ACCREDITED
Certificate # 3939.01

FCC TEST REPORT

(Part 15, Subpart C)

Applicant:	ENTEL PCS Telecomun s.a
Address:	Avenida Costanera Sur 2760, Torre C, Piso 18, las condes. Santiago, Chile

Manufacturer or Supplier:	Shenzhen Tinno Mobile Technology Corp.
Address:	4/F., H-3 Building, OCT Eastern Industrial Park. NO.1 XiangShan East Road., Nan Shan District, Shenzhen, P.R.China.
Product:	Mobile Phone
Brand Name:	ÖWN
Model Name:	FUN 7
FCC ID:	2AO8VFUN7
Date of tests:	Mar. 23, 2018 ~ Apr. 12, 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 <u>COMPLY</u> with the test requirement

Prepared by Yuqiang Yin Engineer / Mobile Department	Approved by Sam Tung Manager / Mobile Department
Date: Apr. 13, 2018	Date: Apr. 13, 2018

This report is 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. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, 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. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification

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
Fax: +86 755 8869 6577
Email: customerservice.dg@cn.bureauveritas.com

TABLE OF CONTENTS

RELEASE CONTROL RECORD 4
1 SUMMARY OF TEST RESULTS 5
1.1 MEASUREMENT UNCERTAINTY 5
2 GENERAL INFORMATION 6
2.1 GENERAL DESCRIPTION OF EUT 6
2.2 DESCRIPTION OF TEST MODES 8
2.2.1 CONFIGURATION OF SYSTEM UNDER TEST 9
2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL 9
2.3 DUTY CYCLE OF TEST SIGNAL 12
2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS 13
2.5 DESCRIPTION OF SUPPORT UNITS 13
3 TEST TYPES AND RESULTS 14
3.1 CONDUCTED EMISSION MEASUREMENT 14
3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT 14
3.1.2 TEST INSTRUMENTS 14
3.1.3 TEST PROCEDURES 15
3.1.4 DEVIATION FROM TEST STANDARD 15
3.1.5 TEST SETUP 16
3.1.6 EUT OPERATING CONDITIONS 16
3.1.7 TEST RESULTS 17
3.2 RADIATED EMISSION MEASUREMENT 19
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT 19
3.2.2 TEST INSTRUMENTS 20
3.2.3 TEST PROCEDURES 21
3.2.4 DEVIATION FROM TEST STANDARD 21
3.2.5 TEST SETUP 22
3.2.6 EUT OPERATING CONDITIONS 23
3.2.7 TEST RESULTS 24
3.3 6 DB BANDWIDTH MEASUREMENT 43
3.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT 43
3.3.2 TEST INSTRUMENTS 43
3.3.3 TEST PROCEDURE 43
3.3.4 DEVIATION FROM TEST STANDARD 44
3.3.5 TEST SETUP 44

3.3.6 EUT OPERATING CONDITIONS 44
3.3.7 TEST RESULTS 45
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) 53
3.5 POWER SPECTRAL DENSITY MEASUREMENT 55
3.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT 55
3.5.2 TEST SETUP 55
3.5.3 TEST INSTRUMENTS 55
3.5.4 TEST PROCEDURE 55
3.5.5 DEVIATION FROM TEST STANDARD 55
3.5.6 EUT OPERATING CONDITION 55
3.5.7 TEST RESULTS 56
3.6 OUT OF BAND EMISSION MEASUREMENT 61
3.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT 61
3.6.2 TEST SETUP 61
3.6.3 TEST INSTRUMENTS 61
3.6.4 TEST PROCEDURE 61
3.6.5 DEVIATION FROM TEST STANDARD 62
3.6.6 EUT OPERATING CONDITION 62
3.6.7 TEST RESULTS 62
4 PHOTOGRAPHS OF THE TEST CONFIGURATION 73
5 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 74

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF180323W002-2	Original release	Apr. 13, 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 -9.37dB at 3.286000MHz.
15.205 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.35dB 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 ETSI TR 100 028-2001:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.66dB
Radiated emissions	9KHz ~ 30MHz	2.68dB
	30MHz ~ 1GMHz	3.26dB
	1GHz ~ 18GHz	4.48dB
	18GHz ~ 40GHz	4.12dB

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	Mobile Phone
BRAND NAME	ÖWN
MODEL NAME	FUN 7
NOMINAL VOLTAGE	5Vdc (adapter or host equipment) 3.8Vdc (Li-ion, battery)
MODULATION TECHNOLOGY	DSSS, OFDM, DTS
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM BT-LE(GFSK) for DTS
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 BT_LE: 1 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40) 2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	WLAN: 96.61mW (Maximum) BT-LE: 0.94mW (Maximum)
ANTENNA TYPE	FPC Antenna with 1.6dBi gain
HW VERSION	V1.0
SW VERSION	OWN _FUN _7_8.1_01
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB cable: non-shielded, detachable, 1.0meter Earphone cable: non-shielded, detachable, 1.2meter

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
802.11n (40MHz)	1TX /1RX
BT_LE	1TX /1RX

3. The EUT was powered by the following adapters:

ADAPTER 1	
BRAND:	öwn
MODEL:	TN-050155E1
INPUT:	AC 100-240V, 250mA
OUTPUT:	DC 5V, 1550mA

ADAPTER 2	
BRAND:	öwn
MODEL:	TN-050155U2
INPUT:	AC 100-240V, 250mA
OUTPUT:	DC 5V, 1550mA

4. The EUT matched the following USB cable and earphone:

USB CABLE	
BRAND:	N/A
MODEL:	N/A
SIGNAL LINE:	1.0 METER

EARPHONE	
BRAND:	N/A
MODEL:	HF-B1070-B
SIGNAL LINE:	1.2 METER

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		

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 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)
802.11n HT40	3 to 9	9	OFDM	BPSK	13.5
BT-LE	0 to 39	39	DTS	GFSK	1.0

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
BT-LE	0 to 39	0,19, 39	DTS	GFSK	1.0

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).

☒ 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)
802.11n HT40	3 to 9	9	OFDM	BPSK	13.5

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
BT-LE	BT-LE	0, 39	DTS	GFSK	1

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
BT-LE	0 to 39	0, 19, 39	DTS	GFSK	1

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	22deg. C, 54%RH	DC 5V from adaptor	Star Le
RE≥1G	22deg. C, 54%RH	DC 5V from adaptor	Star Le
PLC	24deg. C, 55%RH	DC 5V from adaptor	Alex Chen
APCM	25deg. C, 60%RH	3.8Vdc from battery	Wenliang Wu

2.3 Duty Cycle of Test Signal

WIFI 2.4GHz

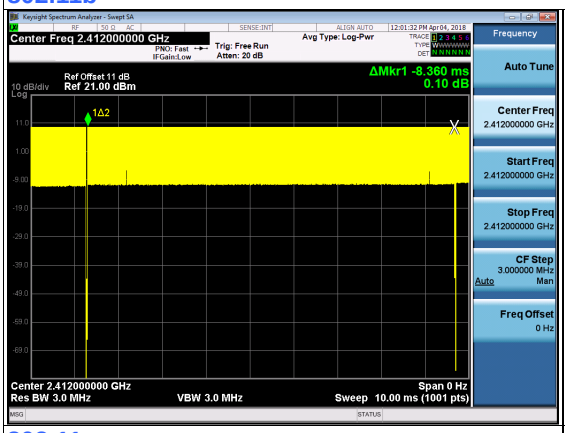
802.11b: Duty cycle = 8.360/8.400 = 0.995 > 98%, Duty factor is not required.

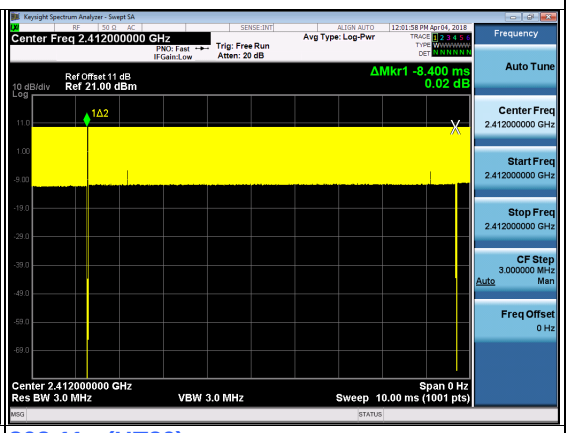
802.11g: Duty cycle = 1.388/1.447 = 0.959 < 98%, Duty factor = 10 * log(1/0.959) = 0.181

802.11n (HT20): Duty cycle = 1.298/1.337 = 0.971 < 98%, Duty factor = 10 * log(1/0.971) = 0.129

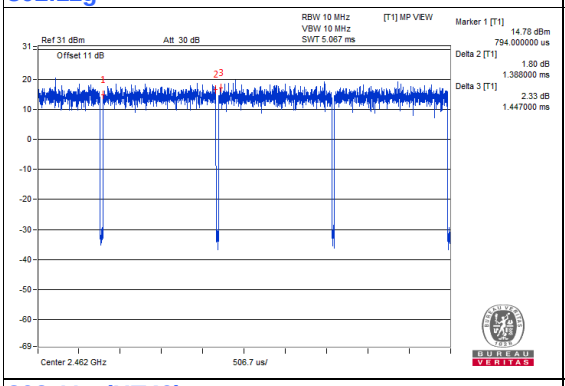
802.11n (HT40): Duty cycle = 0.648/0.686 = 0.945 < 98%, Duty factor = 10 * log(1/0.945) = 0.247

802.11b

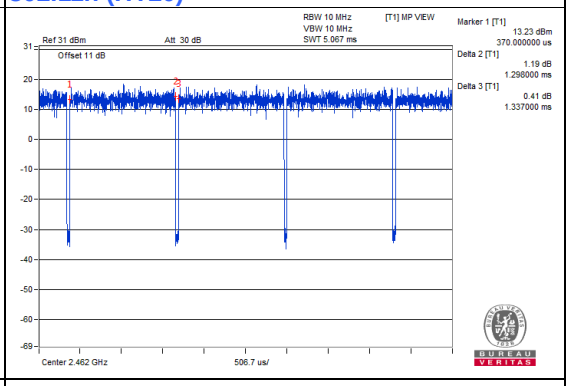




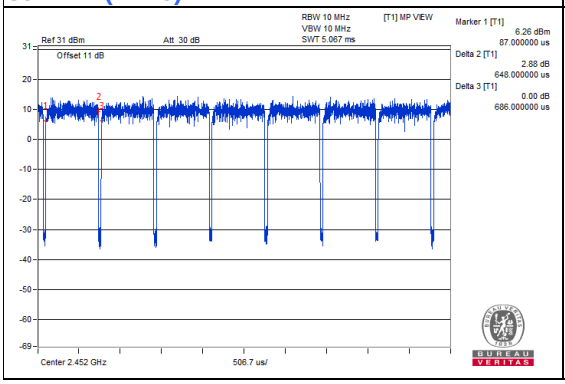
802.11g



802.11n (HT20)



802.11n (HT40)



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 v04

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 (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	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	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	Jun. 28,17	Jun. 27,18
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Sep. 18,17	Sep. 17,18

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.

