TEST REPORT

Ref. Report No.
03-341-005-01

Name and address of the applicant

ID-TECK CO., LTD.
684-1, Deungchon-Dong, Gangsuh-Gu,
Seoul, 157-030 Korea

Standard / Test regulation

FCC Part 15, Subpart C

Test result

Pass

Incoming date : October 20, 2004

Test date : November 02, 2004

Test item(s) ;

Low Power Communication Device Transmitter (Proximity Reader)

Model/type ref. ;

SR30

Manufacturer ;

ID-TECK CO., LTD.

Additional information ;

-Required Authorization : Certification
-FCC ID. : OYUSTARSR30
-Note : Test report(Verification) of Digital Device(Class B) portion of this unit is issued on Ref. Report No. 03-341-005-02.

Issue date : November 03, 2004

Tested and reported by

Jeong-Min Kim, Senior Engineer

Reviewed by

Won-Seo Cho , Telecommunication Team Manager

KOREA TESTING LABORATORY

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Ⅰ. GENERAL INFORMATION

1. Grantee's Name and Mailing Address : ID-TECK CO., LTD.
684-1, Deungchon-Dong, Gangsuh-Gu, Seoul, Korea, 157-030

2. Manufacturer's Name and Mailing Address : ID-TECK CO., LTD.
684-1, Deungchon-Dong, Gangsuh-Gu, Seoul, Korea, 157-030

3. Equipment Descriptions

3.1 Operating Frequency : 13.56 MHz
3.2 Power Supply for RE : DC 12 V
3.3 Power Adapter for CE : YK-12100U, DC 12 V 1.0A (Youkyoung Electronics Co., Ltd.)

4. Rules and Regulations : FCC Part 15, Subpart C

5. Measuring Procedure : ANSI C63.4-2001

6. Place of Measurement : Absorber-lined Room (KTL)

7. Date of Measurement

7.1 Conducted Emission : November 2, 2004
7.2 Radiated Emission : November 2, 2004

Ⅱ. GENERAL REQUIREMENTS OF THE EUT

1. Labelling Requirement (Section 15.19)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interface, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1.1 Location of Label : User's Guide Manual
1.2 How Applied : Printed

2. Information to User (Section 15.21)

The following or similar statements were provided in the manual for user instruction.
Please refer page 8 of the attached manual for details.

CAUTION : Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. Special Accessories (Section 15.27)

3.1 Were the special Accessories provided? [ ] yes, [x] no

3.2 If yes, details for the special accessories are as follows :

3.3 If yes, were the appropriate instructions provided on the first page of the text concerned with the installation of the device?
[ ] yes, [ ] no

3.4 Are these accessories provided of the type which can be readily obtained from multiple retail outlets ?
[ ] yes, [ ] no

And therefore does the manual specify what additional components or accessories are required to used in order to comply with the Rules?
[ ] yes, [ ] no

Ⅲ. CONDUCTED EMISSION MEASUREMENT (Section 15.207)

1. Test Procedure

Conducted emission measurements on the EUT were performed by "AC Power Line Conducted Emissions Testing" procedure as per ANSI C63.4. The EUT was set up on a wooden table 0.8 meters height, 1.0 by 1.5 meters in size, placed in the shielded enclosed with a side of wall of which constituted a vertical conducting surface of 2.2 m x 3.1 m in size to maintain 40 cm from the rear of EUT

LISN(Line Impedance Stabilization Network, EMCO, 3825/2, 50 ohm / 50 μH) was installed and electrically boned to the conducting ground plane. The EUT was connected to the LISN using a typical power adapter.

One of two 50 ohm output terminals of the LISN was connected to the EMI Receiver(ROHDE & SCHWARZ, ESI7, 20 Hz to 7 GHz) and the other was terminated in 50 ohms. Measurements were again performed after interchanging such a connection oppositely.

