

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Nanshan
District, Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

Report No.: SZEM130100044501
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FCC REPORT

Application No.: SZEM1301000445RF
Applicant: Honey Bee (Hong Kong) Ltd.
Manufacturer: Honey Bee (Hong Kong) Ltd.
Factory: Shantou S.E.Z. Honey Bee Electronics Co., Ltd.
Product Name: Personal Audio Enhancer Base Unit
Model No.(EUT): HB-1202
FCC ID: S9X-PAE-300
Standards: 47 CFR Part 15, Subpart C (2011)
Date of Receipt: 2013-01-25
Date of Test: 2013-02-04 to 2013-02-21
Date of Issue: 2013-03-08

Test Result:	PASS *
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2009	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2009	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	KDB558074 D01	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	KDB558074 D01	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	KDB558074 D01	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	KDB558074 D01	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	KDB558074 D01	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2009	PASS
Band Edge (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2009	PASS

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4 General Information

4.1 Client Information

Applicant:	Honey Bee (Hong Kong) Ltd.
Address of Applicant:	Flat L, 12/F, Phase 4, Kwun Tong Industrial Centre, 436-446 Kwun Tong Road, Kowloon, Hong Kong
Manufacturer:	Honey Bee (Hong Kong) Ltd.
Address of Manufacturer:	Flat L, 12/F, Phase 4, Kwun Tong Industrial Centre, 436-446 Kwun Tong Road, Kowloon, Hong Kong
Factory:	Shantou S.E.Z. Honey Bee Electronics Co., Ltd.
Address of Factory:	5/F, Block 3, Zhu Hua Industrial Zone, Li Shui Zhuang Zhong Qu, Long Hu Qu Shantou City, Guangdong Province, China

4.2 General Description of EUT

Product Name:	HB-1202
Model No.:	Honey Bee (Hong Kong) Ltd.
Trade Mark:	VitaSound
Operation Frequency:	2403-2477MHz
Channel Numbers:	75
Channel Separation:	1MHz
Type of Modulation:	GFSK
Test Software of EUT:	C/S:9C25
Sample Type:	Fixed production
Antenna Type:	PCB Antenna
Antenna Gain:	1.0dBi
Power Supply:	MODEL No:UE24WU-090200SPA PART No:UE120901DGMF01-R INPUT:100-240V~50/60Hz,600mA OUTPUT: 9.0V --- 2.0A
Test Voltage:	AC 120V 60Hz
AC Cable:	180cm
RCA Cable:	150cm

4.3 Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1015mbar
Test mode:	
Transmitting mode:	Keep the EUT on transmitting with modulation.

4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
iPod	Apple	A1199

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

The 3m Semi-anechoic chamber, Full-anechoic Chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197, G-416, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1.

4.7 Deviation from Standards

None.

4.8 Abnormalities from Standard Conditions

None.

4.9 Other Information Requested by the Customer

None.

4.10 Equipment List

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2013-06-10
2	LISN	Rohde & Schwarz	ENV216	SEL0152	2013-10-24
3	LISN	ETS-LINDGREN	3816/2	SEL0021	2013-05-17
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	SEL0162	2013-11-10
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	SEL0163	2013-11-10
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	SEL0164	2013-11-10
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2013-05-17
8	Coaxial Cable	SGS	N/A	SEL0025	2013-05-29
9	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2013-10-24
10	Humidity/ Temperature Indicator	Shanghai Qixiang	ZJ1-2B	SEL0103	2013-10-24
11	Barometer	Chang Chun	DYM3	SEL0088	2013-05-24



RE in Chamber					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2013-06-10
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2013-05-17
3	EMI Test software	AUDIX	E3	SEL0050	N/A
4	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2013-10-24
5	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2013-10-24
6	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2013-10-24
7	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2013-05-17
8	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2013-10-24
9	Coaxial cable	SGS	N/A	SEL0027	2013-05-59
10	Coaxial cable	SGS	N/A	SEL0189	2013-05-29
11	Coaxial cable	SGS	N/A	SEL0121	2013-05-29
12	Coaxial cable	SGS	N/A	SEL0178	2013-05-29
13	Band filter	Amindeon	82346	SEL0094	2013-05-17
14	Barometer	Chang Chun	DYM3	SEL0088	2013-05-24
15	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2013-10-24
16	Humidity/ Temperature Indicator	Shanghai Qixiang	ZJ1-2B	SEL0103	2013-10-24
17	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2013-05-17
18	Signal Generator	Rohde & Schwarz	SMY01	SEL0155	2013-10-24
19	Loop Antenna	Beijing Daze	ZN30401	SEL0203	2013-06-04

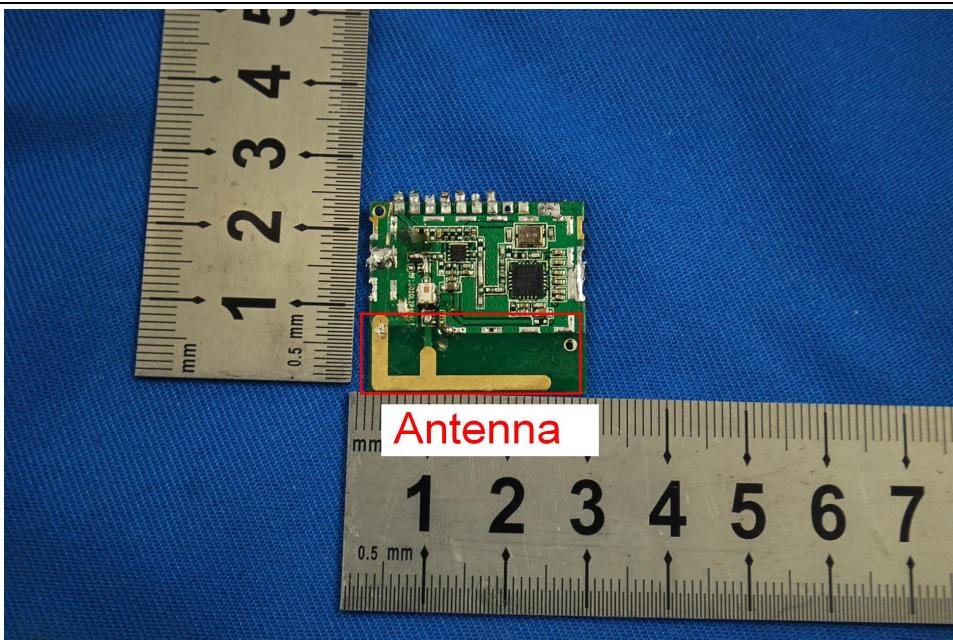


RF connected test					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2013-10-24
2	Humidity/ Temperature Indicator	HYGRO	ZJ1-2B	SEL0033	2013-10-24
3	Spectrum Analyzer	Rohde & Schwarz	FSP	SEL0154	2013-10-24
4	Coaxial cable	SGS	N/A	SEL0178	2013-05-29
5	Coaxial cable	SGS	N/A	SEL0179	2013-05-29
6	Barometer	ChangChun	DYM3	SEL0088	2013-05-24
7	Signal Generator	Rohde & Schwarz	SML03	SEL0068	2013-05-17
8	Band filter	amideon	82346	SEL0094	2013-05-17
9	POWER METER	R & S	NRVS	SEL0144	2013-10-24
10	Attenuator	Beijin feihang taida	TST-2-6dB	SEL0205	2013-05-17
11	Power Divider(splitter)	Agilent Technologies	11636B	SEL0130	2013-10-24

Note: The calibration interval is one year, all the instruments are valid.

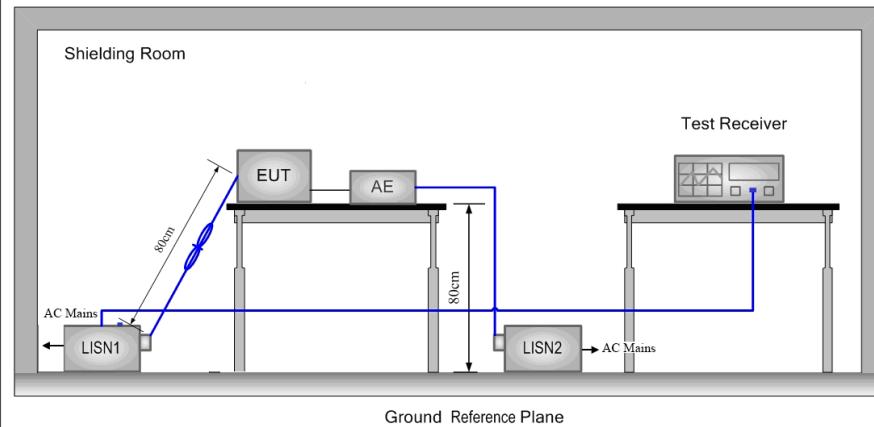
5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
15.203 requirement:	<p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p>
15.247(b) (4) requirement:	<p>The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6dBi.</p>
EUT Antenna:	<p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.0dBi.</p> 

5.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2009		
Test Frequency Range:	150KHz to 30MHz		
Limit:	Frequency range (MHz)		Limit (dBuV)
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Procedure:	<ol style="list-style-type: none">1) The mains terminal disturbance voltage test was conducted in a shielded room.2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.		

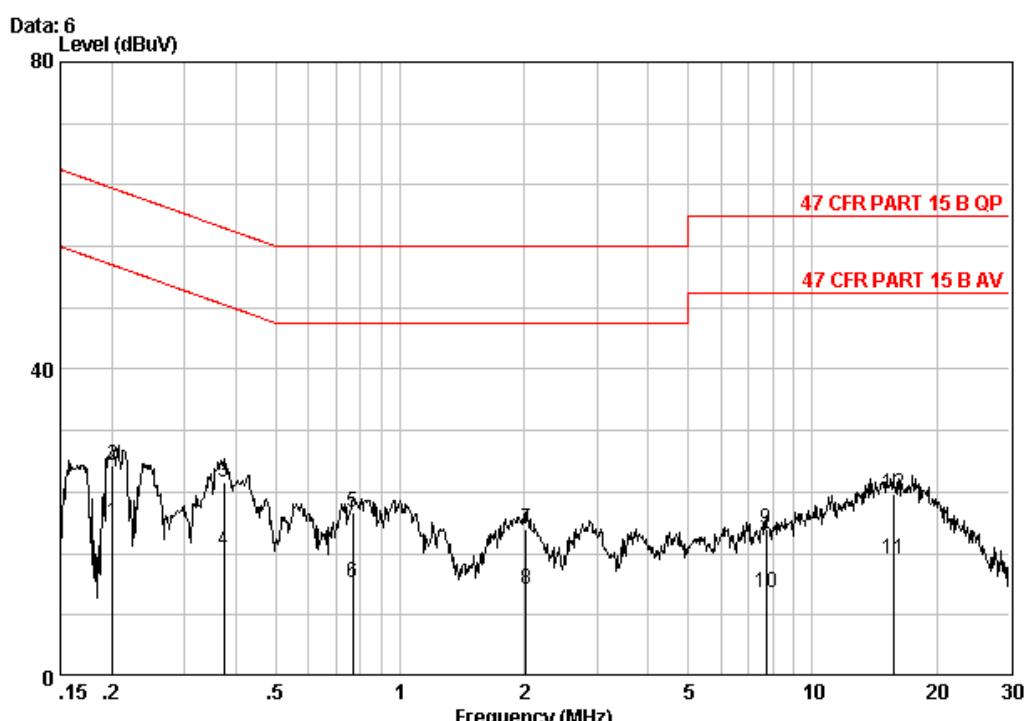
Test Setup:	 <p>The diagram illustrates the test setup within a 'Shielding Room'. On the left, a 'LISN1' box is connected to 'AC Mains' and to the 'EUT' (Equipment Under Test) via a blue line. The 'EUT' is connected to an 'AE' (Antenna Equipment) box, which is further connected to a 'Test Receiver' on the right. The 'Test Receiver' is connected to 'AC Mains' via a 'LISN2' box. A vertical dimension line indicates a height of '80cm' between the LISN1 and LISN2 boxes. A diagonal dimension line indicates a distance of '30cm' between the LISN1 and LISN2 boxes. The entire setup is positioned above a 'Ground Reference Plane'.</p>
Test Mode:	Transmitting mode
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:

