



# TEST REPORT

## No. 2013IOT00090

for

**Sony Mobile Communications AB**

**GSM/WCDMA/LTE Mobile Phone**

**Type: PM-0762-BV**

**FCC ID: PY7PM-0762**

with

**Hardware Version: AP1**

**Software Version: 19.0.A.0.250**

**Issued Date: Jan 17<sup>th</sup>, 2014**



**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

**Test Laboratory:**

**CNAS accreditation (ISO/IEC 17025(CNAS-CL01)): No. CNAS L0442**

**FCC 2.948 Listed: No.733176**

**IC O.A.T.S listed: No.6629A-1**

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## 1. Test Laboratory

### 1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT  
Address: No 52, Huayuanbei Road, Haidian District, Beijing, P.R.China  
Postal Code: 100191  
Telephone: +86-10-62304633-2678  
Fax: +86-10-62304633-2504

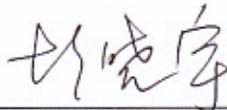
### 1.2. Testing Environment

Ambient Temperature: 15 ~ 25 °C  
Relative Humidity: 30 ~ 60 %  
Air pressure 860 ~ 1060 mbar

### 1.3. Project Data

Receipt of Sample: Dec. 24<sup>th</sup>, 2013  
Testing Start Date: Dec. 26<sup>th</sup>, 2013  
Testing End Date: Jan. 14<sup>th</sup>, 2014

### 1.4. Signature



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Hu Xiaoyu

(Prepared this test report)



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Yang Jun

(Reviewed this test report)



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Wang Hongbo

Deputy Director of the laboratory  
(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Sony Mobile Communications (China) Co. Ltd  
Address /Post: Sony Mobile R&D Center, No. 16, Guangshun South Street,  
Chaoyang District  
City: Beijing  
Postal Code: 100102  
Country: China  
Telephone: +86-10-58656312  
Fax: +86-10-58659049

### **2.2. Manufacturer Information**

Company Name: Sony Mobile Communications AB  
Address /Post: Mobilvägen, 22188 Lund, Sweden  
City: Lund  
Postal Code: 22188  
Country: Sweden  
Telephone: +46 703 227503  
Fax: +46 706 127385

### 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

Description:	GSM/WCDMA/LTE mobile phone
Type	PM-0762-BV
FCC ID	PY7PM-0762
With NFC Function:	Yes
Frequency:	13.56 MHz
Antenna:	Internal
Operation Voltage:	3.5VDC to 4.1VDC (nominal: 3.7VDC)
Operation Temperature:	-20°C to +55°C

Note1: Photographs of EUT are shown in ANNEX B of this test report. For component list, please refer to documents of the manufacturer.

Note2: High and low voltage values of extreme conditions are given by the manufacturer.

#### 3.2. Internal Identification of EUT Used during the Test

##### Mobile phone identification

EUT ID*	SN	IMEI	HW Version	SW Version
EUT1	CB512686PJ	004402451819191	AP1	19.0.A.0.250

\*EUT ID: is used to identify the test sample in the lab internally.

#### 3.3. Internal Identification of AE Used during the Test

AE ID*	Description	SN	Revision
AE1	Travel Charger	4413W 18 511285	1
AE2	Vehicle Charger	122914030172794	1
AE3	USB Cable	131307D20BE8904	SP1
AE4	Type A CARD	/	/

##### AE1

Commercial name	EP880
Type	AC-0400-EU
Manufacturer	SALCOMP
Length of cable	98.5 cm (length of USB cable)

##### AE2

Type	CAA-0003013
Manufacturer	Sony Mobile
Length of cable	98.5 cm (the length of USB cable)

##### AE3

Commercial name	EC801
Type	AI-0401
Manufacturer	Sony Mobile

Length of cable	98.5 cm
AE4	
Type	/
Manufacturer	Gemalto

\*AE ID: is used to identify the test sample in the lab internally.

### 3.4. General Description

The Equipment Under Test (EUT) is a model of GSM/WCDMA/LTE Mobile Phone with integrated antenna and inbuilt battery.

The EUT supports GSM 850/900/1800/1900MHz bands, WCDMA FDD bands 1/5/8 and LTE FDD bands 1/3/5/7/8/20. It supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33. The HSDPA and HSUPA (Cat 6) features are also supported.

It has MP3, camera, USB memory, Mobile High-Definition Link (MHL), FM radio, GPS receiver, NFC, Bluetooth (EDR and Bluetooth 4.0), ANT+, WLAN (802.11 a/b/g/n) and Wi-Fi hotspot functions. For WLAN 802.11n, it supports 20MHz and 40MHz bandwidths on both 2.4GHz band and 5GHz/5.8GHz band.

Manuals and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

Manufacturer's declaration: NFC work does not depend on other access methods, such as WLAN, GPRS, etc.

### 3.5. EUT Set-ups

EUT Set-up No.	Combination of EUT and AE	Remarks
Set. NFC01	EUT1 + AE1 + AE3 + AE4	--
Set. NFC02	EUT1 + AE4	--

The Transmit State of NFC: the NFC function is on. The EUT will transmit the NFC data and command continuously during the test.

The Transmit State of without modulation: The EUT will transmit the CW signal at the operating frequency.

## 4. Reference Documents

### 4.1. Documents Supplied by the Applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

### 4.2. Regulations and Standards

The following documents listed in this section are referred for testing.

Reference	Title	Version
CFR 47 Part 2	Part 2 — Frequency Allocations and Radio Treaty Matters; General Rules and Regulations.	2012
CFR 47 Part 15	Part 15 — Radio Frequency Devices. Subpart C — Intentional Radiators. § 15.35 Measurement detector functions and bandwidths. § 15.207 Conducted limits. § 15.209 Radiated emission limits, general requirements. § 15.215 Additional provisions to the general radiated emission limitations. § 15.225 Operation within the band 13.110–14.010 MHz.	2012
ANSI C63.4	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.	2009
RSS-210	Spectrum Management and Telecommunications Radio Standards Specification Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipments	Issue 8: 2010
RSS-GEN	Spectrum Management and Telecommunications Radio Standards Specification General Requirements and Information for the Certification of Radio Apparatus	Issue 3: 2010

## 5. LABORATORY ENVIRONMENT

**Semi-Anechoic Chamber SAC-2** (10m×6.7m×6.15m) did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 25 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m/10m distance, from 30 to 1000 MHz
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1 to 18 GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

**Fully-Anechoic Chamber FAC-3** (8.6m×6.1m×3.85m) did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 25 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1 to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

**Conducted Chamber** did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 25 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

**Control Room** did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 25 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

## 6. SUMMARY OF TEST RESULTS

### 6.1. Summary of Test Results

No	Test Cases	Clause in FCC Regulation	Clause in IC Regulation	Section in This Report	Verdict
1	Electric Field Strength of Fundamental Emissions	CFR 47 § 15.225(a)	RSS-210 A 2.6	A.1	P(Set. NFC02)
2	Electric Field Strength of Outside the Allocated Bands	CFR 47 § 15.225(b) CFR 47 § 15.225(c)	RSS-210 A 2.6		P(Set. NFC02)
3	Electric Field Radiated Emissions	CFR 47 § 15.225(d)	RSS-GEN 7.2.5	A.2	P(Set. NFC01)
				A.3	P(Set. NFC01)
4	Frequency Tolerance	CFR 47 § 15.225(e)	RSS-210 A 2.6	A.4	P(Set. NFC02)
5	20dB Bandwidth	CFR 47 § 15.215(c)	\	A.5	P(Set. NFC02)
6	Conducted Emissions	CFR 47 § 15.207	RSS-GEN 7.2.4	A.6	P(Set. NFC01)
7	Duty Cycle	CFR 47 § 15.35(c)	RSS-GEN 4.5	A.7	P(Set. NFC02)
8	99% Emission Bandwidth	\	RSS-GEN 4.6.1	A.8	P(Set. NFC02)

The measurement is carried out according to ANSI C63.4. See **ANNEX A** for details.

