FCC TEST REPORT

REPORT NO.:	RF990202A02-2
MODEL NO.:	CU-13R
VERSION:	Proto: B4.0F, HW: 1.0, RCU SW: 0.5B, MV: 1.0
RECEIVED:	Feb. 2, 2010
TESTED:	Feb. 2, 2010
ISSUED:	March 10, 2010

APPLICANT:	Nokia Corporation
ADDRESS:	Joensuunkatu 7E P.O. Box 86 Salo, FIN-24100, Finland

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB LOCATION:	No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, Taiwan

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1. CERTIFICATION

PRODUCT:	Remote
BRAND NAME:	NOKIA
MODEL NO.:	CU-13R
APPLICANT:	Nokia Corporation
TESTED:	Feb. 2, 2010
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	FCC Part 15, Subpart C (Section 15.249), ANSI C63.4-2003

The above equipment 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 : Jessica Cheng , **DATE:** March 10, 2010
(Jessica Cheng / Specialist)

TECHNICAL ACCEPTANCE : Jamison Chan , **DATE:** March 10, 2010
Responsible for RF
(Jamison Chan / Supervisor)

APPROVED BY : Ken Liu , **DATE:** March 10, 2010
(Ken Liu / 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 15.249)			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	Conducted Emission Test	N/A	The EUT power from battery
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 12.209	PASS	Minimum passing margin is –0.2dB at 2475.00MHz

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:

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	30MHz~1GHz	3.86 dB
	Above 1GHz	2.89 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Remote
MODEL NO.	CU-13R
FCC ID	PYACU-13R
POWER SUPPLY	3Vdc
MODULATION TYPE	GFSK
OPERATING FREQUENCY	2475MHz
NUMBER OF CHANNEL	1
ANTENNA TYPE	Printed Antenna with 1.96dBi gain
ANTENNA CONNECTOR	N/A
I/O PORTS	N/A
DATA CABLE	N/A
ASSOCIATED DEVICES	Refer to note below

NOTE:

1. The EUT is a Remote.

2. And the EUT equipped the following accessories:

ITEM	Brand /Model
Display	NOKIA,CK-200 **VERSION:** Proto: B4.0D, HW: 1.0, BT SW: 0.69C, RCU SW: 0.5B,MV: 1.0
Speaker	NOKIA, SP-3
Junction Box	NOKIA, RX-73 **VERSION:** Proto: B4.0D, HW: 1.0, MV: 1.0
Relay Box	NOKIA, CA-160 **VERSION:** Proto: B4.0A, HW: 1.0, MV: 1.0
Microphone	NOKIA, MP-2
Data cable	NOKIA, CA-165; NOKIA, CA-134
Tel. Line	NOKIA, CA-161

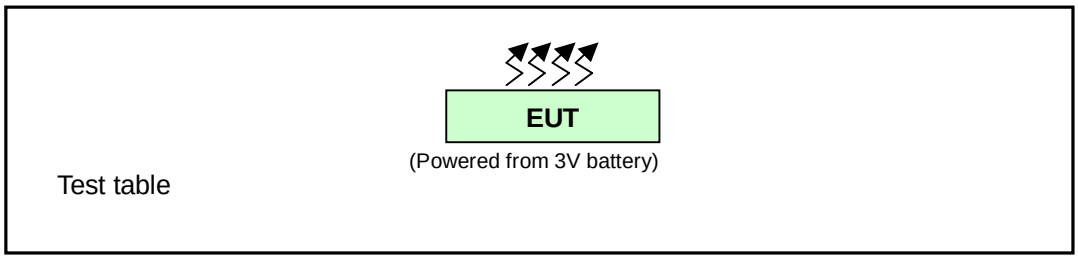
3. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

1 channel is provided to the EUT.

CHANNEL	FREQUENCY (MHz)
0	2475MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	Note	√	√	√	-

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz APCM: Antenna Port Conducted Measurement

Note: No need to concern of Conducted Emission due to the EUT is powered by batteries.

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, 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 TYPE	AXIS
1	0	GFSK	X

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, 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 TYPE	AXIS
1	0	GFSK	X

BANDEDGE 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 TYPE	AXIS
1	0	GFSK	X

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	18deg. C, 78% RH, 1015hPa	3Vdc	Nick Chen
RE<1G	18deg. C, 78% RH, 1015hPa	3Vdc	Nick Chen
APCM	20deg. C, 63% RH, 1014hPa	3Vdc	Chad Lee

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 Part 15, Subpart C. (15.249)

ANSI C63.4-2003

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 without any necessary accessory or support unit.

