FCC CERTIFICATION TEST REPORT FOR

FCC ID: ZUK-KB812M

Report Reference No. ..... :	15FAB09031 21
Date of issue ..... :	2015-11-13
Testing Laboratory ..... :	ATT Product Service Co., Ltd.
Address ..... :	No. 3, ChangLianShan Industrial Park, ChangAn Town, DongGuan City, GuangDong, China.
Applicant's name..... :	Wintop Electronics Co., Ltd.
Address ..... :	Huaguan Industrial Park,Xinhe Road Shangmugu, Pinghu Town, Longgang District, Shenzhen,China
Manufacturer ..... :	Wintop Electronics Co., Ltd.
Test specification:	
Test item description..... :	Wireless keyboard
Trade Mark..... :	--
Model/Type reference ..... :	KB-812M
Ratings ..... :	DC 1.5V (New battery is used; Battery AA * 1Pcs)

Tested by

Lake Hu

（Lake Hu/ Engineer）

Approved by

KingWang

（King Wang /EMC Manager）

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TEST REPORT DECLARE

Applicant	:	Wintop Electronics Co., Ltd.
Address	:	Huaguan Industrial Park,Xinhe Road Shangmugu, Pinghu Town, Longgang District, Shenzhen,China
Equipment under Test	:	Wireless keyboard
Model No	:	KB-812M
Trade Mark	:	--
Manufacturer	:	Wintop Electronics Co., Ltd.
Address	:	Huaguan Industrial Park,Xinhe Road Shangmugu, Pinghu Town, Longgang District, Shenzhen,China

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C: 2010

Test procedure used: ANSI C63.10:2013; ANSI C63.4: 2014.

We Declare:

The equipment described above is tested by ATT Product Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and ATT Product Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation X/Y/Z axis of the EUT. will record worst case in this report.
our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	15FAB09031 21		
Date of Test:	2015-11-06-2015-11-12	**Date of Report:**	2015-11-13

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of ATT Product Service Co., Ltd.

1. Summary of test Standards and results

The EUT have been tested according to the applicable standards as referenced below.

Description of Test Item	Standard	Results
20dB Bandwidth	&15. 215(c) ANSI C63.10:2013	PASS
Radiated Emission	15.209,&15.205,&15.249 ANSI C63.10:2013	PASS
Conducted Emissions	&15.207(a) ANSI C63.10:2013	N/A
Antenna requirement	&15.203	PASS
Outside of Band Emission (50dB attenuation)	&15.249(d)	N/A

Note:

N/A: the EUT was powered by DC battery in normal use condition

2. General test information

2.1. ACCREDITATIONS

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

USA FCC Registration Number :923232
Canada INDUSTRY CANADA Registration Number 11033A

2.2. Description of EUT

EUT* Name	:	Wireless keyboard
Model Number	:	KB-812M
Trade Mark	:	--
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 1.5V (New battery is used; Battery AA * 1Pcs)
Operation frequency	:	2405MHz -2472MHz
Modulation	:	GFSK
Data rate	:	1Mpbs
Antenna Type	:	built-in antenna, maximum PK gain:1.76dBi
Date of Receipt	:	2015-11-06
Sample Type	:	Series production

2.3. Accessories of EUT

Description of Accessories	Manufacturer	Model number or Type	Other
/	/	/	/

2.4. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	FCCID / FCC DOC	Other
/	/	/	/	/

2.5. Block diagram of EUT configuration for test

Tested mode, channel, information		
Test Mode	Channel	Frequency (MHz)
Tx Mode	Low Channel	2405
	Middle Channel	2448
	Hight Channel	2472

2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.7. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (150KHz-30MHz)	3.21dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	3.42 dB (Polarize: V)
	3.52 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	3.52 dB (Polarize: V)
	3.54 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	4.20 dB (Polarize: V)
	4.20 dB (Polarize: H)
Uncertainty for radio frequency	1×10-9
Uncertainty for conducted RF Power	0.65dB

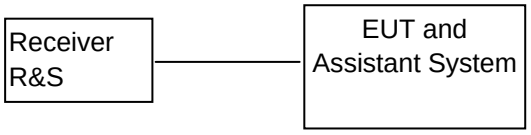
Note：This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. 20dB Bandwidth

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESCI	101307	2015/12/26	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1Y
3	RF Cable	Micable	C10-01-01-1	100309	2015/12/26	1Y

3.2. Block diagram of test setup



3.3. Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated...

