Test Lab
Cert 2951.01

TEST REPORT

Applicant	SZ Telstar CO.,LTD
Address	Telstar Technology Park No.12~14,Gangbei Industrial Zone, Ailian, Longgang District, ShenZhen

Manufacturer or Supplier	SZ Telstar CO.,LTD
Address	Telstar Technology Park No.12~14,Gangbei Industrial Zone, Ailian, Longgang District, ShenZhen
Product	Projector
Brand Name	miroir, Brookstone
Model	U5
Additional Model & Model Difference	M400A, M400, 318490, see item 3.1
Date of tests	Oct. 15, 2016 ~ Nov. 08, 2016

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 Tom Chen Project Engineer / EMC Department	Approved by Glyn He Supervisor/ EMC Department
Tom	Date: Nov. 30, 2016

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TABLE OF CONTENTS

RELEASE CONTROL RECORD **4**
1 SUMMARY OF TEST RESULTS **5**
2 MEASUREMENT UNCERTAINTY **5**
3 GENERAL INFORMATION **6**
3.1 GENERAL DESCRIPTION OF EUT 6
3.2 DESCRIPTION OF TEST MODES 7
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST 8
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL 8
3.3 DUTY CYCLE OF TEST SIGNAL 10
3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS 11
3.5 DESCRIPTION OF SUPPORT UNITS 11
4 TEST TYPES AND RESULTS **12**
4.1 CONDUCTED EMISSION MEASUREMENT 12
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT 12
4.1.2 TEST INSTRUMENTS 12
4.1.3 TEST PROCEDURES 13
4.1.4 DEVIATION FROM TEST STANDARD 13
4.1.5 TEST SETUP 14
4.1.6 EUT OPERATING CONDITIONS 14
4.1.7 TEST RESULTS 15
4.2 RADIATED EMISSION MEASUREMENT 17
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT 17
4.2.2 TEST INSTRUMENTS 18
4.2.3 TEST PROCEDURES 19
4.2.4 DEVIATION FROM TEST STANDARD 19
4.2.5 TEST SETUP 20
4.2.6 EUT OPERATING CONDITIONS 21
4.2.7 TEST RESULTS 22
4.3 6dB BANDWIDTH MEASUREMENT 38
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT 38
4.3.2 TEST INSTRUMENTS 38
4.3.3 TEST PROCEDURE 38
4.3.4 DEVIATION FROM TEST STANDARD 38
4.3.5 TEST SETUP 39
4.3.6 EUT OPERATING CONDITIONS 39

4.3.7 TEST RESULTS 40
4.4 CONDUCTED OUTPUT POWER 42
4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT 42
4.4.2 TEST SETUP 42
4.4.3 TEST INSTRUMENTS 42
4.4.4 TEST PROCEDURES 43
4.4.5 DEVIATION FROM TEST STANDARD 43
4.4.6 EUT OPERATING CONDITIONS 43
4.4.7 TEST RESULTS 44
4.4.7.1 MAXIMUM PEAK OUTPUT POWER 44
4.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE) 45
4.5 POWER SPECTRAL DENSITY MEASUREMENT 46
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT 46
4.5.2 TEST SETUP 46
4.5.3 TEST INSTRUMENTS 46
4.5.4 TEST PROCEDURE 46
4.5.5 DEVIATION FROM TEST STANDARD 46
4.5.6 EUT OPERATING CONDITION 47
4.5.7 TEST RESULTS 47
4.6 OUT OF BAND EMISSION MEASUREMENT 49
4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT 49
4.6.2 TEST SETUP 49
4.6.3 TEST INSTRUMENTS 49
4.6.4 TEST PROCEDURE 49
4.6.5 DEVIATION FROM TEST STANDARD 50
4.6.6 EUT OPERATING CONDITION 50
4.6.7 TEST RESULTS 51
5 PHOTOGRAPHS OF THE TEST CONFIGURATION 58
6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 59

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF160928N001-2	Original release	Nov. 30, 2016

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	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.90dB
	30MHz ~ 1GMHz	3.83dB
	1GHz ~ 18GHz	4.93dB
	18GHz ~ 40GHz	4.80dB

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	Projector
MODEL NO.	U5
MODULE NO.	AP62X2
ADDITIONAL NO.	M400A, M400, 318490
FCC ID	2AFOW-UST520U5
NOMINAL VOLTAGE	AC 120V 60Hz
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/n(HT20) 2402-2480MHz for BT-LE(GFSK)
OUTPUT POWER(PEAK)	WLAN: 212.385mW(Maximum) BT-LE: 7.228mW(Maximum)
ANTENNA TYPE	Integral FPCB Antenna, 2.0dBi Gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	AC Cable: Unshielded, detachable, 2.0m Audio Out Cable: Unshielded, detachable, 1.7m HDMI Cable: Unshielded, detachable, 1.5m

NOTE:

1. The EUT provides completed transmitters and receivers.

MODULATION MODE	FUNCTION
802.11b	1TX/1RX
802.11g	1TX/1RX
802.11n (HT20)	2TX/2RX
BT-LE	1TX/1RX

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.: 160928N001) for detailed product photo.
5. Additional models M400A, M400, 318490 are identical with the test model U5, except the model number for marketing purpose.

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 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

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)
A	802.11b	1 to 11	1	OFDM	DBPSK	1.0
A	BT-LE	0 to 39	39	DTS	GFSK	1.0

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, 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)
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	802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	BT-LE	0 to 39	0,19, 39	DTS	GFSK	1.0

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.

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	802.11n HT20	1 to 11	1, 11	OFDM	BPSK	6.5
A	BT-LE	0 to 39	0, 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	802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
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	25deg. C, 50%RH	AC 120V 60Hz	Cheng Zhong
RE≥1G	25deg. C, 50%RH	AC 120V 60Hz	Cheng Zhong
PLC	20deg. C, 56%RH	AC 120V 60Hz	Robert Cheng
APCM	20deg. C, 55%RH	AC 120V 60Hz	Robert Cheng

3.3 DUTY CYCLE OF TEST SIGNAL

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
KDB 558074 D01 DTS Meas Guidance v03r05
KDB 662911 D01 v02r01
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 without other necessary accessories or support units.

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.

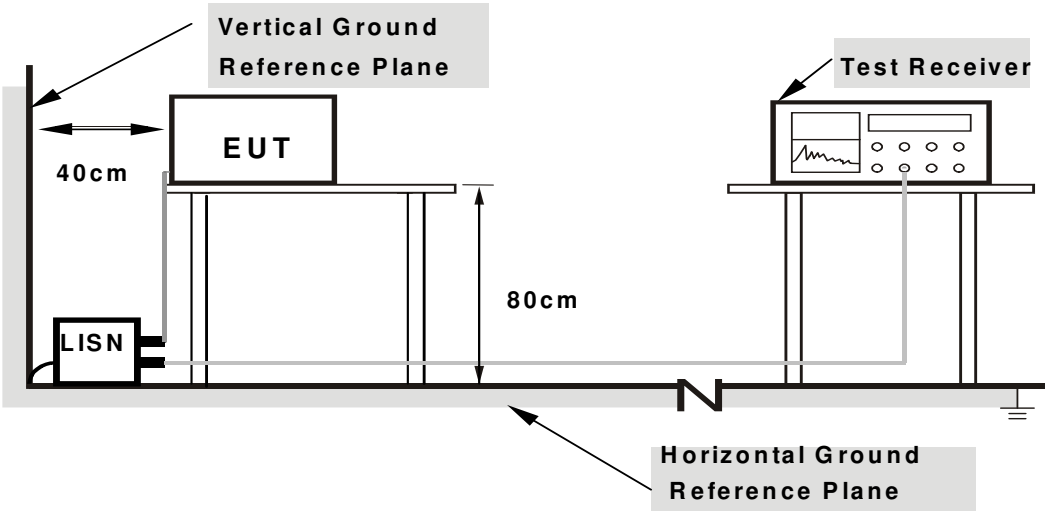
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

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.

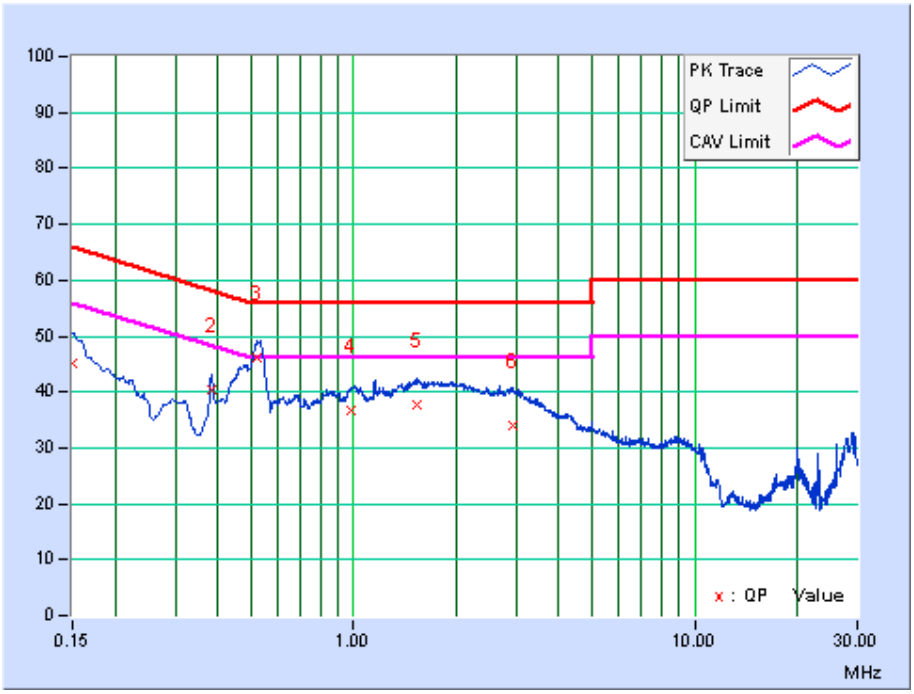
4.1.7 TEST RESULTS

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	10.04	34.92	19.11	44.96	29.15	66.00	56.00	-21.04	-26.85
2	0.38362	10.10	30.47	27.75	40.57	37.85	58.20	48.20	-17.63	-10.35
3	**0.52109**	**10.14**	**36.12**	**31.10**	**46.26**	**41.24**	**56.00**	**46.00**	**-9.74**	**-4.76**
4	0.97800	10.14	26.65	20.36	36.79	30.50	56.00	46.00	-19.21	-15.50
5	1.53023	10.15	27.72	22.48	37.87	32.63	56.00	46.00	-18.13	-13.37
6	2.92425	10.15	23.82	17.67	33.97	27.82	56.00	46.00	-22.03	-18.18