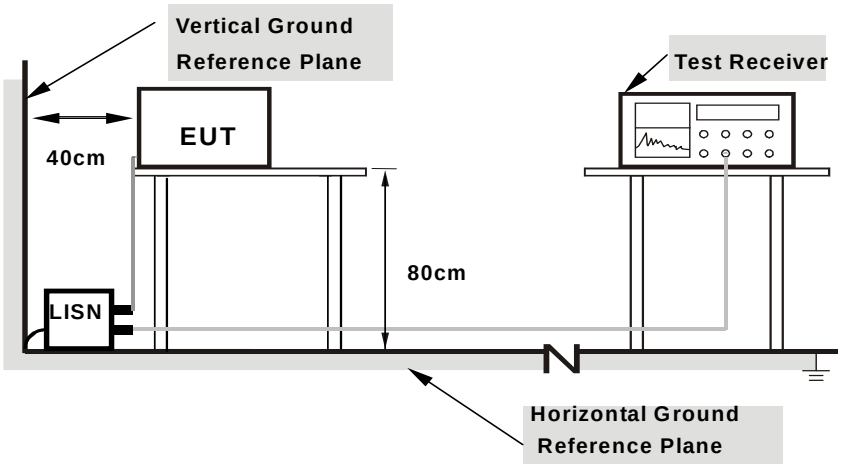
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

a. Turned on the power and connected of 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

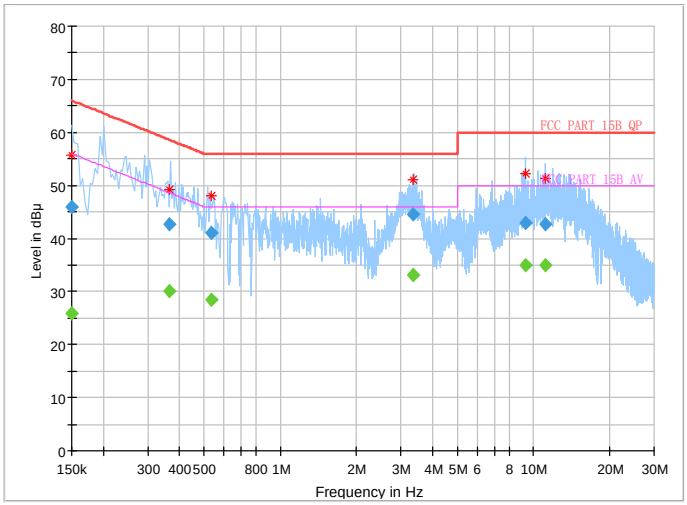
CONDUCTED WORST-CASE DATA:

Frequency Range	150KHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	24deg. C, 55RH
Tested By	Alex Chen	**TEST DATE**	2018/04/03

Frequency (MHz)	QuasiPeak (dB¦ÌV)	CAverage (dB¦ÌV)	Limit (dB¦ÌV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	25.88	56.00	-30.12	L1	ON	9.6
0.150000	45.99	---	66.00	-20.01	L1	ON	9.6
0.364000	---	29.98	48.64	-18.66	L1	ON	9.7
0.364000	42.61	---	58.64	-16.03	L1	ON	9.7
0.532000	---	28.53	46.00	-17.47	L1	ON	9.7
0.532000	40.95	---	56.00	-15.05	L1	ON	9.7
3.364000	---	33.21	46.00	-12.79	L1	ON	9.7
3.364000	44.58	---	56.00	-11.42	L1	ON	9.7
9.284000	---	35.03	50.00	-14.97	L1	ON	9.9
9.284000	42.85	---	60.00	-17.15	L1	ON	9.9
11.128000	---	34.93	50.00	-15.07	L1	ON	9.9
11.128000	42.75	---	60.00	-17.25	L1	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 = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

Full Spectrum

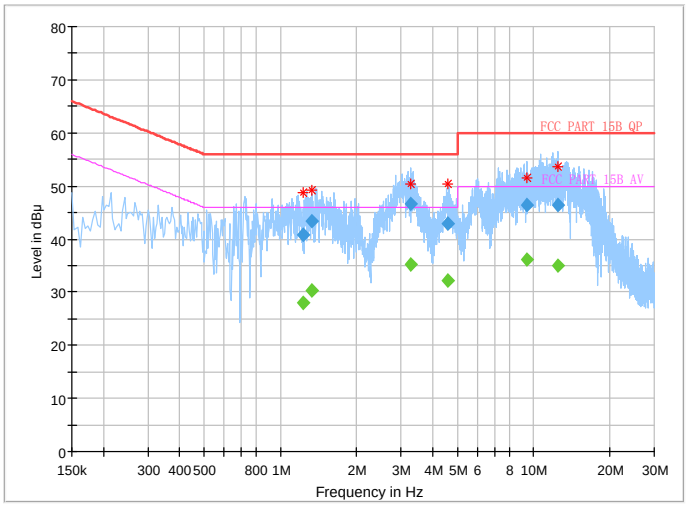


Frequency Range	150KHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	24deg. C, 55RH
Tested By	Alex Chen	**TEST DATE**	2018/03/20

Frequency (MHz)	QuasiPeak (dB¦ÌV)	CAverage (dB¦ÌV)	Limit (dB¦ÌV)	Margin (dB)	Line	Filter	Corr. (dB)
1.232000	---	27.93	46.00	-18.07	N	ON	9.9
1.232000	40.89	---	56.00	-15.11	N	ON	9.9
1.336000	---	30.26	46.00	-15.74	N	ON	9.9
1.336000	43.42	---	56.00	-12.58	N	ON	9.9
3.286000	---	35.14	46.00	-10.86	N	ON	9.8
3.286000	**46.63**	**---**	**56.00**	**-9.37**	**N**	**ON**	**9.8**
4.564000	---	32.13	46.00	-13.87	N	ON	9.8
4.564000	42.81	---	56.00	-13.19	N	ON	9.8
9.416000	---	36.07	50.00	-13.93	N	ON	9.9
9.416000	46.43	---	60.00	-13.57	N	ON	9.9
12.472000	---	35.02	50.00	-14.98	N	ON	9.9
12.472000	46.32	---	60.00	-13.68	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 = 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	May 06,17	May 05,18
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Nov. 26,16	Nov. 25,18
Horn Antenna	ETS-LINDGREN	3117	00168728	Nov. 26,16	Nov. 25,18
Loop antenna	Daze	ZN30900A	0708	Nov. 20,17	Nov. 19,18
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Dec. 16,16	Dec. 15,18
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. 24,17	Jul. 23,18
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 16,18	Mar. 15,19
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jul. 24,17	Jul. 23,18
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jul. 24,17	Jul. 23,18
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Jul. 24,17	Jul. 23,18

NOTE: 1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Chamber.

3. The FCC Site Registration No. is 525120.

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:

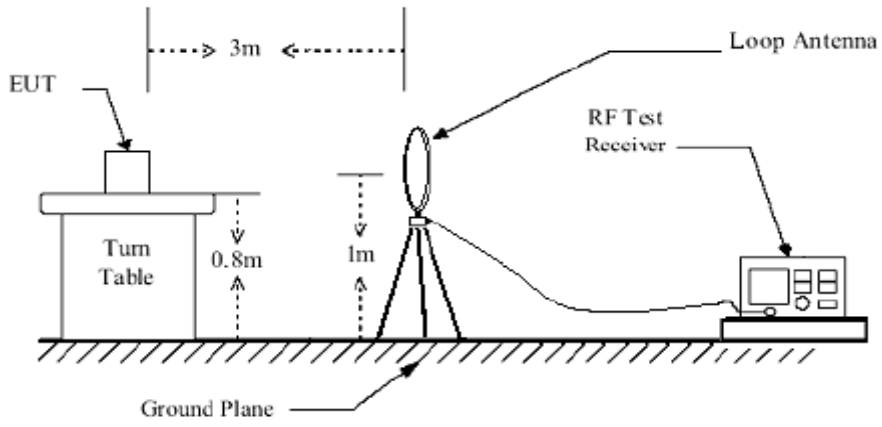
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 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

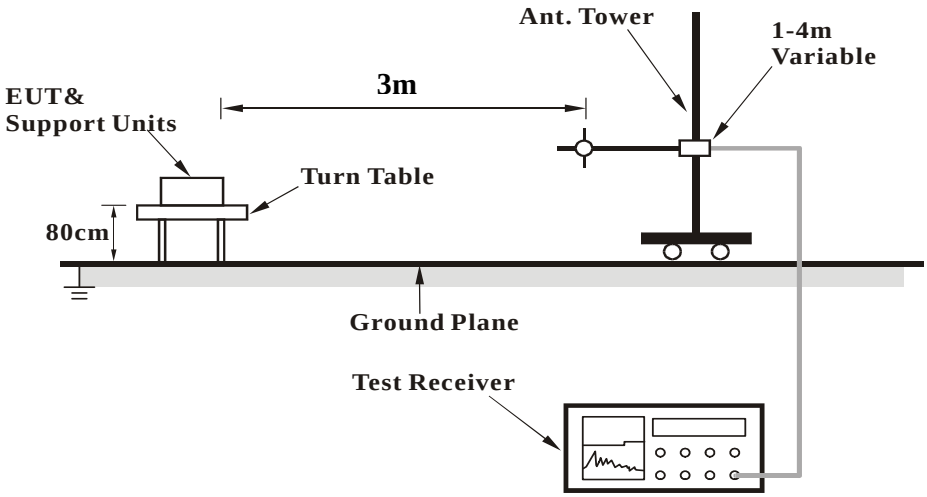
No deviation

3.2.5 TEST SETUP

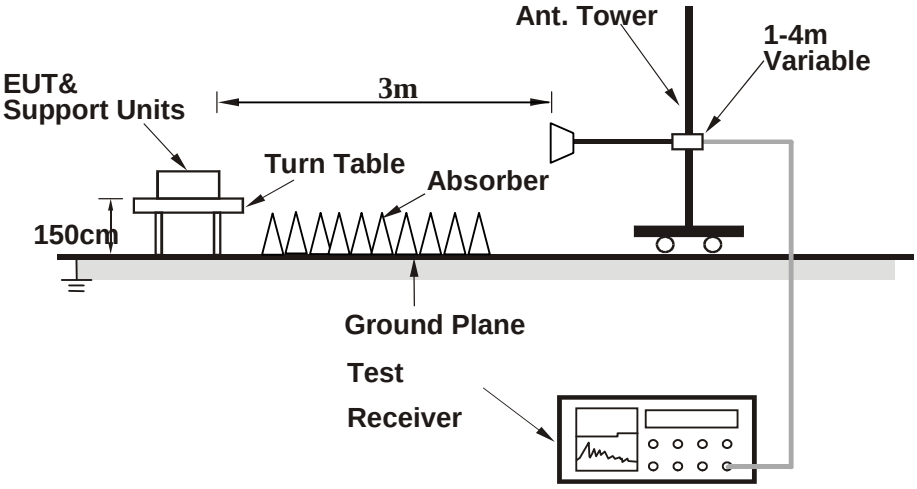
< Frequency Range below 30MHz >



< 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

a. Set the EUT under full load condition and placed them 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

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:

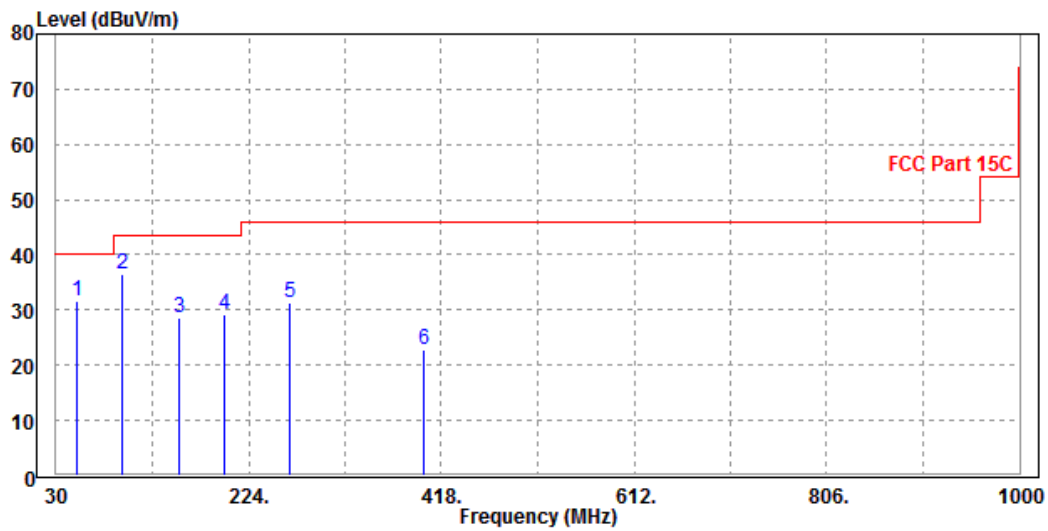
802.11n (40MHz)

CHANNEL	TX Channel 9	**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
50.37	31.56	61.37	40	-8.44	6.5	1.07	37.38	182	59	QP
96.93	36.45	64.28	43.5	-7.05	7.66	1.52	37.01	182	59	QP
154.16	28.6	53.85	43.5	-14.9	9.62	1.9	36.77	182	59	QP
198.78	29.28	53.58	43.5	-14.22	10.09	2.16	36.55	182	59	QP
264.74	31.21	52.61	46	-14.79	12.58	2.53	36.51	182	59	QP
400.54	22.68	39.04	46	-23.32	17.21	3.15	36.72	182	59	QP

REMARKS:

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

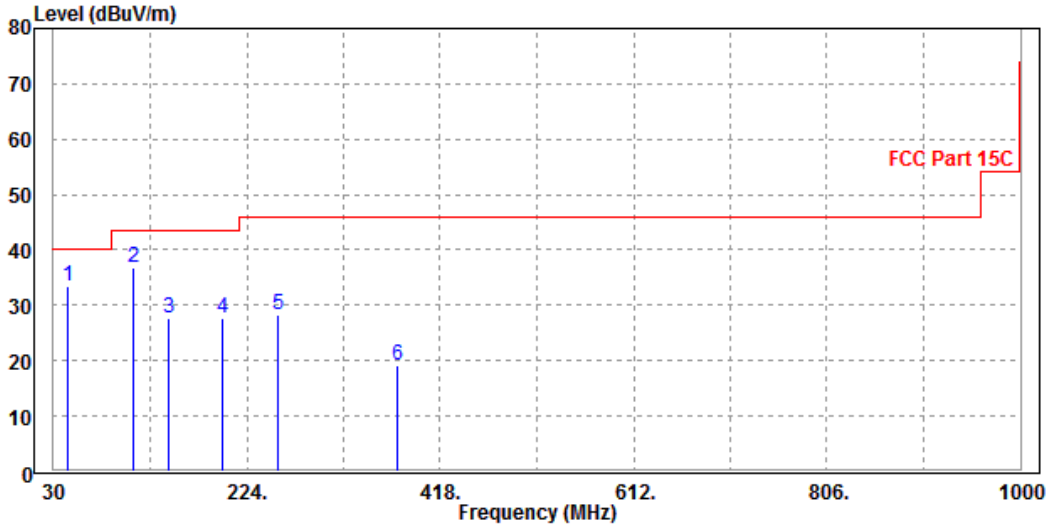


CHANNEL	TX Channel 9	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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
43.58	33.53	61.11	40	-6.47	8.88	0.99	37.45	182	59	QP
110.51	36.93	64.65	43.5	-6.57	7.63	1.61	36.96	182	59	QP
146.4	27.59	53.77	43.5	-15.91	8.77	1.86	36.81	182	59	QP
198.78	27.74	52.04	43.5	-15.76	10.09	2.16	36.55	182	59	QP
256.01	28.19	49.76	46	-17.81	12.47	2.48	36.52	182	59	QP
374.35	19.26	36.76	46	-26.74	16.12	3.04	36.66	182	59	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	45.94	51.42	54	-8.06	32.29	8.15	45.92	183	324	Average
2390	56.82	62.3	74	-17.18	32.29	8.15	45.92	183	324	Peak
2412	90.1	95.51			32.31	8.19	45.91	183	324	Average
2412	99.98	105.39			32.31	8.19	45.91	183	324	Peak
2483.5	40.1	45.29	54	-13.9	32.38	8.32	45.89	183	324	Average
2483.5	51.36	56.55	74	-22.64	32.38	8.32	45.89	183	324	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	44.73	50.21	54	-9.27	32.29	8.15	45.92	100	19	Average
2390	57.61	63.09	74	-16.39	32.29	8.15	45.92	100	19	Peak
2412	87.65	93.06			32.31	8.19	45.91	100	19	Average
2412	96.99	102.4			32.31	8.19	45.91	100	19	Peak
2483.5	41.28	46.47	54	-12.72	32.38	8.32	45.89	100	19	Average
2483.5	51.73	56.92	74	-22.27	32.38	8.32	45.89	100	19	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	43.65	49.13	54	-10.35	32.29	8.15	45.92	179	324	Average
2390	55.07	60.55	74	-18.93	32.29	8.15	45.92	179	324	Peak
2437	89.73	95.06			32.34	8.24	45.91	179	324	Average
2437	99.2	104.53			32.34	8.24	45.91	179	324	Peak
2483.5	39.03	44.22	54	-14.97	32.38	8.32	45.89	179	324	Average
2483.5	53.04	58.23	74	-20.96	32.38	8.32	45.89	179	324	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	44.54	50.02	54	-9.46	32.29	8.15	45.92	100	22	Average
2390	56.62	62.1	74	-17.38	32.29	8.15	45.92	100	22	Peak
2437	87.85	93.18			32.34	8.24	45.91	100	22	Average
2437	96.12	101.45			32.34	8.24	45.91	100	22	Peak
2483.5	38.98	44.17	54	-15.02	32.38	8.32	45.89	100	22	Average
2483.5	53.68	58.87	74	-20.32	32.38	8.32	45.89	100	22	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	46.71	52.19	54	-7.29	32.29	8.15	45.92	58	148	Average
2390	58.08	63.56	74	-15.92	32.29	8.15	45.92	58	148	Peak
2462	90.88	96.14			32.36	8.28	45.9	58	148	Average
2462	100.06	105.32			32.36	8.28	45.9	58	148	Peak
2483.5	40	45.19	54	-14	32.38	8.32	45.89	58	148	Average
2483.5	51.4	56.59	74	-22.6	32.38	8.32	45.89	58	148	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	44.65	50.13	54	-9.35	32.29	8.15	45.92	100	25	Average
2390	57.99	63.47	74	-16.01	32.29	8.15	45.92	100	25	Peak
2462	88.8	94.06			32.36	8.28	45.9	100	25	Average
2462	94.9	100.16			32.36	8.28	45.9	100	25	Peak
2483.5	41.19	46.38	54	-12.81	32.38	8.32	45.89	100	25	Average
2483.5	50.37	55.56	74	-23.63	32.38	8.32	45.89	100	25	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	45.86	51.34	54	-8.14	32.29	8.15	45.92	183	324	Average
2390	58.07	63.55	74	-15.93	32.29	8.15	45.92	183	324	Peak
2412	92.39	97.8			32.31	8.19	45.91	183	324	Average
2412	101.32	106.73			32.31	8.19	45.91	183	324	Peak
2483.5	39.9	45.09	54	-14.1	32.38	8.32	45.89	183	324	Average
2483.5	52.32	57.51	74	-21.68	32.38	8.32	45.89	183	324	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	44.07	49.55	54	-9.93	32.29	8.15	45.92	100	28	Average
2390	55.74	61.22	74	-18.26	32.29	8.15	45.92	100	28	Peak
2412	88.96	94.37			32.31	8.19	45.91	100	28	Average
2412	98.71	104.12			32.31	8.19	45.91	100	28	QP
2483.5	40.07	45.26	54	-13.93	32.38	8.32	45.89	100	28	Average
2483.5	52.57	57.76	74	-21.43	32.38	8.32	45.89	100	28	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	44.88	50.36	54	-9.12	32.29	8.15	45.92	180	324	Average
2390	58.52	64	74	-15.48	32.29	8.15	45.92	180	324	Peak
2437	91.13	96.46			32.34	8.24	45.91	180	324	Average
2437	98	103.33			32.34	8.24	45.91	180	324	Peak
2483.5	38.84	44.03	54	-15.16	32.38	8.32	45.89	180	324	Average
2483.5	51.06	56.25	74	-22.94	32.38	8.32	45.89	180	324	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	46.5	51.98	54	-7.5	32.29	8.15	45.92	100	28	Average
2390	57.3	62.78	74	-16.7	32.29	8.15	45.92	100	28	Peak
2437	88.19	93.52			32.34	8.24	45.91	100	28	Average
2437	97.08	102.41			32.34	8.24	45.91	100	28	Peak
2483.5	40.22	45.41	54	-13.78	32.38	8.32	45.89	100	28	Average
2483.5	52.98	58.17	74	-21.02	32.38	8.32	45.89	100	28	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	44.87	50.35	54	-9.13	32.29	8.15	45.92	148	59	Average
2390	56.88	62.36	74	-17.12	32.29	8.15	45.92	148	59	Peak
2462	90.2	95.46			32.36	8.28	45.9	148	59	Average
2462	99.93	105.19			32.36	8.28	45.9	148	59	Peak
2483.5	40.09	45.28	54	-13.91	32.38	8.32	45.89	148	59	Average
2483.5	51.62	56.81	74	-22.38	32.38	8.32	45.89	148	59	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	45.06	50.54	54	-8.94	32.29	8.15	45.92	100	28	Average
2390	57.98	63.46	74	-16.02	32.29	8.15	45.92	100	28	Peak
2462	87.15	92.41			32.36	8.28	45.9	100	28	Average
2462	97.95	103.21			32.36	8.28	45.9	100	28	Peak
2483.5	40.77	45.96	54	-13.23	32.38	8.32	45.89	100	28	Average
2483.5	51.01	56.2	74	-22.99	32.38	8.32	45.89	100	28	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	47.57	53.05	54	-6.43	32.29	8.15	45.92	223	324	Average
2390	58.77	64.25	74	-15.23	32.29	8.15	45.92	223	324	Peak
2412	88.22	93.63			32.31	8.19	45.91	223	324	Average
2412	99.39	104.8			32.31	8.19	45.91	223	324	Peak
2483.5	42.36	47.55	54	-11.64	32.38	8.32	45.89	223	324	Average
2483.5	54.35	59.54	74	-19.65	32.38	8.32	45.89	223	324	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	44.15	49.05	54	-9.85	32.87	8.15	45.92	223	324	Average
2390	59.35	64.25	74	-14.65	32.87	8.15	45.92	223	324	Peak
2412	89.8	94.63			32.89	8.19	45.91	223	324	Average
2412	97.97	102.8			32.89	8.19	45.91	223	324	Peak
2483.5	40.95	45.54	54	-13.05	32.98	8.32	45.89	223	324	Average
2483.5	52.95	57.54	74	-21.05	32.98	8.32	45.89	223	324	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	45.82	51.3	54	-8.18	32.29	8.15	45.92	180	324	Average
2390	58.05	63.53	74	-15.95	32.29	8.15	45.92	180	324	Peak
2437	93.46	98.79			32.34	8.24	45.91	180	324	Average
2437	100.64	105.97			32.34	8.24	45.91	180	324	Peak
2483.5	43.91	49.1	54	-10.09	32.38	8.32	45.89	180	324	Average
2483.5	54.6	59.79	74	-19.4	32.38	8.32	45.89	180	324	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	51.24	54	-8.24	32.29	8.15	45.92	100	28	Average
2390	61.44	66.92	74	-12.56	32.29	8.15	45.92	100	28	Peak
2437	88.76	94.09			32.34	8.24	45.91	100	28	Average
2437	99.05	104.38			32.34	8.24	45.91	100	28	Peak
2483.5	43.43	48.62	54	-10.57	32.38	8.32	45.89	100	28	Average
2483.5	58.75	63.94	74	-15.25	32.38	8.32	45.89	100	28	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	43.78	49.26	54	-10.22	32.29	8.15	45.92	150	59	Average
2390	57.8	63.28	74	-16.2	32.29	8.15	45.92	150	59	Peak
2462	87.35	92.61			32.36	8.28	45.9	150	59	Average
2462	100.16	105.42			32.36	8.28	45.9	150	59	Peak
2483.5	43.99	49.18	54	-10.01	32.38	8.32	45.89	150	59	Average
2483.5	56.77	61.96	74	-17.23	32.38	8.32	45.89	150	59	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	52.17	54	-7.31	32.29	8.15	45.92	100	28	Average
2390	59.49	64.97	74	-14.51	32.29	8.15	45.92	100	28	Peak
2462	87.44	92.7			32.36	8.28	45.9	100	28	Average
2462	99.51	104.77			32.36	8.28	45.9	100	28	Peak
2483.5	45.12	50.31	54	-8.88	32.38	8.32	45.89	100	28	Average
2483.5	59.57	64.76	74	-14.43	32.38	8.32	45.89	100	28	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	50.67	56.15	54	-3.33	32.29	8.15	45.92	134	58	Average
2390	65.25	70.73	74	-8.75	32.29	8.15	45.92	134	58	Peak
2422	89.31	94.69			32.32	8.21	45.91	134	58	Average
2422	99.98	105.36			32.32	8.21	45.91	134	58	Peak
2483.5	44.58	49.77	54	-9.42	32.38	8.32	45.89	134	58	Average
2483.5	60.96	66.15	74	-13.04	32.38	8.32	45.89	134	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	46.25	51.15	54	-7.75	32.87	8.15	45.92	134	58	Average
2390	63.83	68.73	74	-10.17	32.87	8.15	45.92	134	58	Peak
2422	89.9	94.69			32.91	8.21	45.91	134	58	Average
2422	99.57	104.36			32.91	8.21	45.91	134	58	Peak
2483.5	42.18	46.77	54	-11.82	32.98	8.32	45.89	134	58	Average
2483.5	55.55	60.14	74	-18.45	32.98	8.32	45.89	134	58	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	48.96	54.44	54	-5.04	32.29	8.15	45.92	185	58	Average
2390	62.5	67.98	74	-11.5	32.29	8.15	45.92	185	58	Peak
2437	89.64	94.97			32.34	8.24	45.91	185	58	Average
2437	100.85	106.18			32.34	8.24	45.91	185	58	Peak
2483.5	40.61	45.8	54	-13.39	32.38	8.32	45.89	185	58	Average
2483.5	52.8	57.99	74	-21.2	32.38	8.32	45.89	185	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	50.4	55.88	54	-3.6	32.29	8.15	45.92	100	28	Average
2390	68.22	73.7	74	-5.78	32.29	8.15	45.92	100	28	Peak
2437	90.65	95.98			32.34	8.24	45.91	100	28	Average
2437	104.18	109.51			32.34	8.24	45.91	100	28	Peak
2483.5	44.98	50.17	54	-9.02	32.38	8.32	45.89	100	28	Average
2483.5	59.45	64.64	74	-14.55	32.38	8.32	45.89	100	28	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	50.67	56.15	54	-3.33	32.29	8.15	45.92	148	58	Average
2390	69.36	74.84	74	-4.64	32.29	8.15	45.92	148	58	Peak
2452	88.86	94.15			32.35	8.26	45.9	148	58	Average
2452	98.46	103.75			32.35	8.26	45.9	148	58	Peak
2483.5	44.63	49.82	54	-9.37	32.38	8.32	45.89	148	58	Average
2483.5	62.8	67.99	74	-11.2	32.38	8.32	45.89	148	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	**51.65**	**57.13**	**54**	**-2.35**	**32.29**	**8.15**	**45.92**	**100**	**28**	**Average**
2390	66.69	72.17	74	-7.31	32.29	8.15	45.92	100	28	Peak
2452	94.84	100.13			32.35	8.26	45.9	100	28	Average
2452	104.44	109.73			32.35	8.26	45.9	100	28	Peak
2483.5	46.05	51.24	54	-7.95	32.38	8.32	45.89	100	28	Average
2483.5	59.77	64.96	74	-14.23	32.38	8.32	45.89	100	28	Peak