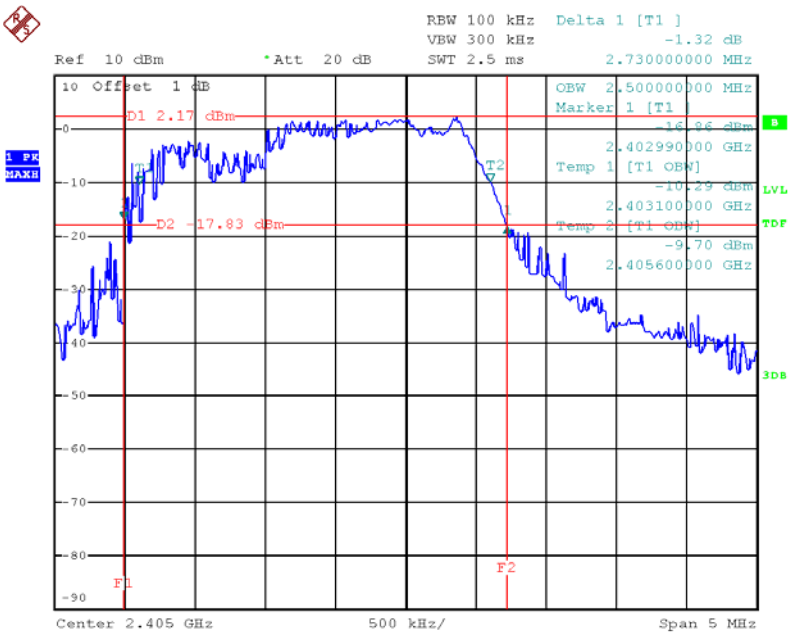
3.4. Test Procedure

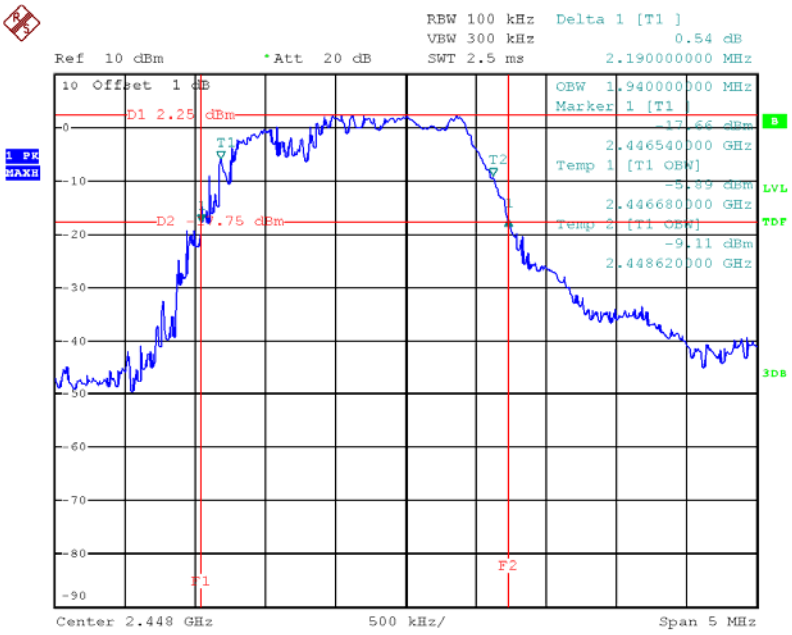
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete..

3.5. Test Result

EUT: Wireless optical mouse M/N: WM-718					
Mode	Freq (MHz)	Result (MHz)	Limit (MHz)	Margin (MHz)	Conclusion
Tx	2405	2.73	/	/	PASS
	2448	2.19	/	/	PASS
	2472	2.13	/	/	PASS

