

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

**Product Name:** GSM/WCDMA Mobile Phone

**Brand Name:** NEC CASIO Mobile Communications, Ltd.

**Model No.:** KMP7R4H1-1A

**Model Differences:** N/A

**FCC ID:** A98-FWP7935

**Report No.:** ER/2012/A0017

**Issue Date:** Oct. 17, 2012

**FCC Rule Part:** §15.225

**Prepared for:** NEC Corp. of America  
Mobile Communications Division, 6535 N. State  
Highway 161, Irving Texas 75039, United States

**Prepared by:** SGS Taiwan Ltd.  
Electronics & Communication Laboratory  
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## VERIFICATION OF COMPLIANCE

**Applicant:** NEC Corp. of America  
Mobile Communications Division, 6535 N. State Highway 161, Irving  
Texas 75039, United States

**Product Name:** GSM/WCDMA Mobile Phone

**Brand Name:** NEC CASIO Mobile Communications, Ltd.

**Model No.:** KMP7R4H1-1A

**Model Difference:** N/A

**FCC ID:** A98-FWP7935

**File Number:** ER/2012/A0017

**Date of Test:** Oct. 12, 2012 ~ Oct 17, 2012

**Date of EUT Received:** Oct. 12, 2012

**We hereby certify that:**

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.225

The test results of this report relate only to the tested sample identified in this report.

*Test By:* Marcus Tseng *Date:* Oct. 17, 2012

**Marcus Tseng / Engineer**

*Prepared By:* Bondi Liu *Date:* Oct. 17, 2012

**Bondi Liu / Sr. Engineer**

*Approved By* Jim Chang *Date:* Oct. 17, 2012

**Jim Chang / Supervisor**

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## Version

Version No.	Date	Description
00	Oct. 17, 2012	Initial creation of document

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## 1 GENERAL INFORMATION

### 1.1 Product Description

Product Name:	GSM/WCDMA Mobile Phone	
Brand Name:	NEC CASIO Mobile Communications, Ltd.	
Model No.:	KMP7R4H1-1A	
Model difference:	N/A	
Hardware Version:	N/A	
Software Version:	N/A	
Power Supply:	3.8Vdc Lithium Ion battery or 5.4Vdc from AC adapter	
	Adaptor:	Model No. : MAS-BH0008-A002, Supplier: NEC CASIO Mobile Communications, Ltd.
	Battery:	Model No.: AAN29431 Supplier: NEC CASIO Mobile Communications, Ltd.

### RFID:

Operating Frequency	13.56MHz
Transmit Power	< 123dBuV/m at 3m.
Number of Channels	1
Operating Mode	Point-to-Point
Antenna Type	Loop Antenna
Module Type	ASK

The EUT is compliance with RFID Standard.

This report applies for RFID.

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## 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **A98-FWP7935** filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules.

## 1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2009. Radiated testing was performed at an antenna to EUT distance 3 meters.

## 1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2009. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-04.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

## 1.5 Special Accessories

Not available for this EUT intended for grant.

## 1.6 Equipment Modifications

Not available for this EUT intended for grant.

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## 2 System Test Configuration

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7.3.1 of ANSI C63.4-2009. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

#### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2009.

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## 2.4 Limitation

### (1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note		
1.The lower limit shall apply at the transition frequencies		
2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

### (2) Radiated Emission

- The field strength of any emission within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- 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.
- 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.
- The field strength of any emissions appearing outside of the 13.110-14.010 MHz shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit).as below.

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance (m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

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- Remark:
1. Emission level in dBuV/m=20 log (uV/m)
  2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
  3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
  4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of §15.205, then the general radiated emission limits in § 15.209 apply.

### (3) Frequency Tolerance

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.

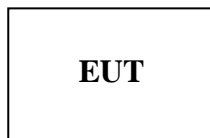
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## 2.5 Configuration of Tested System

**Fig. 2-1 Configuration of Tested System**



**Table 2-1 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	N/A					

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### 3 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	Compliant
§15.225 (a)-(d)	Radiated Emission	Compliant
§15.225 (e)	Frequency Stability	Compliant

### 4 Description of test modes

The EUT stay in continuous transmitting mode. The frequency 13.56 MHz is chosen for radiated emission testing.

