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

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Development District, Guangzhou, China 510663

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TEST REPORT

Application No.:	GZEM1901010283CR
Applicant:	GMY LIGHTING TECHNOLOGY CO.,LTD
Address of Applicant:	No.328 Xinding Road, Gonghe Town, Heshan City, Guangdong, China
Manufacturer:	The same as applicant.
Address of Manufacturer:	The same as applicant.
Factory:	The same as applicant.
Address of Factory:	The same as applicant.
Equipment Under Test (EUT):	
FCC ID:	2AR38-003
EUT Name:	LED Filament Bulb
Model No.:	A19YY-5D-W01-XXZZ, A21YY-5D-W01-XXZZ, A23YY-5D-W01-XXZZ, ST19YY-5D-W01-XXZZ, ST21YY-5D-W01-XXZZ, G25YY-5D-W01-XXZZ, G30YY-5D-W01-XXZZ, G40YY-5D-W01-XXZZ (XX, ZZ = 00-99, YY = A-Z) ¤
¤	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2019-01-15
Date of Test:	2018-12-28 to 2019-05-24
Date of Issue:	2019-10-21
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Kobe Jian
Lab 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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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2019-10-21		Original

Authorized for issue by:				
Tested By		Jackson Yuan **Jackson_Yuan /Project Engineer**		2018-12-28 to 2019-05-24 **Date**
Checked By		Ricky Liu **Ricky_Liu /Reviewer**		2019-05-28 **Date**

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass①
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass②

Remark:

①②: The EUT passed: Conducted Emissions at AC Power Line (150kHz-30MHz), Radiated Spurious Emissions test after modification.

¤ Declaration of EUT Family Grouping:

Model No.: A19YY-5D-W01-XXZZ, A21YY-5D-W01-XXZZ, A23YY-5D-W01-XXZZ, ST19YY-5D-W01-XXZZ, ST21YY-5D-W01-XXZZ, G25YY-5D-W01-XXZZ, G30YY-5D-W01-XXZZ, G40YY-5D-W01-XXZZ (XX, ZZ = 00-99, YY = A-Z)

According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference on the outer appearance and power.

Therefore only one model A19CL-5D-W01-2750 was tested in this report.

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4 General Information

4.1 Details of E.U.T.

Power Supply:	AC 120 V, 60 Hz
Rated Power:	5W
Test Voltage:	AC 120 V, 60 Hz
Cable:	Cap E27
Antenna Gain	0 dBi
Antenna Type	Integral Antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK)
	802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	802.11b/g/n(HT20):11
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2462MHz
software	SecureCRT

4.2 Environment Parameter

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Value	Temperature(℃)	Voltage(V)
TNVN	25	120
TLVN	0	120
THVN	50	120

Note:
VN: Normal Voltage
TN: Normal Temperature
TL: Low Extreme Test Temperature
TH: High Extreme Test Temperature

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

Using test software was control EUT work in continuous transmitter and receiver mode. And select test channel as below:

For 802.11b/g/n (HT20):

Channel	Frequency
The lowest channel (CH1)	2412MHz
The middle channel (CH7)	2442MHz
The highest channel (CH11)	2462MHz

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4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	T430u	REF. No.SEA1800
BT test board	SGS EMC	RF 07	RF 07

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 5.5 \times 10^{-8}$
2	Duty cycle	±0.57%
3	Occupied Bandwidth	±3%
4	RF Conducted power	±0.68dB
5	RF Power Density	±1.50dB
6	Conducted Spurious Emissions	±1.04dB
7	RF Radiated Power	±4.5dB (below 1GHz)
		±4.8dB (above 1GHz)
8	Radiated Spurious Emission Test	±4.5dB (30MHz-1GHz)
		±4.8dB (1GHz-18GHz)
9	Temperature	±0.4°C
10	Humidity	±1.3%
11	Supply Voltages	±1.5%
12	Time	±3%

4.5 Test Location

All tests were performed at:

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No tests were sub-contracted.

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4.6 Test Facility

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

● NVLAP (Lab Code: 200611-0)

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● ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

● SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● CNAS (Lab Code: L0167)

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ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

● FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)

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● FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818, Jul 13, 2017.

● Industry Canada (Registration No.: 4620B, CAB identifier: CN0052)

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

● VCCI (Registration No.: R-12460, C-12584, G-10449 and T-11179)

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● CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

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4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

The EUT passed: Conducted Emissions at AC Power Line (150kHz-30MHz), Radiated Spurious Emissions test after modification.

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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	Zhong Yu	8m x 3m x 3.8m	EMC0306	N/A	N/A
Two-Line V-Netwok	R&S	ENV216	EMC0118	2019-01-11	2020-01-10
LISN	R&S	ENV216	EMC2135	2018-09-21	2019-09-20
EMI Test Receiver	Rohde & Schwarz	ESCS30	EMC0506	2018-11-19	2019-11-18
Coaxial Cable	HangTianXing	2m	EMC0107	2017-07-23	2019-07-22
Voltage Probe	SGS	N/A	EMC0106	2018-04-04	2020-04-03
Conical Metal Housing	SGS-EMC	N/A	EMC0167	2018-04-19	2020-04-18
Test Software E3c	Audix	Ver. 5.4.1221b	GZE100-62	N/A	N/A

Minimum 6dB Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Signal Analzer	AgilentTechnologies	N9010A	EMC2138	2018-11-19	2019-11-18
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2017-11-02	2019-11-01
MI CABLE	SGS	0.8M	EMC2137	2017-11-02	2019-11-01

Conducted Peak Output Power					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Signal Analzer	AgilentTechnologies	N9010A	EMC2138	2018-11-19	2019-11-18
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2017-11-02	2019-11-01
MI CABLE	SGS	0.8M	EMC2137	2017-11-02	2019-11-01

Power Spectrum Density					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Signal Analzer	AgilentTechnologies	N9010A	EMC2138	2018-11-19	2019-11-18
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2017-11-02	2019-11-01

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MI CABLE	SGS	0.8M	EMC2137	2017-11-02	2019-11-01

Conducted Band Edges Measurement

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	2019-02-24	2020-02-23
ESG Vector Signal Generator	Keysight	E4438C	SEM006-03	2019-04-05	2020-04-04
EXG Analog Signal Generator	AgilentTechnologies	N5171B	SEM006-04	2017-07-26	2020-07-25
Power Meter	AgilentTechnologies	U2021XA_Ch2	SEM009-02	2018-09-20	2019-09-19
Power Meter	AgilentTechnologies	U2021XA_Ch3	SEM009-03	2018-09-20	2019-09-19
EXA Signal Analzer	AgilentTechnologies	N9010A	EMC2138	2018-11-19	2019-11-18
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2017-11-02	2019-11-01
MI CABLE	SGS	0.8M	EMC2137	2017-11-02	2019-11-01

Conducted Spurious Emissions

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analzer	AgilentTechnologies	N9010A	EMC2138	2018-11-19	2019-11-18
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2017-11-02	2019-11-01
MI CABLE	SGS	0.8M	EMC2137	2017-11-02	2019-11-01

Radiated Emissions which fall in the restricted bands

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2017-06-30	2019-06-30
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9160	EMC2025	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6112B	EMC0524	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03
Horn Antenna 1GHz-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2016-09-09	2019-09-08
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08

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Amplifier	HP	8447F	EMC2065	2018-06-01	2019-05-31
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2018-11-19	2019-11-18
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2020-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2017-06-18	2019-06-18
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2018-11-19	2019-11-18
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2018-11-19	2019-11-18
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9168	SEM003-18	2016-06-29	2019-06-28
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Radiated Spurious Emissions

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2017-06-30	2019-06-30
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9160	EMC2025	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6112B	EMC0524	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03
Horn Antenna 1GHz-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2016-09-09	2019-09-08
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08
Amplifier	HP	8447F	EMC2065	2018-06-01	2019-05-31
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2018-11-19	2019-11-18
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2020-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2017-06-18	2019-06-18
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2018-11-19	2019-11-18
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2018-11-19	2019-11-18

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Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9168	SEM003-18	2016-06-29	2019-06-28
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DMM	Fluke	73	EMC0006	2018-07-20	2019-07-19
DMM	Fluke	73	EMC0007	2018-07-19	2019-07-18

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(c)

6.1.2 Conclusion

Standard Requirement:

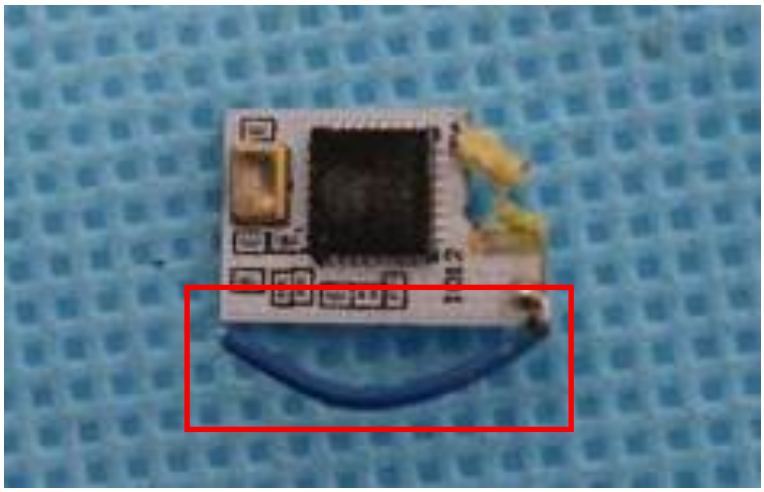
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

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.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0 dBi.



Test result: The unit does meet the FCC requirements.

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7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207
Test Method: ANSI C63.10 (2013) Section 6.2
Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	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.		

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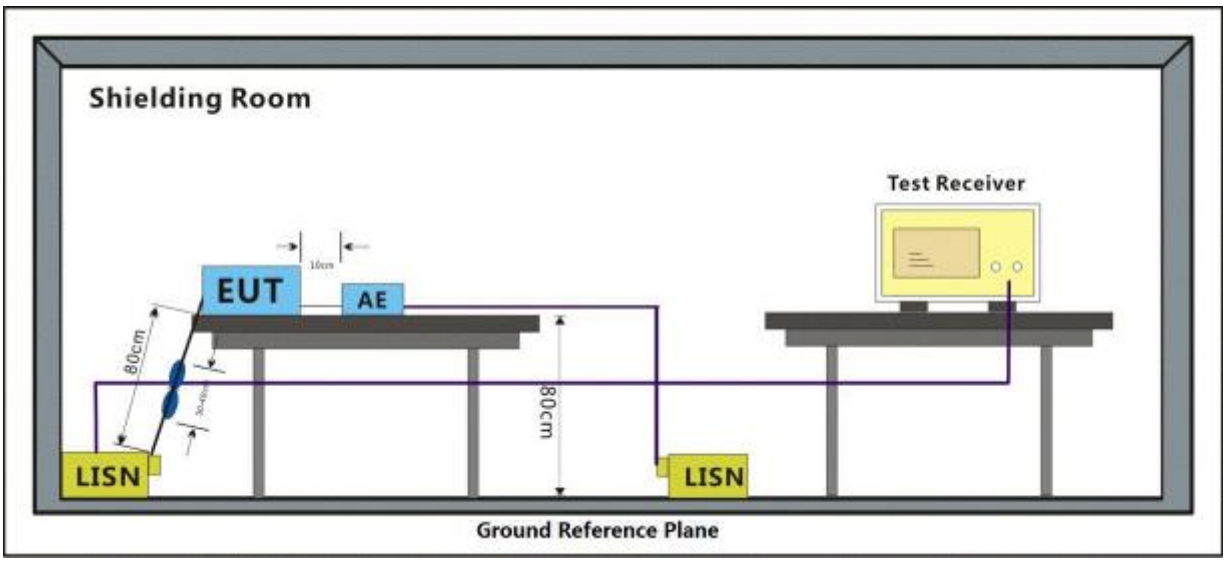
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 23.7 °C Humidity: 53.3 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

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 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

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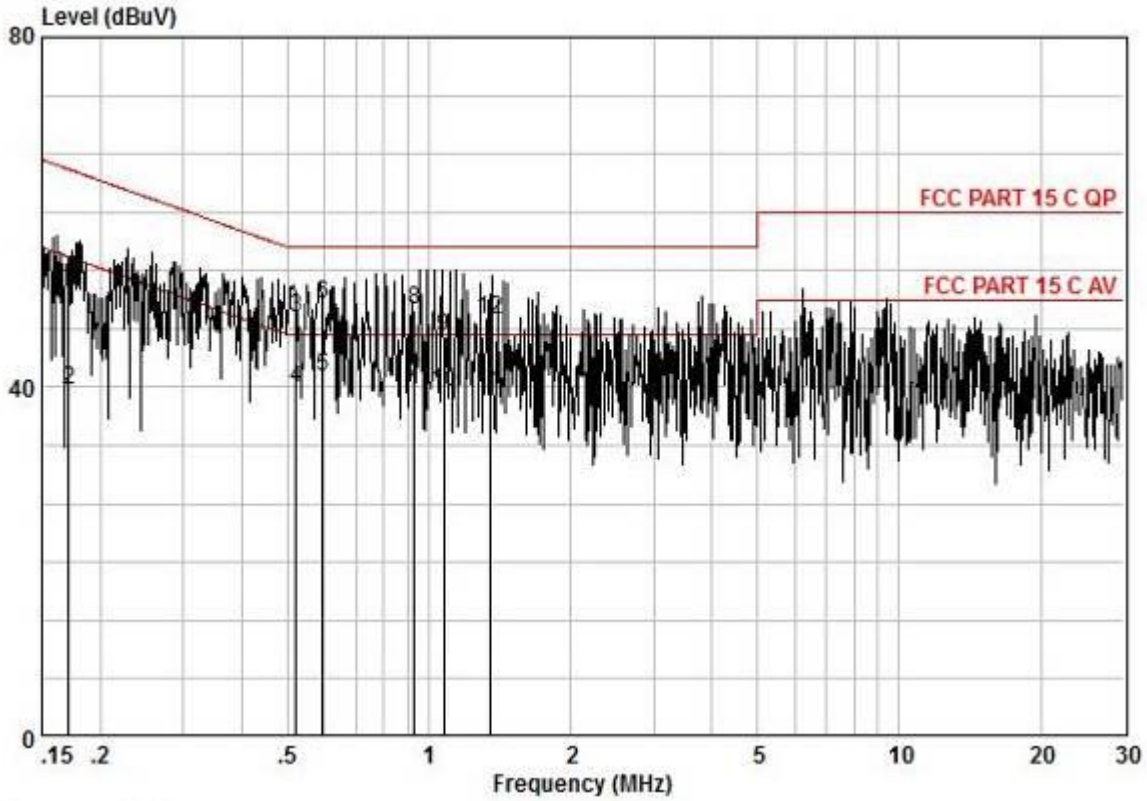
Mode:a; Line:Live Line



Pol :LIVE
No :W01
Model :RT

Frequency MHz	read level dBuV	Cable Loss dB	LISN Factor dB	Measured level dBuV	Limit Line dBuV	Over limit dB	Remark
0.17	41.55	0.10	9.66	51.31	64.90	-13.59	QP
0.17	30.02	0.10	9.66	39.78	54.90	-15.12	AVERAGE
0.52	38.27	0.10	9.67	48.04	56.00	-7.96	QP
0.52	30.19	0.10	9.67	39.96	46.00	-6.04	AVERAGE
0.59	31.39	0.10	9.67	41.16	46.00	-4.84	AVERAGE
0.59	39.66	0.10	9.67	49.43	56.00	-6.57	QP
0.93	30.78	0.10	9.67	40.55	46.00	-5.45	AVERAGE
0.93	38.99	0.10	9.67	48.76	56.00	-7.24	QP
1.07	35.90	0.10	9.67	45.67	56.00	-10.33	QP
1.07	29.60	0.10	9.67	39.37	46.00	-6.63	AVERAGE
1.35	29.42	0.10	9.68	39.20	46.00	-6.80	AVERAGE
1.35	37.97	0.10	9.68	47.75	56.00	-8.25	QP

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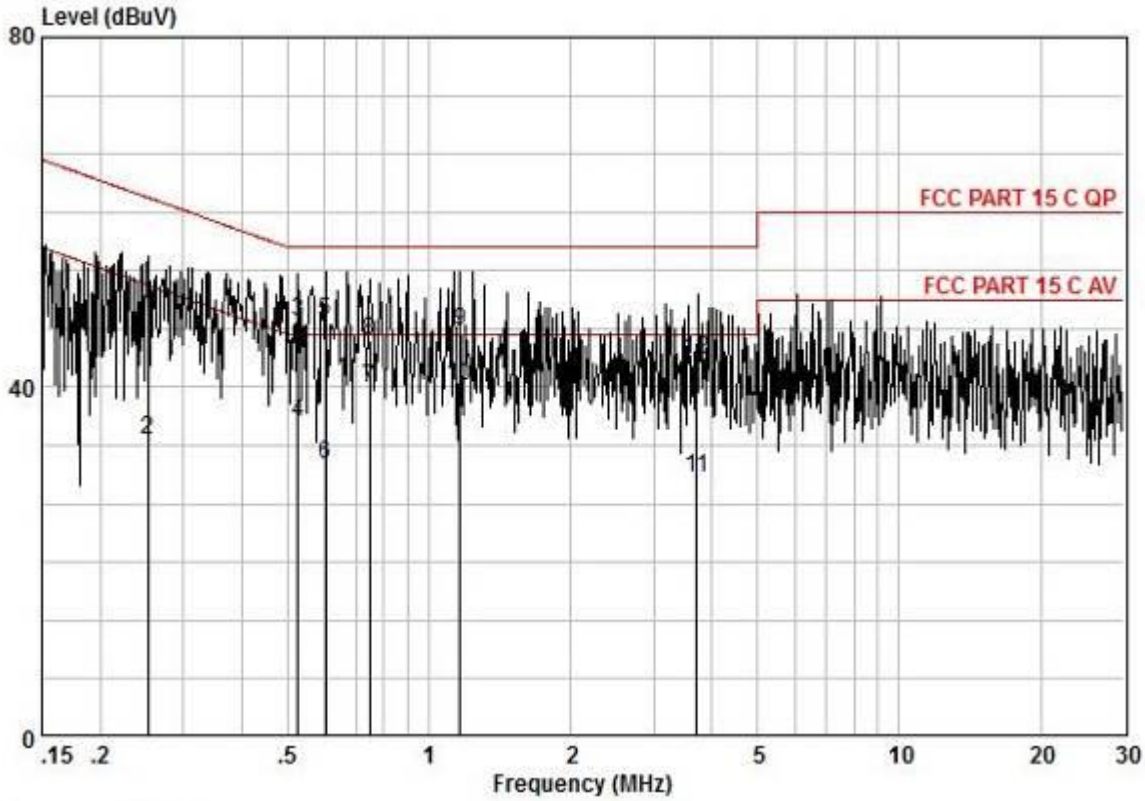
Mode:a; Line:Neutral Line



Pol :NEUTRAL
No :W01
Model :RT

Frequency MHz	read level dBuV	Cable Loss dB	LISN Factor dB	Measured level dBuV	Limit Line dBuV	Over limit dB	Remark
0.25	38.26	0.10	9.59	47.95	61.69	-13.74	QP
0.25	24.38	0.10	9.59	34.07	51.69	-17.62	AVERAGE
0.53	37.85	0.10	9.60	47.55	56.00	-8.45	QP
0.53	26.30	0.10	9.60	36.00	46.00	-10.00	AVERAGE
0.60	37.77	0.10	9.60	47.47	56.00	-8.53	QP
0.60	21.45	0.10	9.60	31.15	46.00	-14.85	AVERAGE
0.75	30.26	0.10	9.61	39.97	46.00	-6.04	AVERAGE
0.75	35.67	0.10	9.61	45.38	56.00	-10.63	QP
1.17	36.64	0.10	9.61	46.35	56.00	-9.65	QP
1.17	30.40	0.10	9.61	40.11	46.00	-5.89	AVERAGE
3.71	19.72	0.20	9.63	29.55	46.00	-16.45	AVERAGE
3.71	33.39	0.20	9.63	43.22	56.00	-12.78	QP

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7.2 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1
Limit: ≥500 kHz

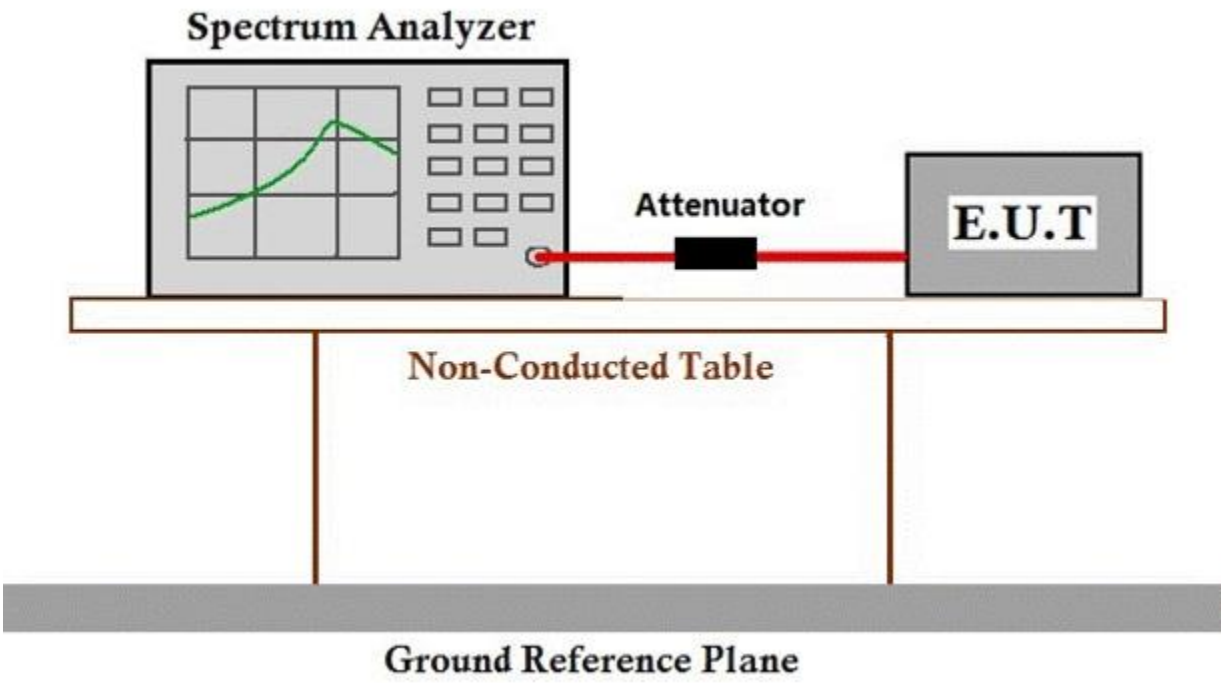
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 50.2 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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7.3 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

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

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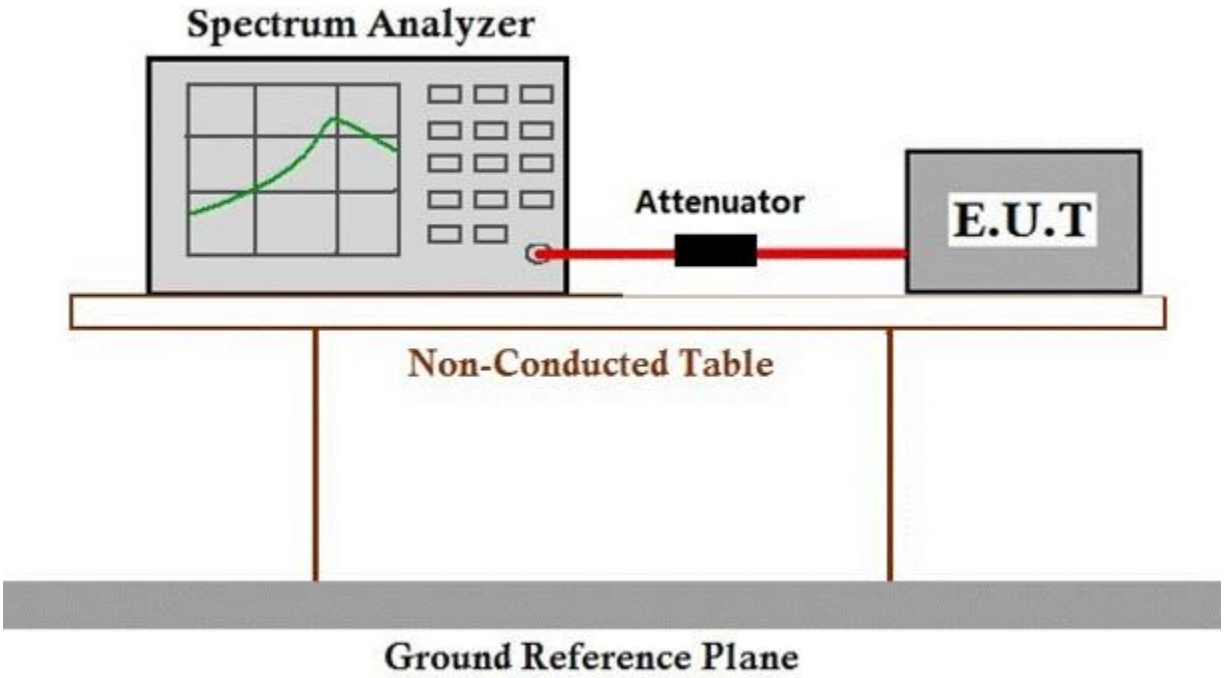
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 50.2 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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7.4 Power Spectrum Density

Test Requirement: 47 CFR Part 15, Subpart C 15.247(e)

Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit: ≤8dBm in any 3 kHz band during any time interval of continuous transmission

