7. FREQUENCY STABILITY MEASUREMENT

7.1 Provisions Applicable

According to §2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃to +50℃centigrade, and according to §2.1055 (d)(2), the frequency stability shall be measured with variation of primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

According to §74.861(e)(4), the frequency tolerance of the transmitter shall be 0.005 percent.

7.2 Measurement Procedure

A) Frequency stability versus environmental temperature

1. Setup the configuration per figure 5 for frequencies measured at ambient temperature if it is within 15℃to 25℃. Otherwise, an environmental chamber set for a temperature of 20℃shall be used.

2. Turn on EUT and set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10℃decreased per stage until the lowest temperature -30℃is measured, record all measurement frequencies.

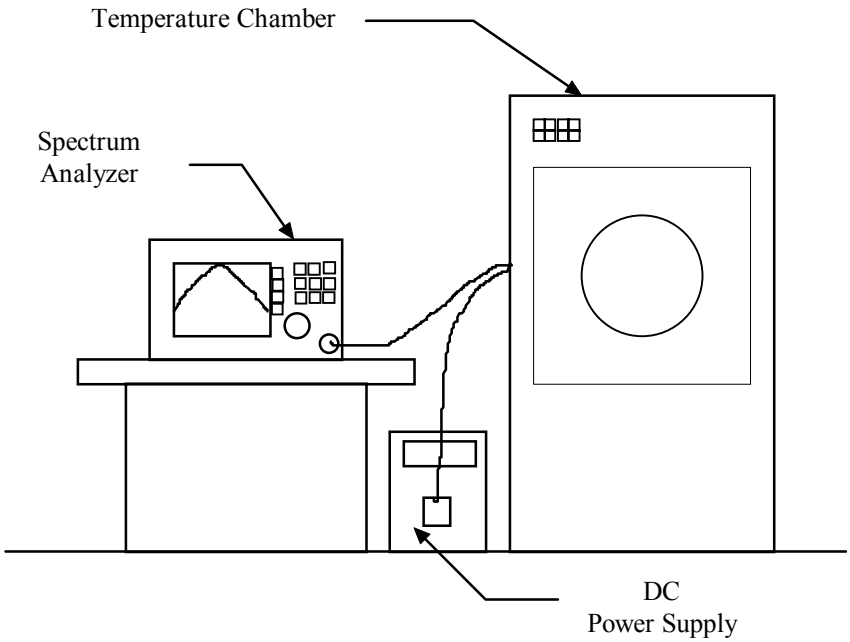
B) Frequency stability versus input voltage

1. Setup the configuration per figure 7 for frequencies measured at ambient temperature if it is within 15℃to 25℃. Otherwise, an environmental chamber set for a temperature of 20℃shall be used. Install new batteries in the EUT.

2. Set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. For non hand carried, battery operated device, supply the EUT primary voltage with 85 and 115 percent of the nominal value and record the frequency.

Figure 5 : Frequency stability measurement configuration



7.3 Measurement Instrument

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2015/01/21	2016/01/20
Temperature Chamber	MALLIER	MCT-2X-M	2014/05/02	2015/05/01

7.4 Measurement Data

Test Date : Jan. 31, 2015 Temperature : 20 °C Humidity : 60 %

A. Tx Frequency 514.100MHz

A1. Frequency stability versus enviroment tempture

Reference Frequency 514.100 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	12.0	514.1093	0.00181	514.0850	-0.00292	514.0933	-0.00130
40		514.1110	0.00214	514.1010	0.00019	514.0806	-0.00377
30		514.0986	-0.00027	514.0951	-0.00095	514.1046	0.00089
20		514.1042	0.00082	514.1024	0.00047	514.0959	-0.00080
10		514.1047	0.00091	514.0864	-0.00265	514.1183	0.00356
0		514.0945	-0.00107	514.0892	-0.00210	514.1001	0.00002
-10		514.1114	0.00222	514.0813	-0.00364	514.0942	-0.00113
-20		514.0812	-0.00366	514.1008	0.00016	514.1006	0.00012
-30		514.0928	-0.00140	514.0983	-0.00033	514.1030	0.00058

