



TEST REPORT

Date: 2012-03-09

Report No.: 60.870.12.005.01F

Applicant: Acoustic Arc International Ltd.
Unit 311B, 3/F, IC Development Centre, No.6
Science Park West Avenue, Hong Kong Science
Park, Shatin, N.T. Hong Kong

Description of Samples: Model name: 2.4GHz Digital Wireless Speaker
(Transmitter)
Brand name: aai
Model no.: DS0980USI
FCCID: VHC-AAI-DS0980USI

Date Samples Received: 2012-02-07

Date Tested: 2012-02-07 to 2012-03-02

Investigation Requested: FCC Part 15 Subpart C, Section 15.247

Conclusions: The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks: ----
Checked by:

Approved by:-

Ray Cheung
Project Engineer
Wireless & Telecom Department

Jeff Pong
Operation Manager
Wireless & Telecom Department



CONTENT:

Cover		Page 1 of 31
Content		Page 2-3 of 31
<u>1.0</u>	<u>General Details</u>	
1.1	Test Laboratory	Page 4 of 31
1.2	Applicant Details	Page 4 of 31
1.3	Equipment Under Test [EUT]	Page 5 of 31
1.4	Related Submittal(s) Grants	Page 5 of 31
<u>2.0</u>	<u>Technical Details</u>	
2.1	Investigations Requested	Page 6 of 31
2.2	Test Standards and Results Summary	Page 6 of 31
<u>3.0</u>	<u>Test Methodology</u>	
3.1	Radiated Emission	Page 7 of 31
3.2	Field Strength Calculation	Page 7 of 31
3.3	Conducted Emission	Page 7 of 31
<u>4.0</u>	<u>Test Results</u>	
4.1	Number of Frequency Hopping	Page 8 of 31
4.2	20dB Bandwidth Measurement	Page 9-10 of 31
4.3	Hopping Channel Carrier Frequency Separation	Page 11 of 31
4.4	Average Time of Occupancy	Page 12-14 of 31
4.5	Pseudorandom Hopping Algorithm	Page 15 of 31
4.6	Band Edge Measurement	Page 16-17 of 31
4.7	Maximum Output Power	Page 18-19 of 31
4.8	Out of Band Emissions and Emissions in Restricted Bands	Page 20-24 of 31
4.9	Conducted Emission on AC Mains	Page 25-29 of 31



5.0 RF Exposure Compliance Requirement

Page 30 of 31

6.0 List of Measurement Equipments

Page 31 of 31

Appendix A

Photos of Test Setup

Appendix B

External EUT Photos

Appendix C

Internal EUT Photos



1.0 **General Details**

1.1 **Test Laboratory**

Neutron Engineering Inc.
No 3, Jinshagang 1st Road, ShiXia, Dalang Town, Dong
Guan, China.
Registration Number: 319330

Tested by:

A handwritten signature in blue ink, appearing to read 'John Zhi', written over a horizontal line.

John Zhi

1.2 **Applicant Details**

Applicant

Acoustic Arc International Ltd.
Unit 311B, 3/F., IC Development Centre, No.6
Science Park West Avenue, Hong Kong Science
Park, Shatin, N.T. Hong Kong

Manufacturer

Acoustic Arc International Ltd.
Unit 311B, 3/F., IC Development Centre, No.6
Science Park West Avenue, Hong Kong Science
Park, Shatin, N.T. Hong Kong



1.3 Equipment Under Test [EUT]

Description of EUT

Product Description:	2.4GHz Digital Wireless Speaker (Transmitter)
Model No.:	DS0980USI
Brand Name:	aai
FCCID:	VHC-AAI-DS0980USI
Rating:	- DC 15V, 2000mA powered by AC/DC power adaptor
Operated Frequency:	2406 -2472 MHz
No. of Operated Channel:	31
Accessories and Auxiliary Equipments:	- iPod - AC/DC power adaptor
Antenna Type:	Integral
Manufacture of Antenna:	Acoustic Arc International Ltd.
Antenna Gain:	0dBi
Antenna Model:	N/A

General Operation of EUT

The Equipment Under Test (EUT) is a Transmitter of the Wireless Speaker System operated at 2.4GHz.

FHSS Operation Principle:

This module is controlled by microchip to generate Pseudorandom Frequency Hopping Sequence, this module support 31 hopping channels. Refer to section 4.5 of this report to have more detail of Pseudorandom Hopping Algorithm.

1.4 Related Submittal(s) Grants

This is a signal application subjected to Certificate Authorization.



2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15:2010 and ANSI C63.4: 2003

2.2 Test Standards and Results Summary Tables

Test Condition	Test Requirement	Test Result	
		Pass	N/A
Number of Frequency Hopping	Section 15.247 (a1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20dB Bandwidth Measurement	Section 15.247 (a1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Hopping Channel Carrier Frequency Separation	Section 15.247 (a1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Average Time of Occupancy	Section 15.247 (a1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pseudorandom Hopping Algorithm	Section 15.247 (a1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Band Edge Measurement	Section 15.247	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Maximum Output Power	Section 15.247 (b1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Out of Band Emission	Section 15.247 (d)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Radiated Emission in Restricted Band	Section 15.247 (d)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Conducted Emission on AC Mains	Section 15.207	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RF Exposure	Section 15.247 (i)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Antenna Requirement	Section 15.203	<input checked="" type="checkbox"/> See note 1	<input type="checkbox"/>

Note 1 : The EUT uses a permanently attached antenna, which in accordance to Section 15.203, is considered sufficient to comply with the provisions of this section.

Remark: N/A - Not Applicable



3.0 Test Methodology

3.1 Radiated Emission

The sample was placed 0.8m above the ground plane on a standard emission test site *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

3.2 Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$\begin{aligned} \text{FS} &= \text{R} + \text{System Factor} \\ \text{System Factor} &= \text{AF} + \text{CF} + \text{FA} - \text{PA} \end{aligned}$$

Where FS = Net Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer / Test Receiver in dBuV.

AF = Antenna Factor in dB.

CF = Cable Attenuation Factor in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

3.3 Conducted Emissions

The test was performed in accordance with ANSI C63.4: 2003, with the following: initial measurements were performed in peak and average detection modes on the live line of personal computer, any emissions recorded within 30dB of the relevant limit lines were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

4.0 Test Results

4.1 Number of Hopping Frequency

Test Requirement:	FCC part 15 section 15.247 (a1)(iii)
Test Date:	2012-03-02
Mode of Operation:	Transmitting mode.
Detector Function:	Max Hold

Result: PASS

Measured Result :

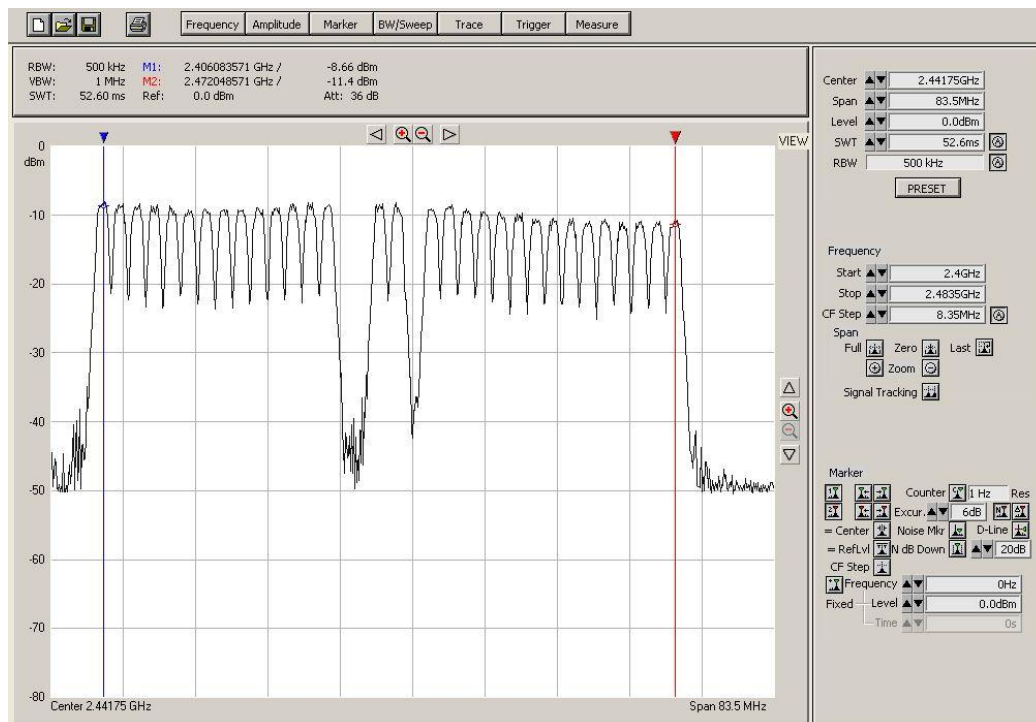
Operating Channel Frequency in sequence (MHz):

