SGS-CSTC Standards Technical Services Ltd.

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FCC REPORT

Application No.:	SZEM1204001812RF
Applicant:	Bensussen Deutsch & Associates, Inc.
Product Name:	POWER A PRO EX CONTROLLER FOR PS3
Model No.(EUT):	220209-FR
FCC ID:	YFK-22003802FR
Standards:	FCC CFR Title 47 Part 15 (2010)
Date of Receipt:	2012-04-18
Date of Test:	2012-04-26 to 2011-05-04
Date of Issue:	2012-05-24
Test Result:	**PASS ***

. * 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.

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	FCC CFR Title 47 Part 15C Section 15.203	ANSI C63.10 (2009)	PASS
AC Power Line Conducted Emission	FCC CFR Title 47 Part 15C Section 15.207	ANSI C63.10 (2009)	PASS
Field Strength of the Fundamental Signal	FCC CFR Title 47 Part 15C Section 15.249 (a)	ANSI C63.10 (2009)	PASS
Spurious Emissions	FCC CFR Title 47 Part 15C Section 15.249 (a)/15.209	ANSI C63.10 (2009)	PASS
Band edge (Radiated Emission)	FCC CFR Title 47 Part 15C Section 15.249(a)/15.205	ANSI C63.10 (2009)	PASS
20dB Occupied Bandwidth	FCC CFR Title 47 Part 15C Section 15.215 (c)	ANSI C63.10 (2009)	PASS

3 Contents

4 General Information

4.1 Client Information

Applicant:	Bensussen Deutsch & Associates, Inc.
Address of Applicant:	15525 Woodinville-Redmond Road NE Woodinville, WA 98072 USA

4.2 General Description of EUT

Name:	POWER A PRO EX CONTROLLER FOR PS3
Model No.:	220209-FR
Frequency Range:	2410.0000MHz-2470.0066MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	MSK
Number of Channels:	75 (declared by the client)
Sample Type:	Fixed production
Antenna Type:	Integral
Antenna Gain:	2.0dBi
Power Supply:	PS3 USB supply AC 120V 60Hz voltage for PS3

Operation Frequency Each of Channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1CH	2410.0000MHz	26CH	2430.2725MHz	51CH	2450.5450MHz
2CH	2410.8109MHz	27CH	2431.0834MHz	52CH	2451.3559MHz
3CH	2411.6218MHz	28CH	2431.8943MHz	53CH	2452.1668MHz
4CH	2412.4327MHz	29CH	2432.7052MHz	54CH	2452.9777MHz
5CH	2413.2436MHz	30CH	2433.5161MHz	55CH	2453.7886MHz
6CH	2414.0545MHz	31CH	2434.3270MHz	56CH	2454.5995MHz
7CH	2414.8654MHz	32CH	2435.1379MHz	57CH	2455.4104MHz
8CH	2415.6763MHz	33CH	2435.9488MHz	58CH	2456.2213MHz
9CH	2416.4872MHz	34CH	2436.7597MHz	59CH	2457.0322MHz
10CH	2417.2981MHz	35CH	2437.5706MHz	60CH	2457.8431MHz
11CH	2418.1090MHz	36CH	2438.3815MHz	61CH	2458.6540MHz
12CH	2418.9199MHz	37CH	2439.1924MHz	62CH	2459.4649MHz
13CH	2419.7308MHz	38CH	2440.0033MHz	63CH	2460.2758MHz
14CH	2420.5417MHz	39CH	2440.8142MHz	64CH	2461.0867MHz
15CH	2421.3526MHz	40CH	2441.6251MHz	65CH	2461.8976MHz
16CH	2422.1635MHz	41CH	2442.4360MHz	66CH	2462.7085MHz
17CH	2422.9744MHz	42CH	2443.2469MHz	67CH	2463.5194MHz
18CH	2423.7853MHz	43CH	2444.0578MHz	68CH	2464.3303MHz
19CH	2424.5962MHz	44CH	2444.8687MHz	69CH	2465.1412MHz
20CH	2425.4071MHz	45CH	2445.6796MHz	70CH	2465.9521MHz
21CH	2426.2180MHz	46CH	2446.4905MHz	71CH	2466.7630MHz
22CH	2427.0289MHz	47CH	2447.3014MHz	72CH	2467.5739MHz
23CH	2427.8398MHz	48CH	2448.1123MHz	73CH	2468.3848MHz
24CH	2428.6507MHz	49CH	2448.9232MHz	74CH	2469.1957MHz
25CH	2429.4616MHz	50CH	2449.7341MHz	75CH	2470.0066MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel(CH1)	2410.0000MHz
The middle channel(CH38)	2440.0033MHz
The highest channel(CH75)	2470.0066MHz

4.3 Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1006 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode.

4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
PS3	Sony Computer Entertainment Inc.	CECHP12
LCD-displaying	DELL	SP2208WFPt

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 Test Instruments List

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	2012-06-10
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2012-05-26
3	EMI Test software	AUDIX	E3	SEL0050	N/A
4	Coaxial cable	SGS	N/A	SEL0028	2012-05-29
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2012-10-29
6	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2012-10-29
7	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2012-10-29
8	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2012-05-26
9	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2012-10-26
11	Band filter	Amindeon	82346	SEL0094	2012-05-26

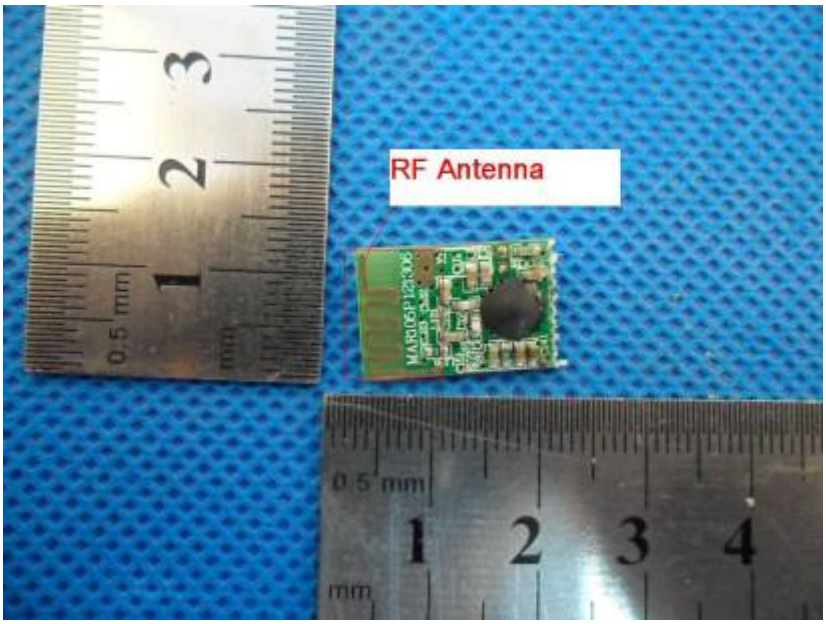
RF conducted					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Due date (yyyy-mm-dd)**
1	Spectrum Analyzer	Rohde & Schwarz	FSP 30	SEL0154	2012-10-23
2	Coaxial cable	SGS	N/A	SEL0028	2012-05-29

Conducted Emission					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Due date (yyyy-mm-dd)**
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2012-06-10
2	Two-Line V-Network	ETS-LINDGREN	3816/2	SEL0021	2012-05-26
3	LISN	Rohde & Schwarz	ENV216	SEL0152	2012-10-23
4	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2012-05-26
5	Coaxial Cable	SGS	N/A	SEL0024	2012-05-29