A2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 514.100 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	10.2	514.1086	0.00167	514.1130	0.00253	514.1098	0.00191
25	13.8	514.1151	0.00294	514.0912	-0.00171	514.0867	-0.00259

8 CONDUCTED EMISSION MEASUREMENT

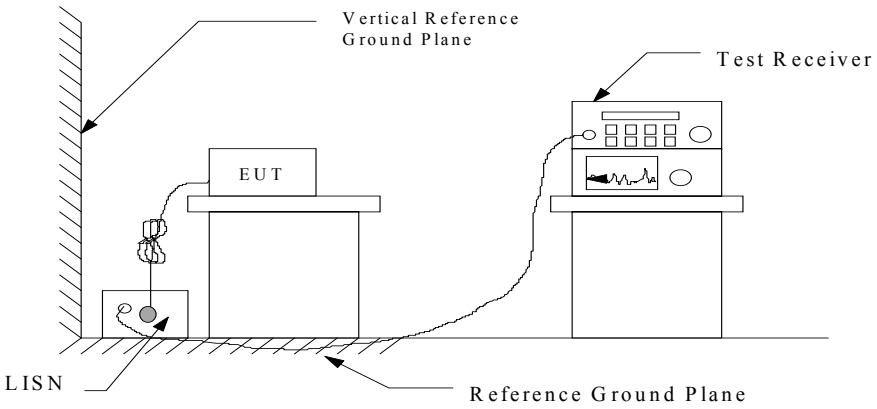
8.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to § 15.107(a) and § 15.207(a) respectively. Both Limits are identical specification.

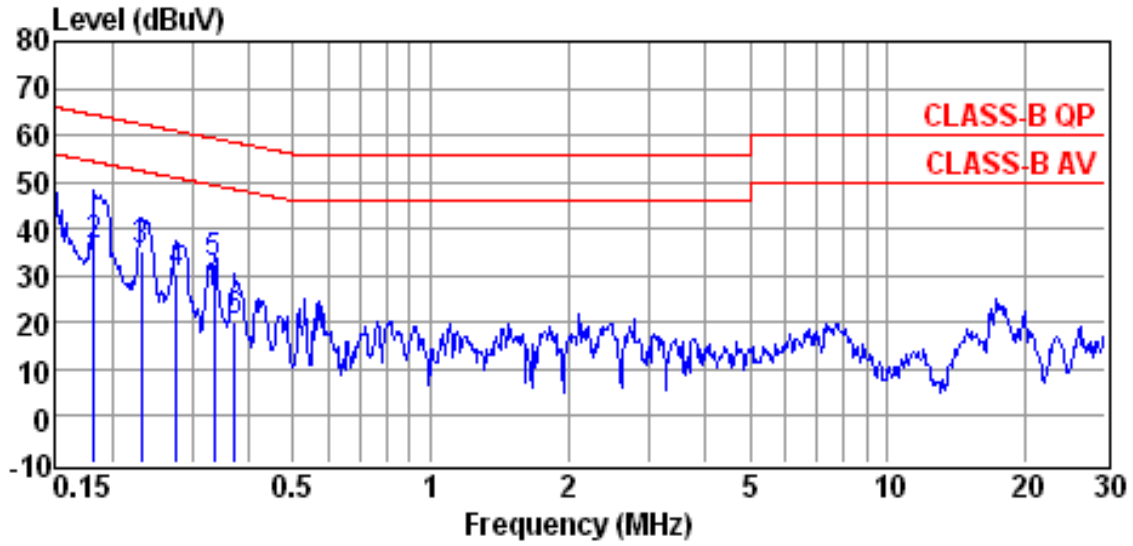
8.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 or 8 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration



8.3 Conducted Emission Data



Site	: conducted #1	Date	: 01-29-2015
Condition	: CLASS-B QP	LISN	: NEUTRAL
Tem / Hum	: 20 ℃ / 60%	Test Mode	: Monopole

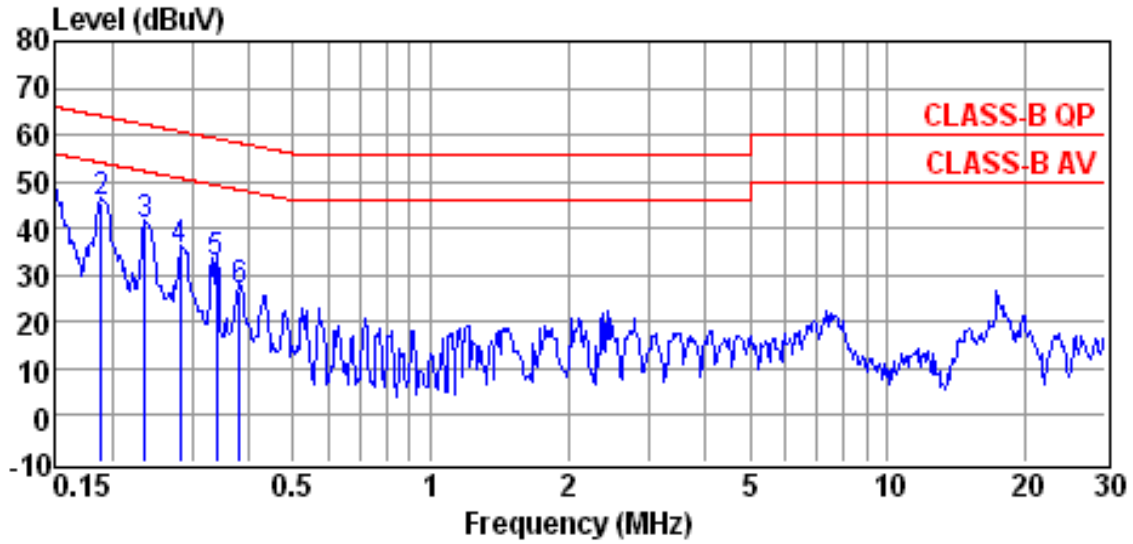
Antenna

EUT : Plug-in UHF Wireless Audio Link Transmitter Module

Power Rating : 120V/60Hz Memo :

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1500	36.0	10.2	46.2	66.0	-19.8	QP
0.1835	25.9	10.2	36.1	64.3	-28.2	QP
0.2329	25.3	10.2	35.5	62.3	-26.8	QP
0.2773	20.1	10.2	30.3	60.9	-30.6	QP
0.3356	22.3	10.2	32.5	59.3	-26.8	QP
0.3712	10.1	10.2	20.3	58.5	-38.2	QP

Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



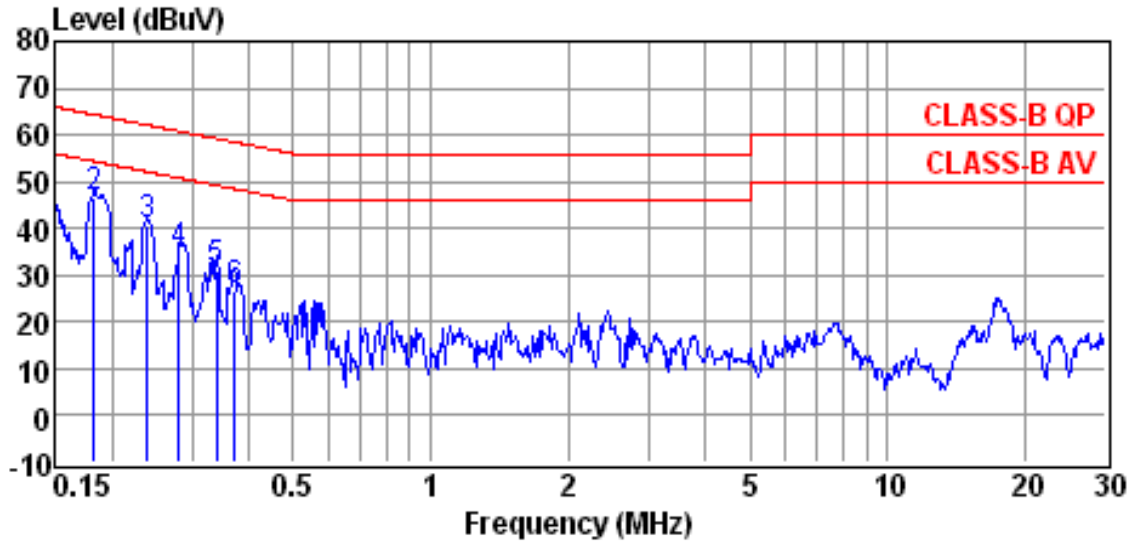
Site	: conducted #1	Date	: 01-29-2015
Condition	: CLASS-B QP	LISN	: LINE
Tem / Hum	: 20 ℃ / 60%	Test Mode	: Monopole

Antenna

EUT	: Plug-in UHF Wireless Audio Link Transmitter Module		
Power Rating	: 120V/60Hz	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1500	35.5	10.1	45.6	66.0	-20.4	QP
0.1904	35.4	10.1	45.5	64.0	-18.5	QP
0.2366	30.5	10.1	40.6	62.2	-21.6	QP
0.2833	24.9	10.1	35.0	60.7	-25.7	QP
0.3392	22.3	10.1	32.4	59.2	-26.8	QP
0.3811	16.5	10.1	26.6	58.3	-31.7	QP

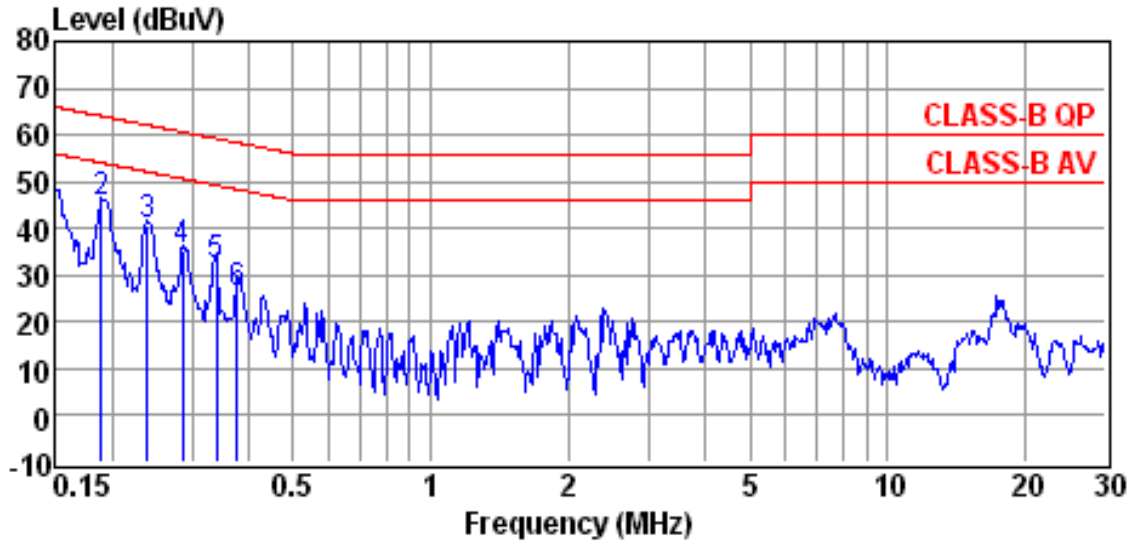
Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



