

EMC TEST REPORT

Report No. : EME-040337

Model No. : 36287

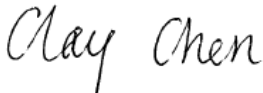
Issued Date : Apr. 22, 2004

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

Test By : Intertek Testing Services Taiwan Ltd.
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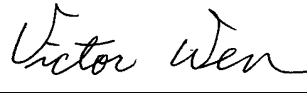
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Project Engineer



Clay Chen

Reviewed By



Victor Wen

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Summary of Tests**2.4GHz Cordless Phone -Model: 36287
FCC ID: PEG36287**

Test	Reference	Results
Conducted Emission of AC Power	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	: 2.4GHz Cordless Phone
Model No.	: 36287
FCC ID.	: PEG36287
Frequency Range	: 2403.05MHz ~ 2475.95MHz
Channel Number	: 40 channels
Frequency of Each Channel (Base Unit)	: Tx: 2403.05MHz + 0.05k MHz k=0~39 Rx: 2474.00MHz + 0.05k MHz k=0~39
Frequency of Each Channel (Handset)	: Tx: 2474.00MHz + 0.05k MHz k=0~39 Rx: 2403.05MHz + 0.05k MHz k=0~39
Type of Modulation	: FM
Power Supply (Base Unit)	: 120Vac, 60Hz with adapter (DVR-0920-3512)
Power Supply (Handset)	: 3.6Vdc Battery
Power Cord	: N/A
Sample Received	: Apr. 11, 2004
Test Date(s)	: Apr. 11, 2004 ~ Apr. 16, 2004

1.2 Additional information about the EUT

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

The models are identical to model 36287 (EUT), the different model number for different brand serves as marketing strategy listed below.

Model Number	Trade Name
SENTON	36287
Bell Phone	36287
AudioVox	AXT2410

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 : Copper wire antenna

Connector Type : Soldering

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 conduction emission test, the EUT was operated in charging mode.
During the other tests, the EUT was transmitted continuously.

2.4 Test equipment

Equipment	Brand	Frequency range	Model No.	Series No.	Last Cal.Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	825788/014	Feb. 18, 2004
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	825428/005	June 10, 2003
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2003
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5890	Oct. 15, 2003
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	159	June 20, 2003
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	3133	Feb. 21, 2004
Turn Table	HDGmbH	N/A	DS 420S	420/669/01	N/A
Antenna Tower	HDGmbH	N/A	MA 240	240/573	N/A
Microwave Amplifier	Agilent	2GHz~26.5GHz	8348A	3111A00567	Dec. 20, 2003
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	Jan. 20, 2004

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

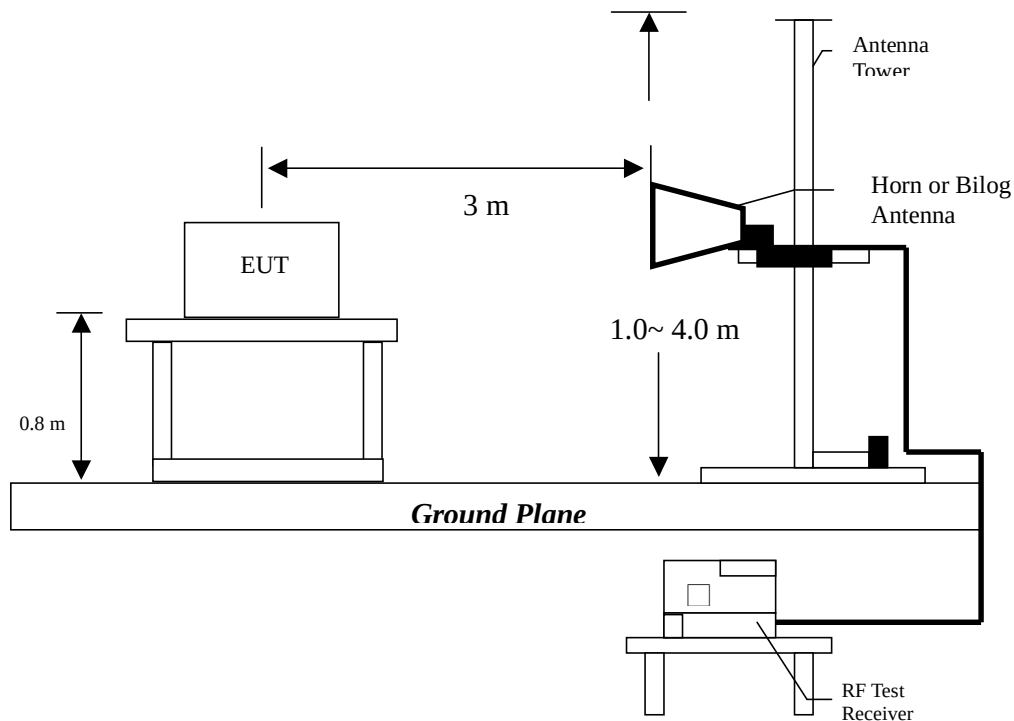
3. Radiated emission test FCC 15.249 (C)

