

EMC

TEST REPORT

Report No. : EME-040670

Model No. : 35178

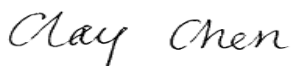
Issued Date : June 11, 2004

Applicant : SENTON Enterprises Limited
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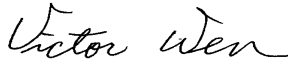
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Project Engineer

A handwritten signature in cursive script that reads "Clay Chen".

Clay Chen

Reviewed By

A handwritten signature in cursive script that reads "Victor Wen".

Victor Wen

Table of Contents

Summary of Tests	3
1. General information	4
1.1 Identification of the EUT	4
1.2 Additional information about the EUT	4
1.3 Antenna description	5
2. Test specifications	6
2.1 Test standard	6
2.2 Operation mode	6
2.3 Test equipment	7
3. Radiated emission test FCC 15.249 (C)	8
3.1 Operating environment	8
3.2 Test setup & procedure	8
3.3 Emission limit	9
3.3.1 Fundamental and harmonics emission limits	9
3.3.2 General radiated emission limits	9
3.4 Radiated spurious emission test data	11
3.4.1 Measurement results: frequencies equal to or less than 1 GHz	11
3.4.2 Measurement results: frequency above 1GHz	12
3.4.3 Measurement results: Fundamental and harmonics emission	15
4. Radiated emission on the band edge FCC 15.249(C)	18

Summary of Tests**5.8GHz Cordless Phone -Model: 35178****FCC ID: PEG35178-H**

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 : 5.8 GHz Cordless Phone
Model No. : 35178
FCC ID. : PEG35178-H
Frequency Range : 2468MHz to 2479.70MHz
Channel Number : 40 channels
Frequency of Each Channel : 2468.00 + 0.3k MHz, k=0~39
Type of Modulation : FM
Power Supply : 3.6Vdc
Power Cord : N/A
Sample Received : May 24, 2004
Test Date(s) : May 28, 2004 ~ June 7, 2004

1.2 Additional information about the EUT

The EUT is a 5.8 GHz Cordless Phone, it consists of handset unit and base unit.

We verify the model number for different brand serves as marketing strategy listed below.

Model Number	Trade Name
SENTON	35178
Bell Phone	35178

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 : 0 dBi max

Antenna Type : Copper Wire

Connector Type : N/A

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 all of the tests, the EUT was operated in continuously transmitting status.

2.3 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
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	100186	Oct. 9, 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.

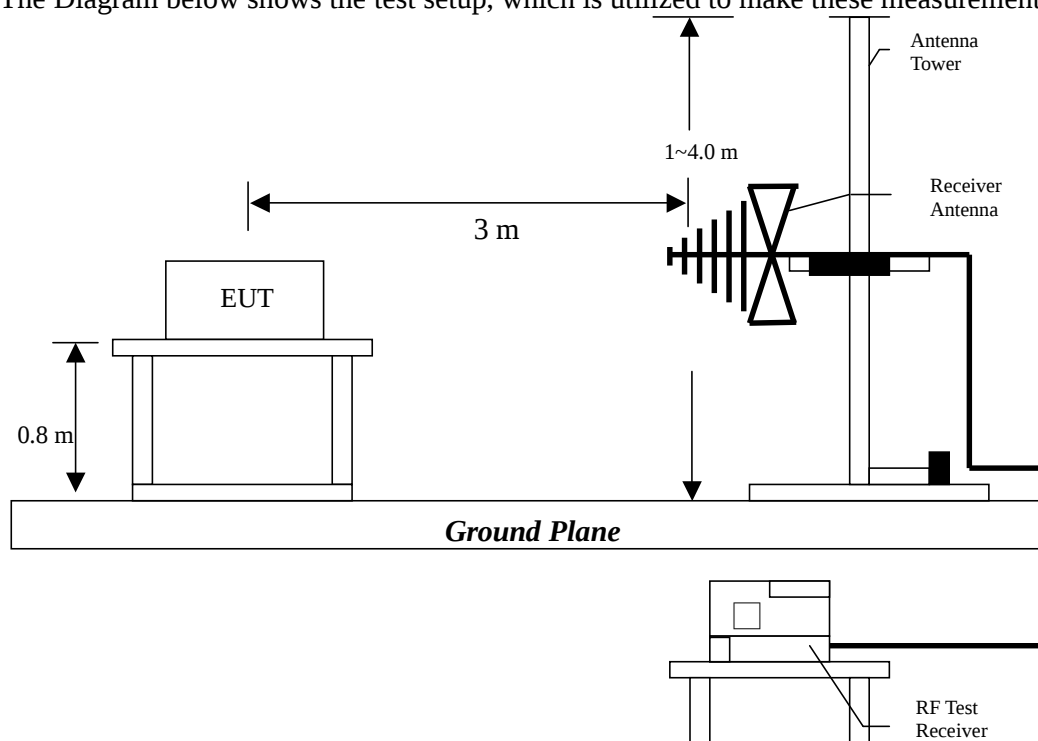
3. Radiated emission test FCC 15.249 (C)