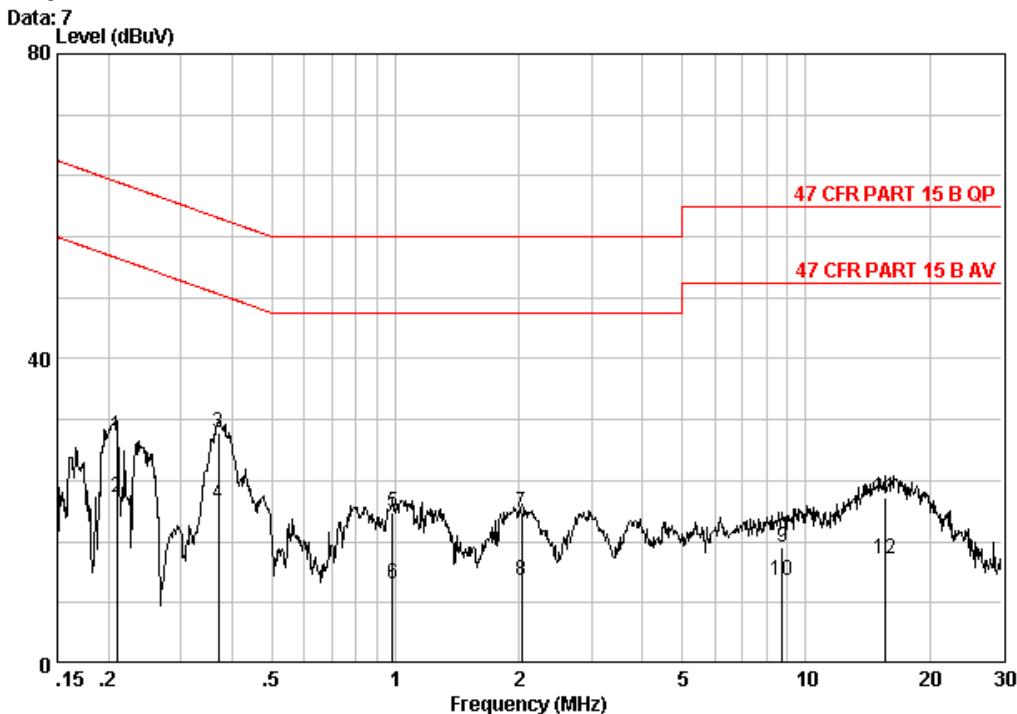


Site : Shielding Room
Condition : 47 CFR PART 15 B QP CE LINE
Job No. : 0445RF
Mode : TX

Freq	Cable	LISN	Read	Limit	Over	Remark
	MHz	dB	dB	dBuV	dBuV	
1	0.20075	0.02	9.70	10.33	20.05	53.58 -33.53 Average
2	0.20075	0.02	9.70	17.75	27.47	63.58 -36.11 QP
3	0.37314	0.01	9.78	15.42	25.21	58.43 -33.23 QP
4	0.37314	0.01	9.78	6.64	16.42	48.43 -32.01 Average
5	0.76702	0.02	9.80	11.64	21.46	56.00 -34.54 QP
6	0.76702	0.02	9.80	2.36	12.18	46.00 -33.82 Average
7	2.023	0.02	9.80	9.44	19.26	56.00 -36.74 QP
8	2.023	0.02	9.80	1.48	11.30	46.00 -34.70 Average
9	7.728	0.01	9.90	9.32	19.23	60.00 -40.77 QP
10	7.728	0.01	9.90	1.04	10.95	50.00 -39.05 Average
11	15.718	0.02	10.10	5.19	15.30	50.00 -34.70 Average
12	15.718	0.02	10.10	13.64	23.76	60.00 -36.24 QP



Neutral Line:



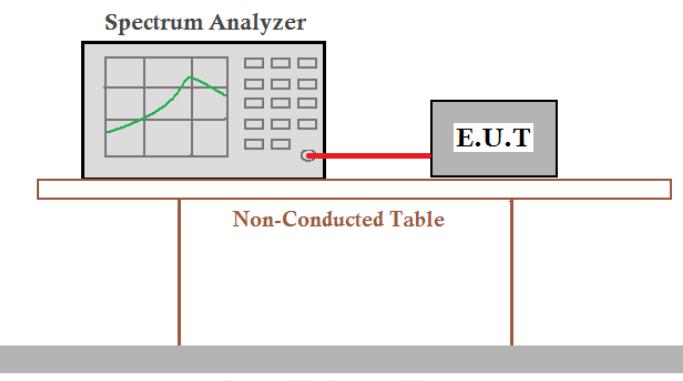
Site : Shielding Room
Condition : 47 CFR PART 15 B QP CE NEUTRAL
Job No. : 0445RF
Mode : TX

Freq	Cable	LISN	Read	Limit	Over	Remark
	Loss	Factor	Level			
	MHz	dB	dB	dBuV	dBuV	dB
1	0.20944	0.02	9.70	20.19	29.91	63.23 -33.32 QP
2	0.20944	0.02	9.70	12.15	21.86	53.23 -31.36 Average
3	0.37117	0.01	9.78	20.59	30.38	58.47 -28.10 QP
4	0.37117	0.01	9.78	11.16	20.95	48.47 -27.53 Average
5	0.98391	0.02	9.80	9.93	19.75	56.00 -36.25 QP
6	0.98391	0.02	9.80	0.70	10.52	46.00 -35.48 Average
7	2.033	0.02	9.80	9.94	19.76	56.00 -36.24 QP
8	2.033	0.02	9.80	1.13	10.95	46.00 -35.05 Average
9	8.776	0.01	10.00	5.14	15.15	60.00 -44.85 QP
10	8.776	0.01	10.00	0.86	10.87	50.00 -39.13 Average
11	15.552	0.02	10.01	11.84	21.87	60.00 -38.13 QP
12	15.552	0.02	10.01	3.61	13.64	50.00 -36.36 Average

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

5.3 Conducted Peak Output Power

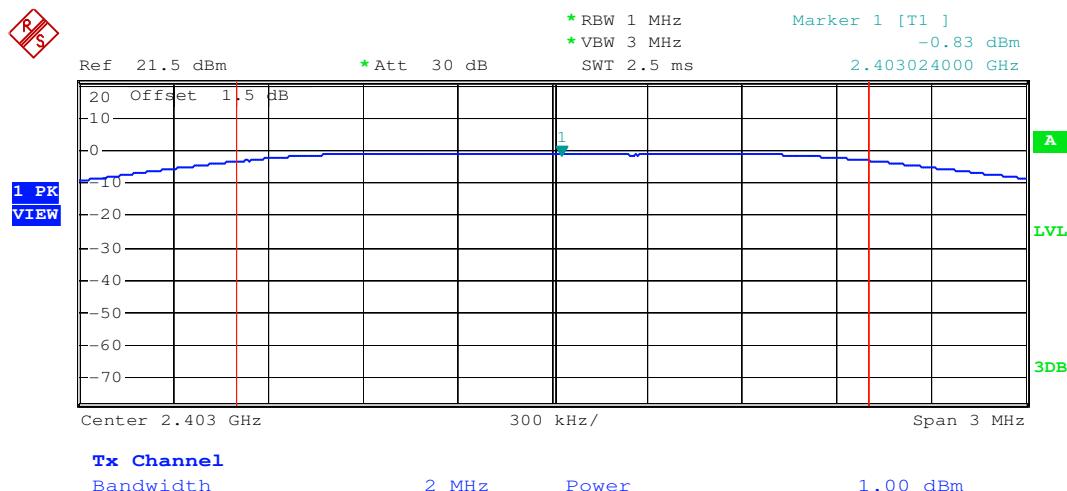
Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	KDB558074 D01
Test Setup:	 <p>Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane</p> <p><i>Remark: Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</i></p>
Test Mode:	Transmitting mode
Limit:	30dBm
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

Measurement Data

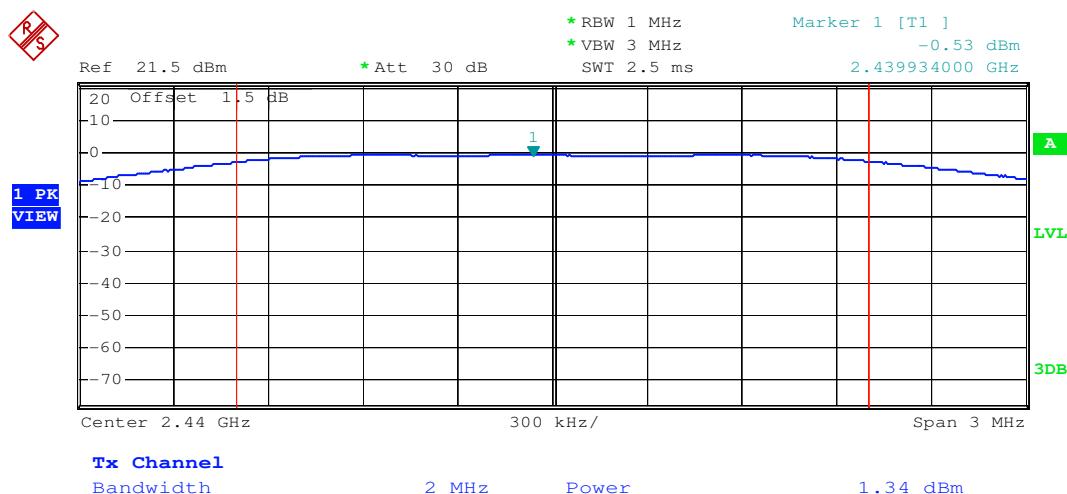
Transmitting mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
2403MHz	1.00	30.00	Pass
2440MHz	1.34	30.00	Pass
2477MHz	4.18	30.00	Pass

Test plot as follows:

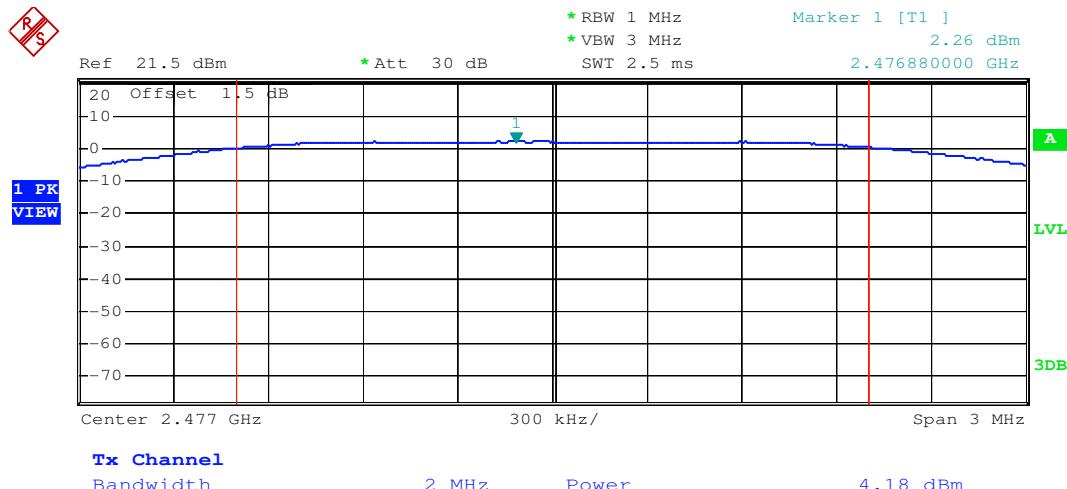
Test mode:	Transmitting mode	Test channel:	Lowest
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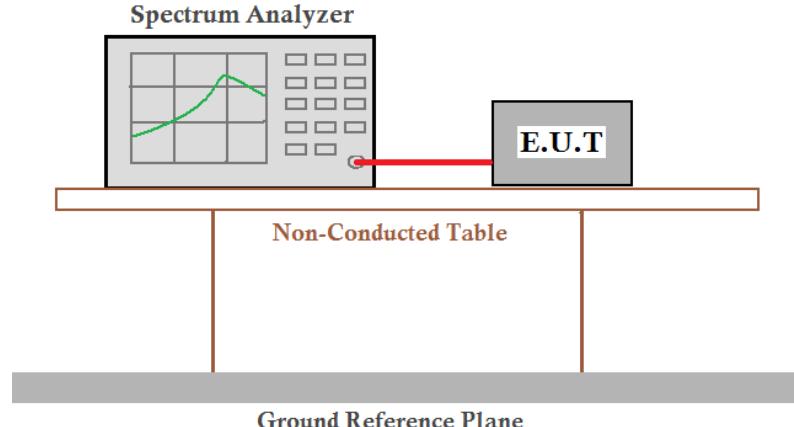
Test mode:	Transmitting mode	Test channel:	Middle
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Test mode:	Transmitting mode	Test channel:	Highest
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5.4 6dB Occupy Bandwidth

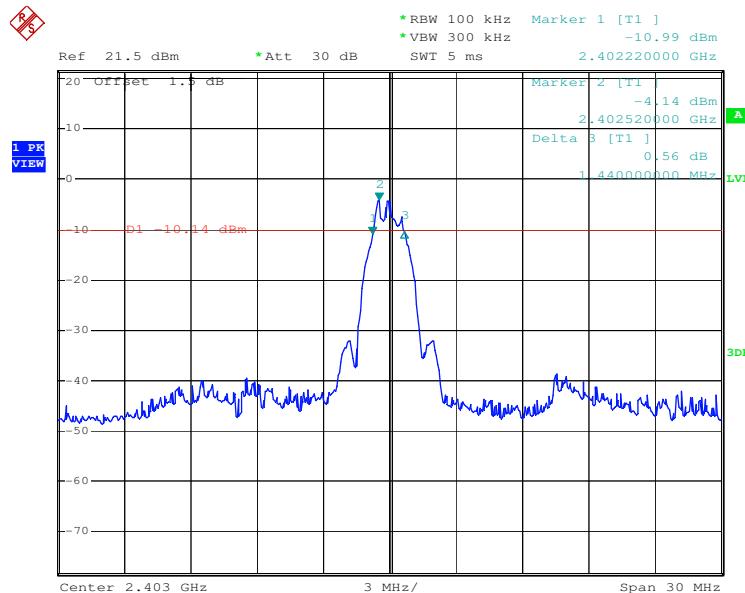
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	KDB558074 D01
Test Setup:	
Test Mode:	Transmitting mode
Limit:	≥ 500 KHz
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

Measurement Data

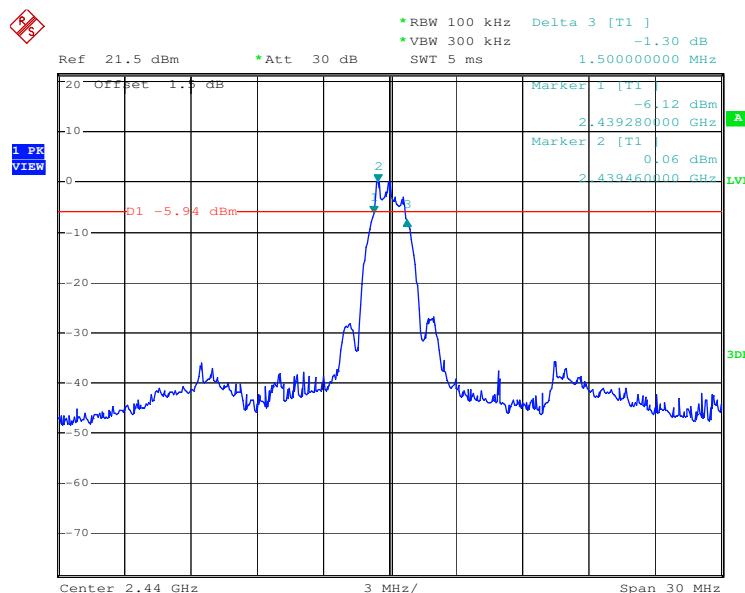
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
2403MHz	1.44	≥ 500	Pass
2440MHz	1.50	≥ 500	Pass
2477MHz	1.56	≥ 500	Pass

Test plot as follows:

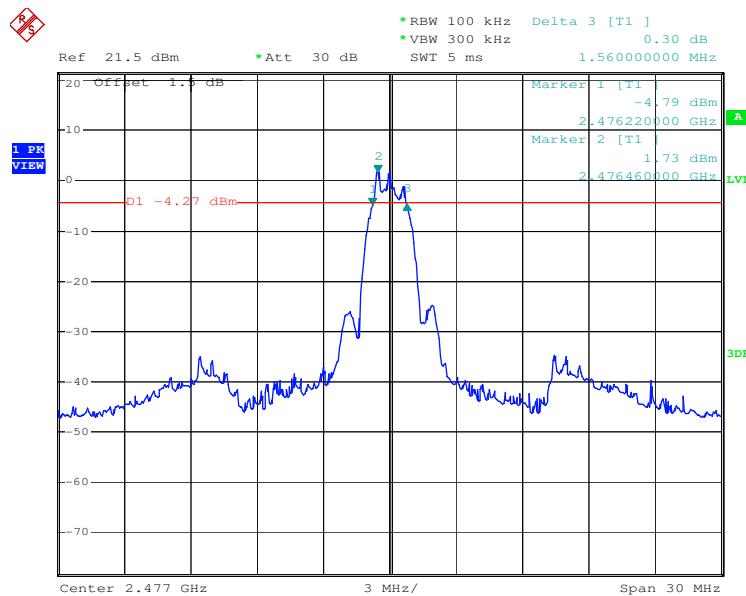
Test mode:	Transmitting mode	Test channel:	Lowest
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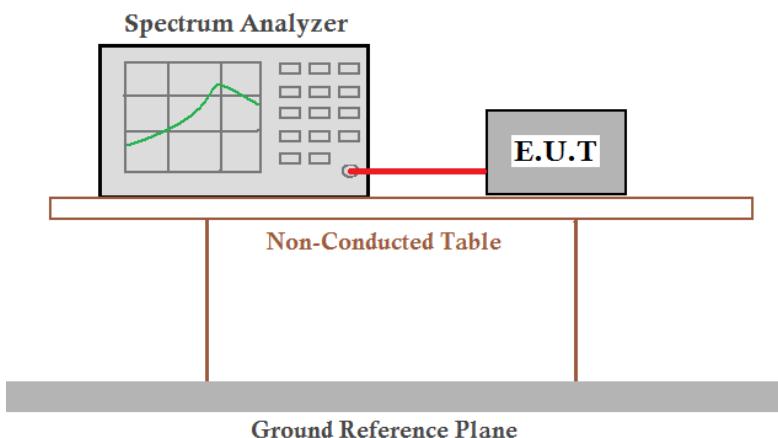
Test mode:	Transmitting mode	Test channel:	Middle
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Test mode:	Transmitting mode	Test channel:	Highest
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5.5 Power Spectral Density

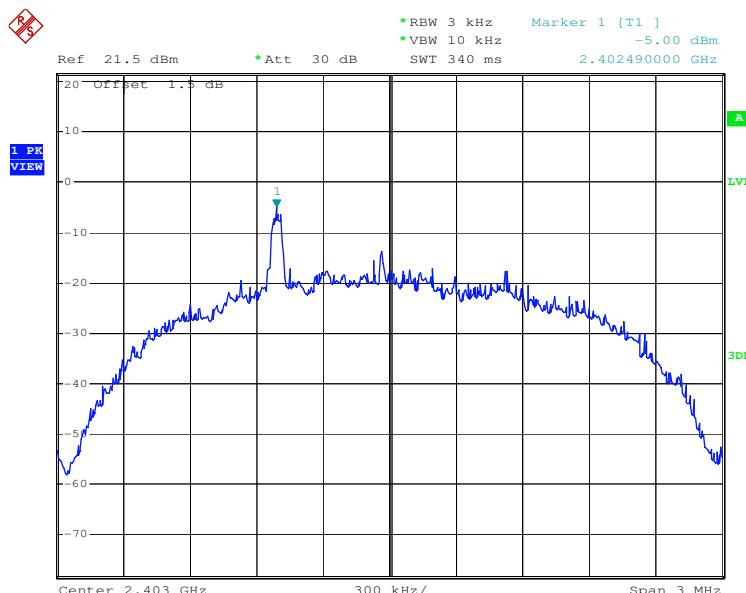
Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	KDB558074 D01
Test Setup:	 <p>Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane</p> <p><i>Remark:</i> <i>Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</i></p>
Test Mode:	Transmitting mode
Limit:	$\leq 8\text{dBm}$
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

Measurement Data

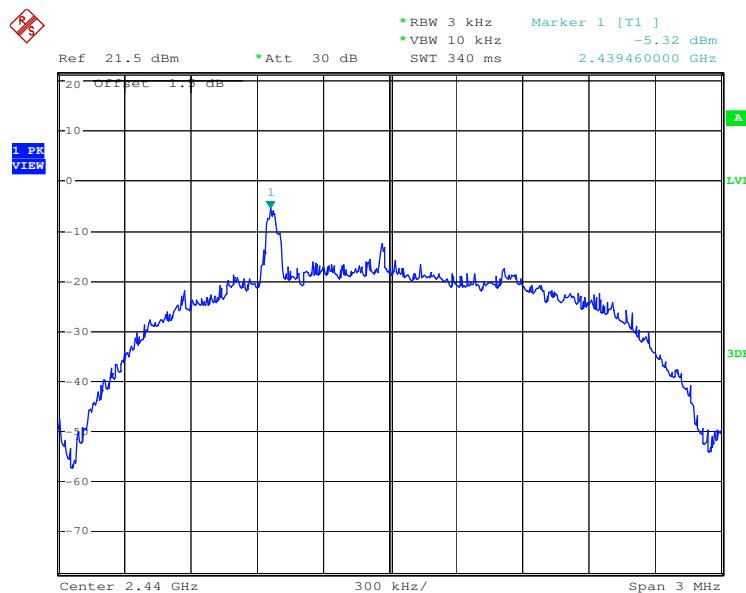
Test channel	Power Spectral Density (dBm)	Limit (dBm)	Result
2403MHz	-5.00	≤ 8.00	Pass
2440MHz	-5.32	≤ 8.00	Pass
2477MHz	-3.08	≤ 8.00	Pass