3.1 Operating environment

Temperature:	23	°C	(10-40°C)
Relative Humidity:	52	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1060hPa)

3.2 Test setup & procedure

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



Radiated emissions were investigated 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.



Setup 1



Setup 2



Setup 3

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.

Expanded uncertainty (k=2) of conducted emission measurement is ± 2.02 dB.

3.4 Radiated spurious emission test data

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

EUT : 36287

Test Unit : Base Unit

Test Condition : Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
41.670	QP	V	12.82	8.42	21.24	40	-18.76	254	147
59.240	QP	V	13.13	4.52	17.65	40	-22.35	144	228
81.980	QP	V	9.72	6.47	16.19	40	-23.81	100	257
96.540	QP	V	10.32	5.64	15.96	43.5	-27.54	108	25
801.020	QP	V	24.35	9.22	33.57	46	-12.43	199	324
826.570	QP	V	24.59	5.79	30.38	46	-15.62	157	152
177.430	QP	H	14	4.66	18.66	43.5	-24.84	100	0
374.210	QP	H	15.78	1.09	16.87	46	-29.13	100	0
532.630	QP	H	19.45	0.87	20.32	46	-25.68	100	0
747.750	QP	H	23.43	3.55	26.98	46	-19.02	125	224
801.000	QP	H	24.35	7.24	31.59	46	-14.41	286	241
827.220	QP	H	24.59	6.97	31.56	46	-14.44	254	322

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

EUT : 36287
Test Unit : Handset with Setup 1
Test Condition : Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
59.120	QP	V	13.13	6.18	19.31	40	-20.69	251	144
82.410	QP	V	9.72	6.54	16.26	40	-23.74	157	225
96.250	QP	V	10.32	5.48	15.8	43.5	-27.7	111	320
107.650	QP	V	11.31	5.22	16.53	43.5	-26.97	254	360
796.320	QP	V	24.28	8.54	32.82	46	-13.18	251	154
823.540	QP	V	24.56	6.97	31.53	46	-14.47	115	222
396.740	QP	H	16.32	1.74	18.06	46	-27.94	100	0
540.250	QP	H	19.56	1.87	21.43	46	-24.57	100	0
615.240	QP	H	20.78	1.54	22.32	46	-23.68	100	0
796.240	QP	H	24.28	8.41	32.69	46	-13.31	147	354
823.410	QP	H	24.56	10.31	34.87	46	-11.13	254	55
870.340	QP	H	24.98	4.87	29.85	46	-16.15	154	352

Remark:

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

3.4.2 Measurement results: Fundamental emission

EUT : 36287

Test Unit : Base Unit

Test Condition : Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2403.03	PK	V	33.74	30.542	62.508	59.31	114	-54.69	185	38
2403.03	AV	V	33.74	30.542	55.788	52.59	94	-41.41	185	38
2403.03	PK	H	33.74	30.542	63.268	60.07	114	-53.93	200	140
2403.03	AV	H	33.74	30.542	56.058	52.86	94	-41.14	200	140

