Test Lab
Cert 2951.01

TEST REPORT

Applicant	Naim Audio Ltd.
Address	Southampton Road, Salisbury, SP1 2LN, UK

Manufacturer or Supplier	Naim Audio Ltd.
Address	Southampton Road , Salisbury, SP1 2LN, UK
Product	WIRELESS MUSIC SYSTEM
Brand Name	Naim
Model	Mu-so Qb
Additional Model & Model Difference	N/A
Date of tests	Oct. 10, 2015 ~ Oct. 28, 2015

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

☒ **FCC Part 15, Subpart C, Section 15.247**

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

Tested by Blue Zheng Project Engineer/ EMC Department	Approved by Chris Chen Assistant Manager / EMC Department
	 Date: Oct. 28, 2015

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF150923N048-2	Original release	Oct. 28, 2015

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.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d)	Band Edge 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 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	4.84dB

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	WIRELESS MUSIC SYSTEM
MODEL NO.	Mu-so Qb
FCC ID	2ACURMUSOQB
NOMINAL VOLTAGE	AC 100-240V 50/60Hz Max 150W USB Output: DC 5V/2.1A
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM BT-LE(GFSK) for DTS
MODULATION TECHNOLOGY	DSSS, OFDM, DTS
OPERATING FREQUENCY	2412-2462MHz for 11b/g 2402-2480MHz for BT-LE(GFSK)
PEAK POWER	WLAN: 25.78dBm (Maximum) BT-LE: 9.21dBm (Maximum)
ANTENNA TYPE	Wire Antenna, 5.58dBi Gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two transmitters and two receivers.

MODULATION MODE	FUNCTION
802.11b	2TX/2RX
802.11g	2TX/2RX

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

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

4. Please refer to the EUT photo document (Reference No.: 150923N048) for detailed product photo.

3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g:

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 X 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	
A	√	√	√	√	**Powered by AC 120V with (WIFI+BT) function**

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.

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.

EUT CONFIGURE MODE	TESTED CONDITION
-	BT Link+ WIFI (2.4G) Link

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A	802.11b	1 to 11	1	OFDM	DBPSK	6.0	X
A	BT-LE	0 to 39	39	DTS	GFSK	1.0	X

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A	802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0	X
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	X
A	BT-LE	0 to 39	0,19, 39	DTS	GFSK	1.0	X

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 11	CCK	DBPSK	1.0
A	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
A	BT-LE	0 to 39	0,19, 39	DTS	GFSK	1.0

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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	BT-LE	0 to 39	0,19, 39	DTS	GFSK	1.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	26deg. C, 67%RH	AC 120V 60Hz	Sen He
RE≥1G	26deg. C, 67%RH	AC 120V 60Hz	Sen He
PLC	20deg. C, 56%RH	AC 120V 60Hz	Sen He
APCM	20deg. C, 55%RH	AC 120V 60Hz	Blue Zheng

3.3 DUTY CYCLE OF TEST SIGNAL

Chain 0:

Duty cycle of test signal is 100 %

Chain 1:

Duty cycle of test signal is 100 %

3.4 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

558074 D01 DTS Meas Guidance v03r03

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

NOTE: It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B(DoC). The test report has been issued separately.

3.5 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.
1	Mobile Phone	SAMSUNG	GT-S7572	R21D85CCB7N

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AUX In Line: Unshielded, Detachable 1m

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	ESCI	100962	Mar. 05,15	Mar. 04,16
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	April 25,15	Apr. 24,16
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	April 25,15	Apr. 24,16
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.

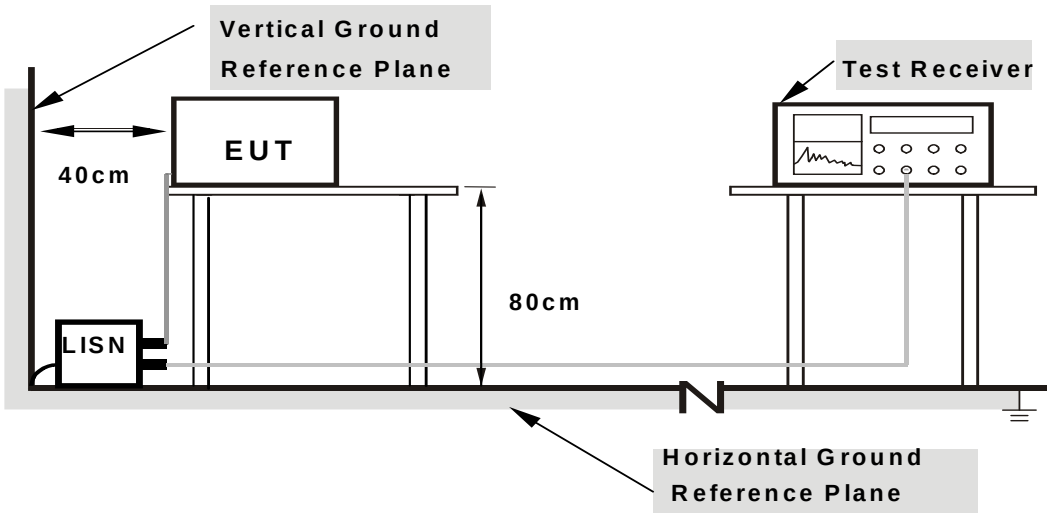
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

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 Manual.

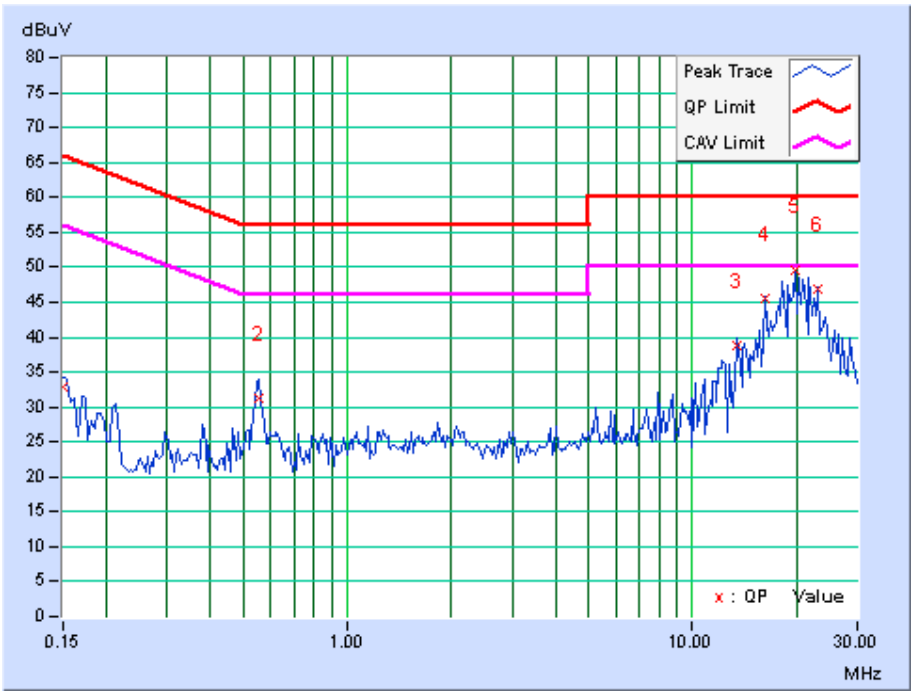
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: BT+WIFI

PHASE	Line	6dB BANDWIDTH	9kHz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.75	23.08	17.06	32.83	26.81	66.00	56.00	-33.17	-29.19
2	0.55234	9.77	21.58	14.50	31.35	24.27	56.00	46.00	-24.65	-21.73
3	13.41797	9.83	28.94	25.22	38.77	35.05	60.00	50.00	-21.23	-14.95
4	16.22656	9.88	35.74	32.24	45.62	42.12	60.00	50.00	-14.38	-7.88
5	**19.70703**	**10.04**	**39.50**	**36.06**	**49.54**	**46.10**	**60.00**	**50.00**	**-10.46**	**-3.90**
6	23.12500	10.15	36.82	33.46	46.97	43.61	60.00	50.00	-13.03	-6.39

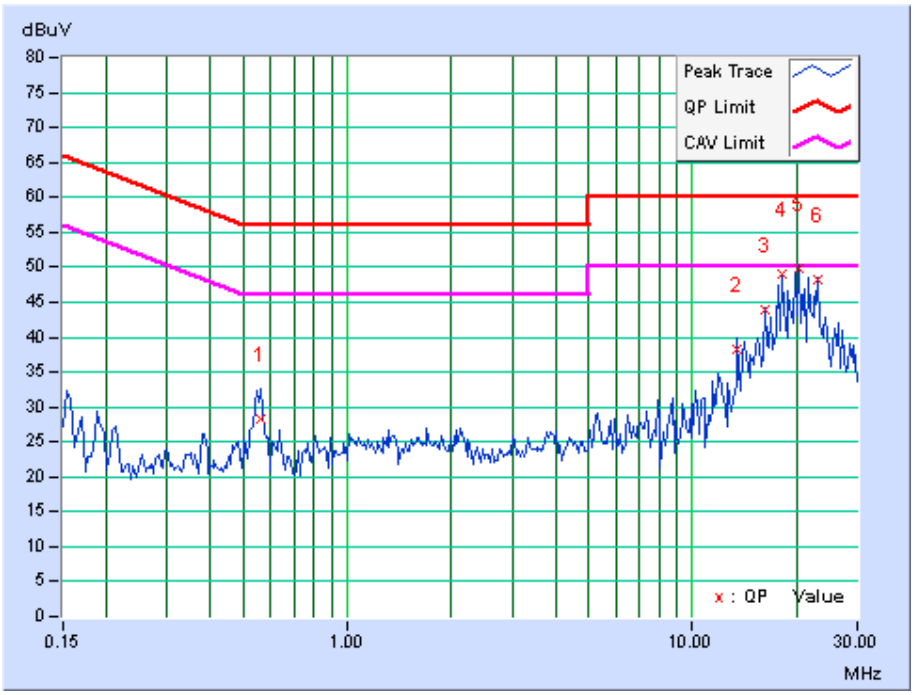
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