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

After verifying three axes, we found the maximum electromagnetic field was occurred at setup 1 configuration. The final test data was executed under this configuration.

The EUT configuration please refers 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)
2468MHz~2479.7 MHz	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 : 35178

Worst Case Condition : Tx at channel 1 with Setup 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)
156.230	QP	V	14.90	7.33	22.23	43.50	-21.27	100.00	0.00
352.410	QP	V	15.23	6.10	21.33	46.00	-24.67	100.00	0.00
505.320	QP	V	18.83	6.30	25.13	46.00	-20.87	100.00	0.00
605.320	QP	V	20.49	7.09	27.58	46.00	-18.42	100.00	0.00
759.440	QP	V	23.64	7.30	30.94	46.00	-15.06	100.00	0.00
821.510	QP	V	24.54	10.86	35.40	46.00	-10.60	124.00	58.00
249.210	QP	H	12.67	5.10	17.77	46.00	-28.23	100.00	0.00
373.420	QP	H	15.74	7.22	22.96	46.00	-23.04	100.00	0.00
485.940	QP	H	18.53	6.52	25.05	46.00	-20.95	100.00	0.00
615.440	QP	H	20.78	6.30	27.08	46.00	-18.92	100.00	0.00
732.310	QP	H	22.86	7.14	30.00	46.00	-16.00	100.00	0.00
821.510	QP	H	24.54	12.39	36.93	46.00	-9.07	203.00	144.00

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

3.4.2 Measurement results: frequency above 1GHz

EUT : 35178

Test Condition : Tx at channel 1 with Setup 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)
4936.020	PK	V	32.27	35.74	35.38	38.86	74.00	-35.14	147.00	115.00
4936.020	AV	V	32.27	35.74	21.75	25.23	54.00	-28.77	147.00	115.00
4936.020	PK	H	32.27	35.74	35.29	38.77	74.00	-35.23	187.00	201.00
4936.020	AV	H	32.27	35.74	21.66	25.14	54.00	-28.86	187.00	201.00

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: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : 35178

Test Condition : Tx at channel 21 with setup 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)
4948.030	PK	V	32.27	35.74	35.31	38.79	74.00	-35.21	101.00	58.00
4948.030	AV	V	32.27	35.74	21.70	25.18	54.00	-28.82	101.00	58.00
4948.030	PK	H	32.27	35.74	35.06	38.54	74.00	-35.46	111.00	231.00
4948.030	AV	H	32.27	35.74	21.63	25.11	54.00	-28.89	111.00	231.00

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: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : 35178

Test Condition : Tx at channel 40 with setup 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)
4959.330	PK	V	32.27	35.74	34.96	38.44	74.00	-35.56	132.00	210.00
4959.330	AV	V	32.27	35.74	21.69	25.17	54.00	-28.83	132.00	210.00
4959.330	PK	H	32.27	35.74	34.84	38.32	74.00	-35.68	162.00	163.00
4959.330	AV	H	32.27	35.74	21.59	25.07	54.00	-28.93	162.00	163.00

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: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

