

EMC

TEST REPORT

Report No. : EME-041136

Model No. : 36282

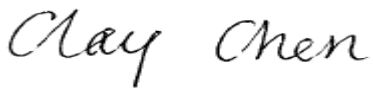
Issued Date : Jan. 17, 2005

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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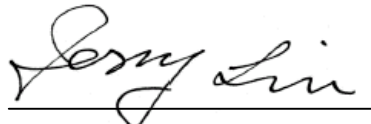
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Project Engineer



Clay Chen

Reviewed By



Jerry Liu

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Summary of Tests**2.4GHz Cordless Phone -Model: 36282
FCC ID: PEG36282**

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.	: 36282
FCC ID.	: PEG36282
Frequency Range	: 2402.55MHz ~ 2475.95MHz
Channel Number	: 40 channels
Frequency of Each Channel (Base Unit)	: Tx: 2402.55MHz + 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: 2402.55MHz + 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	: Nov. 22, 2004
Test Date(s)	: Nov. 22, 2004 ~ Dec. 31, 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 36282 (EUT), the different model number for different brand serves as marketing strategy listed below.

Trade Name	Model Number
SENTON	36282
Bell Phone	36282
AudioVox	AXT2417

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.	Intertek ID No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	EC303	04/13/2005
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	EC317	07/14/2005
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/13/2005
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	10/18/2005
Horn Antenna	EMCO	1GHz~18GHz	3115	EC338	08/16/2005
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	EC351	07/08/2005
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	EC368	05/20/2005
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC373	4/13/2005
Pre-Amplifier	MITEQ	26GHz~40GHz	828825	EC374	1/28/2005
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	01/14/2005

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

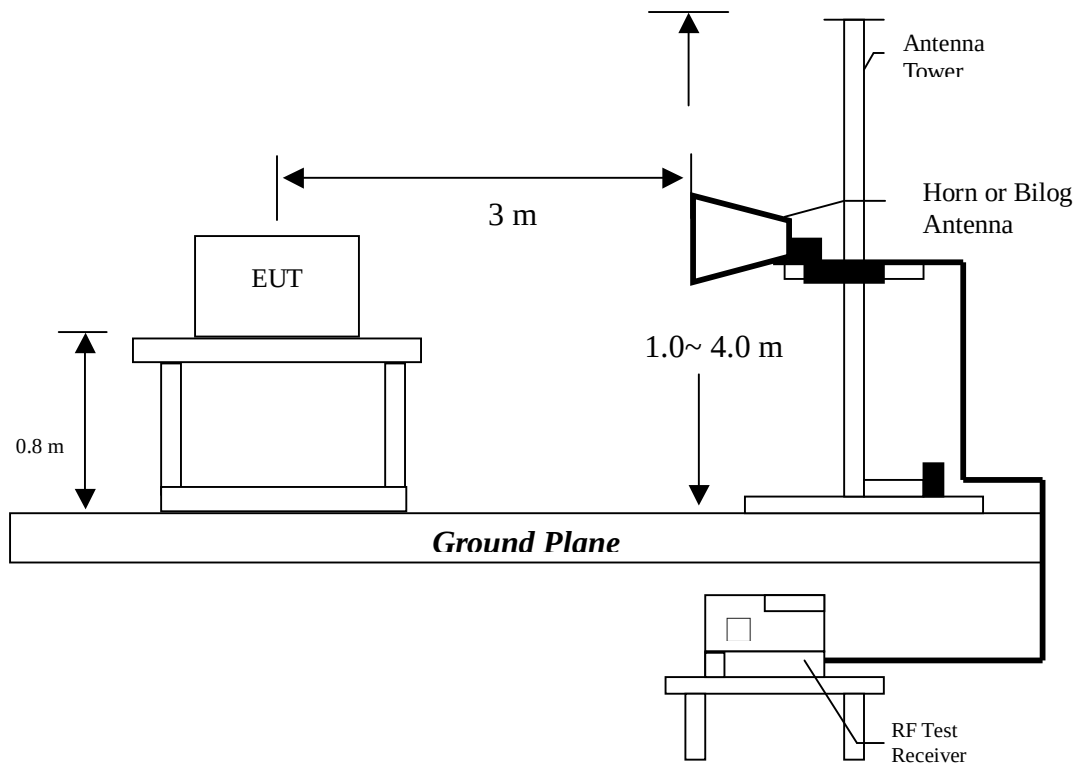
3. Radiated emission test FCC 15.249 (C)

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.