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

N/A

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209, 15.249 as following:

15.209 Limit		
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
15.249 Limit		
Fundamental Frequency	**Field Strength of Fundamental (millivolts/meter)**	**Field Strength of Harmonics (microvolts/meter)**
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

NOTE:

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	May 04, 2009	May 03, 2010
HP Preamplifier	8449B	3008A01924	Aug. 31, 2009	Aug. 30, 2010
HP Preamplifier	8449B	3008A01292	Aug. 10, 2009	Aug. 09, 2010
ROHDE & SCHWARZ TEST RECEIVER	ESU26	100005	Jun. 06, 2009	Jun. 05, 2010
Schwarzbeck Antenna	VULB 9168	137	Apr. 29, 2009	Apr. 28, 2010
Schwarzbeck Antenna	VHBA 9123	480	Apr. 21, 2009	Apr. 20, 2010
EMCO Horn Antenna	3115	6714	Oct. 26, 2009	Oct. 25, 2010
EMCO Horn Antenna	3115	9312-4192	Apr. 17, 2009	Apr. 16, 2010
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V 7.6.15.9.2	NA	NA	NA
SUHNER RF cable	SF104-26.5	CABLE-CH6-17m -01	Aug. 20, 2009	Aug. 19, 2010
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	Apr. 03, 2009	Apr. 02, 2010

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

4.2.3 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 room. 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 height of antenna 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

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 method or average method as specified and then reported in data sheet.

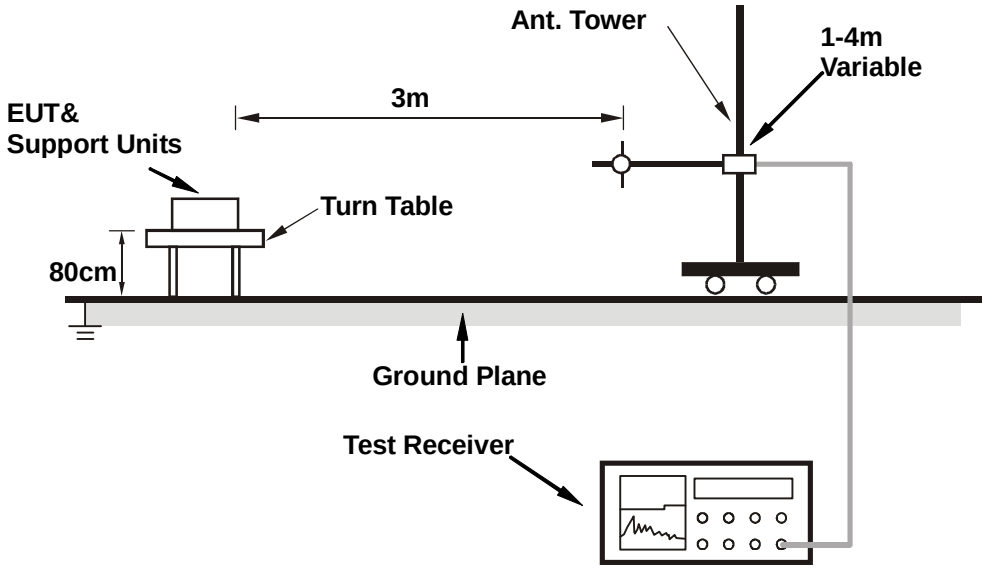
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) 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. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. 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



