Test Lab
Cert 2951.01

FCC TEST REPORT

(WIFI + BT LE)

Product:	LTE OBDII Hotspot
Model Name:	Z6200
FCC ID:	SRQ-Z6200
Applicant:	ZTE Corporation
Address:	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China
Manufacturer:	ZTE Corporation
Address:	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China
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Report No.:	RF160830W005-1
Received Date:	Aug. 14, 2016
Test Date:	Aug. 15, 2016 ~ Sep. 01, 2016
Issued Date:	Sep. 02, 2016

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TABLE OF CONTENTS

RELEASE CONTROL RECORD 4
1 CERTIFICATION 5
2 SUMMARY OF TEST RESULTS 6
2.1 MEASUREMENT UNCERTAINTY 6
3 GENERAL INFORMATION 7
3.1 GENERAL DESCRIPTION OF EUT 7
3.2 DESCRIPTION OF TEST MODES 8
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST 9
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL 9
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS 12
3.4 DESCRIPTION OF SUPPORT UNITS 12
4 TEST TYPES AND RESULTS 13
4.1 CONDUCTED EMISSION MEASUREMENT 13
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT 13
4.1.2 TEST INSTRUMENTS 13
4.1.3 TEST PROCEDURES 14
4.1.4 DEVIATION FROM TEST STANDARD 14
4.1.5 TEST SETUP 15
4.1.6 EUT OPERATING CONDITIONS 15
4.1.7 TEST RESULTS 16
4.2 RADIATED EMISSION MEASUREMENT 18
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT 18
4.2.2 TEST INSTRUMENTS 19
4.2.3 TEST PROCEDURES 20
4.2.4 DEVIATION FROM TEST STANDARD 20
4.2.5 TEST SETUP 21
4.2.6 EUT OPERATING CONDITIONS 22
4.2.7 TEST RESULTS 23
4.3 6 DB BANDWIDTH MEASUREMENT 39
4.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT 39
4.3.2 TEST INSTRUMENTS 39
4.3.3 TEST PROCEDURE 40
4.3.4 DEVIATION FROM TEST STANDARD 40
4.3.5 TEST SETUP 40
4.3.6 EUT OPERATING CONDITIONS 40

4.3.7 TEST RESULTS 41
4.4 CONDUCTED OUTPUT POWER 45
4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT 45
4.4.2 TEST SETUP 45
4.4.3 TEST INSTRUMENTS 45
4.4.4 TEST PROCEDURES 45
4.4.5 DEVIATION FROM TEST STANDARD 45
4.4.6 EUT OPERATING CONDITIONS 45
4.4.7 TEST RESULTS 46
4.4.7.1 MAXIMUM PEAK OUTPUT POWER 46
4.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE) 47
4.5 POWER SPECTRAL DENSITY MEASUREMENT 48
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT 48
4.5.2 TEST SETUP 48
4.5.3 TEST INSTRUMENTS 48
4.5.4 TEST PROCEDURE 48
4.5.5 DEVIATION FROM TEST STANDARD 48
4.5.6 EUT OPERATING CONDITION 48
4.5.7 TEST RESULTS 49
4.6 OUT OF BAND EMISSION MEASUREMENT 53
4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT 53
4.6.2 TEST SETUP 53
4.6.3 TEST INSTRUMENTS 53
4.6.4 TEST PROCEDURE 53
4.6.5 DEVIATION FROM TEST STANDARD 54
4.6.6 EUT OPERATING CONDITION 54
4.6.7 TEST RESULTS 54
5 PHOTOGRAPHS OF THE TEST CONFIGURATION 63
6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 64

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF160830W005-1	Original release	Sep. 02, 2016

1 CERTIFICATION

PRODUCT:	LTE OBDII Hotspot
BRAND NAME:	ZTE
MODEL NAME:	Z6200
APPLICANT:	ZTE Corporation
TESTED:	Aug. 15, 2016 ~ Sep. 01, 2016
TEST SAMPLE:	Identical Prototype
STANDARDS:	**FCC Part 15, Subpart C. Section 15.247** ANSI C63.10-2013

The above equipment has been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , **DATE:** Sep. 02, 2016
(Yuqiang Yin / Engineer)

APPROVED BY : _____ , **DATE:** Sep. 02, 2016
(Bill Yao / Manager)

2 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 20.22dB at 0.416000MHz.
15.205 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.67dB at 4960MHz.
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

2.1 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	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.66dB
Radiated emissions	9KHz ~ 30MHz	2.74dB
	30MHz ~ 1GMHz	3.55dB
	1GHz ~ 18GHz	4.84dB
	18GHz ~ 40GHz	1.94dB

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

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	LTE OBDII Hotspot
MODEL NAME	Z6200
NOMINAL VOLTAGE	12Vdc
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
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	WLAN: 127.644mW (Maximum) BT-LE: 0.209mW (Maximum)
ANTENNA TYPE	PIFA Antenna with 2.5dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

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

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

3.2 DESCRIPTION OF TEST MODES

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

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

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

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

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

3.2.2 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, XYZ axis 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	11	CCK	DBPSK	1.0
BT-LE	0 to 39	39	DTS	GFSK	1

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

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, XYZ axis 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)
BT-LE	0 to 39	39	DTS	GFSK	1

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
BT-LE	0 to 39	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
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 12V from adaptor	Alex Chen
RE≥1G	22deg. C, 54%RH	DC 12V from adaptor	Alex Chen
PLC	25deg. C, 60%RH	DC 12V from adaptor	Yuqiang Yin
APCM	25deg. C, 60%RH	DC 12V from adaptor	Yuqiang Yin

3.3 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 v03r05

ANSI C63.10-2013

Note：

1. All test items have been performed and recorded as per the above standards. Due to the EUT is through the DC power supply, there was no need for Conducted Emission test.
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.

3.4 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

4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 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.

4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101588	Jan. 22,16	Jan. 21,17
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 04,16	Mar. 03,17
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 05,16	Apr. 04,17
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 08,16	Jan. 07,17
Test software	ADT	ADT_Cond_V7.3.7	N/A	N/A	N/A

NOTE:

1. The test was performed in shielded room 553.
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.

4.1.3 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.

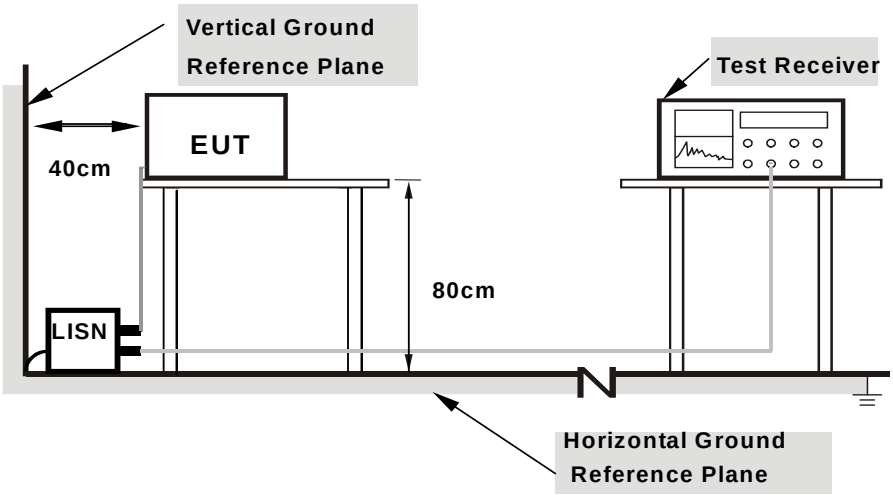
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 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).

4.1.6 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 Manua

4.1.7 TEST RESULTS

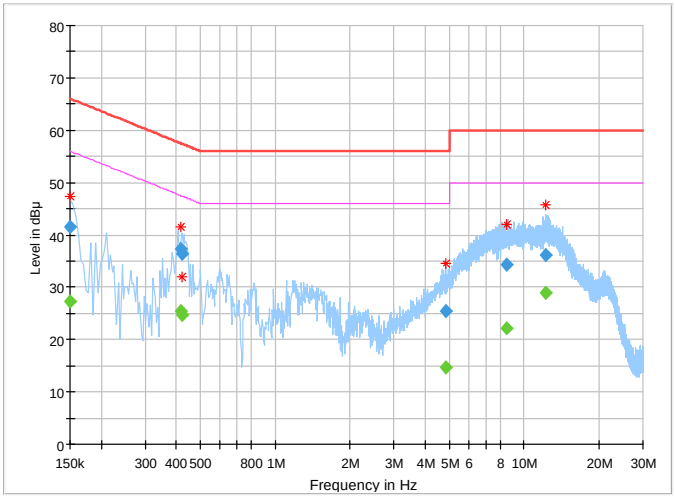
CONDUCTED WORST-CASE DATA:

Frequency Range	150KHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	25 deg. C, 65% RH
Tested By	Eric	**TEST DATE**	2016/08/28

Frequency (MHz)	QuasiPeak (dB¦ÌV)	CAverage (dB¦ÌV)	Limit (dB¦ÌV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	27.26	56.00	28.74	L1	ON	9.6
0.150000	41.40	---	66.00	24.60	L1	ON	9.6
0.416000	---	25.49	47.53	22.04	L1	ON	9.7
0.416000	**37.31**	**---**	**57.53**	**20.22**	**L1**	**ON**	**9.7**
0.420000	---	24.67	47.45	22.78	L1	ON	9.7
0.420000	36.46	---	57.45	20.99	L1	ON	9.7
4.860000	---	14.64	46.00	31.36	L1	ON	9.7
4.860000	25.45	---	56.00	30.55	L1	ON	9.7
8.496000	---	22.10	50.00	27.90	L1	ON	9.8
8.496000	34.30	---	60.00	25.70	L1	ON	9.8
12.196000	---	28.88	50.00	21.12	L1	ON	9.9
12.196000	36.25	---	60.00	23.75	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

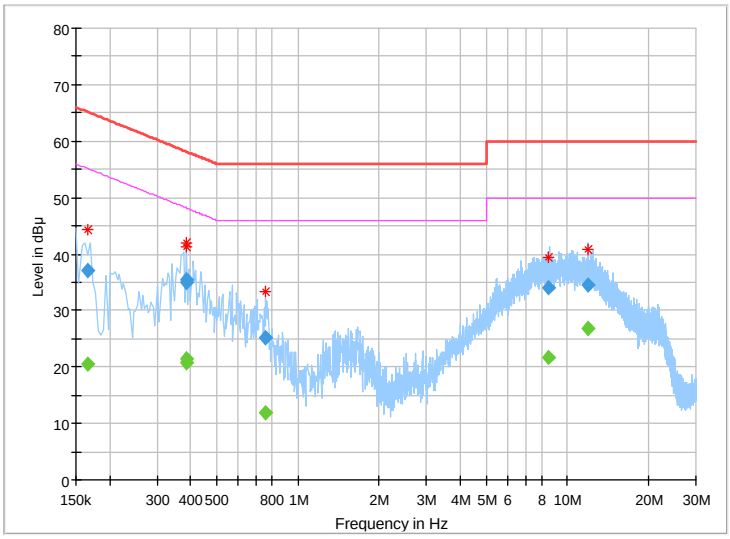


Frequency Range	150KHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	25 deg. C, 65% RH
Tested By	Eric	**TEST DATE**	2016/08/28

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.166000	---	20.52	55.16	34.64	N	ON	10.2
0.166000	37.08	---	65.16	28.08	N	ON	10.2
0.384000	35.44	---	58.19	22.75	N	ON	10.1
0.384000	---	21.37	48.19	26.82	N	ON	10.1
0.388000	35.06	---	58.11	23.05	N	ON	10.1
0.388000	---	20.79	48.11	27.32	N	ON	10.1
0.756000	---	11.84	46.00	34.16	N	ON	10.0
0.756000	25.27	---	56.00	30.73	N	ON	10.0
8.536000	---	21.67	50.00	28.33	N	ON	9.8
8.536000	33.98	---	60.00	26.02	N	ON	9.8
11.956000	---	26.77	50.00	23.23	N	ON	9.9
11.956000	34.49	---	60.00	25.51	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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 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.

