

# FCC TEST REPORT (RFID)

**REPORT NO.:** RF990924C08A  
**MODEL NO.:** F-04C, F-05C  
**FCC ID:** VQK-F04C, VQK-F05C  
**RECEIVED:** Sep. 24, 2010  
**TESTED:** Sep. 28 ~ Oct. 01, 2010  
**ISSUED:** Oct. 26, 2010

**APPLICANT:** FUJITSU LIMITED

**ADDRESS:** 1-1, Kamikodanaka 4-chome, Nakahara-ku,  
Kawasaki 211-8588, Japan

**ISSUED BY:** Bureau Veritas Consumer Products Services (H.K.)  
Ltd., Taoyuan Branch

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang,  
Taipei Hsien 244, 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 test report consists of 24 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product, certification, approval or endorsement by TAF or any government agency. The test results in the report only apply to the tested sample. The test results in this report are traceable to the national or international standards.



## Table of Contents

1.	CERTIFICATION.....	3
2.	SUMMARY OF TEST RESULTS .....	4
2.1	MEASUREMENT UNCERTAINTY.....	4
3.	GENERAL INFORMATION.....	5
3.1	GENERAL DESCRIPTION OF EUT .....	5
3.2	DESCRIPTION OF TEST MODES .....	6
3.2.1	CONFIGURATION OF SYSTEM UNDER TEST .....	6
3.2.2	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	7
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS .....	8
3.4	DESCRIPTION OF SUPPORT UNITS .....	8
4.	TEST TYPES AND RESULTS .....	9
4.1	RADIATED EMISSION MEASUREMENT .....	9
4.1.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	9
4.1.2	TEST INSTRUMENTS.....	10
4.1.3	TEST PROCEDURES .....	11
4.1.4	DEVIATION FROM TEST STANDARD.....	11
4.1.5	TEST SETUP.....	12
4.1.6	EUT OPERATING CONDITIONS .....	12
4.1.7	TEST RESULTS .....	13
4.2	FREQUENCY STABILITY.....	17
4.2.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT .....	17
4.2.2	TEST INSTRUMENTS.....	17
4.2.3	TEST PROCEDURE.....	17
4.2.4	DEVIATION FROM TEST STANDARD.....	18
4.2.5	TEST SETUP.....	18
4.2.6	EUT OPERATING CONDITION.....	18
4.2.7	TEST RESULTS .....	19
4.3	20DB BANDWIDTH .....	20
4.3.1	LIMITS OF 20DB BANDWIDTH MEASUREMENT .....	20
4.3.2	TEST INSTRUMENTS.....	20
4.3.3	TEST PROCEDURE.....	20
4.3.4	DEVIATION FROM TEST STANDARD.....	20
4.3.5	TEST SETUP.....	20
4.3.6	EUT OPERATING CONDITION.....	20
4.3.7	TEST RESULTS .....	21
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	22
6.	INFORMATION ON THE TESTING LABORATORIES .....	23
7.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	24



A D T

## 1. CERTIFICATION

**PRODUCT:** Mobile phone

**MODEL:** F-04C, F-05C

**BRAND:** FOMA

**APPLICANT:** FUJITSU LIMITED

**TESTED:** Sep. 28 ~ Oct. 01, 2010

**TEST SAMPLE:** ENGINEERING SAMPLE

**STANDARDS:** FCC Part 15, Subpart C (Section 15.225)

FCC Part 15, Subpart C (Section 15.215)

ANSI C63.4-2003

The above equipment (model: F-05C) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**. 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** : Pettie Chen , **DATE:** Oct. 26, 2010  
Pettie Chen / Specialist

**TECHNICAL ACCEPTANCE** : Long Chen , **DATE:** Oct. 26, 2010  
Responsible for RF Long Chen / Senior Engineer

**APPROVED BY** : Gary Chang , **DATE:** Oct. 26, 2010  
Gary Chang / Assistant Manager

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.225, 15.215)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.225 (a)	The field strength of any emissions within the band 13.553-13.567 MHz	PASS	Meet the requirement of limit. Minimum passing margin is -71.5dB at 13.56MHz.
15.225 (d)	The field strength of any emissions appearing outside of the 13.110-14.010 MHz band	PASS	Meet the requirement of limit. Minimum passing margin is -9.6dB at 30.00MHz.
15.225 (e)	The frequency tolerance	PASS	Meet the requirement of limit.
15.215 (c)	20dB Bandwidth	PASS	Meet the requirement of limit.

