FCC PART 15 Subpart C

EMI MEASUREMENT AND TEST REPORT

For

Axesstel, Inc.

6305 Lusk Blvd.
San Diego, CA 92121

FCC ID: PH7VZ1-3DWCB-B

2003-04-25

This Report Concerns:	Equipment Type:
☒ Original Report	Cordless Phone

Test Engineer:	Ling Zhang /
Report Number:	R0304032
Test Date:	2003-04-03
Reviewed By:	Hans Mellberg /
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The *Axesstel, Inc.'s* product, FCC ID: PH7VZ1-3DWCB-B *or the* "EUT" as referred to in this report is a hybrid cordless/cellular phone. The EUT is the base part of the cordless phone which measures approximately 6.1"L x 6.5"W x 5.5"H.

** The test data gathered is from typical production samples provided by the manufacturer.*

1.2 Objective

This report is prepared on behalf of *Axesstel, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B, and C of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules for Output Power, Antenna Requirements, 6 dB Bandwidth, power density, 100 kHz Bandwidth of Band Edges Measurement, and Conducted and Spurious Radiated Emission.

1.3 Related Submittal(s)/Grant(s)

No Related Submittals.

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 –1992, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.5 Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-1992.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, CISPR 22: 1997, and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

1.6 Test Equipment List

Manufacturer	Description	Model	Serial Number	Cal. Due Date
HP	Spectrum Analyzer	8568B	2517A01610	2003-10-30
HP	Spectrum Analyzer	8593A	29190A00242	2003-05-01
HP	Amplifier	8447E	1937A01054	2003-05-01
HP	Quasi-Peak Adapter	85650A	2521A00718	2003-05-01
Com-Power	Biconical Antenna	AB-100	14012	2003-05-01
Com-Power	LISN	LI-200	12005	2004-03-28
Com-Power	LISN	LI-200	12008	2004-03-28
Com-Power	Log Periodic Antenna	AL-100	16091	2003-05-01
Com-Power	Log Periodic Antenna	AB-900	15049	2003-05-01
Rohde & Schwarz	EMI Test Receiver	ESPI	1147 8007 07	2003-12-03
Agilent	Spectrum Analyzer (9KHz – 40GHz)	8564E	08303	2003-08-01
Agilent	Spectrum Analyzer (9KHz – 50GHz)	8565EC	06042	2003-05-03
HP	Amplifier (1-26.5GHz)	8449B	3147A00400	2004-03-14
A.H.System	Horn Antenna (700MHz-18GHz)	SAS-200/571	261	2003-05-31

*** Statement of Traceability: Bay Area Compliance Laboratory Corp.** certifies that all calibration has been performed using suitable standards traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY (NIST).

1.7 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
IBM	Notebook	Iseries	N/A	DoC
TELTONE CORP.	Simulator	TLS-3B-01	80071	DOC
Tak Fi	Telephone	T106B	N/A	N/A
Axesstel Inc.	Test Interface	N/A	N/A	N/A

1.8 External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
None-Shielded Telephone Cable	2.0	RJ11 Port/EUT	Telephone Simulator RJ11 Port
None-Shielded Telephone Cable	2.0	RJ11 Port/Simulator	Telephone RJ11 Port/Panasonic
Test Interface Cable	0.4	Notebook	Test Interface
Test Interface Cable	0.3	Test Interface	EUT

2 - SYSTEM TEST CONFIGURATION

2.1 Description of Test Configuration

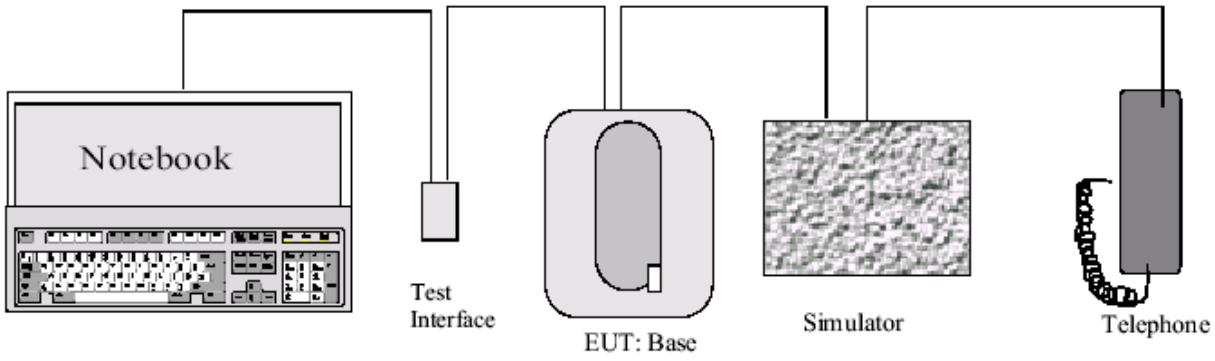
The EUT was configured for testing in a typical fashion (as normally used by a typical user).

Base being tested: The Cordless Telephone – Base was placed on the wooden table. The Low, middle, and high channels were tested. The base was connected to the line simulator and an AC adapter via its Tel Line and power ports, respectively. The base was transmitting and receiving from the handset. The conducted as well as radiated data were taken in this mode of operation. All initial and final investigations were performed with the EMI receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the 2.3.

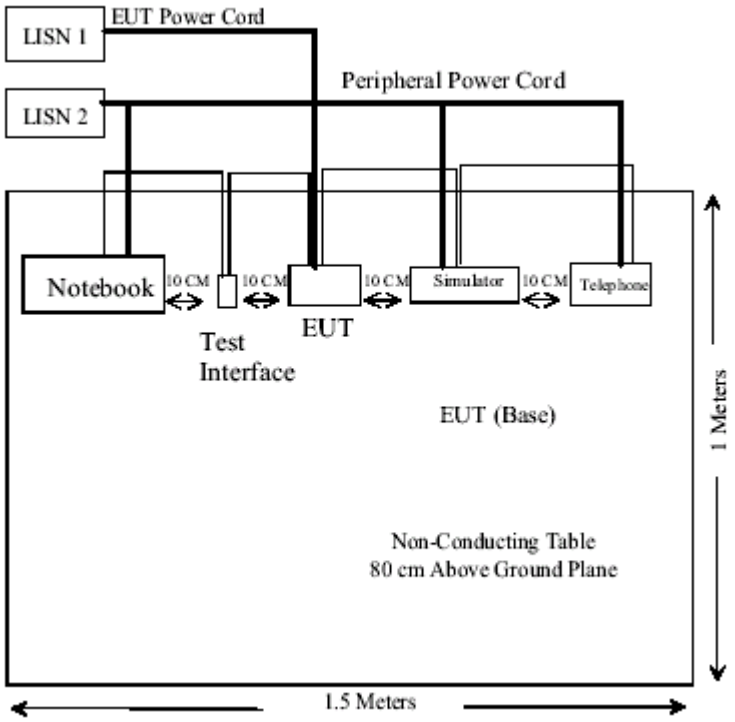
2.2 Equipment Modifications

No modification(s) was made by BACL Corp. to ensure the EUT complies with the applicable limits and standards.

2.3 Configuration of Test System



2.4 Test Setup Block Diagram



3 - SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT	Section Reference
§ 15.205	Restricted Bands	Compliant	Section 11
§15.203	Antenna Requirement	Compliant	Section 9
§15.207 (a)	Conducted Emission	Compliant	Section 12
§15.209 (f)	Spurious Emission	Compliant	Section 6, 11
§15.247 (a) (2)	6 dB Bandwidth	Compliant	Section 5
§15.247 (b) (3)	Peak Output Power	Compliant	Section 4
§15.247 (b) (5)	RF Exposure	Compliant	Section 10
§ 15.247 (c)	100 kHz Bandwidth of Frequency Band Edges	Compliant	Section 7
§15.247 (d)	Peak Power Spectral Density	Compliant	Section 8
§ 15.214 (c)	Privacy Statement	Compliant	Label
§ 15.214 (d)	Security Code	Compliant	Manual

4 - CONDUCTED OUTPUT POWER MEASUREMENT

4.1 Standard Applicable

According to §15.247(b) (3), for systems using digital modulation, the maximum peak output power of the intentional radiator shall not exceed 1 Watt.