#### Test Conditions:

For this report, all the test cases listed above were tested under normal Temperature, Voltage, Humidity, and Air Pressure. The specific conditions are as following:

Temperature	T min	-30 °C
	T nom	20 °C
	T max	50 °C
Voltage	V min	3.5 V
	V nom	3.7 V
	V max	4.1 V
Humidity	H nom	44%
Air Pressure	A nom	1010 mbar

## 6.2. Terms Used in the Summary of Test Results

### Terms Used in Condition Column:

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage
V min	Low Voltage
V max	High voltage
H nom	Norm Humidity
A nom	Norm Air Pressure

### Terms Used in Verdict Column:

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by TMC
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

### Abbreviations:

AC	Alternating Current
AFH	Adaptive Frequency Hopping
BW	Band Width
E.I.R.P.	equivalent isotropical radiated power
ISM	Industrial, Scientific and Medical
RF	Radio Frequency
Tx	Transmitter

## 6.3. Statements

The test cases listed in Section 6.1 of this report for the EUT specified in Section 3 were performed by TMC according to the reference documents in Section 4.

The EUT meets all applicable requirements of the regulations and standards in Section 4.2.

This report only deals with the NFC function among the features described in section 3.

## 7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1.	Climate chamber	WK3-340/70	58226117510010	WEISS	2014-03-30
2.	Test Receiver	ESCI	100344	R&S	2014-03-28
3.	Test Receiver	ESCI 7	100948	R&S	2014-07-18
4.	Spectrum Analyzer	FSU26	200728	R&S	2014-01-30
5.	Spectrum Analyzer	RSA3408A	B 010277	Tektronix	2014-05-27
6.	EMI Antenna	VULB 9163	9163-483	Schwarzbeck	2014-02-17
7.	EMI Antenna	3115	6914	ETS-Lindgren	2014-12-16
8.	LISN	ESH2-Z5	829991/012	R&S	2014-04-14
9.	Universal Radio Communication Tester	CMU200	109914	R&S	2014-04-18

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1. Electric Field Strength of Fundamental and Outside the Allocated bands**

#### **A.1.1. Reference**

See Clause 13.5, Clause 13.4, Clause 8, and Annex E of ANSI C63.4-2009 specifically.  
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2009 generally.

#### **A.1.2. Measurement Methods**

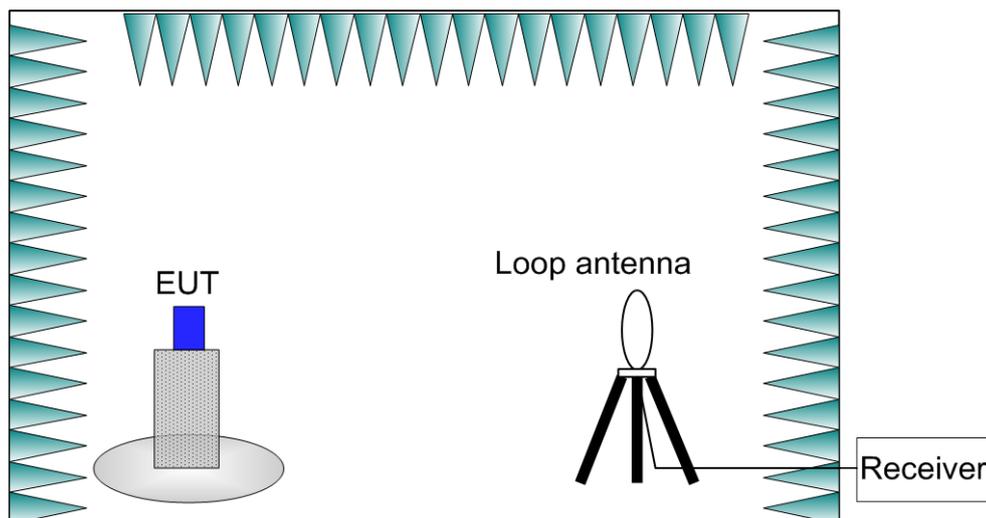
The transmitter carrier output levels (E-Field) from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The E-field is measured with a shielded loop antenna connected to a measurement receiver. Detected E-field was maximized by rotating the EUT through 360° and adjusting the receiving antenna polarizations. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.

The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/VBW
12.56-14.56	10/30 kHz

The E-field measured at 3m is calculated as:

$$\text{E-field (dB}\mu\text{V/m)} = \text{Rx (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{AF@3m (dB/m)}$$



#### **A.1.3. EUT Operating Mode and Test Conditions**

The measurement of EUT is carried out under the transmit state of NFC (See 3.5).

The EUT is powered by a travel adapter.

During the measurements, the ambient temperature of the electromagnetic anechoic chamber is

in the range of 15 ~ 25 °C.

**A.1.4. Limits**

Frequency Range (MHz)	E-field Strength Limit @ 30 m (μV/m)	E-field Strength Limit @ 3 m (dBμV/m)
13.560 ± 0.007	+15,848	124
13.410 to 13.553 13.567 to 13.710	+334	90
13.110 to 13.410 13.710 to 14.010	+106	81

Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula:  