4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,16	Apr. 04,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 14, 16	Jul. 13, 17
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 18,16	May 17,17
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 07, 16	Aug. 06, 17
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 12,16	Mar. 11,18
Test Software	ADT	ADT_Radiated _V7.6.15.9.2	N/A	N/A	N/A
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 12,16	Mar. 11,17
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Mar. 04,16	Mar. 03, 17
Pre-Amplifier(1-18G)	HP	8449B	3008A00409	Apr. 25,16	Apr. 24,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 20,15	Nov. 19,16
Test Software	ADT	ADT_Radiated _V7.6.15.9.2	N/A	N/A	N/A
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Sep. 31,16	Aug. 30,17

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 966 Chamber.
3. The FCC Site Registration No. is 502831.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating 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:

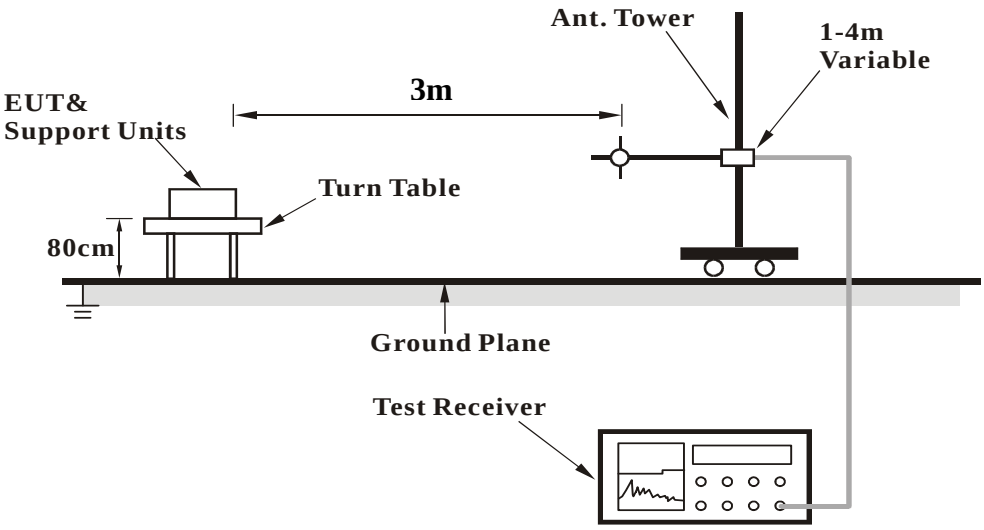
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

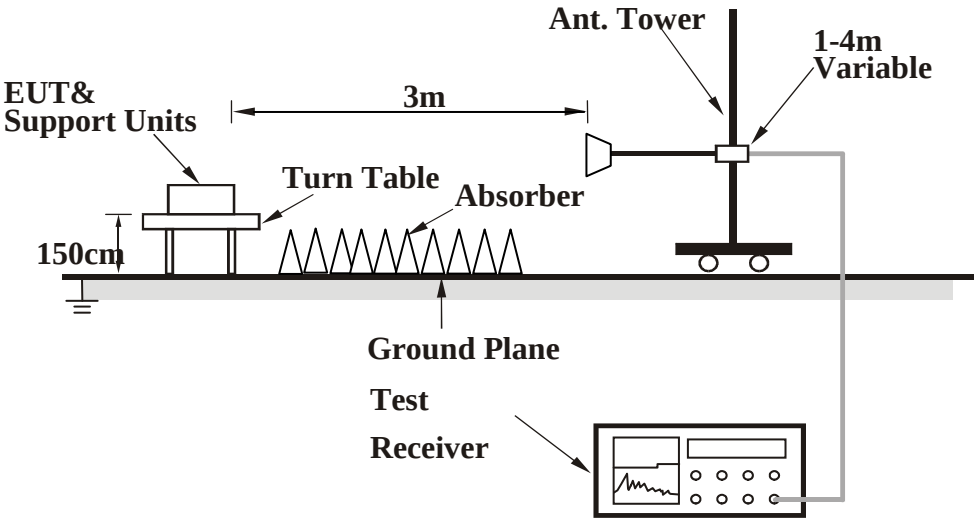
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.2.6 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.

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

9 KHz – 30 KHz 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:

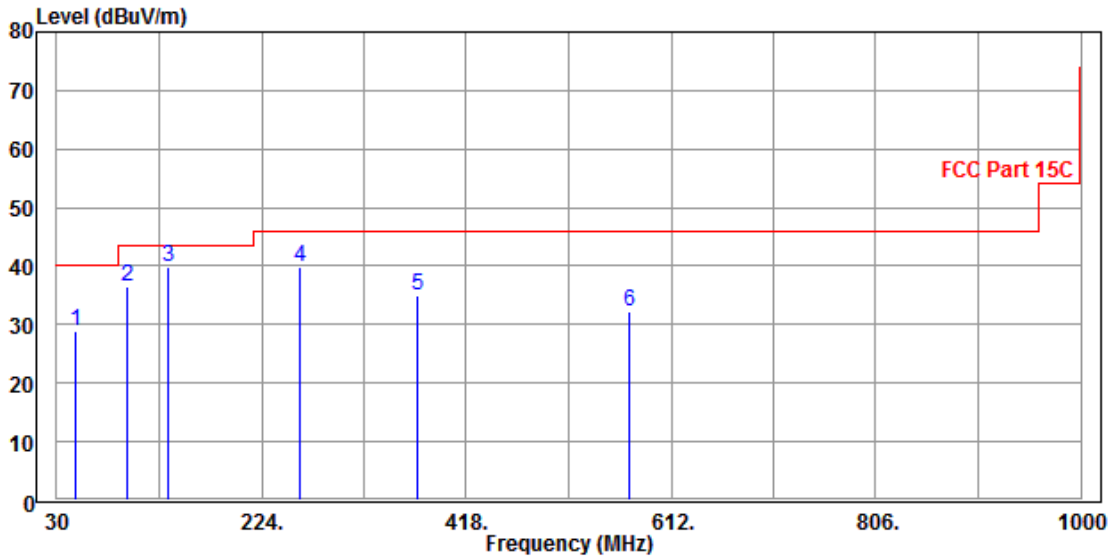
802.11g

CHANNEL	TX Channel 11	**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
48.43	28.89	58.16	40.00	-11.11	7.08	1.05	37.4	200	95	QP
95.96	36.62	64.56	43.50	-6.88	7.56	1.51	37.01	200	103	QP
134.76	39.76	67.06	43.50	-3.74	7.79	1.78	36.87	200	156	QP
260.86	39.97	61.45	46.00	-6.03	12.53	2.51	36.52	200	127	QP
372.41	34.91	52.5	46.00	-11.09	16.04	3.03	36.66	200	180	QP
573.2	32.12	45.64	46.00	-13.88	19.79	3.86	37.17	200	160	QP

REMARKS:

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

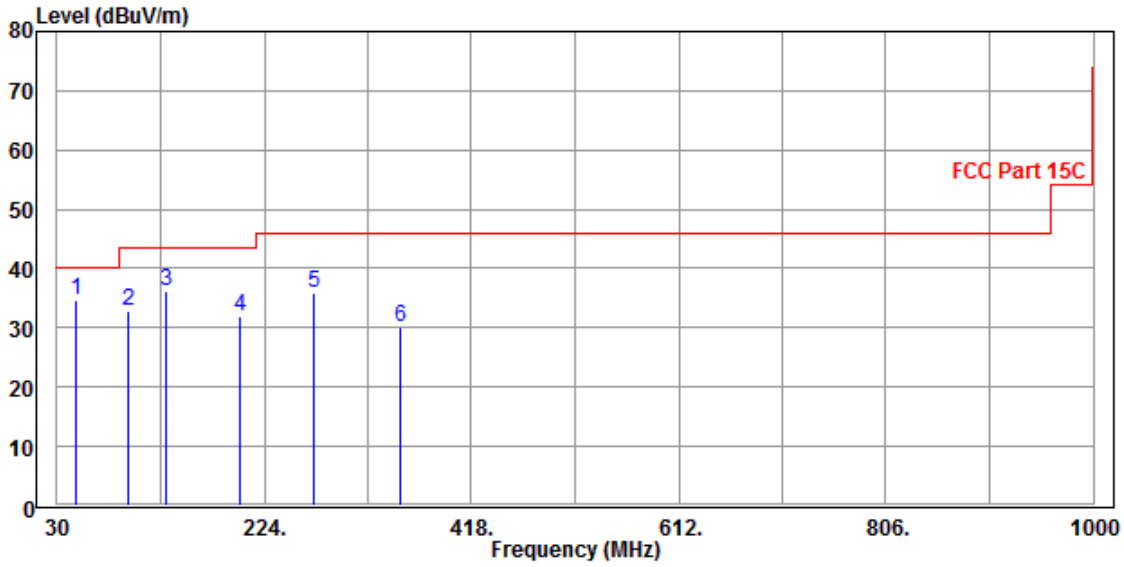


CHANNEL	TX Channel 11	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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
48.43	34.62	63.89	40.00	-5.38	7.08	1.05	37.4	100	48	QP
95.96	32.98	60.92	43.50	-10.52	7.56	1.51	37.01	100	96	QP
132.82	36.24	63.64	43.50	-7.26	7.71	1.77	36.88	100	121	QP
200.72	31.87	56.11	43.50	-11.63	10.13	2.17	36.54	100	240	QP
270.56	35.82	57.12	46.00	-10.18	12.65	2.56	36.51	100	280	QP
351.07	30.12	48.65	46.00	-15.88	15.14	2.94	36.61	100	72	QP

REMARKS:

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



ABOVE 1GHz DATA

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	46.19	54.06	54.00	-7.81	32.29	8.15	48.31	110	130	Average
2390	58.56	66.43	74.00	-15.44	32.29	8.15	48.31	110	130	Peak
*2412	101.57	109.38			32.31	8.19	48.31	110	130	Average
*2412	108.95	116.76			32.31	8.19	48.31	110	130	Peak
2483.5	38.28	45.88	54.00	-15.72	32.38	8.32	48.3	110	130	Average
2483.5	52.84	60.44	74.00	-21.16	32.38	8.32	48.3	110	130	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
2387.2	46.58	54.45	54.00	-7.42	32.29	8.15	48.31	100	120	Average
2387.2	57.53	65.4	74.00	-16.47	32.29	8.15	48.31	100	120	Peak
*2412	101.69	109.5			32.31	8.19	48.31	100	120	Average
*2412	109.56	117.37			32.31	8.19	48.31	100	120	Peak
2483.5	38.98	46.58	54.00	-15.02	32.38	8.32	48.3	100	120	Average
2483.5	53.16	60.76	74.00	-20.84	32.38	8.32	48.3	100	120	Peak