### 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
Radiated emissions	30MHz ~ 200MHz	3.34dB
	200MHz ~1000MHz	3.35dB

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

<b>EUT</b>	Mobile phone
<b>MODEL NO.</b>	F-05C
<b>FCC ID</b>	VQK-F05C
<b>POWER SUPPLY</b>	3.7Vdc (Li-ion battery) 5.4Vdc (Adapter)
<b>MODULATION TYPE</b>	ASK
<b>OPERATING FREQUENCY</b>	13.56MHz
<b>ANTENNA TYPE</b>	Loop antenna
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	Battery

#### NOTE:

1. This is a duplicate report of RF990924C08. The difference compared with original report is adding a model, outward appearance and FCC ID.
2. The EUT is a Mobile phone. The test data are separated into following test reports.

	TEST STANDARD	REFERENCE REPORT
<b>RFID</b>	FCC Part 15, Subpart C (Section 15.225, 15.215)	RF990924C08A
<b>WCDMA 850</b>	FCC Part 22	RF990924C08A-1

3. The EUT uses the following Li-ion battery:

<b>BRAND</b>	Fujitsu Limited
<b>MODEL</b>	F19
<b>RATING</b>	3.7Vdc, 830mAh

4. The following accessories are for support units only.

PRODUCT	BRAND	DESCRIPTION
Adapter	SMK	I/P: 100-240Vac, 50-60Hz, 0.12A O/P: 5.4Vdc, 700mA
USB cable	NA	0.8m non-shielded cable without core

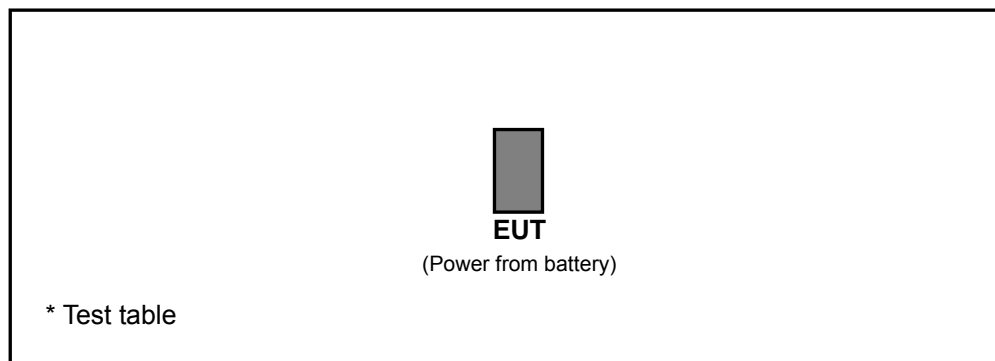
5. IMEI Code: 352149040003260.
6. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

The EUT only have one channel.

CHANNEL	FREQUENCY (MHz)
1	13.56

#### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE	FT	BW	
-	√	√	√	-

Where RE: Radiated Emission FT: Frequency Tolerance  
BW: 20dB Bandwidth

#### RADIATED EMISSION TEST:

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	AXIS
-	1	1	ASK	Z

#### FREQUENCY TOLERANCE:

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	AXIS
-	1	1	ASK	Z

#### 20dB BANDWIDTH:

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	1	1	ASK

#### TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE	26deg. C, 65%RH, 1010 hPa	3.7Vdc	Long Chen
FT	26deg. C, 65%RH, 1010 hPa	3.7Vdc	Long Chen
BW	26deg. C, 65%RH, 1010 hPa	3.7Vdc	Long Chen

### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

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

**FCC Part 15, Subpart C (15.225)**

**FCC Part 15, Subpart C (15.215)**

**ANSI C63.4-2003**

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

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B. The test report has been issued separately.

### **3.4 DESCRIPTION OF SUPPORT UNITS**

The EUT has been tested as an independent unit.



## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100188	Dec. 21, 2009	Dec. 20, 2010
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Dec. 31, 2009	Dec. 30, 2010
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 27, 2010	Apr. 26, 2011
HORN Antenna SCHWARZBECK	9120D	9120D-405	Feb. 03, 2010	Feb. 02, 2011
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 25, 2009	Dec. 24, 2010
Preamplifier Agilent	8447D	2944A10633	Nov. 10, 2009	Nov. 09, 2010
Preamplifier Agilent	8449B	3008A01964	Nov. 09, 2009	Nov. 08, 2010
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 14, 2010	May 13, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 14, 2010	May 13, 2011
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	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 3.
  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 988962.
  5. The IC Site Registration No. is IC 7450F-3.

#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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.

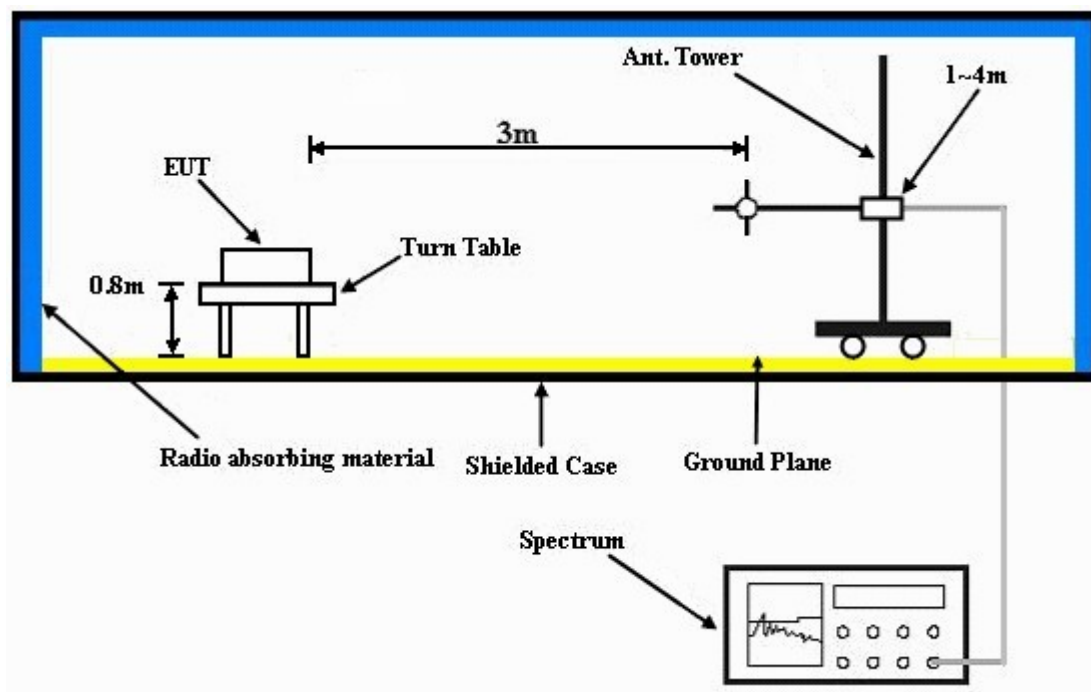
**NOTE:**

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 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.1.5 TEST SETUP



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

#### 4.1.6 EUT OPERATING CONDITIONS

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

#### 4.1.7 TEST RESULTS

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	13.553 ~ 13.567MHz
INPUT POWER	3.7Vdc	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 65%RH 1010 hPa	TESTED BY	Long Chen

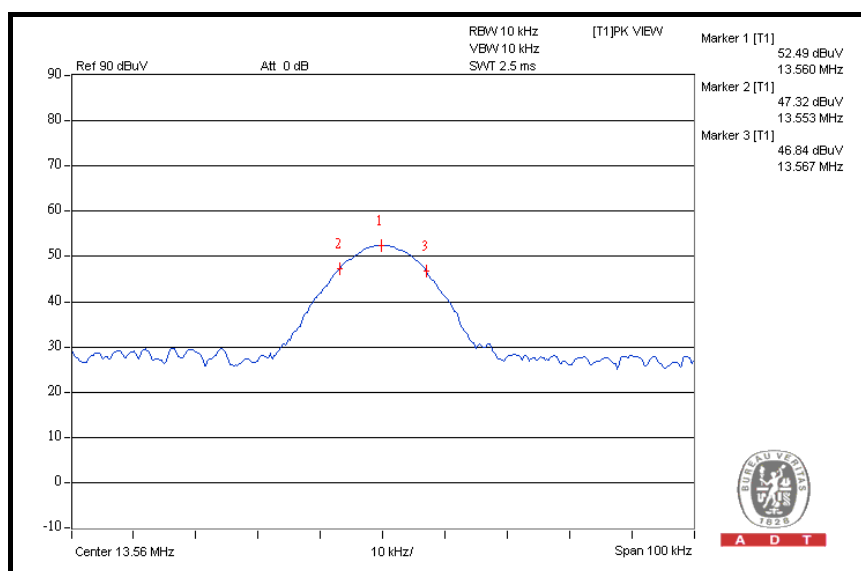
ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA OPEN AT 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.56	52.5	124.0	-71.5	1.00	252	32.7	19.8

