EMC
TEST REPORT

Report No. : EME-060113
Model No. : 36271, MB6271
Issued Date : Feb. 20, 2006

Applicant : SENTON Enterprises Limited
Flat 10, 17/F., Fotan Ind. Center, 26-28 Au Pui Wan St.,
Fo Tan, Shatin, N.T. Hong Kong

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
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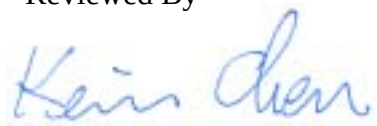
Project Engineer

Jerry Liu

Reviewed By



Kevin Chen

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Summary of Tests

Cordless Phone -Model: 36271
FCC ID: PEG36271

Test	Reference	Results
Power Line Conducted Emission test	15.207	Complies
Radiated Emission test	15.249(c), 15.209	Complies

1. General information

1.1 Identification of the EUT

Applicant	: SENTON Enterprises Limited
Product	: Cordless Phone
Model No.	: 36271
FCC ID.	: PEG36271
Frequency Range	: Base: 2403.05MHz ~ 2405.00MHz Handset: 2474.00MHz ~ 2475.95MHz
Channel Number	: 29channels
Frequency of Each Channel	: Base: 2403.05MHz+0.05k MHz k=0~39 Handset: 2474.00MHz+0.05k MHz k=0~39
Type of Modulation	: FM
Power Supply	: Base: 120Vac, 60Hz with adatper(Model: U090020D) Handset: 3.6Vdc from Battery
Power Cord	: RJ-11 unshielded cable 10meter ㄨ 1
Sample Received	: Jan. 25, 2006
Test Date(s)	: Jan. 27, 2006 ~ Feb. 6, 2006

A DoC report has been generated for the client.

1.2 Additional information about the EUT

The EUT is a Cordless Phone, it consists of handset unit and base unit.

The models listed below are identical to model 36271 (EUT).
Different brand serves as marking strategy.

Trade Name	Model Number
Unical	36271
Bell Phone	36271
Moutain Bell	MB6271

For more detail features, please refer to User's manual as file name “Installation guide.pdf”

1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : 0dBi max
Antenna Type : Soldering antenna
Connector Type : Lead Wire

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Telephone	TENTEL	K-903S	0514000477	FCC DoC Approved
Exchange Board	Teltone	250-00193-07	94948	FCC DoC Approved

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Paragraph 15.249 for non-spread spectrum devices.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

During the radiated emission tests, the EUT was operated in continuously transmitting status.

The EUT was operated in charging and ringing made in conducted emission test.

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Intertek ID No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	EC303	04/17/2006
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	EC317	08/07/2006
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/24/2006
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	11/01/2006
Horn Antenna	EMCO	1GHz~18GHz	3115	EC338	08/16/2006
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	EC351	07/08/2006
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	EC368	05/20/2006
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC373	4/13/2006
Pre-Amplifier	MITEQ	26GHz~40GHz	828825	EC374	1/28/2007
Controller	HDGmbH	N/A	HD 100	EP317-1	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP317-2	N/A
Turn Table	HDGmbH	N/A	DS 420S	EP317-3	N/A
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	01/14/2007

Note: The above equipments are within the valid calibration period.

