

EMC

TEST REPORT

Report No. : EME-040452

Model No. : 35178

Issued Date : June 11, 2004

Applicant : SENTON Enterprises Limited
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Fo Tan Shatin, N.T. Hong Kong

Test By : Intertek Testing Services Taiwan Ltd.
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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

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

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-B
Frequency Range : 5803.019MHz to 5816.019MHz
Channel Number : 40 channels
Frequency of Each Channel : Tx: 5803.019 + 0.3333k MHz, k=0~39
Type of Modulation : FM
Power Supply (Base) : 120Vac, 60Hz with adapter (U120050D)
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 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.
Handset	Senton	35178	N/A

Dummy Load: 150 Ω

1.4 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

In the conducted emission test, the EUT was operated in charging mode.
During the other 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
Pre-Amplifier	MITER	100MHz~26.5GHz	919981	EC373	May 13, 2004
Pre-Amplifier	MITER	26GHz~40GHz	828825	EC374	May 13, 2004
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	Jan. 20, 2004

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

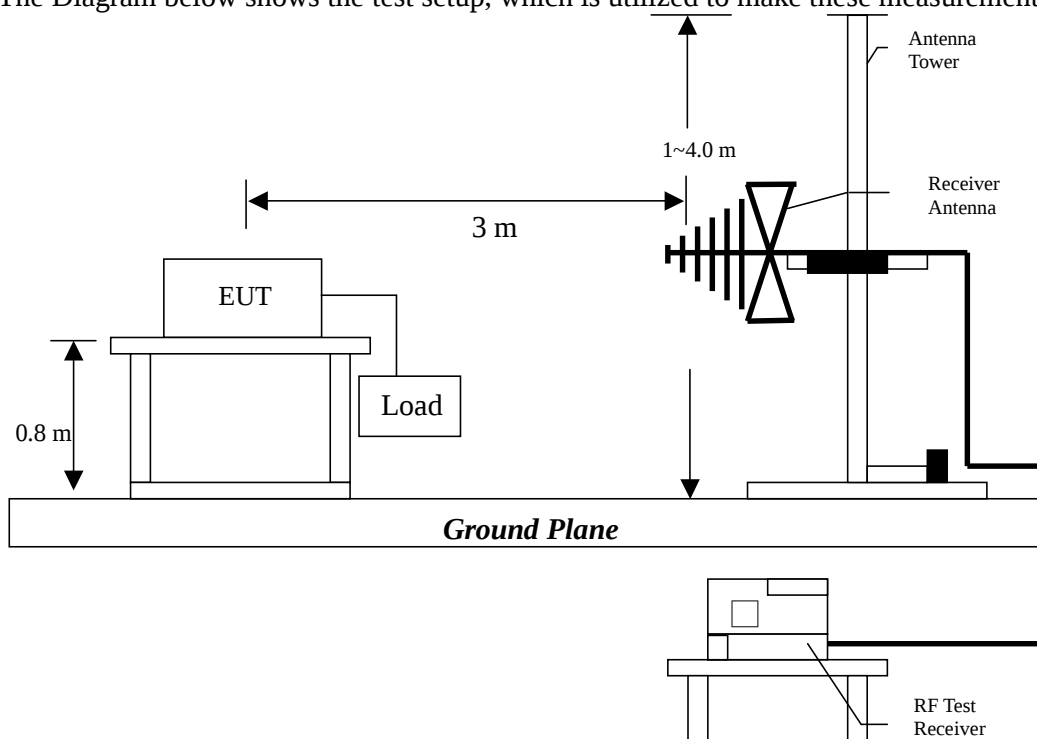
3. Radiated emission test FCC 15.249 (C)

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.

