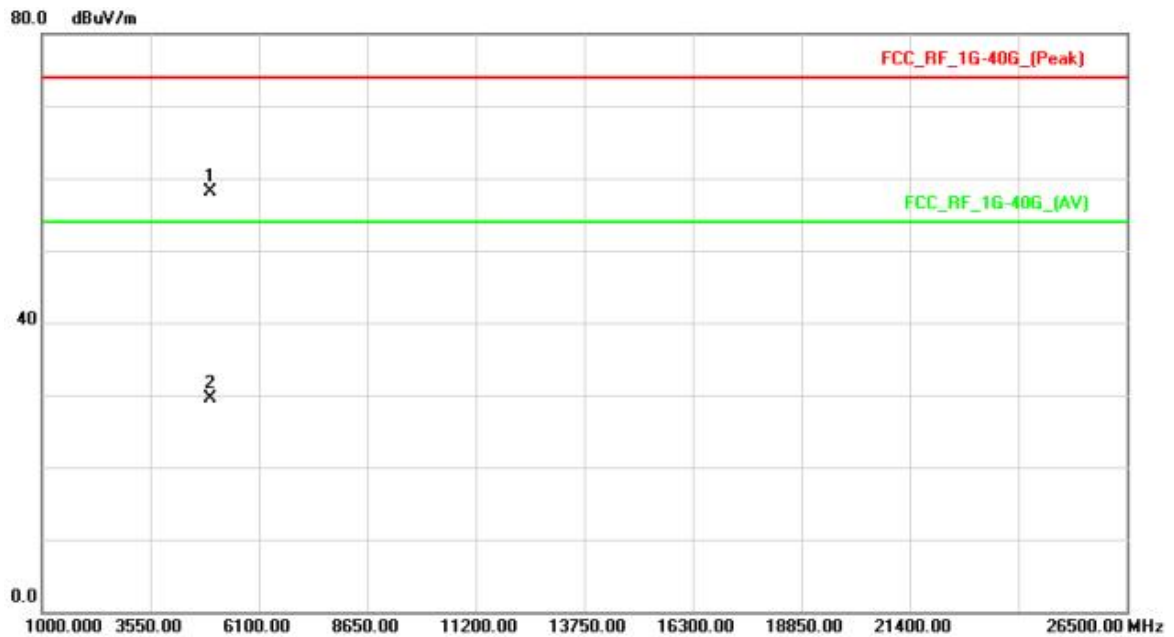
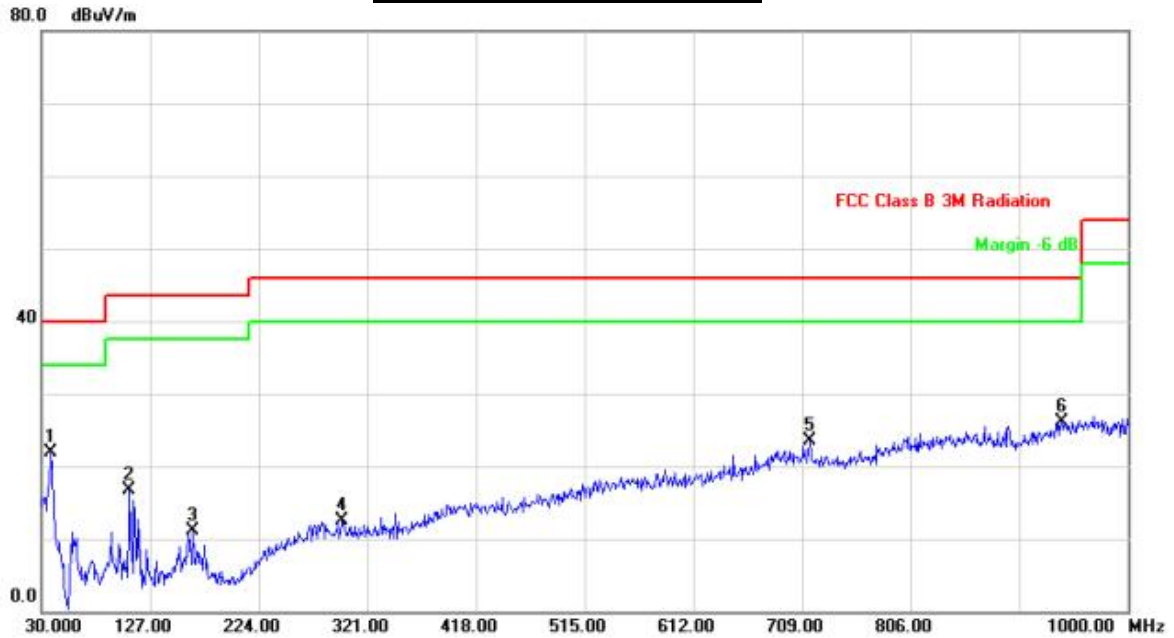