This test was verified at three orthogonal axes and the test configuration was listed.



Setup 1



Setup 2



Setup 3

After verifying three axes, the worst case was occurred at setup 3 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.

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 : 36282
Test Unit : Base Unit
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)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
41.620	QP	V	12.96	7.24	20.20	40.00	-19.80	100.00	254.00
88.270	QP	V	9.50	6.88	16.38	43.50	-27.12	142.00	174.00
392.810	QP	V	16.70	2.17	18.87	46.00	-27.13	204.00	57.00
800.240	QP	V	24.29	7.64	31.93	46.00	-14.07	217.00	106.00
827.340	QP	V	24.22	9.14	33.36	46.00	-12.64	107.00	309.00
912.770	QP	V	25.11	10.14	35.25	46.00	-10.75	210.00	114.00
88.240	QP	H	9.50	7.22	16.72	43.50	-26.78	205.00	101.00
154.270	QP	H	14.76	6.07	20.83	43.50	-22.67	147.00	289.00
173.610	QP	H	14.29	5.61	19.90	43.50	-23.60	233.00	151.00
633.340	QP	H	21.48	2.97	24.45	46.00	-21.55	252.00	214.00
827.310	QP	H	24.22	9.04	33.26	46.00	-12.74	100.00	52.00
903.100	QP	H	25.09	3.24	28.33	46.00	-17.67	181.00	107.00

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

EUT : 36282
Test Unit : Handset
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)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
90.150	QP	V	10.03	6.75	16.78	43.50	-26.72	151.00	208.00
286.140	QP	V	14.07	0.98	15.05	46.00	-30.95	201.00	15.00
414.170	QP	V	16.77	3.51	20.28	46.00	-25.72	100.00	171.00
557.720	QP	V	19.75	2.25	22.00	46.00	-24.00	161.00	126.00
712.980	QP	V	22.84	2.64	25.48	46.00	-20.52	100.00	158.00
796.350	QP	V	23.95	11.84	35.79	46.00	-10.21	158.00	305.00
55.240	QP	H	13.07	9.51	22.58	40.00	-17.42	204.00	212.00
88.270	QP	H	9.50	7.51	17.01	43.50	-26.49	100.00	157.00
235.610	QP	H	12.41	1.24	13.65	46.00	-32.35	157.00	198.00
493.710	QP	H	18.85	1.98	20.83	46.00	-25.17	108.00	206.00
652.710	QP	H	21.49	2.30	23.79	46.00	-22.21	149.00	111.00
759.520	QP	H	23.43	2.87	26.30	46.00	-19.70	258.00	352.00

Remark:

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

3.4.2 Measurement results: frequency above 1GHz

EUT : 36282
Test Unit : Base Unit
Test Condition : Tx at channel 1

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)
2402.630	PK	V	33.74	30.54	72.38	69.18	114.00	-44.82	198.00	353.00
2402.630	AV	V	33.74	30.54	66.78	63.58	94.00	-30.42	198.00	353.00
2402.630	PK	H	33.74	30.54	73.60	70.40	114.00	-43.60	200.00	3.00
2402.630	AV	H	33.74	30.54	68.12	64.92	94.00	-29.08	200.00	3.00

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. No spurious emission during operated frequency above 1GHz.
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 : 36282
Test Unit : Base Unit
Test Condition : Tx at channel 40

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)
2404.500	PK	V	33.74	30.54	73.27	70.07	114.00	-43.93	198.00	337.00
2404.500	AV	V	33.74	30.54	68.12	64.92	94.00	-29.08	198.00	337.00
2404.500	PK	H	33.74	30.54	73.55	70.35	114.00	-43.65	193.00	3.00
2404.500	AV	H	33.74	30.54	67.69	64.49	94.00	-29.51	193.00	3.00

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. No spurious emission during operated frequency above 1GHz.
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 : 36282