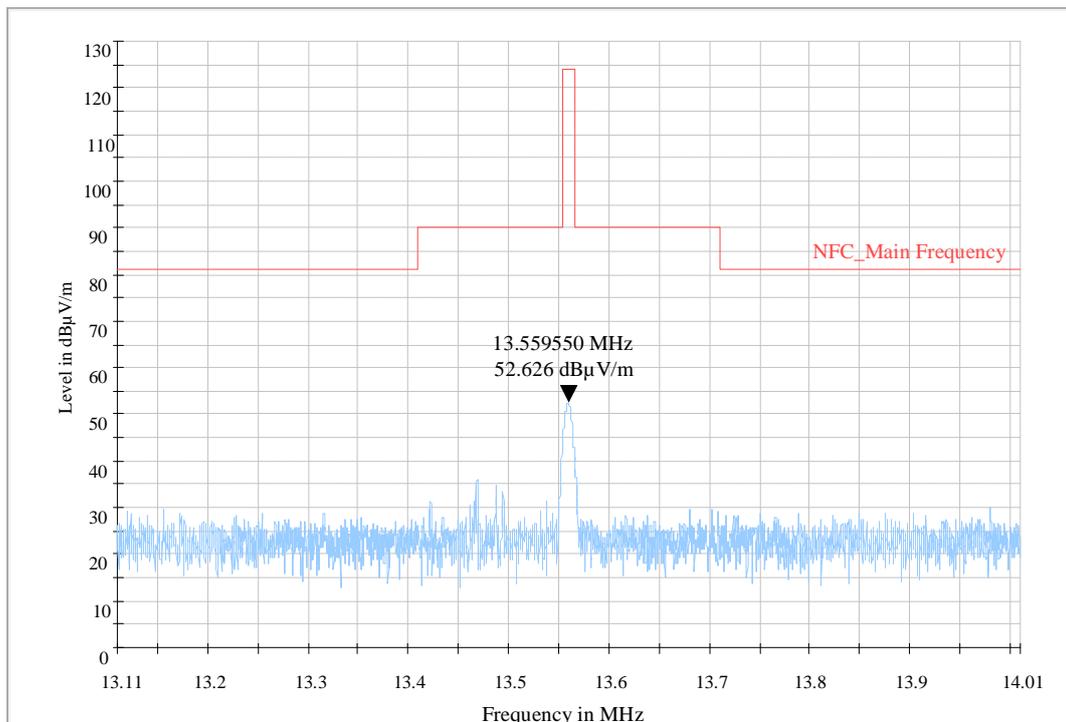
$$\text{Extrapolation(dB)} = 40\log_{10}(\text{Measurement Distance}/\text{Specification Distance})$$

**A.1.5. Measurement Results**

Measurement results of normal conditions see Figure A-1 for different set-ups of EUT. The result displayed take into account applicable antenna factors and cable losses.

**Conclusions:** Set. NFC02, **PASS**.

RE\_NFC Main Frequency\_13.110MHz-14.010MHz



**Figure A-1: Set. NFC02**

**A.1.6. Measurement Uncertainty**

Measurement uncertainty:  $U = 4.0$  dB,  $k=2$ .

## **A.2. Electric Field Radiated Emissions (< 30MHz)**

### **A.2.1. Reference**

See Clause 13.4, Clause 8 and Annex E of ANSI C63.4-2009 specifically.  
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2009 generally.

### **A.2.2. Measurement Methods**

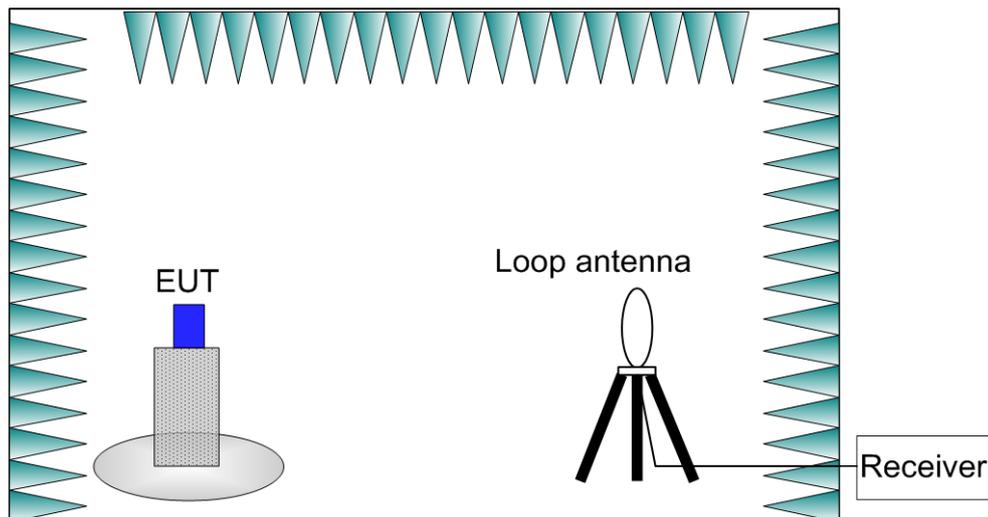
The transmitter carrier output levels (E-Field) from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The E-field is measured with a shielded loop antenna connected to a measurement receiver. Detected E-field was maximized by rotating the EUT through 360° and adjusting the receiving antenna polarizations. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.

The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/VBW
0.009-0.15	100/300 Hz
0.15-30	10/30 kHz

The E-field measured at 3m is calculated as:

$$\text{E-field (dB}\mu\text{V/m)} = \text{Rx (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{AF@3m (dB/m)}$$



### **A.2.3. EUT Operating Mode and Test Conditions**

The measurement of EUT is carried out under the transmit state of NFC (See 3.5).

The EUT is powered by a travel adapter.

During the measurements, the ambient temperature of the electromagnetic anechoic chamber is

in the range of 15 ~ 25 °C.

#### A.2.4. Limits

Frequency Range (MHz)	E-field Strength Limit @ 30m (mV/m)	E-field Strength Limit @ 3m (dB $\mu$ V/m)
0.009-0.490	2400/F(kHz)	129-94
0.490-1.705	24000/F(kHz)	74-63
1.705-30	30	70

Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula:

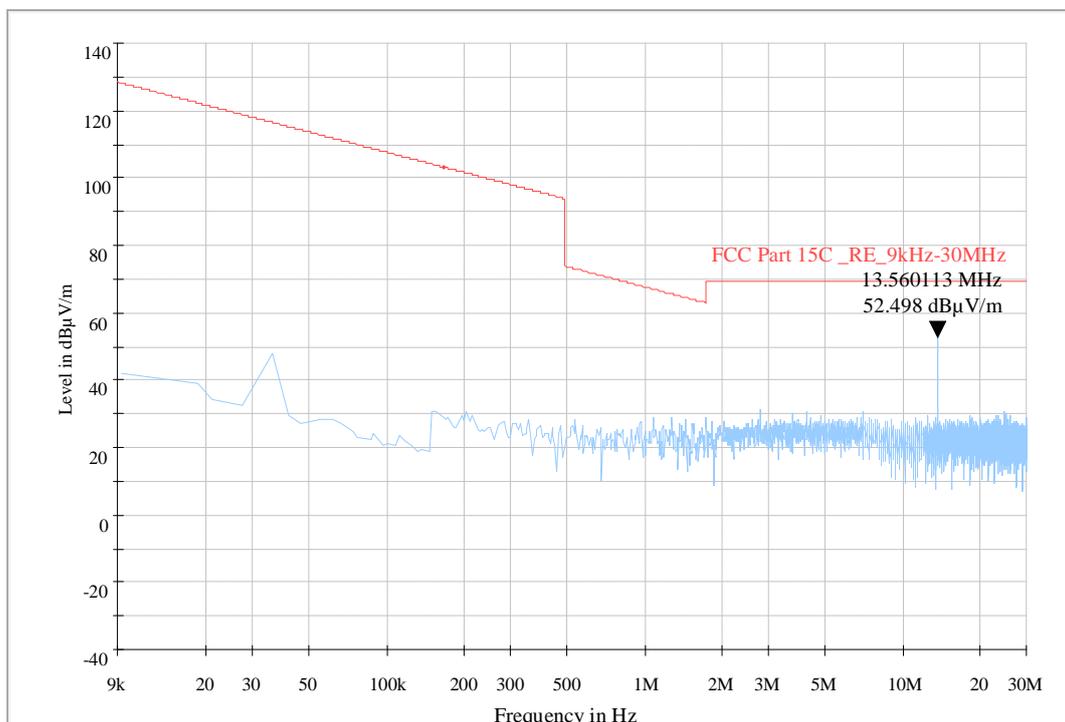
$$\text{Extrapolation(dB)} = 40\log_{10}(\text{Measurement Distance}/\text{Specification Distance})$$

#### A.2.5. Measurement Results

Measurement results of normal conditions see Figure A-2 for different set-ups of EUT. The result displayed take into account applicable antenna factors and cable losses.