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
5. " * ": 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	39.44	47.31	54.00	-14.56	32.29	8.15	48.31	123	116	Average
2390	49.76	57.63	74.00	-24.24	32.29	8.15	48.31	123	116	Peak
*2437	101.91	109.64			32.34	8.24	48.31	123	116	Average
*2437	109.54	117.27			32.34	8.24	48.31	123	116	Peak
2487.9	40.63	48.21	54.00	-13.37	32.39	8.33	48.30	123	116	Average
2487.9	63.3	70.88	74.00	-10.7	32.39	8.33	48.30	123	116	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	38.68	46.55	54.00	-15.32	32.29	8.15	48.31	101	100	Average
2390	55.53	63.4	74.00	-18.47	32.29	8.15	48.31	101	100	Peak
*2437	102.65	110.38			32.34	8.24	48.31	101	100	Average
*2437	110.53	118.26			32.34	8.24	48.31	101	100	Peak
2484.13	39.91	47.51	54.00	-14.09	32.38	8.32	48.30	101	100	Average
2484.13	53.3	60.9	74.00	-20.7	32.38	8.32	48.30	101	100	Peak

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
5. " * ": 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	37.99	45.86	54.00	-16.01	32.29	8.15	48.31	105	120	Average
2390	49.5	57.37	74.00	-24.50	32.29	8.15	48.31	105	120	Peak
*2462	100.95	108.61			32.36	8.28	48.30	105	120	Average
*2462	109.17	116.83			32.36	8.28	48.30	105	120	Peak
2483.5	46.7	54.3	54.00	-7.30	32.38	8.32	48.30	105	120	Average
2483.5	64.83	72.43	74.00	-9.17	32.38	8.32	48.30	105	120	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	37.66	45.53	54.00	-16.34	32.29	8.15	48.31	100	110	Average
2390	49.64	57.51	74.00	-24.36	32.29	8.15	48.31	100	110	Peak
*2462	102.22	109.88			32.36	8.28	48.30	100	110	Average
*2462	109.94	117.6			32.36	8.28	48.30	100	110	Peak
2483.5	47.73	55.33	54.00	-6.27	32.38	8.32	48.30	100	110	Average
2483.5	60.76	68.36	74.00	-13.24	32.38	8.32	48.30	100	110	Peak

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
5. " * ": 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	41.91	49.78	54.00	-12.09	32.29	8.15	48.31	100	155	Average
2390	56.47	64.34	74.00	-17.53	32.29	8.15	48.31	100	155	Peak
*2412	90.21	98.02			32.31	8.19	48.31	100	155	Average
*2412	100.83	108.64			32.31	8.19	48.31	100	155	Peak
2488	34.73	42.31	54.00	-19.27	32.39	8.33	48.30	100	155	Average
2488	47.85	55.43	74.00	-26.15	32.39	8.33	48.30	100	155	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	50.04	57.91	54.00	-3.96	32.29	8.15	48.31	200	150	Average
2390	67.91	75.78	74.00	-6.09	32.29	8.15	48.31	200	150	Peak
*2412	93.73	101.54			32.31	8.19	48.31	200	150	Average
*2412	104.08	111.89			32.31	8.19	48.31	200	150	Peak
2483.5	36.59	44.19	54.00	-17.41	32.38	8.32	48.30	200	150	Average
2483.5	51.63	59.23	74.00	-22.37	32.38	8.32	48.30	200	150	Peak

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
5. " * ": 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	38.38	46.25	54.00	-15.62	32.29	8.15	48.31	120	135	Average
2390	49.37	57.24	74.00	-24.63	32.29	8.15	48.31	120	135	Peak
*2437	94.69	102.42			32.34	8.24	48.31	120	135	Average
*2437	105.45	113.18			32.34	8.24	48.31	120	135	Peak
2483.7	40.78	48.38	54.00	-13.22	32.38	8.32	48.30	120	135	Average
2483.7	58.21	65.81	74.00	-15.79	32.38	8.32	48.30	120	135	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	38.37	46.24	54.00	-15.63	32.29	8.15	48.31	200	130	Average
2390	56.53	64.4	74.00	-17.47	32.29	8.15	48.31	200	130	Peak
*2437	96.88	104.61			32.34	8.24	48.31	200	130	Average
*2437	107.14	114.87			32.34	8.24	48.31	200	130	Peak
2483.5	40.54	48.14	54.00	-13.46	32.38	8.32	48.30	200	130	Average
2483.5	61.28	68.88	74.00	-12.72	32.38	8.32	48.30	200	130	Peak

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
5. " * ": 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	38.00	45.87	54.00	-16.00	32.29	8.15	48.31	120	115	Average
2390	50.73	58.60	74.00	-23.27	32.29	8.15	48.31	120	115	Peak
*2462	93.09	100.75			32.36	8.28	48.30	120	115	Average
*2462	103.46	111.12			32.36	8.28	48.30	120	115	Peak
2483.5	49.78	57.38	54.00	-4.22	32.38	8.32	48.30	120	115	Average
2483.5	64.00	71.60	74.00	-10.00	32.38	8.32	48.30	120	115	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	37.79	45.66	54.00	-16.21	32.29	8.15	48.31	100	110	Average
2390	53.14	61.01	74.00	-20.86	32.29	8.15	48.31	100	110	Peak
*2462	93.12	100.78			32.36	8.28	48.30	100	110	Average
*2462	103.33	110.99			32.36	8.28	48.30	100	110	Peak
2483.5	**51.00**	**58.60**	**54.00**	**-3.00**	**32.38**	**8.32**	**48.30**	**100**	**110**	**Average**
2483.5	64.65	72.25	74.00	-9.35	32.38	8.32	48.30	100	110	Peak

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
5. " * ": 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
2358	38.17	46.13	54.00	-15.83	32.26	8.09	48.31	120	115	Average
2358	49.81	57.77	74.00	-24.19	32.26	8.09	48.31	120	115	Peak
*2412	97.17	104.98			32.31	8.19	48.31	120	115	Average
*2412	104.55	112.36			32.31	8.19	48.31	120	115	Peak
2487	38.17	45.75	54.00	-15.83	32.39	8.33	48.30	120	115	Average
2487	50.19	57.77	74.00	-23.81	32.39	8.33	48.30	120	115	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	50.23	58.1	54.00	-3.77	32.29	8.15	48.31	100	115	Average
2390	65.71	73.58	74.00	-8.29	32.29	8.15	48.31	100	115	Peak
*2412	92.07	99.88			32.31	8.19	48.31	100	115	Average
*2412	103.52	111.33			32.31	8.19	48.31	100	115	Peak
2483.5	38.54	46.14	54.00	-15.46	32.38	8.32	48.30	100	115	Average
2483.5	51.25	58.85	74.00	-22.75	32.38	8.32	48.30	100	115	Peak

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
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	37.84	45.71	54.00	-16.16	32.29	8.15	48.31	120	120	Average
2390	50.17	58.04	74.00	-23.83	32.29	8.15	48.31	120	120	Peak
*2437	89.62	97.35			32.34	8.24	48.31	120	120	Average
*2437	101.26	108.99			32.34	8.24	48.31	120	120	Peak
2483.5	38.25	45.85	54.00	-15.75	32.38	8.32	48.30	120	120	Average
2483.5	51.82	59.42	74.00	-22.18	32.38	8.32	48.30	120	120	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	37.86	45.73	54.00	-16.14	32.29	8.15	48.31	101	115	Average
2390	49.57	57.44	74.00	-24.43	32.29	8.15	48.31	101	115	Peak
*2437	94.88	102.61			32.34	8.24	48.31	101	115	Average
*2437	105.97	113.7			32.34	8.24	48.31	101	115	Peak
2483.5	39.08	46.68	54.00	-14.92	32.38	8.32	48.30	101	115	Average
2483.5	54.35	61.95	74.00	-19.65	32.38	8.32	48.30	101	115	Peak

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
5. " * ": 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	37.89	45.76	54.00	-16.11	32.29	8.15	48.31	120	110	Average
2390	49.50	57.37	74.00	-24.50	32.29	8.15	48.31	120	110	Peak
*2462	91.64	99.30			32.36	8.28	48.30	120	110	Average
*2462	101.34	109.00			32.36	8.28	48.30	120	110	Peak
2483.5	48.66	56.26	54.00	-5.34	32.38	8.32	48.30	120	110	Average
2483.5	63.70	71.30	74.00	-10.30	32.38	8.32	48.30	120	110	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**
2354	37.70	45.67	54.00	-16.30	32.25	8.09	48.31	113	102	Average
2354	53.83	61.80	74.00	-20.17	32.25	8.09	48.31	113	102	Peak
*2462	92.60	100.26			32.36	8.28	48.30	113	102	Average
*2462	103.25	110.91			32.36	8.28	48.30	113	102	Peak
2483.5	50.84	58.44	54.00	-3.16	32.38	8.32	48.30	113	102	Average
2483.5	66.09	73.69	74.00	-7.91	32.38	8.32	48.30	113	102	Peak

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
5. " * ": Fundamental frequency.

BELOW 1GHz WORST-CASE DATA:

9 KHz – 30 KHz 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:

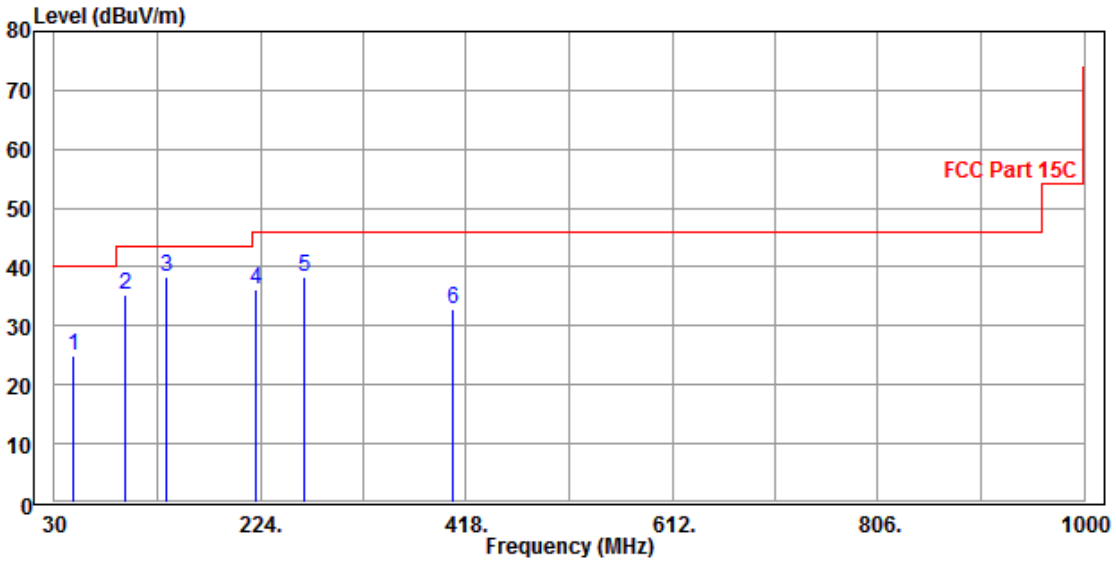
BT-LE (GFSK)