REMARKS:

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

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:

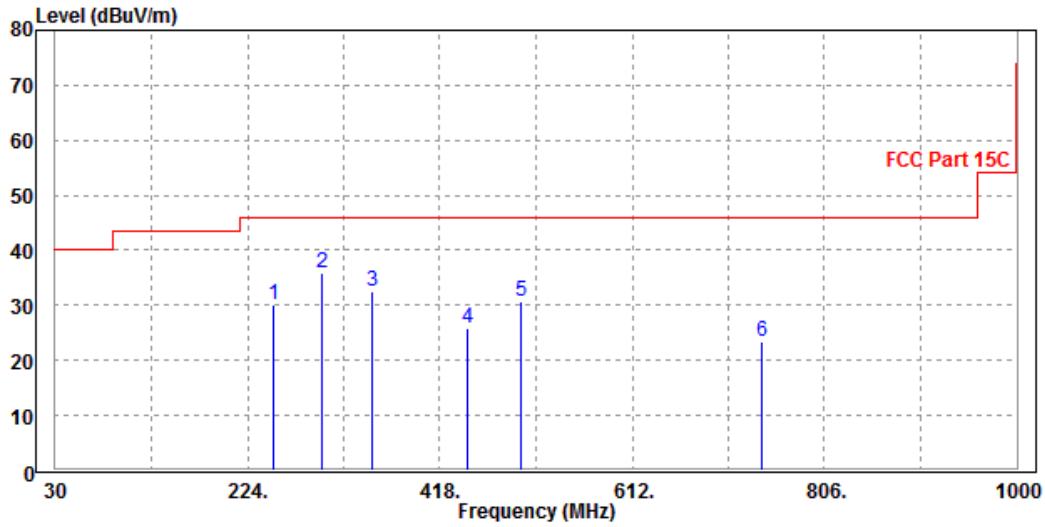
BT-LE (GFSK)

CHANNEL	TX Channel 39	**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
250.19	30.26	51.93	46	-15.74	12.4	2.45	36.52	200	0	QP
299.66	35.9	56.68	46	-10.1	13	2.72	36.5	200	0	QP
350.1	32.66	51.23	46	-13.34	15.1	2.94	36.61	200	0	QP
445.16	25.72	41.52	46	-20.28	17.74	3.29	36.83	200	0	QP
500.45	30.74	45.83	46	-15.26	18.41	3.46	36.96	200	0	QP
742.95	23.3	33.26	46	-22.7	23.06	4.45	37.47	200	0	QP

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.
4. Margin value = Emission Level – Limit value

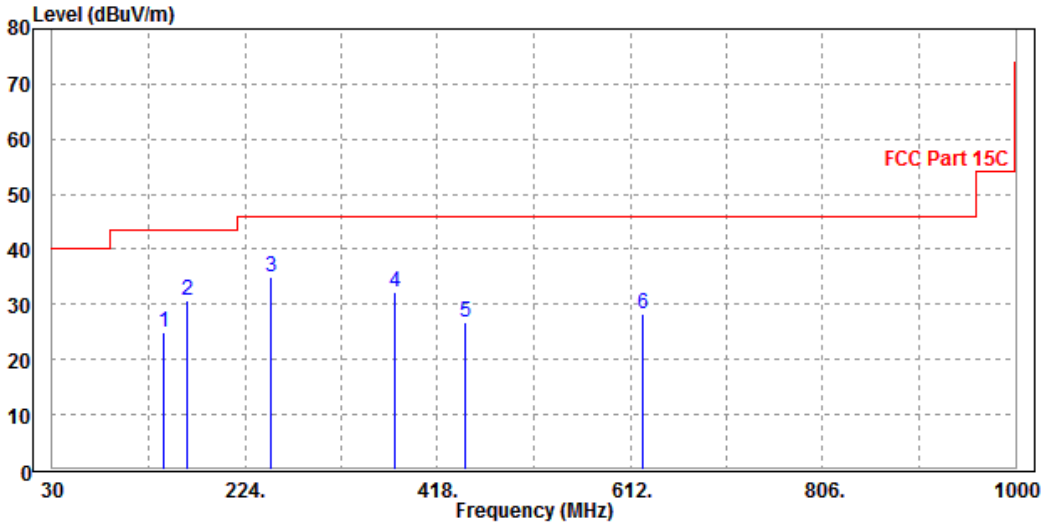


CHANNEL	TX Channel 39	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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
141.55	24.9	51.71	43.5	-18.6	8.19	1.83	36.83	100	0	QP
165.8	30.76	55.41	43.5	-12.74	10.11	1.97	36.73	100	0	QP
250.19	35.04	56.71	46	-10.96	12.4	2.45	36.52	100	0	QP
375.32	32.31	49.78	46	-13.69	16.16	3.04	36.67	100	0	QP
445.16	26.78	42.58	46	-19.22	17.74	3.29	36.83	100	0	QP
624.61	28.27	40.48	46	-17.73	20.99	4.08	37.28	100	0	QP

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.
4. Margin value = Emission Level – Limit value



ABOVE 1GHz TEST DATA:

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

BT-LE (GFSK)

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

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	35.35	40.25	54	-18.65	32.87	8.15	45.92	200	159	Average
2390	47.66	52.56	74	-26.34	32.87	8.15	45.92	200	159	Peak
2402	89.35	94.22			32.88	8.17	45.92	200	159	Average
2402	96.46	101.33			32.88	8.17	45.92	200	159	Peak
2483.5	35.69	40.28	54	-18.31	32.98	8.32	45.89	200	159	Average
2483.5	48.16	52.75	74	-25.84	32.98	8.32	45.89	200	159	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	35.75	41.23	54	-18.25	32.29	8.15	45.92	100	295	Average
2390	47.88	53.36	74	-26.12	32.29	8.15	45.92	100	295	Peak
2402	87.45	92.9			32.3	8.17	45.92	100	295	Average
2402	96.12	101.57			32.3	8.17	45.92	100	295	Peak
2483.5	35.63	40.82	54	-18.37	32.38	8.32	45.89	100	295	Average
2483.5	48.6	53.79	74	-25.4	32.38	8.32	45.89	100	295	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
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										
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	36.26	41.16	54	-17.74	32.87	8.15	45.92	100	305	Average
2390	49.59	54.49	74	-24.41	32.87	8.15	45.92	100	305	Peak
2440	88.52	93.26			32.93	8.24	45.91	100	305	Average
2440	95.94	100.68			32.93	8.24	45.91	100	305	Peak
2483.5	35.72	40.31	54	-18.28	32.98	8.32	45.89	100	305	Average
2483.5	48.79	53.38	74	-25.21	32.98	8.32	45.89	100	305	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	35.48	40.96	54	-18.52	32.29	8.15	45.92	100	265	Average
2390	47.83	53.31	74	-26.17	32.29	8.15	45.92	100	265	Peak
2440	88.39	93.72			32.34	8.24	45.91	100	265	Average
2440	96.32	101.65			32.34	8.24	45.91	100	265	Peak
2483.5	36.16	41.35	54	-17.84	32.38	8.32	45.89	100	265	Average
2483.5	49.39	54.58	74	-24.61	32.38	8.32	45.89	100	265	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
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										
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	35.47	40.37	54	-18.53	32.87	8.15	45.92	100	310	Average
2390	49.53	54.43	74	-24.47	32.87	8.15	45.92	100	310	Peak
2480	88.68	93.29			32.98	8.31	45.9	100	310	Average
2480	96.84	101.45			32.98	8.31	45.9	100	310	Peak
2483.5	36.69	41.28	54	-17.31	32.98	8.32	45.89	100	310	Average
2483.5	50.28	54.87	74	-23.72	32.98	8.32	45.89	100	310	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	35.72	40.62	54	-18.28	32.87	8.15	45.92	100	290	Average
2390	49.69	54.59	74	-24.31	32.87	8.15	45.92	100	290	Peak
2480	88.58	93.19			32.98	8.31	45.9	100	290	Average
2480	96.9	101.51			32.98	8.31	45.9	100	290	Peak
2483.5	36.89	41.48	54	-17.11	32.98	8.32	45.89	100	290	Average
2483.5	49.67	54.26	74	-24.33	32.98	8.32	45.89	100	290	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2480MHz: 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	Mar. 02,18	Mar. 01,19
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510523	Jun. 28,17	Jun. 27,18
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510332	Mar. 16,18	Mar. 15,19
Power Sensor	ANRITSU	MA2411B	1339352	Mar. 16,18	Mar. 15,19

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 RF Oven room.