General used equipment					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Due date (yyyy-mm-dd)**
1	Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	SEL0102 to SEL0103	2012-10-27
2	Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	SEL0101	2012-10-27
3	Barometer	ChangChun	DYM3	SEL0088	2012-05-18

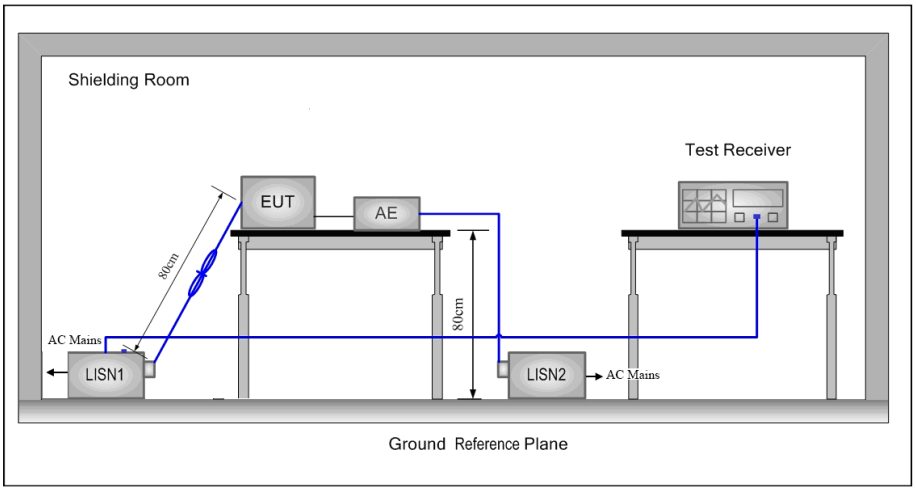
5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: 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.	
EUT Antenna:	
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.0dBi.	
	

5.2 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2009</td></tr>
<tr><td>Test Frequency Range:</td><td>150kHz to 30MHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test Procedure:</td><td>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 50Ω/50μH + 5Ω 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.</td></tr>
</table>

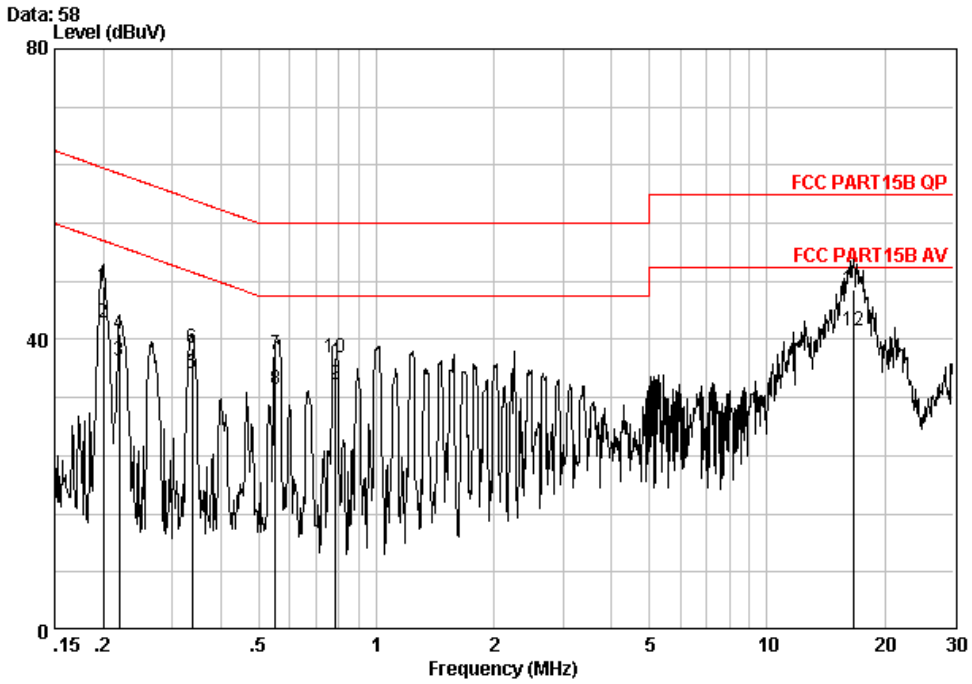
Test Setup:	
Instruments Used:	Refer to section 4.10 for details
Test Mode:	Transmitting mode
Test Results:	Pass

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.

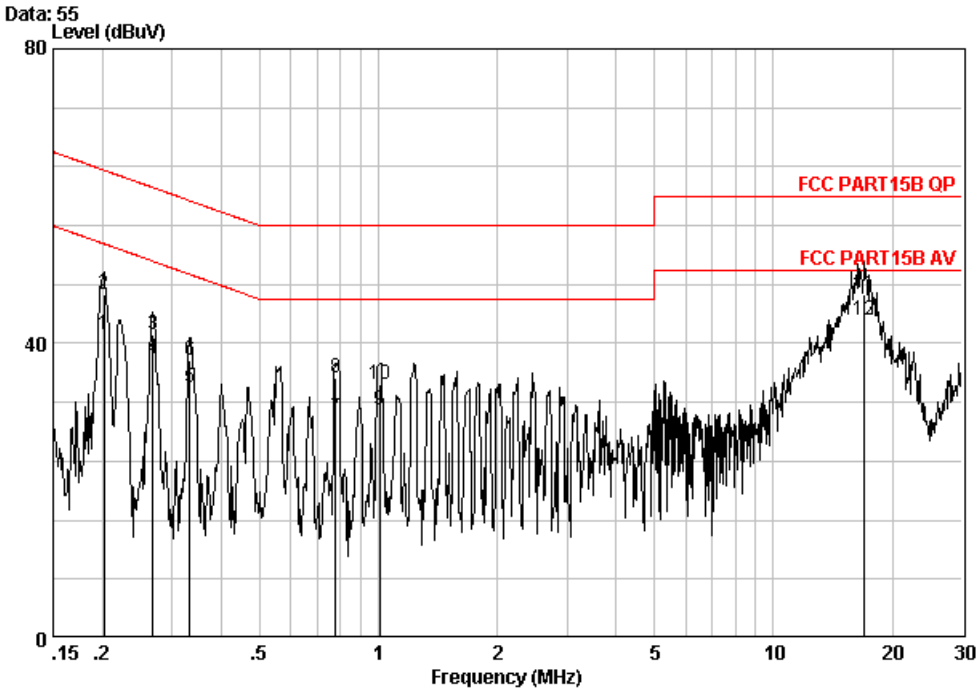
Live Line:



Site : Shielding Room
Condition : FCC PART15B QP CE-20101216 LINE
Job No. : 1812RF
Mode : Tranmitting

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.19969	0.04	9.60	37.68	47.32	63.62	-16.31	QP
2 @	0.19969	0.04	9.60	32.55	42.19	53.62	-11.43	Average
3	0.21967	0.04	9.60	27.49	37.13	52.83	-15.70	Average
4	0.21967	0.04	9.60	31.19	40.83	62.83	-22.00	QP
5	0.33740	0.05	9.60	25.57	35.22	49.27	-14.04	Average
6	0.33740	0.05	9.60	29.13	38.78	59.27	-20.49	QP
7	0.55226	0.06	9.63	28.27	37.97	56.00	-18.03	QP
8	0.55226	0.06	9.63	23.41	33.10	46.00	-12.90	Average
9	0.78761	0.07	9.70	24.04	33.81	46.00	-12.19	Average
10	0.78761	0.07	9.70	27.77	37.54	56.00	-18.46	QP
11	16.661	0.26	10.03	36.50	46.79	60.00	-13.21	QP
12 @	16.661	0.26	10.03	30.90	41.19	50.00	-8.81	Average