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)
5803.019MHz~ 5816.019MHz (Base)	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
Test Unit : Base
Worst Case 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)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
50.380	QP	V	12.94	21.35	34.29	40.00	-5.71	120.00	0.00
80.430	QP	V	10.05	22.13	32.18	40.00	-7.82	178.00	230.00
130.910	QP	V	13.36	11.45	24.81	43.50	-18.69	100.00	67.00
140.610	QP	V	14.18	11.21	25.39	43.50	-18.11	100.00	254.00
167.780	QP	V	14.44	11.57	26.01	43.50	-17.49	100.00	85.00
253.110	QP	V	12.71	11.74	24.45	46.00	-21.55	100.00	251.00
47.230	QP	H	13.00	12.75	25.75	40.00	-14.25	213.00	210.00
84.330	QP	H	9.39	18.71	28.10	40.00	-11.90	174.00	211.00
107.410	QP	H	11.29	17.40	28.69	43.50	-14.81	233.00	177.00
117.210	QP	H	12.17	14.51	26.68	43.50	-16.82	210.00	155.00
171.340	QP	H	14.24	13.32	27.56	43.50	-15.94	100.00	0.00
257.410	QP	H	12.84	17.47	30.31	46.00	-15.69	109.00	105.00

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 Unit : Base

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)
3481.810	PK	V	32.81	33.64	41.60	42.43	74.00	-31.57	140.00	113.00
3481.810	AV	V	32.81	33.64	36.71	37.54	54.00	-16.46	140.00	113.00
4642.410	PK	V	32.27	35.74	38.22	41.70	74.00	-32.30	165.00	149.00
4642.410	AV	V	32.27	35.74	31.59	35.07	54.00	-18.93	165.00	149.00
3481.810	PK	H	32.81	33.64	37.52	38.35	74.00	-35.65	143.00	349.00
3481.810	AV	H	32.81	33.64	28.11	28.94	54.00	-25.06	143.00	349.00
4642.410	PK	H	32.27	35.74	37.28	40.76	74.00	-33.24	163.00	18.00
4642.410	AV	H	32.27	35.74	28.12	31.60	54.00	-22.40	163.00	18.00

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

26.5GHz-40GHz: 42dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

26.5GHz-40GHz: 29dBuV

EUT : 35178
Test Unit : Base
Test Condition : Tx at channel 21

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)
3485.790	PK	V	32.81	33.64	42.25	43.08	74.00	-30.92	143.00	113.00
3485.790	AV	V	32.81	33.64	37.39	38.22	54.00	-15.78	143.00	113.00
4647.730	PK	V	32.27	35.74	38.90	42.38	74.00	-31.62	166.00	149.00
4647.730	AV	V	32.27	35.74	32.45	35.93	54.00	-18.07	166.00	149.00
3485.790	PK	H	32.81	33.64	38.61	39.44	74.00	-34.56	145.00	349.00
3485.790	AV	H	32.81	33.64	28.56	29.39	54.00	-24.61	145.00	349.00
4647.730	PK	H	32.27	35.74	37.30	40.78	74.00	-33.22	193.00	17.00
4647.730	AV	H	32.27	35.74	29.66	33.14	54.00	-20.86	193.00	17.00

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
26.5GHz-40GHz: 42dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV
26.5GHz-40GHz: 29dBuV

EUT : 35178
Test Unit : Base
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)
3489.590	PK	V	32.81	33.64	42.61	43.44	74.00	-30.56	146.00	113.00
3489.590	AV	V	32.81	33.64	37.84	38.67	54.00	-15.33	146.00	113.00
4652.830	PK	V	32.27	35.74	39.54	43.02	74.00	-30.98	167.00	150.00
4652.830	AV	V	32.27	35.74	33.73	37.21	54.00	-16.79	167.00	150.00
3489.590	PK	H	32.81	33.64	38.44	39.27	74.00	-34.73	142.00	350.00
3489.590	AV	H	32.81	33.64	28.92	29.75	54.00	-24.25	142.00	350.00
4652.830	PK	H	32.27	35.74	38.06	41.54	74.00	-32.46	200.00	18.00
4652.830	AV	H	32.27	35.74	31.16	34.64	54.00	-19.36	200.00	18.00

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
26.5GHz-40GHz: 42dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV
26.5GHz-40GHz: 29dBuV

3.4.3 Measurement results: Fundamental and harmonics emission

EUT : 35178

Test Unit : Base

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)
5803.060	PK	V	33.04	38.97	73.92	79.85	114.00	-34.15	159.00	253.00
5803.060	AV	V	33.04	38.97	73.18	79.11	94.00	-14.89	159.00	253.00
5803.060	PK	H	33.04	38.97	73.43	79.36	114.00	-34.64	170.00	56.00
5803.060	AV	H	33.04	38.97	72.17	78.10	94.00	-15.90	170.00	56.00