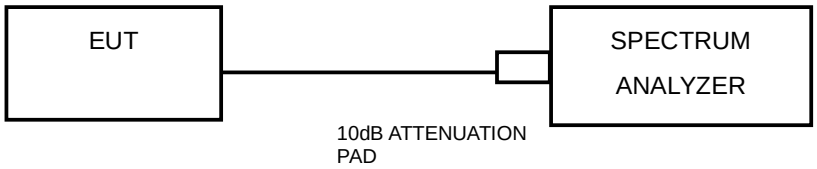
3.3.3 TEST PROCEDURE

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



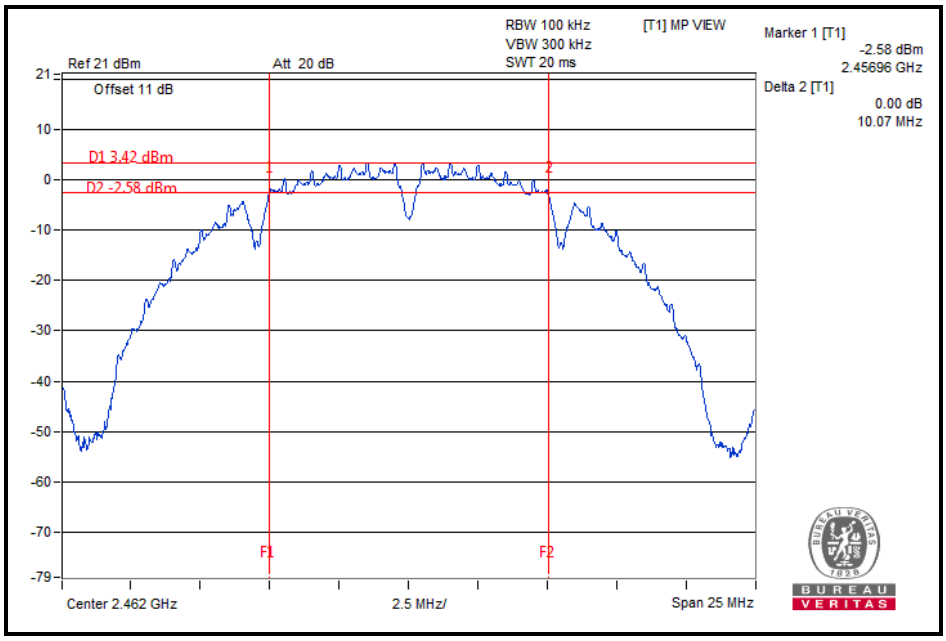
3.3.6 EUT OPERATING CONDITIONS

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

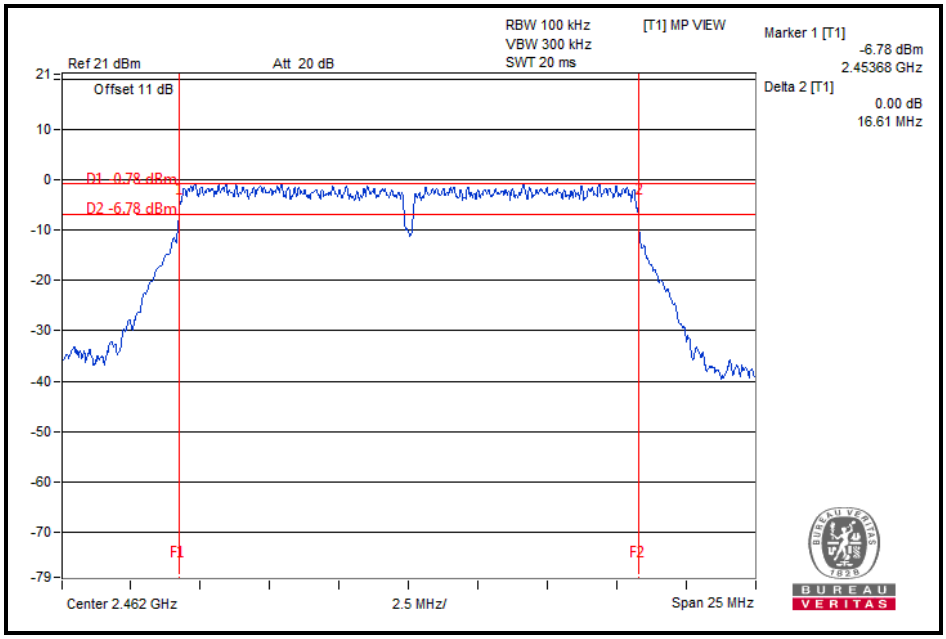
802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.05	0.5	PASS
6	2437	9.60	0.5	PASS
11	2462	10.07	0.5	PASS



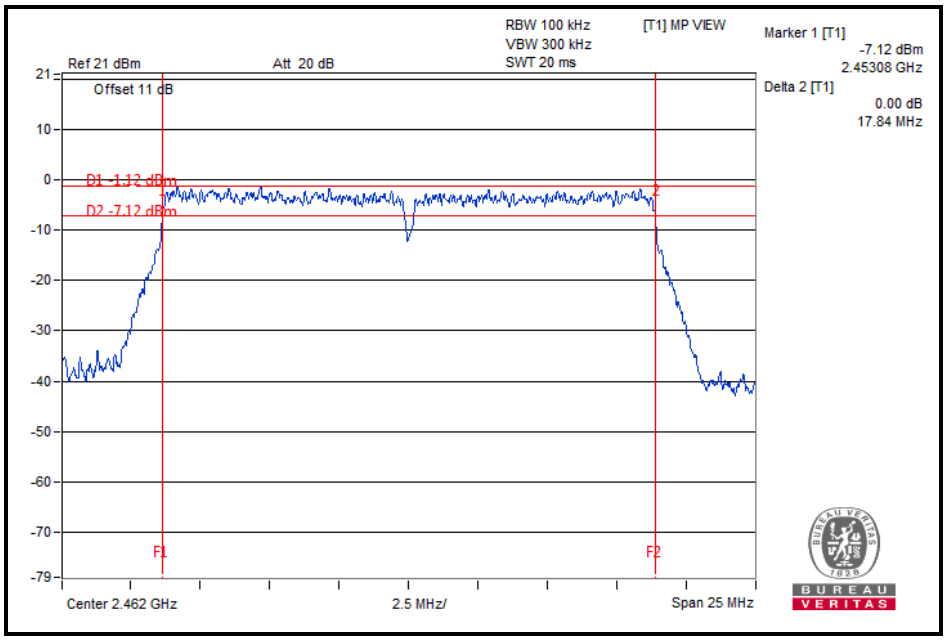
802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.60	0.5	PASS
6	2437	16.50	0.5	PASS
11	2462	16.61	0.5	PASS



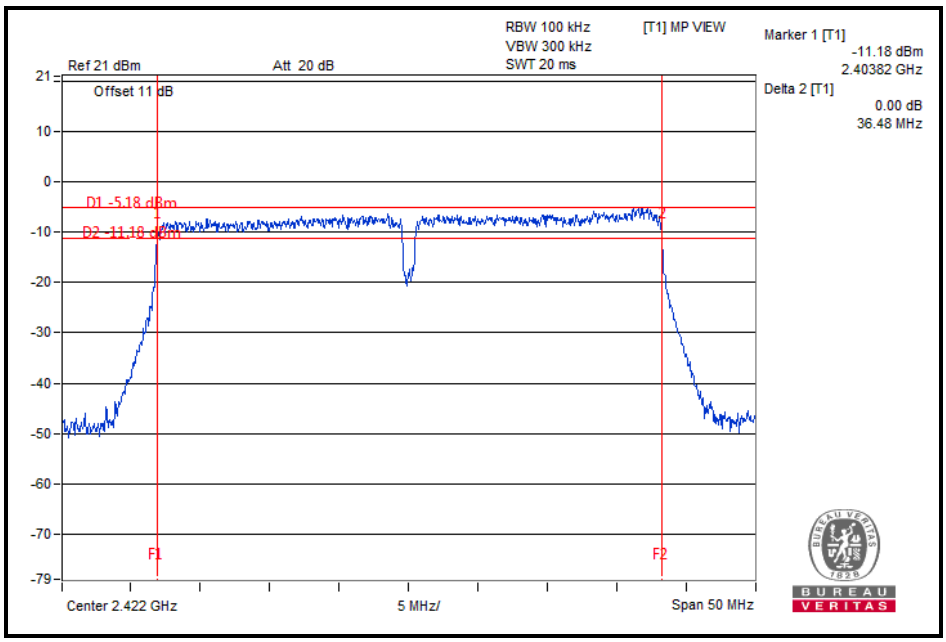
802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.81	0.5	PASS
6	2437	17.74	0.5	PASS
11	2462	11.84	0.5	PASS



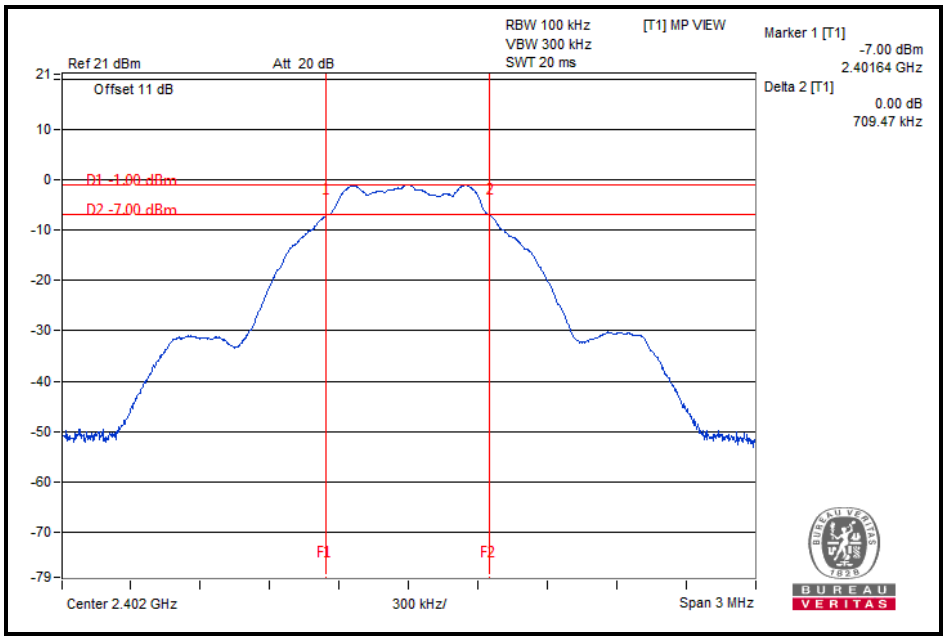
802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.48	0.5	PASS
6	2437	36.40	0.5	PASS
9	2452	36.38	0.5	PASS



BT-LE (GFSK)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	0.71	0.5	PASS
19	2440	0.71	0.5	PASS
39	2480	0.71	0.5	PASS

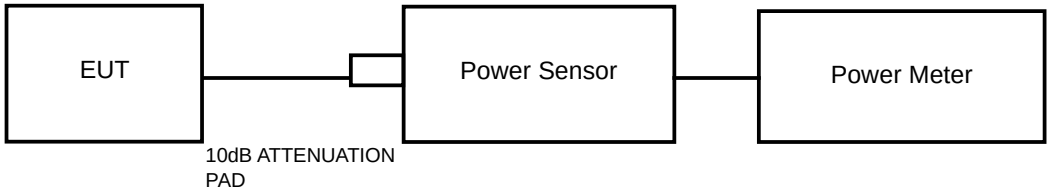


3.4 CONDUCTED OUTPUT POWER

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	15.47	35.24	1	PASS
6	2437	15.37	35.78	1	PASS
11	2462	15.75	37.58	1	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	19.85	**96.61**	1	PASS
6	2437	19.13	81.85	1	PASS
11	2462	18.17	65.61	1	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	18.84	76.56	1	PASS
6	2437	18.30	67.61	1	PASS
11	2462	18.54	71.45	1	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
3	2422	17.44	55.46	1	PASS
6	2437	17.62	57.81	1	PASS
9	2452	17.92	61.94	1	PASS

BT-LE (GFSK)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
0	2402	-1.23	0.75	1	PASS
19	2440	-0.25	**0.94**	1	PASS
39	2480	-1.83	0.66	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	13.56	N/A
6	2437	13.34	N/A
11	2462	13.85	N/A

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	12.34	N/A
6	2437	12.75	N/A
11	2462	12.41	N/A

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	11.57	N/A
6	2437	11.37	N/A
11	2462	11.86	N/A

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
3	2422	10.30	N/A
6	2437	10.92	N/A
9	2452	10.81	N/A

BT-LE (GFSK)

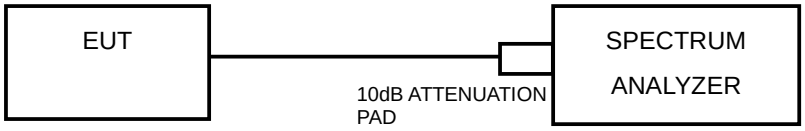
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
0	2402	-1.39	N/A
19	2440	-0.39	N/A
39	2480	-2.04	N/A

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 ≥ 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.