Test Unit : Handset

Test Condition : Tx at channel 1 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)
2474.020	PK	V	33.74	30.54	81.01	77.81	114.00	-36.19	156.00	51.00
2474.020	AV	V	33.74	30.54	80.44	77.24	94.00	-16.76	156.00	51.00
2474.020	PK	H	33.74	30.54	81.10	77.90	114.00	-36.10	144.00	360.00
2474.020	AV	H	33.74	30.54	80.77	77.57	94.00	-16.43	144.00	360.00

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. No spurious emission during operated frequency above 1GHz.
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 : 36282

Test Unit : Handset

Test Condition : Tx at channel 40 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)
2475.900	PK	V	33.74	30.54	79.34	76.14	114.00	-37.86	123.00	136.00
2475.900	AV	V	33.74	30.54	78.83	75.63	94.00	-18.37	123.00	136.00
2475.900	PK	H	33.74	30.54	80.63	77.43	114.00	-36.57	115.00	80.00
2475.900	AV	H	33.74	30.54	79.95	76.75	94.00	-17.25	115.00	80.00

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. No spurious emission during operated frequency above 1GHz.
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

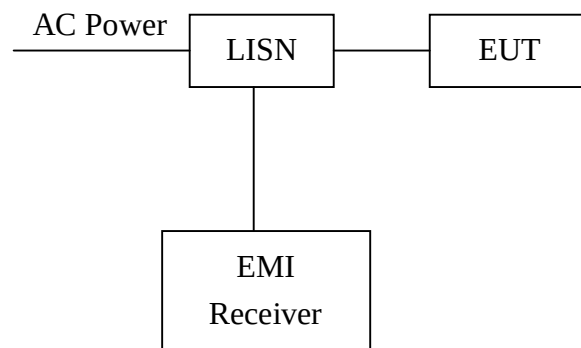
14GHz-26.5GHz: 28dBuV

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.

