



**SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch**

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Report No.: SZEM150800510701  
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## FCC REPORT

**Application No:** SZEM1508005107CR  
**Applicant:** SZ DJI TECHNOLOGY CO., LTD  
**Manufacturer/Factory:** SZ DJI TECHNOLOGY CO., LTD  
**Product Name:** AIR UNIT  
**Model No.(EUT):** R810A  
**Trade Mark:** DJI  
**FCC ID:** SS3-IG8101508  
**Standards:** 47 CFR Part 15, Subpart C (2014)  
**Date of Receipt:** 2015-08-19  
**Date of Test:** 2015-09-01 to 2015-09-09  
**Date of Issue:** 2015-09-14

<b>Test Result:</b>	<b>PASS *</b>
---------------------	---------------

. \* 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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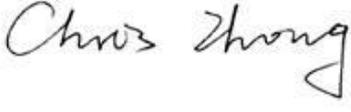
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**2 Version**

<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
00		2015-09-14		Original

<b>Authorized for issue by:</b>			
<b>Tested By</b>			2015-09-09
	<hr/>		<hr/>
	<b>(Chris Zhong) /Project Engineer</b>		<b>Date</b>
<b>Prepared By</b>			2015-09-14
	<hr/>		<hr/>
	<b>(Jade Chen) /Clerk</b>		<b>Date</b>
<b>Checked By</b>			2015-09-14
	<hr/>		<hr/>
	<b>(Owen Zhou) /Reviewer</b>		<b>Date</b>

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### 3 Test Summary

Test Item	Test Requirement	Test method	Result
<b>Antenna Requirement</b>	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2009	PASS
<b>AC Power Line Conducted Emission</b>	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2009	PASS
<b>Conducted Peak Output Power</b>	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	ANSI C63.10 2009 KDB662911 D01Multiple Transmitter Output v02r01	PASS
<b>6dB Occupied Bandwidth</b>	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	ANSI C63.10 2009	PASS
<b>Power Spectral Density</b>	47 CFR Part 15, Subpart C Section 15.247 (e)	ANSI C63.10 2009 KDB662911 D01Multiple Transmitter Output v02r01	PASS
<b>Band-edge for RF Conducted Emissions</b>	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2009 KDB662911 D01Multiple Transmitter Output v02r01	PASS
<b>RF Conducted Spurious Emissions</b>	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2009 KDB662911 D01Multiple Transmitter Output v02r01	PASS
<b>Radiated Spurious Emissions</b>	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2009	PASS
<b>Restricted bands around fundamental frequency (Radiated Emission)</b>	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2009	PASS

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## 5 General Information

### 5.1 Client Information

Applicant:	SZ DJI TECHNOLOGY CO., LTD
Address of Applicant:	14th floor, West Wing, Skyworth Semiconductor Design Building NO.18 Gaoxin South 4th Ave, Nanshan District, Shenzhen, China
Manufacturer:	SZ DJI TECHNOLOGY CO., LTD
Address of Manufacturer:	14th floor, West Wing, Skyworth Semiconductor Design Building NO.18 Gaoxin South 4th Ave, Nanshan District, Shenzhen, China
Factory:	SZ DJI TECHNOLOGY CO., LTD
Address of Factory:	14th floor, West Wing, Skyworth Semiconductor Design Building NO.18 Gaoxin South 4th Ave, Nanshan District, Shenzhen, China

### 5.2 General Description of EUT

Product Name:	AIR UNIT
Model No.:	R810A
Trade Mark:	DJI
Operation Frequency:	2406.5MHz to 2476.5MHz
Test channel :	Low channel:2406.5 MHz Middle channel:2436.5 MHz High channel:2476.5MHz
Type of Modulation:	OFDM
Sample Type:	Fixed production
Antenna Configuration:	Multiple Transmitting
Antenna Type and Gain:	Type : External Antenna Gain : 2.0dBi Number of antennas: N <sub>ANT</sub> =2 Directional gain G <sub>ANT</sub> =5.01dBi



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Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2406.5MHz	4	2436.5MHz	7	2466.5MHz		
2	2416.5MHz	5	2446.5MHz	8	2476.5MHz		
3	2426.5MHz	6	2456.5MHz				

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:

For OFDM:

Channel	Frequency
The Lowest channel	2406.5MHz
The Middle channel	2436.5MHz
The Highest channel	2476.5MHz



### 5.3 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with OFDM modulation.

### 5.4 Description of Support Units

The EUT has been tested independent unit.

### 5.5 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.



## 5.6 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 10m Semi-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.: G-823, R-4188, 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 chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-2.

## 5.7 Deviation from Standards

None.

## 5.8 Abnormalities from Standard Conditions

None.

## 5.9 Other Information Requested by the Customer

None.



### 5.10 Equipment List

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2015-05-14	2016-05-13
2	LISN	Rohde & Schwarz	ENV216	SEL0152	2014-10-25	2015-10-24
3	LISN	ETS-LINDGREN	3816/2	SEL0021	2015-05-14	2016-05-13
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	SEL0162	2015-08-31	2016-08-30
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	SEL0163	2015-08-31	2016-08-30
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	SEL0164	2015-08-31	2016-08-30
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2015-05-14	2016-05-13
8	Coaxial Cable	SGS	N/A	SEL0025	2015-05-14	2016-05-13
9	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-25	2015-10-24
10	Humidity/ Temperature Indicator	Shanghai Qixiang	ZJ1-2B	SEL0103	2014-10-25	2015-10-24
11	Barometer	Chang Chun	DYM3	SEL0088	2015-05-14	2016-05-13



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RF in chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2015-05-14	2016-05-13
2	EMI Test Receiver	Agilent Technologies	N9038A	SEL0312	2014-09-17	2015-09-16
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2014-10-25	2015-10-24
5	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2014-10-25	2015-10-24
6	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2014-10-25	2015-10-24
7	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2015-05-14	2016-05-13
8	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2014-10-25	2015-10-24
9	Coaxial cable	SGS	N/A	SEL0027	2015-05-14	2016-05-13
10	Coaxial cable	SGS	N/A	SEL0189	2015-05-14	2016-05-13
11	Coaxial cable	SGS	N/A	SEL0121	2015-05-14	2016-05-13
12	Coaxial cable	SGS	N/A	SEL0178	2015-05-14	2016-05-13
13	Band filter	Amindeon	82346	SEL0094	2015-05-14	2016-05-13
14	Barometer	Chang Chun	DYM3	SEL0088	2015-05-14	2016-05-13
15	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-25	2015-10-24
16	Humidity/ Temperature Indicator	Shanghai Qixiang	ZJ1-2B	SEL0103	2014-10-25	2015-10-24
17	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2015-05-14	2016-05-13
18	Signal Generator	Rohde & Schwarz	SMY01	SEL0155	2014-10-25	2015-10-24
19	Loop Antenna	Beijing Daze	ZN30401	SEL0203	2015-05-14	2016-05-13

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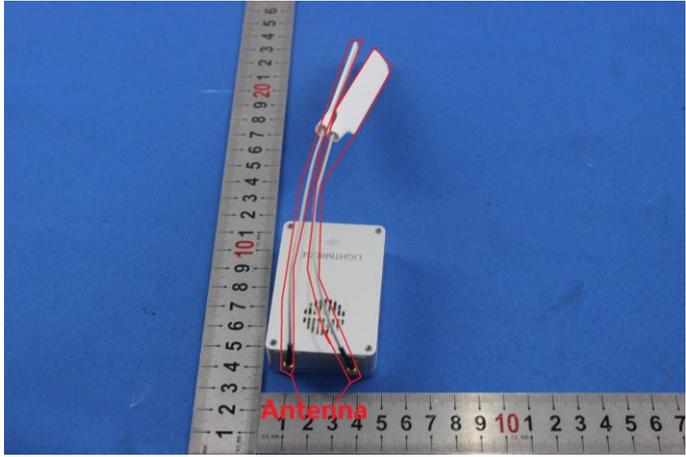
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RF Conducted Test						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-25	2015-10-24
2	Humidity/ Temperature Indicator	HYGRO	ZJ1-2B	SEL0033	2014-10-25	2015-10-24
3	Spectrum Analyzer	Rohde & Schwarz	FSP	SEL0154	2014-10-25	2015-10-24
4	Coaxial cable	SGS	N/A	SEL0178	2015-05-14	2016-05-13
5	Coaxial cable	SGS	N/A	SEL0179	2015-05-14	2016-05-13
6	Barometer	ChangChun	DYM3	SEL0088	2015-05-14	2016-05-13
7	Signal Generator	Rohde & Schwarz	SML03	SEL0068	2015-04-26	2016-04-25
8	Band filter	amideon	82346	SEL0094	2015-05-14	2016-05-13
9	POWER METER	R & S	NRVS	SEL0144	2014-10-25	2015-10-24
10	Attenuator	Beijin feihang taida	TST-2-6dB	SEL0205	2015-04-26	2016-04-25
11	Power Divider(splitter)	Agilent Technologies	11636B	SEL0130	2014-10-25	2015-10-24

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## 6 Test results and Measurement Data

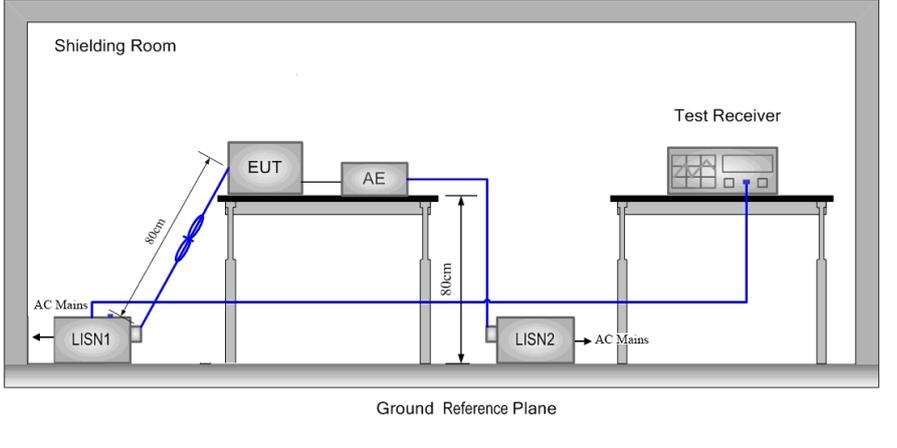
### 6.1 Antenna Requirement

<b>Standard requirement:</b>	47 CFR Part 15C Section 15.203 /247(c)
<p>15.203 requirement:</p> <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> <p>15.247(b) (4) requirement:</p> <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 6 dBi.</p>	
<b>EUT Antenna:</b>	
<p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.0dBi and directional gain <math>G_{ANT}=5.01dBi</math>.</p> <p>Since the device was designed that the signal was split into two parts by one module and transmit through two antennas, and according to the description in KDB662911 "For the purposes of this guidance, transmitter output signals are considered correlated if any of the following are true: The same digital data are transmitted from two or more antennas in a given symbol period, even with different coding or phase shifts", so the device belongs to categorization as correlated.</p>	



## 6.2 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"> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>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.</li> <li>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,</li> <li>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.</li> <li>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.</li> </ol>		

<p>Test Setup:</p>	
<p>Exploratory Test Mode:</p>	<p>Transmitting with OFDM modulations. Transmitting mode.</p>
<p>Instruments Used:</p>	<p>Refer to section 5.10 for details</p>
<p>Test Results:</p>	<p>Pass</p>



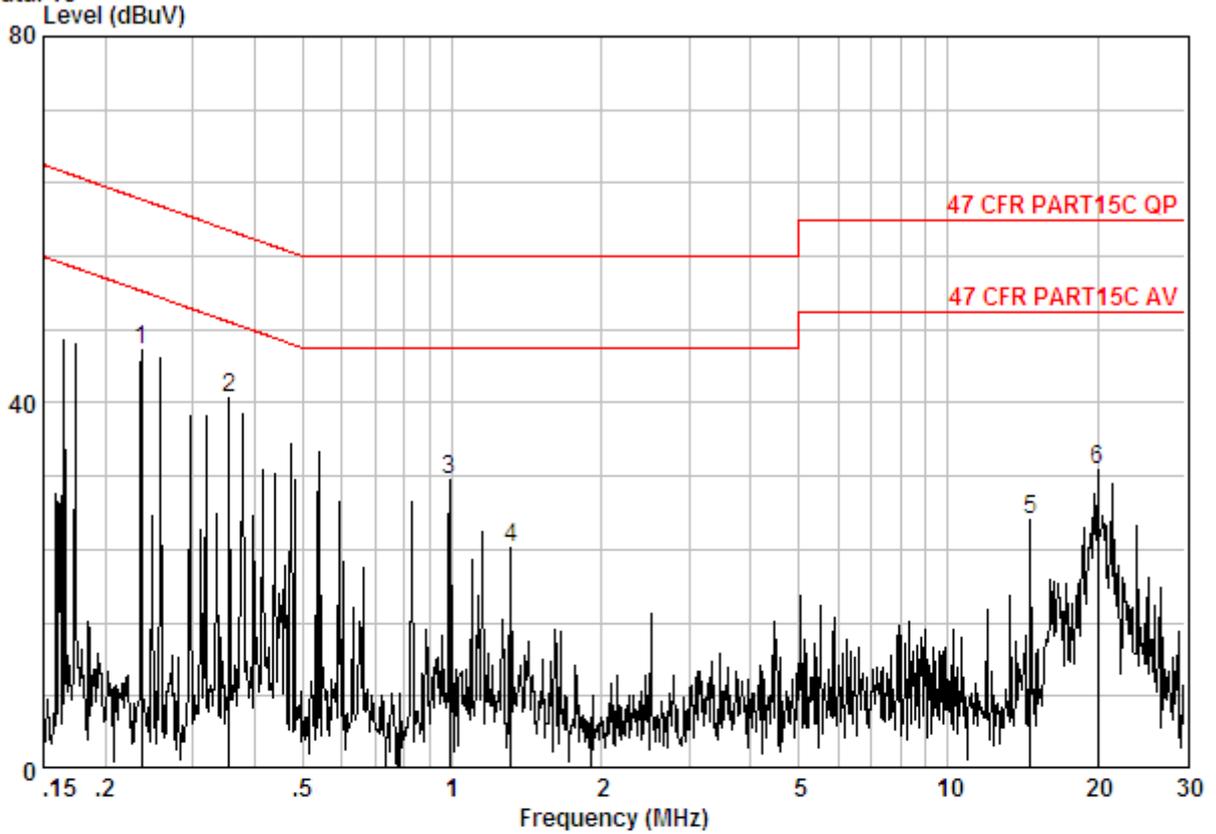
**Measurement Data**

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:

Data: 18



Site : Shielding Room  
 Condition : 47 CFR PART15C AV CE LINE  
 Job No. : 5107CR  
 Test Mode : TX

	Freq	Cable Loss	LISN Factor	Read Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dB	
1	0.23658	0.02	9.84	35.86	52.22	-6.50	Peak
2	0.35576	0.01	9.85	30.64	48.83	-8.33	Peak
3	0.98914	0.02	9.89	21.61	46.00	-14.48	Peak
4	1.317	0.02	9.91	14.21	46.00	-21.85	Peak
5	14.672	0.01	10.16	17.16	50.00	-22.66	Peak
6	20.056	0.02	10.30	22.32	50.00	-17.36	Peak

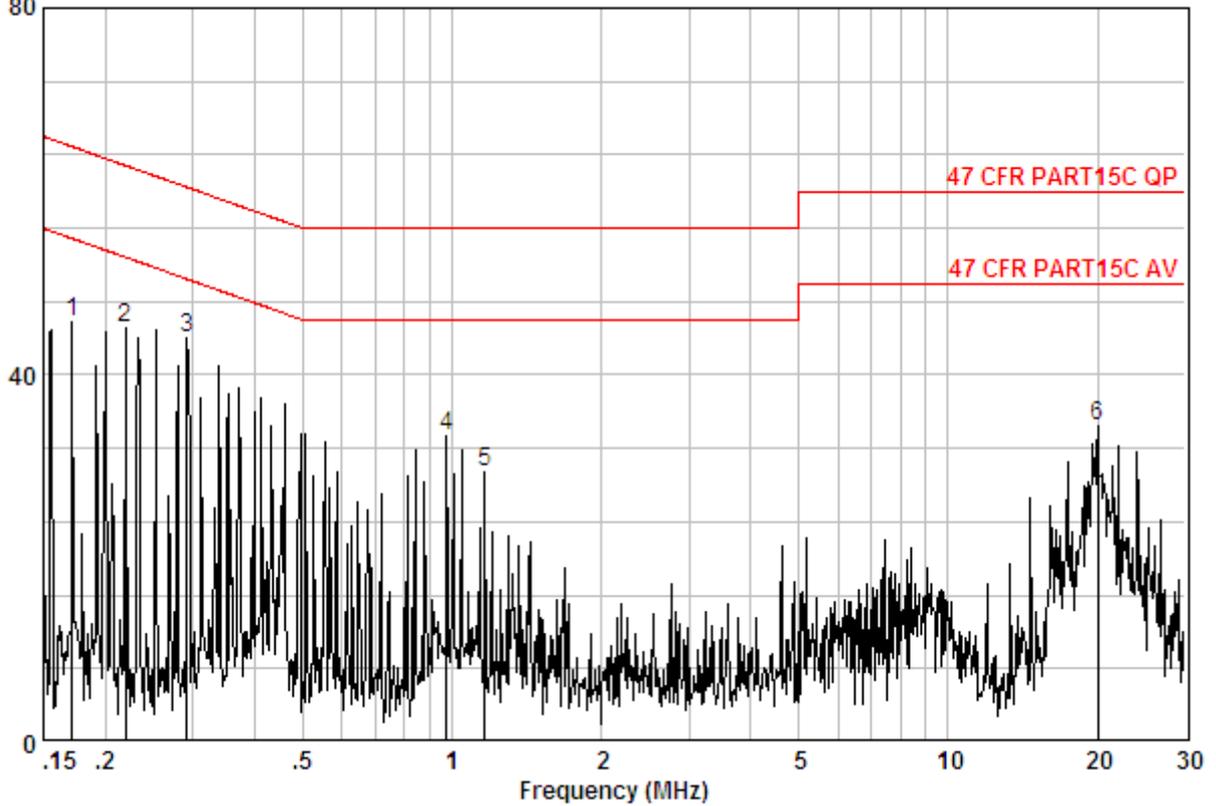
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Neutral Line:

Data: 19

Level (dBuV)



Site : Shielding Room  
Condition : 47 CFR PART15C AV CE NEUTRAL  
Job No. : 5107CR  
Test Mode : TX

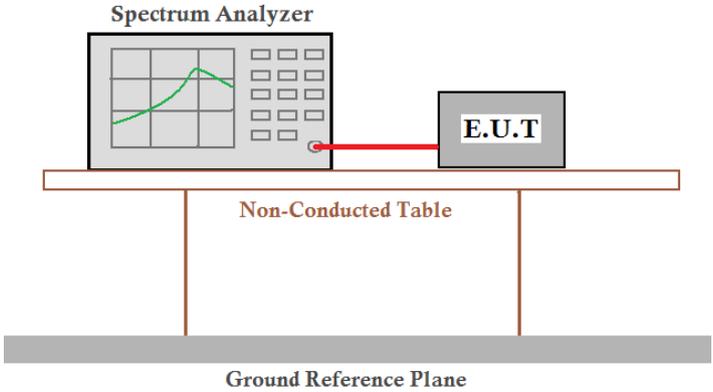
	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dB	
1	0.17124	0.02	9.81	36.01	45.84	-9.06	Peak
2	0.21967	0.02	9.85	35.28	45.15	-7.68	Peak
3	0.29243	0.01	9.86	34.19	44.07	-6.39	Peak
4	0.97354	0.02	10.01	23.40	33.43	-12.57	Peak
5	1.166	0.02	10.04	19.31	29.37	-16.63	Peak
6	20.056	0.02	10.38	23.98	34.38	-15.62	Peak

Notes:

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

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### 6.3 Conducted Peak Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10 2009 KDB662911 D01 Multiple Transmitter Output v02r01
Test Setup:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</p>
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with OFDM
Limit:	30dBm
Test Results:	Pass



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**Measurement Data**

OFDM mode					
Test channel	Peak Output Power (dBm)			Limit (dBm)	Result
	Antenna 1	Antenna 2	Total		
Lowest	22.41	22.67	25.55	30.00	Pass
Middle	22.13	22.28	25.22	30.00	Pass
Highest	22.14	21.83	25.00	30.00	Pass

