ACCREDITED
Certificate # 3939.01

FCC TEST REPORT
(Part 15, Subpart C)

Applicant:	Shenzhen Zolon Technology Co., Ltd.
Address:	401, Building 3, Shenzhen Software Park, Maling Community, Yuehai Street, Nanshan District, Shenzhen City, Guangdong Province, P.R.C

Manufacturer or Supplier:	Shenzhen Zolon Technology Co., Ltd.
Address:	401, Building 3, Shenzhen Software Park, Maling Community, Yuehai Street, Nanshan District, Shenzhen City, Guangdong Province, P.R.C
Product:	Integrated Smart Terminal
Brand Name:	ZOLON
Model Name:	K2220, K2160
FCC ID:	2AV5BK2220
Date of tests:	Jul. 14, 2023 ~ Sep. 28, 2023

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.247**
☒ **ANSI C63.10-2013**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Simon Wang Date: Sep. 28, 2023	Luke Lu Date: Sep. 28, 2023

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/ and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

TABLE OF CONTENTS

RELEASE CONTROL RECORD **4**
1 SUMMARY OF TEST RESULTS **5**
1.1 MEASUREMENT UNCERTAINTY 6
2 GENERAL INFORMATION **7**
2.1 GENERAL DESCRIPTION OF EUT 7
2.2 DESCRIPTION OF TEST MODES 9
2.2.1 CONFIGURATION OF SYSTEM UNDER TEST 10
2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL 10
2.3 DUTY CYCLE OF TEST SIGNAL 13
2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS 14
2.5 DESCRIPTION OF SUPPORT UNITS 14
3 TEST TYPES AND RESULTS **15**
3.1 CONDUCTED EMISSION MEASUREMENT 15
3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT 15
3.1.2 TEST INSTRUMENTS 15
3.1.3 TEST PROCEDURES 16
3.1.4 DEVIATION FROM TEST STANDARD 16
3.1.5 TEST SETUP 17
3.1.6 EUT OPERATING CONDITIONS 17
3.1.7 TEST RESULTS 18
3.2 RADIATED EMISSION MEASUREMENT 20
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT 20
3.2.2 TEST INSTRUMENTS 21
3.2.3 TEST PROCEDURES 23
3.2.4 DEVIATION FROM TEST STANDARD 23
3.2.5 TEST SETUP 24
3.2.6 EUT OPERATING CONDITIONS 25
3.2.7 TEST RESULTS 26
3.3 6 DB BANDWIDTH MEASUREMENT 47
3.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT 47
3.3.2 TEST INSTRUMENTS 47
3.3.3 TEST PROCEDURE 47
3.3.4 DEVIATION FROM TEST STANDARD 48
3.3.5 TEST SETUP 48

3.3.6 EUT OPERATING CONDITIONS 48
3.3.7 TEST RESULTS 49
3.4 CONDUCTED OUTPUT POWER 50
3.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT 50
3.4.2 TEST SETUP 50
3.4.3 TEST INSTRUMENTS 50
3.4.4 TEST PROCEDURES 50
3.4.5 DEVIATION FROM TEST STANDARD 50
3.4.6 EUT OPERATING CONDITIONS 50
3.4.7 TEST RESULTS 51
3.4.7.1 MAXIMUM PEAK OUTPUT POWER 51
3.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE) 52
3.5 POWER SPECTRAL DENSITY MEASUREMENT 53
3.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT 53
3.5.2 TEST SETUP 53
3.5.3 TEST INSTRUMENTS 53
3.5.4 TEST PROCEDURE 53
3.5.5 DEVIATION FROM TEST STANDARD 53
3.5.6 EUT OPERATING CONDITION 53
3.5.7 TEST RESULTS 54
3.6 OUT OF BAND EMISSION MEASUREMENT 55
3.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT 55
3.6.2 TEST SETUP 55
3.6.3 TEST INSTRUMENTS 55
3.6.4 TEST PROCEDURE 55
3.6.5 DEVIATION FROM TEST STANDARD 56
3.6.6 EUT OPERATING CONDITION 56
3.6.7 TEST RESULTS 56
3.7 ANTENNA REQUIREMENTS 57
3.7.1 STANDARD APPLICABLE 57
3.7.2 ANTENNA CONNECTED CONSTRUCTION 57
3.7.3 ANTENNA GAIN 57
4 PHOTOGRAPHS OF THE TEST CONFIGURATION 57
5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 58
6 APPENDIX 1 :WLAN 2.4G 59
7 APPENDIX 2 :BLE 103

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P23070005RF02	Original release	Sep. 28, 2023

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**LAB**
15.207	AC Power Conducted Emission	Compliance	A
15.205 15.209	Radiated Emissions	Compliance	WIFI-2.4G for A BLE for B
15.247(d)	Out of band Emission Measurement	Compliance	A
15.247(a)(2)	6dB bandwidth	Compliance	A
15.247(b)	Conducted Output power	Compliance	A
15.247(e)	Power Spectral Density	Compliance	A
15.203	Antenna Requirement	Compliance	A

Note：Except RSE, other data please refer to Appendix 1 (for WIFI-2.4G) and Appendix 2 (for BLE).

Test Lab Information Reference:
Lab A
BV 7Layers Communications Technology (Shenzhen) Co., Ltd
Lab Address:
No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, China
Accredited Test Lab Cert 3939.01
The FCC Site Registration No. is 525120; The Designation No. is CN1171.

Lab B:
Huarui 7Layers High Technology (Suzhou) Co., Ltd.
Lab Address:
Tower N, Innovation Center, 88 Zhuyi Road, High-tech District, Suzhou City, Anhui Province
Accredited Test Lab Cert 6613.01
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (9KHz~30MHz)	±2.68dB
Radiated emissions (30MHz~1GHz)	±4.98dB
Radiated emissions (1GHz ~6GHz)	±4.70dB
Radiated emissions (6GHz ~18GHz)	±4.60dB
Radiated emissions (18GHz ~40GHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Power Spectral Density	±0.85 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Integrated Smart Terminal
BRAND NAME	ZOLON
MODEL NAME	K2220, K2160
NOMINAL VOLTAGE	12.0Vdc
MODULATION	DSSS, OFDM, GFSK
TRANSMISSION RATE	802.11b: 11/ 5.5/ 2.0 / 1.0 Mbps 802.11g: 54/ 48/ 36 / 24 / 18 / 9/ 6 Mbps 802.11n20: up to 72.2 Mbps BT_LE: 1 Mbps/2 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	WLAN: 200.45mW (Maximum) BT-LE: 2.96mW (Maximum)
ANTENNA TYPE	Small Folding Antenna with 1.07dBi gain
HW VERSION	K2220 K2160
SW VERSION	V0.0.0.1
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	AC cable: non-shielded cable, with w/o ferrite core, 1.8 meter

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. The EUT incorporates a SISO function. Physically, the EUT provides one transmitter and one receiver.

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX /1RX
802.11g	1TX /1RX
802.11n (20MHz)	1TX /1RX
BT_LE(1MHz)	1TX /1RX
BT_LE(2MHz)	1TX /1RX

3. For the test results, the EUT had been tested with all conditions. But only the worst case (K2220) was shown in the test report. （The test mainly executed by K2220,and K2160 verified the AC Power Conducted Emission and RSE test case, only the data of K2220 has been reported in the report.）

4. The difference of K2220 and K2160 is on below:

Object	K2160	K2220
PMN	K2160	K2220
HVIM	K2160	K2220
Power Rating	Model Name: SLX-PWL27-P4 I/P: 100-240Vac, 2000mA, O/P: 12Vdc, 2.0 A；LCD backlight power supply：28.8 Vdc, 150 mA	Model Name: SLX-PWL27-V13 I/P: 100-240Vac, 2000mA, O/P: 12Vdc, 2.0 A；LCD backlight power supply: 54 Vdc, 240 mA
Screen	Manufacturer: CSOT Model Name: MG1561B01-6 Size: 15.6 inches	Manufacturer: HKC Model Name: PN215CT01-1 Size: 21.5 inches
When the operating voltage changes, It does not affect RF, baseband module.		

List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
AC cable US Plug	N/A	N/A	KE301	1.8 METER
Small folding antenna	N/A	Shenzhen Zhenwei technology co.,LTD	HTX-002	N/A

2.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

40 channels are provided for BT-LE (GFSK):

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 4photographs of the test configuration for reference.

2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.
The worst case was found when positioned on Y axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
-	√	√	√	√	-

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

RADIATED EMISSION TEST (BELOW 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11n20	1 to 11	1	OFDM	MCS8
BT-LE	1 to 38	19	GFSK	2.0

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	11.0
802.11g	1 to 11	1, 6, 11	OFDM	54.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS8
BT-LE	0 to 39	0,19, 39	GFSK	1.0
BT-LE	1 to 38	1, 19, 38	GFSK	2.0

POWER LINE CONDUCTED EMISSION TEST

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11g	1 to 11	11	OFDM	54.0

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	11.0
802.11g	1 to 11	1, 6, 11	OFDM	54.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS8
BT-LE	0 to 39	0,19, 39	GFSK	1.0
BT-LE	1 to 38	1, 19, 38	GFSK	2.0

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test values of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	11.0
802.11g	1 to 11	1, 6, 11	OFDM	54.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS8
BT-LE	0 to 39	0,19, 39	GFSK	1.0
BT-LE	1 to 38	1, 19, 38	GFSK	2.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	23deg. C, 70%RH	AC 120V	Jace Hu
RE≥1G	23deg. C, 70%RH	AC 120V	Jace Hu
PLC	25deg. C, 52%RH	AC 120V	Carl Xie
APCM	25deg. C, 60%RH	AC 120V	James Fu

2.3 DUTY CYCLE OF TEST SIGNAL

Please Refer to Appendix1/2 Of this test report.

WORST-CASE DATA:

Measured Duty Cycle		
Mode		Duty Cycle [%]
WIFI 2.4GHz	11B	90.43
	11G	64.29
	11N20	62.96
BT LE	BT4.0	85.60
	BT5.0	57.45

Note:
Duty cycle of test signal is < 98%, duty factor shall be considered.

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C, Section 15.247

KDB 558074 D01 DTS Meas Guidance v05r02

ANSI C63.10-2013

Note：

1. All test items have been performed and recorded as per the above standards.
2. The EUT is also considered as a kind of computer peripheral, because the connection to a computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Desktop	Lenovo	M73 SFF	PC04GRQV	N/A
2	Desktop	Lenovo	M73 SFF	PC06CS27	N/A
3	Laptop	Lenovo	Thinkpad T450	PC-049PT1	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.5m
2	AC Line: Unshielded, Detachable 1.5m
3	AC Line: Unshielded, Detachable 1.5m

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Feb. 14,23	Feb. 13,24
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Mar. 03,23	Mar. 02,24

NOTE:

1. The test was performed in CE shielded room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

3.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

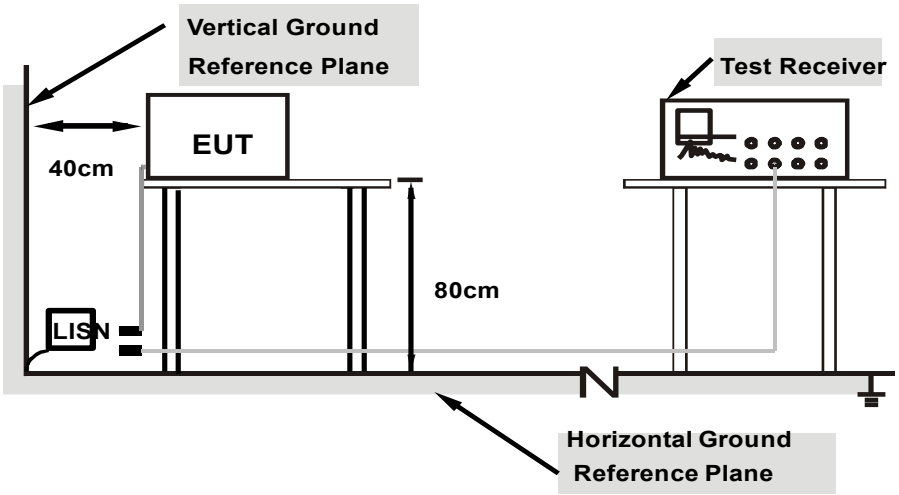
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: All modes of operation were investigated, and the worst-case emissions are reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.6 EUT OPERATING CONDITIONS

a. Turned on the power and connected all equipment.
b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

3.1.7 TEST RESULTS

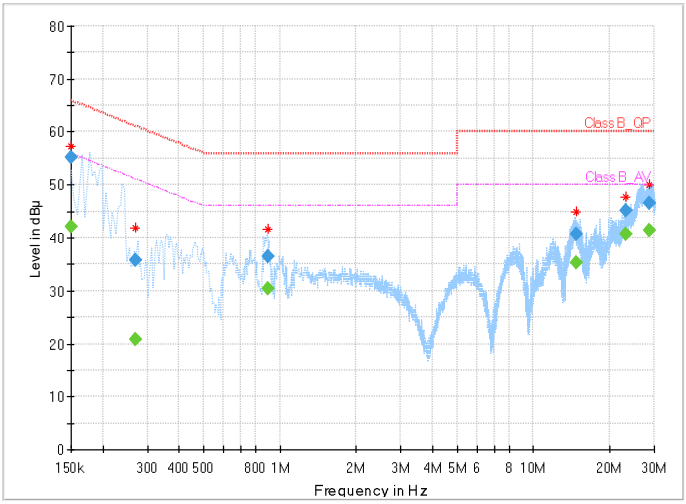
CONDUCTED WORST-CASE DATA:

Frequency Range	150KHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	26deg. C, 51%RH
Tested By	Carl Xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	42.05	56.00	13.95	L1	ON	9.7
0.150000	55.31	---	66.00	10.69	L1	ON	9.7
0.268000	---	20.78	51.18	30.40	L1	ON	9.7
0.268000	35.72	---	61.18	25.46	L1	ON	9.7
0.896000	---	30.51	46.00	15.49	L1	ON	9.7
0.896000	36.51	---	56.00	19.49	L1	ON	9.7
14.700000	---	35.31	50.00	14.69	L1	ON	9.8
14.700000	40.61	---	60.00	19.39	L1	ON	9.8
23.128000	---	40.78	50.00	9.22	L1	ON	9.8
23.128000	45.05	---	60.00	14.95	L1	ON	9.8
28.708000	---	41.36	50.00	8.64	L1	ON	9.8
28.708000	46.47	---	60.00	13.53	L1	ON	9.8

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value -Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

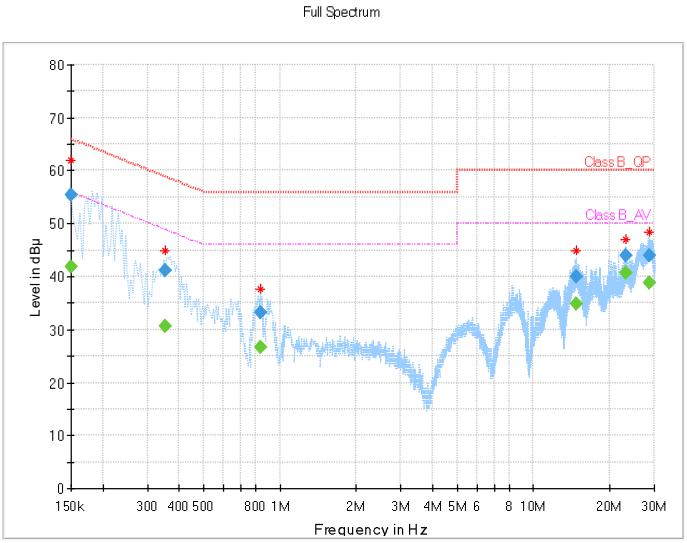
Full Spectrum



Frequency Range	150KHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	26deg. C, 51%RH
Tested By	Carl Xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	41.77	56.00	14.23	N	ON	9.7
0.150000	55.33	---	66.00	10.67	N	ON	9.7
0.352000	---	30.63	48.92	18.29	N	ON	9.7
0.352000	41.14	---	58.92	17.78	N	ON	9.7
0.836000	---	26.72	46.00	19.28	N	ON	9.7
0.836000	33.20	---	56.00	22.80	N	ON	9.7
14.700000	---	34.85	50.00	15.15	N	ON	9.8
14.700000	39.92	---	60.00	20.08	N	ON	9.8
23.128000	---	40.75	50.00	9.25	N	ON	9.9
23.128000	44.09	---	60.00	15.91	N	ON	9.9
28.684000	---	38.79	50.00	11.21	N	ON	9.9
28.684000	44.08	---	60.00	15.92	N	ON	9.9

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value -Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 22, 23	May. 21,26
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 18,23	Feb. 17,24
Horn Antenna	ETS-LINDGREN	3117	00168692	Feb. 18,23	Feb. 17,24
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Sep.04, 22	Sep.03, 23
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Sep.03, 23	Sep.02, 24
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	JS1120-3	3.2.06	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	N/A	May. 06,23	May. 05,24
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 28,23	Mar. 27,24
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May. 06,23	May. 05,24
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.10,23	May.09,24
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,23	Feb. 16,24
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 12,22	Aug. 11,23
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 11,23	Aug. 10,24
Power Meter	Anritsu	ML2495A	1506002	Feb. 14,23	Feb. 13,24
Power Sensor	Anritsu	MA2411B	1339352	Feb. 14,23	Feb. 13,24
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.03,22	Sep.02,23
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.02,23	Sep.01,24

NOTE: 1. The calibration interval of the above test instruments is 12 months or 36 months, and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in the 3m Chamber.

