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Report No.: SZEM180400245802

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FCC REPORT

Application No: SZEM1804002458CR
Applicant: NGSTB Company Limited
Address of Applicant: F11,BLOCK B,ZhiYuan Bldg,No. 89 Industry 8th Road Nanshan District, Shenzhen, 518067, China
Manufacturer: ABOX42 GmbH
Address of Manufacturer: 76227 Karlsruhe Germany
Factory: Aztech Communication Device (DG) Ltd
Address of Factory: Jiu Jiang Shui Village,Chang Ping Town,Dong Guan City,GUangdong Province
Product Name: Set Top Box for Smart TV/OTT/Hybrid
Model No.(EUT): M30WL.11
Trade Mark: ABOX42 GmbH
FCC ID: 2APK9-M30WL11
Standards: 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2016-12-26
Date of Test: 2016-12-26 to 2017-03-03
Date of Issue: 2018-04-08

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

Authorized Signature:



Keny Xu
EMC Laboratory Manager

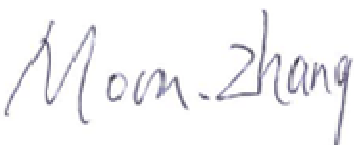
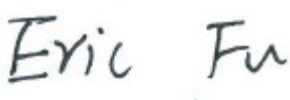
The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant 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.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-04-08		Original

Authorized for issue by:				
				
		(Moon Zhang) /Project Engineer		
				
		(Eric Fu) /Reviewer		



3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	PASS
Conducted Emission	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1.2	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	PASS
Power Spectral Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	PASS
Band-Edge for RF Transmit Conducted Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	PASS
Spurious RF Transmit Conducted Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.11	PASS
Radiated Transmit Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.12	PASS



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5 General Information

5.1 General Description of EUT

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n(HT20 and HT40): OFDM (64QAM, 16QAM, QPSK,BPSK)
Antenna Type:	Embedded Antenna
Antenna Gain:	5dBi (2x2 MIMO)
Power Supply:	AC/DC Adapter: MODEL: F18W6-050250SPAU INPUT:AC100-240V, 50/60Hz, 0.6A OUTPUT:DC 5V, 2.5A
Cable:	HDMI Cable: 150cm unsheilded LAN Cable: 200cm unsheilded



Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		
Operation Frequency each of channel(802.11n HT40)							
Channel	Frequency	Channel	Frequency	Channel		Frequency	
1	2422MHz	4	2437MHz	7		2452MHz	
2	2427MHz	5	2442MHz				
3	2432MHz	6	2447MHz				

For 802.11b/g/n (HT20):

Channel	Frequency
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz

For 802.11n (HT40)

Channel	Frequency
The Lowest channel	2422MHz
The Middle channel	2437MHz
The Highest channel	2452MHz



5.2 Test Environment and Mode

Test Environment:	
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitter mode	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate

5.3 Description of Support Units

The EUT has been tested independently.

5.4 Test Location

All tests were performed at:

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

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.



5.5 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.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 Other Information Requested by the Customer

None.



5.9 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	SEM001-06	2016-05-13	2017-05-13
2	LISN	Rohde & Schwarz	ENV216	SEM007-01	2016-10-09	2017-10-09
3	LISN	ETS-LINDGREN	3816/2	SEM007-02	2016-04-25	2017-04-25
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2016-09-28	2017-09-28
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2016-09-28	2017-09-28
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2016-09-28	2017-09-28
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2016-04-25	2017-04-25
8	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
9	Coaxial Cable	SGS	N/A	SEM024-01	2016-07-13	2017-07-12

RF connected test						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
2	Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
3	Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
4	Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09
5	Coaxial Cable	SGS	N/A	SEM031-02	2016-07-13	2017-07-12



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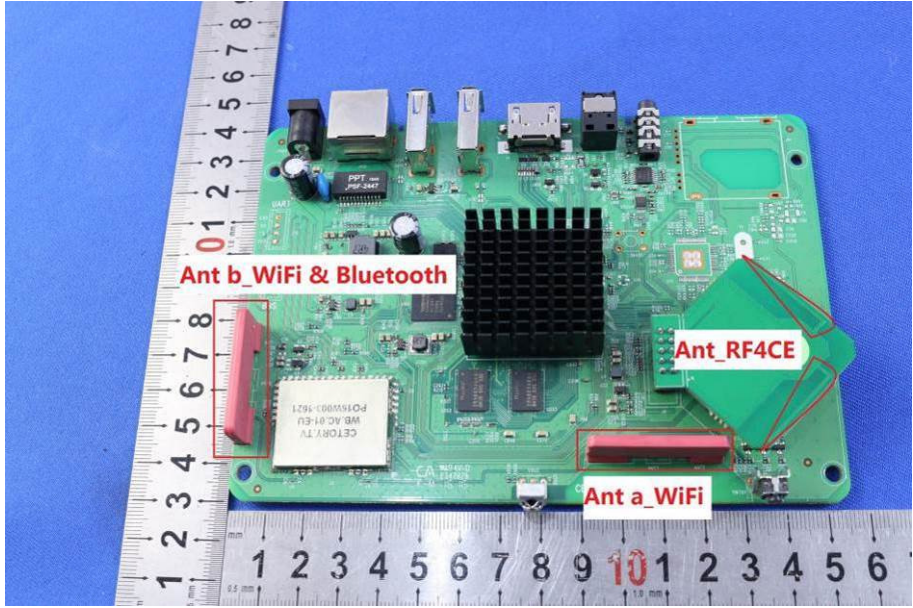
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RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	3m Chamber	AUDIX	N/A	SEM001-02	2016-05-13	2017-05-13
2	EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-09	2016-07-19	2017-07-19
3	BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15
4	Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
5	Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
6	Horn Antenna (18-26GHz)	ETS-Lindgren	3160	SEM003-12	2014-11-24	2017-11-24
7	Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
8	Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
9	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A
10	Coaxial Cable	SGS	N/A	SEM026-01	2016-07-13	2017-07-12

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

6 Test Results and Measurement Data

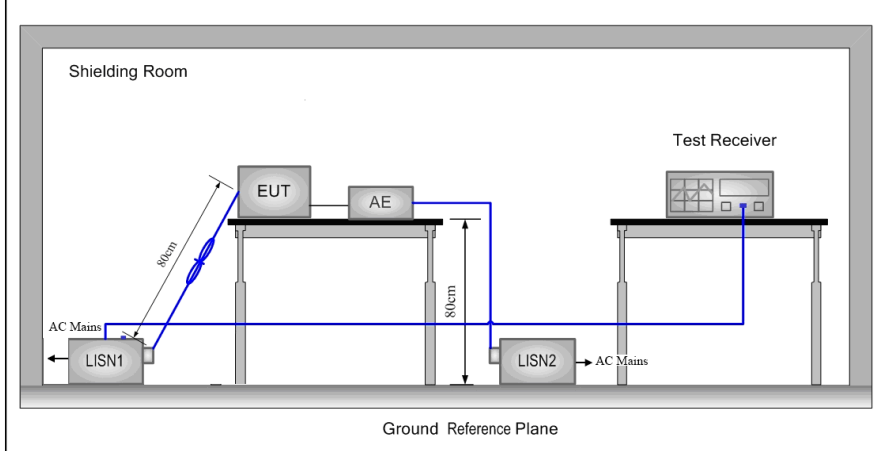
6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15, Subpart C 15.203 & 15.247(c)
EUT Antenna:	
The antenna is integrated on the main PCB and no consideration of replacement. The best-case gain of the antenna is 5dBi. For 802.11n mode, the directional gain = $5 + 10 \cdot \lg(2)$ dBi = 8dBi	



6.2 Conducted Emissions

Test Requirement:	47 CFR Part 15, Subpart C 15.207		
Test Method:	ANSI C63.10 (2013) Section 6.2		
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:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.		

Test Setup:	
Instruments Used:	Refer to section 4.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Transmitting mode.
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate of 802.11b at lowest channel is the worst case Transmitting mode. Only the worst case is recorded in the report.
Test Results:	Pass

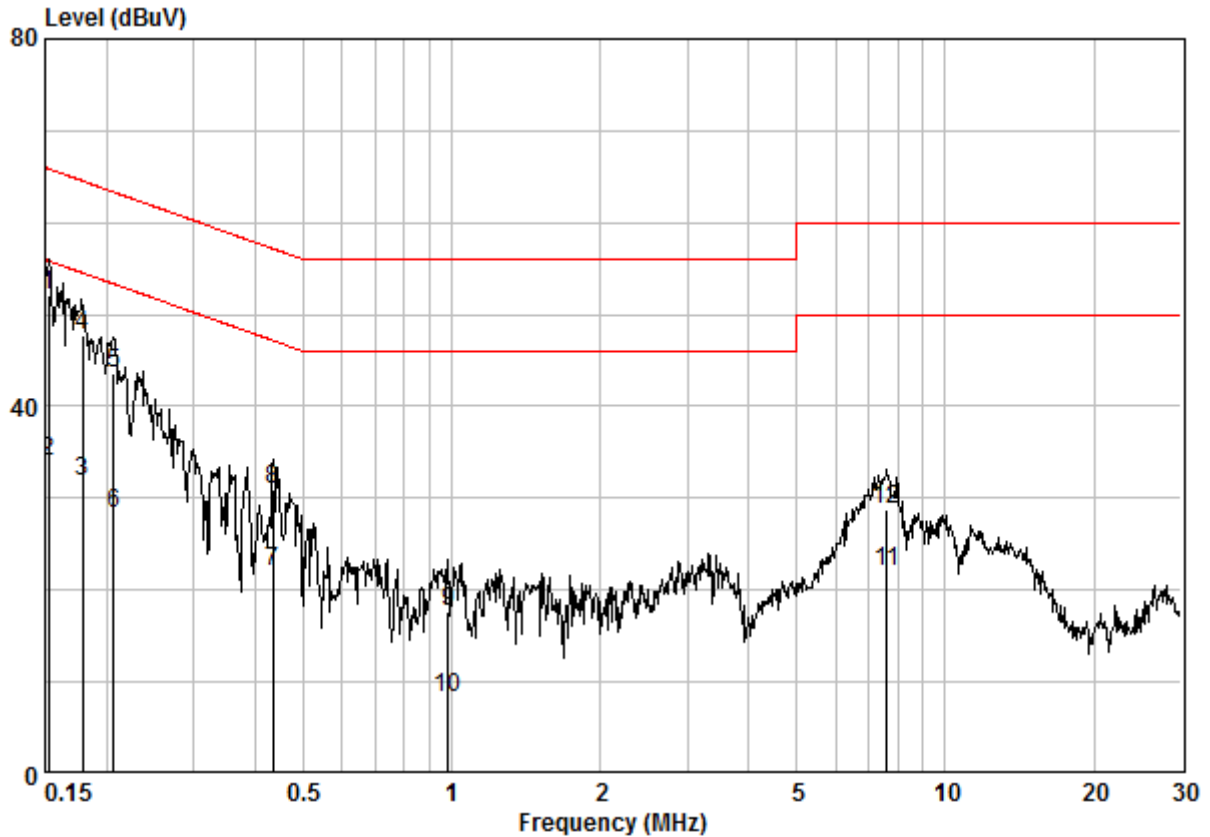
Measurement Data

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:

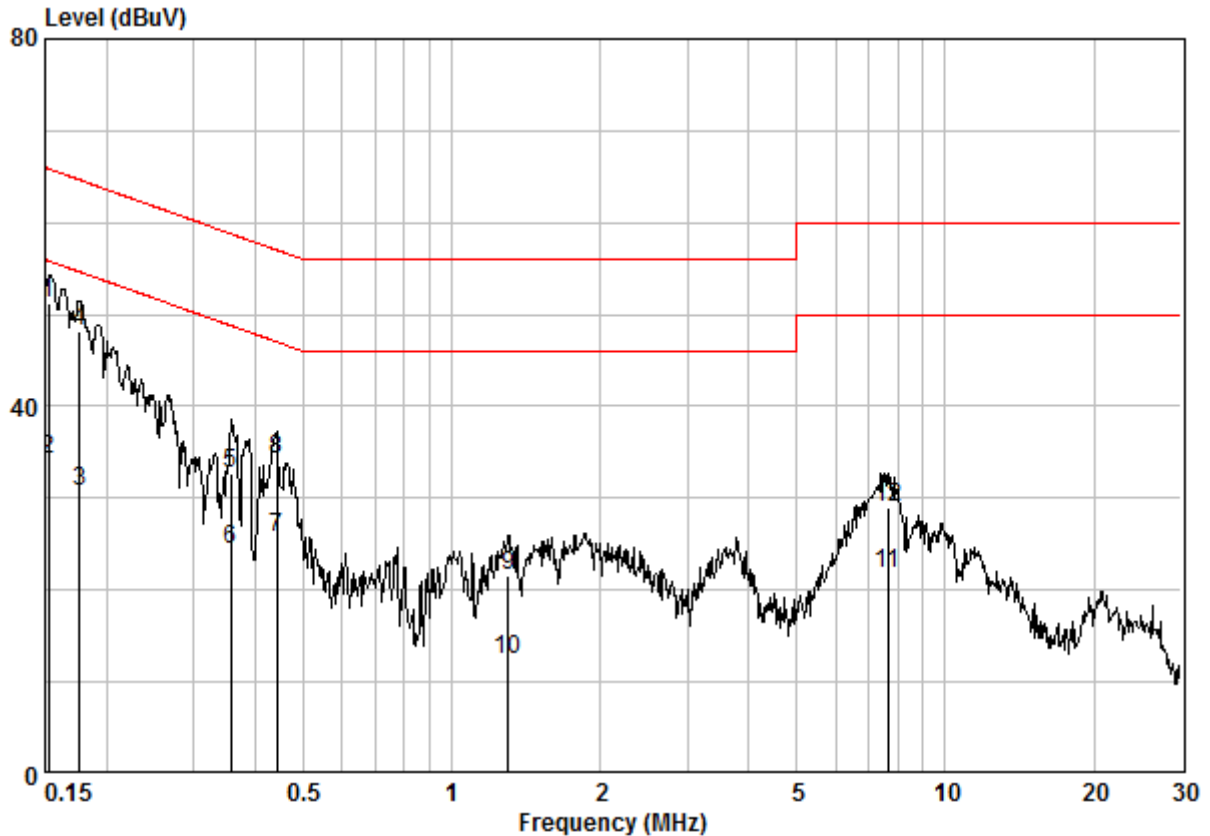


Site : Shielding Room
Condition : CE LINE
Job No. : 11090CR
Test Mode : TX mode

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.15240	0.02	9.64	42.43	52.09	65.87	-13.78	QP
2	0.15240	0.02	9.64	24.27	33.93	55.87	-21.94	AVERAGE
3	0.17866	0.02	9.64	22.17	31.83	54.55	-22.72	AVERAGE
4	0.17866	0.02	9.64	38.16	47.82	64.55	-16.73	QP
5	0.20614	0.02	9.64	33.94	43.60	63.36	-19.76	QP
6	0.20614	0.02	9.64	18.58	28.24	53.36	-25.12	AVERAGE
7	0.43511	0.02	9.64	12.28	21.94	47.15	-25.22	AVERAGE
8	0.43511	0.02	9.64	21.25	30.91	57.15	-26.24	QP
9	0.98391	0.03	9.65	8.05	17.73	56.00	-38.27	QP
10	0.98391	0.03	9.65	-1.33	8.35	46.00	-37.65	AVERAGE
11	7.606	0.09	9.80	12.05	21.94	50.00	-28.06	AVERAGE
12	7.606	0.09	9.80	18.95	28.84	60.00	-31.16	QP



Neutral Line:



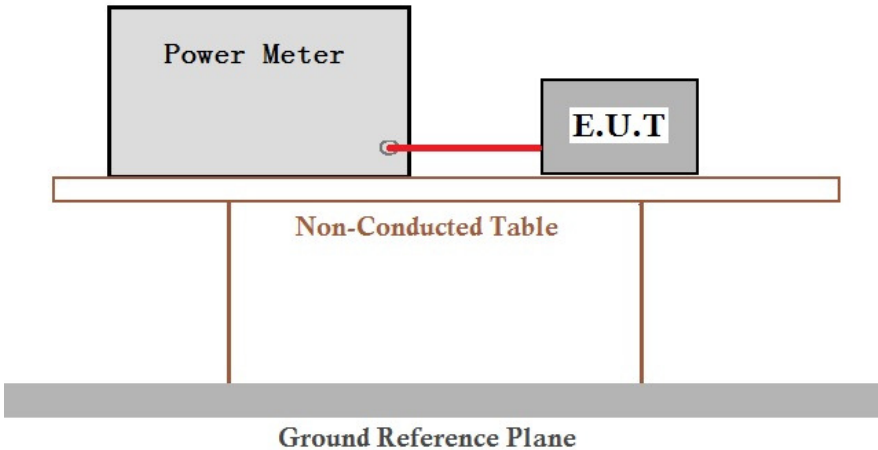
Site : Shielding Room
Condition : CE NEUTRAL
Job No. : 11090CR
Test Mode : TX mode

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.15240	0.02	9.64	41.50	51.16	65.87	-14.70	QP
2	0.15240	0.02	9.64	24.55	34.21	55.87	-21.66	AVERAGE
3	0.17584	0.02	9.63	21.00	30.65	54.68	-24.03	AVERAGE
4	0.17584	0.02	9.63	38.48	48.13	64.68	-16.55	QP
5	0.35765	0.02	9.63	23.12	32.77	58.78	-26.01	QP
6	0.35765	0.02	9.63	14.84	24.49	48.78	-24.30	AVERAGE
7	0.44208	0.02	9.63	16.14	25.79	47.02	-21.23	AVERAGE
8	0.44208	0.02	9.63	24.63	34.28	57.02	-22.74	QP
9	1.303	0.03	9.64	12.01	21.68	56.00	-34.32	QP
10	1.303	0.03	9.64	2.78	12.45	46.00	-33.55	AVERAGE
11	7.646	0.09	9.79	12.01	21.88	50.00	-28.12	AVERAGE
12	7.646	0.09	9.79	19.15	29.03	60.00	-30.97	QP

Notes:

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

6.3 Conducted Peak Output Power

Test Requirement:	47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method:	ANSI C63.10 (2013) Section 11.9.1.2
Test Setup:	
Instruments Used:	Refer to section 4.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40)
Limit:	802.11b & 802.11g: 30dBm 802.11n: 30dBm
Test Results:	Pass



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Pre-scan under all rate at lowest channel 1								
Pre-scan under all rate at lowest channel 1								
Mode	802.11b							
Data Rate (Mbps)	1.00	2.00	5.50	11.00				
Power (dBm)	17.55	17.43	17.35	17.28				
Mode	802.11g							
Data Rate (Mbps)	6	9	12	18	24	36	48	54
Power (dBm)	17.36	17.26	17.13	17.00	16.86	16.81	16.72	16.63
Mode	802.11n(HT20)							
Data Rate (Mbps)	6.5	13	19.5	26	39	52	58.5	65
Power (dBm)	18.11	17.97	17.85	17.76	17.65	17.55	17.41	17.34
Mode	802.11n(HT40)							
Data Rate (Mbps)	13.5	27	40.5	54	81	108	121.5	135
Power (dBm)	17.61	17.55	17.42	17.34	17.28	17.18	17.05	16.90
Through Pre-scan, 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40).								



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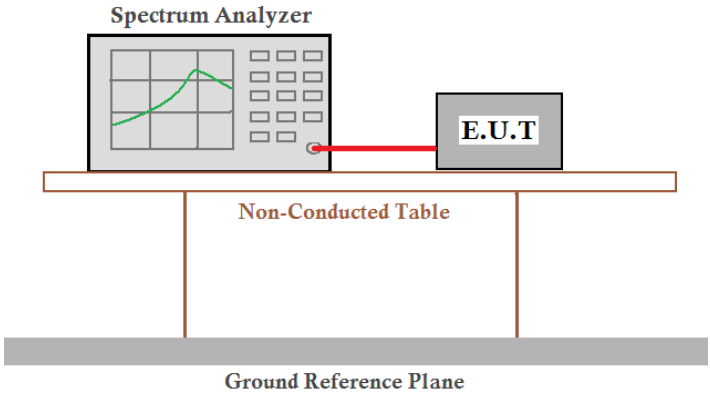
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Measurement Data

802.11b mode					
Test channel	Peak Output Power (dBm)		Limit (dBm)		Result
	Antenna a	Antenna b			
Lowest	17.55	16.20	30.00		Pass
Middle	17.23	16.07	30.00		Pass
Highest	17.55	15.86	30.00		Pass
802.11g mode					
Test channel	Peak Output Power (dBm)		Limit (dBm)		Result
	Antenna a	Antenna b			
Lowest	17.36	15.55	30.00		Pass
Middle	17.28	15.86	30.00		Pass
Highest	17.05	15.52	30.00		Pass
802.11n(HT20)mode					
Test channel	Peak Output Power (dBm)			Limit (dBm)	Result
	Antenna a	Antenna b	Total		
Lowest	18.11	15.97	20.18	30.00	Pass
Middle	17.61	16.77	20.22	30.00	Pass
Highest	17.49	16.12	19.87	30.00	Pass
802.11n(HT40)mode					
Test channel	Peak Output Power (dBm)			Limit (dBm)	Result
	Antenna a	Antenna b	Total		
Lowest	17.61	15.88	19.84	30.00	Pass
Middle	17.07	15.40	19.33	30.00	Pass
Highest	16.96	14.87	19.05	30.00	Pass

6.4 6dB Occupy Bandwidth

Test Requirement:	47 CFR Part 15, Subpart C 15.247a(2)
Test Method:	ANSI C63.10 (2013) Section 11.8.1
Test Setup:	 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. The table is supported by a Ground Reference Plane.
Instruments Used:	Refer to section 4.10 for details
Limit:	≥ 500 kHz
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40)
Remark:	Only the data of antenna b is recorded in the report.
Test Results:	Pass

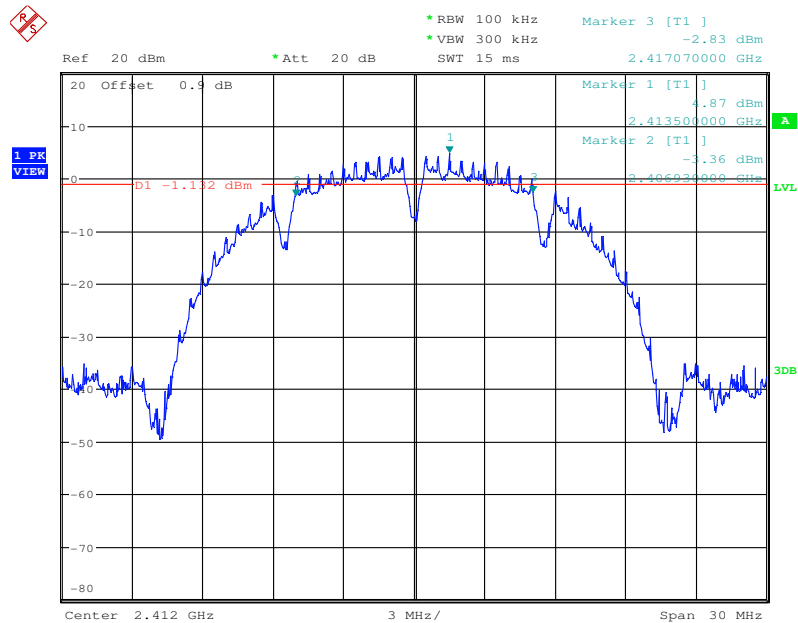


Measurement Data

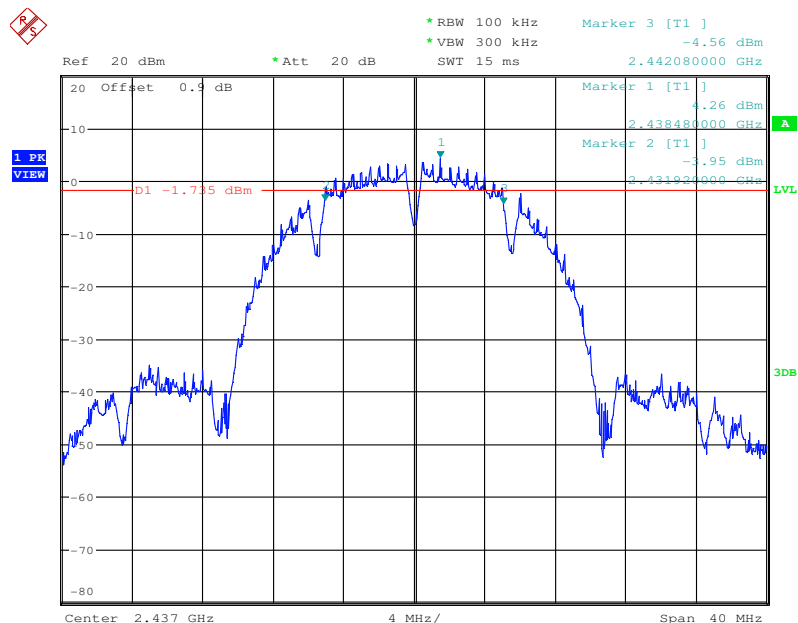
802.11b mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	10.140	≥500	Pass
Middle	10.160	≥500	Pass
Highest	10.160	≥500	Pass
802.11g mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	16.400	≥500	Pass
Middle	16.400	≥500	Pass
Highest	16.040	≥500	Pass
802.11n(HT20) mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	17.600	≥500	Pass
Middle	17.640	≥500	Pass
Highest	17.360	≥500	Pass
802.11n(HT40) mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	36.240	≥500	Pass
Middle	35.640	≥500	Pass
Highest	35.880	≥500	Pass

Test plot as follows:

Test mode:	802.11b	Test channel:	Lowest
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Test mode:	802.11b	Test channel:	Middle
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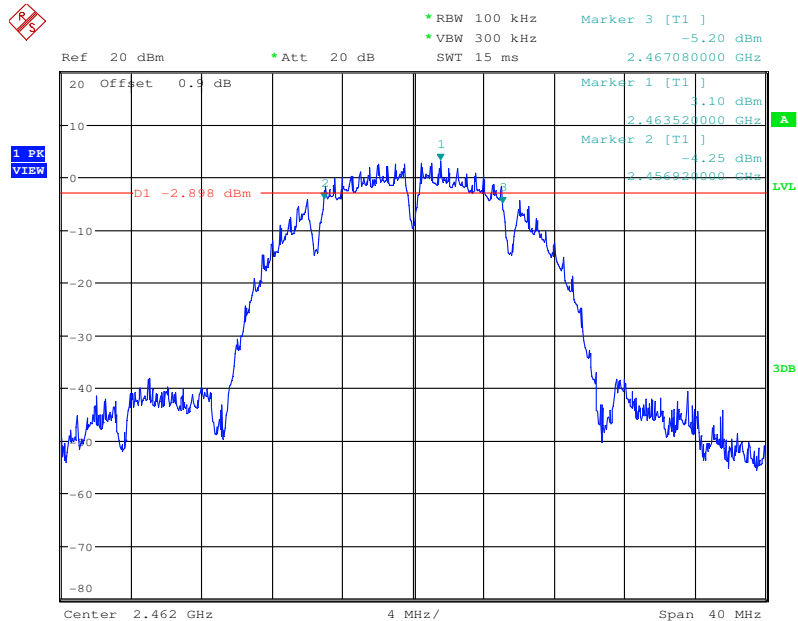


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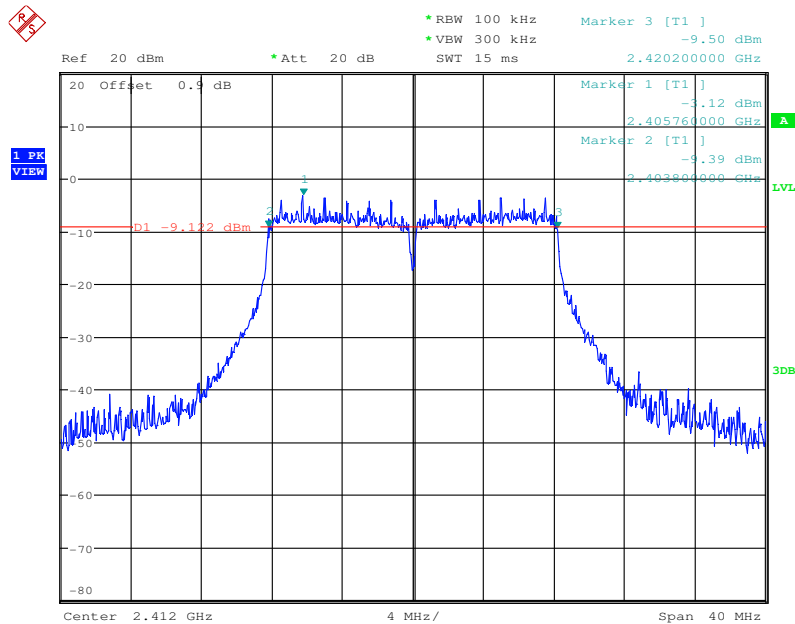
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Test mode:	802.11b	Test channel:	Highest
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Test mode:	802.11g	Test channel:	Lowest
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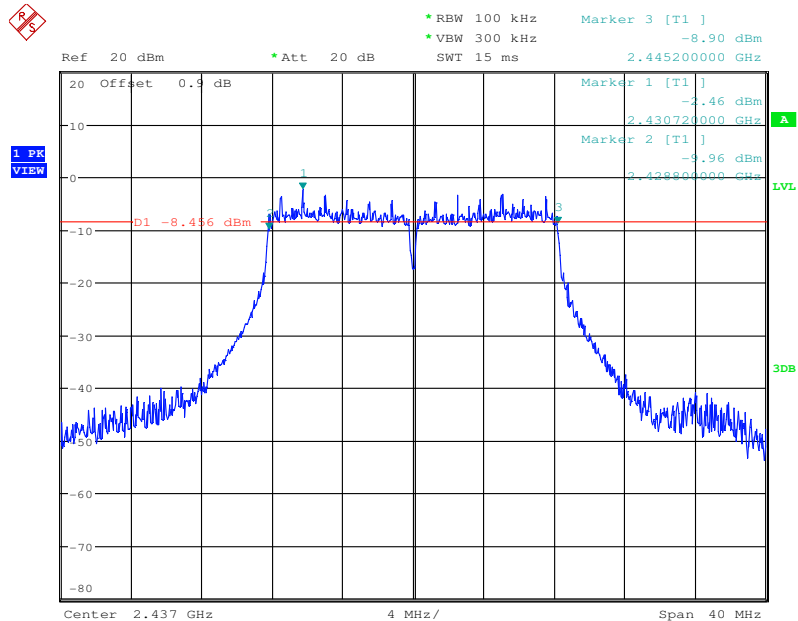