### 5 MEASUREMENT UNCERTAINTY FOR FIELD STRENGTH OF SPURIOUS RADIATION

Measurement uncertainty (Polarization : <b>Vertical</b> )	30MHz - 180MHz: 3.37dB
	180MHz -417MHz: 3.19dB
	0.417GHz-1GHz: 3.19dB
	1GHz - 18GHz: 4.04dB
	18GHz - 40GHz: 4.04dB

Measurement uncertainty (Polarization : <b>Horizontal</b> )	30MHz - 167MHz: 4.22dB
	167MHz -500MHz: 3.44dB
	0.5GHz-1GHz: 3.39dB
	1GHz - 18GHz: 4.08dB
	18GHz - 40GHz: 4.08dB

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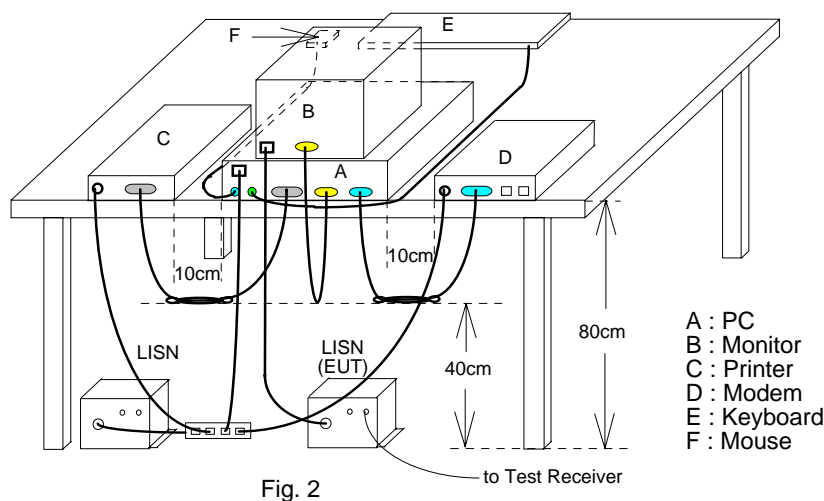
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## 6 Conducted Emissions Test

### 6.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### 6.2 Test SET-UP (Block Diagram of Configuration)



### 6.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013
EMI Receiver	R&S	ESCS 30	828985/004	09/23/2012	09/22/2013
LISN	Rolf-Heine	NNB-2/16Z	99012	03/23/2012	03/22/2013
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/23/2012	03/22/2013
Coaxial Cables	N/A	WK CE Cable	N/A	01/05/2012	01/04/2013

### 6.4 Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peak.

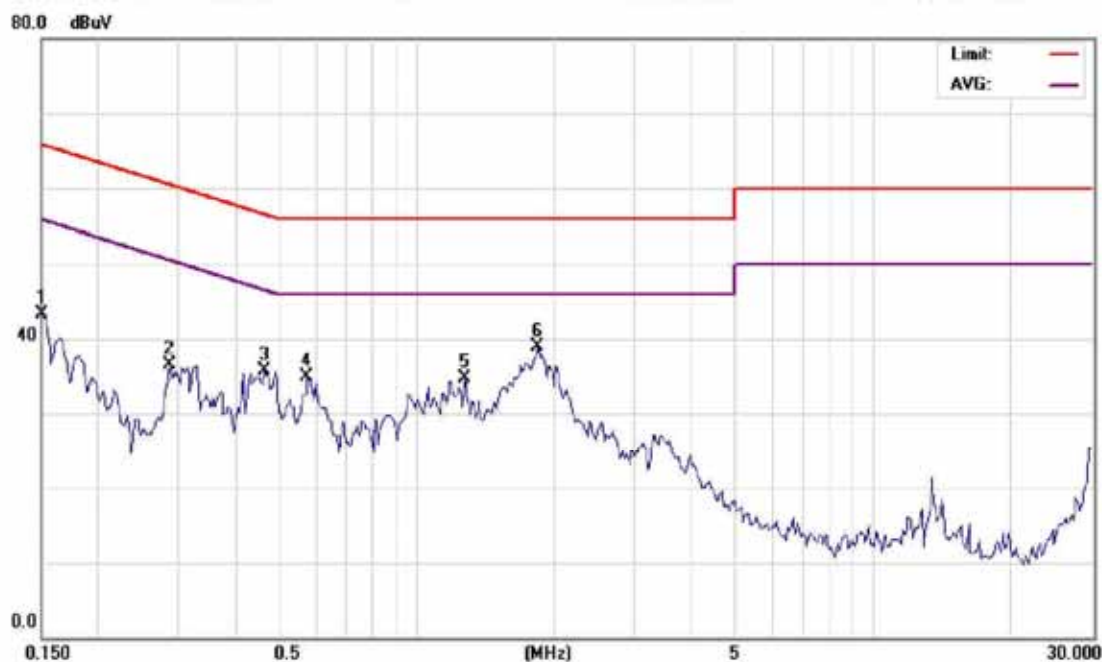
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation	Test Date:	Oct. 15, 2012
		Test By:	Marcus