Test plot as follows:

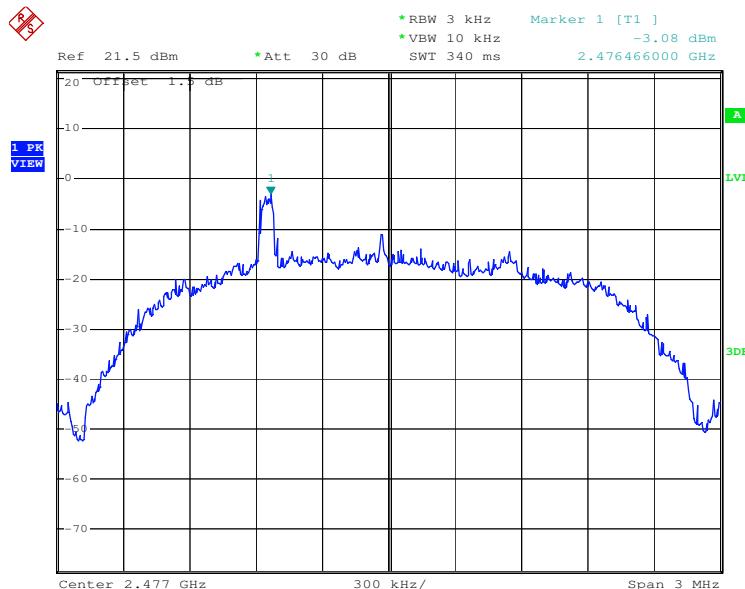
Test mode:	Transmitting mode	Test channel:	Lowest
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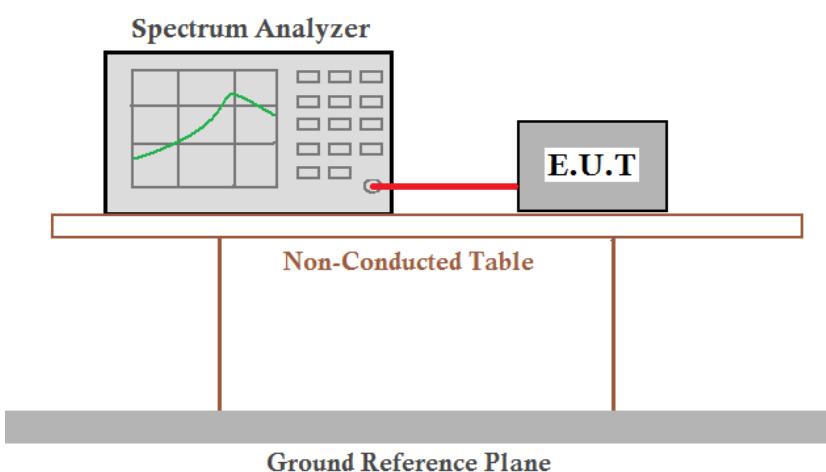
Test mode:	Transmitting mode	Test channel:	Middle
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Test mode:	Transmitting mode	Test channel:	Highest
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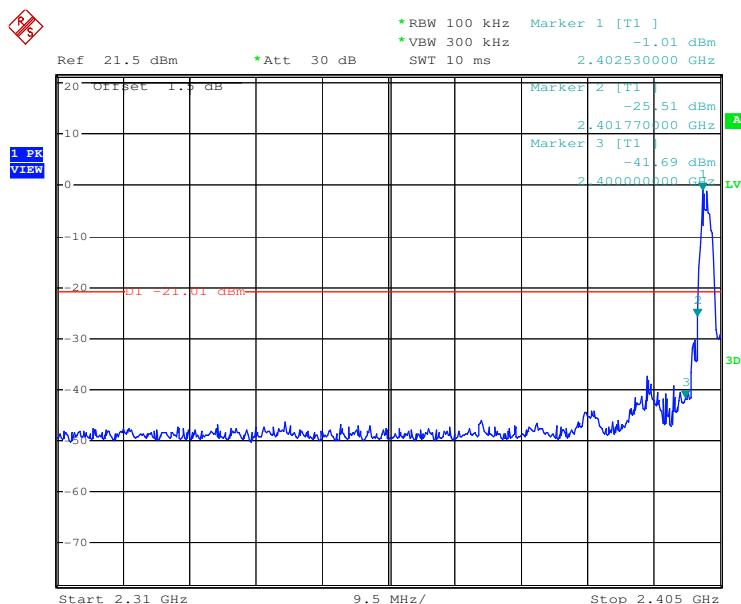


5.6 Band-edge for RF Conducted Emissions

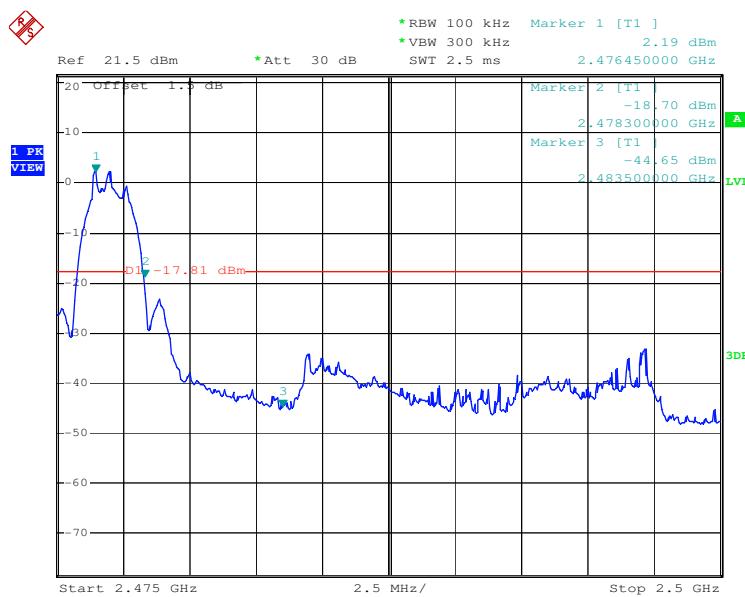
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	KDB558074 D01
Test Setup:	 <p>The diagram illustrates the test setup for measuring RF conducted emissions. A Spectrum Analyzer is connected to the E.U.T (Equipment Under Test) via a cable. The E.U.T is placed on a Non-Conducted Table, which is positioned above a Ground Reference Plane. The Spectrum Analyzer displays a graph with a green curve, representing the measured spectrum.</p>
	<p><i>Remark:</i> <i>Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</i></p>
Test Mode:	Transmitting mode
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 Db below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

Test plot as follows:

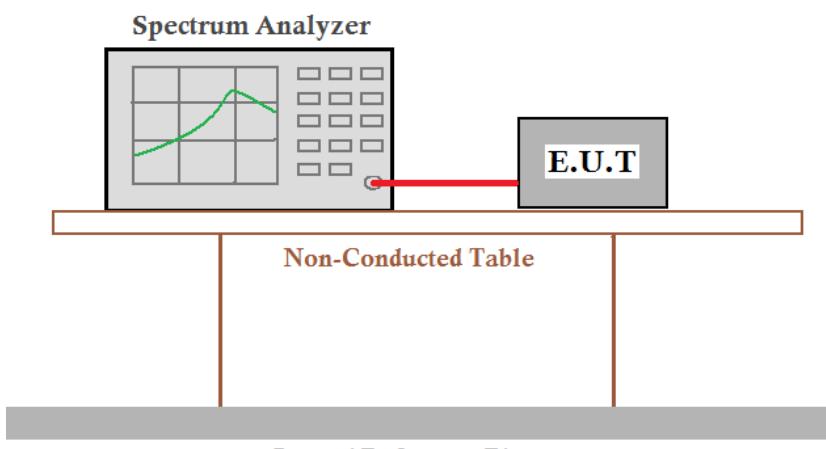
Test mode:	Transmitting mode	Test channel:	Lowest
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Test mode:	Transmitting mode	Test channel:	Highest
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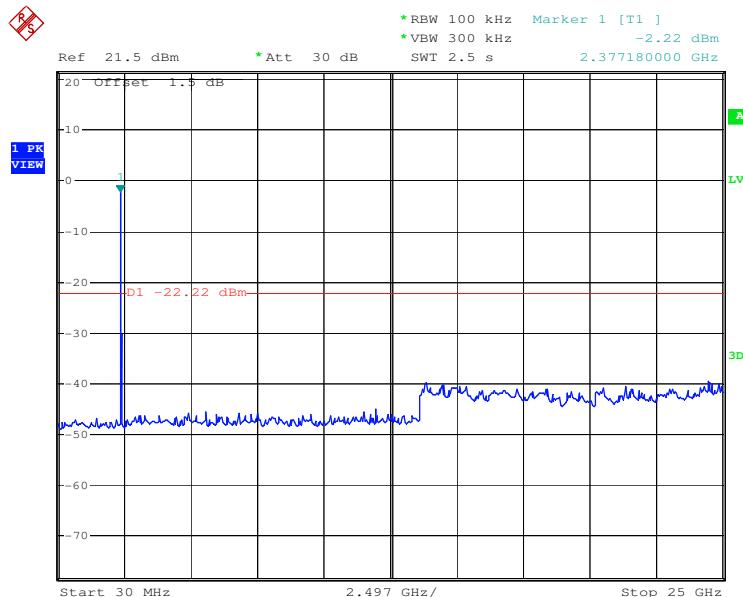


5.7 RF Conducted Spurious Emissions

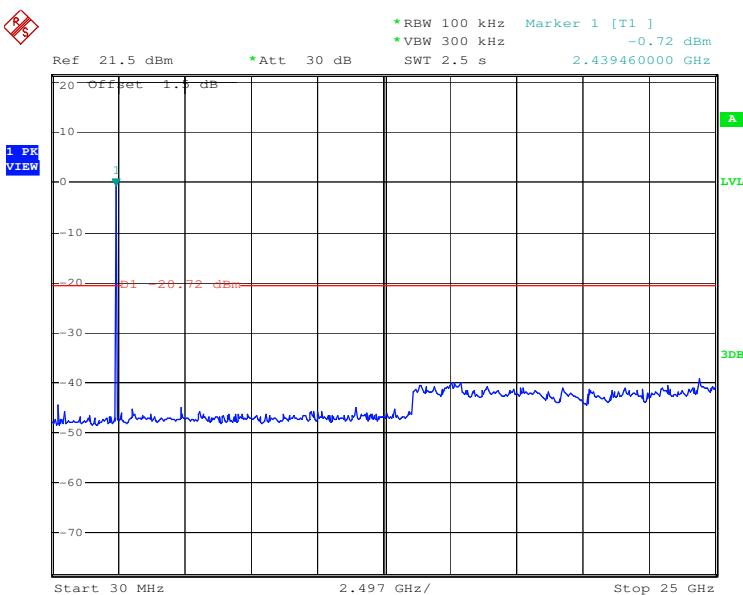
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	KDB558074 D01
Test Setup:	 <p>The diagram illustrates the test setup for RF Conducted Spurious Emissions. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a cable. The setup is placed on a Non-Conducted Table, which sits on a Ground Reference Plane. The Spectrum Analyzer shows a signal spectrum.</p>
	<p><i>Remark:</i> <i>Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</i></p>
Test Mode:	Transmitting mode
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