Horizontal Polarization -Channel 16



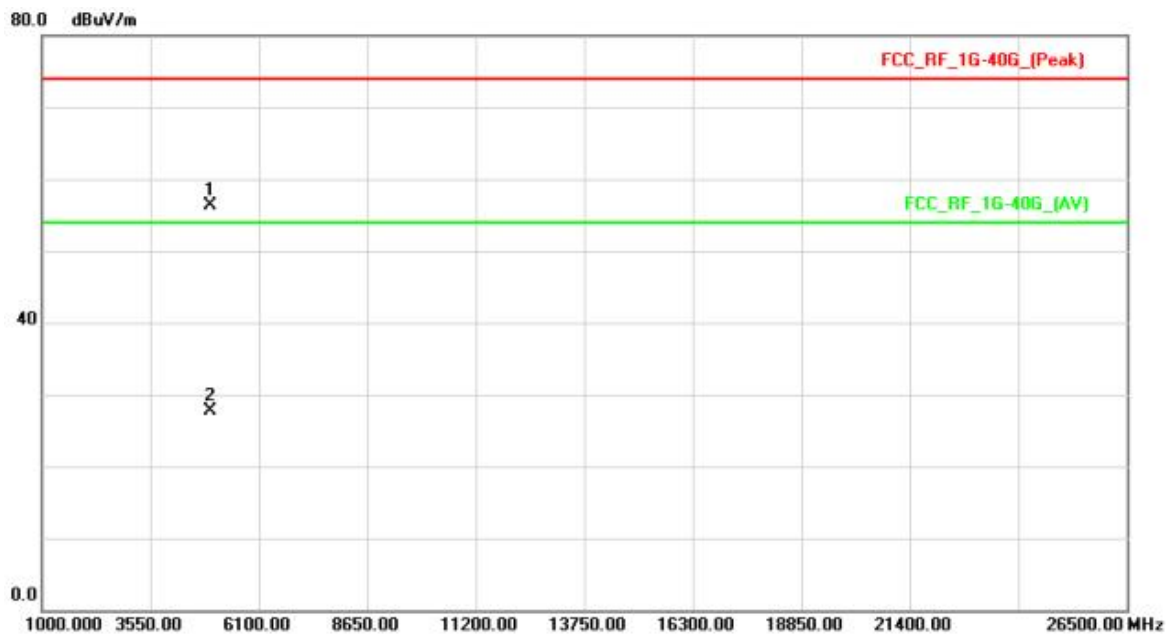


Vertical Polarization -Channel 32





Horizontal Polarization -Channel 32





4.3 Out of Band Emissions

Test Requirement:	FCC part 15 section 15.249 (d)
Test Method:	ANSI C63.4:2003
Test Date:	2012-11-22
Mode of Operation:	Transmitting mode.
Detector Function:	Peak

Results: PASS

Refer to the data graph, the lower and higher edge of the specified frequency bands fulfill the general radiated emission limits in section 15.209. Therefore, the EUT meets the requirement of section 15.249 (d).

