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Report No.: GZEM130400153801  
Page: 1 of 18  
FCC ID: QOF-8032383

## TEST REPORT

Application No.:	GZEM1304001538RF
Applicant:	Disney Interactive Studios, Inc.
FCC ID:	QOF-8032383
Product Name:	Disney Infinity Base INF-8032383
Product Description:	Radio Frequency Identification with 13.56 MHz as carrier.
Model No.:	INF-8032383
Standards:	47 CFR PART 15 SUBPART C:2012 section 15.225 ANSI C63.10:2009
Date of Receipt:	2013-03-22
Date of Test:	2013-03-22 to 2013-04-18
Date of Issue:	2013-05-06
Test Result :	<b>PASS *</b>

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 3 of this report for further details.



**Manager**

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2013-05-06		Original

<b>Authorized for issue by:</b>			
<b>Tested By</b>			2013-03-22 to 2013-04-18 <b>Date</b>
<b>Prepared By</b>			2013-05-06 <b>Date</b>
<b>Checked By</b>			2013-05-06 <b>Date</b>



### 3 Test Summary

Test	Test Requirement	Test method	Result
Radiated Emission (9 kHz to 1 GHz)	FCC PART 15 C section 15.225	ANSI C63.10: Clasue 6.4, 6.5	PASS
Occupied Bandwidth	FCC PART 15 C section 15.225	ANSI 63.10 Clasue 6.9	PASS
Frequency Stability	FCC PART 15 C section 15.225	ANSI C63.10 Clasue 6.8	PASS

**Remark:**

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radio Frequency.

ANSI C63.10: the detail version is ANSI C63.10:2009 in the whole report.



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## 5 General Information

### 5.1 Client Information

Applicant: Disney Interactive Studios, Inc.  
Address of Applicant: 1200 Grand Central Avenue, Glendale, California, 91201 United States

### 5.2 General Description of E.U.T.

Product Name: Disney Infinity Base INF-8032383  
Model No.: INF-8032383

### 5.3 Details of E.U.T.

Operating Frequency 13.56MHz  
Type of Modulation: BPSK  
Antenna Type Cooper Wire printed circuit board  
Antenna gain: 0 dBi  
Power Supply: DC 4.5V (size "AAA" batteries x 3)

### 5.4 Description of Support Units

Description	Manufacturer	Model No.	SN/Certificate NO
3DS	Nintendo	LTZ-CTR-S-USZ	EW100032307

### 5.5 Deviation from Standards

None.

### 5.6 Abnormalities from Standard Conditions

None.

### 5.7 Other Information Requested by the Customer

None.



## **5.8 Test Location**

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,  
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,  
Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



## 5.9 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC (Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

- **Industry Canada (Registration No.: 4620B-1)**

The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

Date of Registration: February 18, 2009. Valid until February 18, 2011.

- **VCCI (Registration No.: R-2460 and C-2584)**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460 and C-2584 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully complies with the requirements of ISO/IEC 17025:2005, the Basic Rules, IEC 61010-1:2006-10 and Rule of procedure IEC 61010-2:2006-10, and the relevant IEC 61010-2:2006-10 Scheme Operational documents.

This certificate was issued August 6, 2009 and valid until May 19, 2012.



## 6 Equipment Used during Test

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date	Calibration Interval
					(YYYY-MM-DD)	
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2014-08-30	2Y
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2013-06-29	1Y
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	100236	2014-03-04	1Y
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2013-06-01	1Y
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9163	9163-450	2013-12-17	2Y
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2013-11-27	2Y
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2014-06-02	2Y
EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2013-11-28	2Y
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2014-07-01	2Y
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2014-03-04	1Y
EMC2065	Amplifier	HP	8447F	N/A	2013-11-7	1Y
EMC2063	1-26GHz Pre Amplifier	Compliance Direction System Inc.	PAP-1G26-48	6279.628	2013-7-29	1Y
EMC0075	310N Amplifier	Sonoma	310N	272683	2014-03-04	1Y
EMC0523	Active Loop Antenna	EMCO	6502	42963	2014-04-07	2Y
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9170	9170-375	2014-06-01	3Y
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2014-04-27	2Y