PHASE	Neutral	6dB BANDWIDTH	9kHz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.56406	9.47	18.88	9.34	28.35	18.81	56.00	46.00	-27.65	-27.19
2	13.41797	9.60	28.74	25.28	38.34	34.88	60.00	50.00	-21.66	-15.12
3	16.23047	9.63	34.22	30.66	43.85	40.29	60.00	50.00	-16.15	-9.71
4	18.24219	9.67	39.32	35.92	48.99	45.59	60.00	50.00	-11.01	-4.41
5	20.25781	9.72	40.08	34.72	49.80	44.44	60.00	50.00	-10.20	-5.56
6	23.12891	9.85	38.42	34.90	48.27	44.75	60.00	50.00	-11.73	-5.25

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.



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. 27,15	Apr. 26,16
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Apr. 23,15	Apr. 22,16
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 16, 15	Jul. 15, 16
Horn Antenna	ETS-Lindgren	3117	00062558	May 30,14	May 29,16
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Mar. 04,15	Mar. 03, 16
Pre-Amplifier (0.5~18GHz)	SCHWARZBECK	BBV 9718	9718-266	Mar 26,14	Mar 25,16
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 08, 14	Aug. 07, 16
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Apr. 19,14	Apr. 18,16
Test Software	ADT	ADT_Radiated _V7.6.15.9.2	N/A	N/A	N/A
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 21,14	Jan. 20,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 20,14	Nov. 19,15

NOTE:

1. The test was performed in 966 Chamber.
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. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 494399.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meters semi-anechoic chamber. 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.

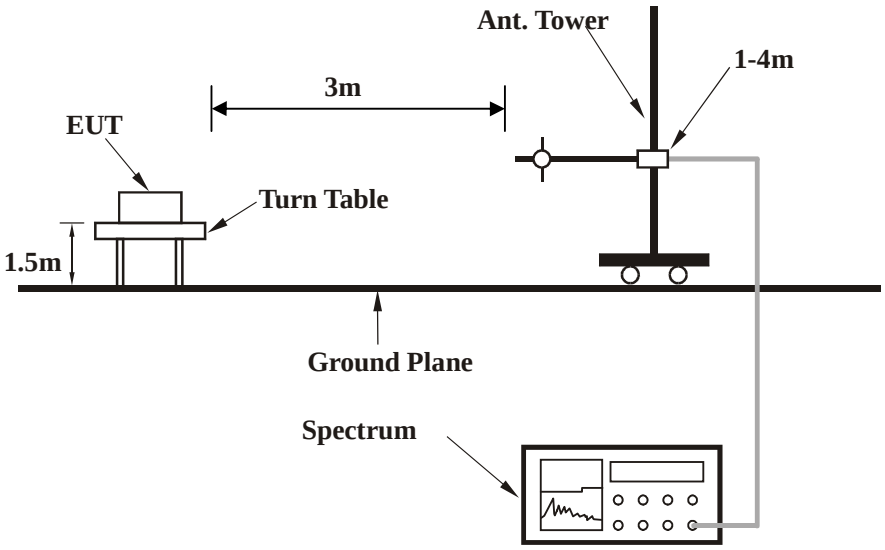
NOTE:

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



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:

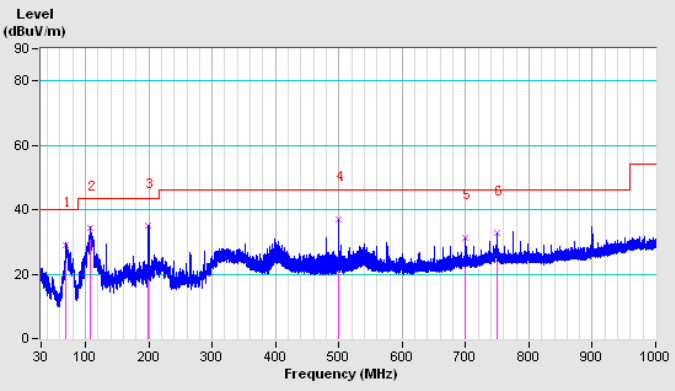
802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	69.13	29.17	40.00	-10.83	100	0	53.99	-24.82
2	108.08	34.37	43.50	-9.13	100	0	53.67	-19.30
3	**199.17**	**35.08**	**43.50**	**-8.42**	**100**	**0**	**56.00**	**-20.92**
4	500.00	37.18	46.00	-8.82	100	0	45.53	-8.35
5	700.03	31.46	46.00	-14.54	100	0	35.80	-4.34
6	749.62	32.89	46.00	-13.11	100	0	35.33	-2.44

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

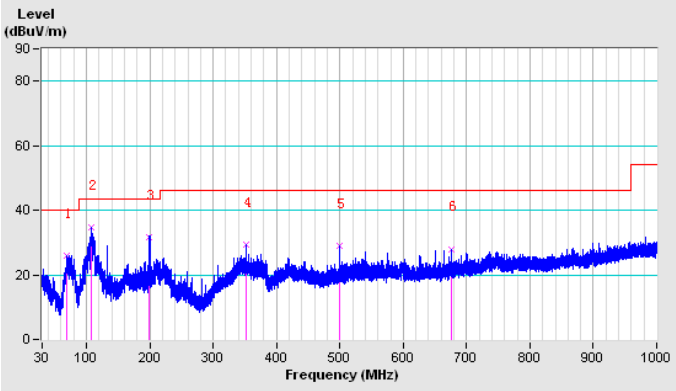


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	69.13	25.78	40.00	-14.22	100	0	50.60	-24.82
2	107.66	34.56	43.50	-8.94	100	0	53.90	-19.34
3	199.17	31.75	43.50	-11.75	100	0	52.67	-20.92
4	352.34	29.24	46.00	-16.76	100	0	42.79	-13.55
5	500.00	29.06	46.00	-16.94	100	0	37.41	-8.35
6	675.87	28.01	46.00	-17.99	100	0	32.81	-4.80

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



ABOVE 1GHz DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	63.1 PK	74.0	-10.9	1.21 H	216	62.71	0.39
2	2390.00	40.0 AV	54.0	-14.0	1.21 H	216	39.63	0.39
3	*2412.00	103.6 PK			1.21 H	216	103.16	0.44
4	*2412.00	92.8 AV			1.21 H	216	92.35	0.44
5	4824.00	53.7 PK	74.0	-20.3	1.03 H	64	47.15	6.59
6	4824.00	39.8 AV	54.0	-14.2	1.03 H	64	33.24	6.59
7	#7236.00	54.6 PK	83.6	-29.0	1.01 H	344	43.80	10.80
8	#7236.00	40.0 AV	72.8	-32.8	1.01 H	344	29.22	10.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	63.7 PK	74.0	-10.3	1.01 V	282	63.35	0.39
2	2390.00	40.4 AV	54.0	-13.6	1.01 V	282	39.97	0.39
3	*2412.00	107.6 PK			1.01 V	282	107.18	0.44
4	*2412.00	97.3 AV			1.01 V	282	96.89	0.44
5	4824.00	52.7 PK	74.0	-21.3	1.02 V	47	46.11	6.59
6	4824.00	40.0 AV	54.0	-14.0	1.02 V	47	33.41	6.59
7	#7236.00	53.7 PK	87.6	-33.9	1.04 V	313	42.86	10.80
8	#7236.00	41.0 AV	77.3	-36.3	1.04 V	313	30.20	10.80

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).
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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.4 PK			1.13 H	185	103.87	0.51
2	*2437.00	94.3 AV			1.13 H	185	93.77	0.51
3	4874.00	53.1 PK	74.0	-20.9	1.49 H	69	46.39	6.73
4	4874.00	43.2 AV	54.0	-10.8	1.49 H	69	36.48	6.73
5	7311.00	55.3 PK	74.0	-18.7	1.12 H	203	44.54	10.80
6	7311.00	44.6 AV	54.0	-9.4	1.12 H	203	33.77	10.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	106.3 PK			1.05 V	270	105.79	0.51
2	*2437.00	96.1 AV			1.05 V	270	95.55	0.51
3	4874.00	52.5 PK	74.0	-21.5	4.00 V	99	45.77	6.73
4	4874.00	43.2 AV	54.0	-10.8	4.00 V	99	36.43	6.73
5	7311.00	54.6 PK	74.0	-19.4	1.09 V	140	43.83	10.80
6	7311.00	44.1 AV	54.0	-9.9	1.09 V	140	33.30	10.80

