

APPLICATION FOR CERTIFICATION

On Behalf of

Sony Corporation

Digital Media Player

Models No.: NW-ZX2

FCC ID: AK8NWZX2

IC: 409B-NWZX2

Brand: SONY

Prepared for : Sony Corporation
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Japan 108-0075

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TEST REPORT CERTIFICATION

Applicant : Sony Corporation
EUT Description : Digital Media Player
FCC ID : **AK8NWZX2**
IC : **409B-NWZX2**
(A) Model No. : NW-ZX2
(B) Serial No. : N/A
(C) Brand : SONY
(D) Power Supply : DC 3.7V (Battery)
(E) Test Voltage : DC 3.7V (Via Battery)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C, Oct 2013
(FCC CFR 47 Part 15C, §15.207, §15.209, §15.215, and §15.225)
ANSI C63.4:2003

Industry Canada Rules and Regulations RSS-Gen (Issue 3), December 2010 and
RSS-210 (Issue 8), December 2010

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 Subpart and Canada RSS-Gen, RSS-210 limits.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC Part 15 and Industry Canada RSS-Gen, RSS-210 standards.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test : 2014. 10. 14 ~ 31 Date of Report: 2014. 10. 31

Producer : Annie Yu
(Annie Yu/Administrator)

Signatory : Ben Cheng
(Ben Cheng/Manager)

1. DESCRIPTION OF REVISION HISTORY

Edition No.	Date of Revision	Revision Summary	Report Number
0	2014. 10. 31	Original Report.	EM-F140662

2. SUMMARY OF MEASUREMENTS AND RESULTS

FCC Part Section	RSS Section	Test description	Result
15.207	RSS-Gen [7.2.2]	Powerline Conducted Emission 150kHz – 30MHz	PASS
15.225 (a)(b)(c)	RSS-210 [A2.6]	In-Band Emission	PASS
15.225 (d) 15.209	RSS-210 [A2.6]	Out-of-Band Emission	PASS
15.215	N/A	20dB Bandwidth	PASS
15.225 (e)	RSS-210 [A2.6]	Frequency Stability Tolerance	PASS

3. GENERAL INFORMATION

3.1. Description of Device (EUT)

Product	Digital Media Player
Model Number	NW-ZX2
Serial Number	N/A
Brand Name	SONY
Applicant	Sony Corporation 1-7-1 Konan Minato-ku, Tokyo, Japan 108-0075
Country of Mass-production	Malaysia
FCC ID	AK8NWZX2
IC	409B-NWZX2
Fundamental Range	802.11b/g/n-HT20: 2412MHz ~ 2462MHz 802.11a: 5180MHz ~ 5240MHz (UNII Band I) and 5260MHz ~ 5320MHz (UNII Band II-2A) and 5500MHz ~ 5700MHz (UNII Band II-2C) and 5745MHz ~ 5825MHz (UNII Band III) UNII Band II (DFS Function, Slave/no In service monitor, no Ad-Hoc mode) 802.11n-HT20: 5180MHz ~ 5240MHz (UNII Band I) and 5260MHz ~ 5320MHz (UNII Band II-2A) and 5500MHz ~ 5700MHz (UNII Band II-2C) and 5745MHz ~ 5825MHz (UNII Band III) UNII Band II (DFS Function, Slave/no In service monitor, no Ad-Hoc mode) 802.11n-HT40: 5190MHz ~ 5230MHz (UNII Band I) and 5270MHz ~ 5310MHz (UNII Band II-2A) and 5510MHz ~ 5670MHz (UNII Band II-2C) and 5755MHz ~ 5795MHz (UNII Band III) UNII Band II (DFS Function, Slave/no In service monitor, no Ad-Hoc mode) Bluetooth: 2402MHz ~ 2480MHz NFC: 13.56MHz GPS: 1575.42MHz

Frequency Channel	802.11b/g/n-HT20: 11 channels 802.11a: UNII Band I: 4 channels UNII Band II-2A: 4 channels UNII Band II-2C: 8 channels UNII Band III: 5 channels 802.11n-HT20: UNI Band I: 4channels UNII Band II-2A: 4 channels UNII Band II-2C: 8 channels UNII Band III: 5 channels 802.11n-HT40: UNII Band I: 2 channels UNII Band II-2A: 2 channels UNII Band II-2C: 3 channels UNII Band III: 2 channels Bluetooth: 79 channels NFC: 1 Channel
Radio Technology	802.11b: DSSS Modulation (DBPSK/DQPSK/CCK) 802.11g: OFDM Modulation (BPSK/QPSK/16QAM/64QAM) 802.11a: OFDM Modulation (BPSK/QPSK/16QAM/64QAM) 802.11n: OFDM Modulation (BPSK/QPSK/16QAM/64QAM) Bluetooth: FHSS (GFSK, π /4DQPSK, 8-DPSK) NFC: ASK
Data Transfer Rate	802.11b: 1/2/5.5/11Mbps 802.11a/g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 150Mbps BT: 1/2/3Mbps
Antenna Gain	2.4GHz: 1dBi 5GHz: -1dBi
USB Cable	Shielded, Detachable, 1.0m
Date of Receipt of Sample	2014. 10. 09
Date of Test	2014. 10. 14 ~ 31