2406 ; 2408 ; 2410 ; 2412 ; 2414 ; 2416 ; 2418 ; 2420 ; 2422 ; 2424 ; 2426 ; 2428 ;
 2430 ; 2432 ; 2438 ; 2440 ; 2444 ; 2446 ; 2448 ; 2450 ; 2452 ; 2454 ; 2456 ; 2458 ;
 2460 ; 2462 ; 2464 ; 2466 ; 2468 ; 2470 ; 2472

Limit for Number of Hopping Channel [Section 15.247 (a1)(iii)]

At least 15 non-overlapping channels of each sequence for 2400-2483.5MHz.

Result data graph shows the number of operation channels:



4.2 20dB Bandwidth Measurement

Test Requirement:	FCC part 15 section 15.247 (a1)
Test Date:	2012-03-02
Mode of Operation:	Transmitting mode.
Detector Function:	Max Hold

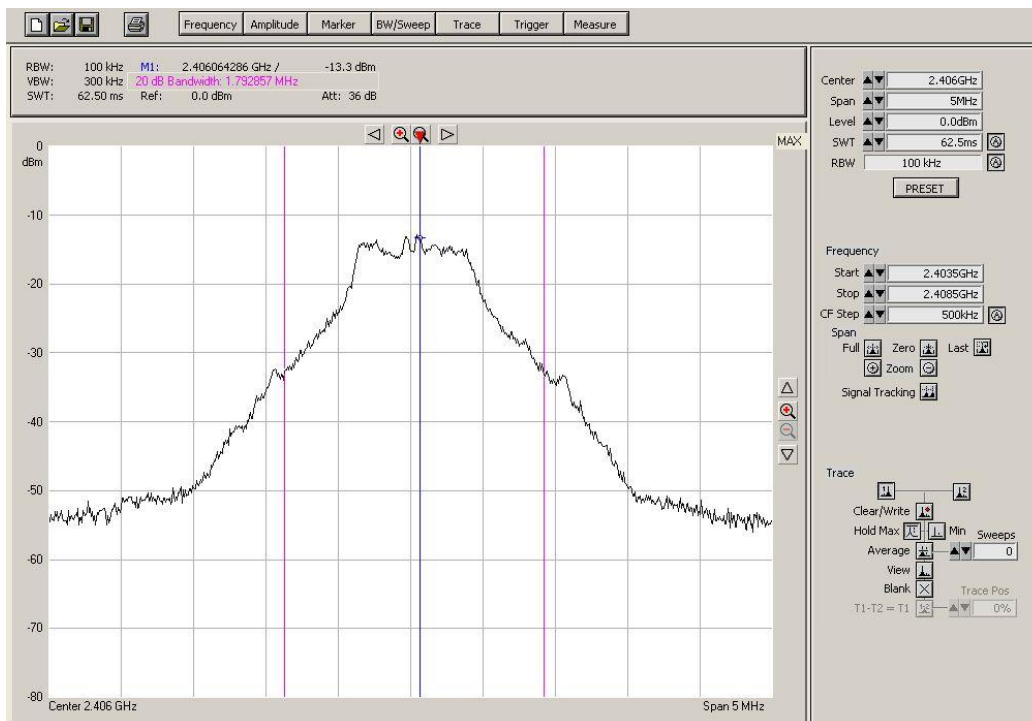
Test Setup:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Channel	Measured frequency (MHz)	20dB Bandwidth (MHz)
Lowest	2.406	1.79
Middle	2.440	1.70
Highest	2.472	1.82

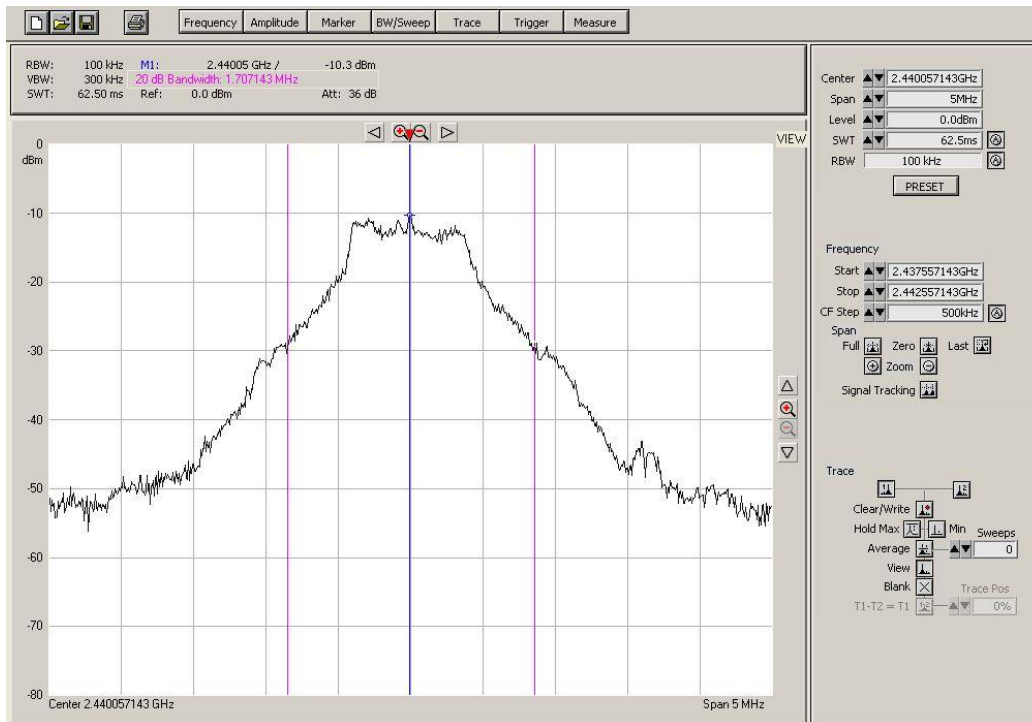
This result is used for checking the hopping channel carrier frequencies separation.