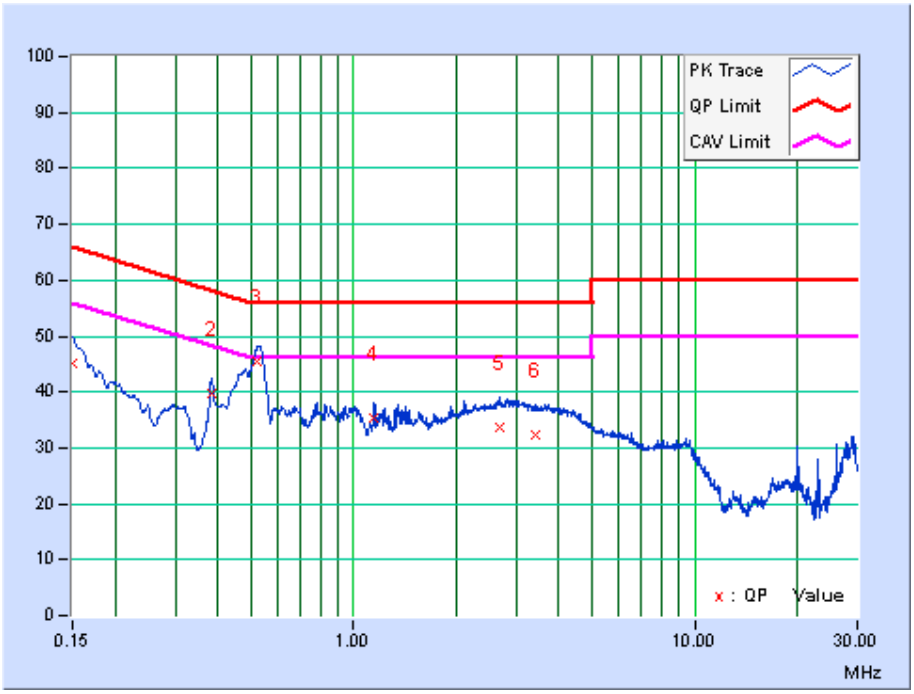
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission 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	0.15000	9.84	35.25	19.49	45.09	29.33	66.00	56.00	-20.91	-26.67
2	0.38362	9.84	30.04	27.74	39.88	37.58	58.20	48.20	-18.32	-10.62
3	0.52109	9.84	35.64	30.84	45.48	40.68	56.00	46.00	-10.52	-5.32
4	1.15125	9.84	25.56	22.79	35.40	32.63	56.00	46.00	-20.60	-13.37
5	2.68534	9.87	23.65	17.59	33.52	27.46	56.00	46.00	-22.48	-18.54
6	3.42150	9.90	22.55	16.89	32.45	26.79	56.00	46.00	-23.55	-19.21

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. 04,16	Nov. 03,17
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. 08, 16	Aug. 07, 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. 04,16	Nov. 03,17
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 test was performed in 966 Chamber.
2. The calibration interval of the above test instruments is 12 or 24 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 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest

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:

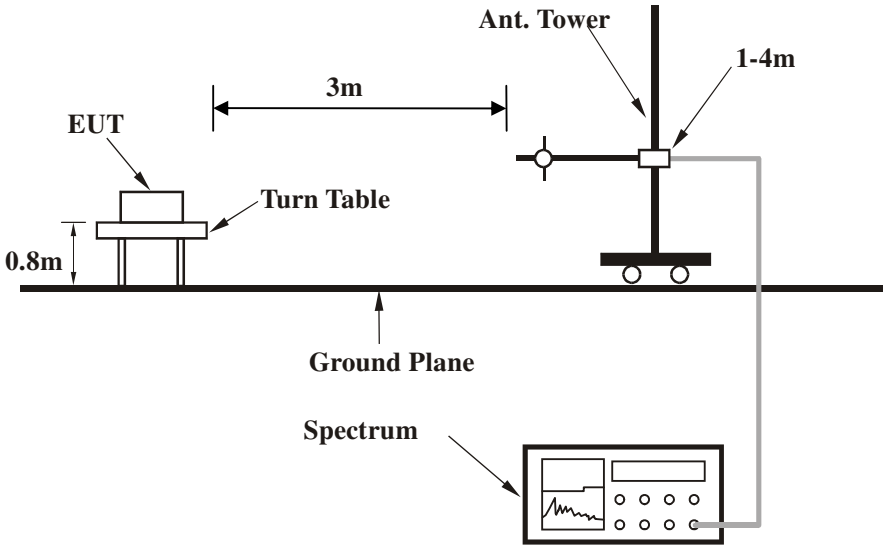
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

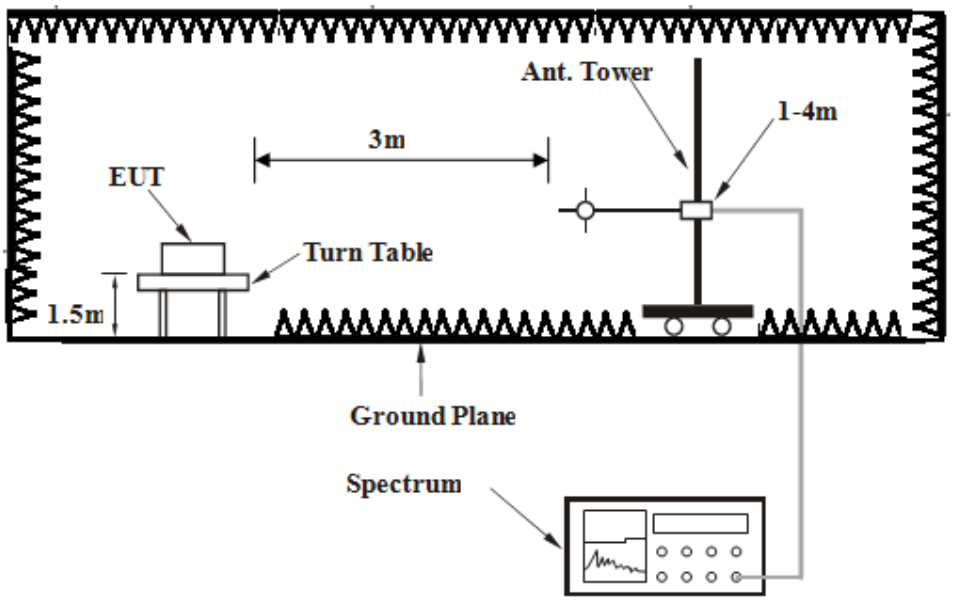
4.2.5 TEST SETUP

Below 1GHz test setup



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

Above 1GHz test setup



Note: 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:

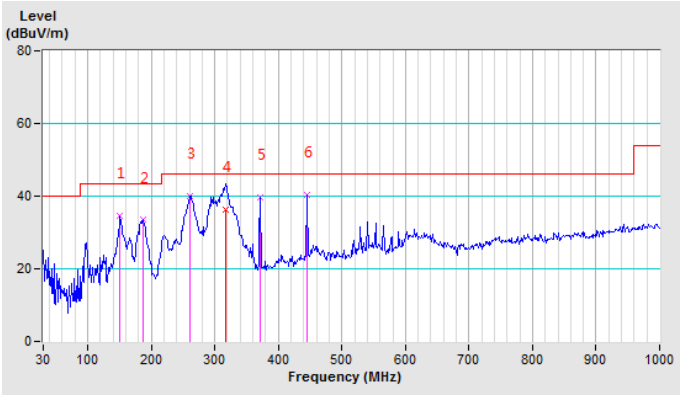
802.11b

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 (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	150.90	34.55 QP	43.50	-8.95	2.00 H	0	50.96	-16.41
2	187.45	33.42 QP	43.50	-10.08	2.00 H	0	52.89	-19.47
3	260.55	39.96 QP	46.00	-6.04	2.00 H	0	52.53	-12.57
4	317.00	36.30 QP	46.00	-9.70	1.00 H	120	49.05	-12.75
5	371.61	39.66 QP	46.00	-6.34	2.00 H	0	50.92	-11.26
6	444.71	40.39 QP	46.00	-5.61	2.00 H	0	48.76	-8.37

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.