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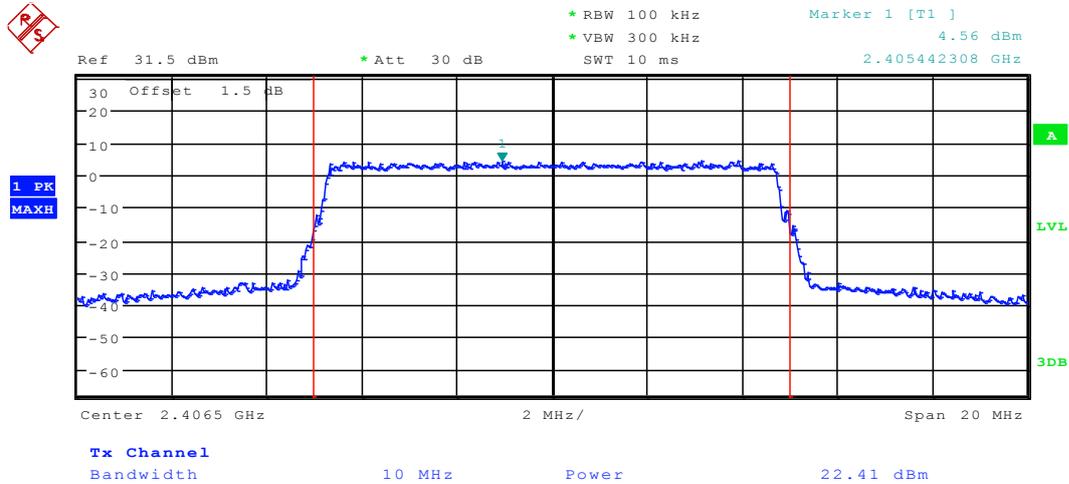
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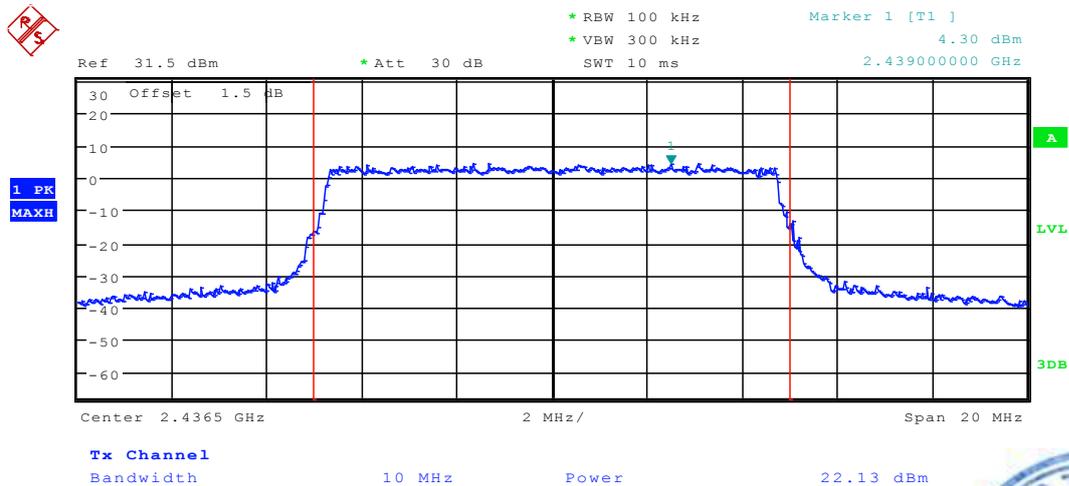
Test plot as follows:

Antenna 1:

Test mode:	OFDM	Test channel:	Lowest
------------	------	---------------	--------



Test mode:	OFDM	Test channel:	Middle
------------	------	---------------	--------



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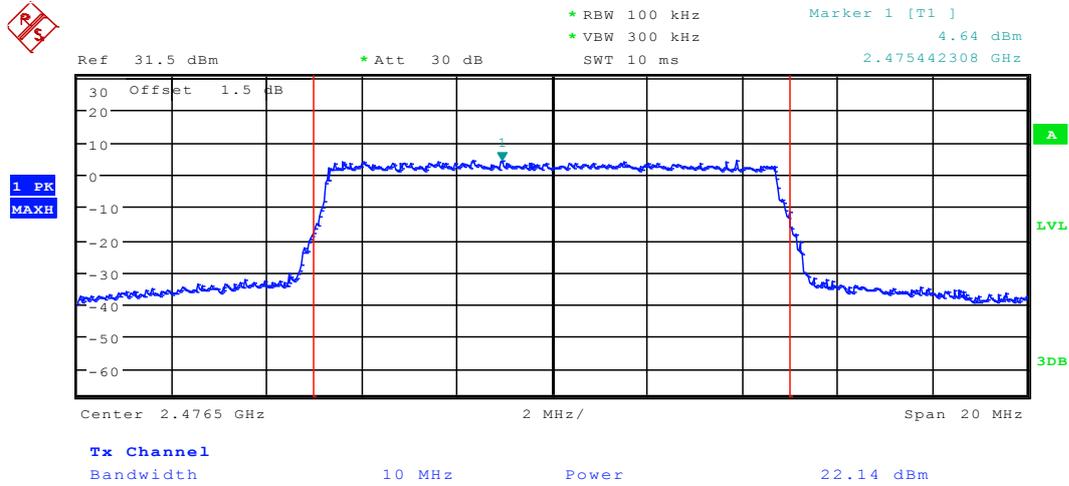


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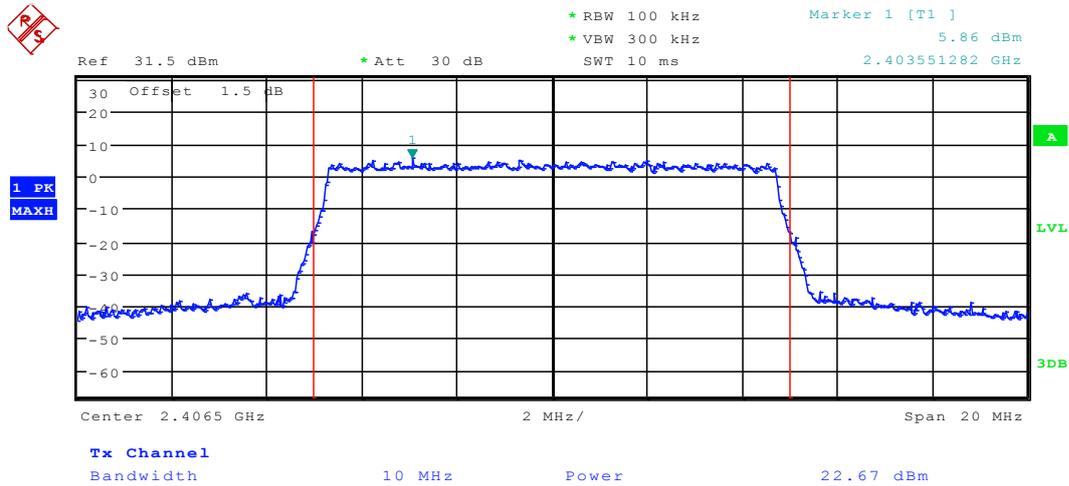
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Test mode:	OFDM	Test channel:	Highest
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## Antenna 2:

Test mode:	OFDM	Test channel:	Lowest
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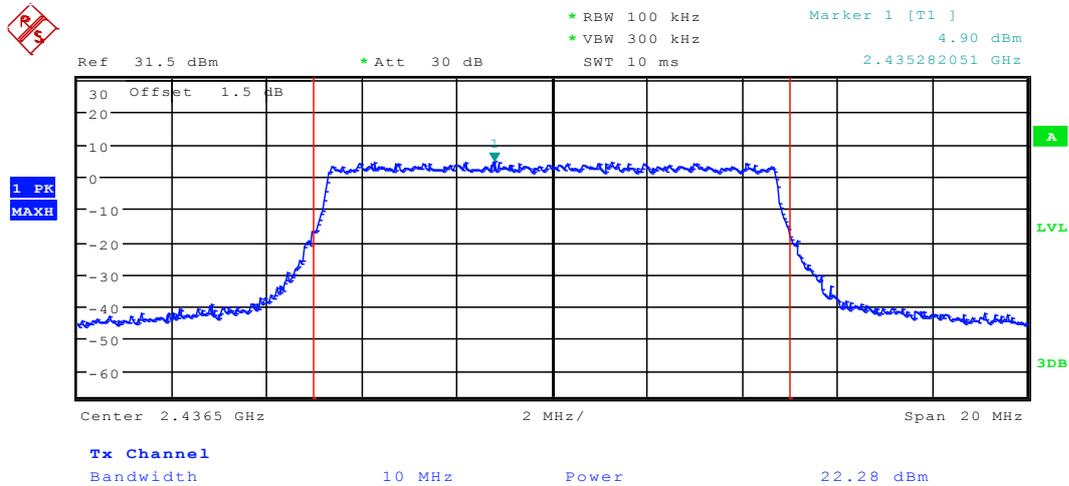


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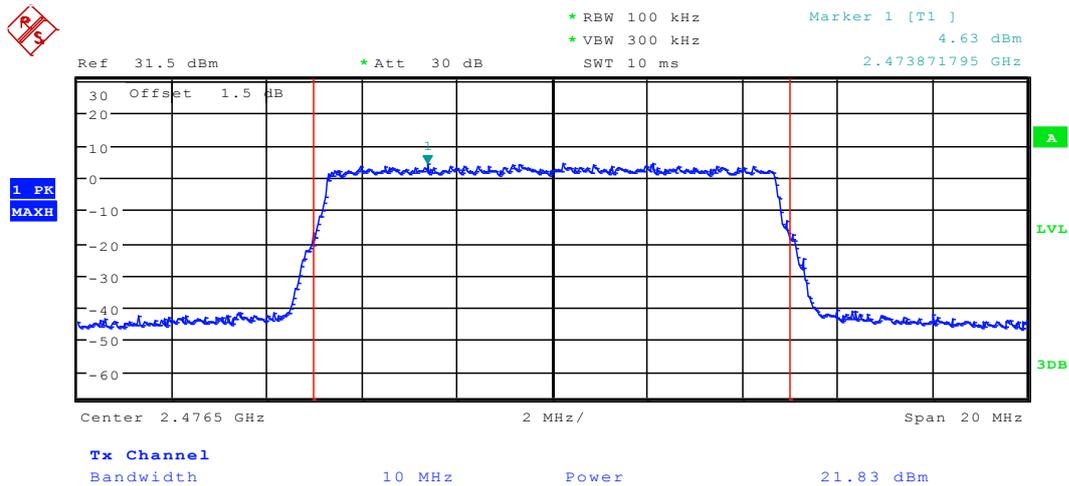
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Test mode:	OFDM	Test channel:	Middle
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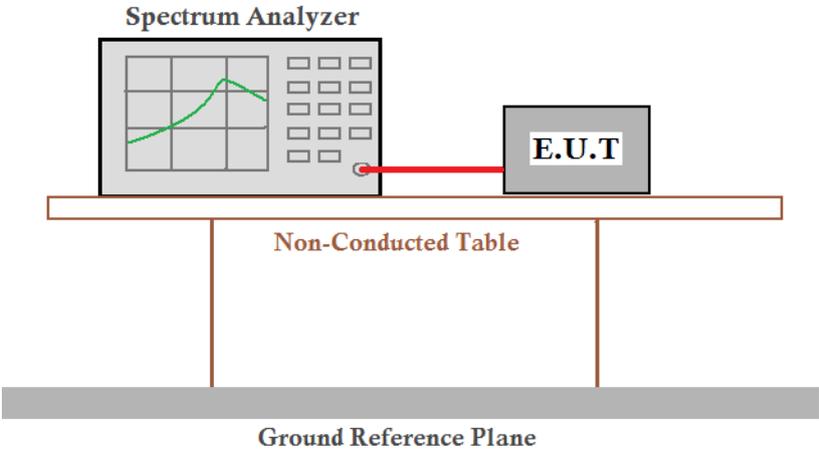


Test mode:	OFDM	Test channel:	Highest
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### 6.4 6dB Occupy Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10 2009
Test Setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with OFDM
Limit:	≥ 500 kHz
Test Results:	Pass



**Measurement Data**

**Antenna 1:**

OFDM mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	9.487	≥500	Pass
Middle	9.551	≥500	Pass
Highest	9.551	≥500	Pass

**Antenna 2:**

OFDM mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	9.551	≥500	Pass
Middle	9.519	≥500	Pass
Highest	9.487	≥500	Pass



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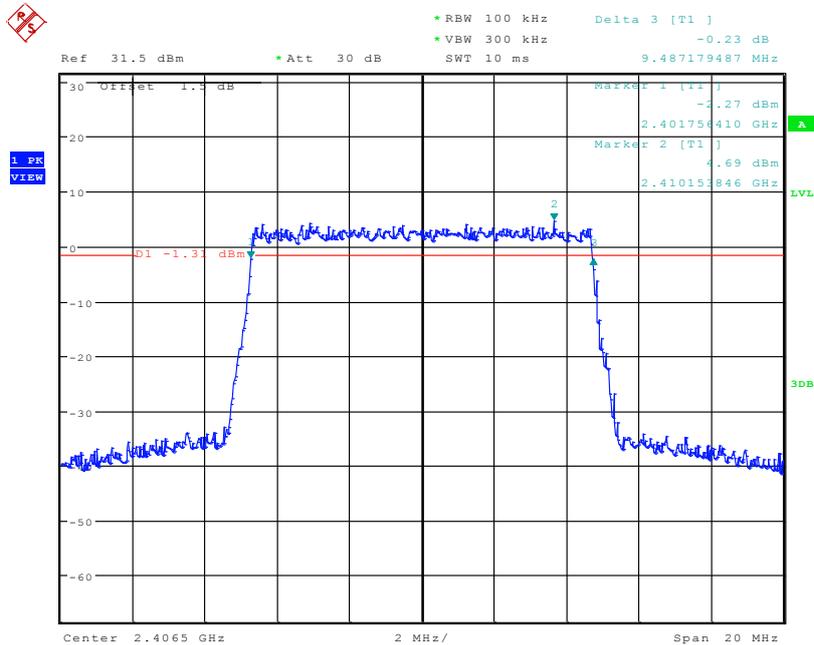
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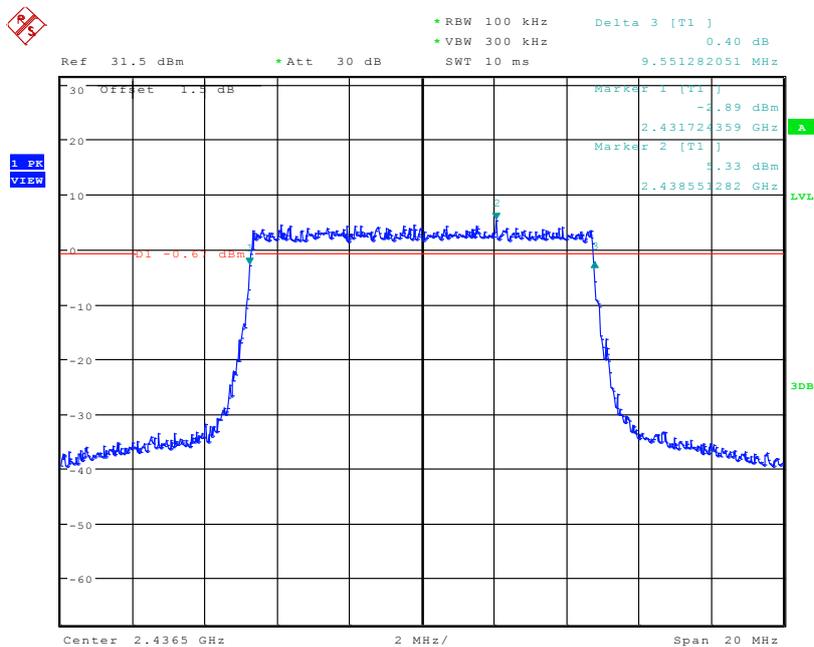
Test plot as follows:

Antenna 1:

Test mode:	OFDM	Test channel:	Lowest
------------	------	---------------	--------



Test mode:	OFDM	Test channel:	Middle
------------	------	---------------	--------



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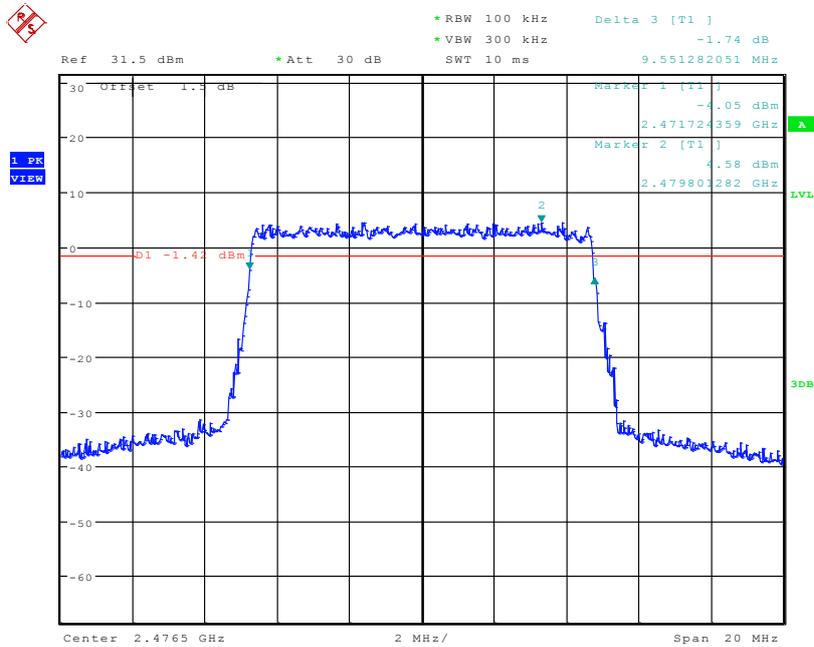


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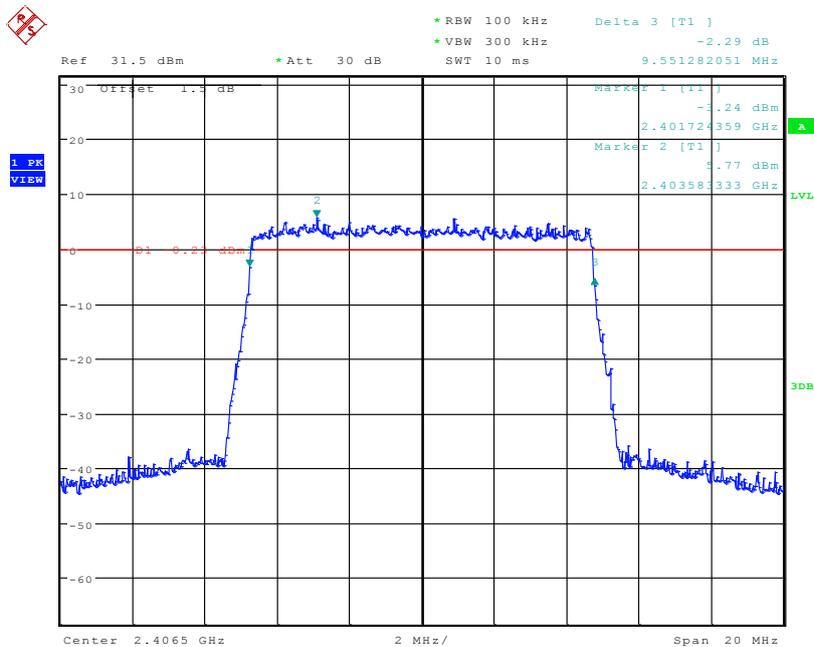
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Test mode:	OFDM	Test channel:	Highest
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## Antenna 2:

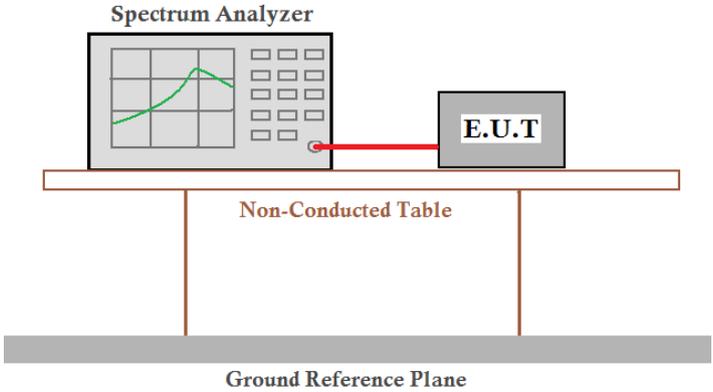
Test mode:	OFDM	Test channel:	Lowest
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## 6.5 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10 2009 KDB662911 D01 Multiple Transmitter Output v02r01
Test Setup:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</p>
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with OFDM
Limit:	≤8.00dBm/3kHz
Test Results:	Pass



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**Measurement Data**

OFDM mode					
Test channel	Power Spectral Density (dBm)			Limit (dBm/3kHz)	Result
	Antenna 1	Antenna 2	Total		
Lowest	-10.74	-10.55	-7.63	≤8.00	Pass
Middle	-11.78	-10.68	-8.18	≤8.00	Pass
Highest	-11.29	-11.25	-8.26	≤8.00	Pass

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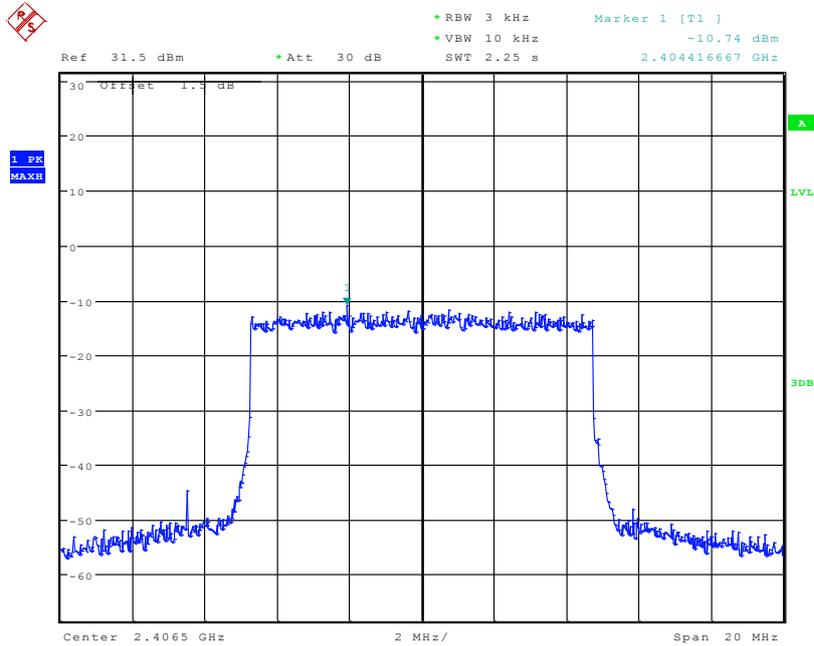
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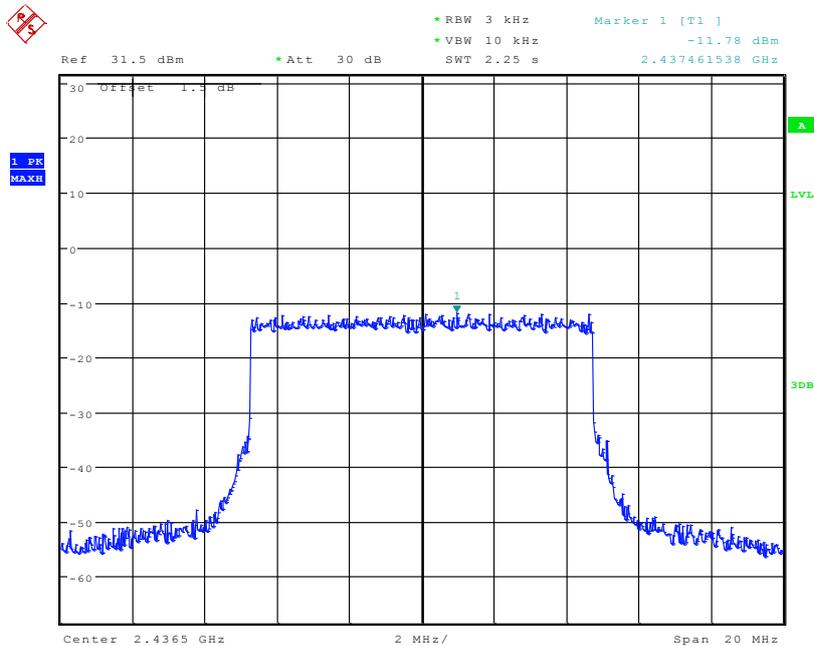
Test plot as follows:

Antenna 1:

Test mode:	OFDM	Test channel:	Lowest
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Test mode:	OFDM	Test channel:	Middle
------------	------	---------------	--------



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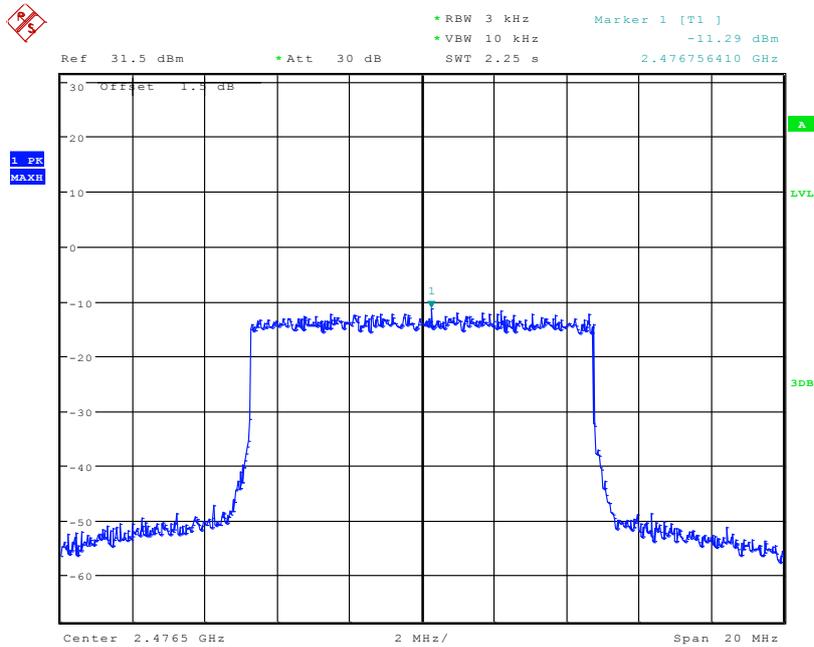


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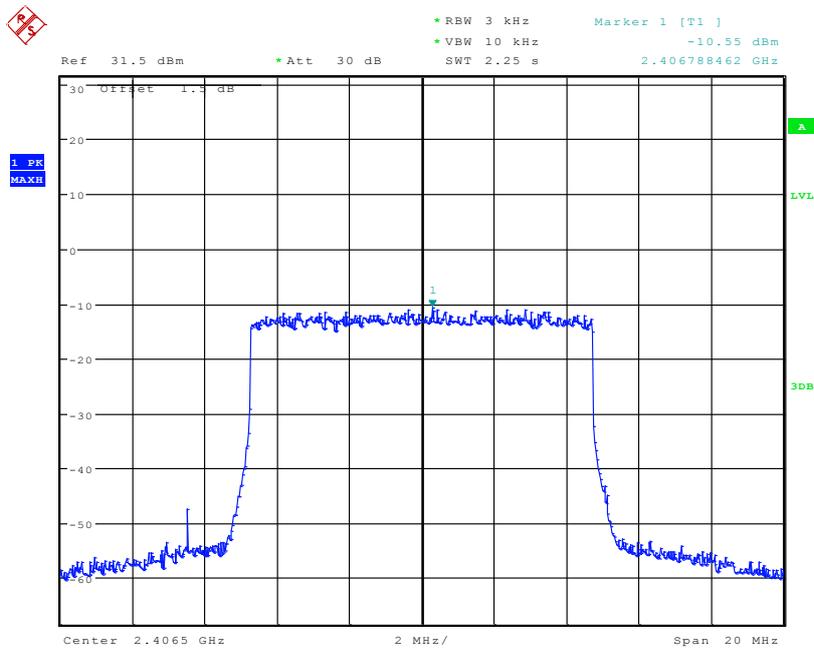
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Test mode:	OFDM	Test channel:	Highest
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## Antenna 2:

Test mode:	OFDM	Test channel:	Lowest
------------	------	---------------	--------



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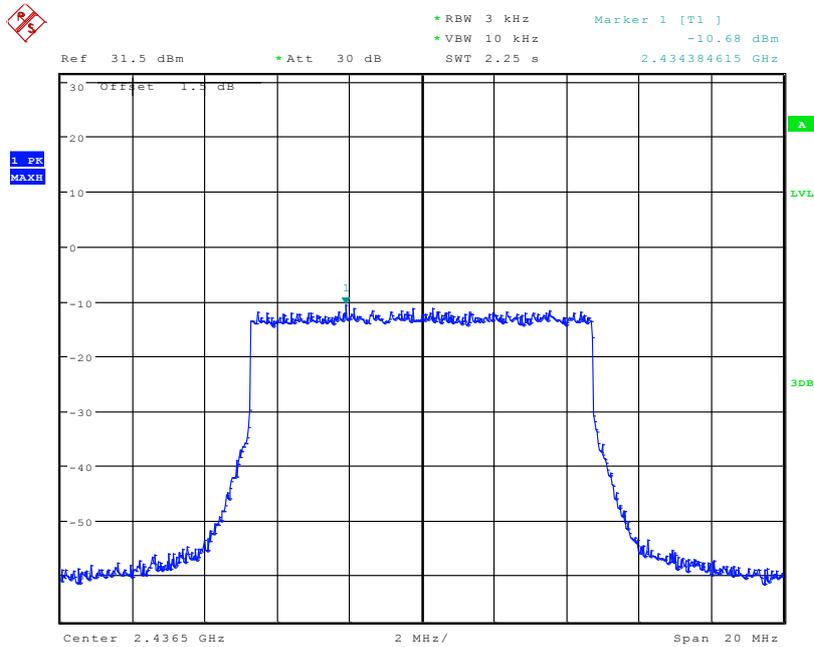


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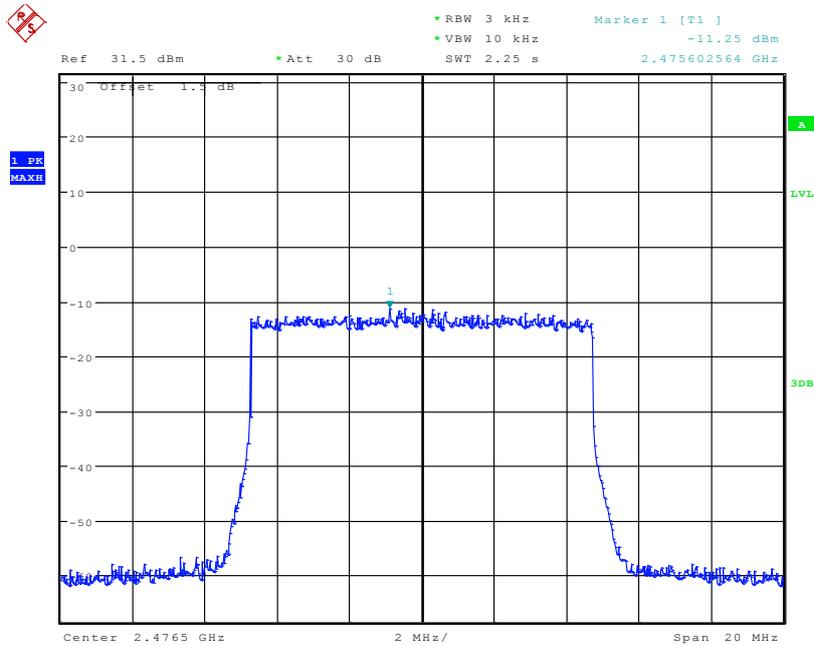
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Test mode:	OFDM	Test channel:	Middle
------------	------	---------------	--------

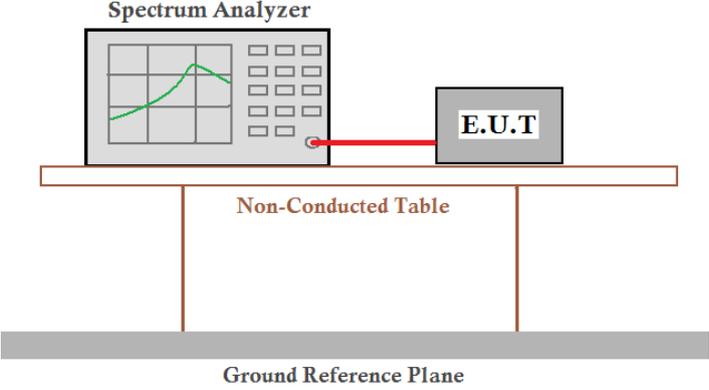


Test mode:	OFDM	Test channel:	Highest
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## 6.6 Band-edge for RF Conducted Emissions

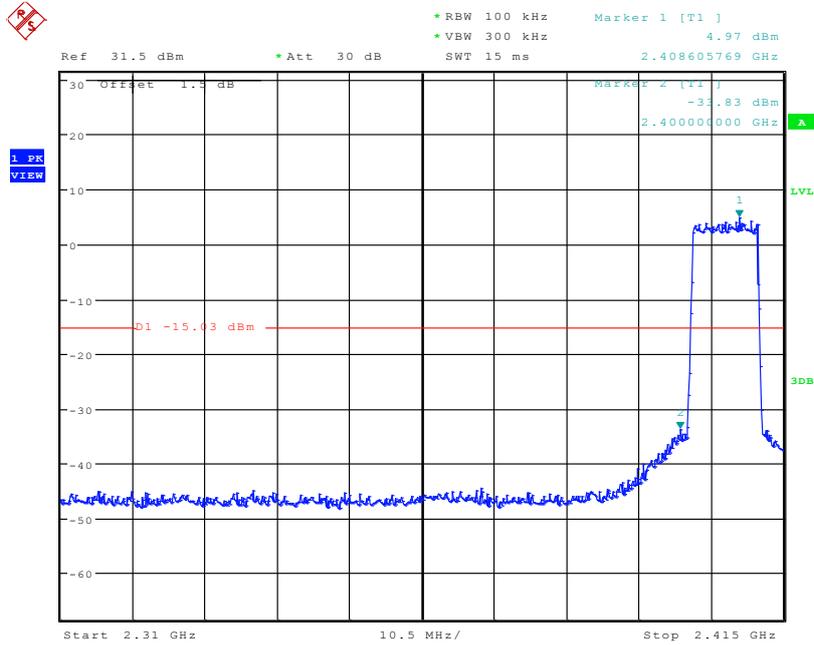
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10 2009 KDB662911 D01 Multiple Transmitter Output v02r01
Test Setup:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</p>
Exploratory Test Mode:	Transmitting with OFDM
Limit:	In any 100 kHz 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 5.10 for details
Test Results:	Pass



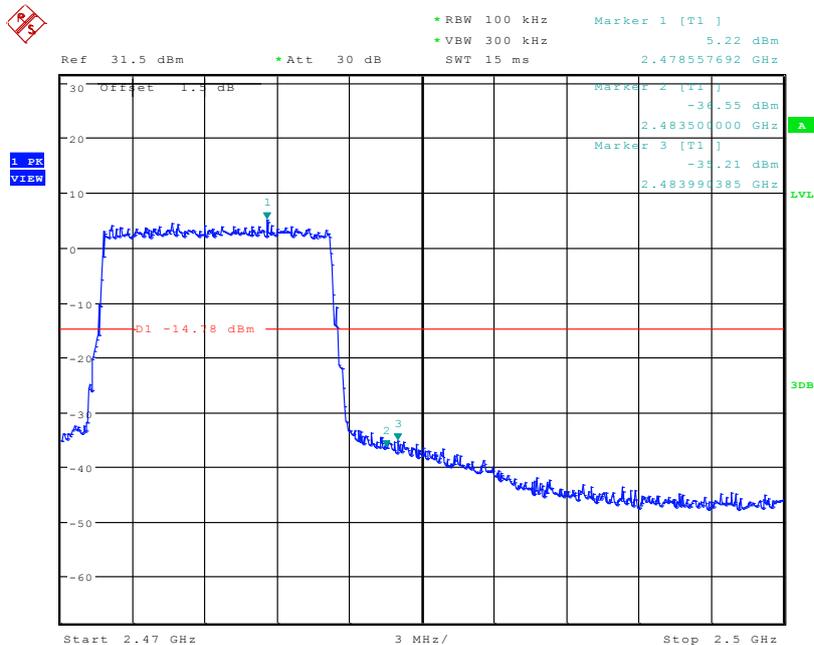
Test plot as follows:

Antenna 1:

Test mode:	OFDM	Test channel:	Lowest
------------	------	---------------	--------



Test mode:	OFDM	Test channel:	Highest
------------	------	---------------	---------



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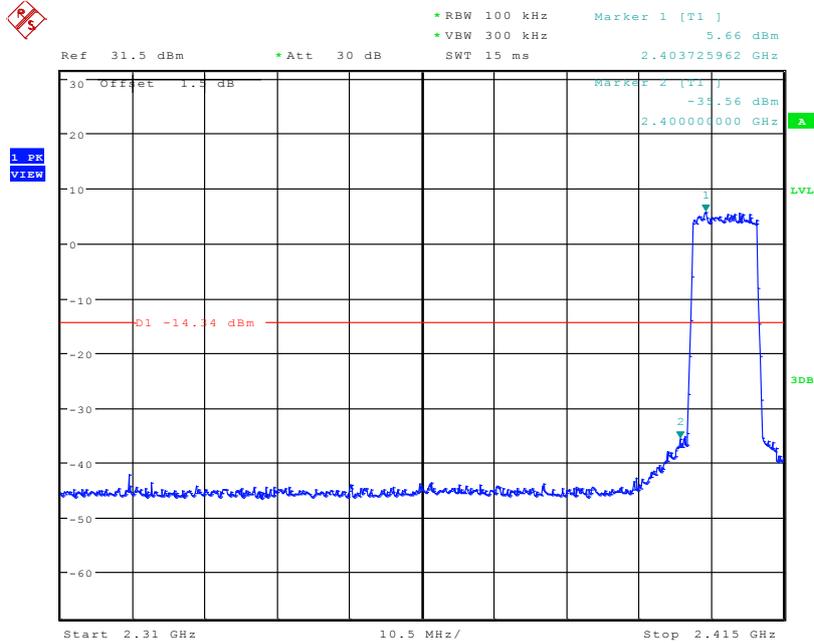
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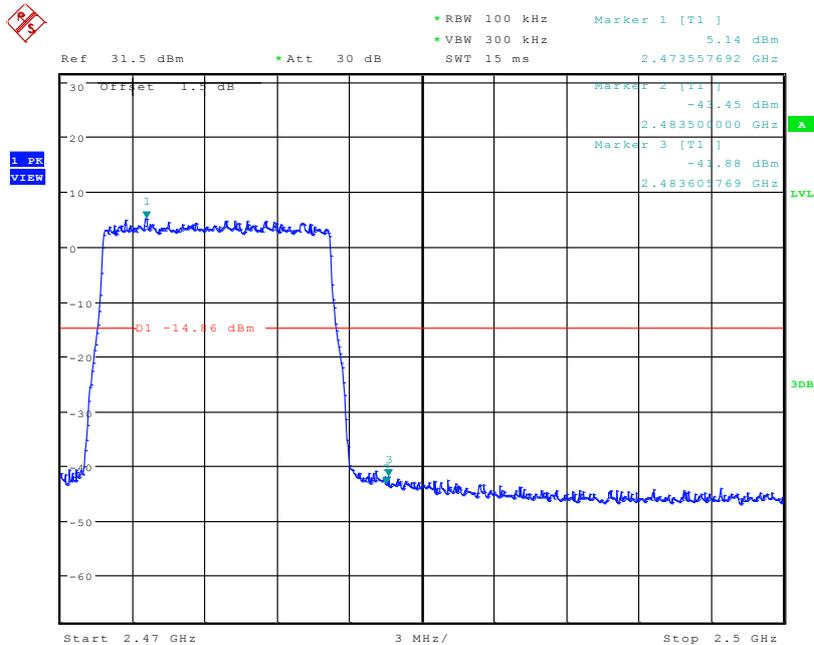
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## Antenna 2:

Test mode:	OFDM	Test channel:	Lowest
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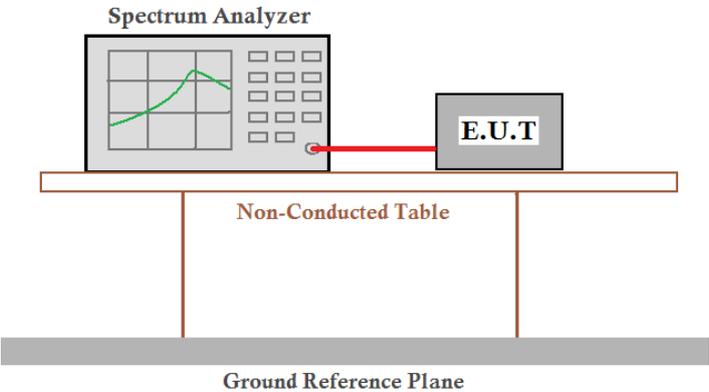


Test mode:	OFDM	Test channel:	Highest
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## 6.7 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10 2009 KDB662911 D01 Multiple Transmitter Output v02r01
Test Setup:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</p>
Exploratory Test Mode:	Refer to section 5.10 for details
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 5.10 for details
Test Results:	Pass



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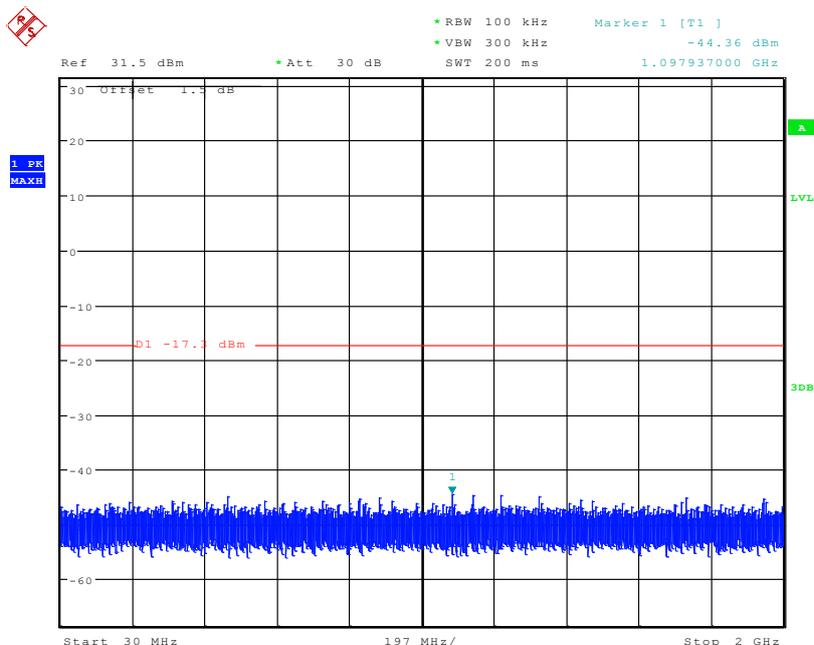
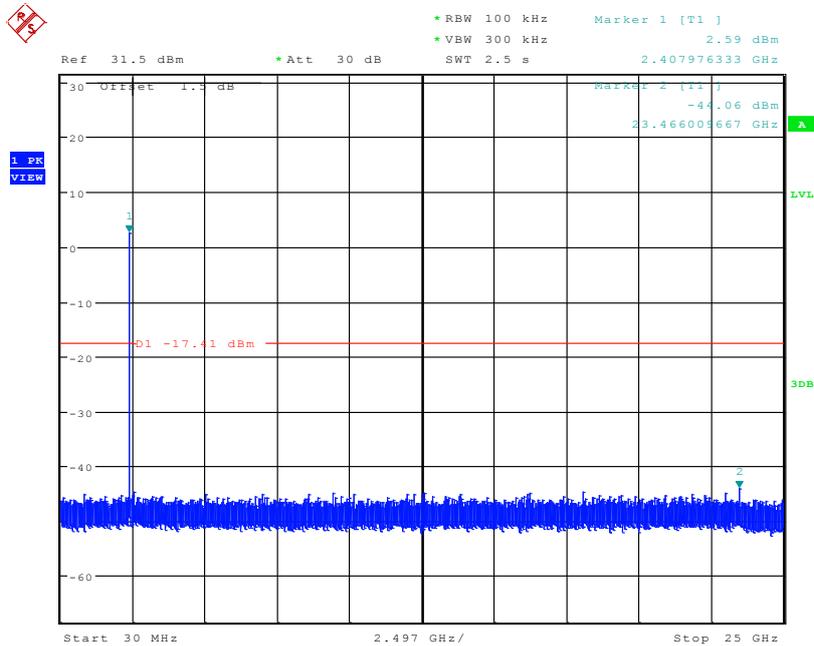
Report No.: SZEM150800510701