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
26.5GHz-40GHz: 42dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV
26.5GHz-40GHz: 29dBuV

EUT : 35178

Test Unit : Base

Test Condition : Tx at channel 21

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)
5809.700	PK	V	33.04	38.97	73.52	79.45	114.00	-34.55	161.00	54.00
5809.700	AV	V	33.04	38.97	73.28	79.21	94.00	-14.79	161.00	54.00
5809.700	PK	H	33.04	38.97	72.00	77.93	114.00	-36.07	172.00	53.00
5809.700	AV	H	33.04	38.97	71.42	77.35	94.00	-16.65	172.00	53.00

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
26.5GHz-40GHz: 42dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV
26.5GHz-40GHz: 29dBuV

EUT : 35178
 Test Unit : Base
 Test Condition : Tx at channel 40

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamplifier (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna height (cm)	Turn Table angle (degree)
5816.040	PK	V	33.04	38.97	72.96	78.89	114.00	-35.11	161.00	55.00
5816.040	AV	V	33.04	38.97	72.74	78.67	94.00	-15.33	161.00	55.00
5816.040	PK	H	33.04	38.97	72.68	78.61	114.00	-35.39	171.00	50.00
5816.040	AV	H	33.04	38.97	72.60	78.53	94.00	-15.47	171.00	50.00

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
 26.5GHz-40GHz: 42dBuV

For AV:

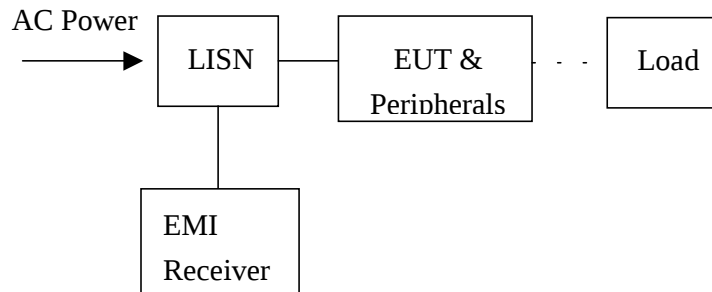
1GHz-3GHz: 10dBuV
 3GHz-14GHz: 16dBuV
 14GHz-26.5GHz: 28dBuV
 26.5GHz-40GHz: 29dBuV

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.