Neutral Line:



Site : Shielding Room
Condition : FCC PART15B QP CE-20101216 NEUTRAL
Job No. : 1812RF
Mode : Tranmitting

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.20181	0.04	9.60	31.64	41.28	53.54	-12.26	Average
2	0.20181	0.04	9.60	37.11	46.75	63.54	-16.79	QP
3	0.26866	0.05	9.60	31.54	41.19	61.16	-19.97	QP
4	0.26866	0.05	9.60	28.28	37.93	51.16	-13.23	Average
5	0.33208	0.05	9.60	24.37	34.02	49.40	-15.38	Average
6	0.33208	0.05	9.60	28.08	37.74	59.40	-21.66	QP
7	0.77931	0.07	9.70	20.15	29.91	46.00	-16.09	Average
8	0.77931	0.07	9.70	25.58	35.35	56.00	-20.65	QP
9	1.005	0.08	9.70	21.09	30.87	46.00	-15.13	Average
10	1.005	0.08	9.70	24.57	34.35	56.00	-21.65	QP
11	17.018	0.26	10.04	36.40	46.70	60.00	-13.30	QP
12 @	17.018	0.26	10.04	32.80	43.10	50.00	-6.90	Average

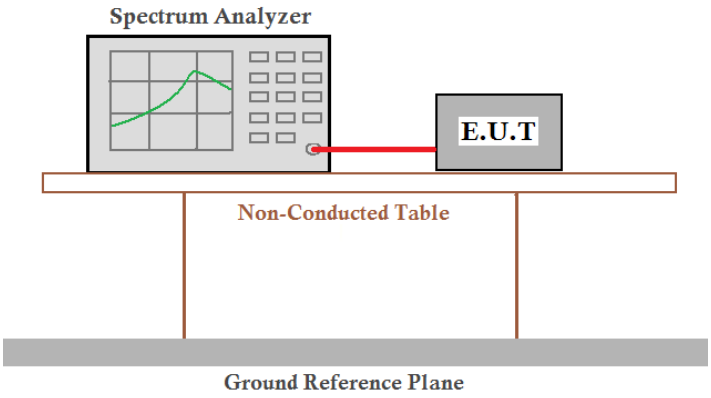
Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

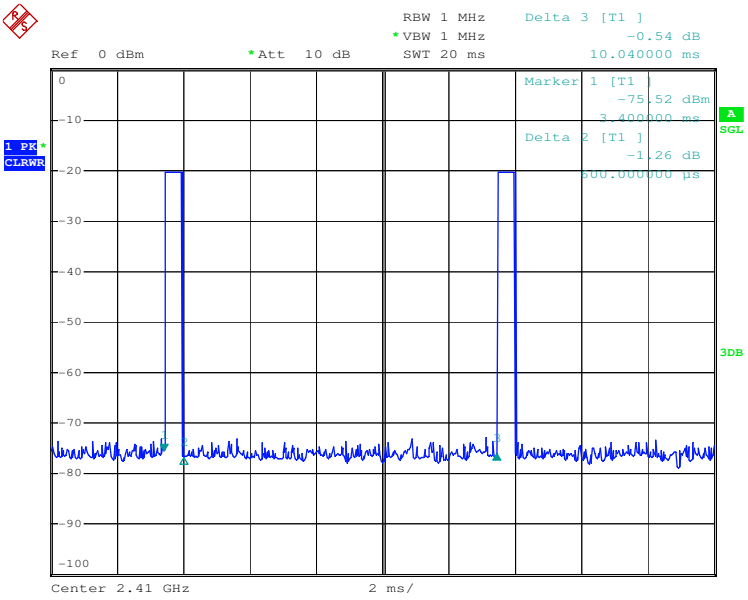
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

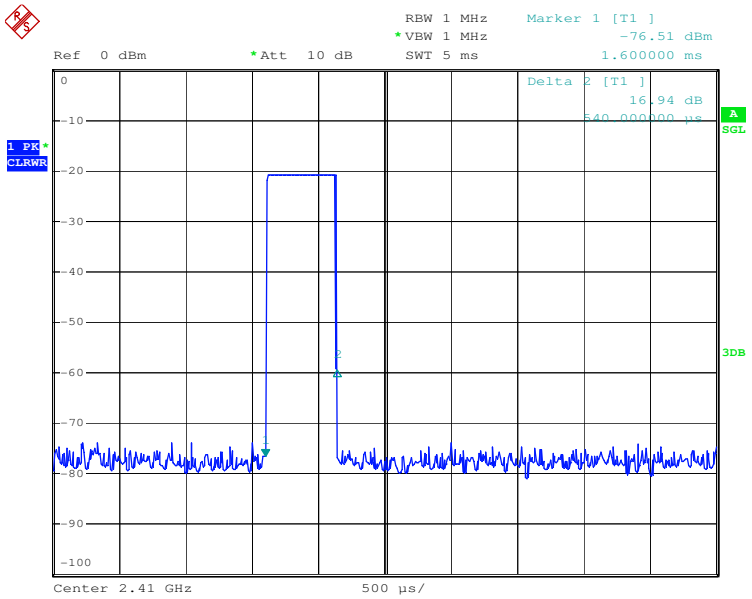
5.3 Spurious Emissions

5.3.1 Duty Cycle

Test Requirement:	FCC Part15 C Section 15.35 (c)
Test Method:	ANSI C63.10:2009
Test Setup:	
Instruments Used:	Refer to section 4.10 for details
Limit:	N/A
Test Mode:	Transmitting mode
Test Results:	Pass

Test plot as follows:





5.3.2Spurious Emissions

Test Requirement:	FCC Part15 C Section 15.249 and 15.209
Test Method:	ANSI C63.10: 2009
Test Frequency Range:	30MHz to 25000MHz
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value

Limit:
(Field strength of the fundamental signal)

Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

Limit:
(Spurious Emissions)

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:

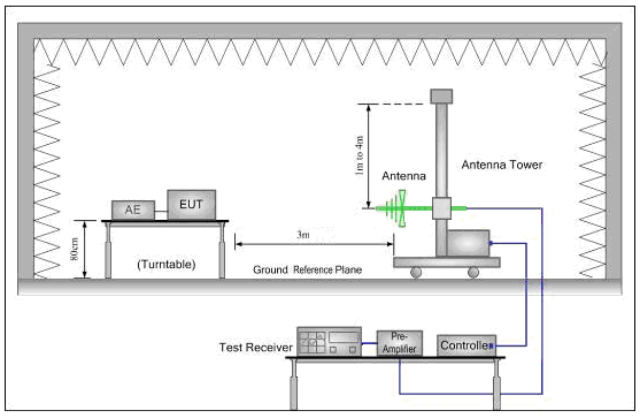


Figure 1. 30MHz to 1GHz

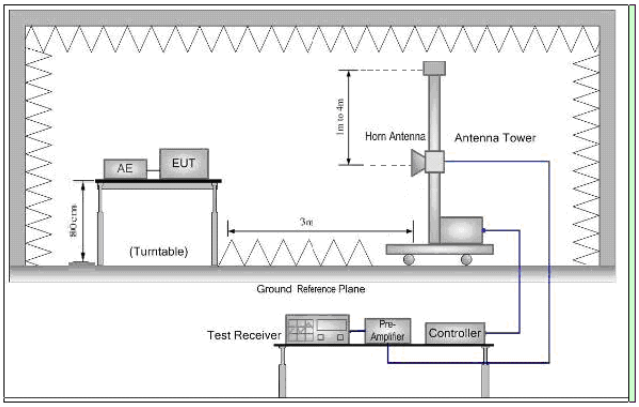


Figure 2. Above 1 GHz

Test Procedure:	a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. 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. 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 lowest channel,the middle channel,the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Instruments Used:	Refer to section 4.10 for details
Test Mode:	Transmitting mode
Test Results:	Pass

