Korea Technology Institute Co., Ltd.

Test Report

Test Report No.:	**KTI07EF12002**		
Registration No.:	**99058**		
Applicant:	**NITGEN CO., LTD.**		
Applicant Address:	**Sam-Oh Bldg, 3rd Floor, 905-4 HoGye-dong, DongAn-gu, AnYang-city, Gyunggi-do, Korea**		
Product:	**ACCESS CONTROLLER**		
FCC ID:	**PEBNAC-2500LM**	**Model No.**	**NAC-2500LM**
Receipt No.:	**07-1125**	**Date of receipt:**	**November 29, 2007**
Date of Issue:	**December 05, 2007**		
Testing location	**Korea Technology Institute Co., Ltd. 51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeungki-Do, Korea**		
Test Standards:	**FCC/ANSI. C63.4: 2003**		
Rule Parts: FCC	**Part 15, Class B**		
Equipment Class:	**Digital device**		
Test Result:	**The above-mentioned product has been tested with compliance.**		

Tested by: T.W. Lee
/ Engineer

Signature **Date**

Approved by: G. C. Min
/President

Signature **Date**

Other Aspects:	
Abbreviations:	**∗ OK, Pass=passed ∗ Fail=failed ∗ N/A=not applicable**

☞ **- This test report is not permitted to copy partly without our permission.**

- This test result is dependent on only equipment to be used.

- This test result is based on a single evaluation of one sample of the above mentioned.

- This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government.

- We certify this test report has been based on the measurement standards that is traceable to the national or international standards.

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Contents

1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. Korea Technology Institute Co., Ltd. performed all measurements reported herein. And were made under Chief Engineer's supervisor.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

Korea Technology Institute Co., Ltd.

Location

51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeungki-Do, Korea

The Test Site is in compliance with ANSI C63.4/2003 for measurement of radio Interference.

List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

- Conducted Emissions

Kind of Equipment	Type	S/N	Calibrated until
Field Strength Meter	ESIB40	100093	07.2008
LISN	KNW407	8-1157-2	01.2008
LISN	EM-7823	115019	05.2008
Conducted Cable	N/A	N/A	11.2008

- Radiated Emissions

Kind of Equipment	Type	S/N	Calibrated until
Field Strength Meter	ESIB40	100093	07.2008
Loop Antenna	6502	3434	06.2008
Biconic Logarithmic Periodic Antenna	VULB9163	9163-281	09.2008
Horn Antenna	3115	6443	2008.08
Open Site Cable	N/A	N/A	11.2008
Antenna Master	DETT-03	N/A	N / A
Antenna & Turntable controller	DETT-04	91X519	N / A

Test Date

Date of Application: November 29, 2007

Date of Test: December 03, 2007

Test Environment

Indoor: 24℃/39%/1000mbar

Outdoor: 9.6℃/20%/1000mbar

3. Description of the tested samples

The EUT is ACCESS CONTROLLER

Rating and Physical Characteristics

Function		Spec.
Display	Type	128 * 32 Dots LCD
	Language	Default: Korean, English Additional Type A: Japanese, Chinese, Spanish, French, Thai, Indonesian Additional Type B: Polish, Farsi, Malay, Hebrew, Vietnamese(voice only), Portuguese
Sensor	Model	OPP03 LFD
	Type	Optical
	Resolution	500 DPI
	Additional	Auto on / Latent Image Check Live Finger Detection
Authentication	Speed	1:1 mode: less than 1 sec / 1:N mode: Application Note
	Algorithm	FRR: less than 0.1% / FAR: less than 0.001%
#of registered users	Terminal	2000(1 finger prints per user) 1000(2 finger prints per user)
Communication	TCP/IP	10 base-T Ethernet (optional)
	RS-485	Max. 115200bps (custom requirement)
Additional function	Guidelines recorded in voice	
	Downloadable logo / firmware	
	IP length (4~15 digits)	
	Authentication results to be displayed in LED	
Optional	Network Board	
	Door Control Board	
	RF Module [125KHz HID(3M 500 ㎶/m, 13.56MHz Mifare(10M 93.5 dB㎶/m)]	

Submitted Documents

- **User's Guide**
- **Block Diagram**

4. Measurement Conditions

Testing Input Voltage: AC 220V

Modes of Operation

The EUT was in the following operation mode during all testing;

1) EUT operates a finger print job with connection to Note Pc

Additional Equipment

DEVICE TYPE	Manufacturer	M/N	S/N	FCC ID
Note PC	Samsung	SV20	E77191AW100064	DOC
Mouse	EUNXING ELECTRONICS	M2000	N / A	DOC
Adapter	DongKwan Samsung	AD-9019	CNBA4400130ASE3 82CD2742	DOC

Uncertainty

1) Radiated disturbance

Uc (Combined standard Uncertainty) = ± 1.8dB

Expanded uncertainty U=KUc

K = 2

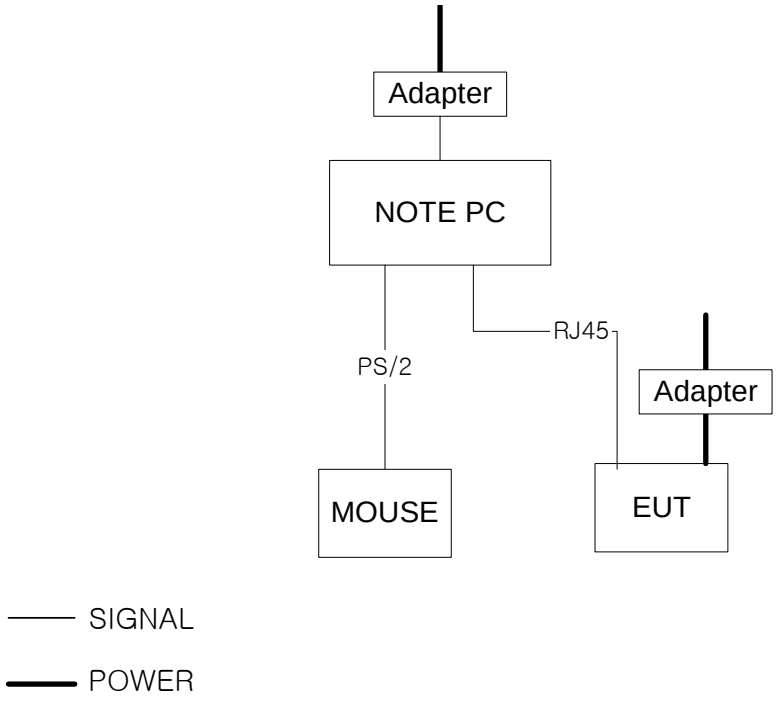
∴ U = ± 3.6dB

2) Conducted disturbance

Uc = ± 0.88dB

U = KUc=2 x Uc = ± 1.8dB

4.4 Test Setup



5. EMISSION Test

5.1.Conducted Emissions

Result: Pass

The line-conducted facility is located inside a 2.3M x 3.5M x 5.5M shielded closure.

