Test Lab
Cert 2951.01

FCC TEST REPORT

(WIFI + BT LE)

Product:	LTE Digital Mobile Phone
Model Name:	NX529J/ nubia Z11 mini
FCC ID:	2AHJO-NX529J
Applicant:	Nubia Technology Co., Ltd.
Address:	10/F, Tower A, Hans Innovation Mansion, North Ring Rd., No. 9018, Hi-Tech Industrial Park, Nanshan District, Shenzhen, P.R.China
Manufacturer:	Nubia Technology Co., Ltd.
Address:	10/F, Tower A, Hans Innovation Mansion, North Ring Rd., No. 9018, Hi-Tech Industrial Park, Nanshan District, Shenzhen, P.R.China
Prepared by:	Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch
Lab Location:	No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China
TEL:	+86 769 8593 5656
FAX:	+86 769 8593 1080
E-MAIL:	customerservice.dg@cn.bureauveritas.com
Report No.:	RF161008W001-2
Received Date:	Oct. 08, 2016
Test Date:	Oct. 09, 2016 ~ Oct. 28, 2016
Issued Date:	Oct. 30, 2016

This report should not be used by the client to claim product certification, approval, or endorsement by A2LA or any government agencies.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF161008W001-2	Original release	Oct. 30, 2016

Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

No. 34, Chenwulu Section, Guantai Rd., Houjie
Town, Dongguan City, Guangdong 523942, China

Tel: +86 769 8593 5656
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com

1 CERTIFICATION

PRODUCT:	LTE Digital Mobile Phone
BRAND NAME:	Nubia
MODEL NAME:	NX529J/ nubia Z11 mini
APPLICANT:	Nubia Technology Co., Ltd.
TESTED:	Oct. 09, 2016 ~ Oct. 28, 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:** Oct. 30, 2016
(Yuqiang Yin / Engineer)

APPROVED BY : _____ , **DATE:** Oct. 30, 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 14.09dB at 0.412000MHz.
15.205 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.40dB at 2483.50MHz.
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 Digital Mobile Phone
MODEL NAME	NX529J/ nubia Z11 mini
NOMINAL VOLTAGE	5.0Vdc (adapter or host equipment) 3.85Vdc dc (Li-ion, battery)
MODULATION TECHNOLOGY	DSSS, OFDM, DTS
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM BT-LE(GFSK) for DTS
TRANSMISSION RATE	802.11b: 11/ 5.5/ 2.0 / 1.0 Mbps 802.11g: 54/ 48/ 36 / 24 / 18 / 9/ 6 Mbps 802.11n: up to 135 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	WLAN: 63.826mW (Maximum) BT-LE: 1.567mW (Maximum)
ANTENNA TYPE	PIFA Antenna with -2dBi gain
HW VERSION	NX529J_V2CMB_A
SW VERSION	NX529J_ENCommon_V1.05
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB cable: non-shielded, detachable, 1.0m

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. The EUT was powered by the following adapters:

ADAPTER 1	
BRAND:	RUIDE
MODEL:	STC-A515A-Z
INPUT:	AC 100-240V, 600mA
OUTPUT:	DC 5V, 1500mA

ADAPTER 2	
BRAND:	DOKOCOM
MODEL:	STC-A515A-Z
INPUT:	AC 100-240V, 600mA
OUTPUT:	DC 5V, 1500mA

ADAPTER 3	
BRAND:	Salcomp
MODEL:	STC-A515A-Z
INPUT:	AC 100-240V, 600mA
OUTPUT:	DC 5V, 1500mA

4. The EUT matched the following USB cable:

USB CABLE	
BRAND:	LIXUN
MODEL:	ZXMT1511003
SIGNAL LINE:	1.0 METER

5. The above models are identical except the model name for marketing purpose.
6. 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	OFDM	BPSK	6.0
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, 20, 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)
802.11g	1 to 11	11	OFDM	BPSK	6.0

BANDEDGE MEASUREMENT:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	CCK	DBPSK	1.0
802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
802.11n HT20	1 to 11	1, 11	OFDM	BPSK	6.5
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, 20, 39	DTS	GFSK	1

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	22deg. C, 54%RH	DC 5V from adaptor	Tony
RE≥1G	22deg. C, 54%RH	DC 5V from adaptor	Tony
PLC	25deg. C, 60%RH	DC 5V from adaptor	Yuqiang Yin
APCM	25deg. C, 60%RH	3.85Vdc from battery	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.
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.

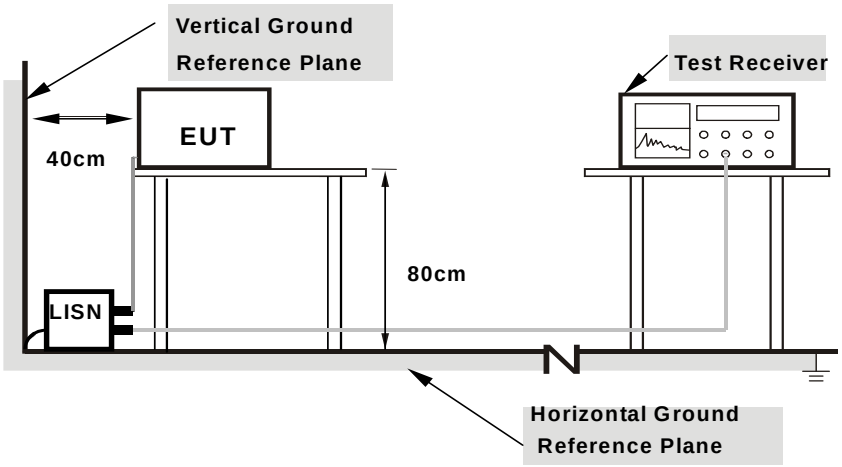
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 Manual.

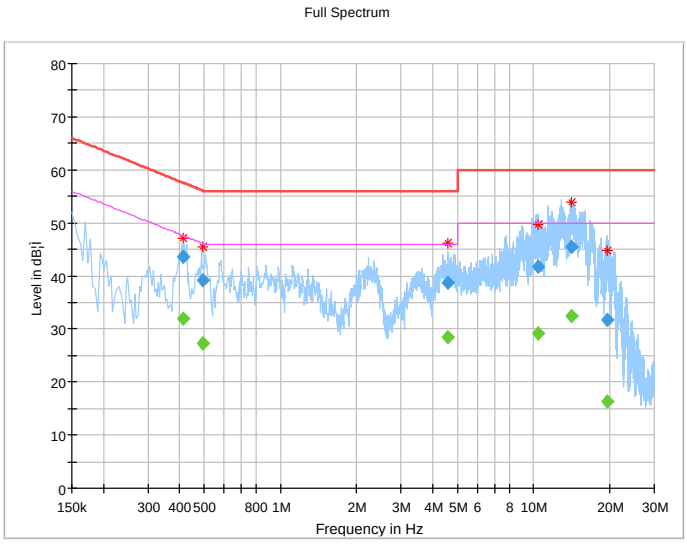
4.1.7 TEST RESULTS

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**	24deg. C, 55RH
Tested By	Eric	**TEST DATE**	2016/10/23

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.412000	---	32.03	47.61	15.58	L	ON	9.7
0.412000	**43.52**	**---**	**57.61**	**14.09**	**L**	**ON**	**9.7**
0.492000	---	27.33	46.13	18.80	L	ON	9.7
0.492000	39.07	---	56.13	17.06	L	ON	9.7
4.608000	---	28.36	46.00	17.64	L	ON	9.7
4.608000	38.67	---	56.00	17.33	L	ON	9.7
10.372000	---	29.23	50.00	20.77	L	ON	9.9
10.372000	41.67	---	60.00	18.33	L	ON	9.9
14.108000	---	32.48	50.00	17.52	L	ON	9.9
14.108000	45.55	---	60.00	14.45	L	ON	9.9
19.524000	---	16.39	50.00	33.61	L	ON	9.9
19.524000	31.61	---	60.00	28.39	L	ON	9.9

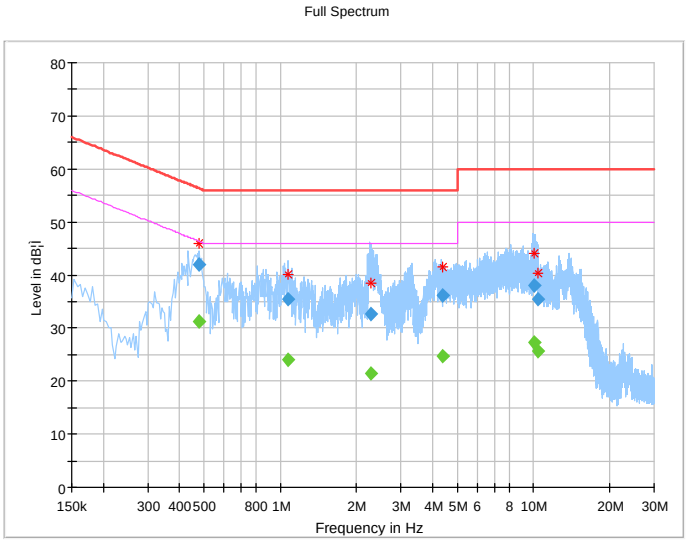
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	24deg. C, 55RH
Tested By	Eric	TEST DATE	2016/10/23

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.476000	---	31.37	46.41	15.04	N	ON	10.1
0.476000	41.99	---	56.41	14.42	N	ON	10.1
1.072000	---	23.93	46.00	22.07	N	ON	9.9
1.072000	35.54	---	56.00	20.46	N	ON	9.9
2.292000	---	21.42	46.00	24.58	N	ON	9.8
2.292000	32.60	---	56.00	23.40	N	ON	9.8
4.372000	---	24.65	46.00	21.35	N	ON	9.8
4.372000	36.10	---	56.00	19.90	N	ON	9.8
10.032000	---	27.27	50.00	22.73	N	ON	9.9
10.032000	38.04	---	60.00	21.96	N	ON	9.9
10.440000	---	25.56	50.00	24.44	N	ON	9.9
10.440000	35.41	---	60.00	24.59	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.