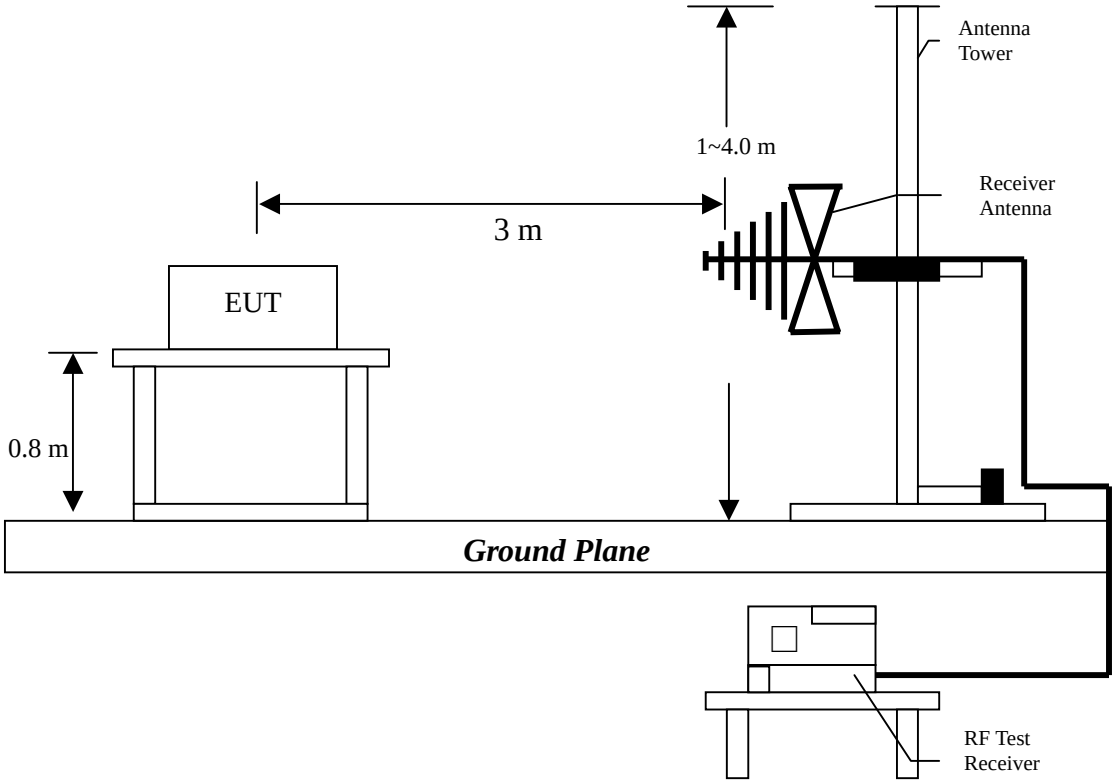
3. Radiated emission test FCC 15.249 (C)

3.1 Operating environment

Temperature:	23	℃
Relative Humidity:	56	%
Atmospheric Pressure:	1023	hPa

3.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



The signal is maximized through rotation and placement in the three orthogonal axes. Radiated emissions were invested cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report.
The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

This test of handset was verified at three orthogonal axes, and the test configuration was listed below:

Setup 1

Setup 2

Setup 3

After verifying three axes, the worst case was occurred at setup 1 configuration. The final test was executed under this configuration and recorded in this report.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

3.3 Emission limit

3.3.1 Fundamental and harmonics emission limits

Frequency (MHz)	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m@3m)	(dBuV/m@3m)	(uV/m@3m)	(dBuV/m@3m)
2400-2483.5	50	94	500	54

3.3.2 General radiated emission limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	15.209 Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:
1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of radiated emission measurement is ±4.98 dB.

3.4 Radiated spurious emission test data

3.4.1 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under continuously transmitting mode. Channel 1, 40 were verified. The worst case occurred at Tx channel 1.

EUT : 36271
Test Unit : Base
Worst Case : Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
36.250	QP	V	12.62	11.50	24.12	40.00	-15.88	111	298
48.700	QP	V	12.84	7.90	20.74	40.00	-19.26	100	178
107.800	QP	V	7.64	10.50	18.14	43.50	-25.36	113	107
222.000	QP	V	12.08	11.08	23.16	46.00	-22.84	108	84
318.000	QP	V	14.10	9.98	24.08	46.00	-21.92	155	225
770.000	QP	V	22.81	9.92	32.73	46.00	-13.27	169	189
37.800	QP	H	13.21	4.80	18.01	40.00	-21.99	104	41
148.300	QP	H	13.24	4.90	18.14	43.50	-25.37	112	74
222.000	QP	H	11.63	5.50	17.13	46.00	-28.88	123	214
427.000	QP	H	18.12	5.90	24.02	46.00	-21.98	115	168
625.000	QP	H	21.55	6.50	28.05	46.00	-17.96	125	57
842.000	QP	H	24.04	7.44	31.48	46.00	-14.53	134	322

Remark:
1.Corrected Level = Reading Level + Correction Factor
2.Correction Factor = Antenna Factor + Cable Loss

The test was performed on EUT under continuously transmitting mode. Channel 1, 40 were verified. The worst case occurred at Tx channel 1.