The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 605-05. A 1m x 1.5m wooden table 80cm high is placed 80cm away from the conducting ground plane and 40cm away from the sidewall of the shielded room. Electro-Metroics Model EM-7823 (9kHz-30MHz)50ohm/50 uH Line-Impedance Stabilization Networks (LISN) are bonded to the shielded room.

The EUT is powered from the Electro-Metroics LISN and the support equipment is powered from the Kyoritsu LISN. Power to the LISN are filtered by a high-current high-insertion loss shield enclosures power line filters (100dB 14kHz-1GHz).

The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure.

All electrical cables are shielded by copper pipe with inner diameter of 1".

If the EUT is a DC-Powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the Rohde & Schwarz LISN.

All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.

Sufficient time for the EUT, Support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The frequency producing the maximum level was reexamined using EMI field Intensity meter (ESIB40). The detector function was set to CISPR quasi-peak mode.

The bandwidth of the receiver was set to 10kHZ. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; if applicable; whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in photograph of conducted test.

Each EME reported was calibrated using self-calibrating mode.

Figure 1: Spectral Diagram, LINE-PE

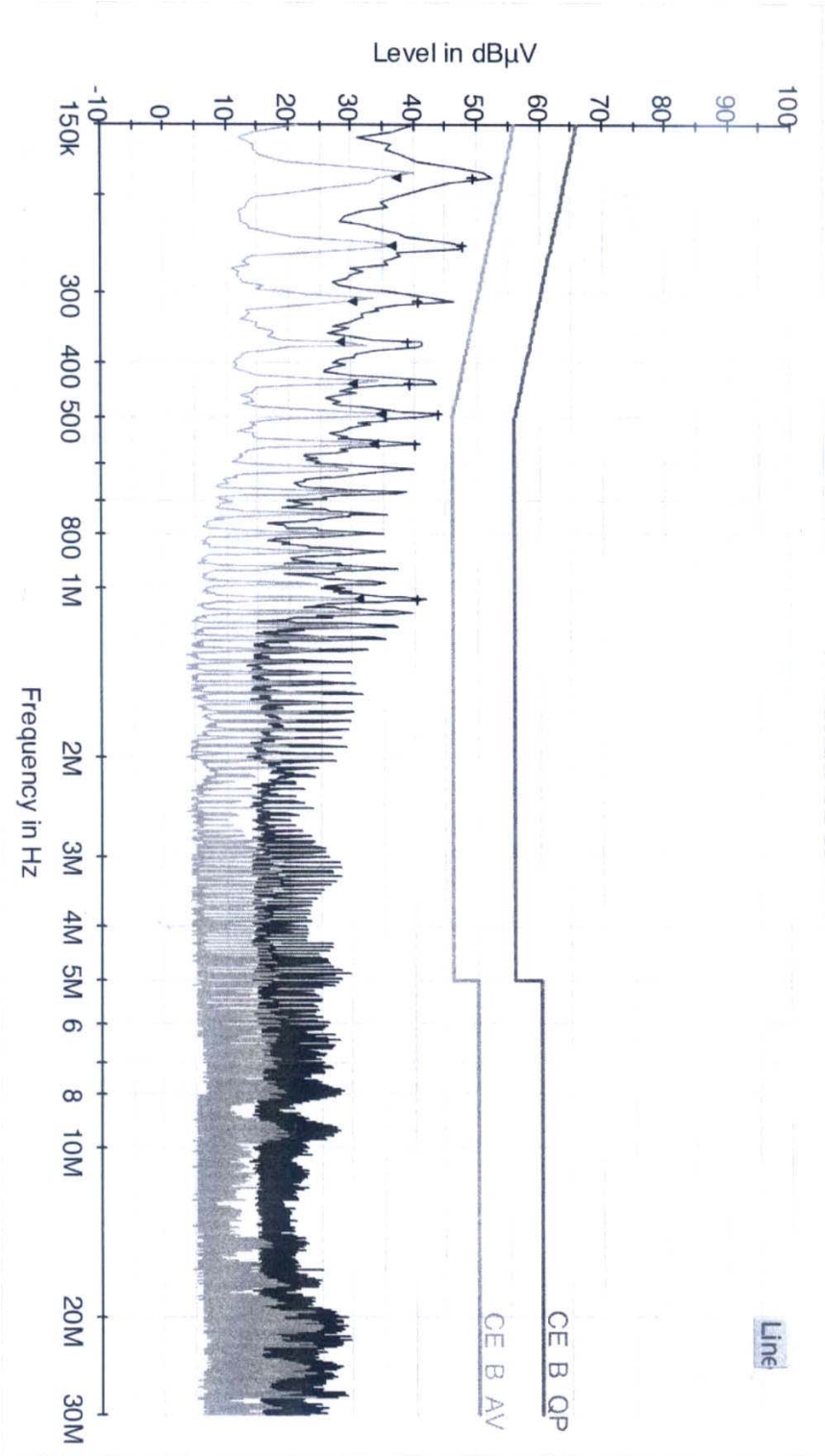


Figure 2: Spectral Diagram, NEUTRAL-PE

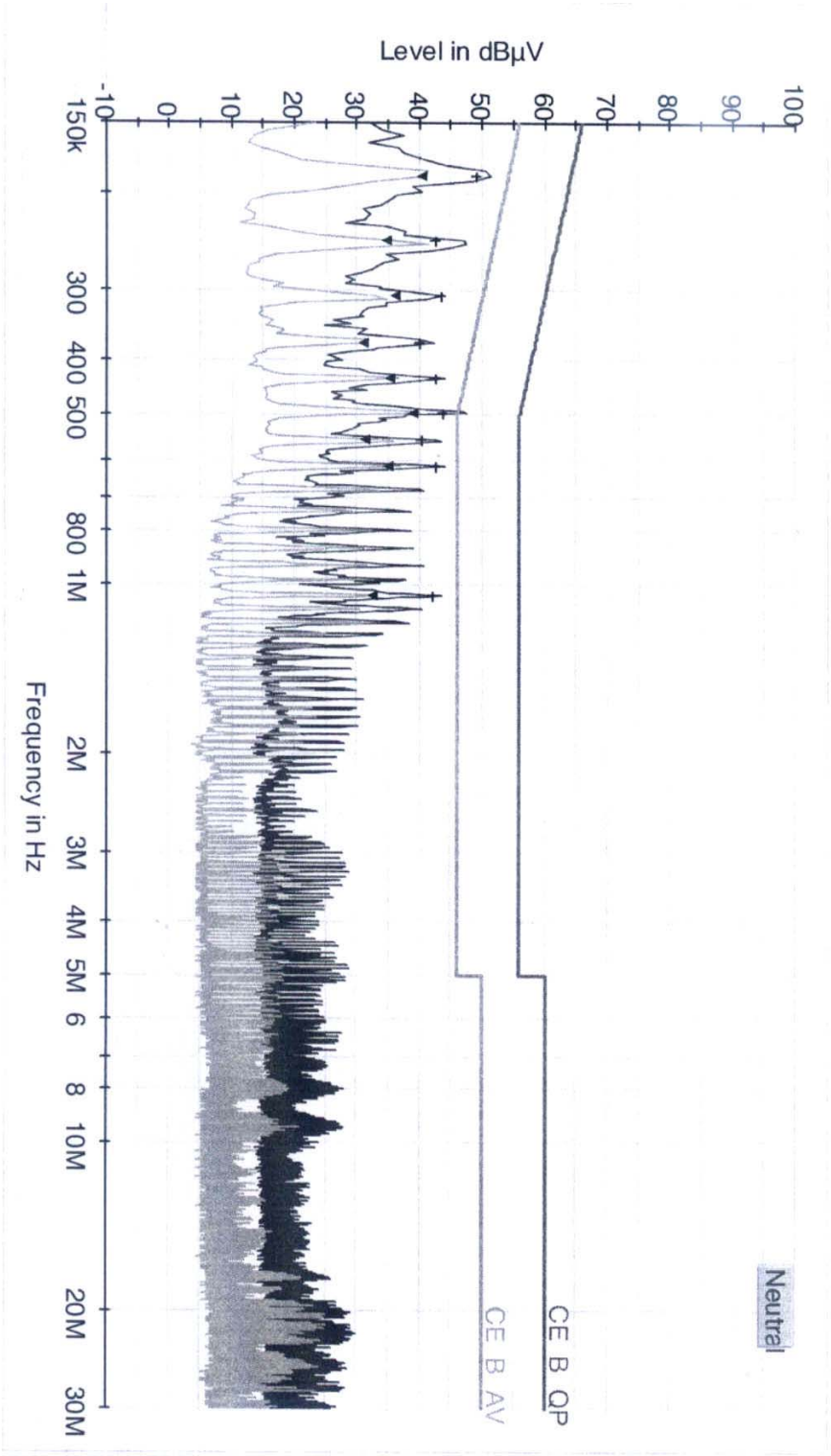


Table 2: Test Data, Conducted Emissions

Frequency (MHz)	(1) Reading (dBμV)	Line	(2)C/F (dB)	(3)Actual (dBμV)	(4) Limit (dBμV)	(5) Margin (dB)
0.19	49.29	L1	0.19	49.48	64.04	14.56
0.25	47.46	L1	0.19	47.65	61.76	14.11
0.31	43.32	L2	0.14	43.46	59.97	16.51
0.43	42.50	L2	0.21	42.71	57.25	14.54
0.49	43.65	L2	0.21	43.86	56.17	12.31
0.61	42.30	L2	0.23	42.53	56.00	13.47

NOTES:

1. All modes of operation were investigated
   And the worst-case emissions are reported.
2. All other emissions are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR Quasi-peak mode.
5. L1 = LINE-PE, L2 = NEUTRAL-PE
6. C/F = Correction Factor(LISN factor + Cable loss)
7. The limit for Class B digital device is 66dBuV to 56dBuV from 150KHz to 500KHz, 56dBuV from 500KHz to 5MHz, 60dBuV Above 5MHz.

♠ Margin Calculation

(5) Margin = (4) Limit – (3) Actual

[(3) Actual = (1) Reading + (2) C/F]

5.2 Radiated Emissions

Result: Pass

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband Amplifier, and spectrum analyzer to determine the frequency producing the maximum EME.
Appropriate precaution was taken to ensure that all EME from the EUT were maximized and Investigated. The system configurations, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30MHz to 1GHz using Biconic Logarithmic Periodic Antenna. Above 1GHz, Double ridged horn Antenna was used.