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. 02, 15	Aug. 01, 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	Aug. 08,16	Aug. 07,17

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

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

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

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

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

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

NOTE:

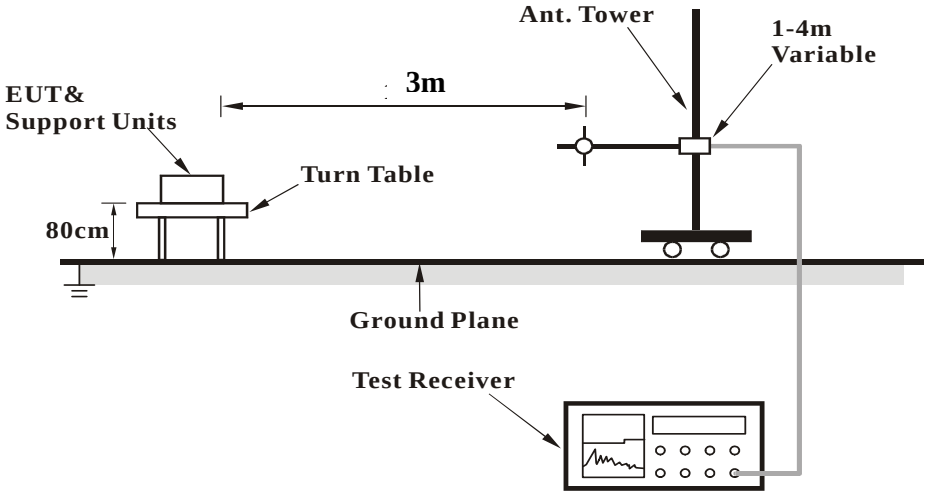
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

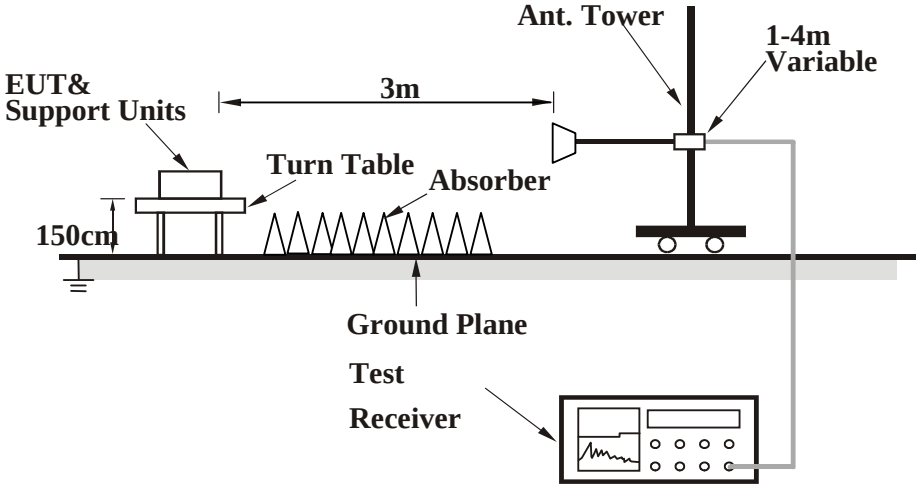
No deviation

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:

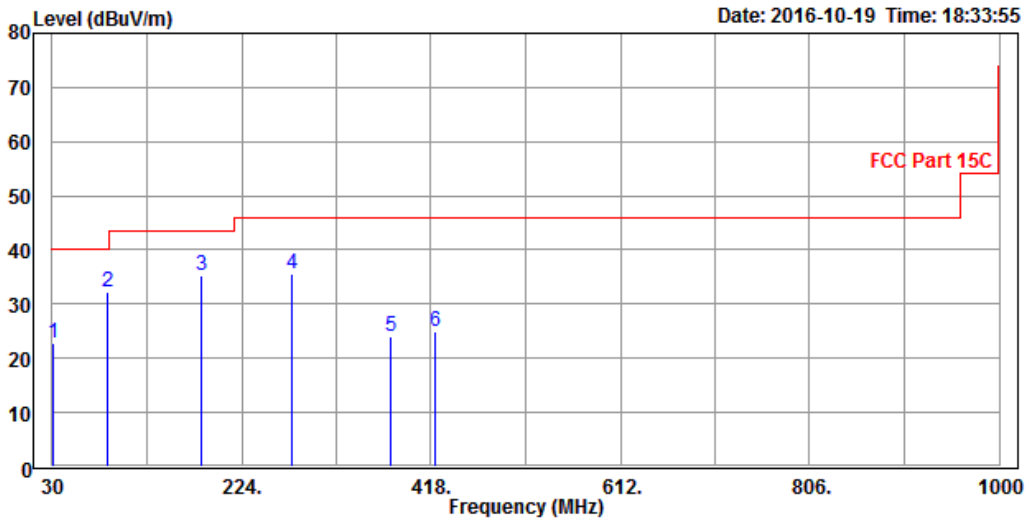
802.11g

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
30.97	22.74	43.06	40.00	-17.26	16.43	0.80	37.55	100	30	QP
87.23	32.09	60.90	40.00	-7.91	6.82	1.44	37.07	100	65	QP
183.26	35.39	60.05	43.50	-8.11	9.93	2.08	36.67	100	98	QP
275.41	35.45	56.67	46.00	-10.55	12.70	2.59	36.51	100	114	QP
376.29	24.15	41.57	46.00	-21.85	16.20	3.05	36.67	100	180	QP
422.85	25.05	41.13	46.00	-20.95	17.47	3.22	36.77	100	248	QP

REMARKS:

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

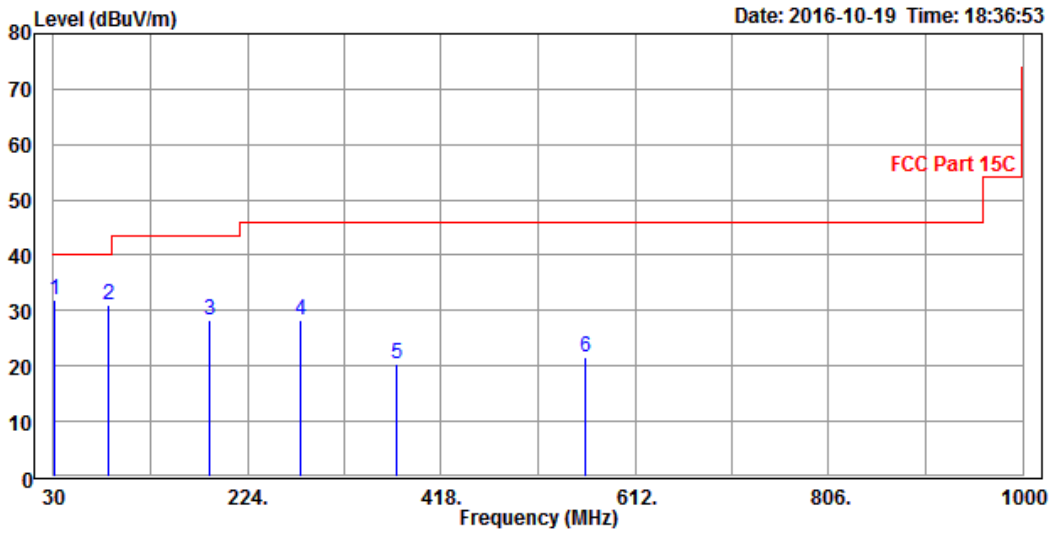


CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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
30.97	32.04	52.36	40.00	-7.96	16.43	0.80	37.55	100	42	QP
85.29	31.10	60.01	40.00	-8.90	6.76	1.42	37.09	100	89	QP
186.17	28.15	52.74	43.50	-15.35	9.96	2.09	36.64	100	112	QP
276.38	28.42	49.62	46.00	-17.58	12.72	2.59	36.51	100	159	QP
373.38	20.50	38.04	46.00	-25.50	16.08	3.04	36.66	100	242	QP
561.56	21.46	35.23	46.00	-24.54	19.57	3.80	37.14	100	276	QP

REMARKS:

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



ABOVE 1GHz WORST-CASE 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										
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**
2386	49.89	57.77	54.00	-4.11	32.29	8.14	48.31	105	360	Average
2386	53.34	61.22	74.00	-20.66	32.29	8.14	48.31	105	360	Peak
2412	98.44	106.25			32.31	8.19	48.31	105	360	Average
2412	102.17	109.98			32.31	8.19	48.31	105	360	Peak
2483.5	32.71	40.31	54.00	-21.29	32.38	8.32	48.30	105	360	Average
2483.5	44.12	51.72	74.00	-29.88	32.38	8.32	48.30	105	360	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**
2386.6	36.94	44.81	54.00	-17.06	32.29	8.15	48.31	265	310	Average
2386.6	46.14	54.01	74.00	-27.86	32.29	8.15	48.31	265	310	Peak
2412	97.92	105.73			32.31	8.19	48.31	265	310	Average
2412	98.47	106.28			32.31	8.19	48.31	265	310	Peak
2483.5	33.26	40.86	54.00	-20.74	32.38	8.32	48.30	265	310	Average
2483.5	45.25	52.85	74.00	-28.75	32.38	8.32	48.30	265	310	Peak

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	34.46	42.33	54.00	-19.54	32.29	8.15	48.31	105	360	Average
2390	45.41	53.28	74.00	-28.59	32.29	8.15	48.31	105	360	Peak
2437	98.88	106.61			32.34	8.24	48.31	105	360	Average
2437	101.78	109.51			32.34	8.24	48.31	105	360	Peak
2483.5	33.79	41.39	54.00	-20.21	32.38	8.32	48.30	105	360	Average
2483.5	45.37	52.97	74.00	-28.63	32.38	8.32	48.30	105	360	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	33.49	41.36	54.00	-20.51	32.29	8.15	48.31	260	310	Average
2390	45.09	52.96	74.00	-28.91	32.29	8.15	48.31	260	310	Peak
2437	97.37	105.10			32.34	8.24	48.31	260	310	Average
2437	99.90	107.63			32.34	8.24	48.31	260	310	Peak
2483.5	34.13	41.73	54.00	-19.87	32.38	8.32	48.30	260	310	Average
2483.5	45.81	53.41	74.00	-28.19	32.38	8.32	48.30	260	310	Peak