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).
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								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.6 PK			1.54 H	211	103.04	0.56
2	*2462.00	91.8 AV			1.54 H	211	91.19	0.56
3	2483.50	60.2 PK	74.0	-13.8	1.54 H	211	59.59	0.61
4	2483.50	38.4 AV	54.0	-15.6	1.54 H	211	37.79	0.61
5	4924.00	54.9 PK	74.0	-19.1	1.02 H	318	48.00	6.88
6	4924.00	40.0 AV	54.0	-14.0	1.02 H	318	33.09	6.88
7	7386.00	54.2 PK	74.0	-19.8	1.04 H	42	43.40	10.80
8	7386.00	40.0 AV	54.0	-14.0	1.04 H	42	29.21	10.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.5 PK			1.41 V	281	105.94	0.56
2	*2462.00	95.3 AV			1.41 V	281	94.78	0.56
3	2483.50	63.4 PK	74.0	-10.6	1.41 V	281	62.79	0.61
4	2483.50	37.7 AV	54.0	-16.3	1.41 V	281	37.09	0.61
5	4924.00	54.7 PK	74.0	-19.3	1.02 V	71	47.82	6.88
6	4924.00	39.6 AV	54.0	-14.4	1.02 V	71	32.72	6.88
7	7386.00	56.2 PK	74.0	-17.8	1.00 V	36	45.40	10.80
8	7386.00	41.3 AV	54.0	-12.7	1.00 V	36	30.50	10.80

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).
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								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.0 PK	74.0	-9.0	1.11 H	192	64.59	0.39
2	2390.00	41.5 AV	54.0	-12.5	1.11 H	192	41.12	0.39
3	*2412.00	106.3 PK			1.11 H	192	105.86	0.44
4	*2412.00	90.1 AV			1.11 H	192	89.67	0.44
5	4824.00	52.6 PK	74.0	-21.4	1.02 H	145	46.04	6.59
6	4824.00	41.3 AV	54.0	-12.7	1.02 H	145	34.73	6.59
7	#7236.00	54.5 PK	86.3	-31.8	1.21 H	58	43.73	10.80
8	#7236.00	44.8 AV	70.1	-25.3	1.21 H	58	33.98	10.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	**2390.00**	**66.4 PK**	**74.0**	**-7.6**	**1.00 V**	**81**	**65.96**	**0.39**
2	2390.00	46.2 AV	54.0	-7.8	1.00 V	81	45.81	0.39
3	*2412.00	106.9 PK			1.00 V	81	106.45	0.44
4	*2412.00	91.3 AV			1.00 V	81	90.90	0.44
5	4824.00	52.3 PK	74.0	-21.7	1.44 V	251	45.75	6.59
6	4824.00	42.0 AV	54.0	-12.0	1.44 V	251	35.43	6.59
7	#7236.00	54.2 PK	86.9	-32.7	1.34 V	176	43.43	10.80
8	#7236.00	43.3 AV	71.3	-28.0	1.34 V	176	32.47	10.80

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).
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								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	105.6 PK			1.01 H	199	105.09	0.51
2	*2437.00	90.0 AV			1.01 H	199	89.52	0.51
3	4874.00	52.4 PK	74.0	-21.6	1.28 H	154	45.63	6.73
4	4874.00	43.7 AV	54.0	-10.3	1.28 H	154	36.92	6.73
5	7311.00	54.0 PK	74.0	-20.0	1.76 H	84	43.15	10.80
6	7311.00	44.1 AV	54.0	-9.9	1.76 H	84	33.32	10.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	108.3 PK			1.00 V	273	107.76	0.51
2	*2437.00	92.9 AV			1.00 V	273	92.35	0.51
3	4874.00	53.1 PK	74.0	-20.9	1.42 V	223	46.37	6.73
4	4874.00	42.6 AV	54.0	-11.4	1.42 V	223	35.83	6.73
5	7311.00	54.6 PK	74.0	-19.4	1.55 V	58	43.76	10.80
6	7311.00	44.5 AV	54.0	-9.5	1.55 V	58	33.73	10.80

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).
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								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.6 PK			1.09 H	177	103.06	0.56
2	*2462.00	86.8 AV			1.09 H	177	86.26	0.56
3	2483.50	64.9 PK	74.0	-9.1	1.09 H	177	64.26	0.61
4	2483.50	45.4 AV	54.0	-8.6	1.09 H	177	44.78	0.61
5	4924.00	52.6 PK	74.0	-21.4	1.51 H	25	45.76	6.88
6	4924.00	43.1 AV	54.0	-10.9	1.51 H	25	36.24	6.88
7	7386.00	54.7 PK	74.0	-19.3	1.18 H	54	43.89	10.80
8	7386.00	43.9 AV	54.0	-10.1	1.18 H	54	33.07	10.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.6 PK			1.14 V	268	105.00	0.56
2	*2462.00	89.6 AV			1.14 V	268	89.08	0.56
3	2483.50	64.1 PK	74.0	-9.9	1.14 V	268	63.51	0.61
4	2483.50	46.0 AV	54.0	-8.0	1.14 V	268	45.41	0.61
5	4924.00	52.8 PK	74.0	-21.2	1.03 V	346	45.91	6.88
6	4924.00	43.2 AV	54.0	-10.8	1.03 V	346	36.33	6.88
7	7386.00	53.9 PK	74.0	-20.1	1.24 V	84	43.12	10.80
8	7386.00	43.6 AV	54.0	-10.4	1.24 V	84	32.76	10.80

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).
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:

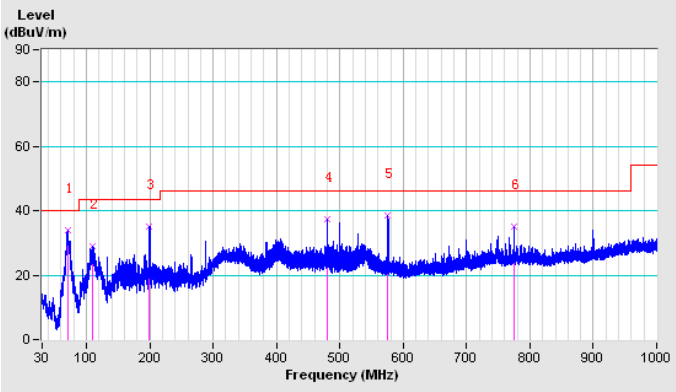
BT-LE (GFSK)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	**70.41**	**34.02**	**40.00**	**-5.98**	**100**	**0**	**58.74**	**-24.72**
2	110.09	29.08	43.50	-14.42	100	0	48.19	-19.11
3	199.17	35.23	43.50	-8.27	100	0	56.15	-20.92
4	480.02	37.34	46.00	-8.66	100	0	46.40	-9.06
5	575.99	38.49	46.00	-7.51	100	0	44.36	-5.87
6	774.17	35.18	46.00	-10.82	100	0	37.64	-2.46

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

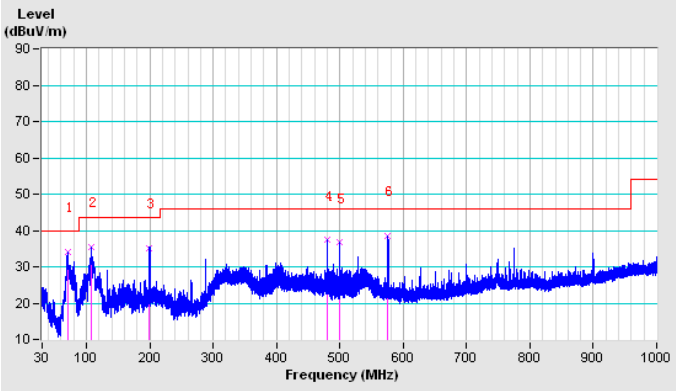


CHANNEL	TX Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	70.41	34.02	40.00	-5.98	100	0	58.74	-24.72
2	107.99	35.50	43.50	-8.00	100	0	54.81	-19.31
3	199.17	35.23	43.50	-8.27	100	0	56.15	-20.92
4	480.02	37.34	46.00	-8.66	100	0	46.40	-9.06
5	500.00	36.64	46.00	-9.36	100	0	44.99	-8.35
6	575.99	38.49	46.00	-7.51	100	0	44.36	-5.87

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).
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								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	61.7 PK	74.0	-12.3	1.48 H	132	61.26	0.39
2	2390.00	36.1 AV	54.0	-17.9	1.48 H	132	35.74	0.39
3	*2402.00	103.8 PK			1.48 H	132	103.37	0.42
4	*2402.00	88.1 AV			1.48 H	132	87.67	0.42
5	4804.00	52.4 PK	74.0	-21.6	1.32 H	98	45.84	6.52
6	4804.00	42.0 AV	54.0	-12.0	1.32 H	98	35.43	6.52
7	#7206.00	54.1 PK	83.8	-29.7	1.55 H	81	43.32	10.80
8	#7206.00	43.2 AV	68.1	-24.9	1.55 H	81	32.41	10.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	67.1 PK	74.0	-6.9	1.03 V	261	66.75	0.39
2	2390.00	36.0 AV	54.0	-18.0	1.03 V	261	35.56	0.39
3	*2402.00	102.2 PK			1.03 V	231	101.76	0.42
4	*2402.00	87.0 AV			1.03 V	261	86.60	0.42
5	4804.00	52.0 PK	74.0	-22.0	1.08 V	253	45.51	6.52
6	4804.00	40.1 AV	54.0	-13.9	1.08 V	253	33.60	6.52
7	#7206.00	55.1 PK	82.2	-27.1	1.51 V	22	44.33	10.80
8	#7206.00	44.3 AV	67.0	-22.7	1.51 V	22	33.52	10.80