Final measurements were made outdoors at 3-meter test range using Schwarzbeck antennas. The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with Polyethylene film. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter (ESIB40). The detector function was set to CISPR quasi-peak or peak mode as appropriate and the bandwidth of the receiver was set to 120kHz or 1 MHz depending on the frequency or type or signal.
The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8meter high non-metallic 1 x 1.5 meter table.
The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna and rotating the EUT in turns with three orthogonal axes for portable devices, whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of radiated emission test.
Each EME reported was calibrated using self-calibrating mode.

Table 3: Test Data, Radiated Emissions

Frequency (MHz)	Pol.	Height [m]	Angle [°]	(1) Reading (dBμV)	(2) AFCL (dB/m)	(3) Actual (dBμV/m)	(4) Limit (dBμV/m)	(5) Margin (dB)
52.80	V	1.05	35	20.60	13.16	33.76	40.00	6.24
147.48	V	1.10	38	26.20	9.98	36.18	43.50	7.32
162.20	V	1.13	40	22.90	10.73	33.63	43.50	9.87
239.60	V	1.20	25	24.10	15.70	39.80	46.00	6.20
335.48	V	1.22	31	22.10	18.84	40.94	46.00	5.06
527.16	V	1.15	18	17.30	23.32	40.62	46.00	5.38

Table. Radiated Measurements at 3-meters

Notes: 1.All modes of operation were investigated.
And the worst-case emission are reported.

2.All other emission is non-significant.

3.All readings are calibrated by self-mode in receiver.

4.Measurements using CISPR quasi-peak mode.

5.AFCL = Antenna factor and cable loss

6.H = Horizontal, V = Vertical Polarization

7. The limit for Class B digital device is 100uV(40dBuV) from 30MHz to 88MHz, 150 uV (43.5dBuV) from 88MHz to 216MHz, 200uV(46dBuV) from 216MHz to 960MHz and 500 uV (54dBuV) from above 960MHz.

♠ Margin Calculation

(5) Margin = (4) Limit – (3) Actual

[(3) Actual = (1) Reading + (2) AFCL]

6. TEST AND MEASUREMENTS

Summary of Test Results

Requirement	FCC, 47CFR15	Report Section	Test Result
Antenna Requirement	15.203	6.1	**PASS**
Radiated Emissions Field Strength within the band 13.553 – 13.567 MHz	15.225(a)	6.2	**PASS**
Field Strength within the bands 13.410–13.553MHz and 13.567–13.710 MHz 13.110–13.410MHz and 13.710–14.010 MHz	15.225(b) & (c)	6.2	**PASS**
Radiated Harmonics and Spurious Emissions Outside of the 13.110–14.010 MHz	15.225(d)	6.2	**PASS**
Frequency Tolerance of the Carrier Signal	15.225(e)	6.3	**PASS**
Power Line Conducted Emissions	15.207(a)	5.1	**PASS**

6.1 ANTNNA REQUIRMENT

6.1.1 Regulation

FCC 47CFR15 – 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

6.1.2 Result: PASS

The transmitter has an integral PCB loop antenna that is enclosed within the housing of the EUT, and meets the requirements of this section.