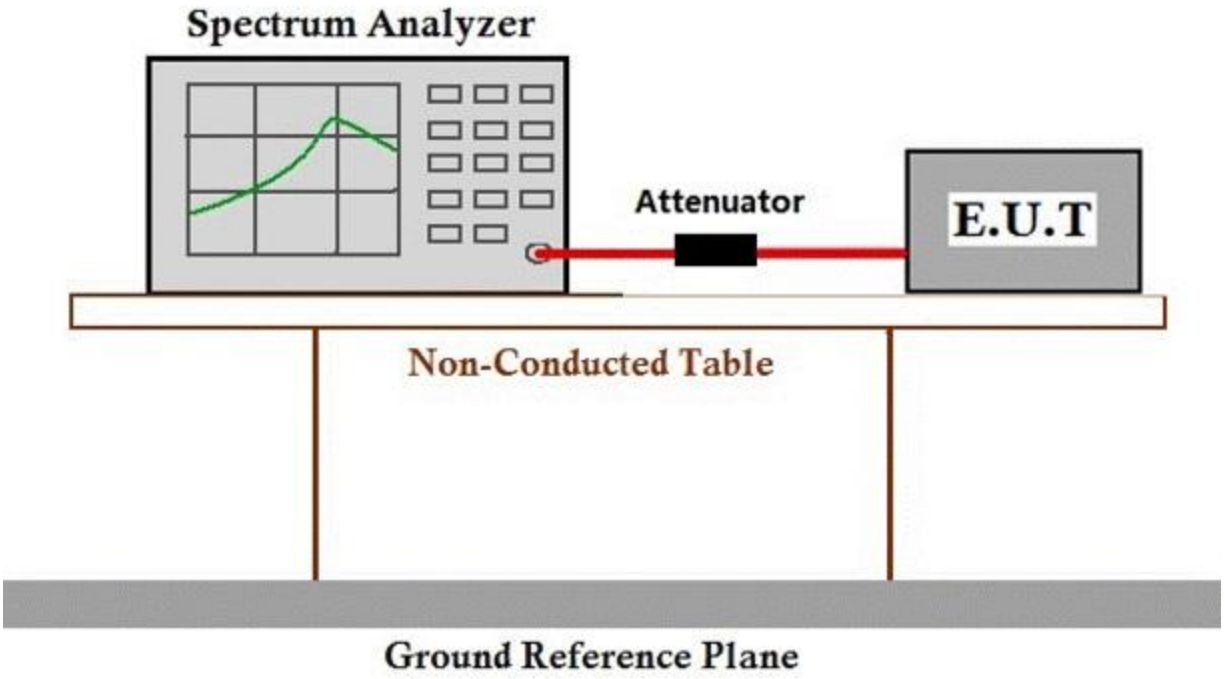
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 50.2 % RH Atmospheric Pressure: 1020 mbar

Test mode: a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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7.5 Conducted Band Edges Measurement

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.13.3.2
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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)

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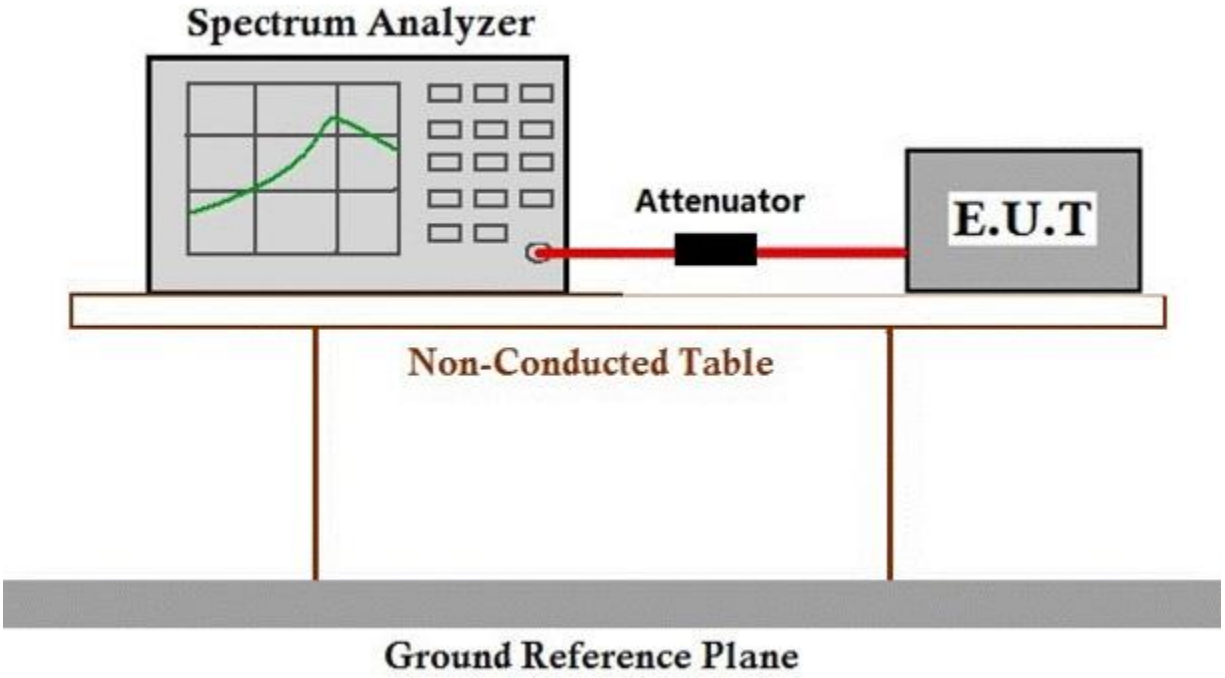
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 50.2 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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7.6 Conducted Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.11
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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)

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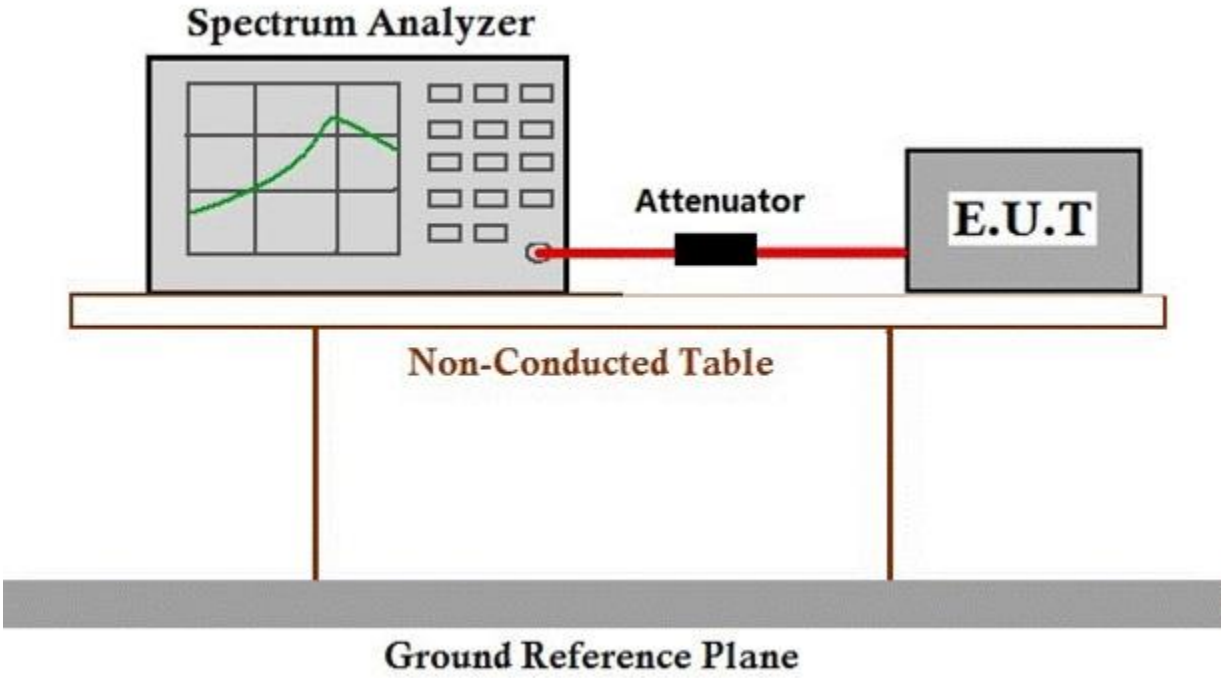
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 50.2 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.6.2 Test Setup Diagram



7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)
Test Method: ANSI C63.10 (2013) Section 6.10.5
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.		

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 62.2 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

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7.7.2 Test Setup Diagram

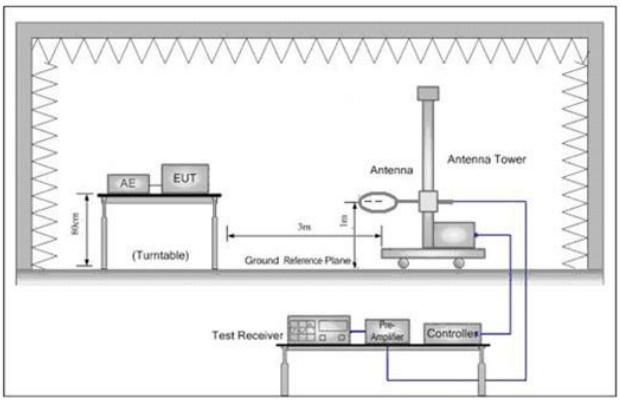

Figure 1. Below 30MHz

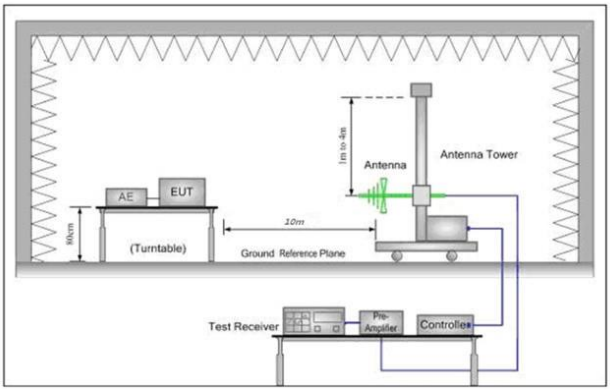

Figure 2. 30MHz to 1GHz

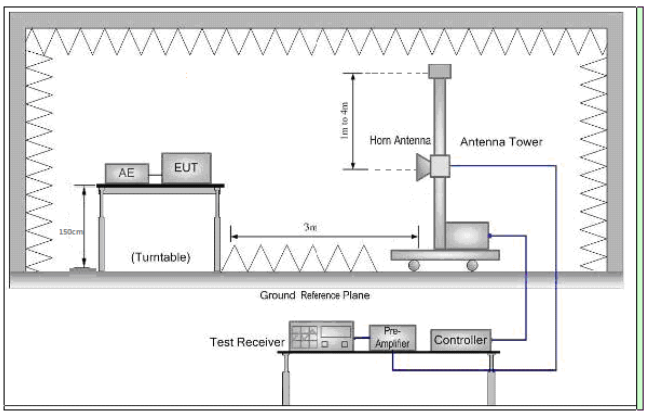

Figure 3. Above 1 GHz

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7.7.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 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 heights 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 the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

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	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	34.72	26.25	5.03	37.44	28.56	54.00	-25.44	HORIZONTAL	Average
2	2310.000	49.40	26.25	5.03	37.44	43.24	74.00	-30.76	HORIZONTAL	Peak
3	2390.000	35.81	26.43	4.88	37.42	29.70	54.00	-24.30	HORIZONTAL	Average
4	2390.000	49.02	26.43	4.88	37.42	42.91	74.00	-31.09	HORIZONTAL	Peak
5	2483.500	34.91	26.58	5.23	37.40	29.32	54.00	-24.68	HORIZONTAL	Average
6	2483.500	49.65	26.58	5.23	37.40	44.06	74.00	-29.94	HORIZONTAL	Peak
7	2500.000	34.82	26.60	4.95	37.39	28.98	54.00	-25.02	HORIZONTAL	Average
8	2500.000	50.24	26.60	4.95	37.39	44.40	74.00	-29.60	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	32.53	26.25	5.03	37.44	26.37	54.00	-27.63	VERTICAL	Average
2	2310.000	46.82	26.25	5.03	37.44	40.66	74.00	-33.34	VERTICAL	Peak
3	2390.000	32.18	26.43	4.88	37.42	26.07	54.00	-27.93	VERTICAL	Average
4	2390.000	47.20	26.43	4.88	37.42	41.09	74.00	-32.91	VERTICAL	Peak
5	2483.500	32.67	26.58	5.23	37.40	27.08	54.00	-26.92	VERTICAL	Average
6	2483.500	47.69	26.58	5.23	37.40	42.10	74.00	-31.90	VERTICAL	Peak
7	2500.000	33.72	26.60	4.95	37.39	27.88	54.00	-26.12	VERTICAL	Average
8	2500.000	48.07	26.60	4.95	37.39	42.23	74.00	-31.77	VERTICAL	Peak

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	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	34.26	26.25	5.03	37.44	28.10	54.00	-25.90	HORIZONTAL	Average
2	2310.000	48.12	26.25	5.03	37.44	41.96	74.00	-32.04	HORIZONTAL	Peak
3	2390.000	34.47	26.43	4.88	37.42	28.36	54.00	-25.64	HORIZONTAL	Average
4	2390.000	48.30	26.43	4.88	37.42	42.19	74.00	-31.81	HORIZONTAL	Peak
5	2483.500	38.76	26.58	5.23	37.40	33.17	54.00	-20.83	HORIZONTAL	Average
6	2483.500	50.83	26.58	5.23	37.40	45.24	74.00	-28.76	HORIZONTAL	Peak
7	2500.000	36.37	26.60	4.95	37.39	30.53	54.00	-23.47	HORIZONTAL	Average
8	2500.000	51.38	26.60	4.95	37.39	45.54	74.00	-28.46	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	34.04	26.25	5.03	37.44	27.88	54.00	-26.12	VERTICAL	Average
2	2310.000	46.63	26.25	5.03	37.44	40.47	74.00	-33.53	VERTICAL	Peak
3	2390.000	33.94	26.43	4.88	37.42	27.83	54.00	-26.17	VERTICAL	Average
4	2390.000	47.42	26.43	4.88	37.42	41.31	74.00	-32.69	VERTICAL	Peak
5	2483.500	33.77	26.58	5.23	37.40	28.18	54.00	-25.82	VERTICAL	Average
6	2483.500	48.44	26.58	5.23	37.40	42.85	74.00	-31.15	VERTICAL	Peak
7	2500.000	32.97	26.60	4.95	37.39	27.13	54.00	-26.87	VERTICAL	Average
8	2500.000	48.43	26.60	4.95	37.39	42.59	74.00	-31.41	VERTICAL	Peak

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	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	43.19	26.25	5.03	37.44	37.03	54.00	-16.97	HORIZONTAL	Average
2	2310.000	56.76	26.25	5.03	37.44	50.60	74.00	-23.40	HORIZONTAL	Peak
3	2390.000	48.01	26.43	4.88	37.42	41.90	54.00	-12.10	HORIZONTAL	Average
4	2390.000	65.64	26.43	4.88	37.42	59.53	74.00	-14.47	HORIZONTAL	Peak
5	2483.500	44.58	26.58	5.23	37.40	38.99	54.00	-15.01	HORIZONTAL	Average
6	2483.500	60.95	26.58	5.23	37.40	55.36	74.00	-18.64	HORIZONTAL	Peak
7	2500.000	45.75	26.60	4.95	37.39	39.91	54.00	-14.09	HORIZONTAL	Average
8	2500.000	58.99	26.60	4.95	37.39	53.15	74.00	-20.85	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	38.06	26.25	5.03	37.44	31.90	54.00	-22.10	VERTICAL	Average
2	2310.000	52.40	26.25	5.03	37.44	46.24	74.00	-27.76	VERTICAL	Peak
3	2390.000	41.18	26.43	4.88	37.42	35.07	54.00	-18.93	VERTICAL	Average
4	2390.000	61.73	26.43	4.88	37.42	55.62	74.00	-18.38	VERTICAL	Peak
5	2483.500	43.52	26.58	5.23	37.40	37.93	54.00	-16.07	VERTICAL	Average
6	2483.500	57.60	26.58	5.23	37.40	52.01	74.00	-21.99	VERTICAL	Peak
7	2500.000	41.79	26.60	4.95	37.39	35.95	54.00	-18.05	VERTICAL	Average
8	2500.000	57.09	26.60	4.95	37.39	51.25	74.00	-22.75	VERTICAL	Peak

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	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	40.13	26.25	5.03	37.44	33.97	54.00	-20.03	HORIZONTAL	Average
2	2310.000	53.74	26.25	5.03	37.44	47.58	74.00	-26.42	HORIZONTAL	Peak
3	2390.000	42.61	26.43	4.88	37.42	36.50	54.00	-17.50	HORIZONTAL	Average
4	2390.000	57.21	26.43	4.88	37.42	51.10	74.00	-22.90	HORIZONTAL	Peak
5	2483.500	47.12	26.58	5.23	37.40	41.53	54.00	-12.47	HORIZONTAL	Average
6	2483.500	65.92	26.58	5.23	37.40	60.33	74.00	-13.67	HORIZONTAL	Peak
7	2500.000	48.49	26.60	4.95	37.39	42.65	54.00	-11.35	HORIZONTAL	Average
8	2500.000	63.02	26.60	4.95	37.39	57.18	74.00	-16.82	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	36.55	26.25	5.03	37.44	30.39	54.00	-23.61	VERTICAL	Average
2	2310.000	49.60	26.25	5.03	37.44	43.44	74.00	-30.56	VERTICAL	Peak
3	2390.000	41.22	26.43	4.88	37.42	35.11	54.00	-18.89	VERTICAL	Average
4	2390.000	51.18	26.43	4.88	37.42	45.07	74.00	-28.93	VERTICAL	Peak
5	2483.500	46.14	26.58	5.23	37.40	40.55	54.00	-13.45	VERTICAL	Average
6	2483.500	61.84	26.58	5.23	37.40	56.25	74.00	-17.75	VERTICAL	Peak
7	2500.000	43.95	26.60	4.95	37.39	38.11	54.00	-15.89	VERTICAL	Average
8	2500.000	58.60	26.60	4.95	37.39	52.76	74.00	-21.24	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	41.15	26.25	5.03	37.44	34.99	54.00	-19.01	HORIZONTAL	Average
2	2310.000	55.58	26.25	5.03	37.44	49.42	74.00	-24.58	HORIZONTAL	Peak
3	2390.000	50.12	26.43	4.88	37.42	44.01	54.00	-9.99	HORIZONTAL	Average
4	2390.000	64.91	26.43	4.88	37.42	58.80	74.00	-15.20	HORIZONTAL	Peak
5	2483.500	46.38	26.58	5.23	37.40	40.79	54.00	-13.21	HORIZONTAL	Average
6	2483.500	59.07	26.58	5.23	37.40	53.48	74.00	-20.52	HORIZONTAL	Peak
7	2500.000	45.65	26.60	4.95	37.39	39.81	54.00	-14.19	HORIZONTAL	Average
8	2500.000	58.16	26.60	4.95	37.39	52.32	74.00	-21.68	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	38.60	26.25	5.03	37.44	32.44	54.00	-21.56	VERTICAL	Average
2	2310.000	50.46	26.25	5.03	37.44	44.30	74.00	-29.70	VERTICAL	Peak
3	2390.000	41.81	26.43	4.88	37.42	35.70	54.00	-18.30	VERTICAL	Average
4	2390.000	60.56	26.43	4.88	37.42	54.45	74.00	-19.55	VERTICAL	Peak
5	2483.500	39.25	26.58	5.23	37.40	33.66	54.00	-20.34	VERTICAL	Average
6	2483.500	55.54	26.58	5.23	37.40	49.95	74.00	-24.05	VERTICAL	Peak
7	2500.000	38.91	26.60	4.95	37.39	33.07	54.00	-20.93	VERTICAL	Average
8	2500.000	54.54	26.60	4.95	37.39	48.70	74.00	-25.30	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2308.475	52.07	26.23	5.04	37.44	45.90	74.00	-28.10	HORIZONTAL	Peak
2	2330.085	53.50	26.30	5.00	37.44	47.36	74.00	-26.64	HORIZONTAL	Peak
3	2375.662	55.24	26.40	4.91	37.43	49.12	74.00	-24.88	HORIZONTAL	Peak
4	2394.083	55.74	26.44	4.87	37.42	49.63	74.00	-24.37	HORIZONTAL	Peak
5	2486.215	64.21	26.58	5.23	37.39	58.63	74.00	-15.37	HORIZONTAL	Peak
6	2501.503	61.09	26.60	4.95	37.39	55.25	74.00	-18.75	HORIZONTAL	Peak
7	2521.827	59.75	26.64	4.98	37.38	53.99	74.00	-20.01	HORIZONTAL	Peak
8	2537.644	59.73	26.66	5.00	37.38	54.01	74.00	-19.99	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	35.32	26.25	5.03	37.44	29.16	54.00	-24.84	VERTICAL	Average
2	2310.000	47.58	26.25	5.03	37.44	41.42	74.00	-32.58	VERTICAL	Peak
3	2390.000	38.55	26.43	4.88	37.42	32.44	54.00	-21.56	VERTICAL	Average
4	2390.000	50.92	26.43	4.88	37.42	44.81	74.00	-29.19	VERTICAL	Peak
5	2483.500	46.48	26.58	5.23	37.40	40.89	54.00	-13.11	VERTICAL	Average
6	2483.500	60.75	26.58	5.23	37.40	55.16	74.00	-18.84	VERTICAL	Peak
7	2500.000	44.66	26.60	4.95	37.39	38.82	54.00	-15.18	VERTICAL	Average
8	2500.000	57.60	26.60	4.95	37.39	51.76	74.00	-22.24	VERTICAL	Peak

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7.8 Radiated Spurious Emissions

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
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.		

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7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 62.2 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.8.2 Test Setup Diagram

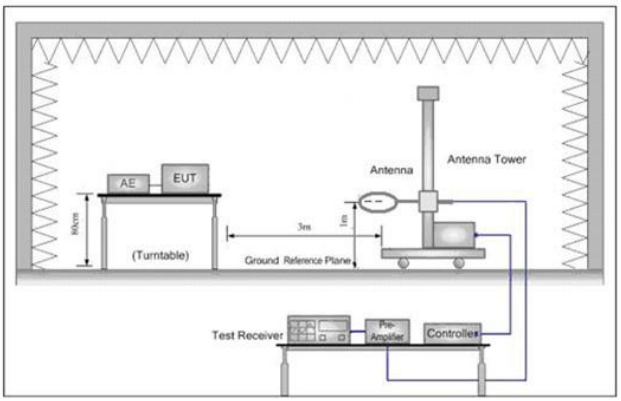

Figure 1. Below 30MHz

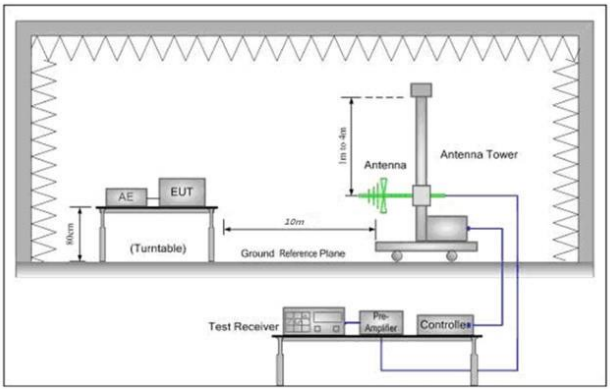

Figure 2. 30MHz to 1GHz

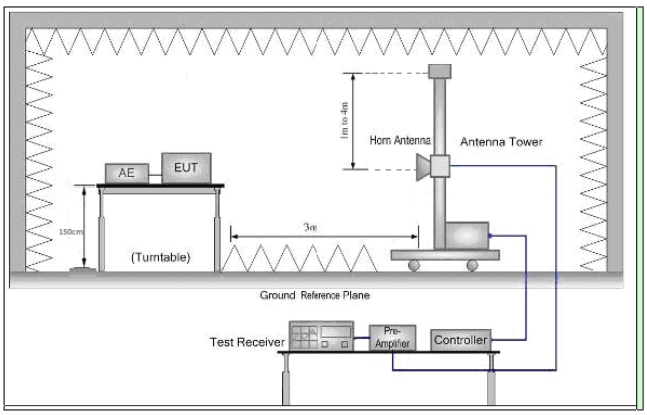

Figure 3. Above 1 GHz

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7.8.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 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 heights 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 the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark:

1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) 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

3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

4) 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown

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Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	40.702	24.12	12.62	0.62	29.72	7.64	40.00	-32.36	HORIZONTAL	QP
2	54.261	27.91	12.68	0.59	29.69	11.49	40.00	-28.51	HORIZONTAL	QP
3	102.719	34.42	9.79	0.86	29.60	15.47	43.50	-28.03	HORIZONTAL	QP
4	180.649	30.58	12.67	1.34	29.60	14.99	43.50	-28.51	HORIZONTAL	QP
5	679.960	30.05	21.30	2.20	29.95	23.60	46.00	-22.40	HORIZONTAL	QP
6	833.317	32.35	23.08	2.86	29.37	28.92	46.00	-17.08	HORIZONTAL	QP

Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3935.493	32.17	29.37	7.43	36.90	32.07	54.00	-21.93	HORIZONTAL	Average
2	3935.493	44.67	29.37	7.43	36.90	44.57	74.00	-29.43	HORIZONTAL	Peak
3	4824.016	52.08	30.82	6.01	36.94	51.97	54.00	-2.03	HORIZONTAL	Average
4	4824.016	59.56	30.82	6.01	36.94	59.45	74.00	-14.55	HORIZONTAL	Peak
5	7236.052	33.83	35.55	7.35	36.93	39.80	54.00	-14.20	HORIZONTAL	Average
6	7236.052	44.40	35.55	7.35	36.93	50.37	74.00	-23.63	HORIZONTAL	Peak
7	8059.475	31.77	36.46	8.33	36.90	39.66	54.00	-14.34	HORIZONTAL	Average
8	8059.475	45.03	36.46	8.33	36.90	52.92	74.00	-21.08	HORIZONTAL	Peak
9	9648.432	31.75	37.54	8.18	37.08	40.39	54.00	-13.61	HORIZONTAL	Average
10	9648.432	44.75	37.54	8.18	37.08	53.39	74.00	-20.61	HORIZONTAL	Peak
11	12060.600	28.44	39.46	10.71	37.17	41.44	54.00	-12.56	HORIZONTAL	Average
12	12060.600	42.66	39.46	10.71	37.17	55.66	74.00	-18.34	HORIZONTAL	Peak

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Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	46.830	24.66	12.92	0.68	29.70	8.56	40.00	-31.44	VERTICAL	QP
2	69.845	26.93	10.82	0.72	29.62	8.85	40.00	-31.15	VERTICAL	QP
3	136.460	25.80	12.93	1.01	29.60	10.14	43.50	-33.36	VERTICAL	QP
4	175.652	26.96	12.81	1.33	29.60	11.50	43.50	-32.00	VERTICAL	QP
5	737.071	28.25	21.84	3.30	29.64	23.75	46.00	-22.25	VERTICAL	QP
6	878.322	30.05	23.80	2.91	29.11	27.65	46.00	-18.35	VERTICAL	QP

Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4824.016	51.16	30.82	6.01	36.94	51.05	54.00	-2.95	VERTICAL	Average
2	4824.016	55.03	30.82	6.01	36.94	54.92	74.00	-19.08	VERTICAL	Peak
3	5697.365	32.93	32.04	6.83	36.99	34.81	54.00	-19.19	VERTICAL	Average
4	5697.365	44.89	32.04	6.83	36.99	46.77	74.00	-27.23	VERTICAL	Peak
5	7236.052	31.22	35.55	7.35	36.93	37.19	54.00	-16.81	VERTICAL	Average
6	7236.052	44.75	35.55	7.35	36.93	50.72	74.00	-23.28	VERTICAL	Peak
7	8789.516	32.03	36.35	8.02	36.97	39.43	54.00	-14.57	VERTICAL	Average
8	8789.516	44.69	36.35	8.02	36.97	52.09	74.00	-21.91	VERTICAL	Peak
9	9648.230	29.83	37.54	8.18	37.08	38.47	54.00	-15.53	VERTICAL	Average
10	9648.230	43.33	37.54	8.18	37.08	51.97	74.00	-22.03	VERTICAL	Peak
11	12060.270	28.50	39.46	10.71	37.17	41.50	54.00	-12.50	VERTICAL	Average
12	12060.270	40.71	39.46	10.71	37.17	53.71	74.00	-20.29	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:middle

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4169.698	36.76	29.67	6.69	36.90	36.22	54.00	-17.78	HORIZONTAL	Average
2	4169.698	45.03	29.67	6.69	36.90	44.49	74.00	-29.51	HORIZONTAL	Peak
3	4884.948	49.75	30.95	6.86	36.95	50.61	54.00	-3.39	HORIZONTAL	Average
4	4884.948	56.82	30.95	6.86	36.95	57.68	74.00	-16.32	HORIZONTAL	Peak
5	7326.172	29.62	35.74	7.39	36.92	35.83	54.00	-18.17	HORIZONTAL	Average
6	7326.172	43.60	35.74	7.39	36.92	49.81	74.00	-24.19	HORIZONTAL	Peak
7	8153.195	31.72	36.39	8.28	36.91	39.48	54.00	-14.52	HORIZONTAL	Average
8	8153.195	44.16	36.39	8.28	36.91	51.92	74.00	-22.08	HORIZONTAL	Peak
9	9768.371	32.06	37.74	8.37	37.09	41.08	54.00	-12.92	HORIZONTAL	Average
10	9768.371	46.04	37.74	8.37	37.09	55.06	74.00	-18.94	HORIZONTAL	Peak
11	12210.270	28.33	39.21	10.98	37.06	41.46	54.00	-12.54	HORIZONTAL	Average
12	12210.270	41.37	39.21	10.98	37.06	54.50	74.00	-19.50	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:middle

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4230.396	34.97	29.77	6.56	36.91	34.39	54.00	-19.61	VERTICAL	Average
2	4230.396	45.03	29.77	6.56	36.91	44.45	74.00	-29.55	VERTICAL	Peak
3	4884.151	46.06	30.95	6.86	36.95	46.92	54.00	-7.08	VERTICAL	Average
4	4884.151	53.25	30.95	6.86	36.95	54.11	74.00	-19.89	VERTICAL	Peak
5	7326.015	31.90	35.74	7.39	36.92	38.11	54.00	-15.89	VERTICAL	Average
6	7326.015	44.26	35.74	7.39	36.92	50.47	74.00	-23.53	VERTICAL	Peak
7	8764.146	31.20	36.33	8.00	36.97	38.56	54.00	-15.44	VERTICAL	Average
8	8764.146	45.29	36.33	8.00	36.97	52.65	74.00	-21.35	VERTICAL	Peak
9	9768.371	30.45	37.74	8.37	37.09	39.47	54.00	-14.53	VERTICAL	Average
10	9768.371	45.06	37.74	8.37	37.09	54.08	74.00	-19.92	VERTICAL	Peak
11	12210.540	29.02	39.21	10.98	37.06	42.15	54.00	-11.85	VERTICAL	Average
12	12210.540	43.14	39.21	10.98	37.06	56.27	74.00	-17.73	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:b; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4924.110	49.22	31.01	7.49	36.95	50.77	54.00	-3.23	HORIZONTAL	Average
2	4924.110	56.87	31.01	7.49	36.95	58.42	74.00	-15.58	HORIZONTAL	Peak
3	7386.309	33.53	35.85	7.42	36.92	39.88	54.00	-14.12	HORIZONTAL	Average
4	7386.309	44.02	35.85	7.42	36.92	50.37	74.00	-23.63	HORIZONTAL	Peak
5	8866.062	33.93	36.42	8.09	36.99	41.45	54.00	-12.55	HORIZONTAL	Average
6	8866.062	45.24	36.42	8.09	36.99	52.76	74.00	-21.24	HORIZONTAL	Peak
7	9848.717	31.98	37.82	8.46	37.09	41.17	54.00	-12.83	HORIZONTAL	Average
8	9848.717	45.01	37.82	8.46	37.09	54.20	74.00	-19.80	HORIZONTAL	Peak
9	12310.610	29.06	39.03	11.10	36.97	42.22	54.00	-11.78	HORIZONTAL	Average
10	12310.610	41.94	39.03	11.10	36.97	55.10	74.00	-18.90	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:b; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4573.760	32.91	30.22	6.92	36.92	33.13	54.00	-20.87	VERTICAL	Average
2	4573.760	45.23	30.22	6.92	36.92	45.45	74.00	-28.55	VERTICAL	Peak
3	4924.490	46.67	31.01	7.49	36.95	48.22	54.00	-5.78	VERTICAL	Average
4	4924.490	53.16	31.01	7.49	36.95	54.71	74.00	-19.29	VERTICAL	Peak
5	7386.461	31.02	35.85	7.42	36.92	37.37	54.00	-16.63	VERTICAL	Average
6	7386.461	44.19	35.85	7.42	36.92	50.54	74.00	-23.46	VERTICAL	Peak
7	8224.200	30.19	36.33	8.23	36.92	37.83	54.00	-16.17	VERTICAL	Average
8	8224.200	44.20	36.33	8.23	36.92	51.84	74.00	-22.16	VERTICAL	Peak
9	9848.349	31.05	37.82	8.46	37.09	40.24	54.00	-13.76	VERTICAL	Average
10	9848.349	45.12	37.82	8.46	37.09	54.31	74.00	-19.69	VERTICAL	Peak
11	12310.710	28.87	39.03	11.10	36.97	42.03	54.00	-11.97	VERTICAL	Average
12	12310.710	41.62	39.03	11.10	36.97	54.78	74.00	-19.22	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	51.121	22.37	12.94	0.60	29.70	6.21	40.00	-33.79	HORIZONTAL	QP
2	62.651	22.77	11.92	0.61	29.66	5.64	40.00	-34.36	HORIZONTAL	QP
3	121.976	28.98	11.62	0.93	29.60	11.93	43.50	-31.57	HORIZONTAL	QP
4	180.649	28.33	12.67	1.34	29.60	12.74	43.50	-30.76	HORIZONTAL	QP
5	612.064	28.94	20.67	2.10	30.18	21.53	46.00	-24.47	HORIZONTAL	QP
6	878.322	29.22	23.80	2.91	29.11	26.82	46.00	-19.18	HORIZONTAL	QP

Mode:a; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4824.016	45.93	30.82	6.01	36.94	45.82	54.00	-8.18	HORIZONTAL	Average
2	4824.016	54.05	30.82	6.01	36.94	53.94	74.00	-20.06	HORIZONTAL	Peak
3	5864.443	31.81	32.22	7.44	37.00	34.47	54.00	-19.53	HORIZONTAL	Average
4	5864.443	44.45	32.22	7.44	37.00	47.11	74.00	-26.89	HORIZONTAL	Peak
5	7236.806	31.54	35.55	7.35	36.93	37.51	54.00	-16.49	HORIZONTAL	Average
6	7236.806	43.74	35.55	7.35	36.93	49.71	74.00	-24.29	HORIZONTAL	Peak
7	8248.005	32.55	36.30	8.21	36.92	40.14	54.00	-13.86	HORIZONTAL	Average
8	8248.005	44.66	36.30	8.21	36.92	52.25	74.00	-21.75	HORIZONTAL	Peak
9	9648.018	31.82	37.54	8.18	37.08	40.46	54.00	-13.54	HORIZONTAL	Average
10	9648.018	44.58	37.54	8.18	37.08	53.22	74.00	-20.78	HORIZONTAL	Peak
11	12060.250	27.94	39.46	10.71	37.17	40.94	54.00	-13.06	HORIZONTAL	Average
12	12060.250	41.74	39.46	10.71	37.17	54.74	74.00	-19.26	HORIZONTAL	Peak

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Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	49.359	26.17	12.99	0.61	29.70	10.07	40.00	-29.93	VERTICAL	QP
2	101.644	29.75	9.71	0.85	29.60	10.71	43.50	-32.79	VERTICAL	QP
3	153.200	28.09	13.32	1.22	29.60	13.03	43.50	-30.47	VERTICAL	QP
4	558.730	29.74	19.84	2.02	30.20	21.40	46.00	-24.60	VERTICAL	QP
5	647.386	29.70	21.00	2.10	30.08	22.72	46.00	-23.28	VERTICAL	QP
6	878.322	29.87	23.80	2.91	29.11	27.47	46.00	-18.53	VERTICAL	QP

Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4824.016	43.75	30.82	6.01	36.94	43.64	54.00	-10.36	VERTICAL	Average
2	4824.016	50.45	30.82	6.01	36.94	50.34	74.00	-23.66	VERTICAL	Peak
3	5830.640	29.02	32.19	7.45	37.00	31.66	54.00	-22.34	VERTICAL	Average
4	5830.640	44.71	32.19	7.45	37.00	47.35	74.00	-26.65	VERTICAL	Peak
5	7236.309	31.79	35.55	7.35	36.93	37.76	54.00	-16.24	VERTICAL	Average
6	7236.309	44.20	35.55	7.35	36.93	50.17	74.00	-23.83	VERTICAL	Peak
7	8789.516	28.37	36.35	8.02	36.97	35.77	54.00	-18.23	VERTICAL	Average
8	8789.516	44.55	36.35	8.02	36.97	51.95	74.00	-22.05	VERTICAL	Peak
9	9648.689	31.61	37.54	8.18	37.08	40.25	54.00	-13.75	VERTICAL	Average
10	9648.689	45.31	37.54	8.18	37.08	53.95	74.00	-20.05	VERTICAL	Peak
11	12060.540	27.19	39.46	10.71	37.17	40.19	54.00	-13.81	VERTICAL	Average
12	12060.540	41.11	39.46	10.71	37.17	54.11	74.00	-19.89	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:middle

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3958.309	31.26	29.42	7.35	36.90	31.13	54.00	-22.87	HORIZONTAL	Average
2	3958.309	44.48	29.42	7.35	36.90	44.35	74.00	-29.65	HORIZONTAL	Peak
3	4884.151	43.64	30.95	6.86	36.95	44.50	54.00	-9.50	HORIZONTAL	Average
4	4884.151	52.55	30.95	6.86	36.95	53.41	74.00	-20.59	HORIZONTAL	Peak
5	7326.122	34.45	35.74	7.39	36.92	40.66	54.00	-13.34	HORIZONTAL	Average
6	7326.122	44.54	35.74	7.39	36.92	50.75	74.00	-23.25	HORIZONTAL	Peak
7	9848.497	31.75	37.82	8.46	37.09	40.94	54.00	-13.06	HORIZONTAL	Average
8	9848.497	44.76	37.82	8.46	37.09	53.95	74.00	-20.05	HORIZONTAL	Peak
9	10885.670	26.27	39.79	9.91	37.14	38.83	54.00	-15.17	HORIZONTAL	Average
10	10885.670	40.12	39.79	9.91	37.14	52.68	74.00	-21.32	HORIZONTAL	Peak
11	12210.740	28.22	39.21	10.98	37.06	41.35	54.00	-12.65	HORIZONTAL	Average
12	12210.740	41.14	39.21	10.98	37.06	54.27	74.00	-19.73	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:middle

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3856.668	31.53	29.19	7.73	36.91	31.54	54.00	-22.46	VERTICAL	Average
2	3856.668	44.40	29.19	7.73	36.91	44.41	74.00	-29.59	VERTICAL	Peak
3	4884.151	36.69	30.95	6.86	36.95	37.55	54.00	-16.45	VERTICAL	Average
4	4884.151	49.69	30.95	6.86	36.95	50.55	74.00	-23.45	VERTICAL	Peak
5	6659.763	31.14	34.53	7.15	36.97	35.85	54.00	-18.15	VERTICAL	Average
6	6659.763	44.41	34.53	7.15	36.97	49.12	74.00	-24.88	VERTICAL	Peak
7	7326.195	30.24	35.74	7.39	36.92	36.45	54.00	-17.55	VERTICAL	Average
8	7326.195	44.15	35.74	7.39	36.92	50.36	74.00	-23.64	VERTICAL	Peak
9	9848.187	30.60	37.82	8.46	37.09	39.79	54.00	-14.21	VERTICAL	Average
10	9848.187	44.39	37.82	8.46	37.09	53.58	74.00	-20.42	VERTICAL	Peak
11	12210.350	27.20	39.21	10.98	37.06	40.33	54.00	-13.67	VERTICAL	Average
12	12210.350	42.35	39.21	10.98	37.06	55.48	74.00	-18.52	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:g; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4133.699	33.39	29.62	6.79	36.90	32.90	54.00	-21.10	HORIZONTAL	Average
2	4133.699	44.81	29.62	6.79	36.90	44.32	74.00	-29.68	HORIZONTAL	Peak
3	4924.490	46.39	31.01	7.49	36.95	47.94	54.00	-6.06	HORIZONTAL	Average
4	4924.490	51.91	31.01	7.49	36.95	53.46	74.00	-20.54	HORIZONTAL	Peak
5	7386.309	30.19	35.85	7.42	36.92	36.54	54.00	-17.46	HORIZONTAL	Average
6	7386.309	44.00	35.85	7.42	36.92	50.35	74.00	-23.65	HORIZONTAL	Peak
7	8688.480	29.76	36.25	7.94	36.96	36.99	54.00	-17.01	HORIZONTAL	Average
8	8688.480	44.66	36.25	7.94	36.96	51.89	74.00	-22.11	HORIZONTAL	Peak
9	9848.684	29.46	37.82	8.46	37.09	38.65	54.00	-15.35	HORIZONTAL	Average
10	9848.684	43.97	37.82	8.46	37.09	53.16	74.00	-20.84	HORIZONTAL	Peak
11	12310.620	28.13	39.03	11.10	36.97	41.29	54.00	-12.71	HORIZONTAL	Average
12	12310.620	41.06	39.03	11.10	36.97	54.22	74.00	-19.78	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:g; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3890.255	44.34	29.27	7.61	36.91	44.31	74.00	-29.69	VERTICAL	Peak
2	4924.490	35.71	31.01	7.49	36.95	37.26	54.00	-16.74	VERTICAL	Average
3	4924.490	47.16	31.01	7.49	36.95	48.71	74.00	-25.29	VERTICAL	Peak
4	7386.309	32.56	35.85	7.42	36.92	38.91	54.00	-15.09	VERTICAL	Average
5	7386.309	44.40	35.85	7.42	36.92	50.75	74.00	-23.25	VERTICAL	Peak
6	8082.804	30.68	36.44	8.32	36.90	38.54	54.00	-15.46	VERTICAL	Average
7	8082.804	44.54	36.44	8.32	36.90	52.40	74.00	-21.60	VERTICAL	Peak
8	9848.684	30.19	37.82	8.46	37.09	39.38	54.00	-14.62	VERTICAL	Average
9	9848.684	43.93	37.82	8.46	37.09	53.12	74.00	-20.88	VERTICAL	Peak
10	12310.130	27.06	39.03	11.10	36.97	40.22	54.00	-13.78	VERTICAL	Average
11	12310.130	40.27	39.03	11.10	36.97	53.43	74.00	-20.57	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	49.359	21.27	12.99	0.61	29.70	5.17	40.00	-34.83	HORIZONTAL	QP
2	65.803	22.67	11.30	0.67	29.63	5.01	40.00	-34.99	HORIZONTAL	QP
3	96.775	29.26	9.11	0.85	29.60	9.62	43.50	-33.88	HORIZONTAL	QP
4	147.404	27.78	13.20	1.14	29.60	12.52	43.50	-30.98	HORIZONTAL	QP
5	511.835	28.27	18.40	2.26	30.20	18.73	46.00	-27.27	HORIZONTAL	QP
6	863.056	28.29	23.62	2.95	29.23	25.63	46.00	-20.37	HORIZONTAL	QP

Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4824.016	37.19	30.82	6.01	36.94	37.08	54.00	-16.92	HORIZONTAL	Average
2	4824.016	51.67	30.82	6.01	36.94	51.56	74.00	-22.44	HORIZONTAL	Peak
3	5797.032	30.31	32.16	7.47	37.00	32.94	54.00	-21.06	HORIZONTAL	Average
4	5797.032	44.27	32.16	7.47	37.00	46.90	74.00	-27.10	HORIZONTAL	Peak
5	7236.052	29.80	35.55	7.35	36.93	35.77	54.00	-18.23	HORIZONTAL	Average
6	7236.052	43.90	35.55	7.35	36.93	49.87	74.00	-24.13	HORIZONTAL	Peak
7	8738.852	29.15	36.30	7.98	36.96	36.47	54.00	-17.53	HORIZONTAL	Average
8	8738.852	44.77	36.30	7.98	36.96	52.09	74.00	-21.91	HORIZONTAL	Peak
9	9648.230	29.08	37.54	8.18	37.08	37.72	54.00	-16.28	HORIZONTAL	Average
10	9648.230	43.60	37.54	8.18	37.08	52.24	74.00	-21.76	HORIZONTAL	Peak
11	12060.070	28.12	39.46	10.71	37.17	41.12	54.00	-12.88	HORIZONTAL	Average
12	12060.070	42.25	39.46	10.71	37.17	55.25	74.00	-18.75	HORIZONTAL	Peak

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Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	47.492	25.27	12.94	0.65	29.70	9.16	40.00	-30.84	VERTICAL	QP
2	69.845	27.35	10.82	0.72	29.62	9.27	40.00	-30.73	VERTICAL	QP
3	137.903	26.33	13.01	1.02	29.60	10.76	43.50	-32.74	VERTICAL	QP
4	164.908	27.46	13.26	1.29	29.60	12.41	43.50	-31.09	VERTICAL	QP
5	609.922	29.13	20.66	2.10	30.18	21.71	46.00	-24.29	VERTICAL	QP
6	833.317	33.18	23.08	2.86	29.37	29.75	46.00	-16.25	VERTICAL	QP

Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:Low

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3856.668	30.57	29.19	7.73	36.91	30.58	54.00	-23.42	VERTICAL	Average
2	3856.668	44.79	29.19	7.73	36.91	44.80	74.00	-29.20	VERTICAL	Peak
3	4824.016	33.73	30.82	6.01	36.94	33.62	54.00	-20.38	VERTICAL	Average
4	4824.016	47.18	30.82	6.01	36.94	47.07	74.00	-26.93	VERTICAL	Peak
5	7236.114	29.17	35.55	7.35	36.93	35.14	54.00	-18.86	VERTICAL	Average
6	7236.114	44.72	35.55	7.35	36.93	50.69	74.00	-23.31	VERTICAL	Peak
7	8663.404	29.26	36.22	7.95	36.96	36.47	54.00	-17.53	VERTICAL	Average
8	8663.404	44.85	36.22	7.95	36.96	52.06	74.00	-21.94	VERTICAL	Peak
9	9648.257	30.61	37.54	8.18	37.08	39.25	54.00	-14.75	VERTICAL	Average
10	9648.257	45.18	37.54	8.18	37.08	53.82	74.00	-20.18	VERTICAL	Peak
11	12060.280	28.90	39.46	10.71	37.17	41.90	54.00	-12.10	VERTICAL	Average
12	12060.280	42.17	39.46	10.71	37.17	55.17	74.00	-18.83	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:middle

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3992.781	31.98	29.48	7.26	36.90	31.82	54.00	-22.18	HORIZONTAL	Average
2	3992.781	45.04	29.48	7.26	36.90	44.88	74.00	-29.12	HORIZONTAL	Peak
3	4884.151	35.61	30.95	6.86	36.95	36.47	54.00	-17.53	HORIZONTAL	Average
4	4884.151	49.76	30.95	6.86	36.95	50.62	74.00	-23.38	HORIZONTAL	Peak
5	7236.015	29.03	35.55	7.35	36.93	35.00	54.00	-19.00	HORIZONTAL	Average
6	7236.015	44.60	35.55	7.35	36.93	50.57	74.00	-23.43	HORIZONTAL	Peak
7	8688.480	29.50	36.25	7.94	36.96	36.73	54.00	-17.27	HORIZONTAL	Average
8	8688.480	45.35	36.25	7.94	36.96	52.58	74.00	-21.42	HORIZONTAL	Peak
9	9768.430	29.78	37.74	8.37	37.09	38.80	54.00	-15.20	HORIZONTAL	Average
10	9768.430	44.56	37.74	8.37	37.09	53.58	74.00	-20.42	HORIZONTAL	Peak
11	12210.450	27.58	39.21	10.98	37.06	40.71	54.00	-13.29	HORIZONTAL	Average
12	12210.450	42.10	39.21	10.98	37.06	55.23	74.00	-18.77	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:middle

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4027.554	32.10	29.52	7.17	36.90	31.89	54.00	-22.11	VERTICAL	Average
2	4027.554	44.51	29.52	7.17	36.90	44.30	74.00	-29.70	VERTICAL	Peak
3	4884.151	32.03	30.95	6.86	36.95	32.89	54.00	-21.11	VERTICAL	Average
4	4884.151	48.32	30.95	6.86	36.95	49.18	74.00	-24.82	VERTICAL	Peak
5	6894.806	31.83	34.98	7.24	36.95	37.10	54.00	-16.90	VERTICAL	Average
6	6894.806	44.10	34.98	7.24	36.95	49.37	74.00	-24.63	VERTICAL	Peak
7	7326.852	29.67	35.74	7.39	36.92	35.88	54.00	-18.12	VERTICAL	Average
8	7326.852	45.37	35.74	7.39	36.92	51.58	74.00	-22.42	VERTICAL	Peak
9	9768.420	29.13	37.74	8.37	37.09	38.15	54.00	-15.85	VERTICAL	Average
10	9768.420	44.44	37.74	8.37	37.09	53.46	74.00	-20.54	VERTICAL	Peak
11	12210.760	27.26	39.21	10.98	37.06	40.39	54.00	-13.61	VERTICAL	Average
12	12210.760	41.65	39.21	10.98	37.06	54.78	74.00	-19.22	VERTICAL	Peak

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Mode:a; Polarization:Horizontal; Modulation:n; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4062.629	33.98	29.55	7.06	36.90	33.69	54.00	-20.31	HORIZONTAL	Average
2	4062.629	45.28	29.55	7.06	36.90	44.99	74.00	-29.01	HORIZONTAL	Peak
3	4924.490	43.66	31.01	7.49	36.95	45.21	54.00	-8.79	HORIZONTAL	Average
4	4924.490	50.38	31.01	7.49	36.95	51.93	74.00	-22.07	HORIZONTAL	Peak
5	7386.278	30.86	35.85	7.42	36.92	37.21	54.00	-16.79	HORIZONTAL	Average
6	7386.278	42.82	35.85	7.42	36.92	49.17	74.00	-24.83	HORIZONTAL	Peak
7	8663.404	28.12	36.22	7.95	36.96	35.33	54.00	-18.67	HORIZONTAL	Average
8	8663.404	43.80	36.22	7.95	36.96	51.01	74.00	-22.99	HORIZONTAL	Peak
9	9848.684	27.98	37.82	8.46	37.09	37.17	54.00	-16.83	HORIZONTAL	Average
10	9848.684	44.88	37.82	8.46	37.09	54.07	74.00	-19.93	HORIZONTAL	Peak
11	12310.270	29.13	39.03	11.10	36.97	42.29	54.00	-11.71	HORIZONTAL	Average
12	12310.270	44.16	39.03	11.10	36.97	57.32	74.00	-16.68	HORIZONTAL	Peak