General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date	Calibration Interval
					(YYYY-MM-DD)	
EMC0006	DMM	Fluke	73	70681569	2013-11-5	1Y
EMC0007	DMM	Fluke	73	70671122	2013-11-5	1Y

## 7 Test Results

### 7.1 E.U.T. test conditions

Test Voltage:	DC 4.5 V (new battery)
Requirements:	<b>15.31(e):</b> For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.
Type of antenna:	Cooper Wire printed circuit board
Operating Environment:	
Temperature:	22-25.0 °C
Humidity:	48-55% RH
Atmospheric Pressure:	1001-1010 mbar
Test frequencies and frequency range:	According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:  According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

#### Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

#### Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10 <sup>th</sup> harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5 <sup>th</sup> harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5 <sup>th</sup> harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

Remark: Test frequency is 13.563 MHz.

## 7.2 Antenna Requirement

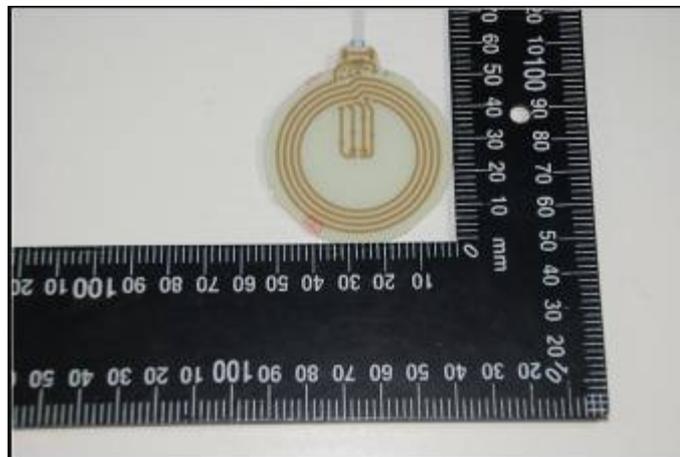
### Standard requirement

15.203 requirement:

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.

### EUT Antenna

The antenna is an Cooper Wire printed circuit board and integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0 dBi.



**Test result: The unit does meet the FCC requirements.**



### 7.3 Radiated Emissions

- Test Requirement:** FCC Part 15 C section 15.225
- Test Method:** ANSI C63.10: Clause 6.4, 6.5
- Measurement Distance:** 3 m (Semi-Anechoic Chamber)
- Test Status:** Test the EUT connected with 3DS in reading tags status.

**Requirements:**

the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

- 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.i.e. **124.0dBµV/m @ 3 m.**
- 15.225(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. i.e. **90.5dBµV/m @ 3 m.**
- 15.225I:** 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. i.e. **80.5dBµV/m @ 3 m.**
- 15.225(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

Out of band emissions shall not exceed:

Frequency range (MHz)	Quasi-peak limits(dBµV/m)
0.009-0.49	128.5-93.8
0.49-1.705	73.8-63.0
1.705 - 30.0	69.5
30 to 88	40.0
88 to 216	43.5
216 to 960	46.0
Above 960	54.0

At transitional frequencies the lower limit applies.