6.2 RADIATED EMISSIONS

6.2.1 Regulation

FCC 47CFR15 – 15.225

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848

microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions

shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions

shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Frequency (MHz)	Field strength limit (uV/m) @ 30m	Field strength limit (dBuV/m) @ 30m	Field strength limit (dBuV/m) @ 3m
13.110 – 13.410	106	40.5	80.5
13.410 – 13.553	334	50.5	90.5
13.553 – 13.567	15,848	84.0	124.0
13.567 – 13.710	334	50.5	90.5
13.710 – 14.010	106	40.5	80.5

FCC 47CFR15 – 15.209

(a)Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength limit (uV/m)	Field strength limit (dBuV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	48.5-13.8	300
0.490 – 1.705	24000/F(kHz)	33.8-23.0	30
1.705 – 30.0	30	29.5	30
30 – 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
Above 960	500	54.0	3

6.2.2 Measurement Procedure

Radiated Emissions Test, 9kHz to 30MHz (Magnetic Field Test)

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions at a distance of 3 meters according to Section 15.31(f)(2).

2. The EUT was placed on the top of the 0.8-meter height, 1 x 1.5 meter non-metallic table.

3. Emissions from the EUT are maximized by adjusting the orientation of the Loop antenna and rotating the EUT on the turntable. Manipulating the system cables also maximizes EUT emissions if applicable.

4. To obtain the final measurement data, each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector with specified bandwidth.

Radiated Emissions Test, 30 MHz to 18000 MHz

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an anechoic chamber at a distance of 3 meters.

2. The EUT was placed on the top of the 0.8-meter height, 1 x 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360

3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 30 to 1000 MHz using the Biconical and Logperiodue broadband antenna, and from 1000 MHz to 18000 MHz using the horn antenna.

4. To obtain the final measurement data, the EUT was arranged on a turntable situated on a 4 x 4 meter at the Open Area Test Site. The EUT was tested at a distance 3 meters.

5. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

6. The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT

6.2.3 Calculation of the field strength limits below 30 MHz

1. No special calculation for obtaining the field strength in dBuV/m is necessary, because the EMI receiver and the active loop antenna operate as a system, where the reading gives directly the field strength result (dBuV/m). The antenna factors and cable losses are already taken into consideration.

2. For test distance other than what is specified, but fulfilling the requirements of section 15.31 (f)(2) the field strength is calculated by adding additionally an extrapolation factor of 40dB/decade (inverse linear distance for field strength measurements).

3. All following emission measurements were performed using the test receiver's average, peak, and quasi-peak detector function with specified bandwidth.

4. The basic equation is as follows;

FS = RA + DF

Where

FS = Field strength in dBuV/m

RA = Receiver Amplitude in dBuV/m

DF = Distance Extrapolation Factor in dB

Where DF = $40\log(D_{TEST} / D_{SPEC})$ where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance

DF = 40log(3m/300m) = -80dB, for frequency band 0.009 to 0.490MHz

DF = 40log(3m/300m) = -40dB, for frequency band 0.490 to 30MHz

6.2.4 Test Results (Test mode : Modulated) PASS

FCC 47CFR15 – 15.225

Frequency (MHz)	Pol.	Height [m]	Angle [°]	(1) Reading (dBμV)	(2) AFCL (dB/m)	(3) Actual (dBμV/m)	(4) Limit (dBμV/m)	(5) Margin (dB)
13.17	V	1.05	35	12.87	10.74	23.61	80.5	56.89
13.54	V	1.10	38	- 7.44	10.74	3.30	90.5	87.20
13.56	V	1.33	40	33.40	10.74	44.14	124.0	87.13
13.69	V	1.20	25	- 7.04	10.74	3.70	90.5	86.80
13.82	V	1.22	31	13.05	10.74	23.79	80.5	56.71

Margin (dB) = Limit – Actual
[Actual = Reading + AF + CL]
1.H = Horizontal, V = Vertical Polarization
2.AF/CL = Antenna Factor and Cable Loss

FCC 47CFR15 – 15.209

Frequency (MHz)	Pol.	Height [m]	Angle [°]	(1) Reading (dBμV)	(2) AFCL (dB/m)	(3) Actual (dBμV/m)	(4) Limit (dBμV/m)	(5) Margin (dB)
0.314	V	1.35	32	32.24	12.17	-35.59	17.7	53.29
1.001	V	1.40	25	21.14	11.85	-7.01	27.6	34.61
14.75	V	1.25	40	37.17	10.14	-12.69	29.5	42.19
15.14	V	1.23	29	18.01	10.14	-11.85	29.5	41.35
15.26	V	1.38	35	17.50	10.14	-12.36	29.5	41.86

Margin (dB) = Limit – Actual
[Actual = FS + AF + CL]
1.H = Horizontal, V = Vertical Polarization
2.AF/CL = Antenna Factor and Cable Loss
3.FS = RA + DF
Where FS = Field strength in dBuV/m
RA = Reciever Amplitude in dBuV/m
DF = Distance Extrapolation Factor in dB

6.3 FREQUENCY TOLERANCE OF CARRIER SIGNAL

6.3.1 Regulation

FCC 47CFR15 – 15.225(e)

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of –20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery-operated equipment, the equipment tests shall be performed using a new battery.

6.3.2 Measurement Procedure

Frequency stability versus environmental temperature

1.Supply the EUT with nominal AC voltage.

2.Turn the EUT off, and place it inside an environmental temperature chamber. For devices that are normally operated continuously, the EUT may be energized while inside the test chamber. For devices that have oscillator heaters, energize only the heater circuit while the EUT is inside the chamber.

3.RF output was connected to a frequency counter or other frequency-measuring instrument via feed through attenuators.

4.Set the temperature control on the chamber to the highest specified EUT operating temperature, and allow the temperature inside the chamber to stabilize at the set temperature before starting frequency measurements.

5.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.

6.After all measurements have been made at the highest specified temperature turn the EUT off.

7.Repeat the above measurement process for the EUT with the test chamber set at the appropriate temperature.

Frequency Stability versus Input Voltage

1.At temperature (20 ± 5°C), supply the EUT with nominal AC voltage.