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss

EUT : 36287
 Test Unit : Base Unit
 Test Condition : Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2404.97	PK	V	33.74	30.542	62.008	58.81	114	-55.19	189	39
2404.97	AV	V	33.74	30.542	53.968	50.77	94	-43.23	189	39
2404.97	PK	H	33.74	30.542	62.188	58.99	114	-55.01	200	137
2404.97	AV	H	33.74	30.542	53.118	49.92	94	-44.08	200	137

Remark:

1. Corrected Level = Reading Level + Correction Factor — Preamp
2. Correction Factor = Antenna Factor + Cable Loss

EUT : 36287

Test Unit : Handset

Test Condition : Tx at low channel with Setup 3

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2473.99	PK	V	33.74	30.542	92.108	88.91	114	-25.09	127	61
2473.99	AV	V	33.74	30.542	91.908	88.71	94	-5.29	127	61
2473.99	PK	H	33.74	30.542	92.318	89.12	114	-24.88	150	354
2473.99	AV	H	33.74	30.542	92.048	88.85	94	-5.15	150	354

Remark:

1. Corrected Level = Reading Level + Correction Factor — Preamp
2. Correction Factor = Antenna Factor + Cable Loss

The radiated spurious emissions at

Frequency(MHz)	Margin
2475.93	-4.58
2475.93	-4.34

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

EUT : 36287

Test Unit : Handset

Test Condition : Tx at high channel with Setup 3

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2475.93	PK	V	33.74	30.542	92.838	89.64	114	-24.36	132	60
2475.93	AV	V	33.74	30.542	92.618	89.42	94	-4.58	132	60
2475.93	PK	H	33.74	30.542	93.088	89.89	114	-24.11	150	356
2475.93	AV	H	33.74	30.542	92.858	89.66	94	-4.34	150	356

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss

3.4.3 Measurement results: Harmonics emission

EUT : 36280
Test Unit : Base Unit
Worst Case Condition : Tx at low channel

Test Result :

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

For PK:

1GHz-3GHz: 50dBuV
3GHz-14GHz: 54dBuV
14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV
3GHz-14GHz: 46dBuV
14GHz-26.5GHz: 46.5dBuV

EUT : 36287
Test Unit : Base Unit
Worst Case Condition : Tx at high channel

Test Result :

No spurious emission was found above the spectrum analyzer's noise floor.
The noise floor are listed as below:

For PK:

1GHz-3GHz: 50dBuV
3GHz-14GHz: 54dBuV
14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV
3GHz-14GHz: 46dBuV
14GHz-26.5GHz: 46.5dBuV

EUT : 36287

Test Unit : Handset

Test Condition : Tx at low channel with Setup 3

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
4123.33	PK	V	31.88	35.742	36.278	40.14	74	-33.86	169	218
4123.33	AV	V	31.88	35.742	26.928	30.79	54	-23.21	169	218
4123.33	PK	H	31.88	35.742	41.608	45.47	74	-28.53	135	215
4123.33	AV	H	31.88	35.742	37.638	41.50	54	-12.5	135	215

Remark:

1. Corrected Level = Reading Level + Correction Factor — Preamp
2. Correction Factor = Antenna Factor + Cable Loss

EUT : 36287

Test Unit : Handset

Test Condition : Tx at high channel with Setup 3

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
4951.92	PK	V	32.265	35.742	39.513	42.99	74	-31.01	115	217
4951.92	AV	V	32.265	35.742	33.233	36.71	54	-17.29	115	217
4126.50	PK	H	31.88	35.742	41.258	45.12	74	-28.88	134	209
4126.50	AV	H	31.88	35.742	37.158	41.02	54	-12.98	134	209

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. 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.