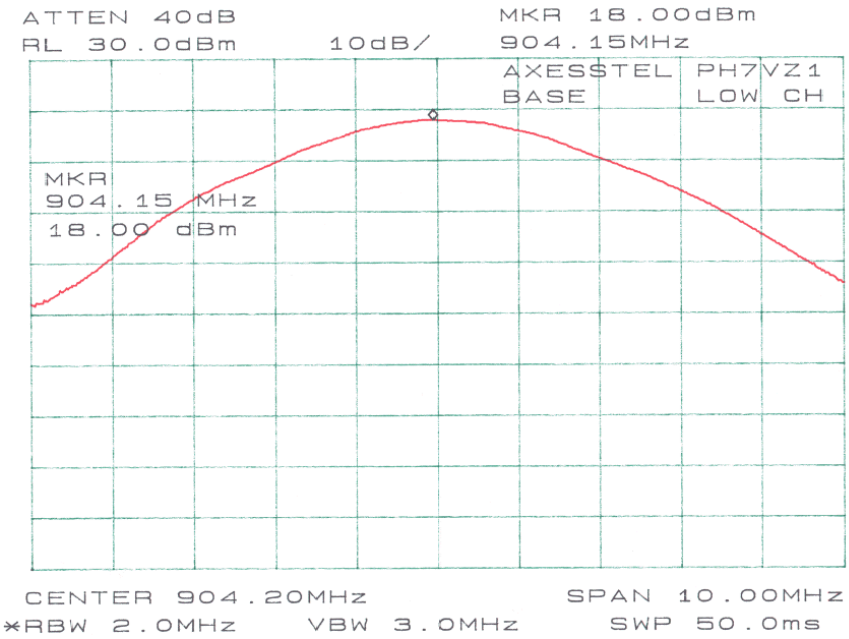
4.2 Measurement Procedure

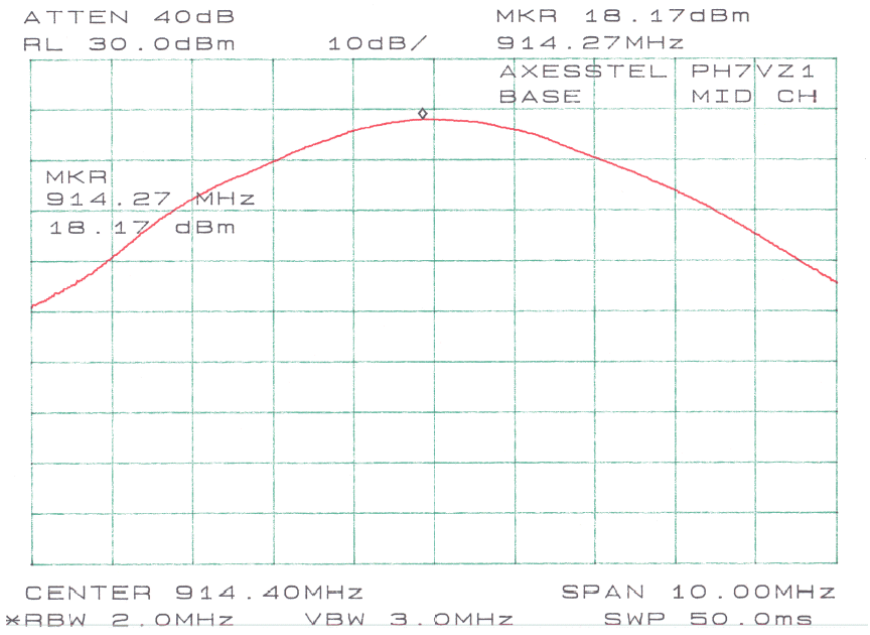
1. Place the EUT on the turntable and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

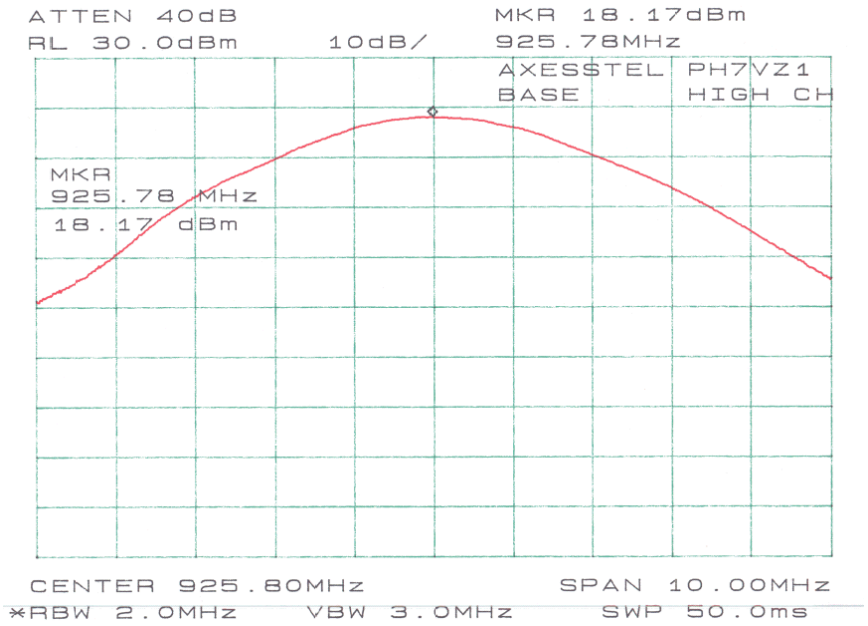
4.3 Measurement Result

Please refer to the attached pictures for more information.

Unit	Channel	Output Power (dBm)	Output Power (W)	Standard (W)	Result
Base	Low	18.00	0.063	≤ 1W	Compliant
Base	Mid	18.17	0.066	≤ 1W	Compliant
Base	High	18.17	0.066	≤ 1W	Compliant


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 18.00dBm
904.15MHz
AXESSTEL PH7VZ1
BASE LOW CH
MKR
904.15 MHz
18.00 dBm
CENTER 904.20MHz
SPAN 10.00MHz
*RBW 2.0MHz
VBW 3.0MHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 18.17dBm
914.27MHz
AXESSTEL PH7VZ1
BASE MID CH
MKR
914.27 MHz
18.17 dBm
CENTER 914.40MHz
SPAN 10.00MHz
*RBW 2.0MHz
VBW 3.0MHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 18.17dBm
925.78MHz
AXESSTEL PH7VZ1
BASE HIGH CH
MKR
925.78 MHz
18.17 dBm
CENTER 925.80MHz
SPAN 10.00MHz
*RBW 2.0MHz
VBW 3.0MHz
SWP 50.0ms

5 - 6 DB BANDWIDTH

5.1 Standard Applicable

According to §15.247(a)(2), for digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