2.Couple RF output to a frequency counter or other frequency-measuring instrument.

3.Turn the EUT on, and measure the EUT operating frequency at startup and two, five, and ten minutes after startup.

4.Supply it with 85% of the nominal AC voltage and repeat above procedure.

5. Supply it with 115% of the nominal AC voltage and repeat above procedure.

6.3.3 Test Results : PASS

TEST MODE : without RFID card (modulated)

Table 3 : Frequency Tolerance

Reference Frequency : 13.5600MHz, LIMIT : within ±1356Hz

Environment Temperature [°C]	Power Supplied [V_{AC}]	Carrier Frequency Measured with Time Elapsed							
		STARTUP		2 minutes		5 minutes		10 minutes	
		[MHz]	Err[Hz]	[MHz]	Err[Hz]	[MHz]	Err[Hz]	[MHz]	Err[Hz]
+50	120	13.561245	1245	13.561258	1258	13.561273	1273	13.561291	1291
+40	120	13.561228	1228	13.561249	1249	13.561258	1258	13.561279	1279
+30	120	13.561204	1204	13.561206	1206	13.561228	1228	13.561245	1245
+20	120	13.561204	1204	13.561215	1215	13.561230	1230	13.561242	1242
+10	120	13.561205	1205	13.561217	1217	13.561233	1233	13.561243	1243
0	120	13.561211	1211	13.561224	1224	13.561238	1238	13.561251	1251
-10	120	13.561220	1220	13.561225	1225	13.561238	1238	13.561273	1273
-20	120	13.561230	1230	13.561245	1245	13.561253	1253	13.561291	1291

Reference Frequency : 13.5600MHz, LIMIT : within ±1356Hz

Power Supplied [V_{AC}]	Carrier Frequency Measured with Time Elapsed							
	STARTUP		2 minutes		5 minutes		10 minutes	
	[MHz]	Err[Hz]	[MHz]	Err[Hz]	[MHz]	Err[Hz]	[MHz]	Err[Hz]
85 %	13.561183	1183	13.561211	1211	13.561223	1223	13.561233	1233
100 %	13.561204	1204	13.561216	1216	13.561230	1230	13.561243	1243
115 %	13.561208	1208	13.561223	1223	13.561256	1256	13.561279	1279

Err[Hz] = Measured carrier frequency (MHz) – Reference Frequency (13.56 MHz)

7. Emission Band Measurement

7.1 Standard Applicable

According to 15.225, The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of –20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

7.2 Measurement Procedure

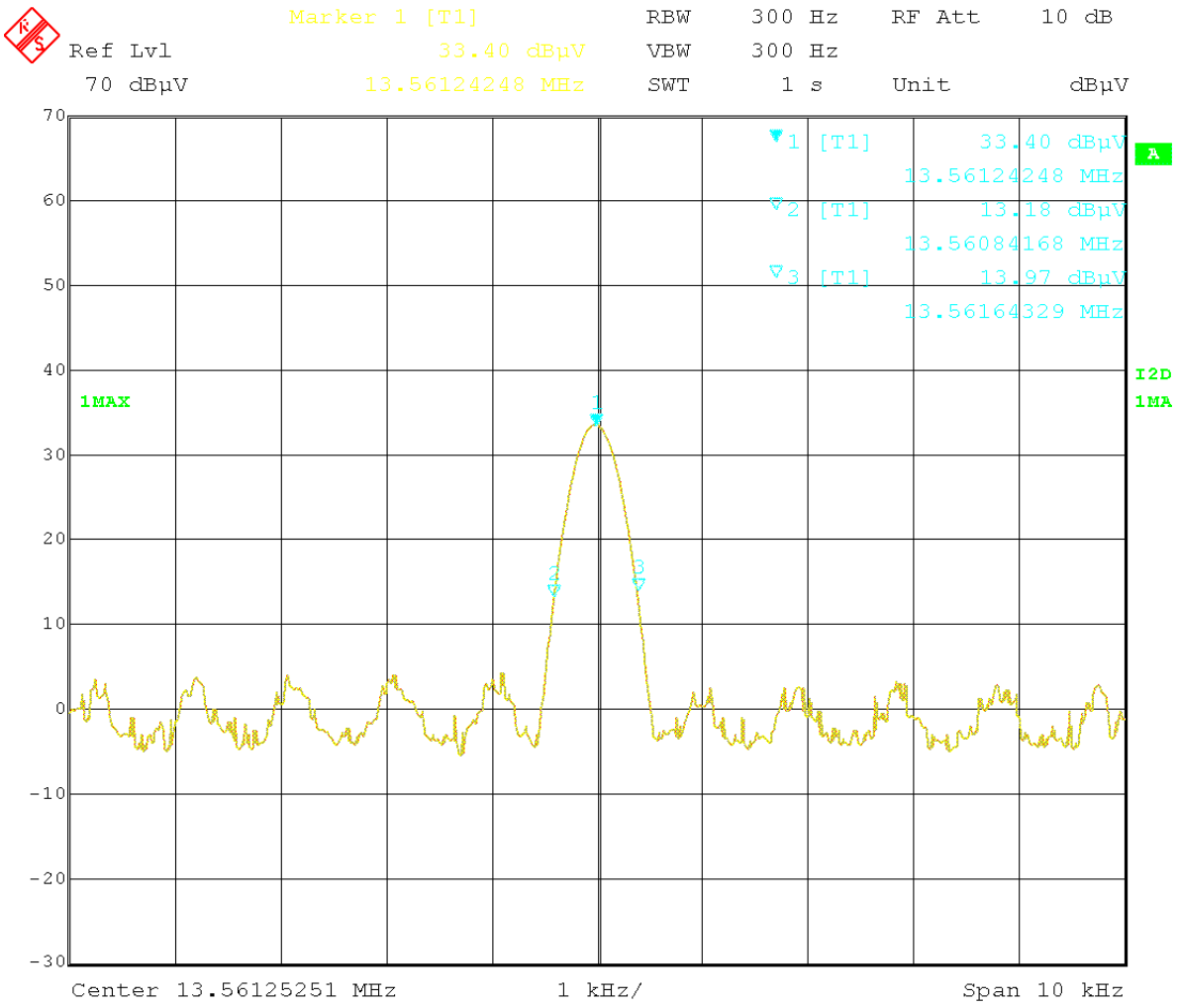
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 1 and measurement the turn on the EUT. Then set it to any one measured frequency within its operation range and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 10 KHz and 100 KHz respectively with a convenient frequency span including 111 KHz bandwidth of the emission.
4. Mark the bandwidth of emission points and plot the graph on spectrum analyzer.
5. Repeat above procedures until all measured frequencies were complete.