Measurement Data

5.3.2.1 Field Strength Of The Fundamental Signal

Peak value:

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
2410.0000	2.99	32.54	39.86	100.94	96.61	114.00	-17.39	Horizontal
2410.0000	2.99	32.54	39.86	99.32	94.99	114.00	-19.01	Vertical
2440.0033	3.01	32.61	39.89	100.48	96.21	114.00	-17.79	Horizontal
2440.0033	3.01	32.61	39.89	98.13	93.86	114.00	-20.14	Vertical
2470.0066	3.02	32.64	39.91	99.54	95.29	114.00	-18.71	Horizontal
2470.0066	3.02	32.64	39.91	98.03	93.78	114.00	-20.22	Vertical

Average value:

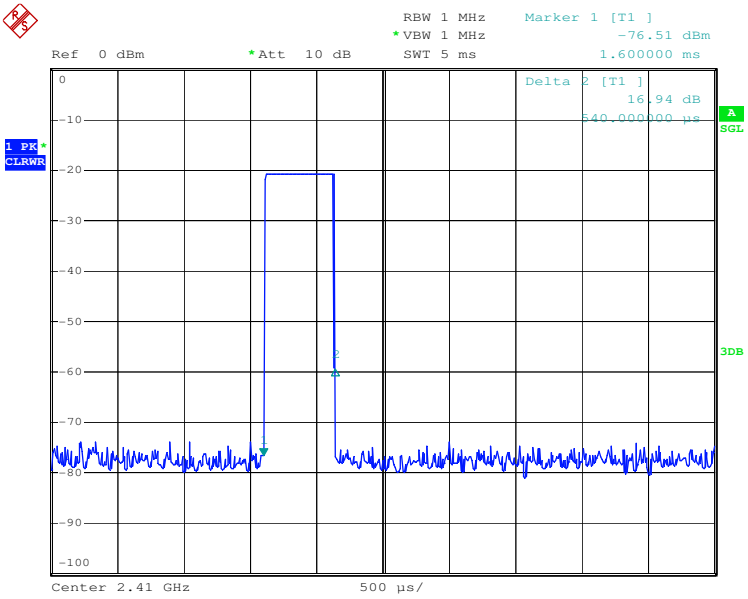
Frequency (MHz)	PDCF	Peak value (dBuV/m)	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2410.0000	-25.38	96.61	71.23	94.00	-22.77	Horizontal
2410.0000	-25.38	94.99	69.61	94.00	-24.39	Vertical
2440.0033	-25.38	96.21	70.83	94.00	-23.17	Horizontal
2440.0033	-25.38	93.86	68.48	94.00	-25.52	Vertical
2470.0066	-25.38	95.29	69.91	94.00	-24.09	Horizontal
2470.0066	-25.38	100.39	75.01	94.00	-18.99	Vertical

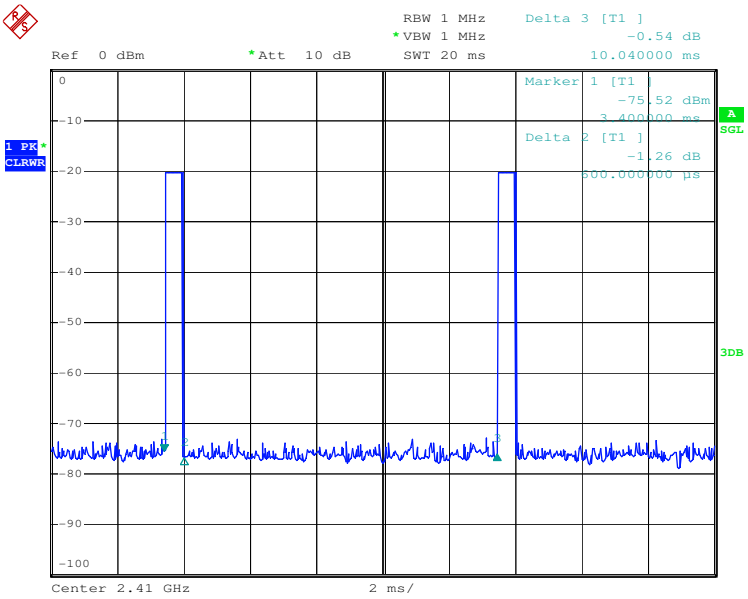
Note:

Peak Level (Final Level)= Reading Level + Antenna Factor + Cable Loss - Preamp Factor

Average value:	
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)=-25.38
	Duty cycle= T on time / T period
Test data:	Ton time =0.54ms
	T period =10.04 ms

Test plot as follows:



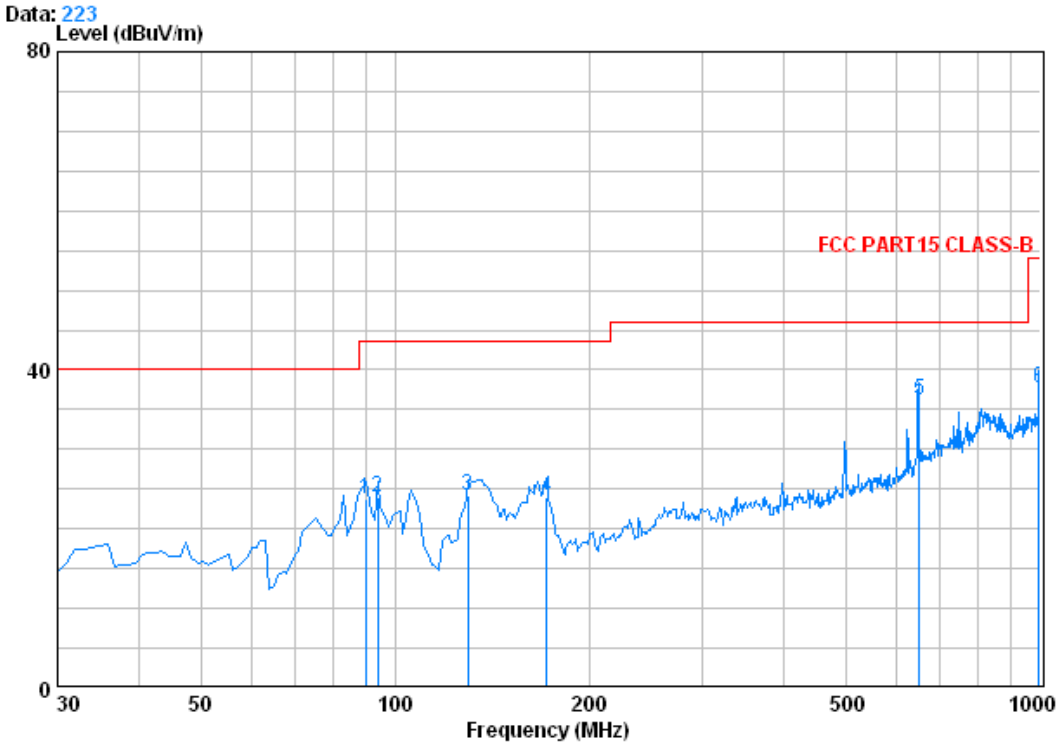


5.3.2.2 Spurious Emissions

30MHz~1GHz		
Test mode:	Transmitting	

QP value:

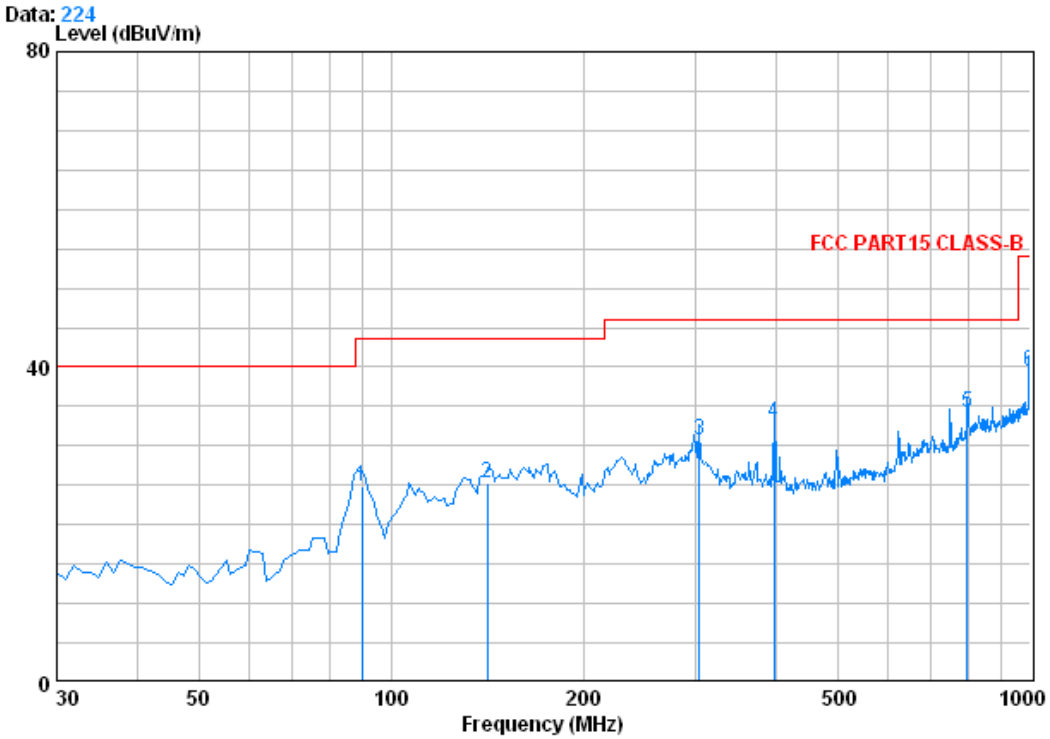
Vertical:



Condition : FCC PART15 CLASS-B 3m 0042673 VERTICAL
Job No. : 1812RF
mode : tx se

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	90.140	1.10	8.71	27.21	41.26	23.87	43.50	-19.63
2	94.020	1.14	8.87	27.21	41.11	23.91	43.50	-19.59
3	129.910	1.28	7.70	27.01	42.19	24.15	43.50	-19.35
4	171.620	1.36	9.55	26.81	39.83	23.93	43.50	-19.57
5 @	648.860	2.80	20.60	27.47	40.33	36.26	46.00	-9.74
6	994.180	3.69	24.21	26.33	36.25	37.82	54.00	-16.18

Horizontal:



Condition : FCC PART15 CLASS-B 3m 0042673 HORIZONTAL
Job No. : 1812RF
mode : tx se

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	90.140	1.10	8.71	27.21	42.25	24.85	43.50	-18.65
2	141.550	1.30	8.24	26.95	42.60	25.19	43.50	-18.31
3	303.540	1.91	14.03	26.42	41.25	30.77	46.00	-15.23
4	397.630	2.19	16.27	27.11	41.52	32.87	46.00	-13.13
5	797.270	3.19	22.09	27.30	36.18	34.16	46.00	-11.84
6	999.030	3.70	24.30	26.30	37.68	39.38	54.00	-14.62

Above 1GHz								
Test mode:	Transmitting	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
1364.250	2.43	27.85	39.29	48.62	39.61	74.00	-34.39	Vertical
1869.500	2.75	30.81	39.51	48.65	42.70	74.00	-31.30	Vertical
4795.250	4.68	34.73	41.63	53.29	51.07	74.00	-22.93	Vertical
6522.500	5.26	36.28	40.46	51.80	52.88	74.00	-21.12	Vertical
7509.500	6.13	36.00	39.61	50.57	53.09	74.00	-20.91	Vertical
9542.250	6.00	37.23	37.85	47.97	53.35	74.00	-20.65	Vertical
1317.250	2.40	27.79	39.28	48.98	39.89	74.00	-34.11	Horizontal
3420.500	3.67	33.23	40.61	50.03	46.32	74.00	-27.68	Horizontal
4830.500	4.70	34.68	41.65	53.80	51.53	74.00	-22.47	Horizontal
5829.250	5.07	35.42	41.07	51.09	50.51	74.00	-23.49	Horizontal
6957.250	5.50	35.85	40.08	50.70	51.97	74.00	-22.03	Horizontal
9154.500	6.11	36.79	38.19	49.23	53.94	74.00	-20.06	Horizontal

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Average		
Frequency (MHz)	Peak Level (dBuV/m)	PDCF (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Over Limit (dB)	polarization	
1364.250	39.61	-25.38	14.23	54.00	-39.77	Vertical	
1869.500	42.7	-25.38	17.32	54.00	-36.68	Vertical	
4795.250	51.07	-25.38	25.69	54.00	-28.31	Vertical	
6522.500	52.88	-25.38	27.50	54.00	-26.50	Vertical	
7509.500	53.09	-25.38	27.71	54.00	-26.29	Vertical	
9542.250	53.35	-25.38	27.97	54.00	-26.03	Vertical	
1317.250	39.89	-25.38	14.51	54.00	-39.49	Horizontal	
3420.500	46.32	-25.38	20.94	54.00	-33.06	Horizontal	
4830.500	51.53	-25.38	26.15	54.00	-27.85	Horizontal	
5829.250	50.51	-25.38	25.13	54.00	-28.87	Horizontal	
6957.250	51.97	-25.38	26.59	54.00	-27.41	Horizontal	
9154.500	53.94	-25.38	28.56	54.00	-25.44	Horizontal	

Test mode:	Transmitting	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
1775.500	2.70	30.20	39.47	48.82	42.25	74.00	-31.75	Vertical
3702.500	3.91	33.45	40.81	49.34	45.89	74.00	-28.11	Vertical
4877.500	4.72	34.59	41.68	53.57	51.20	74.00	-22.80	Vertical
6146.500	5.16	35.88	40.79	51.04	51.29	74.00	-22.71	Vertical
8038.250	6.20	36.01	39.16	49.57	52.62	74.00	-21.38	Vertical
9824.250	5.98	37.53	37.61	47.11	53.01	74.00	-20.99	Vertical
1211.500	2.33	27.57	39.23	49.97	40.64	74.00	-33.36	Horizontal
3702.500	3.91	33.45	40.81	51.13	47.68	74.00	-26.32	Horizontal
4877.500	4.72	34.59	41.68	55.48	53.11	74.00	-20.89	Horizontal
6910.250	5.45	35.89	40.13	50.81	52.02	74.00	-21.98	Horizontal
8543.500	6.18	36.24	38.72	49.21	52.91	74.00	-21.09	Horizontal
10423.500	6.08	38.20	37.62	46.82	53.48	74.00	-20.52	Horizontal