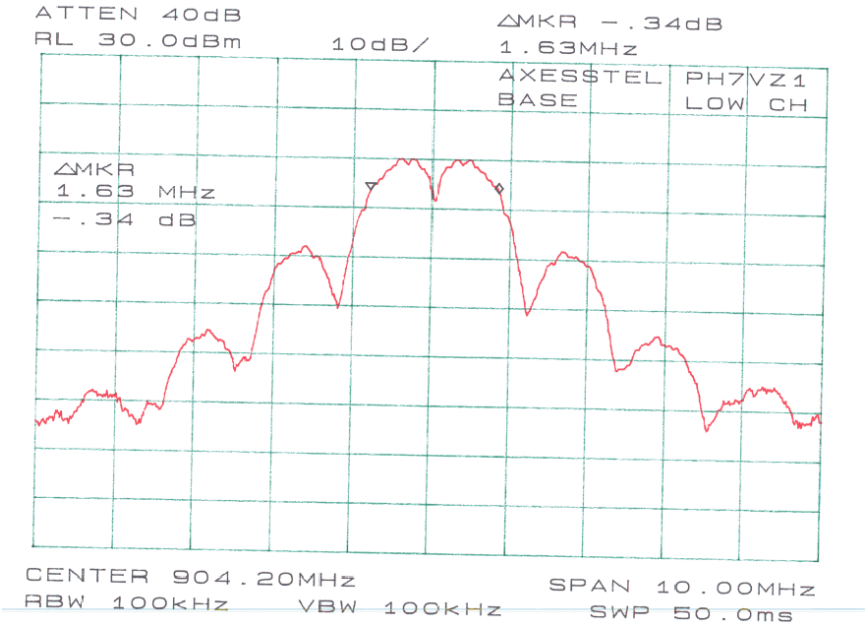
5.2 Measurement Procedure

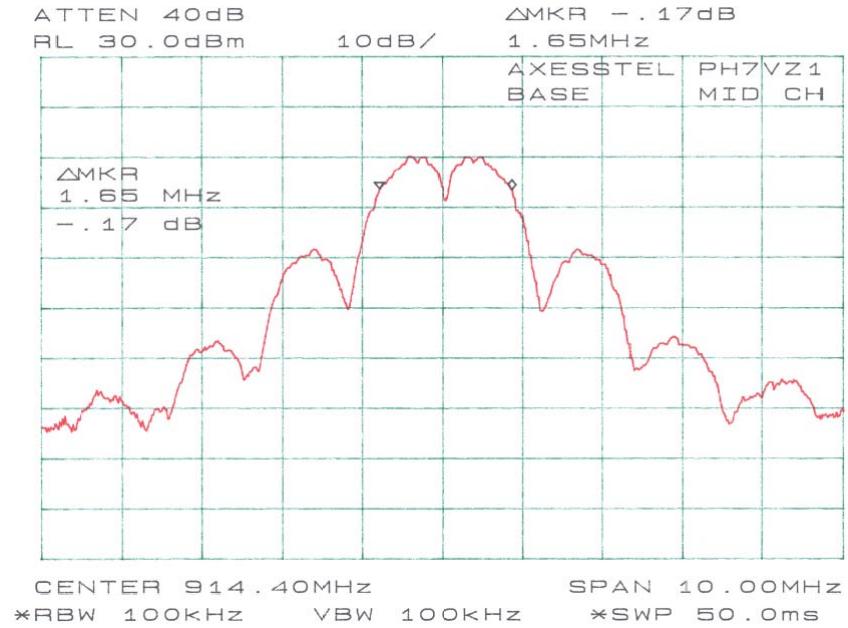
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

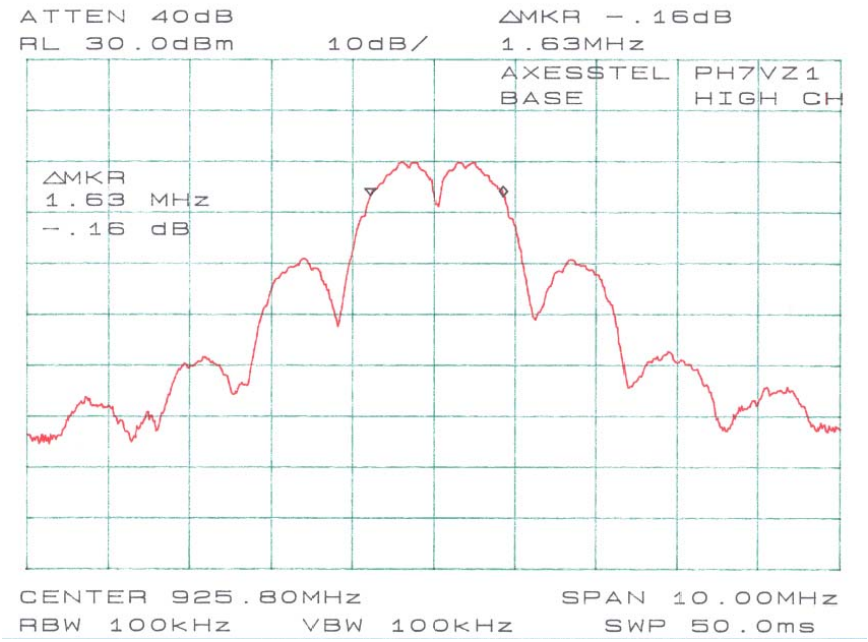
5.3 Measurement Data

Please refer to the following pages.

Unit	Channel	6 DB Bandwidth (MHz)	6 DB Bandwidth (kHz)	Standard (kHz)	Result
Base	Low	1.63	1630	≥ 500	Compliant
Base	Mid	1.65	1650	≥ 500	Compliant
Base	High	1.63	1630	≥ 500	Compliant


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -.34dB
1.63MHz
AXESSTEL PH7VZ1
BASE LOW CH
ΔMKR
1.63 MHz
-.34 dB
CENTER 904.20MHz
SPAN 10.00MHz
RBW 100kHz
VBW 100kHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -.17dB
1.65MHz
AXESSTEL PH7VZ1
BASE MID CH
ΔMKR
1.65 MHz
-.17 dB
CENTER 914.40MHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -.16dB
1.63MHz
AXESSTEL PH7VZ1
BASE HIGH CH
ΔMKR
1.63 MHz
-.16 dB
CENTER 925.80MHz
SPAN 10.00MHz
RBW 100kHz
VBW 100kHz
SWP 50.0ms

6 - SPURIOUS EMISSION

6.1 Standard Applicable

According to §15.209 (f) and §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation f a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit.