The frequency range from 150 kHz to 30 MHz was examined and the remarkable frequencies were measured with Quasi-peak and Average values using the EMI receiver instrument (ROHDE & SCHWARZ, ESI7, 20 Hz to 7 GHz ; Detector Function ; CISPR Quasi-Peak & Average). The 6 dB bandwidth of the Receiver was set to 9 kHz

The position of connecting cables of the EUT was changed to find the worst case configuration during measurements. The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

2. Photograph for the test configuration

3. Sample Calculation

The emission level measured in decibels above one microvolt (dBμV) was converted into microvolt (μV) as shown in following sample calculation.

For example :

	Measured Value at	13.56 MHz	46.0 dBμV @ average mode
+	Cable Losses *		0.0 dB
=	Conducted Emission		46.0 dBμV (= 199.5 μV)

* In case of RG214/ RF cable 15 Ft, the loss is about 0.17 dB at the frequency of 30 MHz which is negligible.

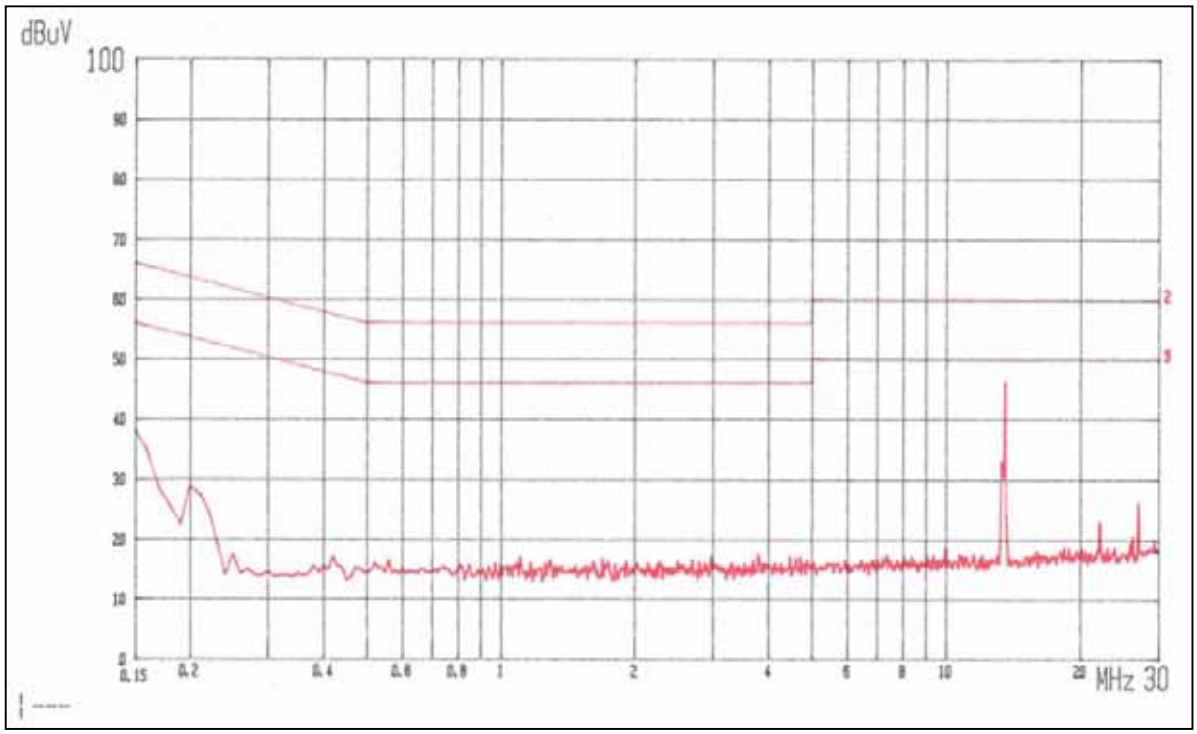
4. Measurement Data

- Resolution Bandwidth : x CISPR Quasi-Peak (6dB Bandwidth : 9 kHz)
  x Average (6dB Bandwidth : 9 kHz)

