FCC TEST REPORT

(PART 22)

REPORT NO.:	RF110923D13-2
MODEL NO.:	MODAT-100
FCC ID:	RFHMODAT-100
RECEIVED:	Jan. 31, 2012
TESTED:	Feb. 06 ~ Feb. 17, 2012
ISSUED:	Feb. 17, 2012

APPLICANT:	ICP Electronics, Inc.
ADDRESS:	3F., No.22, Zhongxing Rd., Xizhi Dist., New Taipei City 221, Taiwan

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.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Feb. 17, 2012

1 CERTIFICATION

PRODUCT: HANDHELD COMPUTER
MODEL: MODAT-100
BRAND: iEi
APPLICANT: ICP Electronics, Inc.
TESTED: Feb. 06 ~ Feb. 17, 2012
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 22, Subpart H**

The above equipment (model: MODAT-100) 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, 2012
Andrea Hsia / Specialist

APPROVED BY : , DATE : Feb. 17, 2012
Gary Chang / Technical Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 & Part 2			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
2.1046 22.913 (a)	Maximum Peak Output Power Limit: max. 7 watts e.r.p peak power	PASS	Meet the requirement of limit. Max. e.r.p is 25.56dBm at 824.2MHz.
2.1055	Frequency Stability AFC Freq. Error vs. Voltage AFC Freq. Error vs. Temperature Limit: max. ±2.5ppm	PASS	Meet the requirement of limit.
2.1049 (h)	Occupied Bandwidth	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is –7.02dB at 1672.80MHz.

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	3.34 dB
	200MHz ~1000MHz	3.35 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	HANDHELD COMPUTER	
MODEL NO.	MODAT-100	
FCC ID	RFHMODAT-100	
POWER SUPPLY	12.0Vdc (adapter) 7.4Vdc (battery)	
MODULATION TYPE	**GPRS, E-GPRS**	GMSK
	WCDMA	BPSK
FREQUENCY RANGE	**GPRS, E-GPRS**	824.2MHz ~ 848.8MHz
	WCDMA	826.4MHz ~ 846.6MHz
MAX. ERP POWER	**GPRS**	0.36Watts
	E-GPRS	0.13Watts
	WCDMA	0.05Watts
MULTI-SLOTS CLASS	10	
WCDMA RELEASE VERSION	5	
MAX. ANTENNA GAIN	Embedded Penta-band Antenna with 3.3dBi gain	
I/O PORTS	Refer to users' manual	
DATA CABLE	NA	
ACCESSORY DEVICES	Refer to Note as below	

NOTE:

1. The EUT was powered by the following adapter & battery:

ADAPTER	
BRAND:	FSP
MODEL:	FSP036-RAB613
INPUT:	90-264Vac, 50-60Hz, 1A
OUTPUT:	12Vdc, 3A
POWER LINE:	1.5m shielded cable 1 core

BATTERY	
RATING:	7.4Vdc, 1880mAh, 13.9Wh

2. Hardware version: R1.05.
3. Software version: R015.
4. Voice & DTM mode is not supported.
5. The above EUT information was 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 GPRS & E-GPRS:

124 channels are provided to this EUT. Therefore, the low, middle and high channels are chosen for testing.

	CHANNEL	FREQUENCY	TX MODE
LOW	128	824.2 MHz	GPRS & E-GPRS
MIDDLE	189	836.4 MHz	GPRS & E-GPRS
HIGH	251	848.8 MHz	GPRS & E-GPRS

NOTE:

1. The channel 128, 189, and 251 were pre-tested in chamber. The channel 189 was chosen for final test.
2. The worst case for final test is chosen when the power control level set 5.
3. The channel space is 0.2MHz.
4. The EUT is an E-GPRS class 10 device (Multislot class: 10), which provide 2 up-link. After pre-tested 2 functions, found up-link with 1 time slot is worse, therefore, test results of output power, frequency stability, occupied bandwidth and band edge tests came out from this.

FOR WCDMA:

102 channels are provided to this EUT. Therefore, the low, middle and high channels are chosen for testing.

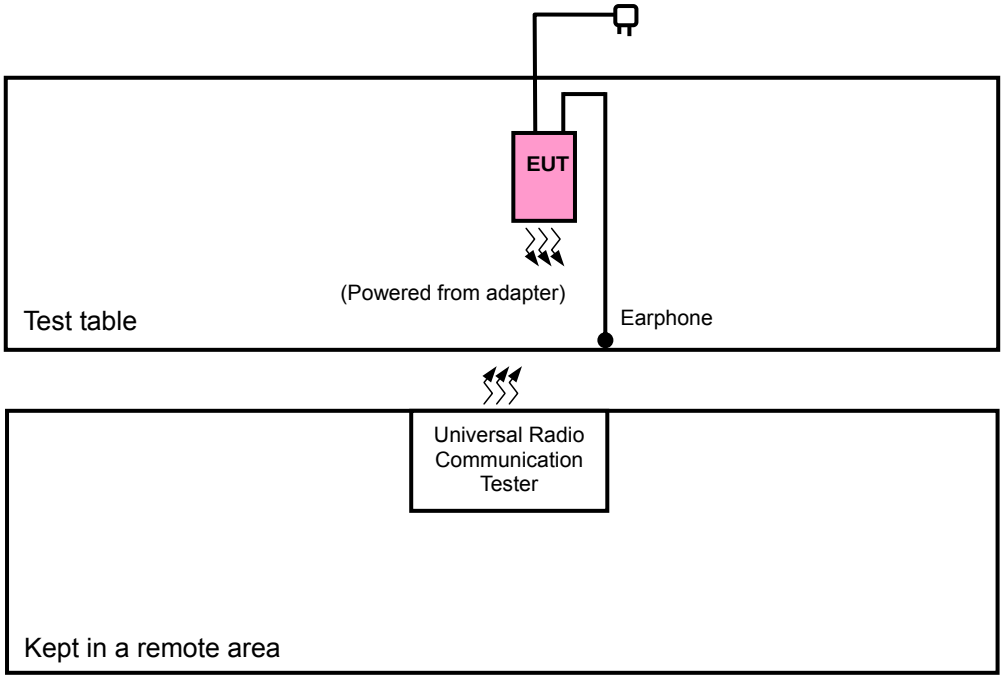
	CHANNEL	FREQUENCY	TX MODE
LOW	4132	826.4 MHz	WCDMA, HSDPA
MIDDLE	4182	836.4 MHz	WCDMA, HSDPA
HIGH	4233	846.6 MHz	WCDMA, HSDPA

NOTE:

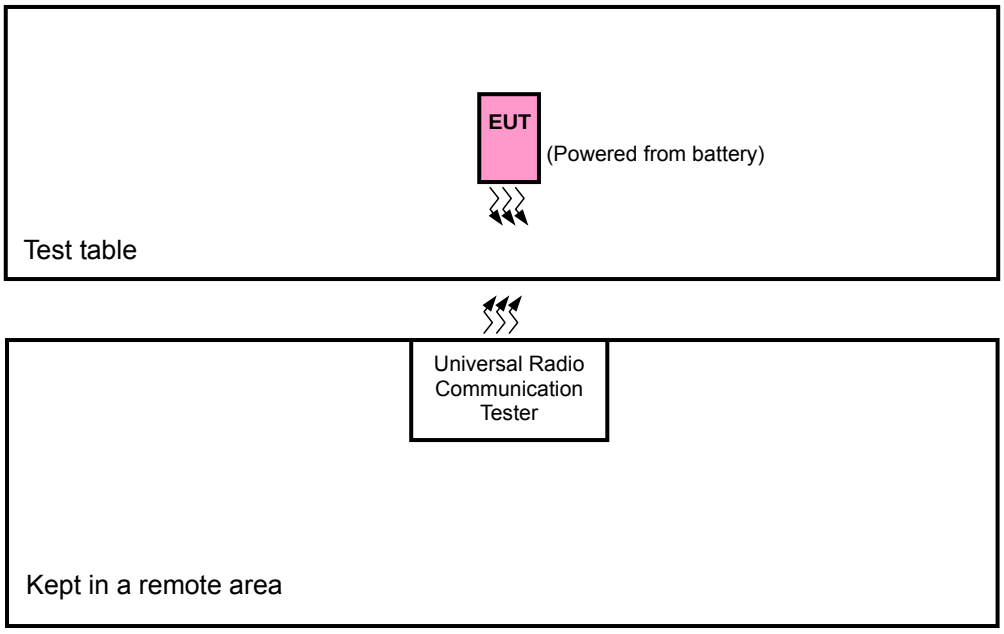
1. The channel 4132, 4182 and 4233 were pre-tested in chamber. The channel 4182 was chosen for final test.
2. The channel space is 0.2MHz.
3. After pretest of output power and spurious emission under WCDMA-RMC & HSDPA mode, find the worst mode is WCDMA-RMC. Therefore, select WCDMA-RMC mode to do final test

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

For Radiated Emission Test



For Output Power Test



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR GPRS & E-GPRS:

EUT CONFIGURE MODE	APPLICABLE TO						DESCRIPTION
	OP	FS	OB	BE	CE	RE	
-	√	√	√	√	√	√	-

Where **OP:** Output power **FS:** Frequency stability
OB: Occupied bandwidth **BE:** Band edge
CE: Conducted spurious emissions **RE:** Radiated emission

OUTPUT POWER MEASUREMENT:

☒ 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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
128 to 251	128, 189, 251	GPRS, E-GPRS	X

FREQUENCY STABILITY MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	189	GPRS, E-GPRS

OCCUPIED BANDWIDTH 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 and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	128, 189, 251	GPRS, E-GPRS

BAND EDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	128, 251	GPRS, E-GPRS

CONDUCTED SPURIOUS EMISSIONS MEASUREMENT:

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	189	GPRS, E-GPRS

RADIATED EMISSION MEASUREMENT:

☒ 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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
128 to 251	189	GPRS, E-GPRS	Z

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
OP	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
FS	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
OB	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
EM	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
BE	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
CE	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
RE	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu

FOR WCDMA:

EUT CONFIGURE MODE	APPLICABLE TO						DESCRIPTION
	OP	FS	OB	BE	CE	RE	
-	√	√	√	√	√	√	-

Where **OP:** Output power **FS:** Frequency stability
OB: Occupied bandwidth **BE:** Band edge
CE: Conducted spurious emissions **RE:** Radiated emission

OUTPUT POWER MEASUREMENT:

☒ 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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
4132 to 4233	4132, 4182, 4233	WCDMA	X

FREQUENCY STABILITY MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
4132 to 4233	4182	WCDMA

OCCUPIED BANDWIDTH 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 and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
4132 to 4233	4132, 4182, 4233	WCDMA

BAND EDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
4132 to 4233	4132, 4233	WCDMA

CONDUCTED SPURIOUS EMISSIONS MEASUREMENT:

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
4132 to 4233	4182	WCDMA

RADIATED EMISSION MEASUREMENT:

☒ 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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
4132 to 4233	4182	WCDMA	Z

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
OP	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
FS	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
OB	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
EM	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
BE	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
CE	25deg. C, 57%RH	7.4Vdc	Phoenix Chen
RE	25deg. C, 57%RH	120Vac, 60Hz	Kay Wu

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 22

ANSI C63.4-2003

ANSI/TIA/EIA-603-C 2004

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

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	UNIVERSAL RADIO COMMUNICATION TESTER	R&S	CMU200	104484	NA
2	Radio Communication Analyzer	Anritsu	MT8820C	6201010284	NA

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

NOTE:

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

4 TEST TYPES AND RESULTS

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

The radiated peak output power shall be according to the specific rule Part 22.913 (a) that “Mobile / Portable station are limited to 7 watts e.r.p”.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 19, 2011	Apr. 18, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 04, 2011	Aug. 03, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Sep. 06, 2011	Sep. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 20, 2011	Jul. 19, 2012
Preamplifier Agilent	8449B	3008A01911	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8447D	2944A10638	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295013/4 283403/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 13, 2011	Aug. 12, 2012
Software	ADT_Radiated_ V7.6.15.9.2	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 460141.