Limit for Out of Band Emissions [Section 15.249 (d)]

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

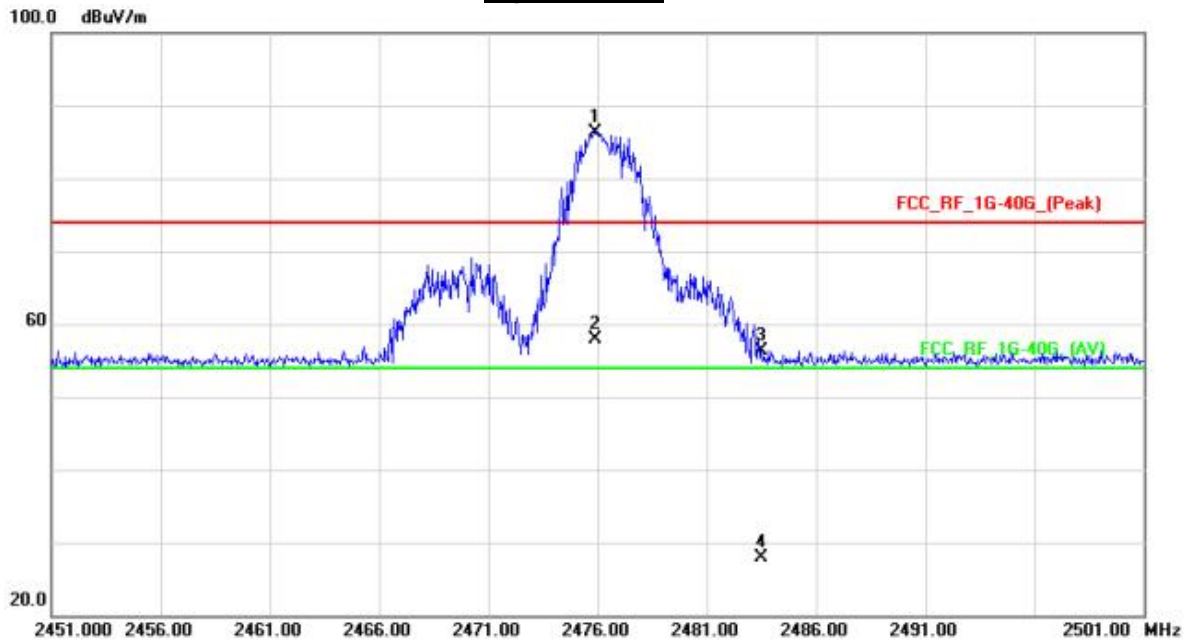
Test Result: Result data graph is shown at the next pages for reference.



Lowest Channel



Highest Channel





4.4 Bandwidth Measurement

Test Requirement:	FCC part 15 section 15.215 (c)
Test Method:	ANSI C63.4:2003
Test Date:	2012-11-22
Mode of Operation:	Transmitting mode.
Detector Function:	Peak

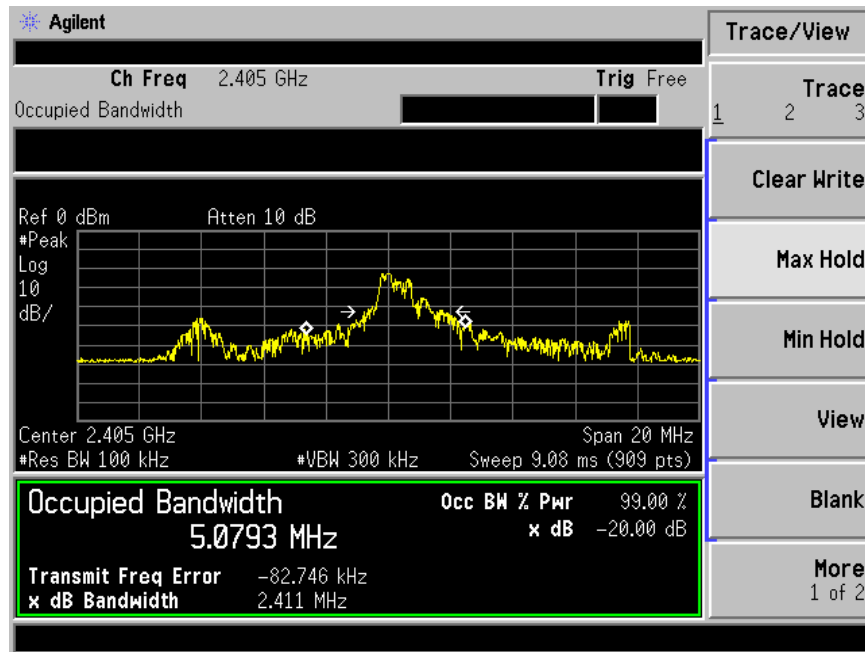
Results: PASS

Refer to the data graph, the 20dB points of Channel 1, Channel 16 and Channel 32 are 2.411MHz, 3.089MHz and 2.808MHz. All channels within the operation bandwidth when equipment is operated. Therefore, the EUT meets the requirement of section 15.215(c).

