FCC TEST REPORT

(CO-LOCATED)

REPORT NO.:	RF131029C26-3
MODEL NO.:	M5360
FCC ID:	TE7M5360
RECEIVED:	Oct. 29, 2013
TESTED:	Feb. 08 ~ Feb. 13, 2014
ISSUED:	Feb. 17, 2014

APPLICANT:	TP-LINK TECHNOLOGIES CO., LTD.
ADDRESS:	Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF131029C26-3	Original release	Feb. 17, 2014

1. CERTIFICATION

PRODUCT:	3G Mobile Wi-Fi, 5200mAh Power Bank
MODEL NO.:	M5360
BRAND:	TP-LINK
APPLICANT:	TP-LINK TECHNOLOGIES CO., LTD.
TESTED:	Feb. 08 ~ Feb. 13, 2014
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** **FCC Part 22, Subpart H** **FCC Part 24, Subpart E** **ANSI C63.10-2009**

The above equipment (model: M5360) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan 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 :** Feb. 17, 2014

Pettie Chen / Senior Specialist

APPROVED BY : _____ **, DATE :** Feb. 17, 2014

Ivan Tsai / Project Engineer

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) FCC Part 22, Subpart H FCC Part 24, Subpart E		
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -12.15dB at 0.18910MHz.
15.247(d) 2.1053 22.917 24.238	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -5.34dB at 1909.80MHz.

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	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

EUT	3G Mobile Wi-Fi, 5200mAh Power Bank	
MODEL NO.	M5360	
POWER SUPPLY	5Vdc (adapter or host equipment) 3.7Vdc (battery)	
MODULATION TYPE	**WLAN**	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	GSM, EDGE	GMSK
TRANSFER RATE	**WLAN**	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 72.2Mbps
OPERATING FREQUENCY	**WLAN**	2412 ~ 2462MHz
	GSM, EDGE	824.2 ~ 848.8MHz 1850.2 ~ 1909.8MHz
OUTPUT POWER	**WLAN**	83.560mW
MAX. ERP POWER	**GSM**	0.899Watts (29.54dBm)
	EDGE	0.973Watts (29.88dBm)
MAX. EIRP POWER	**GSM**	1.476Watts (31.69dBm)
	EDGE	1.439Watts (31.58dBm)
ANTENNA TYPE	**WLAN:** Fixed Internal antenna with 0.42dBi gain **GSM 850:** Fixed Internal antenna with 0.66dBi gain **GPRS 1900:** Fixed Internal antenna with 2.35dBi gain	
DATA CABLE	NA	
I/O PORTS	Refer to user's manual	
ACCESSORY DEVICES	Adapter, Battery	

NOTE:

1. The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX

2. The EUT uses following adapter and battery.

Adapter	
Brand	HuntKey
Model	HKA00605010-2B
Input Power	100-240Vac~50/60Hz 0.2A
Output Power	5.0Vdc / 1.0A

Battery 1	
Brand	HUIZHOU DESAY BATTERY CO., LTD
Model	TBL-18B5200
Power Rating	3.7Vdc, 5200mAh, 19.2 Wh

Battery 2	
Brand	TP-LINK technologies co., LTD
Model	TBL-18B5200
Power Rating	3.7Vdc, 5200mAh, 19.2 Wh

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

FOR 2.4GHz

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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

850 Band:

GSM:

	CHANNEL	FREQUENCY (MHz)
LOW	128	824.2
MIDDLE	189	836.4
HIGH	251	848.8

1900 Band:

GSM:

	CHANNEL	FREQUENCY (MHz)
LOW	512	1850.2
MIDDLE	661	1880.0
HIGH	810	1909.8

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE≥1G	RE<1G	PLC	
A	√	√	-	Power from battery 1
B	-	√	√	Power from battery 1+ adapter

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission

NOTE:
The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

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 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	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
A	GPRS 850 +802.11b	824.2~848.8	128 to 251	251 + 1	GMSK
		2412~2462	1 to 11		DSSS
A	GPRS 1900 +802.11b	1850.2~1909.8	512 to 810	810 + 1	GMSK
		2412~2462	1 to 11		DSSS