Test plot as follows:

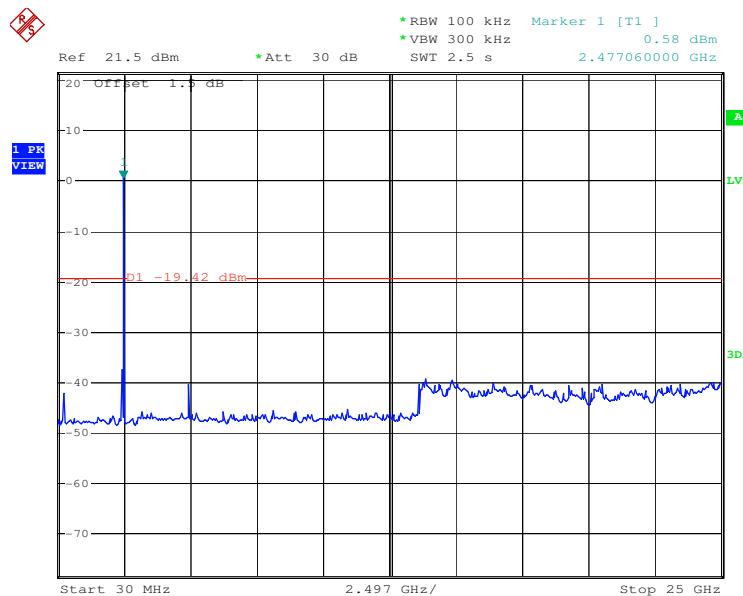
Test mode:	Transmitting mode	Test channel:	Lowest
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Test mode:	Transmitting mode	Test channel:	Middle
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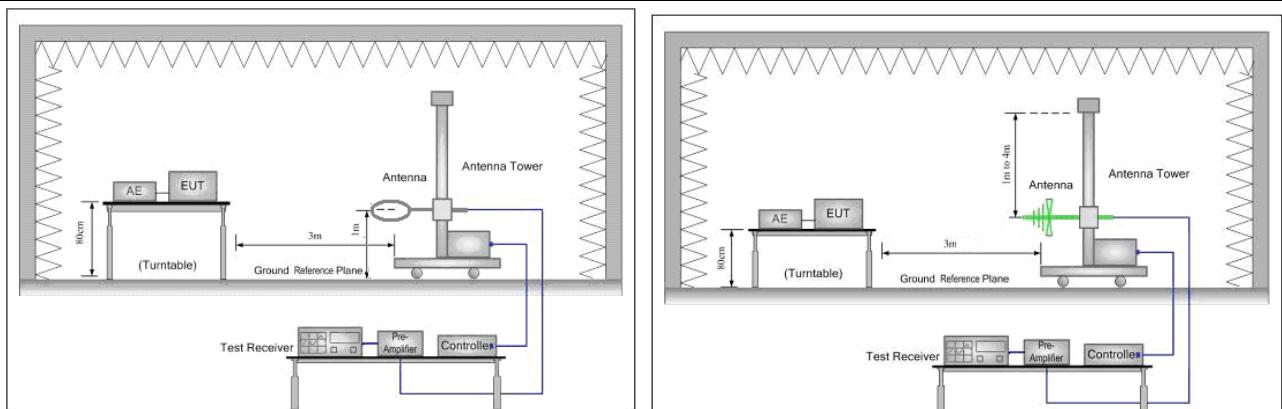
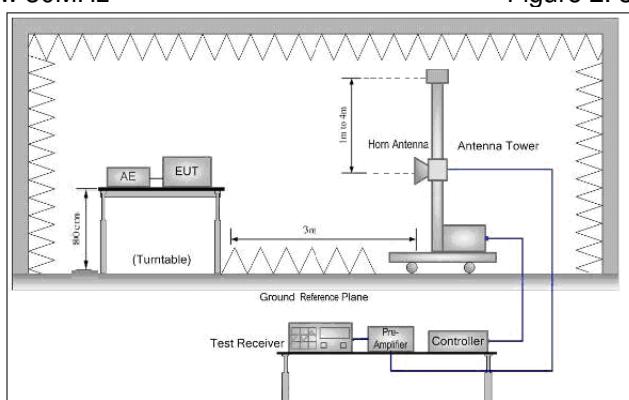
Test mode:	Transmitting mode	Test channel:	Highest
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5.8 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10 2009				
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Setup:

Figure 1. Below 30MHz
Figure 2. 30MHz to 1GHz

Figure 3. Above 1 GHz
Test Procedure:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the

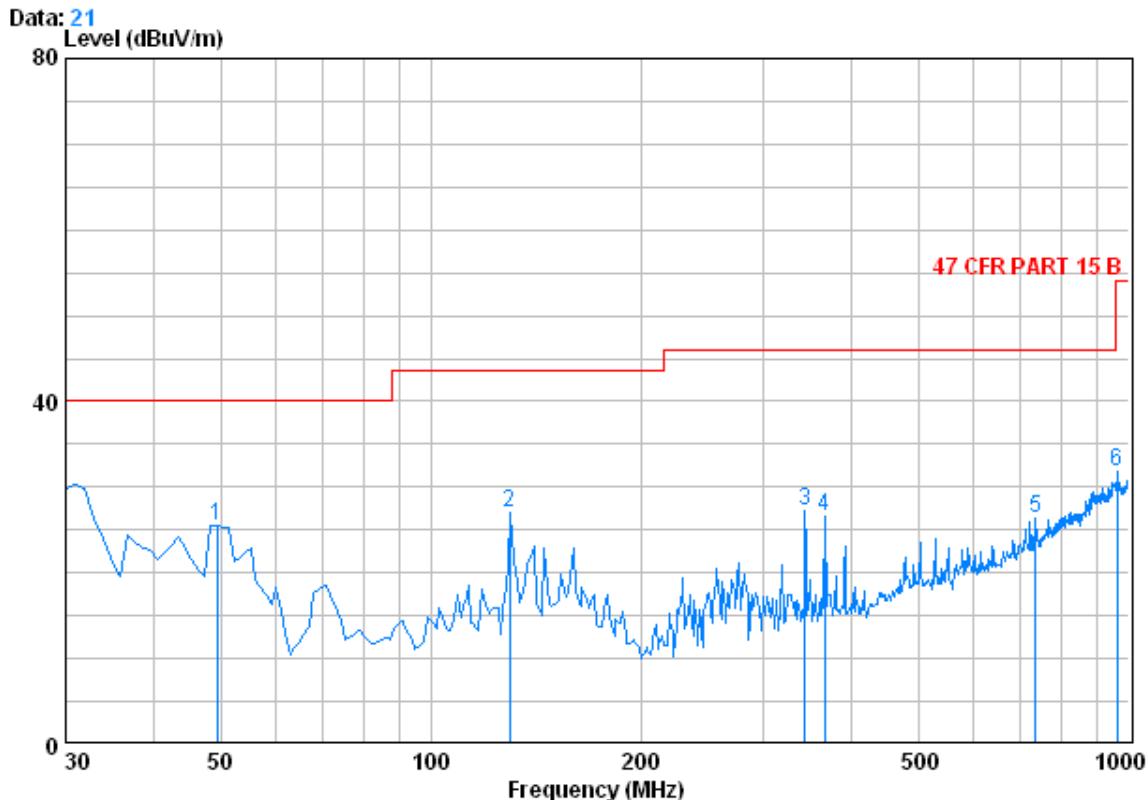


	EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. Test the EUT in the operation channel
Instruments Used:	Refer to section 4.10 for details
Test mode:	Transmitting mode
Test results:	Pass

5.8.1 Radiated emission below 1GHz

30MHz~1GHz(QP)	
Test mode:	Transmitting mode

Vertical:



Condition : 47 CFR PART 15 B 3m 3142C NEW VERTICAL

Job No. : 0445RF

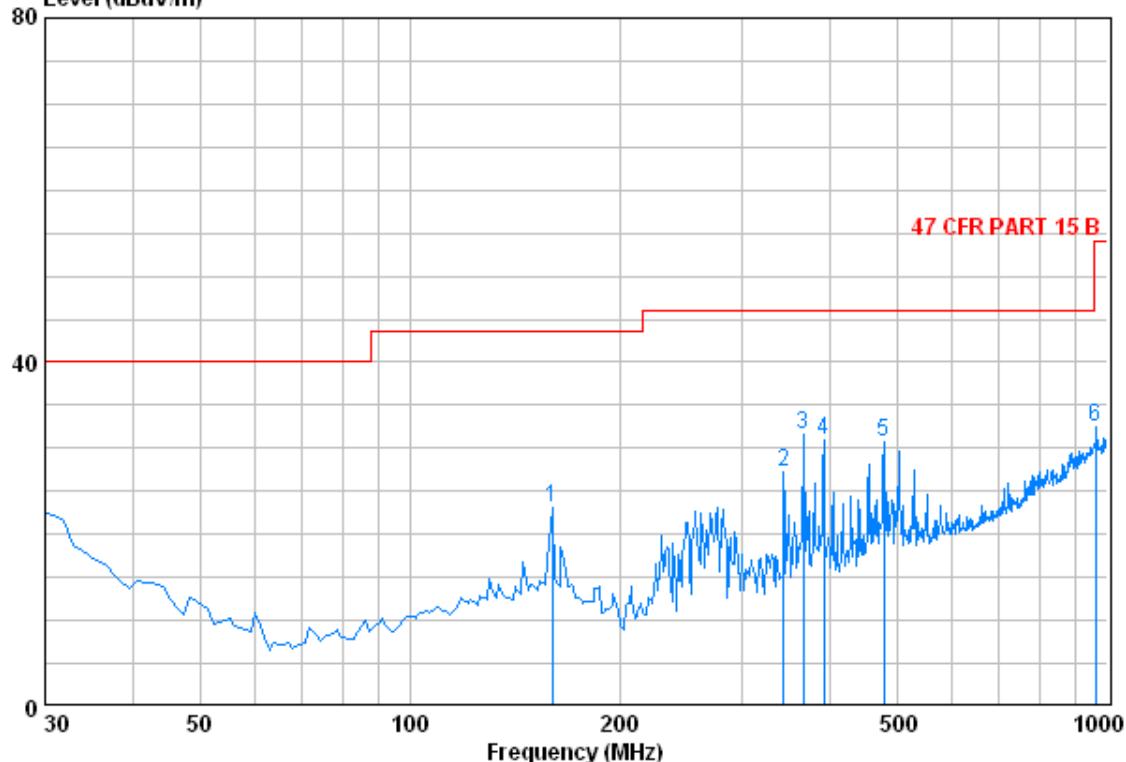
Mode : TX

	Freq	Cable		Antenna	Preamp	Read	Limit	Over
		Loss	Factor	Factor	Level	Level		
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	49.400	0.79	7.53	27.29	44.49	25.51	40.00	-14.49
2	129.910	1.28	8.20	27.01	44.56	27.02	43.50	-16.48
3	343.310	2.04	10.56	26.75	41.37	27.22	46.00	-18.78
4	366.590	2.11	11.04	26.91	40.41	26.66	46.00	-19.34
5	735.190	3.01	17.53	27.37	33.22	26.40	46.00	-19.60
6	963.140	3.66	21.13	26.47	33.41	31.74	54.00	-22.26