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Test plot as follows:

Antenna 1:

Test mode:	OFDM	Test channel:	Lowest
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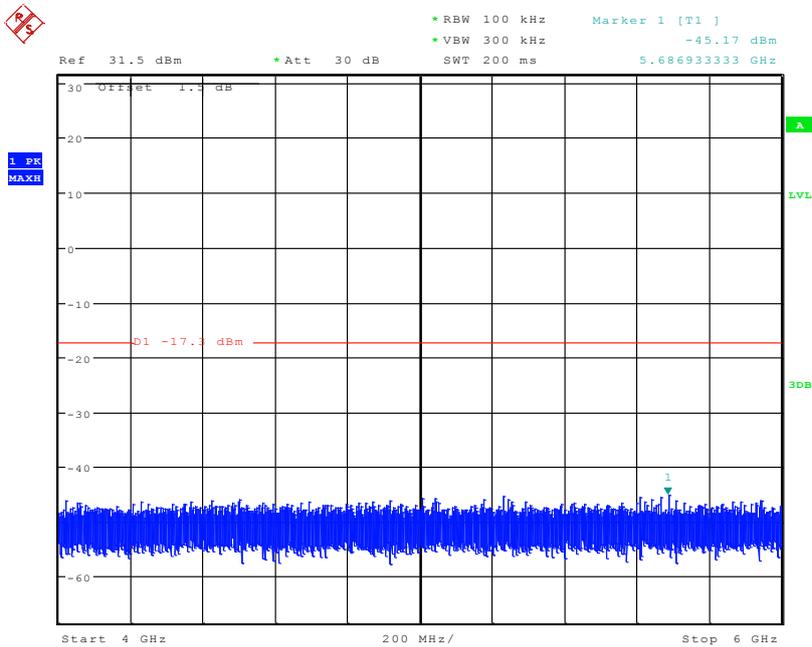
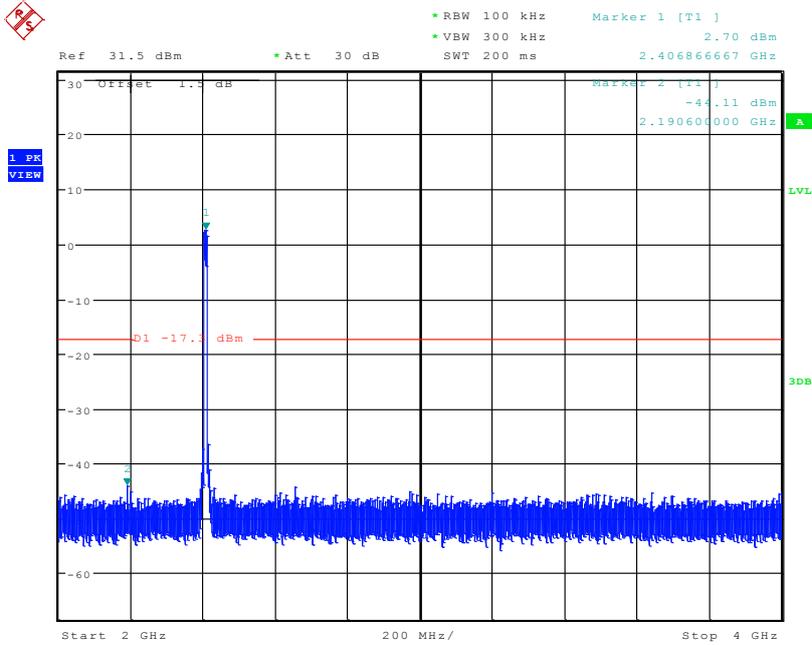
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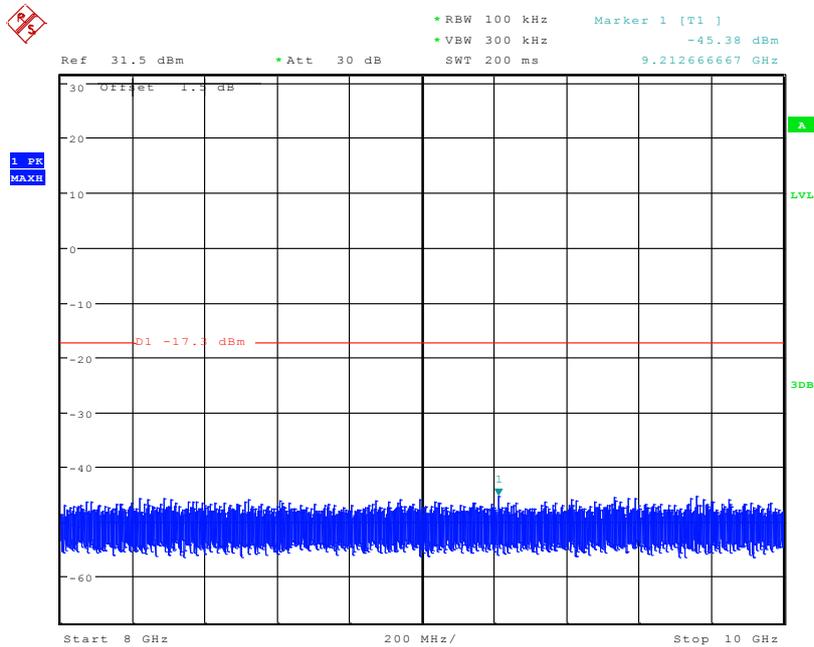
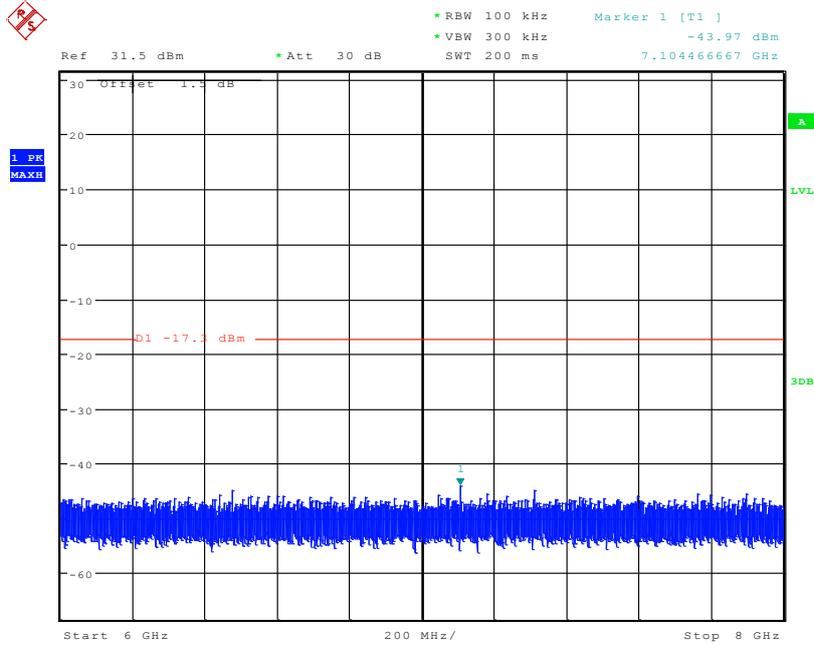
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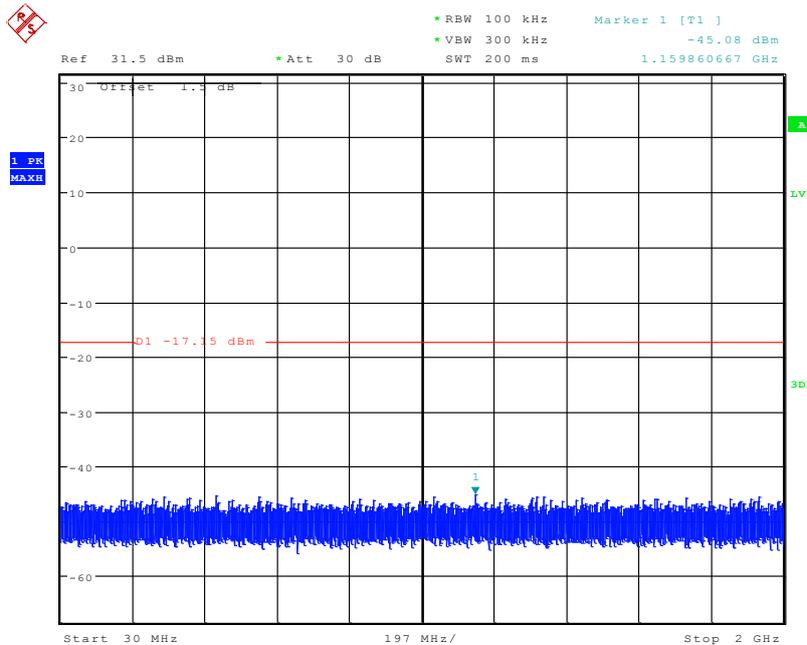
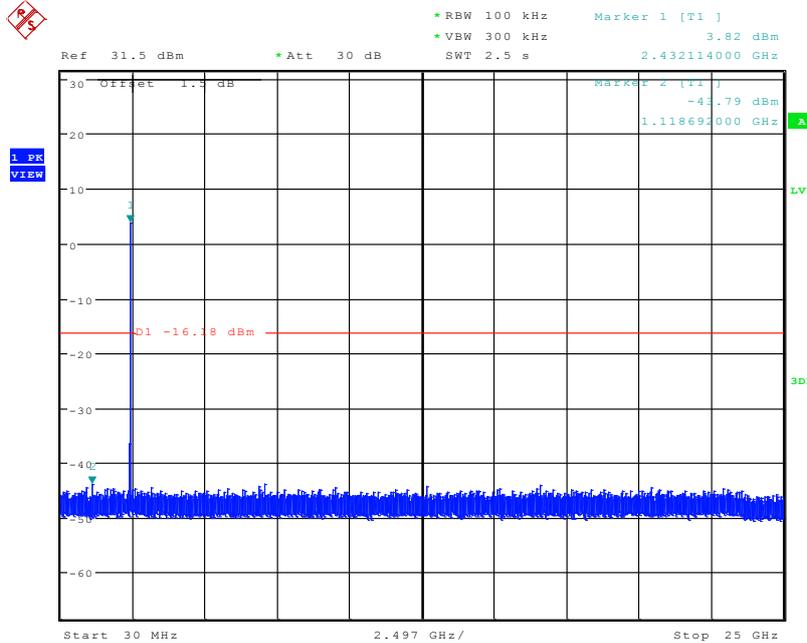


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Test mode:	OFDM	Test channel:	Middle
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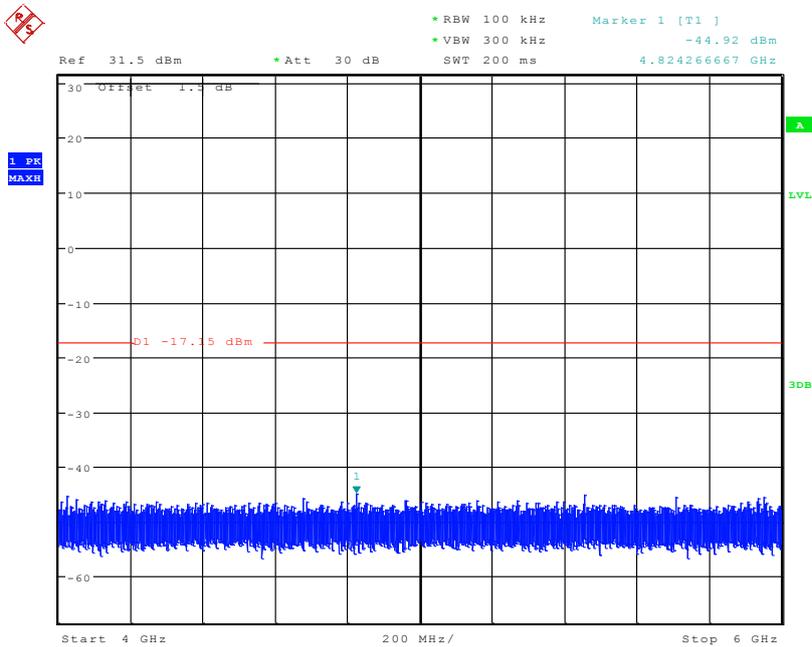
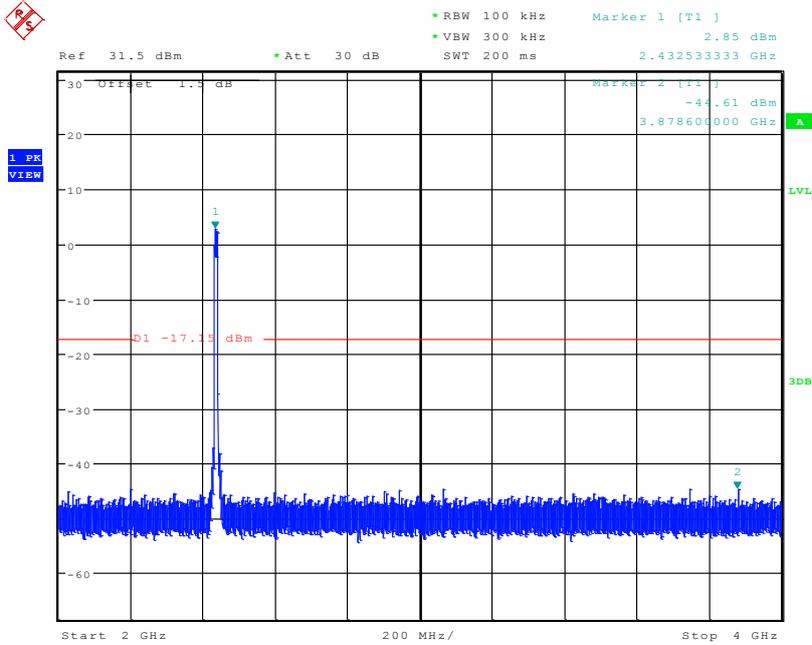
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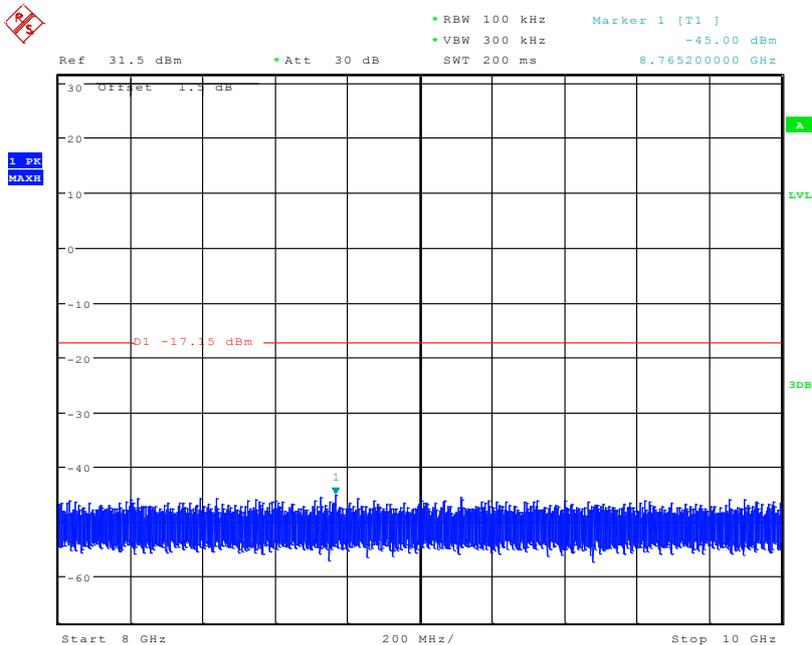
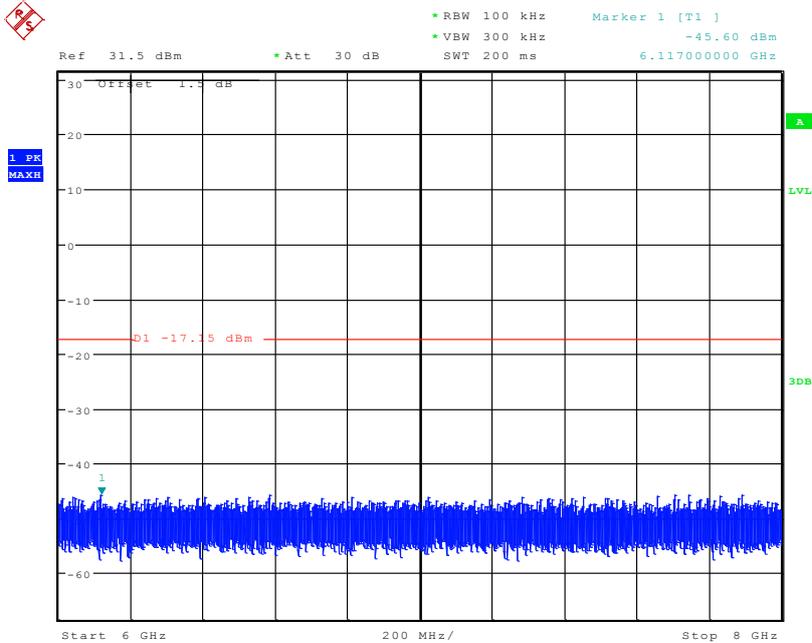
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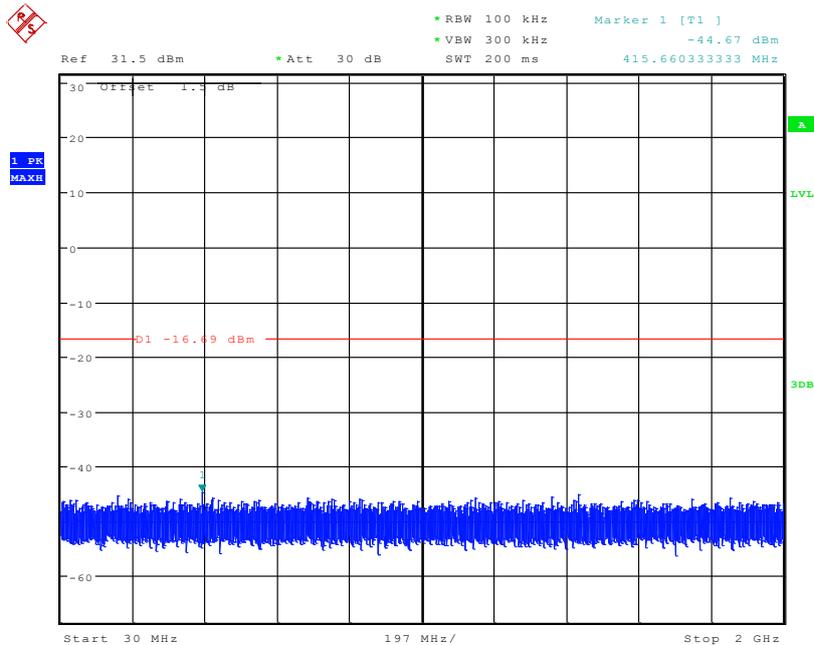
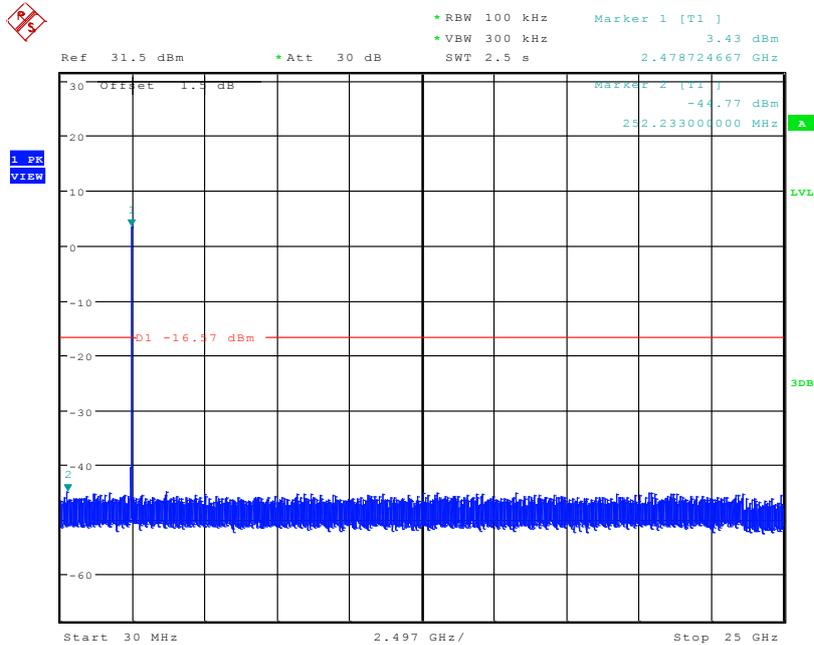