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
48.43	24.85	54.12	40.00	-15.15	7.08	1.05	37.40	200	280	QP
95.96	35.14	63.08	43.50	-8.36	7.56	1.51	37.01	200	68	QP
134.76	38.39	65.69	43.50	-5.11	7.79	1.78	36.87	200	96	QP
220.12	36.29	59.51	46.00	-9.71	11.03	2.28	36.53	200	250	QP
265.71	38.41	59.80	46.00	-7.59	12.59	2.53	36.51	200	140	QP
405.39	32.84	49.14	46.00	-13.16	17.26	3.17	36.73	200	72	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

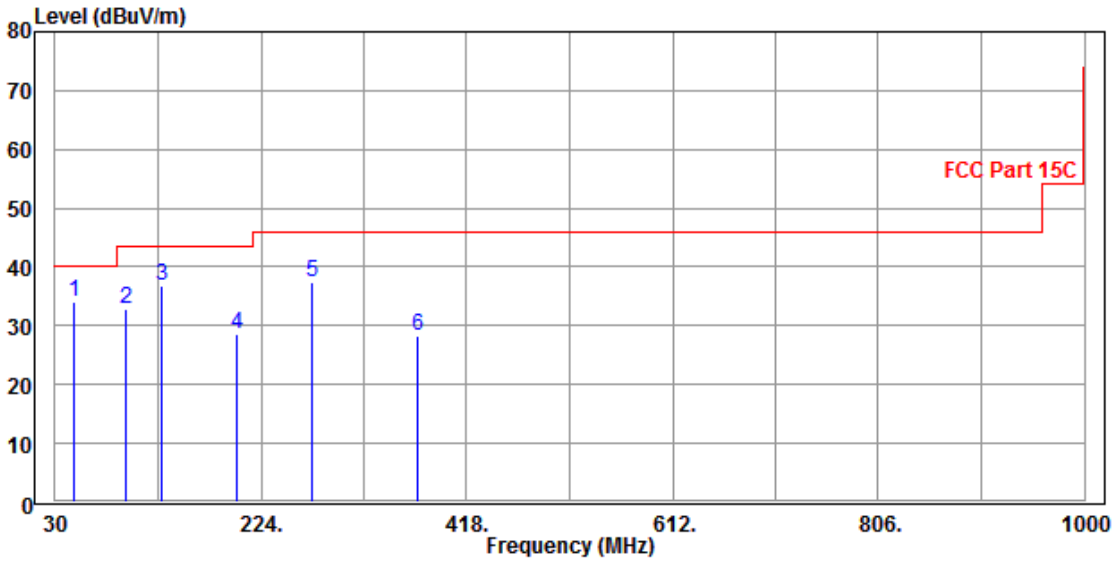


CHANNEL	TX Channel 39	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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
48.43	34.12	63.39	40.00	-5.88	7.08	1.05	37.40	100	32	QP
95.96	32.75	60.69	43.50	-10.75	7.56	1.51	37.01	100	72	QP
130.88	36.79	64.28	43.50	-6.71	7.64	1.76	36.89	100	96	QP
201.69	28.69	52.87	43.50	-14.81	10.18	2.18	36.54	100	250	QP
271.53	37.52	58.80	46.00	-8.48	12.66	2.57	36.51	100	156	QP
372.41	28.23	45.82	46.00	-17.77	16.04	3.03	36.66	100	280	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:

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	33.28	41.15	54.00	-20.72	32.29	8.15	48.31	270	340	Average
2390	45.9	53.77	74.00	-28.10	32.29	8.15	48.31	270	340	Peak
*2402	76.32	84.16			32.30	8.17	48.31	270	340	Average
*2402	81.11	88.95			32.30	8.17	48.31	270	340	Peak
2497	33.49	41.05	54.00	-20.51	32.40	8.34	48.30	270	340	Average
2497	45.36	52.92	74.00	-28.64	32.40	8.34	48.30	270	340	Peak
4804	43.83	45.87	54.00	-10.17	34.30	12.55	48.89	265	340	Average
4804	54.06	56.10	74.00	-19.94	34.30	12.55	48.89	265	340	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**
2387	33.38	41.25	54.00	-20.62	32.29	8.15	48.31	238	323	Average
2387	46.44	54.31	74.00	-27.56	32.29	8.15	48.31	238	323	Peak
*2402	74.07	81.91			32.30	8.17	48.31	238	323	Average
*2402	78.38	86.22			32.30	8.17	48.31	238	323	Peak
2498	33.32	40.87	54.00	-20.68	32.40	8.35	48.30	238	323	Average
2498	45.78	53.33	74.00	-28.22	32.40	8.35	48.30	238	323	Peak
4804	48.71	50.75	54.00	-5.29	34.30	12.55	48.89	150	260	Average
4804	56.41	58.45	74.00	-17.59	34.30	12.55	48.89	150	260	Peak

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
5. " * ": 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**
2383	41.11	49.00	54.00	-12.89	32.28	8.14	48.31	170	345	Average
2383	54.37	62.26	74.00	-19.63	32.28	8.14	48.31	170	345	Peak
*2440	81.15	88.88			32.34	8.24	48.31	170	345	Average
*2440	81.53	89.26			32.34	8.24	48.31	170	345	Peak
2495	38.34	45.90	54.00	-15.66	32.40	8.34	48.30	170	345	Average
2495	50.08	57.64	74.00	-23.92	32.40	8.34	48.30	170	345	Peak
4880	50.57	52.35	54.00	-3.43	34.30	12.84	48.92	150	345	Average
4880	58.44	60.22	74.00	-15.56	34.30	12.84	48.92	150	345	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**
2383.5	35.46	43.35	54.00	-18.54	32.28	8.14	48.31	125	325	Average
2383.5	49.58	57.47	74.00	-24.42	32.28	8.14	48.31	125	325	Peak
*2440	77.49	85.22			32.34	8.24	48.31	125	325	Average
*2440	79.34	87.07			32.34	8.24	48.31	125	325	Peak
2483.8	33.30	40.90	54.00	-20.70	32.38	8.32	48.30	125	325	Average
2483.8	46.22	53.82	74.00	-27.78	32.38	8.32	48.30	125	325	Peak
4880	47.90	49.68	54.00	-6.10	34.30	12.84	48.92	100	208	Average
4880	56.68	58.46	74.00	-17.32	34.30	12.84	48.92	100	208	Peak

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
5. " * ": 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**
2343	34.88	42.89	54.00	-19.12	32.24	8.07	48.32	270	340	Average
2343	46.61	54.62	74.00	-27.39	32.24	8.07	48.32	270	340	Peak
*2480	82.31	89.92			32.38	8.31	48.30	270	340	Average
*2480	83.85	91.46			32.38	8.31	48.30	270	340	Peak
2488	33.99	41.57	54.00	-20.01	32.39	8.33	48.30	270	340	Average
2488	47.16	54.74	74.00	-26.84	32.39	8.33	48.30	270	340	Peak
4960	50.15	51.67	54.00	-3.85	34.30	13.13	48.95	145	325	Average
4960	58.41	59.93	74.00	-15.59	34.30	13.13	48.95	145	325	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**
2343.84	33.12	41.13	54.00	-20.88	32.24	8.07	48.32	228	323	Average
2343.84	45.02	53.03	74.00	-28.98	32.24	8.07	48.32	228	323	Peak
*2480	78.78	86.39			32.38	8.31	48.30	228	323	Average
*2480	81.07	88.68			32.38	8.31	48.30	228	323	Peak
2488.25	33.29	40.87	54.00	-20.71	32.39	8.33	48.30	228	323	Average
2488.25	45.81	53.39	74.00	-28.19	32.39	8.33	48.30	228	323	Peak
4960	**51.33**	**52.85**	**54.00**	**-2.67**	**34.30**	**13.13**	**48.95**	**100**	**270**	**Average**
4960	58.91	60.43	74.00	-15.09	34.30	13.13	48.95	100	270	Peak

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
5. " * ": Fundamental frequency.

4.3 6 dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	May 04,16	May 03,17
Power Sensor	Keysight	U2021XA	MY55060018	May 04,16	May 03,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 12, 15	Oct.11, 16
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.07,15	Sep. 06,16
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 28,15	Nov. 27,16
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Signal Generator	Agilent	N5183A	MY50140980	Nov. 09,15	Nov. 08,16
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 16	Apr. 21, 17
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Sep. 01,15	Aug. 31,16

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.

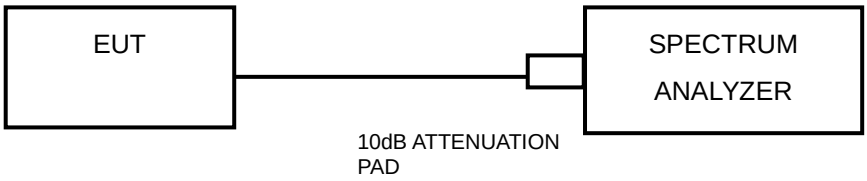
4.3.3 TEST PROCEDURE

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.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



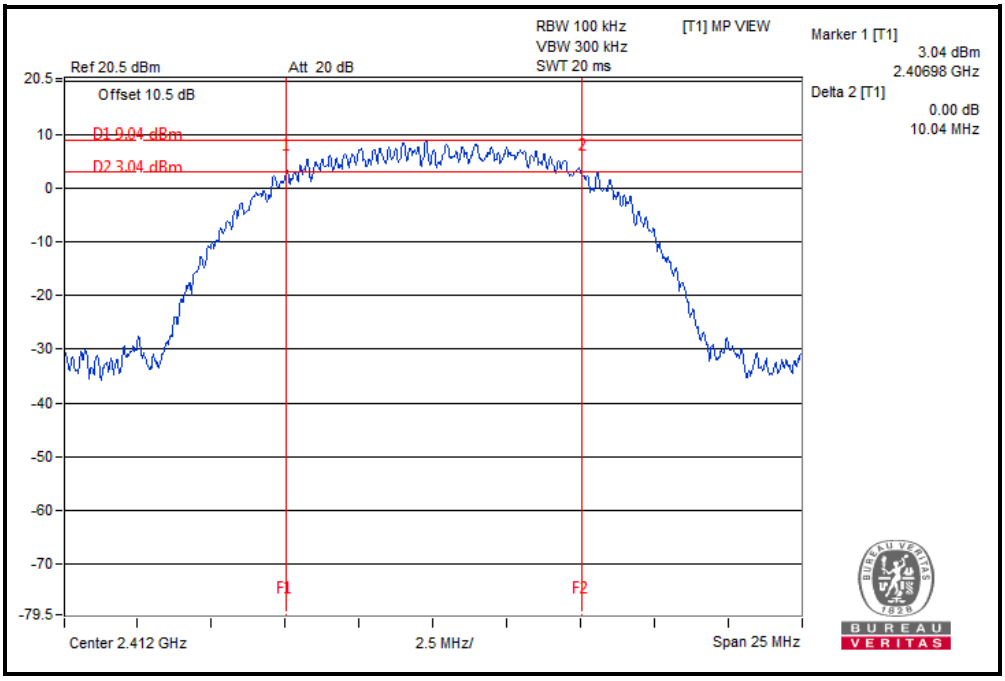
4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