For PK:

1GHz-3GHz: 50dBuV

3GHz-14GHz: 54dBuV

14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV

3GHz-14GHz: 46dBuV

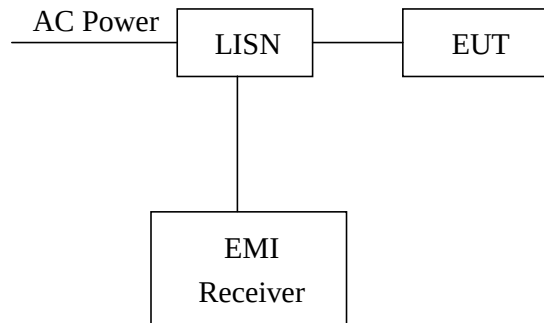
14GHz-26.5GHz: 46.5dBuV

4. Conducted emission test FCC 15.207

4.1 Operating environment

Temperature:	21	°C	(10-40°C)
Relative Humidity:	54	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1061hPa)

4.2 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 C63.4/1992 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”.

4.3 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.

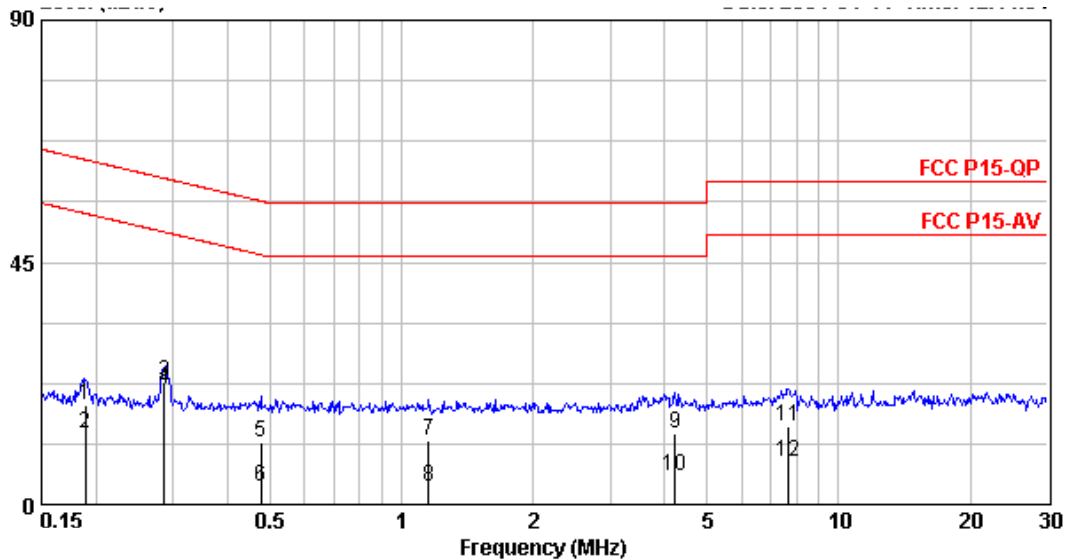
4.4 Conducted emission data FCC 15.207

(1) Line

EUT : 36287

Test Condition : Charging mode

Freq. (MHz)	Correction Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.189	0.00	18.49	64.08	-45.59	QP
0.189	0.00	13.07	54.08	-41.01	AVERAGE
0.286	0.00	22.82	60.64	-37.82	QP
0.286	0.00	21.39	50.64	-29.25	AVERAGE
0.476	0.00	11.66	56.40	-44.74	QP
0.476	0.00	3.36	46.40	-43.04	AVERAGE
1.153	0.00	11.73	56.00	-44.27	QP
1.153	0.00	3.15	46.00	-42.85	AVERAGE
4.227	0.00	13.32	56.00	-42.68	QP
4.227	0.00	5.14	46.00	-40.86	AVERAGE
7.684	0.00	14.64	60.00	-45.36	QP
7.684	0.00	7.81	50.00	-42.19	AVERAGE

