



BUREAU
VERITAS

Test Report No.: RF190322W001-1



FCC TEST REPORT

(Part 15, Subpart C)


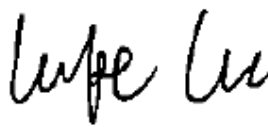
Applicant:	DataRemote Incorporated
Address:	18001 Old Cutler Rd. Suite 600, Miami, FL 33157

Manufacturer or Supplier:	DataRemote Incorporated
Address:	18001 Old Cutler Rd. Suite 600, Miami, FL 33157
Product:	LTE Cellular Router
Brand Name:	DataRemote
Model Name:	CDS-9010
FCC ID:	2AJLF-CDS-9010
Date of tests:	Mar. 23, 2019 ~ May 07, 2018

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 Alex Chen Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
	
Date: May 07, 2018	Date: May 07, 2018

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF190322W001-1	Original release	May 07, 2018



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	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.08dB at 0.444000MHz.
15.205 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.02dB at 2390MHz.
15.247(d)	Out of band Emission Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used

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	$\pm 2.70\text{dB}$
All Radiated emissions	$\pm 4.48\text{dB}$
Conducted emissions	$\pm 2\text{ dB}$
Occupied Channel Bandwidth	$\pm 21.7\text{KHz}$
Conducted Output power	$\pm 1.03\text{ dB}$
Power Spectral Density	$\pm 0.95\text{ dB}$

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	LTE Cellular Router
BRAND NAME	DataRemote
MODEL NAME	CDS-9010
NOMINAL VOLTAGE	12.0Vdc (adapter or host equipment) 7.3Vdc (Li-ion, battery)
MODULATION TECHNOLOGY	DSSS, OFDM
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
TRANSMISSION RATE	802.11b: 11/ 5.5/ 2.0 / 1.0 Mbps 802.11g: 54/ 48/ 36 / 24 / 18 / 9/ 6 Mbps 802.11n: up to 135 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
MAX. OUTPUT POWER	294.442mW (Maximum)
ANTENNA TYPE	PCB Antenna with 4.63dBi gain
HW VERSION	V1.1
SW VERSION	V3.10
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The EUT incorporates MIMO 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)	2TX /2RX
802.11n (40MHz)	2TX /2RX

- The EUT was powered by the following adapter:

ADAPTER	
BRAND:	SHENZHEN GONGJIN ELECTRONICS CO.,LTD Electronic Limited
MODEL:	S24B72-120A200-C4
INPUT:	AC 100-240V, 800mA
OUTPUT:	DC 12V, 2000mA



4. The EUT matched the following Ethernet Cable and Telephone Cables:

ETHERNET CABLE	
BRAND:	Shenzhen Eternity Ju Electronic Co., Ltd
MODEL:	RJ45-8P8C
SIGNAL LINE:	1500±20mm

TELEPHONE CABLE 1	
BRAND:	Shenzhen Eternity Ju Electronic Co., Ltd
MODEL:	RJ11-6P2C
SIGNAL LINE:	1500±20mm

TELEPHONE CABLE 2	
BRAND:	Shenzhen Eternity Ju Electronic Co., Ltd
MODEL:	RJ11-6P2C
SIGNAL LINE:	1500±20mm

5. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



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		

7 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		



2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs 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).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	1	OFDM	BPSK	6.0

**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).

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5

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).

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	1	OFDM	BPSK	6.0

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).

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	CCK	DBPSK	1.0
802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
802.11n HT20	1 to 11	1, 11	OFDM	BPSK	6.5
802.11n HT40	3 to 9	3, 9	OFDM	BPSK	13.5



ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value 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).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	22deg. C, 54%RH	DC 12V from adaptor	Star Le
RE≥1G	22deg. C, 54%RH	DC 12V from adaptor	Star Le
PLC	24deg. C, 55%RH	DC 12V from adaptor	John Wen
APCM	25deg. C, 60%RH	7.3Vdc from battery	Rain Wang



2.3 Duty Cycle of Test Signal

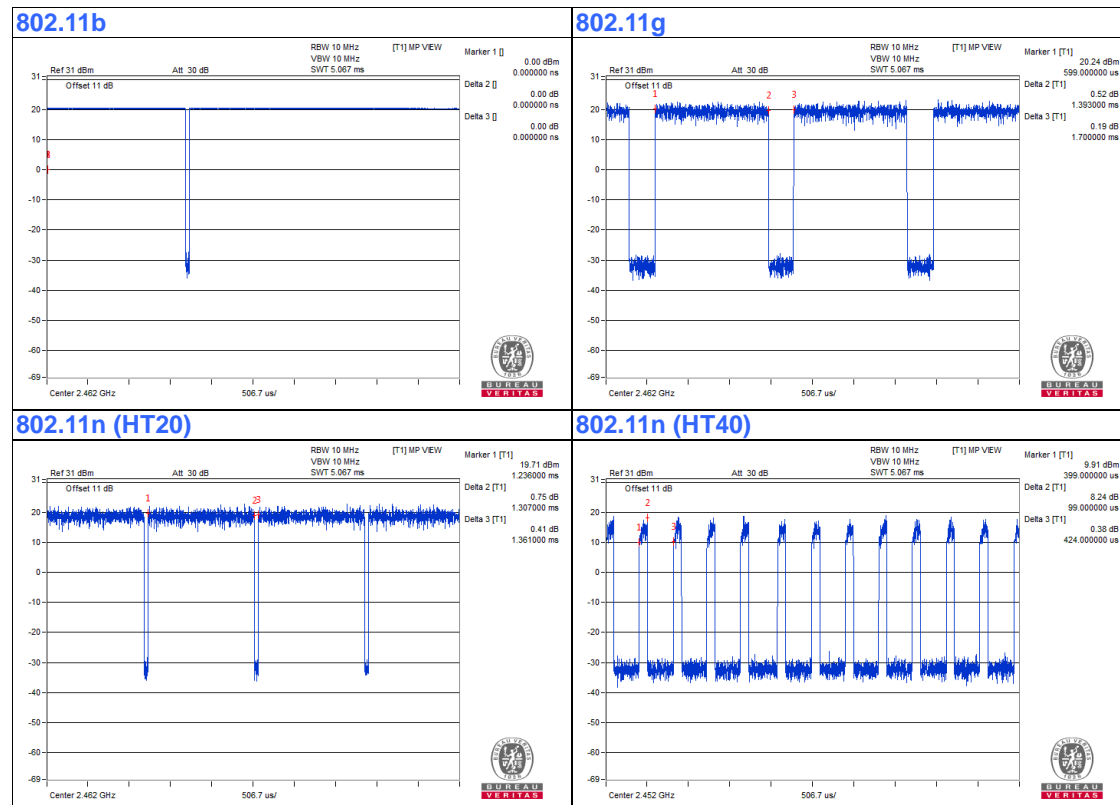
WIFI 2.4GHz

802.11b: Duty cycle = 1 > 98%, Duty factor is not required.

802.11g: Duty cycle = 1.393/1.700 = 0.819 < 98%, Duty factor = $10 * \log(1/0.819) = 0.865$

802.11n (HT20): Duty cycle = 1.307/1.361 = 0.960 < 98%, Duty factor = $10 * \log(1/0.960) = 0.176$

802.11n (HT40): Duty cycle = 0.099/0.424 = 0.233 < 98%, Duty factor = $10 * \log(1/0.233) = 6.317$



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 15.247 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 computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (sDoC). 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	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	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 (dB μ V)	
	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. 26,19	Feb. 25, 20
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 26,19	Feb. 25, 20

NOTE:

- The test was performed in CE shielded room.
- 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) was not recorded.

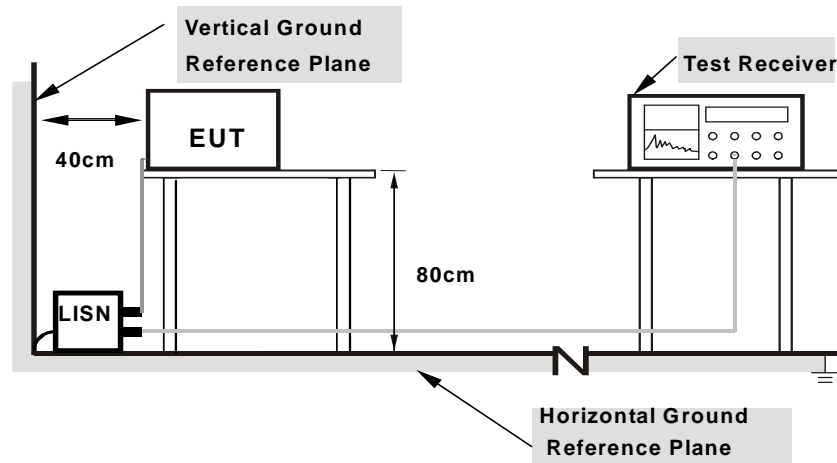
NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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

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



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3.1.7 TEST RESULTS

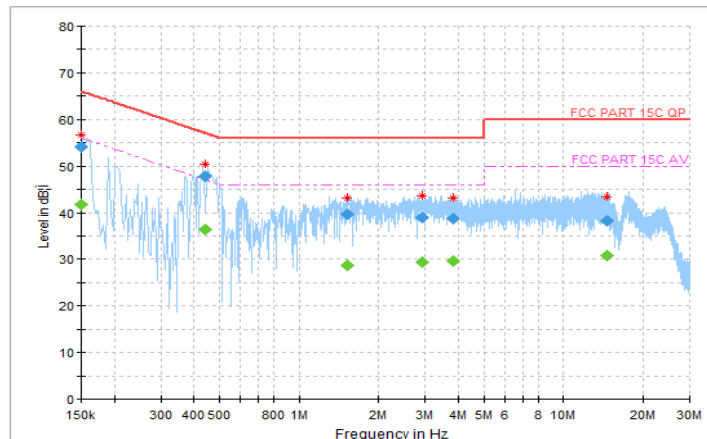
CONDUCTED WORST-CASE DATA:

Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	24deg. C, 55RH
Tested By	John Wen	TEST DATE	2019/03/27

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	54.08	---	66.00	-11.92	L	ON	9.9
0.150000	---	41.67	56.00	-14.33	L	ON	9.9
0.444000	47.91	---	56.99	-9.08	L	ON	10.0
0.444000	---	36.35	46.99	-10.64	L	ON	10.0
1.520000	39.76	---	56.00	-16.24	L	ON	10.1
1.520000	---	28.68	46.00	-17.32	L	ON	10.1
2.908000	38.89	---	56.00	-17.11	L	ON	10.2
2.908000	---	29.36	46.00	-16.64	L	ON	10.2
3.816000	38.72	---	56.00	-17.28	L	ON	10.2
3.816000	---	29.69	46.00	-16.31	L	ON	10.2
14.652000	---	30.84	50.00	-19.16	L	ON	10.5
14.652000	38.17	---	60.00	-21.83	L	ON	10.5

- 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 = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum



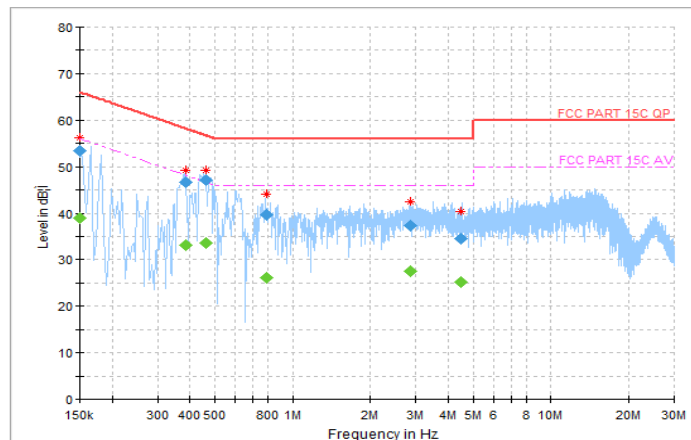


Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	24deg. C, 55RH
Tested By	John Wen	TEST DATE	2019/03/27

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	38.99	56.00	-17.01	N	ON	9.9
0.150000	53.52	---	66.00	-12.48	N	ON	9.9
0.384000	---	33.16	48.19	-15.03	N	ON	9.9
0.384000	46.69	---	58.19	-11.50	N	ON	9.9
0.460000	---	33.62	46.69	-13.08	N	ON	9.9
0.460000	47.00	---	56.69	-9.69	N	ON	9.9
0.796000	---	26.19	46.00	-19.81	N	ON	9.9
0.796000	39.60	---	56.00	-16.40	N	ON	9.9
2.864000	---	27.53	46.00	-18.47	N	ON	10.1
2.864000	37.30	---	56.00	-18.70	N	ON	10.1
4.464000	---	25.23	46.00	-20.77	N	ON	10.1
4.464000	34.50	---	56.00	-21.50	N	ON	10.1

- 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 = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum





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	Feb. 26,19	Feb. 25,20
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 26,19	Feb. 25,20
Horn Antenna	ETS-LINDGREN	3117	00168728	Feb. 26,19	Feb. 25,20
Loop antenna	Daze	ZN30900A	0708	Oct. 23,18	Oct. 22, 19
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Nov. 21, 18	Nov. 20, 19
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jul. 09,18	Jul. 08,19
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 26,19	Feb. 25,20
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jul. 09,18	Jul. 08,19
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jul. 09,18	Jul. 08,19
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Jul. 09,18	Jul. 08,19

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.
 2. The test was performed in 3m Chamber.
 3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.



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 is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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 $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

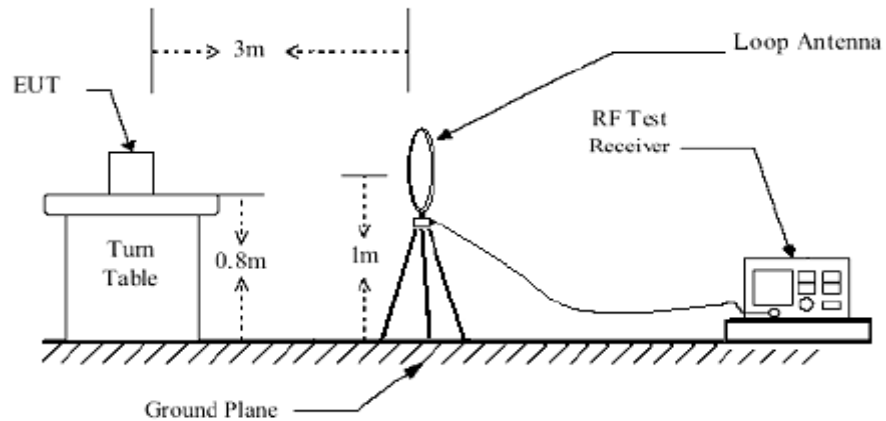
3.2.4 DEVIATION FROM TEST STANDARD

No deviation

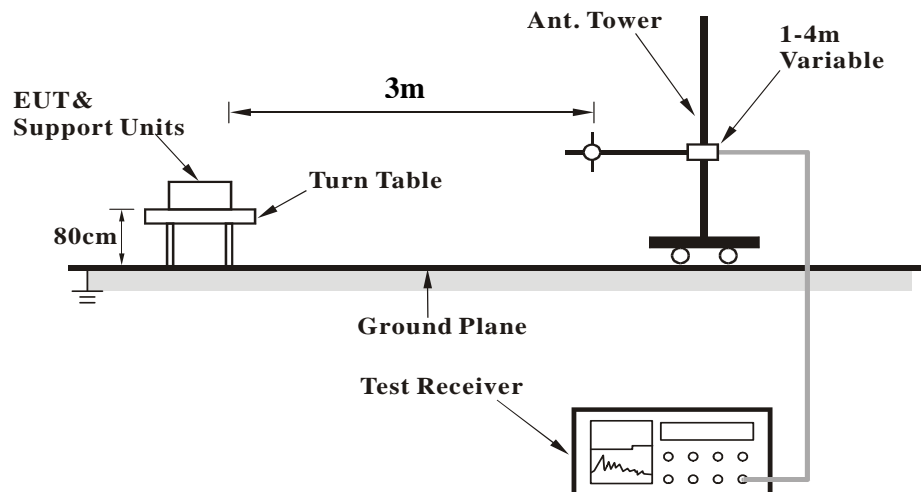


3.2.5 TEST SETUP

< Frequency Range below 30MHz >

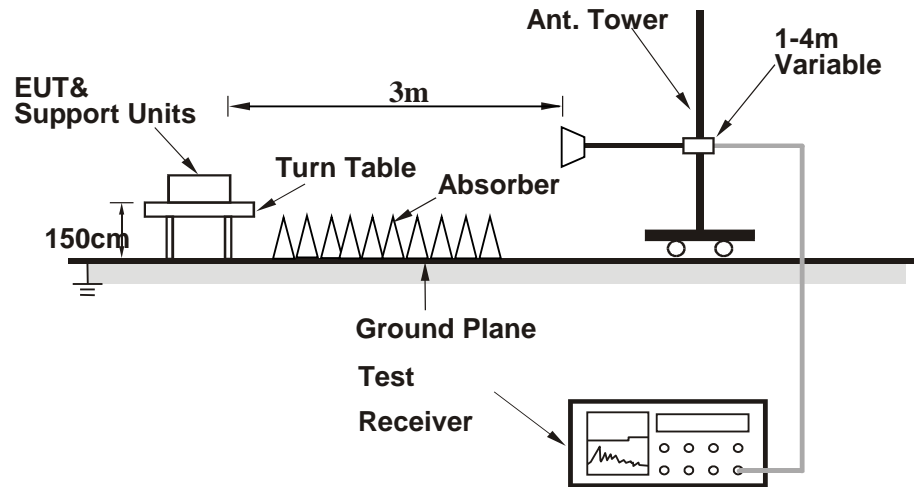


< Frequency Range 30MHz~1GHz >





<Frequency Range above 1GHz>



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

3.2.6 EUT OPERATING CONDITIONS

- Set the EUT under full load condition and placed them on a testing table.
- Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the EUT in full functions.



3.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

9 KHz – 30 MHz data: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

30 MHz – 1GHz data:

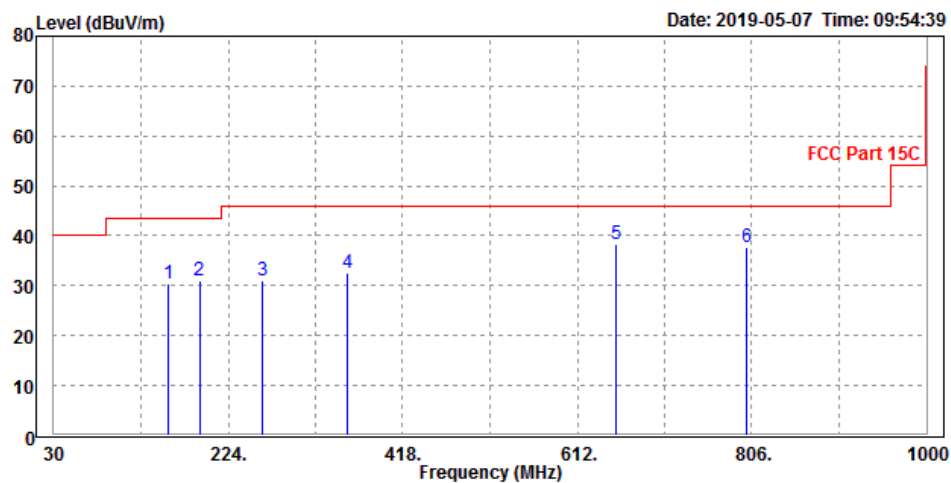
802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
158.04	30.42	55.19	43.5	-13.08	10.34	1.64	36.75	100	360	QP
191.99	30.93	55.17	43.5	-12.57	10.6	1.75	36.59	100	360	QP
262.8	31.04	52.36	46	-14.96	13.28	2.08	36.68	100	360	QP
355.92	32.42	50.94	46	-13.58	15.83	2.44	36.79	100	360	QP
655.65	38.44	50.82	46	-7.56	21.71	3.37	37.46	100	360	QP
800.18	37.64	48.06	46	-8.36	23.4	3.89	37.71	100	360	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.