3.2. Antenna Information

Manufacture	Antenna Type	Usage	Frequency	Peak Gain
Shanghai Amphenol Airwave Communication Electronics Co., Ltd.	Inverted F (LDS)	BT/WLAN	2.4GHz	1dBi
		WLAN	5GHz	-1dBi
		GPS	1.5GHz	-1dBi
	Loop (pattern)	NFC	13.56MHz	---

3.3. Tested Supporting System Details

3.3.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	PC System	ASUS	U5F	6CN0AG047651	By DoC

3.3.2. Cable Lists

No.	Signal Cable Description Of The Above Support Units
1.	Adapter: DELTA, M/N SADP-65KB B, Cord: Non-Shielded, Detachable, 1.8m Power Cord: Non-Shielded, Undetachable, 1.8m

3.4. Description of Test Facility

Name of Firm : **AUDIX Technology Corporation**
EMC Department
 No. 53-11, Dingfu, Linkou Dist.,
 New Taipei City 244, Taiwan, R.O.C.

Test Location & Facility (C7/Semi-AC) : **No. 7 Shielded Room**
 No. 53-11, Dingfu, Linkou Dist.,
 New Taipei City 244, Taiwan, R.O.C.

Semi-Anechoic Chamber
 No. 53-11, Dingfu, Linkou Dist.,
 New Taipei City 244, Taiwan, R.O.C.
 May 11, 2012 Renewal on
 Federal Communication Commission
 Registration Number: 90993

NVLAP Lab. Code : 200077-0

TAF Accreditation No : 1724

3.5. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	$\pm 3.43\text{dB}$
Radiation Test (Distance: 3m)	9kHz~300MHz	$\pm 2.91\text{dB}$
	30MHz~300MHz	$\pm 2.91\text{dB}$
	300MHz~1000MHz	$\pm 2.94\text{dB}$

Remark : Uncertainty = $k_{uc}(y)$

Test Item	Uncertainty
20dB Bandwidth	$\pm 0.2\text{kHz}$
Frequency Stability	$\pm 0.78\text{ppm}$

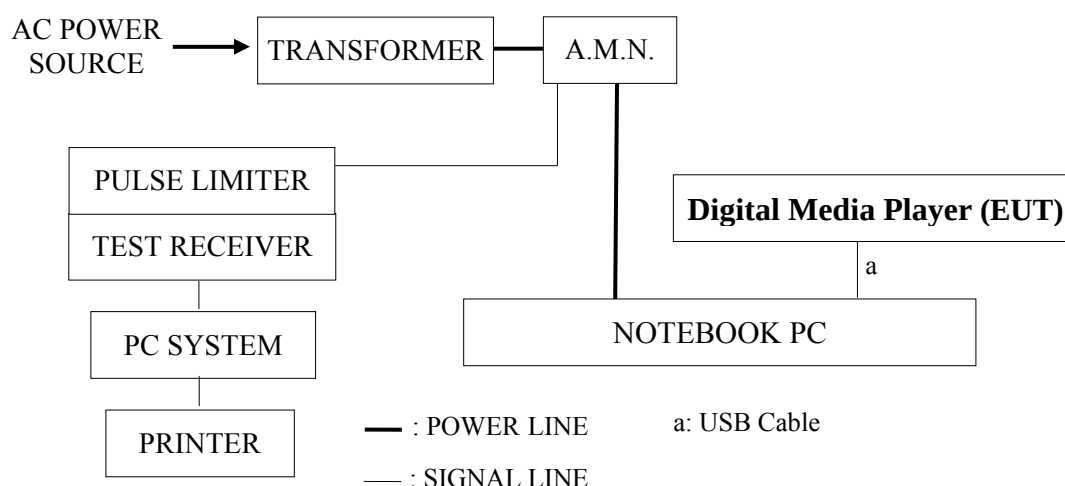
4. POWERLINE CONDUCTED EMISSION MEASUREMENT

4.1. Test Equipment

The following test equipment was used during the powerline conducted emission measurement: (No. 7 Shielded Room)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Test Receiver	R&S	ESCI	101276	2014. 06. 18	1 Year
2	A.M.N.	R&S	ENV4200	100169	2014. 05. 30	1 Year
3	L.I.S.N.	Kyoritsu	KNW-407	8-881-13	2014. 01. 15	1 Year
4	Pulse Limiter	R&S	ESH3-Z2	101495	2014. 01. 18	1 Year

4.2. Block Diagram of Test Setup



4.3. Powerline Conducted Emission Limit (§15.207, RSS-Gen §7.2.2/Table 2)

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark1.: If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

2.: The lower limit applies at the band edges.

