

EMC TEST REPORT

Report No. : EME-040733

Model No. : 39287

Issued Date : Aug. 13, 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.
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

This test report consists of 21 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of Intertek Laboratory. The test result(s) in this report only applies to the tested sample(s).

Project Engineer

Jackey Chiu

Jackey Chiu

Reviewed By

Jerry Liu

Jerry Liu

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
1.4 Peripherals equipment	5
2. Test specifications	6
2.1 Test standard	6
2.2 Operation mode	6
2.4 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	10
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 Fundamental & harmonics radiated emission data	13
4. Conducted emission test FCC 15.207	15
4.1 Operating environment	15
4.2 Test setup & procedure	15
4.3 Emission limit	16
4.4 Conducted emission data FCC 15.207	17
5. Radiated emission on the band edge FCC 15.249(C)	19

Summary of Tests**900MHz Cordless Phone -Model: 39287**
FCC ID: PEG39287

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	: 900MHz Cordless Phone
Model No.	: 39287
FCC ID.	: PEG39287
Frequency Range (Base)	: 902.10MHz ~ 904.05MHz
Frequency Range (Handset)	: 925.45MHz ~ 927.40MHz
Channel Number	: 40 channels
Frequency of Each Channel (Base)	: 902.10MHz+0.05k MHz k=0~39
Frequency of Each Channel (Handset)	: 925.45MHz+0.05k MHz k=0~39
Type of Modulation	: FM
Power Supply (Base)	: 120Vac, 60Hz with adapter (DVR-0920-3512)
Power Supply (Handset)	: 3.6Vdc Battery
Power Cord	: N/A
Sample Received	: July 28, 2004
Test Date(s)	: July 29, 2004 ~ Aug. 9, 2004

1.2 Additional information about the EUT

The EUT is a 900MHz Cordless Phone, it consists of handset unit and base unit.

The models listed below are identical to model 39287 (EUT).

Different brand serves as marking strategy.

Trade Name	Model Number
AudioLogic	APH7923
Bell Phone	39287
Bell Phone	39297

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

1.4 Peripherals equipment

Dummy Load: 600Ω

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.

2.4 Test equipment

Equipment	Brand	Frequency range	Model No.	Intertek ID No.	Last Cal.Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	EC346	09/15/2003
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/14/2004
Horn Antenna	EMCO	1GHz~18GHz	3115	EC338	09/19/2003
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	EC368	02/21/2004
Turn Table	HDGmbH	N/A	DS 420S	EP311	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP310	N/A
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC373	04/13/2004
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	01/15/2004

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

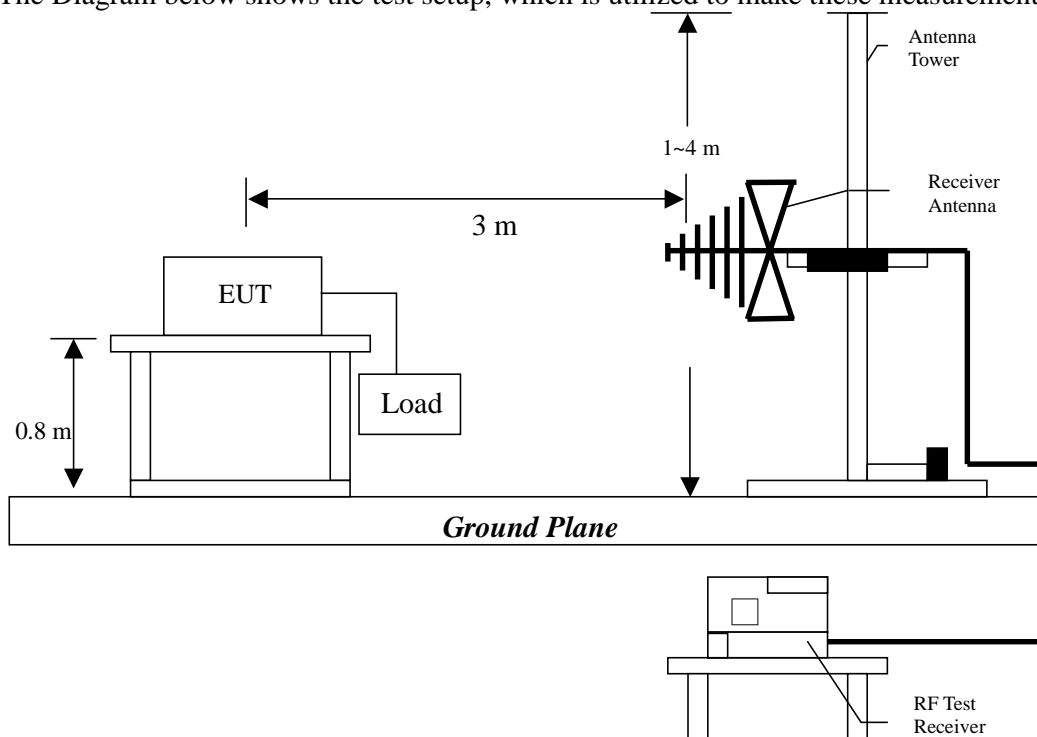
3. Radiated emission test FCC 15.249 (C)