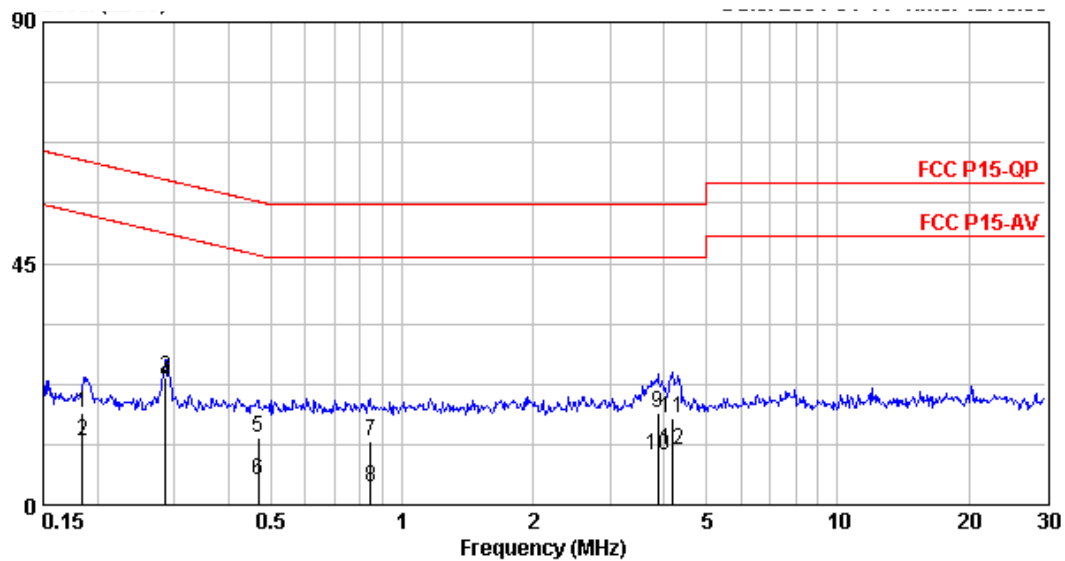


(2) Neutral

EUT : 36287

Test Condition : Charging mode

Freq. (MHz)	Correction Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.185	0.00	17.18	64.28	-47.10	QP
0.185	0.00	11.88	54.28	-42.40	AVERAGE
0.286	0.00	23.81	60.64	-36.83	QP
0.286	0.00	22.81	50.64	-27.83	AVERAGE
0.469	0.00	12.59	56.54	-43.95	QP
0.469	0.00	4.77	46.54	-41.77	AVERAGE
0.845	0.00	11.91	56.00	-44.09	QP
0.845	0.00	3.37	46.00	-42.63	AVERAGE
3.872	0.00	16.99	56.00	-39.01	QP
3.872	0.00	9.24	46.00	-36.76	AVERAGE
4.160	0.00	16.06	56.00	-39.94	QP
4.160	0.00	10.11	46.00	-35.89	AVERAGE