Mode:a; Polarization:Vertical; Modulation:n; bandwidth:20MHz; Channel:High

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	4291.977	45.25	29.89	6.38	36.91	44.61	74.00	-29.39	VERTICAL	Peak
2	4924.993	34.79	31.01	7.49	36.95	36.34	54.00	-17.66	VERTICAL	Average
3	4924.993	47.01	31.01	7.49	36.95	48.56	74.00	-25.44	VERTICAL	Peak
4	7386.015	31.80	35.85	7.42	36.92	38.15	54.00	-15.85	VERTICAL	Average
5	7386.015	45.16	35.85	7.42	36.92	51.51	74.00	-22.49	VERTICAL	Peak
6	8638.399	28.51	36.20	7.96	36.95	35.72	54.00	-18.28	VERTICAL	Average
7	8638.399	44.87	36.20	7.96	36.95	52.08	74.00	-21.92	VERTICAL	Peak
8	9848.018	30.81	37.82	8.46	37.09	40.00	54.00	-14.00	VERTICAL	Average
9	9848.018	45.04	37.82	8.46	37.09	54.23	74.00	-19.77	VERTICAL	Peak
10	12310.600	27.57	39.03	11.10	36.97	40.73	54.00	-13.27	VERTICAL	Average
11	12310.600	41.19	39.03	11.10	36.97	54.35	74.00	-19.65	VERTICAL	Peak

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8 Appendix

8.1 Appendix 15.247

1.6dB Bandwidth

Test Mode	Test Channel	Ant	6dB Bandwidth[MHz]	Limit	Verdict
11B	2412	Ant1	8.560	0.5	PASS
11B	2442	Ant1	8.550	0.5	PASS
11B	2462	Ant1	8.560	0.5	PASS
11G	2412	Ant1	16.36	0.5	PASS
11G	2442	Ant1	16.38	0.5	PASS
11G	2462	Ant1	16.38	0.5	PASS
11N20SISO	2412	Ant1	17.46	0.5	PASS
11N20SISO	2442	Ant1	17.45	0.5	PASS
11N20SISO	2462	Ant1	17.46	0.5	PASS

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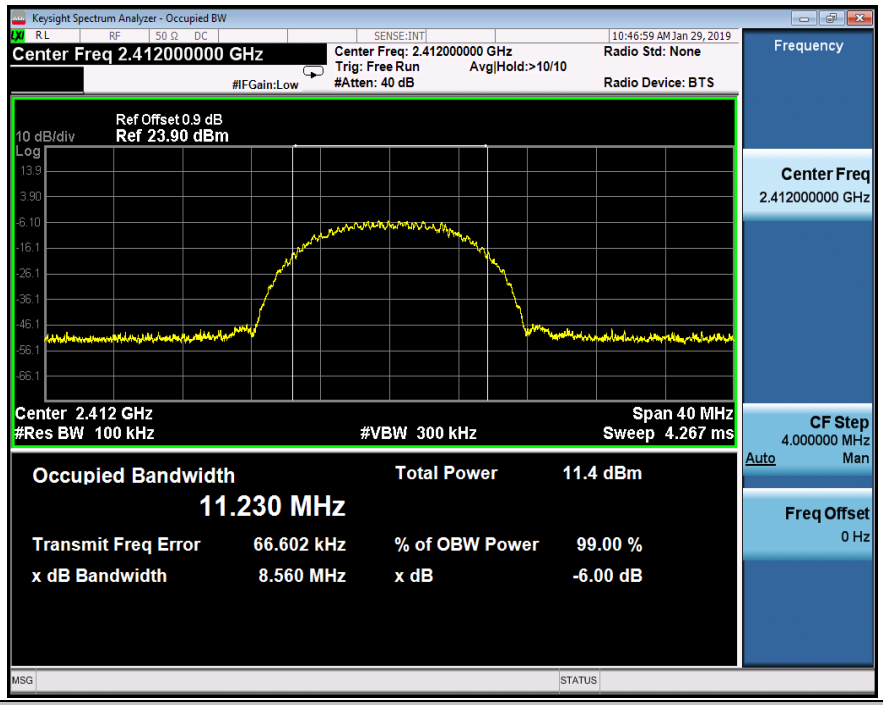
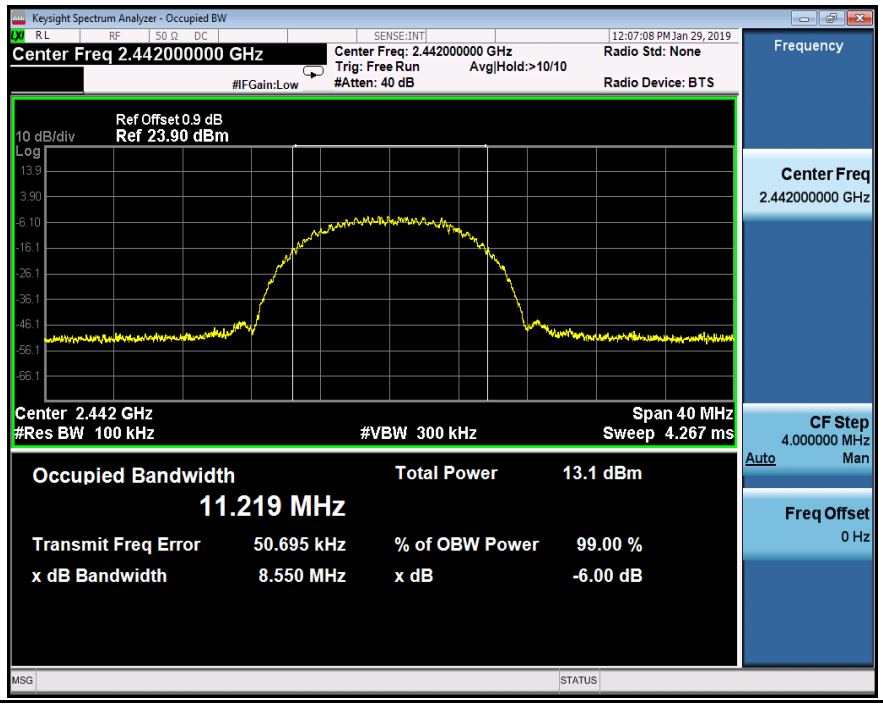
TEST PLOT

6dB Bandwidth_11B_2412_Ant1



6dB Bandwidth_11B_2442_Ant1



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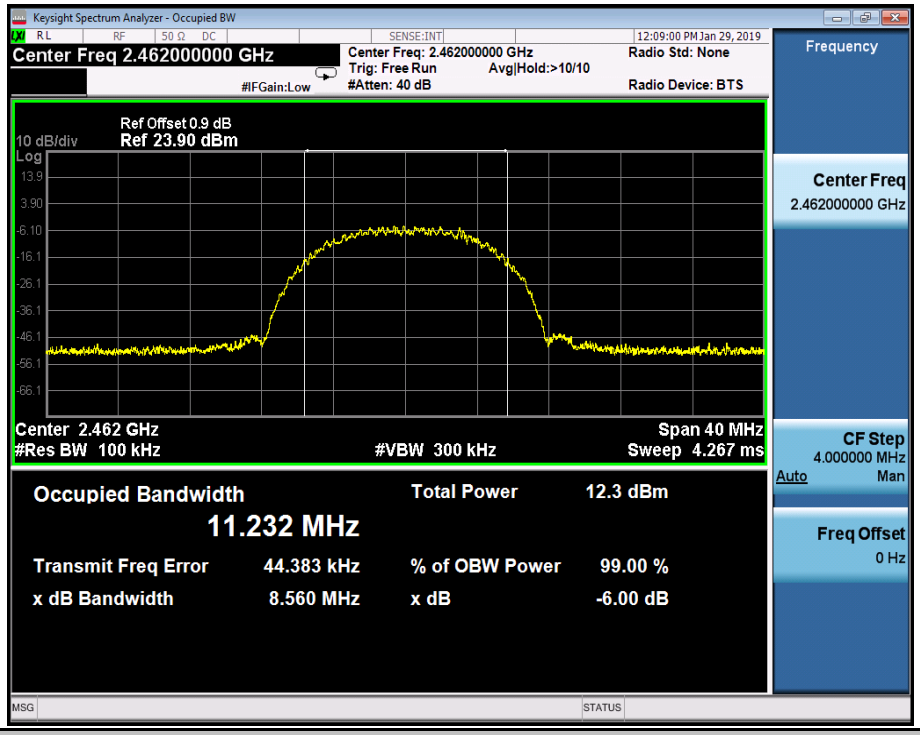
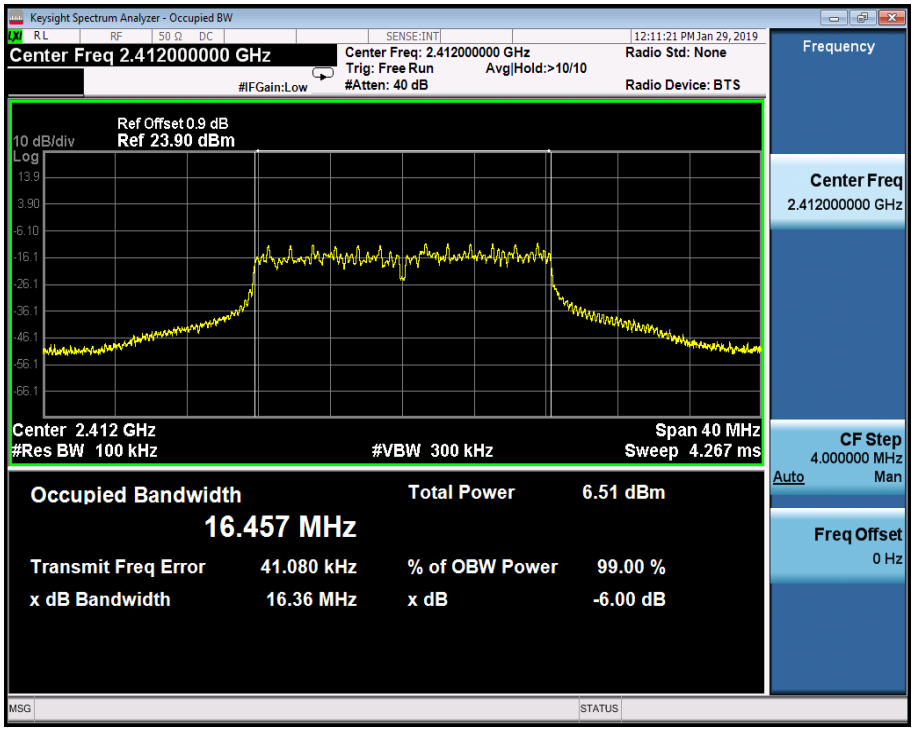
6dB Bandwidth_11B_2462_Ant1



6dB Bandwidth_11G_2412_Ant1



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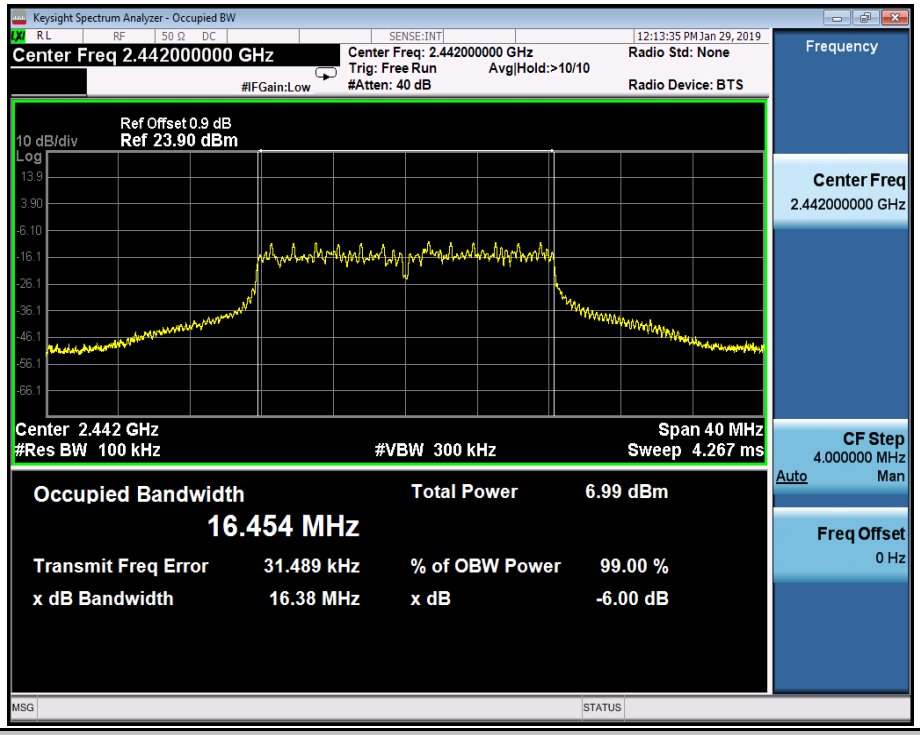
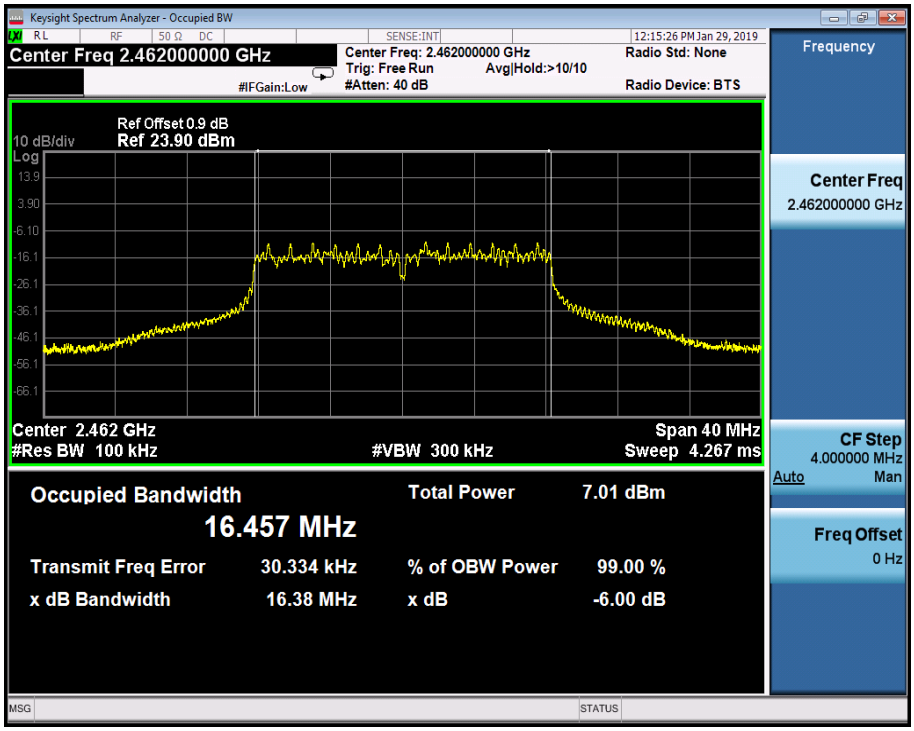
6dB Bandwidth_11G_2442_Ant1



6dB Bandwidth_11G_2462_Ant1



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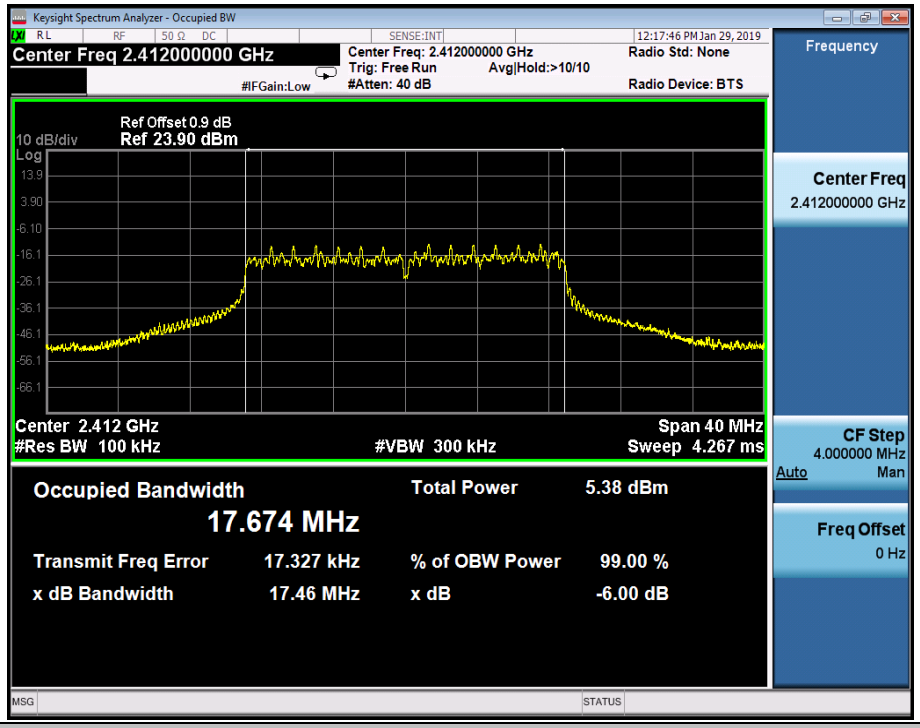
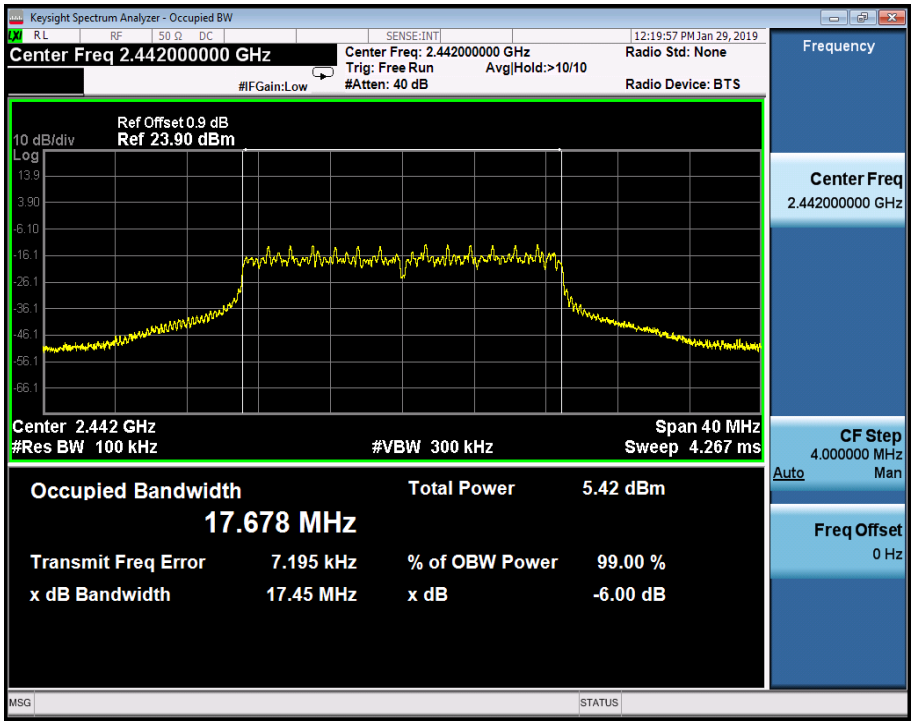
6dB Bandwidth_11N20SISO_2412_Ant1



6dB Bandwidth_11N20SISO_2442_Ant1



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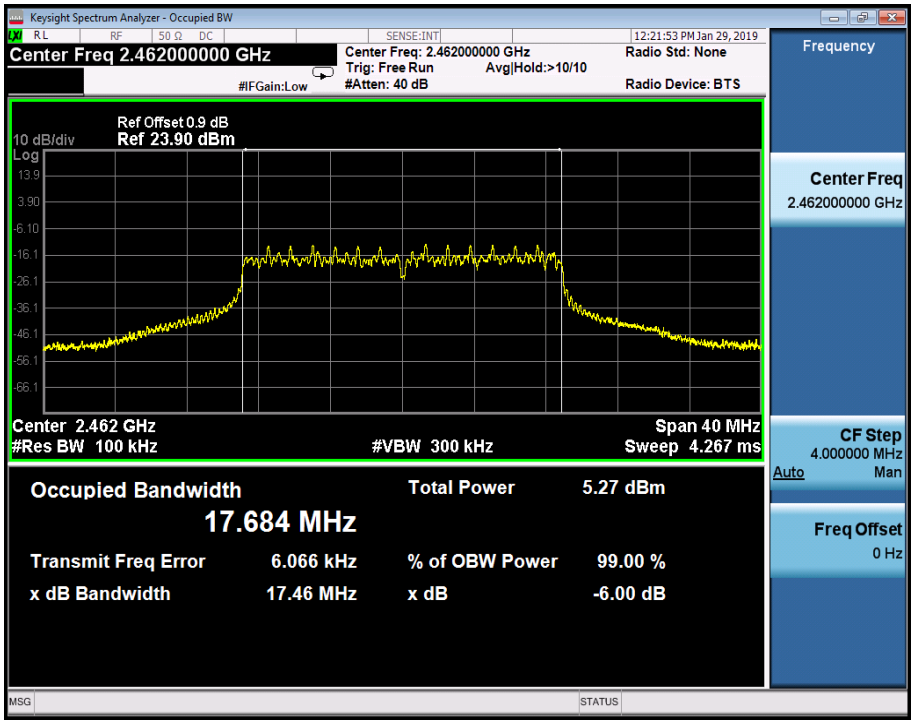
6dB Bandwidth_11N20SISO_2462_Ant1



2.Maximum peak conducted output power

Test Mode	Test Channel	Ant	Power[dBm]	Limit[dBm]	Verdict
11B	2412	Ant1	9.82	30	PASS
11B	2442	Ant1	11.24	30	PASS
11B	2462	Ant1	10.77	30	PASS
11G	2412	Ant1	7.76	30	PASS
11G	2442	Ant1	8	30	PASS
11G	2462	Ant1	7.99	30	PASS
11N20SISO	2412	Ant1	6.32	30	PASS
11N20SISO	2442	Ant1	6.44	30	PASS
11N20SISO	2462	Ant1	6.16	30	PASS

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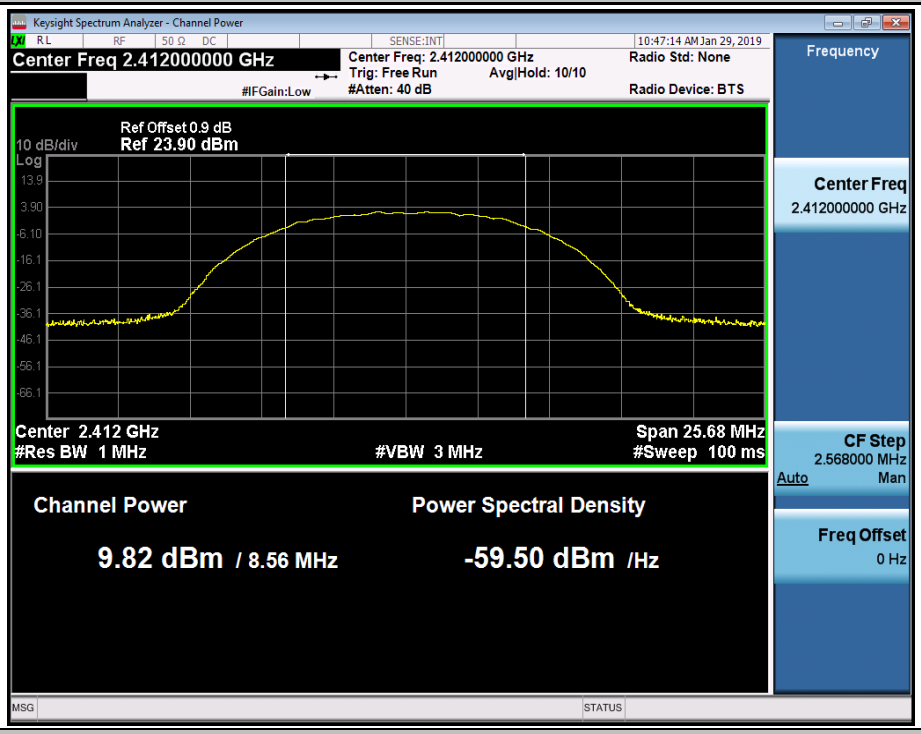
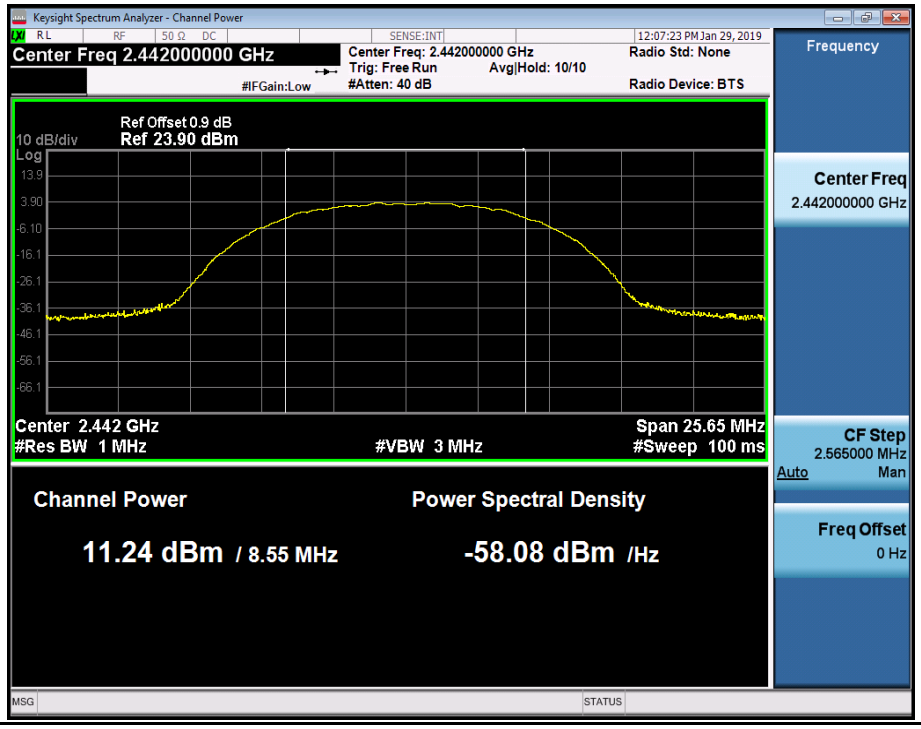
TEST PLOT