3.6. Original test data





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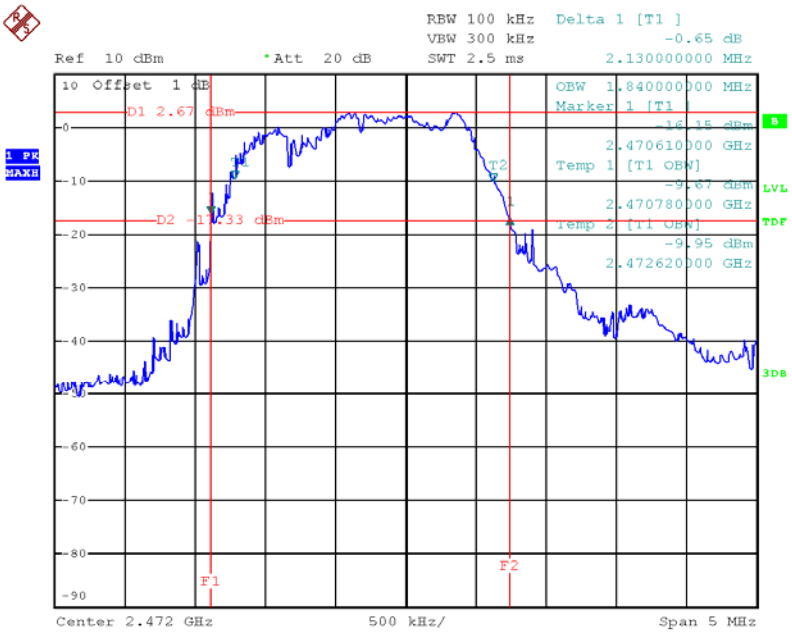

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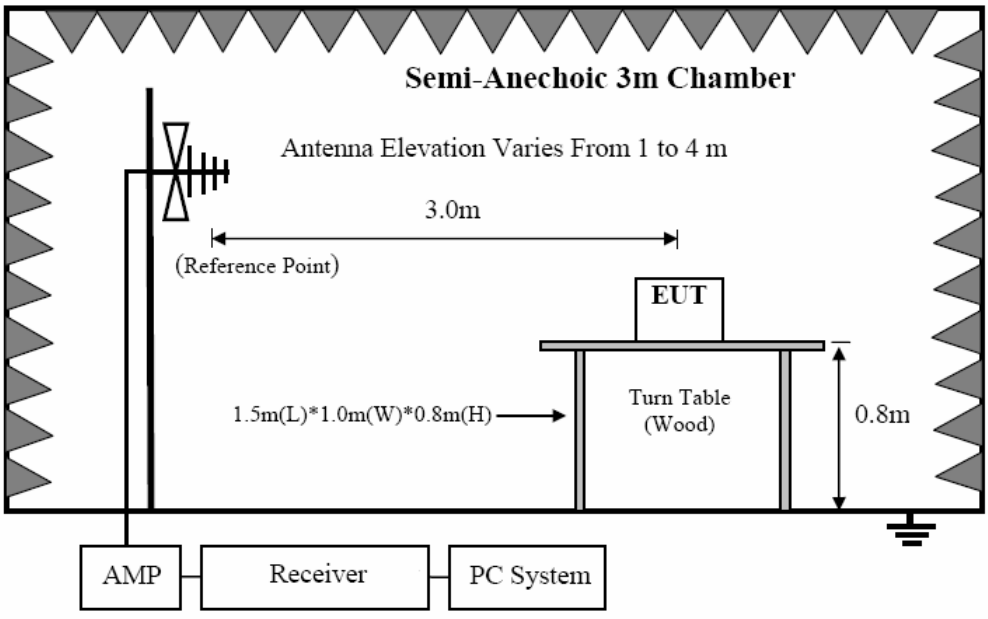
4. Radiated emission

4.1. Test equipment

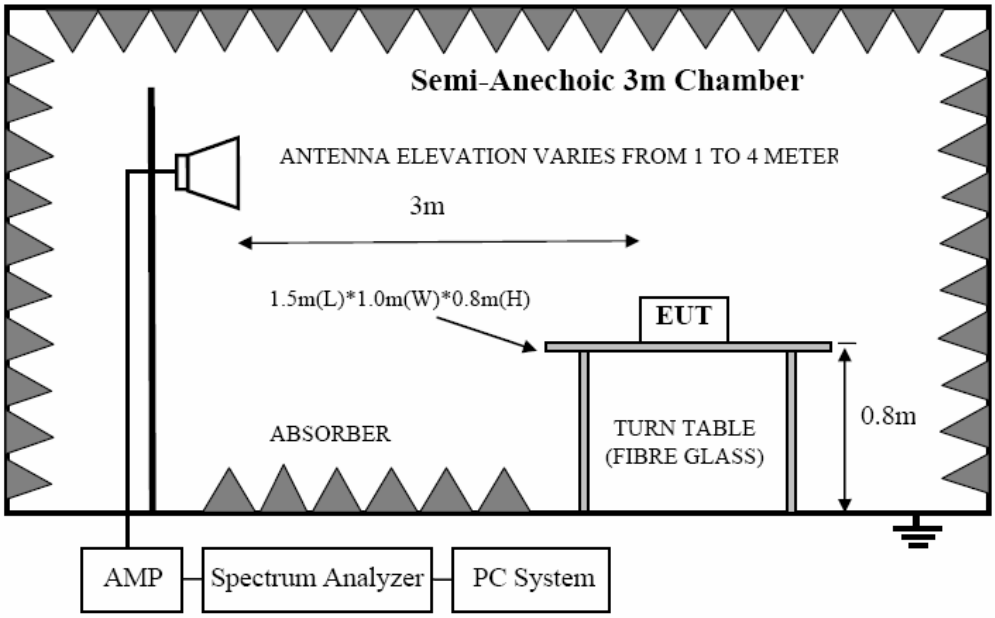
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESCI	101307	2015/12/26	1Y
2	Spectrum analyzer	Agilent	E4407B	US40240708	2016/07/11	1Y
3	Loop antenna	Chase	HLA6120	20129	2015/12/26	1Y
4	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2015/12/26	1Y
5	Double Ridged Horn Antenna	R&S	HF907	100276	2015/12/26	1Y
6	Pre-Amplifier	R&S	SCU-01	10049	2015/12/26	1Y
7	Pre-amplifier	A.H.	PAM0-0118	360	2015/12/26	1Y
8	RF Cable	R&S	R01	10403	2015/12/26	1Y
9	RF Cable	R&S	R02	10512	2015/12/26	1Y
10	Horn Antenna	EMCO	3116	9608-4877	2015/12/26	1Y