Site	: conducted #1	Date	: 01-29-2015
Condition	: CLASS-B QP	LISN	: NEUTRAL
Tem / Hum	: 20 ℃ / 60%	Test Mode	: Dipole Antenna
EUT	: Plug-in UHF Wireless Audio Link Transmitter Module		
Power Rating	: 120V/60Hz	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1500	33.5	10.2	43.7	66.0	-22.3	QP
0.1835	36.5	10.2	46.7	64.3	-17.6	QP
0.2391	30.6	10.2	40.8	62.1	-21.3	QP
0.2803	24.7	10.2	34.9	60.8	-25.9	QP
0.3392	21.0	10.2	31.2	59.2	-28.0	QP
0.3712	16.5	10.2	26.7	58.5	-31.8	QP

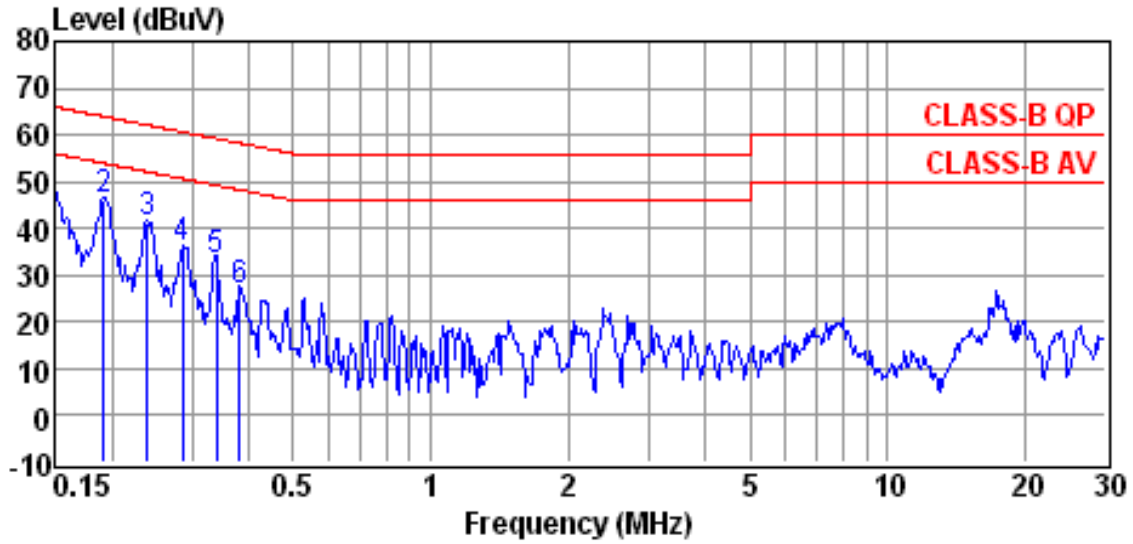
Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



Site	: conducted #1	Date	: 01-29-2015
Condition	: CLASS-B QP	LISN	: LINE
Tem / Hum	: 20 ℃ / 60%	Test Mode	: Dipole Antenna
EUT	: Plug-in UHF Wireless Audio Link Transmitter Module		
Power Rating	: 120V/60Hz	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1500	34.9	10.1	45.0	66.0	-21.0	QP
0.1904	35.4	10.1	45.5	64.0	-18.5	QP
0.2391	30.3	10.1	40.4	62.1	-21.7	QP
0.2863	25.2	10.1	35.3	60.6	-25.3	QP
0.3392	21.9	10.1	32.0	59.2	-27.2	QP
0.3771	16.2	10.1	26.3	58.3	-32.0	QP