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Test mode:	OFDM	Test channel:	Highest
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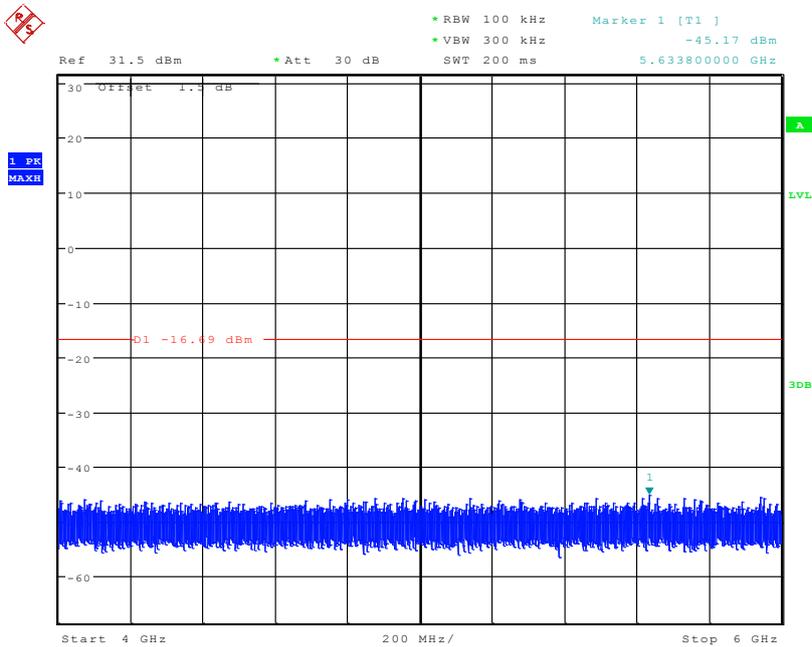
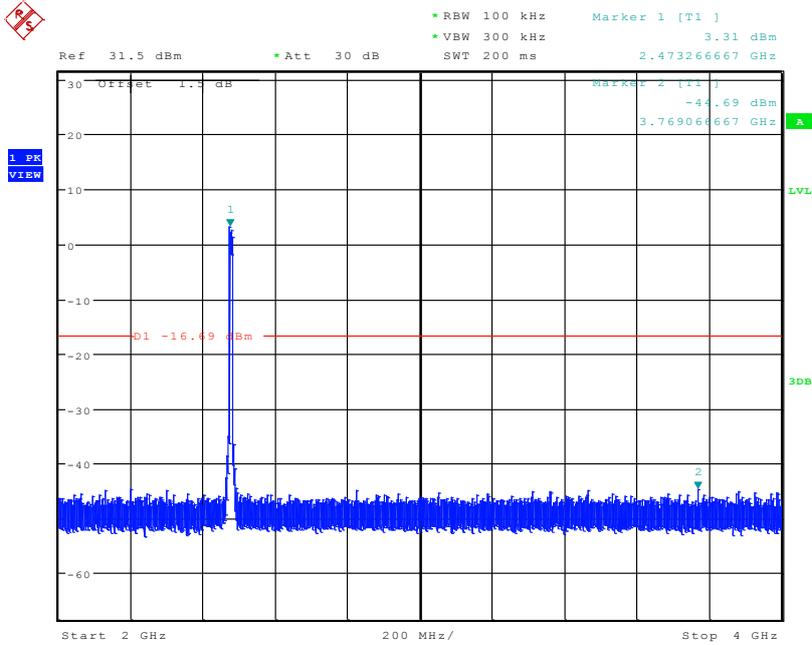
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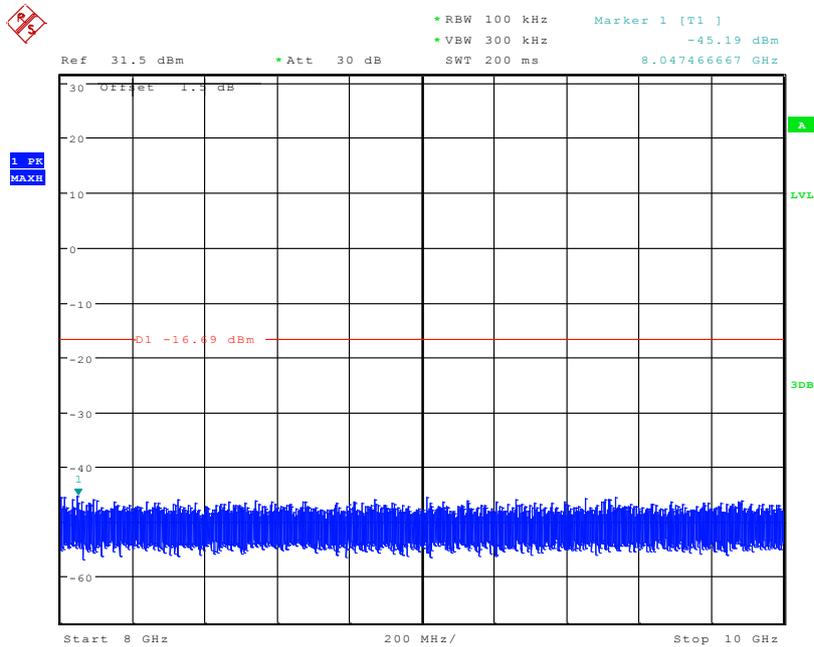
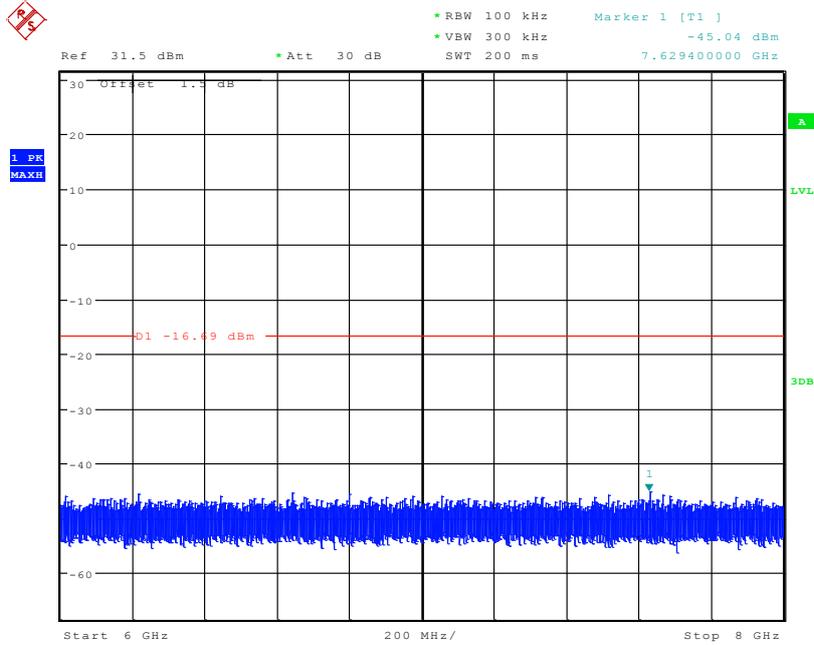
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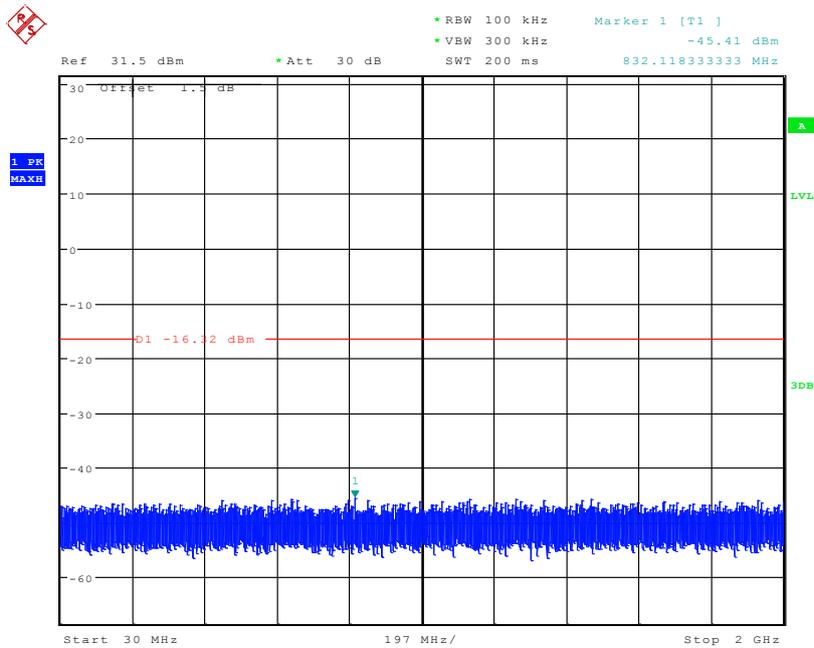
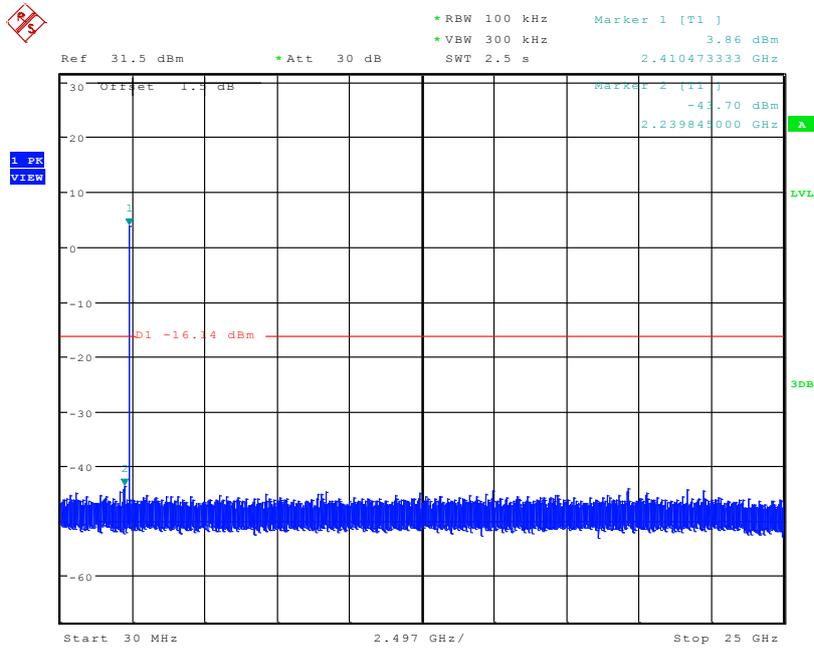
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## Antenna 2:

Test mode:	OFDM	Test channel:	Lowest
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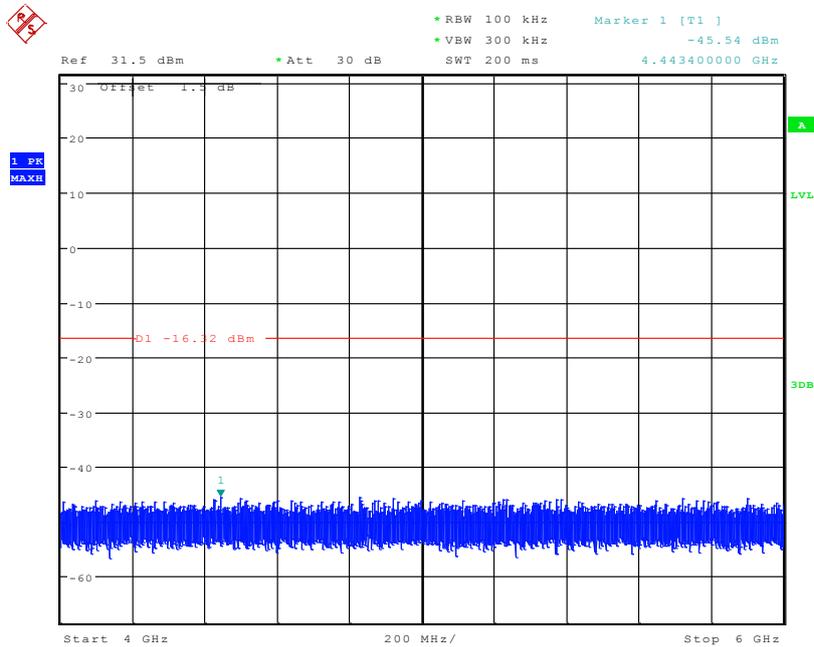
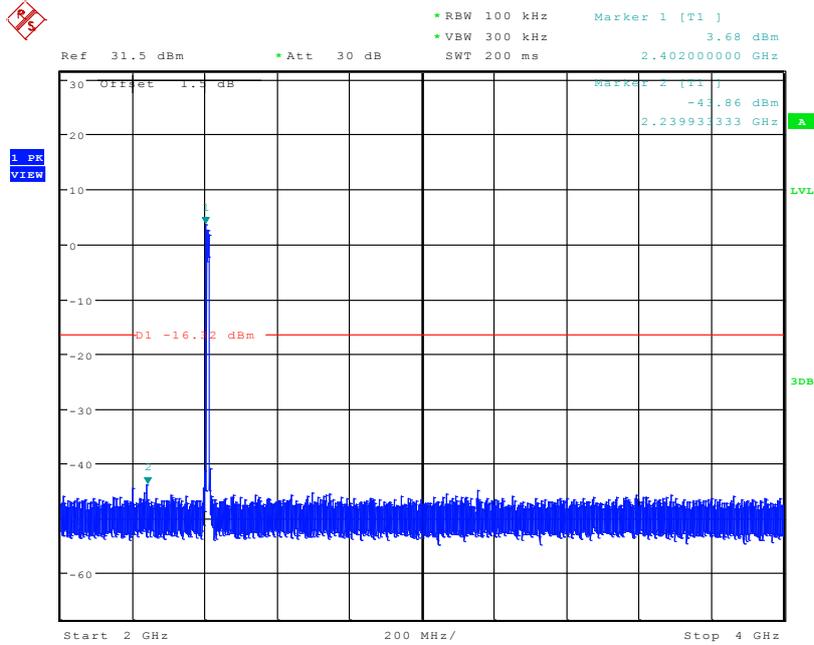
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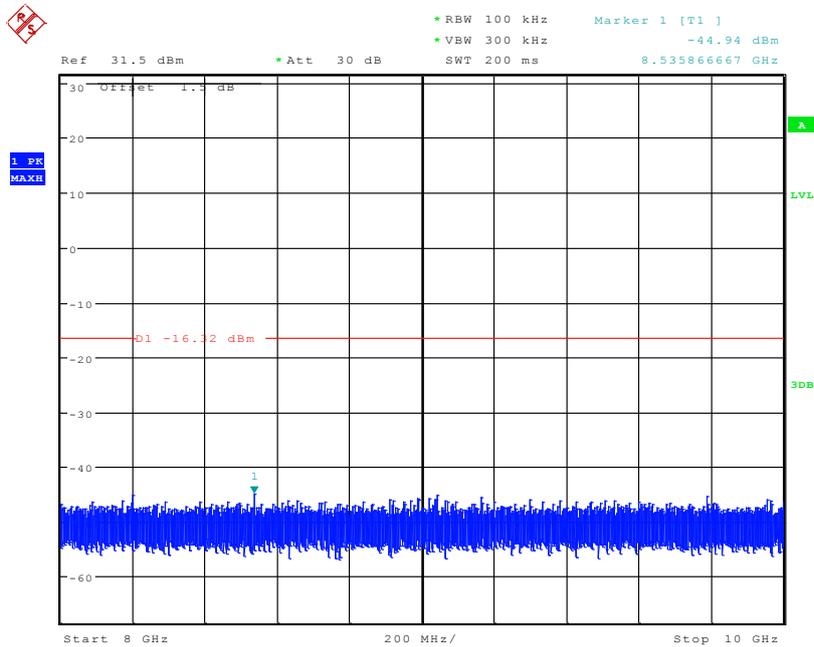
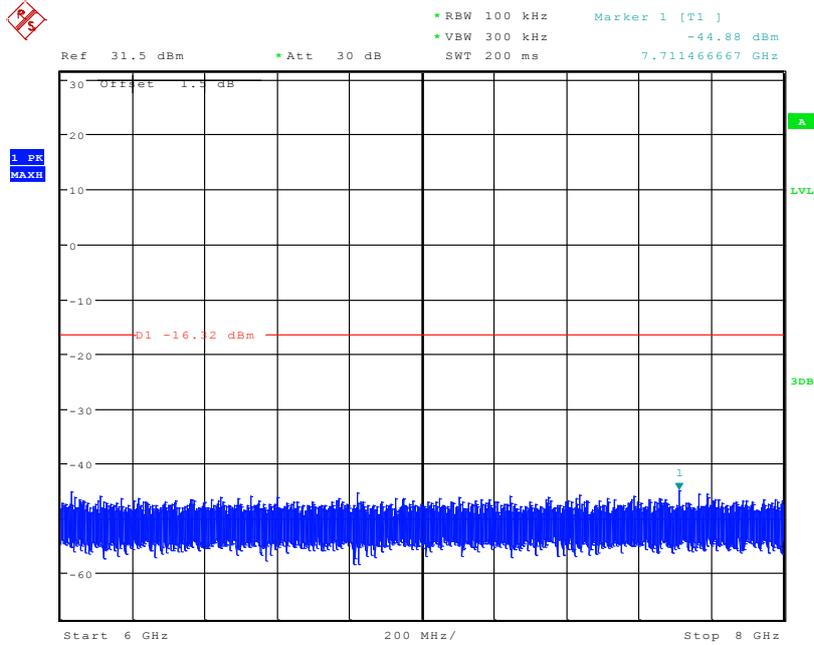
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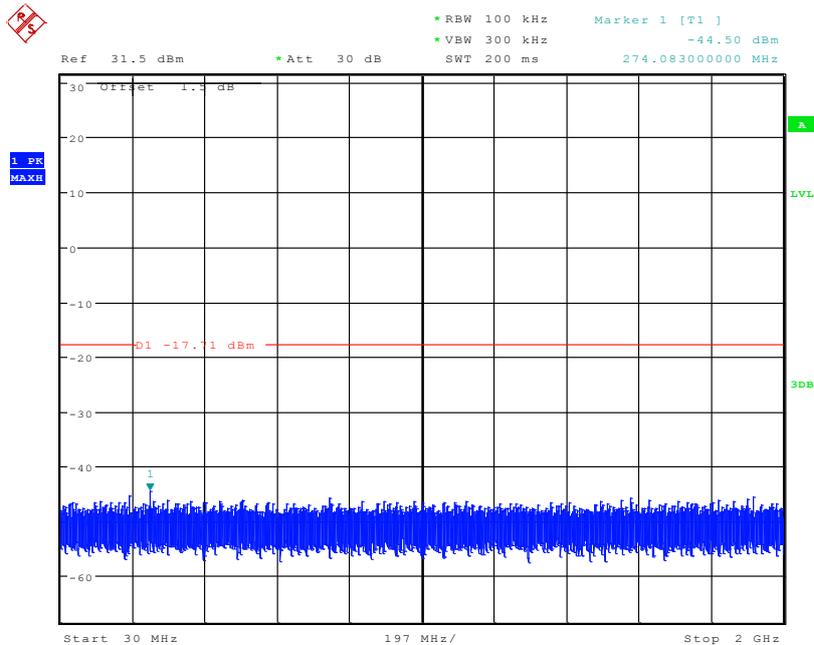
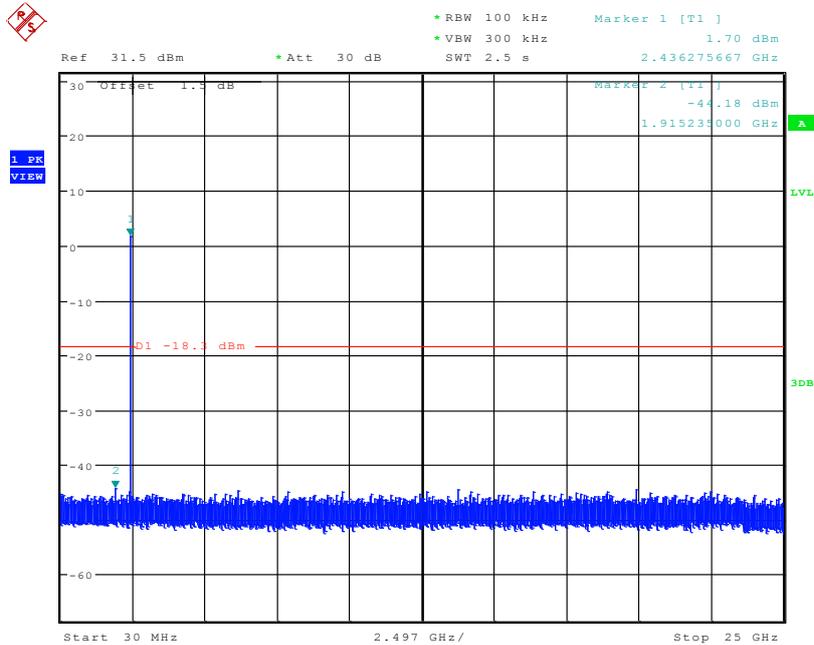