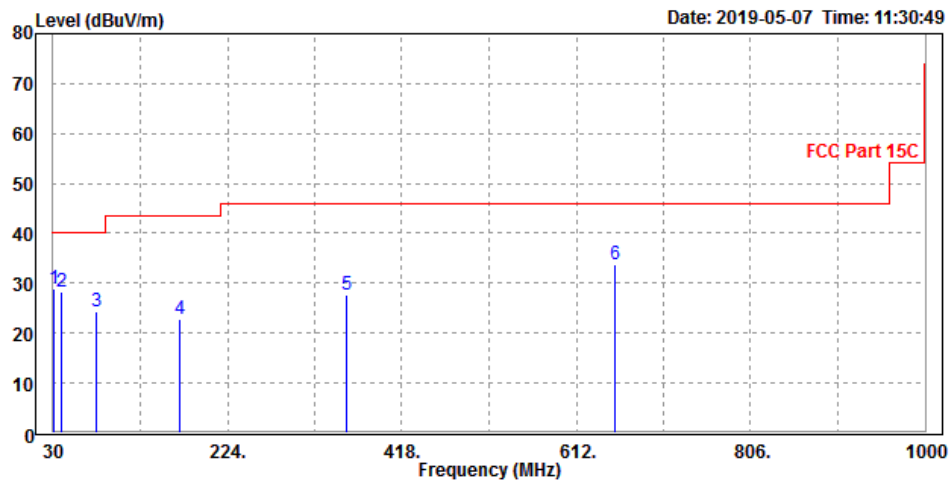


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
30.97	28.88	48.63	40	-11.12	16.82	0.79	37.36	100	360	QP
39.7	28.36	51.25	40	-11.64	13.72	0.91	37.52	100	360	QP
78.5	24.26	52.21	40	-15.74	8.19	1.2	37.34	100	360	QP
170.65	22.78	47.38	43.5	-20.72	10.4	1.68	36.68	100	360	QP
356.89	27.72	46.12	46	-18.28	15.96	2.44	36.8	100	360	QP
655.65	33.82	46.2	46	-12.18	21.71	3.37	37.46	100	360	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.





ABOVE 1GHz WORST-CASE DATA:

Note: For higher frequency, the emission is too low to be detected.

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	44.97	50.45	54	-9.03	32.29	8.15	45.92	114	91	Average
2390	57.61	63.09	74	-16.39	32.29	8.15	45.92	114	91	Peak
2412	98.26	103.67			32.31	8.19	45.91	114	91	Average
2412	101.01	106.42			32.31	8.19	45.91	114	91	Peak
2483.5	44.44	49.63	54	-9.56	32.38	8.32	45.89	114	91	Average
2483.5	56.29	61.48	74	-17.71	32.38	8.32	45.89	114	91	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	48.86	54.34	54	-5.14	32.29	8.15	45.92	156	115	Average
2390	59	64.48	74	-15	32.29	8.15	45.92	156	115	Peak
2412	111.35	116.76			32.31	8.19	45.91	156	115	Average
2412	114.05	119.46			32.31	8.19	45.91	156	115	Peak
2483.5	48.12	53.31	54	-5.88	32.38	8.32	45.89	156	115	Average
2483.5	58.68	63.87	74	-15.32	32.38	8.32	45.89	156	115	Peak

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 2412MHz: Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	38.08	43.56	54	-15.92	32.29	8.15	45.92	100	129	Average
2390	52.86	58.34	74	-21.14	32.29	8.15	45.92	100	129	Peak
2437	103.43	108.76			32.34	8.24	45.91	100	129	Average
2437	105.98	111.31			32.34	8.24	45.91	100	129	Peak
2483.5	37.12	42.31	54	-16.88	32.38	8.32	45.89	100	129	Average
2483.5	48.27	53.46	74	-25.73	32.38	8.32	45.89	100	129	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	38.01	43.57	54	-15.99	32.21	8.15	45.92	105	214	Average
2390	47.04	52.6	74	-26.96	32.21	8.15	45.92	105	214	Peak
2437	99.74	105.07			32.34	8.24	45.91	105	214	Average
2437	101.9	107.23			32.34	8.24	45.91	105	214	Peak
2483.5	36.26	41.37	54	-17.74	32.46	8.32	45.89	105	214	Average
2483.5	48	53.11	74	-26	32.46	8.32	45.89	105	214	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	45.59	50.26	54	-8.41	33.1	8.15	45.92	100	72	Average
2390	57.47	62.14	74	-16.53	33.1	8.15	45.92	100	72	Peak
2462	99.28	103.67			33.23	8.28	45.9	100	72	Average
2462	101.74	106.13			33.23	8.28	45.9	100	72	Peak
2483.5	46.24	50.54	54	-7.76	33.27	8.32	45.89	100	72	Average
2483.5	57.83	62.13	74	-16.17	33.27	8.32	45.89	100	72	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	46.71	52.27	54	-7.29	32.21	8.15	45.92	151	126	Average
2390	57.78	63.34	74	-16.22	32.21	8.15	45.92	151	126	Peak
2462	112.41	117.63			32.4	8.28	45.9	151	126	Average
2462	114.67	119.89			32.4	8.28	45.9	151	126	Peak
2483.5	51.71	56.82	54	-2.29	32.46	8.32	45.89	151	126	Average
2483.5	60.63	65.74	74	-13.37	32.46	8.32	45.89	151	126	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.



802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.98	57.65	54	-1.02	33.1	8.15	45.92	131	97	Average
2390	67.14	71.81	74	-6.86	33.1	8.15	45.92	131	97	Peak
2412	94.78	99.36			33.14	8.19	45.91	131	97	Average
2412	104.83	109.41			33.14	8.19	45.91	131	97	Peak
2483.5	45.91	50.21	54	-8.09	33.27	8.32	45.89	131	97	Average
2483.5	57.63	61.93	74	-16.37	33.27	8.32	45.89	131	97	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	50.93	56.49	54	-3.07	32.21	8.15	45.92	172	130	Average
2390	64.73	70.29	74	-9.27	32.21	8.15	45.92	172	130	Peak
2412	100.76	106.21			32.27	8.19	45.91	172	130	Average
2412	111.56	117.01			32.27	8.19	45.91	172	130	Peak
2483.5	46.11	51.22	54	-7.89	32.46	8.32	45.89	172	130	Average
2483.5	58.59	63.7	74	-15.41	32.46	8.32	45.89	172	130	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	46.56	51.23	54	-7.44	33.1	8.15	45.92	114	289	Average
2390	57.91	62.58	74	-16.09	33.1	8.15	45.92	114	289	Peak
2437	98.77	103.25			33.19	8.24	45.91	114	289	Average
2437	102	106.48			33.19	8.24	45.91	114	289	Peak
2483.5	47.89	52.19	54	-6.11	33.27	8.32	45.89	114	289	Average
2483.5	59.19	63.49	74	-14.81	33.27	8.32	45.89	114	289	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	46.57	52.13	54	-7.43	32.21	8.15	45.92	123	256	Average
2390	56.79	62.35	74	-17.21	32.21	8.15	45.92	123	256	Peak
2437	101.24	106.57			32.34	8.24	45.91	123	256	Average
2437	103.13	108.46			32.34	8.24	45.91	123	256	Peak
2483.5	47.66	52.77	54	-6.34	32.46	8.32	45.89	123	256	Average
2483.5	58.35	63.46	74	-15.65	32.46	8.32	45.89	123	256	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	46.64	51.31	54	-7.36	33.1	8.15	45.92	100	58	Average
2390	56.25	60.92	74	-17.75	33.1	8.15	45.92	100	58	Peak
2462	95.12	99.51			33.23	8.28	45.9	100	58	Average
2462	104.94	109.33			33.23	8.28	45.9	100	58	Peak
2483.5	51.67	55.97	54	-2.33	33.27	8.32	45.89	100	58	Average
2483.5	66.23	70.53	74	-7.77	33.27	8.32	45.89	100	58	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	46.19	51.75	54	-7.81	32.21	8.15	45.92	155	121	Average
2390	58.64	64.2	74	-15.36	32.21	8.15	45.92	155	121	Peak
2462	102.56	107.78			32.4	8.28	45.9	155	121	Average
2462	111.8	117.02			32.4	8.28	45.9	155	121	Peak
2483.5	52.81	57.92	54	-1.19	32.46	8.32	45.89	155	121	Average
2483.5	66.84	71.95	74	-7.16	32.46	8.32	45.89	155	121	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.