Maximum peak conducted output power_11B_2412_Ant1



Maximum peak conducted output power_11B_2442_Ant1



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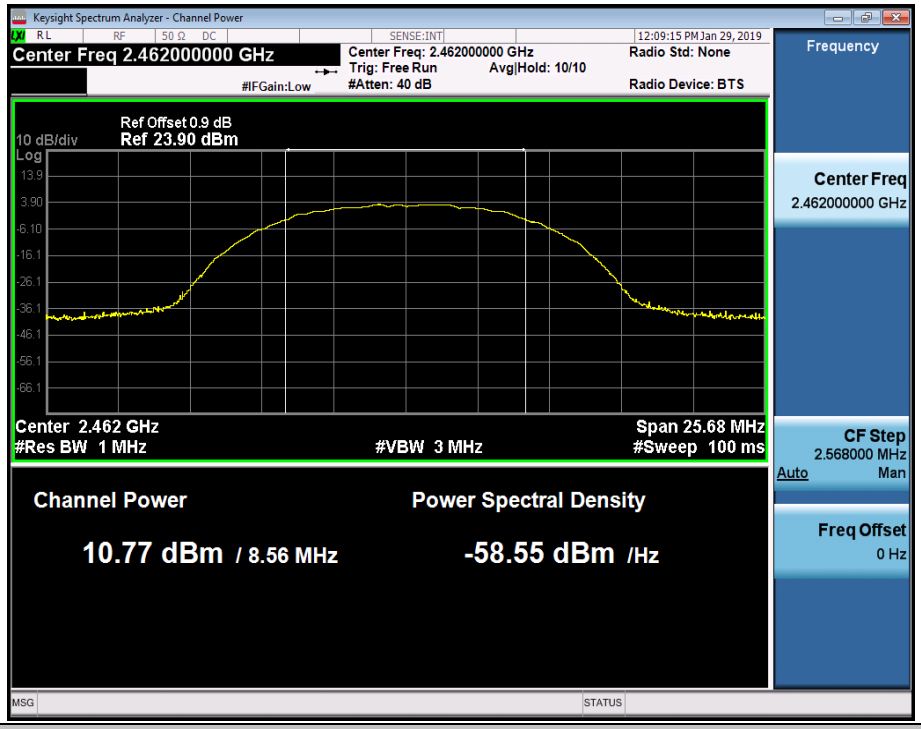
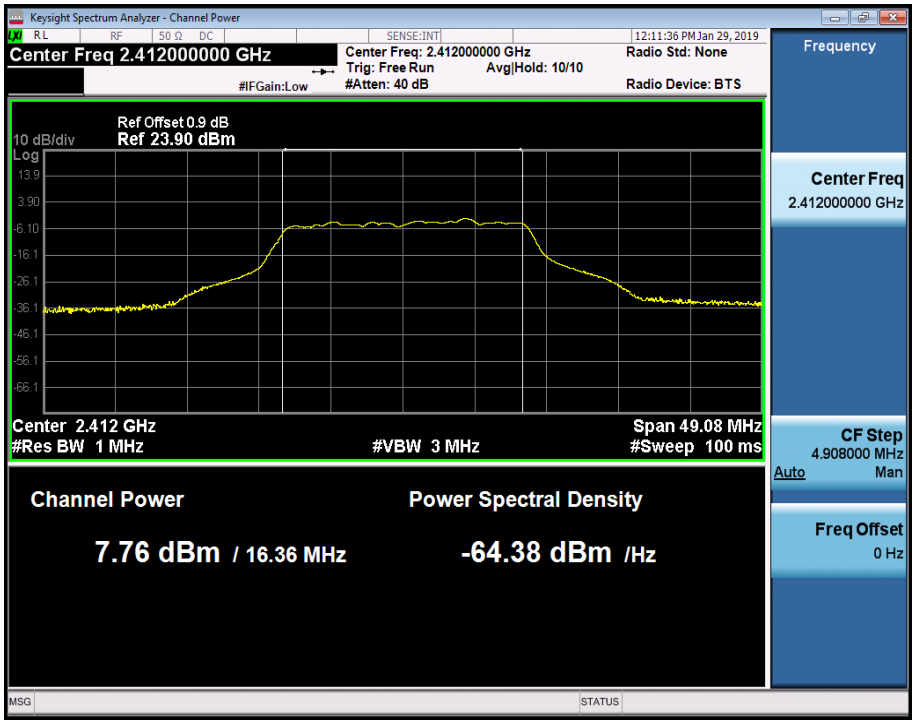
Maximum peak conducted output power_11B_2462_Ant1



Maximum peak conducted output power_11G_2412_Ant1



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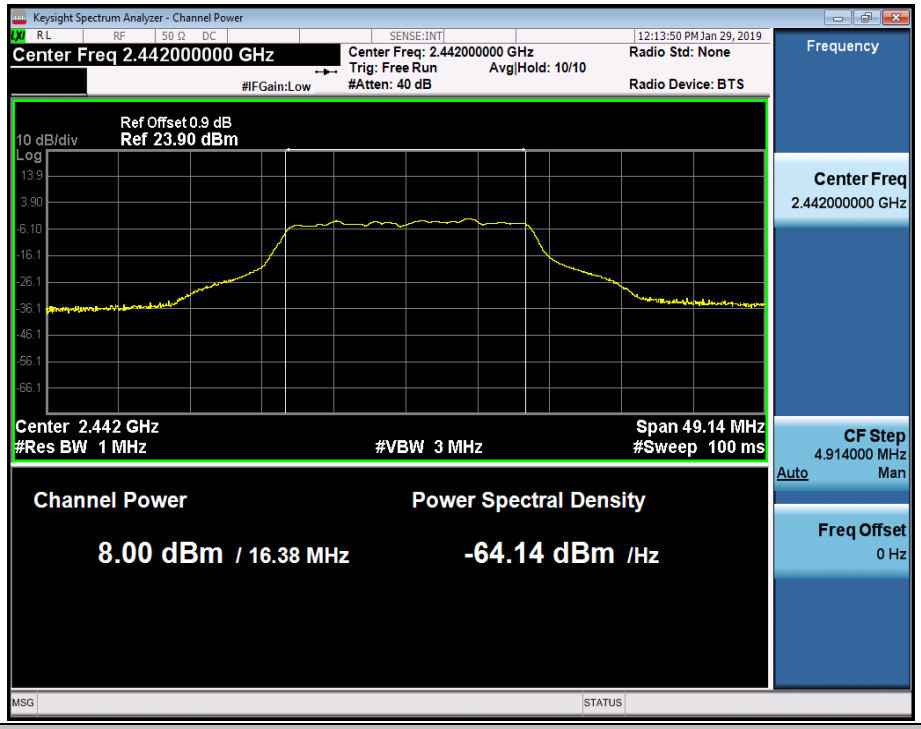
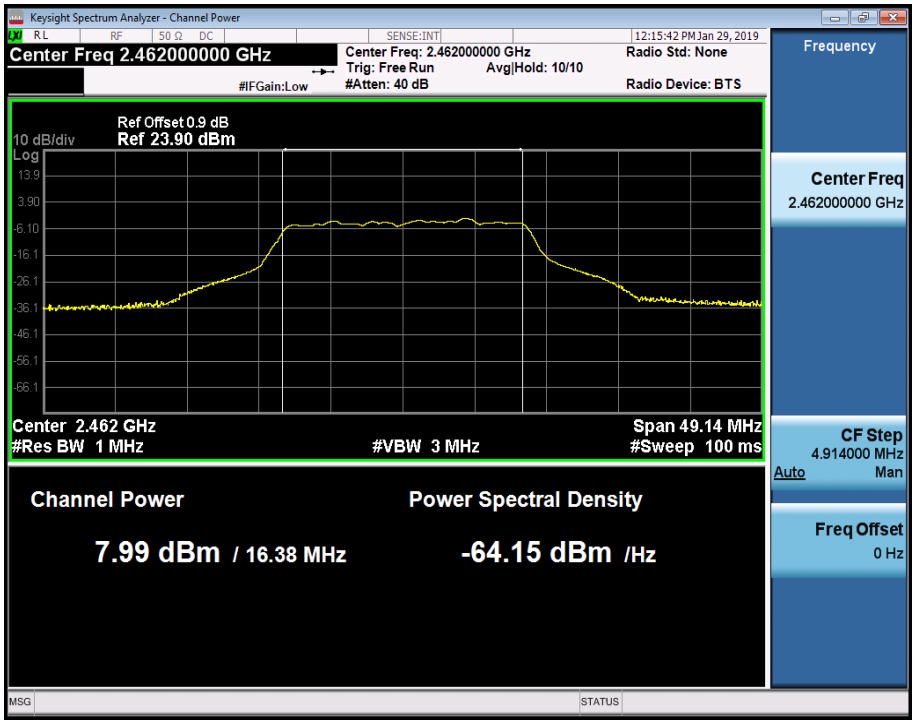
Maximum peak conducted output power_11G_2442_Ant1



Maximum peak conducted output power_11G_2462_Ant1



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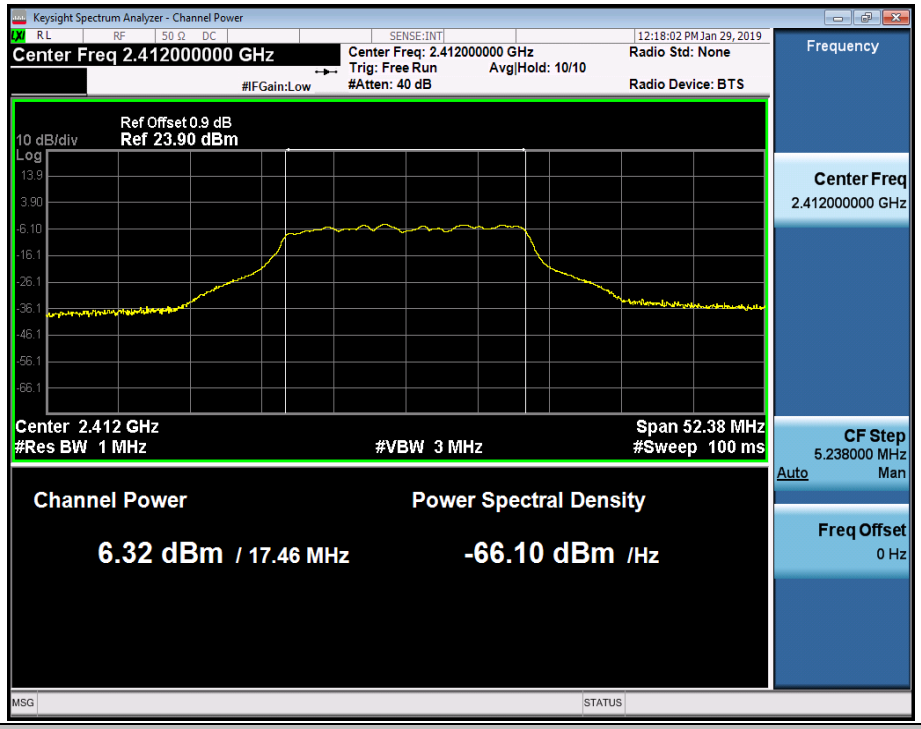
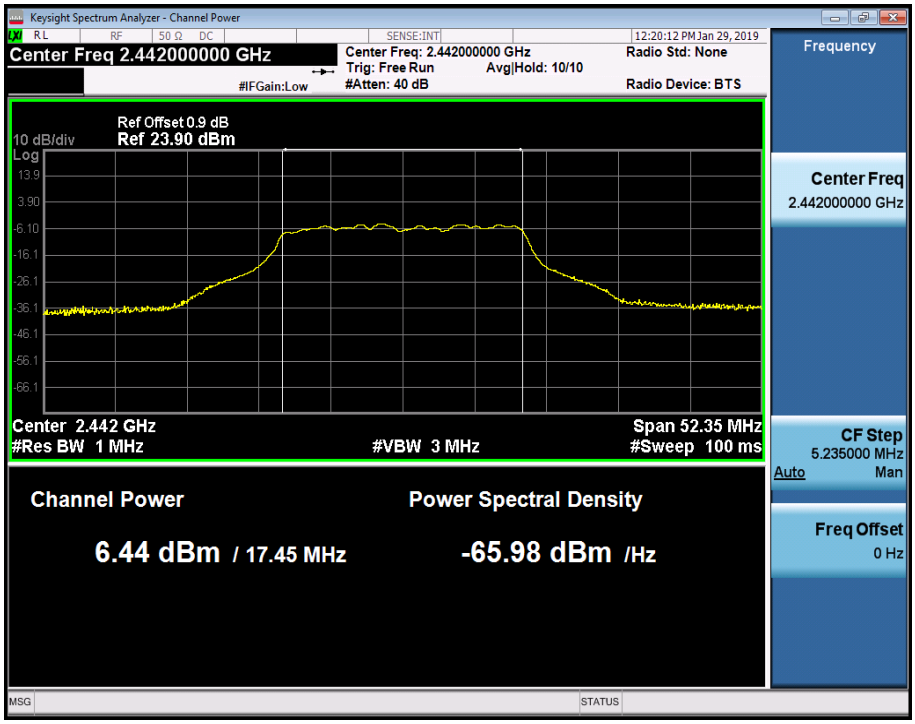
Maximum peak conducted output power_11N20SISO_2412_Ant1



Maximum peak conducted output power_11N20SISO_2442_Ant1



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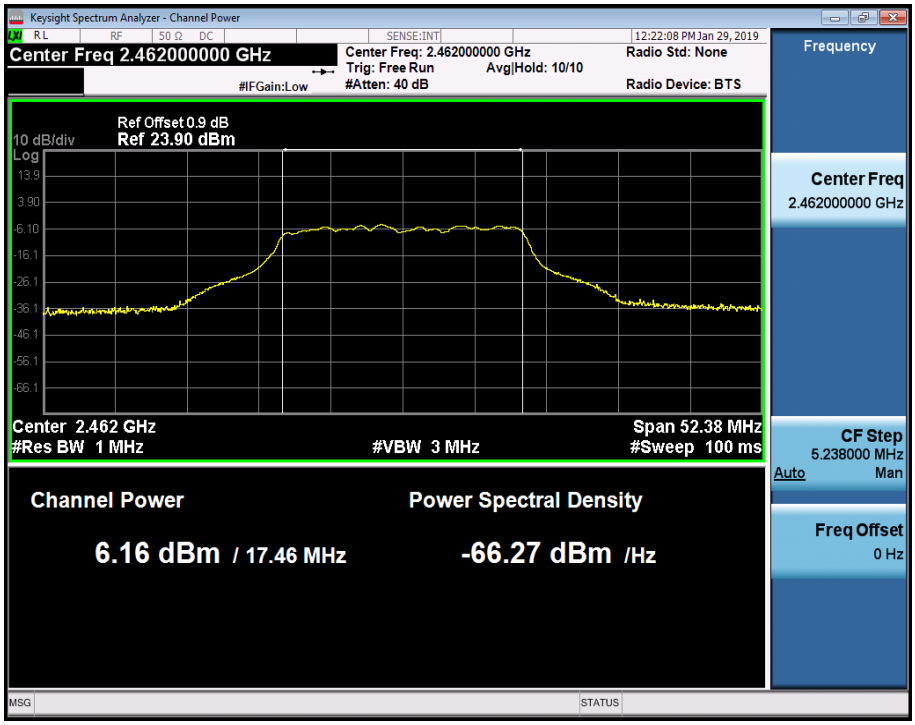
Maximum peak conducted output power_11N20SISO_2462_Ant1



3.Maximum Peak power spectral density

Test Mode	Test Channel	Ant	Result	Limit[dBm/3kHz]	Verdict
11B	2412	Ant1	-19.301	8.00	PASS
11B	2442	Ant1	-18.044	8.00	PASS
11B	2462	Ant1	-18.459	8.00	PASS
11G	2412	Ant1	-22.49	8.00	PASS
11G	2442	Ant1	-22.395	8.00	PASS
11G	2462	Ant1	-22.434	8.00	PASS
11N20SISO	2412	Ant1	-23.418	8.00	PASS
11N20SISO	2442	Ant1	-23.155	8.00	PASS
11N20SISO	2462	Ant1	-23.483	8.00	PASS

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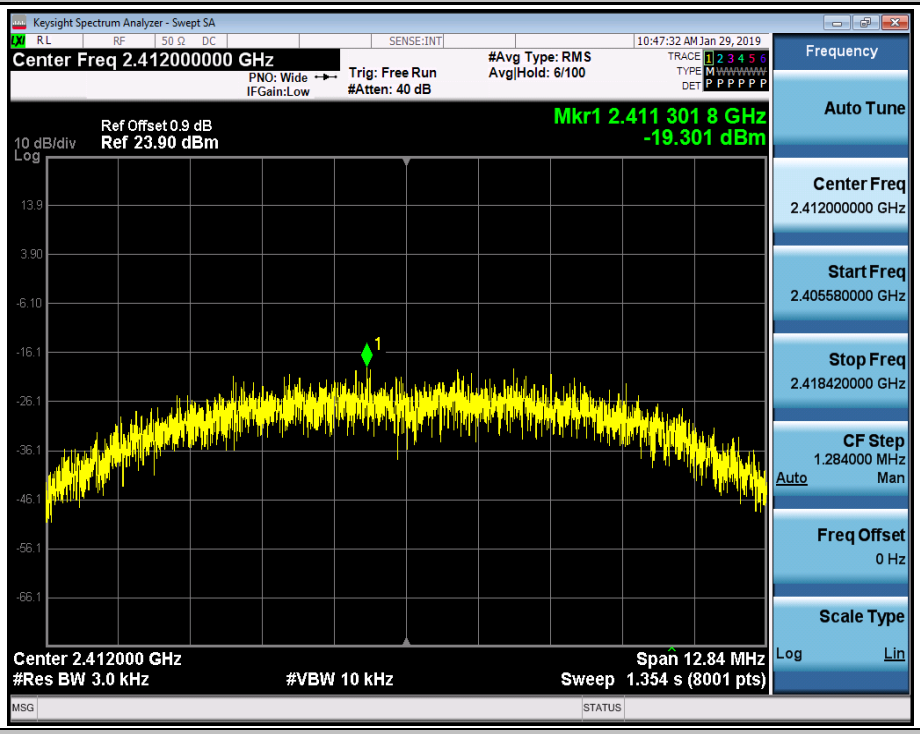
TEST PLOT

Maximum Peak power spectral density_11B_2412_Ant1



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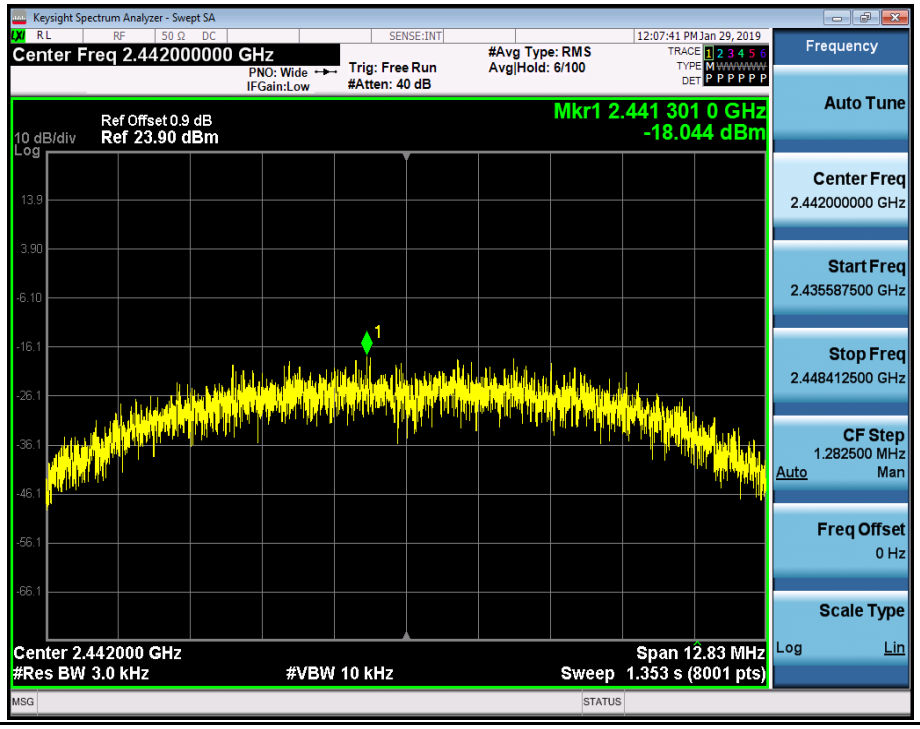

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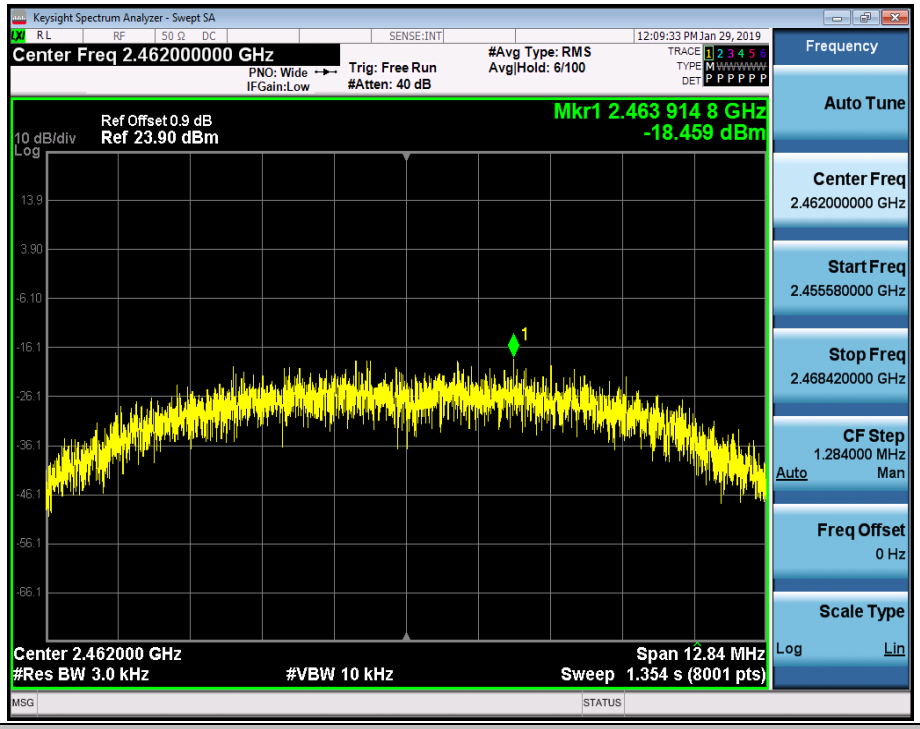
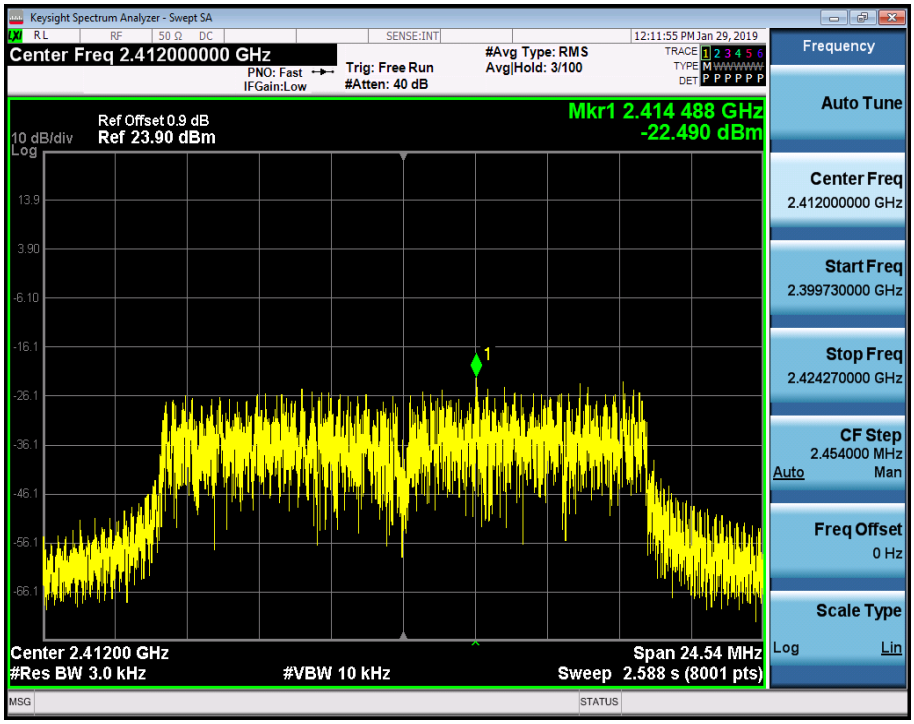
Maximum Peak power spectral density_11B_2462_Ant1