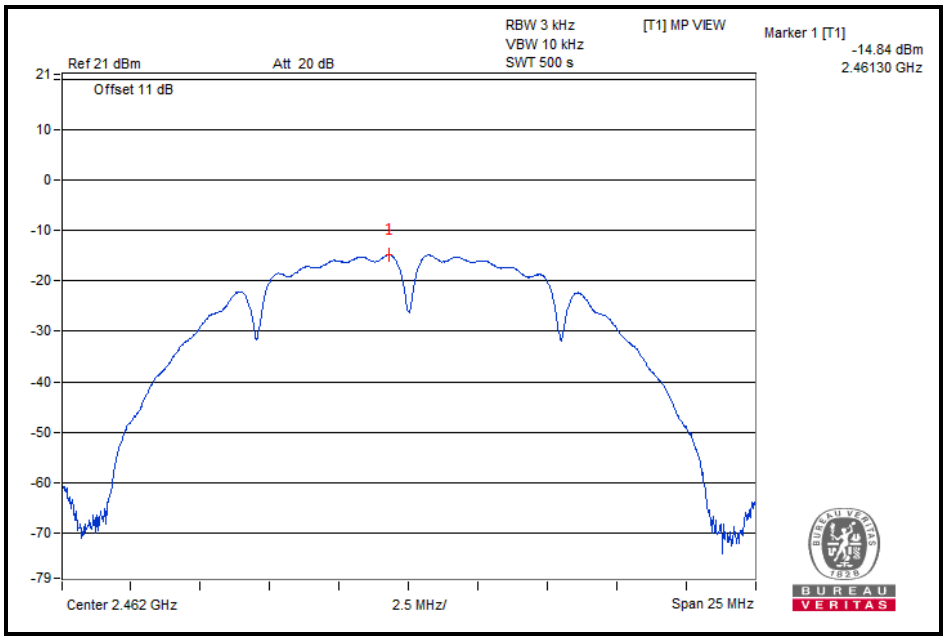
3.5.6 EUT OPERATING CONDITION

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

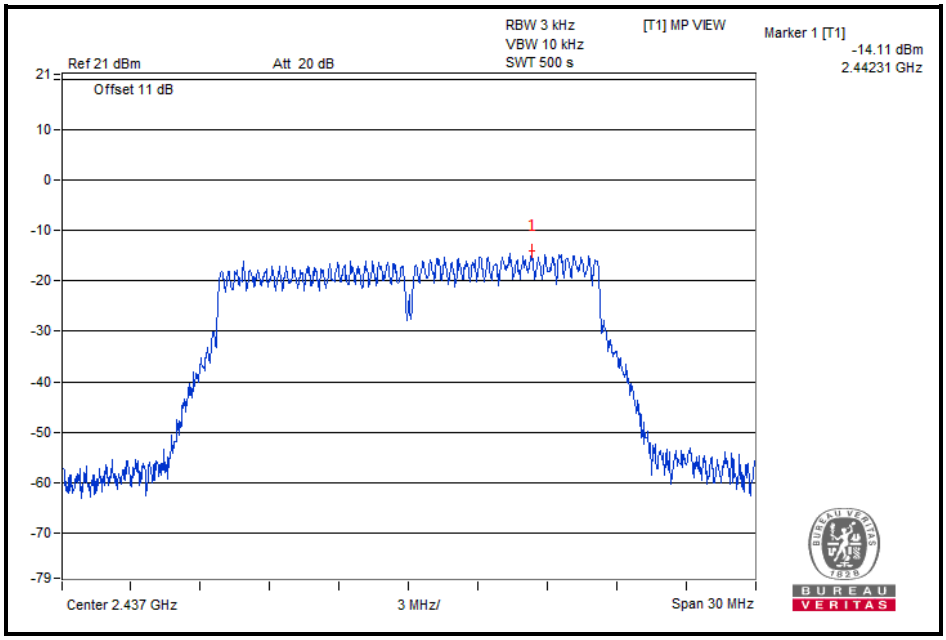
802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-16.27	8	PASS
6	2437	-15.12	8	PASS
11	2462	-14.84	8	PASS



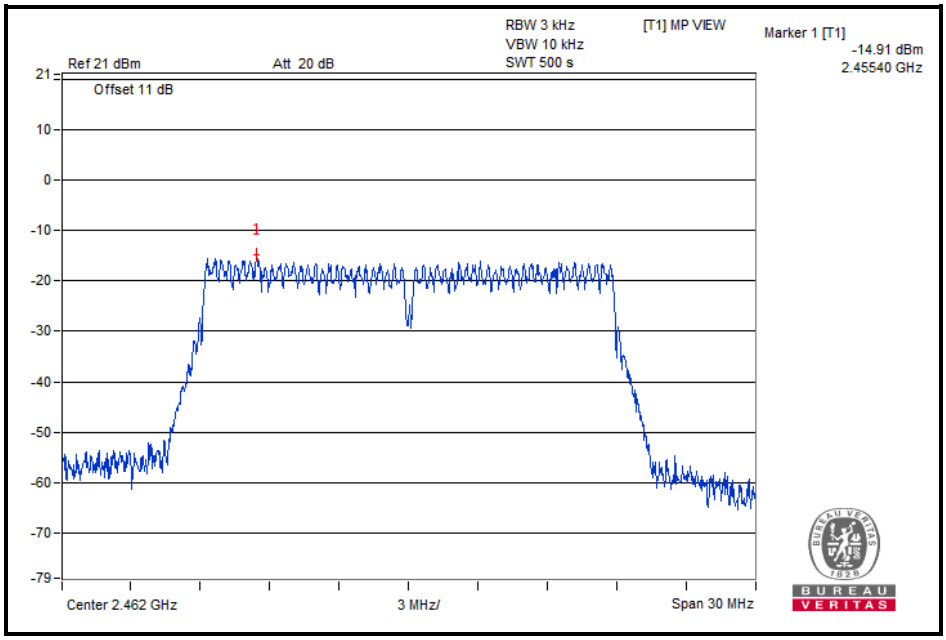
802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-14.95	8	PASS
6	2437	-14.11	8	PASS
11	2462	-14.86	8	PASS



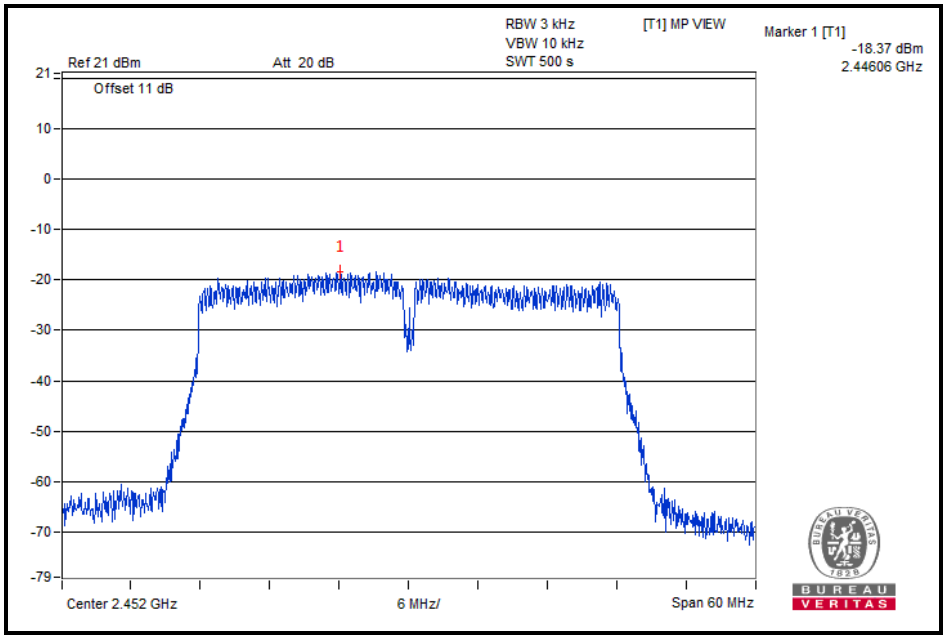
802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-15.45	8	PASS
6	2437	-14.91	8	PASS
11	2462	-14.91	8	PASS



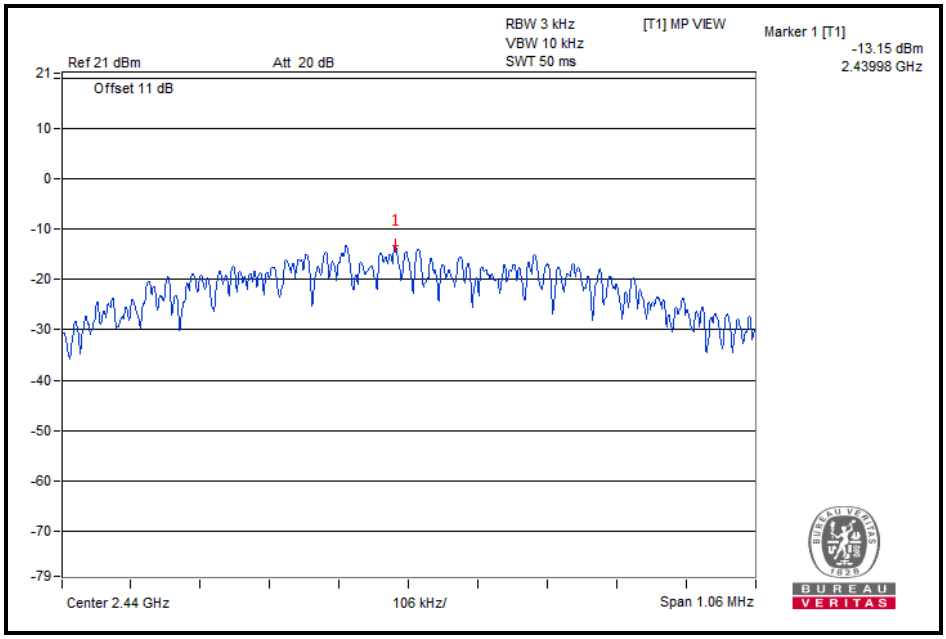
802.11n (40MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-18.52	8	PASS
6	2437	-18.49	8	PASS
9	2452	-18.37	8	PASS



BT-LE (GFSK)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2402	-14.19	8	PASS
19	2440	-13.15	8	PASS
39	2480	-14.59	8	PASS

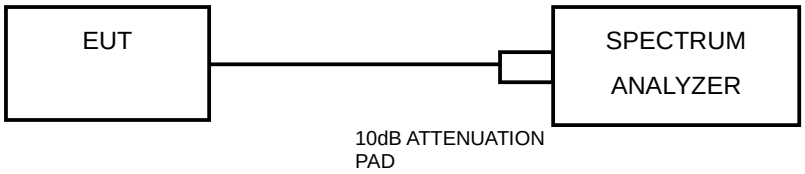


3.6 OUT OF BAND EMISSION MEASUREMENT

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 ≥ 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

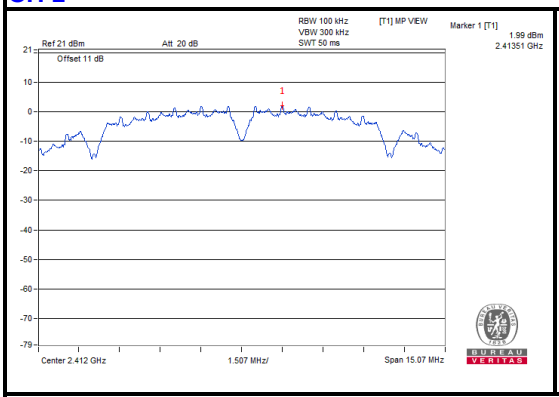
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

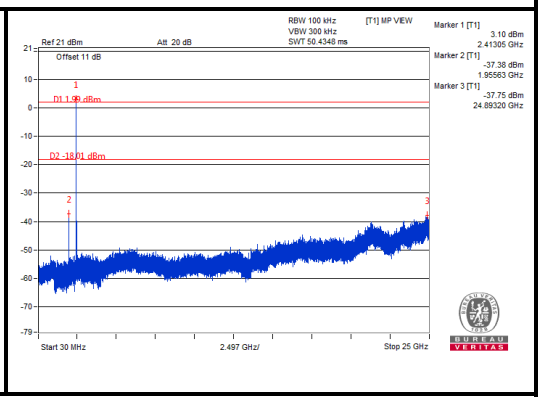
3.6.7 TEST RESULTS

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.