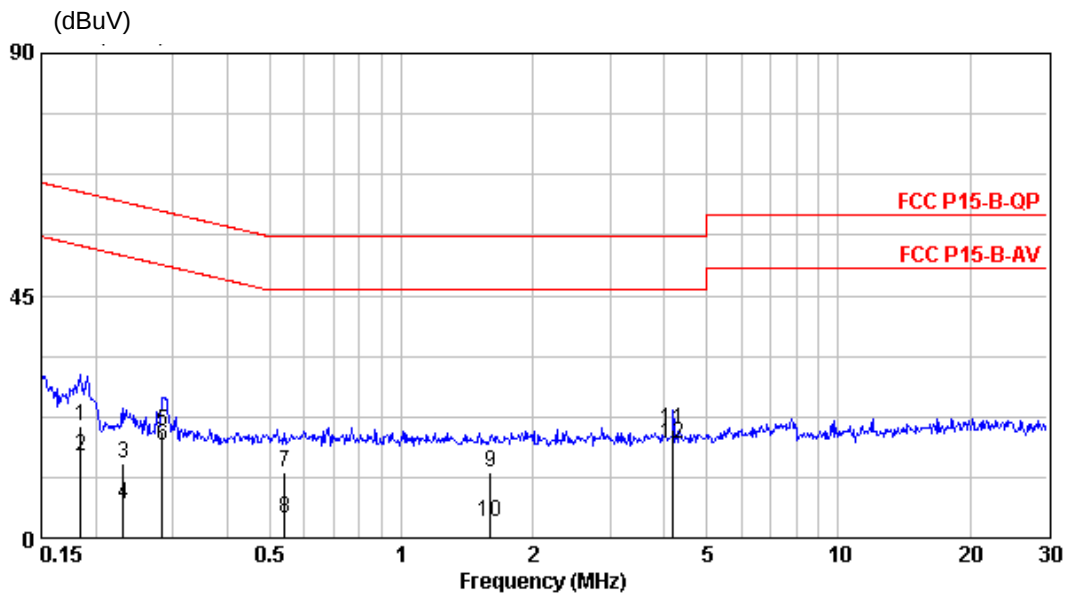
4.4 Conducted emission data FCC 15.207

(1) Line

EUT : 35178

Test Condition : Charging mode

Freq. (MHz)	Correction Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.185	0.10	20.67	64.28	-43.61	QP
0.185	0.10	15.11	54.28	-39.17	AVERAGE
0.231	0.10	13.93	62.43	-48.50	QP
0.231	0.10	6.12	52.43	-46.31	AVERAGE
0.284	0.10	19.84	60.71	-40.87	QP
0.284	0.10	17.09	50.71	-33.62	AVERAGE
0.541	0.10	12.08	56.00	-43.92	QP
0.541	0.10	3.63	46.00	-42.37	AVERAGE
1.599	0.10	12.05	56.00	-43.95	QP
1.599	0.10	3.08	46.00	-42.92	AVERAGE
4.194	0.21	20.13	56.00	-35.87	QP
4.194	0.21	17.45	46.00	-28.55	AVERAGE