- 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. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\mu\text{V/m} & 30\text{m} \\
 &= 84\text{dBuV/m} & 30\text{m} \\
 &= 84+20\log(30/3)^2 & 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$





A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	13.553 ~ 13.567MHz
INPUT POWER	3.7Vdc	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 65%RH 1010 hPa	TESTED BY	Long Chen

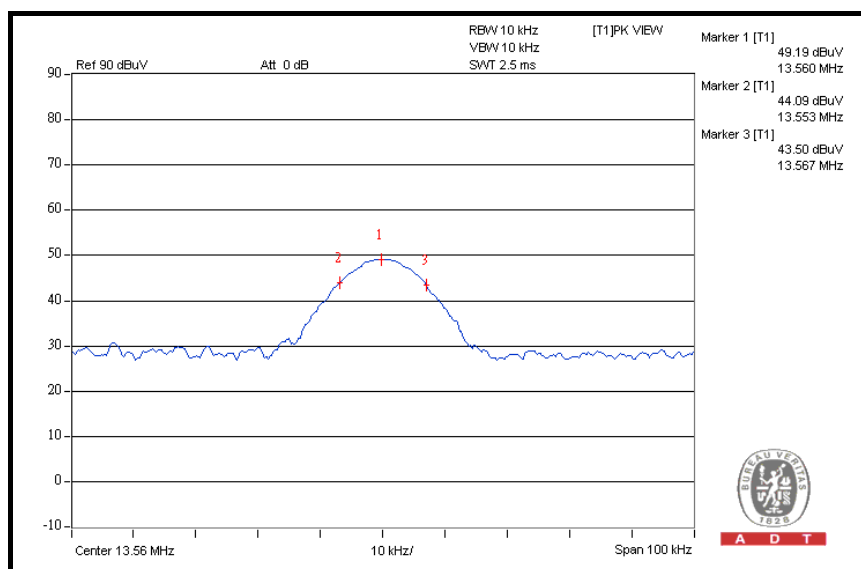
ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA CLOSE AT 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.56	49.2	124.0	-74.8	1.00	125	29.4	19.8

- 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. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}13.56\text{MHz} &= 15848\mu\text{V/m} && 30\text{m} \\ &= 84\text{dBuV/m} && 30\text{m} \\ &= 84+20\log(30/3)^2 && 3\text{m} \\ &= 124\text{dBuV/m}\end{aligned}$$





A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 30MHz
INPUT POWER	3.7Vdc	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 65%RH 1011 hPa	TESTED BY	Long Chen

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA OPEN AT 3m								
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	13.55	47.4	69.5	-22.1	1.00	252	27.6	19.8
2	13.57	46.9	69.5	-22.6	1.00	252	27.1	19.8
3	27.12	32.0	69.5	-37.5	1.00	221	11.8	20.2
ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA CLOSE AT 3m								
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	13.55	44.1	69.5	-25.4	1.00	125	24.3	19.8
2	13.57	43.5	69.5	-26.0	1.00	125	23.7	19.8
3	27.12	32.2	69.5	-37.3	1.00	52	12.0	20.2

**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.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	3.7Vdc	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 65%RH 1011 hPa	TESTED BY	Long Chen