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	32.84	40.71	54.00	-21.16	32.29	8.15	48.31	103	360	Average
2390	44.45	52.32	74.00	-29.55	32.29	8.15	48.31	103	360	Peak
2462	98.69	106.35			32.36	8.28	48.30	103	360	Average
2462	101.83	109.49			32.36	8.28	48.30	103	360	Peak
2487.6	50.19	57.77	54.00	-3.81	32.39	8.33	48.30	103	360	Average
2487.6	54.99	62.57	74.00	-19.01	32.39	8.33	48.30	103	360	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	32.99	40.86	54.00	-21.01	32.29	8.15	48.31	252	310	Average
2390	38.39	46.26	54.00	-15.61	32.29	8.15	48.31	252	310	Average
2462	97.42	105.08			32.36	8.28	48.30	252	310	Average
2462	100.16	107.82			32.36	8.28	48.30	252	310	Peak
2487	38.81	46.39	54.00	-15.19	32.39	8.33	48.30	252	310	Average
2487	47.82	55.40	74.00	-26.18	32.39	8.33	48.30	252	310	Peak

REMARKS:

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	50.48	58.35	54.00	-3.52	32.29	8.15	48.31	105	360	Average
2390	70.09	77.96	74.00	-3.91	32.29	8.15	48.31	105	360	Peak
2412	93.82	101.63			32.31	8.19	48.31	105	360	Average
2412	103.26	111.07			32.31	8.19	48.31	105	360	Peak
2483.5	33.65	41.25	54.00	-20.35	32.38	8.32	48.30	105	360	Average
2483.5	45.33	52.93	74.00	-28.67	32.38	8.32	48.30	105	360	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	40.65	48.52	54.00	-13.35	32.29	8.15	48.31	265	310	Average
2390	57.35	65.22	74.00	-16.65	32.29	8.15	48.31	265	310	Peak
2412	90.75	98.56			32.31	8.19	48.31	265	310	Average
2412	101.22	109.03			32.31	8.19	48.31	265	310	Peak
2483.5	33.72	41.32	54.00	-20.28	32.38	8.32	48.30	265	310	Average
2483.5	46.00	53.60	74.00	-28.00	32.38	8.32	48.30	265	310	Peak

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	34.22	42.09	54.00	-19.78	32.29	8.15	48.31	103	360	Average
2390	44.82	52.69	74.00	-29.18	32.29	8.15	48.31	103	360	Peak
2437	93.75	101.48			32.34	8.24	48.31	103	360	Average
2437	103.42	111.15			32.34	8.24	48.31	103	360	Peak
2483.5	34.93	42.53	54.00	-19.07	32.38	8.32	48.30	103	360	Average
2483.5	46.10	53.70	74.00	-27.90	32.38	8.32	48.30	103	360	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	33.63	41.50	54.00	-20.37	32.29	8.15	48.31	260	312	Average
2390	44.98	52.85	74.00	-29.02	32.29	8.15	48.31	260	312	Peak
2437	89.24	96.97			32.34	8.24	48.31	260	312	Average
2437	99.66	107.39			32.34	8.24	48.31	260	312	Peak
2483.5	34.84	42.44	54.00	-19.16	32.38	8.32	48.30	260	312	Average
2483.5	45.88	53.48	74.00	-28.12	32.38	8.32	48.30	260	312	Peak

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	33.51	41.38	54.00	-20.49	32.29	8.15	48.31	103	360	Average
2390	45.00	52.87	74.00	-29.00	32.29	8.15	48.31	103	360	Peak
2462	92.80	100.46			32.36	8.28	48.30	103	360	Average
2462	101.88	109.54			32.36	8.28	48.30	103	360	Peak
2483.5	**51.60**	**59.20**	**54.00**	**-2.40**	**32.38**	**8.32**	**48.30**	**103**	**360**	**Average**
2483.5	70.75	78.35	74.00	-3.25	32.38	8.32	48.30	103	360	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	33.49	41.36	54.00	-20.51	32.29	8.15	48.31	265	315	Average
2390	45.31	53.18	74.00	-28.69	32.29	8.15	48.31	265	315	Peak
2462	86.69	94.35			32.36	8.28	48.30	265	315	Average
2462	98.36	106.02			32.36	8.28	48.30	265	315	Peak
2483.5	39.83	47.43	54.00	-14.17	32.38	8.32	48.30	265	315	Average
2483.5	59.59	67.19	74.00	-14.41	32.38	8.32	48.30	265	315	Peak

REMARKS:

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

802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	50.63	58.50	54.00	-3.37	32.29	8.15	48.31	105	360	Average
2390	67.56	75.43	74.00	-6.44	32.29	8.15	48.31	105	360	Peak
2412	92.59	100.40			32.31	8.19	48.31	105	360	Average
2412	102.62	110.43			32.31	8.19	48.31	105	360	Peak
2483.5	33.74	41.34	54.00	-20.26	32.38	8.32	48.30	105	360	Average
2483.5	46.01	53.61	74.00	-27.99	32.38	8.32	48.30	105	360	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	40.38	48.25	54.00	-13.62	32.29	8.15	48.31	265	312	Average
2390	53.96	61.83	74.00	-20.04	32.29	8.15	48.31	265	312	Peak
2412	89.43	97.24			32.31	8.19	48.31	265	312	Average
2412	100.00	107.81			32.31	8.19	48.31	265	312	Peak
2483.5	33.83	41.43	54.00	-20.17	32.38	8.32	48.30	265	312	Average
2483.5	45.65	53.25	74.00	-28.35	32.38	8.32	48.30	265	312	Peak

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	33.89	41.76	54.00	-20.11	32.29	8.15	48.31	105	360	Average
2390	49.04	56.91	74.00	-24.96	32.29	8.15	48.31	105	360	Peak
2437	92.69	100.42			32.34	8.24	48.31	105	360	Average
2437	102.71	110.44			32.34	8.24	48.31	105	360	Peak
2483.5	35.15	42.75	54.00	-18.85	32.38	8.32	48.30	105	360	Average
2483.5	46.20	53.80	74.00	-27.80	32.38	8.32	48.30	105	360	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	33.51	41.38	54.00	-20.49	32.29	8.15	48.31	260	310	Average
2390	45.19	53.06	74.00	-28.81	32.29	8.15	48.31	260	310	Peak
2437	87.70	95.43			32.34	8.24	48.31	260	310	Average
2437	98.49	106.22			32.34	8.24	48.31	260	310	Peak
2483.5	34.91	42.51	54.00	-19.09	32.38	8.32	48.30	260	310	Average
2483.5	45.69	53.29	74.00	-28.31	32.38	8.32	48.30	260	310	Peak

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	33.27	41.14	54.00	-20.73	32.29	8.15	48.31	100	360	Average
2390	44.78	52.65	74.00	-29.22	32.29	8.15	48.31	100	360	Peak
2462	90.54	98.20			32.36	8.28	48.30	100	360	Average
2462	100.86	108.52			32.36	8.28	48.30	100	360	Peak
2483.5	50.17	57.77	54.00	-3.83	32.38	8.32	48.30	100	360	Average
2483.5	69.33	76.93	74.00	-4.67	32.38	8.32	48.30	100	360	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	33.41	41.28	54.00	-20.59	32.29	8.15	48.31	252	310	Average
2390	46.35	54.22	74.00	-27.65	32.29	8.15	48.31	252	310	Peak
2462	86.43	94.09			32.36	8.28	48.30	252	310	Average
2462	96.77	104.43			32.36	8.28	48.30	252	310	Peak
2483.5	41.30	48.90	54.00	-12.70	32.38	8.32	48.30	252	310	Average
2483.5	58.77	66.37	74.00	-15.23	32.38	8.32	48.30	252	310	Peak

REMARKS:

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

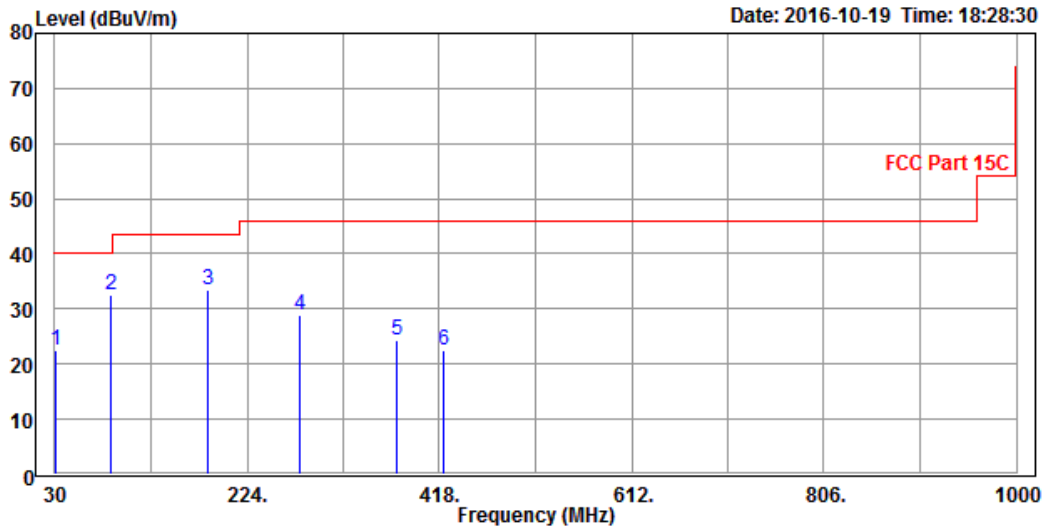
BT-LE (GFSK)