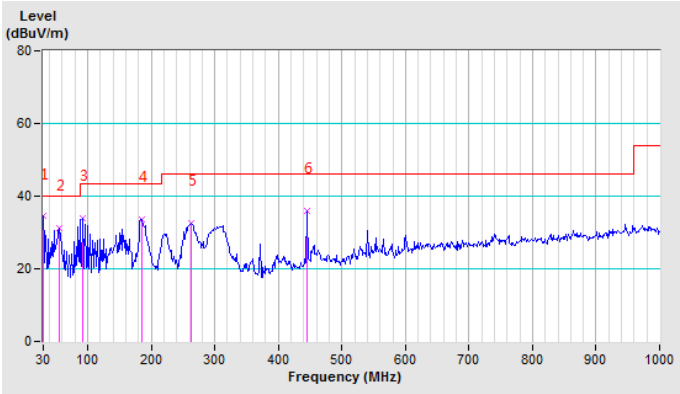


CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	**30.00**	**34.46 QP**	**40.00**	**-5.54**	**1.00 V**	**0**	**45.24**	**-10.78**
2	55.30	31.21 QP	40.00	-8.79	1.00 V	0	54.43	-23.22
3	91.86	34.06 QP	43.50	-9.44	1.00 V	0	52.90	-18.84
4	184.64	33.61 QP	43.50	-9.89	1.00 V	0	52.92	-19.31
5	263.36	32.63 QP	46.00	-13.37	1.00 V	0	45.49	-12.86
6	444.71	36.06 QP	46.00	-9.94	1.00 V	0	44.43	-8.37

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	47.11 PK	74.00	-26.89	1.95 H	203	43.24	3.87
2	2390.00	36.53 AV	54.00	-17.47	1.95 H	203	32.66	3.87
3	*2412.00	101.79 PK			1.95 H	203	97.85	3.94
4	*2412.00	98.68 AV			1.95 H	203	94.74	3.94
5	4824.00	48.78 PK	74.00	-25.22	1.48 H	201	40.77	8.01
6	4824.00	43.48 AV	54.00	-10.52	1.48 H	201	35.47	8.01
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	50.72 PK	74.00	-23.28	1.64 V	201	46.85	3.87
2	2390.00	41.24 AV	54.00	-12.76	1.64 V	201	37.37	3.87
3	*2412.00	104.00 PK			1.64 V	201	100.06	3.94
4	*2412.00	100.87 AV			1.64 V	201	96.93	3.94
5	4824.00	46.94 PK	74.00	-27.06	1.84 V	325	38.93	8.01
6	4824.00	41.04 AV	54.00	-12.96	1.84 V	325	33.03	8.01

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 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	104.33 PK			1.49 H	203	100.32	4.01
2	*2437.00	101.29 AV			1.49 H	203	97.28	4.01
3	4874.00	46.70 PK	74.00	-27.30	1.62 H	243	38.62	8.08
4	4874.00	41.14 AV	54.00	-12.86	1.62 H	243	33.06	8.08
5	7311.00	49.66 PK	74.00	-24.34	1.95 H	203	35.53	14.13
6	7311.00	39.21 AV	54.00	-14.79	1.95 H	203	25.08	14.13
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	106.55 PK			1.65 V	87	102.54	4.01
2	*2437.00	103.35 AV			1.65 V	87	99.34	4.01
3	4874.00	46.00 PK	74.00	-28.00	1.63 V	248	37.92	8.08
4	4874.00	39.05 AV	54.00	-14.95	1.63 V	248	30.97	8.08
5	7311.00	50.58 PK	74.00	-23.42	1.59 V	234	36.45	14.13
6	7311.00	40.32 AV	54.00	-13.68	1.59 V	234	26.19	14.13

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)
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	*2462.00	105.52 PK			1.48 H	201	101.43	4.09
2	*2462.00	102.39 AV			1.48 H	201	98.30	4.09
3	2483.50	50.62 PK	74.00	-23.38	1.48 H	201	46.46	4.16
4	2483.50	38.85 AV	54.00	-15.15	1.48 H	201	34.69	4.16
5	4924.00	48.80 PK	74.00	-25.20	1.87 H	316	40.66	8.14
6	4924.00	44.70 AV	54.00	-9.30	1.87 H	316	36.56	8.14
7	7386.00	48.71 PK	74.00	-25.29	1.28 H	302	34.46	14.25
8	7386.00	38.32 AV	54.00	-15.68	1.28 H	302	24.07	14.25
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	106.34 PK			1.45 V	28	102.25	4.09
2	*2462.00	103.19 AV			1.45 V	28	99.10	4.09
3	2483.50	51.70 PK	74.00	-22.30	1.45 V	28	47.54	4.16
4	2483.50	39.94 AV	54.00	-14.06	1.45 V	28	35.78	4.16
5	4924.00	45.68 PK	74.00	-28.32	1.54 V	281	37.54	8.14
6	4924.00	39.28 AV	54.00	-14.72	1.54 V	281	31.14	8.14
7	7386.00	48.91 PK	74.00	-25.09	1.94 V	227	34.66	14.25
8	7386.00	38.32 AV	54.00	-15.68	1.94 V	227	24.07	14.25

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	71.81 PK	74.00	-2.19	1.74 H	263	67.94	3.87
2	2390.00	51.24 AV	54.00	-2.76	1.74 H	263	47.37	3.87
3	*2412.00	104.80 PK			1.74 H	263	100.86	3.94
4	*2412.00	95.62 AV			1.74 H	263	91.68	3.94
5	4824.00	40.85 PK	74.00	-33.15	1.84 H	325	32.84	8.01
6	4824.00	28.80 AV	54.00	-25.20	1.84 H	325	20.79	8.01
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	73.50 PK	74.00	-0.50	1.52 V	313	69.63	3.87
2	2390.00	52.48 AV	54.00	-1.52	1.52 V	313	48.61	3.87
3	*2412.00	105.42 PK			1.52 V	313	101.48	3.94
4	*2412.00	95.70 AV			1.52 V	313	91.76	3.94
5	4824.00	42.82 PK	74.00	-31.18	1.49 V	234	34.81	8.01
6	4824.00	29.24 AV	54.00	-24.76	1.49 V	234	21.23	8.01

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 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	110.22 PK			2.54 H	50	106.21	4.01
2	*2437.00	97.48 AV			2.54 H	50	93.47	4.01
3	4874.00	45.55 PK	74.00	-28.45	1.55 H	120	37.47	8.08
4	4874.00	31.58 AV	54.00	-22.42	1.55 H	120	23.50	8.08
5	7311.00	51.09 PK	74.00	-22.91	1.20 H	150	36.96	14.13
6	7311.00	37.88 AV	54.00	-16.12	1.20 H	150	23.75	14.13
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	111.45 PK			1.99 V	102	107.44	4.01
2	*2437.00	98.75 AV			1.99 V	102	94.74	4.01
3	4874.00	44.58 PK	74.00	-29.42	1.98 V	103	36.50	8.08
4	4874.00	30.25 AV	54.00	-23.75	1.98 V	103	22.17	8.08
5	7311.00	49.69 PK	74.00	-24.31	1.20 V	251	35.56	14.13
6	7311.00	39.98 AV	54.00	-14.02	1.20 V	251	25.85	14.13

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)
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	*2462.00	105.58 PK			1.69 H	246	101.49	4.09
2	*2462.00	96.14 AV			1.69 H	246	92.05	4.09
3	2483.50	72.40 PK	74.00	-1.60	1.69 H	246	68.24	4.16
4	2483.50	43.51 AV	54.00	-10.49	1.69 H	246	39.35	4.16
5	4924.00	43.25 PK	74.00	-30.75	1.64 H	260	35.11	8.14
6	4924.00	29.97 AV	54.00	-24.03	1.64 H	260	21.83	8.14
7	7386.00	49.32 PK	74.00	-24.68	1.49 H	251	35.07	14.25
8	7386.00	35.33 AV	54.00	-18.67	1.49 H	251	21.08	14.25
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	105.65 PK			1.85 V	236	101.56	4.09
2	*2462.00	94.99 AV			1.85 V	236	90.90	4.09
3	2483.50	73.67 PK	74.00	-0.33	1.85 V	236	69.51	4.16
4	2483.50	46.45 AV	54.00	-7.55	1.85 V	236	42.29	4.16
5	4924.00	43.53 PK	74.00	-30.47	1.14 V	321	35.39	8.14
6	4924.00	31.26 AV	54.00	-22.74	1.14 V	321	23.12	8.14
7	7386.00	48.26 PK	74.00	-25.74	1.19 V	243	34.01	14.25
8	7386.00	36.84 AV	54.00	-17.16	1.19 V	243	22.59	14.25

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.

802.11n 20MHz

CHANNEL	TX Channel 1	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	2390.00	63.62 PK	74.00	-10.38	1.65 H	233	59.75	3.87
2	2390.00	42.12 AV	54.00	-11.88	1.65 H	233	38.25	3.87
3	*2412.00	99.92 PK			1.65 H	233	95.98	3.94
4	*2412.00	87.37 AV			1.65 H	233	83.43	3.94
5	4824.00	48.64 PK	74.00	-25.36	1.75 H	263	40.63	8.01
6	4824.00	35.76 AV	54.00	-18.24	1.75 H	263	27.75	8.01
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	69.09 PK	74.00	-4.91	1.63 V	253	65.22	3.87
2	2390.00	47.35 AV	54.00	-6.65	1.63 V	253	43.48	3.87
3	*2412.00	102.17 PK			1.56 V	238	98.23	3.94
4	*2412.00	89.32 AV			1.56 V	238	85.38	3.94
5	4824.00	45.98 PK	74.00	-28.02	1.58 V	203	37.97	8.01
6	4824.00	37.98 AV	54.00	-16.02	1.58 V	203	29.97	8.01

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 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	100.80 PK			1.78 H	213	96.79	4.01
2	*2437.00	88.24 AV			1.78 H	213	84.23	4.01
3	4874.00	46.92 PK	74.00	-27.08	1.94 H	236	38.84	8.08
4	4874.00	36.85 AV	54.00	-17.15	1.94 H	236	28.77	8.08
5	7311.00	48.34 PK	74.00	-25.66	1.49 H	253	34.21	14.13
6	7311.00	36.65 AV	54.00	-17.35	1.49 H	253	22.52	14.13
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	103.72 PK			1.95 V	236	99.71	4.01
2	*2437.00	93.32 AV			1.95 V	236	89.31	4.01
3	4874.00	50.32 PK	74.00	-23.68	1.54 V	184	42.24	8.08
4	4874.00	37.12 AV	54.00	-16.88	1.54 V	184	29.04	8.08
5	7311.00	51.63 PK	74.00	-22.37	1.72 V	150	37.50	14.13
6	7311.00	37.65 AV	54.00	-16.35	1.72 V	150	23.52	14.13