7.3 Measurement Data

1. Test result:

A. Field strength = 1.611 microvolts/meter

Occupied Bandwidth



F_L = 13.560841 MHz

F_H= 13.561643 MHz

Occupied Bandwidth = 0.000802 MHz

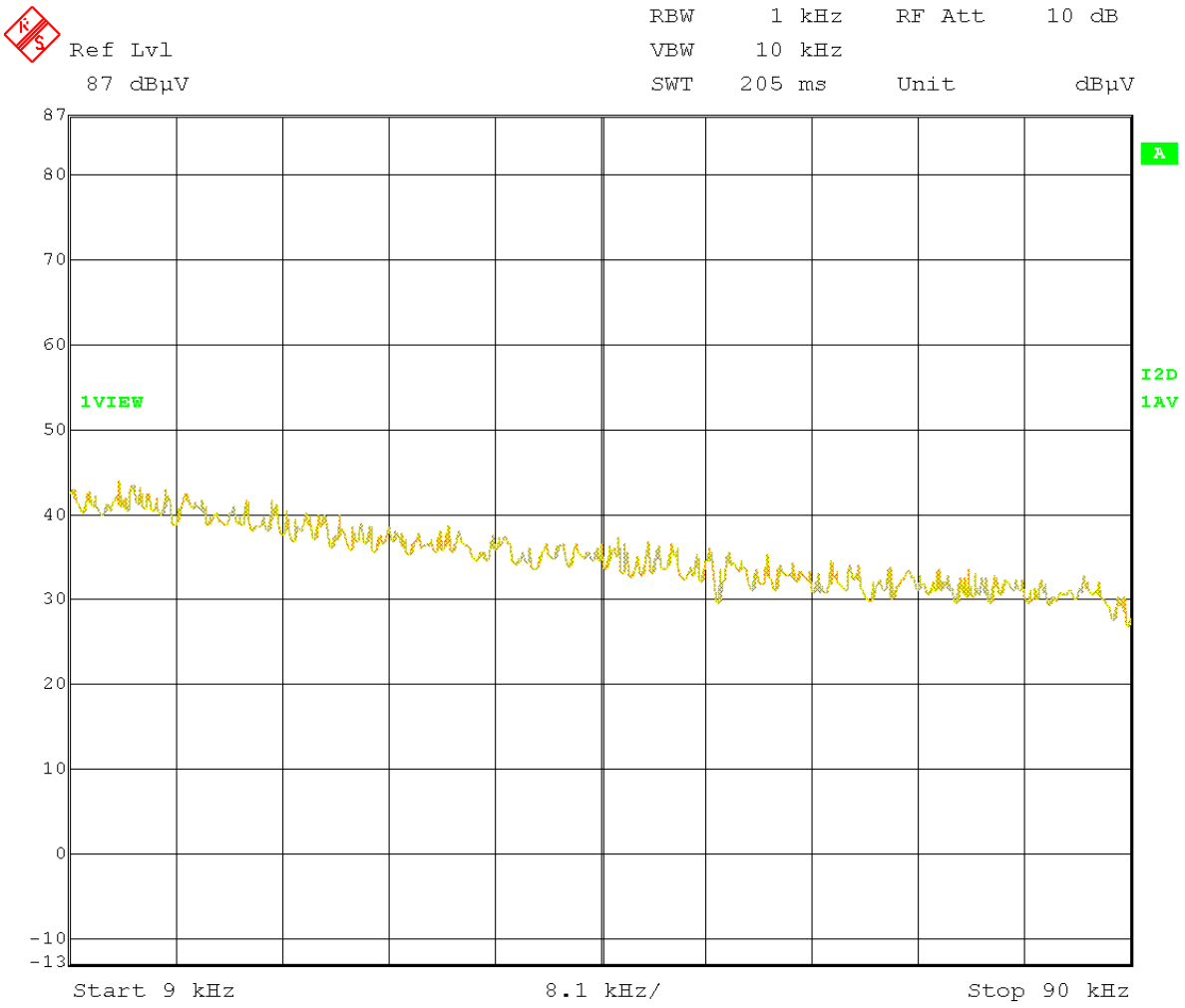
= 802 Hz

FS= RA + DF

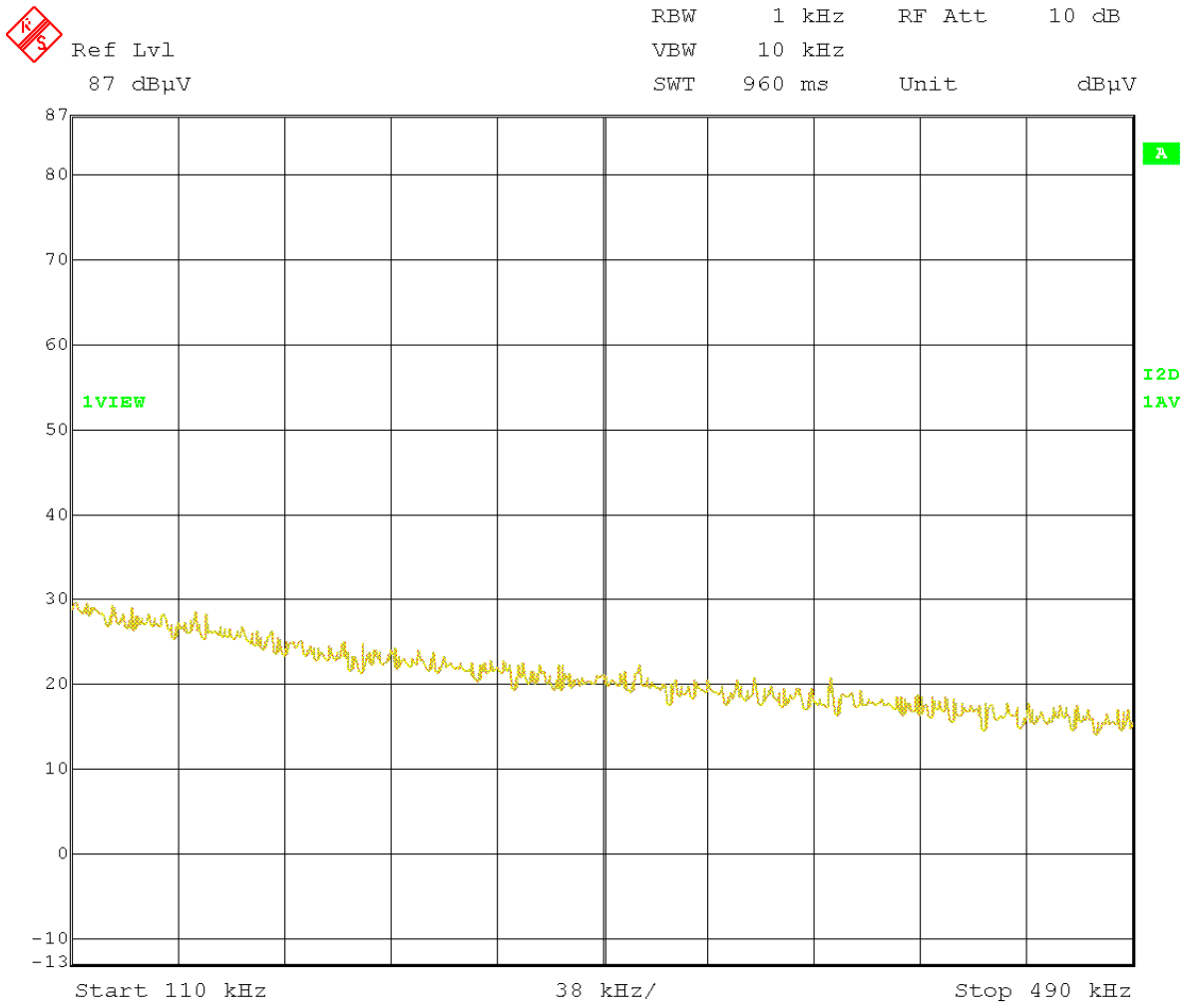
= 44.14 – 40.00 = 4.14 dBuV/m = 1.611 uV/m