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

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

4.2.7 TEST RESULTS

ABOVE 1GHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	3Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	18deg. C, 78%RH 1015 hPa	TESTED BY	Nick 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	2390.00	58.5 PK	74.0	-15.5	1.00 H	252	26.99	31.55
2	2390.00	46.3 AV	54.0	-7.7	1.00 H	252	14.71	31.55
3	*2475.00	95.1 PK	114.0	-18.9	1.00 H	252	63.23	31.88
4	***2475.00**	**93.8 AV**	**94.0**	**-0.2**	**1.00 H**	**252**	**61.91**	**31.88**
5	2483.50	59.4 PK	74.0	-14.6	1.00 H	252	27.50	31.91
6	2483.50	47.3 AV	54.0	-6.7	1.00 H	252	15.41	31.91
7	4950.00	49.1 PK	74.0	-24.9	1.00 H	203	11.01	38.09
8	4950.00	39.6 AV	54.0	-14.4	1.00 H	203	1.54	38.09
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	56.7 PK	74.0	-17.3	1.00 V	265	25.19	31.55
2	2390.00	45.6 AV	54.0	-8.4	1.00 V	265	14.06	31.55
3	*2475.00	88.0 PK	114.0	-26.0	1.00 V	265	56.14	31.88
4	*2475.00	87.1 AV	94.0	-6.9	1.00 V	265	55.23	31.88
5	2483.50	58.6 PK	74.0	-15.4	1.00 V	265	26.71	31.91
6	2483.50	47.2 AV	54.0	-6.9	1.00 V	265	15.24	31.91
7	4950.00	51.0 PK	74.0	-23.1	1.00 V	283	12.86	38.09
8	4950.00	43.3 AV	54.0	-10.7	1.00 V	283	5.21	38.09

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

BELOW 1GHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	3Vdc	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	18deg. C, 78%RH 1015 hPa	TESTED BY	Nick 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	37.77	27.1 QP	40.0	-12.9	1.03 H	7	14.20	12.90
2	104.62	23.0 QP	43.5	-20.5	1.17 H	142	13.58	9.46
3	734.18	24.1 QP	46.0	-21.9	1.02 H	193	-1.34	25.48
4	796.36	25.1 QP	46.0	-20.9	1.32 H	25	-1.43	26.55
5	833.67	26.0 QP	46.0	-20.0	1.08 H	73	-1.15	27.14
6	886.52	31.1 QP	46.0	-15.0	1.22 H	241	3.18	27.87
7	947.15	27.6 QP	46.0	-18.4	1.00 H	157	-0.93	28.56
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	37.77	24.1 QP	40.0	-16.0	1.02 V	55	11.15	12.90
2	87.52	30.1 QP	40.0	-9.9	1.32 V	235	21.57	8.51
3	104.62	26.6 QP	43.5	-16.9	1.27 V	73	17.10	9.46
4	141.92	25.0 QP	43.5	-18.5	1.25 V	28	11.29	13.70
5	200.99	25.6 QP	43.5	-17.9	1.24 V	124	14.30	11.26
6	768.38	24.9 QP	46.0	-21.1	1.36 V	298	-1.23	26.09
7	794.81	25.3 QP	46.0	-20.7	1.27 V	10	-1.20	26.53
8	933.16	27.8 QP	46.0	-18.2	1.25 V	184	-0.63	28.40

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.

4.3 BAND EDGES MEASUREMENT

4.3.1 LIMITS OF BAND EDGES MEASUREMENT

Below –50dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP 40	100036	Apr. 03, 2009	Apr. 02, 2010

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 PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.
The spectrum plots are attached on the following pages.