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
30.97	22.51	42.83	40.00	-17.49	16.43	0.80	37.55	200	24	QP
86.26	32.46	61.32	40.00	-7.54	6.79	1.43	37.08	200	60	QP
184.23	33.44	58.08	43.50	-10.06	9.94	2.08	36.66	200	115	QP
277.35	29.00	50.18	46.00	-17.00	12.73	2.60	36.51	200	148	QP
374.35	24.49	41.99	46.00	-21.51	16.12	3.04	36.66	200	256	QP
422.85	22.60	38.68	46.00	-23.40	17.47	3.22	36.77	200	84	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

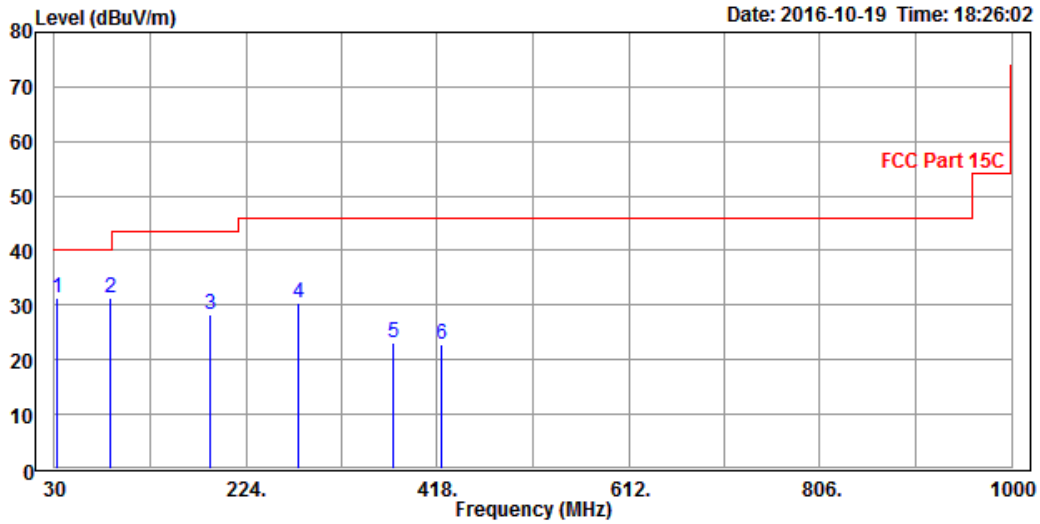


CHANNEL	TX Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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
31.94	31.35	52.31	40.00	-8.65	15.76	0.82	37.54	100	24	QP
86.26	31.20	60.06	40.00	-8.80	6.79	1.43	37.08	100	63	QP
187.14	28.18	52.75	43.50	-15.32	9.97	2.10	36.64	100	125	QP
276.38	30.53	51.73	46.00	-15.47	12.72	2.59	36.51	100	149	QP
373.38	22.99	40.53	46.00	-23.01	16.08	3.04	36.66	100	236	QP
422.85	22.78	38.86	46.00	-23.22	17.47	3.22	36.77	100	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



ABOVE 1GHz TEST DATA:

BT-LE (GFSK)

CHANNEL	TX Channel 0	**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	33.91	41.78	54.00	-20.09	32.29	8.15	48.31	105	360	Average
2390	45.56	53.43	74.00	-28.44	32.29	8.15	48.31	105	360	Peak
2402	96.59	104.43			32.30	8.17	48.31	105	360	Average
2402	101.55	109.39			32.30	8.17	48.31	105	360	Peak
2483.5	34.12	41.72	54.00	-19.88	32.38	8.32	48.30	105	360	Average
2483.5	45.59	53.19	74.00	-28.41	32.38	8.32	48.30	105	360	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	34.04	41.91	54.00	-19.96	32.29	8.15	48.31	100	315	Average
2390	46.14	54.01	74.00	-27.86	32.29	8.15	48.31	100	315	Peak
2402	91.49	99.33			32.30	8.17	48.31	100	315	Average
2402	96.41	104.25			32.30	8.17	48.31	100	315	Peak
2483.5	34.34	41.94	54.00	-19.66	32.38	8.32	48.30	100	315	Average
2483.5	45.70	53.30	74.00	-28.30	32.38	8.32	48.30	100	315	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2402MHz: Fundamental frequency.

CHANNEL	TX Channel 20	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	33.80	41.67	54.00	-20.20	32.29	8.15	48.31	116	360	Average
2390	45.61	53.48	74.00	-28.39	32.29	8.15	48.31	116	360	Peak
2442	97.80	105.52			32.34	8.25	48.31	116	360	Average
2442	102.95	110.67			32.34	8.25	48.31	116	360	Peak
2483.5	34.04	41.64	54.00	-19.96	32.38	8.32	48.30	116	360	Average
2483.5	46.59	54.19	74.00	-27.41	32.38	8.32	48.30	116	360	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	33.88	41.75	54.00	-20.12	32.29	8.15	48.31	282	315	Average
2390	46.19	54.06	74.00	-27.81	32.29	8.15	48.31	282	315	Peak
2442	92.40	100.12			32.34	8.25	48.31	282	315	Average
2442	97.34	105.06			32.34	8.25	48.31	282	315	Peak
2483.5	34.09	41.69	54.00	-19.91	32.38	8.32	48.30	282	315	Average
2483.5	46.17	53.77	74.00	-27.83	32.38	8.32	48.30	282	315	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2442MHz: Fundamental frequency.

CHANNEL	TX Channel 39	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	33.88	41.75	54.00	-20.12	32.29	8.15	48.31	115	360	Average
2390	46.28	54.15	74.00	-27.72	32.29	8.15	48.31	115	360	Peak
2480	96.28	103.89			32.38	8.31	48.30	115	360	Average
2480	101.31	108.92			32.38	8.31	48.30	115	360	Peak
2483.5	35.58	43.18	54.00	-18.42	32.38	8.32	48.30	115	360	Average
2483.5	49.21	56.81	74.00	-24.79	32.38	8.32	48.30	115	360	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	33.92	41.79	54.00	-20.08	32.29	8.15	48.31	150	275	Average
2390	46.18	54.05	74.00	-27.82	32.29	8.15	48.31	150	275	Peak
2480	90.92	98.53			32.38	8.31	48.30	150	275	Average
2480	96.14	103.75			32.38	8.31	48.30	150	275	Peak
2483.5	34.56	42.16	54.00	-19.44	32.38	8.32	48.30	150	275	Average
2483.5	47.04	54.64	74.00	-26.96	32.38	8.32	48.30	150	275	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2480MHz: 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
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jul. 27, 16	Jul. 26, 17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 09, 16	Oct. 08, 17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05,16	Sep. 04,17
Oscilloscope	Agilent	DSO9254A	MY51260160	Sep.05,16	Sep. 04,17
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Signal Generator	Agilent	N5183A	MY50140980	Nov. 09,15	Nov. 08,16
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jul. 27, 16	Jul. 26, 17
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 16	Apr. 21, 17
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug.08, 16	Aug. 07, 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 RF Oven room.