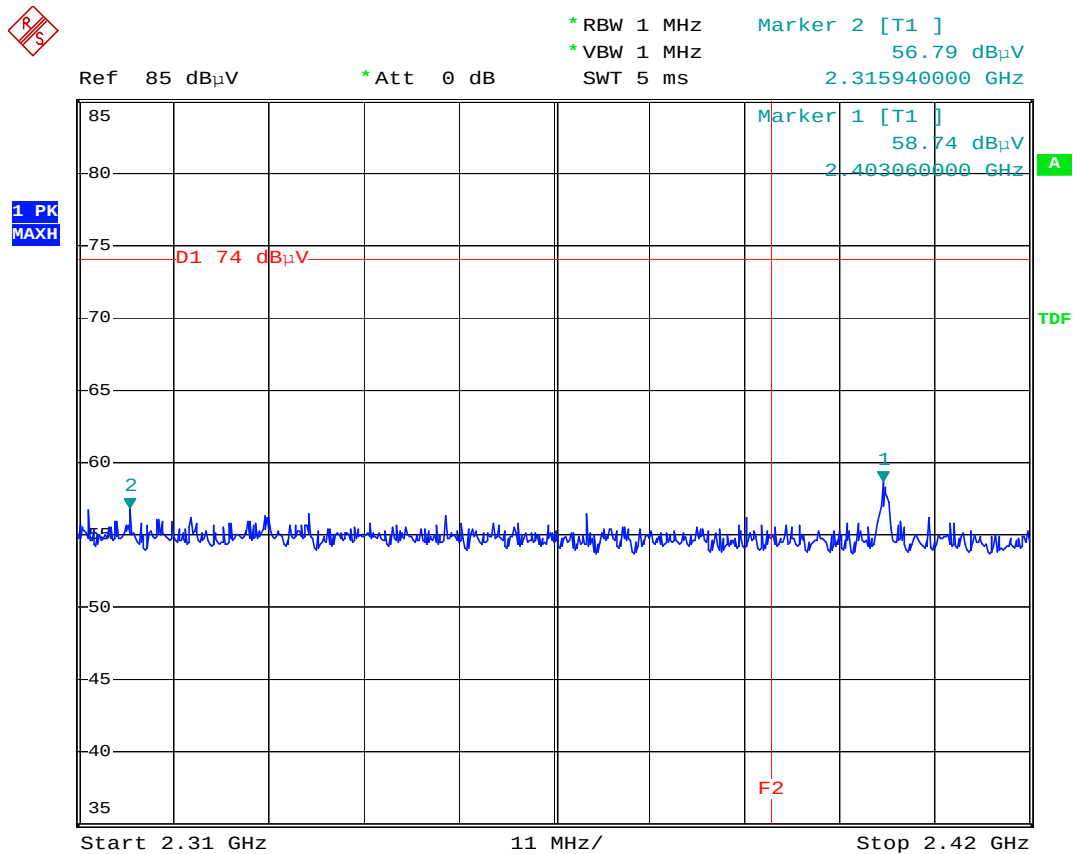


5. Radiated emission on the band edge FCC 15.249(C)

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 (2403.05~2475.95MHz) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

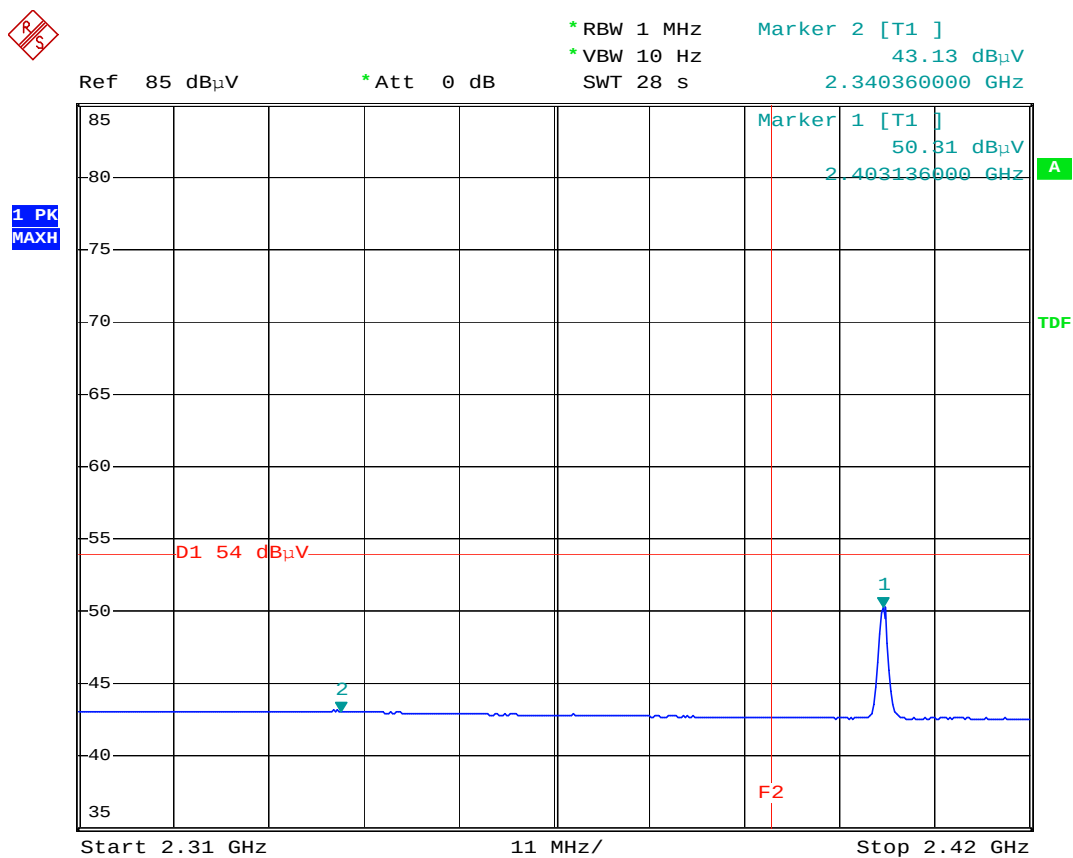
Please see the plot below.