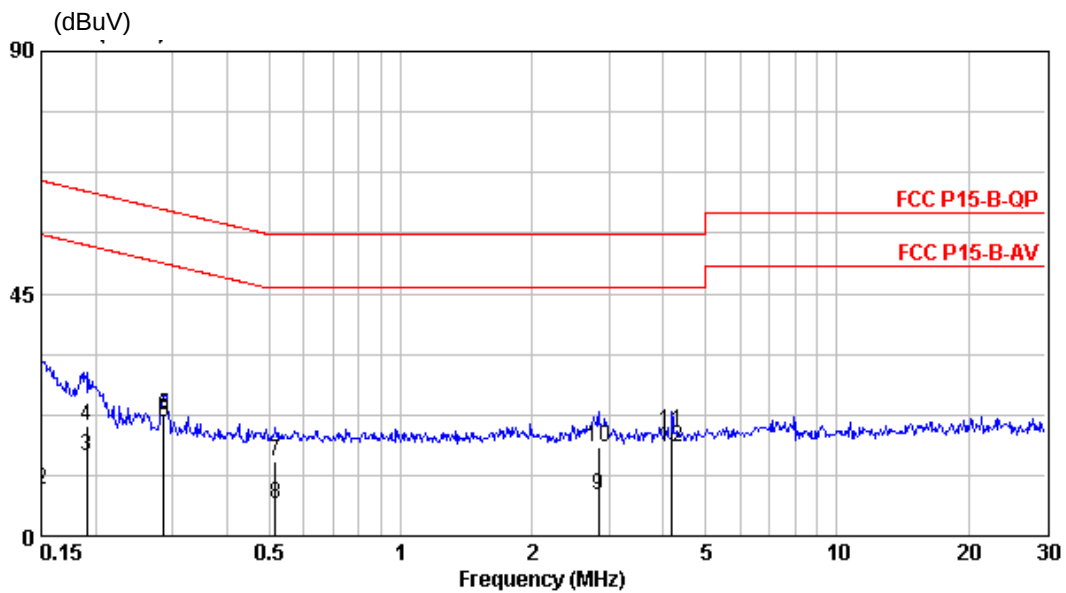


(1) Neutral

EUT : 35178

Test Condition : Charging mode

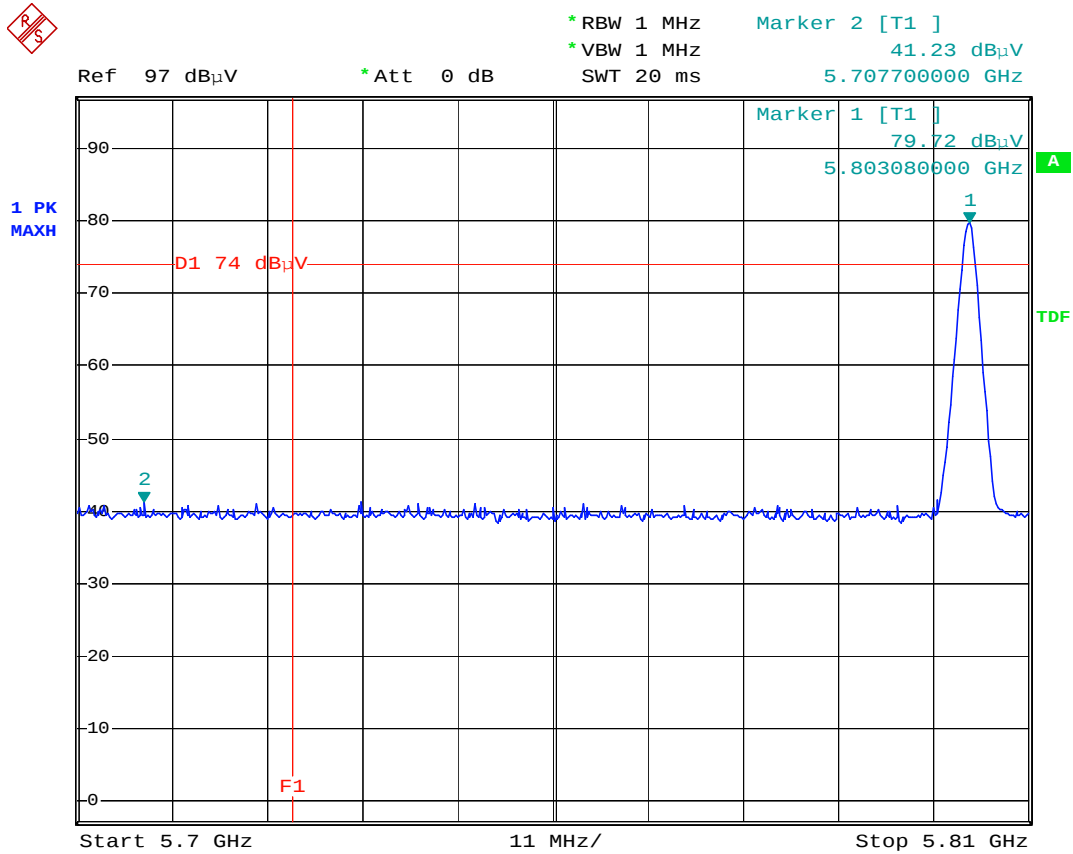
Freq. (MHz)	Correction Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.150	0.10	26.29	66.00	-39.71	QP
0.150	0.10	8.57	56.00	-47.43	AVERAGE
0.191	0.10	20.30	64.01	-43.71	QP
0.191	0.10	14.77	54.01	-39.24	AVERAGE
0.286	0.10	22.53	60.64	-38.11	QP
0.286	0.10	21.10	50.64	-29.54	AVERAGE
0.516	0.10	13.76	56.00	-42.24	QP
0.516	0.10	5.96	46.00	-40.04	AVERAGE
2.838	0.14	16.55	56.00	-39.45	QP
2.838	0.14	7.62	46.00	-38.38	AVERAGE
4.194	0.20	19.45	56.00	-36.55	QP
4.194	0.20	16.38	46.00	-29.62	AVERAGE