Site: ConductionRoom

Phase: L1

Temperature: 26 °C

Limit: FCC Class B Conduction(QP)

Power: AC120V/60Hz

Humidity: 60%

EUT: GSM/WCDMA Mobile Phone

Distance:

M/N: KMP7R4H1-1A

Mode: Operation mode

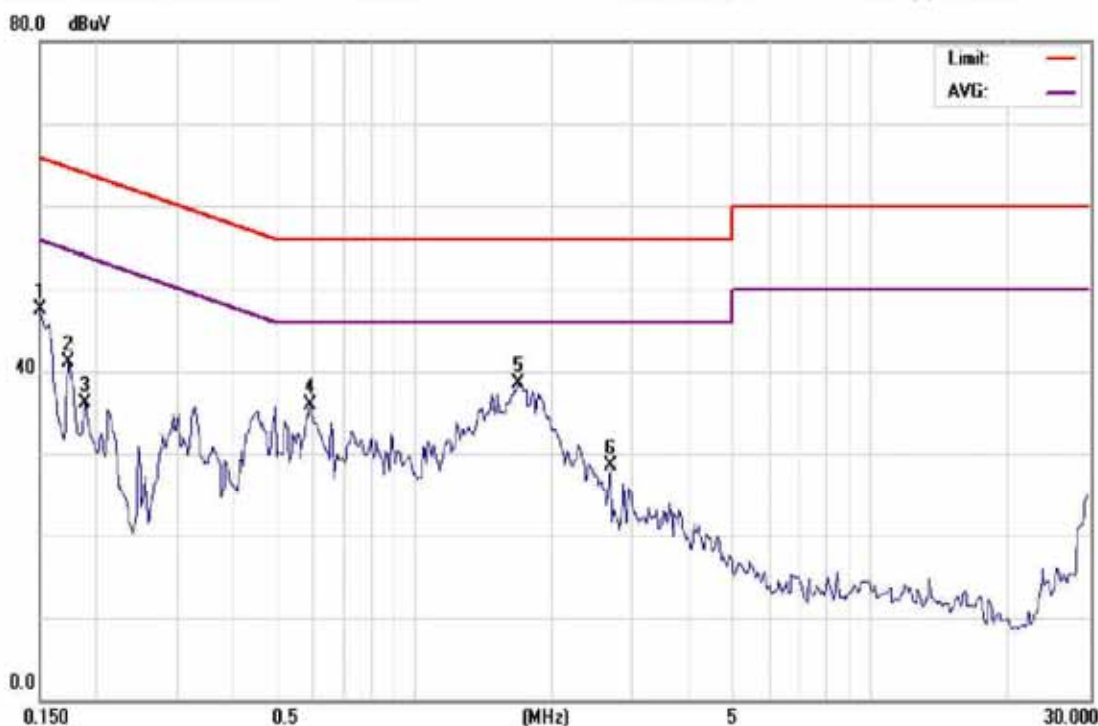
Note:

No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1		0.1500	43.03	0.24	43.27	66.00	-22.73	peak	
2		0.2868	36.27	0.21	36.48	60.62	-24.14	peak	
3		0.4628	35.55	0.22	35.77	56.64	-20.87	peak	
4		0.5743	34.70	0.22	34.92	56.00	-21.08	peak	
5		1.2703	34.52	0.23	34.75	56.00	-21.25	peak	
6	*	1.8450	38.62	0.25	38.87	56.00	-17.13	peak	