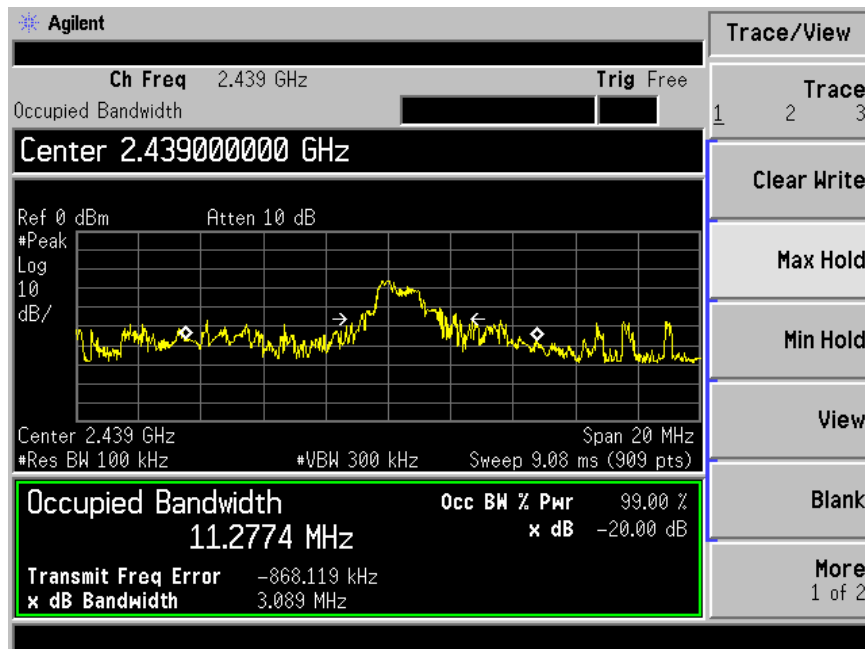
Limit for Bandwidth [Section 15.215 (c)]

The 20dB bandwidth of the emission shall be within the frequency band designated in the rule section under which the equipment is operated.

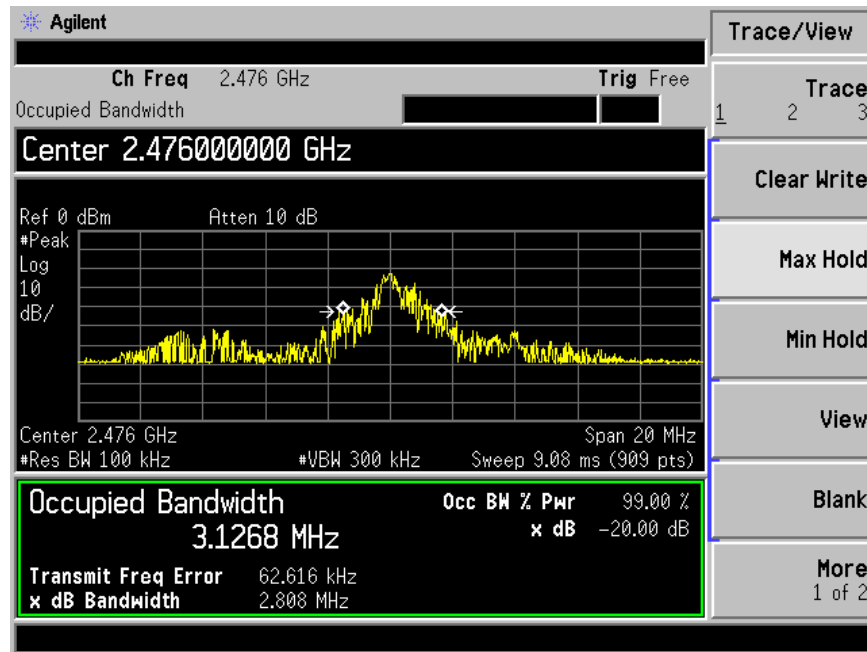
Test Result: Result data graph is shown at the next pages for reference.