802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.79	56.46	54	-2.21	33.1	8.15	45.92	100	314	Average
2390	65.69	70.36	74	-8.31	33.1	8.15	45.92	100	314	Peak
2412	95.99	100.57			33.14	8.19	45.91	100	314	Average
2412	104.49	109.07			33.14	8.19	45.91	100	314	Peak
2483.5	45.69	49.99	54	-8.31	33.27	8.32	45.89	100	314	Average
2483.5	58.84	63.14	74	-15.16	33.27	8.32	45.89	100	314	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.24	56.8	54	-2.76	32.21	8.15	45.92	136	316	Average
2390	66.46	72.02	74	-7.54	32.21	8.15	45.92	136	316	Peak
2412	97.67	103.12			32.27	8.19	45.91	136	316	Average
2412	108.36	113.81			32.27	8.19	45.91	136	316	Peak
2483.5	45.89	51	54	-8.11	32.46	8.32	45.89	136	316	Average
2483.5	58.13	63.24	74	-15.87	32.46	8.32	45.89	136	316	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	45.57	50.24	54	-8.43	33.1	8.15	45.92	123	234	Average
2390	57.11	61.78	74	-16.89	33.1	8.15	45.92	123	234	Peak
2437	102.41	106.89			33.19	8.24	45.91	123	234	Average
2437	105.09	109.57			33.19	8.24	45.91	123	234	Peak
2483.5	47.83	52.13	54	-6.17	33.27	8.32	45.89	123	234	Average
2483.5	58.04	62.34	74	-15.96	33.27	8.32	45.89	123	234	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	46.69	52.25	54	-7.31	32.21	8.15	45.92	100	197	Average
2390	56.29	61.85	74	-17.71	32.21	8.15	45.92	100	197	Peak
2437	99.23	104.56			32.34	8.24	45.91	100	197	Average
2437	102.24	107.57			32.34	8.24	45.91	100	197	Peak
2483.5	45.11	50.22	54	-8.89	32.46	8.32	45.89	100	197	Average
2483.5	57.45	62.56	74	-16.55	32.46	8.32	45.89	100	197	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	47.01	51.68	54	-6.99	33.1	8.15	45.92	128	313	Average
2390	60.14	64.81	74	-13.86	33.1	8.15	45.92	128	313	Peak
2462	94.59	98.98			33.23	8.28	45.9	128	313	Average
2462	103.5	107.89			33.23	8.28	45.9	128	313	Peak
2483.5	51.52	55.82	54	-2.48	33.27	8.32	45.89	128	313	Average
2483.5	64.67	68.97	74	-9.33	33.27	8.32	45.89	128	313	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	45.76	51.32	54	-8.24	32.21	8.15	45.92	152	326	Average
2390	58.69	64.25	74	-15.31	32.21	8.15	45.92	152	326	Peak
2462	100	105.22			32.4	8.28	45.9	152	326	Average
2462	108.57	113.79			32.4	8.28	45.9	152	326	Peak
2483.5	52.79	57.9	54	-1.21	32.46	8.32	45.89	152	326	Average
2483.5	67.45	72.56	74	-6.55	32.46	8.32	45.89	152	326	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.



802.11n (40MHz)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	46.45	51.12	54	-7.55	33.1	8.15	45.92	100	221	Average
2390	56.7	61.37	74	-17.3	33.1	8.15	45.92	100	221	Peak
2422	77.37	81.91			33.16	8.21	45.91	100	221	Average
2422	87.03	91.57			33.16	8.21	45.91	100	221	Peak
2483.5	46.01	50.31	54	-7.99	33.27	8.32	45.89	100	221	Average
2483.5	57.81	62.11	74	-16.19	33.27	8.32	45.89	100	221	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	45.36	50.92	54	-8.64	32.21	8.15	45.92	135	235	Average
2390	61.17	66.73	74	-12.83	32.21	8.15	45.92	135	235	Peak
2422	84.28	89.68			32.3	8.21	45.91	135	235	Average
2422	92.17	97.57			32.3	8.21	45.91	135	235	Peak
2483.5	47.34	52.45	54	-6.66	32.46	8.32	45.89	135	235	Average
2483.5	60.2	65.31	74	-13.8	32.46	8.32	45.89	135	235	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2422MHz: Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	39.22	43.89	54	-14.78	33.1	8.15	45.92	126	254	Average
2390	47.66	52.33	74	-26.34	33.1	8.15	45.92	126	254	Peak
2437	83.04	87.52			33.19	8.24	45.91	126	254	Average
2437	85.28	89.76			33.19	8.24	45.91	126	254	Peak
2483.5	38.53	42.83	54	-15.47	33.27	8.32	45.89	126	254	Average
2483.5	49.26	53.56	74	-24.74	33.27	8.32	45.89	126	254	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	38.79	44.35	54	-15.21	32.21	8.15	45.92	117	163	Average
2390	46.98	52.54	74	-27.02	32.21	8.15	45.92	117	163	Peak
2437	94.69	100.02			32.34	8.24	45.91	117	163	Average
2437	97.26	102.59			32.34	8.24	45.91	117	163	Peak
2483.5	35.95	41.06	54	-18.05	32.46	8.32	45.89	117	163	Average
2483.5	48.36	53.47	74	-25.64	32.46	8.32	45.89	117	163	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	48.75	53.42	54	-5.25	33.1	8.15	45.92	138	320	Average
2390	55.66	60.33	74	-18.34	33.1	8.15	45.92	138	320	Peak
2452	89.29	93.72			33.21	8.26	45.9	138	320	Average
2452	97.71	102.14			33.21	8.26	45.9	138	320	Peak
2483.5	52.95	57.25	54	-1.05	33.27	8.32	45.89	138	320	Average
2483.5	68.06	72.36	74	-5.94	33.27	8.32	45.89	138	320	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	45.21	50.77	54	-8.79	32.21	8.15	45.92	146	0	Average
2390	56.99	62.55	74	-17.01	32.21	8.15	45.92	146	0	Peak
2452	74.08	79.34			32.38	8.26	45.9	146	0	Average
2452	95.79	101.05			32.38	8.26	45.9	146	0	Peak
2483.5	50.36	55.47	54	-3.64	32.46	8.32	45.89	146	0	Average
2483.5	63.45	68.56	74	-10.55	32.46	8.32	45.89	146	0	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2452MHz: Fundamental frequency.



3.3 6 dB BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 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. 26,19	Feb. 25,20
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 26,19	Feb. 25,20
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Feb. 26,19	Feb. 25,20
Power Sensor	ANRITSU	MA2411B	1339352	Feb. 26,19	Feb. 25,20

NOTE:

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

3.3.3 TEST PROCEDURE

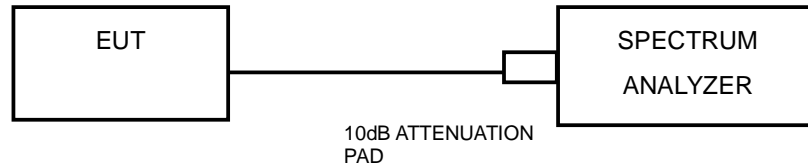
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points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

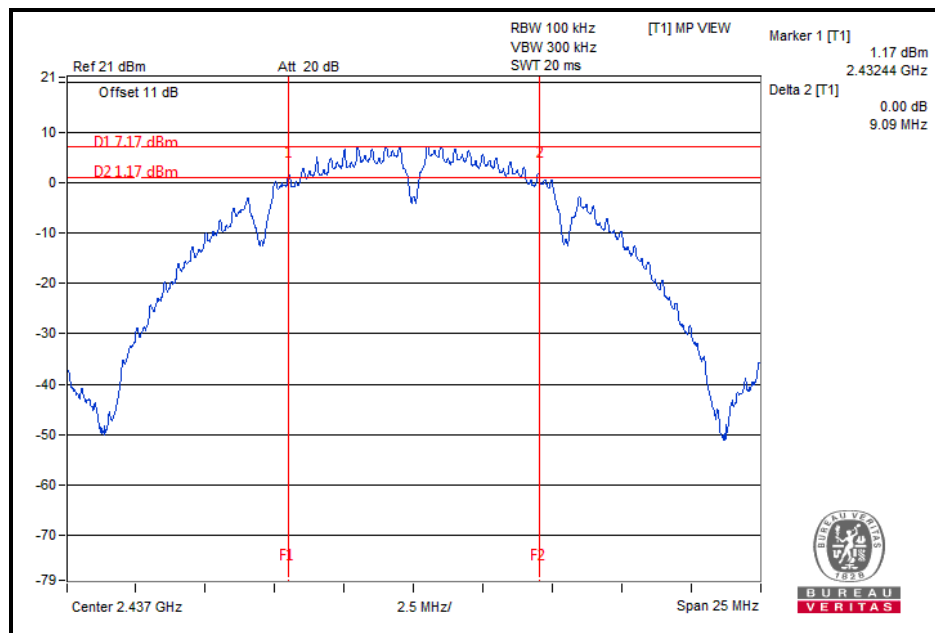
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



3.3.7 TEST RESULTS

802.11b

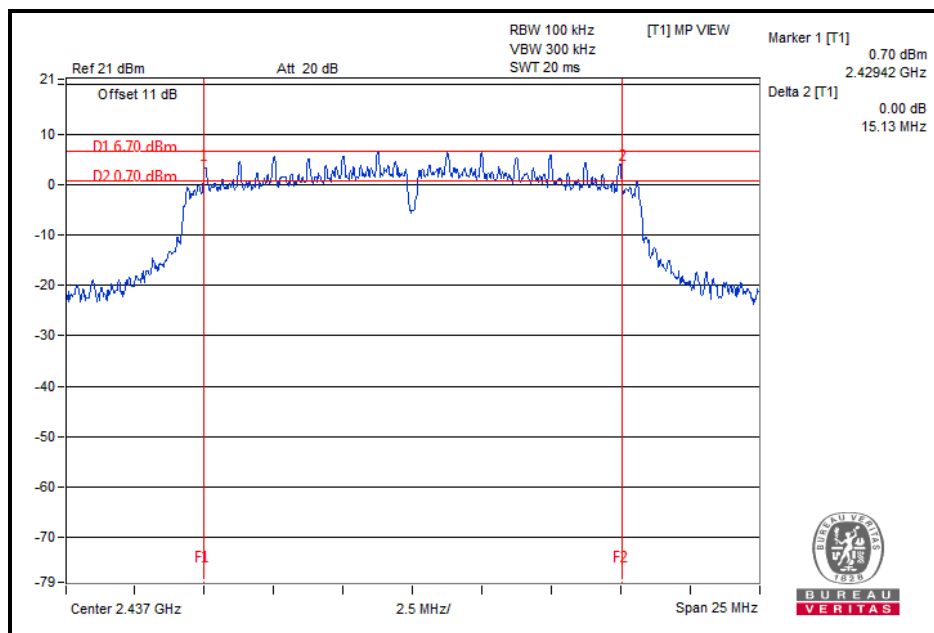
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.10	0.5	PASS
6	2437	9.09	0.5	PASS
11	2462	9.09	0.5	PASS