5. The IC Site Registration No. is IC 7450F-4.

4.1.3 TEST PROCEDURES

EIRP / ERP MEASUREMENT:

a. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels, 128, 189 and 251 (GPRS & E-GPRS) / 4132, 4182 and 4233 (WCDMA) (low, middle and high operational frequency range.) RWB and VBW is 1MHz for GPRS & E-GPRS and 5MHz for WCDMA mode.

b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value“ of step c. Record the power level of S.G

d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

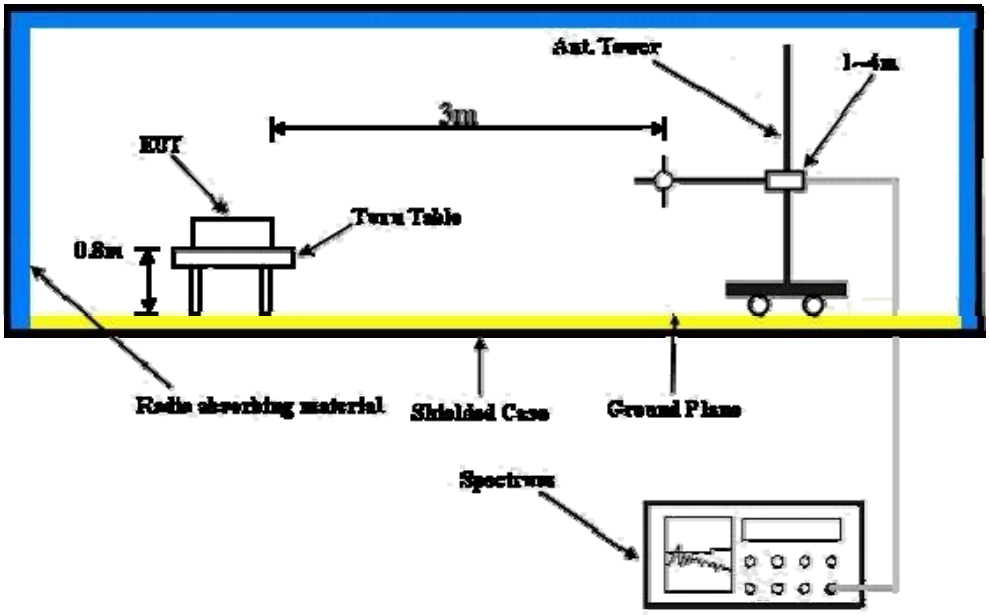
e. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

CONDUCTED POWER MEASUREMENT:

a. The EUT was set up for the maximum power with GPRS, E-GPRS & WCDMA link data modulation and link up with simulator.
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

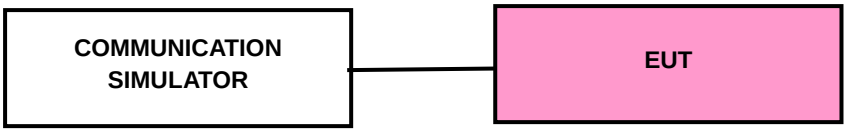
4.1.4 TEST SETUP

EIRP / ERP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:



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

4.1.5 EUT OPERATING CONDITIONS

a. The EUT makes a call to the communication simulator.

b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

4.1.6 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GPRS850		
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
GPRS 8 (GMSK, 1 slot)	31.13	31.25	31.36
GPRS 10 (GMSK, 2 slot)	29.58	29.70	29.82
EDGE 8 (8PSK, 1 slot)	26.16	26.29	26.38
EDGE 10 (8PSK, 2 slot)	26.13	26.26	26.36

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	23.26	23.03	22.79
HSDPA Subtest-1	23.21	23.23	23.06
HSDPA Subtest-2	23.32	23.20	23.16
HSDPA Subtest-3	23.29	23.22	23.17
HSDPA Subtest-4	23.23	23.22	23.15

ERP POWER

FOR GPRS MODE

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(W)	Polarization (H/V)
X	128	824.2	-4.91	32.62	25.56	0.36	H
	189	836.4	-5.51	32.52	24.86	0.31	H
	251	848.8	-7.43	32.65	23.07	0.20	H
	128	824.2	-13.96	32.76	16.65	0.05	V
	189	836.4	-13.61	32.39	16.63	0.05	V
	251	848.8	-16.79	32.54	13.60	0.02	V

FOR E-GPRS MODE

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(W)	Polarization (H/V)
X	128	824.2	-9.24	32.62	21.23	0.13	H
	189	836.4	-9.75	32.52	20.62	0.12	H
	251	848.8	-11.73	32.65	18.77	0.08	H
	128	824.2	-18.44	32.76	12.17	0.02	V
	189	836.4	-17.94	32.39	12.30	0.02	V
	251	848.8	-21.04	32.54	9.35	0.01	V

FOR WCDMA MODE

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(W)	Polarization (H/V)
X	4132	826.4	-13.11	32.62	17.36	0.05	H
	4182	836.4	-13.89	32.52	16.48	0.04	H
	4233	846.6	-14.18	32.65	16.32	0.04	H
	4132	826.4	-22.15	32.76	8.46	0.01	V
	4182	836.4	-22.00	32.39	8.24	0.01	V
	4233	846.6	-23.19	32.54	7.20	0.01	V

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

According to the FCC part 22.863 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The frequency error rate is according to the JTC standard that the frequency error rate shall be accurate to within 2.5ppm of the received frequency from the base station.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Agilent	E4446A	MY43360128	Feb. 22, 2011	Feb. 21, 2012
Hewlett Packard RF cable	8120-6192	01428251	NA	NA
RF cable	SUCOFLEX 104	257029	Sep. 11, 2011	Sep. 10, 2012
WIT Standard Temperature & Humidity Chamber	MHU-225AU	920842	Jun. 15, 2011	Jun. 14, 2012

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

4.2.3 TEST PROCEDURE

a. Because of the measure the carrier frequency under the condition of the AFC lock, it shall be used the mobile station in the GPRS / WCDMA link mode. This is accomplished with the use of the R&S CMU200 / JRC NJZ-2000 simulator station. The oven room could control the temperatures and humidity. The GPRS link channel is the 189 and the WCDMA link channel is the 4182.

b. Power must be removed when changing from one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error.

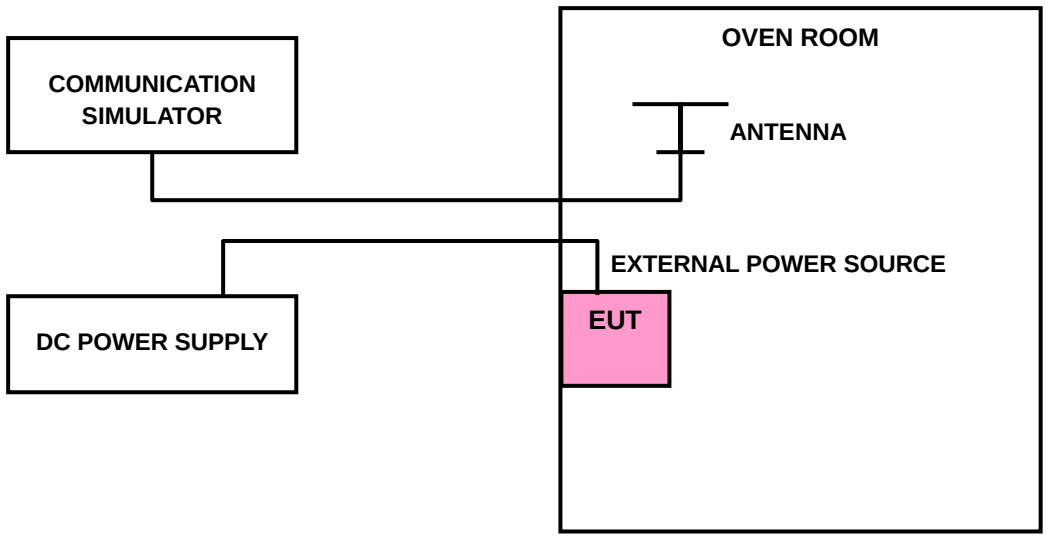
c. EUT is connected the external power supply to control the DC input power. The various Volts from the minimum 6.00Volts to 8.46Volts. Each step shall be record the frequency error rate.

d. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing.

e. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.2.4 TEST SETUP



4.2.5 TEST RESULTS

FOR GPRS:

AFC FREQUENCY ERROR vs. VOLTAGE			
VOLTAGE (Volts)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
7.40	8.47	0.01	2.5
6.00	10.67	0.01	2.5
8.46	4.29	0.01	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 6.00Vdc to 8.46Vdc.

AFC FREQUENCY ERROR vs. TEMP.			
TEMP. (℃)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
-20	-12.55	-0.01	2.5
-10	-10.41	-0.01	2.5
0	-8.76	-0.01	2.5
10	-5.09	-0.01	2.5
20	-4.32	-0.01	2.5
30	3.81	0.00	2.5
40	6.24	0.01	2.5
50	7.66	0.01	2.5

FOR E-GPRS:

AFC FREQUENCY ERROR vs. VOLTAGE			
VOLTAGE (Volts)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
7.40	-3.82	0.00	2.5
6.00	3.28	0.00	2.5
8.46	3.33	0.00	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 6.00Vdc to 8.46Vdc.