Test mode:	Transmitting	Test channel:	Middle	Remark:	Average

Frequency (MHz)	Peak Level (dBuV/m)	PDCF (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Over Limit (dB)	polarization
1775.500	42.25	-25.38	16.87	54.00	-37.13	Vertical
3702.500	45.89	-25.38	20.51	54.00	-33.49	Vertical
4877.500	51.2	-25.38	25.82	54.00	-28.18	Vertical
6146.500	51.29	-25.38	25.91	54.00	-28.09	Vertical
8038.250	52.62	-25.38	27.24	54.00	-26.76	Vertical
9824.250	53.01	-25.38	27.63	54.00	-26.37	Vertical
1211.500	40.64	-25.38	15.26	54.00	-38.74	Horizontal
3702.500	47.68	-25.38	22.30	54.00	-31.70	Horizontal
4877.500	53.11	-25.38	27.73	54.00	-26.27	Horizontal
6910.250	52.02	-25.38	26.64	54.00	-27.36	Horizontal
8543.500	52.91	-25.38	27.53	54.00	-26.47	Horizontal
10423.500	53.48	-25.38	28.10	54.00	-25.90	Horizontal

Test mode:	Transmitting	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
1352.500	2.42	27.85	39.29	48.01	38.99	74.00	-35.01	Vertical
3138.500	3.42	33.34	40.41	50.10	46.45	74.00	-27.55	Vertical
5253.500	4.87	34.65	41.57	56.20	54.15	74.00	-19.85	Vertical
6334.500	5.21	36.10	40.63	50.82	51.50	74.00	-22.50	Vertical
7415.500	6.02	35.97	39.69	51.38	53.68	74.00	-20.32	Vertical
10047.500	5.98	37.76	37.47	47.33	53.60	74.00	-20.40	Vertical
1775.500	2.70	30.20	39.47	49.28	42.71	74.00	-31.29	Horizontal
2997.500	3.32	33.40	40.30	50.14	46.56	74.00	-27.44	Horizontal
4219.500	4.30	34.41	41.19	50.29	47.81	74.00	-26.19	Horizontal
4924.500	4.75	34.51	41.72	53.44	50.98	74.00	-23.02	Horizontal
6287.500	5.20	36.04	40.68	50.63	51.19	74.00	-22.81	Horizontal
7944.250	6.21	36.00	39.24	49.76	52.73	74.00	-21.27	Horizontal

Test mode:	Transmitting	Test channel:	Highest	Remark:	Average

Frequency (MHz)	Peak Level (dBuV/m)	PDCF (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Over Limit (dB)	polarization
1352.500	38.99	-25.38	13.61	54.00	-40.39	Vertical
3138.500	46.45	-25.38	21.07	54.00	-32.93	Vertical
5253.500	54.15	-25.38	28.77	54.00	-25.23	Vertical
6334.500	51.5	-25.38	26.12	54.00	-27.88	Vertical
7415.500	53.68	-25.38	28.30	54.00	-25.70	Vertical
10047.500	53.6	-25.38	28.22	54.00	-25.78	Vertical
1775.500	42.71	-25.38	17.33	54.00	-36.67	Horizontal
2997.500	46.56	-25.38	21.18	54.00	-32.82	Horizontal
4219.500	47.81	-25.38	22.43	54.00	-31.57	Horizontal
4924.500	50.98	-25.38	25.60	54.00	-28.40	Horizontal
6287.500	51.19	-25.38	25.81	54.00	-28.19	Horizontal
7944.250	52.73	-25.38	27.35	54.00	-26.65	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 11GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

5.4 Band edge (Radiated Emission)

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10: 2009
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit(band edge):	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.

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:

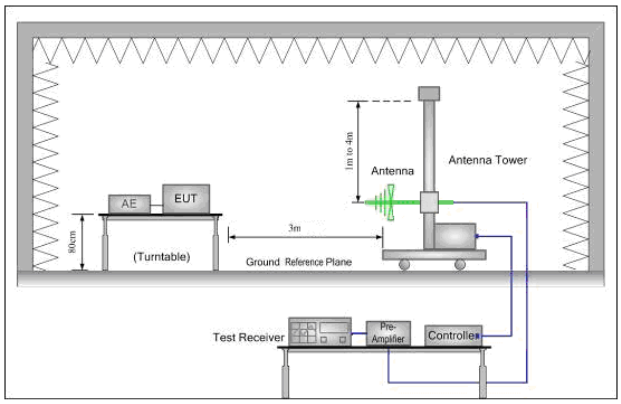


Figure 1. 30MHz to 1GHz

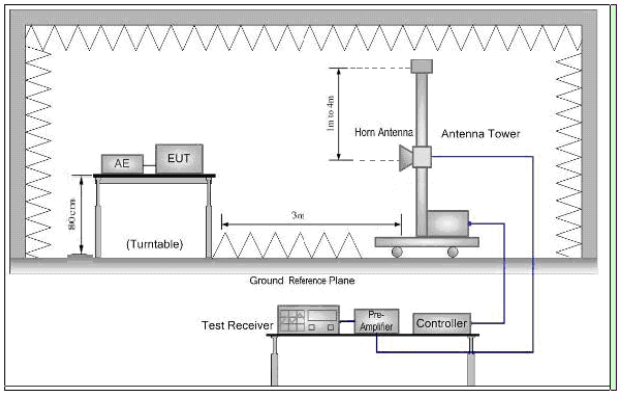


Figure 2. Above 1 GHz

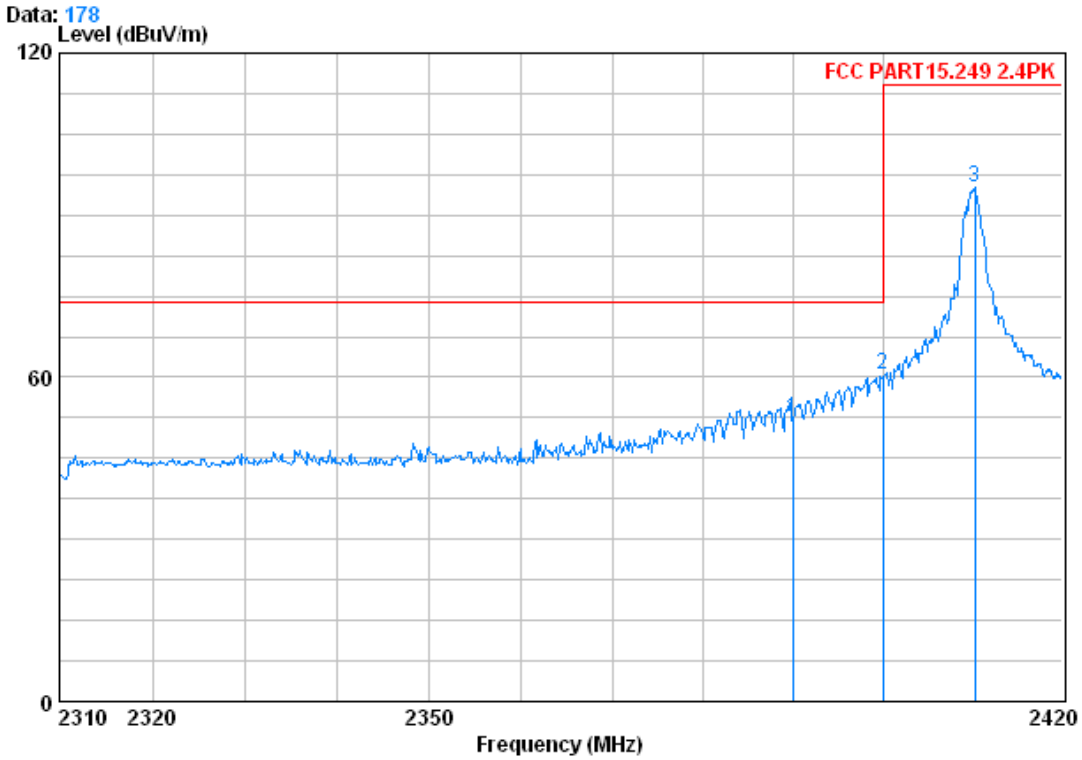
Test Procedure:	a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was 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 lowest and highest channel g. Test the EUT in the lowest channel , the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Instruments Used:	Refer to section 4.10 for details
Test Mode:	Transmitting mode
Test Results:	Pass