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Test mode:	OFDM	Test channel:	Middle
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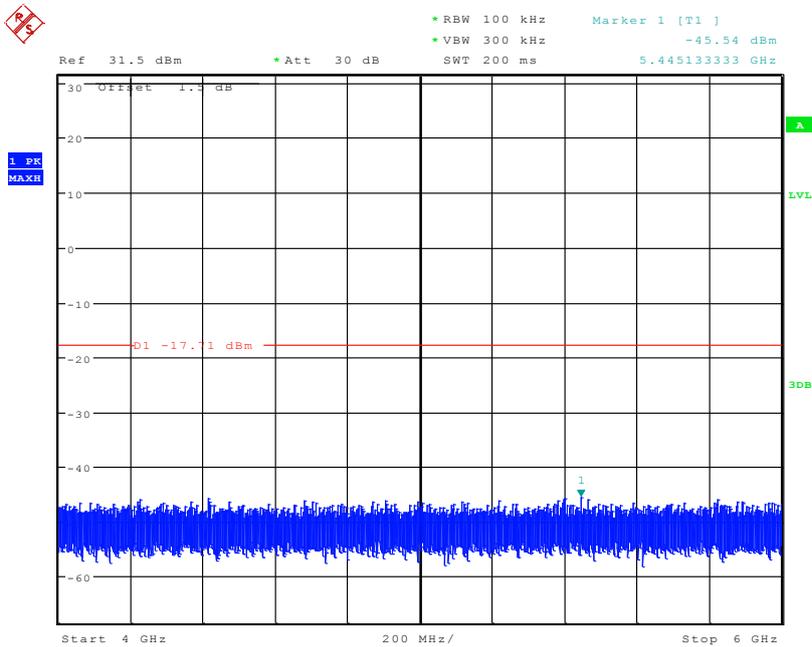
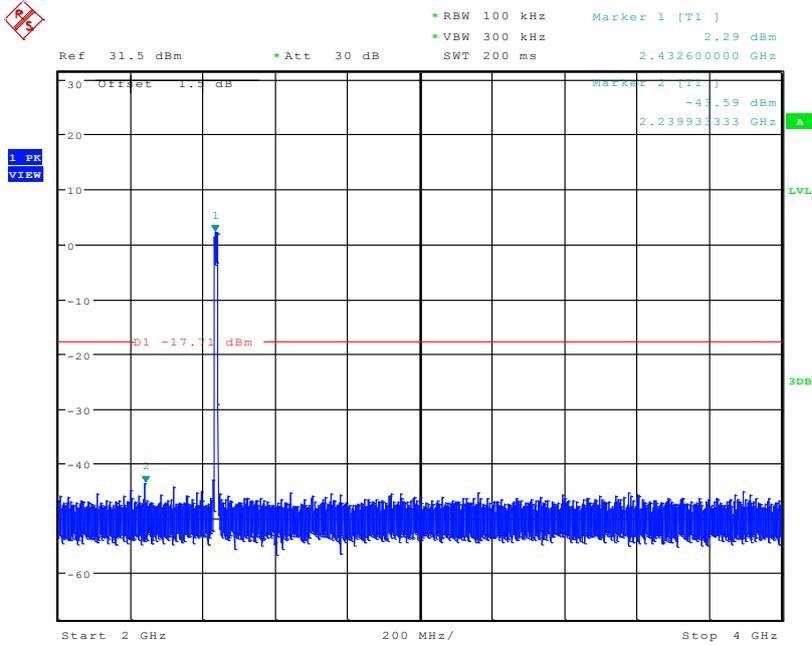
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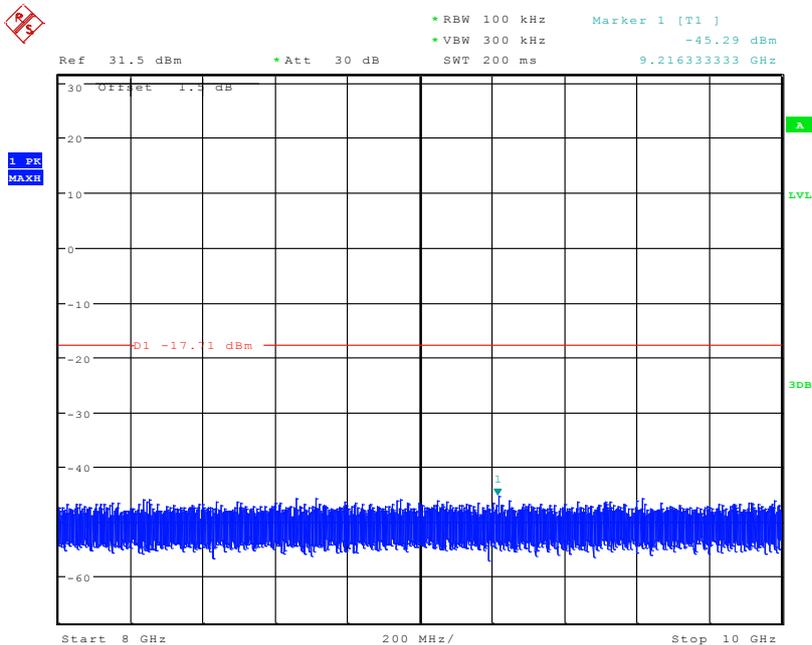
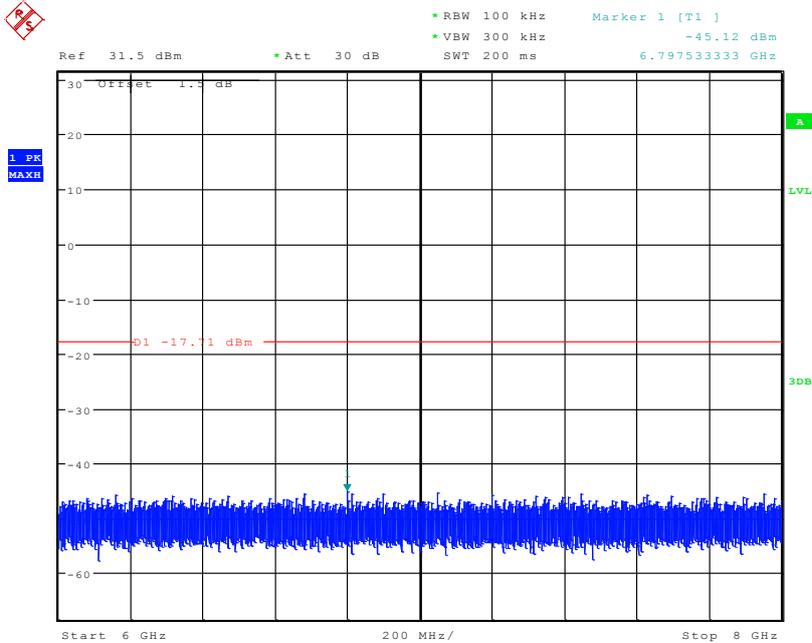
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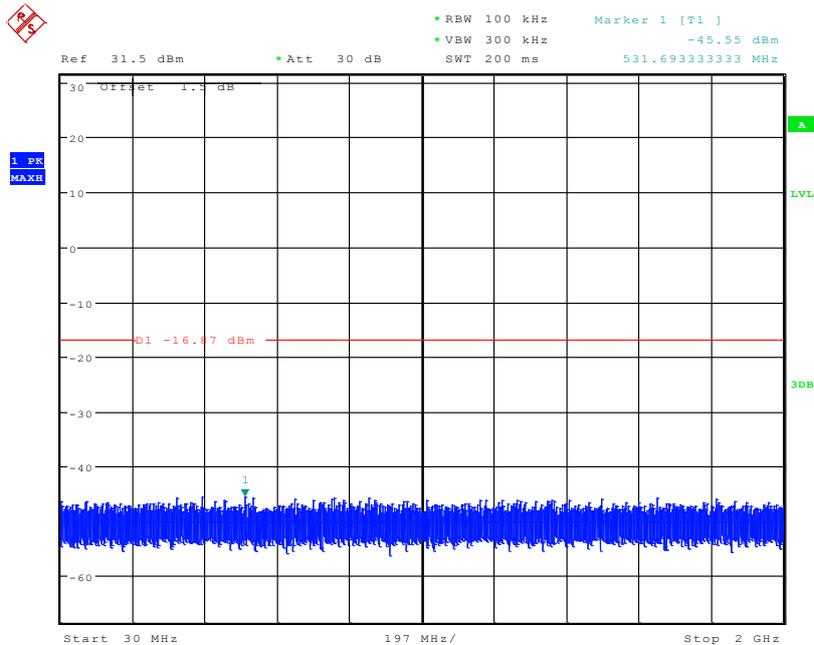
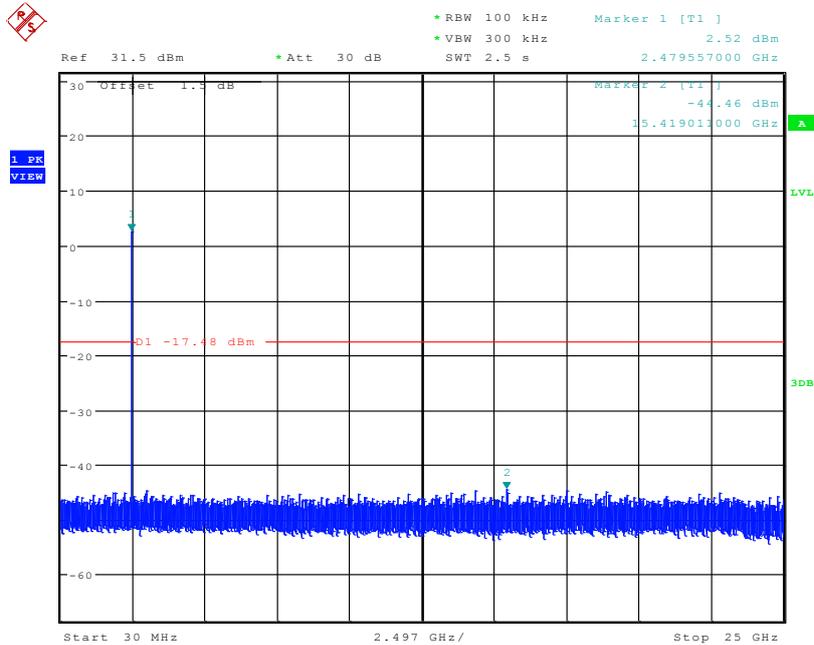


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Test mode:	OFDM	Test channel:	Highest
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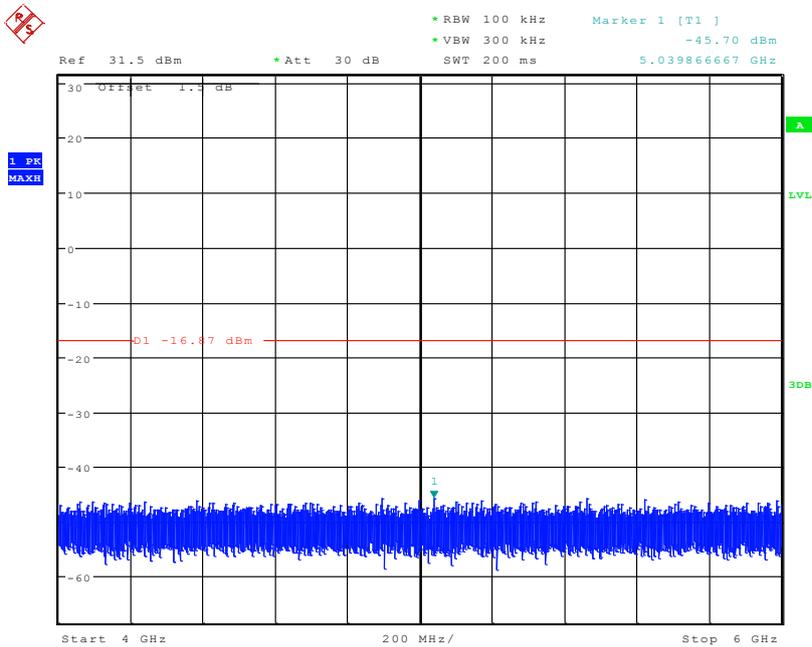
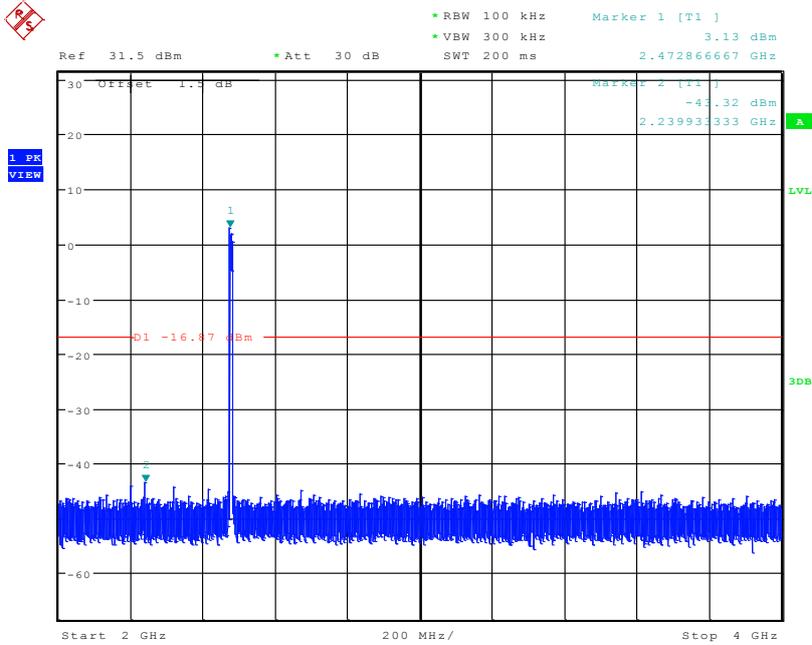
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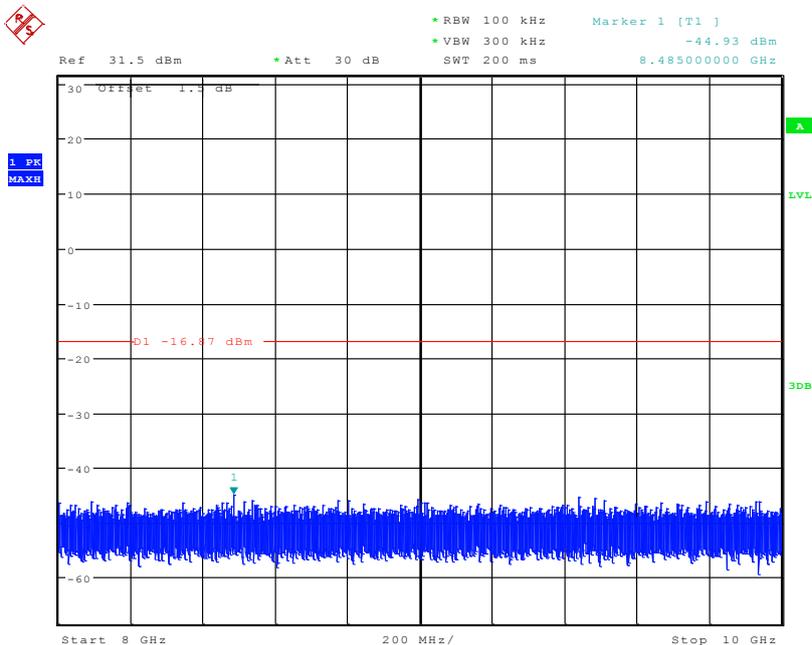
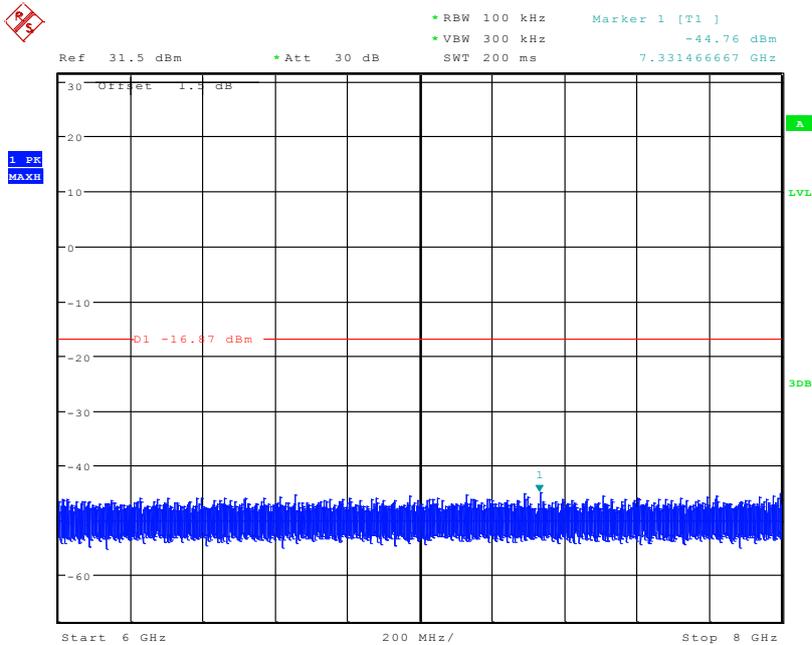
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## Remark:

Pretest 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o), The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

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### 6.8 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
<p>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.</p>					

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**Test Setup:**

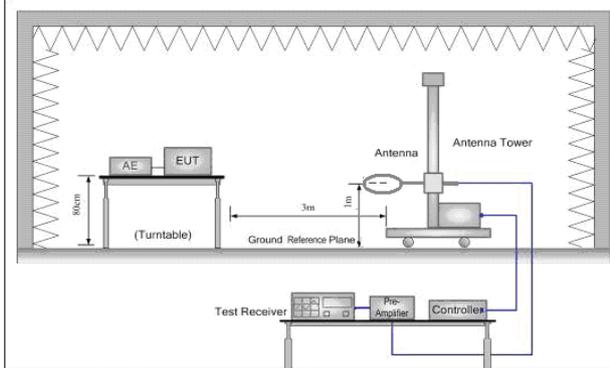


Figure 1. Below 30MHz

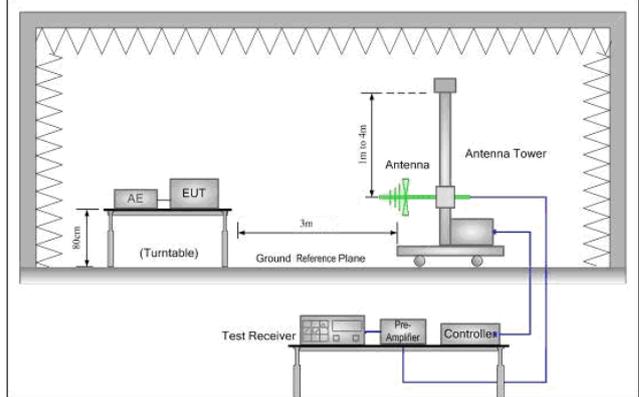


Figure 2. 30MHz to 1GHz

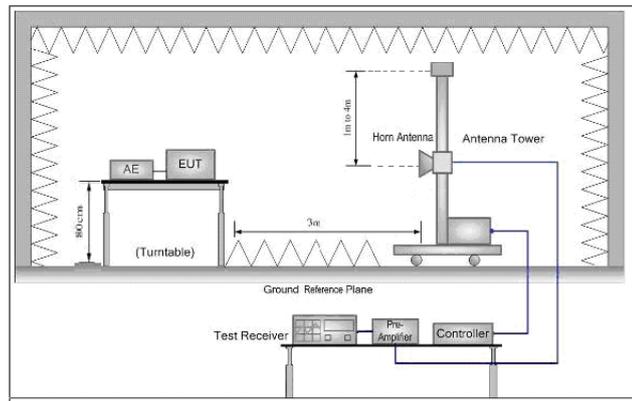


Figure 3. Above 1 GHz

**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 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 (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.
- 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

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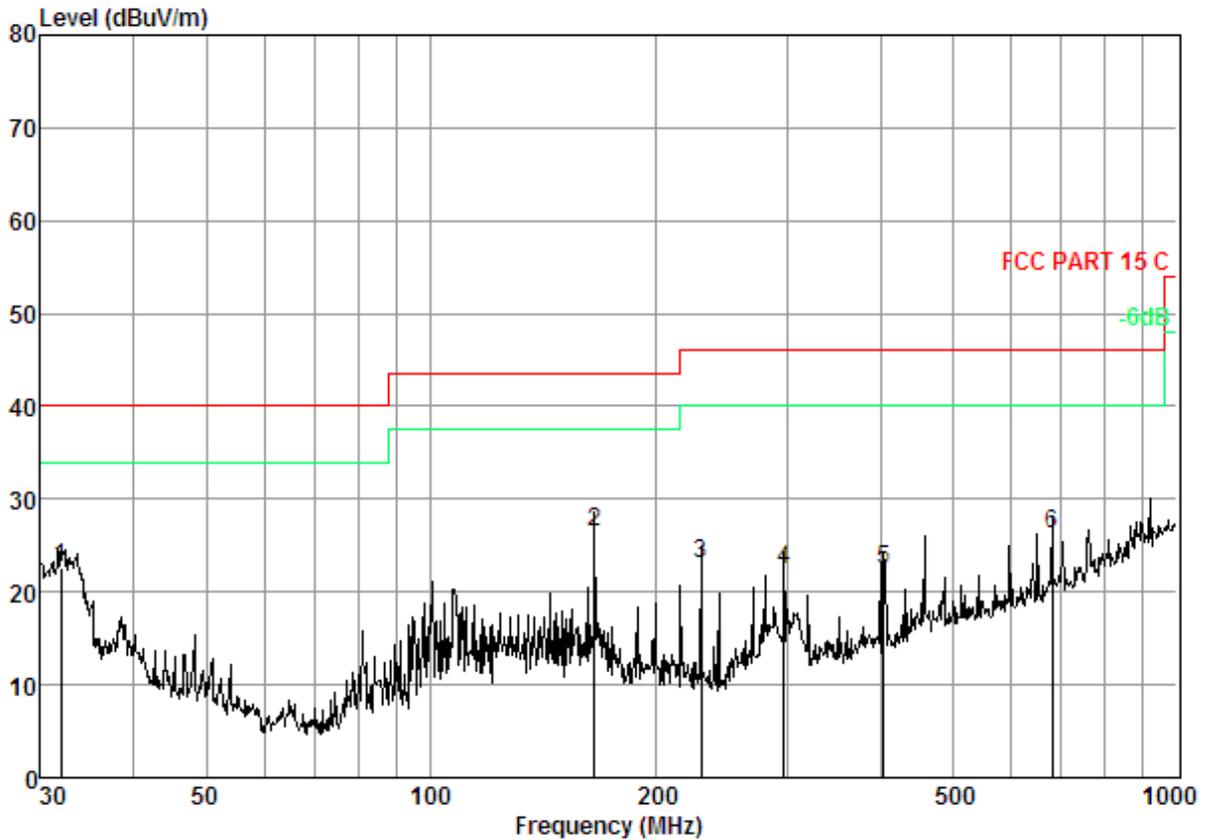
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	method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel ,the middle channel ,the Highest channel h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case. i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with OFDM. Transmitting mode.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