3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.30,22	Aug.29,24
Pre-Amplifier	R&S	SCU08F1	101028	Sep.16,22	Sep.15,24
Signal Generator	R&S	SMB100A	182185	Feb.16,22	Feb.15,24
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.28,22	Feb.27,24
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.23,22	Feb.22,24
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,22	Aug.21,24
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.23,22	Feb.22,24
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.27,22	Jun.26,24
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	N/A	N/A
DC Source	HYELEC	HY3010B	551016	Aug.31,22	Aug.30,24
Hygrothermograph	DELI	20210528	SZ014	Sep.06,22	Sep.05,24
6DB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W12.14	N/A	Apr.28,23	Oct.27,23

NOTE: 1. The calibration interval of the above test instruments is 6 months or 12 months or 36 months, and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in the 3m Chamber.

3. The FCC Site Registration No. is 434559; The Designation No. is CN1325.

3.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3-meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height varies from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. During the test, each emission was maximized by having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

Note:

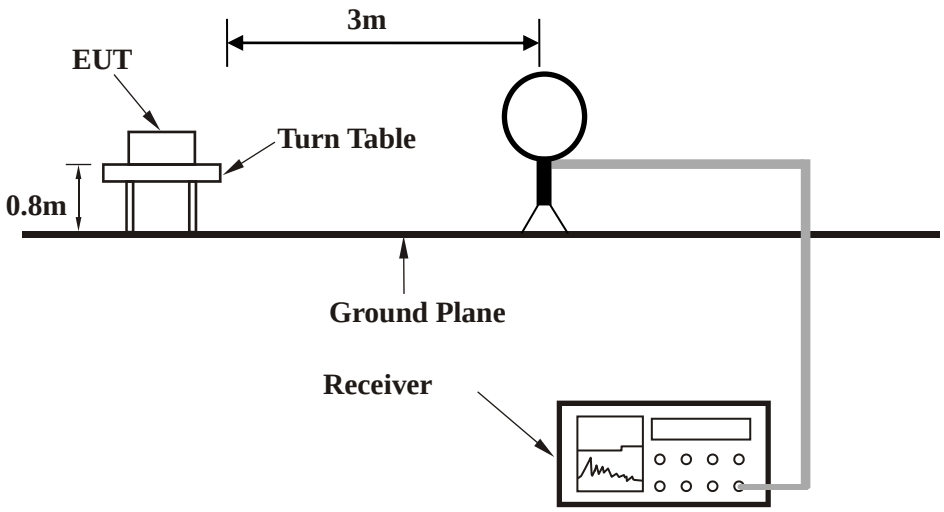
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz, and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated, and the worst-case emissions are reported.

3.2.4 DEVIATION FROM TEST STANDARD

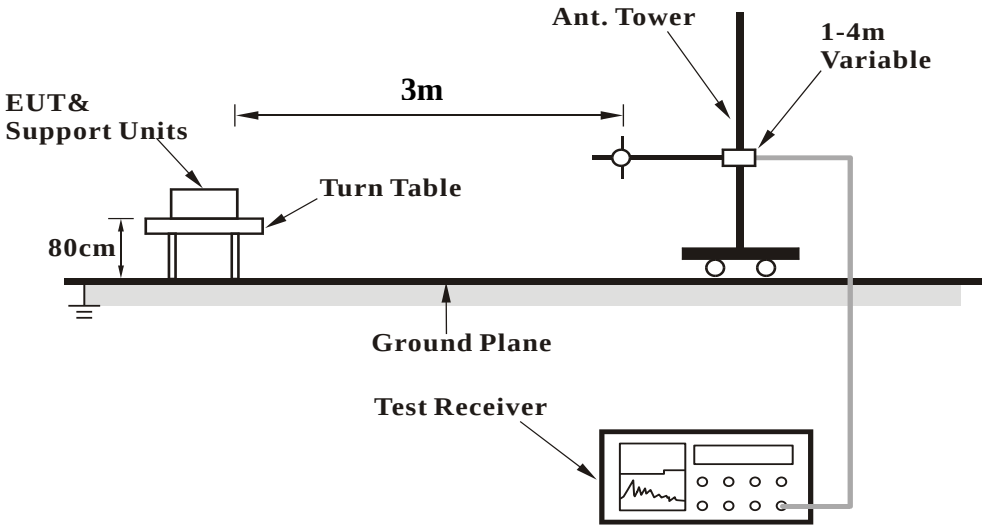
No deviation

3.2.5 TEST SETUP

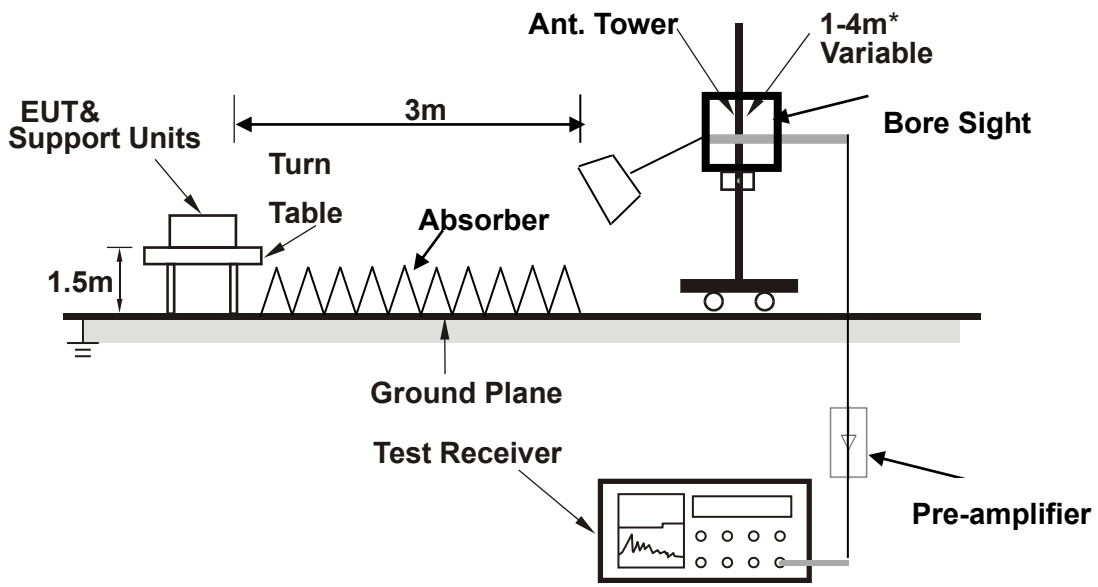
<Frequency Range 9KHz~30MHz >



< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depending on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.2.6 EUT OPERATING CONDITIONS

a. Set the EUT under full load condition and placed it on a testing table.

b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

c. The necessary accessories enable the EUT in full functions.

3.2.7 TEST RESULTS

NOTE ：The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

802.11n20:

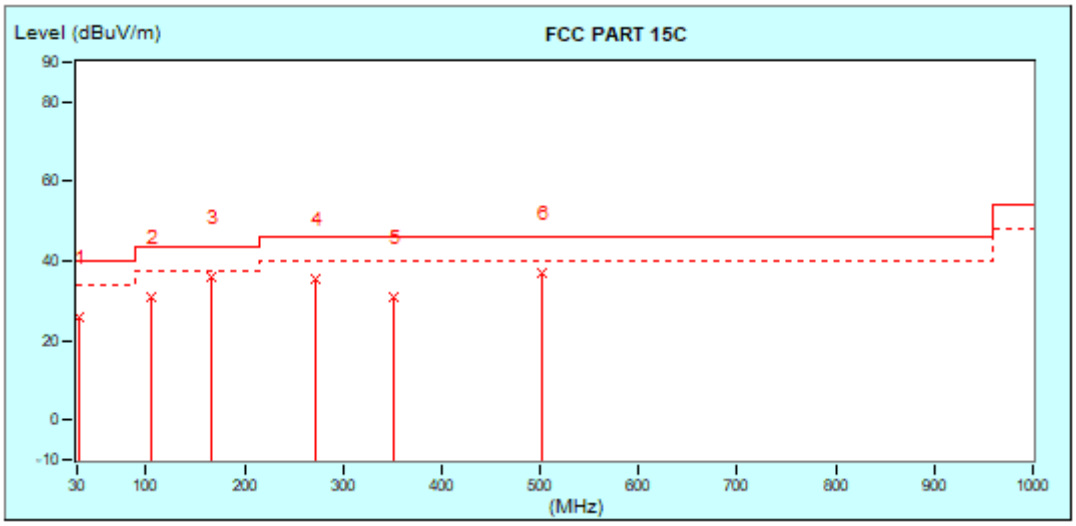
CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY: HORIZONTAL

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	31.55	-0.58	26.44	25.86	40.00	-14.14	100	0
	2	104.62	-9.00	39.71	30.71	43.50	-12.79	100	0
*	3	166.79	-8.31	44.15	35.84	43.50	-7.66	100	0
	4	272.50	-7.42	43.00	35.58	46.00	-10.42	100	0
	5	351.78	-5.36	36.25	30.89	46.00	-15.11	100	0
	6	501.01	-1.31	38.16	36.85	46.00	-9.15	100	0

REMARKS:

1. Emission Level(dBuV/m) = Read Level(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.



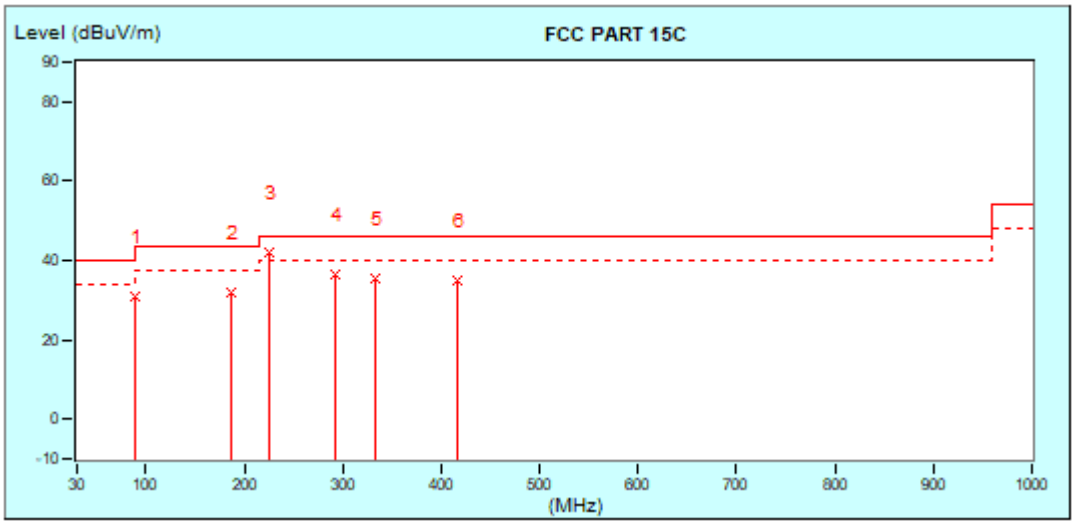
CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY: VERTICAL

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	88.00	-12.64	43.57	30.93	40.00	-9.07	100	0
	2	187.00	-8.74	40.54	31.80	43.50	-11.70	100	0
*	3	225.87	-7.72	49.67	41.95	46.00	-4.05	100	0
	4	292.71	-6.66	43.21	36.55	46.00	-9.45	100	0
	5	333.12	-5.72	40.99	35.27	46.00	-10.73	100	0
	6	417.07	-3.67	38.47	34.80	46.00	-11.20	100	0

REMARKS:

1. Emission Level(dBuV/m) = Read Level(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.



ABOVE 1GHz WORST-CASE DATA:

Note: 1. For radiated emissions testing，the full testing range of different modes have been scanned，only the worst-case harmonic data is reported in the sheet.

2. All other emissions were greater than 20dB below the limit was not recorded

802.11b:

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	cm	deg
	1	2390.00 (PK)	-10.46	54.68	44.22	74.00	-29.78	100	110
	2	2390.00 (AV)	-10.46	44.73	34.27	54.00	-19.73	100	110
i	3	2412.00 (PK)	-10.56	98.31	87.75	74.00	13.75	100	110
*i	4	2412.00 (AV)	-10.56	94.51	83.95	54.00	29.95	100	110
	5	2483.50 (PK)	-10.87	54.75	43.88	74.00	-30.12	100	110
	6	2483.50 (AV)	-10.87	43.68	32.81	54.00	-21.19	100	110

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	cm	deg
	1	2390.00 (PK)	-10.46	55.50	45.04	74.00	-28.96	100	220
	2	2390.00 (AV)	-10.46	45.79	35.33	54.00	-18.67	100	220
i	3	2412.00 (PK)	-10.56	102.12	91.56	74.00	17.56	100	220
*i	4	2412.00 (AV)	-10.56	98.78	88.22	54.00	34.22	100	220
	5	2483.50 (PK)	-10.87	54.83	43.96	74.00	-30.04	100	220
	6	2483.50 (AV)	-10.87	44.10	33.23	54.00	-20.77	100	220

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2412MHz: Fundamental frequency.

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	cm	deg
	1	2390.00 (PK)	-10.46	54.63	44.17	74.00	-29.83	100	110
	2	2390.00 (AV)	-10.46	43.95	33.49	54.00	-20.51	100	110
i	3	2437.00 (PK)	-10.67	98.05	87.38	74.00	13.38	100	110
*i	4	2437.00 (AV)	-10.67	94.35	83.68	54.00	29.68	100	110
	5	2483.50 (PK)	-10.87	54.61	43.74	74.00	-30.26	100	110
	6	2483.50 (AV)	-10.87	43.85	32.98	54.00	-21.02	100	110

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	cm	deg
	1	2390.00 (PK)	-10.46	53.48	43.02	74.00	-30.98	110	135
	2	2390.00 (AV)	-10.46	45.26	34.80	54.00	-19.20	110	135
i	3	2437.00 (PK)	-10.67	103.66	92.99	74.00	18.99	110	135
*i	4	2437.00 (AV)	-10.67	99.94	89.27	54.00	35.27	110	135
	5	2483.50 (PK)	-10.87	55.63	44.76	74.00	-29.24	110	135
	6	2483.50 (AV)	-10.87	45.16	34.29	54.00	-19.71	110	135

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2437MHz: Fundamental frequency.