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Site: Conduction Room

Phase: N

Temperature: 25 °C

Limit: FCC Class B Conduction (QP)

Power: AC 120V/60Hz

Humidity: 60%

EUT: GSM/WCDMA Mobile Phone

Distance:

M/N: KMP7R4H1-1A

Mode: Operation mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1500	47.13	0.34	47.47	66.00	-18.53	peak	
2		0.1735	40.83	0.33	41.16	64.79	-23.63	peak	
3		0.1891	35.78	0.32	36.10	64.08	-27.98	peak	
4		0.5899	35.56	0.33	35.89	56.00	-20.11	peak	
5	*	1.6965	38.11	0.33	38.44	56.00	-17.56	peak	
6		2.6857	28.18	0.34	28.52	56.00	-27.48	peak	

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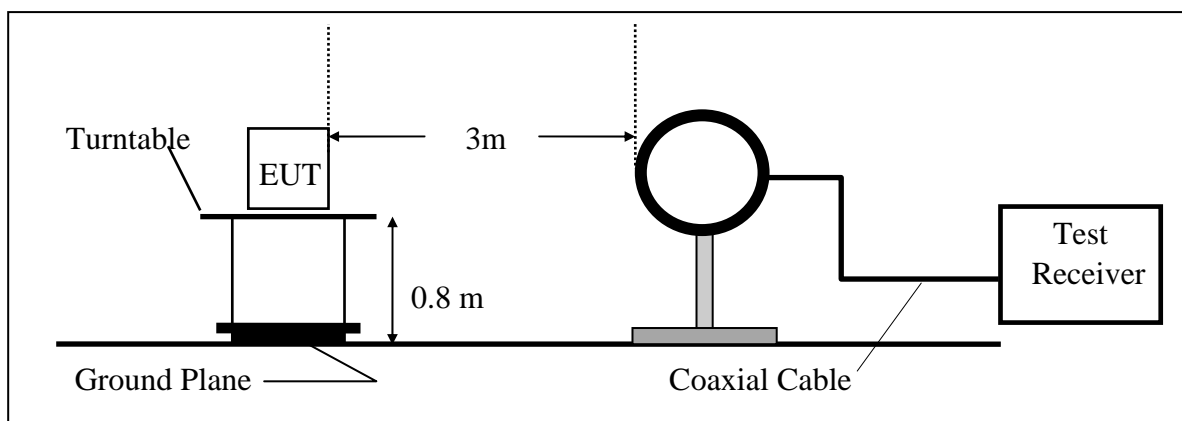
## 7 Radiated Emission Test

### 7.1 Measurement Procedure

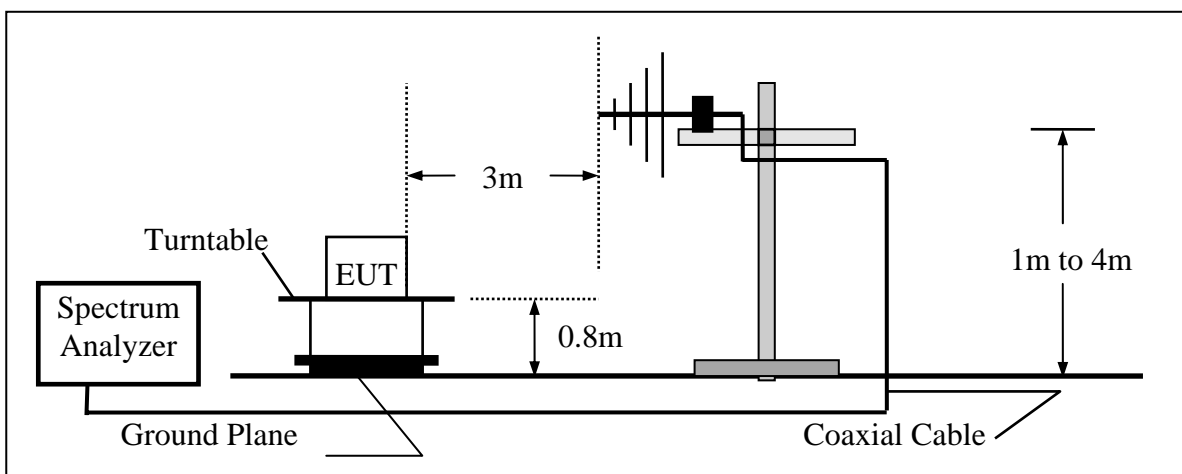
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