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

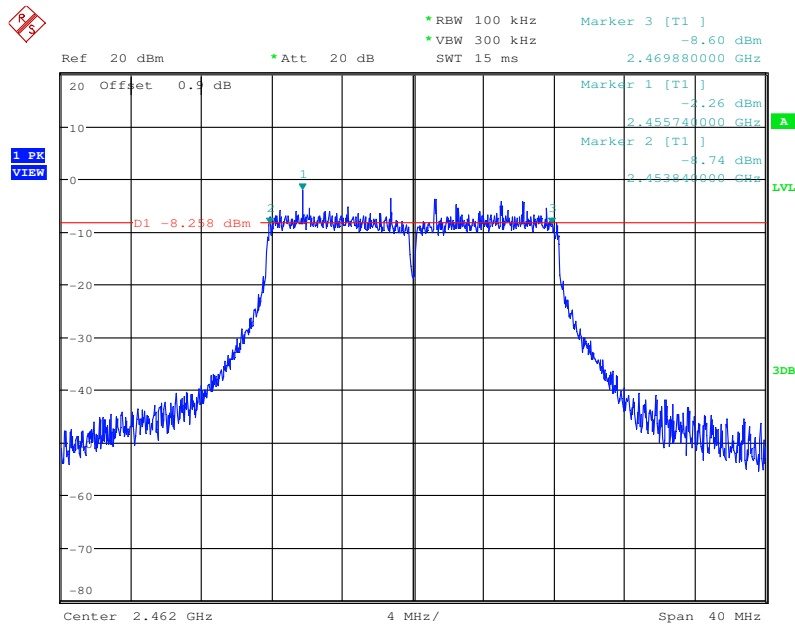
Report No.: SZEM180400245802

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Test mode:	802.11g	Test channel:	Middle
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Test mode:	802.11g	Test channel:	Highest
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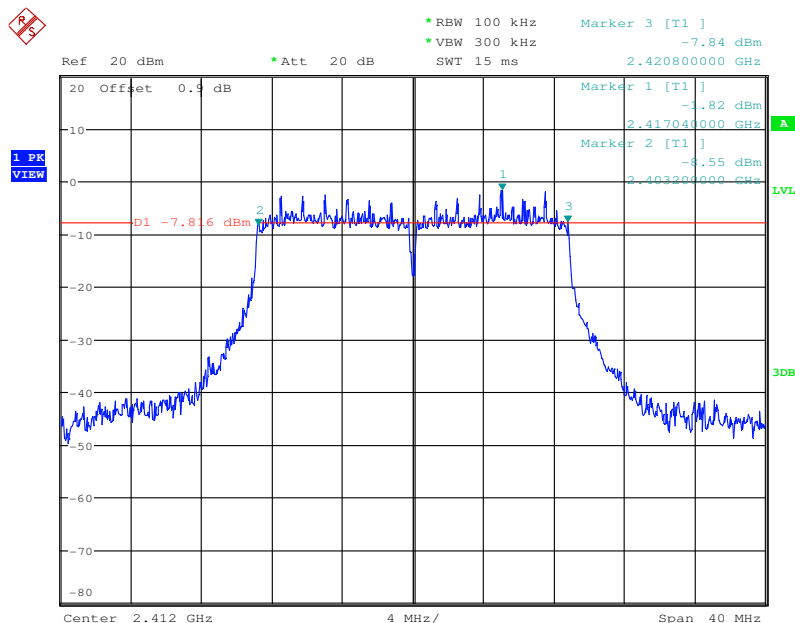


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

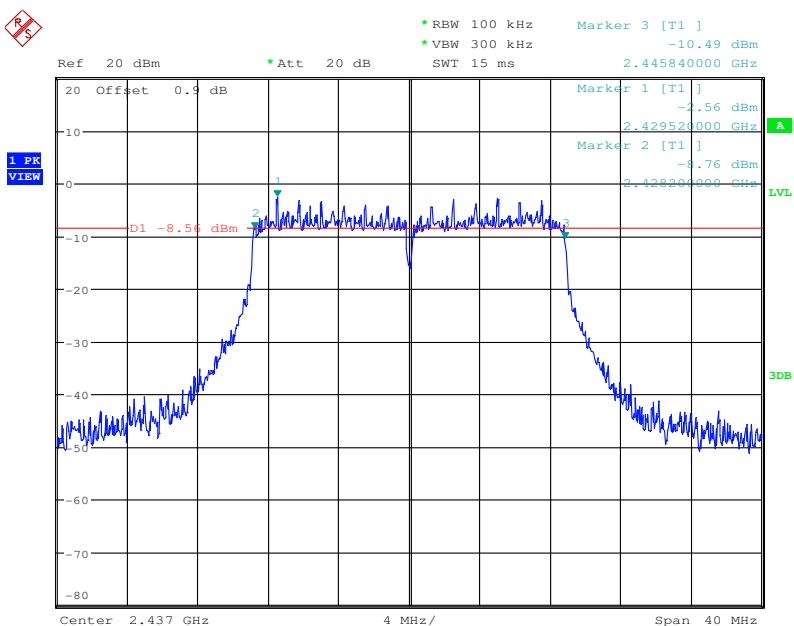
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Test mode:	802.11n(HT20)	Test channel:	Lowest
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Test mode:	802.11n(HT20)	Test channel:	Middle
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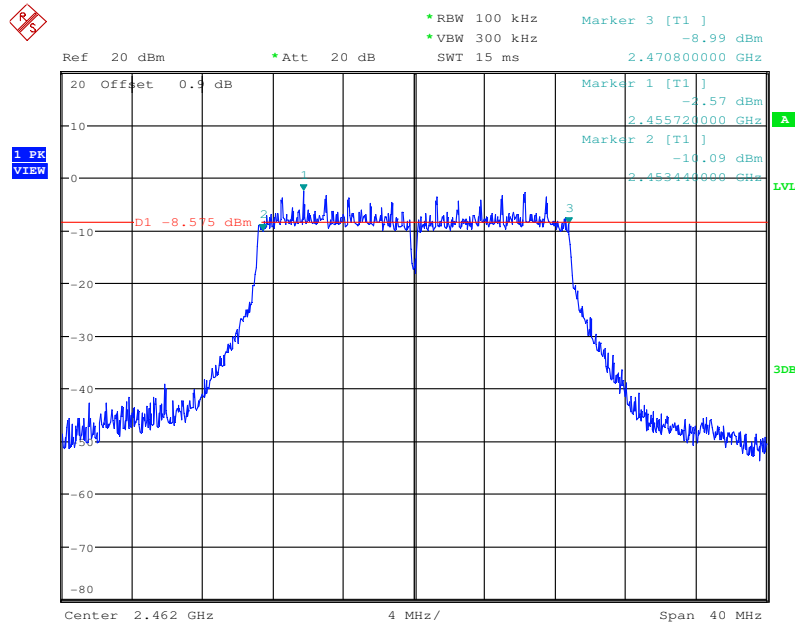


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

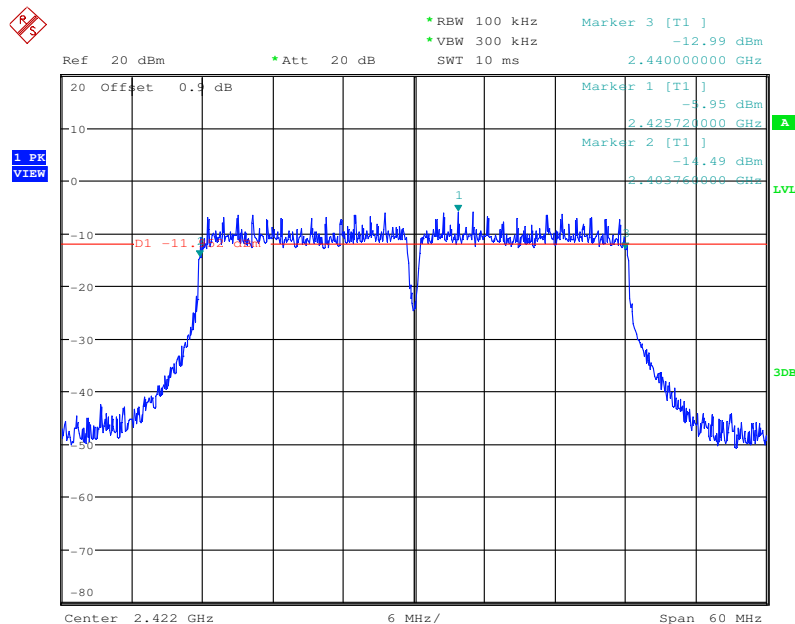
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Test mode:	802.11n(HT20)	Test channel:	Highest
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Test mode:	802.11n(HT40)	Test channel:	Lowest
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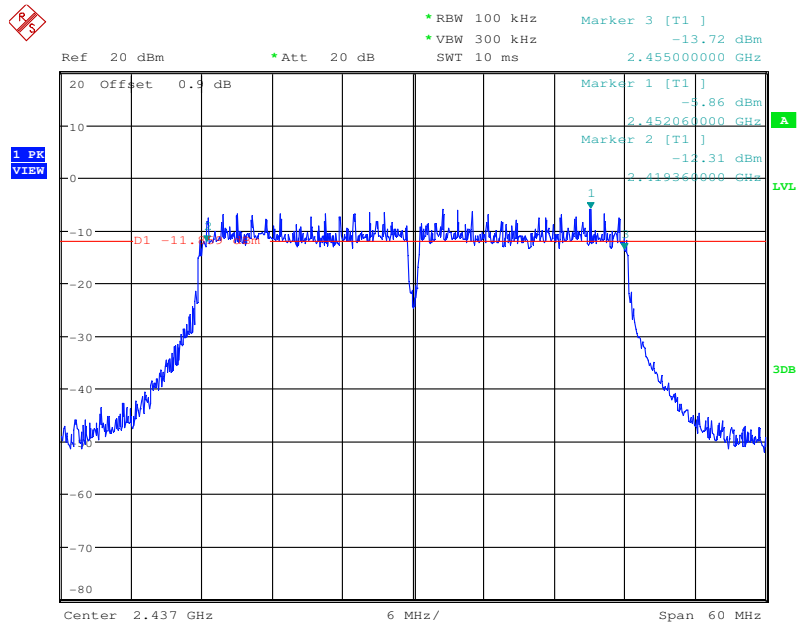


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

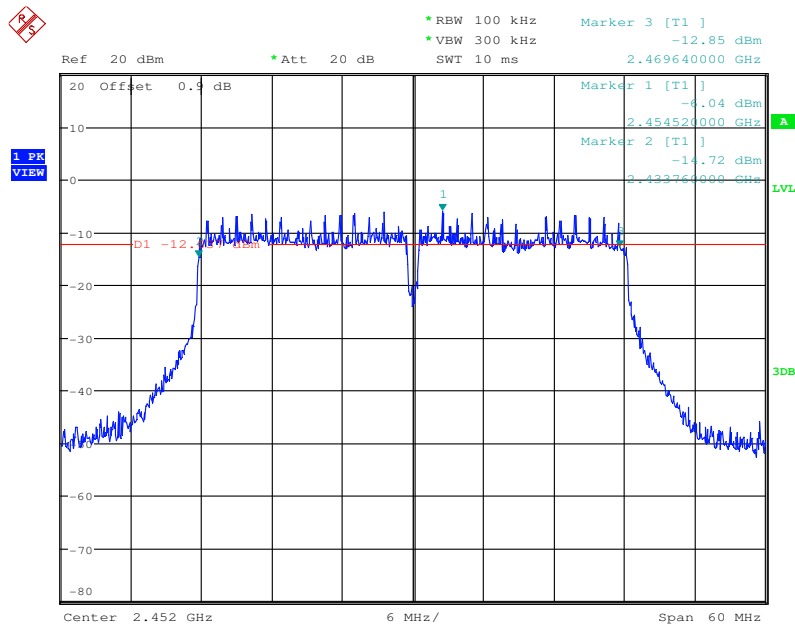
Report No.: SZEM180400245802

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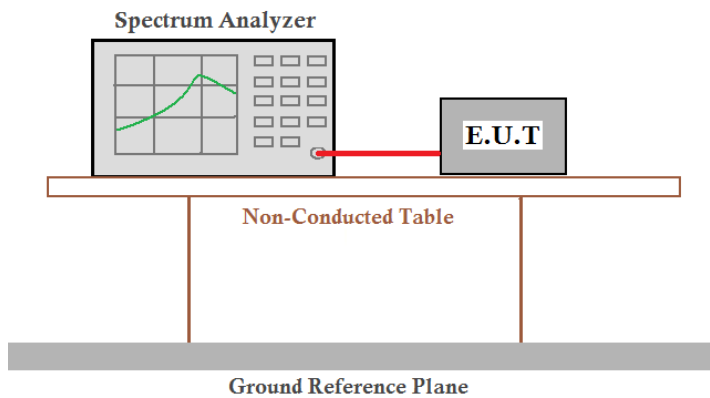
Test mode:	802.11n(HT40)	Test channel:	Middle
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Test mode:	802.11n(HT40)	Test channel:	Highest
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6.5 Power Spectral Density

Test Requirement:	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2
Test Setup:	
Instruments Used:	Refer to section 4.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40)
Limit:	802.11b & 802.11g: 8dBm/3KHz 802.11n: 8dBm/3KHz
Test Results:	Pass



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Measurement Data

802.11b mode					
Test channel	Power Spectral Density (dBm/3KHz)		Limit (8dBm/3KHz)	Result	
	Antenna a	Antenna b			
Lowest	-10.01	-11.96	≤8.00	Pass	
Middle	-10.77	-11.84	≤8.00	Pass	
Highest	-10.6	-11.09	≤8.00	Pass	
802.11g mode					
Test channel	Power Spectral Density (dBm)		Limit (dBm)	Result	
	Antenna a	Antenna b			
Lowest	-17.36	-19.11	≤8.00	Pass	
Middle	-17.19	-18.80	≤8.00	Pass	
Highest	-17.97	-19.21	≤8.00	Pass	
802.11n(HT20) mode					
Test channel	Power Spectral Density (dBm)			Limit (dBm)	Result
	Antenna a	Antenna b	Total		
Lowest	-17.03	-19.04	-14.91	≤8.00	Pass
Middle	-16.34	-18.21	-14.16	≤8.00	Pass
Highest	-17.06	-18.38	-14.66	≤8.00	Pass
802.11n(HT40) mode					
Test channel	Power Spectral Density (dBm)			Limit (dBm)	Result
	Antenna a	Antenna b	Total		
Lowest	-20.61	-21.73	-18.12	≤8.00	Pass
Middle	-21.04	-22.77	-18.81	≤8.00	Pass
Highest	-21.44	-22.33	-18.85	≤8.00	Pass



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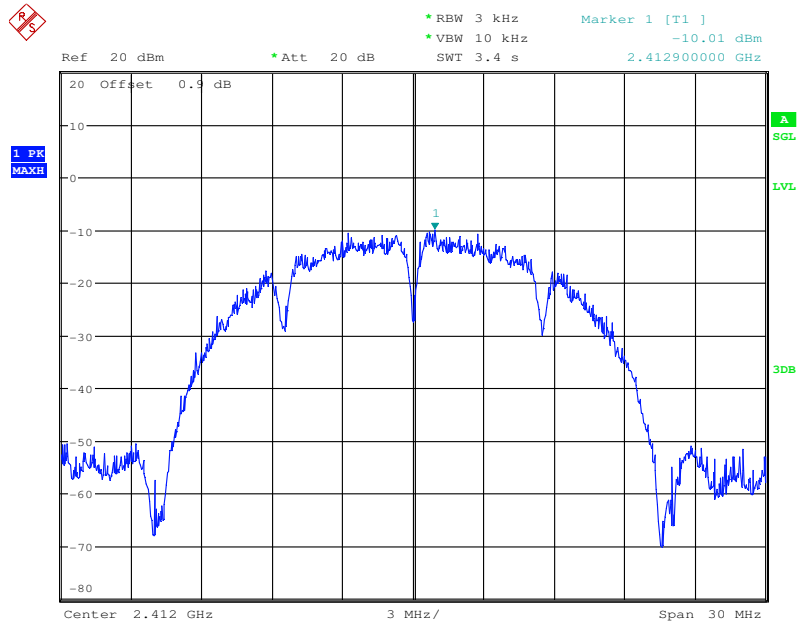
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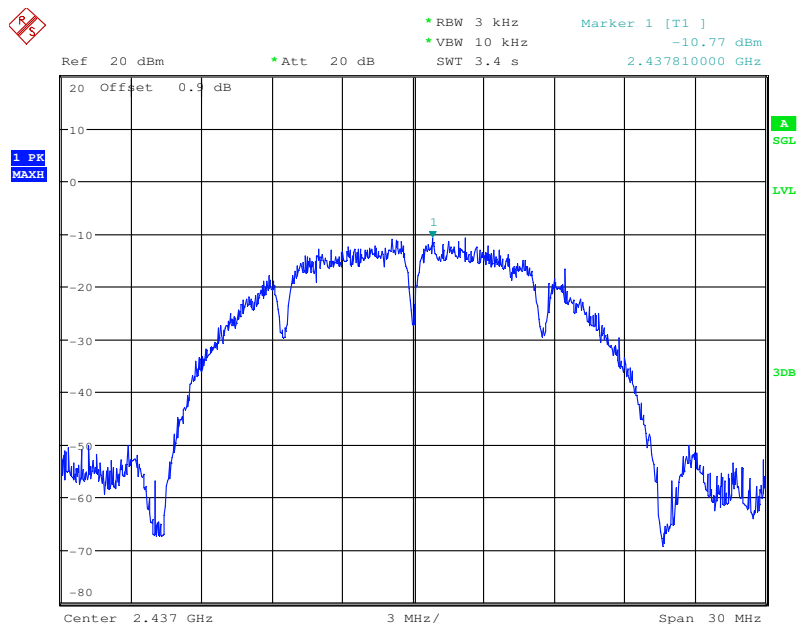
Test plot as follows:

Antenna a:

Test mode:	802.11b	Test channel:	Lowest
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Test mode:	802.11b	Test channel:	Middle
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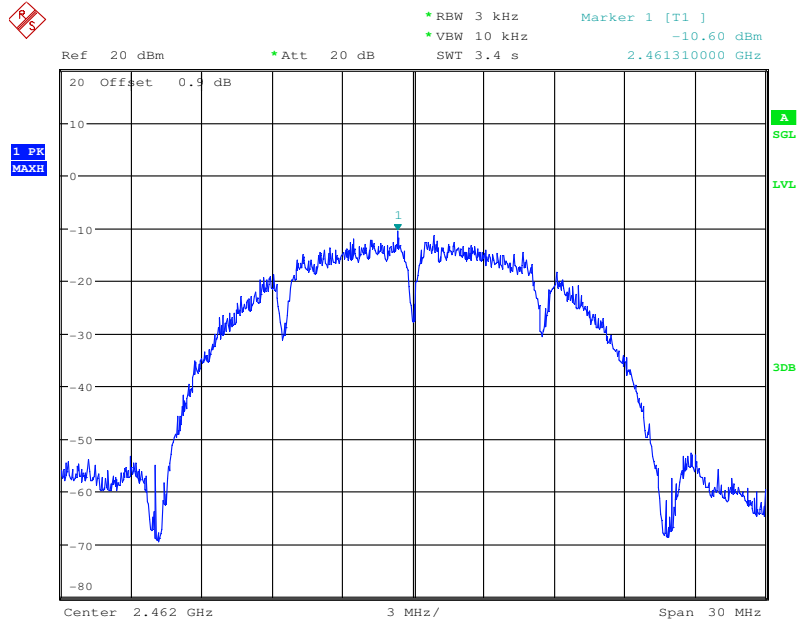


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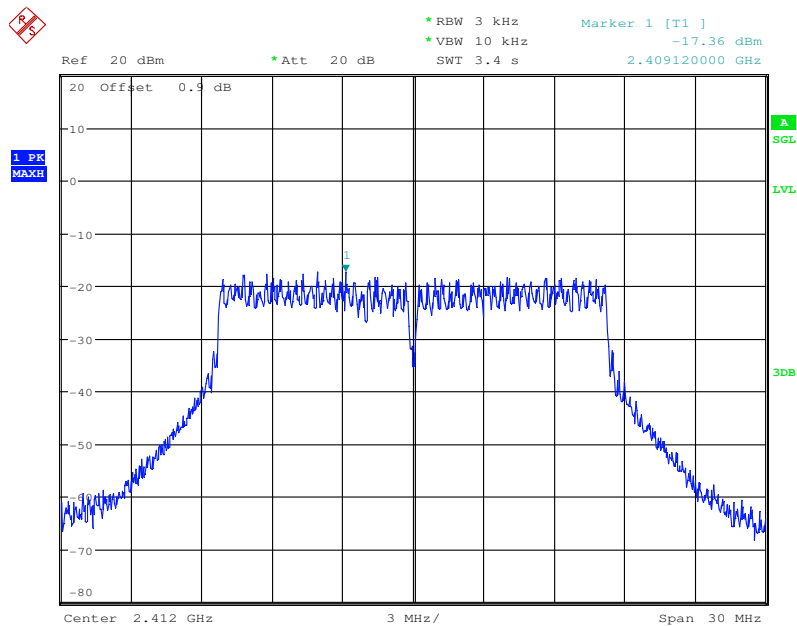
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Test mode:	802.11b	Test channel:	Highest
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Test mode:	802.11g	Test channel:	Lowest
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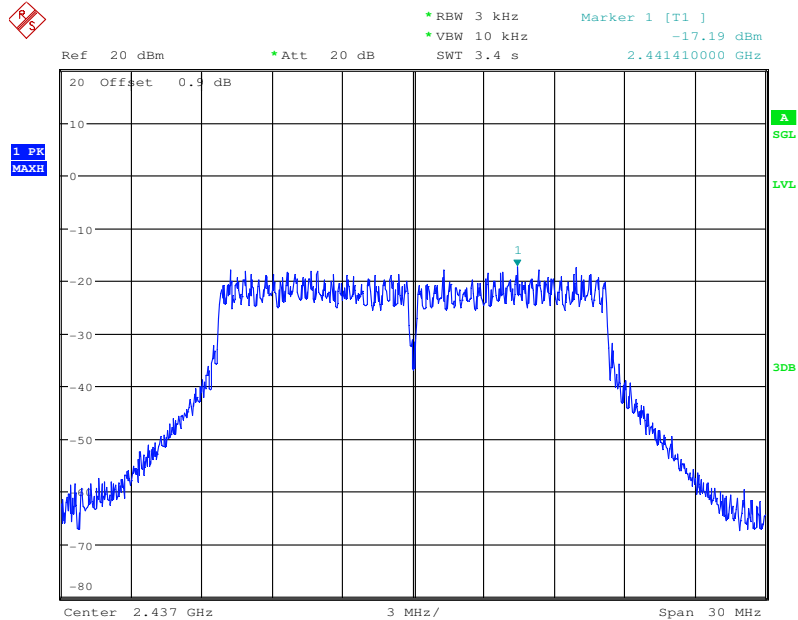


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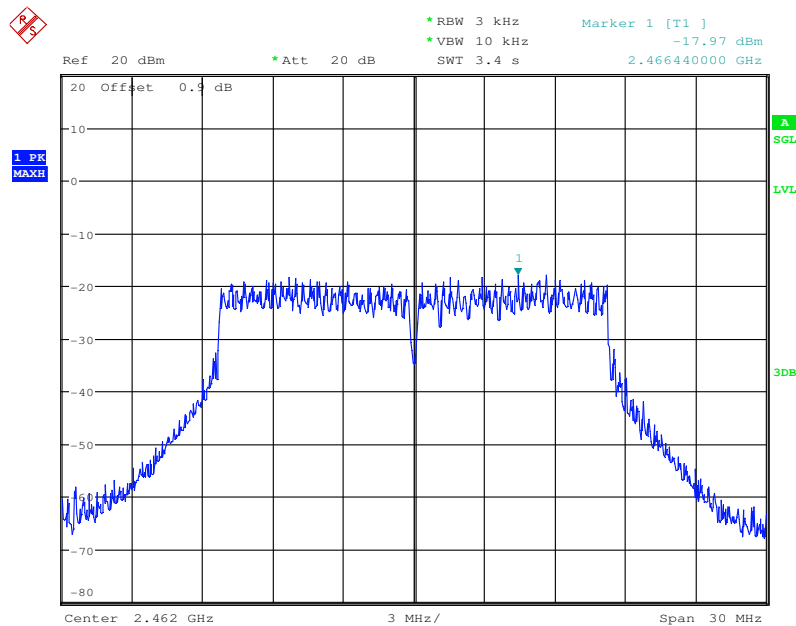
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Test mode:	802.11g	Test channel:	Middle
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Test mode:	802.11g	Test channel:	Highest
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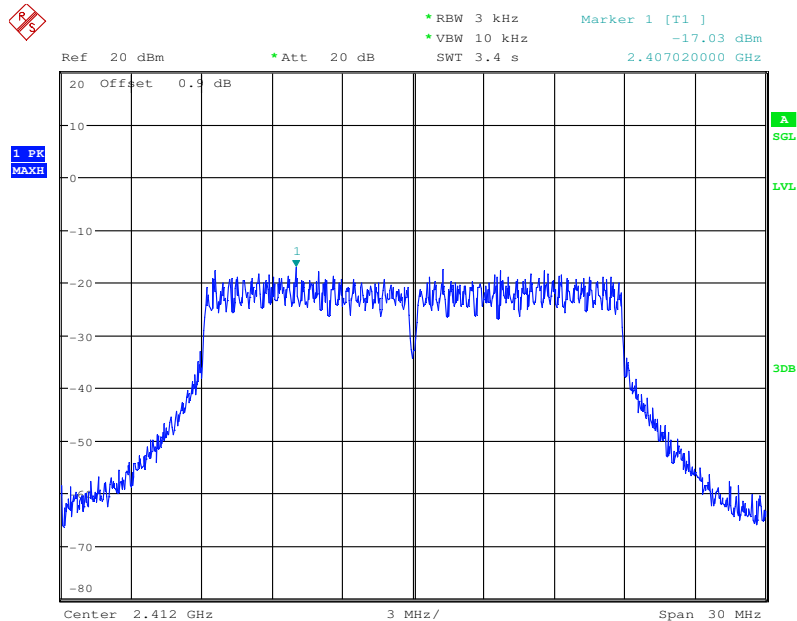


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

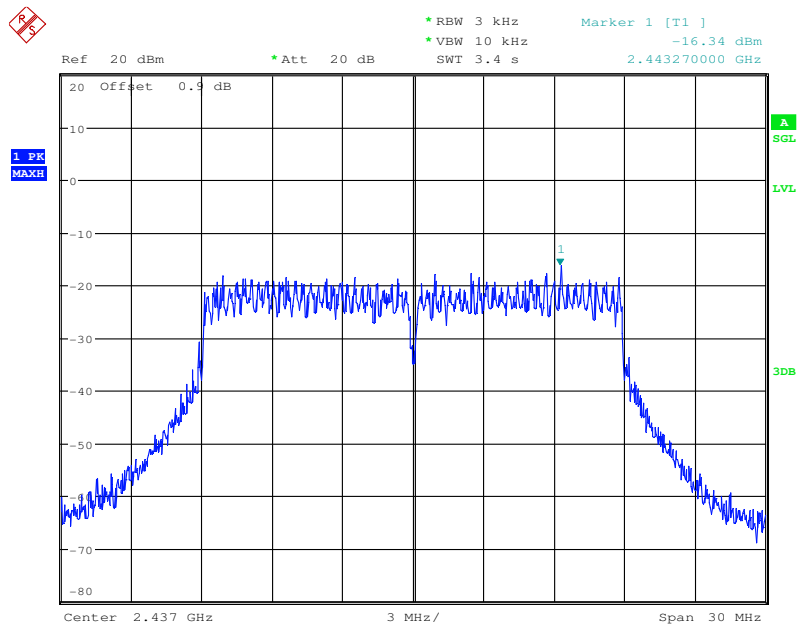
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Test mode:	802.11n (HT20)	Test channel:	Lowest
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Test mode:	802.11n (HT20)	Test channel:	Middle
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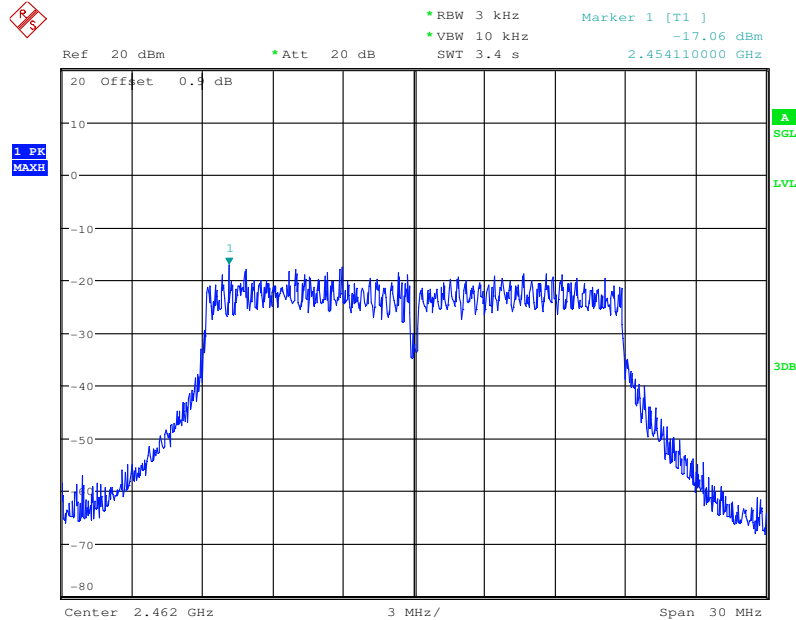