CHANNEL	TX Channel 11	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	53.61	43.15	74.00	-30.85	130	160
	2	2390.00 (AV)	-10.46	43.52	33.06	54.00	-20.94	130	160
i	3	2462.00 (PK)	-10.78	97.52	86.74	74.00	12.74	130	160
*i	4	2462.00 (AV)	-10.78	94.03	83.25	54.00	29.25	130	160
	5	2483.50 (PK)	-10.87	53.92	43.05	74.00	-30.95	130	160
	6	2483.50 (AV)	-10.87	44.61	33.74	54.00	-20.26	130	160

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	53.48	43.02	74.00	-30.98	100	135
	2	2390.00 (AV)	-10.46	43.29	32.83	54.00	-21.17	100	135
i	3	2462.00 (PK)	-10.78	100.32	89.54	74.00	15.54	100	135
*i	4	2462.00 (AV)	-10.78	96.94	86.16	54.00	32.16	100	135
	5	2483.50 (PK)	-10.87	54.08	43.21	74.00	-30.79	100	135
	6	2483.50 (AV)	-10.87	44.52	33.65	54.00	-20.35	100	135

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2462MHz: Fundamental frequency.

802.11g

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	60.95	50.49	74.00	-23.51	100	175
	2	2390.00 (AV)	-10.46	47.89	37.43	54.00	-16.57	100	175
i	3	2412.00 (PK)	-10.56	100.71	90.15	74.00	16.15	100	175
*i	4	2412.00 (AV)	-10.56	91.65	81.09	54.00	27.09	100	175
	5	2483.50 (PK)	-10.87	55.24	44.37	74.00	-29.63	100	175
	6	2483.50 (AV)	-10.87	44.38	33.51	54.00	-20.49	100	175

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	67.60	57.14	74.00	-16.86	110	135
	2	2390.00 (AV)	-10.46	55.01	44.55	54.00	-9.45	110	135
i	3	2412.00 (PK)	-10.56	106.46	95.90	74.00	21.90	110	135
*i	4	2412.00 (AV)	-10.56	97.43	86.87	54.00	32.87	110	135
	5	2462.00 (PK)	-10.78	54.09	43.31	74.00	-30.69	110	135
	6	2462.00 (AV)	-10.78	43.95	33.17	54.00	-20.83	110	135

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2412MHz: Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	54.15	43.69	74.00	-30.31	100	175
	2	2390.00 (AV)	-10.46	43.61	33.15	54.00	-20.85	100	175
i	3	2437.00 (PK)	-10.67	100.51	89.84	74.00	15.84	100	175
*i	4	2437.00 (AV)	-10.67	91.63	80.96	54.00	26.96	100	175
	5	2483.50 (PK)	-10.87	54.85	43.98	74.00	-30.02	100	175
	6	2483.50 (AV)	-10.87	44.26	33.39	54.00	-20.61	100	175

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	55.87	45.41	74.00	-28.59	100	135
	2	2390.00 (AV)	-10.46	44.67	34.21	54.00	-19.79	100	135
i	3	2437.00 (PK)	-10.67	106.79	96.12	74.00	22.12	100	135
*i	4	2437.00 (AV)	-10.67	98.05	87.38	54.00	33.38	100	135
	5	2483.50 (PK)	-10.87	53.34	42.47	74.00	-31.53	100	135
	6	2483.50 (AV)	-10.87	44.16	33.29	54.00	-20.71	100	135

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2437MHz: Fundamental frequency.

CHANNEL	TX Channel 11	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	53.65	43.19	74.00	-30.81	100	175
	2	2390.00 (AV)	-10.46	43.92	33.46	54.00	-20.54	100	175
i	3	2462.00 (PK)	-10.78	99.85	89.07	74.00	15.07	100	175
	4	2462.00 (PK)	-10.78	59.73	48.95	74.00	-25.05	100	175
*i	5	2462.00 (AV)	-10.78	91.03	80.25	54.00	26.25	100	175
	6	2462.00 (AV)	-10.78	47.95	37.17	54.00	-16.83	100	175

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	53.61	43.15	74.00	-30.85	100	135
	2	2390.00 (AV)	-10.46	43.85	33.39	54.00	-20.61	100	135
i	3	2462.00 (PK)	-10.78	104.06	93.28	74.00	19.28	100	135
*i	4	2462.00 (AV)	-10.78	95.21	84.43	54.00	30.43	100	135
	5	2483.50 (PK)	-10.87	65.56	54.69	74.00	-19.31	100	135
	6	2483.50 (AV)	-10.87	51.13	40.26	54.00	-13.74	100	135

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2462MHz: Fundamental frequency.

802.11n (20MHz)

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.		Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	70.29	59.83	74.00	-14.17	100	110
	2	2390.00 (AV)	-10.46	57.64	47.18	54.00	-6.82	100	110
i	3	2412.00 (PK)	-10.56	103.53	92.97	74.00	18.97	100	105
*i	4	2412.00 (AV)	-10.56	94.49	83.93	54.00	29.93	100	105
	5	2483.50 (PK)	-10.87	53.64	42.77	74.00	-31.23	100	110
	6	2483.50 (AV)	-10.87	43.29	32.42	54.00	-21.58	100	110

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.		Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	76.62	66.16	74.00	-7.84	110	135
	2	2390.00 (AV)	-10.46	61.27	50.81	54.00	-3.19	110	135
i	3	2412.00 (PK)	-10.56	107.93	97.37	74.00	23.37	110	135
*i	4	2412.00 (AV)	-10.56	99.04	88.48	54.00	34.48	110	135
	5	2483.50 (PK)	-10.87	54.65	43.78	74.00	-30.22	110	135
	6	2483.50 (AV)	-10.87	45.26	34.39	54.00	-19.61	110	135

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2412MHz: Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	54.23	43.77	74.00	-30.23	100	110
	2	2390.00 (AV)	-10.46	44.07	33.61	54.00	-20.39	100	110
i	3	2437.00 (PK)	-10.67	101.99	91.32	74.00	17.32	100	110
*i	4	2437.00 (AV)	-10.67	93.24	82.57	54.00	28.57	100	110
	5	2483.50 (PK)	-10.87	54.33	43.46	74.00	-30.54	100	110
	6	2483.50 (AV)	-10.87	43.43	32.56	54.00	-21.44	100	110

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	55.67	45.21	74.00	-28.79	110	135
	2	2390.00 (AV)	-10.46	45.23	34.77	54.00	-19.23	110	135
i	3	2437.00 (PK)	-10.67	107.76	97.09	74.00	23.09	110	135
*i	4	2437.00 (AV)	-10.67	98.91	88.24	54.00	34.24	110	135
	5	2483.50 (PK)	-10.87	53.32	42.45	74.00	-31.55	110	135
	6	2483.50 (AV)	-10.87	43.26	32.39	54.00	-21.61	110	135

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2437MHz: Fundamental frequency.

CHANNEL	TX Channel 11	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	55.24	44.78	74.00	-29.22	100	175
	2	2390.00 (AV)	-10.46	43.72	33.26	54.00	-20.74	100	175
i	3	2462.00 (PK)	-10.78	97.55	86.77	74.00	12.77	100	175
*i	4	2462.00 (AV)	-10.78	88.74	77.96	54.00	23.96	100	175
	5	2483.50 (PK)	-10.87	58.96	48.09	74.00	-25.91	100	175
	6	2483.50 (AV)	-10.87	45.82	34.95	54.00	-19.05	100	175

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	2390.00 (PK)	-10.46	54.26	43.80	74.00	-30.20	100	135
	2	2390.00 (AV)	-10.46	43.51	33.05	54.00	-20.95	100	135
i	3	2462.00 (PK)	-10.78	103.27	92.49	74.00	18.49	100	135
*i	4	2462.00 (AV)	-10.78	94.65	83.87	54.00	29.87	100	135
	5	2483.50 (PK)	-10.87	61.56	50.69	74.00	-23.31	100	135
	6	2483.50 (AV)	-10.87	47.41	36.54	54.00	-17.46	100	135

REMARKS:

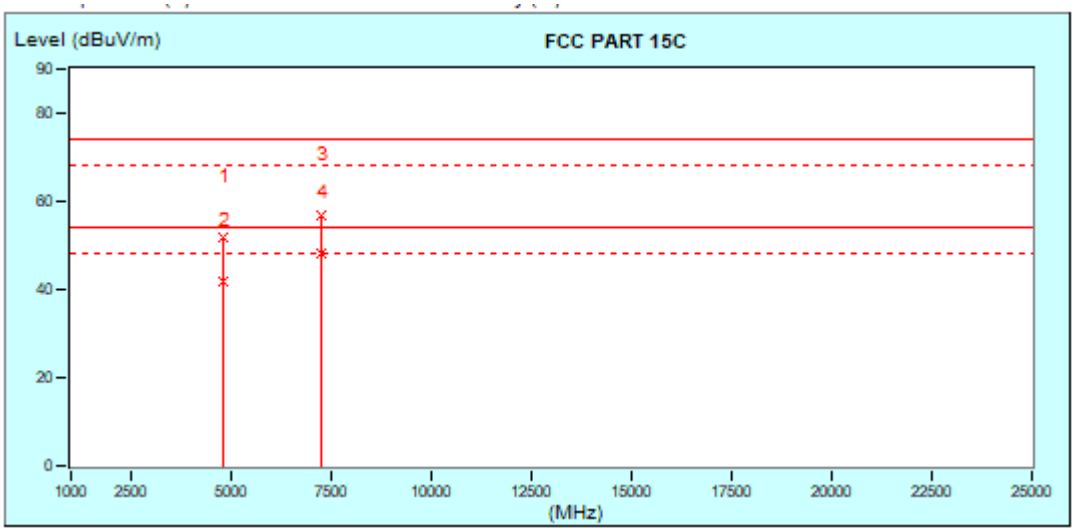
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2462MHz: Fundamental frequency.

Worst case harmonic:

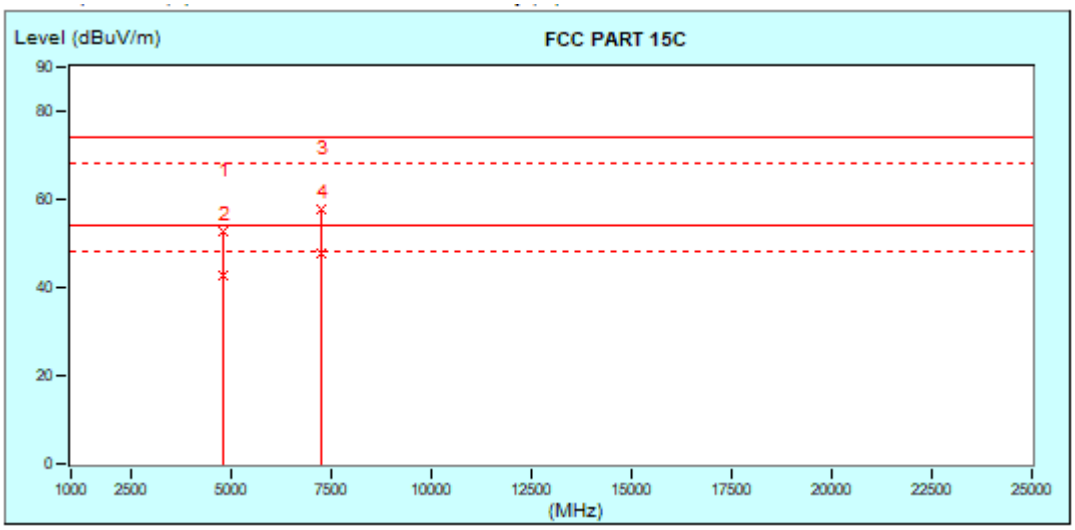
802.11n20

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	4824.00 (PK)	-5.57	57.42	51.85	74.00	-22.15	100	360
	2	4824.00 (AV)	-5.57	47.55	41.98	54.00	-12.02	100	360
	3	7236.00 (PK)	-0.03	56.91	56.88	74.00	-17.12	100	360
*	4	7236.00 (AV)	-0.03	48.06	48.03	54.00	-5.97	100	360



	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	4824.00 (PK)	-5.57	58.26	52.69	74.00	-21.31	100	0
	2	4824.00 (AV)	-5.57	48.29	42.72	54.00	-11.28	100	0
	3	7236.00 (PK)	-0.03	57.59	57.56	74.00	-16.44	100	0
*	4	7236.00 (AV)	-0.03	47.81	47.78	54.00	-6.22	100	0



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2462MHz: Fundamental frequency.
3. For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

BT-LE _2M

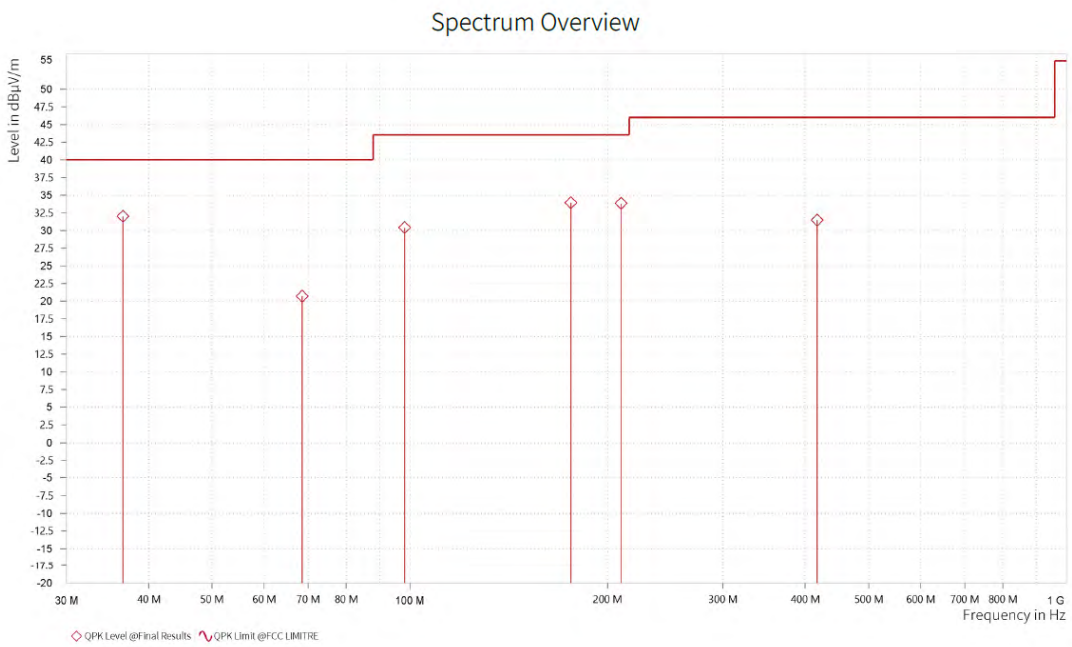
CHANNEL	TX Channel 19	**0DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]
1	36.548	32.01	40.00	7.99	-12.18	H	355.7	2	120.000
1	68.558	20.70	40.00	19.30	-13.99	H	224.4	2	120.000
1	98.191	30.39	43.50	13.11	-12.59	H	84.5	2	120.000
1	175.888	33.94	43.50	9.56	-13.63	H	359.1	1	120.000
1	209.741	33.84	43.50	9.66	-11.13	H	277.8	1	120.000
1	417.321	31.46	46.00	14.54	-4.75	H	355.7	2	120.000

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.