### 7.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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### 7.3 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2011	04/14/2013
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	02/15/2011	02/14/2013
Spectrum Analyzer	R&S	FSV-30	101398	10/18/2011	10/17/2013
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/10/2012	01/09/2014
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2011	05/18/2013
Horn Antenna	Schwarzbeck	BBHA9170	185	07/11/2011	07/10/2013
Pre-Amplifier	Agilent	8447D	2944A07676	01/04/2012	01/03/2013
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/04/2012	01/03/2013
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	02/28/2012	02/28/2013
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2012	02/27/2013
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_Rx	9	01/04/2012	01/03/2013
3m Site NSA	SGS	966 chamber	N/A	07/15/2012	07/14/2013

### 7.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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## 7.5 Measurement Result

Operation Mode: Transmitting Mode  
 Fundamental Frequency: 13.56 MHz  
 Temperature : 27  
 Humidity : 66 %

Test Date : 2012-10-15  
 Test By: Marcus  
 Pol: Vertical

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/AV/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit@3m (dBuV/m)	Safe Margin (dB)	Note
13.56	V	Peak	42.28	10.66	52.94	123.90	-70.96	F
27.12	V	Peak	21.35	9.27	30.62	69.50	-38.88	H
40.68	V	Peak	42.92	-13.48	29.44	40.00	-10.56	H
54.24	V	Peak	--	--	--	--	--	--
67.80	V	Peak	39.46	-16.05	23.41	40.00	-16.59	H
81.36	V	Peak	37.92	-17.85	20.07	40.00	-19.93	H
94.92	V	Peak	40.08	-17.23	22.85	43.50	-20.65	H
108.48	V	Peak	38.59	-15.90	22.69	43.50	-20.81	H
122.04	V	Peak	44.11	-14.42	29.69	43.50	-13.81	H
135.60	V	Peak	36.19	-13.44	22.75	43.50	-20.75	H

### Remark :

- (1) Measuring frequencies from 25 MHz to the 1GHz.
- (2) Radiated emissions measured in frequency range from 25 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA between 25MHz to 30MHz was 10KHz; 30MHz to 1GHz was 100KHz.

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Operation Mode: Transmitting Mode  
 Fundamental Frequency: 13.56 MHz  
 Temperature : 27  
 Humidity : 66 %

Test Date : 2012-10-15  
 Test By: Marcus  
 Pol: Horizontal

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/AV/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit@3m (dBuV/m)	Safe Margin (dB)	Note
13.56	H	Peak	43.50	10.66	54.16	123.90	-69.74	F
27.12	H	Peak	12.84	9.22	22.06	69.50	-47.44	H
40.68	H	Peak	32.28	-13.48	18.80	40.00	-21.20	H
54.24	H	Peak	--	--				
67.80	H	Peak	33.10	-16.05	17.05	40.00	-22.95	H
81.36	H	Peak	32.52	-17.85	14.67	40.00	-25.33	H
94.92	H	Peak	31.46	-17.23	14.23	43.50	-29.27	H
108.48	H	Peak	31.71	-15.90	15.81	43.50	-27.69	H
122.04	H	Peak	38.73	-14.42	24.31	43.50	-19.19	H
135.60	H	Peak	35.27	-13.44	21.83	43.50	-21.67	H

#### Remark :

- (1) Measuring frequencies from 25 MHz to the 1GHz.
- (2) Radiated emissions measured in frequency range from 25 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA between 25MHz to 30MHz was 10KHz; 30MHz to 1GHz was 100KHz.