EUT : 36271
Test Unit : Handset
Worst Case : Tx at channel 1 with setup 1 configuration

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
39.700	QP	V	12.62	3.00	15.62	40.00	-24.38	120	302
47.460	QP	V	12.84	2.70	15.54	40.00	-24.46	121	205
51.340	QP	V	12.90	2.70	15.60	40.00	-24.41	142	147
87.230	QP	V	8.50	3.00	11.50	40.00	-28.51	100	185
157.070	QP	V	15.83	11.50	27.33	43.50	-16.17	154	312
183.260	QP	V	13.10	3.70	16.80	43.50	-26.71	158	56
39.700	QP	H	13.21	1.90	15.11	40.00	-24.89	150	45
51.340	QP	H	14.11	3.40	17.51	40.00	-22.50	163	204
55.220	QP	H	14.11	3.00	17.11	40.00	-22.90	152	38
87.230	QP	H	9.45	2.60	12.05	40.00	-27.96	126	185
115.360	QP	H	10.54	3.80	14.34	43.50	-29.17	119	94
183.260	QP	H	12.08	10.80	22.88	43.50	-20.62	186	358

Remark:
1.Corrected Level = Reading Level + Correction Factor
2.Correction Factor = Antenna Factor + Cable Loss

3.5 Measurement results: frequency above 1GHz

EUT : 36271
Test Unit : Base
Test Condition : Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2403.05	PK	V	30.31	33.62	63.93	114.00	-50.07	120	320
2403.05	AV	V	30.31	30.34	60.65	94.00	-33.35	120	320
2403.05	PK	H	30.31	33.50	63.81	114.00	-50.19	158	335
2403.05	AV	H	30.31	29.66	59.97	94.00	-34.03	158	335

Remark:
1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. No spurious emissions were found above the spectrum analyzer noise floor in the frequency rang 2.5GHz ~ 25GHz.
4. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:
1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

For AV:
1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

EUT : 36271
Test Unit : Base
Test Condition : Tx at channel 40

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2405.00	PK	V	30.31	33.34	63.65	114	-50.35	122	321
2405.00	AV	V	30.31	29.00	59.31	94	-34.69	122	321
2405.00	PK	H	30.31	33.40	63.71	114	-50.29	147	330
2405.00	AV	H	30.31	29.07	59.38	94	-34.62	147	330

Remark:
1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. No spurious emissions were found above the spectrum analyzer noise floor in the frequency rang 2.5GHz ~ 25GHz.
4. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:
1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

For AV:
1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

EUT : 36271
Test Unit : Handset
Test Condition : Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2474.00	PK	V	30.31	51.07	81.38	114.00	-32.62	145	152
2474.00	AV	V	30.31	49.52	79.83	94.00	-14.17	145	152
2474.00	PK	H	30.31	59.16	89.47	114.00	-24.53	101	315
2474.00	AV	H	30.31	58.68	88.99	94.00	-5.01	101	315

Remark:
1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. No spurious emissions were found above the spectrum analyzer noise floor in the frequency rang 2.5GHz ~ 25GHz.
4. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:
1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

For AV:
1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

EUT : 36271
Test Unit : Handset
Test Condition : Tx at channel 40

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2475.95	PK	V	30.31	50.71	81.02	114.00	-32.98	140	148
2475.95	AV	V	30.31	49.22	79.53	94.00	-14.47	140	148
2475.95	PK	H	30.31	58.90	89.21	114.00	-24.79	100	312
2475.95	AV	H	30.31	58.66	88.97	94.00	-5.03	100	312