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	107.26 PK			1.52 H	234	103.17	4.09
2	*2462.00	96.90 AV			1.52 H	234	92.81	4.09
3	2483.50	70.47 PK	74.00	-3.53	1.52 H	234	66.31	4.16
4	2483.50	44.97 AV	54.00	-9.03	1.52 H	234	40.81	4.16
5	4924.00	51.74 PK	74.00	-22.26	1.49 H	302	43.60	8.14
6	4924.00	38.45 AV	54.00	-15.55	1.49 H	302	30.31	8.14
7	7386.00	54.84 PK	74.00	-19.16	1.49 H	246	40.59	14.25
8	7386.00	43.19 AV	54.00	-10.81	1.49 H	246	28.94	14.25
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	104.52 PK			1.94 V	220	100.43	4.09
2	*2462.00	94.44 AV			1.94 V	220	90.35	4.09
3	**2483.50**	**73.70 PK**	**74.00**	**-0.30**	**1.94 V**	**220**	**69.54**	**4.16**
4	2483.50	46.18 AV	54.00	-7.82	1.94 V	220	42.02	4.16
5	4924.00	51.19 PK	74.00	-22.81	1.49 V	213	43.05	8.14
6	4924.00	36.27 AV	54.00	-17.73	1.49 V	213	28.13	8.14
7	7386.00	54.65 PK	74.00	-19.35	1.49 V	246	40.40	14.25
8	7386.00	43.91 AV	54.00	-10.09	1.49 V	246	29.66	14.25

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:

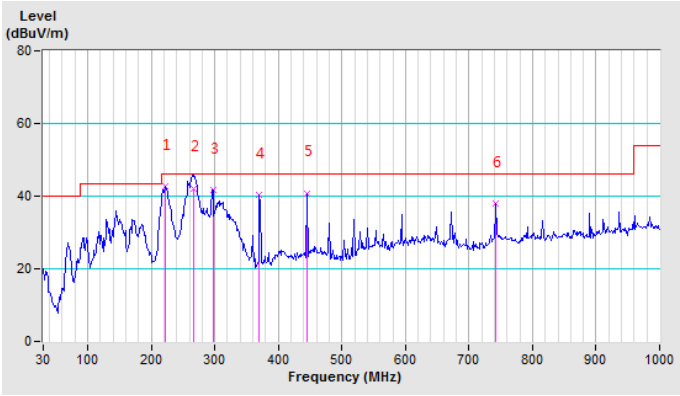
BT-LE (GFSK)

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 (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	**221.19**	**42.59 QP**	**46.00**	**-3.41**	**2.00 H**	**0**	**60.20**	**-17.61**
2	266.17	42.07 QP	46.00	-3.93	2.00 H	0	55.21	-13.14
3	297.10	41.55 QP	46.00	-4.45	2.00 H	0	54.89	-13.34
4	370.20	40.24 QP	46.00	-5.76	2.00 H	0	51.63	-11.39
5	444.71	40.72 QP	46.00	-5.28	2.00 H	0	49.09	-8.37
6	742.74	37.83 QP	46.00	-8.17	2.00 H	0	38.26	-0.43

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.

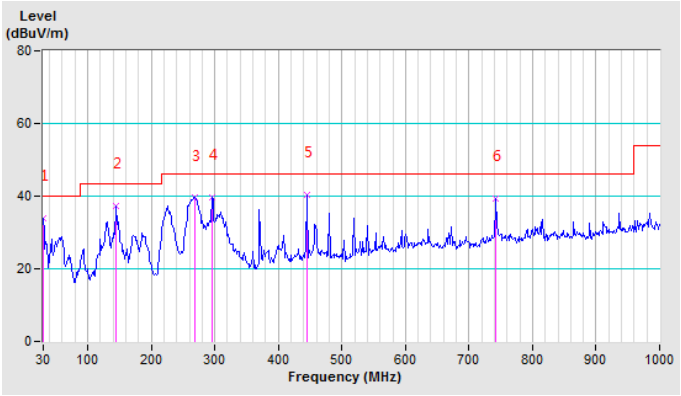


CHANNEL	TX Channel 39	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	30.00	34.01 QP	40.00	-5.99	1.00 V	0	44.79	-10.78
2	145.28	37.25 QP	43.50	-6.25	1.00 V	0	54.02	-16.77
3	268.99	39.57 QP	46.00	-6.43	1.00 V	0	53.00	-13.43
4	295.70	39.77 QP	46.00	-6.23	1.00 V	0	53.18	-13.41
5	444.71	40.31 QP	46.00	-5.69	1.00 V	0	48.68	-8.37
6	742.74	39.28 QP	46.00	-6.72	1.00 V	0	39.71	-0.43

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	43.55 PK	74.00	-30.45	1.52 H	21	39.68	3.87
2	2390.00	30.25 AV	54.00	-23.75	1.52 H	21	26.38	3.87
3	*2402.00	100.80 PK			3.54 H	193	96.90	3.90
4	*2402.00	75.41 AV			3.54 H	193	71.51	3.90
5	4804.00	57.66 PK	74.00	-16.34	1.22 H	210	49.68	7.98
6	4804.00	43.66 AV	54.00	-10.34	1.22 H	210	35.68	7.98
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	43.88 PK	74.00	-30.12	3.92 V	193	40.01	3.87
2	2390.00	33.35 AV	54.00	-20.65	3.92 V	193	29.48	3.87
3	*2402.00	101.45 PK			3.92 V	193	97.55	3.90
4	*2402.00	75.96 AV			3.92 V	193	72.06	3.90
5	4804.00	54.58 PK	74.00	-19.42	1.52 V	251	46.60	7.98
6	4804.00	43.66 AV	54.00	-10.34	1.52 V	251	35.68	7.98

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 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	100.35 PK			3.87 H	109	96.33	4.02
2	*2440.00	75.16 AV			3.87 H	109	71.14	4.02
3	4880.00	61.32 PK	74.00	-12.68	3.84 H	176	53.23	8.09
4	**4880.00**	**48.25 AV**	**54.00**	**-5.75**	**3.84 H**	**176**	**40.16**	**8.09**
5	7320.00	51.22 PK	74.00	-22.78	1.00 H	210	37.08	14.14
6	7320.00	36.36 AV	54.00	-17.64	1.00 H	210	22.22	14.14
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	102.54 PK			3.44 V	181	98.52	4.02
2	*2440.00	76.68 AV			3.44 V	181	72.66	4.02
3	4880.00	59.22 PK	74.00	-14.78	1.00 V	210	51.13	8.09
4	4880.00	45.88 AV	54.00	-8.12	1.00 V	210	37.79	8.09
5	7320.00	51.25 PK	74.00	-22.75	1.55 V	210	37.11	14.14
6	7320.00	36.77 AV	54.00	-17.23	1.55 V	210	22.63	14.14

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	102.38 PK			1.50 H	25	98.23	4.15
2	*2480.00	76.69 AV			1.50 H	25	72.54	4.15
3	2483.50	47.25 PK	74.00	-26.75	1.50 H	25	43.09	4.16
4	2483.50	35.66 AV	54.00	-18.34	1.50 H	25	31.50	4.16
5	4960.00	54.03 PK	74.00	-19.97	1.20 H	210	45.84	8.19
6	4960.00	43.55 AV	54.00	-10.45	1.20 H	210	35.36	8.19
7	7440.00	52.26 PK	74.00	-21.74	2.50 H	264	37.92	14.34
8	7440.00	35.99 AV	54.00	-18.01	2.50 H	264	21.65	14.34
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	99.88 PK			1.06 V	290	95.73	4.15
2	*2480.00	74.59 AV			1.06 V	290	70.44	4.15
3	2483.50	43.98 PK	74.00	-30.02	1.06 V	290	39.82	4.16
4	2483.50	33.59 AV	54.00	-20.41	1.06 V	290	29.43	4.16
5	4960.00	58.55 PK	74.00	-15.45	1.55 V	26	50.36	8.19
6	4960.00	45.55 AV	54.00	-8.45	1.55 V	26	37.36	8.19
7	7440.00	53.66 PK	74.00	-20.34	1.55 V	98	39.32	14.34
8	7440.00	36.05 AV	54.00	-17.95	1.55 V	98	21.71	14.34

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	May 04,16	May 03,17
Power Sensor	Keysight	U2021XA	MY55060018	May 04,16	May 03,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 13, 16	Oct.12, 17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05,16	Sep. 04,17
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 04,16	Nov. 03,17
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 04,16	Nov. 03,17
Signal Generator	Agilent	N5183A	MY50140980	Nov. 04,16	Nov. 03,17
Agile Signal Generator	Agilent	8645A	Agilent	Aug.08, 16	Aug.07, 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 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.

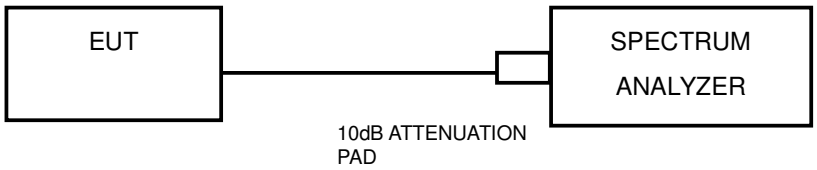
4.3.3 TEST PROCEDURE

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	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.09	0.5	PASS
6	2437	8.10	0.5	PASS
11	2462	8.10	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.52	0.5	PASS
6	2437	15.64	0.5	PASS
11	2462	15.67	0.5	PASS