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 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	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
A, B	GPRS 850 +802.11b	824.2~848.8	128 to 251	251 + 1	GMSK
		2412~2462	1 to 11		DSSS
A, B	GPRS 1900 +802.11b	1850.2~1909.8	512 to 810	810 + 1	GMSK
		2412~2462	1 to 11		DSSS

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	MODE	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
B	GPRS 850 +802.11b	824.2~848.8	128 to 251	251 + 1	GMSK
		2412~2462	1 to 11		DSSS
B	GPRS 1900 +802.11b	1850.2~1909.8	512 to 810	810 + 1	GMSK
		2412~2462	1 to 11		DSSS

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	3.7Vdc	Chris Lin Ted Chang
RE<1G	25deg. C, 65%RH	3.7Vdc 120Vac, 60Hz	Chris Lin Ted Chang
PLC	25deg. C, 68%RH	120Vac, 60Hz	Sun Lin

3.3 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.

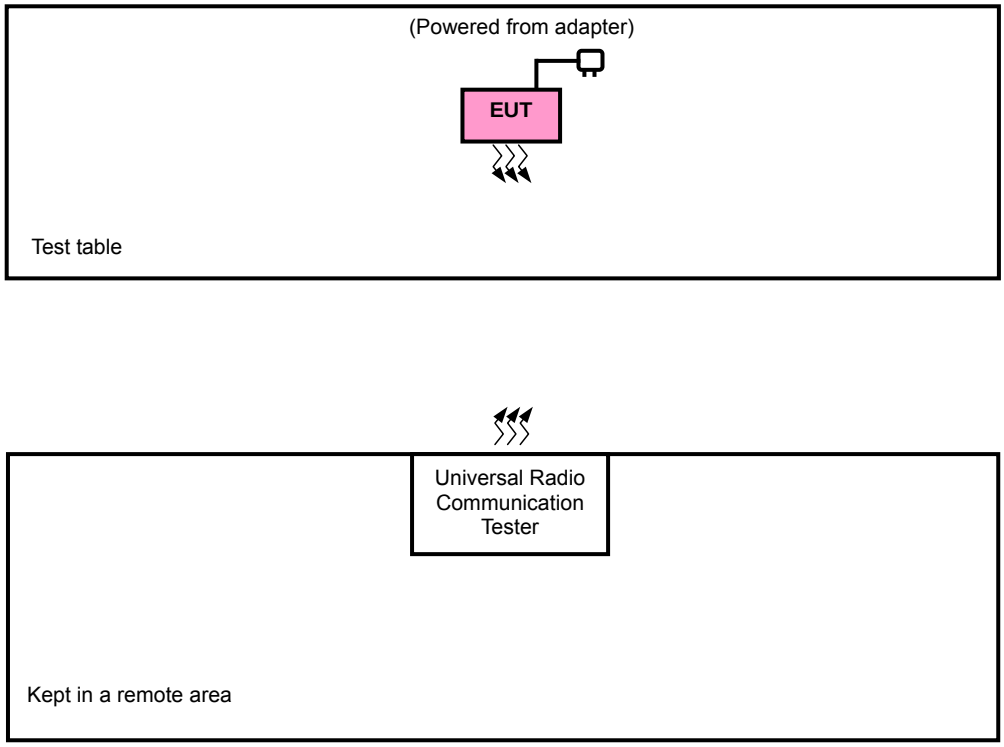
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Universal Radio Communication Tester	R&S	CMU200	104958	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