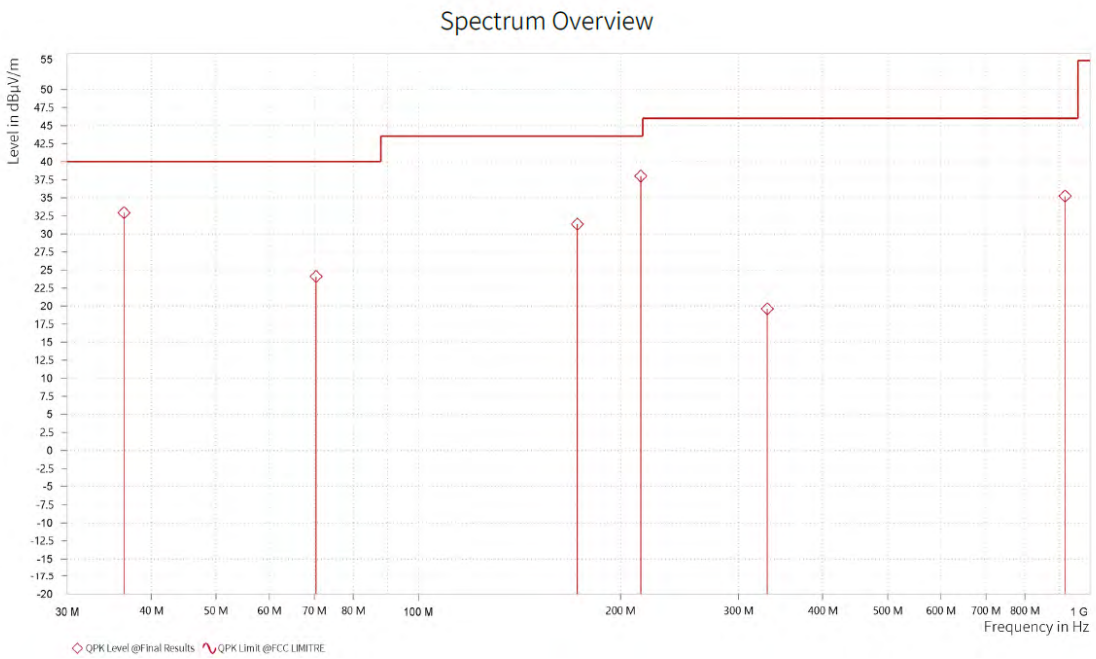
CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]
1	36.451	32.92	40.00	7.08	-12.23	V	135.6	1	120.000
1	70.401	24.06	40.00	15.94	-14.80	V	135.6	1	120.000
1	172.493	31.35	43.50	12.15	-13.85	V	223.2	2	120.000
1	214.446	38.01	43.50	5.49	-10.96	V	0.9	2	120.000
1	330.749	19.61	46.00	26.39	-6.34	V	4.3	1	120.000
1	918.132	35.21	46.00	10.79	1.68	V	359	2	120.000

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.



ABOVE 1GHz TEST DATA

Note: 1. For radiated emissions testing，the full testing range of different modes have been scanned，only the worst case harmonic data is reported in the sheet.

2. All other emissions were greater than 20dB below the limit was not recorded

BT-LE _1M

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,368.500	47.42	74.00	26.58	7.10	H	355.6	2
5	2,390.000	45.98	74.00	28.02	7.08	H	355.6	2
5	2,402.000	88.04			7.08	H	276.7	1

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,359.000	32.08	54.00	21.92	7.10	H	208.9	2
5	2,390.000	32.22	54.00	21.78	7.08	H	208.9	2
5	2,402.000	86.89			7.08	H	355	2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,353.500	46.90	74.00	27.10	7.11	V	5	1
5	2,390.000	46.93	74.00	27.07	7.08	V	42.3	1
5	2,402.500	95.21			7.09	V	91.3	1

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,337.000	32.46	54.00	21.54	7.05	V	214.8	2
5	2,390.000	32.35	54.00	21.65	7.08	V	164.6	2
5	2,402.000	93.10			7.08	V	160.6	1

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2402MHz: Fundamental frequency.

CHANNEL	TX Channel 19	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	4,880.000	52.42	74.00	21.58	40.07	54.00	13.93	15.30	H	31.9	2
2	7,486.000	60.01	74.00	13.99	47.46	54.00	6.54	21.69	H	0.9	2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	4,880.000	50.04	74.00	23.96	40.00	54.00	14.00	15.30	V	330.4	1
2	7,472.500	59.93	74.00	14.07	47.34	54.00	6.66	21.64	V	1	2

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2440MHz: Fundamental frequency.

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,480.200	87.78			7.36	H	317.6	2
6	2,483.500	45.91	74.00	28.09	7.36	H	359.1	1
6	2,492.400	47.11	74.00	26.89	7.37	H	317.6	2

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,480.214	88.68			7.36	H	304.2	1
6	2,483.500	32.51	54.00	21.49	7.36	H	304.2	1
6	2,488.857	32.73	54.00	21.27	7.36	H	61.8	2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.700	95.68			7.36	V	184.6	1
6	2,483.500	46.79	74.00	27.21	7.36	V	184.6	1
6	2,490.700	47.10	74.00	26.90	7.37	V	279.1	1

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,480.286	92.76			7.36	V	197.8	1
6	2,483.500	32.98	54.00	21.02	7.36	V	197.8	1
6	2,487.929	32.75	54.00	21.25	7.36	V	358.7	1

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2480MHz: Fundamental frequency.

BT-LE _2M

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,344.525	47.29	74.00	26.71	7.08	H	280.2	1
5	2,390.000	46.02	74.00	27.98	7.08	H	29.5	2
5	2,403.685	88.38			7.10	H	269.8	2

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,360.335	32.05	54.00	21.95	7.10	H	359.1	1
5	2,390.000	32.28	54.00	21.72	7.08	H	353	1
5	2,404.195	84.63			7.10	H	259.8	1

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,336.875	47.50	74.00	26.50	7.05	V	140.4	1
5	2,390.000	46.01	74.00	27.99	7.08	V	220.7	2
5	2,404.705	96.22			7.11	V	91.4	1

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,363.395	32.48	54.00	21.52	7.10	V	207.7	2
5	2,390.000	32.37	54.00	21.63	7.08	V	207.7	2
5	2,404.195	88.64			7.10	V	164.2	1

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2404MHz: Fundamental frequency.

CHANNEL	TX Channel 19	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	4,880.000	50.93	74.00	23.07	40.10	54.00	13.90	15.30	H	30.7	2
2	7,444.500	60.16	74.00	13.84	47.47	54.00	6.53	21.53	H	1	1

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	4,880.000	51.26	74.00	22.74	40.18	54.00	13.82	15.30	V	269.8	2
2	7,502.000	60.62	74.00	13.38	47.43	54.00	6.57	21.74	V	269.8	2

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2440MHz: Fundamental frequency.

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,478.465	88.81			7.35	H	315.2	2
6	2,483.500	45.53	74.00	28.47	7.36	H	1	2
6	2,491.130	47.32	74.00	26.68	7.37	H	187	1

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,477.976	84.20			7.35	H	301.7	1
6	2,483.500	32.42	54.00	21.58	7.36	H	1	1
6	2,491.045	32.85	54.00	21.15	7.37	H	358.6	1

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,477.530	94.96			7.35	V	196.6	1
6	2,483.500	45.88	74.00	28.12	7.36	V	249.2	1
6	2,495.125	48.15	74.00	25.85	7.37	V	0.9	2

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,477.976	88.99			7.35	V	210	2
6	2,483.500	32.36	54.00	21.64	7.36	V	1	2
6	2,489.834	33.24	54.00	20.76	7.37	V	99.7	1

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. 2478MHz: Fundamental frequency.

3.3 6 dB BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Meter	ANRITSU	ML2495A	1506002	Feb. 14,23	Feb. 13,24
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510523	Feb. 14,23	Feb. 13,24
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.10,23	May.09,24
Power Sensor	ANRITSU	MA2411B	1339352	Feb. 14,23	Feb. 13,24

NOTE:

1. The calibration interval of the above test instruments is 12 months, and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in the RF Oven room.

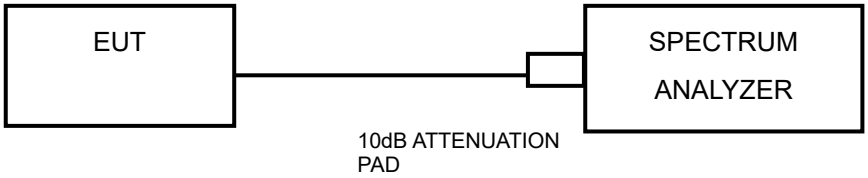
3.3.3 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3.4 DEVIATION FROM TEST STANDARD

No deviation.

3.3.5 TEST SETUP



3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.3.7 TEST RESULTS

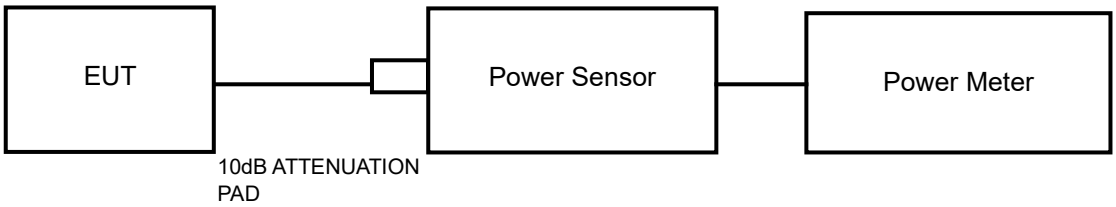
Please Refer to Appendix1/2 Of this test report.

3.4 CONDUCTED OUTPUT POWER

3.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information about the above instrument.

3.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle ,and highest channel frequencies individually.

3.4.7 TEST RESULTS

3.4.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix1/2 Of this test report.

3.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

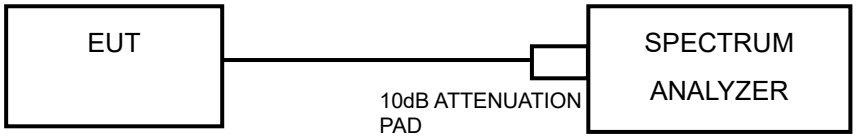
Please Refer to Appendix1/2 Of this test report.

3.5 POWER SPECTRAL DENSITY MEASUREMENT

3.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.2 TEST SETUP



3.5.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information about the above instrument.

3.5.4 TEST PROCEDURE

1. Set the span to 1.5 times the DTS bandwidth.
2. Set the RBW = 3 kHz, VBW ≥ 3 x RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

3.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle, and highest channel frequencies individually.

3.5.7 TEST RESULTS

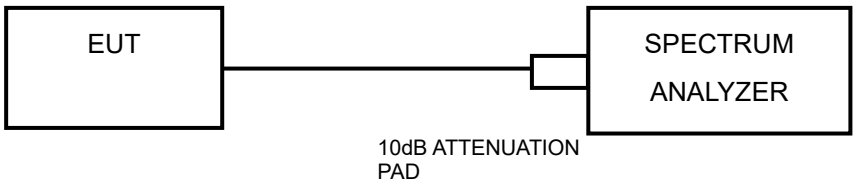
Please Refer to Appendix1/2 Of this test report.

3.6 OUT OF BAND EMISSION MEASUREMENT

3.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.6.2 TEST SETUP



3.6.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information about the above instrument.

3.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

3.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle, and highest channel frequencies individually.

3.6.7 TEST RESULTS

For Band Edge :The spectrum plots are attached in the Appendix. Mark1 value indicates the reference Level. DL line indicates the 20dB offset below reference Level. It shows compliance with the requirement.

For CSE :The spectrum plots are attached in the Appendix. 100KHZ PSD value indicates the reference Level. DL line indicates the 20dB offset below Mark1 value. It shows compliance with the requirement.

3.7 ANTENNA REQUIREMENTS

3.7.1 STANDARD APPLICABLE

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmits power, and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.7.2 ANTENNA CONNECTED CONSTRUCTION

An embedded-in antenna design is used.

3.7.3 ANTENNA GAIN

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit and PSD limit.

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

6 APPENDIX 1 : WLAN 2.4G

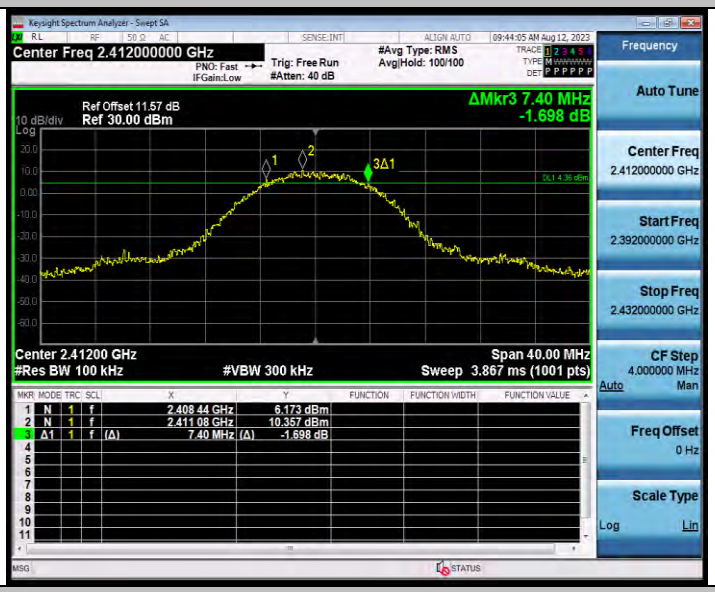
DTS BANDWIDTH

TEST RESULT

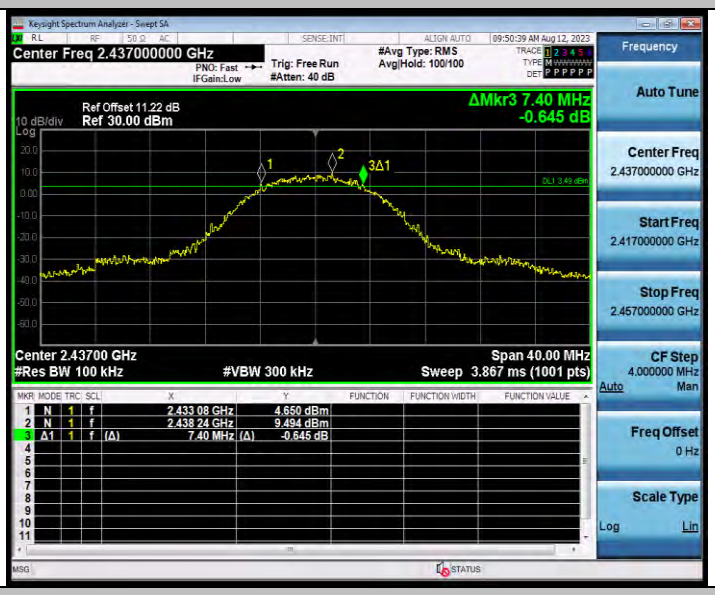
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	7.400	2408.440	2415.840	0.5	PASS
		2437	7.400	2433.080	2440.480	0.5	PASS
		2462	7.320	2458.320	2465.640	0.5	PASS
11G	Ant1	2412	15.160	2404.400	2419.560	0.5	PASS
		2437	15.240	2429.240	2444.480	0.5	PASS
		2462	15.160	2454.400	2469.560	0.5	PASS
11N20SISO	Ant1	2412	15.120	2404.400	2419.520	0.5	PASS
		2437	15.200	2429.360	2444.560	0.5	PASS
		2462	15.160	2454.400	2469.560	0.5	PASS