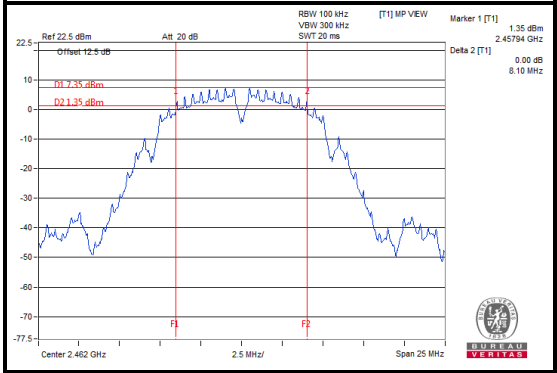
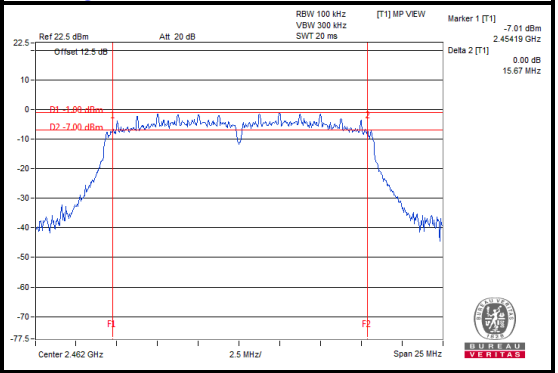
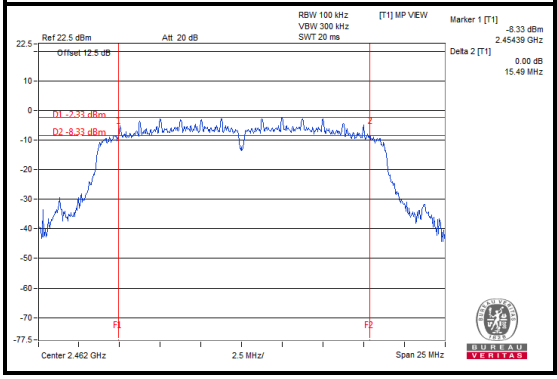
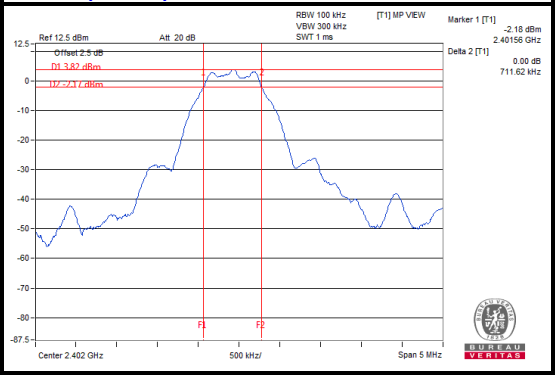
802.11n 20MHz

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	15.49	15.55	0.5	PASS
6	2437	15.19	15.48	0.5	PASS
11	2462	15.49	15.48	0.5	PASS

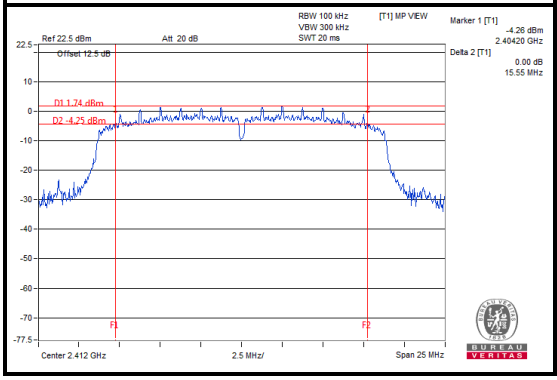
BT-LE (GFSK)

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

Chain 0

SPECTRUM PLOT OF WORST VALUE	
802.11b	**802.11g**
	
802.11n 20MHz	**BT-LE (GFSK)**
	

Chain 1

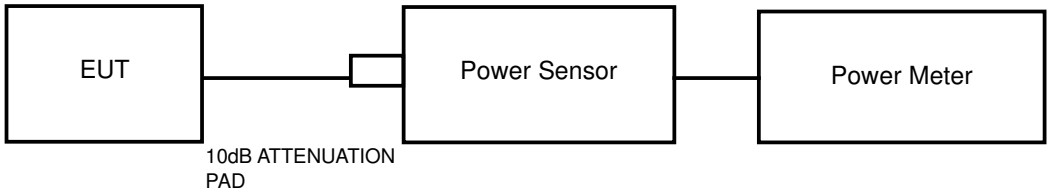
SPECTRUM PLOT OF WORST VALUE	
802.11n 20MHz	
	

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	May 04,16	May 03,17
Power Sensor	Keysight	U2021XA	MY55060018	May 04,16	May 03,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 13, 16	Oct.12, 17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05,16	Sep. 04,17
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 04,16	Nov. 03,17
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 04,16	Nov. 03,17
Signal Generator	Agilent	N5183A	MY50140980	Nov. 04,16	Nov. 03,17
Agile Signal Generator	Agilent	8645A	Agilent	Aug.08, 16	Aug.07, 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 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

MAXIMUM PEAK OUTPUT POWER

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	18.65	73.282	1	PASS
6	2437	18.59	72.277	1	PASS
11	2462	18.63	72.946	1	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	19.26	84.333	1	PASS
6	2437	19.34	85.901	1	PASS
11	2462	17.62	57.81	1	PASS

802.11n 20MHz

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	20.24	20.06	207.073	23.16	1	PASS
6	2437	20.35	**20.17**	**212.385**	23.27	1	PASS
11	2462	16.38	16.42	87.304	19.41	1	PASS

BT-LE (GFSK)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
0	2402	7.23	5.285	1	PASS
19	2440	**8.59**	**7.228**	1	PASS
39	2480	8.56	7.178	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)	AVG. POWER (mW)
1	2412	15.56	35.975
6	2437	15.60	36.308
11	2462	15.59	36.224

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	12.05	16.032
6	2437	12.22	16.672
11	2462	10.05	10.116

802.11n 20MHz

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	13.08	12.58	38.437	15.85
6	2437	13.27	12.62	**39.513**	**15.97**
11	2462	8.96	8.95	15.722	11.97

BT-LE (GFSK)

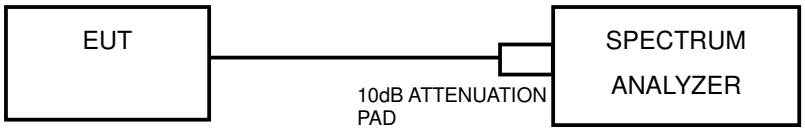
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
0	2402	1.81	1.517
19	2440	**3.25**	**2.113**
39	2480	3.21	2.094

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: 3KHz
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

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-7.39	8.00	PASS
6	2437	-5.33	8.00	PASS
11	2462	-6.99	8.00	PASS

802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.55	8.00	PASS
6	2437	-12.27	8.00	PASS
11	2462	-14.71	8.00	PASS

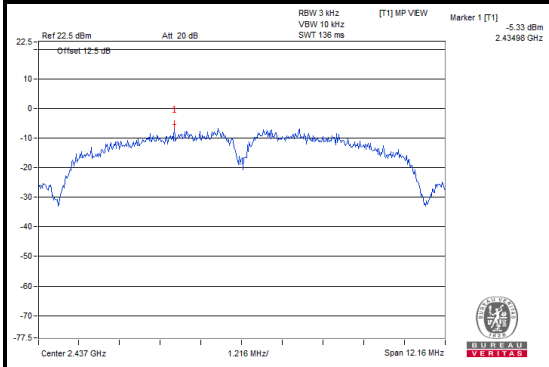
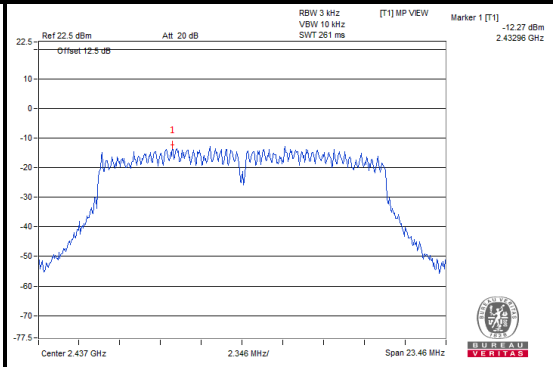
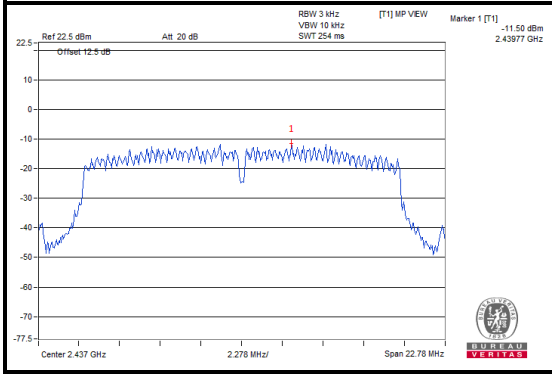
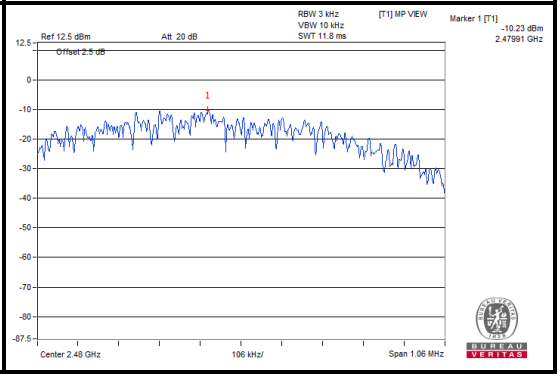
802.11n 20MHz

TX chain	Channel	Freq. (MHz)	PSD (dBm/3KHz)	10 log (N=2) dB	TOTAL PSD (dBm/3KHz)	Limit (dBm3KHz)	PASS /FAIL
0	1	2412	-11.77	3.01	-8.76	8	PASS
	6	2437	-11.50	3.01	-8.49	8	PASS
	11	2462	-16.35	3.01	-13.34	8	PASS
1	1	2412	-11.98	3.01	-8.97	8	PASS
	6	2437	-11.82	3.01	-8.81	8	PASS
	11	2462	-16.59	3.01	-13.58	8	PASS

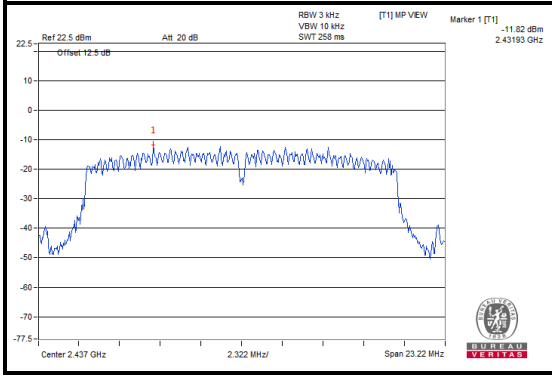
BT-LE (GFSK)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2402	-11.71	8.00	PASS
19	2440	-10.35	8.00	PASS
39	2480	-10.23	8.00	PASS

Chain 0

SPECTRUM PLOT OF WORST VALUE	
802.11b	**802.11g**
	
802.11n 20MHz	**BT-LE (GFSK)**
	

Chain 1

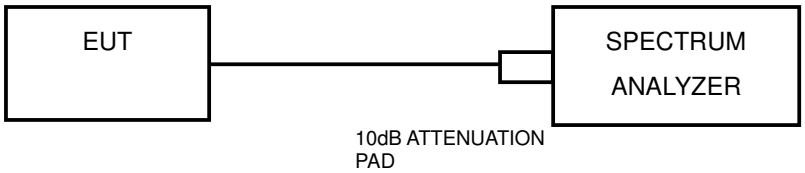
SPECTRUM PLOT OF WORST VALUE	
802.11n 20MHz	
	

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.