Maximum Peak power spectral density_11G_2412_Ant1



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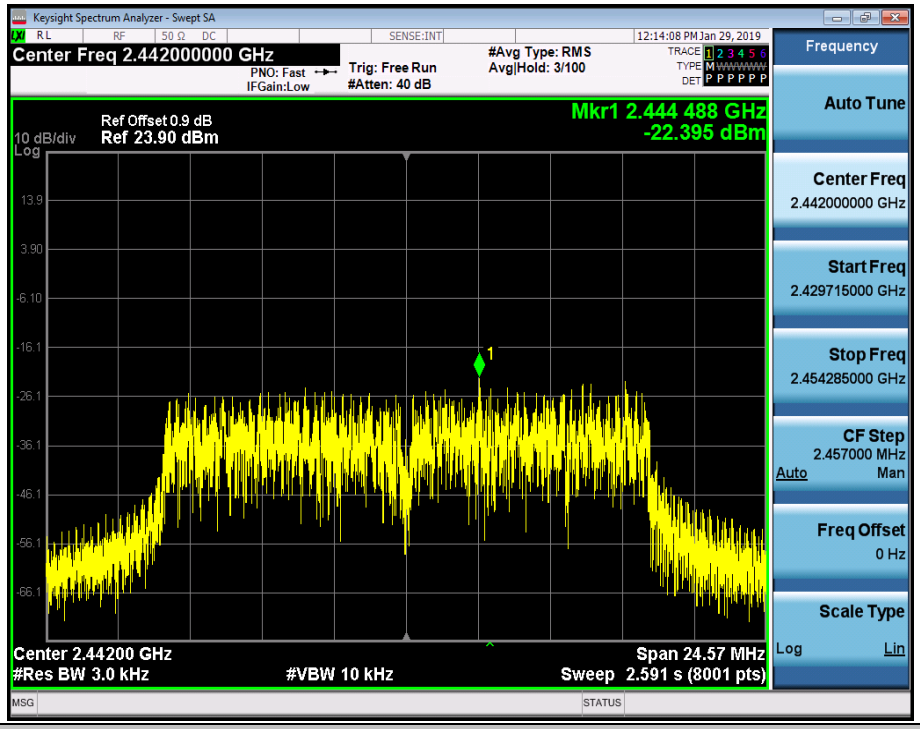
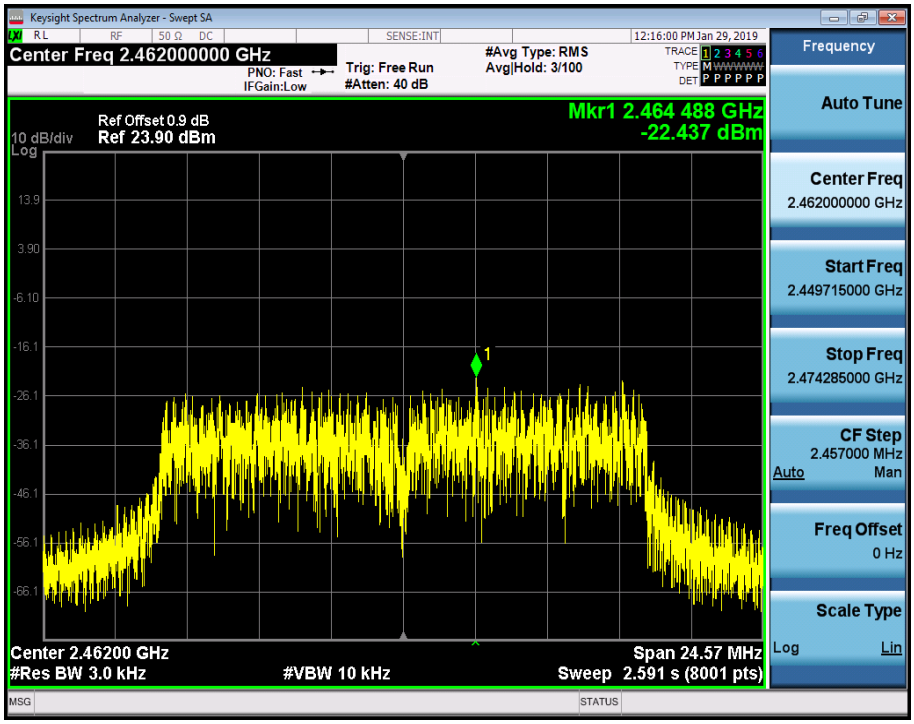
Maximum Peak power spectral density_11G_2442_Ant1



Maximum Peak power spectral density_11G_2462_Ant1



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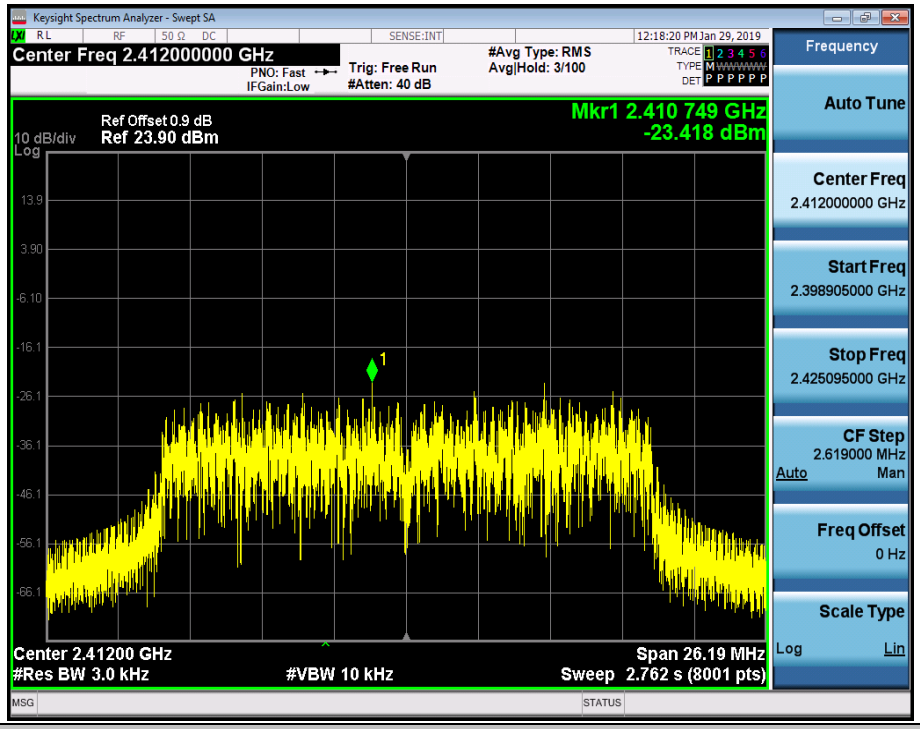
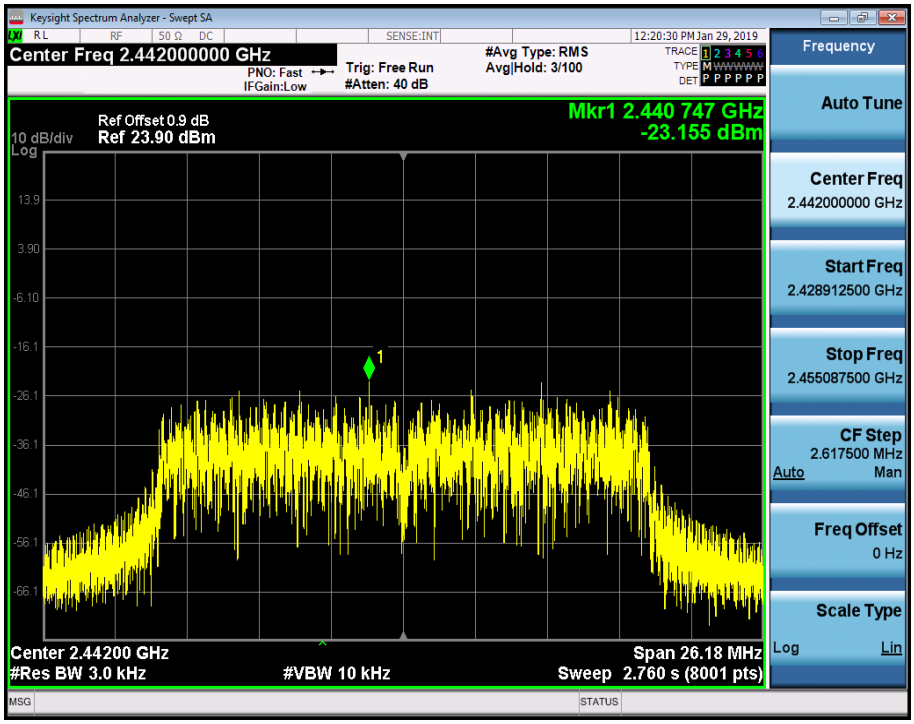
Maximum Peak power spectral density_11N20SISO_2412_Ant1



Maximum Peak power spectral density_11N20SISO_2442_Ant1



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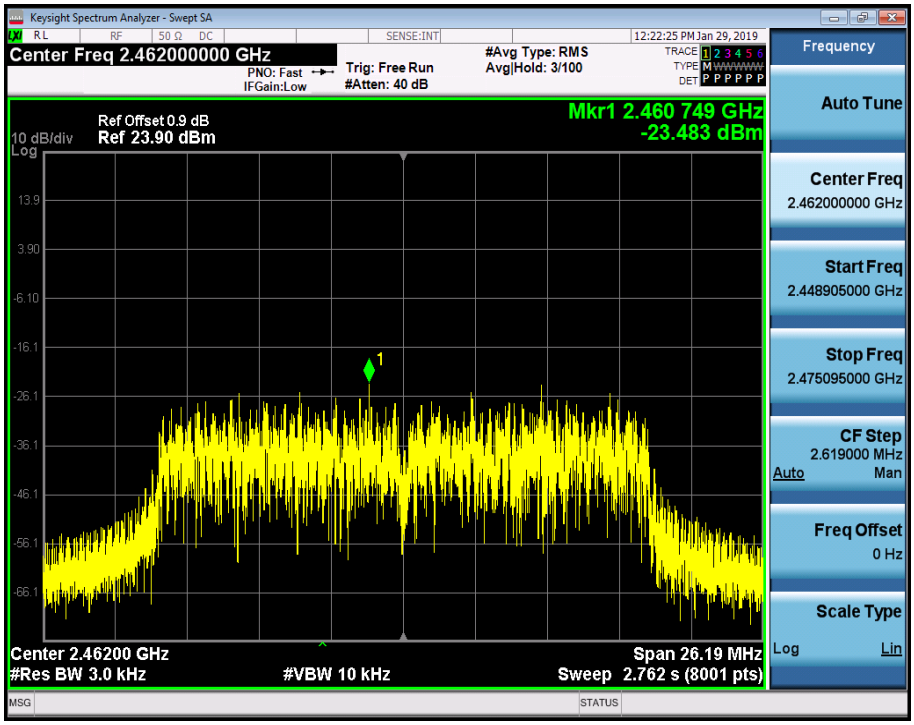
Maximum Peak power spectral density_11N20SISO_2462_Ant1



4.Band-edge for RF Conducted Emissions

Test Mode	Test Channel	Ant	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
11B	2412	Ant1	-5.502	-48.961	-25.5	PASS
11B	2462	Ant1	-4.464	-48.334	-24.46	PASS
11G	2412	Ant1	-10.462	-48.510	-30.46	PASS
11G	2462	Ant1	-10.286	-47.720	-30.29	PASS
11N20SISO	2412	Ant1	-11.871	-48.516	-31.87	PASS
11N20SISO	2462	Ant1	-11.984	-48.345	-31.98	PASS

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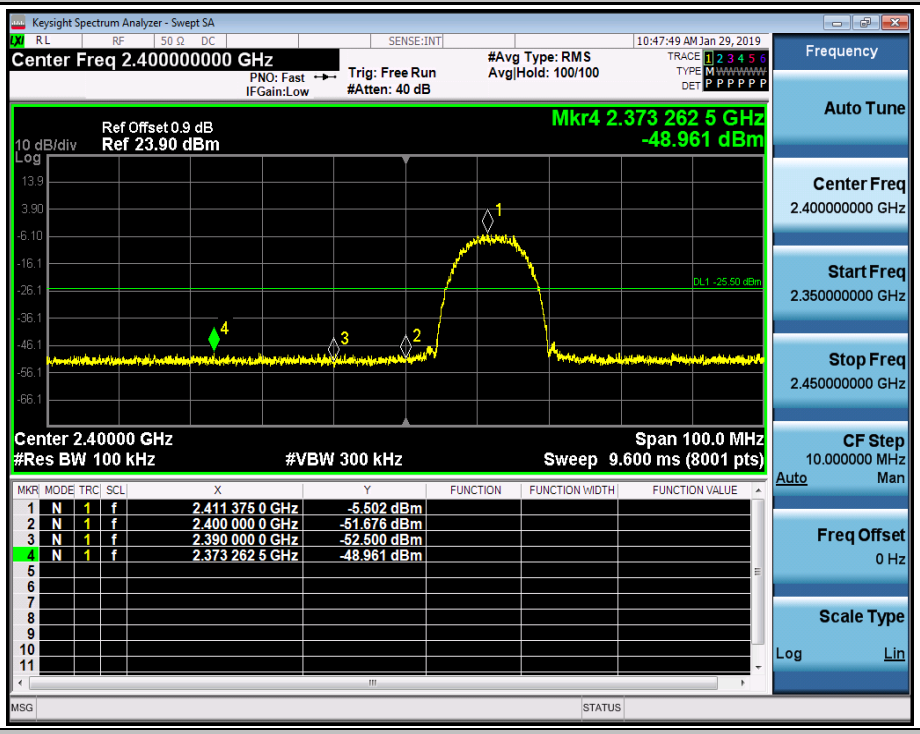
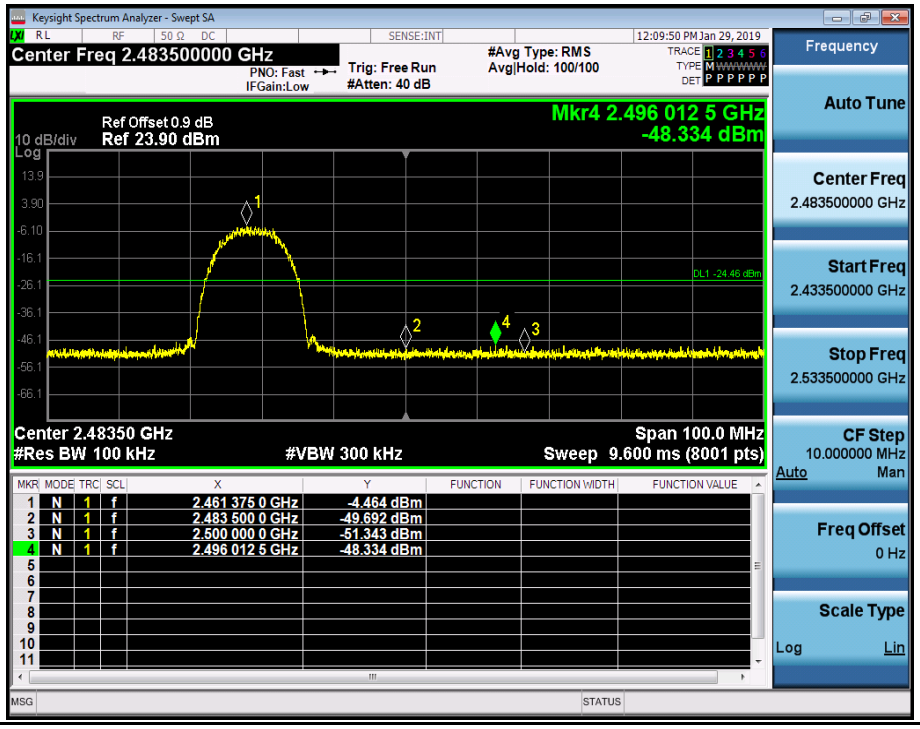
Band-edge for RF Conducted Emissions_11B_2412_Ant1



Band-edge for RF Conducted Emissions_11B_2462_Ant1



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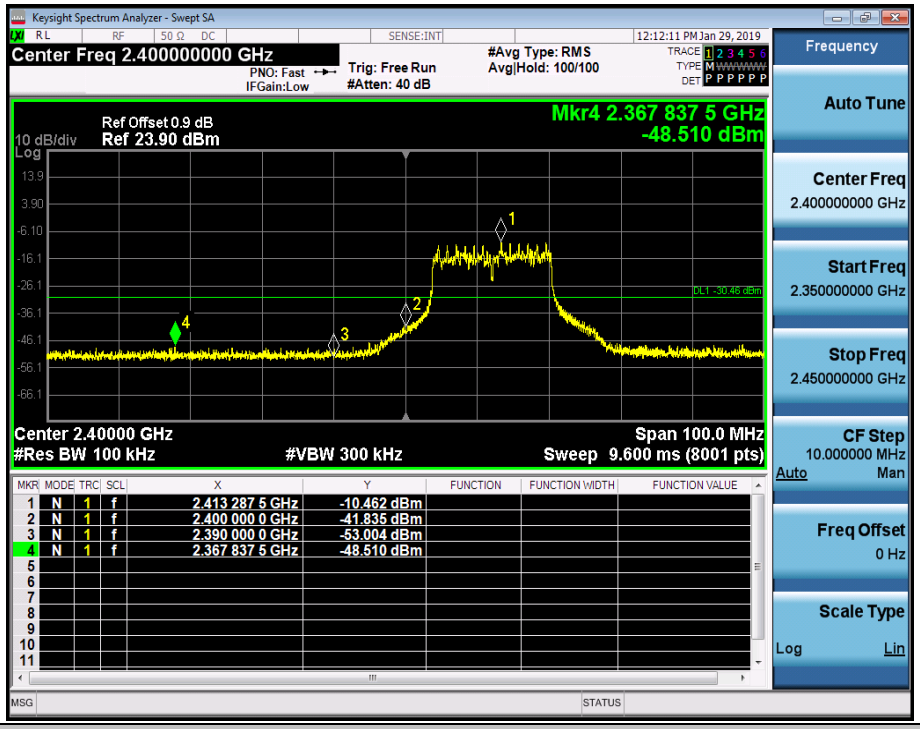
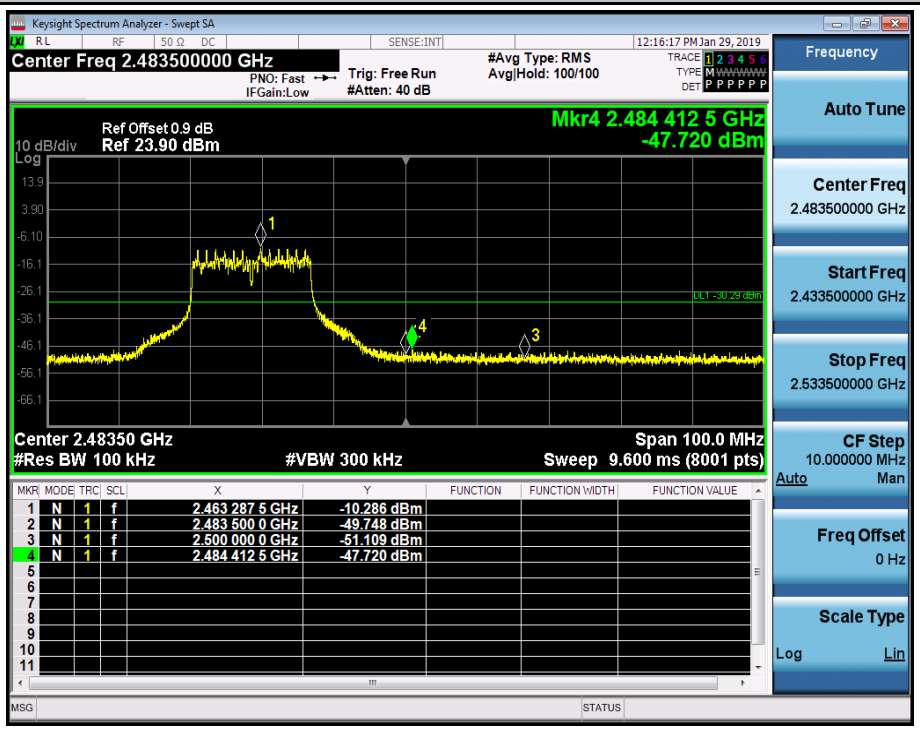
Band-edge for RF Conducted Emissions_11G_2412_Ant1



Band-edge for RF Conducted Emissions_11G_2462_Ant1



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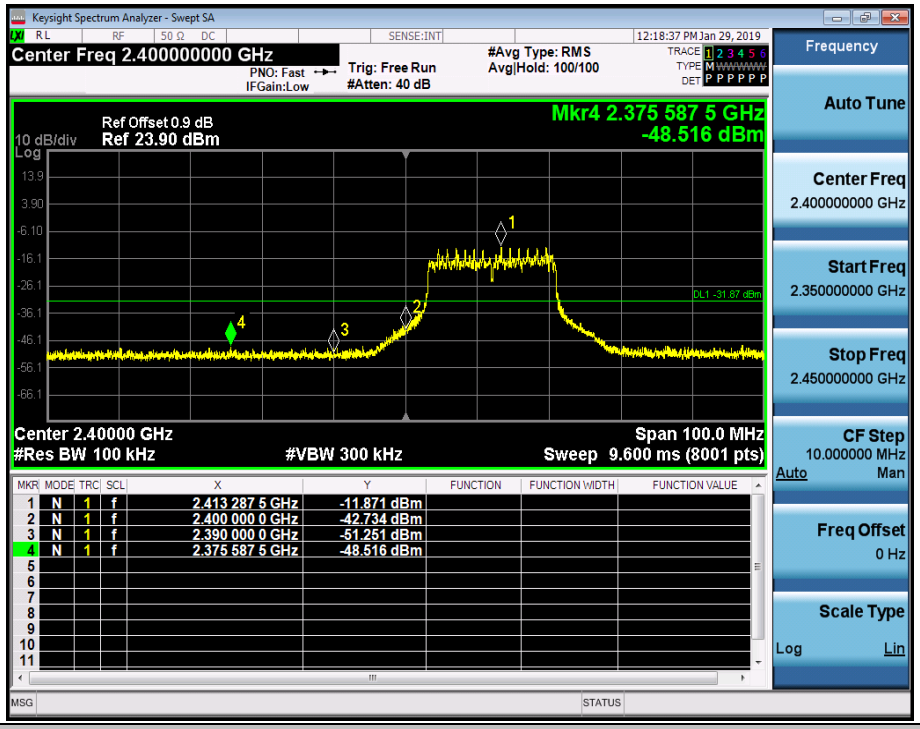
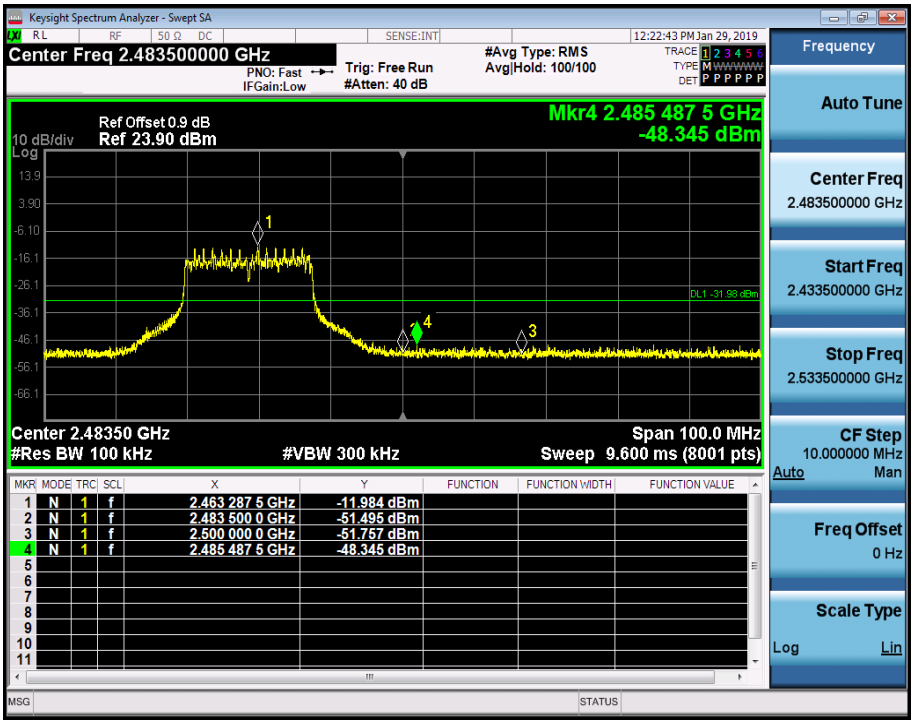
Band-edge for RF Conducted Emissions_11N20SISO_2412_Ant1



Band-edge for RF Conducted Emissions_11N20SISO_2462_Ant1



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5.RF Conducted Spurious Emissions

Test Mode	Test Channel	Ant	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	2412	Ant1	30	10000	100	300	-5.376	-54.196	<-25.376	PASS
11B	2412	Ant1	10000	26000	100	300	-5.376	-51.815	<-25.376	PASS
11B	2442	Ant1	30	10000	100	300	-4.182	-54.487	<-24.182	PASS
11B	2442	Ant1	10000	26000	100	300	-4.182	-50.382	<-24.182	PASS
11B	2462	Ant1	10000	26000	100	300	-4.374	-52.088	<-24.374	PASS
11G	2412	Ant1	30	10000	100	300	-10.5	-54.240	<-30.5	PASS
11G	2412	Ant1	10000	26000	100	300	-10.5	-51.489	<-30.5	PASS
11G	2442	Ant1	30	10000	100	300	-10.357	-54.431	<-30.357	PASS
11G	2442	Ant1	10000	26000	100	300	-10.357	-52.022	<-30.357	PASS
11B	2462	Ant1	30	10000	100	300	-4.374	-53.743	<-24.374	PASS
11G	2462	Ant1	30	10000	100	300	-10.314	-54.325	<-30.314	PASS
11G	2462	Ant1	10000	26000	100	300	-10.314	-51.648	<-30.314	PASS
11N20SISO	2412	Ant1	30	10000	100	300	-12.032	-53.567	<-32.032	PASS
11N20SISO	2412	Ant1	10000	26000	100	300	-12.032	-52.032	<-32.032	PASS
11N20SISO	2442	Ant1	30	10000	100	300	-11.783	-54.501	<-31.783	PASS
11N20SISO	2442	Ant1	10000	26000	100	300	-11.783	-52.064	<-31.783	PASS
11N20SISO	2462	Ant1	30	10000	100	300	-12.047	-54.676	<-32.047	PASS
11N20SISO	2462	Ant1	10000	26000	100	300	-12.047	-51.912	<-32.047	PASS