TEST GRAPHS

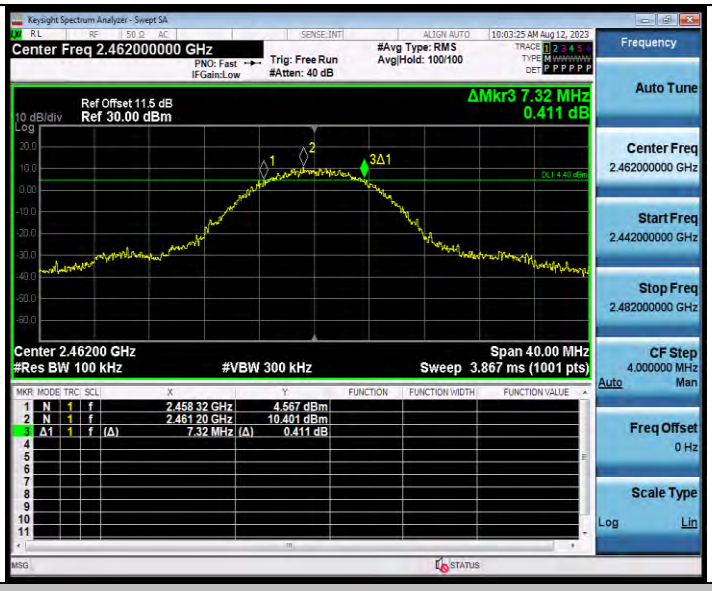
11B_Ant1_2412



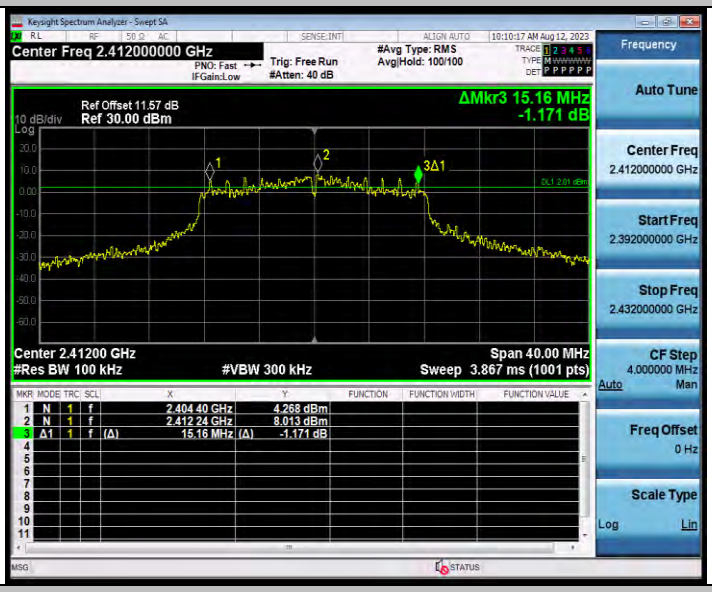
11B_Ant1_2437



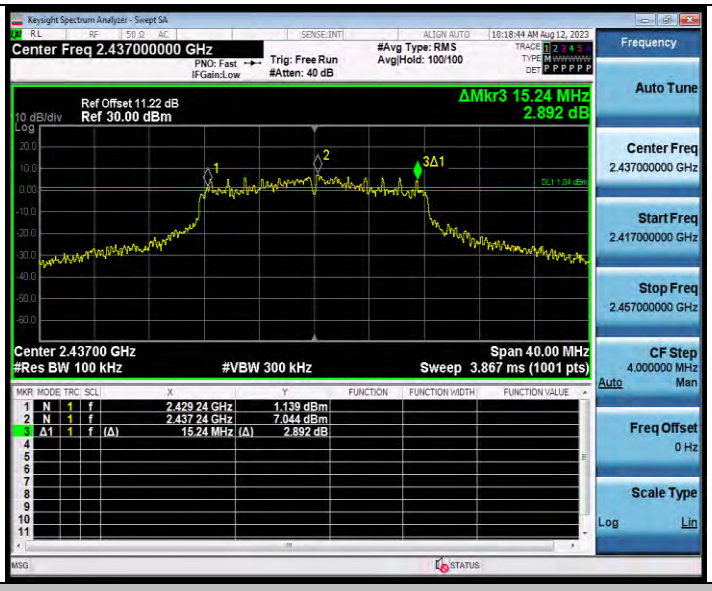
11B_Ant1_2462



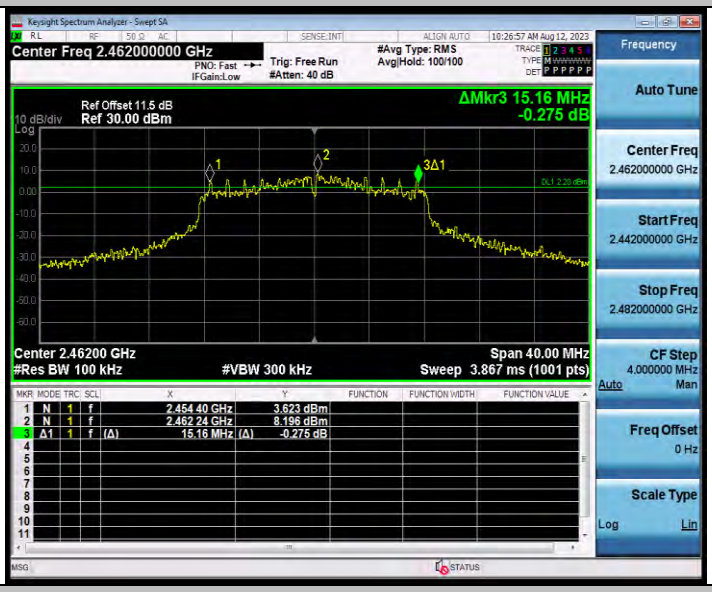
11G_Ant1_2412



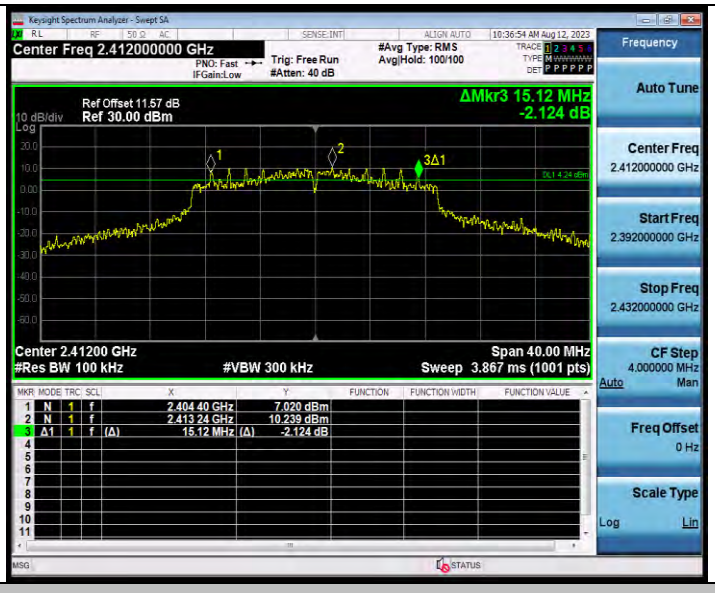
11G_Ant1_2437



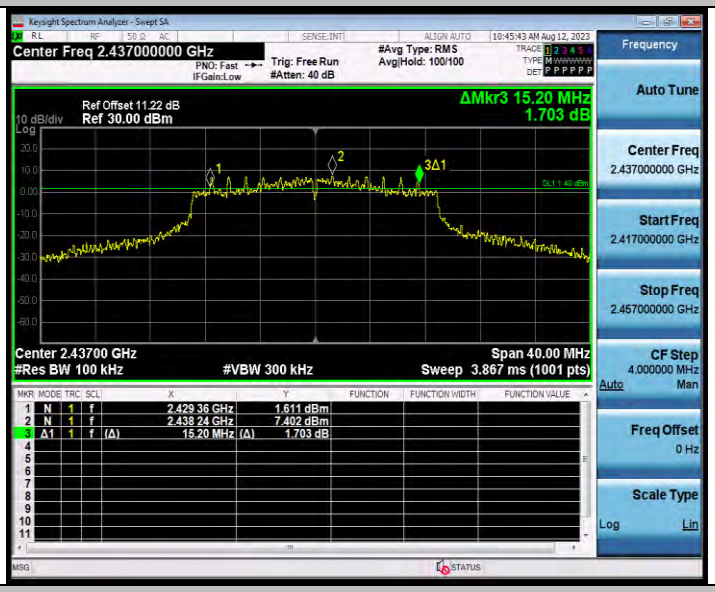
11G_Ant1_2462



11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.462000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
10:54:50 AM Aug 12, 2023
Ref Offset 11.5 dB
10 dB/div Ref 30.00 dBm
Log
ΔMkr3 15.16 MHz
-0.318 dB
Center 2.46200 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 40.00 MHz
Sweep 3.867 ms (1001 pts)
1 N 1 f 2.454 40 GHz 2.492 dBm
2 N 1 f 2.463 24 GHz 6.272 dBm
3 Δ1 1 f (Δ) 15.16 MHz (Δ) -0.318 dB
Frequency
Auto Tune
Center Freq
2.462000000 GHz
Start Freq
2.442000000 GHz
Stop Freq
2.482000000 GHz
CF Step
4.000000 MHz
Auto Man
Freq Offset
0 Hz
Scale Type
Log Lin

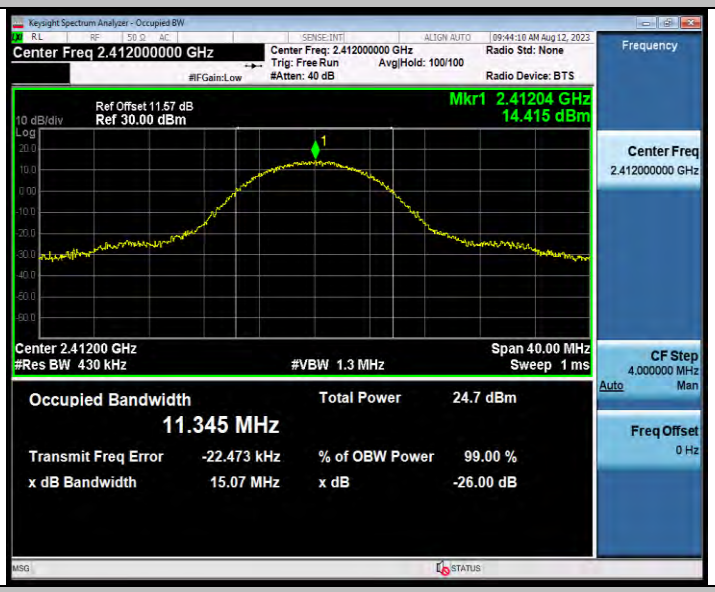
OCCUPIED CHANNEL BANDWIDTH

TEST RESULT

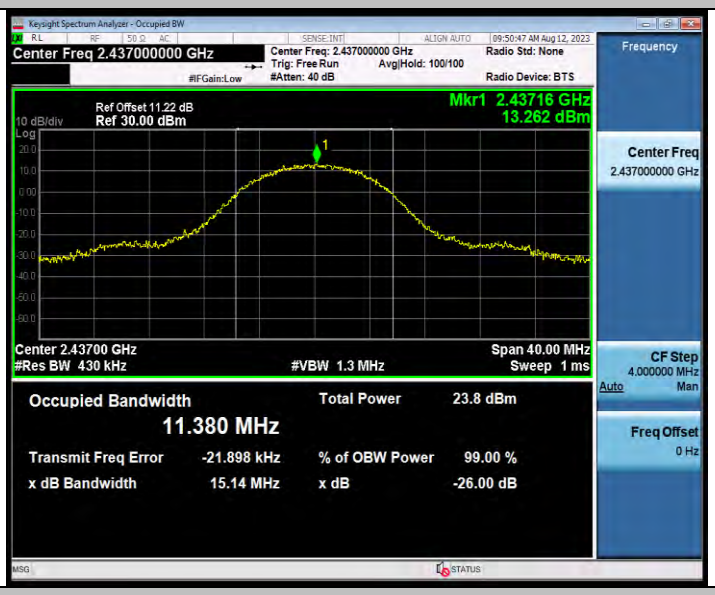
TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	11.345	2406.3050	2417.6500	---	---
		2437	11.380	2431.2881	2442.6681	---	---
		2462	11.393	2456.3664	2467.7594	---	---
11G	Ant1	2412	16.661	2403.6707	2420.3317	---	---
		2437	16.726	2428.6251	2445.3511	---	---
		2462	16.580	2453.7581	2470.3381	---	---
11N20SISO	Ant1	2412	18.724	2402.8048	2421.5288	---	---
		2437	18.169	2427.8938	2446.0628	---	---
		2462	17.714	2453.1531	2470.8671	---	---