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

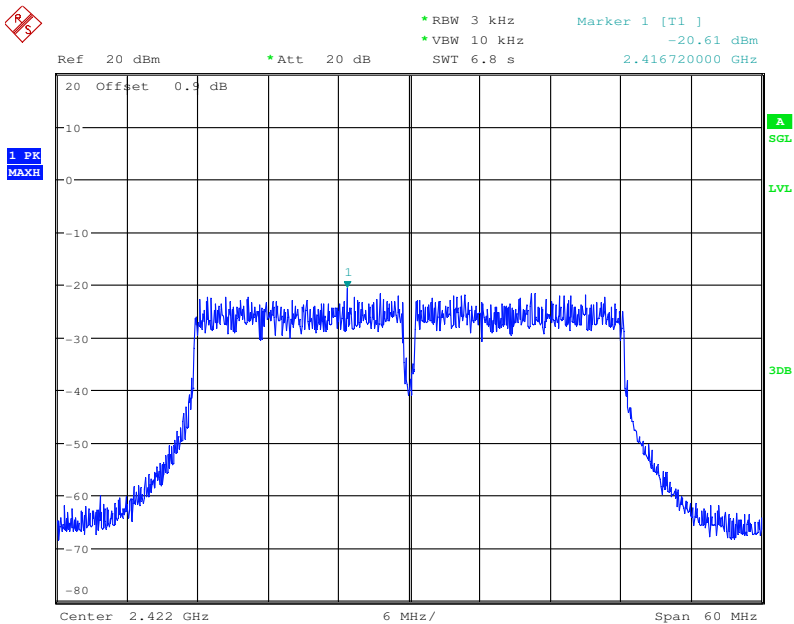
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Test mode:	802.11n (HT20)	Test channel:	Highest
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Test mode:	802.11n (HT40)	Test channel:	Lowest
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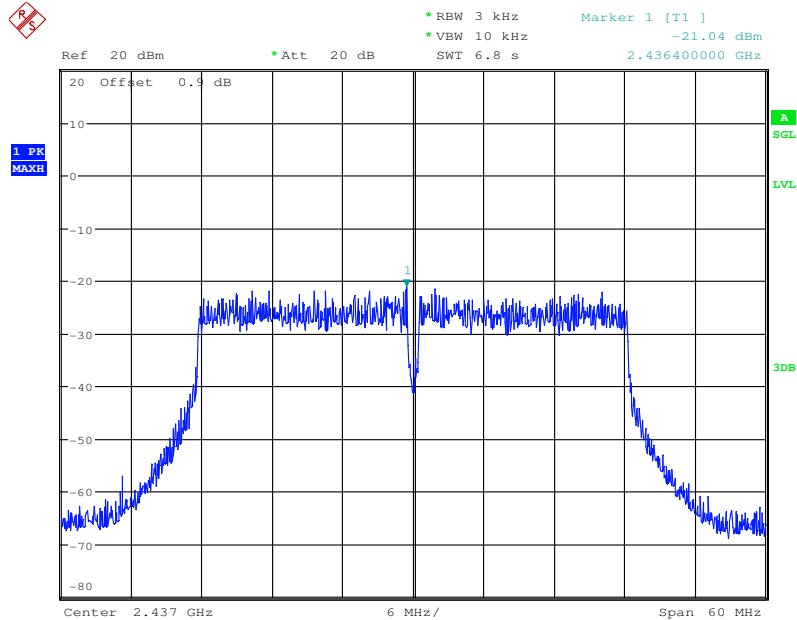


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

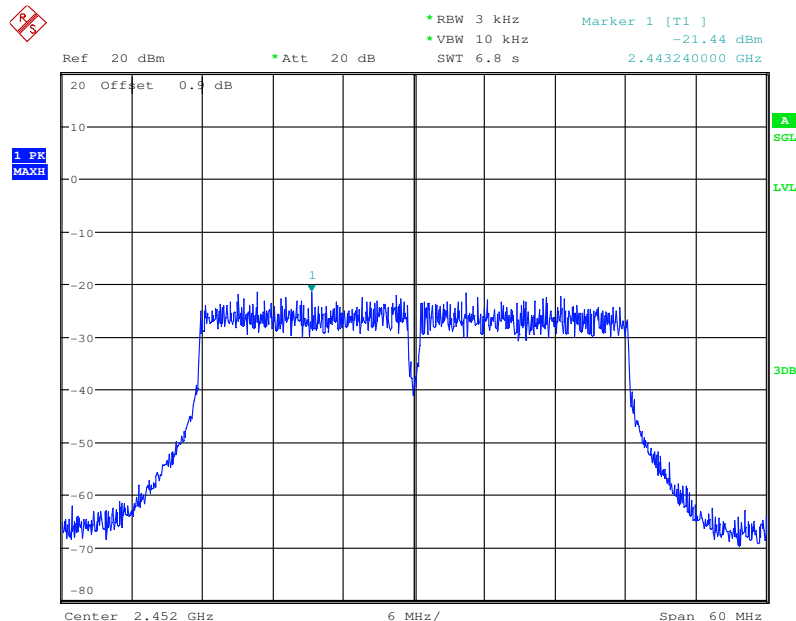
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Test mode:	802.11n (HT40)	Test channel:	Middle
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Test mode:	802.11n (HT40)	Test channel:	Highest
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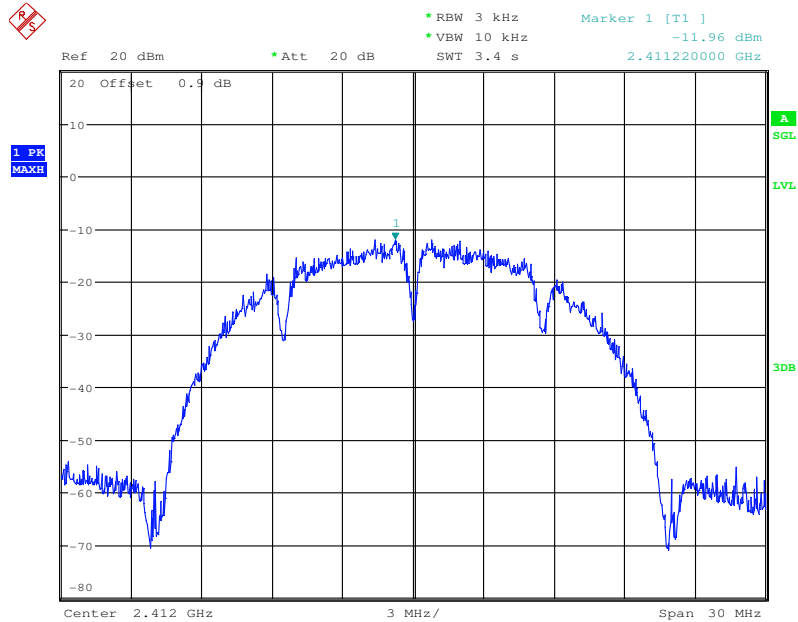
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Report No.: SZEM180400245802

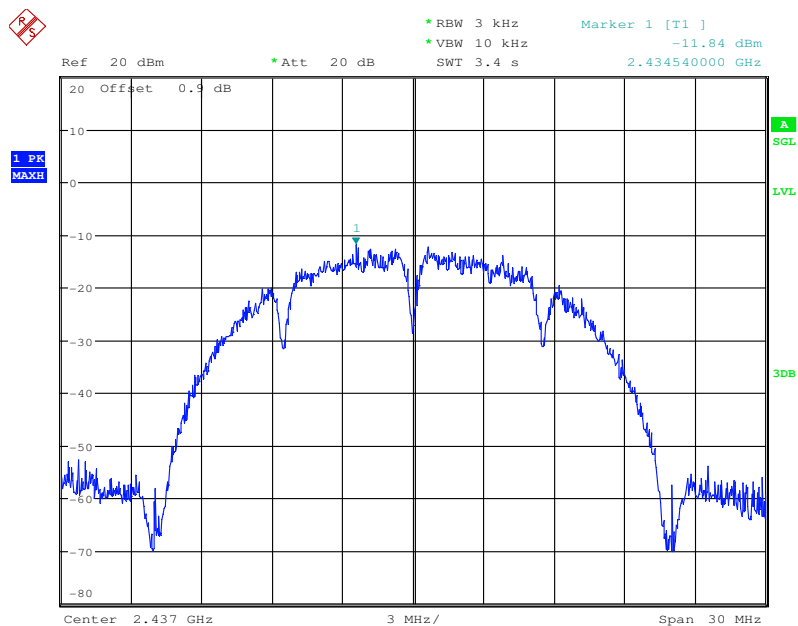
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Antenna b:

Test mode:	802.11b	Test channel:	Lowest
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Test mode:	802.11b	Test channel:	Middle
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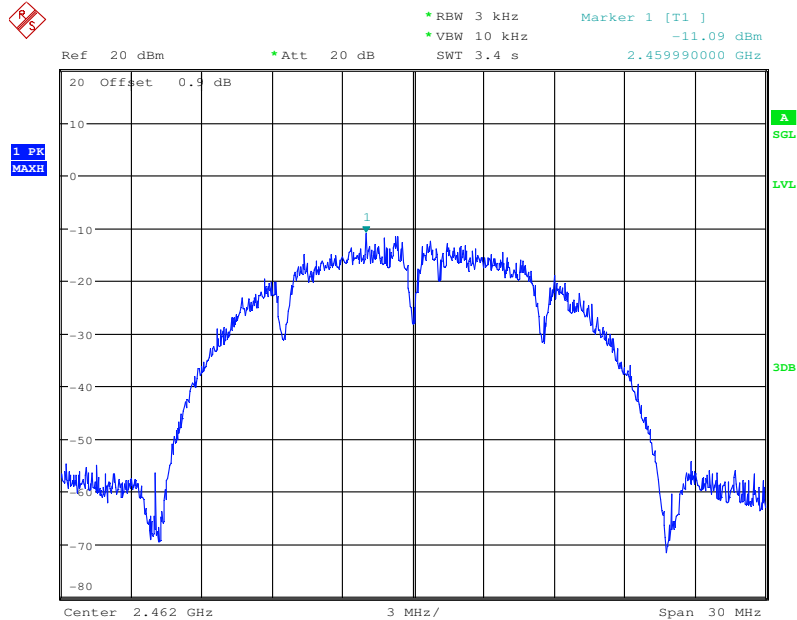


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

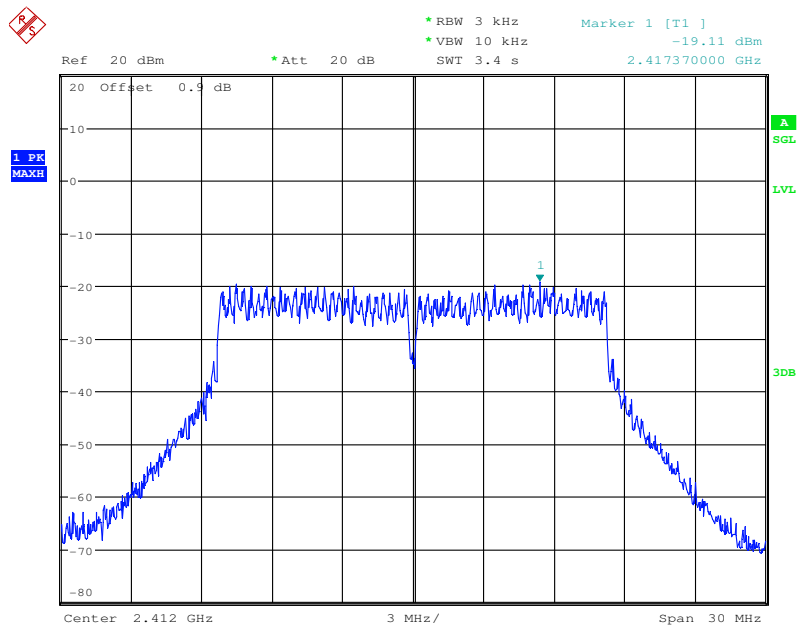
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Test mode:	802.11b	Test channel:	Highest
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Test mode:	802.11g	Test channel:	Lowest
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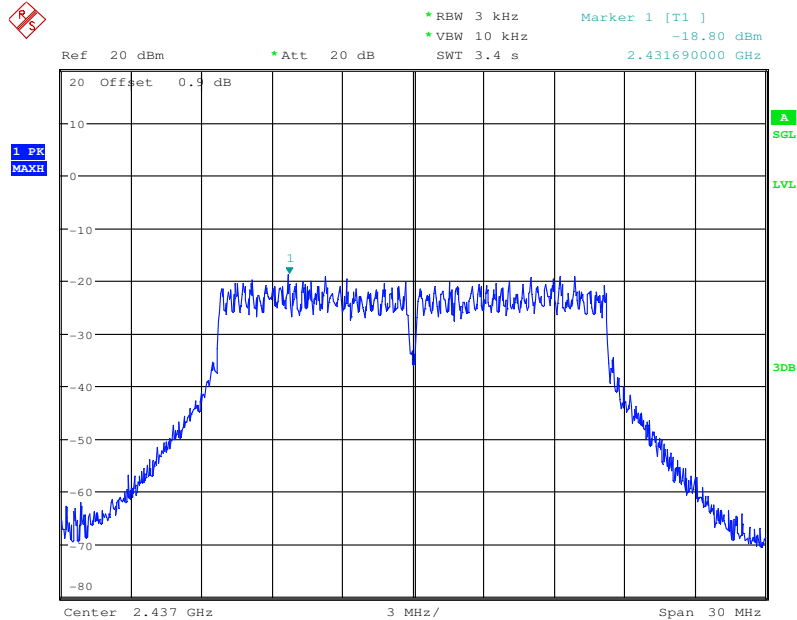


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

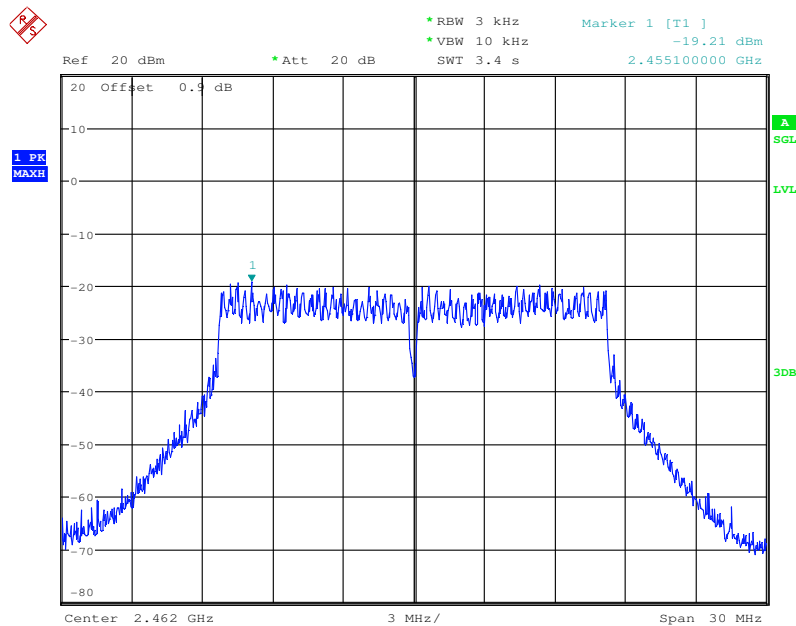
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Test mode:	802.11g	Test channel:	Middle
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Test mode:	802.11g	Test channel:	Highest
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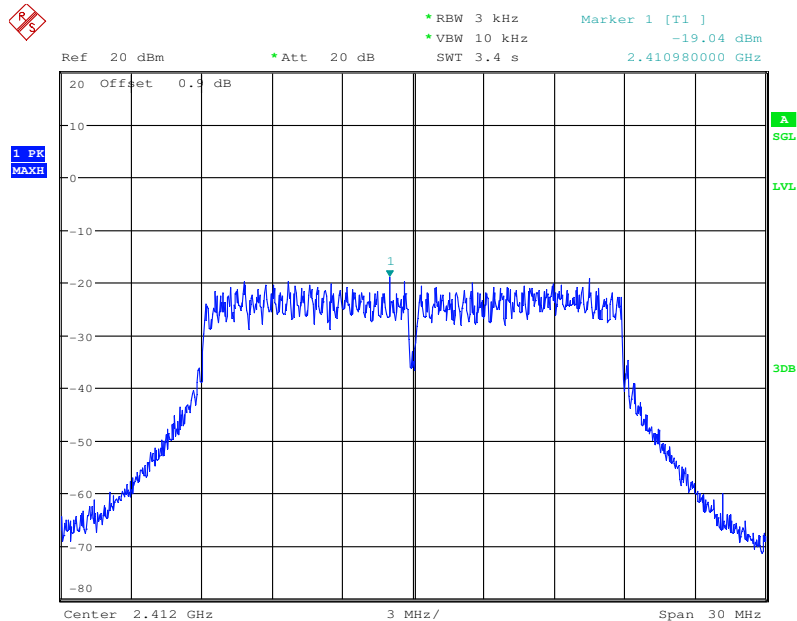


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

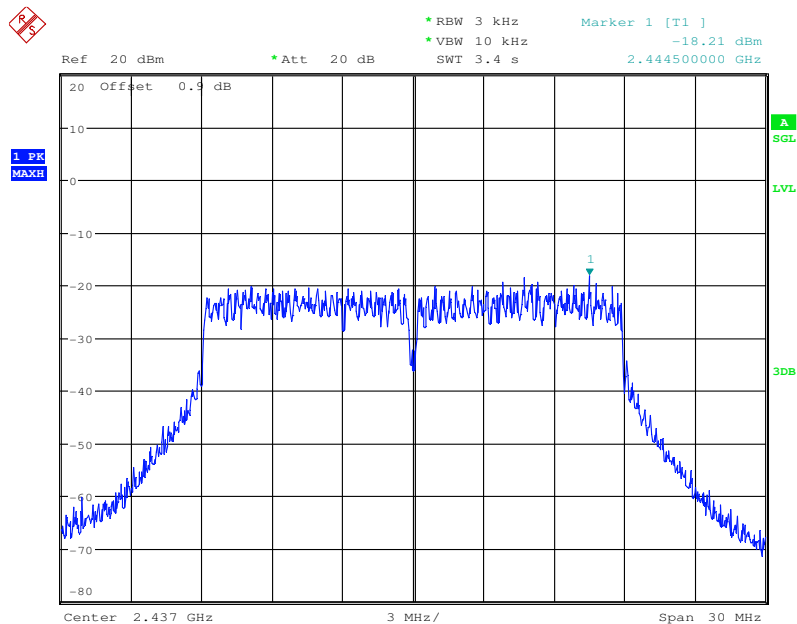
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Test mode:	802.11n (HT20)	Test channel:	Lowest
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Test mode:	802.11n (HT20)	Test channel:	Middle
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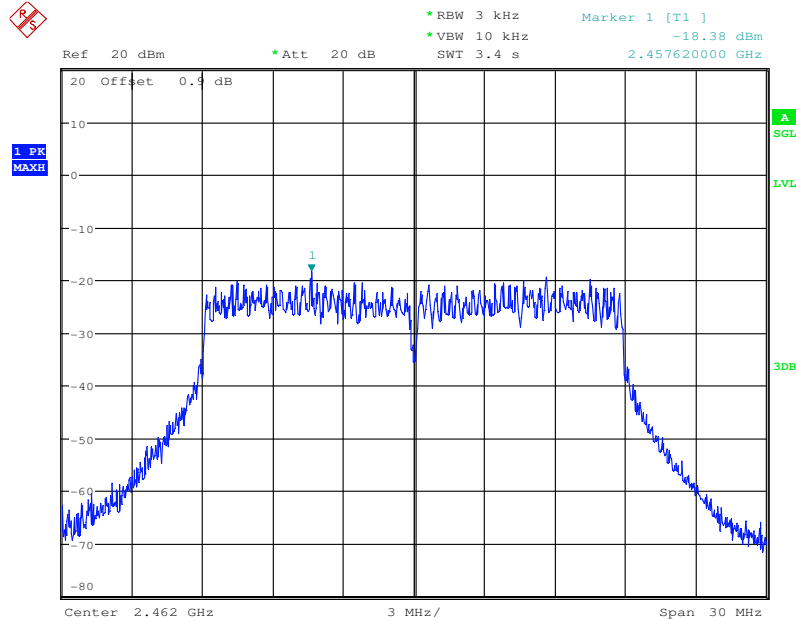


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

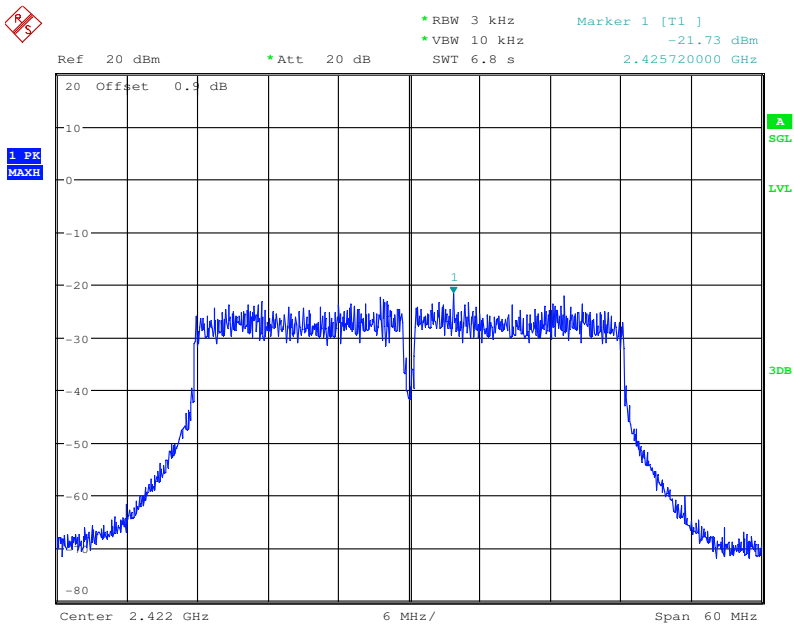
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Test mode:	802.11n (HT20)	Test channel:	Highest
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Test mode:	802.11n (HT40)	Test channel:	Lowest
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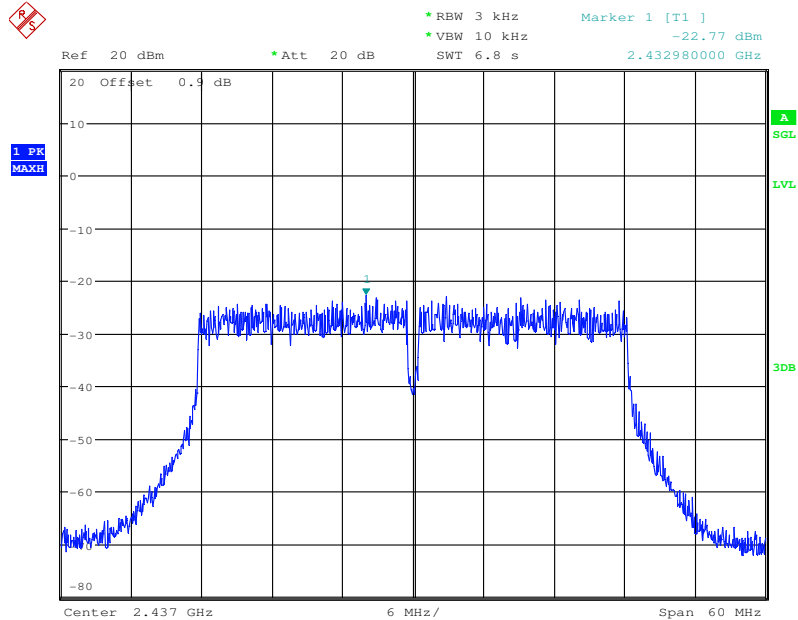


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

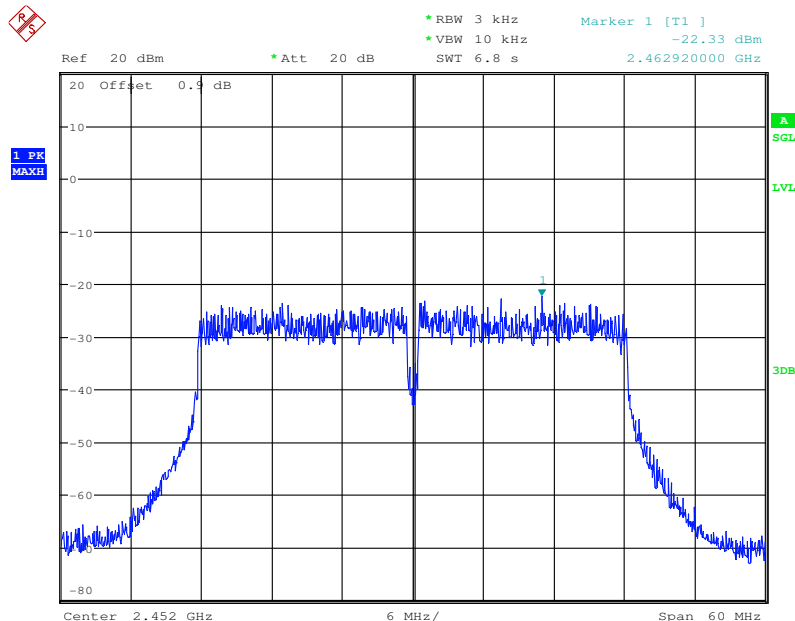
Report No.: SZEM180400245802

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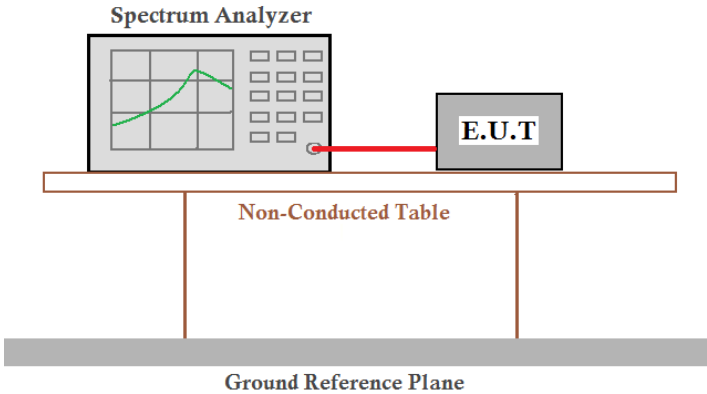
Test mode:	802.11n (HT40)	Test channel:	Middle
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Test mode:	802.11n (HT40)	Test channel:	Highest
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6.6 Band-edge for RF conducted emissions

Test Requirement:	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.13.3.2
Test Setup:	 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. The table is supported by two vertical legs and sits on a Ground Reference Plane.
Instruments Used:	Refer to section 4.10 for details
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40)
Remark:	Only the data of antenna b is recorded in the report.
Test Results:	Pass



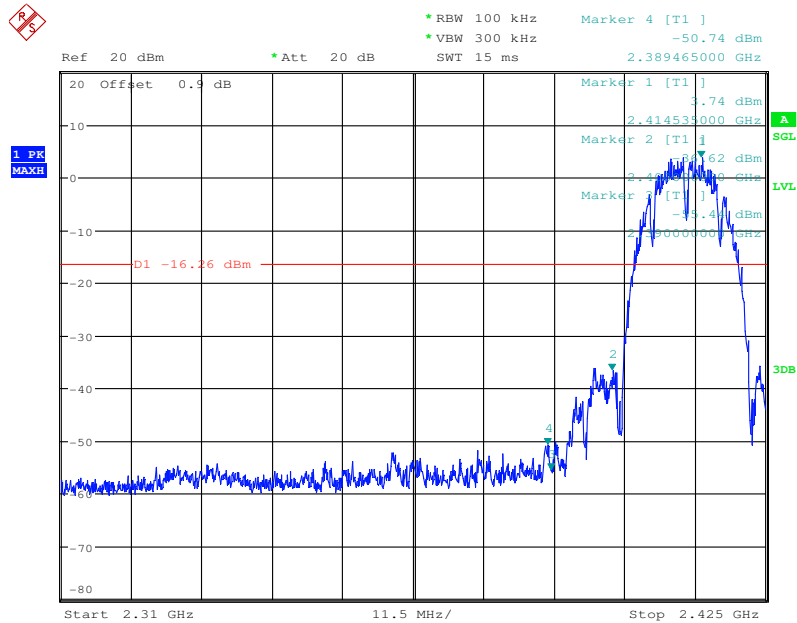
SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