6.8.1 Radiated emission below 1GHz

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



Condition: FCC PART 15 C 3m 3142C VERTICAL  
: 5107CR

Test Mode: TX

	Freq	Cable	Antenna	Preamp	Read	Limit	Over
	MHz	Loss	Factor	Factor	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m
1	31.95	0.67	21.40	25.69	26.23	22.61	40.00 -17.39
2	165.49	1.94	9.50	25.10	40.15	26.49	43.50 -17.01
3	230.10	2.34	8.10	24.76	37.34	23.02	46.00 -22.98
4	297.22	2.75	9.58	25.03	35.01	22.31	46.00 -23.69
5	404.67	3.29	11.45	25.61	33.29	22.42	46.00 -23.58
6	679.96	4.53	16.40	26.36	31.67	26.24	46.00 -19.76

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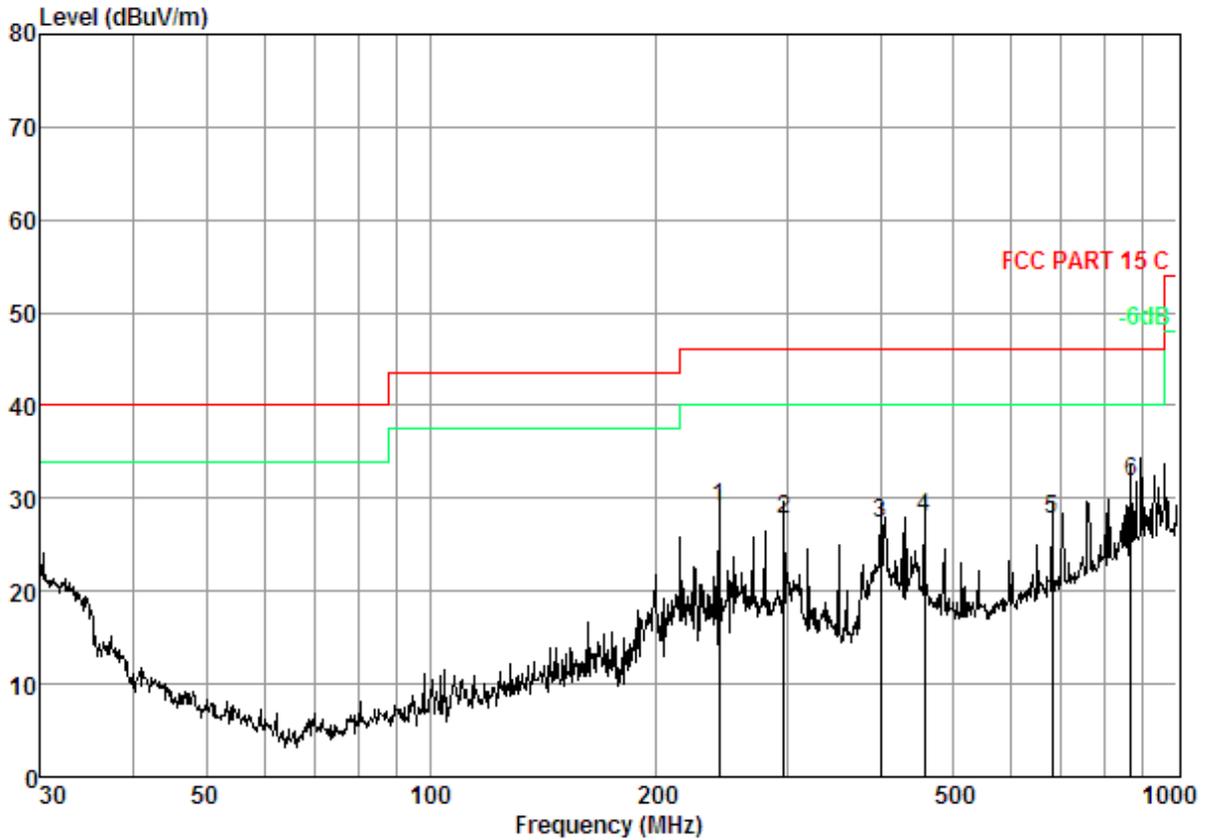


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Test mode:	Transmitting	Horizontal
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Condition: FCC PART 15 C 3m 3142C HORIZONTAL

: 5107CR

Test Mode: TX

	Freq MHz	CableAntenna		Preamp Factor dB	Read Level dBuV	Limit Line dBuV/m	Over Limit dB	
		Loss Factor dB	dB/m					
1	243.38	2.43	8.00	24.81	43.30	28.92	46.00	-17.08
2	297.22	2.75	9.58	25.03	40.40	27.70	46.00	-18.30
3	400.43	3.29	11.30	25.72	38.49	27.36	46.00	-18.64
4	459.11	3.60	13.40	26.07	37.05	27.98	46.00	-18.02
5	679.96	4.53	16.40	26.36	33.14	27.71	46.00	-18.29
6	866.09	5.20	19.40	26.16	33.31	31.75	46.00	-14.25

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**6.8.2 Transmitter emission above 1GHz**

Test mode:		OFDM		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		
3472.071	7.02	32.86	38.73	46.53	47.68	74	-26.32	Vertical		
4813.000	6.44	34.71	39.24	47.10	49.01	74	-24.99	Vertical		
6051.874	8.07	36.24	39.18	47.03	52.16	74	-21.84	Vertical		
7219.500	8.94	35.62	39.07	46.07	51.56	74	-22.44	Vertical		
9626.000	9.98	37.38	37.92	43.52	52.96	74	-21.04	Vertical		
11372.800	10.36	38.15	38.41	43.31	53.41	74	-20.59	Vertical		
3610.398	6.90	33.01	38.79	46.16	47.28	74	-26.72	Horizontal		
4813.000	6.44	34.71	39.24	47.10	49.01	74	-24.99	Horizontal		
6051.874	8.07	36.24	39.18	47.03	52.16	74	-21.84	Horizontal		
7219.500	8.94	35.62	39.07	47.10	52.59	74	-21.41	Horizontal		
9626.000	9.98	37.38	37.92	43.57	53.01	74	-20.99	Horizontal		
11740.650	10.50	38.44	38.58	42.93	53.29	74	-20.71	Horizontal		

Test mode:		OFDM		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		
3417.246	7.13	32.80	38.70	45.56	46.79	74	-27.21	Vertical		
4873.000	6.57	34.77	39.26	46.62	48.70	74	-25.30	Vertical		
6069.413	8.06	36.22	39.18	46.50	51.60	74	-22.40	Vertical		
7309.500	9.06	35.52	39.06	47.13	52.65	74	-21.35	Vertical		
9746.000	9.91	37.75	37.85	42.77	52.58	74	-21.42	Vertical		
10795.570	10.16	37.92	38.12	42.86	52.82	74	-21.18	Vertical		
3257.913	7.44	32.41	38.63	46.06	47.28	74	-26.72	Horizontal		
4873.000	6.57	34.77	39.26	46.93	49.01	74	-24.99	Horizontal		
6051.874	8.07	36.24	39.18	47.03	52.16	74	-21.84	Horizontal		
7309.500	9.06	35.52	39.06	46.17	51.69	74	-22.31	Horizontal		
9746.000	9.91	37.75	37.85	43.51	53.32	74	-20.68	Horizontal		
11860.170	10.55	38.56	38.64	42.23	52.70	74	-21.30	Horizontal		



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Test mode:		OFDM		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		
3462.037	7.04	32.85	38.72	46.16	47.33	74	-26.67	Vertical		
4953.000	6.74	34.85	39.29	47.31	49.61	74	-24.39	Vertical		
6051.874	8.07	36.24	39.18	47.03	52.16	74	-21.84	Vertical		
7419.500	9.21	35.43	39.05	45.85	51.44	74	-22.56	Vertical		
9953.000	9.80	38.36	37.73	43.30	53.73	74	-20.27	Vertical		
10968.760	10.26	38.07	38.21	43.84	53.96	74	-20.04	Vertical		
3368.157	7.22	32.70	38.68	45.46	46.70	74	-27.30	Horizontal		
4953.000	6.74	34.85	39.29	46.71	49.01	74	-24.99	Horizontal		
6008.249	8.08	36.29	39.18	46.63	51.82	74	-22.18	Horizontal		
7429.500	9.22	35.43	39.05	46.71	52.31	74	-21.69	Horizontal		
9906.000	9.82	38.23	37.76	42.06	52.35	74	-21.65	Horizontal		
11372.800	10.36	38.15	38.41	43.31	53.41	74	-20.59	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) Scan from 9kHz to 25GHz, 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. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .
- 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.

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### 6.9 Restricted bands around fundamental frequency

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:**

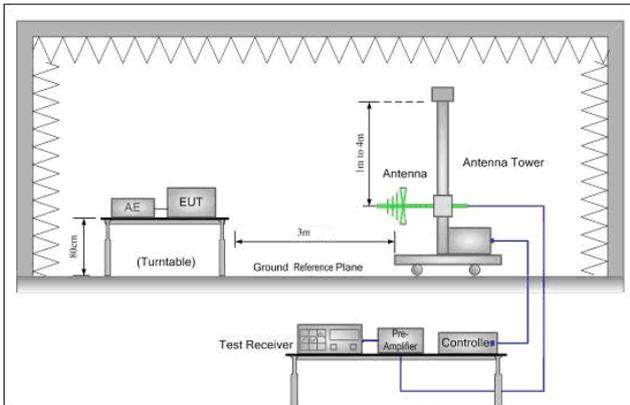


Figure 1. 30MHz to 1GHz

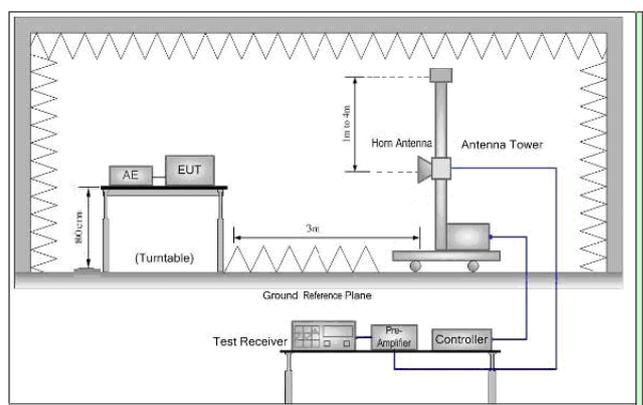


Figure 2. Above 1 GHz



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<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>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</li> <li>g. Test the EUT in the lowest channel , the Highest channel</li> <li>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case.</li> <li>i. Repeat above procedures until all frequencies measured was complete.</li> </ol>
<p>Exploratory Test Mode:</p>	<p>Transmitting with OFDM. Transmitting mode.</p>
<p>Instruments Used:</p>	<p>Refer to section 5.10 for details</p>
<p>Test Results:</p>	<p>Pass</p>



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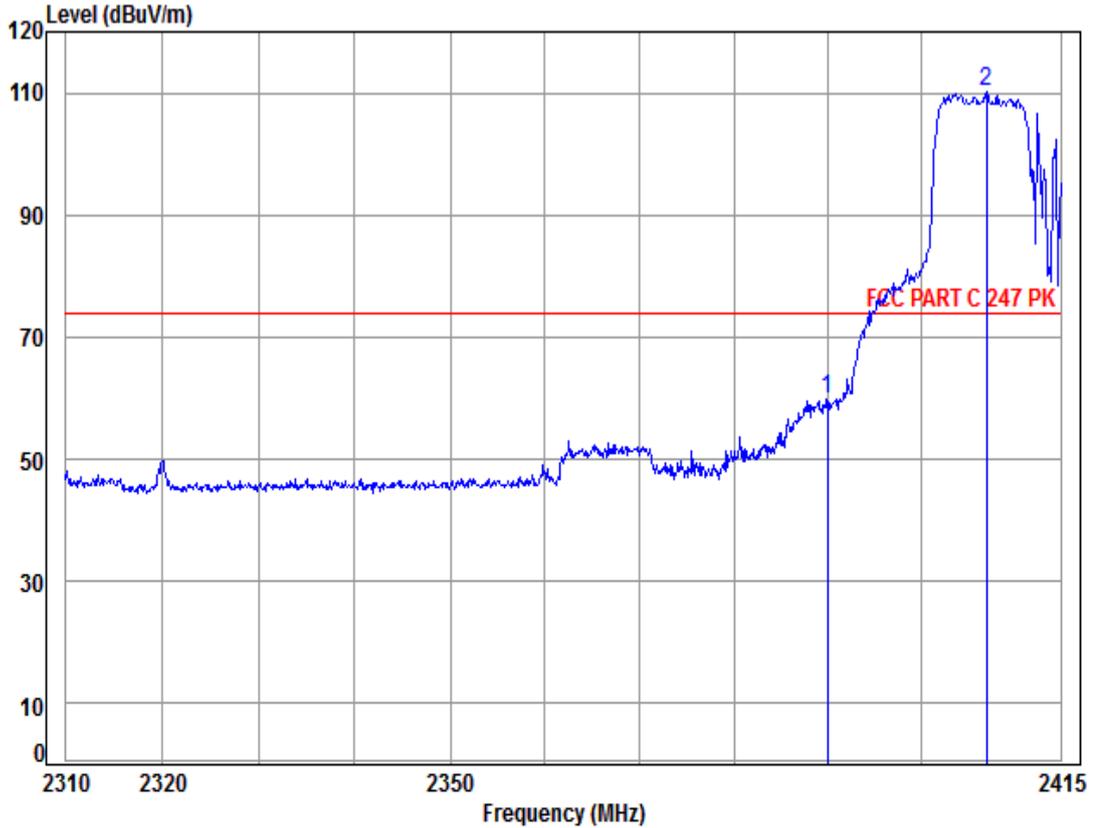
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Test plot as follows:

Worse case mode:	OFDM	Test channel:	Lowest	Remark:	Peak	Vertical
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Data: 100



Site : chamber  
 Condition: FCC PART C 247 PK 3m Vertical  
 Job No: : 5107CR  
 Mode: : 2406.3 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.00	4.90	32.35	38.46	61.19	59.98	74.00	-14.02
2 pp	2407.07	4.92	32.41	38.46	111.32	110.19	74.00	36.19

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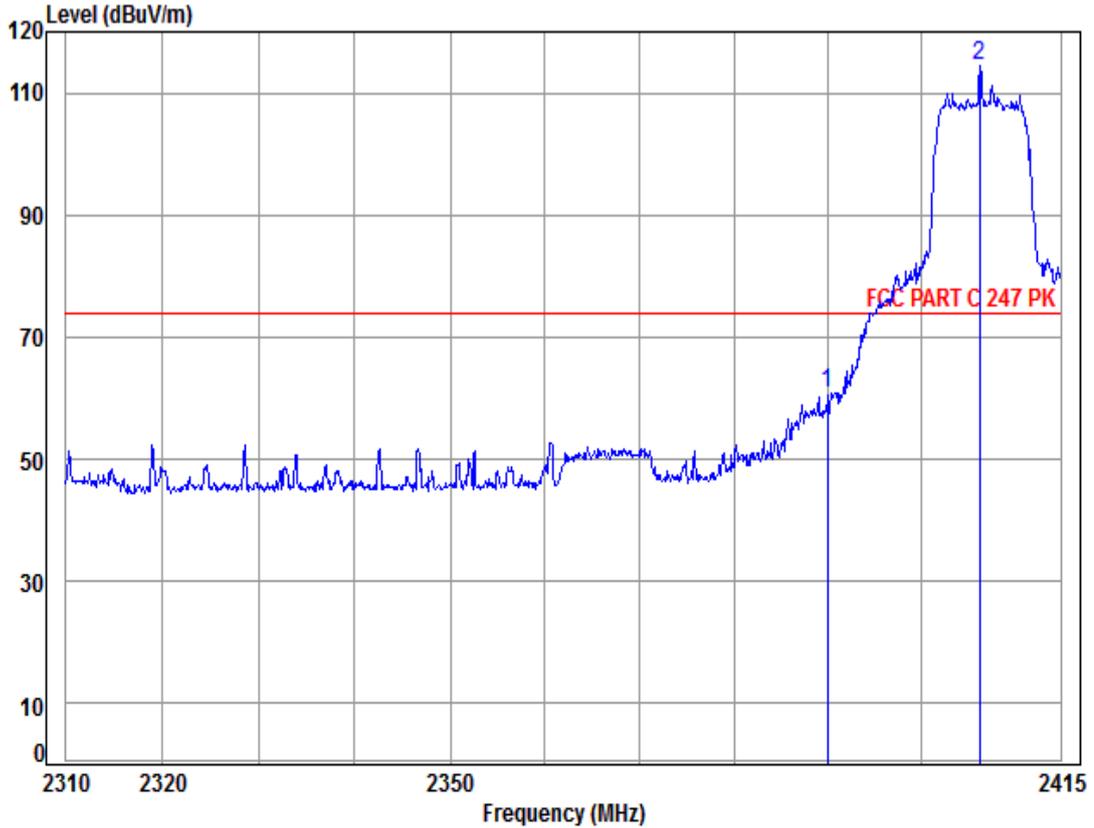
**SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch**

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Worse case mode:	OFDM	Test channel:	Lowest	Remark:	Peak	Horizontal
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Data: 98



Site : chamber  
 Condition: FCC PART C 247 PK 3m Horizontal  
 Job No: : 5107CR  
 Mode: : 2406.3 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.00	4.90	32.35	38.46	62.15	60.94	74.00	-13.06
2 pp	2406.32	4.92	32.41	38.46	115.66	114.53	74.00	40.53

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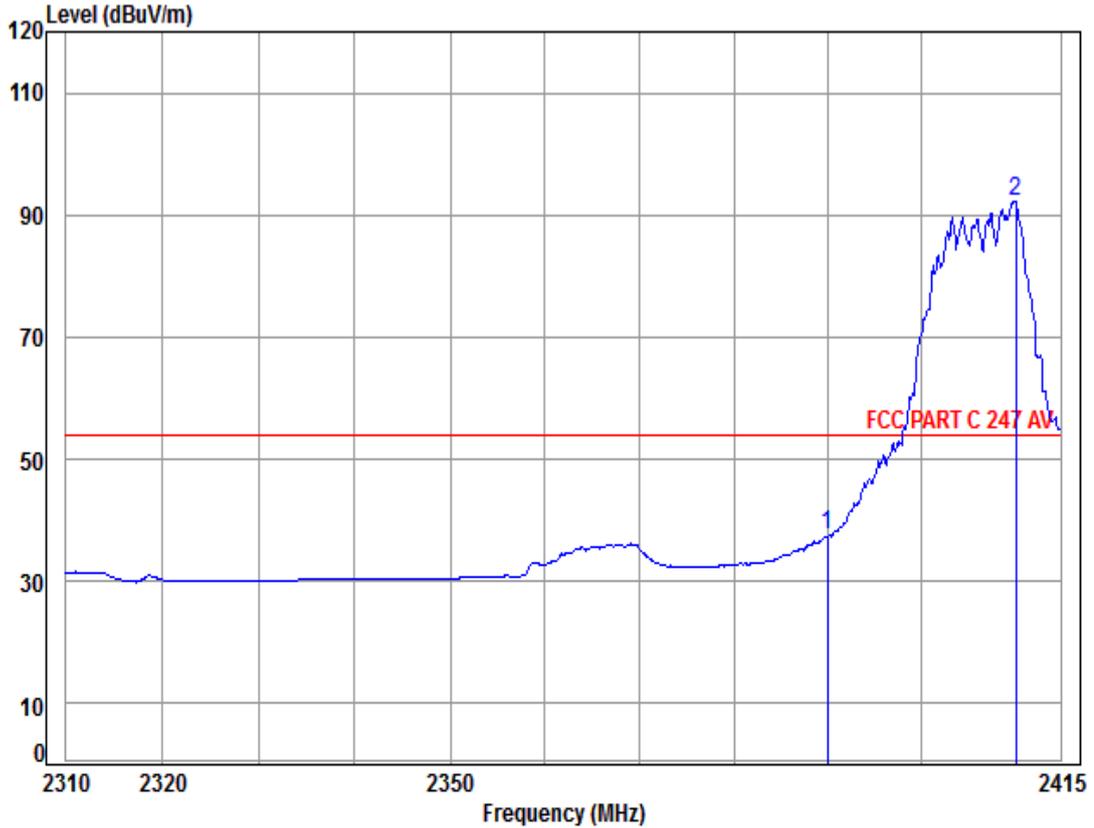
**SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch**

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Worse case mode:	OFDM	Test channel:	Lowest	Remark:	Average	Vertical
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Data: 101



Site : chamber  
 Condition: FCC PART C 247 AV 3m Vertical  
 Job No: : 5107CR  
 Mode: : 2406.3 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.00	4.90	32.35	38.46	38.89	37.68	54.00	-16.32
2 pp	2410.17	4.93	32.41	38.46	93.27	92.15	54.00	38.15