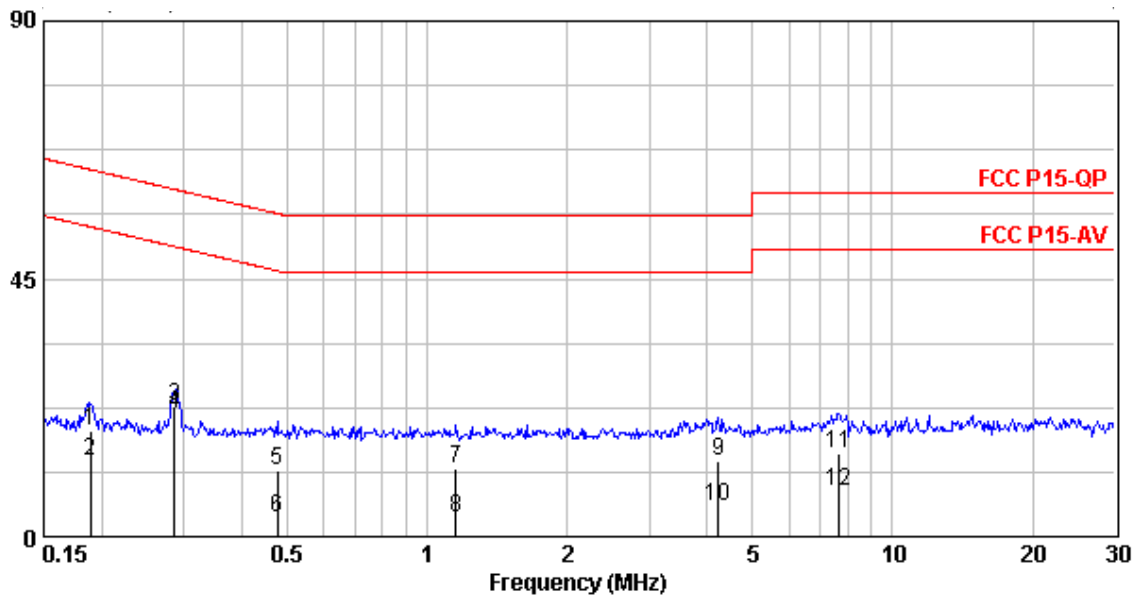
4.4 Conducted emission data FCC 15.207

(1) Line

EUT : 36282

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

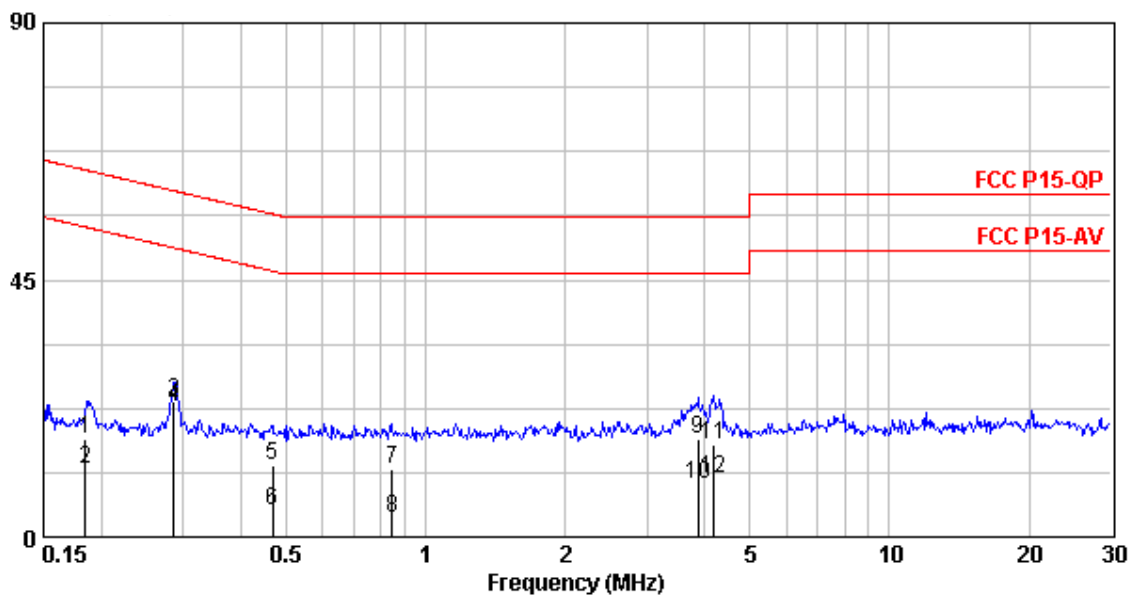


(2) Neutral