Remark:
1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. No spurious emissions were found above the spectrum analyzer noise floor in the frequency rang 2.5GHz ~ 25GHz.
4. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:
1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

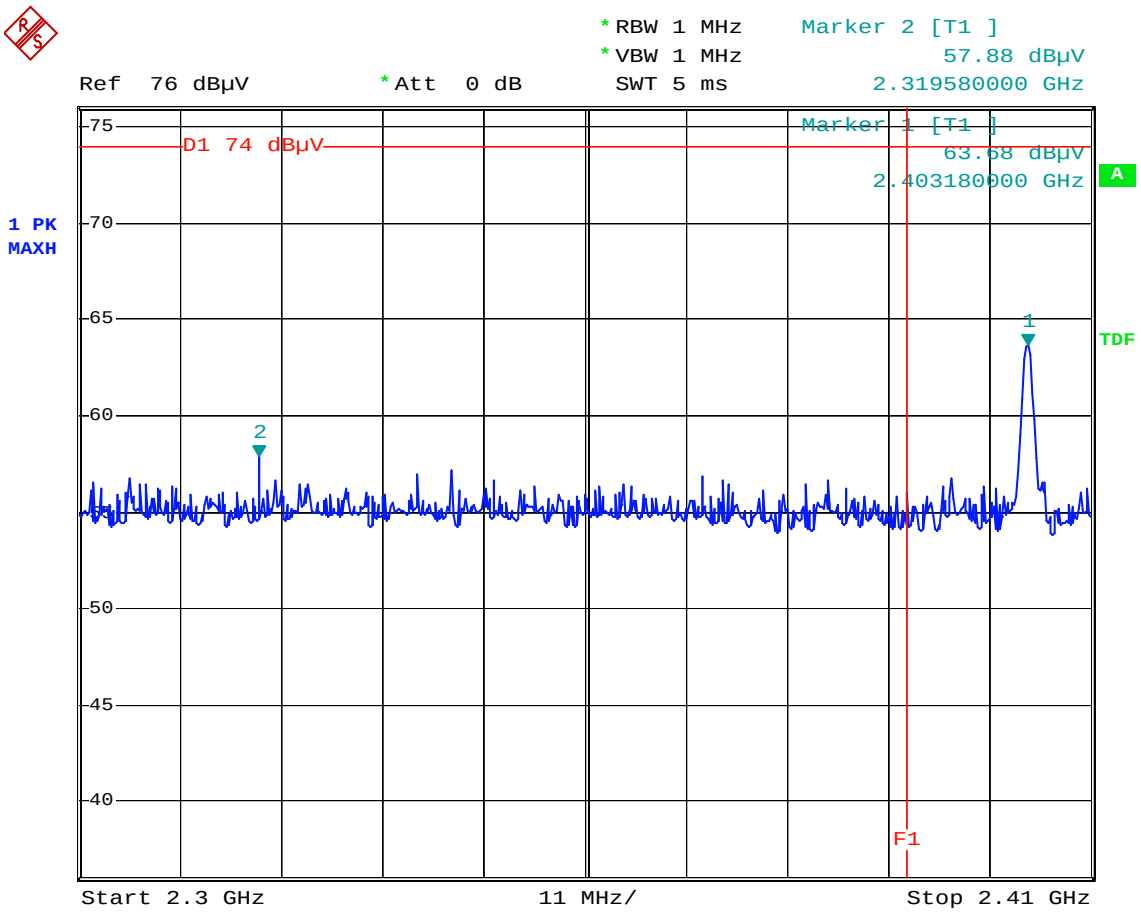
For AV:
1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