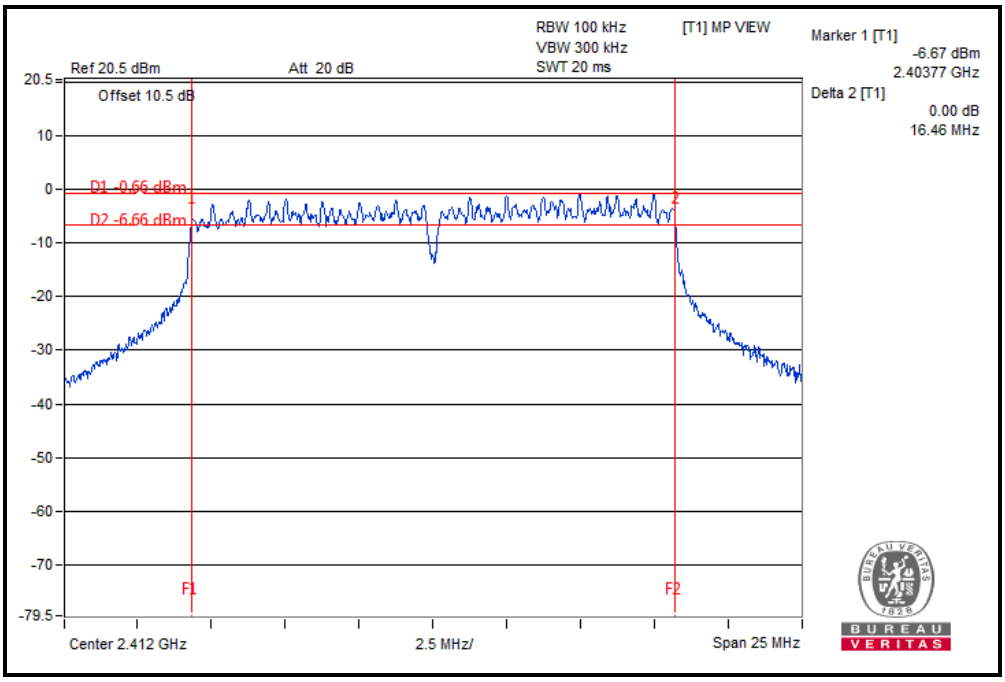
802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.04	0.5	PASS
6	2437	9.99	0.5	PASS
11	2462	9.56	0.5	PASS



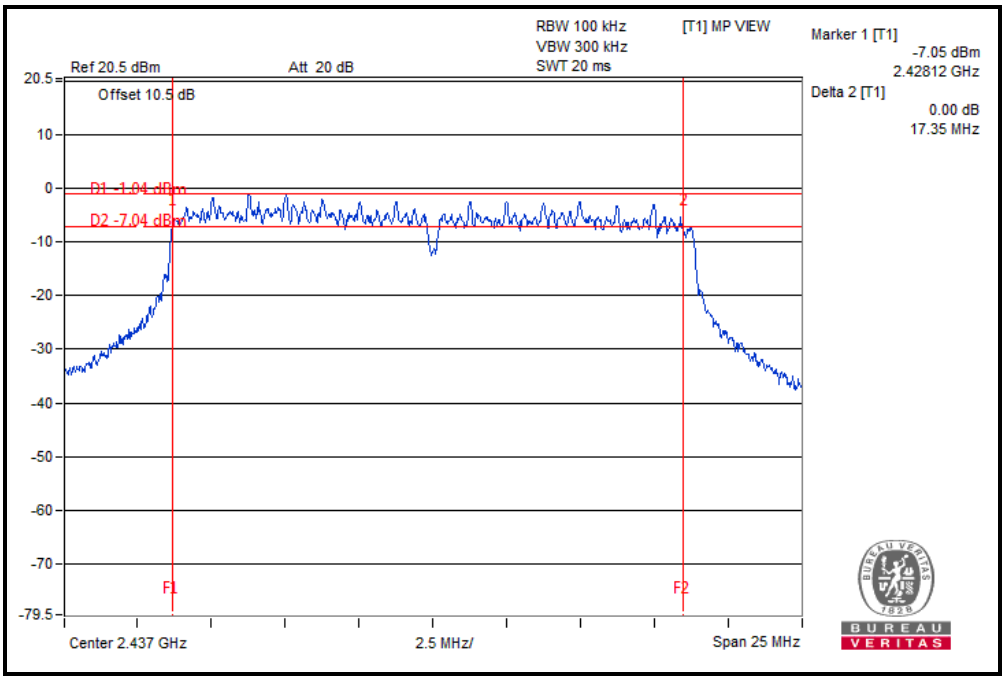
802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.46	0.5	PASS
6	2437	16.46	0.5	PASS
11	2462	16.43	0.5	PASS



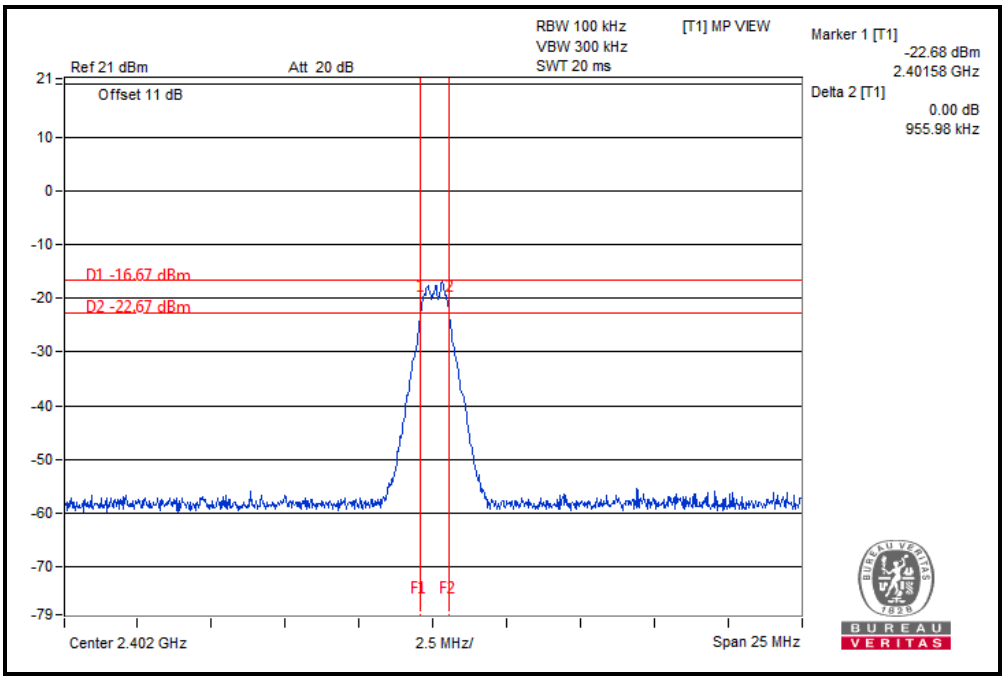
802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.33	0.5	PASS
6	2437	17.35	0.5	PASS
11	2462	17.23	0.5	PASS



BT-LE (GFSK)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	0.96	0.5	PASS
19	2440	0.87	0.5	PASS
39	2480	0.88	0.5	PASS

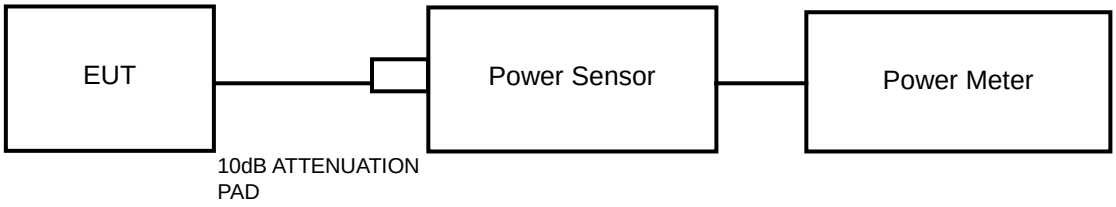


4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.3.3 to get information of above instrument.

4.4.4 TEST PROCEDURES

A 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.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

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

4.4.7 TEST RESULTS

4.4.7.1 MAXIMUM PEAK OUTPUT POWER

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	21.06	**127.644**	1	PASS
6	2437	20.01	100.231	1	PASS
11	2462	20.57	114.025	1	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	17.99	62.951	1	PASS
6	2437	19.32	85.507	1	PASS
11	2462	18.48	70.469	1	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	18.33	68.077	1	PASS
6	2437	17.38	54.702	1	PASS
11	2462	18.13	65.013	1	PASS

BT-LE (GFSK)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
0	2402	-6.91	0.204	1	PASS
19	2440	-6.87	0.206	1	PASS
39	2480	-6.79	0.209	1	PASS

4.4.7.2 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	18.19	N/A
6	2437	17.58	N/A
11	2462	17.91	N/A

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	10.80	N/A
6	2437	11.03	N/A
11	2462	10.52	N/A

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	10.63	N/A
6	2437	10.11	N/A
11	2462	10.32	N/A

BT-LE (GFSK)

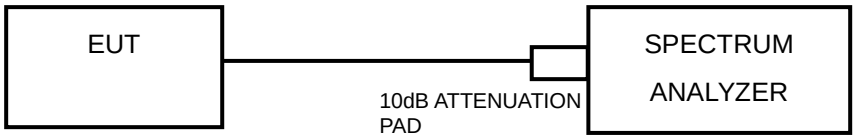
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
0	2402	-6.74	N/A
19	2440	-6.62	N/A
39	2480	-6.57	N/A

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

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

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.5.4 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.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