EUT : 36282

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

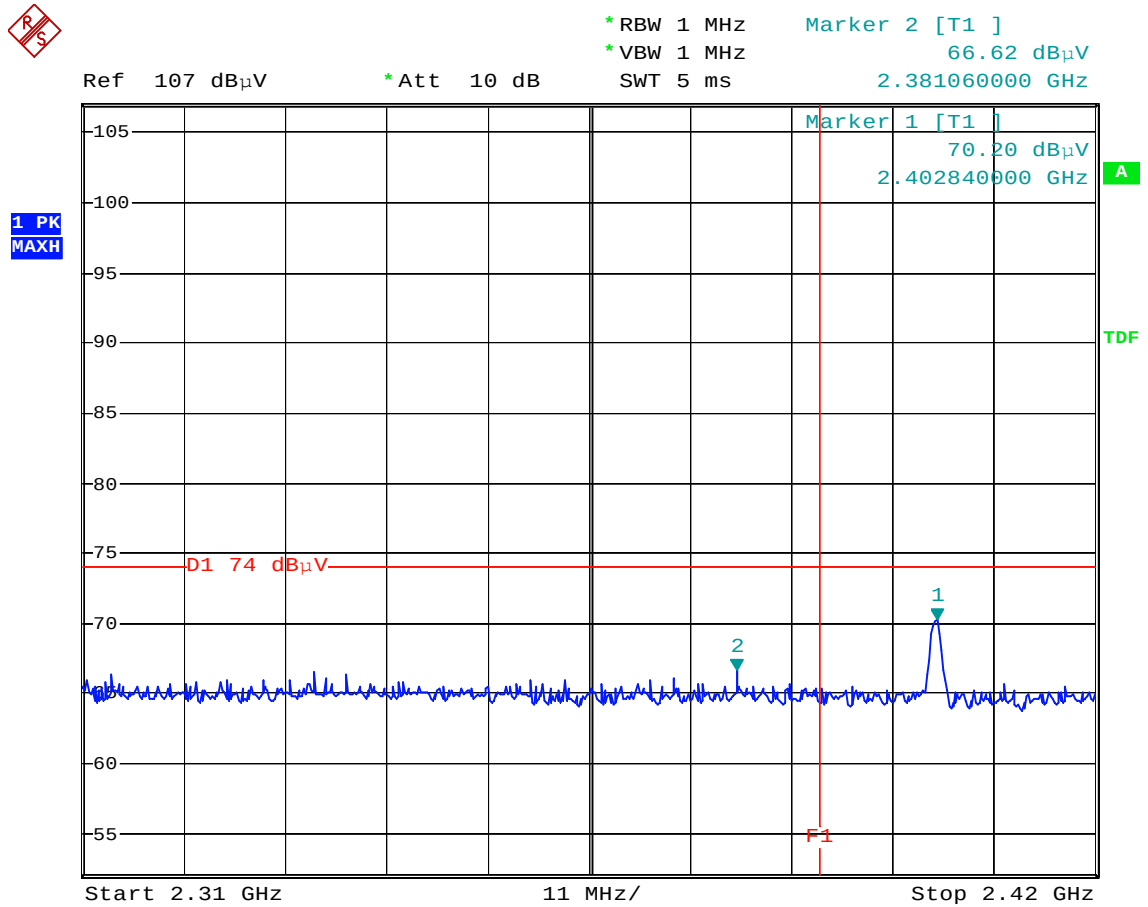


5. Radiated emission on the band edge FCC 15.249(C)

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 (2402.55~2475.95MHz) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Please see the plot below.

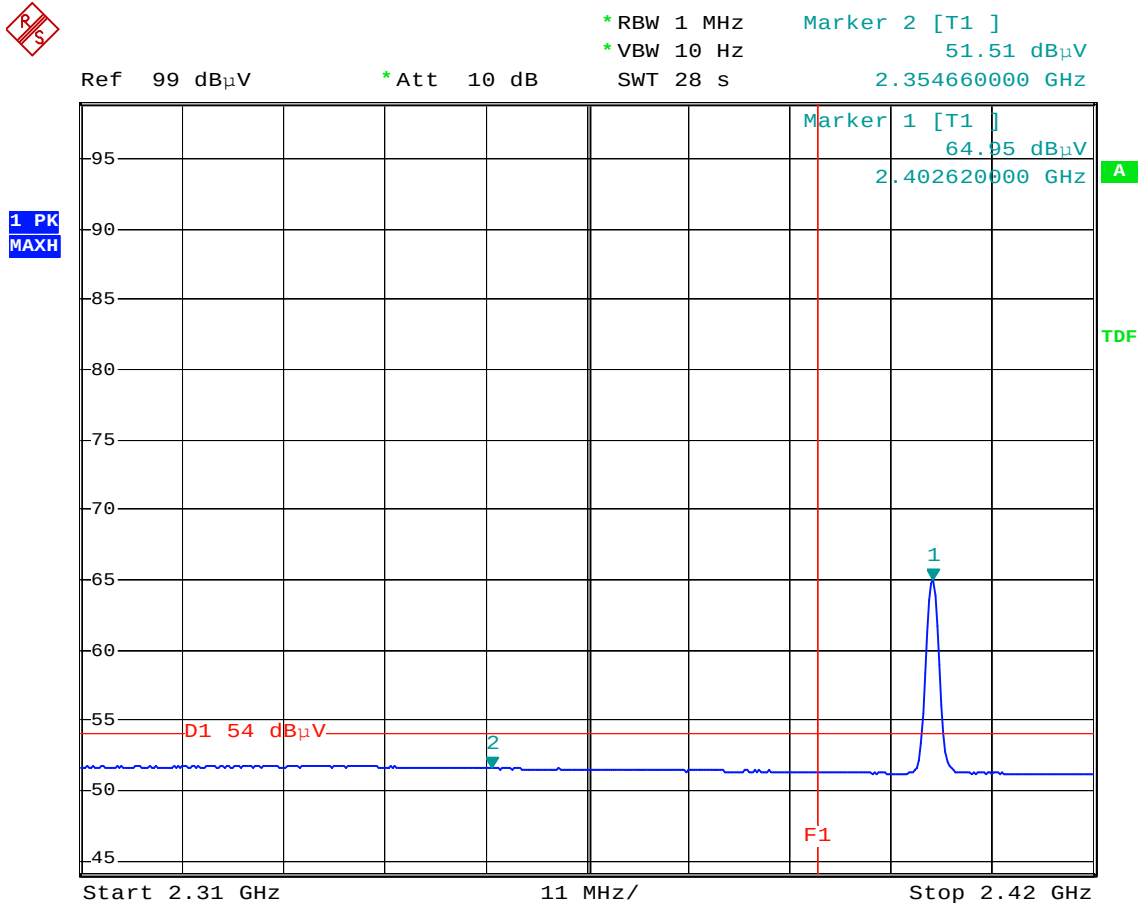
Test Condition : Base Unit mode Tx at channel 1