AFC FREQUENCY ERROR vs. TEMP.			
TEMP. (℃)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
-20	-9.76	-0.01	2.5
-10	-7.39	-0.01	2.5
0	-7.81	-0.01	2.5
10	-6.85	-0.01	2.5
20	-6.22	-0.01	2.5
30	-4.17	0.00	2.5
40	-4.24	0.00	2.5
50	-3.07	0.00	2.5

FOR WCDMA:

AFC FREQUENCY ERROR vs. VOLTAGE			
VOLTAGE (Volts)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
7.40	23.52	0.03	2.5
6.00	25.10	0.03	2.5
8.46	26.33	0.03	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 6.00Vdc to 8.46Vdc.

AFC FREQUENCY ERROR vs. TEMP.			
TEMP. (℃)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
-20	21.99	0.03	2.5
-10	22.02	0.03	2.5
0	22.90	0.03	2.5
10	26.72	0.03	2.5
20	26.66	0.03	2.5
30	32.45	0.04	2.5
40	27.98	0.03	2.5
50	23.14	0.03	2.5

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

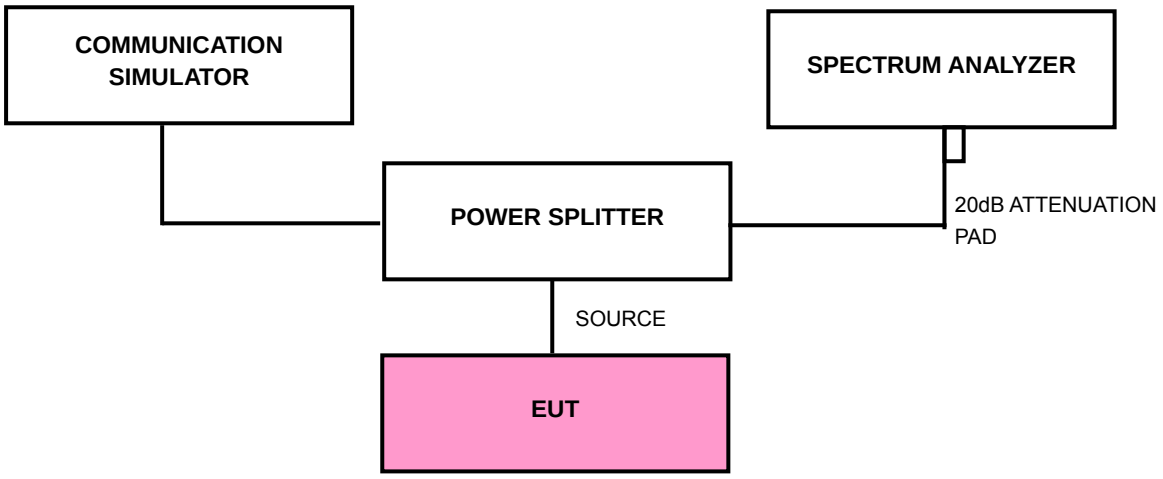
The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the totalmean power of a given emission.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012
Mini-Circuits Power Splitter	ZN2PD-9G	NA	May 25, 2011	May 24, 2012
RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2011	Aug. 19, 2012
RF cable	SUCOFLEX 104	250729/4	Aug. 19, 2011	Aug. 18, 2012
RF cable	SUCOFLEX 104	214377/4	Aug. 19, 2011	Aug. 18, 2012
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

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

4.3.3 TEST SETUP



4.3.4 TEST PROCEDURES

a. The EUT makes a call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels, 128, 189 and 251 (GPRS / E-GPRS) / 4132, 4182 and 4233 (WCDMA) (low, middle and high operational frequency range.)

b. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.3.5 EUT OPERATING CONDITION

a. The EUT makes a call to the communication simulator.

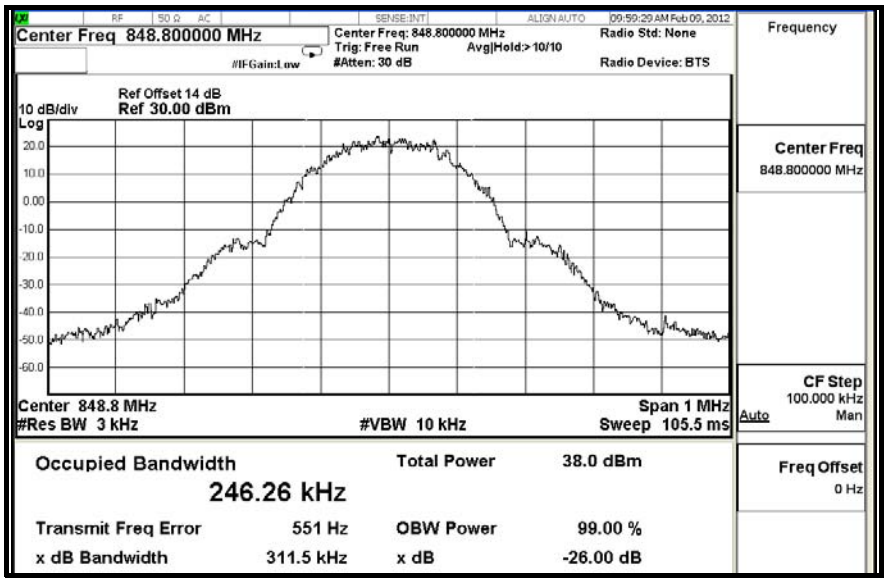
b. The communication simulator station system controlled a EUT to export maximum and minimum output power under transmission mode and specific channel frequency.

4.3.6 TEST RESULTS

FOR GPRS MODE

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (kHz)
128	824.2	245.77
189	836.4	244.18
251	848.8	246.26

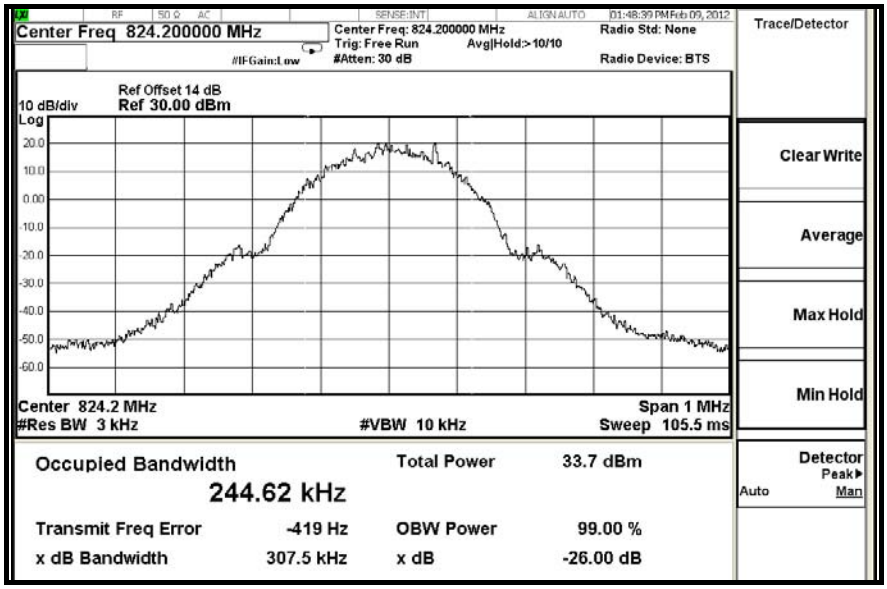
CH 251



FOR E-GPRS MODE

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (kHz)
128	824.2	244.62
189	836.4	243.53
251	848.8	242.39

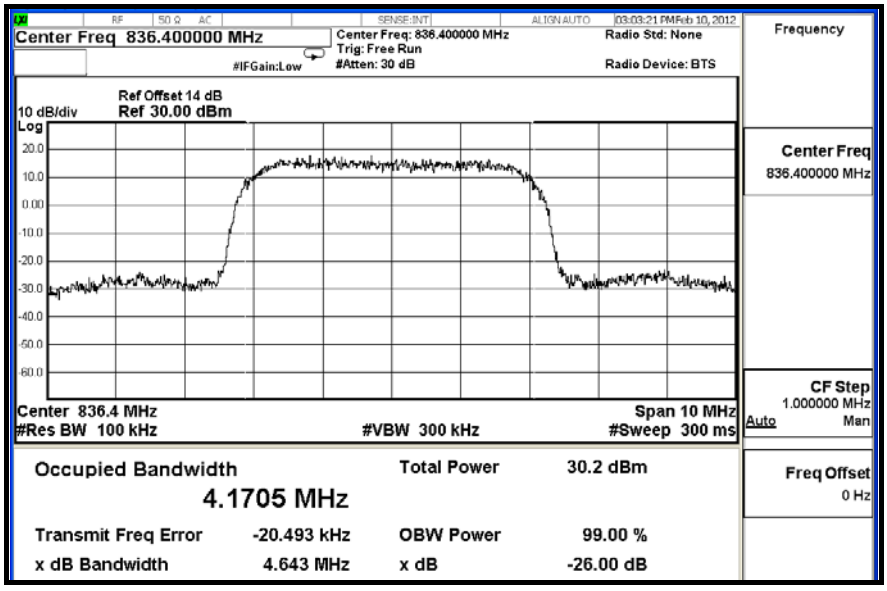
CH 128



FOR WCDMA:

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)
4132	826.4	4.164
4182	836.4	4.171
4233	846.6	4.157

CH 4182



4.4 BAND EDGE MEASUREMENT

4.4.1 LIMITS OF BAND EDGE MEASUREMENT

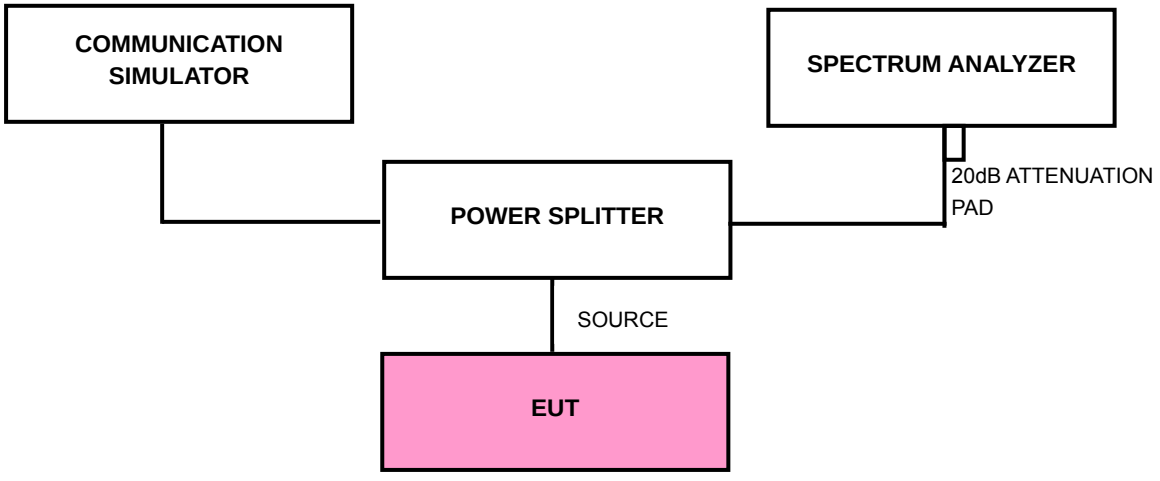
According to FCC 22.917 specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012
Mini-Circuits Power Splitter	ZN2PD-9G	NA	May 25, 2011	May 24, 2012
RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2011	Aug. 19, 2012
RF cable	SUCOFLEX 104	250729/4	Aug. 19, 2011	Aug. 18, 2012
RF cable	SUCOFLEX 104	214377/4	Aug. 19, 2011	Aug. 18, 2012
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

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

4.4.3 TEST SETUP



4.4.4 TEST PROCEDURES

a. The EUT makes a call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels, 128 and 251 (GPRS / E-GPRS) / 4132 and 4233 (WCDMA) (low and high operational frequency range.)

b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 3kHz and VB of the spectrum is 3kHz (GPRS / E-GPRS).

d. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 100kHz (WCDMA).

e. Record the max trace plot into the test report.