4.3.4 DEVIATION FROM TEST STANDARD

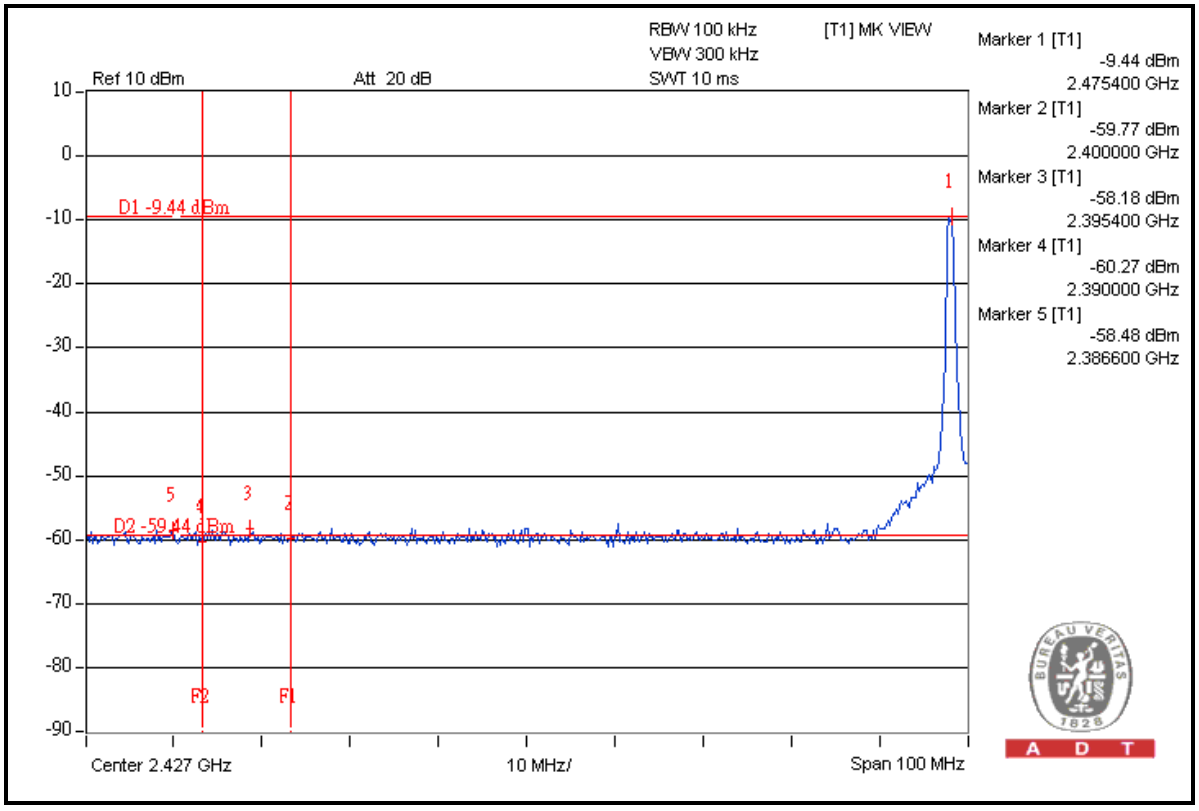
No deviation

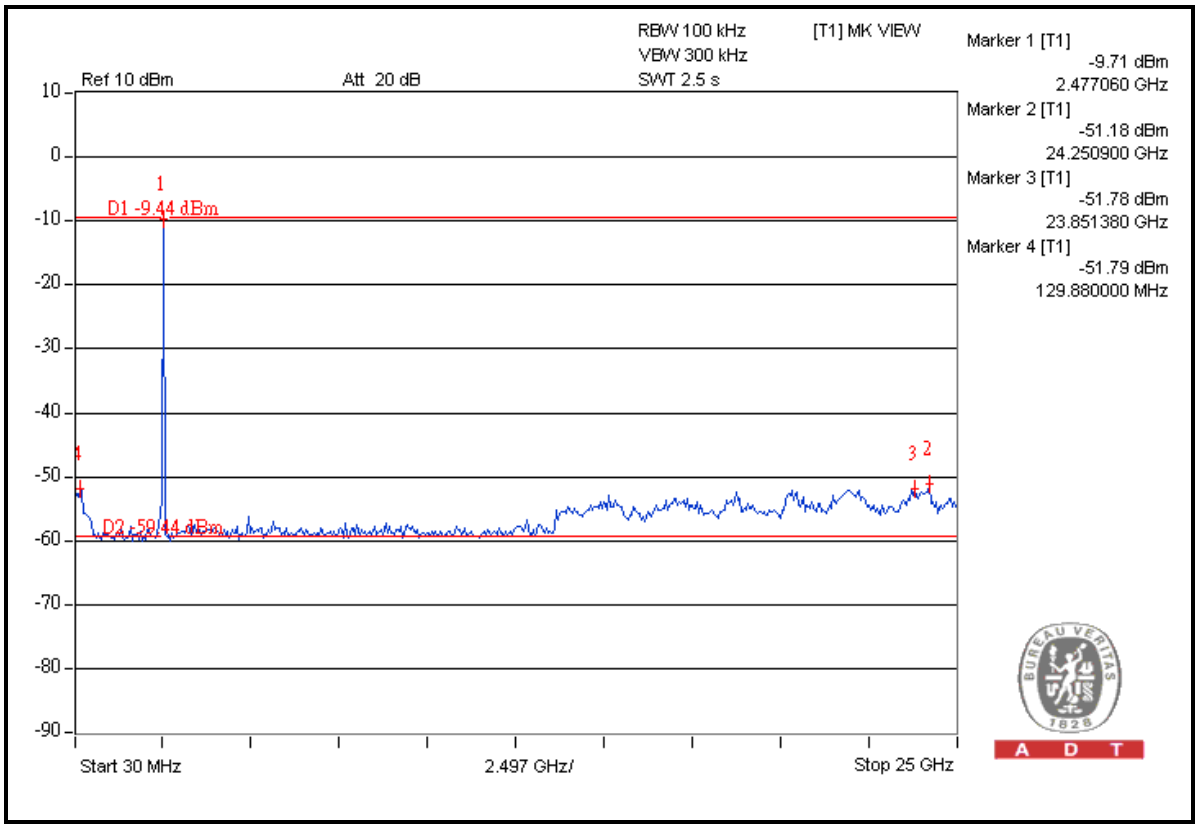
4.3.5 EUT OPERATING CONDITION

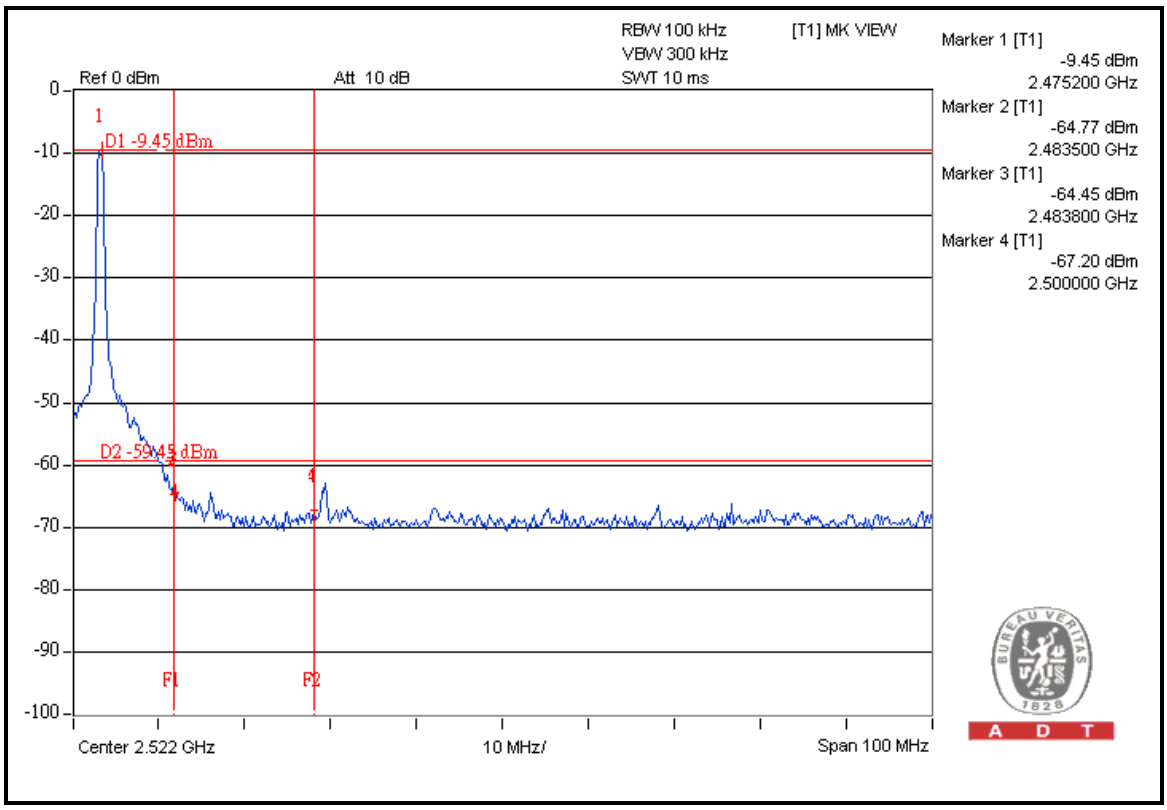
Same as Item 4.2.6

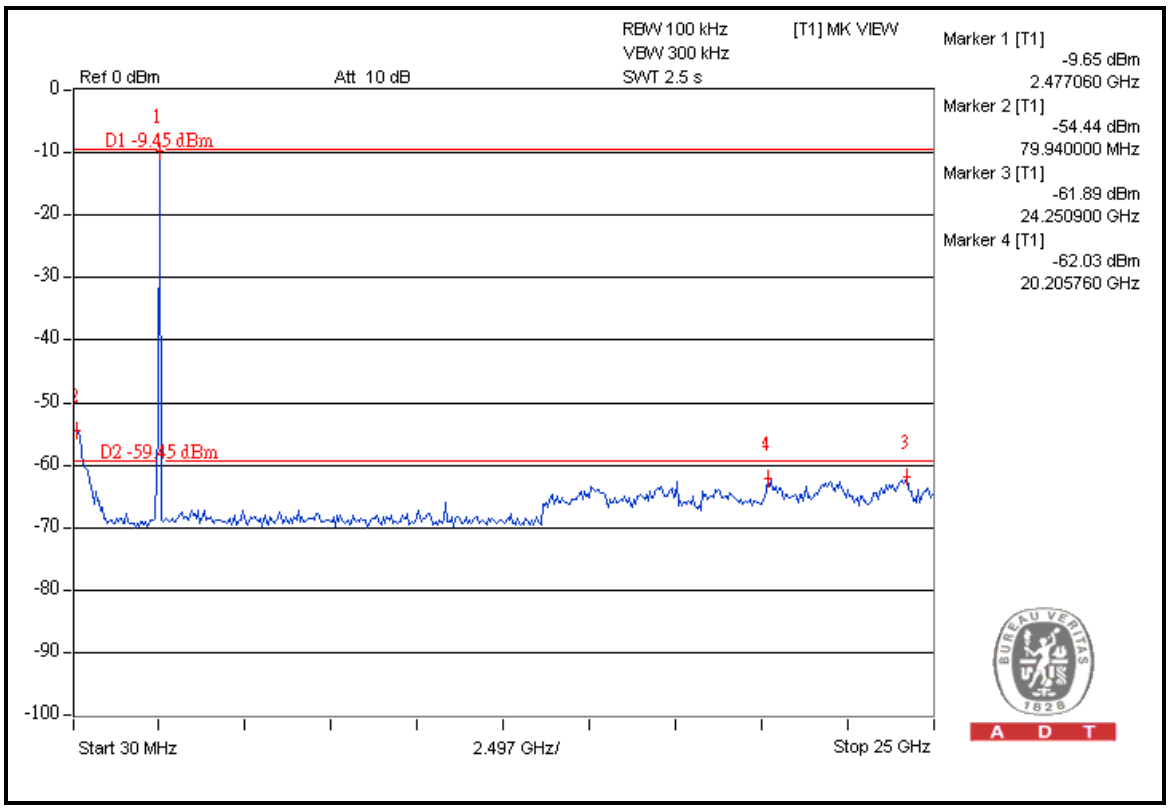
4.3.6 TEST RESULTS

The spectrum plots are attached on the following 4 images. D1 line indicates the highest level, and D2 line indicates the 50dB offset below D1. It shows compliance with the requirement in part 15.249(d).


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 10 dBm
Att 20 dB
D1 -9.44 dBm
D2 -59.44 dBm
Marker 1 [T1]
-9.44 dBm
2.475400 GHz