Comment: Band-edge test at low channel

Comment: Peak detector F1=2390MHz

Date: 24.NOV.2004 11:11:05

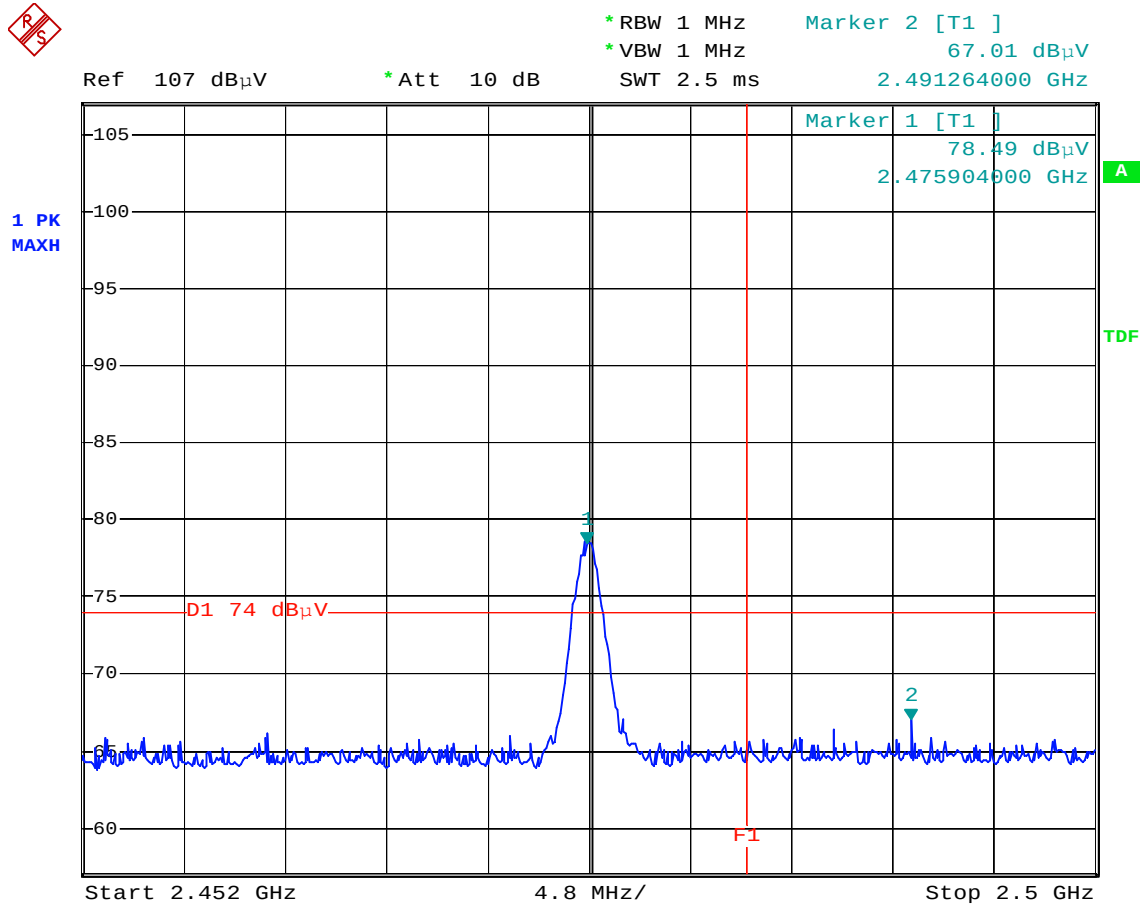


Comment: Band-edge test at low channel

Comment: Average detector

Date: 24.NOV.2004 11:15:11

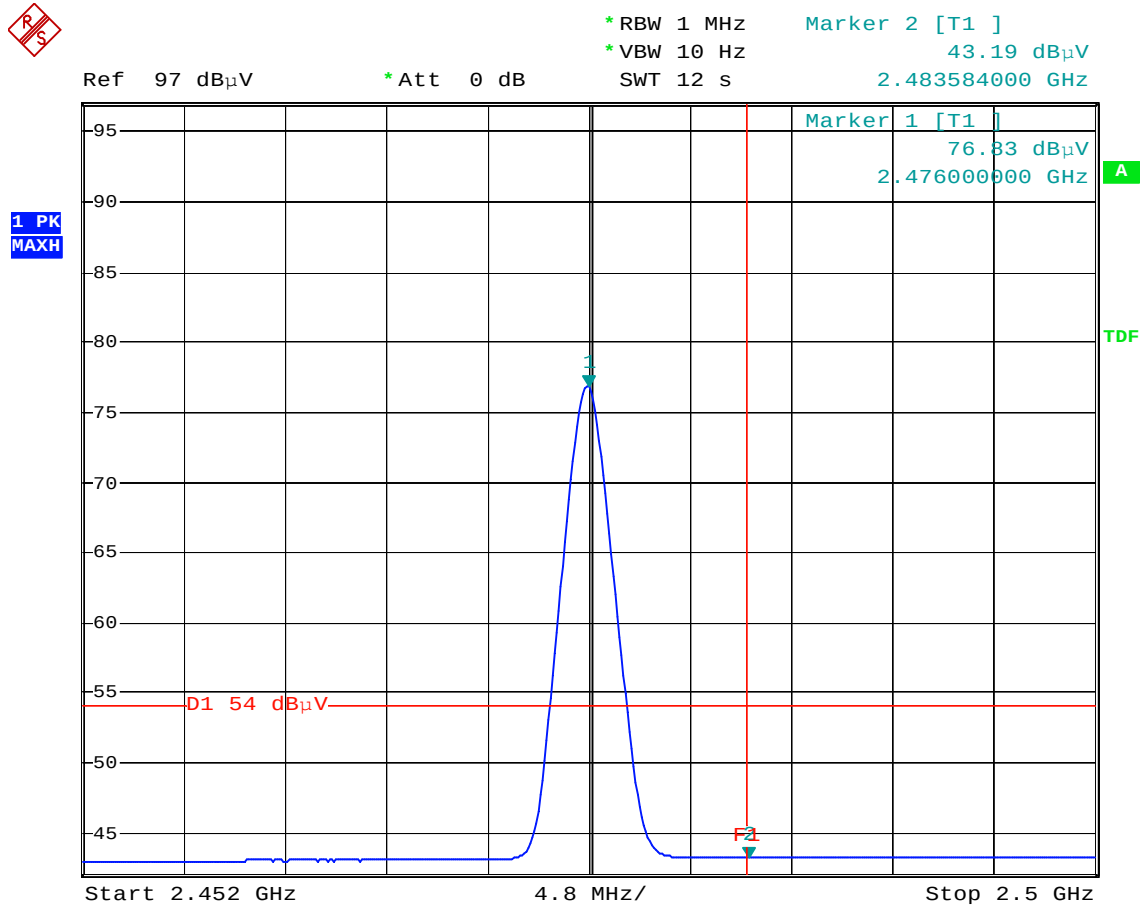
Test Condition : Handset mode Tx at Channel 40



Comment: Band-edge test at high channel

Comment: Peak detector F1=2483.5MHz

Date: 25.NOV.2004 09:56:37



Comment: Band-edge test at high channel
 Comment: Average detector F1=2483.5MHz
 Date: 25.NOV.2004 10:00:15