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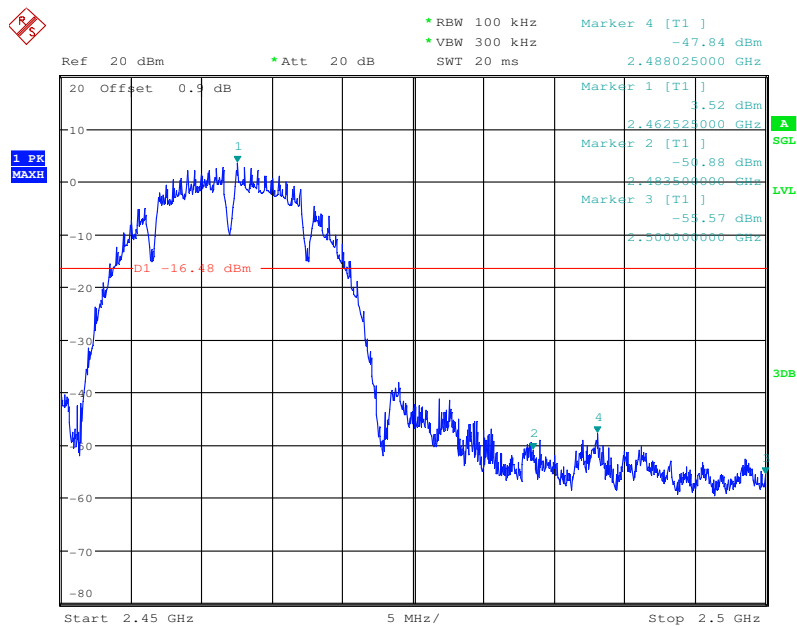
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Test plot as follows:

Test mode:	802.11b	Test channel:	Lowest
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Test mode:	802.11b	Test channel:	Highest
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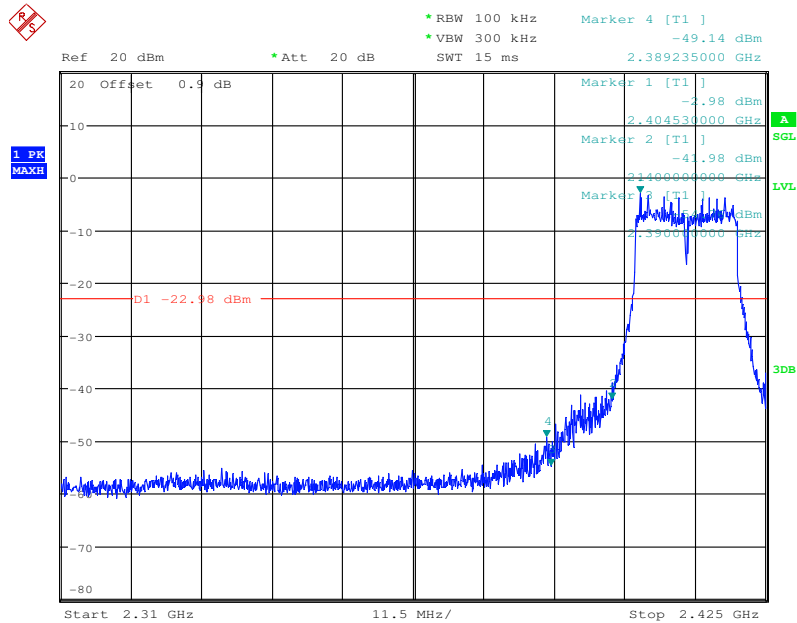


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

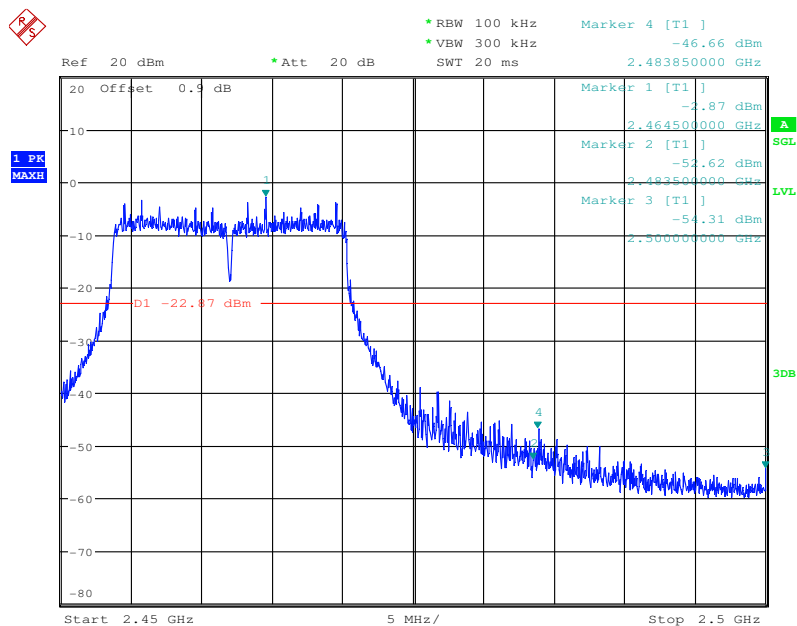
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Test mode:	802.11g	Test channel:	Lowest
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Test mode:	802.11g	Test channel:	Highest
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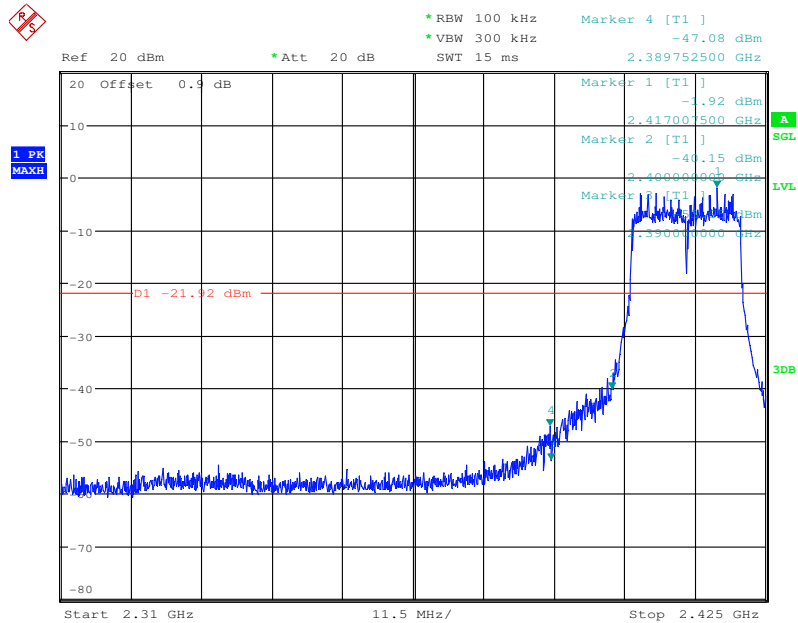


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

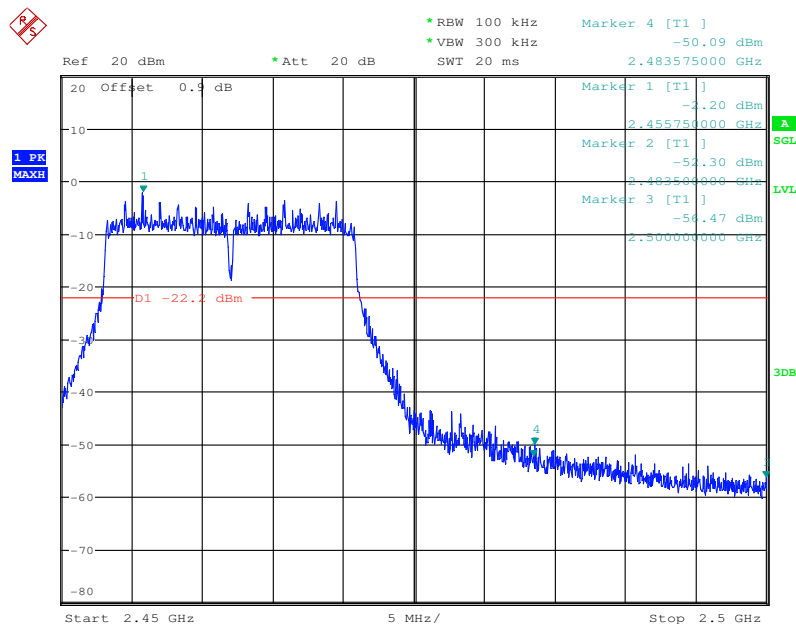
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Test mode:	802.11n (HT20)	Test channel:	Lowest
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Test mode:	802.11n (HT20)	Test channel:	Highest
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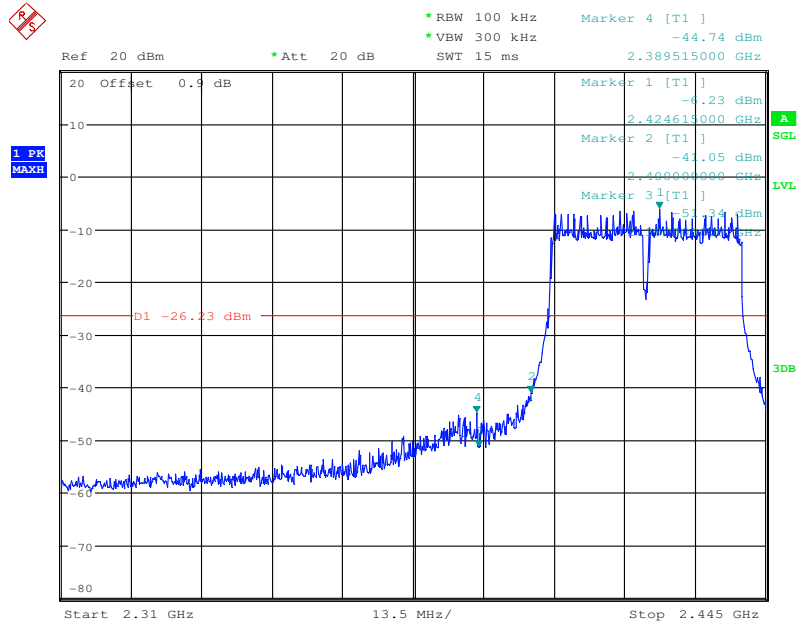


SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

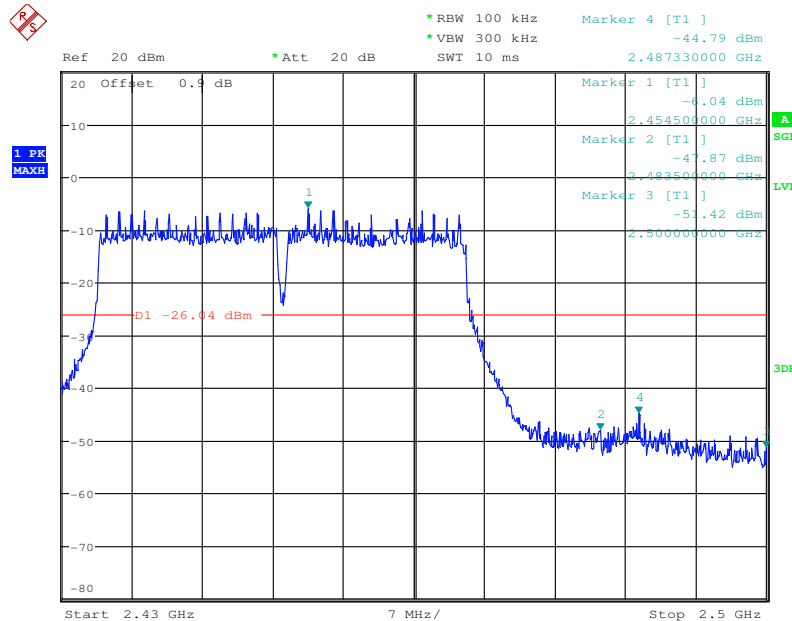
Report No.: SZEM180400245802

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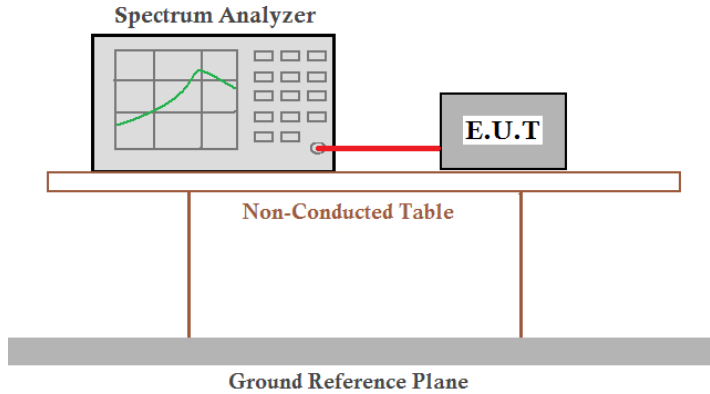
Test mode:	802.11n (HT40)	Test channel:	Lowest
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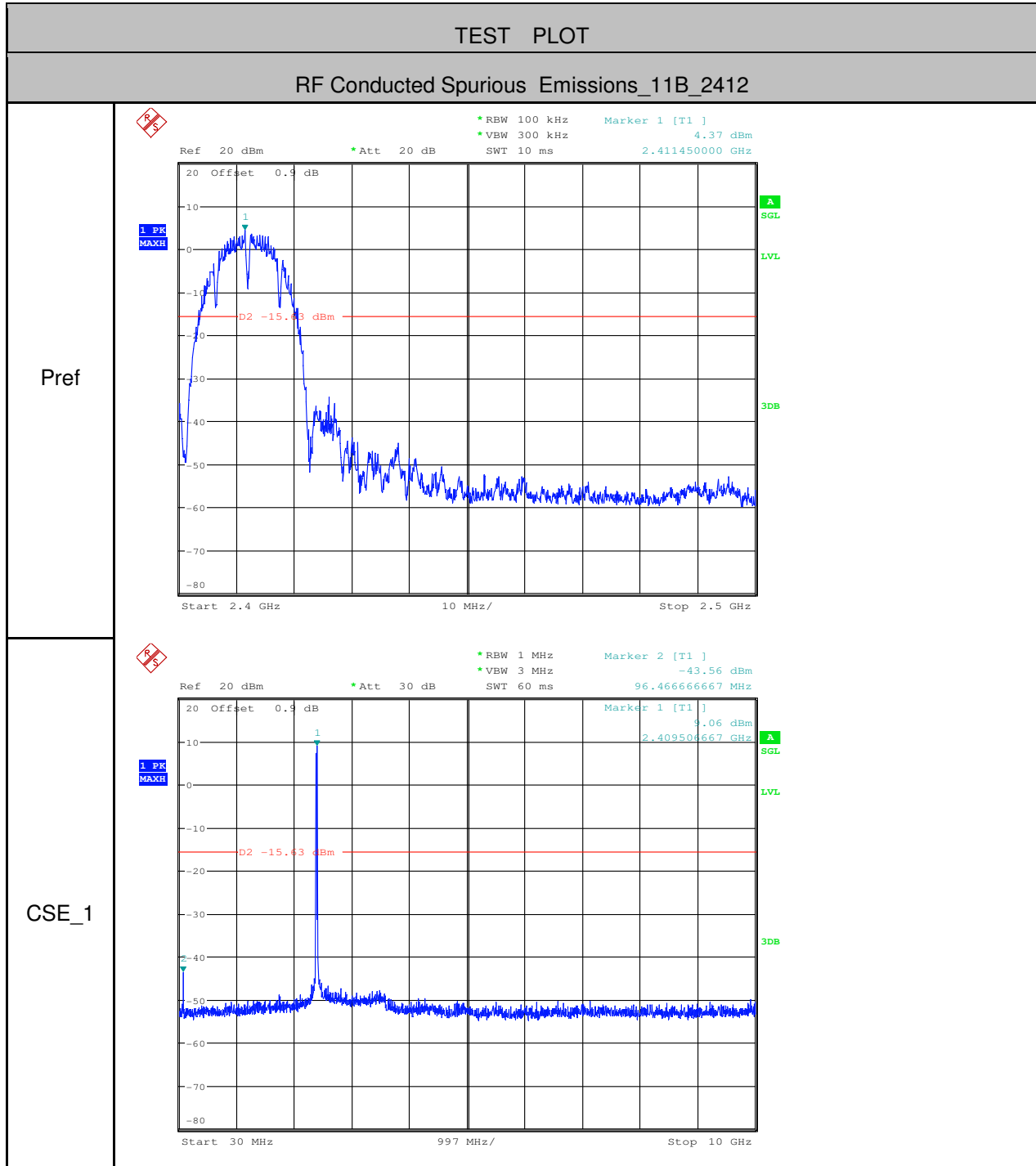
Test mode:	802.11n (HT40)	Test channel:	Highest
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6.7 RF Antenna Conducted Spurious Emissions

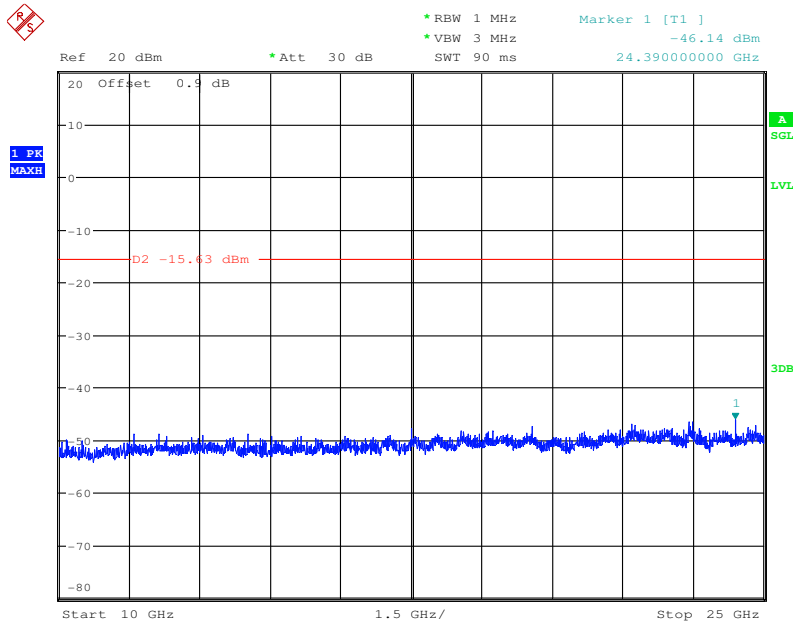
Test Requirement:	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.11
Test Setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.
Instruments Used:	Refer to section 4.10 for details
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40)
Remark:	Only the data of antenna b is recorded in the report.
Test Results:	Pass

Test plot as follows:



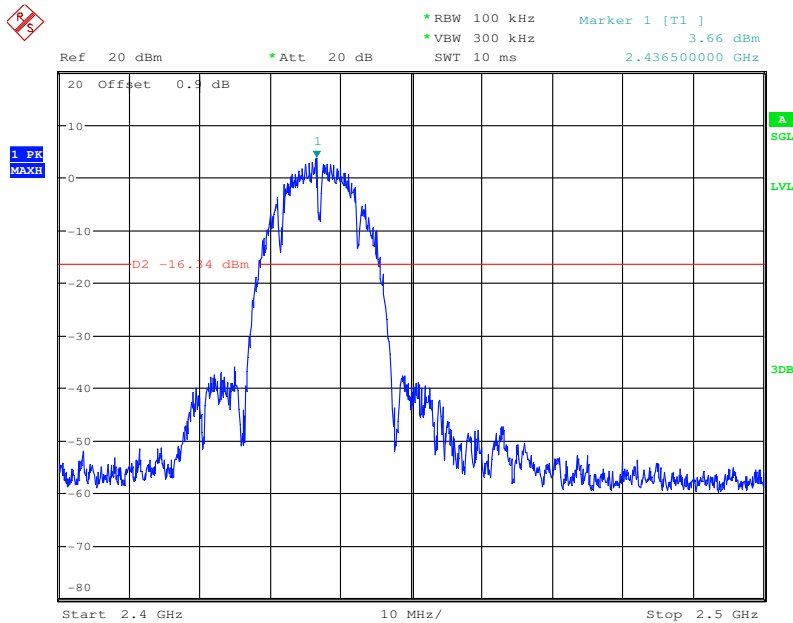


CSE_2



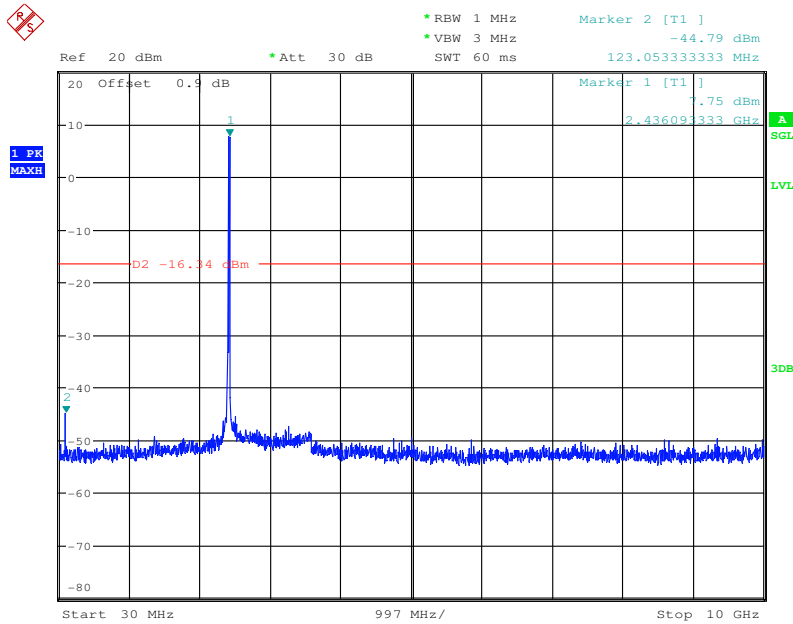
RF Conducted Spurious Emissions_11B_2437

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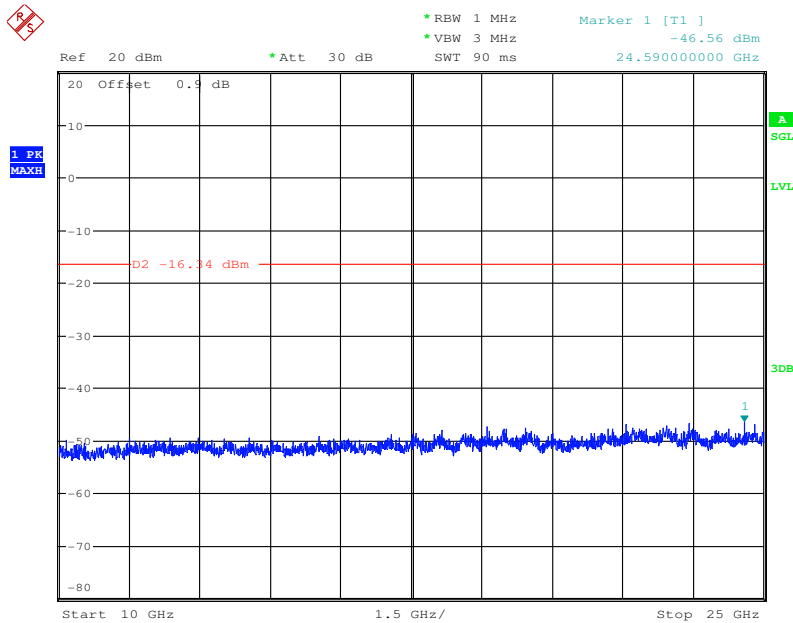


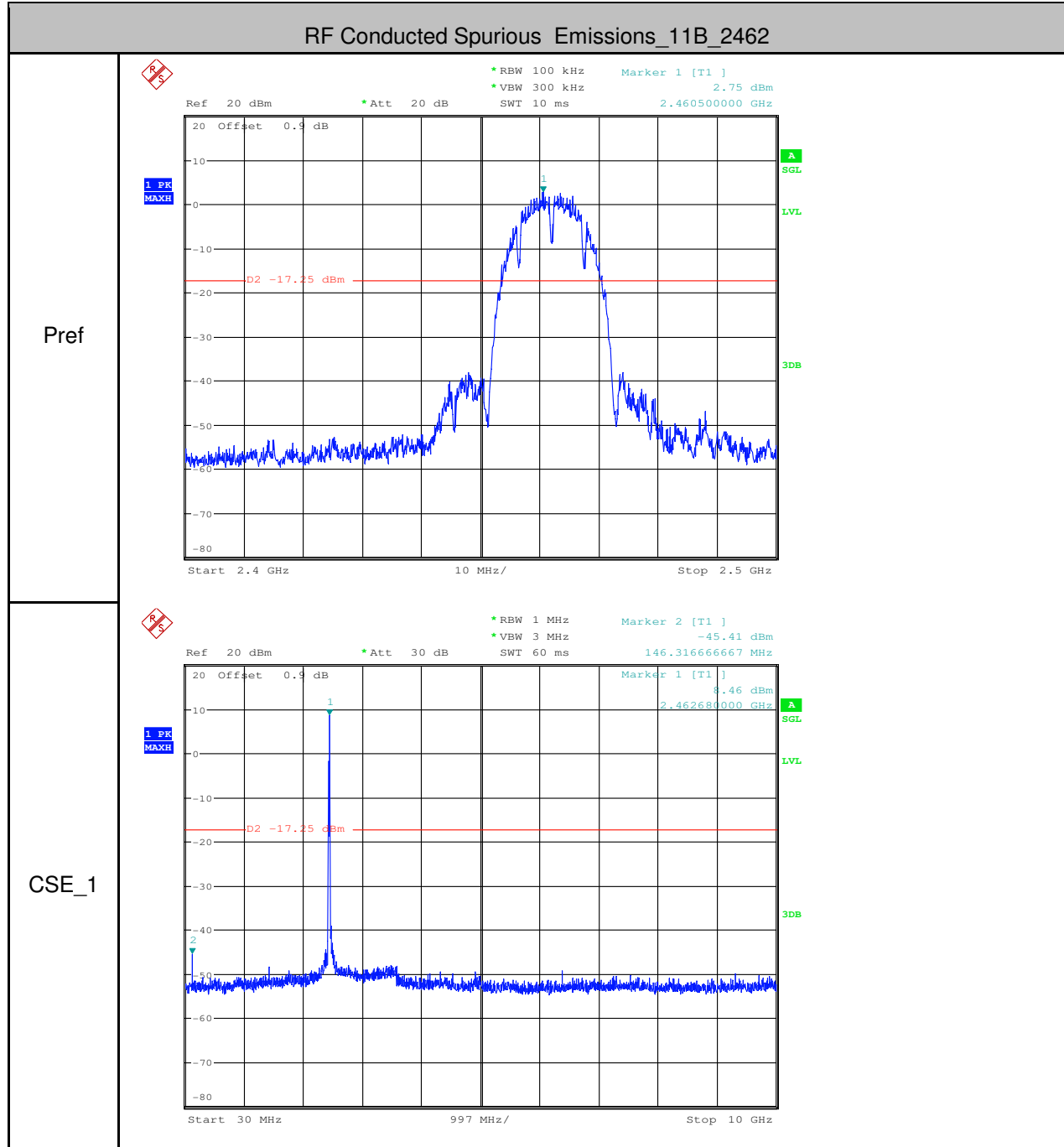


CSE_1



CSE_2





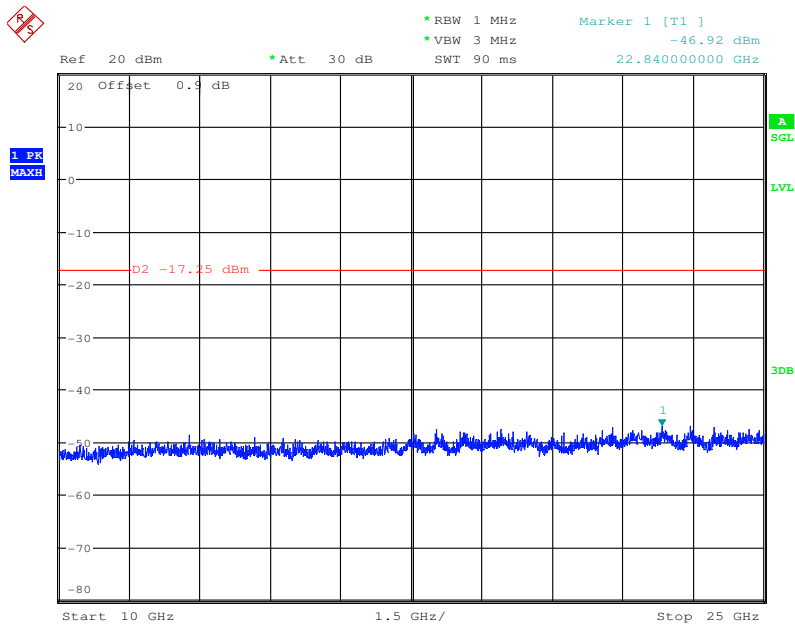


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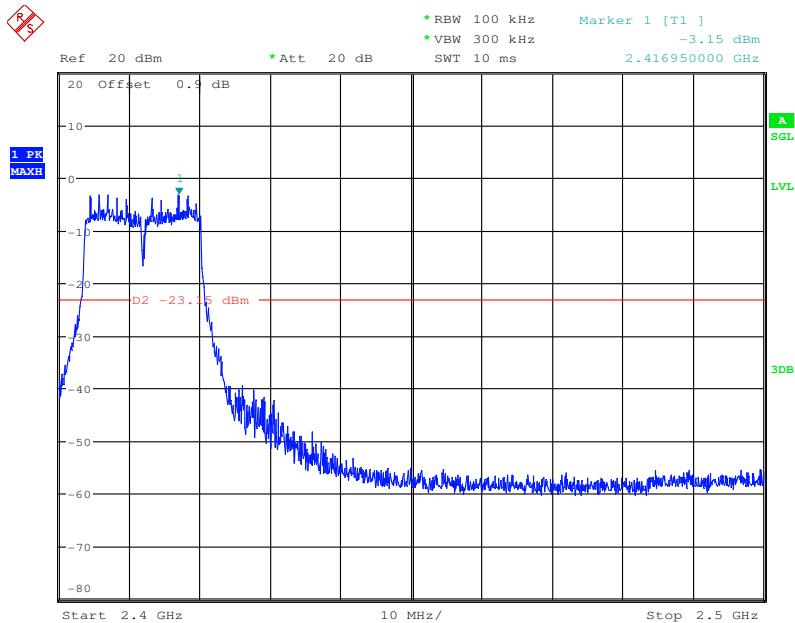
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CSE_2