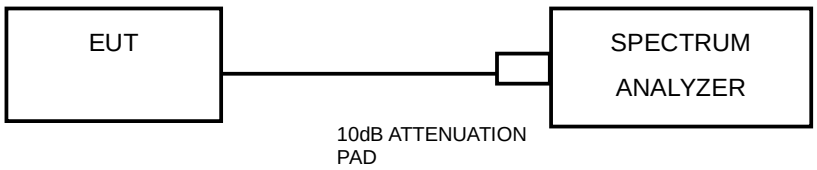
4.3.3 TEST PROCEDURE

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



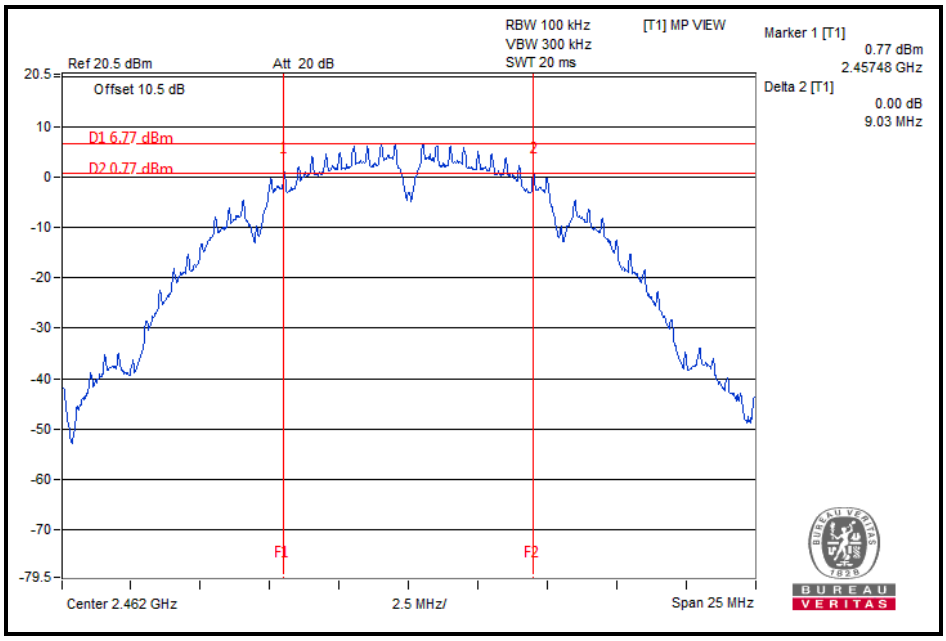
4.3.6 EUT OPERATING CONDITIONS

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

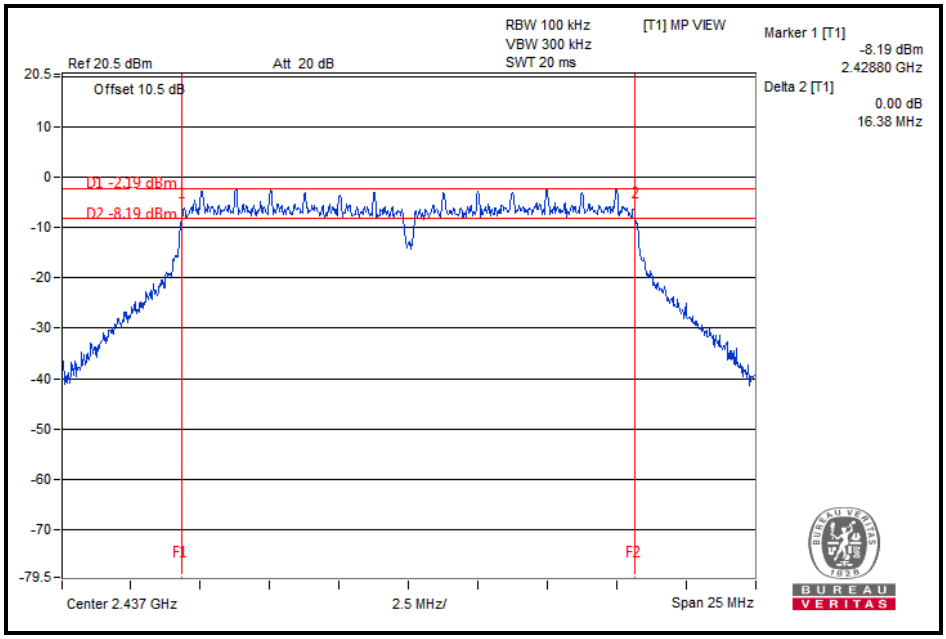
802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.55	0.5	PASS
6	2437	8.99	0.5	PASS
11	2462	9.03	0.5	PASS



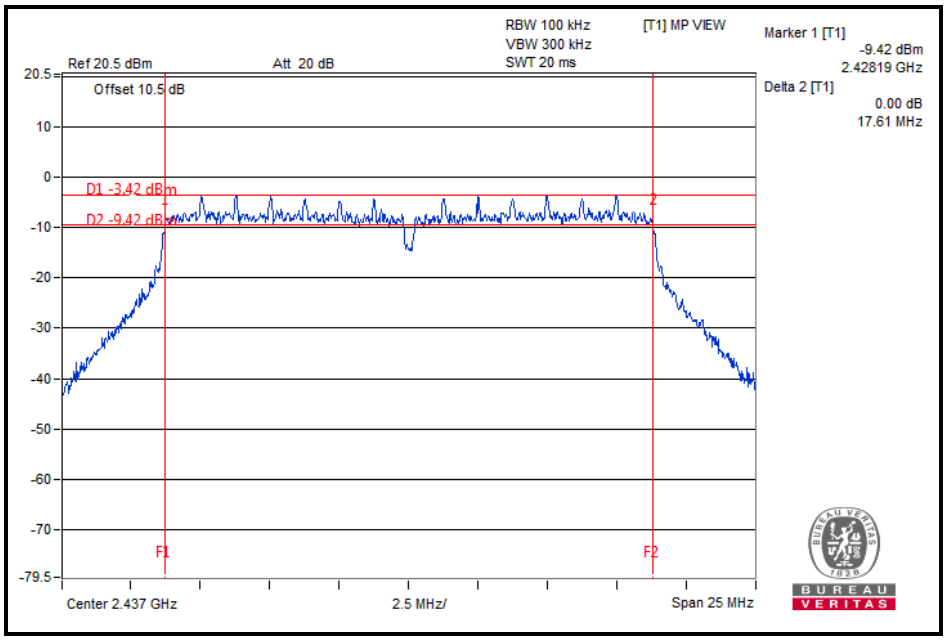
802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.35	0.5	PASS
6	2437	16.38	0.5	PASS
11	2462	16.36	0.5	PASS



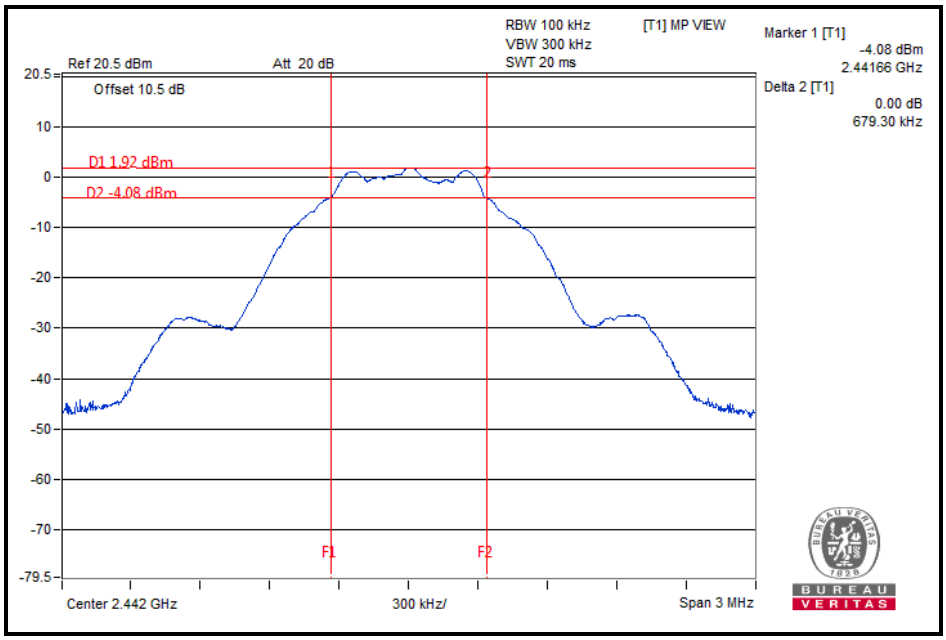
802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.58	0.5	PASS
6	2437	17.61	0.5	PASS
11	2462	17.58	0.5	PASS



BT-LE (GFSK)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	0.67	0.5	PASS
20	2442	0.68	0.5	PASS
39	2480	0.68	0.5	PASS

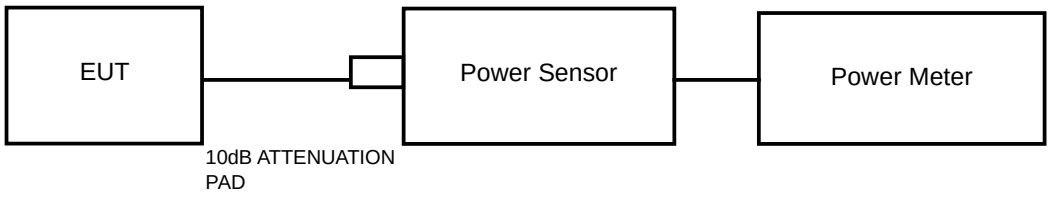


4.4 CONDUCTED OUTPUT POWER

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

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	18.05	**63.826**	1	PASS
6	2437	17.86	61.094	1	PASS
11	2462	17.53	56.624	1	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	15.67	36.898	1	PASS
6	2437	15.88	38.726	1	PASS
11	2462	15.29	33.806	1	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	14.19	26.242	1	PASS
6	2437	14.34	27.164	1	PASS
11	2462	14.23	26.485	1	PASS

BT-LE (GFSK)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
0	2402	1.65	1.462	1	PASS
20	2442	1.95	**1.567**	1	PASS
39	2480	1.00	1.259	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	15.36	N/A
6	2437	15.18	N/A
11	2462	15.06	N/A

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	8.58	N/A
6	2437	8.72	N/A
11	2462	8.54	N/A

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	7.50	N/A
6	2437	7.61	N/A
11	2462	7.55	N/A

BT-LE (GFSK)

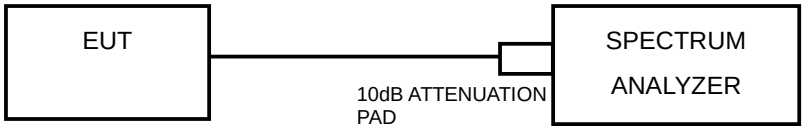
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
0	2402	1.54	N/A
20	2442	1.87	N/A
39	2480	0.86	N/A

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.