TEST GRAPHS

11B_Ant1_2412



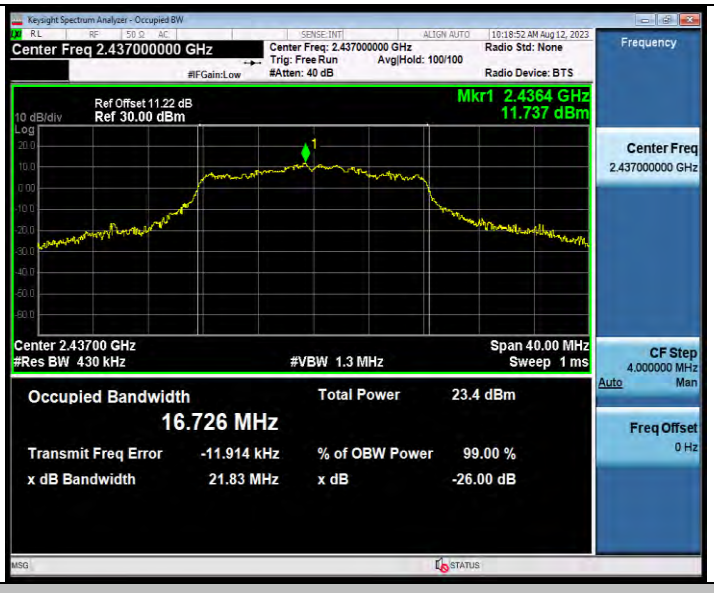
11B_Ant1_2437



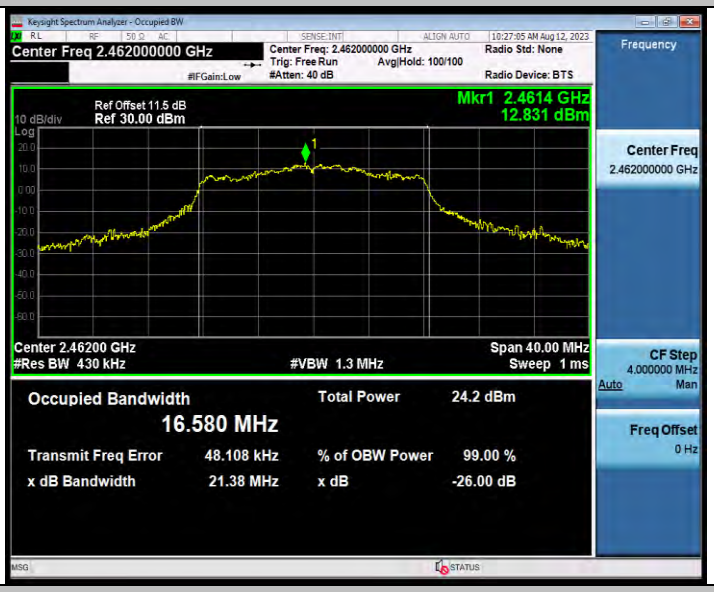
11B_Ant1_2462

11G_Ant1_2412

11G_Ant1_2437

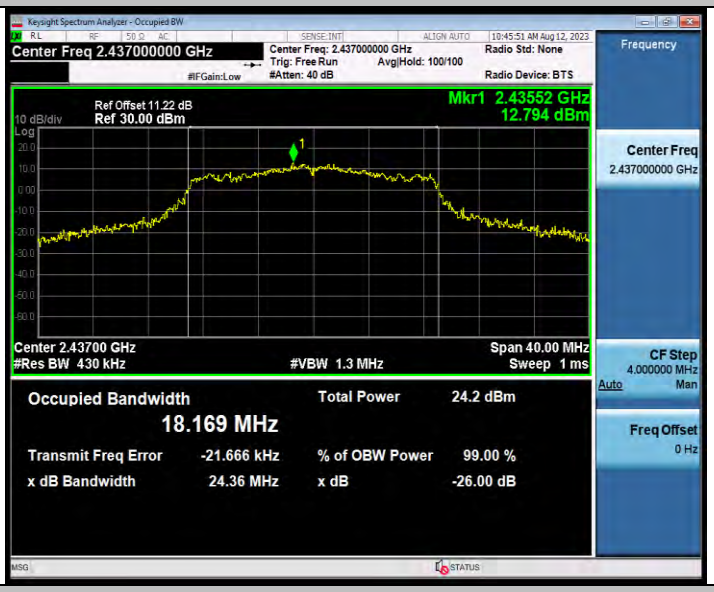


11G_Ant1_2462

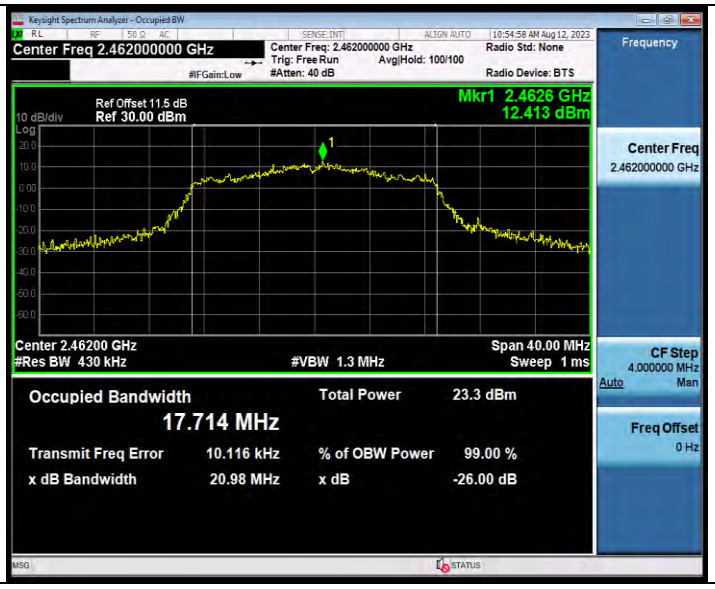


11N20SISO_Ant1_2412

11N20SISO_Ant1_2437



11N20SISO_Ant1_2462


Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.462000000 GHz
Center Freq: 2.462000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
10:54:58 AM Aug 12, 2023
Frequency
Ref Offset 11.5 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.4626 GHz
12.413 dBm
Center Freq
2.462000000 GHz
Center 2.46200 GHz
#Res BW 430 kHz
#VBW 1.3 MHz
Span 40.00 MHz
Sweep 1 ms
CF Step
4.000000 MHz
Auto
Man
Occupied Bandwidth
17.714 MHz
Total Power 23.3 dBm
Transmit Freq Error 10.116 kHz
% of OBW Power 99.00 %
x dB Bandwidth 20.98 MHz
x dB -26.00 dB
Freq Offset
0 Hz

MAXIMUM CONDUCTED OUTPUT POWER

TEST RESULT PEAK

TestMode	Antenna	Freq. [MHz]	Average Power [dBm]	Peak Power [dBm]	Peak Power [mw]	Conducted Limit [dBm]	EIRP [dBm]	EIRP [mw]	EIRP Limit [dBm]	Verdict	Power Setting
11B	Ant1	2412	16.80	20.17	103.99	≤30.00	21.24	133.05	≤36.00	PASS	16
		2437	16.85	20.19	104.47	≤30.00	21.26	133.66	≤36.00	PASS	16
		2462	16.93	20.26	106.17	≤30.00	21.33	135.83	≤36.00	PASS	16
11G	Ant1	2412	15.08	22.75	188.36	≤30.00	23.82	240.99	≤36.00	PASS	17
		2437	15.11	22.76	188.80	≤30.00	23.83	241.55	≤36.00	PASS	17
		2462	15.27	23.02	200.45	≤30.00	24.09	256.45	≤36.00	PASS	17
11N20SISO	Ant1	2412	17.21	23.00	199.53	≤30.00	24.07	255.27	≤36.00	PASS	19
		2437	15.78	22.96	197.70	≤30.00	24.03	252.93	≤36.00	PASS	18
		2462	13.88	22.84	192.31	≤30.00	23.91	246.04	≤36.00	PASS	16

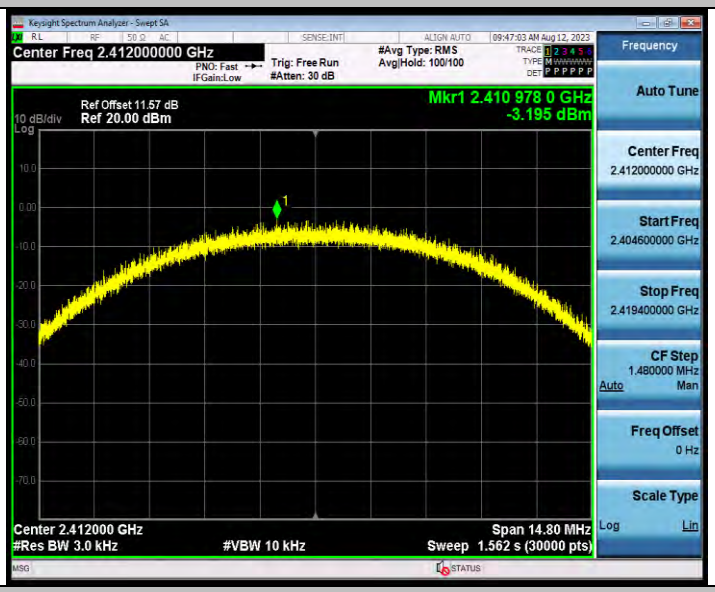
MAXIMUM POWER SPECTRAL DENSITY

TEST RESULT

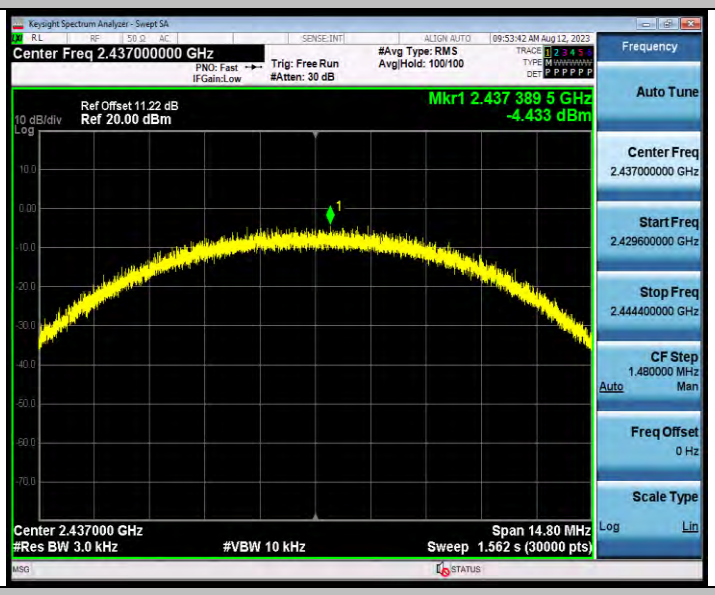
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-3.2	≤8.00	PASS
		2437	-4.43	≤8.00	PASS
		2462	-3.12	≤8.00	PASS
11G	Ant1	2412	-7.28	≤8.00	PASS
		2437	-8.43	≤8.00	PASS
		2462	-7.13	≤8.00	PASS
11N20SISO	Ant1	2412	-3.06	≤8.00	PASS
		2437	-5.52	≤8.00	PASS
		2462	-6.75	≤8.00	PASS