4.4. Operating Condition of EUT

4.4.1. Setup the EUT and simulator as shown on 4.2.

4.4.2. During testing, the EUT was linked to notebook PC and charging through USB cable.

4.5. Test Procedure

The EUT was placed on the table which was above the ground by 80cm and notebook PC's power cord was connected to the AC mains through an Artificial Mains Network (A.M.N.). This provided a 50 ohm coupling impedance for the measuring equipment. (Please refer to the block diagram of the test setup and photographs.) Both sides of A.C. line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions simulators of the interface cables should be manipulated according to FCC ANSI C63.4-2003 , RSS-Gen and RSS-210 during conducted measurement.

The bandwidth of the R & S Test Receiver ESCI was set at 9kHz.

The frequency range from 150kHz to 30MHz was checked.

All the final readings from Test Receiver were measured with the Quasi-Peak detector and Average detector. (Remark: If the Average limit is met when using a Quasi-Peak detector, the Average detector is unnecessary)

4.6. Powerline Conducted Emission Measurement Results

PASSED. All emissions not reported below are too low against the prescribed limits.

EUT was performed during this section testing and all the test results are attached in next pages.

EUT : Digital Media Player M/N : NW-ZX2

Test Date : 2014. 10. 14 Temperature : 25°C Humidity : 54%

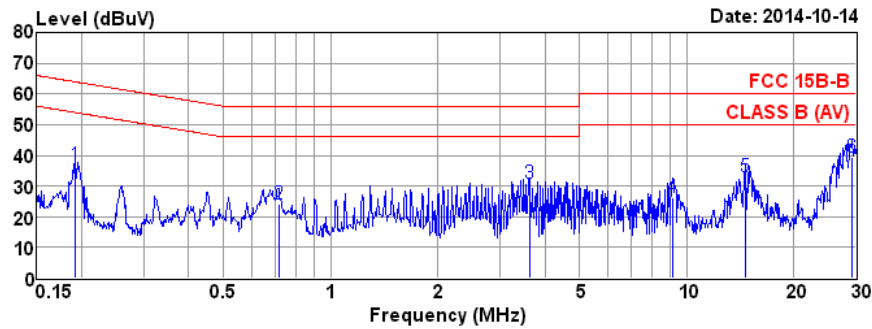
The details are as follows :

Mode	Reference Test Data	
	Neutral	Line
1.	# 2	# 1



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Data: 2 File: D:\test data\REPORT\2014\1M1410XXX\1M1410080-C-D(rf).EM6 (2)



Site no. : No.7 Shielded Room Data no. : 2
 Condition : ENV4200 100169 Phase : NEUTRAL
 Limit : FCC 15B-B
 Env. / Ins. : 25°C / 54% ESCI (1276) Engineer : Hank
 EUT : NW-ZX2
 Power Rating : 120Vac/60Hz
 Test Mode : CHARGE

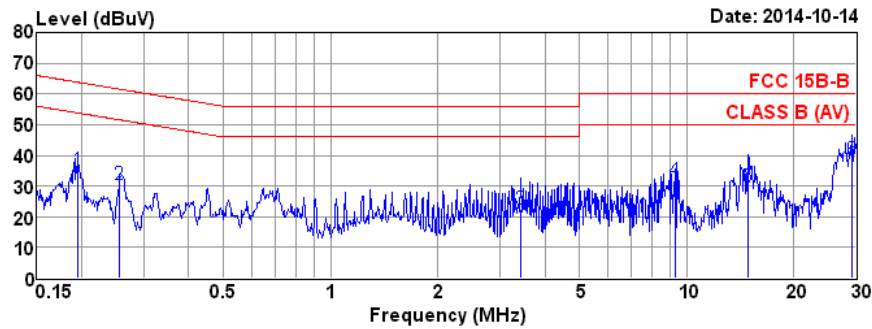
		AMN	Cable	Pulse		Emission			
	Freq.	Factor	Loss	Att.	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dBμV)	(dB)	
1	0.192	10.60	0.03	9.85	16.17	36.65	63.93	27.28	QP
2	0.716	10.46	0.04	9.84	3.69	24.03	56.00	31.97	QP
3	3.623	10.58	0.08	9.86	10.61	31.13	56.00	24.87	QP
4	9.156	11.18	0.13	9.89	5.11	26.31	60.00	33.69	QP
5	14.672	12.39	0.17	9.92	10.47	32.95	60.00	27.05	QP
6	29.216	15.84	0.26	10.01	13.46	39.57	60.00	20.43	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
 2. If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.