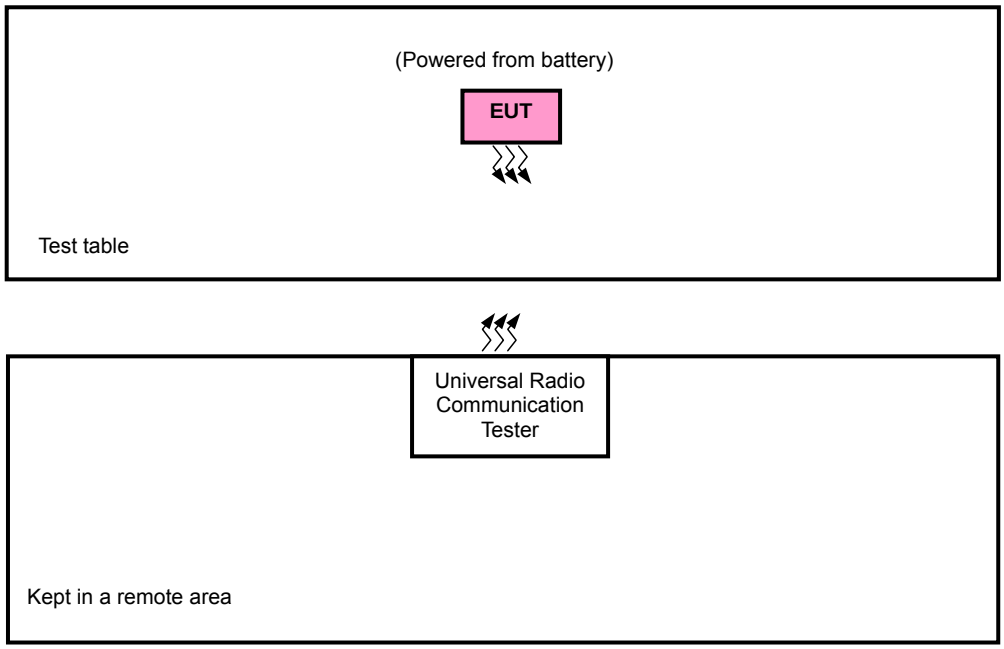
NOTE:
1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1 act as a communication partner to transfer data.

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST

Test Mode A



Test Mode B



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)

FCC Part 22, Subpart H

FCC Part 24, Subpart E

ANSI C63.10-2009

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

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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. 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.

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
√	FIELD STRENGTH AT 3m (dBμV/m)	
	PK	AV
	74	54
	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m)
	PK	PK
	-27	68.3

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts).

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 29, 2013	Nov. 28, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Dec. 18, 2013	Dec. 17, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Mar. 22, 2013	Mar. 21, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-209	Sep. 12, 2013	Sep. 11, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8449B	3008A01911	Aug. 22, 2013	Aug. 21, 2014
Preamplifier Agilent	8447D	2944A10638	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	248780/4 309222/4 274092/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable Worken	5D-FB	Cable-HYCH9-01	Aug. 11, 2013	Aug. 10, 2014
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn Table Controller EMCO	2090	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 215374.

5. The IC Site Registration No. is IC 7450F-9.

4.1.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

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

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

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

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

f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

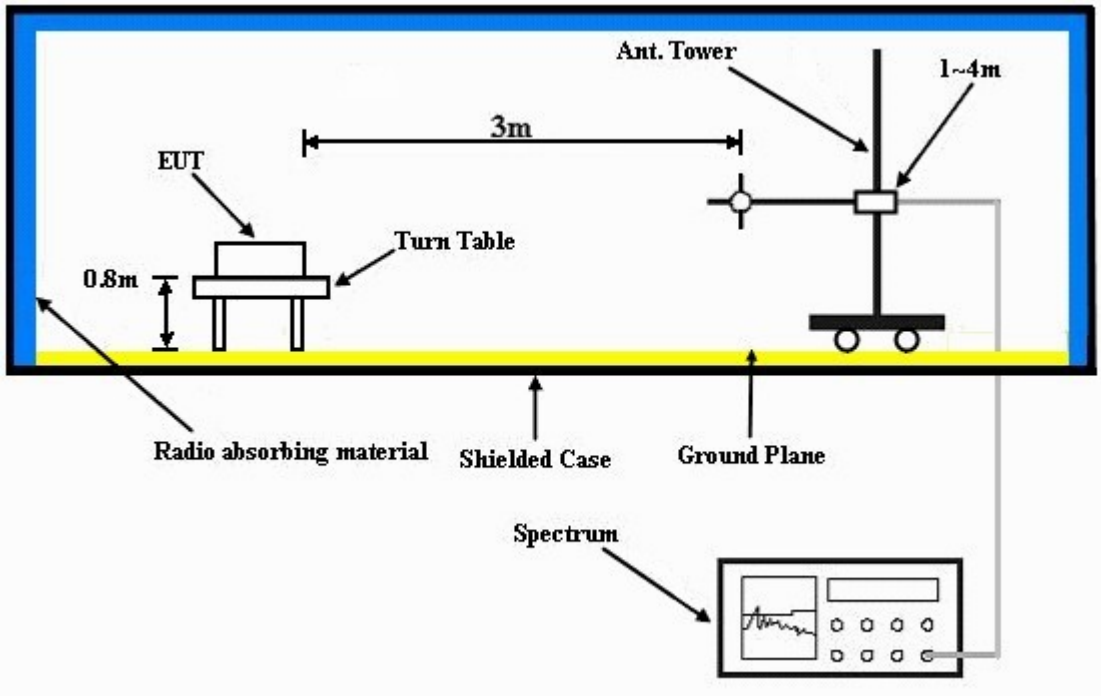
NOTE:

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

4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

4.1.6 TEST SETUP



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

4.1.7 EUT OPERATING CONDITIONS

a. Plugged the EUT in cradle and placed them on the testing table.

b. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.8 TEST RESULTS

Above 1GHz data

GPRS 850+802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 251 + CH 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted Chang

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	56.20 PK	74.00	-17.80	1.32 H	80	23.90	32.30
2	2390.00	45.00 AV	54.00	-9.00	1.32 H	80	12.70	32.30
3	*2412.00	103.10 PK			1.35 H	120	70.60	32.50
4	*2412.00	99.20 AV			1.35 H	120	66.70	32.50
5	2488.00	59.30 PK	74.00	-14.70	1.36 H	90	26.50	32.80
6	2488.00	48.10 AV	54.00	-5.90	1.36 H	90	15.30	32.80
7	4824.00	50.20 PK	74.00	-23.80	1.12 H	23	48.20	2.00
8	4824.00	44.00 AV	54.00	-10.00	1.12 H	23	42.00	2.00
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	55.00 PK	74.00	-19.00	1.00 V	210	22.70	32.30
2	2390.00	44.60 AV	54.00	-9.40	1.00 V	210	12.30	32.30
3	*2412.00	99.20 PK			1.08 V	66	66.70	32.50
4	*2412.00	95.80 AV			1.08 V	66	63.30	32.50
5	2488.00	59.80 PK	74.00	-14.20	1.11 V	142	27.00	32.80
6	2488.00	48.00 AV	54.00	-6.00	1.11 V	142	15.20	32.80
7	4824.00	50.90 PK	74.00	-23.10	1.03 V	3	48.90	2.00
8	4824.00	45.00 AV	54.00	-9.00	1.03 V	3	43.00	2.00

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 251 + CH 1	FREQUENCY RANGE	1 ~ 18GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH
TESTED BY	Chris Lin		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1697.60	-37.21	-40.14	5.59	-34.55	-13.00	-21.55
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1697.60	-34.24	-38.83	5.59	-33.24	-13.00	-20.24

REMARKS:

1. Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 251 + CH 1	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	848.80	-4.29	25.91	0.51	26.42	38.45	-12.03
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	848.80	-10.04	20.72	0.51	21.23	38.45	-17.22

REMARKS:

1. Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

GPRS 1900+802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 810 + CH 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted Chang

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	56.50 PK	74.00	-17.50	1.25 H	118	24.20	32.30
2	2390.00	45.20 AV	54.00	-8.80	1.25 H	118	12.90	32.30
3	*2412.00	103.60 PK			1.30 H	70	71.10	32.50
4	*2412.00	99.40 AV			1.30 H	70	66.90	32.50
5	2488.00	59.50 PK	74.00	-14.50	1.48 H	245	26.70	32.80
6	2488.00	48.50 AV	54.00	-5.50	1.48 H	245	15.70	32.80
7	4824.00	50.10 PK	74.00	-23.90	1.08 H	303	48.10	2.00
8	4824.00	44.30 AV	54.00	-9.70	1.08 H	303	42.30	2.00
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	55.10 PK	74.00	-18.90	1.08 V	90	22.80	32.30
2	2390.00	44.80 AV	54.00	-9.20	1.08 V	90	12.50	32.30
3	*2412.00	99.40 PK			1.08 V	90	66.90	32.50
4	*2412.00	96.00 AV			1.08 V	90	63.50	32.50
5	2488.00	60.10 PK	74.00	-13.90	1.14 V	130	27.30	32.80
6	2488.00	48.30 AV	54.00	-5.70	1.14 V	130	15.50	32.80
7	4824.00	51.10 PK	74.00	-22.90	1.10 V	96	49.10	2.00
8	4824.00	45.20 AV	54.00	-8.80	1.10 V	96	43.20	2.00