4.2. Block diagram of test setup

In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

4.3. Limit

4.3.1. FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

4.3.2. FCC 15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

4.3.3. FCC 15.249 Limit

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

4.3.4. Limit for this EUT

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4:2013. The specification used was the FCC 15.209, and FCC 15.249 limits.

4.4. Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.

(2) Setup EUT and assistant system according clause 2.4 and 8.2

(3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.

(a) Change work frequency or channel of device if practicable.

(b) Change modulation type of device if practicable.

(c) Change power supply range from 85% to 115% of the rated supply voltage

(d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions

(4) Spectrum frequency from 9MHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so below final test was performed with frequency range from 30MHz to 18GHz.

(5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.

(6) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure, Detector is at PK; RBW is set at 1MHz, VBW is set at 10Hz for Average measure, Detector is at PK..

4.5. Test result

PASS. (See below detailed test result)

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, and section 15.205, 15.209 and 15.249, Vertical and Horizontal mode all have been tested, Horizontal mode is the worst case .with the worst margin reading of:

Radiated Emission Test Result

Test Mode:Tx

Test Site	: 3m Chamber		
EUT	: Wireless keyboard	**Model Number**	: KB-812M
Power Supply	: DC 1.5V (New battery is used; Battery AA * 1Pcs)	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:55%	**Antenna/Distance**	: 3m

Frequency	Receiver		Rx Antenna		Cable Loss (dB)	Amplifier Gain (dB)	Result Level (dBμV/m)	FCC 15.249	
(MHz)	Reading (dBμV)	Detector (PK/QP/ AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel (2405)									
2405	65.88	PK	H	28	3.65	0	97.53	114	-16.47
2405	31.21	AV	H	28	3.65	0	62.86	94	-31.14
2405	58.5	PK	V	28	3.65	0	90.15	114	-23.85
2405	23.83	AV	V	28	3.65	0	55.48	94	-38.52
2390	23.03	PK	H	27.8	3.57	0	54.4	74	-19.6
2390	-11.64	AV	H	27.8	3.57	0	19.73	54	-34.27
2390	23.05	PK	V	27.8	3.57	0	54.42	74	-19.58
2390	-11.62	AV	V	27.8	3.57	0	19.75	54	-34.25
2400	21.58	PK	H	28	3.57	0	53.15	74	-20.85
2400	-13.09	AV	H	28	3.57	0	18.48	54	-35.52
2400	22.11	PK	V	28	3.57	0	53.68	74	-20.32
2400	-12.56	AV	V	28	3.57	0	19.01	54	-34.99
4810	50.8	PK	H	32.3	5.91	31.78	57.23	74	-16.77
4810	16.13	AV	H	32.3	5.91	31.78	22.56	54	-31.44
4810	42.73	PK	V	32.3	5.91	31.78	49.16	74	-24.84
4810	8.06	AV	V	32.3	5.91	31.78	14.49	54	-39.51
7215	38.88	PK	H	36.3	6.34	30.97	50.55	74	-23.45
7215	4.21	AV	H	36.3	6.34	30.97	15.88	54	-38.12
7215	38.63	PK	V	36.3	6.34	30.97	50.3	74	-23.7
7215	3.96	AV	V	36.3	6.34	30.97	15.63	54	-38.37
9620	34.76	PK	H	37.9	8.01	30.86	49.81	74	-24.19
9620	0.09	AV	H	37.9	8.01	30.86	15.14	54	-38.86
9620	33.74	PK	V	37.9	8.01	30.86	48.79	74	-25.21
9620	-0.93	AV	V	37.9	8.01	30.86	14.12	54	-39.88
234.99	39.15	QP	H	14.2	2.74	27.6	28.49	46	-17.51
328.24	37.22	QP	V	14.2	2.74	27.6	26.56	46	-19.44
Middle Channel (2448)									
2448	65.76	PK	H	28.3	3.69	0	97.75	114	-16.25
2448	31.09	AV	H	28.3	3.69	0	63.08	94	-30.92
2448	58.63	PK	V	28.3	3.69	0	90.62	114	-23.38
2448	23.96	AV	V	28.3	3.69	0	55.95	94	-38.05
4896	50.81	PK	H	32.9	6.34	31.78	58.27	74	-15.73
4896	16.14	AV	H	32.9	6.34	31.78	23.6	54	-30.4
4896	41.39	PK	V	32.9	6.34	31.78	48.85	74	-25.15