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).
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 19	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	106.7 PK			2.04 H	332	106.14	0.51
2	*2440.00	91.8 AV			2.04 H	332	91.27	0.51
3	4880.00	52.8 PK	74.0	-21.2	1.52 H	314	46.09	6.75
4	4880.00	42.6 AV	54.0	-11.4	1.52 H	314	35.82	6.75
5	7320.00	55.2 PK	74.0	-18.8	1.49 H	351	44.43	10.80
6	7320.00	44.8 AV	54.0	-9.2	1.49 H	351	34.01	10.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	105.7 PK			1.16 V	335	105.14	0.51
2	*2440.00	91.0 AV			1.16 V	335	90.44	0.51
3	4880.00	53.1 PK	74.0	-20.9	1.03 V	254	46.35	6.75
4	4880.00	42.3 AV	54.0	-11.7	1.03 V	254	35.58	6.75
5	7320.00	54.3 PK	74.0	-19.7	1.80 V	24	43.51	10.80
6	7320.00	43.6 AV	54.0	-10.4	1.80 V	24	32.77	10.80

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).
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								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	106.0 PK			2.21 H	335	105.36	0.60
2	*2480.00	90.4 AV			2.21 H	335	89.78	0.60
3	2483.50	65.2 PK	74.0	-8.8	2.21 H	335	64.57	0.61
4	2483.50	41.2 AV	54.0	-12.8	2.21 H	335	40.58	0.61
5	4960.00	52.6 PK	74.0	-21.4	1.03 H	258	45.65	6.99
6	4960.00	41.8 AV	54.0	-12.2	1.03 H	258	34.78	6.99
7	7440.00	54.8 PK	74.0	-19.2	1.14 H	84	44.04	10.80
8	7440.00	43.3 AV	54.0	-10.7	1.14 H	84	32.45	10.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	106.3 PK			2.05 V	344	105.74	0.60
2	*2480.00	89.9 AV			2.05 V	344	89.34	0.60
3	**2483.50**	**70.6 PK**	**74.0**	**-3.4**	**2.05 V**	**344**	**69.95**	**0.61**
4	2483.50	40.7 AV	54.0	-13.3	2.05 V	344	40.12	0.61
5	4960.00	52.0 PK	74.0	-22.0	1.33 V	325	44.97	6.99
6	4960.00	40.6 AV	54.0	-13.4	1.33 V	325	33.59	6.99
7	7440.00	54.1 PK	74.0	-19.9	1.51 V	258	43.31	10.80
8	7440.00	42.6 AV	54.0	-11.4	1.51 V	258	31.81	10.80

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

4.3 6dB 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	Feb. 18,15	Feb. 17,16
Power Sensor	Keysight	U2021XA	MY55060018	Feb. 18,15	Feb. 17,16
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. 28,14	Nov. 27,15
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 05,14	Nov. 04,15
Signal Generator	Agilent	N5183A	MY50140980	Nov. 05,14	Nov. 04,15
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 15	Apr. 21, 16
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Sep. 01,15	Aug. 31,16

NOTE:

1. The test was performed in RF Oven 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.

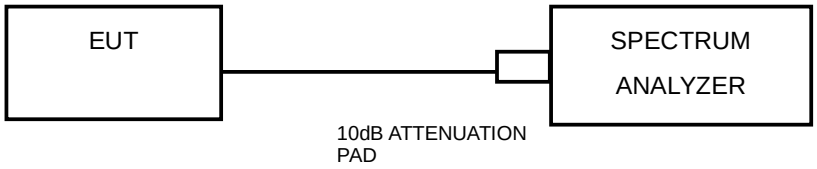
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100KHz
2. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) 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	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	12.09	12.09	0.5	PASS
6	2437	12.11	12.12	0.5	PASS
11	2462	12.11	12.10	0.5	PASS

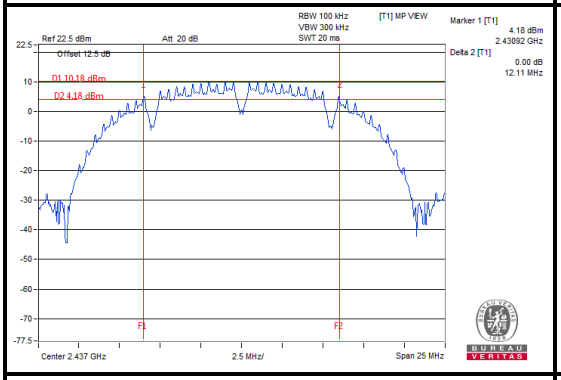
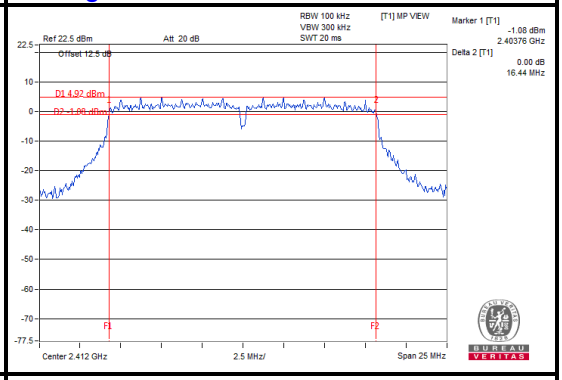
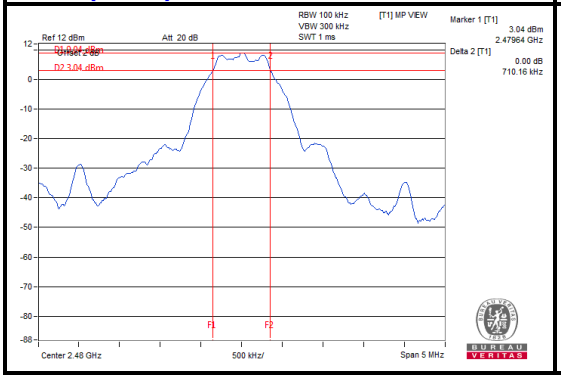
802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.44	16.42	0.5	PASS
6	2437	16.42	16.43	0.5	PASS
11	2462	16.42	16.42	0.5	PASS

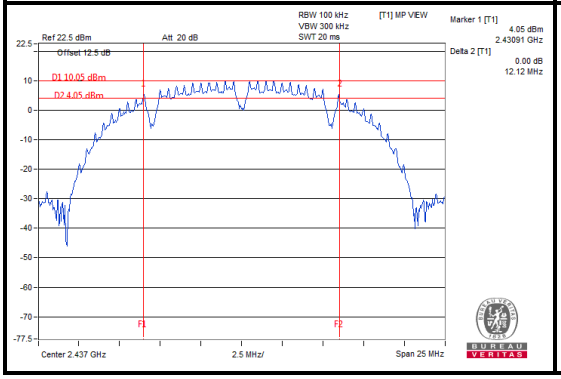
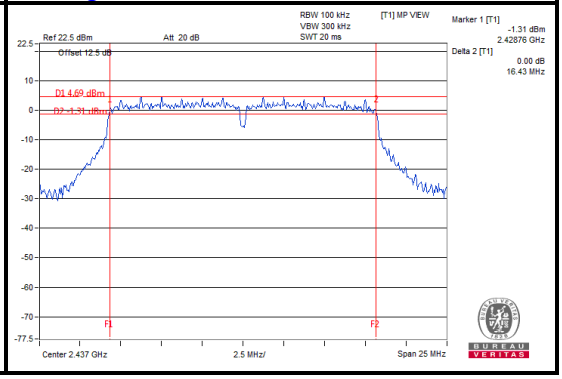
BT-LE (GFSK)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	0.70	0.5	PASS
19	2440	0.71	0.5	PASS
39	2480	0.71	0.5	PASS

CHAIN 0

SPECTRUM PLOT OF WORST VALUE	
802.11b	**802.11g**
	
BT-LE (GFSK)	
	

CHAIN 1

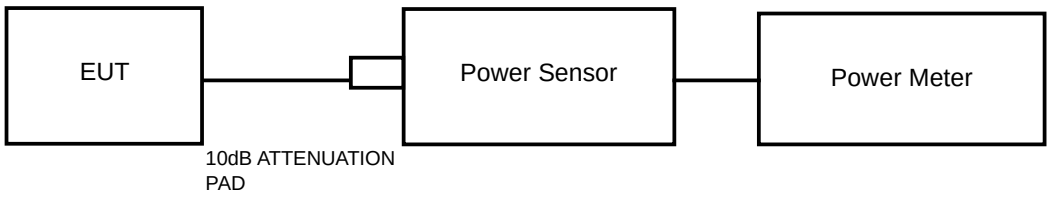
SPECTRUM PLOT OF WORST VALUE	
802.11b	**802.11g**
	

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

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	Feb. 18,15	Feb. 17,16
Power Sensor	Keysight	U2021XA	MY55060018	Feb. 18,15	Feb. 17,16
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. 28,14	Nov. 27,15
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 05,14	Nov. 04,15
Signal Generator	Agilent	N5183A	MY50140980	Nov. 05,14	Nov. 04,15
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 15	Apr. 21, 16
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Sep. 01,15	Aug. 31,16