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 810 + CH 1	FREQUENCY RANGE	1 ~ 18GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH
TESTED BY	Chris Lin		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	11458.80	-47.98	-24.71	2.39	-22.32	-13.00	-9.32
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	11458.80	-46.89	-23.38	2.39	-20.99	-13.00	-7.99

REMARKS:

1. Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 810 + CH 1	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	1909.80	-8.87	26.55	1.11	27.66	33.00	-5.34
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	1909.80	-11.45	23.89	1.11	25.00	33.00	-8.00

REMARKS:

1. Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Below 1GHz data

GPRS 850+802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 251 + CH 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH
TEST MODE	A	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	86.55	-44.71	-54.16	0.17	-53.99	-13.00	-40.99
2	171.05	-50.20	-58.65	1.79	-56.86	-13.00	-43.86
3	261.57	-57.86	-70.10	5.35	-64.75	-13.00	-51.75
4	464.85	-66.91	-74.01	5.02	-68.99	-13.00	-55.99
5	706.25	-68.49	-72.05	5.17	-66.88	-13.00	-53.88
6	813.65	-69.71	-70.54	4.00	-66.54	-13.00	-53.54
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	83.32	-47.97	-53.14	-0.72	-53.86	-13.00	-40.86
2	167.14	-56.76	-59.15	1.29	-57.86	-13.00	-44.86
3	270.26	-59.33	-69.04	5.29	-63.75	-13.00	-50.75
4	462.25	-67.99	-73.79	5.04	-68.75	-13.00	-55.75
5	721.11	-71.05	-71.30	4.99	-66.31	-13.00	-53.31
6	789.27	-71.30	-70.35	4.17	-66.18	-13.00	-53.18

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 251 + CH 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH
TEST MODE	B	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	90.22	-45.11	-54.99	1.13	-53.86	-13.00	-40.86
2	151.25	-51.76	-57.76	-0.09	-57.85	-13.00	-44.85
3	266.28	-56.64	-68.73	5.31	-63.42	-13.00	-50.42
4	448.54	-67.10	-73.96	5.08	-68.88	-13.00	-55.88
5	767.85	-69.94	-71.07	4.42	-66.65	-13.00	-53.65
6	930.32	-71.19	-70.65	3.91	-66.74	-13.00	-53.74
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	85.75	-41.81	-47.18	-0.04	-47.22	-13.00	-34.22
2	163.64	-55.61	-57.07	0.85	-56.22	-13.00	-43.22
3	277.45	-59.03	-68.27	5.25	-63.02	-13.00	-50.02
4	468.96	-67.26	-73.04	5.00	-68.04	-13.00	-55.04
5	721.56	-71.50	-71.74	4.99	-66.75	-13.00	-53.75
6	785.05	-71.35	-70.42	4.21	-66.21	-13.00	-53.21

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

GPRS 1900+802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 810 + CH 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH
TEST MODE	A	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	86.86	-44.91	-52.25	0.26	-51.99	-13.00	-38.99
2	195.42	-49.32	-60.10	4.89	-55.21	-13.00	-42.21
3	249.99	-55.60	-66.15	5.40	-60.75	-13.00	-47.75
4	563.75	-68.18	-72.35	4.59	-67.76	-13.00	-54.76
5	688.96	-70.22	-72.11	5.15	-66.96	-13.00	-53.96
6	848.56	-68.73	-67.32	3.97	-63.35	-13.00	-50.35
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	92.54	-38.78	-42.92	1.06	-41.86	-13.00	-28.86
2	192.44	-50.88	-57.40	4.51	-52.89	-13.00	-39.89
3	296.64	-68.08	-74.72	5.15	-69.57	-13.00	-56.57
4	588.31	-69.59	-70.37	4.49	-65.88	-13.00	-52.88
5	740.58	-70.12	-67.57	4.76	-62.81	-13.00	-49.81
6	955.27	-72.26	-65.85	3.91	-61.94	-13.00	-48.94