3.6 Radiated emission on the band edge FCC 15.249(C)

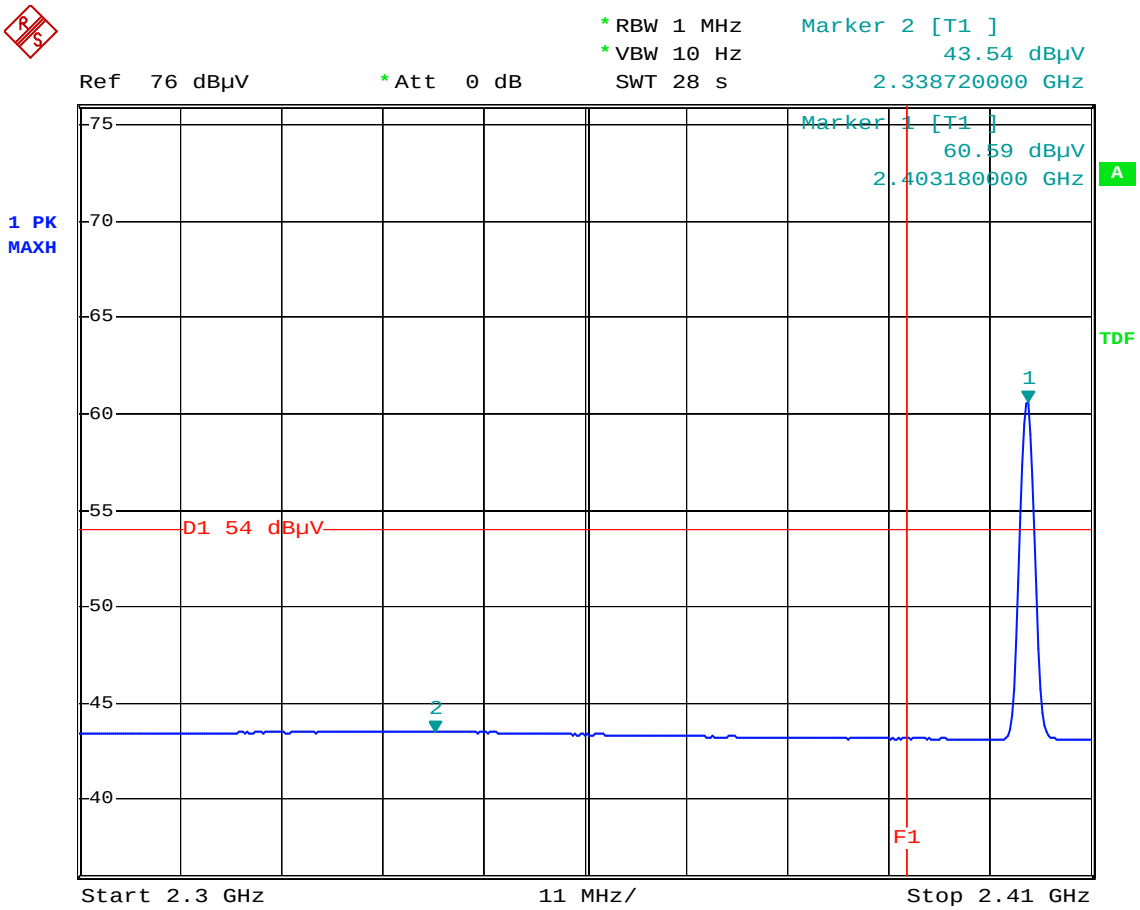
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental (Base: 2403.05MHz ~ 2405.00MHz, Handset: 2474.00MHz ~ 2475.95MHz) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Please see the plot below.