Result data graph shows 20 dB bandwidth, CF = 2.406GHz, BW = 1.71MHz

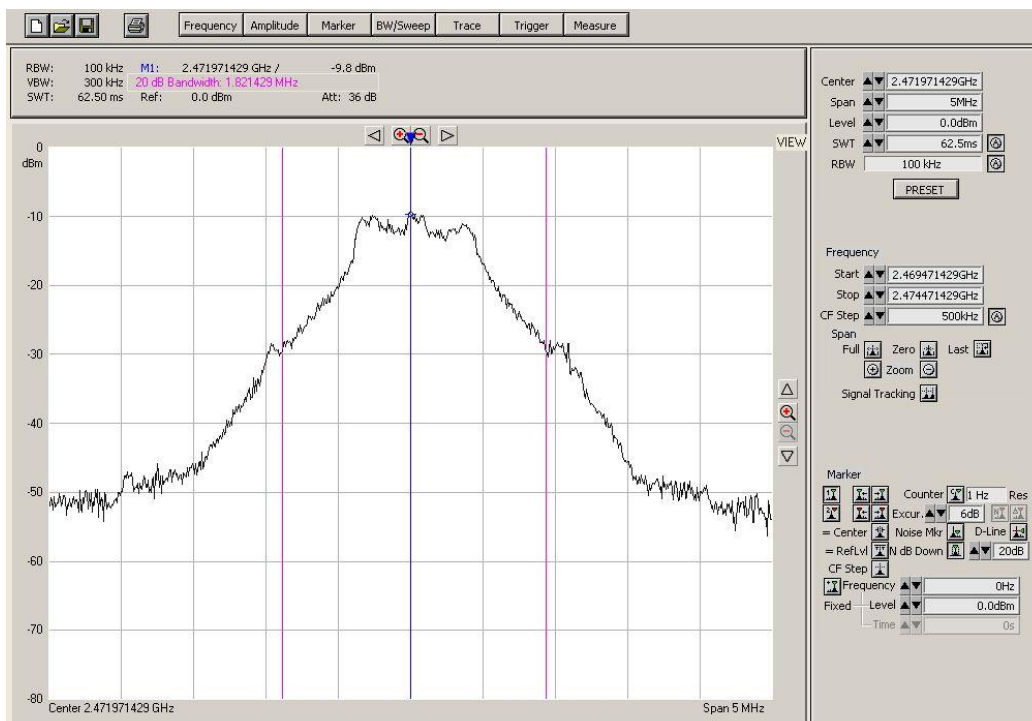




Result data graph shows 20 dB bandwidth, CF = 2.440GHz, BW = 1.70MHz



Result data graph shows 20 dB bandwidth, CF = 2.472GHz, BW = 1.82MHz





4.3 Hopping Channel Carrier Frequency Separation

Test Requirement:	FCC part 15 section 15.247 (a1)
Test Date:	2012-03-02
Mode of Operation:	Transmitting mode.
Detector Function:	Max Hold

Result: PASS

Measured Result :

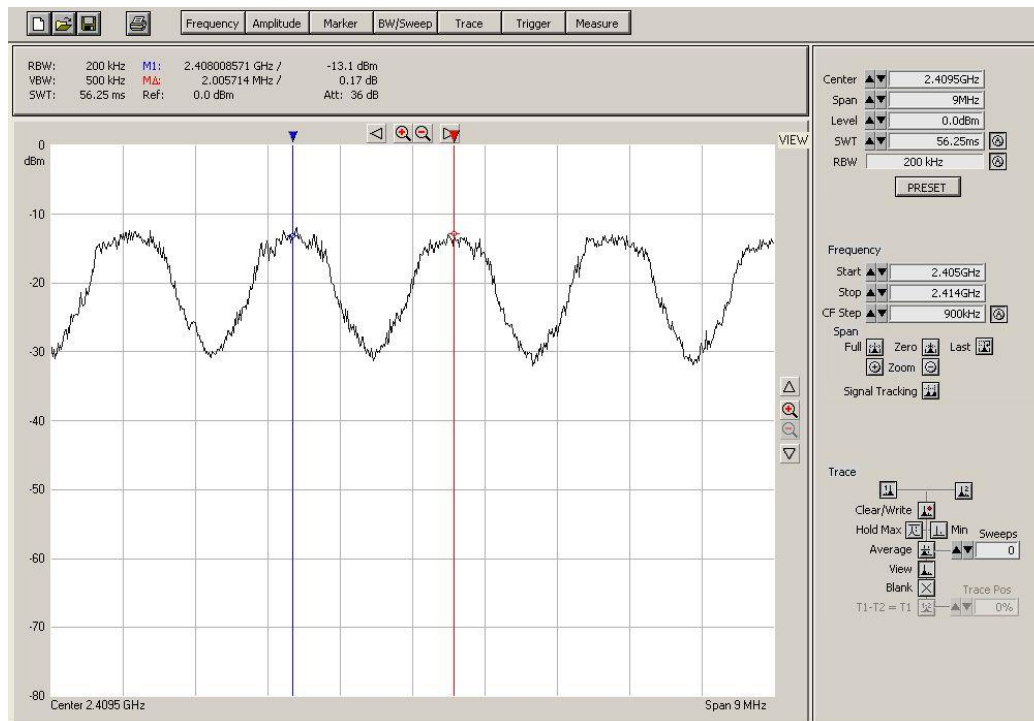
Refer to the delta marker, the frequency separation between two adjacent channels is 2.0 MHz, therefore, the requirement of channel separated by a two-third of the 20dB bandwidth of the hopping channel is applied.

According to the test result shown in section 4.2, the maximum 20dB bandwidth is 1.82 MHz, so the hopping channel separation of this EUT is found to comply with the requirement.

Limits for Hopping Channel Separation [Section 15.247 (a1)]:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25KHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

Result data graph shows the channel separation:





4.4 Average Time of Channel Occupancy

Test Requirement:	FCC part 15 section 15.247 (a1)(iii)
Test Date:	2012-03-02
Mode of Operation:	Transmitting mode.
Detector Function:	Zero span, Sweep time 1s

Result : PASS

Measured Result :

Each transmission only 15 channels will be used.

Observe time = 15 channels \times 0.4s = 6s

There are 17 pulses within 1s

And one set of pulses = 3.686ms

Therefore, the average channel occupancy times (ms)

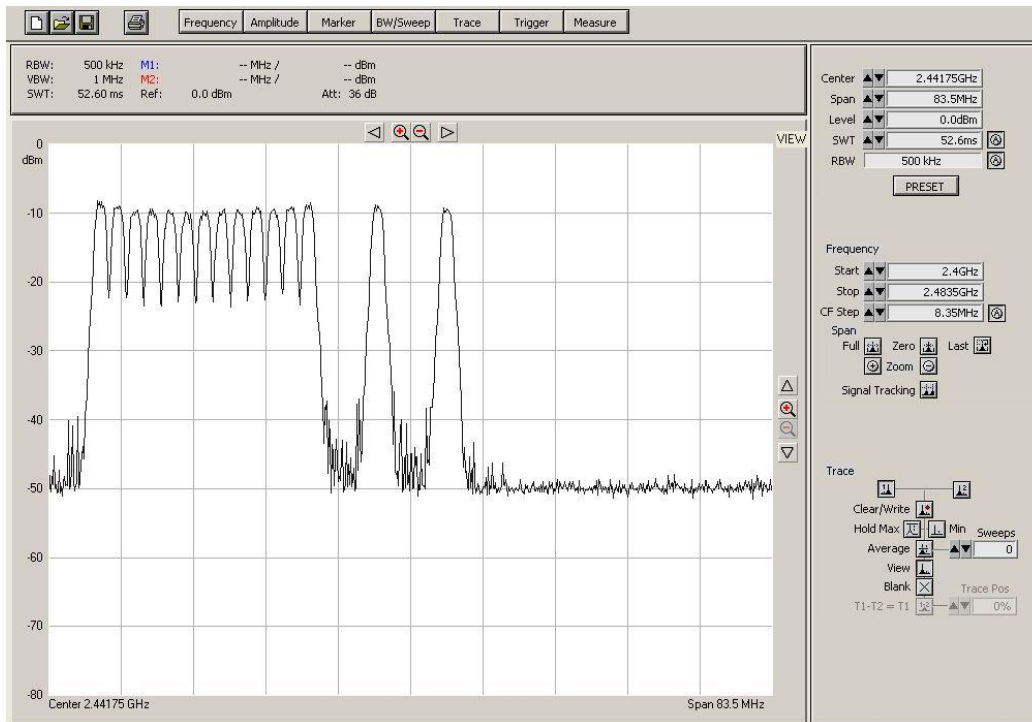
= 3.686ms \times 17 \times 6

So, total transmitting time is 0.376s. (<0.4s).