Measurement Data

Average value:	
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)=-25.38
	Duty cycle= T on time / T period
Test data:	Ton time =0.54ms
	T period =10.04 ms

Band edge (Radiated Emission)					
Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak

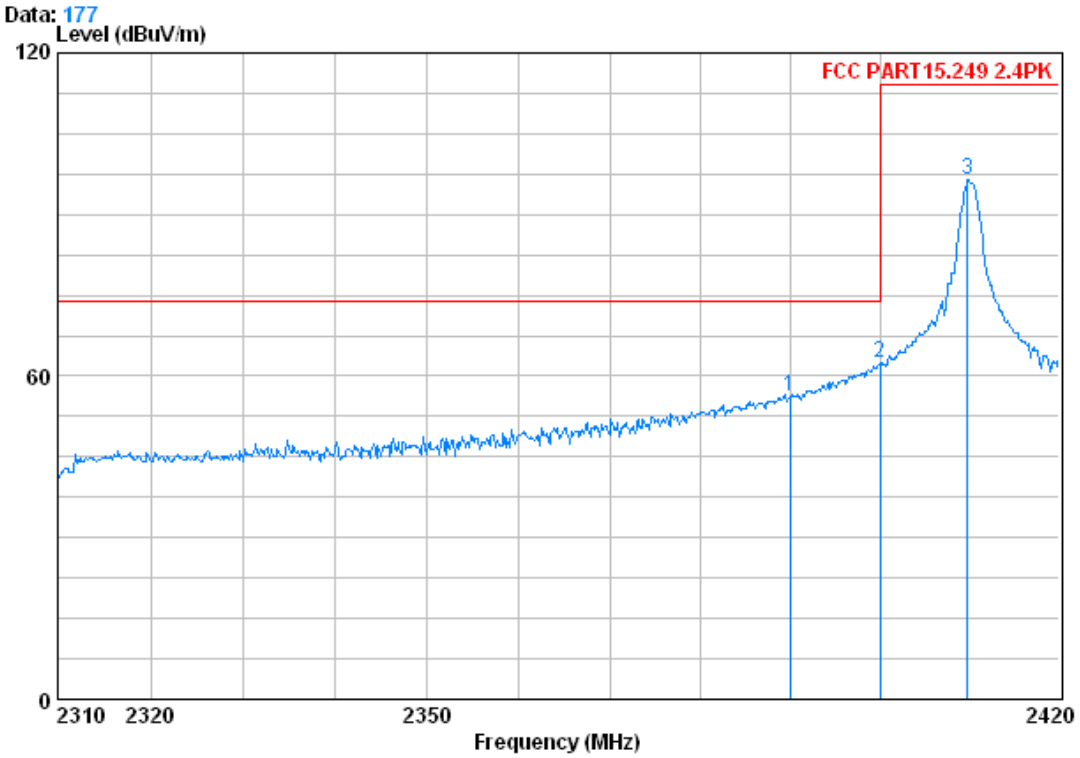
Vertical



Condition : FCC PART15.249 2.4PK 3m VERTICAL
Job No. : 1812RF
test mode : low channel 2410
: Level=Read level+Cable loss+Antenna Fact

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	2.98	32.51	39.85	56.63	52.27	74.00	-21.73	Peak
2	2400.000	2.98	32.51	39.86	64.98	60.61	74.00	-13.39	Peak
3	2410.210	2.99	32.54	39.86	99.31	94.99	114.00	-19.01	Peak

Horizontal

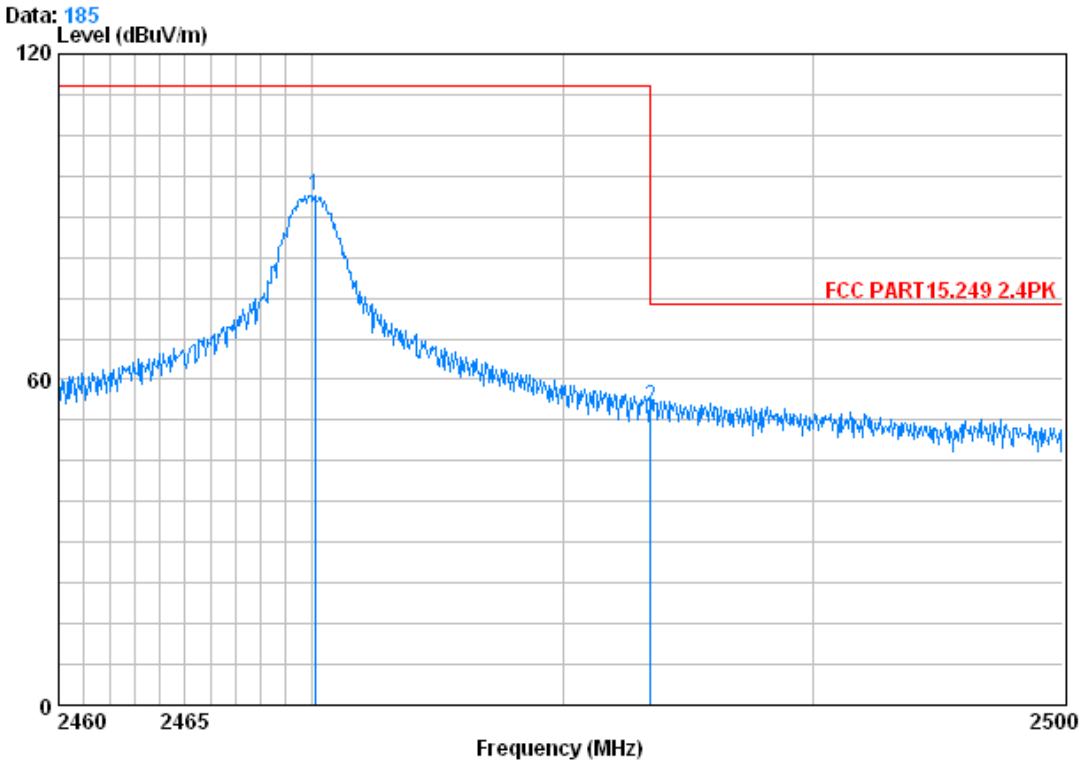


Condition : FCC PART15.249 2.4PK 3m HORIZONTAL
Job No. : 1812RF
test mode : low channel 2410
: Level=Read level+Cable loss+Antenna Fact

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	2.98	32.51	39.85	60.70	56.34	74.00	-17.66	Peak
2 @	2400.000	2.98	32.51	39.86	66.82	62.45	74.00	-11.55	Peak
3	2409.770	2.99	32.54	39.86	100.94	96.61	114.00	-17.39	Peak

Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak

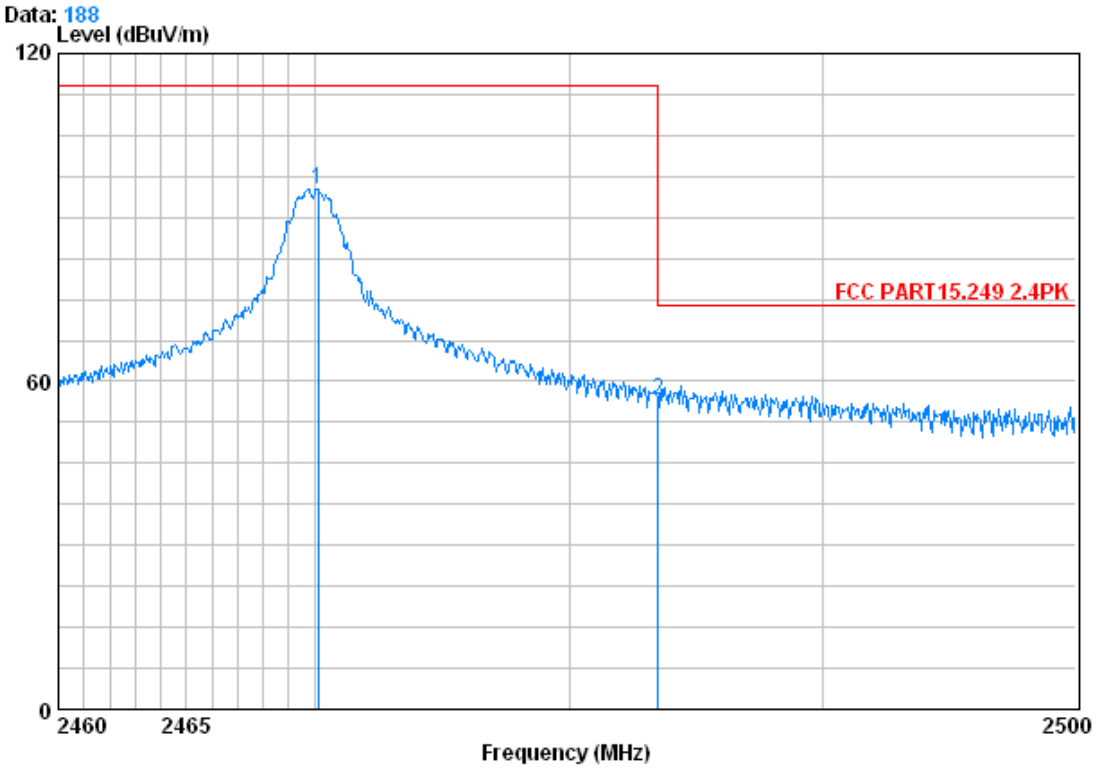
Vertical



Condition : FCC PART15.249 2.4PK 3m VERTICAL
Job No. : 1812RF
test mode : high channel 2470
: Level=Read level+Cable loss+Antenna Fact

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2470.160	3.02	32.64	39.91	98.03	93.78	114.00	-20.22	Peak
2 @	2483.500	3.03	32.67	39.92	59.18	54.96	74.00	-19.04	Peak

Horizontal



Condition : FCC PART15.249 2.4PK 3m HORIZONTAL
Job No. : 1812RF
test mode : high channel 2470
: Level=Read level+Cable loss+Antenna Fact

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2470.160	3.02	32.64	39.91	99.54	95.29	114.00	-18.71	Peak
2 @	2483.500	3.03	32.67	39.92	60.82	56.60	74.00	-17.40	Peak

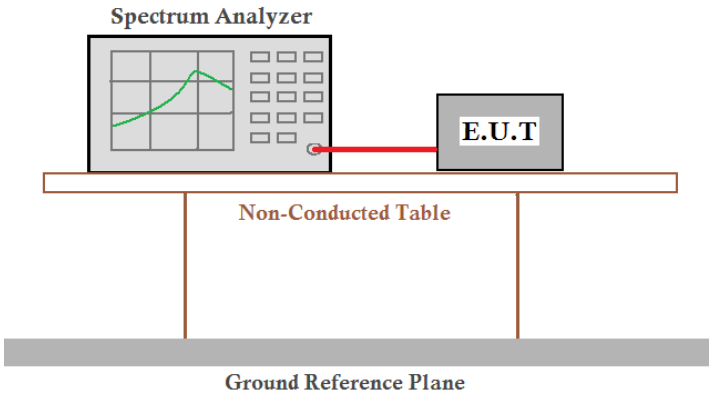
Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

For band-edge radiated emissions (pulse signal) , Average value=Peak value + PDCF

PDCF < Average limte-Peak limit = -20dB,and the peak value complies with the peak limit, so deems to the Average value complies with the average limit.

5.5 20dB Bandwidth

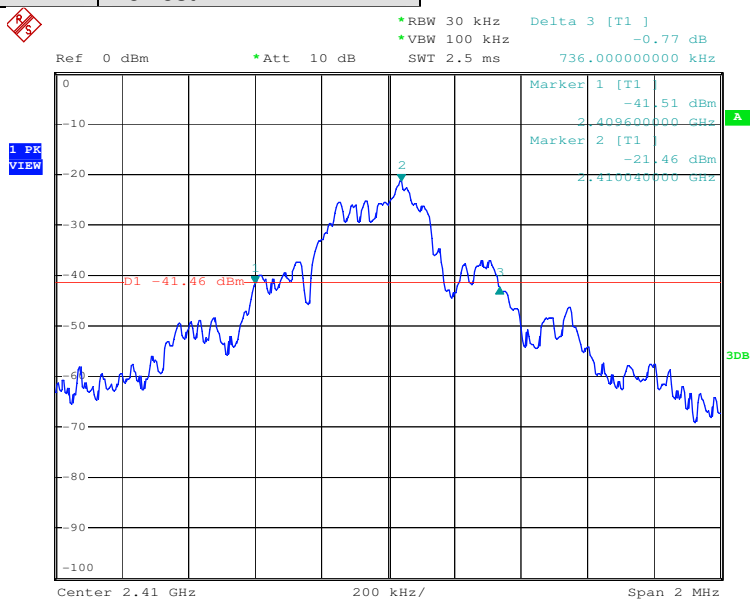
Test Requirement:	FCC Part15 C Section 15.215
Test Method:	ANSI C63.10:2009
Test Setup:	
Instruments Used:	Refer to section 4.7 for details
Test mode:	Transmitting mode
Limit:	N/A
Test Results:	Pass

Measurement Data

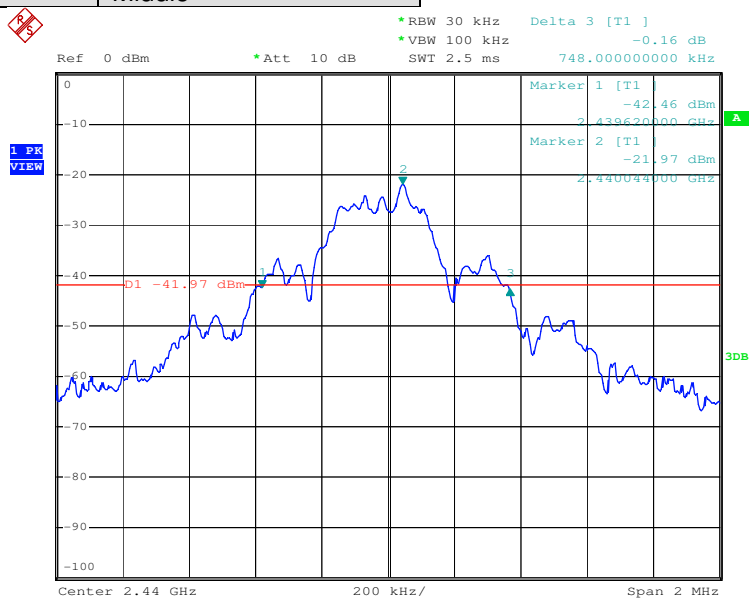
Test channel	20dB bandwidth (MHz)	Results
Lowest	0.736	Pass
Middle	0.748	Pass
Highest	0.780	Pass

Test plot as follows:

Test channel:	Lowest



Test channel:	Middle



Test channel:	Highest