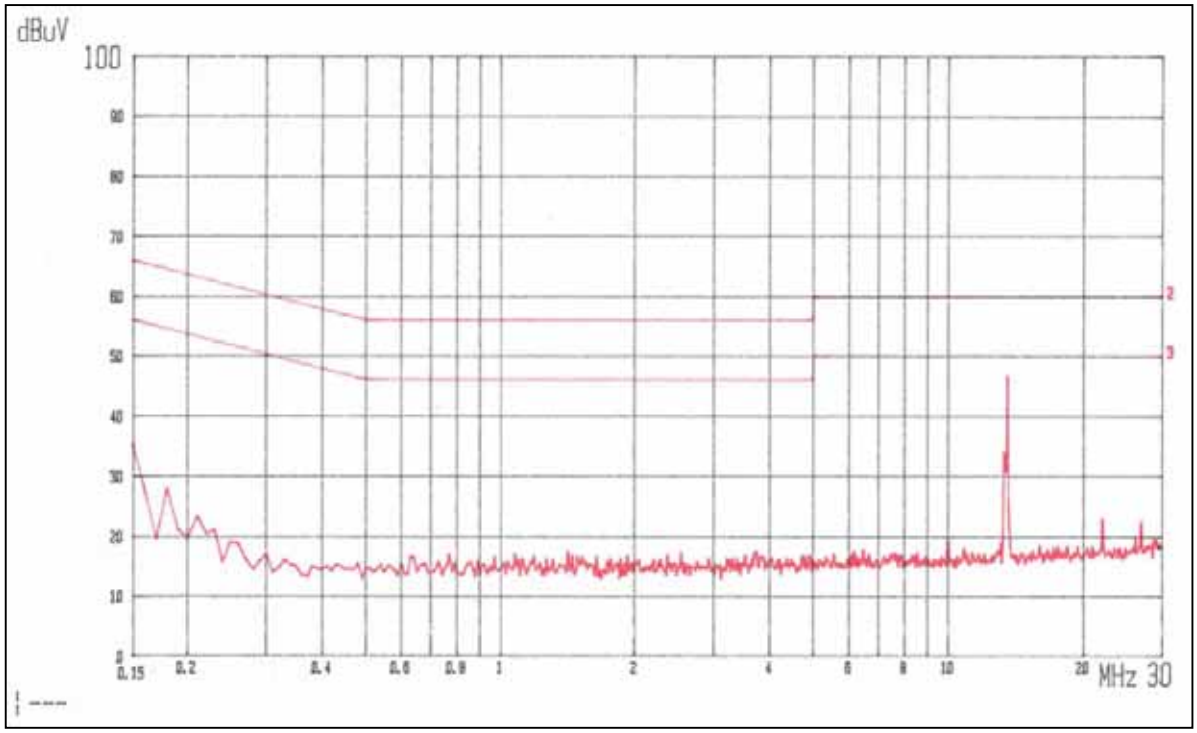
Power Lead Tested	Frequency (MHz)	Emission Level		Limit		(*) Margin	
		Q-Peak (dBμV)	Average (dBμV)	Q-Peak (dBμV)	Average (dBμV)	Q-Peak (dBμV)	Average (dBμV)
Live to Ground	0.20	19.5	5.7	63.6	53.6	-44.1	-47.9
	13.56	46.0	46.0	60.0	50.0	-14.0	- 4.0
	27.12	23.5	23.1	60.0	50.0	-36.5	-26.9
	--	--	--	--	--	--	--
Neutral to Ground	0.19	20.6	14.1	64.0	54.0	-43.4	-39.9
	13.56	46.6	46.6	60.0	50.0	-13.4	- 3.4
	22.12	19.9	19.0	60.0	50.0	-40.1	-31.0
	--	--	--	--	--	--	--

Note : Refer to measured graphs on next page.