Test Mode: Base

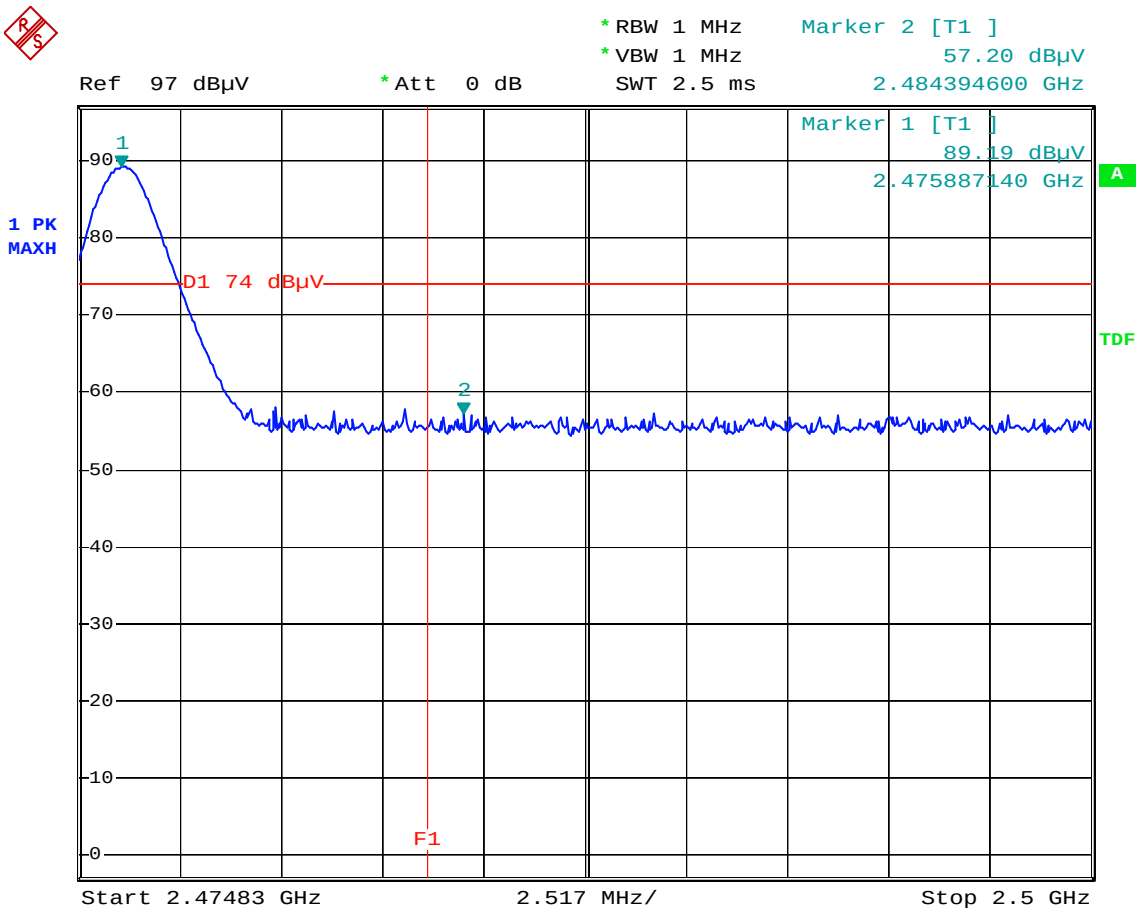


Comment: Band-edge at low ch
Comment: Base PK F1=2390MHz
Date: 6.FEB.2006 17:21:48