NOTE:

1. The test was performed in RF Oven 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.

4.4.4 TEST PROCEDURES

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

CHAN.	FREQ. (MHz)	PEAK POWER(dBm)		PEAK POWER(mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	22.88	22.62	194.089	182.810	376.899	25.76	1	PASS
6	2437	22.95	22.59	197.242	181.552	**378.794**	**25.78**	1	PASS
11	2462	20.31	22.32	107.399	170.608	278.007	24.44	1	PASS

802.11g

CHAN.	FREQ. (MHz)	PEAK POWER(dBm)		PEAK POWER(mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	17.30	16.58	53.703	45.499	99.202	19.97	1	PASS
6	2437	17.33	16.67	54.075	46.452	100.527	20.02	1	PASS
11	2462	16.38	16.45	43.451	44.157	87.608	19.43	1	PASS

BT-LE (GFSK)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
0	2402	5.00	3.162	1	PASS
19	2440	8.72	7.447	1	PASS
39	2480	**9.21**	**8.337**	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

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	19.81	18.51	95.719	70.958	166.677	22.22	30	PASS
6	2437	19.89	18.66	97.499	73.451	**170.950**	**22.33**	30	PASS
11	2462	17.24	18.28	52.966	67.298	120.264	20.80	30	PASS

802.11g

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	17.30	16.58	53.703	45.499	99.202	19.97	30	PASS
6	2437	17.33	16.67	54.075	46.452	100.527	20.02	30	PASS
11	2462	16.38	16.45	43.451	44.157	87.608	19.43	30	PASS

BT-LE (GFSK)

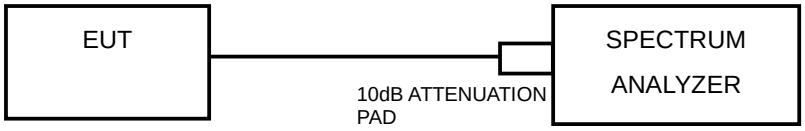
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
0	2402	2.53	1.791
19	2440	2.79	1.901
39	2480	2.65	1.841

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

a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set VBW ≥3 x RBW.
e) Detector = peak
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) 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

Same as item 4.3.6.

4.5.7 TEST RESULTS

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	TOTAL PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-4.36	3.01	-1.35	8	PASS
	6	2437	-2.10	3.01	0.91	8	PASS
	11	2462	-3.95	3.01	-0.94	8	PASS
1	1	2412	-2.91	3.01	0.10	8	PASS
	6	2437	-3.70	3.01	-0.69	8	PASS
	11	2462	-3.51	3.01	-0.50	8	PASS

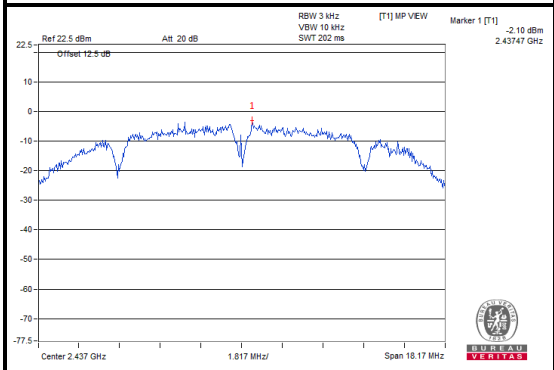
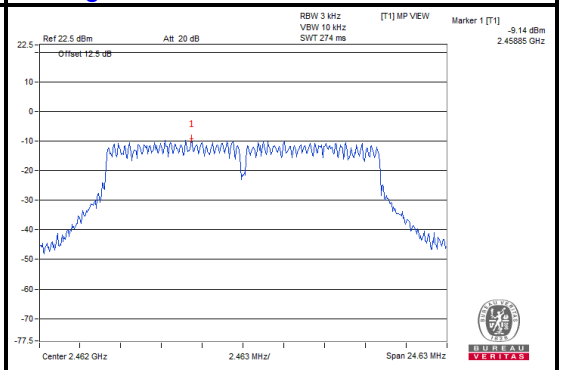
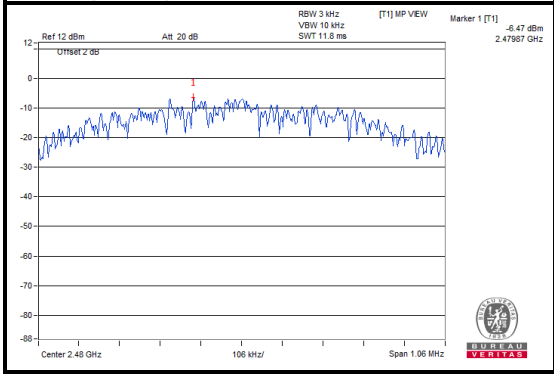
802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	TOTAL PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-9.43	3.01	-6.42	8	PASS
	6	2437	-9.36	3.01	-6.35	8	PASS
	11	2462	-9.14	3.01	-6.13	8	PASS
1	1	2412	-9.68	3.01	-6.67	8	PASS
	6	2437	-9.25	3.01	-6.24	8	PASS
	11	2462	-9.56	3.01	-6.55	8	PASS

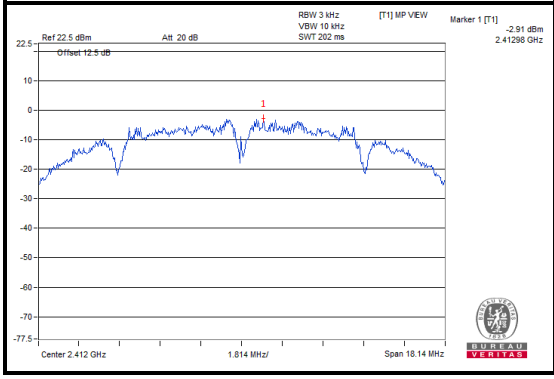
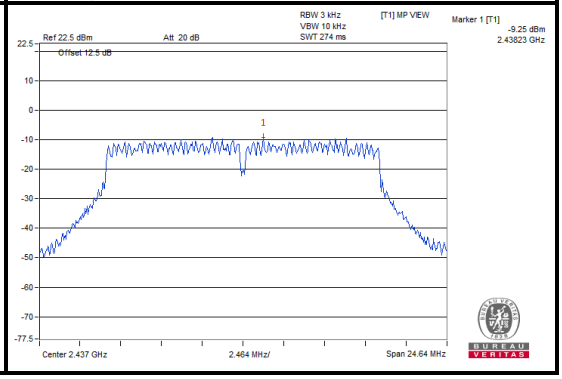
BT-LE (GFSK)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2402	-8.80	8	PASS
19	2440	-6.97	8	PASS
39	2480	-6.47	8	PASS

CHAIN 0

SPECTRUM PLOT OF WORST VALUE	
802.11b	802.11g
	
BT-LE (GFSK)	
	

CHAIN 1

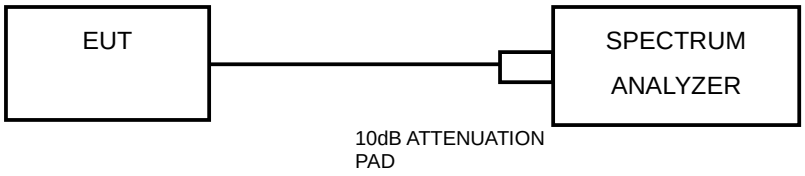
SPECTRUM PLOT OF WORST VALUE	
802.11b	802.11g
	