Channel 1 – 20 dB point, Bandwidth 2.411MHz



Channel 16 – 20 dB point, Bandwidth 3.089MHz



Channel 32 – 20 dB point, Bandwidth 2.808MHz



4.5 Average Factor

Average factor in dB = $20 \log (\text{duty cycle})$

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the specification for output field strengths in accordance with the FCC rules specifies measurements with an average detector.

The duty cycle is the total signal on time per one transmission.

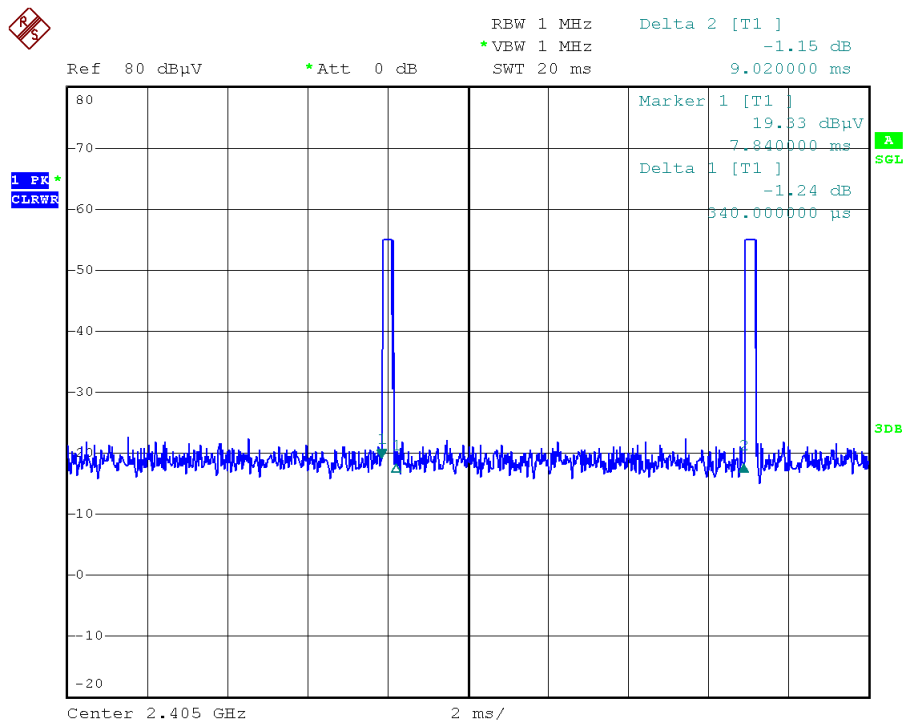
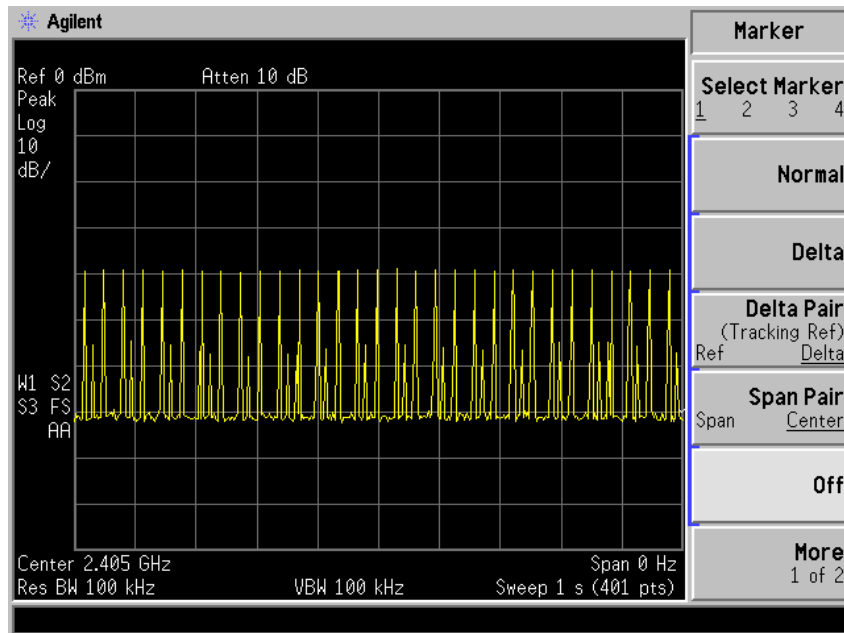
Average factor in dB = $20 \log (\text{duty cycle})$