**Test Procedure:**

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specied distance from the EUT.During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

For testing performed with the bi-log type antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

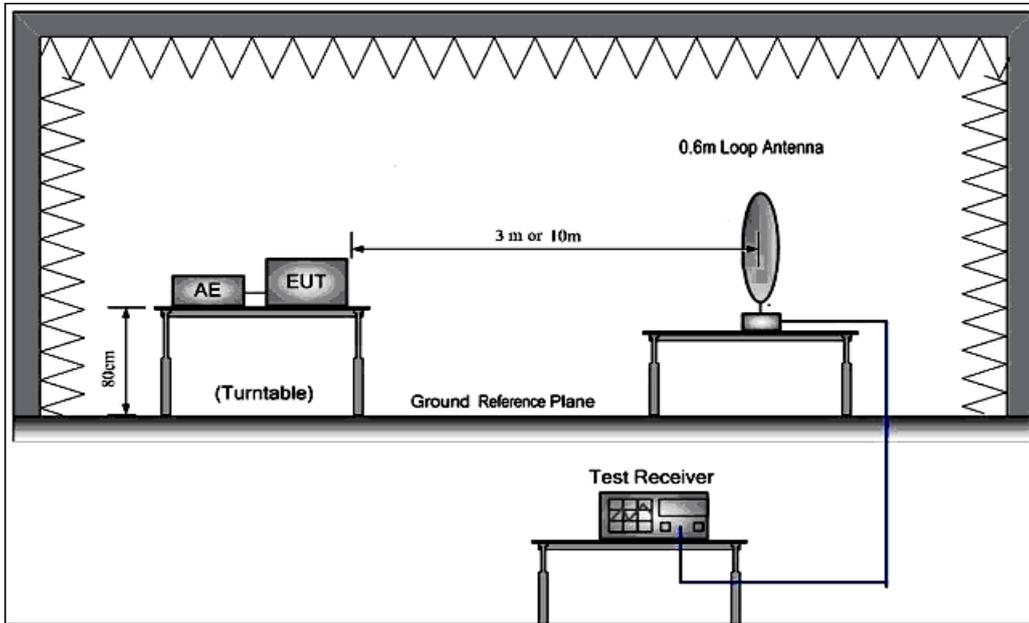
**Detector** Peak for pre-scan

Test Receiver test setup	Detector		
	9 kHz-150 kHz	150 kHz-30 MHz	30 MHz-1000 MHz
RBW	200 Hz	9 kHz	120 kHz
VBW	≥ RBW	≥ RBW	≥ RBW
Sweep	auto	auto	auto
Detector function	QP	QP	AV
Trace	max hold	max hold	max hold

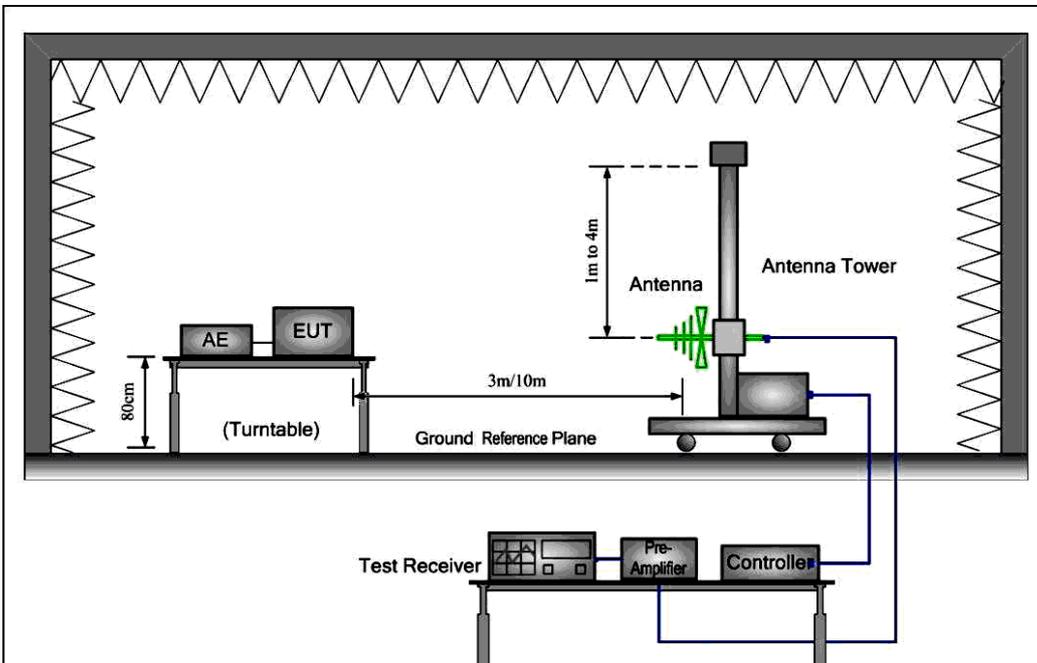
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**Test Configuration:**