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 - Reference Level

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 –Unwanted Emission Level

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

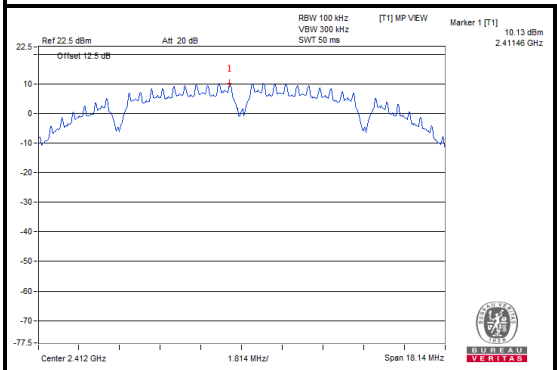
Same as item 4.3.6

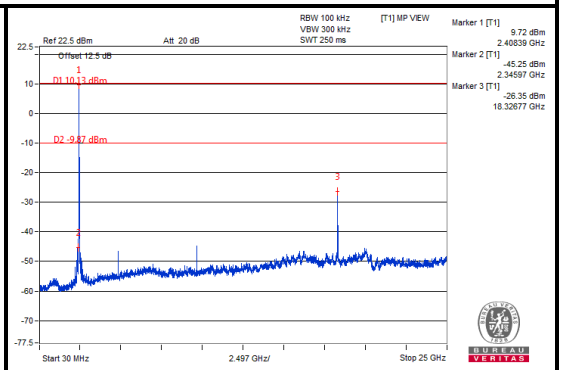
4.6.7 TEST RESULTS

802.11b

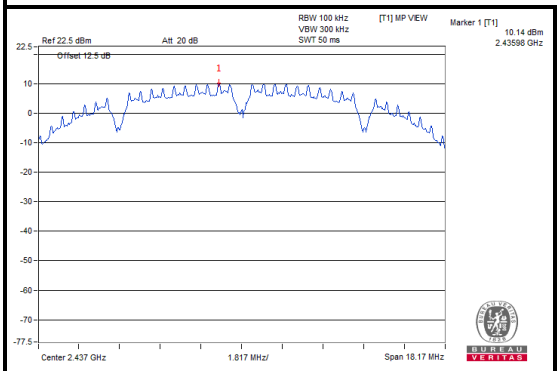
CHAIN 0

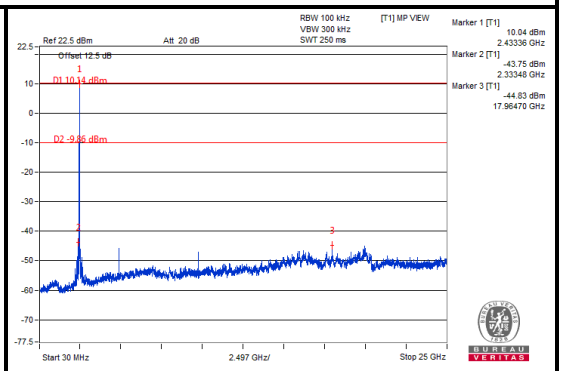
CH 1



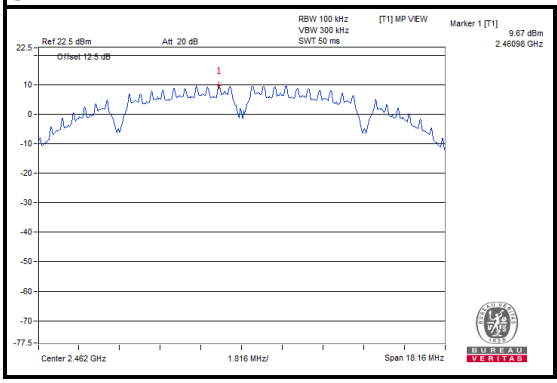


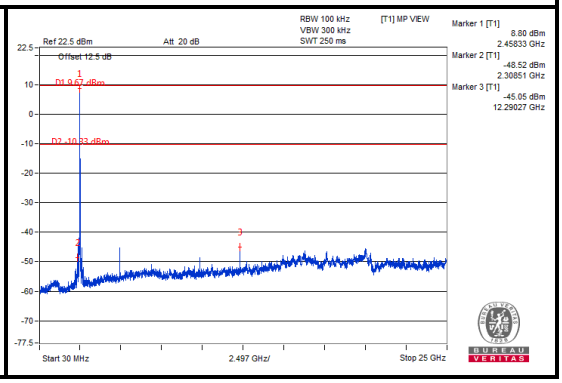
CH 6





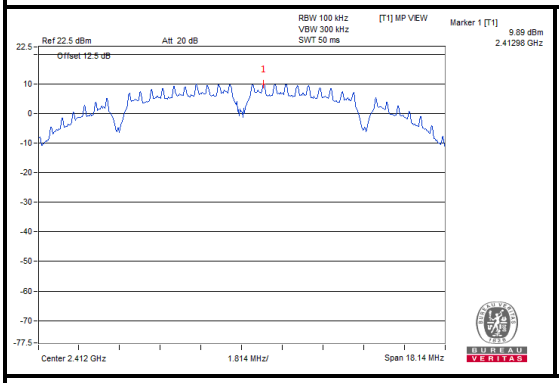
CH 11

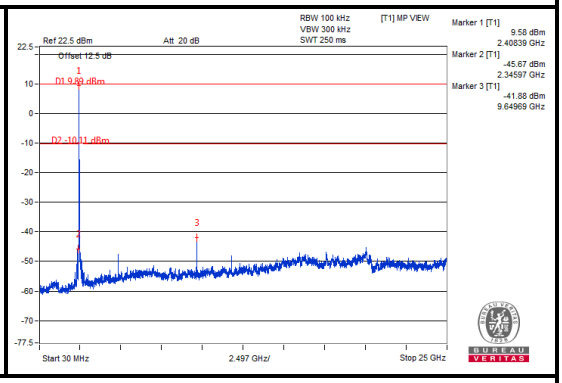




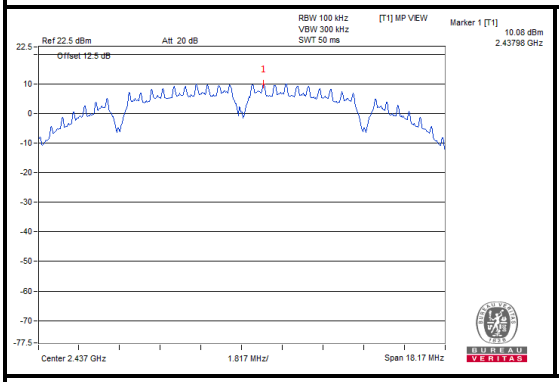
CHAIN 1

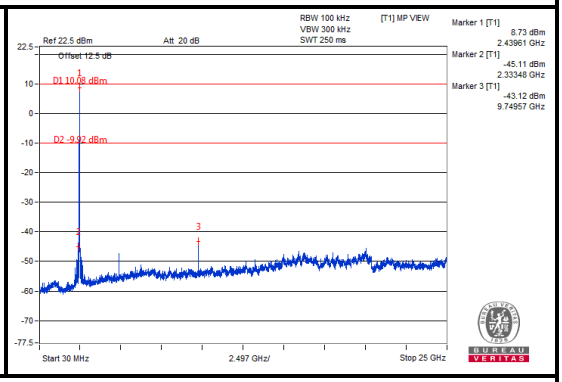
CH 1



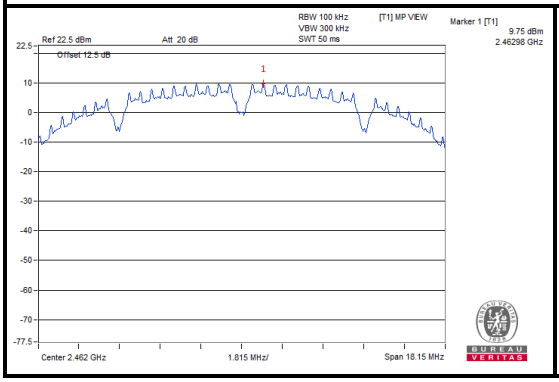