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 810 + CH 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH
TEST MODE	B	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	70.22	-43.11	-45.03	-4.93	-49.96	-13.00	-36.96
2	159.94	-48.72	-52.94	0.39	-52.55	-13.00	-39.55
3	267.58	-55.42	-65.33	5.31	-60.02	-13.00	-47.02
4	506.56	-69.11	-73.72	4.86	-68.86	-13.00	-55.86
5	720.45	-67.19	-67.86	5.00	-62.86	-13.00	-49.86
6	934.31	-68.15	-65.39	3.92	-61.47	-13.00	-48.47
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	75.38	-35.98	-38.24	-3.20	-41.44	-13.00	-28.44
2	157.46	-53.58	-52.27	0.25	-52.02	-13.00	-39.02
3	224.53	-58.04	-65.97	5.44	-60.53	-13.00	-47.53
4	554.68	-67.87	-69.83	4.62	-65.21	-13.00	-52.21
5	731.22	-69.31	-67.06	4.85	-62.21	-13.00	-49.21
6	950.25	-71.27	-64.90	3.90	-61.00	-13.00	-48.00

REMARKS:

1. ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor = gain of substitution antenna + cable loss

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 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 0.50 MHz.
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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 29, 2013	Nov. 28, 2014
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	100312	Jul. 08, 2013	Jul. 07, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 17, 2013	Jul. 16, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 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.

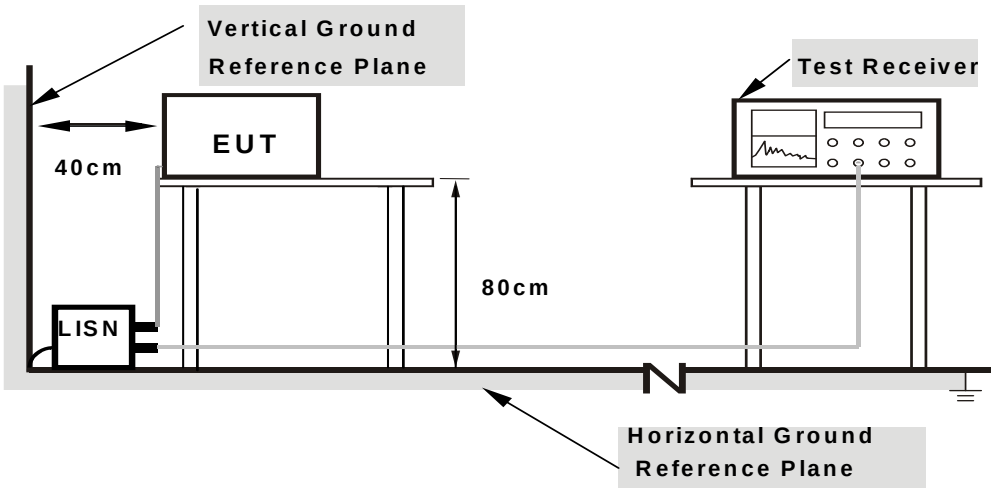
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 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).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA:

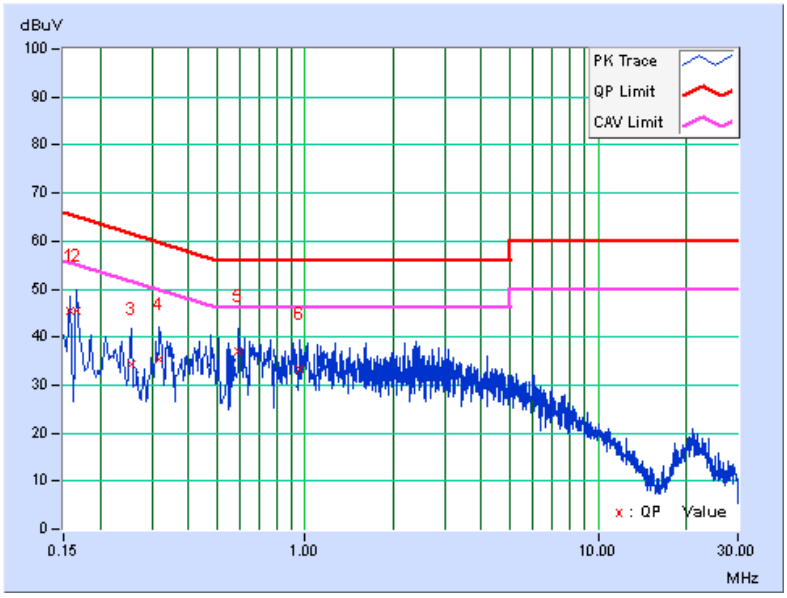
GPRS 850+802.11n(20MHz)