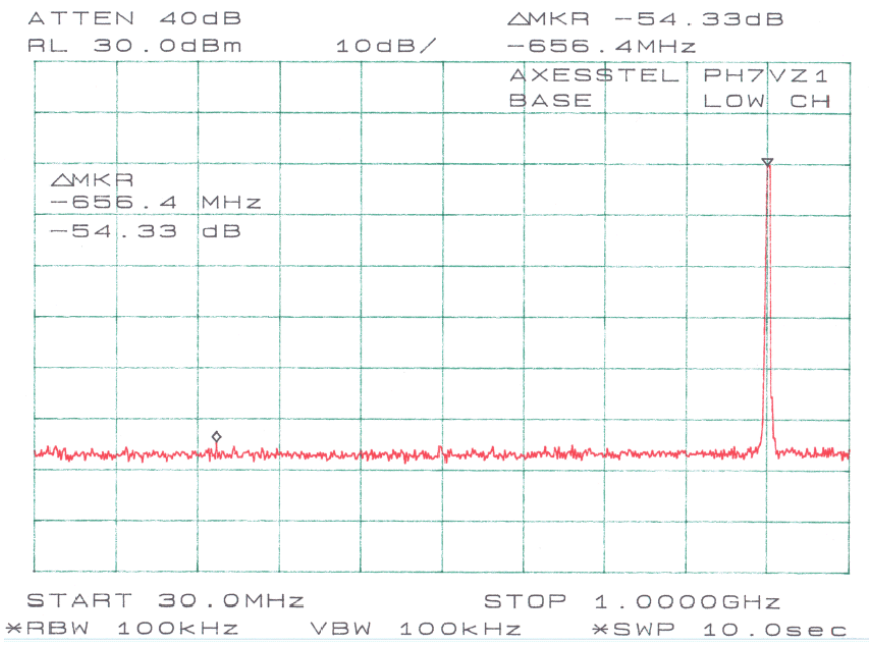
6.2 Measurement Procedure

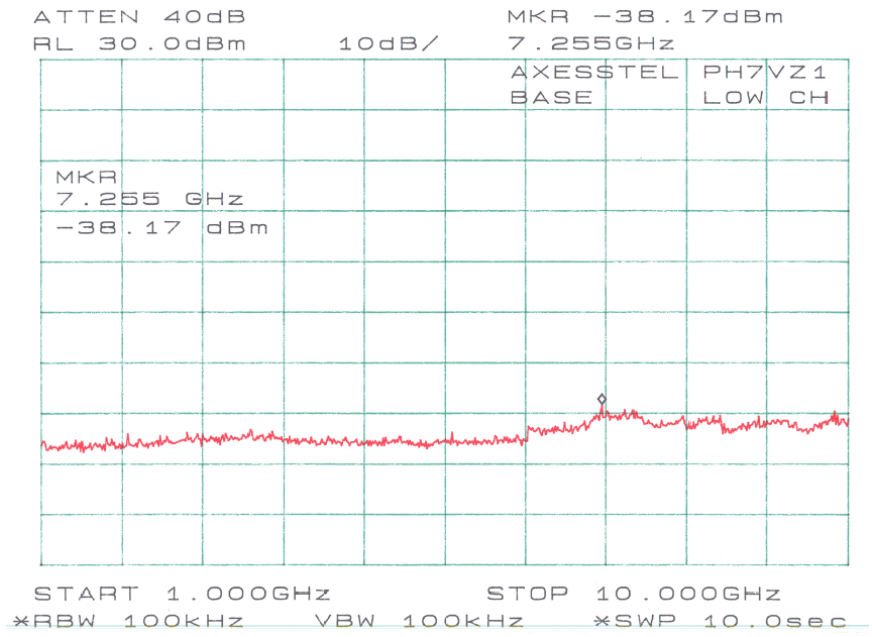
1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the SA on Max-Hold Mode, and then keep the EUT in transmitting mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

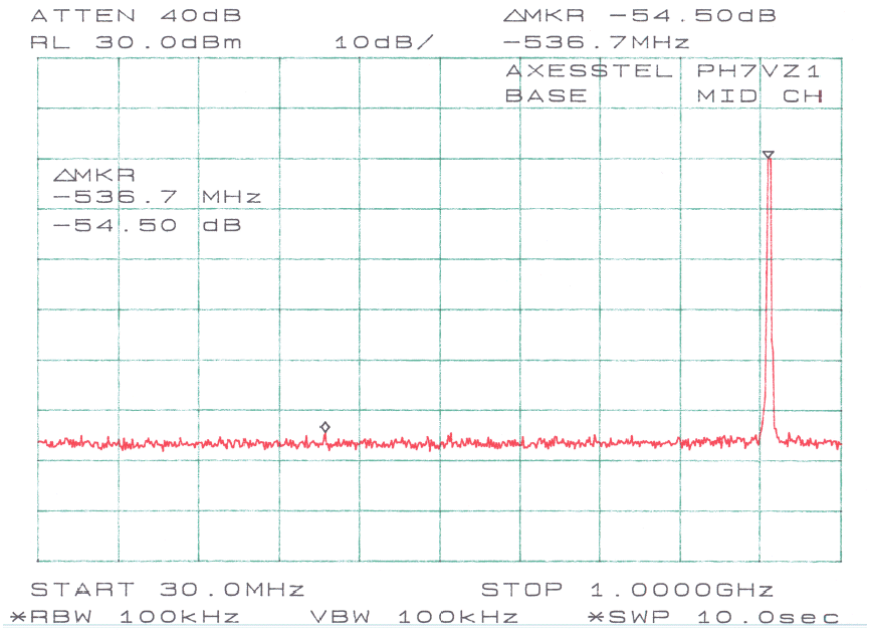
6.3 Measurement Data

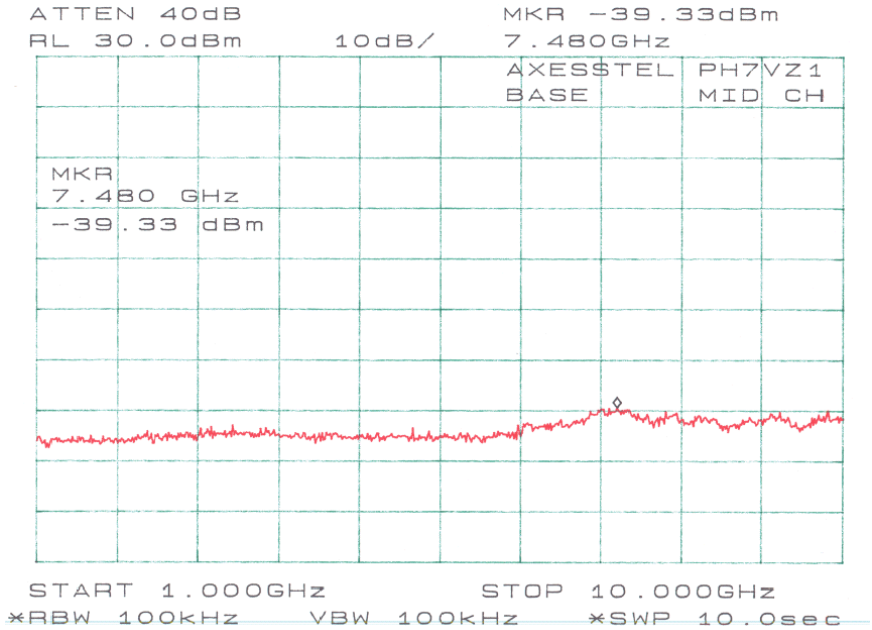
Please refer to the following pages.

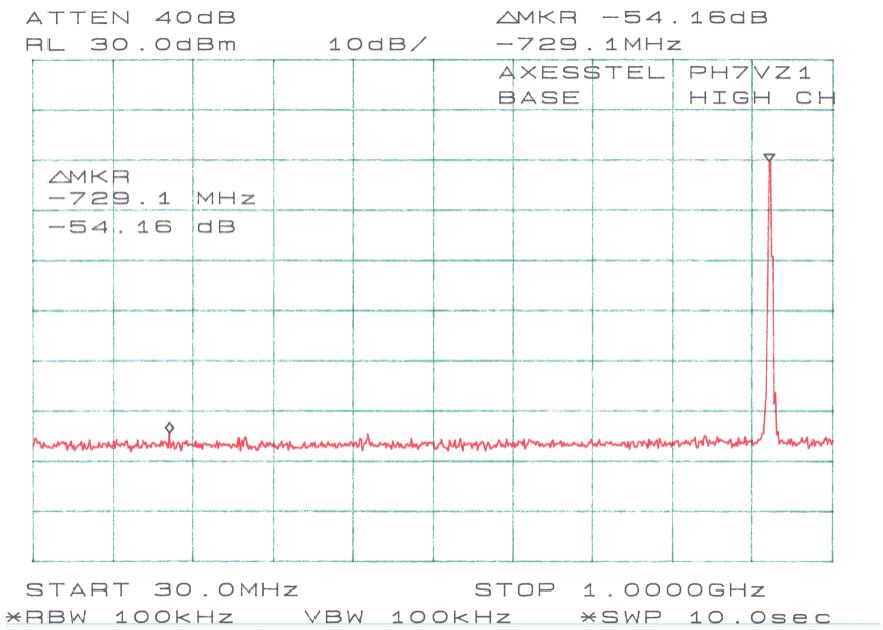
Spurious Emission	Test Result (Base)
Low Channel	Compliant
Middle Channel	Compliant
High Channel	Compliant