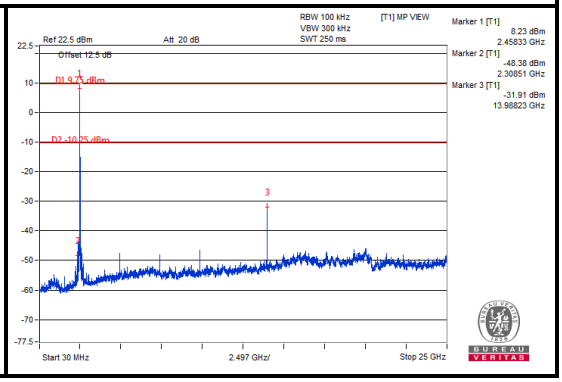
CH 6





CH 11

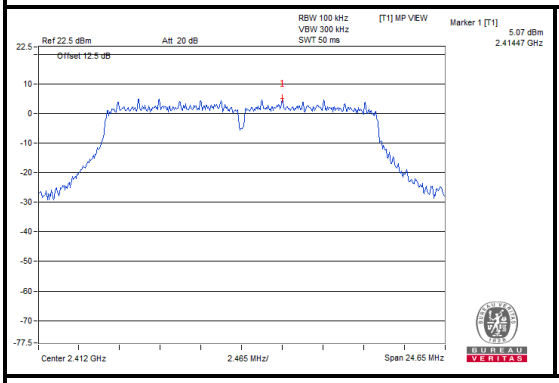


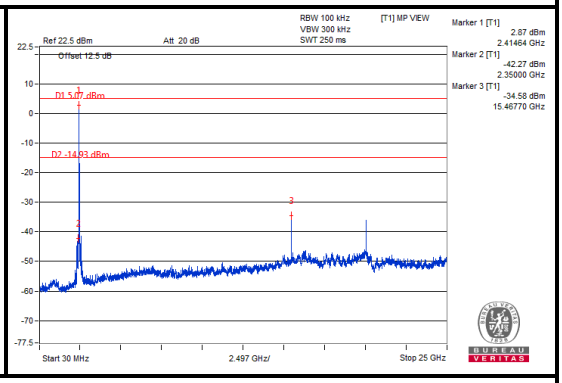


802.11g

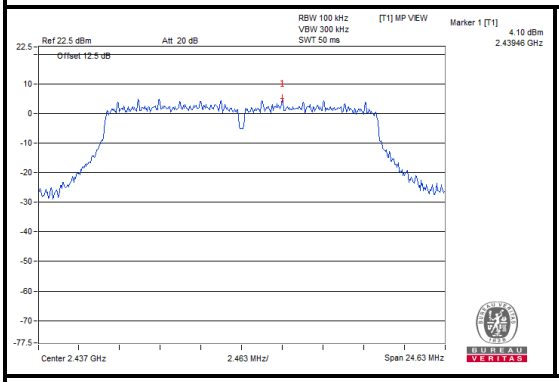
CHAIN 0

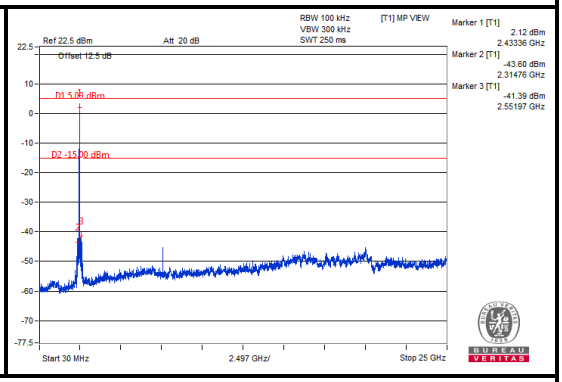
CH 1



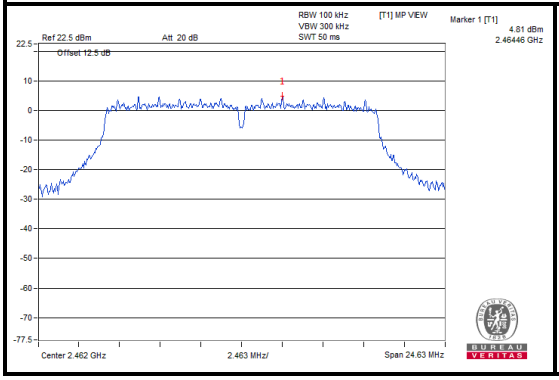


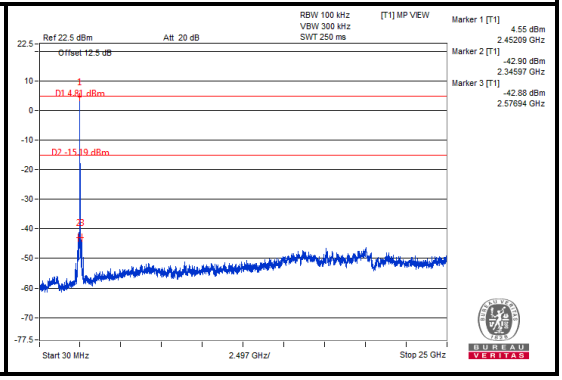
CH 6





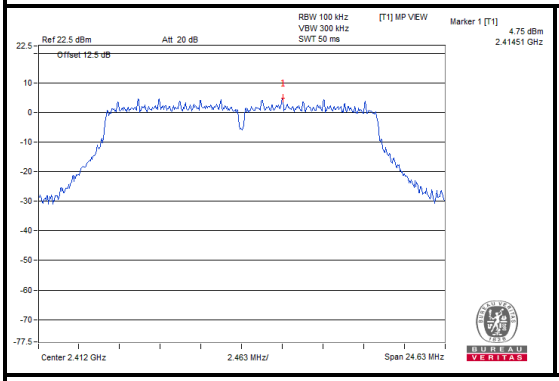
CH 11

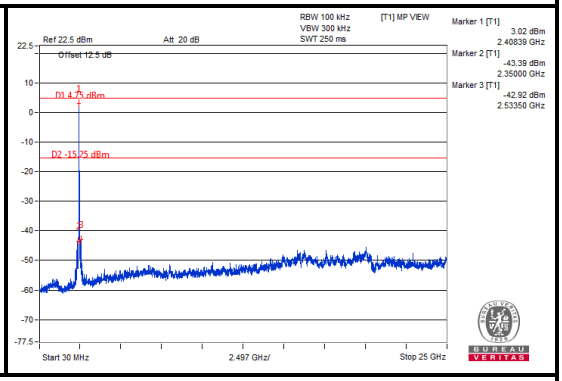




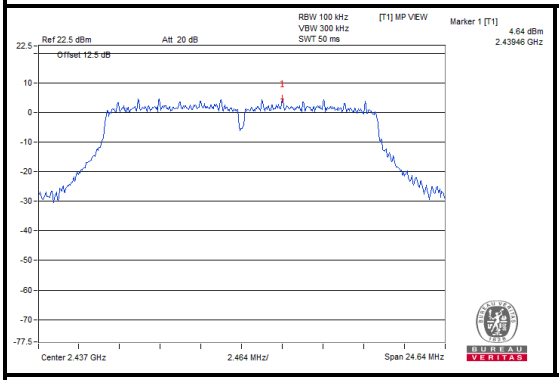
CHAIN 1

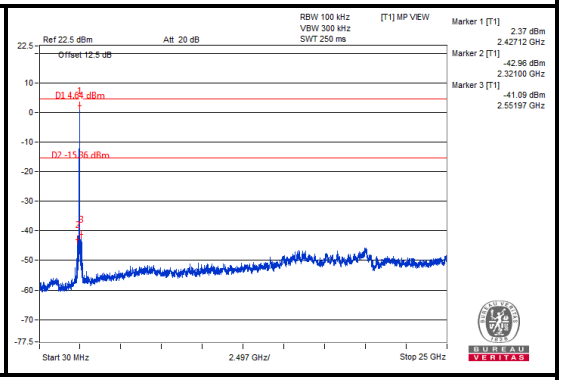
CH 1



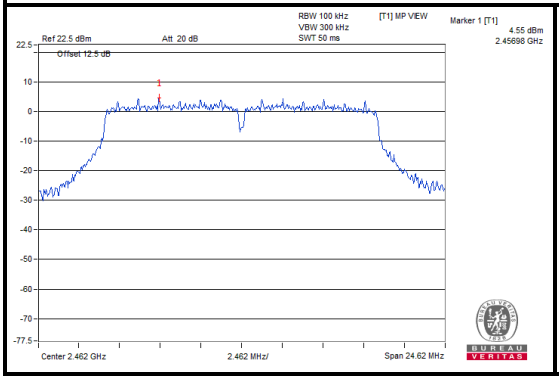


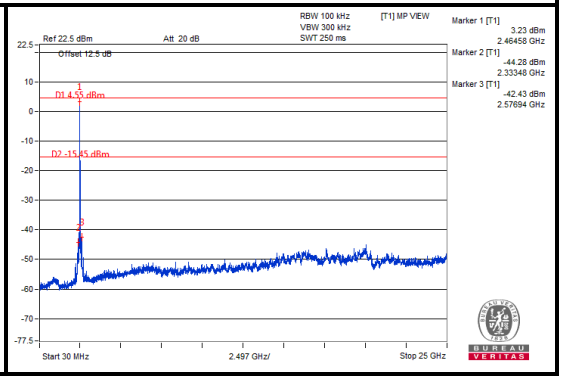
CH 6





CH 11

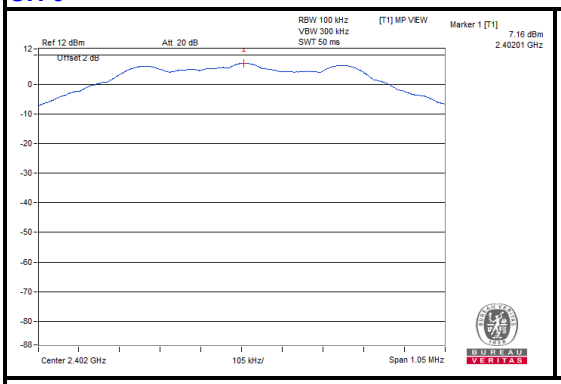


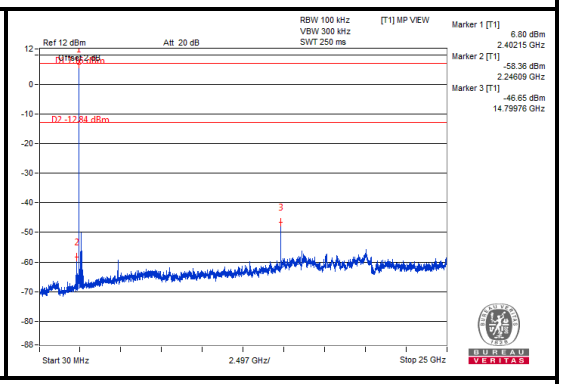


BT-LE (GFSK)