CHANNEL	CH 251 + CH 1	6dB BANDWIDTH	9kHz
PHASE	Line 1	TEST MODE	B

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	0.10	45.44	29.41	45.54	29.51	65.58	55.58	-20.04	-26.07
2	0.16569	0.10	45.49	30.14	45.59	30.24	65.17	55.17	-19.58	-24.93
3	0.25557	0.11	34.26	22.70	34.37	22.81	61.57	51.57	-27.21	-28.77
4	0.31849	0.11	35.19	25.40	35.30	25.51	59.75	49.75	-24.44	-24.23
5	0.59185	0.13	36.83	27.53	36.96	27.66	56.00	46.00	-19.04	-18.34
6	0.96319	0.14	33.08	23.85	33.22	23.99	56.00	46.00	-22.78	-22.01

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

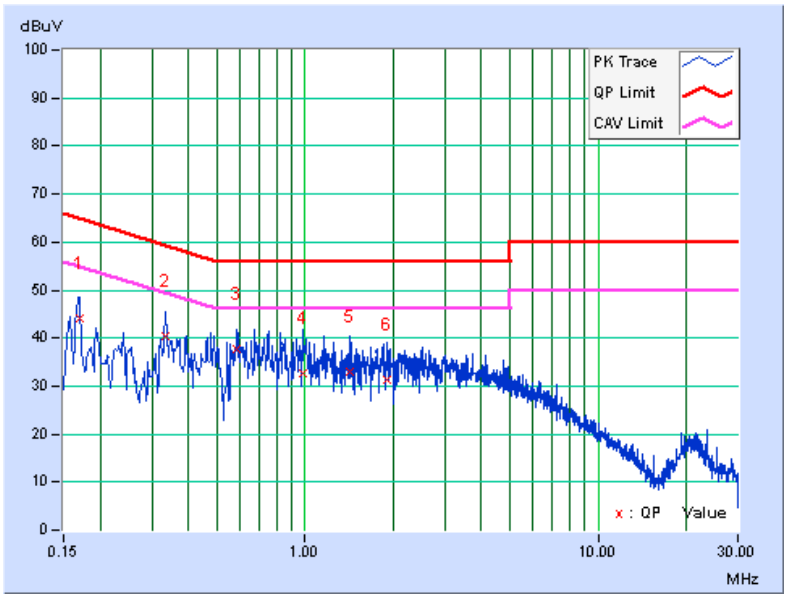


CHANNEL	CH 251 + CH 1	6dB BANDWIDTH	9kHz
PHASE	Line 2	TEST MODE	B

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16955	0.11	43.97	29.11	44.08	29.22	64.98	54.98	-20.90	-25.76
2	0.33396	0.12	40.24	30.16	40.36	30.28	59.35	49.35	-18.99	-19.07
3	0.58401	0.13	37.57	27.22	37.70	27.35	56.00	46.00	-18.30	-18.65
4	0.97892	0.14	32.43	23.23	32.57	23.37	56.00	46.00	-23.43	-22.63
5	1.42857	0.15	32.77	21.71	32.92	21.86	56.00	46.00	-23.08	-24.14
6	1.90950	0.16	31.22	20.77	31.38	20.93	56.00	46.00	-24.62	-25.07