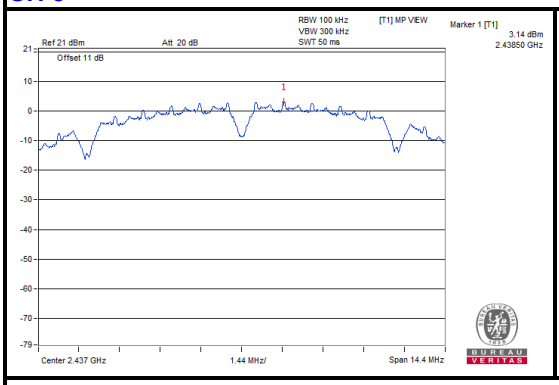
802.11b

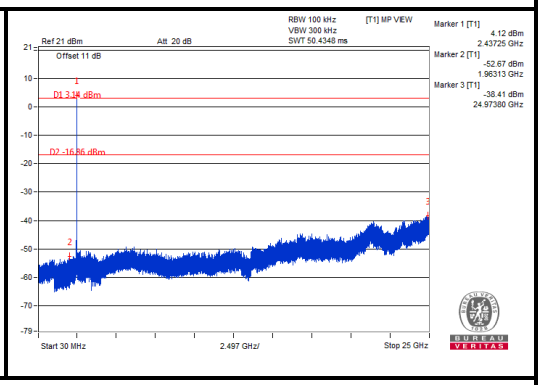
CH 1



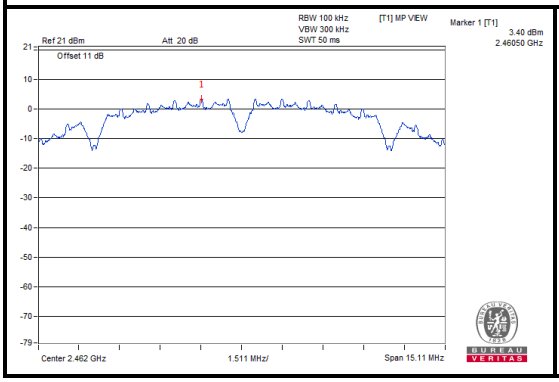


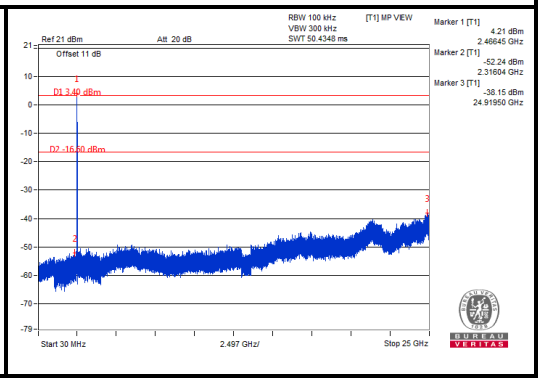
CH 6

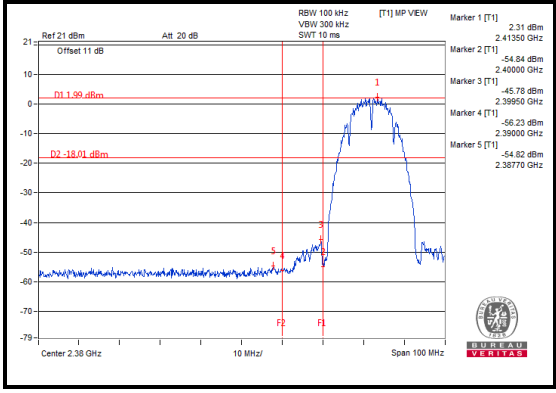
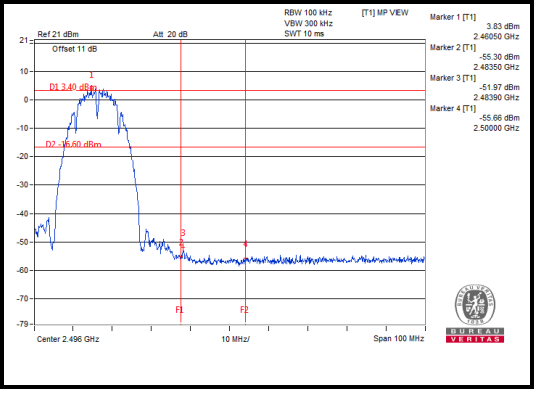




CH 11

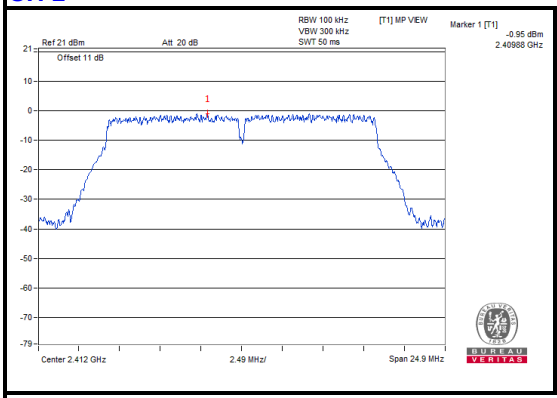


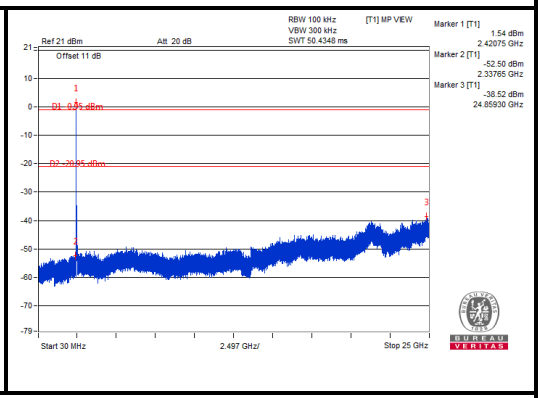


CH 1 Band Edge	CH 11 Band Edge
	

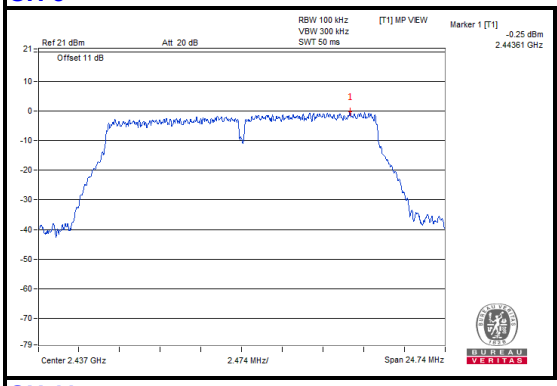
802.11g

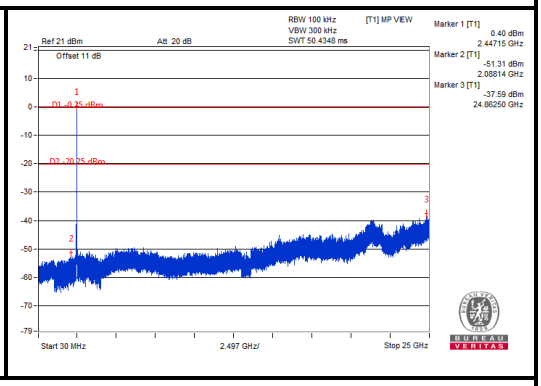
CH 1



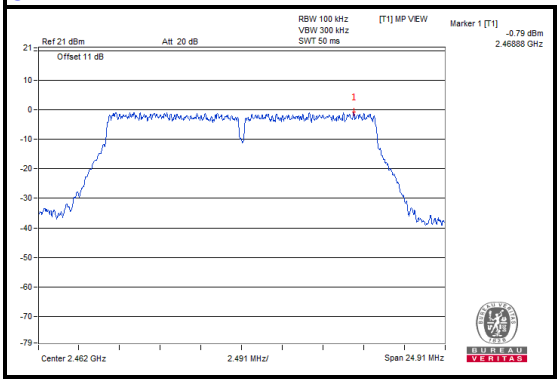


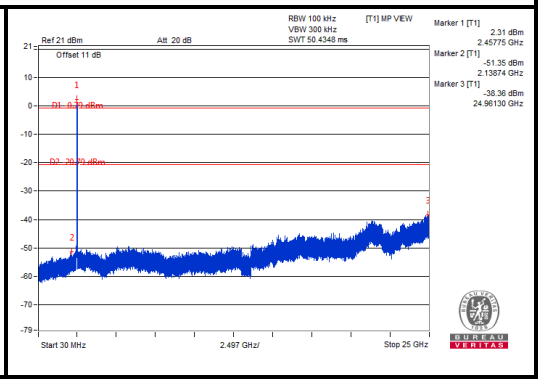
CH 6

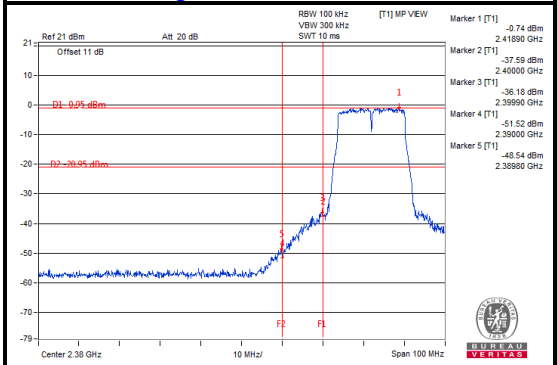
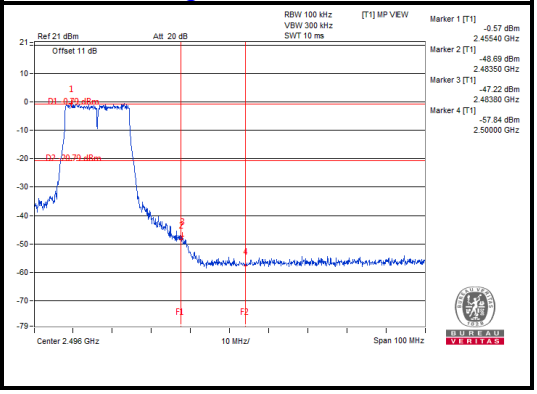




CH 11

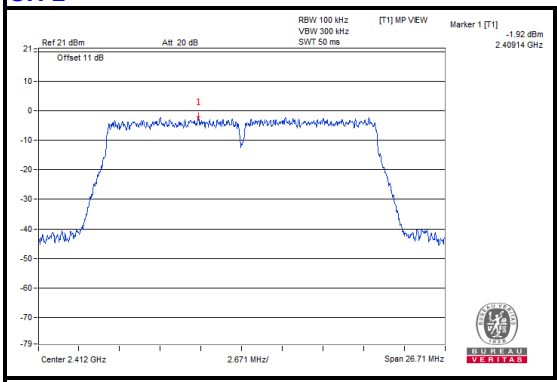


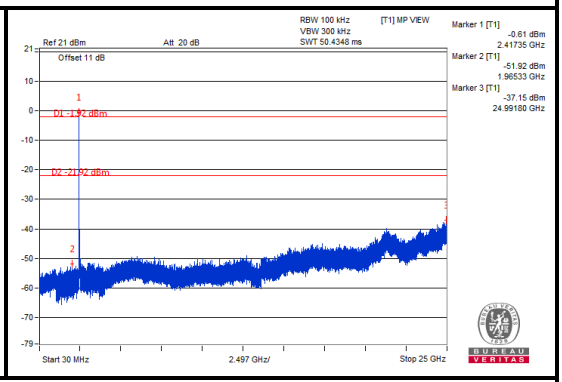


CH 1 Band Edge	CH 11 Band Edge
	

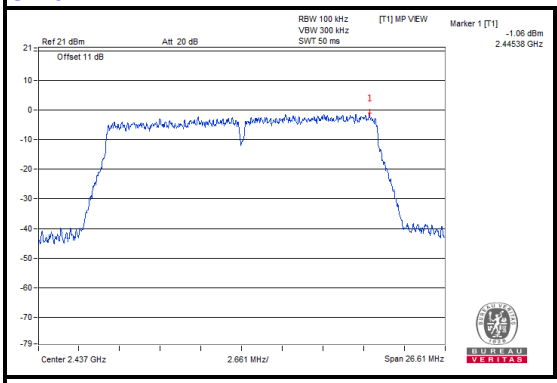
802.11n (20MHz)

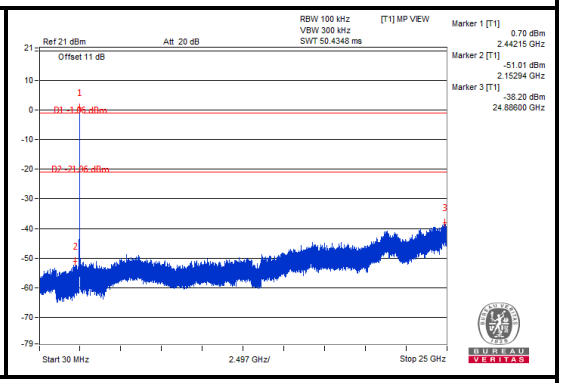
CH 1



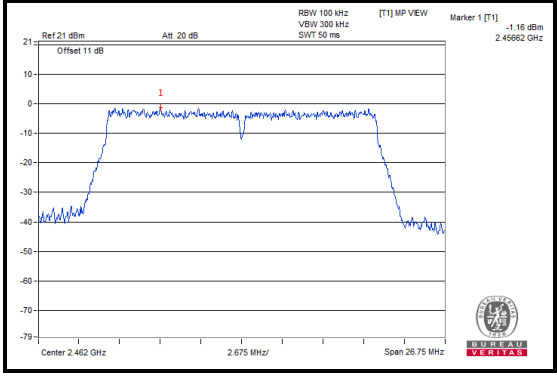


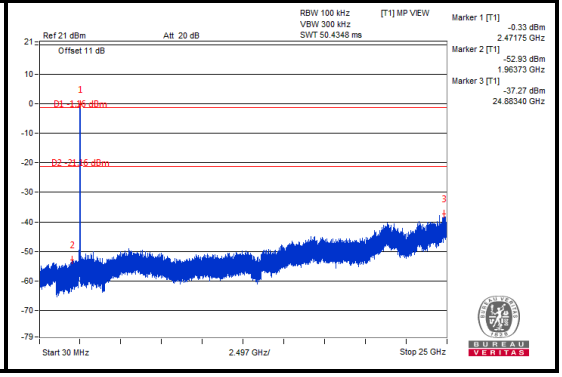
CH 6

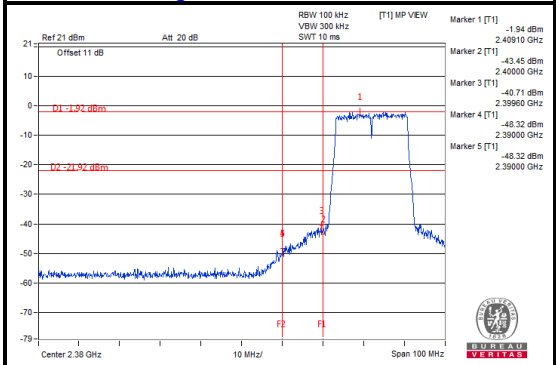
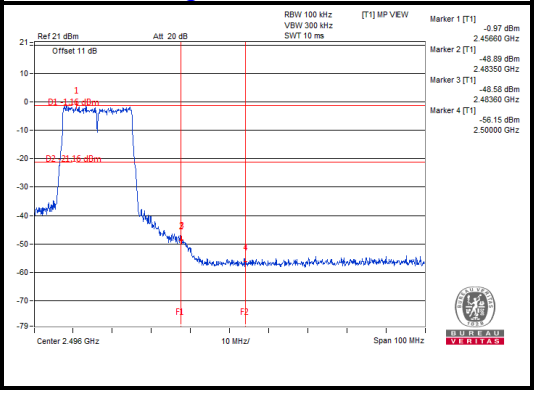