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	31.84	21.5 QP	40.0	-18.5	1.25 H	256	9.00	12.50
2	138.78	26.6 QP	43.5	-16.9	1.50 H	67	12.70	13.90
3	298.21	21.0 QP	46.0	-25.0	1.75 H	184	6.40	14.60
4	515.97	24.1 QP	46.0	-21.9	1.50 H	280	3.90	20.20
5	665.68	31.7 QP	46.0	-14.3	1.00 H	10	8.60	23.10
6	967.05	28.1 QP	54.0	-25.9	1.25 H	352	1.30	26.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	30.4 QP	40.0	-9.6	1.25 V	160	17.90	12.50
2	148.50	24.3 QP	43.5	-19.2	1.00 V	85	10.00	14.30
3	220.44	29.7 QP	46.0	-16.3	1.25 V	4	18.40	11.30
4	298.21	24.1 QP	46.0	-21.9	1.50 V	82	9.50	14.60
5	515.97	23.4 QP	46.0	-22.6	1.00 V	256	3.20	20.20
6	840.67	32.1 QP	46.0	-13.9	1.00 V	187	7.00	25.10

**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.



## 4.2 FREQUENCY STABILITY

### 4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of  $-20$  degrees to  $50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from  $85\%$  to  $115\%$  of the rated supply voltage at a temperature of  $20$  degrees C.

### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
R&S SPECTRUM ANALYZER	FSP40	100040	Jul. 17, 2010	Jul. 16, 2011
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W981030	Jun. 28, 2010	Jun. 27, 2011

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

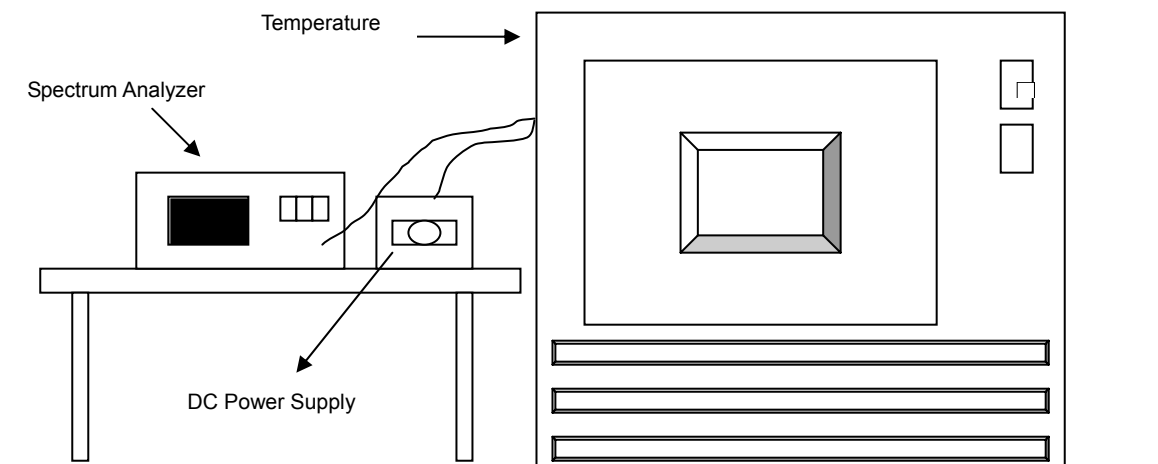
### 4.2.3 TEST PROCEDURE

- The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at  $+20$  degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from  $85\%$  to  $115\%$  and the frequency record.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP



#### 4.2.6 EUT OPERATING CONDITION

Same as Item 4.1.6.

## 4.2.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
55	3.7	13.560176	0.0012979	13.560199	0.0014676	13.560179	0.0013201	13.560202	0.0014897
50	3.7	13.560091	0.0006711	13.560139	0.0010251	13.560159	0.0011726	13.560168	0.0012389
40	3.7	13.560177	0.0013053	13.560145	0.0010693	13.560155	0.0011431	13.560165	0.0012168
30	3.7	13.560130	0.0009587	13.560147	0.0010841	13.560171	0.0012611	13.560193	0.0014233
20	3.7	13.560188	0.0013864	13.560160	0.0011799	13.560171	0.0012611	13.560170	0.0012537
10	3.7	13.560165	0.0012168	13.560205	0.0015118	13.560165	0.0012168	13.560185	0.0013643
0	3.7	13.560189	0.0013938	13.560191	0.0014086	13.560134	0.0009882	13.560181	0.0013348
-10	3.7	13.560168	0.0012389	13.560110	0.0008112	13.560098	0.0007227	13.560142	0.0010472
-20	3.7	13.560220	0.0016224	13.560226	0.0016667	13.560252	0.0018584	13.560194	0.0014307

FREQUENCY STABILITY VERSUS VOLTAGE									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	4.070	13.560187	0.0013791	13.560186	0.0013717	13.560194	0.0014307	13.560155	0.0011431
	3.700	13.560188	0.0013864	13.560160	0.0011799	13.560171	0.0012611	13.560170	0.0012537
	3.330	13.560174	0.0012832	13.560168	0.0012389	13.560104	0.0007670	13.560127	0.0009366

### **4.3 20dB BANDWIDTH**

#### **4.3.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT**

The 20dB bandwidth shall be specified in operating frequency band.