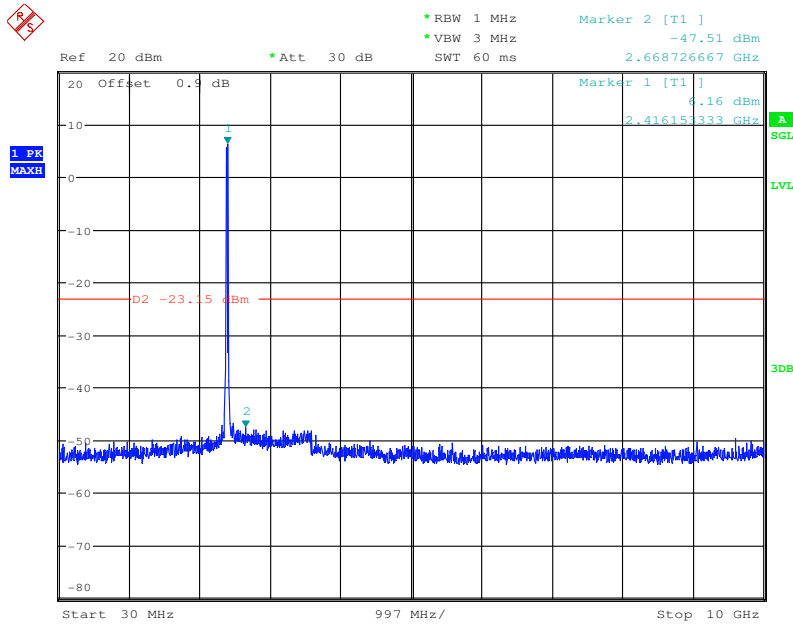
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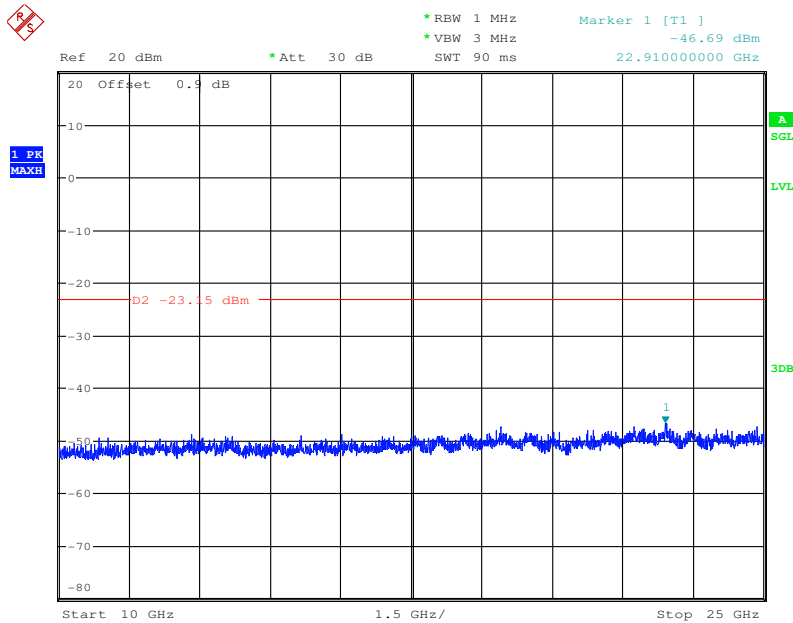


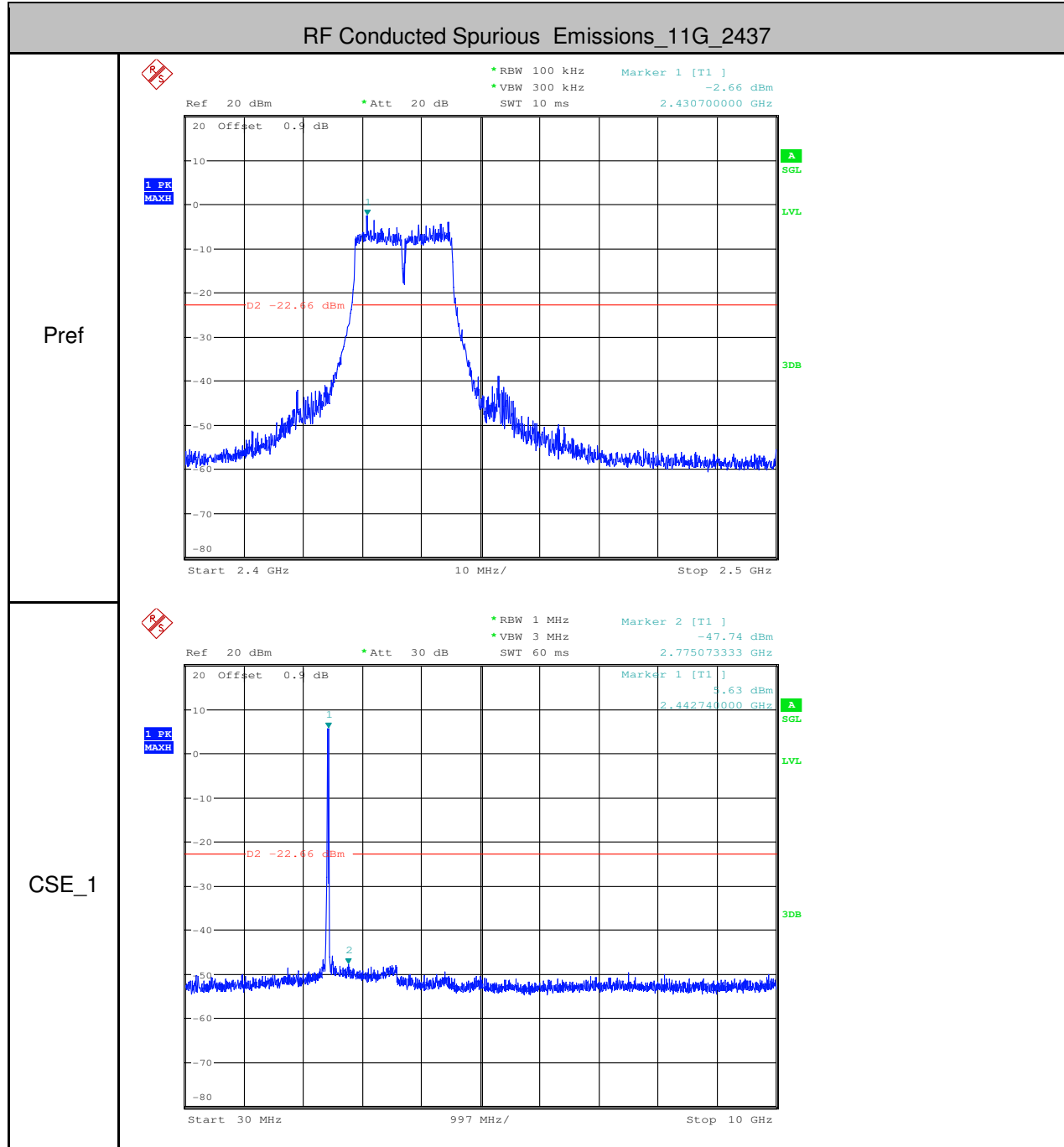


CSE_1



CSE_2





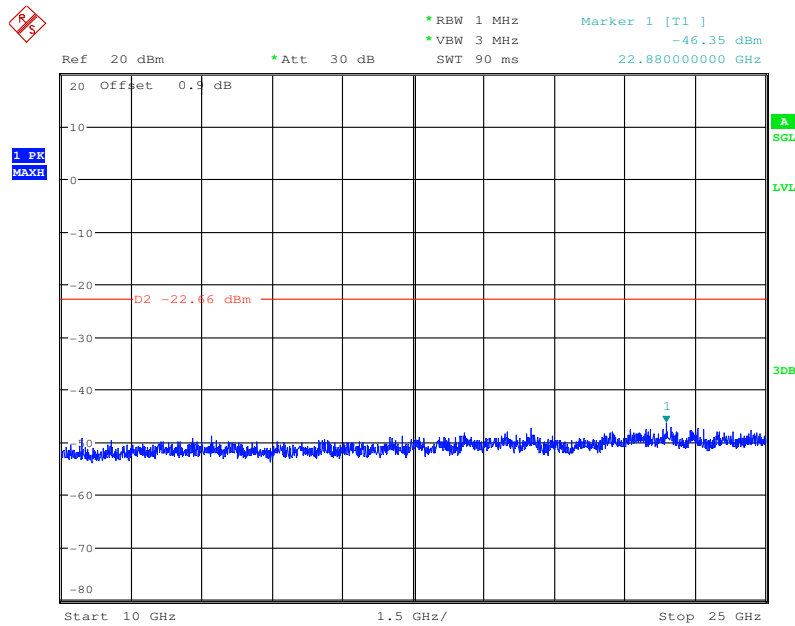


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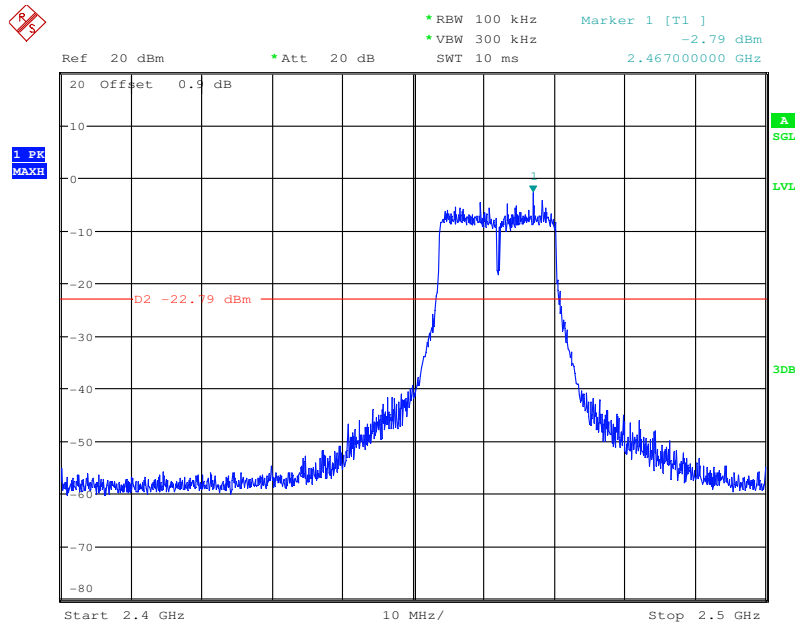
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CSE_2



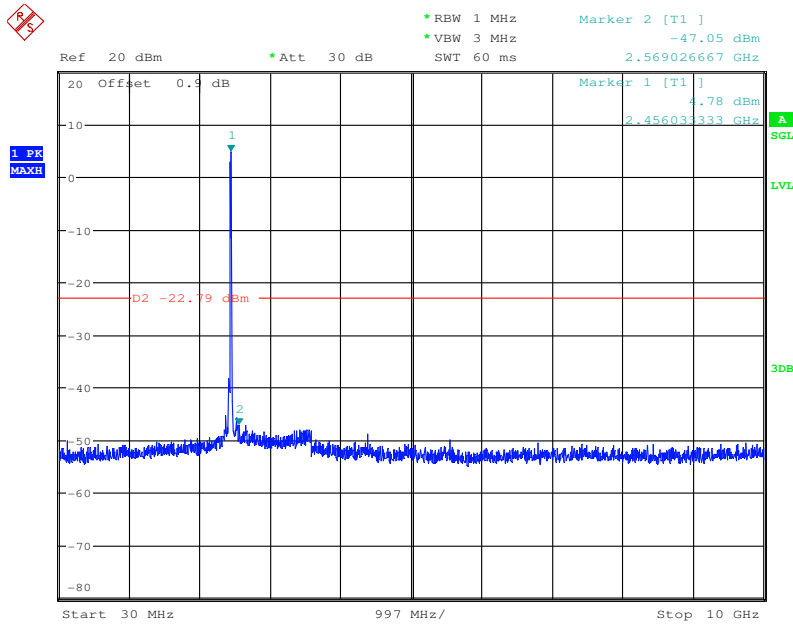
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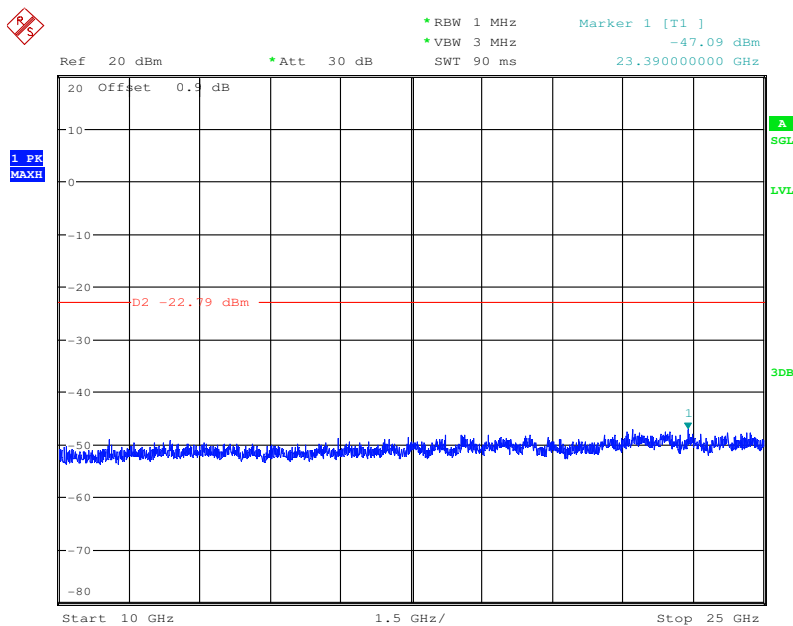


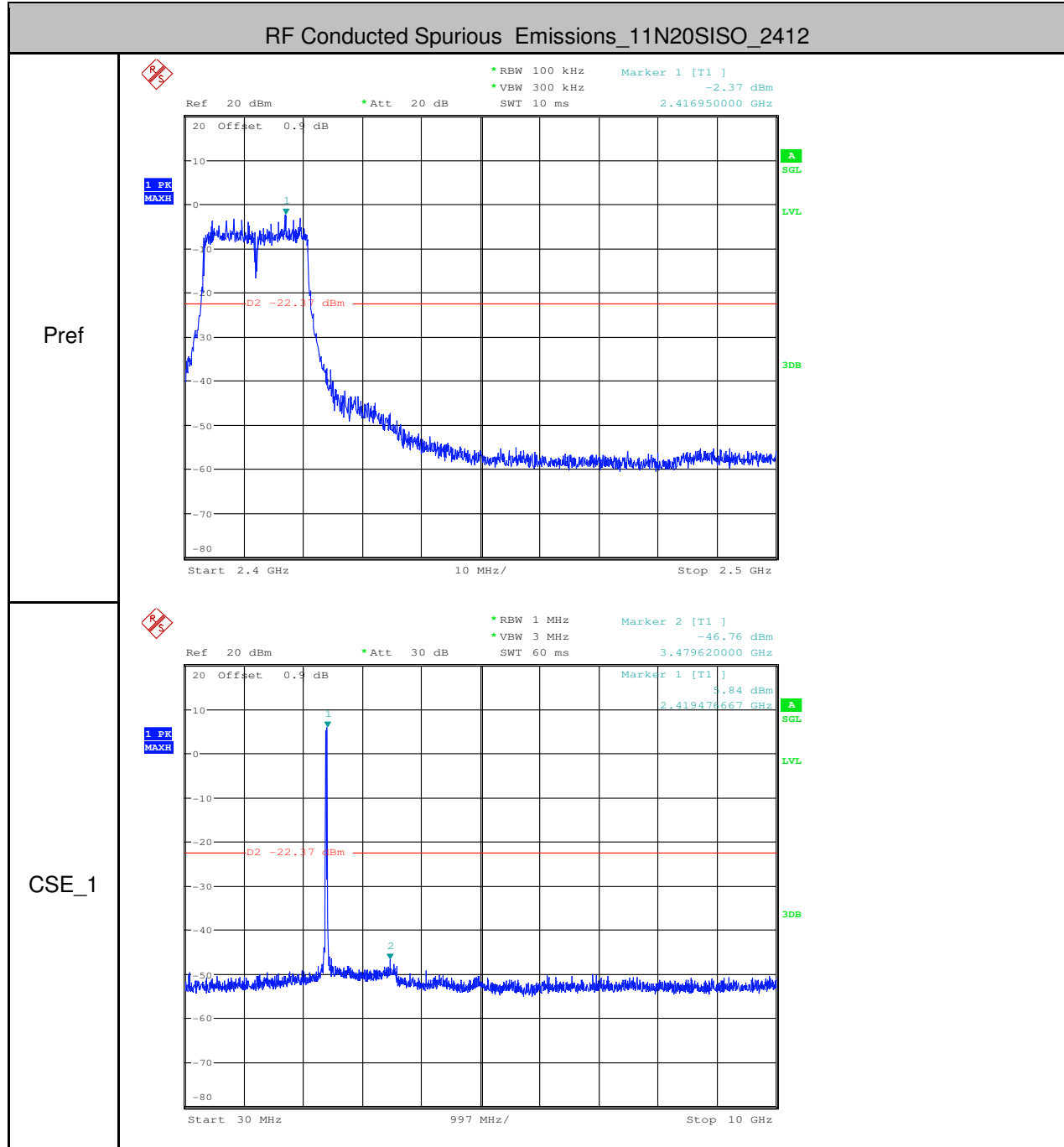


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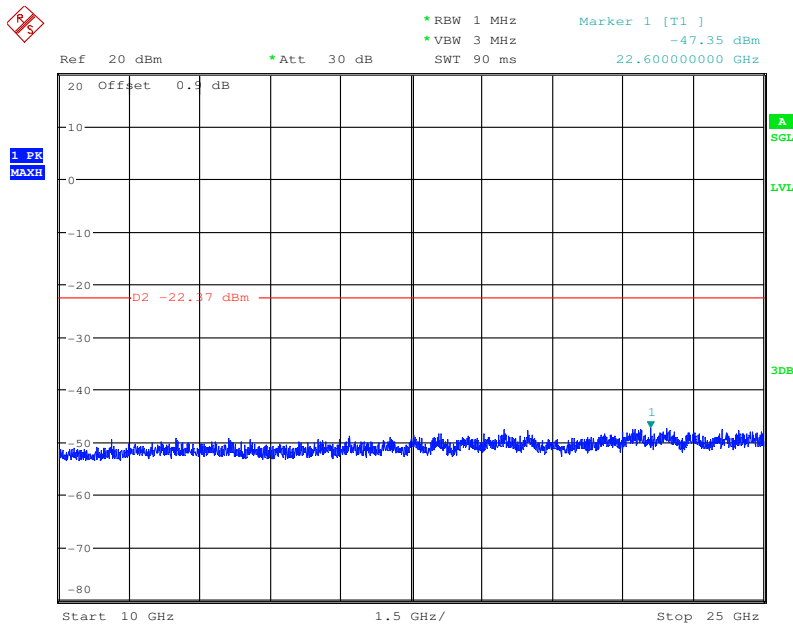
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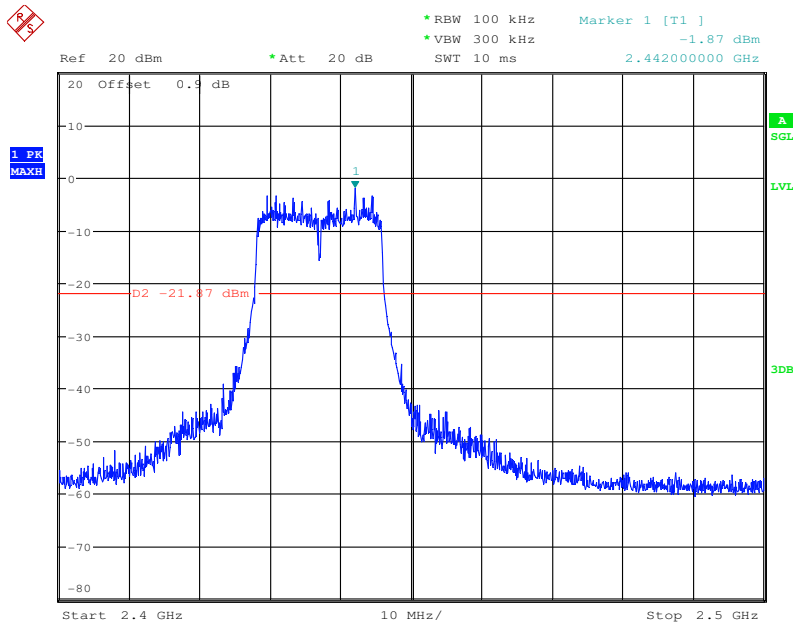


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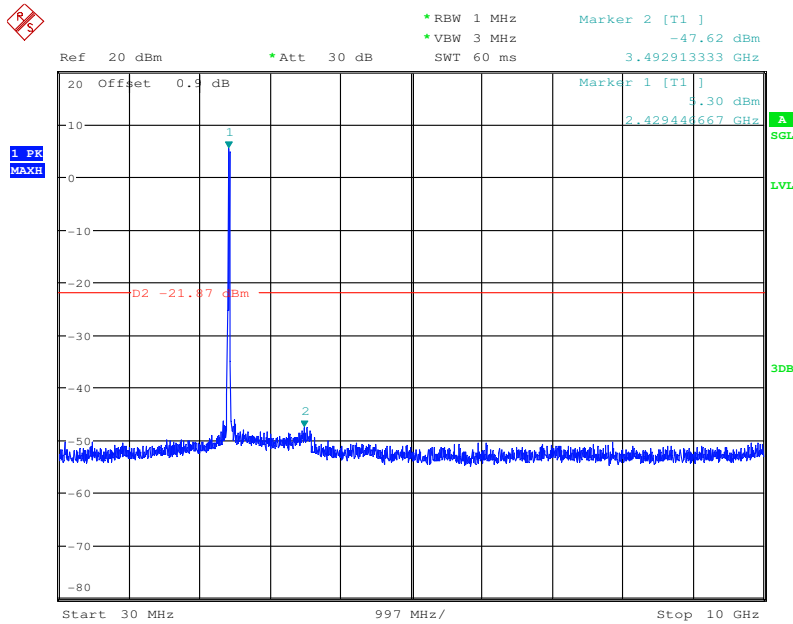
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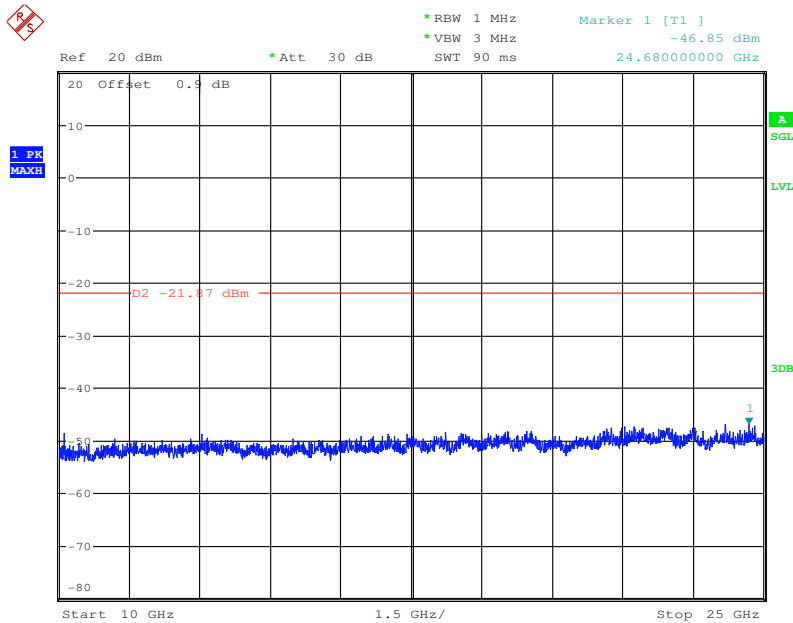


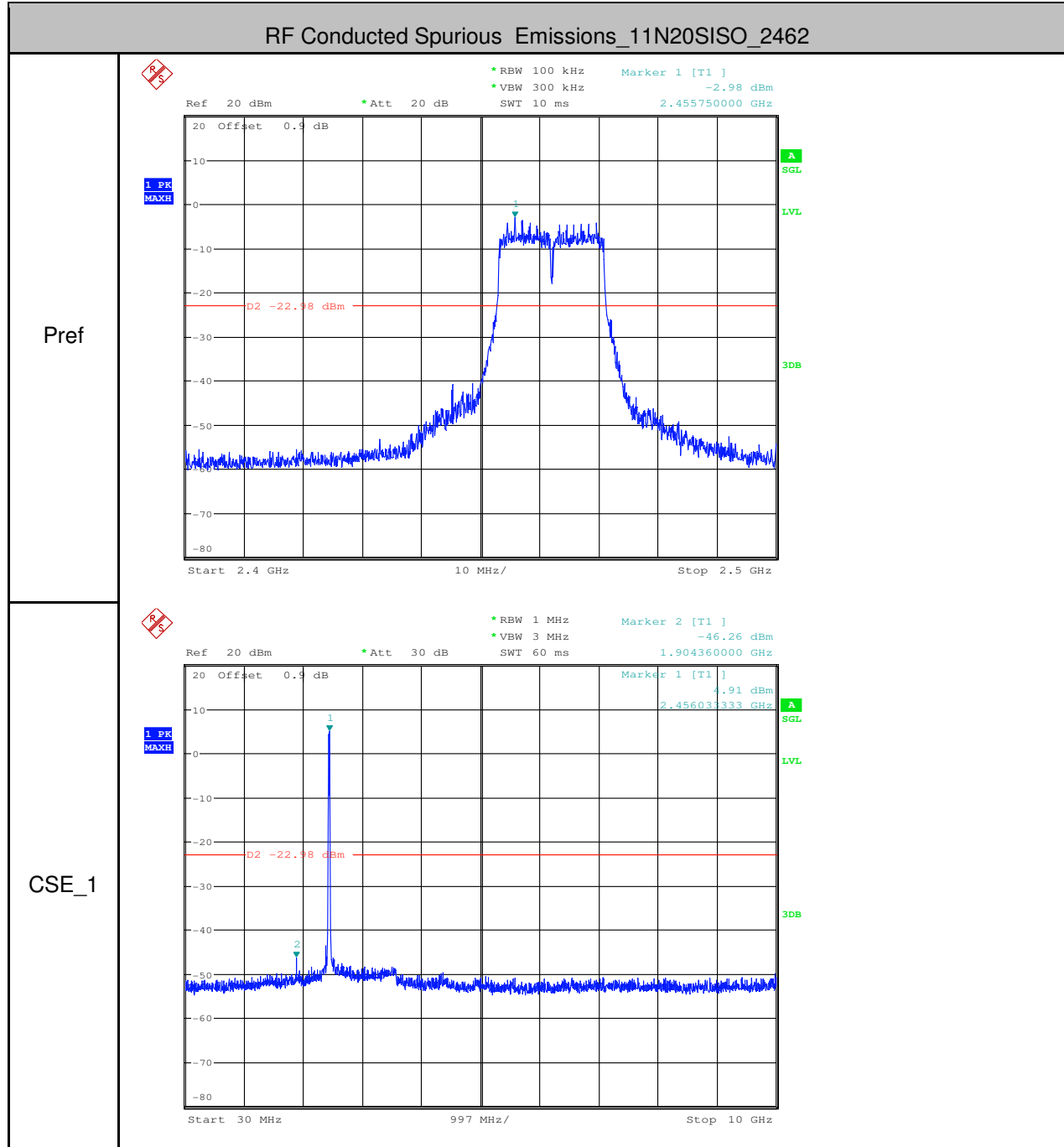


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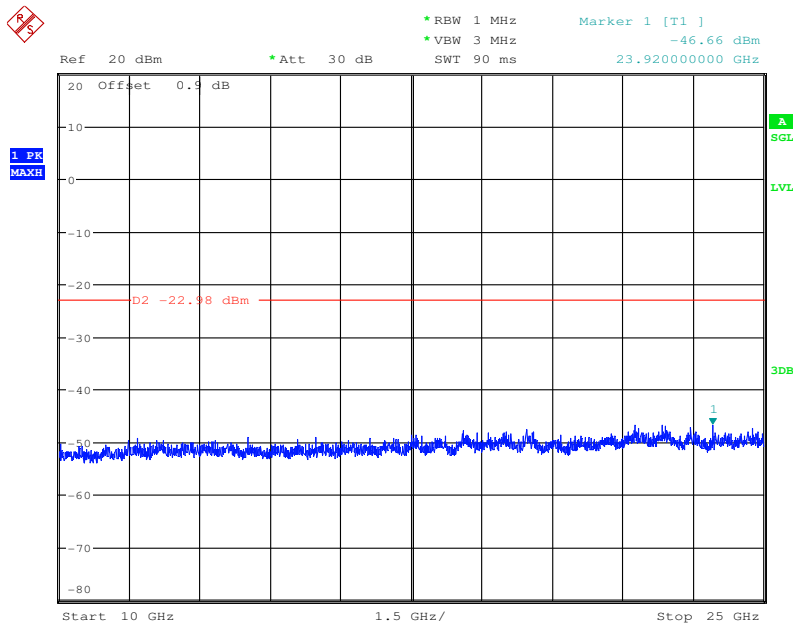
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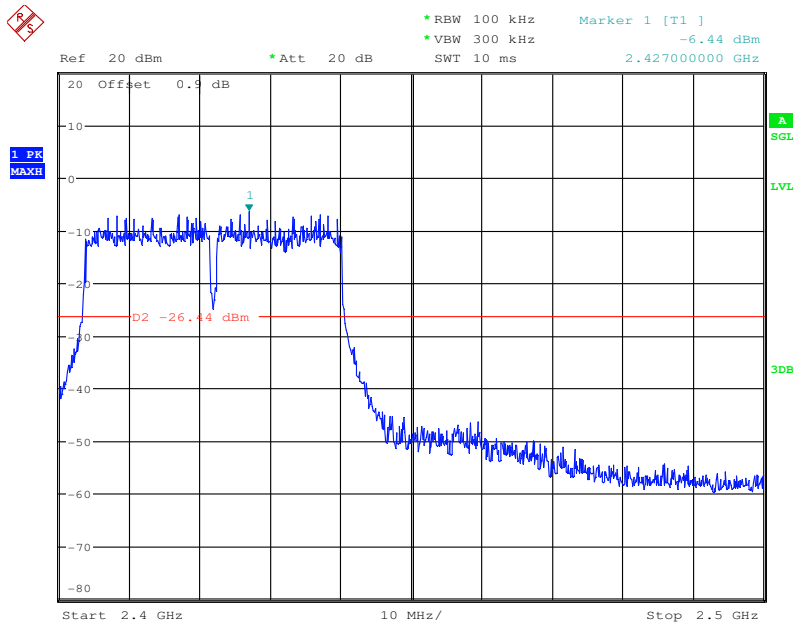