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Data: 1 File: D:\test data\REPORT\2014\1M1410XXX\1M1410080-C-D(rf).EM6 (2)



Site no. : No.7 Shielded Room Data no. : 1
 Condition : ENV4200 100169 Phase : LINE
 Limit : FCC 15B-B
 Env. / Ins. : 25°C / 54% ESCI (1276) Engineer : Hank
 EUT : NW-ZX2
 Power Rating : 120Vac/60Hz
 Test Mode : CHARGE

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.195	10.60	0.03	9.85	14.72	35.20	63.80	28.60	QP
2	0.256	10.56	0.03	9.86	9.91	30.36	61.56	31.20	QP
3	3.436	10.58	0.08	9.86	1.88	22.40	56.00	33.60	QP
4	9.302	11.16	0.13	9.89	10.75	31.93	60.00	28.07	QP
5	14.828	12.34	0.17	9.92	7.41	29.84	60.00	30.16	QP
6	29.216	15.72	0.26	10.01	12.53	38.52	60.00	21.48	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
 2. If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

5. RADIATED SPURIOUS EMISSION MEASUREMENT (IN-BAND)

5.1. Test Equipment

The following test equipment was used during the radiated emission measurement: (at Semi-Anechoic Chamber)

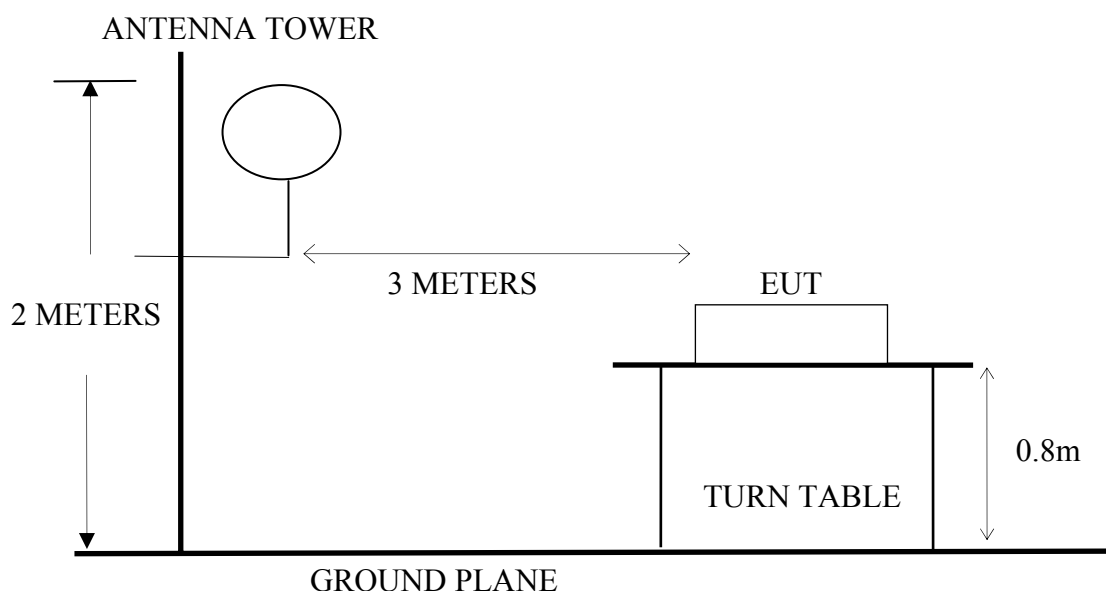
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-503	MY52220119	2014. 06. 25	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3.	Loop Antenna	R & S	HFH2-Z2	891847/27	2013. 12. 24	1 Year

5.2. Block Diagram of Test Setup

5.2.1. Block Diagram of connection between EUT and simulators

**DIGITAL MEDIA
PLAYER (EUT)**

5.2.2. Semi-Anechoic Chamber (3m) Setup Diagram for 9kHz-30MHz



5.3. IN-Band Radiated Spurious Emission Limit [§15.225(a)(b)(c), RSS-210 A2.6]

Fundamental Frequency (MHz)	Distance meter (m)	Limit	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
13.553-13.567	30	15848	84
	3	1584893	124
13.410 -13.553 and 13.567-13.710	30	334	50.50
	3	33381	90.50
13.110 -13.410 and 13.710-14.010	30	106	40.5
	3	10592	80.5

Remark : (1) Emission level ($\text{dB}\mu\text{V/m}$) = $20 \log$ Emission level ($\mu\text{V/m}$)

(2) $15848\mu\text{V/m} = 84\text{dB}\mu\text{V/m} = 84 + 40\log(30\text{m}/3\text{m}) = 124\text{dB}\mu\text{V/m}$

$334\mu\text{V/m} = 50.5\text{dB}\mu\text{V/m} = 50.5 + 40\log(30\text{m}/3\text{m}) = 90.5\text{dB}\mu\text{V/m}$

$106\mu\text{V/m} = 40.5\text{dB}\mu\text{V/m} = 40.5 + 40\log(30\text{m}/3\text{m}) = 80.5\text{dB}\mu\text{V/m}$

5.4. Operating Condition of EUT

5.4.1. Set up the EUT (Digital Media Player) and simulator as shown on 5.2.

5.4.2. During testing, to set EUT on continuously transmit signals at 13.56MHz.

5.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna fixed to 2meters to find out the maximum emission level. Loop antenna was used as a receiving antenna. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2003, RSS-Gen and RSS-210 regulation.