CH 11

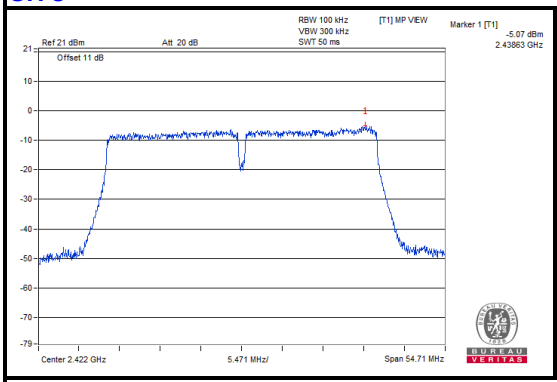


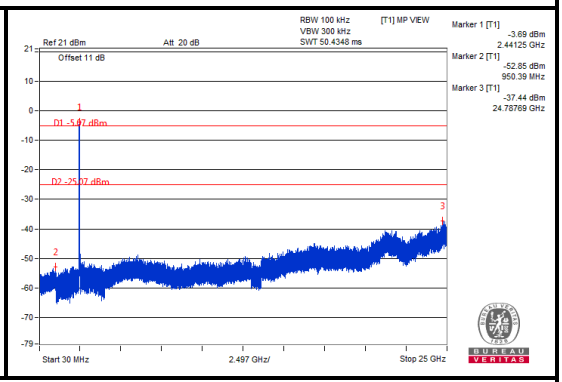


CH 1 Band Edge	CH 11 Band Edge
	

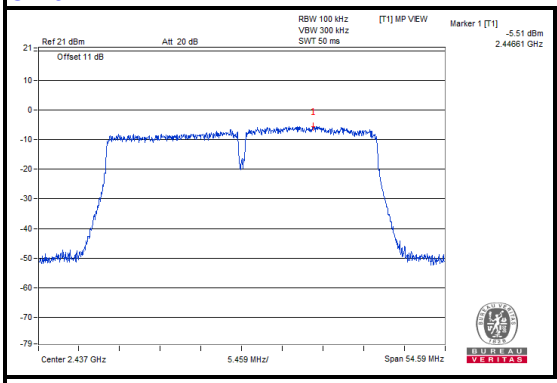
802.11n (40MHz)

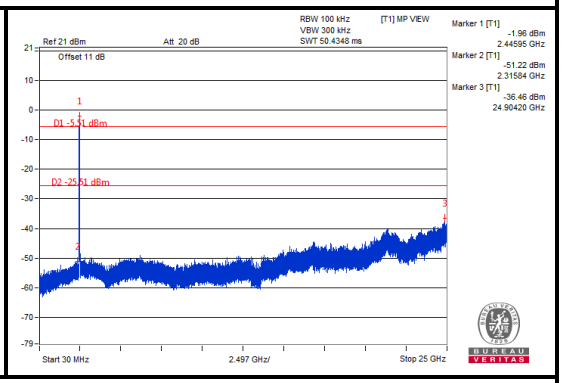
CH 3



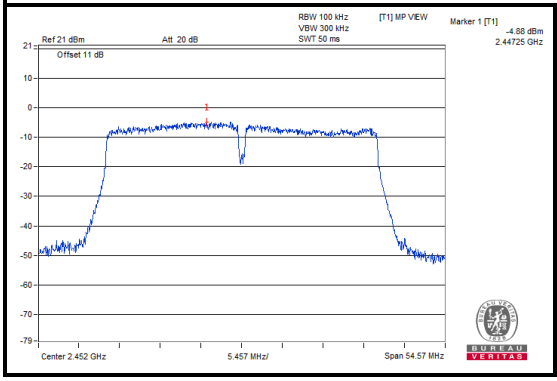


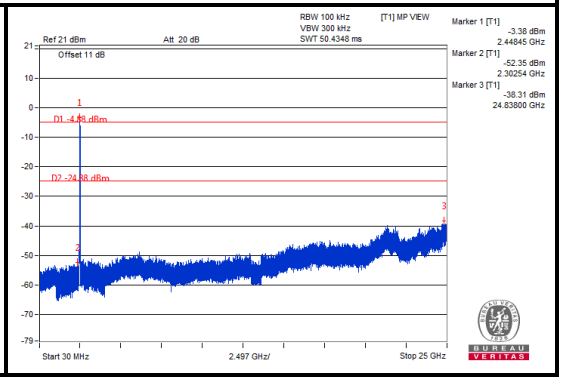
CH 6

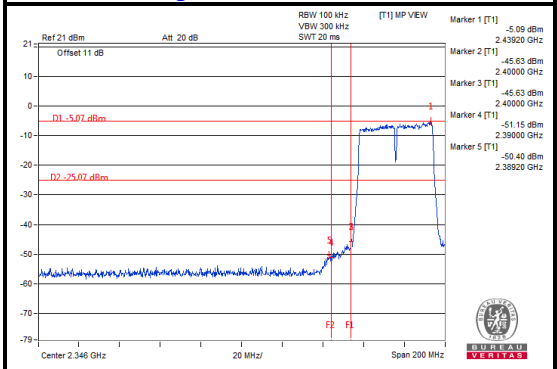
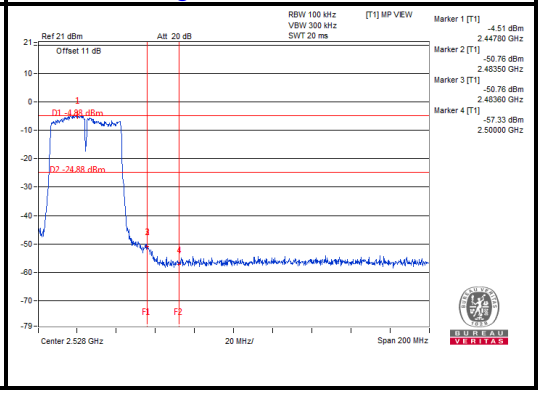




CH 9

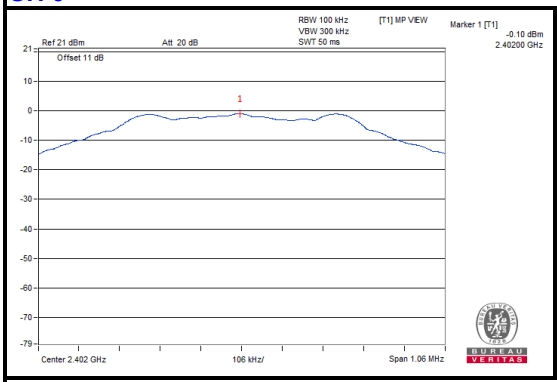


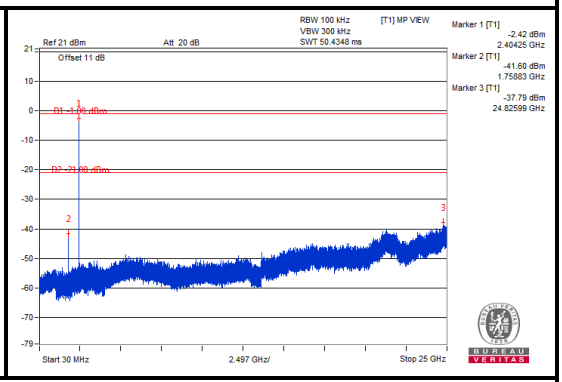


CH 3 Band Edge	CH 9 Band Edge
	

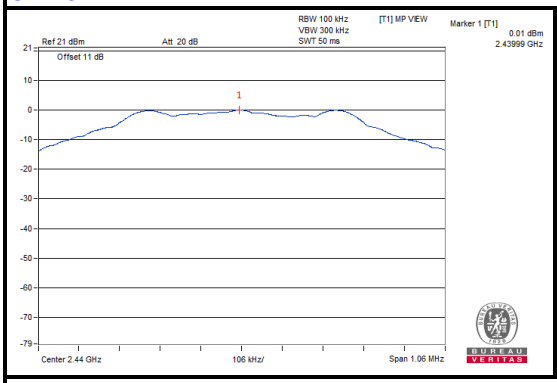
BT-LE (GFSK)

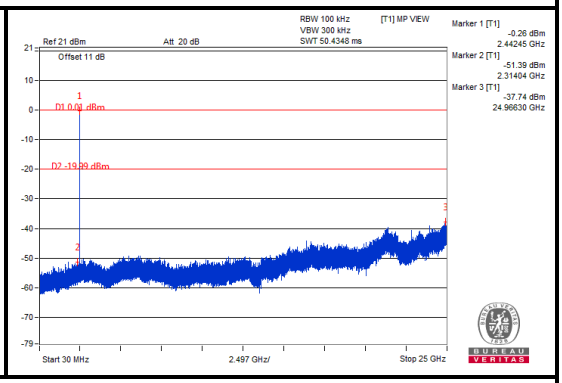
CH 0



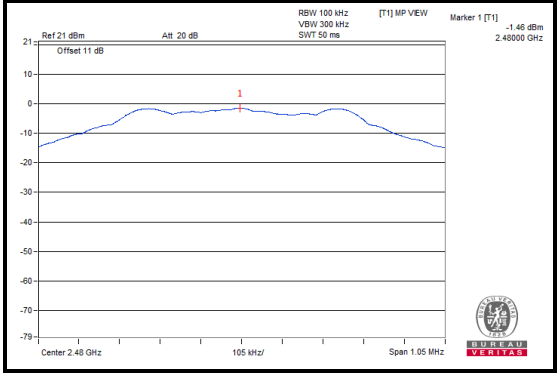


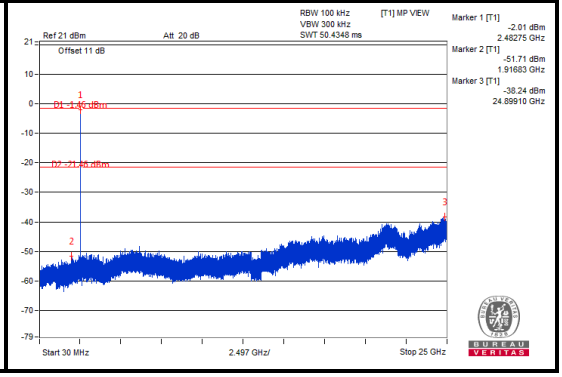
CH 19

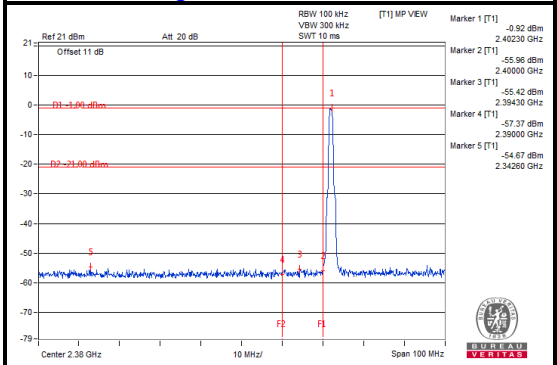
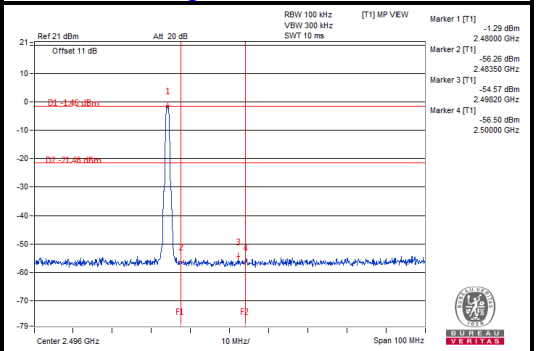




CH 39





CH 0 Band Edge	CH 39 Band Edge
	

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

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

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---