Effective period of the cycle per 100ms = $(3 \times 0.340\text{ms}) / 100\text{ms}$
= $1.02\text{ms} / 100\text{ms}$

Duty cycle = 0.0102

Therefore, the averaging factor is $20 \log (0.0102)$
= -39.8dB.

Measurement data graph is shown at the next pages for reference.

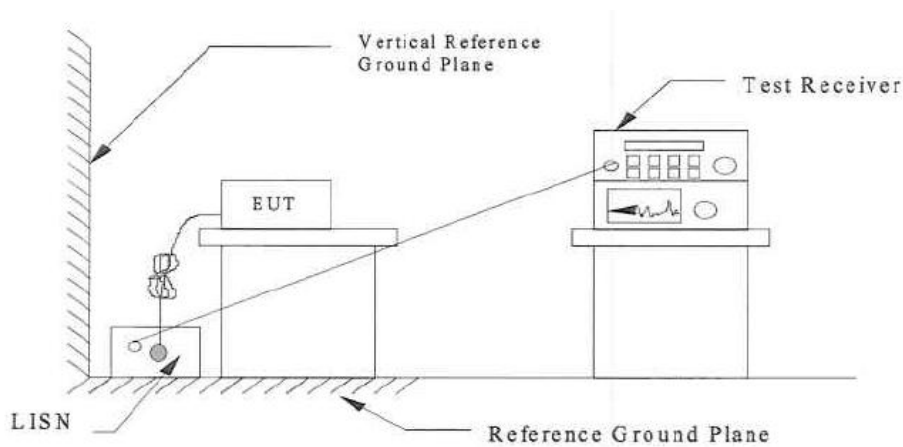


4.6 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC part 15 Section 15.207 Class B
 Test Method: ANSI C63.4:2003
 Test Date: ---
 Mode of Operation: ---
 Detector Function: Quasi-peak, average
 Measurement BW: 9 kHz

Result: N/A

Test Setup:



Remark: - The EUT is connected to AC/DC Adaptor during testing.
 - Calculated measurement uncertainty: $\pm 2.8\text{dB}$

Limits for Conducted Emission [Section 15.207]:

Frequency Range [MHz]	Quasi-Peak Limit [dB μ V]	Average Limit [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.



5.0 List of Measurement Equipment

Radiated Emission and Out of Band Emissions

Description	Manufacturer	Model no.	Serial no.	Last cal	CAL due
Horn Antenna	EMCO	3115	9605-4803	May 14,2012	May 13,2013
Antenna	EMCO	3142C	00066464	May 14,2012	May 13,2013
Amplifier	Agilent	8449B	3008A02584	May 14,2012	May 13,2013
Test Receiver	R&S	ESCI	100382	May 14,2012	May 13,2013
Test Cable	N/A	C-01_CB03	N/A	May 14,2012	May 13,2013
Controller	CT	SC100	N/A	May 14,2012	May 13,2013
Test Cable	Huber+Suhner	SUCOFLEX_1 5m_4m	N/A	May 14,2012	May 13,2013
Coaxial Cable 50ohm	Rosenberger	RTK081-05S- 10m	LA2-001- 10M/002	May 14,2012	May 13,2013
RF Communications Test Set	HP	8920B	US36492628	May 14,2012	May 13,2013

Conducted Emission

Description	Manufacturer	Model no.	Serial no.	Last cal	CAL due
LISN	EMCO	3816/2	00052765	May 14,2012	May 13,2013
LISN	R&S	ENV216	100087	May 14,2012	May 13,2013
Test Cable	N/A	C_17	N/A	May 14,2012	May 13,2013
EMI TEST RECEIVER	R&S	ESCS30	826547/022	May 14,2012	May 13,2013
50Ω Terminator	SHX	TF2-3G-A	08122902	May 14,2012	May 13,2013

Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available