3.1 Operating environment

Temperature:	24	°C	(10-40°C)
Relative Humidity:	55	%	(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 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)
902.0~928.0	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 : 39287
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)
404.400	QP	V	16.94	11.10	28.04	46.00	-17.96	165.00	351.00
429.600	QP	V	17.37	8.30	25.67	46.00	-20.33	124.00	236.00
454.900	QP	V	17.86	7.60	25.46	46.00	-20.54	118.00	222.00
516.900	QP	V	18.58	6.10	24.68	46.00	-21.32	105.00	15.00
615.900	QP	V	20.88	5.70	26.58	46.00	-19.42	136.00	138.00
912.780	QP	V	24.76	7.90	32.66	46.00	-13.34	115.00	147.00
154.200	QP	H	14.76	5.60	20.36	43.50	-23.14	245.00	258.00
173.650	QP	H	14.29	16.70	30.99	43.50	-12.51	214.00	164.00
194.980	QP	H	12.03	7.60	19.63	43.50	-23.87	115.00	1258.00
350.110	QP	H	15.56	7.10	22.66	46.00	-23.34	168.00	147.00
454.980	QP	H	17.86	10.90	28.76	46.00	-17.24	184.00	29.00
912.870	QP	H	24.76	14.60	39.36	46.00	-6.64	136.00	10.00

Remark:

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

EUT : 39287
 Test Unit : Handset
 Worst Case Condition : 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)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
796.360	QP	V	23.49	10.50	33.99	46.00	-12.01	108.00	325.00
807.980	QP	V	23.89	8.40	32.29	46.00	-13.71	114.00	360.00
823.880	QP	V	23.89	9.10	32.99	46.00	-13.01	103.00	321.00
842.980	QP	V	24.46	7.80	32.26	46.00	-13.74	108.00	140.00
862.480	QP	V	24.39	8.40	32.79	46.00	-13.21	168.00	0.00
885.570	QP	V	24.51	8.40	32.91	46.00	-13.09	154.00	125.00
796.350	QP	H	23.49	16.20	39.69	46.00	-6.31	154.00	47.00
813.840	QP	H	23.89	8.10	31.99	46.00	-14.01	168.00	164.00
839.100	QP	H	24.46	7.70	32.16	46.00	-13.84	125.00	360.00
860.350	QP	H	24.39	8.40	32.79	46.00	-13.21	178.00	147.00
879.770	QP	H	24.51	7.80	32.31	46.00	-13.69	149.00	165.00
901.150	QP	H	24.76	8.50	33.26	46.00	-12.74	164.00	136.00

Remark:

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

3.4.2 Fundamental & harmonics radiated emission data

EUT : 39287

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)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
902.100	PK	V	24.76	32.13	56.89	94.00	-37.11	158	360
902.100	PK	H	24.76	34.62	59.38	94.00	-34.62	100	239

EUT : 39287

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)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
904.050	PK	V	24.76	29.24	54.00	94.00	-40.00	157	360
904.050	PK	H	24.76	33.06	57.82	94.00	-36.18	100	244

Remark:

1. Corrected Level = Reading Level + Correction Factor
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 : 39287
Test Unit : Handset
Test Condition : 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)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
925.450	PK	V	25.46	29.90	55.36	94.00	-38.64	117	360
925.450	PK	H	25.46	32.72	58.18	94.00	-35.82	100	41

EUT : 39287
Test Unit : Handset
Test Condition : Tx at channel 40 with setup 1 configuration