3.4.3 Measurement results: Fundamental and harmonics emission

EUT : 35178

Test Condition : Tx at channel 1 with setup 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)
2468.030	PK	V	33.74	30.54	81.26	78.06	114.00	-35.94	124.00	103.00
2468.030	AV	V	33.74	30.54	80.63	77.43	94.00	-16.57	124.00	103.00
2468.030	PK	H	33.74	30.54	80.34	77.14	114.00	-36.86	111.00	208.00
2468.030	AV	H	33.74	30.54	79.52	76.32	94.00	-17.68	111.00	208.00

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: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : 35178

Test Condition : Tx at channel 21 with setup 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)
2474.060	PK	V	33.74	30.54	82.78	79.58	114.00	-34.42	126.00	83.00
2474.060	AV	V	33.74	30.54	82.29	79.09	94.00	-14.91	126.00	83.00
2474.060	PK	H	33.74	30.54	80.77	77.57	114.00	-36.43	184.00	213.00
2474.060	AV	H	33.74	30.54	80.19	76.99	94.00	-17.01	184.00	213.00

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: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : 35178

Test Condition : Tx at channel 40 with setup 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)
2479.680	PK	V	33.74	30.54	85.40	82.20	114.00	-31.80	154.00	100.00
2479.680	AV	V	33.74	30.54	84.06	80.86	94.00	-13.14	154.00	100.00
2479.680	PK	H	33.74	30.54	83.98	80.78	114.00	-33.22	147.00	225.00
2479.680	AV	H	33.74	30.54	81.64	78.44	94.00	-15.56	147.00	225.00

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: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

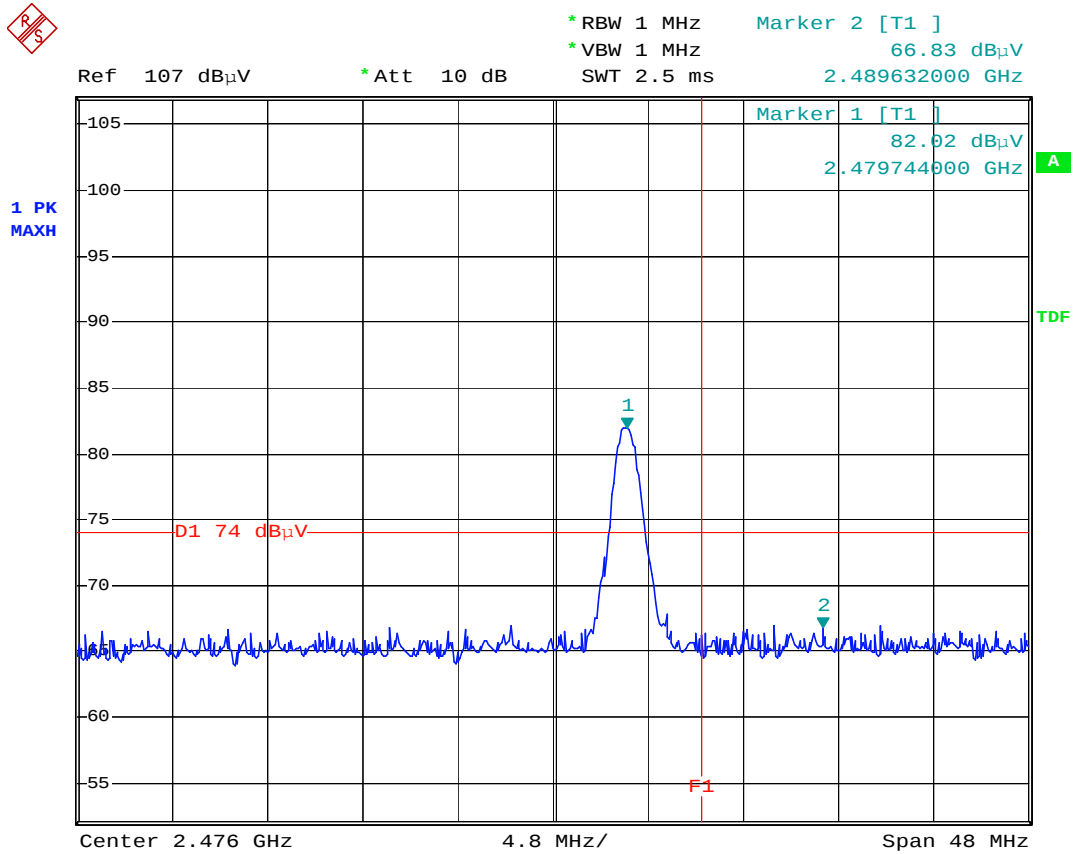
3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