(RA = Reading + AFCL = 33.40 + 10.74 = 44.14)

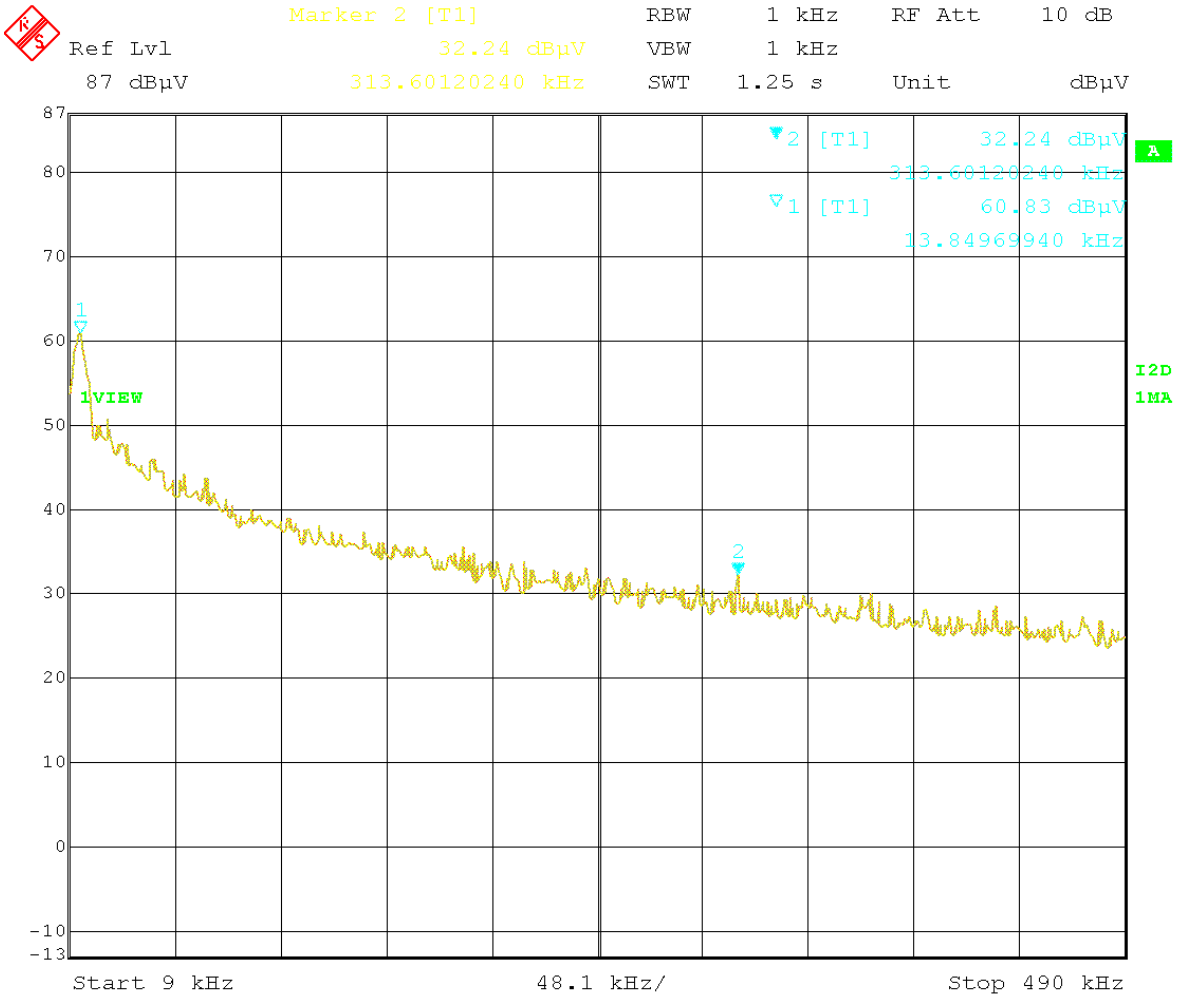
Emissions below 30 MHz (9 kHz – 90 kHz) @ 3m Average