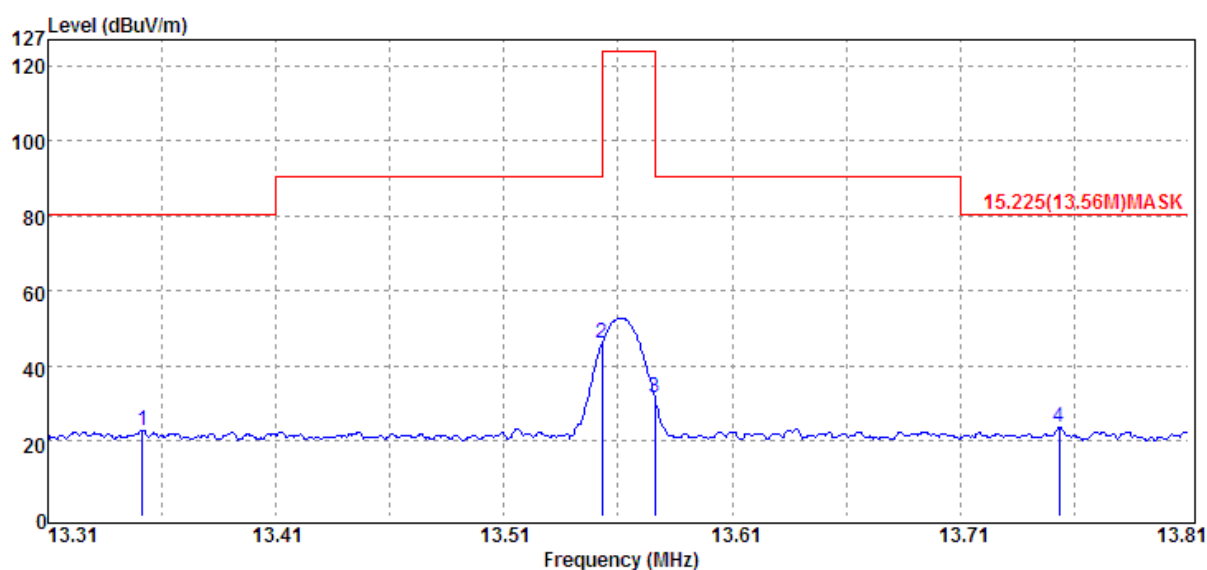
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**Radiated Mask****Vertical:**

Operation Band	:RFID	Test Date	:2012-10-15
Fundamental Frequency	:13.56 MHz	Temp./Humi.	:23.9deg_C/60RH
Operation Mode	:TX MASK	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL



Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
13.35	S	Peak	12.36	10.66	23.02	80.50	-57.48
13.55	S	Peak	35.51	10.66	46.17	90.47	-44.30
13.58	S	Peak	20.96	10.66	31.62	90.47	-58.85
13.75	S	Peak	12.99	10.65	23.64	80.50	-56.86

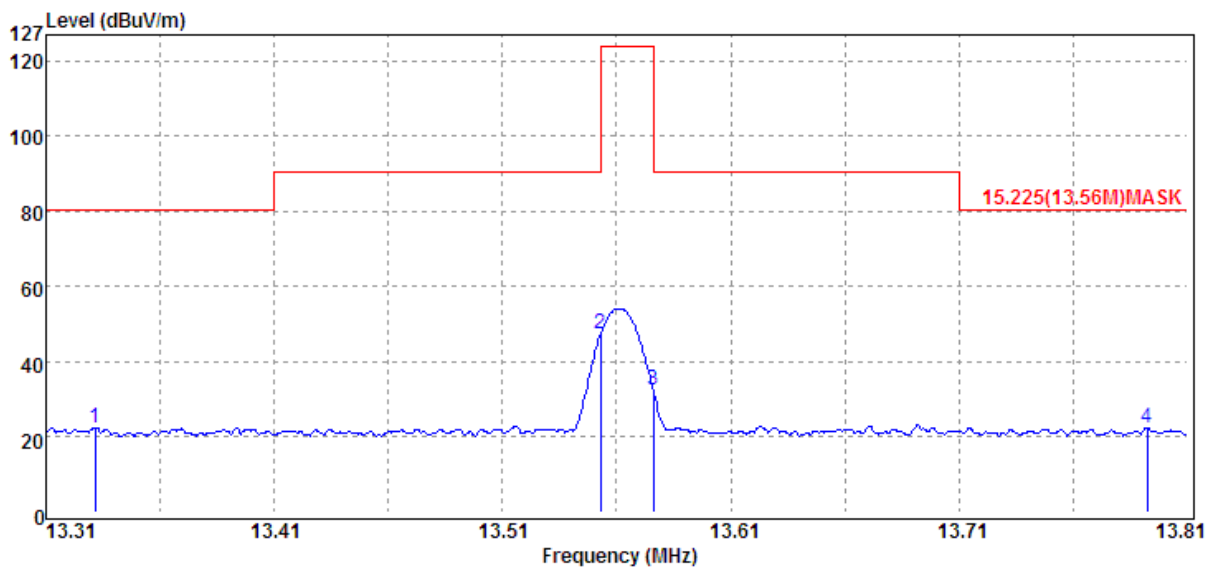
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**Horizontal:**