802.11g

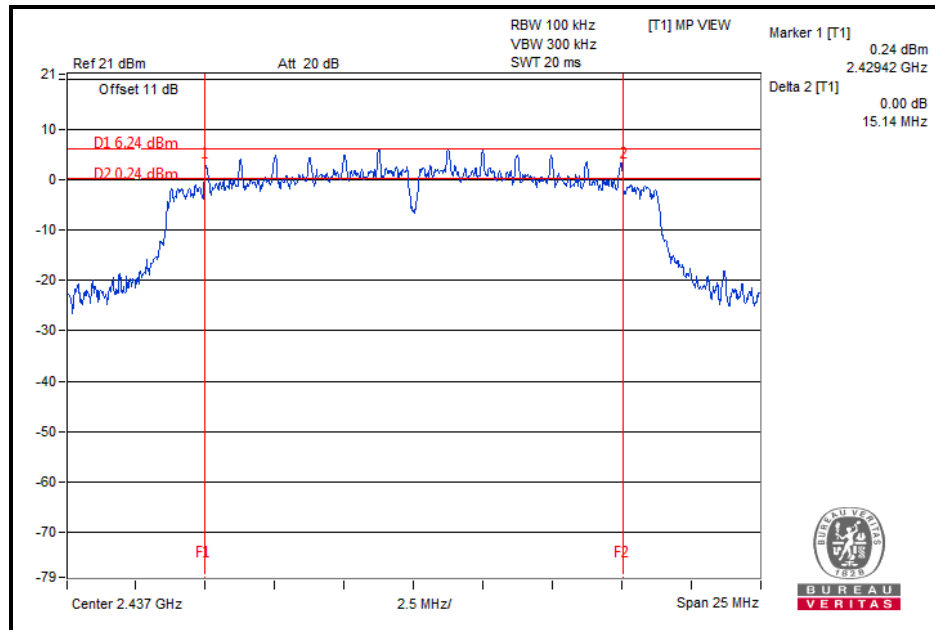
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.12	0.5	PASS
6	2437	15.13	0.5	PASS
11	2462	15.13	0.5	PASS





802.11n (20MHz)

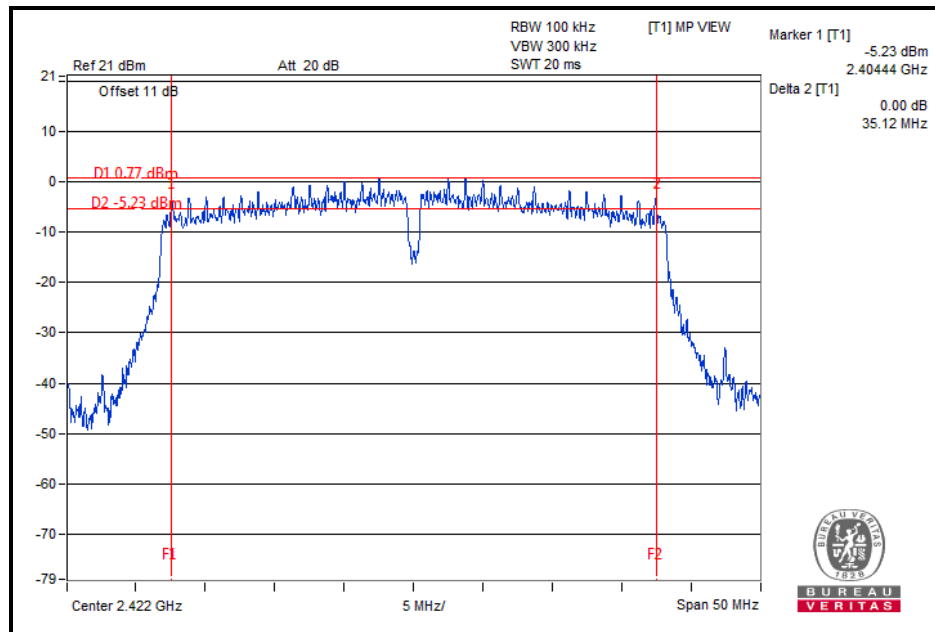
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.11	0.5	PASS
6	2437	15.14	0.5	PASS
11	2462	15.11	0.5	PASS





802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.12	0.5	PASS
6	2437	35.12	0.5	PASS
9	2452	35.12	0.5	PASS

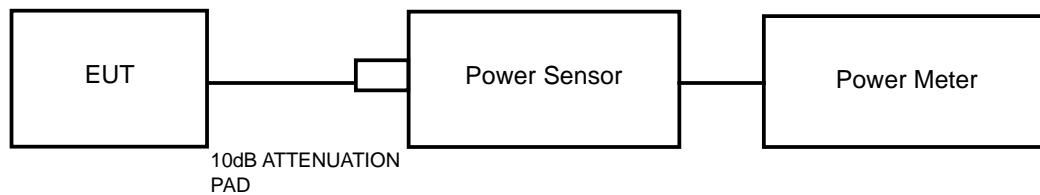


3.4 CONDUCTED OUTPUT POWER

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 of 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

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	18.13	65.013	1	PASS
6	2437	18.12	64.863	1	PASS
11	2462	17.90	61.660	1	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	19.56	90.365	1	PASS
6	2437	22.31	170.216	1	PASS
11	2462	18.40	69.183	1	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
		CHAIN 0	CHAIN 1				
1	2412	19.87	18.16	22.11	162.555	1	PASS
6	2437	22.23	21.05	24.69	294.442	1	PASS
11	2462	17.44	17.66	20.56	113.763	1	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
		CHAIN 0	CHAIN 1				
3	2422	22.15	20.83	24.55	285.102	1	PASS
6	2437	22.03	20.95	24.53	283.792	1	PASS
9	2452	22.10	19.80	23.51	224.388	1	PASS



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.

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	16.04	N/A
6	2437	16.00	N/A
11	2462	15.96	N/A

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	10.75	N/A
6	2437	16.14	N/A
11	2462	10.65	N/A

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	PASS/FAIL
		CHAIN 0	CHAIN 1		
1	2412	10.70	10.86	13.79	N/A
6	2437	16.21	16.16	19.20	N/A
11	2462	9.15	9.13	12.15	N/A

802.11n (40MHz)

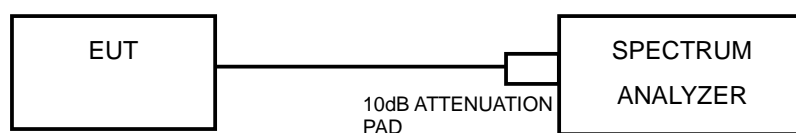
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	PASS/FAIL
		CHAIN 0	CHAIN 1		
3	2422	16.35	16.02	19.20	N/A
6	2437	16.22	16.22	19.23	N/A
9	2452	14.39	14.41	17.41	N/A

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 of 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 $\geq 3 \times$ 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

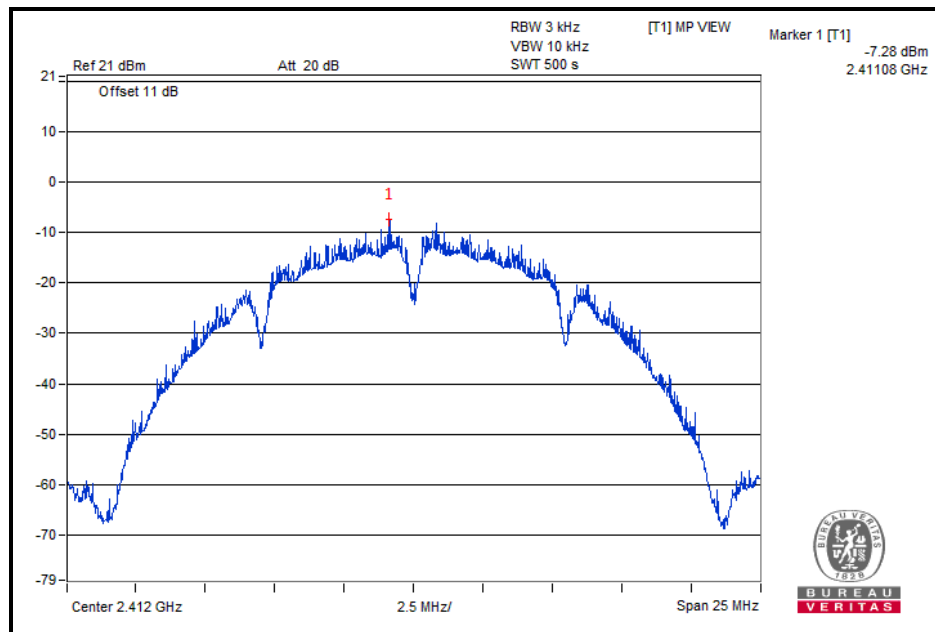
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