The bandwidth of the R&S Test Receiver ESCS30 was set at 9kHz.

The frequency range from 9kHz to 30MHz was checked with Peak detector and all final readings of measurement were with Quasi-Peak detector.

5.6. Radiated Emission Measurement Results

EUT : Digital Media Player

M/N : NW-ZX2

Test Date: 2014. 10. 31 Temperature: 24°C Humidity: 53%

The EUT emitted the fundamental frequency with data code at the stand, side and lying conditions.

The EUT select **worst position “lying”** was performed during this section testing and all the test results are listed in following.

Test Mode: 0 Degree

Frequency (MHz)	Test Result (dBuV/m) (3m)	Limit (dBuV/m) (3m)	Margin (dB)	Detector
13.560	35.17	123.99	88.82	QP

Test Mode: 90 Degree

Frequency (MHz)	Test Result (dBuV/m) (3m)	Limit (dBuV/m) (3m)	Margin (dB)	Detector
13.560	33.69	123.99	90.30	QP

6. RADIATED SPURIOUS EMISSION MEASUREMENT (OUT-BAND)

6.1. Test Equipment

The following test equipment was used during the radiated emission measurement: (at Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-503	MY52220119	2014. 06. 25	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3.	Amplifier	HP	8447D	2944A06305	2014. 02. 19	1 Year
4.	Bilog Antenna	TESEQ	CBL6112D	33821	2014. 08. 02	1 Year

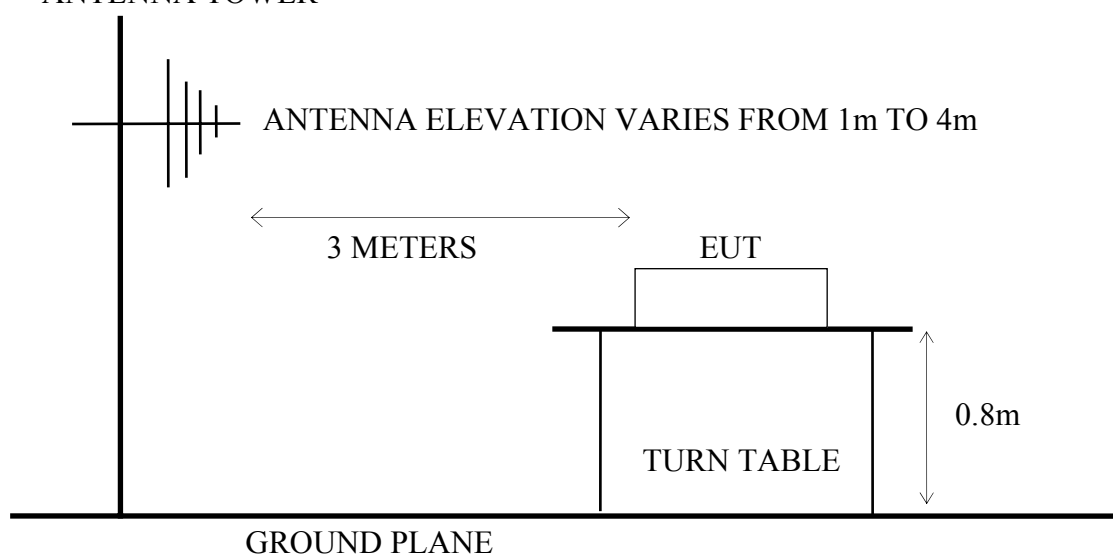
6.2. Block Diagram of Test Setup

6.2.1. Block Diagram of connection between EUT and simulators

Same as section 5.2.1.

6.2.2. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000MHz

ANTENNA TOWER



6.3. Radiated Emission Limits [§15.209, §15.209(d), RSS-210 §2.7/Table 2, RSS-210 (A2.6)]

Frequency MHz	Distance Meters	Field Strengths Limits	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
1.705 ~ 30.0	30 (3)	30 (2985)	29.5 (69.54)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 $\text{dB}\mu\text{V/m}$ (Peak) 54.0 $\text{dB}\mu\text{V/m}$ (Average)	

- Remark :
- (1) Emission level ($\text{dB}\mu\text{V/m}$) = $20 \log$ Emission level ($\mu\text{V/m}$)
 - (2) The tighter limit applies at the edge between two frequency bands.
 - (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 - (4) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a).
 - (5) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35 (b) and Part 15.205(b) & Part 15.209(e) and Part 15.207(c).
 - (6) The 3m limit apply relation: $L2 = L1(d1/d2)$

6.4. Operating Condition of EUT

Same as In-Band Emission measurement which is listed in 5.4. except the test set up replaced by section 6.2.

6.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log-periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2003, RSS-Gen and RSS-210 regulation.