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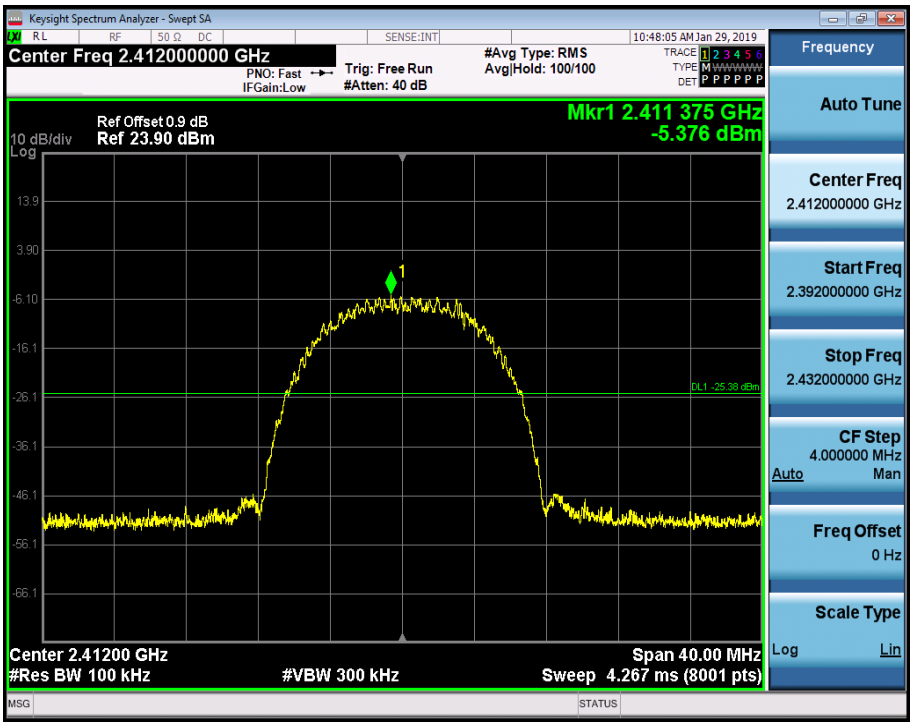
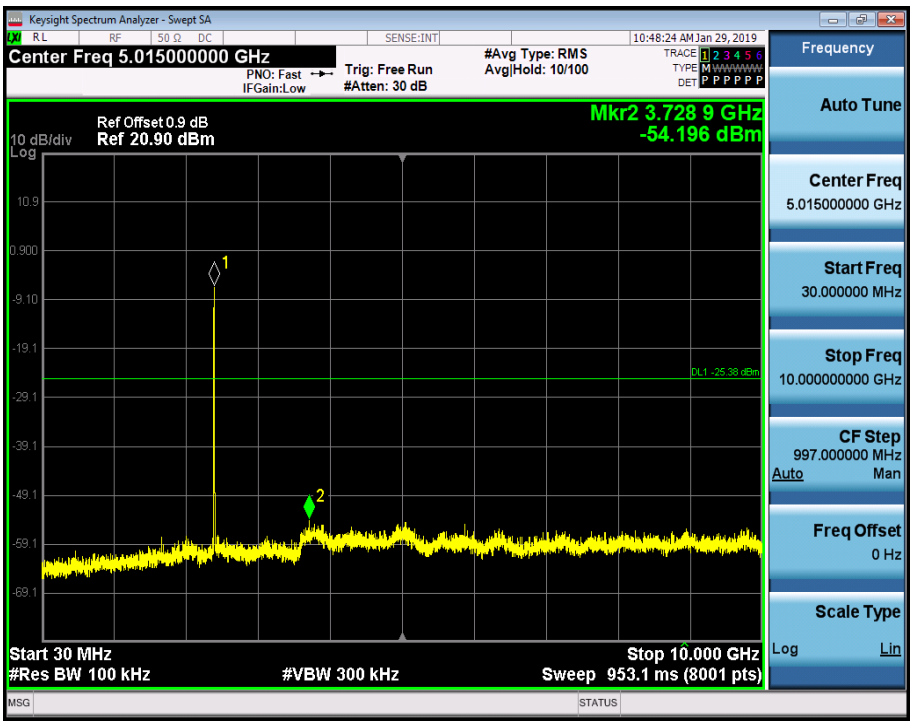
Pref	
CSE_1	

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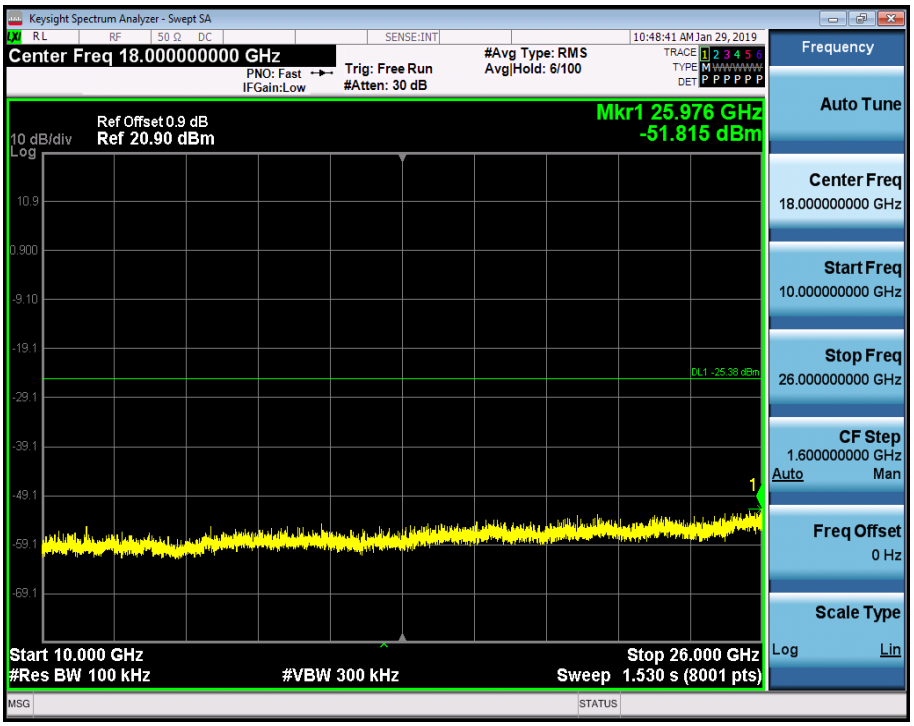
CSE_2



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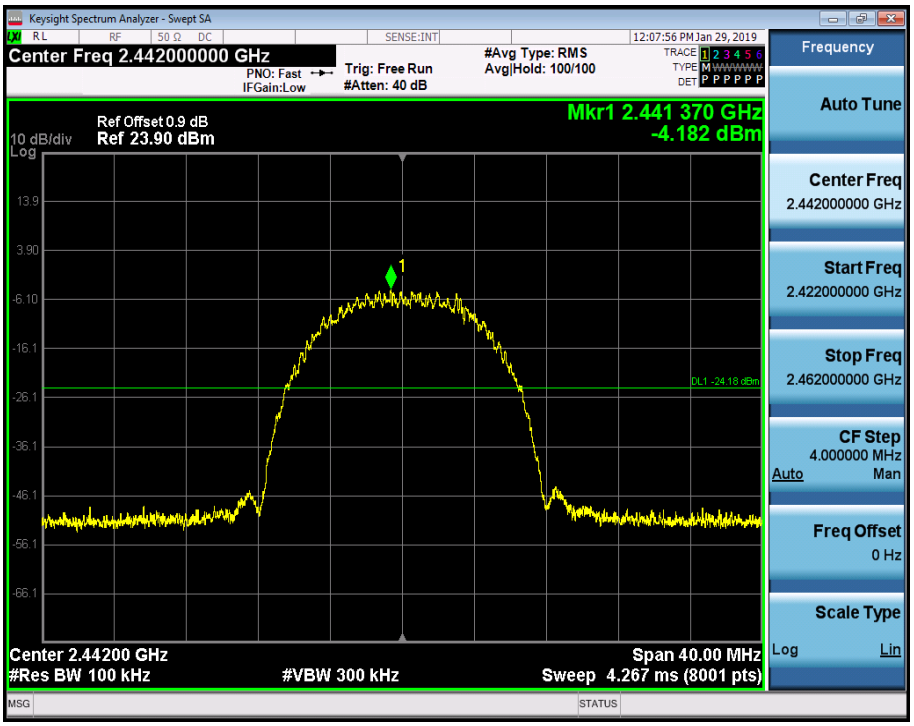

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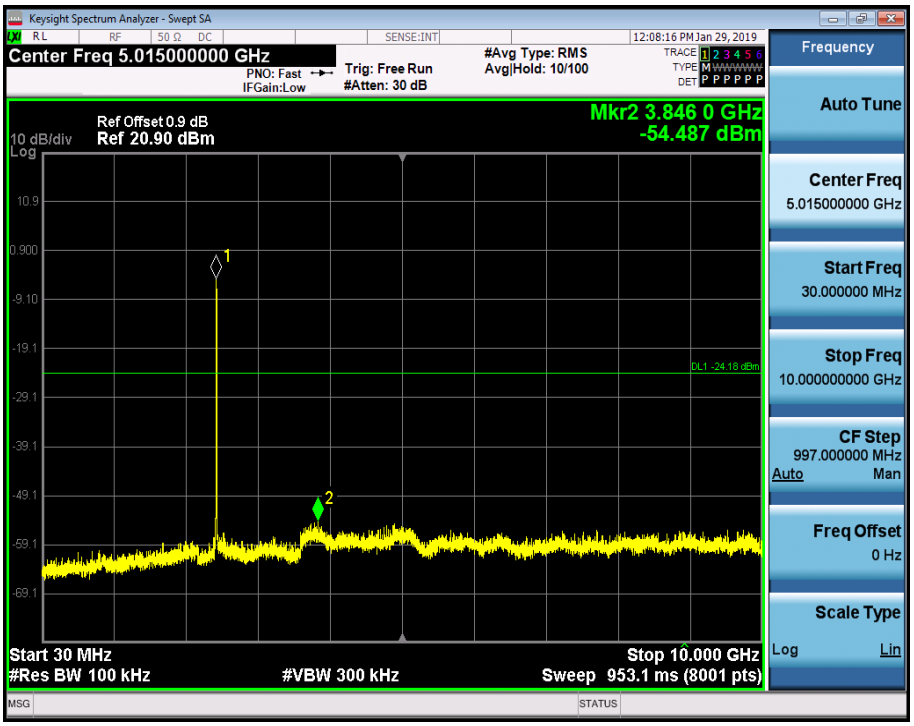

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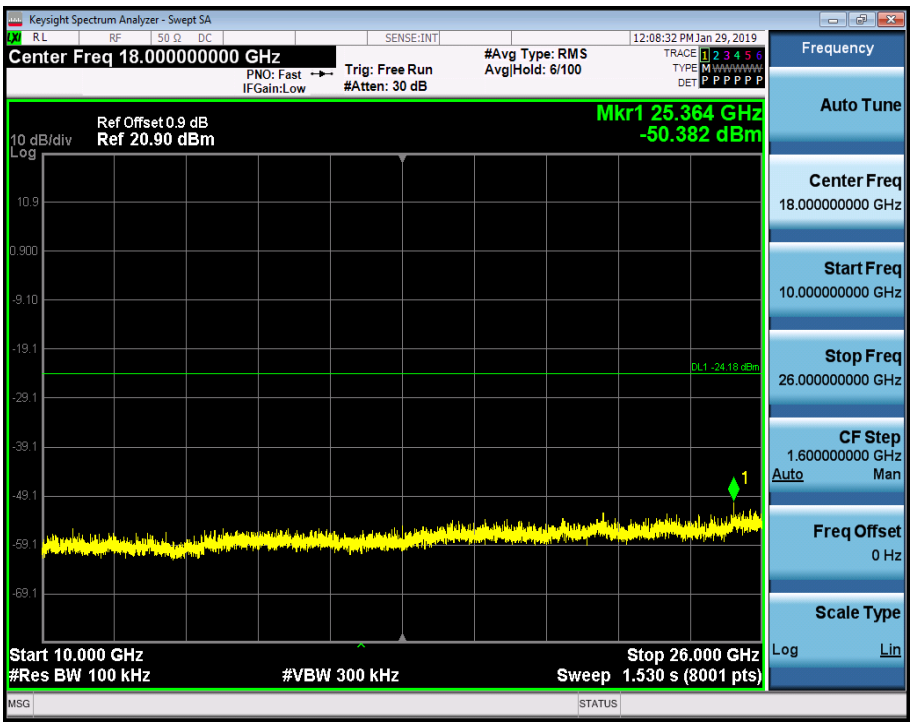

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RF Conducted Spurious Emissions_11B_2462_Ant1

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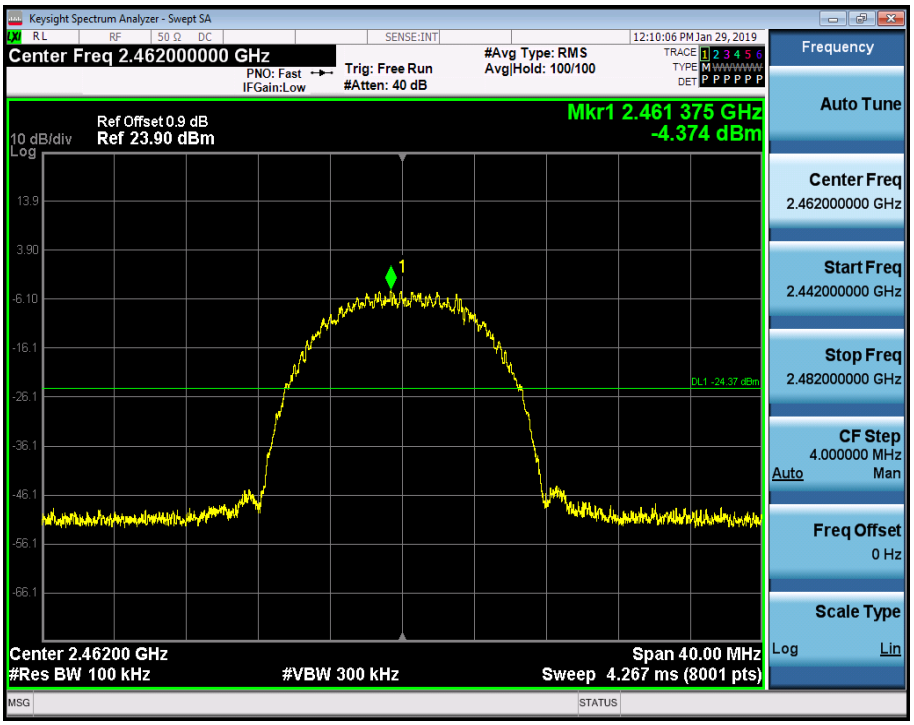

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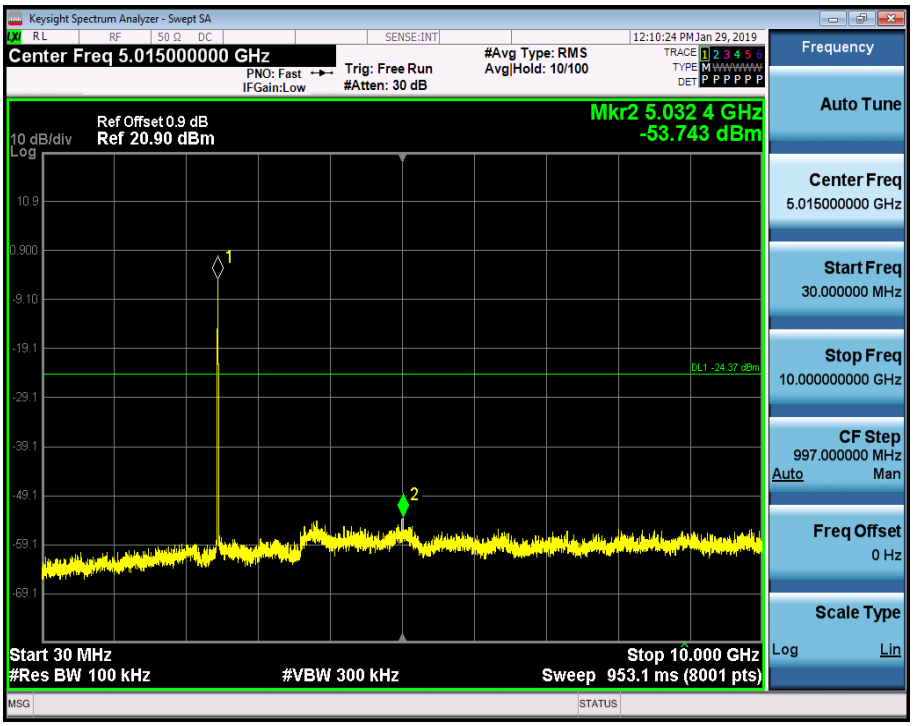

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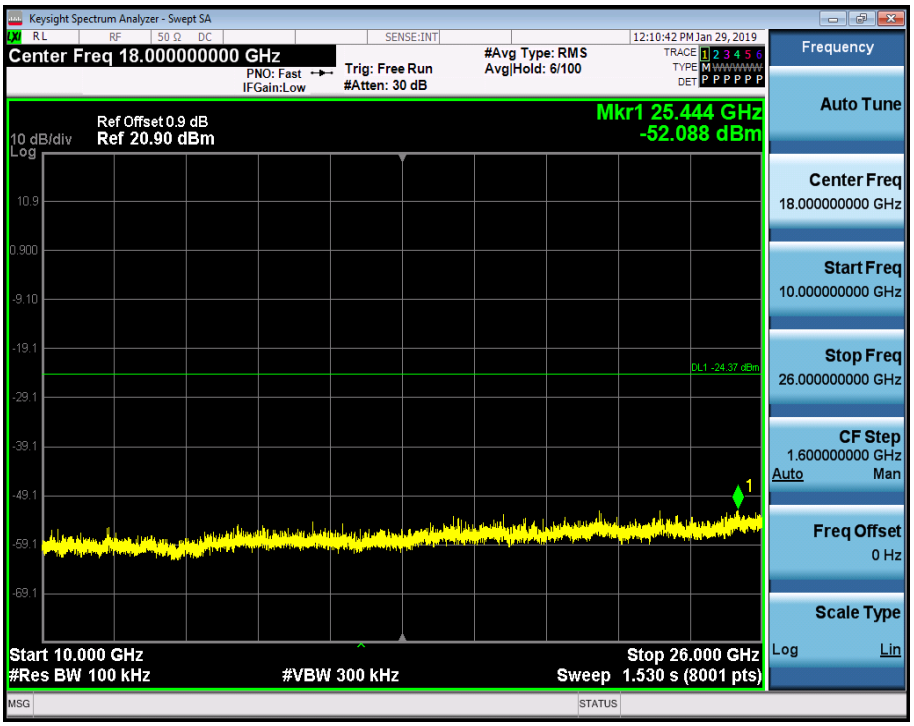
CSE_2



RF Conducted Spurious Emissions_11G_2412_Ant1

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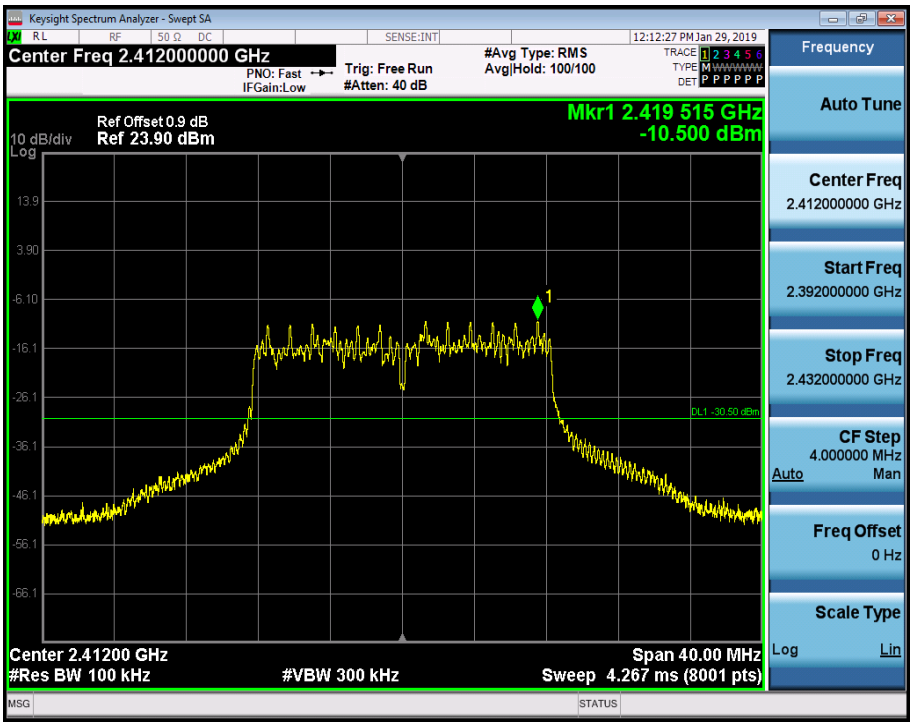

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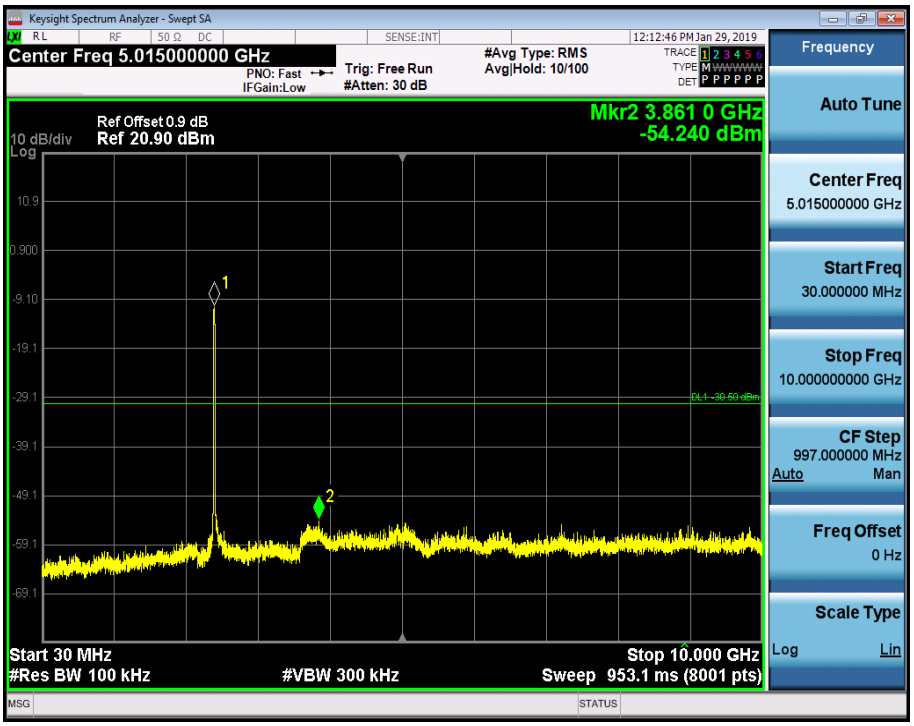
CSE_1



CSE_2

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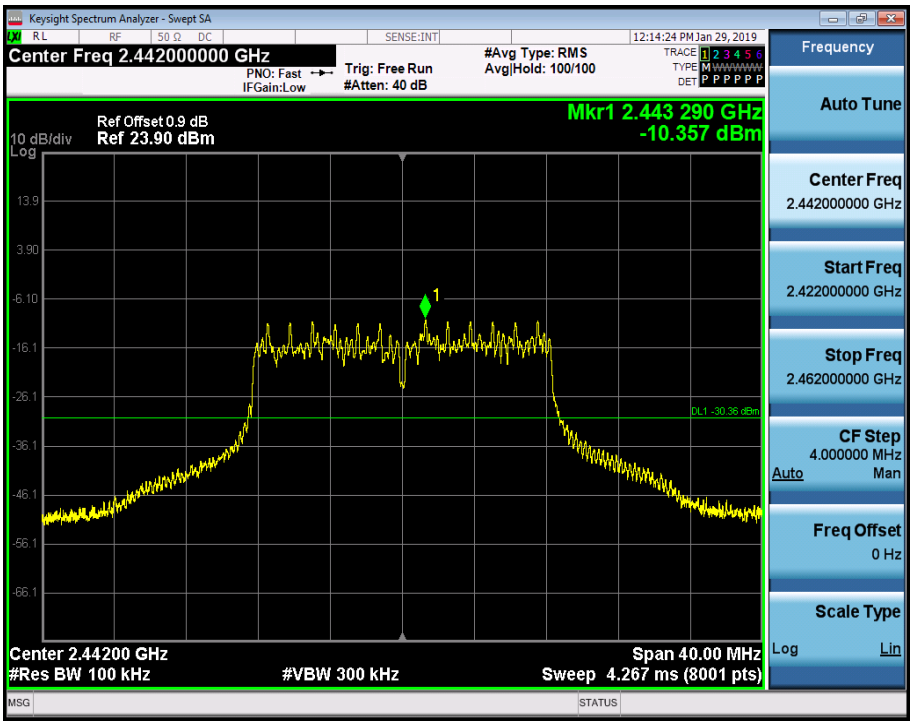