* Margin(dB) : Emission Level (dB) - Limit (dB)



(Test side: Live-Ground side)



(Test side: Neutral-Ground side)

Ⅳ. RADIATED EMISSION MEASUREMENT (Section 15.225)

1. Test Procedure

1.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna (Loop antenna : 0.009 to 30 MHz, Biconi-Log antenna : 30 to 1000 MHz or Horn Antenna : 1 to 18 GHz) was placed at the distance of 1 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed by a plotter.

1.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL absorber-lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

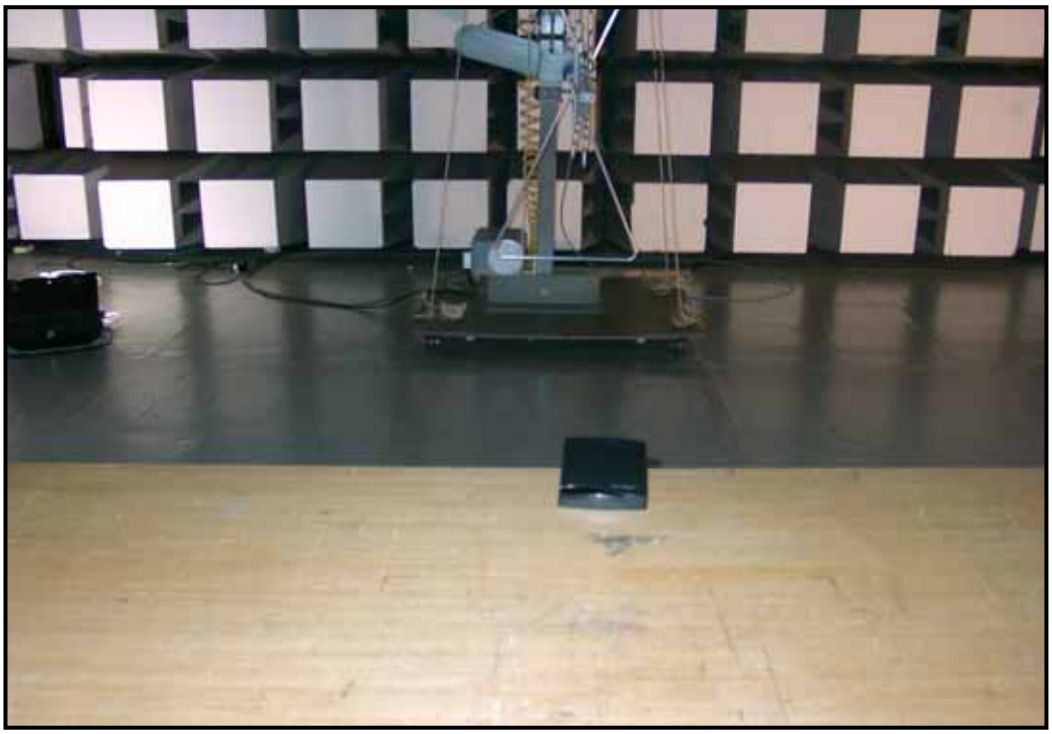
Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver or spectrum analyzer with a RF amplifier.

Turntable was rotated through 360 degrees and the center of the loop antenna was 1 meter above the ground plane. And the loop antenna was rotated along with its vertical axis and positioned horizontally to read maximum emission level.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using the square of an inverse linear distance extrapolation factor(40dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

2. Photograph of the test configuration



3. Sample Calculation

The emission level measured in decibels above one microvolt (dB μV) was calculated as shown in following sample calculation.

For example :

	Measured Value at	13.56 MHz	51.5 dB μV
+	Antenna Factor		9.5 dB
+	Cable Loss		0.5 dB
–	Preamplifier		0.0 dB
–	Distance Correction Factor *		40.0 dB
=	Radiated Emission		21.5 dB μV/m
			(= 11.9 μV/m)

* Extrapolated from the measured distance(3 m) to the specified distance(30 m) using the square of an inverse linear distance extrapolation.