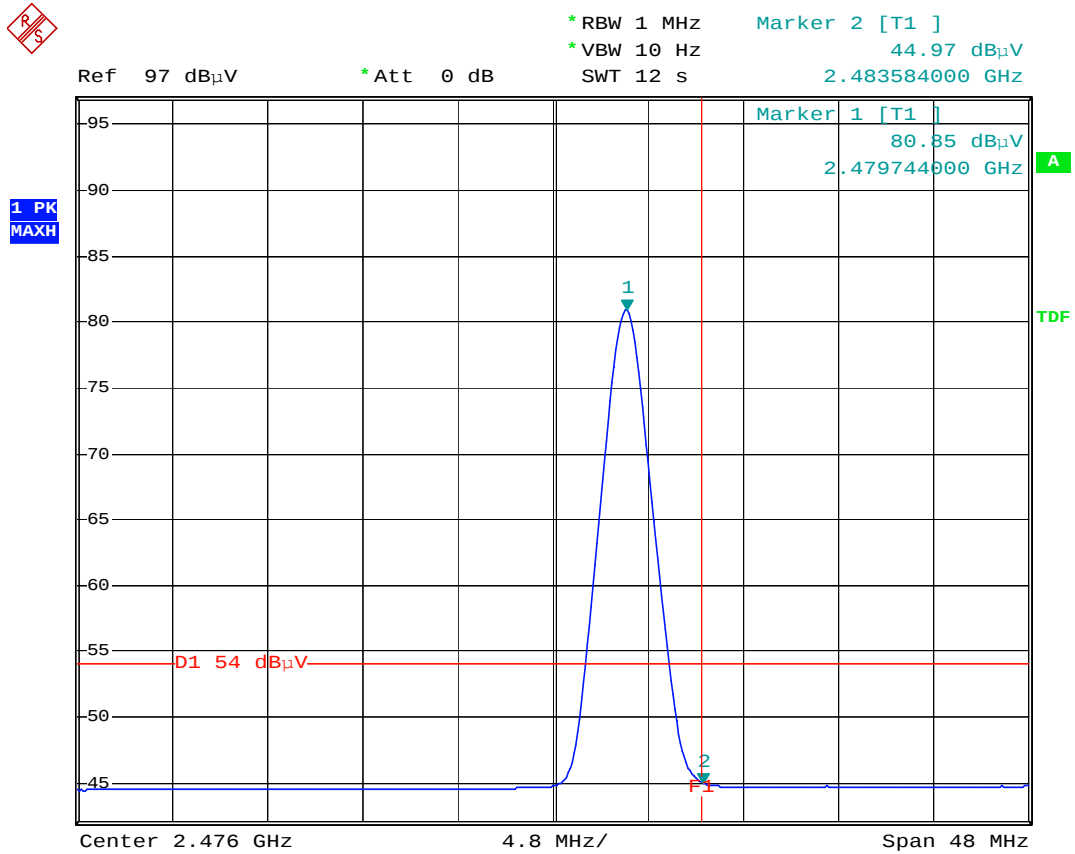
4. Radiated emission on the band edge FCC 15.249(C)

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 (2468.000~2479.700MHz) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Please see the plot below.



Comment: Band-edge test at high channel
 Comment: Peak detector F1=2483.5MHz Handset
 Date: 28.MAY.2004 14:33:10



Comment: Band-edge test at high channel
 Comment: Average detector F1=2483.5MHz Handset
 Date: 28.MAY.2004 14:35:03