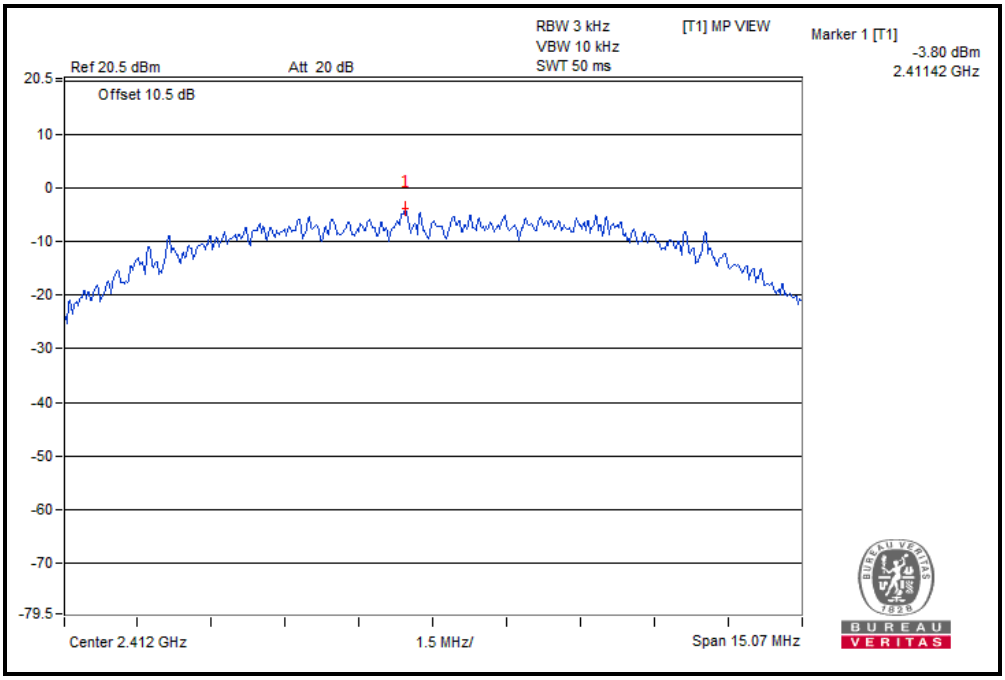
4.5.6 EUT OPERATING CONDITION

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

4.5.7 TEST RESULTS

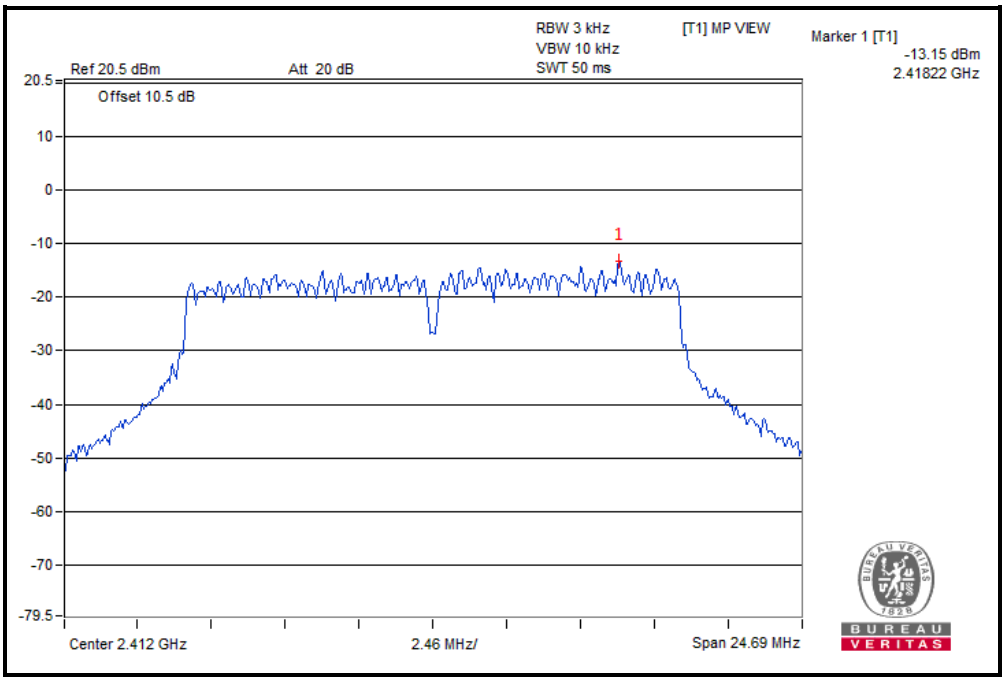
802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-3.80	8	PASS
6	2437	-4.85	8	PASS
11	2462	-4.70	8	PASS



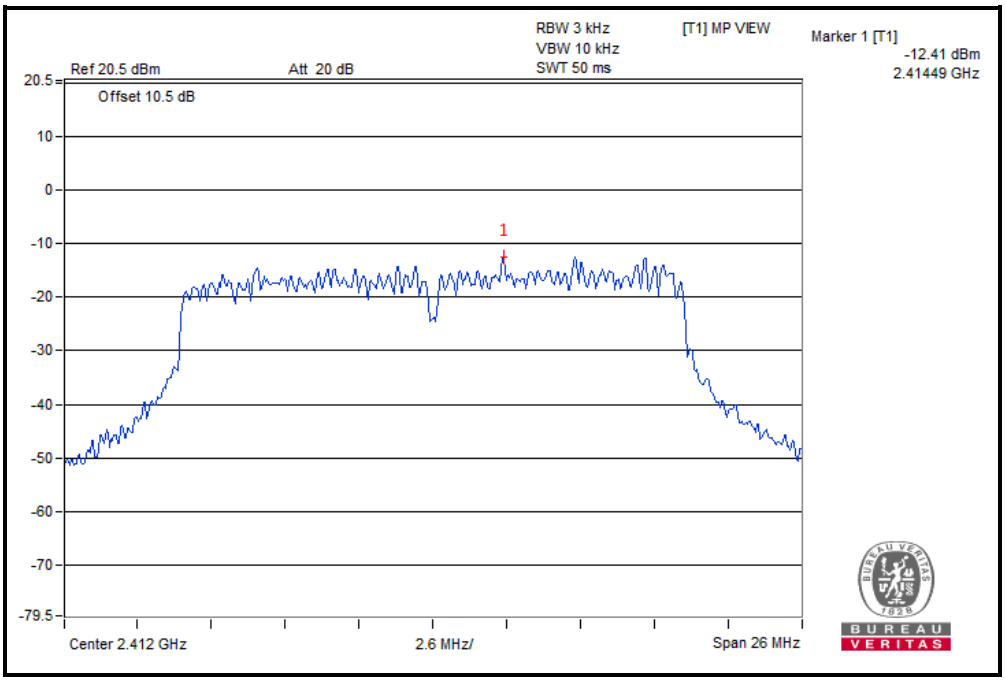
802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.15	8	PASS
6	2437	-14.16	8	PASS
11	2462	-13.16	8	PASS



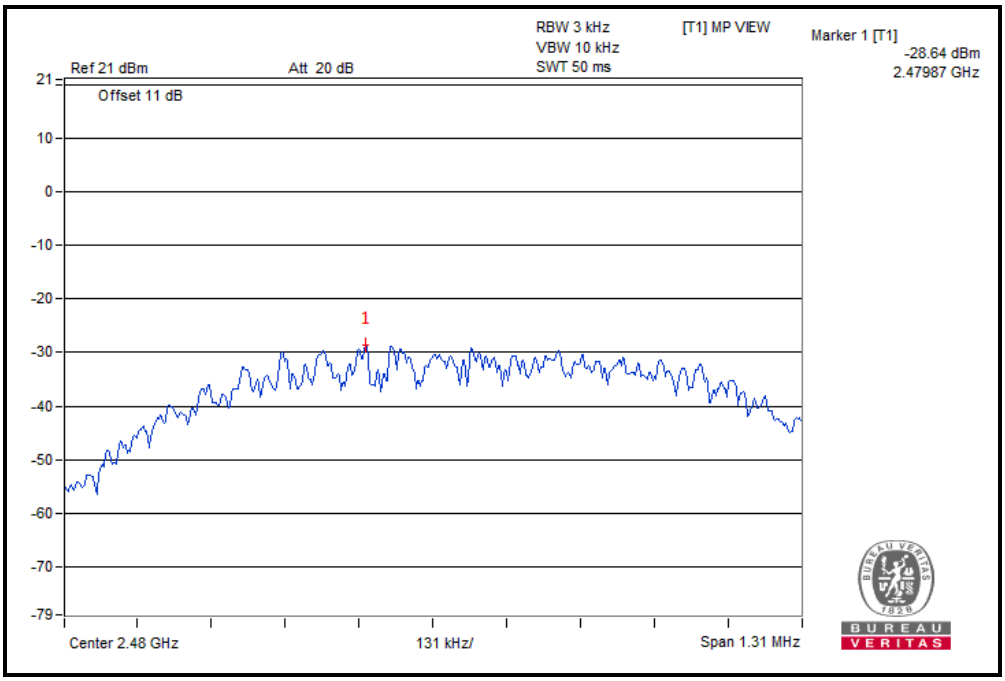
802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.41	8	PASS
6	2437	-14.27	8	PASS
11	2462	-13.16	8	PASS



BT-LE (GFSK)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2402	-29.84	8	PASS
19	2440	-29.28	8	PASS
39	2480	-28.64	8	PASS

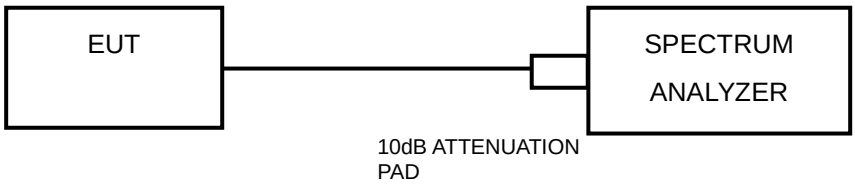


4.6 OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.6.4 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.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

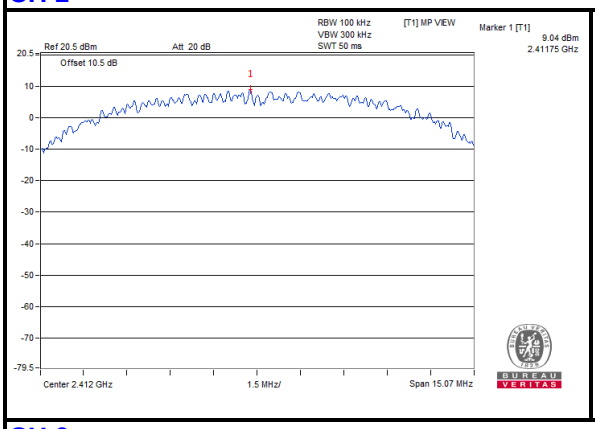
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

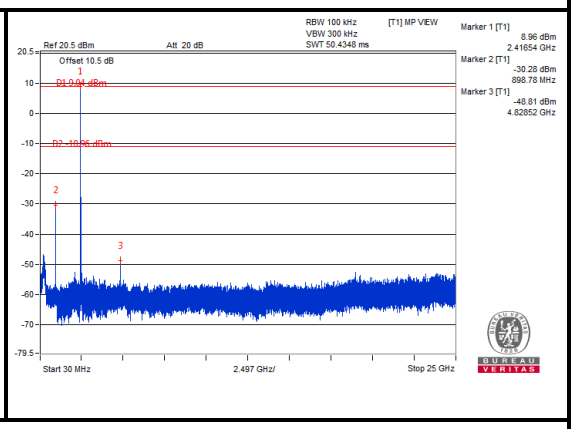
4.6.7 TEST RESULTS

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.