Horizontal:

Data: 20

Level (dBuV/m)



Condition : 47 CFR PART 15 B 3m 3142C NEW HORIZONTAL

Job No. : 0445RF

Mode : TX

	Freq	Cable	Antenna	Preamp	Read	Limit	Over	dB
		Loss	Factor	Factor	Level	Level	Line	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	
1	159.980	1.34	9.50	26.86	39.16	23.14	43.50	-20.36
2	343.310	2.04	10.56	26.75	41.41	27.26	46.00	-18.74
3	366.590	2.11	11.04	26.91	45.42	31.67	46.00	-14.33
4	392.780	2.18	11.66	27.09	44.26	31.01	46.00	-14.99
5	478.140	2.52	13.37	27.60	42.40	30.69	46.00	-15.31
6	963.140	3.66	21.13	26.47	34.20	32.53	54.00	-21.47



5.8.2 Transmitter emission above 1GHz

Test mode:	Transmitting mode			Test channel:	Lowest		Remark:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3143.979	5.27	33.34	40.41	48.18	46.38	74	-27.62	Vertical
4024.520	6.50	33.89	41.05	47.73	47.07	74	-26.93	Vertical
4883.519	7.48	34.59	41.68	48.55	48.94	74	-25.06	Vertical
6017.064	7.98	35.72	40.91	48.06	50.85	74	-23.15	Vertical
6886.154	8.35	35.92	40.15	48.55	52.67	74	-21.33	Vertical
8571.377	9.50	36.25	38.70	45.18	52.23	74	-21.77	Vertical
3143.979	5.27	33.34	40.41	47.88	46.08	74	-27.92	Horizontal
4055.371	6.53	33.99	41.08	47.27	46.71	74	-27.29	Horizontal
4785.075	7.42	34.73	41.61	50.44	50.98	74	-23.02	Horizontal
5850.919	7.91	35.45	41.06	48.64	50.94	74	-23.06	Horizontal
7338.621	8.90	35.94	39.75	47.12	52.21	74	-21.79	Horizontal
9088.188	9.63	36.70	38.24	44.43	52.52	74	-21.48	Horizontal

Test mode:	Transmitting mode			Test channel:	Middle		Remark:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3151.992	5.27	33.34	40.41	48.13	46.33	74	-27.67	Vertical
4181.159	6.68	34.31	41.16	47.73	47.56	74	-26.44	Vertical
4883.519	7.48	34.59	41.68	52.04	52.43	74	-21.57	Vertical
5865.832	7.92	35.48	41.04	48.46	50.82	74	-23.18	Vertical
7117.842	8.61	35.85	39.95	47.22	51.73	74	-22.27	Vertical
8462.975	9.47	36.19	38.78	45.90	52.78	74	-21.22	Vertical
3454.486	5.70	33.22	40.63	47.87	46.16	74	-27.84	Horizontal
4065.707	6.55	33.99	41.08	48.50	47.96	74	-26.04	Horizontal
4871.103	7.48	34.59	41.68	51.67	52.06	74	-21.94	Horizontal
6156.505	8.03	35.88	40.79	48.85	51.97	74	-22.03	Horizontal
6956.627	8.41	35.85	40.08	48.36	52.54	74	-21.46	Horizontal
8725.477	9.55	36.37	38.55	45.51	52.88	74	-21.12	Horizontal

Test mode:	Transmitting mode			Test channel:	Highest		Remark:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3112.129	5.22	33.36	40.38	47.51	45.71	74	-28.29	Vertical
4138.802	6.63	34.22	41.14	47.53	47.24	74	-26.76	Vertical
5617.407	7.81	35.09	41.25	47.37	49.02	74	-24.98	Vertical
6428.771	8.12	36.20	40.55	47.80	51.57	74	-22.43	Vertical
7643.683	9.23	36.00	39.49	46.42	52.16	74	-21.84	Vertical
9322.501	9.65	36.99	38.04	44.27	52.87	74	-21.13	Vertical
3308.185	5.50	33.28	40.52	47.64	45.90	74	-28.10	Horizontal
4512.966	7.09	35.17	41.42	47.53	48.37	74	-25.63	Horizontal
5674.896	7.83	35.18	41.20	48.43	50.24	74	-23.76	Horizontal
6628.177	8.19	36.18	40.38	48.19	52.18	74	-21.82	Horizontal
7643.683	9.23	36.00	39.49	46.47	52.21	74	-21.79	Horizontal
8615.126	9.51	36.29	38.65	45.52	52.67	74	-21.33	Horizontal

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are 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 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

5.9 Band Edge (Radiated Emission)

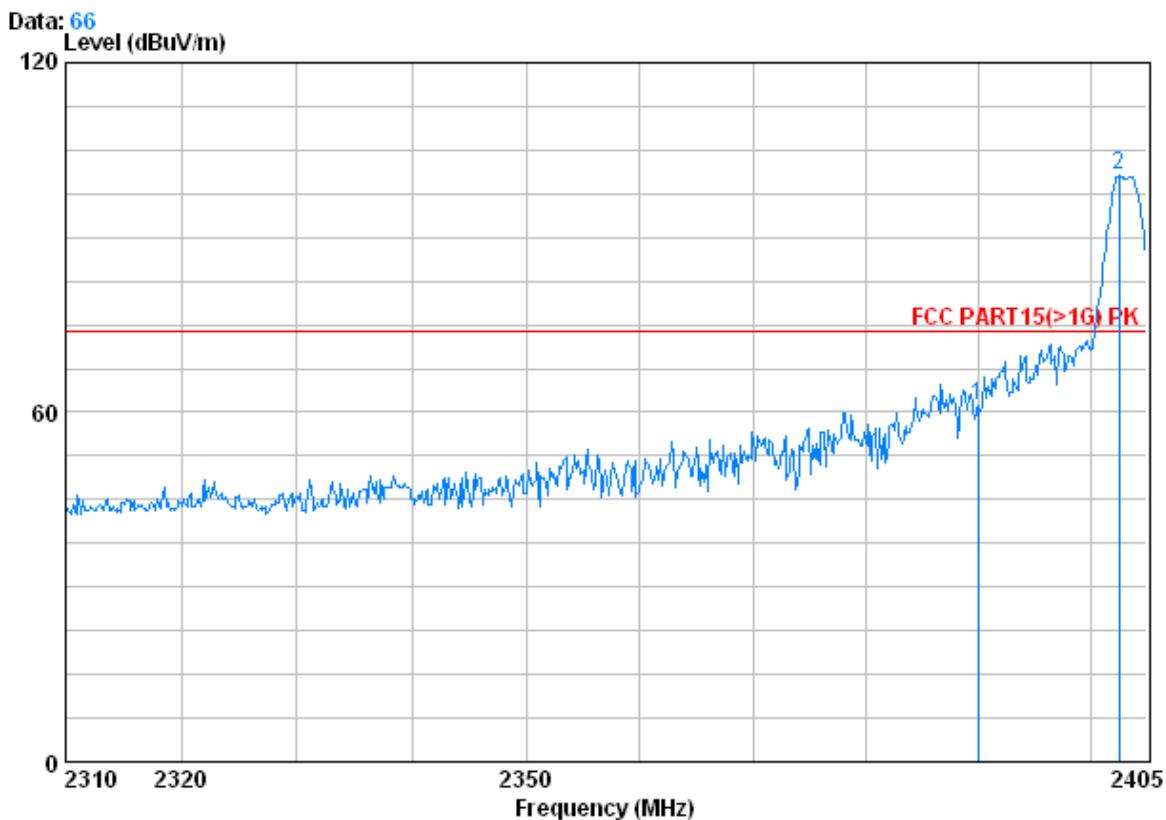
Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205					
Test Method:	ANSI C63.10 2009					
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)					
Limit:	Frequency	Limit (dBuV/m @3m)	Remark			
	30MHz-88MHz	40.0	Quasi-peak Value			
	88MHz-216MHz	43.5	Quasi-peak Value			
	216MHz-960MHz	46.0	Quasi-peak Value			
	960MHz-1GHz	54.0	Quasi-peak Value			
	Above 1GHz	54.0	Average Value			
		74.0	Peak Value			
Test Setup:						
Figure 1. 30MHz to 1GHz		Figure 2. Above 1 GHz				

Test Procedure:	<ol style="list-style-type: none">a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for operation channelg. Test the EUT in the operation channel
Instruments Used:	Refer to section 4.10 for details
Test mode:	Transmitting mode
Test results:	Pass

Band edge (Radiated Emission)

Test mode:	Transmitting mode	Test channel:	2403MHz	Remark:	Peak
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Vertical:



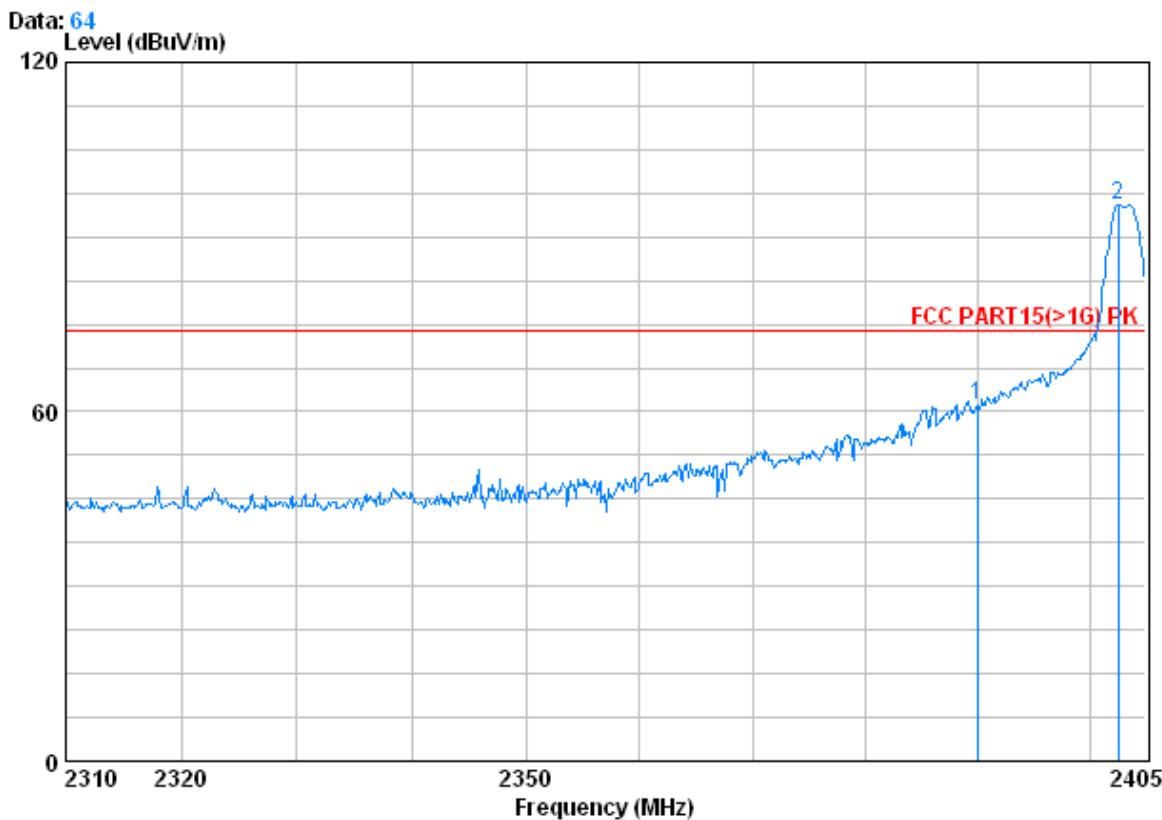
Condition : FCC PART15(>1G) PK 3m VERTICAL