4.4.5 EUT OPERATING CONDITION

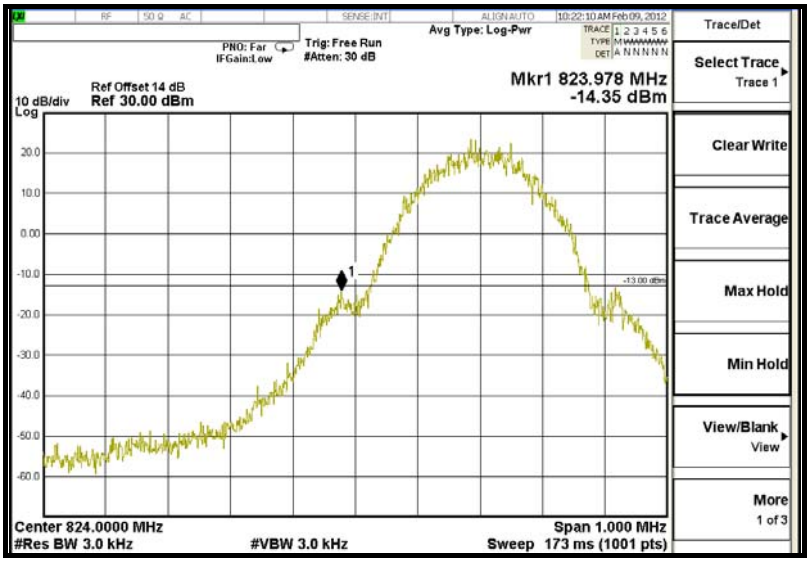
a. The EUT makes a phone call to the communication simulator.

b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

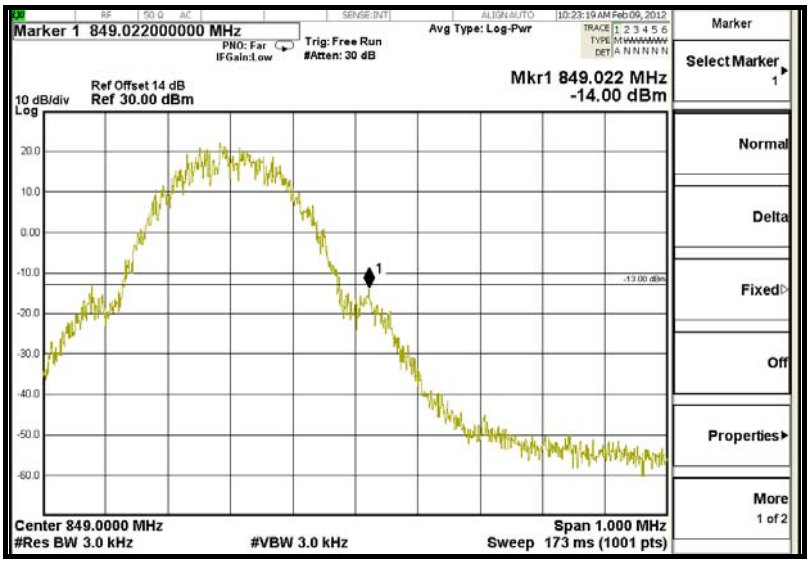
4.4.6 TEST RESULTS

FOR GPRS

LOWER BAND EDGE

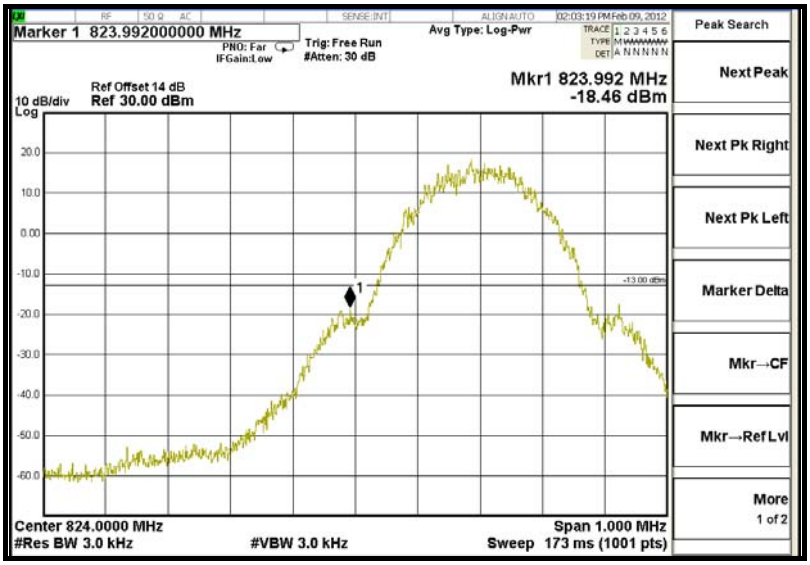


HIGHER BAND EDGE

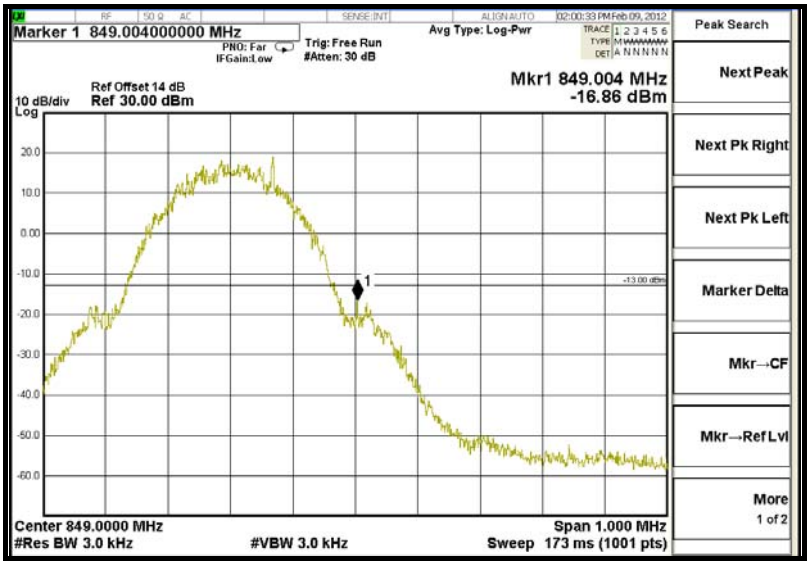


FOR E-GPRS MODE

LOWER BAND EDGE

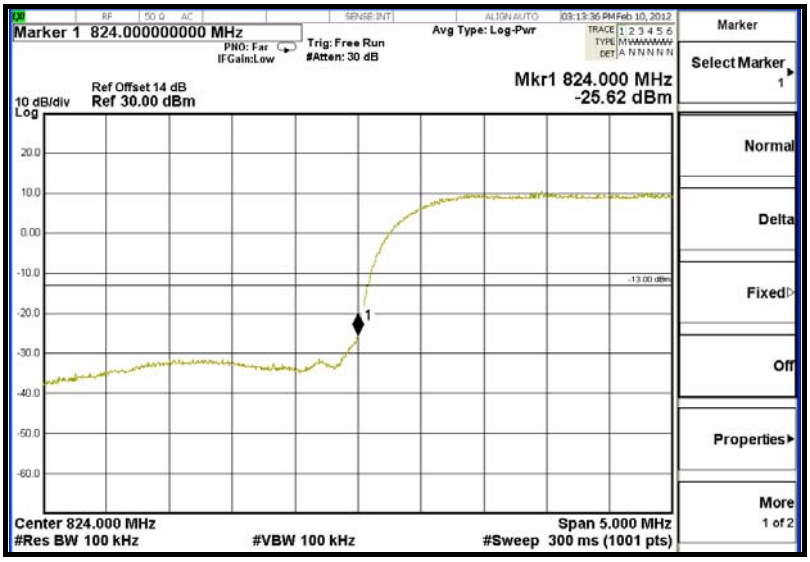


HIGHER BAND EDGE

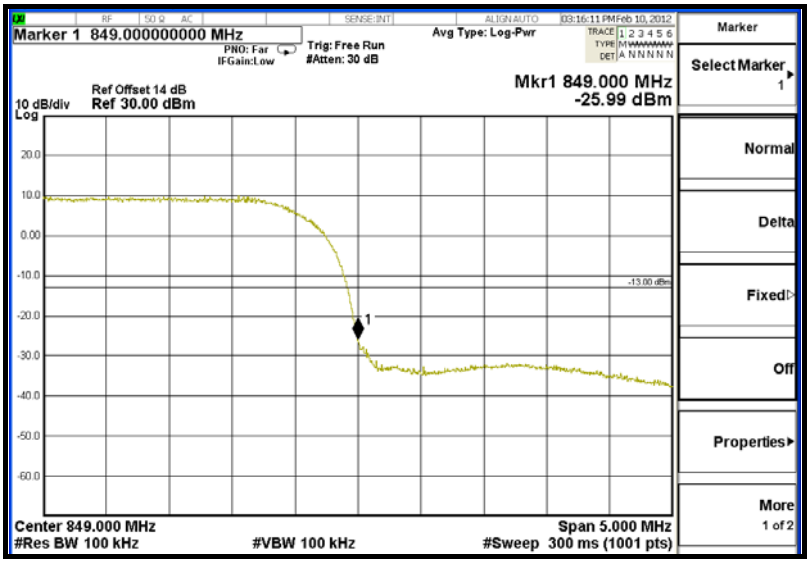


FOR WCDMA MODE

LOWER BAND EDGE



HIGHER BAND EDGE



4.5 CONDUCTED SPURIOUS EMISSIONS

4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

In the FCC 22.917, On any frequency outside a licensee's frequency block within GPRS spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB. The emission limit equal to –13dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012
Mini-Circuits Power Splitter	ZN2PD-9G	NA	May 25, 2011	May 24, 2012
RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2011	Aug. 19, 2012
RF cable	SUCOFLEX 104	250729/4	Aug. 19, 2011	Aug. 18, 2012
RF cable	SUCOFLEX 104	214377/4	Aug. 19, 2011	Aug. 18, 2012
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