3.5.7 TEST RESULTS

802.11b

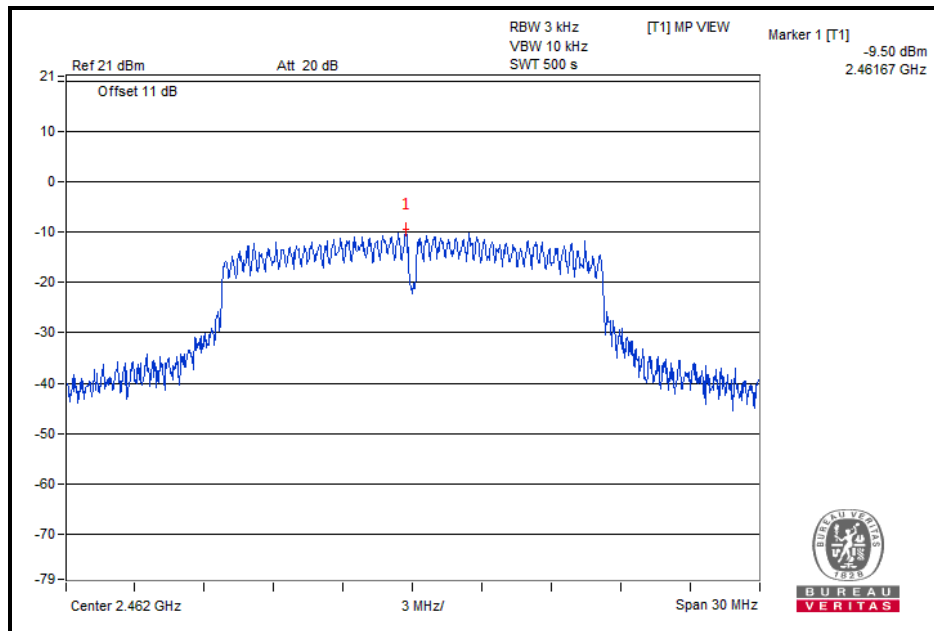
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-7.28	8	PASS
6	2437	-8.22	8	PASS
11	2462	-8.53	8	PASS





802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-10.34	8	PASS
6	2437	-10.05	8	PASS
11	2462	-9.50	8	PASS

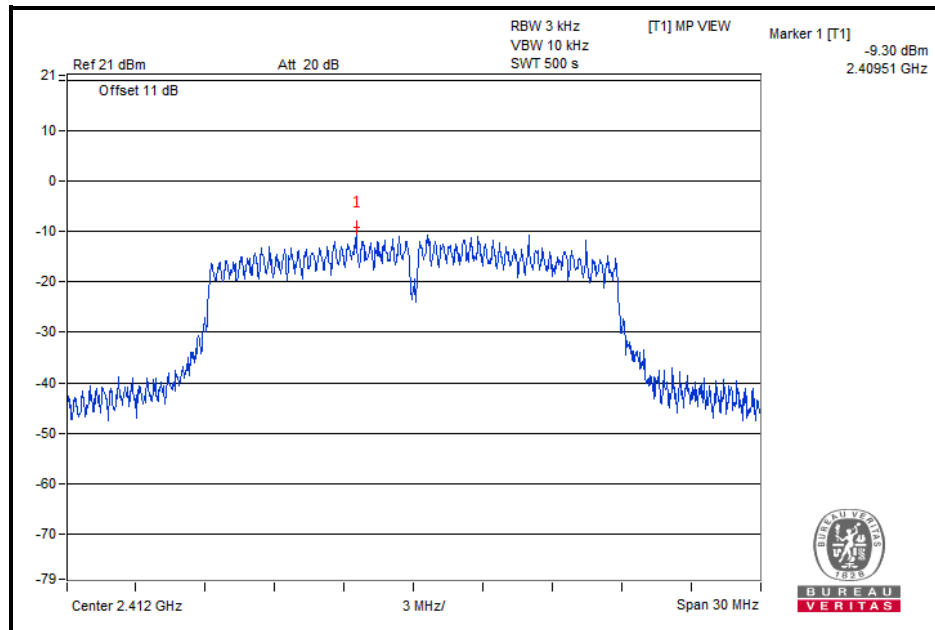




802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)		TOTAL PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
		Chain 0	Chain 1			
1	2412	-9.30	-11.07	-7.09	6.36	PASS
6	2437	-10.07	-9.95	-7.00	6.36	PASS
11	2462	-10.17	-7.56	-5.66	6.36	PASS

Note: $N_{ANT} = 2$, Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi = 7.64dBi > 6dBi, so the power density limit shall be reduced to $8 - (7.64 - 6) = 6.36$ dBm.

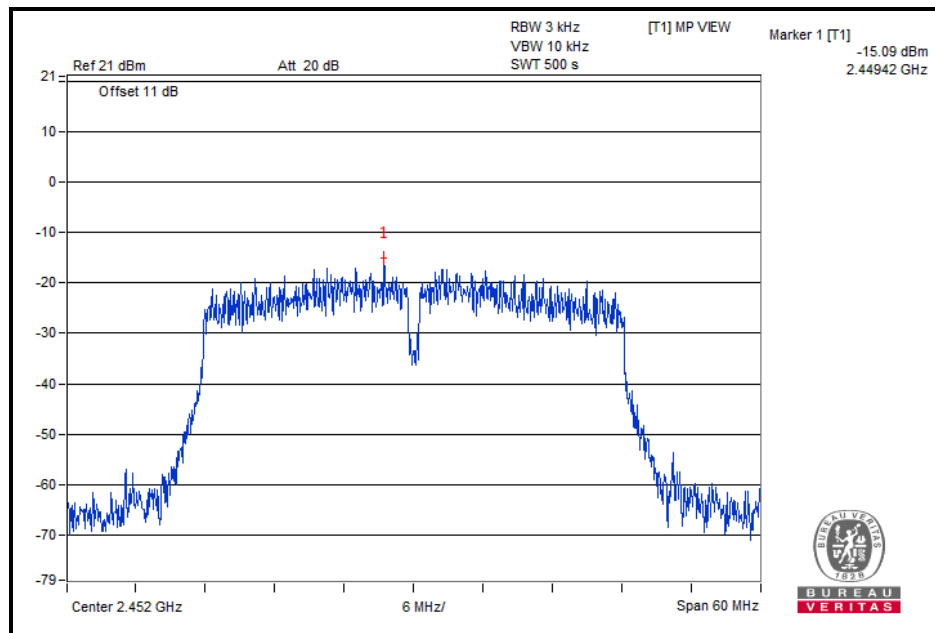




802.11n (40MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)		TOTAL PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
		Chain 0	Chain 1			
3	2422	-16.65	-13.65	-11.89	6.36	PASS
6	2437	-15.68	-12.14	-10.55	6.36	PASS
9	2452	-15.09	-12.10	-10.33	6.36	PASS

Note: $N_{ANT} = 2$, Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi = 7.64dBi > 6dBi, so the power density limit shall be reduced to $8 - (7.64 - 6) = 6.36$ dBm.

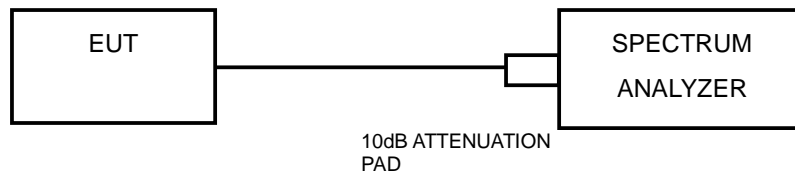


3.6 OUT OF BAND EMISSION MEASUREMENT

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 of above instrument.

3.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW \geq 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 OOB

1. Set RBW = 100 kHz.
2. Set VBW \geq 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.

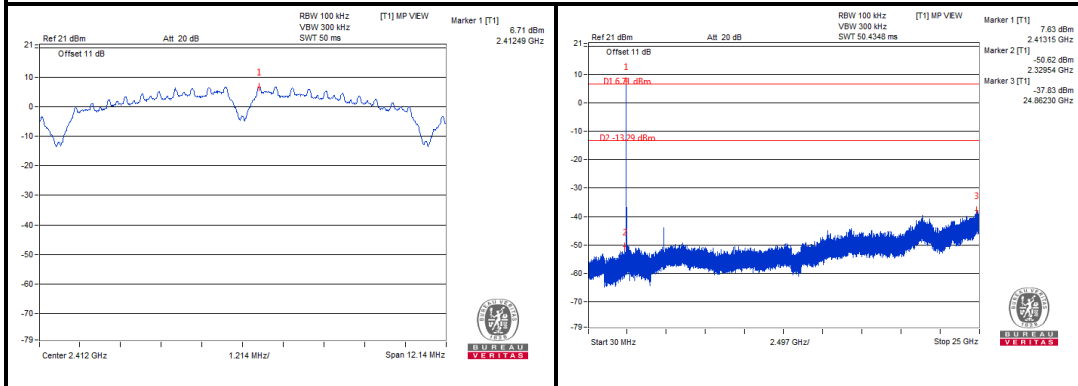
3.6.7 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