**Conclusions:** Set. NFC01, **PASS**.

RE\_9kHz-30MHz



**Figure A-2: Set. NFC01**

#### A.2.6. Measurement Uncertainty

Measurement uncertainty:  $U = 4.0$  dB,  $k=2$ .

### A.3. Electric Field Radiated Emissions ( $\geq 30\text{MHz}$ )

#### A.3.1. Reference

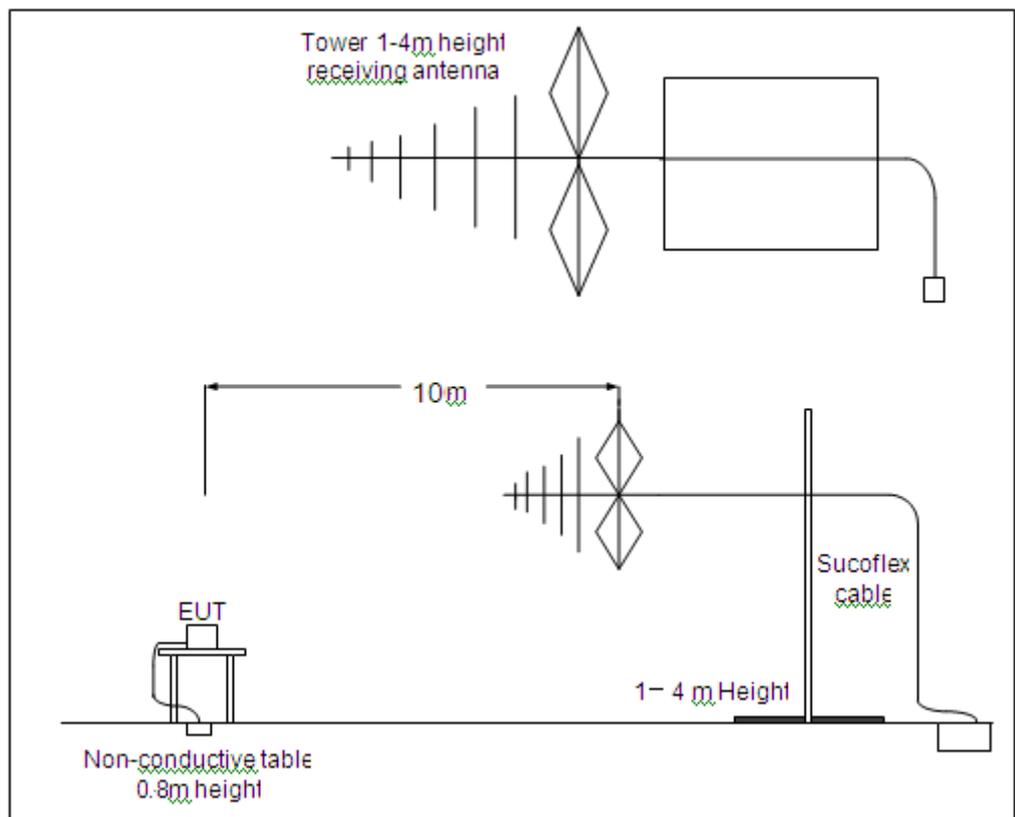
See Clause 13.4, Clause 8, and Annex E of ANSI C63.4-2009 specifically.  
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2009 generally.

#### A.3.2. Measurement Methods

The electric field radiated emissions from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 10m from the receiving antenna. The receiving antennas connected to a measurement receiver comply with Clause 15 of ANSI C63.2-1996 and Clause 4.1.5 of ANSI C63.4-2009. In order to search for maximum field strength emitted from the EUT, the receiving antenna can be moved between the height of 1.0 m to 4.0 m. Detected E-field was maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna positions for both vertical and horizontal antenna polarizations. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.

The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/VBW
30-1000	120kHz



#### A.3.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC (See 3.5).

EUT1 had been connected to a travel adapter.

During the measurements, the ambient temperature of the electromagnetic anechoic chamber is in the range of 15 ~ 25 °C.

#### A.3.4. Limits

Frequency Range (MHz)	E-field Strength Limit @ 3m (mV/m)	E-field Strength Limit @ 3m (dB $\mu$ V/m)	E-field Strength Limit @ 10m (dB $\mu$ V/m)
30-88	100	40	30
88-216	150	43.5	33.5
216-960	200	46	36
960-1000	500	54	44

#### A.3.5. Measurement Results

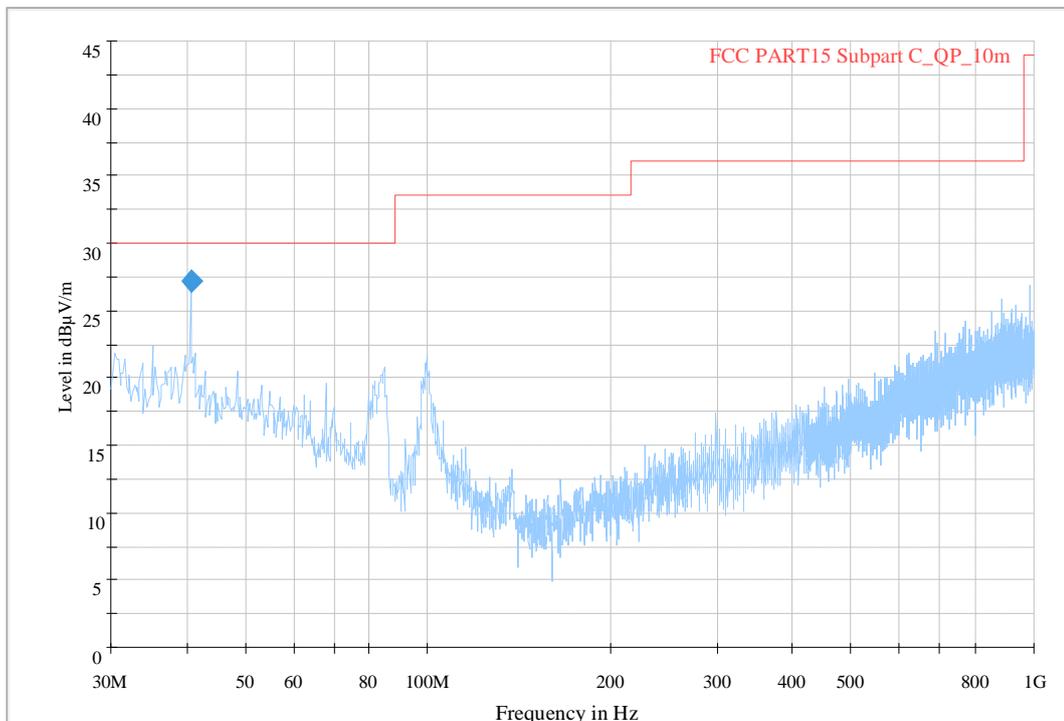
Measurement results of normal conditions see Figure A-3 for different set-ups of EUT. The result displayed take into account applicable antenna factors and cable losses.