4. Measurement Data

- Resolution Bandwidth : Q-Peak (6 dB Bandwidth : 120 kHz for ranges below 1 GHz)
- Measurement Distance : 3 Meter

Frequency (MHz)	* D.M.	* A.P.	Measured Value (dBμV)	* A.F. + C.L. (dB/m)	* A.G. (dB)	* D.C.F. (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	** Margin (dB)
13.56	Q	H	51.5	10.0	-	- 40.0	21.5	84.0	- 62.5
40.68	Q	V	10.0	14.3	--	--	24.3	40.0	- 15.7
44.24	Q	V	15.6	14.1	--	--	29.7	40.0	- 10.3
188.00	Q	V	7.8	11.9	--	--	19.7	43.5	- 23.8
189.85	Q	V	11.3	11.8	--	--	23.1	43.5	- 20.4
244.10	Q	V	17.3	13.4	--	--	30.7	46.0	- 15.3
--	--	--	--	--	--	--	--	--	--

Note
The upper frequency range of this test was 1 GHz. The observed EMI Test Receiver's noise floor level with RF preamplifier was 35.0 dBμV. And all other emissions not reported on data were more than 30 dB below the permitted level.

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor
< : Less than

** Margin (dB) = Emission Level (dB) - Limit (dB)

Note ;

(1) Fundamental emissions from the intentional radiators were not located within any of frequency bands described in section 15.205(a) listed below ;

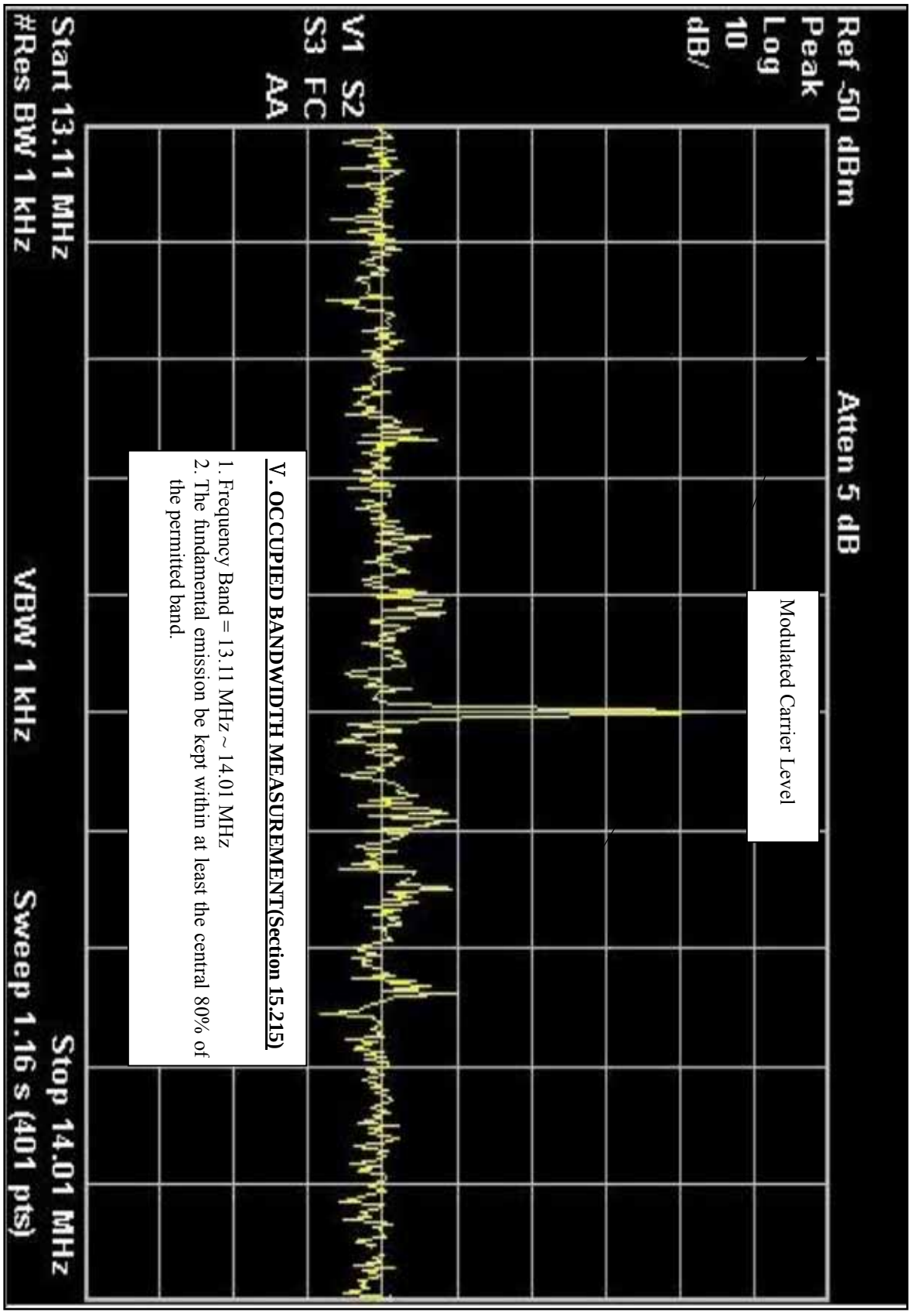
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.1775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	
13.36-13.41			