TEST GRAPHS

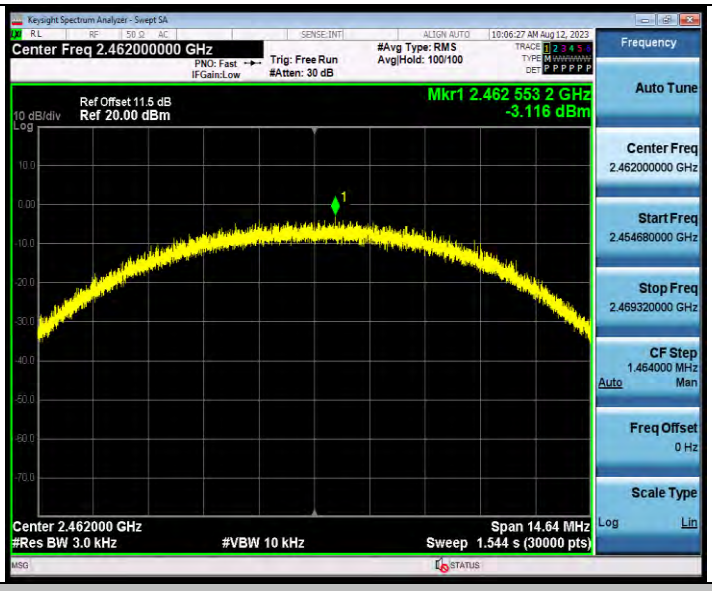
11B_Ant1_2412



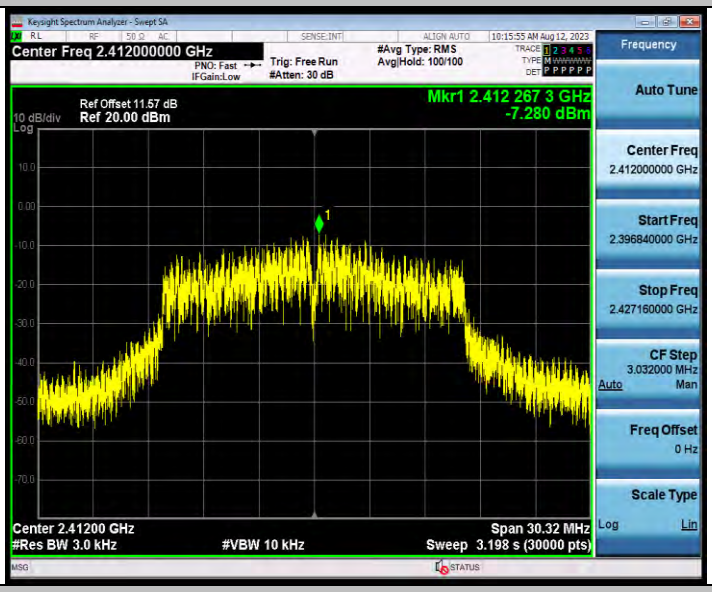
11B_Ant1_2437



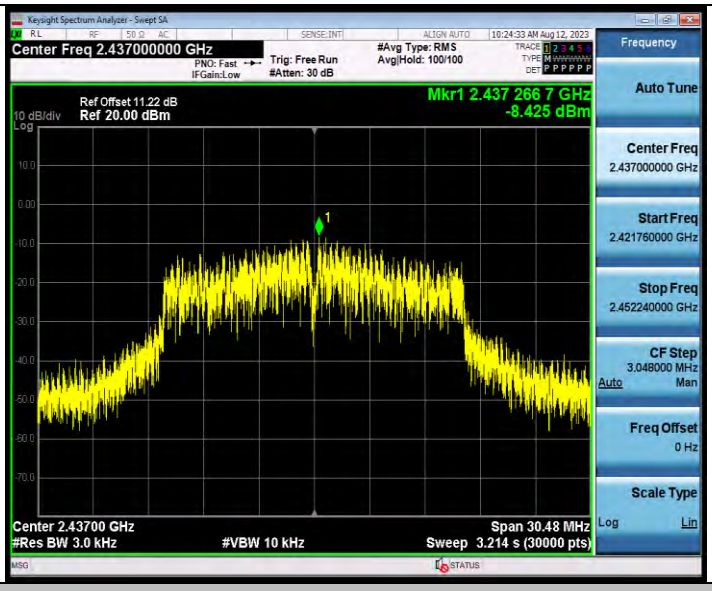
11B_Ant1_2462



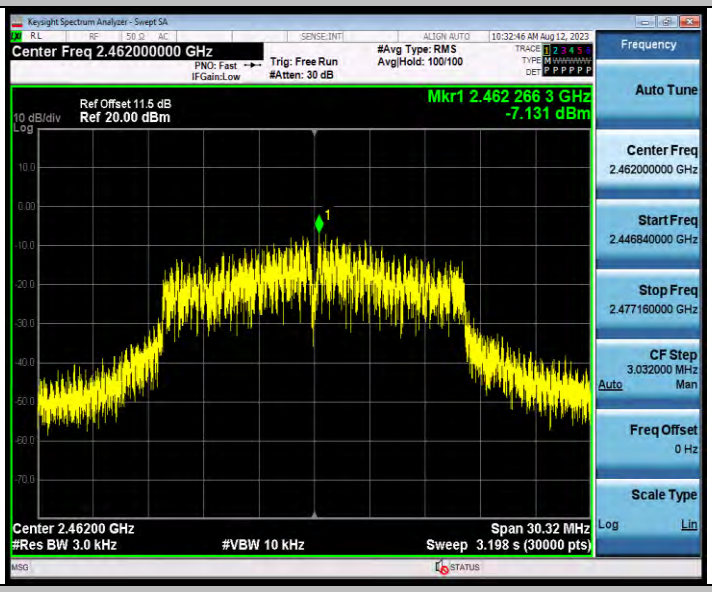
11G_Ant1_2412



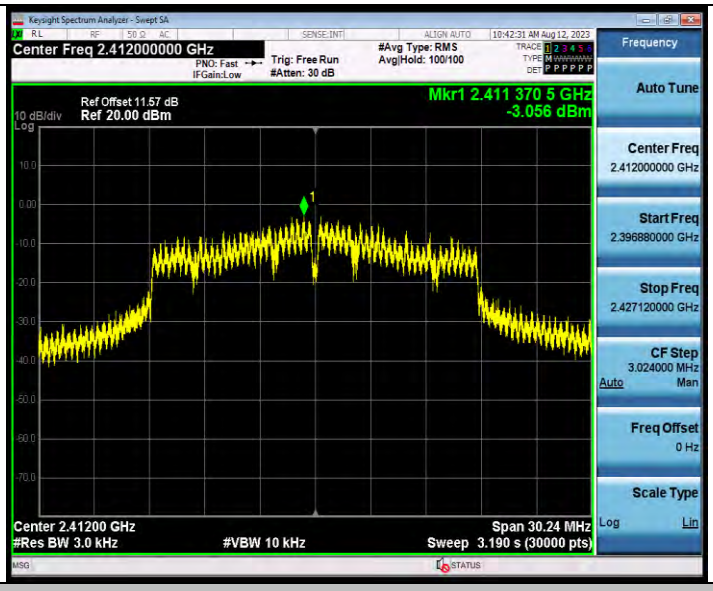
11G_Ant1_2437



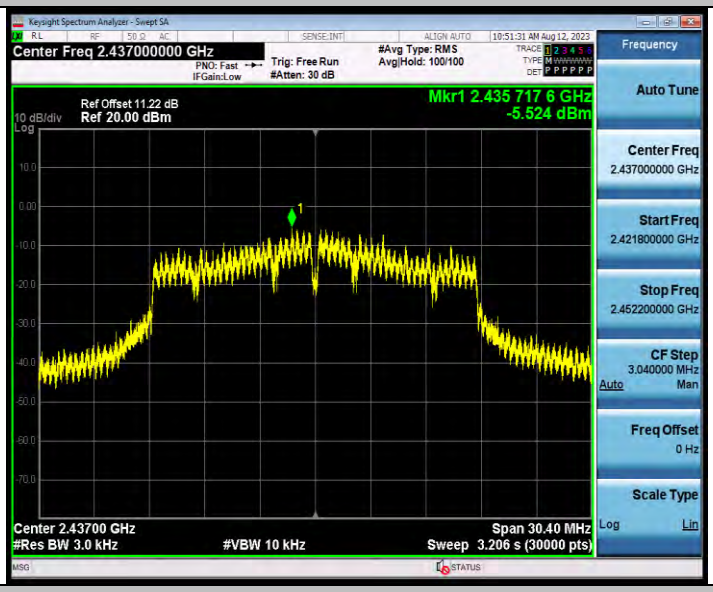
11G_Ant1_2462



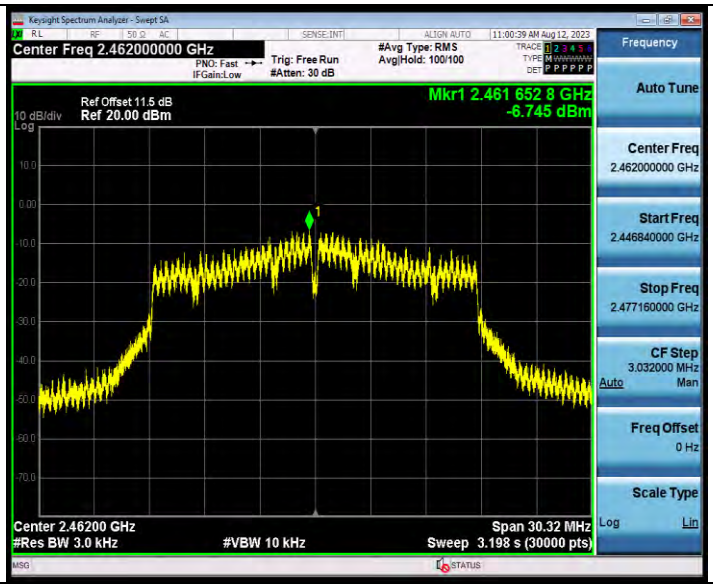
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.462000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
11:00:39 AM Aug 12, 2023
Ref Offset 11.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.461 652 8 GHz
-6.745 dBm
Center 2.46200 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 30.32 MHz
Sweep 3.198 s (30000 pts)
Frequency
Auto Tune
Center Freq
2.462000000 GHz
Start Freq
2.446840000 GHz
Stop Freq
2.477160000 GHz
CF Step
3.032000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

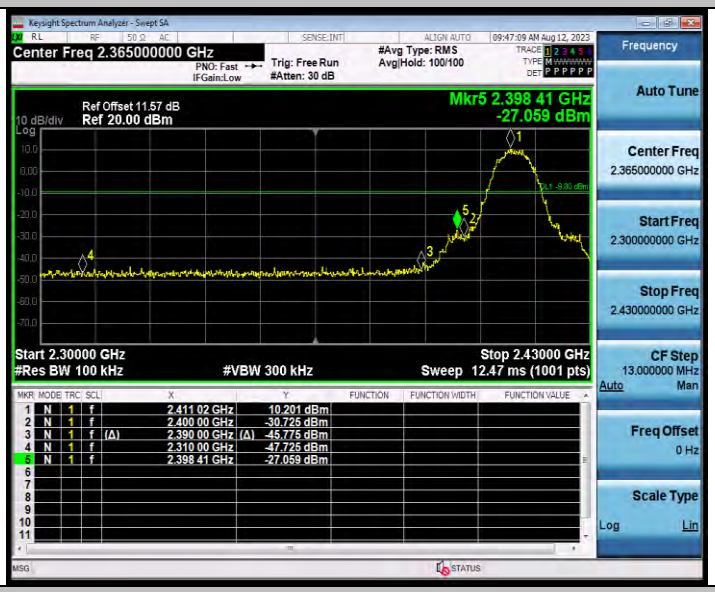
BAND EDGE MEASUREMENTS

TEST RESULT

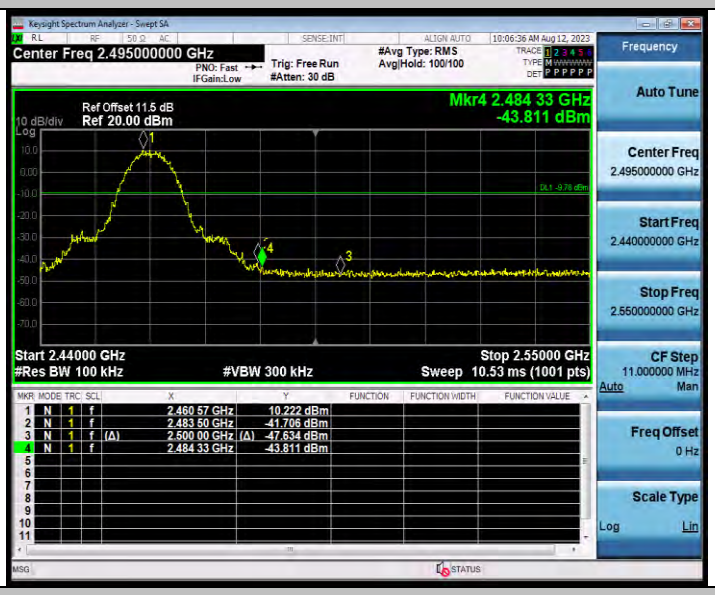
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	10.20	-27.06	≤-9.8	PASS
		High	2462	10.22	-43.81	≤-9.78	PASS
11G	Ant1	Low	2412	8.03	-24.83	≤-11.97	PASS
		High	2462	8.26	-35.39	≤-11.74	PASS
11N20SISO	Ant1	Low	2412	10.29	-15.14	≤-9.71	PASS
		High	2462	6.35	-35.9	≤-13.65	PASS

TEST GRAPHS

11B_Ant1_Low_2412

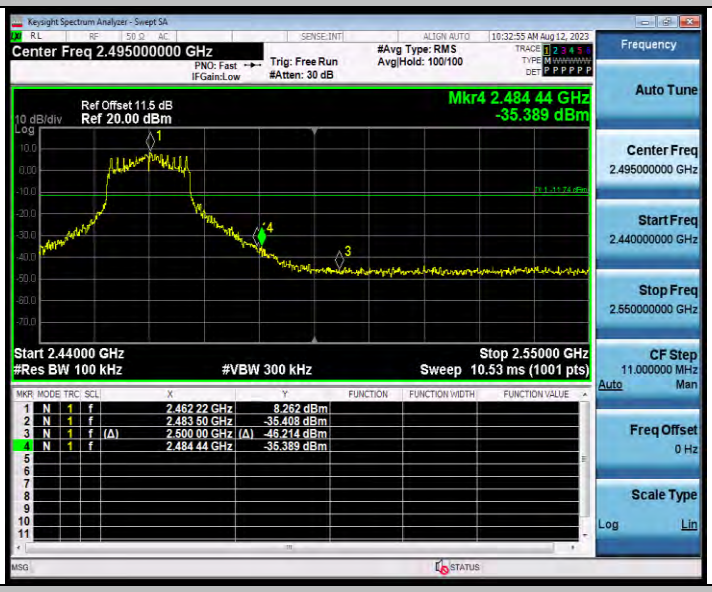


11B_Ant1_High_2462

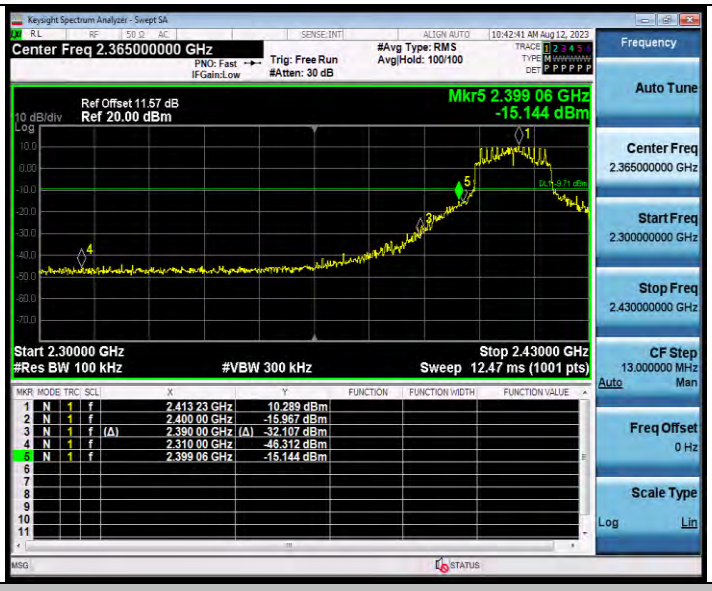


11G_Ant1_Low_2412

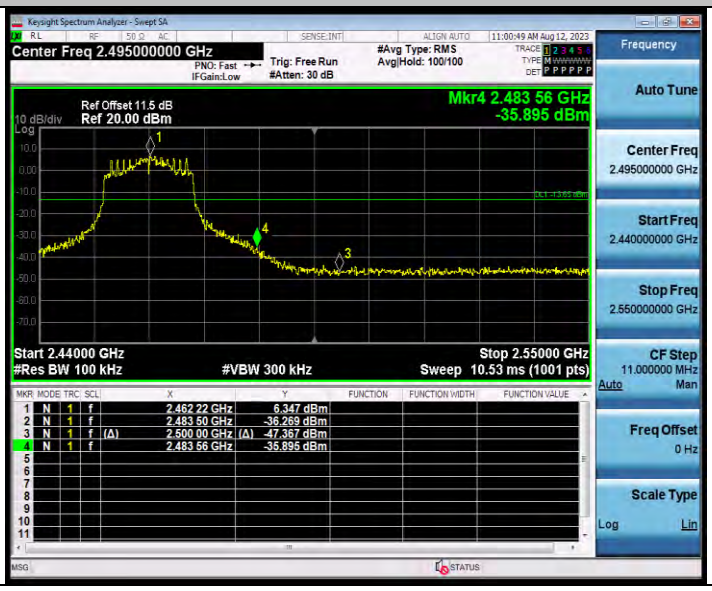
11G_Ant1_High_2462



11N20SISO_Ant1_Low_2412



11N20SISO_Ant1_High_2462



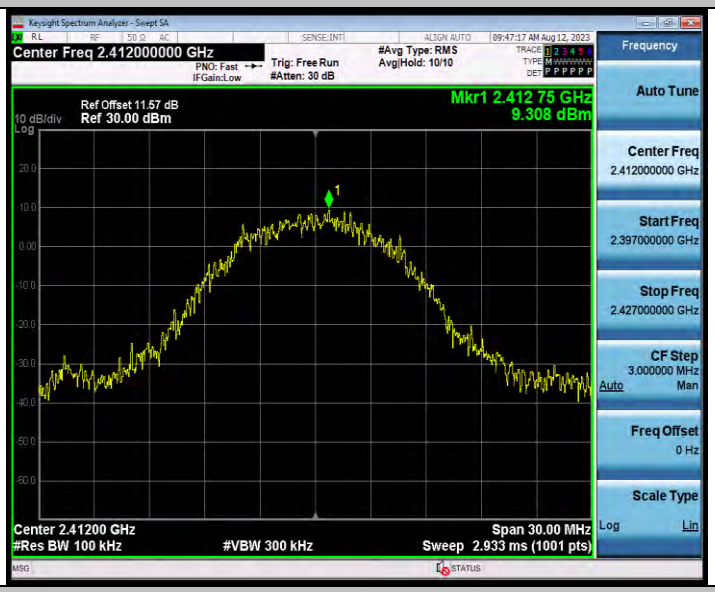
CONDUCTED SPURIOUS EMISSION

TEST RESULT

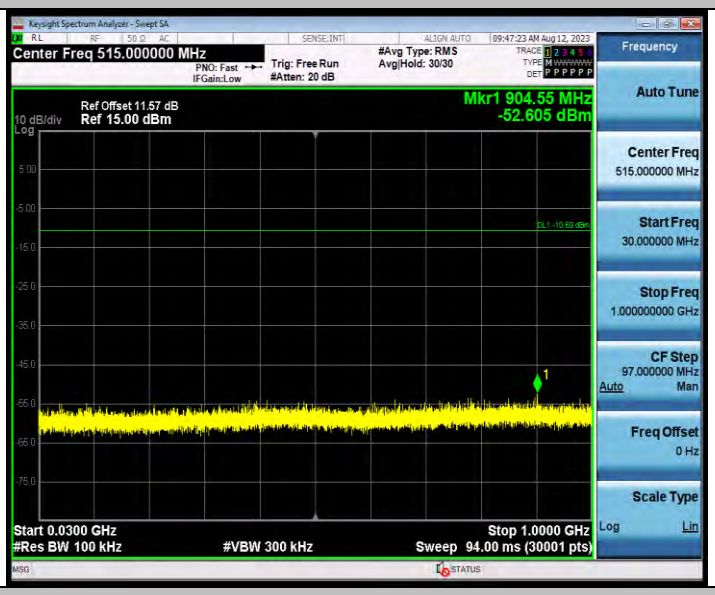
TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	9.31	9.31	---	PASS
			30~1000	9.31	-52.61	≤-10.69	PASS
			1000~26500	9.31	-33.98	≤-10.69	PASS
		2437	Reference	8.26	8.26	---	PASS
			30~1000	8.26	-52.86	≤-11.74	PASS
			1000~26500	8.26	-34.01	≤-11.74	PASS
		2462	Reference	9.00	9.00	---	PASS
			30~1000	9.00	-53.77	≤-11	PASS
			1000~26500	9.00	-33.82	≤-11	PASS
11G	Ant1	2412	Reference	7.54	7.54	---	PASS
			30~1000	7.54	-52.85	≤-12.46	PASS
			1000~26500	7.54	-33.87	≤-12.46	PASS
		2437	Reference	5.77	5.77	---	PASS
			30~1000	5.77	-53.89	≤-14.23	PASS
			1000~26500	5.77	-34.33	≤-14.23	PASS
		2462	Reference	8.10	8.10	---	PASS
			30~1000	8.10	-52.69	≤-11.9	PASS
			1000~26500	8.10	-33.85	≤-11.9	PASS
11N20SISO	Ant1	2412	Reference	9.55	9.55	---	PASS
			30~1000	9.55	-52.89	≤-10.45	PASS
			1000~26500	9.55	-33.82	≤-10.45	PASS
		2437	Reference	6.92	6.92	---	PASS
			30~1000	6.92	-53.19	≤-13.08	PASS
			1000~26500	6.92	-34.49	≤-13.08	PASS
		2462	Reference	6.27	6.27	---	PASS
			30~1000	6.27	-53.94	≤-13.73	PASS
			1000~26500	6.27	-33.92	≤-13.73	PASS