**Conclusions:** Set. NFC01, **PASS**.

#### A.3.6. Measurement Uncertainty

Measurement uncertainty:  $U = 3.9$  dB,  $k=2$

Normal RE\_30M-1GHz\_10m



**Figure A-3: Set. NFC01**

**Final Result 1**

Frequency	QuasiPeak	Height	Polarization	Azimuth	Corr.	Margin	Limit	Comment
40.670000	27.1	225.0	V	300.0	-19.6	2.9	30.0	

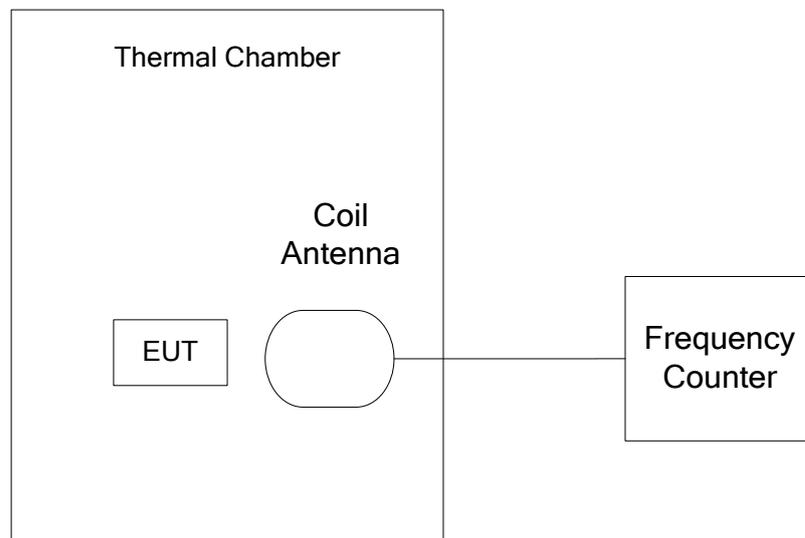
**A.4. Frequency Tolerance**

**A.4.1. Reference**

See Clause 13.6 of ANSI C63.4-2009 specifically.

See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2009 generally.

**A.4.2. Measurement Methods**



The transmitter output signal was picked up by coil antenna connected to the frequency counter. The center frequency was measured with 30Hz RBW and 1kHz span.

During the test, the EUT was placed in a thermal chamber until thermal balance and lasting appropriate time.

**A.4.3. EUT Operating Mode and Test Conditions**

The measurement of EUT is carried out under the transmit state of without modulation (See 3.5).

EUT1 had been not connected to a travel adapter.

Operation Temperature: T min, T nom, and T max with V nom.

Operation Voltage: V min and V max with T nom.

**A.4.4. Test Layouts**

See A.4.2.

**A.4.5. Limits**

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency.

#### A.4.6. Measurement Results

Measurement results see Table A-1 for different test conditions.

**Conclusions:** Set. NFC02, **PASS**.

**Table A-1: Frequency Stability VS Temperature and Voltage**

Temperature	Voltage	Frequency Error (MHz)			
		Startup	2 Min Later	5 Min Later	10 Min Later
T min	V nom	13.5593594	13.5593750	13.5593875	13.5594078
T max	V nom	13.5593641	13.5593516	13.5593141	13.5593266
T nom	V nom	13.5594015	13.5594141	13.5594083	13.5594116
T nom	V min	13.5593926	13.5593601	13.5593981	13.5593727
T nom	V max	13.5594072	13.5594103	13.5594159	13.5594038

Temperature	Voltage	Frequency Error (%)			
		Startup	2 Min Later	5 Min Later	10 Min Later
T min	V nom	-0.005	-0.005	-0.005	-0.004
T max	V nom	-0.005	-0.005	-0.005	-0.005
T nom	V nom	-0.004	-0.004	-0.004	-0.004
T nom	V min	-0.004	-0.005	-0.004	-0.005
T nom	V max	-0.004	-0.004	-0.004	-0.004

#### A.4.7. Measurement Uncertainty

Measurement uncertainty:  $U = 77 \text{ Hz}$ ,  $k=2$

### A.5. 20dB Bandwidth

#### A.5.1. Reference

See Clause 13.7 of ANSI C63.4-2009 specifically.

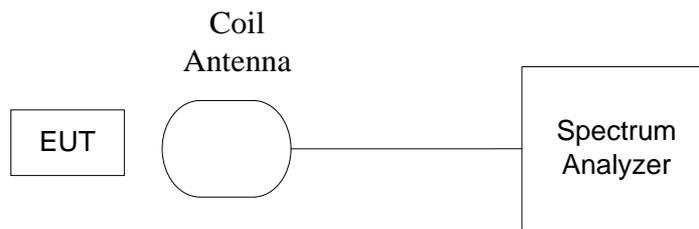
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2009 generally.

#### A.5.2. Measurement Methods

The transmitter output signal was picked up by coil antenna to the spectrum analyzer.

The transmitter output signal was picked up by coil antenna connected to the spectrum analyzer.

The bandwidth of the center frequency was measured with 140Hz RBW, 420Hz VBW and 14kHz span.



#### A.5.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC and without modulation (See 3.5).

EUT had been not connected to a travel adapter..

During the measurements, the ambient temperature is in the range of 15 ~ 25 °C.

#### A.5.4. Test Layouts

See A.5.2.