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

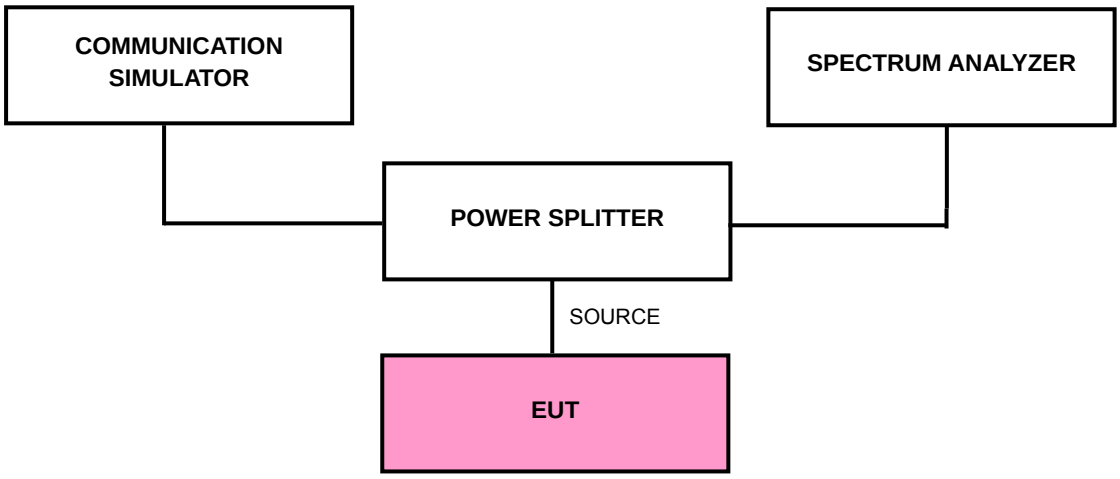
4.5.3 TEST PROCEDURE

a. The EUT makes a phone call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at channel 189 (GPRS / E-GPRS) and channel 4182 (WCDMA).

b. The conducted spurious emission used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. Measuring frequency range is from 30 MHz to 9GHz. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

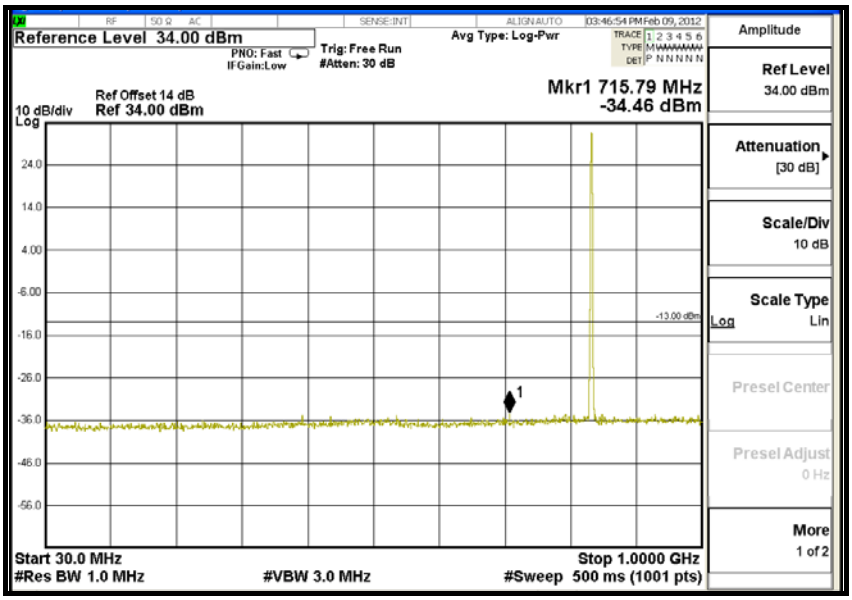
a. The EUT makes a call to the communication simulator.

b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

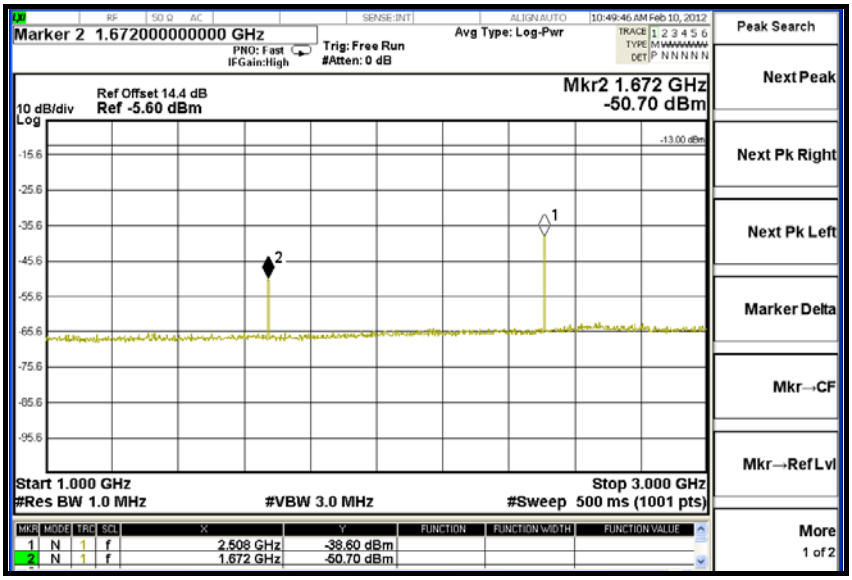
4.5.6 TEST RESULTS

FOR GPRS:

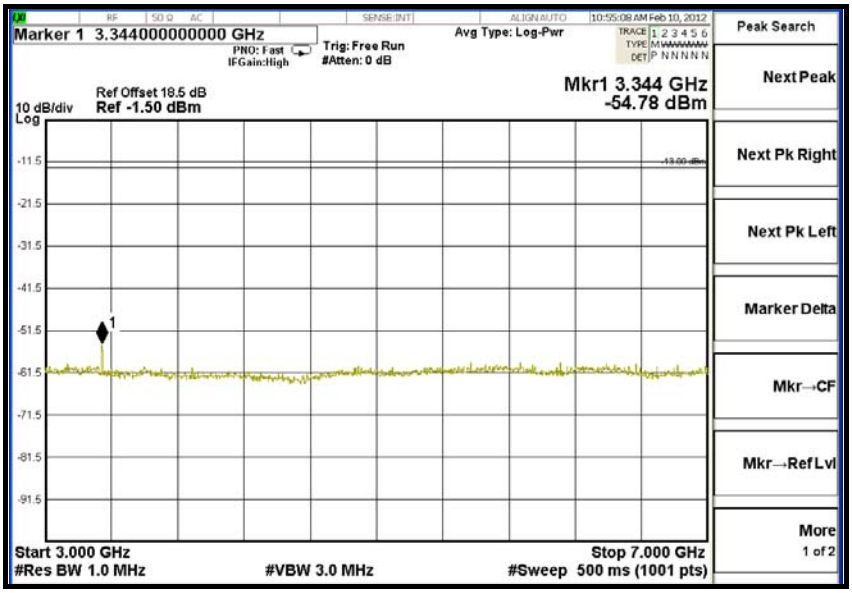
CH 189: 30MHz ~ 1GHz



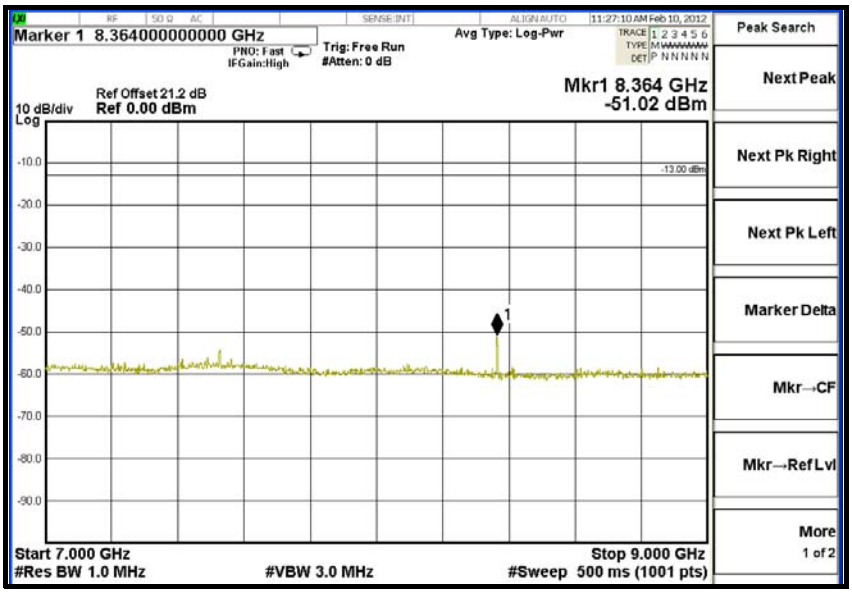
1GHz ~ 3GHz



3GHz ~ 7GHz

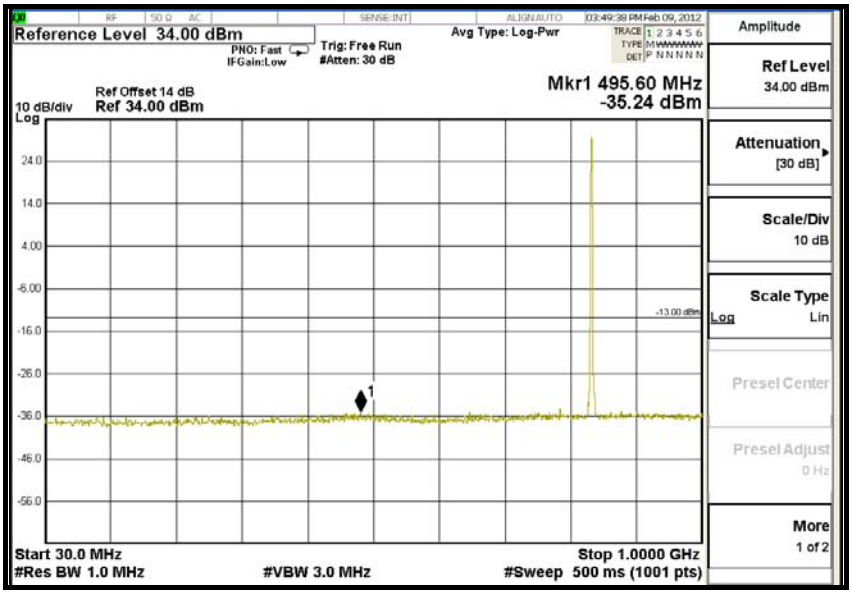


7GHz ~ 9GHz

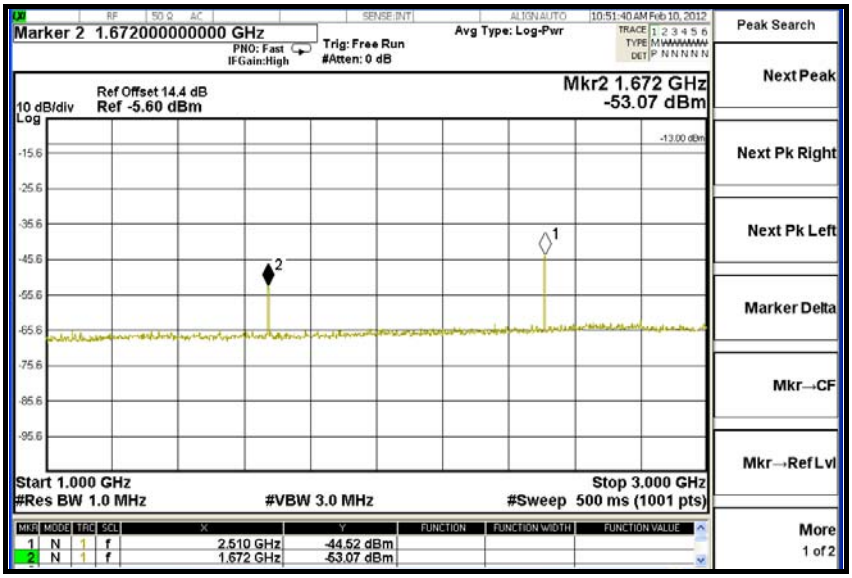


FOR E-GPRS:

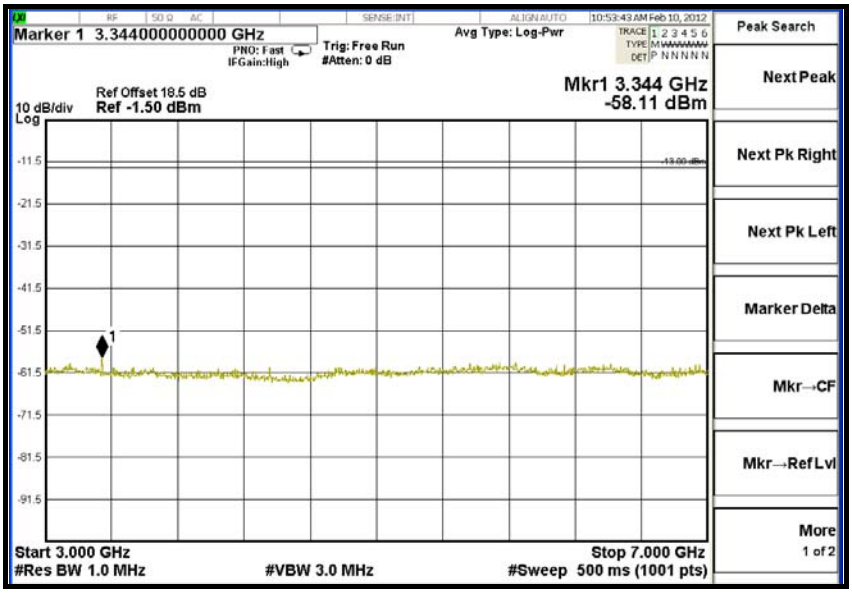
CH 189: 30MHz ~ 1GHz



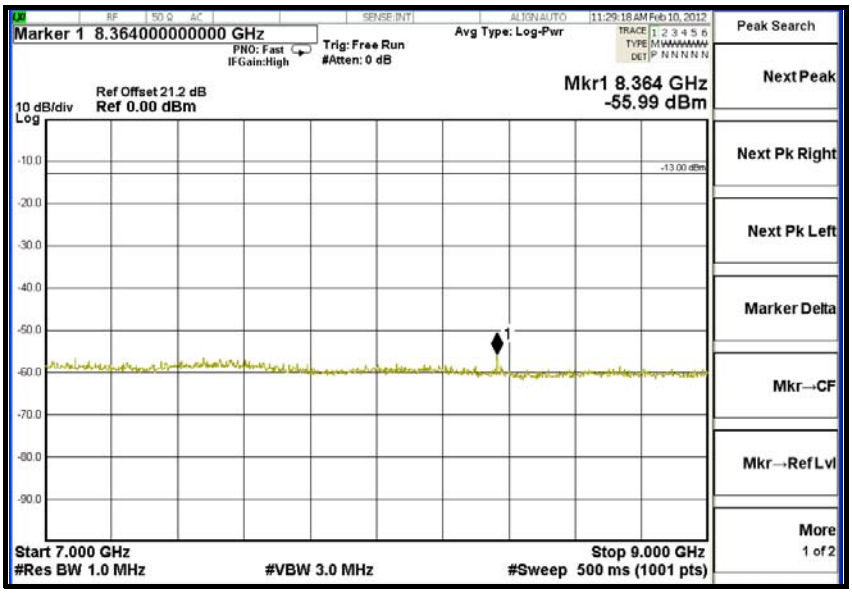
1GHz ~ 3GHz



3GHz ~ 7GHz

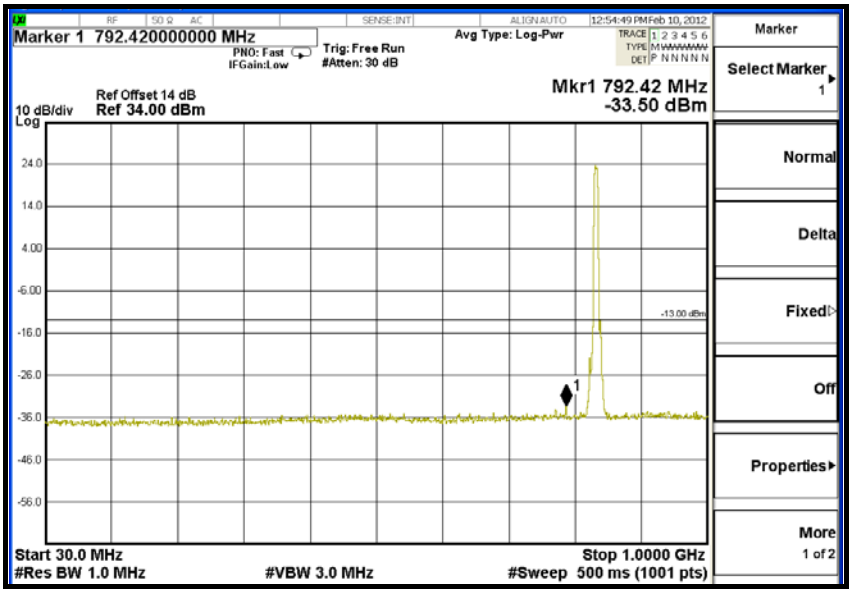


7GHz ~ 9GHz

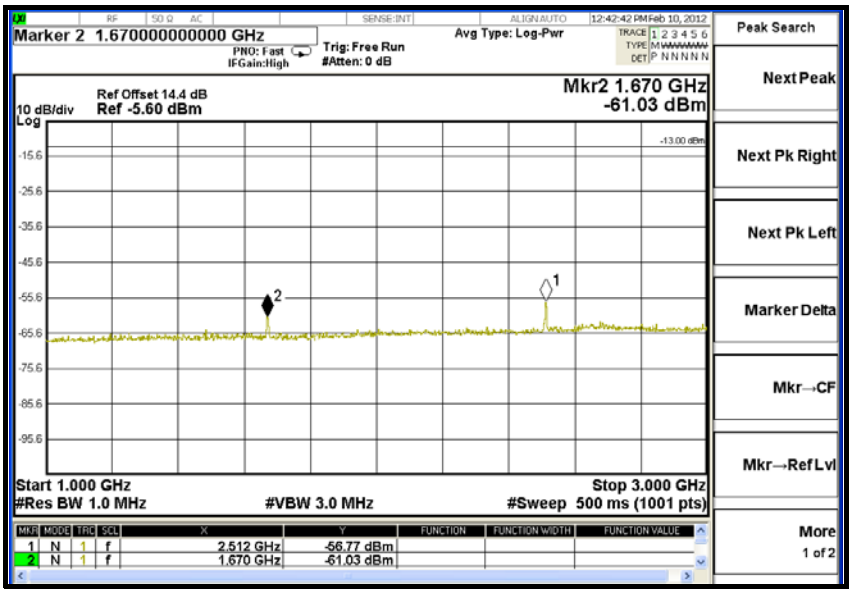


FOR WCDMA:

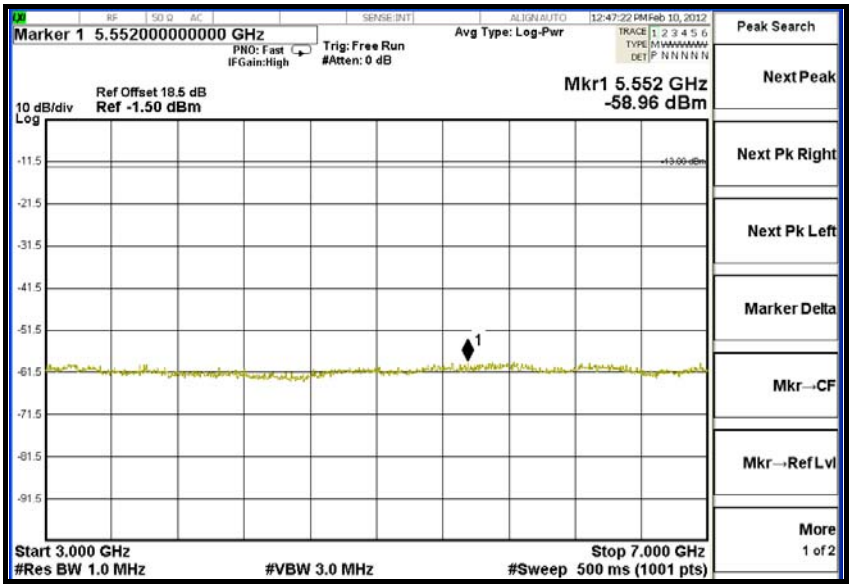
CH 4182: 30MHz ~ 1GHz



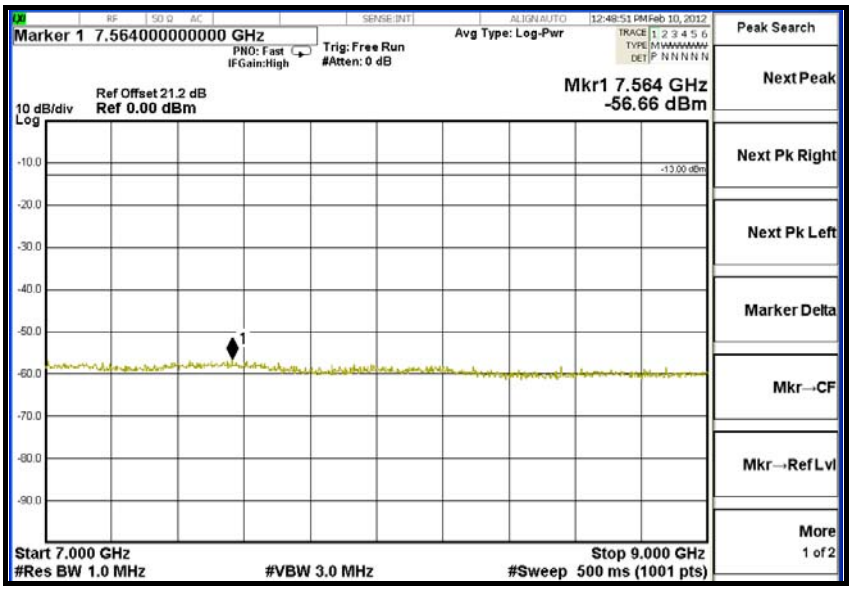
1GHz ~ 3GHz



3GHz ~ 7GHz



7GHz ~ 9GHz



4.6 RADIATED EMISSION MEASUREMENT

4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 22.917 (a), On any frequency outside a licensee's frequency block within USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. The emission limit equal to –13dBm.

4.6.2 TEST INSTRUMENTS

Same as 4.1.2.

4.6.3 TEST PROCEDURES

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

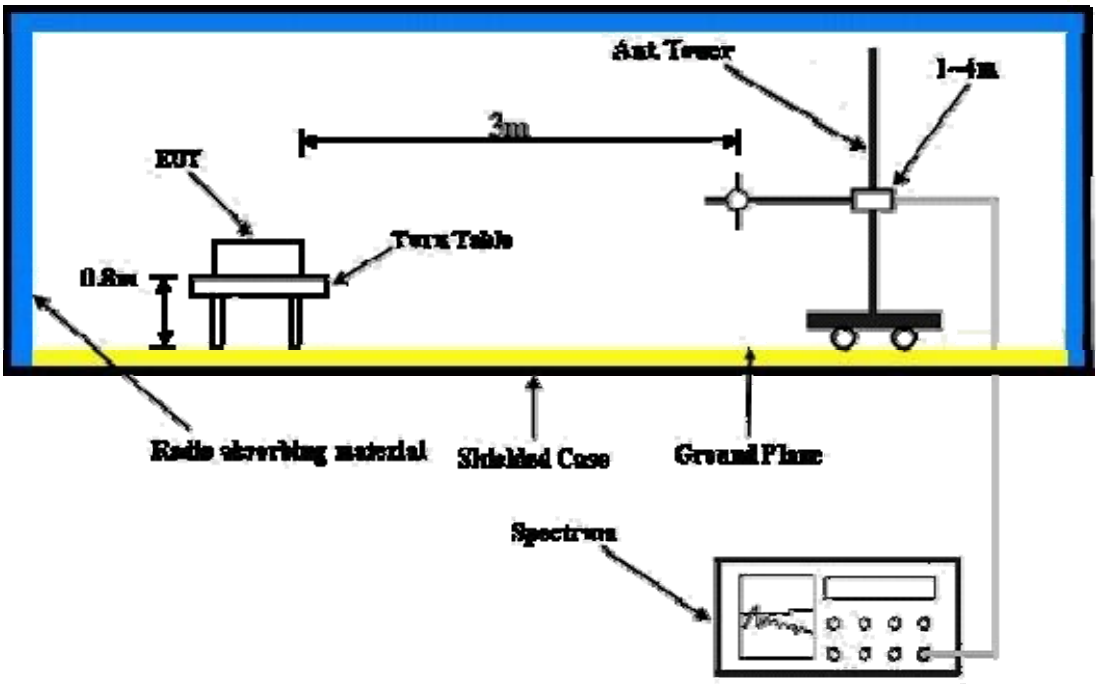
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



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

4.6.6 EUT OPERATING CONDITIONS

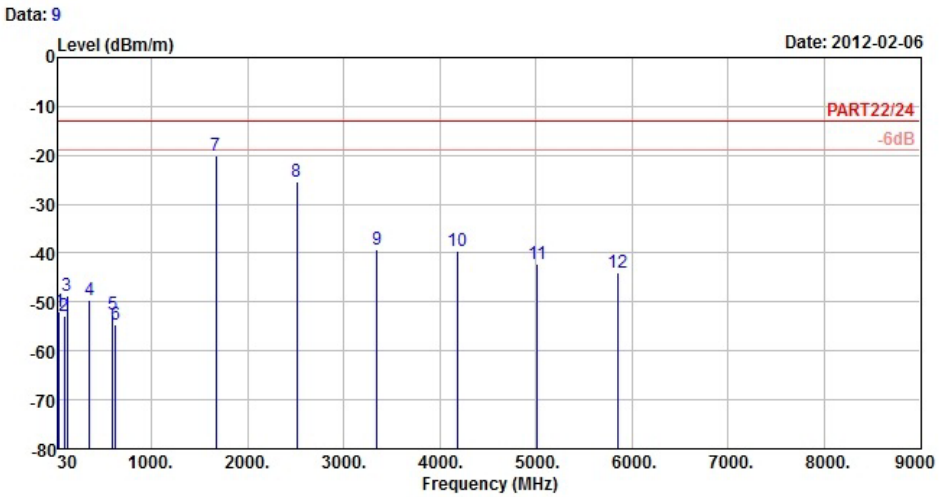
a. The EUT makes a call to the communication simulator.

b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

4.6.7 TEST RESULTS

FOR GPRS:

ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	INPUT POWER	120Vac, 60 Hz
TESTED BY	Kay Wu	POLARIZATION	Horizontal

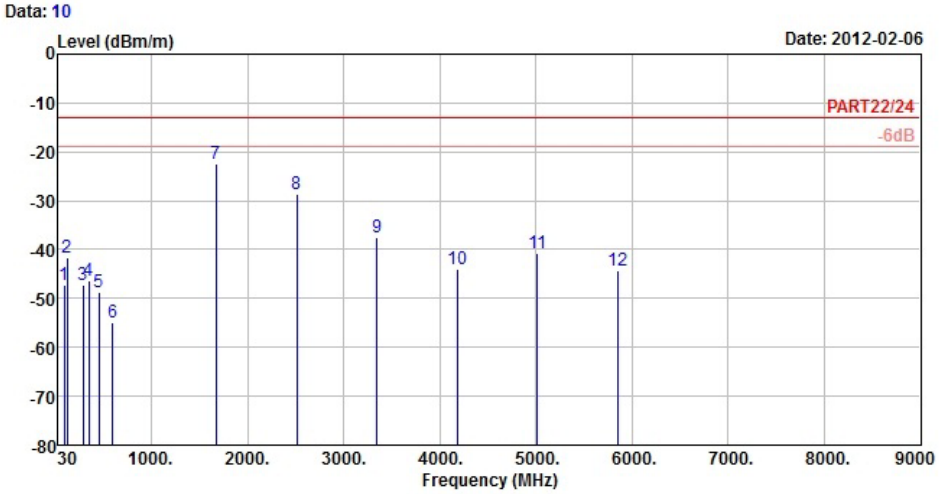


Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE _1G~19G HORIZONTAL
Brand/Model: MODAT-100
Remark : CPRS850 CH189 link (Cradle)
Tested by : DAVID HUANG
Temprature : 25℃
Humidity : 65%
Plane : Z

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	39.45	-52.09	-50.56	-13.00	-39.09	-1.53	Peak
2	94.80	-52.75	-42.26	-13.00	-39.75	-10.49	Peak
3	126.12	-48.68	-39.39	-13.00	-35.68	-9.29	Peak
4	356.00	-49.70	-43.74	-13.00	-36.70	-5.96	Peak
5	598.20	-52.43	-52.03	-13.00	-39.43	-0.40	Peak
6	624.10	-54.73	-54.80	-13.00	-41.73	0.07	Peak
7 pp	1672.80	-20.02	-6.30	-13.00	-7.02	-13.72	Peak
8	2509.20	-25.29	-15.01	-13.00	-12.29	-10.28	Peak
9	3345.60	-39.38	-30.30	-13.00	-26.38	-9.08	Peak
10	4182.00	-39.43	-32.39	-13.00	-26.43	-7.04	Peak
11	5018.40	-42.29	-38.96	-13.00	-29.29	-3.33	Peak
12	5854.80	-43.98	-42.65	-13.00	-30.98	-1.33	Peak

NOTE: Level = read level + factor

ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	INPUT POWER	120Vac, 60 Hz
TESTED BY	Kay Wu	POLARIZATION	Vertical



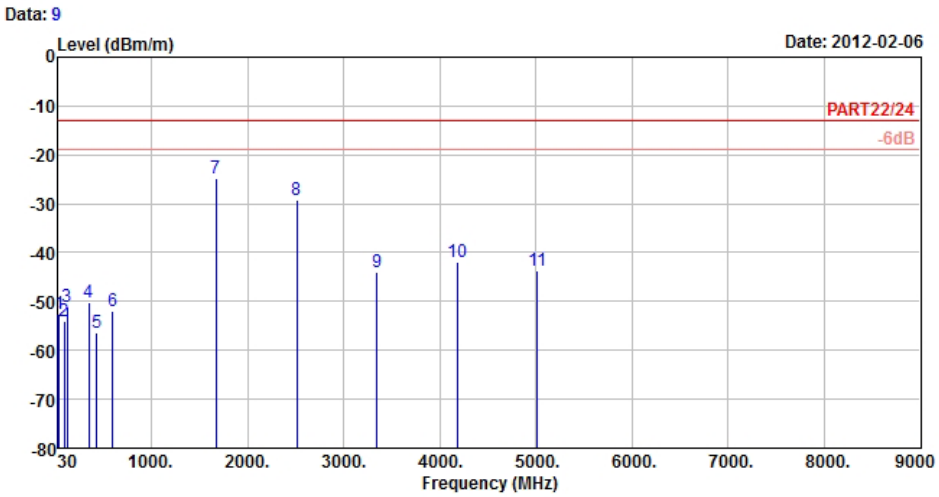
Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE _1G~19G VERTICAL
Brand/Model: MODAT-100
Remark : CPRS850 CH189 link (Cradle)
Tested by : DAVID HUANG
Temprature : 25℃
Humidity : 65%
Plane : Z