The field strength of emissions appearing within above frequency bands did not exceed the limits shown in section 15.209. At frequency equal to or less than 1000MHz, compliance with the limits section 15.209 was demonstrated using measurement employing a CISPR quasi-peak detector. Above 1000MHz, demonstrated based on the average value of the measured emissions.

(2) If the intentional radiator was operated under the radiated emission limits of the general requirements of section 15.209, it's fundamental emissions were not located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-860MHz.

(3) The level of any unwanted emissions from an intentional radiator did not exceed the level of the fundamental emission.

(4) Radiated and spurious emissions were checked from 30 MHz to 1 GHz. And all other emissions not reported on data were more than 30 dB below the permitted level.


Ref -50 dBm
Atten 5 dB
Peak
Log
10
dB/
V1 S2
S3 FC
AA
Start 13.11 MHz
#Res BW 1 kHz
VBW 1 kHz
Stop 14.01 MHz
Sweep 1.16 s (401 pts)
Modulated Carrier Level
V. OCCUPIED BANDWIDTH MEASUREMENT(Section 15.215)
1. Frequency Band = 13.11 MHz ~ 14.01 MHz
2. The fundamental emission be kept within at least the central 80% of the permitted band.

Ⅵ. FREQUENCY TOLERANCE MEASUREMENT (Section 15.225)

1. Test Procedure

1.1 Stability with respect to ambient temperature

Frequency tolerance measurements of the carrier signal were performed by "Frequency stability measurements" procedure as per ANSI C63.4. Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. If possible, a dummy load should be connected to the EUT, because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT.

Couple the EUT's output to the Spectrum Analyzer (Agilent, E4407B, 100 Hz to 26.5 GHz) or Frequency Counter (Anritsu, MF2412B, 10 Hz to 20 GHz) by connecting an antenna to the measurement instrument with a suitable length of coaxial cable and placing the measurement antenna near the EUT or by connecting a dummy load to the measuring instrument through an attenuator, if necessary.

Set the temperature control on the chamber to +50℃, and allow the temperature inside the chamber to stabilize at the set temperature before starting frequency measurements.

While maintaining a constant temperature inside the environmental chamber, turn the EUT on and record the operating frequency at startup and two, five, and ten minutes after the EUT is energized. Four measurements in total were made.

Repeat the above procedure until the number of specified frequencies has been measured. After all measurements have been made at +50℃, turn the EUT off.

Repeat the above measurement process for the EUT with the test chamber set at -20℃.