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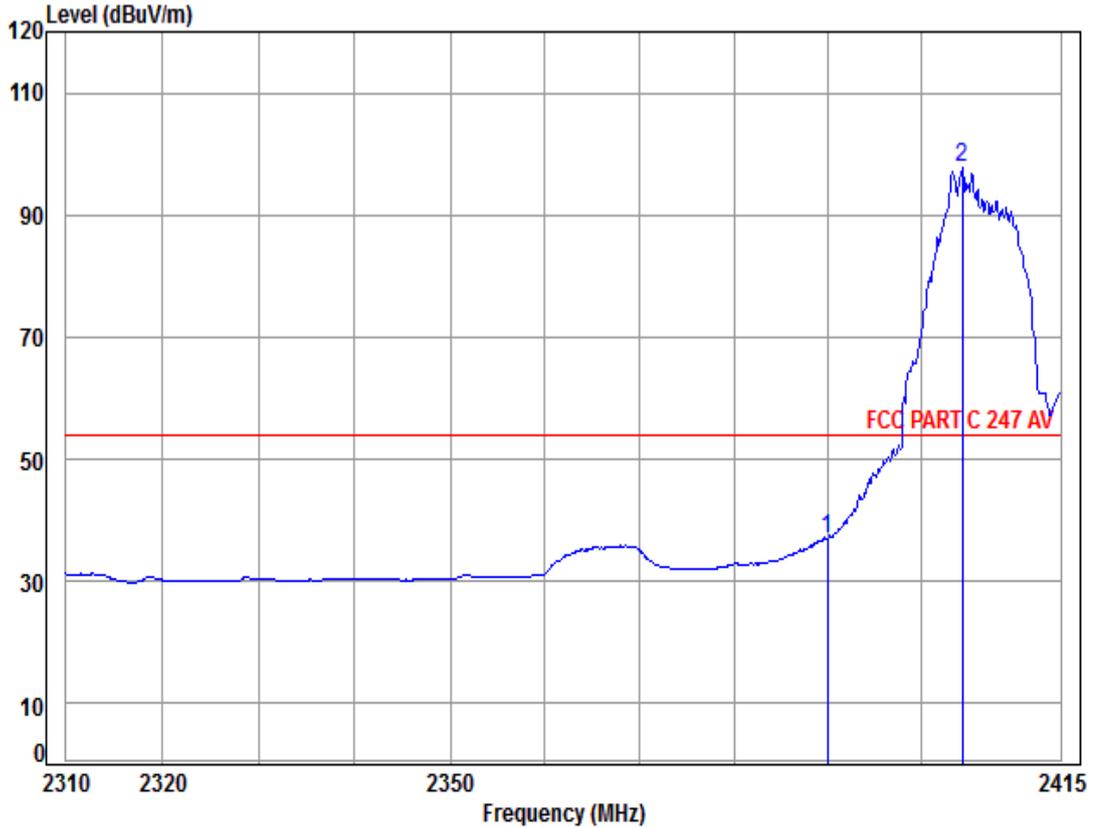


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Shenzhen Branch**

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Worse case mode:	OFDM	Test channel:	Lowest	Remark:	Average	Horizontal
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Data: 99



Site : chamber  
Condition: FCC PART C 247 AV 3m Horizontal  
Job No: : 5107CR  
Mode: : 2406.3 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.00	4.90	32.35	38.46	38.25	37.04	54.00	-16.96
2 pp	2404.40	4.92	32.41	38.46	98.74	97.61	54.00	43.61

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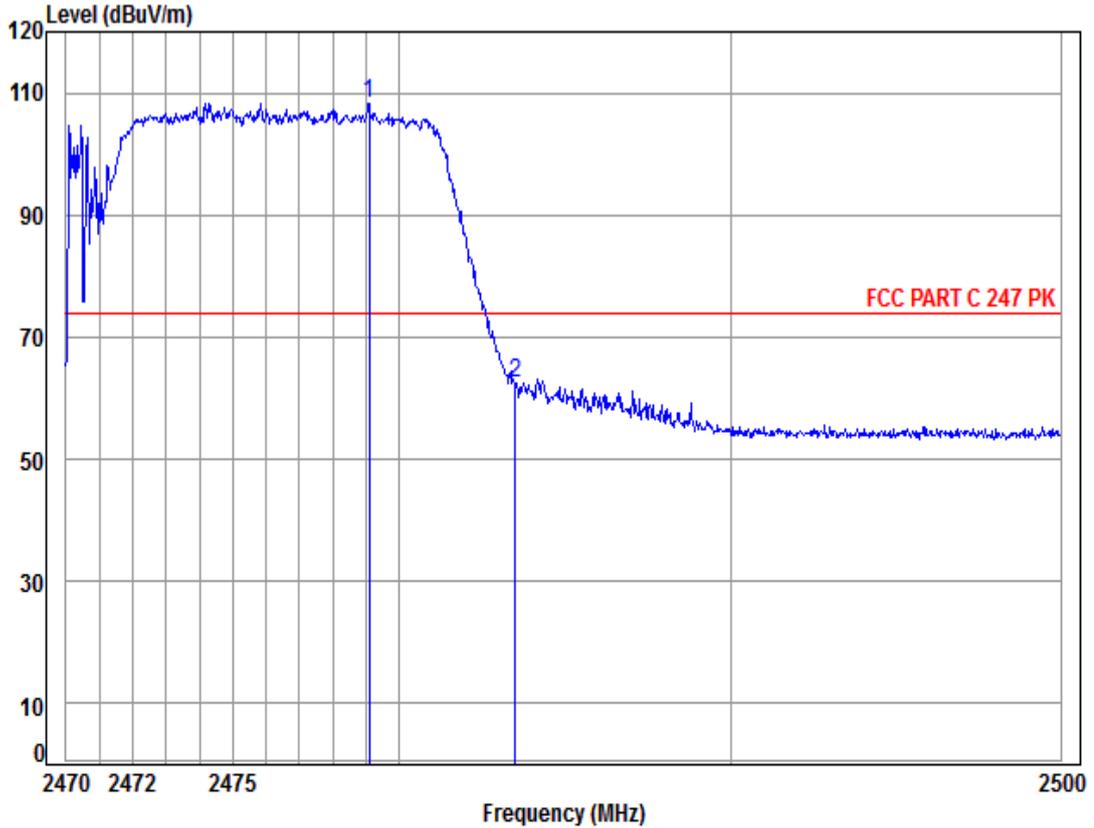
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Worse case mode:	OFDM	Test channel:	Highest	Remark:	Peak	Vertical
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Data: 95



Site : chamber  
 Condition: FCC PART C 247 PK 3m Vertical  
 Job No: : 5107CR  
 Mode: : 2476.5 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1 pp	2479.11	5.02	32.44	38.47	109.35	74.00	34.34
2	2483.50	5.03	32.44	38.47	63.43	74.00	-11.57

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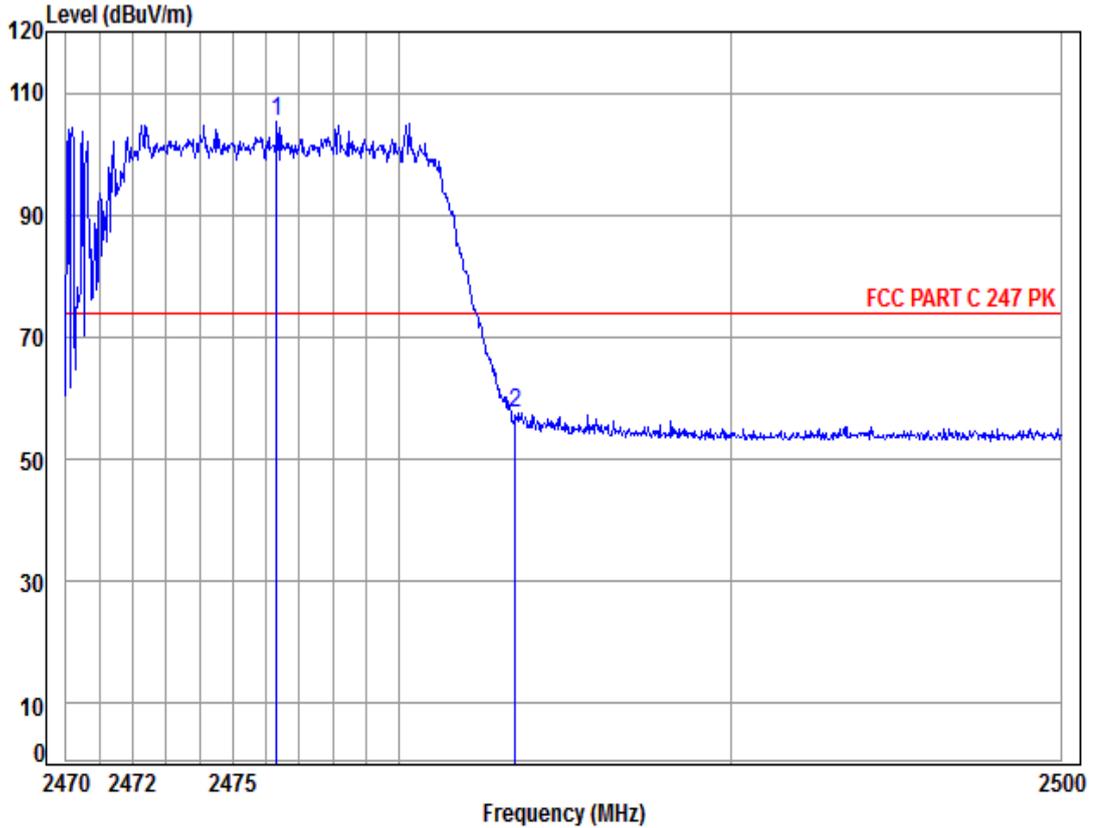
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Worse case mode:	OFDM	Test channel:	Highest	Remark:	Peak	Horizontal
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Data: 94



Site : chamber  
 Condition: FCC PART C 247 PK 3m Horizontal  
 Job No: : 5107CR  
 Mode: : 2476.5 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	2476.33	5.02	32.44	38.47	106.19	105.18	74.00	31.18
2	2483.50	5.03	32.44	38.47	58.44	57.44	74.00	-16.56

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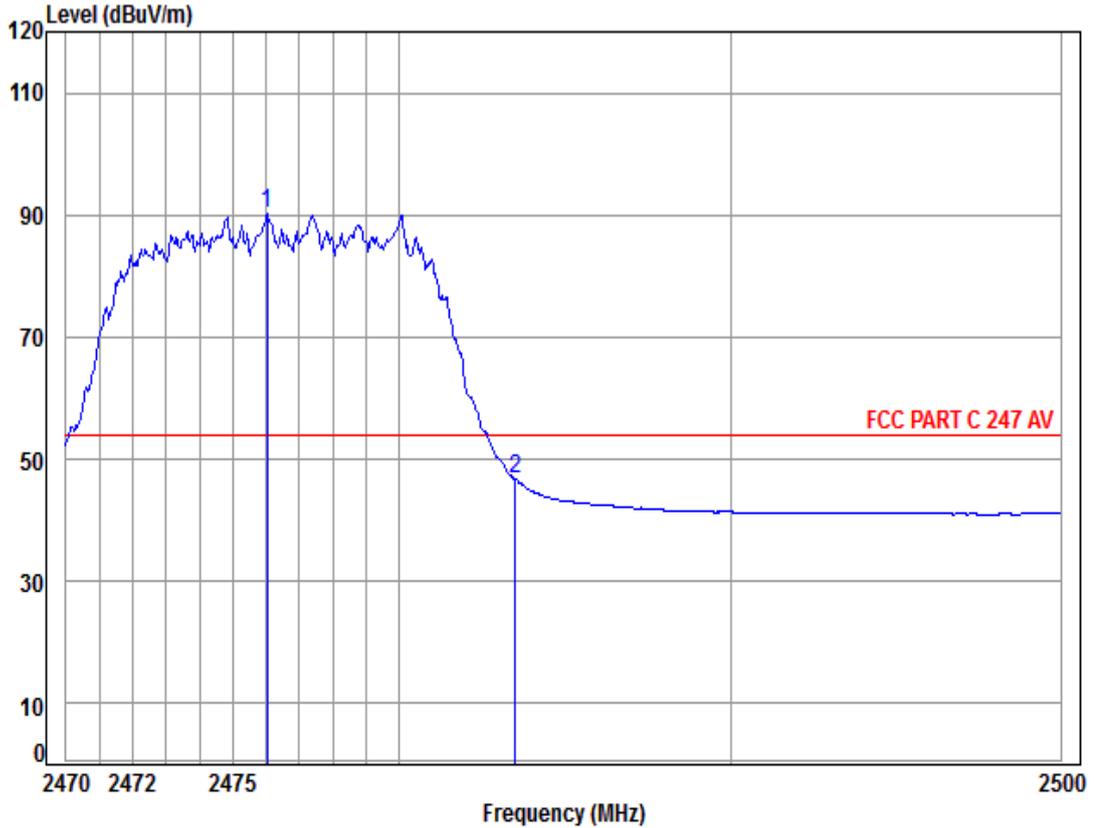


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Worse case mode:	OFDM	Test channel:	Highest	Remark:	Average	Vertical
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Data: 96



Site : chamber  
Condition: FCC PART C 247 AV 3m Vertical  
Job No: : 5107CR  
Mode: : 2476.5 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1 pp	2476.03	5.02	32.44	38.47	91.12	54.00	36.11
2	2483.50	5.03	32.44	38.47	47.70	54.00	-7.30



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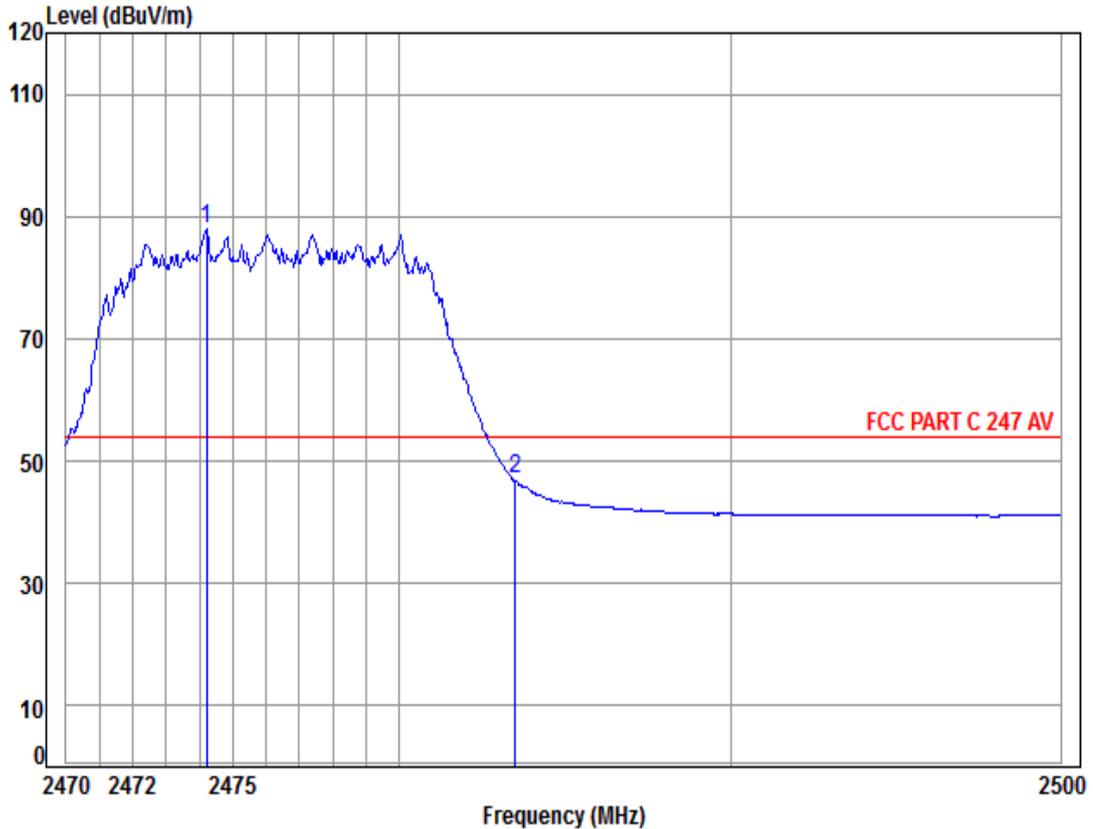
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Worse case mode:	OFDM	Test channel:	Highest	Remark:	Average	Horizontal
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Data: 97



Site : chamber  
 Condition: FCC PART C 247 AV 3m Horizontal  
 Job No: : 5107CR  
 Mode: : 2476.5 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1 pp	2474.21	5.02	32.44	38.46	88.79	87.79	54.00 33.79
2	2483.50	5.03	32.44	38.47	48.00	47.00	54.00 -7.00

**Note:**

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

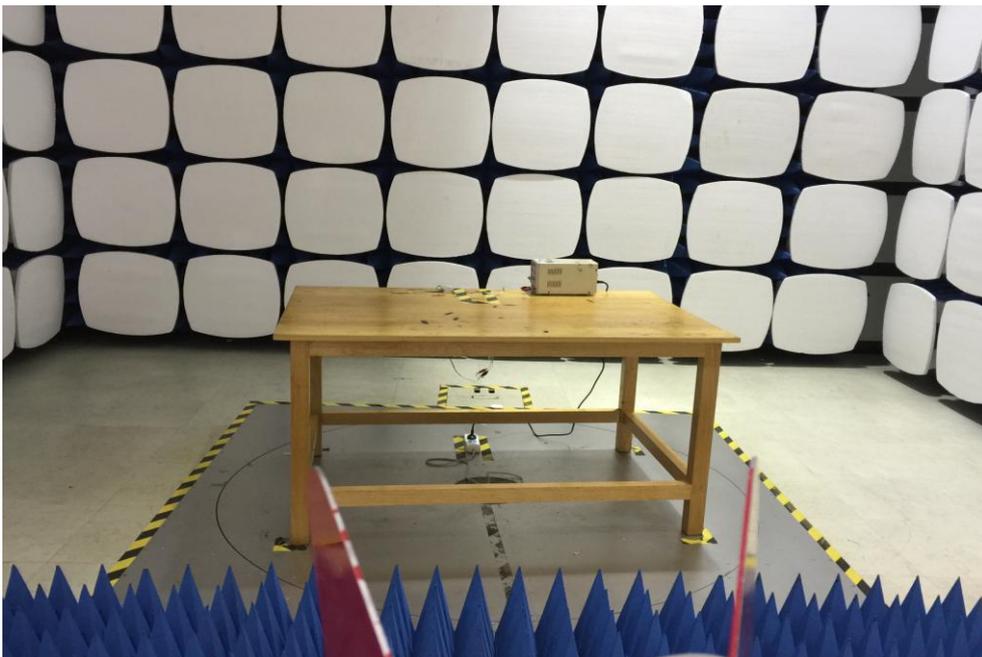
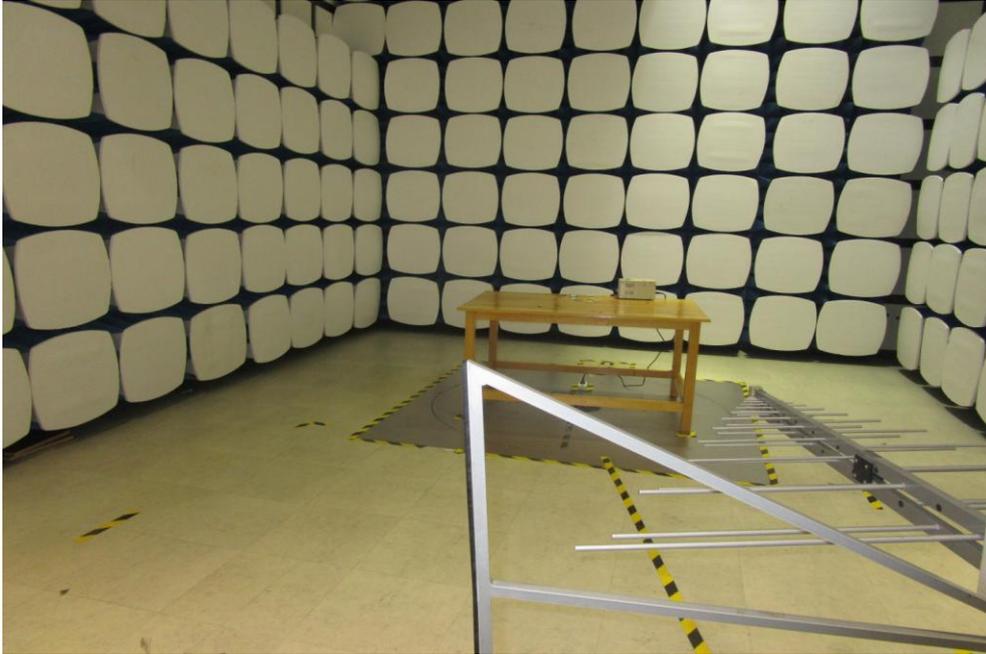
$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

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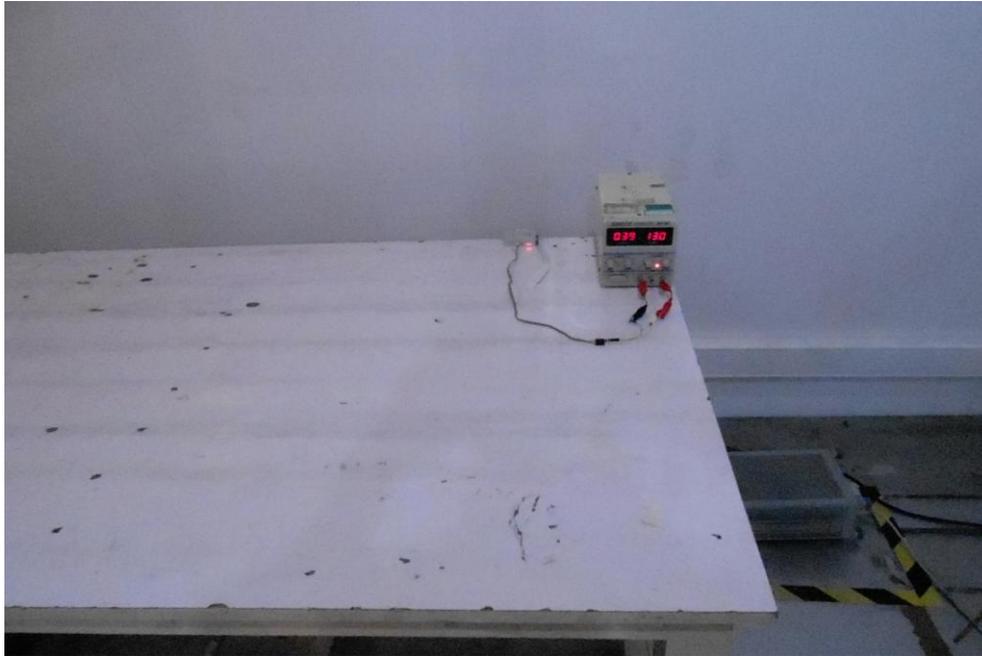
## 7 Photographs - EUT Test Setup

Test model No.: R810A

### 7.1 Radiated Spurious Emission



## 7.2 Conducted Emission



## 8 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1508005107CR.