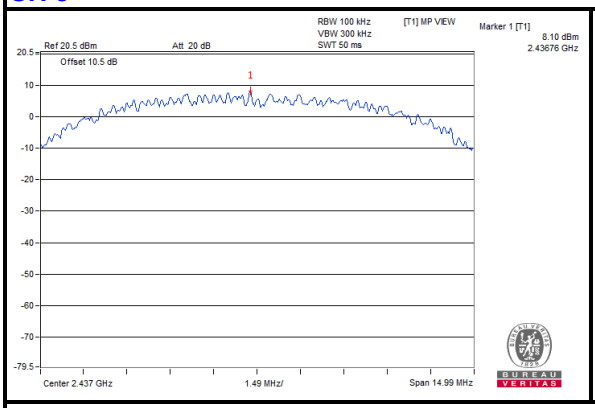
802.11b

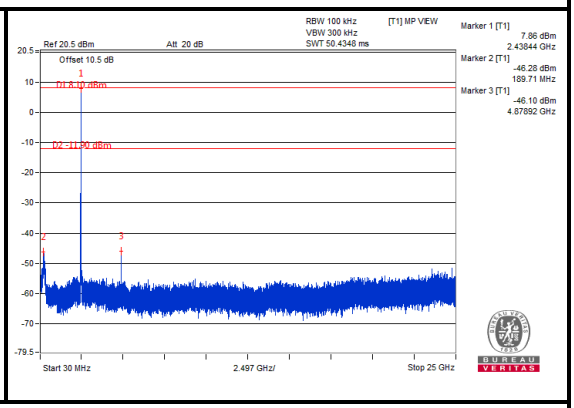
CH 1



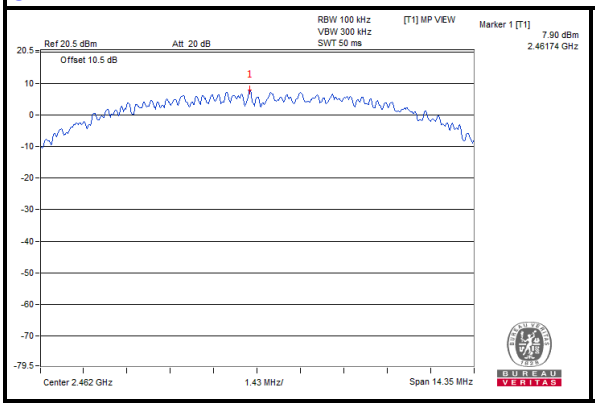


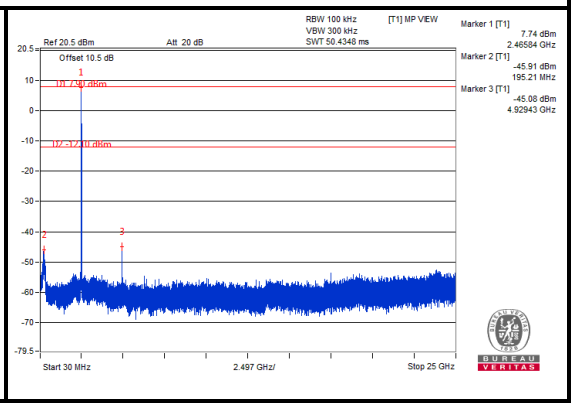
CH 6

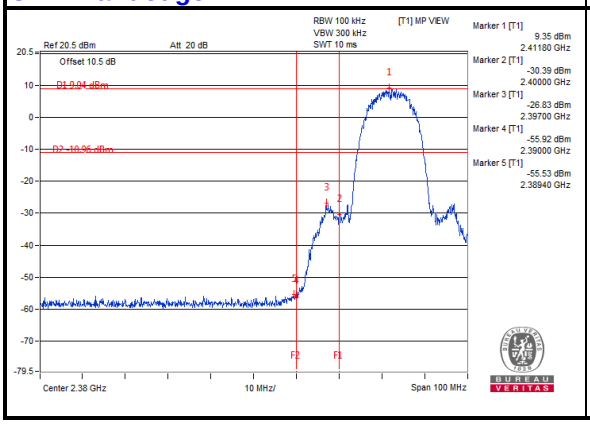
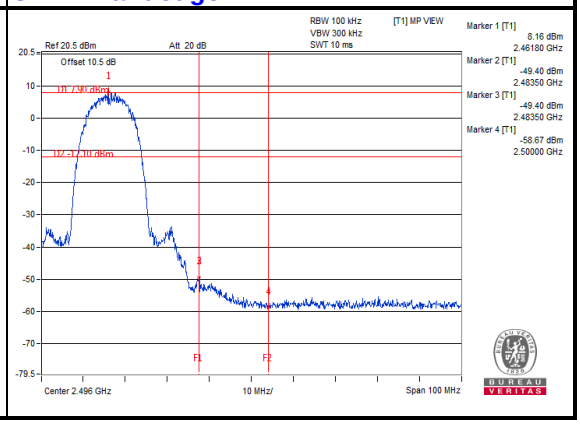




CH 11

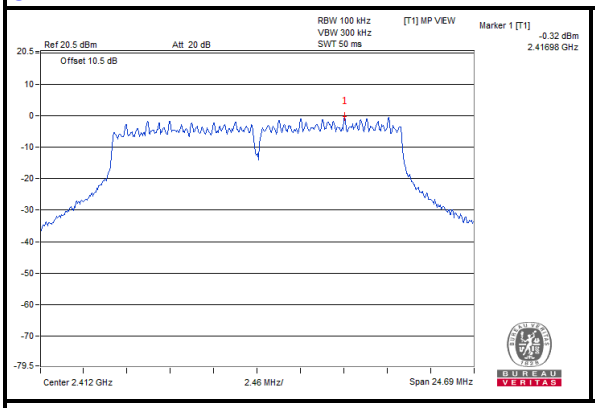


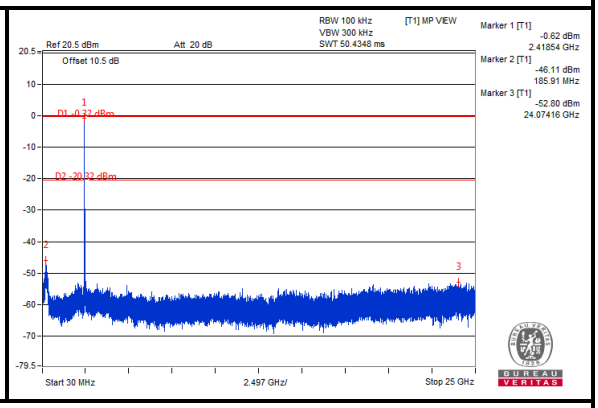


CH 1 Bandedge	CH 11 Bandedge
	

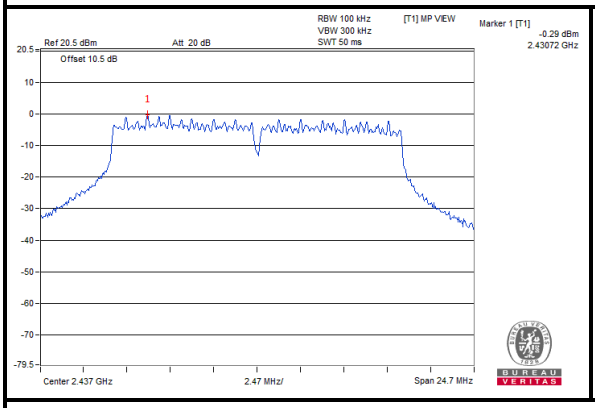
802.11g

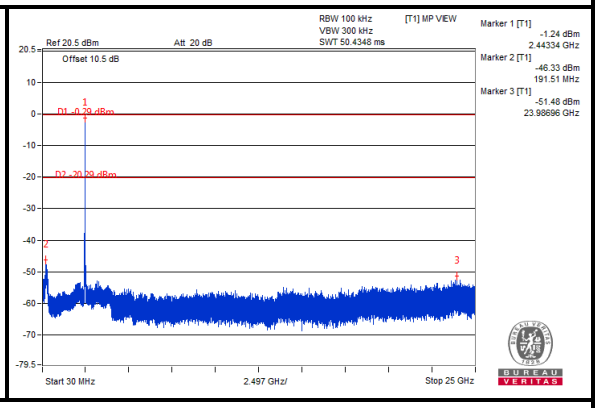
CH 1



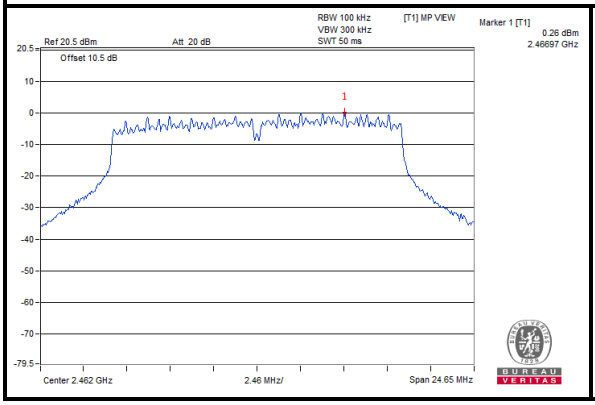


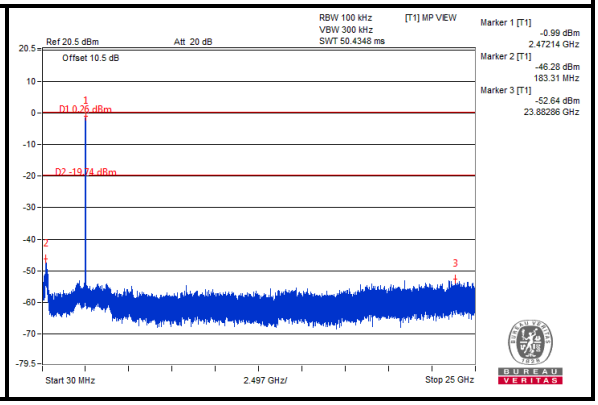
CH 6

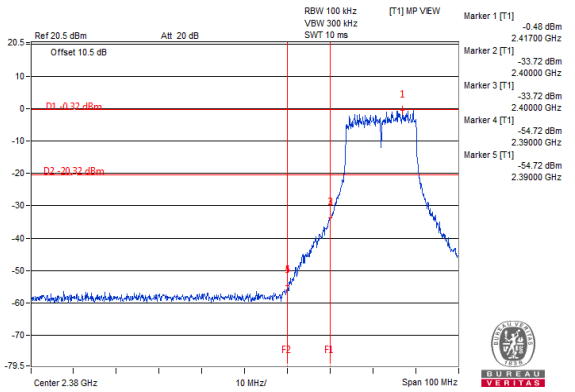
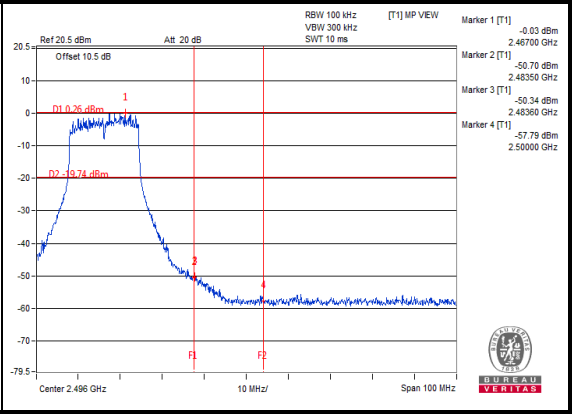




CH 11

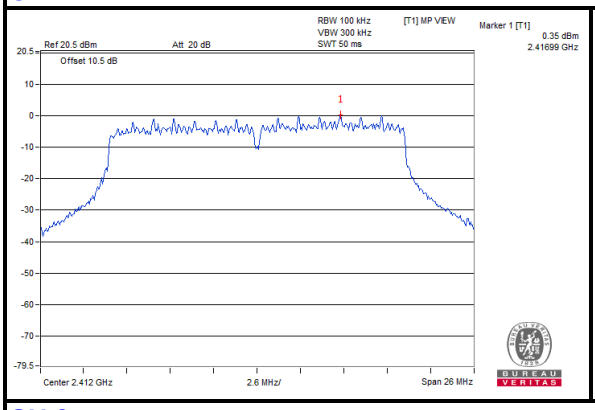


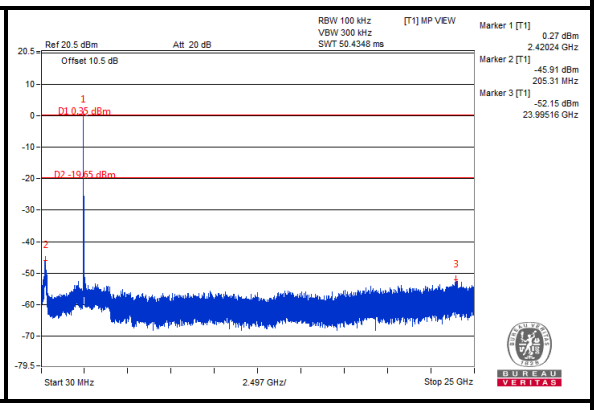


CH 1 Bandedge	CH 11 Bandedge
	

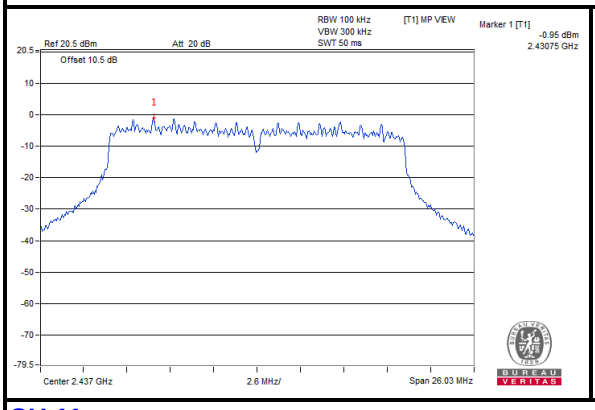
802.11n (20MHz)