Test Condition : Base Unit mode



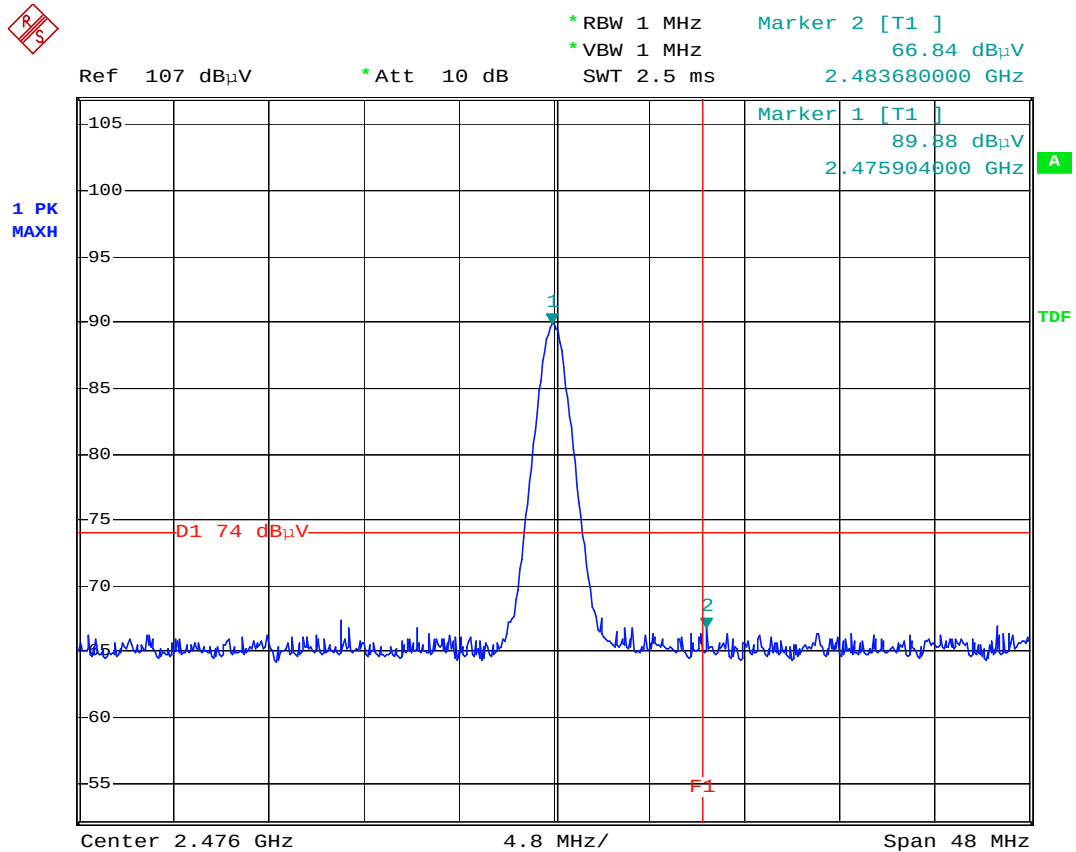
Comment: Band-edge test at low channel
 Comment: Peak detector F2=2390MHz Base unit
 Date: 15.APR.2004 20:48:24