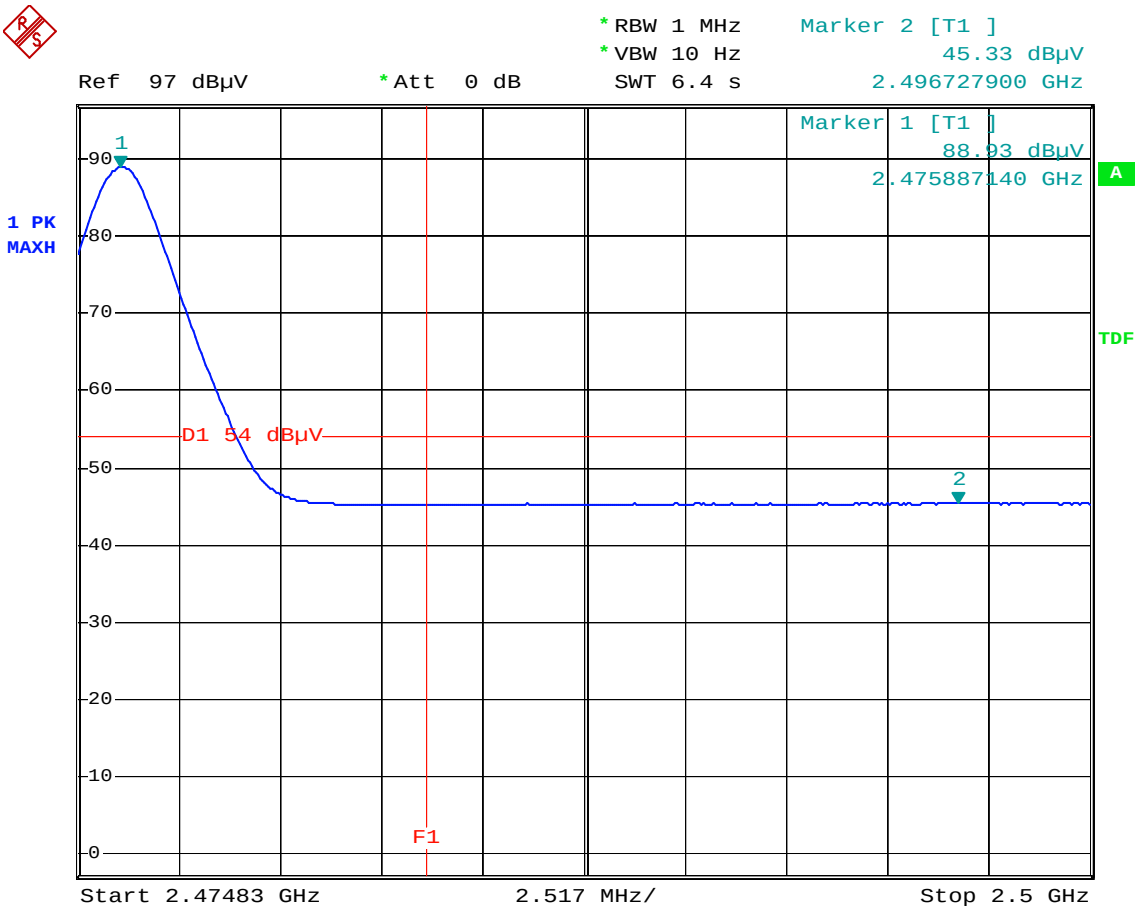


Comment: Band-edge at low ch
Comment: Base AV F1=2390MHz
Date: 6.FEB.2006 17:23:09

Test Mode: Handset



Comment: Band-edge at High ch
Comment: handset PK F1=2483.5MHz
Date: 6.FEB.2006 16:43:40



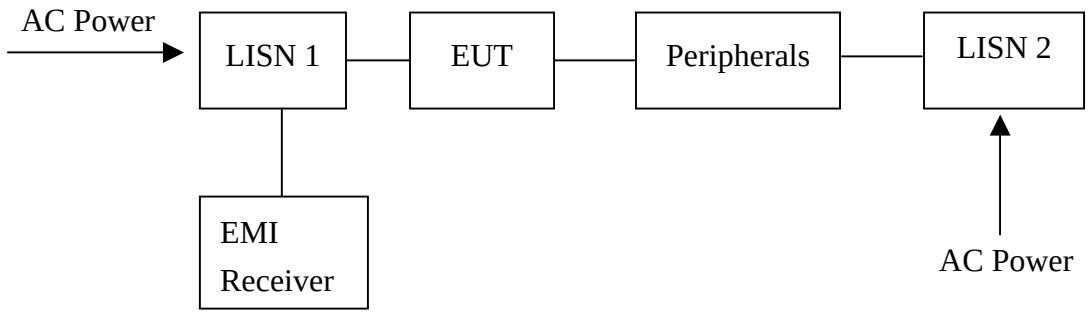
Comment: Band-edge at High ch
Comment: handset AV F1=2483.5MHz
Date: 6.FEB.2006 16:44:55

5. Conducted emission test FCC 15.207

5.1 Operating environment

Temperature:	23	℃
Relative Humidity:	53	%
Atmospheric Pressure:	1023	hPa

5.2 Test setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/2003 on conducted measurement.
The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

The EUT configuration please refer to the “Conducted set-up photo.pdf”.