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
927.400	PK	V	25.46	27.71	53.17	94.00	-40.83	116	360
927.400	AV	H	25.46	22.81	48.27	94.00	-45.73	203	19

Remark:

1. Corrected Level = Reading Level + Correction Factor
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:

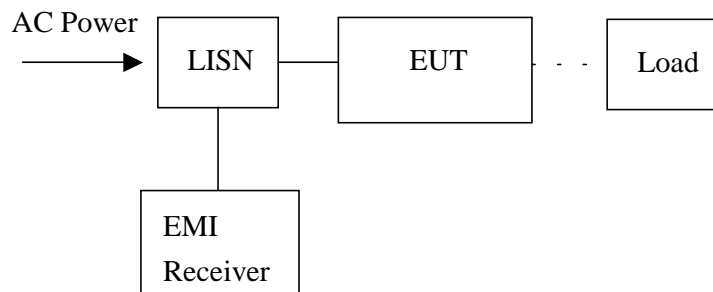
1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

4. Conducted emission test FCC 15.207

4.1 Operating environment

Temperature:	23	°C	(10-40°C)
Relative Humidity:	55	%	(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

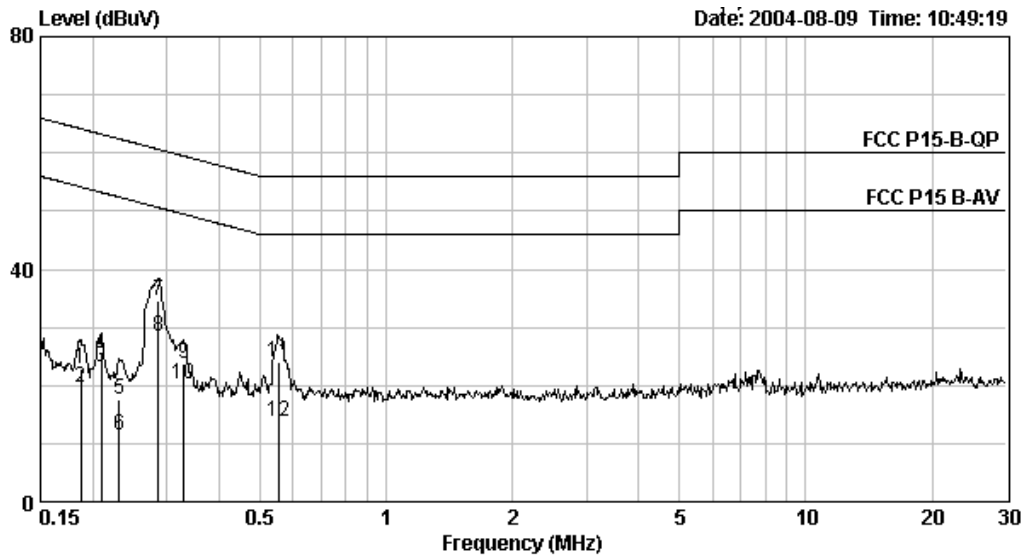
EUT : 39287

Worst Case Condition : Charging mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.187	0.10	22.84	64.15	19.68	54.15	-41.31	-34.47
0.210	0.10	25.51	63.22	23.13	53.22	-37.71	-30.09
0.231	0.10	17.53	62.43	11.52	52.43	-44.90	-40.91
0.286	0.10	34.61	60.64	28.37	50.64	-26.03	-22.27
0.330	0.10	23.70	59.45	20.33	49.45	-35.75	-29.12
0.554	0.10	24.11	56.00	13.84	46.00	-31.89	-32.16

Remark:

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



(1) Neutral

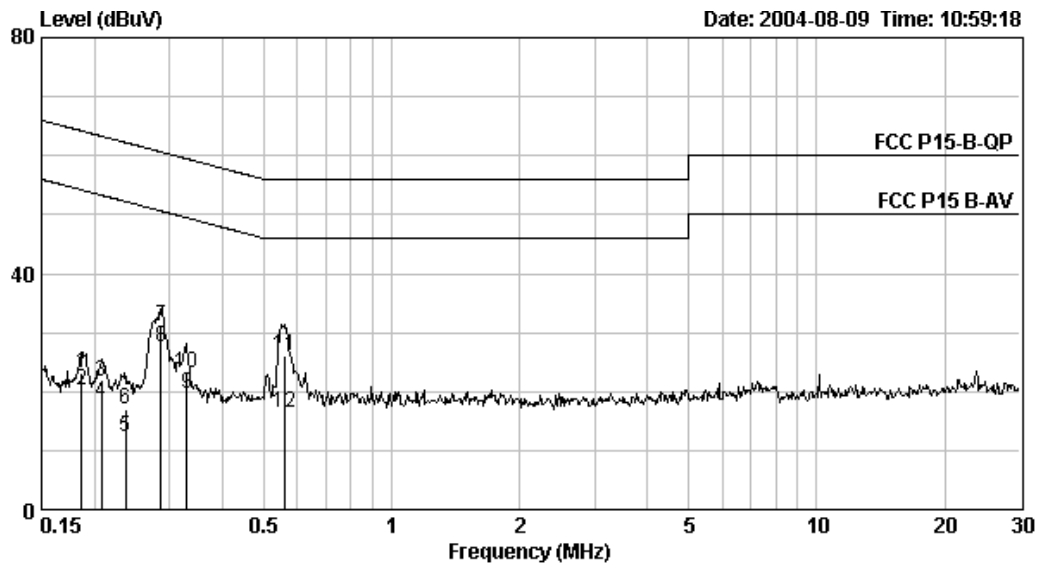
EUT : 39287

Worst Case Condition : Charging mode

Frequency (MHz)	Corr. Factor (dB)	Level	Limit	Level	Limit	Margin	
		Qp (dBuV)	Qp (dBuV)	AV (dBuV)	Av (dBuV)	Qp	Av
0.186	0.10	23.03	64.21	20.12	54.21	-41.18	-34.09
0.208	0.10	21.75	63.29	18.30	53.29	-41.54	-34.99
0.236	0.10	16.90	62.23	12.44	52.23	-45.33	-39.79
0.286	0.10	31.19	60.64	27.42	50.64	-29.45	-23.22
0.330	0.10	23.06	59.45	19.61	49.45	-36.39	-29.84
0.559	0.10	26.02	56.00	16.28	46.00	-29.98	-29.72

Remark:

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

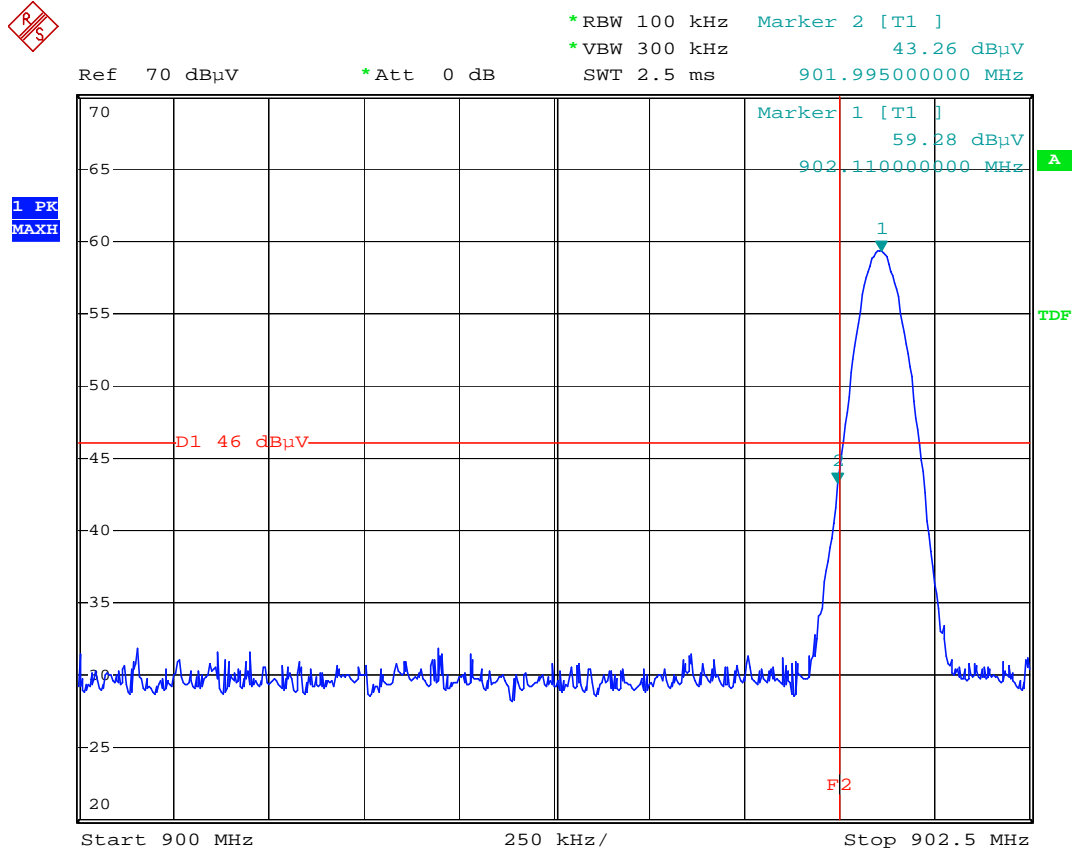


5. Radiated emission on the band edge FCC 15.249(C)

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 (Base: 902.10MHz~904.05, Handset: 925.45MHz~927.40MHz) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Please see the plot below.

Test Mode: Base

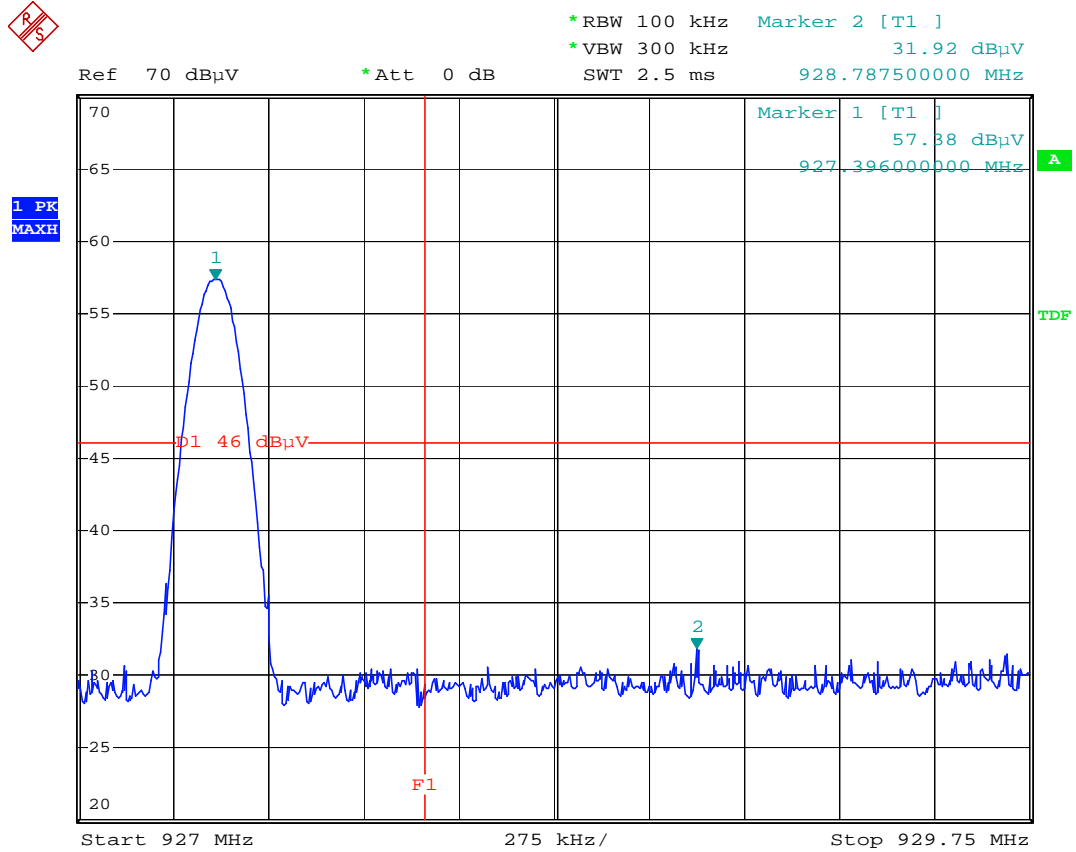


Comment: Band-edge at low channel (EC368/353)

Comment: F2=902MHz Base

Date: 16.AUG.2004 10:15:56

Test Mode: Handset



Comment: Band-edge at high channel (EC368/353)

Comment: F1=928MHz Handset

Date: 16.AUG.2004 11:15:53