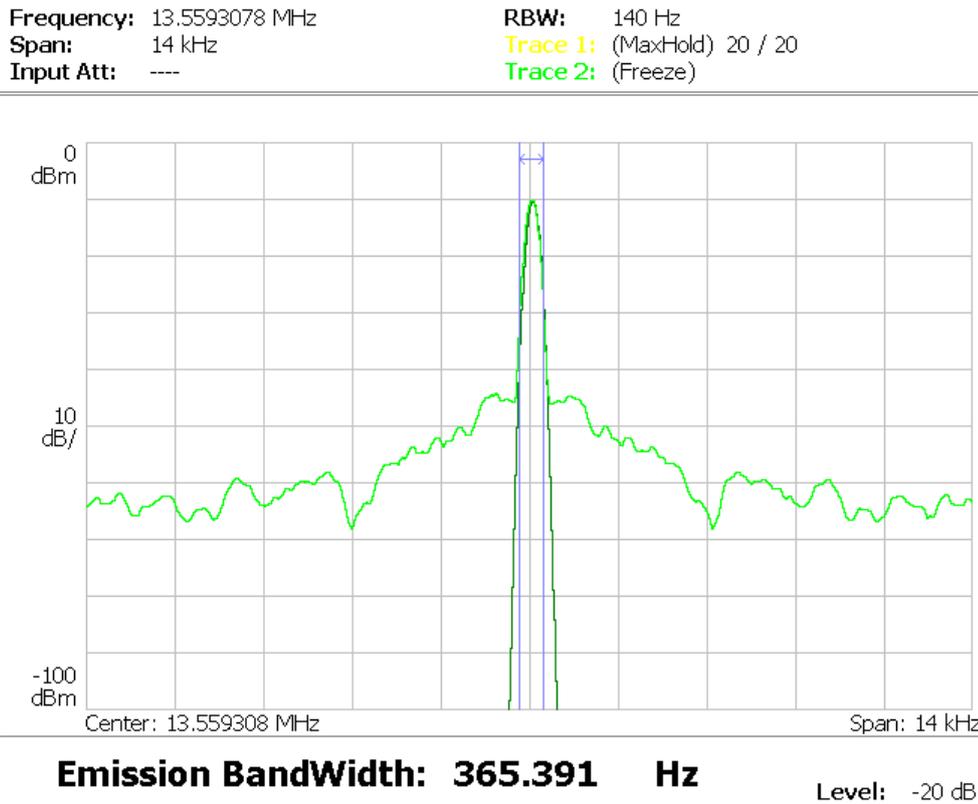
#### A.5.5. Limits

The 20dB bandwidth shall be less than 80% of the permitted frequency band. For 13.56 MHz NFC, the permitted frequency band is 14kHz, so the limit is 11.2 kHz.

#### A.5.6. Measurement Results

Measurement results see Figure A-4.

**Conclusions:** Set. NFC02, **PASS**.



**Figure A-4: Test result of EUT1 at test set. NFC02**

**A.5.7. Measurement Uncertainty**

Measurement uncertainty:  $U = 77$  Hz,  $k=2$

**A.6. Conducted emission**

**A.6.1. Reference**

See Clause 13.3 and Clause 7 of ANSI C63.4-2009 specifically.  
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2009 generally.

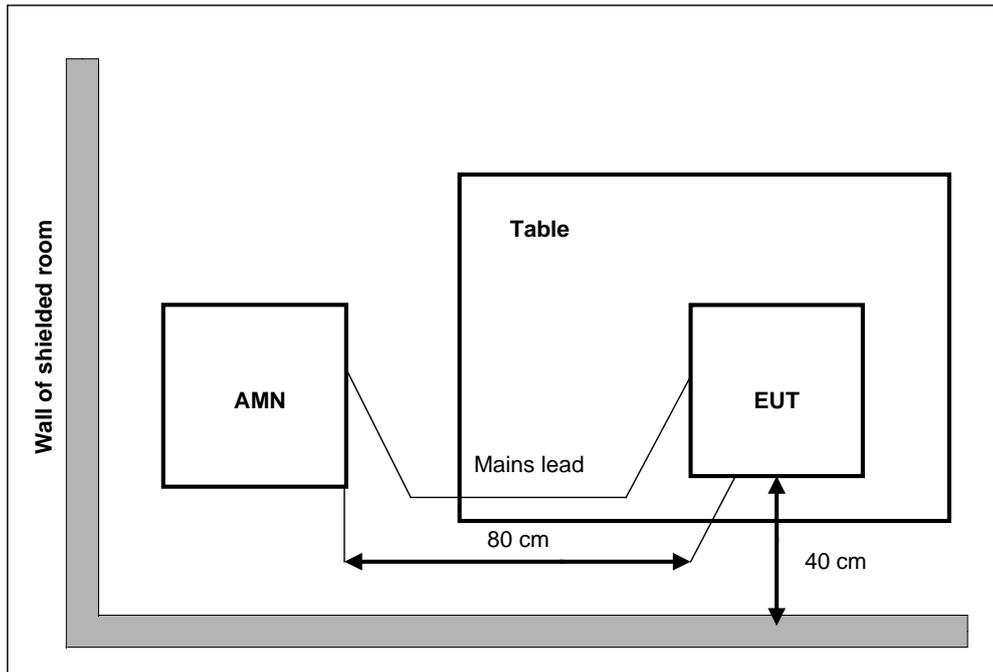
**A.6.2. Measurement Methods**

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver: Quasi-Peak / Average Detector.

The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/VBW
0.15-30	9kHz



### A.6.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC (See 3.5).

The EUT is powered by a travel adapter.

During the measurements, the ambient temperature is in the range of 15 ~ 25 °C.

### A.6.4. Limits

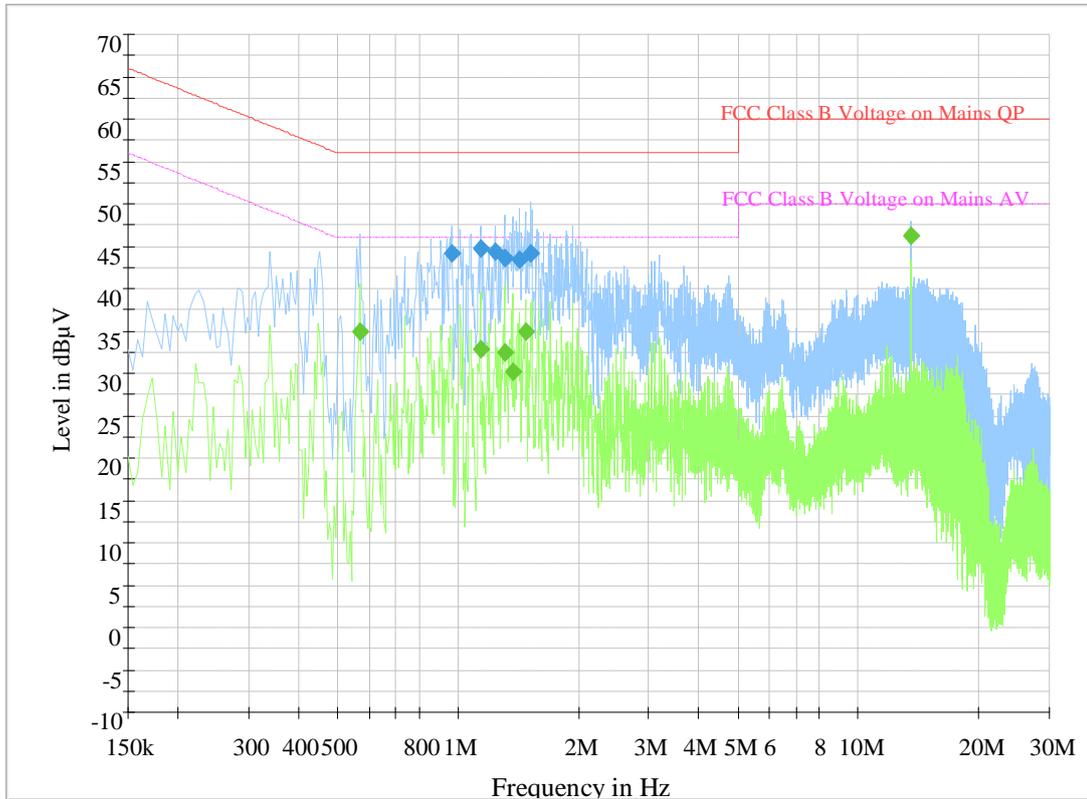
Frequency range (MHz)	Quasi-peak Limit (dB $\mu$ V)	Average Limit (dB $\mu$ V)
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

### A.6.5. Measurement Results

Measurement results see Figure A-5.