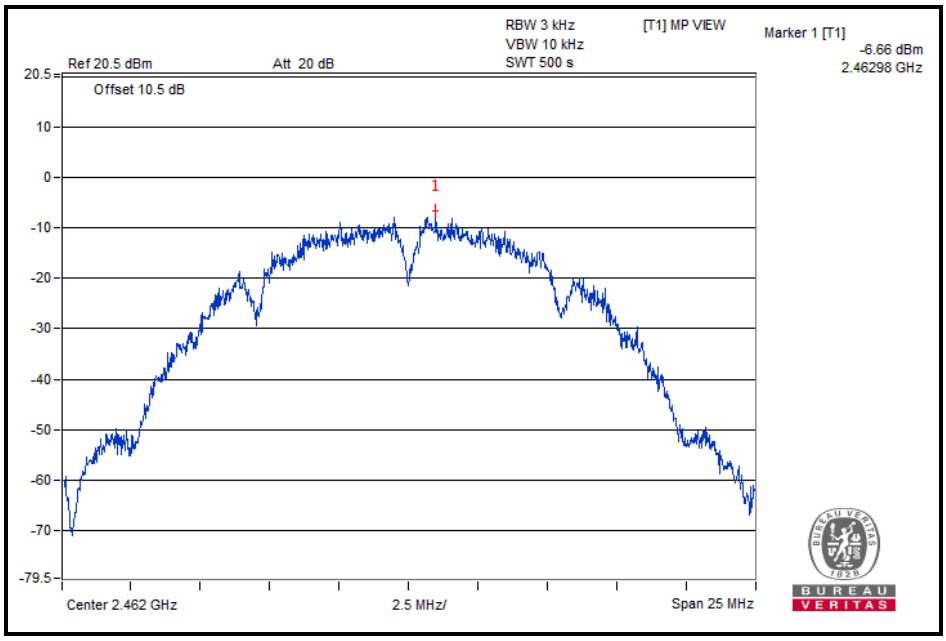
4.5.6 EUT OPERATING CONDITION

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

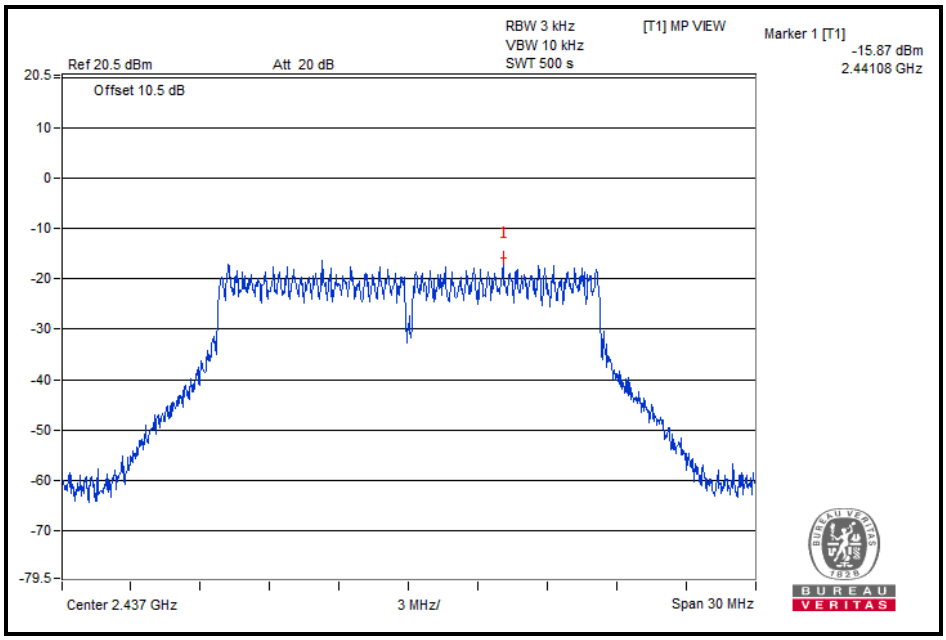
802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-7.68	8	PASS
6	2437	-7.52	8	PASS
11	2462	-6.66	8	PASS



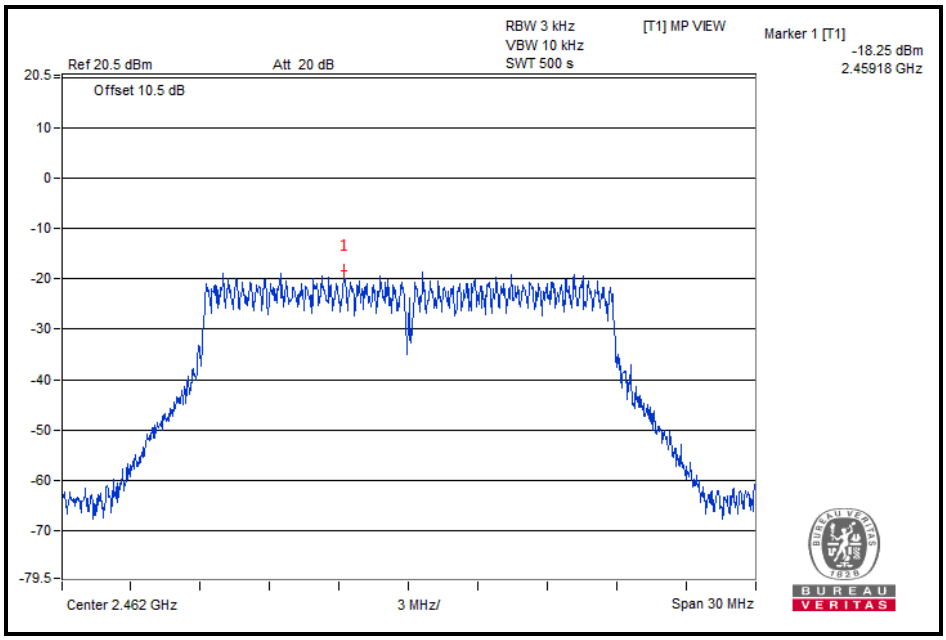
802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-17.10	8	PASS
6	2437	-15.87	8	PASS
11	2462	-16.78	8	PASS



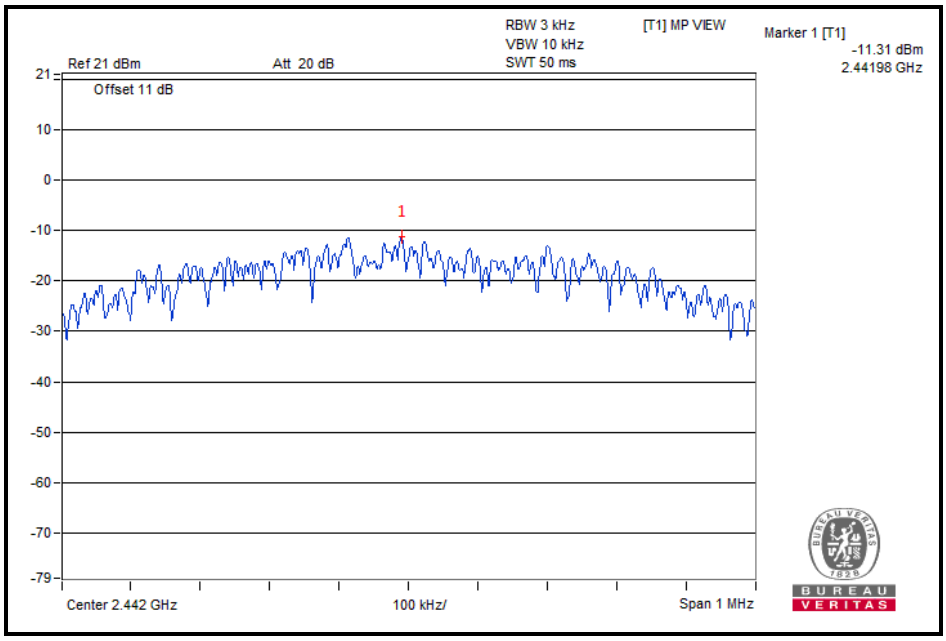
802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-18.47	8	PASS
6	2437	-18.33	8	PASS
11	2462	-18.25	8	PASS



BT-LE (GFSK)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2402	-11.39	8	PASS
20	2442	-11.31	8	PASS
39	2480	-12.45	8	PASS

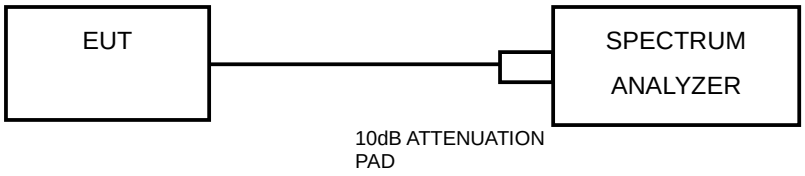


4.6 OUT OF BAND EMISSION MEASUREMENT

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

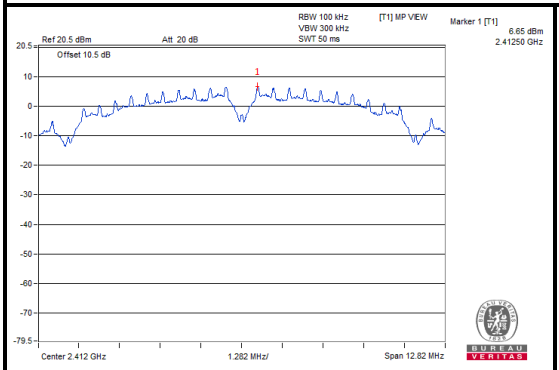
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

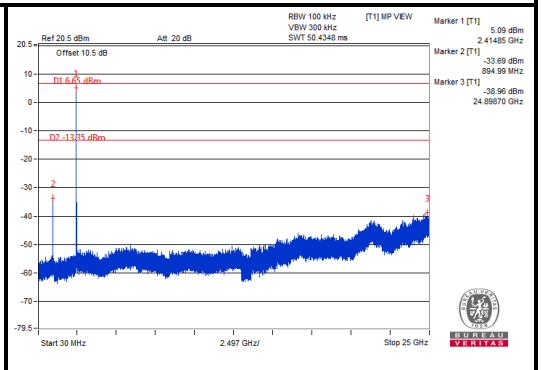
4.6.7 TEST RESULTS

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.