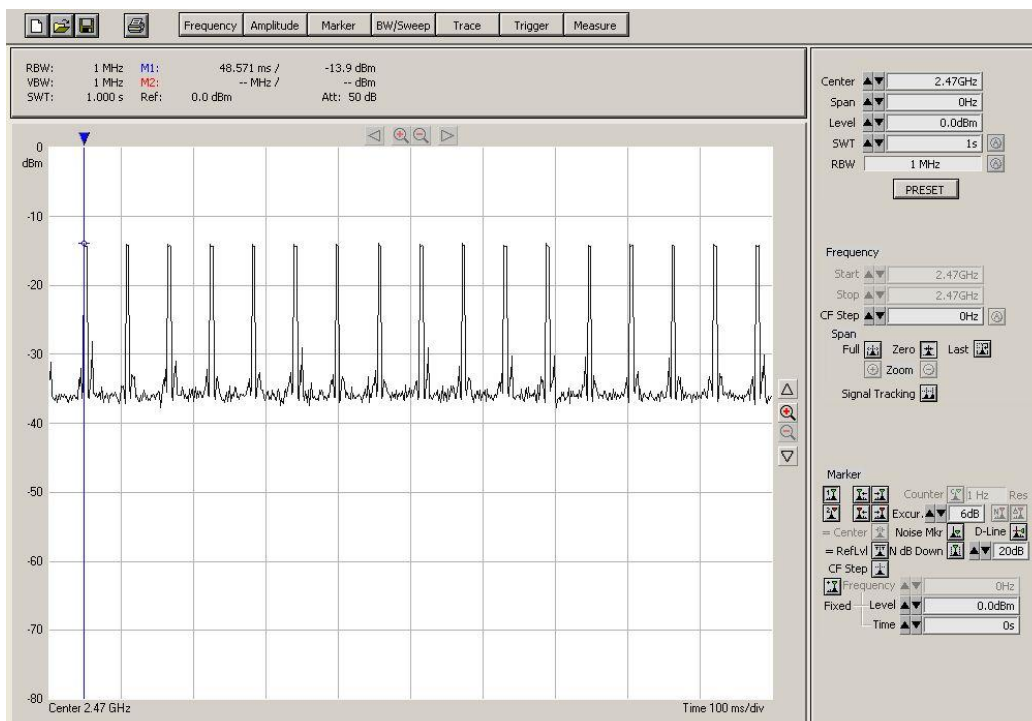
Limits for Average Time of Occupancy [Section 15.247 (a1)(iii)]:

The average time of occupancy on any channel shall not be greater than 0.4 second within a period of 0.4 seconds multiplied by the number of hopping channels employed.

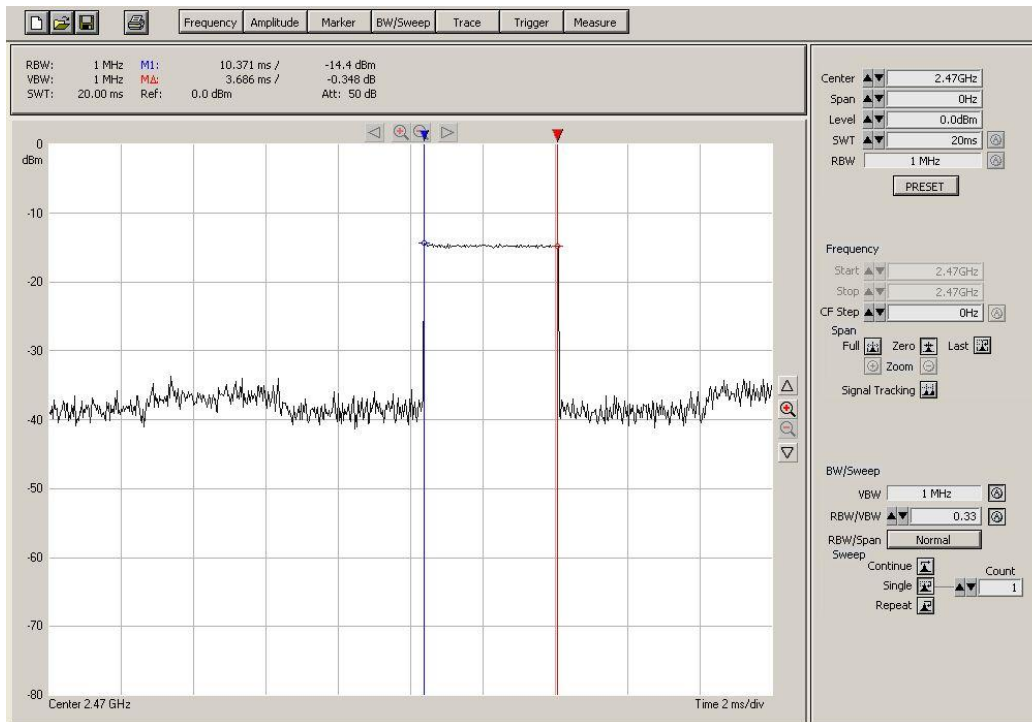
Result data graph shows total 15 channels are used.



Result data graph shows total 17 pulses with 1s.



Result data graph zooms into detail, one pulse period is 3.686ms.





4.5 Pseudorandom Hopping Algorithm

Pseudorandom Frequency Hopping

DS0980USI uses FHSS technology with 31 hopping frequencies. Each channel frequency is selected from a pseudorandom ordered list of hopping frequencies, from 2406MHz to 2472MHz. A single data frame is transmitted on each frequency location before skipping to the next hopping frequency in the list.

Pseudorandom Frequency Hopping Sequence

This module is controlled by microchip to generate Pseudorandom Frequency Hopping Sequence. eRF normal operation mode support 15 hopping channel/Per Sequence. There are four hopping sequences list as below:

Sequence 1: 2406, 2420, 2422, 2424, 2426, 2428, 2444, 2446, 2448, 2450, 2452, 2456, 2468, 2470, 2472 MHz

Sequence 2: 2406, 2408, 2410, 2412, 2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2438, 2446 MHz

Sequence 3: 2432, 2440, 2448, 2450, 2452, 2454, 2456, 2458, 2460, 2462, 2464, 2466, 2468, 2470, 2472 MHz

Sequence 4: 2406, 2408, 2410, 2412, 2414, 2416, 2418, 2426, 2454, 2462, 2464, 2466, 2468, 2470, 2472 MHz

Requirement for Pseudorandom Hopping Algorithm [Section 15.247 (a1)]:

The channel frequencies shall be selected from a pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on average by the transmitter.



4.6 Band Edge Measurement

Test Requirement:	FCC part 15 section 15.247
Test Date:	2012-03-02
Mode of Operation:	Transmitting mode.
Detector Function:	Max Hold

Result: PASS

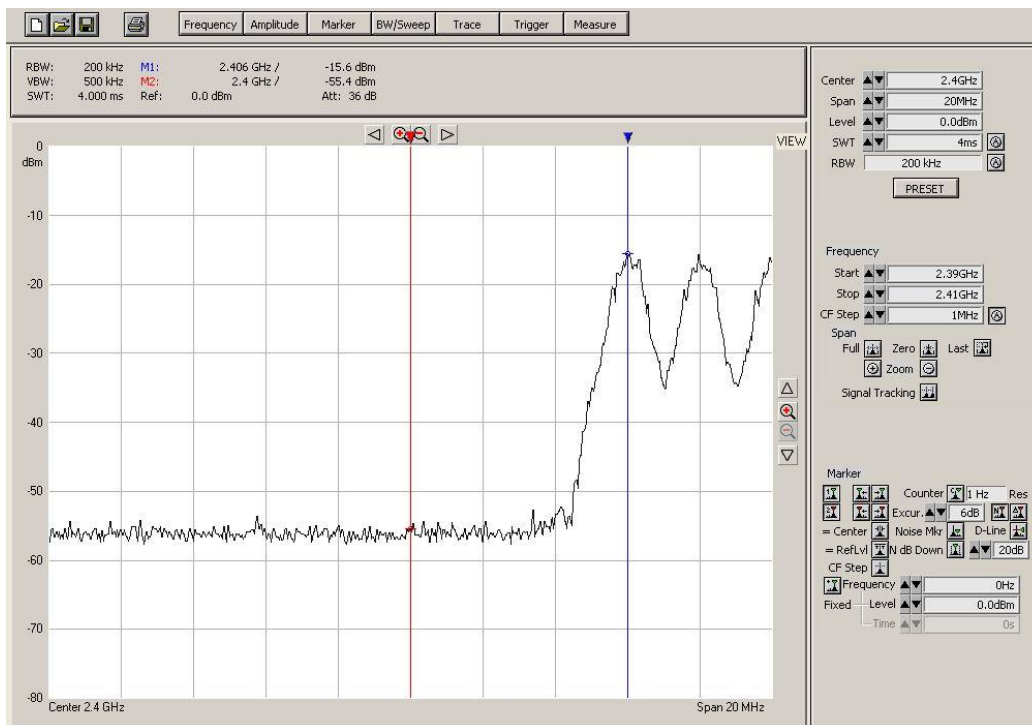
Measured Result :

Refer to the figure, it shows the frequency of lower band edge and upper band edge separately.

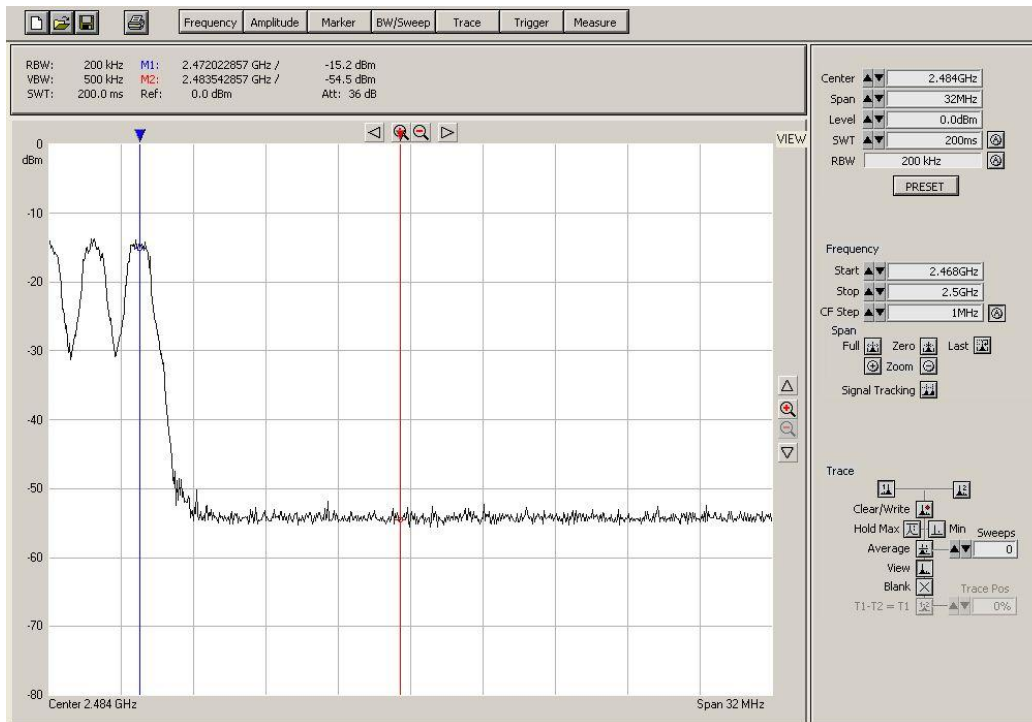
Limits of Band Edge for Carrier Frequencies Operated within the Bands [Section 15.247]:

The carrier frequencies should operate within 2400-2483.5MHz.

Result data graph shows the frequency of lowest channel.



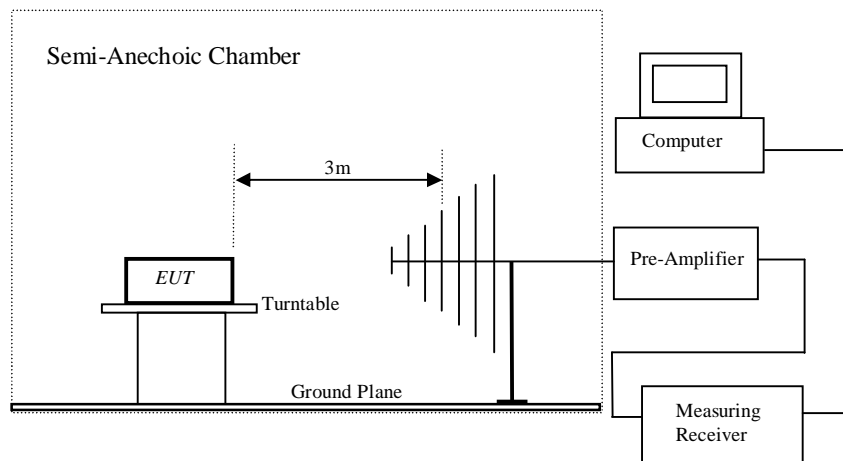
Result data graph shows the frequency of highest channel.



4.7 Maximum Output Power

Test Requirement:	FCC part 15 section 15.247 (a1)
Test Method:	ANSI C63.4:2003
Test Date:	2011-02-28
Mode of Operation:	Transmitting mode.
Detector Function:	Peak
Measurement BW:	RBW 1MHz ; VBW 1MHz

Test Setup:





Result : PASS

Frequency (MHz)	Output Power		Max. Output Power (mW)
	(dBuV/m)	(V/m)	
Lowest Channel : 2406	107.70	0.243	17.70
Middle Channel : 2440	108.07	0.253	19.20
Highest Channel : 2472	108.10	0.254	17.70
Limit	116.20	0.645	125.0

Calculate the transmitter's peak power using the following equation:

$$E = \frac{\sqrt{30PG}}{d}$$

Where: E is the measured maximum fundamental field strength in V/m, utilizing a RBW \geq the 20 dB bandwidth of the emission, VBW > RBW, peak detector function. Follow the procedures in C63.4-2003 with respect to maximizing the emission.

G is the numeric gain of the transmitting antenna with reference to an isotropic radiator. This antenna gain declared by manufacture is 0dBi, antenna is PCB integrated in the actual use. 0dBi logarithmic terms convert to numeric result is nearly 1. So, we apply G =1.0.

d is the distance in meters from which the field strength was measured.

P is the power in watts for which you are solving:

$$P = \frac{(E*d)^2}{30G}$$

Limits for Maximum Output Power [Section 15.247 (a1)(iii)]:

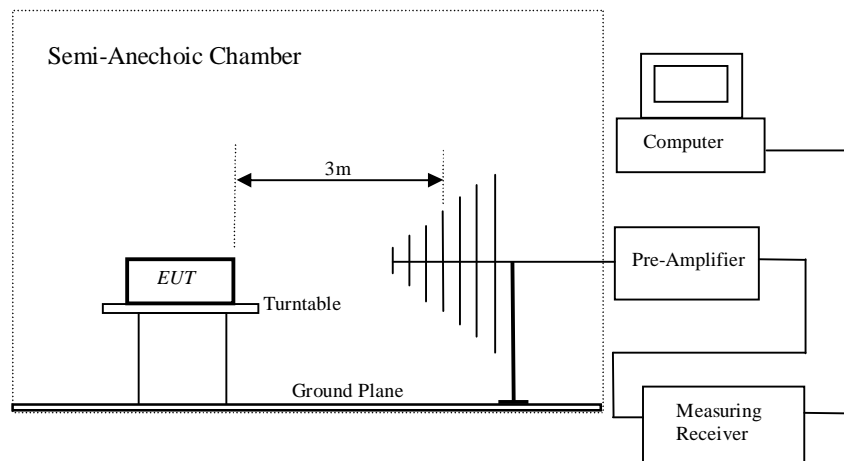
For frequency hopping systems employing at least 75 hopping channels: 1 Watt

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watts

4.8 Out of Band Emissions and Emissions in Restricted Bands

Test Requirement:	FCC part 15 section 15.247 (d)
Test Method:	ANSI C63.4:2003
Test Date:	2012-02-28
Mode of Operation:	Transmitting mode.
Detector Function:	Peak
Measurement BW:	RBW 100KHz ; VBW 300KHz

Test Setup:





Result : PASS

Out of Frequency Band Emissions:

For out of band emissions that are close to or exceed 20dB attenuation requirement, and emission falls into restricted band, radiated emission was performed in order to show compliance with the general radiated emission requirement.

Result Summary:

Refer to the emission data graph, result shows that the significant emissions detected are with more than 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

Limits for Out of Frequency Band Emission [Section 15.247 (d)]:

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. Attenuation below the general limits specified in Section 15.209(a) is not required.

Limit for Radiated Emission Falling in Restricted Bands [Section 15.209]:

Frequency (MHz)	Field Strength [$\mu\text{V/m}$]	Field Strength [dB $\mu\text{V/m}$]
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209.

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.



Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Radiated Emissions							
	Emissions Frequency	E-Field Polarity	Reading	System Factor	Field strength at 3m	Limit	Delta to Limit
	MHz		dBuV/m	dB	dBuV/m	dBuV/m	dBuV/m
Lowest Channel							
PK	*4813.12	V	35.82	5.25	41.07	74.00	-32.93
AV		V	40.41	5.24	45.65	54.00	-8.35
PK	*4813.43	H	35.65	5.25	40.90	74.00	-33.10
AV		H	24.90	5.25	30.15	54.00	-23.85
Middle Channel							
PK	*4871.91	V	37.71	5.46	43.17	74.00	-30.83
AV		V	27.73	5.46	33.19	54.00	-20.81
PK	*4871.93	H	38.83	5.46	44.29	74.00	-29.71
AV		H	27.69	5.46	33.15	54.00	-20.85
Highest Channel							
PK	*4932.55	V	38.51	5.68	44.19	74.00	-29.81
AV		V	29.68	5.68	35.36	54.00	-18.64
PK	*4932.28	H	38.60	5.68	44.28	74.00	-29.72
AV		H	26.97	5.68	32.65	54.00	-21.35
Spurious Emissions							
QP	46.98	V	46.63	-17.09	29.54	40.00	-10.46
QP	73.65	V	48.85	-18.68	30.17	40.00	-9.83
QP	173.08	V	45.15	-17.18	27.97	43.50	-15.53
QP	369.50	V	42.91	-10.13	32.78	46.00	-13.22
QP	633.83	V	39.82	-3.63	36.19	46.00	-9.81
QP	767.20	V	41.85	-2.33	39.52	46.00	-6.48
QP	42.13	H	43.01	-16.68	26.33	40.00	-13.67
QP	76.08	H	43.01	-16.68	26.33	40.00	-13.67
QP	143.98	H	50.07	-17.66	32.41	43.50	-11.09
QP	284.63	H	42.25	-12.37	29.88	46.00	-16.12
QP	466.50	H	39.57	-7.86	31.71	46.00	-14.29
QP	793.88	H	37.86	-1.97	35.89	46.00	-10.11

Refer to Figures shows the worst case channel's emission data graph from 30MHz-26GHz.



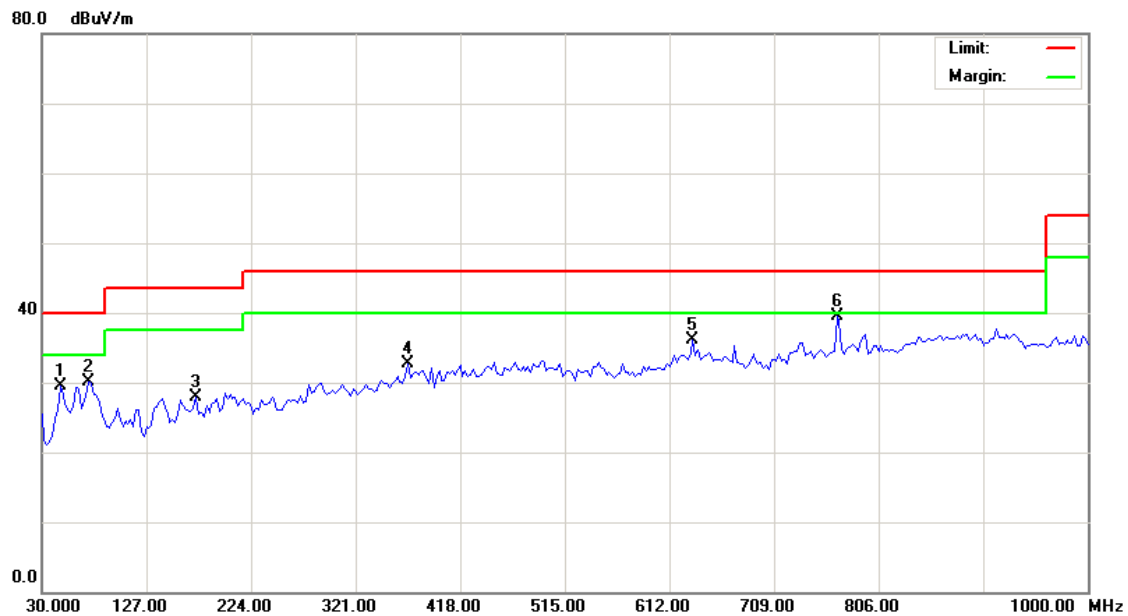
Result Summary:

- 1) Communication mode: All other emissions are more than 20dB below FCC part 15.209 limit.
- 2) No further spurious emissions found between 30 MHz and lowest internal used/generated frequency and from 30MHz to 1GHz.

Remarks:

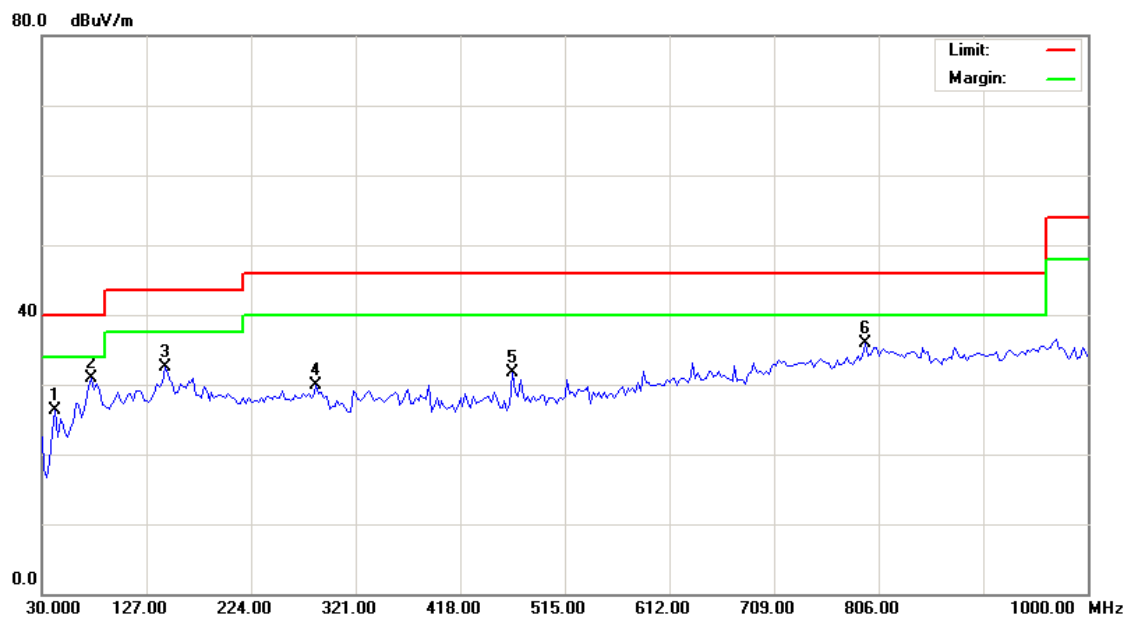
1. “ * ” Radiated emissions which fall in the restricted bands as defined in Section 15.205(a).
2. Emission level with more than 20dB below the FCC required limit is not mentioned in table.
3. Delta to Limit = Field strength (dB μ V/m) – Limit (dB μ V/m).
4. Calculated measurement uncertainty: 9kHz -30MHz: 1.8dB.
30MHz -1GHz: 5.2dB.
1GHz -18GHz: 5.1dB.

Radiated emission data graph (Vertical polarization, 30MHz-1GHz)



Remark: Only background noise was measured from 1GHz-26GHz excluding the operation frequency relational.

Radiated emission data graph (Horizontal polarization, 30MHz-1GHz)



Remark: Only background noise was measured from 1GHz-26GHz excluding the operation frequency relational.



4.9 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC part 15 Section 15.207 Class B
 Test Method: ANSI C63.4:2003
 Test Date: 2012-02-28
 Mode of Operation: -Transmitting mode
 Detector Function: CISPR Quasi Peak
 Measurement BW: 100 kHz
 Worst Case Channel: 1

Results: PASS

- Refer Figures and tables for the result.

Limits for Conducted Emission [Section 15.207]:

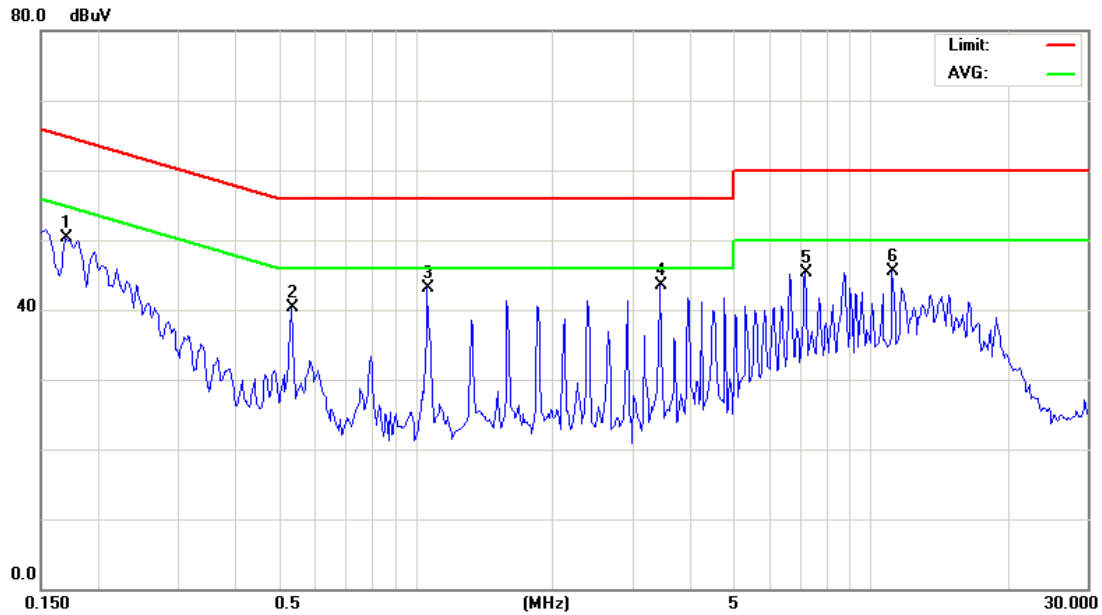
Frequency Range [MHz]	Quasi-Peak Limit [dB μ V]	Average Limit [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Remarks:

Calculated measurement uncertainty: ± 2.8 dB

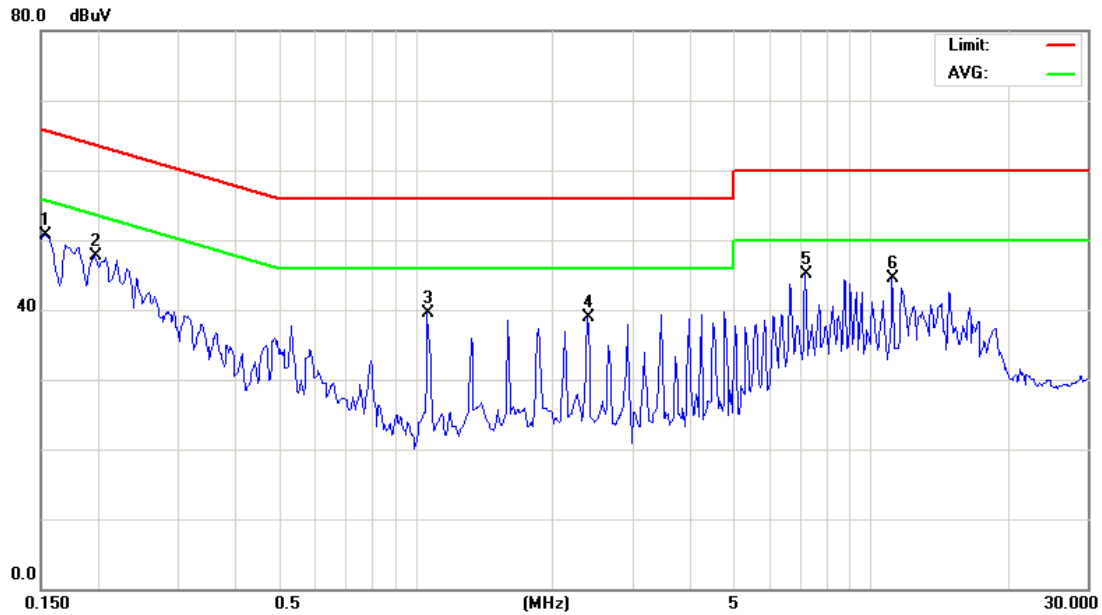
Result data graph shows the conducted emission (Live) with iPod Mode.