#### **4.3.2 TEST INSTRUMENTS**

Same as Item 4.1.2.

#### **4.3.3 TEST PROCEDURE**

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1kHz RBW and 1kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

#### **4.3.4 DEVIATION FROM TEST STANDARD**

No deviation.

#### **4.3.5 TEST SETUP**

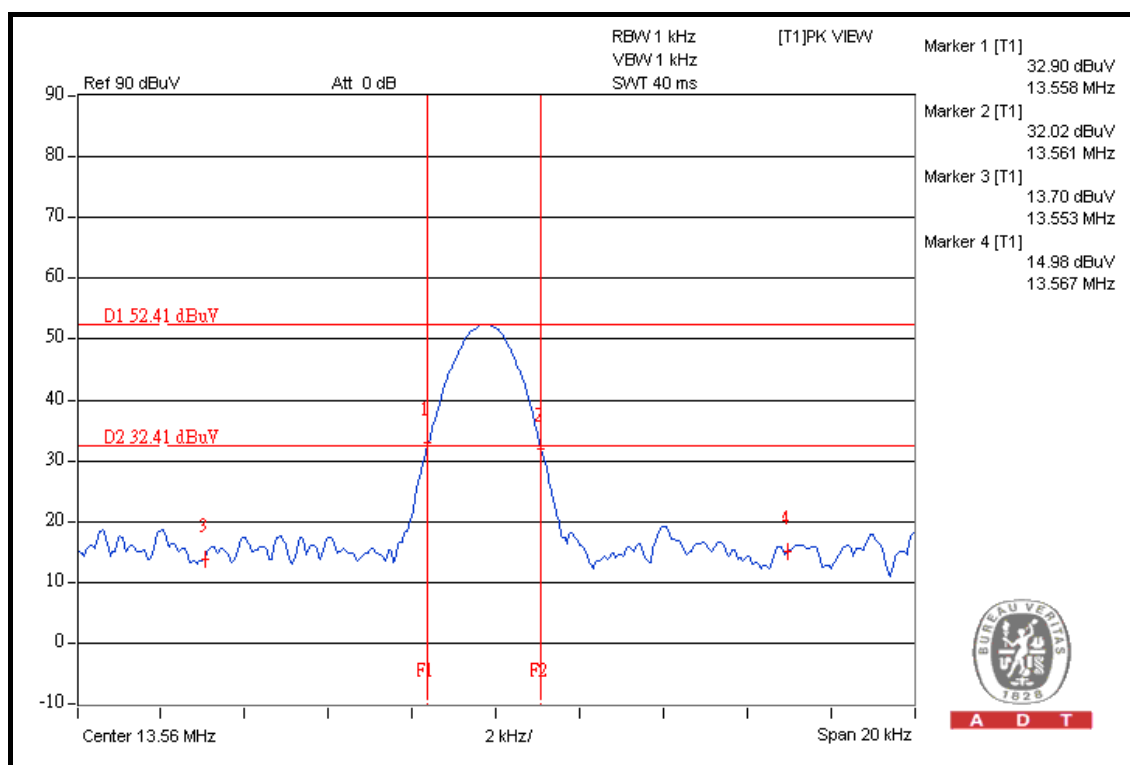
Same as Item 4.1.5.

#### **4.3.6 EUT OPERATING CONDITION**

Same as Item 4.1.6.

### 4.3.7 TEST RESULTS

20dBc point (Low)	20dBc point (HIGH)	Operating frequency band (MHz)	PASS/FAIL
13.558 MHz	13.561 MHz	13.553~13.567	PASS





A D T

## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



A D T

## 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 certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

[www.adt.com.tw/index.5/phtml](http://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

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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



A D T

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

No any modifications are made to the EUT by the lab during the test.

**--- END ---**