The bandwidth of the R&S Test Receiver ESCS30 was set at 120kHz.

The frequency range from 9kHz to 1000MHz was checked with Peak detector and all final readings of measurement were with Quasi-Peak detector. Pursuant to ANSI 63.4: 4.2, peak detector is an alternate option for frequency from 30MHz to 1000MHz.

6.6. Radiated Emission Measurement Results

PASSED.

All emissions not reported below are too low against the prescribed limits.

EUT : Digital Media Player M/N : NW-ZX2

The EUT emitted the fundamental frequency with data code at the stand, side and lying conditions.

The EUT select **worst position “lying”** was performed during this section testing and all the test results are listed in following page.

For Frequency Range 9kHz~30MHz:

Test Date: 2014. 10. 31 Temperature: 24°C Humidity: 53%

Test Mode: 0 Degree

Frequency (MHz)	Test Result (dBuV/m) (3m)	Limit (dBuV/m) (3m)	Margin (dB)	Detector
27.12	-- (Note 1)	69.54	--	QP

Note: 1. All emissions are lower than the ambient level cannot be measured.

Test Mode: 90 Degree

Frequency (MHz)	Test Result (dBuV/m) (3m)	Limit (dBuV/m) (3m)	Margin (dB)	Detector
27.12	-- (Note 1)	69.54	--	QP

Note: 1. All emissions are lower than the ambient level cannot be measured.

For Frequency Range 30MHz~1000MHz:

Test Date: 2014. 10. 31 Temperature: 24°C Humidity: 53%

The details are as follows :

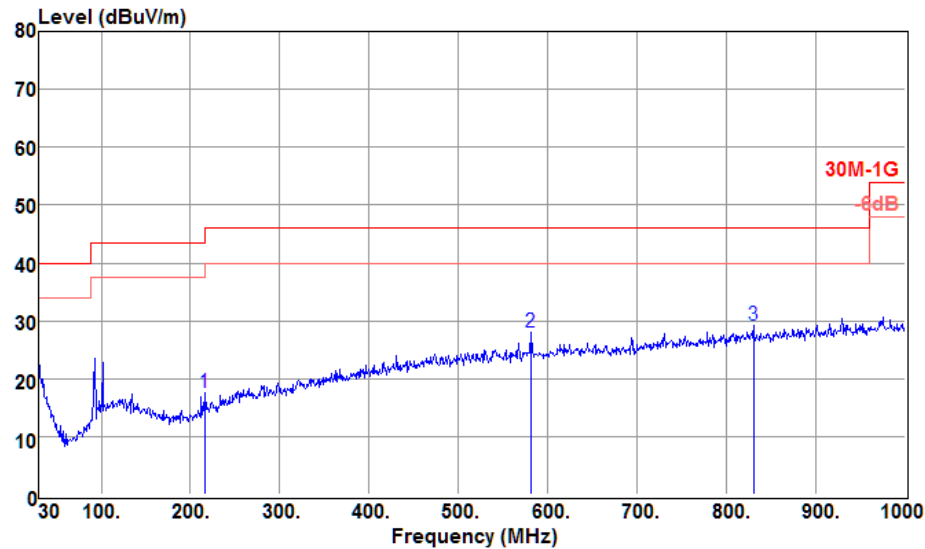
Mode	Reference Test Data	
	Horizontal	Vertical
1.	# 10	# 9

* Above all final readings were measured with Peak detector.



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Data: 10 File: D:\share DOC\johnny-e3\C1M1410080\NFC\FCC\NFC.em6 (10)



Site no. : Audix NO.1 Chamber
Dis. / Ant. : 3m CBL6112D 33821
Limit : 30M-1G
Env. / Ins. : 24°C / 53% N9010A
EUT : NW-ZX2
Power Rating : DC 3.7V
Test Mode : Tx13.56MHZ

Data no. : 10
Ant. pol. : HORIZONTAL
Engineer : Johnny_Hsueh

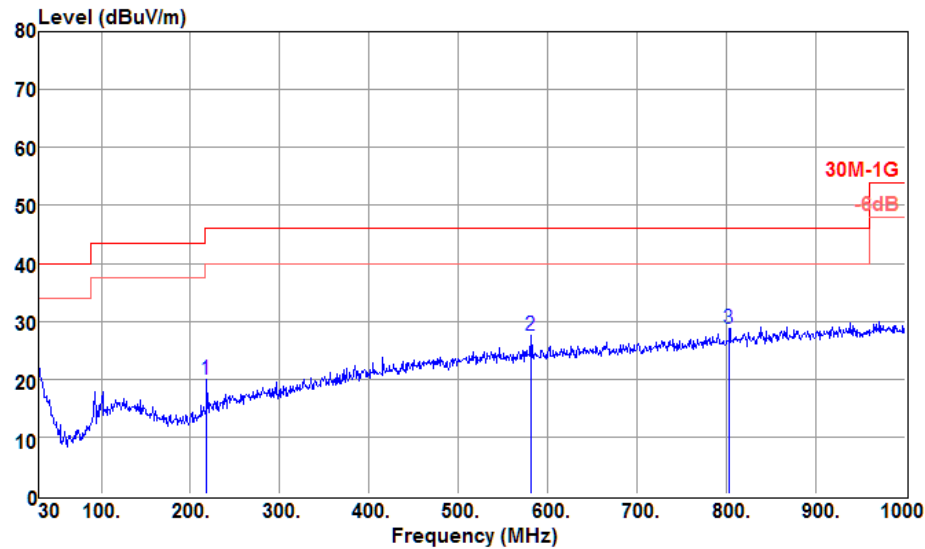
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	216.24	10.35	4.10	3.04	17.49	46.00	28.51	Peak
2	580.96	18.08	6.49	3.50	28.07	46.00	17.93	Peak
3	830.25	20.20	7.28	1.76	29.24	46.00	16.76	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