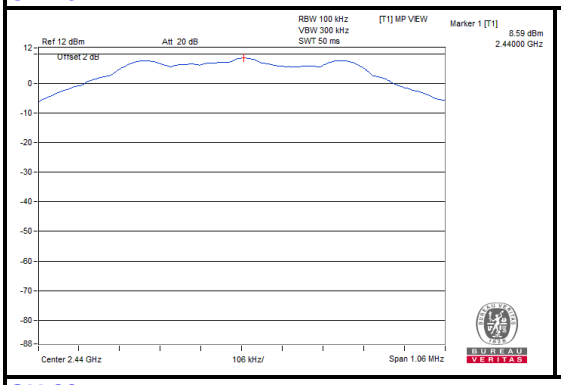
CHAIN 0

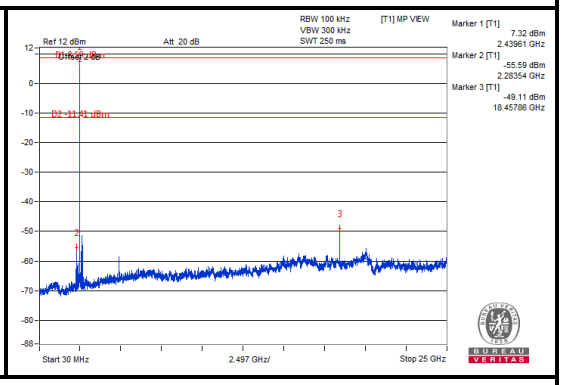
CH 0



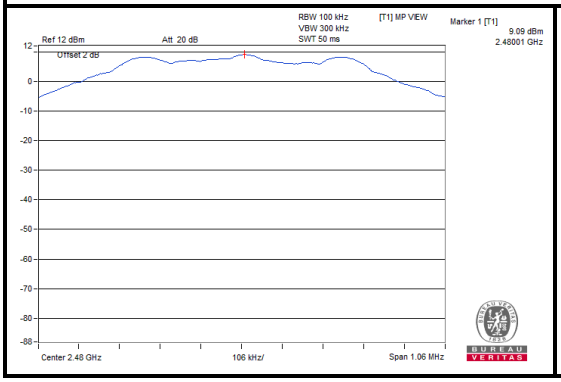


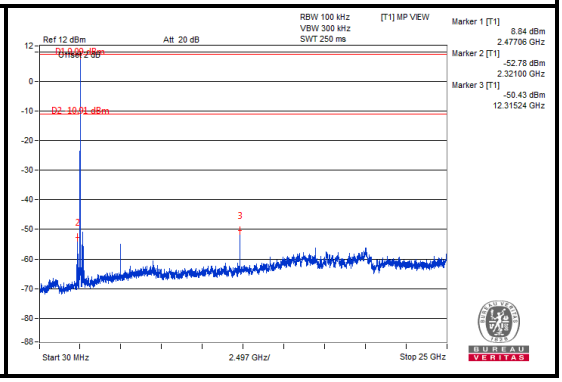
CH 19





CH 39

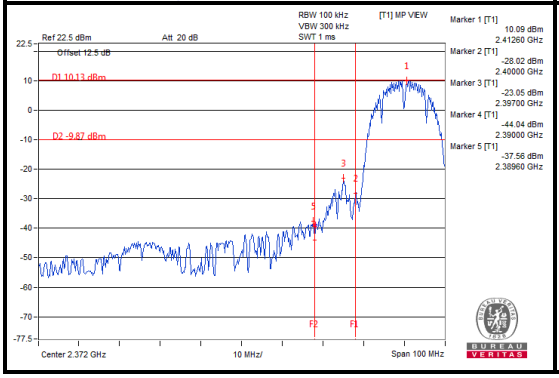




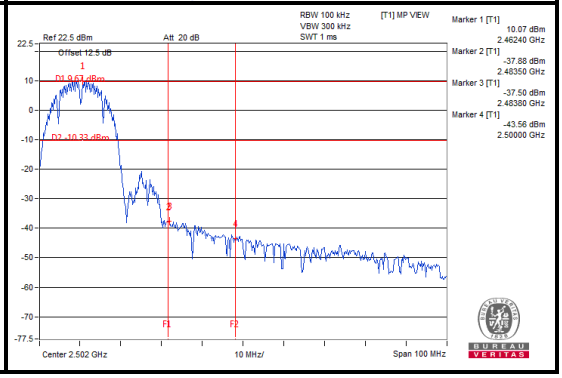
802.11b

CHAIN 0

CH 1 Band edge

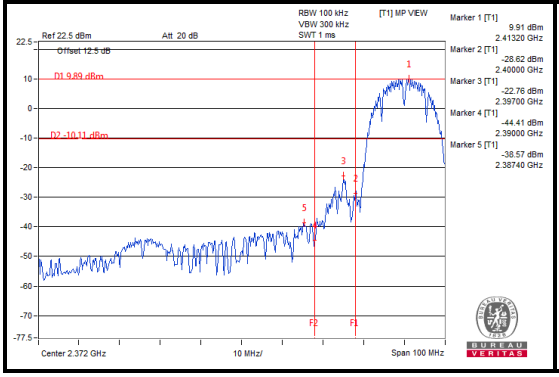


CH 11 Band edge

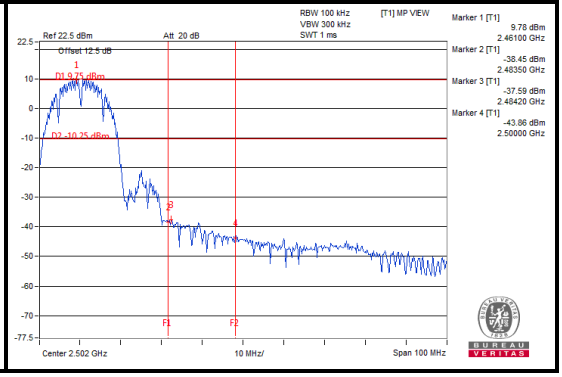


CHAIN 1

CH 1 Band edge

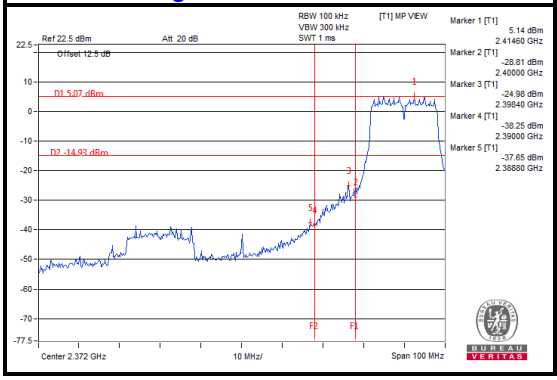
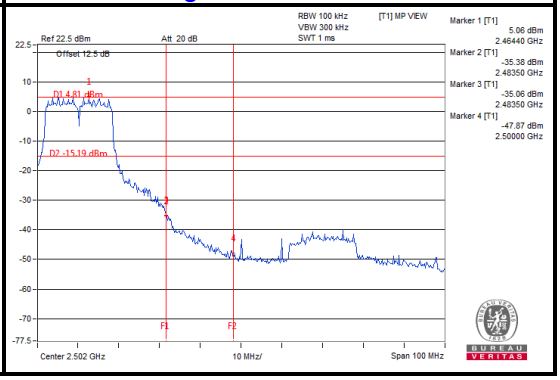


CH 11 Band edge

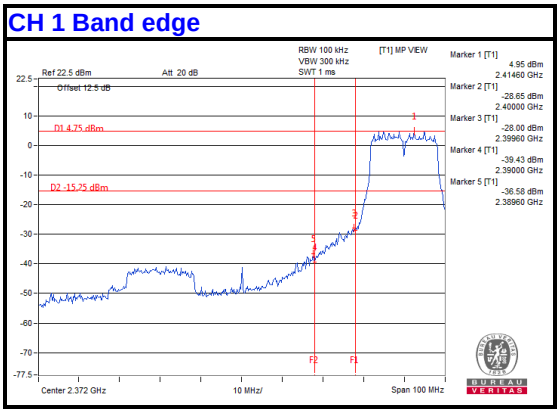
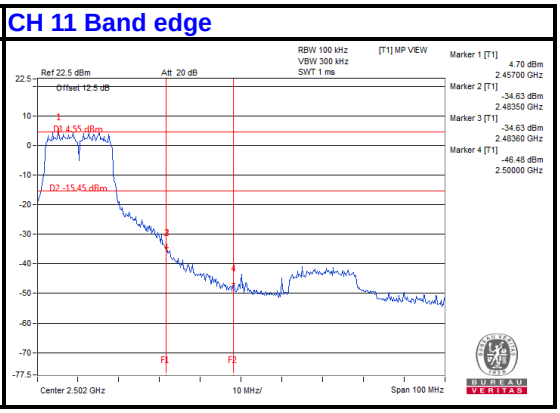


802.11g

CHAIN 0

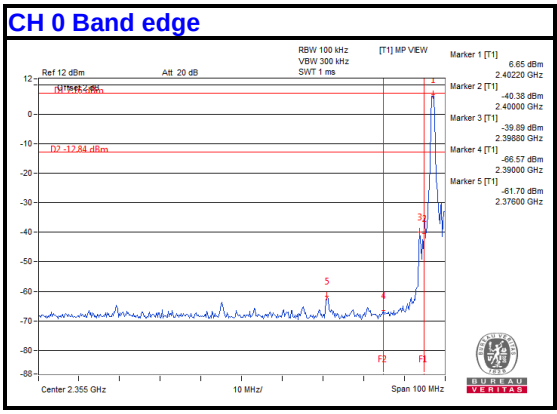
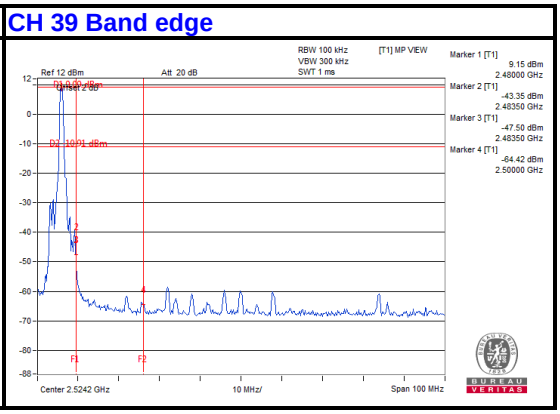
CH 1 Band edge	CH 11 Band edge
	

CHAIN 1

CH 1 Band edge	CH 11 Band edge
	

BT-LE (GFSK)

CHAIN 0

CH 0 Band edge	CH 39 Band edge
	

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---