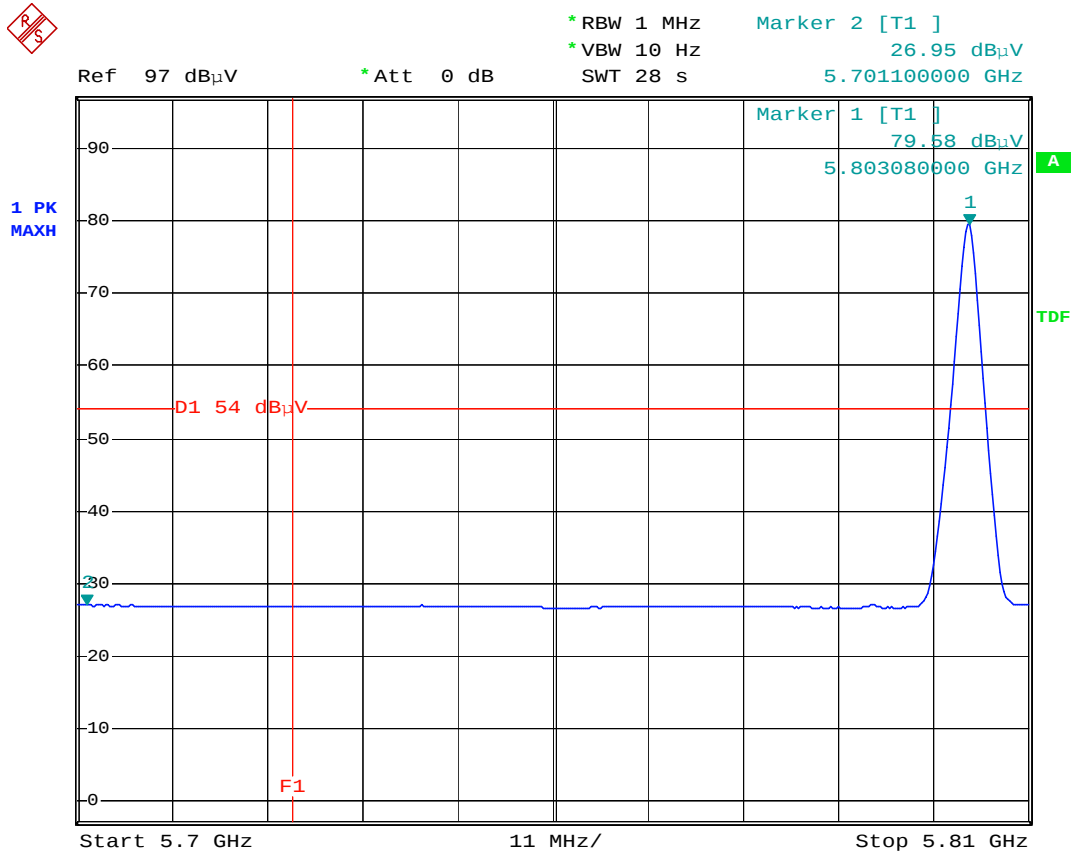
5. Radiated emission on the band edge FCC 15.249(C)

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 (Tx 5803.019~5816.019MHz and Rx 2468.000~2479.700 MHz) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