Job NO. : 445RF

Mode : 2403 Bandedge

	Freq	Cable			Antenna		Preamp	Read	Limit	Line	Over
		Loss	Antenna	Factor	Factor	Level	Level	dBuV			
	MHz	dB	dB/m	dB							
1	2390.000	2.98	32.51	39.85	65.60	61.25	74.00	-12.75			
2 X	2402.530	2.98	32.54	39.86	104.95	100.61	74.00	26.61			

Horizontal:



Condition : FCC PART15(>1G) PK 3m HORIZONTAL

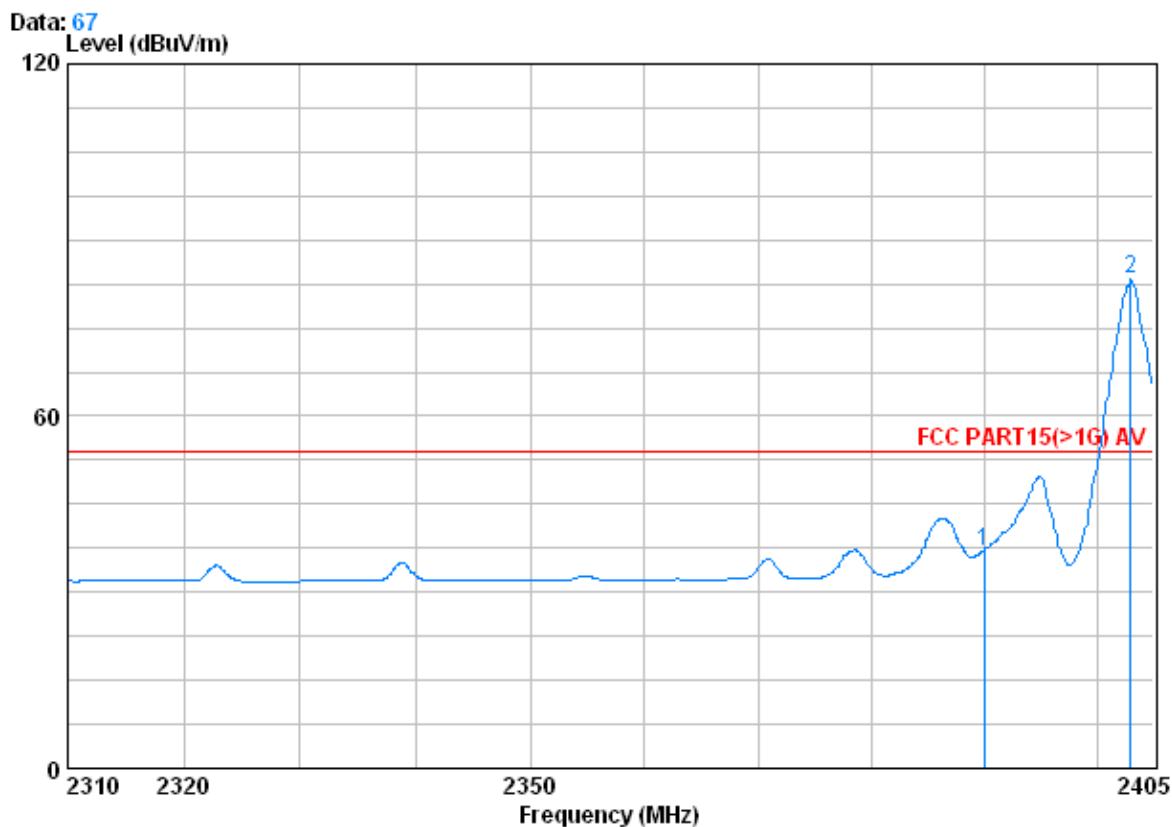
Job NO. : 445RF

Mode : 2403 Bandedge

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	65.48	61.12	74.00	-12.88
2 X	2402.530	2.98	32.54	39.86	99.91	95.57	74.00	21.57

Test mode:	Transmitting mode	Test channel:	2403MHz	Remark:	Average
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Vertical:



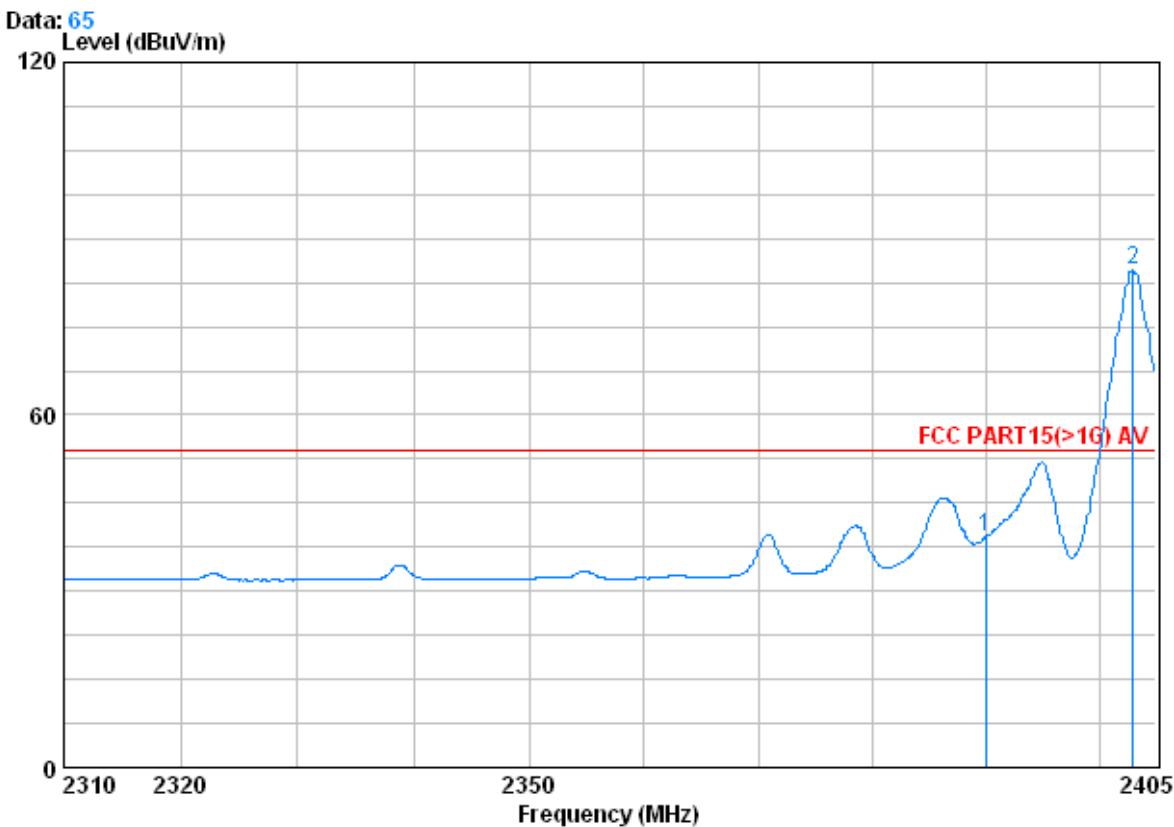
Condition : FCC PART15(>1G) AV 3m VERTICAL

Job NO. : 445RF

Mode : 2403 Bandedge

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Limit Level	Line Limit	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	41.42	37.07	54.00	-16.93
2	2403.005	2.98	32.54	39.86	87.64	83.30	54.00	29.30

Horizontal:



Condition : FCC PART15(>1G) AV 3m HORIZONTAL

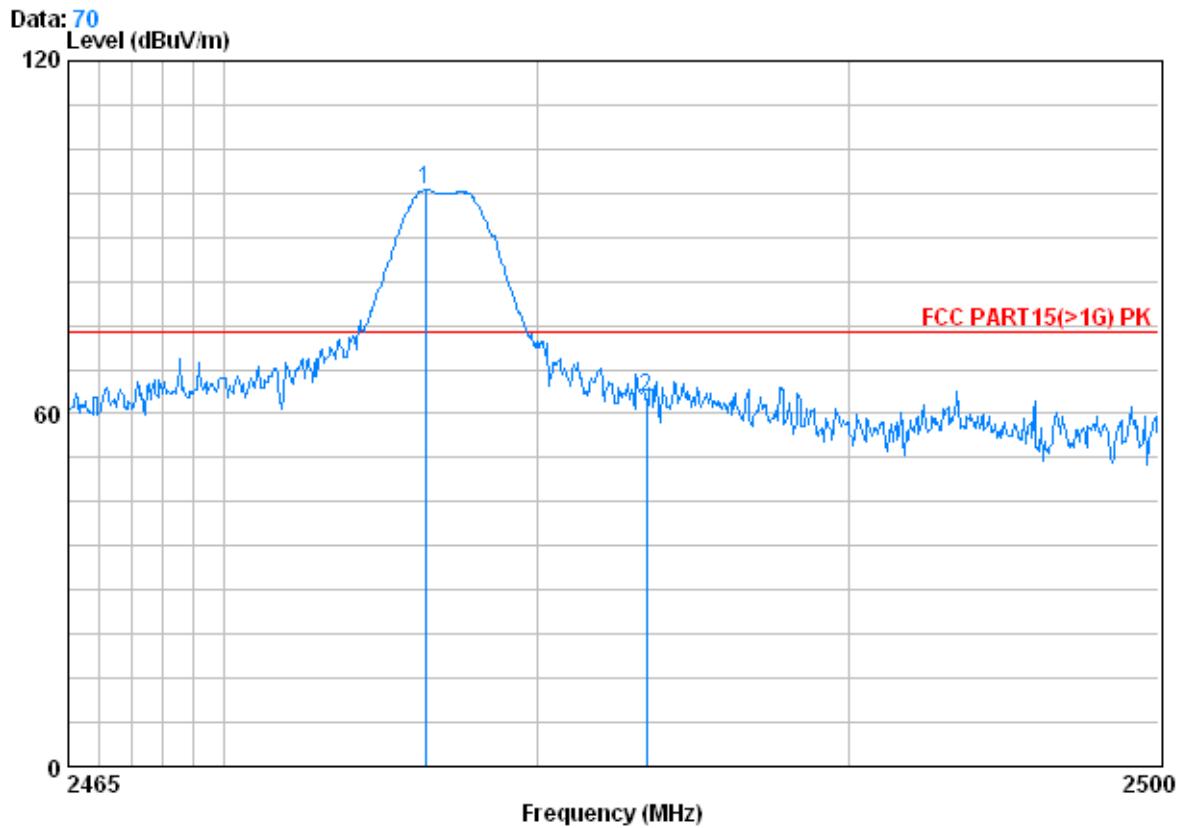
Job NO. : 445RF

Mode : 2403 Bandedge

	Cable	Antenna	Preamp	Read	Limit	Over		
	Freq	Loss	Factor	Level	Level	Line	Limit	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	43.51	39.16	54.00	-14.84
2	2403.005	2.98	32.54	39.86	88.99	84.66	54.00	30.66