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



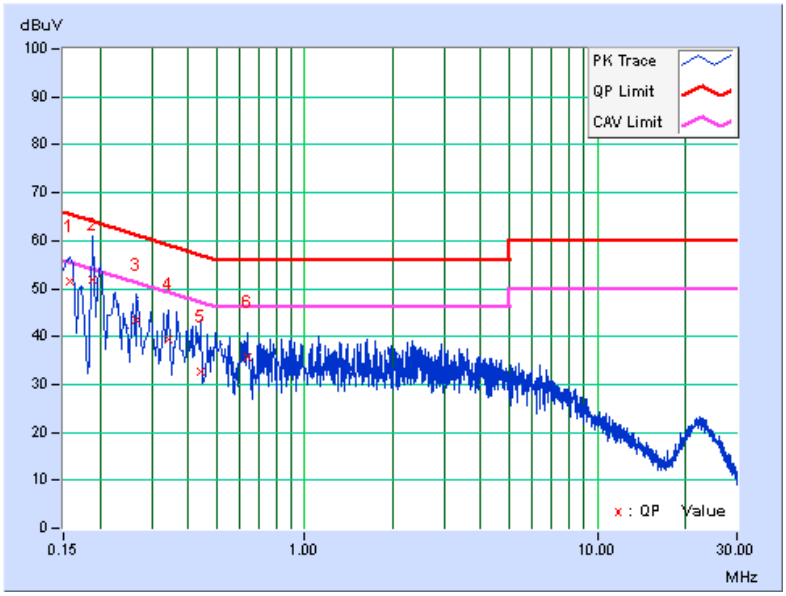
GPRS 1900+802.11n(20MHz)

CHANNEL	CH 810 + CH 1	**6dB BANDWIDTH**	9kHz
PHASE	Line 1	**TEST MODE**	B

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	0.10	51.45	33.39	51.55	33.49	65.58	55.58	-14.03	-22.09
2	**0.18910**	**0.10**	**51.83**	**33.50**	**51.93**	**33.60**	**64.08**	**54.08**	**-12.15**	**-20.48**
3	0.26730	0.11	43.37	26.45	43.48	26.56	61.20	51.20	-17.72	-24.64
4	0.34159	0.11	39.32	24.76	39.43	24.87	59.16	49.16	-19.73	-24.29
5	0.44325	0.12	32.43	21.00	32.55	21.12	57.00	47.00	-24.45	-25.88
6	0.63484	0.13	35.49	26.80	35.62	26.93	56.00	46.00	-20.38	-19.07

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

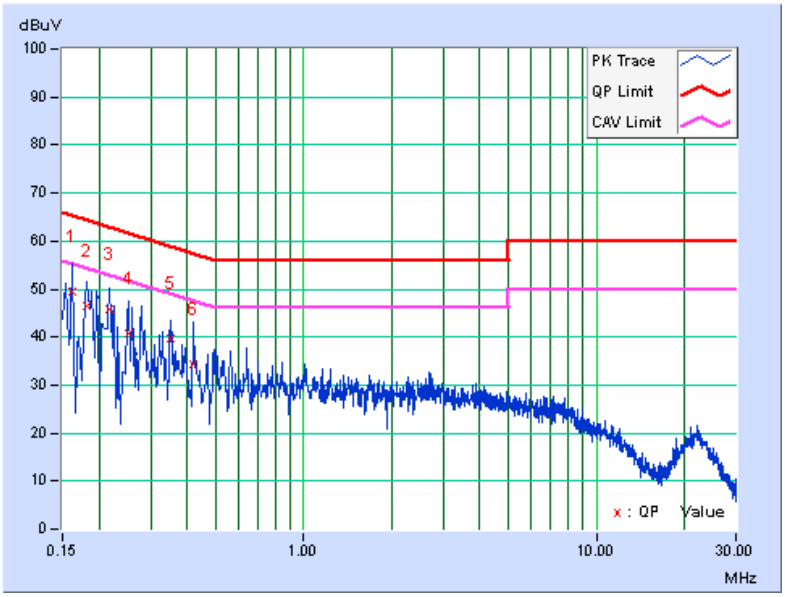


CHANNEL	CH 810 + CH 1	**6dB BANDWIDTH**	9kHz
PHASE	Line 2	**TEST MODE**	B

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16173	0.11	49.44	30.68	49.55	30.79	65.37	55.37	-15.82	-24.58
2	0.18128	0.11	46.42	29.01	46.53	29.12	64.43	54.43	-17.90	-25.31
3	0.21647	0.11	45.70	27.46	45.81	27.57	62.95	52.95	-17.14	-25.38
4	0.25166	0.12	40.50	23.59	40.62	23.71	61.70	51.70	-21.09	-28.00
5	0.34941	0.12	39.57	23.85	39.69	23.97	58.98	48.98	-19.28	-25.00
6	0.41979	0.13	34.22	21.27	34.35	21.40	57.45	47.45	-23.10	-26.05

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab
Tel: 886-2-26052180
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Tel: 886-3-5935343
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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---