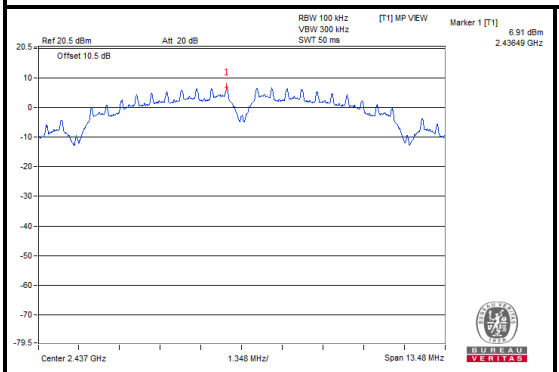
802.11b

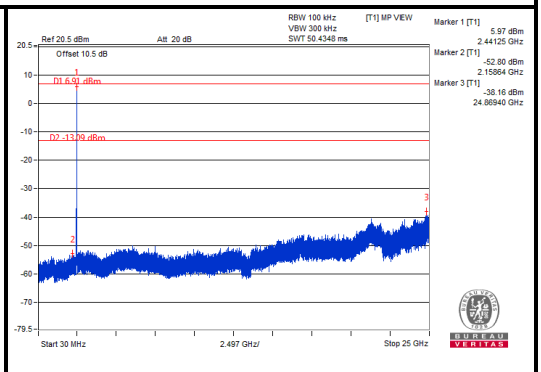
CH 1



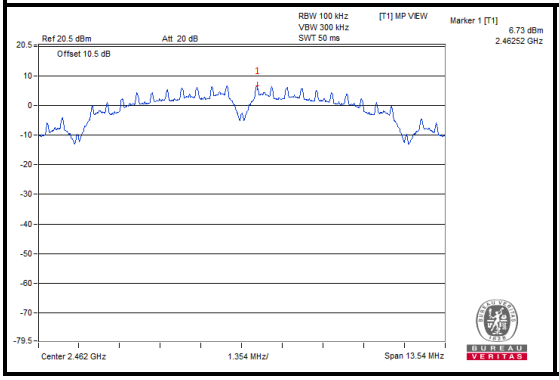


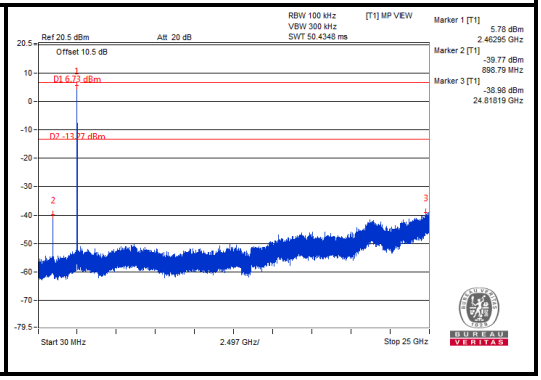
CH 6

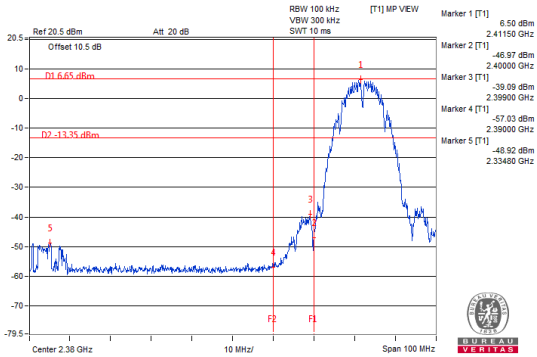
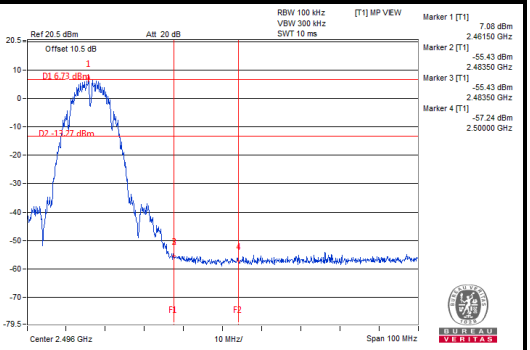




CH 11

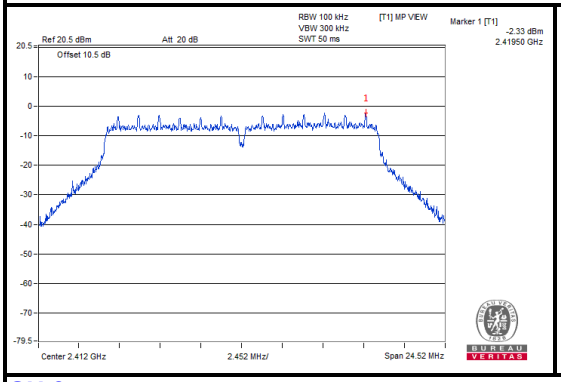


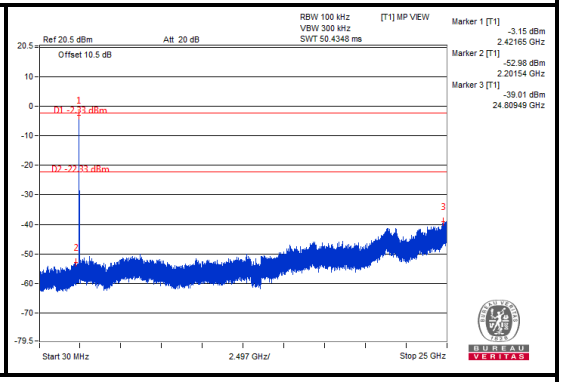


CH 1 Band Edge	CH 11 Band Edge
	

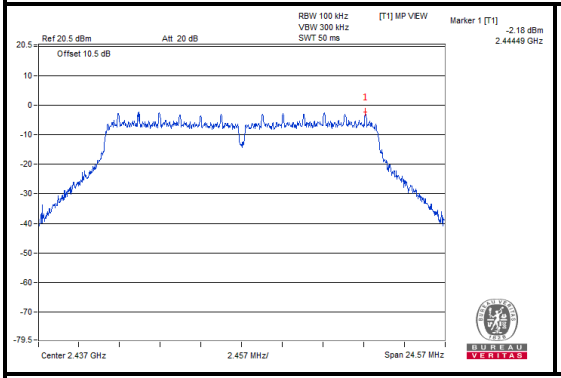
802.11g

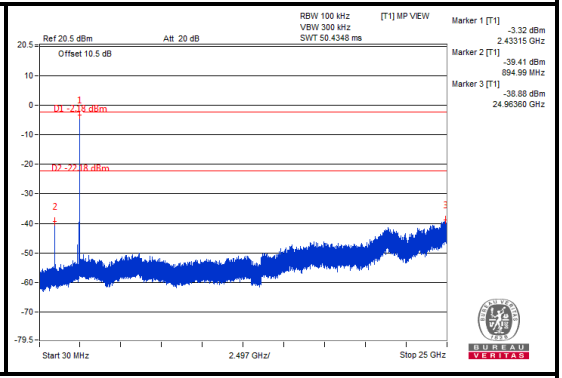
CH 1



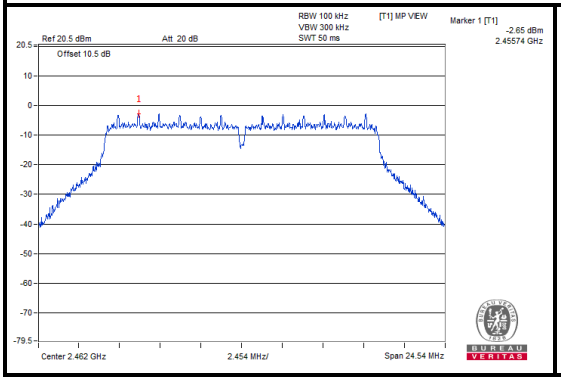


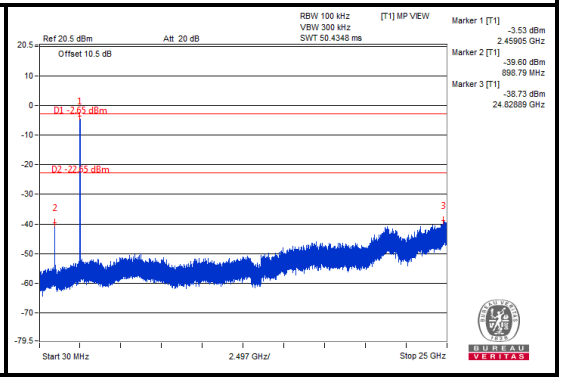
CH 6

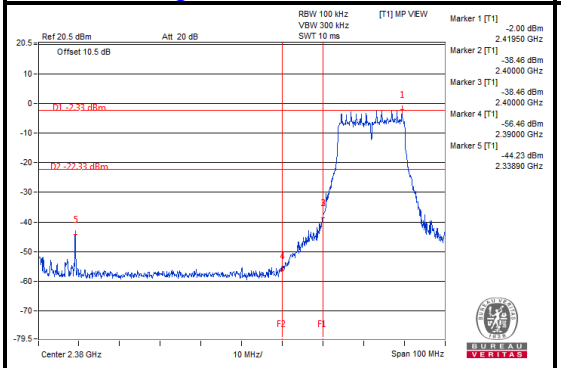
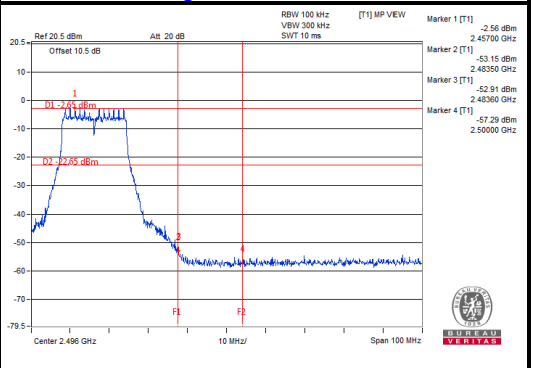




CH 11

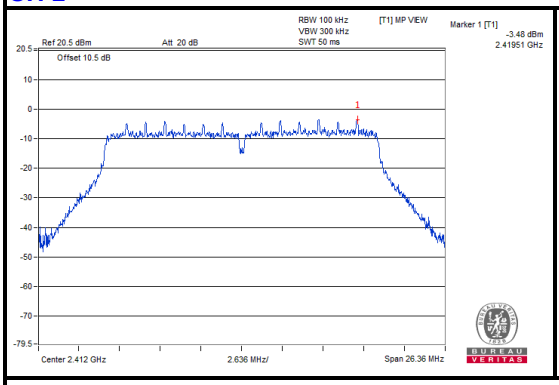


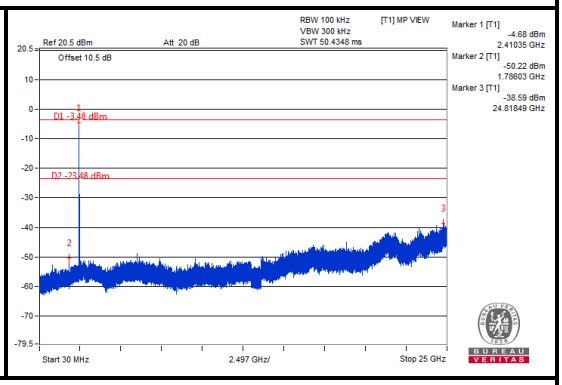


CH 1 Band Edge	CH 11 Band Edge
	

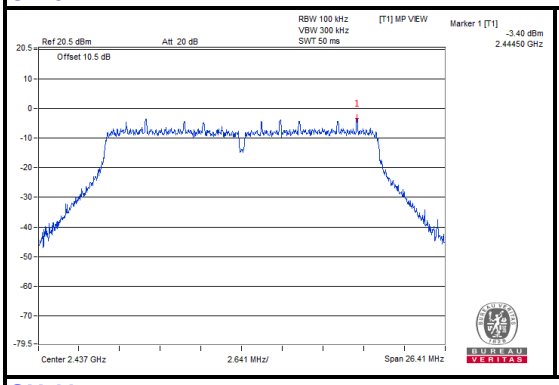
802.11n (20MHz)