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Email:ttemc@ttemc.com.

Data: 9 File: D:\share DOC\johnny-e3\C1M1410080\NFC\FCC\NFC.em6 (10)



Site no. : Audix NO.1 Chamber
Dis. / Ant. : 3m CBL6112D 33821
Limit : 30M-1G
Env. / Ins. : 24°C / 53% N9010A
EUT : NW-ZX2
Power Rating : DC 3.7V
Test Mode : Tx13.56MHZ

Data no. : 9
Ant. pol. : VERTICAL
Engineer : Johnny_Hsueh

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	218.18	10.49	4.12	5.28	19.89	46.00	26.11	Peak
2	580.96	18.08	6.49	2.97	27.54	46.00	18.46	Peak
3	803.09	20.04	7.17	1.42	28.63	46.00	17.37	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

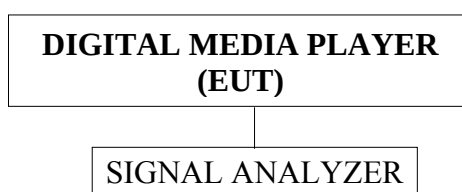
7. 20dB BANDWIDTH MEASUREMENT

7.1. Test Equipment

The following test equipment was used during the 20dB bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 09. 19	1 Year

7.2. Block Diagram of Test Setup



7.3. Specification Limits [§15.215(c)]

The 20dB bandwidth shall be specified in operating frequency band.

7.4. Operating Condition of EUT

Same as In-Band Emission measurement which is listed in 5.4. except the test set up replaced by section 7.2.

7.5. Test Procedure

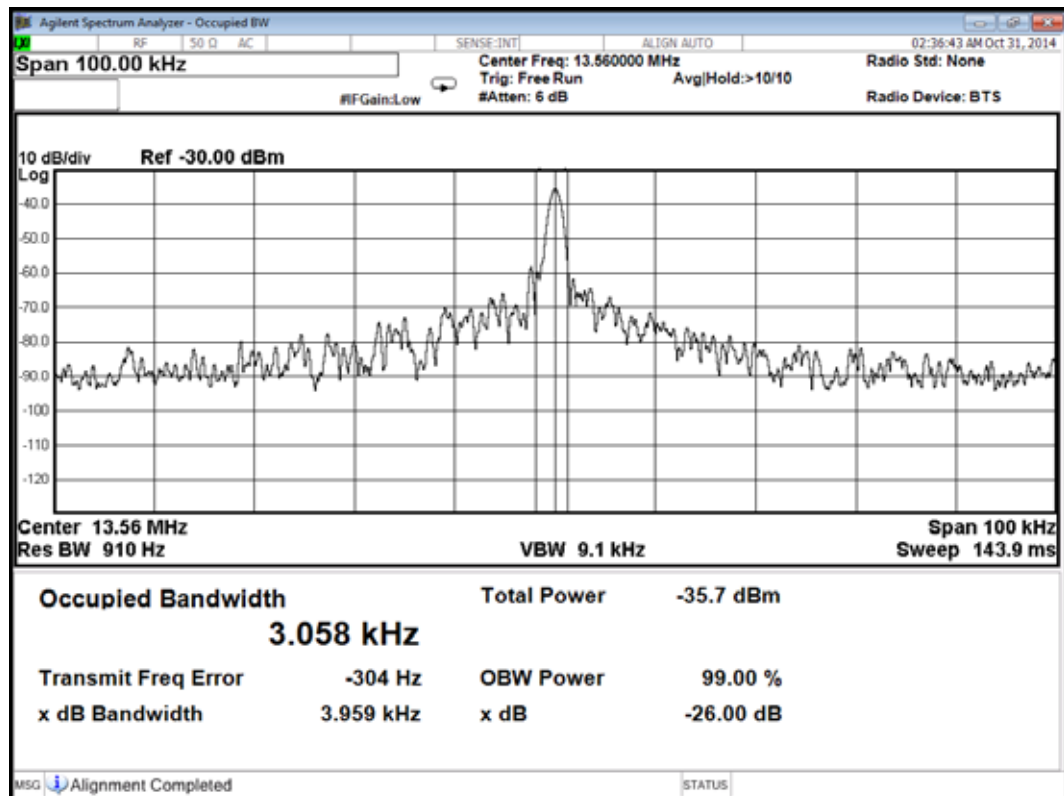
The 20dB bandwidth is measured with a spectrum analyzer connected via receiver antenna placed near the EUT while the EUT is operating in transmission mode.