- 1) 9 kHz to 30 MHz emissions:



- 2) 30 MHz to 1 GHz emissions:





**1) Intentional Emission and Spectrum Mask**

Test Frequency (MHz)	Quasi-Peak (dB $\mu$ V/m)		Limits (dB $\mu$ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
13.110	51.39	50.78	69.5	18.11	18.72
13.410	50.45	47.56	80.5	30.05	32.94
13.553	51.89	51.56	90.5	38.61	38.94
13.563	53.79	51.98	124.0	70.21	72.02
13.567	50.52	50.48	90.5	39.98	40.02
13.710	49.65	48.73	80.5	30.85	31.77
14.010	49.72	48.85	69.5	19.78	20.65

**2) Spurious Emission: below 30 MHz**

Test Frequency (MHz)	Quasi-Peak (dB $\mu$ V/m)		Limits (dB $\mu$ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
3.468	49.02	49.43	69.5	20.48	20.07
9.574	49.47	50.32	69.5	20.03	19.18
28.365	50.21	49.36	69.5	19.29	20.14



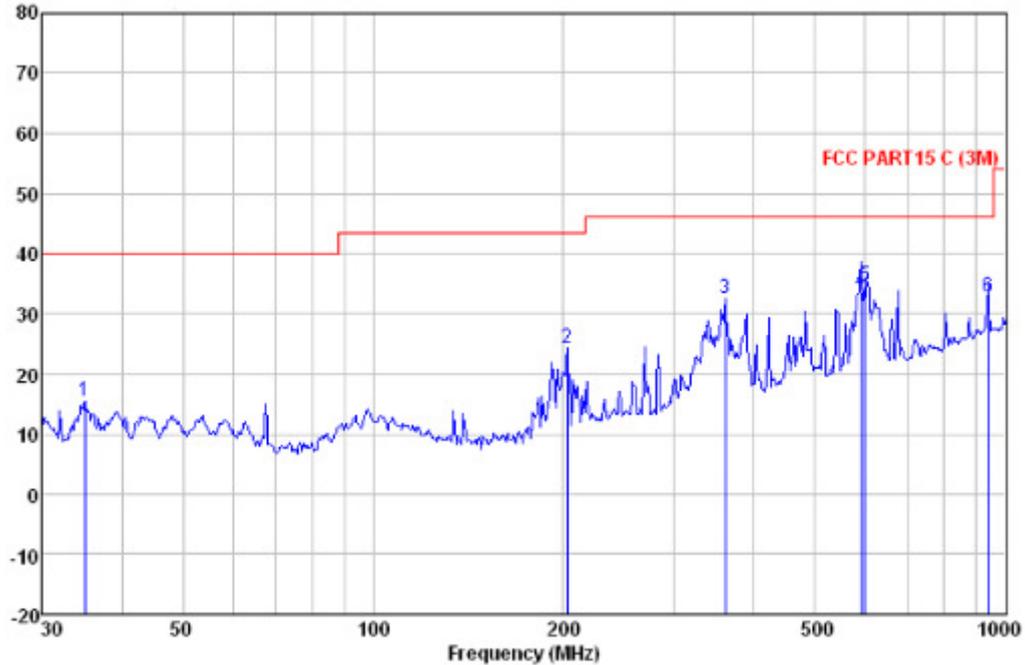
### 3) Spurious Emission: above 30 MHz

The following test results were performed on the EUT.