Marker 2 [T1]
-59.77 dBm
2.400000 GHz
Marker 3 [T1]
-58.18 dBm
2.395400 GHz
Marker 4 [T1]
-60.27 dBm
2.390000 GHz
Marker 5 [T1]
-58.48 dBm
2.386600 GHz
Center 2.427 GHz
10 MHz/
Span 100 MHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 10 dBm
Att 20 dB
D1 -9.44 dBm
D2 -59.44 dBm
Marker 1 [T1]
-9.71 dBm
2.477060 GHz
Marker 2 [T1]
-51.18 dBm
24.250900 GHz
Marker 3 [T1]
-51.78 dBm
23.851380 GHz
Marker 4 [T1]
-51.79 dBm
129.880000 MHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MK VIEW
Ref 0 dBm
Att 10 dB
D1 -9.45 dBm
D2 -59.45 dBm
F1
F2
Center 2.522 GHz
10 MHz/
Span 100 MHz
Marker 1 [T1]
-9.45 dBm
2.475200 GHz
Marker 2 [T1]
-64.77 dBm
2.483500 GHz
Marker 3 [T1]
-64.45 dBm
2.483800 GHz
Marker 4 [T1]
-67.20 dBm
2.500000 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 0 dBm
Att 10 dB
D1 -9.45 dBm
D2 -59.45 dBm
Start 30 MHz
2.497 GHz/
Stop 25 GHz
Marker 1 [T1]
-9.65 dBm
2.477060 GHz
Marker 2 [T1]
-54.44 dBm
79.940000 MHz
Marker 3 [T1]
-61.89 dBm
24.250900 GHz
Marker 4 [T1]
-62.03 dBm
20.205760 GHz

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 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

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 any modifications are made to the EUT by the lab during the test.

---END---