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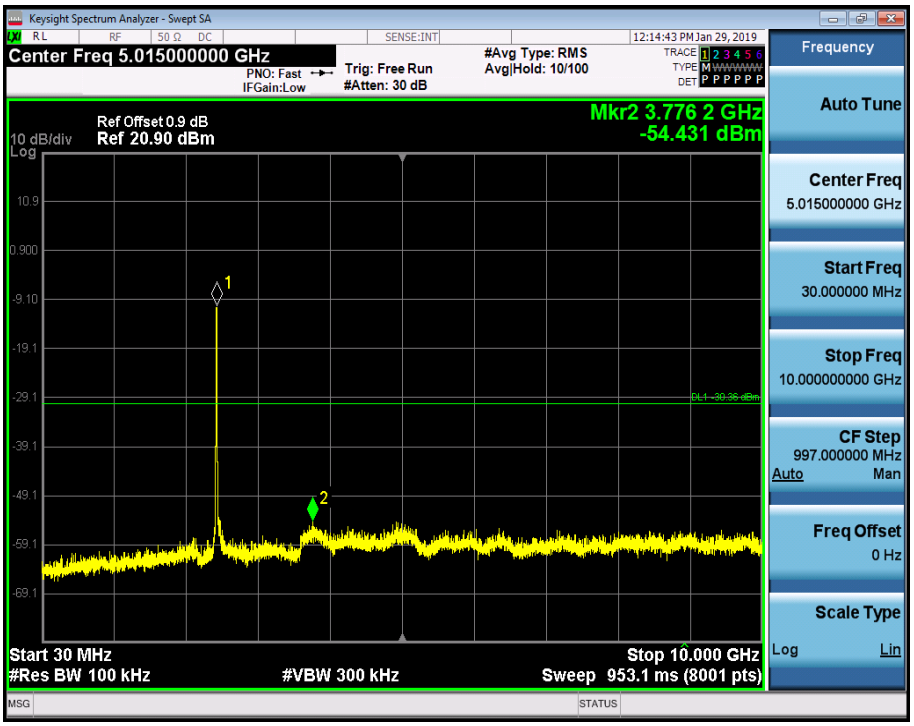

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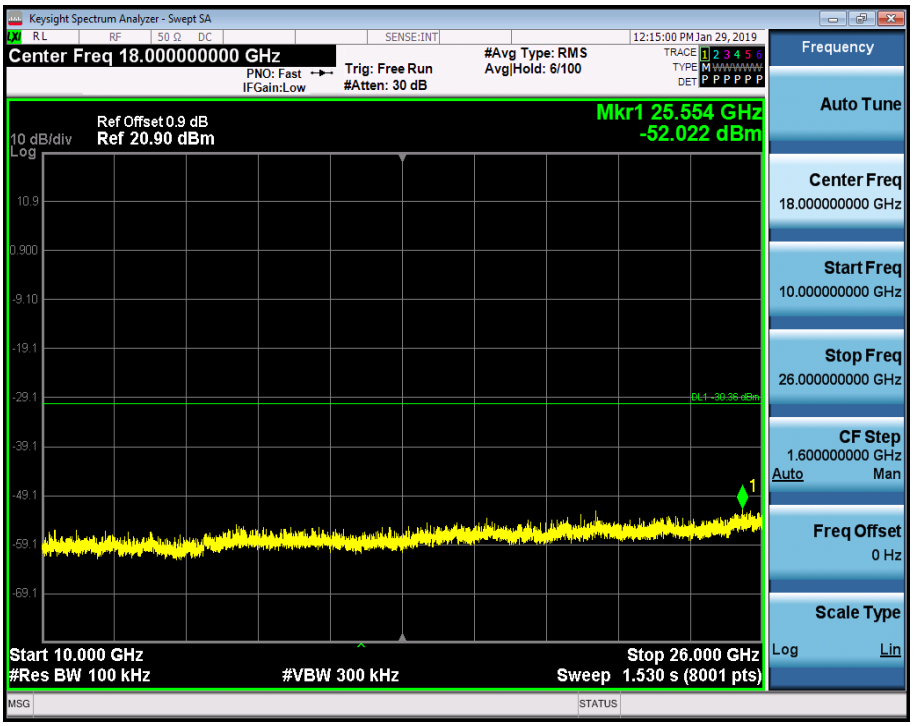

RF Conducted Spurious Emissions_11G_2462_Ant1

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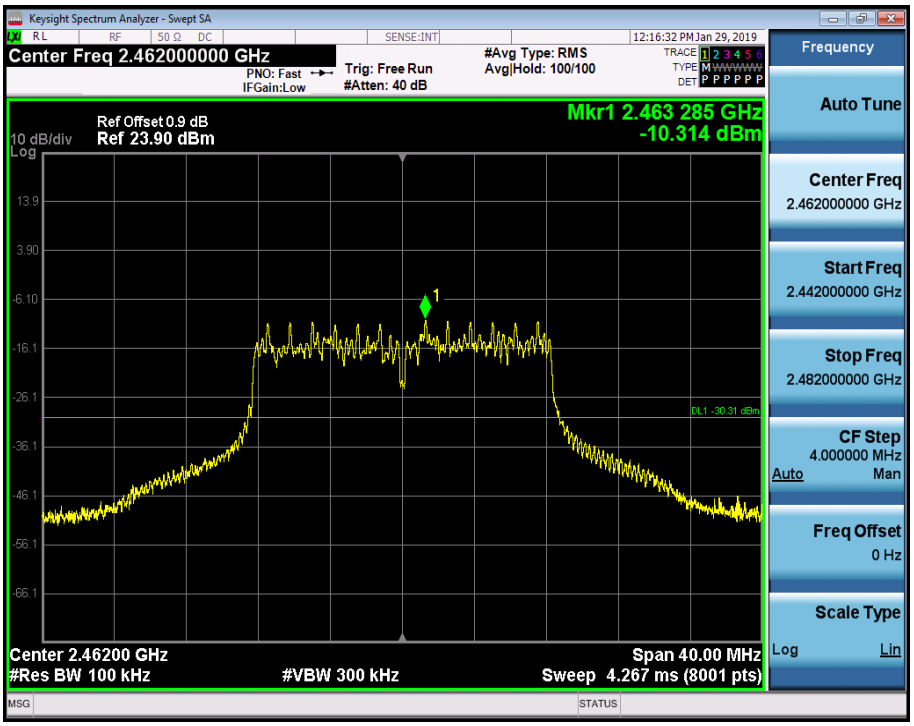

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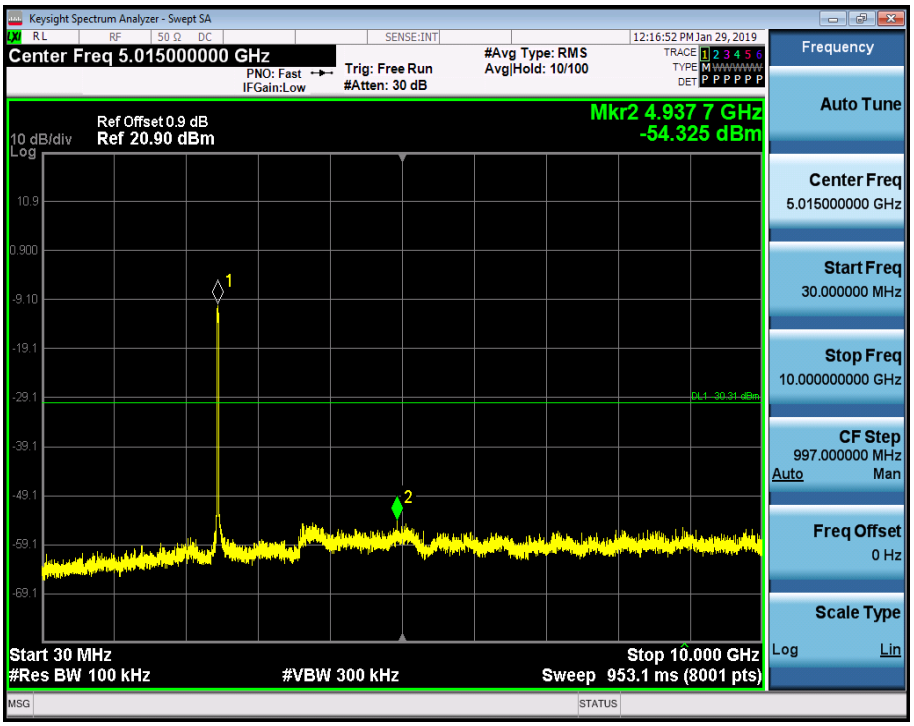

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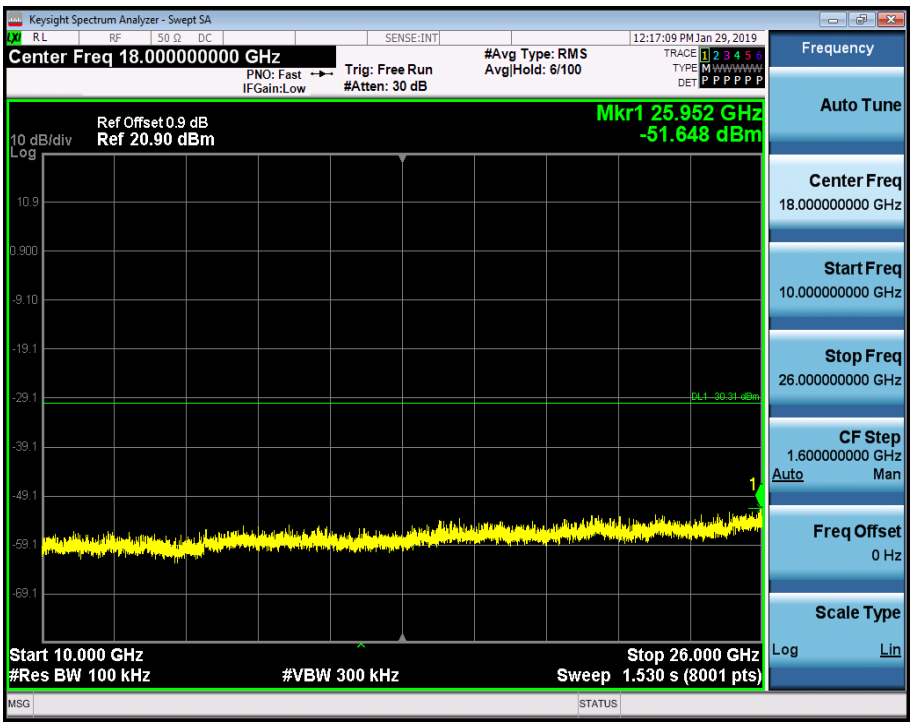

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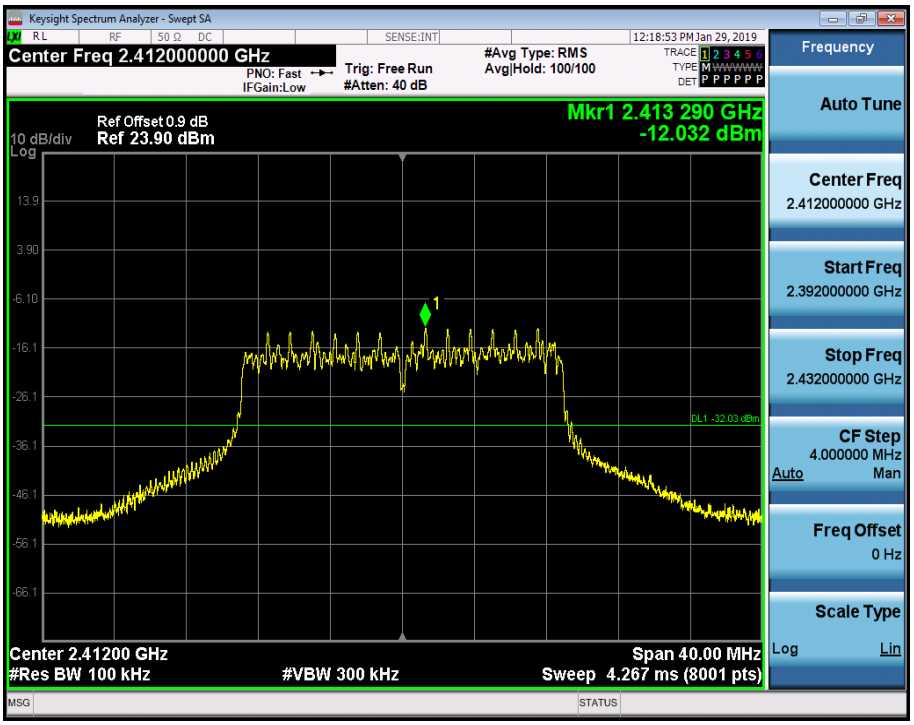

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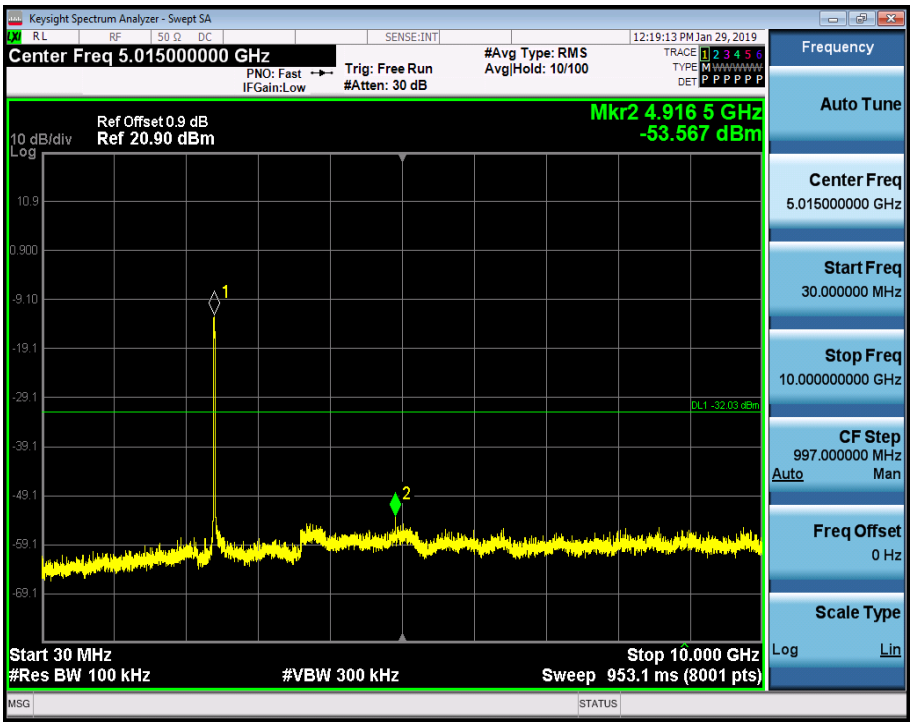

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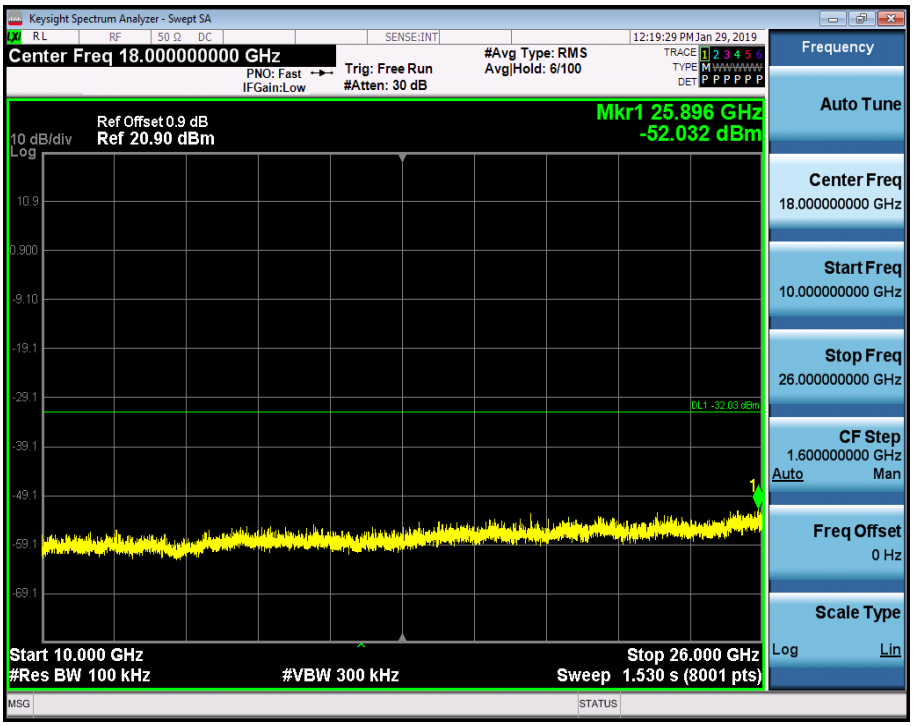
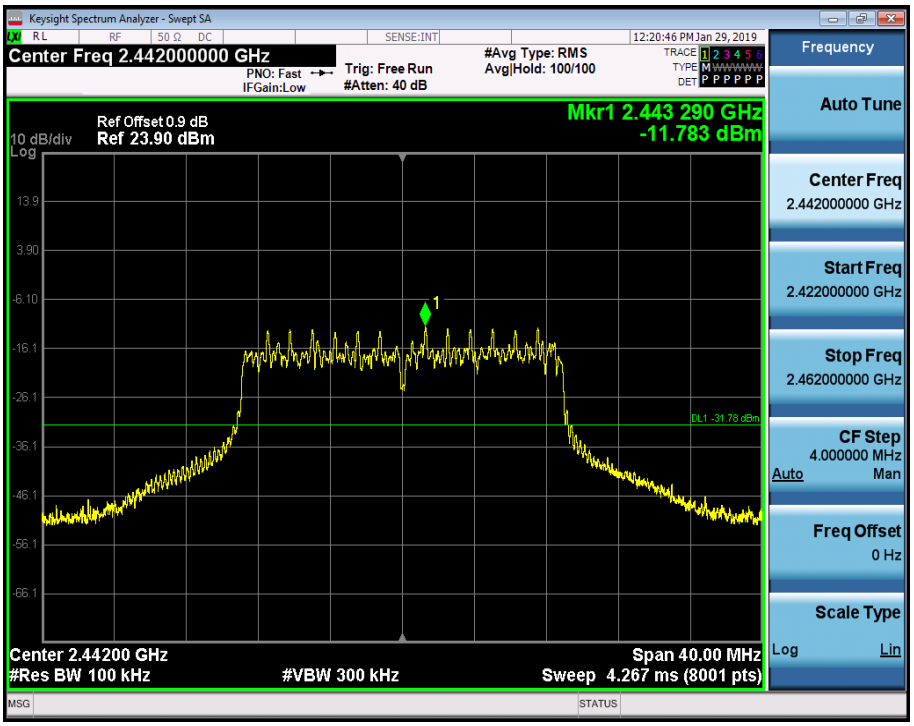
CSE_2



RF Conducted Spurious Emissions_11N20SISO_2442_Ant1

Pref



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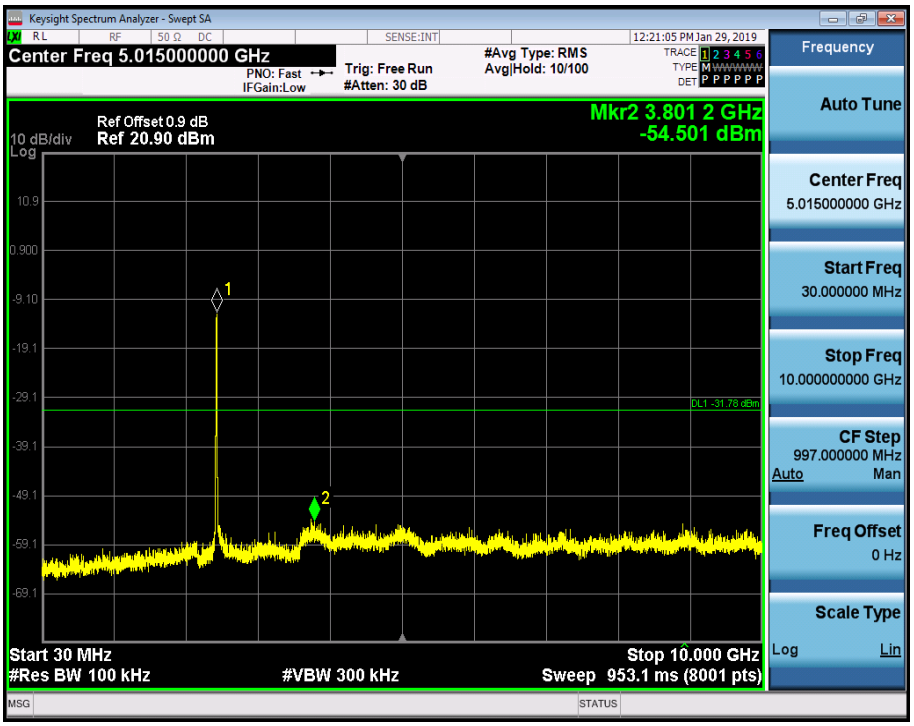
CSE_1



CSE_2

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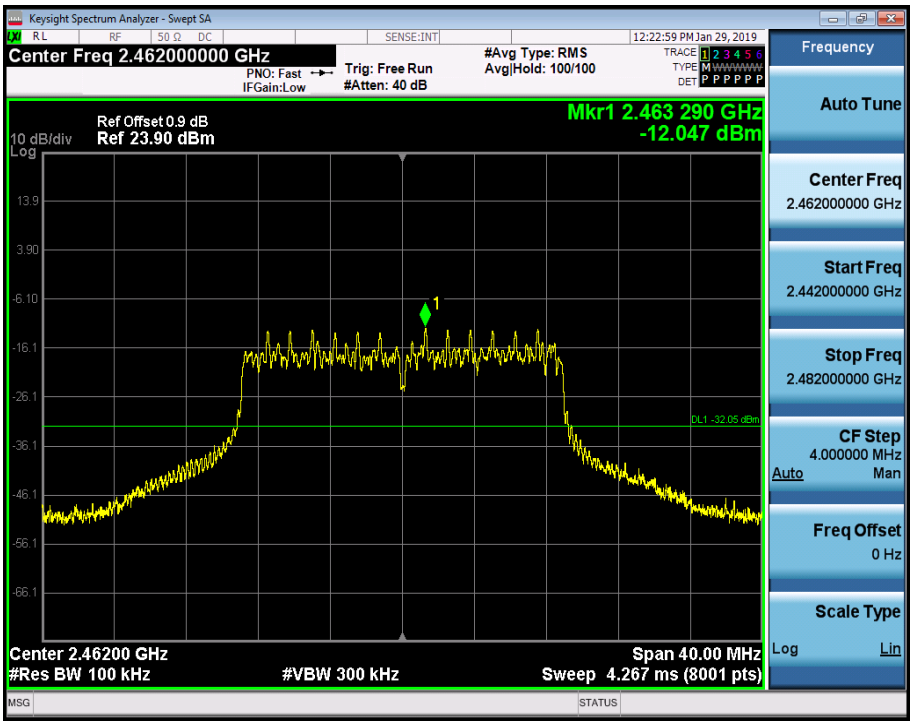
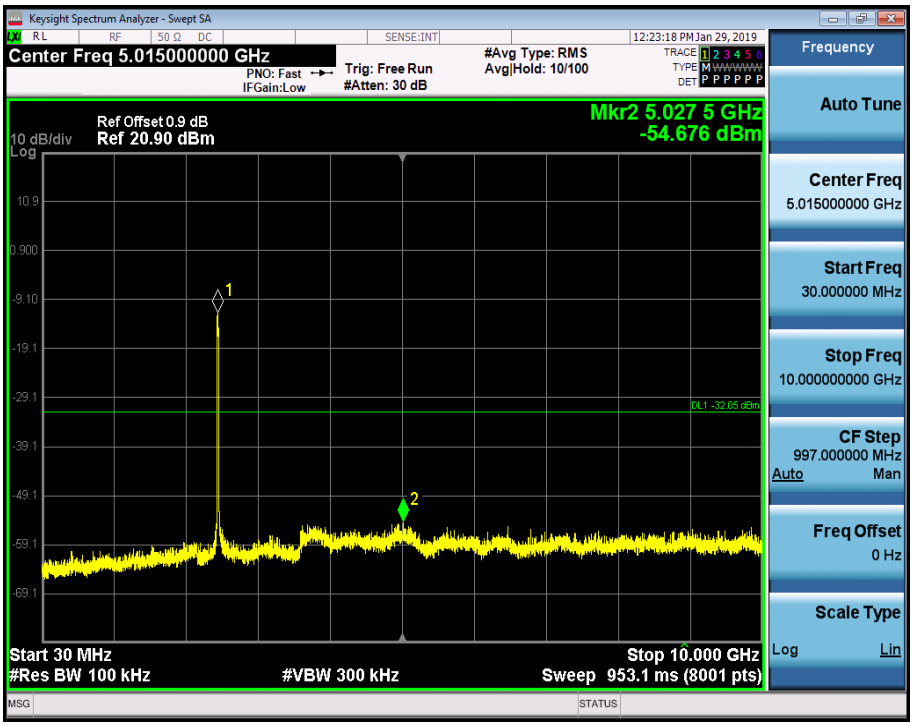
RF Conducted Spurious Emissions_11N20SISO_2462_Ant1

Pref



CSE_1



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CSE_2	

--End of Report--

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