Test mode:	Transmitting mode	Test channel:	2477MHz	Remark:	Peak
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Vertical:



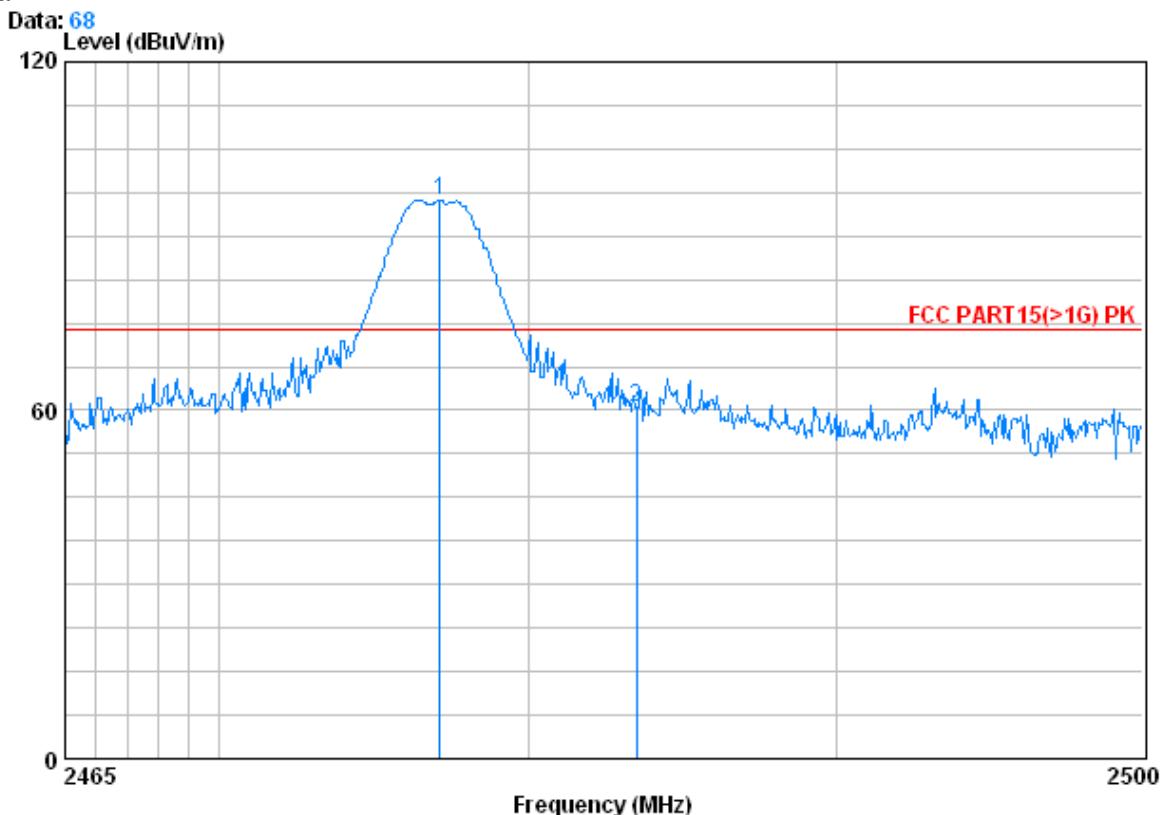
Condition : FCC PART15(>1G) PK 3m VERTICAL

Job NO. : 445RF

Mode : 2477 Bandedge

	Cable	Antenna	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1	2476.410	3.03	32.67	39.92	102.30	98.08	74.00
2	2483.500	3.03	32.67	39.92	67.06	62.84	74.00
							-11.16

Horizontal:



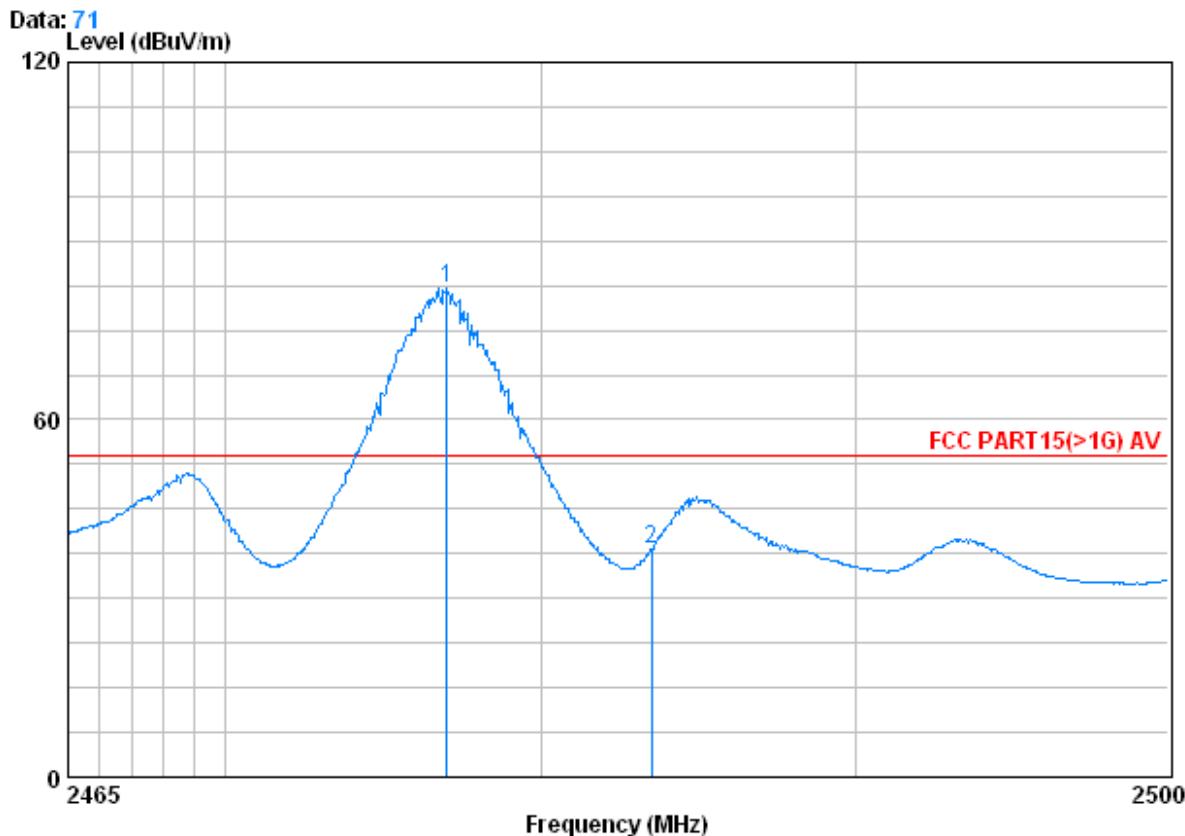
Condition : FCC PART15(>1G) PK 3m HORIZONTAL
Job NO. : 445RF
Mode : 2477 Bandedge

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Limit Level	Line Limit	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 X	2477.110	3.03	32.67	39.92	100.42	96.20	74.00	22.20
2	2483.500	3.03	32.67	39.92	64.78	60.56	74.00	-13.44



Test mode:	Transmitting mode	Test channel:	2477MHz	Remark:	Average
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Vertical:



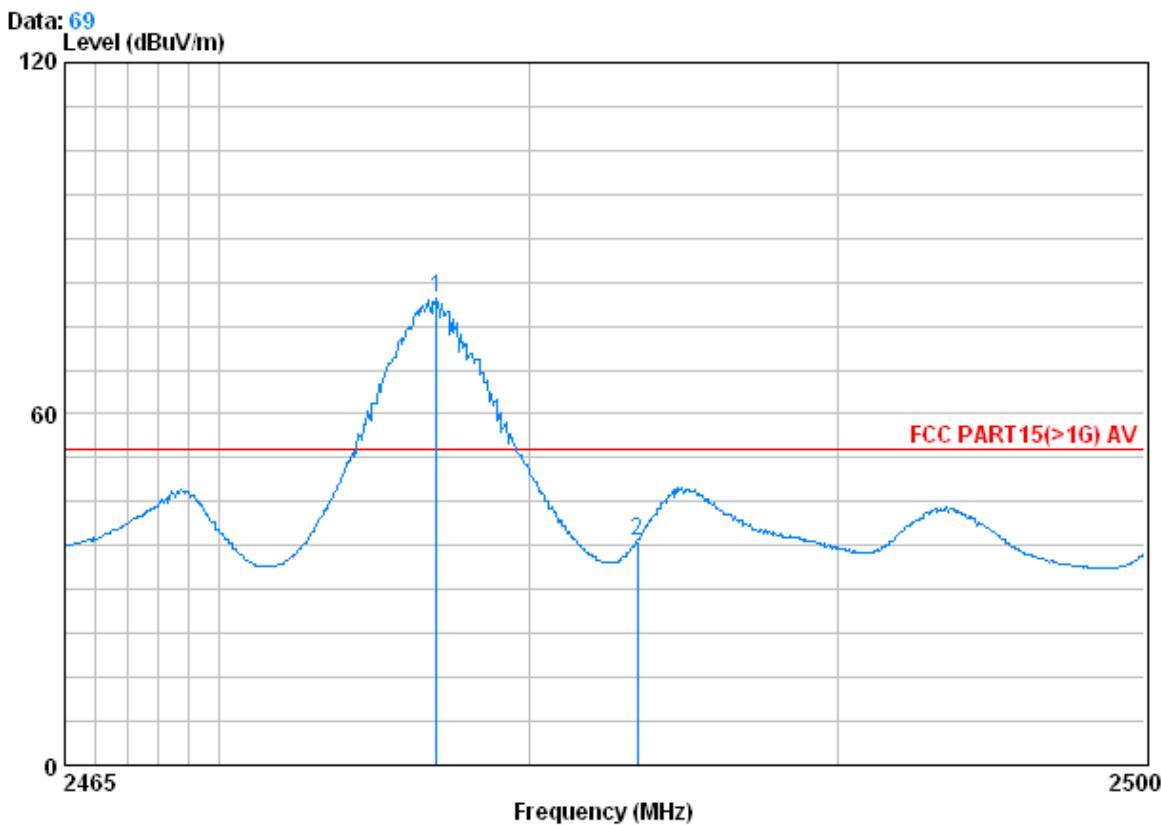
Condition : FCC PART15(>1G) AV 3m VERTICAL

Job NO. : 445RF

Mode : 2477 Bandedge

	Freq	Cable	Antenna	Preamp	Read	Limit	Over	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2477.005	3.03	32.67	39.92	86.44	82.22	54.00	28.22
2	2483.500	3.03	32.67	39.92	42.40	38.18	54.00	-15.82

Horizontal:



Condition : FCC PART15(>1G) AV 3m HORIZONTAL

Job NO. : 445RF

Mode : 2477 Bandedge

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m		dBuV	dBuV/m	dBuV/m	dB
1 X	2477.005	3.03	32.67	39.92	84.16	79.94	54.00	25.94
2	2483.500	3.03	32.67	39.92	42.62	38.40	54.00	-15.60

Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor