FCC Test Report

Report No.: AGC00533131201FE02

FCC ID	:	2ABNFSS-PT2
PRODUCT DESIGNATION	:	silent disco transmitter
BRAND NAME	:	Silent Safaris
TEST MODEL	:	SS-PT2, TX89-2CH,TX-2CH
CLIENT	:	Wireless Audio Solutions LLC
DATE OF ISSUE	:	Jan.17, 2014
STANDARD(S)	:	FCC Part 15 Rules
REPORT VERSION	:	V 1.01

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.01	/	Jan.17, 2014	Valid	Original Report

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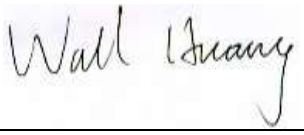
1. VERIFICATION OF COMPLIANCE

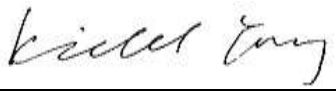
Applicant:	Wireless Audio Solutions LLC
Applicant Address:	95 Brown Rd Office 163 Cornell Business & Technology Park Ithaca NY 14850 USA
Manufacturer:	Shenzhen Changyin Electronic Co., Ltd
Manufacturer Address:	5A,Bldg2, Anle Industrial park, Hezhou, Xixiang, Baoan, Shenzhen, Guang Dong, China
Product Description:	silent disco transmitter
Brand Name:	Silent Safaris
Model Name:	SS-PT2,TX89-2CH,TX-2CH
Model Difference:	All the same except for the mode name and appearance.
Hardware Version:	V7.1
Software Version:	V1.0
Date of Test:	Jan.11, 2014 to Jan.15, 2014

WE HEREBY CERTIFY THAT:

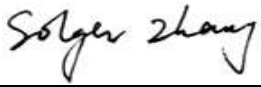
The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.249.

Tested By : 

Wall Huang Jan.17, 2014

Review By : 

Kidd Yang Jan.17, 2014

Approved By: 

Solger Zhang Jan.17, 2014

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)

Operation Frequency	915~917MHz (Only have two channels: 915MHz and 917MHz.)
Modulation	FM
Antenna Designation	Detachable
Antenna Gain	5dBi
Power Supply	DC 9V

2.2. TEST STANDARDS

The following report of is prepared on behalf of the Attestation of Global Compliance(Shenzhen) Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.249, 15.203 and 15.209 of the Federal Communication Commission rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.249, 15.203 and 15.209 of the Federal Communication Commission rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

2.3. RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2ABNFSS-PT2** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

2.4. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2003, 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.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions. The EUT was tested in all three orthogonal planes and the worse case was showed.

2.5. TEST FACILITY

All measurement facilities used to collect the measurement data are located at

Attestation of Global Compliance (Shenzhen) Co., Ltd

(2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China.)

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.

FCC register No.: 259865

2.6. ACCESSORIES EQUIPMENT LIST AND DETAILS

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Power Adapter	--	--	--	--	--

2.7. SUPPORT EQUIPMENT LIST AND DETAILS

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
silent disco transmitter	Silent Safaris	SS-PT2	--	--	1.0m, unshielded
MOBILE PHONE	htc	--	--	--	--

SETUP DESCRIPTION:

1. The test signals (frequency: 1KHz, Level: 100%) provide by mobile phone via by audio line.

2.8. EUT PORT&CABLE LIST AND DETAILS

I/O Port Type	Q'TY	Cable	Tested with
Audio Input Port	4	1.0m, unshielded	4
DC Input Port	1	1.0m, unshielded	1

3. SUMMARY OF TEST RESULTS

Description of Test	Result
§15.203 Antenna Requirement	Compliant
§15.207 Power Line Conducted Emission	Compliant
§15.209 General Requirement	Compliant
§15.249 Emission Bandwidth	Compliant
§15.249 Spurious Emission	Compliant

4. TEST MODES

No.	TEST MODES
1	915MHZ TX + 917MHZ TX + Charging
***Note:** Above 2 modes have performed at maximum emission conditions. 3 axis have been tested and only the worst mode data recorded in the test report if no any other data.*	

5. § 15.203 - ANTENNA REQUIREMENT

5.1. STANDARD APPLICABLE

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

5.2. TEST RESULT

This product has a permanent antenna, fulfill the requirement of this section.

6. §15.209, §15.249 RADIATED EMISSION

6.1. MEASUREMENT UNCERTAINTY

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is +/-3.2 dB.

6.2. STANDARD APPLICABLE

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Field Strength (mV/m)	Field Strength of Harmonics (µV/m)
902-928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

In the above emission table, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength (µV/m at 3-meter)	Field Strength (dBµV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

6.3. TEST EQUIPMENT LIST AND DETAILS

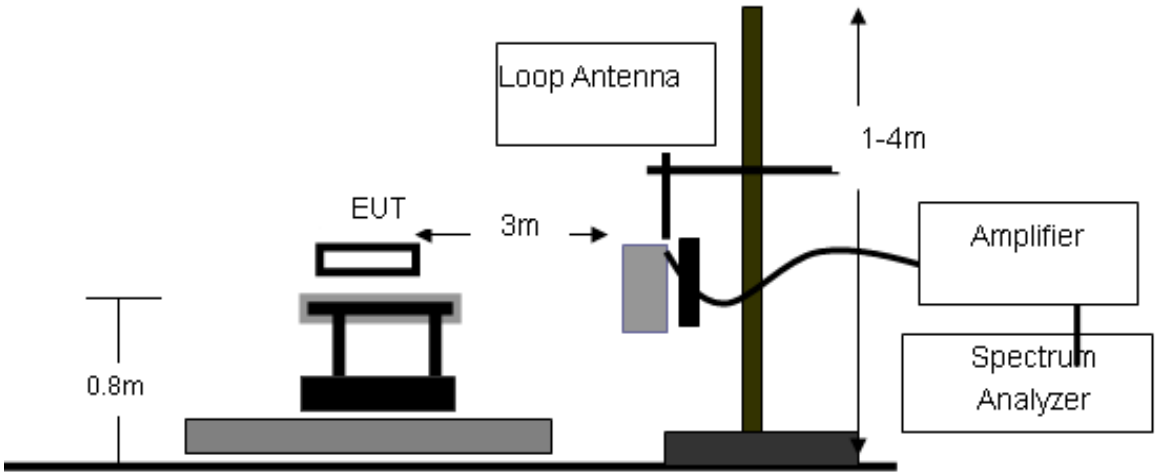
Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
PSA SERIES SPECTRUM ANALYZER	AGILENT	E4440A	US41421290	07/18/2013	07/17/2014
BICONICAL ANTENNA	A.H.	SAS-521-4	128	06/08/2013	06/07/2014
HORN ANTENNA	EM	EM-AH-10180	N/A	04/21/2013	04/20/2014
AMPLIFIER	EM	EM30180	0607030	07/18/2013	07/17/2014
POSITIONING CONTROLLER	MF	MF-7802	MF780208147	--	--
LOOP ANTENNA	A.H.	SAS-562B	N/A	06/01/2013	06/02/2014

6.4. TEST PROCEDURE

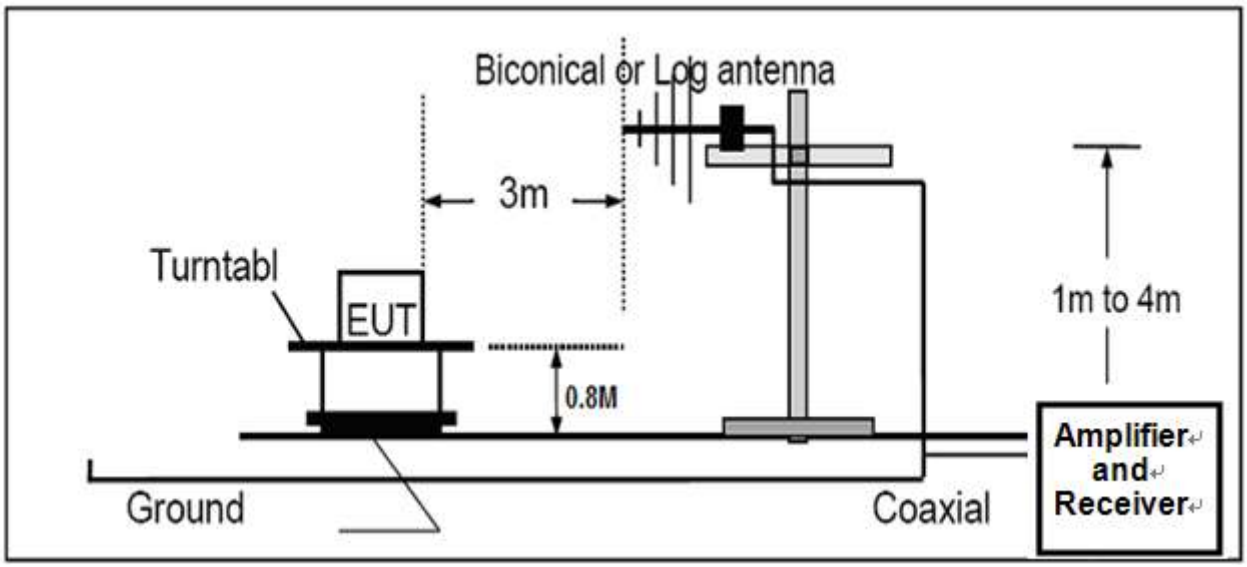
The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.249 and FCC Part 15.209 Limit.

6.5. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

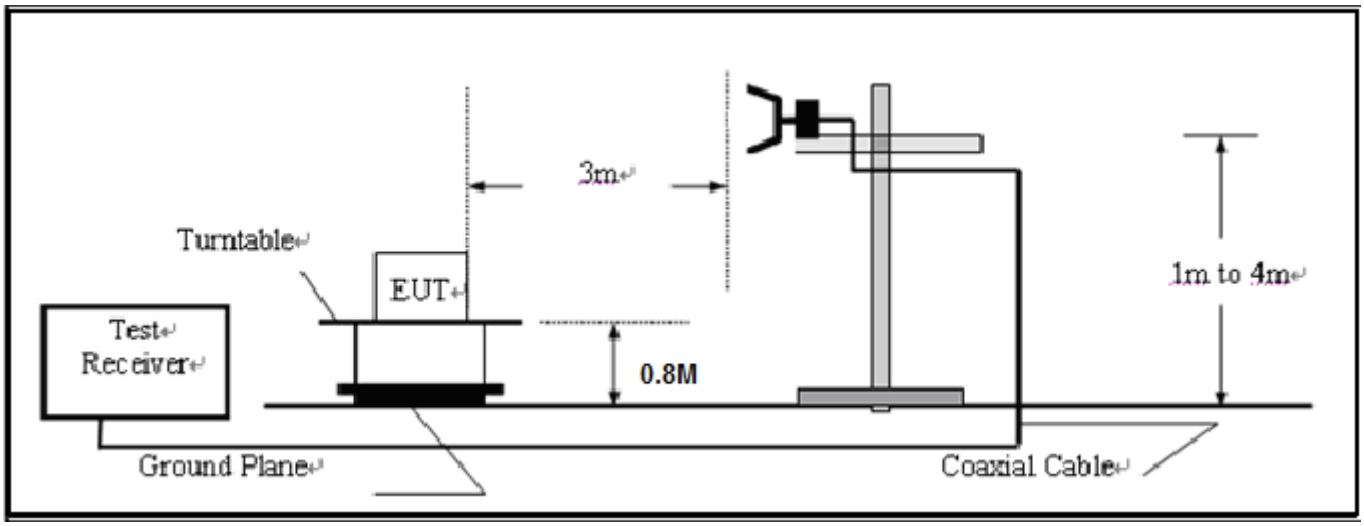
BELOW 30MHz:



30MHz-1000MHz:



ABOVE 1000MHz:



6.6. TEST RESULTS

6.6.1 TEST RESULT OF RADIATED EMISSION TEST (9KHZ-30MHZ)

Freq. (MHz)	Level (dB uV)	Over Limit (dB)	Limit Line (dB uV)	Remark
--	--	--	--	Seen to Note

***Note:**

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be report.

6.6.2 TEST RESULT OF RADIATED EMISSION TEST (30MHZ-1GHZ)

FIELD STRENGTH OF FUNDAMENTAL EMISSIONS (Peak)

Frequency	antenna	reading level(Peak)	Factor	Measurement level(Peak)	Limit(Peak	Margin(dB)
(MHz)	Polarization	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	Peak
915	H	72.41	29.12	101.53	113.98	-12.45
917	H	70.63	29.21	99.84	113.98	-14.14
915	V	69.84	29.10	98.94	113.98	-15.04
917	V	68.52	29.18	97.7	113.98	-16.28

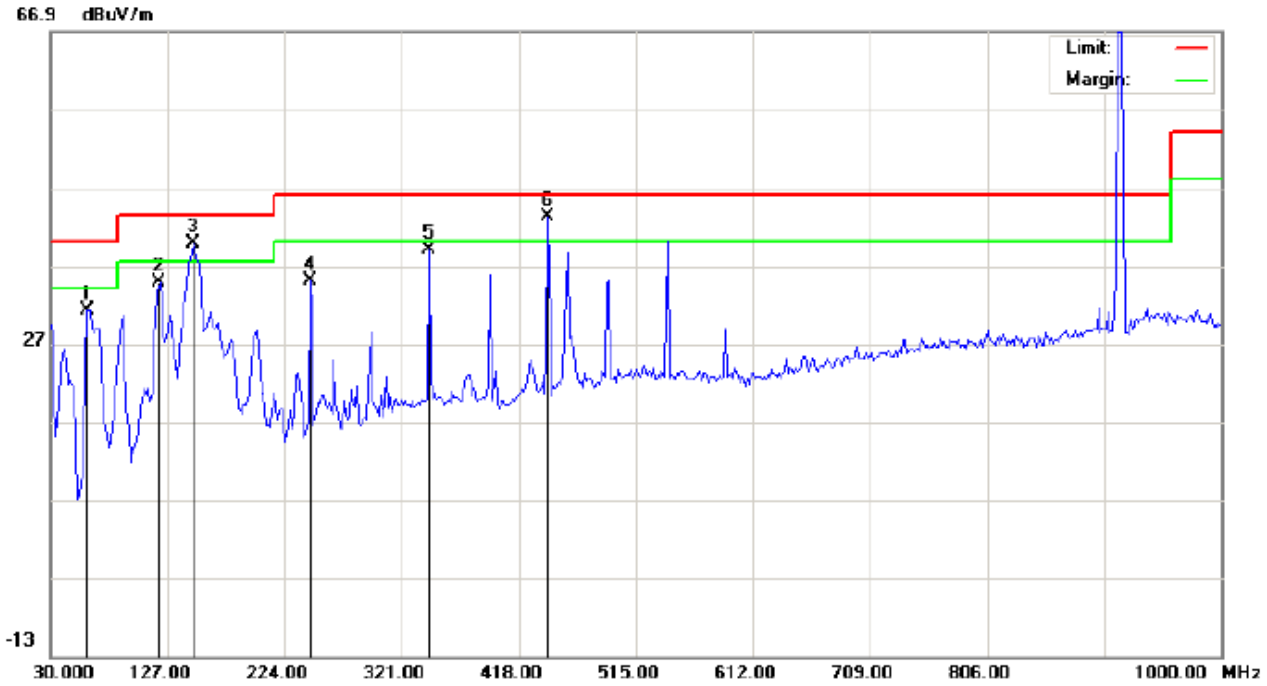
FIELD STRENGTH OF FUNDAMENTAL EMISSIONS (AVG)

Frequency	antenna	reading level(AVG)	Factor	Measurement level(AVG)	Limit(AVG)	Margin(dB)
(MHz)	Polarization	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	AVG
915	H	61.22	29.12	90.34	93.98	-3.64
917	H	60.88	29.21	90.09	93.98	-3.89
915	V	59.47	29.10	88.57	93.98	-5.41
917	V	58.93	29.18	88.11	93.98	-5.87

Note: *Measurement level = Reading level + Factor*

Margin = Measurement level - Limit

RADIATED EMISSION TEST RESULTS – HORIZONTAL



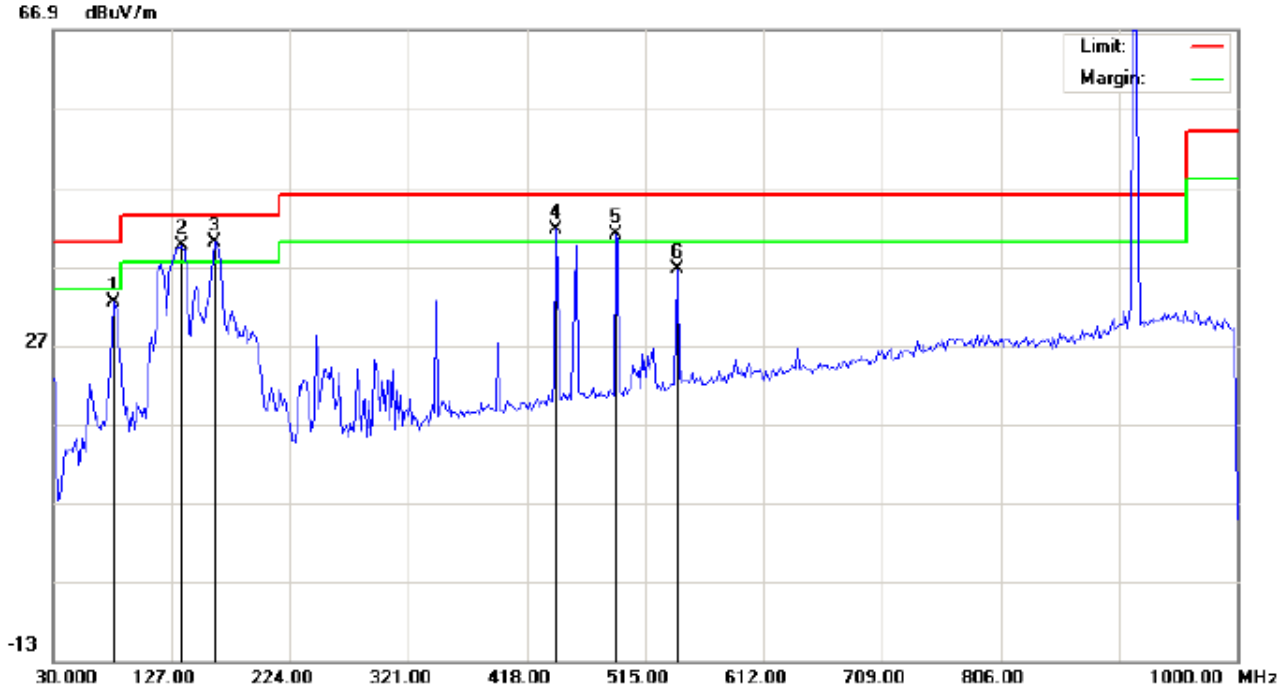
Site: site #1
Limit: FCC Class B 3M Radiation
EUT: silent disco transmitter
M/N: SS-PT2
Mode: Mode 1
Note:

Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		60.7167	23.42	7.87	31.29	40.00	-8.71	peak			
2		120.5332	27.73	7.08	34.81	43.50	-8.69	peak			
3	!	148.0166	24.64	15.25	39.89	43.50	-3.61	peak			
4		245.0166	21.57	13.41	34.98	46.00	-11.02	peak			
5		343.6333	20.65	18.32	38.97	46.00	-7.03	peak			
6	*	442.2500	22.80	20.35	43.15	46.00	-2.85	peak			

RADIATED EMISSION TEST RESULTS – VERTICAL



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: silent disco transmitter
M/N: SS-PT2
Mode: Mode 1
Note:

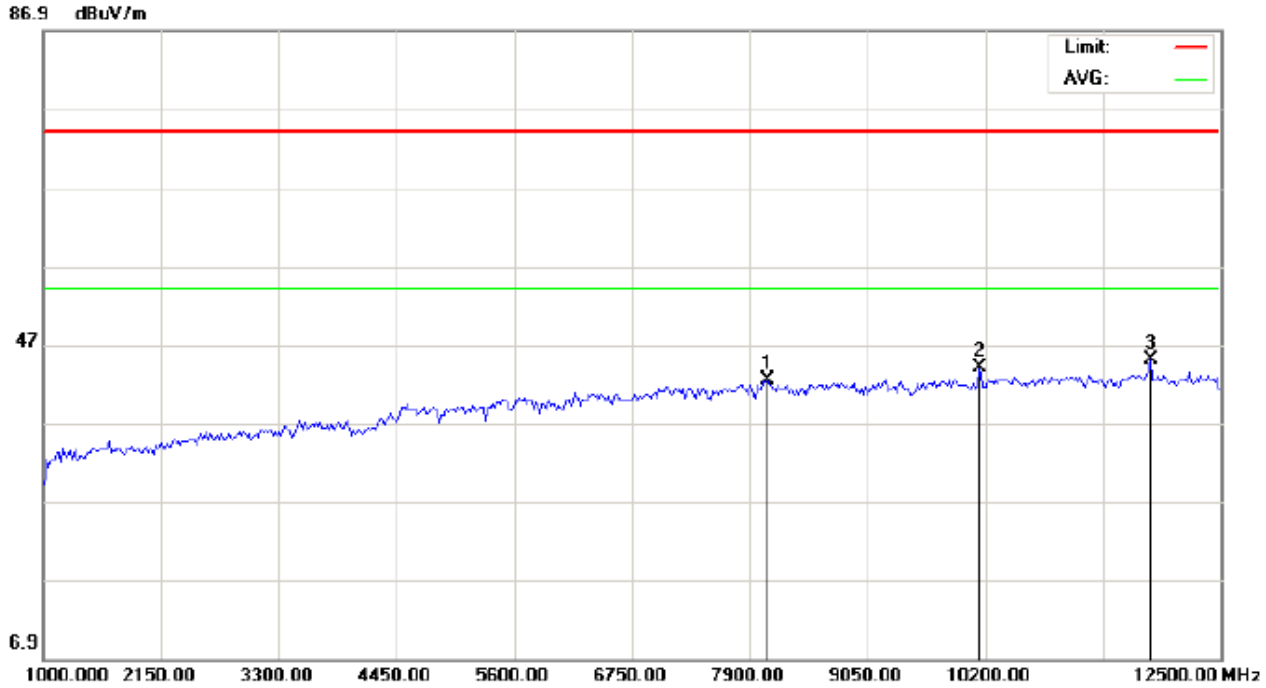
Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		80.1167	22.66	9.80	32.46	40.00	-7.54	peak			
2	!	135.0833	25.31	14.38	39.69	43.50	-3.81	peak			
3	*	162.5667	25.23	14.78	40.01	43.50	-3.49	peak			
4	!	442.2500	21.35	20.35	41.70	46.00	-4.30	peak			
5	!	490.7500	19.96	21.03	40.99	46.00	-5.01	peak			
6		540.8667	14.47	22.23	36.70	46.00	-9.30	peak			

6.6.3 TEST RESULT OF RADIATED EMISSION TEST (ABOVE 1000MHZ)

RADIATED EMISSION TEST RESULTS – HORIZONTAL



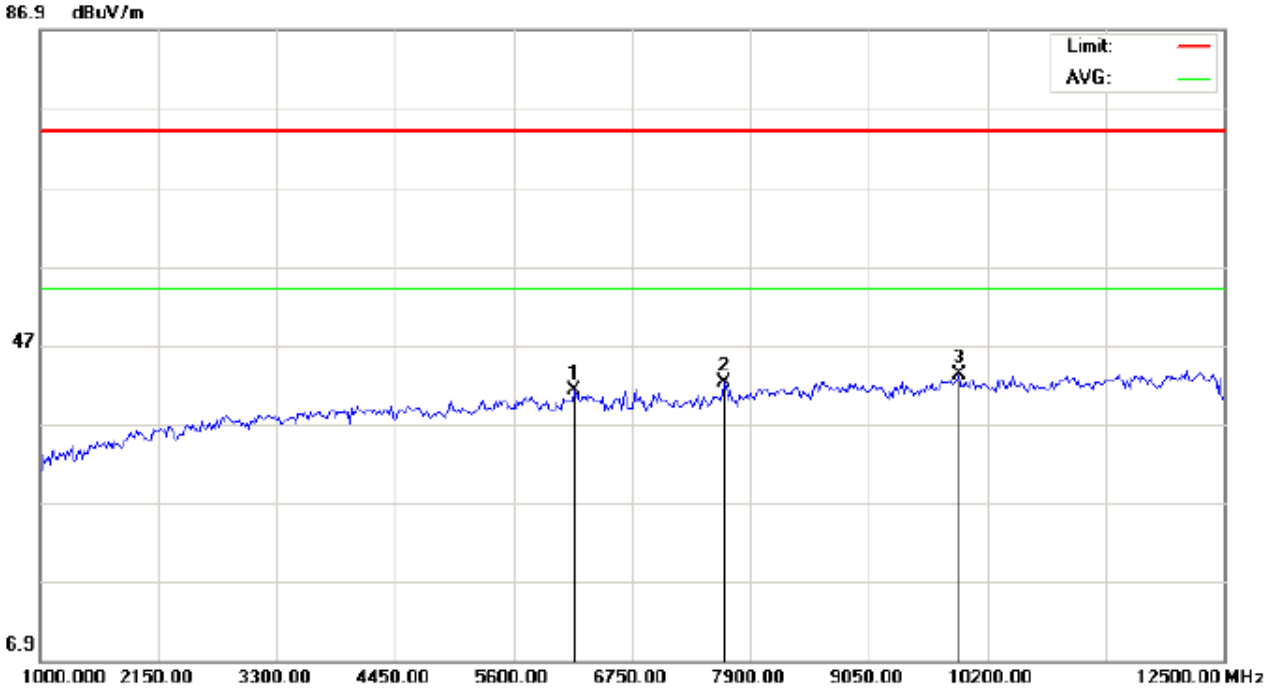
Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: silent disco transmitter
M/N: SS-PT2
Mode: Mode 1
Note:

Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		8072.500	42.67	-0.31	42.36	74.00	-31.64	peak			
2		10142.500	43.81	0.21	44.02	74.00	-29.98	peak			
3	*	11810.000	44.70	0.32	45.02	74.00	-28.98	peak			

RADIATED EMISSION TEST RESULTS – VERTICAL



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: silent disco transmitter
M/N: SS-PT2
Mode: Mode 1
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		6194.167	43.08	-0.88	41.20	74.00	-32.80	peak			
2		7650.833	42.75	-0.63	42.12	74.00	-31.88	peak			
3	*	9931.667	42.98	0.22	43.20	74.00	-30.80	peak			

7. §15.249 EMISSION BANDWIDTH

7.1. STANDARD APPLICABLE

Note: *For reporting purposes only.*

7.2. TEST EQUIPMENT LIST AND DETAILS

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
PSA SERIES SPECTRUM ANALYZER	AGILENT	E4440A	US41421290	07/18/2013	07/17/2014
BICONICAL ANTENNA	A.H.	SAS-521-4	128	06/08/2013	06/07/2014

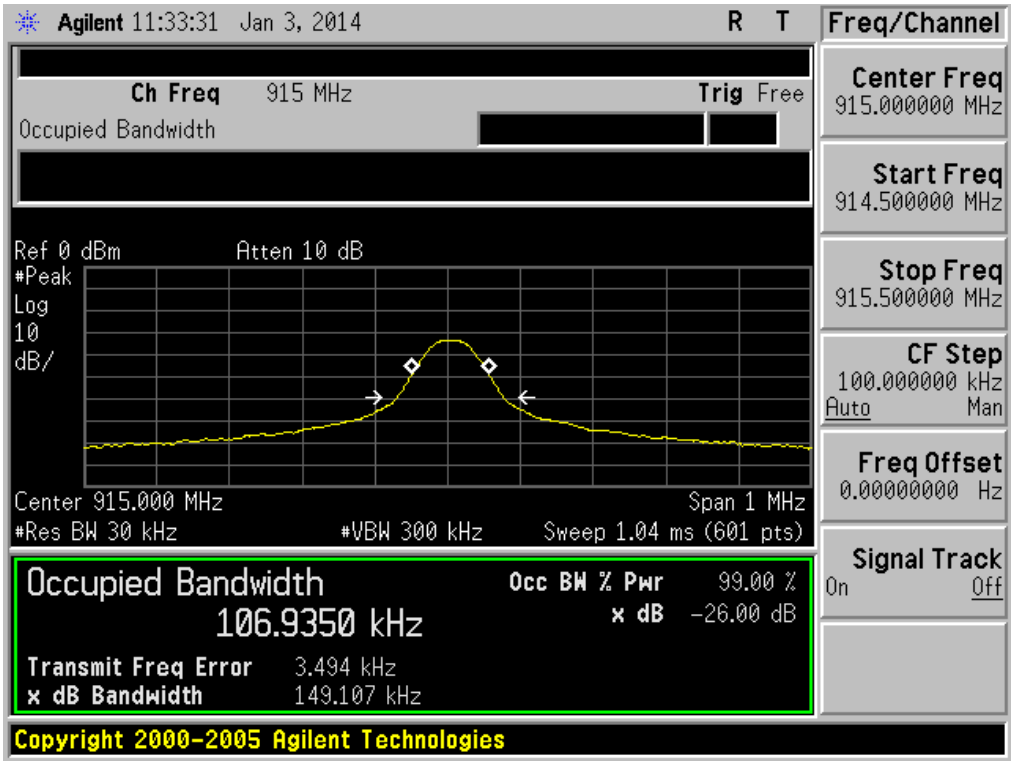
7.3. TEST PROCEDURE

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

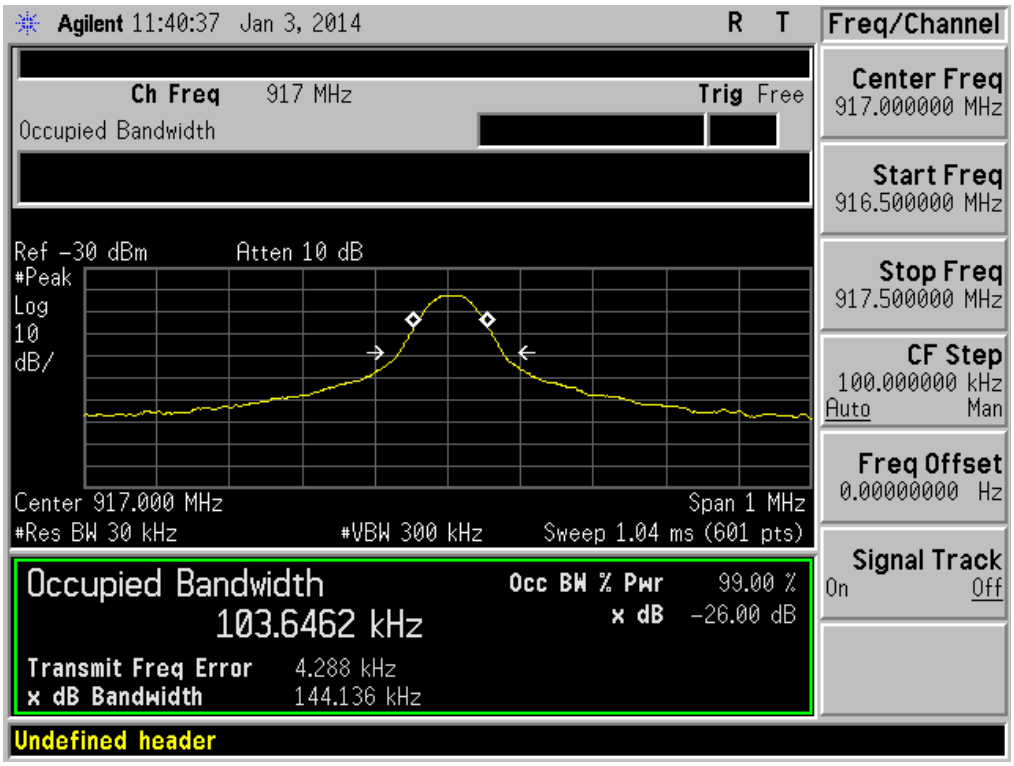
7.4. SUMMARY OF TEST RESULTS/PLOTS

Channel	Emission Bandwidth (KHz)	Limit (KHz)
915MHz	149.107	N/A
917MHz	144.136	

TEST PLOT EMISSION BANDWIDTH (915MHz TX)



TEST PLOT EMISSION BANDWIDTH (917MHz TX)



8. FCC LINE CONDUCTED EMISSION TEST

8.1. LIMITS

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

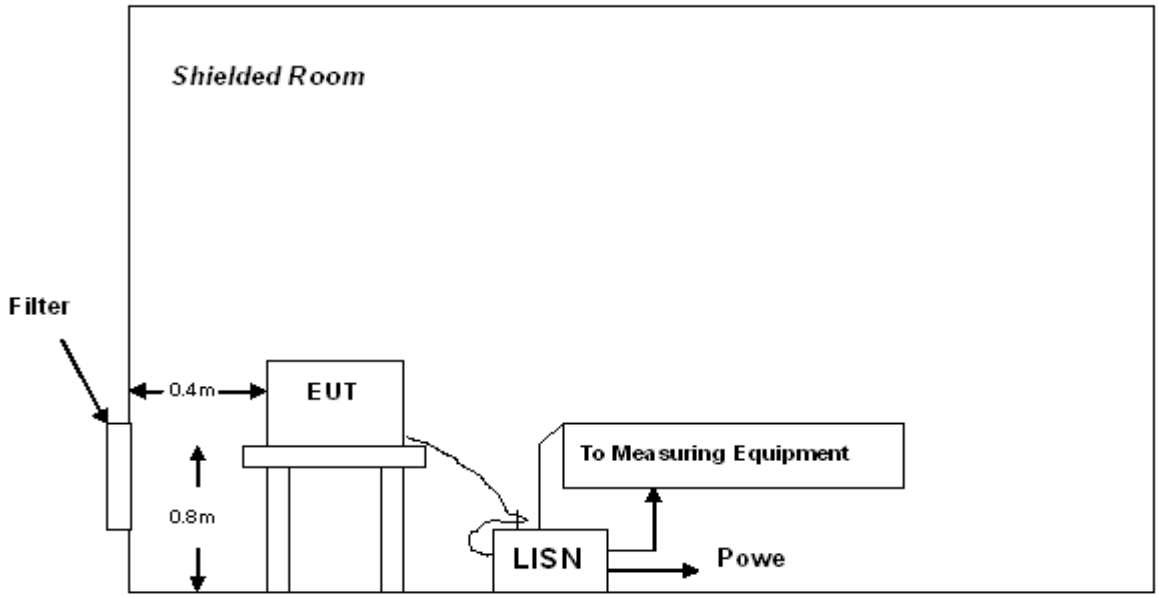
***Note:** 1. The lower limit shall apply at the transition frequency.*

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

8.2. TEST EQUIPMENT LIST AND DETAILS

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
EMI Test Receiver	Rohde & Schwarz	ESCI	100694	07/17/2013	07/16/2014
LISN	R&S	ESH3-Z5	8389791009	07/17/2013	07/16/2014

8.3. TEST SETUP



A: Powered through filter

8.4. PRELIMINARY PROCEDURE

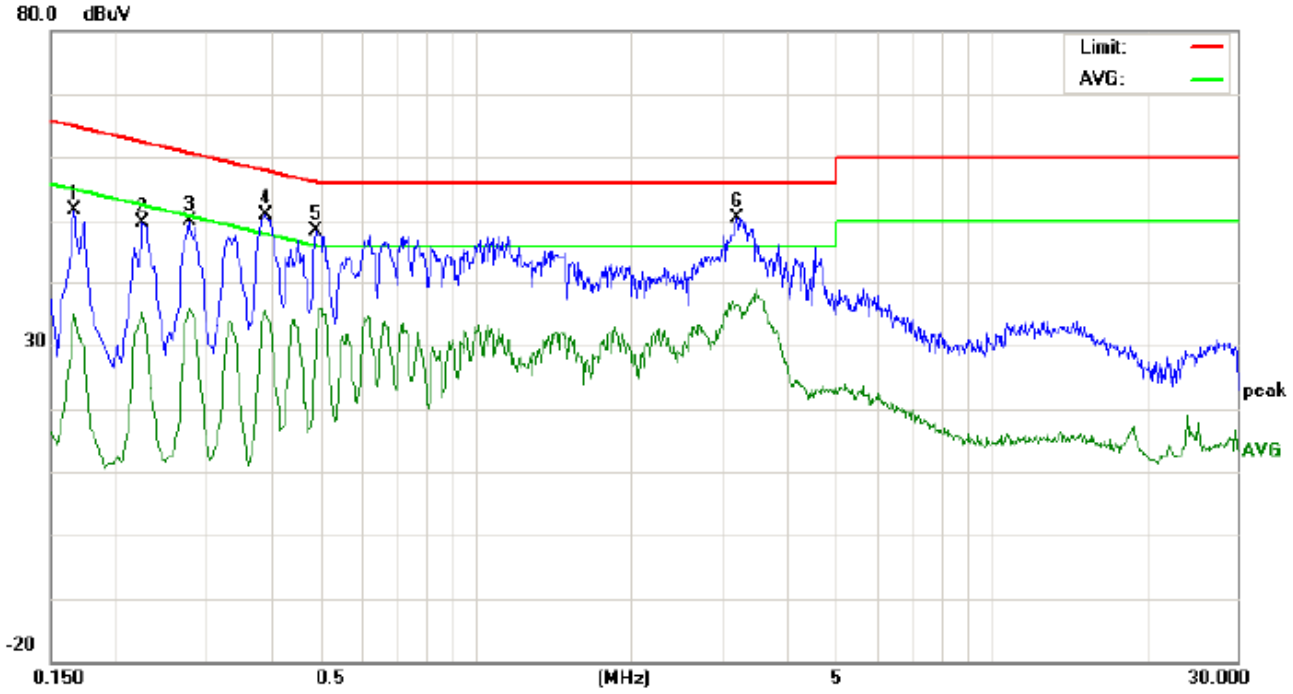
1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4) All support equipments received AC120V/60Hz power from a LISN, if any.
5) The EUT received 120V/60Hz power by a LISN.
6) The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8) During the above scans, the emissions were maximized by cable manipulation.
9) The following test mode(s) were scanned during the preliminary test.
   Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

8.5. FINAL TEST PROCEDURE

1) EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3) The test data of the worst case condition(s) was reported on the Summary Data page.

8.6. TEST RESULT OF POWER LINE

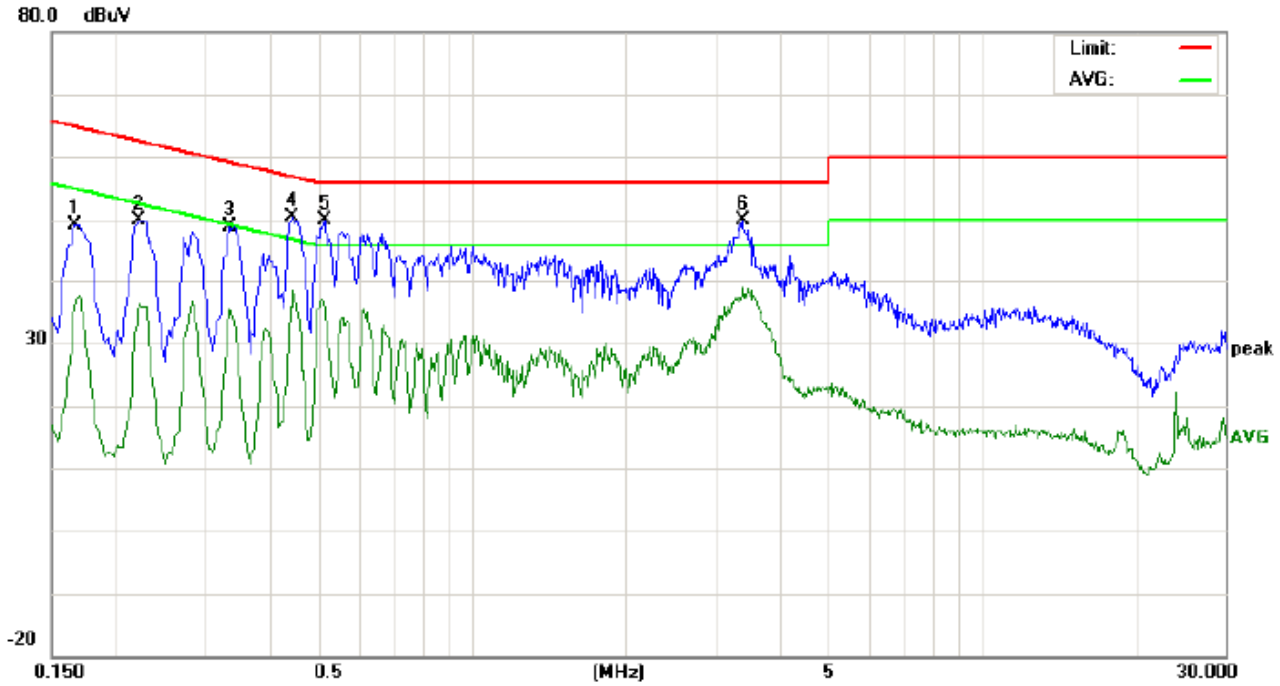
LINE CONDUCTED EMISSION TEST LINE 1-L



Site: Conduction
Phase: L1
Temperature: 26
Limit: FCC Class B Conduction(QP)
Power:
Humidity: 60 %
EUT: silent disco transmitter
M/N: SS-PT2
Mode: Mode 1
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1660	41.44		24.75	10.18	51.62		34.93	65.15	55.15	-13.53	-20.22	P	
2	0.2260	39.37		24.81	10.24	49.61		35.05	62.59	52.59	-12.98	-17.54	P	
3	0.2779	39.60		25.60	10.28	49.88		35.88	60.88	50.88	-11.00	-15.00	P	
4	0.3899	40.48		25.25	10.33	50.81		35.58	58.06	48.06	-7.25	-12.48	P	
5	0.4899	37.97		20.06	10.39	48.36		30.45	56.17	46.17	-7.81	-15.72	P	
6	3.2099	39.79		25.83	10.53	50.32		36.36	56.00	46.00	-5.68	-9.64	P	

LINE CONDUCTED EMISSION TEST LINE 2-N



Site: Conduction
Limit: FCC Class B Conduction(QP)
EUT: silent disco transmitter
M/N: SS-PT2
Mode: Mode 1
Note:

Phase: N
Power:

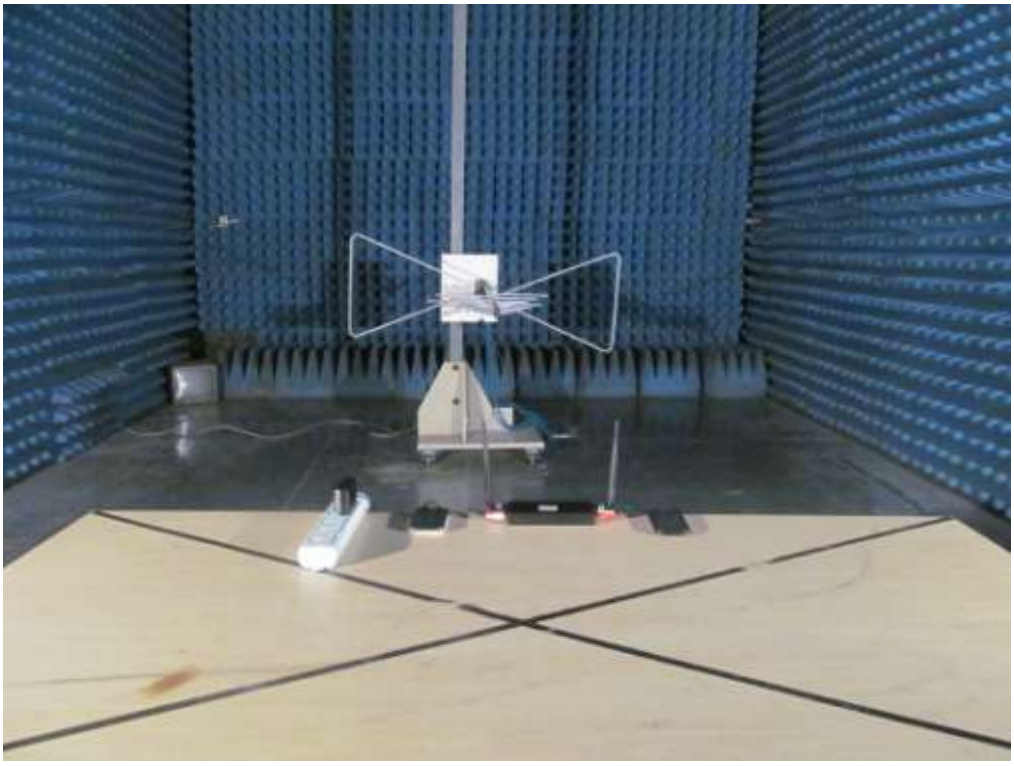
Temperature: 26
Humidity: 60 %

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1660	38.92		25.99	10.18	49.10		36.17	65.15	55.15	-16.05	-18.98	P	
2	0.2220	39.74		26.02	10.24	49.98		36.26	62.74	52.74	-12.76	-16.48	P	
3	0.3339	38.63		25.18	10.30	48.93		35.48	59.35	49.35	-10.42	-13.87	P	
4	0.4460	40.03		27.94	10.36	50.39		38.30	56.95	46.95	-6.56	-8.65	P	
5	0.5140	39.42		25.28	10.39	49.81		35.67	56.00	46.00	-6.19	-10.33	P	
6	3.3980	39.44		27.24	10.52	49.96		37.76	56.00	46.00	-6.04	-8.24	P	

APPENDIX 1
PHOTOGRAPHS OF TEST SETUP

CONDUCTED EMISSION TEST SETUP

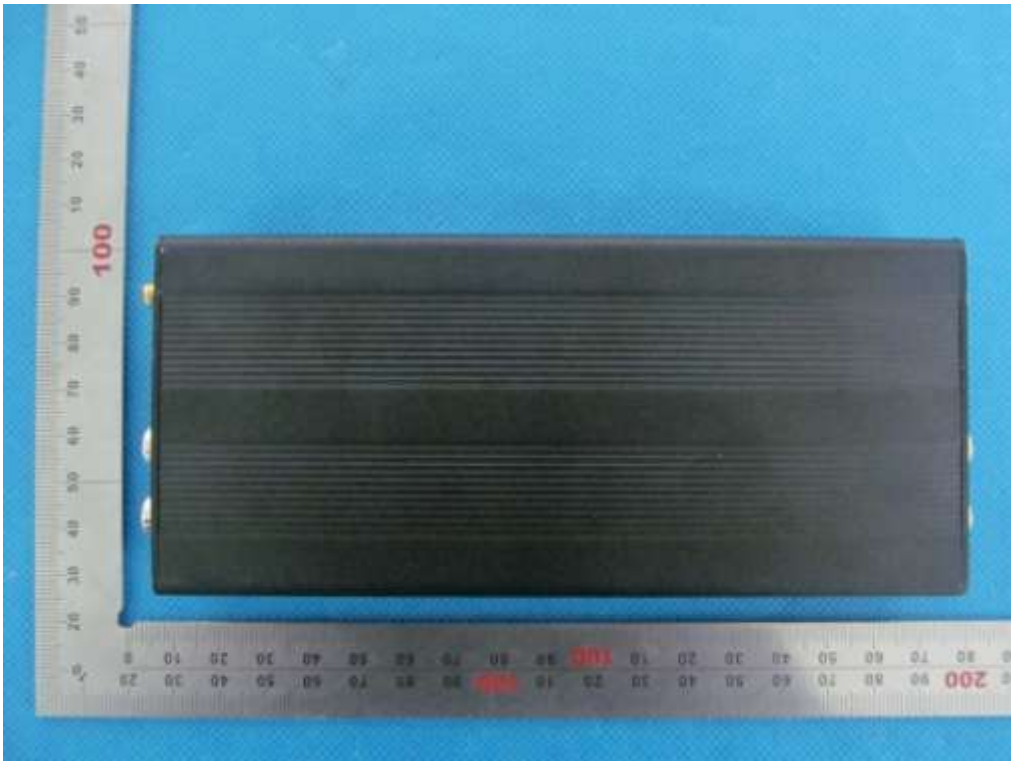
RADIATED EMISSION TEST SETUP



APPENDIX 2
PHOTOGRAPHS OF EUT

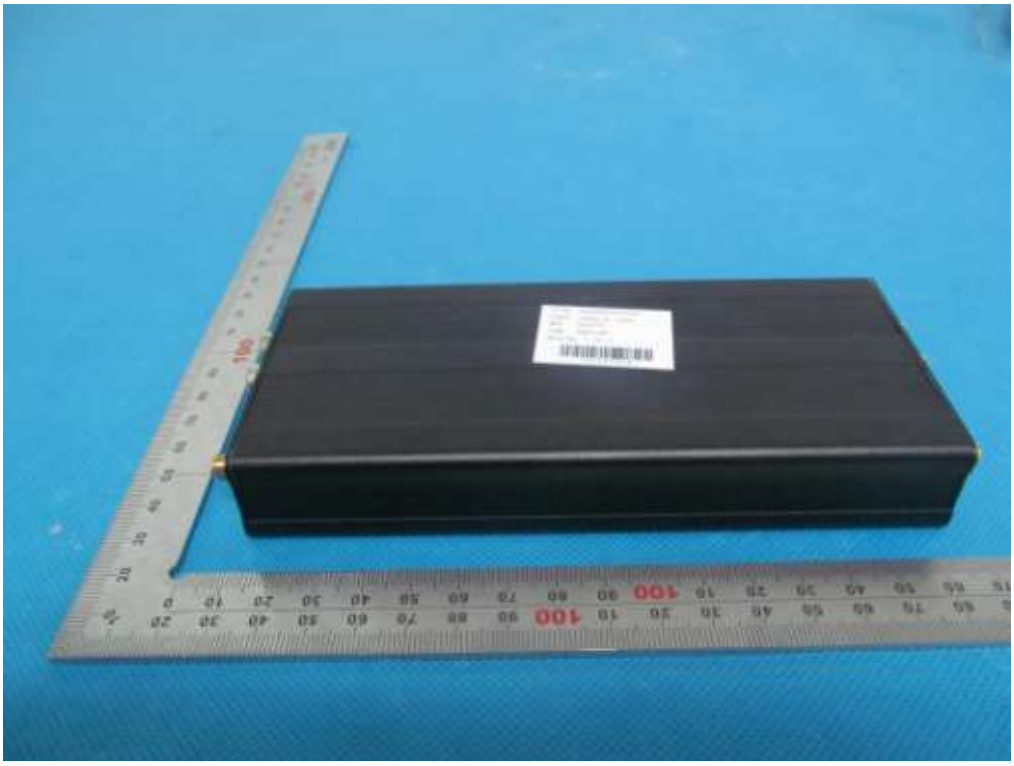
TOTAL VIEW OF EUT

TOP VIEW OF EUT

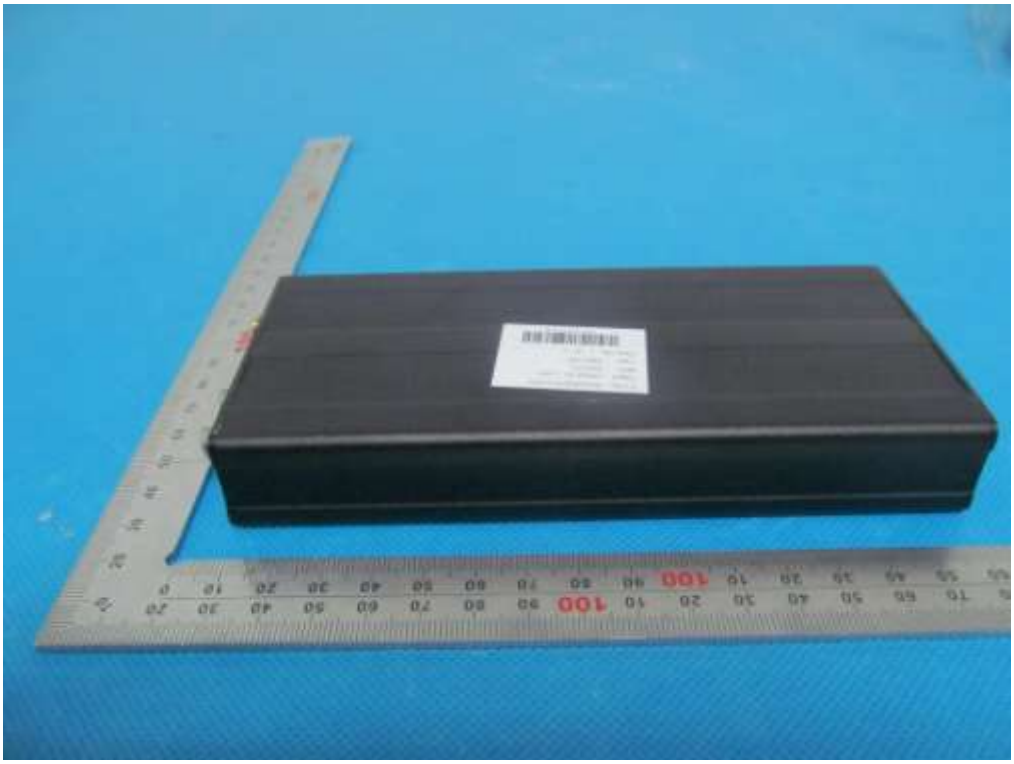


BOTTOM VIEW OF EUT

FRONT VIEW OF EUT

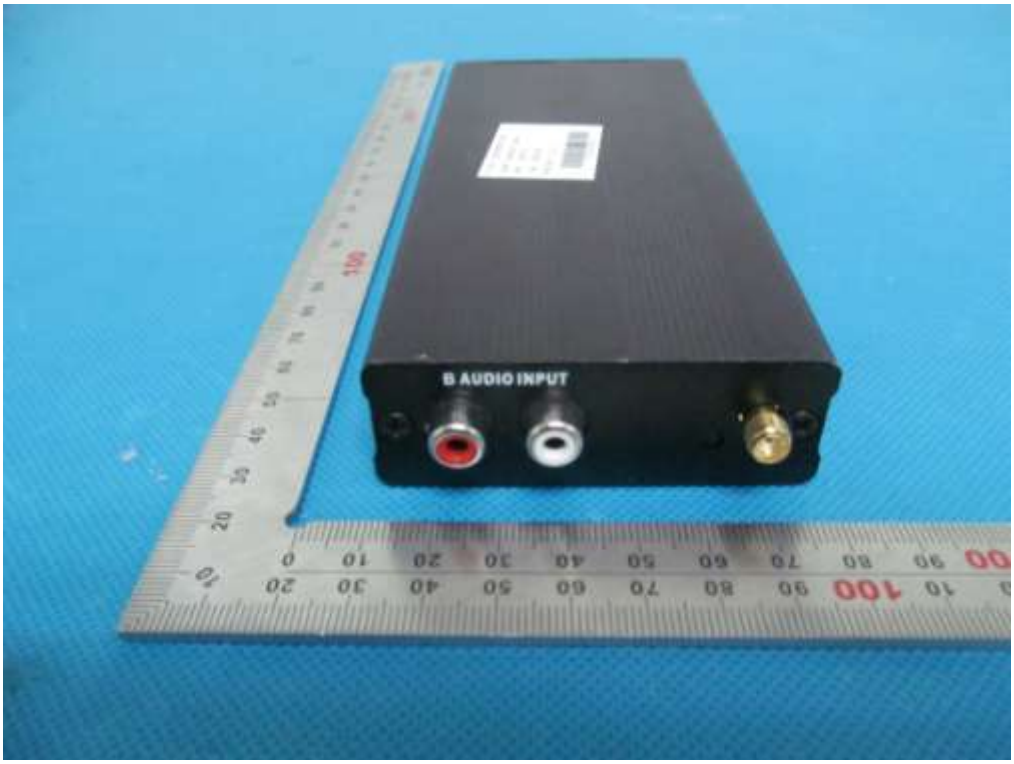


BACK VIEW OF EUT



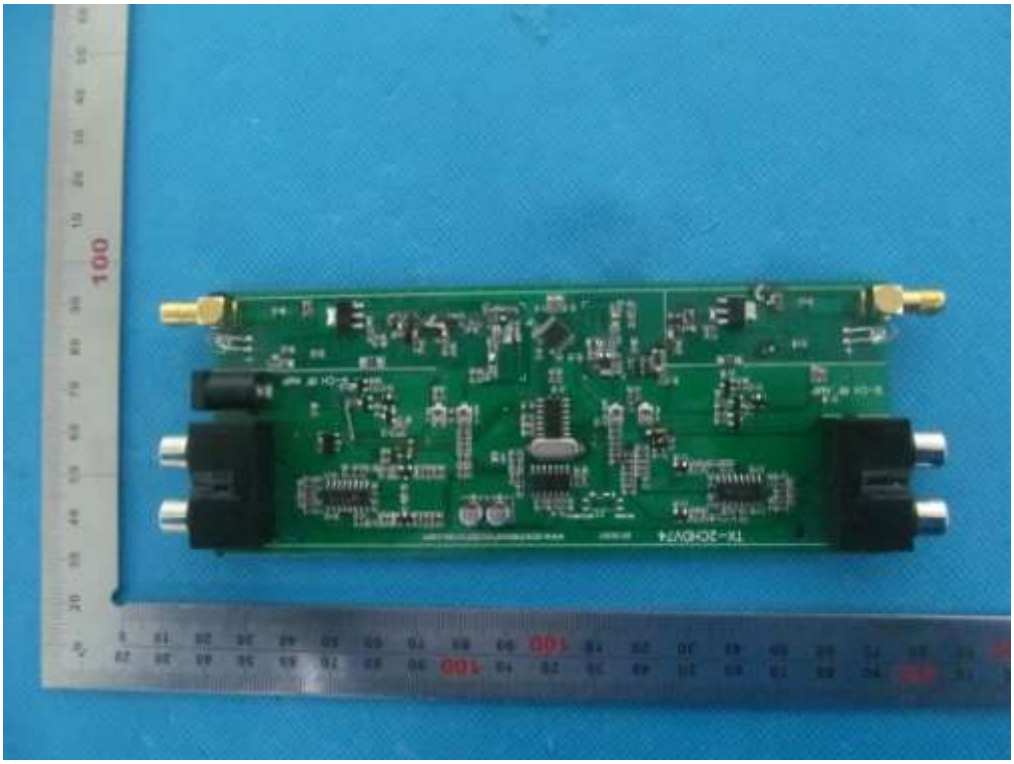
LEFT VIEW OF EUT

RIGHT VIEW OF EUT

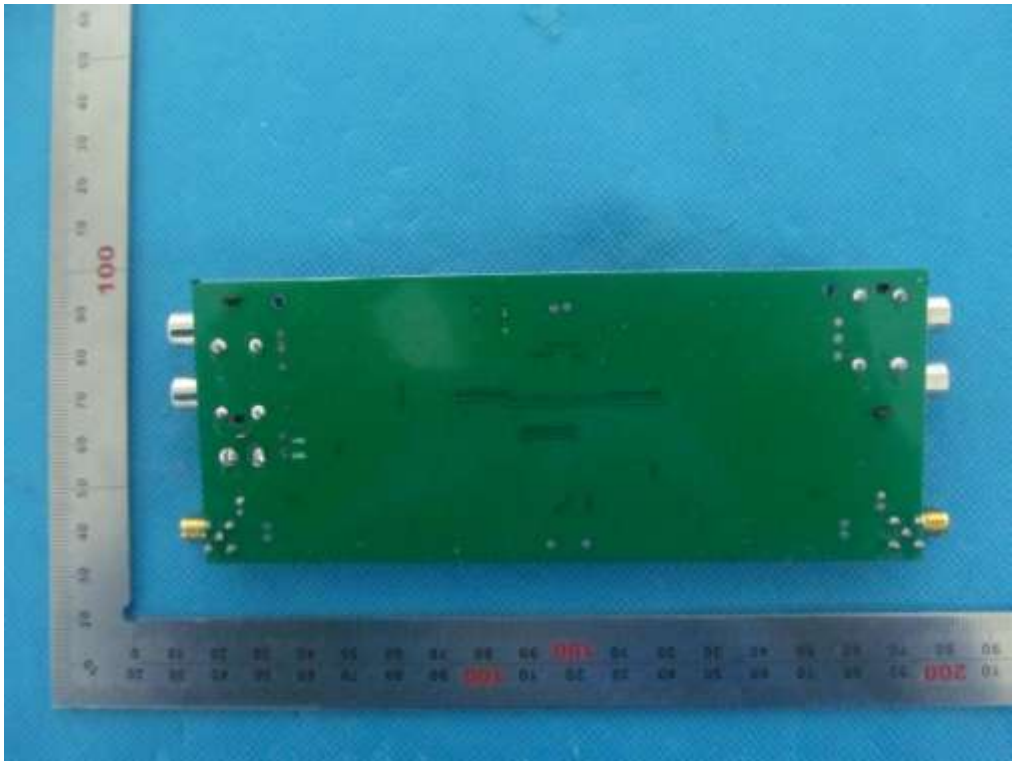


OPEN VIEW OF EUT

INTERNAL VIEW-1 OF EUT



INTERNAL VIEW-2 OF EUT



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