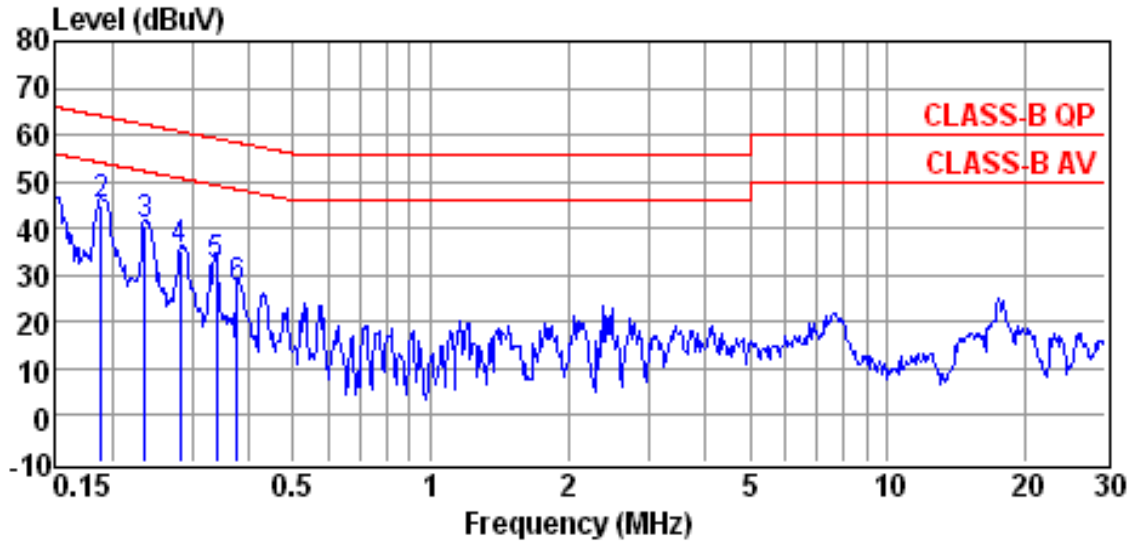
Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



Site	: conducted #1	Date	: 01-29-2015
Condition	: CLASS-B QP	LISN	: NEUTRAL
Tem / Hum	: 20 ℃ / 60%	Test Mode	: Directional Antenna
EUT	: Plug-in UHF Wireless Audio Link Transmitter Module		
Power Rating	: 120V/60Hz	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1500	36.8	10.2	47.0	66.0	-19.0	QP
0.1924	35.6	10.2	45.8	63.9	-18.1	QP
0.2391	31.0	10.2	41.2	62.1	-20.9	QP
0.2863	25.4	10.2	35.6	60.6	-25.0	QP
0.3392	22.7	10.2	32.9	59.2	-26.3	QP
0.3811	16.4	10.2	26.6	58.3	-31.7	QP

Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



Site	: conducted #1	Date	: 01-29-2015
Condition	: CLASS-B QP	LISN	: LINE
Tem / Hum	: 20 ℃ / 60%	Test Mode	: Directional Antenna
EUT	: Plug-in UHF Wireless Audio Link Transmitter Module		
Power Rating	: 120V/60Hz	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1500	35.0	10.1	45.1	66.0	-20.9	QP
0.1904	35.1	10.1	45.2	64.0	-18.8	QP
0.2366	30.4	10.1	40.5	62.2	-21.7	QP
0.2833	25.3	10.1	35.4	60.7	-25.3	QP
0.3392	22.0	10.1	32.1	59.2	-27.1	QP
0.3771	17.3	10.1	27.4	58.3	-30.9	QP

Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss

8.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR

Assume a receiver reading of 22.5 dB μ V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB μ V.

RESULT = 22.5 + 0.1 = 22.6 dB μ V
Level in μ V = Common Antilogarithm[(22.6 dB μ V)/20]
= 13.48 μ V

8.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2014/05/30	2015/05/29
LISN	EMCO	3625/2	2014/05/06	2015/05/05
LISN	Rohde & Schwarz	ESH2-Z5	2014/04/08	2015/04/07

8.6 Photos of Conduction Measuring Setup

Monopole Antenna

Dipole Antenna

Directional Antenna