**Conclusions:** Set. NFC01, **PASS**.

Note: The measurement result at 13.56MHz is the fundamental emission of NFC signal.



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.964500	44.2	GND	L1	9.7	11.8	56.0
1.135500	44.7	GND	L1	9.7	11.3	56.0
1.243500	44.3	GND	L1	9.7	11.7	56.0
1.306500	43.6	GND	L1	9.7	12.4	56.0
1.423500	43.3	GND	L1	9.7	12.7	56.0
1.518000	44.1	GND	L1	9.7	11.9	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.568500	34.8	GND	L1	9.8	11.2	46.0
1.135500	32.9	GND	L1	9.7	13.1	46.0
1.306500	32.4	GND	L1	9.7	13.6	46.0
1.369500	30.2	GND	L1	9.7	15.8	46.0
1.473000	34.9	GND	L1	9.7	11.1	46.0
13.560000	46.2	GND	L1	9.5	3.8	50.0

Figure A-5: Test result of EUT1 at test set. NFC01

**A.6.6. Measurement Uncertainty**

Measurement uncertainty:  $U = 3.2$  dB,  $k=2$

**A.7. Duty Cycle**

**A.7.1. Reference**

See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2009 generally.

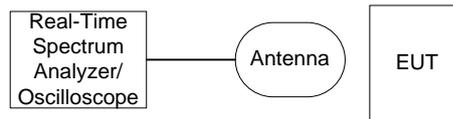
### A.7.2. Measurement Methods

The measurement of EUT is carried out under the transmit state of NFC and the standby state of NFC.

The EUT is powered by a fully charged battery.

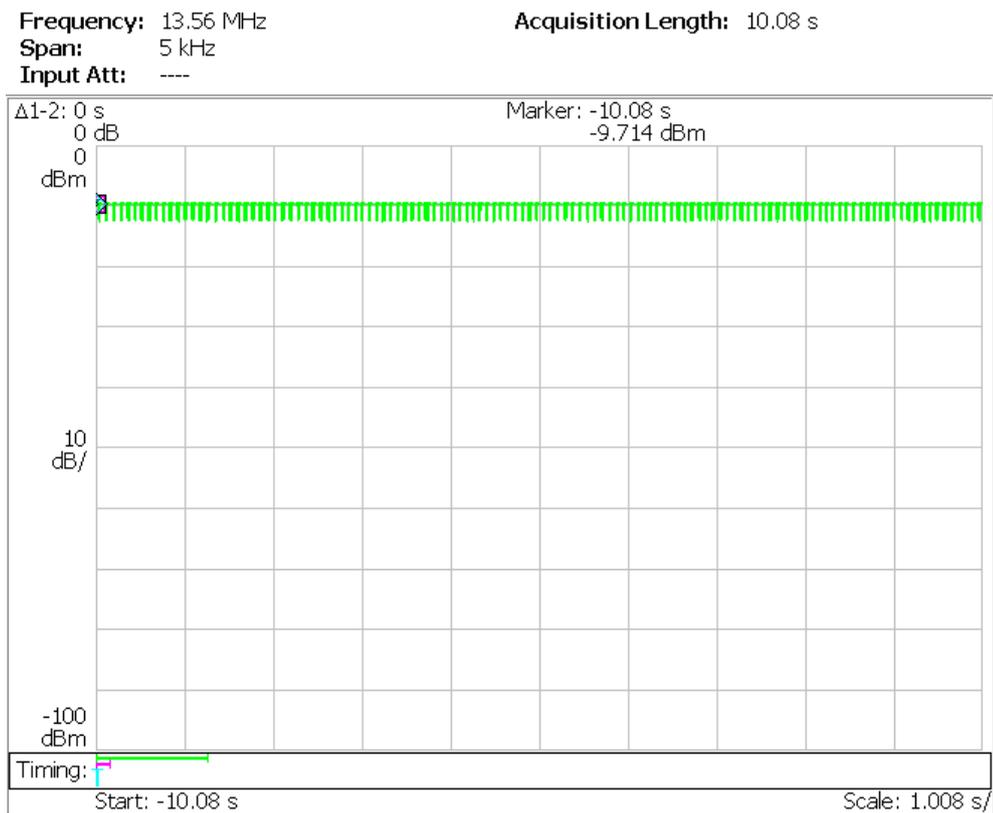
### A.7.3. Test Layouts

The test layout is as the graph below.