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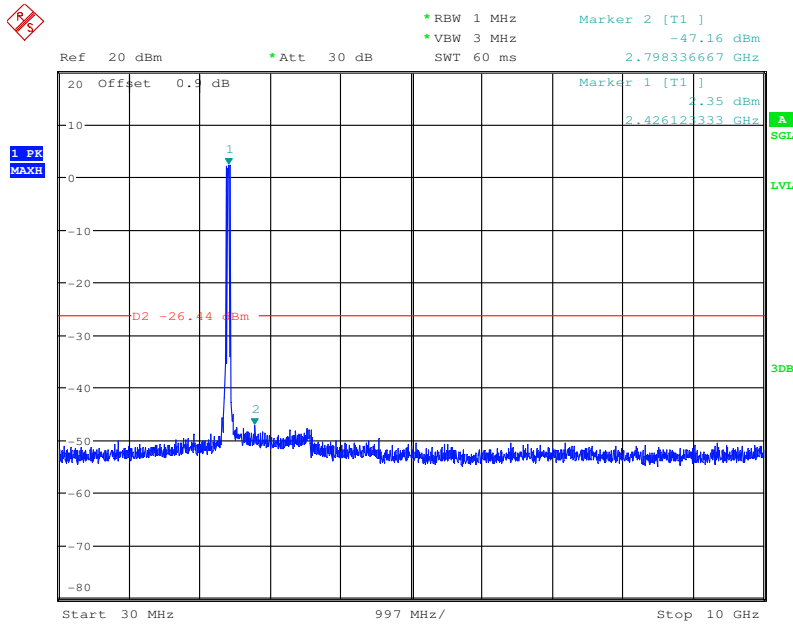
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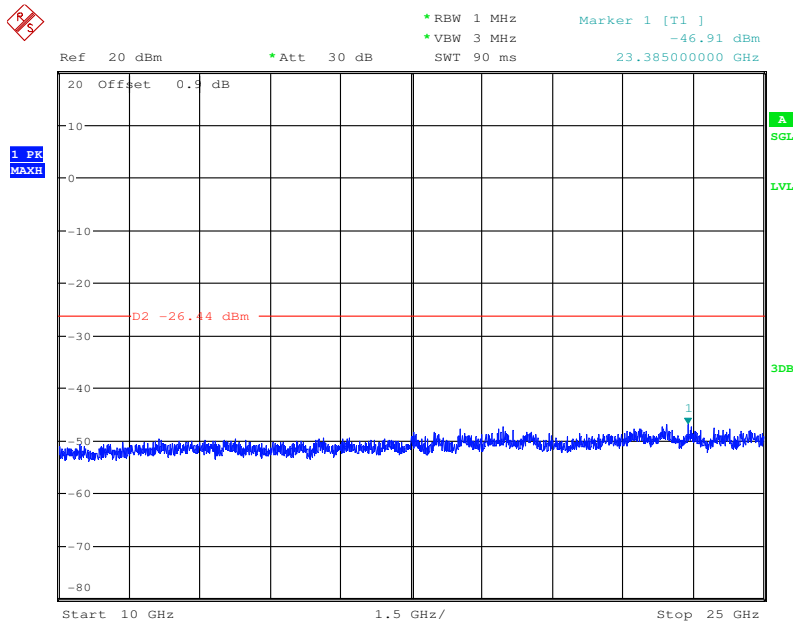


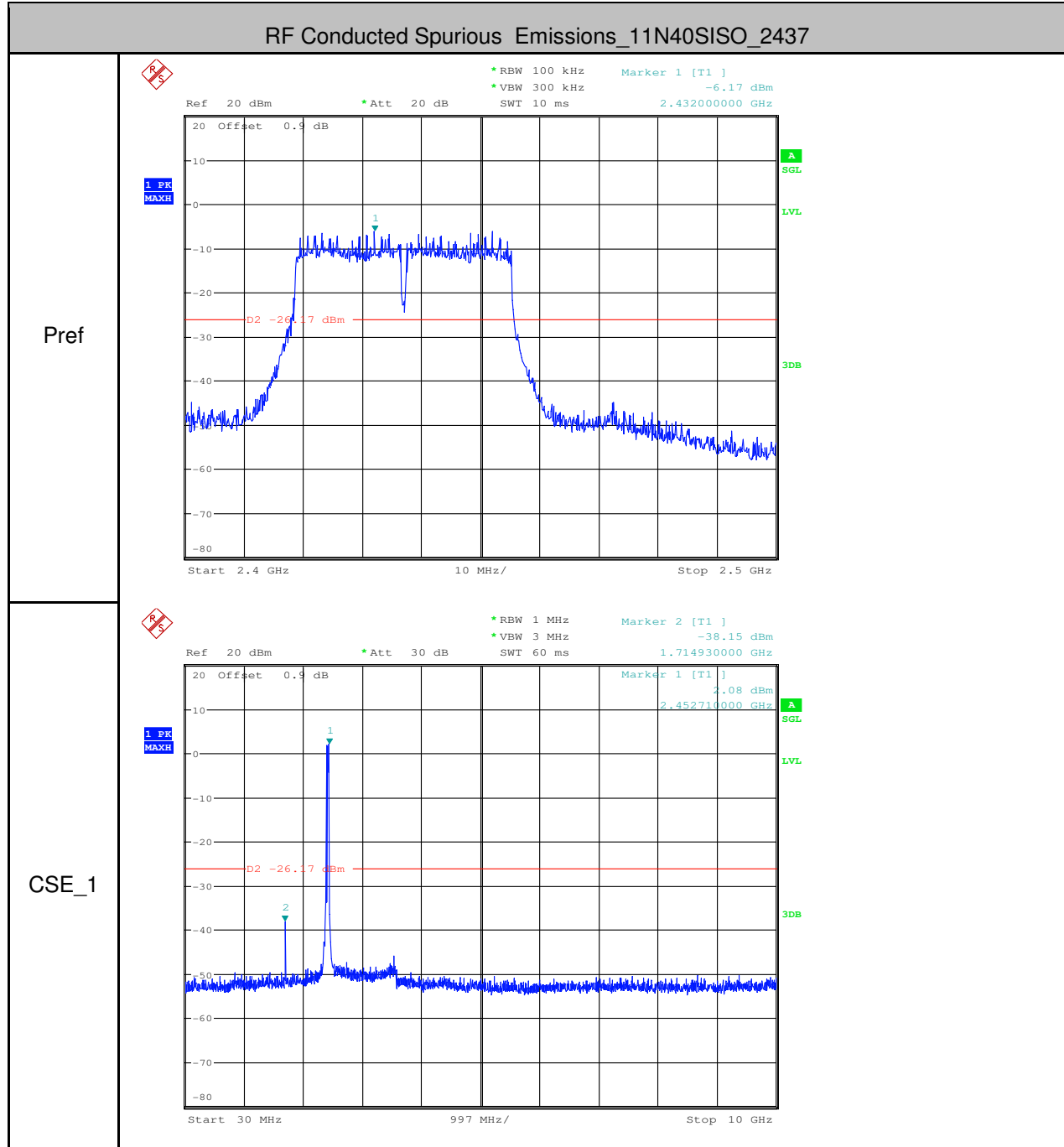


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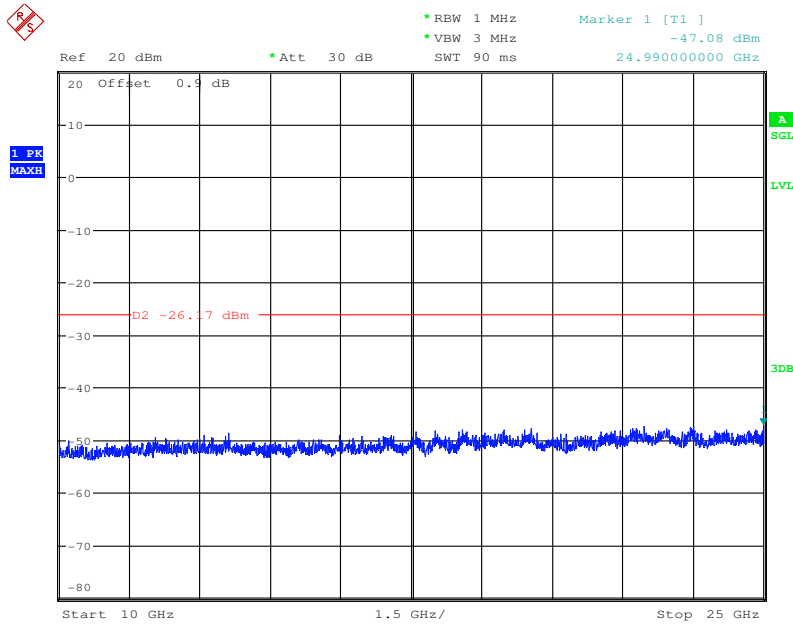
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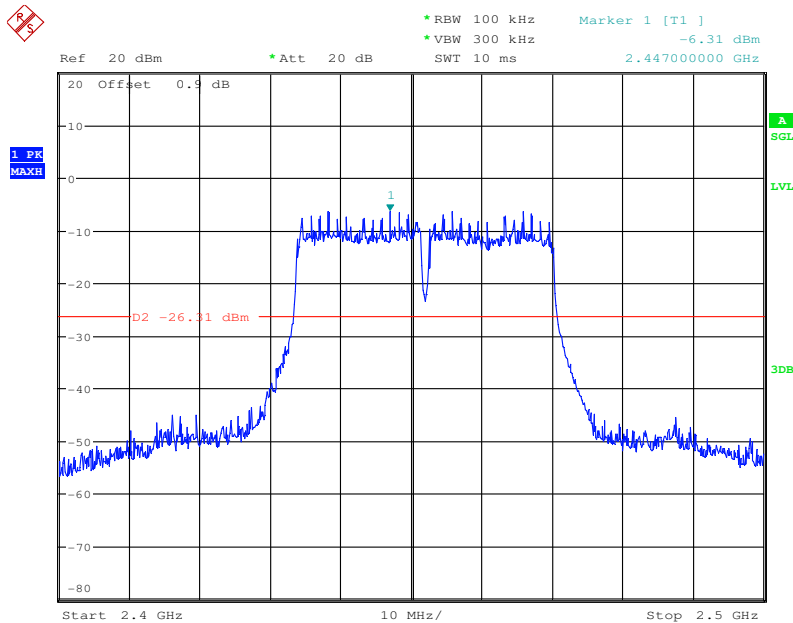


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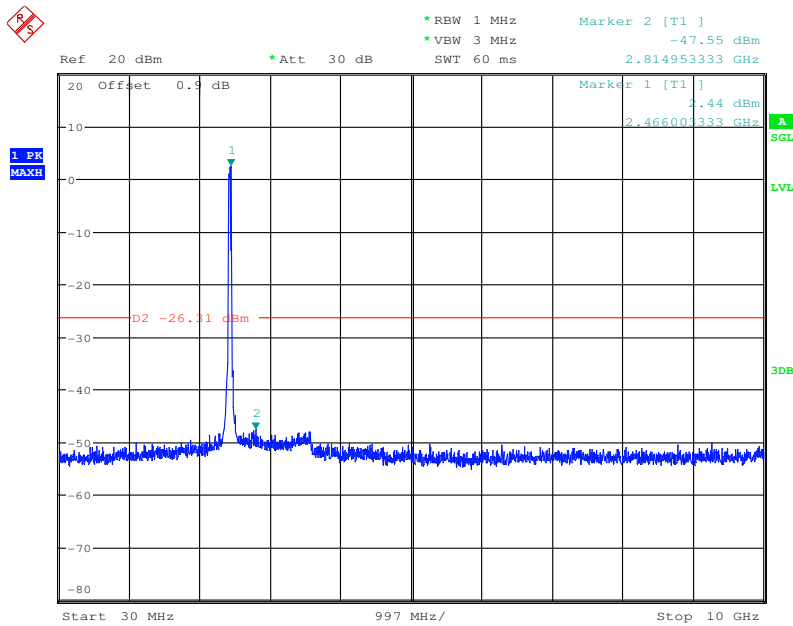
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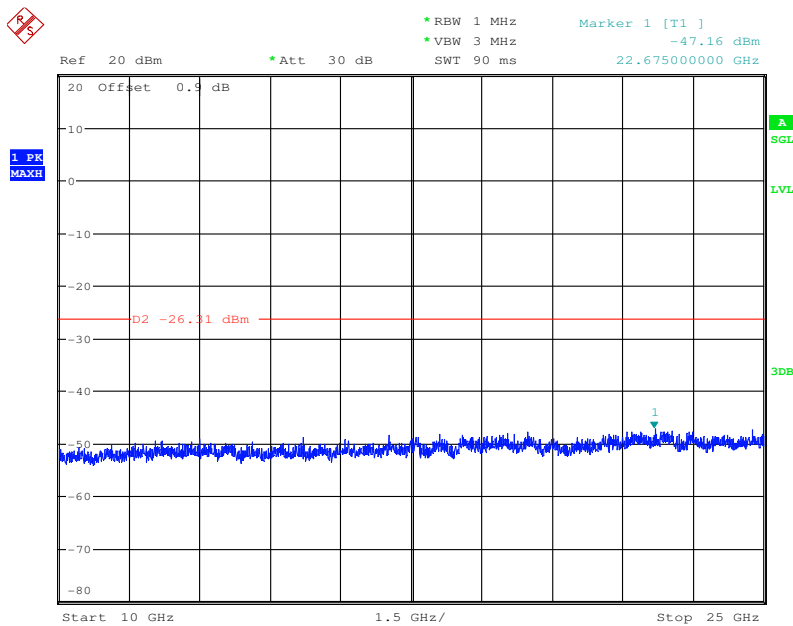




CSE_1



CSE_2



Remark:

Use 100kHz RBW to determine the relative limit in the band 2.4GHz to 2.5GHz, and Use 1MHz RBW to measure spurious emissions in the band 30MHz to 10GHz and 10GHz to 25GHz. The sweep points set to 30001.

6.8 Radiated Spurious Emission

Test Requirement:	47 CFR Part 15, Subpart C 15.209 & 15.247(d)				
Test Method:	ANSI C63.10 (2013) Section 6.4,6.5,6.6				
Test Site:	Measurement Distance: 3m				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.015MHz	Quasi-peak	200Hz	1kHz	Quasi-peak
	0.015MHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120 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)	-	Quasi-peak	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	Quasi-peak	30
	1.705MHz-30MHz	30	-	Quasi-peak	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
			74.0	Peak	3
Test Setup:					

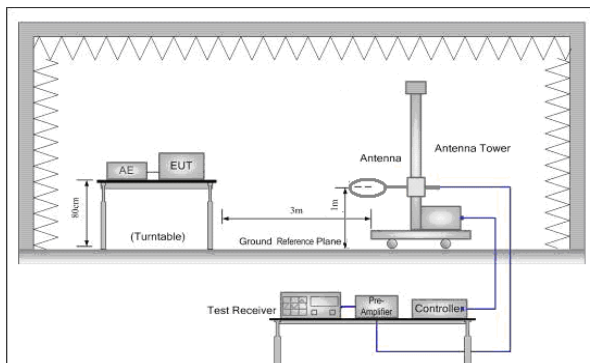


Figure 1. Below 30MHz

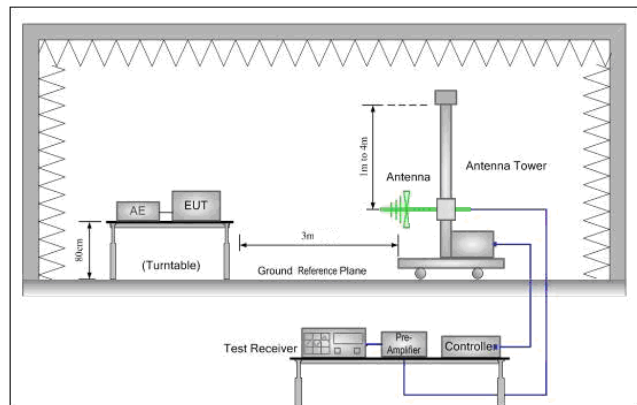


Figure 2. 30MHz to 1GHz

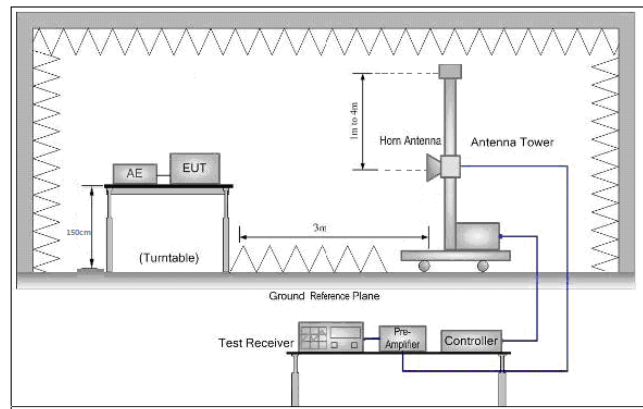


Figure 3. Above 1 GHz

Test Procedure:	a. For below 1GHz test, 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. For above 1GHz test, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. d. 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. e. 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 height 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. g. 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. h. Test the EUT in the lowest channel, the middle channel, the Highest channel i. 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 . j. Repeat above procedures until all frequencies measured was complete.												
Test Instruments:	Refer to section 4.10 for details												
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode												
Final Test Mode:	Through Pre-scan, find the worst case for each modulation type is below: <table><tr><th>Modulation Type</th><th>Data Rate</th><th>Antenna</th></tr><tr><td>802.11b</td><td>1Mbps</td><td>SISO: Antenna a</td></tr><tr><td>802.11g</td><td>6Mbps</td><td>SISO: Antenna a</td></tr><tr><td>802.11n(HT20)</td><td>MCS0</td><td>MIMO: Antenna a+b</td></tr></table>	Modulation Type	Data Rate	Antenna	802.11b	1Mbps	SISO: Antenna a	802.11g	6Mbps	SISO: Antenna a	802.11n(HT20)	MCS0	MIMO: Antenna a+b
Modulation Type	Data Rate	Antenna											
802.11b	1Mbps	SISO: Antenna a											
802.11g	6Mbps	SISO: Antenna a											
802.11n(HT20)	MCS0	MIMO: Antenna a+b											



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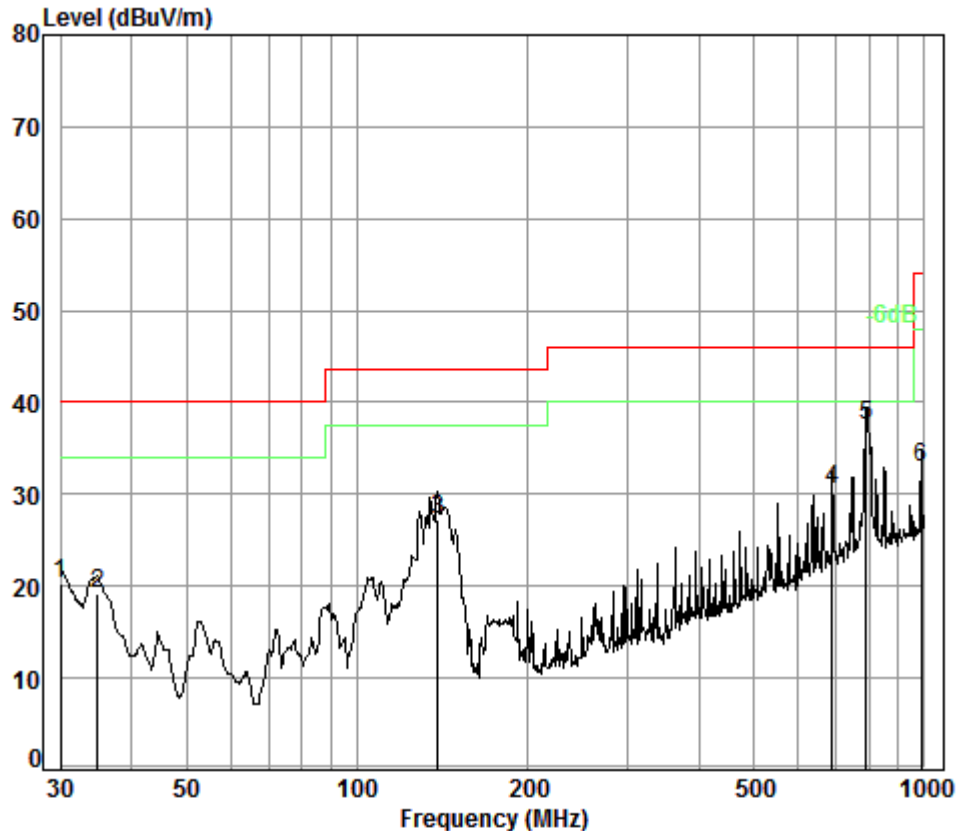
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	802.11n(HT40)	MCS0	MIMO: Antenna a+b
	For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11b at lowest channel is the worst case. Only the worst case is recorded in the report.		
Test Results:	Pass		



6.8.1 Radiated emission below 1GHz

Test mode:	Transmitter mode	Polarization:	Vertical
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Condition: 3m VERTICAL

Job No. : 11090CR

Test mode: TX

: 2.4G

	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	30.00	0.60	18.70	27.36	28.31	20.25	40.00	-19.75
2	34.88	0.60	15.97	27.34	29.87	19.10	40.00	-20.90
3	138.87	1.29	8.05	26.96	44.84	27.22	43.50	-16.28
4	687.15	2.88	21.50	27.43	33.50	30.45	46.00	-15.55
5 pp	790.62	3.18	22.06	27.31	39.61	37.54	46.00	-8.46
6	986.07	3.69	23.74	26.37	31.79	32.85	54.00	-21.15

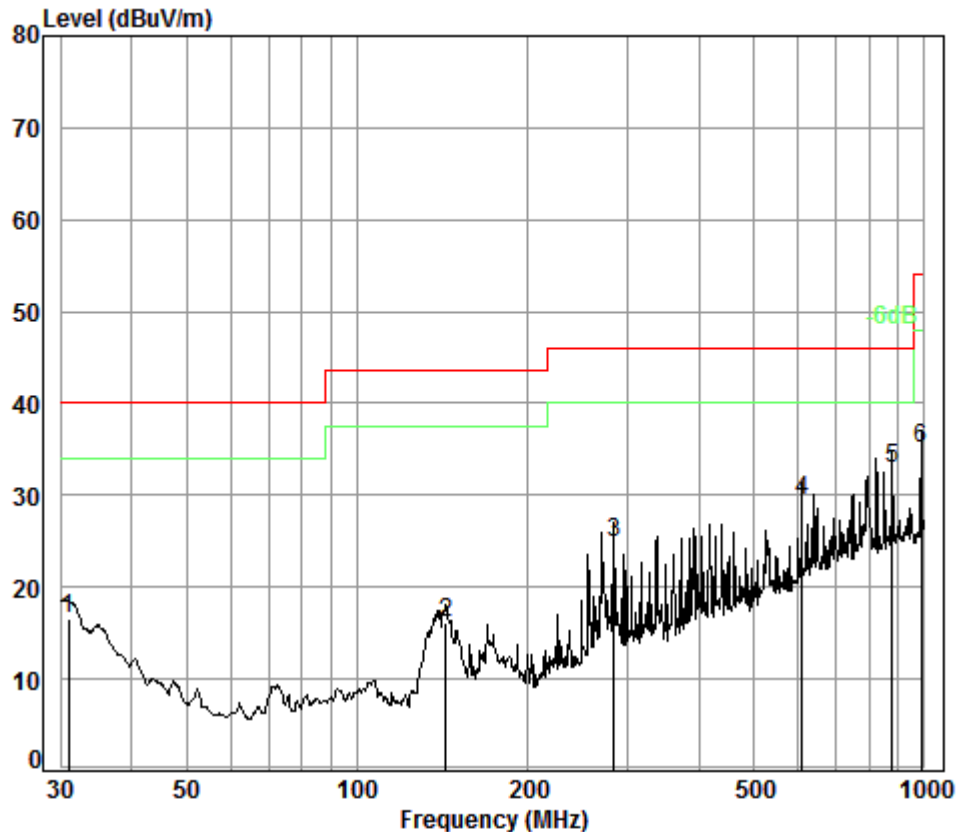


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Test mode:	Transmitter mode	Polarization:	Horizontal
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Condition: 3m HORIZONTAL

Job No. : 11090CR

Test mode: TX

: 2.4G

	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	30.96	0.60	18.16	27.35	25.18	16.59	40.00	-23.41
2	143.33	1.30	8.40	26.94	33.27	16.03	43.50	-27.47
3	283.98	1.83	13.20	26.44	36.35	24.94	46.00	-21.06
4	607.79	2.72	20.02	27.53	34.17	29.38	46.00	-16.62
5 pp	878.32	3.52	23.03	26.89	33.26	32.92	46.00	-13.08
6	986.07	3.69	23.74	26.37	33.94	35.00	54.00	-19.00



6.8.2 Transmitter emission above 1GHz

Test mode:		802.11b		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			
3972.178	7.80	33.53	38.69	45.22	47.86	74.00	-26.14	Vertical			
4824.000	8.90	34.19	39.04	45.45	49.50	74.00	-24.50	Vertical			
5947.702	10.42	34.67	39.00	45.46	51.55	74.00	-22.45	Vertical			
7236.000	10.69	36.40	38.15	44.93	53.87	74.00	-20.13	Vertical			
9648.000	12.52	37.53	36.97	40.58	53.66	74.00	-20.34	Vertical			
12422.220	14.21	38.85	38.73	39.55	53.88	74.00	-20.12	Vertical			
3610.398	7.67	32.53	38.52	45.51	47.19	74.00	-26.81	Horizontal			
4824.000	8.90	34.19	39.04	46.14	50.19	74.00	-23.81	Horizontal			
6104.642	10.42	34.79	38.93	45.48	51.76	74.00	-22.24	Horizontal			
7236.000	10.69	36.40	38.15	43.79	52.73	74.00	-21.27	Horizontal			
9648.000	12.52	37.53	36.97	40.22	53.30	74.00	-20.70	Horizontal			
12226.070	14.37	38.74	38.53	38.44	53.02	74.00	-20.98	Horizontal			

Test mode:		802.11b		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		
3881.276	7.77	33.28	38.65	44.01	46.41	74.00	-27.59	Vertical		
4874.000	8.97	34.28	39.05	45.59	49.79	74.00	-24.21	Vertical		
6078.201	10.46	34.76	38.95	45.43	51.70	74.00	-22.30	Vertical		
7311.000	10.72	36.37	38.07	43.35	52.37	74.00	-21.63	Vertical		
9748.000	12.58	37.55	36.92	39.69	52.90	74.00	-21.10	Vertical		
12621.510	14.50	38.88	38.93	39.37	53.82	74.00	-20.18	Vertical		
3610.398	7.67	32.53	38.52	45.51	47.19	74.00	-26.81	Horizontal		
4874.000	8.97	34.28	39.05	46.13	50.33	74.00	-23.67	Horizontal		
6104.642	10.42	34.79	38.93	45.48	51.76	74.00	-22.24	Horizontal		
7311.000	10.72	36.37	38.07	43.76	52.78	74.00	-21.22	Horizontal		
9748.000	12.58	37.55	36.92	40.21	53.42	74.00	-20.58	Horizontal		
12621.510	14.50	38.88	38.93	39.11	53.56	74.00	-20.44	Horizontal		



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Test mode:		802.11b		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			
3853.298	7.76	33.21	38.64	45.52	47.85	74.00	-26.15	Vertical			
4924.000	9.04	34.37	39.07	45.01	49.35	74.00	-24.65	Vertical			
5973.576	10.49	34.68	39.00	44.66	50.83	74.00	-23.17	Vertical			
7386.000	10.75	36.34	38.00	44.13	53.22	74.00	-20.78	Vertical			
9848.000	12.63	37.57	36.87	39.83	53.16	74.00	-20.84	Vertical			
12386.320	14.24	38.83	38.70	39.22	53.59	74.00	-20.41	Vertical			
3949.255	7.79	33.47	38.68	44.86	47.44	74.00	-26.56	Horizontal			
4924.000	9.04	34.37	39.07	46.01	50.35	74.00	-23.65	Horizontal			
6060.637	10.48	34.75	38.96	44.57	50.84	74.00	-23.16	Horizontal			
7386.000	10.75	36.34	38.00	44.06	53.15	74.00	-20.85	Horizontal			
9848.000	12.63	37.57	36.87	39.78	53.11	74.00	-20.89	Horizontal			
12694.780	14.70	38.86	39.00	39.17	53.73	74.00	-20.27	Horizontal			