4896	6.72	AV	V	32.9	6.34	31.78	14.18	54	-39.82
7344	36.64	PK	H	37.1	6.72	30.97	49.49	74	-24.51
7344	1.97	AV	H	37.1	6.72	30.97	14.82	54	-39.18
7344	38.17	PK	V	37.1	6.72	30.97	51.02	74	-22.98
7344	3.5	AV	V	37.1	6.72	30.97	16.35	54	-37.65
9792	33.3	PK	H	38.6	8.43	30.86	49.47	74	-24.53
9792	-1.37	AV	H	38.6	8.43	30.86	14.8	54	-39.2
9792	33.46	PK	V	38.6	8.43	30.86	49.63	74	-24.37
9792	-1.21	AV	V	38.6	8.43	30.86	14.96	54	-39.04
22.85	40.08	QP	H	14.2	2.74	27.6	29.42	46	-16.58
397.22	37.51	QP	V	14.2	2.74	27.6	26.85	46	-19.15
High Channel (2472)									
2472	64.98	PK	H	28.7	3.72	0	97.4	114	-16.6
2472	30.31	AV	H	28.7	3.72	0	62.73	94	-31.27
2472	56.53	PK	V	28.7	3.72	0	88.95	114	-25.05
2472	21.86	AV	V	28.7	3.72	0	54.28	94	-39.72
2483.5	21.82	PK	H	28.7	3.72	0	54.24	74	-19.76
2483.5	-12.85	AV	H	28.7	3.72	0	19.57	54	-34.43
2483.5	22.76	PK	V	28.7	3.72	0	55.18	74	-18.82
2483.5	-11.91	AV	V	28.7	3.72	0	20.51	54	-33.49
4944	49.91	PK	H	33.1	6.39	31.78	57.62	74	-16.38
4944	15.24	AV	H	33.1	6.39	31.78	22.95	54	-31.05
4944	39.66	PK	V	33.1	6.39	31.78	47.37	74	-26.63
4944	4.99	AV	V	33.1	6.39	31.78	12.7	54	-41.3
7416	36.69	PK	H	37.2	6.77	30.97	49.69	74	-24.31
7416	2.02	AV	H	37.2	6.77	30.97	15.02	54	-38.98
7416	36.56	PK	V	37.2	6.77	30.97	49.56	74	-24.44
7416	1.89	AV	V	37.2	6.77	30.97	14.89	54	-39.11
9888	33.77	PK	H	38.7	8.48	30.86	50.09	74	-23.91
9888	-0.9	AV	H	38.7	8.48	30.86	15.42	54	-38.58
9888	33.6	PK	V	38.7	8.48	30.86	49.92	74	-24.08
9888	-1.07	AV	V	38.7	8.48	30.86	15.25	54	-38.75
231.06	39.76	QP	H	14.2	2.74	27.6	29.1	46	-16.9
315.41	37.35	QP	V	14.2	2.74	27.6	26.69	46	-19.31

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - Amp Gain
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

5. Antenna Requirements

5.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.249 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.2. Result

The EUT has an internal chip antenna permanently soldering on the printed circuit board, which complied with 15.203, the maximum gain was 1.76dBi.

END OF REPORT