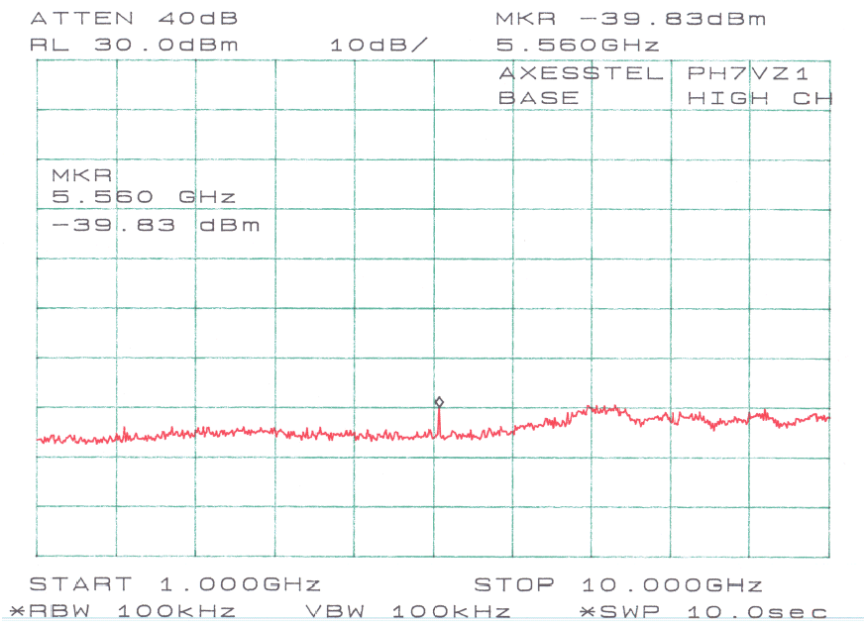

ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -54.33dB
-656.4MHz
AXESSTEL PH7VZ1
BASE LOW CH
ΔMKR
-656.4 MHz
-54.33 dB
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -38.17dBm
7.255GHz
AXESSTEL PH7VZ1
BASE LOW CH
MKR
7.255 GHz
-38.17 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -54.50dB
-536.7MHz
AXESSTEL PH7VZ1
BASE MID CH
ΔMKR
-536.7 MHz
-54.50 dB
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -39.33dBm
7.480GHz
AXESSTEL PH7VZ1
BASE MID CH
MKR
7.480 GHz
-39.33 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
△MKR -54.16dB
-729.1MHz
AXESSTEL PH7VZ1
BASE HIGH CH
△MKR
-729.1 MHz
-54.16 dB
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -39.83dBm
5.560GHz
AXESSTEL PH7VZ1
BASE HIGH CH
MKR
5.560 GHz
-39.83 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec

7 - 100 KHZ BANDWIDTH OF BAND EDGES MEASUREMENT

7.1 Standard Applicable

According to §15.247(c), if *any* 100 kHz bandwidth outside these frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, must also comply wit the radiated emission limits specified in § 15.209(a).

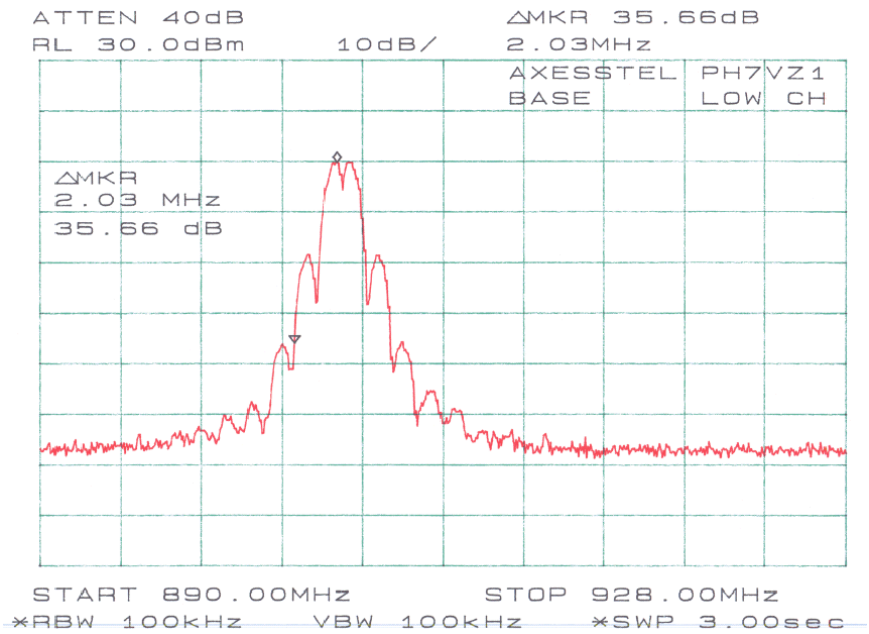
7.2 Measurement Procedure

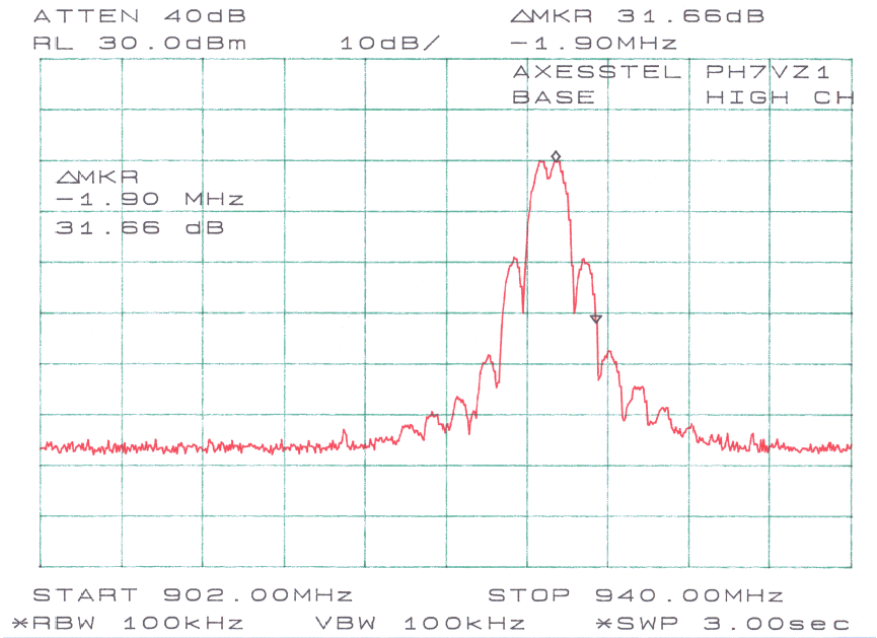
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

7.3 Test Results

Please refer to the following pages.