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	95.34	-47.10	-36.61	-13.00	-34.10	-10.49	Peak
2	126.12	-41.61	-32.32	-13.00	-28.61	-9.29	Peak
3	287.85	-47.16	-40.94	-13.00	-34.16	-6.22	Peak
4	346.20	-46.41	-40.37	-13.00	-33.41	-6.04	Peak
5	452.60	-48.62	-44.33	-13.00	-35.62	-4.29	Peak
6	598.20	-54.94	-54.54	-13.00	-41.94	-0.40	Peak
7 pp	1672.80	-22.49	-8.77	-13.00	-9.49	-13.72	Peak
8	2509.20	-28.76	-18.48	-13.00	-15.76	-10.28	Peak
9	3345.60	-37.55	-28.47	-13.00	-24.55	-9.08	Peak
10	4182.00	-43.98	-36.94	-13.00	-30.98	-7.04	Peak
11	5018.40	-40.78	-37.45	-13.00	-27.78	-3.33	Peak
12	5854.80	-44.26	-42.93	-13.00	-31.26	-1.33	Peak

NOTE: Level = read level + factor

FOR E-GPRS:

ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	**INPUT POWER**	120Vac, 60 Hz
TESTED BY	Kay Wu	**POLARIZATION**	Horizontal

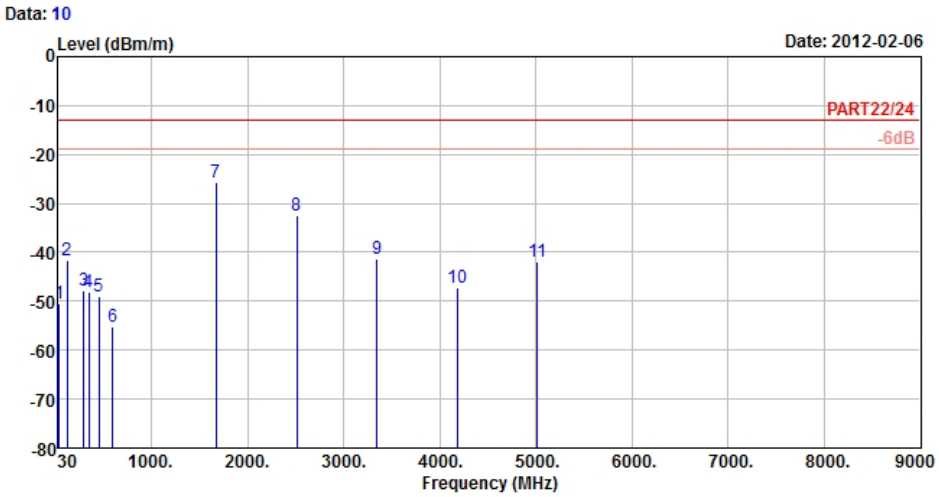


Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE _1G~19G HORIZONTAL
Brand/Model: MODAT-100
Remark : EGPRS850 CH189 link (Cradle)
Tested by : DAVID HUANG
Temprature : 25℃
Humidity : 65%
Plane : Z

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	39.45	-52.48	-50.95	-13.00	-39.48	-1.53	Peak
2	91.29	-54.06	-43.50	-13.00	-41.06	-10.56	Peak
3	125.85	-51.20	-41.91	-13.00	-38.20	-9.29	Peak
4	350.40	-50.19	-44.18	-13.00	-37.19	-6.01	Peak
5	433.70	-56.40	-51.62	-13.00	-43.40	-4.78	Peak
6	598.20	-52.02	-51.62	-13.00	-39.02	-0.40	Peak
7 pp	1672.80	-24.76	-11.04	-13.00	-11.76	-13.72	Peak
8	2509.20	-29.21	-18.93	-13.00	-16.21	-10.28	Peak
9	3345.60	-44.06	-34.98	-13.00	-31.06	-9.08	Peak
10	4182.00	-42.02	-34.98	-13.00	-29.02	-7.04	Peak
11	5018.40	-43.58	-40.25	-13.00	-30.58	-3.33	Peak

NOTE: Level = read level + factor

ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	INPUT POWER	120Vac, 60 Hz
TESTED BY	Kay Wu	POLARIZATION	Vertical



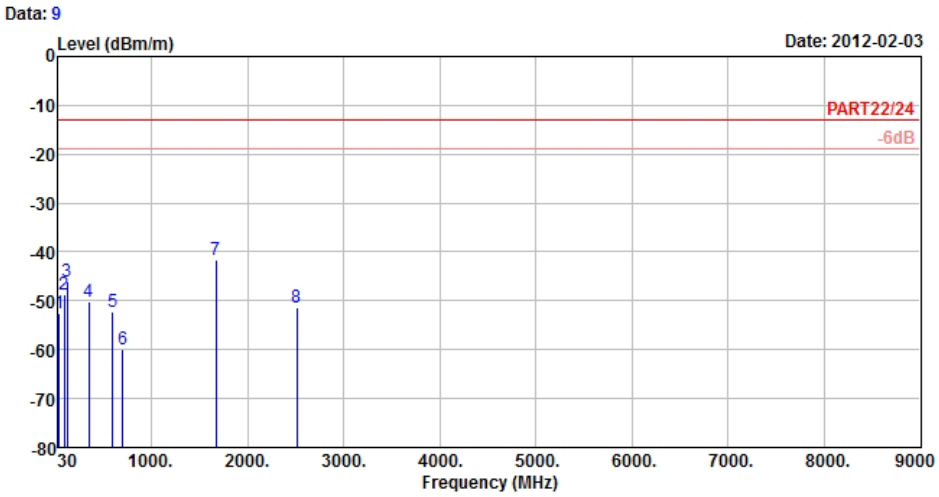
Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE _1G~19G VERTICAL
Brand/Model: MODAT-100
Remark : EGPRS850 CH189 link (Cradle)
Tested by : DAVID HUANG
Temprature : 25℃
Humidity : 65%
Plane : Z

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	39.72	-50.56	-49.03	-13.00	-37.56	-1.53	Peak
2	125.58	-41.50	-32.21	-13.00	-28.50	-9.29	Peak
3	293.25	-47.95	-41.67	-13.00	-34.95	-6.28	Peak
4	348.30	-48.01	-41.99	-13.00	-35.01	-6.02	Peak
5	456.80	-49.06	-44.87	-13.00	-36.06	-4.19	Peak
6	598.20	-55.24	-54.84	-13.00	-42.24	-0.40	Peak
7 pp	1672.80	-25.64	-11.92	-13.00	-12.64	-13.72	Peak
8	2509.20	-32.53	-22.25	-13.00	-19.53	-10.28	Peak
9	3345.60	-41.33	-32.25	-13.00	-28.33	-9.08	Peak
10	4182.00	-47.21	-40.17	-13.00	-34.21	-7.04	Peak
11	5018.40	-41.80	-38.47	-13.00	-28.80	-3.33	Peak

NOTE: Level = read level + factor

FOR WCDMA:

ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	INPUT POWER	120Vac, 60 Hz
TESTED BY	Kay Wu	POLARIZATION	Horizontal

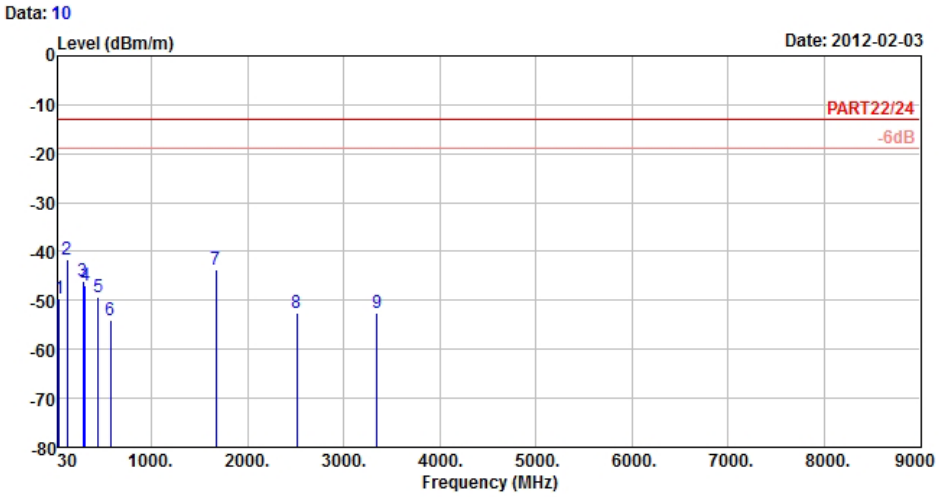


Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE _1G~19G HORIZONTAL
Brand/Model: MODAT-100
Remark : WCDMA850 CH4182 link (Cradle)
Tested by : DAVID HUANG
Temprature : 25℃
Humidity : 65%
Plane : Z

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	39.18	-52.52	-50.78	-13.00	-39.52	-1.74	Peak
2	95.34	-48.76	-38.27	-13.00	-35.76	-10.49	Peak
3	125.04	-46.18	-36.63	-13.00	-33.18	-9.55	Peak
4	350.40	-50.21	-44.20	-13.00	-37.21	-6.01	Peak
5	598.20	-52.31	-51.91	-13.00	-39.31	-0.40	Peak
6	701.80	-60.02	-61.48	-13.00	-47.02	1.46	Peak
7 pp	1672.80	-41.54	-27.82	-13.00	-28.54	-13.72	Peak
8	2509.20	-51.44	-41.16	-13.00	-38.44	-10.28	Peak

NOTE: Level = read level + factor

ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	**INPUT POWER**	120Vac, 60 Hz
TESTED BY	Kay Wu	**POLARIZATION**	Vertical



Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE _1G~19G VERTICAL
Brand/Model: MODAT-100
Remark : WCDMA850 CH4182 link (Cradle)
Tested by : DAVID HUANG
Temprature : 25℃
Humidity : 65%
Plane : Z

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	39.18	-49.63	-47.89	-13.00	-36.63	-1.74	Peak
2 pp	124.77	-41.70	-32.15	-13.00	-28.70	-9.55	Peak
3	287.85	-46.15	-39.93	-13.00	-33.15	-6.22	Peak
4	307.70	-46.90	-40.58	-13.00	-33.90	-6.32	Peak
5	448.40	-49.34	-44.93	-13.00	-36.34	-4.41	Peak
6	572.30	-54.12	-53.00	-13.00	-41.12	-1.12	Peak
7	1672.80	-43.79	-30.07	-13.00	-30.79	-13.72	Peak
8	2509.20	-52.59	-42.31	-13.00	-39.59	-10.28	Peak
9	3345.60	-52.62	-43.54	-13.00	-39.62	-9.08	Peak

NOTE: Level = read level + factor

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.

Copies of accreditation and authorization certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5.phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050
Email: service.adt@tw.bureauveritas.com
Web Site: www.adt.com.tw

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.

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