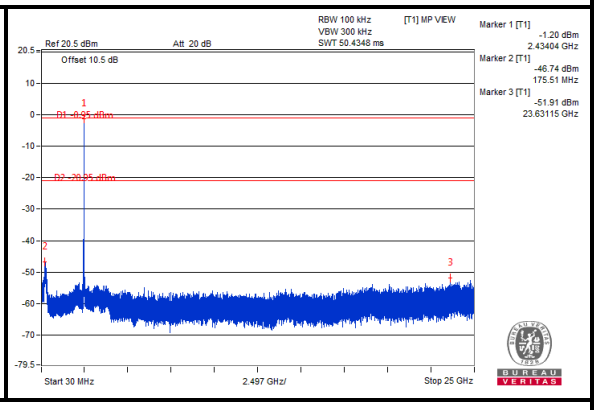
CH 1



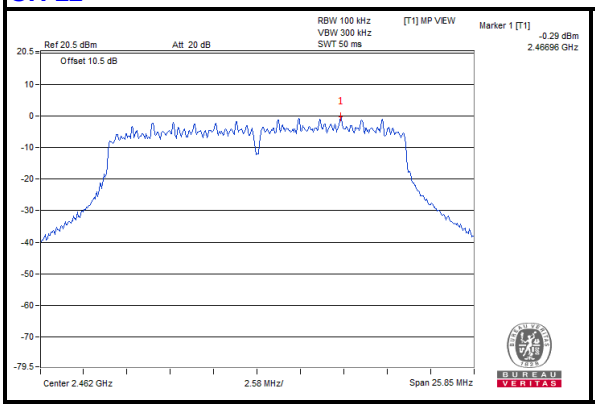


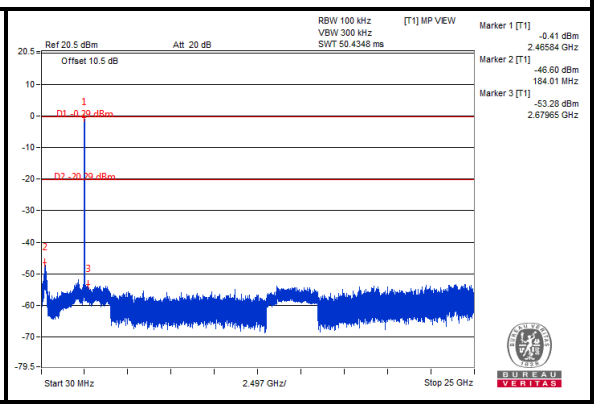
CH 6

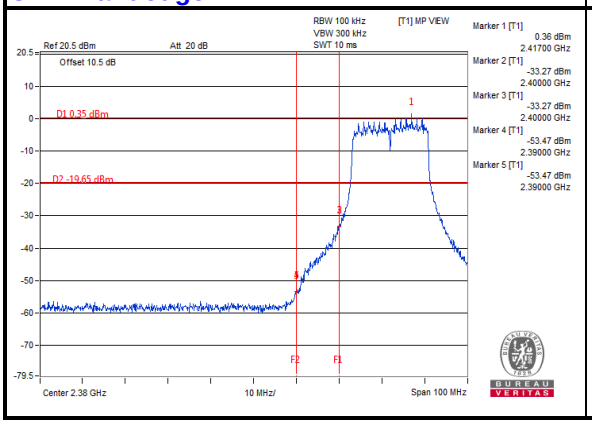
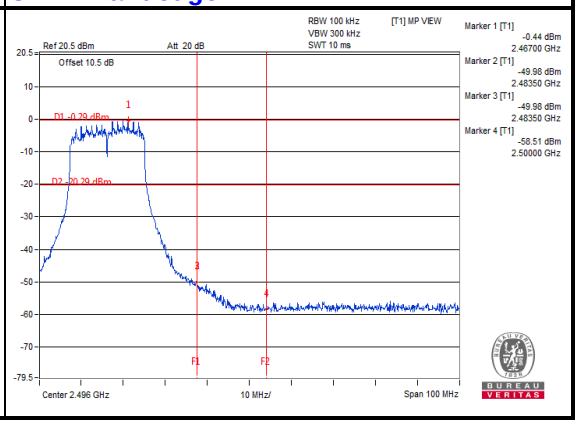




CH 11

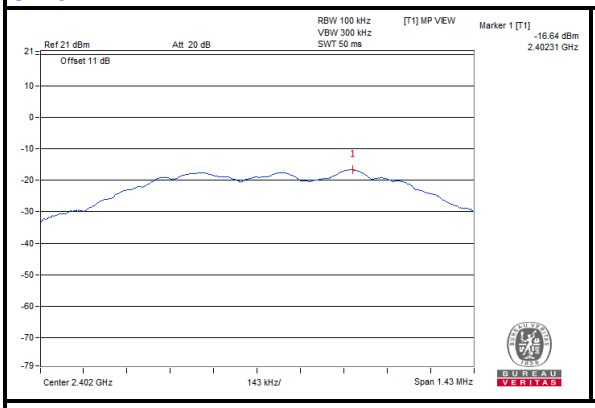


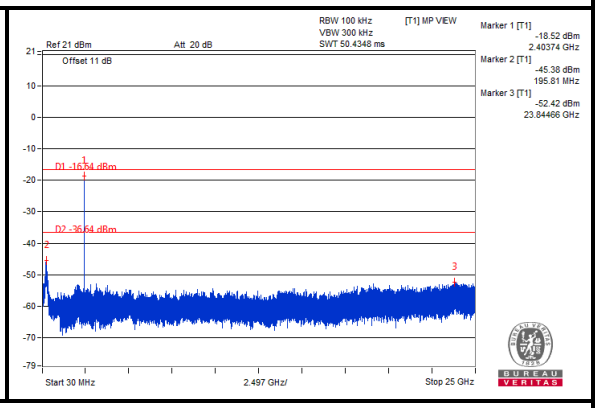


CH 1 Bandedge	CH 11 Bandedge
	

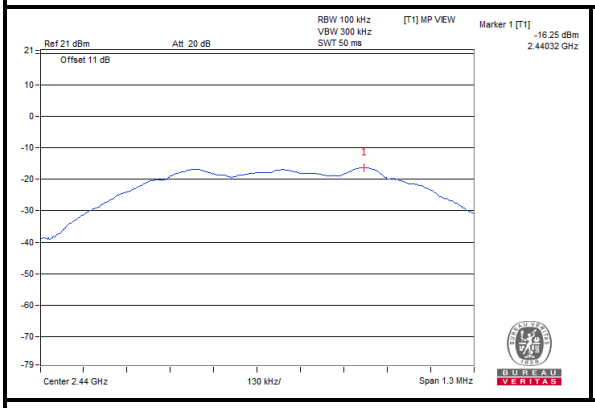
BT-LE (GFSK)

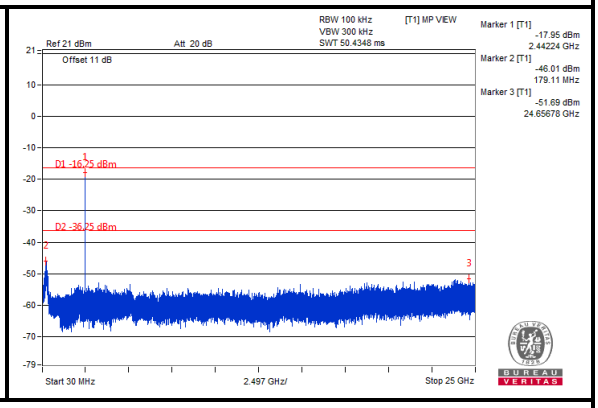
CH 0



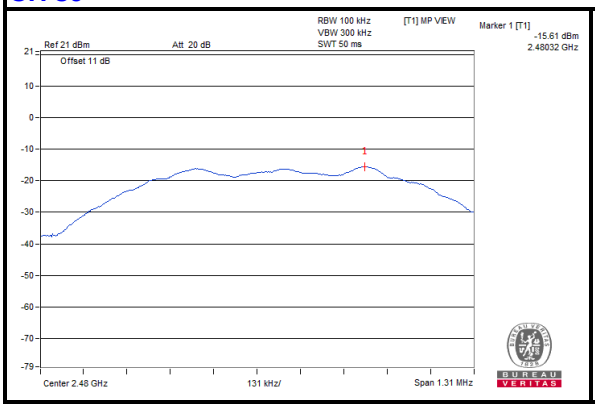


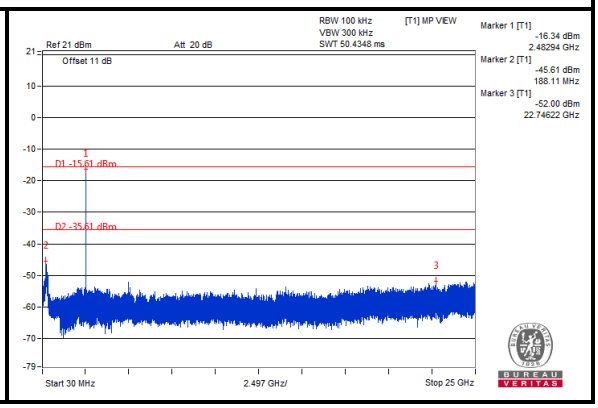
CH 19

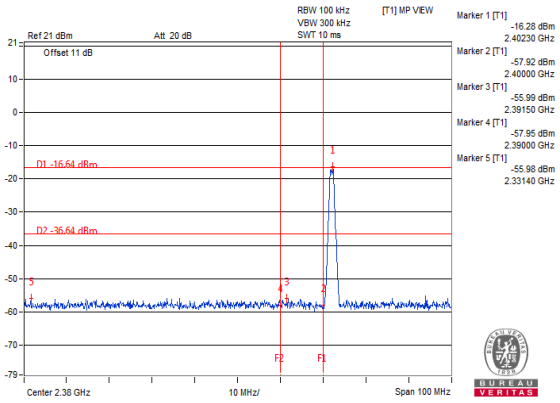
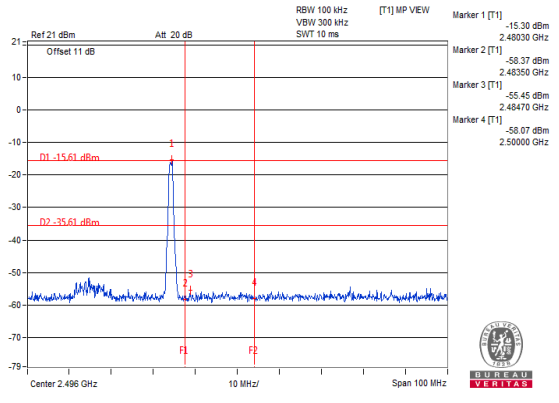




CH 39





CH 0 Bandedge	CH39 Bandedge
	

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6 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---