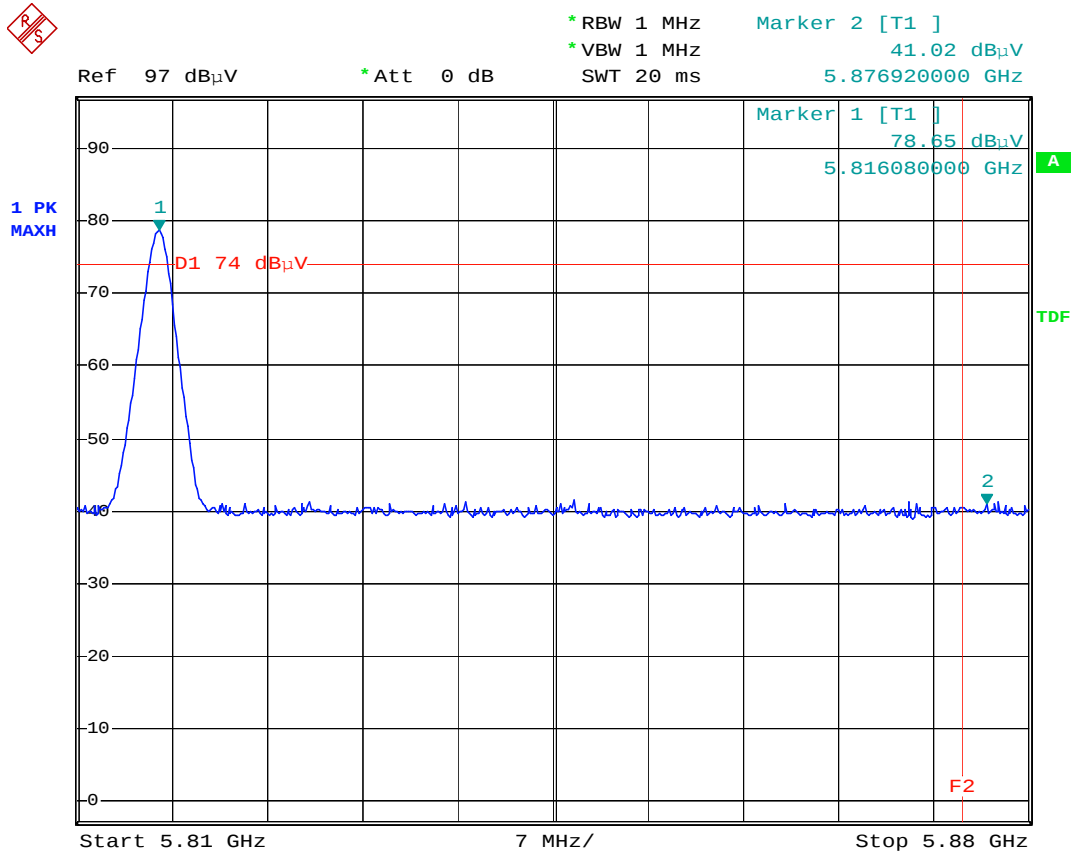
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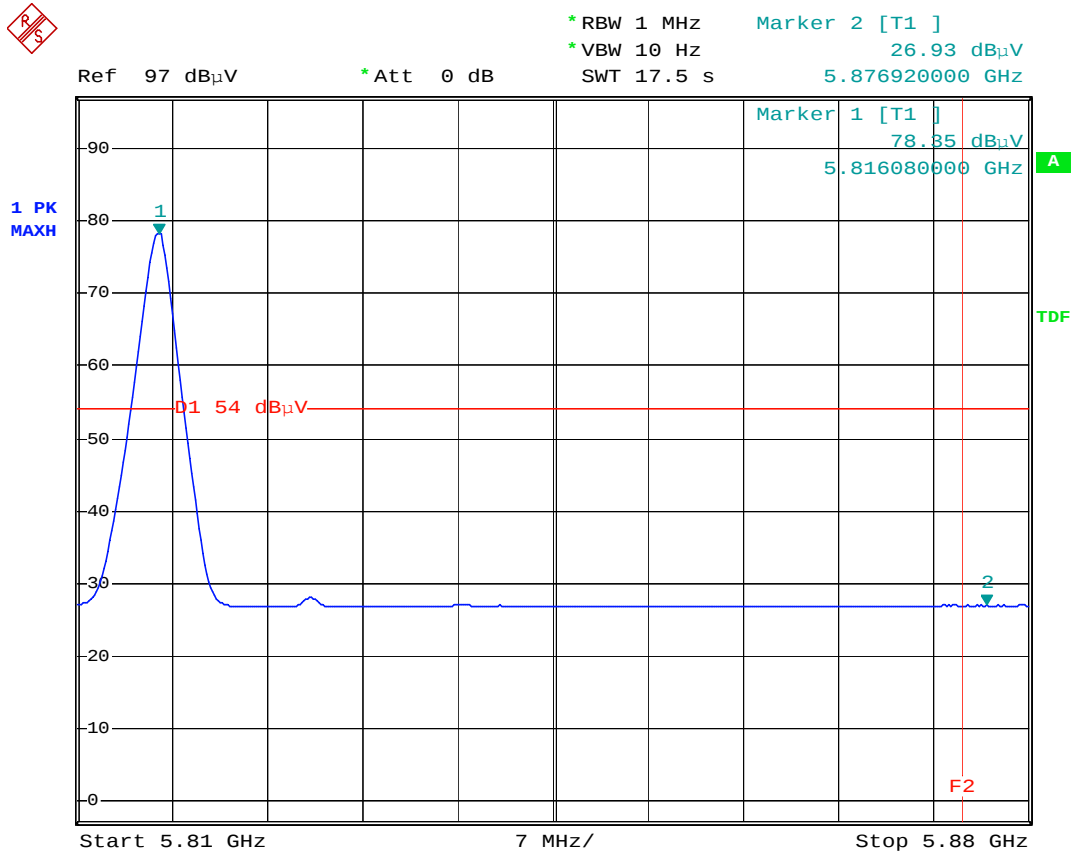
Comment: Band-edge test at low channel
 Comment: Peak detector F1=5725MHz Base unit
 Date: 28.MAY.2004 15:46:52



Comment: Band-edge test at low channel
 Comment: Average detector F1=5725MHz Base unit
 Date: 28.MAY.2004 15:44:36



Comment: Band-edge test at high channel
 Comment: Peak detector F1=5875MHz Base unit
 Date: 28.MAY.2004 16:09:23



Comment: Band-edge test at high channel
 Comment: Average detector F1=5875MHz Base unit
 Date: 28.MAY.2004 16:11:26