5.3 Emission limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

5.4 Uncertainty of Conducted Emission

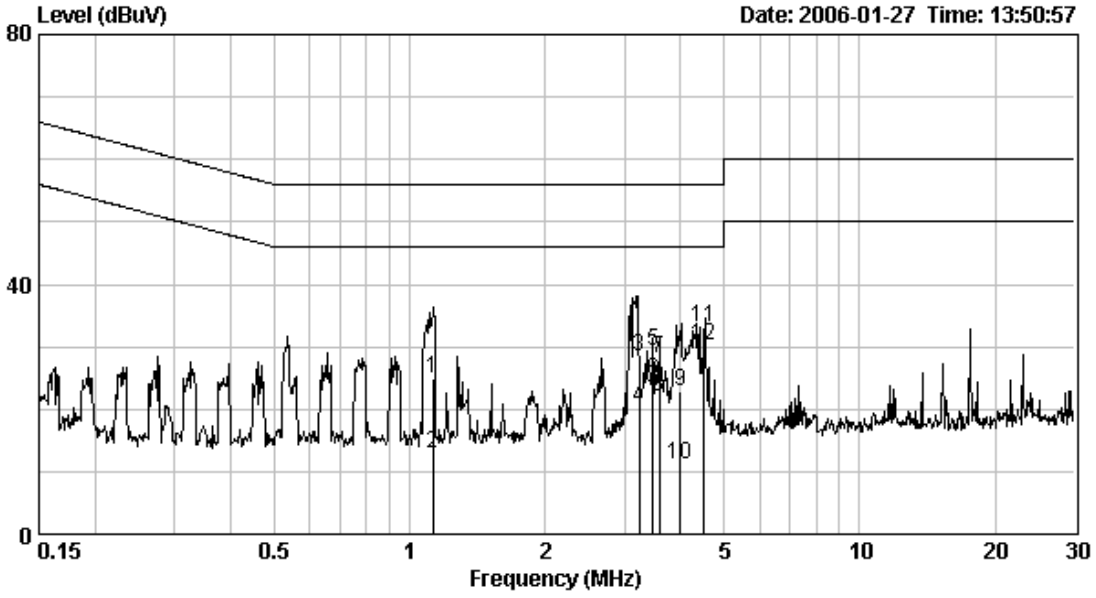
Expanded uncertainty (k=2) of conducted emission measurement is 2.6 dB.

5.5 Power Line Conducted Emission test data

Phase : Line
EUT : 36271
Test Condition : Charging with Ringing mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
1.126	0.10	24.80	56.00	12.78	46.00	-31.20	-33.22
3.234	0.16	28.28	56.00	20.28	46.00	-27.72	-25.72
3.466	0.17	29.26	56.00	24.51	46.00	-26.74	-21.49
3.583	0.18	28.01	56.00	22.03	46.00	-27.99	-23.97
3.988	0.20	22.91	56.00	11.22	46.00	-33.09	-34.78
4.506	0.22	33.20	56.00	30.18	46.00	-22.80	-15.82

Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase : Neutral
EUT : 36271
Test Condition : Charging with Ringing mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.526	0.10	31.34	56.00	30.29	46.00	-24.66	-15.71
1.416	0.10	28.50	56.00	18.50	46.00	-27.50	-27.50
2.949	0.15	30.10	56.00	22.00	46.00	-25.90	-24.00
3.351	0.17	28.18	56.00	25.58	46.00	-27.82	-20.42
4.209	0.20	35.20	56.00	30.20	46.00	-20.80	-15.80
4.738	0.20	31.77	56.00	26.61	46.00	-24.23	-19.39

Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)