Refer to the following table for the result details:

Conducted Emission (iPod Mode)					
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.170	QP	L	50.21	64.98	-14.77
0.533	QP	L	40.39	56.00	-15.61
1.064	QP	L	43.20	56.00	-12.80
3.453	QP	L	43.46	56.00	-12.54
7.176	QP	L	45.30	60.00	-14.70
11.164	QP	L	45.48	60.00	-14.52

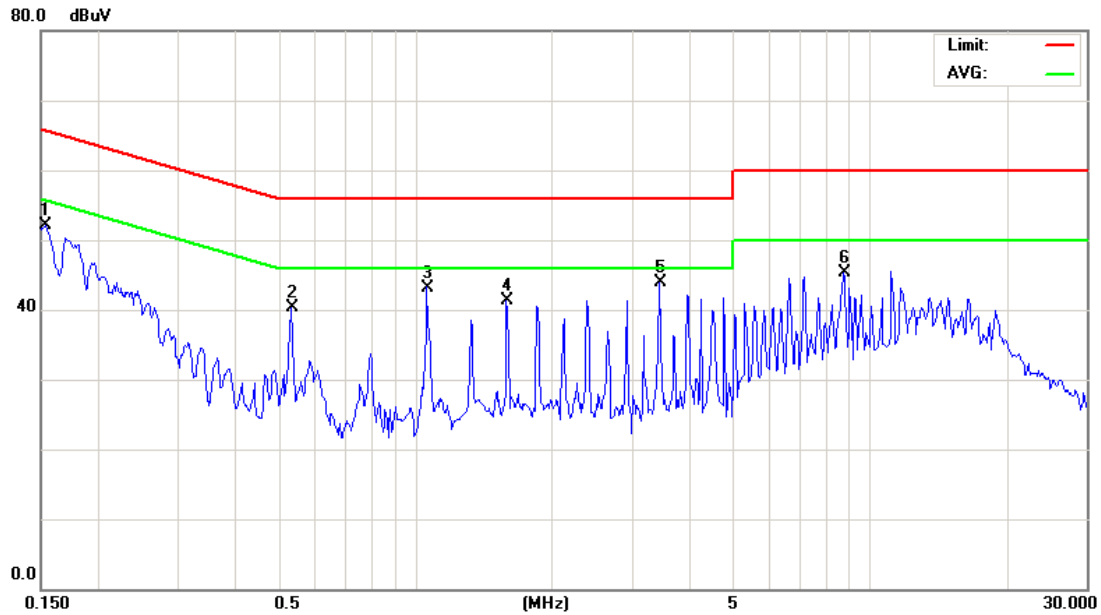
Result data graph shows the conducted emission (Neutral) with iPod Mode.



Refer to the following table for the result details:

Conducted Emission (iPod Mode)					
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.154	QP	N	50.77	65.78	-15.01
0.197	QP	N	47.70	63.74	-16.04
1.064	QP	N	39.58	56.00	-16.42
2.392	QP	N	38.96	56.00	-17.04
7.180	QP	N	45.01	60.00	-14.99
11.172	QP	N	44.50	60.00	-15.50

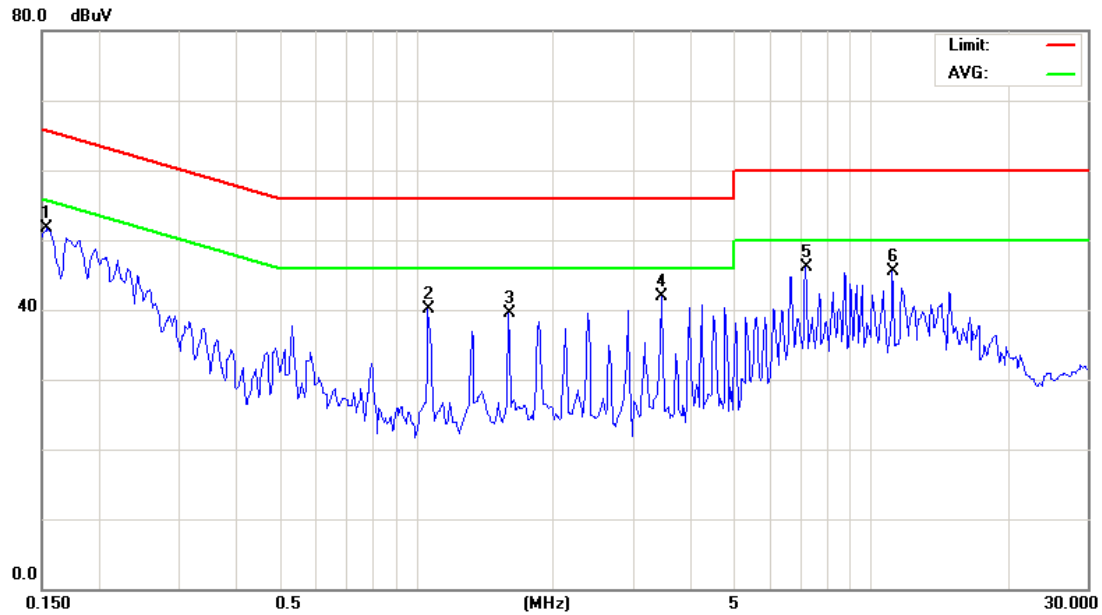
Result data graph shows the conducted emission (Live) with Audio-in Mode.



Refer to the following table for the result details:

Conducted Emission (Audio-in Mode)					
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.154	QP	L	52.07	65.78	-13.71
0.533	QP	L	40.39	56.00	-15.61
1.064	QP	L	43.20	56.00	-12.80
1.591	QP	L	41.30	56.00	-14.70
3.453	QP	L	43.96	56.00	-12.04
8.770	QP	L	45.28	60.00	-14.72

Result data graph shows the conducted emission (Neutral) with Audio-in Mode.



Refer to the following table for the result details:

Conducted Emission (Audio-in Mode)					
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.154	QP	N	51.75	65.78	-14.03
1.064	QP	N	40.08	56.00	-15.92
1.595	QP	N	39.43	56.00	-16.57
3.465	QP	N	41.90	56.00	-14.10
7.179	QP	N	46.01	60.00	-13.99
11.171	QP	N	45.50	60.00	-14.50



5.0 RF Exposure Compliance Requirement

Test Requirement: FCC part 15 section 15.247 (i)
 Test Method: FCC part 15 section 1.1307 (b1)
 OET Bulletin 65, Edition 01-01

Results: PASS

Systems operation under the provision of this section shall be operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the Commission's guideline,

The EUT is considered as a mobile device according to OET Bulletin 65, Edition 01-01, therefore distance to human body of min. 20cm is determined.

Frequency Band:	2.406 GHz ~2.472 GHz
Device Category:	<input type="checkbox"/> Portable (< 20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others :
Exposure Classification:	<input type="checkbox"/> Occupational/ Controlled exposure <input checked="" type="checkbox"/> General Population / Uncontrolled exposure
Max. Output Power	19.20 dBuV
Antenna Gain	0dBi (Numeric gain:1)
Evaluation Applied:	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

MPE calculation:

The radiated (EIRP) = 19.20 mW

The power density at 20cm from the antenna : = $EIRP / 4\pi R^2$
 = 0.00382 mW / cm²

Limits for General Population/Uncontrolled Exposure [OET Bulletin 65, Edition 01-01]:

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30



6.0 List of Measurement Equipment

Radiated Emission and Bandwidth Emissions

Description	Manufacturer	Model no.	Serial no.	CAL due
Test Receiver	R&S	ESCI	100382	26 May 2012
Spectrum Analyzer	Agilent	E4408B	US39240143	26 Nov 2012
Spectrum Analyzer	R&S	FS300	101335	04 Aug 2012
Antenna	Schwarbeck	VULB9160	9160-3232	26 May 2012
Horn Antenna	ETS	3115	00075789	26 May 2012
Amplifier	HP	8447D	2944A09673	26 May 2012
Pre-Amplifier	Agilent	8449B	3008A02274	26 May 2012

Line Conducted

Description	Manufacturer	Model no.	Serial no.	CAL due
LISN	EMCO	3816/2	00052765	26 May 2012
LISN	R&S	ENV216	100087	26 May 2012
EMI Test Receiver	R&S	ESCS30	826547/022	26 May 2012
50 ohm Terminator	SHX	TF2-3G-A	08122902	26 May 2012

N/A Not Applicable or Not Available