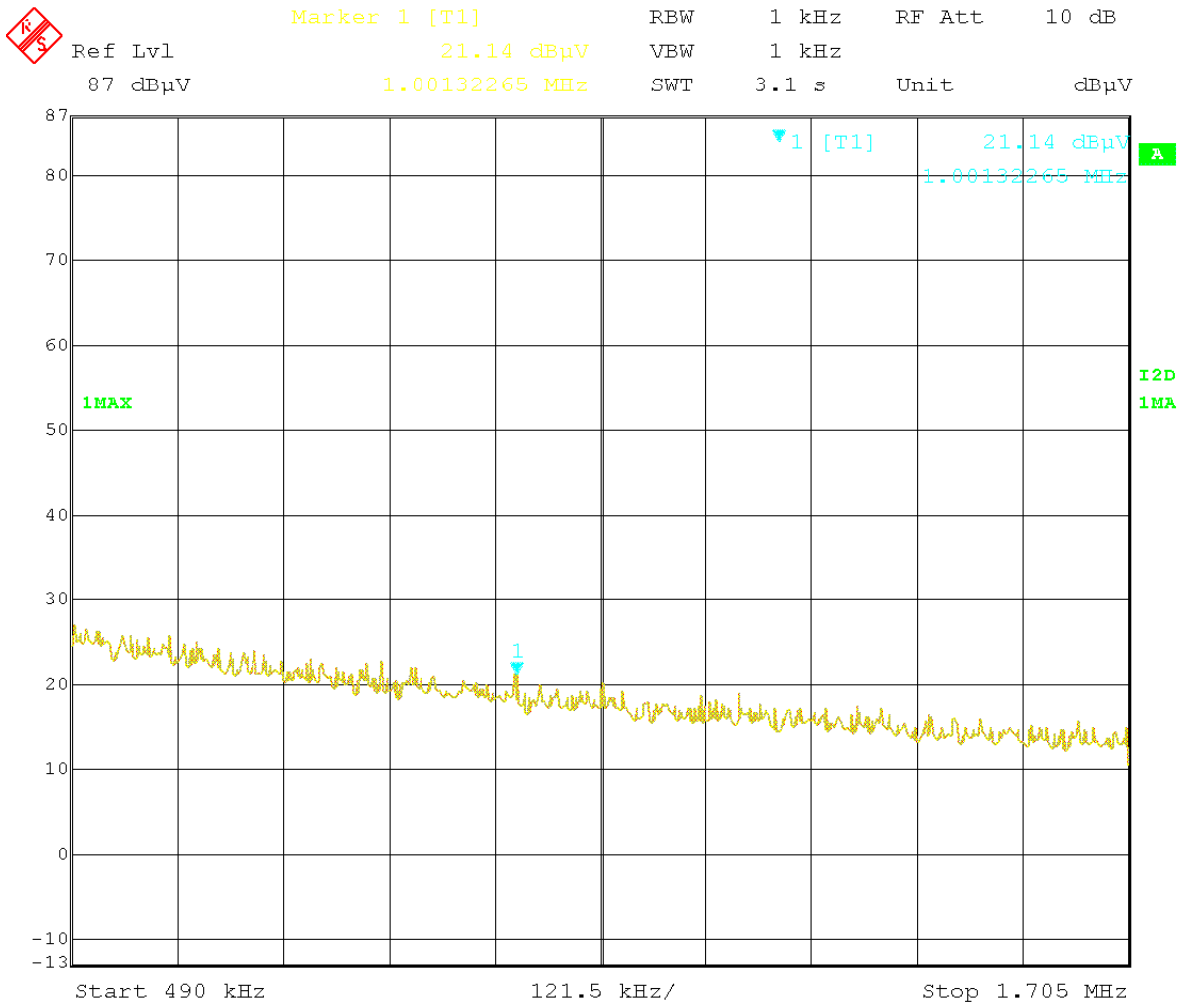
Emissions below 30 MHz (110 kHz – 490 kHz) @ 3m Average



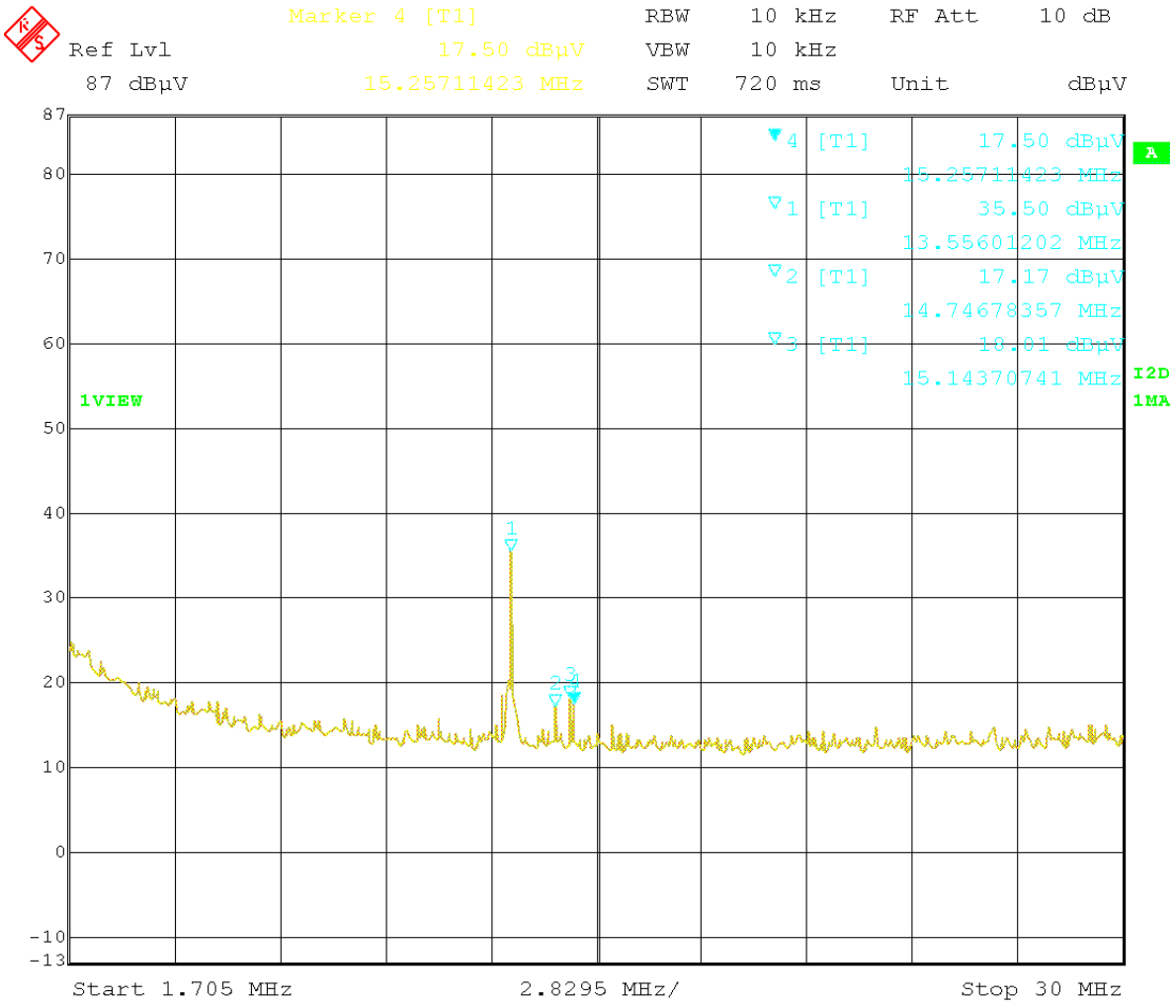
Emissions below 30 MHz (9 kHz – 490 kHz) @ 3m Peak



Emissions below 30 MHz (490 kHz – 1.705 MHz) @ 3m Peak



Emissions below 30MHz (1.705 MHz – 30 MHz) @ 3m Peak



Spectrum Mask