Test mode:		802.11g		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			
3759.672	7.73	32.95	38.59	44.39	46.48	74.00	-27.52	Vertical			
4824.000	8.90	34.19	39.04	45.42	49.47	74.00	-24.53	Vertical			
6060.637	10.48	34.75	38.96	44.46	50.73	74.00	-23.27	Vertical			
7236.000	10.69	36.40	38.15	42.68	51.62	74.00	-22.38	Vertical			
9648.000	12.52	37.53	36.97	39.89	52.97	74.00	-21.03	Vertical			
12243.770	14.36	38.75	38.55	38.97	53.53	74.00	-20.47	Vertical			
3858.877	7.76	33.22	38.64	45.17	47.51	74.00	-26.49	Horizontal			
4824.000	8.90	34.19	39.04	45.58	49.63	74.00	-24.37	Horizontal			
6034.386	10.52	34.73	38.98	44.75	51.02	74.00	-22.98	Horizontal			
7236.000	10.69	36.40	38.15	43.58	52.52	74.00	-21.48	Horizontal			
9648.000	12.52	37.53	36.97	40.54	53.62	74.00	-20.38	Horizontal			
12731.570	14.81	38.85	39.04	38.28	52.90	74.00	-21.10	Horizontal			



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Test mode:		802.11g		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			
3966.435	7.80	33.51	38.69	44.53	47.15	74.00	-26.85	Vertical			
4874.000	8.97	34.28	39.05	45.46	49.66	74.00	-24.34	Vertical			
5939.103	10.39	34.66	39.01	44.78	50.82	74.00	-23.18	Vertical			
7311.000	10.72	36.37	38.07	43.10	52.12	74.00	-21.88	Vertical			
9748.000	12.58	37.55	36.92	39.68	52.89	74.00	-21.11	Vertical			
12120.390	14.46	38.67	38.42	38.40	53.11	74.00	-20.89	Vertical			
3836.607	7.75	33.16	38.63	43.89	46.17	74.00	-27.83	Horizontal			
4874.000	8.97	34.28	39.05	46.19	50.39	74.00	-23.61	Horizontal			
5956.314	10.44	34.67	39.00	45.04	51.15	74.00	-22.85	Horizontal			
7311.000	10.72	36.37	38.07	44.00	53.02	74.00	-20.98	Horizontal			
9748.000	12.58	37.55	36.92	40.55	53.76	74.00	-20.24	Horizontal			
12243.770	14.36	38.75	38.55	39.00	53.56	74.00	-20.44	Horizontal			

Test mode:		802.11g		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			
3842.163	7.76	33.18	38.63	44.75	47.06	74.00	-26.94	Vertical			
4924.000	9.04	34.37	39.07	45.14	49.48	74.00	-24.52	Vertical			
6034.386	10.52	34.73	38.98	44.68	50.95	74.00	-23.05	Vertical			
7386.000	10.75	36.34	38.00	42.88	51.97	74.00	-22.03	Vertical			
9848.000	12.63	37.57	36.87	39.13	52.46	74.00	-21.54	Vertical			
12350.530	14.27	38.81	38.66	39.13	53.55	74.00	-20.45	Vertical			
3847.726	7.76	33.19	38.63	44.30	46.62	74.00	-27.38	Horizontal			
4924.000	9.04	34.37	39.07	44.79	49.13	74.00	-24.87	Horizontal			
6157.871	10.36	34.83	38.90	44.61	50.90	74.00	-23.10	Horizontal			
7386.000	10.75	36.34	38.00	43.42	52.51	74.00	-21.49	Horizontal			
9848.000	12.63	37.57	36.87	39.85	53.18	74.00	-20.82	Horizontal			
12386.320	14.24	38.83	38.70	38.54	52.91	74.00	-21.09	Horizontal			



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Test mode:		802.11n(HT20)		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			
3858.877	7.76	33.22	37.99	44.04	47.03	74.00	-26.97	Vertical			
4924.000	9.04	34.37	38.46	43.74	48.69	74.00	-25.31	Vertical			
6148.967	10.37	34.82	38.15	44.19	51.23	74.00	-22.77	Vertical			
7236.000	10.69	36.40	37.09	41.81	51.81	74.00	-22.19	Vertical			
9648.000	12.52	37.53	35.08	37.13	52.10	74.00	-21.90	Vertical			
12243.770	14.36	38.75	36.19	36.13	53.05	74.00	-20.95	Vertical			
3668.321	7.69	32.69	37.97	44.84	47.25	74.00	-26.75	Horizontal			
4824.000	8.90	34.19	38.41	42.48	47.16	74.00	-26.84	Horizontal			
6043.124	10.50	34.74	38.26	43.13	50.11	74.00	-23.89	Horizontal			
7236.000	10.69	36.40	37.09	41.84	51.84	74.00	-22.16	Horizontal			
9648.000	12.52	37.53	35.08	37.37	52.34	74.00	-21.66	Horizontal			
12173.120	14.42	38.71	36.02	35.95	53.06	74.00	-20.94	Horizontal			

Test mode:		802.11n(HT20)		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			
3781.495	7.73	33.01	37.98	44.88	47.64	74.00	-26.36	Vertical			
4874.000	8.97	34.28	38.44	41.51	46.32	74.00	-27.68	Vertical			
6069.413	10.47	34.76	38.23	43.06	50.06	74.00	-23.94	Vertical			
7311.000	10.72	36.37	37.02	40.94	51.01	74.00	-22.99	Vertical			
9748.000	12.58	37.55	35.03	37.50	52.60	74.00	-21.40	Vertical			
12102.870	14.47	38.66	35.85	35.88	53.16	74.00	-20.84	Vertical			
3847.726	7.76	33.19	37.98	44.32	47.29	74.00	-26.71	Horizontal			
4874.000	8.97	34.28	38.44	41.16	45.97	74.00	-28.03	Horizontal			
5990.888	10.53	34.69	38.30	43.80	50.72	74.00	-23.28	Horizontal			
7311.000	10.72	36.37	37.02	41.38	51.45	74.00	-22.55	Horizontal			
9748.000	12.58	37.55	35.03	37.81	52.91	74.00	-21.09	Horizontal			
11980.900	14.54	38.58	35.60	36.20	53.72	74.00	-20.28	Horizontal			



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Test mode:		802.11n(HT20)		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			
3721.784	7.71	32.84	37.97	43.36	45.94	74.00	-28.06	Vertical			
4924.000	9.04	34.37	38.46	42.69	47.64	74.00	-26.36	Vertical			
6060.637	10.48	34.75	38.24	43.86	50.85	74.00	-23.15	Vertical			
7386.000	10.75	36.34	36.95	41.12	51.26	74.00	-22.74	Vertical			
9848.000	12.63	37.57	34.98	37.10	52.32	74.00	-21.68	Vertical			
12208.390	14.39	38.73	36.10	36.71	53.73	74.00	-20.27	Vertical			
3563.687	7.65	32.39	37.96	44.05	46.13	74.00	-27.87	Horizontal			
4924.000	9.04	34.37	38.46	43.08	48.03	74.00	-25.97	Horizontal			
6202.582	10.30	34.87	38.10	43.21	50.28	74.00	-23.72	Horizontal			
7386.000	10.75	36.34	36.95	41.33	51.47	74.00	-22.53	Horizontal			
9848.000	12.63	37.57	34.98	37.26	52.48	74.00	-21.52	Horizontal			
12137.940	14.45	38.68	35.93	36.03	53.23	74.00	-20.77	Horizontal			

Test mode:		802.11n(HT40)		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			
3831.060	7.75	33.15	37.98	43.44	46.36	74.00	-27.64	Vertical			
4844.000	8.92	34.23	38.42	40.92	45.65	74.00	-28.35	Vertical			
5939.103	10.39	34.66	38.31	43.69	50.43	74.00	-23.57	Vertical			
7266.000	10.70	36.39	37.06	41.47	51.50	74.00	-22.50	Vertical			
9688.000	12.54	37.54	35.06	37.18	52.20	74.00	-21.80	Vertical			
11980.900	14.54	38.58	35.60	35.87	53.39	74.00	-20.61	Vertical			
3781.495	7.73	33.01	37.98	44.26	47.02	74.00	-26.98	Horizontal			
4844.000	8.92	34.23	38.42	40.75	45.48	74.00	-28.52	Horizontal			
5930.516	10.37	34.66	38.31	43.78	50.50	74.00	-23.50	Horizontal			
7266.000	10.70	36.39	37.06	41.15	51.18	74.00	-22.82	Horizontal			
9688.000	12.54	37.54	35.06	37.54	52.56	74.00	-21.44	Horizontal			
12137.940	14.45	38.68	35.93	35.93	53.13	74.00	-20.87	Horizontal			



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Test mode:		802.11n(HT40)	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	
3657.721	7.69	32.66	37.97	44.10	46.48	74.00	-27.52	Vertical	
4874.000	8.97	34.28	38.44	42.25	47.06	74.00	-26.94	Vertical	
6051.874	10.49	34.74	38.25	43.40	50.38	74.00	-23.62	Vertical	
7311.000	10.72	36.37	37.02	41.63	51.70	74.00	-22.30	Vertical	
9748.000	12.58	37.55	35.03	37.29	52.39	74.00	-21.61	Vertical	
12208.390	14.39	38.73	36.10	36.53	53.55	74.00	-20.45	Vertical	
3831.060	7.75	33.15	37.98	44.63	47.55	74.00	-26.45	Horizontal	
4874.000	8.97	34.28	38.44	41.39	46.20	74.00	-27.80	Horizontal	
6016.949	10.54	34.71	38.28	43.07	50.04	74.00	-23.96	Horizontal	
7311.000	10.72	36.37	37.02	41.73	51.80	74.00	-22.20	Horizontal	
9748.000	12.58	37.55	35.03	37.81	52.91	74.00	-21.09	Horizontal	
12085.370	14.49	38.65	35.80	35.88	53.22	74.00	-20.78	Horizontal	

Test mode:		802.11n(HT40)		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			
3737.975	7.72	32.89	37.97	44.78	47.42	74.00	-26.58	Vertical			
4904.000	9.01	34.33	38.45	43.31	48.20	74.00	-25.80	Vertical			
6025.661	10.53	34.72	38.27	43.32	50.30	74.00	-23.70	Vertical			
7356.000	10.74	36.36	36.98	41.77	51.89	74.00	-22.11	Vertical			
9808.000	12.61	37.56	35.00	37.64	52.81	74.00	-21.19	Vertical			
12015.620	14.55	38.61	35.64	36.06	53.58	74.00	-20.42	Vertical			
3842.163	7.76	33.18	37.98	44.61	47.57	74.00	-26.43	Horizontal			
4904.000	9.01	34.33	38.45	42.97	47.86	74.00	-26.14	Horizontal			
6078.201	10.46	34.76	38.22	43.47	50.47	74.00	-23.53	Horizontal			
7356.000	10.74	36.36	36.98	41.49	51.61	74.00	-22.39	Horizontal			
9808.000	12.61	37.56	35.00	37.17	52.34	74.00	-21.66	Horizontal			
12120.390	14.46	38.67	35.89	36.04	53.28	74.00	-20.72	Horizontal			

Remark:

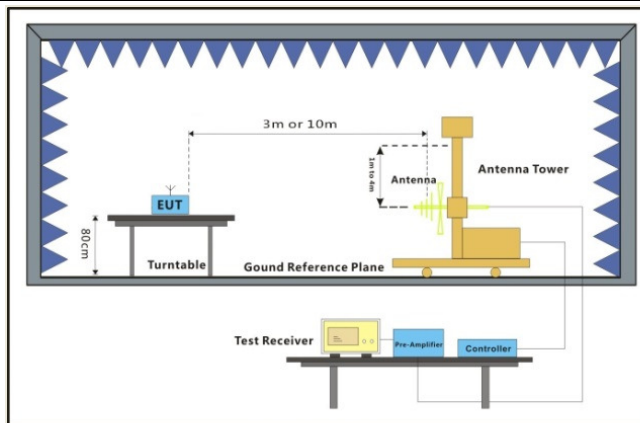
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

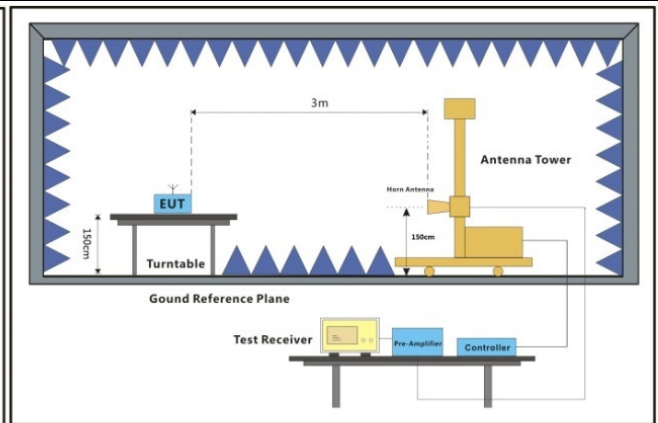
- 2) Scan from 9kHz to 25GHz, The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .

6.9 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15, Subpart C 15.209 & 15.247(d)		
Test Method:	ANSI C63.10 (2013) Section 11.12		
Test Site:	Measurement Distance: 3m		
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:			



30MHz-1GHz



Above 1GHz



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Test Procedure:	a. The EUT was placed on the top of a rotating table 0.8/1.5 meters above the ground at a 3 meter semi-anechoic/full-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. 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.															
Instruments Used:	Refer to section 4.10 for details															
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode															
Final Test Mode:	Through Pre-scan, find the worst case for each modulation type is below: <table><tr><th>Modulation Type</th><th>Data Rate</th><th>Antenna</th></tr><tr><td>802.11b</td><td>1Mbps</td><td>SISO: Antenna a</td></tr><tr><td>802.11g</td><td>6Mbps</td><td>SISO: Antenna a</td></tr><tr><td>802.11n(HT20)</td><td>MCS0</td><td>MIMO: Antenna a+b</td></tr><tr><td>802.11n(HT40)</td><td>MCS0</td><td>MIMO: Antenna a+b</td></tr></table> Only the worst case is recorded in the report.	Modulation Type	Data Rate	Antenna	802.11b	1Mbps	SISO: Antenna a	802.11g	6Mbps	SISO: Antenna a	802.11n(HT20)	MCS0	MIMO: Antenna a+b	802.11n(HT40)	MCS0	MIMO: Antenna a+b
Modulation Type	Data Rate	Antenna														
802.11b	1Mbps	SISO: Antenna a														
802.11g	6Mbps	SISO: Antenna a														
802.11n(HT20)	MCS0	MIMO: Antenna a+b														
802.11n(HT40)	MCS0	MIMO: Antenna a+b														
Test Results:	Pass															

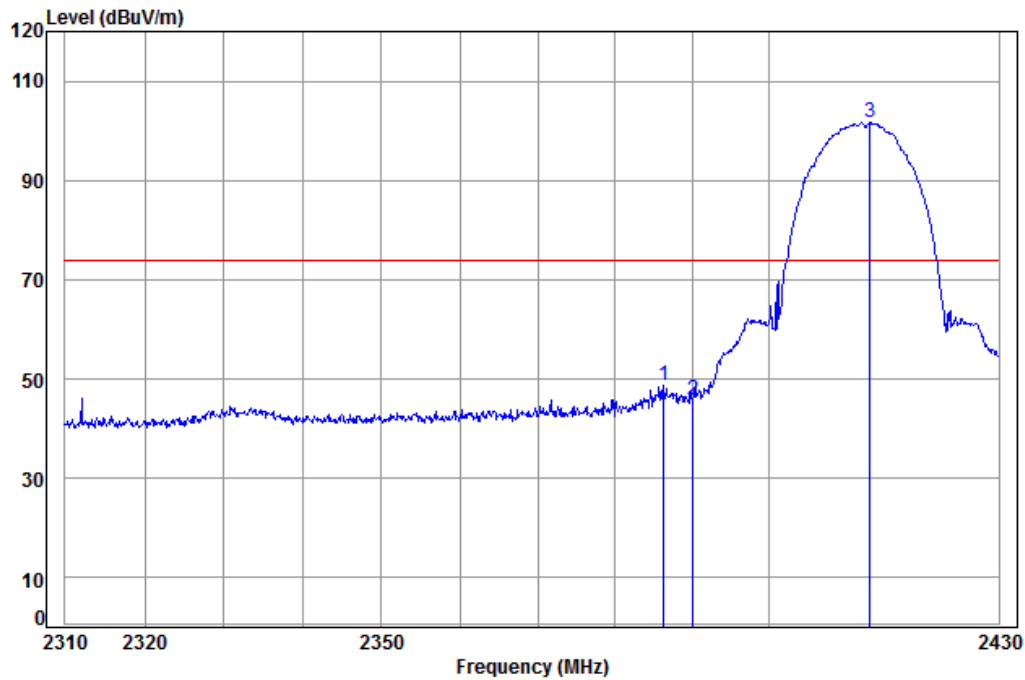


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Worse case mode:	802.11b	Test channel:	Lowest	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 11090CR

Mode: : 2412 Bandedge

: WIFI-B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2386.219	5.33	29.07	37.96	52.16	48.60	74.00	-25.40
2	2390.000	5.34	29.08	37.96	49.23	45.69	74.00	-28.31
3 pp	2413.076	5.35	29.15	37.96	105.17	101.71	74.00	27.71

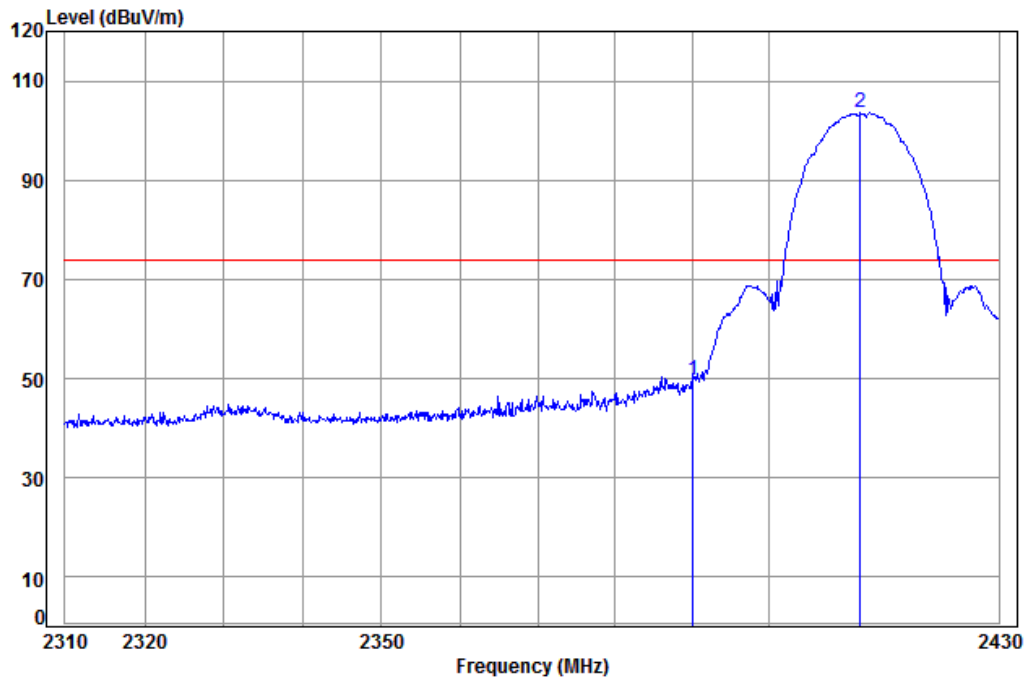


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Worse case mode:	802.11b	Test channel:	Lowest	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 11090CR

Mode: : 2412 Bandedge

: WIFI-B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	5.34	29.08	37.96	53.35	49.81	74.00	-24.19
2 pp	2411.854	5.35	29.14	37.96	107.04	103.57	74.00	29.57

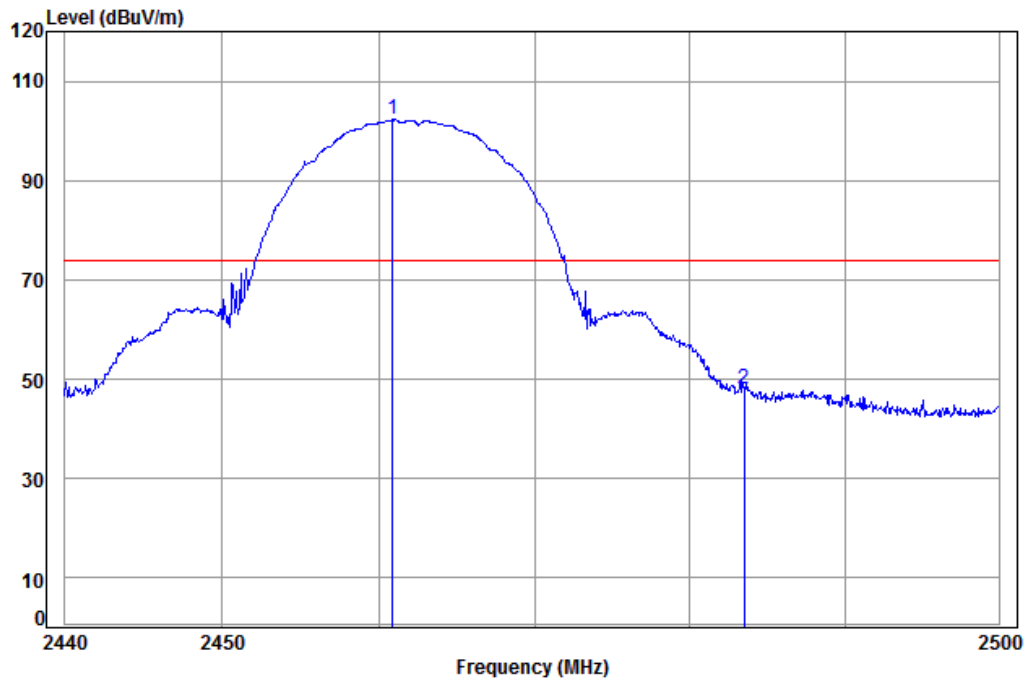


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Worse case mode:	802.11b	Test channel:	Highest	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 11090CR

Mode: : 2462 Bandedge

: WIFI-B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	2460.894	5.39	29.29	37.95	105.51	102.24	74.00	28.24
2	2483.500	5.41	29.35	37.95	51.14	47.95	74.00	-26.05

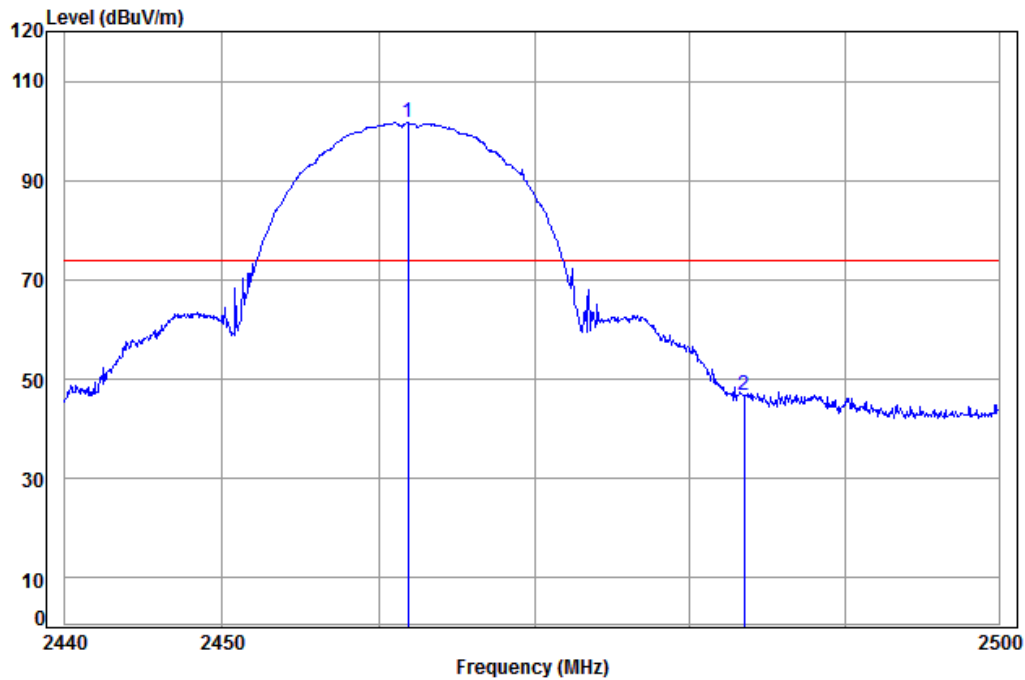


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Worse case mode:	802.11b	Test channel:	Highest	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 11090CR

Mode: : 2462 Bandedge

: WIFI-B

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp 2461.851	5.39	29.29	37.95	104.89	101.62	74.00	27.62
2	2483.500	5.41	29.35	37.95	50.03	46.84	74.00	-27.16

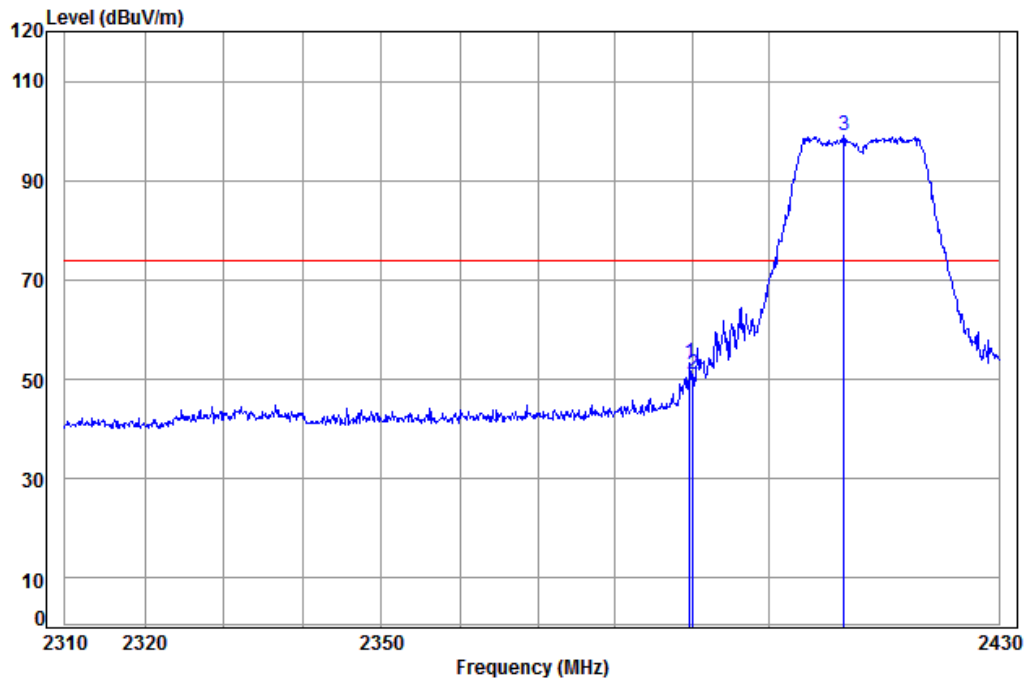


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Worse case mode:	802.11g	Test channel:	Lowest	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 11090CR

Mode: : 2412 Bandedge

: WIFI-G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.605	5.34	29.08	37.96	56.99	53.45	74.00	-20.55
2	2390.000	5.34	29.08	37.96	54.51	50.97	74.00	-23.03
3 pp	2409.657	5.35	29.14	37.96	102.44	98.97	74.00	24.97

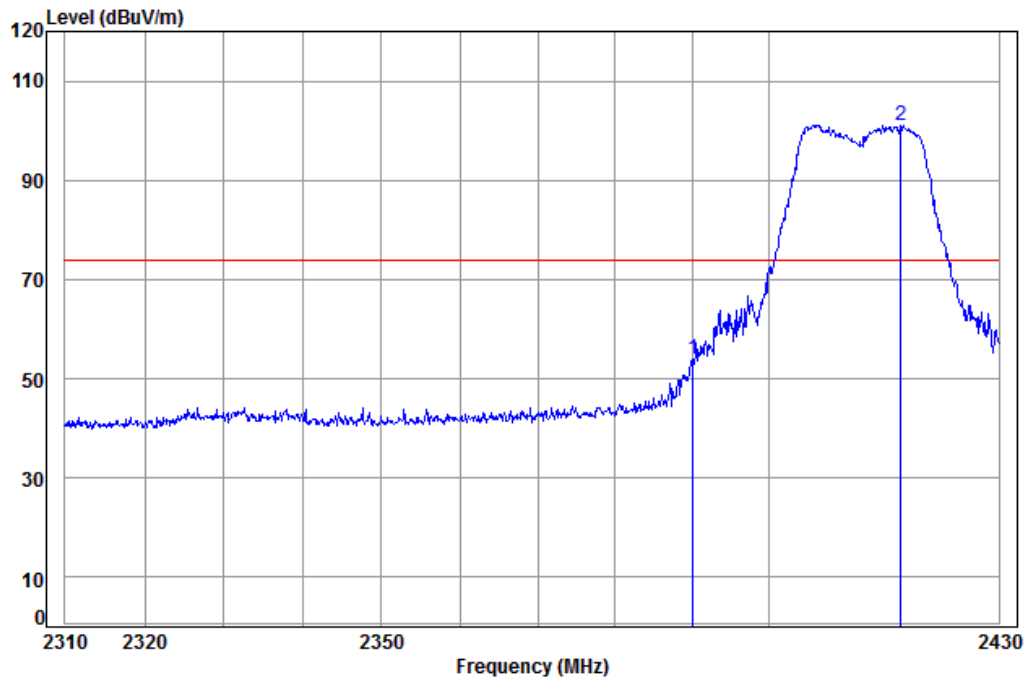


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Worse case mode:	802.11g	Test channel:	Lowest	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 11090CR

Mode: : 2412 Bandedge

: WIFI-G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	5.34	29.08	37.96	57.49	53.95	74.00	-20.05
2 pp	2417.113	5.36	29.16	37.96	104.58	101.14	74.00	27.14