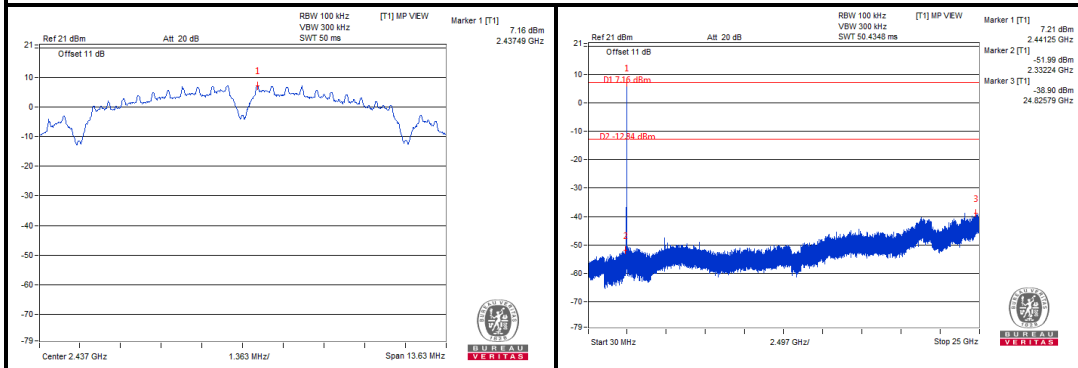


802.11b

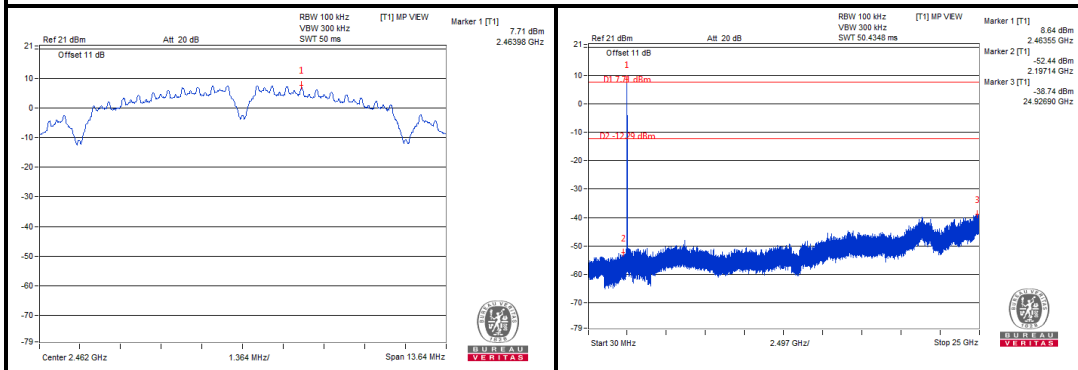
CH 1



CH 6



CH 11

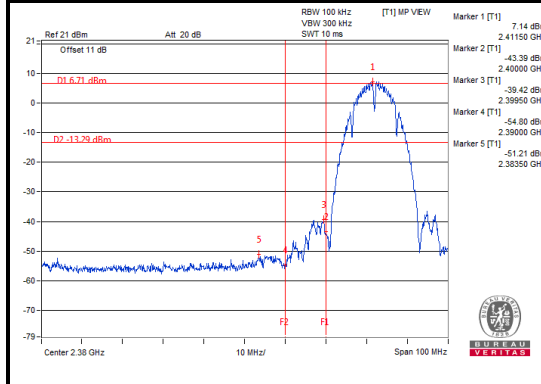




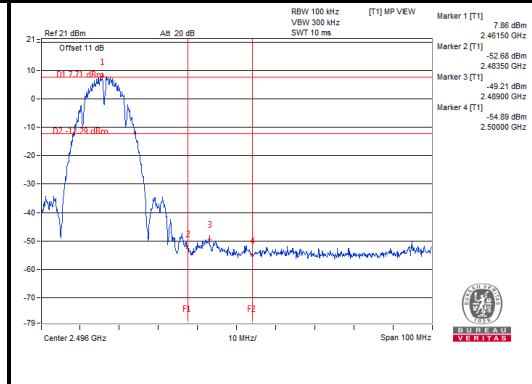
BUREAU
VERITAS

Test Report No.: RF190322W001-1

CH 1 Band Edge



CH 11 Band Edge



BV 7Layers Communications Technology
(Shenzhen) Co. Ltd

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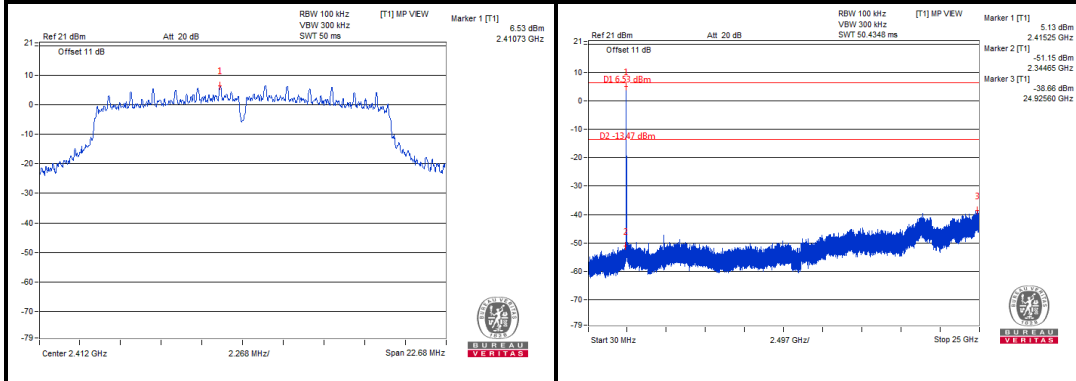


BUREAU
VERITAS

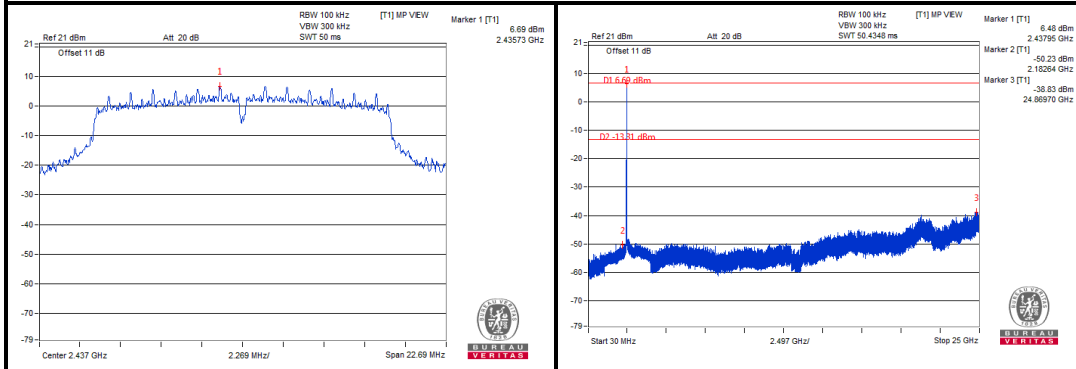
Test Report No.: RF190322W001-1

802.11g

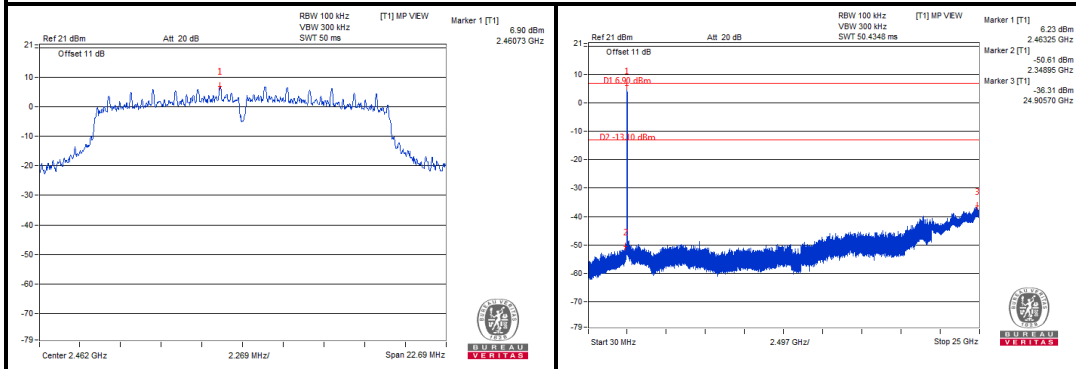
CH 1



CH 6



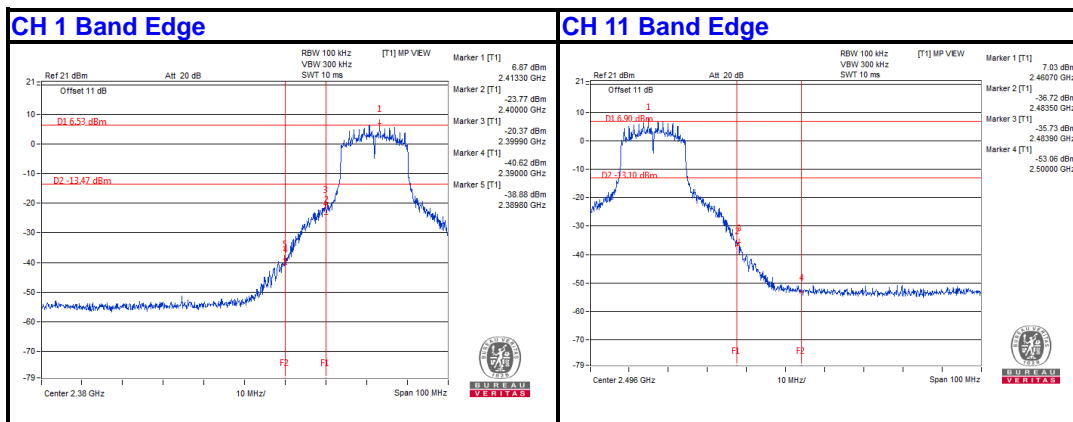
CH 11





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BV 7Layers Communications Technology
(Shenzhen) Co. Ltd

No.B102, Dazu Chuangxin Mansion, North of Beihuan
Avenue, North Area, Hi-Tech Industrial Park, Nanshan
District, Shenzhen, Guangdong, China