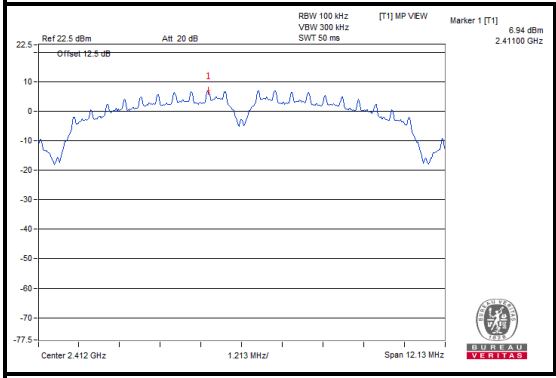
4.6.6 EUT OPERATING CONDITION

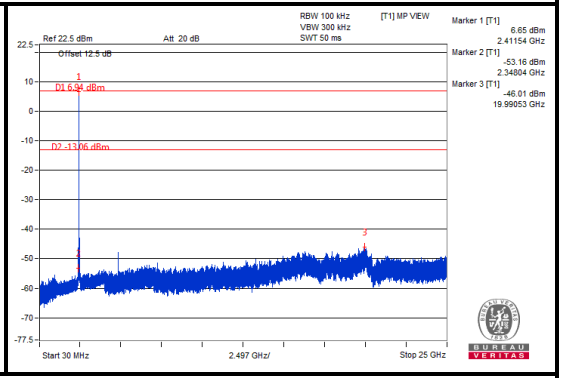
Same as item 4.3.6

4.6.7 TEST RESULTS

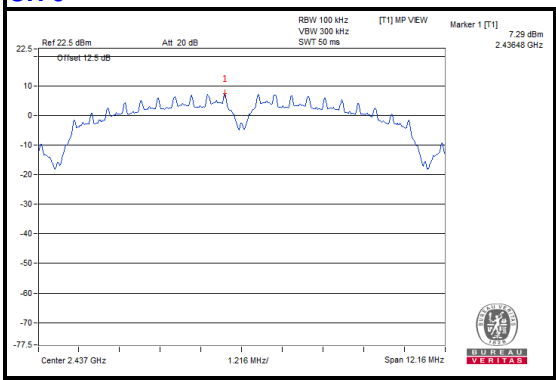
802.11b

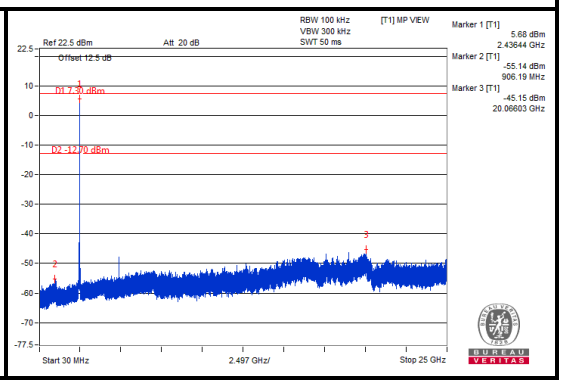
CH 1



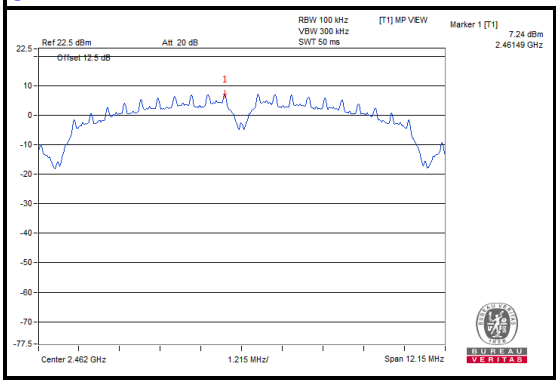


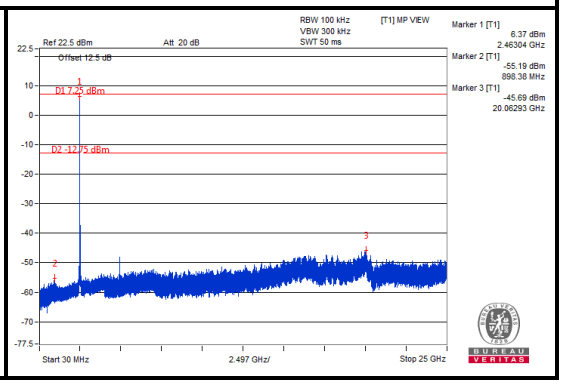
CH 6





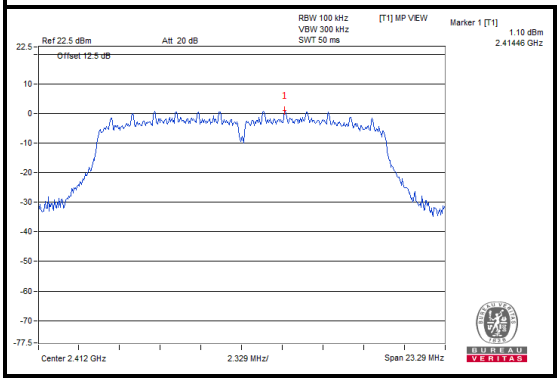
CH 11

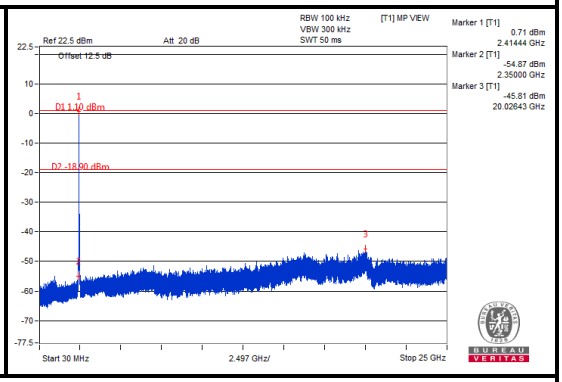




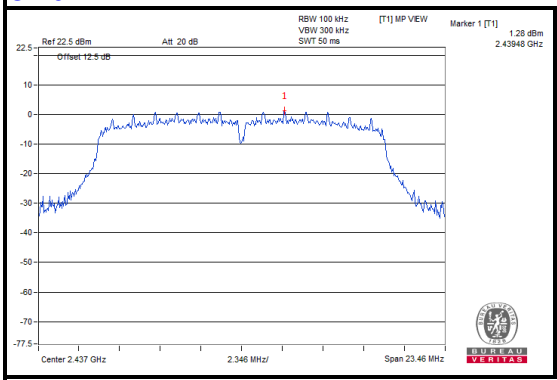
802.11g

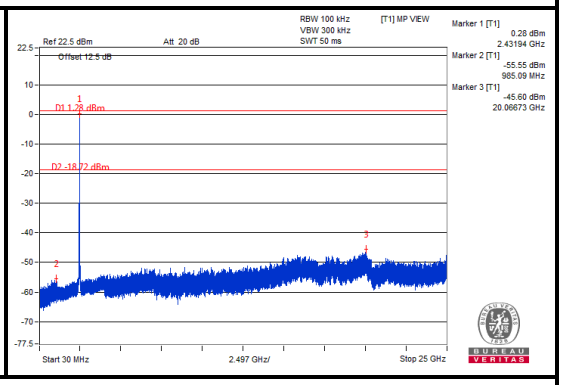
CH 1



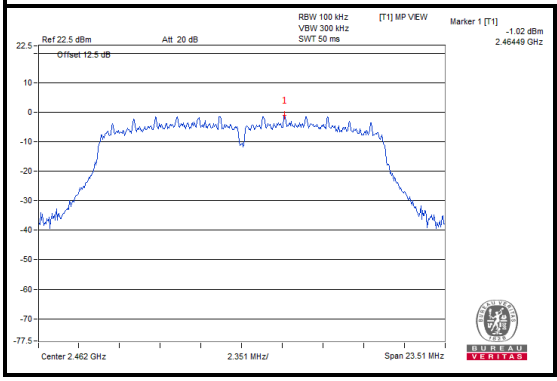


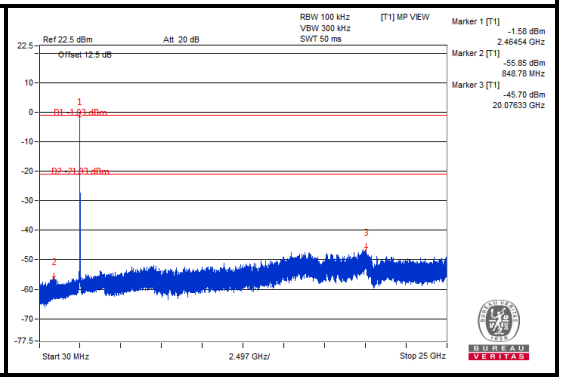
CH 6





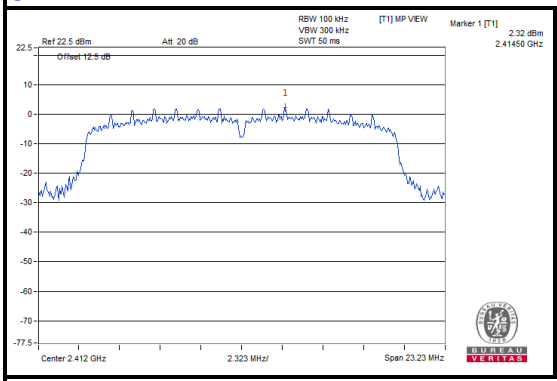
CH 11