7.6. Test Results

PASSED. All the test results are attached in next pages.

Test Date: 2014. 10. 31 Temperature: 25°C Humidity: 50%

No.	Test Frequency	20dB Bandwidth
1.	13.56MHz	3.959kHz



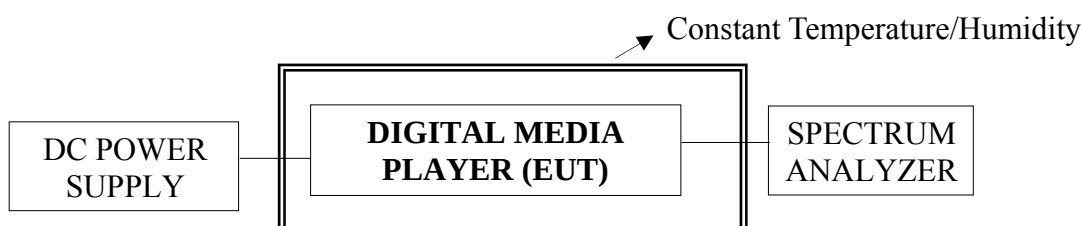
8. FREQUENCY STABILITY MEASUREMENT

8.1. Test Equipment

The following test equipment was used during the carrier frequency separation measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 09. 19	1 Year
2.	Constant Temperature/ Humidity	Taichy	MHG-120LF	920538	2014. 06. 30	1 Year
3.	DC Power Supply	TOP WARD	3303A	N/A	N.C.R.	N.C.R.

8.2. Block Diagram of Test Setup



8.3. Specification Limits [§15.225(c), RSS-210 (A2.6)]

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ 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 degree C.

8.4. Operating Condition of EUT

Same as powerline conducted emission measurement which is listed in 5.4. except the test set up replaced by section 8.2.

8.5. Test Procedure

The device operating in the 13.553-13.567MHz shall maintain the carrier frequency within 0.01% of the operating frequency over the temperature variation of -20 degrees to +50 degrees C at normal supply voltage.

8.6. Test Results

PASSED. All the test results are attached in next pages.

Test Date: 2014. 10. 31 Temperature: 25 °C Humidity: 50%

Test Mode: 2 Minute

Temperature(°C)	-20	-10	0	10	20
Voltage	DC 3.7V	DC 3.7V	DC 3.7V	DC 3.7V	DC 4.255V
Frequency(MHz)	13.55980	13.55960	13.55990	13.56020	13.56100
Error (%)	-0.00147	0.00295	-0.00074	0.00147	0.00737

Temperature(°C)	20	30	40	50	20
Voltage	DC 3.145V	DC 3.7V	DC 3.7V	DC 3.7V	DC 3.7V
Frequency(MHz)	13.55970	13.55990	13.55980	13.55990	13.56096
Error (%)	-0.00221	-0.00074	-0.00147	-0.00074	0.00708

Test Mode: 5 Minute

Temperature(°C)	-20	-10	0	10	20
Voltage	DC 3.7V	DC 3.7V	DC 3.7V	DC 3.7V	DC 4.255V
Frequency(MHz)	13.56080	13.55978	13.55976	13.55990	13.56000
Error (%)	0.00590	-0.00162	-0.00177	-0.00074	0.00000

Temperature(°C)	20	30	40	50	20
Voltage	DC 3.145V	DC 3.7V	DC 3.7V	DC 3.7V	DC 3.7V
Frequency(MHz)	13.56020	13.55980	13.55960	13.55900	13.55960
Error (%)	0.00147	-0.00147	-0.00295	-0.00737	-0.00295

Test Mode: 10 Minute

Temperature(°C)	-20	-10	0	10	20
Voltage	DC 3.7V	DC 3.7V	DC 3.7V	DC 3.7V	DC 4.255V
Frequency(MHz)	13.55970	13.55940	13.55970	13.55960	13.55990
Error (%)	-0.00221	-0.00442	-0.00221	-0.00295	-0.00074

Temperature(°C)	20	30	40	50	20
Voltage	DC 3.145V	DC 3.7V	DC 3.7V	DC 3.7V	DC 3.7V
Frequency(MHz)	13.55963	13.56082	13.56020	13.55970	13.55990
Error (%)	-0.00273	0.00605	0.00147	-0.00221	-0.00074

9. DEVIATION TO TEST SPECIFICATIONS

【NONE】