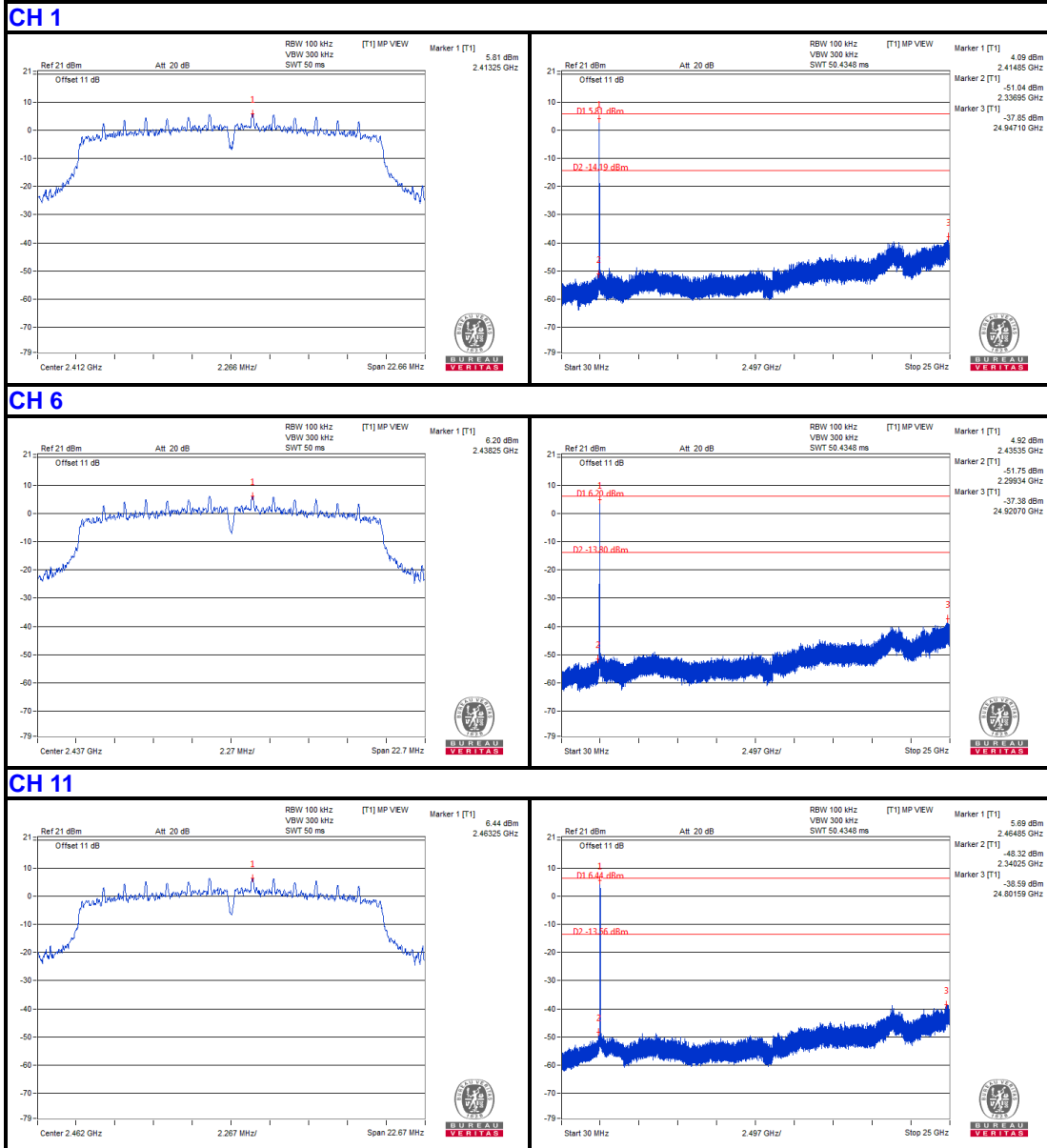
Tel: +86 755 8869 6566
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802.11n (20MHz)



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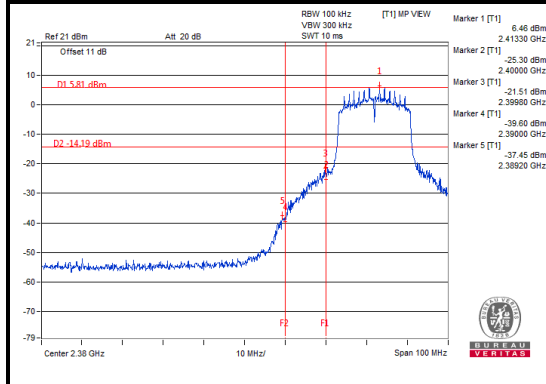
Tel: +86 755 8869 6566
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Email: customerservice.dq@cn.bureauveritas.com



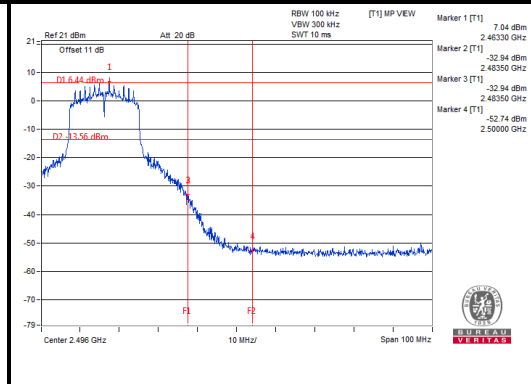
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CH 1 Band Edge



CH 11 Band Edge



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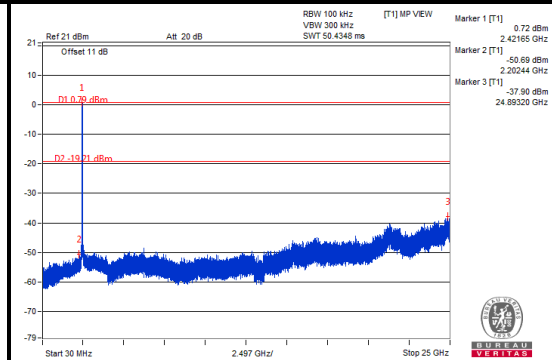
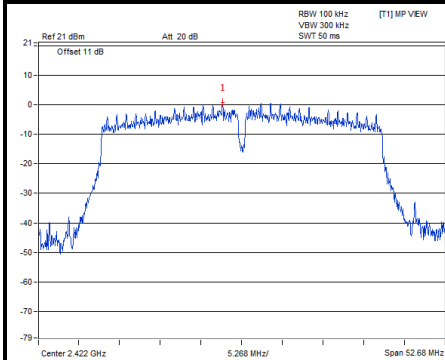


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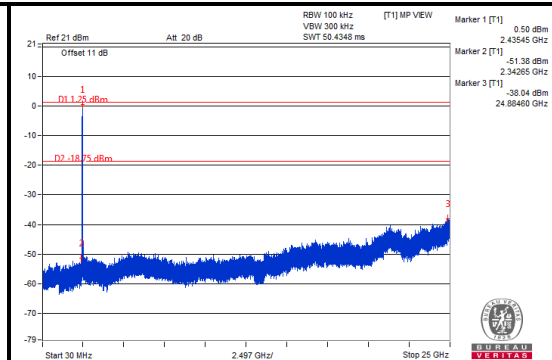
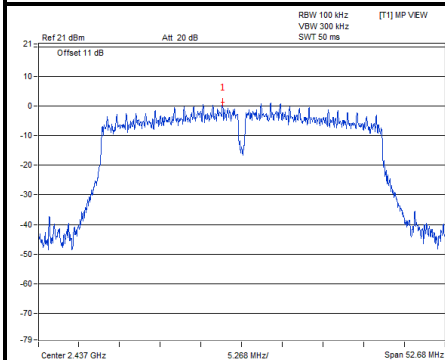
Test Report No.: RF190322W001-1

802.11n (40MHz)

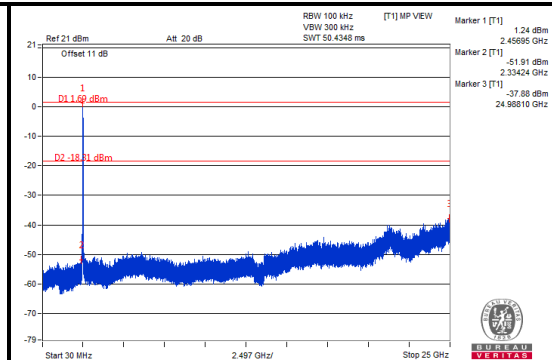
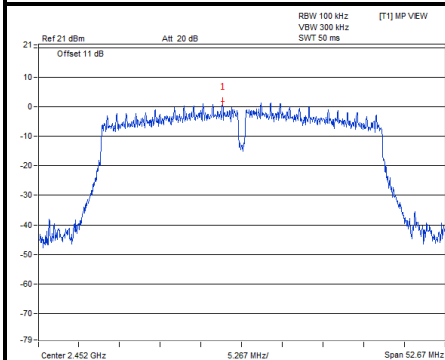
CH 3



CH 6



CH 9

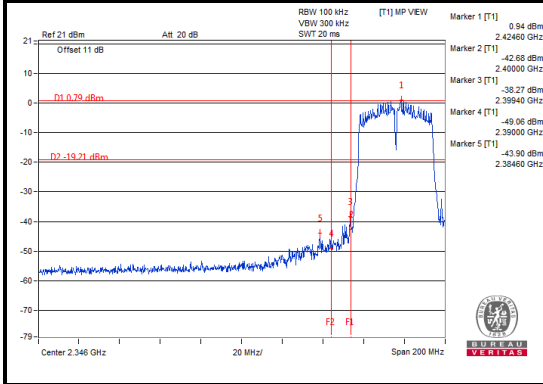




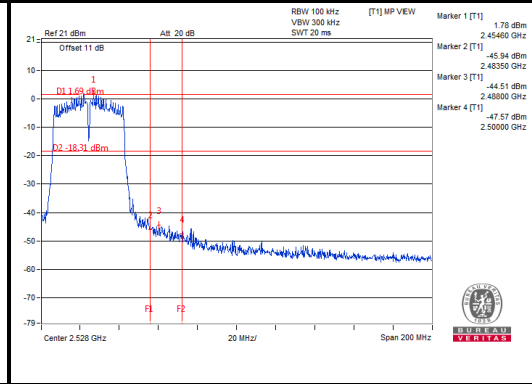
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CH 3 Band Edge



CH 9 Band Edge



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4 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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5 APPENDIX A - 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.

---END---