Vertical:

Peak scan

Level (dB $\mu$ V/m)



Quasi-peak measurement

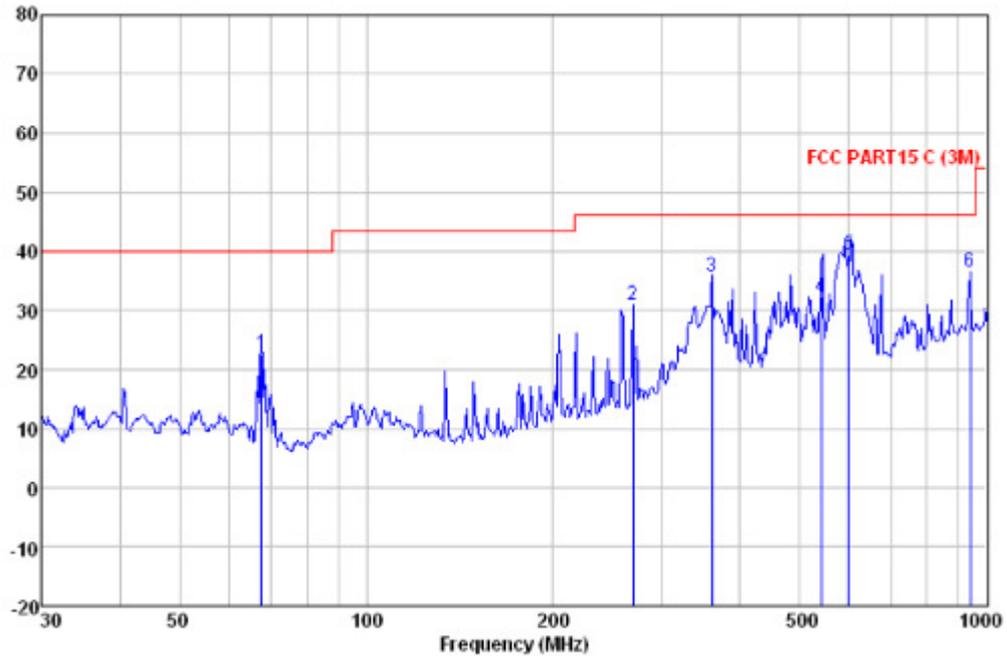
Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Over Limit	Remark
MHz	dB $\mu$ V	dB/m	dB	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
35.005	31.82	12.30	0.88	29.50	15.50	40.00	-24.50	QP
202.810	41.35	10.64	1.90	29.50	24.39	43.50	-19.11	QP
360.448	45.15	14.43	2.59	29.60	32.57	46.00	-13.43	QP
590.110	41.46	18.29	3.25	29.41	33.59	46.00	-12.41	QP
600.002	42.46	18.45	3.28	29.40	34.79	46.00	-11.21	QP
938.386	35.40	21.34	4.13	27.98	32.89	46.00	-13.11	QP



Horizontal:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
MHz	Level	Factor	Loss	Factor	Line	Limit	
	dBµV	dB/m	dB	dB	dBµV/m	dBµV/m	dB
67.826	41.56	9.47	1.21	29.59	22.65	40.00	-17.35 QP
268.485	46.05	12.34	2.23	29.57	31.05	46.00	-14.95 QP
359.997	48.20	14.43	2.59	29.60	35.62	46.00	-10.38 QP
540.012	41.20	17.36	3.09	29.46	32.19	46.00	-13.81 QP
600.011	47.10	18.45	3.28	29.40	39.43	46.00	-6.57 QP
938.833	39.12	21.34	4.13	27.98	36.61	46.00	-9.39 QP

The field strength is calculated by adding the Antenna Factor, Cable Factor & Peramplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Peramplifier Factor.

Remark:

According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.