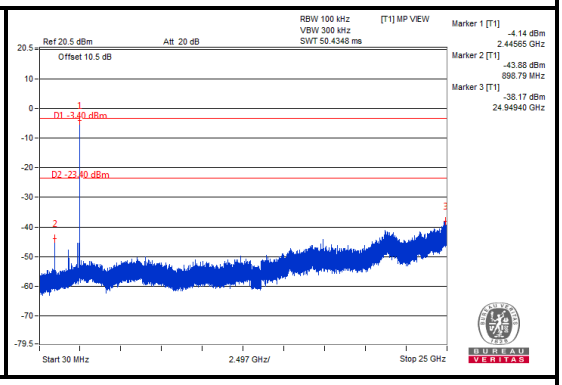
CH 1



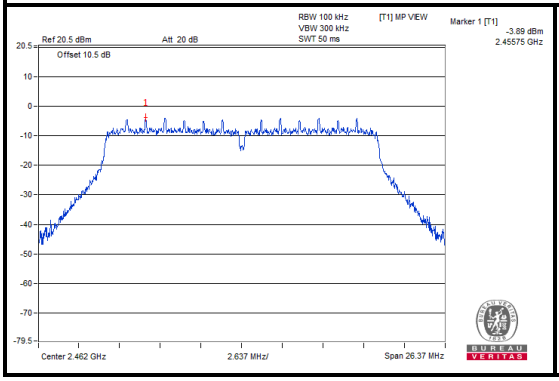


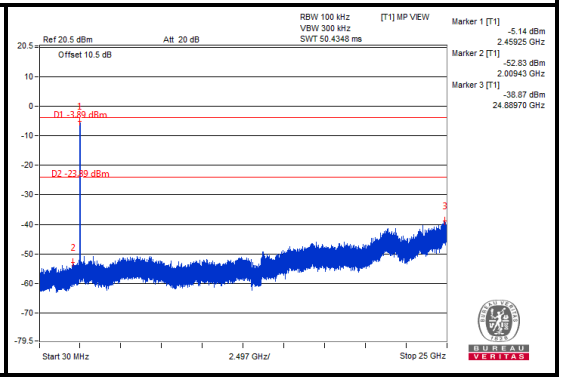
CH 6

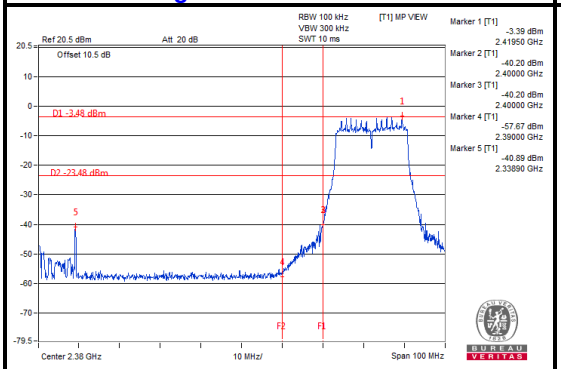
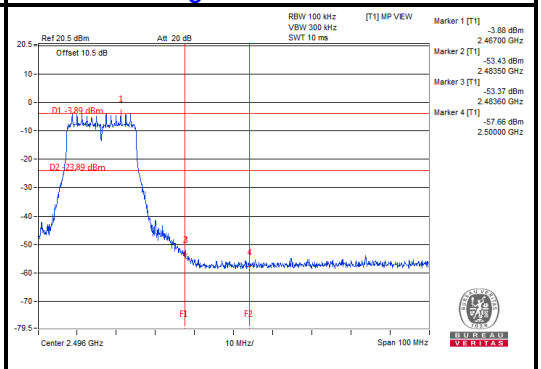




CH 11

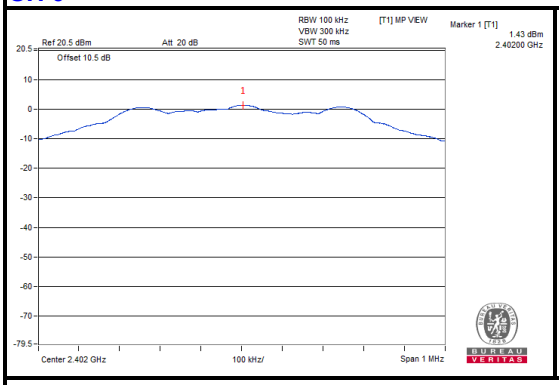


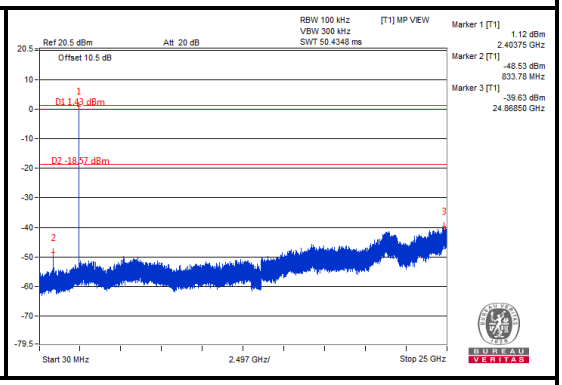


CH 1 Band Edge	CH 11 Band Edge
	

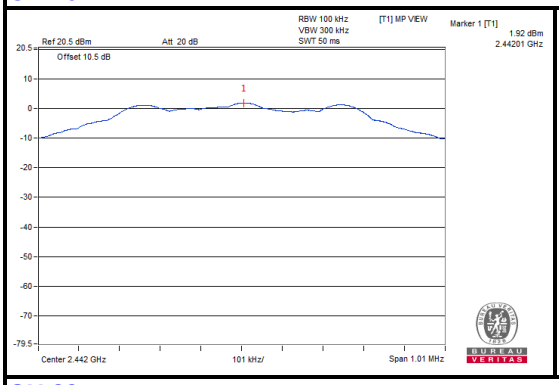
BT-LE (GFSK)

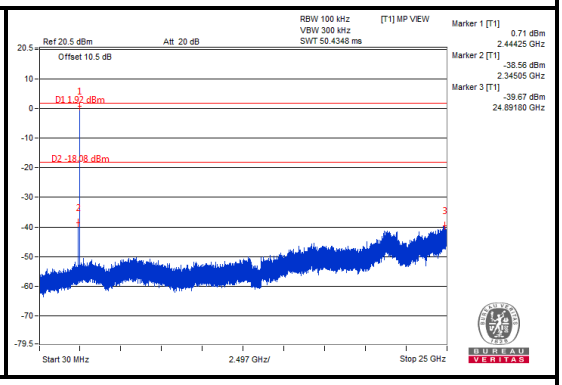
CH 0



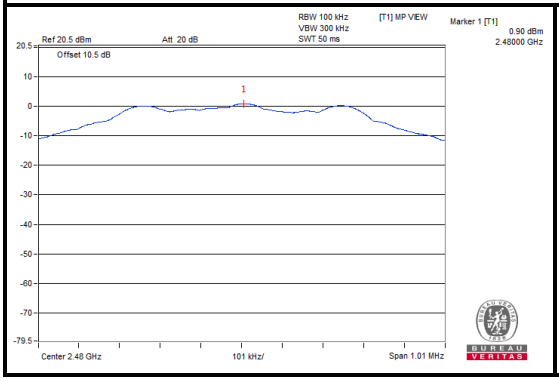


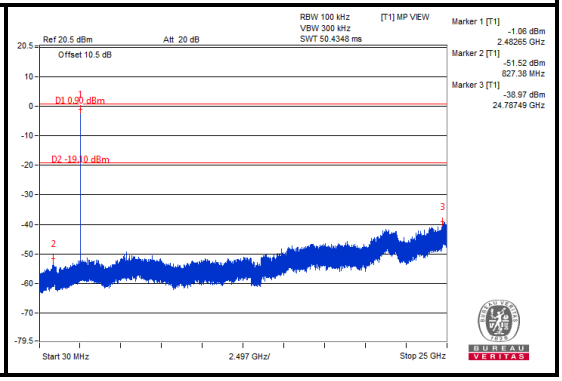
CH 20

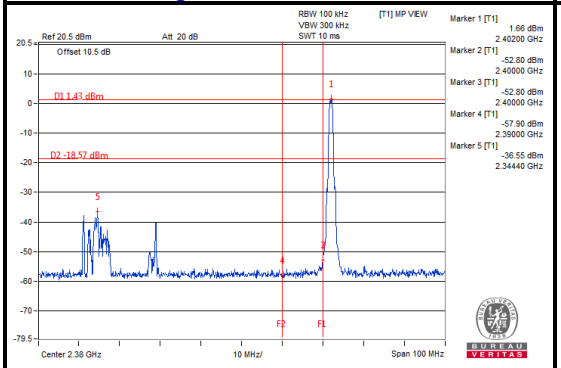
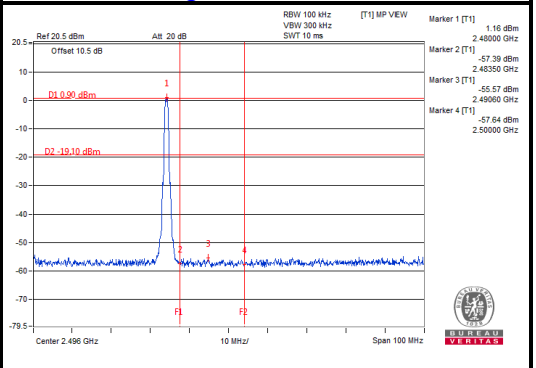




CH 39





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---