Band Edge Bandwidth	Test Result (Base)
Low Channel	Compliant
Middle Channel	Compliant
High Channel	Compliant


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR 35.66dB
2.03MHz
AXESSTEL PH7VZ1
BASE LOW CH
ΔMKR
2.03 MHz
35.66 dB
START 890.00MHz
STOP 928.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 3.00sec


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR 31.66dB
-1.90MHz
AXESSTEL PH7VZ1
BASE HIGH CH
ΔMKR
-1.90 MHz
31.66 dB
START 902.00MHz
STOP 940.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 3.00sec

8 - POWER SPECTRAL DENSITY

8.1 Standard Applicable

According to §15.247 (d), for digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

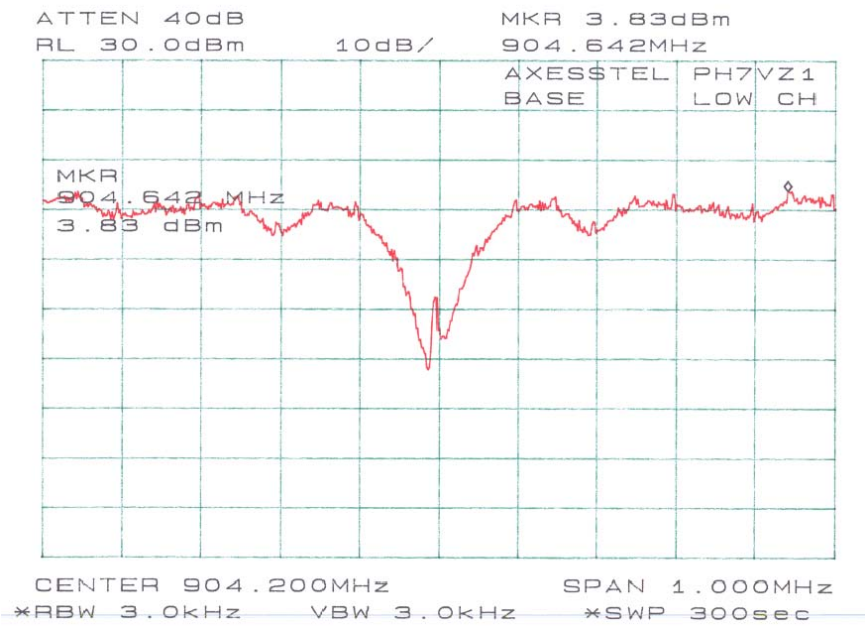
8.2 Measurement Procedure

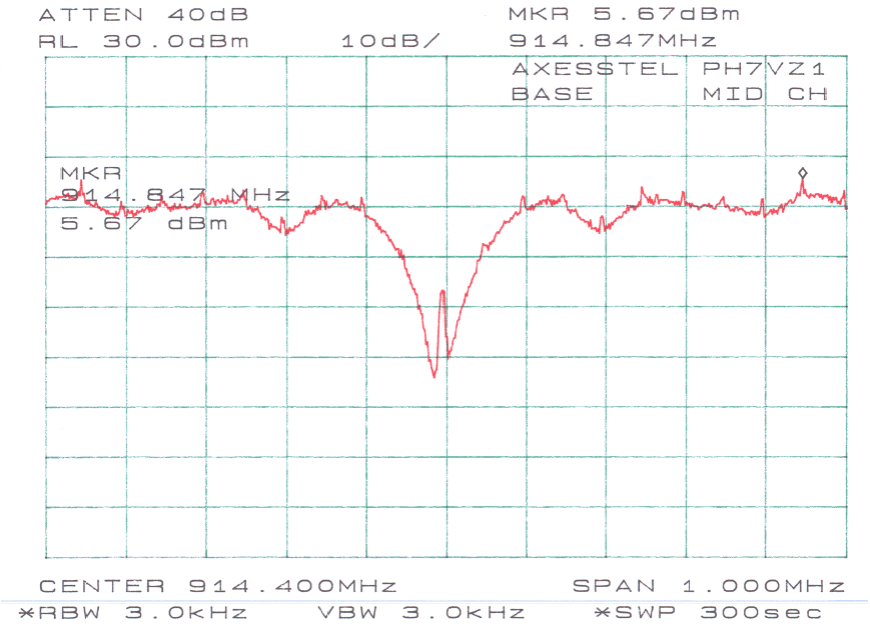
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Repeat above procedures until all frequencies measured were complete.

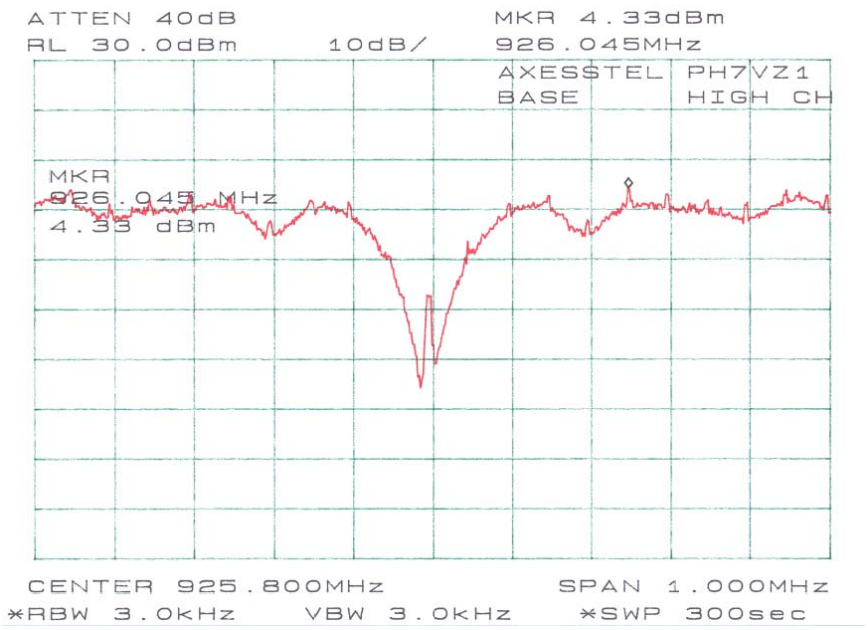
8.3 Test Results

Please refer to the following plot(s).

Power Density	Test Result (Base)
Low Channel	Compliant
Middle Channel	Compliant
High Channel	Compliant


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 3.83dBm
904.642MHz
AXESSTEL PH7VZ1
BASE LOW CH
MKR
904.642 MHz
3.83 dBm
CENTER 904.200MHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 300sec


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 5.67dBm
914.847MHz
AXESSTEL PH7VZ1
BASE MID CH
MKR
914.847 MHz
5.67 dBm
CENTER 914.400MHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 300sec


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 4.33dBm
926.045MHz
AXESSTEL PH7VZ1
BASE HIGH CH
MKR
926.045 MHz
4.33 dBm
CENTER 925.800MHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 300sec

9 - ANTENNA REQUIREMENT

9.1 Standard Applicable

For intentional device, according to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to § 15.247 (1), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

9.2 Antenna Connected Construction

The directional gain of antenna used for transmitting is -1 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

10 - RF SAFETY REQUIREMENTS TO 2.1091

According to section 3 of Supplement C to OET Bulleting 65, Part 15 Transmitters are categorically excluded from Routine Environmental Evaluation by measurement or precise computations unless otherwise required by the Commissions.

According to §15.247(b)(5) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-15000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

For handset of the EUT:
Maximum peak output power at antenna input terminal: 18.17 (dBm)
Maximum peak output power at antenna input terminal: 66.615 (mW)
Antenna Gain (typical): -1 (dBi)
Maximum antenna gain: 0.79 (numeric)
Prediction distance: 20 (cm)
Predication frequency: 900 (MHz)
MPE limit for uncontrolled exposure at prediction frequency: 0.6 (mW/cm^2)
Power density at predication frequency: 0.0105 (mW/cm^2)

Test Result

The predicted power density level at 20 cm is 0.0105 mW/cm^2. This is below the uncontrolled exposure limit of $1mW/cm^2$ at 900 MHz.

11 - SPURIOUS RADIATED EMISSION DATA

11.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is $\pm$4.0 dB.

11.2 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with the ANSI C63.4 - 1992. The specification used was the FCC 15 Subpart C limits.

The base of the EUT was connected to a 120 VAC / 60 Hz power source.

The spacing between the peripherals was 10 centimeters.

Input / Output cables were draped along the edge of the test table and bundle when necessary.