Operation Band	:RFID	Test Date	:2012-10-15
Fundamental Frequency	:13.56 MHz	Temp./Humi.	:23.9deg_C/60RH
Operation Mode	:TX MASK	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL



Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
13.33	S	Peak	11.82	10.67	22.49	80.50	-58.01
13.55	S	Peak	36.69	10.66	47.35	90.47	-43.12
13.58	S	Peak	21.89	10.66	32.55	90.47	-57.92
13.79	S	Peak	11.94	10.64	22.58	80.50	-57.92

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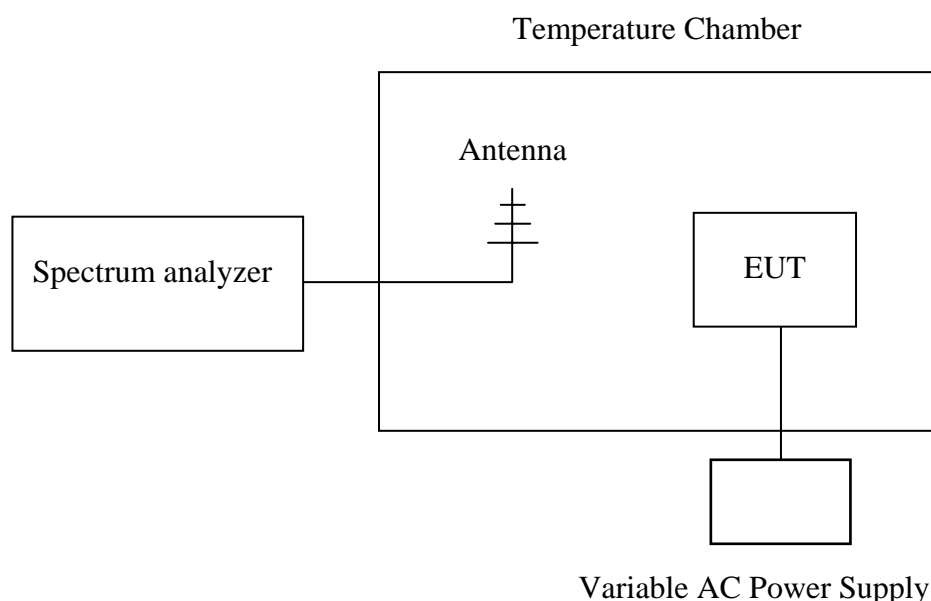
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## 8 Frequency Tolerance

### 8.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10kHz, Span =100kHz.
4. Set SPA Max hold. Mark peak.

### 8.2 Test SET-UP (Block Diagram of Configuration)



### 8.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2011	04/14/2013
Temperature Chamber	TERCHY	MHG-120LF	911009	04/16/2012	04/15/2014
AC Power Supply	APW-105N	887592	All Power	N/A	N/A

### 8.4 Measurement Results

Refer to attached data chart.

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**A. Temperature Variation**

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
Vdc	Temperature ( )	(MHz)		
3.8	-20	13.559616	-109.00	+/- 1.356
3.8	-10	13.559533	-26.00	+/- 1.356
3.8	0	13.559499	8.00	+/- 1.356
3.8	10	13.559516	-9.00	+/- 1.356
3.8	20	13.559507	0.00	+/- 1.356
3.8	30	13.559591	-84.00	+/- 1.356
3.8	40	13.559549	-42.00	+/- 1.356
3.8	50	13.559491	16.00	+/- 1.356

**B. Supply Voltage Variation**

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
Vdc	Temperature ( )	(MHz)		
4.2	20	13.559499	8.00	+/- 1.356
3.8	20	13.559507	0.00	+/- 1.356
3.4	20	13.559524	-17.00	+/- 1.356

**- End of Report -**

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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