TEST GRAPHS

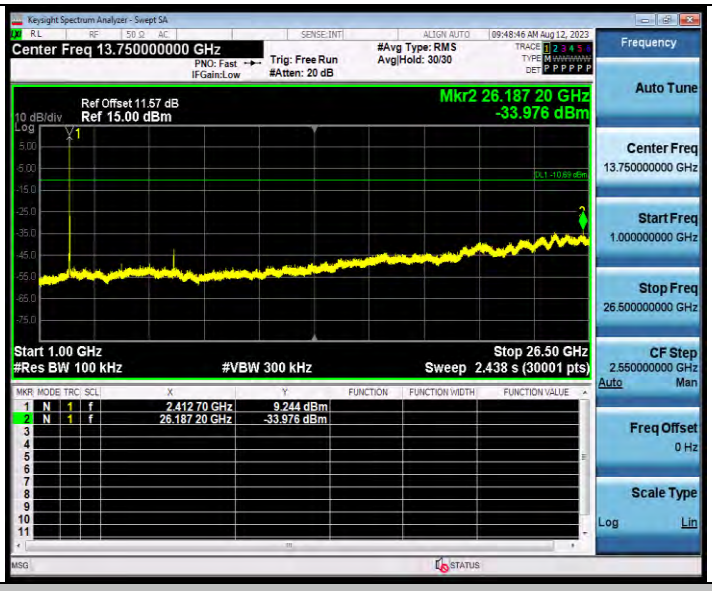
11B_Ant1_2412_0~Reference



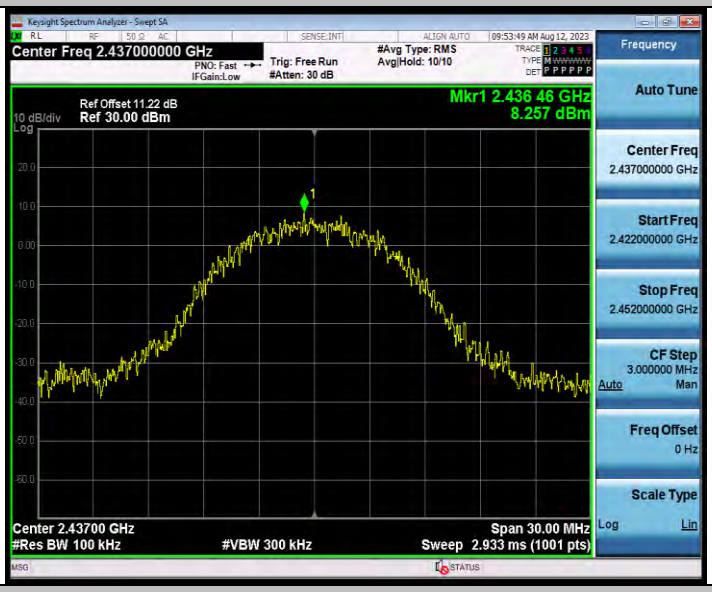
11B_Ant1_2412_30~1000



11B_Ant1_2412_1000~26500

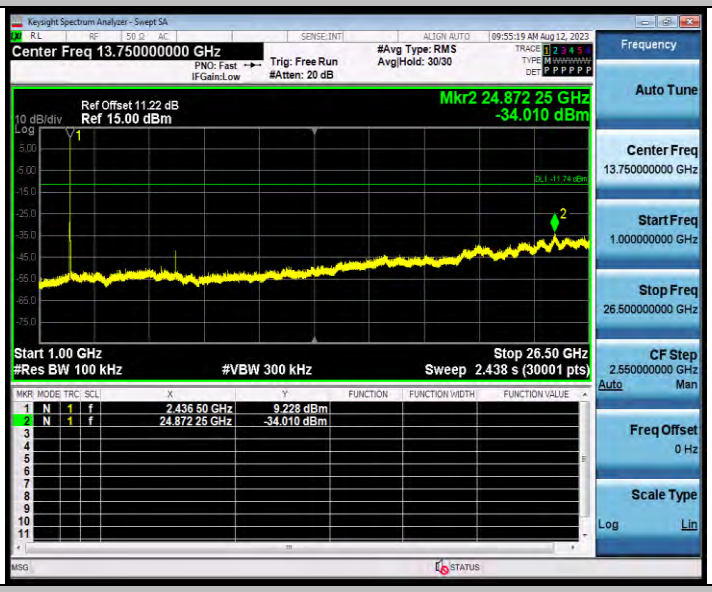


11B_Ant1_2437_0~Reference



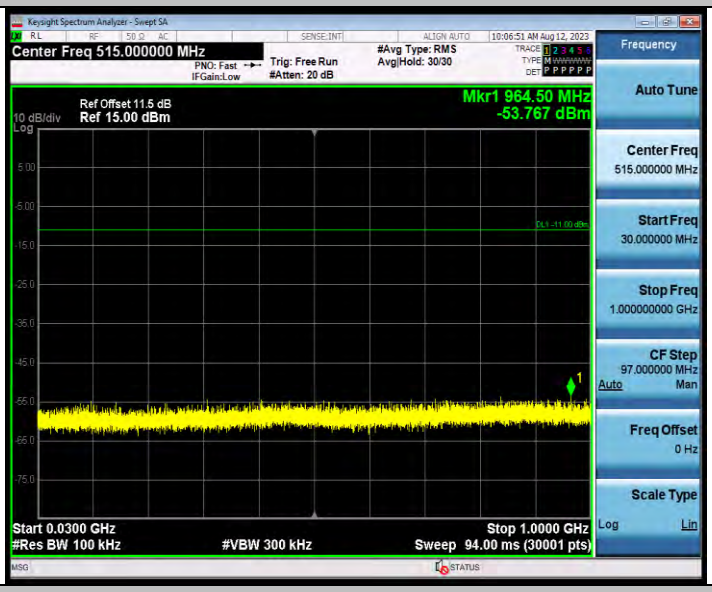
11B_Ant1_2437_30~1000

11B_Ant1_2437_1000~26500



11B_Ant1_2462_0~Reference

11B_Ant1_2462_30~1000

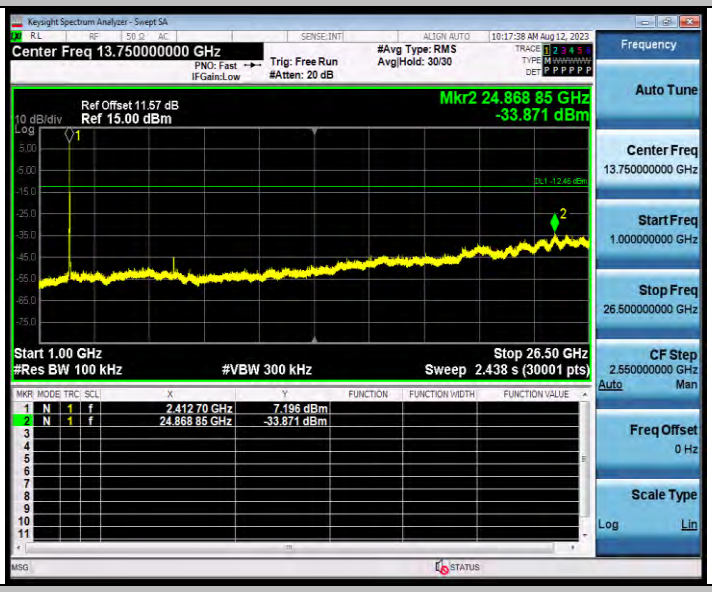


11B_Ant1_2462_1000~26500

11G_Ant1_2412_0~Reference

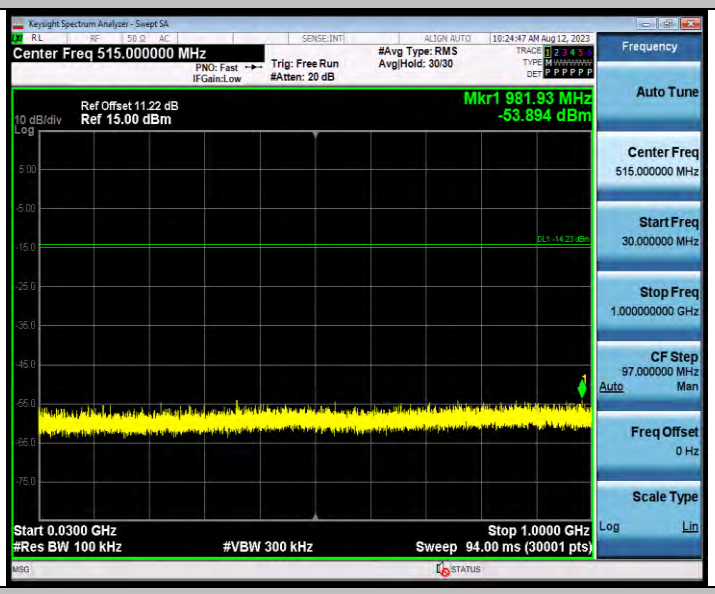
11G_Ant1_2412_30~1000

11G_Ant1_2412_1000~26500

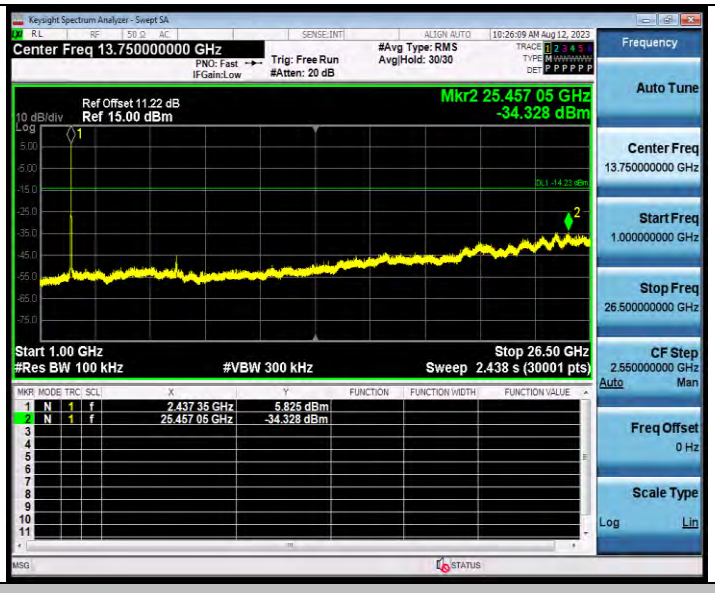


11G_Ant1_2437_0~Reference

11G_Ant1_2437_30~1000



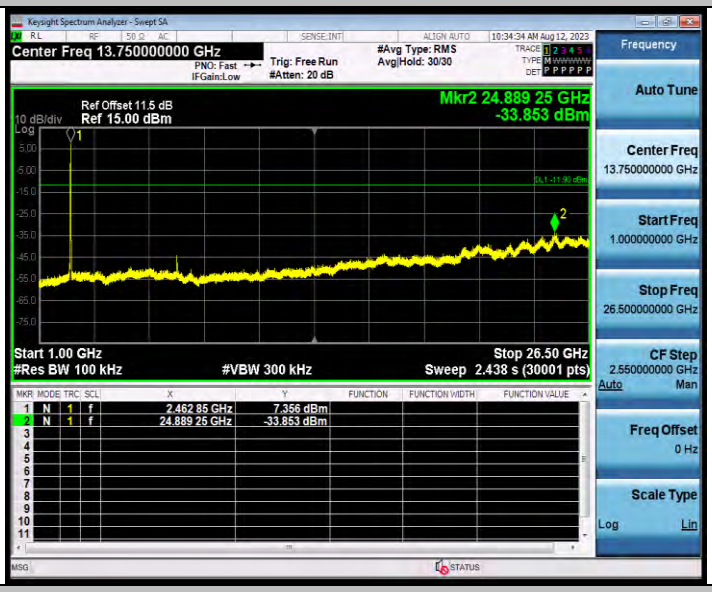
11G_Ant1_2437_1000~26500



11G_Ant1_2462_0~Reference

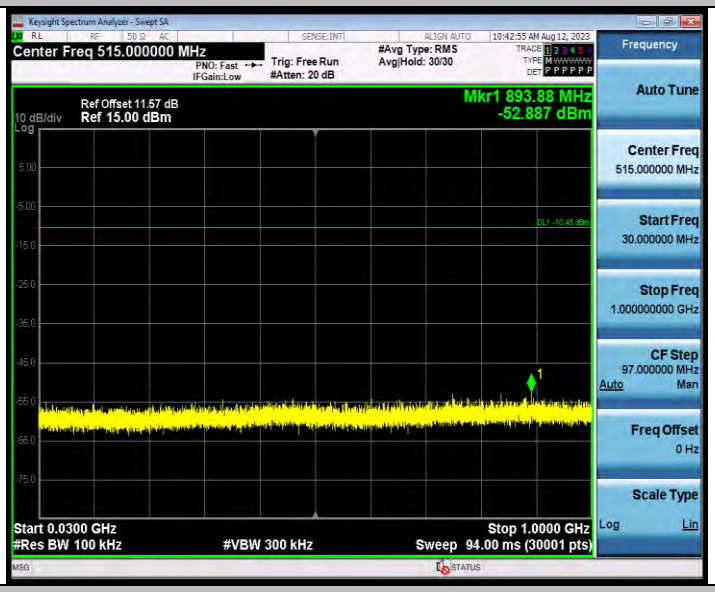
11G_Ant1_2462_30~1000

11G_Ant1_2462_1000~26500

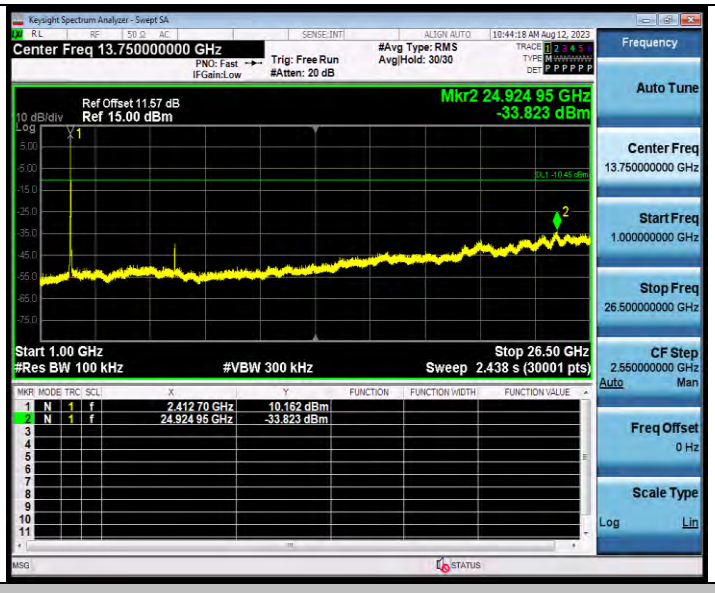


11N20SISO_Ant1_2412_0~Reference

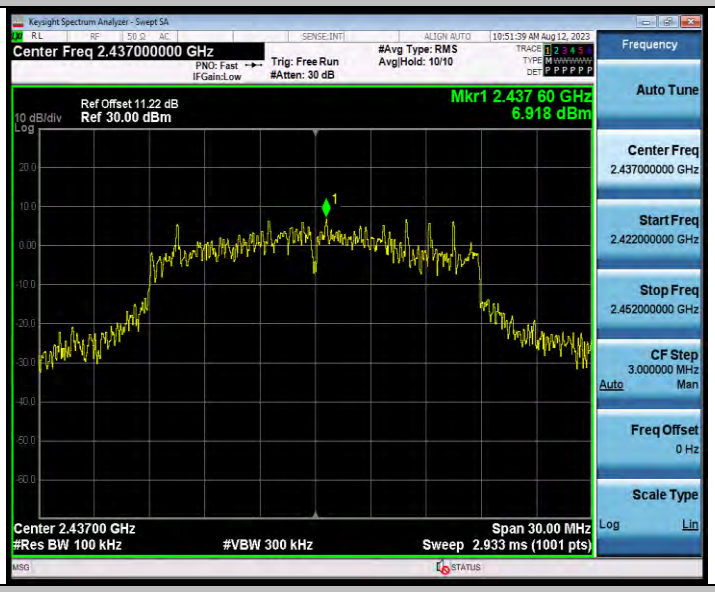
11N20SISO_Ant1_2412_30~1000



11N20SISO_Ant1_2412_1000~26500



11N20SISO_Ant1_2437_0~Reference



11N20SISO_Ant1_2437_30~1000