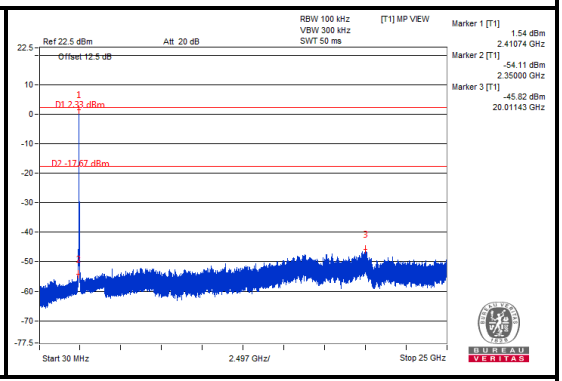




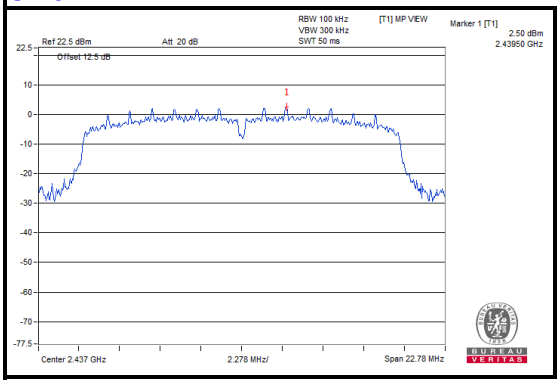
802.11n 20MHz
Chain 0

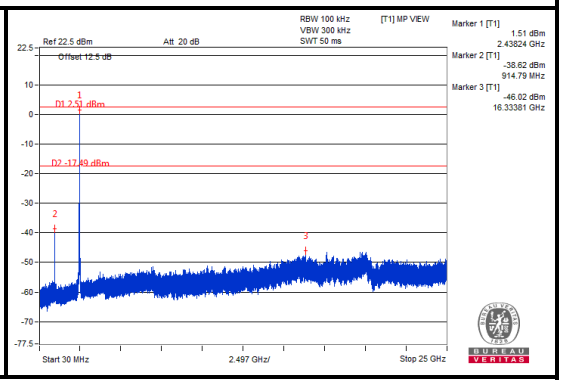
CH 1



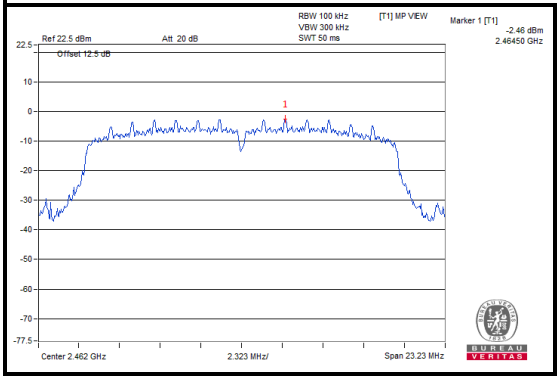


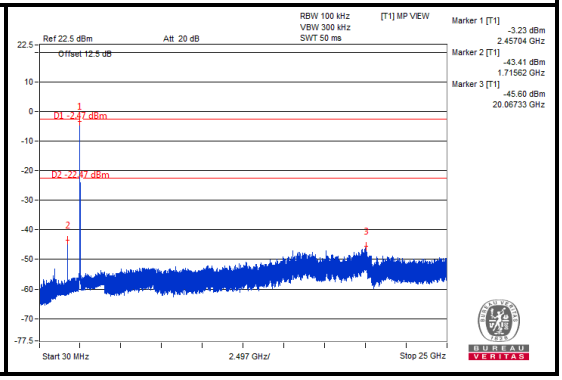
CH 6





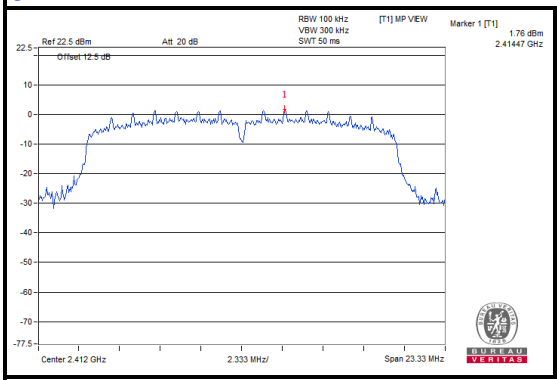
CH 11

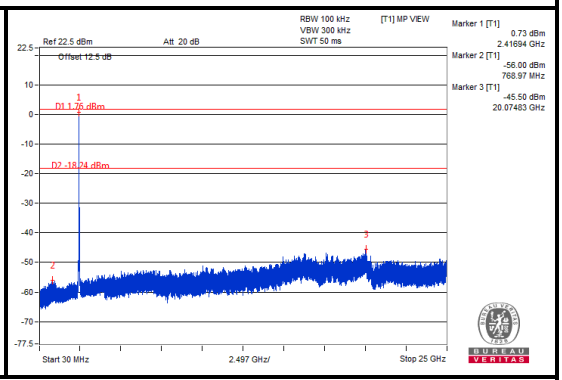




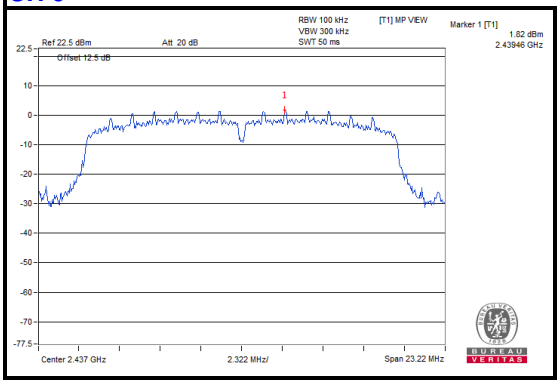
Chain 1

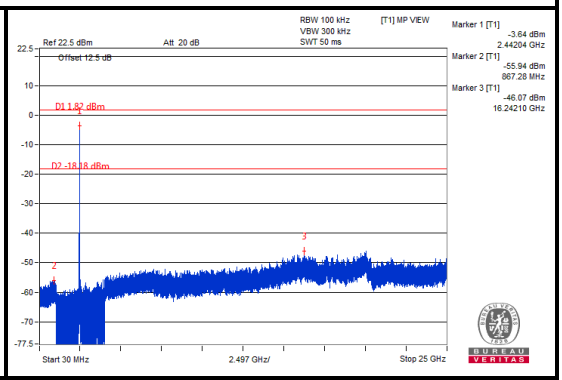
CH 1



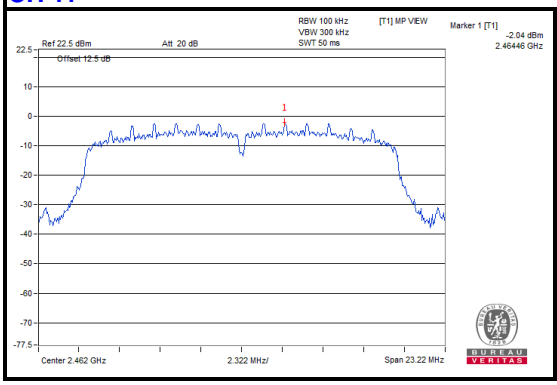


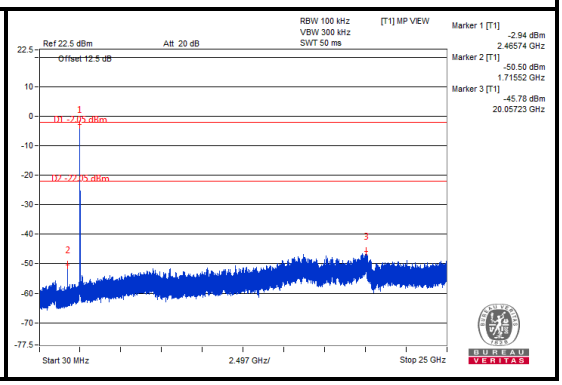
CH 6





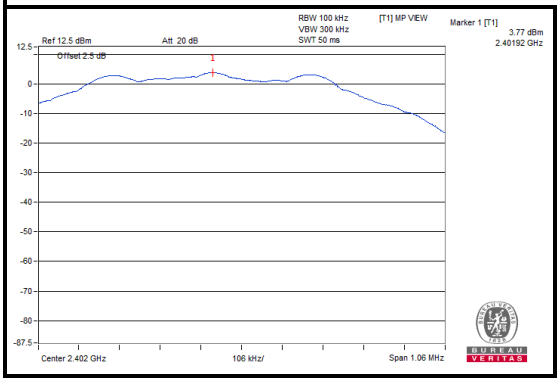
CH 11

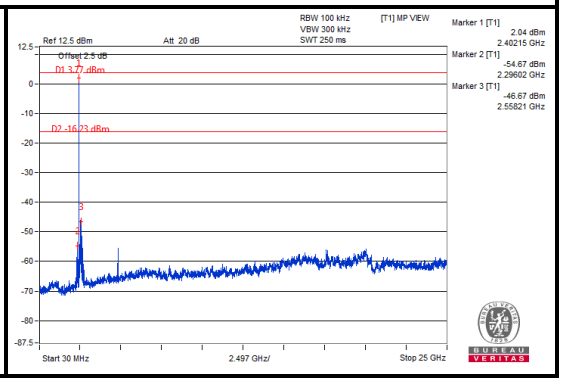




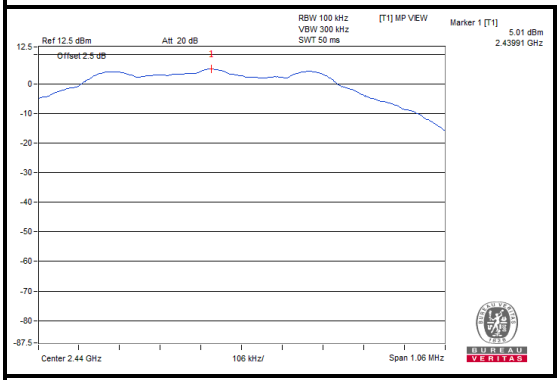
BT-LE (GFSK)