Test Condition : Base Unit mode



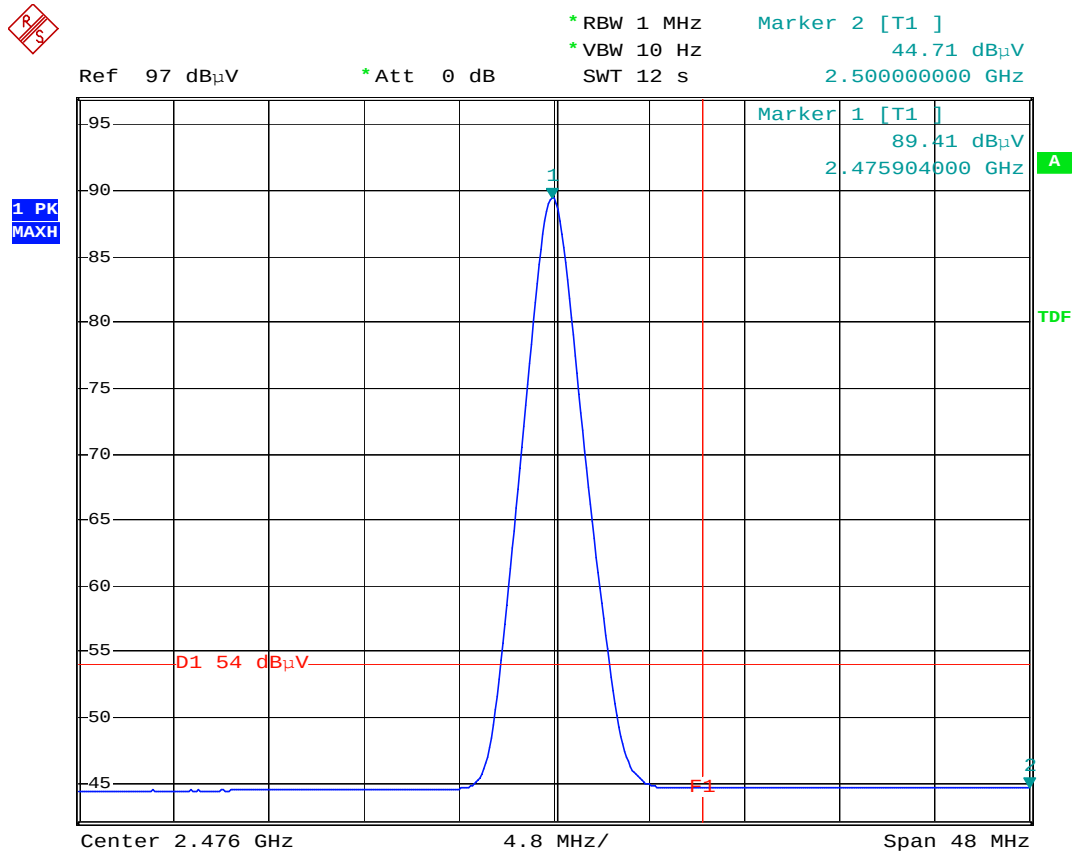
Comment: Band-edge test at low channel
 Comment: Average detector F2=2390MHz Base unit
 Date: 15.APR.2004 20:51:31

Test Condition : Handset mode



Comment: Band-edge test at high channel
 Comment: Peak detector F1=2483.5MHz (Handset)
 Date: 15.APR.2004 21:28:20

Test Condition : Handset mode



Comment: Band-edge test at high channel
 Comment: Average detector F1=2483.5MHz (Handset)
 Date: 15.APR.2004 21:29:39