## 7.4 Occupied Bandwidth

**Test Requirement:** FCC Part 15 C section 15.215

**Test Method:** ANSI C63.10: Clause 6.9  
Operation within the band 13.110 –14.010 MHz

**Test Status:** Test the EUT connected with 3DS in reading tags status.

### Requirements:

15.215(c), Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### Test Procedure:

The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector. Record the 20 dB bandwidth of the carrier.

The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector. The vertical Scale is set to 10dB per division. The horizontal scale is set to 20 kHz per division. Read the down 20dB bandwidth of the carrier.

Set the spectrum analyzer: Span = 15 kHz

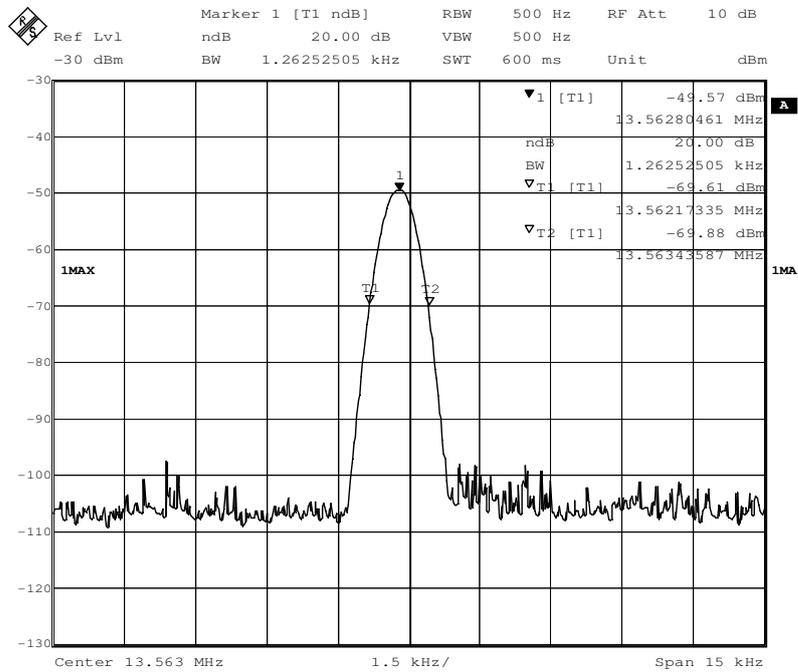
Set the spectrum analyzer: RBW = 500 Hz, VBW = 500 Hz

Sweep = auto; Detector Function = Peak. Trace = Max Hold.

Mark the peak frequency and -20dB points bandwidth.



Test plot as below:



20dB bandwidth lower frequency : 13.5622MHz

20dB bandwidth upper frequency : 13.5634MHz



### 7.5 Frequency Stability

**Test Requirement:** FCC Part 15 C section 15.225 (e)  
**Test Method:** ANSI C63.10: Clause 6.8  
**Test Status:** Test the EUT connected with 3DS in reading tags status.

**Requirements:**

**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.

**Test Procedure:**

1. The EUT was turn-up.
2. With all power removed, the temperature was decreased to -20°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
3. The temperature tests were performed for the worst case.
4. Variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20°C. The maximum frequency change was recorded.

**Test Result:**

Operating Frequency: 13.5628 MHz,

Limit: total emission within +/- 1.35628kHz(+/- 0.01% of the operating frequency)

Frequency stability vs. temperature		
Environment Temperature (°C)	Measured Frequency (MHz)	Frequency Measure with Time Elapsed Total emission within kHz
50	13.5626	-0.0002
40	13.5629	0.0001
30	13.5628	0.0000
20	13.5628	0.0000
10	13.5629	0.0001
0	13.5631	0.0003
-10	13.5630	0.0002
-20	13.5625	-0.0003

Frequency stability vs. input voltage		
Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Measure with Time Elapsed Total emission within kHz
3.825	13.5629	0.0001
4.500	13.5628	0.0000
5.175	13.5625	-0.0003

--The End of Report--