1.2 Stability with respect to input voltage

These measurements were made in environmental temperature test chamber set for a temperature of +20℃. Supply the EUT with nominal ac voltage or install a new or fully charged battery in the EUT. Turn on the EUT, and couple its output to a frequency Counter (Anritsu, MF2412B, 10 Hz to 20 GHz) or Spectrum Analyzer (Agilent, E4407B, 100 Hz to 26.5 GHz). Turn the EUT to one of the number of specified frequencies and adjust the location of the measurement antenna and the controls on the measuring instrument to obtain a suitable signal level.

Turn the EUT off, and place it in an environmental chamber if appropriate. Allow sufficient time for the chamber to stabilize at +20℃ before proceeding.

If the EUT is powered from the ac powerline, supply it with 85% and 115% of the nominal ac voltage and repeat the above procedure. If the EUT is battery-operated equipment, the equipment test shall be performed using a new battery.

Turn the EUT on, and measure the EUT operating frequency at startup, and two, five and ten minutes after startup. Repeat the above procedure until the number of specified frequencies.

2. Photograph of the test configuration

3. Measurement Data

Carrier Frequency (MHz)	Test Condition (Temperature, Supplied Power)	Frequency Offset (Hz)				Limit (Hz)	Results
		startup	2min	5min	10min		
13.56	+50℃, DC 12V	+730	+737	+734	+735	±1356	Passed
	-20℃, DC 12V	+735	+740	+756	+780	±1356	Passed
	+20℃, DC 10.2V	+736	+737	+734	+739	±1356	Passed
	+20℃, DC 13.8V	+725	+730	+732	+734	±1356	Passed

Ⅶ. TEST EQUIPMENT USED FOR MEASUREMENTS

Equipment	Model No.	Manufacturer	Serial No.	Effective Cal. Duration
EMI Receiver (20 MHz-1 GHz)	ESVS30	R & S	830516/002	06/16/04-06/16/05
EMI Receiver (20 Hz-7 GHz)	ESI	R & S	835571/004	09/08/04-09/08/05
Spectrum Analyzer (100 Hz-26.5 GHz)	E4407B	Agilent.	US41443316	10/20/04-10/20/05
Spectrum Analyzer (9 kHz-26.5 GHz)	8563A	H. P.	3222A02069	03/29/04-03/29/05
Spectrum Analyzer (100 Hz-22 GHz)	8566B	H. P.	3014A07057	05/27/04-05/27/05
Quasi-Peak Adapter (10 kHz-1 GHz)	85650A	H. P.	3107A01511	05/27/04-05/27/05
RF-Preselector (20 Hz-2 GHz)	85685A	H. P.	3010A01181	05/27/04-05/27/05
Test Receiver (9 kHz-30 MHz)	ESH3	R & S	860905/001	06/16/04-06/16/05
Frequency Counter (10 Hz-20 GHz)	MF2412B	Anritsu	6200303497	09/21/04-09/21/05
Synthesized Sweeper (10 MHz-20 GHz)	83620A	H. P.	3250A01653	06/16/04-06/16/05
Pre-Amplifier (0.1-3000 MHz, 30 dB)	8347A	H. P.	2834A00543	05/27/04-05/27/05
Pre-Amplifier (1-26.5 GHz, 35 dB)	8449B	H. P.	3008A00302	05/27/04-05/27/05
LISN(50 Ω , 50 μH) (10 kHz-100 MHz)	3825/2	EMCO	9010-1710	05/27/04-05/27/05
Biconical Ant. (30 MHz-300 MHz)	BBA 9106	Schwarzbeck	-	*
Biconi-Log Ant. (30 MHz-1000 MHz)	VULB9168	Schwarzbeck	9168-167	*
Log Periodic Ant. (200 MHz-1 GHz)	3146	EMCO	-	*
Horn Ant. (1 GHz-18 GHz)	3115	EMCO	-	*
Active Loop Ant. (9 kHz-30 MHz)	6502	EMCO	2532	*
Shielded Room (5.0 m x 4.5 m)	-	SIN-MYUNG	-	-

* Each set of antennas has been calibrated to ensure correlation with ANSI C63.5 standard. The calibration of antennas is traceable to Korea Standard Research Institute(KSRI).