11.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR §15.33 (a) (1), the system was tested to 10000 MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
Below 30MHz	10kHz	10KHz
30 – 1000MHz	100kHz	100kHz
Above 1000MHz	1MHz	1MHz

11.4 Test Procedure

For the radiated emissions test, both the EUT and all support equipment power cords were connected to the AC floor outlet since the power supply used in the EUT did not provide an accessory power outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dBμV of specification limits), and are distinguished with a "**Qp**" in the data table.

11.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - Class B Limit

11.6 Summary of Test Results

According to the data in section 11.7, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207, and 15.247, and had the worst margin of:

Base, 30MHz to 10000MHz, 3 meters

-21.3 dBμV at 2712.60 MHz in the Vertical polarization, Low Channel
-17.2 dBμV at 2743.20 MHz in the Horizontal polarization, Middle Channel
-20.7 dBμV at 2777.4 MHz in the Horizontal polarization, High Channel
-11.3 dBμV at 86.19 MHz in the Vertical polarization, Unintentional Emission

11.7 Radiated Emission Test Data for Handset, 30MHz to 10000MHz, 3 meters

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 SUBPART C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel											
904.20	107.2	PEAK	250	1.5	V	23.6	3.8	30.0	104.6		
904.20	102.0	PEAK	330	1.0	H	23.6	3.8	30.0	99.4		
2712.60	30.0	AVG	0	1.5	V	29.0	3.7	30.0	32.7	54	-21.3
1808.40	34.3	AVG	90	1.5	V	25.3	2.6	30.0	32.2	54	-21.8
1808.40	34.2	AVG	30	1.2	H	25.3	2.6	30.0	32.1	54	-21.9
2712.60	28.3	AVG	270	1.2	H	29.0	3.7	30.0	31.0	54	-23.0
1808.40	48.8	PEAK	90	1.5	V	25.3	2.6	30.0	46.7	74	-27.3
1808.40	48.2	PEAK	30	1.2	H	25.3	2.6	30.0	46.1	74	-27.9
2712.60	39.7	PEAK	0	1.5	V	29.0	3.7	30.0	42.3	74	-31.7
2712.60	38.8	PEAK	270	1.2	H	29.0	3.7	30.0	41.5	74	-32.5
Middle Channel											
914.40	107.7	PEAK	220	1.2	V	23.2	3.9	30.0	104.8		
914.40	103.2	PEAK	15	1.5	H	23.2	3.9	30.0	100.3		
2743.20	34.2	AVG	30	1.5	H	29.0	3.7	30.0	36.8	54	-17.2
2743.20	31.5	AVG	160	1.2	V	29.0	3.7	30.0	34.2	54	-19.8
1828.80	34.6	AVG	180	1.5	V	25.3	2.6	30.0	32.5	54	-21.5
1828.80	34.3	AVG	270	1.0	H	25.3	2.6	30.0	32.2	54	-21.8
1828.80	48.2	PEAK	180	1.5	V	25.3	2.6	30.0	46.1	74	-27.9
1828.80	46.8	PEAK	270	1.0	H	25.3	2.6	30.0	44.7	74	-29.3
2743.20	41.5	PEAK	30	1.5	H	29.0	3.7	30.0	44.2	74	-29.8
2743.20	40.7	PEAK	160	1.2	V	29.0	3.7	30.0	43.3	74	-30.7

Radiated Emission Test Data for Handset, 30MHz to 10000MHz, 3 meters (Continued)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel											
925.80	108.7	PEAK	90	1.5	V	23.4	4.0	30.0	106.1		
925.80	111.5	PEAK	0	1.2	H	23.4	4.0	30.0	108.9		
2777.4	30.7	AVG	220	1.8	H	29.0	3.7	30.0	33.3	54	-20.7
1851.60	34.7	AVG	90	1.5	V	25.3	2.6	30.0	32.6	54	-21.4
1851.60	34.2	AVG	0	1.2	H	25.3	2.6	30.0	32.1	54	-21.9
2777.4	29.3	AVG	150	1.2	V	29.0	3.7	30.0	32.0	54	-22.0
1851.60	48.3	PEAK	90	1.5	V	25.3	2.6	30.0	46.2	74	-27.8
1851.60	48.0	PEAK	0	1.2	H	25.3	2.6	30.0	45.9	74	-28.1
2777.4	40.0	PEAK	220	1.8	H	29.0	3.7	30.0	42.7	74	-31.3
2777.4	39.8	PEAK	150	1.2	V	29.0	3.7	30.0	42.5	74	-31.5
Unintentional Emission, 30MHz to 1000MHz											
86.19	42.7		60	1.2	V	9.8	1.2	25.0	28.7	40	-11.3
112.19	39.2		270	1.0	H	11.3	1.5	25.0	27.0	43.5	-16.5
245.79	37.8		45	1.2	V	13.8	2.2	25.0	28.8	46	-17.2
264.01	37.2		270	1.2	V	13.4	2.2	25.0	27.8	46	-18.2
286.02	35.8		30	1.8	V	13.4	2.3	25.0	26.5	46	-19.5

12 – CONDUCTED EMISSIONS

12.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is $\pm$2.4 dB.

12.2 EUT Setup

The measurement was performed at shield room, using the same setup per ANSI C63.4 – 1992 measurement procedure. The specification used was FCC Class B limits.

The base of the EUT was connected to a 120 VAC / 60 Hz power source.

The spacing between the peripherals was 10 centimeters.

Input / Output cables were draped along the edge of the test table and bundle when necessary.

12.3 Spectrum Analyzer Setup

The spectrum analyzer was set with the following configurations during the conduction test:

Start Frequency	150 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth	10 kHz
Video Bandwidth	10 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

12.4 Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within –4 dBμV of specification limits). Quasi-peak readings are distinguished with a "**Qp**".

12.5 Summary of Test Results

According to the data in section 12.6, the EUT complied with the FCC Conducted margin for a Class B device and these test results is deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations, with the *worst* margin reading of:

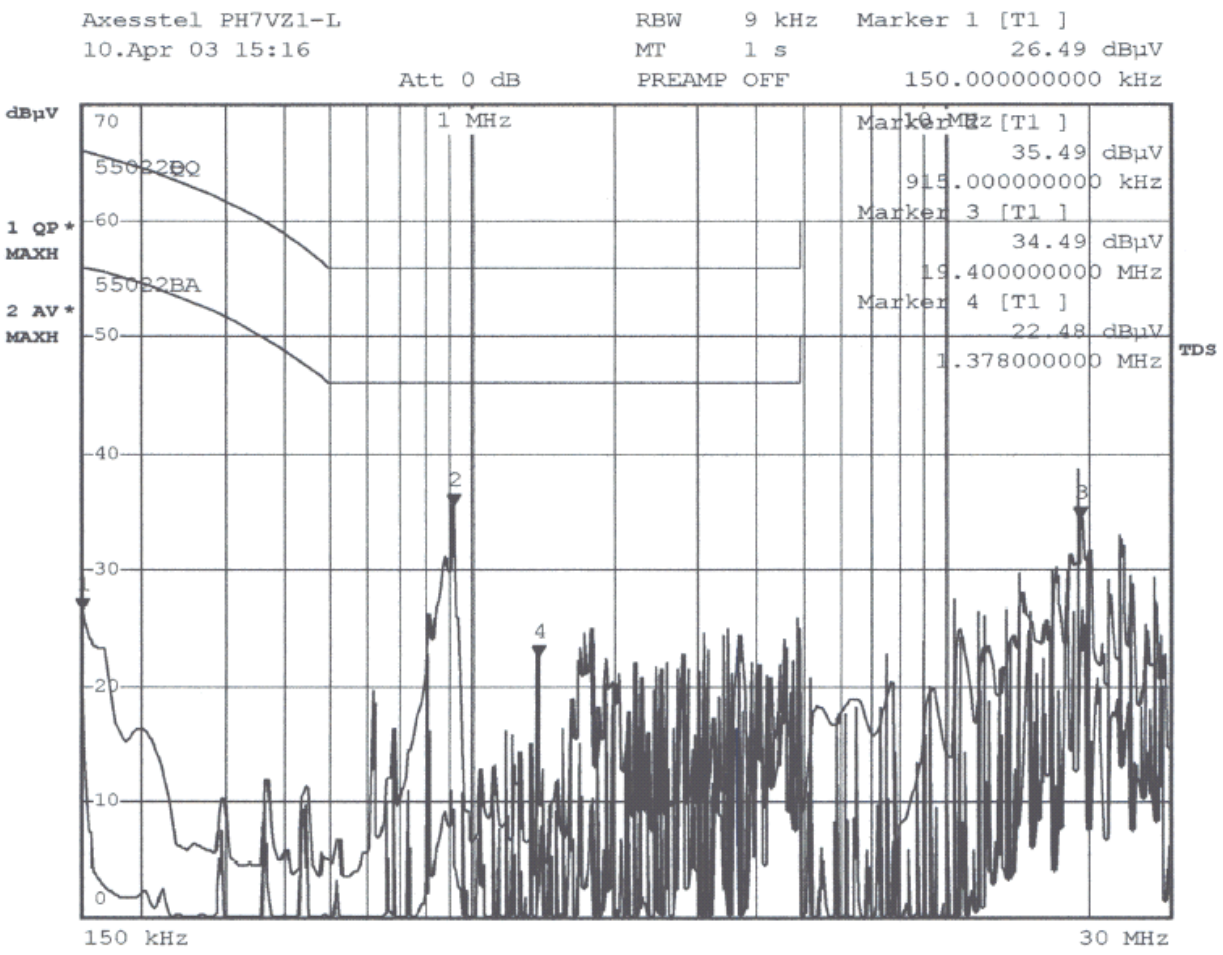
-11.0 dBμV at 1.180 MHz in the Neutral mode, 150kHz – 30 MHz

12.6 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
1.180	35.0	AVG	NEUTRAL	46	-11.0
19.400	37.6	AVG	NEUTRAL	50	-12.4
19.400	37.5	AVG	LINE	50	-12.5
1.180	38.7	QP	NEUTRAL	56	-17.3
0.915	35.5	QP	LINE	56	-20.5
0.915	33.4	QP	NEUTRAL	56	-22.6
19.400	34.5	QP	LINE	60	-25.5
19.400	33.6	QP	NEUTRAL	60	-26.4
0.915	12.0	AVG	LINE	46	-34.0
0.915	10.0	AVG	NEUTRAL	46	-36.0
0.150	16.9	AVG	LINE	56	-39.1
0.150	26.5	QP	LINE	66	-39.5

12.7 Plot of Conducted Emissions Test Data

Plot(s) of Conducted Emissions Test Data is presented in the following page as reference.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PREAMP OFF
Marker 1 [T1]
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Marker 2 [T1]
35.49 dBµV
915.000000000 kHz
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34.49 dBµV
19.400000000 MHz
Marker 4 [T1]
22.48 dBµV
1.378000000 MHz
dBµV
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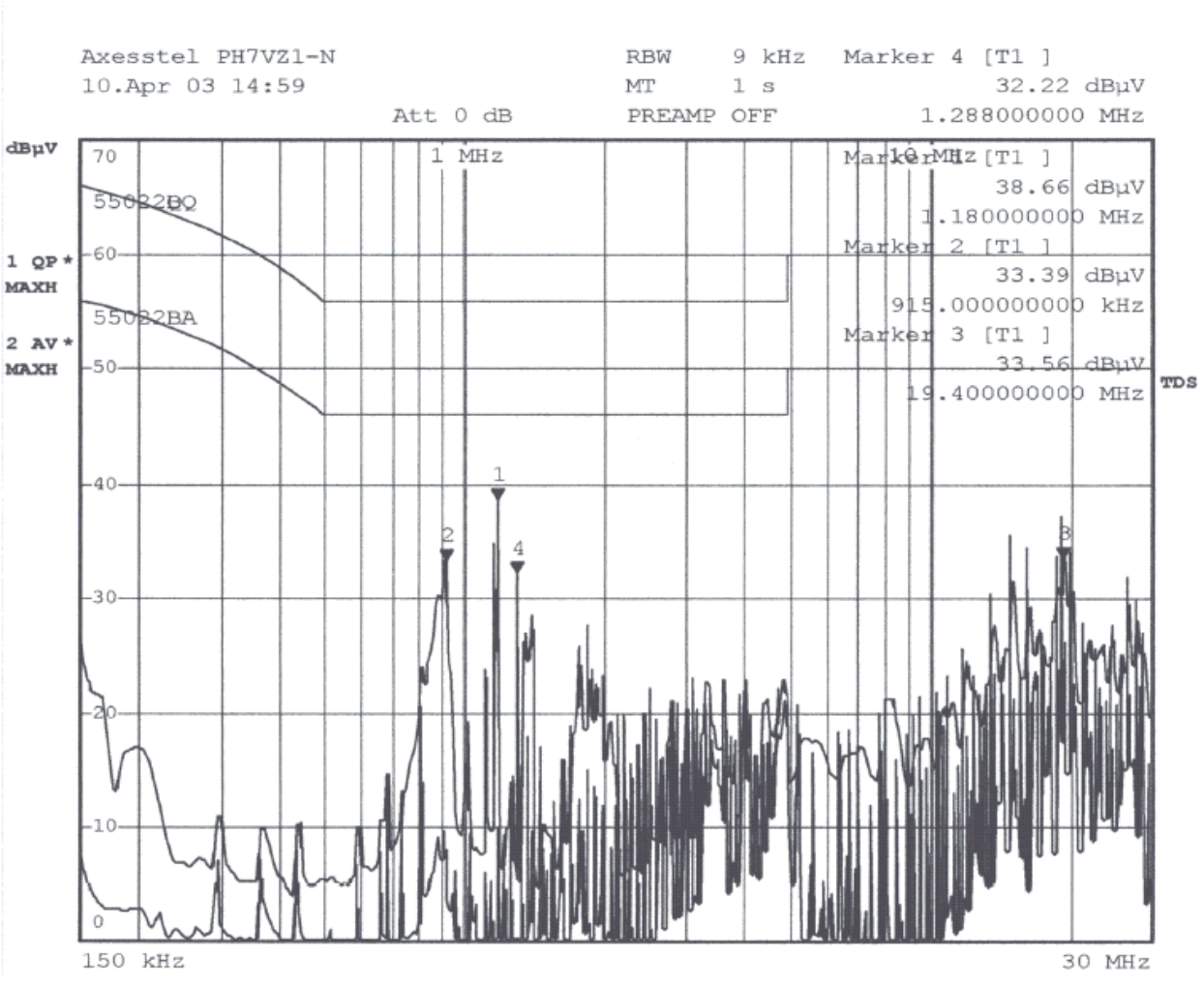
MAXH
2 AV*
MAXH
TDS
1 MHz
10 MHz
150 kHz
30 MHz


Axesstel PH7VZ1-N
10.Apr 03 14:59
RBW 9 kHz
MT 1 s
Att 0 dB
PREAMP OFF
Marker 4 [T1]
32.22 dBµV
1.288000000 MHz
Marker 1 [T1]
38.66 dBµV
1.180000000 MHz
Marker 2 [T1]
33.39 dBµV
915.000000000 kHz
Marker 3 [T1]
33.56 dBµV
19.400000000 MHz
dBµV
1 QP *
MAXH
2 AV *
MAXH
TDS
1 MHz
10 MHz
150 kHz
30 MHz