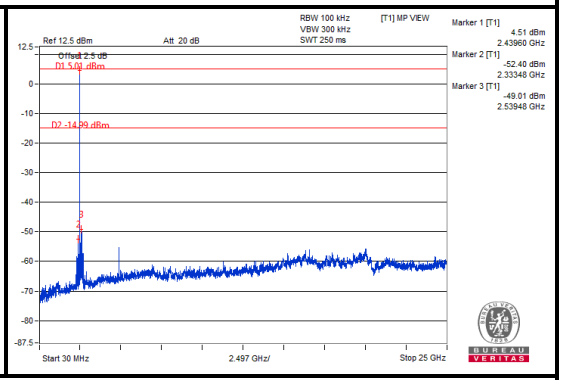
CH 0



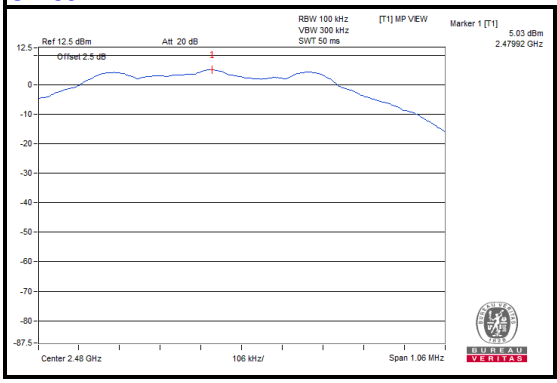


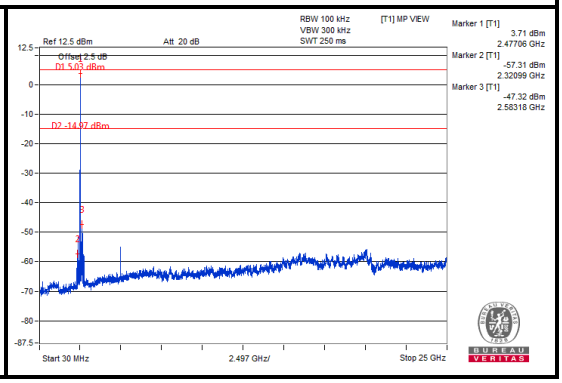
CH 19



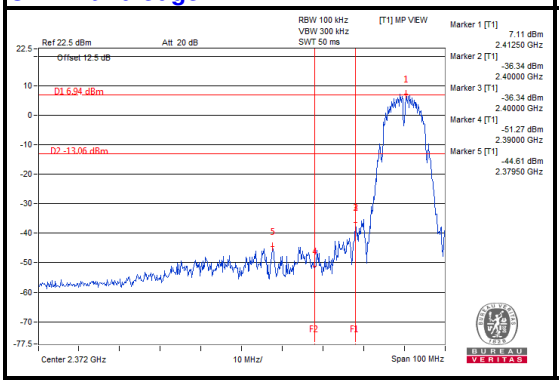
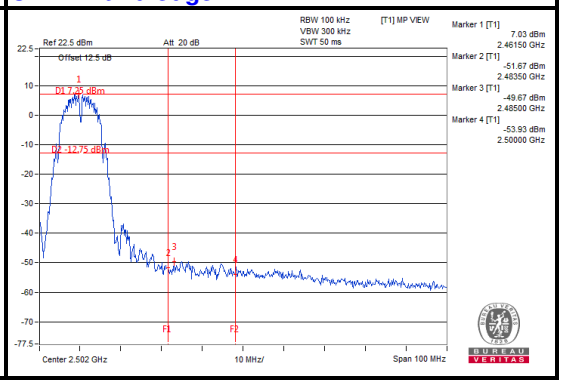


CH 39

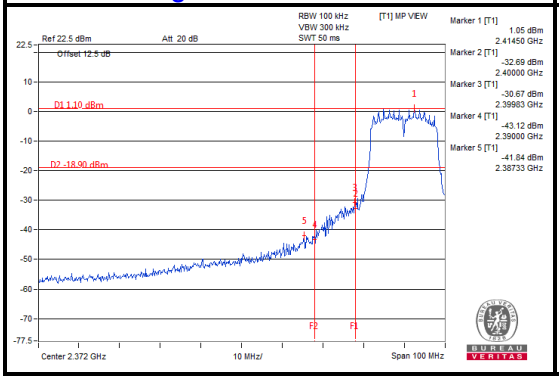
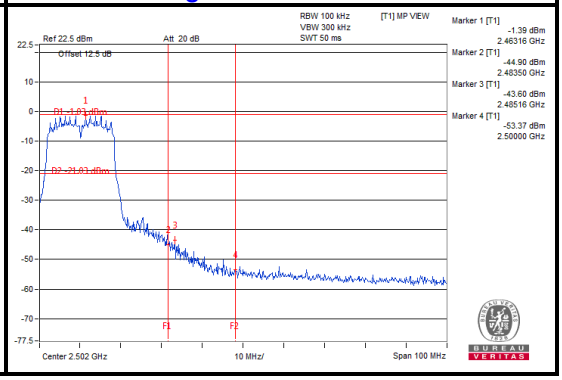




802.11b

CH 1 Band edge	CH 11 Band edge
	

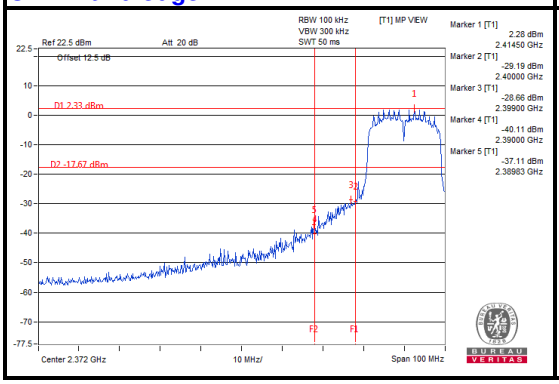
802.11g

CH 1 Band edge	CH 11 Band edge
	

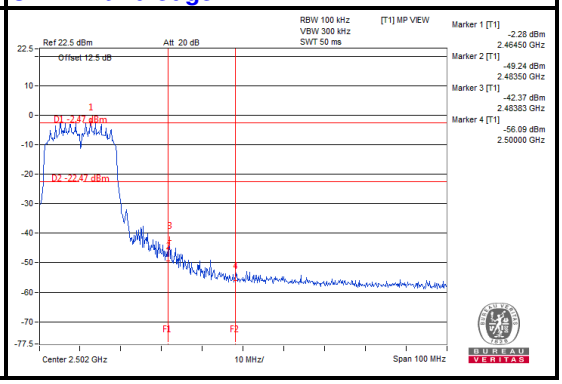
802.11n 20MHz

Chain 0

CH 1 Band edge

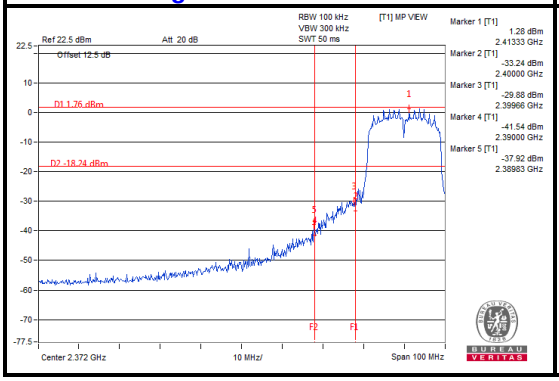


CH 11 Band edge

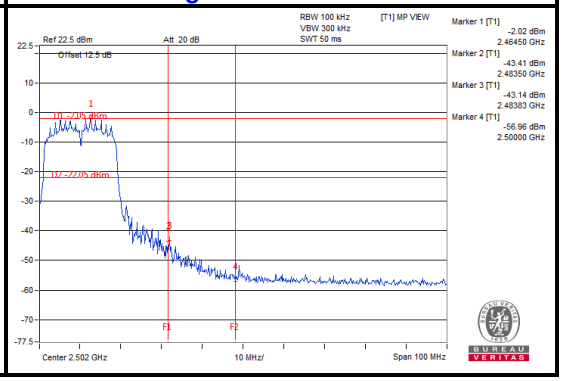


Chain 1

CH 1 Band edge

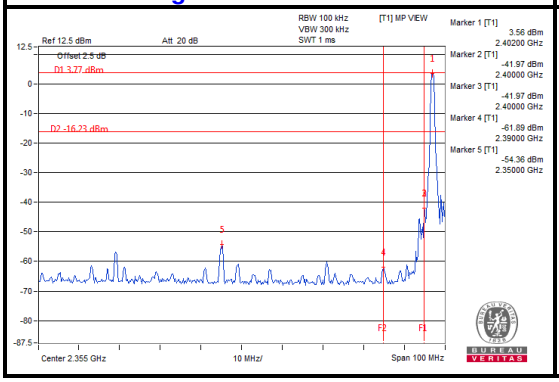


CH 11 Band edge

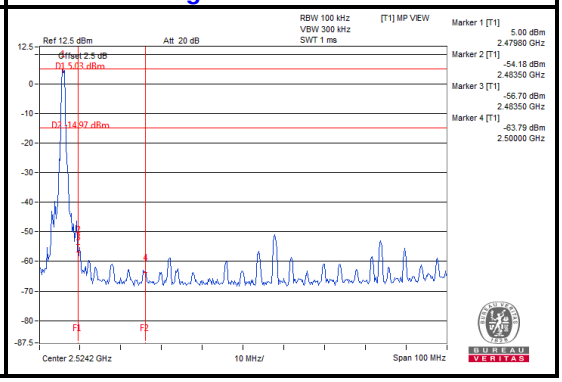


BT-LE (GFSK)

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

Modifications are made to the EUT by the lab during the test.

See material declaration.

---END---