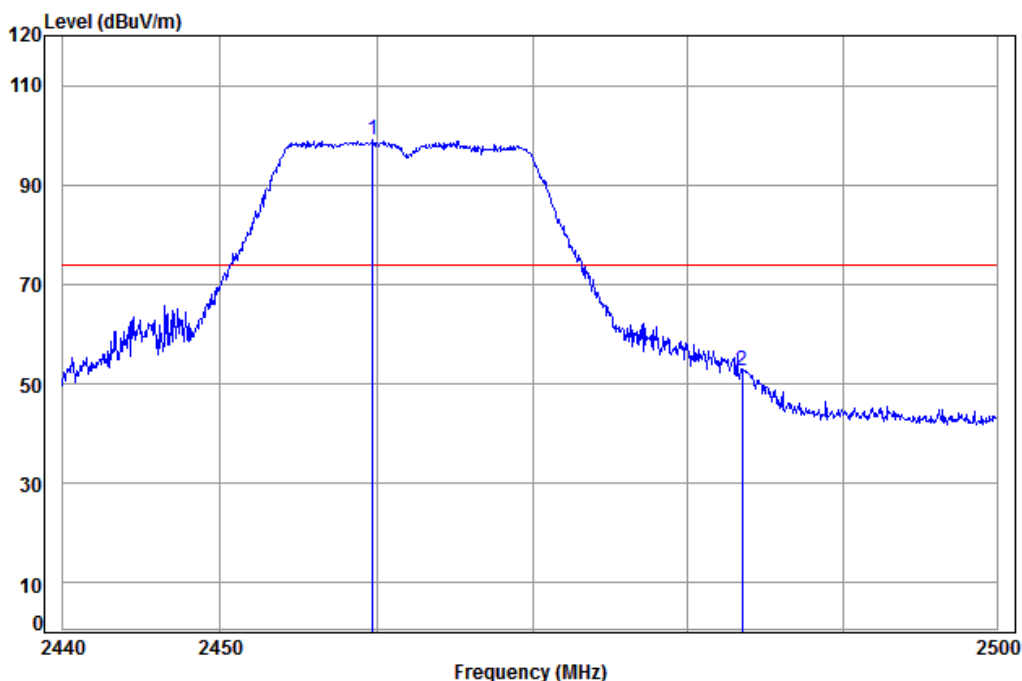


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Worse case mode:	802.11g	Test channel:	Highest	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 11090CR

Mode: : 2462 Bandedge

: WIFI-G

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp 2459.759	5.39	29.28	37.95	102.33	99.05	74.00	25.05
2 pk 2483.500	5.41	29.35	37.95	55.76	52.57	74.00	-21.43 Peak

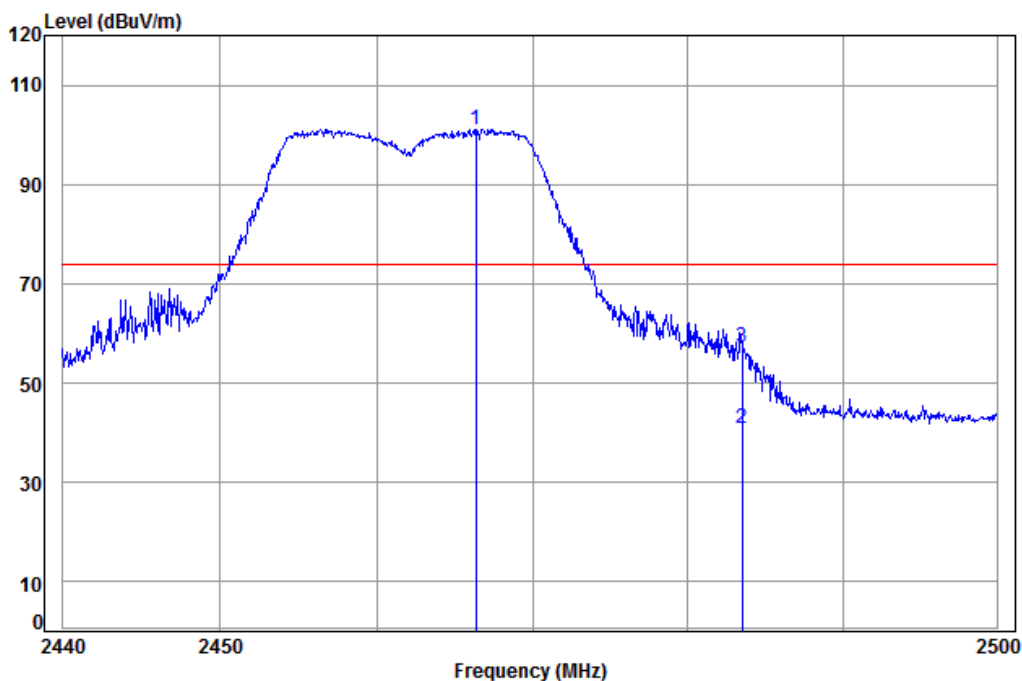


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Worse case mode:	802.11g	Test channel:	Highest	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 11090CR

Mode: : 2462 Bandedge

: WIFI-G

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp 2466.340	5.40	29.30	37.95	104.39	101.14	74.00	27.14
2	av 2483.500	5.41	29.35	37.95	44.13	40.94	54.00	-13.06 Average
3	pk 2483.500	5.41	29.35	37.95	60.45	57.26	74.00	-16.74 Peak

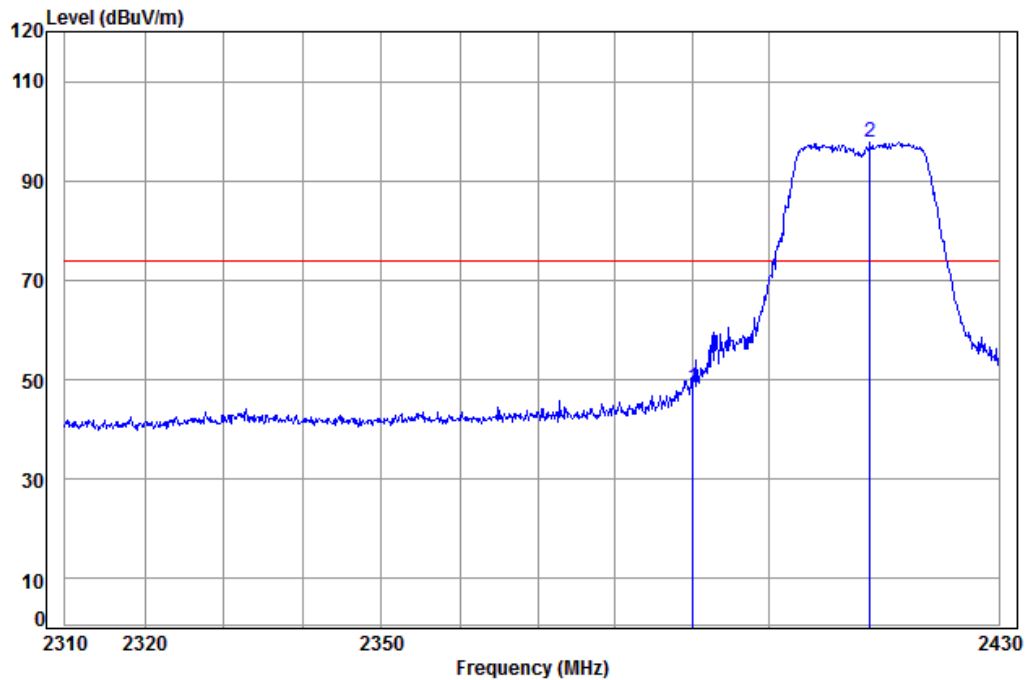


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Worse case mode:	802.11n(HT20)	Test channel:	Lowest	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 11090CR

Mode: : 2412 Bandedge

: WIFI-N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	5.34	29.08	37.96	52.04	48.50	74.00	-25.50
2 pp	2413.076	5.35	29.15	37.96	101.30	97.84	74.00	23.84

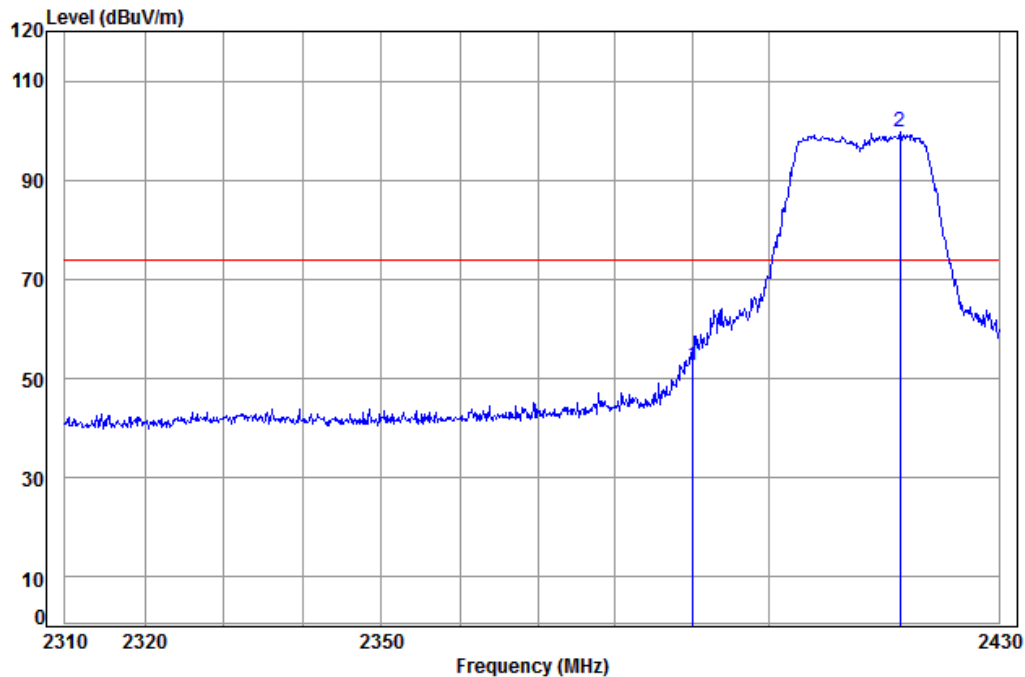


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Worse case mode:	802.11n(HT20)	Test channel:	Lowest	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 11090CR

Mode: : 2412 Bandedge

: WIFI-N20

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	5.34	29.08	37.96	56.25	52.71	74.00	-21.29
2	2416.990	5.36	29.16	37.96	103.09	99.65	74.00	25.65

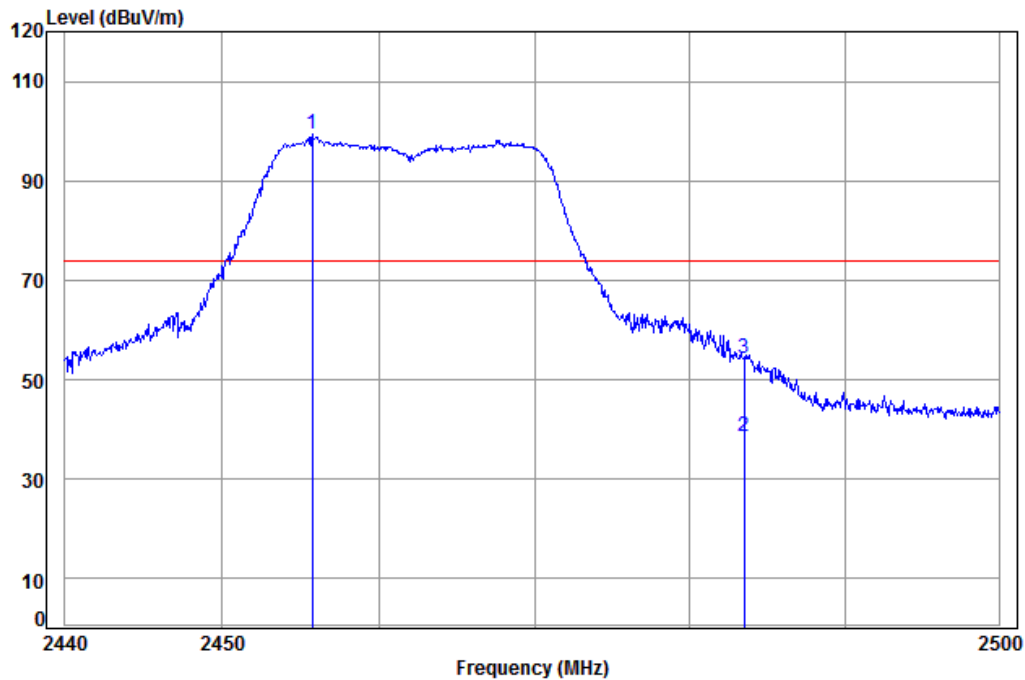


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Worse case mode:	802.11n(HT20)	Test channel:	Highest	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 11090CR

Mode: : 2462 Bandedge

: WIFI-N20

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp 2455.758	5.39	29.27	37.95	102.57	99.28	74.00	25.28
2	av 2483.500	5.41	29.35	37.95	41.81	38.62	54.00	-15.38 Average
3	pk 2483.500	5.41	29.35	37.95	57.48	54.29	74.00	-19.71 Peak

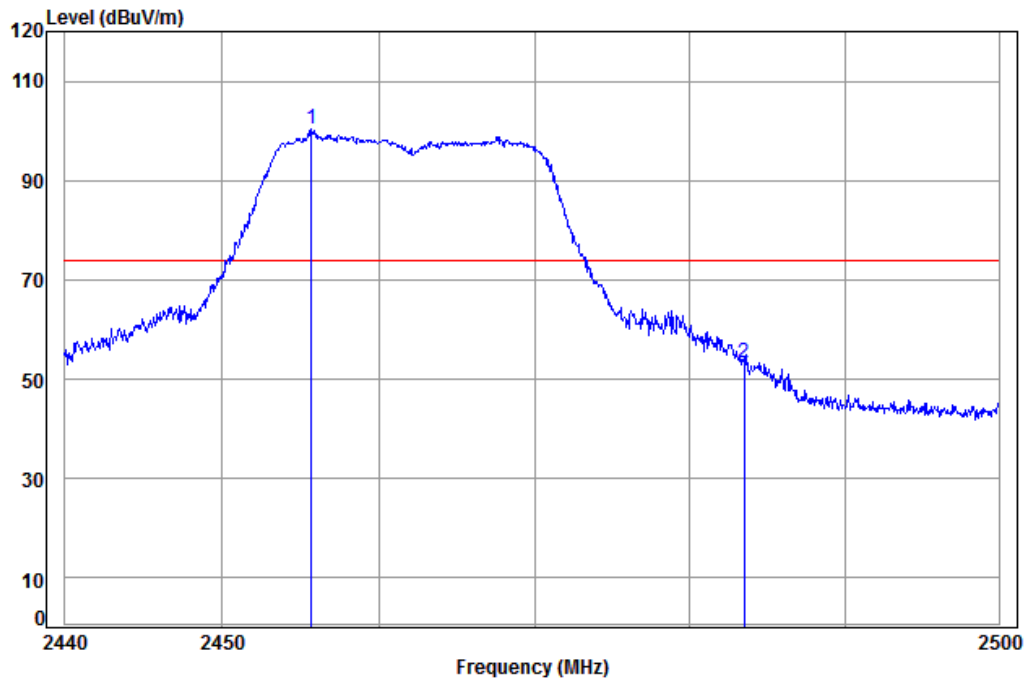


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Worse case mode:	802.11n(HT20)	Test channel:	Highest	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 11090CR

Mode: : 2462 Bandedge

: WIFI-N20

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp 2455.699	5.39	29.27	37.95	103.53	100.24	74.00	26.24
2	2483.500	5.41	29.35	37.95	56.36	53.17	74.00	-20.83

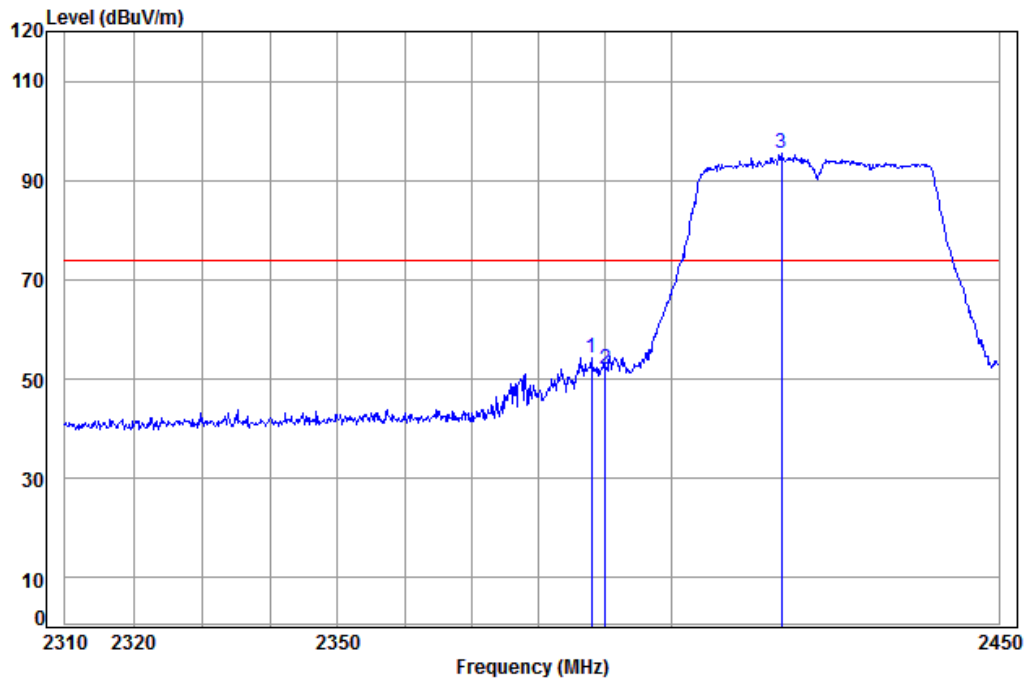


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Worse case mode:	802.11n(HT40)	Test channel:	Lowest	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 11090CR

Mode: : 2422 Bandedge

: WIFI-N40

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2387.946	5.34	29.07	37.96	57.89	54.34	74.00	-19.66	
2	2390.000	5.34	29.08	37.96	55.69	52.15	74.00	-21.85	
3 pp	2416.640	5.36	29.16	37.96	99.00	95.56	74.00	21.56	

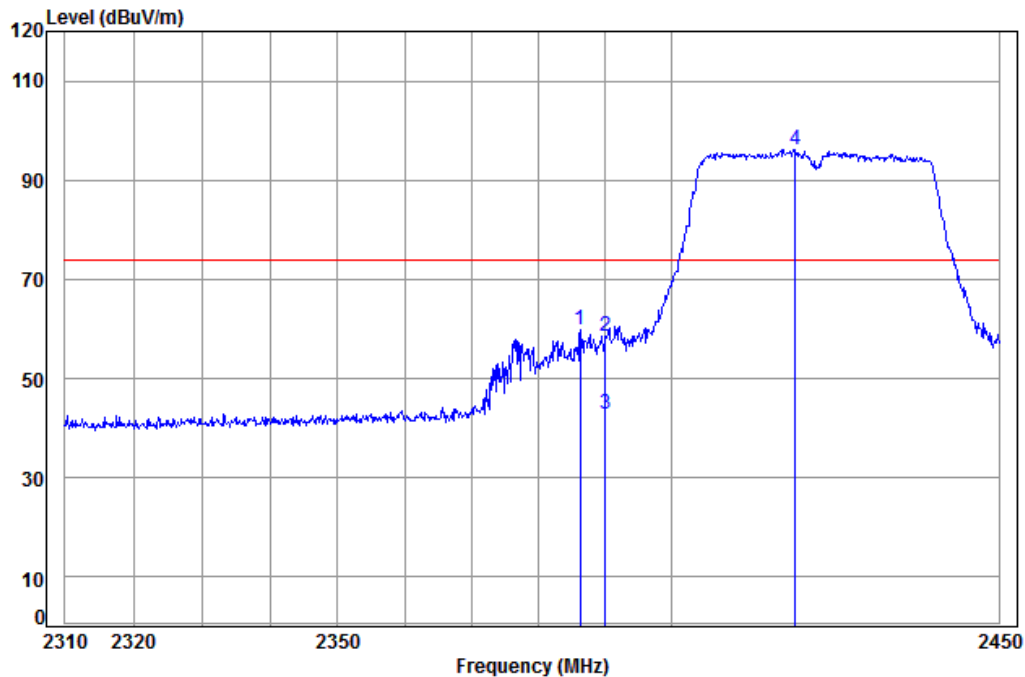


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Worse case mode:	802.11n(HT40)	Test channel:	Lowest	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 11090CR

Mode: : 2422 Bandedge

: WIFI-N40

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2386.260	5.33	29.07	37.96	63.34	59.78	74.00	-14.22	
2	2390.000	5.34	29.08	37.96	61.96	58.42	74.00	-15.58	
3 av	2390.000	5.34	29.08	37.96	46.51	42.97	54.00	-11.03	Average
4 pp	2418.774	5.36	29.16	37.96	99.71	96.27	74.00	22.27	

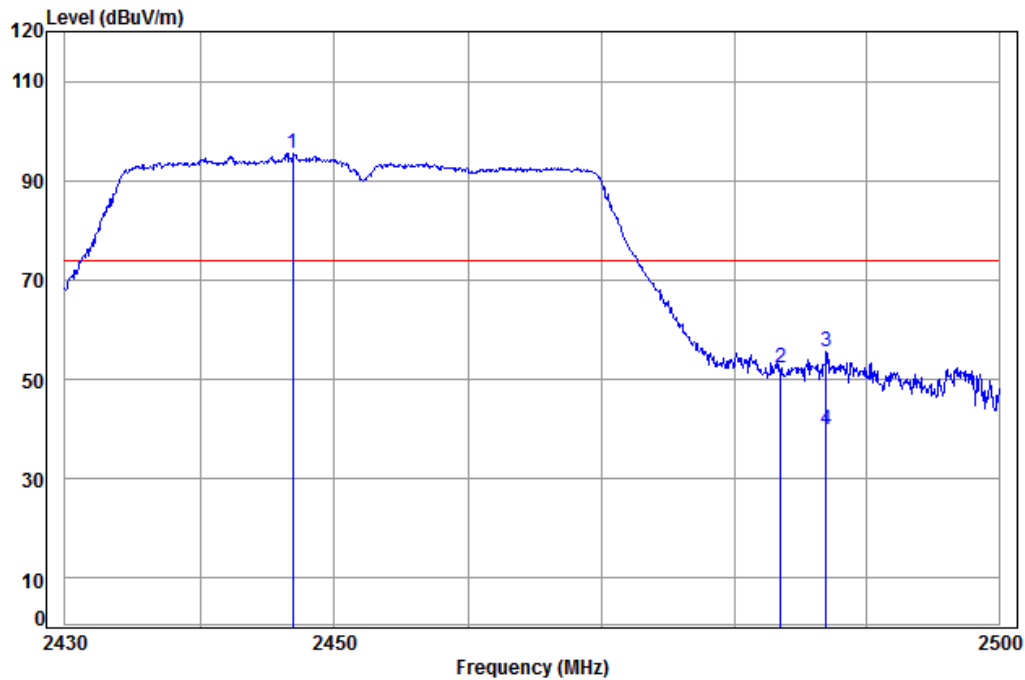


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Worse case mode:	802.11n(HT40)	Test channel:	Highest	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 11090CR

Mode: : 2452 Bandedge

: WIFI-N40

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp 2446.897	5.38	29.25	37.96	98.79	95.46	74.00	21.46
2	2483.500	5.41	29.35	37.95	55.44	52.25	74.00	-21.75
3	2486.900	5.41	29.36	37.95	58.65	55.47	74.00	-18.53
4	av 2486.900	5.41	29.36	37.95	42.95	39.77	54.00	-14.23 Average

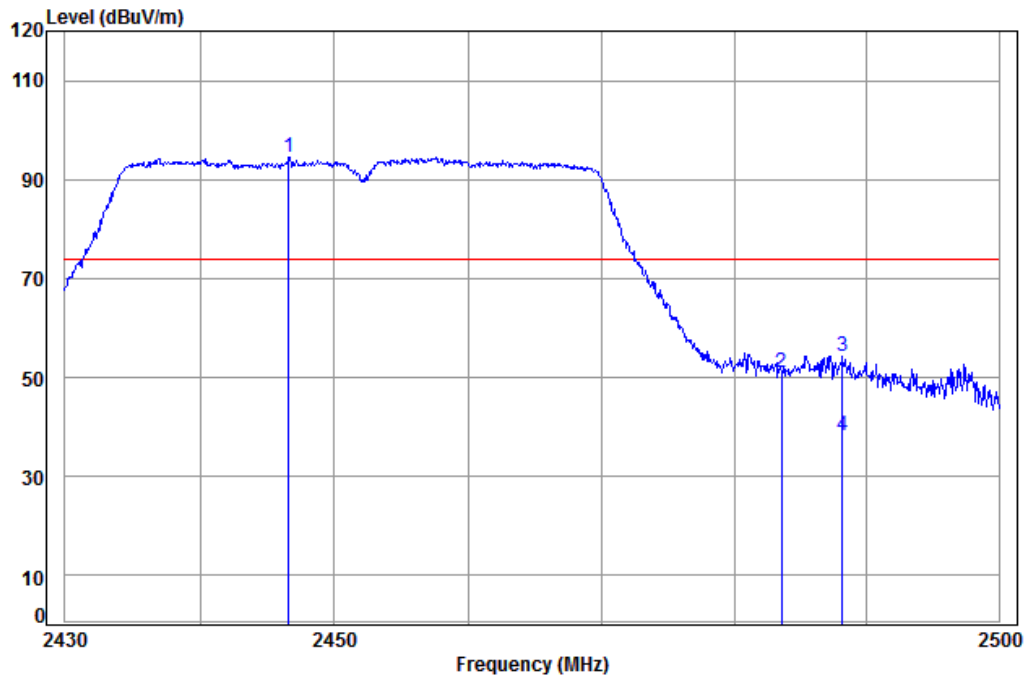


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Worse case mode:	802.11n(HT40)	Test channel:	Highest	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 11090CR

Mode: : 2452 Bandedge

: WIFI-N40

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	2446.619	5.38	29.25	37.96	97.88	94.55	74.00	20.55
2	2483.512	5.41	29.35	37.95	54.26	51.07	74.00	-22.93
3	2488.171	5.41	29.37	37.95	57.55	54.38	74.00	-19.62
4 av	2488.171	5.41	29.37	37.95	41.57	38.40	54.00	-15.60 Average

Note:

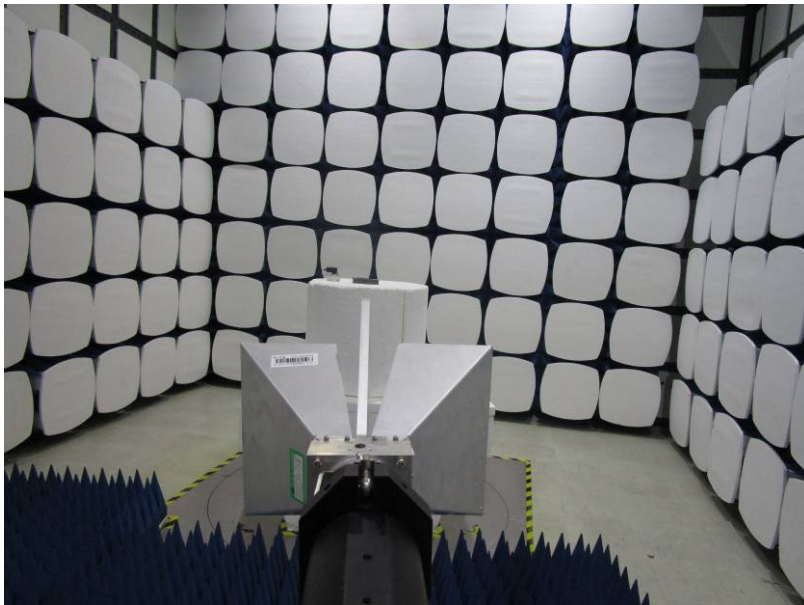
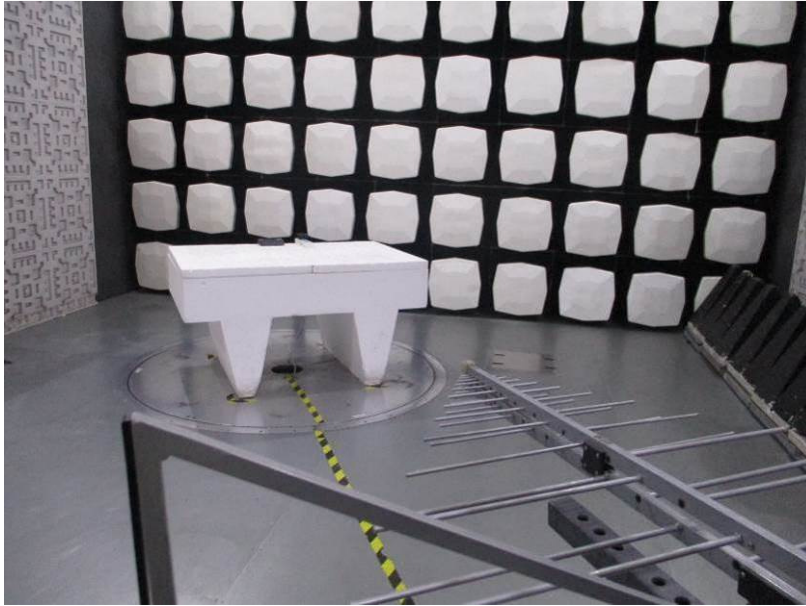
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

7 Photographs

Test model No.: M30WL.11

7.1 Radiated Spurious Emission Test Setup



7.2 Conducted Emission Test Setup



7.3 EUT Constructional Details (External and internal photos)

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1804002458CR.