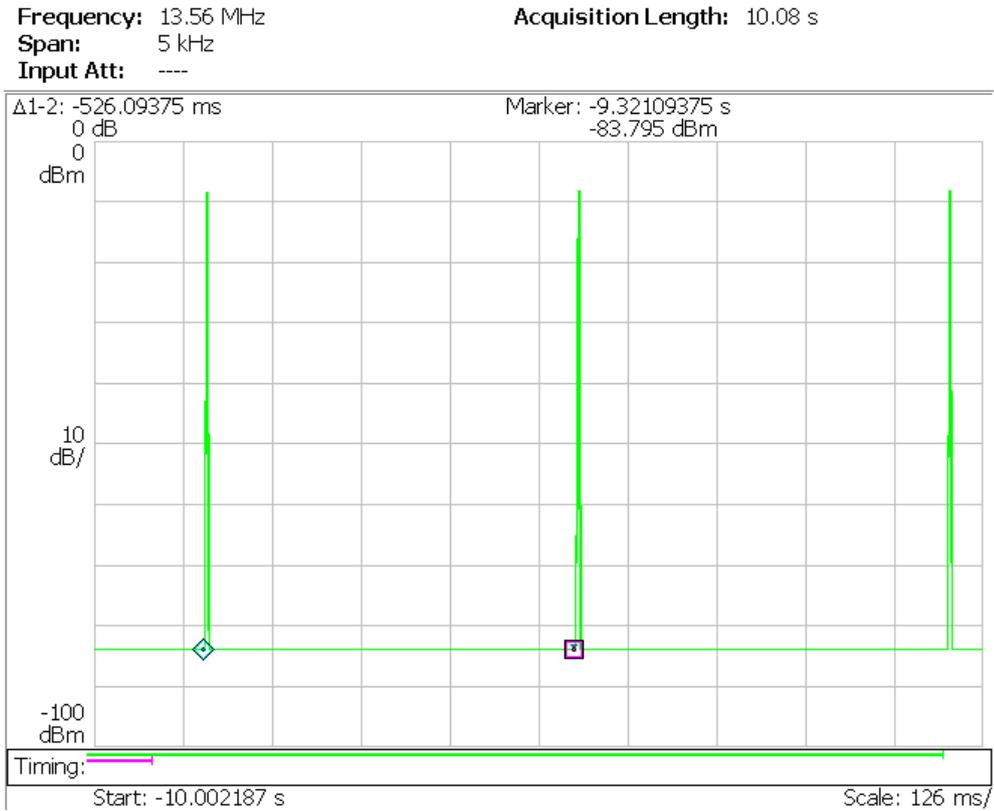
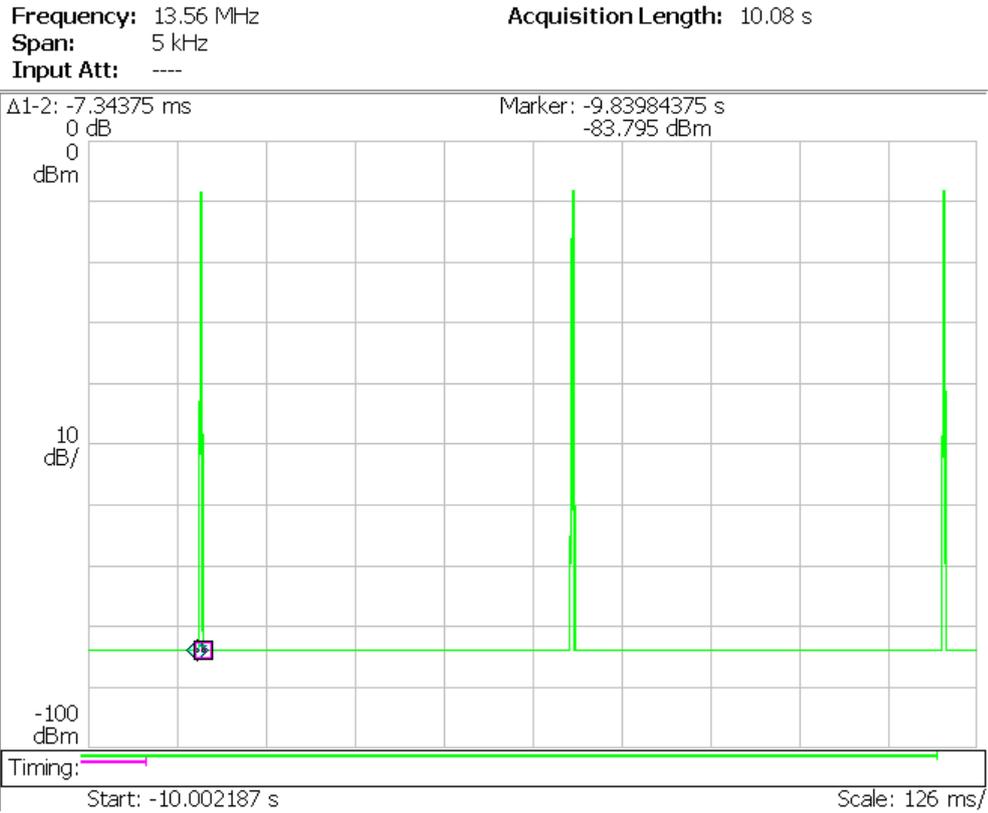


### A.7.4. Measurement Results

The EUT has the fixed duty cycle during the measurement. The duty cycle measured are 100% for traffic mode and 1.4% for idle mode.



**Figure A-6: Duty Cycle Measured at Transmit State**



**Figure A-7: Duty Cycle Measured at Standby State**

### A.7.5. Measurement Uncertainty

Measurement uncertainty:  $U = 77 \text{ Hz}$ ,  $k=2$

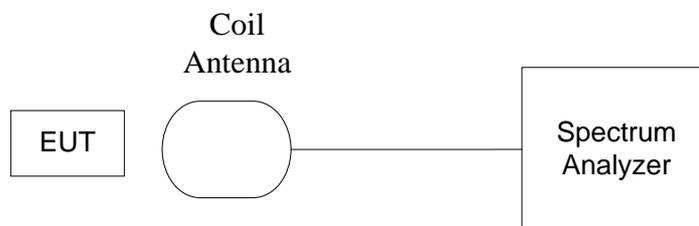
## A.8. 99% Emission Bandwidth

### A.8.1. Reference

See Clause 4.6.1 of RSS-GEN specifically.

### A.8.2. Measurement Methods

The transmitter output signal was picked up by coil antenna to the spectrum analyzer.  
The transmitter output signal was picked up by coil antenna connected to the spectrum analyzer.  
The bandwidth of the center frequency was measured with 10kHz RBW, 1MHz span and Maxhold trace-mode.



### A.8.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state.  
EUT had been not connected to a travel adapter.

### A.8.4. Test Layouts

See A.5.2.

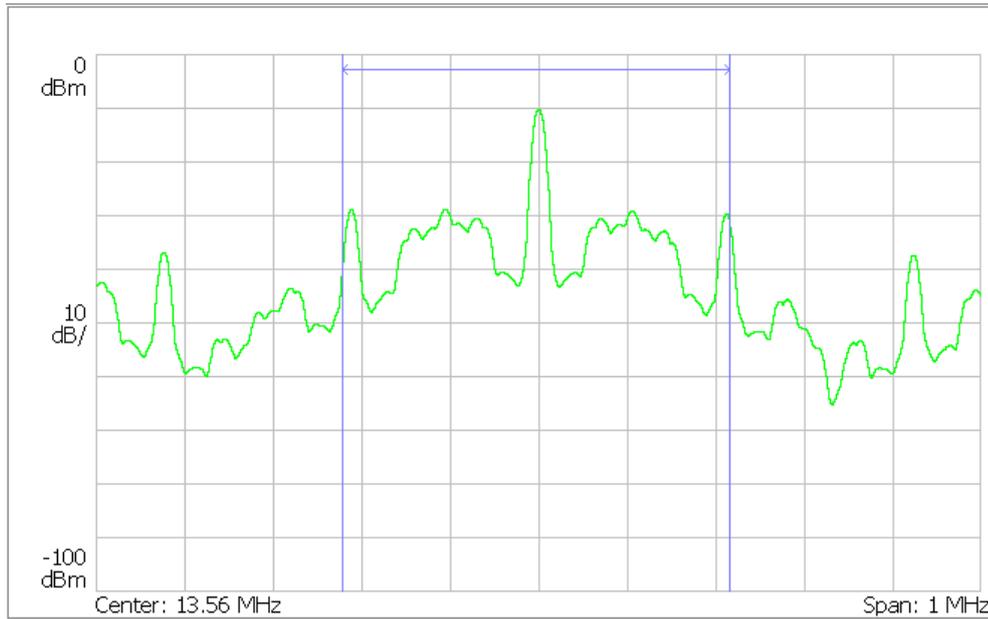
### A.8.5. Measurement Results

Test Conditions		99% Emission Bandwidth
$T_{nom}$	$V_{nom}$	436.7 kHz

Measurement results see Figure A-8.

**Conclusions:** Set. NFC02, **PASS**.

Frequency: 13.56 MHz      RBW: 10 kHz  
 Span: 1 MHz              Trace 1: (MaxHold) 20 / 20  
 Input Att: ----          Trace 2: (Off)



**Occupied BandWidth: 436.559 kHz**

Frequency Error: -2.54389 kHz

Power Ratio: 99 %

**Figure A-8: Test result of EUT1 at test set. NFC02**

**A.8.6. Measurement Uncertainty**

Measurement uncertainty:  $U = \pm 10\text{kHz}$